Source: **T1**

Title: **CR's to TS 34.124 v3.0.0 for approval**

Agenda item: **6.1**

Document for: **Approval**

This document contains 3 CRs to TS 34.124 v3.0.0. These CRs have been agreed by T1 and are put forward to TSG T for approval.

CRs due to adding/updating/correction of tests:

T1 Doc	Spec	CR	Rev	Phase	Subject	Cat	Version Current	Version -New
T1-000222	34.124	001		R99	Idle mode conditions and test loops	F	3.0.0	3.1.0
T1-000223	34.124	002		R99	Adding End- user data besides BER and BLER for EMC data testing	F	3.0.0	3.1.0
T1-000224	34.124	003		R99	Editorial modifications for purposes of clarification	D	3.0.0	3.1.0

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Document T1-00222
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

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34.124	**CR**	**001**	Current Version:	3.0.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to: T # 9 *list expected approval meeting # here ↑*	for approval	X	strategic	
	for information		non-strategic	

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from:* ftp://ftp.3gpp.org/Information/CR-Form-v2.doc

Proposed change affects: *(at least one should be marked with an X)* (U)SIM [ ] ME [X] UTRAN / Radio [ ] Core Network [ ]

Source: TSG T1 SWG EMC #11 **Date:** 30.08.2000

Subject: Idle mode conditions and test loops.

Work item:

Category: *(only one category shall be marked with an X)*

F	Correction	X
A	Corresponds to a correction in an earlier release	
B	Addition of feature	
C	Functional modification of feature	
D	Editorial modification	

Release:

Phase 2	
Release 96	
Release 97	
Release 98	
Release 99	X
Release 00	

Reason for change: Progress in TS25.133, mode detailed Idle mode conditions specified.

Clauses affected: 4.2

Other specs affected:

Other 3G core specifications		→ List of CRs:
Other GSM core specifications		→ List of CRs:
MS test specifications		→ List of CRs:
BSS test specifications		→ List of CRs:
O&M specifications		→ List of CRs:

Other comments:

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[4] IEC 61000-6-1 (1997): "Electromagnetic compatibility (EMC) – Part 6: Generic standards - Section 1: Immunity standard for residential, commercial and light-industrial environments".

[5] IEC 61000-6-3 (1996): "Electromagnetic compatibility (EMC) – Part 6: Generic standards - Section 3: Emission standard for residential, commercial and light-industrial environments.

[6] ISO 7637-1 (1990): "Road vehicles - Electrical disturbance by conduction and coupling - Part 1: Passenger cars and light commercial vehicles with nominal 12 V supply voltage - Electrical transient conduction along supply lines only".

[7] ISO 7637-2 (1990): "Road vehicles - Electrical disturbance by conduction and coupling - Part 2: Commercial vehicles with nominal 24 V supply voltage - Electrical transient conduction along supply lines only".

[8] 3G TR 25.990; 3rd Generation Partnership Project; Technical Specification Group Radio Access Network (RAN); Vocabulary
3GPP TR 21 905: "3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Vocabulary for 3GPP specifications".

[9] IEC 60050(161) (1998): "International Electrotechnical Vocabulary - Chapter 161: Electromagnetic compatibility".

[10] 3G TS 34.108: "3rd Generation Partnership Project (3GPP); Technical Specification Group (TSG) Terminal; Common test environments for user equipment (UE). Conformance Testing".

[11] ITU-R Recommendation SM.329-7 (1997): "Spurious emissions".

[12] 3GPP TS 25.101: "3rd Generation Partnership Project (3GPP); Technical Specification Group (TSG) RAN WG4; UTRA (UE) FDD; Radio transmission and Reception".

[13] 3GPP TS 25.102: "3rd Generation Partnership Project (3GPP); Technical Specification Group (TSG) RAN WG4; UTRA (UE) TDD; Radio transmission and Reception".

[14] IEC CISPR publication 22; 3rd edition (1997-11): "Information technology equipment; Radio disturbance characteristics – Limits and methods of measurement".

[15] 3G TS 34.109: "3rd Generation Partnership Project (3GPP); Technical Specification Group (TSG) Terminal. Terminal Logical Test Interface; Special conformance testing functions".

[16] IEC CISPR publication 16-1; (1993); Radio disturbance and immunity measuring apparatus"; Am.1 (1997): "Specification for radio disturbance and immunity measuring apparatus and methods".

[17] IEC 61000-3-2; (1995-03): "Electromagnetic compatibility; Part 3 - Limits; section 2 – Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)"; Am.1 (1997-09)".

[18] IEC 61000-3-3; (1994-12): "Electromagnetic compatibility; Part 3 - Limits; section 2 – Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current ≤ 16 A"

[19] IEC 61000-4-2: "Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – section 2: Electrostatic discharge immunity test – Basic EMC publication".

[20] IEC 61000-4-3: "Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – section 3: Radiated, radio-frequency electromagnetic field immunity test".

[21] IEC 61000-4-4: "Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – section 4: Electrical fast transient/burst immunity test – Basic EMC publication".

[22] IEC 61000-4-5: "Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – section 5: Surge immunity test".

4.2 Arrangements for establishing a communication link

The wanted RF input signal nominal frequency shall be selected by setting the UTRA Absolute Radio Frequency Channel Number (UARFCN) to an appropriate number.

A communication link shall be set up with a suitable base station simulator (hereafter called "the test system"). The test system shall be located outside of the test environment

When the EUT is required to be in the traffic mode, a call is set up according to the Generic call set-up procedure and the following conditions shall be met:

See TS 34.108 [**10**] and TS 34.109 [**15**] Logical Test Interface for details regarding generic call set-up procedure and BER, BLER test loop scenarios. ~~loopback test~~.

- set and send continuously Up power control commands to the UE;

~~- enter the UE into loopback test mode and start the loopback test;~~

- the DTX shall be disabled;

- Inner Loop Power Control shall be enabled;

- transmitting and/or receiving (UL/DL) bit rate for reference test channel shall be 12.2 kbps;

- adequate measures shall be taken to avoid the effect of the unwanted signal on the measuring equipment;

- the wanted input signal level for immunity testing shall be set to 40 dB above the reference sensitivity level to provide a stable communication link. The reference sensitivity level is defined in 3G TS 25.101 [**12**]. For emission testing the wanted input signal level shall be no more than 15 dB above the reference sensitivity level, such that the performance of the receiver is not limited by strong signal effects.

When the EUT is required to be in the idle mode, the following conditions shall be met:

~~- enable the UE receiver and set Cell Search Mode on a PCCPCH. Since there is no downlink signal, the UE should not pass the Cell Search mode.~~

- UE shall be camped on a cell

- UE shall perform Location Registration (LR) before the test, but not during the test;

- UE´s neighbour cell list shall be empty;

- Paging repetition period and DRX cycle shall be set to minimum (shortest possible time interval);

For immunity tests subclause 4.3, shall apply and the conditions shall be as follows:

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34.124	CR	002	Current Version:	3.0.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to: T # 9	for approval	X	strategic	
list expected approval meeting # here ↑	for information		non-strategic	

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: *(at least one should be marked with an X)*

(U)SIM		ME	X	UTRAN / Radio		Core Network	

Source: TSG T1 SWG EMC #11 **Date:** 30.08.2000

Subject: Adding End- user data besides BER and BLER for EMC data testing.

Work item:

Category: *(only one category shall be marked with an X)*

F	Correction	X	**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change: EMC data testing using BER or BLER is not adequate in cases where the EUT consists of UE + data application ancillary.

Clauses affected: 3.1, Annex B(B1 and B2)

Other specs affected:

Other 3G core specifications		→ List of CRs:
Other GSM core specifications		→ List of CRs:
MS test specifications		→ List of CRs:
BSS test specifications		→ List of CRs:
O&M specifications		→ List of CRs:

Other comments:


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[8] 3G TR 25.990; 3rd Generation Partnership Project; Technical Specification Group Radio Access Network (RAN); Vocabulary
3GPP TR 21 905: "3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Vocabulary for 3GPP specifications".

[9] IEC 60050(161) (1998): "International Electrotechnical Vocabulary - Chapter 161: Electromagnetic compatibility".

[10] 3G TS 34.108: "3rd Generation Partnership Project (3GPP); Technical Specification Group (TSG) Terminal; Common test environments for user equipment (UE). Conformance Testing".

[11] ITU-R Recommendation SM.329-7 (1997): "Spurious emissions".

[12] 3GPP TS 25.101: "3rd Generation Partnership Project (3GPP); Technical Specification Group (TSG) RAN WG4; UTRA (UE) FDD; Radio transmission and Reception".

[13] 3GPP TS 25.102: "3rd Generation Partnership Project (3GPP); Technical Specification Group (TSG) RAN WG4; UTRA (UE) TDD; Radio transmission and Reception".

[14] IEC CISPR publication 22; 3rd edition (1997-11): "Information technology equipment; Radio disturbance characteristics – Limits and methods of measurement".

[15] 3G TS 34.109: "3rd Generation Partnership Project (3GPP); Technical Specification Group (TSG) Terminal. Terminal Logical Test Interface; Special conformance testing functions".

3.1 Definitions

Camped on a cell	The UE is in idle mode and has completed the cell selection/reselection process and has chosen a cell. The UE monitors system information and (in most cases) paging information. Note that the services may be limited, and that the PLMN may not be aware of the existence of the UE within the chosen cell.
Continuous phenomena (continuous disturbance)	Electromagnetic disturbance, the effects of which on a particular device or equipment cannot be resolved into a succession of distinct effects (IEC 60050-161 [9]).
Data application ancillary	ancillary which provides send/receive data access to UMTS services via UE
Enclosure port	physical boundary of the apparatus through which electromagnetic fields may radiate or impinge. In the case of integral antenna equipment, this port is inseparable from the antenna port.
End- User data	Manufacturer defined data patterns for data transfer testing. Represents EUT´s typical user application (eg. photo, video, textfile, message) in its characteristics.
Idle mode	Idle mode is the state of User Equipment (UE) when switched on but with no Radio Resource Control (RRC) connection.
Integral antenna	antenna designed to be connected directly to the equipment with or without the use of an external connector and considered to be part of the equipment. An integral antenna may be fitted internally or externally to the equipment.

Annex B (normative): Performance assessment of data transfer call. Error Ratios

B.1 Calibration of data transfer

For the EUT, calibration of the data transfer may be performed by assessing the Bit Error Ratio (BER), Block Error Ratio (BLER) or End- User data error ratio. before applying the RF immunity test signal (defined in clauses 9.2 and 9.5).

B.2 Derivation of Error Ratios

The manufacturer shall provide the method for calculating the Error Ratio. Known data patterns shall be transferred bi-directionally from end-to-end (the whole of the UL and DL will be exercised). Performance assessment shall be made at each frequency step. Comparison between transmitted known data and received data shall result in the Error Ratio.

The data patterns used should be of sufficient length to give valid results and should be equivalent to the used channel bit rate.

Possible data patterns for assessing the Error Ratio are BER, BLER and User Data. Detailed description of BER and BLER can be found from 3G TS 34.109 [15]

End- User Data may be used where BER and BLER measurements are not appropriate, and is a manufacturers decision (see below):

Note: For example, in the cases when the EUT consists of UE with data application ancillary and the data application ancillary itself does not support a loopback function that can be applied for the assessement of BER or BLER, as specified in TS34.109[15]. This would lead into a situation where the data application ancillary is not exercised, i.e the data transfer loop is not end-to-end.

The characteristics of the End- User Data used for testing (format, size, typical data throughput rate, additional error corrections etc.) and the necessary test equipment shall be delivered to enable the assessment of the EUT.

Following formula may apply to End- User Data :

$$\mathrm{BitErrorRatio} = \left(\frac{\mathrm{erroneuos(bits, bytes, symbols, etc.)}}{\mathrm{total\ number\ of(bits, bytes, symbols, etc.)}} * 100 \right) = n\%$$

(In case that high Error Ratios exist, ensure that errors are a consequence of EMC stress).

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34.124	CR	003	Current Version:	3.0.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

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	for information		non-strategic	

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: *(at least one should be marked with an X)* (U)SIM [ ] ME [X] UTRAN / Radio [ ] Core Network [ ]

Source: TSG T1 SWG EMC #11 **Date:** 30.08.2000

Subject: Editorial modifications for purposes of clarification.

Work item:

Category: *(only one category shall be marked with an X)*

F	Correction		**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification	X		Release 99	X
				Release 00	

Reason for change: Editorial modification for clarification.

Clauses affected: 1, 3.1, 4.2, 5.2, 6.0, 6.1, 8.2.2, 8.2.3, 9.2.2, 9.5.2, Annex B (B3,B4,B5)

Other specs affected:

Other 3G core specifications	[ ]	→ List of CRs:	
Other GSM core specifications	[ ]	→ List of CRs:	
MS test specifications	[ ]	→ List of CRs:	
BSS test specifications	[ ]	→ List of CRs:	
O&M specifications	[ ]	→ List of CRs:	

Other comments:

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1 Scope

The present document establishes the essential EMC requirements for "3rd generation" digital cellular mobile terminal equipment and ancillary accessories in combination with a 3GPP user equipment (UE).

The equipment conforming to the requirements laid out in the present document and used in its intended electromagnetic environment in accordance with the manufacturers instructions

- shall not generate electromagnetic disturbances at a level .which may interfere with the intended operation of other equipment;
- has an adequate level of intrinsic immunity to electromagnetic disturbances to operate as intended;

The present document specifies the applicable EMC tests, the methods of measurement, the frequency range, the limits and the minimum performance criteria for all types of UTRA UE´s operating in FDD or TDD modes and their accessories.

Base station equipment operating within network infrastructure is outside the scope of the present document. However, the present document does cover mobile and portable equipment that is intended to be operated in a fixed location while connected to the AC mains. Base stations in the radio access network are covered by the technical specification TS25.113 [1].

Requirements for the radiated emission from the enclosure port of integral antenna equipment and ancillaries have been included.. Technical specifications for conducted emissions from the antenna connector are found in the 3GPP specifications for the radio interface, e.g. TS34.121 [2] and TS34.122 [3], for the effective use of the radio spectrum.

The immunity requirements have been selected to ensure an adequate level of compatibility for apparatus in residential, commercial, light industrial and vehicular environments. The levels however, do not cover extreme cases, which may occur in any location but with low probability of occurrence.

The environment classification used in the present document refers to the environment classification used in the Generic Standards IEC 61000-6-1 [4], IEC 61000-6-3 [5], except the vehicular environment class which refers to ISO 7637 Part 1 [6] and Part 2 [7].

Compliance of radio equipment to the requirements of the present document does not signify compliance to any requirement related to the use of the equipment (i.e. licensing requirements).

Compliance to the requirements of the present document does not signify compliance to any safety requirement. However, any temporary or permanent unsafe condition caused by EMC is considered as non-compliance.

2 References

The following documents contain provisions, which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific;
- for a specific reference, subsequent revisions do not apply;
- for a non-specific reference, subsequent revisions do apply;

[1] 3G TS 25.113: "3rd Generation Partnership Project; Technical Specification Group (TSG) RAN WG4; Base station EMC".

[2] 3G TS 34.121: "3rd Generation Partnership Project; Technical Specification Group (TSG) T WG1; Terminal Conformance Specification; Radio transmission and reception (FDD)".

[3] 3G TS 34.122: "3rd Generation Partnership Project; Technical Specification Group (TSG) T WG1; Terminal Conformance Specification; Radio transmission and reception (TDD)".

[4] IEC 61000-6-1 (1997): "Electromagnetic compatibility (EMC) – Part 6: Generic standards - Section 1: Immunity standard for residential, commercial and light-industrial environments".

[5] IEC 61000-6-3 (1996): "Electromagnetic compatibility (EMC) – Part 6: Generic standards - Section 3: Emission standard for residential, commercial and light-industrial environments.

[6] ISO 7637-1 (1990): "Road vehicles - Electrical disturbance by conduction and coupling - Part 1: Passenger cars and light commercial vehicles with nominal 12 V supply voltage - Electrical transient conduction along supply lines only".

[7] ISO 7637-2 (1990): "Road vehicles - Electrical disturbance by conduction and coupling - Part 2: Commercial vehicles with nominal 24 V supply voltage - Electrical transient conduction along supply lines only".

[8] 3G TR 25.990; 3rd Generation Partnership Project; Technical Specification Group Radio Access Network (RAN); Vocabulary
3GPP TR 21 905: "3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Vocabulary for 3GPP specifications".

[9] IEC 60050(161) (1998): "International Electrotechnical Vocabulary - Chapter 161: Electromagnetic compatibility".

[10] 3G TS 34.108: "3rd Generation Partnership Project (3GPP); Technical Specification Group (TSG) Terminal; Common test environments for user equipment (UE). Conformance Testing".

[11] ITU-R Recommendation SM.329-7 (1997): "Spurious emissions".

[12] 3GPP TS 25.101: "3rd Generation Partnership Project (3GPP); Technical Specification Group (TSG) RAN WG4; UTRA (UE) FDD; Radio transmission and Reception".

[13] 3GPP TS 25.102: "3rd Generation Partnership Project (3GPP); Technical Specification Group (TSG) RAN WG4; UTRA (UE) TDD; Radio transmission and Reception".

[14] IEC CISPR publication 22; 3rd edition (1997-11): "Information technology equipment; Radio disturbance characteristics – Limits and methods of measurement".

[15] 3G TS 34.109: "3rd Generation Partnership Project (3GPP); Technical Specification Group (TSG) Terminal. Terminal Logical Test Interface; Special conformance testing functions".

[16] IEC CISPR publication 16-1; (1993); Radio disturbance and immunity measuring apparatus"; Am.1 (1997): "Specification for radio disturbance and immunity measuring apparatus and methods".

[17] IEC 61000-3-2; (1995-03): "Electromagnetic compatibility; Part 3 - Limits; section 2 – Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)"; Am.1 (1997-09)".

[18] IEC 61000-3-3; (1994-12): "Electromagnetic compatibility; Part 3 - Limits; section 2 – Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current ≤ 16 A"

[19] IEC 61000-4-2: "Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – section 2: Electrostatic discharge immunity test – Basic EMC publication".

[20] IEC 61000-4-3: "Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – section 3: Radiated, radio-frequency electromagnetic field immunity test".

[21] IEC 61000-4-4: "Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – section 4: Electrical fast transient/burst immunity test – Basic EMC publication".

[22] IEC 61000-4-5: "Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – section 5: Surge immunity test".

[23] IEC 61000-4-6: "Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – section 6: immunity to conducted disturbances induced by radio frequency fields".

[24] IEC 61000-4-11: "Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – section 11:Voltage dips, short interruptions, and voltage variations immunity test".

[25] ETR 027 (1991): "Radio Equipment and Systems (RES); Methods of measurement for private mobile radio equipment".

[26] ITU-T Recommendation P.64: "Telephone transmission quality, Telephone installations, Local line networks, Objective electro-acoustical measurements. Determination of sensitivity/frequency characteristics of local telephone systems".

[27] ITU-T Recommendation P.76: "Telephone transmission quality, Measurements related to speech loudness, Determination of loudness ratings; Fundamental principles, Annex A".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply.

Ancillary equipment

Equipment (apparatus), used in connection with a user equipment (UE) is considered as an ancillary equipment (apparatus) if:

- the equipment is intended for use in conjunction with a UE to provide additional operational and/or control features to the UE, (e.g. to extend control to another position or location); and
- the equipment cannot be used on a stand alone basis to provide user functions independently of a UE; and
- the UE to which it is connected, is capable of providing some intended operation such as transmitting and/or receiving without the ancillary equipment (i.e. it is not a sub-unit of the main equipment essential to the main equipment basic functions).

BLER (BLock Error Ratio)

BLER is block error ratio. The BLER calculation shall be based on evaluating the CRC on each transport block .

Camped on a cell

The UE is in idle mode and has completed the cell selection/reselection process and has chosen a cell. The UE monitors system information and (in most cases) paging information. Note that the services may be limited, and that the PLMN may not be aware of the existence of the UE within the chosen cell.

Continuous phenomena (continuous disturbance)

Electromagnetic disturbance, the effects of which on a particular device or equipment cannot be resolved into a succession of distinct effects (IEC 60050-161 [9]).

Data application ancillary

ancillary which provides send and/or receive data access to UMTS services via UE

Enclosure port

physical boundary of the apparatus through which electromagnetic fields may radiate or impinge. In the case of integral antenna equipment, this port is inseparable from the antenna port.

Idle mode

Idle mode is the state of User Equipment (UE) when switched on but with no Radio Resource Control (RRC) connection.

Integral antenna

antenna designed to be connected directly to the equipment with or without the use of an external connector and considered to be part of the equipment. An integral antenna may be fitted internally or externally to the equipment.

Maximum average power

The average transmitter output power obtained over any specified time interval, including periods with no transmission, when the transmit time slots are at the maximum power setting.

Necessary bandwidth

For a given class of emission, the width of the frequency band which is just sufficient to ensure the transmission of information at the rate and with the quality required under specified conditions.

Out of band emissions

Emission on a frequency or frequencies immediately outside the necessary bandwidth, which results from, the modulation process, but excluding spurious emissions.

NOTE 1 – Any unwanted emission which falls at frequencies separated from the

centre frequency of the emission by less than 250% of the necessary bandwidth of the emission will generally be considered out-of-band emission.

Port

particular interface, of the specified equipment (apparatus), with the electromagnetic environment. For example, any connection point on an equipment intended for connection of cables to or from that equipment is considered as a port (see figure 1).

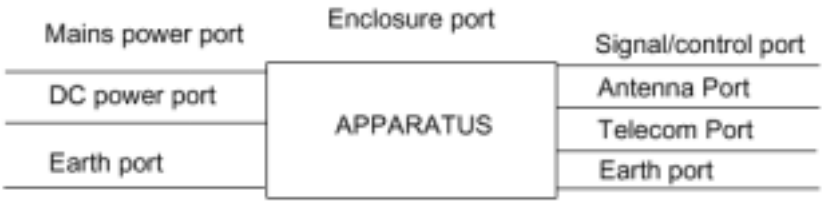

Figure 1: Examples of ports

Spurious emission from ITU-R SM 329-7 [11]	Emission on a frequency, or frequencies, which are outside the necessary bandwidth and the level of which may be reduced without affecting the corresponding transmission of information. Spurious emissions include harmonic emissions, parasitic emissions, intermodulation products and frequency conversion products but exclude out-of-band emissions. NOTE 1 – For the purpose of this Recommendation all emissions, including intermodulation products, conversion products and parasitic emissions, which fall at frequencies separated from the centre frequency of the emission by 250% or more of the necessary bandwidth of the emission will generally be considered spurious emissions.
Telecommunication port	ports which are intended to be connected to telecommunication networks (e.g. public switched telecommunication networks, integrated services digital networks), local area networks (e.g. Ethernet, Token Ring) and similar networks (see CISPR 22 [14]).
Transient phenomena	Pertaining to or designating a phenomena or a quantity which varies between two consecutive steady states during a time interval short compared with the time-scale of interest (IEC 60050-161 [9])
Traffic mode	is the state of User Equipment (UE) when switched on and with Radio Resource Control (RRC) connection established.
Universal mobile telecommunications system (UMTS)	The telecommunications system, incorporating mobile cellular and other functionality, that is the subject of specifications produced by 3GPP
User equipment (UE)	is a "Mobile Station" (MS) which is an entity capable of accessing a set of UMTS services via one or more radio interfaces. This entity may be stationary or in motion within the UMTS service area while accessing the UMTS services, and may simultaneously serve one or more users.

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

AC	Alternating Current
BCCH	Broadcast Control Channel *)
BS	Base Station
BSS	Base Station System
BTS	Base Transceiver Station
CCCH	Common Control Channel *)
CW	Continuous Wave (unmodulated carrier wave)
DC	Direct Current
DL	Down Link (From BTS to UE)
DTX	Discontinuous Transmission *)
EMC	Electromagnetic Compatibility
ESD	Electrostatic Discharge
EUT	Equipment Under Test (UE or UE with ancillaries)
FDD	Frequency Division Duplex
LISN	Line Impedance Stabilizing Network
MRP	Mouth Reference Point (artificial head)
PCCPCH	Primary Common Control Physical Channel
RF	Radio Frequency
rms	root mean square
RRC	Radio Resource Control
SPL	Sound Pressure Level
TCH	Traffic channel
TDD	Time Division Duplex
UARFCN	UTRA Absolute Radio Frequency Channel Number *)
UE	User Equipment
UL	Up Link (From UE to BTS)
UMTS	Universal Mobile Telecommunication System
UTRA	Universal Terrestrial Radio Access network

*) refer to Terminology specifications 3G TS 21.905 and 3G TS 25.990 [8] for further details.

4.2 Arrangements for establishing a communication link

The wanted RF input signal nominal frequency shall be selected by setting the UTRA Absolute Radio Frequency Channel Number (UARFCN) to an appropriate number.

A communication link shall be set up with a suitable base station simulator (hereafter called "the test system"). The test system shall be located outside of the test environment

When the EUT is required to be in the traffic mode, a call is set up according to the Generic call set-up procedure and the following conditions shall be met:

See TS 34.108 [10] and TS 34.109 [15] Logical Test Interface for details regarding generic call set-up procedure and loopback test.

- set and send continuously Up power control commands to the UE;
- enter the UE into loopback test mode and start the loopback test;
- the DTX shall be disabled;
- Inner Loop Power Control shall be enabled;
- transmitting and/or receiving (UL/DL) bit rate for reference test channel shall be 12.2 kbps;
- adequate measures shall be taken to avoid the effect of the unwanted signal on the measuring equipment;
- For immunity testing, the wanted input signal level shall be set to 40 dB above the reference sensitivity level to provide a stable communication link. The reference sensitivity level is defined in 3G TS 25.101 [12].

  For emission testing, the wanted input signal level shall be no more than 15 dB above the reference sensitivity level, such that the performance of the measuring receiver is not limited by strong signal effects.

When the EUT is required to be in the idle mode, the following conditions shall be met:

- enable the UE receiver and set Cell Search Mode on a PCCPCH. Since there is no downlink signal, the UE should not pass the Cell Search mode.

For immunity tests subclause 4.3, shall apply and the conditions shall be as follows:

5.2 Equipment which can provide a continuous communication link

The test arrangement and signals, given in clause 4, apply to radio equipment or a combination of radio equipment and ancillary equipment that permits the establishment of a communication link. The assessment of equipment performance shall be based on speech call and data transfer according to the criteria in clause 6.

5.3 Equipment which can only provide a discontinuous communication link (packet data/transmission)

If the equipment does not permit or allow for a communications link to be established and maintained during the EMC tests (as in subclause 5.2), the manufacturer shall define the performance assessment. The manufacturer shall provide the method of observing the degradation of performance of the equipment.

6 Performance criteria

The maintenance of a communications link shall be assessed by using an indicator, which may be part of the test system or the equipment under test.

Specifically the equipment shall meet the minimum performance criteria as specified in the following subclauses as appropriate.

Portable equipment intended for use whilst powered by the main battery of a vehicle shall additionally fulfil the applicable requirements set out by the present document for mobile equipment for vehicular use.

Portable equipment intended for use whilst powered by AC mains shall additionally fulfil the applicable requirements set out by the present document for equipment for fixed use.

If an equipment is of such nature, that the performance criteria described in the following subclauses are not appropriate, then the manufacturer shall declare, for inclusion in the test report, his own specification for an acceptable level of performance or degradation of performance during and/or after testing, as required by the present document. The performance criteria specified by the manufacturer shall give the same degree of immunity protection as called for in the following subclauses.

In addition, the test shall also be performed in idle mode to ensure the transmitter does not unintentionally operate.

The requirements apply to all types of UTRA (FDD or TDD) for the UE.

6.1 Performance criteria for continuous phenomena

A communication link shall be established at the start of the test, and maintained during the test, subclauses 4.1 and 4.2.

In the data transfer mode, the performance criteria can be one of the following error ratios:

-

- if the BER (as referred in TS34.109) is used, it shall not exceed 0.001 during the test sequence;

- if the BLER (as referred in TS34.109) is used, it shall not exceed 0.01 during the test sequence;

In the speech mode, the performance criteria shall be that the up link and downlink speech output levels shall be at least 35 dB less than the recorded reference levels, when measured through an audio band pass filter of width 200 Hz, centred on 1 kHz (Annex A).

NOTE: When there is a high level noise background noise present the filter bandwidth can be reduced down to a minimum of 40 Hz.

At the conclusion of the test, the EUT shall operate as intended with no loss of user control functions or stored data, and the communication link shall have been maintained.

In addition to confirming the above performance in traffic mode, the test shall be performed in idle mode, and the transmitter shall not unintentionally operate.

8.2.2 Test method

The reference test site shall fulfil the requirements of ITU-R SM. 329-7 [11]. The site shall be a fully anechoic chamber (FAC) meeting the free-space conditions. EUT shall be placed on a non-conducting support. Maximum average power of any spurious components shall be detected by the test antenna and measuring receiver (e.g. a spectrum analyzer).

At each frequency at which a component is detected, the EUT shall be rotated to obtain maximum response, and the effective radiated power (e.r.p.) of that component determined by a substitution measurement. The measurement shall be repeated with the test antenna in the orthogonal polarization plane.

NOTE: Effective radiated power e.r.p. refers to the radiation of a half wave tuned dipole instead of an isotropic antenna. There is a constant difference of 2.15 dB between e.i.r.p. and e.r.p.

e..r.p. (dBm) = e.i.r.p. (dBm) – 2.15 Ref. ITU-R SM. 329-7 ANNEX 1 [11]

Measurements are made with a tuned dipole antenna or a reference antenna with a known gain referenced to an isotropic antenna.

If a different test site or method is used, this shall be stated in the test report. The results shall be converted to a reference site and reference method values and the validity of the conversion shall be demonstrated.

8.2.3 Limits

The references for these requirements are ITU-R SM 329-7 [11] and TS 25.101 subclauses 6.6.3.1. and 7.9.1. [12]

The frequency boundary and reference bandwidths for the detailed transitions of the limits between the requirements for out of band emissions and spurious emissions are based on ITU-R SM 329-7 [11].

These requirements are only applicable for frequencies, which are greater than 12.5 MHz away from the UE centre carrier frequency

Table 3.1: Radiated Spurious emissions requirements

Frequency	Minimum requirement (e.r.p.)/ Reference Bandwidth Idle mode	Minimum requirement (e.r.p.) / Reference Bandwidth Traffic mode
30 MHz ≤ f < 1000 MHz	-57dBm / 100 kHz	-36 dBm / 100 kHz
1 GHz ≤ f < 12.75 GHz fc – 12.5 MHz < f < fc + 12.5 MHz	-47dBm / 100 kHz Not defined	-30 dBm / 1 MHz Not defined

NOTE: fc is the centre frequency of the TCH. The frequency range fc ± 12.5 MHz are covered by the "Out of Band" emission requirements of 3G TS 34.121[2] and 3G TS 34.122 [3].

9.2.2 Test method and level

The test method shall be in accordance with IEC 61000-4-3 [20]

- for UE and ancillary equipment the following requirements shall apply;
- the test level shall be 3 V/m amplitude modulated to a depth of 80 % by a sinusoidal audio signal of 1 kHz;
- the stepped frequency increments shall be 1 % of the momentary frequency;
- when using the max hold detector method (see ANNEX A)at each test frequency step initially an unmodulated test signal shall be applied. Then the test modulation shall be applied;
- the test shall be performed over the frequency range 80 MHz to 1 000 MHz;
- responses in stand alone receivers or receivers which are part of transceivers occurring at discrete frequencies which are narrow band responses, shall be disregarded, see subclause 4.3;
- the frequencies selected during the test shall be recorded in the test report.

9.5.2 Test method and level

The test method shall be in accordance with IEC 61000-4-6 [23].

- the test signal shall be amplitude modulated to a depth of 80 % by a sinusoidal audio signal of 1 kHz;
- the stepped frequency increments shall be either 50 kHz or 1 % frequency increment of the momentary frequency in the frequency range 150 kHz - 5 MHz and 1 % frequency increment of the momentary frequency in the frequency range 5 MHz - 80 MHz;
- when using the max hold detector method (see ANNEX A)at each test frequency step initially an unmodulated test signal shall be applied. Then the test modulation shall be applied;- the test level shall be severity level 2 as given in IEC 61000-4-6 [23] corresponding to 3 V rms, at a transfer impedance of 150 Ω;
- the test shall be performed over the frequency range 150 kHz - 80 MHz;
- responses of stand alone receivers or receivers which are part of transceivers occurring at discrete frequencies which are narrow band responses, shall be disregarded, see subclause 4.3;
- the frequencies selected during the test and the test method used shall be recorded in the test report.

B.3 EUT without data application ancillary

Data monitoring Devices are here considered as part of the Test System. Arrangements should be made by the manufacturer, if needed, to couple the Data monitoring Device by a method which does not affect the radiated electromagnetic field (e.g. ultra sonic or optical).

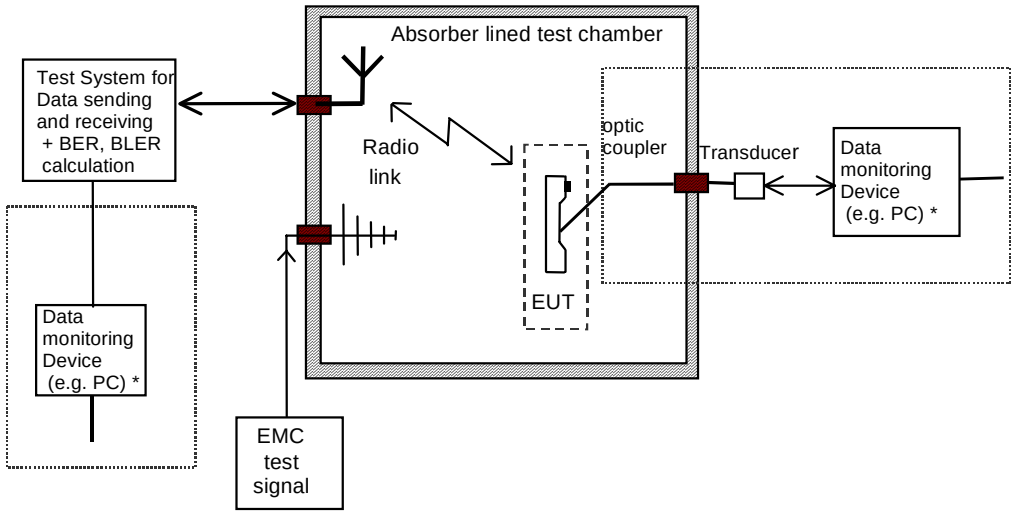

Figure B.1: Error Ratio assessment, test set-up for EUT without data application ancillary.

B.4 EUT with data application ancillary

The Data monitoring Device is here considered as a part of the Test System. The Data application ancillary should be part of the data transfer (UL and DL) loop and is included in the EUT configuration.

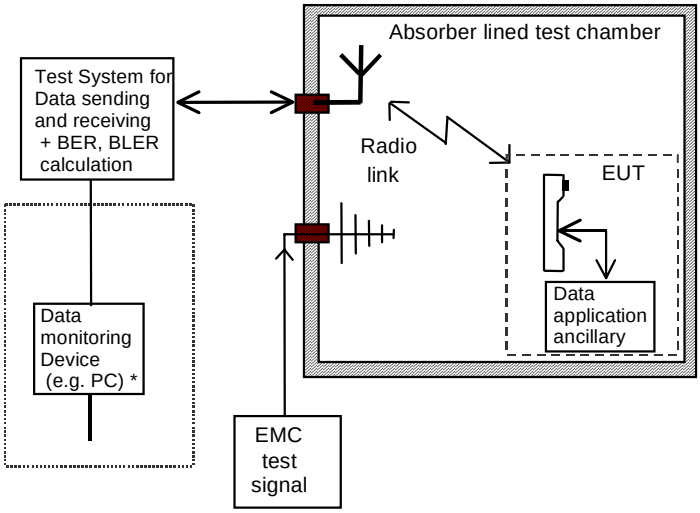

Figure B.2: Error ratio assessment, test set-up for EUT with data application ancillary.