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TEST REPORT

For GSM900/DCS1800

Report Reference No. ..... :	**TRE1603019101**	R/C…….: 14043
Applicant's name ..... :	**Vonino Electronics Limited**	
Address.....:	Miramar Tower 10F - no1010, 132 Nathan Road, Tsim Sha Tsui, Kowloon, Hong Kong	
Manufacturer.....:	Vonino Electronics Limited	
Address.....:	Miramar Tower 10F - no1010, 132 Nathan Road, Tsim Sha Tsui, Kowloon, Hong Kong	
Test item description ..... :	**XAVY L8 / Epic M8**	
Trade Mark .....:	vonino	
Model/Type reference.....:	T8S	
Listed Model(s) .....:	-	
Standard ..... :	**ETSI EN 301 511 V9.0.2: 2003-03**	
Date of receipt of test sample……..:	Mar 29, 2016	
Date of testing……:	Mar 30, 2016- Apr 20, 2016	
Date of issue……...:	Apr 20, 2016	
Result..... ……..:	**PASS**	

Compiled by (position+printed name+signature)..:	File administrators Shayne Zhu	Shayne Zhu
Supervised by (position+printed name+signature)..:	Project Engineer Lion Cai	Lion Cai
Approved by (position+printed name+signature)..:	RF Manager Hans Hu	Hans Hu

Testing Laboratory Name ..... :	**Shenzhen Huatongwei International Inspection Co., Ltd**
Address.....:	1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China

Contents

1. Test standards and Test description

1.1. Test Standards

The tests were performed according to following standards:

ETSI EN 301 511 V9.0.2 (2003-03)–Global System for Mobile communications (GSM);Harmonized EN for mobile stationsin the GSM 900 and GSM 1800 bandscovering essential requirements underarticle 3.2 of the R&TTE directive (1999/5/EC)
ETSI TS 151 010-1 V10.2.0 (2012-10)–Digital cellular telecommunications system (Phase 2+); Mobile Station (MS) conformance specification; Part 1: Conformance specification (3GPP TS 51.010-1 version 10.2.0 Release 10)
3GPP TS 51.010-1 version 10.2.0 Release 10–Digital cellular telecommunications system (Phase 2+);Mobile Station (MS) conformance specification; Part 1: Conformance specification(3GPP TS 51.010-1 version 10.0.0 Release 10

1.2. Test Description

Radio Spectrum Matter (RSM) Part of Transmitter		
Test Item	**Test require**	**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 4.2.22	Pass
Frequency error under multipath and interference conditions in EGPRS Configuration	Clause 4.2.23	Pass
EGPRS Transmitter output power	Clause 4.2.24	Pass
Output RF spectrum in EGPRS configuration	Clause 4.2.25	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
Radio Spectrum Matter (RSM) Part of Receiver		
Test Item	Test Method	Result
Receiver Blocking and spurious response -speech channels	Clause 4.2.20	Pass
Blocking and spurious response in EGPRS configuration	Clause 4.2.26	Pass

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

2. Summary

2.1. Client Information

Applicant:	Vonino Electronics Limited
Address:	Miramar Tower 10F - no1010, 132 Nathan Road, Tsim Sha Tsui, Kowloon, Hong Kong
Manufacturer:	Vonino Electronics Limited
Address:	Miramar Tower 10F - no1010, 132 Nathan Road, Tsim Sha Tsui, Kowloon, Hong Kong

2.2. Product Description

Name of EUT:	XAVY L8 / Epic M8
Trade Mark:	vonino
Model/Type reference:	T8S
Listed Model(s):	-
Power supply:	DC 3.7V From internal battery
Adapter information:	Model:FJ-SW728L0502000UE Input:AC 100-240V,50/60Hz 0.4A Max Output: 5Vd.c., 2000mA
2G	
Operation Band:	GSM900,DCS1800
Supported type:	GSM/GPRS/EGPRS
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
Power Class:	GSM900:Power Class 4 DCS1800:Power Class 1
Modilation Type:	GMSK for GSM/GPRS GMSK, 8PSK for EGPRS
GSM Release Version	R99
GPRS Multislot Class	12
EGPRS Multislot Class	12
Hardware version:	V1.1
Software version:	vonino_v1.1.2
Antenna type:	Internal Antenna
Antenna gain:	GSM900:1dBi DCS1800:1dBi

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
⋮	⋮	⋮	⋮
61	902.20	697	1747.20
62	902.40	698	1747.40
63	902.60	699	1747.60
⋮	⋮	⋮	⋮
123	914.60	884	1784.60
124	914.80	885	1784.80

2.3. EUT operation mode

The EUT and test equipment were configured for testing according to ETSI EN 301 511 V9.0.2 (2003-03), where refer to ETSI TS 151 010-1 V10.2.0 (2012-10) for details.

All the tests are performed at each SIM card mode, the datum recorded is the worst case for all the mode at SIM1 Card mode.

2.4. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

● - supplied by the manufacturer

○ - supplied by the lab

		Length (m) :	/
		Shield :	/
		Detachable :	/
		Manufacturer :	/
		Model No. :	/

2.5. Modifications

No modifications were implemented to meet testing criteria.

3. Test Environment

4. est Environment

4.1. Address of the test laboratory

Laboratory:Shenzhen Huatongwei International Inspection Co., Ltd.
Address: 1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China
Phone: 86-755-26748019 Fax: 86-755-26748089

4.2. Test Facility

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

CNAS-Lab Code: L1225
Shenzhen Huatongwei International Inspection Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories
(identical to ISO/IEC17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories, Date of Registration: February 28, 2015. Valid time is until February 27, 2018.

A2LA-Lab Cert. No. 3902.01
Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing. Valid time is until December 31, 2016.

FCC-Registration No.: 317478
Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration 317478, Renewal date Jul. 18, 2014, valid time is until Jul. 18, 2017.

IC-Registration No.: 5377A&5377B
The 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377A on Dec. 31, 2013, valid time is until Dec. 31, 2016.
Two 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377B on Dec.03, 2014, valid time is until Dec.03, 2017.

ACA
Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our A2LA accreditation.

VCCI
The 3m Semi-
anechoic chamber (12.2m×7.95m×6.7m) of Shenzhen Huatongwei International Inspection Co., Ltd.
has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-2484. Date of Registration: Dec. 20, 2012. Valid time is until Dec. 29, 2015.
Radiated disturbance above 1GHz measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-292. Date of Registration: Dec. 24, 2013. Valid time is until Dec. 23, 2016.
Main Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: C-2726. Date of Registration: Dec. 20, 2012. Valid time is until Dec. 19, 2015.
Telecommunication Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: T-1837. Date of Registration: May 07, 2013. Valid time is until May 06, 2016.

DNV
Shenzhen Huatongwei International Inspection Co., Ltd. has been found to comply with the requirements of DNV towards subcontractor of EMC and safety testing services in conjunction with the EMC and Low voltage Directives and in the voluntary field. The acceptance is based on a formal quality Audit and follow-
ups according to relevant parts of ISO/IEC Guide 17025 (2005), in accordance with the requirements of the DNV Laboratory Quality Manual towards subcontractors. Valid time is until Aug. 24, 2016.

4.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature	NT: Normal Temperature	25°C
	HT: High Temperature	55°C
	LV: Low Temperature	-10°C
Voltage	NV: Normal Voltage	DC 3.70V
	HV: High Voltage	DC 4.25V
	LV: Low Voltage	DC 3.50V
Other	lative Humidity	55 %
	Air Pressure	989 hPa

4.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01" Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics;Part 1" and TR-100028-02 "Electromagnetic compatibilityand Radio spectrum Matters (ERM);Uncertainties in the measurementof mobile radio equipment characteristics;Part 2 " and is documented in the Shenzhen Huatongwei International Inspection Co., Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen Huatongwei laboratory is reported:

3GPP TS 51.010-1	Test Description	Uncertainty
12.1.1	Conducted spurious emissions-MS Allocated a Channel Emissions@100kHz<f<2GHz Emissions@2GHz <f<12.75GHz	 0.593dB 1.123 dB
12.1.2	Conducted spurious emissions- MS in Idle Mode Emissions@100kHz<f<2GHz Emissions@2GHz <f<12.75GHz	 0.649 dB 1.123 dB
12.2.1 12.2.2	Radiated spurious emissions	2.2dB
13.1 13.2 13.16.1 13.17.1 13.17.2	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
13.3.4.1 13.16.2.4.1 13.17.3.4.1	Transmitter output power and burst timing Transmitter output power in GPRS multislot configuration EGPRS Transmitter output power	0.593dB
13.4 13.16.3 13.17.4	Output RF spectrum Transmitter output power in GPRS(or EGPRS)multislot configuration	0.593dB
14.7.1 14.18.5	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	 0.649 dB 0.593 dB 1.035 dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

4.5. Equipments Used during the Test

TS 8980-PRE						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1	WIDEB.RADIO COMM.TESRER	R&S	CMW500	1201.0002K50	2015/11/3	2016/11/2
2	AVG Power Sensor	R&S	NRP-Z31	1169.2400.02	2015/11/3	2016/11/2
3	VECTOR SIGNAL GENNERATOR	R&S	SMW200A	1412.0000K02	2015/11/3	2016/11/2
4	SIGNAL& SPECTRUM ANALYZER	R&S	FSW26	1312.8000K26	2015/11/3	2016/11/2
5	WIDEBAND FILTER UNIT	R&S	TS-TUFI1	1521.0000.03	2015/11/3	2016/11/2
6	SIGNA SWITCHING AND CONDITIONING UNIT	R&S	SSCU-PRE1	1518.0026.12	2015/11/3	2016/11/2
			SSCU-UPG4	1518.0732.02		
7	POWER SUPPLY	R&S	NGMO1	1504.8420.03	2015/11/3	2016/11/2
5	Climate Chamber	ESPEC	EL-10KA	05107008	2015/11/3	2016/11/2

Radiated Emission/ Radiated power						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1	Ultra-Broadband Antenna	SCHWARZBECK	VULB9163	546	11/8/2014	11/7/2017
2	Double-Ridged-Waveguide Horn Antenna	SCHWARZBECK	9120D	1011	11/8/2014	11/7/2017
3	Spectrum Analyzer	R&S	FSP40	100597	11/3/2015	11/2/2016
4	Pre-amplifer	SCHWARZBECK	BBV 9743	9743-0022	11/3/2015	11/2/2016
5	Broadband Preamplifer	SCHWARZBECK	BBV 9718	9718-248	11/3/2015	11/2/2016
6	Turntable	Maturo Germany	TT2.0-1T	\	N/A	N/A
7	Antenna Mast	Maturo Germany	CAM-4.0-P-12	\	N/A	N/A
8	Test Software	R&S	ES-K1	/	N/A	N/A
9	WIDEB.RADIO COMM.TESRER	R&S	CMW500	1201.0002K50	2015/11/3	2016/11/2

The Cal. Interval was one year

5. Test conditions and Results

Test Item	Test Requirement ESTI EN301 511	Test Method ETSI TS151010-1	Test Conditions	Verdict		Note:
				GSM900	**DCS1800**	
Transmitter - Frequency error and phase error	Section 4.2.1	Clause 13.1	NT/NV	Pass	Pass	
			LT/LV	Pass	Pass	
			LT/HV	Pass	Pass	
			HT/LV	Pass	Pass	
			HT/HV	Pass	Pass	
			Vibrated X/Y/Z	Pass	Pass	
Transmitter - Frequency error under multipath and interference conditions	Section 4.2.2	Clause 13.2	NT/NV	Pass	Pass	
			LT/LV	Pass	Pass	
			LT/HV	Pass	Pass	
			HT/LV	Pass	Pass	
			HT/HV	Pass	Pass	
Transmitter output power and burst timing	Section 4.2.5	Clause 13.3	NT/NV	Pass	Pass	*Reference to section 4.1*
			LT/LV	Pass	Pass	
			LT/HV	Pass	Pass	
			HT/LV	Pass	Pass	
			HT/HV	Pass	Pass	
Transmitter - Output RF spectrum	Section 4.2.6	Clause 13.4	NT/NV	Pass	Pass	
			LT/LV	Pass	Pass	
			LT/HV	Pass	Pass	
			HT/LV	Pass	Pass	
			HT/HV	Pass	Pass	
Conducted spurious emissions - MS allocated a channel	Section 4.2.12	Clause 12.1.1	NT/NV	Pass	Pass	
			NT/LV	Pass	Pass	
			NT/HV	Pass	Pass	
Conducted spurious emissions - MS in idle mode	Section 4.2.13	Clause 12.1.2	NT/NV	Pass	Pass	
			NT/LV	Pass	Pass	
			NT/HV	Pass	Pass	
Radiated spurious emissions - MS allocated a channel	Section 4.2.16	Clause 12.2.1	NT/NV	Pass	Pass	*Reference to section 4.4*
			NT/LV	Pass	Pass	
			NT/HV	Pass	Pass	
Radiated spurious emissions - MS in idle mode	Section 4.2.17	Clause 12.2.2	NT/NV	Pass	Pass	*Reference to section 4.5*
			NT/LV	Pass	Pass	
			NT/HV	Pass	Pass	
Receiver Blocking and spurious response - speech channels	Section 4.2.20	Clause 14.7.1	NT/NV	Pass	Pass	

Test Item	Test Requirement ESTI EN301 511	Test Method ETSI TS151010-1	Test Conditions	Verdict		Note:
				GPRS900	**GPRS1800**	
Frequency error and phase error in GPRS multislot configuration	Section 4.2.4	Clause 13.16.1	NT/NV	Pass	Pass	
			LT/LV	Pass	Pass	
			LT/HV	Pass	Pass	
			HT/LV	Pass	Pass	
			HT/HV	Pass	Pass	
			Vibrated X/Y/Z	Pass	Pass	
Transmitter output power in GPRS multislot configuration	Section 4.2.10	Clause 13.16.2	NT/NV	Pass	Pass	*Reference to section 4.2*
			LT/LV	Pass	Pass	
			LT/HV	Pass	Pass	
			HT/LV	Pass	Pass	
			HT/HV	Pass	Pass	
Output RF spectrum in GPRS multislot configuration	Section 4.2.11	Clause 13.16.3	NT/NV	Pass	Pass	
			LT/LV	Pass	Pass	
			LT/HV	Pass	Pass	
			HT/LV	Pass	Pass	
			HT/HV	Pass	Pass	
Test Item	Test Requirement ESTI EN301 511	Test Method ETSI TS151010-1	Test Conditions	Verdict		Note:
				EGPRS900	**EGPRS1800**	
Frequency error and Modulation accuracy in EGPRS Configuration	Section 4.2.22	Clause 13.17.1	NT/NV	Pass	Pass	
			LT/LV	Pass	Pass	
			LT/HV	Pass	Pass	
			HT/LV	Pass	Pass	
			HT/HV	Pass	Pass	
Frequency error under multipath and interference conditions in EGPRS Configuration	Section 4.2.23	Clause 13.17.2	NT/NV	Pass	Pass	
			LT/LV	Pass	Pass	
			LT/HV	Pass	Pass	
			HT/LV	Pass	Pass	
			HT/HV	Pass	Pass	
EGPRS Transmitter output power	Section 4.2.24	Clause 13.17.3	NT/NV	Pass	Pass	*Reference to section 4.3*
			LT/LV	Pass	Pass	
			LT/HV	Pass	Pass	
			HT/LV	Pass	Pass	
			HT/HV	Pass	Pass	
Output RF spectrum in EGPRS configuration	Section 4.2.25	Clause 13.17.4	NT/NV	Pass	Pass	
			LT/LV	Pass	Pass	
			LT/HV	Pass	Pass	
			HT/LV	Pass	Pass	
			HT/HV	Pass	Pass	
Blocking and spurious response in EGPRS configuration	Section 4.2.26	Clause 14.18.5	NT / NV	Pass	Pass	

5.1. Transmitter output power and burst timing

LIMIT

ETSI TS 51.010-1 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

ETSI TS 51.010-1 Sub-clause 13.3.4.2

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

GSM900					
Test environment		Power control Level	Output Power (dBm)		
Temperature (℃)	Voltage (V)		CH975	CH62	CH124
25	3.70	5	32.85	32.47	32.93
		12	19.86	19.67	19.25
		19	5.64	5.75	5.74
-10	4.25	5	32.99	32.56	33.05
		12	19.99	19.75	19.36
		19	5.75	5.82	5.83
	3.50	5	32.95	32.53	33.02
		12	19.96	19.73	19.33
		19	5.73	5.81	5.82
+55	4.25	5	32.73	32.40	32.83
		12	19.76	19.61	19.17
		19	5.55	5.69	5.66
	3.50	5	32.68	32.37	32.79
		12	19.71	19.57	19.12
		19	5.50	5.66	5.62

DCS1800					
Test environment		Power control Level	Output Power (dBm)		
Temperature (℃)	Voltage (V)		CH512	CH698	CH885
25	3.70	0	29.85	29.74	29.76
		8	14.52	15.36	15.08
		15	1.62	1.25	1.43
-10	4.25	0	30.02	29.85	29.91
		8	14.68	15.46	15.22
		15	1.76	1.34	1.55
	3.50	0	29.98	29.82	29.87
		8	14.64	15.44	15.18
		15	1.73	1.32	1.53
+55	4.25	0	29.75	29.68	29.67
		8	14.44	15.31	15.01
		15	1.54	1.20	1.36
	3.50	0	29.71	29.65	29.64
		8	14.39	15.28	14.97
		15	1.50	1.17	1.32

5.2. Transmitter output power in GPRS multislot configuration

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

ETSI TS 51.010-1 (V.10.2.0) Sub-clause 13.16.2.4.2

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 can not be set by GAMMA_TN.

d) The SS commands the MS to the maximum power control level supported by the MS and steps a) to b) are repeated on each timeslot within the multislot configuration for ARFCN in the Low and High ranges.

e) The SS commands the MS to the maximum power control level in the first timeslot allocated within the multislot configuration and to the minimum power control level in the second timeslot allocated. Any further timeslots allocated are to be set to the maximum power control level. Steps 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

GPRS900					
Mode:		Slot: 1down4up; Coding scheme: CS-1			
Test environment		Power control Level	Output Power (dBm)		
Temperature (℃)	Voltage (V)		CH975	CH62	CH124
25	3.70	5	32.74	32.59	32.86
		12	19.63	19.47	19.52
		19	5.21	5.36	5.65
-10	4.25	5	32.85	32.65	32.94
		12	19.74	19.53	19.60
		19	5.30	5.41	5.71
	3.50	5	32.83	32.64	32.92
		12	19.71	19.52	19.58
		19	5.29	5.40	5.70
+55	4.25	5	32.64	32.53	32.79
		12	19.55	19.42	19.46
		19	5.13	5.32	5.60
	3.50	5	32.60	32.51	32.76
		12	19.50	19.40	19.43
		19	5.09	5.29	5.56
Mode:		Slot: 2down2up; Coding scheme: CS-1			
Test environment		Power control Level	Output Power (dBm)		
Temperature (℃)	Voltage (V)		CH975	CH62	CH124
25	3.70	5	31.24	31.08	31.12
		12	18.24	18.05	18.14
		19	4.06	4.29	4.17
-10	4.25	5	31.33	31.13	31.18
		12	18.32	18.10	18.20
		19	4.13	4.33	4.22
	3.50	5	31.31	31.12	31.17
		12	18.30	18.09	18.18
		19	4.12	4.32	4.21
+55	4.25	5	31.16	31.04	31.06
		12	18.18	18.01	18.10
		19	4.00	4.26	4.13
	3.50	5	31.13	31.02	31.04
		12	18.14	17.99	18.07
		19	3.97	4.24	4.10

GPRS1800					
Mode:		Slot: 1down4up; Coding scheme: CS-1			
Test environment		Power control Level	Output Power (dBm)		
Temperature (℃)	Voltage (V)		CH512	CH698	CH885
25	3.70	0	29.64	29.73	29.42
		8	14.82	15.36	15.47
		15	1.64	1.38	1.25
-10	4.25	0	29.78	29.81	29.52
		8	14.96	15.44	15.57
		15	1.76	1.45	1.33
	3.50	0	29.75	29.79	29.50
		8	14.92	15.42	15.54
		15	1.74	1.43	1.32
+55	4.25	0	29.55	29.68	29.36
		8	14.75	15.32	15.42
		15	1.57	1.34	1.20
	3.50	0	29.52	29.66	29.33
		8	14.71	15.30	15.39
		15	1.54	1.32	1.18
Mode:		Slot: 2down2up; Coding scheme: CS-1			
Test environment		Power control Level	Output Power (dBm)		
Temperature (℃)	Voltage (V)		CH512	CH698	CH885
25	3.70	0	28.15	28.36	28.47
		8	13.54	14.05	14.16
		15	0.21	0.39	0.49
-10	4.25	0	28.26	28.42	28.55
		8	13.65	14.11	14.24
		15	0.30	0.44	0.55
	3.50	0	28.23	28.41	28.53
		8	13.62	14.10	14.22
		15	0.28	0.43	0.54
+55	4.25	0	28.08	28.32	28.42
		8	13.49	14.02	14.12
		15	0.16	0.36	0.45
	3.50	0	28.06	28.31	28.40
		8	13.45	14.00	14.10
		15	0.13	0.34	0.43

5.3. EGPRS Transmitter output power

LIMIT

ETSI TS 51.010-1 Sub-clause 13.17.3.5

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.
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.
The transmitter output power for the 8-PSK modulated signals, under every combination of normal and extreme test conditions, for normal 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 13.17.3-1 or table 13.17.3-2 within the tolerances also shown in table 13.17.3-1 or table 13.17.3-2.

Table 13.17.3-1: Bands other than DCS 1800 and PCS 1900 transmitter output power for different power classes 8PSK Modulated Signals

Power class			Power control level (note 3)	GAMMA_TN (Γ_{CH})	Transmitter output power (note 1,2)	Tolerances	
E1	E2	E3					
·			2-5	0-3	33	±2 dB	±2.5dB
			6	4	31	±3 dB	±4 dB
			7	5	29	±3 dB	±4 dB
	·		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

NOTE 1: For R99 and Rel-4, the maximum output power in a multislot configuration must be lower within the limits defined in table 13.17.3-1a. From Rel-5 onwards, the maximum output power in a multislot configuration may be lower within the limits defined in table 13.17.3-1b.

NOTE 2: 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 3: There is no requirement to test power control levels 20-31.

Table 13.17.3-1a: 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 13.17.3-1b: From Rel-5 onwards: 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	3,0
3	4,8
4	6,0
5	7,0
6	7,8
7	8,5
8	9,0

Table 13.17.3-2: DCS 1 800 and PCS 1 900 transmitter output power for different power classes 8-PSK Modulated Signals

Power class			Power control level (note 3)	GAMMA_TN (Γ_{CH})	Transmitter output power (note 1,2)	Tolerances	
E1	E2	E3				NORMAL	EXTREME
·			29,0 *)	0-3 **)	30	±3 dB (note 4)	±4dB (note 4)
			1	4	28	±3 dB	±4 dB
	·		2	5	26	±3 dB (note 4)	±4 dB (note 4)
	·		3	6	24	±3 dB	±4 dB
	·	·	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	±4 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	±5 dB	±5 dB
	·	·	14	17	2	±5 dB	±6 dB
	·	·	15	18	0	±5 dB	±6 dB

*) 30-0 for PCS 1900 **) 1-3 for PCS 1900

NOTE 1: For R99 and Rel-4, the maximum output power in a multislot configuration must be lower within the limits defined in table 13.17.3-2a. From Rel-5 onwards, the maximum output power in a multislot configuration may be lower within the limits defined in table 13.17.3-2b.

NOTE 2: 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 3: There is no requirement to test power control levels 16-28.

NOTE 4: 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 for a class E1 mobile. For a class E2 mobile the tolerances shall be -4/+3 under normal test conditions and -4,5/+4 dB under extreme test conditions.

Table 13.17.3-2a: R99 and Rel-4: DCS 1 800 and PCS 1 900 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 13.17.3-2b: From Rel-5 onwards: DCS 1 800 and PCS 1 900 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	3,0
3	4,8
4	6,0
5	7,0
6	7,8
7	8,5
8	9,0

TEST PROCEDURE

ETSI TS 51.010-1 Sub-clause 13.17.3.4.2

a) Measurement of normal burst transmitter output power
For 8PSK, power may be determined by applying the technique described for GMSK in subclause 13.16.2.4.1.2; step a) and then averaging over multiple bursts to achieve sufficient accuracy (see annex 5). Alternatively, an estimation technique based on a single burst which can be demonstrated to yield the same result as the long term average may be used. The long term average or the estimate of long term average is used as the 0dB reference for the power/time template.

b) Measurement of normal burst power/time relationship. The array of power samples measured in a) are referenced in time to the centre of the useful transmitted symbols and in power to the 0 dB reference, both identified in a).

c) Steps a) to b) are repeated on each timeslot within the multislot configuration with the MS commanded to operate on each of the nominal output power levels defined in tables 13.17.3-1, 13.17.3-2 and 13.17.3-3.
NOTE: Power control levels 0 and 1 are excluded for bands other than DCS 1800 and PCS 1900 since these power control levels can not be set by GAMMA_TN.

d) The SS commands the MS to the maximum power control level supported by the MS and steps a) to b) are repeated on each timeslot within the multislot configuration for ARFCN in the Low and High ranges.

e) The SS commands the MS to the maximum power control level in the first timeslot allocated within the multislot configuration and to the minimum power control level in the second timeslot allocated. Any further timeslots allocated are to be set to the maximum power control level. Steps a) to b) and corresponding measurements on each timeslot within the multislot configuration are repeated. This step is only applicable to MS which support more than one uplink time slot.

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

TEST RESULTS

EGPRS900					
Mode:		Slot: 1down4up; Coding scheme: CS-1			
Test environment		Power control Level	Output Power (dBm)		
Temperature (℃)	Voltage (V)		CH975	CH62	CH124
25	3.70	5	32.69	32.47	32.85
		12	19.36	19.47	19.84
		19	5.39	5.42	5.63
-10	4.25	5	32.80	32.55	32.94
		12	19.47	19.54	19.93
		19	5.48	5.48	5.70
	3.50	5	32.78	32.53	32.92
		12	19.44	19.53	19.91
		19	5.47	5.47	5.69
+55	4.25	5	32.59	32.40	32.77
		12	19.28	19.41	19.77
		19	5.31	5.37	5.57
	3.50	5	32.55	32.37	32.73
		12	19.23	19.38	19.74
		19	5.27	5.34	5.53
Mode:		Slot: 2down2up; Coding scheme: CS-1			
Test environment		Power control Level	Output Power (dBm)		
Temperature (℃)	Voltage (V)		CH975	CH62	CH124
25	3.70	5	31.08	31.47	31.52
		12	18.34	18.52	18.33
		19	4.32	4.08	4.52
-10	4.25	5	31.21	31.56	31.62
		12	18.46	18.60	18.43
		19	4.42	4.15	4.60
	3.50	5	31.17	31.53	31.60
		12	18.43	18.58	18.40
		19	4.40	4.14	4.59
+55	4.25	5	30.97	31.40	31.43
		12	18.25	18.46	18.26
		19	4.24	4.02	4.45
	3.50	5	30.93	31.37	31.40
		12	18.20	18.43	18.22
		19	4.19	3.99	4.41

EGPRS1800					
Mode:		Slot: 1down4up; Coding scheme: CS-1			
Test environment		Power control Level	Output Power (dBm)		
Temperature (℃)	Voltage (V)		CH512	CH698	CH885
25	3.70	0	29.48	29.76	29.52
		8	14.85	15.36	15.47
		15	1.69	1.47	1.52
-10	4.25	0	29.63	29.86	29.64
		8	14.99	15.45	15.58
		15	1.81	1.55	1.61
	3.50	0	29.59	29.83	29.61
		8	14.95	15.43	15.55
		15	1.79	1.54	1.60
+55	4.25	0	29.39	29.70	29.45
		8	14.78	15.31	15.41
		15	1.62	1.42	1.47
	3.50	0	29.36	29.68	29.42
		8	14.74	15.28	15.38
		15	1.59	1.40	1.43
Mode:		Slot: 2down2up; Coding scheme: CS-1			
Test environment		Power control Level	Output Power (dBm)		
Temperature (℃)	Voltage (V)		CH512	CH698	CH885
25	3.70	0	28.46	28.25	28.64
		8	13.46	14.08	14.15
		15	0.06	0.25	0.47
-10	4.25	0	28.58	28.33	28.74
		8	13.57	14.16	14.24
		15	0.15	0.31	0.55
	3.50	0	28.55	28.31	28.71
		8	13.54	14.14	14.22
		15	0.14	0.30	0.53
+55	4.25	0	28.37	28.19	28.56
		8	13.39	14.03	14.09
		15	-0.01	0.20	0.41
	3.50	0	28.33	28.16	28.53
		8	13.34	14.00	14.05
		15	-0.05	0.17	0.38

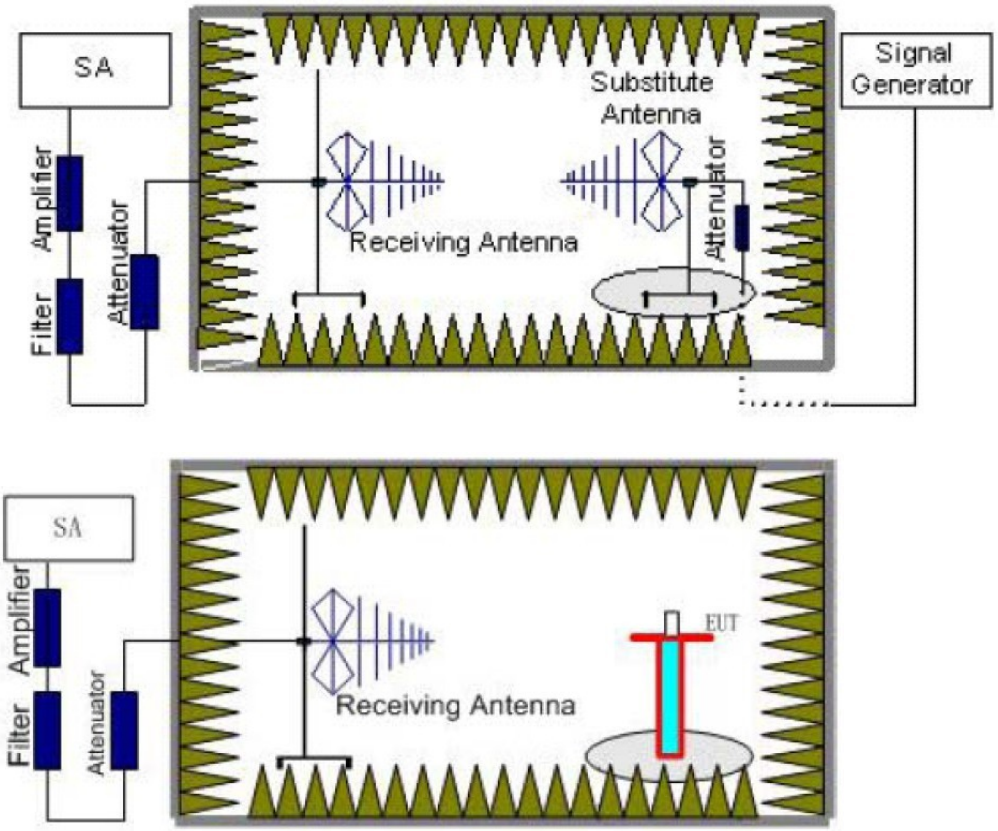
5.4. Radiated spurious emissions-MS Allocated a channel

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 CONFIGURATION



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.
NOTE 1: This is a qualitative step to identify the frequency and presence of spurious emissions which are to be measured in subsequent steps.

b) The test antenna separation is set to the appropriate measurement distance and at each frequency at which a spurious emission has been detected the MS is rotated to obtain a maximum response. The effective radiated power of the emission is determined by a substitution measurement. In case of an anechoic shielded chamber pre-calibration may be used instead of a substitution measurement.

c) The measurement bandwidth based on a 5 pole synchronously tuned filter shall be according to table 8. The power indication is the peak power detected by the measuring system.
The measurement time on any frequency shall be such that it includes the time during which the MS receives a TDMA frame containing the paging channel
NOTE 2: For these filter bandwidths some difficulties may be experienced with noise floor above required measurement limit. This will depend on the gain of the test antenna, and adjustment of the measuring system bandwidth is permissible. Alternatively, for test frequencies above 900 MHz, the test antenna separation from the MS may be reduced to 1 meter.

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

d) The test is repeated under extreme voltage test conditions (see [Annex 1, TC2.2]).

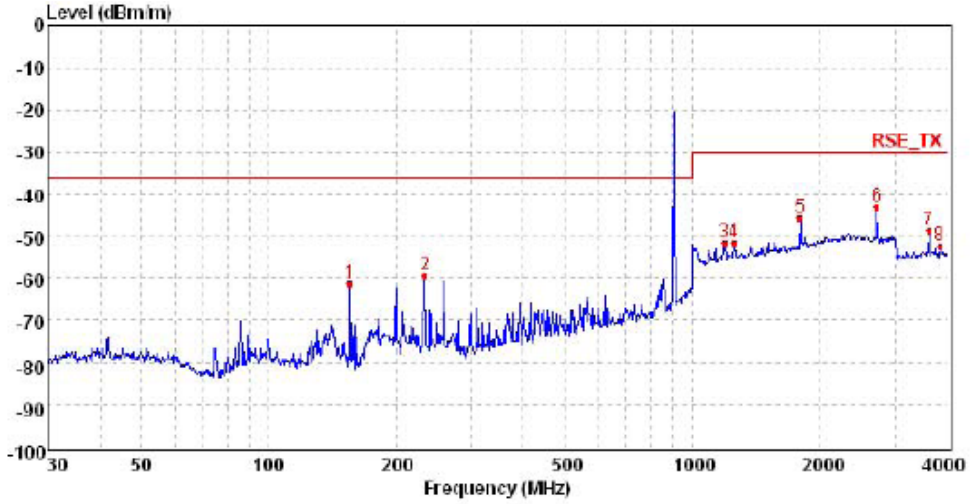
Frequency range	Frequency offset	Filter bandwidth	Approx video bandwidth
30MHz to 50MHz	-	10KHz	30KHz
50MHz to 500MHz	-	100KHz	300KHz
500MHz to 12.75GHz	0 to 10MHz ⩾10MHz ⩾20MHz ⩾30MHz	100KHz 300KHz 1MHz 3MHz	300KHz 1MHz 3MHz 3MHz

TEST RESULTS

This test was carried out in all the test modes, here only the worst test result was shown.at GSM900

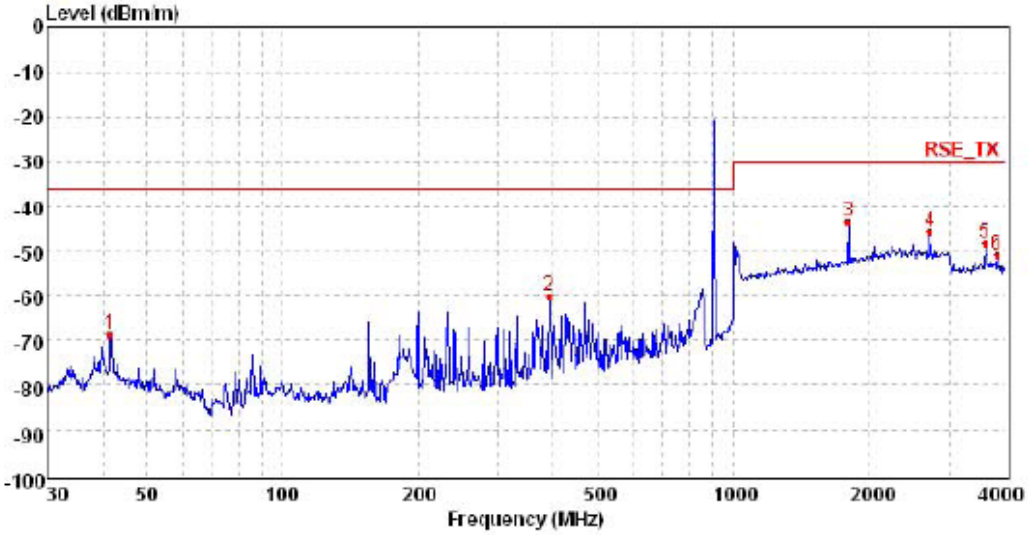
The EUT has met the requirements of 3GPP2 C.S0011-A's requirement.

GSM900			
Test mode:	Traffic mode	Test condition:	Normal Voltage
Channel:	Middle	Polarity:	*Horizontal*



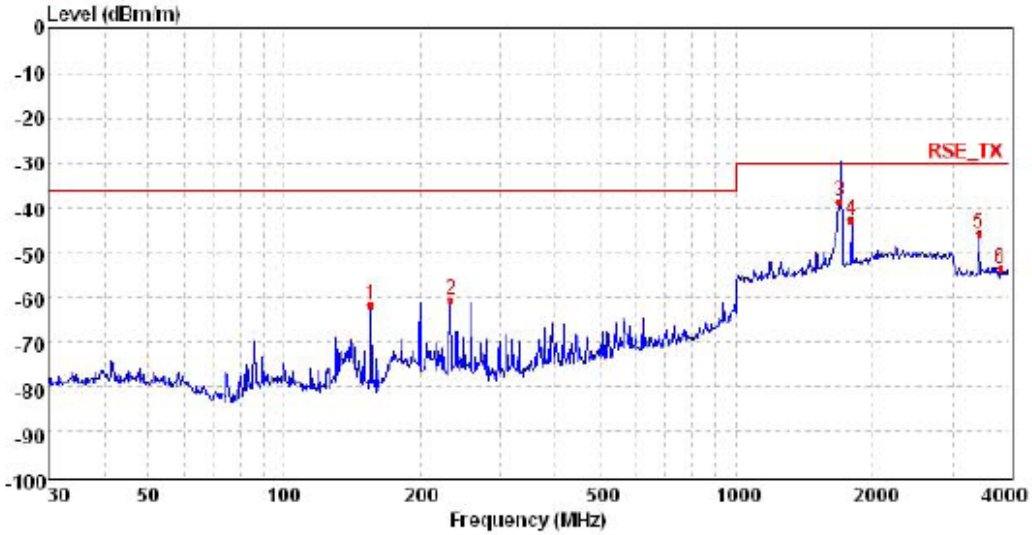
Mark	Frequency MHz	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	156.09	-55.51	21.55	1.33	28.68	-61.31	-36.00	-25.31	Peak
2	233.89	-56.75	24.59	1.67	28.82	-59.31	-36.00	-23.31	Peak
3	1197.42	-66.77	39.09	4.13	28.24	-51.79	-30.00	-21.79	Peak
4	1262.26	-67.16	39.32	4.27	28.22	-51.79	-30.00	-21.79	Peak
5	1803.91	-63.75	40.68	5.27	28.07	-45.87	-30.00	-15.87	Peak
6	2708.63	-65.79	42.76	6.94	27.06	-43.15	-30.00	-13.15	Peak
7	3610.53	-63.47	44.00	8.75	37.99	-48.71	-30.00	-18.71	Peak
8	3819.13	-67.60	44.36	8.68	37.99	-52.55	-30.00	-22.55	Peak

Test mode:	Traffic mode	Test condition:	Normal Voltage
Channel:	Middle	Polarity:	Vertical



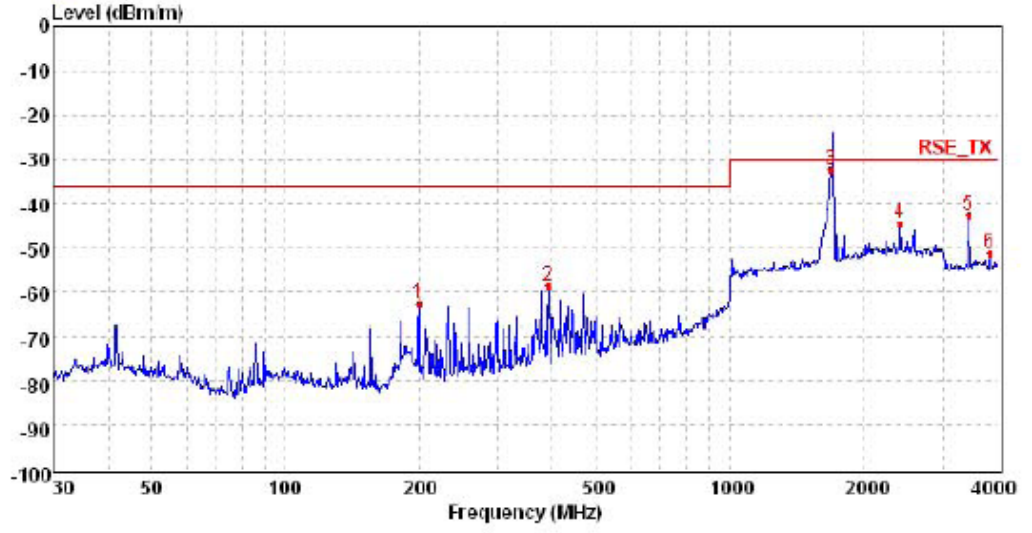
Mark	Frequency MHz	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	41.46	-67.73	26.44	0.61	28.14	-68.82	-36.00	-32.82	Peak
2	390.82	-61.49	28.09	2.24	28.89	-60.05	-36.00	-24.05	Peak
3	1803.91	-61.30	40.68	5.27	28.07	-43.42	-30.00	-13.42	Peak
4	2708.63	-68.34	42.76	6.94	27.06	-45.70	-30.00	-15.70	Peak
5	3610.53	-62.91	44.00	8.75	37.99	-48.15	-30.00	-18.15	Peak
6	3819.13	-66.12	44.36	8.68	37.99	-51.07	-30.00	-21.07	Peak

GSM1800			
Test mode:	Traffic mode	Test condition:	Normal Voltage
Channel:	Middle	Polarity:	*Horizontal*



Mark	Frequency MHz	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	156.09	-56.01	21.55	1.33	28.68	-61.81	-36.00	-25.81	Peak
2	233.89	-58.06	24.59	1.67	28.82	-60.64	-36.00	-24.64	Peak
3	1700.00	-55.94	40.48	5.08	28.10	-38.48	-30.00	-8.48	Peak
4	1805.89	-60.79	40.71	5.27	28.07	-42.68	-30.00	-12.88	Peak
5	3420.29	-60.29	43.71	8.71	37.99	-45.86	-30.00	-15.86	Peak
6	3819.13	-68.59	44.36	8.68	37.99	-53.54	-30.00	-23.54	Peak

Test mode:	Traffic mode	Test condition:	Normal Voltage
Channel:	Middle	Polarity:	Vertical



Mark	Frequency MHz	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	200.36	-59.14	23.60	1.52	28.80	-62.82	-36.00	-26.82	Peak
2	390.82	-60.33	28.09	2.24	28.89	-58.89	-36.00	-22.89	Peak
3	1698.14	-49.88	40.48	5.08	28.10	-32.42	-30.00	-2.42	Peak
4	2421.49	-65.85	42.18	6.38	27.42	-44.71	-30.00	-14.71	Peak
5	3420.29	-57.12	43.71	8.71	37.99	-42.69	-30.00	-12.69	Peak
6	3819.13	-66.46	44.36	8.68	37.99	-51.41	-30.00	-21.41	Peak

Note: The radiated spurious are performed the each test Voltage mode, the datum recorded is the worst case for all the mode at Normal Voltage type.

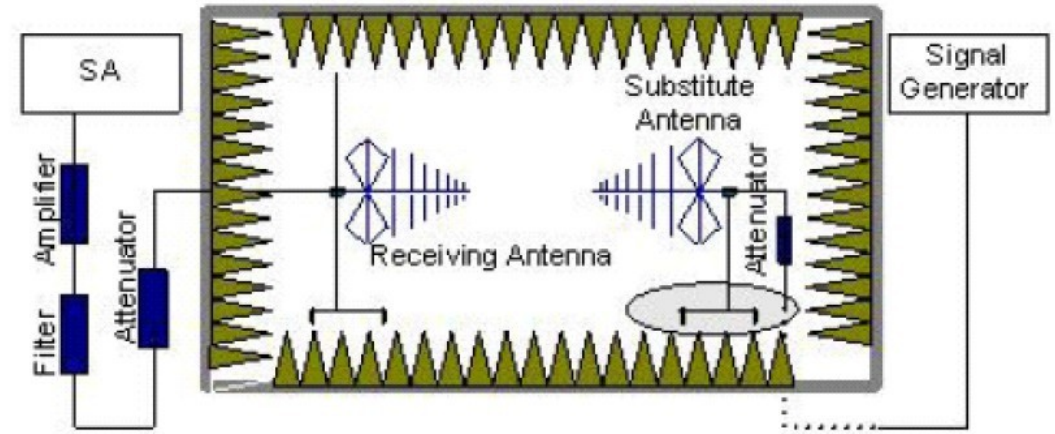
5.5. Radiated spurious emissions- MS in Idle Channel

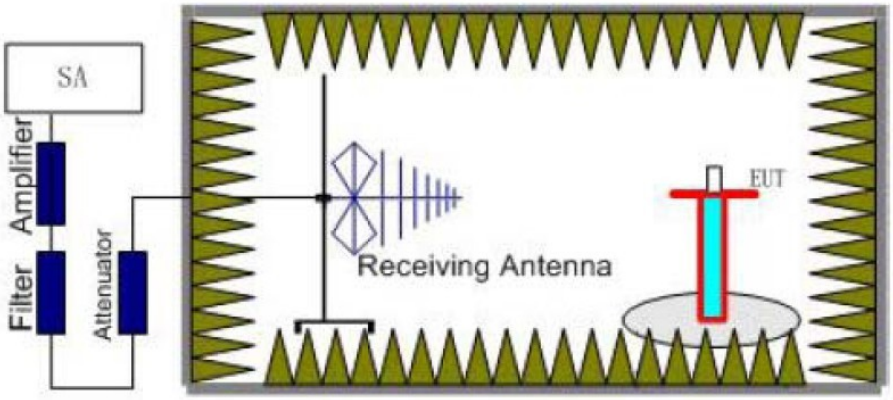
LIMIT

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 CONFIGURATION





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.
NOTE 1: This is a qualitative step to identify the frequency and presence of spurious emissions which are to be measured in subsequent steps.

b) The test antenna separation is set to the appropriate measurement distance and at each frequency at which a spurious emission has been detected the MS is rotated to obtain a maximum response. The effective radiated power of the emission is determined by a substitution measurement. In case of an anechoic shielded chamber pre-calibration may be used instead of a substitution measurement.

c) The measurement bandwidth based on a 5 pole synchronously tuned filter shall be according to table 8. The power indication is the peak power detected by the measuring system.
The measurement time on any frequency shall be such that it includes the time during which the MS receives a TDMA frame containing the paging channel
NOTE 2: For these filter bandwidths some difficulties may be experienced with noise floor above required measurement limit. This will depend on the gain of the test antenna, and adjustment of the measuring system bandwidth is permissible. Alternatively, for test frequencies above 900 MHz, the test antenna separation from the MS may be reduced to 1 meter.

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

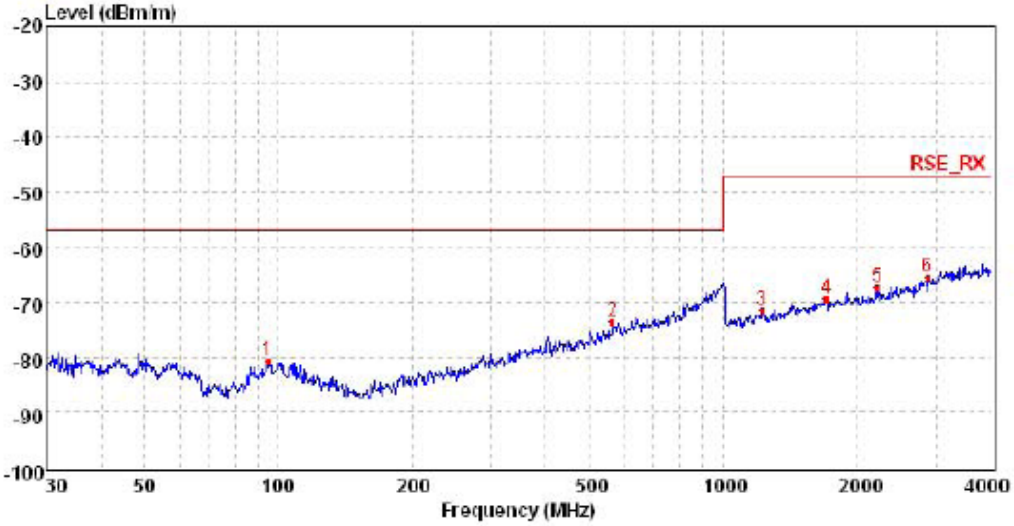
Frequency range	Filter bandwidth	Video bandwidth
100KHz to 50MHz	10KHz	30KHz
50MHz to 12.75GHz	100KHz	300KHz

TEST RESULTS

This test was carried out in all the test modes, here only the worst test result was shown.at GSM900

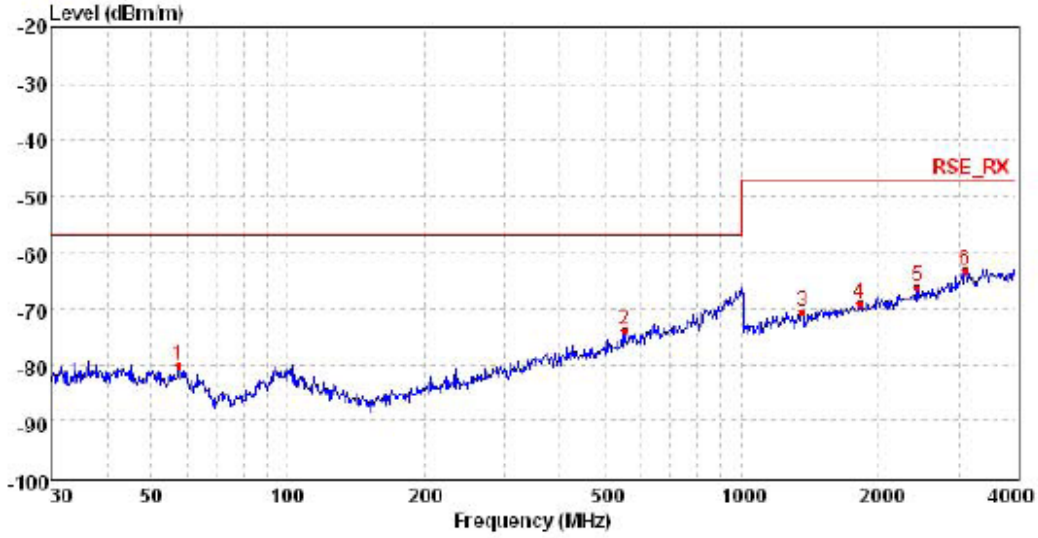
The EUT has met the requirements of 3GPP2 C.S0011-A's requirement.

GSM900			
Test mode:	Idle mode	Test condition:	Normal Voltage
Channel:	Middle	Polarity:	*Horizontal*



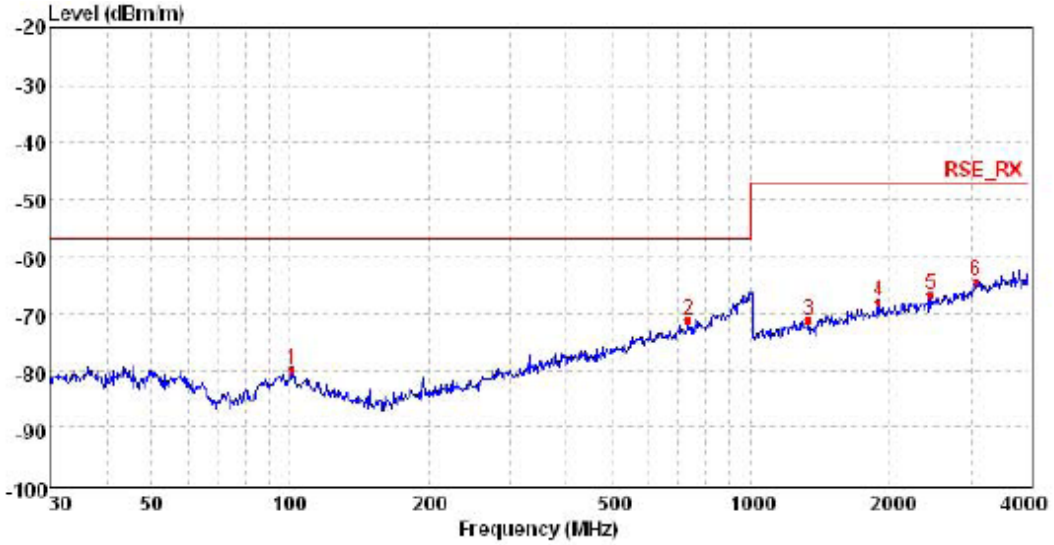
Mark	Frequency MHz	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	94.74	-78.43	25.37	0.96	28.46	-80.56	-57.00	-23.56	Peak
2	565.37	-78.44	31.04	2.75	28.82	-73.47	-57.00	-16.47	Peak
3	1227.74	-78.82	39.20	4.60	36.55	-71.57	-47.00	-24.57	Peak
4	1717.13	-78.57	40.52	5.64	37.03	-69.44	-47.00	-22.44	Peak
5	2234.57	-78.19	41.71	6.57	37.45	-67.36	-47.00	-20.36	Peak
6	2871.89	-78.45	43.06	7.89	37.91	-65.41	-47.00	-18.41	Peak

Test mode:	Idle mode	Test condition:	Normal Voltage
Channel:	Middle	Polarity:	Vertical



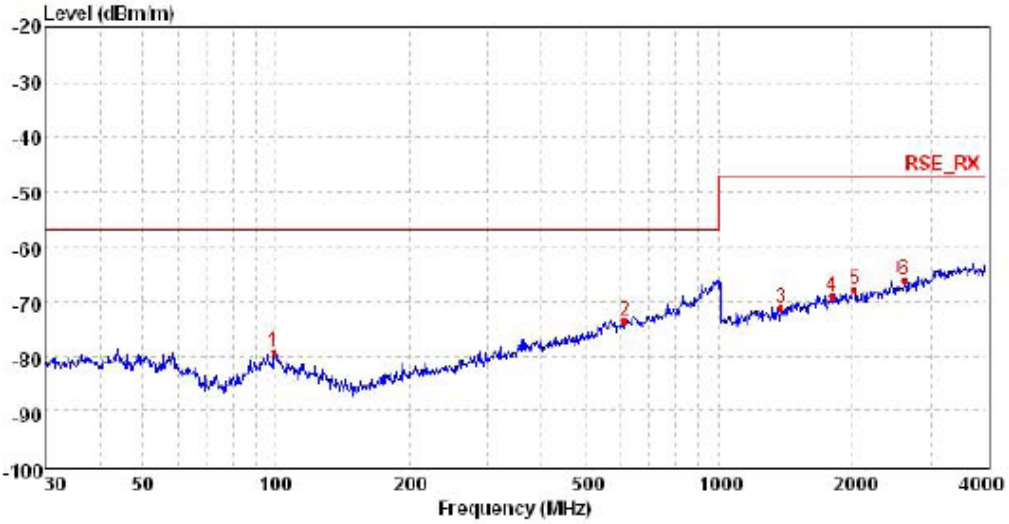
Mark	Frequency MHz	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	57.50	-78.12	25.74	0.74	28.43	-80.07	-57.00	-23.07	Peak
2	553.57	-78.58	30.84	2.70	28.83	-73.87	-57.00	-16.87	Peak
3	1364.15	-78.26	39.65	4.90	36.70	-70.41	-47.00	-23.41	Peak
4	1830.20	-78.59	40.75	5.86	37.12	-69.10	-47.00	-22.10	Peak
5	2448.67	-77.74	42.25	6.90	37.62	-66.21	-47.00	-19.21	Peak
6	3090.84	-76.93	43.37	8.30	37.99	-63.25	-47.00	-16.25	Peak

GSM1800			
Test mode:	Idle mode	Test condition:	Normal Voltage
Channel:	Middle	Polarity:	*Horizontal*



Mark	Frequency MHz	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	100.93	-78.40	26.00	0.99	28.47	-79.88	-57.00	-22.88	Peak
2	735.99	-78.30	32.50	3.21	28.59	-71.18	-57.00	-14.18	Peak
3	1343.50	-79.04	39.59	4.86	36.67	-71.26	-47.00	-24.26	Peak
4	1900.00	-77.69	40.87	5.98	37.17	-68.01	-47.00	-21.01	Peak
5	2475.98	-78.35	42.29	6.94	37.64	-66.76	-47.00	-19.76	Peak
6	3073.75	-78.07	43.35	8.27	37.99	-64.44	-47.00	-17.44	Peak

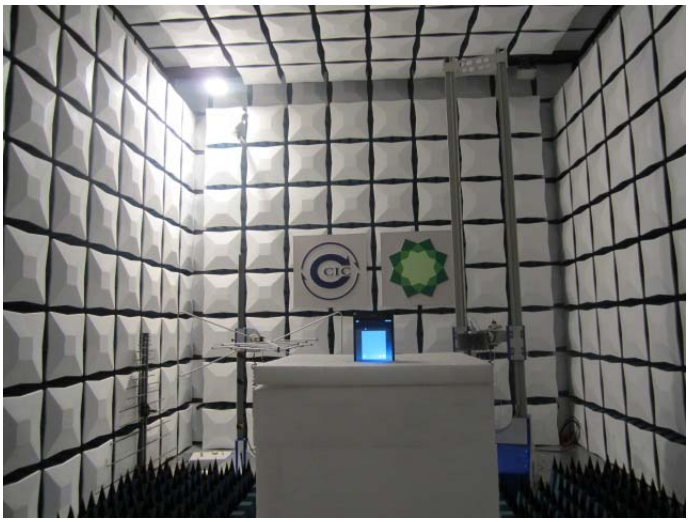
Test mode:	Idle mode	Test condition:	Normal Voltage
Channel:	Middle	Polarity:	Vertical



Mark	Frequency MHz	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	99.17	-77.75	25.92	0.98	28.46	-79.31	-57.00	-22.31	Peak
2	615.16	-79.48	31.71	2.90	28.74	-73.61	-57.00	-16.61	Peak
3	1390.88	-79.20	39.73	4.96	36.72	-71.23	-47.00	-24.23	Peak
4	1812.52	-78.46	40.71	5.82	37.11	-69.04	-47.00	-22.04	Peak
5	2030.73	-78.00	41.13	6.21	37.28	-67.94	-47.00	-20.94	Peak
6	2617.16	-78.31	42.60	7.28	37.74	-66.17	-47.00	-19.17	Peak

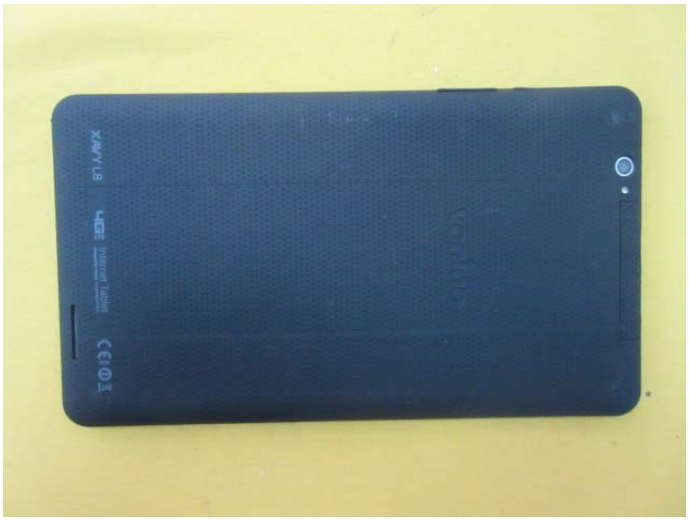
Note: The radiated spurious are performed the each test Voltage mode, the datum recorded is the worst case for all the mode at Normal Voltage type.

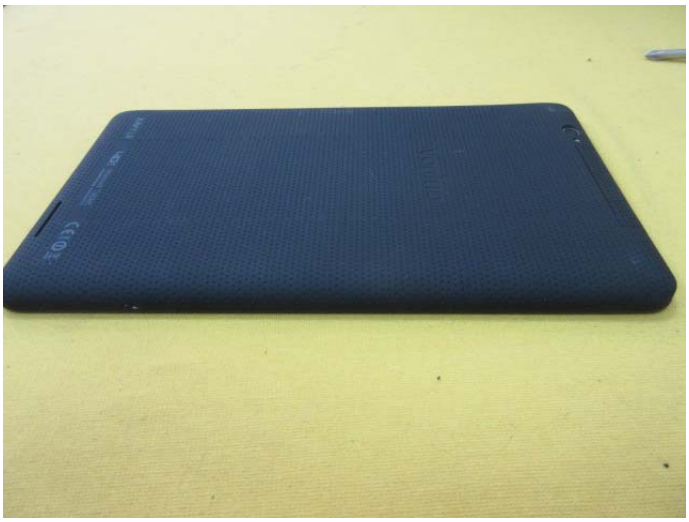
6. Test Setup Photos of the EUT



7. External and Internal Photos of the EUT

External photos of the EUT



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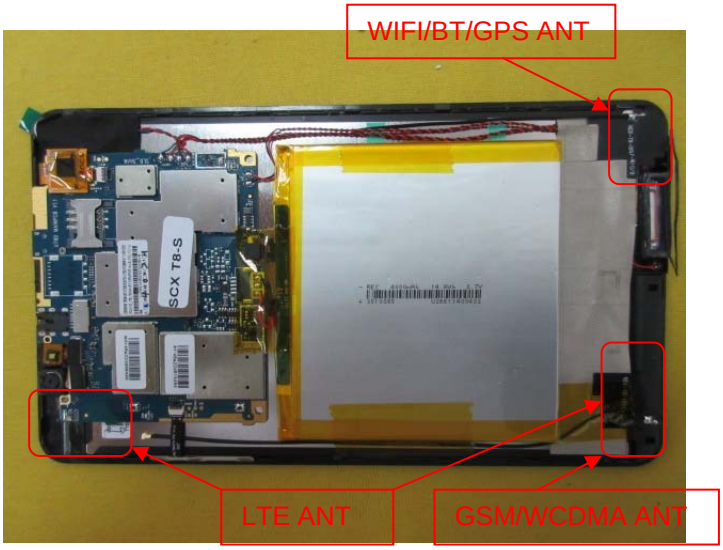
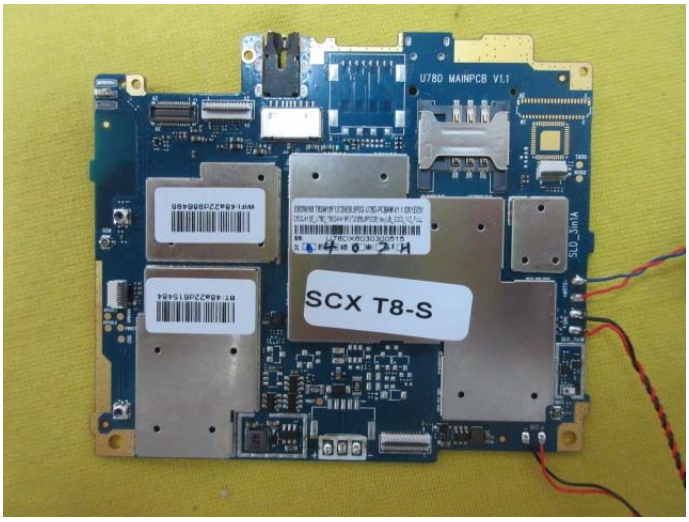
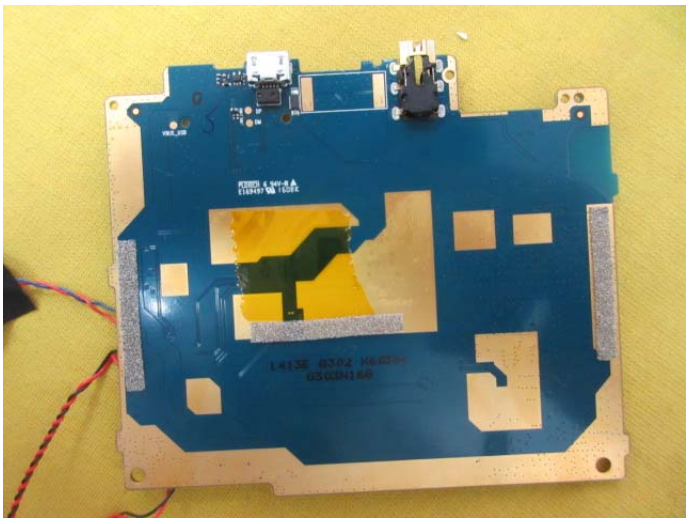
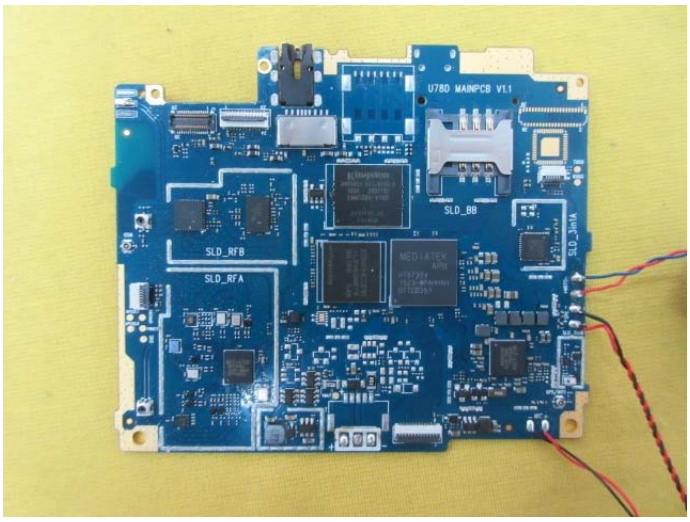
Internal photos of the EUT




U78D MAINPCB V1.1
SCX T8-S
SLD_3inA




U78D MAINPCB V1.1
SLD_BB
SLD_RFB
SLD_RFA
SLD_3inA

----------End of Report----------