



# FCC TEST REPORT

Issued to

Corporativo Lanix S.A. de C.V.

For

#### **GSM** Phone

Model Name:	T65
Trade Name:	Lanix
Brand Name:	N/A
FCC ID :	ZC4T65
Standard:	47 CFR Part 22 Subpart H
	47 CFR Part 24 Subpart E
Test date:	2012-7-22 to 2012-8-25
Issue date:	2012-9-18
	Construction of the stream of
CTIA Authorized Test Lab LAB CODE 20081223-00 IEEE 1725 OTA 電訊管理局	TAFF Testing Laboratory 200 Conficie Observer of Bedia Certification Forum BQTF BQTF FCCC Reg. No. 741109

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	Change History				
Issue	Date	Reason for change			
1.0	Sep 18, 2012	First edition			



# 1. GENERAL INFORMATION

# 1.1 EUT Description

EUT Type:	GSM Phone
Serial No:	(n.a, marked #1 by test site)
Hardware Version:	V2.1
Software Version:	N/A
Applicant:	Corporativo Lanix S.A. de C.V.
	Carretera Internacional Hermosillo-Nogales Km 8.5, Hermosillo
	Sonora, Mexico
Manufacturer:	Shenzhen Tinno Mobile Technology Corp
	4/F, H-3 Building, OCT Eastern industrial Park, No.1 XiangShan
	East Road., Nan Shan District, Shenzhen, P.R. China.
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:	GPRS/GSM Mode with GMSK Modulation
Multislot Class:	GPRS: Multislot Class12
Antenna Type:	PIFA Antenna
Emission Designators:	GSM:249KGXW,
Note 1: The transmitter (Tx) from	equency arrangement of the Cellular 850MHz band used by the EUT
can be represented with	th the formula $F(n)=824.2+0.2*(n-128)$ , $128 <= n <= 251$ ; the lowest,
middle, highest channe	l 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) free	equency arrangement of the PCS 1900MHz band used by the EUT can
be represented with t	the formula $F(n)=1850.2+0.2*(n-512)$ , $512 \le n \le 810$ ; the lowest,
middle and highest cha	nnel 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 de	scription, please refer to Specification or User's Manual supplied by
the applicant and/or ma	nufacturer.



## **1.2** 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	Frequency Allocations and Radio Treaty Matters; General
	(10-1-09 Edition)	Rules and Regulations
2	47 CFR Part 22	Public Mobile Services
	(10-1-09 Edition)	
3	47 CFR Part 24	Personal Communications Services
	(10-1-09 Edition)	

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

No.	Section	Description	Result
1	2.1046	Conducted RF Output Power	PASS
2	2.1049	99% Occupied Bandwidth	PASS
3	2.1055	Frequency Stability	PASS
	22.355		
	24.235		
4	2.1051	Conducted Out of Band Emissions	PASS
	2.1057		
	22.917		
	24.238		
5	2.1051	Band Edge	PASS
	2.1057		
	22.917		
	24.238		
6	22.913	Transmitter Radiated Power (EIPR/ERP)	PASS
	24.232		
7	2.1053	Radiated Out of Band Emissions	PASS
	2.1057		
	22.917		
	24.238		

NOTE: Measurement method according to TIA/EIA 603.D-2010



## **1.3** Facilities and Accreditations

#### **1.3.1** Facilities

Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L3572.

All measurement facilities used to collect the measurement data are located at 3/F, Electronic Testing Building, Shahe Road, Xili, Nanshan District, Shenzhen, 518055 P. R. 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.

#### **1.3.2** Test Environment Conditions

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

Temperature (°C):	15 - 35
Relative Humidity (%):	30 -60
Atmospheric Pressure (kPa):	86-106



# 2. 47 CFR PART 2, PART 22H & 24E REQUIREMENTS

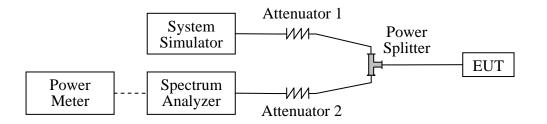
## 2.1 Conducted RF Output Power

#### 2.1.1 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).

#### 2.1.2 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 500hm; 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.

The Power Meter was just used for the Conducted RF Output Power test of WCDMA Model.

2. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date
System Simulator	Agilent	E5515C	GB43130131	2012.05
Spectrum Analyzer	Agilent	E7405A	US44210471	2012.05
Power Meter	Agilent	E4418B	GB43318055	2012.05
Power Splitter	Weinschel	1506A	NW521	(n.a.)
Attenuator 1	Resnet	20dB	(n.a.)	(n.a.)
Attenuator 2	Resnet	3dB	(n.a.)	(n.a.)



## 2.1.3 Test Results

Here the lowest, middle and highest channels are selected to perform testing to verify the conducted RF output power of the EUT.

Band	Channel	Frequency	Measured	Output Power	Limit	Verdict	
Dallu	Channel	(MHz)	dBm	Refer to Plot	dBm		
CSM	128	824.2	32.33			PASS	
GSM 850MHz	190	836.6	32.01	Plot A1 to A3	35	PASS	
83010112	251	848.8	31.8			PASS	
GSM	512	1850.2	30.86		32	PASS	
1900MHz	661	1880.0	29.66	Plot B1 to B3		PASS	
1900МПZ	810	1909.8	29.13			PASS	
GPRS	128	824.2	31.99	Plot C1 to	35	PASS	
850MHz	190	836.6	31.61	$C3^{\text{Note 1}}$		PASS	
830MHZ	251	848.8	31.4	0.5		PASS	
GPRS	512	1850.2	28.48	Dlot D1 to	32	PASS	
1900MHz	661	1880.0	27.18	Plot D1 to D3 <sup>Note 1</sup>		PASS	
THOMME	810	1909.8	26.64	03		PASS	

1. GSM Model Test Verdict:

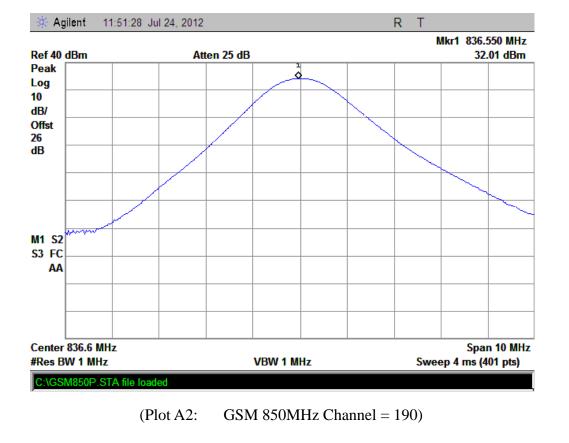
Note 1: For the GPRS model, all the slots were tested and just the worst data was record in this report.

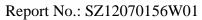


2. GSM Model Test Plots:

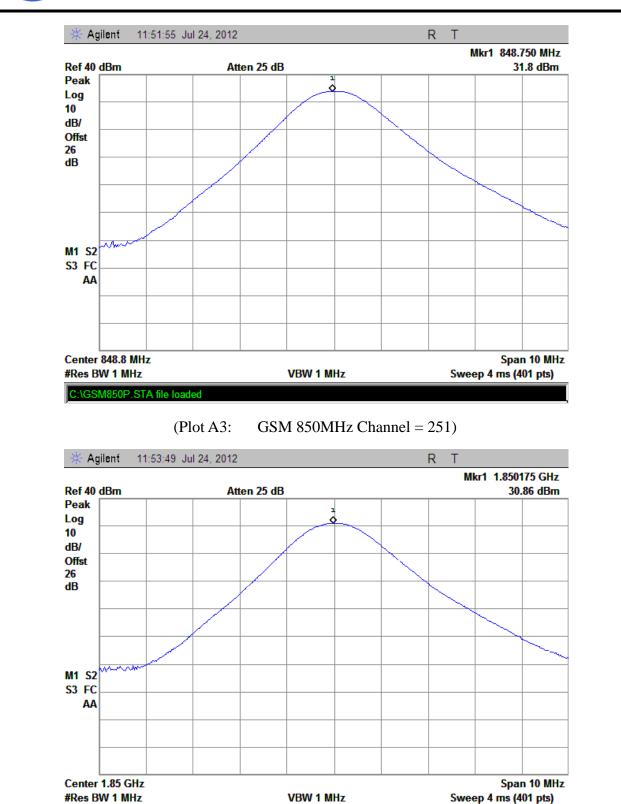
🔆 Agilent 11:50:52 Jul 24, 2012 R T Mkr1 824.125 MHz Ref 40 dBm 32.33 dBm Atten 25 dB Peak ٥ Log 10 dB/ Offst 26 dB M1 S2 S3 FC AA Center 824.2 MHz Span 10 MHz Sweep 4 ms (401 pts) #Res BW 1 MHz VBW 1 MHz GSM850P.STA file loaded





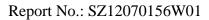






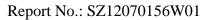
(Plot B1: GSM 1900MHz Channel = 512)

GSM850P.STA file loaded



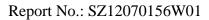




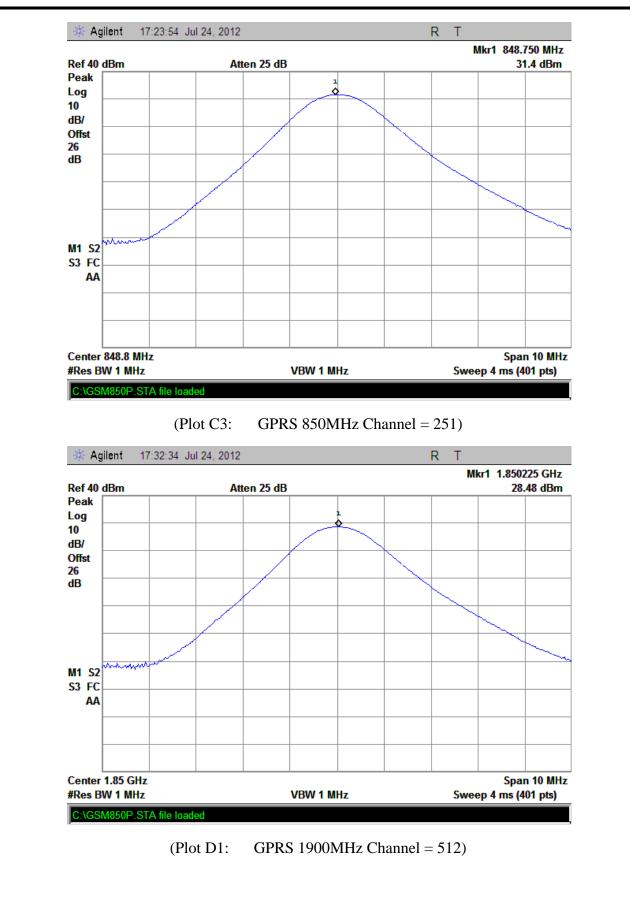


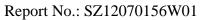




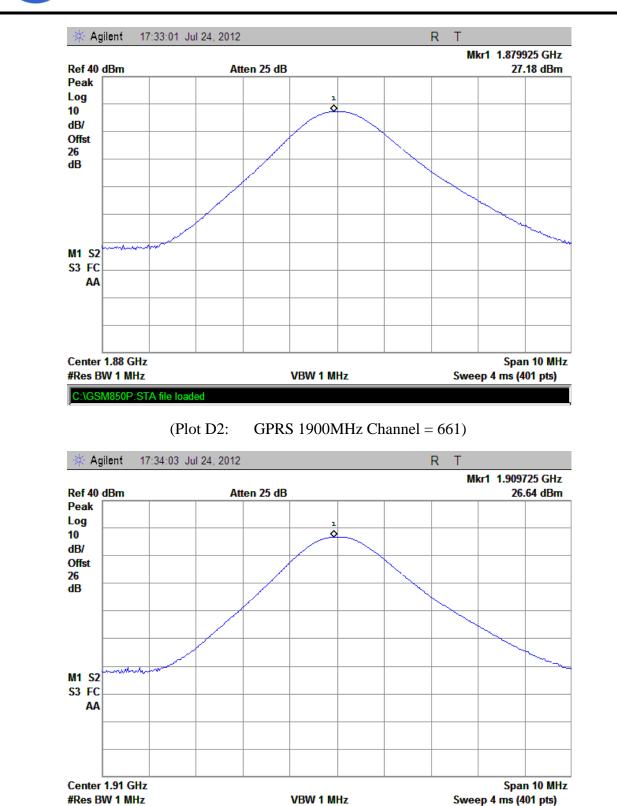












(Plot D3: GPRS 1900Hz Channel = 810)

GSM850P.STA file loaded



## 2.2 99% Occupied Bandwidth

#### 2.2.1 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,

#### 2.2.2 Test Description

See section 2.1.2 of this report.

#### 2.2.3 Test Verdict

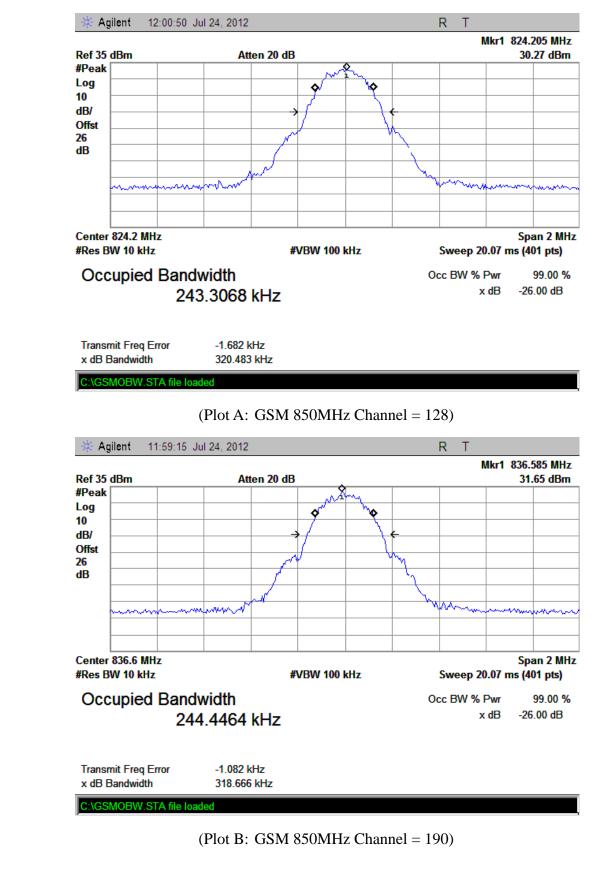
Here the lowest, middle and highest channels are selected to perform testing to verify the 99% occupied bandwidth.

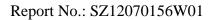
1. Test Verdict:

Band	Channel	Frequency (MHz)	99% Occupied Bandwidth	Refer to Plot
	128	824.2	243.3068kHz	Plot A
GSM 850MHz	190	836.6	244.4464kHz	Plot B
	251	848.8	245.7055kHz	Plot C
	512	1850.2	246.3660kHz	Plot D
GSM 1900MHz	661	1880.0	249.0283kHz	Plot E
	810	1909.8	241.9899kHz	Plot F

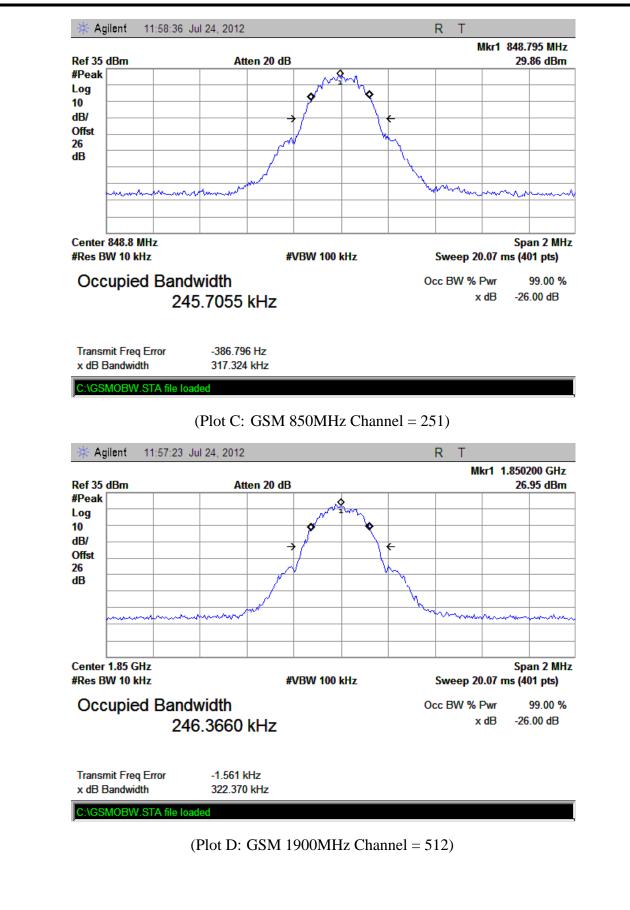


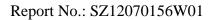
#### 2. Test Plots:



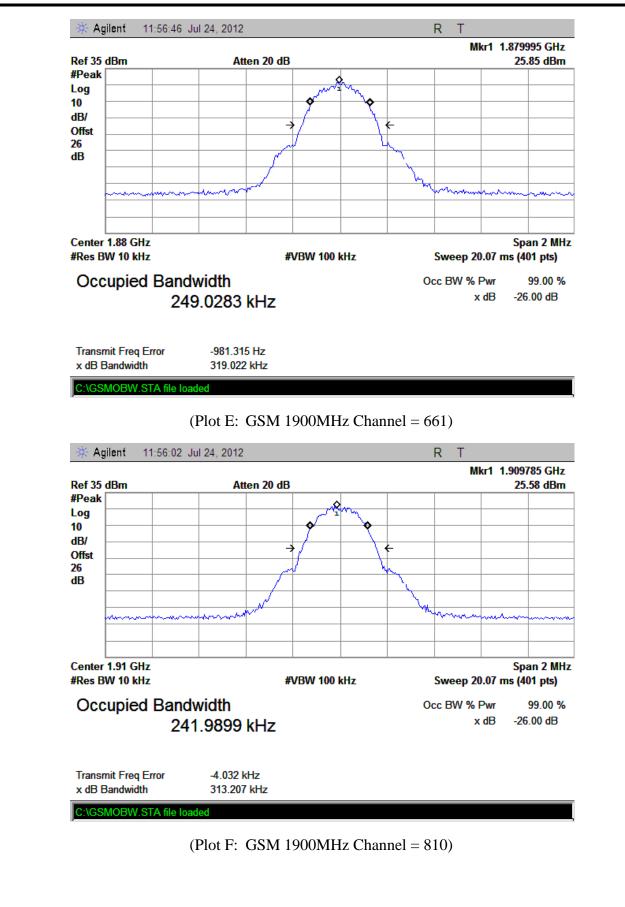














## 2.3 Frequency Stability

#### 2.3.1 Requirement

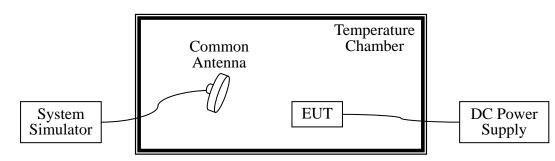
According to FCC section 22.355 and FCC section 24.235, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. According to FCC section 2.1055, the test conditions are:

(a) The temperature is varied from  $-30^{\circ}$ C to  $+50^{\circ}$ C at intervals of not more than  $10^{\circ}$ 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.

## 2.3.2 Test Description

1. Test Setup:



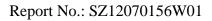
The EUT, which is powered by the DC Power Supply directly, is located in the Temperature Chamber. The EUT is commanded by the System Simulator (SS) to operate at the maximum output power i.e. Power Control Level (PCL) = 5 and Power Class = 4. A call is established between the EUT and the SS via a Common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

#### 2. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date
System Simulator	Agilent	E5515C	GB43130131	2012.05
DC Power Supply	Good Will	GPS-3030DD	EF920938	2012.05
Temperature	YinHe Experimental	HL4003T	(n.a.)	2012.05
Chamber	Equip.			

### 2.3.3 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 of 850MHz band is  $\pm 2.5$  ppm, and 1900MHz is  $\pm 1$  ppm

## 1. GSM 850MHz Band

Test Conditions		Frequency Deviation						
Power	Temperature	Channel = 128 (824.2MHz)		Channel = 190 (836.6MHz)		Channel = 251 (848.8MHz)		Verdict
(VDC)	(°C)	Hz	Limits	Hz	Limits	Hz	Limits	
	-30	11.32		21.06		11.05		
	-20	-9.17	±2060.5	13.05	±2091.5	13.21	±2122	PASS
	-10	12.25		-12.76		22.11		
	0	-23.03		-2.05		31.32		
3.7	+10	-11.02		-3.77		17.11		
	+20	-10.39		5.39		18.01		
	+30	27.75		-2.05		-15.51		
	+40	5.31		-3.77		19.46		
	+50	-22.19		5.39		-6.80		
4.2	+25	23.74		19.65		7.58		
3.6	+25	23.29		-20.70		16.15		

#### 2. GSM 1900MHz Band

Test Conditions		Frequency Deviation						
Power	Temperatur	Channel = 512 (1850.2MHz)		Channel = 661 (1880.0MHz)		Channel = 810 (1909.8MHz)		Verdict
(VDC)	e (°C)	Hz	Limits	Hz	Limits	Hz	Limits	
	-30	17.11		29.16		27.27		
	-20	-15.51		11.23	±1880.0	9.49	±1909.8	PASS
	-10	19.46	±1850.2	-12.86		-12.90		
	0	-6.80		-2.32		12.66		
3.7	+10	7.58		9.49		5.05		
	+20	17.11		-12.90		3.02		
	+30	-15.51		12.66		-13.01		
	+40	44.49		5.05		0.51		
	+50	40.72		3.02		21.45		
4.2	+25	16.15		-13.01		-16.04		
3.6	+25	32.34		3.57		-29.06		



## 2.4 Conducted Out of Band Emissions

#### 2.4.1 Requirement

According to FCC section 22.917(a) and FCC section 24.238(a), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43+10\*log(P)dB. This calculated to be -13dBm.

#### 2.4.2 Test Description

See section 2.1.2 of this report.

#### 2.4.3 Test Result

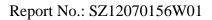
The measurement frequency range is from 30MHz to the 10<sup>th</sup> harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the out of band emissions.

1. Test Verdict:

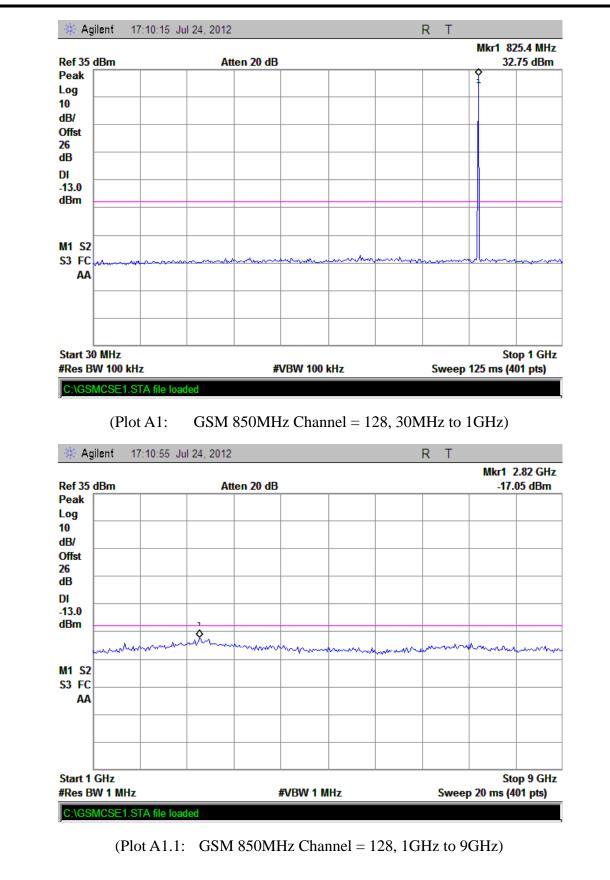
Band	Channel	Frequency (MHz)	Measured Max. Spurious Emission (dBm)	Refer to Plot	Limit (dBm)	Verdic t
GSM	128	824.2	-17.05	Plot A1toA1.1		PASS
850MHz	190	836.6	-21.33	Plot A2toA2.1	-13	PASS
850MHZ	251	848.8	-21	Plot A3toA3.1		PASS
CSM	512	1850.2	< -25	Plot B1toB1.1		PASS
GSM 1900MHz	661	1880.0	< -25	Plot B2toB2.1	-13	PASS
THOMME	810	1909.8	20.88	Plot B3toB3.1		PASS

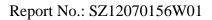
2. Test Plots for the Whole Measurement Frequency Range:

Note: the power of the EUT transmitting frequency should be ignored.

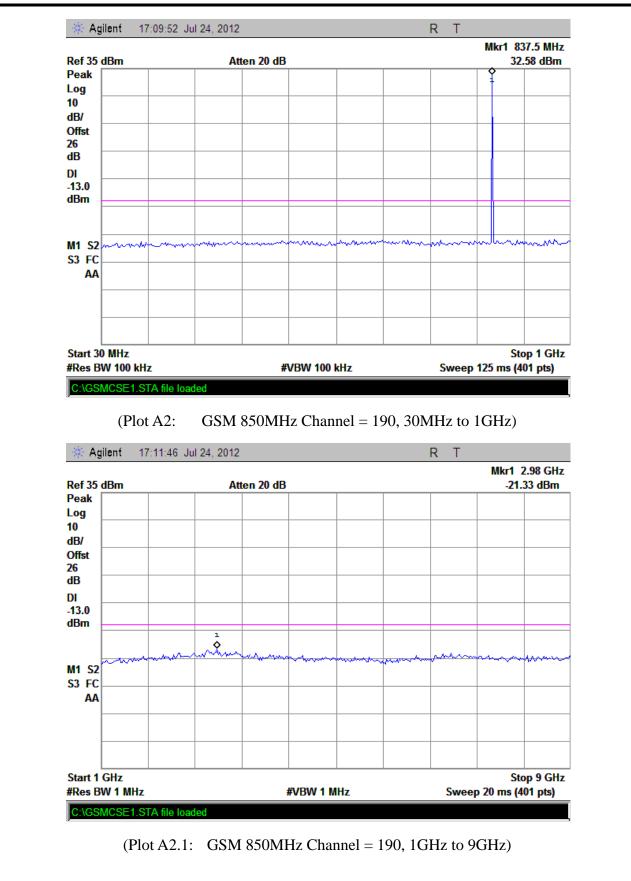


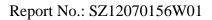




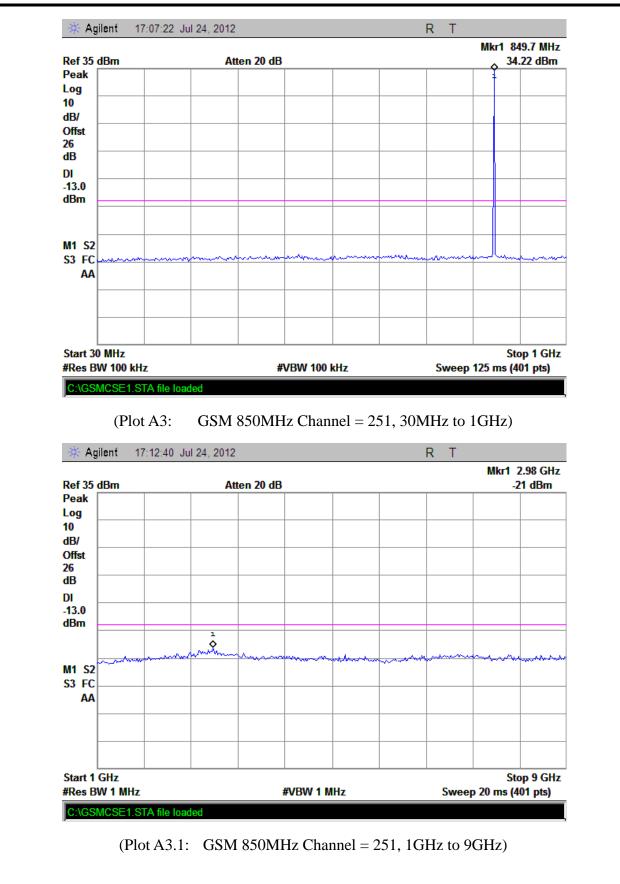


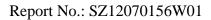




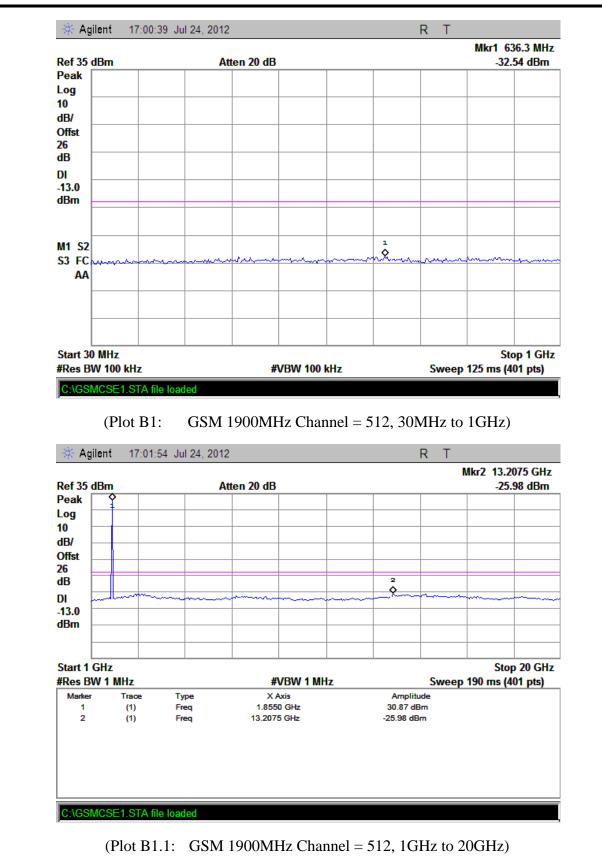


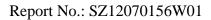




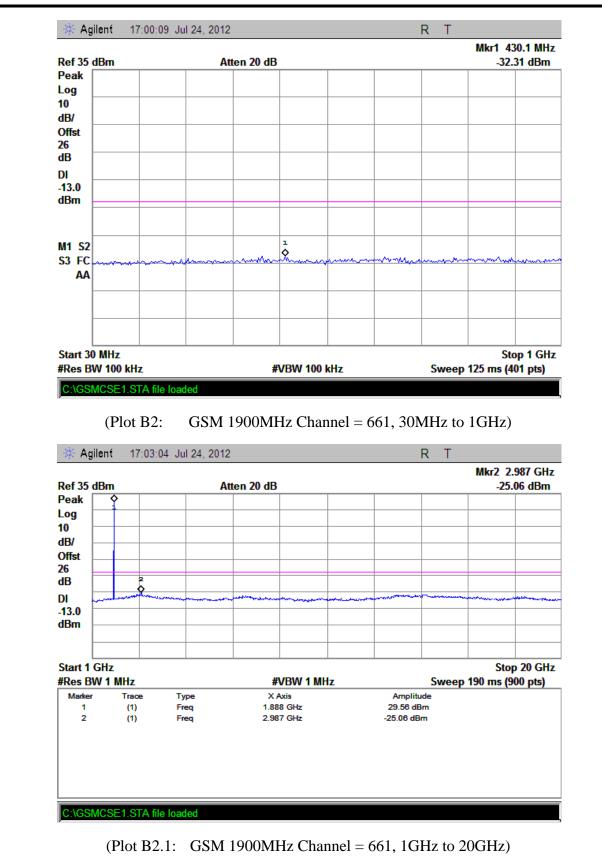


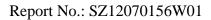




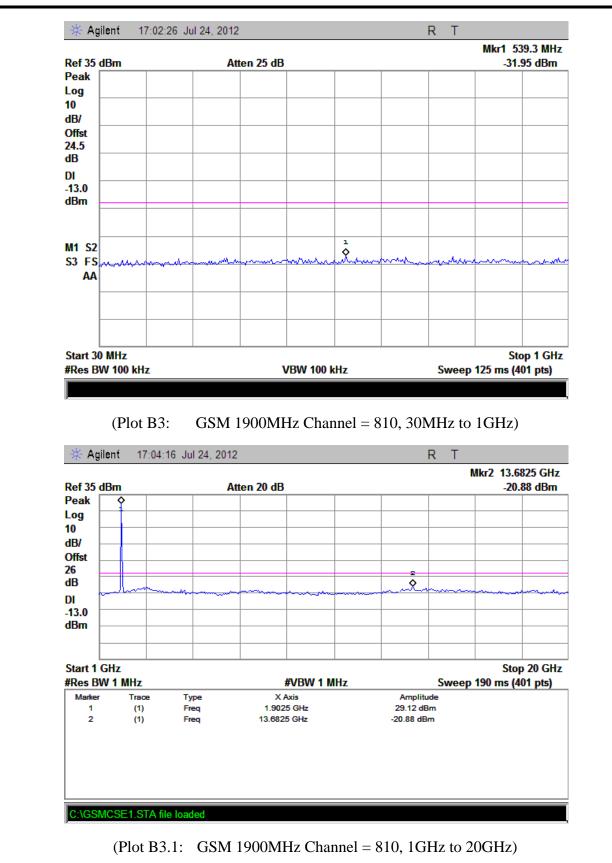














## 2.5 Band Edge

#### 2.5.1 Requirement

According to FCC section 22.917(b) and FCC section 24.238(b), in the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth (26dB emission bandwidth) of the fundamental emission of the transmitter may be employed.

#### 2.5.2 Test Description

See section 2.1.2 of this report.

### 2.5.3 Test Result

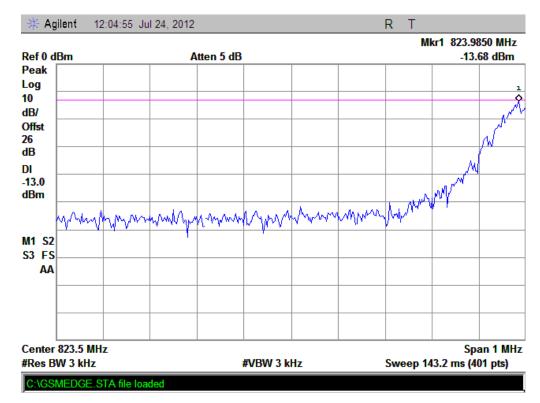
The lowest and highest channels are tested to verify the band edge emissions.

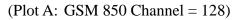
#### 1. Test Verdict:

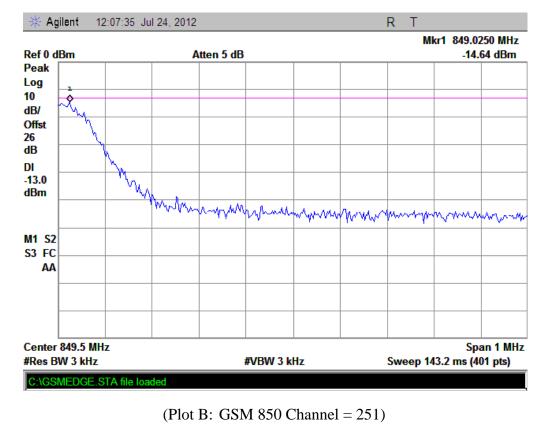
Band	Channel	Frequency (MHz)	Measured Max. Band Edge Emission (dBm)	Refer to Plot	Limit (dBm)	Verdict
GSM	128	824.2	-13.68	Plat A	12	PASS
850MHz	251	848.8	-14.64	Plot B	-13	PASS
GSM	512	1850.2	-17.15	Plat C	-13	PASS
1900MHz	810	1909.8	-17.1	Plot D	-13	PASS

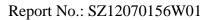


#### 2. Test Plots:

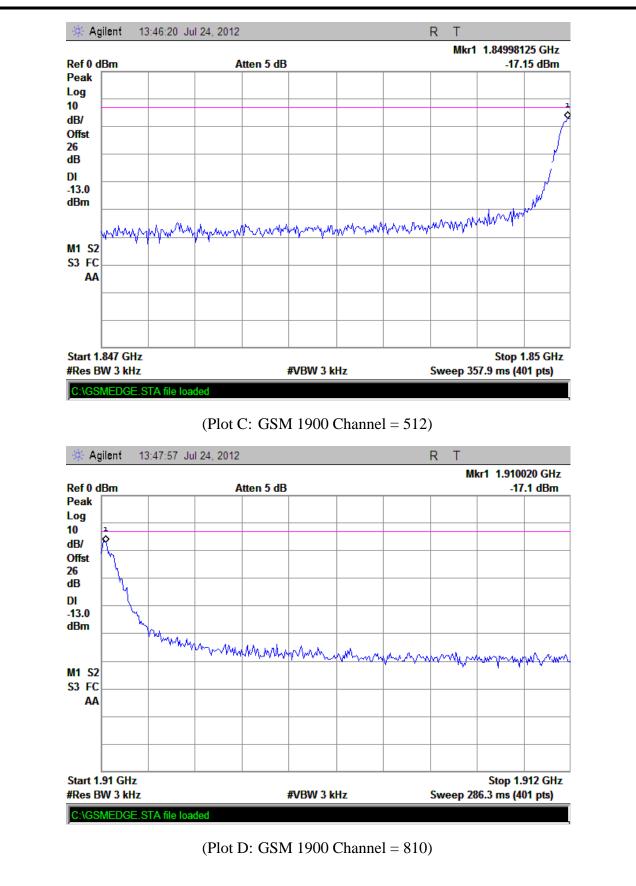














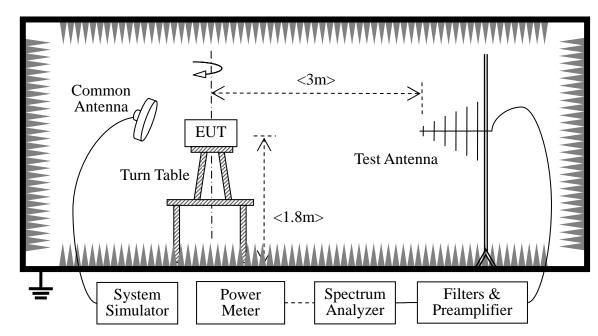
## 2.6 Transmitter Radiated Power (EIRP/ERP)

#### 2.6.1 Requirement

According to FCC section 22.913, the Effective Radiated Power (ERP) of mobile transmitters and auxiliary test transmitters must not exceed 7Watts, and FCC section 24.232, the broadband PCS mobile station is limited to 2 Watts e.i.r.p. peak power.

#### 2.6.2 Test Description

1. Test Setup:



The EUT, which is powered by the Battery charged with the AC Adapter, is located in a 3m Full-Anechoic Chamber; the cable loss, air loss and so on of the site as factors are pre-calibrated using the "Substitution" method, and calculated to correct the reading.

A call is established between the EUT and the SS via a Common Antenna. The EUT is commanded by the SS to operate at the maximum and minimum output power (i.e. GSM850MHz band Power Control Level (PCL) = 5/19 and Power Class = 4, GSM1900MHz band Power Control Level (PCL) = 0/15 and Power Class = 1), and only the test result of the maximum output power was recorded.

- GSM Maximum RF output power: GSM850 32.33dBm, GSM 1900 30.86dBm, Please refer to section 2.1.3 of this report.

- Step size (dB): 3dB

- Minimum RF power: GSM850 3.0dBm, GSM 1900 0.5dBm.



The Test Antenna is a Bi-Log one (used for 30MHz to 1GHz) or a Horn one (used for above 3GHz), and it's located at the same height as the EUT. The Filters consists of Notch Filters and High Pass Filter.

2. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	
System Simulator	Agilent	E5515C	GB43130131	2012.05	
Spectrum Analyzer	Agilent	E7405A	US44210471	2012.05	
Full-Anechoic Chamber	Albatross	9m*6m*6m	(n.a.)	2012.05	
Test Antenna - Bi-Log	Schwarzbeck	VULB 9163	9163-274	2012.05	
Test Antenna - Horn	Schwarzbeck	BBHA 9120C	9120C-384	2012.05	

### 2.6.3 Test Result

The Turn Table is actuated to turn from  $0^{\circ}$  to  $360^{\circ}$ , and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. The lowest, middle and highest channels are tested.

The substitution corrections are obtained as described below:

 $A_{SUBST} = P_{SUBST\_TX} - P_{SUBST\_RX} - L_{SUBST\_CABLES} + G_{SUBST\_TX\_ANT}$ 

 $A_{TOT} = L_{CABLES} + A_{SUBST}$ 

Where A<sub>SUBST</sub> is the final substitution correction including receive antenna gain.

P<sub>SUBST\_TX</sub> is signal generator level,

P<sub>SUBST\_RX</sub> is receiver level,

L<sub>SUBST\_CABLES</sub> is cable losses including TX cable,

G<sub>SUBST\_TX\_ANT</sub> is substitution antenna gain.

A<sub>TOT</sub> is total correction factor including cable loss and substitution correction

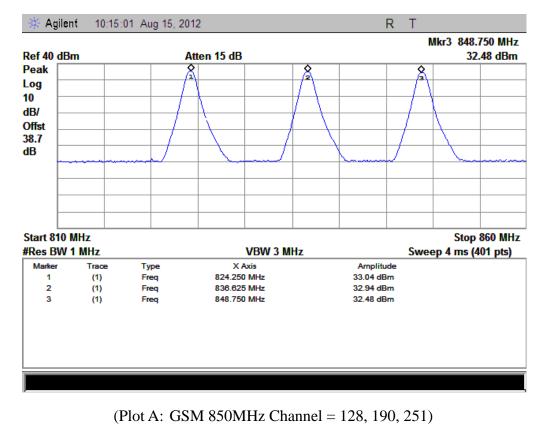
During the test, the data of  $A_{TOT}$  was added in the Test Spectrum Analyze, so Spectrum Analyze reading is the final values which contain the data of  $A_{TOT}$ .



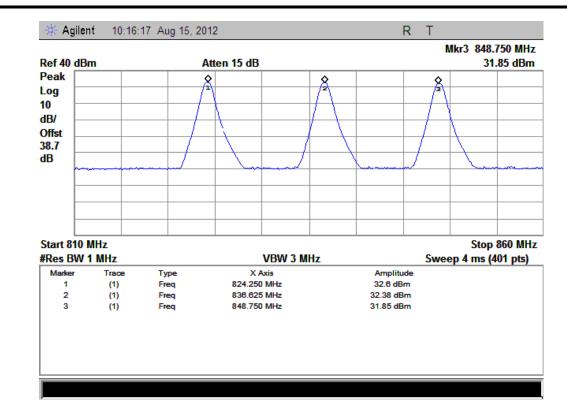
#### 1. GSM Model Test Verdict:

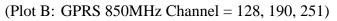
Band	Channel	Frequency		Measured ERP			Limit		Verdict	
Dand		(MHz)		dBm	W	Refer to Plot	dBm	W	veruiet	
COM	128	824.20	5	33.04	2.013724				PASS	
GSM 850MHz	190	836.60	5	32.94	1.967886	Plot A	38.5	7	PASS	
630MITZ	251	848.80	5	32.48	1.770109				PASS	
CDDC	128	824.20	5	32.6	1.819701				PASS	
GPRS	190	836.60	5	32.38	1.729816	Plot B Note 1	38.5	7	PASS	
850MHz	251	848.80	5	31.85	1.531087				PASS	
Dand	Channal	Frequency	DCI	Measured EIRP			Limit		Vardiat	
Band	Channel	(MHz)	PCL	dBm	W	Refer to Plot	dBm	W	Verdict	
CSM	512	1850.2	0	31.19	1.315225				PASS	
GSM 1900MHz	661	1880.0	0	31.28	1.342765	Plot C	33	2	PASS	
1900101112	810	1909.8	0	30.12	1.028016				PASS	
GPRS	512	1850.2	0	31.16	1.306171				PASS	
	661	1880.0	0	31.2	1.318257	Plot D Note 1	33	2	PASS	
1900MHz	810	1909.8	0	29.76	0.946237				PASS	

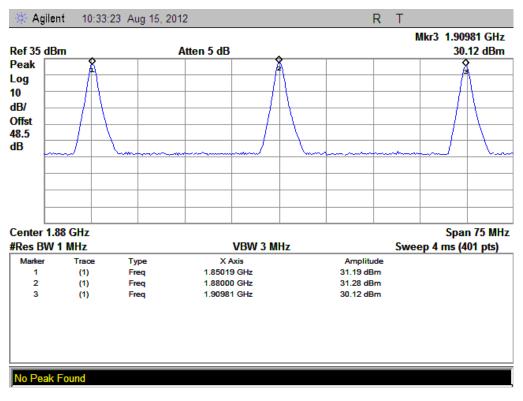
#### 2. Test Plots:



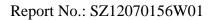




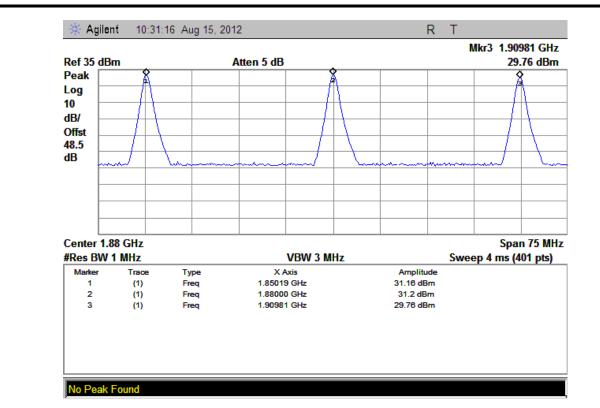


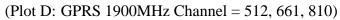


(Plot C: GSM1900MHz Channel = 512, 661, 810)











## 2.7 Radiated Out of Band Emissions

#### 2.7.1 Requirement

According to FCC section 22.917(a) and section 24.238(a), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43+10\*log(P)dB. This calculated to be -13dBm.

#### 2.7.2 Test Description

See section 2.6.2 of this report.

Note: when doing measurements above 1GHz, the EUT has been within the 3dB cone width of the horn antenna during horizontal antenna.

#### 2.7.3 Test Result

The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The Turn Table is actuated to turn from 0° to  $360^{\circ}$ , and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. The lowest, middle and highest channels are tested to verify the out of band emissions.



#### 1. Test Verdict:

Band	Channel	Frequency (MHz)		Iax. Spurious			Verdict
			Test	on (dBm) Test	Refer to Plot	Limit (dBm)	
			Antenna Horizontal	Antenna Vertical			
GSM	128	824.2	< -25	< -25	Plot A.1/A.2		PASS
850MHz	190	836.6	< -25	< -25	Plot A.3/A.4	-13	PASS
830WITZ	251	848.8	< -25	< -25	Plot A.5/A.6		PASS
CCM	512	1850.2	< -25	< -25	Plot B.1/B.2		PASS
GSM 1900MHz	661	1880.0	< -25	< -25	Plot B.3/B.4	-13	PASS
	810	1909.8	< -25	< -25	Plot B.5/B.6		PASS

2. Test Plots for the Whole Measurement Frequency Range:

Note1: the power of the EUT transmitting frequency should be ignored.

Note2: All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

