RF TEST REPORT

Product Name	:	Tablet PC
Brand Name	:	Blackview
Test Model	:	Active 8
Series Model	:	N/A
Applicant	:	DOKE COMMUNICATION (HK) LIMITED
Address	:	RM 1902 EASEY COMM BLDG 253-261 HENNESSY ROAD WANCHAI HK CHINA
Manufacturer	:	Shenzhen DOKE Electronic Co., Ltd
Address	:	801, Building3, 7th Industrial Zone, Yulv Community, Yutang Road, Guangming District, Shenzhen, China
Date of Receipt	:	2023.05.25
Date of Test	:	2023.05.25-2023.06.13
Issued Date	:	2023.06.14
Report Version	:	V1.0
Test Sample	:	Engineering Sample No.: AIT23052502-1
Standard(s)	:	ETSI EN 301 511 V12.5.1: 2017-03

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This device has been tested and found to comply with the stated standard(s), which is (are) required by the council directive of 2014/53/EU and indicated in the test report and are applicable only to the tested sample identified in the report.

Reviewed by: Simba huang

Approved by: Seal Chen

REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	2023.06.14	Valid	Initial Release

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1. PRODUCT INFORMATION

1.1. PRODUCT TECHNICAL DESCRIPTION

EUT Name:	Tablet PC
Model No:	Active 8
Serial Model:	N/A
Difference Description	N/A
Brand Name:	Blackview
Power Supply	DC 3.87V 22000mAh for Battery
Hardware Version	DK051-T616-V1.0
Software Version	Active8_EEA_T30_V1.0
GSM Information:	
Supported type	GSM/GPRS/EGPRS
Frequency Bands	☒ GSM 900 ☒ DCS 1800 (EU Frequency) ☐ GSM 850 ☐ PCS1900 (none EU Frequency)
Operation Frequency Range	Transmit: GSM900: 880.2MHz~914.8MHz, DCS1800: 1710.2MHz~1784.8MHz
	Receive: GSM900: 925.2MHz~959.8MHz, DCS1800: 1805.2MHz~1879.8MHz
Modulation Type	GMSK, 8PSK
Power Class	GSM900: 4, DCS1800: 1
GSM Release Version	R99
GPRS Class	☐ 8 ☐ 10 ☒ 12
EGPRS Class	☐ 8 ☐ 10 ☒ 12
Antenna Type	FPC Antenna
Antenna Gain	GSM900: 1.80dBi PCS1800:-0.70dBi
SIM Card Description	There are dual-SIM cards for GSM.

Note:

1. The above information was declared by the manufacturer.
2. The equipment submitted representative production models.
3. For more details, please refer to the User's manual of the EUT.

1.2. DESCRIPTION OF TEST MODES AND TEST FREQUENCY

The EUT has been tested under typical operating condition. The Applicant provides communication tools software to control the EUT for staying in continuous transmitting and receiving mode for testing

Operation Frequency List:

Transmit Frequency Range			
GSM900		**DCS1800**	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
975	**880.20**	**512**	**1710.20**
976	880.40	513	1710.40
· :	· :	· :	· :
60	902.00	**698**	**1747.40**
61	902.20	699	1747.60
62	**902.40**	700	1747.80
⋮	⋮	⋮	⋮
123	914.60	884	1784.60
124	**914.80**	**885**	**1784.80**

1.3. OBJECTIVE

Perform Radio Spectrum tests for CE Marking according to the provisions of article 3.2 of the Radio Equipment Directive (2014/53/EU) for the Radio function of the EUT.

1.4. TEST ITEMS AND THE RESULTS

Leading reference documents for testing:

ETSI EN 301 511	Global System for Mobile communications (GSM); Mobile Stations (MS) equipment; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU

Specific reference documents for testing:

ETSI TS 151 010-1	3rd Generation Partnership Project; Technical Specification Group GSM/EDGE Radio Access Network Digital cellular telecommunications system (Phase 2+); Mobile Station (MS) conformance specification; Part 1: Conformance specification

Technical requirements specifications for transmitter		
Test Item	EN 301 511 V12.5.1 Sub-Clause	Result
Transmitter – Frequency error and phase error	Clause 4.2.1	Pass
Transmitter – Frequency error under multi path and interference conditions	Clause 4.2.2	Pass
Transmitter output power and burst timing	Clause 4.2.5	Pass
Transmitter - Output RF spectrum	Clause 4.2.6	Pass
Frequency error and phase error in GPRS multislot configuration	Clause 4.2.4	Pass
Transmitter output power in GPRS multislot configuration	Clause 4.2.10	Pass
Output RF spectrum in GPRS multislot configuration	Clause 4.2.11	Pass
Frequency error and Modulation accuracy in EGPRS Configuration	Clause 4.2.26	Pass
Frequency error under multipath and interference conditions in EGPRS Configuration	Clause 4.2.27	Pass
EGPRS Transmitter output power	Clause 4.2.28	Pass
Output RF spectrum in EGPRS configuration	Clause 4.2.29	Pass
Conducted spurious emissions - MS allocated a channel	Clause 4.2.12	Pass
Conducted spurious emissions - MS in idle mode	Clause 4.2.13	Pass
Radiated spurious emissions - MS allocated a channel	Clause 4.2.16	Pass
Radiated spurious emissions - MS in idle mode	Clause 4.2.17	Pass

Technical requirements specifications for receiver		
Test Item	EN 301 511 V12.5.1 Sub-Clause	Result
Receiver Blocking and spurious response -speech channels	Clause 4.2.20	N/A
Blocking and spurious response in EGPRS configuration	Clause 4.2.30	Pass
Intermodulation rejection – speech channels	Clause 4.2.32	N/A
Intermodulation rejection - EGPRS	Clause 4.2.34	Pass
AM suppression - speech channels	Clause 4.2.35	N/A
AM suppression - packet channels	Clause 4.2.37	Pass
Adjacent channel rejection – speech channels (TCH/FS)	Clause 4.2.38	N/A
Adjacent channel rejection - EGPRS	Clause 4.2.40	Pass
Reference sensitivity - TCH/FS	Clause 4.2.42	N/A
Reference sensitivity - FACCH/F	Clause 4.2.43	N/A
Minimum Input level for Reference Performance -GPRS	Clause 4.2.44	Pass
Minimum Input level for Reference Performance -EGPRS	Clause 4.2.45	Pass

Note:
1.The measurement uncertainty is not included in the test result.

2.N/A: means this test item is not applicable for this device according to the technology characteristic of device.

3.EUT Orthogonal Axis: “X” - denotes Laid on Table; ”Y” - denotes Vertical Stand; ”Z” - denotes Side Stand.

1.5. TYPE OF MOBILE STATION AND ADDITIONAL INFORMATION

Table A.2: Type of Mobile Station (Re. ETSI EN 301 511 Annex B)

Item	Type of Mobile Station	Support	Mnemonic
1	HSCSD Multislot MS	NO	Type_HSCSD_Multislot
2	R-GSM MS	NO	Type_R-GSM
3	Support of GPRS Multislot class on the uplink	YES	Type_GPRS_Multislot_uplink
4	EGPRS	YES	Type_EGPRS
5	EGPRS capable of 8PSK in Uplink, of all Multislot classes	YES	Type_EGPRS_8PSK_uplink
6	ER-GSM MS	NO	Type-GSM
7	DLMC MS	NO	Type DLMC

Type A.3: Additional information (Re. ETSI EN 301 511 Annex C)

Item	Additional Information	Support	Mnemonic
1	Telephony	YES	TSPC_Serv_TS11
2	Permanent Antenna Connector	YES	TSPC_AddInfo_PermAntenna

Note: Telephony means make a phone call.

2. TEST ENVIROMENT

2.1 ADDRESS OF THE TEST LABORATORY

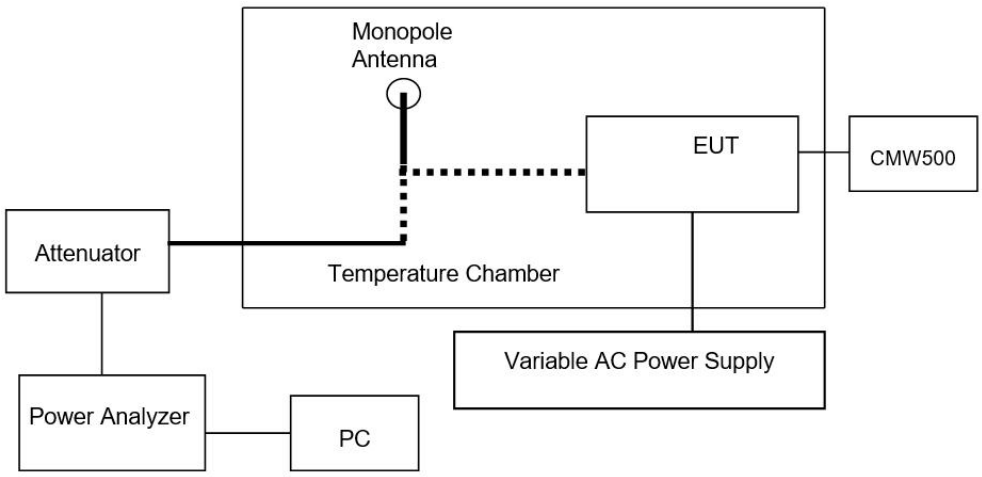
Test Site	Dongguan Yaxu (AiT) Technology Limited
Location	Add: No.22, Jinqianling 3rd Street, Jitigang, Huangjiang,Dongguan, Guangdong, China
CNAS- Registration No	L6177

2.2 ENVIRONMENTAL CONDITIONS

	NORMAL CONDITIONS	EXTREME CONDITIONS
Temperature range (℃)	15 - 35	-10 - 50
Relative humidty range	20 % - 75 %	20 % - 75 %
Pressure range (kPa)	86 - 106	86 - 106
Power supply	DC 3.87V	LV:DC 3.28V/HV: DC 4.45V
Note: 1.The Extreme Temperature and Extreme Voltages declared by the manufacturer. 2.The Limit Voltage 4.40V was declared by manufacturer, 3.The EUT couldn't be operate normally with higher voltage. 4.The maximum temperature of 40 is not a standard requirement and is measured according to the maximum service temperature stated by the manufacturer.		

2.2 SETUP CONFIGURATION OF EUT

Conducted measurements configuration of EUT shall be as follows:



Remarks:
The Signal Analyzer could be connected to a monopole antenna or directly connected to the EUT, if the EUT has already employing an antenna connector.

2.4 MEASUREMENT UNCERTAINTY

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

Test Description	Uncertainty
Conducted spurious emissions-MS Allocated a Channel Emissions@100kHz<f<2GHz Emissions@2GHz <f<12.75GHz	 0.593dB 1.380 dB
Conducted spurious emissions- MS in Idle Mode Emissions@100kHz<f<2GHz Emissions@2GHz <f<12.75GHz	 0.649 dB 1.381 dB
Radiated spurious emissions	<1GHz: 4.68dB >1GHz: 4.89dB
Frequency error and phase error Frequency error under multipath and interference conditions Frequency error and phase error in GPRS multislot configuration Frequency error and Modulation accuracy in EGPRS Configuration Frequency error under multipath and interference conditions in EGPRS Configuration	 Freq Err<11.5Hz RMS Phase Err 1.0degrees Peak Phase Error 4.0degrees
Transmitter output power and burst timing Transmitter output power in GPRS multislot configuration EGPRS Transmitter output power	 0.16dB
Output RF spectrum Transmitter output power in GPRS(or EGPRS)multislot configuration	0.18dB
Receiver Blocking and spurious response - speech channels Blocking and spurious response in EGPRS Configuration Wanted Signal@f<2GHz Blocking Signal@100kHz<f<2GHz Blocking Signal@2GHz<f<12.75GHz	 0.257 dB 0.302 dB 0.281 dB

2.5 LIST OF EQUIPMENTS USED

No	Test Equipment	Manufacturer	Model No	Serial No	Cal. Date	Cal. Due Date
1	Spectrum Analyzer	R&S	FSV40	101470	2022.09.02	2023.09.01
2	EMI Measuring Receiver	R&S	ESR	101660	2022.09.02	2023.09.01
3	Low Noise Pre Amplifier	HP	HP8447E	1937AIT2305 2502-1855	2022.09.02	2023.09.01
4	Low Noise Pre Amplifier	Tsj	MLA-0120-A0 2-34	2648A04738	2022.09.02	2023.09.01
5	Passive Loop	ETS	6512	00165355	2022.09.03	2024.09.02
6	TRILOG Super Broadband test Antenna	SCHWARZBE CK	VULB9160	9160-3206	2021.08.29	2024.08.28
7	Broadband Horn Antenna	SCHWARZBE CK	BBHA9120D	452	2021.08.29	2024.08.28
8	SHF-EHF Horn Antenna 15-40GHz	SCHWARZBE CK	BBHA9170	BBHA91703 67d	2020.11.24	2023.11.23
9	EMI Test Receiver	R&S	ESCI	100124	2022.09.02	2023.09.01
10	LISN	Kyoritsu	KNW-242	8-837-4	2022.09.02	2023.09.01
11	LISN	R&S	ESH3-Z2	0357.8810.54-101161-S2	2022.09.02	2023.09.01
12	Pro.Temp&Humi.chamber	MENTEK	MHP-150-1C	MAA08112501	2022.09.02	2023.09.01
13	RF Automatic Test system	MW	MW100-RFCB	21033016	2022.09.02	2023.09.01
14	Signal Generator	Agilent	N5182A	MY50143009	2022.09.02	2023.09.01
15	Wideband Radio communication tester	R&S	CMW500	1201.0002K50	2022.09.02	2023.09.01
16	RF Automatic Test system	MW	MW100-RFCB	21033016	2022.09.02	2023.09.01
17	DC power supply	ZHAOXIN	RXN-305D-2	28070002559	N/A	N/A
18	RE Software	EZ	EZ-EMC_RE	Ver.AIT-03A	N/A	N/A
19	CE Software	EZ	EZ-EMC_CE	Ver.AIT-03A	N/A	N/A
20	RF Software	MW	MTS 8310	2.0.0.0	N/A	N/A
21	temporary antenna connector(Note)	NTS	R001	N/A	N/A	N/A
22	Spectrum Analyzer	Agilent	N9020A	MT21033052	2022.09.02	2023.09.01
Note: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.						

3. SUMMARY OF TEST RESULTS

Terms in the column “Verdict” for the test results list of the section:

Verdict	Description
PASS	EUT passed this test case
FAIL	EUT failed this test case
INC.	EUT did not pass and did not fail this test case, therefore the verdict is inconclusive
N/A	Test case not applicable for the EUT, see the column “Note” for detailed

Table A.1: The EN Requirements Table (EN-RT) (Re. ETSI EN 301 511 Annex A) for SIM Card 1

Test Case (ETSI TS 151010-1)	Test Case (EN 301 511)	Test Condition	GSM 900		GSM 1800		Note
			Sample	Result	Sample	Result	
12.1.1	4.2.12	Conducted spurious emissions - MS allocated a channel					
		NT / NV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		NT / LV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		NT / HV	AIT23052502-1	PASS	AIT23052502-1	PASS	
12.1.2	4.2.13	Conducted spurious emissions - MS in idle mode					
		NT / NV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		NT / LV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		NT / HV	AIT23052502-1	PASS	AIT23052502-1	PASS	
12.2.1	4.2.16	Radiated spurious emissions - MS allocated a channel					
		NT / NV	AIT23052502-1	PASS	AIT23052502-1	PASS	Reference to the section 4.10
		NT / LV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		NT / HV	AIT23052502-1	PASS	AIT23052502-1	PASS	
12.2.2	4.2.17	Radiated spurious emissions - MS in idle mode					
		NT / NV	AIT23052502-1	PASS	AIT23052502-1	PASS	Reference to the section 4.11
		NT / LV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		NT / HV	AIT23052502-1	PASS	AIT23052502-1	PASS	
13.1	4.2.1	Transmitter - Frequency error and phase error					
		NT / NV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		LT / LV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		LT / HV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		HT / LV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		HT / HV	AIT23052502-1	PASS	AIT23052502-1	PASS	

		Vibration X-axis	AIT23052502-1	PASS	AIT23052502-1	PASS	
		Vibration Y-axis	AIT23052502-1	PASS	AIT23052502-1	PASS	
		Vibration Z-axis	AIT23052502-1	PASS	AIT23052502-1	PASS	
13.2	4.2.2	Transmitter - Frequency error under multipath and interference conditions					
		NT / NV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		LT / LV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		LT / HV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		HT / LV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		HT / HV	AIT23052502-1	PASS	AIT23052502-1	PASS	
13.3	4.2.5	Transmitter output power and burst timing					
		NT / NV	AIT23052502-1	PASS	AIT23052502-1	PASS	Reference to the section 4.4
		LT / LV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		LT / HV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		HT / LV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		HT / HV	AIT23052502-1	PASS	AIT23052502-1	PASS	
13.4	4.2.6	Transmitter - Output RF spectrum					
		NT / NV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		LT / LV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		LT / HV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		HT / LV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		HT / HV	AIT23052502-1	PASS	AIT23052502-1	PASS	
13.16.1	4.2.4	Frequency error and phase error in GPRS multislot configuration					
		NT / NV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		LT / LV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		LT / HV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		HT / LV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		HT / HV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		Vibration X-axis	AIT23052502-1	PASS	AIT23052502-1	PASS	
		Vibration Y-axis	AIT23052502-1	PASS	AIT23052502-1	PASS	
		Vibration Z-axis	AIT23052502-1	PASS	AIT23052502-1	PASS	
13.16.2	4.2.10	Transmitter output power in GPRS multislot configuration					
		NT / NV	AIT23052502-1	PASS	AIT23052502-1	PASS	Reference to

		LT / LV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		LT / HV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		HT / LV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		HT/HV	AIT23052502-1	PASS	AIT23052502-1	PASS	
13.16.3	4.2.11	Output RF spectrum in GPRS multislot configuration					
		NT / NV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		LT / LV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		LT / HV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		HT / LV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		HT/HV	AIT23052502-1	PASS	AIT23052502-1	PASS	
14.2.1	4.2.42	Reference sensitivity - TCH/FS					
		NT / NV	AIT23052502-1	N/A	AIT23052502-1	N/A	
		NT / LV	AIT23052502-1	N/A	AIT23052502-1	N/A	
		NT / HV	AIT23052502-1	N/A	AIT23052502-1	N/A	
14.2.3	4.2.43	Reference sensitivity - FACCH/F					
		NT / NV	AIT23052502-1	N/A	AIT23052502-1	N/A	
14.16.1	4.2.44	Minimum Input level for Reference Performance - GPRS					
		NT / NV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		NT / LV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		NT / HV	AIT23052502-1	PASS	AIT23052502-1	PASS	
14.6.1	4.2.32	Intermodulation rejection-speech channels					
		NT / NV	AIT23052502-1	N/A	AIT23052502-1	N/A	
		NT / LV	AIT23052502-1	N/A	AIT23052502-1	N/A	
		NT / HV	AIT23052502-1	N/A	AIT23052502-1	N/A	
14.8.1	4.2.35	AM suppression-speech channels					
		NT / NV	AIT23052502-1	N/A	AIT23052502-1	N/A	
		NT / LV	AIT23052502-1	N/A	AIT23052502-1	N/A	
		NT / HV	AIT23052502-1	N/A	AIT23052502-1	N/A	
14.8.3	4.2.37	AM suppression - packet channels					
		NT / NV	AIT23052502-1	PASS	AIT23052502-1	PASS	
14.5.1	4.2.38	Adjacent channel rejection-speech channels (TCH/FS)					
		NT / NV	AIT23052502-1	N/A	AIT23052502-1	N/A	
		NT / LV	AIT23052502-1	N/A	AIT23052502-1	N/A	
		NT / HV	AIT23052502-1	N/A	AIT23052502-1	N/A	
14.7.1	4.2.20	Blocking and spurious response – speech channels					
		NT / NV	AIT23052502-1	N/A	AIT23052502-1	N/A	

		NT / LV	AIT23052502-1	N/A	AIT23052502-1	N/A	
		NT / HV	AIT23052502-1	N/A	AIT23052502-1	N/A	
14.18.3	4.2.40	Adjacent channel rejection - EGPRS					
		NT / NV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		NT / LV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		NT / HV	AIT23052502-1	PASS	AIT23052502-1	PASS	
14.18.4	4.2.34	Intermodulation rejection - EGPRS					
		NT / NV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		NT / LV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		NT / HV	AIT23052502-1	PASS	AIT23052502-1	PASS	
13.17.1	4.2.26	Frequency error and Modulation accuracy in EGPRS Configuration					
		NT / NV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		NT / LV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		NT / HV	AIT23052502-1	PASS	AIT23052502-1	PASS	
13.17.2	4.2.27	Frequency error under multipath and interference conditions in EGPRS Configuration					
		NT / NV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		NT / LV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		NT / HV	AIT23052502-1	PASS	AIT23052502-1	PASS	
13.17.3	4.2.28	EGPRS Transmitter output power					
		NT / NV	AIT23052502-1	PASS	AIT23052502-1	PASS	Reference to the section 4.14
		NT / LV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		NT / HV	AIT23052502-1	PASS	AIT23052502-1	PASS	
13.17.4	4.2.29	Output RF spectrum in EGPRS configuration					
		NT / NV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		NT / LV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		NT / HV	AIT23052502-1	PASS	AIT23052502-1	PASS	
14.18.1	4.2.45	Minimum Input level for Reference Performance - EGPRS					
		NT / NV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		NT / LV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		NT / HV	AIT23052502-1	PASS	AIT23052502-1	PASS	
14.18.5	4.2.30	Blocking and spurious response in EGPRS configuration					
		NT / NV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		NT / LV	AIT23052502-1	PASS	AIT23052502-1	PASS	
		NT / HV	AIT23052502-1	PASS	AIT23052502-1	PASS	

4. ETSI EN 301 511 REQUIREMENTS

4.1. TRANSMITTER – FREQUENCY ERROR AND PHASE ERROR

TEST LIMIT

Requirement: Per ETSI EN 301 511 V12.5.1(2017-03), section 4.2.1, the MS carrier frequency shall be accurate to within 0.1 ppm, or accurate to within 0.1 ppm compared to signals received from the BS. The RMS phase error for each burst shall not be greater than 5 degrees. The maximum peak deviation during the useful part of each burst shall not be greater than 20 degrees.

TEST PROCEDURE

a) For one transmitted burst, the SS captures the signal as a series of phase samples over the period of the burst. These samples are evenly distributed over the duration of the burst with a minimum sampling rate of 2/T, where T is the modulation symbol period. The received phase trajectory is then represented by this array of at least 294 samples.

b) The SS then calculates, from the known bit pattern and the formal definition of the modulator contained in 3GPP TS 05.04, the expected phase trajectory.

c) From a) and b) the phase trajectory error is calculated, and a linear regression line computed through this phase trajectory error. The slope of this regression line is the frequency error of the mobile transmitter relative to the simulator reference. The difference between the regression line and the individual sample points is the phase error of that point.

c.1) The sampled array of at least 294 phase measurements is represented by the vector:
⌀m = ⌀m(0)...⌀m(n)
where the number of samples in the array n+1 >= 294.

c.2) The calculated array, at the corresponding sampling instants, is represented by the vector:
⌀c = ⌀c(0)...⌀c(n)

c.3) The error array is represented by the vector:
⌀e = {⌀m(0) - ⌀c(0)}.....{⌀m(n) - ⌀c(n)} = ⌀e(0)...⌀e(n)

c.4) The corresponding sample numbers form a vector t = t(0)...t(n).

c.5) By regression theory the slope of the samples with respect to t is k where:

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

c.6) The frequency error is given by k/(360 *), where 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:
⌀e(j) - k*t(j)

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

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

d) Steps a) to c) are repeated for 20 bursts, not necessarily contiguous.
e) The SS instructs the MS to its maximum power control level, 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.
h) 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).

TEST RESULTS

Please refer to AIT23052502CW1-GSM Test Data

4.2. TRANSMITTER – FREQUENCY ERROR UNDER MULTIPATH AND INTERFERENCE CONDITIONS

TEST LIMIT

Requirement: Per ETSI EN 301 511 V12.5.1(2017-03), section 4.2.2, the MS carrier frequency error for each burst shall be accurate to within 0.1 ppm, or 0.1 ppm compared to signals received from the BS for signal levels down to 3 dB below reference sensitivity level under normal condition and extreme conditions. The MS carrier frequency error for each burst shall be accurate to within 0.1 ppm, or 0.1 ppm compared to signals received from the BS for 3 dB less carrier to interference ratio than the reference interference ratios.

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

TEST REQUIREMENTS

Requirements for frequency error under multi path, Doppler shift and interference conditions

GSM 850 and GSM 900		DCS 1800	
Propagation Condition	**Permitted frequency error**	**Propagation Condition**	**Permitted frequency error**
RA250	±300 Hz	RA130	±400 Hz
HT100	±180 Hz	HT100	±350 Hz
TU50	±160 Hz	TU50	±260 Hz
TU3	±230 Hz	TU1.5	±320 Hz

TEST RESULTS

Please refer to AIT23052502CW1-GSM Test Data

4.3. FREQUENCY ERROR AND PHASE ERROR IN GPRS MULTISLOT CONFIGURATION

TEST LIMIT

According to ETSI EN 301 511 V12.5.1(2017-03), section 4.2.4, The MS carrier frequency shall be accurate to within 0,1 ppm compared to signals received from the BS. The RMS phase error (difference between the phase error trajectory and its linear regression on the active part of the time slot) for each burst shall not be greater than 5 degrees. The maximum peak deviation during the useful part of each burst shall not be greater than 20 degrees.

TEST PROCEDURE

a) For one transmitted burst on the last slot of the multislot configuration, the SS captures the signal as a series of phase samples over the period of the burst. These samples are evenly distributed over the duration of the burst with a minimum sampling rate of 2/T, where T is the modulation symbol period. The received phase trajectory is then represented by this array of at least 294 samples.
b) The SS then calculates, from the known bit pattern and the formal definition of the modulator contained in 3GPP TS 05.04, the expected phase trajectory.
c) From a) and b) the phase trajectory error is calculated, and a linear regression line computed through this phase trajectory error. The slope of this regression line is the frequency error of the mobile transmitter relative to the simulator reference. The difference between the regression line and the individual sample points is the phase error of that point.
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: 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).

TEST RESULTS

Please refer to AIT23052502CW1-GSM Test Data

4.4. TRANSMITTER OUTPUT POWER AND BURST TIMING

TEST LIMIT

ETSI TS 51.010-1 (V.11.2.0) Sub-clause 13.3.5

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.

The transmitter output power, under every combination of normal and extreme test conditions, for normal bursts and access bursts, at each frequency and for each nominal output power level applicable to the MS power class, shall be at the relevant level shown in table 13-2, table 13-3 within the tolerances also shown in table 13-2, table 13-3 .

Table 13-2: Bands other than DCS 1800 and PCS 1900 transmitter output power for different power classes

Power class				Power control level (note2)	Transmitter output power	Tolerances	
2	3	4	5		dBm	normal	extreme
·				2	39	±2 dB	±2,5 dB
·	·			3	37	±3 dB (note1)	±4 dB (note1)
·	·			4	35	±3 dB	±4 dB
·	·	·		5	33	±3 dB (note1)	±4 dB (note1)
·	·	·		6	31	±3 dB	±4 dB
·	·	·	·	7	29	±3 dB (note1)	±4 dB (note1)
·	·	·	·	8	27	±3 dB	±4 dB
·	·	·	·	9	25	±3 dB	±4 dB
·	·	·	·	10	23	±3 dB	±4 dB
·	·	·	·	11	21	±3 dB	±4 dB
·	·	·	·	12	19	±3 dB	±4 dB
·	·	·	·	13	17	±3 dB	±4 dB
·	·	·	·	14	15	±3 dB	±4 dB
·	·	·	·	15	13	±3 dB	±4 dB
·	·	·	·	16	11	±5 dB	±6 dB
·	·	·	·	17	9	±5 dB	±6 dB
·	·	·	·	18	7	±5 dB	±6 dB
·	·	·	·	19	5	±5 dB	±6 dB

NOTE1: When the power control level corresponds to the power class of the MS, then the tolerances shall be 2,0 dB under normal test conditions and 2,5 dB under extreme test conditions.

NOTE2: There is no requirement to test power control levels 20-31

Table 13-3: DCS 1 800 transmitter output power for different power classes

Power class			Power control level (note2)	Transmitter output power	Tolerances	
1	2	3		dBm	normal	extreme
		·	29	36	±2,0 dB	±2,5 dB
		·	30	34	±3,0 dB	±4,0 dB
		·	31	32	±3,0 dB	±4,0 dB
·		·	0	30	±3,0 dB (note1)	±4 dB (note1)
·		·	1	28	±3 dB	±4 dB
·		·	2	26	±3 dB	±4 dB
·	·	·	3	24	±3 dB (note1)	±4 dB (note1)
·	·	·	4	22	±3 dB	±4 dB
·	·	·	5	20	±3 dB	±4 dB
·	·	·	6	18	±3 dB	±4 dB
·	·	·	7	16	±3 dB	±4 dB
·	·	·	8	14	±3 dB	±4 dB
·	·	·	9	12	±4 dB	±5 dB
·	·	·	10	10	±4 dB	±5 dB
·	·	·	11	8	±4 dB	±5 dB
·	·	·	12	6	±4 dB	±5 dB
·	·	·	13	4	±4 dB	±5 dB
·	·	·	14	2	±5 dB	±6 dB
·	·	·	15	0	±5 dB	±6 dB

NOTE1: When the power control level corresponds to the power class of the MS, then the tolerances shall be 2,0 dB under normal test conditions and 2,5 dB under extreme test conditions.

NOTE2: There is no requirement to test power control levels 16-28

TEST PROCEDURE

a) Measurement of normal burst transmitter output power.
   1. 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.
   2. 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 1.

d) Steps 1 to 3 are repeated with the MS commanded to operate on each of the nominal output power levels supported by the MS, (see tables 13-2, 13-3 and 13-4) and in step a) on one nominal output power level higher than supported by the MS.

e) The SS commands the MS to the maximum power control level supported by the MS and steps 1) to 2 are repeated for ARFCN in the Low and High ranges.

f) Measurement of access burst transmitter output power.
   1. 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.
   2. 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.
   3. The transmitter output power is calculated as the average of the samples over the 87 useful bits of the burst. This is also used as the 0 dB reference for the power/time template.

g) Measurement of access burst timing delay.
   The burst timing delay is the difference in time between the timing reference identified in f) and the MS received data on the common control channel.

h) Measurement of access burst power/time relationship.
   The array of power samples measured in f) is referenced in time to the centre of the useful transmitted bits and in power to the 0 dB reference, both identified in 6.

i) Depending on the method used in step f) to cause the MS to send an Access Burst, the SS sends either a HANDOVER COMMAND with power control level set to 10 or it changes the System Information elements MS_TXPWR_MAX_CCH and for DCS 1 800 the POWER_OFFSET on the serving cell BCCH in order to limit the MS transmit power on the Access Burst to power control level 10 (+23 dBm for GSM 400, GSM 700, T-GSM 810, GSM 850, and GSM 900 or +10 dBm for DCS 1 800 and PCS 1 900) and then steps6 to 8 are repeated.

j) Steps1 to 8 are repeated under extreme test conditions (annex 1, TC2.2) except that the repeats at step 4 are only performed for power control level 10 and the minimum nominal output power level supported by the MS.

TEST RESULTS

Note: All test modes were carried out for all operation modes and record the worst test mode (GSM 900/1800 TN/VN) of fellow:

GSM900							
Test Condition	PCL	Power(dBm)			Limit(dBm)	Power / time template	Verdict
		CH975	CH63	CH124			
NTNV	5	33.86	33.85	33.41	31 to 35	PASS	PASS
	6	29.61	29.62	29.34	28 to 34	PASS	PASS
	7	28.06	28.06	27.79	27 to 31	PASS	PASS
	8	26.02	26.03	25.76	24 to 30	PASS	PASS
	9	23.90	23.91	23.64	22 to 28	PASS	PASS
	10	21.68	21.69	21.42	20 to 26	PASS	PASS
	11	19.39	19.39	19.10	18 to 24	PASS	PASS
	12	17.07	17.07	16.78	16 to 22	PASS	PASS
	13	14.68	14.66	14.36	14 to 20	PASS	PASS
	14	12.37	12.32	12.01	12 to 18	PASS	PASS
	15	12.53	12.34	12.25	10 to 16	PASS	PASS
	16	12.66	12.62	12.31	6 to 16	PASS	PASS
	17	10.84	10.78	10.47	4 to 14	PASS	PASS
	18	9.14	9.04	8.72	2 to 12	PASS	PASS
	19	7.44	7.32	6.98	0 to 10	PASS	PASS

DCS1800							
Test Condition	PCL	Power(dBm)			Limit(dBm)	Power / time template	Verdict
		CH512	CH698	CH885			
NTNV	0	30.83	30.85	30.91	28 to 32	PASS	PASS
	1	28.12	28.08	27.92	25 to 31	PASS	PASS
	2	24.88	24.71	24.84	23 to 29	PASS	PASS
	3	23.33	23.44	23.24	22 to 26	PASS	PASS
	4	20.86	20.75	20.65	19 to 25	PASS	PASS
	5	18.57	18.76	18.69	17 to 23	PASS	PASS
	6	17.68	17.69	17.75	15 to 21	PASS	PASS
	7	15.85	15.86	16.01	13 to 19	PASS	PASS
	8	14.17	13.97	14.22	11 to 17	PASS	PASS
	9	12.63	12.75	12.55	8 to 16	PASS	PASS
	10	10.75	10.51	10.51	6 to 14	PASS	PASS
	11	8.52	8.27	8.56	4 to 12	PASS	PASS
	12	5.21	5.36	5.29	2 to 10	PASS	PASS
	13	5.88	5.66	5.85	0 to 8	PASS	PASS
	14	1.06	0.90	0.81	-3 to 7	PASS	PASS
	15	-2.21	-2.12	-2.32	-5 to 5	PASS	PASS

4.5. TRANSMITTER – OUTPUT RF SPECTRUM

TEST LIMIT

Requirements: According to ETSI EN 301 511 V12.5.1(2017-03), section 4.2.6, 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 467,6 MHz 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	-	-79
736 to 746	-	-73
747 to 757	-	-79
757 to 763	-	-73
869 to 894	-	-79
1 930 to 1 990	-	-71

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 the bits 87 to 132 of the burst is the only spectrum measured. This gating may be analogue or numerical, dependent upon the design of the spectrum 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.

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.

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) 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.

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.

TEST RESULTS

Please refer to AIT23052502CW1-GSM Test Data

4.6. TRANSMITTER OUTPUT POWER IN GPRS MULTISLOT CONFIGURATION

TEST LIMIT

ETSI TS 51.010-1 (V.10.2.0) Sub-clause 13.16.2.5

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 transmitter output power, under every combination of normal and extreme test conditions, for normal bursts and access bursts, at each frequency and for each power control level applicable to the MS power class, shall be at the relevant level shown in table 13.16.2-1, table 13.16.2-2 or table 13.16.2-3 within the tolerances also shown in table 13.16.2-1, table 13.16.2-2 or table 13.16.2-3.

Table 13.16.2-1: Bands other than DCS 1800 and PCS 1900 transmitter output power for different power classes

Power class				Power control level (note 4)	GAMMA_TN (Γ_{CH})	Transmitter output power (note 2,3)	Tolerances	
2	3	4	5			dBm	normal	extreme
·				2	0	39	±2 dB	±2,5 dB
·	·			3	1	37	±3 dB (note 1)	±4 dB (note 1)
·	·			4	2	35	±3 dB	±4 dB
·	·	·		5	3	33	±3 dB (note 1)	±4 dB (note 1)
·	·	·		6	4	31	±3 dB	±4 dB
·	·	·	·	7	5	29	±3 dB (note 1)	±4 dB (note 1)
·	·	·	·	8	6	27	±3 dB	±4 dB
·	·	·	·	9	7	25	±3 dB	±4 dB
·	·	·	·	10	8	23	±3 dB	±4 dB
·	·	·	·	11	9	21	±3 dB	±4 dB
·	·	·	·	12	10	19	±3 dB	±4 dB
·	·	·	·	13	11	17	±3 dB	±4 dB
·	·	·	·	14	12	15	±3 dB	±4 dB
·	·	·	·	15	13	13	±3 dB	±4 dB
·	·	·	·	16	14	11	±5 dB	±6 dB
·	·	·	·	17	15	9	±5 dB	±6 dB
·	·	·	·	18	16	7	±5 dB	±6 dB
·	·	·	·	19	17	5	±5 dB	±6 dB

NOTE1: When the power control level corresponds to the power class of the MS, then the tolerances shall be 2,0 dB under normal test conditions and 2,5 dB under extreme test conditions.

NOTE 2: For R99 and Rel-4, the maximum output power in a multislot configuration must be lower within the limits defined in table 13.16.2-1a. From Rel-5 onwards, the maximum output power in a multislot configuration may be lower within the limits defined in table 13.16.2-1b.

NOTE 3: For a MS using reduced interslot dynamic range in multislot configurations, 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.

NOTE 4: There is no requirement to test power control levels 20-31.

Table 13.16.2-1a: R99 and Rel-4: Bands other than DCS 1800 and PCS 1900 allowed maximum output power reduction in a multislot configuration

Number of timeslots in uplink assignment	Permissible nominal reduction of maximum output power, (dB)
1	0
2	0 to 3,0
3	1,8 to 4,8
4	3,0 to 6,0

Table 13.16.2-2: DCS1800 transmitter output power for different power classes

Power class			Power control level (note 4)	GAMMA_TN (Γ_{CH}	Transmitter output power (note 2,3)	Tolerances	
1	2	3			dBm	normal	extreme
		·	29	0	36	±2,0 dB	±2,5 dB
		·	30	1	34	±3,0 dB	±4,0 dB
		·	31	2	32	±3,0 dB	±4,0 dB
·		·	0	3	30	±3,0 dB (note_1)	±4 dB (note_1)
·		·	1	4	28	±3 dB	±4 dB
·		·	2	5	26	±3 dB	±4 dB
·	·	·	3	6	24	±3 dB (note_1)	±4 dB (note_1)
·	·	·	4	7	22	±3 dB	±4 dB
·	·	·	5	8	20	±3 dB	±4 dB
·	·	·	6	9	18	±3 dB	±4 dB
·	·	·	7	10	16	±3 dB	±4 dB
·	·	·	8	11	14	±3 dB	±4 dB
·	·	·	9	12	12	±4 dB	±5 dB
·	·	·	10	13	10	±4 dB	±5 dB
·	·	·	11	14	8	±4 dB	±5 dB
·	·	·	12	15	6	±4 dB	±5 dB
·	·	·	13	16	4	±4 dB	±5 dB
·	·	·	14	17	2	±5 dB	±6 dB
·	·	·	15	18	0	±5 dB	±6 dB

NOTE1: When the power control level corresponds to the power class of the MS, then the tolerances shall be 2,0 dB under normal test conditions and 2,5 dB under extreme test conditions.

NOTE 2: For R99 and Rel-4, the maximum output power in a multislot configuration must be lower within the limits defined in table 13.16.2-2a. From Rel-5 onwards, the maximum output power in a multislot configuration may be lower within the limits defined in table 13.16.2-2b.

NOTE 3: For a MS using reduced interslot dynamic range in multislot configurations, 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.

NOTE 4: There is no requirement to test power control levels 16-28.

Table 13.16.2-2a: R99 and Rel-4: DCS 1 800 allowed maximum output power reduction in a multislot configuration

Number of timeslots in uplink assignment	Permissible nominal reduction of maximum output power, (dB)
1	0
2	0 to 3,0
3	1,8 to 4,8
4	3,0 to 6,0

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 1.

c) Steps 1 to 2 are repeated on each timeslot within the multislot configuration with the MS commanded to operate on each of the nominal output power levels defined in tables 13.16.2-1, 13.16.2-2 and 13.16.2-3, and in step a) only on one nominal output power higher than supported by the MS.

NOTE: Power control levels 0 and 1 are excluded for bands other than DCS 1800 and PCS 1900 since these power control levels cannot 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 1 to 2 and corresponding measurements on each timeslot within the multislot configuration are repeated.

f) Measurement of access burst transmitter output power

The SS causes the MS to generate an Access Burst on an ARFCN in the Mid ARFCN range, this could be either by a cell re-selection or a new request for radio resource. In the case of a cell re-selection procedure the Power Level indicated in the PSI3 message is the maximum power control level supported by the MS. In the case of an Access Burst the MS shall use the Power Level indicated in the GPRS_MS_TXPWR_MAX_CCH parameter. If the power class of the MS is DCS 1 800 Class 3 and the Power Level is indicated by the MS_TXPWR_MAX_CCH parameter, the MS shall also use the POWER_OFFSET parameter.

The SS takes power measurement samples evenly distributed over the duration of the access burst as described in a). However, in this case the SS identifies the 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) is referenced in time to the centre of the useful transmitted bits and in power to the 0 dB reference, both identified in 5.

h) Depending on the method used in step f) to cause the MS to send an Access Burst, the SS sends either a PACKET CELL CHANGE ORDER along with power control level set to 10 in PSI3 parameter GPRS_MS_TXPWR_MAX_CCH or it changes the (Packet) System Information elements (GPRS_)MS_TXPWR_MAX_CCH and for DCS 1 800 the POWER_OFFSET on the serving cell PBCCH/BCCH in order to limit the MS transmit power on the Access Burst to power control level 10 (+23 dBm for bands other than DCS 1800 and PCS 1900 or +10 dBm for DCS 1 800 and PCS 1 900) and then steps 5 to 6 are repeated.

i) Steps a) to h) are repeated under extreme test conditions (annex 1, TC2.2) except that the repeats at step 3 are only performed for power control level 10 and the minimum nominal output power level supported by the MS.

TEST RESULTS

Remark: We test each combination of Up and Down Slot, and recorded the worst case at 1up 4down.

GPRS900							
Test Condition	PCL	Power(dBm)			Limit(dBm)	Power / time template	Verdict
		CH975	CH63	CH124			
NTNV	5	33.28	33.38	33.64	25 to 35	PASS	PASS
	6	30.93	31.05	31.38	22 to 34	PASS	PASS
	7	28.78	28.98	28.97	21 to 31	PASS	PASS
	8	26.37	26.46	26.37	18 to 30	PASS	PASS
	9	25.53	25.48	25.62	16 to 28	PASS	PASS
	10	23.94	23.74	23.94	14 to 26	PASS	PASS
	11	21.67	21.71	21.64	12 to 24	PASS	PASS
	12	18.65	18.87	19.01	10 to 22	PASS	PASS
	13	16.70	16.71	16.91	8 to 20	PASS	PASS
	14	14.05	14.03	14.00	6 to 18	PASS	PASS
	15	12.55	12.63	12.76	4 to 16	PASS	PASS
	16	9.56	9.63	9.92	0 to 16	PASS	PASS
	17	7.61	7.31	7.49	-2 to 14	PASS	PASS
	18	7.26	7.32	7.17	-4 to 12	PASS	PASS
	19	5.34	5.44	5.61	-6 to 10	PASS	PASS

GPSR1800							
Test Condition	PCL	Power(dBm)			Limit(dBm)	Power / time template	Verdict
		CH512	CH698	CH885			
NTNV	0	30.57	30.79	30.28	22 to 32	PASS	PASS
	1	29.37	29.17	29.17	19 to 31	PASS	PASS
	2	26.90	26.77	27.09	17 to 29	PASS	PASS
	3	23.41	23.65	23.15	16 to 26	PASS	PASS
	4	20.66	20.79	20.44	13 to 25	PASS	PASS
	5	20.01	20.23	20.07	11 to 23	PASS	PASS
	6	18.97	19.08	19.18	9 to 21	PASS	PASS
	7	17.18	17.35	17.05	7 to 19	PASS	PASS
	8	15.34	15.11	15.30	5 to 17	PASS	PASS
	9	11.96	12.23	12.14	2 to 16	PASS	PASS
	10	9.72	9.92	9.83	0 to 14	PASS	PASS
	11	7.17	7.17	7.48	-2 to 12	PASS	PASS
	12	6.42	6.41	6.55	-4 to 10	PASS	PASS
	13	2.97	2.82	3.01	-6 to 8	PASS	PASS

	14	4.08	4.31	4.18	-9 to 7	PASS	PASS
	15	0.69	0.79	0.51	-11 to 5	PASS	PASS

4.7. OUTPUT RF SPECTRUM IN GPRS MULTISLOT CONFIGURATION

TEST LIMIT

According to ETSI EN 301 511 V12.5.1(2017-03), section 4.2.11,

1. The level of the output RF spectrum due to modulation shall be no more than that given in 3GPPTS 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 PCS1 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 200kHz 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 atmore 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 880MHz where exceptions at up to -36 dBm are permitted. For GSM 400 MS, in addition, the poweremitted by MS, in the bands of 460,4 MHz to 467,6 MHz and 488,8 MHz to 496 MHz shall be nomore 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 13.16.3-5: 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 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 to763		-73
869 to 894		-79
1930 to 1990		-71

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 least40 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 50bursts.
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 asin b).
f) By tuning the spectrum analyzer centre frequency to the measurement frequencies the power levelis 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 levelis measured at the following frequencies:
FT + 400 kHz FT - 400 kHz;
FT + 600 kHz FT - 600 kHz;

FT + 1,2 MHz FT - 1,2 MHz;
FT + 1,8 MHz FT - 1,8 MHz;
where FT = RF channel nominal centre frequency.

The duration of each measurement (at each frequency) will be such as to cover at least 10 burst transmissions at FT.

j) Step i) is repeated for power control levels 7 and 11.

k) Steps b), f), h) and i) are repeated with FT equal to the hop pattern ARFCN in the Low ARFCN range except that in step h) the MS is commanded to power control level 11 rather than maximum power.

l) Steps b), f), h) and i) are repeated with FT equal to the hop pattern ARFCN in the High ARFCN range except that in step h) the MS is commanded to power control level 11 rather than maximum power.

m) Steps a) b) f) h), and i) are repeated under extreme test conditions (annex 1, TC2.2). Except that at step h) the MS is commanded to power control level 11.

TEST RESULTS

Please refer to AIT23052502CW1-GSM Test Data

4.8. CONDUCTED SPURIOUS EMISSIONS – MS ALLOCATION A CHANNEL

TEST LIMIT

Requirements: According to ETSI EN 301 511 V12.5.1(2017-03), section 4.2.12, the conducted spurious power emitted by the MS, when allocated a channel, shall be no more than the levels in table below:

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

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 than the requirement 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. The power indication is the peak power detected by the measuring system.
The measurement on any frequency shall be performed for at least one TDMA frame period with the exception of the idle frame.
NOTE: This ensures that both the active times (MS transmitting) and the quiet times are measured.

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

Frequency range	Frequency offset	Filter bandwidth	Approx video bandwidth
100 kHz to 50 MHz	-	10 kHz	30 kHz
50 MHz to 500 MHz excl. relevant TX band: GSM 450: 450,4 MHz to 457,6 MHz; GSM 480: 478,8 MHz to 486 MHz, and the RX bands: For GSM 400 MS: 460,4 MHz to 467,6 MHz; 488,8 MHz to 496 MHz.	-	100 kHz	300 kHz
500 MHz to 12,75 GHz, excl. relevant TX band: GSM 750: 777 MHz to 792 MHz GSM 850: 824 MHz to 849 MHz; P-GSM: 890 MHz to 915 MHz; E-GSM: 880 MHz to 915 MHz; DCS: 1 710 MHz to 1 785 MHz, PCS 1 900: 1 850 MHz to 1 910 MHz; and the RX bands: For GSM 400 MS, GSM 900 MS and DCS 1 800 MS: 925 MHz to 960 MHz; 1 805 MHz to 1 880 MHz. For GSM 700 MS, GSM 850 MS and PCS 1 900 MS: 747 MHz to 762 MHz; 869 MHz to 894 MHz; 1 930 MHz to 1 990 MHz	0 to 10 MHz >= 10 MHz >= 20 MHz >= 30 MHz (offset from edge of relevant TX band)	100 kHz 300 kHz 1 MHz 3 MHz	300 kHz 1 MHz 3 MHz 3 MHz
relevant TX band: GSM 450: 450,4 MHz to 457,6 MHz GSM 480: 478,8 MHz to 486 MHz GSM 750: 777 MHz to 792 MHz GSM 850: 824 MHz to 849 MHz P-GSM: 890 MHz to 915 MHz E-GSM: 880 MHz to 915 MHz DCS: 1 710 MHz to 1 785 MHz PCS 1 900: 1 850 MHz to 1 910 MHz	1,8 to 6,0 MHz > 6,0 MHz (offset from carrier)	30 kHz 100 kHz	100 kHz 300 kHz
NOTE 1: The excluded RX bands are tested in subclause 13.4. NOTE 2: The filter and video bandwidths, and frequency offsets are only correct for measurements on an MS transmitting on a channel in the Mid ARFCN range. NOTE 3: Due to practical implementation, the video bandwidth is restricted to a maximum of 3 MHz.			

TEST RESULTS

Please refer to AIT23052502CW1-GSM Test Data

4.9. CONDUCTED SPURIOUS EMISSIONS – MS IN IDLE MODE

TEST LIMIT

Requirements: According to ETSI EN 301 511 V12.5.1(2017-03), section 4.2.13, the conducted spurious power emitted by the MS, when allocated a channel, shall be no more than the levels in table below:

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

TEST PROCEDURE

a) Measurements are made in the frequency range 100 kHz to 12,75 GHz. Spurious emissions are measured at the connector of the transceiver, as the power level of any discrete signal, higher than the requirement 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. The power indication is the peak power detected by the measuring system.
The measurement on any frequency shall be performed for at least one TDMA frame period with the exception of the idle frame.
NOTE: This ensures that both the active times (MS transmitting) and the quiet times are measured.

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

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

TEST RESULTS

Please refer to AIT23052502CW1-GSM Test Data

4.10. RADIATED SPURIOUS EMISSIONS-MS ALLOCATED A CHANNEL

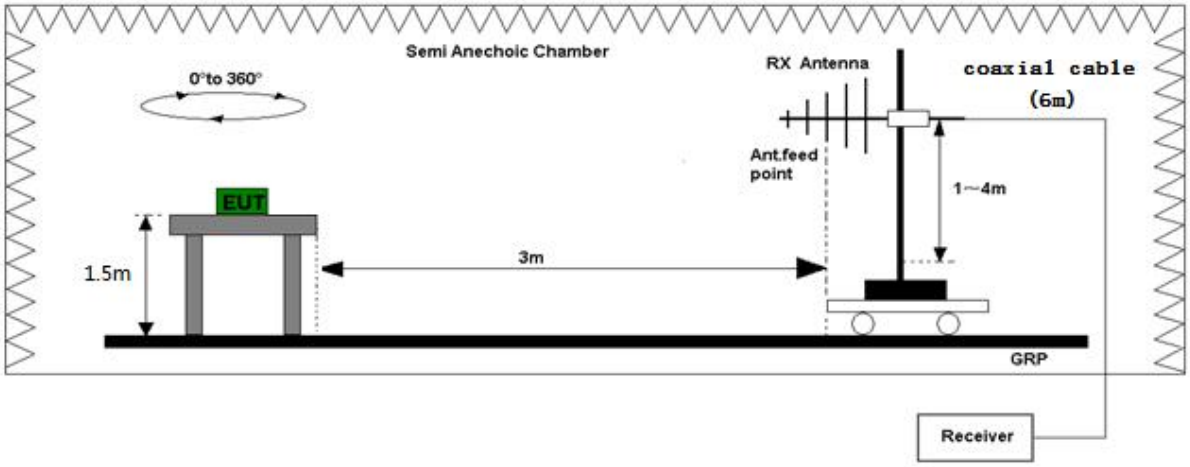
TEST LIMIT

ETSI TS 51.010-1 Sub-clause 12.2.1.5

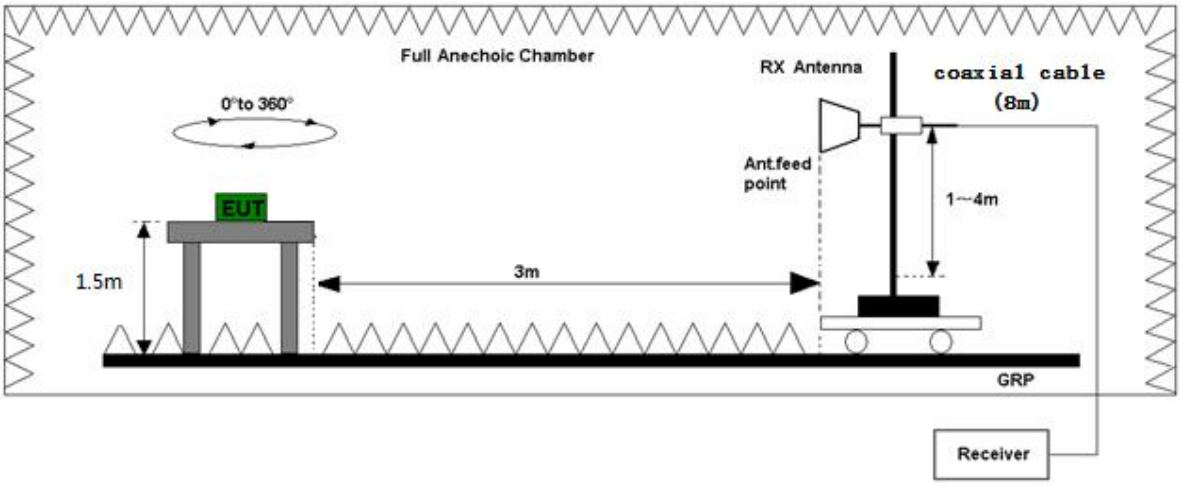
Frequency range	Power level in dBm	
	GSM900	DCS1800
30MHz to 1GHz	-36	-36
1GHz to 4GHz	-30	-
1GHz to 1710MHz	-	-30
1710MHz to 1785MHz	-	-36
1785MHz to 4GHz	-	-30

TEST SETUP

Radiated Emission Test Set-Up Frequency 30 MHz ~ 1 GHz



Radiated Emission Test Set-Up Frequency Above 1 GHz



TEST PROCEDURE

ETSI TS 51.010-1 Sub-clause 12.2.1.4.2

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.
b) NOTE 1: This is a qualitative step to identify the frequency and presence of spurious emissions which are to be measured in subsequent steps.
c) 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.
d) 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.
e) 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
f) 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.
g) The measurements are repeated with the test antenna in the orthogonal polarization plane.
h) The test is repeated under extreme voltage test conditions (see [Annex 1, TC2.2]).

Frequency range	Frequency offset	Filter bandwidth	Approx video bandwidth
30MHz to 50MHz	-	10KHz	30KHz
50MHz to 500MHz	-	100KHz	300KHz
500MHz to 12.75GHz	0 to 10MHz ≥10MHz ≥20MHz ≥30MHz	100KHz 300KHz 1MHz 3MHz	300KHz 1MHz 3MHz 3MHz

TEST RESULTS

This test was carried out in all the test modes, record worst case as follows.

GSM900				
Test mode:		Traffic mode	**Test condition:**	NTNV
Channel:		Middle	**Polarity:**	Horizontal
Suspected List				
NO.	Freq. [MHz]	Result Level [dBm]	Limit (dBm)	Margin (dB)
1	1804.80	-38.07	-30.00	8.07
2	2707.20	-38.44	-30.00	8.44
3	3609.60	-37.37	-30.00	7.37
4	4512.00	-42.91	-30.00	12.91
--	--	--	--	--
Test mode:		Traffic mode	**Test condition:**	NTNV
Channel:		Middle	**Polarity:**	Vertical
Suspected List				
NO.	Freq. [MHz]	Result Level [dBm]	Limit (dBm)	Margin (dB)
1	1804.80	-36.70	-30.00	6.70
2	2707.20	-37.21	-30.00	7.21
3	3609.60	-36.15	-30.00	6.15
4	4512.00	-41.55	-30.00	11.55
--	--	--	--	--

GSM900				
Test mode:		Traffic mode	**Test condition:**	NTLV
Channel:		Middle	**Polarity:**	Horizontal
Suspected List				
NO.	Freq. [MHz]	Result Level [dBm]	Limit (dBm)	Margin (dB)
1	1804.80	-37.48	-30.00	7.48
2	2707.20	-37.74	-30.00	7.74
3	3609.60	-36.52	-30.00	6.52
4	4512.00	-42.33	-30.00	12.33
--	--	--	--	--
Test mode:		Traffic mode	**Test condition:**	NTLV
Channel:		Middle	**Polarity:**	Vertical
Suspected List				
NO.	Freq. [MHz]	Result Level [dBm]	Limit (dBm)	Margin (dB)
1	1804.80	-37.48	-30.00	7.48
2	2707.20	-37.74	-30.00	7.74
3	3609.60	-36.52	-30.00	6.52
4	4512.00	-42.33	-30.00	12.33
--	--	--	--	--

GSM900				
Test mode:		Traffic mode	**Test condition:**	NTHV
Channel:		Middle	**Polarity:**	Horizontal
Suspected List				
NO.	Freq. [MHz]	Result Level [dBm]	Limit (dBm)	Margin (dB)
1	1804.80	-38.06	-30.00	8.06
2	2707.20	-37.17	-30.00	7.17
3	3609.60	-37.49	-30.00	7.49
4	4512.00	-44.26	-30.00	14.26
--	--	--	--	--
Test mode:		Traffic mode	**Test condition:**	NTHV
Channel:		Middle	**Polarity:**	Vertical
Suspected List				
NO.	Freq. [MHz]	Result Level [dBm]	Limit (dBm)	Margin (dB)
1	1804.80	-35.82	-30.00	5.82
2	2707.20	-35.86	-30.00	5.86
3	3609.60	-34.77	-30.00	4.77
4	4512.00	-42.08	-30.00	12.08
--	--	--	--	--

RESULT: PASS

Note:

1. Result Level = Reading Level + Correct Factor.
2.Margin Level = Limit Value- Result Level

DCS1800				
Test mode:		Traffic mode	**Test condition:**	NTNV
Channel:		Middle	**Polarity:**	Horizontal
Suspected List				
NO.	Freq. [MHz]	Result Level [dBm]	Limit (dBm)	Margin (dB)
1	3494.80	-40.94	-30.00	10.94
2	5242.20	-40.11	-30.00	10.11
3	6989.60	-40.57	-30.00	10.57
4	8737.00	-44.62	-30.00	14.62
--	--	--	--	--
Test mode:		Traffic mode	**Test condition:**	NTNV
Channel:		Middle	**Polarity:**	Vertical
Suspected List				
NO.	Freq. [MHz]	Result Level [dBm]	Limit (dBm)	Margin (dB)
1	3494.80	-39.55	-30.00	9.55
2	5242.20	-38.95	-30.00	8.95
3	6989.60	-39.09	-30.00	9.09
4	8737.00	-43.58	-30.00	13.58
--	--	--	--	--

DCS1800				
Test mode:		Traffic mode	**Test condition:**	NTLV
Channel:		Middle	**Polarity:**	Horizontal
Suspected List				
NO.	Freq. [MHz]	Result Level [dBm]	Limit (dBm)	Margin (dB)
1	3494.80	-42.39	-30.00	12.39
2	5242.20	-41.32	-30.00	11.32
3	6989.60	-39.86	-30.00	9.86
4	8737.00	-44.21	-30.00	14.21
--	--	--	--	--
Test mode:		Traffic mode	**Test condition:**	NTLV
Channel:		Middle	**Polarity:**	Vertical
Suspected List				
NO.	Freq. [MHz]	Result Level [dBm]	Limit (dBm)	Margin (dB)
1	3494.80	-38.52	-30.00	8.52
2	5242.20	-39.55	-30.00	9.55
3	6989.60	-38.38	-30.00	8.38
4	8737.00	-43.78	-30.00	13.78
--	--	--	--	--

DCS1800			
Test mode:	Traffic mode	**Test condition:**	NTHV

Channel:		Middle	Polarity:	Horizontal
Suspected List				
NO.	Freq. [MHz]	Result Level [dBm]	Limit (dBm)	Margin (dB)
1	3494.80	-40.77	-30.00	10.77
2	5242.20	-39.61	-30.00	9.61
3	6989.60	-40.78	-30.00	10.78
4	8737.00	-44.95	-30.00	14.95
--	--	--	--	--
Test mode:		Traffic mode	**Test condition:**	NTHV
Channel:		Middle	**Polarity:**	Vertical
Suspected List				
NO.	Freq. [MHz]	Result Level [dBm]	Limit (dBm)	Margin (dB)
1	3494.80	-40.19	-30.00	10.19
2	5242.20	-40.34	-30.00	10.34
3	6989.60	-39.99	-30.00	9.99
4	8737.00	-44.31	-30.00	14.31
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RESULT: PASS

Note:

1. Result Level = Reading Level + Correct Factor.
2.Margin Level = Limit Value- Result Level

4.11. RADIATED SPURIOUS EMISSIONS- MS IN IDLE MODE

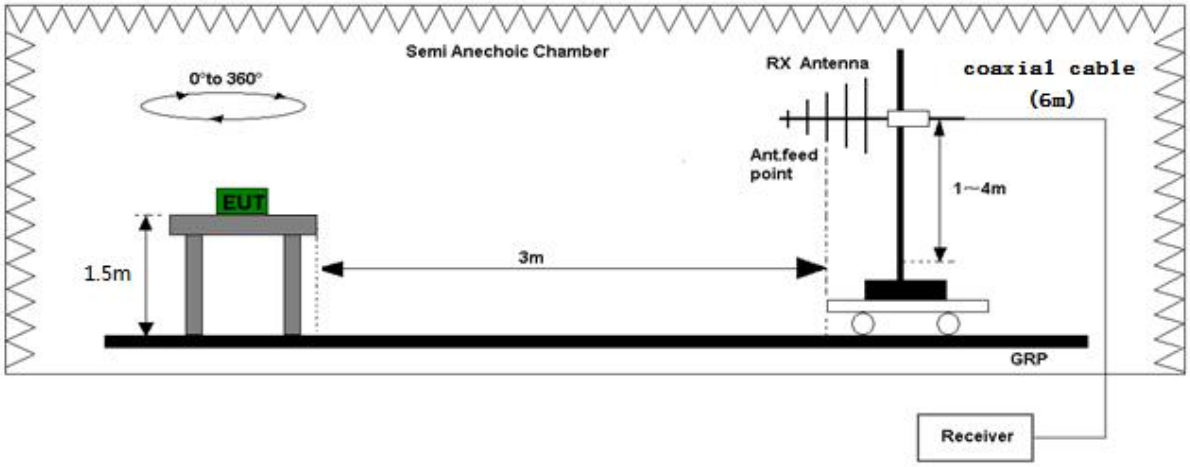
TEST LIMIT

ETSI TS 51.010-1 Sub-clause 12.2.2.5

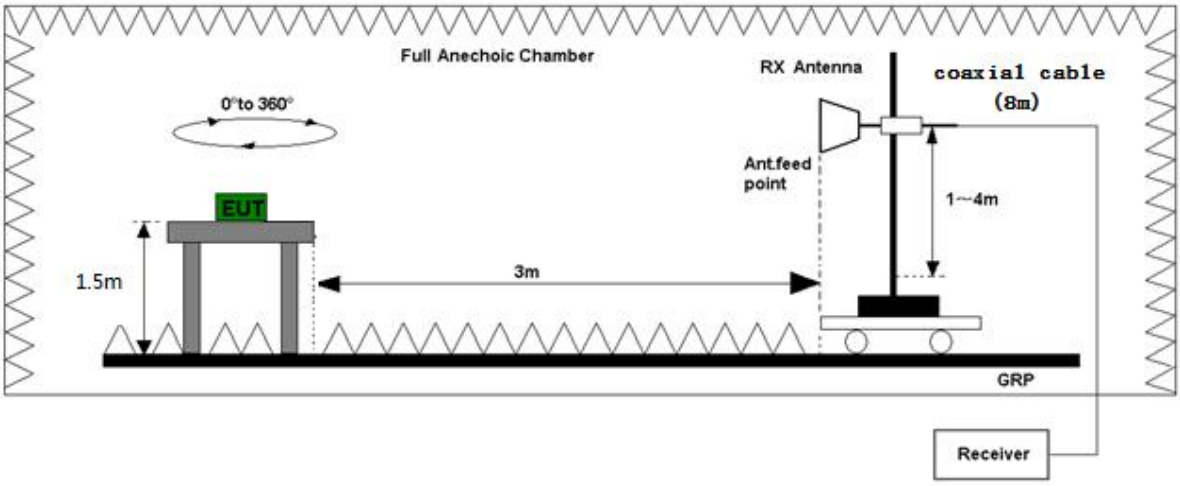
Frequency range	Limit (dBm)
9KHz to 880MHz	-57
880MHz to 915MHz	-59
915MHz to 1000MHz	-57
1GHz to 1710MHz	-47
1710MHz to 1785MHz	-53
1785MHz to 12.75GHz	-47

TEST SETUP

Radiated Emission Test Set-Up Frequency 30 MHz ~ 1 GHz



Radiated Emission Test Set-Up Frequency Above 1 GHz



TEST PROCEDURE

ETSI TS 51.010-1 Sub-clause 12.2.2.4.2

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.
b) NOTE 1: This is a qualitative step to identify the frequency and presence of spurious emissions which are to be measured in subsequent steps.
c) 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.
d) 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.
e) 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
f) 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.
g) The measurements are repeated with the test antenna in the orthogonal polarization plane.
h) The test is repeated under extreme voltage test conditions (see [Annex 1, TC2.2]).

Frequency range	Filter bandwidth	Video bandwidth
100KHz to 50MHz	10KHz	30KHz
50MHz to 12.75GHz	100KHz	300KHz

TEST RESULTS

This test was carried out in all the test modes, and record worst case as blow.

The EUT has met the requirements of 3GPP2 C.S0011-A's requirement.

Remark: Normal and extreme voltage test conditions have been tested, only the measurement data of normal voltage condition are reported.

GSM900				
Test mode:		Traffic mode	**Test condition:**	NTNV
Channel:		Middle	**Polarity:**	Horizontal
Suspected List				
NO.	Freq. [MHz]	Result Level [dBm]	Limit (dBm)	Margin (dB)
1	462.48	-75.71	-57	18.71
2	888.00	-75.51	-59	16.51
3	968.67	-75.06	-57	18.06
4	1746.28	-70.74	-53	17.74
5	9135.60	-57.33	-47	10.33
--	--	--	--	--
Test mode:		Traffic mode	**Test condition:**	NTNV
Channel:		Middle	**Polarity:**	Vertical
Suspected List				
NO.	Freq. [MHz]	Result Level [dBm]	Limit (dBm)	Margin (dB)
1	63.10	-74.22	-57	17.22
2	906.53	-74.34	-59	15.34
3	926.68	-73.83	-57	16.83
4	1753.93	-69.33	-53	16.33
5	6977.17	-56.29	-47	9.29
--	--	--	--	--

GSM900				
Test mode:		Traffic mode	**Test condition:**	NTLV
Channel:		Middle	**Polarity:**	Horizontal
Suspected List				
NO.	Freq. [MHz]	Result Level [dBm]	Limit (dBm)	Margin (dB)
1	462.39	-76.94	-57	19.94
2	894.15	-76.65	-59	17.65
3	945.33	-73.83	-57	16.83
4	1756.24	-69.85	-53	16.85
5	3247.17	-56.54	-47	9.54
--	--	--	--	--
Test mode:		Traffic mode	**Test condition:**	NTLV
Channel:		Middle	**Polarity:**	Vertical
Suspected List				
NO.	Freq. [MHz]	Result Level [dBm]	Limit (dBm)	Margin (dB)
1	63.09	-74.11	-57	17.11
2	910.66	-75.02	-59	16.02
3	989.19	-72.65	-57	15.65
4	1776.19	-68.46	-53	15.46
5	10295.73	-57.77	-47	10.77
--	--	--	--	--

GSM900				
Test mode:		Traffic mode	**Test condition:**	NTHV
Channel:		Middle	**Polarity:**	Horizontal
Suspected List				
NO.	Freq. [MHz]	Result Level [dBm]	Limit (dBm)	Margin (dB)
1	462.18	-75.64	-57	18.64
2	887.87	-74.62	-59	15.62
3	968.17	-75.97	-57	18.97
4	1745.83	-70.89	-53	17.89
5	9135.31	-58.05	-47	11.05
--	--	--	--	--
Test mode:		Traffic mode	**Test condition:**	NTHV
Channel:		Middle	**Polarity:**	Vertical
Suspected List				
NO.	Freq. [MHz]	Result Level [dBm]	Limit (dBm)	Margin (dB)
1	63.58	-75.28	-57	18.28
2	910.18	-75.10	-59	16.10
3	972.45	-75.13	-57	18.13
4	1728.32	-69.82	-53	16.82
5	5179.28	-56.83	-47	9.83
--	--	--	--	--

RESULT: PASS

Note:

1. Result Level = Reading Level + Correct Factor.
2.Margin Level = Limit Value- Result Level

DCS1800				
Test mode:		Traffic mode	**Test condition:**	NTNV
Channel:		Middle	**Polarity:**	Horizontal
Suspected List				
NO.	Freq. [MHz]	Result Level [dBm]	Limit (dBm)	Margin (dB)
1	374.27	-76.81	-57	19.81
2	886.04	-76.81	-59	17.81
3	950.33	-74.74	-57	17.74
4	1717.81	-71.60	-53	18.60
5	2780.87	-58.03	-47	11.03
--	--	--	--	--
Test mode:		Traffic mode	**Test condition:**	NTNV
Channel:		Middle	**Polarity:**	Vertical
Suspected List				
NO.	Freq. [MHz]	Result Level [dBm]	Limit (dBm)	Margin (dB)
1	373.14	-75.50	-57	18.50
2	894.27	-75.72	-59	16.72
3	951.38	-73.68	-57	16.68
4	1766.57	-70.25	-53	17.25
5	2192.36	-56.76	-47	9.76
--	--	--	--	--

DCS1800				
Test mode:		Traffic mode	**Test condition:**	NTLV
Channel:		Middle	**Polarity:**	Horizontal
Suspected List				
NO.	Freq. [MHz]	Result Level [dBm]	Limit (dBm)	Margin (dB)
1	374.38	-76.58	-57	19.58
2	892.15	-77.73	-59	18.73
3	933.47	-75.48	-57	18.48
4	1766.78	-70.80	-53	17.80
5	4114.46	-58.40	-47	11.40
--	--	--	--	--
Test mode:		Traffic mode	**Test condition:**	NTLV
Channel:		Middle	**Polarity:**	Vertical
Suspected List				
NO.	Freq. [MHz]	Result Level [dBm]	Limit (dBm)	Margin (dB)
1	372.92	-74.71	-57	17.71
2	886.38	-74.24	-59	15.24
3	939.26	-74.97	-57	17.97
4	1720.26	-70.53	-53	17.53
5	6977.27	-56.55	-47	9.55
--	--	--	--	--

DCS1800				
Test mode:		Traffic mode	**Test condition:**	NTHV
Channel:		Middle	**Polarity:**	Horizontal
Suspected List				
NO.	Freq. [MHz]	Result Level [dBm]	Limit (dBm)	Margin (dB)
1	374.01	-76.94	-57	19.94
2	886.30	-77.80	-59	18.80
3	950.41	-73.44	-57	16.44
4	1717.33	-70.73	-53	17.73
5	2781.16	-58.91	-47	11.91
--	--	--	--	--
Test mode:		Traffic mode	**Test condition:**	NTHV
Channel:		Middle	**Polarity:**	Vertical
Suspected List				
NO.	Freq. [MHz]	Result Level [dBm]	Limit (dBm)	Margin (dB)
1	373.49	-76.96	-57	19.96
2	913.46	-75.95	-59	16.95
3	933.72	-73.27	-57	16.27
4	1739.77	-71.68	-53	18.68
5	6343.01	-55.73	-47	8.73
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RESULT: PASS

Note:

1. Result Level = Reading Level + Correct Factor.
2.Margin Level = Limit Value- Result Level

4.12. FREQUENCY ERROR AND MODULATION ACCURACY IN EGPRS CONFIGURATION

TEST LIMIT

Clause 13.16.1 of TS 151 010-1 V13.3.0 applies.

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.

The requirements and this test apply to EGPRS 900 and EGPRS 1800 MS.

TEST PROCEDURE

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.

1.1 Under normal conditions; 3GPP TS 05.10, subclause 6.1.
1.2 Under extreme conditions; 3GPP TS 05.10, subclause 6.1; 3GPP TS 05.05, subclause 4.4; 3GPP TS 05.05, annex D subclauses D.2.1 and D.2.2.

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 %.

3.1 Under normal conditions; 3GPP TS 05.05, subclause 4.6.2.3.
3.2 Under extreme conditions; 3GPP TS 05.05, subclause 4.6.2.3; 3GPP TS 05.05, annex D subclauses D.2.1 and D.2.2.

4. The 95:th-percentile value of any burst of the 8-PSK modulated signal shall be ≤ 15 %.

4.1 Under normal conditions; 3GPP TS 05.05, subclause 4.6.2.4.
4.2 Under extreme conditions; 3GPP TS 05.05, subclause 4.6.2.4; 3GPP TS 05.05, annex D subclauses D.2.1 and D.2.2.

5. The Origin Offset Suppression for any 8PSK modulated signal shall exceed 30 dB.

5.1 Under normal conditions; 3GPP TS 05.05, subclause 4.6.2.2.
5.2 Under extreme conditions; 3GPP TS 05.05, subclause 4.6.2.2; 3GPP TS 05.05, annex D subclauses D.2.1 and D.2.2.

Table Conformance requirements in relation to the test conditions

Conformance requirement	Normal	HTHV	HTLV	LTHV	LTLV	Vibration
1. MS carrier frequency EGPRS 900	√	√	√	√	√	√
1. MS carrier frequency EGPRS 1800	√	√	√	√	√	√
2. RMS EVM EGPRS 900	√	√	√	√	√	√
2. RMS EVM EGPRS 1800	√	√	√	√	√	√
3. Peak EVM EGPRS 900	√	√	√	√	√	√
3. Peak EVM EGPRS 1800	√	√	√	√	√	√
4. 95:th-percentile EGPRS 900	√	√	√	√	√	√
4. 95:th-percentile EGPRS 1800	√	√	√	√	√	√
5. Origin Offset Suppression EGPRS 900	√	√	√	√	√	√
5. Origin Offset Suppression EGPRS 1800	√	√	√	√	√	√

Procedures and conditions described in clause 13.1.4 where applied. All required parameter have been checked and adjusted in Agilent 8960 and R&S CMU200, R&S CMW500 before any measurement was performed.

Test equipment: Agilent 8960 + R&S CMU200+ R&S CMW500 with options, Climate chamber, vibration equipment, AC/DC regulated power supply, DC Voltmeter, test SIM card

TEST RESULTS

Please refer to AIT23052502CW1-GSM Test Data

4.13. FREQUENCY ERROR UNDER MULTIPATH AND INTERFERENCE CONDITIONS IN EGPRS CONFIGURATION

TEST LIMIT

Clause 13.2 of TS 151 010-1 V13.3.0 (2017-03) applies.

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.

The requirements and this test apply to GSM900 and DCS1800 MS.

TEST PROCEDURE

1. The MS carrier frequency error for each burst shall be accurate to within 0,1 ppm, or 0,1 ppm 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, or 0,1 ppm compared to signals received from the BS for 3 dB less carrier to interference ratio than the reference interference ratios.

Table Conformance requirements in relation to the test conditions:

Conformance requirement	Normal	HTHV	HTLV	LTHV	LTLV
1. MS carrier frequency error E-GSM900	√	√	√	√	√
1. MS carrier frequency error DCS1800	√	√	√	√	√
2. MS carrier frequency error E-GSM900	√	√	√	√	√
2. MS carrier frequency error DCS1800	√	√	√	√	√

Procedures and conditions described in clause 13.2.4 where applied. All required parameter have been checked and adjusted in CMU200 and SMIQ before any measurement was performed.

Test equipment: R&S CMU200 + option K20, K21, K22, K23, K24, K27, K28, K29, K42, K65 B12, B41, B52, B54, B66, B56 + R&S SMIQ 03HD + option SM-B1, SMIQB11, 2xSMIQB12, SMIQB14, SMIQB17, SMIQB20, Climate chamber, AC/DC regulated power supply, DC Voltmeter

TEST RESULTS

Please refer to AIT23052502CW1-GSM Test Data

4.14. TRANSMITTER OUTPUT POWER IN EGPRS MULTISOLT CONFIGURATION

TEST LIMIT

Clause 13.16.2 of ETSI TS 151 010-1 V13.3.0 (2017-03) applies.
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. Since the conformance requirement, test procedure and test requirement of GSMK modulated signal's output power are
defined in subclause 13.16.2 for GPRS MS, being thereby defined also for all EGPRS MS in that section, only 8PSK modulated signal's output power conformance requirement, test procedure and test requirements are defined in this subclause.

TEST PROCEDURE

The requirements and this test apply to EGPRS 900 and EGPRS 1800 MS.

3.11.2 Conformance requirements

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.
6.1 Under normal conditions; 3GPP TS 05.05, subclause 4.5.2.
6.2 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.
Table Conformance requirements in relation to the test conditions

Conformance requirement	Normal	HTHV	HTLV	LTHV	LTLV
1. Maximum output power E-GSM900	√				
1. Maximum output power DCS1800	√				
2. Maximum output power E-GSM900		√	√	√	√
2. Maximum output power DCS1800		√	√	√	√
3. Power control levels E-GSM900	√				
3. Power control levels DCS1800	√				
4. Power control levels E-GSM900		√	√	√	√
4. Power control levels DCS1800		√	√	√	√
5. Power control levels form monotonic sequence E-GSM900	√				
5. Power control levels form monotonic sequence DCS 1800	√				
6.Transmitted power in time/power template E-GSM900 for normal burst	√	√	√	√	√
6. Transmitted power in time/power template DCS 1800 for normal burst	√	√	√	√	√
7.Use of MS_TXPWR_MAX_CCH E-GSM900	√				
7. Use of MS_TXPWR_MAX_CCH DCS 1800	√				
10.MS uses TA value 0 for random access burst DCS 1800	√	√	√	√	√

Conformance requirement	Normal	HTHV	HTLV	LTHV	LTLV
8. Transmission from MS to BS 468,75 TA bits behind E-GSM900	√	√	√	√	√
8. Transmission from MS to BS 468,75 TA bits behind DCS 1800	√	√	√	√	√
9.Transmitted power in time/power template E-GSM900 for random access burst	√	√	√	√	√
9. Transmitted power in time/power template DCS 1800 for random access burst	√	√	√	√	√
10.MS uses TA value 0 for random access burst E-GSM900	√	√	√	√	√
10.MS uses TA value 0 for random access burst DCS 1800	√	√	√	√	√

Procedures and conditions described in clause 13.16.2.4 (Method of test for equipment with permanent antenna connector) where applied. All required parameter have been checked and adjusted in Agilent 8960 before any measurement was done.

Test equipment: Agilent 8960 with options, Climate chamber, AC/DC regulated power supply, DC Voltmeter, test SIM card

TEST RESULTS

EGPRS900							
Test Condition	**PCL**	**Power(dBm)**			**Limit(dBm)**	**Power / time template**	**Verdict**
		CH975	**CH63**	**CH124**			
NTNV	8	28.01	28.06	28.06	18 to 30	PASS	PASS
	9	25.35	25.45	25.28	16 to 28	PASS	PASS
	10	22.43	22.36	22.39	14 to 26	PASS	PASS
	11	21.64	21.80	21.81	12 to 24	PASS	PASS
	12	18.18	18.22	18.21	10 to 22	PASS	PASS
	13	18.17	18.35	18.55	8 to 20	PASS	PASS
	14	16.47	16.54	16.39	6 to 18	PASS	PASS
	15	13.22	13.01	12.90	4 to 16	PASS	PASS
	16	10.95	10.83	10.56	0 to 16	PASS	PASS
	17	7.52	7.44	7.60	-2 to 14	PASS	PASS
	18	7.87	8.00	7.86	-4 to 12	PASS	PASS
	19	6.58	6.85	7.05	-6 to 10	PASS	PASS

EGPRS1800							
Test Condition	PCL	Power(dBm)			Limit(dBm)	Power / time template	Verdict
		CH512	CH698	CH885			
NTNV	2	25.89	25.74	25.96	17 to 29	PASS	PASS
	3	24.46	24.74	24.53	16 to 26	PASS	PASS
	4	22.62	22.77	22.63	13 to 25	PASS	PASS
	5	20.99	21.00	21.12	11 to 23	PASS	PASS
	6	17.54	17.74	17.77	9 to 21	PASS	PASS
	7	14.51	14.52	14.51	7 to 19	PASS	PASS
	8	13.99	14.22	13.88	5 to 17	PASS	PASS
	9	12.15	12.22	12.13	2 to 16	PASS	PASS
	10	9.61	9.57	9.72	0 to 14	PASS	PASS
	11	8.69	8.94	8.41	-2 to 12	PASS	PASS
	12	5.27	5.17	5.48	-4 to 10	PASS	PASS
	13	4.76	5.01	4.82	-6 to 8	PASS	PASS
	14	2.45	2.39	2.55	-9 to 7	PASS	PASS
	15	1.47	1.32	1.25	-11 to 5	PASS	PASS

4.15. TRANSMITTER – OUTPUT RF SPECTRUM IN EGPRS MULTISOLT CONFIGURATION

TEST LIMIT

Clause 13.16.3 of ETSI TS 151 010-1 V13.3.0 (2017-03) applies.
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.
Since the conformance requirement, test procedure and test requirement of GSMK modulated signal's output RFspectrum are defined in subclause 13.16.3 for GPRS MS, being thereby defined also for all EGPRS MS in that section, only 8PSK modulated signal's RF output spectrum conformance requirement, test procedure and test requirements are defined in this subclause.
The requirements and this test apply to EGPRS 900 and EGPRS 1800.

TEST PROCEDURE

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.
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 subclauses D.2.1 and D.2.2.
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 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; 3GPP TS 45.005, subclause 4.3.3.

Table Conformance requirements in relation to the test conditions

Comformance requirement	Normal	HTHV	HTLV	LTHV	LTLV
1.MS output spectrum due to modulation E-GSM900	√	√	√	√	√
1.MS output spectrum due to modulation DCS1800	√	√	√	√	√
2.MS output spectrum due to switching transients E-GSM900	√	√	√	√	√
2.MS output spectrum due to switching transients DCS1800	√	√	√	√	√
3. By allocated channel power in various bands should below a certain limit E-GSM900	√	-	-	-	-
3.By allocated channel power in various bands should below a certain limit DCS1800	√	-	-	-	-

Procedures and conditions described in clause 13.4.4.2 where applied. All required parameter have been checked and adjusted in Agilent 8960 before any measurement was performed.

Test equipment: Agilent 8960 with options, Climate chamber, AC/DC regulated, power supply, DC Voltmeter, test SIM card

TEST RESULTS

Please refer to AIT23052502CW1-GSM Test Data

4.16. RECEIVE BLOCKING AND SPURIOUS RESPONSE – SPEECH CHANNELS

TEST 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 05.05sub 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 70 dBµV (emf) (i.e. -43 dBm). 3GPP TS 05.05, sub clause 5.1.

TEST PROCEDURE

a) The SS produces a static wanted signal and a static interfering signal at the same time. The amplitude of the wanted signal is set to 4 dB above the reference sensitivity level.
b) The unwanted signal is a C.W. signal (Standard test signal IO) of frequency FB. It is applied in turn on the subset of frequencies calculated in step c) in the overall range 100 kHz to 12,75 GHz, where FB is an integer multiple of 200 kHz. However, frequencies in the range FR ±600 kHz are excluded.

NOTE: Allowance must be made for possible spurious signals arising from the SS. These are particularly likely at sub harmonic frequencies nFB where n = 2, 3, 4, 5, etc.

c) The frequencies at which the test is performed (adjusted to an integer multiple of 200 kHz channels most closely approximating the absolute frequency of the calculated blocking signal frequency) are the combined frequencies from i), ii) and iii) below i) The total frequency range formed by: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.

Table 14-28a: Level of unwanted signals

	GSM 900		DCS 1 800
	Small MS	Other MS	
FREQUENCY	LEVEL IN dBµVemf( )		
FR ±600 kHz to FR ±800 kHz	70	75	70
FR ±800 kHz to FR ±1,6 MHz	70	80	70
FR ±1,6 MHz to FR ±3 MHz	80	90	80
915 MHz to FR - 3 MHz	90	90	-
FR + 3 MHz to 980 MHz	90	90	-
1 785 MHz to FR - 3 MHz	-	-	87
FR + 3 MHz to 1 920 MHz	-	-	87
835 MHz to < 915 MHz	113	113	
> 980 MHz to 1 000 MHz	113	113	
100 kHz to < 835 MHz	90	90	
> 1 000 MHz to 12,75 GHz	90	90	
100 kHz to 1 705 MHz	-	-	113
> 1 705 MHz to < 1 785 MHz	-	-	101
> 1 920 MHz to 1 980 MHz	-	-	101
> 1 980 MHz to 12,75 GHz	-	-	90

Table 14-28b: Level of unwanted signals

	GSM 450		GSM 480	
	Small MS	Other MS	Small MS	Other MS
FREQUENCY	LEVEL IN dBµVemf( )			
FR ±600 kHz to FR ±800 kHz	70	75	70	75
FR ±800 kHz to FR ±1,6 MHz	70	80	70	80
FR ±1,6 MHz to FR ±3 MHz	80	90	80	90
457,6 MHz to FR - 3 MHz	90	90	-	-
FR + 3 MHz to 473,6 MHz	90	90	-	-
486 MHz to FR - 3 MHz	-	-	90	90
FR + 3 MHz to 502 MHz	-	-	90	90
100 kHz to < 457,6 MHz	113	113	-	-
> 473,6 MHz to 12,75 GHz	113	113	-	-
100 kHz to < 486 MHz	-	-	113	113
> 502 MHz to 12,75 GHz	-	-	113	113

Table 14-28c: Level of unwanted signals

FREQUENCY	PCS 1 900 LEVEL IN dBµVemf( )
FR ±600 kHz to FR ±800 kHz	70
FR ±800 kHz to FR ±1,6 MHz	70
FR ±1,6 MHz to FR ±3 MHz	80
1 910 MHz to FR - 3 MHz	87
FR + 3 MHz to 2 010 MHz	87
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 12,75 GHz	90

Table 14-28d: Level of unwanted signals

	GSM 710	GSM 750	T-GSM 810	GSM 850
FREQUENCY	LEVEL IN dBµVemf( )			
FR ±600 kHz to FR ±800 kHz	70	70	70	70
FR ±800 kHz to FR ±1,6 MHz	70	70	70	70
FR ±1,6 MHz to FR ±3 MHz	80	80	80	80
678 MHz to FR - 3 MHz	90	-	-	-
FR + 3 MHz to 728 MHz	90	-	-	-
727 MHz to FR - 3 MHz	-	90	-	-
FR + 3 MHz to 777 MHz	-	90	-	-
831 MHz to FR - 3 MHz	-	-	90	-
FR + 3 MHz to 886 MHz	-	-	90	-
849 MHz to FR - 3 MHz	-	-	-	90
FR + 3 MHz to 914 MHz	-	-	-	90
678 MHz to FR - 3 MHz	113	-	-	-
FR + 3 MHz to 728 MHz	113	-	-	-
100 kHz to < 727 MHz	-	113	-	-
> 777 MHz to 12,75 GHz	-	113	-	-
100 kHz to 831 MHz	-	-	113	-
> 886 MHz to 12,75 MHz	-	-	113	-
100 kHz to < 849 MHz	-	-	-	113
> 914 MHz to 12,75 GHz	-	-	-	113

NOTE 1: 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 < 457,6 MHz 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 mini mumnumber 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.

TEST RESULTS

Not applicable the device not support telephony service.

4.17. BLOCKING AND SPURIOUS RESPONSE IN EGPRS CONFIGURATION

TEST 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 subclause 5.1. The reference sensitivity performance as specified in table 1 of 3GPP TS 05.05 shall be met when the following signals are simultaneously input to the receiver:
- a useful signal at frequency f0, 3 dB above the reference sensitivity level as specified in 3GPP TS 05.05 subclause 6.2;
- a continuous, static sine wave signal at a level as in the table of 3GPP TS 05.05 subclause 5.1 and at a frequency (f) which is an integer multiple of 200 kHz.

With the following exceptions, called spurious response frequencies:
a) R-GSM 900 or ER-GSM 900: in band, for a maximum of six occurrences (which if grouped shall not exceed three contiguous occurrences per group);
b) out of band, for a maximum of 24 occurrences (which if below f0 and grouped shall not exceed three contiguous occurrences per group).
Where the above performance shall be met when the continuous sine wave signal (f) is set to a level of 70 dBµV (emf) (i.e. -43 dBm). 3GPP TS 05.05, subclause 5.1.

TEST PROCEDURE

1. To verify that the in band blocking performance is met without exceeding the total number of allowed in band spurious responses. An allowance is made for the statistical significance of the test.
2. To verify that at selected out of band frequencies, the out of band blocking performance is met without exceeding the total number of allowed out of band spurious responses. An allowance is made for the statistical significance of the test.

TEST RESULTS

Please refer to AIT23052502CW1-GSM Test Data

4.18. INTERMODULATION REJECTION - SPEECH CHANNELS

TEST 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, 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.

TEST PROCEDURE

a) The amplitude of the wanted signal is set to 4 dB above the reference sensitivity level (see table 14-24). b) The SS commands the MS to create the loop back facility signalling erased frames. c) The SS produces a static wanted signal, and two static interfering (unwanted) signals at the same time. There is no correlation in the modulation between the signals. The first interfering signal is on a frequency equal to the centre frequency of an ARFCN four above that of the receiver. This signal is static and unmodulated. The second interfering signal is on an ARFCN eight above that of the receiver. This signal is static, continuous and modulated by random data. The amplitude of both the interfering signals is set according to table 14-24. d) The SS compares the data of the signal that it sends to the MS with the signal which is looped back from the receiver after demodulation and decoding, and checks the frame erasure indication. The SS tests the RBER compliance of class II bits by examining at least the minimum number of samples of consecutive bits. Bits only taken from those frames which do not signal frame erasure. The number of error events is recorded. e) The measurement of step d) is repeated with the two unwanted signals having frequencies corresponding to ARFCN four and eight below the ARFCN of the wanted signal. f) Steps b) to e), are repeated but with the receiver operating on an ARFCN in the Low ARFCN range. g) Steps b) to e), are repeated but with the receiver operating on an ARFCN in the High ARFCN range. h) Steps a) to g) are repeated under extreme test conditions.

Table 14-24: Intermodulation test signal levels

	GSM 400, GSM 700, T-GSM 810, GSM 850 and GSM 900		DCS 1 800		PCS 1 900
	Small MS	Other MS	Class 1 and 2	Class 3	
WANTED SIGNAL dBµVemf( )	15	13	17	15	15
FIRST INTERFERER dBµVemf( )	64	74	64	68	64
SECOND INTERFERER dBµVemf( )	63	63	64	68	64

NOTE: Some of the levels in table 14-24 are different to those specified in 3GPP TS 05.05 due to the consideration of the effect of modulation side band noise from the second interferer.

TEST RESULTS

Not applicable the device not support telephony service.

4.19. INTERMODULATION REJECTION - EGPRS

TEST 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 subclause 5.1. The reference sensitivity performance as specified in table 1 of 3GPP TS 05.05 shall be met when the following signals are simultaneously input to the receiver:
- a useful signal at frequency f0, 3 dB above the reference sensitivity level as specified in 3GPP TS 05.05 subclause 6.2;
- a continuous, static sine wave signal at a level as in the table of 3GPP TS 05.05 subclause 5.1 and at a frequency (f) which is an integer multiple of 200 kHz.

With the following exceptions, called spurious response frequencies:
a) R-GSM 900 or ER-GSM 900: in band, for a maximum of six occurrences (which if grouped shall not exceed three contiguous occurrences per group);
b) out of band, for a maximum of 24 occurrences (which if below f0 and grouped shall not exceed three contiguous occurrences per group).
Where the above performance shall be met when the continuous sine wave signal (f) is set to a level of 70 dBµV (emf) (i.e. -43 dBm). 3GPP TS 05.05, subclause 5.1.

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, GSM 900, PCS 1 900		DCS 1 800	
	Small MS	Other MS	Class 1 and 2	Class 3
FIRST INTERFERER dBµVemf( )	64	74	64	68
SECOND INTERFERER dBµVemf( )	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.

TEST RESULTS

Please refer to AIT23052502CW1-GSM Test Data

4.20. AM SUPPRESSION - SPEECH CHANNELS

TEST LIMIT

Channel	Propagation conditions	Type of measurement	Test limit error rate %	Minimum No. of samples
TCH/FS Class II	Static	RBER	2,439	8 200

TEST PROCEDURE

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.

MS type	Signal level (dBµVemf)
GSM 400	82
GSM 700	82
T-GSM 810	82
GSM 850	82
GSM 900	82
DCS 1 800	82/84
PCS 1 900	82
NOTE: The 82 dBµVemf (i.e. -31 dBm) level shall apply to DCS 1 800 class 1 and class 2 MS meeting the -102 dBm reference sensitivity level requirement according to 3GPP TS 05.05, subclause 6.2.	

c) The SS compares the data of the signal that it sends to the MS with the signal which is looped back from the receiver after demodulation and decoding, and checks the frame erasure indication.
d) The SS tests the RBER compliance of class II bits by examining at least the minimum number of samples of consecutive bits. Bits only taken from those frames which do not signal frame erasure. The number of error events is recorded.

TEST RESULTS

Not applicable the device not support telephony service.

4.21. AM SUPPRESSION - PACKET CHANNELS

TEST LIMIT

Channel	Propagation conditions	Type of measurement	Test limit error rate %	Minimum No. of samples
MCS-5	Static	BLER	10	2000
USF/MCS-5	Static	BLER	1	20 000

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.
c) The SS counts the number of blocks transmitted with current coding scheme and the number of these blocks not acknowledged based on the content of the Ack/Nack Description information element (see 04.60, 12.3) in the Packet Downlink Ack/Nack as sent from the MS to the SS on the PACCH.
d) The SS sets the value of the USF/MCS-5 according 3GPP 45.005 table 1c.
e) The SS counts the number of times the USF is allocated to the MS, and the number of times the MS does not transmit while being allocated the uplink.
NOTE: Due to the error rates related to the USF, the MS is likely to occasionally miss its USF for transmitting the Packet Downlink Ack/Nack. As this requirement is not verified in this part of the test, the SS then again assigns uplink resources so the MS can sent this message

TEST RESULTS

Please refer to AIT23052502CW1-GSM Test Data

4.22. ADJACENT CHANNEL REJECTION - SPEECH CHANNELS (TCH/FS)

TEST LIMIT

			GSM 400, GSM 700, T-GSM 810, GSM 850 and GSM 900		DCS 1 800 and PCS 1 900	
Interference at	Channel	Type of measurement	Test limit error rate %	Minimum No. of samples	Test limit error rate %	Minimum No. of samples
200 kHz	TCH/FS	FER	6,742*α	8 900	3,371*α	17 800
	class Ib	RBER	0,420/α	1 000 000	0,270/α	2 000 000
	class II	RBER	8,333	600 000	8,333	1 200 000
400 kHz	TCH/FS	FER	6,742*α	8 900	3,371*α	17 800
Interferer	class Ib	RBER	0,420/α	1 000 000	0,270/α	2 000 000
TUhight	class II	RBER	8,333	600 000	8,333	1 200 000
400 kHz	TCH/FS	FER	11,461*α	8 900	5,714*α	10 500
Interferer	class Ib	RBER	0,756/α	1 000 000	0,483/α	1 200 000
Static	class II	RBER	9,167	600 000	9,167	720 000

TEST PROCEDURE

In addition to the wanted signal, the SS transmits an independent, uncorrelated interfering signal, Standard TestSignal 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.

TEST RESULTS

Not applicable the device not support telephony service.

4.23. ADJACENT CHANNEL REJECTION - EGPRS

TEST LIMIT

In addition to the wanted signal, the SS transmits an independent, uncorrelated interfering signal, Standard TestSignal 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.

TEST PROCEDURE

			GSM 400, GSM 700, T-GSM 810, GSM 850 and GSM 900		DCS 1 800 and PCS 1 900	
Interference at	Channel	Type of measurement	Test limit error rate %	Minimum No. of samples	Test limit error rate %	Minimum No. of samples
200 kHz	TCH/FS	FER	6,742*α	8 900	3,371*α	17 800
	class Ib	RBER	0,420/α	1 000 000	0,270/α	2 000 000
	class II	RBER	8,333	600 000	8,333	1 200 000
400 kHz	TCH/FS	FER	6,742*α	8 900	3,371*α	17 800
Interferer	class Ib	RBER	0,420/α	1 000 000	0,270/α	2 000 000
TUhight	class II	RBER	8,333	600 000	8,333	1 200 000
400 kHz	TCH/FS	FER	11,461*α	8 900	5,714*α	10 500
Interferer	class Ib	RBER	0,756/α	1 000 000	0,483/α	1 200 000
Static	class II	RBER	9,167	600 000	9,167	720 000

TEST RESULTS

Please refer to AIT23052502CW1-GSM Test Data

4.24. REFERENCE SENSITIVITY - TCH/FS

TEST LIMIT

Channels	Propagation conditions TUhigh		Propagation conditions RA		Propagation conditions HT		Static conditions	
	Test limit error rate %	Minimum No. of samples	Test limit error rate %	Minimum No. of samples	Test limit error rate %	Minimum No. of samples	Test limit error rate %	Minimum No. of samples
TCH/EFS								
FER	1	8900					1	164000
class Ib(RBER)	0,03	1000000					0,03	20000000
class II (RBER)	3,29	120000	6,19	24000	5,34	60000	6,22	8200

Channels	Propagation conditions TUhigh		Propagation conditions RA		Propagation conditions HT		Static conditions	
	Test limit error rate %	Minimum No. of samples	Test limit error rate %	Minimum No. of samples	Test limit error rate %	Minimum No. of samples	Test limit error rate %	Minimum No. of samples
TCH/EFS								
FER	1	13400					1	164000
class Ib(RBER)	0,04	1500000					0,03	20000000
class II(RBER)	4,92	60000	6,07	24000	6,85	30000	6,22	8200

TEST PROCEDURE

a) The fading function is set to TUhigh.
b) The SS sets the amplitude of the wanted signal to reference sensitivity as defined in Table 1w.
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/EFS 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.

TEST RESULTS

Not applicable the device not support telephony service.

4.25. REFERENCE SENSITIVITY - FACCH/F

TEST LIMIT

			GSM 400, GSM 700, T-GSM 810, GSM 850 and GSM 900		DCS 1 800 and PCS 1 900	
Channels	Type of measurements	Propagation	Test limit error rate %	Minimum No of samples	Test limit error rate %	Minimum No of samples
FACCH/F	FER	TUhigh	8,961	6696	4,368	13736

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 sends a Layer 3 message which does not require a Layer 3 response from the MS. Due to the low signal level the MS may not be able to acknowledge the Layer 2 frame with an RR frame and the SS will repeat the Layer 2 frame. Each repeated L2 frame will be counted and will indicate a frame erasure event.
d) The SS determines the frame erasure events during at least the minimum number of samples of FACCH/F frames.

TEST RESULTS

Not applicable the device not support telephony service.

4.26. MINIMUM INPUT LEVEL FOR REFERENCE PERFORMANCE - GPRS

TEST LIMIT

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

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

TEST PROCEDURE

1. To verify that that the MS sends a Packet Not Acknowledge in the Packet Downlink Ack/Nack in case of a the Block Check Sequence indicating a Block Error.
2. To verify that the MS does not exceed conformance requirement 1 for CS-3 and CS-4 under STATIC, TUhigh,HT and RA propagation conditions with an allowance for the statistical significance of the test.
3. To verify that the MS does not exceed conformance requirement 2 under HT propagation conditions with an allowance for the statistical significance of the test.
4. To verify that the MS does not exceed conformance requirement 3 under STATIC, TUhigh, HT and RA propagation conditions for the PDTCH, and HT propagation conditions for the USF, with an allowance for the statistical significance of the test.
5. To verify that the MS meets the conformance requirements also 1 and 2 for the conditions allowed by conformance requirement 4, with an allowance for the statistical significance of the test.
6. To verify that the MS meets conformance requirement 5, with an allowance for the statistical significance of the
test.

TEST RESULTS

Please refer to AIT23052502CW1-GSM Test Data

4.27. MINIMUM INPUT LEVEL FOR REFERENCE PERFORMANCE - EGPRS

TEST LIMIT

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.

TEST PROCEDURE

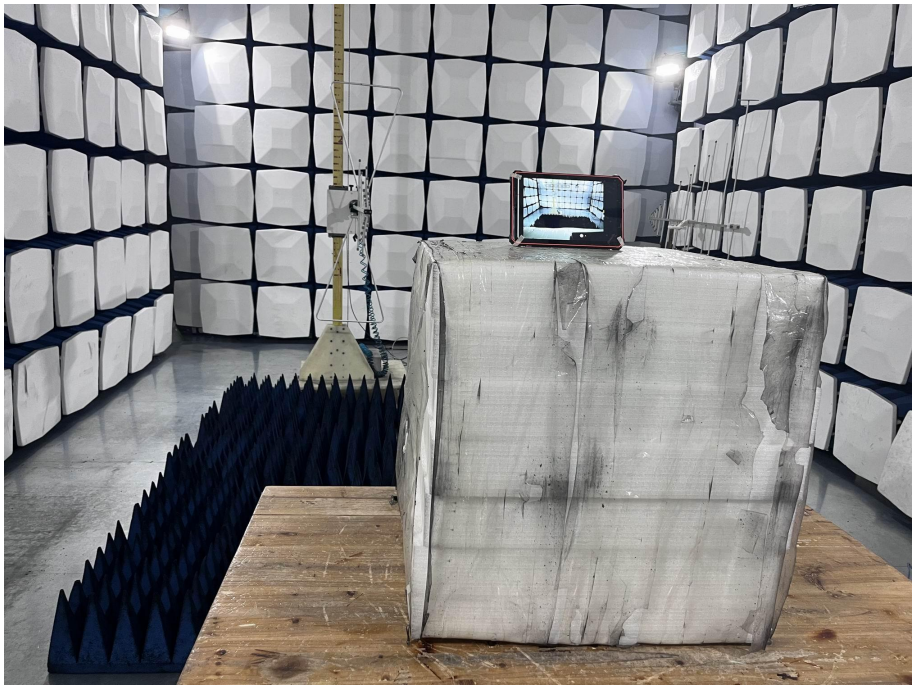
1. To verify that the MS sends a Packet Not Acknowledge in the Packet Downlink Ack/Nack in case of the BlockCheck Sequence indicating a Block Error.
2. To verify that the MS does not exceed conformance requirement 1 for PDTCH with different coding schemes and under different propagation conditions with an allowance for the statistical significance of the test.
3. To verify that the MS does not exceed conformance requirement 2 under HT propagation conditions with an allowance for the statistical significance of the test.
4. To verify that the MS does not exceed conformance requirement 3 under STATIC, TU high, HT and RA propagation conditions for the PDTCH, and under HT propagation conditions for the USF, with an allowance for the statistical significance of the test.
5. To verify that the MS meets the conformance requirements also 1 and 2 for the conditions allowed by conformance requirement 4, with an allowance for the statistical significance of the test.
6. To verify that the MS meets conformance requirement 5, with an allowance for the statistical significance of the test.

TEST RESULTS

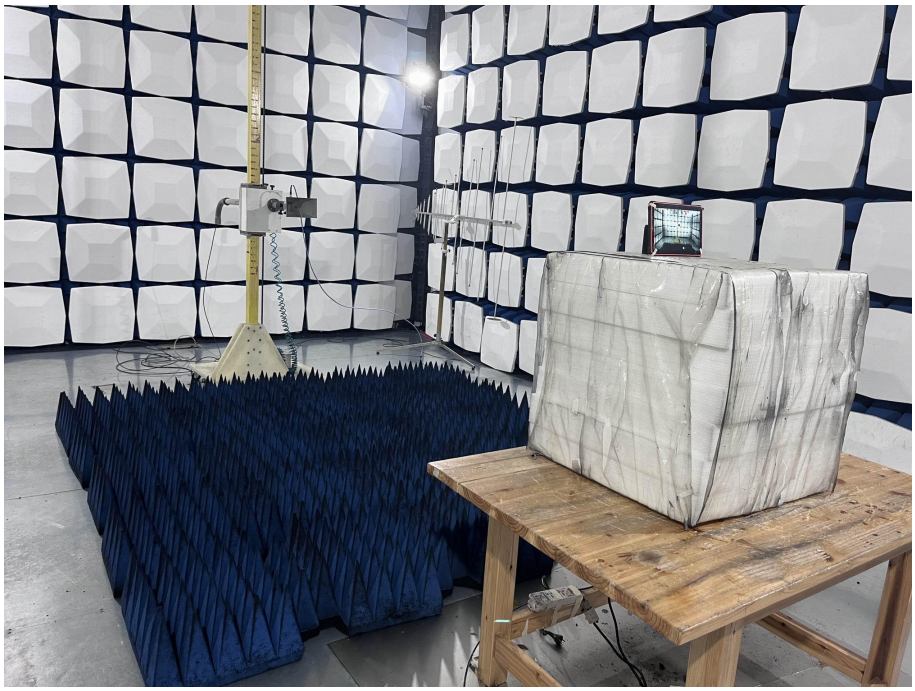
Please refer to AIT23052502CW1-GSM Test Data

5. PHOTOGRAPHS OF TEST SETUP

RADIATED EMISSION TEST SETUP



RADIATED EMISSION ABOVE 1G TEST SETUP



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