TEST REPORT

Report No.:	BCTC2504944206-8E
Applicant:	Shenzhen Huafurui Technology Co., Ltd.
Product Name:	Smartphone
Test Model:	KINGKONG ES 3
Tested Date:	2025-04-09 to 2025-05-26
Issued Date:	2025-05-30

Shenzhen BCTC Testing Co., Ltd.

Product Name:	Smartphone
Trademark:	CUBOT
Model/Type reference:	KINGKONG ES 3
Prepared For:	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:	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
Prepared By:	Shenzhen BCTC Testing Co., Ltd.
Address:	1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China
Sample Received Date:	2025-04-09
Sample tested Date:	2025-04-07 to 2025-05-21
Issue Date:	2025-05-30
Report No.:	BCTC2504944206-8E
Test Standards:	ETSI EN 301 511 V12.5.1 (2017-03)
Test Results:	PASS
Remark:	This is GSM radio test report.

Tested by: Brave Zeng

Brave Zeng/ Project Handler

Approved by:

Zero Zhou/Reviewer

The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. Without written approval of Shenzhen BCTC Testing Co., Ltd, this report can't be reproduced except in full. The tested sample(s) and the sample information are provided by the client.

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(Note: N/A Means Not Applicable)

1. Version

Report No.	Issue Date	Description	Approved
BCTC2504944206-8E	2025-05-30	Original	Valid

2. Test Summary

The Product has been tested according to the following specifications:

Test Item	Test Requirement	Test Method	Limit	Result
Transmitter – Frequency error and phase error	ETSI EN 301 511 V12.5.1 (2017-03) Clause 4.2.1	ETSI TS 151 010-1 Clause 13.1	ETSI TS 151 010-1 Clause 13.1.5	PASS
Transmitter - Frequency error under multipath and interference conditions	ETSI EN 301 511 V12.5.1 (2017-03) Clause 4.2.2	ETSI TS 151 010-1 Clause 13.2	ETSI TS 151 010-1 Clause 13.2.5	PASS
Transmitter - Frequency error and phase error in HSCSD multislot configuration	ETSI EN 301 511 V12.5.1 (2017-03) Clause 4.2.3	ETSI TS 151 010-1 Clause 13.6	ETSI TS 151 010-1 Clause 13.6.5	N/A
Frequency error and phase error in GPRS multislot configuration	ETSI EN 301 511 V12.5.1 (2017-03) Clause 4.2.4	ETSI TS 151 010-1 Clause 13.16.1	ETSI TS 151 010-1 Clause 13.16.1.5.1&2	PASS
Transmitter output power and burst timing	ETSI EN 301 511 V12.5.1 (2017-03) Clause 4.2.5	ETSI TS 151 010-1 Clause 13.3	ETSI TS 151 010-1 Clause 13.3.5	PASS
Transmitter – Output RF spectrum	ETSI EN 301 511 V12.5.1 (2017-03) Clause 4.2.6	ETSI TS 151 010-1 Clause 13.4	ETSI TS 151 010-1 Clause 13.4.5	PASS
Transmitter output power and burst timing in HSCSD multislotconfigurations	ETSI EN 301 511 V12.5.1 (2017-03) Clause 4.2.7	ETSI TS 151 010-1 Clause 13.7	ETSI TS 151 010-1 Clause 13.7.5	N/A
Transmitter - Output RF spectrum in HSCSD multislot configuration	ETSI EN 301 511 V12.5.1 (2017-03) Clause 4.2.8	ETSI TS 151 010-1 Clause 13.8	ETSI TS 151 010-1 Clause 13.8.5	N/A
Transmitter – Output RF spectrum for MS supporting the R-GSM or ER-GSM frequency band	ETSI EN 301 511 V12.5.1 (2017-03) Clause 4.2.9	ETSI TS 151 010-1 Clause 13.9	ETSI TS 151 010-1 Clause 13.9.5	N/A
Transmitter output power in GPRS multislot configuration	ETSI EN 301 511 V12.5.1 (2017-03) Clause 4.2.10	ETSI TS 151 010-1 Clause 13.16.2	ETSI TS 151 010-1 Clause 13.16.2.5	PASS
Output RF spectrum in GPRS multislot configuration	ETSI EN 301 511 V12.5.1 (2017-03) Clause 4.2.11	ETSI TS 151 010-1 Clause 13.16.3	ETSI TS 151 010-1 Clause 13.16.3.5	PASS
Conducted spurious emissions – MS allocated a channel	ETSI EN 301 511 V12.5.1 (2017-03) Clause 4.2.12	ETSI TS 151 010-1 Clause 12.1.1	ETSI TS 151 010-1 Clause 12.1.1.5	PASS
Conducted spurious emission – MS in idle mode	ETSI EN 301 511 V12.5.1 (2017-03)Clause 4.2.13	ETSI TS 151 010-1 Clause 12.1.2	ETSI TS 151 010-1 Clause 12.1.2.5	PASS
Conducted spurious emissions for MS supporting the R-GSM or ER-GSM frequency band – MS allocated a channel	ETSI EN 301 511 V12.5.1 (2017-03)Clause 4.2.14	ETSI TS 151 010-1 Clause 12.3.1	ETSI TS 151 010-1 Clause 12.3.1.5	N/A
Conducted spurious emissions for MS supporting the R-GSM or ER-GSM frequency band – MS in idle mode	ETSI EN 301 511 V12.5.1 (2017-03)Clause 4.2.15	ETSI TS 151 010-1 Clause 12.3.2	ETSI TS 151 010-1 Clause 12.3.2.5	N/A

Radiated spurious emissions – MS allocated a channel	ETSI EN 301 511 V12.5.1 (2017-03)Clause 4.2.16	ETSI TS 151 010-1 Clause 12.2.1	ETSI TS 151 010-1 Clause 12.2.1.5	PASS
Radiated spurious emissions – MS in idle mode	ETSI EN 301 511 V12.5.1 (2017-03)Clause 4.2.17	ETSI TS 151 010-1 Clause 12.2.2	ETSI TS 151 010-1 Clause 12.2.2.5	PASS
Radiated spurious emissions for MS supporting the R-GSM or ER-GSM frequency band – MS allocated a channel	ETSI EN 301 511 V12.5.1 (2017-03)Clause 4.2.18	ETSI TS 151 010-1 Clause 12.4.1	ETSI TS 151 010-1 Clause 12.4.1.5	N/A
Radiated spurious emissions for MS supporting the R-GSMor ER-GSM frequency band – MS in idle mode	ETSI EN 301 511 V12.5.1 (2017-03)Clause 4.2.19	ETSI TS 151 010-1 Clause 12.4.2	ETSI TS 151 010-1 clause 12.4.2.5	N/A
Receiver blocking and spurious responses – speech channels	ETSI EN 301 511 V12.5.1 (2017-03)Clause 4.2.20	ETSI TS 151 010-1 Clause 14.7.1	ETSI TS 151 010-1 clause 14.7.1.5	PASS
Receiver blocking and spurious response – speech channels for MS supporting the R-GSM or ER-GSM frequency band	ETSI EN 301 511 V12.5.1 (2017-03)Clause 4.2.21	ETSI TS 151 010-1 Clause 14.7.3	ETSI TS 151 010-1 clause 14.7.3.5	N/A
Improved Receiver Blocking and spurious response - speech channels for 8W MS supporting the R-GSM or ER-GSM frequency band	ETSI EN 301 511 V12.5.1 (2017-03)Clause 4.2.22	ETSI TS 151 010-1 Clause 14.7.3	ETSI TS 151 010-1 clause 14.7.3.5	N/A
Improved Receiver Blocking and spurious response - speech channels for 2W MS supporting the R-GSM or ER-GSM frequency band	ETSI EN 301 511 V12.5.1 (2017-03)Clause 4.2.23	ETSI TS 102933-2 Clause 4.2 and 4.3	ETSI TS 102933-2 Clause 4.2.1 and 4.3.1	N/A
Improved Receiver Blocking and spurious response - control channels for 8W MS supporting the R-GSM or ER-GSM frequency band not supporting speech	ETSI EN 301 511 V12.5.1 (2017-03)Clause 4.2.24	ETSI TS 102933-2 Clause 5.2 and 5.3	ETSI TS 102933-2 Clause 5.2.1 and 5.3.1	N/A
Improved Receiver Blocking and spurious response - control channels for 2W MS supporting the R-GSM or ER-GSM frequency band not supporting speech	ETSI EN 301 511 V12.5.1 (2017-03)Clause 4.2.25	ETSI TS 102933-2 Clause 4.2 and 4.3	ETSI TS 102933-2 Clause 4.2.2 and 4.3.2	N/A
Frequency error and modulation accuracy in EGPRS configuration	ETSI EN 301 511 V12.5.1 (2017-03)Clause 4.2.26	ETSI TS 151 010-1 Clause 13.17.1	ETSI TS 151 010-1 clause 13.17.1.5	N/A
Frequency error under multipath and interference conditions in EGPRS Configuration	ETSI EN 301 511 V12.5.1 (2017-03)Clause 4.2.27	ETSI TS 151 010-1 Clause 13.17.2	ETSI TS 151 010-1 clause 13.17.2.5	PASS
EGPRS Transmitter output power	ETSI EN 301 511 V12.5.1 (2017-03)Clause 4.2.28	ETSI TS 151 010-1 Clause 13.17.3	ETSI TS 151 010-1 clause 13.17.3.5	PASS

Output RF spectrum in EGPRS configuration	ETSI EN 301 511 V12.5.1 (2017-03)Clause 4.2.29	ETSI TS 151 010-1 Clause 13.17.4	ETSI TS 151 010-1 clause 13.17.4.5	PASS
Blocking and spurious response in EGPRS configuration	ETSI EN 301 511 V12.5.1 (2017-03)Clause 4.2.30	ETSI TS 151 010-1 Clause 14.18.5	ETSI TS 151 010-1 clause 14.18.5.5	PASS
Blocking and spurious response in DLMC configuration	ETSI EN 301 511 V12.5.1 (2017-03)Clause 4.2.31	ETSI TS 151 010-1 Clause 14.18.5b	ETSI TS 151 010-1 clause 14.18.5b.5	N/A
Intermodulation rejection - speech channels	ETSI EN 301 511 V12.5.1 (2017-03)Clause 4.2.32	ETSI TS 151 010-1 Clause 14.6.1	ETSI TS 151 010-1 clause 14.6.1.5	PASS
Intermodulation rejection - control channels	ETSI EN 301 511 V12.5.1 (2017-03)Clause 4.2.33	ETSI TS 151 010-1 Clause 14.6.2	ETSI TS 151 010-1 clause 14.6.2.5	PASS
Intermodulation rejection - EGPRS	ETSI EN 301 511 V12.5.1 (2017-03)Clause 4.2.34	ETSI TS 151 010-1 Clause 14.18.4	ETSI TS 151 010-1 clause 14.18.4.5	PASS
AM suppression - speech channels	ETSI EN 301 511 V12.5.1 (2017-03)Clause 4.2.35	ETSI TS 151 010-1 Clause 14.8.1	ETSI TS 151 010-1 clause 14.8.1.5	PASS
AM suppression - control channels	ETSI EN 301 511 V12.5.1 (2017-03)Clause 4.2.36	ETSI TS 151 010-1 Clause 14.8.2	ETSI TS 151 010-1 clause 14.8.2.5	PASS
AM suppression - packet channels	ETSI EN 301 511 V12.5.1 (2017-03)Clause 4.2.37	ETSI TS 151 010-1 Clause 14.8.3	ETSI TS 151 010-1 clause 14.8.3.5	PASS
Adjacent channel rejection - speech channels (TCH/FS)	ETSI EN 301 511 V12.5.1 (2017-03)Clause 4.2.38	ETSI TS 151 010-1 Clause 14.5.1.1	ETSI TS 151 010-1 clause 14. 5.1.1.5	PASS
Adjacent channel rejection - control channels	ETSI EN 301 511 V12.5.1 (2017-03)Clause 4.2.39	ETSI TS 151 010-1 Clause 14.5.2	ETSI TS 151 010-1 clause 14.5.2.5	N/A
Adjacent channel rejection - EGPRS	ETSI EN 301 511 V12.5.1 (2017-03)Clause 4.2.40	ETSI TS 151 010-1 Clause 14.18.3	ETSI TS 151 010-1 clause 14.18.3.5	PASS
Adjacent channel rejection in DLMC configuration	ETSI EN 301 511 V12.5.1 (2017-03)Clause 4.2.41	ETSI TS 151 010-1 Clause 14.18.3d	ETSI TS 151 010-1 clause 14.18.3d.5	N/A
Reference sensitivity - TCH/FS	ETSI EN 301 511 V12.5.1 (2017-03)Clause 4.2.42	ETSI TS 151 010-1 Clause 14.2.1	ETSI TS 151 010-1 clause 14. 2.1.5	PASS

Reference sensitivity - FACCH/F	ETSI EN 301 511 V12.5.1 (2017-03)Clause 4.2.43	ETSI TS 151 010-1 Clause 14.2.3	ETSI TS 151 010-1 clause 14. 2.3.5	N/A
Minimum Input level for Reference Performance - GPRS	ETSI EN 301 511 V12.5.1 (2017-03)Clause 4.2.44	ETSI TS 151 010-1 Clause 14.16.1	ETSI TS 151 010-1 clause 14. 16.1.5	PASS
Minimum Input level for Reference Performance - EGPRS	ETSI EN 301 511 V12.5.1 (2017-03)Clause 4.2.45	ETSI TS 151 010-1 Clause 14.18.1	ETSI TS 151 010-1 clause 14. 18.1.5	PASS
Reference sensitivity - TCH/FS for MS supporting the R-GSM or ER-GSM band	ETSI EN 301 511 V12.5.1 (2017-03)Clause 4.2.46	ETSI TS 151 010-1 Clause 14.2.9	ETSI TS 151 010-1 clause 14. 2.9.5	N/A

Remark:
The tested sample and the sample information are provided by the client.
Tx: In this whole report Tx (or tx) means Transmitter.
Rx: In this whole report Rx (or rx) means Receiver.
RF: In this whole report RF means Radiated Frequency.
Press: In this whole report Press means Pressure.
N/A: Not applicable.

3. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

RF frequency	1×10^{-7}
RF power, conducted	1.38dB
Conducted spurious emission (30MHz-1GHz)	0.9dB
Conducted spurious emission (1GHz-18GHz)	1.0dB
Radiated Spurious emission (30MHz-1GHz)	4.3dB
Radiated Spurious emission (1GHz-18GHz)	4.5dB
Temperature	0.59℃
Humidity	5.3%

4. Product Information And Test Setup

4.1 Product Information

Model/Type reference:	KINGKONG ES 3
Model differences:	N/A
GSM Band(s):	GSM/GPRS/EGPRS 900/1800MHz
GPRS Class:	12
Hardware Version:	S17F-MB-V2.0
Software Version:	CUBOT_KINGKONG_ES_3_F071C_V01
Operation Frequency:	GSM/GPRS/EGPRS 900: Tx: 880-915MHz, Rx: 925-960MHz GSM/GPRS/EGPRS 1800: Tx: 1710-1785MHz, Rx: 1805-1880MHz
Max. RF output power:	GSM/GPRS/EGPRS 900: 32.94 dBm GSM/GPRS/EGPRS 1800: 32.86 dBm
Type of Modulation:	GSM/GPRS/EGPRS: GMSK
Antenna Type:	Internal antenna
Antenna Gain:	GSM/GPRS/EGPRS 900: -0.68 dBi GSM/GPRS/EGPRS 1800: -0.04 dBi Remark: ☒ The antenna gain of the product comes from the antenna report provided by the customer, and the test data is affected by the customer information. ☐ The antenna gain of the product is provided by the customer, and the test data is affected by the customer information.
Ratings:	DC 9V from adapter/DC 3.87V from battery
Adapter 1 Information:	Model: TD-203G200170VF01 Input: 100-240V~50/60Hz 0.6A Output: DC 5V 3A DC 9V 3A DC 12V 2.5A DC 15V 2A DC 20V 1.5A PPS: 3.3V-16V/2A 3.3V-11V/3A Total output power: 33W Max
Adapter 2 Information:	Model: HJ-PD33W-EU Input: 100-240V~50/60Hz 0.8A Output: DC 5.0V 3.0A 15.0W OR DC 9.0V 3.0A 27.0W OR DC 12.0V 2.75A 33.0W MAX.

Cable of Product

No.	Cable Type	Quantity	Provider	Length (m)	Shielded	Note
1	--	--	Applicant	---	Yes/No	---
2	--	--	BCTC	--	Yes/No	--

4.2 Test Setup Configuration

See test photographs attached in EUT TEST SETUP PHOTOGRAPHS for the actual connections between Product and support equipment.

EUT

4.3 Support Equipment

No.	Device Type	Brand	Model	Series No.	Note
1.	Adapter	/	TD-203G200170VF01	---	---
2.	Adapter	/	HJ-PD33W-EU	---	---
3.	TF card	SanDisk	32G		

Notes:
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.

4.4 Channel List

N/A

4.5 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Operation Band		Test Mode	Channel Frequency	Channel Number
Tx	E-GSM 900	GSM/GPRS/EGPRS	880.2 MHz	975
			902.4 MHz	62
			914.8 MHz	124
	PCS 1800	GSM/GPRS/EGPRS	1710.2 MHz	512
			1747.8 MHz	700
			1784.8 MHz	885
Rx	E-GSM 900	GSM/GPRS/EGPRS	idle	N/A
	PCS 1800	GSM/GPRS/EGPRS	idle	N/A
Remark: All mode(s) were tested and the worst data was recorded.				

4.6 Test Environment

1.Extreme Test Conditions:
For tests at extreme temperatures, measurements shall be made over the extremes of the operating temperature range as declared by the manufacturer.
For tests at extreme voltages, measurements shall be made over the extremes of the power source voltage range as declared by the manufacturer.

Test Conditions	LTLV	LTHV	HTLV	HTHV
Temperature (℃)	-10	-10	45	45
Test Voltage (DC)	3.48	4.26	3.48	4.26

5. Test Facility and test Instrument Used

5.1 Test Facility

All measurement facilities used to collect the measurement data are located at Shenzhen BCTC Testing Co., Ltd. Address:1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.

5.2 Test Instrument Used

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	966 chamber	ChengYu	966 Room	966	May 15, 2023	May 14, 2026
2	Receiver	R&S	ESR	102075	May 16, 2024	May 15, 2025
3	Receiver	R&S	ESRP	101154	May 16, 2024	May 15, 2025
4	Amplifier	Schwarzbeck	BBV9744	9744-0037	May 16, 2024	May 15, 2025
5	TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	942	May 21, 2024	May 20, 2025
6	Loop Antenna	Schwarzbeck	FMZB1519B	00014	May 21, 2024	May 20, 2025
7	Amplifier	SKET	LAPA_01G18G-45dB	SK2021040901	May 16, 2024	May 15, 2025
8	Horn Antenna	Schwarzbeck	BBHA9120D	1541	May 21, 2024	May 20, 2025
9	Preamplifier	MITEQ	TTA1840-35-HG	2034381	May 16, 2024	May 15, 2025
10	Horn antenna	Schwarzbeck	BBHA9170	00822	May 21, 2024	May 20, 2025
11	Spectrum Analyzer 9kHz-40GHz	R&S	FSP 40	100363	May 16, 2024	May 15, 2025
12	Software	Frad	EZ-EMC	FA-03A2 RE	\	\
13	Spectrum Analyzer	Keysight	N9020A	MY49100060	May 16, 2024	May 15, 2025
14	Signal Generator	Keysight	N5182B	MY56200519	May 16, 2024	May 15, 2025
15	Signal Generator	Keysight	83711B	US37100131	May 16, 2024	May 15, 2025
16	Communication test set	R&S	CMW500	126173	Nov. 11. 2024	Nov. 10, 2025
17	band rejection filter	ZBSF	ZBSF-C2441.5	1706003606	May 16, 2024	May 15, 2025
18	Programmable constant temperature and humidity test chamber	DGBELL	BTKS5-150C	\	Jul. 01, 2024	Jun. 30, 2025
19	Radio frequency control box	MAIWEI	MW200-RFCB	\	\	\
20	Software	MAIWEI	MTS 8200	\	\	\

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	966 chamber	ChengYu	966 Room	966	May 14, 2025	May 13, 2026
2	Receiver	R&S	ESR	102075	May 14, 2025	May 13, 2026
3	Receiver	R&S	ESRP	101154	May 14, 2025	May 13, 2026
4	Amplifier	Schwarzbeck	BBV9744	9744-0037	May 14, 2025	May 13, 2026
5	TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	942	May 21, 2024	May 20, 2026
6	Loop Antenna	Schwarzbeck	FMZB1519B	00014	May 21, 2024	May 20, 2026
7	Amplifier	SKET	LAPA_01G18G-45dB	SK2021040901	May 14, 2025	May 13, 2026
8	Horn Antenna	Schwarzbeck	BBHA9120D	1541	May 21, 2024	May 20, 2026
9	Preamplifier	MITEQ	TTA1840-35-HG	2034381	May 14, 2025	May 13, 2026
10	Horn antenna	Schwarzbeck	BBHA9170	00822	May 21, 2024	May 20, 2026
11	Spectrum Analyzer 9kHz-40GHz	R&S	FSP 40	100363	May 14, 2025	May 13, 2026
12	Software	Frad	EZ-EMC	FA-03A2 RE	\	\
13	Spectrum Analyzer	Keysight	N9020A	MY49100060	May 14, 2025	May 13, 2026
14	Signal Generator	Keysight	N5182B	MY56200519	May 14, 2025	May 13, 2026
15	Signal Generator	Keysight	83711B	US37100131	May 14, 2025	May 13, 2026
16	Communication test set	R&S	CMW500	126173	Nov. 11. 2024	Nov. 10, 2025
17	band rejection filter	ZBSF	ZBSF-C2441.5	1706003606	May 16, 2024	May 15, 2026
18	Programmable constant temperature and humidity test chamber	DGBELL	BTKS5-150C	\	May 14, 2025	May 13, 2026
19	Radio frequency control box	MAIWEI	MW200-RFCB	\	\	\
20	Software	MAIWEI	MTS 8200	\	\	\

6. Transmitter – Frequency Error And Phase Error

6.1 Definition

The frequency error is the difference in frequency, after adjustment for the effect of the modulation and phase error, between the RF transmission from the MS and either:
- the RF transmission from the BS; or
- the nominal frequency for the ARFCN used.

The phase error is the difference in phase, after adjustment for the effect of the frequency error, between the RF transmission from the MS and the theoretical transmission according to the intended modulation.

6.2 Limit

For all measured bursts, the frequency error, derived in step c.6), shall be less than 0,1 ppm, except for GSM 400 MS where a value of 0,2 ppm shall be used.
For all measured bursts, the RMS phase error, derived in step c.8), shall not exceed 5 degrees.
For all measured bursts, each individual phase error, derived in step c.7), shall not exceed 20 degrees.

6.3 EUT Operation Condition

The EUT was programmed to be in continuously transmitting mode.

6.4 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:
Øm = Øm(0)...Øm(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:
Øc = Øc(0)...Øc(n).
c.3) The error array is represented by the vector:
Øe = {Øm(0) - Øc(0)}.........{Øm(n) - Øc(n)} = Øe(0)...Øe(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:

$$k=\frac{\sum_{j=0}^{j=n} t(j) * \phi_e(j)}{\sum_{j=0}^{j=n} t(j)^2}$$

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:
Øe(j) - k*t(j).

c.8) The RMS value øe of the phase errors is given by:

$$Ø_e(RMS)\left[\frac{\sum_{j=0}^{j=n}\{\phi_e(j) - k * t(j)\}^2}{n+1}\right]^{1/2}$$

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, 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 postprocessing,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

6.5 Measurement Record

GSM 900 (MS under maximum power control level)							
GSM900	**Test Condition**	**Frequency Error (Hz)**	**Limit (Hz)**	**Phase Error (degree)**		**Limit (degree)**	**Result**
Reference Frequency 902.4MHz	Normal	4.00	90.2	RMS	1.04	5	PASS
				Peak	3.20	20	
	LVLT	3.95		RMS	1.03	5	
				Peak	3.10	20	
	LVHT	3.87		RMS	0.97	5	
				Peak	2.98	20	
	HVLT	3.82		RMS	0.96	5	
				Peak	2.91	20	
	HVHT	3.74		RMS	0.89	5	
				Peak	2.90	20	
	Vibration	3.68		RMS	0.83	5	
				Peak	2.79	20	

GSM 900 (MS under minimum power control level)							
GSM900	**Test Condition**	**Frequency Error (Hz)**	**Limit (Hz)**	**Phase Error (degree)**		**Limit (degree)**	**Result**
Reference Frequency 902.4MHz	Normal	8.43	90.2	RMS	1.07	5	PASS
				Peak	3.26	20	
	LVLT	8.33		RMS	1.02	5	
				Peak	3.22	20	
	LVHT	8.22		RMS	1.00	5	
				Peak	3.12	20	
	HVLT	8.12		RMS	0.95	5	
				Peak	3.04	20	
	HVHT	8.01		RMS	0.84	5	
				Peak	3.00	20	
	Vibration	7.90		RMS	0.82	5	
				Peak	2.91	20	

GSM 1800 (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	-1.94	174.78	RMS	1.59	5	PASS
				Peak	5.05	20	
	LVLT	-1.99		RMS	1.48	5	
				Peak	5.03	20	
	LVHT	-2.10		RMS	1.38	5	
				Peak	4.93	20	
	HVLT	-2.21		RMS	1.34	5	
				Peak	4.89	20	
	HVHT	-2.23		RMS	1.22	5	
				Peak	4.79	20	
	Vibration	-2.27		RMS	1.12	5	
				Peak	4.71	20	

GSM 1800 (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	16.50	174.78	RMS	1.54	5	PASS
				Peak	4.81	20	
	LVLT	16.46		RMS	1.42	5	
				Peak	4.74	20	
	LVHT	16.40		RMS	1.36	5	
				Peak	4.63	20	
	HVLT	16.40		RMS	1.31	5	
				Peak	4.62	20	
	HVHT	16.33		RMS	1.26	5	
				Peak	4.56	20	
	Vibration	16.23		RMS	1.21	5	
				Peak	4.54	20	

7. Transmitter – Frequency Error Under Multipath And Interference Conditions

7.1 Definition

The frequency error under multipath and interference conditions is a measure of the ability of the MS to maintain frequency synchronization with the received signal under conditions of Doppler shift, multipath reception and interference.

7.2 Limit

T-GSM 810, GSM 850 andE-GSM 900		DCS 1 800		PCS 1 900	
Propagation condition	**Permitted frequency error**	**Propagation condition**	**Permitted frequency error**	**Propagation condition**	**Permitted frequency error**
RA250 HT100 TU50 TU3	±300 Hz ±180 Hz ±160 Hz ±230 Hz	RA130 HT100 TU50 TU1,5	±400 Hz ±350 Hz ±260 Hz ±320 Hz	RA130 HT100 TU50 TU1,5	±420 Hz ±370 Hz ±280 Hz ±330 Hz

7.3 EUT Operation Condition

The EUT was programmed to be in continuously transmitting mode.

7.4 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 toTU50 (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 mid amble.
- the fading function for all channels is set to TUlow.
j) The SS waits 100 s for the MS to stabilize to these conditions.
k) 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.
l) The initial conditions are established again and steps a) to k) are repeated for ARFCN in the Low ARFCN range.

m) The initial conditions are established again and steps a) to k) are repeated for ARFCN in the High ARFCN range.
n) Repeat step h) under extreme test conditions

7.5 Measurement Record

NOTE: All test mode were tested and passed, only shows the worst case mode which were recorded in this report.

GSM 900 (MS under maximum power control level)					
GSM900	**Test Condition**		**Frequency error (Hz)**	**Limit (Hz)**	**Result**
Reference Frequency 902.4MHz	Normal	RA250	-289	±300	PASS
		HT100	115	±180	
		TU50	-4	±160	
		TU3	96	±230	
	LVLT	RA250	-173	±300	
		HT100	-16	±180	
		TU50	54	±160	
		TU3	-44	±230	
	LVHT	RA250	195	±300	
		HT100	92	±180	
		TU50	-6	±160	
		TU3	-3	±230	
	HVLT	RA250	139	±300	
		HT100	6	±180	
		TU50	49	±160	
		TU3	-195	±230	
	HVHT	RA250	56	±300	
		HT100	153	±180	
		TU50	-78	±160	
		TU3	-216	±230	

GSM 900 (MS under minimum power control level)					
GSM900	**Test Condition**		**Frequency error (Hz)**	**Limit (Hz)**	**Result**
Reference Frequency 902.4MHz	Normal	RA250	160	±300	PASS
		HT100	89	±180	
		TU50	43	±160	
		TU3	157	±230	
	LVLT	RA250	-249	±300	
		HT100	39	±180	
		TU50	6	±160	
		TU3	-177	±230	
	LVHT	RA250	-186	±300	
		HT100	7	±180	
		TU50	15	±160	
		TU3	-100	±230	
	HVLT	RA250	205	±300	
		HT100	83	±180	
		TU50	3	±160	
		TU3	33	±230	
	HVHT	RA250	-280	±300	
		HT100	-4	±180	
		TU50	-27	±160	
		TU3	69	±230	

DCS 1800 (MS under maximum power control level)					
DCS1800	Test Condition		Frequency error (Hz)	Limit (Hz)	Result
Reference Frequency 1747.8MHz	Normal	RA130	-355	±400	PASS
		HT100	323	±350	
		TU50	241	±260	
		TU1.5	196	±320	
	LVLT	RA130	211	±400	
		HT100	174	±350	
		TU50	211	±260	
		TU1.5	-275	±320	
	LVHT	RA130	-94	±400	
		HT100	45	±350	
		TU50	-168	±260	
		TU1.5	-311	±320	
	HVLT	RA130	-170	±400	
		HT100	-259	±350	
		TU50	139	±260	
		TU1.5	-293	±320	
	HVHT	RA130	366	±400	
		HT100	-115	±350	
		TU50	-140	±260	
		TU1.5	93	±320	

DCS 1800 (MS under minimum power control level)					
DCS1800	Test Condition		Frequency error (Hz)	Limit (Hz)	Result
Reference Frequency 1747.8MHz	Normal	RA130	16	±400	PASS
		HT100	169	±350	
		TU50	60	±260	
		TU1.5	-220	±320	
	LVLT	RA130	-350	±400	
		HT100	38	±350	
		TU50	242	±260	
		TU1.5	158	±320	
	LVHT	RA130	-74	±400	
		HT100	193	±350	
		TU50	15	±260	
		TU1.5	8	±320	
	HVLT	RA130	149	±400	
		HT100	-130	±350	
		TU50	217	±260	
		TU1.5	313	±320	
	HVHT	RA130	-149	±400	
		HT100	-165	±350	
		TU50	231	±260	
		TU1.5	52	±320	

8. Frequency Error And Phase Error In GPRS Multislot Configuration

8.1 Definition

The frequency error is the difference in frequency, after adjustment for the effect of the modulation and phase error, between the RF transmission from the MS and either:
- the RF transmission from the BS; or
- the nominal frequency for the ARFCN used.

The phase error is the difference in phase, after adjustment for the effect of the frequency error, between the RF transmission from the MS and the theoretical transmission according to the intended modulation.

8.2 Limit

For all measured bursts, the frequency error, derived in step c.6), shall be less than 10E-7.
For all measured bursts, the RMS phase error, derived in step c.8), shall not exceed 5 degrees.
For all measured bursts, each individual phase error, derived in step c.7), shall not exceed 20 degrees.

8.3 EUT Operation Condition

The EUT was programmed to be in continuously transmitting mode.

8.4 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:
Øm = Øm(0)...Øm(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:
Øc = Øc(0)...Øc(n).
c.3) The error array is represented by the vector:
Øe = {Øm(0) - Øc(0)}.........{Øm(n) - Øc(n)} = Øe(0)...Øe(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:

$$k=\frac{\sum_{j=0}^{j=n} t(j) * \phi_e(j)}{\sum_{j=n}^{j=n} t(j)^2}$$

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:
Øe(j) - k*t(j).

c.8) The RMS value Øe of the phase errors is given by:

$$\text{Ø}_e(\text{RMS}) \left[\frac{\sum_{j=0}^{j=n} \{\phi_e(j) - k * t(j)\}^2}{n+1} \right]^{1/2}$$

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 (ΓCH) 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.
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: Steps g) and h) are skipped if TSPC_No_Vibration_Sensitive_Components is declared as Yes

8.5 Measurement Record

GPRS900(MS under maximum power control level)							
GPRS900	**Test Condition**	**Frequency Error (Hz)**	**Limit (Hz)**	**Phase Error (degree)**		**Limit (degree)**	**Result**
Reference Frequency 902.4MHz	Normal	-3.81	90.2	RMS	1.14	5	PASS
				Peak	3.32	20	
	LVLT	-3.91		RMS	1.06	5	
				Peak	3.25	20	
	LVHT	-3.95		RMS	0.95	5	
				Peak	3.21	20	
	HVLT	-3.97		RMS	0.88	5	
				Peak	3.21	20	
	HVHT	-4.00		RMS	0.86	5	
				Peak	3.21	20	
	Vibration	-4.06		RMS	0.77	5	
				Peak	3.11	20	

GPRS900(MS under minimum power control level)							
GPRS900	**Test Condition**	**Frequency Error (Hz)**	**Limit (Hz)**	**Phase Error (degree)**		**Limit (degree)**	**Result**
Reference Frequency 902.4MHz	Normal	12.24	90.2	RMS	1.04	5	PASS
				Peak	3.24	20	
	LVLT	12.16		RMS	0.95	5	
				Peak	3.22	20	
	LVHT	12.04		RMS	0.92	5	
				Peak	3.19	20	
	HVLT	11.92		RMS	0.82	5	
				Peak	3.18	20	
	HVHT	11.89		RMS	0.75	5	
				Peak	3.14	20	
	Vibration	11.79		RMS	0.69	5	
				Peak	3.10	20	

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	-3.97	174.78	RMS	1.62	5	PASS
				Peak	5.09	20	
	LVLT	-4.10		RMS	1.52	5	
				Peak	4.99	20	
	LVHT	-4.19		RMS	1.45	5	
				Peak	4.96	20	
	HVLT	-4.31		RMS	1.38	5	
				Peak	4.94	20	
	HVHT	-4.40		RMS	1.37	5	
				Peak	4.88	20	
	Vibration	-4.41		RMS	1.28	5	
				Peak	4.78	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	9.65	174.78	RMS	1.62	5	PASS
				Peak	4.82	20	
	LVLT	9.62		RMS	1.54	5	
				Peak	4.78	20	
	LVHT	9.51		RMS	1.43	5	
				Peak	4.74	20	
	HVLT	9.41		RMS	1.33	5	
				Peak	4.73	20	
	HVHT	9.38		RMS	1.21	5	
				Peak	4.61	20	
	Vibration	9.38		RMS	1.20	5	
				Peak	4.55	20	

9. Transmitter Output Power And Burst Timing

9.1 Definition

The transmitter output power is the average value of the power delivered to an artificial antenna or radiated by the MS and its integral antenna, over the time that the useful information bits of one burst are transmitted.
The transmit burst timing is the envelope of the RF power transmitted with respect to time. The timings are referenced to the transition from bit 13 to bit 14 of the Training Sequence ("midamble") before differential decoding. The timing of the modulation is referenced to the timing of the received signal from the SS.

9.2 Limit

1. The MS maximum output power shall be as defined in 3GPP TS 05.05, sub clause 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, sub clause 4.1.1, table for GMSK modulation.
2. The MS maximum output power shall be as defined in 3GPP TS 05.05, sub clause 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, sub clause 4.1.1, table for GMSK modulation; 3GPP TS 05.05 annex D in subclasses 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, sub clause 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, sub clause 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, ±5dB or ±6 dB under extreme conditions; 3GPP TS 05.05, sub clause 4.1.1; 3GPP TS 05.05 annex D subclasses D.2.1and 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, 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 in figure B.1:
6.1 Under normal conditions; 3GPP TS 05.05, sub clause 4.5.2.
6.2 Under extreme conditions; 3GPP TS 05.05, sub clause 4.5.2, 3GPP TS 05.05 annex D in sub clauses D.2.1 and D.2.2.
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:
8.1 Under normal conditions; 3GPP TS 05.10, sub clause 6.4.
8.2 Under extreme conditions; 3GPP TS 05.10, sub clause 6.4, 3GPP TS 05.05 annex D in sub clauses D.2.1 and D.2.2.
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:
9.1 Under normal conditions; 3GPP TS 05.05, sub clause 4.5.2.
9.2 Under extreme conditions; 3GPP TS 05.05, sub clause 4.5.2, 3GPP TS 05.05 annex D in sub clause D.2.1 and D.2.2.

10.The MS shall use a TA value of 0 for the Random Access burst sent:
10.1 Under normal conditions; 3GPP TS 05.10, sub clause 6.6.

10.2 Under extreme conditions; 3GPP TS 05.10, sub clause 6.6, 3GPP TS 05.05 annex D in sub clause D.2.1 and D.2.2.

9.3 EUT Operation Condition

The EUT was programmed to be in continuously transmitting mode.

9.4 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 mid amble, 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 power control levels defined, even those not 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) are referenced in time to the centre of the useful transmitted bits and in power to the 0 dB reference, both identified in f).
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, 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) 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 power control level of the MS.

9.5 Measurement Record

Power Control Level	GSM900, Low Channel, F=880.2 MHz						
	OUTPUT POWER (dBm)						Result
	Normal	LTLV	HTLV	LTHV	HTHV	Limit	
5	32.63	32.72	32.31	32.79	**32.94**	33±3	PASS
6	29.69	29.20	29.47	29.38	29.18	31±3	
7	28.92	28.62	28.12	28.08	28.18	29±3	
8	26.97	26.40	26.84	26.44	26.04	27±3	
9	24.63	24.47	24.65	24.42	24.01	25±3	
10	21.91	21.71	21.65	21.97	21.36	23±3	
11	20.63	20.49	20.88	20.08	20.87	21±3	
12	17.39	17.89	17.90	17.52	17.58	19±3	
13	16.84	16.23	16.03	16.24	16.09	17±3	
14	14.94	14.61	14.07	14.55	14.76	15±3	
15	11.98	11.99	11.73	11.17	11.18	13±3	
16	9.89	9.94	9.19	9.16	9.20	11±3	
17	7.07	7.50	7.73	7.46	7.71	9±3	
18	6.17	6.58	6.84	6.08	6.53	7±3	
19	4.24	4.85	4.22	4.45	4.62	5±3	

Power Control Level	GSM900, Middle Channel, F= 902.4MHz						
	OUTPUT POWER (dBm)						Result
	Normal	LTLV	HTLV	LTHV	HTHV	Limit	
5	31.77	31.99	31.80	31.52	31.51	33±3	PASS
6	29.27	29.23	29.54	29.98	29.83	31±3	
7	28.96	28.35	28.36	28.60	28.10	29±3	
8	26.40	26.33	26.38	26.08	26.75	27±3	
9	24.72	24.61	24.13	24.57	24.19	25±3	
10	21.75	21.64	21.27	21.17	21.93	23±3	
11	20.69	20.51	20.51	20.56	20.78	21±3	
12	17.18	17.02	17.13	17.45	17.75	19±3	
13	16.45	16.57	16.51	16.44	16.64	17±3	
14	14.89	14.36	14.64	14.02	14.72	15±3	
15	11.25	11.55	11.33	11.55	11.66	13±3	
16	9.28	9.20	9.58	9.15	9.68	11±3	
17	7.52	7.23	7.71	7.63	7.31	9±3	
18	6.86	6.91	6.87	6.52	6.32	7±3	
19	4.09	4.81	4.21	4.69	4.28	5±3	

Power Control Level	GSM900, High Channel, F= 914.8 MHz						
	OUTPUT POWER (dBm)						Result
	Normal	LTLV	HTLV	LTHV	HTHV	Limit	
5	31.43	31.10	31.52	31.84	31.03	33±3	PASS
6	29.64	29.66	29.55	29.20	29.42	31±3	
7	28.43	28.99	28.44	28.14	28.09	29±3	
8	26.88	26.46	26.71	26.01	26.17	27±3	
9	24.14	24.66	24.48	24.87	24.40	25±3	
10	21.07	21.91	21.93	21.92	21.58	23±3	
11	20.05	20.90	20.82	20.21	20.96	21±3	
12	17.20	17.54	17.97	17.50	17.68	19±3	
13	16.02	16.80	16.25	16.60	16.97	17±3	
14	14.68	14.18	14.86	14.58	14.71	15±3	
15	11.53	11.05	11.86	11.79	11.27	13±3	
16	9.42	9.66	9.63	9.83	9.61	11±3	
17	7.81	7.98	7.65	7.10	7.98	9±3	
18	6.38	7.00	6.99	6.88	6.68	7±3	
19	4.10	4.81	4.54	4.03	4.37	5±3	

Power Control Level	DCS1800, Low Channel, F= 1710.2 MHz						
	OUTPUT POWER (dBm)						Result
	Normal	LTLV	HTLV	LTHV	HTHV	Limit	
0	32.47	**32.86**	32.13	32.84	32.62	30±3	PASS
1	27.11	27.40	27.12	27.27	27.66	28±3	
2	25.38	25.76	25.14	25.50	25.52	26±3	
3	22.01	22.64	23.00	22.10	22.61	24±3	
4	20.97	20.56	20.12	20.67	20.67	22±3	
5	19.18	19.91	19.63	19.92	19.94	20±3	
6	17.48	17.26	17.72	17.34	17.31	18±3	
7	14.30	14.92	14.93	14.48	14.96	16±3	
8	12.56	12.70	12.28	12.63	12.21	14±3	
9	11.53	11.88	11.56	11.63	11.81	12±4	
10	8.09	8.24	8.50	8.74	8.72	10±4	
11	6.65	6.25	6.39	6.84	6.94	8±4	
12	5.07	5.21	5.95	5.64	5.46	6±4	
13	3.56	3.66	3.27	3.25	3.47	4±4	
14	0.98	0.92	0.02	0.77	0.29	2±5	
15	-2.00	-1.65	-1.86	-1.14	-1.36	0±5	

Power Control Level	DCS1800, Middle Channel, F= 1747.8 MHz						Result
	OUTPUT POWER (dBm)						
	Normal	LTLV	HTLV	LTHV	HTHV	Limit	
0	32.47	31.70	31.73	31.50	32.46	30±3	PASS
1	27.14	27.14	27.02	27.41	27.43	28±3	
2	25.69	25.78	25.99	25.53	25.60	26±3	
3	22.43	22.33	22.17	22.12	22.93	24±3	
4	20.29	20.63	20.35	20.03	20.33	22±3	
5	19.62	19.76	19.67	19.76	19.17	20±3	
6	17.77	17.41	17.62	17.73	17.92	18±3	
7	14.11	14.17	14.73	14.53	14.04	16±3	
8	12.16	12.96	12.03	12.50	12.89	14±3	
9	11.95	11.73	11.53	11.61	11.70	12±4	
10	8.93	8.26	8.54	8.59	8.36	10±4	
11	6.98	6.08	6.79	6.44	6.74	8±4	
12	5.91	5.02	5.24	5.43	5.34	6±4	
13	3.19	3.60	3.83	3.77	3.88	4±4	
14	0.84	0.54	0.85	0.68	0.02	2±5	
15	-1.12	-1.75	-1.72	-1.19	-1.79	0±5	

Power Control Level	DCS1800, High Channel, F= 1784.8 MHz						Result
	OUTPUT POWER (dBm)						
	Normal	LTLV	HTLV	LTHV	HTHV	Limit	
0	32.42	32.21	32.08	32.46	32.02	30±3	PASS
1	27.58	27.87	27.38	27.99	27.84	28±3	
2	25.47	25.02	25.89	25.56	25.43	26±3	
3	22.67	22.03	22.46	22.20	22.30	24±3	
4	20.13	20.34	20.67	20.30	20.99	22±3	
5	19.74	19.92	19.92	19.02	19.97	20±3	
6	17.05	17.52	17.38	17.35	17.49	18±3	
7	14.27	14.05	14.27	14.60	14.23	16±3	
8	12.88	12.48	12.45	12.53	12.88	14±3	
9	11.28	11.15	11.05	11.98	11.70	12±4	
10	8.31	8.20	8.07	8.66	8.37	10±4	
11	6.86	6.21	6.01	6.90	6.48	8±4	
12	5.57	5.21	5.05	5.42	5.20	6±4	
13	3.51	3.46	3.20	3.13	3.97	4±4	
14	0.04	0.14	0.40	0.12	0.37	2±5	
15	-1.89	-1.56	-1.73	-1.09	-1.74	0±5	

10. Transmitter – Output RF Spectrum

10.1 Definition

The output RF spectrum is the relationship between the frequency offset from the carrier and the power, measured in a specified bandwidth and time, produced by the MS due to the effects of modulation and power ramping.

10.2 Limit

The level of the output RF spectrum due to modulation shall be no more than that given in ETSI TS 151 010-1 V7.11.0 (2008-10),sub clause 13.4.5, table Table 13-6) GSM 400, GSM 700, T-GSM 810, GSM 850 and GSM 900 Spectrum due to modulation out to less than 1800 kHz offset, Table 13-7) DCS 1800 Spectrum due to modulation out to less than 1800 kHz offset, Table 13-9) Spectrum due to modulation from 1800 kHz offset to the edge of the transmit band (wideband noise), Table 13-10) Spurious emissions in the MS receive bands.
For GSM 400, T-GSM 810, GSM 900 and DCS 1800 MS the spurious emissions in the bands 850 MHz to 866 MHz, 925 MHz to 935 MHz, 935 MHz to 960 MHz and 1805 MHz to 1880 MHz, measured in step d),shall not exceed the values shown in table 13-10 except in up to five measurements in the band 925 MHz to 960 MHz and five measurements in the band 1805 MHz to 1880 MHz where a level up to -36 dBm is permitted. For GSM 400 MS, in addition, the MS spurious emissions in the bands 460, 4 MHz to 467,6MHz and 488,8 MHz to 496 MHz shall not exceed the value of -67 dBm, except in up to three measurements in each of the bands 460,4 MHz to 467,6 MHz and 488,8 MHz to 496 MHz where a level up to -36 dBm is permitted. For GSM 700, GSM 850 and PCS 1 900 MS the spurious emissions in the bands 698 MHz to 716 MHz, 747 MHz to 762 MHz, 869 MHz to 894 MHz and 1930 MHz to 1990 MHz shall not exceed the values shown in table 13-10 except in up to five measurements in each of the bands 698 MHz to 716 MHz, 747 MHz to 762 MHz, 869 MHz to 894 MHz and 1930 MHz to 1990 MHz where a level up to -36 dBm is permitted.

Table 13-10: Spurious emissions in the MS receive bands

Band (MHz)	Spurious emissions level(dBm)	
-	GSM 400, T-GSM 810, GSM 900 and DCS 1 800	GSM 700, GSM 850 and PCS 1 900
460.4 – 467.6 (GSM 400 MS only)	-67	-
488.8 - 496 (GSM 400 MS only)	-67	-
850 to 866 (T-GSM 810 MS only)	-79	-
925 to 935	-67	-
935 to 960	-79	-
1 805 to 1 880	-71	-
728 to 736	-	-73
736 to 746	-	-79
747 to 757	-	-79
757 to 763	-	-73
869 to 894	-	--79
1 930 to 1 990	-	-71

10.3 EUT Operation Condition

The EUT was programmed to be in continuously transmitting mode.

10.4 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 analyzer 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.

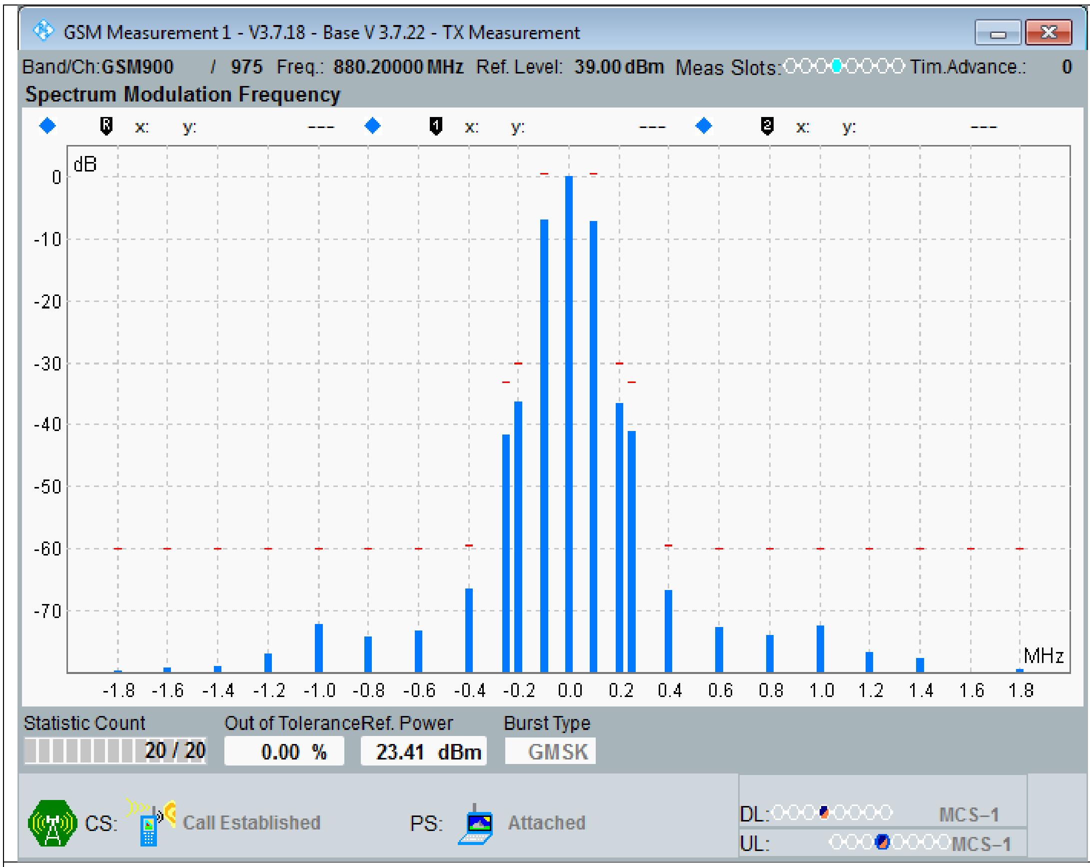
The video signal of the spectrum analyzer is "gated" such that the spectrum generated by at least 40 of thebits 87 to 132 of the burst is the only spectrum measured. This gating may be analogue or numerical,dependent upon the design of the spectrum analyzer. Only measurements during transmitted bursts on thenominal carrier of the measurement are included. The spectrum analyzer averages over the gated periodand 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 analyzer 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 analyzer 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 over50 bursts.

e) The MS is commanded to its minimum power control level. The spectrum analyzer is set again as in b).
f) By tuning the spectrum analyzer 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.
- Zero frequency scan;
- Resolution bandwidth: 30 kHz;
- Video bandwidth: 100 kHz;
- Peak hold.

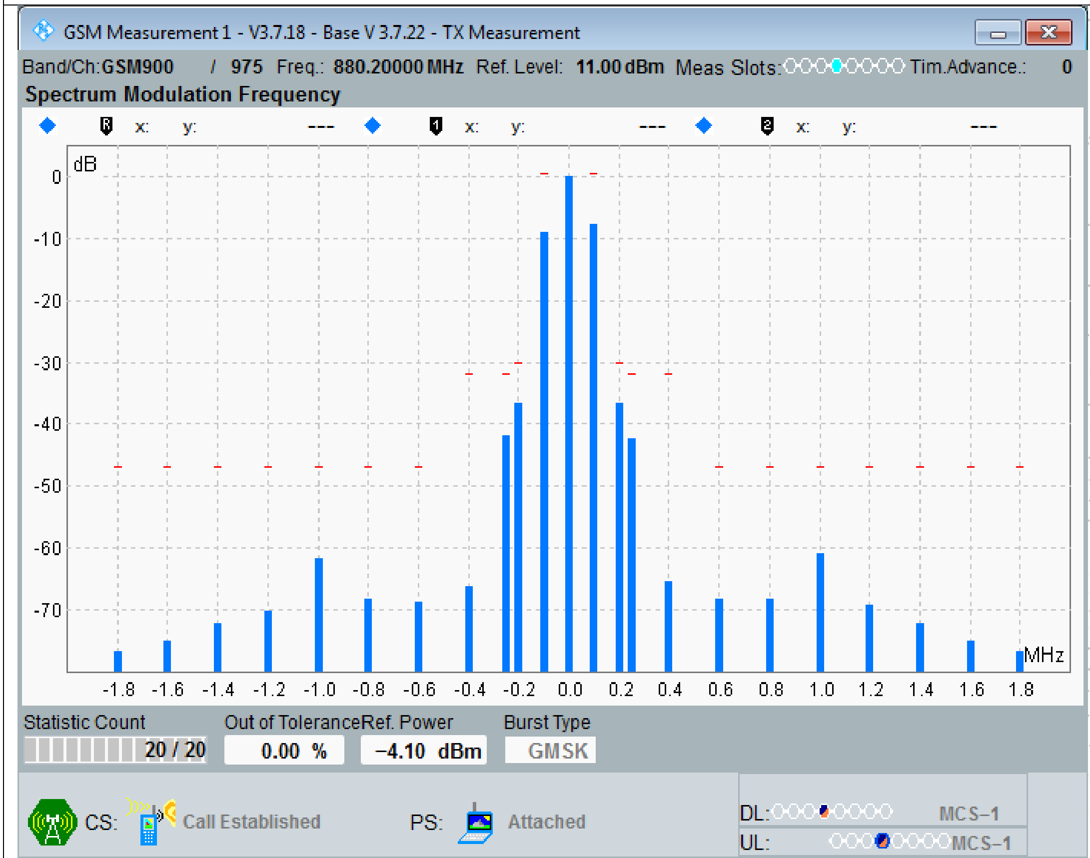
The spectrum analyzer gating of the signal is switched off.
The MS is commanded to its maximum power control level.
h) By tuning the spectrum analyzer centre frequency to the measurement frequencies the power level is measured at the following frequencies:
FT + 400 kHz FT - 400 kHz;
FT + 600 kHz FT - 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.

10.5 Measurement Record

GSM



GSM900 Channel=975 PCL=5 NVNT



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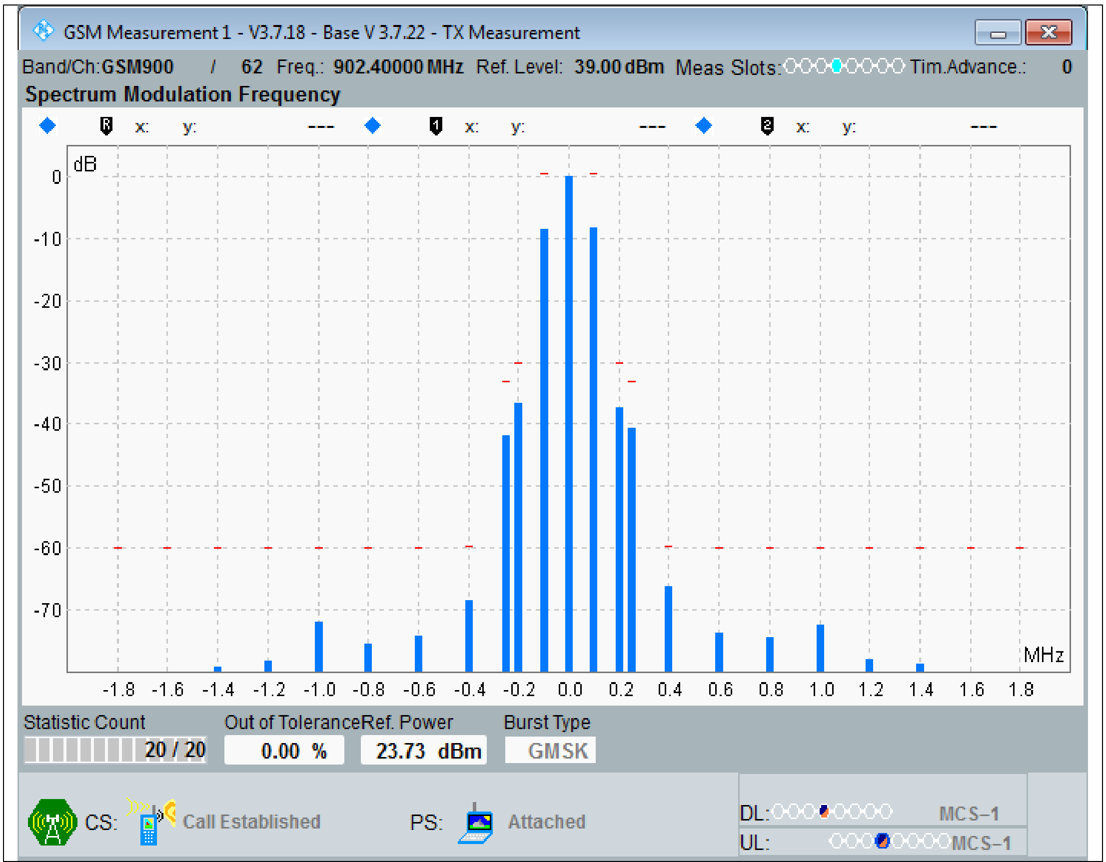
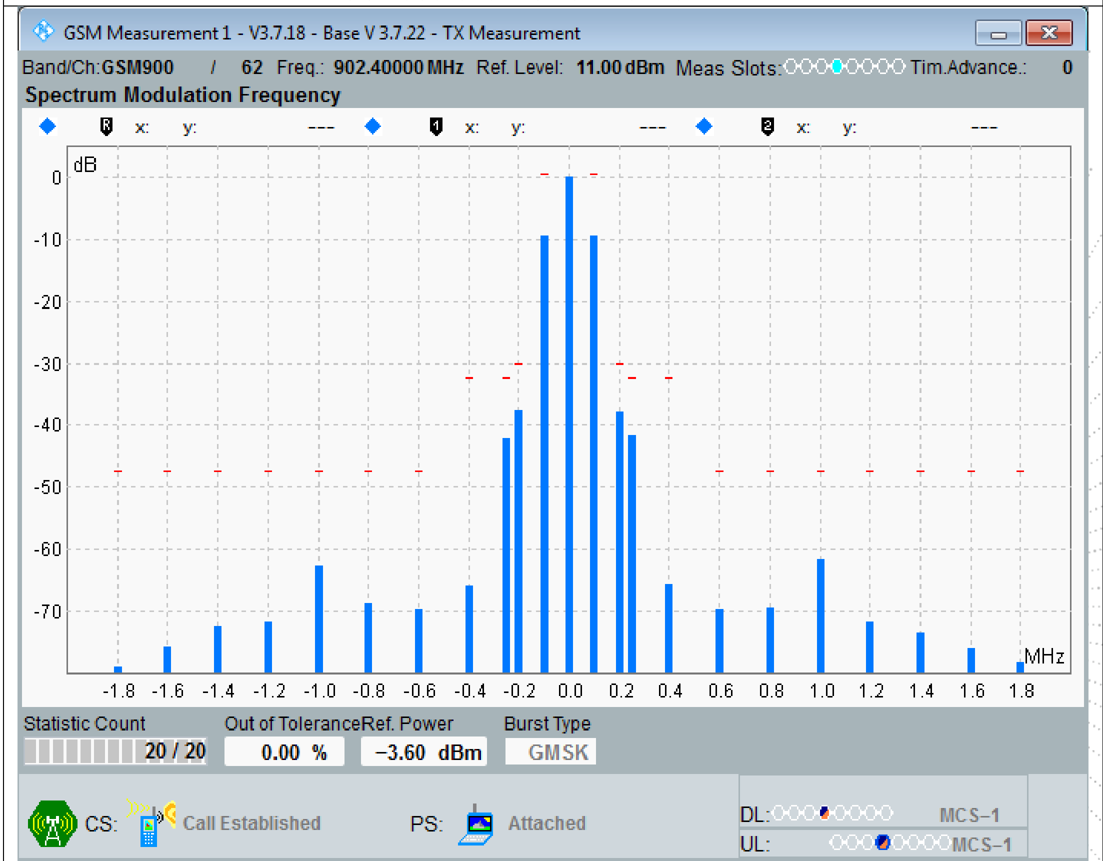


GSM900 Channel=62 PCL=5 NVNT



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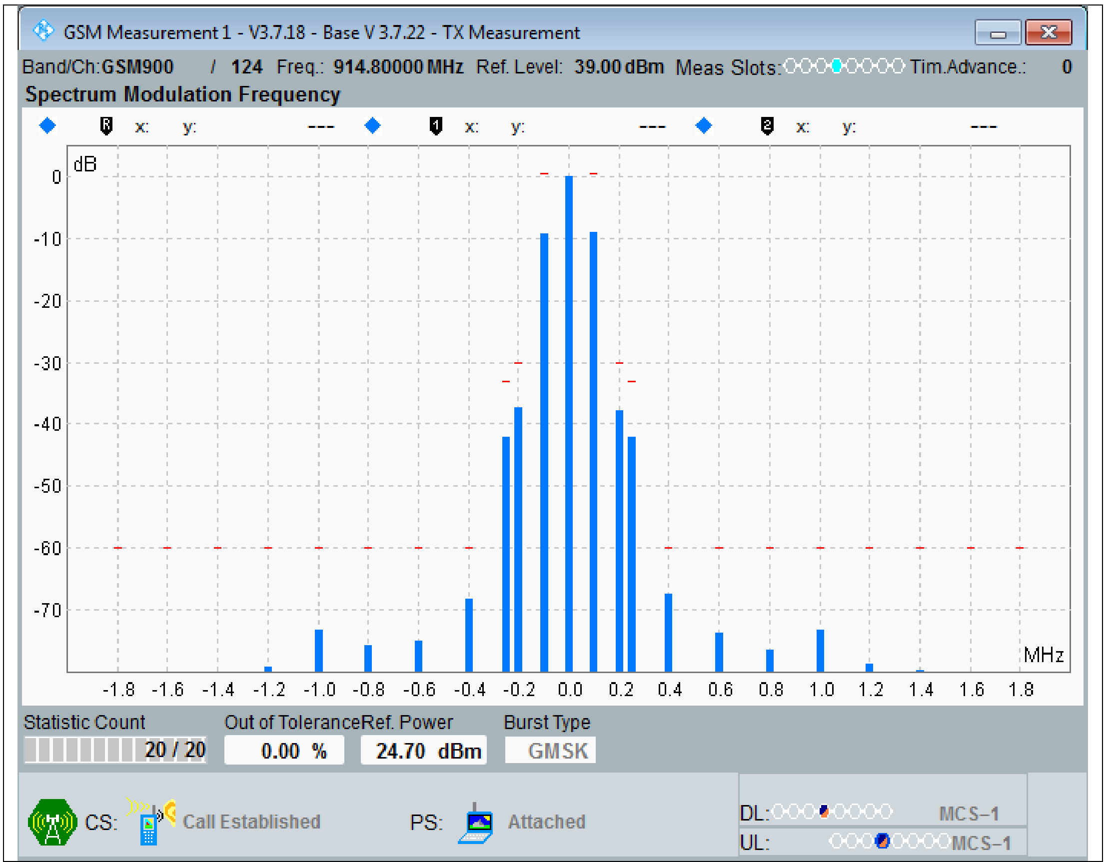
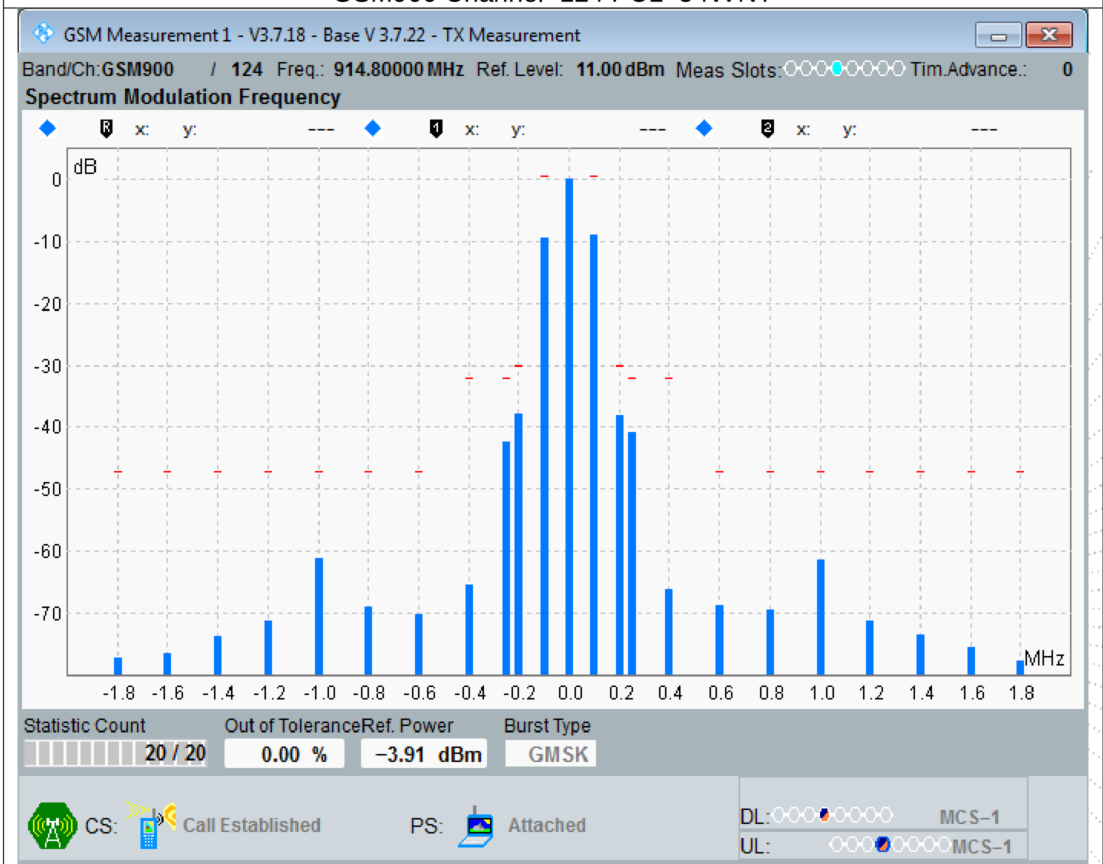
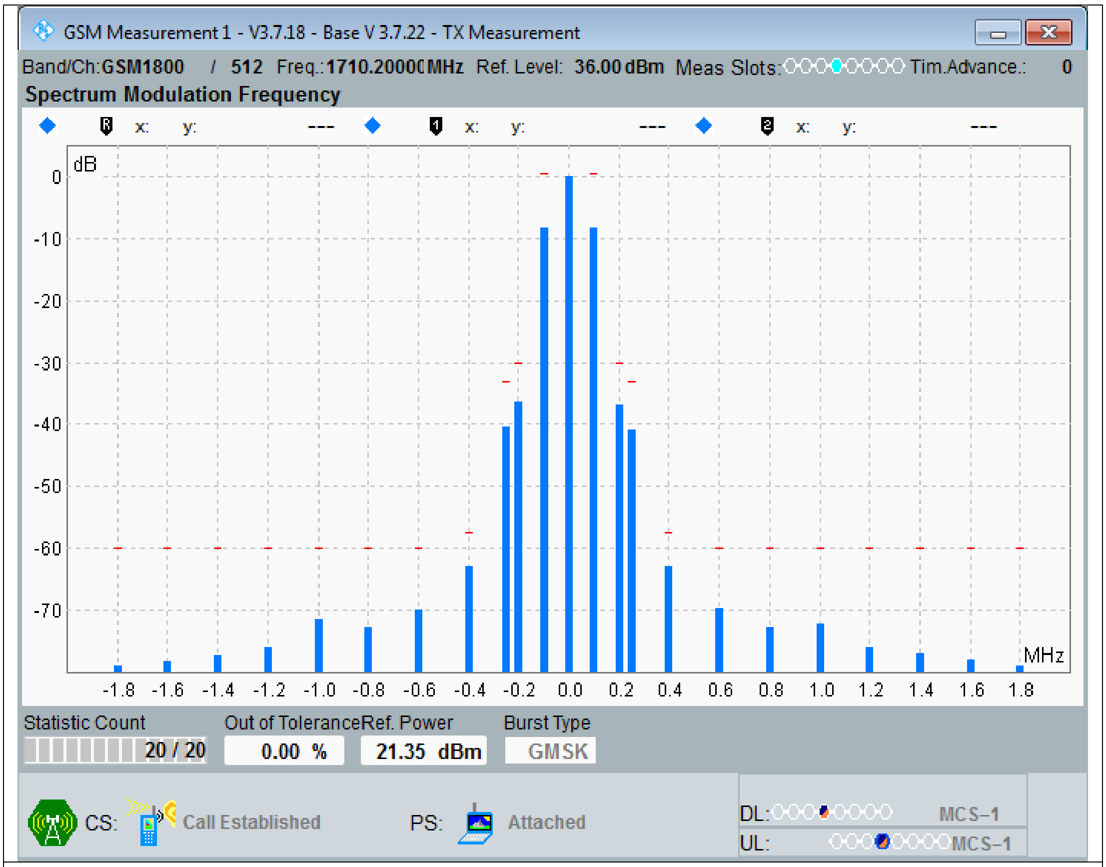


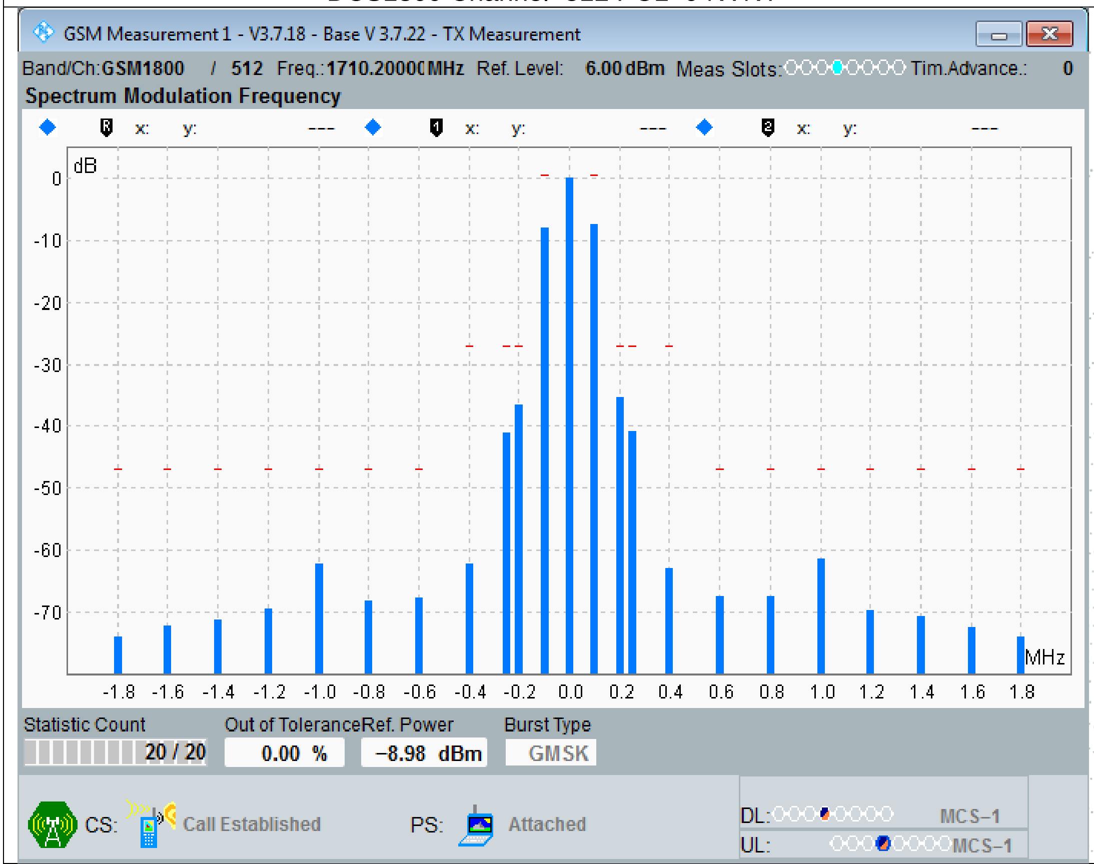
GSM900 Channel=124 PCL=5 NVNT



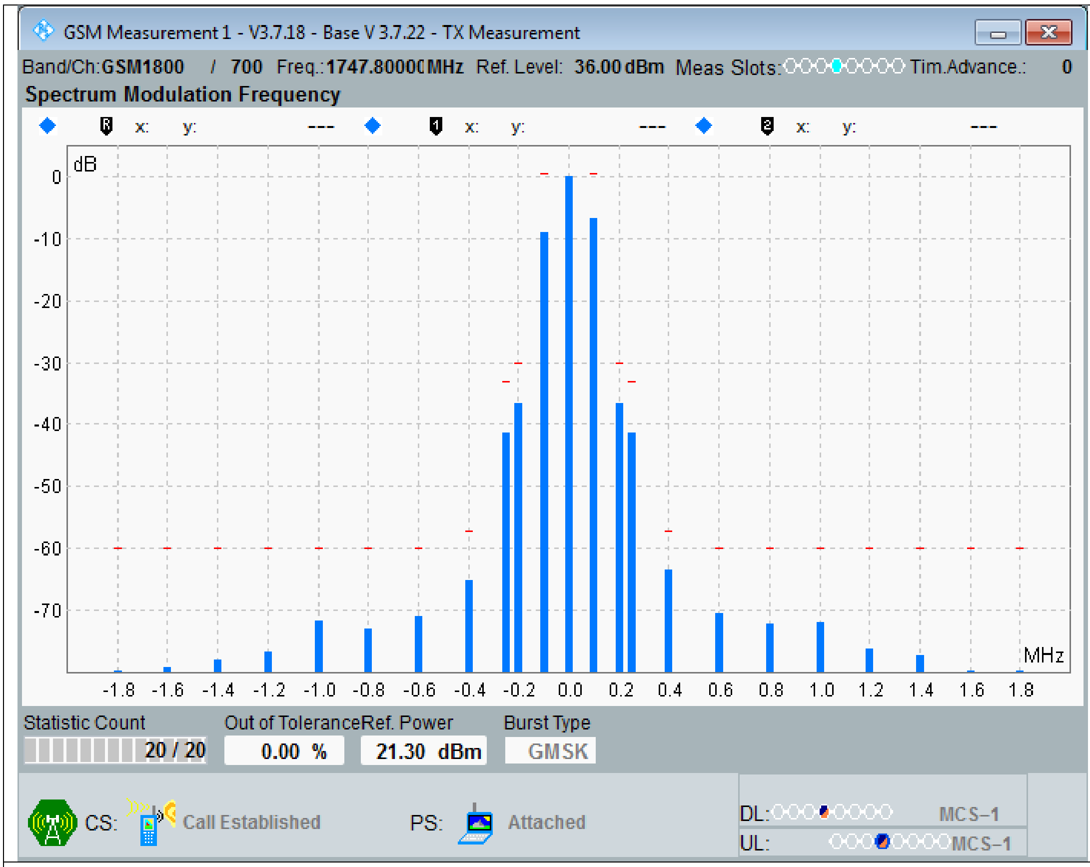
GSM900 Channel=124 PCL=19 NVNT



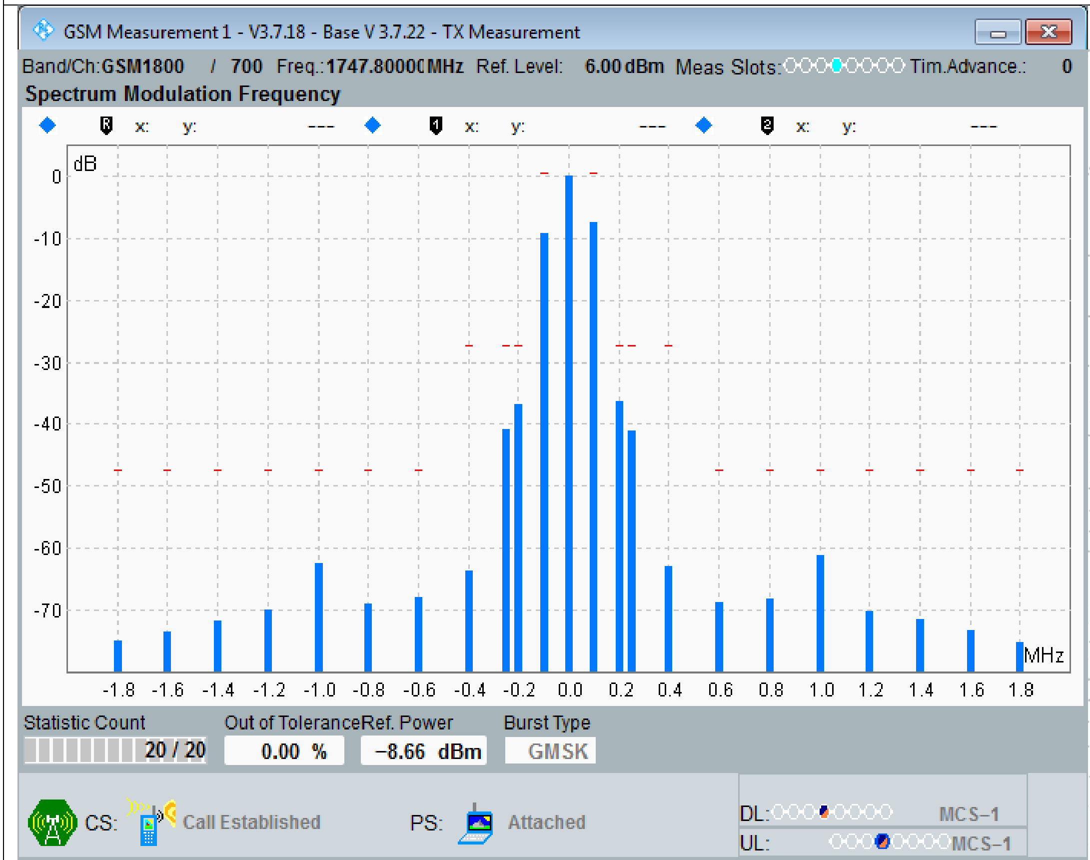
DCS1800 Channel=512 PCL=0 NVNT



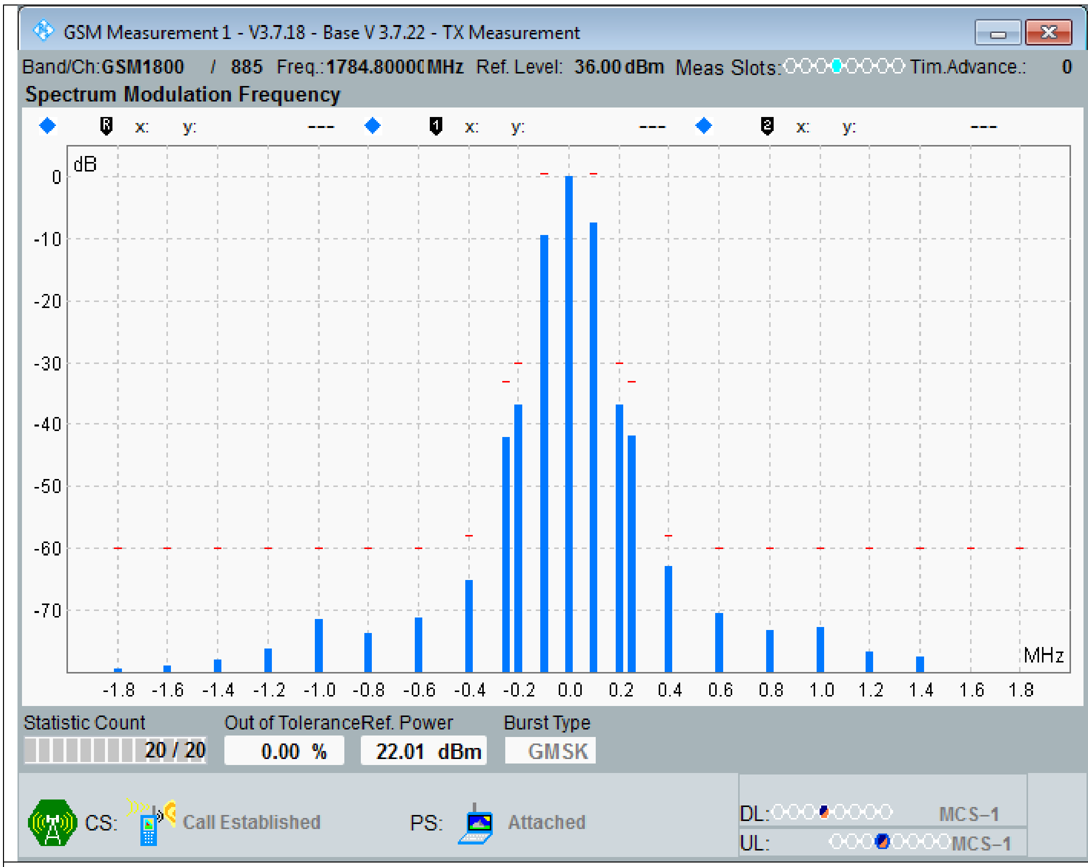
DCS1800 Channel=512 PCL=15 NVNT



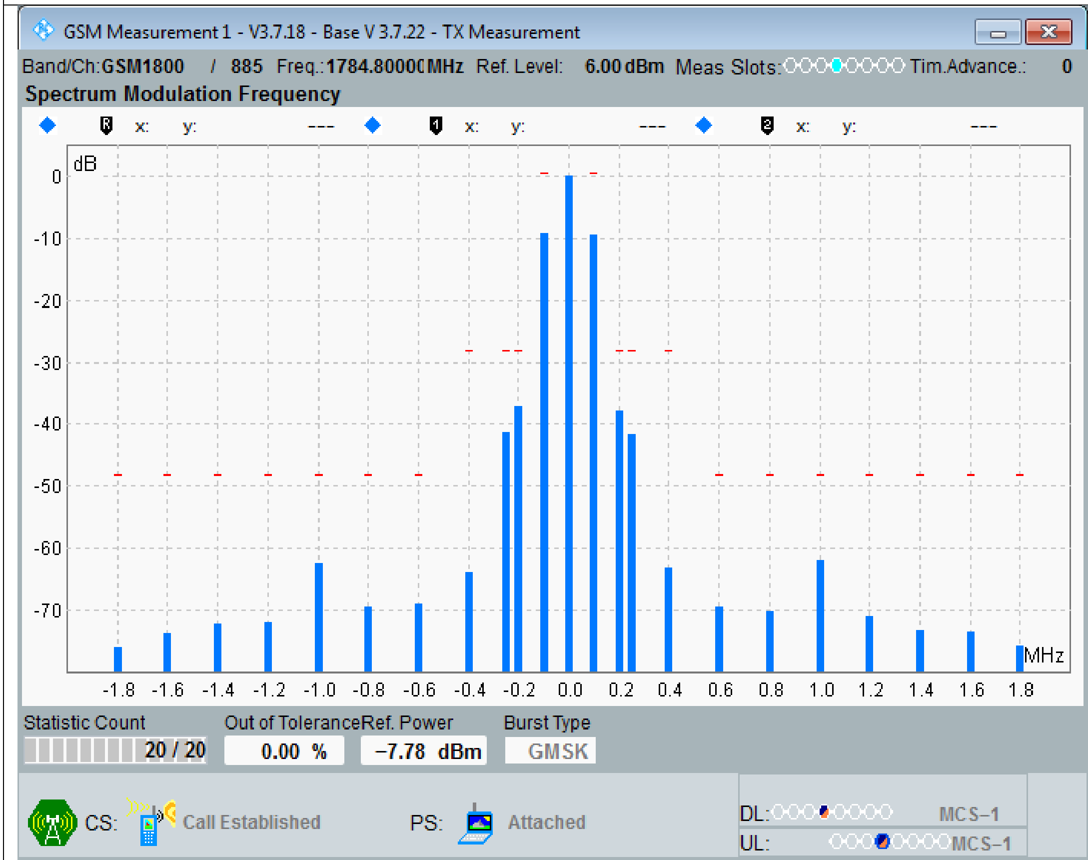
DCS1800 Channel=700 PCL=0 NVNT



DCS1800 Channel=700 PCL=15 NVNT



DCS1800 Channel=885 PCL=0 NVNT



DCS1800 Channel=885 PCL=15 NVNT

11. Transmitter Output Power In GPRS Multislot Configuration

11.1 Definition

The transmitter output power is the average value of the power delivered to an artificial antenna or radiated by the MS and its integral antenna, over the time that the useful information bits of one burst are transmitted.

11.2 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.
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.
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.
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 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:
6.1 Under normal conditions; 3GPP TS 05.05, subclause 4.5.2.
Under extreme conditions; 3GPP TS 05.05, subclause 4.5.2, 3GPP TS 05.05 annex D subclauses D.2.1 and D.2.2.
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_XPWR_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:
8.1 Under normal conditions; 3GPP TS 05.05, subclause 4.5.2.
8.2 Under extreme conditions; 3GPP TS 05.05, subclause 4.5.2, 3GPP TS 05.05 annex D subclauses D.2.1 and D.2.2.

11.3 EUT Operation Condition

The EUT was programmed to be in continuously transmitting mode.

11.4 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 power control levels defined, even those not supported by the MS.
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 reselection 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 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 power/time relationship
The array of power samples measured in f) are 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 GSM 400, GSM 700, GSM 850 and GSM 900 or +10 dBm for DCS 1 800 and PCS 1 900) and then steps f) to g) are repeated.
i) Steps a) to h) 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 power control level of the MS.

11.5 Measurement Record

	E-GSM900 Output Power in GPRS				
γ=	OUTPUT POWER (dBm)				Result
	Low Channel 880.2 MHz	Middle Channel 902.4 MHz	High Channel 914.8 MHz	Limit	
1 up slot					PASS
3	31.84	31.62	31.83	33±3	
4	30.06	30.09	30.63	31±3	
5	28.56	28.71	28.73	29±3	
6	25.56	25.17	25.08	27±3	
7	24.40	24.60	24.36	25±3	
8	22.65	22.08	22.46	23±3	
9	19.95	19.35	19.49	21±3	
10	18.48	18.23	18.29	19±3	
11	16.19	16.00	16.35	17±3	
12	14.81	14.13	14.15	15±3	
13	12.09	12.06	12.83	13±3	
14	9.13	9.10	9.92	11±5	
15	8.01	8.77	8.51	9±5	
16	6.65	6.02	6.04	7±5	
17	4.28	4.10	4.86	5±5	
2 up slot					
3	30.38	30.01	30.92	30±3	
17	1.56	1.49	1.92	2±5	
3 up slot					
3	28.91	28.97	28.02	28±3	
17	0.52	0.07	0.54	0±5	
4 up slot					
3	25.02	25.13	25.75	26±3	
17	-2.83	-2.02	-2.23	-2±5	

	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	Limit	
1 up slot					PASS
3	28.72	28.09	28.15	30±3	
4	27.25	27.11	27.89	28±3	
5	24.05	24.54	24.30	26±3	
6	22.35	22.12	22.60	24±3	
7	21.69	21.03	21.79	22±3	
8	18.85	18.69	18.26	20±3	
9	17.77	17.20	17.69	18±4	
10	14.63	14.64	14.83	16±4	
11	12.70	12.44	12.80	14±4	
12	10.21	10.98	10.01	12±4	
13	8.48	8.13	8.35	10±4	
14	6.90	6.22	6.11	8±4	
15	4.06	4.39	4.40	6±4	
16	3.33	3.29	3.49	4±4	
17	0.09	0.38	0.82	2±5	
18	-0.17	-0.63	-0.88	0±5	
2 up slot					
3	27.71	27.28	27.33	28±3	
18	-0.26	-0.02	-0.82	-2±5	
3 up slot					
3	24.40	24.08	24.70	26±3	
18	-2.24	-2.27	-2.23	-4±5	
4 up slot					
3	22.29	22.33	22.93	24±3	
18	-5.60	-5.01	-5.97	-6±5	

12. Output RF Spectrum In GPRS Multislot Configuration

12.1 Definition

The output RF spectrum is the relationship between the frequency offset from the carrier and the power, measured in a specified bandwidth and time, produced by the MS due to the effects of modulation and power ramping.

12.2 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 1800 or table c) for PCS 1900, 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.
1.1 Under normal conditions; 3GPP TS 05.05, subclause 4.2.1.
1.2 Under extreme conditions; 3GPP TS 05.05, subclause 4.2.1; 3GPP TS 05.05, annex D subclauses D.2.1 and D.2.2.
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".
2.1 Under normal conditions; 3GPP TS 05.05, subclause 4.2.2.
2.2 Under extreme conditions; 3GPP TS 05.05, subclause 4.2.2; 3GPP TS 05.05 annex D subclause D.2.1 and D.2.2.
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 747 MHz to 757 MHz shall be no more than -79 dBm, in the band of 757 MHz to 762 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 747 MHz to 762 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 05.05, subclause 4.3.3.

Table 13-10: Spurious emissions in the MS receive bands

Band (MHz)	Spurious emissions level(dBm)	
	GSM 400, GSM 900 and DCS 1 800	GSM 700, GSM 850 and PCS 1 900
925 to 935	-67	-
935 to 960	-79	-
1805 to 1880	-71	-
728 to 736	-	-79
736 to 746	-	-73
747 to 757	-	-79
757 to 763	-	-73
869 to 894	-	-79
1930 to 1990	-	-71

12.3 EUT Operation Condition:

The EUT was programmed to be in continuously transmitting mode.

12.4 Test Procedure

NOTE: When averaging is in use during frequency hopping mode, the averaging only includes bursts transmitted when the hopping carrier corresponds to the nominal carrier of the measurement.
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 analyzer 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 analyzer 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 analyzer.
Only measurements during transmitted bursts on the nominal carrier of the measurement are included. The spectrum analyzer 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 analyzer 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 analyzer 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, GSM 900 and DCS 1800: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..
e) The MS is commanded to its minimum power control level. The spectrum analyzer is set again as in b).
f) By tuning the spectrum analyzer 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 analyzer settings are adjusted to:

- Zero frequency scan;
- Resolution bandwidth: 30 kHz;
- Video bandwidth: 100 kHz;
- Peak hold.

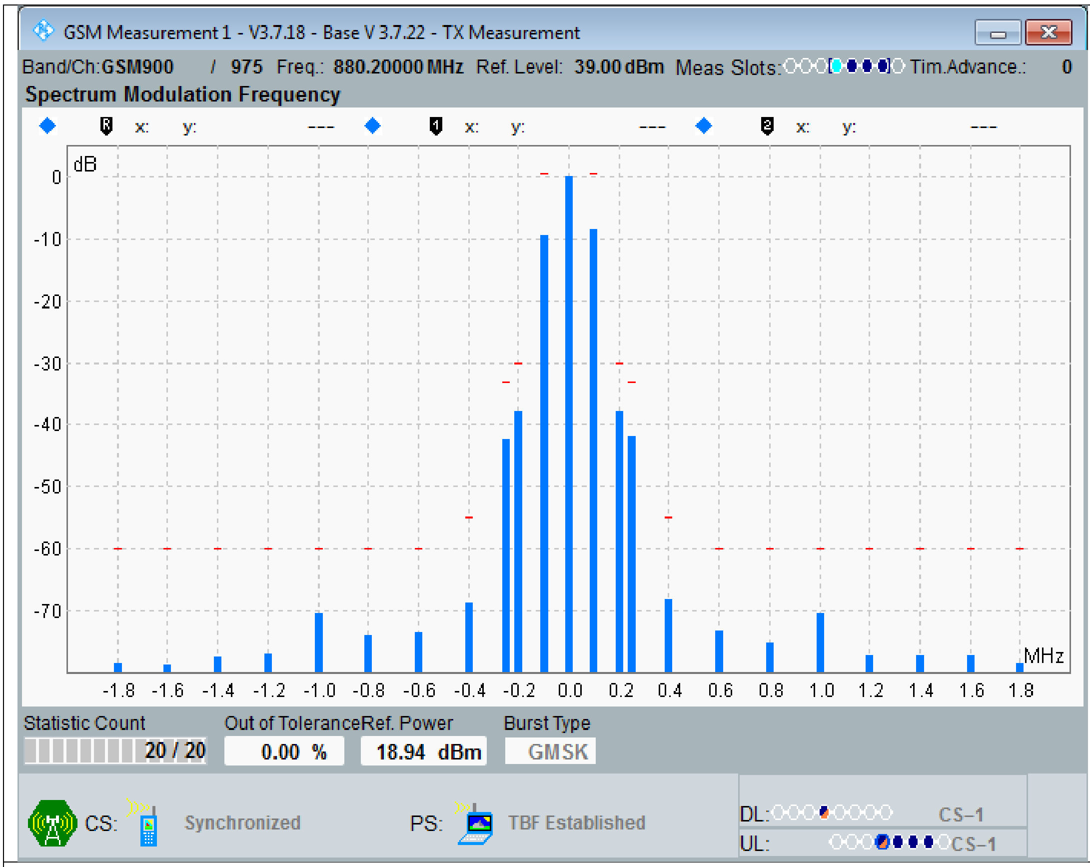
The spectrum analyzer gating of the signal is switched off.
The MS is commanded to its maximum power control level in every transmitted time slot.
i) By tuning the spectrum analyzer centre frequency to the measurement frequencies the power level is measured at the following frequencies:
FT + 400 kHz 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.

12.5 Measurement Record

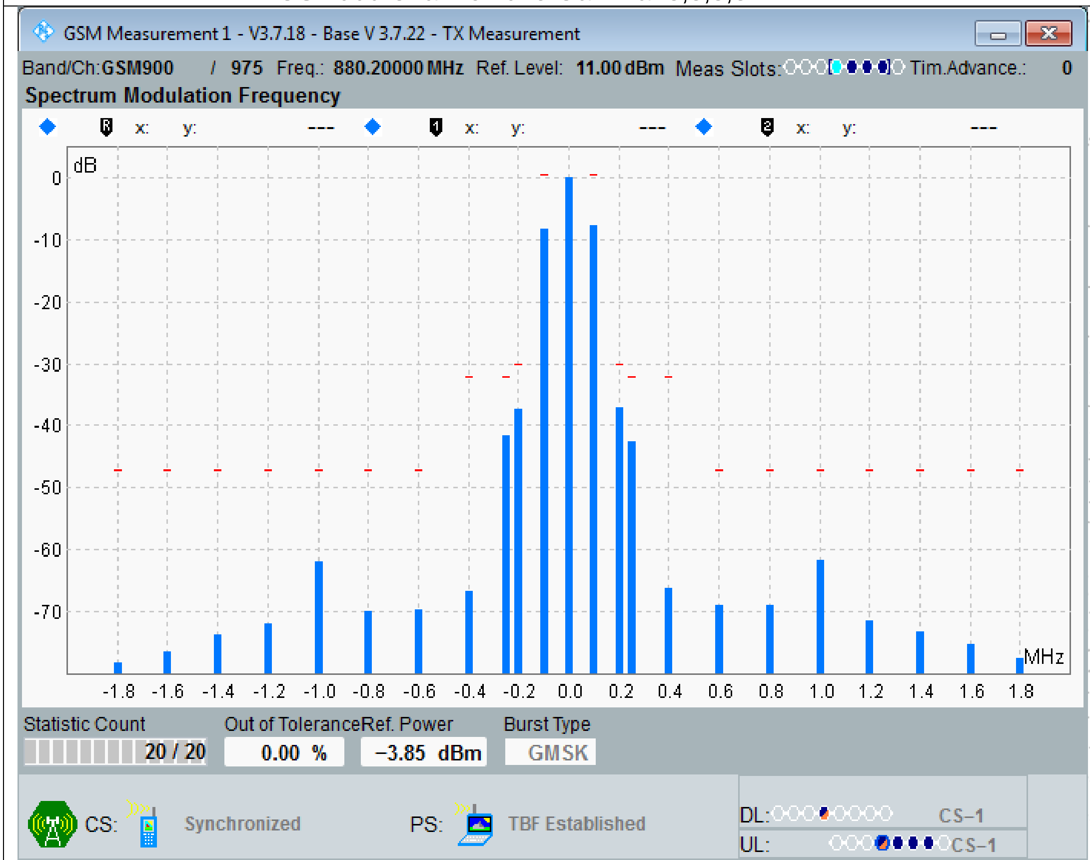
Mode	Test Frequency(MHz)	Test Condition					Result
E-GSM900	880.2	Normal	LTLV	LTHV	HTLV	HTHV	PASS
	897.4	Normal	LTLV	LTHV	HTLV	HTHV	PASS
	914.8	Normal	LTLV	LTHV	HTLV	HTHV	PASS
DCS 1800	1710.2	Normal	LTLV	LTHV	HTLV	HTHV	PASS
	1747.4	Normal	LTLV	LTHV	HTLV	HTHV	PASS
	1784.8	Normal	LTLV	LTHV	HTLV	HTHV	PASS

NOTE: All test mode were tested and passed, only shows the worst case mode which were recorded in this report.

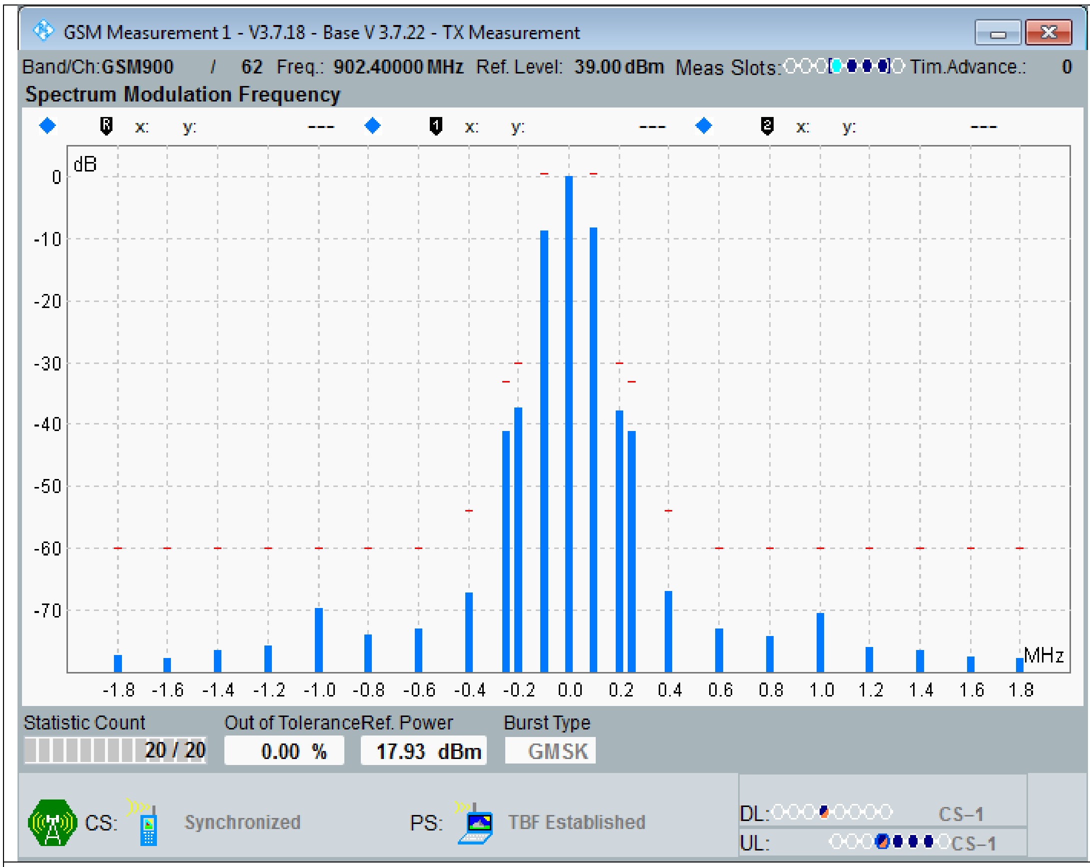
GPRS



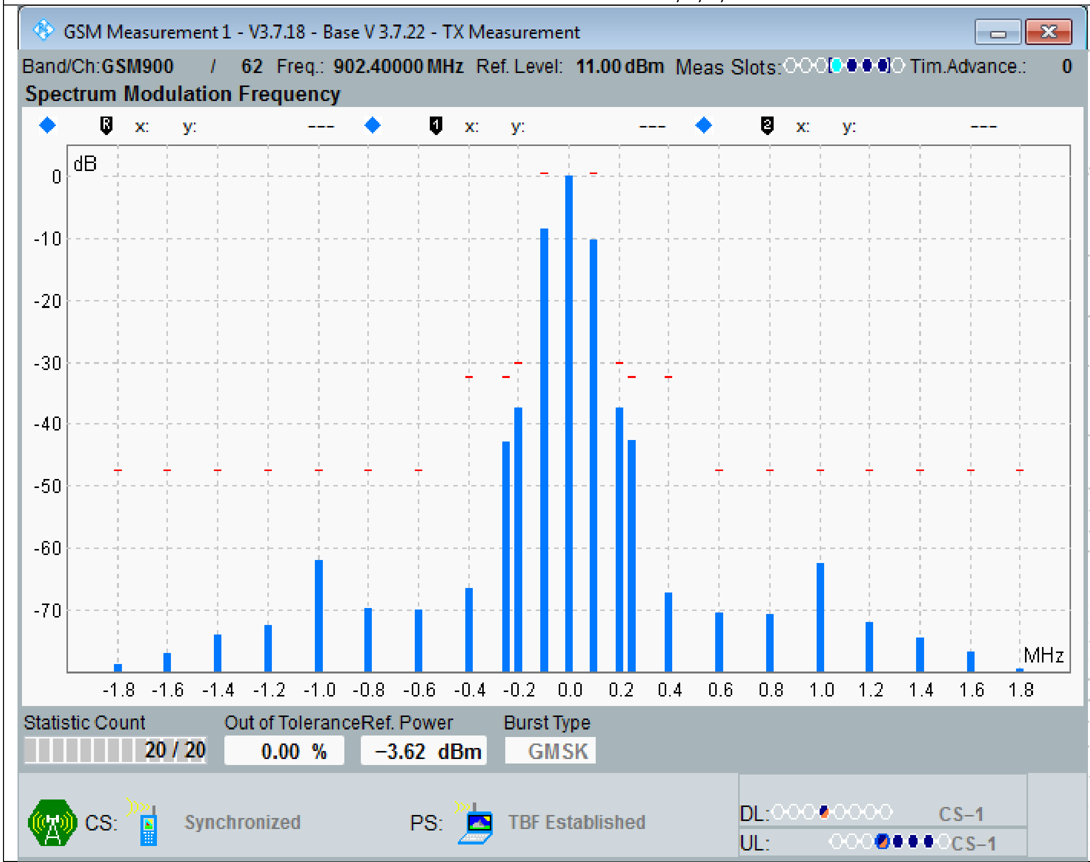
GSM900 Channel=975 Gamma=3;3;3;3 NVNT



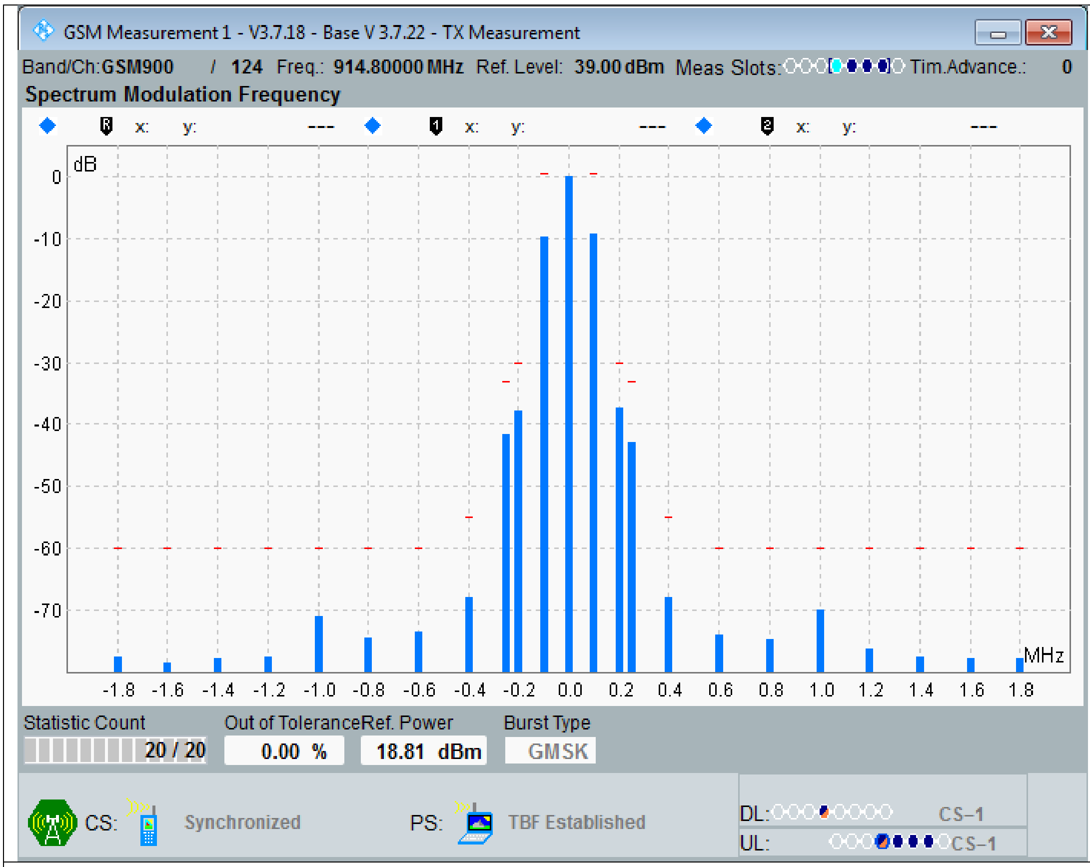
GSM900 Channel=975 Gamma=17;17;17;17 NVNT



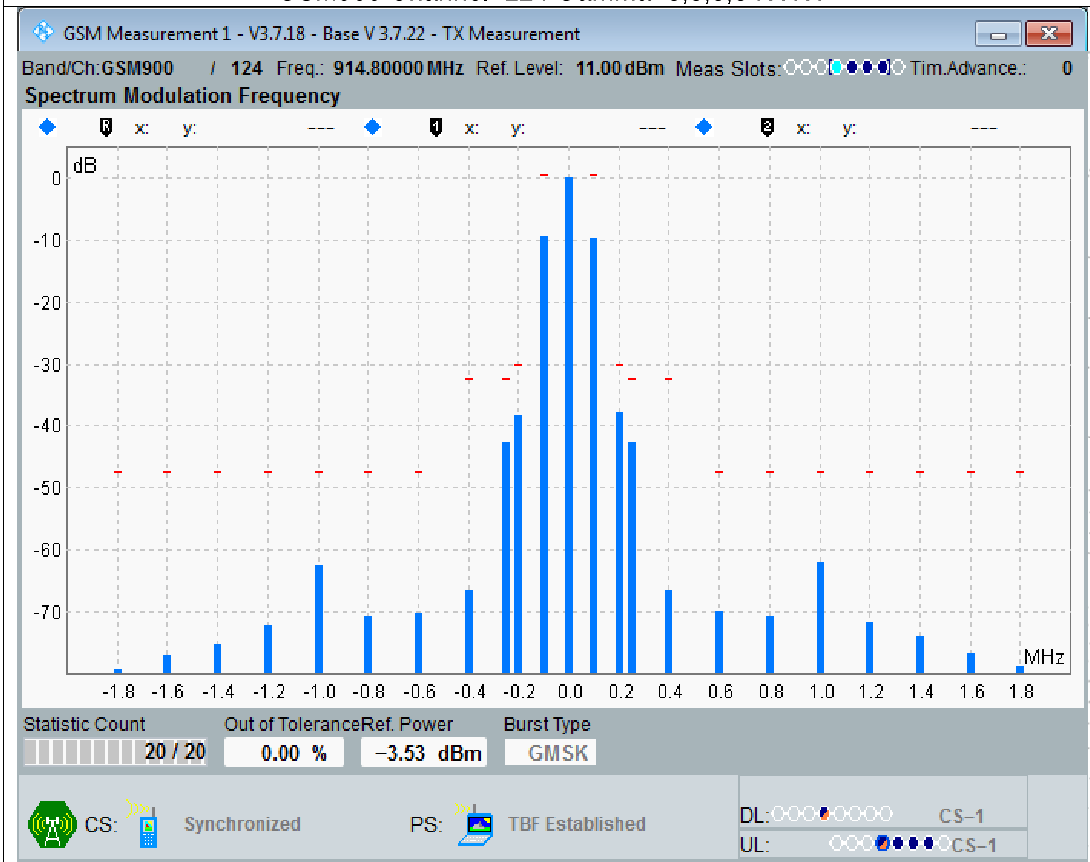
GSM900 Channel=62 Gamma=3;3;3;3 NVNT



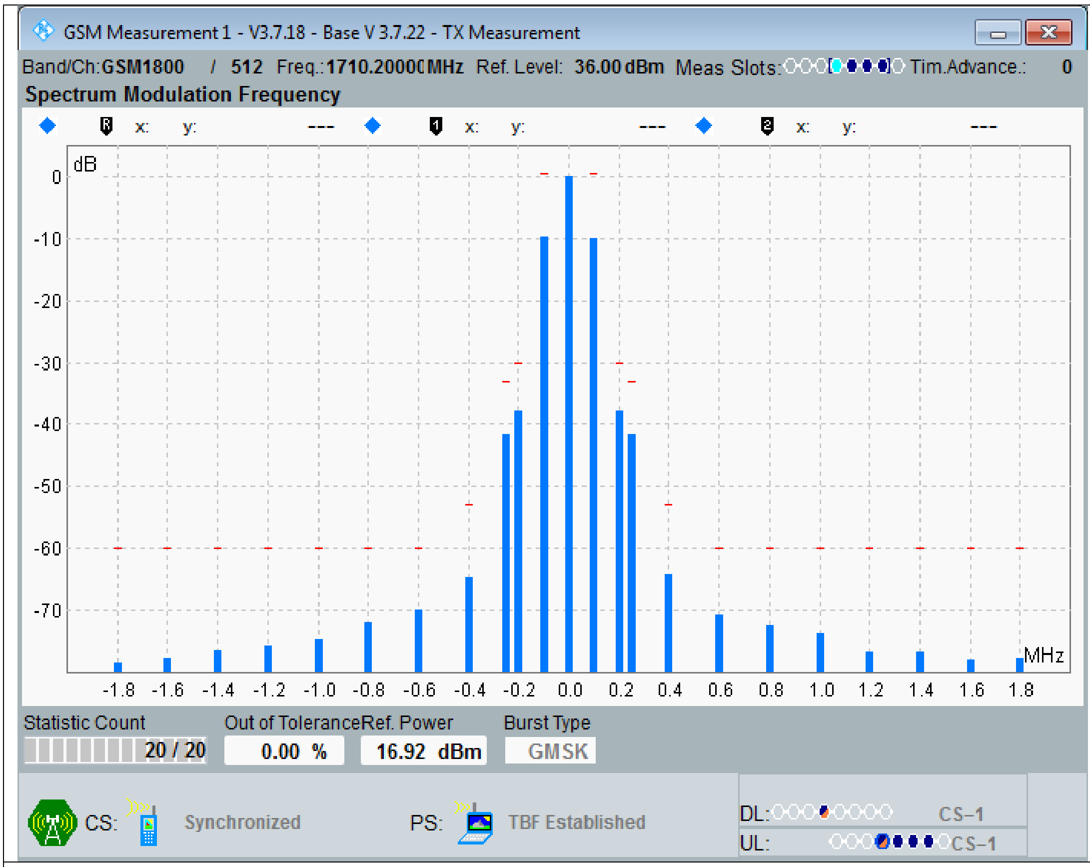
GSM900 Channel=62 Gamma=17;17;17;17 NVNT



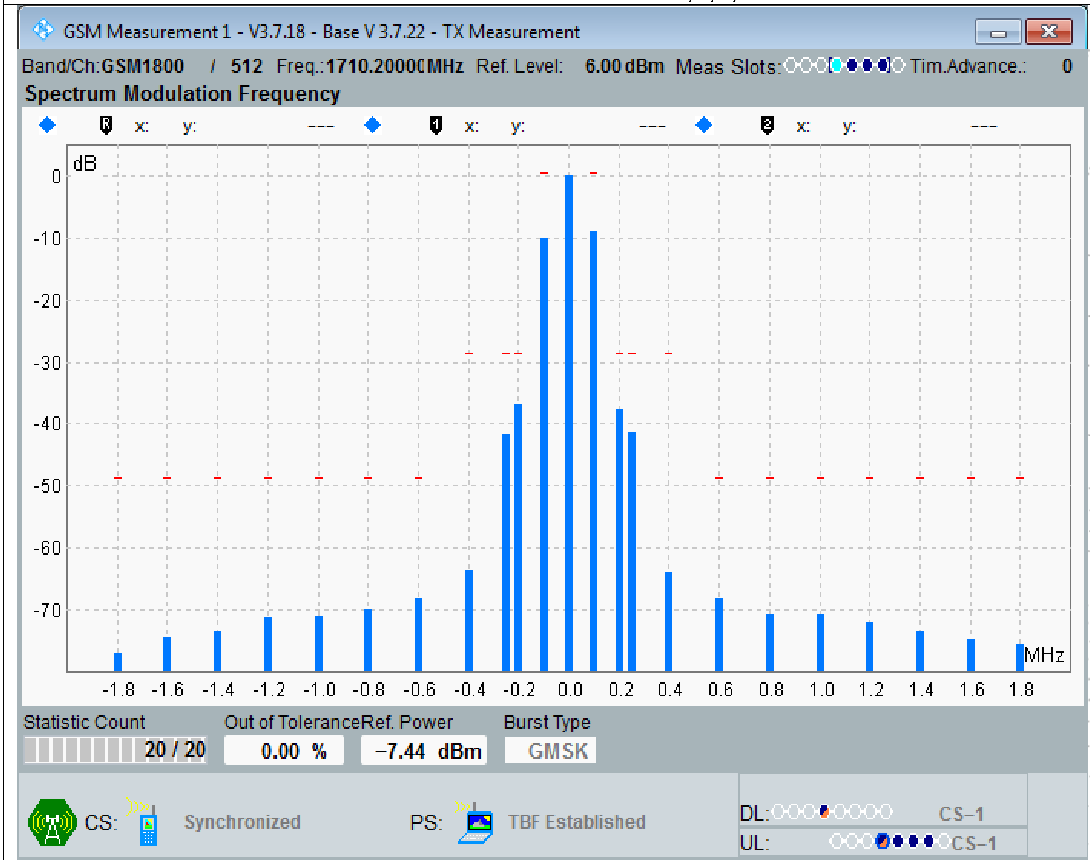
GSM900 Channel=124 Gamma=3;3;3;3 NVNT



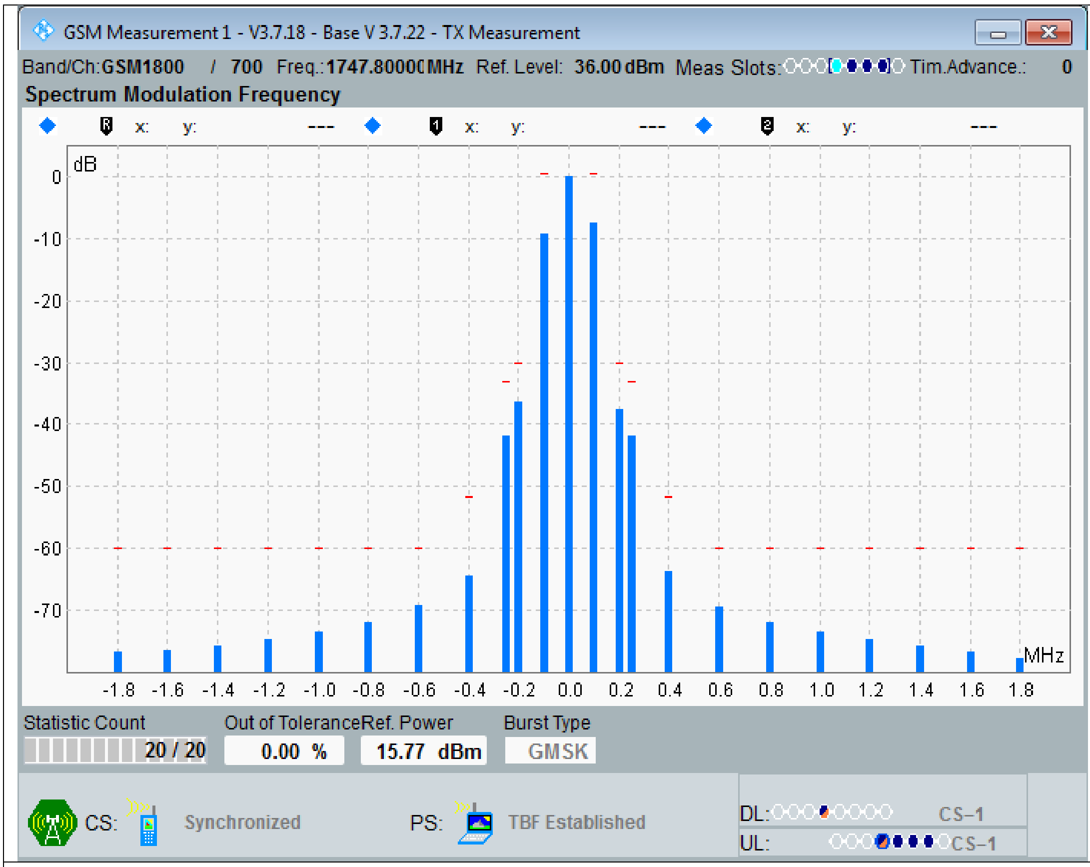
GSM900 Channel=124 Gamma=17;17;17;17 NVNT



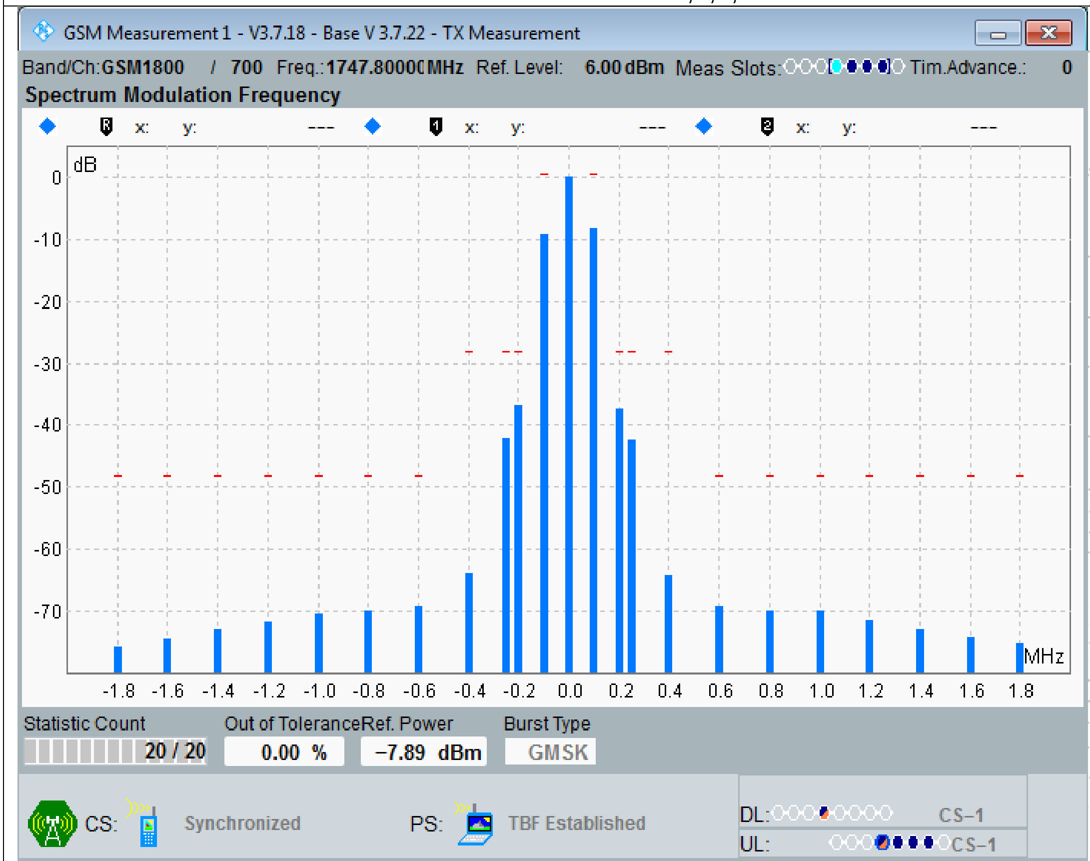
DCS1800 Channel=512 Gamma=3;3;3;3 NVNT



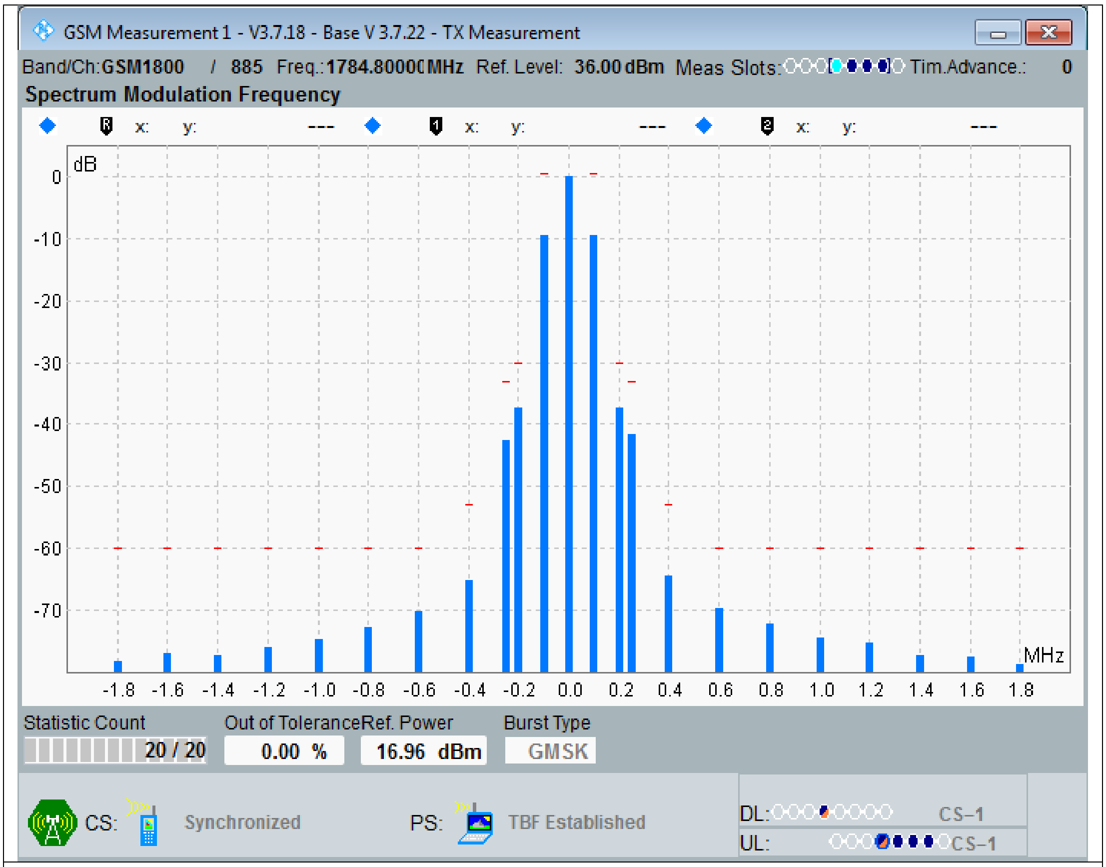
DCS1800 Channel=512 Gamma=18;18;18;18 NVNT



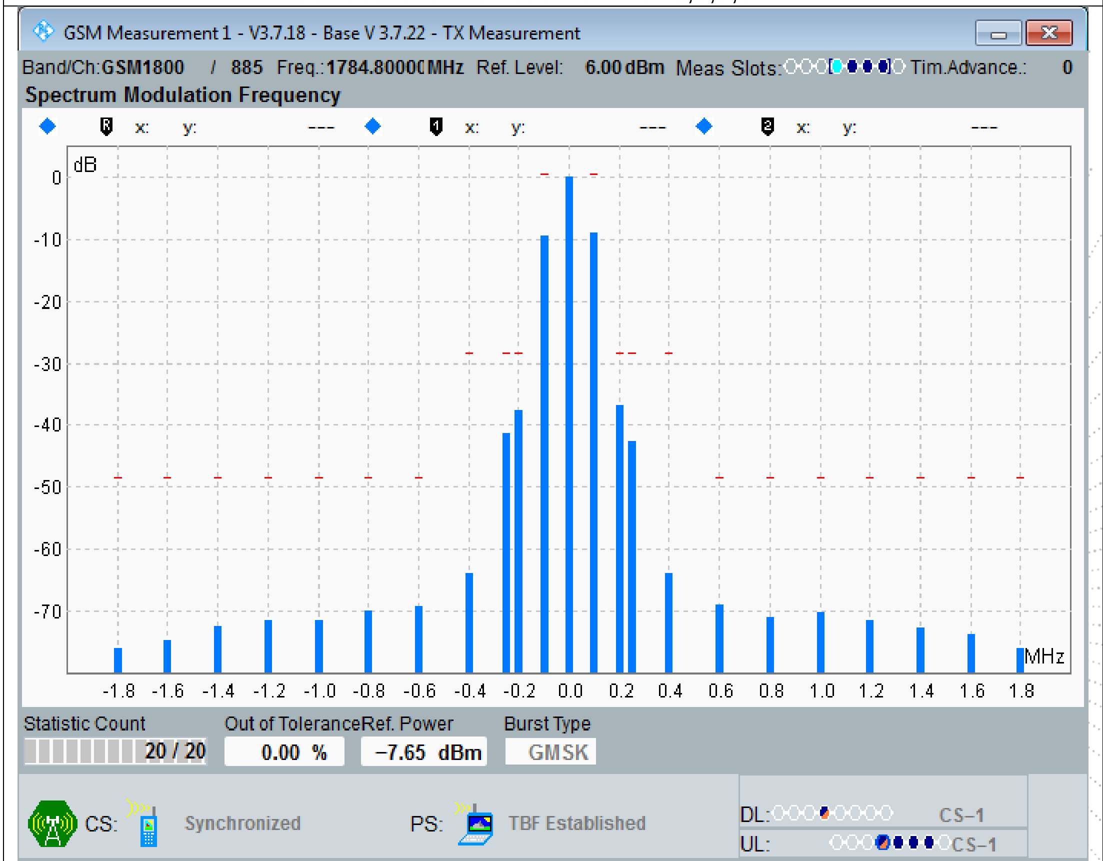
DCS1800 Channel=700 Gamma=3;3;3;3 NVNT



DCS1800 Channel=700 Gamma=18;18;18;18 NVNT



DCS1800 Channel=885 Gamma=3;3;3;3 NVNT



DCS1800 Channel=885 Gamma=18;18;18;18 NVNT

13. Conducted Spurious Emissions – MS Allocated A Channel

13.1 Definition

Conducted spurious emissions, when the MS has been allocated a channel, are emissions from the antenna connector at frequencies other than those of the carrier and sidebands associated with normal modulation.

13.2 Limit

Frequency range	**Power level in dBm**		
	GSM 400, GSM 700, T-GSM 810 GSM 850, GSM 900	**DCS 1 800**	**PCS 1 900**
9 kHz to 1 GHz 1 GHz to 12,75 GHz 1 GHz to 1 710 MHz 1 710 MHz to 1 785 MHz 1 785 MHz to 12,75 GHz	-36 -30	-36 -30 -36 -30	-36 -30

13.3 EUT Operation Condition

The EUT was programmed to be in continuously transmitting mode.

13.4 Test Procedure

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 thantherequirement in table 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 2. Thepower 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 ([annex 1, TC2.2 and TC3]).

13.5 Measurement Record

E-GSM900, Normal Voltage Condition at Middle Channel				
Frequency Range	**Frequency(MHz)**	**Max. Level observed (dBm)**	**Limit (dBm)**	**Result**
100 KHz~50MHz	19.99	53.56	-36	PASS
50MHz~500MHz	257.91	56.28		
500MHz~850MHz	787.82	44.23		
850MHz~860MHz	852.91	53.74		
860MHz~870MHz	868.00	38.89		
870MHz~880MHz	872.78	47.33		
915MHz~925MHz	922.98	52.08		
960MHz~1GHz	982.93	55.15		
1GHz~12.75GHz	8558.90	41.88	-30	

DCS1800, Normal Voltage Condition at Middle Channel				
Frequency Range	**Frequency(MHz)**	**Max. Level observed (dBm)**	**Limit (dBm)**	**Result**
100 KHz~50MHz	24.82	48.82	-36	PASS
50MHz~500MHz	443.82	51.87		
500MHz~1GHz	936.75	41.93		
1GHz~1.68GHz	1486.93	44.79	-30	
1.68GHz~1.69GHz	1684.83	50.74		
1.69GHz~1.7GHz	1693.83	50.90		
1.7GHz~1.71GHz	1707.96	46.85		
1.785GHz~1.795GHz	1792.91	51.87		
1.795GHz~1.805GHz	1798.72	51.80		
1.88GHz~12.75GHz	9244.87	41.78		
1.795GHz~1.805GHz	1797.76	49.92		

14. Conducted Spurious Emissions –Ms In Idle Mode

14.1 Definition

Conducted spurious emissions are any emissions from the antenna connector, when the MS is in idle mode.

14.2 Limit

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

14.3 EUT Operation Condition

The EUT was programmed to be in continuously transmitting mode.

14.4 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 4. 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
100kHz to 50MHz	10kHz	30kHz
50MHz to 12.75GHz	100kHz	300kHz

b) The test is repeated under extreme voltage test conditions ([annex 1, TC2.2 and TC3])

14.5 Measurement Record

E-GSM900, Normal Voltage Condition in idle mode				
Frequency Range	**Frequency(MHz)**	**Max. Level observed (dBm)**	**Limit (dBm)**	**Result**
100 KHz~50MHz	42.75	77.63	-57	**PASS**
50MHz~880MHz	520.97	70.34	-57	
880MHz~915MHz	894.99	78.85	-59	
915MHz~1GHz	944.97	66.12	-57	
1GHz ~1.71GHz	1417.91	69.50	-47	
1.71GHz ~1.785GHz	1714.97	64.02	-53	
1.785GHz ~12.75GHz	5420.79	87.21	-47	

DCS1800, Normal Voltage Condition in idle mode				
Frequency Range	**Frequency(MHz)**	**Max. Level observed (dBm)**	**Limit (dBm)**	**Result**
100 KHz~50MHz	25.80	90.93	-57	**PASS**
50MHz~880MHz	291.99	66.77	-57	
880MHz~915MHz	909.91	93.95	-59	
915MHz~1GHz	980.75	78.47	-57	
1GHz ~1.71GHz	1521.76	77.04	-47	
1.71GHz ~1.785GHz	1742.98	96.04	-53	
1.785GHz ~12.75GHz	3967.91	82.17	-47	

15. Radiated Spurious Emissions – MS Allocated A Channel

15.1 Definition

Radiated spurious emissions, when the MS has been allocated a channel, are any emissions radiated by the cabinet and structure of the mobile station, including all interconnecting cables. This is also known as "cabinet radiation".
The test applies to all types of MS with the exception of the test at extreme voltages for an MS where a practical connection, to an external power supply, is not possible.
NOTE: A "practical connection" shall be interpreted to mean it is possible to connect extreme voltages to the MS without interfering with the configuration of the MS in a way which could invalidate the test.

15.2 Limit

Frequency range	**Power level in dBm**		
	GSM 400, GSM 700, T-GSM 810, GSM 850, GSM 900	**DCS 1 800**	**PCS 1 900**
30 MHz to 1 GHz 1 GHz to 4 GHz 1 GHz to 1 710 MHz 1 710 MHz to 1 785 MHz 1 785 MHz to 4 GHz	-36 -30	-36 -30 -36 -30	-36 -30

15.3 EUT Operation Condition

The EUT was programmed to be in continuously transmitting mode.

15.4 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 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 6. 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 MHz, the test antenna separation from the MS may be reduced to 1 meter.
d) The measurements are repeated with the test antenna in the orthogonal polarization plane.
e) The test is repeated under extreme voltage test conditions (see [annex 1, TC2.2]).

15.5 Measurement Record

E-GSM 900

Test Condition	Test Channel			Result
Normal Voltage	Low Channel	Middle Channel	High Channel	PASS
Low Voltage	Low Channel	Middle Channel	High Channel	PASS
High Voltage	Low Channel	Middle Channel	High Channel	PASS
Remark: Only the worst date(Low Voltage) is recorded.				

DCS1800

Test Condition	Test Channel			Result
Normal Voltage	Low Channel	Middle Channel	High Channel	PASS
Low Voltage	Low Channel	Middle Channel	High Channel	PASS
High Voltage	Low Channel	Middle Channel	High Channel	PASS
Remark: Only the worst date(Low Voltage) is recorded.				

Low Voltage Condition
GSM 900
Normal Condition

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Correct Factor	Absolute Level	Result	
			Height	Polar			Limit	Margin
(MHz)	(dBm)	Degree	(m)	(H/V)	(dB)	(dBm)	(dBm)	(dB)
low channel								
549.01	-33.99	251	1.5	H	-27.96	-61.95	-36.00	-25.95
549.01	-32.22	145	1.5	V	-27.96	-60.18	-36.00	-24.18
1760.40	-19.83	212	1.4	H	-27.13	-46.96	-30.00	-16.96
1760.40	-21.68	158	1.7	V	-27.13	-48.81	-30.00	-18.81
2640.60	-26.22	53	1.3	H	-24.68	-50.90	-30.00	-20.90
2640.60	-32.38	4	1.5	V	-24.68	-57.06	-30.00	-27.06
Mid channel								
549.01	-35.24	53	1.4	H	-27.96	-63.21	-36.00	-27.21
549.01	-35.95	42	1.5	V	-27.96	-63.91	-36.00	-27.91
1804.80	-19.90	24	1.1	H	-27.03	-46.93	-30.00	-16.93
1804.80	-18.35	276	1.1	V	-27.03	-45.38	-30.00	-15.38
2707.20	-25.89	46	1.5	H	-24.48	-50.37	-30.00	-20.37
2707.20	-29.11	307	1.7	V	-24.48	-53.59	-30.00	-23.59
high channel								
549.01	-33.25	163	2.0	H	-27.96	-61.21	-36.00	-25.21
549.01	-32.45	22	1.0	V	-27.96	-60.41	-36.00	-24.41
1829.60	-19.64	304	1.1	H	-26.97	-46.61	-30.00	-16.61
1829.60	-18.83	11	1.0	V	-26.97	-45.80	-30.00	-15.80
2744.40	-27.65	231	1.8	H	-24.37	-52.02	-30.00	-22.02
2744.40	-27.47	48	2.0	V	-24.37	-51.84	-30.00	-21.84

Remark:
Absolute Level = Receiver Reading + Factor
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

DCS1800 Band
Normal Condition

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Correct Factor	Absolute Level	Result	
			Height	Polar			Limit	Margin
(MHz)	(dBm)	Degree	(m)	(H/V)	(dB)	(dBm)	(dBm)	(dB)
low channel								
535.15	-32.69	217	1.7	H	-28.01	-60.71	-36.00	-24.71
535.15	-34.72	75	1.1	V	-28.01	-62.73	-36.00	-26.73
3420.40	-25.42	16	1.5	H	-22.76	-48.18	-30.00	-18.18
3420.40	-20.88	315	1.8	V	-22.76	-43.64	-30.00	-13.64
5130.60	-31.72	326	1.1	H	-19.53	-51.25	-30.00	-21.25
5130.60	-36.60	168	1.7	V	-19.53	-56.13	-30.00	-26.13
Mid channel								
535.15	-35.04	62	1.4	H	-28.01	-63.06	-36.00	-27.06
535.15	-33.70	235	1.6	V	-28.01	-61.72	-36.00	-25.72
3495.60	-23.02	220	2.0	H	-22.61	-45.63	-30.00	-15.63
3495.60	-24.59	191	1.4	V	-22.61	-47.20	-30.00	-17.20
5243.40	-33.93	68	1.6	H	-19.48	-53.41	-30.00	-23.41
5243.40	-34.74	22	1.2	V	-19.48	-54.22	-30.00	-24.22
high channel								
535.15	-34.12	24	1.4	H	-28.01	-62.13	-36.00	-26.13
535.15	-36.42	113	1.7	V	-28.01	-64.43	-36.00	-28.43
3569.60	-20.08	206	1.5	H	-22.46	-42.54	-30.00	-12.54
3569.60	-26.62	251	1.1	V	-22.46	-49.08	-30.00	-19.08
5354.40	-34.46	162	1.9	H	-19.42	-53.88	-30.00	-23.88
5354.40	-30.91	338	1.9	V	-19.42	-50.33	-30.00	-20.33

Remark:
Absolute Level = Receiver Reading + Factor
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

16. Radiated Spurious Emissions –MS In Idle Mode

16.1 Definition

Radiated spurious emissions, when the MS is in idle mode, are any emissions radiated by the cabinet and structure of the mobile station, including all interconnecting cables.
This is also known as "cabinet radiation".
The test applies to all types of MS with the exception of the test at extreme voltages for an MS where a practical connection, to an external power supply, is not possible.
NOTE: A "practical connection" shall be interpreted to mean it is possible to connect extreme voltages to the MS without interfering with the configuration of the MS in a way which could invalidate the test.

16.2 Limit

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

16.3 EUT Operation Condition

The EUT was programmed to be in idle mode.

16.4 Test Procedure

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 8.
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 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 meter.

Frequency range	**Filter bandwidth**	**Video bandwidth**
30MHz to 50MHz	10kHz	30kHz
50MHz to 4GHz	100kHz	300kHz

d) The measurements are repeated with the test antenna in the orthogonal polarization plane.
e) The test is repeated under extreme voltage test conditions (see [Annex 1, TC2.2]).

16.5 Measurement Record

E-GSM 900

Test Condition	Test Channel			Result
Normal Voltage	Low Channel	Middle Channel	High Channel	PASS
Low Voltage	Low Channel	Middle Channel	High Channel	PASS
High Voltage	Low Channel	Middle Channel	High Channel	PASS
Remark: Only the worst date(Low Voltage) is recorded.				

DCS1800

Test Condition	Test Channel			Result
Normal Voltage	Low Channel	Middle Channel	High Channel	PASS
Low Voltage	Low Channel	Middle Channel	High Channel	PASS
High Voltage	Low Channel	Middle Channel	High Channel	PASS
Remark: Only the worst date(Low Voltage) is recorded.				

GSM 900
Normal Condition

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Correct Factor	Absolute Level	Result	
			Height	Polar			Limit	Margin
(MHz)	(dBm)	Degree	(m)	(H/V)	(dB)	(dBm)	(dBm)	(dB)
low channel								
258.30	-37.37	315	1.3	H	-29.35	-66.73	-57.00	-9.73
258.30	-34.47	157	1.3	V	-29.35	-63.82	-57.00	-6.82
2952.95	-41.30	20	1.1	H	-23.74	-65.04	-47.00	-18.04
2952.95	-42.72	159	1.4	V	-23.74	-66.46	-47.00	-19.46
Mid channel								
258.30	-33.96	182	1.8	H	-29.35	-63.32	-57.00	-6.32
258.30	-36.00	75	1.6	V	-29.35	-65.35	-57.00	-8.35
2952.95	-37.42	270	2.0	H	-23.74	-61.16	-47.00	-14.16
2952.95	-43.17	216	1.9	V	-23.74	-66.91	-47.00	-19.91
high channel								
258.30	-37.48	82	1.7	H	-29.35	-66.83	-57.00	-9.83
258.30	-38.32	221	1.4	V	-29.35	-67.67	-57.00	-10.67
2952.95	-41.51	282	1.9	H	-23.74	-65.25	-47.00	-18.25
2952.95	-42.91	310	2.0	V	-23.74	-66.65	-47.00	-19.65

Remark:
Absolute Level = Receiver Reading + Factor
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

DCS1800 Band
Normal Condition

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Correct Factor	Absolute Level	Result	
			Height	Polar			Limit	Margin
(MHz)	(dBm)	Degree	(m)	(H/V)	(dB)	(dBm)	(dBm)	(dB)
low channel								
291.74	-35.82	67	1.1	H	-29.05	-64.87	-57.00	-7.87
291.74	-36.58	22	1.8	V	-29.05	-65.62	-57.00	-8.62
2962.00	-39.94	134	1.9	H	-23.71	-63.65	-47.00	-16.65
2962.00	-42.99	36	1.4	V	-23.71	-66.70	-47.00	-19.70
Mid channel								
291.74	-38.12	38	1.6	H	-29.05	-67.17	-57.00	-10.17
291.74	-40.34	329	1.7	V	-29.05	-69.39	-57.00	-12.39
2962.00	-40.30	260	1.2	H	-23.71	-64.01	-47.00	-17.01
2962.00	-37.85	7	1.7	V	-23.71	-61.57	-47.00	-14.57
high channel								
291.74	-36.52	225	1.2	H	-29.05	-65.57	-57.00	-8.57
291.74	-37.36	89	1.2	V	-29.05	-66.41	-57.00	-9.41
2962.00	-41.78	174	1.4	H	-23.71	-65.50	-47.00	-18.50
2962.00	-40.10	99	1.9	V	-23.71	-63.81	-47.00	-16.81

Remark:
Absolute Level = Receiver Reading + Factor
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

17. Receiver Blocking And Spurious Response – Speech Channels

17.1 Definition

Blocking is a measure of the ability of the receiver to receive a modulated wanted input signal in the presence of an unwanted input signal, on frequencies other than those of the spurious responses or the adjacent channels, without exceeding a given degradation.

17.2 Limit

The blocking characteristics of the receiver are specified separately for in-band and out-of-band performance as Identified in 3GPP TS 05.05 sub clause 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 f0, 3 dB above the reference sensitivity level as specified in 3GPP TS 05.05 sub clause 6.2;
- a continuous, static sine wave signal at a level as in the table of 3GPP TS 05.05 sub clause 5.1 and at a frequency(f) which is an integer multiple of 200 kHz;
- with the following exceptions, called spurious response frequencies:
a) GSM 700, GSM 850 and 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 70dBμV(emf) (i.e. -43 dBm). 3GPP TS 05.05, sub clause 5.1

17.3 EUT Operation Condition

The EUT was programmed to be in continuously receiving mode.

17.4 Test Procedure

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:
E-GSM 900 the frequencies between Flo + (IF1 + IF2 + ... + IFn + 17,5 MHz) and Flo - (IF1 + IF2 + ...+ IFn + 17,5 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 14-28.
NOTE 1: These values differ from 3GPP TS 05.05 because of practical generator limits in the SS.
NOTE 2: For an E-GSM 900 MS the level of the unwanted signal in the band 905 MHz to < 915 MHz is relaxed to 108 dBuVemf( ).
NOTE 3: For a GSM 450 small MS the level of the unwanted signal in the band 450,4 MHz to < 457,6MHz is relaxed to 108 dBuVemf( ). For a GSM 480 small MS the level of the unwanted signal in the band 478,8 MHz to < 486 MHz is relaxed to 108 dBuVemf( ).
e) 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 for the bits of class II, by examining sequences of at least the Minimum number of samples of consecutive bits of class II, where bits are taken only from those frames for which no bad frame indication was given. The number of error events is recorded.
If a failure is indicated it is noted and counted towards the allowed exemption totals.
In the case of failures discovered at the predicted frequencies at steps f ii), iii) or iv) 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 tested. This process is repeated until all channels constituting the group of failures is known.

17.5 Measurement Record

GPRS 900 Band

Channel(MHz)	Test condition	number of samples	RBER(%)	Limit(%)	Result
880.2	normal	6696	0.005	8.961	PASS
902.4		6696	0.007		
914.8		6696	0.029		

DCS 1800 Band

Channel(MHz)	Test condition	number of samples	RBER(%)	Limit(%)	Result
880.2	normal	13736	0.002	4.368	PASS
902.4		13736	0.028		
914.8		13736	0.016		

18. Intermodulation Rejection - Speech Channels

18.1 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.

18.2 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

Vemf	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
WantedsignaldBVemf( )	15	13	17	13
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 TS05.05 due to the consideration of the effect of modulation sideband noise from thesecond interferer.

18.3 Measurement Record

E-GSM900:

Channel frequency (MHz)	RBER (%)	Number of test samples	Limit (%)	Result
880.2	0.023	10000	2.439	PASS
902.4	0.012	10000	2.439	
914.8	0.025	10000	2.439	

DCS1800:

Channel frequency (MHz)	RBER (%)	Number of test samples	Limit (%)	Result
1710.2	0.015	10000	2.439	PASS
1747.8	0.025	10000	2.439	
1784.8	0.014	10000	2.439	

19. AM suppression - speech channels

19.1 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 f0, 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 - 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. 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	-29dBm/-31 dBm
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.

19.2 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

MS type	Signal level(Vemf)
GSM 400	82 dBm
GSM 700	82 dBm
T-GSM 810	82 dBm
GSM 850	82 dBm
GSM 900	82 dBm
GSM 1800	82/84 dBm
GSM 1900	82 dBm
NOTE: The 82 dBμVemf (i.e. -31 dBm) level shall apply to DCS 1 800 class 1 and class 2MS meeting the -102 dBm reference sensitivity level requirement according to 3GPP TS05.05, subclause 6.2.	

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.

19.3 Measurement Record

E-GSM900:

Channel frequency (MHz)	RBER (%)	Number of test samples	Limit (%)	Result
880.2	0.029	10000	2.439	PASS
902.4	0.021	10000	2.439	
914.8	0.021	10000	2.439	

DCS1800:

Channel frequency (MHz)	RBER (%)	Number of test samples	Limit (%)	Result
1710.2	0.008	10000	2.439	PASS
1747.8	0.006	10000	2.439	
1784.8	0.009	10000	2.439	

20. AM suppression - packet channels

20.1 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 fo, 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	-29dBm/-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

20.2 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(Vemf)
GSM 400	82 dBm
GSM 700	82 dBm
T-GSM 810	82 dBm
GSM 850	82 dBm
GSM 900	82 dBm
GSM 1800	82/84 dBm
GSM 1900	82 dBm
NOTE: The 82 dBμVemf (i.e. -31 dBm) level shall apply to DCS 1 800 class 1 and class 2MS meeting the -102 dBm reference sensitivity level requirement according to 3GPP TS05.05, 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.

20.3 Measurement Record

E-GSM900:

Channel frequency (MHz)	BLER (%)	Number of test samples	Limit (%)	Result
880.2	0.027	10000	10	PASS
902.4	0.019	10000	10	
914.8	0.015	10000	10	

DCS1800:

Channel frequency (MHz)	BLER (%)	Number of test samples	Limit (%)	Result
1710.2	0.022	10000	10	PASS
1747.8	0.007	10000	10	
1784.8	0.012	10000	10	

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

21.1 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.

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.

21.2 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 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.

21.3 Measurement Record

E-GSM900:

Channel frequency (MHz)	RBER (%)	Number of test samples	Limit (%)	Result
880.2	0.003	10000	10	PASS
902.4	0.021	10000	10	
914.8	0.025	10000	10	

DCS1800:

Channel frequency (MHz)	RBER (%)	Number of test samples	Limit (%)	Result
1710.2	0.004	10000	10	PASS
1747.8	0.001	10000	10	
1784.8	0.009	10000	10	

22. Reference sensitivity - TCH/FS

22.1 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.

22.2 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 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.

22.3 Measurement Record

E-GSM900:

Channel frequency (MHz)	BLER (%)	Number of test samples	Limit (%)	Result
880.2	0.010	10000	10	PASS
902.4	0.002	10000	10	
914.8	0.007	10000	10	

DCS1800:

Channel frequency (MHz)	BLER (%)	Number of test samples	Limit (%)	Result
1710.2	0.001	10000	10	PASS
1747.8	0.008	10000	10	
1784.8	0.005	10000	10	

23. Minimum Input level for Reference Performance – GPRS

23.1 Limit

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

Propagation conditions					
Type of Channel	**static**	**TUhigh (noFH)**	**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.

Propagation conditions					
Type of Channel	**static**	**TUhigh (noFH)**	**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.

23.2 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.

23.3 Measurement Record

E-GSM900, Normal Voltage Condition at Middle Channel			
Frequency Range	**Max. Level observed (dBm)**	**Limit (dBm)**	**Result**
100 KHz~50MHz	50.39	-36	PASS
50MHz~500MHz	47.18		
500MHz~850MHz	41.06		
850MHz~860MHz	57.45		
860MHz~870MHz	40.78		
870MHz~880MHz	41.41		
915MHz~925MHz	48.26		
960MHz~1GHz	49.06		
1GHz~12.75GHz	44.72	-30	

DCS1800, Normal Voltage Condition at Middle Channel			
Frequency Range	**Max. Level observed (dBm)**	**Limit (dBm)**	**Result**
100 KHz~50MHz	47.84	-36	PASS
50MHz~500MHz	53.81		
500MHz~1GHz	51.79		
1GHz~1.68GHz	51.93	-30	
1.68GHz~1.69GHz	47.90		
1.69GHz~1.7GHz	41.91		
1.7GHz~1.71GHz	57.80		
1.785GHz~1.795GHz	56.88		
1.795GHz~1.805GHz	44.79		
1.88GHz~12.75GHz	47.77		
1.795GHz~1.805GHz	43.82		

24. Frequency error and Modulation accuracy in EGPRS Configuration

24.1 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

24.2 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.

24.3 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}Wt
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 + j 2 f accounts for both a frequency offset of "2 f" radians per second phase rotation and an amplitude change of " " 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(,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:

$$\text{RMS EVM} = \sqrt{\sum_{k\in K}|E(k)|^2 / \sum_{k\in K}|S(k)|^2}$$

c.4) Steps c.1) to c.3) are repeated with successive approximations of W(,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:

$$\text{EVM}(k) = \sqrt{\frac{|E(k)|^2}{\frac{\sum_{k\in K}|S(k)|^2}{N}}}$$

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:

$$OOS = \left(\frac{|C_o|^2}{\frac{1}{N}\sum_{k\in K}|S(k)|^2}\right)$$

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.

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 ( ) to 0 and GAMMA_TN (CH) 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).

24.4 Test Instrument

Refer to Item 3.3

24.5 Test Result

PASS

EGPRS 900 (MS under maximum power control level)							
EGPRS 900	Test Condition	Frequency Error (Hz)	Limit (Hz)	Phase Error (degree)		Limit (degree)	Result
Reference Frequency 902.4MHz	Normal	11.69	90.2	RMS	1.41	5	PASS
				Peak	3.67	20	
	LVLT	11.60		RMS	1.30	5	
				Peak	3.57	20	
	LVHT	11.48		RMS	1.25	5	
				Peak	3.51	20	
	HVLT	11.36		RMS	1.15	5	
				Peak	3.51	20	
	HVHT	11.28		RMS	1.06	5	
				Peak	3.41	20	
	Vibration	11.18		RMS	1.02	5	
				Peak	3.32	20	

EGPRS 900 (MS under minimum power control level)							
EGPRS 900	Test Condition	Frequency Error (Hz)	Limit (Hz)	Phase Error (degree)		Limit (degree)	Result
Reference Frequency 902.4MHz	Normal	17.72	90.2	RMS	1.34	5	PASS
				Peak	3.68	20	
	LVLT	17.67		RMS	1.29	5	
				Peak	3.66	20	
	LVHT	17.65		RMS	1.23	5	
				Peak	3.61	20	
	HVLT	17.54		RMS	1.21	5	
				Peak	3.54	20	
	HVHT	17.50		RMS	1.13	5	
				Peak	3.50	20	
	Vibration	17.40		RMS	1.10	5	
				Peak	3.49	20	

EGPRS 1800 (MS under maximum power control level)							
EGPRS 1800	Test Condition	Frequency Error (Hz)	Limit (Hz)	Phase Error (degree)		Limit (degree)	Result
Reference Frequency 1747.8 MHz	Normal	-6.04	174.78	RMS	2.40	5	PASS
				Peak	6.75	20	
	LVLT	-6.05		RMS	2.38	5	
				Peak	6.68	20	
	LVHT	-6.14		RMS	2.30	5	
				Peak	6.65	20	
	HVLT	-6.20		RMS	2.22	5	
				Peak	6.62	20	
	HVHT	-6.28		RMS	2.22	5	
				Peak	6.54	20	
	Vibration	-6.31		RMS	2.15	5	
				Peak	6.42	20	

EGPRS 1800 (MS under minimum power control level)							
EGPRS 1800	Test Condition	Frequency Error (Hz)	Limit (Hz)	Phase Error (degree)		Limit (degree)	Result
Reference Frequency 1747.8 MHz	Normal	-5.49	174.78	RMS	2.31	5	PASS
				Peak	6.55	20	
	LVLT	-5.56		RMS	2.29	5	
				Peak	6.47	20	
	LVHT	-5.65		RMS	2.25	5	
				Peak	6.39	20	
	HVLT	-5.68		RMS	2.20	5	
				Peak	6.37	20	
	HVHT	-5.74		RMS	2.14	5	
				Peak	6.36	20	
	Vibration	-5.85		RMS	2.11	5	
				Peak	6.35	20	

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

25.1 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

25.2 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

25.3 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).

25.4 Test Instrument

Refer to Item 3.3

25.5 Test Result:

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	6	90.2	RMS	3.53	<9	10.81	<15	46.97	>30	PASS
				Peak	12.96	<30					
	LVLT	3		RMS	3.46	<10	8.23		43.14		
				Peak	13.01	<30					
	LVHT	4		RMS	3.50	<10	12.55		48.18		
				Peak	12.92	<30					
	HVLT	3		RMS	3.42	<10	10.81		42.80		
				Peak	13.17	<30					
	HVHT	10		RMS	3.39	<10	13.17		46.47		
				Peak	12.88	<30					
	Vibration	4		RMS	3.45	<10	13.13		44.86		
				Peak	12.60	<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	6	90.2	RMS	3.00	<9	7.89	<15	45.35	>30	PASS
				Peak	11.50	<30					
	LVLT	3		RMS	2.98	<10	5.19		43.60		
				Peak	11.51	<30					
	LVHT	4		RMS	3.04	<10	8.86		49.55		
				Peak	11.21	<30					
	HVLT	5		RMS	2.95	<10	7.77		46.49		
				Peak	11.36	<30					
	HVHT	11		RMS	2.87	<10	10.70		47.74		
				Peak	11.32	<30					
	Vibration	3		RMS	2.96	<10	10.55		46.43		
				Peak	11.18	<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	-5	174.78	RMS	3.99	<9	8.53	<15	49.01	>30	PASS
				Peak	13.92	<30					
	LVLT	-8		RMS	3.98	<10	6.63		46.27		
				Peak	14.01	<30					
	LVHT	-8		RMS	4.06	<10	7.98		55.74		
				Peak	13.88	<30					
	HVLT	-7		RMS	4.00	<10	5.85		49.13		
				Peak	14.12	<30					
	HVHT	0		RMS	3.96	<10	10.41		50.54		
				Peak	14.09	<30					
	Vibration	-9		RMS	4.02	<10	8.96		47.89		
				Peak	13.96	<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	5	174.78	RMS	4.55	<9	5.74	<15	48.64	>30	PASS
				Peak	12.19	<30					
	LVLT	2		RMS	4.49	<10	3.03		47.80		
				Peak	12.31	<30					
	LVHT	3		RMS	4.54	<10	6.84		56.04		
				Peak	12.02	<30					
	HVLT	0		RMS	4.47	<10	2.31		49.31		
				Peak	12.29	<30					
	HVHT	5		RMS	4.46	<10	2.53		52.82		
				Peak	12.26	<30					
	Vibration	-2		RMS	4.52	<10	1.04		51.10		
				Peak	11.98	<30					

26. EGPRS Transmitter output power

26.1 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

26.2 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 (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.

26.3 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.

26.4 Test Instrument

Refer to Item 3.3

26.5 Test Result

PASS

	E-GSM900 Output Power in EGPRS				
γ=	OUTPUT POWER (dBm)				Result
	Low Channel 880.2 MHz	Middle Channel 902.4 MHz	High Channel 914.8 MHz	Limit	
1 up slot					PASS
3	29.49	29.87	29.78	33±2	
4	29.02	29.31	29.97	31±2	
5	28.13	28.27	28.42	29±2	
6	27.30	27.19	27.65	27±2	
7	24.57	24.02	24.59	25±2	
8	23.23	23.28	23.55	23±2	
9	20.82	20.49	20.71	21±2	
10	18.34	18.63	18.62	19±3	
11	16.19	16.81	16.28	17±3	
12	15.26	15.52	15.35	15±3	
13	12.45	12.23	12.69	13±3	
14	10.79	10.30	10.22	11±5	
15	9.41	9.45	9.03	9±5	
16	7.98	7.79	7.76	7±5	
17	4.73	4.46	4.34	5±5	
2 up slot					
3	29.63	29.24	29.73	30±3	
17	1.88	1.32	1.71	2±5	
3 up slot					
3	28.09	28.72	28.17	28±3	
17	-0.37	-0.79	-0.07	0±5	
4 up slot					
3	27.19	27.38	27.34	26±3	
17	-1.58	-1.23	-1.36	-2±5	

	DCS1800 Output Power in EGPRS				
γ=	OUTPUT POWER (dBm)				Result
	Low Channel 1710.2 MHz	Middle Channel 1747.8 MHz	High Channel 1784.8 MHz	Limit	
1 up slot					PASS
3	29.86	29.38	29.70	29±3	
4	26.60	26.24	26.55	27±3	
5	24.19	24.79	24.27	25±3	
6	23.21	23.15	23.80	23±3	
7	21.15	21.23	21.73	21±3	
8	18.49	18.93	18.47	19±3	
9	16.04	16.67	16.20	17±4	
10	14.06	14.72	14.23	15±4	
11	12.00	12.51	12.36	13±4	
12	10.41	10.45	10.26	11±4	
13	8.59	8.31	8.13	9±4	
14	7.44	7.77	7.02	7±4	
15	5.37	5.52	5.65	5±4	
16	3.75	3.30	3.73	3±4	
17	1.90	1.98	1.57	1±5	
18	-1.40	-1.39	-1.96	-1±5	
2 up slot					
3	26.11	26.74	26.05	27±3	
18	-3.81	-3.80	-3.65	-3±5	
3 up slot					
3	24.26	24.67	24.74	25±3	
18	-5.18	-5.06	-5.88	-5±5	
4 up slot					
3	23.35	23.27	23.80	23±3	
18	-7.77	-7.13	-7.30	-7±5	

27. Output RF spectrum in EGPRS configuration

27.1 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

27.2 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.

27.3 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.

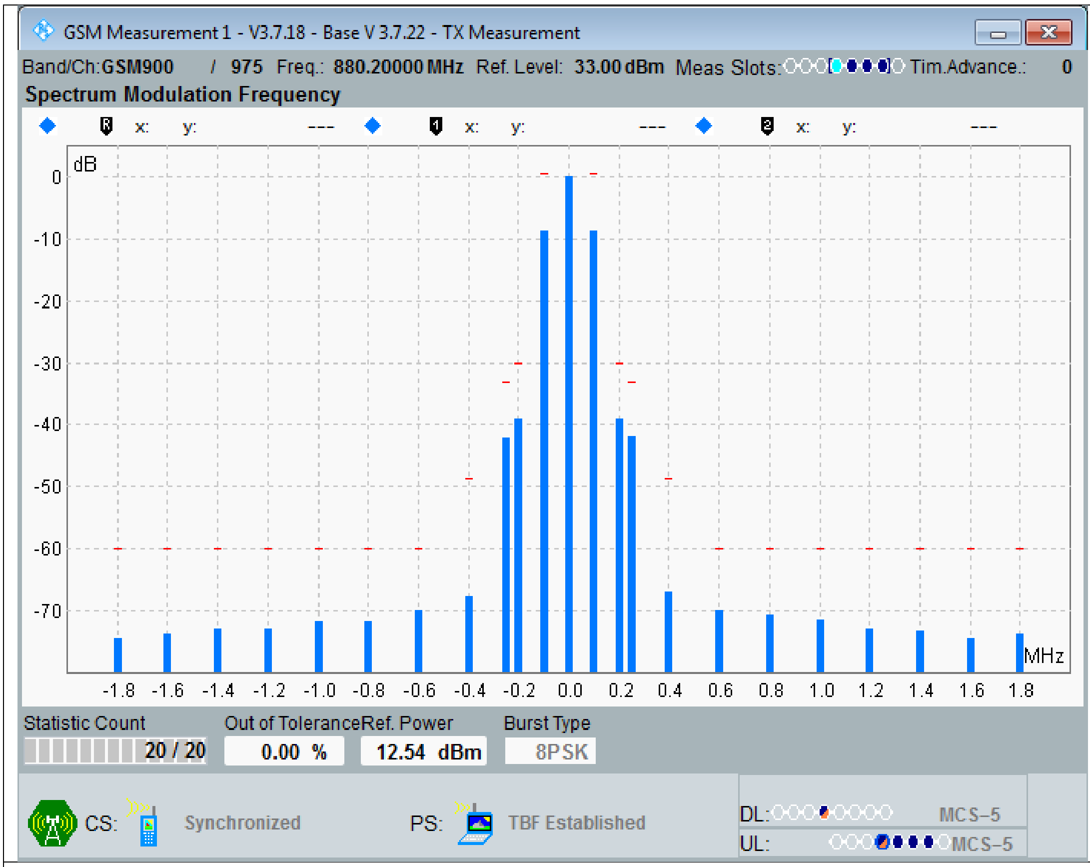
The video signal of the spectrum analyser is "gated" such that the spectrum generated by at least 40 of the symbols 87 to 132 of the burst in one of the active time slots is the only spectrum measured. This gating may be analogue or numerical, dependent upon the design of the spectrum analyser. Only 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 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.

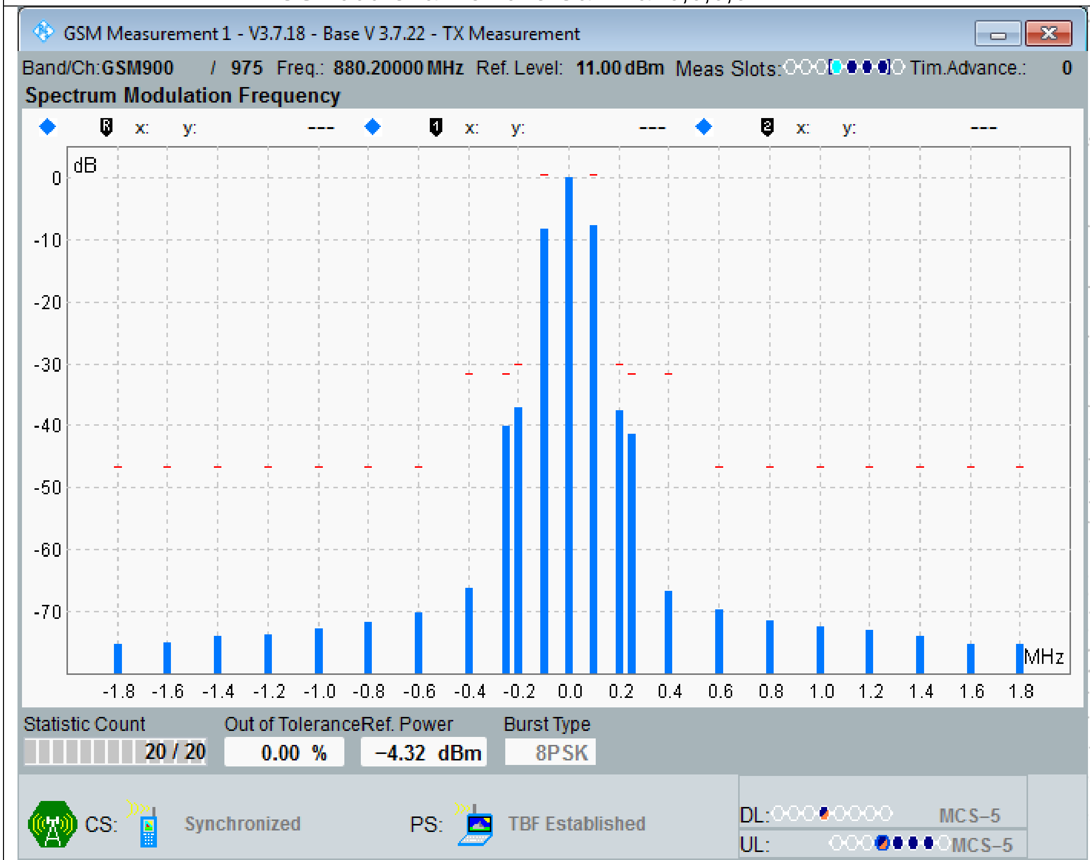
27.4 Test Instrument
Refer to Item 3.3

27.5 Test Result
PASS

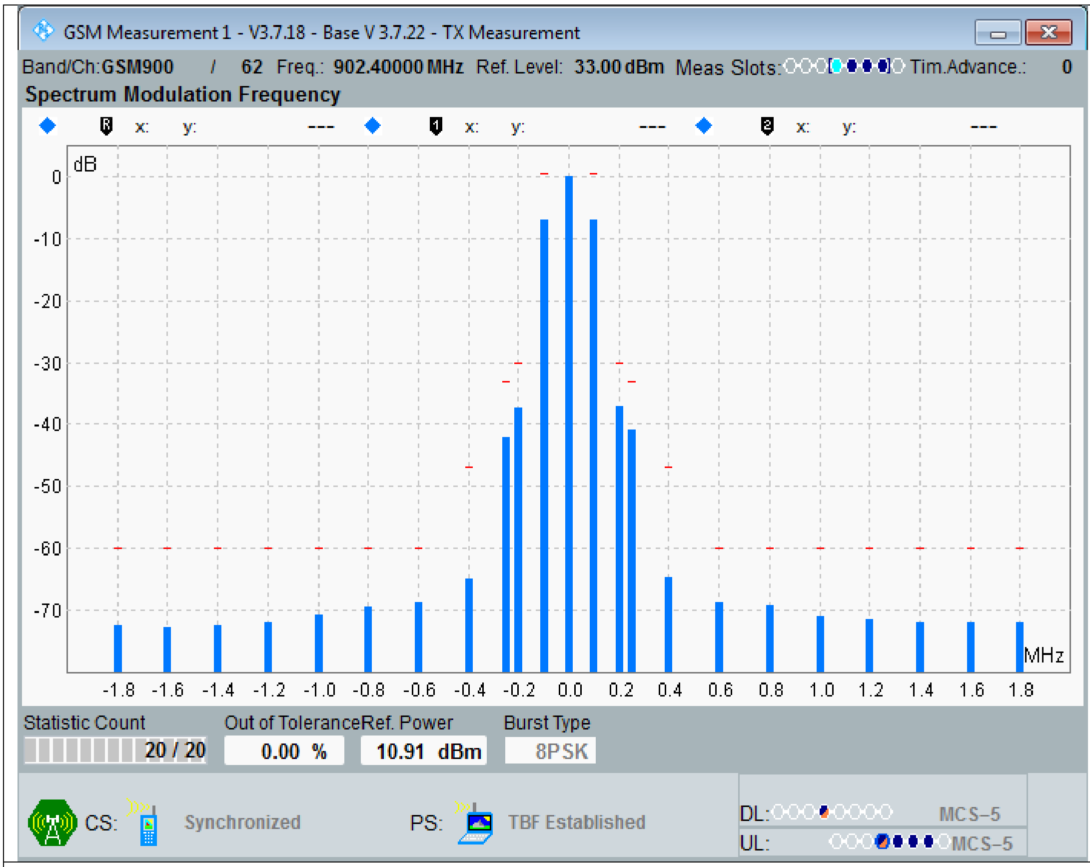
EGPRS



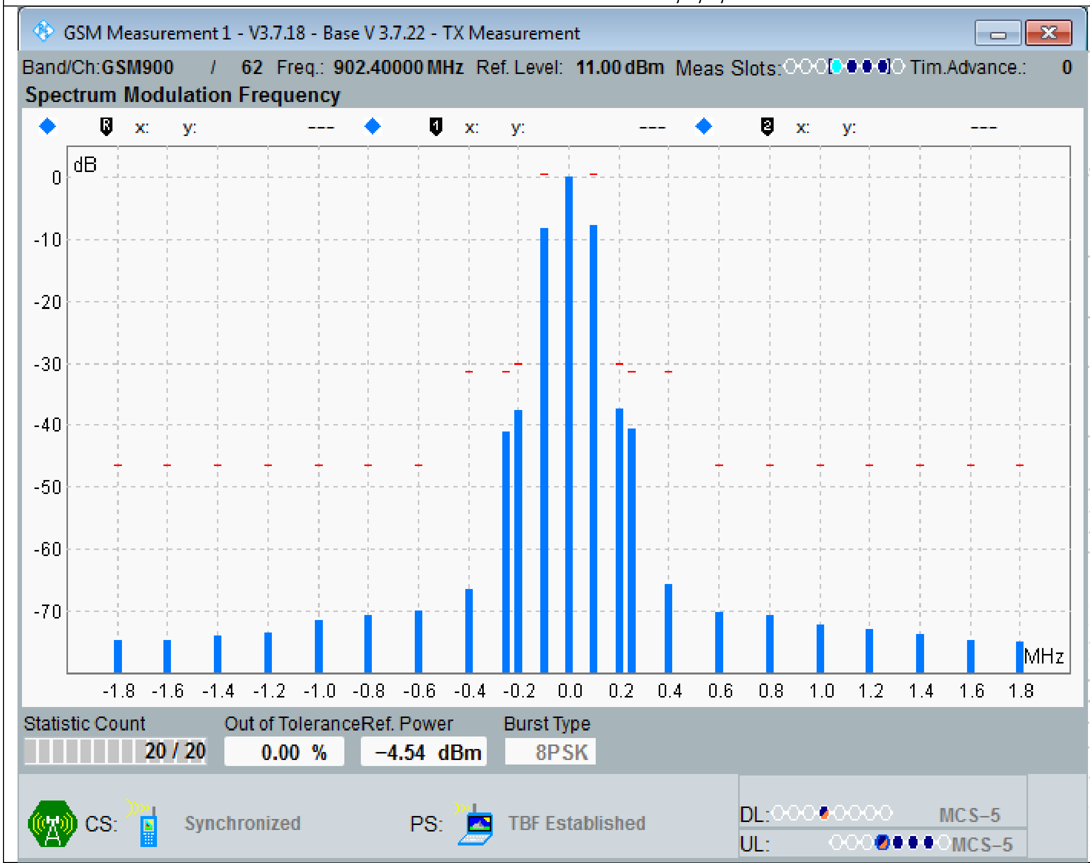
GSM900 Channel=975 Gamma=6;6;6;6 NVNT



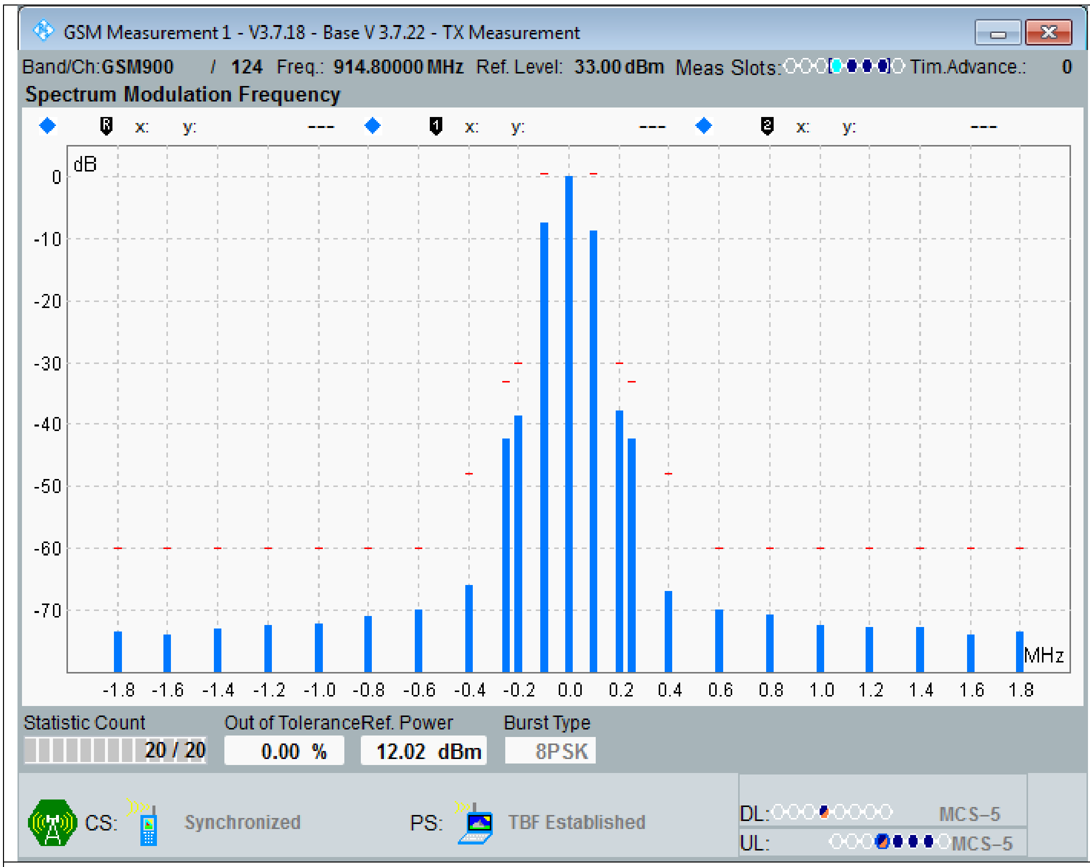
GSM900 Channel=975 Gamma=17;17;17;17 NVNT



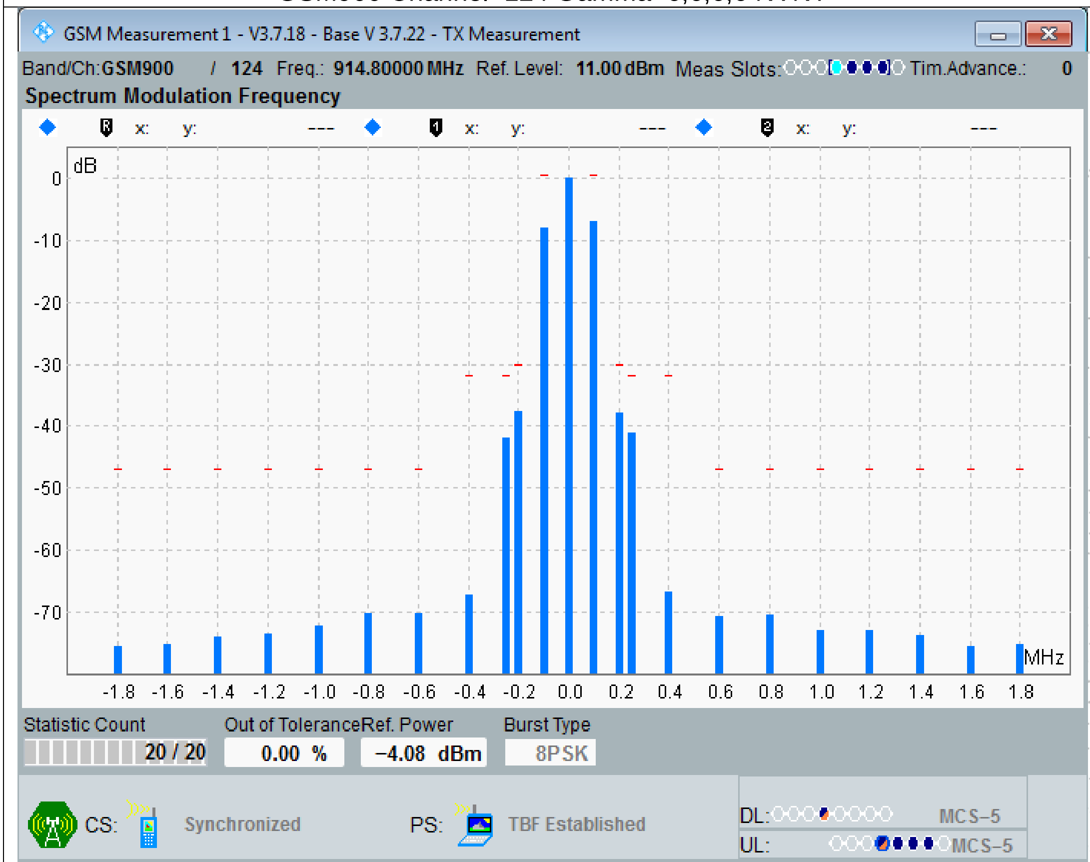
GSM900 Channel=62 Gamma=6;6;6;6 NVNT



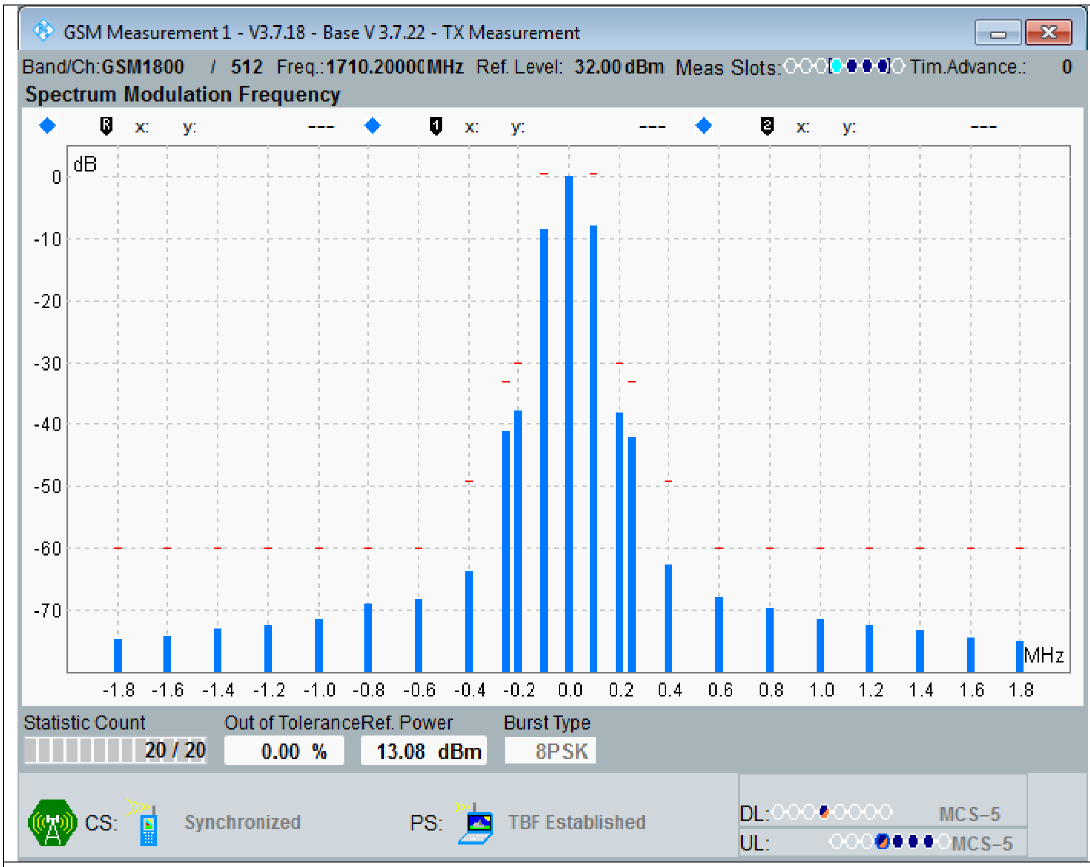
GSM900 Channel=62 Gamma=17;17;17;17 NVNT



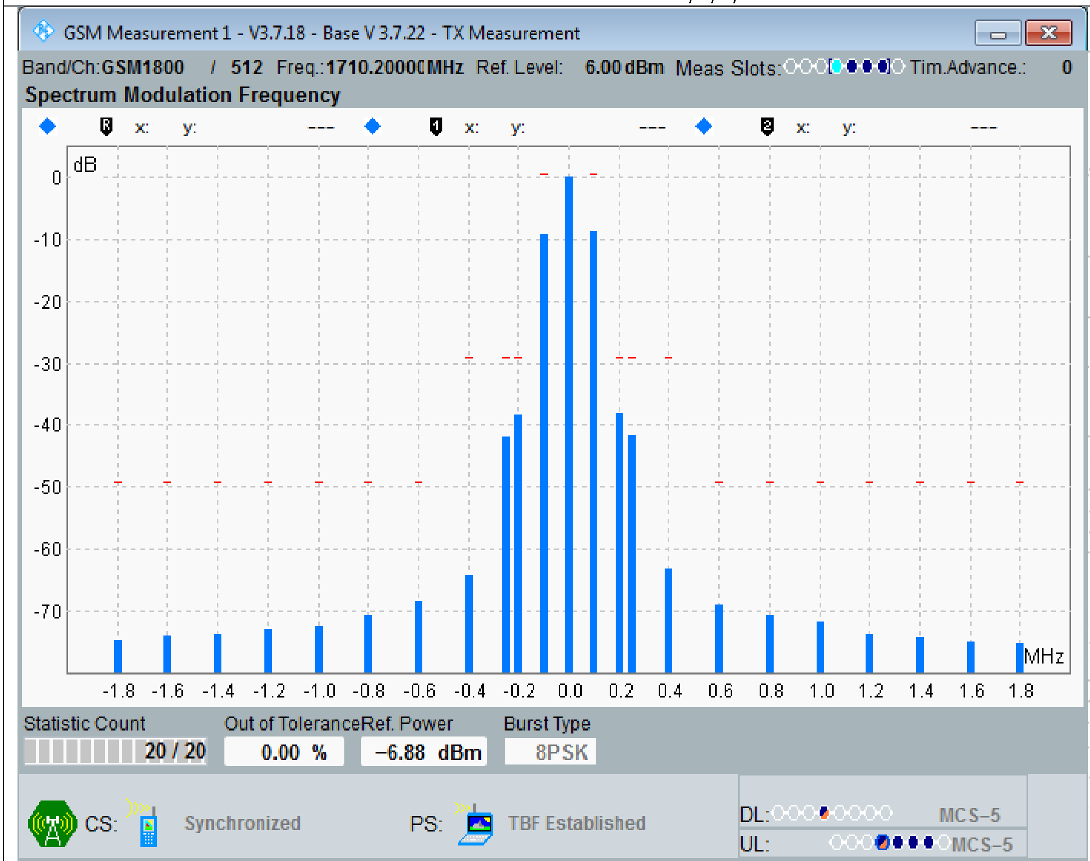
GSM900 Channel=124 Gamma=6;6;6;6 NVNT



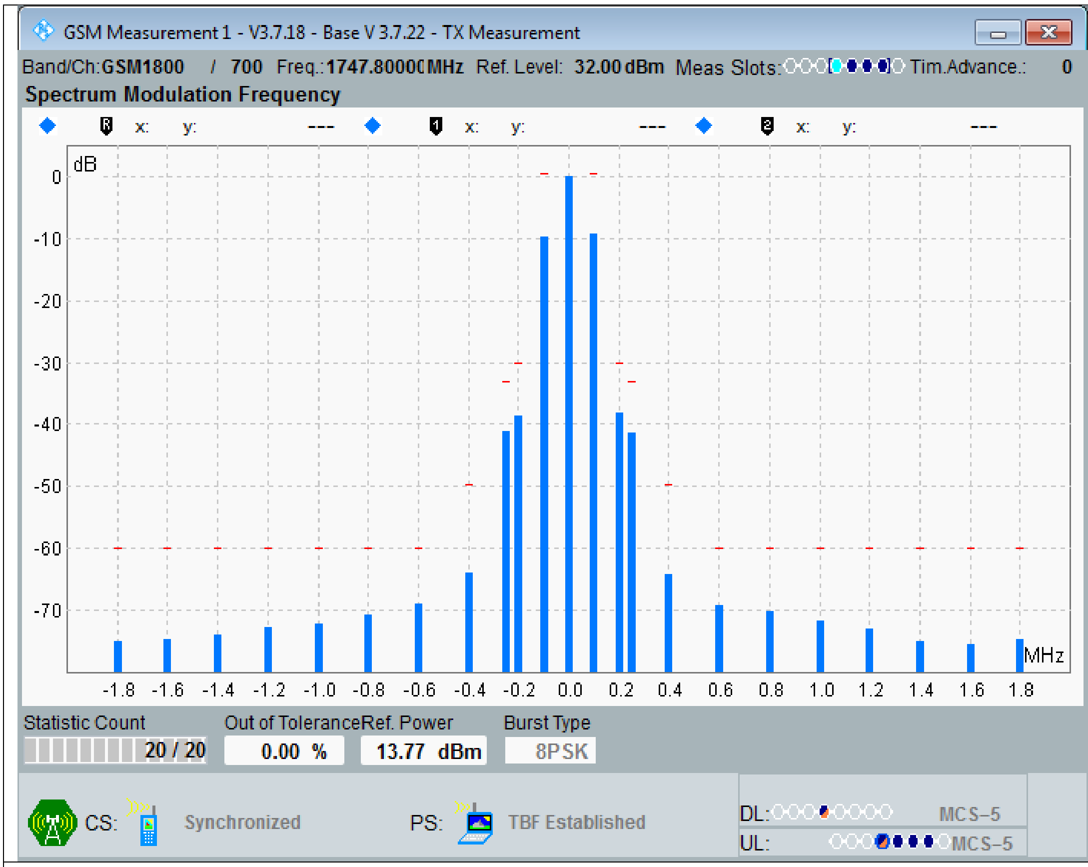
GSM900 Channel=124 Gamma=17;17;17;17 NVNT



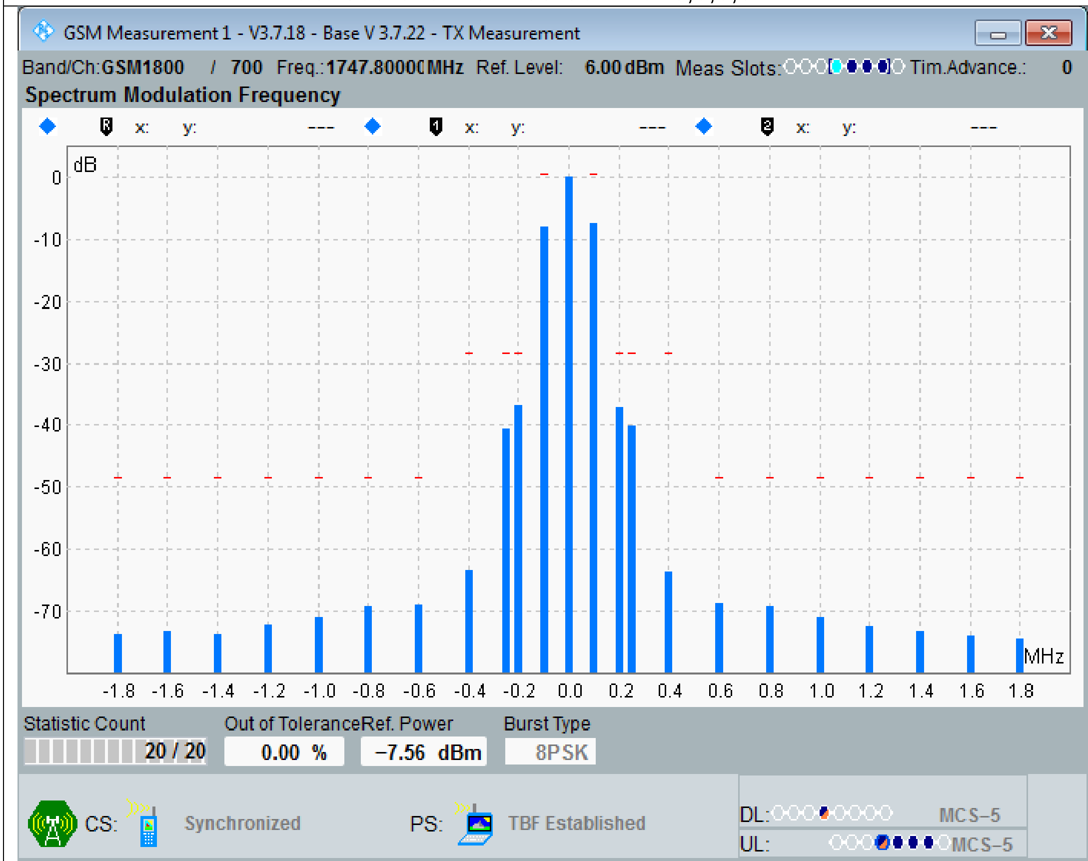
DCS1800 Channel=512 Gamma=5;5;5;5 NVNT



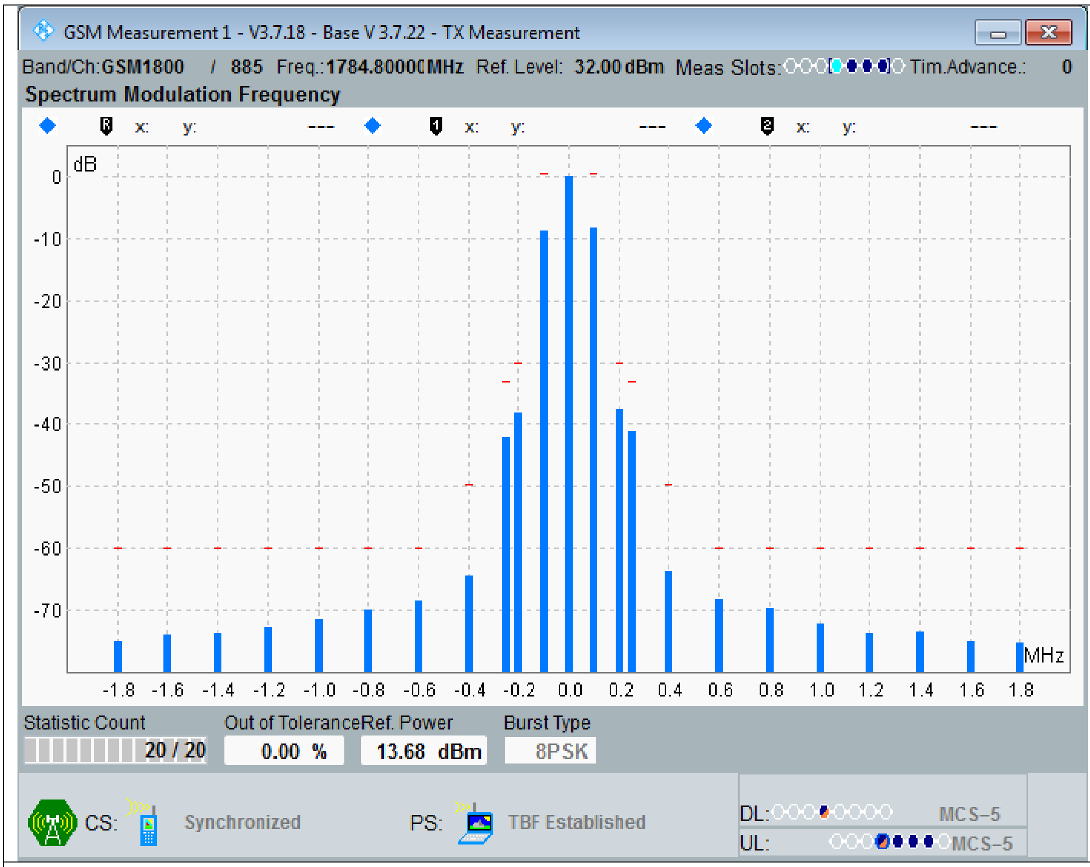
DCS1800 Channel=512 Gamma=18;18;18;18 NVNT



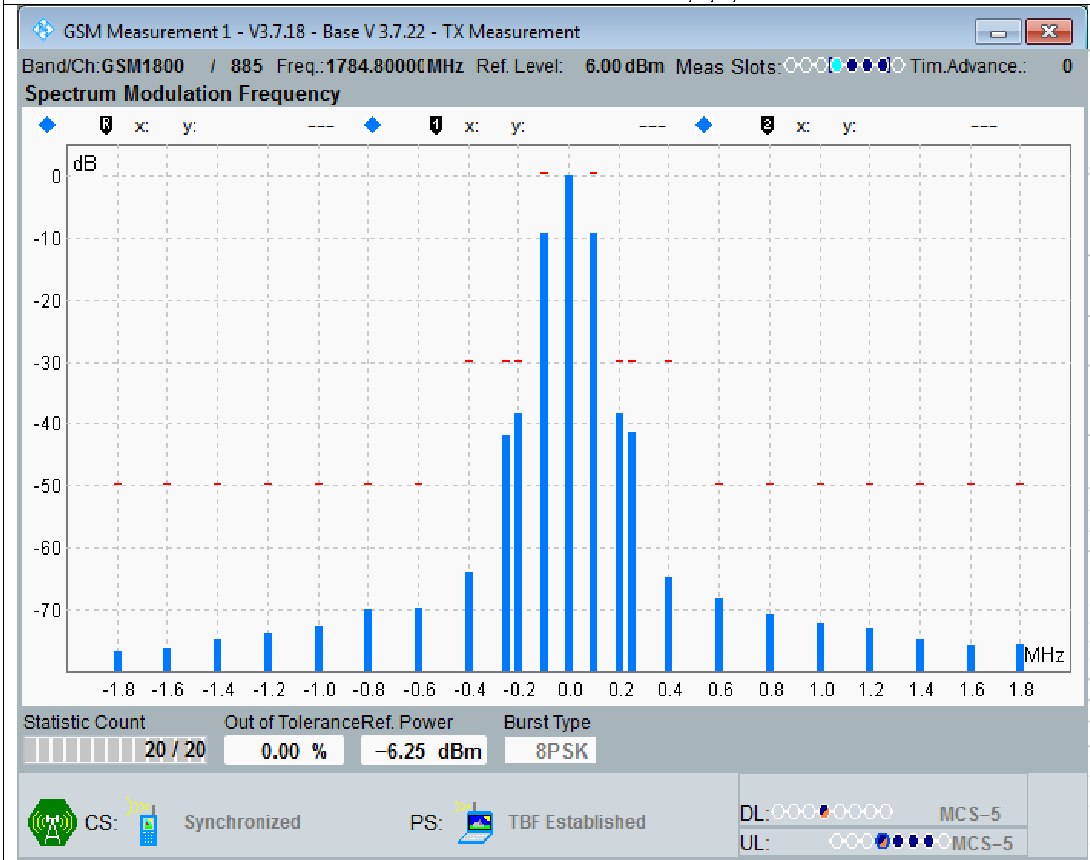
DCS1800 Channel=700 Gamma=5;5;5;5 NVNT



DCS1800 Channel=700 Gamma=18;18;18;18 NVNT



DCS1800 Channel=885 Gamma=5;5;5;5 NVNT



DCS1800 Channel=885 Gamma=18;18;18;18 NVNT

28. Blocking and spurious response in EGPRS configuration

28.1 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

28.2 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 f0 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.

28.3 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.
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 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	**LEVEL IN dB Vemf( )**							
FR ±600 kHz to FR ±800 kHz	70	75	70	75	70	75	70	70
FR ±800 kHz to FR ±1,6 MHz	70	80	70	80	70	80	70	70
FR ±1,6 MHz to FR ±3 MHz	80	90	80	90	80	90	80	80
457,6 MHz to FR - 3 MHz	90	90	-	-	-	-	-	-
FR + 3 MHz to 473,6 MHz	90	90	-	-	-	-	-	-
486 MHz to FR - 3MHz	-	-	90	90	-	-	-	-
FR + 3MHz to 502 MHz	-	-	90	90	-	-	-	-
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	-
1 910 MHz to FR - 3 MHz	-	-	-	-	-	-	-	87
FR + 3 MHz to 2 010 MHz	-	-	-	-	-	-	-	87
100 kHz to < 457,6 MHz	113	113	-	-	-	-	-	-
> 473,6MHz to 12,750 MHz	113	113	-	-	-	-	-	-
100 kHz to < 486 MHz	-	-	113	113	-	-	-	-
> 502 MHz to 12,750 MHz	-	-	113	113	-	-	-	-
835 MHz to < 915 MHz	-	-	-	-	113	113	-	-
> 980 MHz to 1 000 MHz	-	-	-	-	113	113	-	-
100 kHz to < 835 MHz	-	-	-	-	113	113	-	-
> 1 000 MHz to 12,750 MHz	-	-	-	-	113	113	-	-
100 kHz to 1 705 MHz	-	-	-	-	-	-	113	-
> 1 705 MHz to < 1 785 MHz MHz	-	-	-	-	-	-	101	-
> 1 920 MHz to 1 980 MHz	-	-	-	-	-	-	101	-
> 1 980 MHz to 12,750 MHz	-	-	-	-	-	-	113	-
100 kHz to < 1 830 MHz	-	-	-	-	-	-	-	113
1 830 MHz to < 1 910 MHz	-	-	-	-	-	-	-	101
> 2 010 MHz to 2 070 MHz	-	-	-	-	-	-	-	101
> 2 070 MHz to 12,750 MHz	-	-	-	-	-	-	-	113

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

	GSM 710	GSM 750	T-GSM 810	GSM 850
FREQUENCY	LEVEL IN dB Vemf( )			
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.
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 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.

28.4 Test Instrument

Refer to Item 3.3

28.5 Test Result

E-GSM900:

Channel frequency (MHz)	FBER (%)	Number of test samples	Limit (%)	Result
880.2	0.047	10000	2.439	PASS
902.0	0.055	10000	2.439	
914.8	0.061	10000	2.439	

DCS1800:

Channel frequency (MHz)	FBER (%)	Number of test samples	Limit (%)	Result
1710.2	0.074	10000	2.439	PASS
1747.8	0.060	10000	2.439	
1784.8	0.078	10000	2.439	

29. Intermodulation rejection - EGPRS

29.1 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

29.2 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.

29.3 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
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

	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.

29.4 Test Instrument

Refer to Item 3.3

29.5 Test Result

E-GSM900:

Channel frequency (MHz)	RBER (%)	Number of test samples	Limit (%)	Result
880.2	0.012	10000	2.439	PASS
902.0	0.027	10000	2.439	
914.8	0.039	10000	2.439	

DCS1800:

Channel frequency (MHz)	RBER (%)	Number of test samples	Limit (%)	Result
1710.2	0.016	10000	2.439	PASS
1747.8	0.028	10000	2.439	
1784.8	0.037	10000	2.439	

30. Adjacent channel rejection - EGPRS

30.1 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

30.2 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.

30.3 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 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.

30.4 Test Instrument

Refer to Item 3.3

30.5 Test Result

E-GSM900:

Channel frequency (MHz)	BLER (%)	Number of test samples	Limit (%)	Result
880.2	0.059	10000	10	PASS
902.0	0.065	10000	10	
914.8	0.073	10000	10	

DCS1800:

Channel frequency (MHz)	BLER (%)	Number of test samples	Limit (%)	Result
1710.2	0.067	10000	10	PASS
1747.8	0.075	10000	10	
1784.8	0.080	10000	10	

31. Minimum Input level for Reference Performance - EGPRS

31.1 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

31.2 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 3)	(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.

31.3 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.

31.4 Test Instrument

Refer to Item 3.3

31.5 Test Result:

E-GSM900:

Channel frequency (MHz)	BLER (%)	Number of test samples	Limit (%)	Result
880.2	0.054	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	0.052	10000	10	PASS
1747.8	0.067	10000	10	
1784.8	0.078	10000	10	

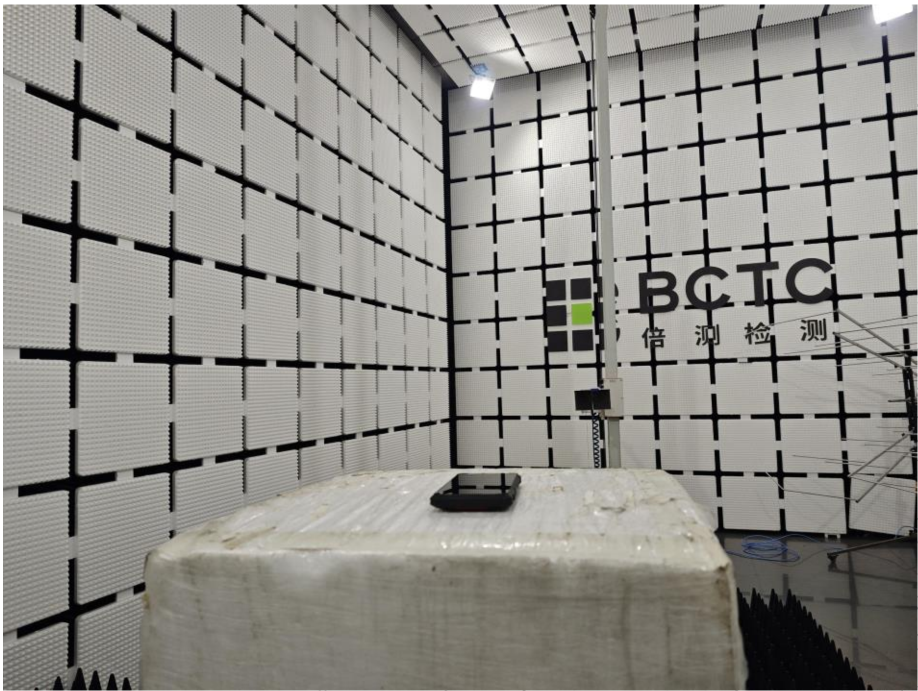
32. EUT Photographs

EUT Photo 1

NOTE: Appendix-Photographs Of EUT Constructional Details

33. EUT Test Setup Photographs

Spurious emissions



STATEMENT

1. The equipment lists are traceable to the national reference standards.

2. The test report can not be partially copied unless prior written approval is issued from our lab.

3. The test report is invalid without the "special seal for inspection and testing".

4. The test report is invalid without the signature of the approver.

5. The test process and test result is only related to the Unit Under Test.

6. Sample information is provided by the client and the laboratory is not responsible for its authenticity.

7. The quality system of our laboratory is in accordance with ISO/IEC17025.

8. If there is any objection to this test report, the client should inform issuing laboratory within 15 days from the date of receiving test report.

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