




# FCC Test Report

## FCC ID:2AE4BJCY-W801

Product Name:	<b>Multi Parameter Monitor</b>
Trademark:	
Model Name:	<b>JCY-W801</b>
Prepared For:	<b>Shenzhen Liu He Liu Medical equipment Co.,LTD.</b>
Address:	Floor 4,Building A,Jinke Industrial Park,No.310,Wuhe,Guanlan Street,Longhua New District,Shenzhen
Prepared By:	<b>Shenzhen BCTC Technology Co., Ltd.</b>
Address:	No.101,Yousong Road,Longhua New District, Shenzhen,China
Test Date:	<b>Jun. 13 - Jun. 20, 2015</b>
Date of Report:	<b>Jun. 20, 2015</b>
Report No.:	<b>BCTC-15060086</b>



## VERIFICATION OF COMPLIANCE

**Applicant's name.....: Shenzhen Liu He Liu Medical equipment Co.,LTD.**

**Address.....: Floor 4,Building A,Jinke Industrial Park,No.310,Wuhe,Guanlan Street,Longhua New District,Shenzhen**

**Manufacture's Name.....: Shenzhen Liu He Liu Medical equipment Co.,LTD.**

**Address.....: Floor 4,Building A,Jinke Industrial Park,No.310,Wuhe,Guanlan Street,Longhua New District,Shenzhen**

### Product description

**Product name.....: Multi Parameter Monitor**

**Trademark:**



**Model Name: JCY-W801**

FCC CFR Title 47 Part 2: 2013

**Test procedure FCC CFR Title 47 Part22 Subpart H: 2013**

FCC CFR Title 47 Part24 Subpart E: 2013

This device described above has been tested by BCTC, and the test results show that the equipment under test (EUT) is in compliance with the requirements. And it is applicable only to the tested sample identified in the report.

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**Test Result : Pass**

**Testing Engineer :**

*Eric Yang*

(Eric Yang)

**Technical Manager :**

*Sophie Lu*

(Sophia Lee)

**Authorized Signatory :**

*Carson Zhang*



(Carson. Zhang)



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## 1.TEST SUMMARY

Test Items	Test Requirement	Result
RF Exposure (SAR)	Part 1.1307 Part 2.1093	Passed* (Please refer to SAR Report)
Conducted RF Output Power	2.1046	PASS
Peak to Average Ratio	2.1055,22.355 24.235,27.54	PASS
99% & -26 dB Occupied Bandwidth	2.1049, 22.917 24.238,	PASS
Frequency Stability	2.1055, 22.355 24.235,	PASS
Conducted Out of Band Emissions	2.1051,2.1057 22.917, 24.238	PASS
Band Edge	2.1051,2.1057 22.917, 24.238	PASS
Transmitter Radiated Power (EIPR/ERP)	22.913, 24.232	PASS
Radiated Out of Band Emissions	2.1053,2.1057 22.917, 24.238	PASS



## 2.GENERAL PRODUCT INFORMATION

### 2.1. Product Function

Refer to Technical Construction Form and User Manual.

### 2.2. Description of Device (EUT)

Product Name:	Multi Parameter Monitor
Model No.:	JCY-W801
Operation Frequency:	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) WCDMA Band II: TX: 1852.4MHz - 1907.6MHz, (at intervals of 200kHz); RX: 1932.4MHz - 1987.6MHz(at intervals of 200kHz);
Modulation technology:	GSM/GPRS Mode with GMSK, 8PSK Modulation WCDMA Mode with QPSK Modulation HSDPA Mode with QPSK, 16QAM Modulation HSUPA Mode with QPSK, 16QAM Modulation
Antenna Type:	Integral Antenna
Antenna gain:	1.5dBi (GSM&WCDMA) ,
Power supply:	DC 5V from adapter Rechargeable lithium-ion battery 3.7V
GPRS Class:	12
EGPRS Class:	12
Adapter	M/N:JM-50300 I/P:AC 100~240V 50/60Hz 0.15A O/P:DC 5V 1.5A



## 2.3. Difference between Model Numbers

The product are different for model, outlook color and size.

## 2.4. Test Supporting System

None.

## 2.5. Independent Operation Modes

During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on three test planes to find out the worst emission.

Test modes		
Band	Radiated	Conducted
GSM 850	n GSM link	n GSM link
	n EGPRS 8 link	n EGPRS 8 link
PCS 1900	n GSM link	n GSM link
	n EGPRS 8 link	n EGPRS 8 link
WCDMA Band II.	n RMC 12.2Kbps link	n RMC 12.2Kbps link

Note: The maximum power levels are GSM mode for GMSK link, RMC12.2Kbps mode for WCDMA band V, RMC12.2Kbps mode for WCDMA band II and V.

The conducted average power tables are as follows:

Conducted Average Power (dBm)						
Band	GSM850			PCS1900		
Channel	128	190	251	512	661	810
Frequency	824.20	836.60	848.80	1850.20	1880.00	1909.80
GSM	31.27	31.35	31.70	30.33	30.69	30.64



### 3. TEST SITES

#### 3.1. Test Facilities

Shenzhen BCTC Technology Co., Ltd.

Add.:No.101,Yousong Road,Longhua New District, Shenzhen,China

FCC Registration No.:187086

##### 3.1.1. Measurement Uncertainty

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

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 1.38\text{dB}$
2	RF power,conducted	$\pm 0.16\text{dB}$
3	Spurious emissions,conducted	$\pm 0.21\text{dB}$
4	All emissions,radiated(<1G)	$\pm 4.68\text{dB}$
5	All emissions,radiated(>1G)	$\pm 4.89\text{dB}$
6	Temperature	$\pm 0.5^{\circ}\text{C}$
7	Humidity	$\pm 2\%$



### 3.2. List of Test and Measurement Instruments

#### 3.2.1. For conducted emission at the mains terminals test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Test Receiver	R&S	ESCI	101160	2015.06.07	2016.06.06
LISN	SCHWARZBECK	ENV216	101313	2014.08.25	2015.08.24
LISN	EMCO	3816/2	00042990	2014.08.25	2015.08.24
50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2015.06.07	2016.06.06
Passive Voltage Probe	R&S	ESH2-Z3	100196	2015.06.07	2016.06.06
Absorbing clamp	R&S	MOS-21	100423	2015.06.08	2016.06.07
RF cables	R&S	R204	R20X	2014.07.06	2015.07.05

#### 3.2.2. For radiated emission test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Test Receiver	R&S	ESPI	101318	2015.06.07	2016.06.06
System Simulator	Agilent	E5515C	GB43130252	2015.06.07	2016.06.06
Power Splitter	Weinschel	1506A	NW534	2015.06.07	2016.06.06
Bilog Antenna	TESEQ	CBL6111D	31216	2014.07.06	2015.07.05
Loop antenna	ARA	PLA-1030/B	1029	2015.06.07	2016.06.06
Spectrum Analyzer	Agilent	E4411B	MY4511235	2014.07.06	2015.07.05
Signal Amplifier	SONOMA	313	187022	2014.07.06	2015.07.05
Signal Amplifier	Agilent	8449B	3008A00213	2014.07.06	2015.07.05
RF Cable	R&S	R203	R20X	2014.07.06	2015.07.05
MULTI-DEVICE Controller	ETS-LINDGREEN	31250	126821	N/A	N/A
Horn Antenna	EM	EM-AH-10180	2011071402	2014.07.06	2015.07.05
Horn Antenna	Schwarzbeck	BBHA 9170	9170-181	2014.07.06	2015.07.05
Spectrum Analyzer	Agilent	8593E	3911A03928	2014.07.06	2015.07.05
Spectrum Analyzer	Agilent	E4407B	MY45108040	2014.07.06	2015.07.05
Signal Amplifier	DAZE	ZN3380B	11235	2014.08.25	2015.08.24
High Pass filter	KANGMAI	WHKX1.0/1.5G-10SS	40	2014.08.25	2015.08.24
Filter	COM-MW	ZBSF-C836.5-25-X	BCTC042	2014.08.25	2015.08.24
Filter	COM-MW	ZBSF-C1747.5-75-X2	BCTC045	2014.08.25	2015.08.24
Filter	COM-MW	ZBSF-C1880-60-X2	BCTC047	2014.08.25	2015.08.24
DC Power Supply	LongWei	PS-305D	010965682	2014.07.06	2015.07.05
Constant temperature and humidity box	GF	GTH-800-40-2P	MAA9906-012	2015.06.07	2016.06.06
Universal radio communication tester	R&S	CMU200	115295	2014.08.25	2015.08.24
Splitter	Agilent	11435B	1125162	2014.07.06	2015.07.05





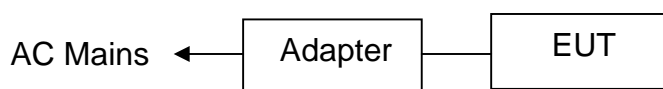
## 4. TEST SET-UP AND OPERATION MODES

### 4.1. Principle of Configuration Selection

**Emission:** The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the Operating Instructions.

### 4.2. Block Diagram of Test Set-up

System Diagram of Connections between EUT and Simulators



*(EUT: Multi Parameter Monitor)*

### 4.3. Test Operation Mode and Test Software

None.

### 4.4. Special Accessories and Auxiliary Equipment

None.

### 4.5. Countermeasures to Achieve EMC Compliance

None.

### 4.6. Test Environment:

Ambient conditions in the test laboratory:

Items	Actual
Temperature (°C)	21~23
Humidity (%RH)	50~65



## 5. EMISSION TEST RESULTS

### 5.1. Conducted RF Output Power

#### 5.1.1. Limit

According to FCC section 2.1046(a) , FCC part22.913(a) and FCC part24.232(b) ,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).

#### 5.1.2. Test Setup

The EUT, which is powered by the adapter, 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.

#### 5.1.3. Test Result

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

Measurement data

The conducted power tables are as follows:

Average Conducted Power (dBm)						
Band	GSM850			PCS1900		
Frequency	824.20	836.60	848.80	1850.20	1880.00	1909.80
GSM (GMSK, 1 TX slot)	31.27	31.35	31.70	30.33	30.69	30.64
GPRS (GMSK, 1 TX slot)	31.11	31.31	31.67	30.15	30.55	30.58
GPRS (GMSK, 2 TX slot)	30.32	30.57	30.88	28.99	29.47	29.34
GPRS (GMSK, 3 TX slot)	28.34	28.60	28.44	26.97	27.41	27.38
GPRS (GMSK, 4 TX slot)	27.34	27.45	27.76	24.90	25.37	25.33
EGPRS(GMSK, 1 TX slot)	31.07	31.27	31.63	29.09	29.49	29.51
EGPRS(GMSK, 2 TX slot)	30.30	30.55	30.86	28.38	28.36	28.23
EGPRS(GMSK, 3 TX slot)	28.29	28.55	28.59	25.93	26.36	26.25
EGPRS(GMSK, 4 TX slot)	26.51	26.56	26.68	25.23	24.71	24.67



EGPRS (8PSK, 1 TX slot)	25.73	25.71	25.65	25.18	25.46	25.55
EGPRS (8PSK, 2 TX slot)	24.66	24.92	24.76	23.89	24.35	23.37
EGPRS (8PSK, 3 TX slot)	22.78	23.07	23.26	22.39	22.73	22.51
EGPRS (8PSK, 4 TX slot)	21.82	21.90	22.10	21.30	21.49	21.76
Limit	38.45			33.01		
Result	Pass					

Average Conducted Power						
Band	WCDMA Band II.					
Frequency	1852.4	1880.0	1907.6			
RMC 12.2Kbps	22.69	22.56	22.58			
RMC 64kbps	22.62	22.45	22.50			
RMC 144kbps	22.55	22.46	22.50			
RMC 384kbps	22.48	22.46	22.50			
HSDPA Subtest-1	22.28	22.23	22.31			
HSDPA Subtest-2	22.29	22.22	22.31			
HSDPA Subtest-3	22.24	22.18	22.23			
HSDPA Subtest-4	22.21	22.09	22.25			
HSUPA Subtest-1	22.19	22.18	22.19			
HSUPA Subtest-2	22.16	22.07	22.21			
HSUPA Subtest-3	22.29	22.17	22.25			
HSUPA Subtest-4	22.11	22.10	22.21			
HSUPA Subtest-5	22.14	22.09	22.13			
ARM	22.22	22.06	22.17			
Limit	33.01					
Result	Pass					

Note: Measurement Uncertainty:  $\pm 2.6$  dB.



## 5.2. Peak to Average Ratio

### 5.2.1. Limit

According to FCC section 27.50(d)(5) , the peak to average ratio(PAR) of the transmission may not exceed 13dB.

### 5.2.2. Test Setup

See section 5.1.2 of this report.

### 5.2.3. Test Result

Measurement data as follows:

Band	GSM850		
	Low	Middle	High
Frequency	824.20	836.60	848.80
Peak-to average ratio(dB)/GSM	0.64	0.58	0.60
Peak-to average ratio(dB)/EDGE	0.39	0.40	0.42

Band	PCS1900		
	Low	Middle	High
Frequency	1850.20	1880.00	1909.8
Peak-to average ratio(dB)/GSM	0.65	0.66	0.66
Peak-to average ratio(dB)/EDGE	0.38	0.37	0.33

Band	WCDMA Band II.		
	Low	Middle	High
Frequency	1852.40	1880.00	1907.6
Peak-to average ratio(dB)	0.53	0.50	0.52

Note: Measurement Uncertainty:  $\pm 0.2$  dB.



### 5.3. 99% Occupied Bandwidth

#### 5.3.1. Limit

According to FCC section 2.1049 and FCC part22.913(a) and FCC part24.232(b), 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,

#### 5.3.2. Test Setup

The EUT, which is powered by the adapter, 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.

#### 5.3.3. Test Result

Measurement Data

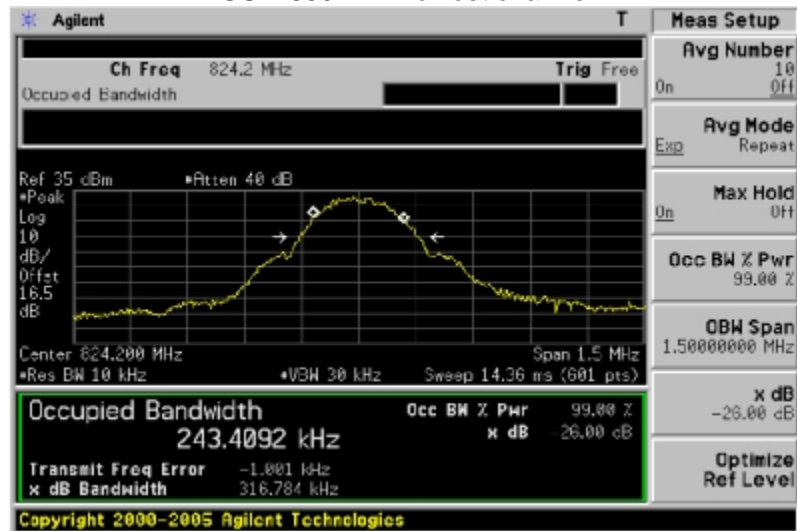
EUT Mode	Frequency (MHz)	99% Occupy bandwidth (kHz)
GSM 850 (GSM link)	824.20	243.4
	836.60	244.5
	848.80	242.7
GSM 850 (EGPRS 8 link)	824.20	250.0
	836.60	248.8
	848.80	249.8
PCS 1900 (GSM link)	1850.20	240.4
	1880.00	243.3
	1909.80	241.3
PCS 1900 (EGPRS 8 link)	1850.20	247.1
	1880.00	247.8
	1909.80	248.8
WCDMA Band II (RMC 12.2Kbps link)	1852.4	4062.5
	1880.0	4042.6
	1907.6	4035.2

Note: Measurement Uncertainty:  $\pm 20\text{Hz}$ .



Test plot as follows:

GSM 850MHz Lowest channel

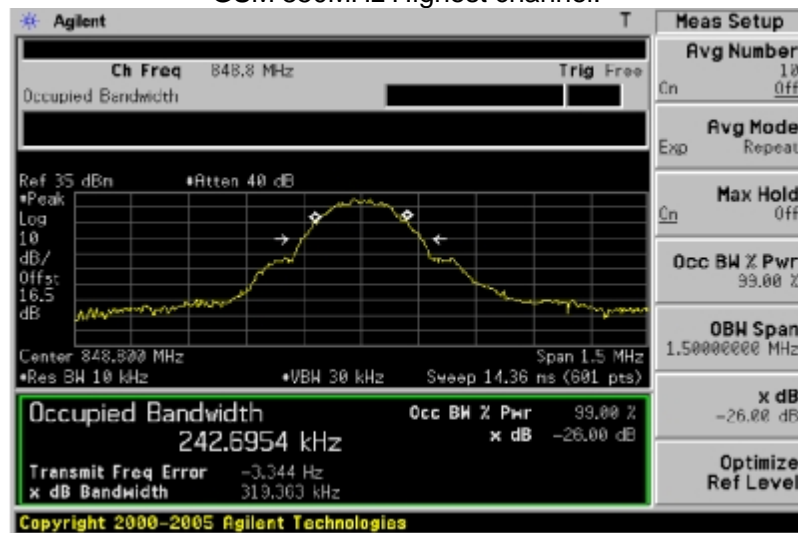


GSM 850MHz Middle channel



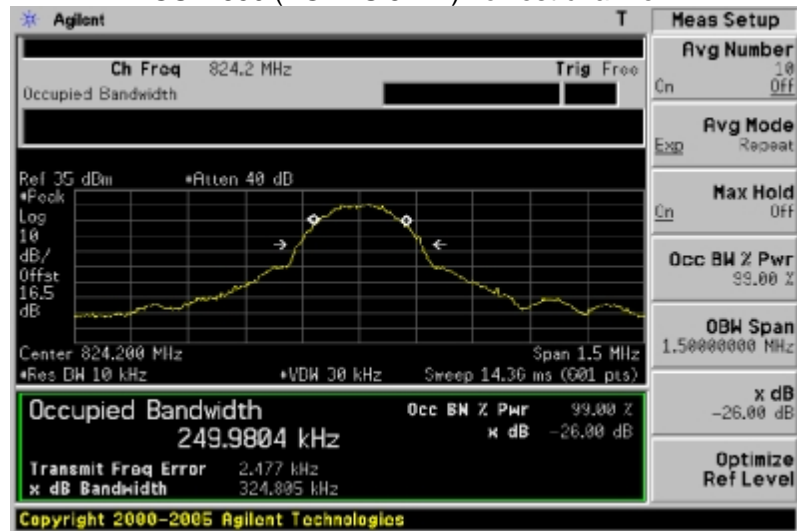


## GSM 850MHz Highest channel:

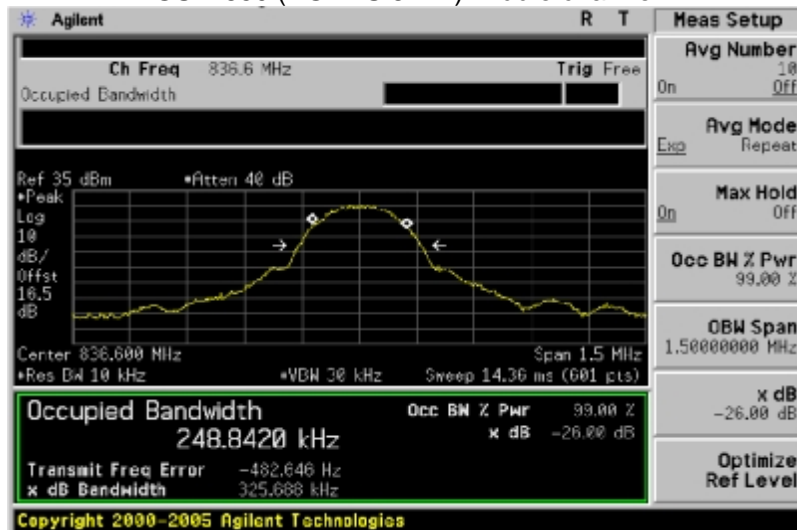




GSM 850 (EGPRS 8 link) Lowest channel



GSM 850 (EGPRS 8 link) Middle channel







## GSM 850 (EGPRS 8 link) Highest channel





PCS 1900 (GSM link) Lowest channel

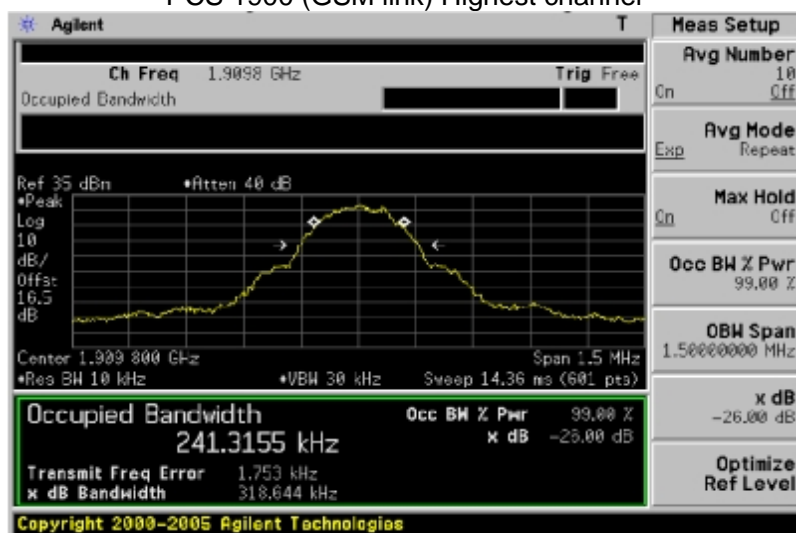


PCS 1900 (GSM link) Middle channel





## PCS 1900 (GSM link) Highest channel

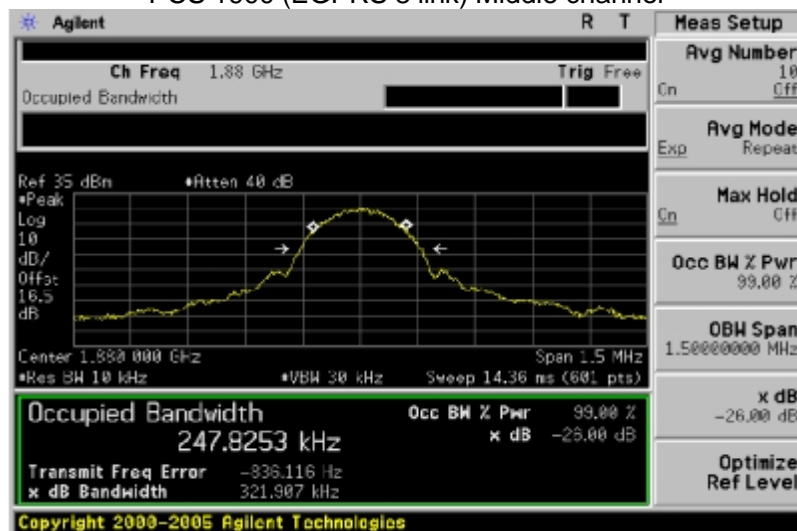




PCS 1900 (EGPRS 8 link) Lowest channel



PCS 1900 (EGPRS 8 link) Middle channel



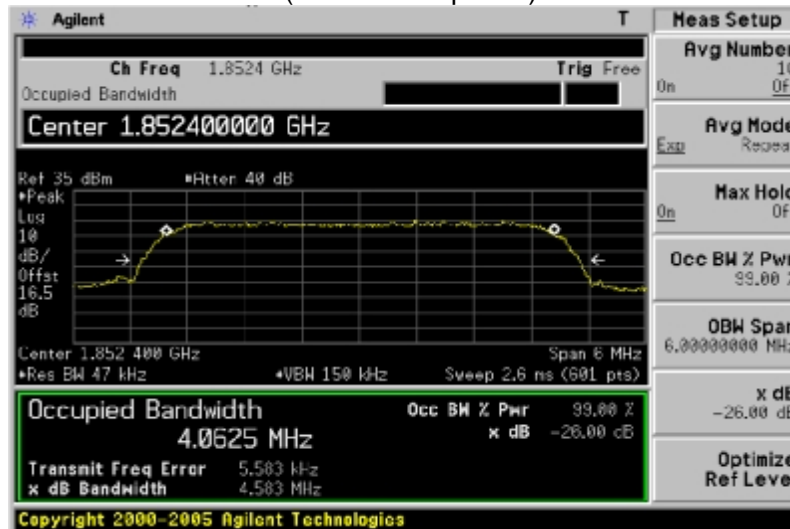


## PCS 1900 (EGPRS 8 link)z Highest channel

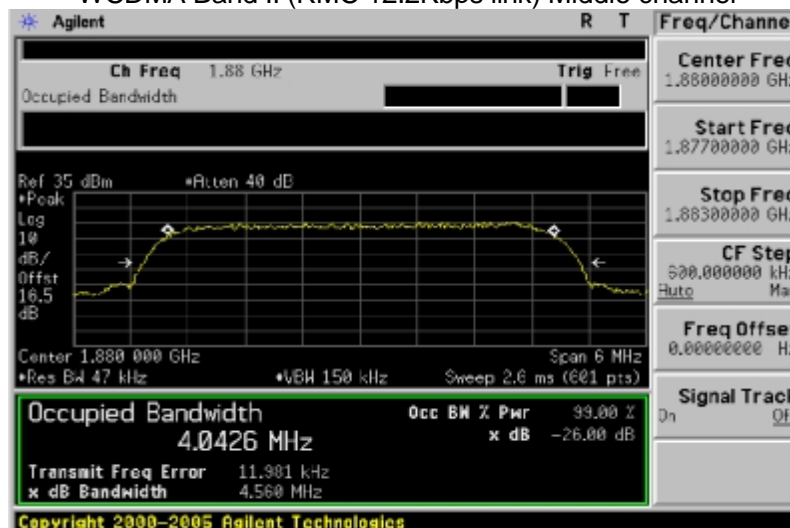




## WCDMA Band II (RMC 12.2Kbps link) Lowest channel



## WCDMA Band II (RMC 12.2Kbps link) Middle channel





## WCDMA Band II (RMC 12.2Kbps link) Highest channel



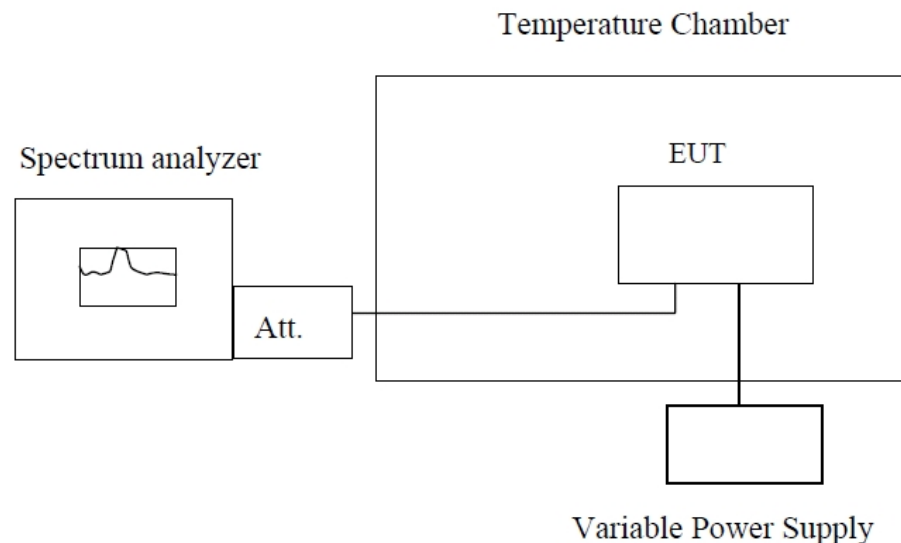
## 5.4. Frequency Stability

### 5.4.1. Limit

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  $-30^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$  at intervals of not more than  $10^{\circ}\text{C}$ .
- (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.

### 5.4.2. Test Setup



**Note :** Measurement setup for testing on Antenna connector

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

### 5.4.3. Test Result

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  $25^{\circ}\text{C}$ . The frequency deviation limit of 850MHz band is  $\pm 2.5\text{ppm}$ , and 1900MHz is  $\pm 1\text{ppm}$





Normal

Test Conditions			Frequency Deviation			Result
Band	Power(Vdc)	Temperature(°C)	Frequency Error(Hz)	ppm	Limit	
GSM850 (GSM link) Middle channel=190 channel=836. 6MHz	3.7	-30	44	0.0526	±2.5	PASS
	3.7	-20	40	0.0478		
	3.7	-10	35	0.0418		
	3.7	0	33	0.0394		
	3.7	10	31	0.0371		
	3.7	20	27	0.0323		
	3.7	30	33	0.0394		
	3.7	40	37	0.0442		
	3.7	50	35	0.0418		
	4.25	25	29	0.0347		
	3.70	25	27	0.0323		
	3.40	25	31	0.0371		
GSM850 (EGPRS 8 link) Middle channel=190 channel=836. 6MHz	3.7	-30	39	0.0466	±2.5	PASS
	3.7	-20	36	0.0430		
	3.7	-10	31	0.0371		
	3.7	0	30	0.0359		
	3.7	10	28	0.0335		
	3.7	20	25	0.0299		
	3.7	30	30	0.0359		
	3.7	40	33	0.0394		
	3.7	50	31	0.0371		
	4.25	25	27	0.0323		
	3.70	25	25	0.0299		
	3.40	25	28	0.0335		
PCS1900 (GSM link) Middle channel=661 channel=188 0MHz	3.7	-30	72	0.0383	±1	PASS
	3.7	-20	67	0.0356		
	3.7	-10	59	0.0314		
	3.7	0	57	0.0303		
	3.7	10	54	0.0287		
	3.7	20	49	0.0261		
	3.7	30	57	0.0303		
	3.7	40	62	0.0330		
	3.7	50	59	0.0314		
	4.25	25	52	0.0277		
	3.70	25	49	0.0261		
	3.40	25	51	0.0271		

Note: Measurement Uncertainty: ±20Hz.



PCS1900 (EGPRS 8 link) Middle channel=661 channel=188 0MHz	3.7	-30	57	0.0303	±1	PASS
	3.7	-20	64	0.0340		
	3.7	-10	75	0.0399		
	3.7	0	64	0.0340		
	3.7	10	36	0.0191		
	3.7	20	55	0.0293		
	3.7	30	48	0.0255		
	3.7	40	43	0.0229		
	3.7	50	63	0.0335		
	4.25	25	57	0.0303		
	3.70	25	45	0.0239		
	3.40	25	27	0.0144		
WCDMA Band II Middle channel=940 0 channel=188 0.0MHz	3.7	-30	46	0.0245	±1	PASS
	3.7	-20	65	0.0346		
	3.7	-10	57	0.0303		
	3.7	0	44	0.0234		
	3.7	10	43	0.0229		
	3.7	20	38	0.0202		
	3.7	30	26	0.0138		
	3.7	40	45	0.0239		
	3.7	50	54	0.0287		
	4.25	25	36	0.0191		
	3.70	25	48	0.0255		
	3.40	25	42	0.0223		

Note: Measurement Uncertainty: ±20Hz.

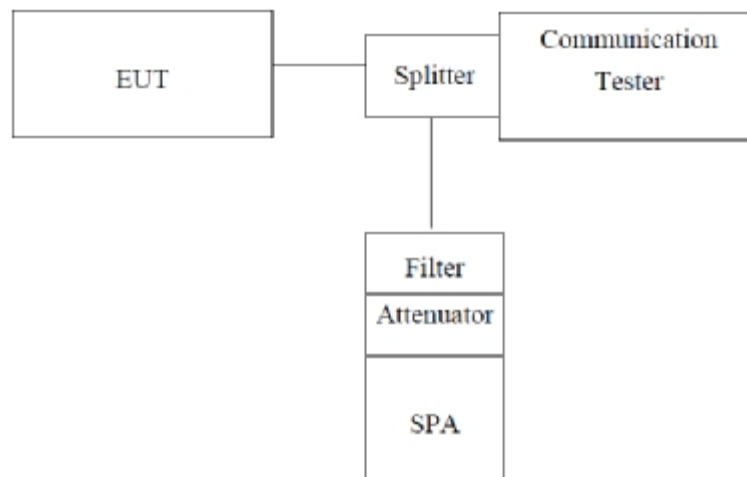


## 5.5. Conducted Out of Band Emissions

### 5.5.1. Limit

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.

### 5.5.2. Test Setup



*Note: Measurement setup for testing on Antenna connector*

### 5.5.3. Measurement Procedure

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 1MHz, sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.

For the out of band: Set the RBW, VBW = 100KHz, Start=30MHz, Stop= 10th harmonic.

Limit = -13dBm

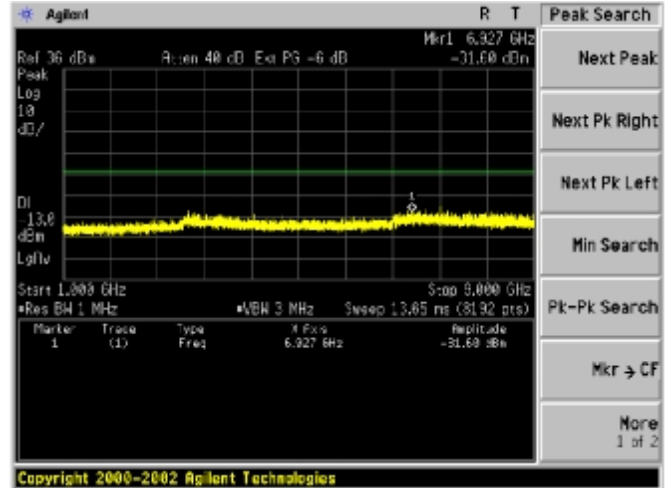
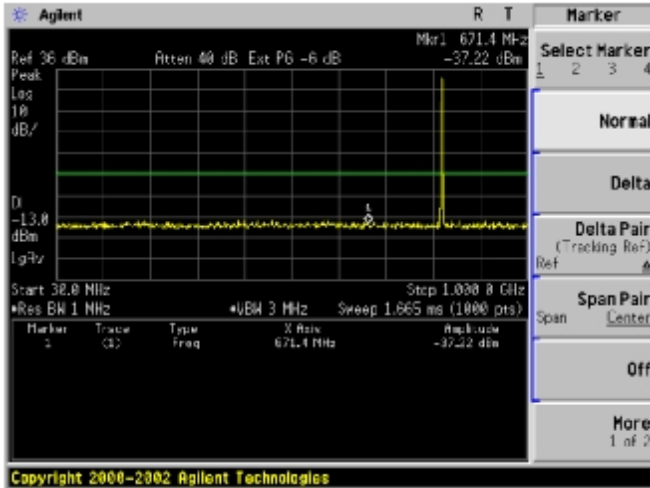
### 5.5.4. Test Result

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

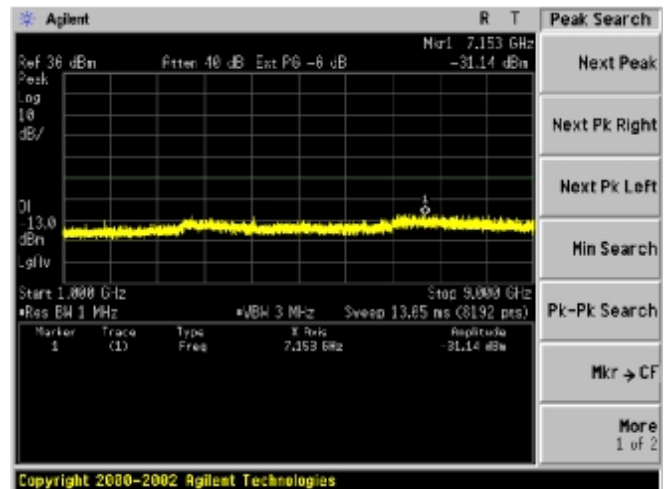
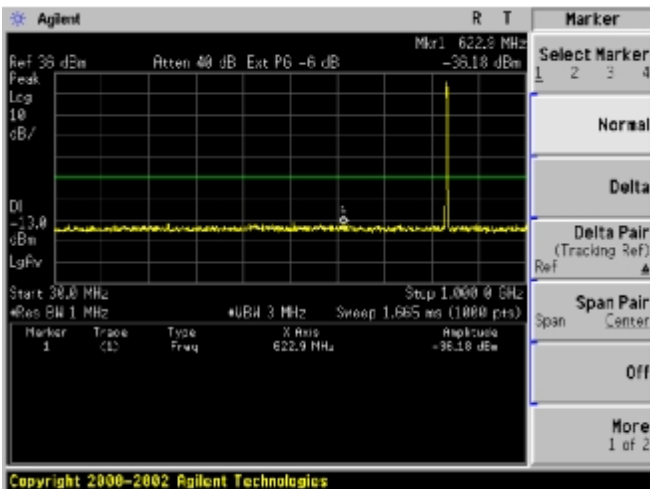
Test plot as follows:



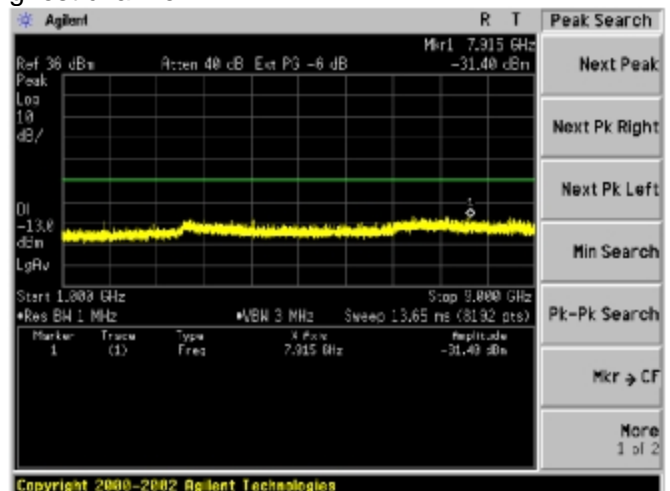
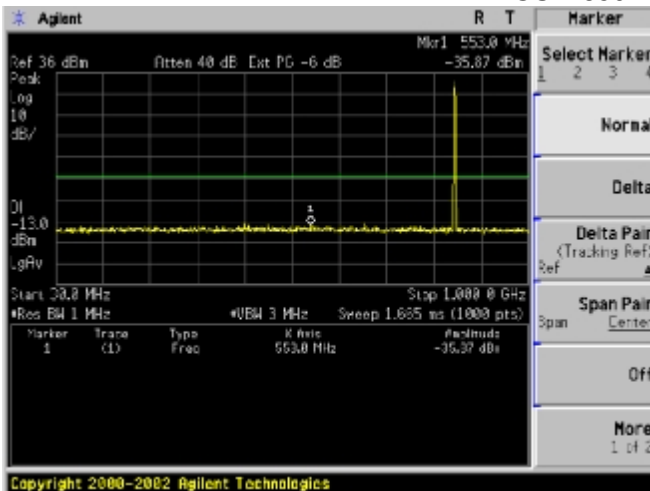
## GSM 850MHz Lowest channel



## GSM 850MHz Middle channel

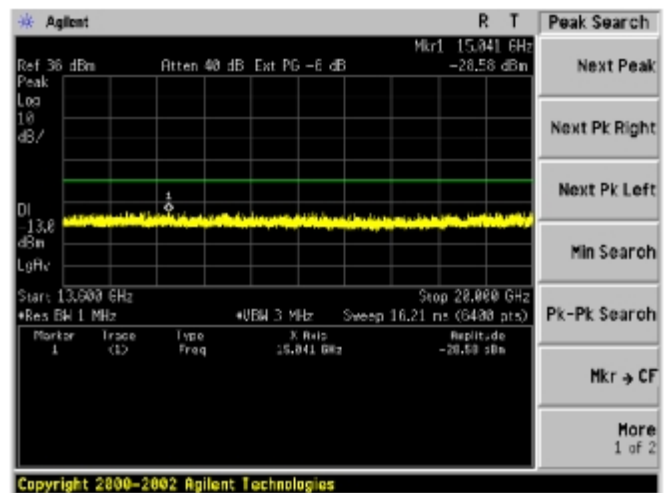
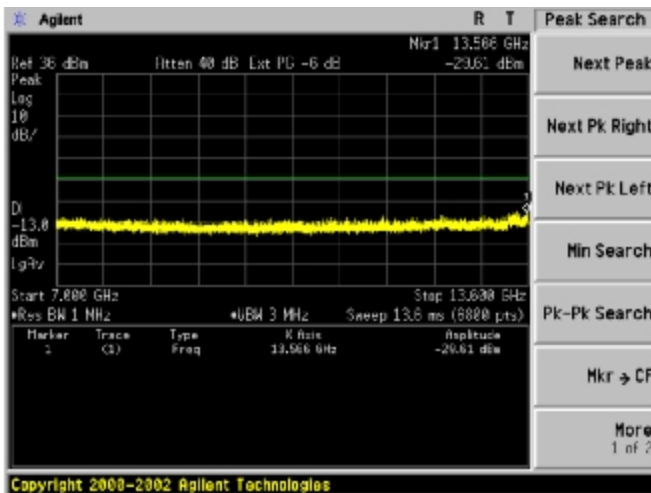
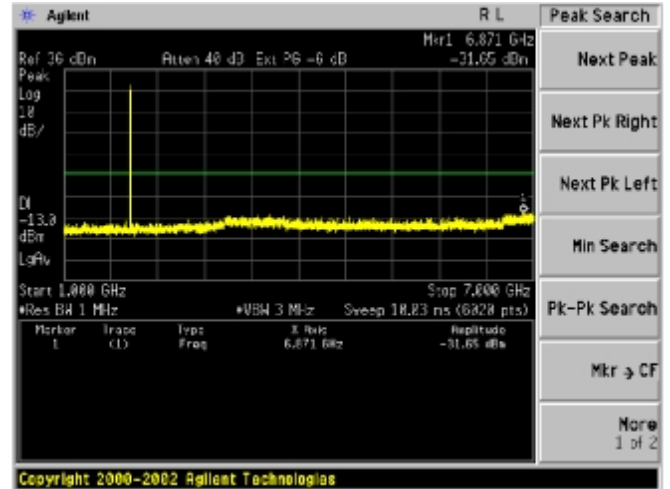
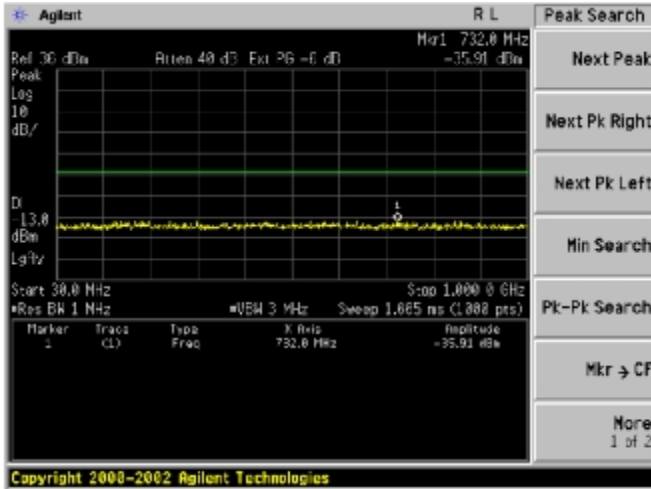


## GSM 850MHz Highest channel



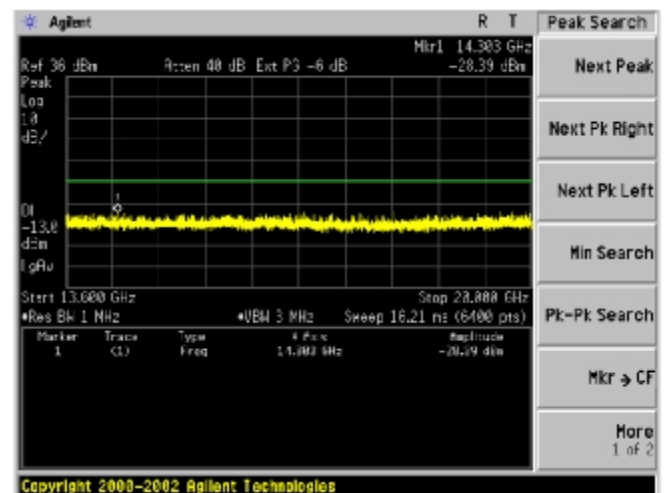
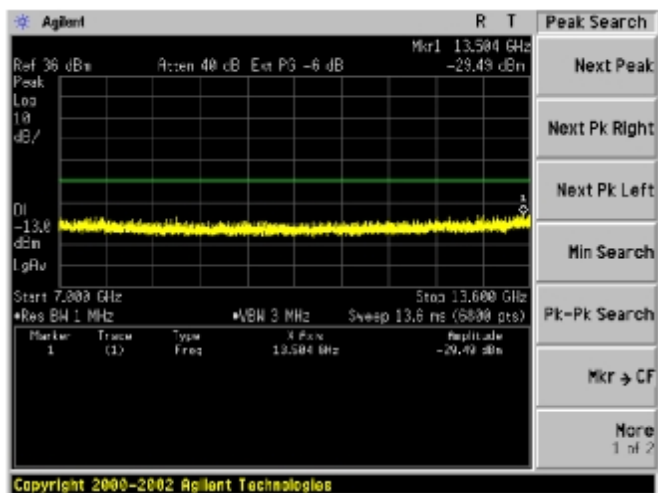
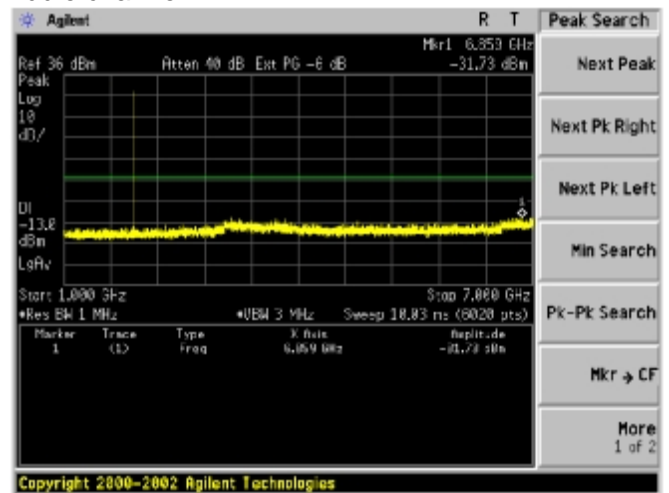
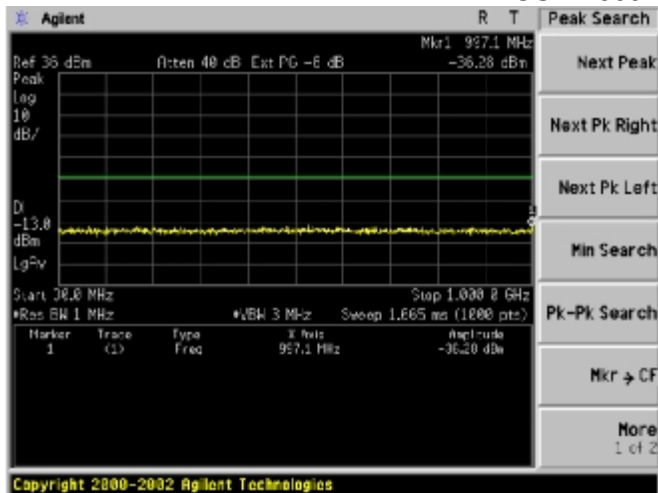


## GSM 1900MHz Lowest channel



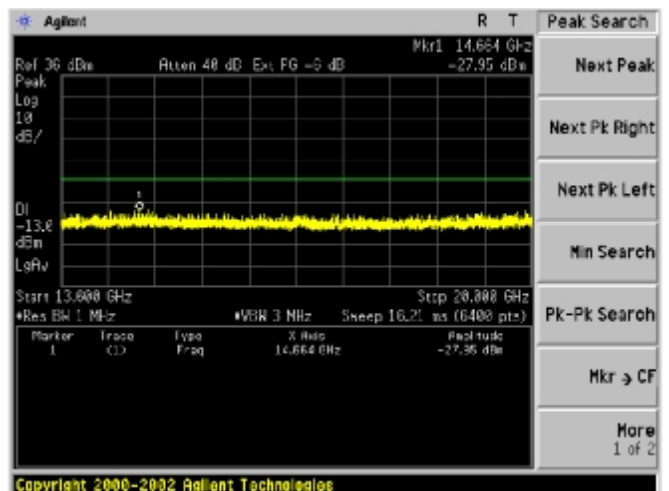
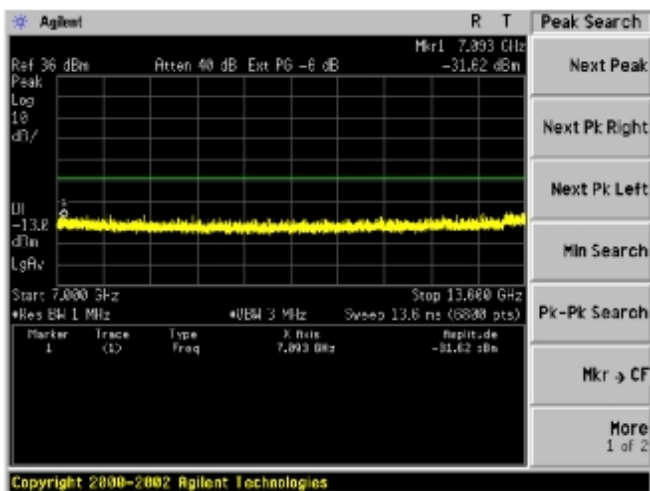
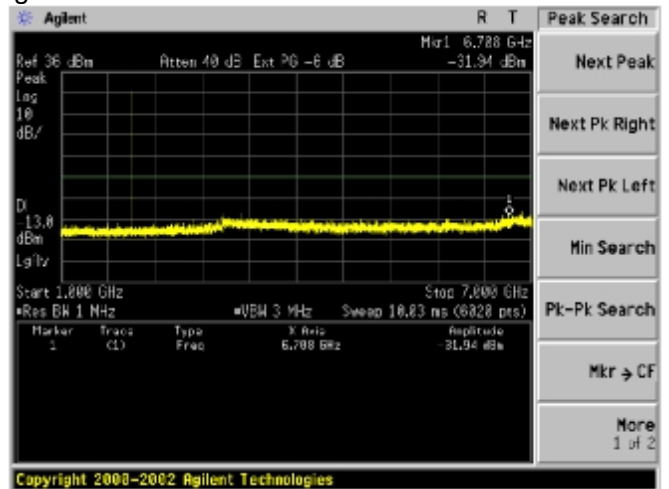
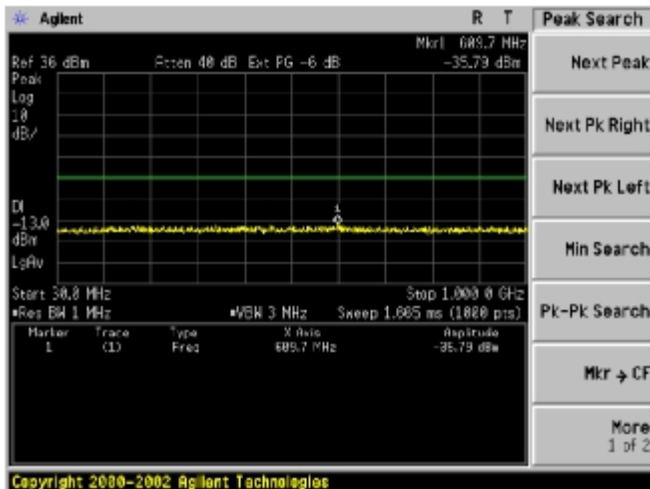


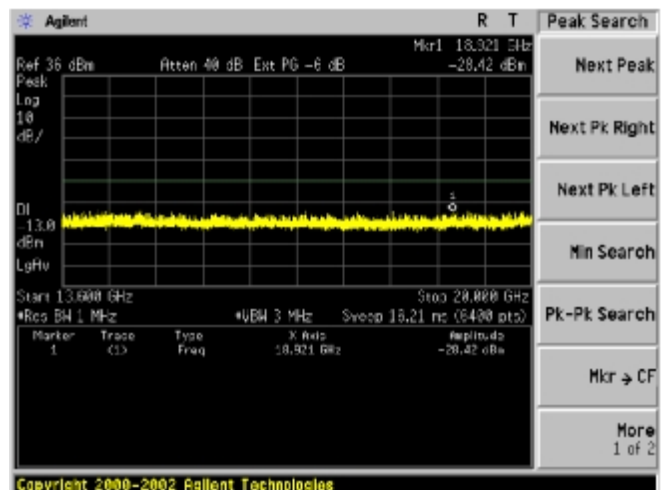
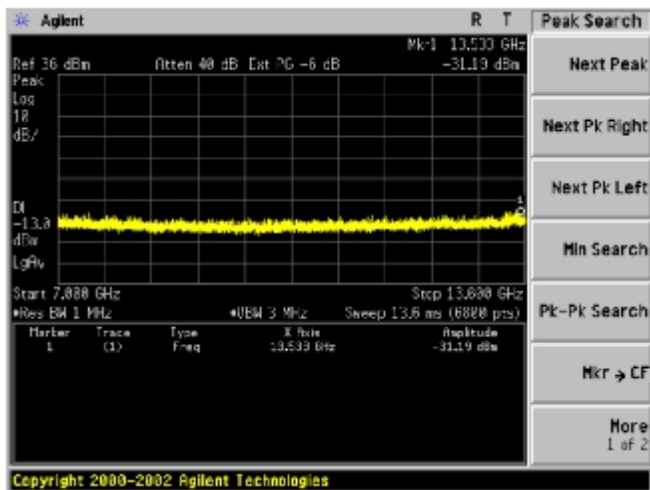
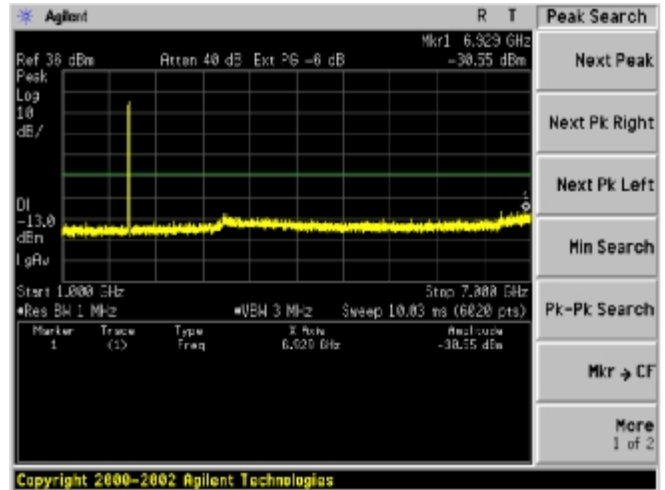
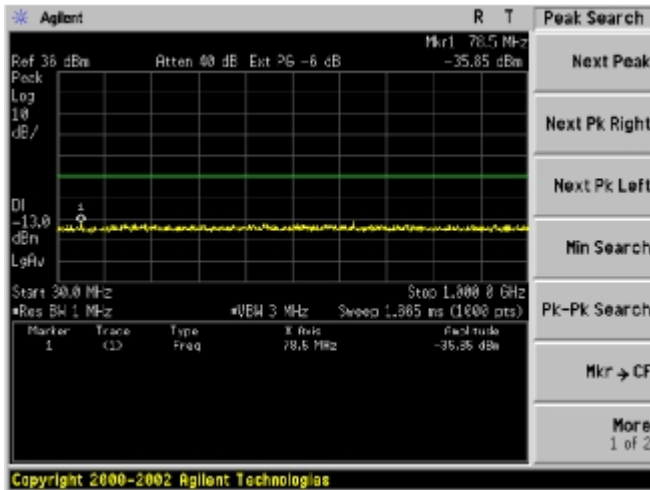
## GSM 1900MHz Middle channel



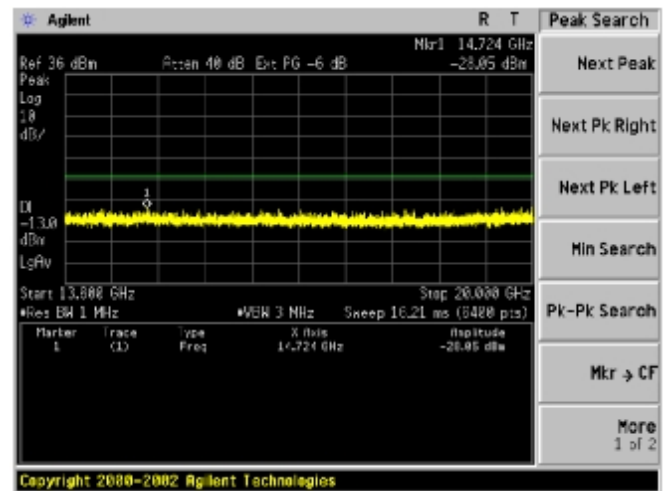
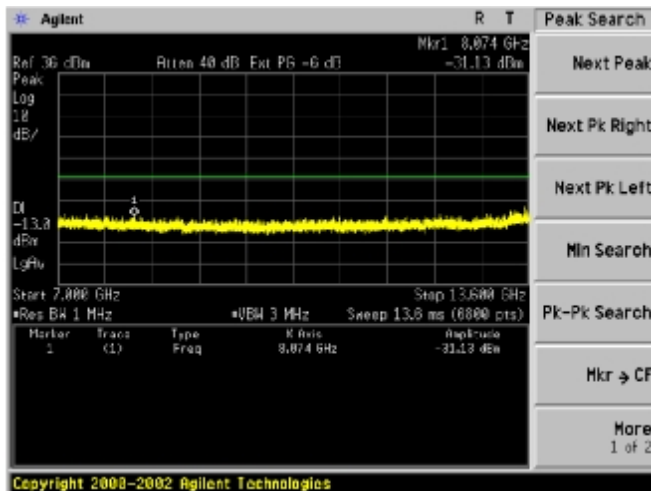
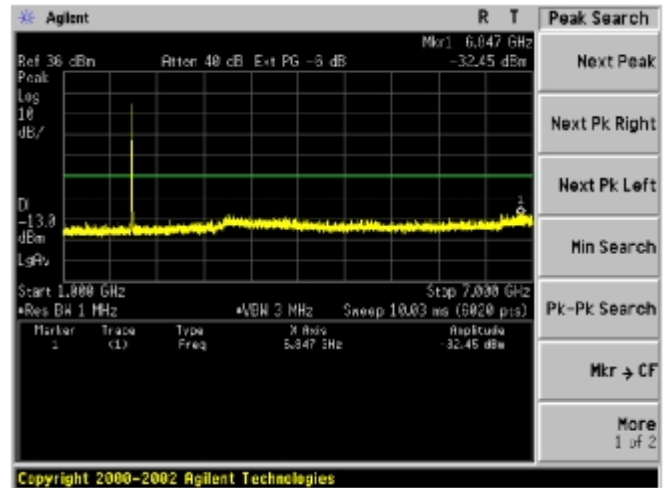
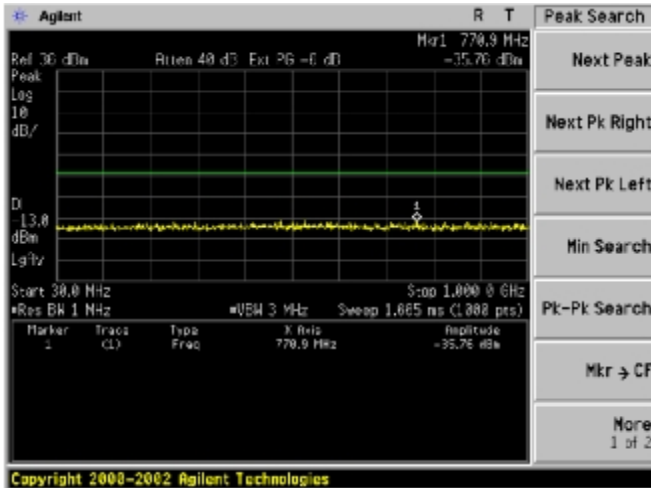


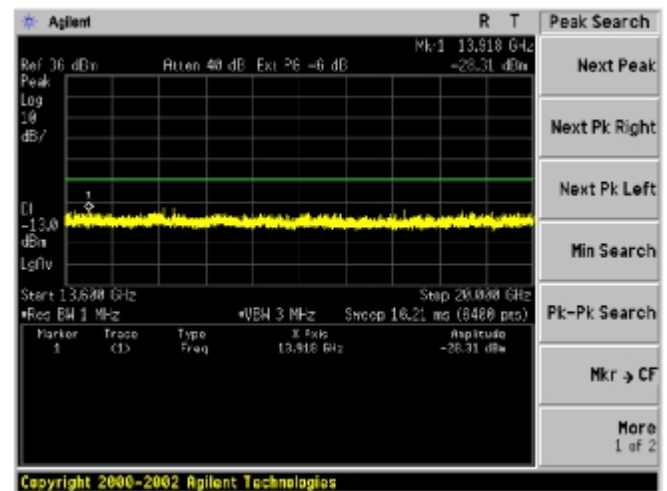
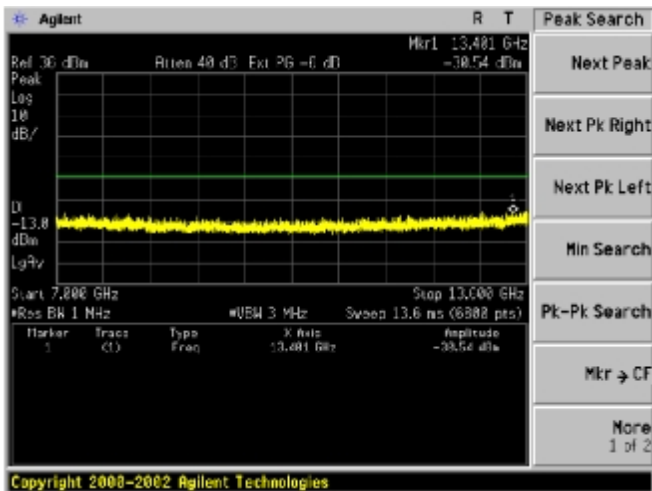
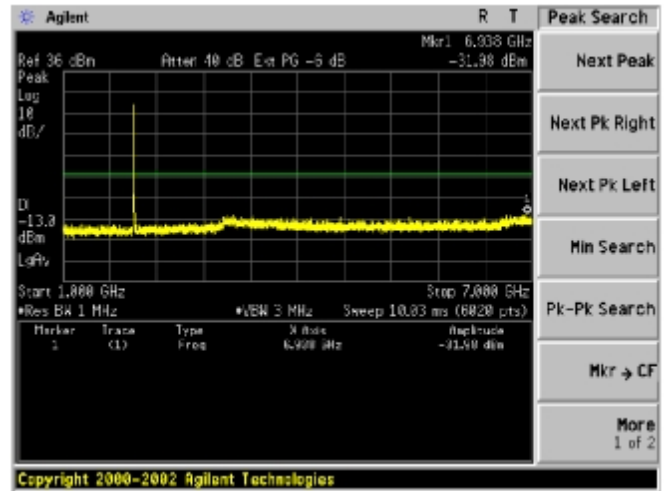
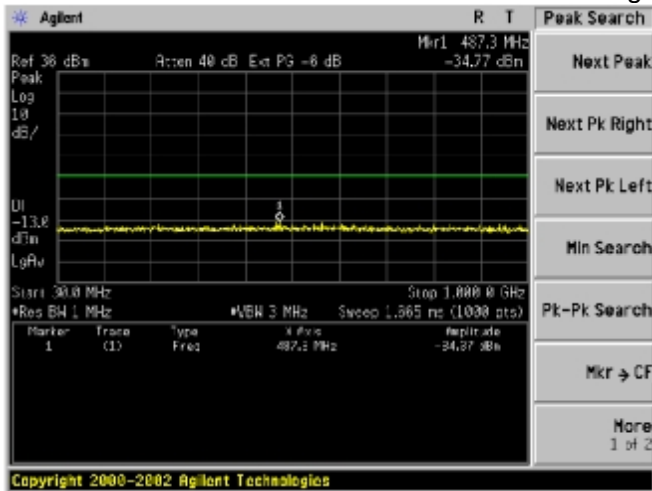
## GSM 1900MHz Highest channel



WCDMA Band II (RMC 12.2Kbps link)  
Lowest channel



WCDMA Band II (RMC 12.2Kbps link)  
Middle channel

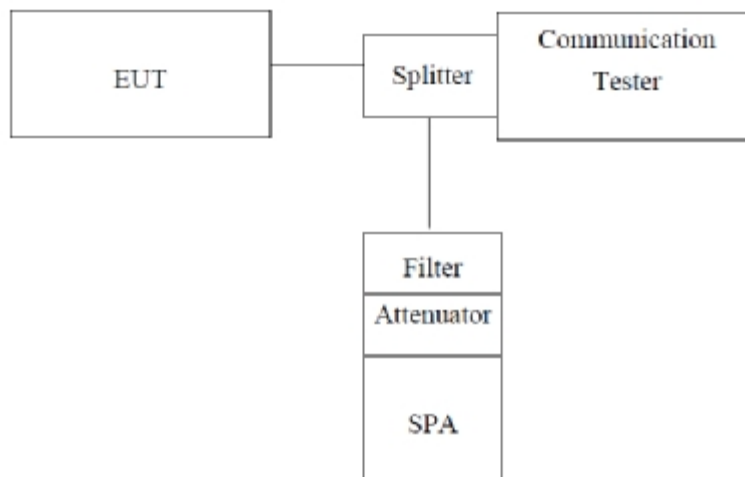
WCDMA Band II (RMC 12.2Kbps link)  
Highest channel

## 5.6. Conducted Out of Band Emissions

### 5.6.1. Limit

According to FCC section 22.917(b) and FCC section 24.238(b), 27.53(g)(h) 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.

### 5.6.2. Test Setup



*Note: Measurement setup for testing on Antenna connector*

### 5.6.3. Measurement Procedure

The EUT, which is powered by the adapter, is coupled to the Spectrum Analyzer and the System Simulator 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 System Simulator 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 System Simulator.

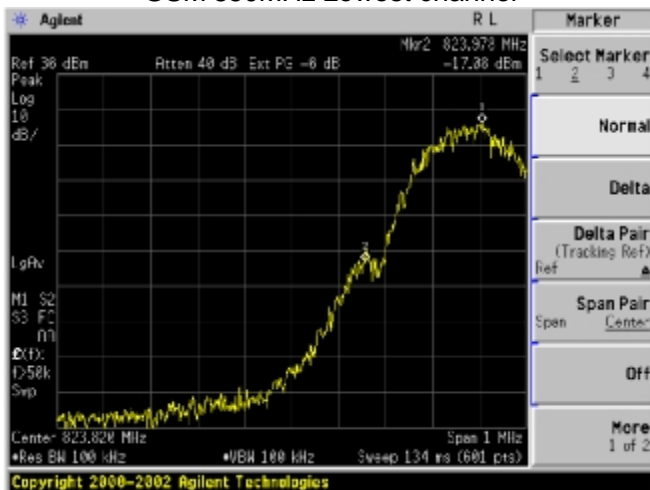
### 5.6.4. Test Result

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

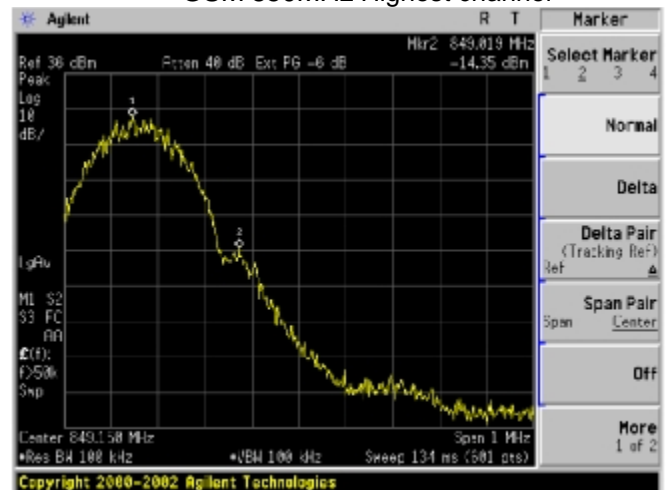
Test plot as follows:



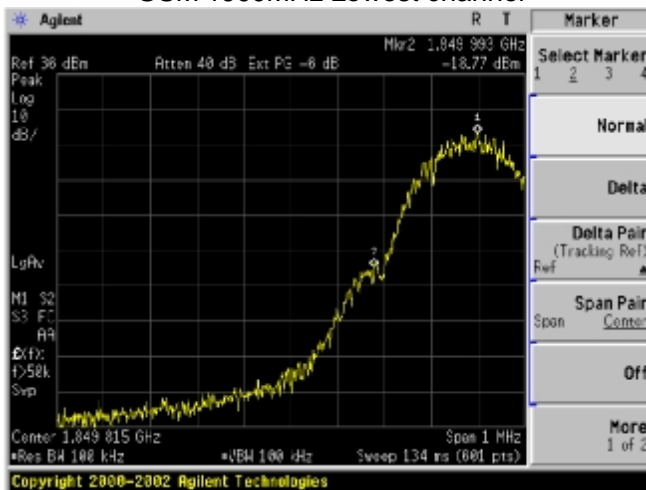
GSM 850MHz Lowest channel



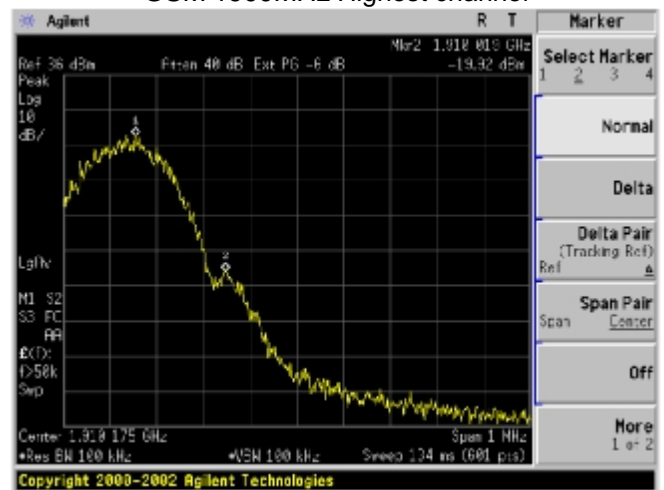
GSM 850MHz Highest channel

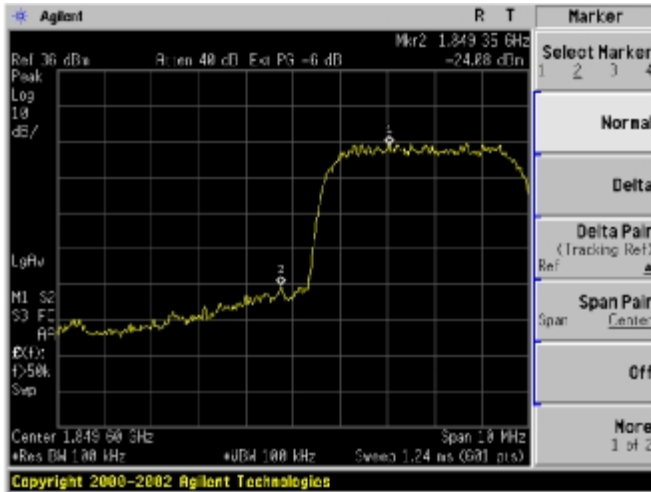
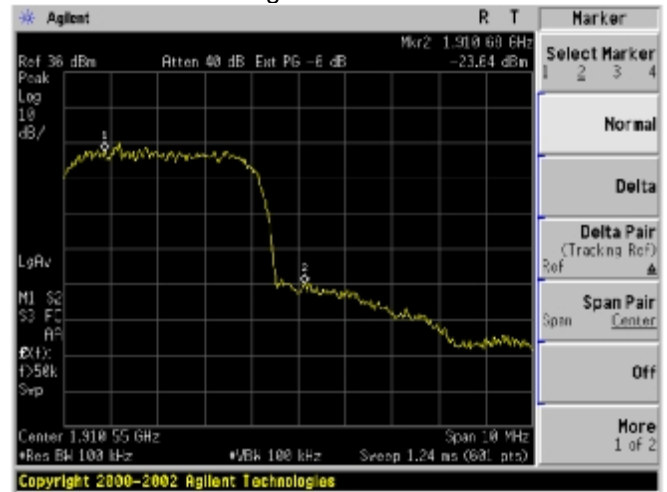


GSM 1900MHz Lowest channel



GSM 1900MHz Highest channel



WCDMA Band II (RMC 12.2Kbps link)  
Lowest channelWCDMA Band II (RMC 12.2Kbps link)  
Highest channel

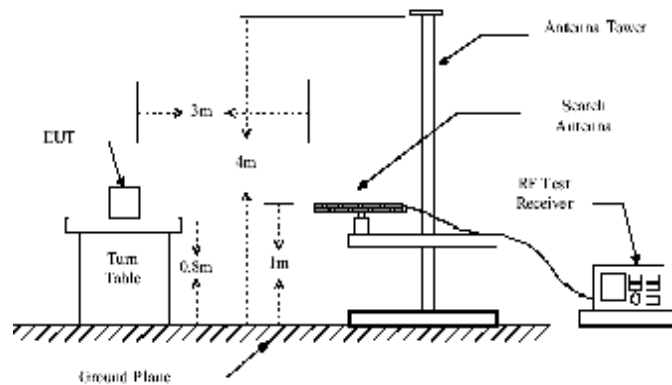
## 5.7. Transmitter Radiated Power (EIRP/ERP)

### 5.7.1. Limit

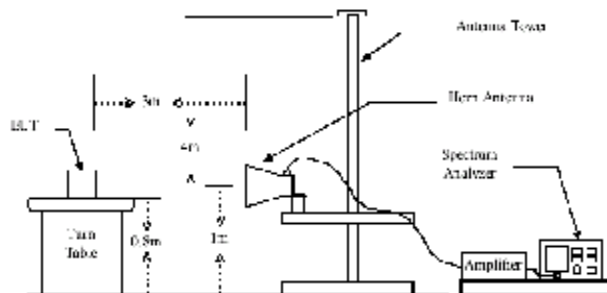
According to FCC section 22.913, the Effective Radiated Power (ERP) of mobile transmitters and auxiliary test transmitters must not exceed 7Watts, and FCC section 24.232, the broadband PCS mobile station is limited to 2 Watts e.i.r.p. peak power.

### 5.7.2. Test Setup

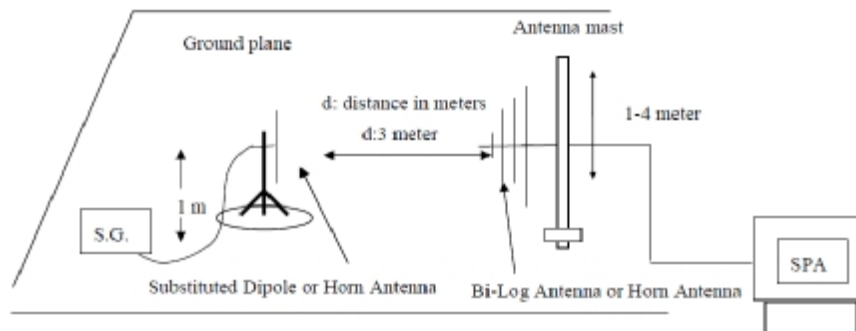
Below 1GHz



Above 1GHz



Substituted method:





### 5.7.3. Measurement Procedure

The EUT was placed on a non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer. All test in Full-Anechoic Chamber.

During the measurement, the EUT was communication with the station. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna from 4m to 1m. The reading was recorded and the field strength (E in dBuV/m) was calculated.

ERP in frequency band 824.2 –848.80.8MHz were measured using a substitution method. The EUT was replaced by dipole antenna connected, the S.G. output was recorded and ERP was calculated as follows:

EIRP in frequency band 1850.2 –1909.8MHz were measured using a substitution method. The EUT was replaced by or horn antenna connected, the S.G. output was recorded and EIRP was calculated as follows:

$$\text{ERP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBd)} - \text{Cable Loss (dB)}$$
$$\text{EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable Loss (dB)}$$

### 5.7.4. Test Result



EUT mode	Channel	EUT Pol.	Antenna Pol.	ERP(dBm)	Limit (dBm)	Result
GSM850 (GSM link)	Lowest	H	V	31.84	38.45	Pass
			H	29.08		
		E1	V	25.09		
			H	29.41		
		E2	V	24.57		
			H	27.79		
	Middle	H	V	31.73	38.45	Pass
			H	29.32		
		E1	V	25.42		
			H	29.77		
		E2	V	25.85		
			H	28.24		
	Highest	H	V	32.28	38.45	Pass
			H	29.04		
		E1	V	25.28		
			H	28.83		
		E2	V	24.17		
			H	28.38		





EUT mode	Channel	EUT Pol.	Antenna Pol.	ERP(dBm)	Limit (dBm)	Result
GSM850 (EGPRS 8 link)	Lowest	H	V	30.84	38.45	Pass
			H	28.97		
		E1	V	22.94		
			H	25.38		
		E2	V	24.29		
			H	23.34		
	Middle	H	V	27.93	38.45	Pass
			H	25.18		
		E1	V	26.26		
			H	25.74		
		E2	V	20.80		
			H	23.82		
	Highest	H	V	32.12	38.45	Pass
			H	24.63		
		E1	V	27.89		
			H	24.36		
		E2	V	27.50		
			H	23.80		



EUT mode	Channel	EUT Pol.	Antenna Pol.	EIRP (dBm)	Limit (dBm)	Result
PCS1900 (GSM link)	Lowest	H	V	29.73	33.01	Pass
			H	27.08		
		E1	V	22.99		
			H	27.42		
		E2	V	22.46		
			H	25.76		
	Middle	H	V	30.24	33.01	Pass
			H	28.60		
		E1	V	24.60		
			H	29.06		
		E2	V	25.03		
			H	27.49		
	Highest	H	V	30.05	33.01	Pass
			H	27.91		
		E1	V	24.05		
			H	27.69		
		E2	V	22.92		
			H	27.23		



EUT mode	Channel	EUT Pol.	Antenna Pol.	EIRP (dBm)	Limit (dBm)	Result
PCS1900 (EGPRS 8 link)	Lowest	H	V	28.72	33.01	Pass
			H	24.09		
		E1	V	19.48		
			H	24.47		
		E2	V	18.89		
			H	22.60		
	Middle	H	V	29.89	33.01	Pass
			H	24.37		
		E1	V	19.87		
			H	24.88		
		E2	V	20.36		
			H	23.12		
	Highest	H	V	29.92	33.01	Pass
			H	23.72		
		E1	V	19.39		
			H	23.48		
		E2	V	18.11		
			H	22.96		



EUT mode	Channel	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
WCDMA Band II	Lowest	H	V	22.89	33.01	Pass
			H	17.97		
		E1	V	15.85		
			H	16.39		
		E2	V	15.19		
			H	19.31		
	Middle	H	V	22.63	33.01	Pass
			H	17.83		
		E1	V	16.83		
			H	18.40		
		E2	V	17.38		
			H	20.45		
	Highest	H	V	22.83	33.01	Pass
			H	21.28		
		E1	V	15.46		
			H	20.01		
		E2	V	14.05		
			H	17.44		

## 5.8. Radiated Out of Band Emissions

### 5.8.1. Limit

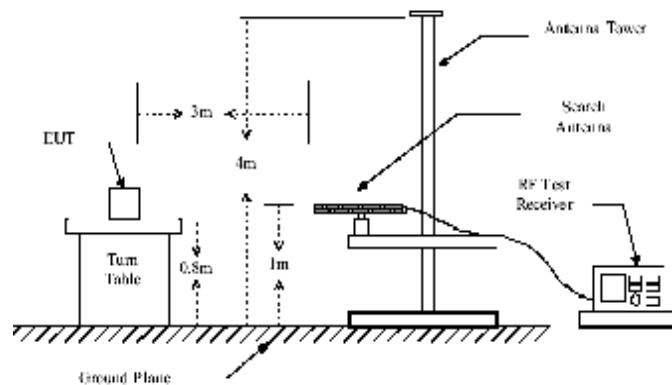
According to FCC section 22.917(a) and section 24.238(a), 27.53(g) the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power

(P) by a factor of at least  $43+10*\log(P)$ dB. This calculated to be -13dBm.

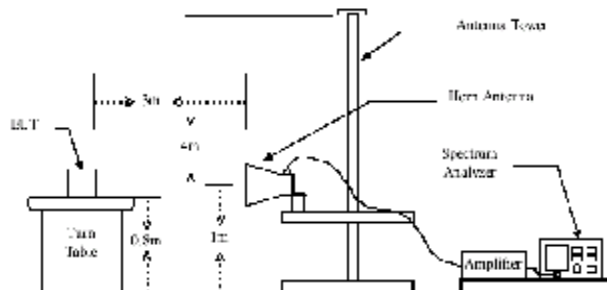
The spurious emission with frequency band 1900 according to FCC section 2.1057.

### 5.8.2. Test Setup

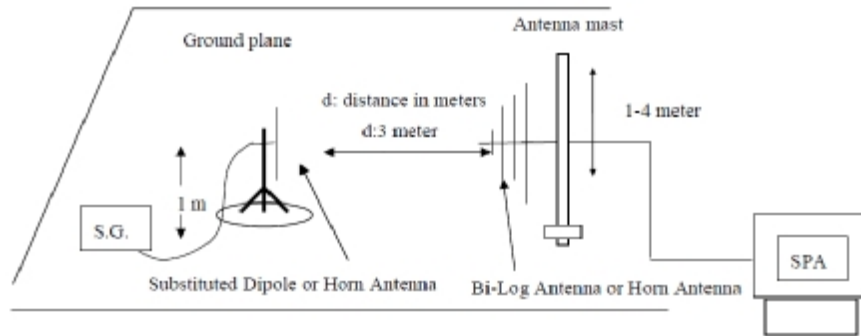
Below 1GHz



Above 1GHz



Substituted method:



### 5.8.3. Measurement Procedure

The EUT was placed on a non-conductive, The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations. all test in Full-Anechoic Chamber.

The frequency range up to tenth harmonic was investigated for each of three fundamental frequency

(low, middle and high channels). Once spurious emission was identified, the power of the emission was determined using the substitution method.

The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency.

$$\text{EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain(dBi)} - \text{Cable Loss (dB)}$$

Note: Measurement Uncertainty:  $\pm 3.6$  dB.



Band	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level(dBm)		
GSM 850 Lowest	47.87	Vertical	-73.05	-13	PASS
	1648.40	Vertical	-24.27		
	2472.60	Vertical	-31.33		
	3296.80	Vertical	-33.58		
	4121.00	Vertical	-41.08		
	4945.20	Vertical	-35.23		
	127.58	Horizontal	-72.53		
	2472.60	Horizontal	-28.67		
	3296.80	Horizontal	-33.52		
	4121.00	Horizontal	-41.53		
	4945.20	Horizontal	-44.48		
	5769.40	Horizontal	-38.58		

Band	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level(dBm)		
GSM 850 Middle	45.58	Vertical	-71.15	-13	PASS
	1673.20	Vertical	-27.24		
	2509.80	Vertical	-28.59		
	3346.40	Vertical	-36.53		
	4183.00	Vertical	-43.46		
	5019.60	Vertical	-38.59		
	126.86	Horizontal	-72.43		
	1673.20	Horizontal	-24.18		
	2509.80	Horizontal	-28.44		
	3346.40	Horizontal	-44.15		
	4183.00	Horizontal	-45.21		
	5019.60	Horizontal	-35.06		

Band	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level(dBm)		
GSM 850 Highest	45.76	Vertical	-72.24	-13	PASS
	1697.60	Vertical	-26.13		
	2546.40	Vertical	-28.86		
	3395.20	Vertical	-32.43		
	4244.00	Vertical	-37.12		
	5092.80	Vertical	-42.21		
	121.65	Horizontal	-72.23		
	1697.60	Horizontal	-24.57		
	2546.40	Horizontal	-29.06		
	3395.20	Horizontal	-34.15		
	4244.00	Horizontal	-42.46		
	5092.80	Horizontal	-48.64		



Band	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level(dBm)		
PCS1900 Lowest	39.89	Vertical	-74.15	-13	PASS
	3700.40	Vertical	-42.53		
	5550.60	Vertical	-42.76		
	7400.80	Vertical	-35.16		
	9251.00	Vertical	-38.11		
	11101.20	Vertical	-37.16		
	188.67	Horizontal	-73.12		
	3700.40	Horizontal	-44.75		
	5550.60	Horizontal	-43.13		
	7400.80	Horizontal	-37.78		
	9251.00	Horizontal	-42.59		
	11101.20	Horizontal	-39.87		

Band	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level(dBm)		
PCS1900 Middle	39.47	Vertical	-71.76	-13	PASS
	3760.00	Vertical	-43.86		
	5640.00	Vertical	-42.58		
	7520.00	Vertical	-38.17		
	9400.00	Vertical	-37.11		
	11280.00	Vertical	-38.61		
	187.77	Horizontal	-73.62		
	3760.00	Horizontal	-42.28		
	5640.00	Horizontal	-42.13		
	7520.00	Horizontal	-34.75		
	9400.00	Horizontal	-38.21		
	11280.00	Horizontal	-37.61		

Band	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level(dBm)		
PCS1900 Highest	42.96	Vertical	-72.34	-13	PASS
	3819.60	Vertical	-43.23		
	5729.40	Vertical	-37.05		
	7639.20	Vertical	-33.36		
	9549.00	Vertical	-39.76		
	11458.80	Vertical	-39.61		
	185.89	Horizontal	-72.75		
	3819.60	Horizontal	-41.58		
	5729.40	Horizontal	-36.95		
	7639.20	Horizontal	-32.73		
	9549.00	Horizontal	-37.85		
	11458.80	Horizontal	-37.15		





Band	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level(dBm)		
WCDMA Band II Lowest	52.79	Vertical	-74.18	-13	PASS
	3704.80	Vertical	-24.57		
	5557.20	Vertical	-25.84		
	7409.60	Vertical	-32.54		
	9262.00	Vertical	-39.28		
	11114.40	Vertical	-44.61		
	152.32	Horizontal	-75.16		
	3704.80	Horizontal	-21.74		
	5557.20	Horizontal	-27.08		
	7409.60	Horizontal	-35.16		
	9262.00	Horizontal	-41.34		
	11114.40	Horizontal	-46.37		

Band	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level(dBm)		
WCDMA Band II Middle	51.12	Vertical	-74.15	-13	PASS
	3760.00	Vertical	-23.62		
	5640.00	Vertical	-25.86		
	7520.00	Vertical	-32.45		
	9400.00	Vertical	-39.75		
	11280.00	Vertical	-44.18		
	147.78	Horizontal	-75.12		
	3760.00	Horizontal	-22.37		
	5640.00	Horizontal	-27.18		
	7520.00	Horizontal	-35.12		
	9400.00	Horizontal	-41.42		
	11280.00	Horizontal	-46.07		

Band	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level(dBm)		
WCDMA Band II Highest	54.09	Vertical	-74.21	-13	PASS
	3815.20	Vertical	-22.73		
	5722.80	Vertical	-27.19		
	7630.40	Vertical	-32.06		
	9538.00	Vertical	-39.32		
	11445.60	Vertical	-44.51		
	151.76	Horizontal	-73.59		
	3815.20	Horizontal	-22.06		
	5722.80	Horizontal	-27.12		
	7630.40	Horizontal	-35.26		
	9538.00	Horizontal	-41.75		
	11445.60	Horizontal	-46.35		

## 6. PHOTOGRAPHS OF TEST SET-UP

