

**Global System for Mobile communications (GSM);
Harmonized EN for Base Station Equipment covering
the essential requirements of article 3.2 of
the R&TTE Directive**



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Contents

Intellectual Property Rights	7
Foreword.....	7
Introduction	7
1 Scope	8
2 References	8
2.1 Normative references	8
2.2 Informative references	10
3 Definitions and abbreviations.....	10
3.1 Definitions	10
3.2 Abbreviations	12
4 Technical requirements specifications	13
4.1 Environmental profile.....	13
4.2 Conformance requirements	13
4.2.1 Modulation accuracy.....	14
4.2.1.1 Definition	14
4.2.1.2 Limit.....	14
4.2.1.3 Conformance.....	15
4.2.2 Mean transmitted RF carrier power	15
4.2.2.1 Definition	15
4.2.2.2 Limit.....	15
4.2.2.3 Conformance.....	16
4.2.3 Transmitted RF carrier power versus time.....	16
4.2.3.1 Definition	16
4.2.3.2 Limit.....	16
4.2.3.3 Conformance.....	19
4.2.4 Adjacent channel power.....	19
4.2.4.1 Spectrum due to modulation and wideband noise.....	20
4.2.4.1.1 Definition.....	20
4.2.4.1.2 Limit	20
4.2.4.1.3 Conformance	22
4.2.4.2 Switching transients spectrum.....	22
4.2.4.2.1 Definition.....	22
4.2.4.2.2 Limit	22
4.2.4.2.3 Conformance	22
4.2.5 Spurious emissions from the transmitter antenna connector.....	22
4.2.5.1 Conducted spurious emissions from the transmitter antenna connector, inside the BTS transmit band.....	22
4.2.5.1.1 Definition.....	22
4.2.5.1.2 Limit	22
4.2.5.1.3 Conformance	22
4.2.5.2 Conducted spurious emissions from the transmitter antenna connector, outside the BTS transmit band.....	22
4.2.5.2.1 Definition.....	23
4.2.5.2.2 Limit	23
4.2.5.2.3 Conformance	24
4.2.5.3 Conducted spurious emissions from the transmitter antenna connector, in 3G bands outside the BTS transmit band	24
4.2.5.3.1 Definition.....	24
4.2.5.3.2 Limit	24
4.2.5.3.3 Conformance	24
4.2.6 Intermodulation attenuation	24
4.2.6.1 Definition	24
4.2.6.2 Limit.....	24

4.2.6.2.1	For all BTSs except multicarrier BTS	24
4.2.6.2.2	For multicarrier BTS	25
4.2.6.3	Conformance.....	25
4.2.7	Intra Base Station System intermodulation attenuation	25
4.2.7.1	Definition	25
4.2.7.2	Limit.....	25
4.2.7.2.1	For all BTSs except multicarrier BTS	25
4.2.7.2.2	For multicarrier BTS	25
4.2.7.3	Conformance.....	25
4.2.8	Wideband noise and intra BSS intermodulation attenuation in multicarrier operation.....	25
4.2.8.1	Definition	25
4.2.8.2	Limit.....	26
4.2.9	Static Reference Sensitivity Level	27
4.2.9.1	Definition	27
4.2.9.2	Limit.....	27
4.2.9.3	Conformance.....	30
4.2.10	Multipath Reference Sensitivity Level	30
4.2.10.1	Definition	30
4.2.10.2	Limit.....	30
4.2.10.3	Conformance.....	37
4.2.11	Reference Interference Level.....	37
4.2.11.1	Definition	37
4.2.11.2	Limit.....	38
4.2.11.3	Conformance.....	51
4.2.12	Blocking Characteristics	51
4.2.12.1	Definition	51
4.2.12.2	Limit.....	51
4.2.12.2.1	Blocking	51
4.2.12.2.2	Spurious response	52
4.2.12.3	Conformance.....	52
4.2.13	Intermodulation characteristics.....	52
4.2.13.1	Definition	52
4.2.13.2	Limit.....	53
4.2.13.3	Conformance.....	53
4.2.14	AM suppression	53
4.2.14.1	Definition	53
4.2.14.2	Limit.....	53
4.2.14.3	Conformance.....	53
4.2.15	Spurious emissions from the receiver antenna connector	53
4.2.15.1	Definition	53
4.2.15.2	Limit.....	54
4.2.15.3	Conformance.....	54
4.2.16	Radiated spurious emissions	54
4.2.16.1	Definition	54
4.2.16.2	Limit.....	54
4.2.16.3	Conformance.....	54
5	Testing for compliance with technical requirements.....	54
5.1	Environmental conditions for testing	54
5.2	Interpretation of the measurement results	55
5.3	Essential radio test suites.....	56
5.3.1	Modulation accuracy.....	56
5.3.1.1	Test case.....	56
5.3.1.2	Test Environment.....	57
5.3.2	Mean transmitted RF carrier power	57
5.3.2.1	Test case.....	57
5.3.2.2	Test Environment.....	58
5.3.3	Transmitted RF carrier power versus time.....	58
5.3.3.1	Test case.....	58
5.3.3.2	Test Environment.....	59
5.3.4	Adjacent channel power.....	59
5.3.4.1	Spectrum due to modulation and wideband noise	59

5.3.4.1.1	Test case	59
5.3.4.1.2	Test Environment	60
5.3.4.2	Switching transients spectrum.....	60
5.3.4.2.1	Test case	60
5.3.4.2.2	Test Environment	61
5.3.5	Spurious emissions from the transmitter antenna connector.....	62
5.3.5.1	Conducted spurious emissions from the transmitter antenna connector, inside the BTS transmit band.....	62
5.3.5.1.1	Test case	62
5.3.5.1.2	Test Environment	62
5.3.5.2	Conducted spurious emissions from the transmitter antenna connector, outside the BTS transmit band.....	62
5.3.5.2.1	All base stations except multicarrier BTS	62
5.3.5.2.2	Multicarrier BTS	63
5.3.5.3	Conducted spurious emissions from the transmitter antenna connector, in 3G bands outside the BTS transmit band	65
5.3.5.3.1	Test case	65
5.3.5.3.2	Test Environment	66
5.3.6	Intermodulation attenuation	66
5.3.6.1	Test case.....	66
5.3.6.2	Test Environment.....	68
5.3.7	Intra Base Station System intermodulation attenuation	68
5.3.7.1	Test case.....	68
5.3.7.2	Test Environment.....	69
5.3.8	Wideband noise and intra BSS intermodulation attenuation in multicarrier operation.....	69
5.3.8.1	Test case.....	69
5.3.8.2	Test Environment.....	71
5.3.9	Static reference sensitivity level	71
5.3.9.1	Test case.....	71
5.3.9.2	Test Environment.....	73
5.3.10	Multipath Reference Sensitivity Level	73
5.3.10.1	Test case.....	73
5.3.10.2	Test Environment.....	78
5.3.11	Reference Interference Level.....	78
5.3.11.1	Test case.....	78
5.3.11.2	Test Environment.....	85
5.3.12	Blocking Characteristics	85
5.3.12.1	Test case.....	86
5.3.12.2	Test Environment.....	89
5.3.13	Intermodulation characteristics	89
5.3.13.1	Test case.....	89
5.3.13.2	Test Environment.....	91
5.3.14	AM suppression	91
5.3.14.1	Test case.....	91
5.3.14.2	Test Environment.....	92
5.3.15	Spurious emissions from the receiver antenna connector	92
5.3.15.1	Test case.....	93
5.3.15.2	Test Environment.....	93
5.3.16	Radiated spurious emissions	93
5.3.16.1	Test case.....	94
5.3.16.2	Test Environment.....	95

Annex A (normative):	HS Requirements and conformance Test specifications Table (HS-RTT).....	96
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Annex B (normative):	General test conditions and declarations.....	98
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B.1	Declaration by manufacturer	98
B.1.1	Output power and determination of power class	98
B.1.2	Specified frequency range	98
B.1.3	Frequency hopping	99
B.1.4	RF power control.....	99

B.1.5	Downlink discontinuous transmission (DTX)	99
B.2	BTS Configurations.....	99
B.2.1	Receiver diversity	100
B.2.2	Duplexers	100
B.2.3	Power supply options	101
B.2.4	Ancillary RF amplifiers.....	101
B.2.5	BSS using antenna arrays	101
B.2.6	BTS supporting 8-PSK modulation.....	103
B.2.7	BTS supporting additional modulations in EGPRS2.....	103
B.2.8	Supported Symbol Rate.....	103
B.2.9	Support of RTTI and/or FANR	103
B.2.10	Multicarrier BTS	103
Annex C (normative):	Test environments.....	105
C.1	Normal test environment	105
C.2	Extreme test environment.....	105
C.2.1	Extreme temperature	106
C.3	Vibration.....	106
C.4	Power supply	106
Annex D (informative):	The EN title in the official languages	107
Annex E (informative):	Bibliography.....	108
History		109

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Foreword

This Harmonized European Standard (Telecommunications series) has been produced by ETSI Technical Committee Mobile Standards Group (MSG), and is now submitted for the Vote phase of the ETSI standards Two-step Approval Procedure.

The present document has been produced by ETSI in response to a mandate from the European Commission issued under Council Directive 98/34/EC [i.1] (as amended) laying down a procedure for the provision of information in the field of technical standards and regulations.

The present document is intended to become a Harmonized Standard, the reference of which will be published in the Official Journal of the European Communities referencing the Directive 1999/5/EC [i.2] of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity ("the R&TTE Directive").

The requirements relevant to Directive 1999/5/EC [i.2] are summarized in annex A.

Proposed national transposition dates	
Date of latest announcement of this EN (doa):	3 months after ETSI publication
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	6 months after doa
Date of withdrawal of any conflicting National Standard (dow):	18 months after doa

Introduction

The present document is part of a set of standards developed by ETSI and is designed to fit in a modular structure to cover all radio and telecommunications terminal equipment within the scope of the R&TTE Directive. The modular structure is shown in EG 201 399 [i.3].

Figure 1: Void

1 Scope

The present document applies to the following {radio}{telecommunications terminal} equipment types:

- 1) GSM base stations.

Table 1-1: GSM Base Station System frequency bands

GSM band	Direction of transmission	GSM Base Station System relevant frequency bands
P-GSM 900	Transmit	935 MHz to 960 MHz
	Receive	890 MHz to 915 MHz
E-GSM 900	Transmit	925 MHz to 960 MHz
	Receive	880 MHz to 915 MHz
R-GSM 900	Transmit	921 MHz to 960 MHz
	Receive	876 MHz to 915 MHz
DCS 1 800	Transmit	1 805 MHz to 1 880 MHz
	Receive	1 710 MHz to 1 785 MHz
GSM 450	Transmit	460,4 MHz to 467,6 MHz
	Receive	450,4 MHz to 457,6 MHz
GSM 480	Transmit	488,8 MHz to 496 MHz
	Receive	478,8 MHz to 486 MHz

The present document is intended to cover the provisions of Directive 1999/5/EC [i.2] (R&TTE Directive), article 3.2, which states that "..... radio equipment shall be so constructed that it effectively uses the spectrum allocated to terrestrial/space radio communications and orbital resources so as to avoid harmful interference".

In regards to interference to systems operating in adjacent bands guidance for single carrier BTS and multicarrier BTS is provided in ECC Report 146 [i.4].

In addition to the present document, other ENs that specify technical requirements in respect of essential requirements under other parts of article 3 of the R&TTE Directive [i.2] may apply to equipment within the scope of the present document.

NOTE: A list of such ENs is included on the web site <http://www.newapproach.org>.

2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the reference document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at <http://docbox.etsi.org/Reference>.

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

2.1 Normative references

The following referenced documents are necessary for the application of the present document.

- [1] ETSI TR 121 905 (V8.8.0): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Vocabulary for 3GPP Specifications (3GPP TR 21.905 version 8.8.0 Release 8)".
- [2] ETSI TS 151 021 (V8.7.0): "Digital cellular telecommunications system (Phase 2+); Base Station System (BSS) equipment specification; Radio aspects (3GPP TS 51.021 version 8.7.0 Release 8)".

- [3] ETSI TS 145 002 (V8.0.0): "Digital cellular telecommunications system (Phase 2+); Multiplexing and multiple access on the radio path (3GPP TS 45.002 version 8.0.0 Release 8)".
- [4] ETSI TS 145 004 (V8.0.0): "Digital cellular telecommunications system (Phase 2+); Modulation (3GPP TS 45.004 version 8.0.0 Release 8)".
- [5] ETSI TS 145 005 (V8.9.0): "Digital cellular telecommunications system (Phase 2+); Radio Transmission and reception (3GPP TS 45.005 version 8.9.0 Release 8)".
- [6] Void.
- [7] ETSI TS 145 010 (V8.5.0): "Digital cellular telecommunications system (Phase 2+); Radio subsystem synchronization (3GPP TS 45.010 version 8.5.0 Release 8)".
- [8] ETSI TS 144 060 (V8.9.0): "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Mobile Station (MS) - Base Station System (BSS) interface; Radio Link Control/Medium Access Control (RLC/MAC) protocol (3GPP TS 44.060 version 8.9.0 Release 8)".
- [9] ETSI TR 100 028 (all parts) (V1.4.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics".
- [10] ETSI EN 300 019-1 (V2.1.2): "Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 1-0: Classification of environmental conditions; Introduction".
- [11] ETSI EN 300 019-1-3 (V2.3.2): "Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 1-3: Classification of environmental conditions; Stationary use at weatherprotected locations".
- [12] ETSI EN 300 019-1-4 (V2.1.2): "Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 1-4: Classification of environmental conditions; Stationary use at non-weatherprotected locations".
- [13] IEC 60068-2 (2007): "Environmental testing procedures; Part 2: Tests".
- [14] IEC 60721 (2002): "Classification of environmental conditions".
- [15] ETSI TS 124 022 (V8.0.0): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Radio Link Protocol (RLP) for circuit switched bearer and teleservices (3GPP TS 24.022 version 8.0.0 Release 8)".
- [16] ETSI TS 148 020 (V8.0.0): "Digital cellular telecommunications system (Phase 2+); Rate Adaptation on the Base Station System - Mobile Service Switching Centre (BSS-MSC) Interface (3GPP TS 48.020 version 8.0.0 Release 8)".
- [17] ITU-T Recommendation O.153 (1992): "Basic Parameters for the measurement of error performance at bit rates below the primary rate".
- [18] ITU-R Recommendation SM.329-10 (2003): "Unwanted emissions in the spurious domain".
- [19] ETSI TS 145 001 (V8.1.0): "Digital cellular telecommunications system (Phase 2+); Physical layer on the radio path; General description (3GPP TS 45.001 version 8.1.0 Release 8)".
- [20] ITU-T Recommendation O.151 (1992): "Error performance measuring equipment operating at the primary rate and above".
- [21] CEPT/ERC/RECOMMENDATION 74-01E: "Unwanted emissions in the spurious domain".

2.2 Informative references

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

- [i.1] Directive 98/34/EC of the European Parliament and of the Council of 22 June 1998 laying down a procedure for the provision of information in the field of technical standards and regulations.
- [i.2] Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity (R&TTE Directive).
- [i.3] ETSI EG 201 399: "Electromagnetic compatibility and Radio spectrum Matters (ERM); A guide to the production of Harmonized Standards for application under the R&TTE Directive".
- [i.4] ECC Report 146: "Compatibility between GSM MCBTS and other services (TRR, RSBN/PRMG, HC-SDMA, GSM-R, DME, MIDS, DECT) operating in the 900 and 1800 MHz frequency bands", 6th July 2010.
- [i.5] ETSI EN 301 908-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 Third-Generation cellular networks; Part 1: Harmonized EN for IMT-2000, introduction and common requirements, covering the essential requirements of article 3.2 of the R&TTE Directive".
- [i.6] ETSI EN 301 908-18: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 Third-Generation cellular networks; Part 18: Harmonized EN for E-UTRA, UTRA and GSM/EDGE Multi-Standard Radio (MSR) Base Station (BS) covering the essential requirements of article 3.2 of the R&TTE Directive".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 121 905 [1] and the following apply:

8-PSK: modulation type as defined in TS 145 004 [4], clause 3

16-QAM: modulation type as defined in TS 145 004 [4], clause 4 for EGPRS2-A and clause 5 for EGRPS2-B

32-QAM: modulation type as defined in TS 145 004 [4], clause 4 for EGPRS2-A and clause 5 for EGRPS2-B

ancillary RF amplifier: piece of equipment, which when connected by RF coaxial cables to the BTS, has the primary function to provide amplification between the transmit and/or receive antenna connector of a BTS and an antenna without requiring any control signal to fulfil its amplifying function

base station RF bandwidth: instantaneous bandwidth in which a multicarrier BTS transmits or transmits and receives multiple carriers simultaneously

BSS: in the present document, the term BSS (or base station subsystem) applies to both a BTS and integrated BSS

NOTE: If a separate BSC is required to perform tests on a BTS, the BSC may be regarded as test equipment and the environmental conditions of the BSC need not be controlled.

Base Station System Test Equipment (BSSTE): See annex B in TS 151 021 [2].

carrier frequency: centre of the ARFCN under test

circuit switched logical channels: all the standard GSM logical channels, including traffic channels (TCH), common control channels (RACH) and dedicated control channels (SDCCH, SACCH)

E-GSM: extended GSM 900 band (includes P-GSM band)

ECSD: any subset of the E-TCH traffic channels and related control channels

EGPRS: any subset of the packet traffic channels PDTCH/MCS-1 to MCS-9 and related control channels

EGPRS2: any of EGPRS2-A and EGPRS2-B

EGPRS2-A: packet traffic channels utilizing any subset of the packet traffic channels MCS-1 to 6 and PDTCH/UAS-7 to UAS-11 in uplink, together with MCS-1 to 4 and PDTCH/DAS-5 to DAS-12 in downlink, and related control channels

NOTE In addition, MCS-7 and MCS-8 may be used in downlink when either the USF or the PAN or both are addressed to one or more EGPRS mobile stations.

EGPRS2-B: packet traffic channels utilizing any subset of the packet traffic channels MCS-1 to 4 and PDTCH/UBS-5 to UBS-12 in uplink, together with MCS-1 to 4 and PDTCH/DBS-5 to DBS-12 in downlink, and related control channels

NOTE: In addition, MCS-6 to MCS-9, DAS-5, DAS-6, DAS-8, DAS-9, DAS-10 pad, DAS-11, and DAS-12pad may be used in downlink under the conditions specified in TS 144 060 [8].

environmental profile: range of environmental conditions under which equipment within the scope of the present document is required to comply with the provisions of the present document

GMSK: modulation type as defined by TS 145 004 [4], clause 2

GPRS: any subset of the packet traffic channels PDTCH/CS-1 to CS-4 and related control channels

GSM: unless otherwise specified, references to GSM include GSM 400, GSM 900 and DCS1800

GSM 400: unless otherwise specified, references to GSM 400 include GSM 450 and GSM 480 band

GSM 900: unless otherwise specified, references to GSM 900 include P-GSM, E-GSM and R-GSM band

manufacturer: in the present document, a reference to a manufacturer shall also apply to an agent of the manufacturer

maximum base station RF bandwidth: maximum bandwidth in which a multicarrier BTS transmits or transmits and receives multiple carriers simultaneously

maximum transmit filter bandwidth: maximum bandwidth of the duplexer or the transmit filter used in a multicarrier BTS transmitting carriers simultaneously

micro-BTS: low-power BTS with performance requirements defined in TS 145 005 [5]

NOTE: In the present document, this also includes a BSS which incorporates a micro-BTS.

multicarrier BTS: class of BTS, characterized by the ability to, in addition to single carrier operation, process two or more carriers in common active components simultaneously, either in multicarrier transmitter only or, in both multicarrier transmitter and multicarrier receiver

normal BTS: any BTS or BSS as defined by TS 145 005 [5] which is not a micro-BTS or pico-BTS

operating band: transmit and receive operating bands together comprise the frequency band supported by the BSS

NOTE: As defined in clause B.1.2.

P-GSM: primary GSM 900 band

packet switched logical channels: all the General Packet Radio Services (GPRS) packet data logical channels, including packet traffic channels (PDTCH and PACCH) and packet common control channels (PRACH)

pico-BTS: low-power BTs with performance requirements defined in TS 145 005 [5]

NOTE: In the present document, this also includes a BSS which incorporates a pico-BTS.

QPSK: modulation type as defined TS 145 004 clause 5 [4], used in EGPRS2-B

R-GSM: Railways GSM 900 band (includes P-GSM band and E-GSM band)

relevant RX band (or relevant receive band): receive band for the frequency band of BTS declared by the manufacturer

NOTE: As defined in clause 1.

relevant TX band (or relevant transmit band): transmit band for the frequency band of BTS declared by the manufacturer

NOTE: As defined in clause 1.

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in TR 121 905 [1] and the following apply:

AGC	Automatic Gain Control
AMR	Adaptive Multi-rate
AMR-WB	Adaptive - Wideband
ARFCN	Absolute Radio Frequency Channel Number
B	Bottom
BCCH	Broadcast Control Channel
BER	Bit Error Ratio
BLER	BLock Error Ratio
BSC	Base Station Controller
BSS	Base Station System
BSSTE	Base Station System Test Equipment
BTS	Base Transceiver Station
BTTI	Basic Transmission Time Interval
BW	Bandwidth
DAS	EGPRS2 Downlink Level A modulation and coding Scheme
DBS	EGPRS2 Downlink Level B modulation and coding Scheme
DC	Direct Current
DCS	Digital Cellular System
ECSD	Enhanced Circuit Switched Data
EGPRS	Enhanced GPRS
EGPRS2	Enhanced GPRS phase 2
ESIDR	Erased SID frame Rate
E-TCH	Enhanced Traffic Channel
EVM	Error Vector Magnitude
EVRFR	Erased Valid RATSCCH Frame Rate
EVSIDR	Erased Valid SID frame Rate
EVSIDUR	Erased Valid SID_UPDATE frame Rate associated to an adaptive speech traffic channel
FANR	Fast Ack/Nack Reporting
FER	Frame Erasure Ratio
GMSK	Gaussian Minimum Shift Keying
GPRS	General Packet Radio Service
IM	InterModulation
M	Middle
MCBTS	multicarrier BTS
MFS	Multipath Fading Simulator
MSC	Mobile service Switching Centre
MSE	Mean Square Error
O-FACCH	Octal Fast Associated Control Channel
PAN	Piggy-backed Ack/Nack message
PDTCH	Packet Data Traffic Channel
PSK	Phase Shift Keying
RACH	Random Access Channel
RBER	Residual Bit Error Ratio
RF	Radio Frequency
RTTI	Reduced Transmission Time Interval
RX	Reception
SACCH	Slow associated Control Channel
SDCCH	Stand alone Dedicated Control Channel

SFH	Slow Frequency Hopping
T	Top
TCH	Traffic Channel
TRX	Transceiver
TSC	Training Sequence Code
TX	Transmission
UAS	EGPRS2 Uplink level A modulation and coding Scheme
UBS	EGPRS2 Uplink level B modulation and coding Scheme
UFR	Unreliable Frame Rate
WFS	Wideband AMR full rate codec based on GMSK

4 Technical requirements specifications

4.1 Environmental profile

The technical requirements of the present document apply under the environmental profile for operation of the equipment, which shall be declared by the supplier. The equipment shall comply with all the technical requirements of the present document at all times when operating within the boundary limits of the declared operational environmental profile.

For guidance on how a supplier can declare the environmental profile see annex C.

4.2 Conformance requirements

Support of certain functions of a BTS are optional in the GSM specifications. When specified in a test, the manufacturer shall declare the nominal value of a parameter, or whether an option is supported. A summary of such functions are included in annex B.

For a multicarrier BTS additionally conforming to EN 301 908-1 [i.5] and EN 301 908-18 [i.6], conformance with the technical requirements listed in table 4.2-1 can equally be demonstrated through the corresponding technical requirements and test suites in EN 301 908-1 [i.5] and EN 301 908-18 [i.6], as listed in table 4.2-1.

When conformance is demonstrated through the test suites in EN 301 908-1 [i.5] and EN 301 908-18 [i.6] for these technical requirements, the corresponding test suites in the present document need not be performed.

Table 4.2-1: Alternative technical requirements and test suites in EN 301 908-1 [i.5] and EN 301 908-18 [i.6] that can equally be used for demonstrating conformance for MCBTS

Technical requirement in the present document	Corresponding technical requirements in EN 301 908	Corresponding test suites in EN 301 908
4.2.5.2 Conducted spurious emissions from the transmitter antenna connector, outside the BTS transmit band (Note 1)	4.2.4 Transmitter spurious emissions (in EN 301 908-18 [i.6])	5.3.3 Transmitter spurious emissions (in EN 301 908-18 [i.6])
4.2.5.3 Conducted spurious emissions from the transmitter antenna connector, in 3G bands outside the BTS transmit band	4.2.4 Transmitter spurious emissions (in EN 301 908-18 [i.6])	5.3.3 Transmitter spurious emissions (in EN 301 908-18 [i.6])
4.2.12 Blocking Characteristics (Note 2)	4.2.9 Out-of-band blocking (in EN 301 908-18 [i.6])	5.3.8 Out-of-band blocking (in EN 301 908-18 [i.6])
4.2.15 Spurious emissions from the receiver antenna connector	4.2.7 Receiver spurious emissions (in EN 301 908-18 [i.6])	5.3.6 Receiver spurious emissions (in EN 301 908-18 [i.6])
4.2.16 Radiated spurious emissions	4.2.3 Radiated emissions (BS and repeater) (in EN 301 908-1 [i.5])	5.3.2 Radiated emissions (BS and repeater) (in EN 301 908-1 [i.5])
NOTE 1: Applicable for frequency offsets larger than 10 MHz outside the relevant transmit band.		
NOTE 2: Applicable for frequency offsets outside the relevant inband frequencies, as defined in table 5.12-2 in the present document.		

4.2.1 Modulation accuracy

4.2.1.1 Definition

GMSK modulation

When transmitting a burst, the modulation accuracy is defined by the phase accuracy of the signal, relative to the theoretical modulated waveforms as specified in TS 145 004 [4]. The phase error trajectory on the useful part of the burst (including tail bits), shall be measured by computing the difference between the phase of the transmitted waveform and the phase of the expected one.

8-PSK, QPSK, 16-QAM and 32-QAM modulation

When transmitting a burst, the modulation accuracy is defined by the error vector between the vector representing the actual transmitted signal and the vector representing the error-free modulated signal as specified in TS 145 004 [4]. The magnitude of the error vector is called Error Vector Magnitude (EVM). The magnitude of the error vector shall be computed by measuring the error vector between the vector representing the transmitted waveform and the vector representing the ideal one on the useful part of the burst (excluding tail symbols).

The purpose of the test to measure against modulation accuracy requirements is:

- 1) To verify the correct implementation of the pulse shaping filtering.
- 2) To verify that at GMSK modulation the phase error during the active part of the time slot does not exceed the specified limits under normal and extreme test conditions and when subjected to vibration.
- 3) To verify that the frequency error during the active part of the time slot does not exceed the specified limits under normal and extreme test conditions and when subjected to vibration.
- 4) To verify that at supported modulations 8-PSK, QPSK, 16-QAM and 32-QAM the Error Vector Magnitude (EVM) and the origin offset during the active part of the time slot do not exceed the specified limits under normal and extreme test conditions and when subjected to vibration.

4.2.1.2 Limit

GMSK modulation

The phase error shall not exceed:

- 5 degrees rms.
- 20 degrees peak.

For normal and micro BTSs the mean frequency error across the burst shall not exceed:

- 0,05 ppm.

For pico BTSs the mean frequency error across the burst shall not exceed:

- 0,1 ppm.

Higher order modulation

The RMS EVM values, measured after any active element and excluding the effect of passive combining equipment, shall not exceed:

	Normal symbol rate			Higher symbol rate		
	8-PSK	16-QAM	32-QAM	QPSK	16-QAM	32-QAM
under normal conditions	7,0 %	5,0 %	5,0 %	7,0 %	4,0 %	4,0 %
under extreme conditions	8,0 %	6,0 %	6,0 %	8,0 %	5,0 %	5,0 %

The RMS EVM values, measured after any active element and including the effect of passive combining equipment, shall not exceed:

	Normal symbol rate			Higher symbol rate		
	8-PSK	16-QAM	32-QAM	QPSK	16-QAM	32-QAM
under normal conditions	8,0 %	6,0 %	6,0 %	8,0 %	5,5 %	5,5 %
under extreme conditions	9,0 %	7,0 %	7,0 %	9,0 %	6,5 %	6,5 %

The origin offset suppression shall exceed:

- 35 dB.

For normal and micro BTSs the frequency offset shall not exceed:

- 0,05 ppm.

For pico BTSs the frequency offset shall not exceed:

- 0,1 ppm.

The peak EVM values, excluding the effect of passive combining equipment, shall not exceed:

- 22 %.

The 95:th percentile EVM value, excluding the effect of passive combining equipment, shall not exceed:

- 11 %.

4.2.1.3 Conformance

Conformance tests described in clause 5.3.1 shall be carried out.

4.2.2 Mean transmitted RF carrier power

4.2.2.1 Definition

For GMSK modulation, the mean transmitted RF carrier power refers to the measure of the power when averaged over the useful part of the burst (see TS 145 004 [4]).

For QPSK, 8-PSK, 16-QAM and 32-QAM modulation, the mean transmitted RF carrier power refers to a measure that, with sufficient accuracy, is equivalent to the long term average of the power when taken over the useful part of the burst as specified in TS 145 002 [3] with any fixed TSC and with random encrypted bits.

The purpose of the test to measure against mean transmitted RF carrier power requirements is:

- To verify the accuracy of the mean transmitted RF carrier power across the frequency range and at each power step.

4.2.2.2 Limit

The BSS shall support N_{max} steps of Static Power Control for each supported modulation with respect to the declared output power as declared by the manufacture. For the modulation with the highest output power, N_{max} shall be at least 6.

The static power step N has the range from the highest static power level to N_{max} inclusive, where:

- The Highest Static Power Level corresponds to the maximum single carrier output power declared by the manufacturer. For multicarrier BTS, the Highest Static Power Level corresponds to maximum output power per carrier for each supported number of carriers declared by the manufacturer.
- The Lowest Static Power Level is defined as the Highest Static Power Level reduced by N_{max} power steps, where the number of power steps can be different for each supported modulation.

The power measured when the TRX is set to Highest Static Power Control Level shall have a tolerance of ± 2 dB under normal conditions and $\pm 2,5$ dB under extreme conditions, relative to the maximum power declared by the manufacturer for the modulation under test. In this test, this measured power is termed the maximum BTS output power. Static power control shall allow the RF output power to be reduced from the maximum BTS output power for the modulation with the highest output power capability in at least 6 steps of nominally 2 dB with a tolerance of ± 1 dB for each modulation referenced to the previous level of the same modulation. In addition, the actual absolute output power for each supported modulation at each static RF power step (N), with the exception below for the highest RF power level for 8-PSK, shall be $2 \cdot N$ dB below the maximum BTS output power for the modulation with the highest output power capability with a tolerance of ± 3 dB under normal conditions and ± 4 dB under extreme conditions.

In addition to the Static Power Control levels the BSS may utilize up to M steps of dynamic Downlink Power Control. M can have an upper limit of 0 to 15.

Dynamic Downlink power control shall allow the RF output power to be reduced in M steps with a step size of 2 dB with a tolerance of $\pm 1,5$ dB referenced to the previous level.

Each dynamic Downlink Power Control level shall have a tolerance of ± 3 dB under normal conditions and ± 4 dB under extreme conditions relative to $2 \cdot Y$ dB below the maximum BTS output power for the modulation with the highest output power capability, where Y is the sum of the number of static and dynamic steps below Highest Static Power Control Level for the modulation with the highest output power capability.

For BTS supporting 8-PSK, QPSK, 16-QAM and/or 32-QAM the output power for GMSK, 8-PSK, QPSK, 16-QAM and/or 32-QAM shall be nominally the same for any supported static and dynamic power control level. An exception is allowed for the maximum output power of the respective modulation QPSK, 8-PSK, 16-QAM and/or 32-QAM, which may be lower than the GMSK output power for the same static or dynamic power control level. The nominal size of the first step down from the respective maximum power level of QPSK, 8-PSK, 16-QAM and 32-QAM may be in the range 0 to 2 dB. The output power of QPSK, 8-PSK, 16-QAM and 32-QAM for the respective second highest static or dynamic power control level shall be the same as the GMSK power for the corresponding static or dynamic power control level within a tolerance of ± 1 dB. The number of static RF power steps and the total number of power control steps may be different for GMSK and other supported modulations (8-PSK, QPSK, 16-QAM and 32-QAM).

4.2.2.3 Conformance

Conformance tests described in clause 5.3.2 shall be carried out.

4.2.3 Transmitted RF carrier power versus time

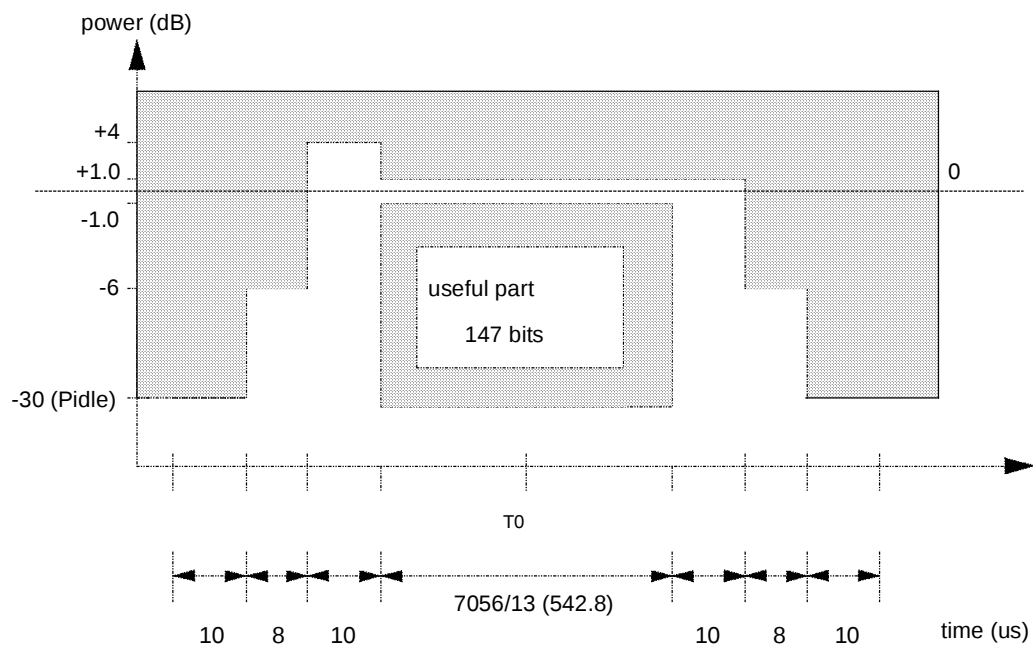
4.2.3.1 Definition

The purpose of the test to measure against the transmitted RF carrier power versus time requirements is to verify:

- 1) the time during which the transmitted power envelope should be stable (the useful part of the time slot);
- 2) the stability limits;
- 3) the maximum output power when nominally off between time slots.

4.2.3.2 Limit

The output power of each time slot tested relative to time shall conform with that illustrated in figures 4.2.3-1 and, if other modulations are supported, 4.2.3-2, 4.2.3-3, 4.2.3-4 and 4.2.3-5. The residual output power, if a time slot is not activated, shall be maintained at, or below, the level of -30 dBc (300 kHz measurement bandwidth).



147 bits = 542.8 us = 7056/13 us

1 timeslot = 576.9 us = 156.25 bits

Figure 4.2.3-1: Power/time mask for power ramping of normal bursts at GMSK modulation

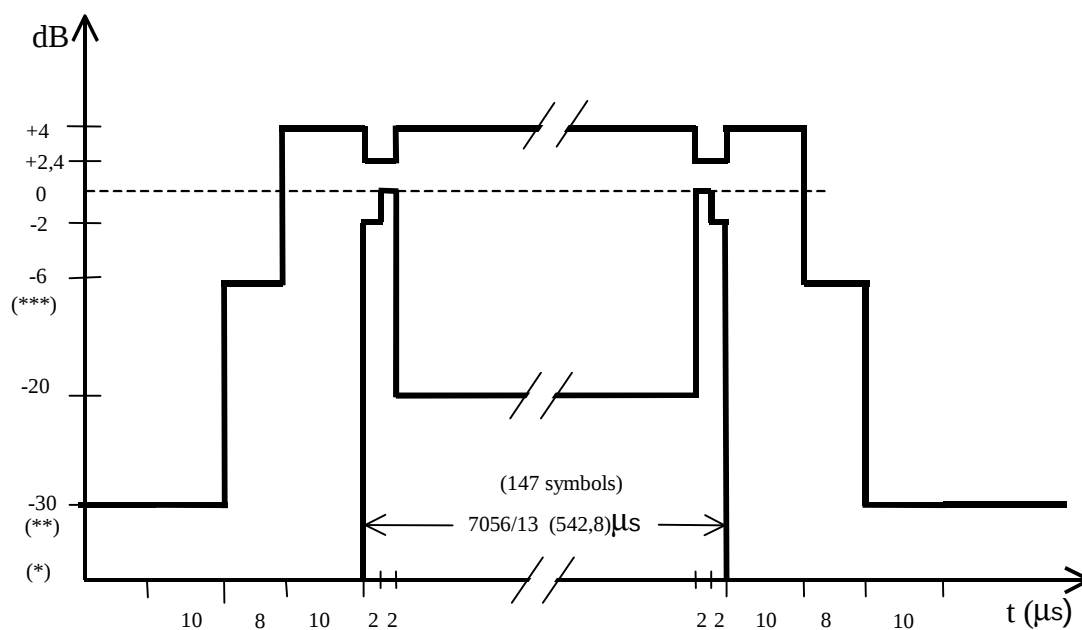


Figure 4.2.3-2: Power/time mask for power ramping of normal bursts at 8-PSK modulation

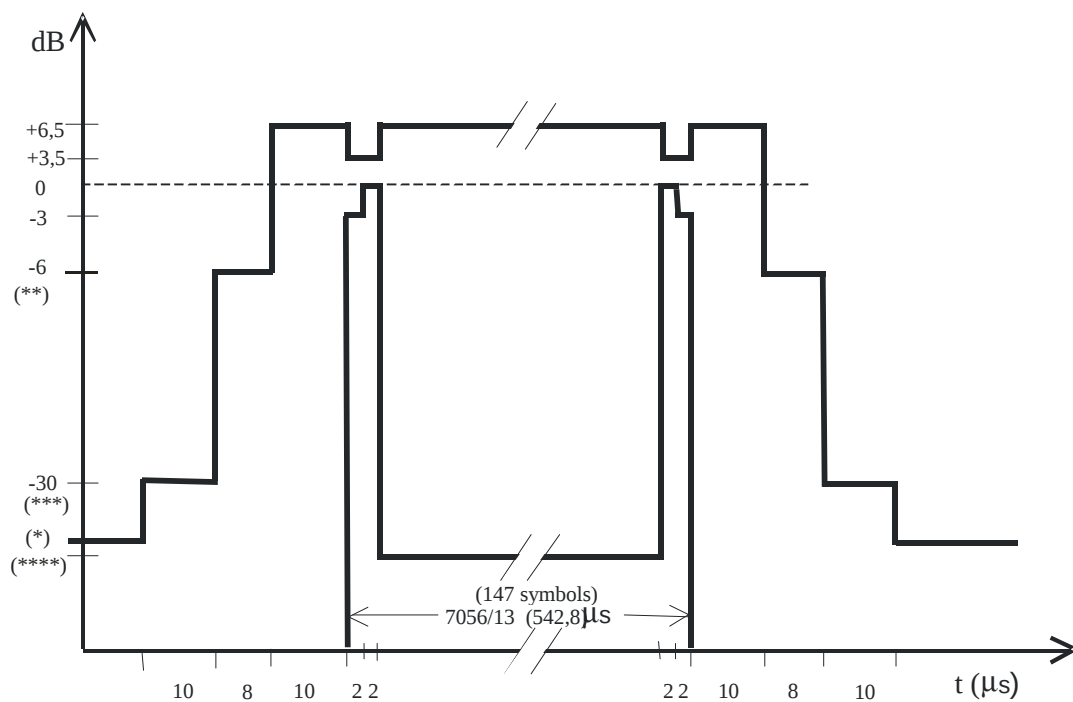


Figure 4.2.3-3: Power/Time mask for normal bursts (NB) at 16-QAM and 32-QAM modulation at normal symbol rate

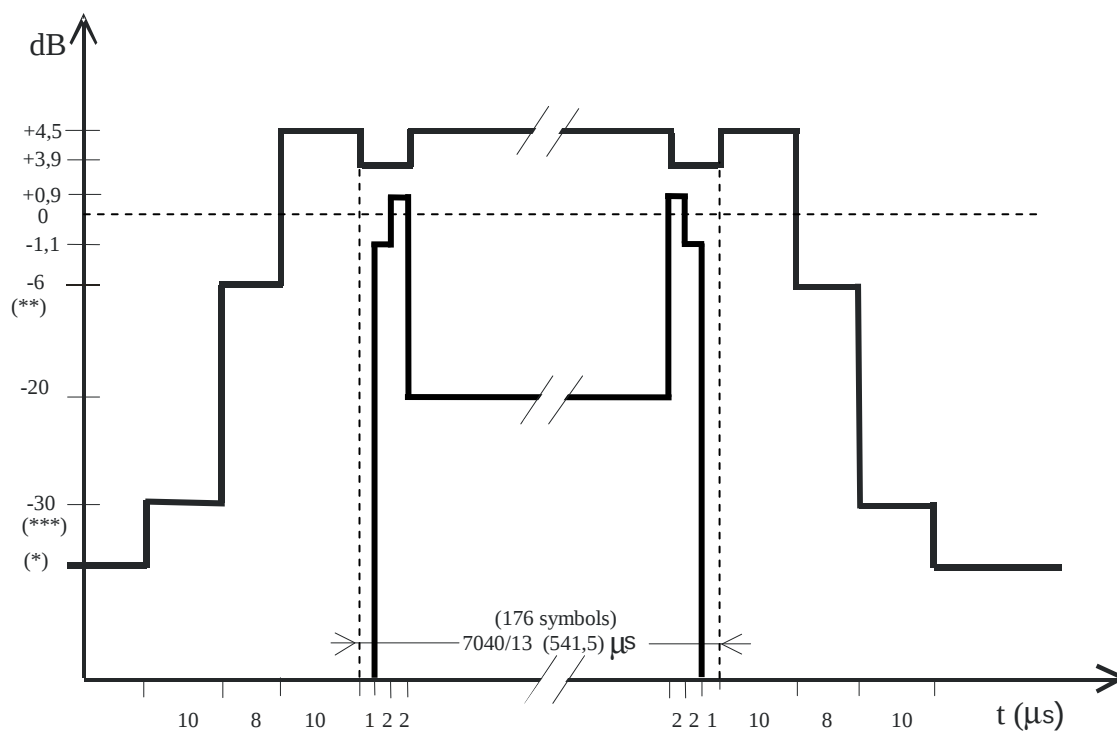
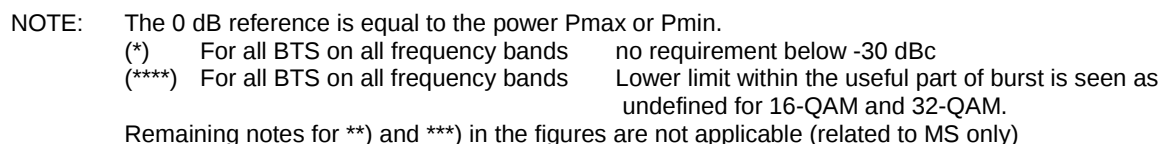


Figure 4.2.3-4: Power/Time mask for higher symbol rate bursts (HB) at QPSK modulation with narrow pulse shaping filter



4.2.3.3 Conformance

4.2.4 Adjacent channel power

- 1) continuous modulation spectrum and wideband noise;
- 2) switching transients spectrum.

4.2.4.1 Spectrum due to modulation and wideband noise

4.2.4.1.1 Definition

The purpose of the test to measure against spectrum due to modulation and wideband noise requirements is to verify that the output RF spectrum due to modulation and wideband noise does not exceed the specified levels for an individual transceiver.

4.2.4.1.2 Limit

4.2.4.1.2.1 Normal BTS and multicarrier BTS

The test shall be performed for one TRX. In case of a multicarrier BTS the test is performed for each transmitting antenna connector.

For each static power step, the power measured in steps d) to g) of the test cases shall not exceed the limits shown in table 4.2.4-1 for the power level measured in step b), except where one or more of the following exceptions and minimum measurement levels applies:

- 1) For a GSM 400 or GSM900 BTS, if the limit according to table 4.2.4-1 is below -65 dBm, a value of -65 dBm shall be used instead.
- 2) For a DCS 1 800 BTS, if the limit according to table 4.2.4-1 is below -57 dBm, a value of -57 dBm shall be used instead.
- 3) In the combined range 600 kHz to 6 MHz above and below the carrier frequency, in up to three bands of 200 kHz width centred on a frequency which is an integer multiple of 200 kHz, exceptions at up to -36 dBm are allowed.
- 4) Above 6 MHz offset from the carrier frequency, in up to 12 bands of 200 kHz width centred on a frequency which is an integer multiple of 200 kHz, exceptions at up to -36 dBm are allowed.
- 5) In case of multicarrier BTS operating with one carrier, the level and number of allowable exceptions up to 10 MHz outside the relevant transmit band as defined in clause 4.2.8 using N= 1 apply.
- 6) In case of multicarrier BTS for all applicable frequency bands, if the limit according to table 4.2.4-1 is below -47 dBm, this value shall be used instead.

Table 4.2.4-1: Continuous modulation spectrum - maximum limits for BTS

	Power level (dBm) as measured in step b)	Maximum relative level (dB) at specified carrier offsets (kHz), using specified measurement (filter) bandwidths (kHz):							
		100	200	250	400	600 to < 1 200	1 200 to < 1 800	1 800 to < 6 000	> 6 000
		Measurement (filter) bandwidth; 30 kHz						Measurement (filter) bandwidth; 100 kHz	
Case 1	≥ 43	+0,5	-30	-33	-60*	-70	-73	-75	-80
	41	+0,5	-30	-33	-60*	-68	-71	-73	-80
	39	+0,5	-30	-33	-60*	-66	-69	-71	-80
	37	+0,5	-30	-33	-60*	-64	-67	-69	-80
	35	+0,5	-30	-33	-60*	-62	-65	-67	-80
	≤ 33	+0,5	-30	-33	-60*	-60	-63	-65	-80
NOTE:		For equipment supporting QPSK, 8-PSK, 16-QAM or 32-QAM, at normal symbol rate, the requirement at these modulations is -56 dB.							

The requirements are specified, depending on symbol-rate and pulse-shaping filter used:

- Case 1: Normal symbol rate using linearised GMSK pulse-shaping filter and higher symbol rate using spectrally narrow pulse shaping filter.

For definition of pulse-shaping filters, see TS 145 004 [4]. The spectrally narrow pulse shaping filter in Case 1 is in the present document referred to as narrow pulse shaping filter.

The limit values in table 4.2.4-1, at the listed offsets from carrier frequency (kHz), are the ratio of the measured power to the measured power in step c) for the same static power step.

Table 4.2.4-1 provides requirements at discrete power levels. For powers between those specified, linear interpolation should be applied.

Micro and Pico-BTS Conformance requirement

The test shall be performed for one TRX.

For each static power step, the power measures in steps d) and e) of the test case shall not exceed the limits shown in table 4.2.4-1 for the power level measured in step b), except where one or more of the micro or pico-BTS exceptions and minimum measurement levels applies.

For each static power step, the ratio of the power measured in steps f) and g) of the test case to the power measured in step c) for the same static power step shall not exceed the limits specified in table 4.2.4-2 for GSM 900 and 4.2.4-3 for DCS 1 800 systems, except where one or more of the micro or pico-BTS exceptions and minimum measurement levels applies.

Table 4.2.4-2: Continuous modulation spectrum - maximum limits for GSM900 Micro and Pico-BTS

Power Class		Maximum relative level (dB) at specified carrier offsets (kHz), using specified measurement (filter) bandwidths (kHz):	
		1 800 to < 6 000	> 6 000
		Measurement (filter) bandwidth; 100 kHz	
M1 to M3	Case 1	-70	-70
P1	Case 1	-70	-80

Table 4.2.4-3: Continuous modulation spectrum - maximum limits for DCS1800 Micro and Pico-BTS

Power Class		Maximum relative level (dB) at specified carrier offsets (kHz), using specified measurement (filter) bandwidths (kHz):	
		1 800 to < 6 000	> 6 000
		Measurement (filter) bandwidth; 100 kHz	
M1 to M3	Case 1	-76	-76
P1	Case 1	-76	-80

The following exceptions and minimum measurement levels shall apply for the micro and pico-BTS:

- 1) In the combined range 600 kHz to 6 MHz above and below the carrier frequency, in up to three bands of 200 kHz width centred on a frequency which is an integer multiple of 200 kHz, exceptions at up to -36 dBm are allowed.
- 2) Above 6 MHz offset from the carrier frequency, in up to 12 bands of 200 kHz width centred on a frequency which is an integer multiple of 200 kHz, exceptions at up to -36 dBm are allowed.
- 3) If the limit as specified above is below the values in table 4.2.4-4, then the values in table 4.2.4-4 shall be used instead.

Table 4.2.4-4: Continuous modulation spectrum - minimum levels for micro and pico-BTS

Power Class	Maximum spectrum due to modulation and noise in 100 kHz	
	GSM 900 (dBm)	DCS 1 800 (dBm)
M1	-59	-57
M2	-64	-62
M3	-69	-67
P1	-68	-65

4.2.4.1.3 Conformance

Conformance tests described in clause 5.3.4.1 shall be carried out.

4.2.4.2 Switching transients spectrum

4.2.4.2.1 Definition

The purpose of the test to measure against switching transients spectrum requirements is to verify that the output RF spectrum due to switching transients does not exceed the specified limits.

4.2.4.2.2 Limit

For all types of BTS, the power measured shall not exceed the limits shown in table 4.2.4-5, or -36 dBm, whichever value is less stringent.

Table 4.2.4-5: Switching transients spectrum - maximum limits

Offset (kHz):	Power (dBc): GSM 400, GSM 900 (GMSK)	Power (dBc): GSM 400, GSM 900 (8-PSK, QPSK, 16-QAM, 32-QAM)	Power (dBc): DCS 1 800 (GMSK)	Power (dBc): DCS 1 800 (8-PSK, QPSK, 16-QAM, 32-QAM)
400	-57	-52	-50	-50
600	-67	-62	-58	-58
1 200	-74	-74	-66	-66
1 800	-74	-74	-66	-66

4.2.4.2.3 Conformance

Conformance tests described in clause 5.3.4.2 shall be carried out.

4.2.5 Spurious emissions from the transmitter antenna connector

The test conditions for conducted emissions are defined separately for the BSS relevant transmit band, and elsewhere.

4.2.5.1 Conducted spurious emissions from the transmitter antenna connector, inside the BTS transmit band

4.2.5.1.1 Definition

This test measures spurious emissions from the BSS transmitter antenna connector inside the BSS relevant transmit band, while one transmitter is in operation.

4.2.5.1.2 Limit

The maximum power measured shall not exceed -36 dBm. In case of multicarrier BTS, the requirements stated in clause 4.2.4.1.2 for single carrier operation apply for the case of declared maximum output power.

4.2.5.1.3 Conformance

Conformance tests described in clause 5.3.5.1 shall be carried out.

4.2.5.2 Conducted spurious emissions from the transmitter antenna connector, outside the BTS transmit band

For a multicarrier BTS additionally conforming to EN 301 908-1 [i.5] and EN 301 908-18 [i.6], either the requirement of the present clause or the Transmitter spurious emissions requirement in clause 4.2.4 of EN 301 908-18 [i.6] can be equally applied for frequency offsets larger than 10 MHz outside the relevant transmit band.

4.2.5.2.1 Definition

This test measures spurious emissions from the BSS transmitter antenna connector outside the BSS relevant transmit band, while the transmitters are in operation. It also tests the intra-BTS intermodulation requirements outside the BTS transmit and receive bands.

4.2.5.2.2 Limit

4.2.5.2.2.1 All BTS except Multicarrier BTS

- 1) The maximum power measured in the respective transmit band shall not exceed:
 - 47 dBm for a GSM 900 and GSM 400 BSS in the frequency band 1 805 MHz to 1 880 MHz;
 - 57 dBm for a DCS 1 800 and GSM 400 BSS in the frequency band 921 MHz to 960 MHz;
 - 57 dBm for a GSM 400 BSS in the frequency band 925 MHz to 960 MHz.

In addition, if co-coverage with GSM 400 is supported:

- 57 dBm for a DCS 1 800 and GSM 900 BSS in the frequency band 460,4 MHz to 467,6 MHz and 488,8 MHz to 496,0 MHz.
- 2) The maximum power measured outside the transmit bands in 1) and, if co-coverage with GSM 400 is not supported, in the frequency band 460,4 MHz to 467,6 MHz and 488,8 MHz to 496,0 MHz, shall not exceed:
 - 36 dBm for frequencies from 9 kHz up to 1 GHz;
 - 30 dBm for frequencies from 1 GHz to 12,75 GHz.

4.2.5.2.2.2 Multicarrier BTS

- 1) The maximum power measured at step c) and f) in clause 5.3.5.2.2.1 shall not exceed:
 - 47 dBm for a GSM 900 or GSM 400 BSS in the band 1 805 MHz to 1 880 MHz;
 - 57 dBm for a GSM 900 or DCS 1 800 BSS in the bands 460,4 MHz to 467,6 MHz and 488,8 MHz to 496,0 MHz;
 - 57 dBm for a DCS 1 800 or GSM 400 BSS, in the band 925 MHz to 960 MHz;

In addition, if co-coverage with GSM 400 is supported by declaration

- 57 dBm for a DCS 1 800 and GSM 900 BSS in the frequency band 460,4 MHz to 467,6 MHz and 488,8 MHz to 496,0 MHz;
- 2) The maximum power measured outside the transmit bands in 1) and, if co-coverage with GSM 400 is not supported, in the frequency band 460,4 MHz to 467,6 MHz and 488,8 MHz to 496,0 MHz shall not exceed the values for multicarrier BTS in table 4.2.5-1. Δf is the frequency offset from the edge of the relevant TX band. For offsets less than 10 MHz the power measured shall not exceed the requirements in clause 4.2.8 or the values for multicarrier BTS in table 4.2.5-1, whichever is most stringent.

Table 4.2.5-1: Spurious Emissions Measurements outside the transmit band

Band	Frequency offset outside relevant transmit band	Maximum power limit
		Multicarrier BTS
9 kHz to 1 GHz	≥ 2 MHz	-25 dBm
	≥ 5 MHz	$-20-4,2*(\Delta f-5)$ dBm
	≥ 10 MHz	-36 dBm
1 GHz to 12,75 GHz	≥ 2 MHz	-25 dBm
	≥ 5 MHz	$-20-3*(\Delta f-5)$ dBm
	≥ 10 MHz	-30 dBm

4.2.5.2.3 Conformance

Conformance tests described in clause 5.3.5.2 shall be carried out.

4.2.5.3 Conducted spurious emissions from the transmitter antenna connector, in 3G bands outside the BTS transmit band

For a multicarrier BTS additionally conforming to EN 301 908-1 [i.5] and EN 301 908-18 [i.6], either the requirement of the present clause or the Transmitter spurious emissions requirement in clause 4.2.4 of EN 301 908-18 [i.6] can be equally applied.

4.2.5.3.1 Definition

This test measures spurious emissions from the BSS transmitter antenna connector in the UTRA UE and BS receive bands, while the transmitters are in operation.

4.2.5.3.2 Limit

The maximum power measured in the following bands shall not exceed -62 dBm:

- The band 1 900 MHz to 1 920 MHz.
- The band 1 920 MHz to 1 980 MHz.
- The band 2 010 MHz to 2 025 MHz.
- The band 2 110 MHz to 2 170 MHz.
- The band 2 300 MHz to 2 400 MHz.
- The band 2 620 MHz to 2 690 MHz.

4.2.5.3.3 Conformance

Conformance tests described in clause 5.3.5.3 shall be carried out.

4.2.6 Intermodulation attenuation

4.2.6.1 Definition

The purpose of the test to measure against requirements intermodulation attenuation is to verify that the RF transmit equipment is able to restrict the generation of signals in its non-linear elements caused by the presence of the RF output from the transmitter and an interfering signal reaching the transmitter via its antenna to below specified levels.

4.2.6.2 Limit

4.2.6.2.1 For all BTSs except multicarrier BTS

At frequencies offset from the wanted signal carrier frequency by more than 6 MHz and up to the edge of the relevant transmit band, the intermodulation components measured shall not exceed -70 dBc or -36 dBm, whichever is the higher. 1 in 100 time slot periods may fail the requirement by up to 10 dB.

At frequencies offset from the wanted signal carrier frequency of less than 6 MHz, the requirements are that specified in clause 4.2.4.1, Continuous Modulation Spectrum. The exceptions given in clause 4.2.4.1 also apply.

4.2.6.2.2 For multicarrier BTS

In the relevant transmit band, at offsets from the wanted signal carrier frequency by more than 6 MHz and up to 10 MHz outside the edge of the relevant transmit band, the measured intermodulation products shall not exceed -36 dBm if maximum output power per carrier exceeds 33 dBm else -41 dBm, or the requirement according to multicarrier BTS, -70 dBc, whichever is less stringent. In addition, for multicarrier BTS the measured third order intermodulation products may increase up to -60 dBc or -36 dBm, whichever is less stringent.

In the relevant transmit band, at offsets less than 6 MHz, the requirements are that specified in clause 4.2.4.1, except at intermodulation frequencies where the measured intermodulation products shall not exceed -36 dBm if maximum output power per carrier exceeds 33 dBm else -41 dBm, or the requirement according to multicarrier BTS, -70 dBc, whichever is less stringent. In addition, for multicarrier BTS the measured third order intermodulation products may increase up to -60 dBc or -36 dBm, whichever is less stringent.

In case of multicarrier BTS operating with one carrier, the level and number of allowable exceptions up to 10 MHz outside the relevant transmit band as defined in clause 4.2.8 using $N = 1$ apply.

The intermodulation products shall never exceed -16 dBm, measured in 100 kHz bandwidth.

4.2.6.3 Conformance

Conformance tests described in clause 5.3.6 shall be carried out.

4.2.7 Intra Base Station System intermodulation attenuation

4.2.7.1 Definition

The purpose of the test to measure against requirements for intra Base Station System intermodulation attenuation is to verify that the level of intermodulation products produced inside the RX and TX bands (due to the leakage of RF power between transmitters that are operating in close vicinity of each other inside the BSS, or are combined to feed a single antenna) do not exceed the specified limit.

4.2.7.2 Limit

4.2.7.2.1 For all BTSs except multicarrier BTS

In the relevant transmit band, at offsets greater than 0,6 MHz and up to 6 MHz, the requirements are that specified in clause 4.2.4.1, Continuous Modulation Spectrum. The exceptions given there shall also apply.

At frequencies offset from the wanted signal carrier frequency by more than 6 MHz and up to the edge of the relevant transmit band, the intermodulation components measured shall not exceed -70 dBc or -36 dBm, whichever is the higher. 1 in 100 time slot periods may fail the requirement by up to 10 dB.

4.2.7.2.2 For multicarrier BTS

Not applicable for multicarrier BTS. In this case, in the relevant transmit band, the requirements in clause 4.2.8 apply.

4.2.7.3 Conformance

Conformance tests described in clause 5.3.7 shall be carried out.

4.2.8 Wideband noise and intra BSS intermodulation attenuation in multicarrier operation

4.2.8.1 Definition

The purpose of the test to measure against requirements for wideband noise and intra BSS intermodulation attenuation in multicarrier operation is to verify that the level of intermodulation products produced inside the relevant TX bands for a multicarrier BTS do not exceed the specified limit when multiple carriers are active.

4.2.8.2 Limit

For a multicarrier BTS, when more than one carrier is active, in the relevant transmit band, the unwanted emission power shall be measured at offsets between 0,4 MHz from the uppermost and lowermost wanted signal carrier frequency and 10 MHz outside the edge of the relevant transmit band.

At frequency offsets larger than 1,8 MHz from the centre frequency of the uppermost and lowermost active carrier and up to 10 MHz outside the edge of the relevant TX band, the unwanted emissions for the multicarrier BTS class shall not exceed the less stringent of the following requirements:

- The average power measured at the centre frequencies of the intermodulation components and at the centre of their adjacent channels (± 200 kHz), over a timeslot shall not exceed -70 dBc or -36 dBm if maximum output power per carrier exceeds 33 dBm else -41 dBm, whichever is less stringent, for frequency offsets between 0,4 MHz from uppermost and lowermost active carrier and 10 MHz outside the edge of the relevant TX band.
- In addition, the average power of the measured intermodulation components over a timeslot at the third order intermodulation centre frequencies and at the centre frequencies of their adjacent channels (± 200 kHz) may increase up to -60 dBc.
- The requirements specified in clause 4.2.4.1, Continuous Modulation Spectrum, increased by $10 \cdot \text{LOG}(N)$ dB where N is the number of active carriers, or the Intermodulation requirement given above for the multicarrier BTS, whichever is the less stringent

In the test case with unequal power distribution, the reference for the relative requirements is the power of the carrier with the highest power is applied.

At frequency offsets less than or equal to 1,8 MHz from the outermost carriers, the unwanted emissions must fulfil a mask that is defined in the following steps:

- 1) The dBc values of table 4.2.4-1 in clause 4.2.4.1 (A_j with $j=1$ to N) are extracted for each carrier, taking into account the output power level of one carrier and the corresponding frequency offset between the measurement frequency point and the respective carrier. For carriers at offsets above 1,8 MHz from the measurement frequency point, the dBc value for the respective carrier must be reduced by 5 dB to account for the bandwidth conversion from 100 kHz to 30 kHz.
- 2) The dBc value (A_j with $j=N+1$) of the IM attenuation as defined above in the present clause for the multicarrier BTS has to be derived. In some configurations there might be no IM product falling onto the respective frequency. Then this contribution is ignored in the following.
- 3) The obtained $N+1$ dBc values are cumulated in the (following way) linear domain:

$$A_{\text{Cumulated, dBc}} = 10 \log_{10} \sum_{j=1}^{N+1} 10^{A_j/10}.$$

- 4) This procedure has to be done for the following frequency offsets above the uppermost and below the lowermost carriers: 400 kHz, 600 kHz, 1 200 kHz and 1 800 kHz.
- 5) For each of these measurement frequency points, the measured spectrum must not exceed the respective unwanted emission mask defined by $A_{\text{cumulated, dBc}}$.

For test case c) in clause 5.3.8.1 the requirements above the uppermost carrier and below the lowermost carrier are the same as specified above with N being the total number of active carriers. In addition the test includes the measurement of the frequency range between the innermost carriers of the two pairs of carriers, where the following requirements apply:

- a) For frequency offsets less than 1,8 MHz above the centre frequency of the uppermost carrier A of the lower pair of carriers or below the centre frequency of the lowermost carrier B of the upper pair of carriers, the unwanted emission must not exceed a mask defined by the cumulation of the spectrum due to modulation and wideband noise from each of the N carriers and the Intermodulation products, as specified above in this clause for frequency offsets less than 1,8 MHz for the test of contiguous carrier allocations.
- b) For frequency offsets of 1,8 MHz, 2,0 MHz, 2,2 MHz, 2,4 MHz and 2,6 MHz above the centre frequency of the uppermost carrier A of the lower pair of carriers: the value of the spectrum due to modulation and wideband noise given for the measurement of carrier A may not increase by more than $10 \cdot \text{LOG}(N)$ dB, or fulfil the Intermodulation requirement given above for the multicarrier BTS, whichever is the less stringent.
- c) For frequency offsets of 1,8 MHz, 2,0 MHz, 2,2 MHz, 2,4 MHz and 2,6 MHz below the centre frequency of the lowermost carrier B of the upper pair of carriers: the value of the spectrum due to modulation and wideband noise given for the measurement of carrier B may not increase by more than $10 \cdot \text{LOG}(N)$ dB, or fulfil the Intermodulation requirement given above for the multicarrier BTS, whichever is the less stringent.

The absolute lower limit in item 6) in clause 4.2.4.1 shall apply for all numbers N of active carriers.

At offsets between 600 kHz above the uppermost and below the lowermost carrier, respectively, and 10 MHz outside the relevant transmit band, in bands of 200 kHz width centered on a frequency, which is an integer multiple of 200 kHz, in test case a) and b) in clause 5.3.8.1 exceptions are allowed for N active carriers at $M = 18 + 3 \cdot (N-1)$ or up to 40 bands, whichever is the lowest. All exceptions are measured in 100 kHz bandwidth and may be up to -36 dBm. In addition, all exceptions within the relevant transmit band and up to four exceptions at offsets up to 2 MHz from the respective band edges, may be up to -70 dBc relative to the carrier measured in a bandwidth of 100 kHz, or -36 dBm, whichever is less stringent. For test case c) in clause 5.3.8.1 the same total number of exceptions M for N active carriers shall apply as given above for test case a) in clause 5.3.8.1, including the range of frequency offsets between 0,6 MHz above the uppermost carrier of the lower pair of carriers and 0,6 MHz below the lowermost carrier of the upper pair of carriers. Such bands, which centre frequency coincides with the centre frequency of third order IM products of any combination of two or three active carriers and corresponding adjacent channels (± 200 kHz), shall not be included in counting the exceptions.

4.2.9 Static Reference Sensitivity Level

4.2.9.1 Definition

The static reference sensitivity level of the receiver is the level of signal at the receiver input with a standard test signal at which the receiver will produce after demodulation and channel decoding data with a Frame Erasure Ratio (FER), Residual Bit Error Ratio (RBER) Bit Error Ratio (BER) or Block Error Ratio (BLER) better than or equal to that specified for a specific logical channel type under static propagation conditions.

4.2.9.2 Limit

For tests with SFH disabled, the tests shall be performed at one ARFCN. For tests with SFH enabled, the tests shall be performed with the range of hopping frequencies centred around RF channel M.

The error performance given in table 4.2.9-1 shall be met for TCH/FS channel (FER and RBER for class Ib and class II bits) and TCH/HS channel (FER and RBER for class Ib and class II bits with BFI = 0).

If GPRS is supported by the BSS, the error performance given in table 4.2.9-1 shall be met for PDTCH/CS-1 channel (BLER).

If AMR or AMR-WB is supported by the BSS, the error performance given in table 4.2.9-1 shall be met for one channel. The channel with the highest bitrate shall be tested.

If 8-PSK modulated AMR or AMR-WB is supported by the BSS, the error performance given in table 4.2.9-1 shall be met for one traffic channel and corresponding associated control channel O-FACCH. The traffic channel with the highest bitrate shall be tested.

The error performance given in table 4.2.9-1 shall be met for PDTCH/MCS-5 or, if not supported, for the PDTCH/MCS-x with the next higher supported number x.

The error performance given in table 4.2.9-1 shall be met for PDTCH/UAS-7 or, if not supported, for the PDTCH/UAS-x with the next higher supported number x.

The error performance given in table 4.2.9-1 shall be met for PDTCH/UBS-5, PDTCH/UBS-7 and PDTCH/UBS-10 or, if not supported, for the PDTCH/UBS-x with the next higher supported number x.

The error performance given in table 4.2.9-1 shall be met for E-TCH/F43.2 NT if supported or for the highest supported data speed.

For all tests where a signal is present on adjacent timeslots, the receiver of the TRX under test shall be activated for the duration of the test on the adjacent time slots. As a minimum, this shall include the Automatic Gain Control (AGC) of the receiver being operational on the adjacent timeslots.

Table 4.2.9-1: Static error performance limits at RX sensitivity level

Channel type	Error Parameter	Limit Value
FACCH/H	FER	0,10 %
FACCH/F	FER	0,10 %
E-FACCH/F	FER	5 %
SDCCH and SACCH	FER	0,10 %
RACH	FER	0,50 %
E-TCH/F43.2 NT	BLER	10 %
E-TCH/F32.0 T	BER	0,1 %
E-TCH/F28.8 T	BER	0,1 %
E-TCH/F28.8 NT	BLER	10 %
TCH/F14.4	BER	10 ⁻⁵
TCH/F9.6	BER	10 ⁻⁵
TCH/H4.8	BER	10 ⁻⁵
TCH/FS	FER	0,10 α %
- class Ib	RBER	0,40/α %
- class II	RBER	2,0 %
TCH/HS	FER	0,025 %
- class Ib, BFI=0	RBER	0,001 %
- class II, BFI=0	RBER	0,72 %
-	UFR	0,048 %
- class Ib, UFI=0	RBER	0,001 %
-	EVSIDR	0,06 %
SID=0 and BFI=0	RBER	0,001 %
-	ESIDR	0,01 %
SID=1 or 2	RBER	0,003 %
TCH/EFS	FER	0,1 %
- class Ib	RBER	0,1 %
- class II	RBER	2,0 %
TCH/AFS12.2, class Ib	RBER	0,001 %
TCH/AFS10.2, class Ib	RBER	0,001 %
TCH/AHS7.95	FER	0,01 %
- class Ib	RBER	0,004 %
- class II	RBER	0,66 %
TCH/AHS7.4	FER	0,01 %
- class Ib	RBER	0,001 %
- class II	RBER	0,66 %
TCH/AHS6.7	FER	0,01 %
- class Ib	RBER	0,001 %
- class II	RBER	0,66 %
TCH/AHS5.9, class II	RBER	0,66 %
TCH/AHS5.15, class II	RBER	0,66 %
TCH/AHS4.75, class II	RBER	0,66 %
TCH/AHS-INB	FER	0,013 %
PDTCH/CS-1 to 4	BLER	10 %

Channel type	Error Parameter	Limit Value
PDTCH/MCS-1 to 9	BLER	10 % (see note 2)
PDTCH/UAS-7 to 11	BLER	10 % (see note 3)
PDTCH/UBS-5 to 12	BLER	10 % (see note 3)
PAN	BLER	5 %
PRACH/11 bits	BLER	15 %
PRACH/8 bits	BLER	15 %
PACCH	BLER	10 %
TCH/WFS12.65	FER	1 %
	RBER	0,50 %
TCH/ WFS8.85	FER	1 %
	RBER	0,50 %
TCH/WFS6.60	FER	1 %
	RBER	0,24 %
O-FACCH/F	FER	5 %
O-FACCH/H	FER	5 %
O-TCH/AHS12.2	FER	1 %
- Class Ib	RBER	0,71 %
O-TCH/AHS10.2	FER	1 %
- Class Ib	RBER	0,35 %
O-TCH/AHS7.95	FER	1 %
- Class Ib	RBER	0,10 %
O-TCH/AHS7.4	FER	1 %
- Class Ib	RBER	0,16 %
O-TCH/AHS6.7	FER	1 %
- Class Ib	RBER	0,22 %
O-TCH/AHS5.9	FER	1 %
- Class Ib	RBER	0,57 %
O-TCH/AHS5.15	FER	1 %
- Class Ib	RBER	0,15 %
O-TCH/AHS4.75	FER	1 %
- Class Ib	RBER	0,18 %
O-TCH/AHS-INB	FER	0.5 %
O-TCH/AHS (EVSIDUR)	FER	1 %
O-TCH/AHS (EVRFR)	FER	1 %
O-TCH/WFS23.85	FER	1 %
- Class Ib	RBER	1,00 %
O-TCH/WFS15.85	FER	1 %
- Class Ib	RBER	0,50 %
O-TCH/WFS12.65	FER	1 %
- Class Ib	RBER	0,89 %
O-TCH/WFS8.86	FER	1 %
- Class Ib	RBER	0,77 %
O-TCH/WFS6.6	FER	1 %
- Class Ib	RBER	0,05 %
O-TCH/WFS-INB	FER	0,5 %
O-TCH/WFS (EVSIDUR)	FER	1 %
O-TCH/WFS (EVRFR)	FER	1 %
O-TCH/WHS12.65	FER	1 %
- Class Ib	RBER	0,57 %
O-TCH/WHS8.86	FER	1 %
- Class Ib	RBER	0,19 %
O-TCH/WHS6.6	FER	1 %
- Class Ib	RBER	0,23 %
O-TCH/WHS-INB	FER	0,5 %
O-TCH/WHS (EVSIDUR)	FER	1 %
O-TCH/WHS (EVRFR)	FER	1 %

Channel type	Error Parameter	Limit Value
NOTE 1: The performance requirements for TCH/WFS inband signalling, SID_UPDATE and RATSCCH are the same as those given for TCH/AFS. It is sufficient to test inband signalling, SID_UPDATE and RATSCCH requirements for only one of the channel types TCH/AFS and TCH/WFS.		
NOTE 2: The performance requirements for MCS-1 to 4 and MCS-5 to 9 apply to BTTI and RTTI without PAN included. For MCS-1 to 3 and MCS-5 to 8 the requirements also apply for BTTI and RTTI with PAN.		
NOTE 3: The performance requirements for all respective PDTCH type apply to BTTI and RTTI with or without PAN included.		

NOTE: The value of α in table 4.2.9-1 may be between 1 and 1,6, but should be the same for both occurrences.

4.2.9.3 Conformance

Conformance tests described in clause 5.3.9 shall be carried out.

4.2.10 Multipath Reference Sensitivity Level

4.2.10.1 Definition

The multipath reference sensitivity level of the receiver is the level of signal at the receiver input with a standard test signal at which the receiver will produce after demodulation and channel decoding data with a Frame Erasure Ratio (FER), Residual Bit Error Ratio (RBER), Bit Error Ratio (BER) or Block Error Ratio (BLER) better than or equal to that specified for a specific logical channel type, under multipath propagation conditions.

4.2.10.2 Limit

The error performance of TCH/FS shall be measured on RF channels B, M, and T for propagation profile TU50 (no SFH). The receiver of the TRX under test shall also be activated on the adjacent timeslots. As a minimum, this shall include the Automatic Gain Control (AGC) of the receiver being operational on the adjacent timeslots.

The error performance of each of the following logical channel types supported by the BSS shall be measured, each on one ARFCN, for the specified propagation profiles (for GSM 400 applicable speeds are multiplied by 2):

TCH/FS:	TU50 (no SFH), HT100, RA130 or RA250
TCH/HS (FER and RBER with BFI=0):	TU50 (no SFH), HT100, RA130 or RA250
SDCCH:	TU50 (no SFH), HT100, RA130 or RA250
TCH/F9.6:	HT100, RA130 or RA250
TCH/F4.8:	HT100, RA130 or RA250
PDTCH/CS-1:	TU50(no SFH), HT100, RA130 or RA250
PDTCH/MCS-1 or, if not supported, PDTCH/MCS-x with the next higher supported number x:	TU50(no SFH), HT100, RA130 or RA250
PDTCH/MCS-5 or, if not supported, PDTCH/MCS-x with the next higher supported number x:	TU50(no SFH), HT100, RA130 or RA250
E-TCH/43.2 NT or for the highest supported data speed:	HT100, RA130 or RA250
PDTCH/UAS-7 or, if not supported, PDTCH/UAS-x with the next higher supported number x:	TU50(no SFH), HT100, RA130 or RA250

PDTCH/UBS-5 or, if not supported,
PDTCH/UBS-x with the
next higher supported number x: TU50(no SFH), HT100, RA130 or RA250

PDTCH/UBS-7 or, if not supported,
PDTCH/UBS-x with the
next higher supported number x: TU50(no SFH), HT100, RA130 or RA250

PDTCH/UBS-10 or, if not supported,
PDTCH/UBS-x with the
next higher supported number x: TU50(no SFH), HT100, RA130 or RA250

For all UBS-x, the tests need only to be performed for input signals with wide pulse-shaping filter.

The error performance given in tables 4.2.10-1 and 4.2.10-2 shall be met for all combinations of logical channel type, frequency and multipath propagation profile tested.

If AMR or AMR-WB is supported by the BSS, the error performance given in tables 4.2.10-1 and 4.2.10-2 shall be met for one channel under TU50 (no SFH) propagation condition. The channel with the highest bitrate shall be tested.

If 8-PSK modulated AMR or AMR-WB is supported by the BSS, the error performance given in tables 4.2.10-1 and 4.2.10-2 shall be met for one traffic channel and corresponding associated control channel O-FACCH under TU50 (no SFH) propagation condition. The traffic channel with the highest bitrate shall be tested.

Pico-BTS Conformance Requirement

The error performance of TCH/FS shall be measured on RF channels B, M, and T for propagation profile TI5 (no SFH). The receiver of the TRX under test shall also be activated on the adjacent timeslots. As a minimum, this shall include the Automatic Gain Control (AGC) of the receiver being operational on the adjacent timeslots.

The error performance of each of the following logical channel types supported by the BSS shall also be measured, each on one ARFCN, for propagation profile TI5 (no SFH) only (for GSM 400 applicable speeds are multiplied by 2):

TCH/HS (FER and RBER with BFI=0): TI5

SDCCH: TI5

TCH/F9.6: TI5

TCH/F4.8: TI5

PDTCH/CS-1 TI5

PDTCH/MCS-1 or, if not supported,
for the PDTCH/MCS-x with the
next higher supported number x: TI5

PDTCH/MCS-5 or, if not supported,
PDTCH/MCS-x with the
next higher supported number x: TI5

E-TCH/43.2NT
or for the highest supported data speed.: TI5

PDTCH/UAS-5 or, if not supported,
PDTCH/UAS-x with the
next higher supported number x: TI5

PDTCH/UBS-5 or, if not supported,
PDTCH/UBS-x with the next higher
supported number x: TI5

PDTCH/UBS-7 or, if not supported,
PDTCH/UBS-x with the
next higher supported number x: TI5

PDTCH/UBS-10 or, if not supported,
PDTCH/UBS-x with the
next higher supported number x: TI5

For all UBS-x, the tests need only to be performed for input signals with wide pulse-shaping filter.

The error performance given in tables 4.2.10-1 and 4.2.10-2 for the TI5 (no SFH) multipath propagation profile shall be met for all the above logical channel types tested.

If AMR or AMR-WB is supported by the BSS, the error performance given in tables 4.2.10-1 and 4.2.10-2 shall be met for one channel under TI5 propagation condition. The channel with the highest bitrate shall be tested.

If 8-PSK modulated AMR or AMR-WB is supported by the BSS, the error performance given in tables 4.2.10-1 and 4.2.10-2 shall be met for one traffic channel and corresponding associated control channel O-FACCH under TI5 propagation condition. The traffic channel with the highest bitrate shall be tested.

Table 4.2.10-1: GSM 400 and GSM900 Multipath error performance limits at RX sensitivity level

Channel Type	Error Measure	Error Ratios for the specified propagation conditions				
		TU50 (no SFH)	TU50 (ideal SFH)	RA250 (no SFH)	HT100 (no SFH)	TI5 (no SFH)
FACCH/H	(FER)	6,9 %	6,9 %	5,7 %	10,0 %	6,9 %
FACCH/F	(FER)	8,0 %	3,8 %	3,4 %	6,3 %	8,0 %
E-FACCH/F	(FER)	5 %	5 %	5 %	5 %	5 %
SDCCH and SACCH	(FER)	13 %	8,0 %	8,0 %	12,0 %	13 %
RACH	(FER)	13 %	13 %	12 %	13 %	13 %
E-TCH/F43.2 NT	(BLER)	10 %	10 %	10 %	10 %	10 %
E-TCH/F32.0 T	(BER)	0,1 %	0,1 %	0,1 %	0,1 %	0,1 %
E-TCH/F28.8 T	(BER)	0,1 %	0,1 %	0,1 %	0,1 %	0,1 %
E-TCH/F28.8 NT	(BLER)	10 %	10 %	10 %	10 %	10 %
TCH/F14.4	(BER)	2,5%	2,0%	2,0%	5,0%	2,5 %
TCH/F9.6	(BER)	0,50 %	0,40 %	0,10 %	0,70 %	0,50 %
TCH/F4.8	(BER)	10 ⁻⁴	10 ⁻⁴	10 ⁻⁴	10 ⁻⁴	10 ⁻⁴
TCH/F2.4	(BER)	2 10 ⁻⁴	10 ⁻⁵	10 ⁻⁵	10 ⁻⁵	2 10 ⁻⁴
TCH/H4.8	(BER)	0,50 %	0,40 %	0,10 %	0,70 %	0,50 %
TCH/H2.4	(BER)	10 ⁻⁴	10 ⁻⁴	10 ⁻⁴	10 ⁻⁴	10 ⁻⁴
- class II	(RBER)	8,0 %	8,0 %	7,0 %	9,0 %	8,0 %
TCH/HS	(FER)	4,1 %	4,1 %	4,1 %	4,5 %	4,1 %
- class Ib	(RBER, BFI=0)	0,36 %	0,36 %	0,28 %	0,56 %	0,36 %
- class II	(RBER, BFI=0)	6,9 %	6,9 %	6,8 %	7,6 %	6,9 %
-	(UFR)	5,6 %	5,6 %	5,0 %	7,5 %	5,6 %
- class Ib	(RBER, UFI=0)	0,24 %	0,24 %	0,21 %	0,32 %	0,24 %
-	(EVSIDR)	6,8 %	6,8 %	6,0 %	9,2 %	6,8 %
-	(RBER, SID=2 and BFI=0)	0,01 %	0,01 %	0,01 %	0,02 %	0,01 %
-	(ESIDR)	3,0 %	3,0 %	3,2 %	3,4 %	3,0 %
-	(RBER, SID=1 or 2)	0,3 %	0,3 %	0,21 %	0,42 %	0,3 %
TCH/EFS	(FER)	8 %	3 %	3 %	7%	8 %
- class Ib	(RBER)	0,21 %	0,11 %	0,10 %	0,20 %	0,21 %
- class II	(RBER)	7 %	8 %	7 %	9 %	7 %
TCH/AFS12.2	(FER)	4,9 %	2,4 %	1,4 %	4,5 %	4,9 %

Channel Type	Error Measure	Error Ratios for the specified propagation conditions				
		TU50 (no SFH)	TU50 (ideal SFH)	RA250 (no SFH)	HT100 (no SFH)	T15 (no SFH)
- class Ib	(RBER)	1,5 %	1,5 %	1,2 %	2,1 %	1,5 %
TCH/AFS10.2	(FER)	2,1 %	0,85 %	0,45 %	1,6 %	2,1 %
- class Ib	(RBER)	0,23 %	0,15 %	0,092 %	0,26 %	0,23 %
TCH/AFS7.95	(FER)	0,36 %	0,045 %	0,024 %	0,096 %	0,36 %
- class Ib	(RBER)	0,11 %	0,032 %	0,02 %	0,06 %	0,11 %
TCH/AFS7.4	(FER)	0,41 %	0,069 %	0,028 %	0,13 %	0,41 %
- class Ib	(RBER)	0,054 %	0,016 %	0,009 %	0,033 %	0,054 %
TCH/AFS6.7	(FER)	0,16 %	0,017 %	0,01 %	0,026 %	0,16 %
- class Ib	(RBER)	0,082 %	0,022 %	0,013 %	0,044 %	0,082 %
TCH/AFS5.9	(FER)	0,094 %	0,01 %	0,01 %	0,011 %	0,094 %
- class Ib	(RBER)	0,014 %	0,001 %	0,001 %	0,003 %	0,014 %
TCH/AFS5.15	(FER)	0,07 %	0,01 %	0,01 %	0,01 %	0,07 %
- class Ib	(RBER)	0,014 %	0,001 %	0,001 %	0,002 %	0,014 %
TCH/AFS4.75	(FER)	0,029 %	0,01 %	-	0,01 %	0,029 %
- class Ib	(RBER)	0,005 %	0,001 %	0,001 %	0,001 %	0,005 %
TCH/AFS-INB	(FER)	0,034 %	0,013 %	0,006 %	0,019 %	0,034 %
TCH/AFS	(EVSIDUR)	0,82 %	0,17 %	0,17 %	0,17 %	0,82 %
TCH/AFS	(EVRFR)	0,095 %	0,007 %	0,007 %	0,011 %	0,095 %
TCH/AHS7.95	(FER)	20 %	20 %	17 %	28 %	20 %
- class Ib	(RBER)	2,3 %	2,3 %	2 %	2,9 %	2,3 %
- class II	(RBER)	5 %	5 %	4,7 %	5,7 %	5 %
TCH/AHS7.4	(FER)	16 %	16 %	14 %	22 %	16 %
- class Ib	(RBER)	1,4 %	1,4 %	1,1 %	1,8 %	1,4 %
- class II	(RBER)	5,3 %	5,3 %	5 %	6,0 %	5,3 %
TCH/AHS6.7	(FER)	9,2 %	9,2 %	8 %	13 %	9,2 %
- class Ib	(RBER)	1,1 %	1,1 %	0,93 %	1,5 %	1,1 %
- class II	(RBER)	5,8 %	5,8 %	5,5 %	6,6 %	5,8 %
TCH/AHS5.9	(FER)	5,7 %	5,7 %	4,9 %	8,6 %	5,7 %
- class Ib	(RBER)	0,51 %	0,51 %	0,42 %	0,73 %	0,51 %
- class II	(RBER)	6 %	6 %	5,7 %	6,8 %	6 %
TCH/AHS5.15	(FER)	2,5 %	2,5 %	2,2 %	4 %	2,5 %
- class Ib	(RBER)	0,51 %	0,51 %	0,43 %	0,78 %	0,51 %
- class II	(RBER)	6,3 %	6,3 %	6 %	7,2 %	6,3 %
TCH/AHS4.75	(FER)	1,2 %	1,2 %	1,2 %	1,8 %	1,2 %
- class Ib	(RBER)	0,17 %	0,17 %	0,14 %	0,26 %	0,17 %
- class II	(RBER)	6,4 %	6,4 %	6,2 %	7,4 %	6,4 %
TCH/AHS-INB	(FER)	0,72 %	0,64 %	0,53 %	0,94 %	0,72 %
TCH/AHS	(EVSIDUR)	1,5 %	1,5 %	2,1 %	1,5 %	1,5 %
TCH/AHS	(EVRFR)	0,25 %	0,24 %	0,33 %	0,38 %	0,25 %
PDTCH/CS-1 to 4	(BLER)	10%	10 %	10 %	10 %	10 %
PDTCH/MCS-1 to 6	(BLER)	10%	10 %	10 %	10 %	10 %
PDTCH/MCS-7	(BLER)	10 %	10 %	30 %	30 %	10 %
PDTCH/MCS-8	(BLER)	10 %	10 %	-	30 %	10 %
PDTCH/MCS-9	(BLER)	10 %	10 %	-	-	10 %
PDTCH/UAS-7 to 9	(BLER)	10 %	10 %	10 %	10 %	10 %
PDTCH/UAS-10	(BLER)	10 %	10 %	30 %	30 %	10 %
PDTCH/UAS-11	(BLER)	10 %	10 %	-	30 %	10 %
PDTCH/UBS-5 to 9	(BLER)	10 % ³⁾	10 %	10 % ³⁾	10 %	10 % ³⁾
PDTCH/UBS-10	(BLER)	10 % ³⁾	10 %	10 % ³⁾	30 % ³⁾	10 % ³⁾

Channel Type	Error Measure	Error Ratios for the specified propagation conditions				
		TU50 (no SFH)	TU50 (ideal SFH)	RA250 (no SFH)	HT100 (no SFH)	T15 (no SFH)
PDTCH/UBS-11	(BLER)	10 % ³⁾	10 %	30 % ³⁾	30 % ³⁾	10 % ³⁾
PDTCH/UBS-12	(BLER)	10 % ³⁾	10 %	30 % ³⁾	-	10 % ³⁾
PRACH/11 bits	(BLER)	15 %	15 %	15 %	15 %	15 %
PRACH/8 bits	(BLER)	15 %	15 %	15 %	15 %	15 %
PACCH	(BLER)	10 %	10 %	10 %	10 %	10 %
TCH/WFS12.65	(FER)	1 %	1 %	1 %	1 %	1 %
	(RBER)	0,35 %	0,62 %	0,72 %	0,62 %	0,35 %
TCH/ WFS8.85	(FER)	1 %	1 %	1 %	1 %	1 %
	(RBER)	0,38 %	0,59 %	0,72 %	0,62 %	0,38 %
TCH/ WFS6.60	(FER)	1 %	1 %	1 %	1 %	1 %
	(RBER)	0,15 %	0,17 %	0,19 %	0,24 %	0,15 %
O-FACCH/F	(FER)	5 %	5 %	5 %	5 %	5 %
O-FACCH/H	(FER)	5 %	5 %	5 %	5 %	5 %
O-TCH/AHS12.2	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,30 %	0,35 %	0,29 %	0,40 %	0,30 %
O-TCH/AHS10.2	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,15 %	0,15 %	0,13 %	0,19 %	0,15 %
O-TCH/AHS7.95	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,08 %	0,08 %	0,05 %	0,10 %	0,08 %
O-TCH/AHS7.4	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,15 %	0,15 %	0,12 %	0,17 %	0,15 %
O-TCH/AHS6.7	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,14 %	0,15 %	0,12 %	0,16 %	0,14 %
O-TCH/AHS5.9	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,20 %	0,19 %	0,15 %	0,25 %	0,20 %
O-TCH/AHS5.15	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,10 %	0,08 %	0,07 %	0,11 %	0,10 %
O-TCH/AHS4.75	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,15 %	0,11 %	0,11 %	0,10 %	0,15 %
O-TCH/AHS-INB	(FER)	0,5 %	0,5 %	0,5 %	0,5 %	0,5 %
O-TCH/AHS	(EVSIDUR)	1 %	1 %	1 %	1 %	1 %
O-TCH/AHS	(EVRFR)	1 %	1 %	1 %	1 %	1 %
O-TCH/WFS23.85	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,16 %	0,28 %	0,24 %	0,28 %	0,16 %
O-TCH/WFS15.85	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,44 %	0,33 %	0,64 %	0,50 %	0,44 %
O-TCH/WFS12.65	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,37 %	0,21 %	0,51 %	0,59 %	0,37 %
O-TCH/WFS8.85	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,31 %	0,22 %	0,42 %	0,48 %	0,31 %
O-TCH/WFS6.60	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,18 %	0,12 %	0,23 %	0,27 %	0,18 %
O-TCH/WFS-INB	(FER)	0,5 %	0,5 %	0,5 %	0,5 %	0,5 %
O-TCH/WFS	(EVSIDUR)	1 %	1 %	1 %	1 %	1 %
O-TCH/WFS	(EVRFR)	1 %	1 %	1 %	1 %	1 %
O-TCH/WHS12.65	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,30 %	0,38 %	0,30 %	0,40 %	0,30 %
O-TCH/WHS8.85	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,10 %	0,11 %	0,10 %	0,13 %	0,10 %
O-TCH/WHS6.60	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,15 %	0,15 %	0,13 %	0,19 %	0,15 %
O-TCH/WHS-INB	(FER)	0,5 %	0,5 %	0,5 %	0,5 %	0,5 %
O-TCH/WHS	(EVSIDUR)	1 %	1 %	1 %	1 %	1 %
O-TCH/WHS	(EVRFR)	1 %	1 %	1 %	1 %	1 %

NOTE 1: For GSM 400 the speeds shall be doubled (e.g. TU50 shall be TU100).

NOTE 2: The performance requirements for TCH/WFS inband signalling, SID_UPDATE and RATSCCH are the same as those given for TCH/AFS. It is sufficient to test inband signalling, SID_UPDATE and RATSCCH requirements for only one of the channel types TCH/AFS and TCH/WFS.

NOTE 3: No requirement apply for wanted signal narrow.

Table 4.2.10-2: DCS 1 800 Multipath error performance limits at RX sensitivity level

Channel Type	Error Measure	Error Ratios for the specified propagation conditions				
		TU50 (no SFH)	TU50 (ideal SFH)	RA130 (no SFH)	HT100 (no SFH)	TI5 (no SFH)
FACCH/H	(FER)	7,2 %	7,2 %	5,7 %	10,4 %	6,9 %
FACCH/F	(FER)	3,9 %	3,9 %	3,4 %	7,4 %	8,0 %
E-FACCH/F	(FER)	5 %	5 %	5 %	5 %	5 %
SDCCH and SACCH	(FER)	9,0 %	9,0 %	8,0 %	13,0 %	13 %
RACH	(FER)	13 %	13 %	12 %	13 %	13 %
E-TCH/F43.2 NT	(BLER)	10 %	10 %	10 %	10 %	10 %
E-TCH/F32.0 T	(BER)	0,1 %	0,1 %	0,1 %	0,1 %	0,1 %
E-TCH/F28.8 T	(BER)	0,1 %	0,1 %	0,1 %	0,1 %	0,1 %
E-TCH/F28.8 NT	(BLER)	10 %	10 %	10 %	10 %	10 %
TCH/F14.4	(BER)	2,1%	2,0%	2,0%	6,5%	2,5%
TCH/F9.6	(BER)	0,40 %	0,40 %	0,10 %	0,70 %	0,50 %
TCH/F4.8	(BER)	10 ⁻⁴	10 ⁻⁴	10 ⁻⁴	10 ⁻⁴	10 ⁻⁴
TCH/F2.4	(BER)	10 ⁻⁵	10 ⁻⁵	10 ⁻⁵	10 ⁻⁵	2 10 ⁻⁴
TCH/H4.8	(BER)	0,40 %	0,40 %	0,10 %	0,70 %	0,50 %
TCH/H2.4	(BER)	10 ⁻⁴	10 ⁻⁴	10 ⁻⁴	10 ⁻⁴	10 ⁻⁴
TCH/FS	(FER)	3,0 α %	3,0 α %	2,0 α %	7,0 α %	6,0 α %
- class Ib	(RBER)	0,30/ α %	0,30/ α %	0,20/ α %	0,50/ α %	0,40/ α %
- class II	(RBER)	8,0 %	8,0 %	7,0 %	9,0 %	8,0 %
TCH/HS	(FER)	4,2 %	4,2 %	4,1 %	5,0 %	4,1 %
- class Ib	(RBER, BFI=0)	0,38 %	0,38 %	0,28 %	0,63 %	0,36 %
- class II	(RBER, BFI=0)	6,9 %	6,9 %	6,8 %	7,8 %	6,9 %
-	(UFR)	5,7 %	5,7 %	5,0 %	8,1 %	5,6 %
- class Ib	(RBER, UFI=0)	0,26 %	0,26 %	0,21 %	0,35 %	0,24 %
-	(EVSIDR)	7,0 %	7,0 %	6,0 %	9,9 %	6,8 %
-	(RBER, SID=2 and BFI=0)	0,01 %	0,01 %	0,01 %	0,02 %	0,01 %
-	(ESIDR)	3,0 %	3,0 %	3,2 %	3,9 %	3,0 %
-	(RBER, SID=1 or 2)	0,33 %	0,33 %	0,21 %	0,45 %	0,3 %
TCH/EFS	(FER)	4 %	4 %	3 %	7%	8 %
- class Ib	(RBER)	0,12 %	0,12 %	0,10 %	0,24 %	0,21 %
- class II	(RBER)	8 %	8 %	7 %	9 %	7 %
TCH/AFS12.2	(FER)	2 %	2,0 %	1,3 %	4,6 %	4,9 %
- class Ib	(RBER)	1,4 %	1,4 %	1,2 %	2,1 %	1,5 %
TCH/AFS10.2	(FER)	0,65 %	0,65 %	0,41 %	1,6 %	2,1 %
- class Ib	(RBER)	0,12 %	0,12 %	0,084 %	0,26 %	0,23 %
TCH/AFS7.95	(FER)	0,025 %	0,025 %	0,018 %	0,089 %	0,36 %
- class Ib	(RBER)	0,023 %	0,023 %	0,016 %	0,061 %	0,11 %
TCH/AFS7.4	(FER)	0,036 %	0,036 %	0,023 %	0,13 %	0,41 %
- class Ib	(RBER)	0,013 %	0,013 %	0,007 %	0,031 %	0,054 %
TCH/AFS6.7	(FER)	0,01 %	0,01 %	0,01 %	0,031 %	0,16 %
- class Ib	(RBER)	0,017 %	0,017 %	0,01 %	0,041 %	0,082 %
TCH/AFS5.9	(FER)	0,01 %	0,01 %	0,01 %	0,01 %	0,094 %
- class Ib	(RBER)	0,001 %	0,001 %	0,001 %	0,002 %	0,014 %
TCH/AFS5.15	(FER)	0,01 %	0,01 %	-	0,01 %	0,07 %
- class Ib	(RBER)	0,001 %	0,001 %	0,001 %	0,003 %	0,014 %
TCH/AFS4.75	(FER)	0,01 %	-	-	0,01 %	0,029 %
- class Ib	(RBER)	0,001 %	0,001 %	0,001 %	0,001 %	0,005 %
TCH/AFS-INB	(FER)	0,011 %	0,011 %	0,006 %	0,021 %	0,034 %
TCH/AFS	(EVSIDUR)	0,19 %	0,19 %	0,17 %	0,25 %	0,82 %
TCH/AFS	(EVRFR)	0,007 %	0,007 %	0,002 %	0,01 %	0,095 %
TCH/AHS7.95	(FER)	20 %	20 %	17 %	27 %	20 %
- class Ib	(RBER)	2,3 %	2,3 %	2 %	2,9 %	2,3 %
- class II	(RBER)	5 %	5 %	4,8 %	5,7 %	5 %
TCH/AHS7.4	(FER)	16 %	16 %	13 %	22 %	16 %
- class Ib	(RBER)	1,4 %	1,4 %	1,1 %	1,9 %	1,4 %
- class II	(RBER)	5,3 %	5,3 %	5,1 %	6,1 %	5,3 %

Channel Type	Error Measure	Error Ratios for the specified propagation conditions				
		TU50 (no SFH)	TU50 (ideal SFH)	RA130 (no SFH)	HT100 (no SFH)	TI5 (no SFH)
TCH/AHS6.7	(FER)	9,4 %	9,4 %	7,5 %	13 %	9,2 %
- class Ib	(RBER)	1,1 %	1,1 %	0,92 %	1,5 %	1,1 %
- class II	(RBER)	5,8 %	5,8 %	5,5 %	6,6 %	5,8 %
TCH/AHS5.9	(FER)	5,9 %	5,9 %	4,6 %	8,5 %	5,7 %
- class Ib	(RBER)	0,52 %	0,52 %	0,39 %	0,72 %	0,51 %
- class II	(RBER)	6,1 %	6,1 %	5,8 %	6,8 %	6 %
TCH/AHS5.15	(FER)	2,6 %	2,6 %	2 %	3,7 %	2,5 %
- class Ib	(RBER)	0,53 %	0,53 %	0,4 %	0,76 %	0,51 %
- class II	(RBER)	6,3 %	6,3 %	6,1 %	7,2 %	6,3 %
TCH/AHS4.75	(FER)	1,2 %	1,2 %	1,1 %	1,7 %	1,2 %
- class Ib	(RBER)	0,18 %	0,18 %	0,13 %	0,25 %	0,17 %
- class II	(RBER)	6,5 %	6,5 %	6,2 %	7,3 %	6,4 %
TCH/AHS-INB	(FER)	0,64 %	0,64 %	0,53 %	0,94 %	0,72 %
TCH/AHS	(EVSIDUR)	1,3 %	1,3 %	2,1 %	1,5 %	1,5 %
TCH/AHS	(EVRFR)	0,24 %	0,24 %	0,25 %	0,24 %	0,25 %
PDTCH/CS-1 to 4	(BLER)	10%	10%	10%	10%	10 %
PDTCH/MCS-1 to 6	(BLER)	10%	10%	10%	10%	10%
PDTCH/MCS-7	(BLER)	10 %	10 %	30 %	-	10 %
PDTCH/MCS-8	(BLER)	30 %	30 %	-	-	30 %
PDTCH/MCS-9	(BLER)	30 %	30 %	-	-	30 %
PDTCH/UAS-7	(BLER)	10 %	10 %	10 %	10 %	10 %
PDTCH/UAS-8 to 9	(BLER)	10%	10%	10%	30%	10%
PDTCH/UAS-10	(BLER)	10%	10%	30%	-	10%
PDTCH/UAS-11	(BLER)	30%	30%	-	-	30%
PDTCH/UBS-5 to 12	(BLER)	10% ²⁾	10%	10% ²⁾	10% ²⁾	10% ²⁾
PDTCH/UBS-8	(BLER)	10% ²⁾	10%	10% ²⁾	10% ³⁾	10% ²⁾
PDTCH/UBS-9	(BLER)	10% ²⁾	10%	10% ²⁾	10% ³⁾	10% ²⁾
PDTCH/UBS-10	(BLER)	10% ²⁾	10%	10% ²⁾	30% ²⁾	10% ²⁾
PDTCH/UBS-11	(BLER)	10% ²⁾	10%	30% ²⁾	-	10% ²⁾
PDTCH/UBS-12	(BLER)	10% ²⁾	10%	30% ²⁾	-	10% ²⁾
PRACH/11 bit	(BLER)	15%	15%	15%	15%	15 %
PRACH/8 bit	(BLER)	15%	15%	15%	15%	15 %
PACCH	(BLER)	10%	10%	10%	10%	10 %
TCH/WFS12.65	(FER)	1%	1%	1%	1%	1%
	(RBER)	0,62 %	0,62 %	0,72 %	0,66 %	0,35 %
TCH/ WFS8.85	(FER)	1%	1%	1%	1%	1%
	(RBER)	0,59 %	0,59 %	0,72 %	0,58 %	0,38 %
TCH/ WFS6.60	(FER)	1%	1%	1%	1%	1%
	(RBER)	0,17 %	0,17 %	0,19 %	0,25 %	0,15 %
O-FACCH/F	(FER)	5 %	5 %	5 %	5 %	5 %
O-FACCH/H	(FER)	5 %	5 %	5 %	5 %	5 %
O-TCH/AHS12.2	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,30 %	0,30 %	1 %	0,42 %	0,30 %
O-TCH/AHS10.2	(FER)	1 %	1 %	0,29 %	1 %	1 %
- class Ib	(RBER)	0,17 %	0,17 %	1 %	0,20 %	0,15 %
O-TCH/AHS7.95	(FER)	1 %	1 %	0,13 %	1 %	1 %
- class Ib	(RBER)	0,08 %	0,08 %	1 %	0,08 %	0,08 %
O-TCH/AHS7.4	(FER)	1 %	1 %	0,05 %	1 %	1 %
- class Ib	(RBER)	0,15 %	0,15 %	1 %	0,17 %	0,15 %
O-TCH/AHS6.7	(FER)	1 %	1 %	0,12 %	1 %	1 %
- class Ib	(RBER)	0,16 %	0,16 %	1 %	0,19 %	0,14 %
O-TCH/AHS5.9	(FER)	1 %	1 %	0,12 %	1 %	1 %
- class Ib	(RBER)	0,22 %	0,22 %	1 %	0,24 %	0,20 %
O-TCH/AHS5.15	(FER)	1 %	1 %	0,15 %	1 %	1 %
- class Ib	(RBER)	0,11 %	0,11 %	1 %	0,12 %	0,10 %
O-TCH/AHS4.75	(FER)	1 %	1 %	0,07 %	1 %	1 %
- class Ib	(RBER)	0,15 %	0,15 %	1 %	0,17 %	0,15 %
O-TCH/AHS-INB	(FER)	0,5 %	0,5 %	0,5 %	0,5 %	0,5 %
O-TCH/AHS	(EVSIDUR)	1 %	1 %	1 %	1 %	1 %
O-TCH/AHS	(EVRFR)	1 %	1 %	1 %	1 %	1 %

Channel Type	Error Measure	Error Ratios for the specified propagation conditions				
		TU50 (no SFH)	TU50 (ideal SFH)	RA130 (no SFH)	HT100 (no SFH)	TI5 (no SFH)
O-TCH/WFS23.85	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,17 %	0,17 %	0,24 %	0,26 %	0,16 %
O-TCH/WFS15.85	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,50 %	0,50 %	0,64 %	0,60 %	0,44 %
O-TCH/WFS12.65	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,45 %	0,45 %	0,51 %	0,63 %	0,37 %
O-TCH/WFS8.85	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,38 %	0,38 %	0,42 %	0,57 %	0,31 %
O-TCH/WFS6.60	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,20 %	0,20 %	0,23 %	0,30 %	0,18 %
O-TCH/WFS-INB	(FER)	0,5 %	0,5 %	0,5 %	0,5 %	0,5 %
O-TCH/WFS	(EVSIDUR)	1 %	1 %	1 %	1 %	1 %
O-TCH/WFS	(EVRFR)	1 %	1 %	1 %	1 %	1 %
O-TCH/WHS12.65	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,34 %	0,34 %	0,30 %	0,44 %	0,30 %
O-TCH/WHS8.85	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,12 %	0,12 %	0,10 %	0,15 %	0,10 %
O-TCH/WHS6.60	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,16 %	0,16 %	0,13 %	0,19 %	0,15 %
O-TCH/WHS-INB	(FER)	0,5 %	0,5 %	0,5 %	0,5 %	0,5 %
O-TCH/WHS	(EVSIDUR)	1 %	1 %	1 %	1 %	1 %
O-TCH/WHS	(EVRFR)	1 %	1 %	1 %	1 %	1 %
NOTE 1: The performance requirements for TCH/WFS inband signalling, SID_UPDATE and RATSCCH are the same as those given for TCH/AFS. It is sufficient to test inband signalling, SID_UPDATE and RATSCCH requirements for only one of the channel types TCH/AFS and TCH/WFS.						
NOTE 2: No requirement apply for wanted signal narrow.						
NOTE 3: 30 % BLER requirement apply for wanted signal narrow.						

The value of α in tables 4.2.10-1 and 4.2.10-2 shall be between 1 and 1,6, and shall be the same for both occurrences in each propagation condition; it may be different for different propagation conditions.

4.2.10.3 Conformance

Conformance tests described in clause 5.3.9 shall be carried out.

4.2.11 Reference Interference Level

4.2.11.1 Definition

The reference interference level is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted modulated signal at the same carrier frequency (co-channel interference) or at any adjacent carrier frequencies (adjacent channel interference).

4.2.11.2 Limit

1) Co-channel:

The error performance shall be measured for TCH/FS channel (FER, class Ib and class II), for TU50 propagation condition. If synthesizer SFH is supported by the BSS, this shall be enabled, with the range of hopping frequencies centred around RF channel M. If synthesizer SFH is not supported, this shall be tested on one ARFCN channel.

With SFH disabled, the error performance for each of the following logical channel types supported by the BSS shall be measured, each on one ARFCN, for the specified propagation conditions (for GSM 400 applicable speeds are multiplied by 2):

TCH/FS:	TU1.5 or TU3
FACCH/F:	TU1.5 or TU3
FACCH/H:	TU1.5 or TU3
E-FACCH/F:	TU1.5 or TU3
SDCCH:	TU1.5 or TU3
TCH/F9.6:	TU1.5 or TU3, TU50
TCH/F4.8:	TU1.5 or TU3, TU50
PDTCH/CS-1:	TU1.5 or TU3, TU50
PDTCH/MCS-1 or, if not supported, PDTCH/MCS-x with the next higher supported number x:	TU1.5 or TU3, TU50
PDTCH/MCS-5 or, if not supported, PDTCH/MCS-x with the next higher supported number x:	TU1.5 or TU3, TU50
E-TCH/43.2 NT or for the highest supported data speed:	TU1.5 or TU3, TU50
PDTCH/UAS-7 or, if not supported, PDTCH/UAS-x with the next higher supported number x:	TU1.5 or TU3, TU50
PDTCH/UBS-5 or, if not supported, PDTCH/UBS-x with the next higher supported number x:	TU1.5 or TU3, TU50
PDTCH/UBS-7 or, if not supported, PDTCH/UBS-x with the next higher supported number x:	TU1.5 or TU3, TU50
PDTCH/UBS-10 or, if not supported, PDTCH/UBS-x with the next higher supported number x:	TU1.5 or TU3, TU50

If AMR or AMR-WB is supported by the BSS, the error performance given in tables 4.2.11-1 and 4.2.11-2 shall be met for one channel under TU50 (no SFH) propagation condition. The channel with the highest bitrate shall be tested.

If 8-PSK modulated AMR or AMR-WB is supported by the BSS, the error performance given in tables 8 and 8a shall be met for one traffic channel and corresponding associated control channel O-FACCH under TU50 (no SFH) propagation condition. The traffic channel with the highest bitrate shall be tested.

2) 200 kHz offset:

With SFH disabled, the error performance for each of the following logical channel types supported by the BSS shall be measured, each on one ARFCN, for the specified propagation conditions:

TCH/FS:	TU50
FACCH/F:	TU50
E-TCH/43.2 NT or for the highest supported data speed or PDTCH/MCS-5 or, if not supported, PDTCH/MCS-x with the next higher supported number x:	TU50
PDTCH/UAS-7 or, if not supported, PDTCH/UAS-x with the next higher supported number x	TU50
PDTCH/UBS-5 or, if not supported PDTCH/UBS-x with the next higher supported number x	TU50
PDTCH/UBS-7 or, if not supported PDTCH/UBS-x with the next higher supported number x	TU50
PDTCH/UBS-10 or, if not supported PDTCH/UBS-x with the next higher supported number x	TU50

For tests with UBS-x, the Interfering signal shall use higher symbol rate and be generated with the same modulation and pulse shaping filter as the wanted signal.

3) 400 kHz offset:

With SFH disabled, the error performance for each of the following logical channel types supported by the BSS shall be measured, each on RF channels B, M and T, for the specified propagation conditions:

TCH/FS:	TU50
E-TCH/43.2 NT or for the highest supported data speed or PDTCH/MCS-5 or, if not supported, PDTCH/MCS-x with the next higher supported number x:	TU50
PDTCH/UAS-7 or, if not supported, PDTCH/UAS-x with the next higher supported number x:	TU50
PDTCH/UBS-5 or, if not supported PDTCH/UBS-x with the next higher supported number x:	TU50
PDTCH/UBS-7 or, if not supported PDTCH/UBS-x with the next higher supported number x:	TU50
PDTCH/UBS-10 or, if not supported PDTCH/UBS-x with the next higher supported number x:	TU50

With SFH disabled, the error performance for each of the following logical channel types supported by the BSS shall be measured, each on one ARFCN, for the specified propagation profiles:

FACCH/F:	TU50
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In cases 1) and 2) above, the error performance given in tables 4.2.11-1 and 4.2.11-2 shall be met for all combinations of logical channel type, frequency of wanted signal, 0 kHz and 200 kHz frequency offset of interfering signal and multipath propagation condition tested. For 8-PSK modulated AMR and AMR-WB channels 200 kHz offset table 4.2.11-3 applies.

In case 3) above, the error performance given in tables 4.2.11-1 and 4.2.11-2 for EGPRS, ECSD and AMR-WB, and 8-PSK modulated AMR and AMR-WB channels and tables 4.2.11-4 and 4.2.11-5 for other channels shall be met for all combinations of logical channel type, frequency of wanted signal, 400 kHz frequency offset of interfering signal and multipath propagation condition tested.

The value of α in tables 4.2.11-1 to 4.2.11-5 shall be in the range 1 to 1,6, and shall be the same for both occurrences in each propagation condition; it may be different for different propagation conditions.

Pico-BTS Conformance Requirement

1) Co-channel:

With SFH disabled, the error performance for each of the following logical channel types supported by the BSS shall be measured, each on one ARFCN, for the TI5 multipath propagation profile (for GSM 400 applicable speeds are multiplied by 2):

TCH/FS:	TI5
FACCH/F:	TI5
FACCH/H:	TI5
E-FACCH/F:	TI5
SDCCH:	TI5
TCH/F9.6:	TI5
TCH/F4.8:	TI5
PDTCH/CS-1:	TI5
PDTCH/MCS-1 or, if not supported, PDTCH/MCS-x with the next higher supported number x:	TI5
PDTCH/MCS-5 or, if not supported, PDTCH/MCS-x with the next higher supported number x:	TI5
E-TCH/43.2 NT or for the highest supported data speed:	TI5
PDTCH/UAS-7 or, if not supported, PDTCH/UAS-x with the next higher supported number x:	TI5
PDTCH/UBS-5 or, if not supported PDTCH/UBS-x with the next higher supported number x:	TI5
PDTCH/UBS-7 or, if not supported PDTCH/UBS-x with the next higher supported number x:	TI5

PDTCH/UBS-10 or, if not supported
PDTCH/UBS-x with the next higher
supported number x: TI5

If AMR or AMR-WB is supported by the BSS, the error performance given in tables 4.2.11-1 and 4.2.11-2 shall be met for one channel under TI5 propagation condition. The channel with the highest bitrate shall be tested.

If 8-PSK modulated AMR or AMR-WB is supported by the BSS, the error performance given in tables 4.2.11-1 and 4.2.11-2 shall be met for one traffic channel and corresponding associated control channel O-FACCH under TI5 propagation condition. The traffic channel with the highest bitrate shall be tested.

2) 200 kHz offset:

With SFH disabled, the error performance for each of the following logical channel types supported by the BSS shall be measured, each on one ARFCN, for the TI5 multipath propagation profile:

TCH/FS: TI5

FACCH/F: TI5

E-TCH/43.2 NT or for the highest
supported data speed
or PDTCH/MCS-5 or, if not supported,
PDTCH/MCS-x with the next higher
supported number x: TI5

PDTCH/UAS-7 or, if not supported,
PDTCH/UAS-x with the next higher
supported number x: TI5

PDTCH/UBS-5 or, if not supported
PDTCH/UBS-x with the next higher
supported number x: TI5

PDTCH/UBS-7 or, if not supported
PDTCH/UBS-x with the next higher
supported number x: TI5

PDTCH/UBS-10 or, if not supported
PDTCH/UBS-x with the next higher
supported number x: TI5

3) 400 kHz offset:

With SFH disabled, the error performance for each of the following logical channel types supported by the BSS shall be measured, each on one ARFCN, for the TI5 multipath propagation profile:

TCH/FS: TI5

FACCH/F: TI5

E-TCH/43.2 NT
or for the highest supported data speed
or PDTCH/MCS-5 or, if not supported,
PDTCH/MCS-x with the next higher
supported number x: TI5

PDTCH/UAS-7 or, if not supported,
PDTCH/UAS-x with the next higher
supported number x: TI5

PDTCH/UBS-5 or, if not supported
PDTCH/UBS-x with the next higher
supported number x: TI5

PDTCH/UBS-7 or, if not supported
PDTCH/UBS-x with the next higher
supported number x:

TI5

PDTCH/UBS-10 or, if not supported
PDTCH/UBS-x with the next higher
supported number x:

TI5

In cases 1) and 2) above, the error performance given in tables 4.2.11-1 and 4.2.11-4 shall be met for all combinations of logical channel type, frequency of wanted signal, 0 kHz and 200 kHz frequency offset of interfering signal and TI5 multipath propagation condition tested. For 8-PSK modulated AMR and AMR-WB channels 200 kHz offset table 4.2.11-3 applies.

In case 3) above, the error performance given in tables 4.2.11-1 and 4.2.11-2 for EGPRS, ECSD and AMR-WB channels and tables 4.2.11-4 and 4.2.11-5 for other channels shall be met for all combinations of logical channel type, frequency of wanted signal, 400 kHz frequency offset of interfering signal and multipath propagation condition tested.

The value of α in tables 4.2.11-1 to 4.2.11-5 shall be in the range 1 to 1,6, and shall be the same for both occurrences in the TI5 propagation condition.

Table 4.2.11-1: GSM 400 and GSM900 Multipath error performance limits at RX interference level

Channel Type	Error Measure	Error Ratios for the specified propagation conditions				
		TU3 (no SFH)	TU50 (no SFH)	TU50 (ideal SFH)	RA250 (no SFH)	TI5 (no SFH)
FACCH/H	(FER)	22 %	6,7 %	6,7 %	5,7 %	6,7 %
FACCH/F	(FER)	22 %	9,5 %	3,4 %	3,5 %	9,5 %
E-FACCH/F	(FER)	5 %	5 %	5 %	5 %	5 %
SDCCH and SACCH	(FER)	22 % (*)	13 %	9 %	8,0 %	13 %
SACCH (TCH/AxS)	(FER @-3 dB)	40 % (*)	-	-	-	-
RACH	(FER)	15 %	16 %	16 %	13 %	16 %
E-TCH/F43.2 NT	(BLER)	10 %	10 %	10 %	10 %	10 %
E-TCH/F32.0 T	(BER)	0,1 %	0,1 %	0,1 %	0,1 %	0,1 %
E-TCH/F28.8 T	(BER)	0,1 %	0,1 %	0,1 %	0,1 %	0,1 %
E-TCH/F28.8 NT	(BLER)	10 %	10 %	10 %	10 %	10 %
TCH/F14.4	(BER)	10,0 %	4,5 %	3,0 %	3,0 %	4,5 %
TCH/F9.6	(BER)	8,0 %	0,80 %	0,30 %	0,2 %	0,80 %
TCH/F4.8	(BER)	3,0 %	10 ⁻⁴	10 ⁻⁴	10 ⁻⁴	10 ⁻⁴
TCH/F2.4	(BER)	3,0 %	10 ⁻⁴	10 ⁻⁵	10 ⁻⁵	10 ⁻⁴
TCH/H4.8	(BER)	8,0 %	0,80 %	0,30 %	0,20 %	0,80 %
TCH/H2.4	(BER)	4,0 %	2 10 ⁻⁴	10 ⁻⁴	10 ⁻⁴	2 10 ⁻⁴
TCH/FS	(FER)	21 α %	6,0 α %	3,0 α %	3,0 α %	6,0 α %
- class Ib	(RBER)	2,0/ α %	0,40/ α %	0,20/ α %	0,20/ α %	0,40/ α %
- class II	(RBER)	4,0 %	8,0 %	8,0 %	8,0 %	8,0 %
TCH/HS	(FER)	19,1 %	5,0 %	5,0 %	4,7 %	5,0 %
- class Ib	(RBER, BFI=0)	0,52 %	0,29 %	0,29 %	0,21 %	0,29 %
- class II	(RBER, BFI=0)	2,8 %	7,1 %	7,1 %	7,0 %	7,1 %
-	(UFR)	20,7 %	6,1 %	6,1 %	5,6 %	6,1 %
- class Ib	(RBER, UFI=0)	0,29 %	0,21 %	0,21 %	0,17 %	0,21 %
-	(EVSIDR)	21,9 %	7,0 %	7,0 %	6,3 %	7,0 %
-	(RBER, SID=2 and BFI=0)	0,02 %	0,01 %	0,01 %	0,01 %	0,01 %
-	(ESIDR)	17,1 %	3,6 %	3,6 %	3,4 %	3,6 %
-	(RBER, SID=1 or 2)	0,50 %	0,26 %	0,26 %	0,20 %	0,26 %
TCH/EFS	(FER)	23 %	9 %	3 %	4 %	9 %
- class Ib	(RBER)	0,20 %	0,20 %	0,10 %	0,13 %	0,20 %
- class II	(RBER)	3 %	7 %	8 %	8 %	7 %
TCH/AFS12.2	(FER)	22 %	6 %	3,5 %	2,5 %	6 %
- Class Ib	(RBER)	0,9 %	1,7 %	1,7 %	1,5 %	1,7 %
TCH/AFS10.2	(FER)	18 %	2,7 %	1,4 %	0,92 %	2,7 %
- Class Ib	(RBER)	0,53 %	0,3 %	0,21 %	0,16 %	0,3 %
TCH/AFS7.95	(FER)	13 % (*)	0,51 %	0,12 %	0,073 %	0,51 %

Channel Type	Error Measure	Error Ratios for the specified propagation conditions				
		TU3 (no SFH)	TU50 (no SFH)	TU50 (ideal SFH)	RA250 (no SFH)	TI5 (no SFH)
- Class Ib	(RBER)	0,66 % (*)	0,15 %	0,065 %	0,044 %	0,15 %
TCH/AFS7.95	(FER@-3dB)	26 % (*)	5,3 %	2,7 %	1,8 %	5,3 %
- Class Ib	(RBER@-3dB)	1,2 % (*)	1 %	0,78 %	0,6 %	1 %
TCH/AFS7.4	(FER)	14 % (*)	0,56 %	0,16 %	0,09 %	0,56 %
- Class Ib	(RBER)	0,43 % (*)	0,072 %	0,032 %	0,018 %	0,072 %
TCH/AFS7.4	(FER@-3dB)	26 % (*)	5,4 %	3,1 %	2 %	5,4 %
- Class Ib	(RBER@-3dB)	0,79 % (*)	0,52 %	0,38 %	0,28 %	0,52 %
TCH/AFS6.7	(FER)	11 % (*)	0,21 %	0,041 %	0,021 %	0,21 %
- Class Ib	(RBER)	0,75 % (*)	0,11 %	0,042 %	0,028 %	0,11 %
TCH/AFS6.7	(FER@-3dB)	23 % (*)	2,9 %	1,2 %	0,75 %	2,9 %
- Class Ib	(RBER@-3dB)	1,4 % (*)	0,86 %	0,6 %	0,44 %	0,86 %
TCH/AFS5.9	(FER)	10 % (*)	0,12 %	0,018 %	0,01 %	0,12 %
- Class Ib	(RBER)	0,38 % (*)	0,022 %	0,005 %	0,003 %	0,022 %
TCH/AFS5.9	(FER@-3dB)	21 % (*)	2 %	0,7 %	0,4 %	2 %
- Class Ib	(RBER@-3dB)	0,74 % (*)	0,23 %	0,12 %	0,079 %	0,23 %
TCH/AFS5.15	(FER)	9,2 % (*)	0,081 %	0,011 %	0,01 %	0,081 %
- Class Ib	(RBER)	0,44 % (*)	0,019 %	0,003 %	0,002 %	0,019 %
TCH/AFS5.15	(FER@-3dB)	19 % (*)	1,4 %	0,47 %	0,25 %	1,4 %
- Class Ib	(RBER@-3dB)	0,85 % (*)	0,22 %	0,11 %	0,069 %	0,22 %
TCH/AFS4.75	(FER)	7,9 % (*)	0,036 %	0,01 %	0,01 %	0,036 %
- Class Ib	(RBER)	0,32 % (*)	0,006 %	0,001 %	0,001 %	0,006 %
TCH/AFS4.75	(FER@-3dB)	17 % (*)	0,82 %	0,23 %	0,11 %	0,82 %
- Class Ib	(RBER@-3dB)	0,62 % (*)	0,11 %	0,033 %	0,019 %	0,11 %
TCH/AFS-INB	(FER)	1,5 % (*)	0,025 %	0,018 %	0,009 %	0,025 %
TCH/AFS-INB	(FER@-3dB)	3,5 % (*)	0,22 %	0,16 %	0,1 %	0,22 %
TCH/AFS	(EVSIDUR)	11 % (*)	1,4 % (*)	0,39 % (*)	0,46 % (*)	1,4 % (*)
TCH/AFS	(EVSIDUR@-3dB)	21 % (*)	6,3 % (*)	3,4 % (*)	3,1 % (*)	6,3 % (*)
TCH/AFS	(EVRFR)	10 % (*)	0,15 %	0,024 %	0,01 %	0,15 %
TCH/AFS	(EVRFR@-3dB)	21 % (*)	2,08 %	0,77 %	0,48 %	2,08 %
TCH/AHS7.95	(FER)	27 %	22 %	22 %	21 %	22 %
- Class Ib	(RBER)	0,84 %	2,3 %	2,3 %	2,1 %	2,3 %
- Class II	(RBER)	1,7 %	5,3 %	5,3 %	5 %	5,3 %
TCH/AHS7.95	(FER@+3dB)	14 %	6,7 %	6,7 %	7 %	6,7 %
- Class Ib	(RBER@+3dB)	0,48 %	1 %	1 %	1 %	1 %
- Class II	(RBER@+3dB)	1 %	3,2 %	3,2 %	3,2 %	3,2 %
TCH/AHS7.4	(FER)	25 %	18 %	18 %	17 %	18 %
- Class Ib	(RBER)	0,68 %	1,4 %	1,4 %	1,3 %	1,4 %
- Class II	(RBER)	1,9 %	5,6 %	5,6 %	5,4 %	5,6 %
TCH/AHS7.4	(FER@+3dB)	13 %	4,8 %	4,8 %	5,3 %	4,8 %
- Class Ib	(RBER@+3dB)	0,38 %	0,51 %	0,51 %	0,50 %	0,51 %
- Class II	(RBER@+3dB)	1,2 %	3,3 %	3,3 %	3,4 %	3,3 %
TCH/AHS6.7	(FER)	23 %	11 %	11 %	11 %	11 %
- Class Ib	(RBER)	0,71 %	1,2 %	1,2 %	1,1 %	1,2 %
- Class II	(RBER)	2,3 %	6,2 %	6,2 %	6 %	6,2 %
TCH/AHS6.7	(FER@+3dB)	11 %	2,3 %	2,3 %	2,9 %	2,3 %
- Class Ib	(RBER@+3dB)	0,39 %	0,39 %	0,39 %	0,4 %	0,39 %
- Class II	(RBER@+3dB)	1,4 %	3,6 %	3,6 %	3,6 %	3,6 %
TCH/AHS5.9	(FER)	21 %	7,1 %	7,1 %	7 %	7,1 %
- Class Ib	(RBER)	0,55 %	0,57 %	0,57 %	0,51 %	0,57 %
- Class II	(RBER)	2,6 %	6,5 %	6,5 %	6,3 %	6,5 %
TCH/AHS5.15	(FER)	17 %	3,3 %	3,3 %	3,5 %	3,3 %
- Class Ib	(RBER)	0,8 %	0,6 %	0,6 %	0,57 %	0,6 %
- Class II	(RBER)	3,1 %	6,9 %	6,9 %	6,7 %	6,9 %
TCH/AHS4.75	(FER)	15 %	1,8 %	1,8 %	2,1 %	1,8 %
- Class Ib	(RBER)	0,6 %	0,22 %	0,22 %	0,22 %	0,22 %
- Class II	(RBER)	3,6 %	7 %	7 %	6,9 %	7 %
TCH/AHS-INB	(FER)	2,7 % (*)	0,7 % (*)	0,7 % (*)	0,63 % (*)	0,7 % (*)
TCH/AHS-INB	(FER@-3dB)	6 % (*)	2,2 % (*)	2,2 % (*)	2 % (*)	2,2 % (*)
TCH/AHS	(EVSIDUR)	15 % (*)	2,5 % (*)	2,5 % (*)	3,8 % (v	2,5 % (*)
TCH/AHS	(EVSIDUR@-3dB)	28 % (*)	15 % (*)	15 % (*)	15 % (*)	15 % (*)
TCH/AHS	(EVRFR)	11 % (*)	0,51 % (*)	0,51 % (*)	0,61 % (*)	0,51 % (*)

Channel Type	Error Measure	Error Ratios for the specified propagation conditions				
		TU3 (no SFH)	TU50 (no SFH)	TU50 (ideal SFH)	RA250 (no SFH)	TI5 (no SFH)
TCH/AHS	(EVRFR@-3dB)	22 % (*)	4,4 % (*)	4,4 % v	4,1 % (*)	4,4 % (*)

Channel Type	Error Measure	Error Ratios for the specified propagation conditions				
		TU3 (no SFH)	TU50 (no SFH)	TU50 (ideal SFH)	RA250 (no SFH)	TI5 (no SFH)
PDTCH/CS-1 to 4	(BLER)	10 %	10 %	10 %	10 %	10 %
PDTCH/MCS-1 to 6	(BLER)	10 %	10 %	10 %	10 %	10 %
PDTCH/MCS-7	(BLER)	10 %	10 %	10 %	30 %	10 %
PDTCH/MCS-8	(BLER)	10 %	10 %/30 %(*)	10 %/30 %(*)	-	30 %
PDTCH/MCS-9	(BLER)	10 %	10 %/30 %(*)	10 %/30 %(*)	-	30 %
PDTCH/UAS-7 to 9	(BLER)	10 %	10 %	10 %	10 %	10 %
PDTCH/UAS-10	(BLER)	10 %	10 %	10 %	30 %	10 %
PDTCH/UAS-11	(BLER)	10 %	10 %	10 %	-	10 %
PDTCH/UBS-5 to 10	(BLER)	10 %	10 %	10 %	10 %	10 %
PDTCH/UBS-11	(BLER)	10 %	10 %	10 %	10 % (note 3)	10 %
PDTCH/UBS-12	(BLER)	10 %	10 %	10 %	30 %	10 %
PRACH/11 bit	(BLER)	15 %	15 %	15 %	15 %	15 %
PRACH/8 bit	(BLER)	15 %	15 %	15 %	15 %	15 %
PACCH	(BLER)	10 %	10 %	10 %	10 %	10 %
TCH/WFS12.65	(FER)	1 %	1 %	1 %	1 %	1 %
	(RBER)	0,08 %	0,40 %	0,63 %	0,63 %	0,40 %
TCH/ WFS8.85	(FER)	1 %	1 %	1 %	1 %	1 %
	(RBER)	0,11 %	0,42 %	0,64 %	0,73 %	0,42 %
TCH/ WFS6.60	(FER)	1 %	1 %	1 %	1 %	1 %
	(RBER)	0,09 %	0,16 %	0,27 %	0,24 %	0,16 %
O-FACCH/F	(FER)	5 %	5 %	5 %	5 %	5 %
O-FACCH/H	(FER)	5 %	5 %	5 %	5 %	5 %
O-TCH/AHS12.2	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,17 %	0,30 %	0,32 %	0,26 %	0,30 %
O-TCH/AHS10.2	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,09 %	0,15 %	0,16 %	0,20 %	0,15 %
O-TCH/AHS7.95	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,06 %	0,06 %	0,07 %	0,10 %	0,06 %
O-TCH/AHS7.4	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,08 %	0,12 %	0,13 %	0,16 %	0,12 %
O-TCH/AHS6.7	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,09 %	0,12 %	0,14 %	0,20 %	0,12 %
O-TCH/AHS5.9	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,11 %	0,16 %	0,18 %	0,17 %	0,16 %
O-TCH/AHS5.15	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,06 %	0,08 %	0,09 %	0,09 %	0,08 %
O-TCH/AHS4.75	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,08 %	0,09 %	0,10 %	0,13 %	0,09 %
O-TCH/AHS-INB	(FER)	0,5 %	0,5 %	0,5 %	0,5 %	0,5 %
O-TCH/AHS	(EVSIDUR)	1 %	1 %	1 %	1 %	1 %
O-TCH/AHS	(EVRFR)	1 %	1 %	1 %	1 %	1 %
O-TCH/WFS23.85	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,10 %	0,15 %	0,23 %	0,28 %	0,15 %
O-TCH/WFS15.85	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,26 %	0,35 %	0,60 %	0,60 %	0,35 %
O-TCH/WFS12.65	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,18 %	0,31 %	0,45 %	0,40 %	0,31 %

Channel Type	Error Measure	Error Ratios for the specified propagation conditions				
		TU3 (no SFH)	TU50 (no SFH)	TU50 (ideal SFH)	RA250 (no SFH)	TI5 (no SFH)
O-TCH/WFS8.85	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,16 %	0,22 %	0,40 %	0,42 %	0,22 %
O-TCH/WFS6.60	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,10 %	0,14 %	0,18 %	0,23 %	0,14 %
O-TCH/WFS-INB	(FER)	0,5 %	0,5 %	0,5 %	0,5 %	0,5 %
O-TCH/WFS	(EVSIDUR)	1 %	1 %	1 %	1 %	1 %
O-TCH/WFS	(EVRFR)	1 %	1 %	1 %	1 %	1 %
O-TCH/WHS12.65	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,16 %	0,27 %	0,36 %	0,32 %	0,27 %
O-TCH/WHS8.85	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,07 %	0,11 %	0,11 %	0,11 %	0,11 %
O-TCH/WHS6.60	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,09 %	0,12 %	0,13 %	0,14 %	0,12 %
O-TCH/WHS-INB	(FER)	0,5 %	0,5 %	0,5 %	0,5 %	0,5 %
O-TCH/WHS	(EVSIDUR)	1 %	1 %	1 %	1 %	1 %
O-TCH/WHS	(EVRFR)	1 %	1 %	1 %	1 %	1 %
* Co-channel interference performance is defined at 10 % BLER and adjacent channel interference performance at 30 % BLER.						
NOTE 1: For GSM 400 the speeds shall be doubled (e.g. TU50 shall be TU100).						
NOTE 2: The performance requirements for inband signalling, SID_UPDATE and RATSCCH are the same as those given for TCH/AFS. It is sufficient to test inband signalling, SID_UPDATE and RATSCCH requirements for only one of the channel types TCH/AFS and TCH/WFS.						
NOTE 3: 30 % BLER requirement apply for wanted signal narrow.						

Table 4.2.11-2: DCS 1 800 Multipath error performance limits at RX interference level

Channel Type	Error Measure	Error Ratios for the specified propagation conditions				
		TU1,5 (no SFH)	TU50 (no SFH)	TU50 (ideal SFH)	RA130 (no SFH)	TI5 (no SFH)
FACCH/H	(FER)	22 %	6,9 %	6,9 %	5,7 %	6,7 %
FACCH/F	(FER)	22 %	3,4 %	3,4 %	3,5 %	9,5 %
E-FACCH/F	(FER)	5	5 %	5 %	5 %	5 %
SDCCH and SACCH	(FER)	22 % (*)	9,0 %	9,0 %	8,0 %	13 %
SACCH (TCH/AxS)	(FER @-3 dB)	40 % (*)	-	-	-	-
RACH	(FER)	15 %	16 %	16 %	13 %	16 %
E-TCH/F43.2 NT	(BLER)	10 %	10 %	10 %	10 %	10 %
E-TCH/F32.0 T	(BER)	0,1 %	0,1 %	0,1 %	0,1 %	0,1 %
E-TCH/F28.8 T	(BER)	0,1 %	0,1 %	0,1 %	0,1 %	0,1 %
E-TCH/F28.8 NT	(BLER)	10 %	10 %	10 %	10 %	10 %
TCH/14.4	(BER)	10,0 %	4,0 %	3,1 %	3,0%	4,5 %
TCH/F9.6	(BER)	8,0 %	0,80 %	0,30 %	0,2 %	0,80 %
TCH/F4.8	(BER)	3,0 %	10 ⁻⁴	10 ⁻⁴	10 ⁻⁴	10 ⁻⁴
TCH/F2.4	(BER)	3,0 %	10 ⁻⁵	10 ⁻⁵	10 ⁻⁵	10 ⁻⁴
TCH/H4.8	(BER)	8,0 %	0,80 %	0,30 %	0,20 %	0,80 %
TCH/H2.4	(BER)	4,0 %	10 ⁻⁴	10 ⁻⁴	10 ⁻⁴	2 10 ⁻⁴
TCH/FS	(FER)	21 α %	3,0 α %	3,0 α %	3,0 α %	6,0 α %
- class Ib	(RBER)	2,0/ α %	0,25/ α %	0,25/ α %	0,20/ α %	0,40/ α %
- class II	(RBER)	4,0 %	8,1 %	8,1 %	8,0 %	8,0 %
TCH/HS	(FER)	19,1 %	5,0 %	5,0 %	4,7 %	5,0 %
- class Ib	(RBER, BFI=0)	0,52 %	0,29 %	0,29 %	0,21 %	0,29 %
- class II	(RBER, BFI=0)	2,8 %	7,2 %	7,2 %	7,0 %	7,1 %
-	(UFR)	20,7 %	6,1 %	6,1 %	5,6 %	6,1 %
- class Ib	(RBER, UFI=0)	0,29 %	0,21 %	0,21 %	0,17 %	0,21 %
-	(EVSIDR)	21,9 %	7,0 %	7,0 %	6,3 %	7,0 %
-	(RBER, SID=2 and BFI=0)	0,02 %	0,01 %	0,01 %	0,01 %	0,01 %
-	(ESIDR)	17,1 %	3,6 %	3,6 %	3,4 %	3,6 %
-	(RBER, SID=1 or 2)	0,50 %	0,26 %	0,26 %	0,20 %	0,26 %
TCH/EFS	(FER)	23 %	3 %	3 %	4 %	9 %
- class Ib	(RBER)	0,20 %	0,10 %	0,10 %	0,13 %	0,20 %

Channel Type	Error Measure	Error Ratios for the specified propagation conditions				
		TU1,5 (no SFH)	TU50 (no SFH)	TU50 (ideal SFH)	RA130 (no SFH)	TI5 (no SFH)
- class II	(RBER)	3 %	8 %	8 %	8 %	7 %
TCH/AFS12.2	(FER)	22 %	2,7 %	2,7 %	1,8 %	6 %
- Class Ib	(RBER)	0,92 %	1,6 %	1,6 %	1,4 %	1,7 %
TCH/AFS10.2	(FER)	18 %	0,98 %	0,98 %	0,56 %	2,7 %
- Class Ib	(RBER)	0,54 %	0,17 %	0,17 %	0,12 %	0,3 %
TCH/AFS7.95	(FER)	13 % (*)	0,07 %	0,07 %	0,029 %	0,51 %
- Class Ib	(RBER)	0,67 % (*)	0,042 %	0,042 %	0,03 %	0,15 %
TCH/AFS7.95	(FER@-3dB)	25 % (*)	2 %	2 %	1,2 %	5,3 %
- Class Ib	(RBER@-3dB)	1,2 % (*)	0,68 %	0,68 %	0,48 %	1 %
TCH/AFS7.4	(FER)	14 % (*)	0,083 %	0,083 %	0,047 %	0,56 %
- Class Ib	(RBER)	0,43 % (*)	0,02 %	0,02 %	0,012 %	0,072 %
TCH/AFS7.4	(FER@-3dB)	26 % (*)	2,3 %	2,3 %	1,4 %	5,4 %
- Class Ib	(RBER@-3dB)	0,8 % (*)	0,32 %	0,32 %	0,22 %	0,52 %
TCH/AFS6.7	(FER)	11 % (*)	0,025 %	0,025 %	0,01 %	0,21 %
- Class Ib	(RBER)	0,76 % (*)	0,028 %	0,028 %	0,016 %	0,11 %
TCH/AFS6.7	(FER@-3dB)	22 % (*)	0,82 %	0,82 %	0,41 %	2,9 %
- Class Ib	(RBER@-3dB)	1,4 % (*)	0,51 %	0,51 %	0,34 %	0,86 %
TCH/AFS5.9	(FER)	10 % (*)	0,01 %	0,01 %	0,01 %	0,12 %
- Class Ib	(RBER)	0,38 % (*)	0,002 %	0,002 %	0,001 %	0,022 %
TCH/AFS5.9	(FER@-3dB)	21 % (*)	0,41 %	0,41 %	0,2 %	2 %
- Class Ib	(RBER@-3dB)	0,72 % (*)	0,079 %	0,079 %	0,046 %	0,23 %
TCH/AFS5.15	(FER)	9,2 % (*)	0,01 %	0,01 %	0,01 %	0,081 %
- Class Ib	(RBER)	0,45 % (*)	0,001 %	0,001 %	0,001 %	0,019 %
TCH/AFS5.15	(FER@-3dB)	19 % (*)	0,26 %	0,26 %	0,13 %	1,4 %
- Class Ib	(RBER@-3dB)	0,84 % (*)	0,072 %	0,072 %	0,038 %	0,22 %
TCH/AFS4.75	(FER)	7,9 % (*)	0,01 %	0,01 %	-	0,036 %
- Class Ib	(RBER)	0,31 % (*)	0,001 %	0,001 %	0,001 %	0,006 %
TCH/AFS4.75	(FER@-3dB)	17 % (*)	0,1 %	0,1 %	0,051 %	0,82 %
- Class Ib	(RBER@-3dB)	0,61 % (*)	0,021 %	0,021 %	0,009 %	0,11 %
TCH/AFS-INB	(FER)	1,5 % (*)	0,013 %	0,013 %	0,008 %	0,025 %
TCH/AFS-INB	(FER@-3dB)	3,5 % (*)	0,12 %	0,12 %	0,1 %	0,22 %
TCH/AFS	(EVSIDUR)	11 % (*)	0,3 %	0,3 %	0,36 % (*)	1,4 % (*)
TCH/AFS	(EVSIDUR@-3dB)	21 % (*)	2,8 %	2,8 %	2,8 % (*)	6,3 % (*)
TCH/AFS	(EVRFR)	10 % (*)	0,022 %	0,022 %	0,005 %	0,15 %
TCH/AFS	(EVRFR@-3dB)	21 % (*)	0,78 %	0,78 %	0,28 %	2,08 %
TCH/AHS7.95	(FER)	27 %	23 %	23 %	20 %	22 %
- Class Ib	(RBER)	0,85 %	2,3 %	2,3 %	2,1 %	2,3 %
- Class II	(RBER)	1,7 %	5,1 %	5,1 %	5,1 %	5,3 %
TCH/AHS7.95	(FER@+3dB)	14 %	6,7 %	6,7 %	6,5 %	6,7 %
- Class Ib	(RBER@+3dB)	0,49 %	1 %	1 %	0,98 %	1 %
- Class II	(RBER@+3dB)	1 %	3,1 %	3,1 %	3,1 %	3,2 %
TCH/AHS7.4	(FER)	26 %	18 %	18 %	16 %	18 %
- Class Ib	(RBER)	0,69 %	1,4 %	1,4 %	1,3 %	1,4 %
- Class II	(RBER)	1,9 %	5,5 %	5,5 %	5,4 %	5,6 %
TCH/AHS7.4	(FER@+3dB)	13 %	4,9 %	4,9 %	4,8 %	4,8 %
- Class Ib	(RBER@+3dB)	0,39 %	0,51 %	0,51 %	0,47 %	0,51 %
- Class II	(RBER@+3dB)	1,2 %	3,3 %	3,3 %	3,3 %	3,3 %
TCH/AHS6.7	(FER)	23 %	12 %	12 %	9,9 %	11 %
- Class Ib	(RBER)	0,71 %	1,2 %	1,2 %	1 %	1,2 %
- Class II	(RBER)	2,3 %	6 %	6 %	6 %	6,2 %
TCH/AHS6.7	(FER@+3dB)	11 %	2,5 %	2,5 %	2,5 %	2,3 %
- Class Ib	(RBER@+3dB)	0,39 %	0,38 %	0,38 %	0,37 %	0,39 %
- Class II	(RBER@+3dB)	1,4 %	3,5 %	3,5 %	3,5 %	3,6 %
TCH/AHS5.9	(FER)	21 %	7,7 %	7,7 %	6,4 %	7,1 %
- Class Ib	(RBER)	0,55 %	0,6 %	0,6 %	0,48 %	0,57 %
- Class II	(RBER)	2,6 %	6,4 %	6,4 %	6,3 %	6,5 %
TCH/AHS5.15	(FER)	17 %	3,8 %	3,8 %	3,1 %	3,3 %
- Class Ib	(RBER)	0,8 %	0,66 %	0,66 %	0,53 %	0,6 %
- Class II	(RBER)	3,1 %	6,8 %	6,8 %	6,6 %	6,9 %
TCH/AHS4.75	(FER)	15 %	2,1 %	2,1 %	1,8 %	1,8 %
- Class Ib	(RBER)	0,6 %	0,25 %	0,25 %	0,19 %	0,22 %

Channel Type	Error Measure	Error Ratios for the specified propagation conditions				
		TU1,5 (no SFH)	TU50 (no SFH)	TU50 (ideal SFH)	RA130 (no SFH)	TI5 (no SFH)
- Class II	(RBER)	3,6 %	7 %	7 %	6,8 %	7 %
TCH/AHS-INB	(FER)	2,8 % (*)	0,71 % (*)	0,71 % (*)	0,6 % (*)	0,7 % (*)
TCH/AHS-INB	(FER@-3dB)	5,9 % (*)	2,2 % (*)	2,2 % (*)	1,8 % (*)	2,2 % (*)
TCH/AHS	(EVSIDUR)	15 % (*)	3,1 % (*)	3,1 % (*)	3,5 % (*)	2,5 % (*)
TCH/AHS	(EVSIDUR@-3dB)	28 % (*)	15 % (*)	15 % (*)	14 % (*)	15 % (*)
TCH/AHS	(EVRFR)	11 % (*)	0,53 % (*)	0,53 % (*)	0,52 % (*)	0,51 % (*)
TCH/AHS	(EVRFR@-3dB)	22 % (*)	4,5 % (*)	4,5 % (*)	3,8 % (*)	4,4 % (*)

Channel Type	Error Measure	Error Ratios for the specified propagation conditions				
		TU1,5 (no SFH)	TU50 (no SFH)	TU50 (ideal SFH)	RA130 (no SFH)	TI5 (no SFH)
PDTCH/CS-1 to 4	(BLER)	10 %	10 %	10 %	10 %	10 %
PDTCH/MCS-1 to 6	(BLER)	10 %	10 %	10 %	10 %	10 %
PDTCH/MCS-7	(BLER)	10 %	10 %	10 %	30 %	10 %
PDTCH/MCS-8	(BLER)	10 %	30 %	30 %	-	30 %
PDTCH/MCS-9	(BLER)	10 %	30 %	30 %	-	30 %
PDTCH/UAS-7 to 9	(BLER)	10 %	10 %	10 %	10 %	10 %
PDTCH/UAS-10	(BLER)	10 %	30 %/10 %(*)	30 %/10 %(*)	30 %	10 %
PDTCH/UAS-11	(BLER)	10 %	30 %	30 %	-	10 %
PDTCH/UBS-5 to 10	(BLER)	10 %	10 %	10 %	10 %	10 %
PDTCH/UBS-11	(BLER)	10 %	10 % (note 2)	10 % (note 2)	10 % (note 2)	10 % (note 2)
PDTCH/UBS-12	(BLER)	10 %	10 % (note 2)	10 % (note 2)	30 %	10 % (note 2)
PRACH/11 bit	(BLER)	15 %	15 %	15 %	15 %	15 %
PRACH/8 bit	(BLER)	15 %	15 %	15 %	15 %	15 %
PACCH	(BLER)	10 %	10 %	10 %	10 %	10 %
TCH/WFS12.65	(FER)	1 %	1 %	1 %	1 %	1 %
	(RBER)	0,08 %	0,63 %	0,63 %	0,63 %	0,40 %
TCH/ WFS8.85	(FER)	1 %	1 %	1 %	1 %	1 %
	(RBER)	0,11 %	0,64 %	0,64 %	0,73 %	0,42 %
TCH/ WFS6.60	(FER)	1 %	1 %	1 %	1 %	1 %
	(RBER)	0,09 %	0,27 %	0,27 %	0,24 %	0,16 %
O-FACCH/F	(FER)	5 %	5 %	5 %	5 %	5 %
O-FACCH/H	(FER)	5 %	5 %	5 %	5 %	5 %
O-TCH/AHS12.2	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,17 %	0,30 %	0,30 %	0,26 %	0,30 %
O-TCH/AHS10.2	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,09 %	0,13 %	0,13 %	0,20 %	0,15 %
O-TCH/AHS7.95	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,06 %	0,07 %	0,07 %	0,10 %	0,06 %
O-TCH/AHS7.4	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,08 %	0,12 %	0,12 %	0,16 %	0,12 %
O-TCH/AHS6.7	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,09 %	0,12 %	0,12 %	0,20 %	0,12 %
O-TCH/AHS5.9	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,11 %	0,15 %	0,15 %	0,17 %	0,16 %
O-TCH/AHS5.15	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,06 %	0,08 %	0,08 %	0,09 %	0,08 %
O-TCH/AHS4.75	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,08 %	0,10 %	0,10 %	0,13 %	0,09 %
O-TCH/AHS-INB	(FER)	0,5 %	0,5 %	0,5 %	0,5 %	0,5 %
O-TCH/AHS	(EVSIDUR)	1 %	1 %	1 %	1 %	1 %
O-TCH/AHS	(EVRFR)	1 %	1 %	1 %	1 %	1 %
O-TCH/WFS23.85	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,10 %	0,20 %	0,20 %	0,28 %	0,15 %
O-TCH/WFS15.85	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,26 %	0,44 %	0,44 %	0,60 %	0,35 %
O-TCH/WFS12.65	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,18 %	0,32 %	0,32 %	0,40 %	0,31 %

Channel Type	Error Measure	Error Ratios for the specified propagation conditions				
		TU1,5 (no SFH)	TU50 (no SFH)	TU50 (ideal SFH)	RA130 (no SFH)	TI5 (no SFH)
O-TCH/WFS8.85	(FER)	1 %	1 %	1 %	1 %	1 %
- class 1b	(RBER)	0,16 %	0,28 %	0,28 %	0,42 %	0,22 %
O-TCH/WFS6.60	(FER)	1 %	1 %	1 %	1 %	1 %
- class 1b	(RBER)	0,10 %	0,16 %	0,16 %	0,23 %	0,14 %
O-TCH/WFS-INB	(FER)	0,5 %	0,5 %	0,5 %	0,5 %	0,5 %
O-TCH/WFS	(EVSIDUR)	1 %	1 %	1 %	1 %	1 %
O-TCH/WFS	(EVRFR)	1 %	1 %	1 %	1 %	1 %
O-TCH/WHS12.65	(FER)	1 %	1 %	1 %	1 %	1 %
- class 1b	(RBER)	0,16 %	0,30 %	0,30 %	0,32 %	0,27 %
O-TCH/WHS8.85	(FER)	1 %	1 %	1 %	1 %	1 %
- class 1b	(RBER)	0,07 %	0,11 %	0,11 %	0,11 %	0,11 %
O-TCH/WHS6.60	(FER)	1 %	1 %	1 %	1 %	1 %
- class 1b	(RBER)	0,09 %	0,12 %	0,12 %	0,14 %	0,12 %
O-TCH/WHS-INB	(FER)	0,5 %	0,5 %	0,5 %	0,5 %	0,5 %
O-TCH/WHS	(EVSIDUR)	1 %	1 %	1 %	1 %	1 %
O-TCH/WHS	(EVRFR)	1 %	1 %	1 %	1 %	1 %
* Co-channel interference performance is defined at 30 % BLER and adjacent channel interference performance at 10 % BLER.						
NOTE 1: The performance requirements for inband signalling, SID_UPDATE and RATSCCH are the same as those given for TCH/AFS. It is sufficient to test inband signalling, SID_UPDATE and RATSCCH requirements for only one of the channel types TCH/AFS and TCH/WFS.						
NOTE 2: 30 % BLER requirement apply for wanted signal narrow.						

Table 4.2.11-3: GSM 400, GSM 900 and DCS 1 800 Multipath error performance limits at RX interference level offset 200 kHz

GSM 400 and GSM900						
Channel Type	Error Measure	Error Ratios for the specified propagation conditions				
		TU3 (no SFH)	TU50 (no SFH)	TU50 (ideal SFH)	RA250 (no SFH)	TI5 (no SFH)
O-FACCH/F	(FER)	5 %	5 %	5 %	5 %	5 %
O-FACCH/H	(FER)	5 %	5 %	5 %	5 %	5 %
O-TCH/AHS12.2	(FER)	1 %	1 %	1 %	1 %	1 %
- class 1b	(RBER)	0,15 %	0,26 %	0,28 %	0,33 %	0,26 %
O-TCH/AHS10.2	(FER)	1 %	1 %	1 %	1 %	1 %
- class 1b	(RBER)	0,11 %	0,14 %	0,14 %	0,17 %	0,14 %
O-TCH/AHS7.95	(FER)	1 %	1 %	1 %	1 %	1 %
- class 1b	(RBER)	0,07 %	0,08 %	0,07 %	0,07 %	0,08 %
O-TCH/AHS7.4	(FER)	1 %	1 %	1 %	1 %	1 %
- class 1b	(RBER)	0,11 %	0,15 %	0,15 %	0,17 %	0,15 %
O-TCH/AHS6.7	(FER)	1 %	1 %	1 %	1 %	1 %
- class 1b	(RBER)	0,08 %	0,15 %	0,16 %	0,13 %	0,15 %
O-TCH/AHS5.9	(FER)	1 %	1 %	1 %	1 %	1 %
- class 1b	(RBER)	0,08 %	0,19 %	0,22 %	0,17 %	0,19 %
O-TCH/AHS5.15	(FER)	1 %	1 %	1 %	1 %	1 %
- class 1b	(RBER)	0,05 %	0,10 %	0,08 %	0,10 %	0,10 %
O-TCH/AHS4.75	(FER)	1 %	1 %	1 %	1 %	1 %
- class 1b	(RBER)	0,06 %	0,13 %	0,11 %	0,12 %	0,13 %
O-TCH/AHS-INB	(FER)	0,5 %	0,5 %	0,5 %	0,5 %	0,5 %
O-TCH/AHS	(EVSIDUR)	1 %	1 %	1 %	1 %	1 %
O-TCH/AHS	(EVRFR)	1 %	1 %	1 %	1 %	1 %
O-TCH/WFS23.85	(FER)	1 %	1 %	1 %	1 %	1 %
- class 1b	(RBER)	0,09 %	0,17 %	0,21 %	0,26 %	0,17 %
O-TCH/WFS15.85	(FER)	1 %	1 %	1 %	1 %	1 %
- class 1b	(RBER)	0,30 %	0,45 %	0,50 %	0,60 %	0,45 %
O-TCH/WFS12.65	(FER)	1 %	1 %	1 %	1 %	1 %
- class 1b	(RBER)	0,11 %	0,35 %	0,46 %	0,46 %	0,35 %
O-TCH/WFS8.85	(FER)	1 %	1 %	1 %	1 %	1 %
- class 1b	(RBER)	0,13 %	0,35 %	0,31 %	0,29 %	0,35 %
O-TCH/WFS6.60	(FER)	1 %	1 %	1 %	1 %	1 %
- class 1b	(RBER)	0,09 %	0,15 %	0,17 %	0,16 %	0,15 %
O-TCH/WFS-INB	(FER)	0,5 %	0,5 %	0,5 %	0,5 %	0,5 %
O-TCH/WFS	(EVSIDUR)	1 %	1 %	1 %	1 %	1 %
O-TCH/WFS	(EVRFR)	1 %	1 %	1 %	1 %	1 %
O-TCH/WHS12.65	(FER)	1 %	1 %	1 %	1 %	1 %
- class 1b	(RBER)	0,17 %	0,30 %	0,33 %	0,36 %	0,30 %
O-TCH/WHS8.85	(FER)	1 %	1 %	1 %	1 %	1 %
- class 1b	(RBER)	0,09 %	0,11 %	0,12 %	0,14 %	0,11 %
O-TCH/WHS6.60	(FER)	1 %	1 %	1 %	1 %	1 %
- class 1b	(RBER)	0,07 %	0,15 %	0,17 %	0,13 %	0,15 %
O-TCH/WHS-INB	(FER)	0,5 %	0,5 %	0,5 %	0,5 %	0,5 %
O-TCH/WHS	(EVSIDUR)	1 %	1 %	1 %	1 %	1 %
O-TCH/WHS	(EVRFR)	1 %	1 %	1 %	1 %	1 %

DCS 1 800						
Channel Type	Error Measure	Error Ratios for the specified propagation conditions				
		TU1,5 (no SFH)	TU50 (no SFH)	TU50 (ideal SFH)	RA130 (no SFH)	TI5 (no SFH)
O-FACCH/F	(FER)	5 %	5 %	5 %	5 %	5 %
O-FACCH/H	(FER)	5 %	5 %	5 %	5 %	5 %
O-TCH/AHS12.2	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,15 %	0,30 %	0,30 %	0,33 %	0,26 %
O-TCH/AHS10.2	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,11 %	0,14 %	0,14 %	0,17 %	0,14 %
O-TCH/AHS7.95	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,07 %	0,08 %	0,08 %	0,07 %	0,08 %
O-TCH/AHS7.4	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,11 %	0,17 %	0,17 %	0,17 %	0,15 %
O-TCH/AHS6.7	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,08 %	0,15 %	0,15 %	0,13 %	0,15 %
O-TCH/AHS5.9	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,08 %	0,20 %	0,20 %	0,17 %	0,19 %
O-TCH/AHS5.15	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,05 %	0,11 %	0,11 %	0,10 %	0,10 %
O-TCH/AHS4.75	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,06 %	0,14 %	0,14 %	0,12 %	0,13 %
O-TCH/AHS-INB	(FER)	0,5 %	0,5 %	0,5 %	0,5 %	0,5 %
O-TCH/AHS	(EVSIDUR)	1 %	1 %	1 %	1 %	1 %
O-TCH/AHS	(EVRFR)	1 %	1 %	1 %	1 %	1 %
O-TCH/WFS23.85	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,09 %	0,18 %	0,18 %	0,26 %	0,17 %
O-TCH/WFS15.85	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,30 %	0,50 %	0,50 %	0,60 %	0,45 %
O-TCH/WFS12.65	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,11 %	0,36 %	0,36 %	0,46 %	0,35 %
O-TCH/WFS8.85	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,13 %	0,42 %	0,42 %	0,29 %	0,35 %
O-TCH/WFS6.60	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,09 %	0,20 %	0,20 %	0,16 %	0,15 %
O-TCH/WFS-INB	(FER)	0,5 %	0,5 %	0,5 %	0,5 %	0,5 %
O-TCH/WFS	(EVSIDUR)	1 %	1 %	1 %	1 %	1 %
O-TCH/WFS	(EVRFR)	1 %	1 %	1 %	1 %	1 %
O-TCH/WS12.65	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,17 %	0,32 %	0,32 %	0,36 %	0,30 %
O-TCH/WS8.85	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,09 %	0,12 %	0,12 %	0,14 %	0,11 %
O-TCH/WS6.60	(FER)	1 %	1 %	1 %	1 %	1 %
- class Ib	(RBER)	0,07 %	0,16 %	0,16 %	0,13 %	0,15 %
O-TCH/WS-INB	(FER)	0,5 %	0,5 %	0,5 %	0,5 %	0,5 %
O-TCH/WS	(EVSIDUR)	1 %	1 %	1 %	1 %	1 %
O-TCH/WS	(EVRFR)	1 %	1 %	1 %	1 %	1 %

Table 4.2.11-4: GSM 400 and GSM 900 Multipath error performance limits at RX interference level offset 400 kHz

Channel Type	Error Measure	Error Ratios for the specified propagation conditions	
		TU50 (no SFH)	TI5 (no SFH)
FACCH/F	(FER)	17,1 %	17,1 %
TCH/FS	(FER)	10,2 α %	10,2 α %
- class Ib	(RBER)	0,72/ α %	0,72/ α %
- class II	(RBER)	8,8 %	8,8 %
NOTE: For GSM 400 the speeds shall be doubled (e.g. TU50 shall be TU100).			

Table 4.2.11-5: DCS 1800 Multipath error performance limits at RX interference level offset 400 kHz

Channel Type	Error Measure	Error Ratios for the specified propagation conditions	
		TU50 (no SFH)	TI5 (no SFH)
FACCH/F	(FER)	6,1 %	17,1 %
TCH/FS	(FER)	5,1 α %	10,2 α %
- class Ib	(RBER)	0,45/ α %	0,72/ α %
- class II	(RBER)	8,9 %	8,8 %

NOTE 1: For TU 6 (ideal FH), TU3 (ideal FH) and TU1.5 (ideal FH), sufficient decorrelation cannot readily be achieved between the channel propagation conditions for each frequency hopped on. The requirements in TS 145 005 [5] for performance with TU1.5, TU3 or TU6 (ideal FH) propagation condition cannot hence be tested and are thus absent in this test specification. They are inherently tested by TU50 (ideal FH) together with TU3 (no FH), TU 6 (no FH) or TU1.5 (no FH).

NOTE 2: In certain AMR channels, two requirements are given, one at the reference interference ratio and one at 3 dB above or below the reference interference ratio. In these cases, only the requirement at 3 dB above or below the reference interference ratio needs to be tested, except those marked by an (*), where only the requirement at the reference interference ratio needs to be tested.

4.2.11.3 Conformance

Conformance tests described in clause 5.3.10 shall be carried out.

4.2.12 Blocking Characteristics

For a multicarrier BTS additionally conforming to EN 301 908-1 [i.5] and EN 301 908-18 [i.6], either the test suite of the present clause or the Out-of-band blocking requirement in clause 4.2.9 of EN 301 908-18 [i.6] can be equally applied for frequency offsets outside the relevant inband frequencies as defined in table 5.3.12-2 of present document.

4.2.12.1 Definition

Blocking and spurious response rejection is a measure of the ability of a BSS receiver to receive a wanted GSM modulated signal in the presence of an interfering signal; the level of the interfering signal is higher for the test of blocking than for spurious response.

4.2.12.2 Limit

4.2.12.2.1 Blocking

For the channels below, if supported, the measured values shall not exceed the following requirements:

Channel: TCH/FS	Limit: classII(RBER) = 2,0 %.
Channel: E-TCH/F43.2 NT or for the highest supported data speed	Limit: according to table 4.2.9-1.
Channel: PDTCH/MCS-5 or, if not supported, PDTCH/MCS-x with the next higher supported number x	Limit: according to table 4.2.9-1.
Channel: PDTCH/MCS-1 to MCS-4 if TCH/FS is not supported	Limit: according to table 4.2.9-1.

For packet-switched channels, the requirements apply for BTTI without PAN

The number of recorded frequencies for the channel type tested, at which the limits above are exceeded, shall meet all of the following requirements:

- a) For measurement frequencies which are:
 - GSM 900: 45 MHz or less from the wanted signal, the total number does not exceed six.
 - DCS 1 800: 95 MHz or less from the wanted signal, the total number does not exceed twelve.
 - GSM 400: in band frequencies, the total number does not exceed three.
- b) For measurement frequencies which are:
 - GSM 900: 45 MHz or less from the wanted signal, no more than three are consecutive.
 - DCS 1 800: 95 MHz or less from the wanted signal, no more than three are consecutive.
- c) For measurement frequencies which are:
 - GSM 900: more than 45 MHz from the wanted signal, the total number does not exceed twenty four.
 - DCS 1 800: more than 95 MHz from the wanted signal, the total number does not exceed twenty four.
 - GSM 400: out band frequencies, the total number does not exceed twenty four.
- d) For measurement frequencies which are:
 - GSM 900: more than 45 MHz below the wanted signal, no more than three are consecutive.
 - DCS 1 800: more than 95 MHz below the wanted signal, no more than three are consecutive.
 - GSM 400: out band frequencies below the wanted signal, no more than three are consecutive.

4.2.12.2.2 Spurious response

The limits below shall never be exceeded:

Channel: TCH/FS	Limit: classII (RBER) = 2,0 %.
Channel: E-TCH/F43.2 NT or the highest supported data speed	Limit: according to table 4.2.9-1.
Channel: PDTCH/MCS-5 or, if not supported, PDTCH/MCS-x with the next higher supported number x	Limit: according to table 4.2.9-1.

For packet-switched channels, the tests and requirements apply for BTTI without PAN.

4.2.12.3 Conformance

Conformance tests described in clause 5.3.12 shall be carried out.

4.2.13 Intermodulation characteristics

4.2.13.1 Definition

This test measures the linearity of the receiver RF parts. It expresses the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of two or more unwanted signals with a specific frequency relationship to the wanted signal frequency.

4.2.13.2 Limit

The RBER of TCH/FS Class II shall not exceed 2,0 %.

The BLER of E-TCH/F43.2 NT shall not exceed 10 % or BLER (or BER) of the highest supported data speed shall not exceed the values given in table 4.2.9-1.

The BLER of PDTCH/MCS-5 or, if not supported, of PDTCH/MCS-x with the next higher supported number x shall not exceed 10 %.

For packet-switched channels, the tests and requirements apply for BTTI without PAN.

If TCH/FS is not supported the BLER of the tested PDTCH/MCS-1 to MCS-4 shall not exceed the values given in table 4.2.9-1.

4.2.13.3 Conformance

Conformance tests described in clause 5.3.13 shall be carried out.

4.2.14 AM suppression

4.2.14.1 Definition

AM suppression is a measure of the ability of a BSS receiver to receive a wanted GSM modulated signal without exceeding a given degradation due to the presence of an unwanted modulated signal.

4.2.14.2 Limit

For a TCH/FS the RBER of class II, class Ib and the FER the error performance shall not exceed the values given in table 4.2.9-1.

For a E-TCH/F43.2 NT the BLER or for the highest supported data speed the BLER (or BER) performance shall not exceed the values given in table 4.2.9-1.

For a PDTCH/MCS-5 or, if not supported, for a PDTCH/MCS-x with the next higher supported number x the BLER performance shall not exceed the values given in table 4.2.9-1.

For packet-switched channels, the tests and requirements apply for BTTI without PAN.

If TCH/FS is not supported the BLER of the tested PDTCH/MCS-1 to MCS-4 shall not exceed the values given in table 4.2.9-1.

4.2.14.3 Conformance

Conformance tests described in clause 5.3.14 shall be carried out.

4.2.15 Spurious emissions from the receiver antenna connector

For a multicarrier BTS additionally conforming to EN 301 908-1 [i.5] and EN 301 908-18 [i.6], either the requirement of the present clause or the Receiver spurious emissions requirement in clause 4.2.7 of EN 301 908-18 [i.6] can be equally applied.

4.2.15.1 Definition

Spurious emissions are emissions at frequencies other than those of the BTS transmitter ARFCNs and adjacent frequencies. This test measures spurious emissions from the BTS receiver antenna connector.

4.2.15.2 Limit

The measured power shall not exceed:

- -57 dBm for all frequencies from 9 kHz up to 1 GHz.
- -47 dBm for all frequencies from 1 GHz to 12,75 GHz.

4.2.15.3 Conformance

Conformance tests described in clause 5.3.15 shall be carried out.

4.2.16 Radiated spurious emissions

For a multicarrier BTS additionally conforming to EN 301 908-1 [i.5] and EN 301 908-18 [i.6], either the requirement of the present clause or the Radiated emissions requirement in clause 4.2.3 of EN 301 908-1 [i.5] can be equally applied.

4.2.16.1 Definition

This test measures radiated spurious emissions from the BSS cabinet, including emissions due to the transmitters.

4.2.16.2 Limit

- a) The power measured within the BTS relevant transmitter band shall not exceed -36 dBm.
- b) The power measured over the frequency range 30 MHz to 12,75 GHz, excluding the BTS relevant transmitter band shall not exceed:
 - -36 dBm for frequencies up to 1 GHz.
 - -30 dBm for frequencies above 1 GHz.

4.2.16.3 Conformance

Conformance tests described in clause 5.3.16 shall be carried out.

5 Testing for compliance with technical requirements

5.1 Environmental conditions for testing

Tests defined in the present document shall be carried out at representative points within the boundary limits of the declared operational environmental profile.

Where technical performance varies subject to environmental conditions, tests shall be carried out under a sufficient variety of environmental conditions (within the boundary limits of the declared operational environmental profile) to give confidence of compliance for the affected technical requirements.

Normally it should be sufficient for all tests to be conducted using normal test conditions except where otherwise stated.

For guidance on the use of other test conditions to be used in order to show compliance reference can be made to TS 151 021 [2], clause 4.6.

Many tests in the present document are performed with appropriate frequencies in the bottom, middle and top of the operating frequency band of the BS. These are denoted as RF channels B (bottom), M (middle) and T (top) as defined in clause 3.1.

The measurement system required for each test is described in TS 151 021 [2], annex B. The measurement procedure and other information on testing of statistical parameters is provided in annexes A and C in TS 151 021 [2].

5.2 Interpretation of the measurement results

The interpretation of the results recorded in a test report for the measurements described in the present document shall be as follows:

- the measured value related to the corresponding limit will be used to decide whether an equipment meets the requirements of the present document;
- the value of the measurement uncertainty for the measurement of each parameter shall be included in the test report;
- the recorded value of the measurement uncertainty shall be, for each measurement, equal to or lower than the figures in table 5.2-1.

For the test methods, according to the present document, the measurement uncertainty figures shall be calculated and shall correspond to an expansion factor (coverage factor) $k = 1,96$ or $k = 2$ (which provide confidence levels of respectively 95 % and 95,45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)). Principles for the calculation of measurement uncertainty are contained in TR 100 028 [9].

Table 5.2-1 is based on such expansion factors.

Table 5.2-1: Maximum measurement uncertainty

Parameter			Uncertainty
Modulation accuracy	GMSK	Frequency	± 10 Hz (± 5 Hz for GSM 400)
	GMSK	Phase	1,5 degree rms; 5 degrees peak
	8-PSK	Frequency	± 16 Hz
	QPSK, 16-QAM, 32-QAM	Frequency	± 6 Hz
	8-PSK, QPSK, 16-QAM, 32-QAM	EVM	$-(0,75 + 0,025\text{RMS_EVM}) - +(0,75 + 0,025\text{RMV_EVM})$ % RMS
Transmitted RF carrier power	Absolute RF power level	power step 0	$\pm 1,0$ dB
	Relative RF power	Other power steps	$\pm 0,7$ dB
RF carrier power versus time	RF power relative	To 0 dB reference	± 10 dB
Spectrum due to modulation and wideband noise	RF power	absolute limit values	$\pm 1,0$ dB
	Relative RF power	$\delta f \leq 0,1$ MHz	$\pm 0,5$ dB
		$0,1 \text{ MHz} < \delta f \leq 1,8$ MHz	Power diff > 50 dB: $\pm 0,7$ dB Power diff ≥ 50 dB: $\pm 1,5$ dB
		$> 1,8$ MHz	$\pm 2,0$ dB
Switching transients spectrum	RF power	Absolute power level	$\pm 1,5$ dB
		Relative power	Power diff > 50 dB: $\pm 0,7$ dB Power diff ≥ 50 dB: $\pm 1,5$ dB
Conducted spurious emissions from the antenna connector	inside the BTS transmit band		$\pm 1,5$ dB
	in the receive band of the BTS elsewhere		± 3 dB
		$f \leq 2$ GHz	$\pm 1,5$ dB
		$2 \text{ GHz} < f \leq 4 \text{ GHz}$	$\pm 2,0$ dB
Intermodulation attenuation and Intra base station system intermodulation attenuation	outside RX band	$f > 4$ GHz	$\pm 4,0$ dB
		RF power; absolute limit values	$\pm 1,5$ dB
	inside RX band	RF power; relative measurements	$\pm 2,0$ dB
		RF power; absolute limit values	$+4$ dB / -3 dB
Static reference sensitivity level	RF power		$\pm 1,0$ dB
	Relative RF power	adjacent timeslots	$\pm 3,0$ dB
Multipath reference sensitivity level	RF power		$\pm 1,5$ dB
	Relative RF power		$\pm 3,0$ dB
Reference interference level	RF power		$+5$ dB / -0 dB
	Relative RF power		$\pm 1,0$ dB

Parameter			Uncertainty
Blocking characteristics	RF power, wanted signal		$\pm 1,0$ dB
	RF power, interfering signal	$f \leq 2$ GHz	$\pm 0,7$ dB
		$2 \text{ GHz} < f \leq 4 \text{ GHz}$	$\pm 1,5$ dB
		$f > 4$ GHz	$\pm 3,0$ dB
RX Intermodulation characteristics and AM suppression	RF power, wanted signal		$\pm 1,0$ dB
	RF power, interfering signals		$\pm 0,7$ dB
Radiated spurious emissions	RF power		$\pm 6,0$ dB

5.3 Essential radio test suites

The tests listed in this clause are based on GSM base station standard configuration. For other configurations some tests may need to be repeated, see annex B.

5.3.1 Modulation accuracy

5.3.1.1 Test case

All TRXs in the configuration shall be switched on, transmitting full power in all time slots for at least 1 hour before starting the test.

In case of a multicarrier BTS, the tests shall be performed with one carrier active and with the declared maximum number of carriers active at declared maximum output power equally distributed.

If the Manufacturer declares that Synthesizer Slow Frequency Hopping is supported by the BSS, the BSS shall be configured with the maximum number of TRXs with ARFCNs which shall be distributed over the entire declared bandwidth of operation for the BSS under test, and including B, M and T, and three tests shall be performed. These tests may either use a test apparatus which employs the same hopping sequence as the BSS, or a fixed frequency apparatus on the radio frequency channels B, M and T. If only Baseband SFH is supported or SFH is not supported, one test shall be performed for each of the radio frequency channels B, M and T, using different TRXs to the extent possible for the configuration. As a minimum, one time slot shall be tested on each TRX specified to be tested.

GMSK modulation

The transmitted GMSK modulated signal from the TRX under test shall be extracted in the BSSTE for a pseudo-random known bit stream of encrypted bits into the TRX modulator (the BSSTE is defined in clause B.1 in TS 151 021 [2]). The pseudo-random bit stream shall be any 148 bit sub-sequence of the 511 bit pseudo-random bit stream defined in ITU-T Recommendation O.153 [17] fascicle IV.4. This pseudo-random bit stream may be generated by another pseudo-random bit stream inserted before channel encoding in the TRX and shall generate at least 200 different bursts. The phase trajectory (phase versus time) for the useful part of the time slots (147 bits in the centre of the burst - see TS 145 004 [4] and TS 145 010 [7] for further information) shall be extracted with a resolution of at least 2 samples per modulating bit. The RF receiver parts of the BSSTE shall not limit the measurement.

The theoretical phase trajectory from the known pseudo-random bit stream shall be calculated in the BSSTE.

The phase difference trajectory shall be calculated as the difference between the measured and the theoretical phase trajectory. The mean frequency error across the burst shall then be calculated as the derivative of the regression line of the phase difference trajectory. The regression line shall be calculated using the Mean Square Error (MSE) method.

The phase error is then finally the difference between the phase difference trajectory and its linear regression line.

8-PSK, QPSK, 16-QAM and 32-QAM modulation

The transmitted 8-PSK, QPSK, 16-QAM or 32-QAM modulated signal from the TRX under test shall be extracted in the BSSTE for a pseudo-random known bit stream of encrypted bits into the TRX modulator (the BSSTE is defined in TS 151 021 [2], clause B.1). The pseudo-random bit stream shall be any bit sub-sequence of the 32 767-bit pseudo-random bit stream defined in ITU-T Recommendation O.151 [20].

The error vector between the vector representing the transmitted signal and the vector representing the error-free modulated signal defines modulation accuracy. The magnitude of the error vector is called Error Vector Magnitude (EVM). Origin suppression is defined to be the ratio of the carrier leakage to the modulated signal. For definition and calculation of EVM, see TS 145 005 [5], annex G.

The following steps 1) to 5) shall be performed according to TS 145 005 [5], clause 4.6.2 and annex G:

- 1) The RMS EVM shall be measured and calculated over the useful part of the burst (excluding tail bits) for at least 200 bursts.
- 2) The origin offset suppression shall be measured and calculated.
- 3) The frequency offset shall be measured and calculated.
- 4) The peak EVM shall be measured and calculated. The peak EVM is the peak error deviation within a burst, measured at each symbol interval, averaged over at least 200 bursts. The bursts shall have a minimum distance in time of 7 idle timeslots between them. The peak EVM values are acquired during the useful part of the burst, excluding tail bits.
- 5) The 95:th percentile EVM shall be measured and calculated. The 95:th percentile EVM is the point where 95 % of the individual EVM, measured at each symbol interval, is below that point. That is, only 5 % of the symbols are allowed to have an EVM exceeding the 95:th-percentile point. The EVM values are acquired during the useful part of the burst, excluding tail bits, over 200 bursts.

5.3.1.2 Test Environment

Normal: One test shall be performed on each of B, M and T.

Extreme Power supply: One test shall be performed on each of B, M and T.

NOTE: tests under extreme power supply are carried out at extreme temperature limits.

In case of multicarrier BTS the tests shall be performed for single carrier operation at B, M and T of the operating transmit band, and with declared maximum number of carriers distributed according to test case b) in clause 5.3.8 throughout the maximum Base Station RF bandwidth. For the test with maximum number of carriers, all carriers shall apply the same modulation type and be operated with equal maximum declared carrier power for this modulation type and this carrier configuration, where the test is repeated for each modulation type supported by the multicarrier BTS.

The results obtained shall be compared to the limits in clause 4.2.1.2 in order to prove compliance.

5.3.2 Mean transmitted RF carrier power

5.3.2.1 Test case

For a normal BTS, the power shall be measured at the input of the TX combiner or at the BSS antenna connector. For a micro-BTS, the power shall be measured at the BSS antenna connector. For a multicarrier BTS the power shall be measured at each transmitting BSS antenna connector. The Manufacturer shall declare the maximum output power of the BSS for each supported modulation at the same reference point as the measurement is made. The TX combiner shall have the maximum number of TRXs connected to it so that the measurement can be used as a reference for the measurement of transmitted carrier power versus time in clause 5.3.3.

NOTE: The value of the output power measured at the antenna connector is generally more useful for cell planning, and may be required for regulatory purposes.

All TRXs in the configuration shall be switched on transmitting full power in all time slots for at least 1 hour before starting the test.

The Manufacturer shall declare how many TRXs the BSS supports:

- 1) TRX: The TRX shall be tested at B, M and T;
- 2) TRX: The TRXs shall each be tested at B, M and T;
- 3) TRX or more: Three TRXs shall each be tested at B, M and T.

In case of multicarrier BTS the tests shall be performed for the declared number(s) of carriers, operating at maximum and equally distributed power at minimum frequency spacing and grouped at B, M and T, for each antenna connector.

In addition the test case with unequal power distribution according to clause B.2.10 in annex B shall be performed for the declared maximum number of carriers.

If the Manufacturer declares that Synthesizer Slow Frequency Hopping is supported by the BSS, the BSS shall be configured with the number of TRXs and frequency allocation defined above and SFH enabled.

The BSS under test shall be set to transmit at least 3 adjacent time slots in a TDMA-frame at the same power level. The RMS power level shall be measured on a time slot basis over the useful part of one of the active time slots and then the average of the logarithmic value taken over at least 200 time slots. Only active bursts shall be included in the averaging process. Whether SFH is supported or not, the measurement shall be carried out on all of the 3 frequencies in turn. The measurement bandwidth shall be at least 300 kHz.

For the definition of the useful part of the time slot see figure 4.2.3-1, and for further details TS 145 004 [4] and TS 145 010 [7]. For timing on a per time slot basis, in case of normal symbol rate, each time slot may contain 156,25 modulating symbols, or 2 time slots may contain 157 and 6 time slots 156 modulating symbols according to TS 145 010 [7]. In case of higher symbol rate each time slot may contain 187,5 symbols or 188,4 symbols on timeslot 0 and 4 and 187,2 symbols on the remaining timeslots in a TDMA-frame according to TS 145 010 [7].

The power shall be measured at each nominal power level as specified in clause 4.2.2. As a minimum, one time slot shall be tested on each TRX. Any TRX which is a dedicated BCCH shall only be tested at highest static power step.

5.3.2.2 Test Environment

Normal: Each TRX specified in the test case shall be tested.

Extreme power supply: One TRX shall be tested, on one ARFCN, for highest static power step only.

NOTE: Tests under extreme power supply are carried out at extreme temperature limits.

5.3.3 Transmitted RF carrier power versus time

5.3.3.1 Test case

The Manufacturer shall declare how many TRXs the BSS supports, and declare any TRXs which are a dedicated BCCH carrier:

- 1) TRX: The BSS shall not be tested.
- 2) TRX: One TRX shall be configured to support the BCCH and the other shall be tested. Tests shall be performed on B, M and T, and both TRXs shall be tested on at least one frequency.
- 3) TRX: One TRX shall be configured to support the BCCH and the other two shall be tested at B, T and B, M. Tests shall be performed on B, M and T and both TRXs shall be tested on at least one frequency.
- 4) TRX or more: One TRX shall be configured to support the BCCH and three TRXs tested, one on B, one on M and one on T.

If the Manufacturer declares that Synthesizer Slow Frequency Hopping is supported by the BSS, the BSS shall be configured with the number of TRXs activated and frequency allocation defined above and SFH enabled. The TRX configured to support the BCCH shall not be tested.

If the TRX under test supports 8-PSK and/or other modulation(s), the test shall be performed at GMSK, 8-PSK and all other supported modulations.

A single time slot in a TDMA-frame shall be activated in all TRXs to be tested, all other time slots in the TDMA-frame shall be at Pidle.

Power measurements are made with a detector bandwidth of at least 300 kHz at the BTS antenna connector, at each to symbol 14 of the midamble training sequence for each time slot. For higher symbol rate T0 is defined as center of the 16th symbol. For timing on a per time slot basis each time slot, for the normal symbol rate case, may contain 156,25 modulating symbols, or 2 time slots may contain 157 and 6 time slots 156 modulating symbols according to TS 145 010 [7]. In case of higher symbol rate each time slot may contain 187,5 symbols or 188,4 symbols on timeslot 0 and 4 and 187,2 symbols on the remaining timeslots in a TDMA-frame. Measurements shall be made at Pmax and Pmin. The time slots measured shall be displayed or stored for at least 100 complete cycles of the time slot power sequence for each measurement.

Pmax = Power measured in clause 5.3.2 (Highest Static Power Level).

Pmin = Power measured in clause 5.3.2 (Lowest Static Power Level)

Pidle Pmax -30 dB, or Pmin - 30 dB.

As a minimum, one time slot shall be tested on each TRX under test which is not a dedicated BCCH.

5.3.3.2 Test Environment

Normal.

5.3.4 Adjacent channel power

5.3.4.1 Spectrum due to modulation and wideband noise

5.3.4.1.1 Test case

The system under test shall be tested with one TRX active or with the BTS equipped with only one TRX, at three frequencies (B, M and T).

- a) All time slots shall be set up to transmit full power GMSK modulated with a pseudo-random bit sequence of encrypted bits apart from time slot 0 which shall be set up to transmit at full power but may be modulated with normal BCCH data. The pseudo-random bit sequence may be generated by another pseudo-random bit sequence inserted before channel encoding in the BSS.
- b) The power level (as used in table 4.2.4-1 in clause 4.2.4.1 shall be measured using the method of clause 5.3.2 for each power step to be tested.
- c) Using a filter and video bandwidth of 30 kHz the power shall be measured at the antenna connector on the carrier frequency. The measurement shall be gated over 50 % to 90 % of the useful part of the time slot excluding midamble, and the measured value over this part of the burst shall be averaged. The averaging shall be over at least 200 time slots and only the active burst shall be included in the averaging process. The test is performed on one timeslot and not on timeslot 0.
- d) Step c) shall be repeated with the following offsets above and below the carrier frequency:
 - 100 MHz, 200 MHz, 250 MHz, 400 kHz; and
 - 600 MHz to 1 800 kHz in steps of 200 kHz.
- e) With all time slots at the same power level, step c) and d) shall be repeated for all static power levels specified for the equipment (clause 4.2.2).
- f) With a filter and video bandwidth of 100 kHz and all time slots active, the power shall be measured at the antenna connector for frequency offsets beyond 1 800 kHz up to 2 MHz outside either side of the relevant TX band. This test shall be made in a frequency scan mode, with a minimum sweep time of 75 ms and averaged over 200 sweeps.
- g) With all time slots at the same power level, step f) shall be repeated for all static power levels specified for the equipment (clause 4.2.2).

- h) If the TRX supports QPSK, 8-PSK, 16-QAM or 32-QAM modulation, step a) to g) shall be repeated with all time slots set up to transmit with the respective modulation apart from timeslot 0 which may be modulated with normal BCCH data.

For a multicarrier BTS, the test methods and conditions in this clause apply for configurations with one carrier active. For multicarrier BTS configurations with more than one carrier active, the test in clause 5.3.8 shall be performed.

5.3.4.1.2 Test Environment

Normal.

5.3.4.2 Switching transients spectrum

5.3.4.2.1 Test case

The Manufacturer shall declare how many TRXs the BSS supports:

- 1) TRX: The TRX shall be tested at B, M and T.
- 2) TRX: One shall be configured to support the BCCH and the second TRX shall be activated and tested at B, M and T.
- 3) TRX: One shall be configured to support the BCCH and the other two shall be activated and tested. Tests shall be performed on B, M and T and both TRXs shall be tested on at least one frequency.
- 4) TRX or more: One shall be configured to support the BCCH and three TRXs shall be tested, one on B, one on M and one on T.

For a multicarrier BTS, the test is performed for a single active carrier at B, M and T for each antenna port, transmitting at declared maximum power.

If the TRX supporting the BCCH is physically different from the remaining TRX(s), it shall also be tested on B, M and T.

- a) All active time slots shall be GMSK, 8-PSK, QPSK, 16-QAM or 32-QAM modulated with a pseudo-random bit sequence apart from time slot 0 of the TRX supporting the BCCH which may be modulated with normal data. The power shall be measured at the offsets listed below from one of the carrier frequencies in the configuration with the test equipment parameters below. The reference power for relative measurements is the power measured in a bandwidth of at least 300 kHz for the TRX under test for the time slot in this test with the highest power.

Resolution bandwidth: 30 kHz.

Video bandwidth: 100 kHz.

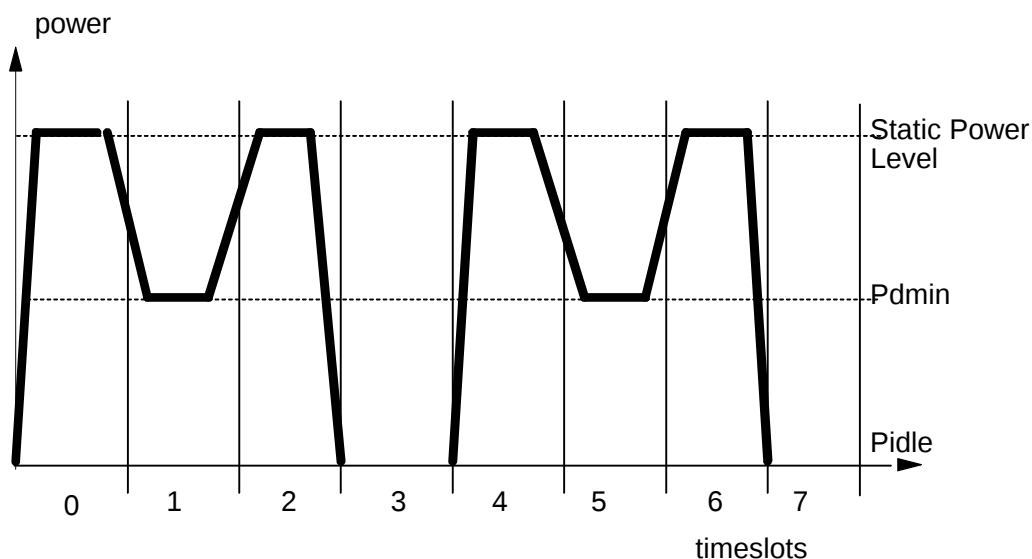
Zero frequency scan.

Peak hold enabled.

The following offsets from the carrier frequency shall be used:

- 400 kHz, 600 kHz, 1 200 kHz, and 1 800 kHz.
- b) All timeslots of the TRX or TRXs under test shall be activated at the highest level of static power control and the power measured as described in step a). If synthesizer SFH is supported, the test shall be repeated for the TRX or TRXs which are activated and which do not support the BCCH, with them hopping between B, M and T.
 - c) All timeslots of the TRX or TRXs under test shall be activated at the lowest level of static power control and the power measured as described in step a). If synthesizer SFH is supported, the test shall be repeated for the TRX or TRXs which are activated and which do not support the BCCH, with them hopping between B, M and T.

- d) Any active TRX which does not support the BCCH shall be configured with alternate timeslots active at the highest level of static power control and the remaining timeslots idle as illustrated in figure 4 and the power measured as described in step a).
- e) Any active TRX which does not support the BCCH shall be configured with alternate timeslots active at the lowest level of static power control and the remaining timeslots idle as illustrated in figure 5.3.4-2 and the power measured as described in step a).
- f) If the BSS supports dynamic downlink power control, any active TRX which does not support the BCCH shall be configured with transitions between timeslots active at the highest level of static power control and timeslots active at the lowest available level of dynamic power control and idle timeslots, as illustrated in figure 5.3.4-1 and the power measured as described in step a).



NOTE: P_{dmin} = The lowest dynamic power step measured in clause 5.3.2.

Figure 5.3.4-1: Power/time slot configuration (RF power control)

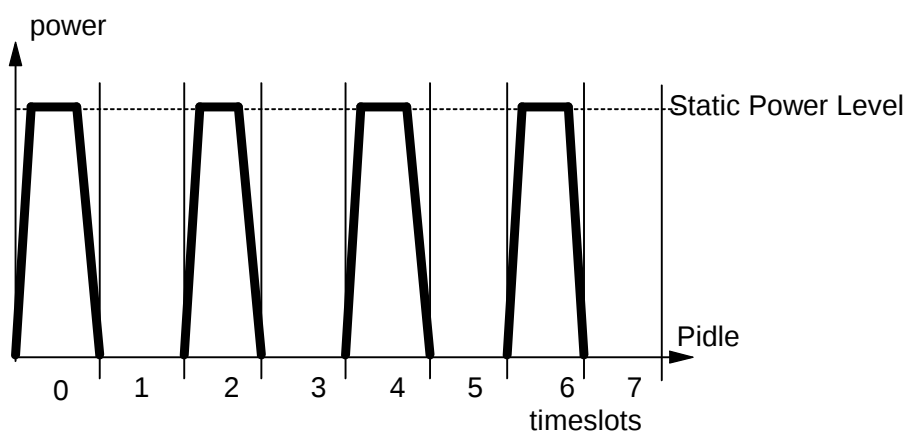


Figure 5.3.4-2: Power/time slot configuration (no RF power control)

5.3.4.2.2 Test Environment

Normal.

5.3.5 Spurious emissions from the transmitter antenna connector

5.3.5.1 Conducted spurious emissions from the transmitter antenna connector, inside the BTS transmit band

5.3.5.1.1 Test case

The BTS shall be configured with one TRX active at its maximum output power on all time slots. The test shall be performed at RF channels B, M and T. Slow frequency hopping shall be disabled.

The transmitter antenna connector shall be connected to a spectrum analyser or selective voltmeter with the same characteristic impedance. Peak hold shall be enabled. In case of multicarrier BTS average detector mode shall be enabled instead. The power shall be measured.

For frequencies with an offset of $1,8 \text{ MHz} \leq f < 6 \text{ MHz}$ from the carrier frequency, and which fall within the relevant TX band:

- The detecting device shall be configured with a resolution bandwidth of 30 kHz and a video bandwidth of approximately three times this value.

For frequencies with an offset of $\geq 6 \text{ MHz}$ from the carrier frequency, and which fall within the relevant TX band:

- The detecting device shall be configured with a resolution bandwidth of 100 kHz and a video bandwidth of approximately three times this value.

For a multicarrier BTS, the test methods and conditions in this clause apply for configurations with one carrier active. For BTS configurations with more than one carrier active, the test in clause 5.3.8 shall be performed in addition.

5.3.5.1.2 Test Environment

Normal.

5.3.5.2 Conducted spurious emissions from the transmitter antenna connector, outside the BTS transmit band

For a multicarrier BTS additionally conforming to EN 301 908-1 [i.5] and EN 301 908-18 [i.6], either the test suite of the present clause or the Transmitter spurious emissions test suite in clause 5.3.3 of EN 301 908-18 [i.6] can be equally applied for frequency offsets larger than 10 MHz outside the relevant transmit band.

5.3.5.2.1 All base stations except multicarrier BTS

5.3.5.2.1.1 Test case

- The BSS shall be configured with all transmitters active at their maximum output power on all time slots. If a TRX is designated as being a dedicated BCCH, it shall be allocated to RF channel M. All remaining TRXs shall be allocated in the following order; first to RF channel B, then to T, then distributed as evenly as possible throughout the BSS operating transmit band. Slow frequency hopping shall be disabled.
- The transmitter antenna connector shall be connected to a spectrum analyser or selective voltmeter with the same characteristic impedance.

The detecting device shall be configured with a resolution and video bandwidth of 100 kHz. The minimum sweep time shall be at least 75 ms and the response shall be averaged over 200 sweeps.

The power shall be measured over the BSS operating receive band.

- Step b) shall be repeated for the following frequency band:
 - For a GSM 900 or GSM 400 BSS, the band 1 805 MHz to 1 880 MHz.
 - For a DCS1800 or GSM 400 BSS, the band 921 MHz to 960 MHz.

- For a GSM 900, DCS 1 800 or GSM 400 BSS, the band 851 MHz to 866 MHz.
- d) The BSS shall be configured as in step a) except that each TRX which is not a dedicated BCCH shall transmit on full power on alternate time slots. The active timeslots should be the same for all TRXs. Either odd or even timeslots may be tested. If slow frequency hopping is supported, each TRX which is not a dedicated BCCH shall hop over the full range of frequencies defined in step a).

The detecting device shall be configured as defined in table 5.3.5-1. Peak hold shall be enabled, and the video bandwidth shall be approximately three times the resolution bandwidth. If this video bandwidth is not available on the detecting device, it shall be the maximum available, and at least 1 MHz.

The power shall be measured over those parts of the frequency range 100 kHz to 12,75 GHz which are outside the BTS relevant transmit band.

- e) If the manufacturer declares that the BSS protects co-coverage GSM 400 systems the following test shall be performed:

Step b) shall be repeated for the following frequency band:

- for a GSM 900 or DCS 1 800 BSS, the bands 460,4 MHz to 467,6 MHz and 488,8 MHz to 496,0 MHz.

Table 5.3.5-1: Spurious Emissions Measurements outside the transmit band

Frequency Band	Frequency offset	Resolution Bandwidth
100 kHz to 50 MHz		10 kHz
50 MHz to 500 MHz and outside the relevant transmit band	(offset from the edge of the relevant transmit band)	
	≥ 2 MHz	30 kHz
	≥ 5 MHz	100 kHz
500 MHz to 12,75 GHz and outside the relevant transmit band	(offset from the edge of the relevant transmit band)	
	≥ 2 MHz	30 kHz
	≥ 5 MHz	100 kHz
	≥ 10 MHz	300 kHz
	≥ 20 MHz	1 MHz
	≥ 30 MHz	3 MHz

5.3.5.2.1.2 Test Environment

Normal.

5.3.5.2.2 Multicarrier BTS

5.3.5.2.2.1 Test case

- a) The BSS shall be configured with the maximum number of carriers per antenna connector active at their corresponding maximum output power on all time slots. All carriers shall be distributed according to test case b) in clause 5.3.8 throughout the maximum Base Station RF bandwidth, including the lowest and highest possible RF channels. If a carrier is designated as being a dedicated BCCH, it shall be allocated to RF channel in the middle of the maximum Base Station RF bandwidth. The maximum Base Station RF bandwidth shall include RF channel B and in a repeated test RF channel T. Slow frequency hopping shall be disabled
- b) Each transmitter antenna connector shall be connected to a spectrum analyser or selective voltmeter with the same characteristic impedance.

The detecting device shall be configured with a resolution and video bandwidth of 100 kHz. The minimum sweep time shall be at least 75 ms and the response shall be averaged over 200 sweeps.

The power shall be measured over the BSS operating receive band.

- c) Step b) shall be repeated for the following frequency band:
- For a GSM 900 or GSM 400 BSS, the band 1 805 MHz to 1 880 MHz.
 - For a DCS1800 or GSM 400 BSS, the band 921 MHz to 960 MHz.
- d) The BSS shall be configured as in step a) except that each carrier which is not a dedicated BCCH shall transmit on full power on alternate time slots. The active timeslots should be the same for all carriers. Either odd or even timeslots may be tested. If slow frequency hopping is supported, each carrier which is not a dedicated BCCH shall hop over the full range of frequencies defined in step a).

The detecting device shall be configured as defined in table 5.3.2-2. Average detection shall be enabled, and the video bandwidth shall be approximately three times the resolution bandwidth. If this video bandwidth is not available on the detecting device, it shall be the maximum available, and at least 1 MHz.

The power shall be measured over those parts of the frequency range 100 kHz to 12,75 GHz which are outside the BTS relevant transmit band.

- e) If the manufacturer declares that the BSS protects co-coverage GSM 400 systems the following test shall be performed:

Step b) shall be repeated for the following frequency band:

- For a GSM 900 or DCS 1 800 BSS, the bands 460,4 MHz to 467,6 MHz and 488,8 MHz to 496,0 MHz.
- f) Test d) is repeated for two cases: when the carriers not supporting BCCH are located at minimum frequency spacing at RF channel B and upwards and when allocated at RF channel T and downwards.

Table 5.3.5-2: Spurious Emissions Measurements outside the transmit band

Frequency Band	Frequency offset	Resolution Bandwidth
100 kHz to 50 MHz		10 kHz
50 MHz to 500 MHz and outside the relevant transmit band	(offset from the edge of the relevant transmit band)	
	≥ 2 MHz	30 kHz
	≥ 5 MHz	100 kHz
500 MHz to 1000 MHz and outside the relevant transmit band	(offset from the edge of the relevant transmit band)	
	≥ 2 MHz	30 kHz
	≥ 5 MHz	100 kHz
	≥ 10 MHz	300 kHz
	≥ 20 MHz	1 MHz
	≥ 30 MHz	3 MHz
1000 MHz to 12,75 GHz and outside the relevant transmit band	(offset from the edge of the relevant transmit band)	
	≥ 2 MHz	30 kHz
	≥ 5 MHz	100 kHz
	≥ 10 MHz	1 MHz
	≥ 30 MHz	3 MHz

For multicarrier BTS the definition of the requirements are aligned with the definitions in ITU-R Recommendation SM.329 [18] and ERC/REC 74-01 [21] in that:

- Unwanted emissions in multicarrier operation are specified in clause 4.2.8 of the present document (requirements for wideband noise and intra BSS intermodulation attenuation in multicarrier operation) in present specification, both for inband and out-of band emissions up to 2*BW frequency offset from edge of relevant transmit band, where BW is the transmitter bandwidth used as the necessary bandwidth for determining the boundary between the out-of-band and spurious domains. The transmitter bandwidth is defined as the width of the frequency band covering the envelope of the transmitted carriers.
- Minimum required transmitter bandwidth for each operator is assumed to be 5 MHz, i.e. BW is 5 MHz.

- Spurious emissions according to ERC/REC 74-01 [21] definition are specified in clause 4.2.5.2 of the present document from $2 \cdot BW = 10$ MHz and higher frequency offsets. The 10 MHz spurious domain boundary applies also for larger transmitter bandwidths.
- In addition there is an upper limit for the unwanted emissions from 0 MHz to 10 MHz frequency offset outside the relevant transmit band edge according to the limits in clause 4.2.5.2.2.2 of the present document.
- The relevant transmit bands are defined in table 1-1 of the present document.

5.3.5.2.2.2 Test Environment

Normal.

5.3.5.3 Conducted spurious emissions from the transmitter antenna connector, in 3G bands outside the BTS transmit band

For a multicarrier BTS additionally conforming to EN 301 908-1 [i.5] and EN 301 908-18 [i.6], either the test suite of the present clause or the Transmitter spurious emissions test suite in clause 5.3.3 of EN 301 908-18 [i.6] can be equally applied, as stated in clause 4.2 in the present document.

5.3.5.3.1 Test case

- a) The BSS shall be configured with all transmitters active at their maximum output power on all time slots. If a TRX is designated as being a dedicated BCCH, it shall be allocated to RF channel M. All remaining TRXs shall be allocated in the following order; first to RF channel B, then to T, then distributed as evenly as possible throughout the maximum Base Station RF bandwidth. Slow frequency hopping shall be disabled.

In case of multicarrier BTS the BSS shall be configured with the maximum number of carriers per antenna connector active at their corresponding maximum output power on all time slots. All carriers shall be distributed according to test case b) in clause 5.3.8 throughout the maximum Base Station RF bandwidth, including the lowest and highest possible RF channels. If a carrier is designated as being a dedicated BCCH, it shall be allocated to RF channel in the middle of the maximum Base Station RF bandwidth. The maximum Base Station RF bandwidth shall include RF channel B and in a repeated test RF channel T. Slow frequency hopping shall be disabled.

- b) Each transmitter antenna connector shall be connected to a spectrum analyser or selective voltmeter with the same characteristic impedance.

The detecting device shall be configured with a resolution and video bandwidth of 100 kHz. The minimum sweep time shall be at least 75 ms and the response shall be averaged over 200 sweeps.

The power shall be measured for the following frequency bands:

- the band 1 900 MHz to 1 920 MHz;
- the band 1 920 MHz to 1 980 MHz;
- the band 2 010 MHz to 2 025 MHz;
- the band 2 110 MHz to 2 170 MHz;
- the band 2 300 MHz to 2 400 MHz;
- the band 2 620 MHz to 2 690 MHz.

- c) The BSS shall be configured with all transmitters active at their maximum output power on all time slots. If a TRX is designated as being a dedicated BCCH, it shall be allocated to RF channel M. All remaining TRXs shall be allocated in the following order; first to RF channel B, then to T, then distributed as evenly as possible throughout the BSS operating transmit band. Slow frequency hopping shall be disabled.

In case of multicarrier BTS the BSS shall be configured with the maximum number of carriers per antenna connector active at their corresponding maximum output power on all time slots. All carriers shall be distributed according to test case b) in clause 5.3.8 throughout the maximum Base Station RF bandwidth, including the lowest and highest possible RF channels. If a carrier is designated as being a dedicated BCCH, it shall be allocated to RF channel in the middle of the maximum Base Station RF bandwidth. The maximum Base Station RF bandwidth shall include RF channel B and in a repeated test RF channel T. Slow frequency hopping shall be disabled.

5.3.5.3.2 Test Environment

Normal.

5.3.6 Intermodulation attenuation

5.3.6.1 Test case

If SFH is supported by the BSS, it shall be disabled during this measurement.

The Manufacturer shall declare how many TRXs the BSS supports. The BSS shall be configured with the maximum number of TRXs supported. The test shall be performed for the number of TRXs and the frequencies defined in the conformance requirement.

Only the TRX under test shall be active. All remaining TRXs shall be idle on an ARFCN within the transmit **operating** band for the BSS.

NOTE: It is particularly important, for a BSS which uses a tuned transmitter combiner, that all sections of the combiner are set to frequencies within the transmit **operating** band of the BSS during this test.

The antenna output of the RF transmit equipment under test, including the combiner, shall be connected to a coupling device, presenting to the RF equipment a load with an impedance of 50 Ω . The frequency of the test signal shall be within the transmit operating band (see clause B.1.2). The test signal shall be unmodulated and the frequency shall be X MHz offset from the frequency of the RF transmit equipment under test. The TRX under test shall be set to highest static power control level and the test signal power level shall be adjusted 30 dB below this value. The test signals are illustrated in figure 5.3.6-1. The power level of the test signal shall be measured at the antenna output end of the coaxial cable, when disconnected from the RF transmit equipment and then correctly matched into 50 ohms. The antenna output power of the RF transmit equipment shall be measured directly at the antenna output terminal connected to an artificial antenna. Intermodulation product frequencies in the relevant TX band and relevant RX band shall be identified and measured according to the following process.

For the measurements in the relevant RX band:

Use a measurement and filter bandwidth of 100 kHz, frequency scan mode, averaged over 200 sweeps, with a sweep time of at least 75 ms. The frequency offset X shall be chosen to cause the lowest order intermodulation product to fall in the operating RX band.

For measurements in the relevant TX band:

i) For BTSs except multicarrier BTS:

The measurement shall be made for frequency offsets X of: 0,8 MHz, 2,0 MHz, 3,2 MHz and 6,2 MHz. The power of all third and fifth order intermodulation products shall be measured. The method of measurement specified below depends on the frequency offset of the intermodulation product from the carrier frequency:

- For measurements at frequency offsets from the active TRX of more than 6 MHz the peak power of any intermodulation components shall be measured with a bandwidth of 300 kHz, zero frequency span, over a time slot period. This shall be measured over sufficient time slots to ensure conformance according to methodology of annex A in TS 151 021 [2]. The reference power for relative measurements is the power measured in a bandwidth of at least 300 kHz for the TRX under test.

- For measurements at frequency offsets from the active TRX 1,8 MHz or less the intermodulation product power shall be measured selectively using video averaging over 50 % to 90 % of the useful part of the time slot excluding the mid-amble. The averaging shall be over at least 200 time slots and only active bursts shall be included in the averaging process. The RF and video filter bandwidth of the measuring instrument shall be 30 kHz.
- For measurements at frequency offsets in the range 1,8 to 6 MHz the intermodulation product power shall be measured in a frequency scan mode, with a minimum sweep time of 75 ms and averaged over 200 sweeps. The RF and video filter bandwidth of the measuring instrument shall be 100 kHz.

ii) For multicarrier BTS:

The measurements shall be made for frequency offsets X of: 0,8 MHz, 2,0 MHz, 3,2 MHz and 6,2 MHz. At least the power of all third and fifth order intermodulation products shall be measured at their centre frequencies and at the centre frequencies of their corresponding adjacent channels (± 200 kHz). The method of measurement specified below depends on the frequency offset of the intermodulation product from the carrier frequency:

- For measurements at frequency offsets from the active TRX of 6 MHz or more the average power of any intermodulation components shall be measured with a bandwidth of 300 kHz, zero frequency span, over a time slot period. This shall be measured over sufficient time slots to ensure conformance according to methodology of annex A in TS 151 021 [2]. The reference power for relative measurements is the power measured in a bandwidth of at least 300 kHz for the TRX under test.
- For measurements at frequency offsets in the range from 1,8 MHz up to 6 MHz the average power of any intermodulation components shall be measured with a bandwidth of 100 kHz, zero frequency span, over a time slot period. This shall be measured over sufficient time slots to ensure conformance according to methodology of annex A in TS 151 021 [2]. The reference power for relative measurements is the power measured in a bandwidth of at least 100 kHz for the TRX under test.
- For measurements at frequency offsets in the range from 1,2 MHz up to 1,8 MHz the average power of any intermodulation components shall be measured with a bandwidth of 30 kHz, zero frequency span, over a time slot period. This shall be measured over sufficient time slots to ensure conformance according to methodology of annex A in TS 151 021 [2]. The reference power for relative measurements is the power measured in a bandwidth of at least 30 kHz for the TRX under test.

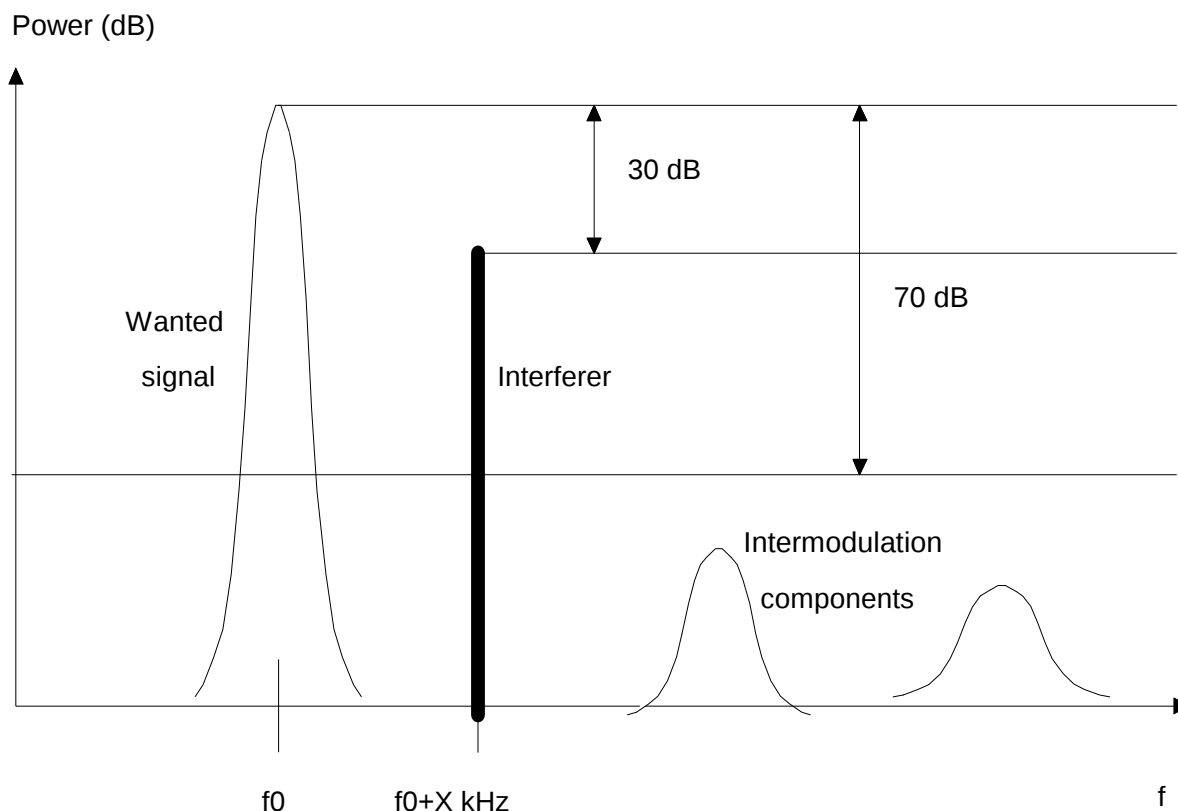


Figure 5.3.6-1: Example of TX intermodulation attenuation

5.3.6.2 Test Environment

Normal:

The following tests shall be performed, depending on the number of TRXs supported by the BSS:

- 1) TRX: The TRX shall be tested at B, M, and T.
- 2) TRX: One test shall be performed on B, M, and T. Each TRX shall be tested at least once.
- 3) or more TRX: One TRX shall be tested at B, one at M and one at T.

A multicarrier BTS shall be tested on B, M and T for each transmitting antenna connector.

5.3.7 Intra Base Station System intermodulation attenuation

5.3.7.1 Test case

If SFH is supported by the BSS, it shall be disabled during this measurement.

The BSS shall be configured with a full complement of transceivers. Each RF transmit equipment shall be operated at the maximum power specified (Highest Static Power Level in clause 4.2.2) and with modulation of a pseudo random sequence applied.

For multicarrier BTS the tests shall be performed per antenna connector for the lowest supported number of carriers (≥ 2) and the declared maximum number of carriers transmitting on equal maximum power according to the power declaration for each configuration.

In the relevant transmit band, the intermodulation components shall be measured at frequency offsets above the uppermost and below the lowermost carrier frequencies.

All intermodulation product frequencies in the relevant TX band and operating RX band shall be identified and measured according to the process below.

For the measurement in the operating RX band

The equipment shall be operated with ARFCNs such that the lowest order intermodulation product falls into the operating receive band. The measurement shall be carried out at the antenna connector of the BSS, using a frequency selective instrument.

A possible measurement set-up for this test is shown in clause B.2 in TS 151 021 [2].

For measurements in the RX band the following is the test set up:

- A filter and video bandwidth of 100 kHz.
- Frequency scan mode.
- Minimum sweep time of 75 ms and averaged over 200 sweeps.

For measurements in the relevant TX band excluding multicarrier BTS

The equipment shall be operated at equal and minimum frequency spacing specified for the BSS configuration under test.

For frequency offsets of more than 6 MHz the peak power of any intermodulation components shall be measured with a bandwidth of 300 kHz, zero frequency span, over a time slot period. This shall be measured over sufficient time slots to ensure conformance according to methodology of clause A.1 in TS 151 021 [2]. The reference power for relative measurements is the power measured in a bandwidth of at least 300 kHz for the TRX under test.

For frequency offsets 1,8 MHz or less the intermodulation product power shall be measured selectively using video averaging over 50 % to 90 % of the useful part of the time slot excluding the mid-amble. The averaging shall be over at least 200 time slots and only active bursts shall be included in the averaging process. The RF and video filter bandwidth of the measuring instrument shall be 30 kHz.

For frequency offsets in the range 1,8 to 6 MHz the intermodulation product power shall be measured in a frequency scan mode, with a minimum sweep time of 75 ms and averaged over 200 sweeps. The RF and video filter bandwidth of the measuring instrument shall be 100 kHz.

For measurements in the relevant TX band for multicarrier BTS

The tests are performed according to clause 5.3.8.

5.3.7.2 Test Environment

Normal.

5.3.8 Wideband noise and intra BSS intermodulation attenuation in multicarrier operation

5.3.8.1 Test case

If SFH is supported by the BSS, it shall be disabled during this measurement.

- a) The tests shall be performed per antenna connector for the declared maximum number of carriers transmitting on equal maximum power according to the power declaration. In addition the test shall be performed for the test case with unequal power distribution according to clause B.2.10 for the declared maximum number of carriers.
The equipment shall be operated at equal and minimum frequency spacing specified for the BSS configuration under test. The test is performed for carriers located around M.

- b) The multicarrier BTS shall be configured to operate with the the lowest supported numbers of carriers (≥ 2) and the declared maximum number of carriers transmitting on equal maximum power according to the power declaration for each configuration and distributed as described below over the corresponding declared maximum Base Station RF bandwidth, configured to include B. The test is repeated in a configuration where maximum Base Station RF bandwidth includes T.

In addition, if no third order intermodulation product at any of these configurations occurs within the relevant TX band or the maximum Transmit Filter bandwidth, whichever is smallest, the carrier frequency spacing's shall be equally reduced until one of the third order intermodulation product closest to the group of carriers occurs on one of the band edges of the applicable bandwidth, and the test is repeated. When reducing the spacing's, both carrier frequency configurations shall be tested: one where the lowest frequency is kept at B and as close as possible to the lower band edge and one where the highest frequency is kept at T and as close as possible to the upper band edge of the relevant transmit band.

- c) If the multicarrier BTS equipment according to the vendor declaration supports non-contiguous frequency allocation as defined in clause B.2.10 and four or more carriers, tests shall be performed per antenna connector with two pairs of carriers, located around M with 5,4 MHz separation between the innermost carriers of the pairs and minimum frequency spacing within the pairs. The carriers shall be operating at equal declared maximum power for this configuration.

To distribute the carriers in test case b) the difference between adjacent carrier spacing's between the carrier center frequencies shall be maximum ± 200 kHz and the third order IM products, generated by any combination of two or three frequencies, shall coincide within 400 kHz, measured at the center frequencies of the IM products. Any combination fulfilling these criteria can be used, but the same carrier frequency configuration shall be used when B or T respectively is included in the measurement.

The following procedure applies:

- 1) Calculate the maximum possible equal frequency spacing (Deq) within the declared maximum Base Station RF bandwidth (RF-BWmax). Note that the center frequencies of the outermost carriers shall be 200 kHz inside the band edges of RF-BWmax.
- 2) Allocate one carrier at lowest and one at highest frequency possible within the RF-BWmax.
- 3) Allocate the remaining carriers at frequencies shifted from one of the outermost carriers by a multiple of Deq with altering offsets. These offsets may be chosen freely to be either 0, +200 kHz or -200 kHz but the difference between two adjacent spacings shall be no more than 200 kHz. It is not allowed to set all offsets to 0. In addition the IM spread limits (IM3 to coincide within 400 kHz) shall be fulfilled.

For frequency offsets of more than 6 MHz the average power shall be measured over sufficient time slots to ensure conformance according to methodology of annex A.1. At the centre frequencies of the intermodulation components and at the centre frequencies of their adjacent channels (± 200 kHz) the measurement bandwidth shall be 300 kHz and the reference power for relative measurements shall be the power measured in a bandwidth of 300 kHz for one of the carriers under test. For other offsets the measurement bandwidth shall be 100 kHz and the reference power for relative measurements in a bandwidth of 30 kHz.

For frequency offsets in the range 1,8 MHz to 6 MHz the average power shall be measured in a frequency scan mode, with a minimum sweep time of 75 ms and averaged over 200 sweeps. At the centre frequencies of the intermodulation components and at the centre frequencies of their adjacent channels (± 200 kHz) the RF and video filter bandwidth of the measuring instrument shall be 100 kHz and the reference power for relative measurements shall be the power measured in a bandwidth of 100 kHz for one of the carriers under test. For other offsets the measurement bandwidth shall be 100 kHz and the reference power for relative measurements in a bandwidth of 30 kHz.

For measurements at frequency offsets from the outermost active carrier of 1,8 MHz or less the intermodulation product power shall be measured selectively using video averaging over 50 % to 90 % of the useful part of the time slot excluding the mid-amble. The averaging shall be over at least 200 time slots and only active bursts shall be included in the averaging process. The RF and video filter bandwidth of the measuring instrument shall be 30 kHz. The reference power for relative measurements shall be the power measured in a bandwidth of 30 kHz for one of the carriers under test.

The measurement conditions for the continuous modulation spectrum regarding frequency offsets, detector settings and measurement bandwidths shall be the same as defined in clause 5.3.4.1 for multicarrier BTS.

5.3.8.2 Test Environment

Normal.

5.3.9 Static reference sensitivity level

5.3.9.1 Test case

The test shall be performed for the specified ARFCNs. As a minimum, one time slot shall be tested on one TRX.

All TRXs in the BSS configuration shall be on and transmitting full power in all time slots.

For circuit switched channels, except ECSD with slow frequency hopping disabled and AMR-WB, and 8-PSK modulated AMR and AMR-WB channels, a test signal with normal GSM modulation shall be applied to the BSS RX antenna connector, with a power specified in table 5.3.9-1, on a chosen time slot.

For packet switched channels, for ECSD with slow frequency hopping disabled and AMR-WB, and 8-PSK modulated AMR and AMR-WB channels, a test signal with normal GSM modulation shall be applied to the BSS RX antenna connector, with a power specified in table 5.3.9-2, on a chosen time slot. For packet switched channels only BTTI without PAN need to be tested.

For BTS types other than normal, the test signal input level shall be increased by the values in table 5.3.9-3.

The two adjacent time slots shall have a level 50 dB above reference sensitivity requirement specified in table 5.3.9-1. The content of this signal shall allow the receiver of the TRX under test to either be activated or to detect valid GMSK modulated GSM signals (as specified in the conformance requirement) on the adjacent timeslots for the duration of the test. No signal should be applied during the remaining timeslots.

If Synthesizer Slow Frequency Hopping is supported by the BSS, the test shall be repeated with the following changes:

- a) The BSS shall be hopping over the maximum range and number of ARFCNs possible for the test environment and which are available in the BSS configuration.
- b) The test signal should only be applied for the timeslot under test; no signal should be applied during the remaining timeslots.

Table 5.3.9-1: Test Signal input level for Static reference sensitivity measurement for circuit switched channels except ECSD and AMR-WB channels, and 8-PSK modulated AMR and AMR-WB channels

BTS Type	Test signal Input Level GMSK
GSM 400/GSM900/DCS1800 BTS	-104 dBm
GSM900 micro-BTS M1	-97 dBm
GSM900 micro-BTS M2	-92 dBm
GSM900 micro-BTS M3	-87 dBm
GSM900 pico-BTS P1	-88 dBm
DCS1800 micro-BTS M1	-102 dBm
DCS1800 micro-BTS M2	-97 dBm
DCS1800 micro-BTS M3	-92 dBm
DCS1800 pico-BTS P1	-95 dBm

Table 5.3.9-2: Test Signal input level for Static reference sensitivity measurement for packet switched channels without PAN, ECSD and AMR-WB channels, and 8-PSK modulated AMR and AMR-WB channels

Normal BTS (GSM 400, GSM 900 and DCS 1 800)				
Type of Channel		Static	TTI (see note 2)	Comment
PDTCH/CS-1 to 3	dBm	-104	BTTI	
PDTCH/CS-4	dBm	-101	BTTI	
PRACH/11 bits	dBm	-104	-	
PRACH/8 bits	dBm	-104	-	
PACCH	dBm	-104	-	
PDTCH/MCS-1	dBm	-104	BTTI and RTTI	
PDTCH/MCS-2	dBm	-104	BTTI and RTTI	
PDTCH/MCS-3	dBm	-104	BTTI and RTTI	
PDTCH/MCS-4	dBm	-101,5	BTTI and RTTI	
PDTCH/MCS-5	dBm	-101	BTTI and RTTI	
PDTCH/MCS-6	dBm	-99,5	BTTI and RTTI	
PDTCH/MCS-7	dBm	-96	BTTI and RTTI	
PDTCH/MCS-8	dBm	-93	BTTI and RTTI	
PDTCH/MCS-9	dBm	-91,5	BTTI and RTTI	
PDTCH/UAS-7	dBm	-97,5	BTTI and RTTI	
PDTCH/UAS-8	dBm	-96,5	BTTI and RTTI	
PDTCH/UAS-9	dBm	-96	BTTI and RTTI	
PDTCH/UAS-10	dBm	-95	BTTI and RTTI	
PDTCH/UAS-11	dBm	-93	BTTI and RTTI	
PDTCH/UBS-5	dBm	-103,5	BTTI and RTTI	Input signal generated with narrow pulse-shaping filter
PDTCH/UBS-6	dBm	-101,5	BTTI and RTTI	
PDTCH/UBS-7	dBm	-95	BTTI and RTTI	
PDTCH/UBS-8	dBm	-93	BTTI and RTTI	
PDTCH/UBS-9	dBm	-91,5	BTTI and RTTI	
PDTCH/UBS-10	dBm	-88	BTTI and RTTI	
PDTCH/UBS-11	dBm	-85,5	BTTI and RTTI	
PDTCH/UBS-12	dBm	-84,5	BTTI and RTTI	Input signal generated with wide pulse-shaping filter
PDTCH/UBS-5	dBm	-104	BTTI and RTTI	
PDTCH/UBS-6	dBm	-104	BTTI and RTTI	
PDTCH/UBS-7	dBm	-101	BTTI and RTTI	
PDTCH/UBS-8	dBm	-99,5	BTTI and RTTI	
PDTCH/UBS-9	dBm	-98,5	BTTI and RTTI	
PDTCH/UBS-10	dBm	-95	BTTI and RTTI	
PDTCH/UBS-11	dBm	-93	BTTI and RTTI	
PDTCH/UBS-12	dBm	-91,5	BTTI and RTTI	
E-FACCH/F	dBm	-104		
E-TCH/F43.2 (NT)	dBm	-97		
E-TCH/F32 (T)	dBm	-104		
E-TCH/F28.8 (T)	dBm	-99,5		
E-TCH/F28.8 (NT)	dBm	-100		
TCH/WFS12.65	dBm	-104		
TCH/ WFS8.85	dBm	-104		
TCH/WFS6.60	dBm	-104		
O-FACCH/F	dBm	-104		
O-FACCH/H	dBm	-104		
O-TCH/AHS12.2	dBm	-100,5		
O-TCH/AHS10.2	dBm	-101		
O-TCH/AHS7.95	dBm	-102,5		
O-TCH/AHS7.4	dBm	-102,5		
O-TCH/AHS6.7	dBm	-103		
O-TCH/AHS5.9	dBm	-103,5		
O-TCH/AHS5.15	dBm	-104		
O-TCH/AHS4.75	dBm	-104		
O-TCH/AHS-INB (FER)	dBm	-103,5		
O-TCH/AHS (EVSIDUR)	dBm	-104		
O-TCH/AHS (EVRFR)	dBm	-104		

Normal BTS (GSM 400, GSM 900 and DCS 1 800)				
Type of Channel		Static	TTI (see note 2)	Comment
O-TCH/WFS23.85	dBm	-100,5		
O-TCH/WFS15.85	dBm	-102,5		
O-TCH/WFS12.65	dBm	-104		
O-TCH/WFS8.85	dBm	-104		
O-TCH/WFS6.60	dBm	-104		
O-TCH/WFS-INB (FER)	dBm	-104		
O-TCH/WFS (EVSIDUR)	dBm	-104		
O-TCH/WFS (EVRFR)	dBm	-104		
O-TCH/WHS12.65	dBm	-100,5		
O-TCH/WHS8.85	dBm	-102,5		
O-TCH/WHS6.60	dBm	-103		
O-TCH/WHS-INB (FER)	dBm	-103,5		
O-TCH/WHS (EVSIDUR)	dBm	-104		
O-TCH/WHS (EVRFR)	dBm	-104		

NOTE 1: Not applicable.
NOTE 2: Test Signal input levels for Static reference sensitivity apply to BTTI without PAN as well as RTTI without PAN for PDTCH indicated in the table.
NOTE 3: The requirements for all channel types assume single antenna configuration.

Table 5.3.9-3: Test signal input level corrections for different BTS Types (for table 5.3.9-2)

BTS Type	Test signal Average Input Level corrections
GSM400/GSM900 micro-BTS M1	+7 dB
GSM900 micro-BTS M2	+12 dB
GSM900 micro-BTS M3	+17 dB
GSM900 pico-BTS P1	+16 dB
DCS1800 micro-BTS M1	+2 dB
DCS1800 micro-BTS M2	+7 dB
DCS1800 micro-BTS M3	+12 dB
DCS1800 pico-BTS P1	+9 dB

The input signal before channel encoding in the BSSTE shall be compared with the signal which is obtained from the BSS receiver after channel decoding.

5.3.9.2 Test Environment

Normal.

5.3.10 Multipath Reference Sensitivity Level

5.3.10.1 Test case

As a minimum, one time slot shall be tested on one TRX.

A test signal with normal GSM modulation shall be applied to the BSS RX antenna connector through a Multipath Fading Simulator as described in clause B.1 in TS 151 021 [2], on the chosen time slot. When testing 16-QAM, 32-QAM (both normal and higher symbol rate) and QPSK modulated channels, TSC-6 shall be used for the wanted signal.

For circuit switched channels, except ECSD and AMR-WB, and 8-PSK modulated AMR and AMR-WB channels, the average signal level at the receiver antenna connector of a BTS shall be as specified in table 5.3.10-1.

For packet switched channels (GPRS, EGPRS and EGPRS2), for ECSD, for AMR-WB channels, and for 8-PSK modulated AMR and AMR-WB channels, the average signal level at the receiver antenna connector of a normal BTS for which the reference performance shall be met is specified in table 5.3.10-2, according to the type of channel and the propagation condition. For the TI5 propagation profile used for testing GSM 900 and DCS 1800 pico BTS P1 the column headed "TU50 (no FH)" shall be used. For BTS types other than normal, the levels specified in table 5.3.10-2 shall be increased by the values specified in table 5.3.10-3.

In all cases, the average signal level at the receiver shall be measured by taking the mean powers of the sum of the individual paths.

All TRXs in the BSS configuration shall be on and transmitting full power in all time slots.

For tests with TU50 (ideal SFH):

- The BSS shall be hopping over the maximum range and number of ARFCNs possible for the test environment and which are available in the BSS configuration.

For TU50 (no SFH), RA250 (no SFH), HT100 (no SFH) and TI5 (no SFH):

- If slow frequency hopping is supported by the BSS, it shall be disabled. The test shall be performed for the specified ARFCNs. A test signal with GMSK modulation shall also be applied to the RX antenna connector on the two adjacent time slots at a static power level 50 dB above the reference sensitivity requirement specified in table 5.3.10-1 of the chosen time slot over the useful part of the burst as defined in TS 145 005 [5] for the MS. The content of this signal shall allow the receiver of the TRX under test to either be activated or to detect valid GMSK modulated GSM signals (as specified in the conformance requirement) on the adjacent timeslots for the duration of the test.

Table 5.3.10-1: Test signal input level for Multipath Reference Sensitivity measurements for circuit switched channels except ECSD, AMR-WB channels and 8-PSK modulated AMR and AMR-WB channels

BTS Type	Test signal Average Input Level to receiver
GSM 400/GSM900/DCS1800 BTS	-104 dBm
GSM900 micro-BTS M1	-97 dBm
GSM900 micro-BTS M2	-92 dBm
GSM900 micro-BTS M3	-87 dBm
GSM900 pico-BTS P1	-85 dBm
DCS1800 micro-BTS M1	-102 dBm
DCS1800 micro-BTS M2	-97 dBm
DCS1800 micro-BTS M3	-92 dBm
DCS1800 pico-BTS P1	-92 dBm

Table 5.3.10-2: Test signal input level for Multipath Reference Sensitivity measurements for packet switched, ECSD and AMR-WB channels, and 8-PSK modulated AMR and AMR-WB channels

Normal BTS (GSM 400 and GSM 900)							
Type of Channel		Propagation conditions				Comments	
		TU50 (no FH)	TU50 (ideal FH)	RA250 (no FH)	HT100 (no FH)		
PDTCH/CS-1	dBm	-104	-104	-104	-103		
PDTCH/CS-2	dBm	-100	-101	-101	-99		
PDTCH/CS-3	dBm	-98	-99	-98	-96		
PDTCH/CS-4	dBm	-90	-90	*	*		
PDTCH/MCS-1	dBm	-102,5	-103	-103	-102	(6)	
PDTCH/MCS-2	dBm	-100,5	-101	-100,5	-100	(6)	
PDTCH/MCS-3	dBm	-96,5	-96,5	-92,5	-95,5	(6)	
PDTCH/MCS-4	dBm	-91	-91	*	*	(6)	
PDTCH/MCS-5	dBm	-96,5	-97	-96	-95	(6)	
PDTCH/MCS-6	dBm	-94	-94,5	-91	-91	(6)	
PDTCH/MCS-7	dBm	-89	-88,5	-87**	-86**	(6)	
PDTCH/MCS-8	dBm	-84	-84	*	-81,5**	(6)	
PDTCH/MCS-9	dBm	-80	-80	*	*	(6)	
PDTCH/UAS-7	dBm	-92	-93	-93,5	-91	(6)	
PDTCH/UAS-8	dBm	-91	-91,5	-90,5	-89	(6)	
PDTCH/UAS-9	dBm	-89	-89,5	-85,5	-86,5	(6)	
PDTCH/UAS-10	dBm	-87	-87	-84,5**	-86,5**	(6)	
PDTCH/UAS-11	dBm	-82,5	-82	*	-80,5**	(6)	
PDTCH/UBS-5	dBm	-104	-104	-104	-104	(6)	Input signal generated with wide pulse-shaping filter
PDTCH/UBS-6	dBm	-104	-104	-104	-103,5	(6)	
PDTCH/UBS-7	dBm	-99,5	-100,5	-101,5	-98,5	(6)	
PDTCH/UBS-8	dBm	-97,5	-98,5	-99,5	-95,5	(6)	
PDTCH/UBS-9	dBm	-96,5	-97	-97,5	-93	(6)	
PDTCH/UBS-10	dBm	-92,5	-93	-93	-93,5**	(6)	
PDTCH/UBS-11	dBm	-90	-90	-92,5**	-89,5**	(6)	
PDTCH/UBS-12	dBm	-88,5	-88,5	-90**	*	(6)	
PDTCH/UBS-5	dBm	*	-103,5	*	-103,5	(6)	Input signal generated with narrow pulse-shaping filter
PDTCH/UBS-6	dBm	*	-101,5	*	-101	(6)	
PDTCH/UBS-7	dBm	*	-95	*	-92,5	(6)	
PDTCH/UBS-8	dBm	*	-92,5	*	-88	(6)	
PDTCH/UBS-9	dBm	*	-91,5	*	-85	(6)	
PDTCH/UBS-10	dBm	*	-87	*	*	(6)	
PDTCH/UBS-11	dBm	*	-82	*	*	(6)	
PDTCH/UBS-12	dBm	*	-80	*	*	(6)	
E-TCH/F43.2 NT	dBm	-91	-92	-89	-89,5		
E-TCH/F32.0 T	dBm	-97,5	-100	-100	-96,5		
E-TCH/F28.8 T	dBm	-93,5	-95	-93,5	-94,5		
E-TCH/F28.8 NT	dBm	-95,5	-96,5	-96,5	-96		
E-FACCH/F	dBm	-101	-102	-102	-98		
PRACH/11 bits	dBm	-104	-104	-103	-103		
PRACH/8 bits	dBm	-104	-104	-103	-103		
PACCH	dBm	-104	-104	-104	-103		
TCH/WFS12.65	dBm	-99,5	-100,5	-101	-99		
TCH/ WFS8.85	dBm	-102	-103,5	-104	-102		
TCH/ WFS6.60	dBm	-103	-104	-104	-103,5		
O-FACCH/F	dBm	-100,5	-101,5	-101,5	-100		
O-FACCH/H	dBm	-100,5	-100,5	-101	-99		
O-TCH/AHS12.2	dBm	-94,5	-95	-94	-92,5		
O-TCH/AHS10.2	dBm	-95,5	-96	-95	-93,5		
O-TCH/AHS7.95	dBm	-96,5	-97	-96,5	-94,5		
O-TCH/AHS7.4	dBm	-97,5	-97,5	-97	-95		
O-TCH/AHS6.7	dBm	-98	-98,5	-97,5	-95,5		
O-TCH/AHS5.9	dBm	-98	-98,5	-98,5	-96,5		
O-TCH/AHS5.15	dBm	-98,5	-99	-98,5	-97		
O-TCH/AHS4.75	dBm	-99,5	-99,5	-99,5	-97,5		
O-TCH/AHS-INB (FER)	dBm	-99	-99,5	-98,5	-98		
O-TCH/AHS (EVSIDUR)	dBm	-100,5	-101,5	-101,5	-99		

Normal BTS (GSM 400 and GSM 900)							
Type of		Propagation conditions					Comments
Channel		TU50 (no FH)	TU50 (ideal FH)	RA250 (no FH)	HT100 (no FH)		
O-TCH/AHS (EVRFR)	dBm	-101	-101,5	-101,5	-99		
O-TCH/WFS23.85	dBm	-95	-96,5	-97	-94,5		
O-TCH/WFS15.85	dBm	-97,5	-99	-100,5	-97		
O-TCH/WFS12.65	dBm	-99	-100	-101	-98,5		
O-TCH/WFS8.85	dBm	-100,5	-102	-102,5	-100,5		
O-TCH/WFS6.60	dBm	-101,5	-103	-103,5	-101,5		
O-TCH/WFS-INB (FER)	dBm	-103,5	-103,5	-104	-103		
O-TCH/WFS (EVSIDUR)	dBm	-100	-102	-101	-99,5		
O-TCH/WFS (EVRFR)	dBm	-101	-103	-103	-101		
O-TCH/WHS12.65	dBm	-94,5	-95	-93,5	-92,5		
O-TCH/WHS8.85	dBm	-96	-96,5	-96	-94		
O-TCH/WHS6.60	dBm	-98	-98,5	-97,5	-96		
O-TCH/WHS-INB (FER)	dBm	-99	-99,5	-98,5	-98		
O-TCH/WHS (EVSIDUR)	dBm	-100,5	-101,5	-101,5	-99		
O-TCH/WHS (EVRFR)	dBm	-101	-101,5	-101,5	-99		

Normal BTS (DCS 1 800)							
Type of		Propagation conditions					Comments
Channel		TU50 (no FH)	TU50 (ideal FH)	RA130 (no FH)	HT100 (no FH)		
PDTCH/CS-1	dBm	-104	-104	-104	-103		
PDTCH/CS-2	dBm	-100	-100	-101	-99		
PDTCH/CS-3	dBm	-98	-98	-98	-94		
PDTCH/CS-4	dBm	-88	-88	*	*		
PDTCH/MCS-1	dBm	-102,5	-103	-103	-101,5	(6)	
PDTCH/MCS-2	dBm	-100,5	-101	-100,5	-99,5	(6)	
PDTCH/MCS-3	dBm	-96,5	-96,5	-92,5	-94,5	(6)	
PDTCH/MCS-4	dBm	-90,5	-90,5	*	*	(6)	
PDTCH/MCS-5	dBm	-95,5	-97	-96	-93	(6)	
PDTCH/MCS-6	dBm	-94	-94	-91	-85,5	(6)	
PDTCH/MCS-7	dBm	-87	-86,5	-87**	*	(6)	
PDTCH/MCS-8	dBm	-86,5**	-86,5**	*	*	(6)	
PDTCH/MCS-9	dBm	-83**	-83**	*	*	(6)	
PDTCH/UAS-7	dBm	-92,5	-92,5	-93,5	-85	(6)	
PDTCH/UAS-8	dBm	-91	-91	-90,5	-87,5**	(6)	
PDTCH/UAS-9	dBm	-89	-89	-85,5	-81,5**	(6)	
PDTCH/UAS-10	dBm	-85	-85	-84,5**	*	(6)	
PDTCH/UAS-11	dBm	-86**	-86**	*	*	(6)	
PDTCH/UBS-5	dBm	-104	-104	-104	-104	(6)	Input signal generated with wide pulse-shaping filter
PDTCH/UBS-6	dBm	-104	-104	-104	-104	(6)	
PDTCH/UBS-7	dBm	-100,5	-100,5	-101,5	-97,5	(6)	
PDTCH/UBS-8	dBm	-98,5	-98,5	-99,5	-97	(6)	
PDTCH/UBS-9	dBm	-97	-97	-97,5	-94,5	(6)	
PDTCH/UBS-10	dBm	-92,5	-92,5	-93	-91,5**	(6)	
PDTCH/UBS-11	dBm	-88,5	-88,5	-92,5**	*	(6)	
PDTCH/UBS-12	dBm	-86,5	-86,5	-90**	*	(6)	
PDTCH/UBS-5	dBm	*	-103,5	*	-103,5	(6)	Input signal generated with narrow pulse-shaping filter
PDTCH/UBS-6	dBm	*	-101,5	*	-101	(6)	
PDTCH/UBS-7	dBm	*	-95	*	-89,5	(6)	
PDTCH/UBS-8	dBm	*	-92,5	*	-92**	(6)	
PDTCH/UBS-9	dBm	*	-91,5	*	-88,5**	(6)	
PDTCH/UBS-10	dBm	*	-87	*	*	(6)	
PDTCH/UBS-11	dBm	*	-82	*	*	(6)	
PDTCH/UBS-12	dBm	*	-80	*	*	(6)	

Normal BTS (DCS 1 800)							
Type of		Propagation conditions					Comments
Channel		TU50 (no FH)	TU50 (ideal FH)	RA130 (no FH)	HT100 (no FH)		
E-TCH/F43.2 NT	dBm	-91,5	-91,5	-88,5	-86		
E-TCH/F32.0 T	dBm	-98,5	-100	-100	-97		
E-TCH/F28.8 T	dBm	-94,5	-95	-92,5	-93		
E-TCH/F28.8 NT	dBm	-96	-96,5	-96	-95		
E-FACCH/F	dBm	-102	-102	-102	-98		
PRACH/11 bits	dBm	-104	-104	-103	-103		
PRACH/8 bits	dBm	-104	-104	-103	-103		
PACCH	dBm	-104	-104	-104	-103		
TCH/WFS12.65	(dBm)	-100,5	-100,5	-101	-99		
TCH/ WFS8.85	(dBm)	-103,5	-103,5	-104	-102		
TCH/ WFS6.60	(dBm)	-104	-104	-104	-103,5		
O-FACCH/F	dBm	-100,5	-100,5	-101,5	-100		
O-FACCH/H	dBm	-100	-100	-101	-99		
O-TCH/AHS12.2	dBm	-94,5	-94,5	-94	-92		
O-TCH/AHS10.2	dBm	-95,5	-95,5	-95	-93		
O-TCH/AHS7.95	dBm	-96,5	-96,5	-96,5	-94		
O-TCH/AHS7.4	dBm	-97	-97	-97	-94,5		
O-TCH/AHS6.7	dBm	-98	-98	-97,5	-95,5		
O-TCH/AHS5.9	dBm	-98,5	-98,5	-98,5	-96		
O-TCH/AHS5.15	dBm	-99	-99	-98,5	-97		
O-TCH/AHS4.75	dBm	-99,5	-99,5	-99,5	-97,5		
O-TCH/AHS-INB (FER)	dBm	-99	-99	-98,5	-97,5		
O-TCH/AHS (EVSIDUR)	dBm	-97,5	-97,5	-101,5	-99		
O-TCH/AHS (EVRFR)	dBm	-101	-101	-101,5	-99		
O-TCH/WFS23.85	dBm	-96	-96	-97	-94		
O-TCH/WFS15.85	dBm	-98,5	-98,5	-100,5	-97		
O-TCH/WFS12.65	dBm	-100	-100	-101	-98,5		
O-TCH/WFS8.85	dBm	-102	-102	-102,5	-100,5		
O-TCH/WFS6.60	dBm	-102,5	-102,5	-103,5	-101,5		
O-TCH/WFS-INB (FER)	dBm	-103	-103	-104	-102,5		
O-TCH/WFS (EVSIDUR)	dBm	-101	-101	-101	-99		
O-TCH/WFS (EVRFR)	dBm	-102,5	-102,5	-103	-101		
O-TCH/WHS12.65	dBm	-94,5	-94,5	-93,5	-92		
O-TCH/WHS8.85	dBm	-96	-96	-96	-94		
O-TCH/WHS6.60	dBm	-98	-98	-97,5	-95,5		
O-TCH/WHS-INB (FER)	dBm	-99	-99	-98,5	-97,5		
O-TCH/WHS (EVSIDUR)	dBm	-97,5	-97,5	-101,5	-99		
O-TCH/WHS (EVRFR)	dBm	-101	-101	-101,5	-99		

NOTE 1: PDTCH/CS-4, MCS-x and UAS-x shall not be tested for the propagation conditions marked as (*).

NOTE 2: For GSM 400 the speeds shall be doubled (e.g. TU50 shall be TU100).

NOTE 3: Performance is specified at 30 % BLER for those cases marked as (**).

NOTE 4: Not applicable.

NOTE 5: PDTCH/UBS-5 to 12 requirements assume that two-antenna receive diversity is used. The input signals shall use higher symbol rate and be generated with the applicable pulse-shaping filter.

NOTE 6: Only BTTI without PAN need to be tested.

Table 5.3.10-3: Test signal input level corrections for different BTS Types (for table 5.3.10-2)

BTS Type	Test signal Average Input Level corrections
GSM900 micro-BTS M1	+7 dB
GSM900 micro-BTS M2	+12 dB
GSM900 micro-BTS M3	+17 dB
GSM900 pico-BTS P1	+19 dB
DCS1800 micro-BTS M1	+2 dB
DCS1800 micro-BTS M2	+7 dB
DCS1800 micro-BTS M3	+12 dB
DCS1800 pico-BTS P1	+12 dB

The input signal before channel encoding in the BSSTE shall be compared with the signal which is obtained from the BSS receiver after channel decoding.

5.3.10.2 Test Environment

Normal.

5.3.11 Reference Interference Level

5.3.11.1 Test case

If Slow Frequency Hopping (SFH) is supported by the BSS, it shall be disabled during this measurement, except when performing tests using propagation conditions with ideal SFH.

When SFH is used in the test, the BSS shall hop over the maximum range and number of ARFCNs possible for the test environment and which are available in the BSS configuration. If SFH is not supported, the test shall be performed on the specified number of ARFCNs. As a minimum, one time slot shall be tested on one TRX.

The tests shall be performed in a single-antenna configuration except in case of packet-switched channels with higher symbol rate where two-antenna configuration with no correlation or gain difference between the branches is used.

Two input signals shall be connected to the respective receiver connector via a combining network. When testing each signal shall be connected through a Multipath Fading Simulator (MFS) as described in clause B.1 in TS 151 021 [2], except in the cases of frequency offsets of the interfering signal from the wanted signal of 400 kHz or greater, where the interferer shall be static, unless otherwise stated in tables 5.3.11-2 and 5.3.10-3. The multipath fading propagation conditions shall be uncorrelated.

The referred power level for both signals shall be the average power into the BSS RX antenna connector. This shall be measured by taking the mean powers of the sum of the individual paths.

For GMSK modulated circuit switched channels except AMR-WB, the wanted signal shall have the power level as defined in table 5.3.11-1. It shall have normal GSM modulation. In the case of a pico-BTS, the power level defined in table 5.3.11-1 (*) shall be 4 dB greater for measurements performed with interferer offsets of 400 kHz or greater.

For packet switched channels, ECSD and for AMR-WB, and for 8-PSK modulated AMR and AMR-WB channels, the wanted signal level shall be $(X-9\text{dB}+I_r)$, where "X" is the power level defined in table 5.3.11-1 and " I_r " is the co-channel interference ratio defined in table 5.3.11-4. As an exception, the wanted signal level shall be $(X+9\text{dB}+I_r)$ for packet-switched channels with QPSK, 16-QAM and 32-QAM modulation in the case of 200 kHz adjacent channel interference, where "X" is the power level defined in table 5.3.11-1 and " I_r " the interference ratio in table 5.3.11-5.

Table 5.3.11-1: Test signal average input level for Reference Interference Level measurements

BTS Type	Test signal average input level to receiver
GSM 400 /GSM900/DCS1800 BTS	-84 dBm
GSM900 micro-BTS M1	-77 dBm
GSM900 micro-BTS M2	-72 dBm
GSM900 micro-BTS M3	-67 dBm
GSM900 pico-BTS P1	-68 dBm *
DCS1800 micro-BTS M1	-82 dBm
DCS1800 micro-BTS M2	-77 dBm
DCS1800 micro-BTS M3	-72 dBm
DCS1800 pico-BTS P1	-75 dBm *

The interfering signal shall be continuous and have GSM modulation of a pseudo-random bitstream without midamble. If the TRX supports 8-PSK, 16-QAM or 32-QAM at normal symbol rate it shall be tested with the interfering signal having GMSK modulation and with the interfering signal having 8-PSK modulation, unless it can be demonstrated that it is sufficient to test either with GMSK or 8-PSK modulated interfering signal.

If the wanted signal has higher symbol rate, the TRX shall be tested for adjacent (200 kHz) channel interference performance with an interfering signal at higher symbol rate, using the same modulation and pulse shaping filter as the wanted signal, while co-channel interference performance and adjacent (400 kHz) channel interference performance shall be tested with the interfering signal having GMSK modulation and with the interfering signal having 8-PSK modulation. If the TRX does not support 8-PSK it shall be tested with the interfering signal having GMSK modulation. For SFH this interferer shall consist of either one signal which hops in synchronization with the time slot under test or a number of fixed frequency signal sources. In the latter case the number of interfering sources determines the number of frequencies over which the time slot under test can hop in the test environment irrespective of the upper limit of the BTS.

For packet-switched channels only BTTI without PAN need to be tested.

When testing 16-QAM, 32-QAM (both normal and higher symbol rate) and QPSK modulated channels TSC-6 shall be used for the wanted signal.

For GMSK modulated circuit switched channels except AMR-WB, the test shall be performed with frequency offsets of the interfering signal from the wanted signal, for a relative level of interfering signal above the wanted signal as specified in table 5.3.11-2. In some cases a second requirement is specified, where the interference ratio in table 5.3.11-2 shall be increased or decreased by 3 dB. In these cases the Error measures are noted as FER@+3dB or FER@-3dB respectively.

For packet switched channels, ECSD and AMR-WB, and 8-PSK modulated AMR and AMR-WB channels, the test shall be performed with frequency offsets of the interfering signal from the wanted signal, for a carrier to interferer ratio, relative to the co-channel interference ratio (C/I_c), as specified in table 5.3.11-3. The minimum co-channel interference ratio (C/I_c) for all the combinations of packet switched logical channel type and propagation condition are as specified in table 5.3.11-4.

In the case of Slow Frequency Hopping (SFH) the interfering signal shall be on the same ARFCN as the wanted signal over the useful part of the time slot burst. For offsets greater than 0 kHz only the multipath propagation condition TU50 (no SFH) need be tested for normal and micro-BTS systems, and only the multipath propagation condition TI5 (no SFH) need be tested for pico-BTS systems.

Table 5.3.11-2: Co-channel and adjacent channel interference rejections for circuit switched channels except ECSD and AMR-WB channels, and 8-PSK modulated AMR and AMR-WB channels

Interferers offset:	Carrier to Interferer Ratio:		Fading of interferer
	Normal and Micro-BTS	Pico-BTS	
0 kHz	9 dB	13 dB	yes
200 kHz	-9 dB	-5 dB	yes
400 kHz	-41 dB	-37 dB	no

Table 5.3.11-3: Co-channel and adjacent channel interference ratios for packet switched channels, for ECSD and for AMR-WB channels, and for 8-PSK modulated AMR and AMR-WB channels

Modulation of wanted signal	GMSK	8-PSK	16-QAM and 32-QAM with normal symbol rate	QPSK, 16-QAM and 32-QAM with higher symbol rate	
Interferers offset:	Carrier to Interferer Ratio	Carrier to Interferer Ratio	Carrier to Interferer Ratio	Carrier to Interferer Ratio	Fading of interferer
0 kHz	C/Ic (table 5.3.11-4)	C/Ic (table 5.3.11-4)	C/Ic (table 5.3.11-4)	C/Ic (table 5.3.11-4)	yes
200 kHz	C/Ic - 18 dB	table 5.3.11-5	table 5.3.11-5	table 5.3.11-5	yes
400 kHz	C/Ic - 50 dB	C/Ic - 50 dB	C/Ic - 48 dB	C/Ic - 44,5 dB (QPSK) C/Ic - 43 dB (16-QAM) C/Ic - 42,5 dB (32-QAM)	yes

For QPSK, 16-QAM and 32-QAM modulated channels with higher symbol rate, the wanted signal shall be generated with wide pulse shaping filter when testing for co-channel and adjacent (400 kHz) channel performance. For tests of adjacent (200 kHz) channel performance the input signals shall be generated with pulse shaping filters according to table 5.3.11-5.

Table 5.3.11-4: Co-channel interference ratios (C/Ic) for packet switched channels, for ECSD and for AMR-WB channels, and for 8-PSK modulated AMR and AMR-WB channels

GSM 400 and GSM 900						
Channel Type	Unit	Carrier to Interferer Ratios for specified propagation conditions				
		TU3 (no SFH)	TU50 (no SFH)	TU50 (ideal SFH)	RA250 (no SFH)	TI5 (no SFH)
PDTCH/CS-1	dB	13	10	9	9	14
PDTCH/CS-2	dB	15	14	13	13	18
PDTCH/CS-3	dB	16	16	15	16	20
PDTCH/CS-4	dB	21	24	24	*	27
PDTCH/MCS-1	dB	13	10,5	9,5	10	14,5
PDTCH/MCS-2	dB	15	12,5	12	12	16,5
PDTCH/MCS-3	dB	16,5	17	17	19	21
PDTCH/MCS-4	dB	19	22	22	*	26
PDTCH/MCS-5	dB	18	15,5	14,5	16	19,5
PDTCH/MCS-6	dB	20	18	17,5	21	22
PDTCH/MCS-7	dB	23,5	24	24,5	26,5**	28
PDTCH/MCS-8	dB	28,5	30	30	*	34
PDTCH/MCS-9	dB	30	33	35	*	37
PDTCH/UAS-7	dB	27	23,5	22,5	22	27,5
PDTCH/UAS-8	dB	28	25	24,5	25,5	29
PDTCH/UAS-9	dB	28,5	27	26,5	33	31
PDTCH/UAS-10	dB	29,5	29,5	29,5	34,5**	33,5
PDTCH/UAS-11	dB	30,5	33	33	*	37
PDTCH/UBS-5	dB	-4,5	-4,5	-6,0	-1,5	-0,5
PDTCH/UBS-6	dB	-2,0	-3,0	-3,5	1,5	1,0
PDTCH/UBS-7	dB	2,5	1,5	1,0	5,5	5,5
PDTCH/UBS-8	dB	4,5	4,0	3,5	9,5	8,0
PDTCH/UBS-9	dB	5,5	5,5	5,0	13,0	9,5
PDTCH/UBS-10	dB	11,0	12,5	12,0	26,0	16,5
PDTCH/UBS-11	dB	13,5	16,5	17,0	35,0	20,5
PDTCH/UBS-12	dB	15,0	19,5	19,5	28,0**	23,5
E-TCH/F43.2 NT	dB	24	19,5	19	21,5	23,5
E-TCH/F32.0 T	dB	25,5	17	15,5	15,5	21
E-TCH/F28.8 T	dB	27	17,5	15,5	16	21,5
E-TCH/F28.8 NT	dB	20	14,5	13,5	13,5	18,5
E-FACCH/F	dB	17,5	12,5	11,5	11,5	16,5
PACCH	dB	13	10	9	9	14
PRACH/11 bits	dB	8	8	8	10	12

GSM 400 and GSM 900						
Channel Type	Unit	Carrier to Interferer Ratios for specified propagation conditions				
		TU3 (no SFH)	TU50 (no SFH)	TU50 (ideal SFH)	RA250 (no SFH)	TI5 (no SFH)
PRACH/8 bits	dB	8	8	8	9	12
TCH/WFS12.65	dB	21,5	14,5	13	12,5	18,5
TCH/ WFS8.85	dB	20	11,5	10	9	15,5
TCH/ WFS6.60	dB	19	10,5	9	8	14,5
O-FACCH/F	dB	15,5	10	8	9	14
O-FACCH/H	dB	15,5	10	9	9,5	14
O-TCH/AHS12.2	dB	22,5	16,5	15,5	17	20,5
O-TCH/AHS10.2	dB	21,5	15,5	14,5	15,5	19,5
O-TCH/AHS7.95	dB	20,5	14,5	13,5	14,5	18,5
O-TCH/AHS7.4	dB	20	14	12,5	13,5	18
O-TCH/AHS6.7	dB	19,5	13,5	12	13	17,5
O-TCH/AHS5.9	dB	19	13	12	12,5	17
O-TCH/AHS5.15	dB	18,5	12,5	11	12	16,5
O-TCH/AHS4.75	dB	18	12	10,5	11,5	16
O-TCH/AHS-INB (FER)	dB	16,5	10,5	10,5	12,5	14,5
O-TCH/AHS (EVSIDUR)	dB	16	10,5	9,5	10,5	14,5
O-TCH/AHS (EVRFR)	dB	16	10,5	9,5	11	14,5
O-TCH/WFS23.85	dB	22,5	16	13,5	13,5	20
O-TCH/WFS15.85	dB	20	13,5	11	10,5	17,5
O-TCH/WFS12.65	dB	18,5	11,5	9,5	9,5	15,5
O-TCH/WFS8.85	dB	17	10,5	7,5	7,5	14,5
O-TCH/WFS6.60	dB	16	9,5	7	6,5	13,5
O-TCH/WFS-INB (FER)	dB	14,5	7	6	6	11
O-TCH/WFS (EVSIDUR)	dB	17,5	11,5	9,5	9,5	15,5
O-TCH/WFS (EVRFR)	dB	16,5	10	7,5	7,5	14
O-TCH/WHS12.65	dB	22,5	17	15,5	17	21
O-TCH/WHS8.85	dB	21	15	14	15	19
O-TCH/WHS6.60	dB	19,5	13,5	12	13	17,5
O-TCH/WHS-INB (FER)	dB	16,5	10,5	10,5	12,5	14,5
O-TCH/WHS (EVSIDUR)	dB	16	10,5	9,5	10,5	14,5
O-TCH/WHS (EVRFR)	dB	16	10,5	9,5	11	14,5

DCS 1 800						
Channel Type	Unit	Carrier to Interferer Ratios for specified propagation conditions				
		TU1.5 (no SFH)	TU50 (no SFH)	TU50 (ideal SFH)	RA130 (no SFH)	TI5 (no SFH)
PDTCH/CS-1	dB	13	9	9	9	14
PDTCH/CS-2	dB	15	13	13	13	18
PDTCH/CS-3	dB	16	16	16	16	20
PDTCH/CS-4	dB	21	27	27	*	27
PDTCH/MCS-1	dB	13	10	9,5	10	14,5
PDTCH/MCS-2	dB	15	12	12	12	16,5
PDTCH/MCS-3	dB	16,5	17	18	19	21
PDTCH/MCS-4	dB	19	23	23	*	26
PDTCH/MCS-5	dB	18	15	15	16	19,5
PDTCH/MCS-6	dB	20	17,5	18	21	22
PDTCH/MCS-7	dB	23,5	26	26,5	27**	28
PDTCH/MCS-8	dB	28,5	25**	24,5**	*	34
PDTCH/MCS-9	dB	30	29**	29**	*	37
PDTCH/UAS-7	dB	27	23	23	22	27,5
PDTCH/UAS-8	dB	28	25	25	25,5	29
PDTCH/UAS-9	dB	28,5	26	26	33	31

DCS 1 800						
Channel Type	Unit	Carrier to Interferer Ratios for specified propagation conditions				
		TU1.5 (no SFH)	TU50 (no SFH)	TU50 (ideal SFH)	RA130 (no SFH)	TI5 (no SFH)
PDTCH/UAS-10	dB	29,5	26,5**	26,5**	34,5**	33,5
PDTCH/UAS-11	dB	30,5	29,5**	29,5**	*	37
PDTCH/UBS-5	dB	-4,5	-4,5	-4,5	-1,5	-0,5
PDTCH/UBS-6	dB	-2,0	-2,5	-2,5	1,5	1,0
PDTCH/UBS-7	dB	2,5	2,5	2,5	5,5	5,5
PDTCH/UBS-8	dB	4,5	5,0	5,0	9,5	8,0
PDTCH/UBS-9	dB	5,5	6,5	6,5	13,0	9,5
PDTCH/UBS-10	dB	11,0	14,5	14,5	26,0	16,5
PDTCH/UBS-11	dB	13,5	22,5	22,5	35,0	20,5
PDTCH/UBS-12	dB	15,0	28,5	28,5	28,0**	23,5
E-TCH/F43.2 NT	dB	24	19,5	19,5	22	23,5
E-TCH/F32.0 T	dB	25,5	16	15,5	15,5	21
E-TCH/F28.8 T	dB	27	16	16	17	21,5
E-TCH/F28.8 NT	dB	20	14	14	14,5	18,5
E-FACCH/F	dB	17,5	11,5	11,5	11,5	16,5
PACCH	dB	13	9	9	9	14
PRACH/11 bits	dB	9	9	9	10	12
PRACH/8 bits	dB	8	8	8	9	12
TCH/WFS12.65	dB	21,5	13	13	12,5	18,5
TCH/ WFS8.85	dB	20	10	10	9	15,5
TCH/ WFS6.60	dB	19	9	9	8	14,5
O-FACCH/F	dB	15,5	9	9	9	14
O-FACCH/H	dB	15,5	9,5	9,5	9,5	14
O-TCH/AHS12.2	dB	22,5	16,5	16,5	17	20,5
O-TCH/AHS10.2	dB	21,5	15,5	15,5	15,5	19,5
O-TCH/AHS7.95	dB	20,5	14,5	14,5	14,5	18,5
O-TCH/AHS7.4	dB	20	14	14	13,5	18
O-TCH/AHS6.7	dB	19,5	13	13	13	17,5
O-TCH/AHS5.9	dB	19	12,5	12,5	12,5	17
O-TCH/AHS5.15	dB	18,5	12	12	12	16,5
O-TCH/AHS4.75	dB	18	11,5	11,5	11,5	16
O-TCH/AHS-INB (FER)	dB	16,5	11	11	12,5	14,5
O-TCH/AHS (EVSIDUR)	dB	16	10,5	10,5	10,5	14,5
O-TCH/AHS (EVRFR)	dB	16	10,5	10,5	11	14,5
O-TCH/WFS23.85	dB	22,5	14,5	14,5	13,5	20
O-TCH/WFS15.85	dB	20	12	12	10,5	17,5
O-TCH/WFS12.65	dB	18,5	10,5	10,5	9,5	15,5
O-TCH/WFS8.85	dB	17	9	9	7,5	14,5
O-TCH/WFS6.60	dB	16	8	8	6,5	13,5
O-TCH/WFS-INB (FER)	dB	14,5	6,5	6,5	6	11
O-TCH/WFS (EVSIDUR)	dB	17,5	11	11	9,5	15,5
O-TCH/WFS (EVRFR)	dB	16,5	9	9	7,5	14
O-TCH/WHs12.65	dB	22,5	16,5	16,5	17	21
O-TCH/WHs8.85	dB	21	14,5	14,5	15	19
O-TCH/WHs6.60	dB	19,5	13	13	13	17,5
O-TCH/WHs-INB (FER)	dB	16,5	11	11	12,5	14,5

DCS 1 800						
Channel Type	Unit	Carrier to Interferer Ratios for specified propagation conditions				
		TU1.5 (no SFH)	TU50 (no SFH)	TU50 (ideal SFH)	RA130 (no SFH)	TI5 (no SFH)
O-TCH/WHS (EVSIDUR)	dB	16	10,5	10,5	10,5	14,5
O-TCH/WHS (EVRFR)	dB	16	10,5	10,5	11	14,5

NOTE 1: PDTCH/CS-4, MCS-x and UAS-x shall not be tested for the propagation conditions marked as (*).
NOTE 2: For GSM 400 the speeds shall be doubled (e.g. TU50 shall be TU100).
NOTE 3: Performance is specified at 30 % BLER for those cases marked as (**).
NOTE 4: Not applicable.
NOTE 5: PDTCH/UBS-5 to 12 requirements assume two-antenna configuration. The wanted signal shall use higher symbol rate and be generated with wide pulse shaping filter. The interfering signal shall use GMSK and 8-PSK modulation.

Table 5.3.11-5: adjacent channel interference ratios (C/Ia) for EGPRS, EGPRS2, ECSD and 8-PSK modulated AMR and AMR-WB channels

GSM 400 and GSM 900							
Channel Type	Unit	Carrier to Interferer Ratios for specified propagation conditions					Comment
		TU3 (no SFH)	TU50 (no SFH)	TU50 (ideal SFH)	RA250 (no SFH)	TI5 (no SFH)	
PDTCH/MCS-5	dB	2,5	-2	-2	1	2	
PDTCH/MCS-6	dB	4,5	1	1	6,5	5	
PDTCH/MCS-7	dB	8	8,5	8,5	13,5**	12,5	
PDTCH/MCS-8	dB	10,5	9**	9,5**	*	13**	
PDTCH/MCS-9	dB	12	13,5**	13,5**	*	17,5**	
PDTCH/UAS-7	dB	13	9,5	8	10,5	13,5	
PDTCH/UAS-8	dB	14,5	11	10	15	15	
PDTCH/UAS-9	dB	15,5	13,5	12,5	22,5	17,5	
PDTCH/UAS-10	dB	17,5	17	17	25**	21	
PDTCH/UAS-11	dB	19	23,5	24	-	27,5	
PDTCH/UBS-5	dB	-17,5	-16,5	-17,0	-9,0	-12,5	Input signals generated with wide pulse-shaping filter (see note 5)
PDTCH/UBS-6	dB	-15,0	-14,0	-14,5	-5,5	-10,0	
PDTCH/UBS-7	dB	-11,5	-9,5	-9,5	-2,5	-5,5	
PDTCH/UBS-8	dB	-8,0	-6,0	-6,0	1,5	-2,0	
PDTCH/UBS-9	dB	-6,0	-3,5	-4,0	4,0	0,5	
PDTCH/UBS-10	dB	0,0	1,0	1,0	12,5	5,0	
PDTCH/UBS-11	dB	5,5	9,0	9,0	25,0	13,0	Input signals generated with narrow pulse-shaping filter (see note 5)
PDTCH/UBS-12	dB	8,0	13,5	12,5	16,5**	17,5	
PDTCH/UBS-5	dB	-14,5	-14,0	-14,0	-2,5	-10,0	
PDTCH/UBS-6	dB	-12,0	-11,0	-11,5	1,5	-7,0	
PDTCH/UBS-7	dB	-1,5	-2,5	-3,0	7,0	1,5	
PDTCH/UBS-8	dB	1,0	0,5	0,5	11,0	4,5	
PDTCH/UBS-9	dB	2,5	2,0	2,0	12,5	6,0	
PDTCH/UBS-10	dB	7,0	9,0	9,0	18,0	13,0	
PDTCH/UBS-11	dB	8,5	13,0	13,5	18,5**	17,0	
PDTCH/UBS-12	dB	9,0	14,5	15,0	22,5**	18,5	
E-TCH/F43.2 NT	dB	8	3,5	2,5	12	7,5	
E-TCH/F32.0 T	dB	7,5	-2,5	-4	-4	1,5	
E-TCH/F28.8 T	dB	10	0,5	-1	2,5	4,5	
E-TCH/F28,8NT	dB	3,5	-1,5	-2,5	-0,5	2,5	
O-FACCH/F	dB	0	-7,5	-8	-8,5	-3,5	
O-FACCH/H	dB	0,5	-5,5	-6,5	-6	-1,5	
O-TCH/AHS12.2	dB	5	-1	-2	-0,5	3	
O-TCH/AHS10.2	dB	4,5	-2	-3	-2	2	
O-TCH/AHS7.95	dB	3	-3	-4	-3,5	1	
O-TCH/AHS7.4	dB	2,5	-4	-5	-4,5	0	
O-TCH/AHS6.7	dB	2	-4,5	-6	-5,5	-0,5	
O-TCH/AHS5.9	dB	1,5	-5,5	-6,5	-6,5	-1,5	
O-TCH/AHS5.15	dB	1	-6	-7	-7	-3	
O-TCH/AHS4.75	dB	0,5	-7	-7,5	-7,5	-4	

GSM 400 and GSM 900							
Channel Type	Unit	Carrier to Interferer Ratios for specified propagation conditions					Comment
		TU3 (no SFH)	TU50 (no SFH)	TU50 (ideal SFH)	RA250 (no SFH)	TI5 (no SFH)	
O-TCH/AHS-INB (FER)	dB	-1	-7	-7	-6,5	-3	
O-TCH/AHS (EVSIDUR)	dB	-1,5	-8	-8	-7,5	-4	
O-TCH/AHS (EVRFR)	dB	-1	-8	-8,5	-7,5	-4	
O-TCH/WFS23.85	dB	5	-2	-4	-4	2	
O-TCH/WFS15.85	dB	2	-5	-7	-7	-1	
O-TCH/WFS12.65	dB	0,5	-7	-9	-9	-3	
O-TCH/WFS8.85	dB	-0,5	-9	-11	-10,5	-5	
O-TCH/WFS6.60	dB	-1,5	-10	-12	-11,5	-6	
O-TCH/WFS-INB (FER)	dB	-4	-11,5	-13	-13	-7,5	
O-TCH/WFS (EVSIDUR)	dB	-0,5	-7	-8,5	-8	-3	
O-TCH/WFS (EVRFR)	dB	-1	-9,5	-11	-10,5	-5,5	
O-TCH/WHS12.65	dB	5	-1	-2	0	3	
O-TCH/WHS8.85	dB	3	-3	-3,5	-3	1	
O-TCH/WHS6.60	dB	2	-5	-6	-5,5	-1	
O-TCH/WHS-INB (FER)	dB	-1	-7	-7	-6,5	-3	
O-TCH/WHS (EVSIDUR)	dB	-1,5	-8	-8	-7,5	-4	
O-TCH/WHS (EVRFR)	dB	-1	-8	-8,5	-7,5	-4	

DCS 1 800							
Channel Type	Unit	Carrier to Interferer Ratios for specified propagation conditions					Comment
		TU1.5 (no SFH)	TU50 (no SFH)	TU50 (ideal SFH)	RA130 (no SFH)	TI5 (no SFH)	
PDTCH/MCS-5	dB	2,5	-2	-1,5	1	2	
PDTCH/MCS-6	dB	4,5	1,5	1,5	6,5	5	
PDTCH/MCS-7	dB	8	10,5	11	13,5**	12,5	
PDTCH/MCS-8	dB	10,5	10**	9,5**	*	13**	
PDTCH/MCS-9	dB	12	16**	16**	*	17,5**	
PDTCH/UAS-7	dB	13	9,5	9,5	10,5	13,5	
PDTCH/UAS-8	dB	14,5	12	12	15	15	
PDTCH/UAS-9	dB	15,5	15,5	15,5	22,5	17,5	
PDTCH/UAS-10	dB	17,5	24,5	24,5	25**	21	
PDTCH/UAS-11	dB	19	20,5**	20,5**	-	27,5	
PDTCH/UBS-5	dB	-17,5	-13,0	-13,0	-9,0	-12,5	Input signals generated with wide pulse-shaping filter (see note 5)
PDTCH/UBS-6	dB	-15,0	-10,0	-10,0	-5,5	-10,0	
PDTCH/UBS-7	dB	-11,5	-5,5	-5,5	-2,5	-5,5	
PDTCH/UBS-8	dB	-8,0	-2,0	-2,0	1,5	-2,0	
PDTCH/UBS-9	dB	-6,0	1,5	1,5	4,0	0,5	
PDTCH/UBS-10	dB	0,0	5,0	5,0	12,5	5,0	
PDTCH/UBS-11	dB	5,5	14,5	14,5	25,0	13,5	Input signals generated with [narrow] pulse-shaping filter (see note 5)
PDTCH/UBS-12	dB	8,0	20,0	20,0	16,5**	17,5	
PDTCH/UBS-5	dB	-14,5	-10,0	-10,0	-2,5	-10,0	
PDTCH/UBS-6	dB	-12,0	-6,5	-6,5	1,5	-7,5	
PDTCH/UBS-7	dB	-1,5	2,0	2,0	7,0	1,5	
PDTCH/UBS-8	dB	1,0	5,0	5,0	11,0	4,5	
PDTCH/UBS-9	dB	2,5	7,0	7,0	12,5	6,0	
PDTCH/UBS-10	dB	7,0	14,0	14,0	18,0	13,0	
PDTCH/UBS-11	dB	8,5	12,5**	12,5**	18,5**	17,0	
PDTCH/UBS-12	dB	9,0	14,0**	14,0**	22,5**	18,5	
E-TCH/F43.2 NT	dB	8	4	3,5	14	7,5	
E-TCH/F32.0 T	dB	7	-3,5	-3,5	-4	1,5	
E-TCH/F28.8 T	dB	10	-0,5	-0,5	5	4,5	

DCS 1 800							
Channel Type	Unit	Carrier to Interferer Ratios for specified propagation conditions					
		TU1.5 (no SFH)	TU50 (no SFH)	TU50 (ideal SFH)	RA130 (no SFH)	TI5 (no SFH)	Comment
E-TCH/F28,8NT	dB	3,5	- 2	- 2	0,5	2,5	
O-FACCH/F	dB	0	-6,5	0	-8,5	-3,5	
O-FACCH/H	dB	0,5	-5,5	0,5	-6	-1,5	
O-TCH/AHS12.2	dB	5	-1	5	-0,5	3	
O-TCH/AHS10.2	dB	4,5	-2	4,5	-2	2	
O-TCH/AHS7.95	dB	3	-3	3	-3,5	1	
O-TCH/AHS7.4	dB	2,5	-4	2,5	-4,5	0	
O-TCH/AHS6.7	dB	2	-5	2	-5,5	-0,5	
O-TCH/AHS5.9	dB	1,5	-5,5	1,5	-6,5	-1,5	
O-TCH/AHS5.15	dB	1	-6,5	1	-7	-3	
O-TCH/AHS4.75	dB	0,5	-7	0,5	-7,5	-4	
O-TCH/AHS-INB (FER)	dB	-1	-6,5	-1	-6,5	-3	
O-TCH/AHS (EVSIDUR)	dB	-1,5	-7,5	-1,5	-7,5	-4	
O-TCH/AHS (EVRFR)	dB	-1	-8	-1	-7,5	-4	
O-TCH/WFS23.85	dB	5	-2,5	5	-4	2	
O-TCH/WFS15.85	dB	2	-5,5	2	-7	-1	
O-TCH/WFS12.65	dB	0,5	-7,5	0,5	-9	-3	
O-TCH/WFS8.85	dB	-0,5	-10	-0,5	-10,5	-5	
O-TCH/WFS6.60	dB	-1,5	-11,5	-1,5	-11,5	-6	
O-TCH/WFS-INB (FER)	dB	-4	-11	-4	-13	-7,5	
O-TCH/WFS (EVSIDUR)	dB	-0,5	-8	-0,5	-8	-3	
O-TCH/WFS (EVRFR)	dB	-1	-10,5	-1	-10,5	-5,5	
O-TCH/WHS12.65	dB	5	-1	5	0	3	
O-TCH/WHS8.85	dB	3	-3	3	-3	1	
O-TCH/WHS6.60	dB	2	-5	2	-5,5	-1	
O-TCH/WHS-INB (FER)	dB	-1	-6,5	-1	-6,5	-3	
O-TCH/WHS (EVSIDUR)	dB	-1,5	-7,5	-1,5	-7,5	-4	
O-TCH/WHS (EVRFR)	dB	-1	-8	-1	-7,5	-4	

NOTE 1: PDTCH/MCS-x and UAS-x shall not be tested for the propagation conditions marked as (*).
NOTE 2: For GSM 400 the speeds shall be doubled (e.g. TU50 shall be TU100).
NOTE 3: Performance is specified at 30 % BLER for those cases marked as (**).
NOTE 4: Not applicable.
NOTE 5: PDTCH/UBS-5 to 12 requirements assume two-antenna configuration. The Interfering signal shall use higher symbol rate and be generated with the same modulation and pulse shaping filter as the wanted signal.

All TRXs in the BSS configuration shall be on and transmitting full power in all time slots.

The input signal before channel encoding in the BSSTE shall be compared with the signal which is obtained from the BSS receiver after channel decoding.

5.3.11.2 Test Environment

Normal.

5.3.12 Blocking Characteristics

For a multicarrier BTS additionally conforming to EN 301 908-1 [i.5] and EN 301 908-18 [i.6], either the test suite of the present clause or the Out-of-band blocking test suite in clause 5.3.8 of EN 301 908-18 [i.6] can be equally applied for frequency offsets outside the relevant inband frequencies as defined in table 5.3.12-2 of present document.

5.3.12.1 Test case

The manufacturer shall declare any intermediate frequencies (IF1 to IFn) used within the receiver, and the frequency of the local oscillator applied to the first receiver mixer.

- 1) This measurement is carried out in three stages:
 - a) An optional preliminary test to identify frequencies of interfering signal which require more detailed investigation.
 - b) Measurement of blocking performance:
 - i) All out-of-band frequencies (general requirements for co-existence).
 - c) Measurement of spurious response performance; this test need only be performed at those frequencies of interfering signal at which the specification for blocking is not met.
- 2) The BSS shall be configured to operate as close to the centre of the operating receive band as is possible. If Slow frequency hopping is supported by the BSS, it shall be disabled during these measurements.
- 3) The two RF signals shall be fed into the receiver antenna connector of the BSS using a combining network. The wanted signal shall be at the operating frequency of the receiver, shall be modulated with normal GSM modulation, and shall be at a level as specified in table 5.3.12-1. The measurement is only performed under static propagation conditions.

If BSS supports both EGPRS and ECSD, it is not necessary to perform testing in both modes. If ECSD channel other than E-TCH/F43.2 NT is to be measured a wanted signal level 3 dB above the test signal level specified in clause 5.3.9 shall be used. If TCH/FS is not supported, the highest supported of PDTCH/MCS-1 to MCS-4 shall be measured using a wanted signal level 3 dB above the test signal level specified in clause 5.3.9, where a wanted signal 1 dB above the test signal level specified in clause 5.3.9 shall be used.

Table 5.3.12-1: Power level of wanted signal for test of Blocking Characteristics

BTS Type	Power level of Wanted Signal						
	TCH/ FS	E-TCH/ F43.2 NT	PDTCH/ MCS-5	PDTCH/ MCS-6	PDTCH/ MCS-7	PDTCH/ MCS-8	PDTCH/ MCS-9
GSM 400/ GSM900/DCS1800 BTS	-101 dBm	-94 dBm	-98 dBm	-96,5 dBm	-93 dBm	-90 dBm	-88,5 dBm
GSM900 micro-BTS M1	-94 dBm	- 87 dBm	-91 dBm	-89,5 dBm	-86 dBm	-83 dBm	-81,5 dBm
GSM900 micro-BTS M2	-89 dBm	- 82 dBm	-86 dBm	-84,5 dBm	-81 dBm	-78 dBm	-76,5 dBm
GSM900 micro-BTS M3	-84 dBm	- 77 dBm	-81 dBm	-79,5 dBm	-76 dBm	-73 dBm	-71,5 dBm
GSM900 pico-BTS P1	-85 dBm	- 78 dBm	-82 dBm	-80,5 dBm	-93 dBm	-74 dBm	-72,5 dBm
DCS1800 micro-BTS M1	-99 dBm	- 92 dBm	-96 dBm	-94,5 dBm	-91 dBm	-88 dBm	-86,5 dBm
DCS1800 micro-BTS M2	-94 dBm	- 87 dBm	-91 dBm	-89,5 dBm	-86 dBm	-83 dBm	-81,5 dBm
DCS1800 micro-BTS M3	-89 dBm	- 82 dBm	-86 dBm	-84,5 dBm	-81 dBm	-78 dBm	-76,5 dBm
DCS1800 pico-BTS P1	-92 dBm	- 85 dBm	-89 dBm	-87,5 dBm	-84 dBm	-81 dBm	-79,5 dBm

Preliminary Test

- 4) This optional test may be performed to reduce the number of measurements required in step 8. If it is performed, this shall be at the frequencies specified below.
- 5) The test shall be performed for an interfering signal at all frequencies which are integer multiples of 200 kHz , and which fall within one or more of the frequency ranges listed below, but excluding frequencies which exceed 12,75 GHz or are less than 600 kHz from the wanted signal:
 - a) from:

PGSM 900:	790 MHz to 1 015 MHz inclusive.
E-GSM 900:	780 MHz to 1 015 MHz inclusive.
R-GSM 900:	776 MHz to 1 015 MHz inclusive.

DCS 1 800: 1 610 MHz to 1 885 MHz inclusive.

GSM 450: 350 MHz to 558 MHz inclusive.

GSM 480: 378 MHz to 586 MHz inclusive.

b) P-GSM 900, E-GSM 900 and R-GSM 900:

from $F_{lo} - (IF_1 + IF_2 + \dots + IF_n + 12,5 \text{ MHz})$ to

$F_{lo} + (IF_1 + IF_2 + \dots + IF_n + 12,5 \text{ MHz})$.

DCS 1 800:

from $F_{lo} - (IF_1 + IF_2 + \dots + IF_n + 37,5 \text{ MHz})$ to

$F_{lo} + (IF_1 + IF_2 + \dots + IF_n + 37,5 \text{ MHz})$.

GSM 400:

from $F_{lo} - (IF_1 + IF_2 + \dots + IF_n + 3,6 \text{ MHz})$ to

$F_{lo} + (IF_1 + IF_2 + \dots + IF_n + 3,6 \text{ MHz})$.

c) from $IF_1 - 400 \text{ kHz}$ to $IF_1 + 400 \text{ kHz}$.

d) All of the ranges:

$mF_{lo} - IF_1 - 200 \text{ kHz}$ to $mF_{lo} - IF_1 + 200 \text{ kHz}$; and

$mF_{lo} + IF_1 - 200 \text{ kHz}$ to $mF_{lo} + IF_1 + 200 \text{ kHz}$.

e) All integer multiples of 10 MHz

Where: F_{lo} is the frequency of the local oscillator applied to the first receiver mixer.

$IF_1 \dots IF_n$ are the n intermediate frequencies.

m is all positive integers.

To reduce test time, a shortened test procedure according to annex A in TS 151 021 [2] may be used, with an upper limit of measurement of 4 GHz.

6) The interfering signal shall be frequency modulated with a modulation frequency of 2 kHz and a peak deviation of $\pm 100 \text{ kHz}$.

7) For interfering signal frequency within the range:

PGSM900: 870 MHz to 925 MHz;

E-GSM 900: 860 MHz to 925 MHz;

R-GSM 900: 856 MHz to 921 MHz;

DCS1800: 1 690 MHz to 1 805 MHz.

GSM 450: 444,4 MHz to 460,4 MHz;

GSM 480: 472,8 MHz to 488,8 MHz;

the level of the interfering signal at the receiver input shall be:

GSM 400 and GSM 900: -3 dBm.

DCS 1 800: -15 dBm.

For interfering signal frequencies on other frequencies, the level of the interfering signal shall be +10 dBm.

The Residual Bit Error Ratio (RBER) for the TCH/FS channel using class II bits and the Block Error Ratio (BLER) for one supported PDTCH/MCS- x with lowest number x and 8PSK modulation ($x=5$, if the BSS supports all coding schemes) and/or E-TCH/F43.2 NT channel or BLER (or BER) for the highest supported data speed shall be measured and if TCH/FS is not supported the BLER for the tested PDTCH/MCS-1 to MCS-4. All frequencies at which the RBER exceeds 10 % and/or at which the BLER exceeds 25 % or the BER exceeds 0,25 % respectively shall be recorded for further study. A relaxed statistical significance may be used for this measurement, compared to that of step 9).

Blocking Test

- 8) If the preliminary test has been performed, this test shall be performed at all frequencies which have been recorded at step 7. If the preliminary test has not been performed, this test shall be performed at all frequencies specified in step 5.

The interfering signal shall be unmodulated, and shall have a level at the receiver input as specified in table 5.3.12-3.

- 9) The channels below shall, if supported, be measured. All frequencies at which the limit in table 4.2.9-1 is exceeded shall be recorded.

Channel: TCH/FS

Channel: E-TCH/F43.2 NT
or for the highest supported data speed

Channel: PDTCH/MCS-5

or, if not supported, PDTCH/MCS- x with the
next higher supported number x

Channel: PDTCH/MCS-1 to MCS-4
if TCH/FS is not supported

For packet-switched channels, the tests and requirements apply for BTTI without PAN

For this test, in band frequencies are defined in table 5.3.12-2.

Table 5.3.12-2 Definition of relevant inband frequencies

GSM band	Relevant inband frequency band
P-GSM 900	870 MHz to 925 MHz
E-GSM 900	860 MHz to 925 MHz
R-GSM 900	856 MHz to 921 MHz
DCS1800	1 690 MHz to 1 805 MHz
GSM 450	444,4 MHz to 460,4 MHz
GSM 480	472,8 MHz to 488,8 MHz

NOTE: The methodology for the measurement of BER is described in annex A in TS 151 021 [2].

f_o is the frequency of the wanted signal.

Table 5.3.12-3: Level of interfering signal for blocking

Frequency band	GSM 400 and GSM 900 (dBm)						DCS 1 800 (dBm)					
	BTS	Multicarrier	micro and pico-BTS				BTS	Multicarrier	micro and pico-BTS			
		BTS (see note 2)	M1	M2	M3	P1		BTS including Multicarrier BTS	M1	M2	M3	P1
in - band:												
$f_o \pm 600$ kHz	-26	-35	-31	-26	-21	-34	-35	-35	-40	-35	-30	-41
$800 \text{ kHz} \leq f-f_o < 1,6 \text{ MHz}$	-16	-25 and -20	-21	-16	-11	-34	-25	-25	-30	-25	-20	-41
$1,6 \text{ MHz} \leq f-f_o < 3 \text{ MHz}$	-16	-25 and -20	-21	-16	-11	-26	-25	-25	-30	-25	-20	-31
$3 \text{ MHz} \leq f-f_o $	-13	-25 and -16	-21	-16	-11	-18	-25	-25	-30	-25	-20	-23
out - of - band	General	8	-15		8	8	8	-15	0	0	0	0
NOTE 1: Micro and pico-BTS is not defined for GSM 400.												
NOTE 2: The relaxed values for multicarrier BTS are not applicable for GSM-R usage. The requirements for multicarrier BTS apply to BTS with multicarrier receiver.												

For P-GSM 900 and E-GSM 900, the blocking level in the band 925 MHz to 935 MHz is relaxed to 0 dBm.

For R-GSM 900 at offsets $600 \text{ kHz} \leq |f-f_o| < 3 \text{ MHz}$, the blocking level in the band 876 MHz to 880 MHz shall be reduced by 5 dB.

In case of multicarrier BTS with multicarrier receiver for GSM 400 and GSM 900, the inband requirements for frequency offsets $800 \text{ kHz} \leq |f-f_o|$ and blocking signal levels higher than -25 dBm, the power level of wanted signal in table 5.3.12-1 may be increased up to 5 dB for interfering signal levels lower than -20 dBm and up to 9 dB for interfering signal levels above -20 dBm.

Spurious response

- 10) This test shall be performed at all frequencies and channels which have been recorded at step 9. The interfering signal shall be unmodulated, and shall have a level of -43 dBm.
- 11) The RBER for TCH/FS channel using class II bits and BLER for one supported PDTCH/MCS-x with lowest number x and 8PSK modulation ($x=5$, if the BSS supports all coding schemes) and/or BLER for E-TCH/F43.2 NT or BLER (or BER) for the highest supported data speed and, if TCH/FS is not supported, the BLER for the tested PDTCH/MCS-1 to MCS-4 shall be measured.

5.3.12.2 Test Environment

Normal: One TRX shall be tested.

5.3.13 Intermodulation characteristics

5.3.13.1 Test case

If SFH is supported by the BSS, it shall be disabled during this measurement. The measurement is performed only under static conditions. The measurement shall be performed for the radio frequency channels B, M and T and for the supported channels in table 5.3.13-1. As a minimum, one time slot shall be tested on one TRX to be tested.

Three signals shall be applied to the receiver via a combining network. The powers of the signals are measured at the receiver antenna connector.

The wanted signal shall have a power level as defined in table 5.3.13-1. Only wanted signals with BTTI and no PAN need to be tested.

The second signal is an interfering signal, GMSK modulated by a pseudo-random bit sequence, and shall be 1,6 MHz above the wanted signal frequency. During the useful part of the burst of the wanted signal, the modulation of this interfering signal shall be any 148-bits subsequent of the 511-bits sequence, defined in ITU-T Recommendation O.153 [17] fascicle IV.4., and the power shall be -43 dBm for GSM 400 and GSM 900 and -49 dBm for DCS 1 800.

NOTE: This signal can be a continuous signal modulated by the 511-bits sequence.

The third signal is an interfering signal and shall be unmodulated. It shall be 800 kHz above the wanted signal frequency, and the power shall be -43 dBm for GSM 400 and GSM 900 and -49 dBm for DCS 1 800.

The various signals are illustrated in figure 5.3.13-1.

If BSS supports both EGPRS and ECSD, it is not necessary to perform testing in both modes. If ECSD channel other than E-TCH/F43.2 NT is to be measured a wanted signal level 3 dB above the test signal level specified in clause 5.3.9 shall be used. If TCH/FS is not supported, the highest supported of PDTCH/MCS-1 to MCS-4 shall be measured using a wanted signal level 3 dB above the test signal level specified in clause 5.3.9.

Table 5.3.13-1: Wanted signal level for testing of Intermodulation Characteristics

BTS Type	Power level of Wanted Signal						
	TCH/FS	E-TCH/ F43.2 NT	PDTCH/ MCS-5	PDTCH/ MCS-6	PDTCH/ MCS-7	PDTCH/ MCS-8	PDTCH/ MCS-9
GSM 400/GSM900/DCS1800 BTS	-101 dBm	-94 dBm	-98 dBm	-96,5 dBm	-93 dBm	-90 dBm	-88,5 dBm
GSM900 micro-BTS M1	-94 dBm	-87 dBm	-91 dBm	-89,5 dBm	-86 dBm	-83 dBm	-81,5 dBm
GSM900 micro-BTS M2	-89 dBm	-82 dBm	-86 dBm	-84,5 dBm	-81 dBm	-78 dBm	-76,5 dBm
GSM900 micro-BTS M3	-84 dBm	-77 dBm	-81 dBm	-79,5 dBm	-76 dBm	-73 dBm	-71,5 dBm
GSM900 pico-BTS P1	-85 dBm	-78 dBm	-82 dBm	-80,5 dBm	-77 dBm	-74 dBm	-72,5 dBm
DCS1800 micro-BTS M1	-99 dBm	-92 dBm	-96 dBm	-94,5 dBm	-91 dBm	-88 dBm	-86,5 dBm
DCS1800 micro-BTS M2	-94 dBm	-87 dBm	-91 dBm	-89,5 dBm	-86 dBm	-83 dBm	-81,5 dBm
DCS1800 micro-BTS M3	-89 dBm	-82 dBm	-86 dBm	-84,5 dBm	-81 dBm	-78 dBm	-76,5 dBm
DCS1800 pico-BTS P1	-92 dBm	-85 dBm	-89 dBm	-87,5 dBm	-84 dBm	-81 dBm	-79,5 dBm

The unprotected class II bits obtained from the BSS receiver after channel decoding and before any extrapolation shall be compared with the unprotected class II bits originating from the BSSTE.

The RBER of the TCH/FS class II bits and BLER of one supported PDTCH/MCS-x with lowest number x and 8PSK modulation (x=5, if the BSS supports all coding schemes) and E-TCH/F43.2 NT or BLER (or BER) of the highest supported data speed and, if TCH/FS is not supported, the BLER for the tested PDTCH/MCS-1 to MCS-4 shall be measured.

The measurement shall be repeated with the unwanted signal frequencies below the carrier frequency of the wanted signal.

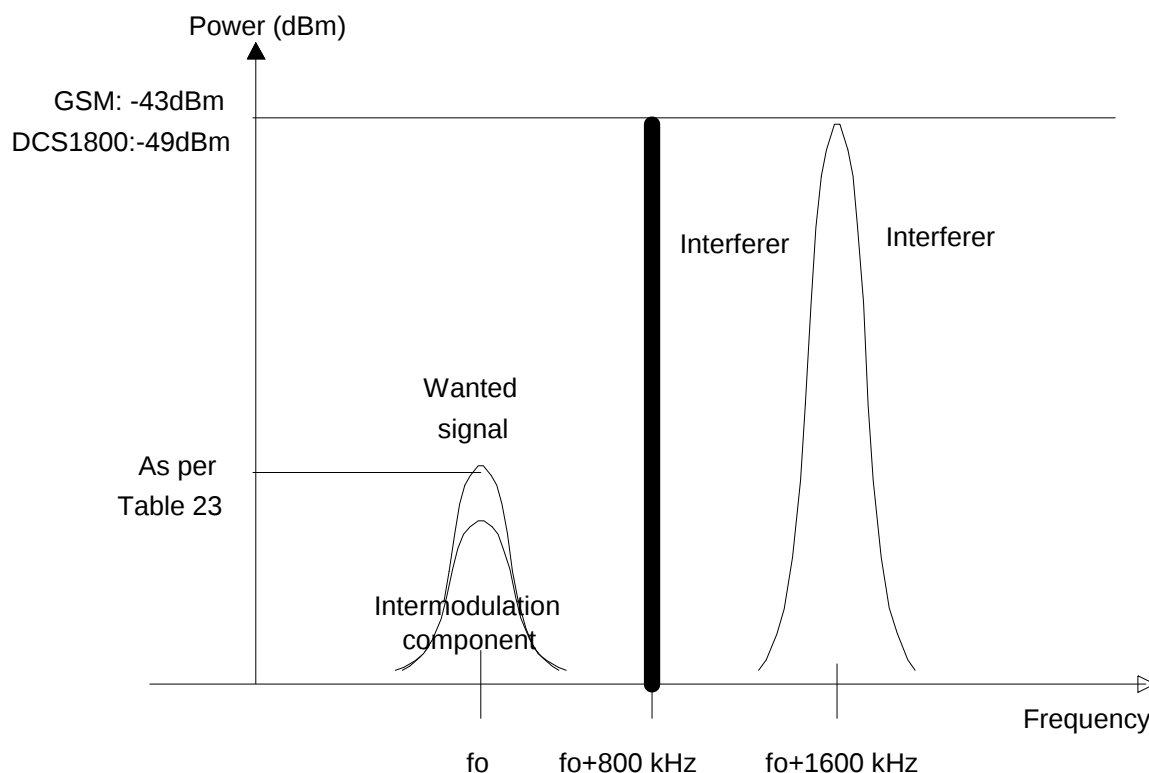


Figure 5.3.13-1: Example of RX intermodulation rejection

5.3.13.2 Test Environment

Normal: One TRX shall be tested.

5.3.14 AM suppression

5.3.14.1 Test case

This test shall be performed at any one ARFCN on one TRX and on supported channels in table 5.3.14-1. If Slow Frequency Hopping (SFH) is supported by the BSS, it shall be disabled during this measurement. The measurement is performed only under static conditions.

The wanted signal shall have normal GSM modulation with a power level as defined in table 5.3.14-1.

If BSS supports both EGPRS and ECSD, it is not necessary to perform testing in both modes. If ECSD channel other than E-TCH/F43.2 NT is to be measured a wanted signal level 3 dB above the test signal level specified in clause 5.3.9 shall be used. If TCH/FS is not supported, the highest supported of PDTCH/MCS-1 to MCS-4 shall be measured using a wanted signal level 3 dB above the test signal level specified in clause 5.3.9.

Table 5.3.14-1: Test signal input level

BTS Type	Test signal Input Level to receiver TCH/FS	Power level of Wanted Signal					
		E-TCH/ F43.2 NT	PDTCH/ MCS-5	PDTCH/ MCS-5	PDTCH/ MCS-7	PDTCH/ MCS-8	PDTCH/ MCS-9
GSM400/ /GSM900/DCS1800 BTS	-101 dBm	-94 dBm	-98 dBm	-96,5 dBm	-93 dBm	-90 dBm	-88,5 dBm
GSM900 micro-BTS M1	-94 dBm	-87 dBm	-91 dBm	-89,5 dBm	-86 dBm	-83 dBm	-81,5 dBm
GSM900 micro-BTS M2	-89 dBm	-82 dBm	-86 dBm	-84,5 dBm	-81 dBm	-78 dBm	-76,5 dBm
GSM900 micro-BTS M3	-84 dBm	-77 dBm	-81 dBm	-79,5 dBm	-76 dBm	-73 dBm	-71,5 dBm
GSM900 pico-BTS P1	-85 dBm	-78 dBm	-82 dBm	-80,5 dBm	-93 dBm	-74 dBm	-72,5 dBm
DCS1800/ micro-BTS M1	-99 dBm	-92 dBm	-96 dBm	-94,5 dBm	-91 dBm	-88 dBm	-86,5 dBm
DCS1800 micro-BTS M2	-94 dBm	-87 dBm	-91 dBm	-89,5 dBm	-86 dBm	-83 dBm	-81,5 dBm
DCS1800 micro-BTS M3	-89 dBm	-82 dBm	-86 dBm	-84,5 dBm	-81 dBm	-78 dBm	-76,5 dBm
DCS1800 pico-BTS P1	-92 dBm	-85 dBm	-89 dBm	-87,5 dBm	-84 dBm	-81 dBm	-79,5 dBm

The interfering signal is GMSK modulated according to GSM characteristics (with or without a midamble) with a pseudo random bit sequence of at least 511 bits length.

NOTE 1: A 148-bit sequence of the 511-bit of a pseudo-random bit sequence as defined in ITU-T Recommendation O.153 [17] fascicle IV.4 is recommended.

Its frequency (f) shall be in the relevant receive band, at least 6 MHz separated from the ARFCN under test. Frequency f is an integer multiple of 200 kHz and at least 2 ARFCNs separated from any identified spurious response in step 9 of the test case in clause 5.3.12.

The interferer shall have one timeslot active, meeting the power/time mask of figure 4.2.3-1. The transmitted bursts shall be synchronized to but delayed in time between 61 and 86 symbol periods relative to the bursts of the wanted signal. The mean level of the interferer over the useful part of the burst is defined in table 5.3.14-2.

Table 5.3.14-2: Interfering signal level

	BTS (dBm)	Micro-BTS			Pico-BTS
		M1 (dBm)	M2 (dBm)	M3 (dBm)	P1 (dBm)
GSM 400	-31	-	-	-	-
GSM 900	-31	-34	-29	-24	-21
DCS 1 800	-35	-33	-28	-23	-26

The two input signals shall be connected to the receiver via a combining network. The referred power level for both signals shall be the power into the BSS RX antenna connector.

NOTE 2: When testing this requirement, a notch filter may be necessary to ensure that the co channel performance of the receiver is not compromised.

5.3.14.2 Test Environment

Normal.

5.3.15 Spurious emissions from the receiver antenna connector

For a multicarrier BTS additionally conforming to EN 301 908-1 [i.5] and EN 301 908-18 [i.6], either the test suite of the present clause or the Receiver spurious emissions test suite in clause 5.3.6 of EN 301 908-18 [i.6] can be equally applied.

5.3.15.1 Test case

The transmitter shall be configured with one TRX active. It shall be allocated to RF Channel M and shall transmit at full power on all time slots.

For a BTS equipped with diversity, the requirements of this clause apply to each receiver dedicated antenna connector.

For a BTS equipped with a duplexer or duplexers, the requirements of clause 4.2.5 apply to any antenna connector which is a port for both transmitter(s) and receiver(s). Therefore, this test need not be performed on these ports.

The receiver antenna connector shall be connected to a spectrum analyser or selective voltmeter with the same characteristic impedance.

The detecting device shall be configured as defined in table 5.3.15-1. Peak hold shall be enabled, and the video bandwidth shall be approximately three times the resolution bandwidth. If this bandwidth is not available on the detecting device, it shall be the maximum available, and at least 1 MHz.

The power shall be measured over the frequency ranges specified in table 5.3.15-1.

5.3.15.2 Test Environment

Normal.

Table 5.3.15-1: measurement conditions for Conducted Emissions from the Receiver Antenna Connector

Frequency Band	Frequency offset	Resolution Bandwidth
100 kHz to 50 MHz		10 kHz
50 MHz to 500 MHz and outside the relevant transmit band	(offset from the edge of the relevant transmit band)	
	≥ 2 MHz	30 kHz
	≥ 5 MHz	100 kHz
500 MHz to 1 GHz and outside the relevant transmit band	(offset from the edge of the relevant transmit band)	
	≥ 2 MHz	30 kHz
	≥ 5 MHz	100 kHz
	≥ 10 MHz	300 kHz
	≥ 20 MHz	1 MHz
	≥ 30 MHz	3 MHz
1 GHz to 12,75 GHz and outside the relevant transmit band	(offset from the edge of the relevant transmit band)	
	≥ 2 MHz	30 kHz
	≥ 5 MHz	100 kHz
	≥ 10 MHz	300 kHz/ 1 MHz (see note)
	≥ 20 MHz	1 MHz
	≥ 30 MHz	3 MHz
Inside the relevant transmit band	(offset from the transmit carrier frequency)	
	≥ 1,8 MHz	30 kHz
	≥ 6 MHz	100 kHz
NOTE: 1 MHz measurement bandwidth applies only to BTS belonging to multicarrier BTS class.		

5.3.16 Radiated spurious emissions

For a multicarrier BTS additionally conforming to EN 301 908-1 [i.5] and EN 301 908-18 [i.6], either the test suite of the present clause or the Radiated emissions test suite in clause 5.3.2 of EN 301 908-1 [i.5] can be equally applied.

5.3.16.1 Test case

- a) A test site fulfilling the requirements of ITU-R Recommendation SM.329-10 [18] shall be used. The BTS shall be placed on a non-conducting support and shall be operated from a power source via an RF filter to avoid radiation from the power leads. The method of ITU-R Recommendation SM.329-10 [18] shall be used, except in any case where it conflicts with the present document.

Radiation of any spurious components shall be detected by the test antenna and measuring receiver (e.g. a spectrum analyser). At each frequency at which a component is detected, the BSS shall be rotated and the height of the test antenna adjusted to obtain maximum response, and the effective radiated power of that component determined by a substitution measurement. The measurement shall be repeated with the test antenna in the orthogonal polarization plane.

- b) The BTS shall be configured with one transmitter active, at its maximum output power on all time slots, on the specified ARFCNs. Slow frequency hopping shall be disabled.

NOTE: It may be necessary to take steps to ensure that emissions from other transmitters which are not active do not influence the results. This may be achieved by, for example, equipping the BTS with only one TRX or by muting the outputs of the transmitters to a greater degree than otherwise required in TS 145 005 [5].

- c) The measuring receiver shall be configured with a resolution bandwidth of 30 kHz and a video bandwidth of approximately three times this value. Peak hold shall be enabled, except in case of multicarrier BTS where average mode of detector applies.. The received power shall be measured for frequencies with an offset of $1,8 \text{ MHz} \leq f < 6 \text{ MHz}$ from the carrier frequency, and which fall within the BTS relevant transmitter band.

At each frequency at which a component is detected, the maximum effective radiated power of that component shall be determined, as described in step a).

- d) The measuring receiver shall be configured with a resolution bandwidth of 100 kHz and a video bandwidth of approximately three times this value. Peak hold shall be enabled, except in case of multicarrier BTS where average mode of detector applies. The received power shall be measured for frequencies with an offset of $\geq 6 \text{ MHz}$ from the carrier frequency, and which fall within the BTS relevant transmitter band.

At each frequency at which a component is detected, the maximum effective radiated power of that component shall be determined, as described in step a).

- e) The BSS shall be configured with all transmitters active at their maximum output power on all time slots. If a TRX is designated as being a dedicated BCCH, it shall be allocated to RF channel M. All remaining TRXs shall be allocated in the following order; first to RF channel B, then to T, then distributed as evenly as possible throughout the BSS operating transmit band. Slow frequency hopping shall be disabled. In case of multicarrier BTS the maximum number of supported carriers are active and operating at maximum declared power. The carriers are distributed over the maximum supported RF BW as defined in clause 5.3.8.

The measuring receiver shall be configured as defined in table 5.3.16-1. Peak hold shall be enabled, and the video bandwidth shall be approximately three times the resolution bandwidth. If this video bandwidth is not available on the measuring receiver, it shall be the maximum available, and at least 1 MHz. The received power shall be measured over the frequency range 30 MHz to 12,75 GHz, excluding the BTS relevant transmitter band.

Table 5.3.16-1: Spurious Emissions Measurements outside the transmit band

Frequency Band	Frequency offset	Resolution Bandwidth
30 MHz to 50 MHz		10 kHz
50 MHz to 500 MHz and outside the relevant transmit band	(offset from the edge of the relevant transmit band)	
	≥ 2 MHz	30 kHz
	≥ 5 MHz	100 kHz
500 MHz to 1 GHz and outside the relevant transmit band	(offset from the edge of the relevant transmit band)	
	≥ 2 MHz	30 kHz
	≥ 5 MHz	100 kHz
	≥ 10 MHz	300 kHz
	≥ 20 MHz	1 MHz
	≥ 30 MHz	3 MHz
1 GHz to 12,75 GHz and outside the relevant transmit band	(offset from the edge of the relevant transmit band)	
	≥ 2 MHz	30 kHz
	≥ 5 MHz	100 kHz
	≥ 10 MHz	300 kHz/ 1 MHz (see note)
	≥ 20 MHz	1 MHz
	≥ 30 MHz	3 MHz
NOTE: 1 MHz measurement bandwidth applies only to BTS belonging to multicarrier BTS class.		

At each frequency at which a component is detected, the maximum effective radiated power of that component shall be determined, as described in step a).

5.3.16.2 Test Environment

Normal: Inside the relevant TX band: The test shall be performed with the TRX active on one ARFCN.
Outside the relevant TX band: The test shall be performed once.

Annex A (normative): HS Requirements and conformance Test specifications Table (HS-RTT)

The HS Requirements and conformance Test specifications Table (HS-RTT) in table A.1 serves a number of purposes, as follows:

- it provides a statement of all the requirements in words and by cross reference to (a) specific clause(s) in the present document or to (a) specific clause(s) in (a) specific referenced document(s);
- it provides a statement of all the test procedures corresponding to those requirements by cross reference to (a) specific clause(s) in the present document or to (a) specific clause(s) in (a) specific referenced document(s);
- it qualifies each requirement to be either:
 - Unconditional: meaning that the requirement applies in all circumstances; or
 - Conditional: meaning that the requirement is dependent on the manufacturer having chosen to support optional functionality defined within the schedule.
- in the case of Conditional requirements, it associates the requirement with the particular optional service or functionality;
- it qualifies each test procedure to be either:
 - Essential: meaning that it is included with the Essential Radio Test Suite and therefore the requirement shall be demonstrated to be met in accordance with the referenced procedures;
 - Other: meaning that the test procedure is illustrative but other means of demonstrating compliance with the requirement are permitted.

Table A.1: HS Requirements and conformance Test specifications Table (HS-RTT)

Harmonized Standard EN 301 502 The following requirements and test specifications are relevant to the presumption of conformity under the article 3.2 of the R&TTE Directive						
Requirement			Requirement Conditionality		Test Specification	
No	Description	Reference: Clause No	U/C	Condition	E/O	Reference: Clause No
1	Modulation accuracy	4.2.1	U		E	5.3.1
2	Mean transmitted RF carrier power	4.2.2	U		E	5.3.2
3	Transmitted RF carrier power versus time	4.2.3	U		E	5.3.3
4	Adjacent channel power	4.2.4	U		E	5.3.4
5	Spurious emissions from the transmitter antenna connector	4.2.5	U		E	5.3.5
6	Intermodulation attenuation	4.2.6	U		E	5.3.6
7	Intra Base Station System intermodulation attenuation	4.2.7	C	For all base station equipment except multicarrier BTS	E	5.3.7
8	Wideband noise and intra BSS intermodulation attenuation in multicarrier operation	4.2.8	C	For multicarrier BTS only.	E	5.3.8

Harmonized Standard EN 301 502 The following requirements and test specifications are relevant to the presumption of conformity under the article 3.2 of the R&TTE Directive						
Requirement			Requirement Conditionality		Test Specification	
No	Description	Reference: Clause No	U/C	Condition	E/O	Reference: Clause No
9	Static Reference Sensitivity Level	4.2.9	U		E	5.3.9
10	Multipath Reference Sensitivity Level	4.2.10	U		E	5.3.10
11	Reference Interference Level	4.2.11	U		E	5.3.11
12	Blocking Characteristics	4.2.12	U		E	5.3.12
13	Intermodulation characteristics	4.2.13	U		E	5.3.13
14	AM suppression	4.2.14	U		E	5.3.14
15	Spurious emissions from the receiver antenna connector	4.2.15	U		E	5.3.15
16	Radiated spurious emissions	4.2.16	U		E	5.3.16

Key to columns:
Requirement:

No A unique identifier for one row of the table which may be used to identify a requirement or its test specification.

Description A textual reference to the requirement.

Clause Number Identification of clause(s) defining the requirement in the present document unless another document is referenced explicitly.

Requirement Conditionality:

U/C Indicates whether the requirement is to be *unconditionally* applicable (U) or is *conditional* upon the manufacturers claimed functionality of the equipment (C).

Condition Explains the conditions when the requirement shall or shall not be applicable for a technical requirement which is classified "conditional".

Test Specification:

E/O Indicates whether the test specification forms part of the Essential Radio Test Suite (E) or whether it is one of the Other Test Suite (O).

NOTE: All tests whether "E" or "O" are relevant to the requirements. Rows designated "E" collectively make up the Essential Radio Test Suite; those designated "O" make up the Other Test Suite; for those designated "X" there is no test specified corresponding to the requirement. The completion of all tests classified "E" as specified with satisfactory outcomes is a necessary condition for a presumption of conformity. Compliance with requirements associated with tests classified "O" or "X" is a necessary condition for presumption of conformity, although conformance with the requirement may be claimed by an equivalent test or by manufacturer's assertion supported by appropriate entries in the technical construction file.

Clause Number Identification of clause(s) defining the test specification in the present document unless another document is referenced explicitly. Where no test is specified (that is, where the previous field is "X") this field remains blank.

Annex B (normative): General test conditions and declarations

B.1 Declaration by manufacturer

Certain functions of a BTS are optional in the GSM specifications.

When specified in a test, the manufacturer shall declare the nominal value of a parameter, or whether an option is supported.

B.1.1 Output power and determination of power class

The manufacturer shall declare the rated maximum power per TRX for each supported modulation. For a micro or pico-BTS, this shall be specified at the antenna connector. For a normal BTS, it shall be stated whether this is specified at the input to the combiner or at the antenna connector of the BSS.

For a multicarrier BTS, the manufacturer shall declare the maximum output power per carrier in case that all carriers are operated at the same nominal output power. The declaration shall be given for each modulation and for each supported number of carriers up to the maximum number on each antenna port. Additionally, the maximum total power supported shall be declared.

For a micro-BTS, the class of the micro-BTS shall be determined from the declared maximum power, according to table B.1-1. Where applicable, the manufacturer shall declare whether the BTS meets the requirements of a micro or pico-BTS.

For a BTS supporting other modulations as well (8-PSK, 16-QAM, 32-QAM, QPSK) or higher symbol rate the manufacturer shall declare the maximum output power capability for GMSK and each other supported combination of modulation and symbol rate. The TRX power class, the class of a micro-BTS or a pico-BTS is defined by the highest output power capability for any modulation.

Table B.1-1: Micro and pico-BTS Power Classes

TRX power class	GSM 900 micro and pico-BTS Maximum output power	DCS1800 micro and pico-BTS Maximum output power
M1	(> 19)-24 dBm	(> 27)-32 dBm
M2	(> 14)-19 dBm	(> 22)-27 dBm
M3	(> 9)-14 dBm	(> 17)-22 dBm
P1	(> 13)-20 dBm	(> 16)-23 dBm

NOTE: For a normal BTS, the TRX power class can be determined from the manufacturers declared output power per TRX measured at the input to the combiner, according to the tables of TRX power classes in TS 145 005 [5]. The test requirements for a normal BTS do not vary with TRX power classes. The definition of TRX power class only relates to the declared power per TRX and does not impose any requirement on the measured output power of the BTS.

B.1.2 Specified frequency range

The manufacturer shall declare:

- which of the frequency bands defined in clause 1 are supported by the BSS; a BSS may support DCS 1 800, GSM 450, GSM 480 and one of the GSM 900 bands, but shall not be defined as supporting more than one of the GSM 900 bands;
- the frequency range within the above frequency band(s) supported by the BSS; This frequency range comprises the transmit and receive operating bands;

- in case of multicarrier BTS, the maximum Base Station RF bandwidth supported by the BSS;
- in case of multicarrier BTS, the maximum Transmit Filter bandwidth supported by the BSS.

Many tests in the present document are performed with appropriate frequencies in the bottom, middle and top of the operating frequency band of the BTS. These are denoted as RF channels B (bottom), M (middle) and T (top).

When a test is performed by a test laboratory, the ARFCNs to be used for RF channels B, M and T shall be specified by the laboratory. The laboratory may consult with operators, the manufacturer or other bodies.

When a test is performed by a manufacturer, the ARFCNs to be used for RF channels B, M and T may be specified by an operator.

B.1.3 Frequency hopping

The Manufacturer shall declare whether the BSS supports Slow Frequency Hopping (SFH) and if yes, which basic implementation or implementations is supported. If SFH is supported the BSS shall be able to switch to any frequency in its operating band on a time slot per time slot basis.

Two basic implementations of SFH are possible:

- a) baseband frequency hopping: frequency hopping is done by multiplexing the data of the logical channels to different TRXs according to the hopping scheme. The TRXs are fixed tuned to a dedicated ARFCN;
- b) synthesizer frequency hopping: frequency hopping is done by tuning the TRX on a timeslot per timeslot basis. The logical channels are dedicated to a hopping TRX.

The detailed description of the frequency hopping scheme is described in TS 145 002 [3].

B.1.4 RF power control

RF power control functions ("dynamic power control") may optionally be implemented in GSM Base Station Systems according to TS 145 010 [7] as an operator choice. If implemented, the BSS shall be able to hop between any defined power level on a time slot per time slot basis. The manufacturer shall declare how many static power steps (Nmax) and how many dynamic steps are supported by the BSS. The number of static power steps and the total number of power control steps may be different for GMSK and other modulations (8-PSK, 16-QAM, 32-QAM, QPSK).

B.1.5 Downlink discontinuous transmission (DTX)

Downlink discontinuous transmission (DTX), as defined in the GSM specifications for fullrate speech channels and in TS 124 022 [15] and TS 148 020 [16] for non-transparent data, may optionally be implemented in the downlink BSS (transmitter) as an operator choice. All requirements in the present document, unless otherwise stated, apply whether downlink DTX is used or not.

B.2 BTS Configurations

The present document specifies tests for the standard configurations of BTS which have been assumed in GSM requirements specifications, In particular TS 145 001 [19], TS 145 002 [3] and TS 145 005 [5]. However, there are other configurations of BTS which comply with these specifications, but for which the application of these specifications is not fully defined. For some such configurations there may be alternate ways to apply the requirements of this specification to testing of the configuration, or some variation in the test method may be necessary. It may therefore be necessary for the parties to the testing to reach agreement over the method of testing in advance.

If the BSS is supplied in a number of different environmental enclosures or configurations, it may not be necessary to test RF parameters for each environmental configuration, provided that it can be demonstrated that the equipment has been tested at the worst internal environmental conditions.

If a BTS is supplied with a number of different configurations of passive TX antenna combiners, there may be alternate ways to demonstrate the compliance rather than performing the measurements for each configuration. As an example, the worst case configuration of the antenna combiners for a given test shall as a minimum be used for this purpose.

Where alternative interpretations of this specification are possible for a BSS configuration under test, the interpretation which has been adopted in performing the test shall be recorded with the test results.

Where variation in the test method within the present document has been necessary to enable a BSS configuration to be tested, the variation in the test method which has been made in performing the test shall be recorded with the test results. Where possible, agreement should be reached in advance about the nature of such a variation with any party who will later receive the test results.

Possible interpretations of the present document for some common configurations are given in the following clauses.

B.2.1 Receiver diversity

The tests in clauses 5.3.9 thru 5.3.15 of the present document assume that the receiver is not equipped with diversity. For receivers with diversity, the tests shall be performed by applying the specified test signals to one of the receiver antenna connectors, with the remaining receiver antenna connectors being terminated with 50 Ω ; or disabled.

This does not apply to cases which are specified for two antenna configuration only, i.e. EGPRS2-B with higher symbol rate. In this case all receiver tests are performed in two antenna configuration except in Static propagation conditions. At two-antenna configuration the requirements are specified for no correlation or gain imbalance between the two receive branches.

B.2.2 Duplexers

The requirements of the present document shall be met with a duplexer fitted, if a duplexer is supplied as part of the BSS. If the duplexer is supplied as an option by the manufacturer, sufficient tests should be repeated with and without the duplexer fitted to verify that the BSS meets the requirements of the present document in both cases.

The following tests should be performed with the duplexer fitted, and without it fitted if this is an option:

- 1) Clause 5.3.2, Mean transmitted RF power, for the highest static power step only, if this is measured at the antenna connector.
- 2) Clause 5.3.5.2, Conducted spurious emissions from the transmitter antenna connector; outside the BTS transmit band.
- 3) Clause 5.3.7, Intra base station system intermodulation attenuation or 5.3.8 Wideband noise and intra BSS intermodulation attenuation in multicarrier operation.
- 4) Clause 5.3.10, Multipath reference sensitivity; for the testing of essential conformance, the ARFCNs should be selected to minimize intermodulation products from the transmitters falling in receive channels.

The remaining tests may be performed with or without the duplexer fitted.

NOTE 1: When performing receiver tests with a duplexer fitted, it is important to ensure that the output from the transmitters does not affect the test apparatus. This can be achieved using a combination of attenuators, isolators and filters.

NOTE 2: When duplexers are used, intermodulation products will be generated, not only in the duplexer but also in the antenna system. The intermodulation products generated in the antenna system are not controlled by ETSI specifications, and may degrade during operation (e.g. due to moisture ingress). Therefore, to ensure continued satisfactory operation of a BSS, an operator will normally select ARFCNs to minimize intermodulation products falling on receive channels. For testing of complete conformance, an operator may specify the ARFCNs to be used.

B.2.3 Power supply options

If the BSS is supplied with a number of different power supply configurations, it may not be necessary to test RF parameters for each of the power supply options, provided that it can be demonstrated that the range of conditions over which the equipment is tested is at least as great as the range of conditions due to any of the power supply configurations.

This applies particularly if a BSS contains a DC rail which can be supplied either externally or from an internal mains power supply. In this case, the conditions of extreme power supply for the mains power supply options can be tested by testing only the external DC supply option. The range of DC input voltages for the test should be sufficient to verify the performance with any of the power supplies, over its range of operating conditions within the BTS, including variation of mains input voltage, temperature and output current.

B.2.4 Ancillary RF amplifiers

The requirements of the present document shall be met with the ancillary RF amplifier fitted. At tests according to clauses 5.3.1 to 5.3.8 and 5.3.9 to 5.3.15 for TX and RX respectively, the ancillary amplifier is connected to the BTS by a connecting network (including any cable(s), attenuator(s), etc.) with applicable loss to make sure the appropriate operating conditions of the ancillary amplifier and the BTS. The applicable connecting network loss range is declared by the manufacturer. Other characteristics and the temperature dependence of the attenuation of the connecting network are neglected. The actual attenuation value of the connecting network is chosen for each test as one of the applicable extreme values. The lowest value is used unless otherwise stated.

Sufficient tests should be repeated with the ancillary amplifier fitted and, if it is optional, without the ancillary RF amplifier to verify that the BSS meets the requirements of the present document in both cases.

When testing for essential conformance, the following tests should be repeated with the optional ancillary amplifier fitted according to table B.2-1, where x denotes that the test is applicable:

Table B.2-1

	Clause	TX amplifier only	RX amplifier only	TX/RX amplifiers combined (see note)
Receiver tests	5.3.9		x	x
	5.3.12		x	x
	5.3.13		x	x
	5.3.15		x	
Transmitter tests	5.3.2	x		x
	5.3.4 (5.3.4.1 only)	x		x
	5.3.5	x		x
	5.3.6	x		x
	5.3.7 or 5.3.8	x		x
NOTE: Combining can be by duplex filters or any other network. The amplifiers can either be in RX or TX branch or in both. Either one of these amplifiers could be a passive network.				

For receiver tests only testing on TCH/FS is required.

In test according to clauses 5.3.9 and 5.3.2 highest applicable attenuation value is applied.

B.2.5 BSS using antenna arrays

A BSS may be configured with a multiple antenna port connection for some or all of its TRXs or with an antenna array related to one cell (not one array per TRX). This clause applies to a BSS which meets at least one of the following conditions:

- the transmitter output signals from one or more TRX appear at more than one antenna port; or
- there is more than one receiver antenna port for a TRX or per cell and an input signal is required at more than one port for the correct operation of the receiver; or

NOTE: Diversity reception does not meet this requirement) thus the outputs from the transmitters as well as the inputs to the receivers are directly connected to several antennas (known as "air combining").

- transmitters and receivers are connected via duplexers to more than one antenna.

If a BSS is used, in normal operation, in conjunction with an antenna system which contains filters or active elements which are necessary to meet the GSM requirements, the tests of essential conformance may be performed on a system comprising the BSS together with these elements, supplied separately for the purposes of testing. In this case, it must be demonstrated that the performance of the configuration under test is representative of the system in normal operation, and the conformance assessment is only applicable when the BSS is used with the antenna system.

For testing of essential conformance of such a BSS, the following procedure may be used.

Receiver tests

For each test, the test signals applied to the receiver antenna connectors shall be such that the sum of the powers of the signals applied equals the power of the test signal(s) specified in the test.

An example of a suitable test configuration is shown in figure B.2-1.

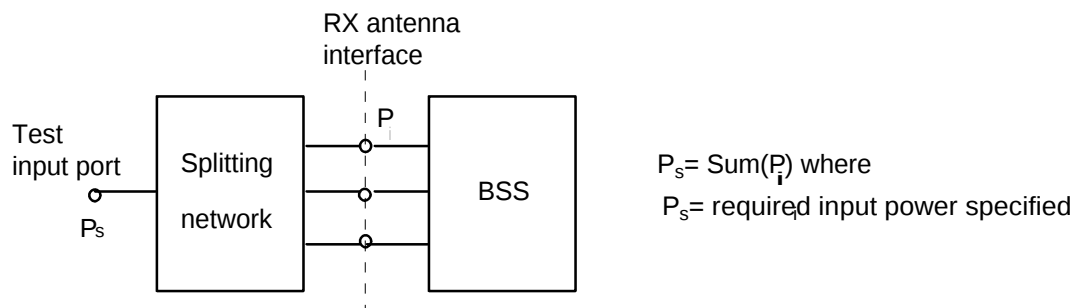


Figure B.2-1: Receiver test setup

For spurious emissions from the receiver antenna connector, the test may be performed separately for each receiver antenna connector.

Transmitter tests

For each test, the conformance requirement shall be met by the sum of the signals emitted by each transmitter antenna connector. This may be assessed by separately measuring the signals emitted by each antenna connector and summing the results, or by combining the signals and performing a single measurement. The characteristics (e.g. amplitude and phase) of the combining network should be such that the power of the combined signal is maximized.

An example of a suitable test configuration is shown in figure B.2-2.

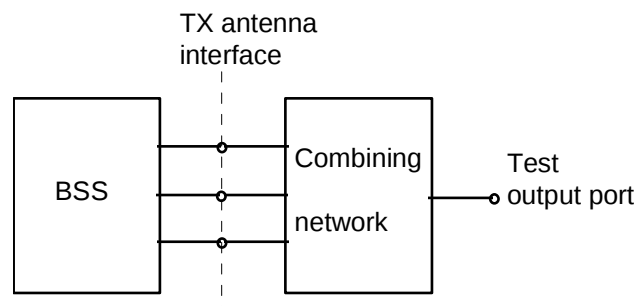


Figure B.2-2: Transmitter test setup

For Intermodulation attenuation, the test may be performed separately for each transmitter antenna connector.

B.2.6 BTS supporting 8-PSK modulation

If a TRX supports 8-PSK it shall, unless otherwise stated in the tests in clause 5.3, be tested at both GMSK and 8-PSK modulation unless it can be demonstrated that it is sufficient to test only at GMSK or 8-PSK modulation.

If a BTS is configured with both TRXs supporting 8-PSK and TRXs not supporting 8-PSK, the stated number of TRXs to be tested shall apply to each type of TRX.

B.2.7 BTS supporting additional modulations in EGPRS2

If a TRX supports additional modulations (QPSK, 16-QAM or 32-QAM) it shall, unless otherwise stated in the tests in clause 5.3, be tested at GMSK as well as at the additional supported modulation unless it can be demonstrated that it is sufficient to test only at GMSK or the specific additional modulation.

If a BTS is configured with TRXs supporting additional modulations as well as TRXs not supporting additional modulations, the different types of TRX shall be counted separately, and the stated number of TRXs to be tested shall refer to each type of TRX separately.

B.2.8 Supported Symbol Rate

The tests in this specification are applicable to both normal symbol rate and higher symbol rate configurations, unless otherwise stated. In case of higher symbol rate the requirements in clauses 4.3.9 thru 4.3.15 of the present document assume input signals using the wide pulse shaping filter unless otherwise stated. For definition of narrow and wide pulse-shaping filters, see TS 145 004 [4]. The input signals used are defined by:

Narrow pulse-shaping filter: Higher symbol rate using spectrally narrow pulse shaping filter.

Wide pulse-shaping filter: Higher symbol rate using spectrally wide pulse shaping filter.

B.2.9 Support of RTTI and/or FANR

All tests are performed for BTTI configuration and without PAN, unless otherwise stated. Additional tests marked as specifically RTTI requirements without and with PAN, as well as BTTI with PAN shall be performed if BTS is declared to support these features.

B.2.10 Multicarrier BTS

If the BTS is declared to be a multicarrier BTS the configuration and number of TRXs to be used in the test corresponds to the configuration and number of active carriers at each transmitting antenna connector (i.e. at each transmitter output of a multicarrier transmitter or transceiver). The tests shall be repeated for each transmitting antenna connector, if connected to a multicarrier transmitter. If the maximum Base Station RF bandwidth is less than the relevant transmit band, and the transmitter is capable of operating on all parts of the relevant transmit band or a declared part of it (operating TX band according to clause B.1.2) by tuning, the transmitter tests are repeated until the whole relevant transmit band or the declared operating band is tested. Similarly, if the maximum Base Station RF bandwidth is less than the relevant receive band, the receiver tests are to be repeated until the whole relevant receive band is tested.

For a multicarrier BTS, when the test case specifies minimum equal frequency spacing, the carrier spacing of 600 kHz shall be used.

The tests in this specification are based on the testing of multicarrier configurations for the supported numbers of carriers, operating at declared maximum power for each number of carriers equally distributed among the carriers. All supported numbers of carriers shall be included in the tests unless otherwise stated in the test case. Equipment that passes all the tests in this specification shall also comply in other configurations, with unequal distribution of power among the carriers, as long as these configurations are defined within the limits of total power, power control margin and maximum number of carriers in the multicarrier transmitter. To verify this compliance a test case with unequal power distribution shall be tested when stated in the clause:

- If support of four or more active carriers is declared: two carriers are configured to 2 dB higher power and two to 4 dB lower power than the declared maximum power at equal distribution. Any additional carrier shall be configured to the declared maximum power at equal distribution. If one carrier needs to be defined as BCCH carrier according to test case, the carrier with highest power shall be used for BCCH.
- If support of less than four active carriers is declared: One carrier is configured to 2 dB higher power and one to 4 dB lower power than the declared maximum power at equal distribution. Any additional carrier shall be configured to the declared maximum power at equal distribution. If one carrier needs to be defined as BCCH carrier according to test case, the carriers with highest power shall be used for BCCH.

For a multicarrier BTS the manufacturer shall declare the supported combinations of number of carriers, output powers and the maximum Base Station RF bandwidth.

For any test that applies to a multicarrier configuration in case of multicarrier BTS all carriers shall apply the GMSK modulation, unless otherwise stated.

In test cases regarding unwanted emissions inband, i.e. including spectrum due to modulation and wideband noise, spurious emissions and Intermodulation attenuation, detector mode AVG or RMS can be used for conformance testing. If the requirements are fulfilled in either detector mode, the tests are sufficient for compliance. The detector mode used, shall be stated in the conformance test report.

The vendor shall declare if the multicarrier BTS supports non-contiguous frequency allocation, defined as an allocation where two groups of frequencies are separated with at least 5,4 MHz.

Annex C (normative): Test environments

For each test in the present document, the environmental conditions under which the BSS is to be tested are defined. The classification of environment is defined in IEC 60721 [14].

C.1 Normal test environment

When a normal test environment is specified for a test, the test should be performed under any combination of conditions between the minimum and maximum limits stated in table C.1-1.

Table C.1-1: Limits of conditions for Normal Test Environment

Condition	Minimum	Maximum
Barometric pressure	86 kPa	106 kPa
Temperature	15 °C	30 °C
Relative Humidity	20 %	85 %
Power supply	Nominal, as declared by the manufacturer	
Vibration	Negligible	

The ranges of barometric pressure, temperature and humidity represent the maximum variation expected in the uncontrolled environment of a test laboratory. If it is not possible to maintain these parameters within the specified limits, the actual values shall be recorded in the test report.

NOTE: This may, for instance, be the case for measurements of radiated emissions performed on an open field test site.

C.2 Extreme test environment

The manufacturer shall declare one of the following:

- the equipment class for the equipment under test, as defined in EN 300 019-1-3 [11], (Equipment Engineering (EE); Environmental conditions and environmental test for telecommunications equipment, Part 1-3: Classification of environmental conditions, Stationary use at weather protected locations);
- the equipment class for the equipment under test, as defined in EN 300 019-1-4 [12], (Equipment Engineering (EE); Environmental conditions and environmental test for telecommunications equipment, Part 1-4: Classification of environmental conditions, Stationary use at non-weather protected locations);
- for equipment that does not comply to an EN 300 019-1 [10] class, the relevant classes from IEC 60721 [14] documentation for Temperature, Humidity and Vibration shall be declared.

NOTE: Reduced functionality for conditions that fall outside of the standard operational conditions are not tested in the present document. These may be stated and tested separately.

C.2.1 Extreme temperature

When an extreme temperature test environment is specified for a test, the test shall be performed at the standard minimum and maximum operating temperatures defined by the manufacturer's declaration for the equipment under test.

Minimum temperature:

- The test shall be performed with the environmental test equipment and methods of inducing the required environmental phenomena into the equipment, conforming to the test procedure of IEC 60068-2-1 [13], Environmental Testing, Part 2: Tests - Tests A: Cold. The equipment shall be maintained at the stabilized condition for the duration of the test sequence.

Maximum temperature:

- The test shall be performed with the environmental test equipment and methods of inducing the required environmental phenomena in to the equipment, conforming to the test procedure of IEC 60068-2-2 [13], (Environmental Testing, Part 2: Tests - Tests Bd Dry heat). The equipment shall be maintained at the stabilized condition for the duration of the test sequence.

NOTE: It is recommended that the equipment is made fully operational prior to the equipment being taken to its lower operating temperature.

C.3 Vibration

When vibration conditions are specified for a test, the test shall be performed while the equipment is subjected to a vibration sequence as defined by the manufacturers declaration for the equipment under test. This shall use the environmental test equipment and methods of inducing the required environmental phenomena in to the equipment, conforming to the test procedure of IEC 60068-2-6 [13], Environmental Testing, Part 2: Tests - Test Fc and guidance: Vibration (Sinusoidal) or IEC 60068-2-64 [13], Test Fh: Vibration broad-band random (digital control) and guidance. Other environmental conditions shall be within the ranges specified in clause C.1, Normal test environment.

NOTE: The higher levels of vibration may induce undue physical stress in to equipment after a prolonged series of tests. The testing body should only vibrate the equipment during the RF measurement process.

C.4 Power supply

When extreme power supply conditions are specified for a test, the test shall be performed at the standard upper and lower limits of operating voltage defined by the manufacturer's declaration for the equipment under test.

Upper voltage limit

The equipment shall be supplied with a voltage equal to the upper limit declared by the manufacturer (as measured at the input terminals to the equipment). The tests shall be carried out at the steady state minimum and maximum temperature limits declared by the manufacturer for the equipment, to the methods described in IEC 60068-2-1 [13], Test Ab/Ad: Cold and IEC 60068-2-2 [13], Test Bb/Bd: Dry Heat.

Lower voltage limit

The equipment shall be supplied with a voltage equal to the lower limit declared by the manufacturer (as measured at the input terminals to the equipment). The tests shall be carried out at the steady state minimum and maximum temperature limits declared by the manufacturer for the equipment, to the methods described in IEC 60068-2-1 [13], Test Ab/Ad: Cold and IEC 60 068-2-2 [13], Test Bb/Bd: Dry Heat.

Annex D (informative): The EN title in the official languages

The enlargement of the European Union (EU) resulted in a requirement from the EU for a larger number of languages for the translation of the titles of Harmonized Standards and mandated ENs that are to be listed in the Official Journal to support the implementation of this legislation.

For this reason the title translation concerning the present document can be consulted via the [e-approval](#) application.

Annex E (informative): Bibliography

- ETSI TS 145 008 (V8.7.0): "Digital cellular telecommunications system (Phase 2+); Radio subsystem link control (3GPP TS 45.008 version 8.7.0 Release 8)".
- Council Directive 89/336/EEC of 3 May 1989 on the approximation of the laws of the Member States relating to electromagnetic compatibility (EMC Directive).
- Council Directive 73/23/EEC of 19 February 1973 on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits (LV Directive).

History

Document history			
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