TCT 通测检测 TESTING CENTRE TECHNOLOGY

Test Report

Test Report No. ....:	TCT240614E020
Date of issue ....:	Jul. 26, 2024
Testing laboratory...........:	Shenzhen TCT Testing Technology Co., Ltd.
Testing location/ address:	2101 & 2201, Zhenchang Factory, Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China
Applicant's name ....:	Shenzhen Huafurui Technology Co., Ltd.
Address ....:	Unit 601-03, 6/F, Block A, Building 1, Ganfeng Technology Building, No. 993 Jiaxian Road, Xiangjiaotang Community, Bantian Street, Longgang District, Shenzhen, P.R. China
Manufacturer's name......:	Shenzhen Huafurui Technology Co., Ltd.
Address ....:	Unit 601-03, 6/F, Block A, Building 1, Ganfeng Technology Building, No. 993 Jiaxian Road, Xiangjiaotang Community, Bantian Street, Longgang District, Shenzhen, P.R. China
Standard(s).......................:	ETSI EN 301 511 V12.5.1 (2017-03)
Product Name ....:	Smartphone
Trade Mark.......................:	CUBOT
Model/Type reference .....:	KINGKONG POWER 3
Rating(s) ....:	Refer to EUT description of page 4
Date of receipt of test item ....:	Jun. 14, 2024
Date (s) of performance of test ....:	Jun. 14, 2024 ~ Jul. 26, 2024
Tested by (+signature)....:	Rleo LIU Rleo Liu
Check by (+signature) ....:	Beryl ZHAO Beryl Zhao
Approved by (+signature):	Tomsin Tomsin

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1. General Product Information

1.1. EUT description

Product Name......................:	Smartphone
Model/Type reference...........:	KINGKONG POWER 3
Hardware Version.................:	E388_MAIN_PCB_V1.1
Software Version..................:	CUBOT_E071C_KINGKONG POWER 3_V01
Operation Frequency...........:	E-GSM 900/GPRS 900/EGPRS 900: TX: 880MHz~915MHz; RX: 925MHz~960MHz GSM 1800/GPRS 1800/EGPRS 1800: TX: 1710MHz~1785MHz; RX: 1805MHz~1880MHz
Modulation Technology ....:	GSM: GMSK GPRS: GMSK EGPRS: 8PSK
Antenna Type.......................:	FPC Antenna
Antenna Gain.......................:	E-GSM 900/GPRS 900/EGPRS 900: 0.07dBi GSM 1800/GPRS 1800/EGPRS 1800: 1.02dBi
Rating(s)..............................:	Adapter Information: Model: HJ-PD33W-EU Input: AC 100-240V, 50/60Hz, 0.8A Output: DC 5.0V, 3.0A/ DC 9.0V, 3.0A, 27.0W DC 12.0V, 2.75A, 33.0W MAX Rechargeable Li-polymer Battery DC 3.87V

Note: The antenna gain listed in this report is provided by applicant, and the test laboratory is not responsible for this parameter.

1.2. Model(s) list

None.

1.3. EUT Features Supported

Feature	Supported	Comments
GSM	Y	GSM900/GSM1800
GPRS	Y	GPRS Multi-Slot Class 12
EGPRS	Y	EGPRS Multi-Slot Class 12

2. Test Result Summary

No.	Description of Test	Result
1	Transmitter – Frequency error and phase error	PASS
2	Transmitter – Frequency error under multi path and interference conditions	PASS
3	Transmitter – Frequency error and Phase Error in HSCSD Multislot Configuration	N/A
4	Frequency error and phase error in GPRS multislot configuration	PASS
5	Transmitter output power and burst timing	PASS
6	Transmitter – Output RF spectrum	PASS
7	Transmitter output power and burst timing in HSCSD multislot configuration	N/A
8	Transmitter – Output RF spectrum in HSCSD multislot configuration	N/A
9	Transmitter – Output RF spectrum for MS supporting the R-GSM or ER-GSM frequency band	N/A
10	Transmitter output power in GPRS multislot configuration	PASS
11	Output RF spectrum in GPRS multislot configuration	PASS
12	Conducted spurious emissions – MS allocated a channel	PASS
13	Conducted spurious emission – MS in idle mode	PASS
14	Conducted spurious emissions for MS supporting the R-GSM or ER-GSM frequency band – MS allocated a channel	N/A
15	Conducted spurious emissions for MS supporting the R-GSM or ER-GSM frequency band – MS in idle mode	N/A
16	Radiated spurious emissions – MS allocated a channel	PASS
17	Radiated spurious emissions – MS in idle mode	PASS
18	Radiated spurious emissions for MS supporting the R-GSM or ER-GSM frequency band – MS allocated a channel	N/A
19	Radiated spurious emissions for MS supporting the R-GSM or ER-GSM frequency band – MS in idle mode	N/A
20	Receiver blocking and spurious responses – speech channels	PASS
21	Receiver blocking and spurious response – speech channels for MS supporting the R-GSM or ER-GSM frequency band	N/A
22	Improved Receiver blocking and spurious response – speech channels for 8W MS supporting the R-GSM or ER-GSM frequency band	N/A
23	Improved Receiver blocking and spurious response – speech channels for 2W MS supporting the R-GSM or ER-GSM frequency band	N/A
24	Improved Receiver blocking and spurious response – control channels for 8W MS supporting the R-GSM or ER-GSM frequency band not supporting speech	N/A
25	Improved Receiver blocking and spurious response – control channels for 2W MS supporting the R-GSM or ER-GSM frequency band not supporting speech	N/A
26	Frequency error and Modulation accuracy in EGPRS Configuration	PASS
27	Frequency error under multipath and interference conditions in EGPRS Configuration	PASS
28	EGPRS Transmitter output power	PASS

29	Output RF spectrum in EGPRS configuration	PASS
30	Blocking and spurious response in EGPRS configuration	PASS
31	Blocking and spurious response in DLMC configuration	N/A
32	Intermodulation rejection - speech channels	PASS
33	Intermodulation rejection - control channels	PASS
34	Intermodulation rejection - EGPRS	PASS
35	AM suppression - speech channels	PASS
36	AM suppression - control channels	PASS
37	AM suppression - packet channels	PASS
38	Adjacent channel rejection - speech channels (TCH/FS)	PASS
39	Adjacent channel rejection - control channels	PASS
40	Adjacent channel rejection - EGPRS	PASS
41	Adjacent channel rejection in DLMC configuration	N/A
42	Reference sensitivity - TCH/FS	PASS
43	Reference sensitivity - FACCH/F	N/A
44	Minimum Input level for Reference Performance - GPRS	PASS
45	Minimum Input level for Reference Performance - EGPRS	PASS
46	Reference sensitivity - TCH/FS for MS supporting the R-GSM or ER-GSM band	N/A

Note:

1 PASS: Test item meets the requirement.

2. N/A: Test case does not apply to the test object.

3. The test result judgment is decided by the limit of test standard.

3. General Information

3.1. Test environment and mode

Item	Normal condition	Extreme condition			
		HVHT	LVHT	HVLT	LVLT
Temperature	+25ºC	+40ºC	+40ºC	-20ºC	-20ºC
Voltage	DC 3.87V	DC 4.35V	DC 3.5V	DC 4.35V	DC 3.5V
Humidity	20%-75%				
Atmospheric Pressure:	1008 mbar				
Vibration Condition:	Frequency in Hz		acceleration spectral densities in m^2/s^3		
	5-20 20-500		0.96 0.96 at 20Hz, thereafter -3dB/octave		
Test Mode:	Linking/idle mode configured according to TS 151.010-1				
Remark:	Both SIM have been test, and the result of SIM1 is the worst. All the test data in this report are carried out on SIM1 for test.				

3.2. Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Equipment	Model No.	Serial No.	Trade Name
/	/	/	/

Note:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.

2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

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3.3. Test Instruments List

Name	Model No.	Manufacturer	Date of Cal.	Due Date
EMI Test Receiver	ESCI7	R&S	Feb. 01, 2024	Jan. 31, 2025
Spectrum Analyzer	FSQ40	R&S	Jun. 27, 2024	Jun. 26, 2025
Pre-amplifier	8447D	HP	Jun. 27, 2024	Jun. 26, 2025
Pre-amplifier	LNPA_0118G-45	SKET	Feb. 01, 2024	Jan. 31, 2025
Pre-amplifier	LNPA_1840G-50	SKET	Feb. 01, 2024	Jan. 31, 2025
Broadband Antenna	VULB9163	Schwarzbeck	Jun. 29, 2024	Jun. 28, 2025
Horn Antenna	BBHA 9120D	Schwarzbeck	Jun. 29, 2024	Jun. 28, 2025
Horn Antenna	BBHA 9170	Schwarzbeck	Feb. 03, 2024	Feb. 02, 2025
Coaxial cable	RE-03-D	SKET	Jun. 27, 2024	Jun. 26, 2025
Coaxial cable	RE-03-M	SKET	Jun. 27, 2024	Jun. 26, 2025
Coaxial cable	RE-03-L	SKET	Jun. 27, 2024	Jun. 26, 2025
Coaxial cable	RE-04-D	SKET	Jun. 27, 2024	Jun. 26, 2025
Coaxial cable	RE-04-M	SKET	Jun. 27, 2024	Jun. 26, 2025
Coaxial cable	RE-04-L	SKET	Jun. 27, 2024	Jun. 26, 2025
EMI Test Software	FA-03A2 RE+	EZ_EMC	/	/
Spectrum Analyzer	N9020A	Agilent	Jun. 27, 2024	Jun. 26, 2025
Universal Radio Communication Tester	CMU200	R&S	Jun. 27, 2024	Jun. 26, 2025
DC Power Supply	KR3005K	Kingrang	Jun. 27, 2024	Jun. 26, 2025
Programable temprature and humidity chamber	JQ-2000	JQ	Jun. 27, 2024	Jun. 26, 2025

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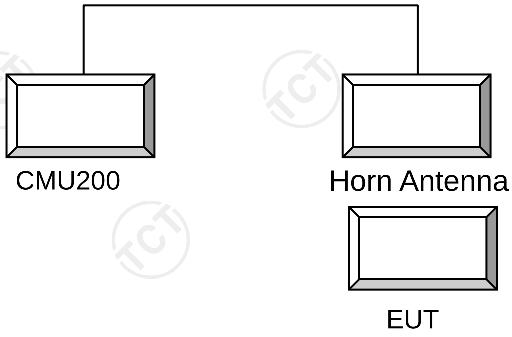
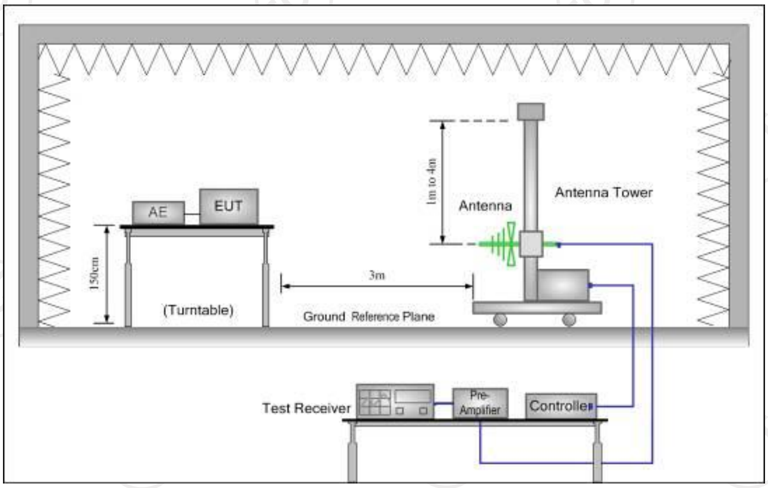
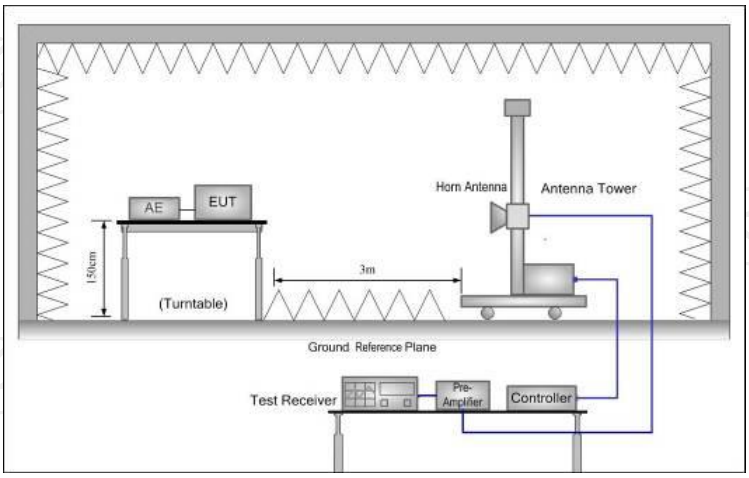
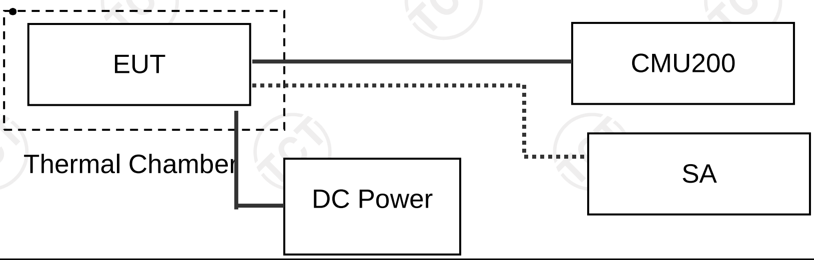
3.4. System Test Configuration

Configuration:	
Block Diagram for Radiated Method Test:	Below 1GHz  Above 1GHz 
Block Diagram for Conducted Method Test:	

4. Facilities and Accreditations

4.1. Facilities

The test facility is recognized, certified, or accredited by the following organizations:

- FCC - Registration No.: 645098
  SHENZHEN TONGCE TESTING LAB
  Designation Number: CN1205
  The testing lab has been registered and fully described in a report with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.
- IC - Registration No.: 10668A-1
  SHENZHEN TONGCE TESTING LAB
  CAB identifier: CN0031
  The testing lab has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing.

4.2. Location

Shenzhen TCT Testing Technology Co., Ltd.

Address: 2101 & 2201, Zhenchang Factory, Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China

TEL: +86-755-27673339

4.3. Measurement Uncertainty

The reported uncertainty of measurement y ± U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

No.	Item	MU
1	Conducted Emission	± 3.10 dB
2	RF power, conducted	± 0.12 dB
3	Spurious emissions, conducted	± 0.11 dB
4	All emissions, radiated(<1 GHz)	± 4.56 dB
5	All emissions, radiated(1 GHz - 18 GHz)	± 4.22 dB
6	All emissions, radiated(18 GHz- 40 GHz)	± 4.36 dB
7	Temperature	± 0.1°C
8	Humidity	± 1.0%

5. Test Results and Measurement Data

5.1. Transmitter – Frequency error and phase error

5.1.1. Test Specification

Test Requirement:	ETSI EN 301 511 V12.5.1 clause 4.2.1
Test Method:	ETSI EN 301 511 V12.5.1 clause 5.3.1
Limit:	1. The MS carrier frequency shall be accurate to within 0.1 ppm, or accurate to within 0.1 ppm compared to signals received from the BS. For GSM 400 MS a value of 0.2 ppm shall be used in both cases. 2. The RMS phase error (difference between the phase error trajectory and its linear regression on the active part of the time slot) for each burst shall not be greater than 5 degrees. 3. The maximum peak deviation during the useful part of each burst shall not be greater than 20 degrees.
Test Procedure:	a) For one transmitted burst, the SS captures the signal as a series of phase samples over the period of the burst. These samples are evenly distributed over the duration of the burst with a minimum sampling rate of 2/T, where T is the modulation symbol period. The received phase trajectory is then represented by this array of at least 294 samples. b) The SS then calculates, from the known bit pattern and the formal definition of the modulator contained in 3GPP TS 05.04, the expected phase trajectory. c) From a) and b) the phase trajectory error is calculated, and a linear regression line computed through this phase trajectory error. The slope of this regression line is the frequency error of the mobile transmitter relative to the simulator reference. The difference between the regression line and the individual sample points is the phase error of that point. c.1) The sampled array of at least 294 phase measurements is represented by the vector: $\varnothing_m = \varnothing_m(0)...\varnothing_m(n)$ where the number of samples in the array n+1 >= 294. c.2) The calculated array, at the corresponding sampling instants, is represented by the vector: $\varnothing_c = \varnothing_c(0)...\varnothing_c(n)$. c.3) The error array is represented by the vector: $\varnothing_e = \{\varnothing_m(0) - \varnothing_c(0)\}.........\{\varnothing_m(n) - \varnothing_c(n)\} = \varnothing_e(0)...\varnothing_e(n)$. c.4) The corresponding sample numbers form a vector t = t(0)...t(n). c.5) By regression theory the slope of the samples with respect to t is k where:

c.6) The frequency error is given by k/(360 * γ), where γ is the sampling interval in s and all phase samples are measured in degrees.

c.7) The individual phase errors from the regression line are given by:

$\varnothing_e(j) - k*t(j)$.

c.8) The RMS value $\varnothing_e$ of the phase errors is given by:

d) Steps a) to c) are repeated for 20 bursts, not necessarily contiguous.

e) The SS instructs the MS to its maximum power control level, all other conditions remaining constant. Steps a) to d) are repeated.

f) The SS instructs the MS to the minimum power control level, all other conditions remaining constant. Steps a) to d) are repeated.

g) The MS is hard mounted on a vibration table and vibrated at the frequency/amplitudes specified in annex 1, TC4.

During the vibration steps a) to f) are repeated.

NOTE 1: *If the call is terminated when mounting the MS to the vibration table, it will be necessary to establish the initial conditions again before repeating steps a) to f).*

h) The MS is re-positioned on the vibration table in the two orthogonal planes to the plane used in step g). For each of the orthogonal planes step g) is repeated.

i) Steps a) to f) are repeated under extreme test conditions (see annex 1, TC2.2).

NOTE 2: *The series of samples taken to determine the phase trajectory could also be used, with different post-processing, to determine the transmitter burst characteristics of subclause 13.3. Although described independently, it is valid to combine the tests of subclauses 13.1 and 13.3, giving both answers from single sets of captured data.*

NOTE 3: *Steps g) and h) are skipped if TSPC_No_Vibration_Sensitive_Components is declared as Yes*

Test Instrument:	Refer to Item 3.3
Test Result:	PASS

5.2. Transmitter - Frequency error under multipath and interference conditions

5.2.1. Test Specification

Test Requirement:	ETSI EN 301 511 V12.5.1 clause 4.2.2
Test Method:	ETSI EN 301 511 V12.5.1 clause 5.3.2
Limit:	1.The MS carrier frequency error for each burst shall be accurate to within 0,1 ppm (0,2 ppm for GSM 400), or 0,1 ppm (0,2 ppm for GSM 400) compared to signals received from the BS for signal levels down to 3 dB below the reference sensitivity level. 2.The MS carrier frequency error for each burst shall be accurate to within 0,1 ppm (0,2 ppm for GSM 400), or 0,1 ppm (0,2 ppm for GSM 400) compared to signals received from the BS for 3 dB less carrier to interference ratio than the reference interference ratios (3GPP TS 05.10, subclauses 6 and 6.1).
Test procedure:	a) The level of the serving cell BCCH is set to 10 dB above the reference sensitivity level ( ) and the fading function set to RA. The SS waits 30 s for the MS to stabilize to these conditions. The SS is set up to capture the first burst transmitted by the MS during call establishment. A call is initiated by the SS on a channel in the mid ARFCN range as described for the generic call set up procedure but to a TCH at level 10 dB above the reference sensitivity level( ) and fading function set to RA. b) The SS calculates the frequency accuracy of the captured burst as described in test 13.1. c) The SS sets the serving cell BCCH and TCH to the reference sensitivity level( ) applicable to the type of MS, still with the fading function set to RA and then waits 30 s for the MS to stabilize to these conditions. d) The SS shall capture subsequent bursts from the traffic channel in the manner described in test 13.1. ***NOTE:*** *Due to the very low signal level at the MS receiver input the MS receiver is liable to error. The "looped back" bits are therefore also liable to error, and hence the SS does not know the expected bit sequence. The SS will have to demodulate the received signal to derive (error free) the transmitter burst bit pattern. Using this bit pattern the SS can calculate the expected phase trajectory according to the definition within 3GPP TS 05.04.* e) The SS calculates the frequency accuracy of the captured burst as described in test 13.1. f) Steps d) and e) are repeated for 5 traffic channel bursts spaced over a period of not less than 20 s. g) The initial conditions are established again and steps a) to f) are repeated but with the fading function set to HT100 (HT200 for GSM 400, HT120 for GSM 700).

	h) The initial conditions are established again and steps a) to f) are repeated but with the fading function set to TU50 (TU100 for GSM 400, TU 60 for GSM 700). i) The initial conditions are established again and steps a) and b) are repeated but with the following differences: - the levels of the BCCH and TCH are set to 18 dB above reference sensitivity level( ). - two further independent interfering signals are sent on the same nominal carrier frequency as the BCCH and TCH and at a level 10 dB below the level of the TCH and modulated with random data, including the midamble. - the fading function for all channels is set to TUlow. - the SS waits 100 s for the MS to stabilize to these conditions. j) Repeat steps d) to f), except that at step f) the measurement period must be extended to 200 s and the number of measurements increased to 20. k) The initial conditions are established again and steps a) to j) are repeated for ARFCN in the Low ARFCN range. l) The initial conditions are established and steps a) to j) are repeated for ARFCN in the High ARFCN range. m) Repeat step h) under extreme test conditions (see annex 1, TC2.2).
Test Instruments:	Refer to Item 3.3
Test Result	PASS

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5.3. Frequency error and phase error in GPRS multislot configuration

5.3.1. Test Specification

Test Requirement:	ETSI EN 301 511 V12.5.1 clause 4.2.4
Test Method:	ETSI EN 301 511 V12.5.1 clause 5.3.4
Limit:	1. The MS carrier frequency shall be accurate to within 0,1 ppm compared to signals received from the BS. 2. The RMS phase error (difference between the phase error trajectory and its linear regression on the active part of the time slot) for each burst shall not be greater than 5 degrees. 3. The maximum peak deviation during the useful part of each burst shall not be greater than 20 degrees.
Test Procedure:	a) For one transmitted burst on the last slot of the multislot configuration, the SS captures the signal as a series of phase samples over the period of the burst. These samples are evenly distributed over the duration of the burst with a minimum sampling rate of 2/T, where T is the modulation symbol period. The received phase trajectory is then represented by this array of at least 294 samples. b) The SS then calculates, from the known bit pattern and the formal definition of the modulator contained in 3GPP TS 05.04, the expected phase trajectory. c) From a) and b) the phase trajectory error is calculated, and a linear regression line computed through this phase trajectory error. The slope of this regression line is the frequency error of the mobile transmitter relative to the simulator reference. The difference between the regression line and the individual sample points is the phase error of that point. c.1) The sampled array of at least 294 phase measurements is represented by the vector: $\varnothing_m = \varnothing_m(0)...\varnothing_m(n)$ where the number of samples in the array $n+1 \geq 294$. c.2) The calculated array, at the corresponding sampling instants, is represented by the vector: $\varnothing_c = \varnothing_c(0)...\varnothing_c(n)$. c.3) The error array is represented by the vector: $\varnothing_e = \{\varnothing_m(0) - \varnothing_c(0)\}.........\{\varnothing_m(n) - \varnothing_c(n)\} = \varnothing_e(0)...\varnothing_e(n)$. c.4) The corresponding sample numbers form a vector $t = t(0)...t(n)$. c.5) By regression theory the slope of the samples with respect to t is k where: $k = \dfrac{\sum_{j=0}^{j=n} t(j) * \varnothing_e(j)}{\sum_{j=0}^{j=n} t(j)^2}$

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	c.6) The frequency error is given by k/(360 * g), where g is the sampling interval in s and all phase samples are measured in degrees. c.7) The individual phase errors from the regression line are given by: $\varnothing_e(j) - k*t(j)$. c.8) The RMS value $\varnothing_e$ of the phase errors is given by: $$\varnothing_e(RMS) = \left[\frac{\sum_{j=0}^{j=n} \{\varnothing_e(j) - k*t(j)\}^2}{n+1} \right]^{1/2}$$ d) Steps a) to c) are repeated for 20 bursts, not necessarily contiguous. e) The SS instructs the MS to its maximum power control level by setting the power control parameter ALPHA (α) to 0 and GAMMA_TN (Γ_{CH}) for each timeslot to the desired power level in the Packet Uplink Assignment message (Closed Loop Control, see 3GPP TS 05.08, clause B.2), all other conditions remaining constant. Steps a) to d) are repeated. f) The SS instructs the MS to the minimum power control level, all other conditions remaining constant. Steps a) to d) are repeated. g) The MS is hard mounted on a vibration table and vibrated at the frequency/amplitudes specified in annex 1, TC4. During the vibration steps a) to f) are repeated. ***NOTE1:*** *If the call is terminated when mounting the MS to the vibration table, it will be necessary to establish the initial conditions again before repeating steps a) to f).* h) The MS is re-positioned on the vibration table in the two orthogonal planes to the plane used in step g). For each of the orthogonal planes step g) is repeated. i) Steps a) to f) are repeated under extreme test conditions (see annex 1, TC2.2). ***NOTE2:*** *Steps g) and h) are skipped if TSPC_No_Vibration_Sensitive_Components is declared as Yes*
Test Instrument:	Refer to Item 3.3
Test Result:	PASS

5.4. Transmitter output power and burst timing

5.4.1. Test Specification

Test Requirement:	ETSI EN 301 511 V12.5.1 clause 4.2.5
Test Method:	ETSI EN 301 511 V12.5.1 clause 5.3.5
Limit:	1. The MS maximum output power shall be as defined in 3GPP TS 05.05, subclause 4.1.1, table for GMSK modulation, according to its power class, with a tolerance of ±2 dB under normal conditions; 3GPP TS 05.05, subclause 4.1.1, table for GMSK modulation. 2. The MS maximum output power shall be as defined in 3GPP TS 05.05, subclause 4.1.1, table for GMSK modulation, according to its power class, with a tolerance of ±2,5 dB under extreme conditions; 3GPP TS 05.05, subclause 4.1.1, table for GMSK modulation; 3GPP TS 05.05 annex D in subclauses D.2.1 and D.2.2. 3. The power control levels shall have the nominal output power levels as defined in 3GPP TS 05.05, subclause 4.1.1, from the lowest power control level up to the maximum output power corresponding to the class of the MS (for tolerance on maximum output power see conformance requirements 1), with a tolerance of ±3 dB, ±4 dB or ±5 dB under normal conditions; 3GPP TS 05.05, subclause 4.1.1. 4. The power control levels shall have the nominal output power levels as defined in 3GPP TS 05.05, 4.1.1, from the lowest power control level up to the maximum output power corresponding to the class of the MS (for tolerance on maximum output power see conformance requirements 2), with a tolerance of ±4 dB, ±5 dB or ±6 dB under extreme conditions; 3GPP TS 05.05, subclause 4.1.1; 3GPP TS 05.05 annex D subclauses D.2.1 and D.2.2. 5. The output power actually transmitted by the MS at consecutive power control levels shall form a monotonic sequence and the interval between power control levels shall be 2 ± 1,5 dB (1 ± 1dB between power control level 30 and 31 for PCS 1 900); 3GPP TS 05.05, subclause 4.1.1. 6. The transmitted power level relative to time for a normal burst shall be within the power/time template given in 3GPP TS 05.05, annex B in figure B.1: 7. When accessing a cell on the RACH and before receiving the first power command during a communication on a DCCH or TCH (after an IMMEDIATE ASSIGNMENT), all GSM, class 1 and class 2 DCS 1 800 and PCS 1 900 MS shall use the power control level defined by the MS_TXPWR_MAX_CCH parameter broadcast on the BCCH of the cell, or if MS_TXPWR_MAX_CCH corresponds to a power control level not supported by the MS as defined by its power class, the MS shall act as though the closest

	supported power control level had been broadcast. A Class 3 DCS 1 800 MS shall use the POWER_OFFSET parameter. 8. The transmissions from the MS to the BS, measured at the MS antenna, shall be 468,75 - TA bit periods behind the transmissions received from the BS, where TA is the last timing advance received from the current serving BS. The tolerance on these timings shall be ±1 bit period: 9. The transmitted power level relative to time for a random access burst shall be within the power/time template given in 3GPP TS 05.05, annex B in figure B.3: 10. The MS shall use a TA value of 0 for the Random Access burst sent: 11. In addition, if the network indicates support for MS power reduction by broadcasting parameter INIT_PWR_RED (see 3GPP TS 44.018) and if the latest RLA-value, RLA_C or RLA_P (see section 6.1) for the measured signal strength from the BTS the MS is accessing is -48 dBm or higher immediately before the access attempt, the MS power shall not exceed. PRED = min{(MS_TXPWR_MAX_CCH, (LB_MS_TXPWR_MAX_CCH + Band_offset), (P5 INIT_PWR_RED)} for GSM 400, GSM 700, T-GSM 810, GSM 850 and GSM 900 and PRED = min{ MS_TXPWR_MAX_CCH, (P0+2 INIT_PWR_RED)} for DCS 1800 and PCS 1900, where P5 and P0 are the power control levels for respective band in 3GPP TS 45.005. The power reduction only applies for the first transmission of the access burst on the RACH. If the initial transmission fails due to no response from the network, the MS shall not apply power reduction in remaining transmissions. The power reduction also applies for DCCH or TCH (after an IMMEDIATE ASSIGNMENT) under the same received signal strength conditions until the ordered power control level in the SACCH L1 header differs from MS_TXPWR_MAX_CCH or LB_MS_TXPWR_MAX_CCH + Band_offset, whichever is applicable or a L3 message with a valid power control command is received. If INIT_PWR_RED is not broadcast, no power reduction shall apply.
Test Procedure:	a) Measurement of normal burst transmitter output power. -The SS takes power measurement samples evenly distributed over the duration of one burst with a sampling rate of at least 2/T, where T is the bit duration. The samples are identified in time with respect to the modulation on the burst. The SS identifies the centre of the useful 147 transmitted bits, i.e. the transition from bit 13 to bit 14 of the midamble, as the timing reference.

	-The transmitter output power is calculated as the average of the samples over the 147 useful bits. This is also used as the 0 dB reference for the power/time template. b) Measurement of normal burst timing delay. - The burst timing delay is the difference in time between the timing reference identified in a) and the corresponding transition in the burst received by the MS immediately prior to the MS transmit burst sampled. c) Measurement of normal burst power/time relationship. -The array of power samples measured in a) are referenced in time to the centre of the useful transmitted bits and in power to the 0 dB reference, both identified in a). d) Steps a) to c) are repeated with the MS commanded to operate on each of the nominal output power levels supported by the MS, (see tables 13-2, 13-3 and 13-4) and in step a) on one nominal output power level higher than supported by the MS. e) The SS commands the MS to the maximum power control level supported by the MS and steps a) to c) are repeated for ARFCN in the Low and High ranges. f) Measurement of access burst transmitter output power. -The SS causes the MS to generate an Access Burst on an ARFCN in the Mid ARFCN range, this could be either by a handover procedure or a new request for radio resource. In the case of a handover procedure the Power Level indicated in the HANDOVER COMMAND message is the maximum power control level supported by the MS. In the case of an Access Burst the MS shall use the Power Level indicated in the MS_TXPWR_MAX_CCH parameter. If the power class of the MS is DCS 1 800 Class 3, the MS shall also use the POWER_OFFSET parameter. -The SS takes power measurement samples evenly distributed over the duration of the access burst as described in a). However, in this case the SS identifies the centre of the useful bits of the burst by identifying the transition from the last bit of the synch sequence. The centre of the burst is then five data bits prior to this point and is used as the timing reference. -The transmitter output power is calculated as the average of the samples over the 87 useful bits of the burst. This is also used as the 0 dB reference for the power/time template. g) Measurement of access burst timing delay. - The burst timing delay is the difference in time between the timing reference identified in f) and the MS received data on the common control channel. h) Measurement of access burst power/time relationship. - The array of power samples measured in f) is referenced in time to the centre of the useful transmitted bits and in

	power to the 0 dB reference, both identified in f). i) Depending on the method used in step f) to cause the MS to send an Access Burst, the SS sends either a HANDOVER COMMAND with power control level set to 10 or it changes the System Information elements MS_TXPWR_MAX_CCH and for DCS 1 800 the POWER_OFFSET on the serving cell BCCH in order to limit the MS transmit power on the Access Burst to power control level 10 (+23 dBm for GSM 400, GSM 700, T-GSM 810, GSM 850, and GSM 900 or +10 dBm for DCS 1 800 and PCS 1 900) and then steps f) to h) are repeated. j) If MS supporting RACH Power Reduction the call is released and the Serving cell downlink level is set to -42 dBm. INIT_PWR_RED is set to 1. The SS waits for 30 seconds (Possible cell reselection). Step f) is repeated. k) If MS supporting RACH Power Reduction SS commands the MS to the maximum power control level supported by the MS and steps a) to c) are repeated for ARFCN in the Mid range. l) If MS supporting RACH Power Reduction the call is released and the Serving cell downlink level is set to -42 dBm. INIT_PWR_RED is set to 1. The SS waits for 30 seconds (Possible cell reselection). Step f) is repeated but the SS does not answer the initial, but the second transmission of the access burst.m) Steps a) to i) are repeated under extreme test conditions (annex 1, TC2.2) except that the repeats at step d) are only performed for power control level 10 and the minimum nominal output power level supported by the MS.
Test Instrument:	Refer to Item 3.3
Test Result:	PASS

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5.5. Transmitter - Output RF spectrum

5.5.1. Test Specification

Test Requirement:	ETSI EN 301 511 V12.5.1 clause 4.2.6
Test Method:	ETSI EN 301 511 V12.5.1 clause 5.3.6
Limit:	1. The level of the output RF spectrum due to modulation shall be no more than that given in 3GPP TS 05.05, sub clause 4.2.1, table a1) for GSM 400, GSM 700, T_GSM 810, GSM 850 and GSM 900, table B.1) for DCS 1 800 or table C.1) for PCS 1 900, with the following lowest measurement limits: - -36 dBm below 600 kHz offset from the carrier; - -51 dBm for GSM 400, GSM 700, T_GSM 810, GSM 850 and GSM 900 or -56 dBm for DCS 1 800 and PCS 1 900 from 600 kHz out to less than 1 800 kHz offset from the carrier; - -46 dBm for GSM 400, GSM 700, T_GSM 810, GSM 850 and GSM 900 or -51 dBm for DCS 1 800 and PCS 1 900 at and beyond 1 800 kHz offset from the carrier; but with the following exceptions at up to -36 dBm: - up to three bands of 200 kHz width centred on a frequency which is an integer multiple of 200 kHz in the combined range 600 kHz to 6000 kHz above and below the carrier; - up to 12 bands of 200 kHz width centred on a frequency which is an integer multiple of 200 kHz at more than 6 000 kHz offset from the carrier. 2. The level of the output RF spectrum due to switching transients shall be no more than given in 3GPP TS 05.05, subclause 4.2.2, table "a) Mobile Station". 3. When allocated a channel, the power emitted by a GSM 400, GSM 900 and DCS 1 800 MS, in the band 935 MHz to 960 MHz shall be no more than -79 dBm, in the band 925 MHz to 935 MHz shall be no more than -67 dBm and in the band 1 805 MHz to 1 880 MHz shall be no more than -71 dBm except in five measurements in each of the bands 925 MHz to 960 MHz and 1 805 MHz to 1 880 MHz where exceptions at up to -36 dBm are permitted. For GSM 400 MS, in addition, the power emitted by MS, in the bands of 460,4 MHz to 467,6 MHz and 488,8 MHz to 496 MHz shall be no more than -67 dBm except in three measurements in each of the bands 460,4 MHz to 467,6 MHz and 488,8 MHz to 496 MHz where exceptions at up to -36 dBm are permitted. For GSM 700, GSM 850 and PCS 1 900 MS, the power emitted by MS, in the band of 728 MHz to 736 MHz shall be no more than -73 dBm, in the band of 736 MHz to 746 MHz shall be no more than -79 dBm, in the band of 747 MHz to 757 MHz shall be no more than -79 dBm, in the band of 757 MHz to 763 MHz shall be no more than -73 dBm, in the band 869 MHz to 894 MHz

	shall be no more than -79 dBm, in the band 1 930 MHz to 1 990 MHz shall be no more than -71 dBm except in five measurements in each of the bands 728 MHz to 746 MHz, 747 MHz to 763 MHz, 869 MHz to 894 MHz and 1 930 MHz to 1 990 MHz where exceptions at up to -36 dBm are permitted. Under normal conditions; 3GPP TS 45.005, subclause 4.3.3. 3GPP TS 45.05 subclause 2: For T-GSM 810 the requirements for GSM 900 shall apply, apart for those parameters for which a separate requirement exists.
Test Procedure:	a) In steps b) to h) the FT is equal to the hop pattern ARFCN in the Mid ARFCN range. b) The other settings of the spectrum analyser are set as follows: - Zero frequency scan; - Resolution bandwidth: 30 kHz; - Video bandwidth: 30 kHz; - Video averaging: may be used, depending on the implementation of the test. The video signal of the spectrum analyser is "gated" such that the spectrum generated by at least 40 of the bits 87 to 132 of the burst is the only spectrum measured. This gating may be analogue or numerical, dependent upon the design of the spectrum analyser. Only measurements during transmitted bursts on the nominal carrier of the measurement are included. The spectrum analyser averages over the gated period and over 200 or 50 such bursts, using numerical and/or video averaging. The MS is commanded to its maximum power control level. c) By tuning the spectrum analyser centre frequency to the measurement frequencies the power level is measured over 50 bursts at all multiples of 30 kHz offset from FT to < 1 800 kHz. d) The resolution and video bandwidth on the spectrum analyser are adjusted to 100 kHz and the measurements are made at the following frequencies: - on every ARFCN from 1 800 kHz offset from the carrier to the edge of the relevant transmit band for each measurement over 50 bursts; - at 200 kHz intervals over the 2 MHz either side of the relevant transmit band for each measurement over 50 bursts. For GSM 400 and DCS 1 800: - at 200 kHz intervals over the band 925 MHz to 960 MHz for each measurement over 50 bursts; - at 200 kHz intervals over the band 1 805 MHz to 1 880 MHz for each measurement over 50 bursts. For GSM 900

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	- at 200 kHz intervals over the band 925 MHz to 960MHz for each measurement over 50 bursts; - at 200 kHz intervals over the band 1805 MHz to 1880 MHz for each measurement over 50 bursts. In addition for GSM 400 MS: - at 200 kHz intervals over the band 460,4 MHz to 467,6 MHz for each measurement over 50 bursts; - at 200 kHz intervals over the band 488,8 MHz to 496 MHz for each measurement over 50 bursts. In addition for T-GSM 810 MS: - at 200 kHz intervals over the band 851 MHz to 866 MHz for each measurement over 50 bursts; For GSM 700, GSM 850 and PCS 1 900: - at 200 kHz intervals over the band 728 MHz to 746 MHz for each measurement over 50 bursts; - at 200 kHz intervals over the band 747 MHz to 763 MHz for each measurement over 50 bursts; - at 200 kHz intervals over the band 869 MHz to 894 MHz for each measurement over 50 bursts; - at 200 kHz intervals over the band 1 930 MHz to 1 990 MHz for each measurement over 50 bursts. e) The MS is commanded to its minimum power control level. The spectrum analyser is set again as in b). f) By tuning the spectrum analyser centre frequency to the measurement frequencies the power level is measured over 200 bursts at the following frequencies: FT; FT + 100 kHz FT - 100 kHz; FT + 200 kHz FT - 200 kHz; FT + 250 kHz FT - 250 kHz; FT + 200 kHz * N FT - 200 kHz * N; where N = 2, 3, 4, 5, 6, 7, and 8; and FT = RF channel nominal centre frequency. g) The spectrum analyser settings are adjusted to: - Zero frequency scan; - Resolution bandwidth:30 kHz; - Video bandwidth: 100 kHz; - Peak hold. The spectrum analyser gating of the signal is switched off. The MS is commanded to its maximum power control level. h) By tuning the spectrum analyser centre frequency to the measurement frequencies the power level is measured at the following frequencies: FT + 400 kHz FT - 400 kHz; FT + 600 kHz FT - 600 kHz;

	FT + 1,2 MHz FT - 1,2 MHz; FT + 1,8 MHz FT - 1,8 MHz; where FT = RF channel nominal centre frequency. The duration of each measurement (at each frequency) will be such as to cover at least 10 burst transmissions at FT. i) Step h) is repeated for power control levels 7 and 11. j) Steps b), f), g) and h) are repeated with FT equal to the hop pattern ARFCN in the Low ARFCN range except that in step g) the MS is commanded to power control level 11 rather than maximum power. k) Steps b), f), g) and h) are repeated with FT equal to the hop pattern ARFCN in the High ARFCN range except that in step g) the MS is commanded to power control level 11 rather than maximum power. l) Steps a) b) f) g) and h) are repeated under extreme test conditions (annex 1, TC2.2). except that at step g) the MS is commanded to power control level 11.
Test Instrument:	Refer to Item 3.3
Test Result:	PASS

5.6. Transmitter output power in GPRS multislot configuration

5.6.1. Test Specification

Test Requirement:	ETSI EN 301 511 V12.5.1 clause 4.2.10
Test Method:	ETSI EN 301 511 V12.5.1 clause 5.3.10
Limit:	1. The MS maximum output power shall be as defined in 3GPP TS 05.05, subclause 4.1.1, first table, according to its power class, with a tolerance of ±2 dB under normal conditions; 3GPP TS 05.05, subclause 4.1.1, first table. From R99 onwards, the MS maximum output power in an uplink multislot configuration shall be as defined in 3GPP TS 05.05 subclause 4.1.1, sixth table, according to its power class, with a tolerance of ±3 dB under normal conditions; 3GPP TS 05.05, subclause 4.1.1, first and sixth table. In case the MS supports the same maximum output power in an uplink multislot configuration as it supports for single slot uplink operation, the tolerance shall be ±2 dB. 2. The MS maximum output power shall be as defined in 3GPP TS 05.05, subclause 4.1.1, first table, according to its power class, with a tolerance of ±2,5 dB under extreme conditions; 3GPP TS 05.05, subclause 4.1.1, first table; 3GPP TS 05.05 annex D subclauses D.2.1 and D.2.2. From R99 onwards, the MS maximum output power in an uplink multislot configuration shall be as defined in 3GPP TS 05.05 subclause 4.1.1, sixth table, according to its power class, with a tolerance of ±4 dB under extreme conditions; 3GPP TS 05.05, subclause 4.1.1, first and sixth table; 3GPP TS 05.05 annex D in subclauses D.2.1 and D.2.2. In case the MS supports the same maximum output power in an uplink multislot configuration as it supports for single slot uplink operation, the tolerance shall be ±2,5 dB. 3. The power control levels shall have the nominal output power levels as defined in 3GPP TS 05.05, subclause 4.1.1, third table (for GSM 400, GSM 700, GSM 850 and GSM 900), fourth table (for DCS 1 800) or fifth table (for PCS 1 900), from the lowest power control level up to the maximum output power corresponding to the class of the MS (for tolerance on maximum output power see conformance requirements 1), with a tolerance of ±3 dB, ±4 dB or ±5 dB under normal conditions; 3GPP TS 05.05, subclause 4.1.1, third, fourth or fifth table. 4. The power control levels shall have the nominal output power levels as defined in 3GPP TS 05.05, subclause 4.1.1, third table (for GSM 400, GSM 700, GSM 850 and GSM 900), fourth table (for DCS 1 800) or fifth table (for PCS 1 900), from the lowest power control level up to the maximum output power corresponding to the class of the MS (for tolerance on maximum output power see conformance

	requirements 2), with a tolerance of ±4 dB, ±5 dB or ±6 dB under extreme conditions; 3GPP TS 05.05, subclause 4.1.1, third, fourth or fifth table; 3GPP TS 05.05 annex D subclauses D.2.1 and D.2.2. 4a. From R99 onwards, the supported maximum output power for each number of uplink timeslots shall form a monotonic sequence. The maximum reduction of maximum output power from an allocation of n uplink timeslots to an allocation of n+1 uplink timeslots shall be equal to the difference of maximum permissible nominal reduction of maximum output power for the corresponding number of timeslots, as defined in 3GPP TS 05.05, subclause 4.1.1, sixth table. 5. The output power actually transmitted by the MS at consecutive power control levels shall form a monotonic sequence and the interval between power control levels shall be 2 ± 1,5 dB (1 ± 1dB between power control level 30 and 31 for PCS 1 900), from R99 onwards, in a multislot configuration, the first power control step down from the maximum output power is allowed to be in the range 0…2 dB; 3GPP TS 05.05, sub clause 4.1.1. 6. The transmitted power level relative to time for a normal burst shall be within the power/time template given in 3GPP TS 05.05, annex B figure B1. In multislot configurations where the bursts in two or more consecutive time slots are actually transmitted at the same frequency the template of annex B shall respected during the useful part of each burst and at the beginning and the end of the series of consecutive bursts. The output power during the guard period between every two consecutive active timeslots shall not exceed the level allowed for the useful part of the first timeslot or the level allowed for the useful part of the second timeslot plus 3 dB, whichever is the highest: 7. When accessing a cell on the PRACH or RACH and before receiving the first power control parameters during packet transfer on PDCH, all GSM and class 1 and class 2 DCS 1 800 and PCS 1 900 MS shall use the power control level defined by the GPRS_MS_TXPWR_MAX_CCH parameter broadcast on the PBCCH or MS_TXPWR_MAX_CCH parameter broadcast on the BCCH of the cell. When MS_TXPWR_MAX_CCH is received on the BCCH, a class 3 DCS 1800 MS shall add to it the value POWER_OFFSET broadcast on the BCCH. If MS_TXPWR_MAX_CCH or the sum defined by: MS_TXPWR_MAX_CCH plus POWER_OFFSET corresponds to a power control level not supported by the MS as defined by its power class, the MS shall act as though the closest supported power control level had been broadcast.

	8. The transmitted power level relative to time for a Random Access burst shall be within the power/time template given in 3GPP TS 05.05, annex B figure B.3: 9. In addition, if the network indicates support for MS power reduction by broadcasting parameter INIT_PWR_RED (see 3GPP TS 44.018) and if the latest RLA-value, RLA_C or RLA_P (see section 6.1) for the measured signal strength from the BTS the MS is accessing is -48 dBm or higher immediately before the access attempt, the MS power shall not exceed. PRED = min{(MS_TXPWR_MAX_CCH, (LB_MS_TXPWR_MAX_CCH + Band_offset), (P5 INIT_PWR_RED)} for GSM 400, GSM 700, T-GSM 810, GSM 850 and GSM 900 and PRED = min{ MS_TXPWR_MAX_CCH, (P0+2 INIT_PWR_RED)} for DCS 1800 and PCS 1900, where P5 and P0 are the power control levels for respective band in 3GPP TS 45.005. The power reduction only applies for the first transmission of the access burst on the RACH. If the initial transmission fails due to no response from the network, the MS shall not apply power reduction in remaining transmissions. The power reduction also applies for DCCH or TCH (after an IMMEDIATE ASSIGNMENT) under the same received signal strength conditions until the ordered power control level in the SACCH L1 header differs from MS_TXPWR_MAX_CCH or LB_MS_TXPWR_MAX_CCH + Band_offset, whichever is applicable or a L3 message with a valid power control command is received. If INIT_PWR_RED is not broadcast, no power reduction shall apply. 3GPP TS 45.008, subclause 4.2, subclause 10.2.1, 3GPP TS 44.018, subclause 10.5.2.33b. 9.1 Under normal conditions; 3GPP TS 05.10, subclause 6.6. On a multislot uplink configuration the MS may restrict the interslot output power control range to a 10 dB window, on a TDMA frame basis. On those timeslots where the ordered power level is more than 10 dB lower than the applied power level of the highest power timeslot, the MS shall transmit at a lowest possible power level within 10 dB range from the highest applied power level, if not transmitting at the actual ordered power level. 3GPP TS 45.05 subclause 2: For T-GSM 810 the requirements for GSM 900 shall apply, apart for those parameters for which a separate requirement exists.
Test Procedure:	a) Measurement of normal burst transmitter output power. The SS takes power measurement samples evenly distributed over the duration of one burst with a sampling rate of at least 2/T, where T is the bit duration. The samples

	are identified in time with respect to the modulation on the burst. The SS identifies the centre of the useful 147 transmitted bits, i.e. the transition from bit 13 to bit 14 of the midamble, as the timing reference. The transmitter output power is calculated as the average of the samples over the 147 useful bits. This is also used as the 0 dB reference for the power/time template. b) Measurement of normal burst power/time relationship The array of power samples measured in a) are referenced in time to the centre of the useful transmitted bits and in power to the 0 dB reference, both identified in a). c) Steps a) to b) are repeated on each timeslot within the multislot configuration with the MS commanded to operate on each of the nominal output power levels defined in tables 13.16.2-1, 13.16.2-2 and 13.16.2-3, and in step a) only on one nominal output power higher than supported by the MS. ***NOTE:*** *Power control levels 0 and 1 are excluded for bands other than DCS 1800 and PCS 1900 since these power control levels can not be set by GAMMA_TN.* d) The SS commands the MS to the maximum power control level supported by the MS and steps a) to b) are repeated on each timeslot within the multislot configuration for ARFCN in the Low and High ranges. e) The SS commands the MS to the maximum power control level in the first timeslot allocated within the multislot configuration and to the minimum power control level in the second timeslot allocated. Any further timeslots allocated are to be set to the maximum power control level. Steps a) to b) and corresponding measurements on each timeslot within the multislot configuration are repeated. f) Measurement of access burst transmitter output power The SS causes the MS to generate an Access Burst on an ARFCN in the Mid ARFCN range, this could be either by a cell re-selection or a new request for radio resource. In the case of a cell re-selection procedure the Power Level indicated in the PSI3 message is the maximum power control level supported by the MS. In the case of an Access Burst the MS shall use the Power Level indicated in the GPRS_MS_TXPWR_MAX_CCH parameter. If the power class of the MS is DCS 1 800 Class 3 and the Power Level is indicated by the MS_TXPWR_MAX_CCH parameter, the MS shall also use the POWER_OFFSET parameter. The SS takes power measurement samples evenly distributed over the duration of the access burst as described in a). However, in this case the SS identifies the center of the useful bits of the burst by identifying the transition from the last bit of the synch sequence. The centre of the burst is then five data bits prior to this point and is used as the timing reference.

	The transmitter output power is calculated as the average of the samples over the 87 useful bits of the burst. This is also used as the 0 dB reference for the power/time template. g) Measurement of access burst power/time relationship The array of power samples measured in f) is referenced in time to the centre of the useful transmitted bits and in power to the 0 dB reference, both identified in f). h) Depending on the method used in step f) to cause the MS to send an Access Burst, the SS sends either a PACKET CELL CHANGE ORDER along with power control level set to 10 in PSI3 parameter GPRS_MS_TXPWR_MAX_CCH or it changes the (Packet) System Information elements (GPRS_)MS_TXPWR_MAX_CCH and for DCS 1 800 the POWER_OFFSET on the serving cell PBCCH/BCCH in order to limit the MS transmit power on the Access Burst to power control level 10 (+23 dBm for bands other than DCS 1800 and PCS 1900 or +10 dBm for DCS 1 800 and PCS 1 900) and then steps f) to g) are repeated. i) If theMS supports RACH Power Reduction the TBF is released and thes erving cell downlink level is set to -42 dBm. INIT_PWR_RED is set to 1. The SS waits for 30 seconds (Possible cell reselection). Step f) is repeated. j) Steps a) to h) are repeated under extreme test conditions (annex 1, TC2.2) except that the repeats at step c) are only performed for power control level 10 and the minimum nominal output power level supported by the MS.
Test Instrument:	Refer to Item 3.3
Test Result:	PASS

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5.7. Output RF spectrum in GPRS multislot configuration

5.7.1. Test Specification

Test Requirement:	ETSI EN 301 511 V12.5.1 clause 4.2.11
Test Method:	ETSI EN 301 511 V12.5.1 clause 5.3.11
Limit:	1. The level of the output RF spectrum due to modulation shall be no more than that given in 3GPP TS 05.05, subclause 4.2.1, table a) for GSM 400, GSM 700, GSM 850 and GSM 900, table b) for DCS 1 800 or table c) for PCS 1 900, with the following lowest measurement limits: - -36 dBm below 600 kHz offset from the carrier; - -51 dBm for GSM 400, GSM 700, GSM 850 and GSM 900 or -56 dBm for DCS 1 800 and PCS 1 900 from 600 kHz out to less than 1 800 kHz offset from the carrier; - -46 dBm for GSM 400, GSM 700, GSM 850 and GSM 900 or -51 dBm for DCS 1 800 and PCS 1 900 at and beyond 1 800 kHz offset from the carrier; but with the following exceptions at up to -36 dBm: - up to three bands of 200 kHz width centred on a frequency which is an integer multiple of 200 kHz in the combined range 600 kHz to 6 000 kHz above and below the carrier; - up to 12 bands of 200 kHz width centred on a frequency which is an integer multiple of 200 kHz at more than 6 000 kHz offset from the carrier. 2. The level of the output RF spectrum due to switching transients shall be no more than given in 3GPP TS 05.05, subclause 4.2.2, table "a) Mobile Station". 3. When allocated a channel, the power emitted by a GSM 400, GSM 900 and DCS 1 800 MS, in the band 935 MHz to 960 MHz shall be no more than -79 dBm, in the band 925 MHz to 935 MHz shall be no more than -67 dBm and in the band 1 805 MHz to 1 880 MHz shall be no more than -71 dBm except in five measurements in each of the bands 925 MHz to 960 MHz and 1 805 MHz to 1 880 MHz where exceptions at up to -36 dBm are permitted. For GSM 400 MS, in addition, the power emitted by MS, in the bands of 460,4 MHz to 467,6 MHz and 488,8 MHz to 496 MHz shall be no more than -67 dBm except in three measurements in each of the bands 460,4 MHz to 467,6 MHz and 488,8 MHz to 496 MHz where exceptions at up to -36 dBm are permitted. For GSM 700 and GSM 850, the power emitted by MS, in the band of 728 MHz to 736 MHz shall be no more than -73 dBm, in the band of 736 MHz to 746 MHz shall be no more than -79 dBm, in the band of 747 MHz to 757 MHz shall be no more than -79 dBm, in the band of 757 MHz to 763 MHz shall be no more than –73 dBm, in the band 869

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	MHz to 894 MHz shall be no more than -79 dBm, in the band 1 930 MHz to 1 990 MHz shall be no more than -71 dBm except in five measurements in each of the bands 728 MHz to 746 MHz, 747 MHz to 763 MHz, 869 MHz to 894 MHz and 1 930 MHz to 1 990 MHz where exceptions at up to -36 dBm are permitted. For PCS 1 900 MS, the power emitted by MS, in the band 869 MHz to 894 MHz shall be no more than -79 dBm, in the band 1 930 MHz to 1 990 MHz shall be no more than -71 dBm except in five measurements in each of the bands 869 MHz to 894 MHz and 1 930 MHz to 1 990 MHz where exceptions at up to -36 dBm are permitted. Under normal conditions; 3GPP TS 45.005, subclause 4.3.3.
Test Procedure:	a) In steps b) to h) the FT is equal to the hop pattern ARFCN in the Mid ARFCN range. b) The other settings of the spectrum analyser are set as follows: - Zero frequency scan; - Resolution bandwidth: 30 kHz; - Video bandwidth: 30 kHz; - Video averaging: may be used, depending on the implementation of the test. The video signal of the spectrum analyser is "gated" such that the spectrum generated by at least 40 of the bits 87 to 132 of the burst in one of the active time slots is the only spectrum measured. This gating may be analogue or numerical, dependent upon the design of the spectrum analyser. Only measurements during transmitted bursts on the nominal carrier of the measurement are included. The spectrum analyser averages over the gated period and over 200 or 50 such bursts, using numerical and/or video averaging. The MS is commanded to its maximum power control level in every transmitted time slot. c) By tuning the spectrum analyser centre frequency to the measurement frequencies the power level is measured over 50 bursts at all multiples of 30 kHz offset from FT to < 1 800 kHz. d) The resolution and video bandwidth on the spectrum analyser are adjusted to 100 kHz and the measurements are made at the following frequencies: on every ARFCN from 1 800 kHz offset from the carrier to the edge of the relevant transmit band for each measurement over 50 bursts. at 200 kHz intervals over the 2 MHz either side of the relevant transmit band for each measurement over 50 bursts. For GSM 400 and DCS 1 800: at 200 kHz intervals over the band 925 MHz to 960 MHz for

	each measurement over 50 bursts. at 200 kHz intervals over the band 1 805 MHz to 1 880 MHz for each measurement over 50 bursts. For GSM 900 at 200 kHz intervals over the band 925 MHz to 960MHz for each measurement over 50 bursts; at 200 kHz intervals over the band 1805 MHz to 1880 MHz for each measurement over 50 bursts. In addition for GSM 400 MS: at 200 kHz intervals over the band 460,4 MHz to 467,6 MHz for each measurement over 50 bursts. at 200 kHz intervals over the band 488,8 MHz to 496 MHz for each measurement over 50 bursts. For GSM 700 and GSM 850: at 200 kHz intervals over the band 728MHz to 746 MHz for each measurement over 50 bursts. at 200 kHz intervals over the band 747MHz to 763 MHz for each measurement over 50 bursts. at 200 kHz intervals over the band 869 MHz to 894 MHz for each measurement over 50 bursts. at 200 kHz intervals over the band 1 930 MHz to 1 990 MHz for each measurement over 50 bursts. For PCS 1 900: at 200 kHz intervals over the band 869 MHz to 894 MHz for each measurement over 50 bursts. at 200 kHz intervals over the band 1 930 MHz to 1 990 MHz for each measurement over 50 bursts. e) The MS is commanded to its minimum power control level. The spectrum analyser is set again as in b). f) By tuning the spectrum analyser centre frequency to the measurement frequencies the power level is measured over 200 bursts at the following frequencies: FT; FT + 100 kHz FT - 100 kHz; FT + 200 kHz FT - 200 kHz; FT + 250 kHz FT - 250 kHz; FT + 200 kHz * N FT - 200 kHz * N; where N = 2, 3, 4, 5, 6, 7, and 8; and FT = RF channel nominal centre frequency. g) Steps a) to f) is repeated except that in step a) the spectrum analyzer is gated so that the burst of the next active time slot is measured. h) The spectrum analyser settings are adjusted to: - Zero frequency scan; - Resolution bandwidth:30 kHz; - Video bandwidth: 100 kHz;

	- Peak hold. The spectrum analyser gating of the signal is switched off. The MS is commanded to its maximum power control level in every transmitted time slot. i) By tuning the spectrum analyser centre frequency to the measurement frequencies the power level is measured at the following frequencies: FT + 400 kHz FT - 400 kHz; FT + 600 kHz FT - 600 kHz; FT + 1,2 MHz FT - 1,2 MHz; FT + 1,8 MHz FT - 1,8 MHz; where FT = RF channel nominal centre frequency. The duration of each measurement (at each frequency) will be such as to cover at least 10 burst transmissions at FT. j) Step i) is repeated for power control levels 7 and 11. k) Steps b), f), h) and i) are repeated with FT equal to the hop pattern ARFCN in the Low ARFCN range except that in step h) the MS is commanded to power control level 11 rather than maximum power. l) Steps b), f), h) and i) are repeated with FT equal to the hop pattern ARFCN in the High ARFCN range except that in step h) the MS is commanded to power control level 11 rather than maximum power. m) Steps a) b) f) h), and i) are repeated under extreme test conditions (annex 1, TC2.2). except that at step h) the MS is commanded to power control level 11.
Test Instrument:	Refer to Item 3.3
Test Result:	PASS

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5.8. Conducted spurious emissions – MS allocated a channel

5.8.1. Test Specification

<table>
<tr><td>Test Requirement:</td><td>ETSI EN 301 511 V12.5.1 clause 4.2.12</td></tr>
<tr><td>Test Method:</td><td>ETSI EN 301 511 V12.5.1 clause 5.3.12</td></tr>
<tr><td>Limit:</td><td>1. The conducted spurious power emitted by the MS, when allocated a channel, shall be no more than the levels in table below.
<table>
<tr><th>Frequency range</th><th colspan="3">Power level in dBm</th></tr>
<tr><th></th><th>GSM 400, GSM 700, T-GSM 810 GSM 850, GSM 900</th><th>DCS 1 800</th><th>PCS 1 900</th></tr>
<tr><td>9 kHz to 1 GHz</td><td>-36</td><td>-36</td><td>-36</td></tr>
<tr><td>1 GHz to 12,75 GHz</td><td>-30</td><td></td><td>-30</td></tr>
<tr><td>1 GHz to 1 710 MHz</td><td></td><td>-30</td><td></td></tr>
<tr><td>1 710 MHz to 1 785 MHz</td><td></td><td>-36</td><td></td></tr>
<tr><td>1 785 MHz to 12,75 GHz</td><td></td><td>-30</td><td></td></tr>
</table></td></tr>
<tr><td>Test Procedure:</td><td>a) Measurements are made in the frequency range 100 kHz to 12,75 GHz. Spurious emissions are measured at the connector of the transceiver, as the power level of any discrete signal, higher than the requirement in table 12.1 minus 6 dB, delivered into a 50 Ω load.
The measurement bandwidth based on a 5 pole synchronously tuned filter is according to table below. The power indication is the peak power detected by the measuring system.
The measurement on any frequency shall be performed for at least one TDMA frame period with the exception of the idle frame.
NOTE: This ensures that both the active times (MS transmitting) and the quiet times are measured.
b) The test is repeated under extreme voltage test conditions.
<table>
<tr><th>Frequency range</th><th>Frequency offset</th><th>Filter bandwidth</th><th>Approx video bandwidth</th></tr>
<tr><td>100 kHz to 50 MHz</td><td>-</td><td>10 kHz</td><td>30 kHz</td></tr>
<tr><td>50 MHz to 500 MHz</td><td>-</td><td>100 kHz</td><td>300 kHz</td></tr>
<tr><td>excl. relevant TX band:</td><td></td><td></td><td></td></tr>
<tr><td>GSM 450: 450,4 MHz to 457,6 MHz;</td><td></td><td></td><td></td></tr>
<tr><td>GSM 480: 478,8 MHz to 486 MHz,</td><td></td><td></td><td></td></tr>
<tr><td>and the RX bands:</td><td></td><td></td><td></td></tr>
<tr><td>For GSM 400 MS: 460,4 MHz to 467,6 MHz;</td><td></td><td></td><td></td></tr>
</table></td></tr>
</table>

		488,8 MHz to 496 MHz.				
		500 MHz to 12,75 GHz,	0 to 10 MHz	100 kHz	300 kHz	
			>= 10 MHz	300 kHz	1 MHz	
		excl. relevant TX band:	>= 20 MHz	1 MHz	3 MHz	
		GSM 710: 698 MHz to 716 MHz	>= 30 MHz	3 MHz	3 MHz	
		GSM 750: 777 MHz to 793 MHz				
		T-GSM 810: 806 MHz to 821 MHz;				
		GSM 850: 824 MHz to 849 MHz;				
		P-GSM: 890 MHz to 915 MHz;	(offset from edge			
		E-GSM: 880 MHz to 915 MHz;	of relevant TX band)			
		DCS: 1 710 MHz to 1 785 MHz,				
		PCS 1 900: 1 850 MHz to 1 910 MHz;				
		and the RX bands:				
		For GSM 400 MS, GSM 900 MS and DCS 1 800 MS:				
		925 MHz to 960 MHz;				
		1 805 MHz to 1 880 MHz.				
		For GSM 710, GSM 750, T-GSM 810, GSM 850 MS and PCS 1 900 MS: 728 MHz to 746 MHz; 747 MHz to 763 MHz; 851 MHz to 866 MHz 869 MHz to 894 MHz; 1 930 MHz to 1 990 MHz				
		relevant TX band:				
		GSM 450: 450,4 MHz to 457,6 MHz	1,8 to 6,0 MHz	30 kHz	100 kHz	
		GSM 480: 478,8 MHz to 486 MHz	> 6,0 MHz	100 kHz	300 kHz	
		GSM 710: 698 MHz to 716 MHz				
		GSM 750: 777 MHz to 793 MHz				
		T-GSM 810: 806 MHz to 821 MHz;				
		GSM 850: 824 MHz to 849 MHz				
		P-GSM: 890 MHz to 915 MHz				
		E-GSM: 880 MHz to				

		915 MHz				
		DCS: 1 710 MHz to 1 785 MHz				
		PCS 1 900: 1 850 MHz to 1 910 MHz	(offset from carrier)			
Test Instrument:	Refer to Item 3.3					
Test Result:	PASS					

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5.9. Conducted spurious emissions – MS in idle mode

5.9.1. Test Specification

Test Requirement:	ETSI EN 301 511 V12.5.1 clause 4.2.13
Test Method:	ETSI EN 301 511 V12.5.1 clause 5.3.13
Limit:	1. The conducted spurious power emitted by the MS, when in idle mode, shall be no more than the levels in table below.

Frequency range		**Power level in dBm**	
		GSM 400, T-GSM 810 GSM 900, DCS 1 800	**GSM 700, GSM 850, PCS 1 900**
9 kHz to	880 MHz	-57	-57
880 MHz to	915 MHz	-59	-57
915 MHz to	1000 MHz	-57	-57
1 GHz to	1 710 MHz	-47	
1 710 MHz to	1 785 MHz	-53	
1 785 MHz to	12,75 GHz	-47	
1 GHz to	1 850 MHz		-47
1 850 MHz to	1 910 MHz		-53
1 910 MHz to	12,75 GHz		-47

Test Procedure:

a) Measurements are made in the frequency range 100 kHz to 12,75 GHz. Spurious emissions are measured as the power level of any discrete signal, higher than the requirement in table 12.4 minus 6 dB, delivered into a 50 Ω load.

The measurement bandwidth based on a 5 pole synchronously tuned filter is set according to table below. The power indication is the peak power detected by the measuring system.

The measurement time on any frequency shall be such that it includes the time during which the MS receives a TDMA frame containing the paging channel.

Frequency range	**Filter bandwidth**	**Video bandwidth**
100 kHz to 50 MHz	10 kHz	30 kHz
50 MHz to 12,75 GHz	100 kHz	300 kHz

b) The test is repeated under extreme voltage test conditions

Test Instrument:	Refer to Item 3.3
Test Result:	PASS

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5.10. Radiated spurious emissions – MS allocated a channel

5.10.1. Test Specification

<table>
<tr><td>Test Requirement:</td><td>ETSI EN 301 511 V12.5.1 clause 4.2.16</td></tr>
<tr><td>Test Method:</td><td>ETSI EN 301 511 V12.5.1 clause 5.3.16</td></tr>
<tr><td>Limit:</td><td>
1. The radiated spurious power emitted by the MS, when allocated a channel, shall be no more than the levels in table below under normal voltage conditions;
2. The radiated spurious power emitted by the MS, when allocated a channel, shall be no more than the levels in table below under extreme voltage conditions;
<table>
<tr><th colspan="2">Frequency range</th><th colspan="3">Power level in dBm</th></tr>
<tr><td colspan="2"></td><td>GSM 400, GSM 700, T-GSM 810, GSM 850, GSM 900</td><td>DCS 1 800</td><td>PCS 1 900</td></tr>
<tr><td>30 MHz to</td><td>1 GHz</td><td>-36</td><td>-36</td><td>-36</td></tr>
<tr><td>1 GHz to</td><td>4 GHz</td><td>-30</td><td></td><td>-30</td></tr>
<tr><td>1 GHz to</td><td>1 710 MHz</td><td></td><td>-30</td><td></td></tr>
<tr><td>1 710 MHz to</td><td>1 785 MHz</td><td></td><td>-36</td><td></td></tr>
<tr><td>1 785 MHz to</td><td>4 GHz</td><td></td><td>-30</td><td></td></tr>
</table>
</td></tr>
<tr><td>Test Procedure:</td><td>
a) Initially the test antenna is closely coupled to the MS and any spurious emission radiated by the MS is detected by the test antenna and receiver in the range 30 MHz to 4 GHz.
NOTE 1: This is a qualitative step to identify the frequency and presence of spurious emissions which are to be measured in subsequent steps.
b) The test antenna separation is set to the appropriate measurement distance and at each frequency at which an emission has been detected, the MS shall be rotated to obtain maximum response and the effective radiated power of the emission determined by a substitution measurement. In case of an anechoic shielded chamber pre-calibration may be used instead of a substitution measurement.
c) The measurement bandwidth, based on a 5 pole synchronously tuned filter, is set according to table below. The power indication is the peak power detected by the measuring system.
The measurement on any frequency shall be performed for at least one TDMA frame period, with the exception of the idle frame.
NOTE 2: This ensures that both the active times (MS transmitting) and the quiet times are measured.
NOTE 3: For these filter bandwidths some difficulties may be experienced with noise floor above required measurement limit. This will depend on the gain of the test antenna, and adjustment of the measuring system bandwidth is permissible. Alternatively, for test frequencies above 900
</td></tr>
</table>

MHz, the test antenna separation from the MS may be reduced to 1 metre.

d) The measurements are repeated with the test antenna in the orthogonal polarization plane.

e) The test is repeated under extreme voltage test conditions.

Frequency range	Frequency offset	Filter bandwidth	Approx video bandwidth
30 MHz to 50 MHz	-	10 kHz	30 kHz
50 MHz to 500 MHz	-	100 kHz	300 kHz
excl. relevant TX band:			
GSM 450: 450,4 MHz to 457,6 MHz;			
GSM 480: 478,8 MHz to 486 MHz			
500 MHz to 4 GHz,	0 to 10 MHz	100 kHz	300 kHz
	>= 10 MHz	300 kHz	1 MHz
Excl. relevant TX band:	>= 20 MHz	1 MHz	3 MHz
GSM 710: 698 MHz to 716 MHz	>= 30 MHz	3 MHz	3 MHz
GSM 750: 777 MHz to 793 MHz			
T-GSM 810: 806MHz to 821 MHz			
GSM 850: 824 MHz to 849 MHz			
P-GSM: 890 MHz to 915 MHz;	(offset from edge of		
E-GSM: 880 MHz to 915 MHz;	relevant TX band)		
DCS: 1 710 MHz to 1 785 MHz.			
PCS 1 900: 1 850 MHz to 1 910 MHz			
Relevant TX band:			
GSM 450: 450,4 MHz to 457,6 MHz	1,8 MHz to 6,0 MHz	30 kHz	100 kHz
GSM 480: 478,8 MHz to 486 MHz	> 6,0 MHz	100 kHz	300 kHz
GSM 710: 698 MHz to 716 MHz			
GSM 750: 777 MHz to 793 MHz			
T-GSM 810: 806MHz to 821 MHz			
GSM 850: 824 MHz to 849 MHz	(offset from carrier)		
P-GSM: 890 MHz to 915 MHz			
E-GSM: 880 MHz to 915 MHz			
DCS: 1 710 MHz to 1 785 MHz			
PCS 1 900: 1 850 MHz to 1 910 MHz			
NOTE 1: The filter and video bandwidths, and frequency offsets are only correct for measurements on an MS transmitting on a channel in			

	the Mid ARFCN range. NOTE 2: Due to practical implementation of a SS, the video bandwidth is restricted to a maximum of 3 MHz.
Test Instrument:	Refer to Item 3.3
Test Result:	PASS

5.11. Radiated spurious emissions – MS in idle mode

5.11.1. Test Specification

Test Requirement:	ETSI EN 301 511 V12.5.1 clause 4.2.17
Test Method:	ETSI EN 301 511 V12.5.1 clause 5.3.17
Limit:	1. The radiated spurious power emitted by the MS, when in idle mode, shall be no more than the levels in table below. under normal voltage conditions; 2. The radiated spurious power emitted by the MS, when in idle mode, shall be no more than the levels in table below. under extreme voltage conditions;

Frequency range		Power level in dBm	
		GSM 400, T-GSM 810, GSM 900, DCS 1 800	**GSM 700, GSM 850, PCS 1 900**
30 MHz to	880 MHz	-57	-57
880 MHz to	915 MHz	-59	-57
915 MHz to	1 000 MHz	-57	-57
1 GHz to	1 710 MHz	-47	
1 710 MHz to	1 785 MHz	-53	
1 785 MHz to	4GHz	-47	
1 GHz to	1 850 MHz		-47
1 850 MHz to	1 910 MHz		-53
1 910 MHz to	4GHz		-47

Test Procedure:	a) Initially the test antenna is closely coupled to the MS and any spurious emission radiated by the MS is detected by the test antenna and receiver in the range 30 MHz to 4 GHz. NOTE 1: This is a qualitative step to identify the frequency and presence of spurious emissions which are to be measured in subsequent steps. b) The test antenna separation is set to the appropriate measurement distance and at each frequency at which a spurious emission has been detected the MS is rotated to obtain a maximum response. The effective radiated power of the emission is determined by a substitution measurement. In case of an anechoic shielded chamber pre-calibration may be used instead of a substitution measurement. c) The measurement bandwidth based on a 5 pole synchronously tuned filter shall be according to table 12.10. The power indication is the peak power detected by the measuring system. The measurement time on any frequency shall be such that it includes the time during which the MS receives a TDMA frame containing the paging channel. ***NOTE 2:*** *For these filter bandwidths some difficulties may be experienced with*

<table>
<tr><td></td><td>noise floor above required measurement limit. This will depend on the gain of the test antenna, and adjustment of the measuring system bandwidth is permissible. Alternatively, for test frequencies above 900 MHz, the test antenna separation from the MS may be reduced to 1 metre.
<table>
<tr><th>Frequency range</th><th>Filter bandwidth</th><th>Video bandwidth</th></tr>
<tr><td>30 MHz to 50 MHz</td><td>10 kHz</td><td>30 kHz</td></tr>
<tr><td>50 MHz to 4 GHz</td><td>100 kHz</td><td>300 kHz</td></tr>
</table>
d) The measurements are repeated with the test antenna in the orthogonal polarization plane.
e) The test is repeated under extreme voltage test conditions.</td></tr>
<tr><td>Test Instrument:</td><td>Refer to Item 3.3</td></tr>
<tr><td>Test Result:</td><td>PASS</td></tr>
</table>

5.12. Receiver Blocking and spurious response - speech channels

5.12.1. Test Specification

Test Requirement:	ETSI EN 301 511 V12.5.1 clause 4.2.20
Test Method:	ETSI EN 301 511 V12.5.1 clause 5.3.20
Limit:	1. The blocking characteristics of the receiver are specified separately for in-band and out-of-band performance as identified in 3GPP TS 05.05 subclause 5.1. The reference sensitivity performance as specified in table 1 of 3GPP TS 05.05 shall be met when the following signals are simultaneously input to the receiver: - a useful signal at frequency f_0, 3 dB above the reference sensitivity level as specified in 3GPP TS 05.05 subclause 6.2; - a continuous, static sine wave signal at a level as in the table of 3GPP TS 05.05 subclause 5.1 and at a frequency (f) which is an integer multiple of 200 kHz. With the following exceptions, called spurious response frequencies: a) R-GSM 900 or ER-GSM 900: in band, for a maximum of six occurrences (which if grouped shall not exceed three contiguous occurrences per group); b) out of band, for a maximum of 24 occurrences (which if below f0 and grouped shall not exceed three contiguous occurrences per group). Where the above performance shall be met when the continuous sine wave signal (f) is set to a level of 70 dBµV (emf) (i.e. -43 dBm). 3GPP TS 05.05, subclause 5.1. 3GPP TS 45.05 subclause 2: For T-GSM 810 the requirements for GSM 900 shall apply, apart for those parameters for which a separate requirement exists.
Test Procedure:	a) The SS produces a static wanted signal and a static interfering signal at the same time. The amplitude of the wanted signal is set to 4 dB above the reference sensitivity level. b) The unwanted signal is a C.W. signal (Standard test signal IO) of frequency FB. It is applied in turn on the subset of frequencies calculated in step c) in the overall range 100 kHz to 12,75 GHz, where FB is an integer multiple of 200 kHz. However, frequencies in the range FR ±600 kHz are excluded. ***NOTE:*** *Allowance must be made for possible spurious signals arising from the SS. These are particularly likely at sub harmonic frequencies nFB where n = 2, 3, 4, 5, etc.* c) The frequencies at which the test is performed (adjusted to an integer multiple of 200 kHz channels most closely approximating the absolute frequency of the calculated blocking signal frequency) are the combined frequencies from

i), ii) and iii) below:

- i) The total frequency range formed by:-

GSM 400 the frequencies between Flo + (IF1 + IF2 + ... + IFn +3,6 MHz) and Flo - (IF1 + IF2 + ... + IFn + 3,6 MHz).

GSM 700 and T-GSM 810 the frequencies between Flo + (IF1 + IF2 + ... + IFn +7,5 MHz) and Flo - (IF1 + IF2 + ... + IFn + 7,5 MHz).

GSM 850 and P-GSM 900 the frequencies between Flo + (IF1 + IF2 + ... + IFn +1 2,5 MHz) and Flo - (IF1 + IF2 + ... + IFn + 12,5 MHz).

E-GSM 900 the frequencies between Flo + (IF1 + IF2 + ... + IFn + 17,5 MHz) and Flo - (IF1 + IF2 + ... + IFn + 17,5 MHz).

DCS 1 800 the frequencies between Flo + (IF1 + IF2 + ... +IFn + 37,5 MHz) and Flo - (IF1 + IF2 + ... + IFn + 37,5 MHz).

PCS 1 900 the frequencies between Flo + (IF1 + IF2 + ... + IFn + 30,0 MHz) and Flo - (IF1 + IF2 + ... + IFn + 30,0 MHz).

and

the frequencies +100 MHz and -100 MHz from the edge of the relevant receive band.

Measurements are made at 200 kHz intervals.

ii) The three frequencies IF1, IF1 + 200 kHz, IF1 - 200 kHz.

iii) The frequencies:

mFlo + IF1;

mFlo - IF1;

mFR;

where m is all positive integers greater than or equal to 2 such that either sum lies in the range 100 kHz to 12,75 GHz.

The frequencies in step ii) and iii) lying in the range of frequencies defined by step i) above need not be repeated.

Where:

Flo - local oscillator applied to first receiver mixer

IF1 ... IFn - are the n intermediate frequencies

Flo, IF1, IF2 ... IFn - shall be declared by the manufacturer in the PIXIT statement

3GPP TS 51.010-1 annex 3.

d) The level of the unwanted signal is set according to table below.

	GSM 900		DCS 1800
	Small MS	**Other MS**	
FREQUENCY	**LEVEL IN dB Vemf( )**		**LEVEL IN dB Vemf( )**
FR ±600 kHz to FR ±800 kHz	70	75	70
FR ±800 kHz to FR ±1,6 MHz	70	80	70

		FR ±1,6 MHz to FR ±3 MHz	80	90	80
		915 MHz to FR - 3 MHz	90	90	
		FR + 3 MHz to 980 MHz	90	90	
		1 785 MHz to FR - 3 MHz	-	-	87
		FR + 3 MHz to 1 920 MHz	-	-	87
		835 MHz to < 915 MHz	113	113	
		> 980 MHz to 1 000 MHz	113	113	
		100 kHz to < 835 MHz	90	90	
		> 1 000 MHz to 12,75 GHz	90	90	
		100 kHz to 1 705 MHz	-	-	113
		> 1 705 MHz to < 1 785 MHz	-	-	101
		> 1 920 MHz to 1 980 MHz	-	-	101
		> 1 980 MHz to 12,75 GHz	-	-	90
Test Instrument:	Refer to Item 3.3				
Test Result:	PASS				

5.13. Frequency error and Modulation accuracy in EGPRS Configuration

5.13.1. Test Specification

Test Requirement:	ETSI EN 301 511 V12.5.1 clause 4.2.26
Test Method:	ETSI EN 301 511 V12.5.1 clause 5.3.26
Limit:	1. The carrier frequency under 8PSK modulation shall be accurate to within 0,2 ppm for GSM 400 and 0,1 ppm for all other bands compared to signals received from the BS. 2. The RMS EVM over the useful part of any burst of the 8-PSK modulated signal shall not exceed. 2.1 9,0% Under normal conditions; 3GPP TS 05.05, subclause 4.6.2.1 2.2 10,0% Under extreme conditions; 3GPP TS 05.05, subclause 4.6; 3GPP TS 05.05, annex D subclauses D.2.1 and D.2.2. 3. The peak EVM values averaged over at least 200 bursts of the 8PSK modulated signal shall be ≤ 30 %. 4. The 95:th-percentile value of any burst of the 8-PSK modulated signal shall be ≤ 15 %. 5. The Origin Offset Suppression for any 8PSK modulated signal shall exceed 30 dB.
Test Procedure:	Procedure for 8PSK Frequency error and modulation accuracy measurements a) For one transmitted burst on the last slot of the multislot configuration, the SS captures the transmitted signal by taking at least four samples per symbol. The transmitted signal is modelled by: $Y(t) = C1\{R(t) + D(t) + C0\}W^t$ R(t) is defined to be an ideal transmitter signal. D(t) is the residual complex error on signal R(t). C0 is a constant origin offset representing carrier feed through. C1 is a complex constant representing the arbitrary phase and output power of the transmitter. $W = e^{\alpha + j 2\pi f}$ accounts for both a frequency offset of "$2\pi f$" radians per second phase rotation and an amplitude change of "α" nepers per second. The symbol timing phase of Y(t) is aligned with R(t). b) The SS shall generate the ideal transmitter signal as a reference. The ideal transmitter signal can be constructed from a priori knowledge of the transmitted symbols or from the demodulated symbols of the transmitted burst. In the latter case, unknown symbols shall be detected with an error rate sufficiently small to ensure the accuracy of the measurement equipment (see annex 5).

	c) c.1) The transmitted signal Y(t) is compensated in amplitude, frequency and phase by multiplying with the factor: $W^{-t}/C1$ The values for W and C1 are determined using an iterative procedure. W(α,f), C1 and C0 are chosen to minimise the RMS value of EVM on a burst-by-burst basis. c.2) After compensation, Y(t) is PASSed through the specified measurement filter (3GPP TS 05.05, subclause 4.6.2) to produce the signal: Z(k) = S(k) + E(k) + C0 where: S(k) is the ideal transmitter signal observed through the measurement filter; k = floor(t/Ts), where Ts =1/270.833 kHz corresponding to the symbol times. c.3) The error vector is defined to be: E(k) = Z(k) – C0 –S(k) It is measured and calculated for each instant k over the useful part of the burst excluding tail bits. The RMS vector error is defined as: $\text{RMS EVM} = \sqrt{\sum_{k\in K}\lvert E(k)\rvert^2 / \sum_{k\in K}\lvert S(k)\rvert^2}$ c.4) Steps c.1) to c.3) are repeated with successive approximations of W(α,f), C1 and C0 until the minimum value of RMS EVM is found. The minimised value of RMS EVM and the final values for C1, C0 and f are noted. (f represents the frequency error of the burst). d) For each symbol in the useful part of the burst excluding tail bits, the SS shall calculate the error vector magnitude as: $\text{EVM}(k) = \sqrt{\dfrac{\lvert E(k)\rvert^2}{\dfrac{\sum_{k\in K}\lvert S(k)\rvert^2}{N}}}$ The peak value of symbol EVM in the useful part of the burst, excluding tail bits, is noted. e) The SS shall calculate the value for Origin Offset Suppression for the burst as: $OOS = \left(\dfrac{\lvert C_o\rvert^2}{\dfrac{1}{N}\sum_{k\in K}\lvert S(k)\rvert^2}\right)$ f) Steps a) to e) are repeated for a total of 200 bursts. g) The peak values of symbol EVM noted in step d) are

	averaged for the 200 measured bursts. h) The origin offset suppression values derived in step e) are averaged for the 200 measured bursts. The resulting average is converted to log format. $OOS(dB) = -10\log(OOS)$ i) From the distribution of symbol EVM values calculated in step d) for the 200 measured bursts, the SS shall determine the 95: the percentile value. j) The SS instructs the MS to its maximum power control level by setting the power control parameter ALPHA (α) to 0 and GAMMA_TN (ΓCH) for each timeslot to the desired power level in the Packet Uplink Assignment or Packet Timeslot Reconfigure message (Closed Loop Control, see 3GPP TS 05.08, clause B.2), all other conditions remaining constant. Steps a) to i) are repeated. k) The SS instructs the MS to the minimum power control level, all other conditions remaining constant. Steps a) to i) are repeated. l) Steps a) to i) are repeated under extreme test conditions (see annex 1, TC2.2).
Test Instrument:	Refer to Item 3.3
Test Result:	PASS

5.14. Frequency error under multipath and interference conditions in EGPRS Configuration

5.14.1. Test Specification

Test Requirement:	ETSI EN 301 511 V12.5.1 clause 4.2.27
Test Method:	ETSI EN 301 511 V12.5.1 clause 5.3.27
Limit:	1. The MS carrier frequency error for each burst shall be accurate to within 0,1 ppm for GSM 700, GSM 850, GSM 900, DCS 1800, PCS 1 900 and 0,2 ppm for GSM 400 compared to signals received from the BS for signal levels down to 3 dB below the reference sensitivity level. 2. The MS carrier frequency error for each burst shall be accurate to within 0,1 ppm, for GSM 700, GSM 850, GSM 900, DCS 1800 and PCS 1 900 and 0,2 ppm for GSM 400 compared to signals received from the BS for 3 dB less carrier to interference ratio than the reference interference ratios; 3GPP TS 05.10, subclauses 6 and 6.1. 3GPP TS 45.05 subclause 2: For T-GSM 810 the requirements for GSM 900 shall apply, apart for those parameters for which a separate requirement exists.
Test Procedure:	a) The SS transmits packets under static conditions, using MCS-5 coding. The SS is set up to capture the first burst transmitted by the MS during the uplink TBF. EGPRS Switched Radio Block Loop Back Mode is initiated by the SS according to the procedure defined in 3GPP TS 04.14; 5.5.1 on a PDTCH/MCS-5 channel in the mid ARFCN range. The PDTCH level is set to 10 dB above the input signal level at reference sensitivity performance for PDTCH/MCS-5 applicable to the type of MS and the fading function is set to RA. 8PSK modulated downlink transmission shall be utilised. b) The SS calculates the frequency accuracy of the captured burst as described in test 13.16.1 for MS capable of only GMSK modulated transmission in the uplink. For MS capable of both GMSK and 8PSK modulated transmission in the uplink the frequency accuracy of the captured burst shall be calculated as described in the test 13.17.1. c) The SS sets the serving cell BCCH and PDTCH to the PDTCH input signal level at reference sensitivity performance for PDTCH/MCS-5 applicable to the type of MS, still with the fading function set to RA and then waits 30 s for the MS to stabilize to these conditions. d) The SS shall capture subsequent bursts from the traffic channel in the manner described in test 13.16.1 or test 13.17.1. ***NOTE:*** *Due to the very low signal level at the MS receiver input the MS receiver*

	is liable to error. The "looped back" bits are therefore also liable to error, and hence the SS does not know the expected bit sequence. The SS will have to demodulate the received signal to derive (error free) the transmitter burst bit pattern. Using this bit pattern the SS can calculate the expected phase trajectory according to the definition within 3GPP TS 05.04. e) The SS calculates the frequency accuracy of the captured burst as described in test 13.16.1 or test 13.17.1. f) Steps d) and e) are repeated for 5 traffic channel bursts spaced over a period of not less than 20 s. g) Both downlink and uplink TBFs are terminated. The initial conditions are established again and steps a) to f) are repeated but with the fading function set to HT200 for GSM 400, HT120 for GSM700 and HT100 for all other bands. h) The initial conditions are established again and steps a) to f) are repeated but with the fading function set to TU100 for GSM 400, TU60 for GSM700 and TU50 for all other bands. i) The initial conditions are established again and steps a) and b) are repeated but with the following differences: - the levels of the BCCH and PDTCH are set to – 72,5 dBm + Corr. Corr = the correction factor for reference performance according to Spec 45.005 subclause 6.2. - two further independent 8-PSK modulated interfering signals are sent on the same nominal carrier frequency as the BCCH and PDTCH and at a level 20,5 dB below the level of the PDTCH and modulated with random data, including the midamble. - the fading function for all channels including the interfering signals is set to TUlow. - the SS waits 100 s for the MS to stabilize to these conditions. j) Repeat steps d) to f), except that at step f) the measurement period must be extended to 200 s and the number of measurements increased to 20. k) The initial conditions are established again and steps a) to j) are repeated for ARFCN in the Low ARFCN range. l) The initial conditions are established again and steps a) to j) are repeated for ARFCN in the High ARFCN range. m) Repeat step h) under extreme test conditions (see annex 1, TC2.2).
Test Instrument:	Refer to Item 3.3
Test Result:	PASS

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5.15. EGPRS Transmitter output power

5.15.1. Test Specification

Test Requirement:	ETSI EN 301 511 V12.5.1 clause 4.2.28
Test Method:	ETSI EN 301 511 V12.5.1 clause 5.3.28
Limit:	1. The MS maximum output power for 8-PSK modulated signal shall be as defined in 3GPP TS 05.05, subclause 4.1.1, second table, according to its power class, with a tolerances of ±2 dB, ±3 dB, +3/-4 dB defined under normal conditions in the 3GPP TS 05.05, subclause 4.1.1, second table. From R99 onwards, the MS maximum output power in an uplink multislot configuration shall be as defined in 3GPP TS 05.05 subclause 4.1.1, sixth table, according to its power class, with a tolerance of ±3 dB under normal conditions; 3GPP TS 05.05, subclause 4.1.1, second and sixth table. In case the MS supports the same maximum output power in an uplink multislot configuration as it supports for single slot uplink operation, the tolerance shall be ±2 dB. 2. The MS maximum output power for 8-PSK modulated signal shall be as defined in 3GPP TS 05.05, subclause 4.1.1, second table, according to its power class, with a tolerances of ±2,5 dB, ±4 dB, +4/-4,5 dB defined under extreme conditions in the 3GPP TS 05.05, subclause 4.1.1, second table. From R99 onwards, the MS maximum output power in an uplink multislot configuration shall be as defined in 3GPP TS 05.05 subclause 4.1.1, sixth table, according to its power class, with a tolerance of ±4 dB under extreme conditions; 3GPP TS 05.05, subclause 4.1.1, second and sixth table; 3GPP TS 05.05 annex D in subclauses D.2.1 and D.2.2. In case the MS supports the same maximum output power in an uplink multislot configuration as it supports for single slot uplink operation, the tolerance shall be ±2,5 dB. 3. The power control levels for 8-PSK shall have the nominal output power levels as defined in 3GPP TS 05.05, subclause 4.1.1, third table (for GSM 400, GSM 700, GSM 850 and GSM 900), fourth table (for DCS 1 800) or fifth table (for PCS 1 900), from the lowest power control level up to the maximum output power corresponding to the class of the MS (for tolerance on maximum output power see conformance requirement 1), with a tolerance of ±2 dB,±3 dB, 4 dB or 5 dB under normal conditions; 3GPP TS 05.05, subclause 4.1.1, third, fourth or fifth table. 4. The power control levels for 8-PSK shall have the nominal output power levels as defined in 3GPP TS 05.05, subclause 4.1.1, third table (for GSM 400, GSM 700, GSM 850 and GSM 900), fourth table (for DCS 1 800) or fifth table (for PCS 1 900), from the lowest power control level up to the maximum output power corresponding to the class of the MS

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	(for tolerance on maximum output power see conformance requirements 2), with a tolerance of ±2,5 dB, ±4 dB, 5 dB or 6 dB under extreme conditions; 3GPP TS 05.05, subclause 4.1.1, third, fourth or fifth table; 3GPP TS 05.05 annex D subclauses D.2.1 and D.2.2. 4a. From R99 onwards, the supported maximum output power for each number of uplink timeslots shall form a monotonic sequence. The maximum reduction of maximum output power from an allocation of n uplink timeslots to an allocation of n+1 uplink timeslots shall be equal to the difference of maximum permissible nominal reduction of maximum output power for the corresponding number of timeslots, as defined in 3GPP TS 05.05, subclause 4.1.1, sixth table. 5. For 8-PSK, the output power actually transmitted by the MS at consecutive power control levels shall form a monotonic sequence and the interval between power control levels shall be 2 ± 1,5 dB; 3GPP TS 05.05, subclause 4.1.1, from R99 onwards, in a multislot configuration, the first power control step down from the maximum output power is allowed to be in the range 0…2 dB 6. The transmitted power level relative to time for a normal burst shall be within the power/time template given in 3GPP TS 05.05, annex B bottom figure for 8PSK modulated signal. In the case of Multislot Configurations where the bursts in two or more consecutive time slots are actually transmitted at the same frequency, the template of annex B shall be respected during the useful part of each burst and at the beginning and the end of the series of consecutive bursts. The output power during the guard period between every two consecutive active timeslots shall not exceed the level allowed for the useful part of the first timeslot, or the level allowed for the useful part of the second timeslot plus 3 dB, whichever is the highest. On a multislot uplink configuration the MS may restrict the interslot output power control range to a 10 dB window, on a TDMA frame basis. On those timeslots where the ordered power level is more than 10 dB lower than the applied power level of the highest power timeslot, the MS shall transmit at a lowest possible power level within 10 dB range from the highest applied power level, if not transmitting at the actual ordered power level. 3GPP TS 45.05 subclause 2: For T-GSM 810 the requirements for GSM 900 shall apply, apart for those parameters for which a separate requirement exists.
Test Procedure:	a) Measurement of normal burst transmitter output power For 8PSK, power may be determined by applying the technique described for GMSK in subclause 13.16.2.4.1.2;

	step a) and then averaging over multiple bursts to achieve sufficient accuracy (see annex 5). Alternatively, an estimation technique based on a single burst which can be demonstrated to yield the same result as the long term average may be used. The long term average or the estimate of long term average is used as the 0dB reference for the power/time template. b) Measurement of normal burst power/time relationship. The array of power samples measured in a) are referenced in time to the centre of the useful transmitted symbols and in power to the 0 dB reference, both identified in a). c) Steps a) to b) are repeated on each timeslot within the multislot configuration with the MS commanded to operate on each of the nominal output power levels defined in tables 13.17.3-1, 13.17.3-2 and 13.17.3-3. ***NOTE:*** *Power control levels 0 and 1 are excluded for bands other than DCS 1800 and PCS 1900 since these power control levels can not be set by GAMMA_TN.* d) The SS commands the MS to the maximum power control level supported by the MS and steps a) to b) are repeated on each timeslot within the multislot configuration for ARFCN in the Low and High ranges. e) The SS commands the MS to the maximum power control level in the first timeslot allocated within the multislot configuration and to the minimum power control level in the second timeslot allocated. Any further timeslots allocated are to be set to the maximum power control level. Steps a) to b) and corresponding measurements on each timeslot within the multislot configuration are repeated. This step is only applicable to MS which support more than one uplink time slot. f) Steps a) to e) are repeated under extreme test conditions (annex 1, TC2.2) except that the repeats at step c) are only performed for power control level 10 and the minimum nominal output power level supported by the MS.
Test Instrument:	Refer to Item 3.3
Test Result:	PASS

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5.16. Output RF spectrum in EGPRS configuration

5.16.1. Test Specification

Test Requirement:	ETSI EN 301 511 V12.5.1 clause 4.2.29
Test Method:	ETSI EN 301 511 V12.5.1 clause 5.3.29
Limit:	1. The level of the output RF spectrum due to 8PSK modulation shall be no more than that given in 3GPP TS 05.05, subclause 4.2.1, with the following lowest measurement limits: - -36 dBm below 600 kHz offset from the carrier; - -51 dBm for GSM 400, GSM 700, GSM 850 and GSM 900 or -56 dBm for DCS 1 800 and PCS 1 900 from 600 kHz out to less than 1 800 kHz offset from the carrier; - -46 dBm for GSM 400, GSM 700, GSM 850 and GSM 900 or -51 dBm for DCS 1 800 and PCS 1 900 at and beyond 1 800 kHz offset from the carrier; but with the following exceptions at up to -36 dBm: - up to three bands of 200 kHz width centred on a frequency which is an integer multiple of 200 kHz in the combined range 600 kHz to 6 000 kHz above and below the carrier; - up to 12 bands of 200 kHz width centred on a frequency which is an integer multiple of 200 kHz at more than 6 000 kHz offset from the carrier. 2. The level of the output RF spectrum due to switching transients shall be no more than given in 3GPP TS 05.05, subclause 4.2.2, table "a) Mobile Station". 3. When allocated a channel, the power emitted by the GSM 400, GSM 900 and DCS 1800 MS, in the band 935 MHz to 960 MHz shall be no more than -79 dBm, in the band 925 MHz to 935 MHz shall be no more than -67 dBm and in the band 1 805 MHz to 1 880 MHz shall be no more than -71 dBm, except in five measurements in each of the bands 925 MHz to 960 MHz and 1 805 MHz to 1 880 MHz, where exceptions at up to -36 dBm are permitted. For GSM 400 mobiles, in addition, a limit of -67 dBm shall apply in the frequency bands 460,4 MHz to 467,6 MHz and 488,8 MHz to 496 MHz. For GSM 700, GSM 850 and PCS 1 900, the power emitted by MS, in the band of 728 MHz to 736 MHz shall be no more than -73 dBm, in the band of 736 MHz to 746 MHz shall be no more than -79 dBm, in the band of 747 MHz to 757 MHz shall be no more than -79 dBm, in the band of 757 MHz to 763 MHz shall be no more than -73 dBm, in the band 869 MHz to 894 MHz shall be no more than -79 dBm, in the band 1 930 MHz to 1 990 MHz shall be no more than -71 dBm except in five measurements in each of the bands 728 MHz to 746

	MHz, 747 MHz to 763 MHz, 869 MHz to 894 MHz and 1 930 MHz to 1 990 MHz where exceptions at up to -36 dBm are permitted; 3GPP TS 45.005, subclause 4.3.3.
Test Procedure:	a) In steps b) to h) the FT is equal to the hop pattern ARFCN in the Mid ARFCN range. b) The other settings of the spectrum analyser are set as follows: - Zero frequency scan; - Resolution bandwidth: 30 kHz; - Video bandwidth: 30 kHz; - Video averaging: may be used, depending on the implementation of the test. The video signal of the spectrum analyser is "gated" such that the spectrum generated by at least 40 of the symbols 87 to 132 of the burst in one of the active time slots is the only spectrum measured. This gating may be analogue or numerical, dependent upon the design of the spectrum analyser. Only measurements during transmitted bursts on the nominal carrier of the measurement are included. The spectrum analyser averages over the gated period and over 200 or 50 such bursts, using numerical and/or video averaging. The MS is commanded to its maximum power control level in every transmitted time slot. c) By tuning the spectrum analyser centre frequency to the measurement frequencies the power level is measured over 50 bursts at all multiples of 30 kHz offset from FT to < 1 800 kHz. d) The resolution and video bandwidth on the spectrum analyser are adjusted to 100 kHz and the measurements are made at the following frequencies: on every ARFCN from 1 800 kHz offset from the carrier to the edge of the relevant transmit band for each measurement over 50 bursts. at 200 kHz intervals over the 2 MHz either side of the relevant transmit band for each measurement over 50 bursts. For GSM 400 and DCS 1 800: at 200 kHz intervals over the band 450 MHz to 496 MHz for each measurement over 50 bursts. at 200 kHz intervals over the band 925 MHz to 960 MHz for each measurement over 50 bursts. at 200 kHz intervals over the band 1 805 MHz to 1 880 MHz for each measurement over 50 bursts. For GSM 900 at 200 kHz intervals over the band 925 MHz to 960MHz for each measurement over 50 bursts; at 200 kHz intervals over the band 1805 MHz to 1880 MHz

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	for each measurement over 50 bursts. For GSM 700, GSM 850 and DCS 1 900: at 200 kHz intervals over the band 728MHz to 746 MHz for each measurement over 50 bursts. at 200 kHz intervals over the band 747 MHz to 763 MHz for each measurement over 50 bursts. at 200 kHz intervals over the band 869 MHz to 894 MHz for each measurement over 50 bursts. at 200 kHz intervals over the band 1 930 MHz to 1 990 MHz for each measurement over 50 bursts. e) The MS is commanded to its minimum power control level. The spectrum analyser is set again as in b). f) By tuning the spectrum analyser centre frequency to the measurement frequencies the power level is measured over 200 bursts at the following frequencies: FT; FT + 100 kHz FT - 100 kHz; FT + 200 kHz FT - 200 kHz; FT + 250 kHz FT - 250 kHz; FT + 200 kHz * N FT - 200 kHz * N; where N = 2, 3, 4, 5, 6, 7, and 8; and FT = RF channel nominal centre frequency. g) Steps a) to f) is repeated except that in step a) the spectrum analyzer is gated so that the burst of the next active time slot is measured. h) The spectrum analyser settings are adjusted to: - Zero frequency scan; - Resolution bandwidth:30 kHz; - Video bandwidth: 100 kHz; - Peak hold. The spectrum analyser gating of the signal is switched off. The MS is commanded to its maximum power control level in every transmitted time slot. i) By tuning the spectrum analyser centre frequency to the measurement frequencies the power level is measured at the following frequencies: FT + 400 kHz FT - 400 kHz; FT + 600 kHz FT - 600 kHz; FT + 1,2 MHz FT - 1,2 MHz; FT + 1,8 MHz FT - 1,8 MHz; where FT = RF channel nominal centre frequency. The duration of each measurement (at each frequency) will be such as to cover at least 10 burst transmissions at FT. j) Step i) is repeated for power control levels 7 and 11. k) Steps b), f), h) and i) are repeated with FT equal to the hop

	pattern ARFCN in the Low ARFCN range except that in step h) the MS is commanded to power control level 11 rather than maximum power. l) Steps b), f), h) and i) are repeated with FT equal to the hop pattern ARFCN in the High ARFCN range except that in step h) the MS is commanded to power control level 11 rather than maximum power. m) Steps a) b) f) h), and i) are repeated under extreme test conditions (annex 1, TC2.2). except that at step h) the MS is commanded to power control level 11.
Test Instrument:	Refer to Item 3.3
Test Result:	PASS

5.17. Blocking and spurious response in EGPRS configuration

5.17.1. Test Specification

Test Requirement:	ETSI EN 301 511 V12.5.1 clause 4.2.30
Test Method:	ETSI EN 301 511 V12.5.1 clause 5.3.30
Limit:	1. The blocking characteristics of the receiver are specified separately for in-band and out-of-band performance as identified in 3GPP TS 05.05 subclause 5.1. 2. The block error rate (BLER) performance for PDTCH/MCS1 to 4 shall not exceed 10 % and for PDTCH/MCS5 to 9 shall not exceed 10 % or 30 % depending on Coding Schemes and for USF/MCS1 to 9 shall not exceed 1 % when the following signals are simultaneously input to the receiver; 3GPP TS 05.05, subclause 6.2: - a useful signal at frequency f0, 3 dB above the reference sensitivity level specified in table 14.18-3a for GMSK modulation and table 14.18-3b for 8-PSK modulation for PDTCH channels; and in tables 14.18-4a for GMSK modulation and 14.18-4b for 8-PSK modulation for USF channel with correction values as specified in 3GPP TS 05.05 subclause 6.2; - a continuous, static sine wave unwanted signal at a level as in the table 14.18-9 below and at a frequency (f) which is an integer multiple of 200 kHz. with the following exceptions, called spurious response frequencies: a) GSM 400: in band, for a maximum of three occurrences. 3GPP TS 05.05, subclause 5.1. GSM 700, GSM 850 or GSM 900: in band, for a maximum of six occurrences (which if grouped shall not exceed three contiguous occurrences per group). 3GPP TS 05.05, subclause 5.1. DCS 1 800 and PCS 1 900: in band, for a maximum of twelve occurrences (which if grouped shall not exceed three contiguous occurrences per group). 3GPP TS 05.05, subclause 5.1. b) out of band, for a maximum of 24 occurrences (which if below f_0 and grouped shall not exceed three contiguous occurrences per group). 3GPP TS 05.05, subclause 5.1. where the above performance shall be met when the continuous sine wave signal (f) is set to a level of 70 dBµV (emf) (i.e. -43 dBm). 3GPP TS 05.05, subclause 5.1.
Test Procedure:	For the ACK/NACK test steps the maximum number of supported time slots shall be used, and for the USF test steps the maximum supported symmetrical UL slot configuration shall be used.

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	For GMSK Modulation: a) The SS is set to produce a static GMSK wanted signal and a static interfering signal at the same time. The SS sets the amplitude of the wanted signal to 4 dB above the reference sensitivity level specified in table 14.18-3a for PDTCH channel and in table 14.18-4a for USF channel with correction values as specified in 3GPP TS 05.05 subclause 6.2. b) The SS transmits packets on PDTCH using MCS-4 coding to MS on all allocated timeslots. c) The unwanted signal is of frequency FB. It is applied in turn on the subset of frequencies calculated at step d) in the overall range 100 kHz to 12,75 GHz, where FB is an integer multiple of 200 kHz. However, frequencies in the range FR ± 600 kHz are excluded. ***NOTE:*** *Allowance must be made for possible spurious signals arising from the SS. These are particularly likely at sub harmonic frequencies nFB where n = 2, 3, 4, 5, etc.* d) The frequencies at which the test is performed (adjusted to an integer multiple of 200 kHz channels most closely approximating the absolute frequency of the calculated blocking signal frequency) are the combined frequencies from i), ii) and iii) which follow: i) The total frequency range formed by: GSM 400 the frequencies between Flo + (IF1 + IF2 + ... + IFn + 3,6 MHz) and Flo - (IF1 + IF2 + ... + IFn + 3,6 MHz). GSM 700 the frequencies between Flo + (IF1 + IF2 + ... + IFn + 7,5 MHz) and Flo - (IF1 + IF2 + ... + IFn + 7,5 MHz). GSM 850 the frequencies between Flo + (IF1 + IF2 + ... + IFn + 12,5 MHz) and Flo - (IF1 + IF2 + ... + IFn + 12,5 MHz). P-GSM 900: the frequencies between Flo + (IF1 + IF2 + ... + IFn + 12,5 MHz) and Flo - (IF1 + IF2 + ... + IFn + 12,5 MHz). E-GSM 900: the frequencies between Flo + (IF1 + IF2 + ... + IFn + 17,5 MHz) and Flo - (IF1 + IF2 + ... + IFn + 17,5 MHz). DCS 1 800: the frequencies between Flo + (IF1 + IF2 + ... + IFn + 37,5 MHz) and Flo - (IF1 + IF2 + ... + IFn + 37,5 MHz). PCS 1 900: the frequencies between Flo + (IF1 + IF2 + ... + IFn + 30 MHz) and Flo - (IF1 + IF2 + ... + IFn + 30 MHz). and the frequencies +100 MHz and -100 MHz from the edge of the

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relevant receive band.

Measurement are made at 200 kHz intervals.

ii) The three frequencies IF1, IF1 + 200 kHz, IF1 - 200 kHz.

iii) The frequencies:

mFlo + IF1;

mFlo - IF1;

mFR;

where m is all positive integers greater than or equal to 2 such that either sum lies in the range 100 kHz to 12,75 GHz.

The frequencies in step ii) and iii) lying in the range of frequencies defined by step i) above need not be repeated.

Where:

Flo - local oscillator applied to first receiver mixer

IF1 ... IFn - are the n intermediate frequencies

Flo, IF1, IF2 ... IFn - shall be declared by the manufacturer in the PIXIT statement

3GPP TS 51.010-1 annex 3.

e) The level of the unwanted signal is set according to table 14.18-9.

Table 14.18-9a: Level of unwanted signals

	GSM450		**GSM480**		**GSM 900**		**DCS 1800**	**PCS 1900**
	Small MS	**Other MS**	**Small MS**	**Other MS**	**Small MS**	**Other MS**		
FREQUENCY	**L**							
FR ±600 kHz to FR ±800	7	75	7	75	70	7	70	70
FR ±800 kHz to FR ±1,6 MHz	7	80	7	80	70	8	70	70
FR ±1,6 MHz to FR ±3 MHz MHz	80	90	80	90	80	90	80	80
457,6 MHz to FR - 3 MHz	9	90	-	-	-	-	-	-
FR + 3 MHz to 473,6 MHz MHz	90	90	-	-	-	-	-	-
486 MHz to FR - 3MHz	-	-	9	90	-	-	-	-
FR + 3MHz to 502 MHz	-	-	90	90	-	-	-	-
915 MHz to FR - 3 MHz	-	-	-	-	90	9	-	-
FR + 3 MHz to 980 MHz	-	-	-	-	90	90	-	-
1 785 MHz to FR - 3 MHz	-	-	-	-	-	-	8	-
FR + 3 MHz to 1 920 MHz	-	-	-	-	-	-	87	-
1 910 MHz to FR - 3 MHz MHz	-	-	-	-	-	-	-	8
FR + 3 MHz to 2 010 MHz MHz	-	-	-	-	-	-	-	87
100 kHz to < 457,6 MHz	1	113	-	-	-	-	-	-
> 473,6MHz to 12,750 MHz	11	113	-	-	-	-	-	-

MHz								
100 kHz to < 486 MHz	-	-	1	113	-	-	-	-
> 502 MHz to 12,750 MHz MHz	-	-	1 1	113	-	-	-	-
835 MHz to < 915 MHz	-	-	-	-	113	1	-	-
> 980 MHz to 1 000 MHz	-	-	-	-	113	1	-	-
100 kHz to < 835 MHz	-	-	-	-	113	1	-	-
> 1 000 MHz to 12,750 MHz MHz	-	-	-	-	113	1 1	-	-
100 kHz to 1 705 MHz	-	-	-	-	-	-	1	-
> 1 705 MHz to < 1 785 MHz	-	-	-	-	-	-	1	-
> 1 920 MHz to 1 980 MHz	-	-	-	-	-	-	1	-
> 1 980 MHz to 12,750 MHz MHz	-	-	-	-	-	-	1 1	-
100 kHz to < 1 830 MHz	-	-	-	-	-	-	-	1
1 830 MHz to < 1 910 MHz	-	-	-	-	-	-	-	1
> 2 010 MHz to 2 070 MHz	-	-	-	-	-	-	-	1
> 2 070 MHz to 12,750 MHz	-	-	-	-	-	-	-	113

Table 14-18-9b: Level of unwanted signals

	GSM	GSM	T-GSM	GSM
FREQUENCY	**LEVEL IN dBμVemf( )**			
FR ±600 kHz to FR ±800 kHz	70	70	70	70
FR ±800 kHz to FR ±1,6 MHz	70	70	70	70
FR ±1,6 MHz to FR ±3 MHz	80	80	80	80
678 MHz to FR - 3 MHz	90	-	-	-
FR + 3 MHz to 728 MHz	90	-	-	-
727 MHz to FR – 3 MHz	-	90	-	-
FR + 3 MHz to 777 MHz	-	90	-	-
831 MHz to FR - 3 MHz	-	-	90	-
FR + 3 MHz to 886 MHz	-	-	90	-
849 MHz to FR – 3 MHz	-	-	-	90
FR + 3 MHz to 914 MHz	-	-	-	90
678 MHz to FR - 3 MHz	113	-	-	-
FR + 3 MHz to 728 MHz	113	-	-	-
100 kHz to < 727 MHz	-	113	-	-
> 777 MHz to 12,75 GHz	-	113	-	-
100 kHz to 831 MHz	-	-	113	-
> 886 MHz to 12,75 MHz	-	-	113	-
100 kHz to < 849 MHz	-	-	-	113
> 914 MHz to 12,75 GHz	-	-	-	113

NOTE 1: *For E-GSM 900 MS the level of the unwanted signal in the band 905 MHz to 915 MHz is relaxed to108 dBuVemf( ). 3GPP TS 05.05, subclause 5.1.*
NOTE 2: *a) For R-GSM 900 MS the level of the unwanted signal in the band 880 MHz to 915 MHz is relaxed to 108 dBuVemf( ). 3GPP TS 05.05, subclause 5.1.*
For ER-GSM MS the level of the unwanted signal in the band 880 MHz to 912 MHz is relaxed to 108 dBuVemf( ). 3GPP TS 45.005, subclause 5.1.
For ER-GSM MS the level of the unwanted signal in the band 912 MHz to 915 MHz is relaxed to 101 dBuVemf( ). 3GPP TS 45.005, subclause 5.1.
b) For R-GSM 900 small MS the level of the unwanted signal in the band 876 MHz to 915 MHz is relaxed to 106 dBuVemf( ). 3GPP TS 05.05, subclause 5.1.
For ER-GSM small MS the level of the unwanted signal in the band 873 MHz to 912 MHz is relaxed to 106 dBuVemf( ). 3GPP TS 45.005, subclause 5.1.
For ER-GSM small MS the level of the unwanted signal in the band 912 MHz to 915 MHz is relaxed to 99 dBuVemf( ). 3GPP TS 45.005, subclause 5.1.

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	NOTE 3: *a) For GSM 450 small MS the level of the unwanted signal in the band 450,4 MHz to 457,6 MHz is relaxed to 108 dBuVemf( ). 3GPP TS 05.05, subclause 5.1.* *b) For GSM 480 small MS the level of the unwanted signal in the band 478,8 MHz to 486 MHz is relaxed to 108 dBuVemf( ). 3GPP TS 05.05, subclause 5.1.* f) The SS counts the number of blocks transmitted with current coding scheme and the number of these blocks not acknowledged based on the content of the Ack/Nack Description information element (see 3GPP TS 04.60, subclause 12.3) in the Packet Downlink Ack/Nack as sent from the MS to the SS on the PACCH. ***NOTE 1:*** *Due to the error rates related to the USF, the MS is likely to occasionally miss its USF for transmitting the Packet Downlink Ack/Nack. As this requirement is not verified in this part of the test, the SS then again assigns uplink resources so the MS can send this message.* g) Once the number of blocks transmitted with the current coding scheme as counted in step f) reaches or exceeds the minimum number of blocks as given in table 14.18-2, the SS calculates the Block error ratio. The SS resets both counters. If a failure is indicated, it is noted and counted towards the allowed exemption total. In the case of failures discovered at the predicted frequencies at steps d i), ii) or iii) the test is repeated on the adjacent channels ±200 kHz away. If either of these two frequencies fail then the next channel 200 kHz beyond is also be tested. This process is repeated until all channels constituting the group of failures is known. h) The SS sets the value of the USF/MCS-4 such as to allocate the uplink to the MS. i) The unwanted signal is of frequency FB. It is applied in turn on the subset of frequencies calculated at step d) in the overall range 100 kHz to 12,75 GHz, where FB is an integer multiple of 200 kHz. However, frequencies in the range FR ±600 kHz are excluded. NOTE 2: Allowance must be made for possible spurious signals arising from the SS. These are particularly likely at sub harmonic frequencies nFB where n = 2, 3, 4, 5, etc. j) The level of the unwanted signal is set according to table 14.18-9. k) The SS counts the number of times the USF is allocated to the MS, and the number of times the MS does not transmit while being allocated the uplink. l) Once the number of USF/MCS-4 allocating the uplink for the MS as counted in step k) reaches or exceeds the minimum number of blocks as given in table 14.18-2, the SS calculates the Block error ratio. The SS resets both counters. If a failure is indicated, it is noted and counted towards the allowed exemption total. In the case of failures discovered at the predicted frequencies at steps d i), ii) or iii) the test is repeated on the adjacent channels ±200 kHz away. If either of these two frequencies fail

	then the next channel 200 kHz beyond is also be tested. This process is repeated until all channels constituting the group of failures is known. For 8-PSK Modulation: a) The SS is set to produce a static 8-PSK wanted signal and a static interfering signal at the same time. The SS sets the amplitude of the wanted signal to 4 dB above the reference sensitivity level specified in table 14.18-3b for PDTCH channel and in table 14.18-4b for USF channel with correction values as specified in 3GPP TS 05.05 subclause 6.2; b) The SS transmits packets on PDTCH using MCS-9 coding to MS on all allocated timeslots. c) The unwanted signal is of frequency FB. It is applied in turn on the subset of frequencies calculated at step d) in the overall range 100 kHz to 12,75 GHz, where FB is an integer multiple of 200 kHz. However, frequencies in the range FR ±600 kHz are excluded. ***NOTE 3:*** *Allowance must be made for possible spurious signals arising from the SS. These are particularly likely at sub harmonic frequencies nFB where n = 2, 3, 4, 5, etc.* d) The frequencies at which the test is performed (adjusted to an integer multiple of 200 kHz channels most closely approximating the absolute frequency of the calculated blocking signal frequency) are the combined frequencies from i), ii) and iii) which follow: i) The total frequency range formed by: GSM 400 the frequencies between Flo + (IF1 + IF2 + ... + IFn + 3,6 MHz) and Flo - (IF1 + IF2 + ... + IFn + 3,6 MHz). GSM 700 the frequencies between Flo + (IF1 + IF2 + ... + IFn + 7,5 MHz) and Flo - (IF1 + IF2 + ... + IFn + 7,5 MHz). GSM 850 the frequencies between Flo + (IF1 + IF2 + ... + IFn + 12,5 MHz) and Flo - (IF1 + IF2 + ... + IFn + 12,5 MHz). P-GSM 900: the frequencies between Flo + (IF1 + IF2 + ... + IFn + 12,5 MHz) and Flo - (IF1 + IF2 + ... + IFn + 12,5 MHz). E-GSM 900: the frequencies between Flo + (IF1 + IF2 + ... + IFn + 17,5 MHz) and Flo - (IF1 + IF2 + ... + IFn + 17,5 MHz). DCS 1 800: the frequencies between Flo + (IF1 + IF2 + ... + IFn + 37,5 MHz) and Flo - (IF1 + IF2 + ... + IFn + 37,5 MHz). PCS 1 900: the frequencies between Flo + (IF1 + IF2 + ... + IFn + 30 MHz) and Flo - (IF1 + IF2 + ... + IFn + 30 MHz).

	and the frequencies +100 MHz and -100 MHz from the edge of the relevant receive band. Measurement are made at 200 kHz intervals. ii) The three frequencies IF1, IF1 + 200 kHz, IF1 - 200 kHz. iii) The frequencies: mFlo + IF1; mFlo - IF1; mFR; where m is all positive integers greater than or equal to 2 such that either sum lies in the range 100 kHz to 12,75 GHz. The frequencies in step ii) and iii) lying in the range of frequencies defined by step i) above need not be repeated. Where: Flo - local oscillator applied to first receiver mixer IF1 ... IFn - are the n intermediate frequencies Flo, IF1, IF2 ... IFn - shall be declared by the manufacturer in the PIXIT statement 3GPP TS 51.010-1 annex 3. e) The level of the unwanted signal is set according to table 14.18-9. f) The SS counts the number of blocks transmitted with current coding scheme and the number of these blocks not acknowledged based on the content of the Ack/Nack Description information element (see 04.60, 12.3) in the Packet Downlink Ack/Nack as sent from the MS to the SS on the PACCH. ***NOTE 4:*** *Due to the error rates related to the USF, the MS is likely to occasionally miss its USF for transmitting the Packet Downlink Ack/Nack. As this requirement is not verified in this part of the test, the SS then again assigns uplink resources so the MS can send this message.* g) Once the number of blocks transmitted with the current coding scheme as counted in step f) reaches or exceeds the minimum number of blocks as given in table 14.18-2, the SS calculates the Block error ratio. The SS resets both counters. If a failure is indicated, it is noted and counted towards the allowed exemption total. In the case of failures discovered at the predicted frequencies at steps d i), ii) or iii) the test is repeated on the adjacent channels ±200 kHz away. If either of these two frequencies fail then the next channel 200 kHz beyond is also be tested. This process is repeated until all channels constituting the group of failures is known. h) The SS sets the value of the USF/MCS-9 such as to allocate the uplink to the MS. j) The unwanted signal is of frequency FB. It is applied in turn on the subset of frequencies calculated at step d) in the overall range 100 kHz to 12,75 GHz, where FB is an integer

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	multiple of 200 kHz. However, frequencies in the range FR ±600 kHz are excluded. ***NOTE 5:*** *Allowance must be made for possible spurious signals arising from the SS. These are particularly likely at sub harmonic frequencies nFB where n = 2, 3, 4, 5, etc.* k) The level of the unwanted signal is set according to table 14.18-9. l) The SS counts the number of times the USF is allocated to the MS, and the number of times the MS does not transmit while being allocated the uplink. m) Once the number of USF/MCS-9 allocating the uplink for the MS as counted in step l) reaches or exceeds the minimum number of blocks as given in table 14.18-2, the SS calculates the Block error ratio. The SS resets both counters. If a failure is indicated, it is noted and counted towards the allowed exemption total. In the case of failures discovered at the predicted frequencies at steps d i), ii) or iii) the test is repeated on the adjacent channels ±200 kHz away. If either of these two frequencies fail then the next channel 200 kHz beyond is also be tested. This process is repeated until all channels constituting the group of failures is known.
Test Instrument:	Refer to Item 3.3
Test Result:	PASS

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5.18. Intermodulation rejection - speech channels

5.18.1. Test Specification

Test Requirement:	ETSI EN 301 511 V12.5.1 clause 4.2.32
Test Method:	ETSI EN 301 511 V12.5.1 clause 5.3.32
Limit:	In the presence of two unwanted signals with a specific frequency relationship to the wanted signal frequency the Class II RBER for TCH/FS shall meet the reference sensitivity performance of table 1 in 3GPP TS 05.05 subclause 5.3.
Test Procedure:	a) The amplitude of the wanted signal is set to 4 dB above the reference sensitivity level (see table 14-24). b) The SS commands the MS to create the loop back facility signalling erased frames. c) The SS produces a static wanted signal, and two static interfering (unwanted) signals at the same time. There is no correlation in the modulation between the signals. The first interfering signal is on a frequency equal to the centre frequency of an ARFCN four above that of the receiver. This signal is static and unmodulated. The second interfering signal is on an ARFCN eight above that of the receiver. This signal is static, continuous and modulated by random data. The amplitude of both the interfering signals is set according to table 14-24. d) The SS compares the data of the signal that it sends to the MS with the signal which is looped back from the receiver after demodulation and decoding, and checks the frame erasure indication. The SS tests the RBER compliance of class II bits by examining at least the minimum number of samples of consecutive bits. Bits only taken from those frames which do not signal frame erasure. The number of error events is recorded. e) The measurement of step d) is repeated with the two unwanted signals having frequencies corresponding to ARFCN four and eight below the ARFCN of the wanted signal. f) Steps b) to e), are repeated but with the receiver operating on an ARFCN in the Low ARFCN range. g) Steps b) to e), are repeated but with the receiver operating on an ARFCN in the High ARFCN range. h) Steps a) to g) are repeated under extreme test conditions. **Table 14-24: Intermodulation test signal levels**

	GSM 400, GSM 700, T-GSM 810, GSM 850 and GSM 900		DCS 1 800	
	Small MS	Other MS	Class 1 and 2	Class 3
WANTED SIGNAL dB Vemf( )	15	13	17	15

	FIRST INTERFERER dB Vemf( )	64	74	64	68
	SECOND INTERFERER dB Vemf( )	63	63	64	68
	NOTE: *Some of the levels in table 14-24 are different to those specified in 3GPP TS 05.05 due to the consideration of the effect of modulation sideband noise from the second interferer.*				
Test Instrument:	Refer to Item 3.3				
Test Result:	PASS				

5.19. Intermodulation rejection - EGPRS

5.19.1. Test Specification

Test Requirement:	ETSI EN 301 511 V12.5.1 clause 4.2.34
Test Method:	ETSI EN 301 511 V12.5.1 clause 5.3.34
Limit:	In the presence of two unwanted signals with a specific frequency relationship to the wanted signal frequency in both GMSK and 8-PSK modulations 1. The block error rate (BLER) performance for PDTCH/MCS1 to 4 shall not exceed 10 % and for PDTCH/MCS5 to 9 shall not exceed 10 % or 30 % depending on Coding Schemes; 3GPP TS 05.05, subclause 6.2. 2. The block error rate (BLER) performance for USF/MSC-1 to 9 shall not exceed 1 %; 3GPP TS 05.05, subclause6.2. 3. The BLER shall not exceed the conformance requirements given in 1. - 2. under extreme conditions; 3GPP TS 05.05, subclause 6.2 and annex D subclauses D.2.1 and D.2.2.
Test Procedure:	For GMSK modulation: a) The SS transmits packets on PDTCH using MCS-4 coding to the MS on all allocated timeslots. b) The first interfering signal is on a frequency equal to the centre frequency of an ARFCN four above the ARFCN of the wanted signal. This signal is static, continuous and unmodulated. c) The second interfering signal is on an ARFCN eight above the ARFCN of the wanted signal. This signal is static, continuous and GMSK modulated by random data (I1). The amplitude of both the interfering signals is set according to table 14.18-8. d) The SS counts the number of blocks transmitted with current coding scheme and the number of these blocks not acknowledged based on the content of the Ack/Nack Description information element (see 3GPP TS 04.60, subclause 12.3) in the Packet Downlink Ack/Nack as sent from the MS to the SS on the PACCH. *NOTE 1: Due to the error rates related to the USF, the MS is likely to occasionally miss its USF for transmitting the Packet Downlink Ack/Nack. As this requirement is not verified in this part of the test, the SS then again assigns uplink resources so the MS can send this message.* e) Once the number of blocks transmitted with the current coding scheme as counted in step d) reaches or exceeds the minimum number of blocks as given in table 14-18-2, the SS calculates the Block error ratio. The SS resets both counters. f) The SS repeats steps d) and e) with the two unwanted signals having frequencies corresponding to ARFCN four and eight below the ARFCN of the wanted signal. g) The SS repeats steps a) to f) with the receiver operating on

	an ARFCN in the Low ARFCN. h) The SS repeats steps a) to f) with the receiver operating on an ARFCN in the High ARFCN range. i) The SS repeats steps a) to f) for each of the coding schemes MCS-1 to 3. j) Steps a) to h) are repeated under extreme test conditions for MCS-4 only. k) The SS establishes the normal test conditions. An uplink TBF shall be established. l) The SS sets the value of the USF/MCS-4 such as to allocate the uplink to the MS. m) The first interfering signal is on a frequency equal to the centre frequency of an ARFCN four above the ARFCN of the wanted signal. This signal is static, continuous and unmodulated. n) The second interfering signal is on an ARFCN eight above the ARFCN of the wanted signal. This signal is static, continuous and GMSK modulated by random data (I1). The amplitude of both the interfering signals is set according to table 14.18-8. o) The SS counts the number of times the USF is allocated to the MS, and the number of times the MS does not transmit while being allocated the uplink. p) Once the number of USF/MCS-4 allocating the uplink for the MS as counted in step o) reaches or exceeds the minimum number of blocks as given in table 14-18-2, the SS calculates the Block error ratio. The SS resets both counters. q) The SS repeats steps o) and p) with the two unwanted signals having frequencies corresponding to ARFCN four and eight below the ARFCN of the wanted signal. r) The SS repeats steps l) to q) with the receiver operating on an ARFCN in the Low ARFCN. s) The SS repeats steps l) to q) with the receiver operating on an ARFCN in the High ARFCN range. t) The SS repeats steps l) to s) under extreme test conditions for MCS-4. For 8-PSK Modulation: a) The SS transmits packets on PDTCH using MCS-9 coding to the MS on all allocated timeslots. b) The first interfering signal is on a frequency equal to the centre frequency of an ARFCN four above the ARFCN of the wanted signal. This signal is static, continuous and unmodulated. c) The second interfering signal is on an ARFCN eight above the ARFCN of the wanted signal. This signal is static, continuous and GMSK modulated by random data (I1). The amplitude of both the interfering signals is set according to table 14.18-8. d) The SS counts the number of blocks transmitted with current coding scheme and the number of these blocks not

	acknowledged based on the content of the Ack/Nack Description information element (see 04.60, 12.3) in the Packet Downlink Ack/Nack as sent from the MS to the SS on the PACCH. NOTE 2: Due to the error rates related to the USF, the MS is likely to occasionally miss its USF for transmitting the Packet Downlink Ack/Nack. As this requirement is not verified in this part of the test, the SS then again assigns uplink resources so the MS can send this message. e) Once the number of blocks transmitted with the current coding scheme as counted in step d) reaches or exceeds the minimum number of blocks as given in table 14.18-2, the SS calculates the Block error ratio. The SS resets both counters. f) The SS repeats steps d) and e) with the two unwanted signals having frequencies corresponding to ARFCN four and eight below the ARFCN of the wanted signal. g) The SS repeats steps a) to f) with the receiver operating on an ARFCN in the Low ARFCN. h) The SS repeats steps a) to f) with the receiver operating on an ARFCN in the High ARFCN range. i) The SS repeats steps a) to f) for each of the coding schemes MCS-5,6,7 and 8 with the receiver operating on an ARFCN in the Middle ARFCN range. j) The SS repeats steps a) to h) under extreme test conditions for MCS-9 only. k) The SS establishes the normal test conditions. An uplink TBF shall be established. l) The SS sets the value of the USF/MCS-9 such as to allocate the uplink to the MS. m) The first interfering signal is on a frequency equal to the centre frequency of an ARFCN four above the ARFCN of the wanted signal. This signal is static, continuous and unmodulated. n) The second interfering signal is on an ARFCN eight above the ARFCN of the wanted signal. This signal is static, continuous and GMSK modulated by random data (I1). The amplitude of both the interfering signals is set according to table 14.18-8. o) The SS counts the number of times the USF is allocated to the MS, and the number of times the MS does not transmit while being allocated the uplink. p) Once the number of USF/MCS-9 allocating the uplink for the MS as counted in step o) reaches or exceeds the minimum number of blocks as given in table 14.18-2, the SS calculates the Block error ratio. The SS resets both counters. q) The SS repeats steps o) and p) with the two unwanted signals having frequencies corresponding to ARFCN four

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	and eight below the ARFCN of the wanted signal. r) The SS repeats steps l) to q) with the receiver operating on an ARFCN in the Low ARFCN s) The SS repeats steps l) to q) with the receiver operating on an ARFCN in the High ARFCN range. t) The SS repeats steps l) to s) under extreme test conditions for MCS-9 only. **Table 14.18-8: Intermodulation interfering test signal levels**
Test Instrument:	Refer to Item 3.3
Test Result:	PASS

Table 14.18-8: Intermodulation interfering test signal levels

	GSM 400, GSM 700, T-GSM 810, GSM 850 and GSM 900		**DCS 1 800**	
	Small MS	**Other MS**	**Class 1 and 2**	**Class 3**
FIRST INTERFERER dB Vemf( )	64	74	64	68
SECOND INTERFERER dB Vemf( )	63	63	64	68

NOTE: Some of the levels in table 14.18-8 are different to those specified in 3GPP TS 05.05 due to the consideration of the effect of modulation sideband noise from the second interferer.

5.20. AM suppression - speech channels

5.20.1. Test Specification

Test Requirement:	ETSI EN 301 511 V12.5.1 clause 4.2.35
Test Method:	ETSI EN 301 511 V12.5.1 clause 5.3.35
Limit:	The reference sensitivity performance as specified in table 1 shall be met when the following signals are simultaneously input to the receiver: - a useful signal at frequency f_0, 3 dB above the reference sensitivity level as specified in 3GPP TS 05.05 subclause 5.2. - a single frequency (f), in the relevant receive band, $\|f - f_0\| >$ 6MHz, which is an integer multiple of 200 kHz, a GSM TDMA signal modulated by any 148-bits subsequence of the 511-bits pseudo random bit sequence, defined in ITU-T Recommendation O.153 fascicle IV.4, at a level as defined in the table below. The interferer shall have one timeslot active and the frequency shall be at least 2 channels separated from any identified spurious responses. The transmitted bursts shall be synchronized to but, delayed in time between 61 and 86 bit periods relative to the bursts of the wanted signal. 3GPP TS 05.05, subclause 5.2. **MS type** / **Signal level**: GSM 400: -31 dBm GSM 700: -31 dBm GSM 850: -31 dBm GSM 900: -31 dBm GSM 1800: -29/-31 dBm(note) GSM 1900: -31 dBm NOTE: The –31 dBm level shall apply to DCS 1 800 class 1 and class 2 MS meeting the –102 dBm reference sensitivity level requirement according to 3GPP TS 05.05, subclause 6.2. 3GPP TS 45.05 subclause 2: For T-GSM 810 the requirements for GSM 900 shall apply, apart for those parameters for which a separate requirement exists.
Test Procedure:	a) The SS produces a static wanted signal with an amplitude 4 dB above reference sensitivity level. b) The SS produces an interfering signal as described below: - static fading profile; - at an in band frequency greater than 6 MHz separated from FR and separated by at least two ARFCNs from any spurious responses. *NOTE: Spurious responses are identified by test cases 14.7.1 and 14.7.2.* - at a level as described in table 14-32. - GSM TDMA modulated by random data with one timeslot active. - synchronized to, but delayed between 61 and 86 bit periods to the bursts of the wanted signal.

	Table 14-32: Interferer signal level <table><tr><th>MS type</th><th>Signal level (dB Vemf)</th></tr><tr><td>GSM 400</td><td>82</td></tr><tr><td>GSM 700</td><td>82</td></tr><tr><td>T-GSM 810</td><td>82</td></tr><tr><td>GSM 850</td><td>82</td></tr><tr><td>GSM 900</td><td>82</td></tr><tr><td>GSM 1800</td><td>82/84</td></tr><tr><td>GSM 1900</td><td>82</td></tr><tr><td colspan="2">NOTE: The 82 dBμVemf (i.e. -31 dBm) level shall apply to DCS 1 800 class 1 and class 2 MS meeting the -102 dBm reference sensitivity level requirement according to 3GPP TS 05.05, subclause 6.2.</td></tr></table>c) The SS compares the data of the signal that it sends to the MS with the signal which is looped back from the receiver after demodulation and decoding, and checks the frame erasure indication. d) The SS tests the RBER compliance of class II bits by examining at least the minimum number of samples of consecutive bits. Bits only taken from those frames which do not signal frame erasure. The number of error events is recorded.
Test Instrument:	Refer to Item 3.3
Test Result:	PASS

5.21. AM suppression - packet channels

5.21.1. Test Specification

Test Requirement:	ETSI EN 301 511 V12.5.1 clause 4.2.37
Test Method:	ETSI EN 301 511 V12.5.1 clause 5.3.37
Limit:	The reference sensitivity performance as specified in tables 1, 1a, 1c and 1e, adjusted by the correction factors of table 6.2-4, shall be met when the following signals are simultaneously input to the receiver. - A useful signal, modulated with the relevant supported modulation (GMSK or 8-PSK) and symbol rate, at frequency f_o, 3 dB above the reference sensitivity level or input level for reference performance, whichever applicable, as specified in sub clause 6.2 - A single frequency (f), in the relevant receive band, |f - f0| > 6MHz, which is an integer multiple of 200 kHz, a GSM TDMA signal modulated by any 148-bits subsequence of the 511-bits pseudo random bit sequence, defined in ITU-T Recommendation O.153 fascicle IV.4, at a level as defined in the table below. The interferer shall have one timeslot active and the frequency shall be at least 2 channels separated from any identified spurious responses. The transmitted bursts shall be synchronized to but, delayed in time between 61 and 86 bit periods relative to the bursts of the wanted signal. **MS type** / **Signal level**: GSM 400 / -31 dBm GSM 700 / -31 dBm GSM 850 / -31 dBm GSM 900 / -31 dBm GSM 1800 / -29/-31 dBm(note) GSM 1900 / -31 dBm NOTE: The –31 dBm level shall apply to DCS 1 800 class 1 and class 2 MS meeting the –102 dBm reference sensitivity level requirement according to 3GPP TS 45.005, subclause 6.2. 3GPP TS 45.005, subclause 5.2 The block error rate (BLER) performance for PDTCH/MCS5 to 9 shall not exceed 10 % or 30 % depending on Coding Schemes. The block error rate (BLER) performance for USF/MCS5 shall not exceed 1 %. For T-GSM 810 the requirements for GSM 900 shall apply, apart for those parameters for which a separate requirement exists. 3GPP TS 45.005 subclause 6.2
Test Procedure:	a) The SS produces a static wanted signal with an amplitude 4 dB above reference sensitivity level according 3GPP 45.005 table 1c. b) The SS produces an interfering signal as described below: - static fading profile;

	- at an in band frequency greater than 6 MHz separated from FR and separated by at least two ARFCNs from any spurious responses. *NOTE: Spurious responses are identified by test case 14.18.5.* - at a level as described in table 14.8.3-1. - GSM TDMA modulated by random data with one timeslot active. - synchronized to, but delayed between 61 and 86 bit periods to the bursts of the wanted signal. **Table 14.8.3-1: Interferer signal level** **MS type** / **Signal level (dB Vemf)** GSM 400 / 82 GSM 700 / 82 T-GSM 810 / 82 GSM 850 / 82 GSM 900 / 82 GSM 1800 / 82/84 GSM 1900 / 82 NOTE: The 82 dBµVemf (i.e. -31 dBm) level shall apply to DCS 1 800 class 1 and class 2 MS meeting the -102 dBm reference sensitivity level requirement according to 3GPP TS 05.05, subclause 6.2. c) The SS counts the number of blocks transmitted with current coding scheme and the number of these blocks not acknowledged based on the content of the Ack/Nack Description information element (see 04.60, 12.3) in the Packet Downlink Ack/Nack as sent from the MS to the SS on the PACCH. d) The SS sets the value of the USF/MCS-5 according 3GPP 45.005 table 1c. e) The SS counts the number of times the USF is allocated to the MS, and the number of times the MS does not transmit while being allocated the uplink. *NOTE: Due to the error rates related to the USF, the MS is likely to occasionally miss its USF for transmitting the Packet Downlink Ack/Nack. As this requirement is not verified in this part of the test, the SS then again assigns uplink resources so the MS can sent this message.*
Test Instrument:	Refer to Item 3.3
Test Result:	PASS

5.22. Adjacent channel rejection - speech channels (TCH/FS)

5.22.1. Test Specification

Test Requirement:	ETSI EN 301 511 V12.5.1 clause 4.2.38
Test Method:	ETSI EN 301 511 V12.5.1 clause 5.3.38
Limit:	1. With adjacent channel interference at 200 kHz above and below the wanted signal and signal level 9 dB above the wanted signal level: 1.1 For a TUhigh faded wanted signal and a TUhigh adjacent channel interferer, the FER for TCH/FS shall be within the requirements of table 2 in 3GPP TS 05.05 subclause 6.3. 1.2 For a TUhigh faded wanted signal and a TUhigh adjacent channel interferer, the Class Ib RBER shall be within the requirements of table 2 in 3GPP TS 05.05 subclause 6.3. 1.3 For a TUhigh faded wanted signal and a TUhigh adjacent channel interferer, the Class II RBER shall be within the requirements of table 2 in 3GPP TS 05.05 subclause 6.3. 1.4 For a TUhigh faded wanted signal and a TUhigh adjacent channel interferer, the Class II RBER shall be within the requirements of table 2 in 3GPP TS 05.05 under extreme test conditions; 3GPP TS 05.05 subclause 6.3 and annex D subclauses D.2.1 and D.2.2. 2. For adjacent channel interference at 400 kHz above and below the wanted signal frequency and signal level 41dB above the wanted signal level: 2.1 For a TUhigh faded wanted signal and a TUhigh adjacent channel interferer, the FER for TCH/FS shall be within the requirements of table 2 in 3GPP TS 05.05 subclause 6.3. 2.2 For a TUhigh faded wanted signal and a TUhigh adjacent channel interferer, the Class Ib RBER shall be within the requirements of table 2 in 3GPP TS 05.05 subclause 6.3. 2.3 For a TUhigh faded wanted signal and a TUhigh adjacent channel interferer, the Class II RBER shall be within the requirements of table 2 in 3GPP TS 05.05 subclause 6.3. 2.4 For a TUhigh faded wanted signal and a TUhigh adjacent channel interferer, the Class II RBER shall be within the requirements of table 2 in 3GPP TS 05.05 under extreme test conditions; 3GPP TS 05.05 subclause 6.3 and annex D subclauses D.2.1 and D.2.2. If a system simulator does not support the faded interferer, a static adjacent interferer has to be used. The following requirements apply. 2.5 For a TUhigh faded wanted signal and a static adjacent channel interferer, the FER for TCH/FS shall be better than: GSM 400, GSM 700, GSM 850 and GSM 900: 10,2*α %; 3GPP TS 05.05, subclause 6.3; DCS 1 800 and PCS 1 900: 5,1*α %; 3GPP TS 05.05, subclause 6.3.

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	2.6 For a TUhigh faded wanted signal and a static adjacent channel interferer, the Class Ib RBER shall be better than: GSM 400, GSM 700, GSM 850 and GSM 900: 0,72/α %; 3GPP TS 05.05, subclause 6.3; DCS 1 800 and PCS 1 900: 0,45/α %; 3GPP TS 05.05, subclause 6.3. 2.7 For a TUhigh faded wanted signal and a static adjacent channel interferer, the Class II RBER shall be better than: GSM 400, GSM 700, GSM 850 and GSM 900: 8,8 %; 3GPP TS 05.05, subclause 6.3; DCS 1 800 and PCS 1 900: 8,9 %; 3GPP TS 05.05, subclause 6.3. 2.8 For a TUhigh faded wanted signal and a static adjacent channel interferer, the Class II RBER shall be better than: GSM 400, GSM 700, GSM 850 and GSM 900: 8,8 %; DCS 1 800 and PCS 1 900: 8,9 %. under extreme test conditions; 3GPP TS 05.05, subclause 6.3, annex D subclauses D.2.1 and D.2.2. 3GPP TS 45.05 subclause 2: For T-GSM 810 the requirements for GSM 900 shall apply, apart for those parameters for which a separate requirement exists.
Test Procedure:	a) In addition to the wanted signal, the SS transmits an independent, uncorrelated interfering signal, Standard Test Signal I1 (unwanted signal). The unwanted signal is continuous and has no fixed relationship with the bit transitions of the wanted signal. The fading characteristic of the wanted and the unwanted signal is set to TUhigh. The unwanted signal is transmitted at a nominal frequency 200 kHz above the nominal frequency of the wanted signal. Its amplitude is set to 9dB above that of the wanted signal. b) The SS compares the data of the signal that it sends to the MS with the signal which is looped back from the receiver after demodulation and decoding, and checks the frame erasure indication. c) The SS tests the frame erasure compliance for the TCH/FS by examining at least the minimum number of samples of consecutive frames. The number of frame erasure events is recorded. d) The SS determines the number of residual bit error events for the bits of the class Ib and class II, by examining sequences of at least the minimum number of samples of consecutive bits of class Ib and class II, Bits are only taken from those frames for which no bad frame indication was given. e) The measurement of steps c) and d) is repeated with the unwanted signal on a frequency at the same displacement from, but below, the frequency of the wanted signal. f) The measurement of steps c) to e) shall be repeated for a displacement of the unwanted signal of 400 kHz, and with the

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	amplitude of the unwanted signal 41 dB above the level of the wanted input signal, The fading characteristic of the wanted and the unwanted signal is set to TUhigh. If a system simulator does not support the faded interferer, a static adjacent interferer may be used. g) Steps c) to f) are repeated for class II BER under extreme test conditions.
Test Instrument:	Refer to Item 3.3
Test Result:	PASS

5.23. Adjacent channel rejection - EGPRS

5.23.1. Test Specification

Test Requirement:	ETSI EN 301 511 V12.5.1 clause 4.2.40
Test Method:	ETSI EN 301 511 V12.5.1 clause 5.3.40

Limit:

1. For GMSK modulation, under adjacent channel interference at 200 kHz above and below the wanted signal frequency and at the adjacent interference ratio (C/Ia1) exceeding C/Ic - 18dB where C/Ic is the co-channel interference ratio specified in table 14.18-5a for PDTCH and table 14.18-6a for USF channels.

1.1 For a TUhigh faded wanted signal and a TUhigh adjacent channel interferer, The block error rate (BLER) performance for PDTCH/MCS-1 to 4 shall not exceed 10 %; 3GPP TS 05.05, subclause 6.2.

1.2 For a TUhigh faded wanted signal and a TUhigh adjacent channel interferer, The block error rate (BLER) performance for USF/MSC-1 to 4 shall not exceed 1 %; 3GPP TS 05.05, subclause 6.2.

For 8-PSK modulation, under adjacent channel interference at 200 kHz above and below the wanted signal frequency and at the adjacent interference ratio (C/Ia1) specified in table 14.18-7a.

1.3 For a TUhigh faded wanted signal and a TUhigh adjacent channel interferer, The block error rate (BLER) performance for PDTCH/MCS-5 to 9 shall not exceed 10 % or 30 % depending on Coding Scheme; GPP TS 05.05, subclause 6.2.

1.4 For a TUhigh faded wanted signal and a TUhigh adjacent channel interferer, The block error rate (BLER) performance for USF/MSC-5 to 9 shall not exceed 1 %; 3GPP TS 05.05, subclause 6.2.

Table 14.18-7a: Adjacent channel interference ratio for MS at reference performance for 8-PSK modulation

GSM 400, GSM 700, GSM 850 and GSM 900						
Type of channel		Propagation conditions				
		TUlow (no FH)	TUlow (ideal FH)	TUhigh (no FH)	TUhigh (ideal FH)	RA (no FH)
PDTCH/MCS-5	dB	2.5	-2	-1	-2	1
PDTCH/MCS-6	dB	5.5	0.5	2	1	6.5
PDTCH/MCS-7	dB	10.5	8	10	9	(note 1)
PDTCH/MCS-8	dB	15.5	9 (note 2)	11(note 2)	10.5(note 2)	(note 1)
PDTCH/MCS-9	dB	10(note 2)	12.5(note 2)	17(note 2)	15.5(note 2)	(note 1)
USF/MCS-5 to 9	dB	-1	-8.5	-8	-9.5	-9
DCS 1 800 and PCS 1 900						
Type of channel		Propagation conditions				
		TUlow (no FH)	TUlow (ideal FH)	TUhigh (no FH)	TUhigh (ideal FH)	RA (no FH)
PDTCH/MCS-5	dB	2.5	-2	-2	-1.5	1
PDTCH/MCS-6	dB	5.5	0.5	1.5	1.5	6.5
PDTCH/MCS-7	dB	10.5	8	12.5	12	(note 1)
PDTCH/MCS-8	dB	15.5	9 (note 2)	16(note 2)	15.5(note 2)	(note 1)

	PDTCH/MCS-9	dB	10(note 2)	12.5(note 2)	(note 1)	(note 1)	(note 1)
	USF/MCS-5 to 9	dB	-1	-8.5	-9	-9.5	-9
	NOTE1: PDTCH for MCS-x can not meet the reference performance for some propagation conditions. NOTE 2: Performance is specified at 30% BLER for some cases.						
	3GPP TS 05.05, table 2g and subclause 6.3. 2 For both GMSK and 8-PSK modulations, under adjacent channel interference conditions with interfering signals at 400 kHz above and below the wanted signal frequency and at the adjacent interference ratio (C/Ia2) exceeding C/Ic -50dB. 2.1 For a TUhigh faded wanted signal and a TUhigh adjacent channel interferer, The block error rate (BLER) performance for PDTCH/MCS-1 to 4 shall not exceed 10 % for GMSK modulation; and for PDTCH/MCS-5 to 9 shall not exceed 10 % or 30 % depending on Coding Schemes; 3GPP TS 05.05, subclause 6.2. 2.2 For a TUhigh faded wanted signal and a TUhigh adjacent channel interferer, The block error rate (BLER) performance for USF/MSC-1 to 9 shall not exceed 1 %; 3GPP TS 05.05, subclause 6.2. C/Ic is the co-channel interference ratio. For a PDTCH with GMSK modulation C/Ic is specified in table 14.18-5a; for a PDTCH with 8-PSK modulation C/Ic is specified in table 14.18-5b, for a USF with GMSK modulation C/Ic is specified in tables 14.18-6a; and for USF with 8-PSK modulation C/Ic is specified in table 14.18-6b. 3GPP TS 05.05, subclause 6.3. 3. The BLER shall not exceed the conformance requirements given in 1. and 2. under extreme conditions; 3GPP TS 05.05, subclause 6.2 and annex D subclauses D.2.1 and D.2.2. 3GPP TS 45.05 subclause 2: For T-GSM 810 the requirements for GSM 900 shall apply, apart for those parameters for which a separate requirement exists.						
Test Procedure:	For GMSK Modulation: a) The SS transmits packets on PDTCH using MCS-1 coding to the MS on all allocated timeslots. b) The SS transmits the unwanted signal at a nominal frequency 200kHz above the nominal frequency of the wanted signal. Its amplitude is set to achieve the adjacent interference ratio 1dB above that specified in the conformance requirements. c) The SS counts the number of blocks transmitted with current coding scheme and the number of these blocks not acknowledged based on the content of the Ack/Nack Description information element (see 3GPP TS 04.60, subclause 12.3) in the Packet Downlink Ack/Nack as sent from the MS to the SS on the PACCH. ***NOTE 1:*** *Due to the error rates related to the USF, the MS is likely to occasionally miss its USF for transmitting the Packet Downlink Ack/Nack. As this requirement is*						

	not verified in this part of the test, the SS then again assigns uplink resources so the MS can send this message. d) Once the number of blocks transmitted with the current coding scheme as counted in step c) reaches or exceeds the minimum number of blocks as given in table 14-18-2, the SS calculates the Block error ratio. The SS resets both counters. e) The SS repeats steps c) and d) with the unwanted signal transmitted at a nominal frequency 200 kHz below the nominal frequency of the wanted signal and its amplitude is set to achieve the adjacent interference ratio 1dB above that specified in the conformance requirements. f) The SS repeats steps c) and d) with the unwanted signal transmitted at a nominal frequency 400 kHz above the nominal frequency of the wanted signal and its amplitude is set to achieve the adjacent interference ratio 1dB above that specified in the conformance requirements. g) The SS repeats steps c) and d) with the unwanted signal transmitted at a nominal frequency 400 kHz below the nominal frequency of the wanted signal and its amplitude is set to achieve the adjacent interference ratio 1dB above that specified in the conformance requirements. h) The SS repeats steps b) to g) for each of the coding schemes MCS-2 to 4. i) The SS repeats steps a) to g) under extreme test conditions for MCS-4 coding scheme only. j) The SS establishes the normal test conditions. An uplink TBF shall be established. k) The SS sets the value of the USF/MCS-1 such as to allocate the uplink to the MS. l) The SS transmits the unwanted signal at a nominal frequency 200 kHz above the nominal frequency of the wanted signal. Its amplitude is set to achieve the adjacent interference ratio 1dB above that specified in the conformance requirements. m) The SS counts the number of times the USF is allocated to the MS, and the number of times the MS does not transmit while being allocated the uplink. n) Once the number of USF/MCS-1 allocating the uplink for the MS as counted in step m) reaches or exceeds the minimum number of blocks as given in table 14.18-2, the SS calculates the Block error ratio. The SS resets both counters. o) The SS repeats steps m) and n) with the unwanted signal transmitted at a nominal frequency 200 kHz below the nominal frequency of the wanted signal and its amplitude is set at to achieve the adjacent interference ratio 1dB above that specified in the conformance requirements. p) The SS repeats steps m) and n) with the unwanted signal transmitted at a nominal frequency 400 kHz above the nominal frequency of the wanted signal and its amplitude is set

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	to achieve the adjacent interference ratio 1dB above that specified in the conformance requirements. q) The SS repeats steps m) and n) with the unwanted signal transmitted at a nominal frequency 400 kHz below the nominal frequency of the wanted signal and its amplitude is set to achieve the adjacent interference ratio 1dB above that specified in the conformance requirements. r) The SS repeats steps k) to q) under extreme test conditions for coding scheme USF/MCS-4. For 8-PSK Modulation: a) The SS transmits packets on PDTCH using MCS-5 coding to the MS on all allocated timeslots. b) The SS transmits the unwanted signal at a nominal frequency 200 kHz above the nominal frequency of the wanted signal. Its amplitude is set to achieve the adjacent interference ratio 1dB above that specified in the conformance requirements. c) The SS counts the number of blocks transmitted with current coding scheme and the number of these blocks not acknowledged based on the content of the Ack/Nack Description information element (see 3GPP TS 04.60, subclause 12.3) in the Packet Downlink Ack/Nack as sent from the MS to the SS on the PACCH. *NOTE 2: Due to the error rates related to the USF, the MS is likely to occasionally miss its USF for transmitting the Packet Downlink Ack/Nack. As this requirement is not verified in this part of the test, the SS then again assigns uplink resources so the MS can send this message.* d) Once the number of blocks transmitted with the current coding scheme as counted in step c) reaches or exceeds the minimum number of blocks as given in table 14-18-2, the SS calculates the Block error ratio. The SS resets both counters. e) The SS repeats steps c) and d) with the unwanted signal transmitted at a nominal frequency 200 kHz below the nominal frequency of the wanted signal and its amplitude is set to achieve the adjacent interference ratio 1dB above that specified in the conformance requirements. f) The SS repeats steps c) and d) with the unwanted signal transmitted at a nominal frequency 400 kHz above the nominal frequency of the wanted signal and its amplitude is set to achieve the adjacent interference ratio 1dB above that specified in the conformance requirements. g) The SS repeats steps c) and d) with the unwanted signal transmitted at a nominal frequency 400 kHz below the nominal frequency of the wanted signal and its amplitude is set to achieve the adjacent interference ratio 1dB above that specified in the conformance requirements. h) The SS repeats steps b) to g) for each of the coding schemes MCS-6 to 8 and for the coding scheme MCS-9 with the TU low fading condition for both the wanted and the interfering signal.

	i) The SS repeats steps a) to h) under extreme test conditions for coding scheme MCS-9 only. j) The SS establishes the normal test conditions. An uplink TBF shall be established. k) The SS sets the value of the USF/MCS-5 such as to allocate the uplink to the MS. l) The SS transmits the unwanted signal at a nominal frequency 200 kHz above the nominal frequency of the wanted signal. Its amplitude is set to achieve the adjacent interference ratio 1dB above that specified in the conformance requirements. m) The SS counts the number of times the USF is allocated to the MS, and the number of times the MS does not transmit while being allocated the uplink. n) Once the number of USF/MCS-5 allocating the uplink for the MS as counted in step m) reaches or exceeds the minimum number of blocks as given in table 14-18-2, the SS calculates the Block error ratio. The SS resets both counters. o) The SS repeats steps m) and n) with the unwanted signal transmitted at a nominal frequency 200 kHz below the nominal frequency of the wanted signal and its amplitude is set to achieve the adjacent interference ratio 1dB above that specified in the conformance requirements. p) The SS repeats steps m) and n) with the unwanted signal transmitted at a nominal frequency 400 kHz above the nominal frequency of the wanted signal and its amplitude is set to achieve the adjacent interference ratio 1dB above that specified in the conformance requirements. q) The SS repeats steps m) and n) with the unwanted signal transmitted at a nominal frequency 400 kHz below the nominal frequency of the wanted signal and its amplitude is set to achieve the adjacent interference ratio 1dB above that specified in the conformance requirements. r) The SS repeats steps k) to q) under extreme test conditions for coding scheme MCS-9.
Test Instrument:	Refer to Item 3.3
Test Result:	PASS

5.24. Reference sensitivity - TCH/FS

5.24.1. Test Specification

Test Requirement:	ETSI EN 301 511 V12.5.1 clause 4.2.42
Test Method:	ETSI EN 301 511 V12.5.1 clause 5.3.42
Limit:	1. At reference sensitivity level, the TCH/FS FER shall meet the reference sensitivity performance of table 1 in 3GPP TS 05.05 subclause 6.2. 2 At reference sensitivity level, the TCH/FS class I RBER shall meet the reference sensitivity performance of table 1 in 3GPP TS 05.05 subclause 6.2. 3 At reference sensitivity level, the TCH/FS class II RBER shall meet the reference sensitivity, performance of table 1 in 3GPP TS 05.05 subclause 6.2. 4. At reference sensitivity level, the TCH/FS class II RBER shall meet the reference sensitivity, performance of table 1 in GSM under extreme conditions; 3GPP TS 05.05 subclause 6.2 and annex D subclauses D.2.1 and D.2.2.
Test Procedure:	a) The fading function is set to TUhigh. b) the SS sets the amplitude of the wanted signal to reference sensitivity level ( ). c) The SS compares the data of the signal that it sends to the MS with the signal which is looped back from the receiver after demodulation and decoding, and checks the frame erasure indication. d) The SS determines the number of residual bit error events for the bits of class II, by examining sequences of at least the minimum number of samples of consecutive bits of class II. Bits are taken only from those frames not signalled as erased. e) The SS determines the number of residual bit error events for the bits of the class Ib, by examining sequences of at least the minimum number of samples of consecutive bits of class Ib. Bits are only taken from those frames not signalled as erased. f) The SS also determines the frame erasure events by examining sequences of at least the minimum number of samples of consecutive frames and assuming a frame is received successfully, if it is not signalled as erased. g) Steps a) to d) are repeated under extreme test conditions. h) Steps a) to g) are repeated for TCH/FS with ARFCNs in the Low ARFCN range for GSM 400, GSM 700, TGSM 810, GSM 850, DCS 1800 and PCS 1 900 and ARFCN 5 for GSM 900 and the High ARFCN range. *NOTE: For GSM 900 ARFCN 5 is tested since this is the 72nd harmonic of the 13 MHz clock normally used internally in a MS.* i) Steps b) to d) are repeated with the SS fading function set in turn to RA and HT. j) Steps b) to g) are repeated, with the SS fading function set to static and the MS is commanded by the SS into hopping mode

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	using the hopping sequence defined in clause 6. The amplitude of the wanted signal is set according to step b). All the other time slots, except the active ones, are set to 20 dB above reference sensitivity level( ). This implicitly tests adjacent time slot rejection.
Test Instrument:	Refer to Item 3.3
Test Result:	PASS

5.25. Minimum Input level for Reference Performance - GPRS

5.25.1. Test Specification

Test Requirement:	ETSI EN 301 511 V12.5.1 clause 4.2.42
Test Method:	ETSI EN 301 511 V12.5.1 clause 5.3.42

Limit:

1. The block error rate (BLER) performance shall not exceed 10 % at input levels according to the table below.

Type of Channel	Propagation conditions				
	static	TUhigh (no FH)	TUhigh (ideal FH)	RA (no FH)	HT (no FH)
GSM 400, GSM 700, GSM 850 and GSM 900					
PDTCH/CS-1(dBm)	-104	-104	-104	-104	-103
PDTCH/CS-2(dBm)	-104	-100	-101	-101	-99
PDTCH/CS-3(dBm)	-104	-98	-99	-98	-96
PDTCH/CS-4(dBm)	-101	-90	-90	*	*
DCS 1 800 and PCS 1 900					
PDTCH/CS-1(dBm)	-104	-104	-104	-104	-103
PDTCH/CS-2(dBm)	-104	-100	-100	-101	-99
PDTCH/CS-3(dBm)	-104	-98	-98	-98	-94
PDTCH/CS-4(dBm)	-101	-88	-88	*	*

The input levels given in the above Table are referenced to normal GSM 900 MS, and have to be corrected by the following values for other MS:

GSM 400, GSM 700, GSM 850 and GSM 900 small MS +2 dB
DCS 1800 class 1 or 2 MS +2/+4 dB**
DCS 1800 class 3 and PCS 1 900 class 1 or 2 MS +2 dB
PCS 1 900 class 3 MS 0 dB

** For all DCS 1 800 class 1 and class 2 MS, a correction offset of +2dB shall apply for the reference sensitivity performance as specified in table 1a for the normal conditions defined in Annex D and an offset of +4 dB shall be used to determine all other MS performances.

3GPP TS 05.05, table 1a; 3GPP TS 05.05, subclause 6.2.

2 The block error rate (BLER) performance shall not exceed 1 % at input levels according to the table below.

Type of channel	Propagation conditions				
	static	TUhigh (no FH)	TUhigh (ideal FH)	RA (no FH)	HT (no FH)
GSM 400, GSM 700, GSM 850 and GSM 900					
USF/CS-1(dBm)	<-104	-101	-103	-103	-101
USF/CS-2 to 4(dBm)	<-104	-103	-104	-104	-104
DCS 1 800 and PCS 1 900					
USF/CS-1(dBm)	<-104	-103	-103	-103	-101
USF/CS-2 to 4(dBm)	<-104	-104	-104	-104	-103

The input levels given in the above Table are referenced to normal GSM 900 MS, and have to be corrected by the following values for other MS:

GSM 400, GSM 700, GSM 850 and GSM 900 small MS +2 dB
DCS 1800 class 1 or 2 MS +2/+4 dB**
DCS 1800 class 3 and PCS 1 900 class 1 or 2 MS +2 dB
PCS 1 900 class 3 MS 0 dB

	** For all DCS 1 800 class 1 and class 2 MS, a correction offset of +2dB shall apply for the reference sensitivity performance as specified in table 1a for the normal conditions defined in Annex D and an offset of +4 dB shall be used to determine all other MS performances. 3GPP TS 05.05, table 1a; 3GPP TS 05.05, subclause 6.2. 3. The BLER shall not exceed the conformance requirements given in 1. - 2. under extreme conditions; 3GPP TS 05.05, subclause 6.2 and annex D subclauses D.2.1 and D.2.2. 4. The reference sensitivity performance specified above need not be met in the following cases: for MS at the static channel, if the received level on either of the two adjacent timeslots to the wanted exceed the wanted timeslot by more than 20 dB; for MS on a multislot configuration, if the received level on any of the timeslots belonging to the same multislot configuration as the wanted time slot, exceed the wanted time slot by more than 6 dB; The interfering adjacent time slots shall be static with valid GSM signals in all cases; 3GPP TS 05.05, subclause 6.2. 5) For an MS allocated a USF on a PDCH with a random RF input or a valid PDCH signal with a random USF not equal to the allocated USF, the overall reception shall be such that the MS shall detect the allocated USF in less than 1% of the radio blocks. This requirement shall be met for all input levels up to -40 dBm. 3GPP TS 05.05, subclause 6.4 3GPP TS 45.05 subclause 2: For T-GSM 810 the requirements for GSM 900 shall apply, apart for those parameters for which a separate requirement exists.
Test Procedure:	a) The SS transmits packets under Static propagation conditions, using CS-3 coding at a level of 1 dB above the level given in conformance reference 1. Out of the 400 blocks transmitted by the SS, 20 blocks are sent with incorrect BCS, at (pseudo) random positions. The SS checks, for the blocks it transmitted with incorrect BCS, whether or not the MS Packet Downlink Ack/Nack as sent by the MS indicates these blocks as not acknowledged. b) The SS transmits packets under static conditions, with the MS commanded to hopping mode using the hopping sequence used in clause 6, and using CS-3 coding to the MS on all allocated timeslots, at a level of 1 dB above the level given in the table in conformance requirement 1. On the time slots not allocated to the MS, the SS transmits at a level of 20 dB above the level given in the table in conformance requirement 1. This implicitly tests adjacent time slot rejection. c) The SS counts the number of blocks transmitted with CS-3 and the number of these blocks not acknowledged based on

	the content of the Ack/Nack Description information element (see 3GPP TS 04.60, subclause 12.3) in the Packet Downlink Ack/Nack as sent from the MS to the SS on the PACCH. *NOTE: Due to the error rates related to the USF, the MS is likely to occasionally miss its USF for transmitting the Packet Downlink Ack/Nack. As this requirement is not verified in this part of the test, the SS then again assigns uplink resources so the MS can sent this message.* d) Once the number of blocks transmitted with CS-3 as counted in step c) reaches or exceeds the minimum number of blocks as given in table 14.16-2, the SS calculates the Block error ratio. The SS resets both counters. e) The SS repeats step b) to d) with the following four fading conditions and hopping modes: TUhigh/noFH, TUhigh/FH, HT/noFH and RA/noFH. For these tests with fading channels , the SS does not transmit on the timeslots not allocated to the MS. f) The SS repeats steps b) to d) using CS-4 coding with the following three fading conditions: Static/FH, TUhigh/noFH and TUhigh/FH. For these tests with fading channels , the SS does not transmit on the timeslots not allocated to the MS. g) The SS repeats steps b) to f) under extreme test conditions. h) This step is only performed for a multislot MS. The SS establishes the normal test conditions with the exceptions in the parameter settings of Packet Downlink Assignment message: - P0 = 14 dBm; - BTS_PWR_CTRL_MODE = Mode A; - PR_MODE = B. Furthermore, the SS has to set the PR fields in the MAC headers of each downlink RLC data block to correspond the applied downlink power level, as defined below. The SS repeats steps b) to d) with only one of the active timeslots at 1 dB above the level at which the reference sensitivity performance shall be met, and all other timeslots belonging to the same multislot configuration at a level of 6 dB above this timeslot. i) The SS establishes the normal test conditions, and sets the fading function to HT/noFH. j) The SS sets the value of the USF/CS-1 such as to allocate the uplink to the MS, transmitting at a level of 1 dB above the level given in the table in conformance requirement 2. k) The SS counts the number of times the USF is allocated to the MS, and the number of times the MS does not transmit while being allocated the uplink. l) Once the number of USF/CS-1 allocating the uplink for the MS as counted in step k) reaches or exceeds the minimum number of blocks as given in table 14.16-2, the SS calculates the Block error ratio. The SS resets both counters. m) The SS repeats steps j) to l) using USF/CS2 to 4 coding. NOTE: Since coding for USF-bits is identical for CS2 and CS3, it's not required to perform the step for both of those CS.

	n) The SS repeats steps i) to m) under extreme test conditions. o) The SS establishes normal test condition and a static channel. The SS sets the value of the USF/CS-1 to all values randomly, with the exception of the one allocated to the MS, transmitting at 3 dB below the level at which reference performance shall be met, and counts the number of times the MS transmits on the uplink. This is done for 2 000 blocks.
Test Instrument:	Refer to Item 3.3
Test Result:	PASS

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5.26. Minimum Input level for Reference Performance - EGPRS

5.26.1. Test Specification

Test Requirement:	ETSI EN 301 511 V12.5.1 clause 4.2.45
Test Method:	ETSI EN 301 511 V12.5.1 clause 5.3.45
Limit:	1. The block error rate (BLER) performance for PDTCH/MCS1 to 4 shall not exceed 10 % at input levels according to the table 14.18-3a; and for PDTCH/MCS5 to 9 shall not exceed 10 % or 30 % depending on Coding Schemes at input levels according to the table 14.18-3b.

Table 14.18-3a: PDTCH Sensitivity Input Level for GMSK modulation

Type of Channel	Propagation conditions				
	static	TUhigh (no FH)	TUhigh (ideal FH)	RA (no FH)	HT (no FH)
GSM 400, GSM 700, GSM 850 and GSM 900					
PDTCH/MCS-1(dBm)	-104	-102,5	-103	-103	-102
PDTCH/MCS-2(dBm)	-104	-100,5	-101	-100.5	-100
PDTCH/MCS-3(dBm)	-104	-96,5	-96,5	-92,5	-95,5
PDTCH/MCS-4(dBm)	-101,5	-91	-91	(note)	(note)
DCS 1 800 and PCS 1 900					
PDTCH/MCS-1(dBm)	-104	-102,5	-103	-103	-101,5
PDTCH/MCS-2(dBm)	-104	-100,5	-101	-100,5	-99,5
PDTCH/MCS-3(dBm)	-104	-96,5	-96,5	-92,5	-94,5
PDTCH/MCS-4(dBm)	-101,5	-90,5	-90,5	(note)	(note)
NOTE: PDTCH/MCS-4 can not meet the reference performance for some propagation conditions.					

The input levels given in the above Table are applicable to GSM 400, GSM 700, GSM 850, GSM 900 and PCS 1 900 MS, and have to be corrected by the following values for the following classes of MS:

GSM 400 small MS +2 dB;
GSM 700, GSM 850, GSM 900 small MS +2 dB;
DCS 1800 class 1 or 2 MS +2/+4 dB**;
DCS 1800 class 3 MS +2 dB;
PCS 1 900 class 1 or 2 MS +2 dB.

** For all DCS 1 800 class 1 and class 2 MS, a correction offset of +2dB shall apply for the reference sensitivity performance as specified in table 1a for the normal conditions defined in Annex D and an offset of +4 dB shall be used to determine all other MS performances.

3GPP TS 05.05, table 1a; 3GPP TS 05.05, subclause 6.2.

Table 14.18-3b: PDTCH Sensitivity Input Level for MS for 8-PSK modulation

GSM 400, GSM 700, GSM 850 and GSM 900					
Type of channel	Propagation conditions				
	static	TUhigh (no FH)	TUhigh (ideal FH)	RA (no FH)	HT (no FH)
PDTCH/MCS-5(dBm)	-98	-93	-94	-93	-92
PDTCH/MCS-6(dBm)	-96	-91	-91,5	-88	-89
PDTCH/MCS-7(dBm)	-93	-84	-84	(note 2)	-83 (note 3)
PDTCH/MCS-8(dBm)	-90,5	-83 (note 3)	-83 (note 3)	(note 2)	(note 2)
PDTCH/MCS-9(dBm)	-86	-78,5 (note 3)	-78,5 (note	(note 2)	(note 2)

DCS 1 800 and PCS 1 900					
Type of channel	Propagation conditions				
	static	TUhigh (no FH)	TUhigh (ideal FH)	RA (no FH)	HT (no FH)
PDTCH/MCS-5(dBm)	-98	-93,5	-93,5	-93	-89,5
PDTCH/MCS-6(dBm)	-96	-91	-91	-88	-83,5
PDTCH/MCS-7(dBm)	-93	-81,5	-80,5	(note 2)	(note 2)
PDTCH/MCS-8(dBm)	-90,5	-80 (note 3)	-80 (note 3)	(note 2)	(note 2)
PDTCH/MCS-9(dBm)	-86	(note 2)	(note 2)	(note 2)	(note 2)

NOTE 1: Ideal FH case assumes perfect decorrelation between bursts. This case may only be tested if such a decorrelation is ensured in the test. For TUhigh (ideal FH), sufficient decorrelation may be achieved with 4 frequencies spaced over 5 MHz.

NOTE 2: PDTCH for MCS-x can not meet the reference performance for some propagation conditions.

NOTE 3: Performance is specified at 30% BLER for some cases.

The input levels given in the above Table are applicable to Class 4 or Class 5 MS for GSM 400, GSM 700, GSM 850 and GSM 900 and to Class 1 or Class 2 MS for DCS 1 800 and PCS 1 900. For all other MS the input levels have to be corrected by the value of -2 dB.
3GPP TS 05.05, tables 1c; 3GPP TS 05.05, subclause 6.2
2. The block error rate (BLER) performance for USF/MCS1 to 9 shall not exceed 1 % at input levels according to the tables 14.18-4a and 14.18-4b.

Table 14.18-4a: USF Sensitivity Input Level for GMSK modulation

Type of channel	Propagation conditions				
	static	TUhigh (no FH)	TUhigh (ideal FH)	RA (no FH)	HT (no FH)
GSM 400, GSM 700, GSM 850 and GSM 900					
USF/MCS-1 to 4(dBm)	-104	-102,5	-104	-104	-102,5
DCS 1 800 and PCS 1 900					
USF/MCS-1 to 4(dBm)	-104	-104	-104	-104	-102,5

The input levels given in the above Table are applicable to GSM 400, GSM 700, GSM 850, GSM 900and PCS 1 900 MS, and have to be corrected by the following values for the following classes of MS:
GSM 400 small MS +2 dB;
GSM 700, GSM 850 and GSM 900 small MS +2 dB;
DCS 1800 class 1 or 2 MS +2/+4 dB**;
DCS 1800 class 3 MS +2 dB;
PCS 1 900 class 1 or 2 MS +2 dB.
** For all DCS 1 800 class 1 and class 2 MS, a correction offset of +2dB shall apply for the reference sensitivity performance as specified in table 1a for the normal conditions defined in Annex D and an offset of +4 dB shall be used to determine all other MS performances.
3GPP TS 05.05, table 1a; 3GPP TS 05.05, subclause 6.2.

Table 14.18-4b: USF Sensitivity Input Level for 8-PSK modulation

Type of Channel	Propagation conditions				
	static	TUhigh (no FH)	TUhigh (ideal FH)	RA (no FH)	HT (no FH)
GSM 400, GSM 700, GSM 850 and GSM 900					
USF/MCS-5 to 9dBm	-102	-97,5	-99	-100	-99
DCS 1 800 and PCS 1 900					

	USF/MCS-5 to 9dBm | -102 | -99 | -99 | -100 | -99 The input levels given in the above Table are applicable to Class 4 or Class 5 MS for GSM 400, GSM 700, GSM 850 and GSM 900 and to Class 1 or Class 2 MS for DCS 1 800 and PCS 1 900. For all other MS the input levels have to be corrected by the value of -2 dB. 3GPP TS 05.05, table 1c; 3GPP TS 05.05, subclause 6.2 3. The BLER shall not exceed the conformance requirements given in 1. and 2. under extreme conditions; 3GPP TS 05.05, subclause 6.2 and annex D subclauses D.2.1 and D.2.2. 4. The reference sensitivity performance specified above need not be met in the following cases: For MS at the static channel, if the received level on either of the two adjacent timeslots to the wanted exceed the wanted timeslot by more than 20 dB. For MS on a multislot configuration, if the received level on any of the timeslots belonging to the same multislot configuration as the wanted time slot, exceed the wanted time slot by more than 6 dB. The interfering adjacent time slots shall be static with valid GSM signals in all cases. 3GPP TS 05.05, subclause 6.2. 5. For an MS allocated a USF on a PDCH with a random RF input or a valid PDCH signal with a random USF not equal to the allocated USF, the overall reception shall be such that the MS shall detect the allocated USF in less than 1 % of the radio blocks for GMSK modulated signals and 1 % for 8-PSK modulated signals. This requirement shall be met for all input levels up to -40 dBm for GMSK modulated signals and up to -40 dBm for 8-PSK modulated signals. 3GPP TS 05.05, subclause 6.4 3GPP TS 45.05 subclause 2: For T-GSM 810 the requirements for GSM 900 shall apply, apart for those parameters for which a separate requirement exists.
Test Procedure:	For GMSK Modulation: a) The SS transmits packets under static conditions, using MCS-4 coding at a level of 1 dB above the level given in conformance reference 1. Out of the 400 blocks transmitted by the SS, 20 blocks are sent with incorrect BCS, at (pseudo) random positions. The SS checks, for the blocks it transmitted with incorrect BCS, whether or not the MS Packet Downlink Ack/Nack as sent by the MS indicates these blocks as not acknowledged. b) The SS transmits packets under static conditions, with the MS commanded to hopping mode using the hopping sequence used in clause 6, and using MCS-4 coding to the MS on all allocated timeslots, at a level of 1 dB above the level given in the table in conformance requirement 1. On the time

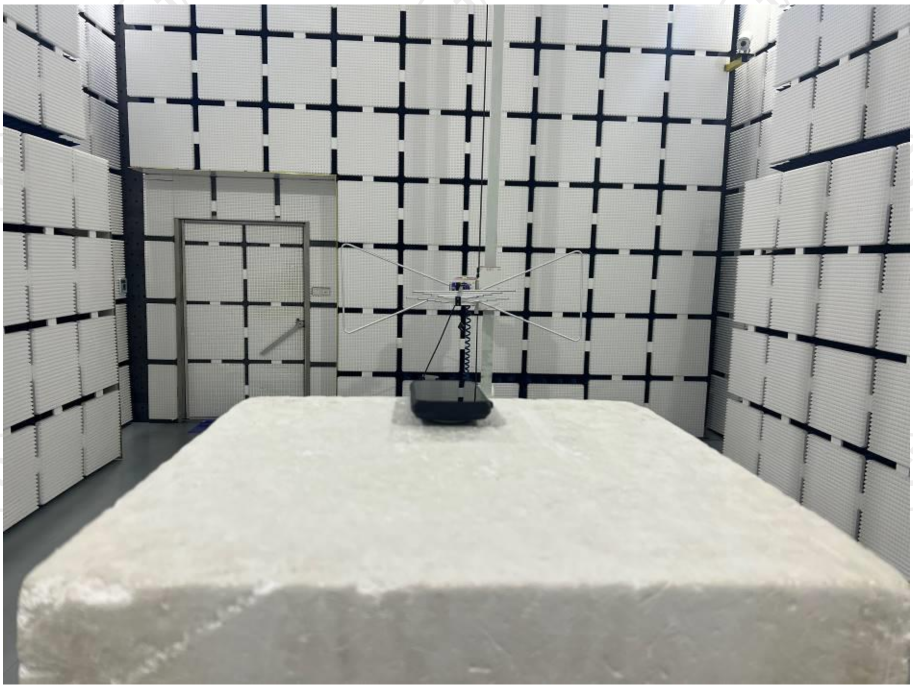
	slots not allocated to the MS, the SS transmits at a level of 20 dB above the level given in the table in conformance requirement 1. This implicitly tests adjacent time slot rejection. c) The SS counts the number of blocks transmitted with MCS-4 and the number of these blocks not acknowledged based on the content of the Ack/Nack Description information element (see 3GPP TS 04.60, subclause 12.3) in the Packet Downlink Ack/Nack as sent from the MS to the SS on the PACCH. *NOTE 5: Due to the error rates related to the USF, the MS is likely to occasionally miss its USF for transmitting the Packet Downlink Ack/Nack. As this requirement is not verified in this part of the test, the SS then again assigns uplink resources so the MS can sent this message.* d) Once the number of blocks transmitted with MCS-4 as counted in step c) reaches or exceeds the minimum number of blocks as given in table 14-18-2, the SS calculates the Block error ratio. The SS resets both counters. e) The SS repeats step b) to d) with the following two fading conditions and hopping modes: TUhigh/noFH and TUhigh/FH. For these tests with fading channels , the SS does not transmit on the timeslots not allocated to the MS. f) The SS repeats steps b) to d) using MCS-3 coding with RA/No FH, MCS-2 coding with HT/No FH and MCS-1 coding with TUhigh/No FH. For these tests, the SS does not transmit on the timeslots not allocated to the MS. g) The SS repeats steps b) to e) under extreme test conditions for MCS-4 coding only. h) This step is only performed for a multislot MS. The SS establishes the normal test conditions with the exceptions in the parameter settings of Packet Downlink Assignment message: - P0 = 14 dB; - BTS_PWR_CTRL_MODE = Mode A; - PR_MODE = B. Furthermore, the SS has to set the PR fields in the MAC headers of each downlink RLC data block to correspond the applied downlink power level, as defined below. The SS repeats steps b) to d) with only one of the active timeslots at 1 dB above the level at which the reference sensitivity performance shall be met, and all other timeslots belonging to the same multislot configuration at a level of 6 dB above this timeslot. i) The SS establishes the normal test conditions, and sets the fading function to HT/noFH. An uplink TBF shall be established. j) The SS sets the value of the USF/MCS-1 such as to allocate the uplink to the MS, transmitting at a level of 1 dB above the level given in the table in conformance requirement 2. k) The SS counts the number of times the USF is allocated to the MS, and the number of times the MS does not transmit while being allocated the uplink. l) Once the number of USF/MCS-1 allocating the uplink for the

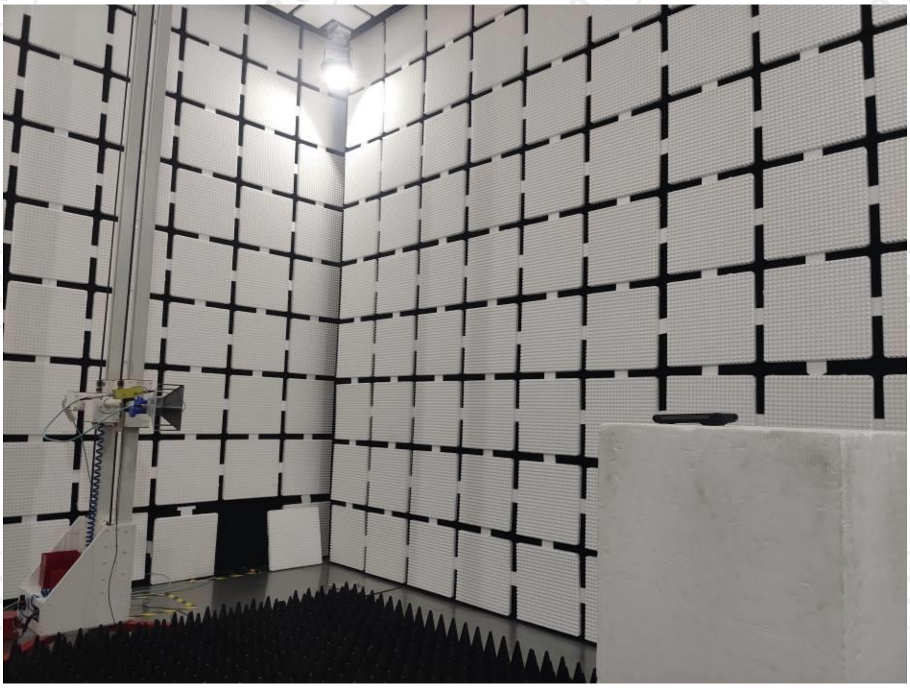
	MS as counted in step k) reaches or exceeds the minimum number of blocks as given in table 14-18-2, the SS calculates the Block error ratio. The SS resets both counters m) The SS repeats steps i) to l) under extreme test conditions using MCS-4 coding. n) The SS establishes normal test condition and a static channel. The SS sets the value of the USF/MCS-1 to all values randomly, with the exception of the one allocated to the MS, transmitting at 3 dB below the level at which reference performance shall be met, and counts the number of times the MS transmits on the uplink. This is done for 2 000 blocks. For 8-PSK Modulation: a) The SS transmits packets under static conditions, using MCS-8 coding at a level of 1 dB above the level given in conformance reference 1. Out of the 400 blocks transmitted by the SS, 20 blocks are sent with incorrect BCS, at (pseudo) random positions. The SS checks, for the blocks it transmitted with incorrect BCS, whether or not the MS Packet Downlink Ack/Nack as sent by the MS indicates these blocks as not acknowledged. b) The SS transmits packets under static conditions, with the MS commanded to hopping mode using the hopping sequence used in clause 6, and using MCS-8 coding to the MS on all allocated timeslots, at a level of 1 dB above the level given in the table in conformance requirement 1. On the time slots not allocated to the MS, the SS transmits at a level of 20 dB above the level given in the table in conformance requirement 1. This implicitly tests adjacent time slot rejection. c) The SS counts the number of blocks transmitted with MCS-8 and the number of these blocks not acknowledged based on the content of the Ack/Nack Description information element (see 3GPP TS 04.60, subclause 12.3) in the Packet Downlink Ack/Nack as sent from the MS to the SS on the PACCH. *NOTE 6: Due to the error rates related to the USF, the MS is likely to occasionally miss its USF for transmitting the Packet Downlink Ack/Nack. As this requirement is not verified in this part of the test, the SS then again assigns uplink resources so the MS can sent this message.* d) Once the number of blocks transmitted with MCS-8 as counted in step c) reaches or exceeds the minimum number of blocks as given in table 14-18-2, the SS calculates the Block error ratio. The SS resets both counters. e) The SS repeats step b) to d) with the following two fading conditions and hopping modes: TUhigh/noFH and TUhigh/FH. For these tests with fading channels, the SS does not transmit on the timeslots not allocated to the MS. f) The SS repeats steps b) to d) using MCS-9 with static condition, MCS-7 with TUhigh/FH, MSC-6 with HT/No FH and MSC-5 with RA/No FH. For these tests, the SS does not transmit on the timeslots not allocated to the MS. g) The SS repeats steps b) to e) under extreme test conditions

	for MCS-8 coding only. h) This step is only performed for a multislot MS. The SS establishes the normal test conditions with the exceptions in the parameter settings of Packet Downlink Assignment message: - P0 = 14 dB; - BTS_PWR_CTRL_MODE = Mode A; - PR_MODE = B. Furthermore, the SS has to set the PR fields in the MAC headers of each downlink RLC data block to correspond the applied downlink power level, as defined below. The SS repeats steps b) to d) with only one of the active timeslots at 1 dB above the level at which the reference sensitivity performance shall be met, and all other timeslots belonging to the same multislot configuration at a level of 6 dB above this timeslot. i) The SS establishes the normal test conditions, and sets the fading function to HT/noFH. An uplink TBF shall be established. j) The SS sets the value of the USF/MCS-5 such as to allocate the uplink to the MS, transmitting at a level of 1 dB above the level given in the table in conformance requirement 2. k) The SS counts the number of times the USF is allocated to the MS, and the number of times the MS does not transmit while being allocated the uplink. l) Once the number of USF/MCS-5 allocating the uplink for the MS as counted in step k) reaches or exceeds the minimum number of blocks as given in table 14-18-2, the SS calculates the Block error ratio. The SS resets both counters. m) The SS repeats steps j) to l) under extreme test conditions using MCS-9 coding. n) The SS establishes normal test condition and a static channel. The SS sets the value of the USF/MCS-5 to all values randomly, with the exception of the one allocated to the MS, transmitting at 3 dB below the level at which reference performance shall be met, and counts the number of times the MS transmits on the uplink. This is done for 2 000 blocks.
Test Instrument:	Refer to Item 3.3
Test Result:	PASS

6. Photographs of Test Configuration

Radiated Emission





7. Photographs of EUT

Refer to the test report No. TCT240614E023

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8. Appendix A-Test Data

A.1 Transmitter – Frequency error and phase error

E-GSM900(MS under maximum power control level)							
E-GSM900	Test Condition	Frequency Error (Hz)	Limit (Hz)	Phase Error (degree)		Limit (degree)	Result
Reference Frequency 902MHz	Normal	16	90.2	RMS	0.89	5	PASS
				Peak	1.91	20	
	LVLT	15		RMS	0.92	5	
				Peak	2.03	20	
	LVHT	16		RMS	1.04	5	
				Peak	2.11	20	
	HVLT	14		RMS	0.93	5	
				Peak	1.94	20	
	HVHT	13		RMS	0.97	5	
				Peak	2.03	20	
	Vibration	12		RMS	1.05	5	
				Peak	2.06	20	

E-GSM900(MS under minimum power control level)							
E-GSM900	Test Condition	Frequency Error (Hz)	Limit (Hz)	Phase Error (degree)		Limit (degree)	Result
Reference Frequency 902MHz	Normal	12	90.2	RMS	1.04	5	PASS
				Peak	2.01	20	
	LVLT	12		RMS	1.12	5	
				Peak	2.13	20	
	LVHT	11		RMS	1.24	5	
				Peak	2.21	20	
	HVLT	10		RMS	1.13	5	
				Peak	2.04	20	
	HVHT	11		RMS	1.17	5	
				Peak	2.13	20	
	Vibration	9		RMS	1.15	5	
				Peak	2.16	20	

DCS1800(MS under maximum power control level)							
DCS1800	Test Condition	Frequency Error (Hz)	Limit (Hz)	Phase Error (degree)		Limit (degree)	Result
Reference Frequency 1747.8 MHz	Normal	15	174.78	RMS	1.13	5	PASS
				Peak	2.11	20	
	LVLT	15		RMS	1.12	5	
				Peak	2.23	20	
	LVHT	14		RMS	1.24	5	
				Peak	2.31	20	
	HVLT	13		RMS	1.23	5	
				Peak	2.14	20	
	HVHT	14		RMS	1.27	5	
				Peak	2.23	20	
	Vibration	12		RMS	1.25	5	
				Peak	2.26	20	

DCS1800(MS under minimum power control level)							
DCS1800	Test Condition	Frequency Error (Hz)	Limit (Hz)	Phase Error (degree)		Limit (degree)	Result
Reference Frequency 1747.8 MHz	Normal	13	174.78	RMS	1.57	5	PASS
				Peak	2.61	20	
	LVLT	13		RMS	1.62	5	
				Peak	2.73	20	
	LVHT	11		RMS	1.74	5	
				Peak	2.81	20	
	HVLT	13		RMS	1.63	5	
				Peak	2.64	20	
	HVHT	11		RMS	1.67	5	
				Peak	2.73	20	
	Vibration	12		RMS	1.65	5	
				Peak	2.76	20	

A.2 Transmitter - Frequency error under multipath and interference conditions

E-GSM900(MS under maximum power control level)					
E-GSM900	Test Condition		Frequency error (Hz)	Limit (Hz)	Result
Reference Frequency 902MHz	Normal	RA250	66	±300	PASS
		HT100	70	±180	
		TU50	-32	±160	
		TU3	-27	±230	
	LVLT	RA250	61	±300	
		HT100	69	±180	
		TU50	-34	±160	
		TU3	-30	±230	
	LVHT	RA250	60	±300	
		HT100	66	±180	
		TU50	-37	±160	
		TU3	-29	±230	
	HVLT	RA250	59	±300	
		HT100	67	±180	
		TU50	-36	±160	
		TU3	-33	±230	
	HVHT	RA250	58	±300	
		HT100	65	±180	
		TU50	-33	±160	
		TU3	-31	±230	

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E-GSM900(MS under minimum power control level)					
E-GSM900	**Test Condition**		**Frequency error (Hz)**	**Limit (Hz)**	**Result**
Reference Frequency 902MHz	Normal	RA250	-38	±300	PASS
		HT100	72	±180	
		TU50	55	±160	
		TU3	-33	±230	
	LVLT	RA250	-43	±300	
		HT100	71	±180	
		TU50	53	±160	
		TU3	-36	±230	
	LVHT	RA250	-44	±300	
		HT100	68	±180	
		TU50	50	±160	
		TU3	-35	±230	
	HVLT	RA250	-45	±300	
		HT100	69	±180	
		TU50	51	±160	
		TU3	-39	±230	
	HVHT	RA250	-46	±300	
		HT100	67	±180	
		TU50	54	±160	
		TU3	-37	±230	

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DCS1800(MS under maximum power control level)					
DCS1800	Test Condition		Frequency error (Hz)	Limit (Hz)	Result
Reference Frequency 1747.8MHz	Normal	RA130	49	±400	PASS
		HT100	61	±350	
		TU50	-53	±260	
		TU1.5	-44	±320	
	LVLT	RA130	44	±400	
		HT100	60	±350	
		TU50	-55	±260	
		TU1.5	-47	±320	
	LVHT	RA130	43	±400	
		HT100	57	±350	
		TU50	-58	±260	
		TU1.5	-46	±320	
	HVLT	RA130	42	±400	
		HT100	58	±350	
		TU50	-57	±260	
		TU1.5	-50	±320	
	HVHT	RA130	41	±400	
		HT100	56	±350	
		TU50	-54	±260	
		TU1.5	-48	±320	

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DCS1800(MS under minimum power control level)					
DCS1800	Test Condition		Frequency error (Hz)	Limit (Hz)	Result
Reference Frequency 1747.8MHz	Normal	RA130	-81	±400	PASS
		HT100	74	±350	
		TU50	45	±260	
		TU1.5	-60	±320	
	LVLT	RA130	-86	±400	
		HT100	73	±350	
		TU50	43	±260	
		TU1.5	-63	±320	
	LVHT	RA130	-87	±400	
		HT100	70	±350	
		TU50	40	±260	
		TU1.5	-62	±320	
	HVLT	RA130	-88	±400	
		HT100	71	±350	
		TU50	41	±260	
		TU1.5	-66	±320	
	HVHT	RA130	-89	±400	
		HT100	69	±350	
		TU50	44	±260	
		TU1.5	-64	±320	

A.3 Frequency error and phase error in GPRS multislot configuration

GPRS900(MS under maximum power control level)							
GPRS900	Test Condition	Frequency Error (Hz)	Limit (Hz)	Phase Error (degree)		Limit (degree)	Result
Reference Frequency 902MHz	Normal	14	90.2	RMS	1.02	5	PASS
				Peak	2.01	20	
	LVLT	12		RMS	1.02	5	
				Peak	2.13	20	
	LVHT	14		RMS	1.14	5	
				Peak	2.21	20	
	HVLT	12		RMS	1.03	5	
				Peak	2.04	20	
	HVHT	14		RMS	1.17	5	
				Peak	2.13	20	
	Vibration	13		RMS	1.15	5	
				Peak	2.16	20	

GPRS900(MS under minimum power control level)							
GPRS900	Test Condition	Frequency Error (Hz)	Limit (Hz)	Phase Error (degree)		Limit (degree)	Result
Reference Frequency 902MHz	Normal	10	90.2	RMS	1.75	5	PASS
				Peak	2.81	20	
	LVLT	9		RMS	1.82	5	
				Peak	2.93	20	
	LVHT	10		RMS	1.94	5	
				Peak	3.01	20	
	HVLT	9		RMS	1.83	5	
				Peak	2.84	20	
	HVHT	8		RMS	1.87	5	
				Peak	2.93	20	
	Vibration	7		RMS	1.85	5	
				Peak	2.96	20	

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GPRS1800(MS under maximum power control level)							
GPRS1800	Test Condition	Frequency Error (Hz)	Limit (Hz)	Phase Error (degree)		Limit (degree)	Result
Reference Frequency 1747.8 MHz	Normal	15	174.78	RMS	1.11	5	PASS
				Peak	2.11	20	
	LVLT	14		RMS	1.12	5	
				Peak	2.23	20	
	LVHT	13		RMS	1.24	5	
				Peak	2.31	20	
	HVLT	12		RMS	1.13	5	
				Peak	2.14	20	
	HVHT	13		RMS	1.27	5	
				Peak	2.23	20	
	Vibration	11		RMS	1.25	5	
				Peak	2.26	20	

GPRS1800(MS under minimum power control level)							
GPRS1800	Test Condition	Frequency Error (Hz)	Limit (Hz)	Phase Error (degree)		Limit (degree)	Result
Reference Frequency 1747.8 MHz	Normal	12	174.78	RMS	1.63	5	PASS
				Peak	2.61	20	
	LVLT	11		RMS	1.62	5	
				Peak	2.73	20	
	LVHT	12		RMS	1.74	5	
				Peak	2.81	20	
	HVLT	10		RMS	1.73	5	
				Peak	2.64	20	
	HVHT	9		RMS	1.77	5	
				Peak	2.73	20	
	Vibration	10		RMS	1.75	5	
				Peak	2.76	20	

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A.4 Transmitter output power and burst timing

GSM900, Low Channel, F = 880.2 MHz						
Power Control Level	OUTPUT POWER (dBm)					Result
	Normal	LTLV	HTLV	LTHV	HTHV	
5	32.90	32.78	32.87	32.76	32.84	PASS
6	31.69	31.59	31.61	31.57	31.63	
7	30.56	30.43	30.50	30.41	30.47	
8	28.40	28.22	28.35	28.27	28.26	
9	26.19	26.14	26.12	26.09	26.08	
10	23.77	23.63	23.71	23.62	23.62	
11	22.33	22.17	22.23	22.22	22.28	
12	19.91	19.82	19.87	19.77	19.84	
13	17.56	17.46	17.48	17.43	17.52	
14	15.91	15.74	15.79	15.81	15.85	
15	13.70	13.54	13.60	13.62	13.58	
16	11.44	11.31	11.26	11.38	11.41	
17	9.82	9.72	9.61	9.67	9.77	
18	7.69	7.62	7.58	7.56	7.67	
19	5.58	5.46	5.52	5.48	5.55	

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GSM900, Middle Channel, F = 902 MHz						
Power Control Level	OUTPUT POWER (dBm)					Result
	Normal	LTLV	HTLV	LTHV	HTHV	
5	32.96	32.84	32.93	32.82	32.90	PASS
6	31.75	31.65	31.67	31.63	31.69	
7	30.62	30.49	30.56	30.47	30.53	
8	28.46	28.28	28.41	28.33	28.32	
9	26.25	26.20	26.18	26.15	26.14	
10	23.83	23.69	23.77	23.68	23.68	
11	22.39	22.23	22.29	22.28	22.34	
12	19.97	19.88	19.93	19.83	19.90	
13	17.62	17.52	17.54	17.49	17.58	
14	15.97	15.80	15.85	15.87	15.91	
15	13.76	13.60	13.66	13.68	13.64	
16	11.50	11.37	11.32	11.44	11.47	
17	9.88	9.78	9.67	9.73	9.83	
18	7.75	7.68	7.64	7.62	7.73	
19	5.64	5.52	5.58	5.54	5.61	

GSM900, High Channel, F = 914.8 MHz						
Power Control Level	OUTPUT POWER (dBm)					Result
	Normal	LTLV	HTLV	LTHV	HTHV	
5	32.95	32.83	32.92	32.81	32.89	PASS
6	31.74	31.64	31.66	31.62	31.68	
7	30.61	30.48	30.55	30.46	30.52	
8	28.45	28.27	28.40	28.32	28.31	
9	26.24	26.19	26.17	26.14	26.13	
10	23.82	23.68	23.76	23.67	23.67	
11	22.38	22.22	22.28	22.27	22.33	
12	19.96	19.87	19.92	19.82	19.89	
13	17.61	17.51	17.53	17.48	17.57	
14	15.96	15.79	15.84	15.86	15.90	
15	13.75	13.59	13.65	13.67	13.63	
16	11.49	11.36	11.31	11.43	11.46	
17	9.87	9.77	9.66	9.72	9.82	
18	7.74	7.67	7.63	7.61	7.72	
19	5.63	5.51	5.57	5.53	5.60	

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DCS1800, Low Channel, F = 1710.2 MHz						
Power Control Level	OUTPUT POWER (dBm)					Result
	Normal	LTLV	HTLV	LTHV	HTHV	
0	30.73	30.61	30.71	30.57	30.68	PASS
1	29.52	29.42	29.45	29.37	29.51	
2	28.39	28.27	28.31	28.29	28.35	
3	26.23	26.10	26.20	26.06	26.17	
4	24.02	23.90	23.98	23.92	24.00	
5	21.60	21.43	21.54	21.52	21.59	
6	20.16	20.11	20.07	20.04	20.11	
7	17.74	17.66	17.69	17.58	17.67	
8	15.39	15.28	15.35	15.26	15.33	
9	13.74	13.62	13.67	13.57	13.72	
10	11.53	11.40	11.50	11.45	11.52	
11	9.27	9.11	9.19	9.18	9.23	
12	7.65	7.50	7.59	7.55	7.63	
13	5.52	5.38	5.50	5.41	5.47	
14	3.41	3.31	3.37	3.28	3.40	
15	1.31	1.18	1.29	1.20	1.26	

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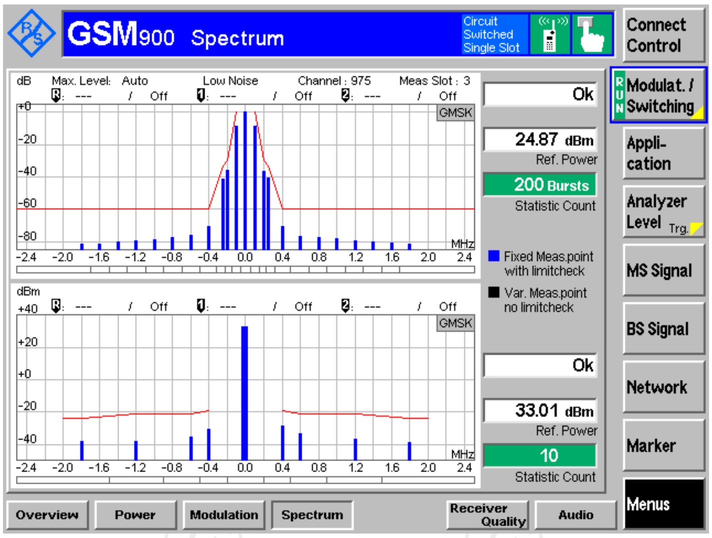
DCS1800, Middle Channel, F = 1747.8 MHz						
Power Control Level	OUTPUT POWER (dBm)					Result
	Normal	LTLV	HTLV	LTHV	HTHV	
0	30.27	30.15	30.25	30.11	30.22	PASS
1	29.06	28.96	28.99	28.91	29.05	
2	27.93	27.81	27.85	27.83	27.89	
3	25.77	25.64	25.74	25.60	25.71	
4	23.56	23.44	23.52	23.46	23.54	
5	21.14	20.97	21.08	21.06	21.13	
6	19.70	19.65	19.61	19.58	19.65	
7	17.28	17.20	17.23	17.12	17.21	
8	14.93	14.82	14.89	14.80	14.87	
9	13.28	13.16	13.21	13.11	13.26	
10	11.07	10.94	11.04	10.99	11.06	
11	8.81	8.65	8.73	8.72	8.77	
12	7.19	7.04	7.13	7.09	7.17	
13	5.06	4.92	5.04	4.95	5.01	
14	2.95	2.85	2.91	2.82	2.94	
15	0.85	0.72	0.83	0.74	0.80	

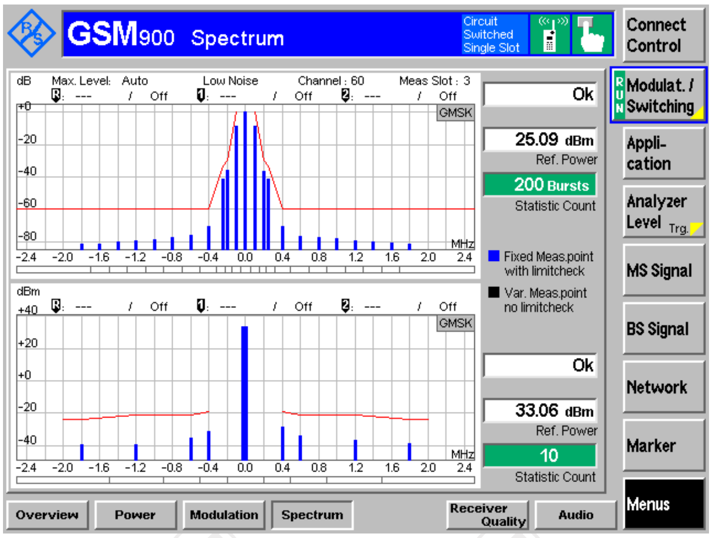
DCS1800, High Channel, F = 1784.8 MHz						
Power Control Level	OUTPUT POWER (dBm)					Result
	Normal	LTLV	HTLV	LTHV	HTHV	
0	30.05	29.90	29.98	29.99	29.95	PASS
1	29.03	28.92	28.98	28.85	28.96	
2	27.97	27.80	27.96	27.85	27.91	
3	25.76	25.71	25.67	25.65	25.73	
4	23.47	23.37	23.44	23.42	23.35	
5	21.12	20.98	21.02	21.08	21.05	
6	19.71	19.65	19.70	19.56	19.62	
7	17.23	17.14	17.19	17.11	17.22	
8	14.89	14.74	14.81	14.70	14.87	
9	13.17	12.99	13.14	13.06	13.10	
10	10.89	10.79	10.88	10.82	10.73	
11	8.68	8.61	8.66	8.53	8.57	
12	7.01	6.82	6.93	6.87	6.98	
13	4.83	4.72	4.82	4.68	4.76	
14	2.67	2.53	2.62	2.57	2.59	
15	0.48	0.36	0.42	0.31	0.47	

A.5 Transmitter - Output RF spectrum

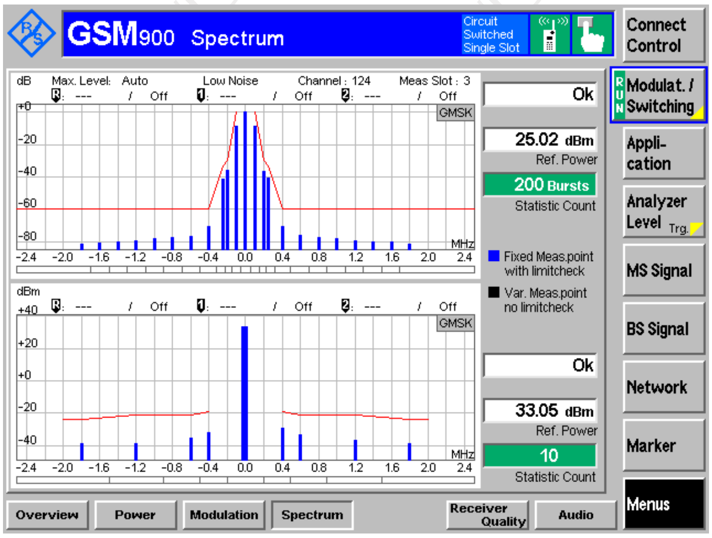
GSM900 PCL=5 Lowest channel



Middle channel

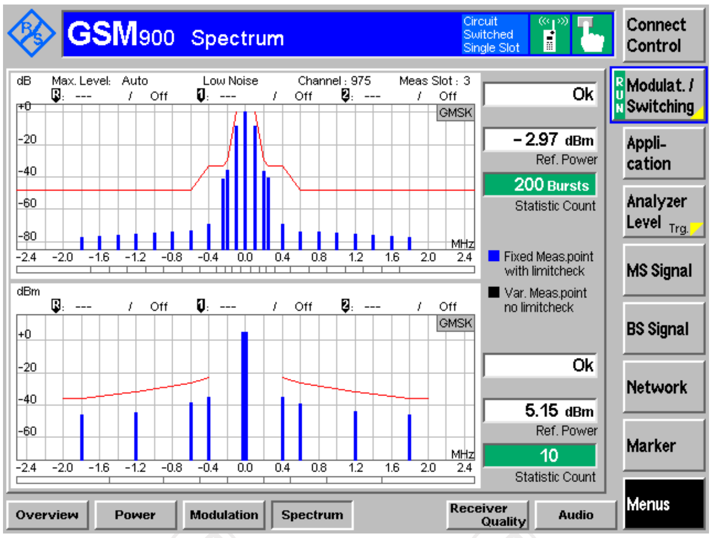


Highest channel

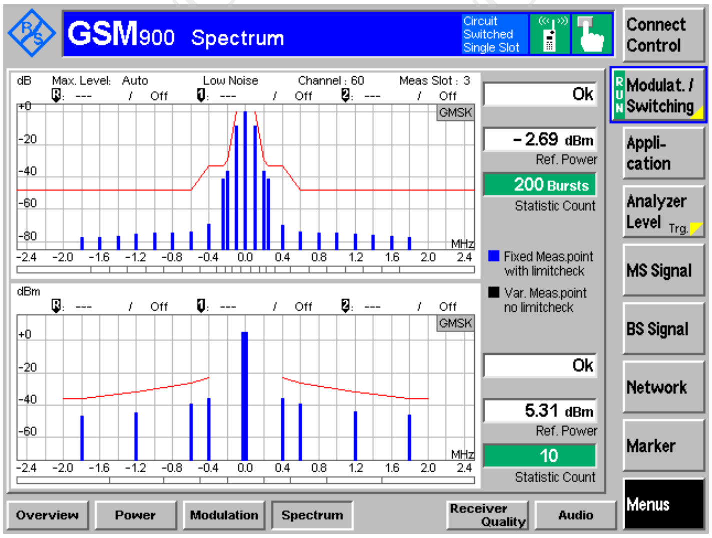


GSM900 PCL=19

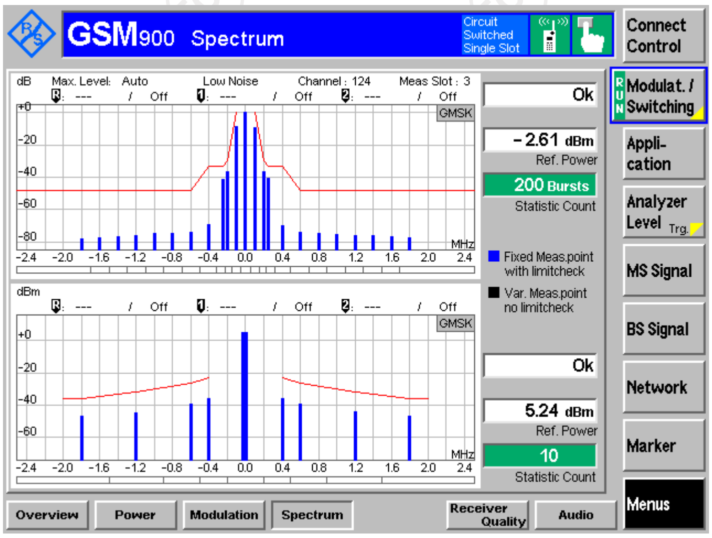
Lowest channel



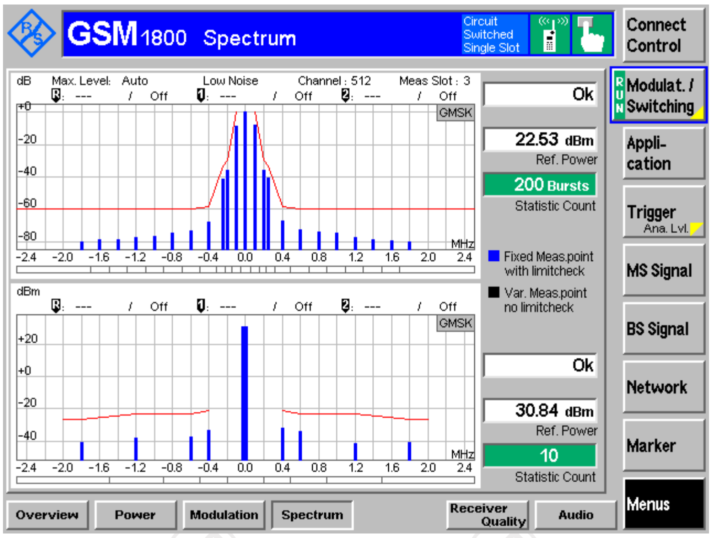
Middle channel



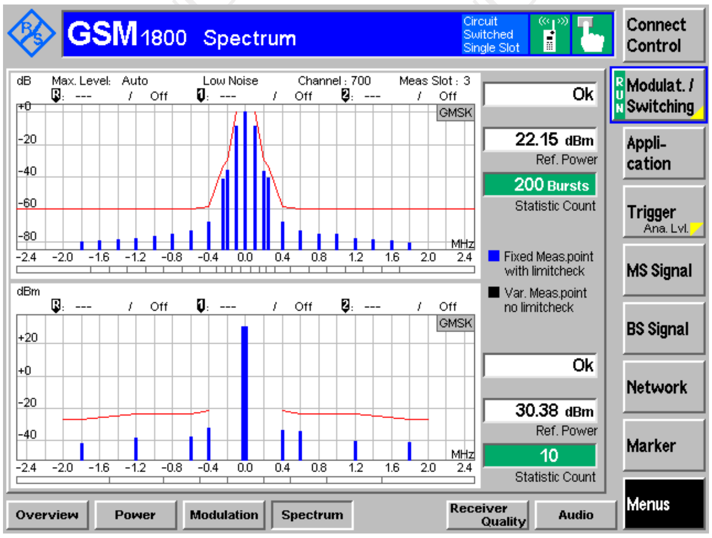
Highest channel



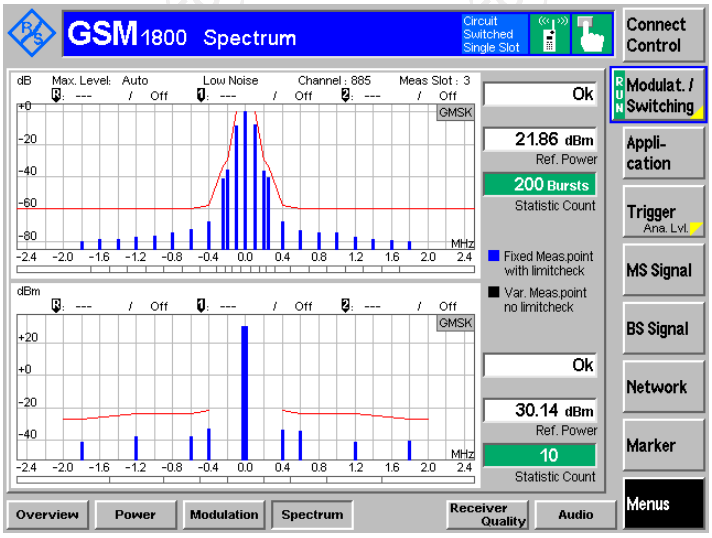
DCS1800 PCL=0 Lowest channel



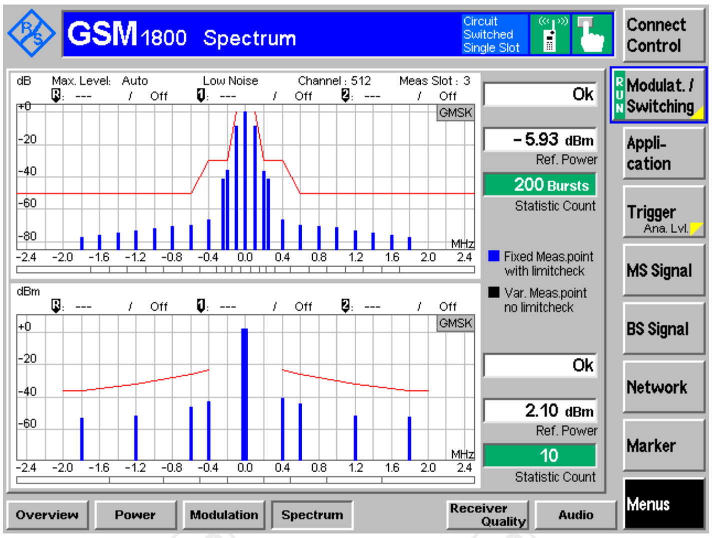
Middle channel



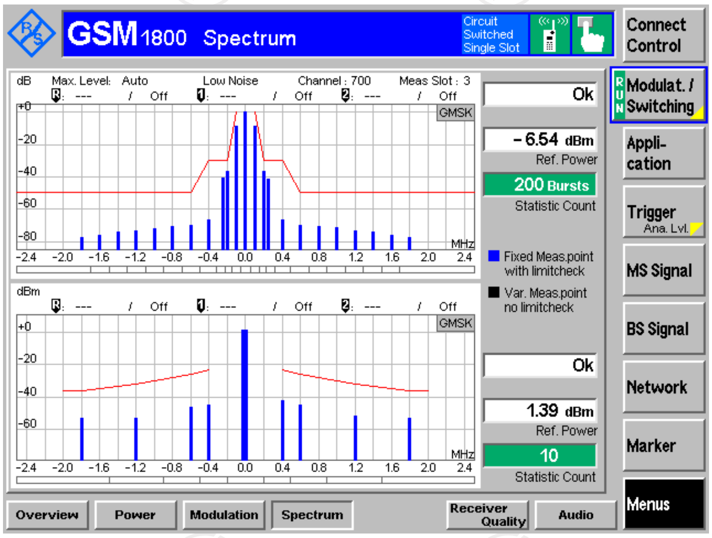
Highest channel



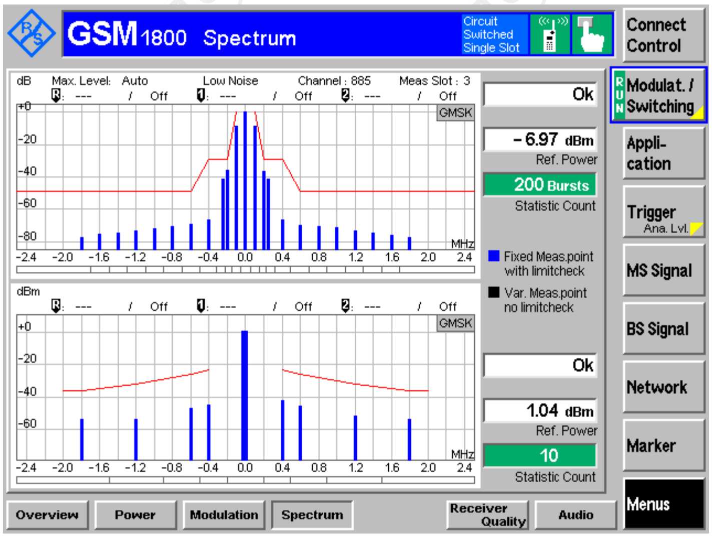
DCS1800 PCL=15 Lowest channel



Middle channel



Highest channel



A.6 Transmitter output power in GPRS multislot configuration

E-GSM900 Output Power in GPRS				
γ =	OUTPUT POWER (dBm)			Result
	Low Channel 880.2 MHz	Middle Channel 902.0 MHz	High Channel 914.8 MHz	
1 up slot				PASS
3	32.92	32.96	32.94	
4	30.71	30.59	30.69	
5	28.59	28.47	28.57	
6	26.45	26.33	26.43	
7	24.24	24.12	24.22	
8	21.86	21.74	21.84	
9	20.42	20.30	20.40	
10	18.00	17.88	17.98	
11	15.67	15.55	15.65	
12	14.02	13.90	14.00	
13	11.75	11.63	11.73	
14	9.32	9.20	9.30	
15	7.71	7.59	7.69	
16	6.57	6.45	6.55	
17	5.44	5.32	5.42	
2 up slot				
3	32.15	32.17	32.16	
17	5.45	5.33	5.43	
3 up slot				
3	30.36	30.35	30.31	
17	5.34	5.19	5.30	
4 up slot				
3	29.12	29.13	29.10	
17	5.16	5.03	5.10	

DCS1800 Output Power in GPRS				
γ =	OUTPUT POWER (dBm)			Result
	Low Channel 1710.2 MHz	Middle Channel 1747.8 MHz	High Channel 1784.8 MHz	
1 up slot				PASS
3	30.74	30.26	30.06	
4	28.53	28.41	28.51	
5	26.41	26.29	26.39	
6	24.27	24.15	24.25	
7	22.06	21.94	22.04	
8	19.68	19.56	19.66	
9	18.24	18.12	18.22	
10	15.82	15.70	15.80	
11	13.49	13.37	13.47	
12	11.84	11.72	11.82	
13	9.57	9.45	9.55	
14	7.14	7.02	7.12	
15	5.53	5.41	5.51	
16	4.39	4.27	4.37	
17	3.26	3.14	3.24	
18	2.05	1.93	2.03	
2 up slot				
3	29.93	29.35	29.13	
18	1.12	0.96	1.06	
3 up slot				
3	27.98	27.47	27.29	
18	1.02	-0.13	-0.07	
4 up slot				
3	26.94	26.31	26.22	
18	0.94	0.76	0.88	

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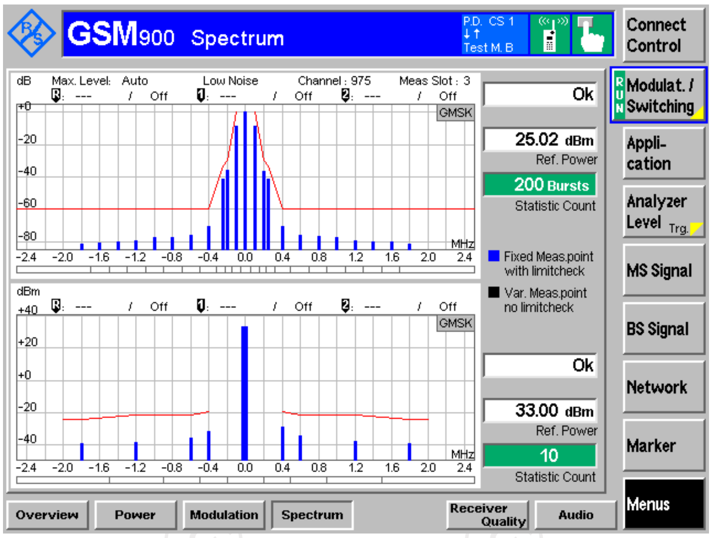
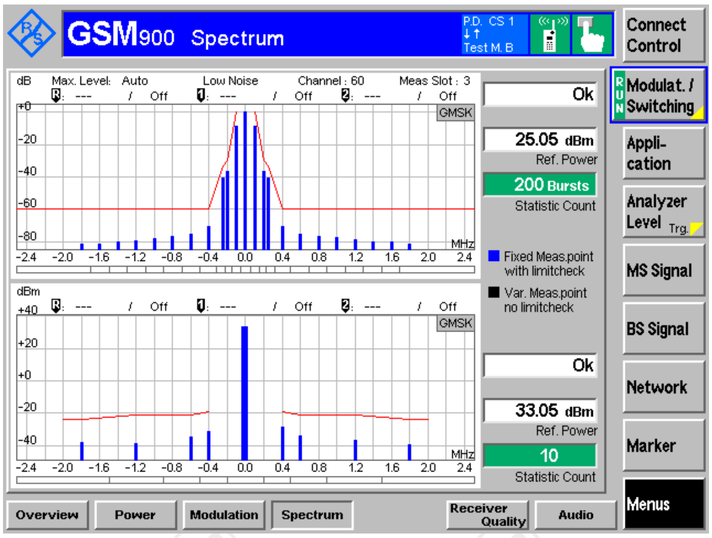
A.7 Output RF spectrum in GPRS multislot configuration

E-GSM900 Y=3

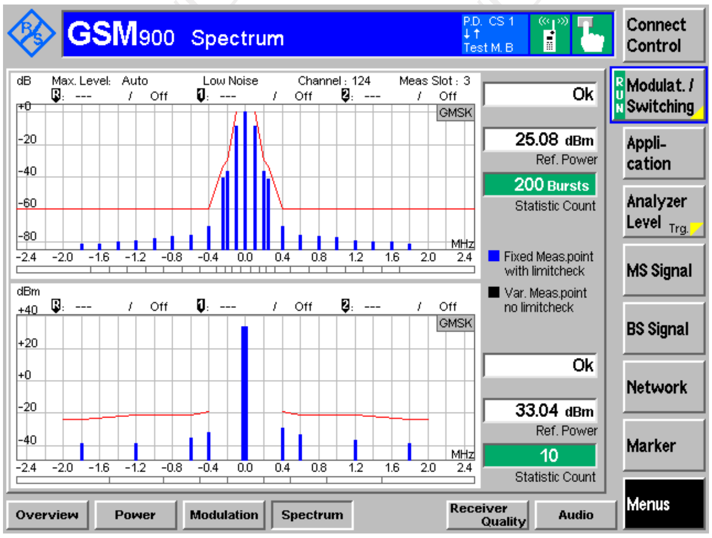
Lowest channel



Middle channel

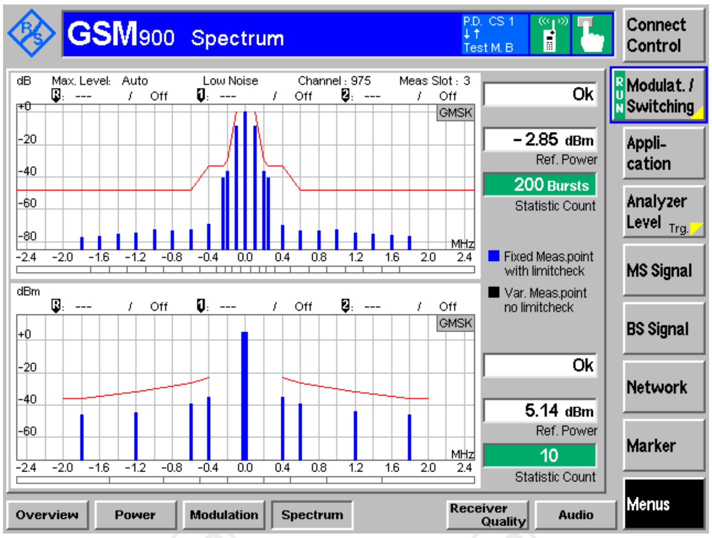


Highest channel

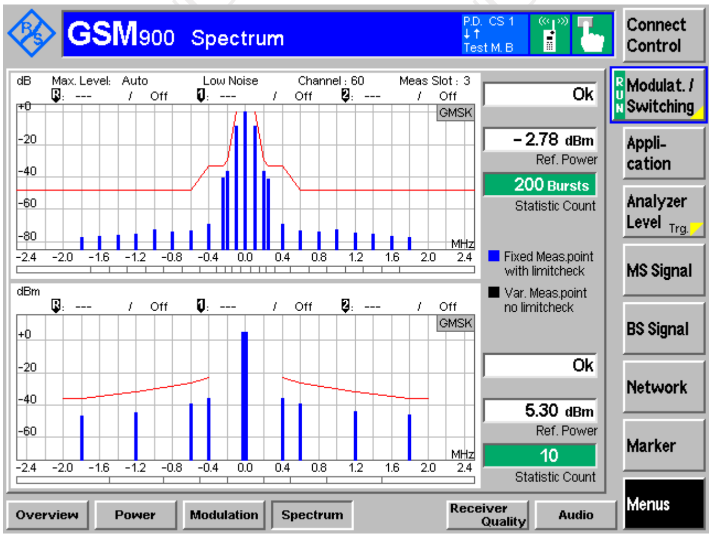


E-GSM900 Y=17

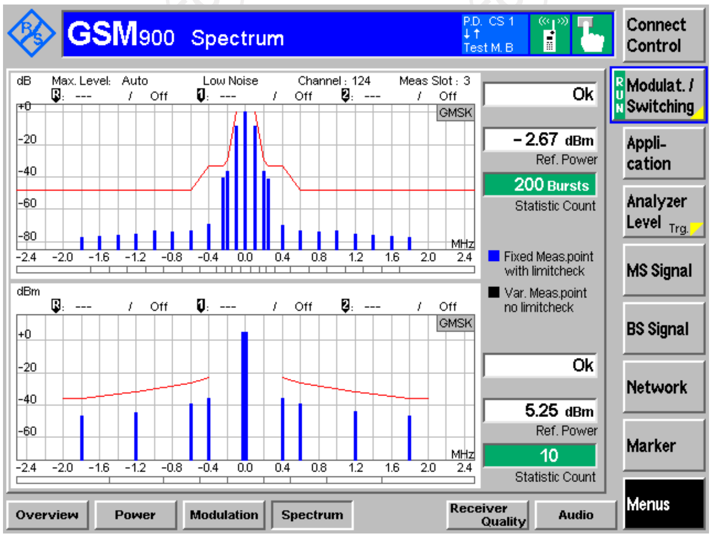
Lowest channel



Middle channel

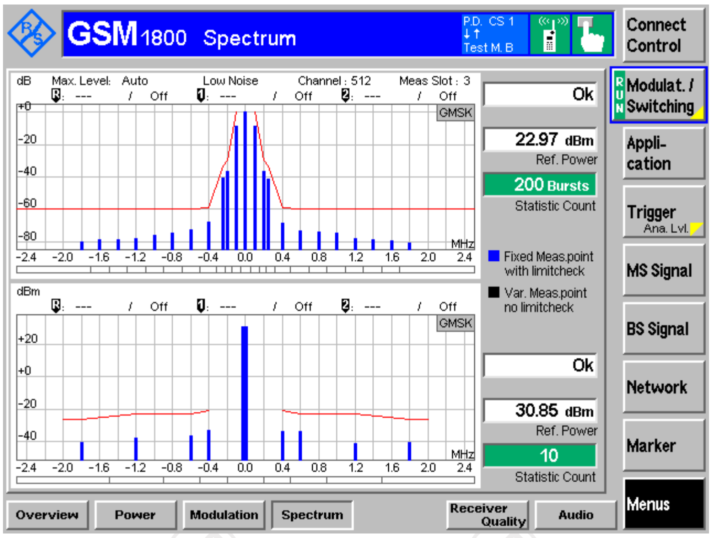


Highest channel

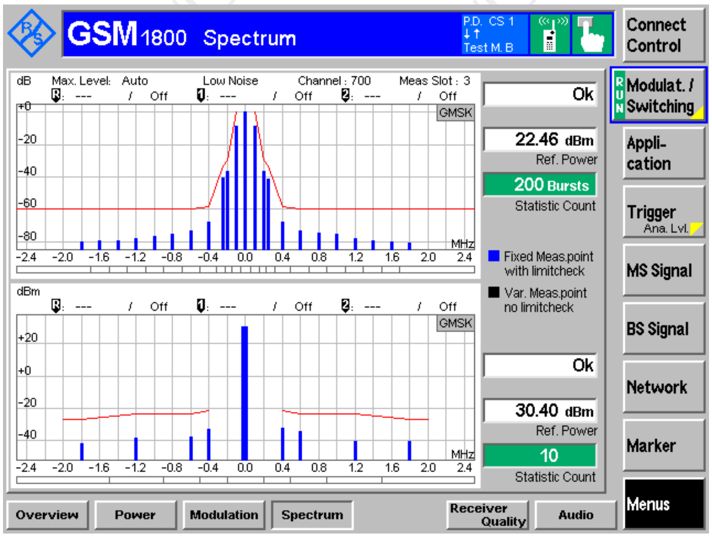


DCS1800 Y=3

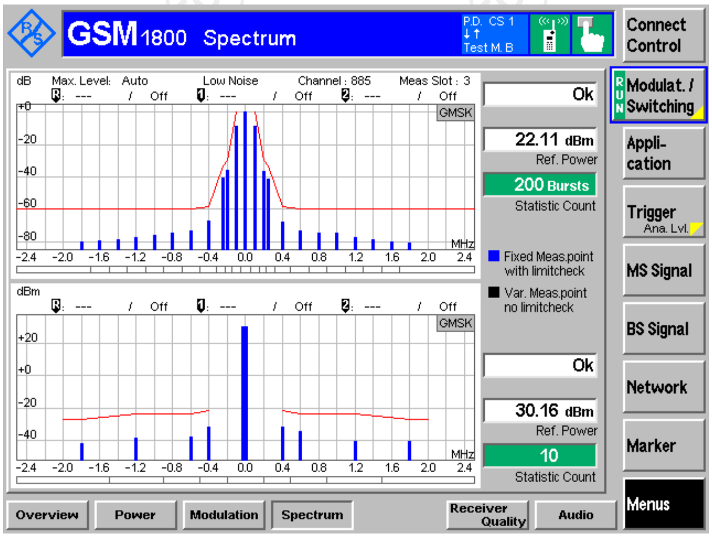
Lowest channel



Middle channel

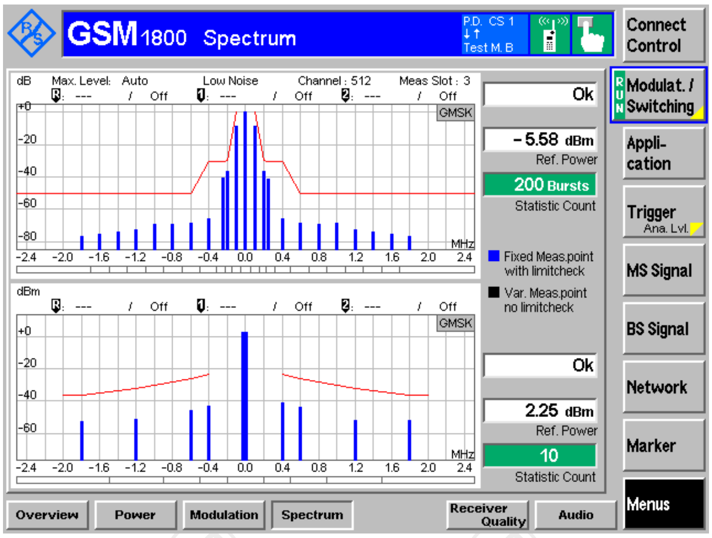


Highest channel

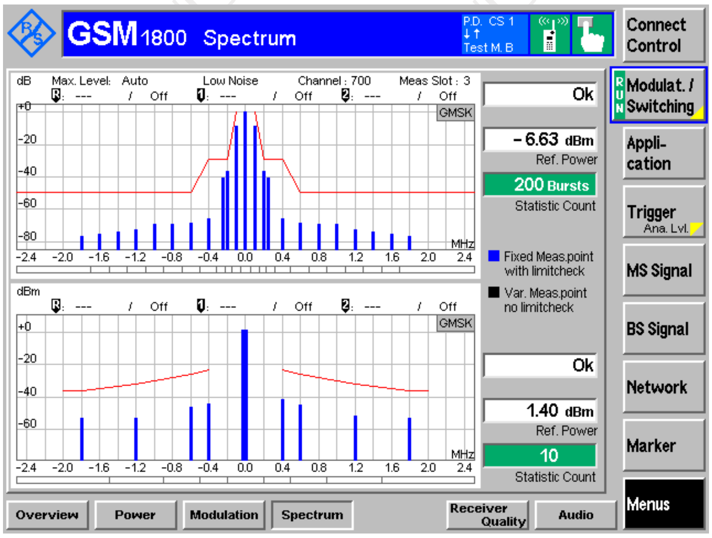


DCS1800 Y=18

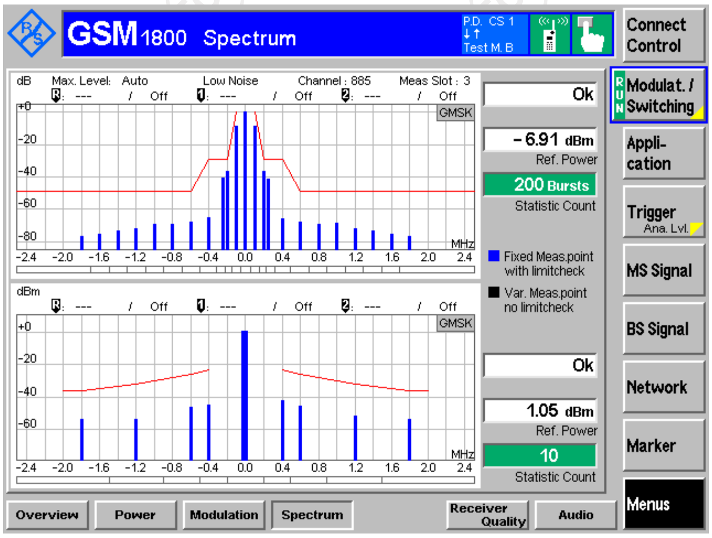
Lowest channel



Middle channel



Highest channel



A.8 Conducted spurious emissions – MS allocated a channel

E-GSM900, Normal Voltage Condition at Middle Channel			
Frequency Range	**Max. Level observed (dBm)**	**Limit (dBm)**	**Result**
100 KHz~50MHz	-78.45	-36	PASS
50MHz~500MHz	-70.32		
500MHz~850MHz	-70.15		
850MHz~860MHz	-70.24		
860MHz~870MHz	-72.09		
870MHz~880MHz	-69.25		
915MHz~925MHz	-66.41		
960MHz~1GHz	-66.08		
1GHz~12.75GHz	-46.55	-30	

DCS1800, Normal Voltage Condition at Middle Channel			
Frequency Range	**Max. Level observed (dBm)**	**Limit (dBm)**	**Result**
100 KHz~50MHz	-77.81	-36	PASS
50 MHz~500MHz	-69.75		
500MHz~1GHz	-70.14		
1GHz~1.68GHz	-70.19	-30	
1.68GHz~1.69GHz	-71.78		
1.69GHz~1.7GHz	-68.71		
1.7GHz~1.71GHz	-66.16		
1.785GHz~1.795GHz	-66.21		
1.795GHz~1.805GHz	-45.63		
1.805GHz~1.88GHz	-45.14		
1.88GHz~12.75GHz	-45.67		

A.9 Conducted spurious emissions – MS in idle mode

E-GSM900, Normal Voltage Condition in idle mode			
Frequency Range	**Max. Level observed (dBm)**	**Limit (dBm)**	**Result**
100 KHz~50MHz	-88.35	-57	PASS
50MHz~880MHz	-80.24	-57	
880MHz~915MHz	-80.15	-59	
915MHz~1GHz	-80.14	-57	
1GHz ~1.71GHz	-52.65	-47	
1.71GHz ~1.785GHz	-59.20	-53	
1.785GHz ~12.75GHz	-56.96	-47	

DCS1800, Normal Voltage Condition in idle mode			
Frequency Range	**Max. Level observed (dBm)**	**Limit (dBm)**	**Result**
100 KHz~50MHz	-86.14	-57	PASS
50MHz~880MHz	-78.01	-57	
880MHz~915MHz	-77.94	-59	
915MHz~1GHz	-77.33	-57	
1GHz ~1.71GHz	-50.04	-47	
1.71GHz ~1.785GHz	-56.48	-53	
1.785GHz ~12.75GHz	-53.92	-47	

A.10 Radiated spurious emissions – MS allocated a channel

E-GSM900, Middle Channel, Normal Voltage				
Frequency (MHz)	Spurious Emission		Limit dBm(EIRP)	Result
	Polarization	Level dBm(EIRP)		
60.21	Vertical	-54.73	-36	PASS
1804	V	-52.06	-30	
2706	V	-50.63	-30	
142.16	Horizontal	-53.52	-36	
1804	H	-52.27	-30	
2706	H	-50.11	-30	
DCS1800, Middle Channel, Normal Voltage				
Frequency (MHz)	Spurious Emission		Limit dBm(EIRP)	Result
	Polarization	Level dBm(EIRP)		
60.21	Vertical	-50.41	-36	PASS
3495.6	V	-53.50	-30	
142.16	Horizontal	-49.68	-36	
3495.6	H	-50.09	-30	

A.11 Radiated spurious emissions – MS in idle mode

E-GSM900, in idle mode, Normal Voltage				
Frequency (MHz)	Spurious Emission		Limit dBm(EIRP)	Result
	Polarization	Level dBm(EIRP)		
60.21	Vertical	-72.98	-57.00	PASS
1238.41	V	-70.14	-47.00	
142.16	Horizontal	-68.85	-57.00	
1238.41	H	-71.77	-47.00	
DCS1800, in idle mode, Normal Voltage				
Frequency (MHz)	Spurious Emission		Limit dBm(EIRP)	Result
	Polarization	Level dBm(EIRP)		
60.21	Vertical	-68.05	-57.00	PASS
1238.41	V	-68.66	-47.00	
142.16	Horizontal	-70.23	-57.00	
1238.41	H	-69.57	-47.00	

A.12 Receiver Blocking and spurious response - speech channels

E-GSM900 Band:

Channel frequency (MHz)	FBER (%)	Number of test samples	Limit (%)	Result
880.2	0.041	10000	2.439	PASS
902.0	0.055	10000	2.439	
914.8	0.063	10000	2.439	

DCS1800 Band:

Channel frequency (MHz)	FBER (%)	Number of test samples	Limit (%)	Result
1710.2	0.053	10000	2.439	PASS
1747.8	0.065	10000	2.439	
1784.8	0.078	10000	2.439	

A.13 Frequency error and Modulation accuracy in EGPRS Configuration

E-GSM900 EGPRS MS under maximum power control level											
E-GSM900	**Test Condition**	**Frequency Error (Hz)**	**Limit (Hz)**	**EVM (%)**		**Limit (%)**	**95:th-percentile (%)**	**Limit (%)**	**Origin Offset (dB)**	**Limit (dB)**	**Result**
Reference Frequency 902MHz	Normal	-10	90.2	RMS	1.2	<9	1.19	<15	53.7	>30	PASS
				Peak	2.2	<30					
	LVLT	-11		RMS	1.3	<10	5.54		55.4		
				Peak	2.3	<30					
	LVHT	-12		RMS	1.4	<10	3.37		53.9		
				Peak	2.4	<30					
	HVLT	-10		RMS	1.4	<10	2.35		56.7		
				Peak	2.5	<30					
	HVHT	-14		RMS	1.7	<10	1.46		57.1		
				Peak	2.9	<30					
	Vibration	-13		RMS	1.7	<10	3.17		55.8		
				Peak	3.1	<30					

E-GSM900 EGPRS MS under minimum power control level											
E-GSM900	**Test Condition**	**Frequency Error (Hz)**	**Limit (Hz)**	**EVM (%)**		**Limit (%)**	**95:th-percentile (%)**	**Limit (%)**	**Origin Offset (dB)**	**Limit (dB)**	**Result**
Reference Frequency 902MHz	Normal	-7	90.2	RMS	1.6	<9	2.21	<15	52.3	>30	PASS
				Peak	2.6	<30					
	LVLT	-10		RMS	1.7	<10	5.78		51.9		
				Peak	2.7	<30					
	LVHT	-11		RMS	1.8	<10	4.62		52.6		
				Peak	2.8	<30					
	HVLT	-8		RMS	1.8	<10	2.57		51.7		
				Peak	2.9	<30					
	HVHT	-10		RMS	2.1	<10	2.36		53.5		
				Peak	3.3	<30					
	Vibration	-9		RMS	3.3	<10	3.62		51.2		
				Peak	3.5	<30					

DCS1800 EGPRS MS under maximum power control level											
GSM1800	**Test Condition**	**Frequency Error (Hz)**	**Limit (Hz)**	**EVM (%)**		**Limit (%)**	**95:th-percentile (%)**	**Limit (%)**	**Origin Offset (dB)**	**Limit (dB)**	**Result**
Reference Frequency 1747.8MHz	Normal	-12	174.78	RMS	1.4	<9	0.73	<15	53.7	>30	PASS
				Peak	2.4	<30					
	LVLT	-13		RMS	1.5	<10	0.58		52.3		
				Peak	2.5	<30					
	LVHT	-14		RMS	1.6	<10	0.82		53.5		
				Peak	2.6	<30					
	HVLT	-13		RMS	1.6	<10	0.65		54.1		
				Peak	2.7	<30					
	HVHT	-15		RMS	1.9	<10	0.77		52.8		
				Peak	3.1	<30					
	Vibration	-13		RMS	1.9	<10	0.59		53.2		
				Peak	3.3	<30					

DCS1800 EGPRS MS under minimum power control level											
GSM1800	**Test Condition**	**Frequency Error (Hz)**	**Limit (Hz)**	**EVM (%)**		**Limit (%)**	**95:th-percentile (%)**	**Limit (%)**	**Origin Offset (dB)**	**Limit (dB)**	**Result**
Reference Frequency 1747.8MHz	Normal	-9	174.78	RMS	1.9	<9	0.35	<15	57.3	>30	PASS
				Peak	2.9	<30					
	LVLT	-10		RMS	2.0	<10	0.28		58.4		
				Peak	3.0	<30					
	LVHT	-9		RMS	2.1	<10	0.31		56.8		
				Peak	3.1	<30					
	HVLT	-11		RMS	2.1	<10	0.36		59.6		
				Peak	3.2	<30					
	HVHT	-12		RMS	2.4	<10	0.23		58.4		
				Peak	3.6	<30					
	Vibration	-11		RMS	2.4	<10	0.29		57.9		
				Peak	3.8	<30					

A.14 Frequency error under multipath and interference conditions in EGPRS Configuration

E-GSM900 EGPRS(MS under maximum power control level)					
E-GSM900	Test Condition		Frequency error (Hz)	Limit (Hz)	Result
Reference Frequency 902MHz	Normal	RA250	83	±300	PASS
		HT100	57	±180	
		TU50	-32	±160	
		TU3	-54	±230	
	LVLT	RA250	78	±300	
		HT100	56	±180	
		TU50	-34	±160	
		TU3	-57	±230	
	LVHT	RA250	77	±300	
		HT100	53	±180	
		TU50	-37	±160	
		TU3	-56	±230	
	HVLT	RA250	76	±300	
		HT100	54	±180	
		TU50	-36	±160	
		TU3	-60	±230	
	HVHT	RA250	75	±300	
		HT100	52	±180	
		TU50	-33	±160	
		TU3	-58	±230	

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E-GSM900 EGPRS(MS under minimum power control level)					
E-GSM900	**Test Condition**		**Frequency error (Hz)**	**Limit (Hz)**	**Result**
Reference Frequency 902MHz	Normal	RA250	66	±300	PASS
		HT100	39	±180	
		TU50	-41	±160	
		TU3	-63	±230	
	LVLT	RA250	61	±300	
		HT100	38	±180	
		TU50	-43	±160	
		TU3	-66	±230	
	LVHT	RA250	60	±300	
		HT100	35	±180	
		TU50	-46	±160	
		TU3	-65	±230	
	HVLT	RA250	59	±300	
		HT100	36	±180	
		TU50	-45	±160	
		TU3	-69	±230	
	HVHT	RA250	58	±300	
		HT100	34	±180	
		TU50	-42	±160	
		TU3	-67	±230	

DCS1800 EGPRS(MS under maximum power control level)					
DCS1800	Test Condition		Frequency error (Hz)	Limit (Hz)	Result
Reference Frequency 1747.8MHz	Normal	RA130	56	±400	PASS
		HT100	38	±350	
		TU50	-41	±260	
		TU1.5	-72	±320	
	LVLT	RA130	51	±400	
		HT100	37	±350	
		TU50	-43	±260	
		TU1.5	-75	±320	
	LVHT	RA130	50	±400	
		HT100	34	±350	
		TU50	-46	±260	
		TU1.5	-74	±320	
	HVLT	RA130	49	±400	
		HT100	35	±350	
		TU50	-45	±260	
		TU1.5	-78	±320	
	HVHT	RA130	48	±400	
		HT100	33	±350	
		TU50	-42	±260	
		TU1.5	-76	±320	

DCS1800 EGPRS(MS under minimum power control level)					
DCS1800	Test Condition		Frequency error (Hz)	Limit (Hz)	Result
Reference Frequency 1747.8MHz	Normal	RA130	76	±400	PASS
		HT100	54	±350	
		TU50	-63	±260	
		TU1.5	-44	±320	
	LVLT	RA130	71	±400	
		HT100	53	±350	
		TU50	-65	±260	
		TU1.5	-47	±320	
	LVHT	RA130	70	±400	
		HT100	50	±350	
		TU50	-68	±260	
		TU1.5	-46	±320	
	HVLT	RA130	69	±400	
		HT100	51	±350	
		TU50	-67	±260	
		TU1.5	-50	±320	
	HVHT	RA130	68	±400	
		HT100	49	±350	
		TU50	-64	±260	
		TU1.5	-48	±320	

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A.15 EGPRS Transmitter output power

E-GSM900 EGPRS Output Power				
γ =	OUTPUT POWER (dBm)			Result
	Low Channel 880.2 MHz	Middle Channel 902.0 MHz	High Channel 914.8 MHz	
1 up slot				PASS
3	27.31	27.20	27.03	
4	25.10	24.98	25.08	
5	22.98	22.86	22.96	
6	20.84	20.72	20.82	
7	18.63	18.51	18.61	
8	16.25	16.13	16.23	
9	14.81	14.69	14.79	
10	12.39	12.27	12.37	
11	10.06	9.94	10.04	
12	8.41	8.29	8.39	
13	6.14	6.02	6.12	
14	3.71	3.59	3.69	
15	2.10	1.98	2.08	
16	0.96	0.84	0.94	
17	-0.17	-0.29	-0.19	
2 up slot				
3	26.19	26.02	25.87	
17	-0.16	-0.28	-0.18	
3 up slot				
3	23.88	23.76	23.72	
17	-0.27	-0.42	-0.31	
4 up slot				
3	22.82	22.63	22.56	
17	-0.45	-0.58	-0.51	

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DCS1800 EGPRS Output Power				
γ =	OUTPUT POWER (dBm)			Result
	Low Channel 1710.2 MHz	Middle Channel 1747.8 MHz	High Channel 1784.8 MHz	
1 up slot				PASS
3	26.40	26.01	25.58	
4	24.19	24.07	24.17	
5	22.07	21.95	22.05	
6	19.93	19.81	19.91	
7	17.72	17.60	17.70	
8	15.34	15.22	15.32	
9	13.90	13.78	13.88	
10	11.48	11.36	11.46	
11	9.15	9.03	9.13	
12	7.50	7.38	7.48	
13	5.23	5.11	5.21	
14	2.80	2.68	2.78	
15	1.19	1.07	1.17	
16	0.05	-0.07	0.03	
17	-1.08	-1.20	-1.10	
18	-2.29	-2.41	-2.31	
2 up slot				
3	25.43	24.98	24.62	
18	-3.22	-3.38	-3.28	
3 up slot				
3	23.51	23.03	22.63	
18	-3.32	-3.45	-3.39	
4 up slot				
3	22.29	21.82	21.13	
18	-3.40	-3.58	-3.46	

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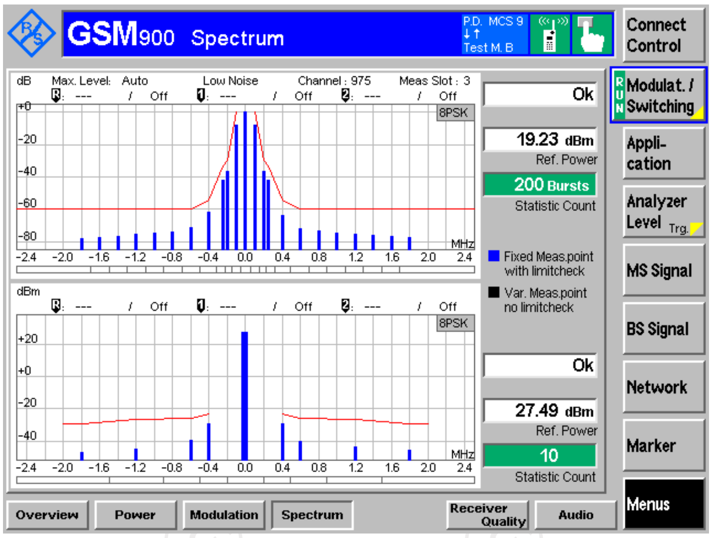
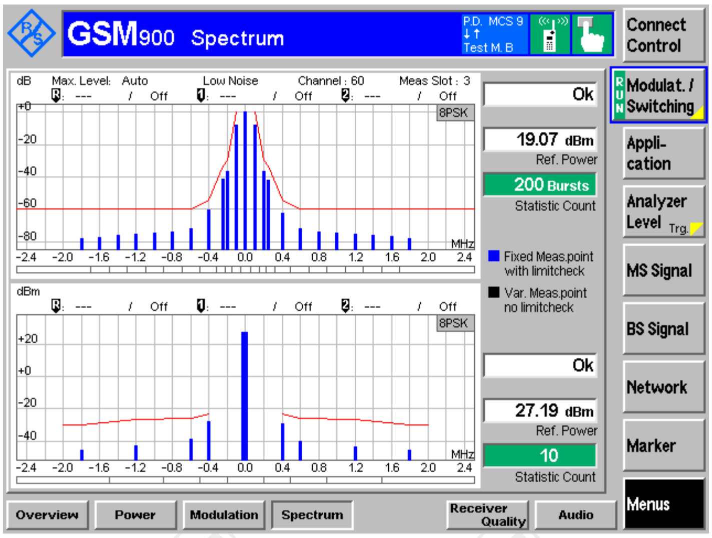
A.16 Output RF spectrum in EGPRS configuration

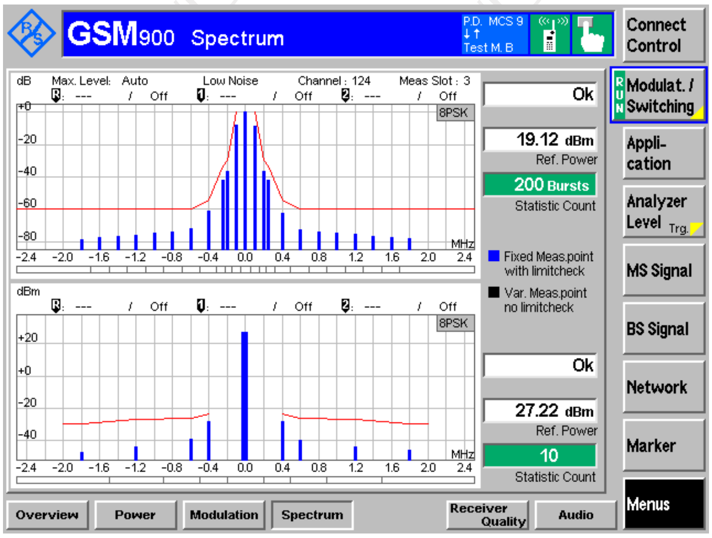
E-GSM900　Y=3　　　　Lowest channel



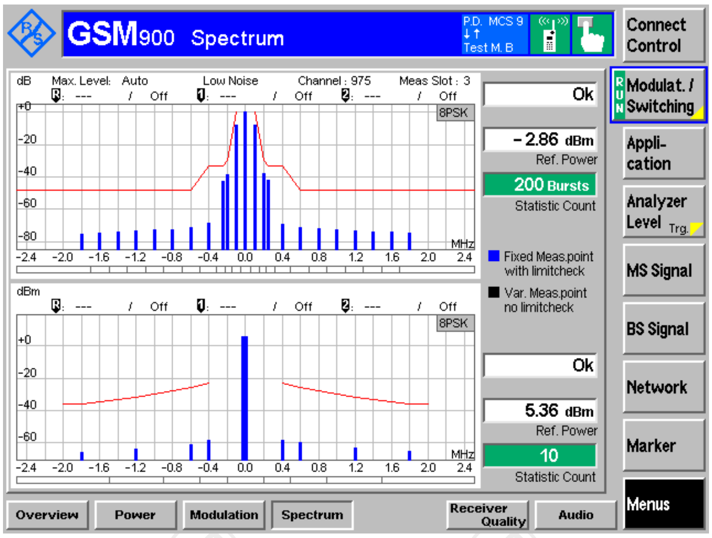
Middle channel



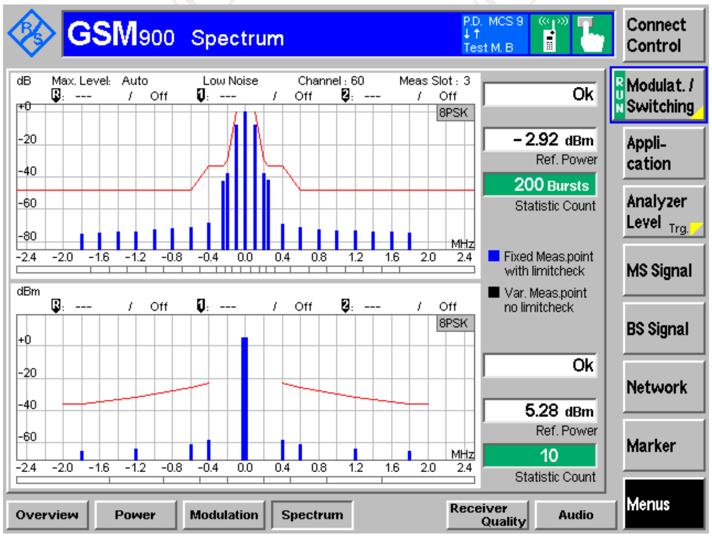
Highest channel



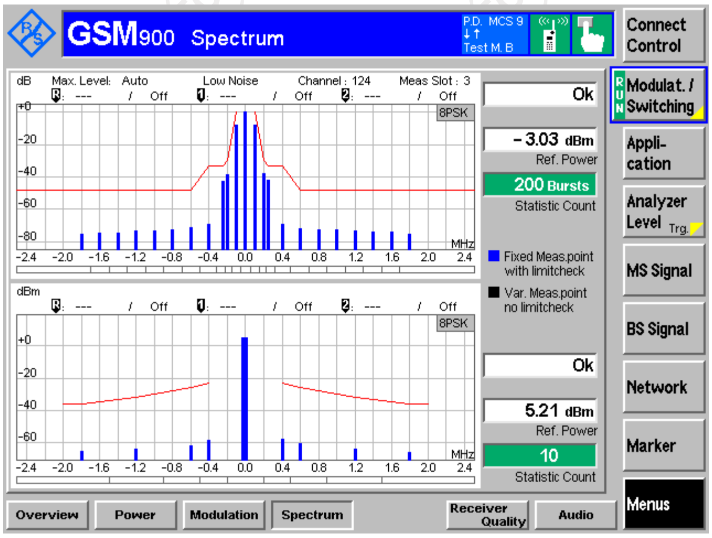
E-GSM900 Y=17 Lowest channel



Middle channel

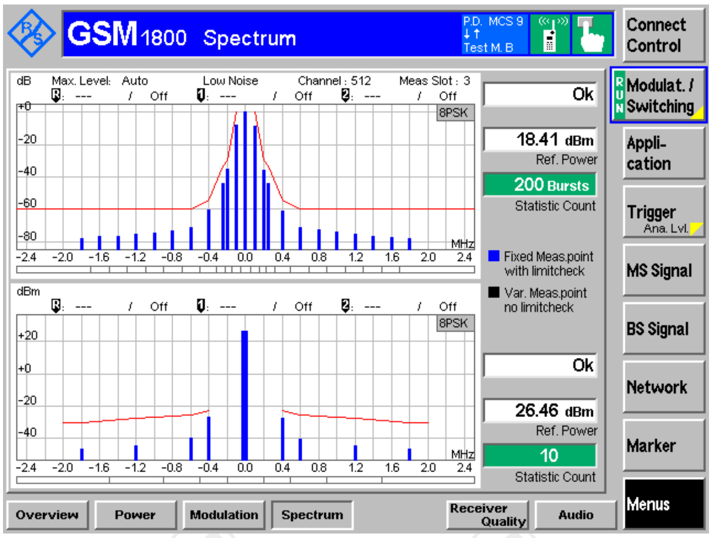


Highest channel

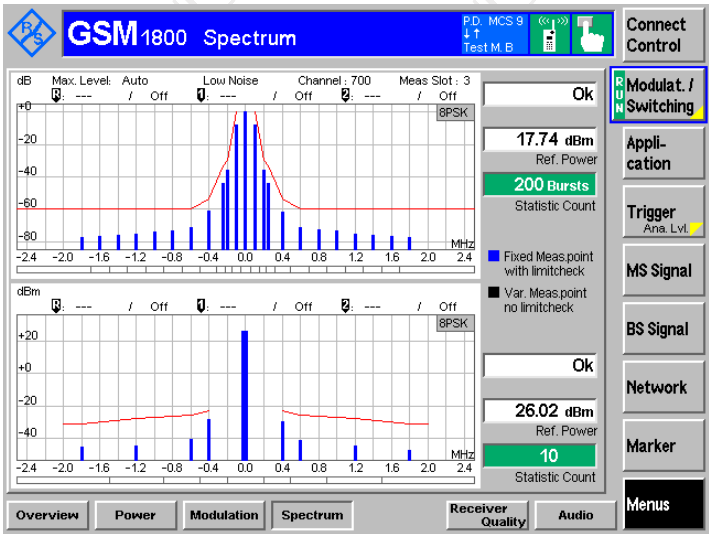


DCS1800 Y=3

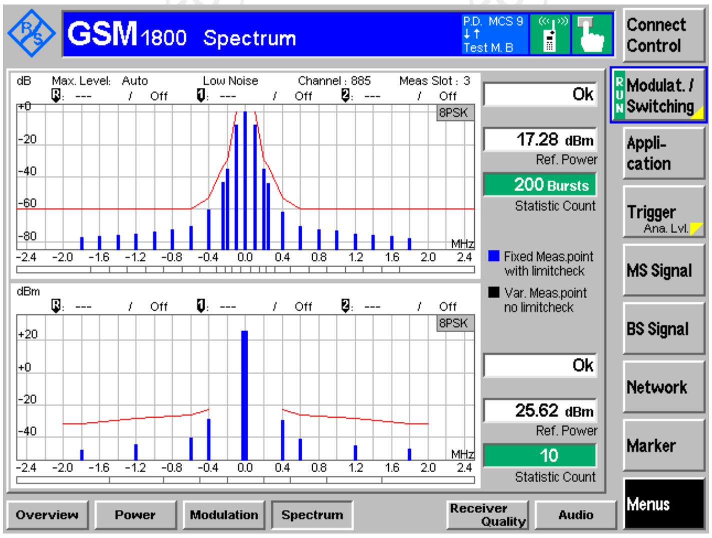
Lowest channel



Middle channel

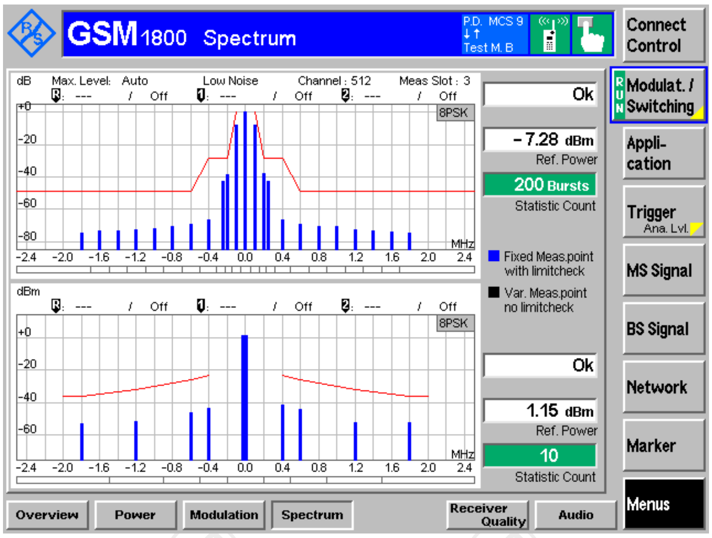


Highest channel

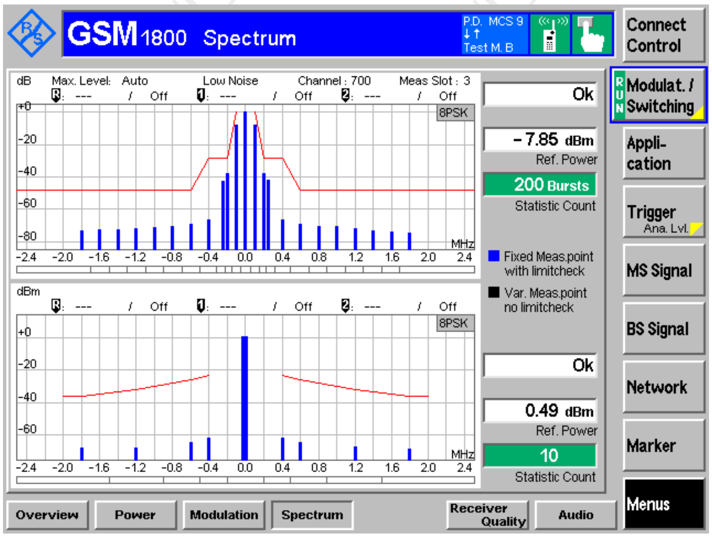


DCS1800 Y=18

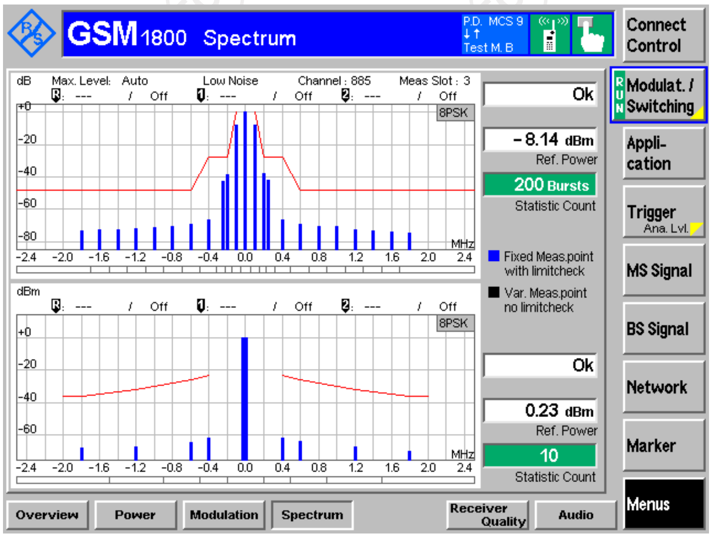
Lowest channel



Middle channel



Highest channel



A.17 Blocking and spurious response in EGPRS configuration

E-GSM900:

Channel frequency (MHz)	FBER (%)	Number of test samples	Limit (%)	Result
880.2	0.044	10000	2.439	PASS
902.0	0.058	10000	2.439	
914.8	0.066	10000	2.439	

DCS1800:

Channel frequency (MHz)	FBER (%)	Number of test samples	Limit (%)	Result
1710.2	0.037	10000	2.439	PASS
1747.8	0.049	10000	2.439	
1784.8	0.064	10000	2.439	

A.18 Intermodulation rejection - speech channels

E-GSM900:

Channel frequency (MHz)	RBER (%)	Number of test samples	Limit (%)	Result
880.2	0.052	10000	2.439	PASS
902.0	0.064	10000	2.439	
914.8	0.078	10000	2.439	

DCS1800:

Channel frequency (MHz)	RBER (%)	Number of test samples	Limit (%)	Result
1710.2	0.061	10000	2.439	PASS
1747.8	0.073	10000	2.439	
1784.8	0.088	10000	2.439	

A.19 Intermodulation rejection - EGPRS

E-GSM900:

Channel frequency (MHz)	BLER (%)	Number of test samples	Limit (%)	Result
880.2	0.040	10000	10	PASS
902.0	0.052	10000	10	
914.8	0.067	10000	10	

DCS1800:

Channel frequency (MHz)	BLER (%)	Number of test samples	Limit (%)	Result
1710.2	0.045	10000	10	PASS
1747.8	0.057	10000	10	
1784.8	0.069	10000	10	

A.20 AM suppression - speech channels

E-GSM900:

Channel frequency (MHz)	RBER (%)	Number of test samples	Limit (%)	Result
880.2	0.057	10000	2.439	PASS
902.0	0.070	10000	2.439	
914.8	0.079	10000	2.439	

DCS1800:

Channel frequency (MHz)	RBER (%)	Number of test samples	Limit (%)	Result
1710.2	0.060	10000	2.439	PASS
1747.8	0.072	10000	2.439	
1784.8	0.081	10000	2.439	

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A.21 AM suppression - packet channels

E-GSM900:

Channel frequency (MHz)	BLER (%)	Number of test samples	Limit (%)	Result
880.2	0.049	10000	10	PASS
902.0	0.063	10000	10	
914.8	0.071	10000	10	

DCS1800:

Channel frequency (MHz)	BLER (%)	Number of test samples	Limit (%)	Result
1710.2	0.054	10000	10	PASS
1747.8	0.068	10000	10	
1784.8	0.076	10000	10	

A.22 Adjacent channel rejection - speech channels (TCH/FS)

E-GSM900:

Channel frequency (MHz)	RBER (%)	Number of test samples	Limit (%)	Result
880.2	0.042	10000	10	PASS
902.0	0.054	10000	10	
914.8	0.070	10000	10	

DCS1800:

Channel frequency (MHz)	RBER (%)	Number of test samples	Limit (%)	Result
1710.2	0.035	10000	10	PASS
1747.8	0.048	10000	10	
1784.8	0.057	10000	10	

A.23 Adjacent channel rejection - EGPRS

E-GSM900:

Channel frequency (MHz)	BLER (%)	Number of test samples	Limit (%)	Result
880.2	0.031	10000	10	PASS
902.0	0.043	10000	10	
914.8	0.058	10000	10	

DCS1800:

Channel frequency (MHz)	BLER (%)	Number of test samples	Limit (%)	Result
1710.2	0.034	10000	10	PASS
1747.8	0.046	10000	10	
1784.8	0.059	10000	10	

A.24 Reference sensitivity - TCH/FS

E-GSM900:

Channel frequency (MHz)	BLER (%)	Number of test samples	Limit (%)	Result
880.2	0.054	10000	10	PASS
902.0	0.066	10000	10	
914.8	0.078	10000	10	

DCS1800:

Channel frequency (MHz)	BLER (%)	Number of test samples	Limit (%)	Result
1710.2	0.048	10000	10	PASS
1747.8	0.060	10000	10	
1784.8	0.074	10000	10	

A.25 Minimum Input level for Reference Performance - GPRS

E-GSM900:

Channel frequency (MHz)	BLER (%)	Number of test samples	Limit (%)	Result
880.2	0.063	10000	10	PASS
902.0	0.075	10000	10	
914.8	0.087	10000	10	

DCS1800:

Channel frequency (MHz)	BLER (%)	Number of test samples	Limit (%)	Result
1710.2	0.055	10000	10	PASS
1747.8	0.070	10000	10	
1784.8	0.077	10000	10	

A.26 Minimum Input level for Reference Performance - EGPRS

E-GSM900:

Channel frequency (MHz)	BLER (%)	Number of test samples	Limit (%)	Result
880.2	0.039	10000	10	PASS
902.0	0.052	10000	10	
914.8	0.061	10000	10	

DCS1800:

Channel frequency (MHz)	BLER (%)	Number of test samples	Limit (%)	Result
1710.2	0.041	10000	10	PASS
1747.8	0.055	10000	10	
1784.8	0.063	10000	10	

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