



47 CFR PART 22 SUBPART H & 24 SUBPART E

TEST REPORT

of

GSM/GPRS 850/900/1800/1900 Module

Model Name: M10
Brand Name: QUECTEL
Report No.: SH09070021AR02
FCC ID: XMR-16182009002

prepared for

Quectel Wireless Solutions Co.,Ltd

Room 801, Building E, No 1618 Yishan Road, Shanghai, China, 201103

prepared by

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TABLE OF CONTENTS

1. TEST CERTIFICATION4

2. GENERAL INFORMATION5

2.1 EUT Description5

2.2 Test Standards and Results7

2.3 Facilities and Accreditations8

2.3.1 Facilities8

2.3.2 Test Environment Conditions8

3. 47 CFR PART 2, PART 22H REQUIREMENTS9

3.1 Frequencies9

3.1.1 Requirement9

3.1.2 Test Description9

3.1.3 Test Result10

3.2 Conducted RF Output Power15

3.2.1 Requirement15

3.2.2 Test Description15

3.2.3 Test Result15

3.3 20dB Occupied Bandwidth22

3.3.1 Definition22

3.3.2 Test Description22

3.3.3 Test Verdict22

3.4 Frequency Stability29

3.4.1 Requirement29

3.4.2 Test Description29

3.4.3 Test Verdict29

3.5 Conducted Out of Band Emissions31

3.5.1 Requirement31

3.5.2 Test Description31

3.5.3 Test Result31

3.6 Band Edge44

3.6.1 Requirement44

3.6.2 Test Description44



3.6.3	Test Result	44
3.7	Transmitter Radiated Power (EIRP/ERP).....	49
3.7.1	Requirement	49
3.7.2	Test Description	49
3.7.3	Test Result.....	50
3.8	Radiated Out of Band Emissions.....	57
3.8.1	Requirement	57
3.8.2	Test Description	57
3.8.3	Test Result.....	57
Appendix I:	Photograph of the Test Setup	58
Appendix II:	Photograph of the EUT.....	58



1. TEST CERTIFICATION

Equipment under Test: GSM/GPRS 850/900/1800/1900 Module

Brand Name: QUECTEL
 Model Name: M10
 FCC ID: XMR-16182009002
 Applicant: Quectel Wireless Solutions Co.,Ltd
 Room 801, Building E, No 1618 Yishan Road,
 Shanghai, China, 201103
 Manufacturer: Quectel Wireless Solutions Co.,Ltd
 Room 801, Building E, No 1618 Yishan Road,
 Shanghai, China, 201103

Test Standards: 47 CFR Part 2
 47 CFR Part 22 Subpart H
 47 CFR Part 24 Subpart E

Test Date(s): July 25, 2009 – July 31, 2009

Test Result: PASS

* We Hereby Certify That:

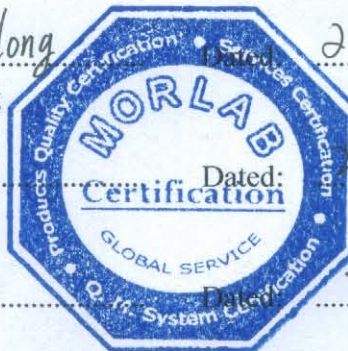
The equipment under test was tested by Shenzhen Electronic Product Quality Testing Center Morlab Laboratory. The test data, data evaluation, test procedures and equipment configurations shown in this report were made in accordance with the requirement of related FCC rules.

The test results of this report only apply for the tested sample equipment identified above. The test report shall be invalid without all the signatures of the test engineer, the reviewer and the approver.

Tested by: Huang Yunlong 2009.8.14
 Huang Yunlong

Reviewed by: Zhang Jun 2009.8.14
 Zhang Jun

Approved by: Su Feng 2009.8.14
 Su Feng



2. GENERAL INFORMATION

2.1 EUT Description

EUT Type: GSM/GPRS 850/900/1800/1900 Module
Model Name: M10
Serial No.....: N/A
IMEI: N/A
Hardware Version: V1.01
Software Version: MTK 0836
Frequency Range: GSM 850MHz:
Tx: 824.20 - 848.80MHz (at intervals of 200kHz);
Rx: 869.20 - 893.80MHz (at intervals of 200kHz)
GSM 1900MHz:
Tx: 1850.20 - 1909.80MHz (at intervals of 200kHz);
Rx: 1930.20 - 1989.80MHz (at intervals of 200kHz)
Modulation Type.....: GMSK
Emission Designators: 300KGXW
Ancillary Equipments.....: **AC Adapter**
Model Name: P-050B-B2152
Brand Name: SOMETHING HIGH
Serial No.: (n.a. marked #2 by test site)
Rated Input: ~100-240V, 300mA, 50/60Hz
Rated Output: = 5V, 2A
Manufacturer: SOMETHING HIGH ELECTRIC (XIAMEN)
Co.,Ltd.
Manufacturer Address: No.421, Xiahushe, Houkengshe Area, Huli
Industrial Park, Xiamen, China
Wire Length: 150cm
Antenna
Ant Manufacture: Shenzhen RFCN Communication Technology
Co.,Ltd
Brand: RFCN
Model Name: WT-C&G-28-90
Antenna Type: Dipole antenna
Connector: SMA
Gain(Max): 3dBi

Note 1: The transmitter (Tx) frequency arrangement of the Cellular 850MHz band used by the EUT can be represented with the formula $F(n)=824.2+0.2*(n-128)$, $128 \leq n \leq 251$; the lowest, middle, highest channel numbers (ARFCHs) used and tested in this report are separately 128

(824.2MHz), 190 (836.6MHz) and 251 (848.8MHz).

Note 2: The transmitter (Tx) frequency arrangement of the PCS 1900MHz band used by the EUT can be represented with the formula $F(n)=1850.2+0.2*(n-512)$, $512 \leq n \leq 810$; the lowest, middle and highest channel numbers (ARFCHs) used and tested in this report are separately 512 (1850.2MHz), 661 (1880.0MHz) and 810 (1909.8MHz).

Note 3: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

2.2 Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 2, Part 22 and Part 24 for the EUT FCC ID Certification:

No.	Identity	Document Title
1	47 CFR Part 2 (10-1-05 Edition)	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
2	47 CFR Part 22 (10-1-05 Edition)	Public Mobile Services
3	47 CFR Part 24 (10-1-05 Edition)	Personal Communications Services

Test detailed items/section required by FCC rules and results are as below:

No.	Section	Description	Result
1	2.106 22.905 24.229	Frequencies	PASS
2	2.1046	Conducted RF Output Power	PASS
3	2.1049	20dB Occupied Bandwidth	PASS
4	2.1055 22.355 24.235	Frequency Stability	PASS
5	2.1051 2.1057 22.917 24.238	Conducted Out of Band Emissions	PASS
6	2.1051 2.1057 22.917 24.238	Band Edge	PASS
7	22.913 24.232	Transmitter Radiated Power (EIPR/ERP)	PASS
8	2.1053 2.1057 22.917 24.238	Radiated Out of Band Emissions	PASS

2.3 Facilities and Accreditations

2.3.1 Facilities

Shenzhen Electronic Product Quality Testing Center Morlab Laboratory is a testing organization accredited by China National Accreditation Board for Laboratories (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L1659.

All measurement facilities used to collect the measurement data are located at Electronic Testing Building, Shahe Road, Xili, Nanshan District, Shenzhen 518055 CHINA. The test site is constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22; the FCC registration number is 741109.

2.3.2 Test Environment Conditions

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

Temperature (°C):	20 - 25
Relative Humidity (%):	40 - 60
Atmospheric Pressure (kPa):	960

3. 47 CFR PART 2, PART 22H REQUIREMENTS

3.1 Frequencies

3.1.1 Requirement

According to FCC section 22.905, the frequency blocks assignment for the cellular radiotelephone service is listed as below:

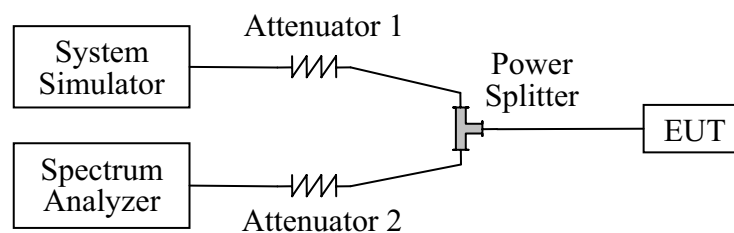
- (a) Channel Block A:
Mobile 824 - 835MHz, Base 869 - 880MHz;
Mobile 845 - 846.5MHz, Base 890 - 891.5MHz
- (b) Channel Block B:
Mobile 835 - 845 MHz, Base 880 - 890MHz;
Mobile 846.5 - 849 MHz, Base 891.5 - 894MHz

According to FCC section 24.229, the frequencies available in the Broadband PCS services are listed as below, in accordance with the frequency allocations table of FCC section 2.106.

- (a) The following frequency blocks are available for assignment on an MTA basis:
Block A: 1850 - 1865MHz paired with 1930 - 1945MHz;
Block B: 1870 - 1885MHz paired with 1950 - 1965MHz.
- (b) The following frequency blocks are available for assignment on a BTA basis:
Block C: 1895 - 1910 MHz paired with 1975 - 1990MHz;
Block D: 1865 - 1870 MHz paired with 1945 - 1950MHz;
Block E: 1885 - 1890 MHz paired with 1965 - 1970MHz;
Block F: 1890 - 1895 MHz paired with 1970 - 1975MHz.

3.1.2 Test Description

1. Test Setup:



The EUT, which is powered by the Battery, is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna

terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power i.e. Power Control Level (PCL) = 5 and Power Class = 4. A call is established between the EUT and the SS.

2. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
System Simulator	Anritsu	MT8820A	6100255046	2009.06	1year
Spectrum Analyzer	Rohde-Schwarz	FSEM	DE23811	2009.07	1year
Power Splitter	Weinschel	1506A	NW521	(n.a.)	(n.a.)
Attenuator 1	Resnet	20dB	(n.a.)	(n.a.)	(n.a.)
Attenuator 2	Resnet	3dB	(n.a.)	(n.a.)	(n.a.)

3.1.3 Test Result

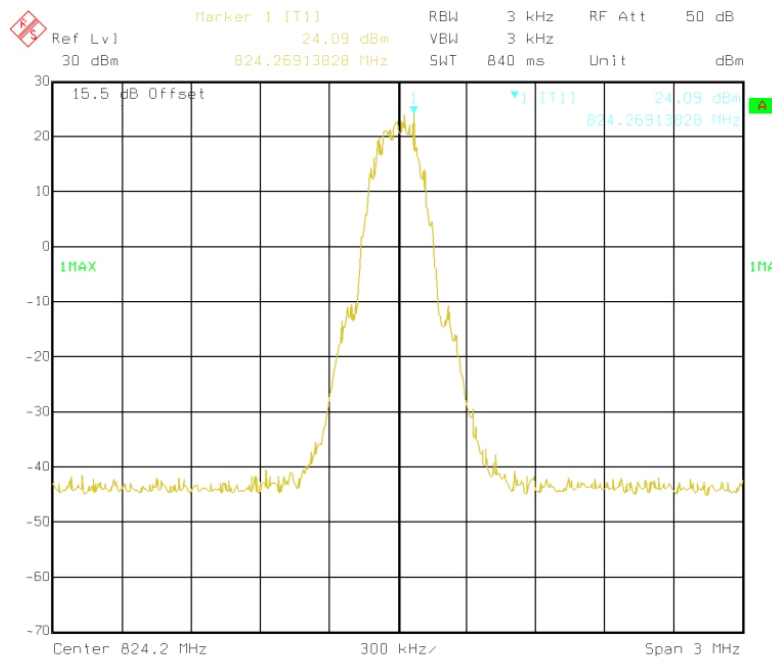
The Tx frequency arrangement of the Cellular 850MHz band employed by the EUT should be from 824.2MHz to 848.8MHz (the corresponding frequency block is from 824MHz to 849MHz), and Tx frequency arrangement of the PCS 1900MHz band employed by the EUT should be from 1850.2MHz to 1909.8MHz (the corresponding frequency block is from 1850MHz to 1910MHz). Here the lowest and highest channels are tested to verify the EUT's using the frequency block required.

1. Test Verdict:

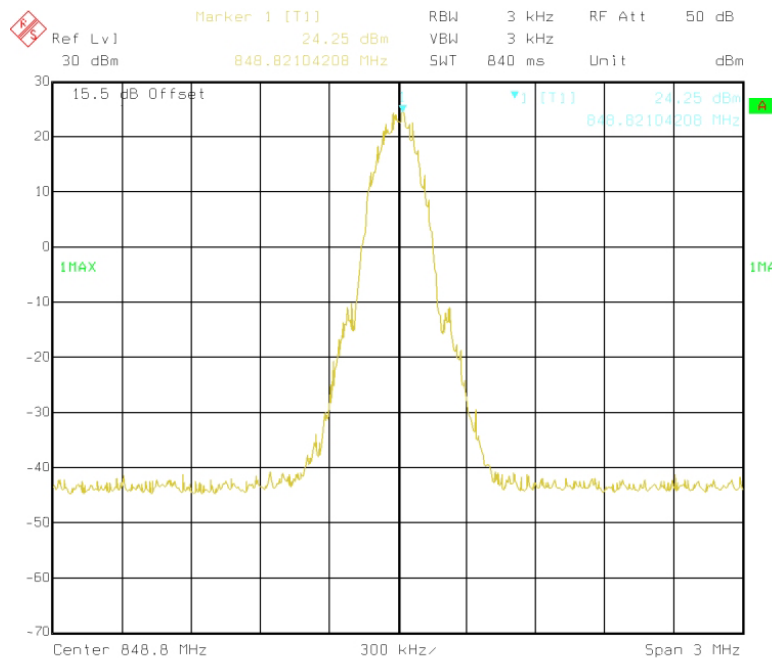
The required frequency block is employed legally, the verdict is PASS.

Band	Channel	Frequency (MHz)	Measured Carrier (dBm)	Refer to Plot
GSM 850MHz	128	824.2	24.09	Plot A1
	251	848.8	24.25	Plot B1
GSM 1900MHz	512	1850.2	20.26	Plot C1
	810	1909.8	20.37	Plot D1
GPRS 850MHz	128	824.2	22.30	Plot A2
	251	848.8	22.40	Plot B2
GPRS 1900MHz	512	1850.2	18.61	Plot C2
	810	1909.8	18.50	Plot D2

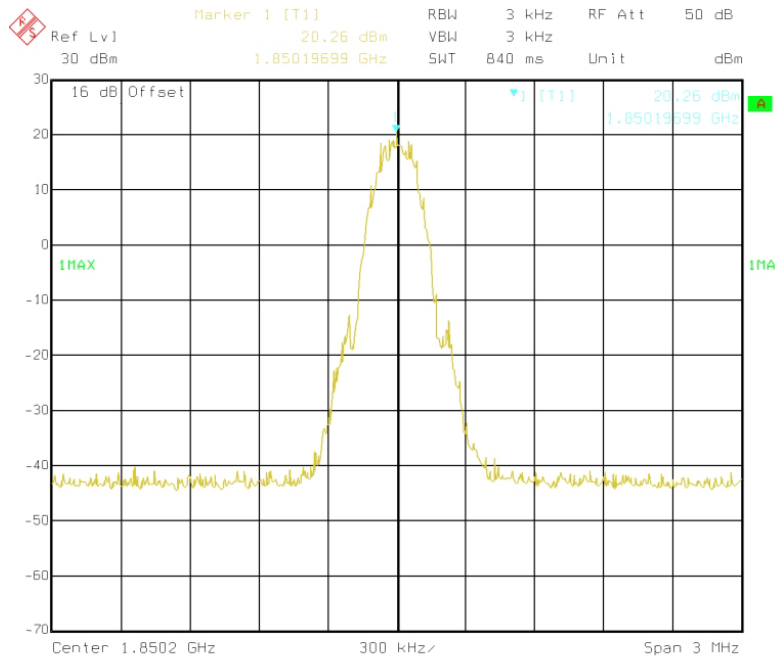
2. Test Plot of GSM:



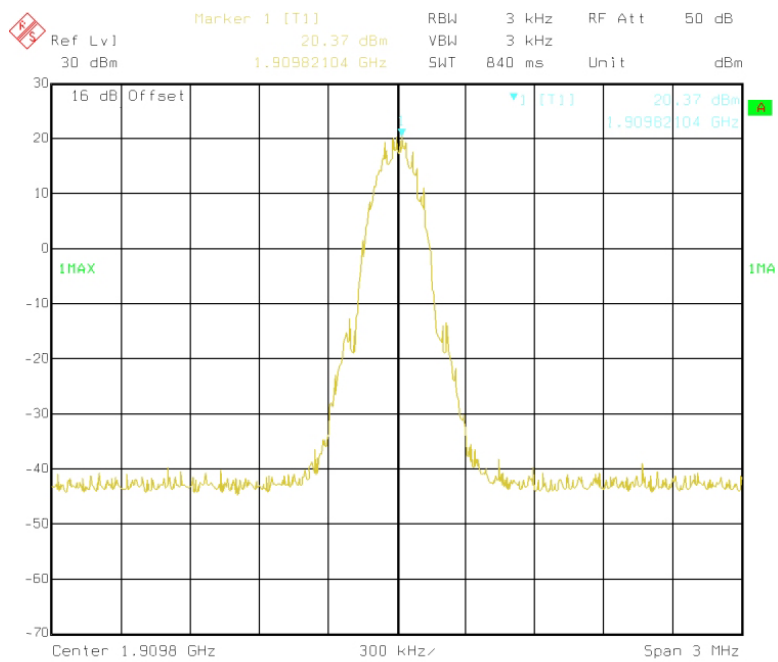
(Plot A1:GSM 850MHz Channel = 128)



(Plot B1:GSM 850MHz Channel = 251)

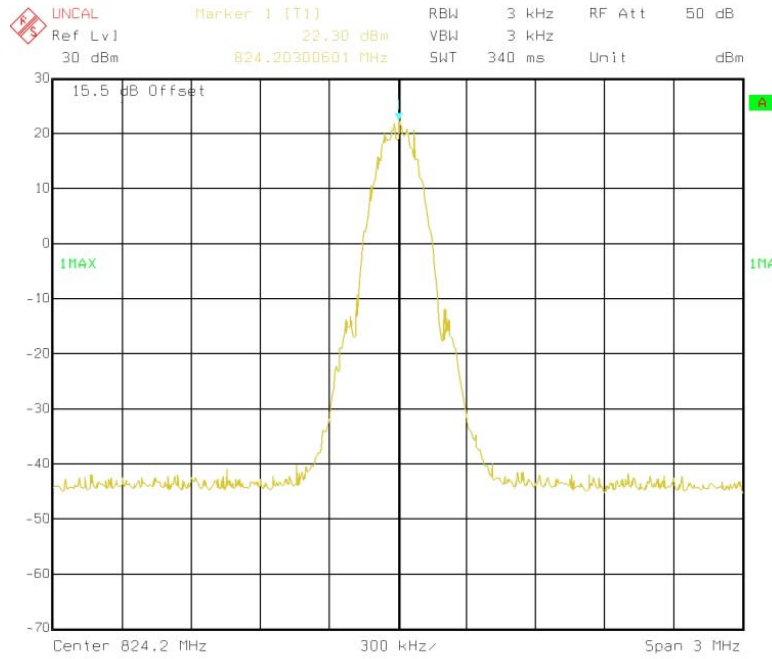


(Plot C1:GSM 1900MHz Channel = 512)

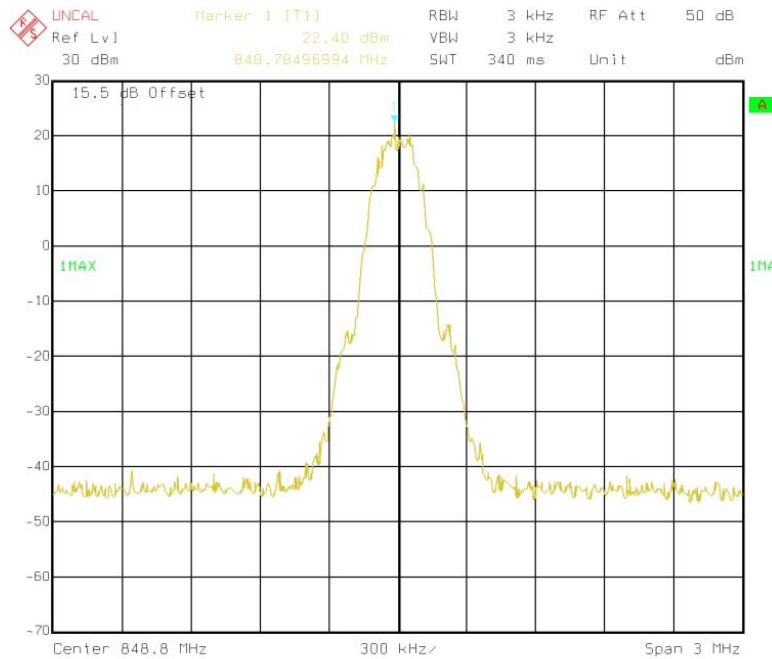


(Plot D1:GSM 1900MHz Channel = 810)

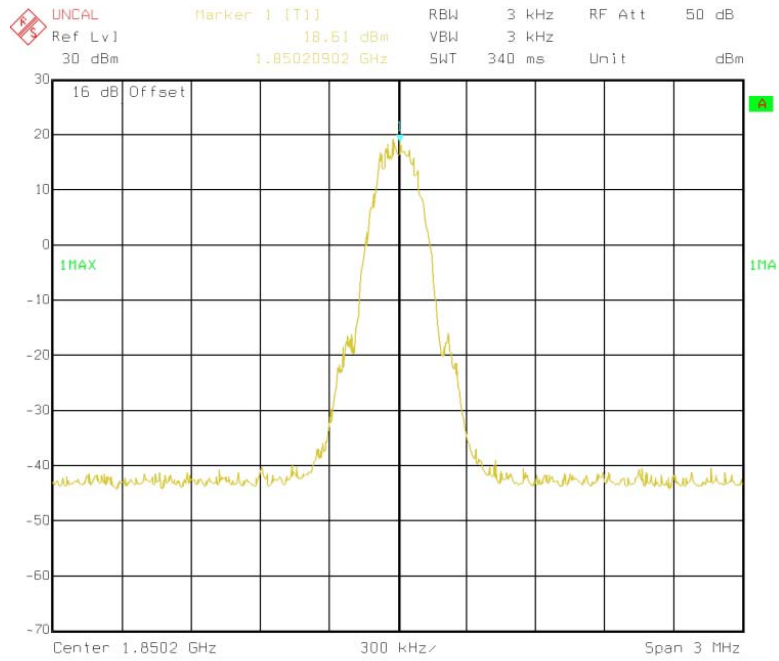
3. Test Plot of GPRS:



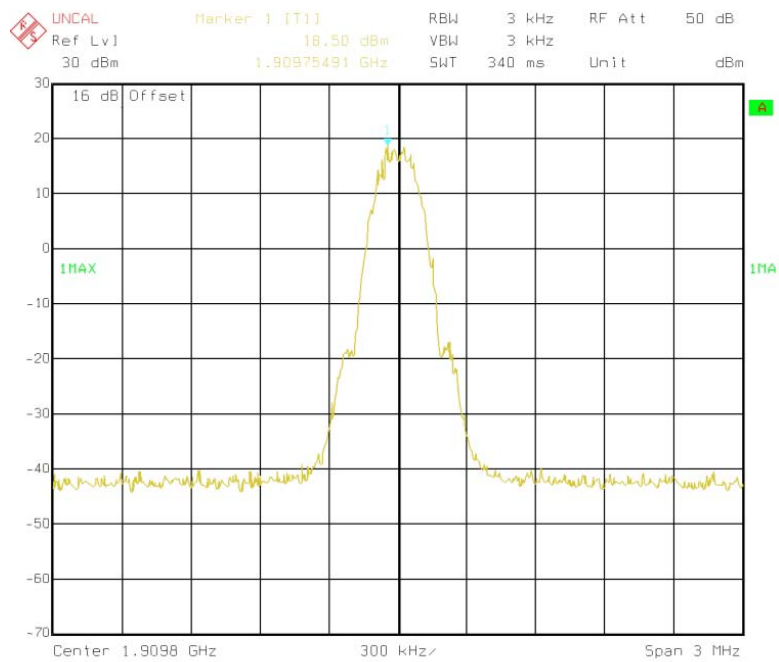
(Plot A2: GPRS 850MHz Channel =128)



(Plot B2: GPRS 850MHz Channel =251)



(Plot C2: GPRS 1900MHz Channel =512)



(Plot D2: GPRS 1900MHz Channel =810)

3.2 Conducted RF Output Power

3.2.1 Requirement

According to FCC section 2.1046(a), for transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in FCC section 2.1033(c)(8).

3.2.2 Test Description

See section 3.1.2 of this report.

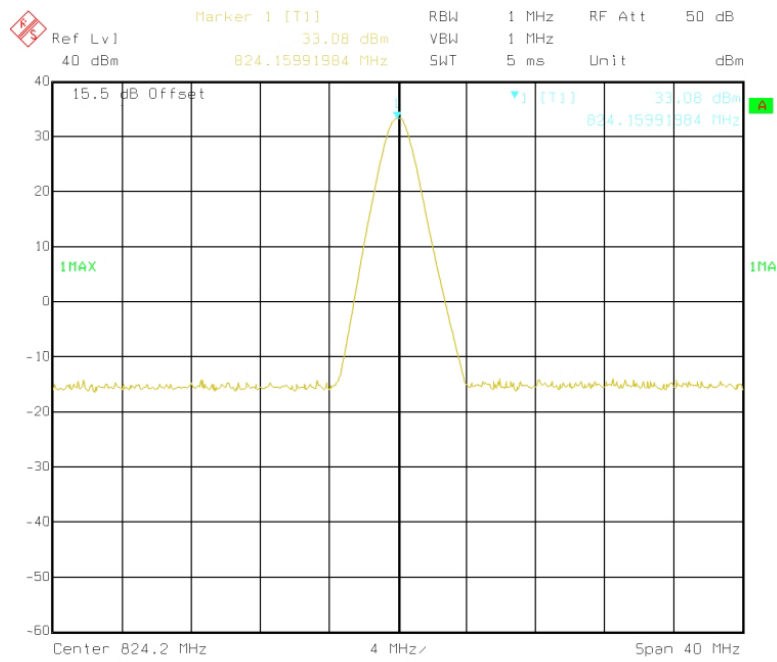
3.2.3 Test Result

Here the lowest, middle and highest channels are selected to perform testing to verify the conducted RF output power of the EUT. For the GSM 850MHz operates at PCL=5 (where Power Class is 4), the rated conducted RF output power is 33dBm within the tolerance of ± 3 dB, and For the GSM 1900MHz operates at PCL=0 (where Power Class is 1), the rated conducted RF output power is 30dBm within the tolerance of ± 3 dB.

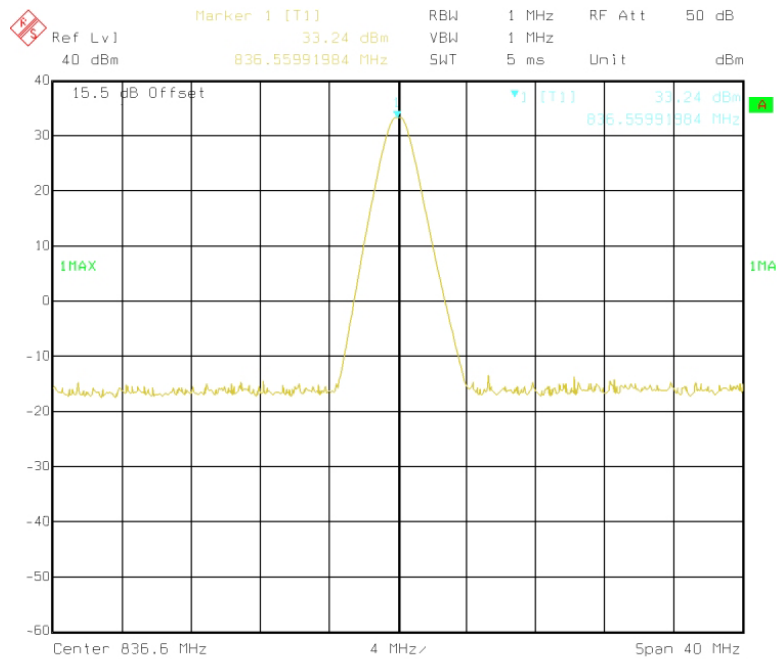
1. Test Verdict:

Band	Channel	Frequency (MHz)	Measured Output Power		Rated Output Power		Verdict
			dBm	Refer to Plot	dBm	Tolerance (dB)	
GSM 850MHz	128	824.2	33.08	Plot A1	33	± 3	PASS
	190	836.6	33.24	Plot B1			PASS
	251	848.8	33.05	Plot C1			PASS
GSM 1900MHz	512	1850.2	29.39	Plot D1	30	± 3	PASS
	661	1880.0	29.58	Plot E1			PASS
	810	1909.8	29.86	Plot F1			PASS
GPRS 850MHz	128	824.2	29.53	Plot A2	33	± 3	PASS
	190	836.6	29.58	Plot B2			PASS
	251	848.8	29.41	Plot C2			PASS
GPRS 1900MHz	512	1850.2	26.45	Plot D2	30	± 3	PASS
	661	1880.0	26.59	Plot E2			PASS
	810	1909.8	26.95	Plot F2			PASS

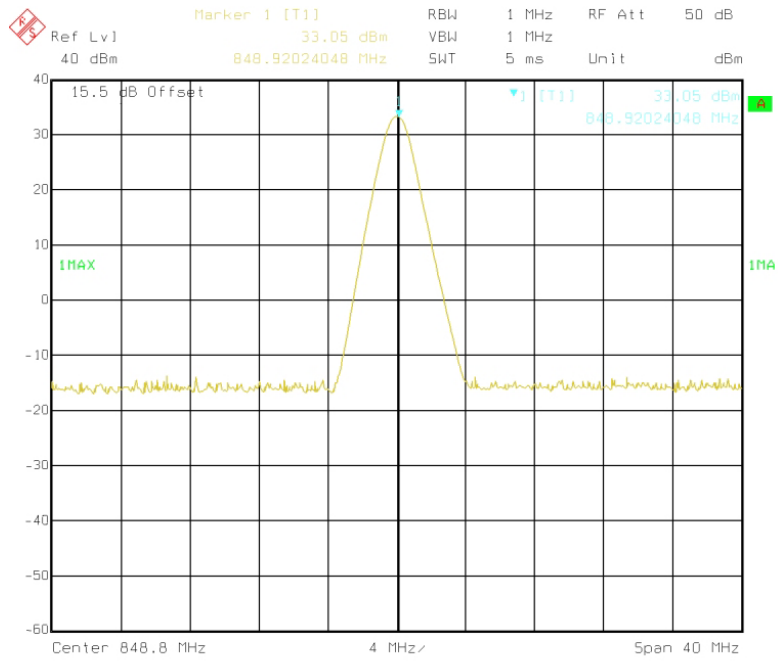
2. Test Plot of GSM



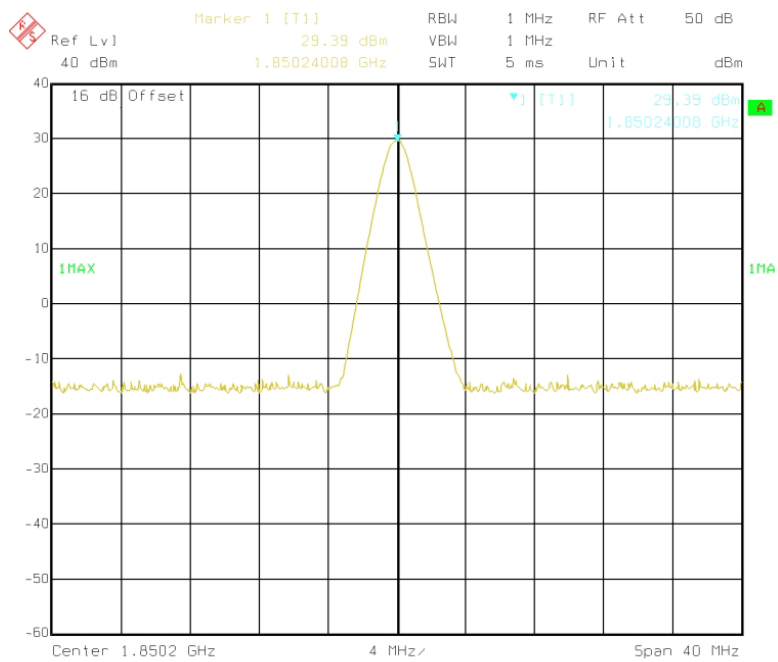
(Plot A1:GSM 850MHz Channel = 128)



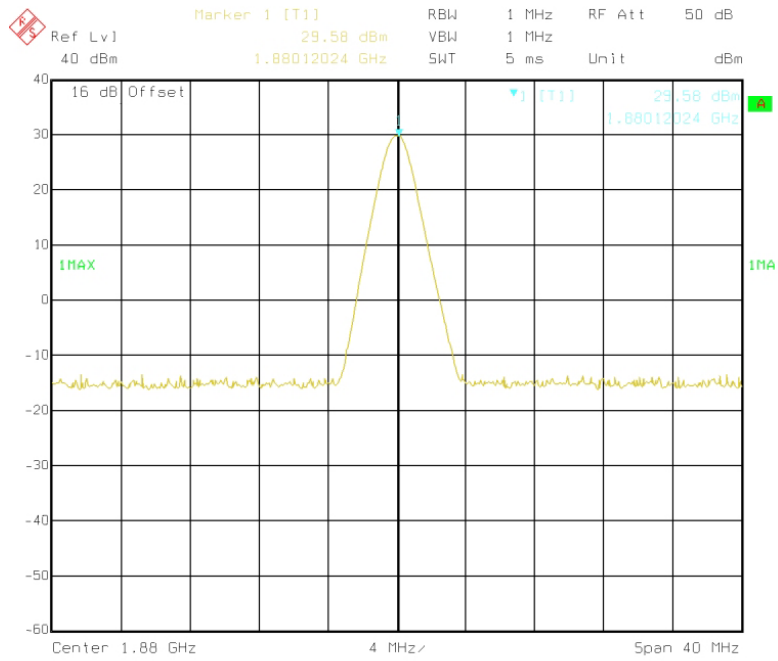
(Plot B1:GSM 850MHz Channel = 190)



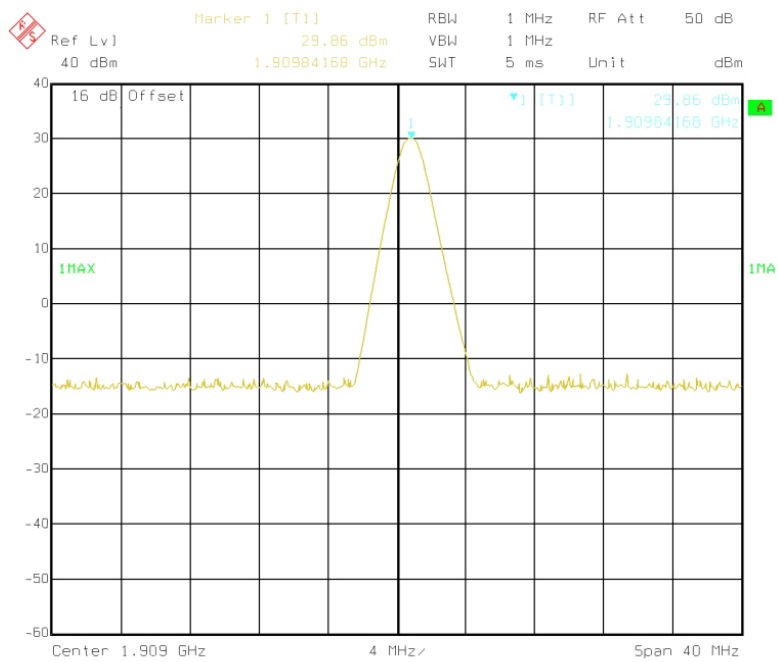
(Plot C1:GSM 850MHz Channel = 251)



(Plot D1:GSM 1900MHz Channel = 512)

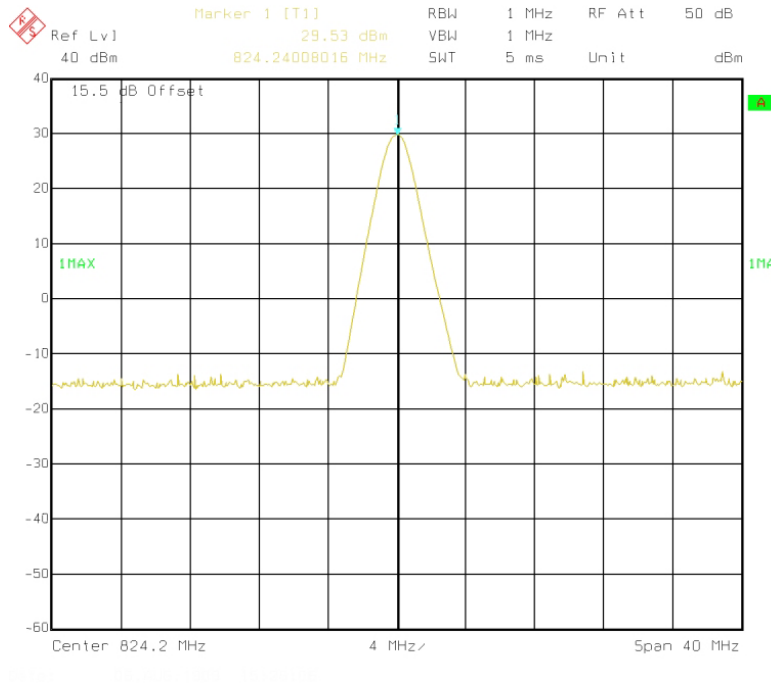


(Plot E1:GSM 1900MHz Channel = 661)

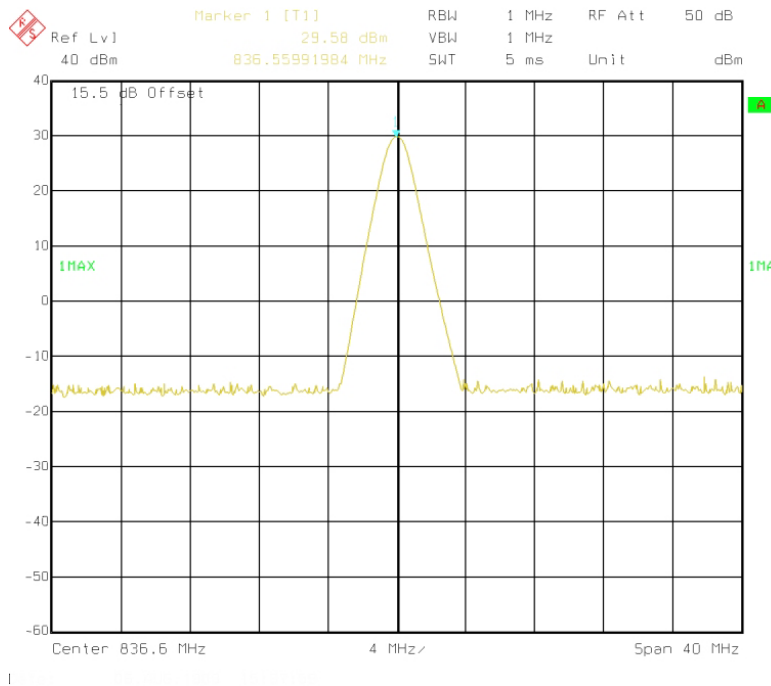


(Plot F1:GSM 1900MHz Channel = 810)

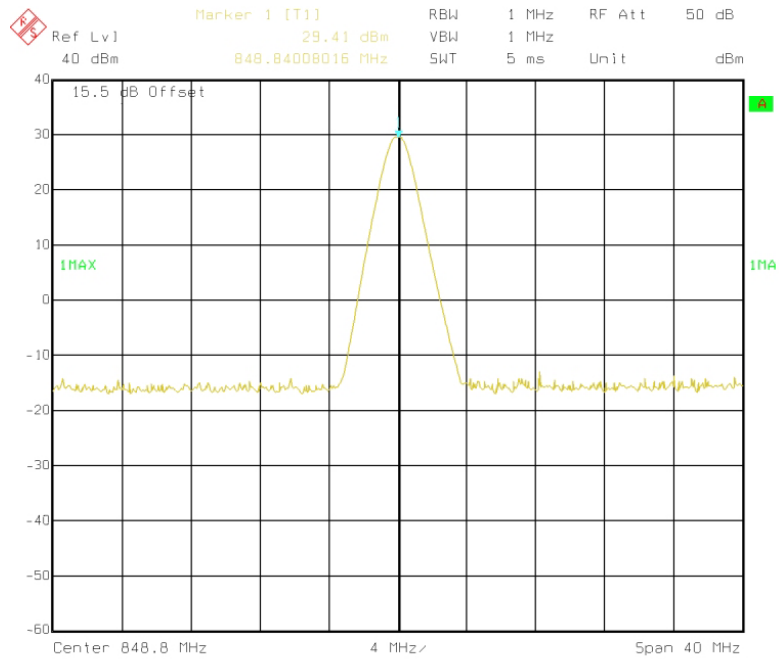
3. Test Plot of GPRS



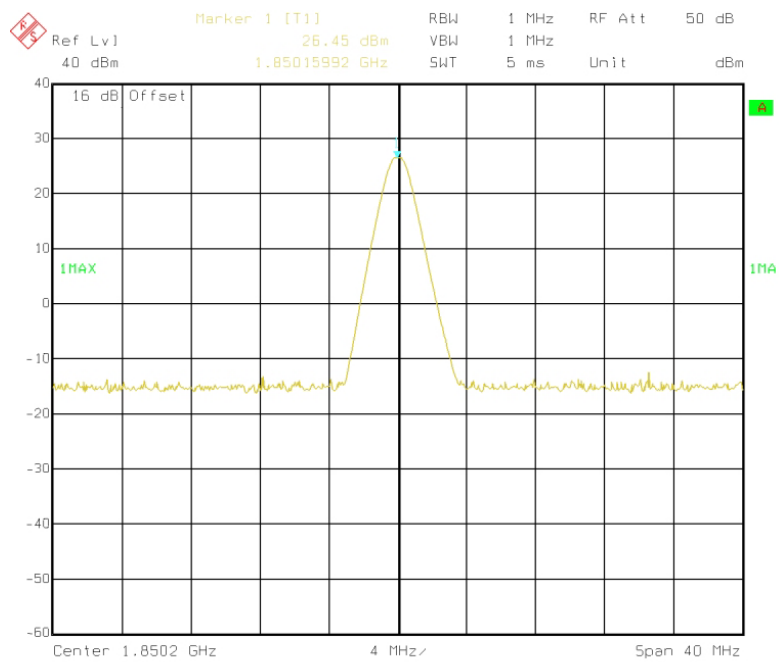
(Plot A2: GPRS 850MHz Channel =128)



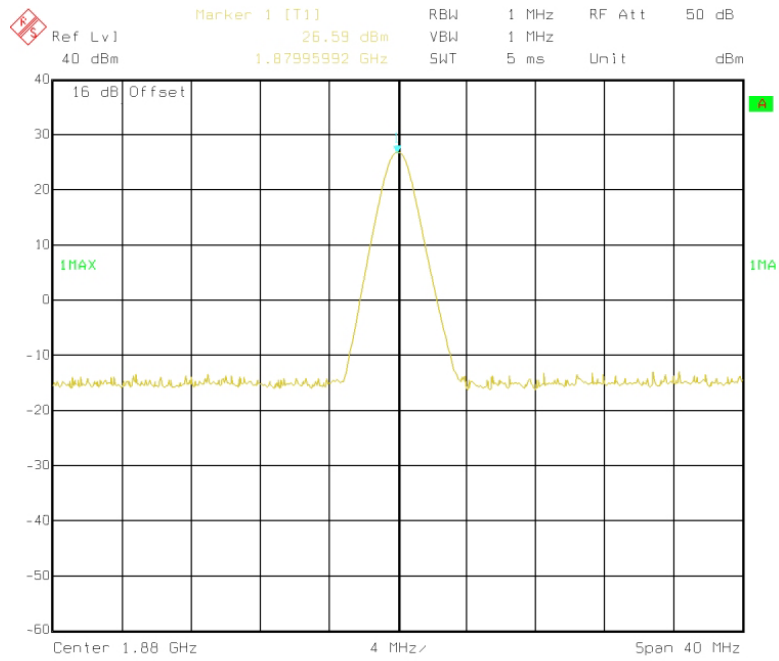
(Plot B2: GPRS 850MHz Channel =190)



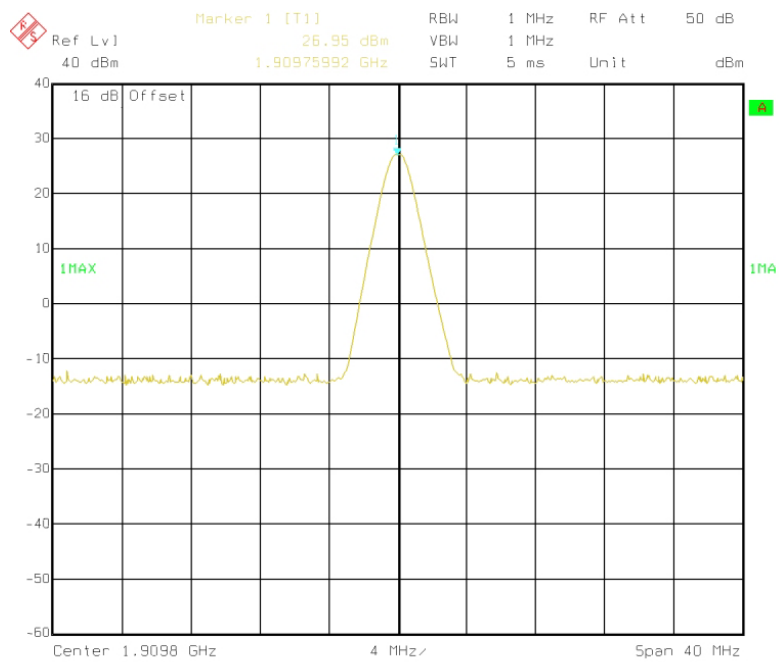
(Plot C2: GPRS 850MHz Channel =251)



(Plot D2: GPRS 1900MHz Channel =512)



(Plot E2: GPRS 1900MHz Channel =661)



(Plot F2: GPRS 1900MHz Channel =810)

3.3 20dB Occupied Bandwidth

3.3.1 Definition

According to FCC section 2.1049, the occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission.

Occupied bandwidth is also known as the 99% emission bandwidth, or 20dB bandwidth ($10 \cdot \log 1\% = 20\text{dB}$) taking the total RF output power as reference.

3.3.2 Test Description

See section 3.1.2 of this report.

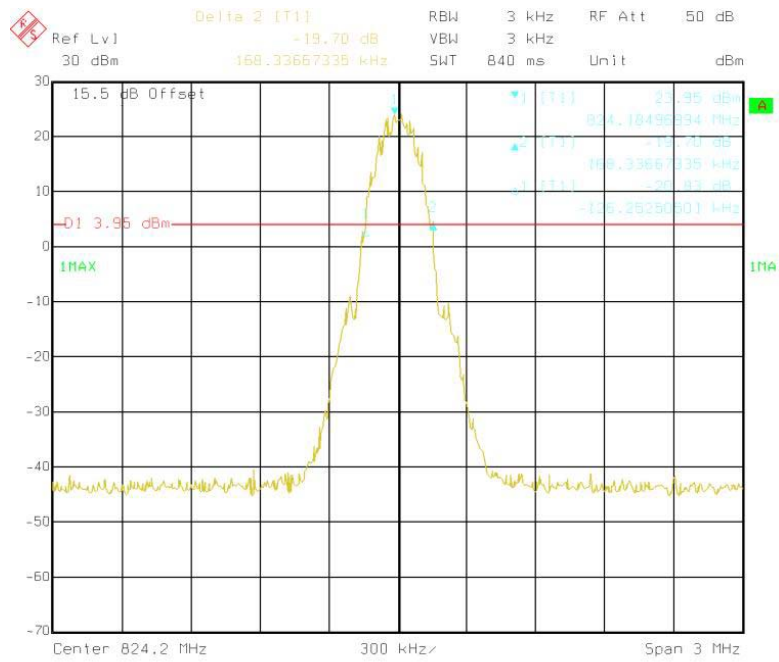
3.3.3 Test Verdict

Here the lowest, middle and highest channels are tested to record the 20dB occupied bandwidth, it's about 300kHz.

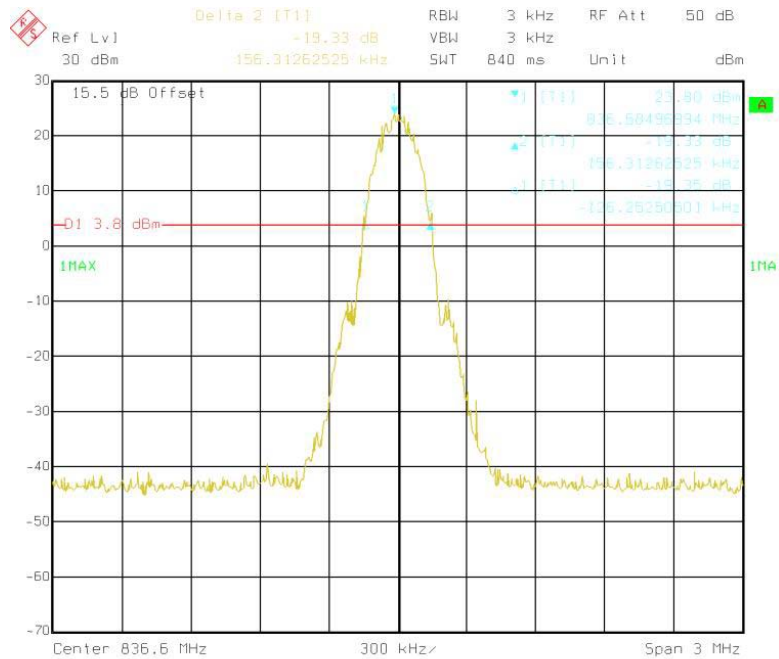
1. Test Verdict:

Band	Channel	Frequency (MHz)	Measured 20dB Occupied Bandwidth (kHz)	Refer to Plot
GSM 850MHz	128	824.2	294	Plot A1
	190	836.6	282	Plot B1
	251	848.8	288	Plot C1
GSM 1900MHz	512	1850.2	282	Plot D1
	661	1880.0	288	Plot E1
	810	1909.8	276	Plot F1
GPRS 850MHz	128	824.2	294	Plot A2
	190	836.6	276	Plot B2
	251	848.8	294	Plot C2
GPRS 1900MHz	512	1850.2	288	Plot D2
	661	1880.0	288	Plot E2
	810	1909.8	282	Plot F2

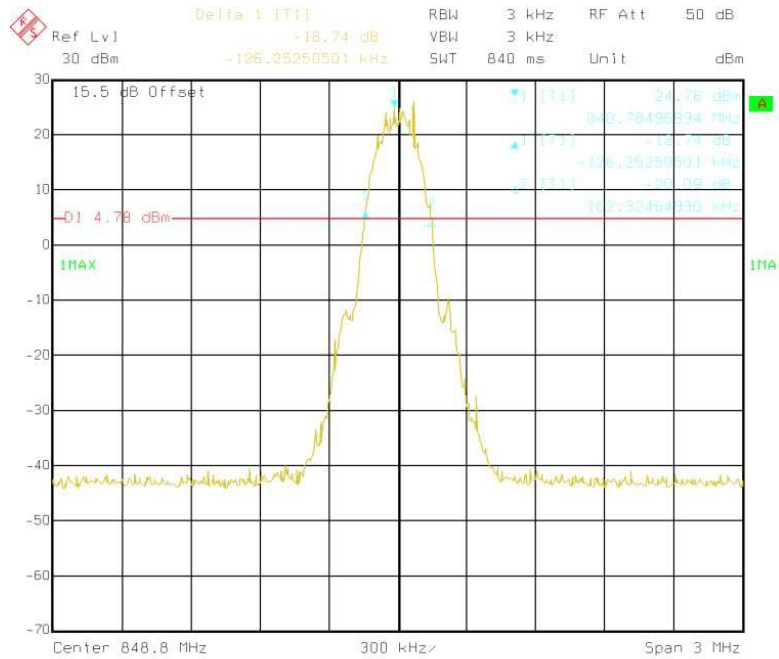
2. Test Plot of GSM



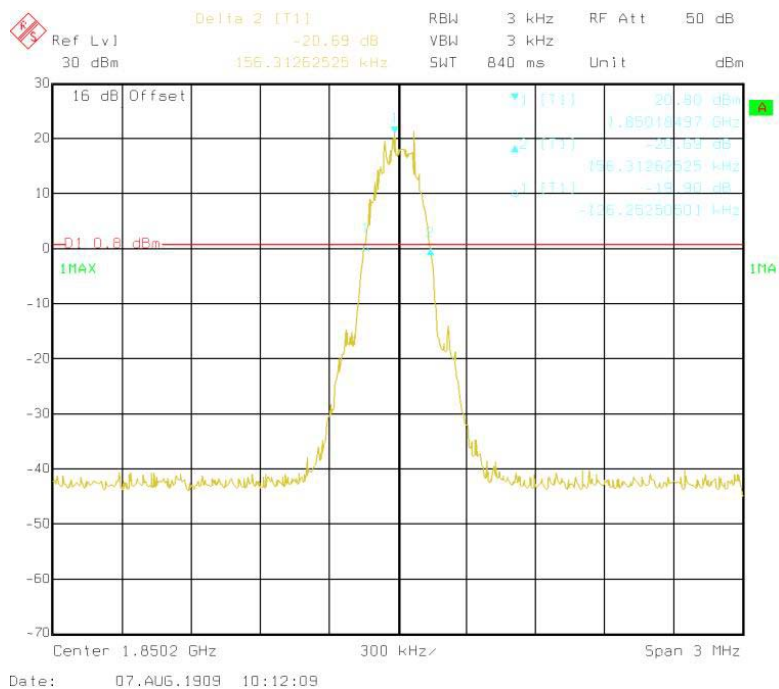
(Plot A1:GSM 850MHz Channel = 128)



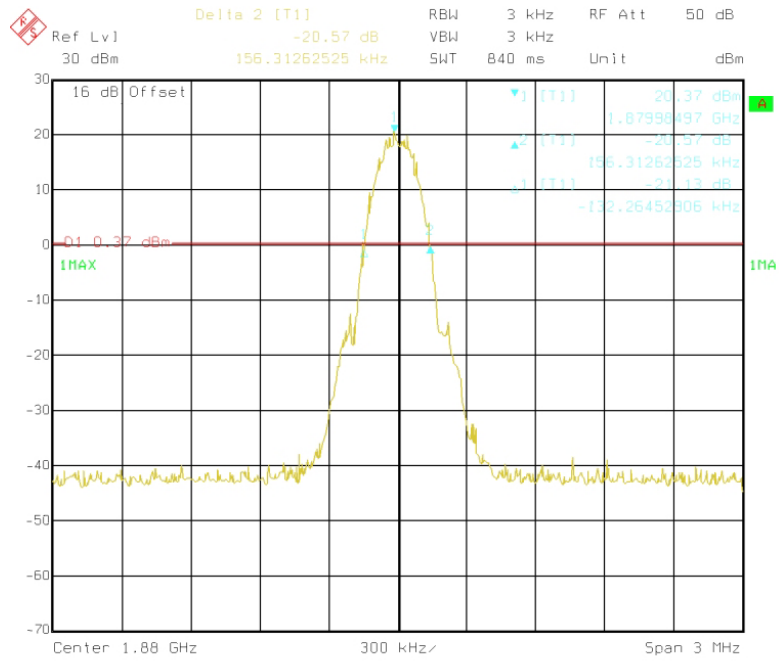
(Plot B1:GSM 850MHz Channel = 190)



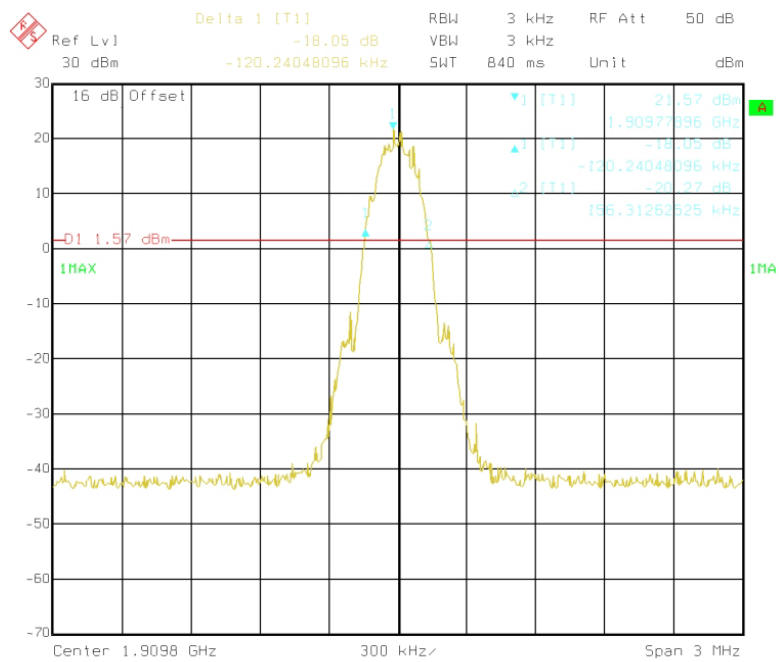
(Plot C1:GSM 850MHz Channel = 251)



(Plot D1:GSM 1900MHz Channel = 512)

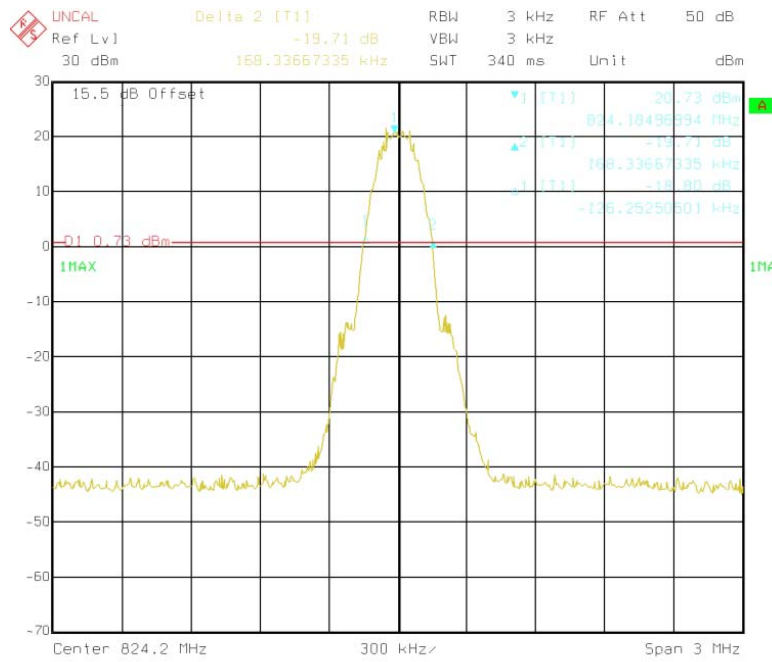


(Plot E1:GSM 1900MHz Channel = 661)

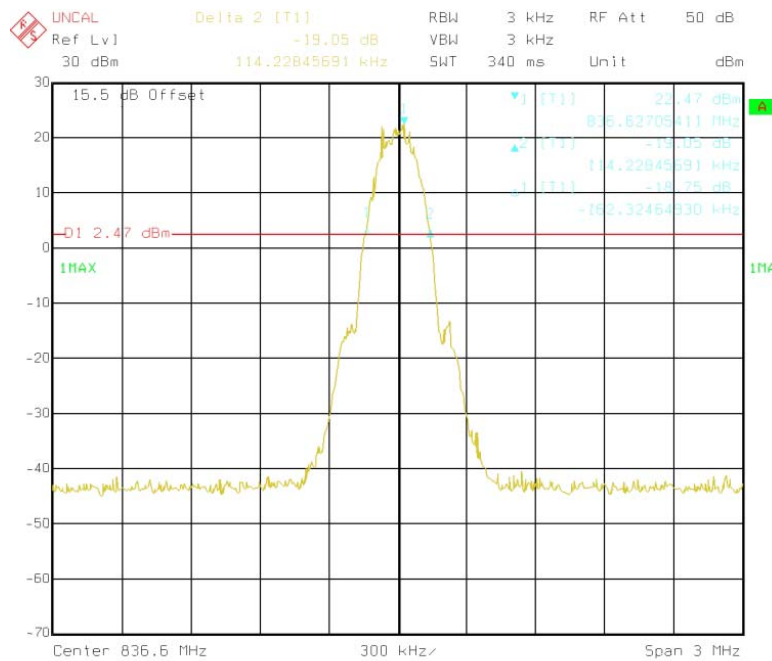


(Plot F1:GSM 1900MHz Channel = 810)

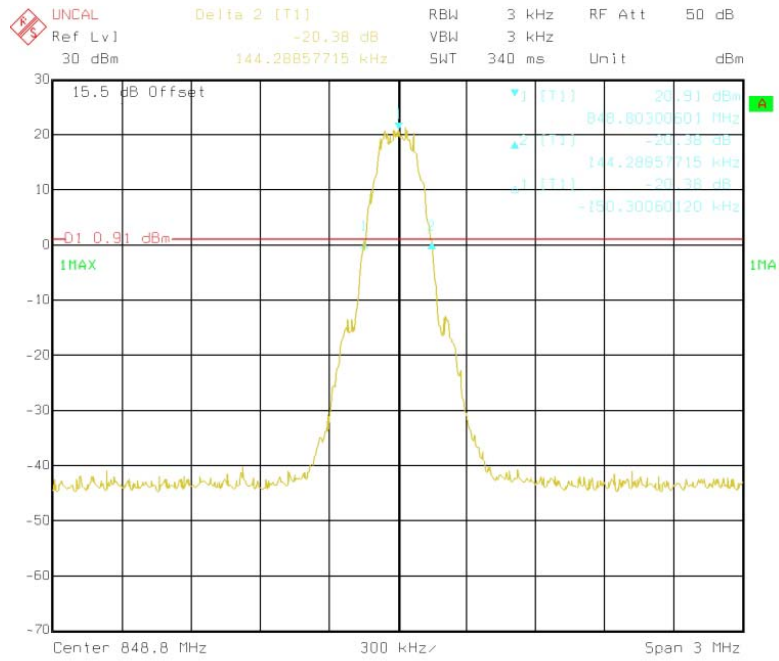
3. Test Plot of GPRS



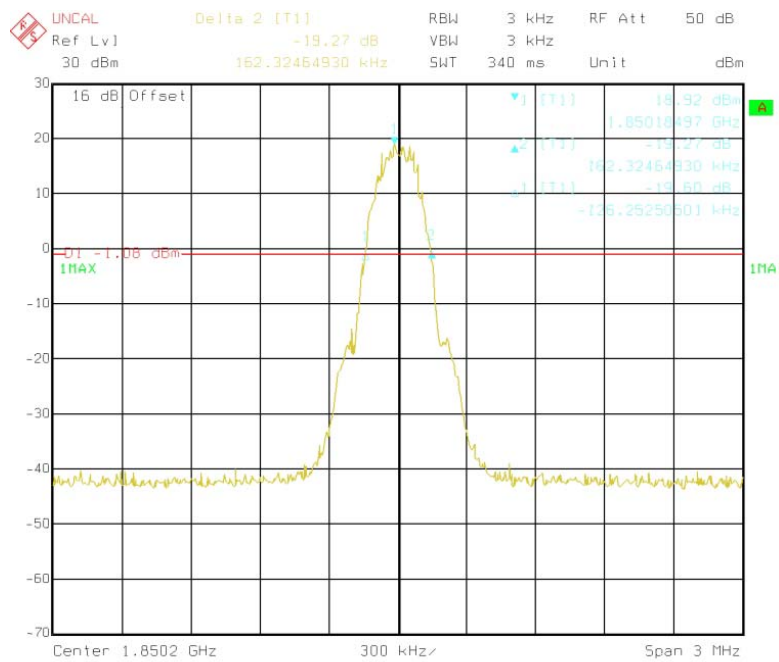
(Plot A2:GPRS 850MHz Channel = 128)



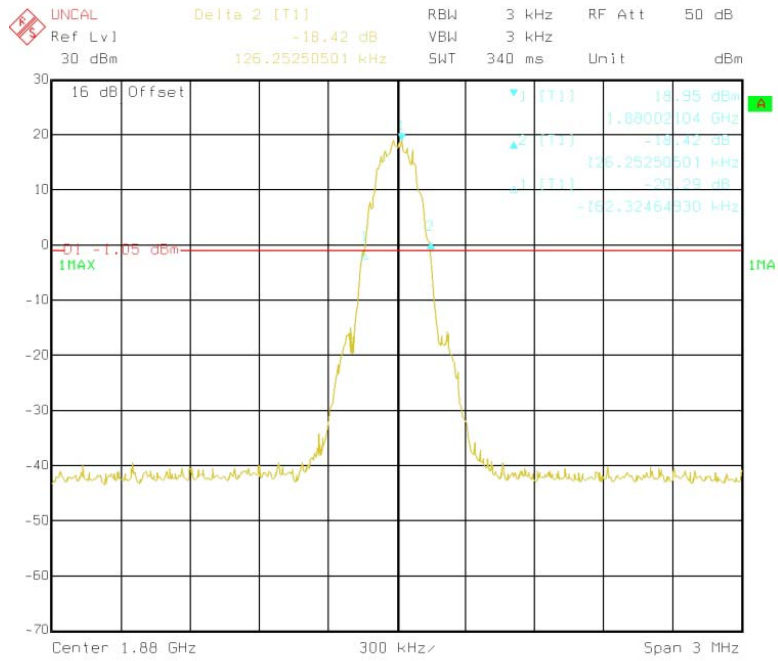
(Plot B2:GPRS 850MHz Channel = 190)



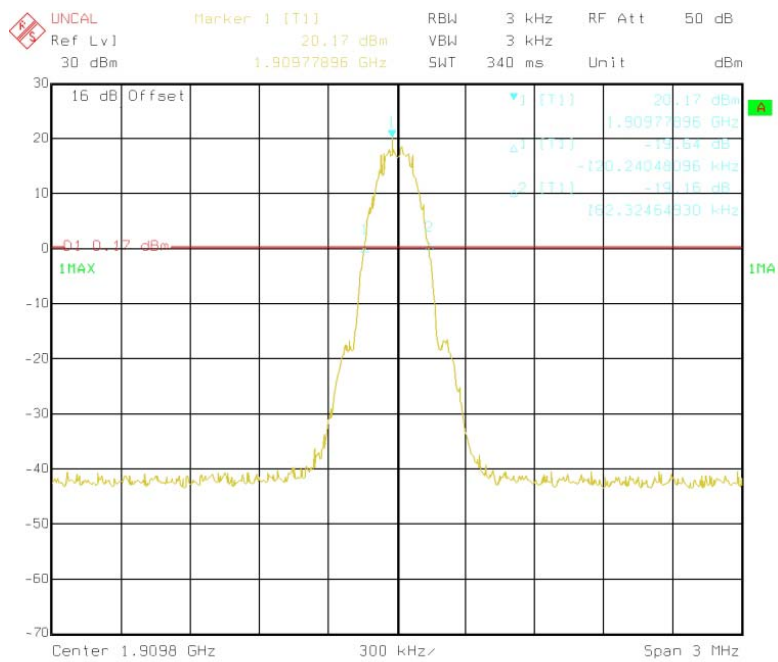
(Plot C2:GPRS 850MHz Channel = 251)



(Plot D2:GPRS 1900MHz Channel = 512)



(Plot E2:GPRS 1900MHz Channel = 661)



(Plot F2:GPRS 1900MHz Channel = 810)

3.4 Frequency Stability

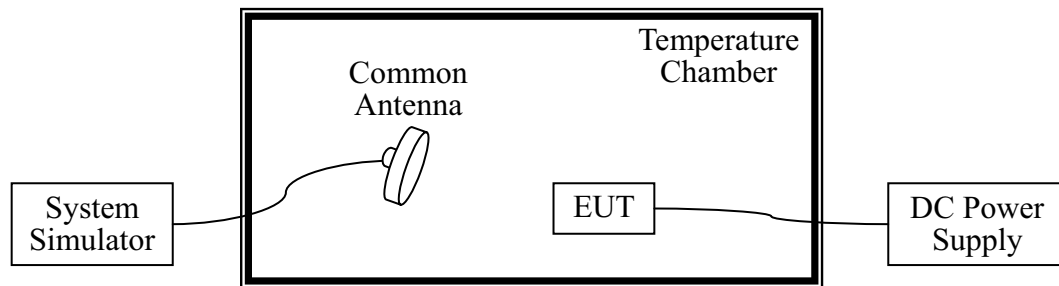
3.4.1 Requirement

According to FCC section 22.355 and FCC section 24.235, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. According to FCC section 2.1055, the test conditions are:

- (a) The temperature is varied from -30°C to $+50^{\circ}\text{C}$ at intervals of not more than 10°C .
- (b) For hand carried battery powered equipment, the primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacture. The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided.

3.4.2 Test Description

1. Test Setup:



The EUT, which is powered by the DC Power Supply directly, is located in the Temperature Chamber. The EUT is commanded by the System Simulator (SS) to operate at the maximum output power i.e. Power Control Level (PCL) = 5 and Power Class = 4. A call is established between the EUT and the SS via a Common Antenna.

2. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
System Simulator	Anritsu	MT8820A	6100255046	2009.06	1year
DC Power Supply	Good Will	GPS-3030DD	EF920938	2008.06	2year
Temperature Chamber	YinHe Experimental Equip.	HL4003T	(n.a.)	2009.03	1year

3.4.3 Test Verdict

The nominal, highest and lowest extreme voltages are separately 3.7VDC, 4.2VDC and 3.6VDC, which are specified by the applicant; the normal temperature here used is 25°C . The frequency



deviation limit is ± 2.5 ppm.

Band	Test Conditions		Frequency Deviation						Verdict
	Power (VDC)	Temperature (°C)	Channel = 128 (824.2MHz)		Channel = 190 (836.6MHz)		Channel = 251 (848.8MHz)		
			Hz	Limit	Hz	Limit	Hz	Limit	
GSM 850MHz	3.7	-30	13.52	± 2060.5	-16.57	± 2091.5	-13.57	± 2122.0	PASS
		-20	-12.37		-10.36		-12.36		
		-10	10.01		16.51		13.51		
		0	11.25		16.25		17.25		
		+10	12.56		10.54		14.54		
		+20	-11.63		15.60		12.60		
		+30	10.21		13.55		15.55		
		+40	-12.59		13.95		17.95		
		+50	-19.73		12.34		14.34		
	4.2	+25	-13.57	13.46	17.46				
3.6	+25	-17.51	12.38	11.38					
GSM 1900MHz	3.7	-30	25.64	± 1550.2	22.47	± 1550.0	25.33	± 1707.5	PASS
		-20	12.55		13.20		12.63		
		-10	-11.35		13.21		-11.62		
		0	-16.56		14.54		-16.23		
		+10	15.16		15.35		15.76		
		+20	-20.22		23.11		-20.62		
		+30	-10.62		-14.43		-14.62		
		+40	14.06		12.25		16.06		
		+50	-12.24		20.10		-13.25		
	4.2	+25	-15.53	-17.27	-16.35				
3.6	+25	15.53	-15.33	15.42					