

# FCC Part 22H & 24E Measurement and Test Report

For

Shenzhen Fortuneship Technology Co., Ltd.

Room 701-716, 7th Floor, Kanghesheng Building, No.1 ChuangSheng Road,

Nanshan District, Shenzhen, Guangdong, P. R. China

**FCC ID: 2ABXIE400**

**FCC Rules:** FCC Part 22H, FCC Part 24E

**Product Description:** 3G Mobile Phone

**Tested Model:** PCD E400

**Report No.:** STR16018171I-1

**Tested Date:** 2016-01-27 to 2016-02-19

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**Tested By:** Iven Guo / Engineer

*Iven Guo*

**Reviewed By:** Silin Chen / EMC Manager

*Silin Chen*

**Approved & Authorized By:** Jandy So / PSQ Manager

*Jandy So*

**Prepared By:**

**Shenzhen SEM.Test Technology Co., Ltd.**

1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road,  
Bao'an District, Shenzhen, P.R.C. (518101)

Tel.: +86-755-33663308 Fax.: +86-755-33663309 Website: www.semtest.com.cn

Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by Shenzhen SEM. Test Technology Co., Ltd.

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## 1. GENERAL INFORMATION

### 1.1 Product Description for Equipment Under Test (EUT)

#### Client Information

Applicant: Shenzhen Fortuneship Technology Co., Ltd.  
Address of applicant: Room 701-716, 7th Floor, Kanghesheng Building, No.1  
ChuangSheng Road, Nanshan District, Shenzhen,  
Guangdong, P. R. China

Manufacturer: Shenzhen Fortuneship Technology Co., Ltd.  
Address of manufacturer: Room 701-716, 7th Floor, Kanghesheng Building, No.1  
ChuangSheng Road, Nanshan District, Shenzhen,  
Guangdong, P. R. China

General Description of EUT:	
Product Name:	3G Mobile Phone
Brand Name:	/
Model No.:	PCD E400
Hardware Version:	A500-MB-V0.6
Software Version:	VS401_NFUTRAL_B25_2SIM_UNLOCK_V01_20151022
IMEI:	354329060072092
Rated Voltage:	Battery: DC 3.7V(5.18Wh)
Power Adaptor:	Model: PCD E400
	INPUT: AC100-240V 50/60Hz,0.15A
	OUTPUT: DC5V/0.7A
Note: The test data is gathered from a production sample provided by the manufacturer.	

Technical Characteristics of EUT:	
2G	
Support Networks:	GSM, GPRS, EDGE
Support Band:	GSM850/PCS1900
Uplink Frequency:	GSM/GPRS/EDGE 850: 824~849MHz GSM/GPRS/EDGE 1900: 1850~1910MHz
Downlink Frequency:	GSM/GPRS/EDGE 850: 869~894MHz GSM/GPRS/EDGE 1900: 1930~1990MHz
Max RF Output Power:	GSM850: 32.37dBm, GSM1900: 28.78dBm EDGE850: 28.17dBm, EDGE1900: 25.51dBm
Type of Emission:	GSM850: 253KGXW, GSM1900: 251KGXW EDGE850: 265KG7W, EDGE1900: 256KG7W
Type of Modulation:	GMSK, 8PSK
Type of Antenna:	Integral Antenna
Antenna Gain:	GSM850: -0.7dBi; GSM1900: 0.7dBi
GPRS/EDGE Class:	Class 12
3G	
Support Networks:	WCDMA, HSDPA, HSUPA
Support Band:	WCDMA Band 2, WCDMA Band 5
Uplink Frequency:	WCDMA Band 2: 1850~1910MHz WCDMA Band 5: 824~849MHz
Downlink Frequency:	WCDMA Band 2: 1930~1990MHz WCDMA Band 5: 869~894MHz
RF Output Power:	WCDMA Band 2: 22.49dBm, WCDMA Band 5: 22.33dBm
Type of Emission:	WCDMA Band 2: 4M17F9W WCDMA Band 5: 4M19F9W
Type of Modulation:	BPSK
Antenna Type:	Integral Antenna
Antenna Gain:	WCDMA Band 2: 0.7dBi, WCDMA Band 5: -0.7dBi

## 1.2 Test Standards

The following report is prepared on behalf of the Shenzhen Fortuneship Technology Co., Ltd. in accordance with FCC Part 2 subpart J, FCC Part 22 subpart H and FCC Part 24 subpart E and FCC Part 27 of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 2 subpart J, FCC Part 22 subpart H and FCC Part 24 subpart E and FCC Part 27 of the Federal Communication Commissions rules.

**Maintenance of compliance** is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

## 1.3 Test Methodology

All measurements contained in this report were conducted with ANSI/TIA-603-D: 2010 and ANSI C63.4-2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz. The measurement guide KDB 971168 D01 Power Meas License Digital Systems v02r02 shall be performed also.

## 1.4 Test Facility

- **FCC – Registration No.: 934118**

Shenzhen SEM.Test Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files and the Registration is 934118.

- **Industry Canada (IC) Registration No.: 11464A**

The 3m Semi-anechoic chamber of Shenzhen SEM.Test Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

- **CNAS Registration No.: L4062**

Shenzhen SEM.Test Technology Co., Ltd. is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L4062. All measurement facilities used to collect the measurement data are located at 1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road, Bao'an District, Shenzhen, P.R.C (518101)

## 1.5 EUT Setup and Test Mode

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	GSM 850	Low, Middle, High Channels
TM2	GPRS 850	Low, Middle, High Channels
TM3	EDGE 850	Low, Middle, High Channels
TM4	GSM 1900	Low, Middle, High Channels
TM5	GPRS 1900	Low, Middle, High Channels
TM6	EDGE 1900	Low, Middle, High Channels
TM7	WCDMA Band 5	Low, Middle, High Channels
TM8	HSDPA Band 5	Low, Middle, High Channels
TM9	HSUPA Band 5	Low, Middle, High Channels
TM10	WCDMA Band 2	Low, Middle, High Channels
TM11	HSDPA Band 2	Low, Middle, High Channels
TM12	HSUPA Band 2	Low, Middle, High Channels

Testing Configure			
Support Band	Support Standard	Channel Frequency	Channel Number
GSM 850	GSM/GPRS/EDGE	824.2 MHz	128
		836.6 MHz	190
		848.8 MHz	251
PCS 1900	GSM/GPRS/EDGE	1850.2 MHz	512
		1880.0 MHz	661
		1909.8 MHz	810
WCDMA Band 5	WCDMA/HSDPA/HSUPA	826.4 MHz	4132
		836.6 MHz	4183
		846.6 MHz	4233
WCDMA Band 2	WCDMA/HSDPA/HSUPA	1852.4 MHz	9262
		1880.0 MHz	9400
		1907.6 MHz	9538

Note: the transmitter has been tested on the communications mode of GSM, GPRS, EDGE, WCDMA, HSDPA, HSUPA compliance test and record the worst case.

## EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
USB Cable	1.0	Unshielded	Without Ferrite
Earphone	1.2	Unshielded	Without Ferrite

## Auxiliary Equipment List and Details

Description	Manufacturer	Model	Serial Number
/	/	/	/

## Special Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
/	/	/	/

## 1.6 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
RF Output Power	Conducted	$\pm 0.42\text{dB}$
Occupied Bandwidth	Conducted	$\pm 1.5\%$
Frequency Stability	Conducted	2.3%
Transmitter Spurious Emissions	Radiated	$\pm 5.1\text{dB}$

## 1.7 Test Equipment List and Details

Kind of Equipment	Manufacturer	Type	S/N	Cal Date	Due Date
Equipment list of < Shenzhen SEM.Test Technology Co., Ltd.>					
Test SIM card	-		-	N/A	
GSM Tester	Rohde & Schwarz	CMU200	104036	2015-06-17	2016-06-16
Spectrum Analyzer	Agilent	E4407B	MY41440400	2015-06-17	2016-06-16
Spectrum Analyzer	Agilent	N9020A	US47140102	2015-06-17	2016-06-16
Signal Generator	Agilent	83752A	3610A01453	2015-06-17	2016-06-16
Vector Signal Generator	Agilent	N5182A	MY47070202	2015-06-17	2016-06-16
Power Divider	Weinschel	1506A	PM204	2015-06-17	2016-06-16
Power Divider	RF-Lambda	RFLT4W5M18G	14110400027	2015-06-17	2016-06-16
Spectrum Analyzer	Rohde & Schwarz	FSP	836079/035	2015-06-17	2016-06-16
EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2015-06-17	2016-06-16
Amplifier	Agilent	8447F	3113A06717	2015-06-17	2016-06-16
Amplifier	C&D	PAP-1G18	2002	2015-06-17	2016-06-16
Loop Antenna	Schwarz beck	FMZB 1516	9773	2015-06-17	2016-06-16
Broadband Antenna	Schwarz beck	VULB9163	9163-333	2015-06-17	2016-06-16
Broadband Antenna	Schwarz beck	VULB9163	9163-332	2015-06-17	2016-06-16
Horn Antenna	ETS	3117	00086197	2015-06-17	2016-06-16
Horn Antenna	ETS	3117	00086168	2015-06-17	2016-06-16
Horn Antenna	ETS	3116B	00088203	2015-06-17	2016-06-16
Horn Antenna	ETS	3116B	00088221	2015-06-17	2016-06-16



## 2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§ 1.1307, § 2.1093	RF Exposure	Compliant
§ 22.913 (a), § 24.232 (c), §27.50(d)	RF Output Power	Compliant
§ 24.51	Peak-to-average Radio (PAR) of Transmitter	Compliant
§ 22.917 (b), § 24.238 (b), § 27.53	Emission Bandwidth	Compliant
§ 22.917 (a), § 24.238 (a), § 27.53(h)	Spurious Emissions at Antenna Terminal	Compliant
§ 22.917 (a), § 24.238 (a), § 27.53(h)	Spurious Radiation Emissions	Compliant
§ 22.917 (a), § 24.238 (a), § 27.53(h)	Out of Band Emissions	Compliant
§ 22.355, § 24.235, § 27.54	Frequency Stability	Compliant

### **3. RF Exposure**

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#### **3.1 Standard Applicable**

According to § 1.1307 and § 2.1093, the portable transmitter must comply the RF exposure requirements.

#### **3.2 Test Result**

This product complied with the requirement of the RF exposure, please see the SAR report.

## 4. RF Output Power

### 4.1 Standard Applicable

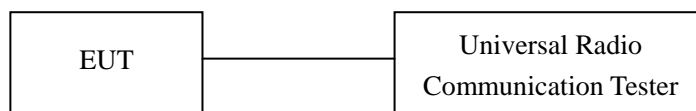
According to §22.913(a)(2), The ERP of mobile and portable stations transmitters and auxiliary test transmitters must not exceed 7 Watts.

According to §24.232 (c), Mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

According to §27.50(d)(4), Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

### 4.2 Test Procedure

Conducted output power test method:



Radiated power test method:

- 1.The setup of EUT is according with per ANSI/TIA Standard 603D and ANSI C63.4-2014 measurement procedure.
2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.
3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
4. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

### 4.3 Environmental Conditions

Temperature:	24 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

## 4.4 Summary of Test Results/Plots

### Max. Radiated Power

ERP For GSM Mode GSM850

Frequency	Substitute SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	FCC Part 22H Limit
MHz	dBm	Meter	Degree	H / V	dB	dB	dBm	dBm
Low Channel								
824.2	30.22	1.5	0	H	1.5	0	28.72	38.45
824.2	31.42	1.5	0	V	1.5	0	29.92	38.45
Middle Channel								
836.4	29.77	1.5	0	H	1.5	0	28.27	38.45
836.4	31.67	1.5	0	V	1.5	0	30.17	38.45
High Channel								
848.8	29.15	1.5	0	H	1.5	0	27.65	38.45
848.8	31.15	1.5	0	V	1.5	0	29.65	38.45

EIRP For GSM Mode PCS1900

Frequency	Substitute SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	FCC Part 24E Limit
MHz	dBm	Meter	Degree	H / V	dB	dB	DBm	dBm
Low Channel								
1850.2	20.04	1.5	0	H	1.9	7.7	25.84	33.00
1850.2	22.91	1.5	0	V	1.9	7.7	28.71	33.00
Middle Channel								
1880.0	20.19	1.5	0	H	1.9	7.7	25.99	33.00
1880.0	21.03	1.5	0	V	1.9	7.7	26.83	33.00
High Channel								
1909.8	20.76	1.5	0	H	1.9	7.7	26.56	33.00
1909.8	22.53	1.5	0	V	1.9	7.7	28.33	33.00

## ERP For GPRS Mode GSM850

Frequency	Substitute SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	FCC Part 22H Limit
MHz	dBm	Meter	Degree	H / V	dB	dB	dBm	dBm
Low Channel								
824.2	30.31	1.5	0	H	1.5	0	28.81	38.45
824.2	30.81	1.5	0	V	1.5	0	29.31	38.45
Middle Channel								
836.6	29.56	1.5	0	H	1.5	0	28.06	38.45
836.6	30.74	1.5	0	V	1.5	0	29.24	38.45
High Channel								
848.8	30.25	1.5	0	H	1.5	0	28.75	38.45
848.8	30.84	1.5	0	V	1.5	0	29.34	38.45

## EIRP For GPRS Mode PCS1900

Frequency	Substitute SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	FCC Part 24E Limit
MHz	dBm	Meter	Degree	H / V	dB	dB	DBm	dBm
Low Channel								
1850.2	20.46	1.5	0	H	1.9	7.7	26.26	33.00
1850.2	22.27	1.5	0	V	1.9	7.7	28.07	33.00
Middle Channel								
1880.0	20.96	1.5	0	H	1.9	7.7	26.76	33.00
1880.0	21.73	1.5	0	V	1.9	7.7	27.53	33.00
High Channel								
1909.8	20.49	1.5	0	H	1.9	7.7	26.29	33.00
1909.8	22.01	1.5	0	V	1.9	7.7	27.81	33.00

## ERP For EDGE Mode GSM850

Frequency	Substitute SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	FCC Part 22H Limit
MHz	dBm	Meter	Degree	H / V	dB	dB	dBm	dBm
Low Channel								
824.2	24.13	1.5	0	H	1.5	0	22.63	38.45
824.2	26.23	1.5	0	V	1.5	0	24.73	38.45
Middle Channel								
836.6	25.57	1.5	0	H	1.5	0	24.07	38.45
836.6	26.95	1.5	0	V	1.5	0	25.45	38.45
High Channel								
848.8	24.97	1.5	0	H	1.5	0	23.47	38.45
848.8	27.16	1.5	0	V	1.5	0	25.66	38.45

## EIRP For EDGE Mode PCS1900

Frequency	Substitute SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	FCC Part 24E Limit
MHz	dBm	Meter	Degree	H / V	dB	dB	DBm	dBm
Low Channel								
1850.2	15.01	1.5	0	H	1.9	7.7	20.81	33.00
1850.2	16.98	1.5	0	V	1.9	7.7	22.78	33.00
Middle Channel								
1880.0	15.64	1.5	0	H	1.9	7.7	21.44	33.00
1880.0	16.57	1.5	0	V	1.9	7.7	22.37	33.00
High Channel								
1909.8	16.73	1.5	0	H	1.9	7.7	22.53	33.00
1909.8	17.07	1.5	0	V	1.9	7.7	22.87	33.00

## ERP For WCDMA Mode Band 5

Frequency	Substitute SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	FCC Part 22H Limit
MHz	dBm	Meter	Degree	H / V	dB	dBd	dBm	dBm
Low Channel								
826.4	22.02	1.5	0	H	1.5	0	20.52	38.45
826.4	22.88	1.5	0	V	1.5	0	21.38	38.45
Middle Channel								
836.6	21.65	1.5	0	H	1.5	0	20.15	38.45
836.6	23.07	1.5	0	V	1.5	0	21.57	38.45
High Channel								
846.6	21.43	1.5	0	H	1.5	0	19.93	38.45
846.6	22.82	1.5	0	V	1.5	0	21.32	38.45

## ERP For HSDPA Mode Band 5

Frequency	Substitute SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	FCC Part 22H Limit
MHz	dBm	Meter	Degree	H / V	dB	dBd	dBm	dBm
Low Channel								
826.4	21.01	1.5	0	H	1.5	0	19.51	38.45
826.4	21.87	1.5	0	V	1.5	0	20.37	38.45
Middle Channel								
836.6	20.59	1.5	0	H	1.5	0	19.09	38.45
836.6	22.01	1.5	0	V	1.5	0	20.51	38.45
High Channel								
846.6	20.44	1.5	0	H	1.5	0	18.94	38.45
846.6	21.83	1.5	0	V	1.5	0	20.33	38.45

## ERP For HSUPA Mode Band 5

Frequency	Substitute SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	FCC Part 22H Limit
MHz	dBm	Meter	Degree	H / V	dB	dBd	dBm	dBm
Low Channel								
826.4	21.01	1.5	0	H	1.5	0	19.51	38.45
826.4	21.87	1.5	0	V	1.5	0	20.37	38.45
Middle Channel								
836.6	20.65	1.5	0	H	1.5	0	19.15	38.45
836.6	22.07	1.5	0	V	1.5	0	20.57	38.45
High Channel								
846.6	20.46	1.5	0	H	1.5	0	18.96	38.45
846.6	21.85	1.5	0	V	1.5	0	20.35	38.45

## EIRP For WCDMA Mode Band 2

Frequency	Substitute SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	FCC Part 24E Limit
MHz	dBm	Meter	Degree	H / V	dB	dB	DBm	dBm
Low Channel								
1852.4	14.04	1.5	0	H	1.9	7.7	19.84	33
1852.4	15.76	1.5	0	V	1.9	7.7	21.56	33
Middle Channel								
1880.0	13.82	1.5	0	H	1.9	7.7	19.62	33
1880.0	16.03	1.5	0	V	1.9	7.7	21.83	33
High Channel								
1907.6	14.28	1.5	0	H	1.9	7.7	20.08	33
1907.6	16.02	1.5	0	V	1.9	7.7	21.82	33



## EIRP For HSDPA Mode Band 2

Frequency	Substitute SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	FCC Part 24E Limit
MHz	dBm	Meter	Degree	H / V	dB	dB	DBm	dBm
Low Channel								
1852.4	12.96	1.5	0	H	1.9	7.7	18.76	33
1852.4	14.68	1.5	0	V	1.9	7.7	20.48	33
Middle Channel								
1880.0	12.86	1.5	0	H	1.9	7.7	18.66	33
1880.0	15.07	1.5	0	V	1.9	7.7	20.87	33
High Channel								
1907.6	13.33	1.5	0	H	1.9	7.7	19.13	33
1907.6	15.07	1.5	0	V	1.9	7.7	20.87	33

## EIRP For HSUPA Mode Band 2

Frequency	Substitute SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	FCC Part 24E Limit
MHz	dBm	Meter	Degree	H / V	dB	dB	DBm	dBm
Low Channel								
1852.4	12.93	1.5	0	H	1.9	7.7	18.73	33
1852.4	14.65	1.5	0	V	1.9	7.7	20.45	33
Middle Channel								
1880.0	12.86	1.5	0	H	1.9	7.7	18.66	33
1880.0	15.07	1.5	0	V	1.9	7.7	20.87	33
High Channel								
1907.6	13.3	1.5	0	H	1.9	7.7	19.1	33
1907.6	15.04	1.5	0	V	1.9	7.7	20.84	33

Note: Result = Substitute - Cable loss + Antenna Gain

## Max. Conducted Output Power

For Cellular Band (GSM850)

Test Mode	Channel	Frequency (MHz)	Average Power (dBm)	FCC Part 22.913 Limit (dBm)
GSM	Low Channel	824.2	32.31	38.45
	Middle Channel	836.6	32.32	38.45
	High Channel	848.8	32.24	38.45
GPRS(1 Slot)	Low Channel	824.2	32.37	38.45
	Middle Channel	836.6	32.36	38.45
	High Channel	848.8	32.29	38.45
EDGE(1 Slot)	Low Channel	824.2	28.17	38.45
	Middle Channel	836.6	28.15	38.45
	High Channel	848.8	27.95	38.45

For PCS Band (GSM1900)

Test Mode	Channel	Frequency (MHz)	Average Power (dBm)	FCC Part 24.232 Limit (dBm)
GSM	Low Channel	1850.2	28.62	33.0
	Middle Channel	1880.0	28.66	33.0
	High Channel	1909.8	28.72	33.0
GPRS(1 Slot)	Low Channel	1850.2	28.75	33.0
	Middle Channel	1880.0	28.77	33.0
	High Channel	1909.8	28.78	33.0
EDGE(1 Slot)	Low Channel	1850.2	25.38	33.0
	Middle Channel	1880.0	25.51	33.0
	High Channel	1909.8	25.26	33.0

## For WCDMA Band 5

Test Mode	Channel	Frequency (MHz)	Average Power (dBm)	FCC Part 22.913 Limit (dBm)
WCDMA	Low Channel	826.4	22.33	38.45
	Middle Channel	836.6	22.26	38.45
	High Channel	846.6	22.21	38.45
HSDPA	Low Channel	826.4	21.36	38.45
	Middle Channel	836.6	21.20	38.45
	High Channel	846.6	21.17	38.45
HSUPA	Low Channel	826.4	21.33	38.45
	Middle Channel	836.6	21.14	38.45
	High Channel	846.6	21.20	38.45

## For WCDMA Band 2

Test Mode	Channel	Frequency (MHz)	Average Power (dBm)	FCC Part 24.232 Limit (dBm)
WCDMA	Low Channel	1852.4	22.49	33.00
	Middle Channel	1880.0	22.27	33.00
	High Channel	1907.6	22.13	33.00
HSDPA	Low Channel	1852.4	21.45	33.00
	Middle Channel	1880.0	21.24	33.00
	High Channel	1907.6	21.08	33.00
HSUPA	Low Channel	1852.4	21.45	33.00
	Middle Channel	1880.0	21.25	33.00
	High Channel	1907.6	21.01	33.00

## 5. Peak-to-average Radio (PAR) of Transmitter

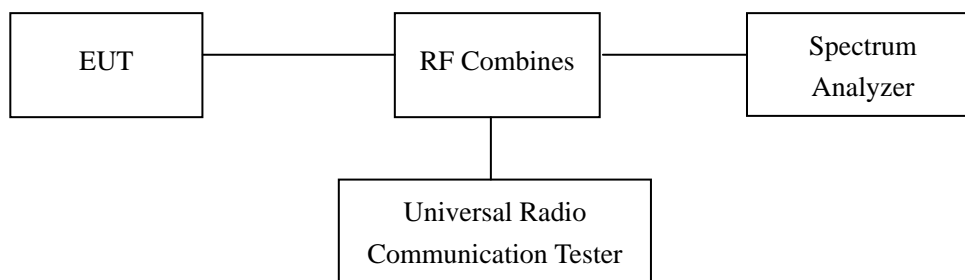
### 5.1 Standard Applicable

According to §24.232(d), Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

### 5.2 Test Procedure

The RF output terminal of the transmitter was connected to the input of the spectrum analyzer via a suitable attenuation. The RBW of the spectrum analyzer was set to 30kHz and the peak-to-average ratio (PAR) of the transmission was recorded. Record the maximum PAR level associated with a probability of 0.1%.

Test Configuration for the emission bandwidth testing:



### 5.3 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

## 5.4 Summary of Test Results

Only the worst case was selected to record

For PCS Band

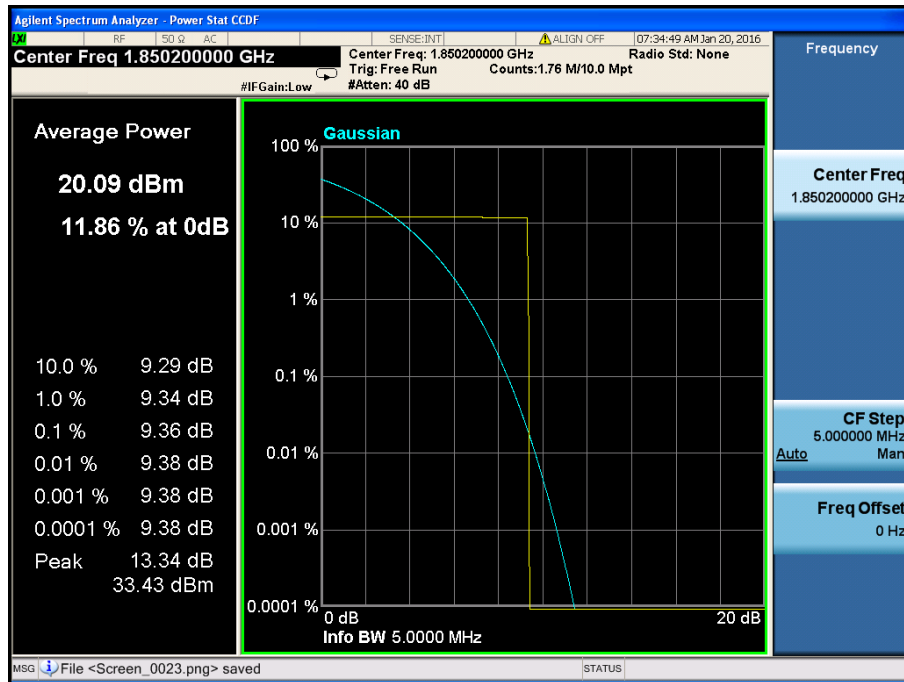
Test Mode	Channel	Frequency (MHz)	PAR (dB)	Limit (dB)
GSM	512	1909.8	9.36	13
GPRS(1 Slot)	512	1850.2	10.10	13
EDGE(1 Slot)	512	1850.2	12.85	13

For WCDMA Band 2

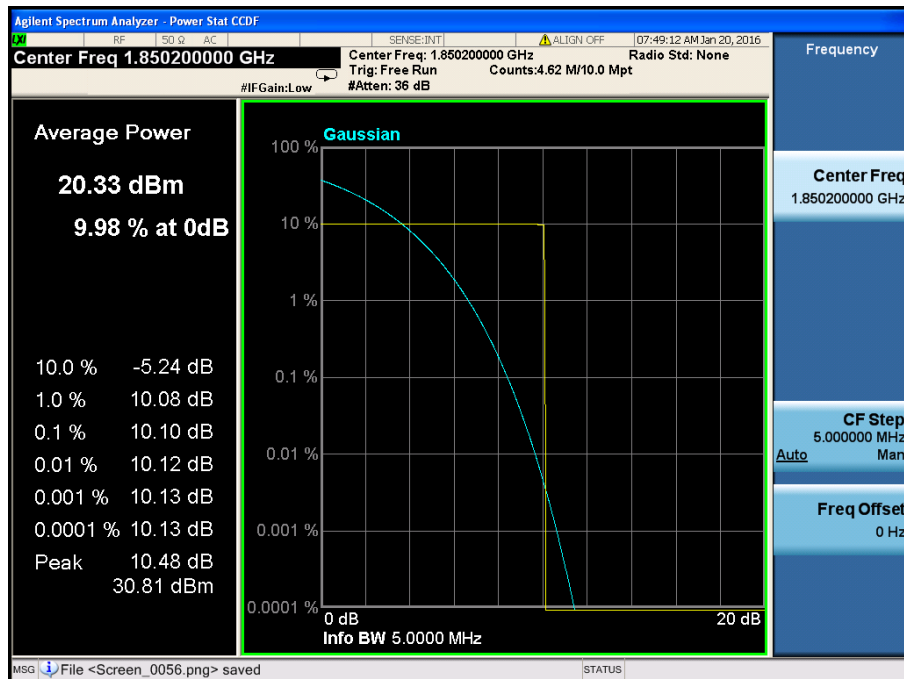
Test Mode	Channel	Frequency (MHz)	PAR (dB)	Limit (dB)
WCDMA	9262	1852.4	2.79	13
HSDPA	9400	1880.0	2.84	13
HSUPA	9400	1880.0	2.86	13

Test plots please refer to below:

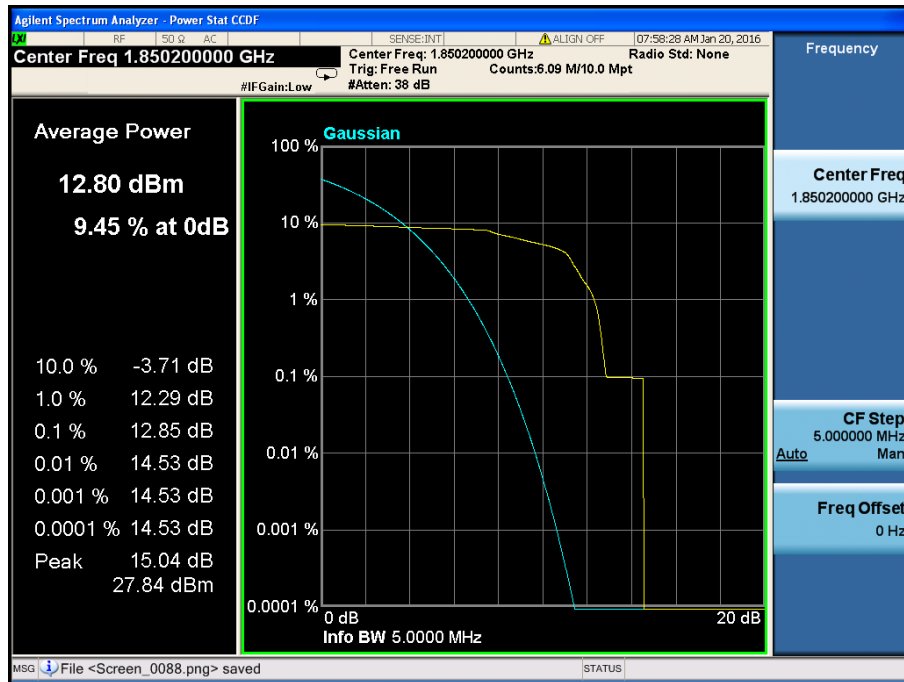
For GSM



For GPRS



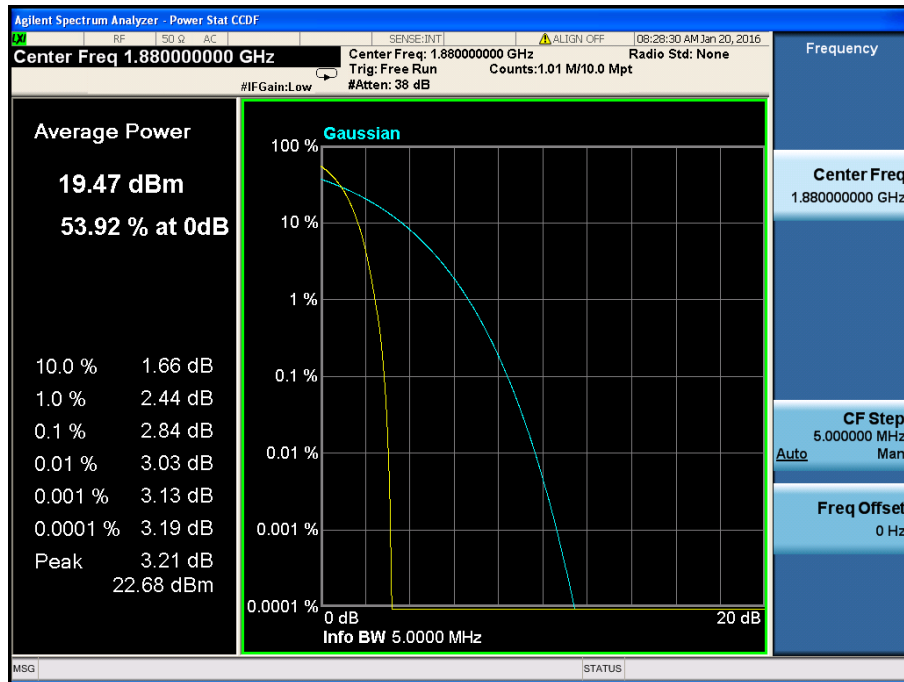
For EDGE



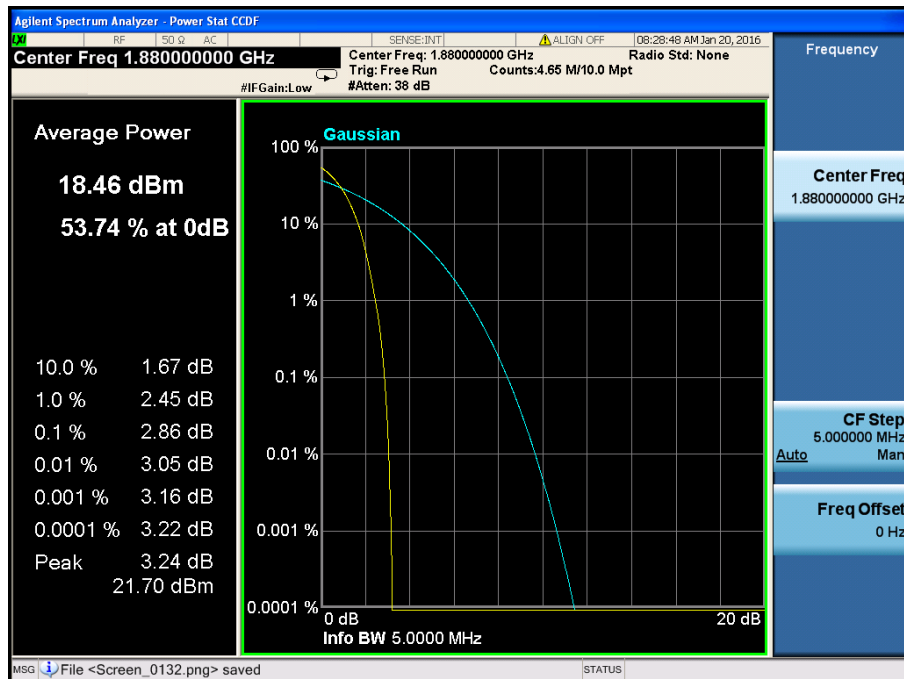
For WCDMA



For HSDPA



For HSUPA





## 6. Emission Bandwidth

### 6.1 Standard Applicable

According to §22.917(b), The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

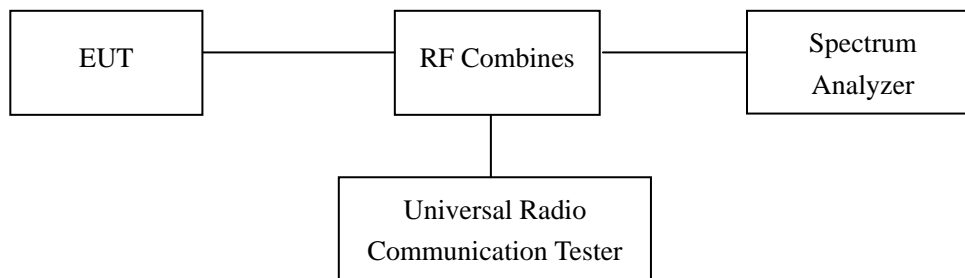
According to §24.238(b), The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

According to §27.53, The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

### 6.2 Test Procedure

The RF output terminal of the transmitter was connected to the input of the spectrum analyzer via a suitable attenuation. The RBW of the spectrum analyzer was set to 10kHz for GSM mode and 100kHz for WCDMA mode, VBW shall be at least 3 times the RBW, and the 26dB bandwidth was recorded.

Test Configuration for the emission bandwidth testing:



### 6.3 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

## 6.4 Summary of Test Results/Plots

For Cellular Band

Test Mode	Channel	Frequency (MHz)	99% Emission Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM	128	824.2	243.4975	314.333
	190	836.6	252.5236	312.915
	251	848.8	248.7018	318.424
GPRS	128	824.2	245.2476	311.862
	190	836.6	248.0336	307.393
	251	848.8	245.6413	321.681
EDGE	128	824.2	258.4909	338.369
	190	836.6	257.0385	321.762
	251	848.8	264.9140	324.137

For PCS Band

Test Mode	Channel	Frequency (MHz)	99% Emission Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM	512	1850.2	248.5277	314.291
	661	1880.0	251.1965	317.418
	810	1909.8	239.3545	311.842
GPRS	512	1850.2	240.2924	309.267
	661	1880.0	249.0034	316.903
	810	1909.8	249.0424	317.687
EDGE	512	1850.2	252.0129	322.847
	661	1880.0	253.8044	313.397
	810	1909.8	255.9564	315.584

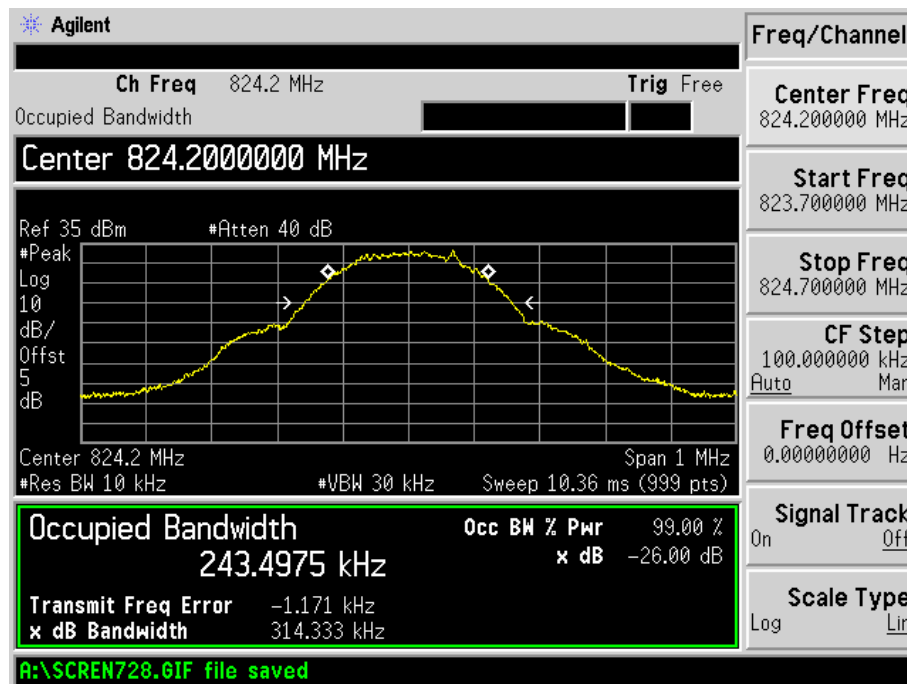
## For Band 5

Test Mode	Channel	Frequency (MHz)	99% Emission Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
WCDMA	4132	826.4	4.1697	4.685
	4183	836.6	4.1789	4.693
	4233	846.6	4.1513	4.644
HSDPA	4132	826.4	4.1618	4.690
	4183	836.6	4.1622	4.690
	4233	846.6	4.1436	4.688
HSUPA	4132	826.4	4.1497	4.675
	4183	836.6	4.1858	4.718
	4233	846.6	4.1500	4.676

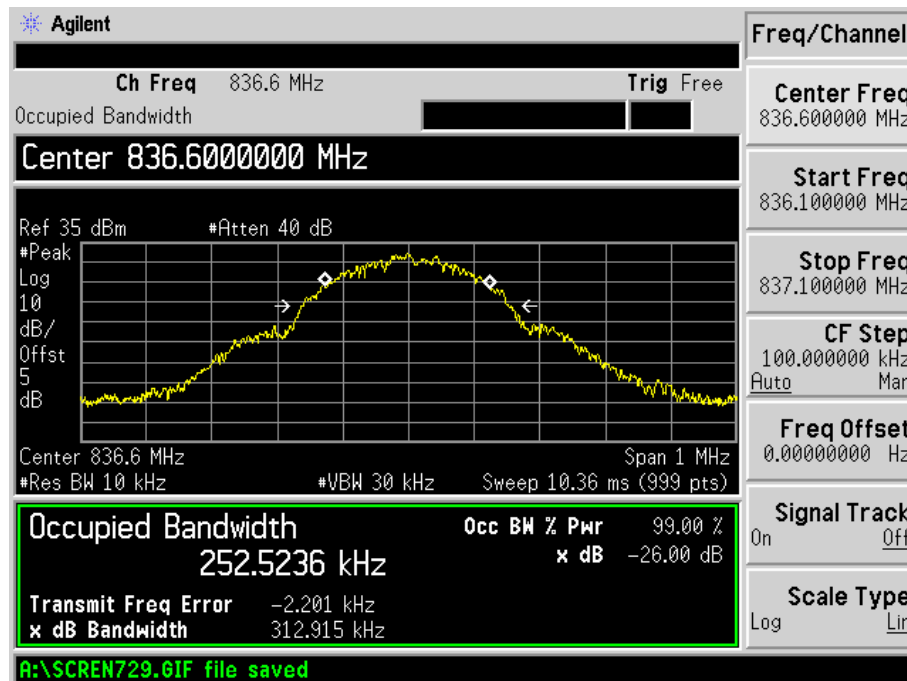
## For Band 2

Test Mode	Channel	Frequency (MHz)	99% Emission Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
WCDMA	9262	1852.4	4.1723	4.700
	9400	1880.0	4.1589	4.702
	9538	1907.6	4.1635	4.720
HSDPA	9262	1852.4	4.1715	4.704
	9400	1880.0	4.1755	4.707
	9538	1907.6	4.1633	4.691
HSUPA	9262	1852.4	4.1671	4.719
	9400	1880.0	4.1572	4.717
	9538	1907.6	4.1712	4.731

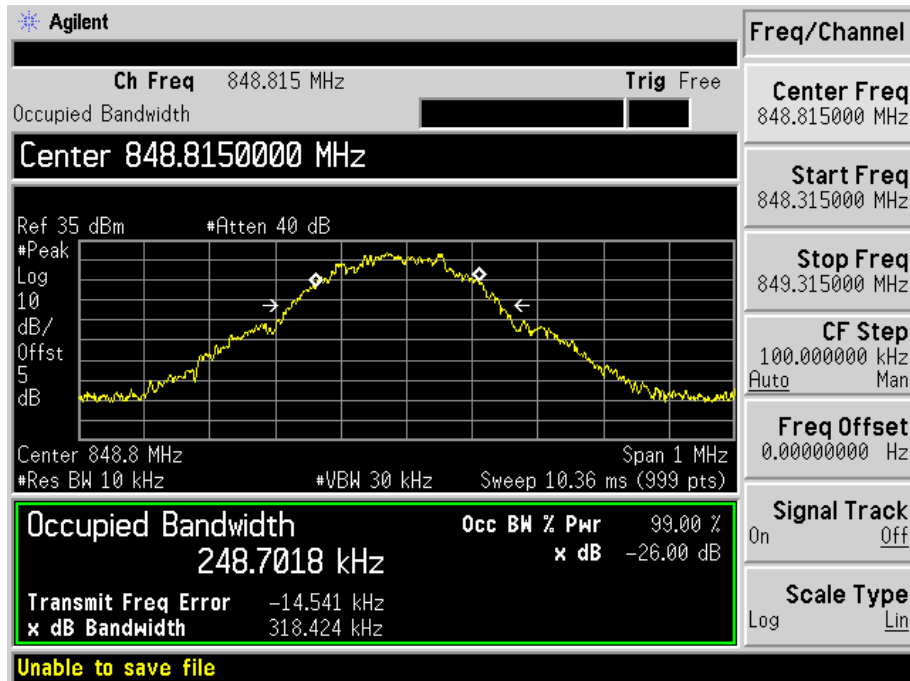
For Cellular Band  
GSM Low Channel



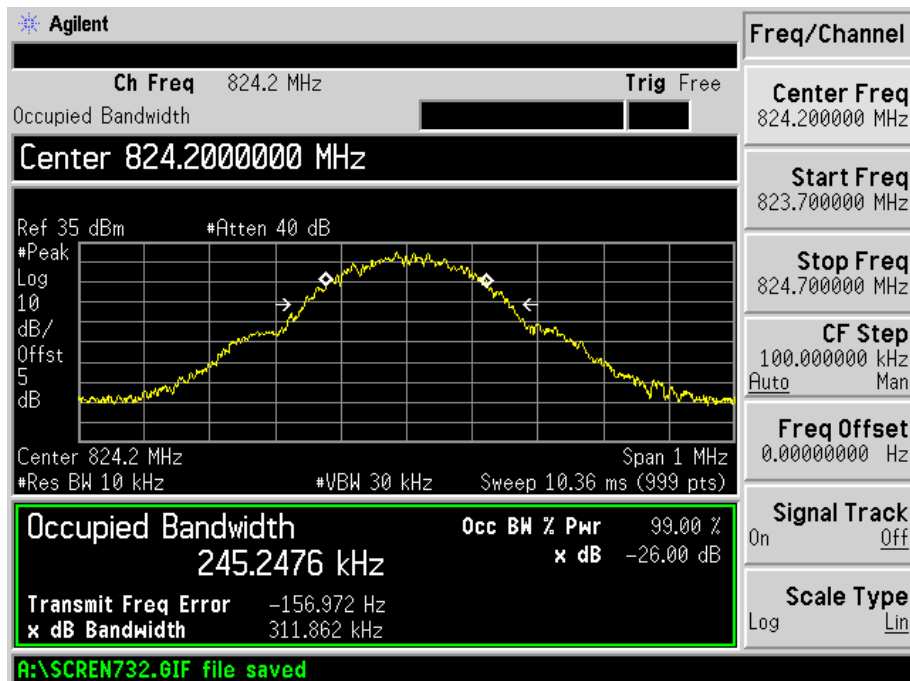
GSM Middle Channel



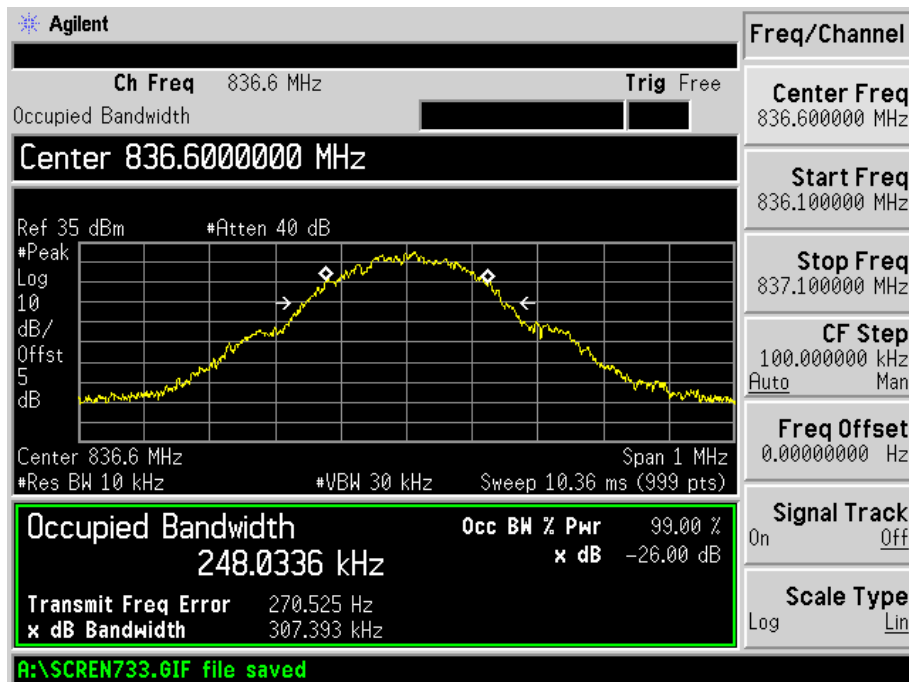
### GSM High channel



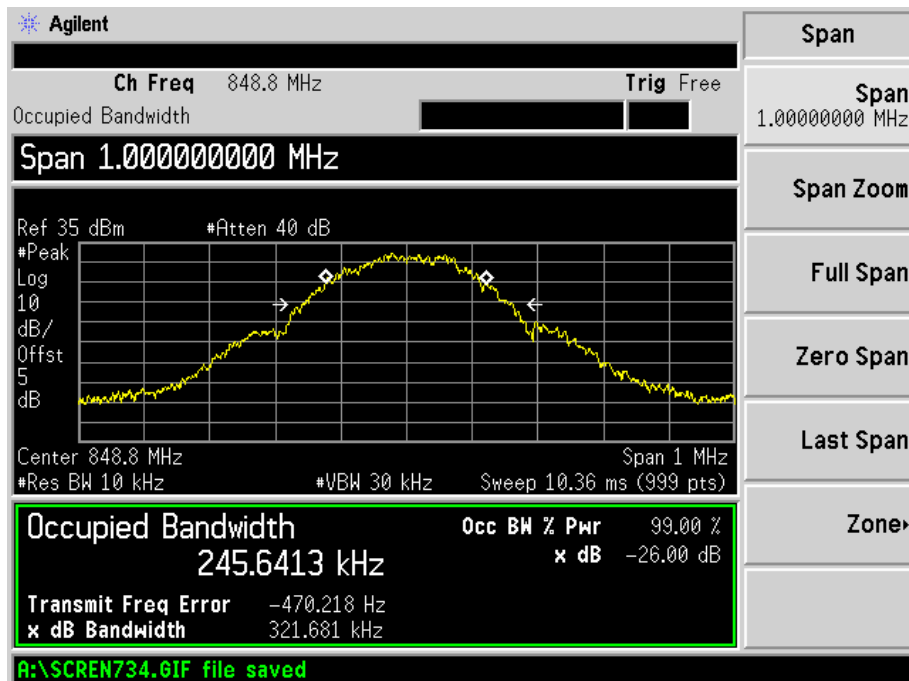
### GPRS Low Channel



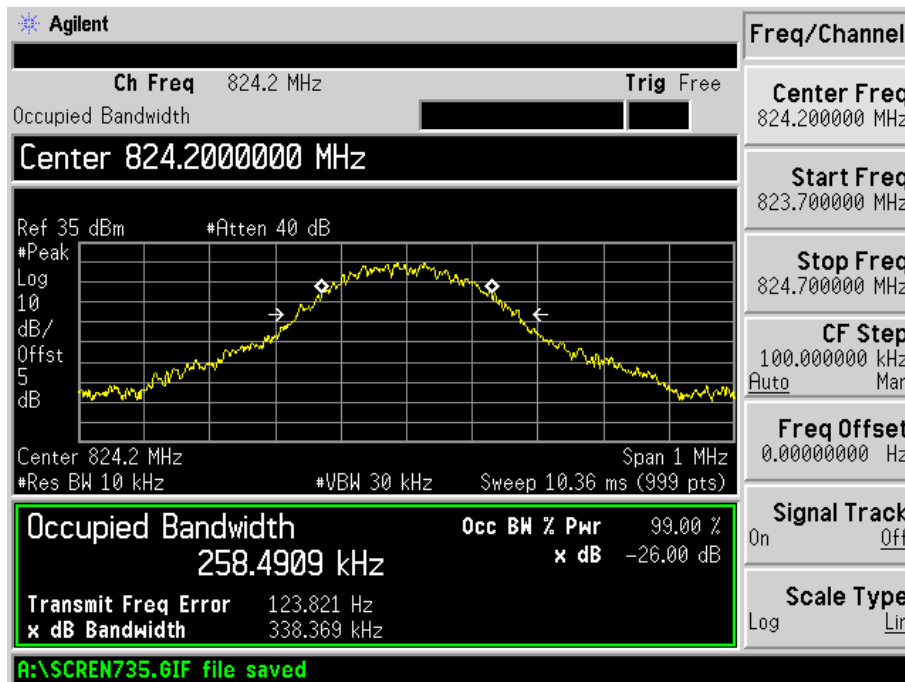
## GPRS Middle Channel



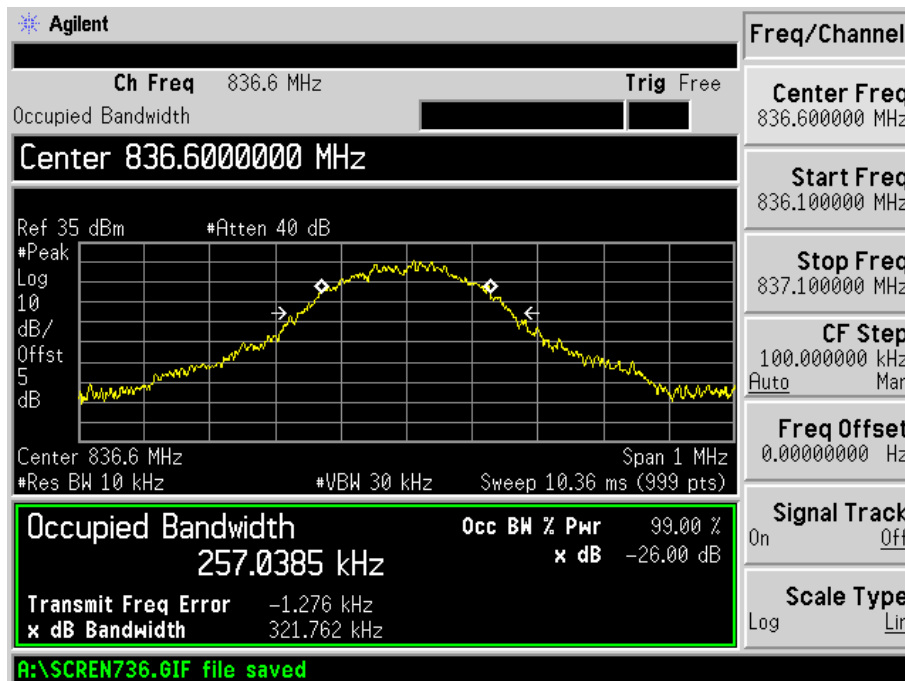
## GPRS High Channel



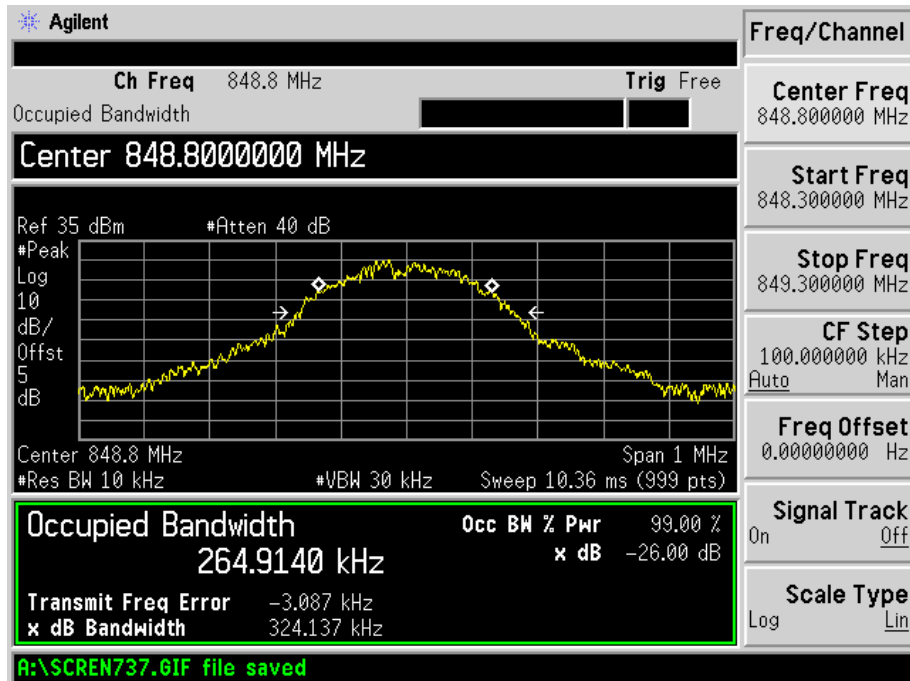
## EDGE Low Channel



## EDGE Middle Channel

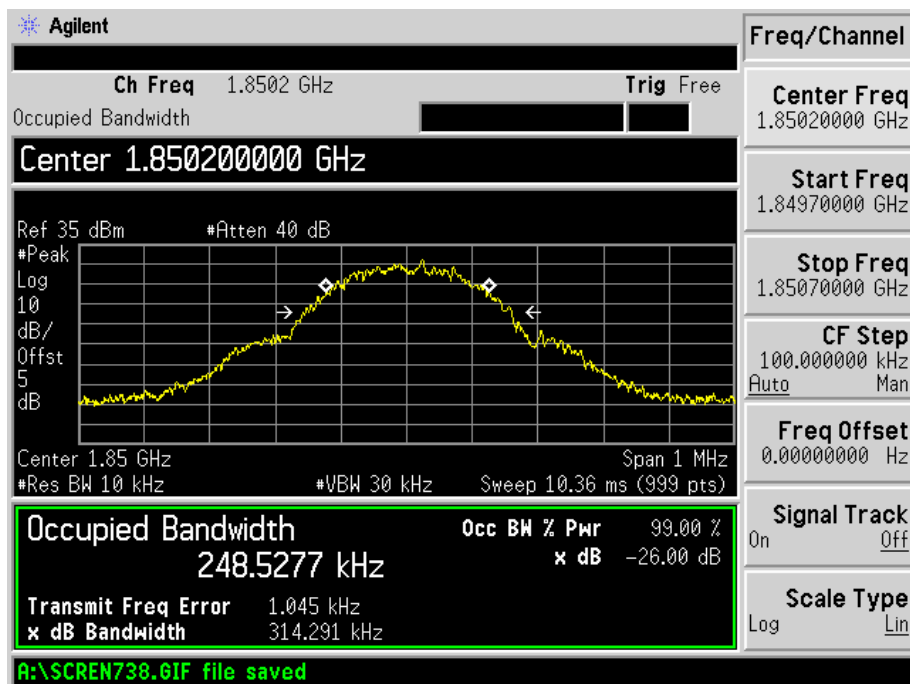


## EDGE High Channel



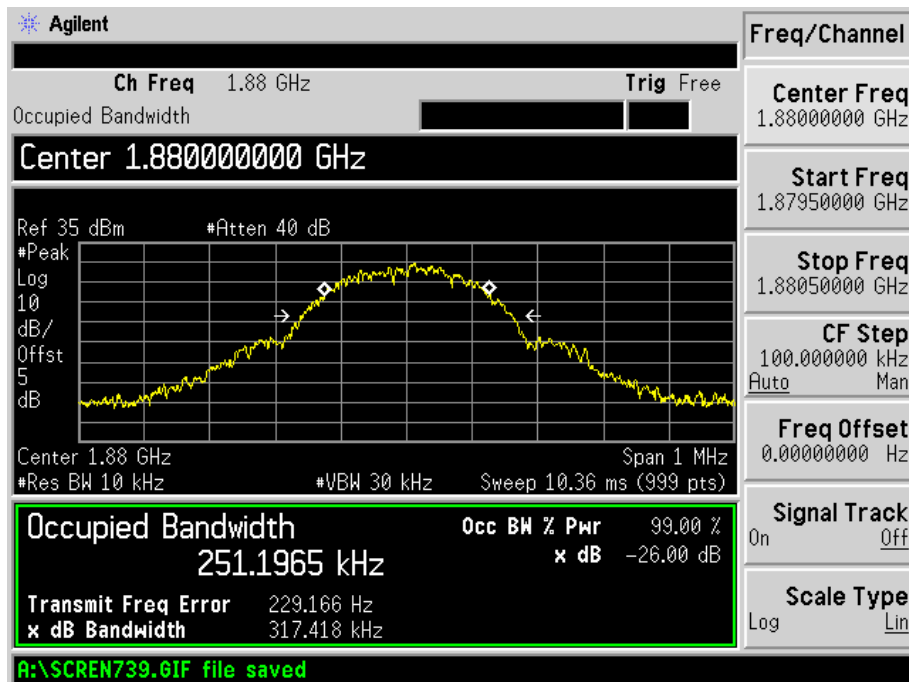
For PCS Band

GSM Low Channel

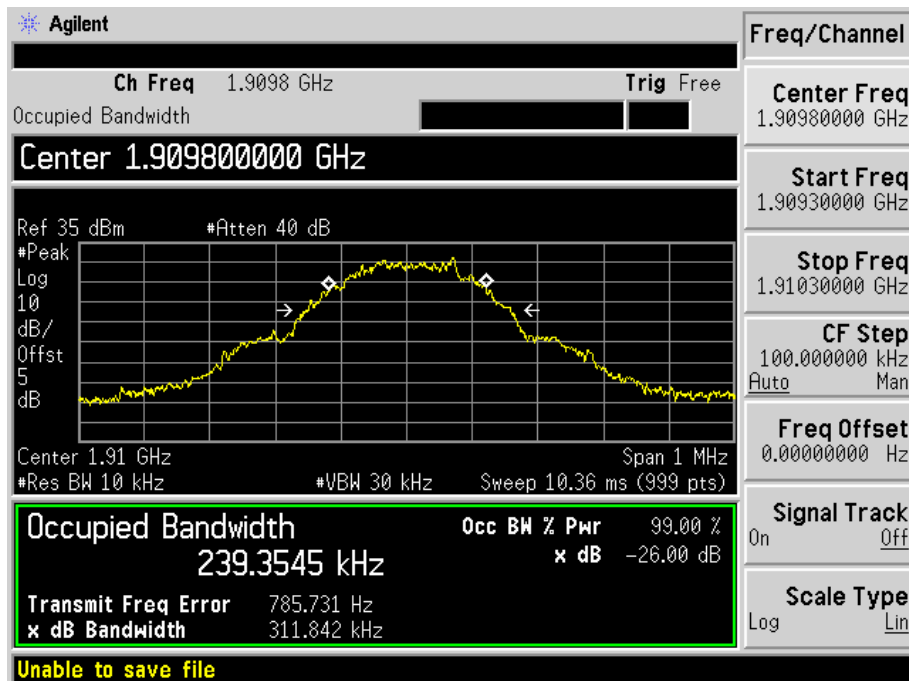




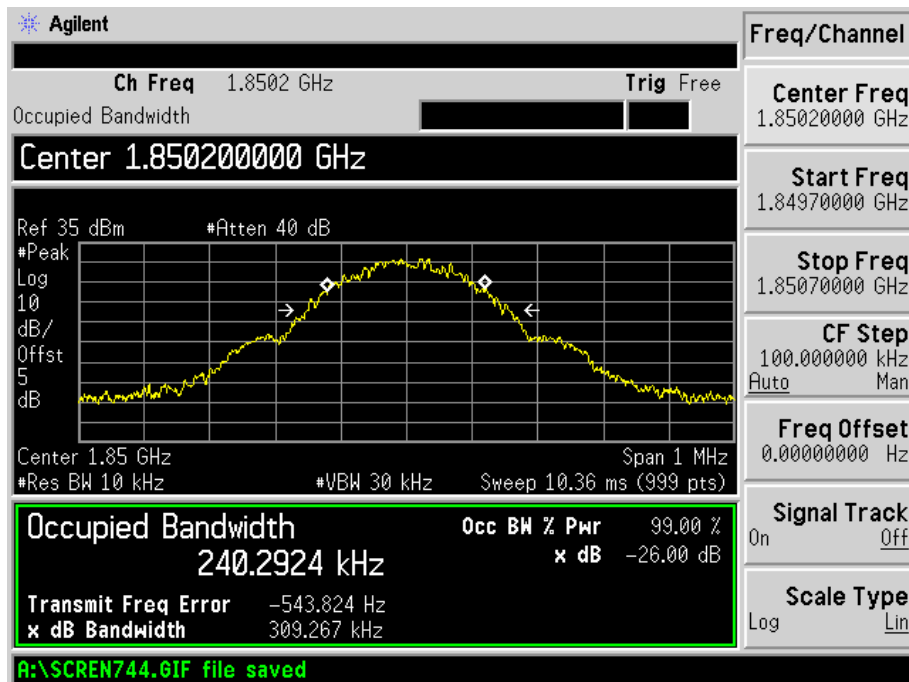
### GSM Middle Channel



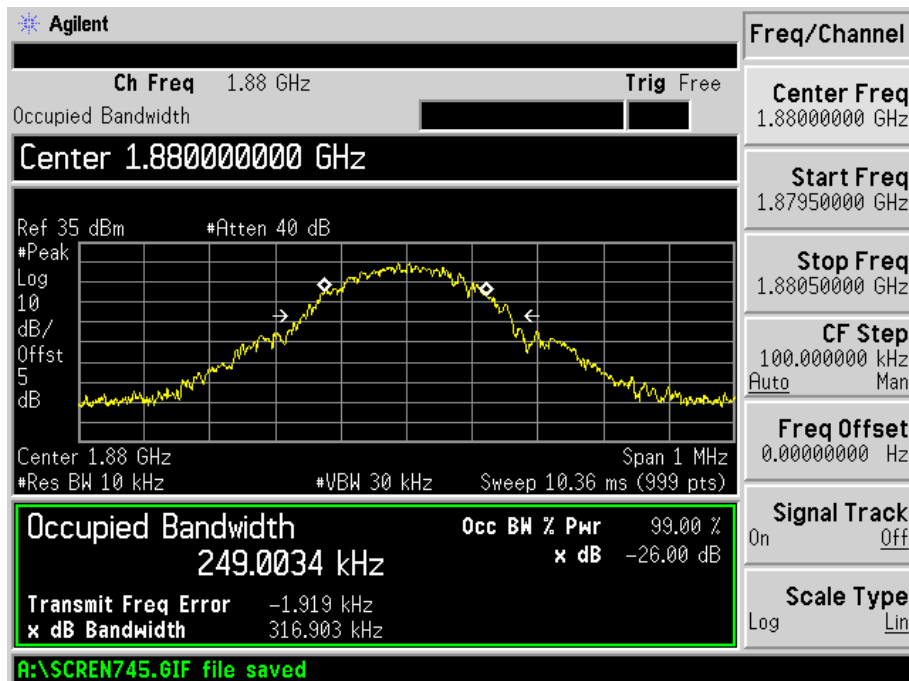
### GSM High channel



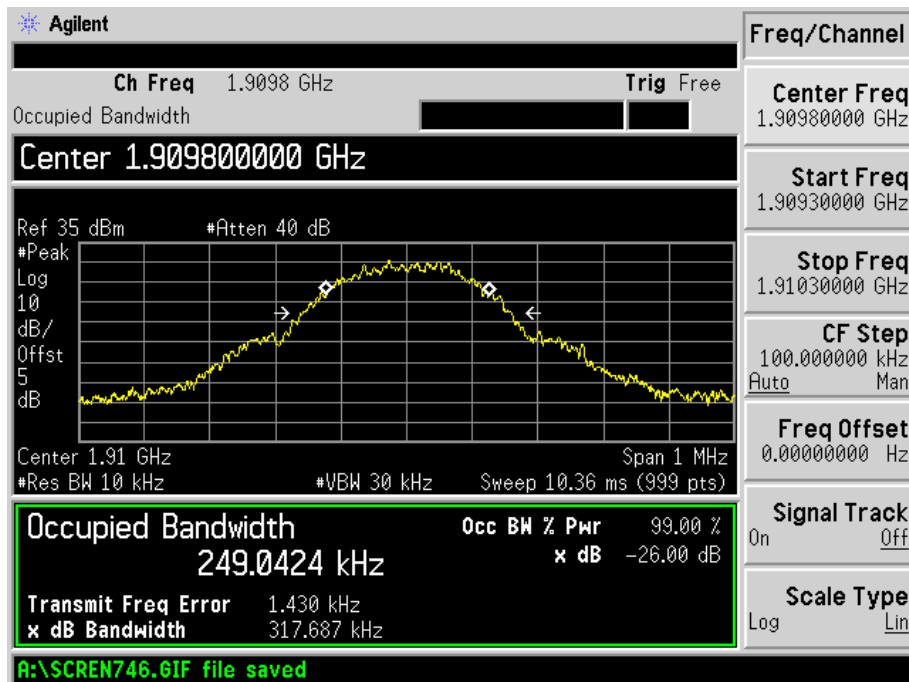
## GPRS Low Channel



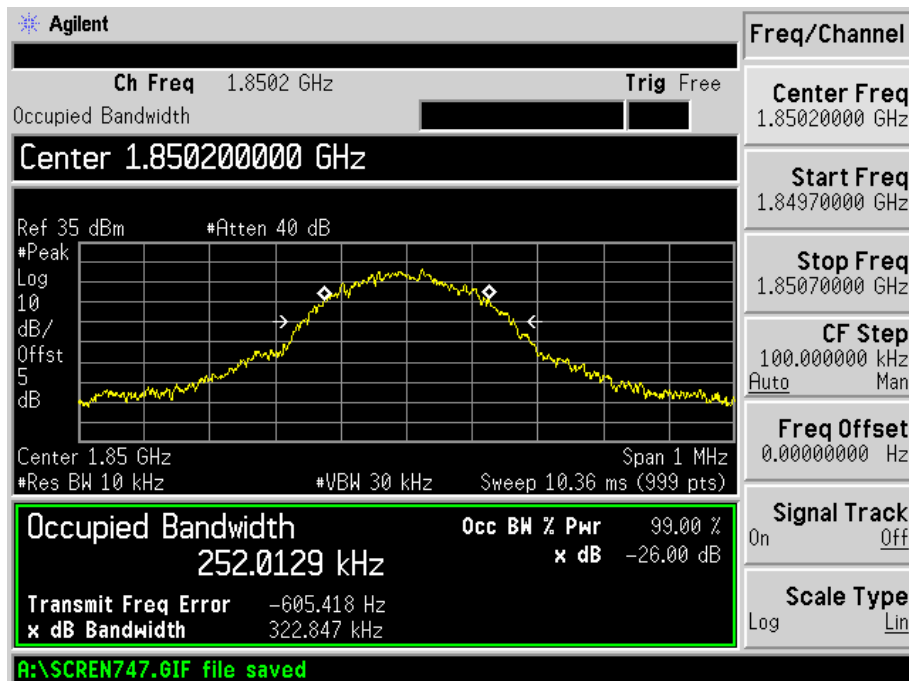
## GPRS Middle Channel



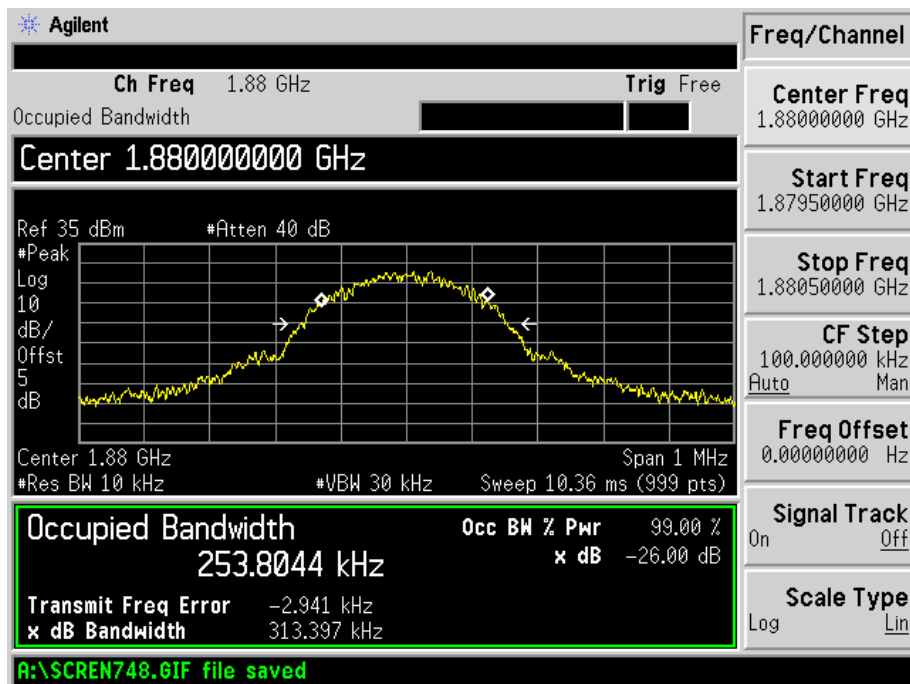
## GPRS High Channel



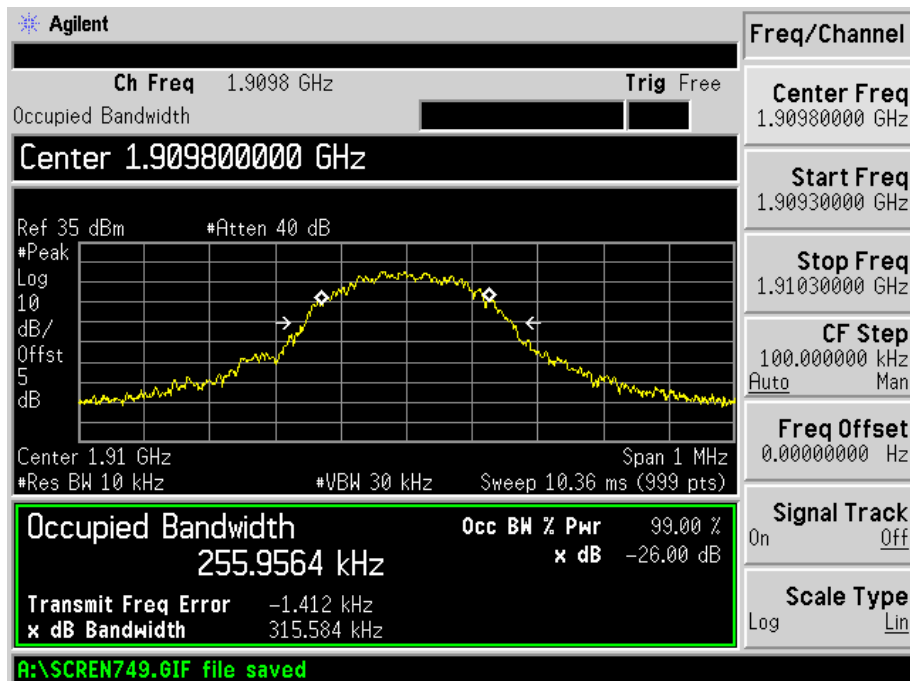
## EDGE Low Channel



### EDGE Middle Channel

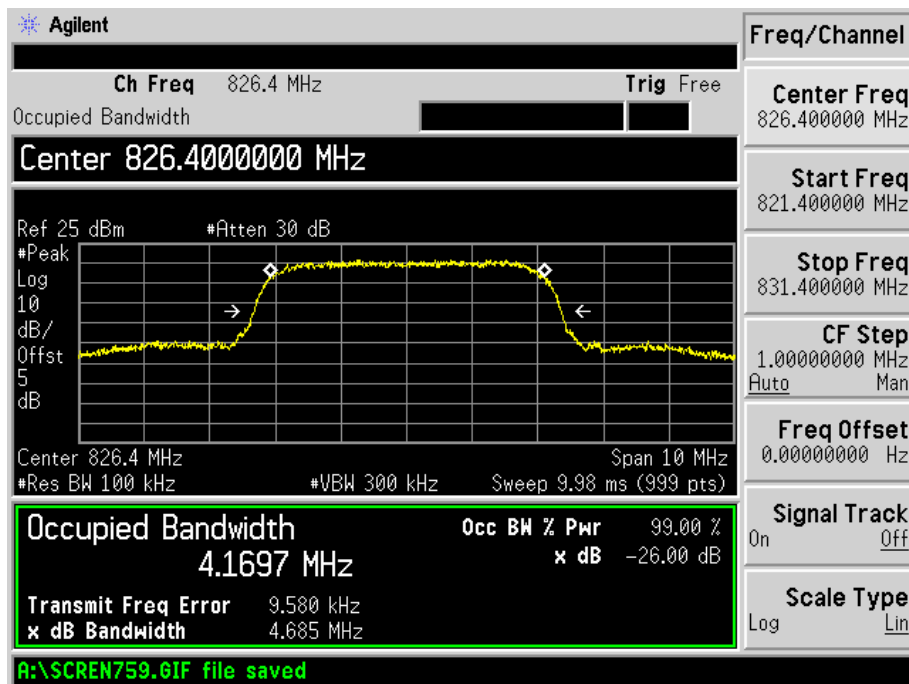


### EDGE High Channel

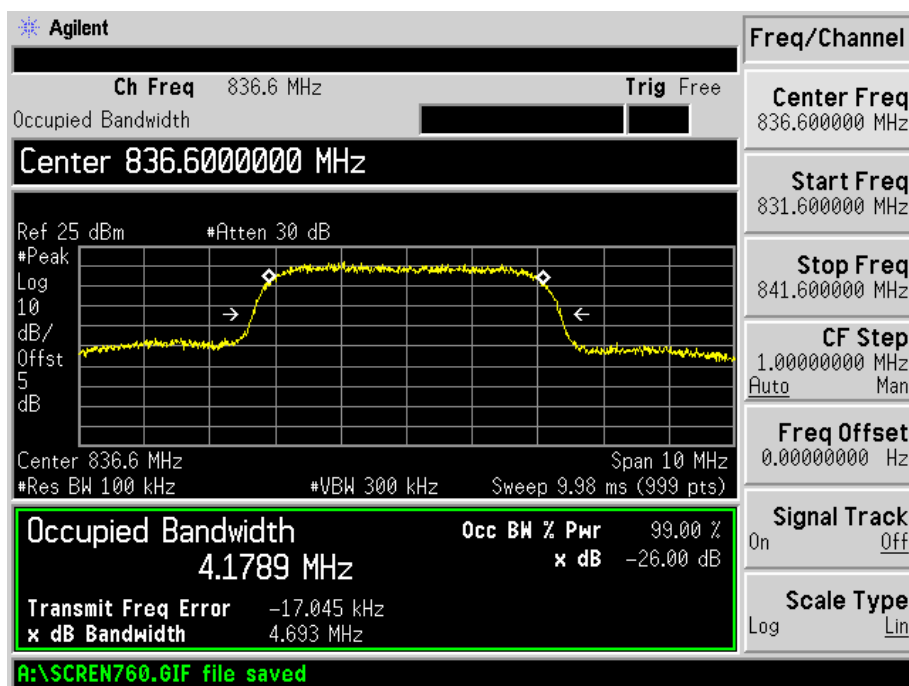


For Band V

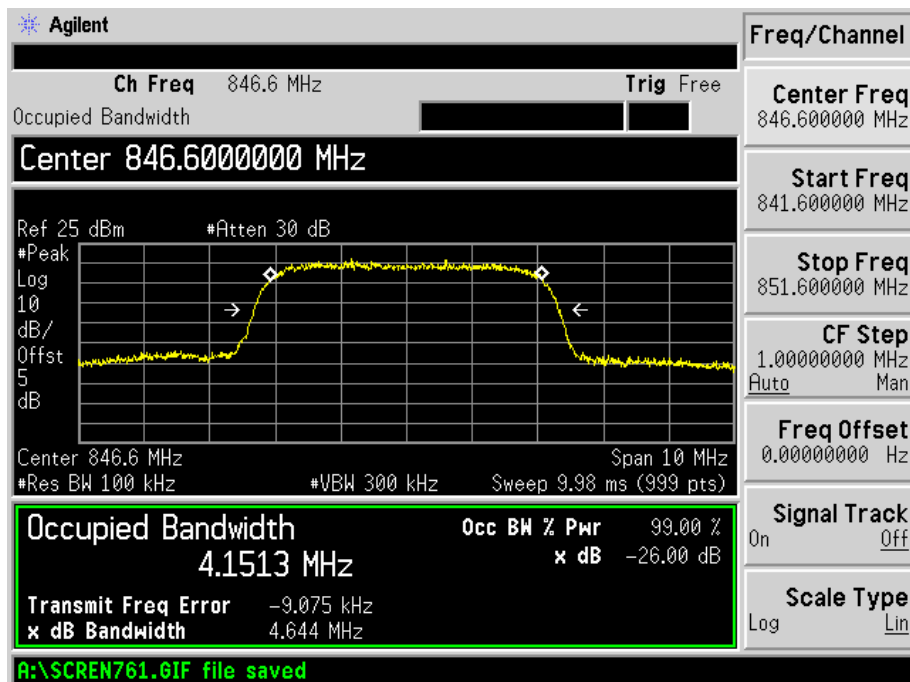
WCDMA Low Channel



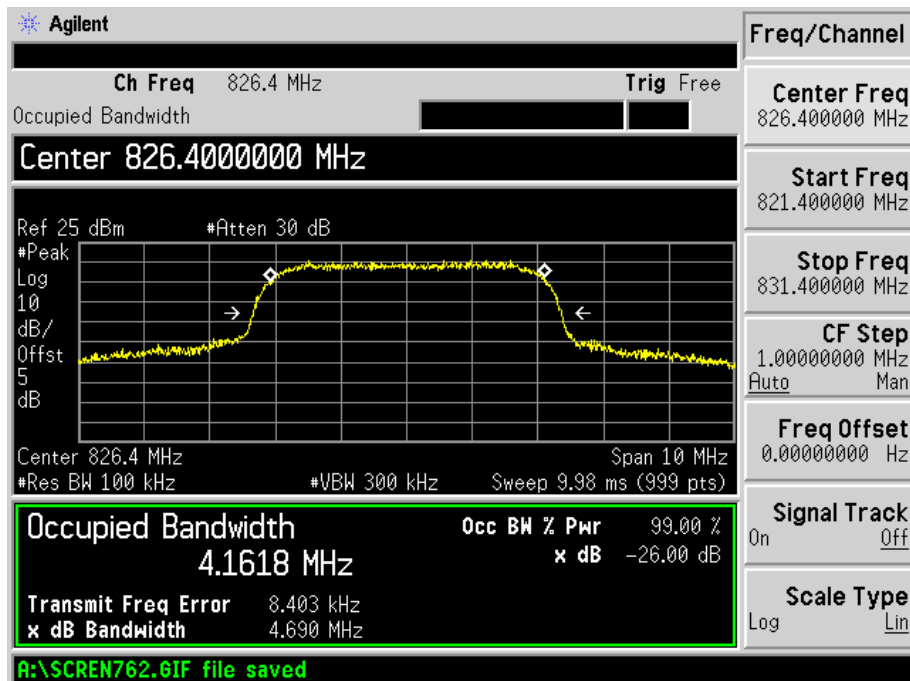
WCDMA Middle Channel



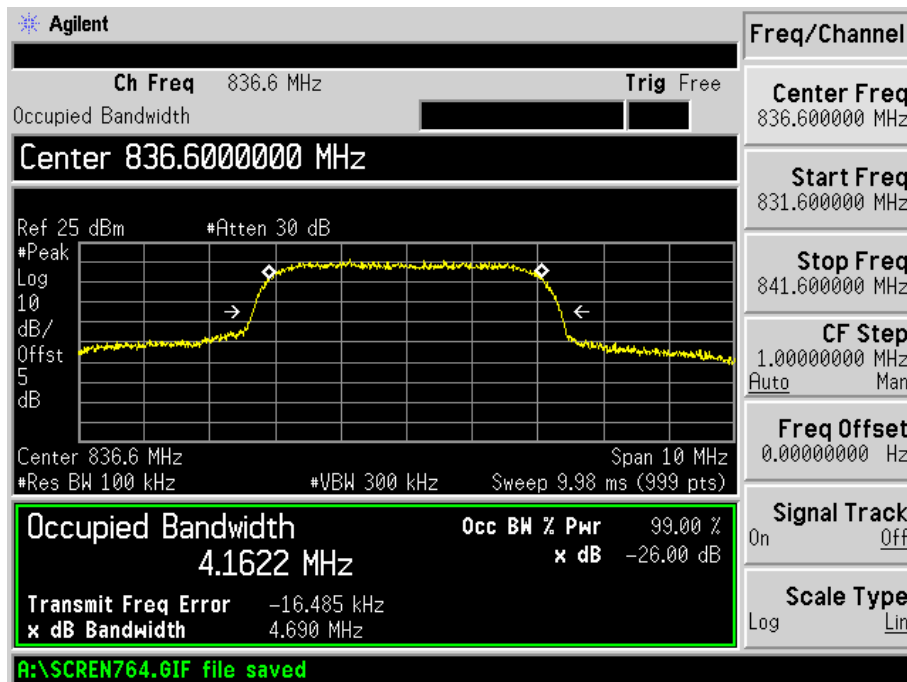
## WCDMA High Channel



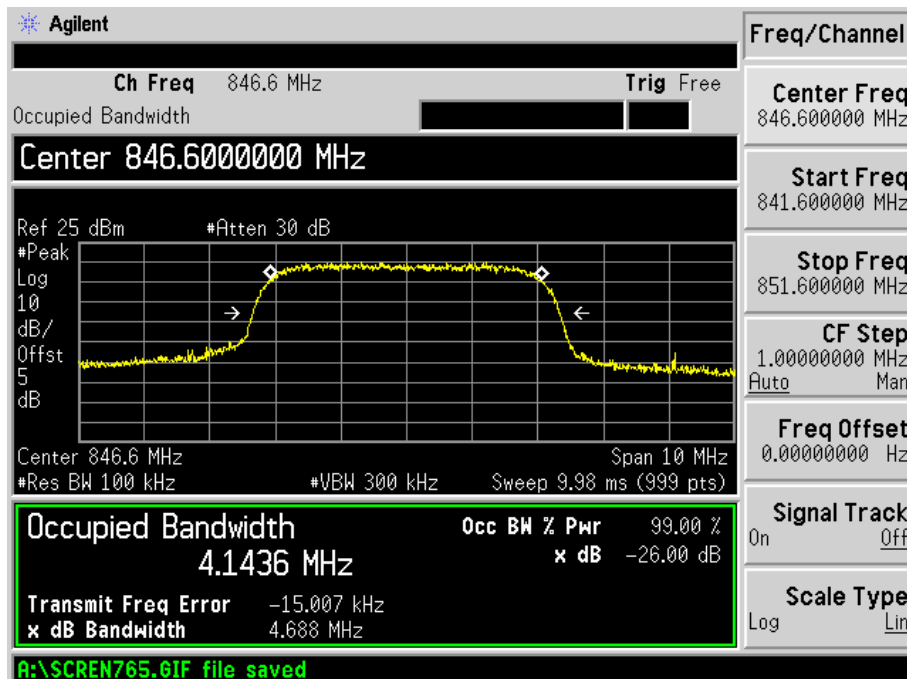
## HSDPA Low Channel



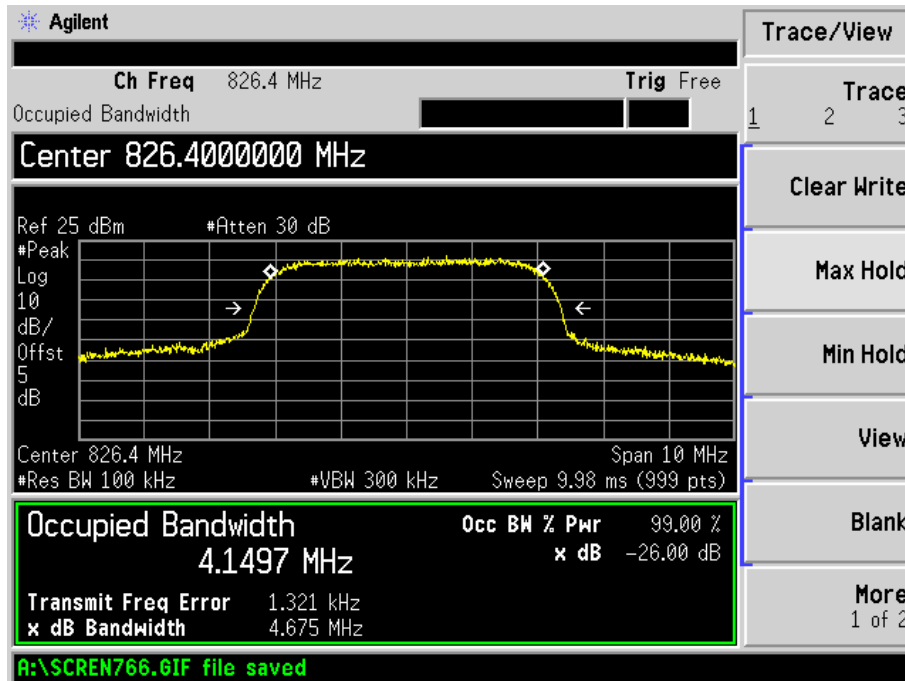
### HSDPA Middle Channel



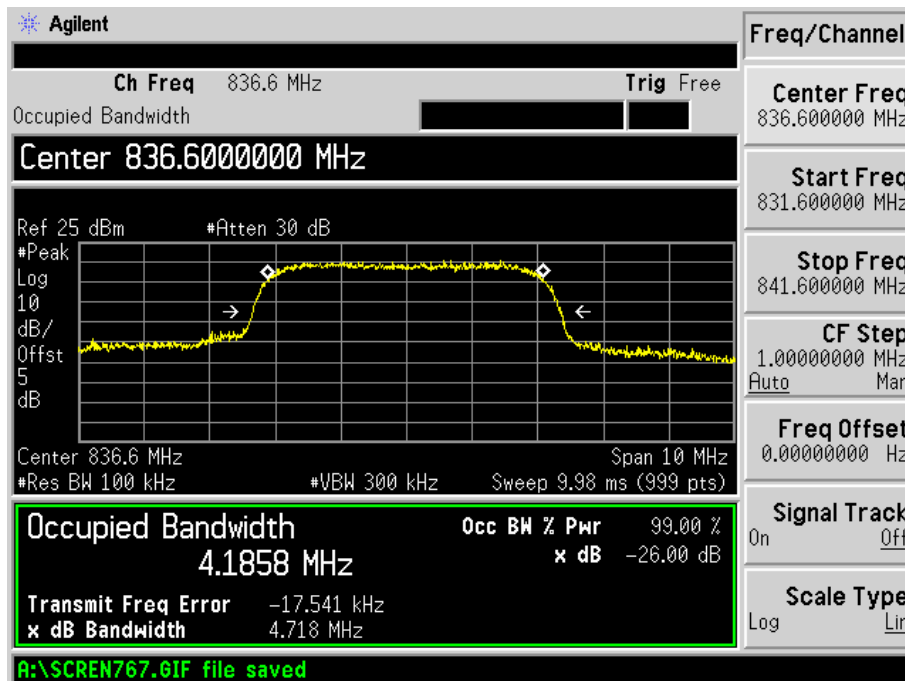
### HSDPA High Channel



### HSUPA Low Channel

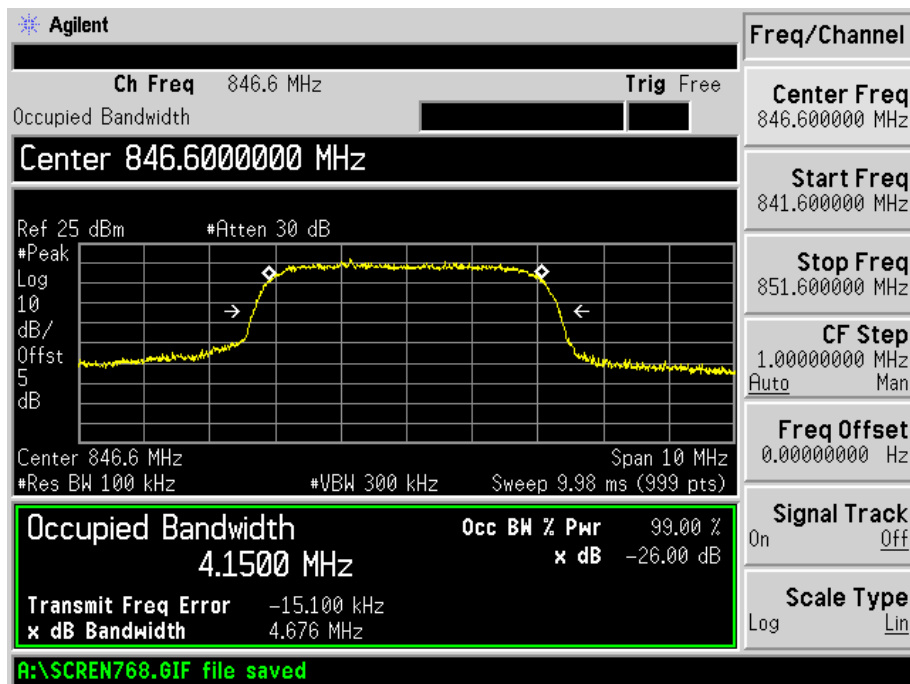


### HSUPA Middle Channel



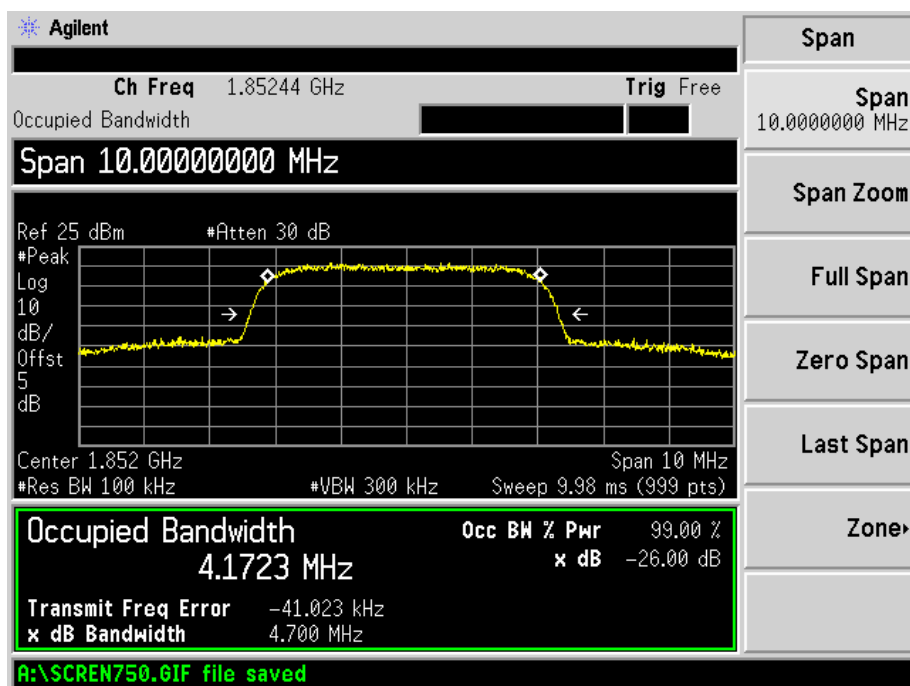


## HSUPA High Channel

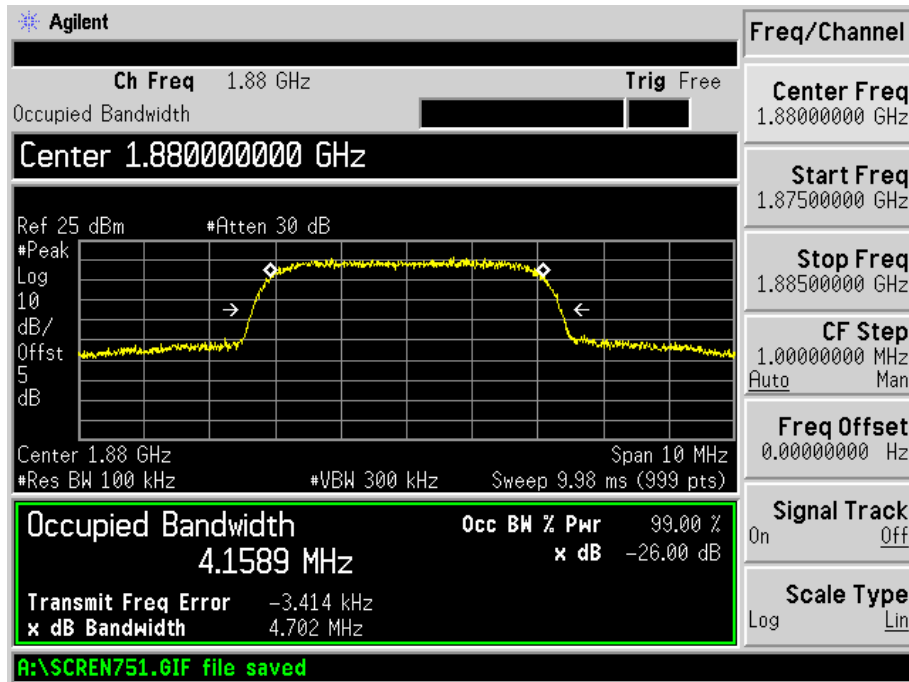


## For Band II

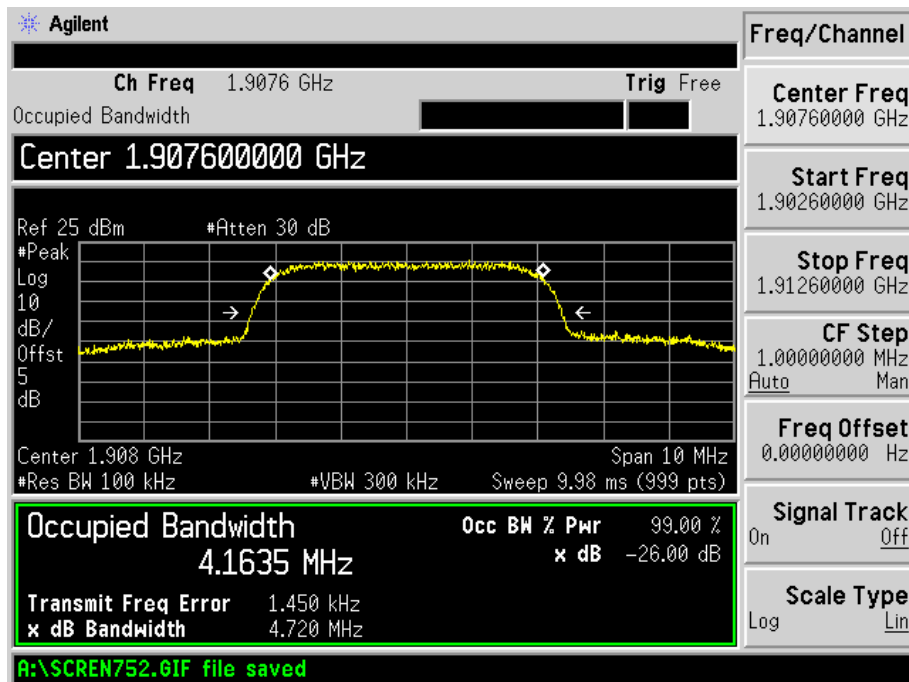
## WCDMA Low Channel



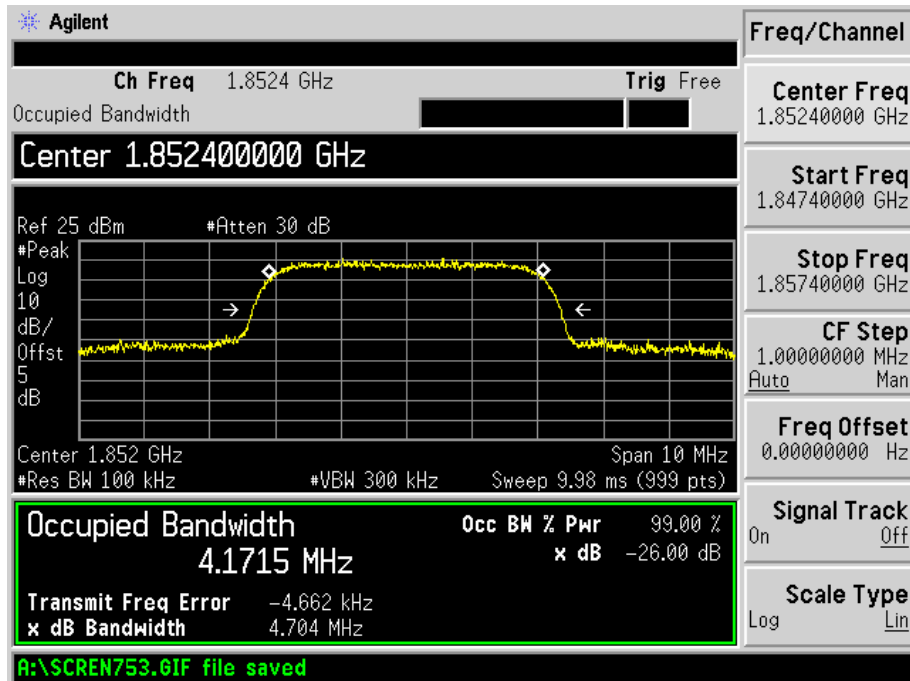
### WCDMA Middle Channel



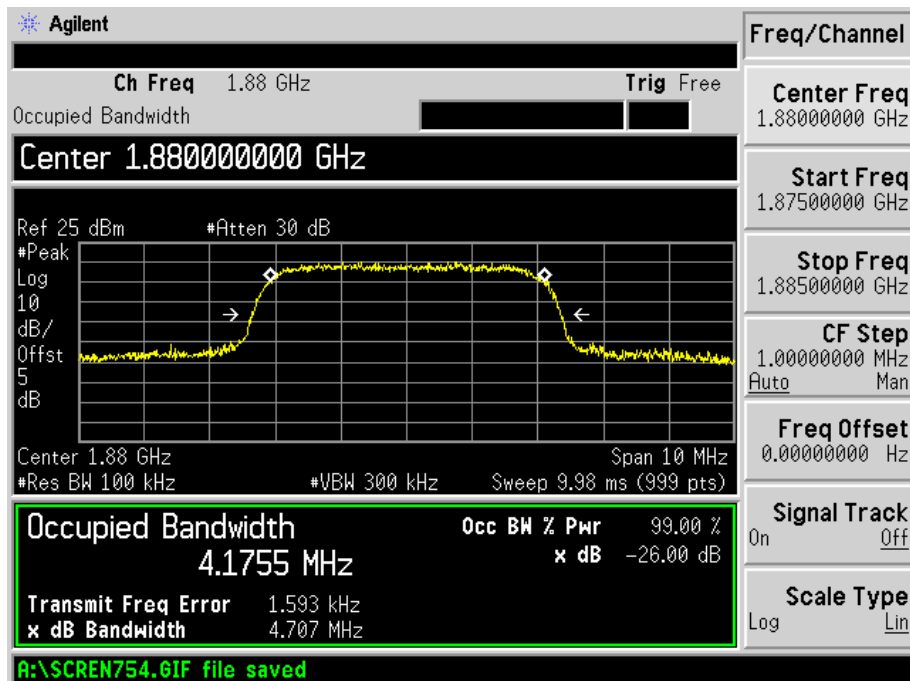
### WCDMA High Channel



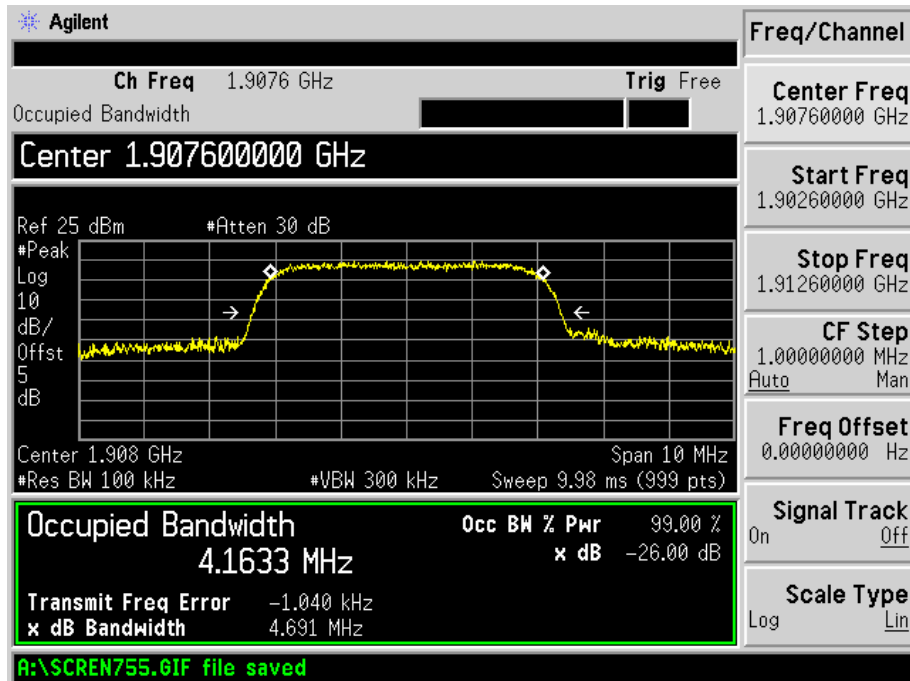
## HSDPA Low Channel



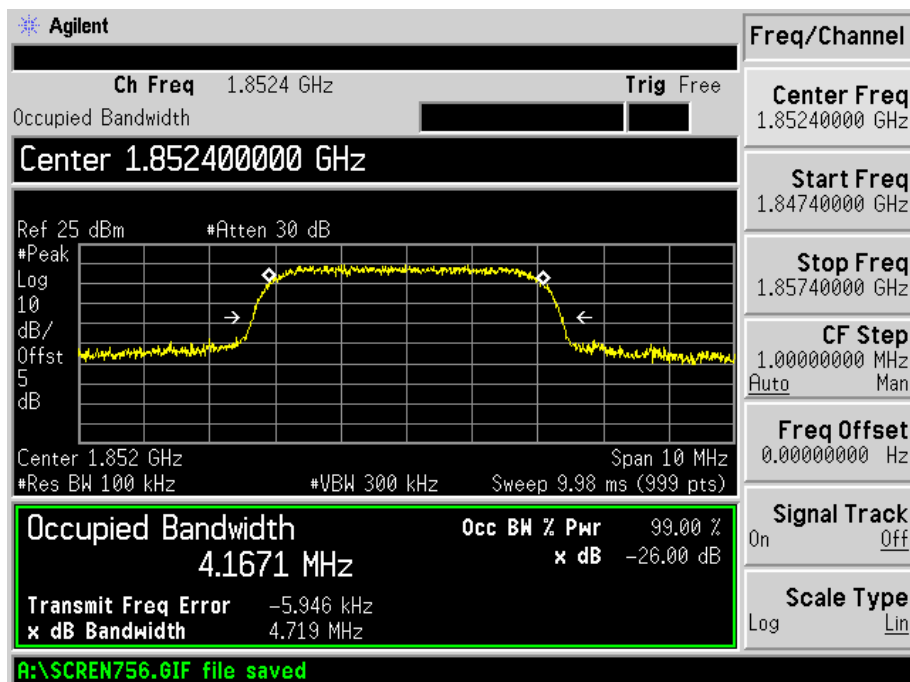
## HSDPA Middle Channel



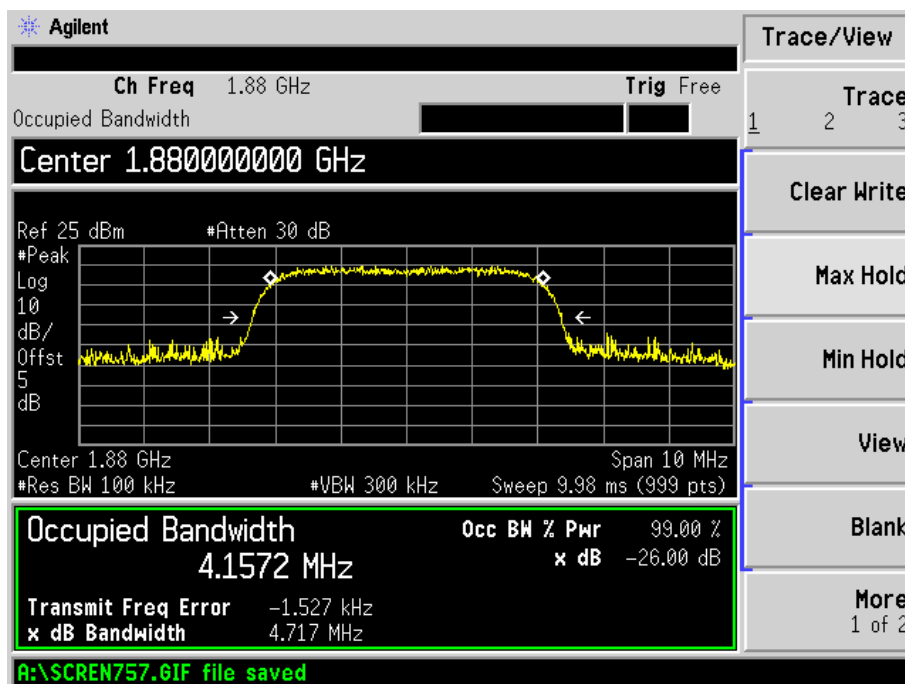
## HSDPA High Channel



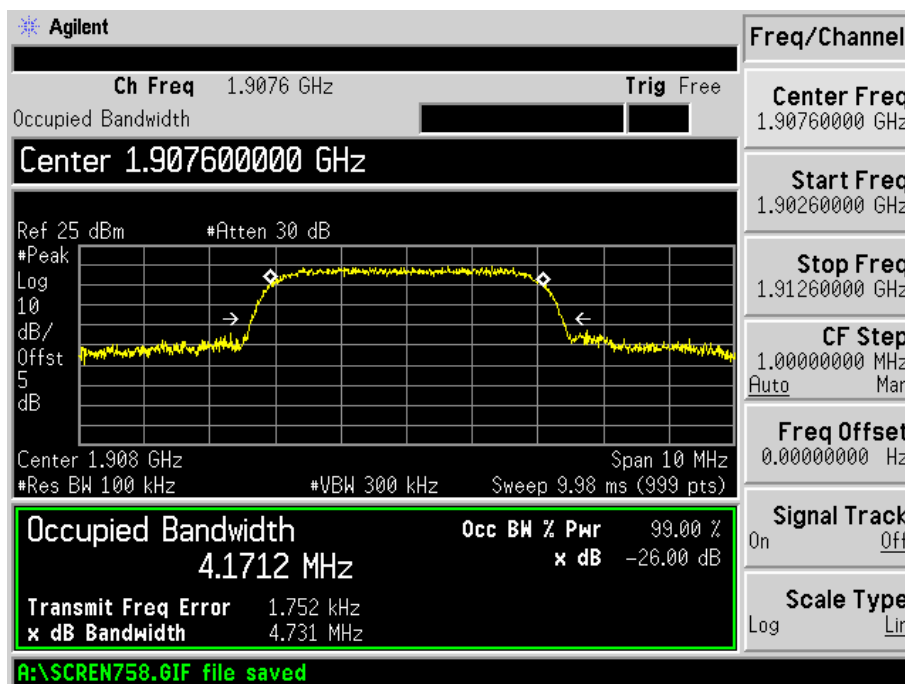
## HSUPA Low Channel



### HSUPA Middle Channel



### HSUPA High Channel



## 7. Out of Band Emissions at Antenna Terminal

### 7.1 Standard Applicable

According to §22.917(a), the power of any emissions 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.

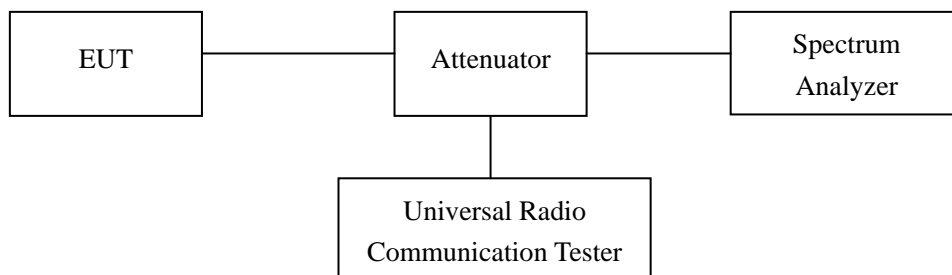
According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

According to §27.53 (h), the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log_{10}(P)$  dB.

### 7.2 Test Procedure

The RF output terminal of the transmitter was connected to the input of the spectrum analyzer via a suitable attenuation. The RBW of the spectrum analyzer was set to 100kHz and 1MHz for the scan frequency from 30MHz to 1GHz and the scan frequency from 1GHz to up to 10<sup>th</sup> harmonic.

Test Configuration for the out of band emissions testing:



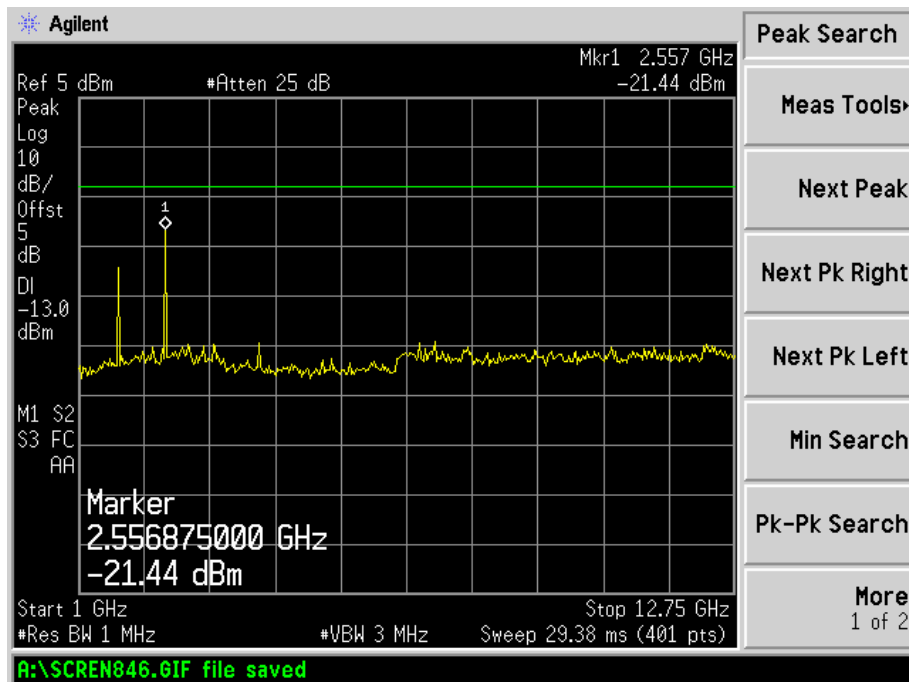
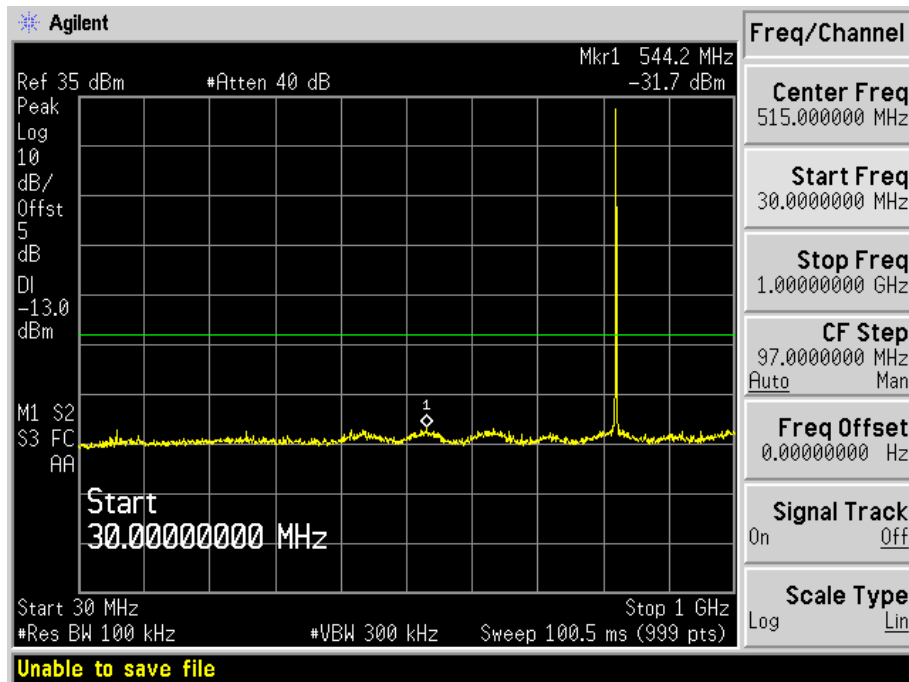
### 7.3 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

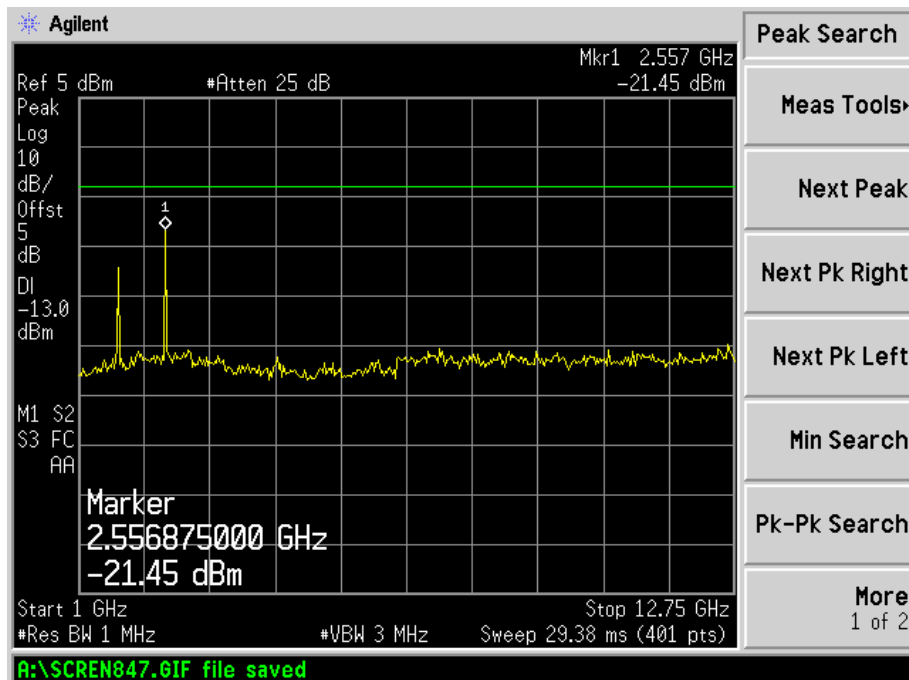
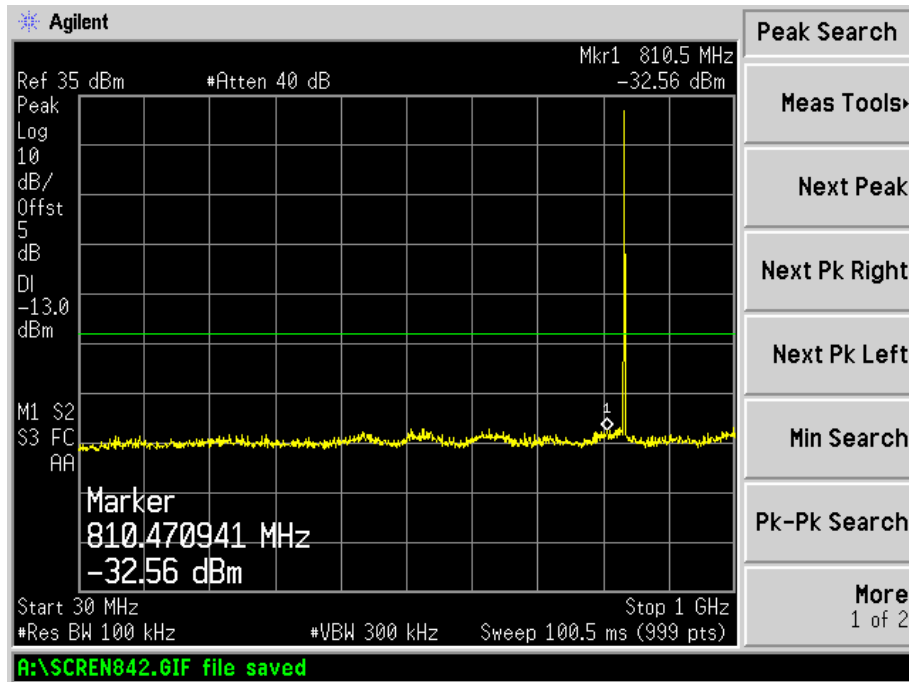
## 7.4 Summary of Test Results/Plots

Please refer to the following test plots For Cellular Band

GSM Low Channel

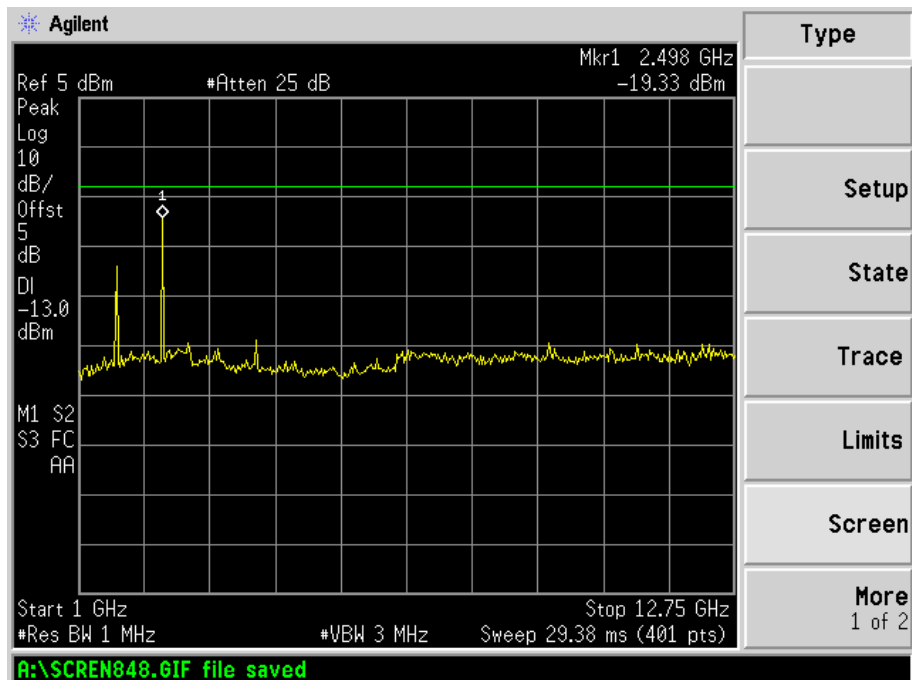
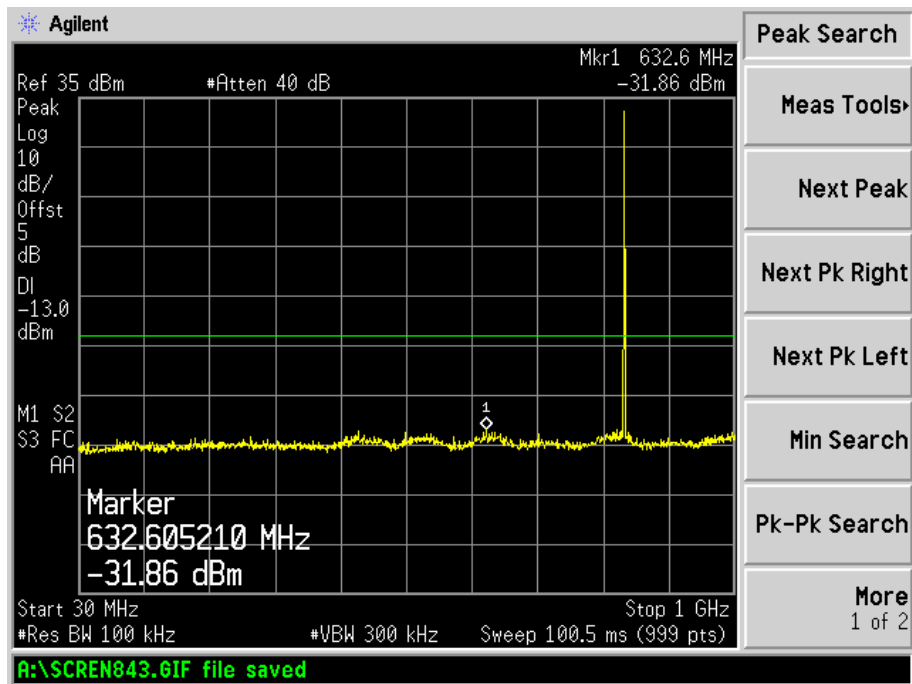


## GSM Middle Channel

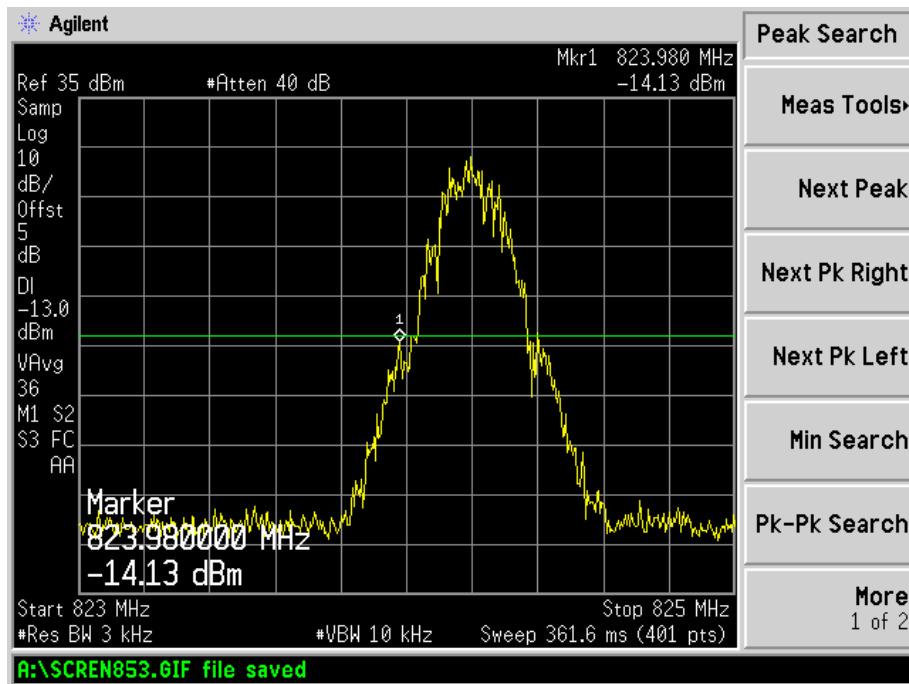




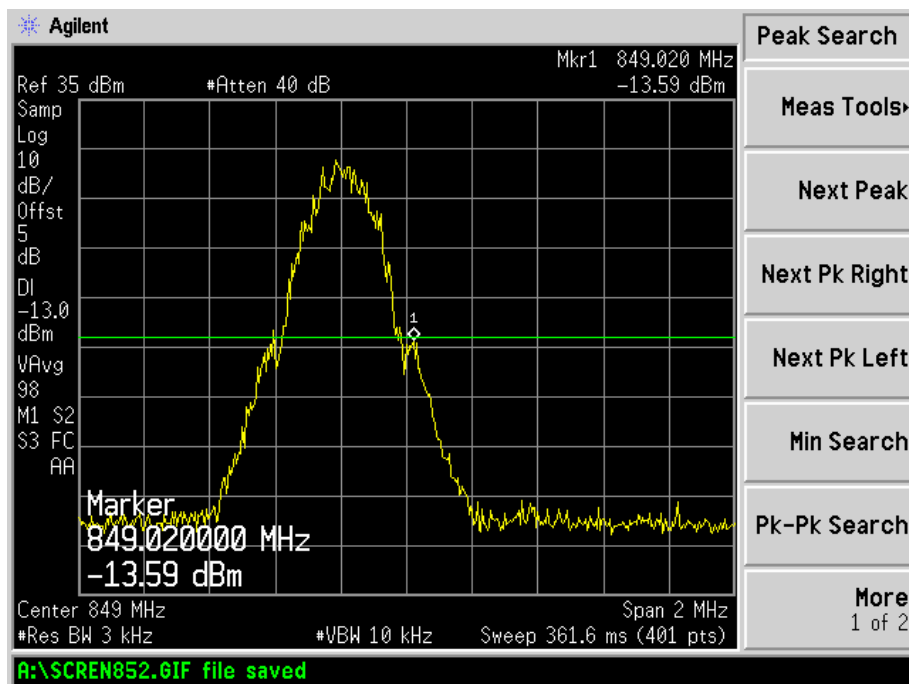
## GSM High Channel



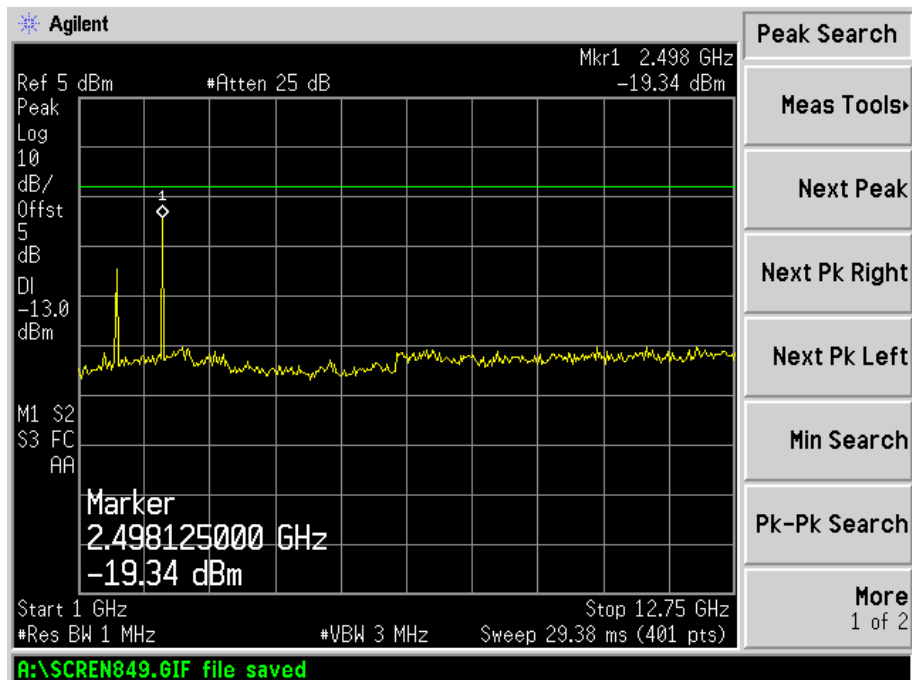
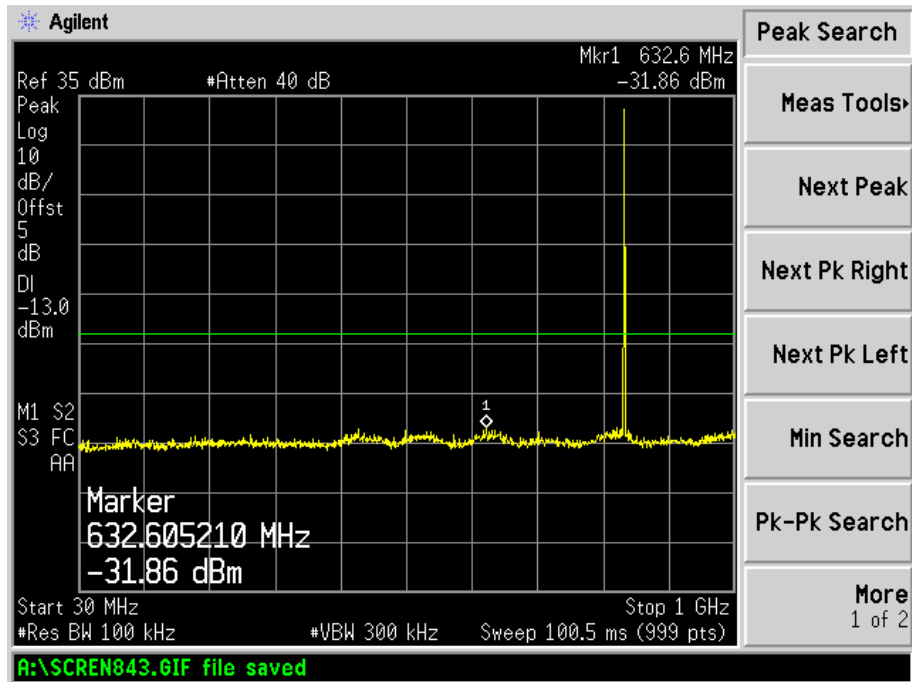
## GSM Low Band Emission



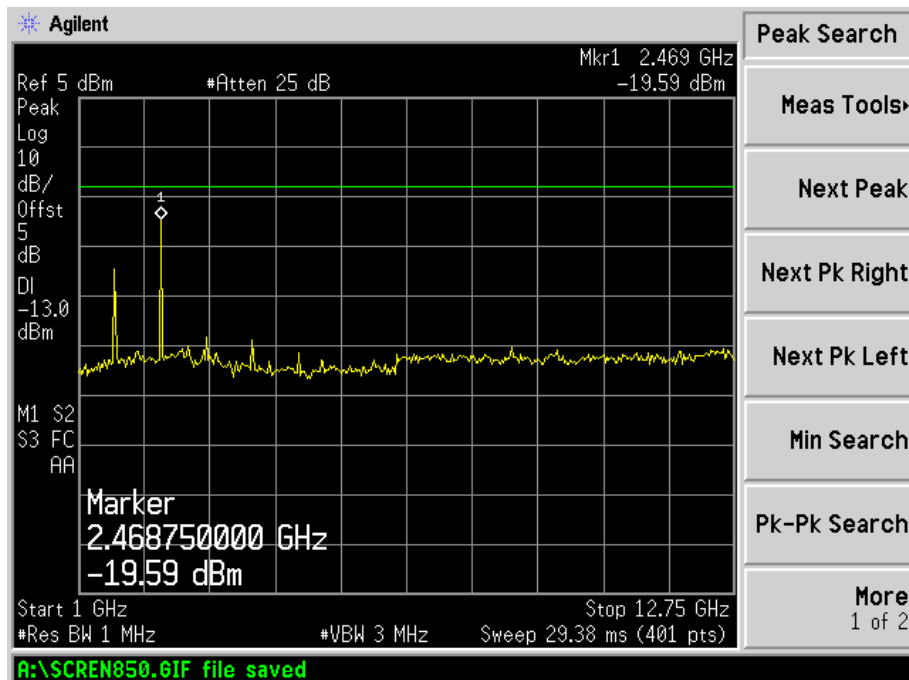
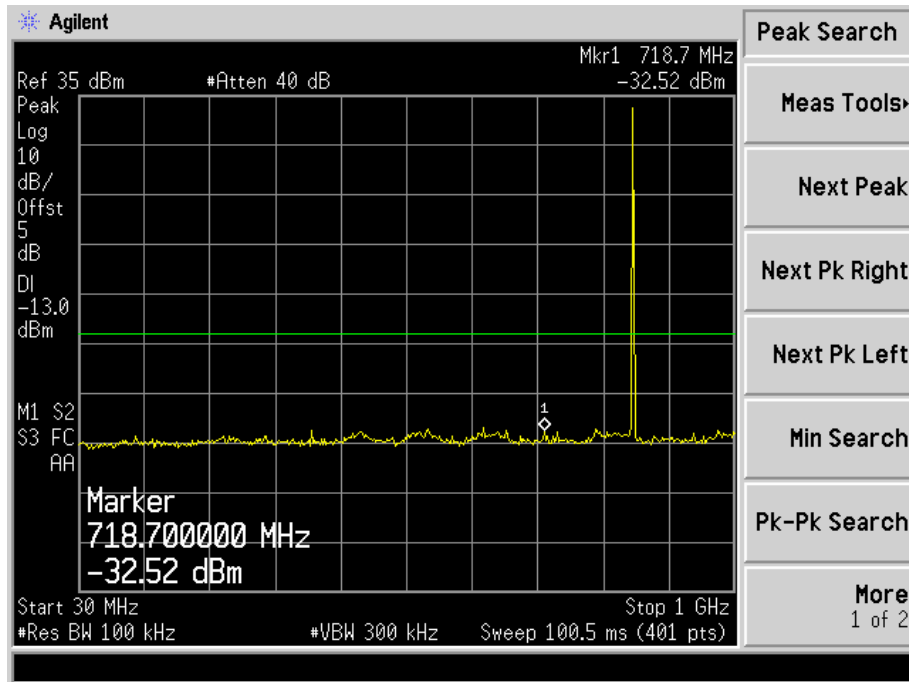
## GSM High Band Emission



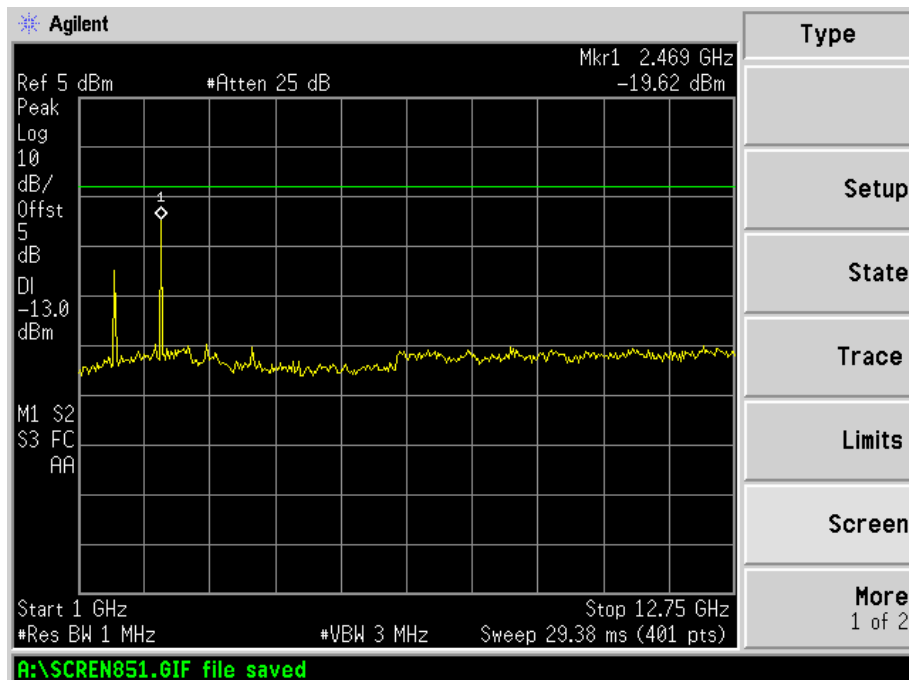
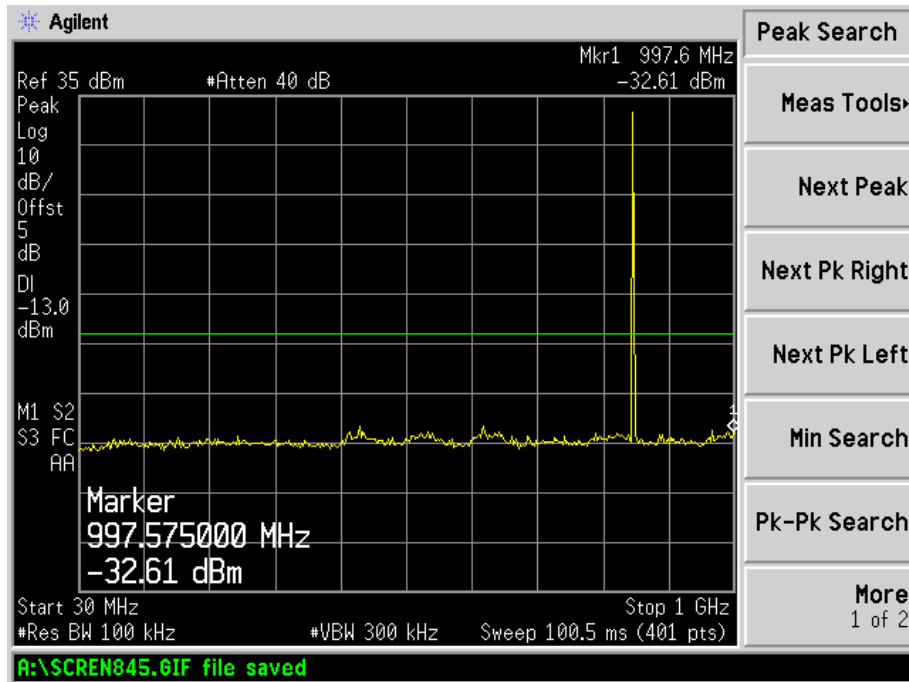
## GPRS Low Channel



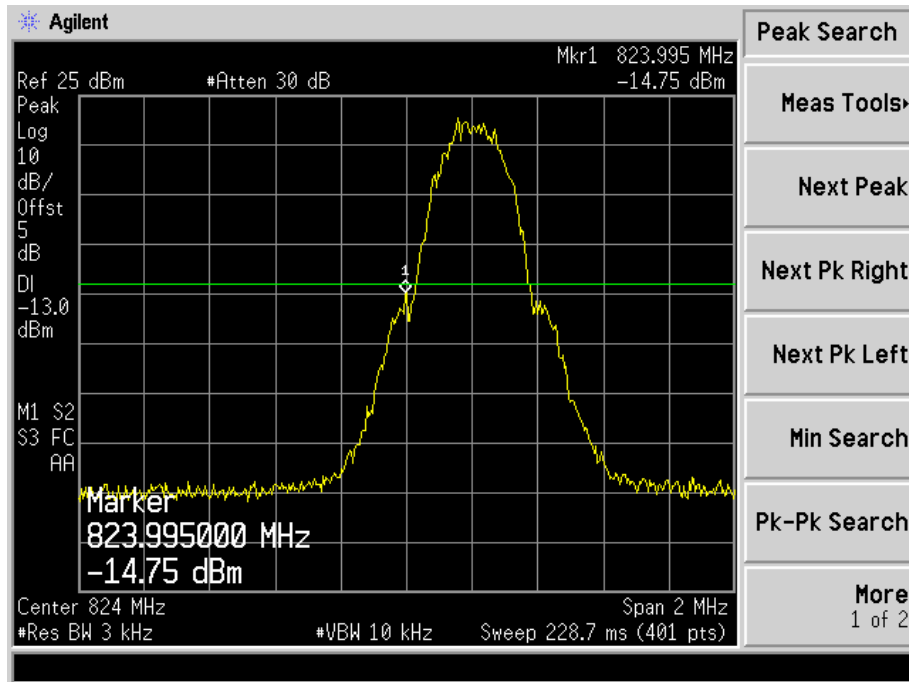
## GPRS Middle Channel



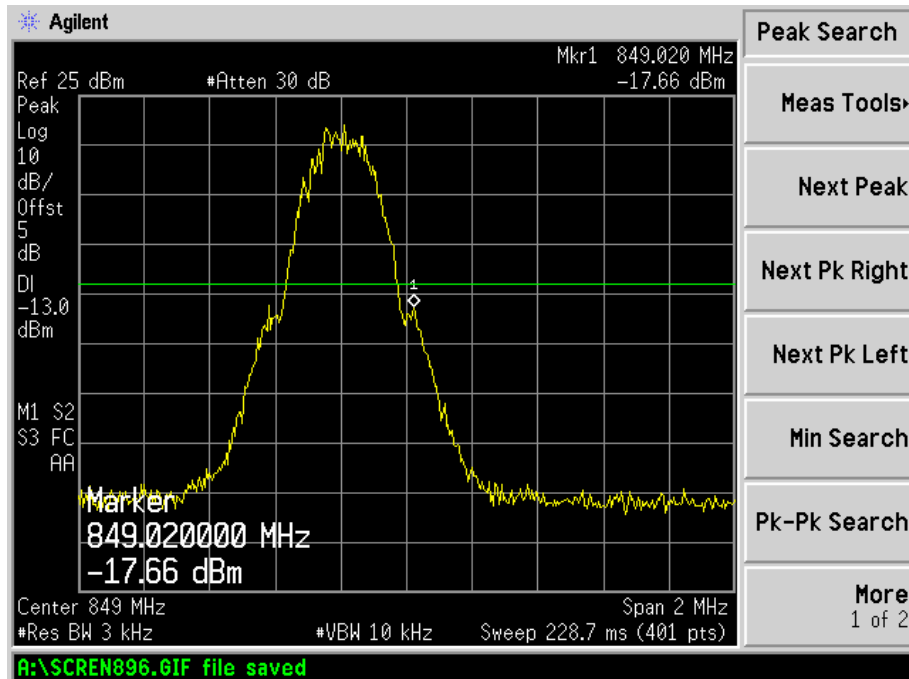
## GPRS High Channel



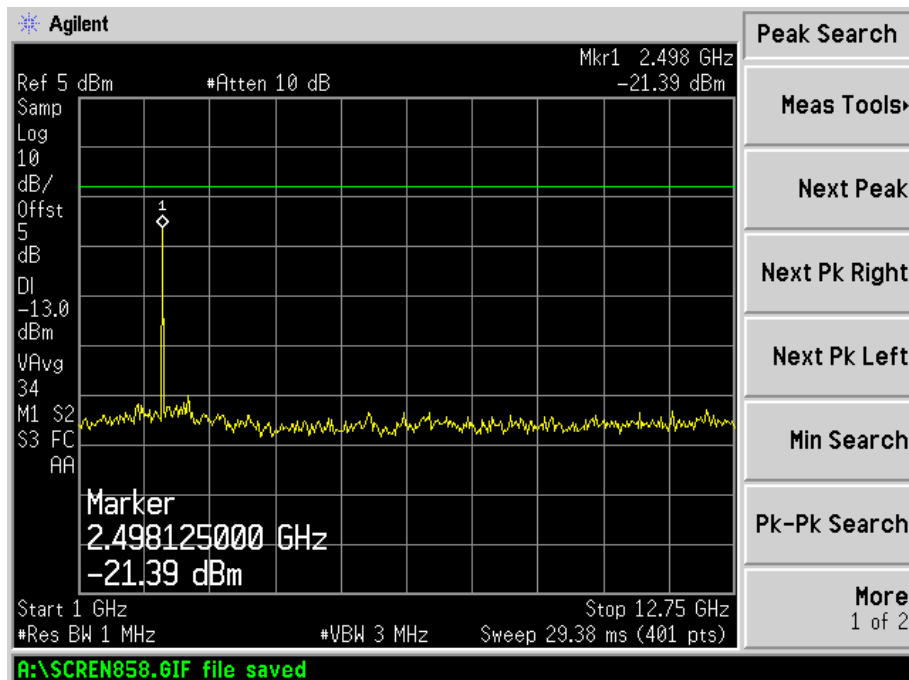
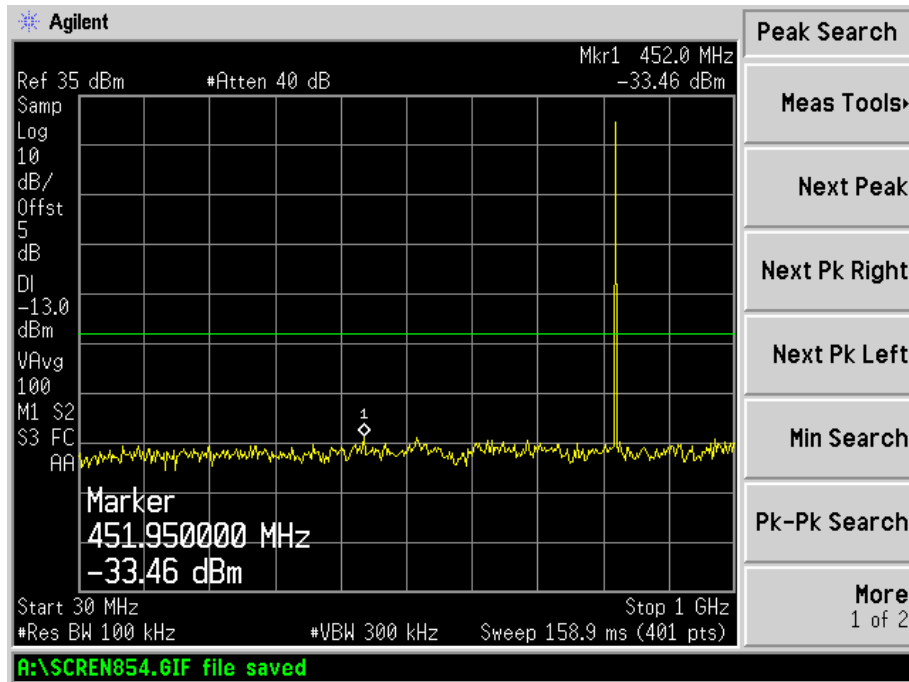
## GPRS Low Band Emission



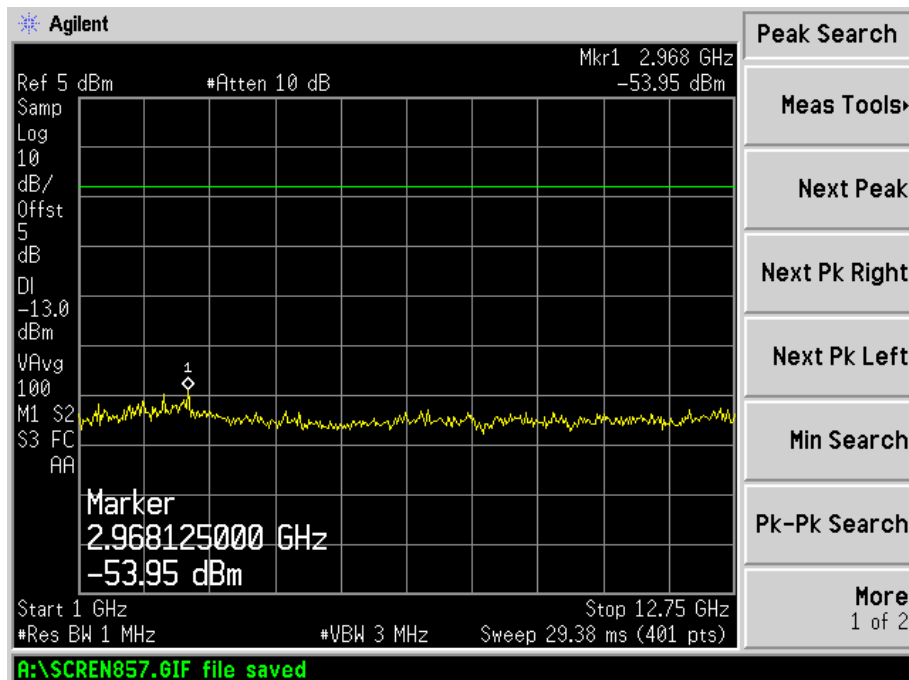
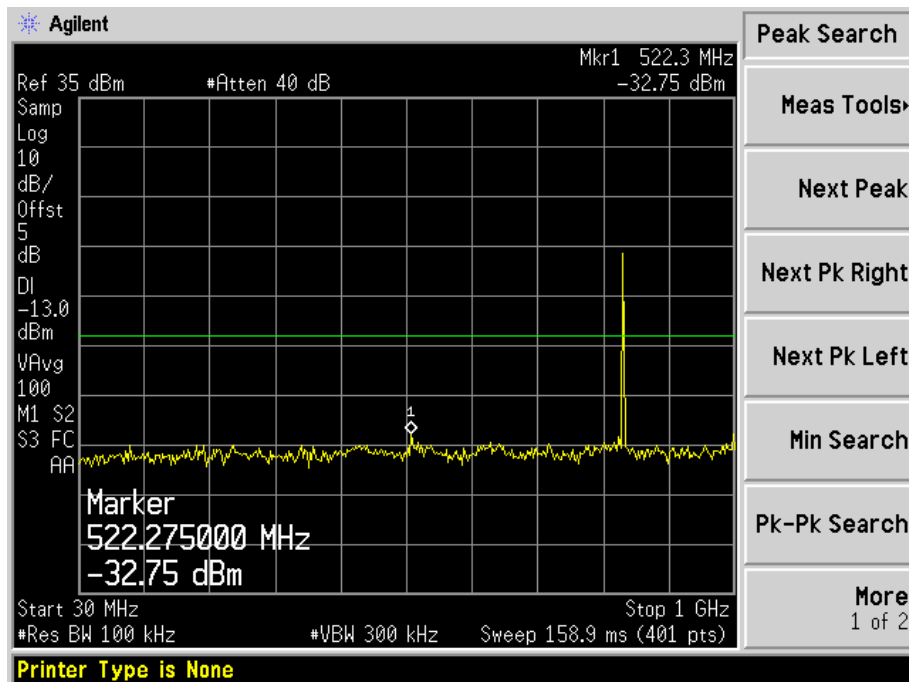
## GPRS High Band Emission



## EDGE Low Channel

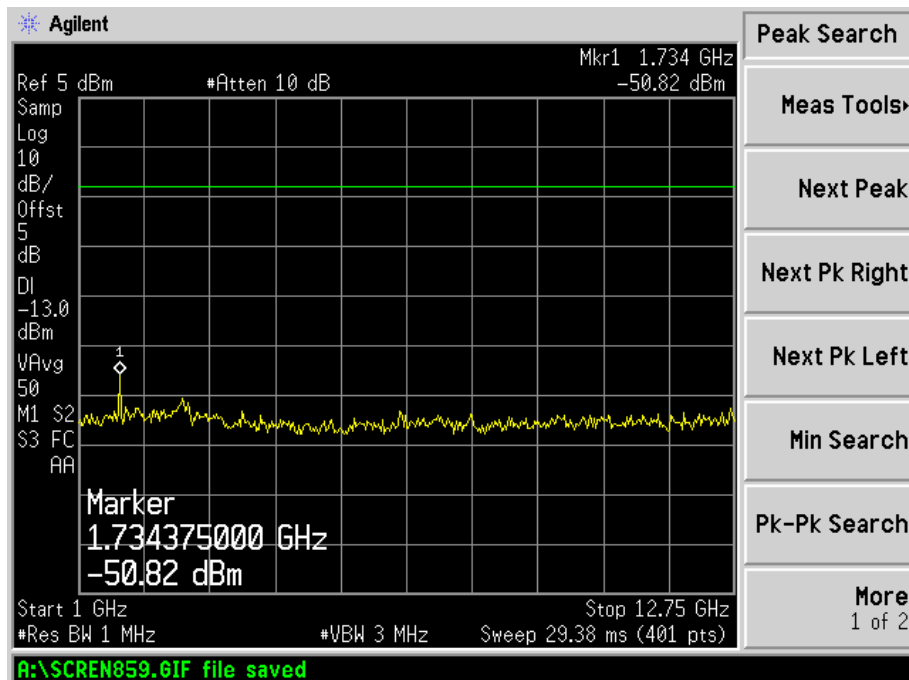
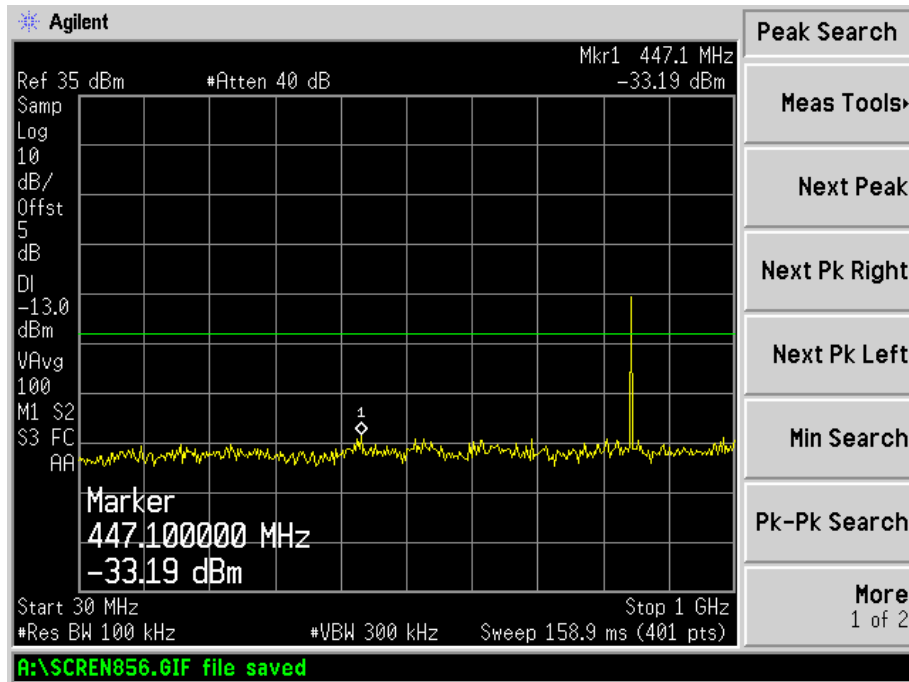


## EDGE Middle Channel

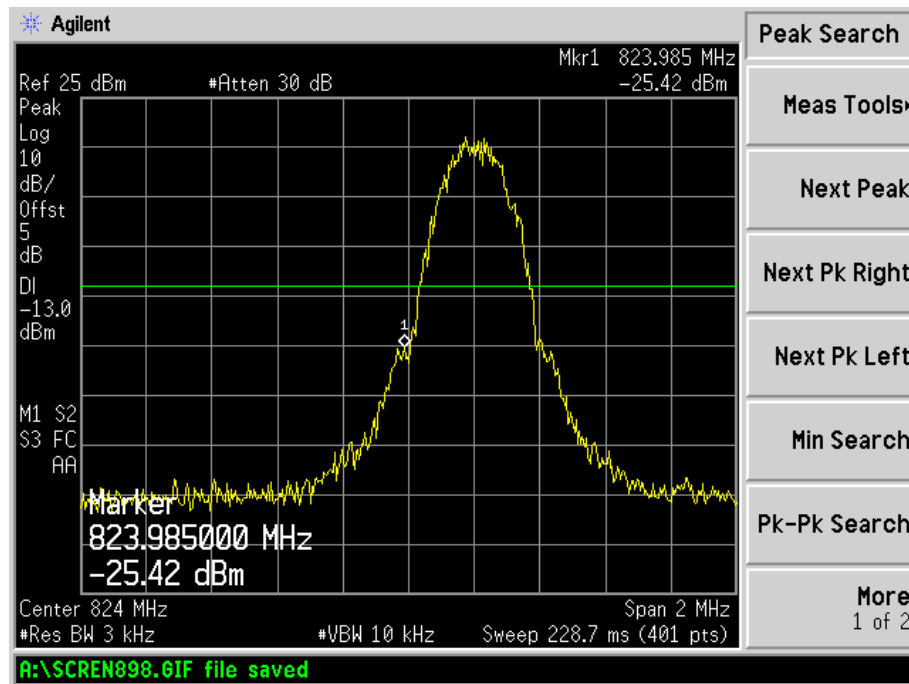




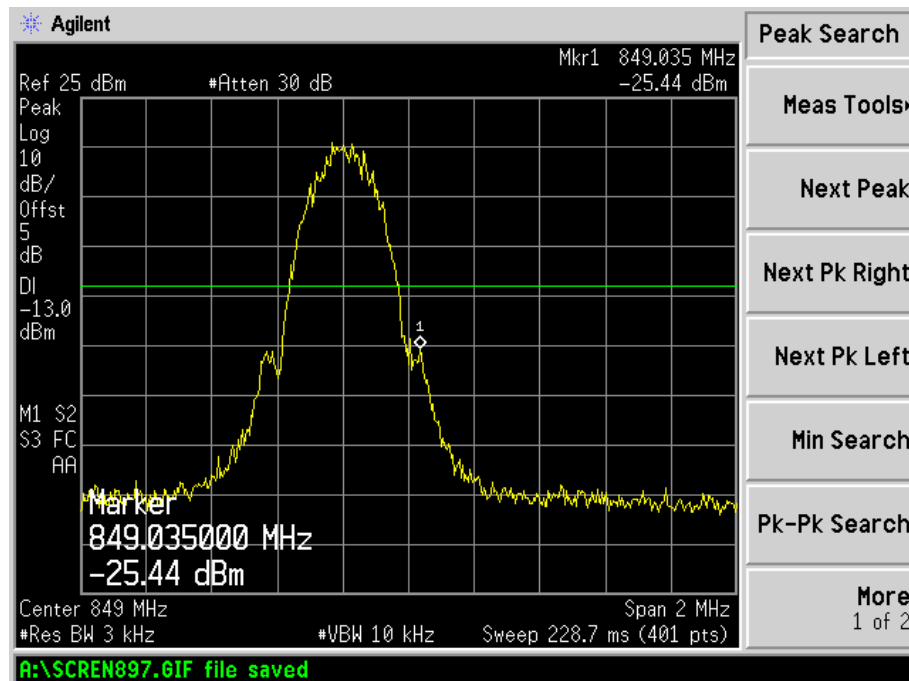
## EDGE High Channel



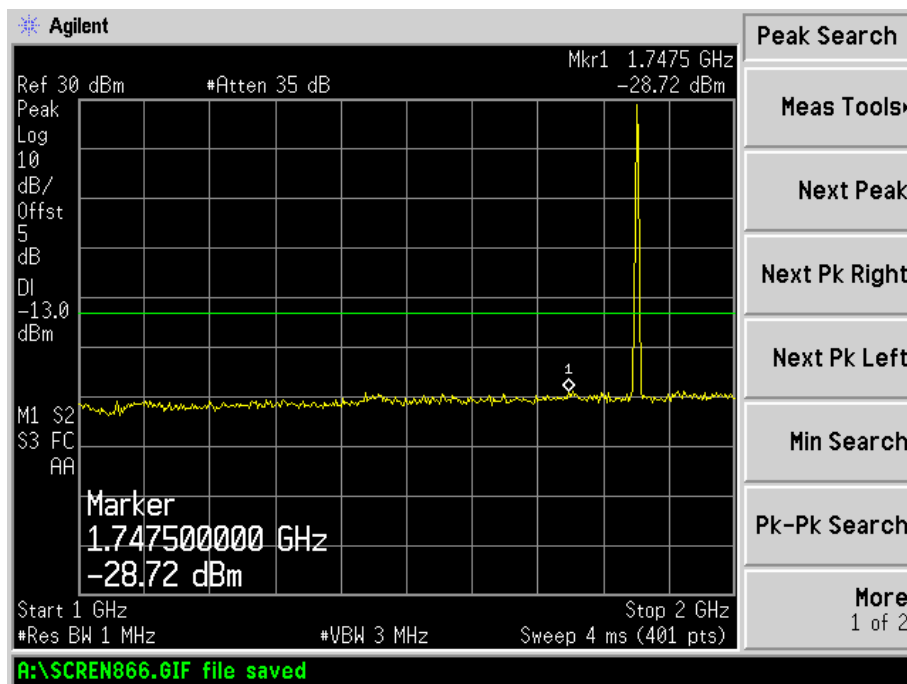
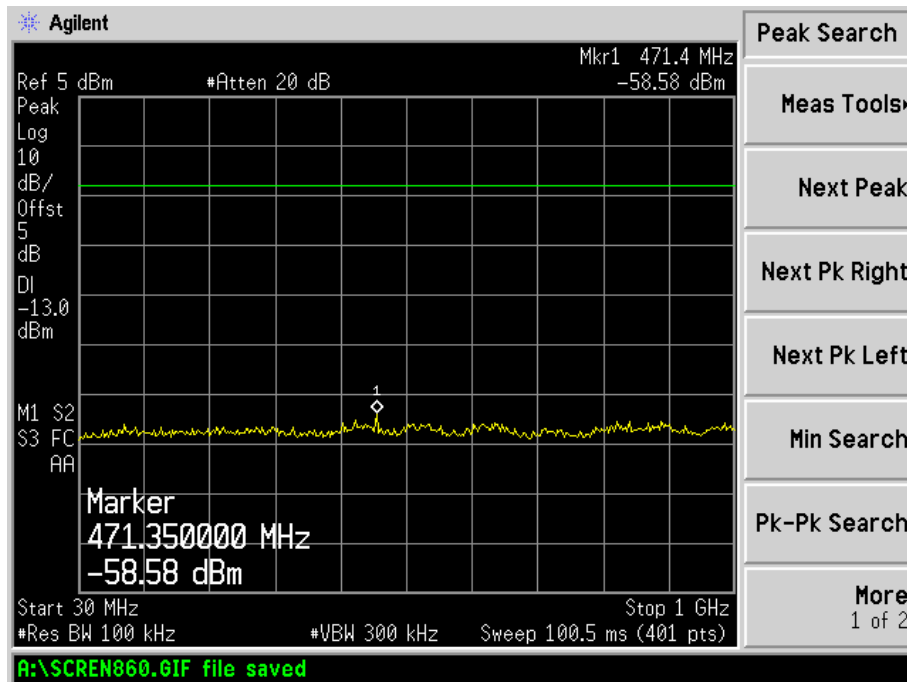
## EDGE Low Band Emission

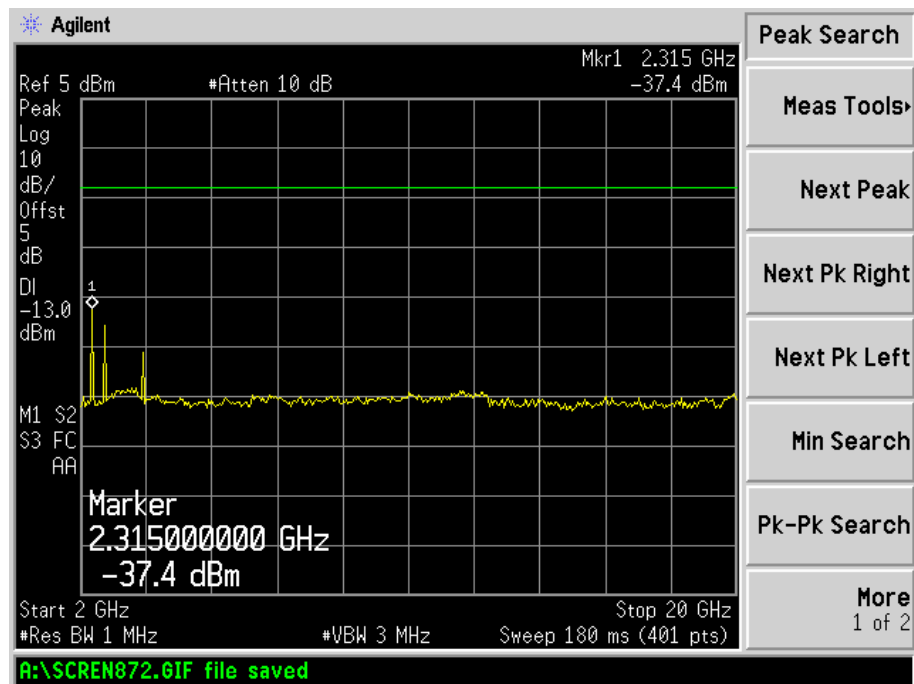


## EDGE High Band Emission

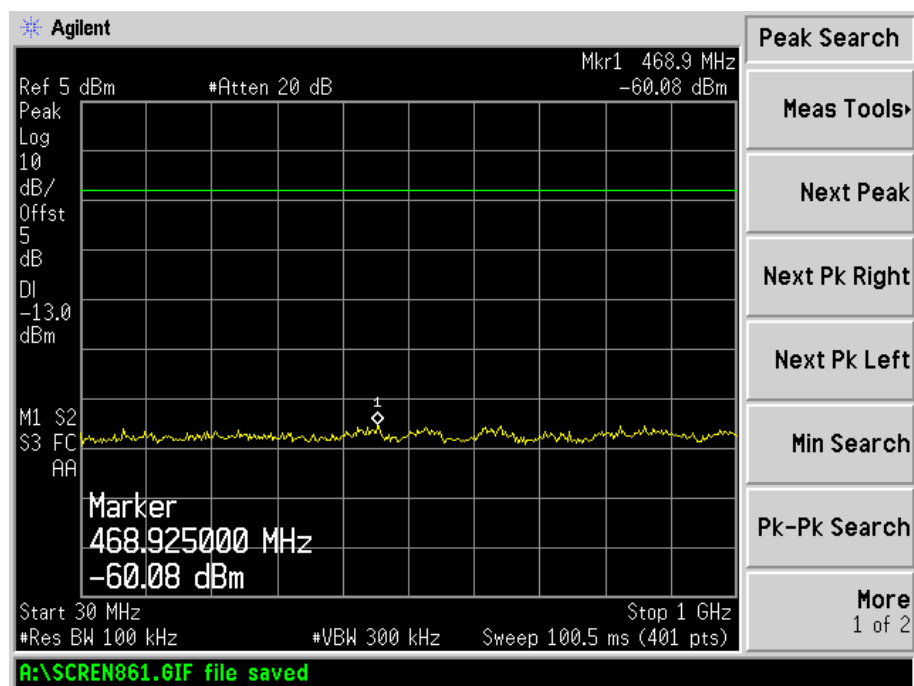


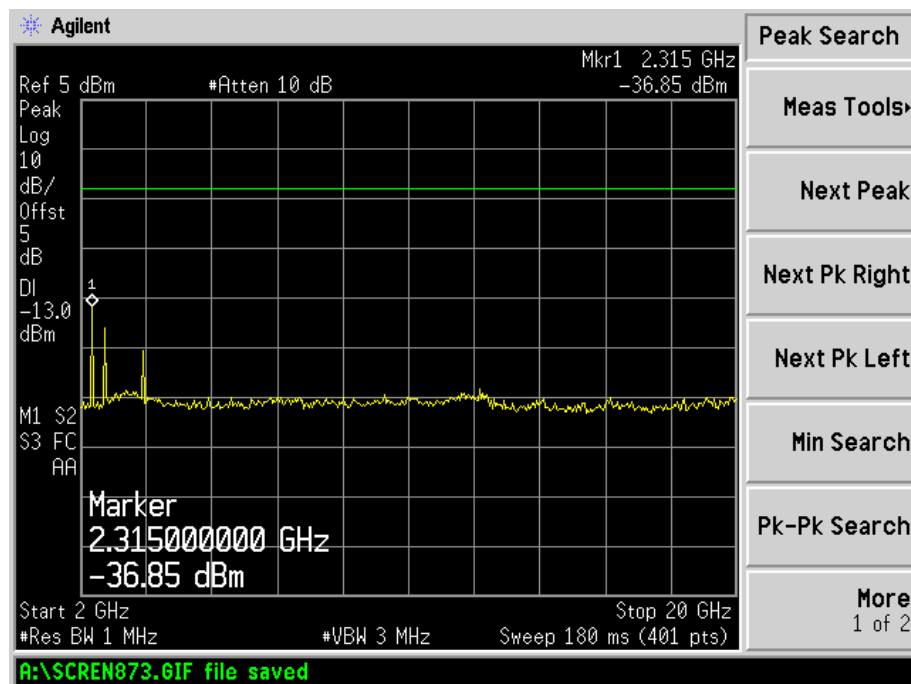
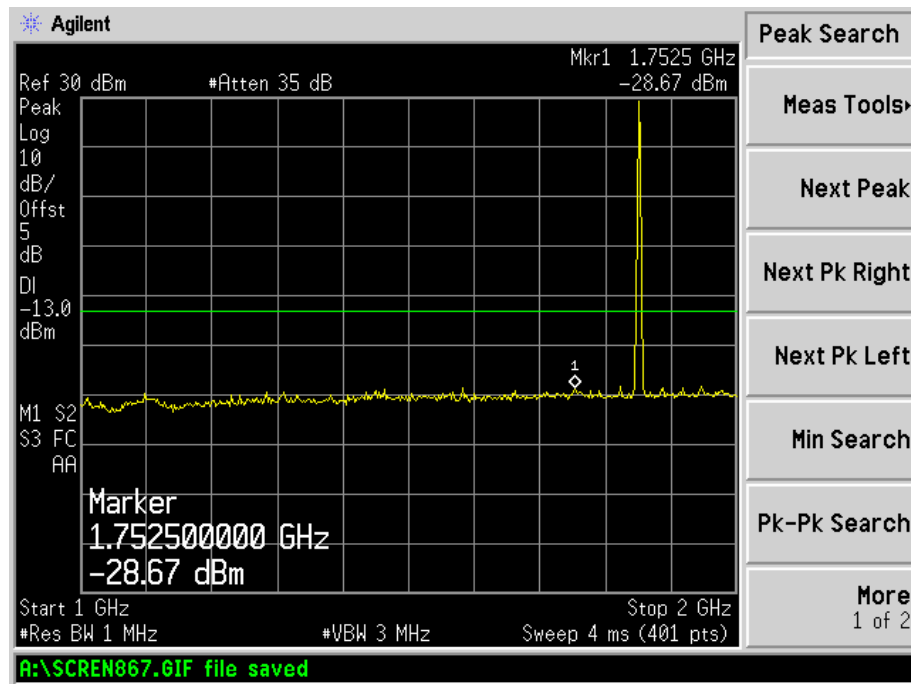
For PCS Band  
GSM Low Channel



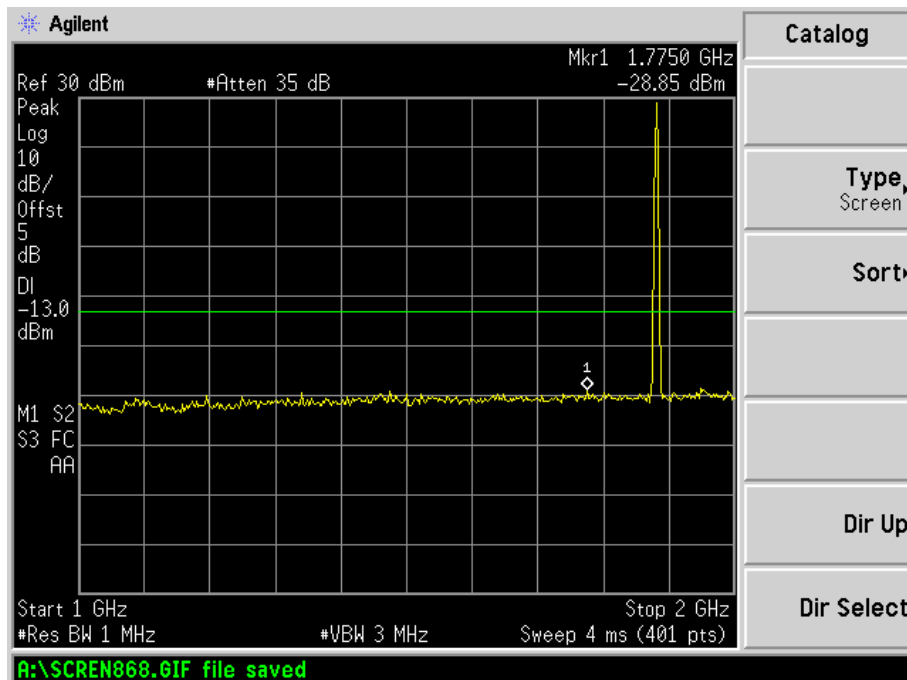
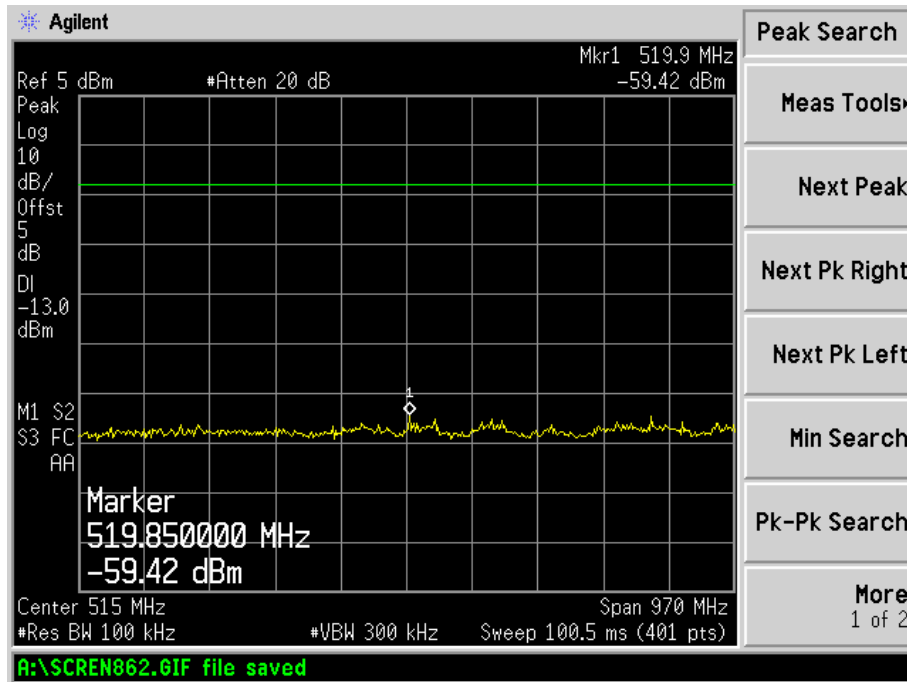


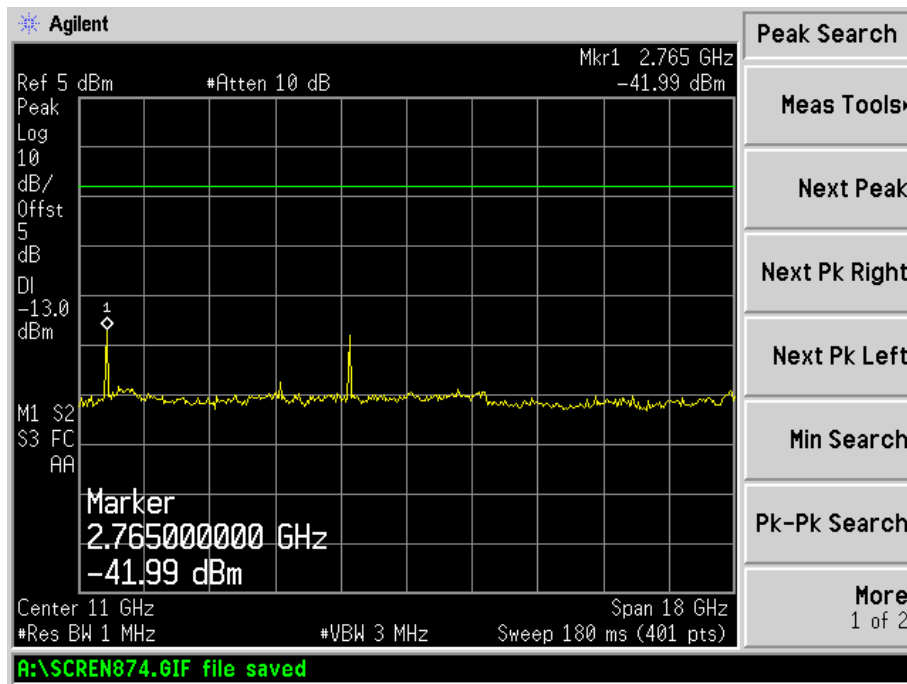
## GSM Middle Channel



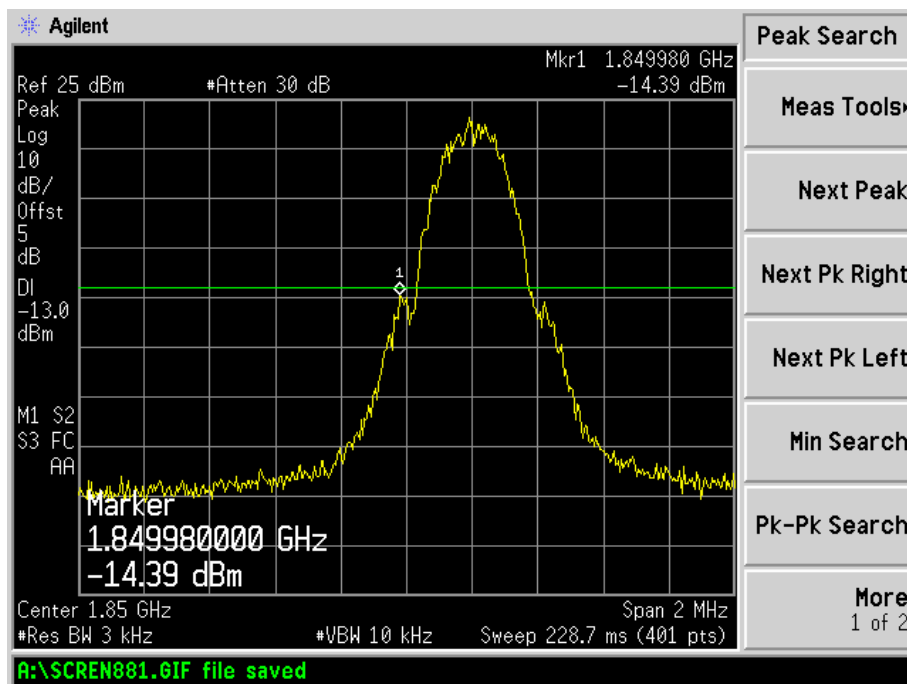


## GSM High Channel

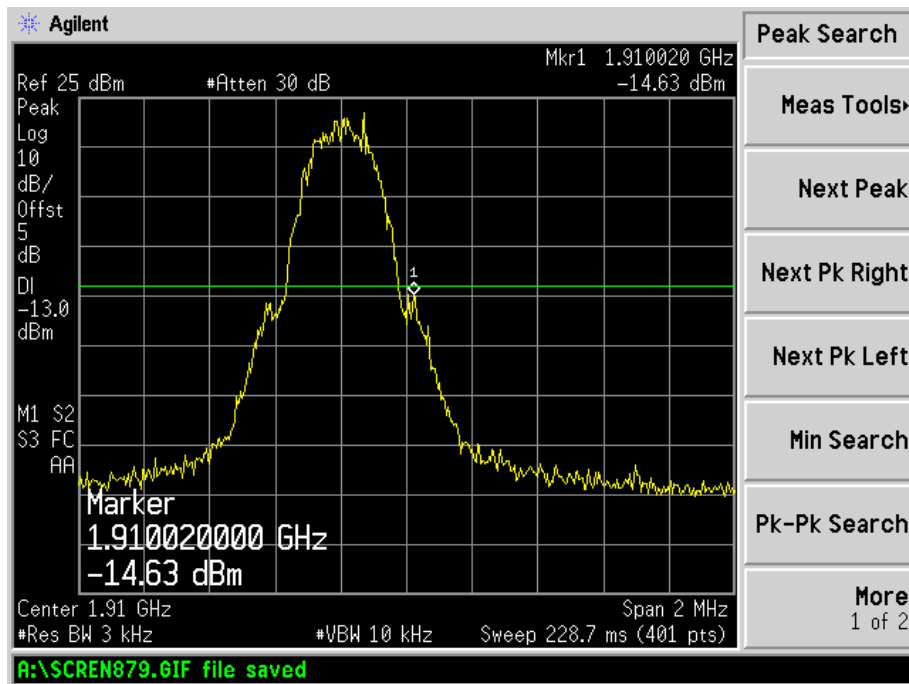




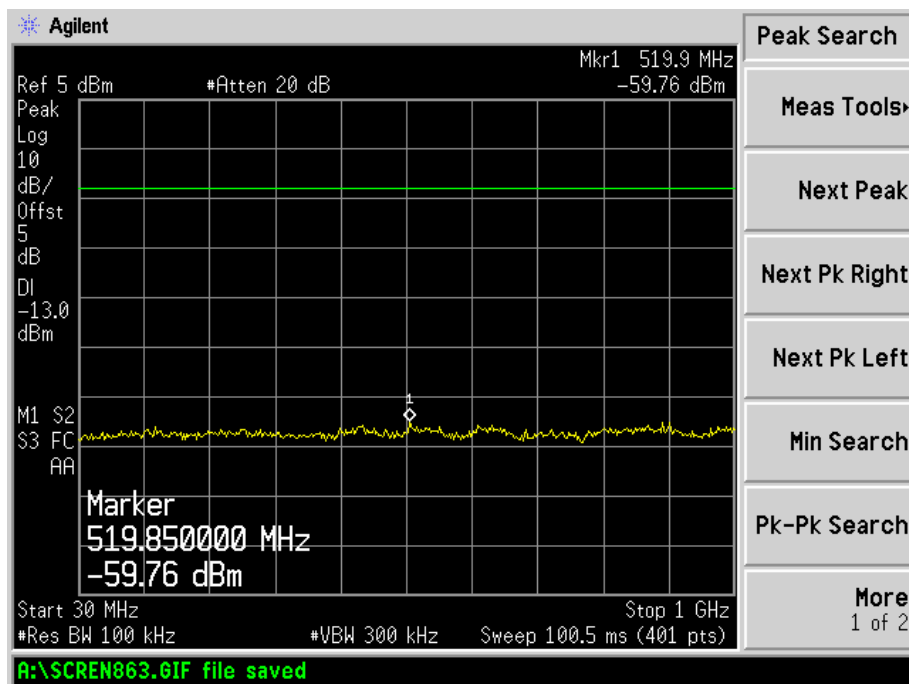
## GSM Low Band Emission



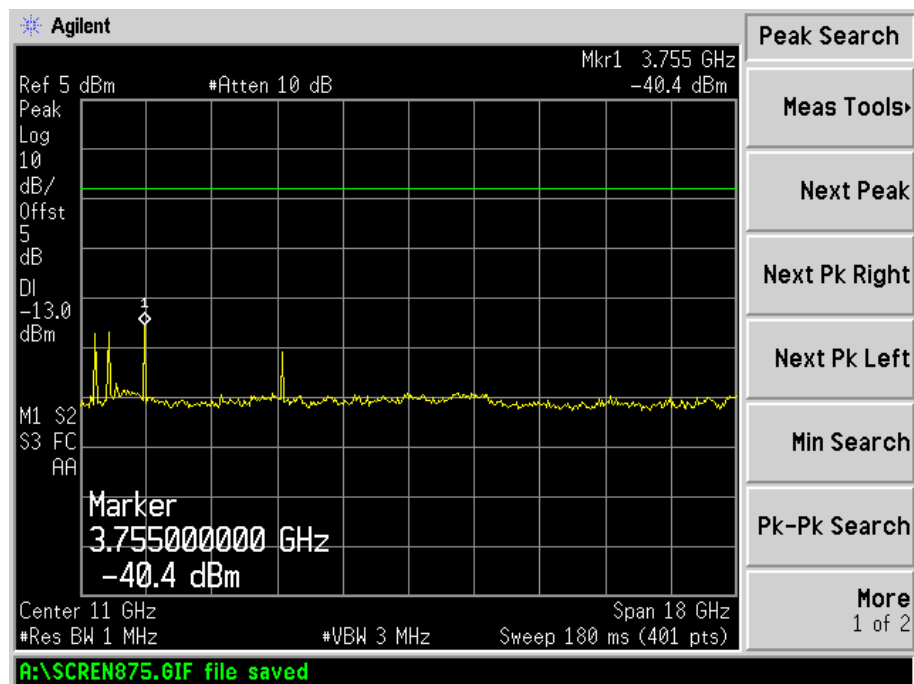
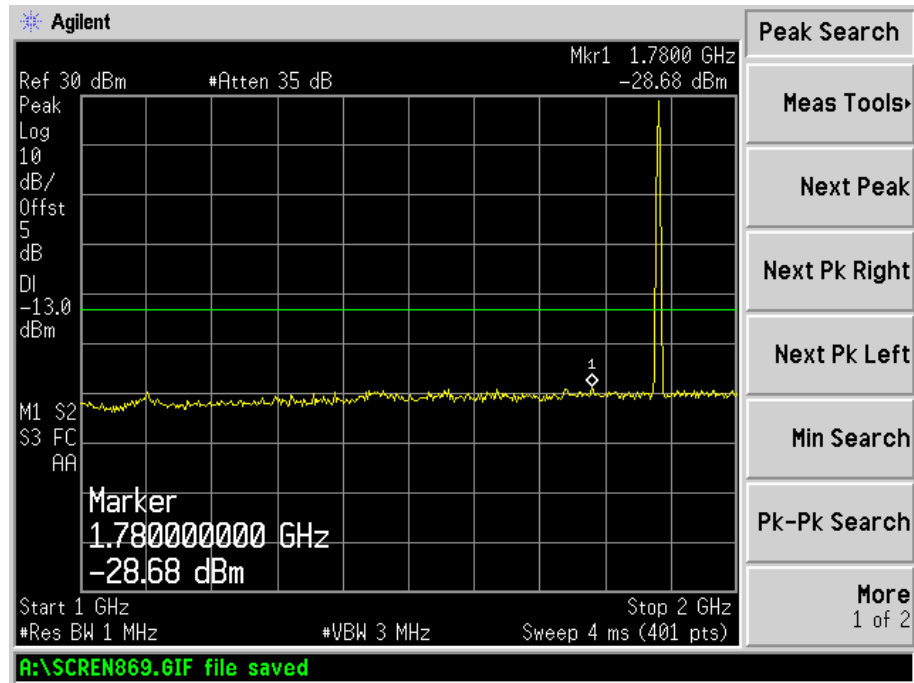
## GSM High Band Emission



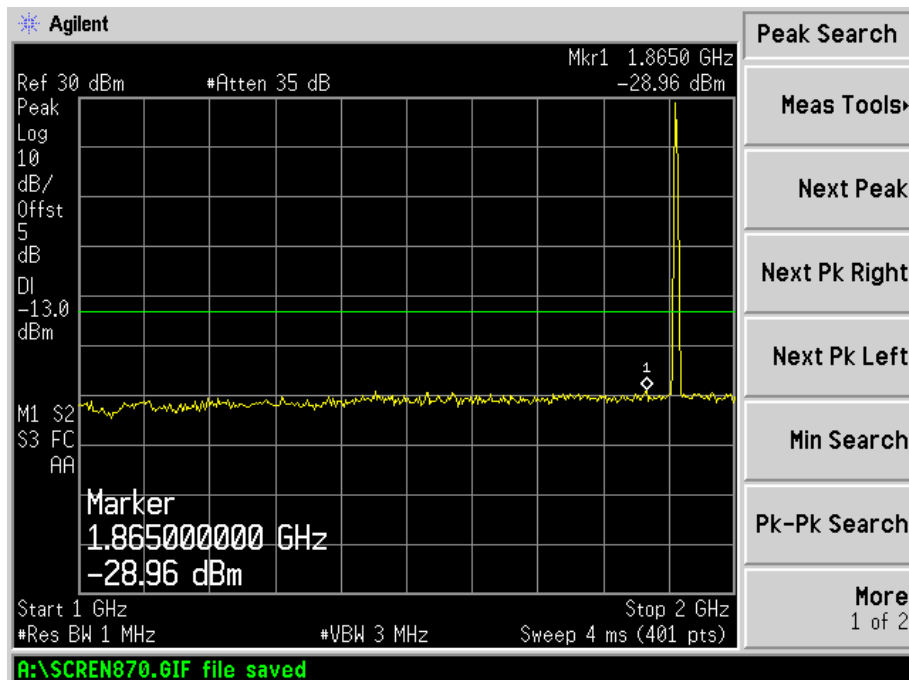
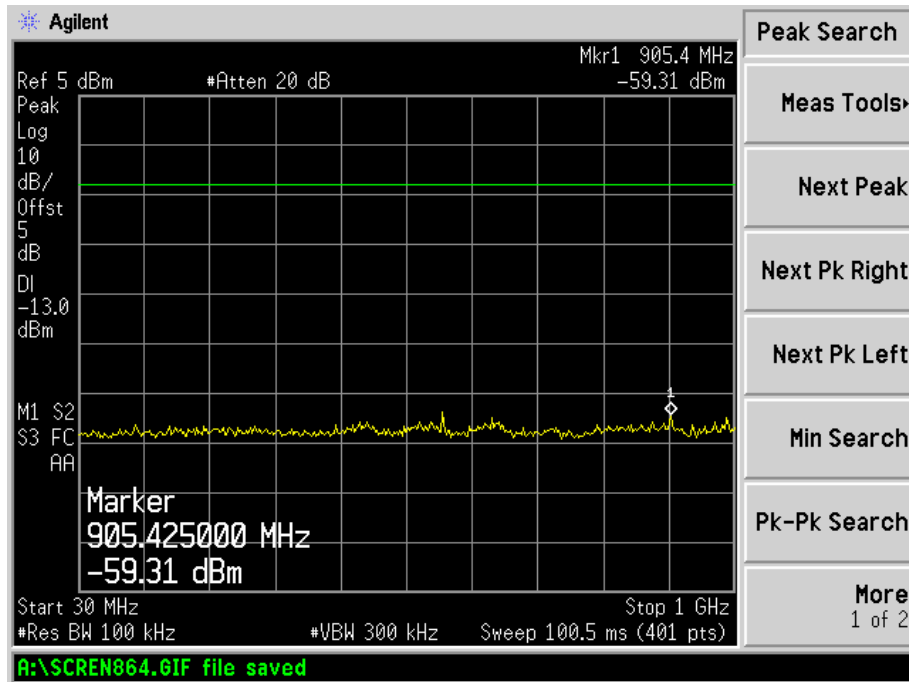
## GPRS Low Channel

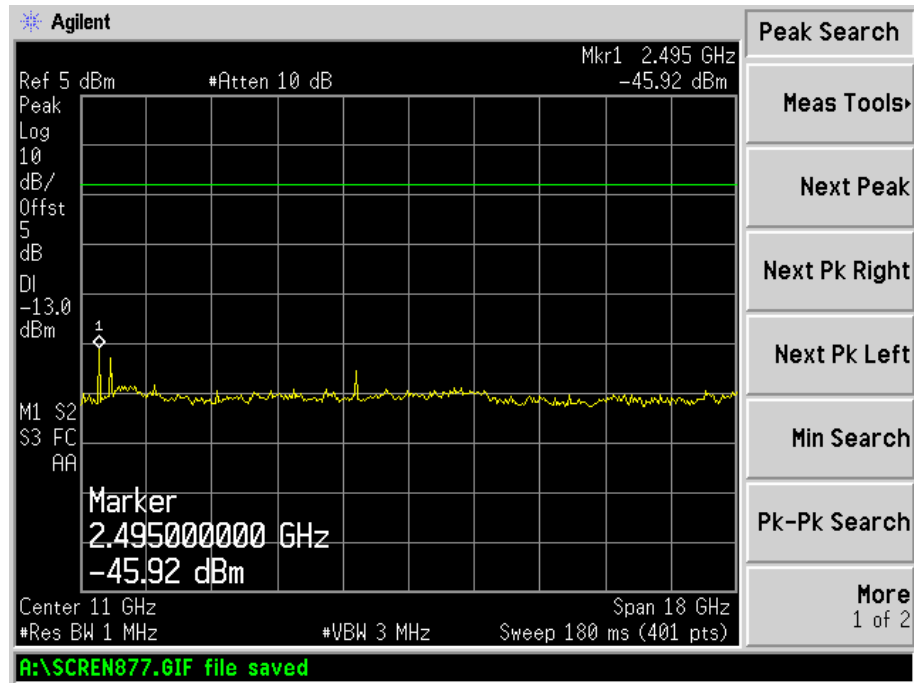




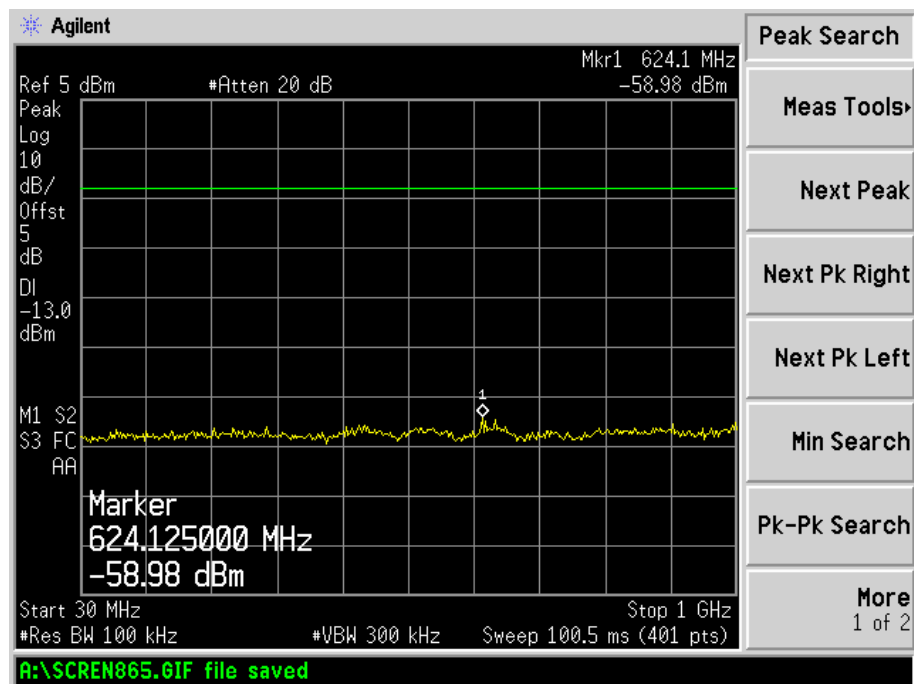


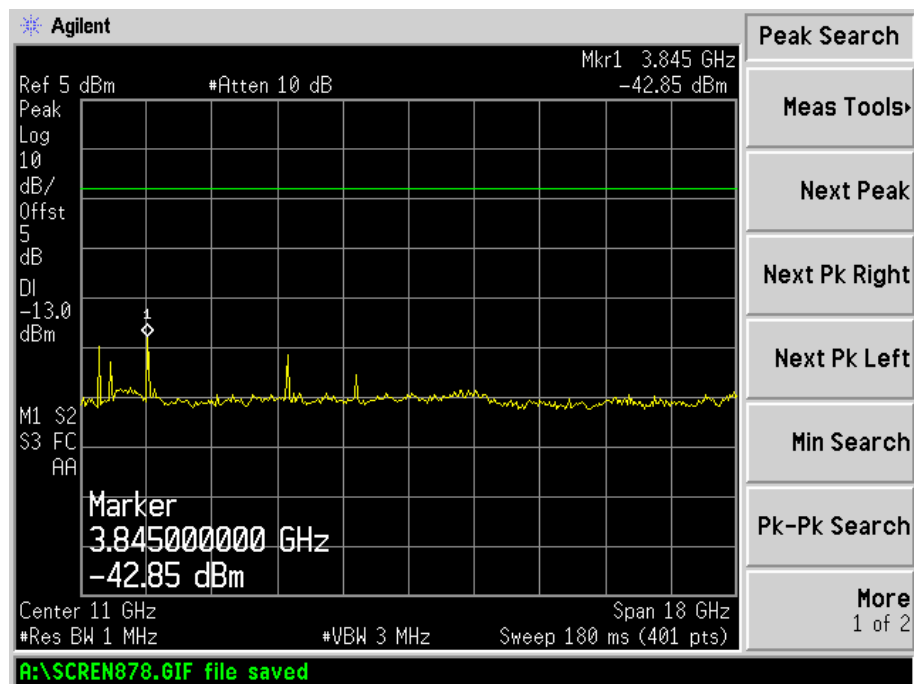
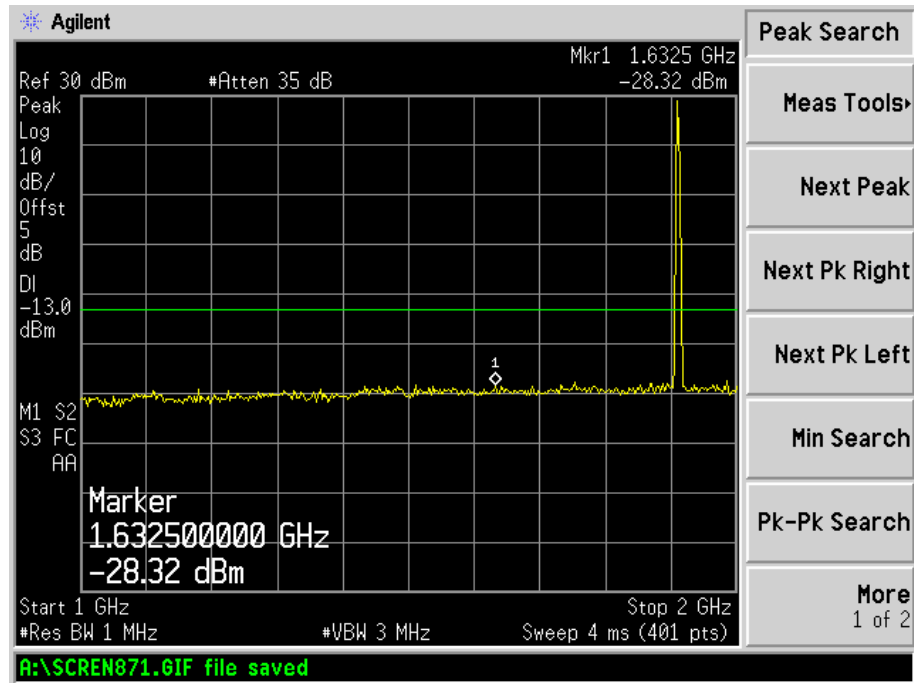
# GPRS Middle Channel



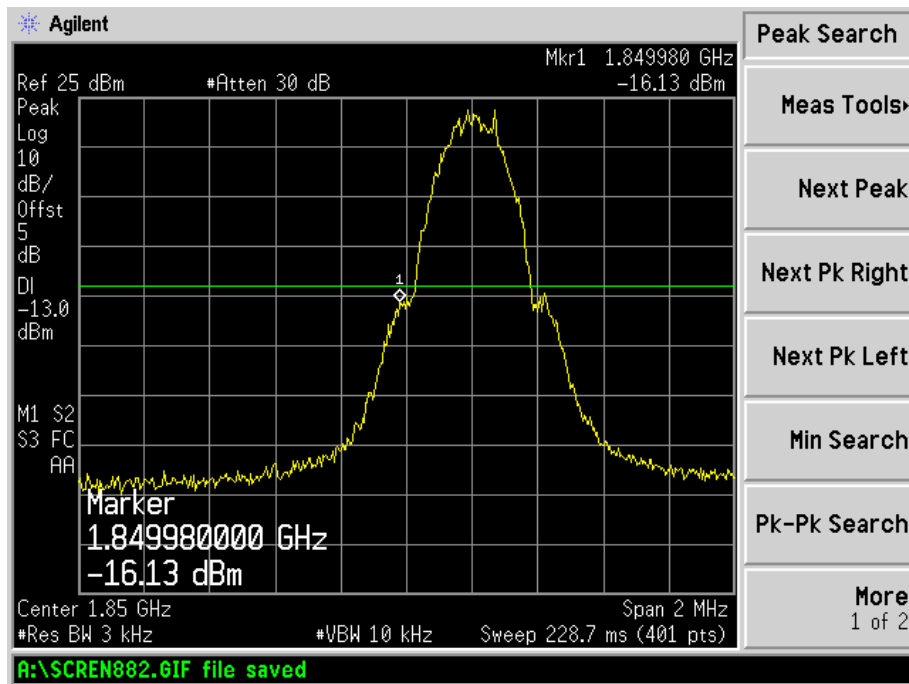


### GPRS High Channel

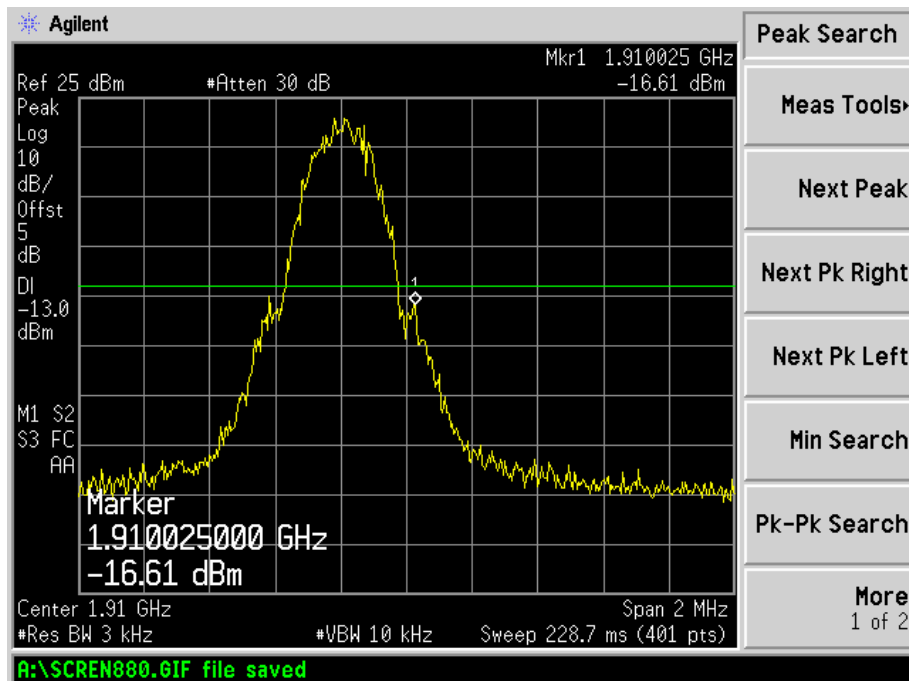




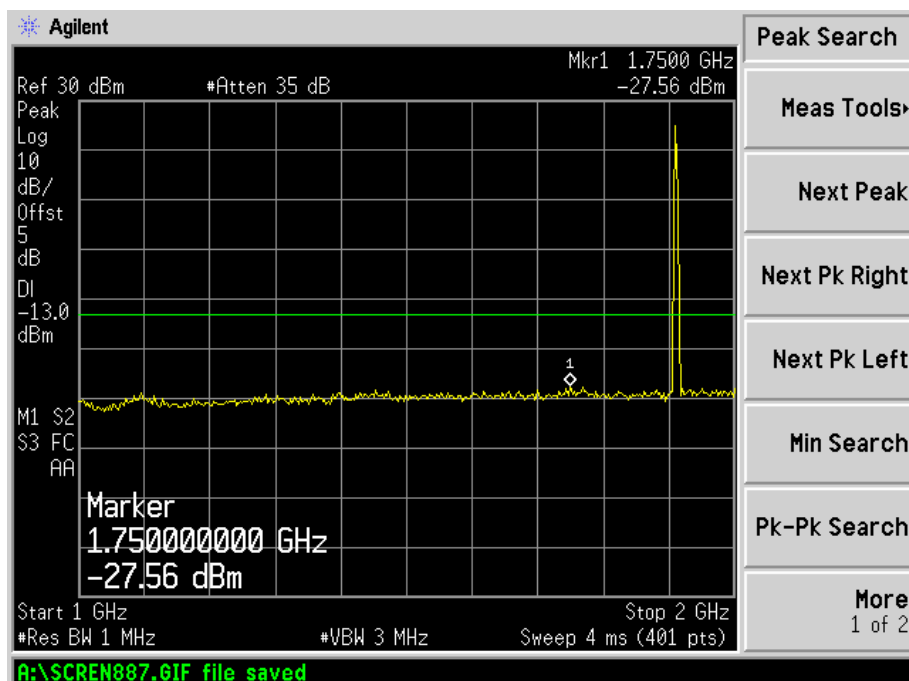
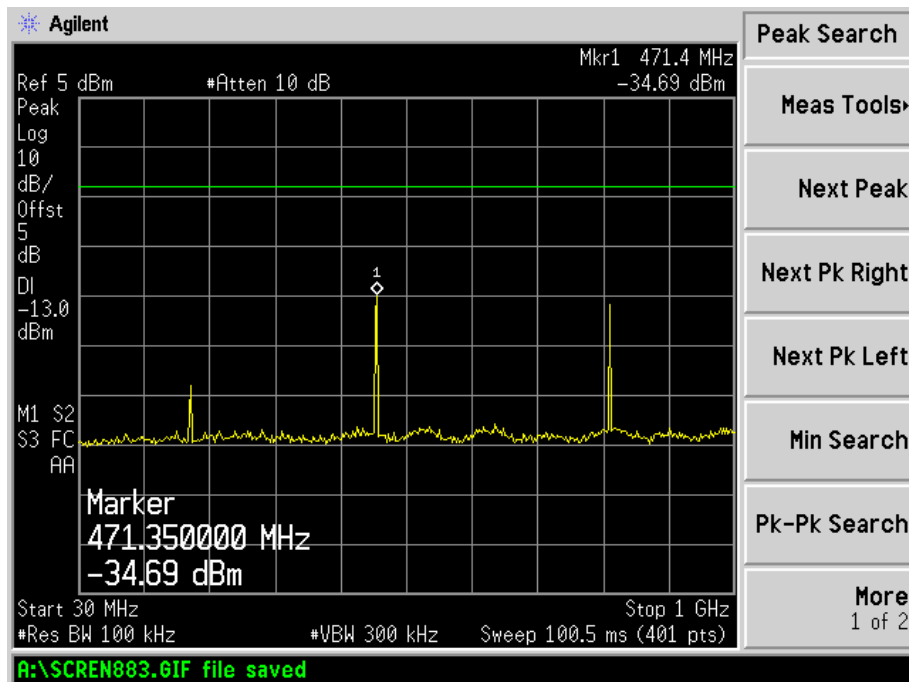
## GPRS Low Band Emission

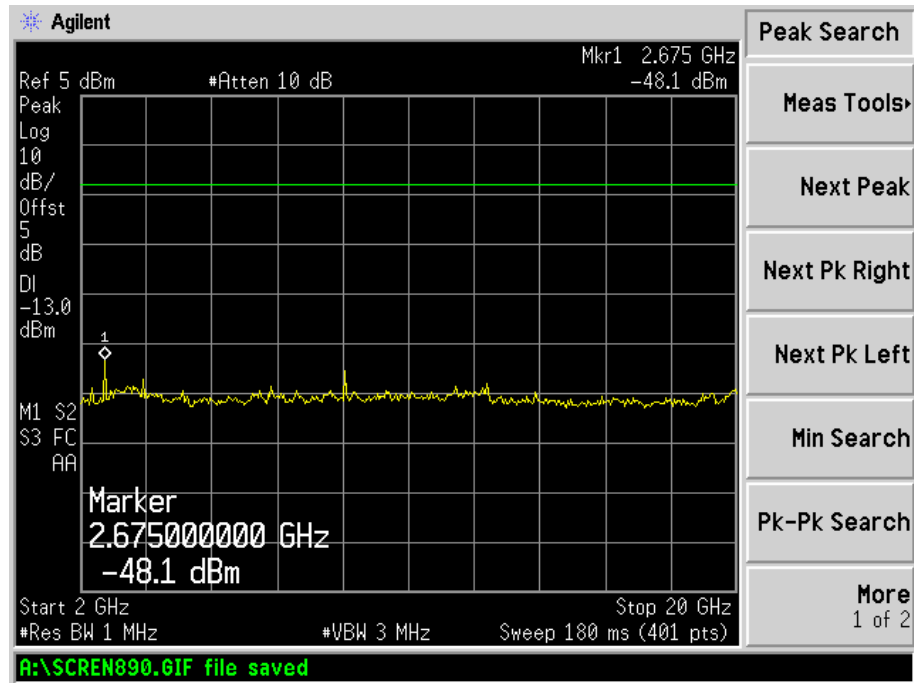


## GPRS High Band Emission

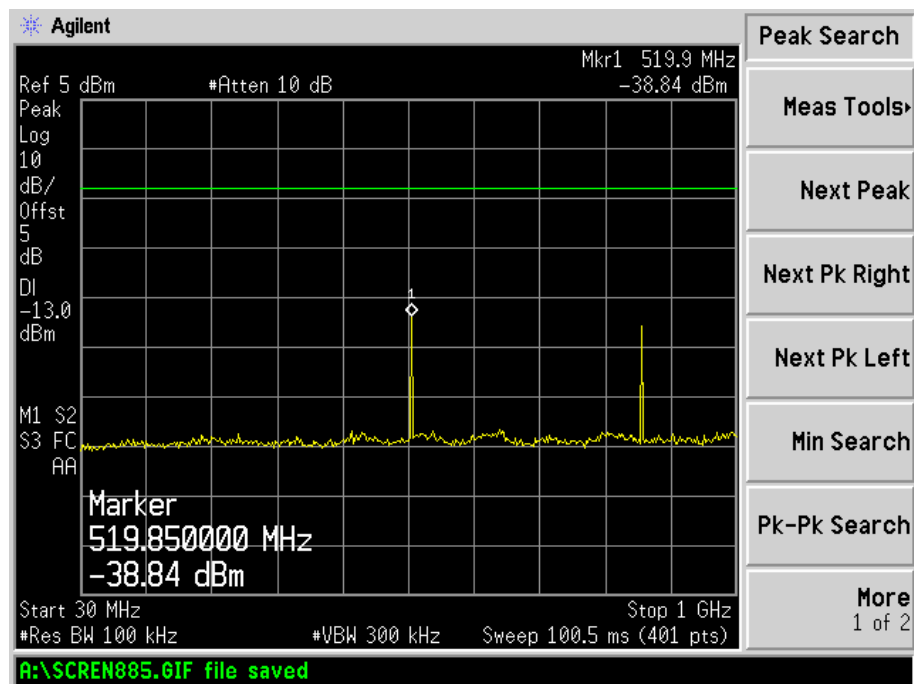


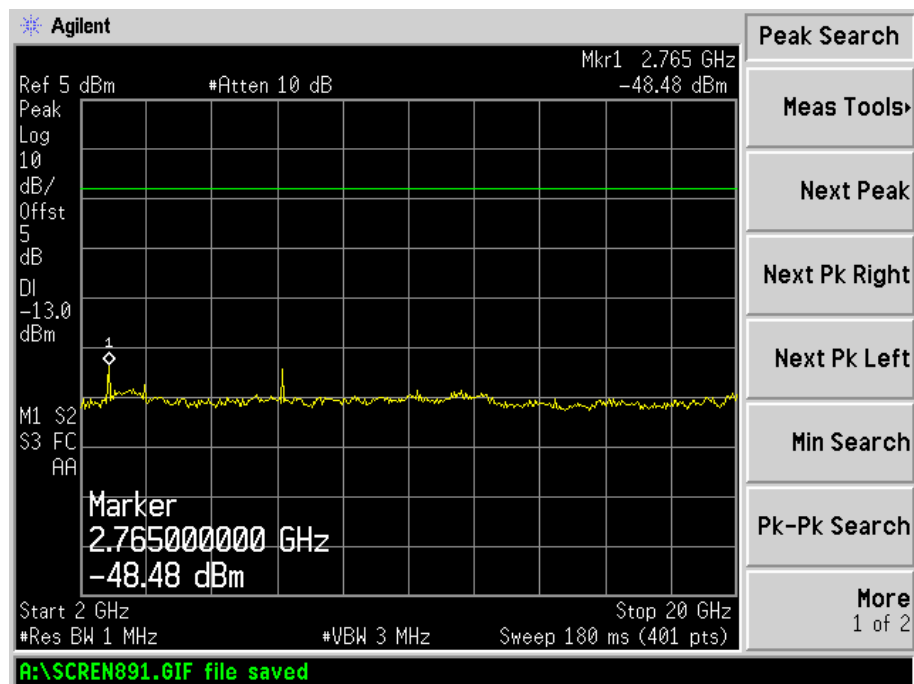
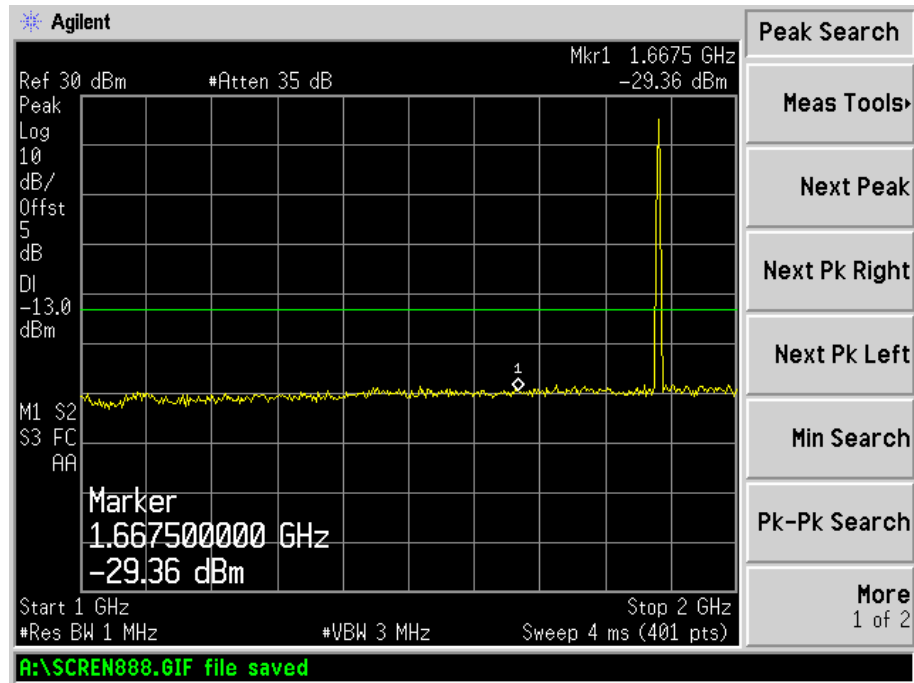
## EDGE Low Channel





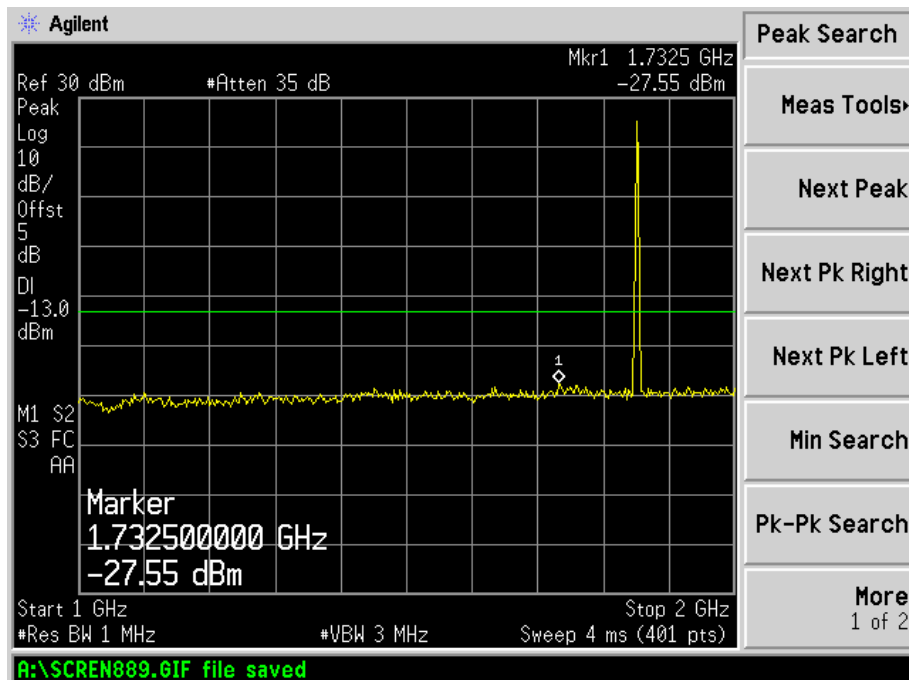
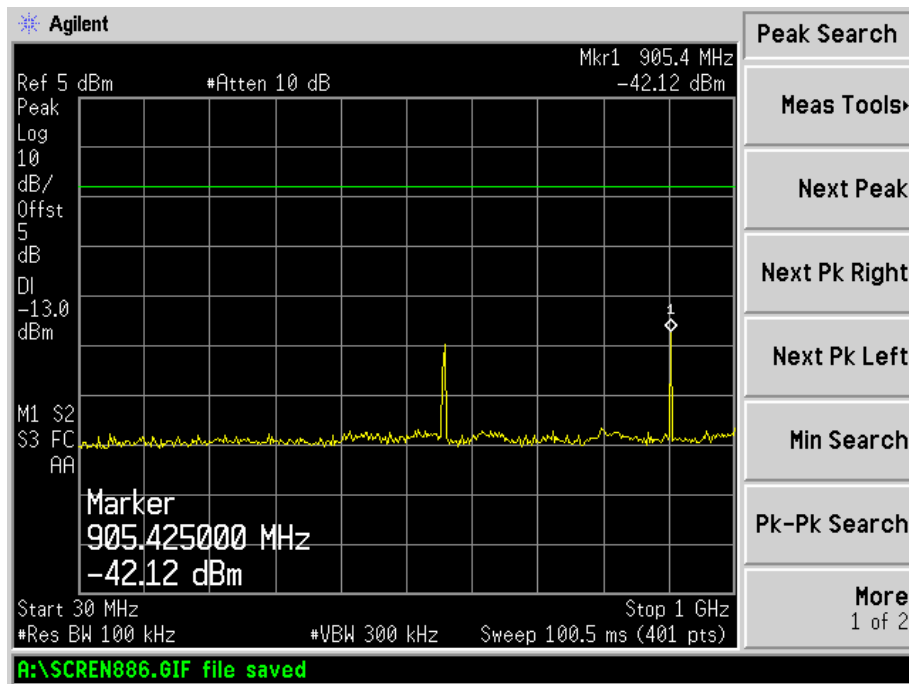
#### EDGE Middle Channel

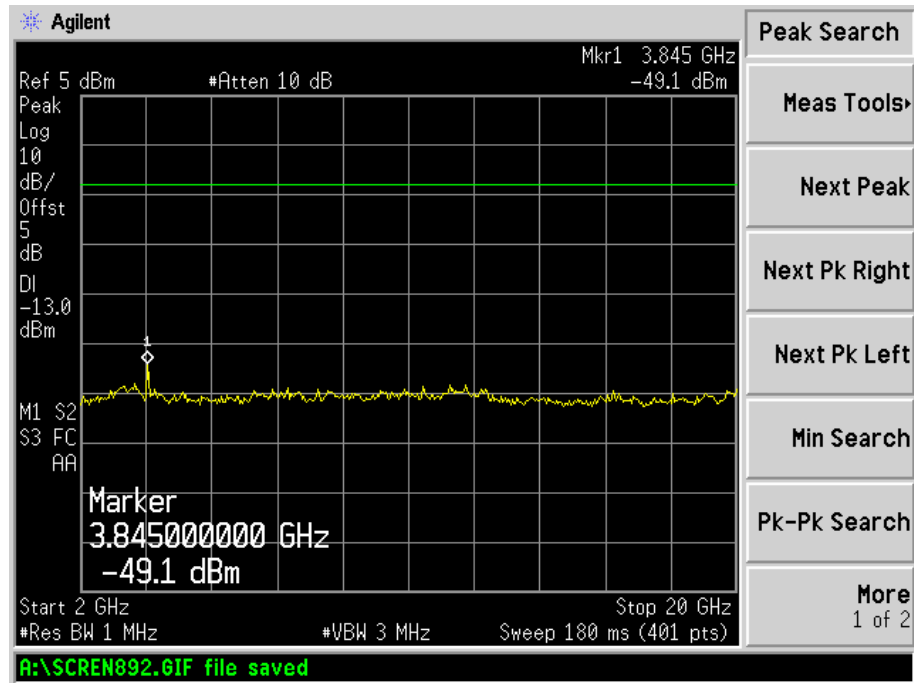




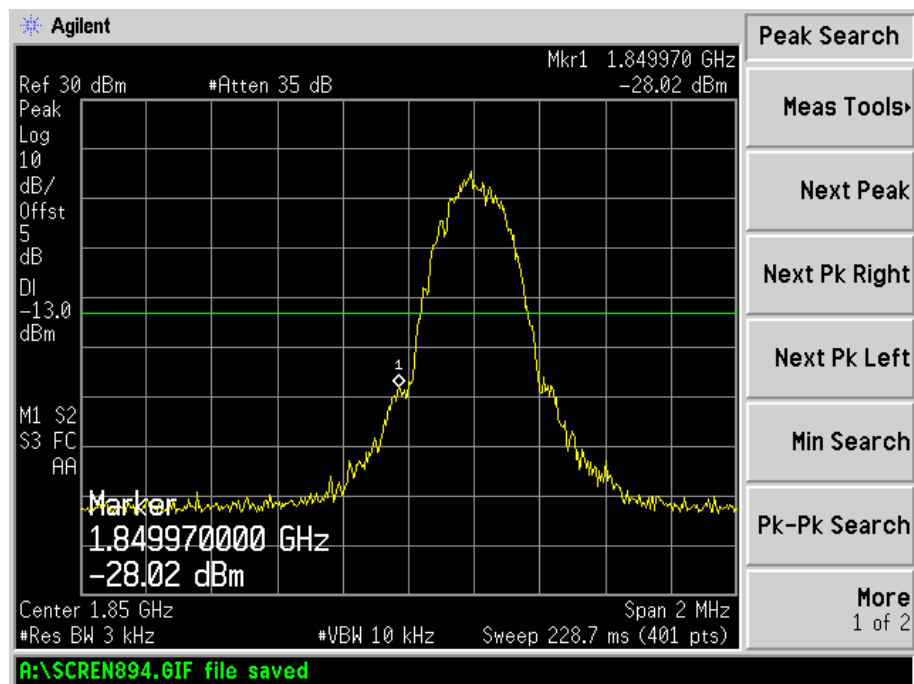


# EDGE High Channel

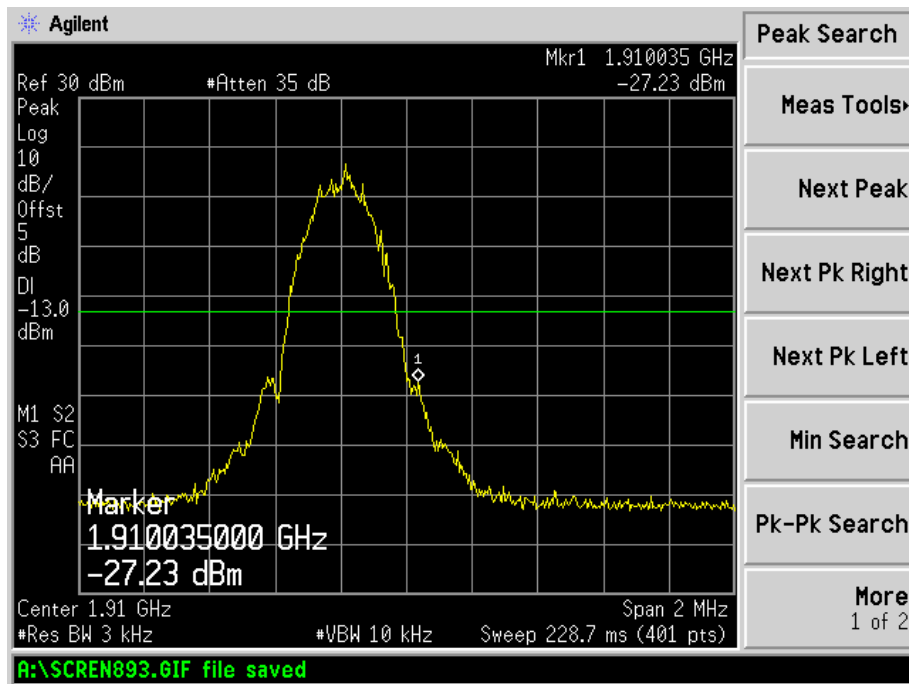




## EDGE Low Band Emission

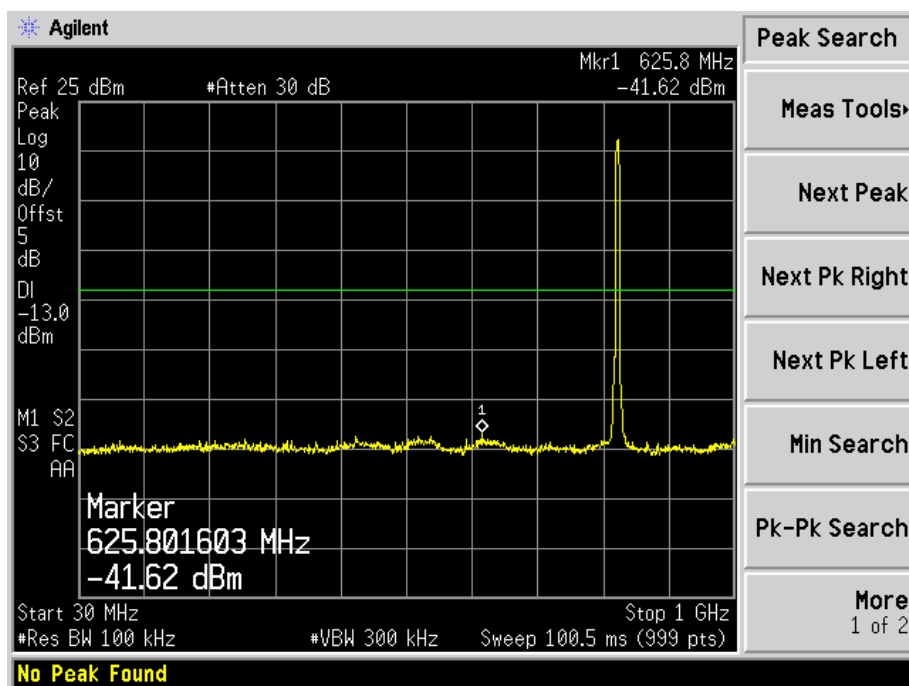


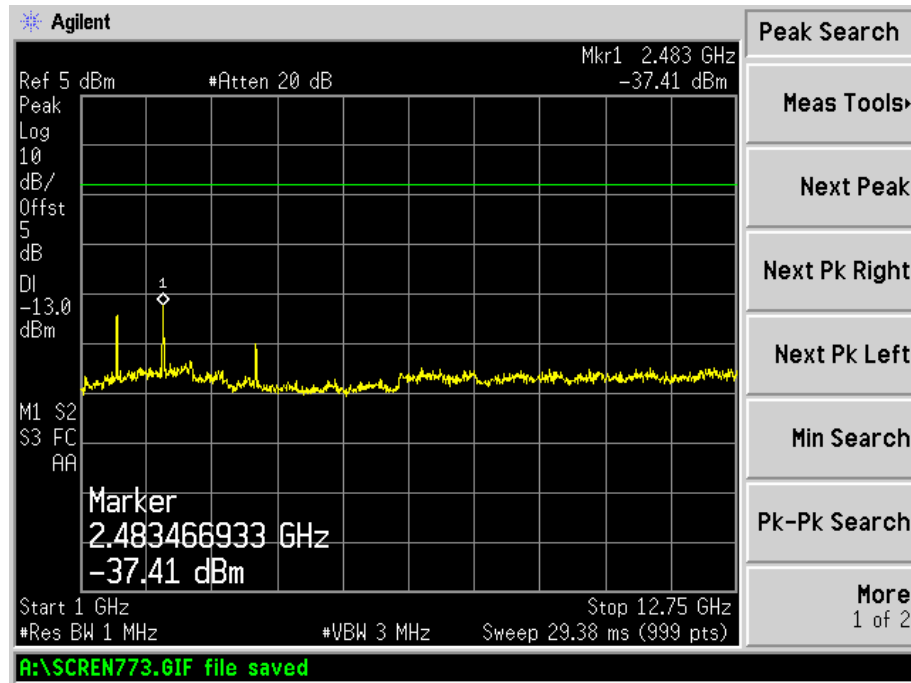
## EDGE High Band Emission



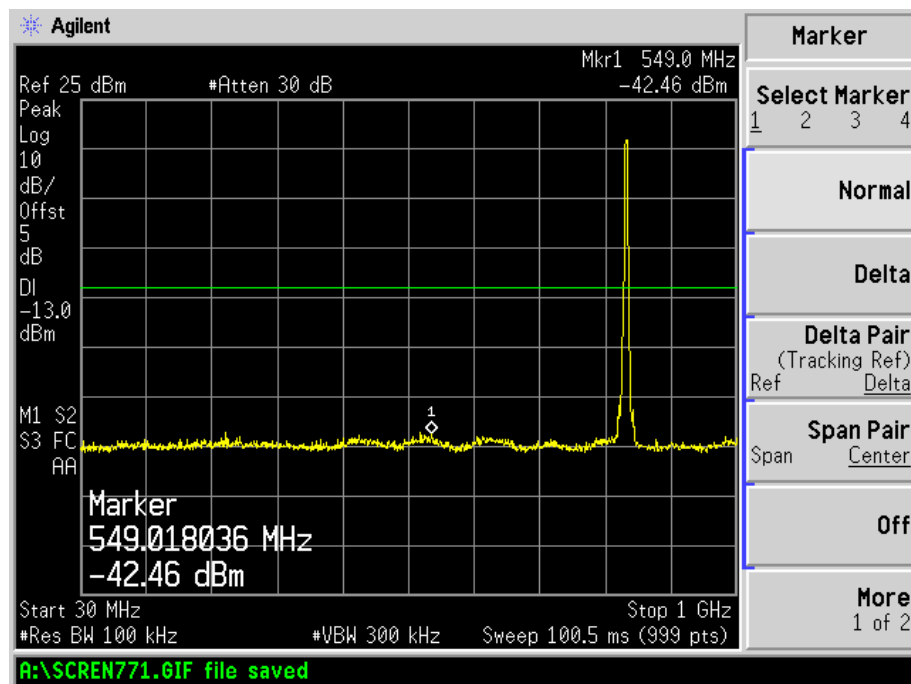
## For Band V

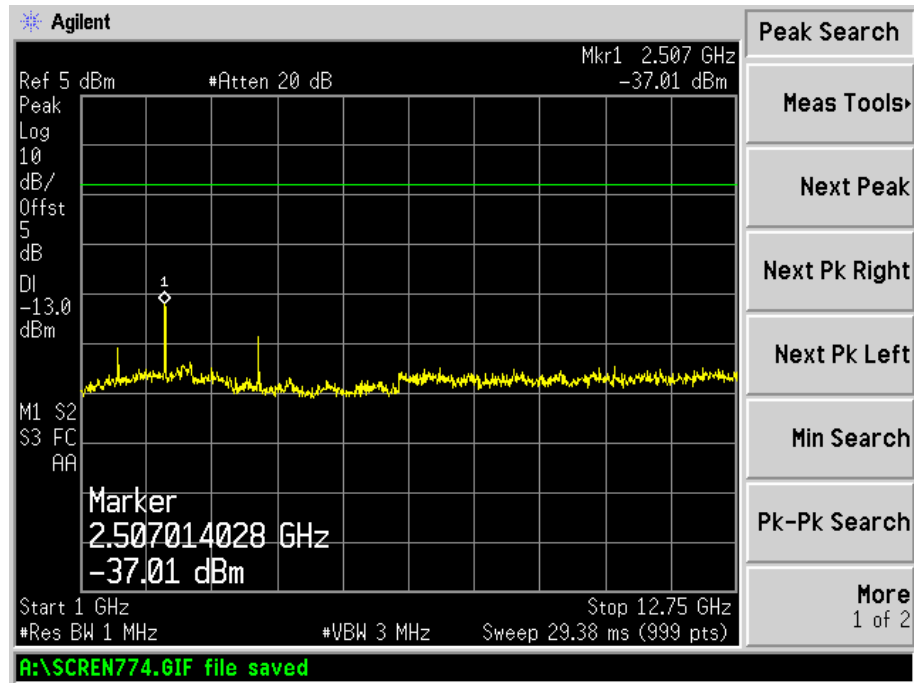
### WCDMA Low Channel



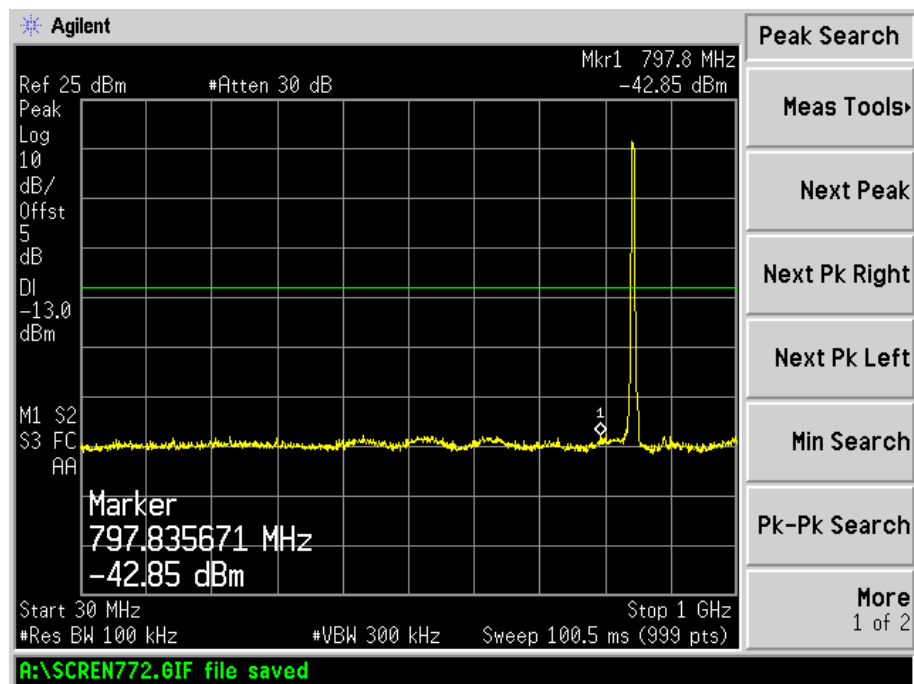


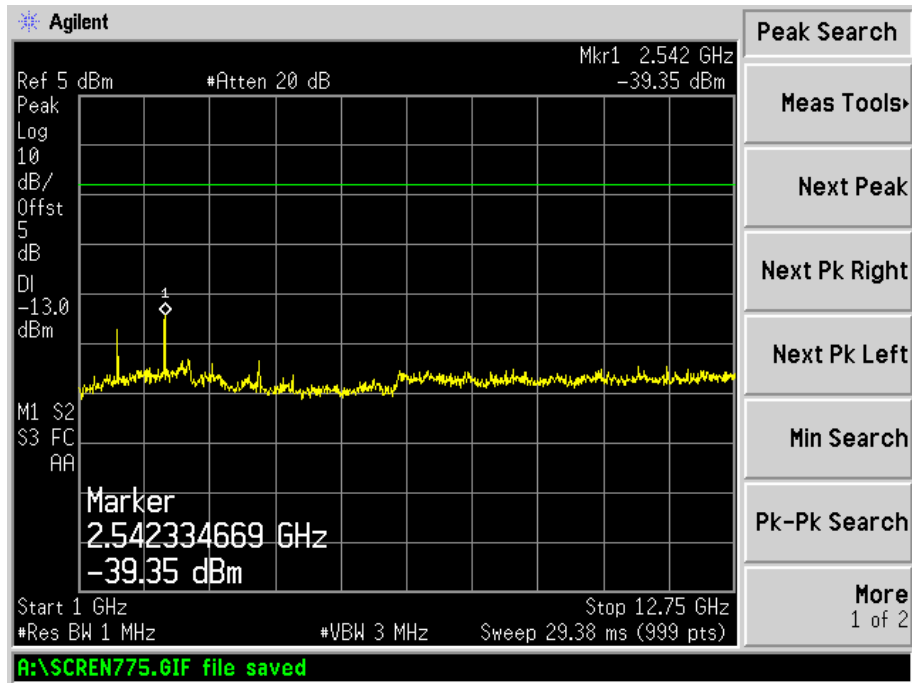
## WCDMA Middle Channel



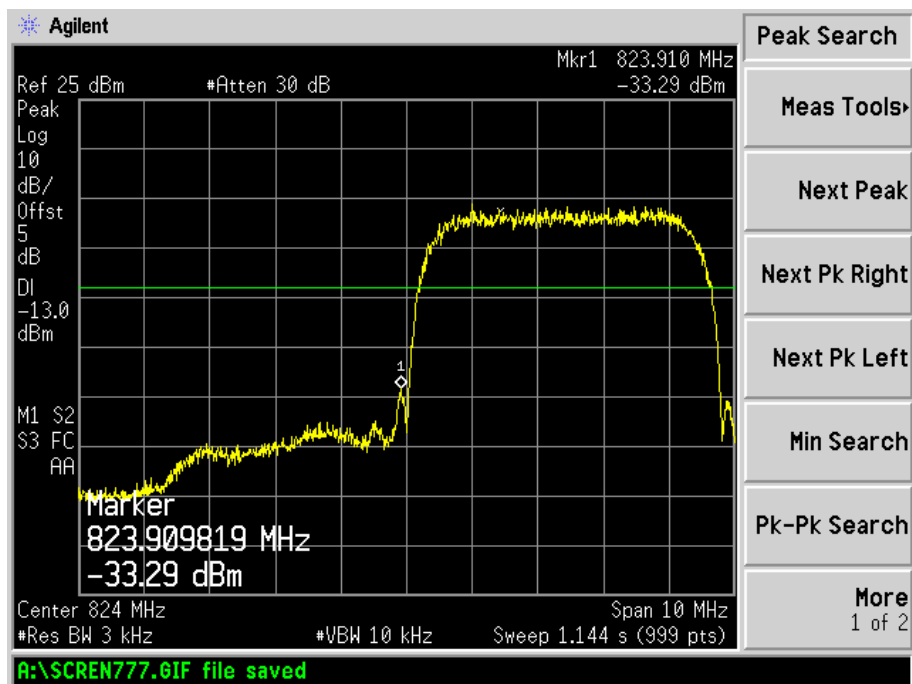


## WCDMA High Channel

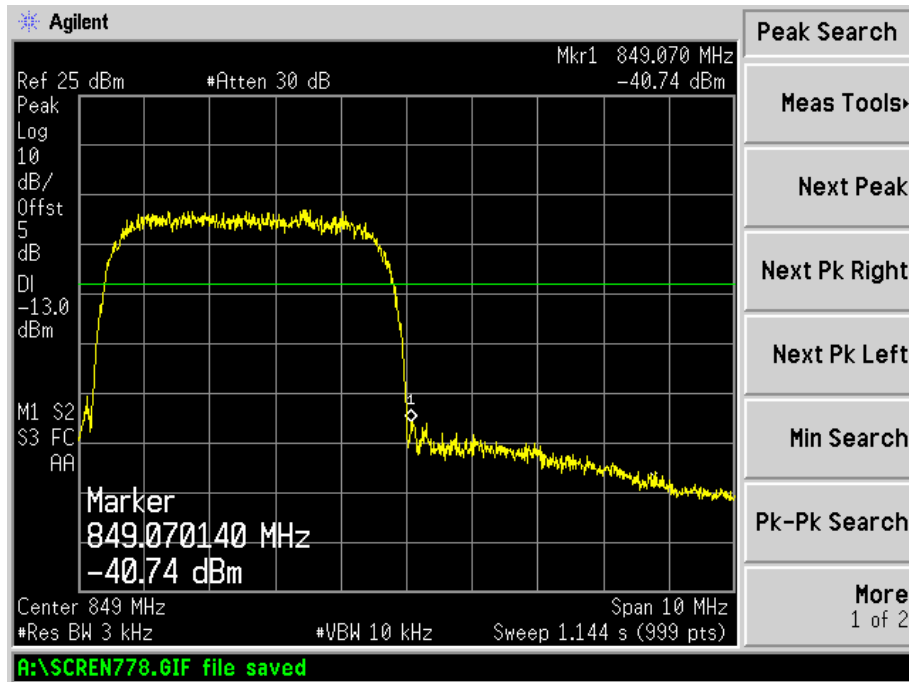




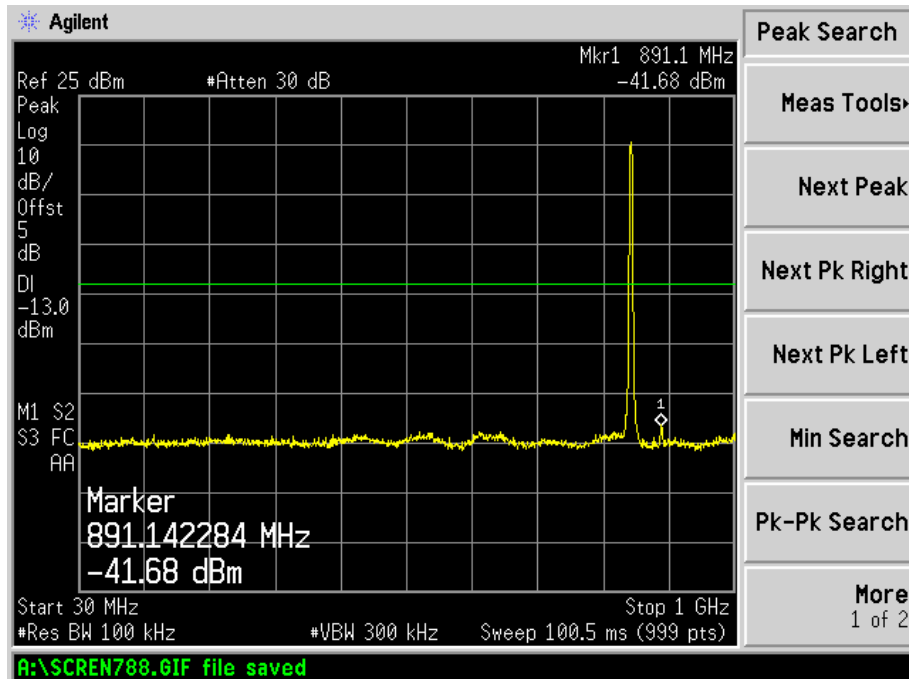
### WCDMA Low Band Spurious Emission

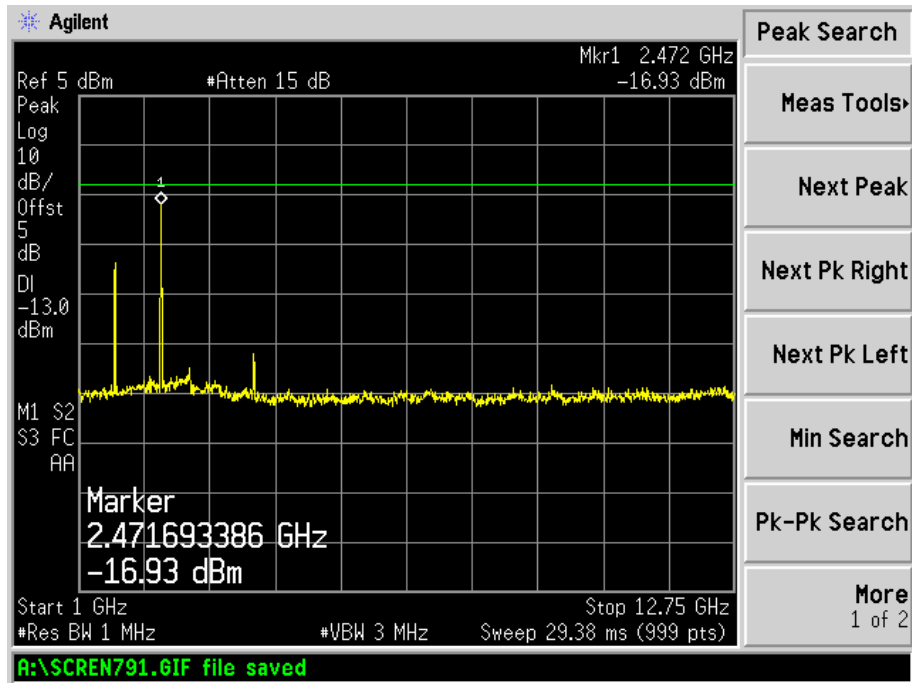


### WCDMA High Band Spurious Emission

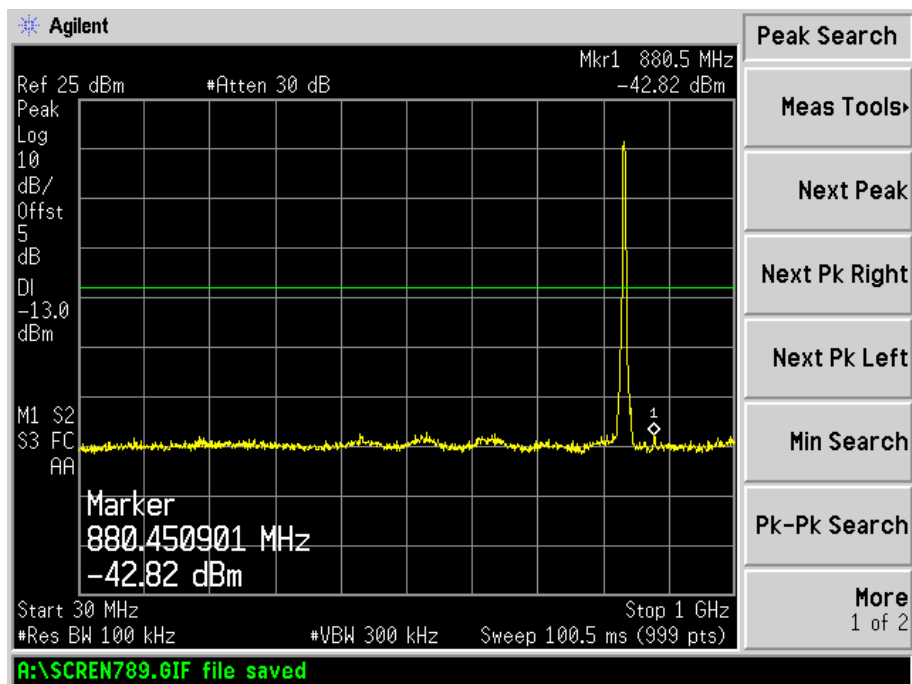


### HSDPA Low Channel

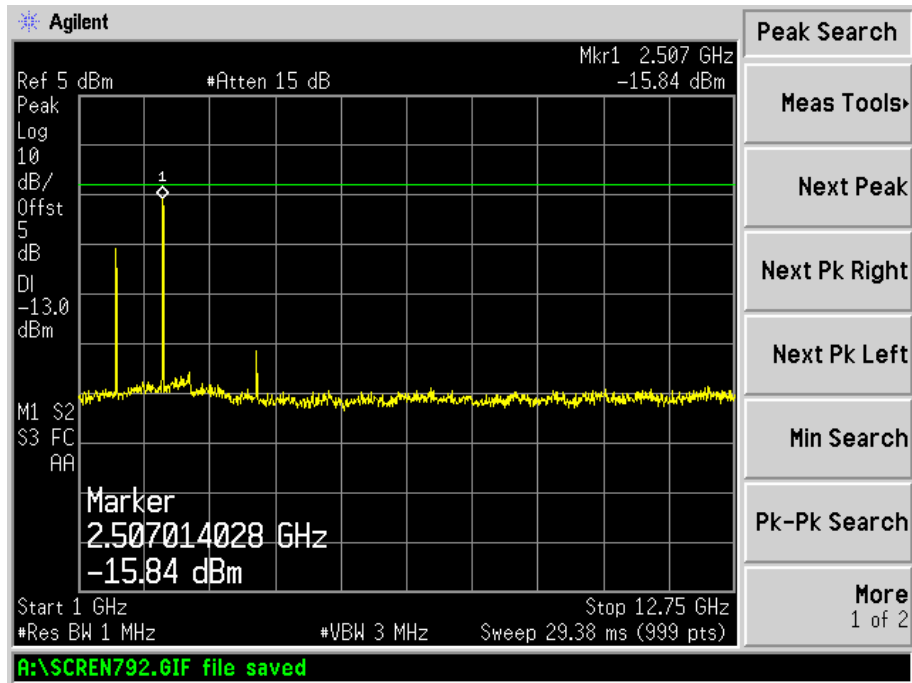




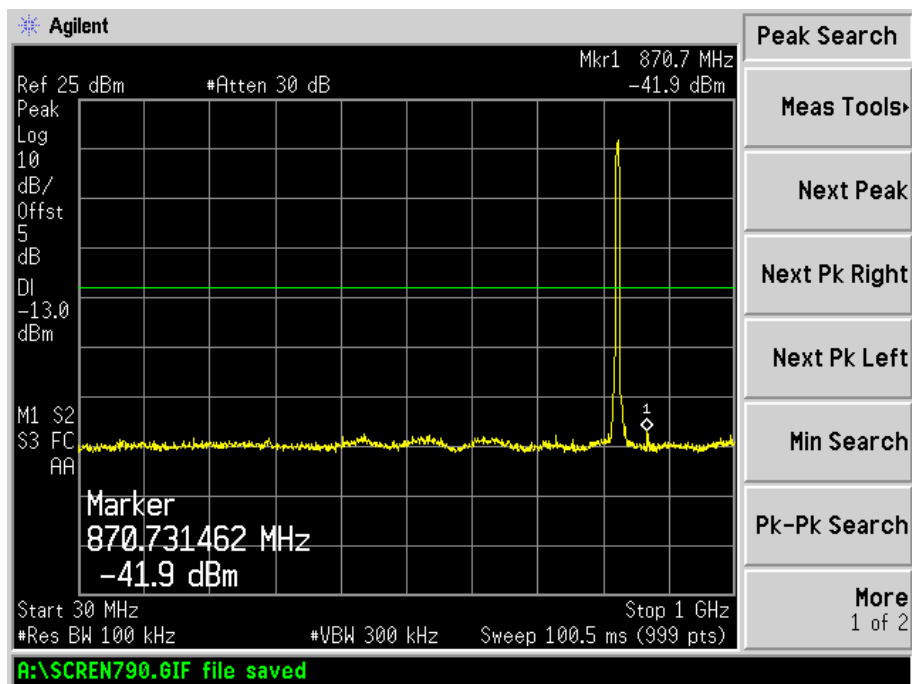
## HSDPA Middle Channel

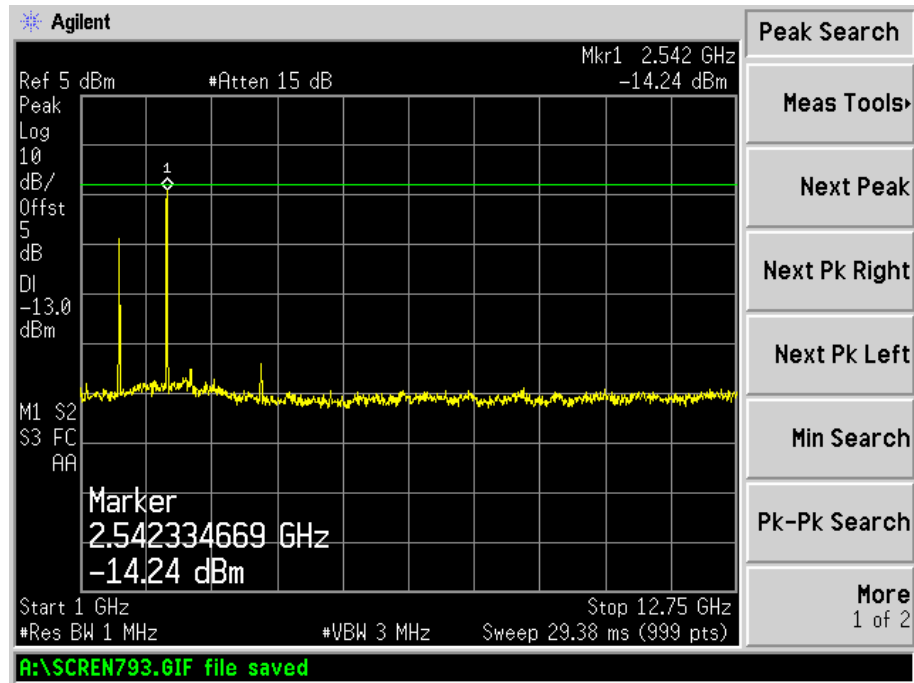




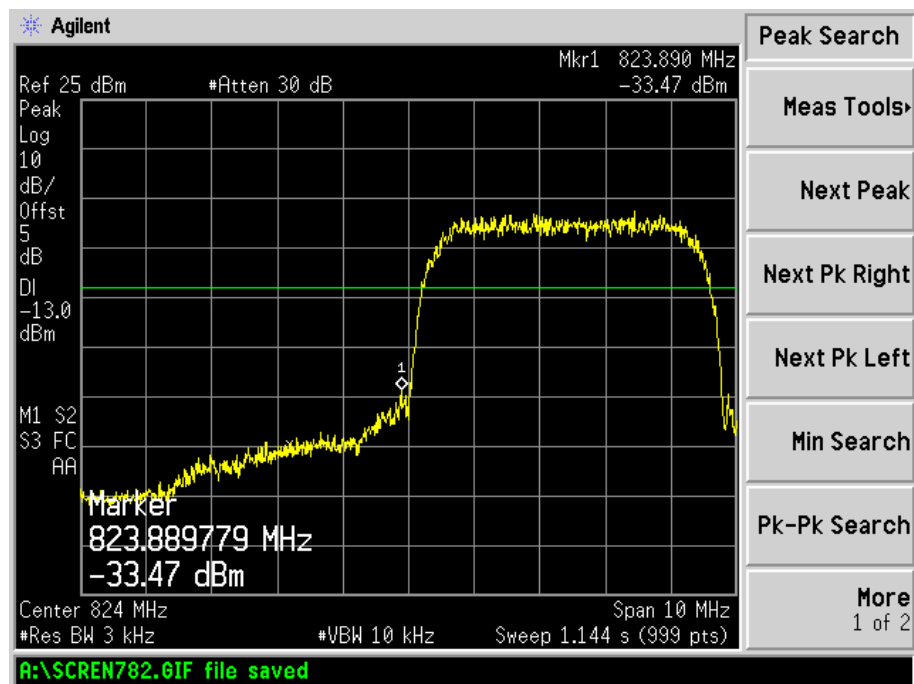


## HSDPA High Channel

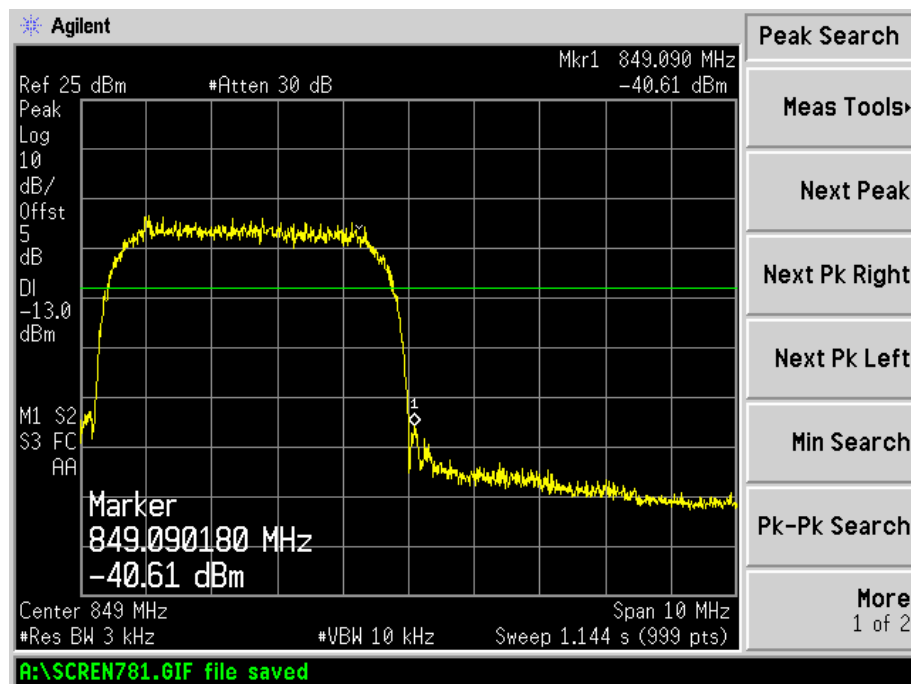




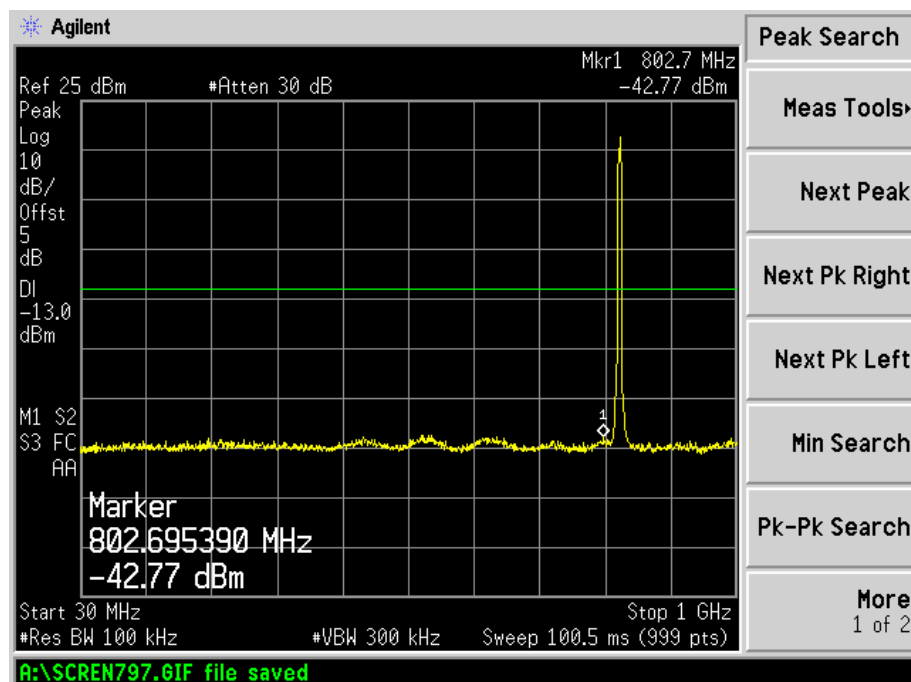
### HSDPA Low Band Spurious Emission

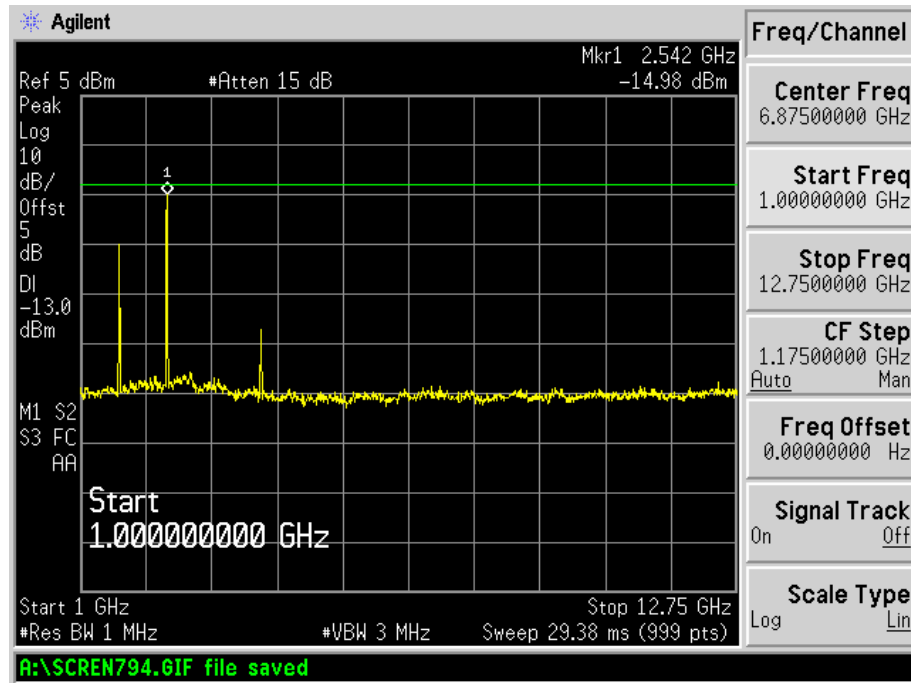


## HSDPA High Band Spurious Emission

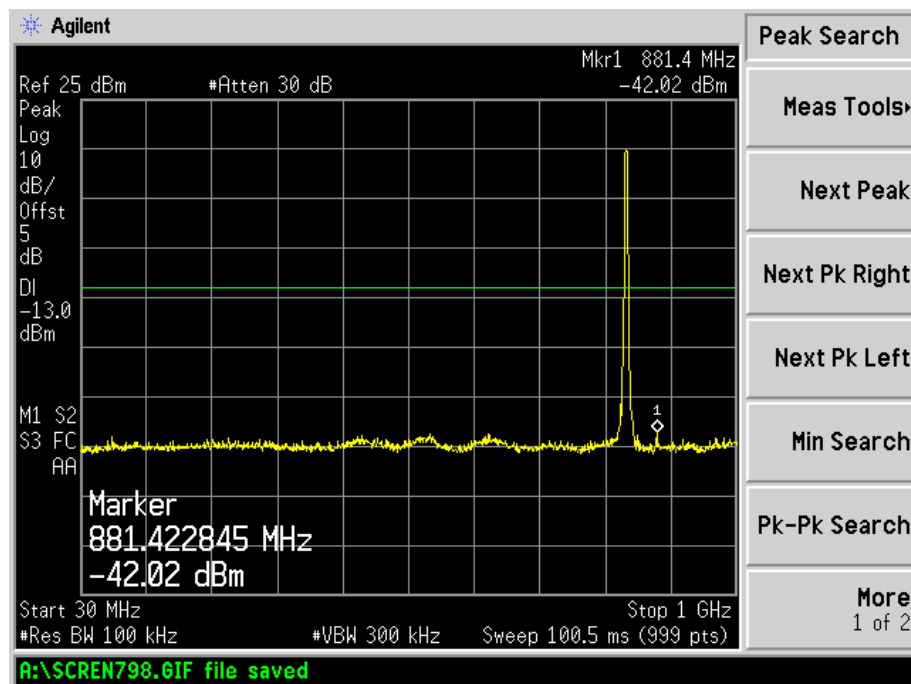


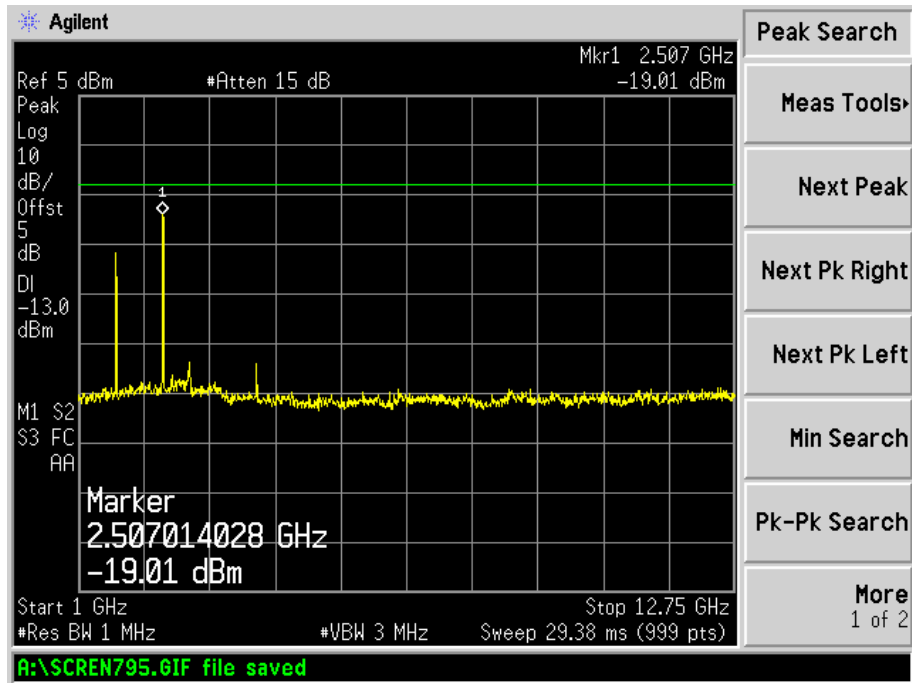
## HSUPA Low Channel



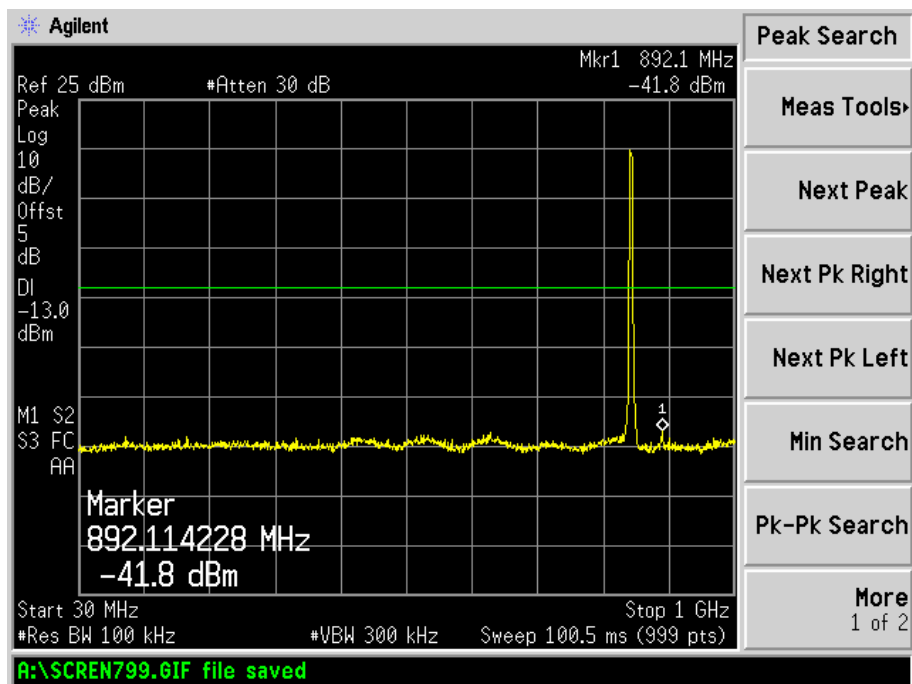


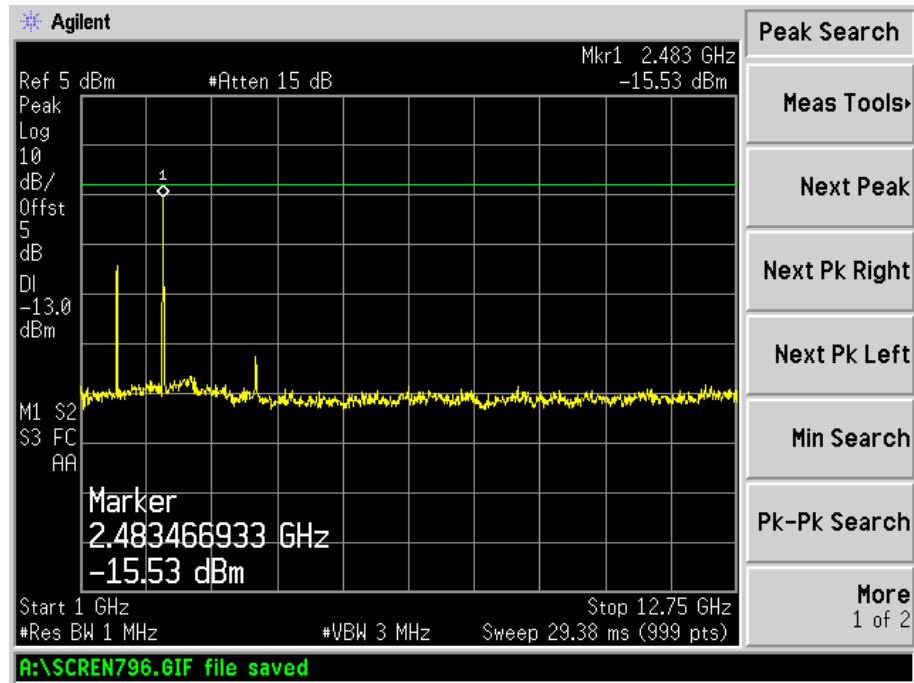
HSUPA Middle Channel



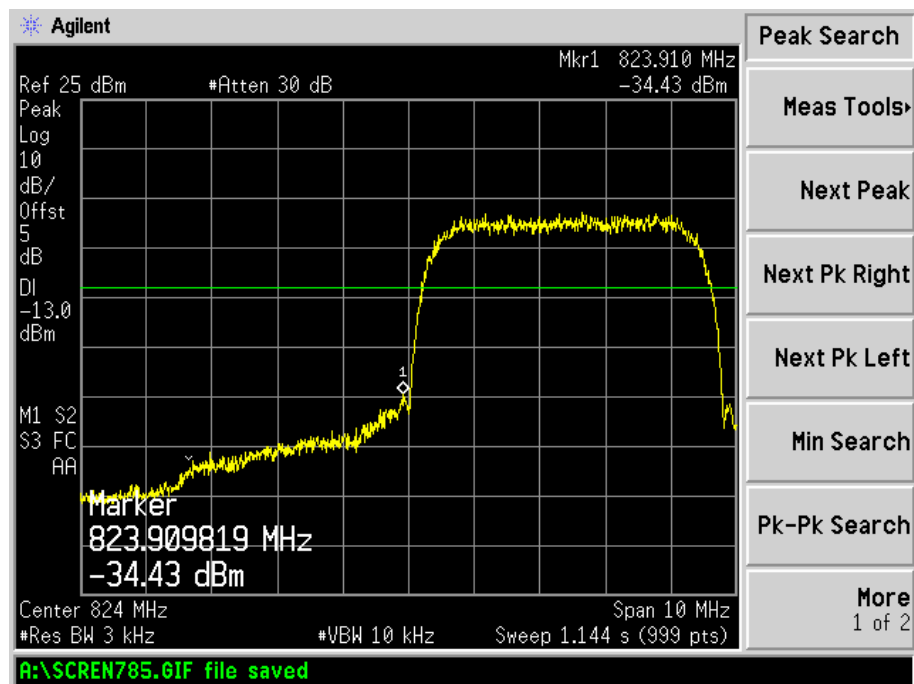


HSUPA High Channel

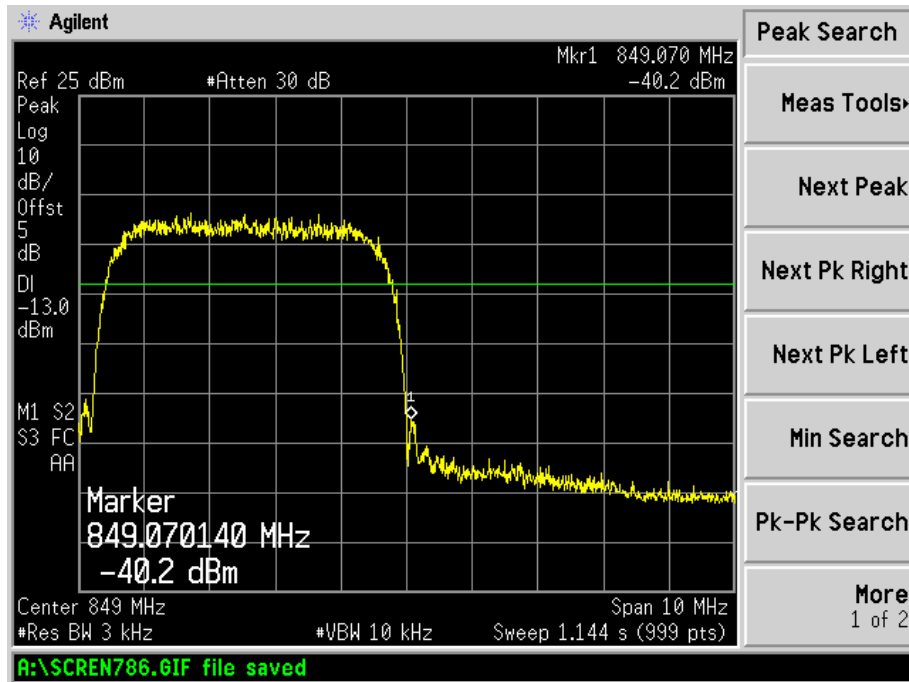




#### HSUPA Low Band Spurious Emission

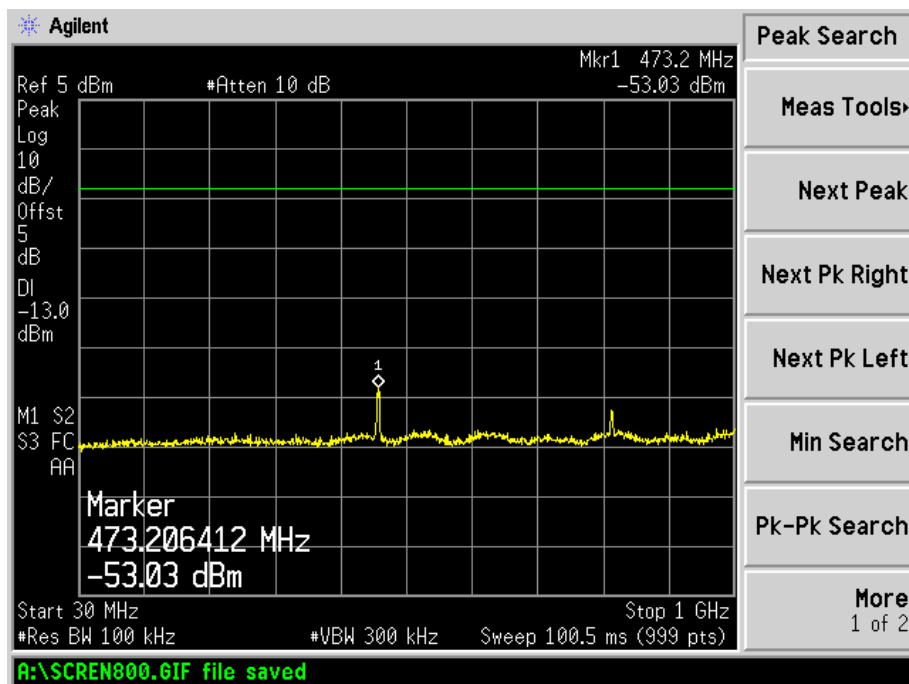


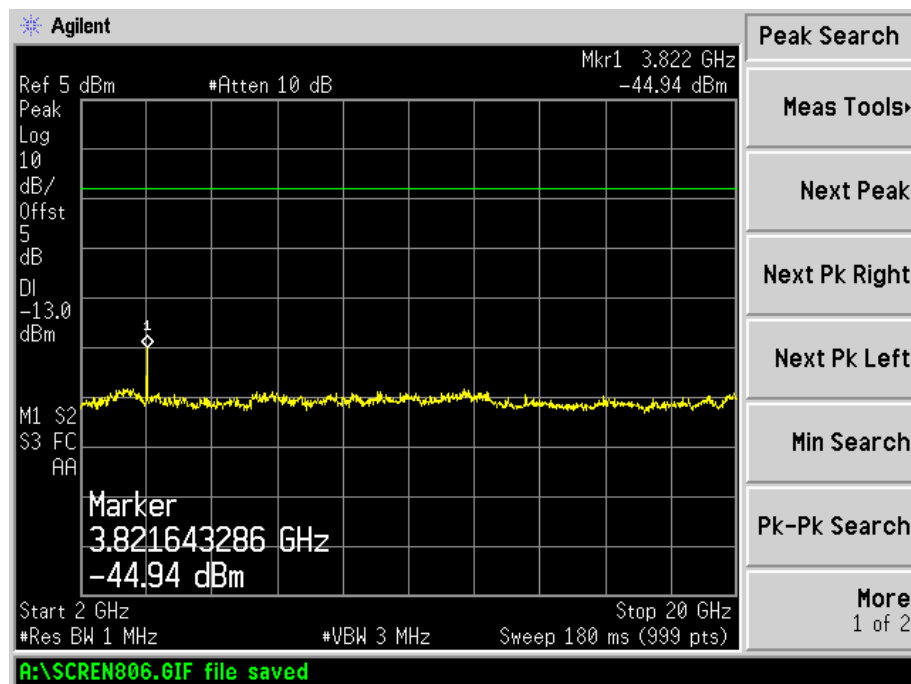
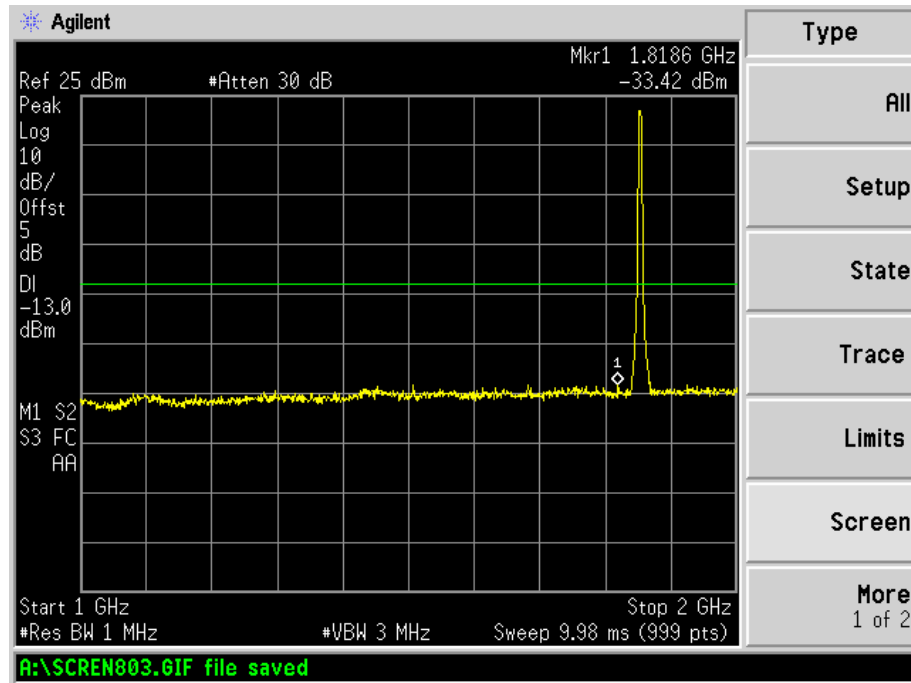
## HSUPA High Band Spurious Emission



## For Band II

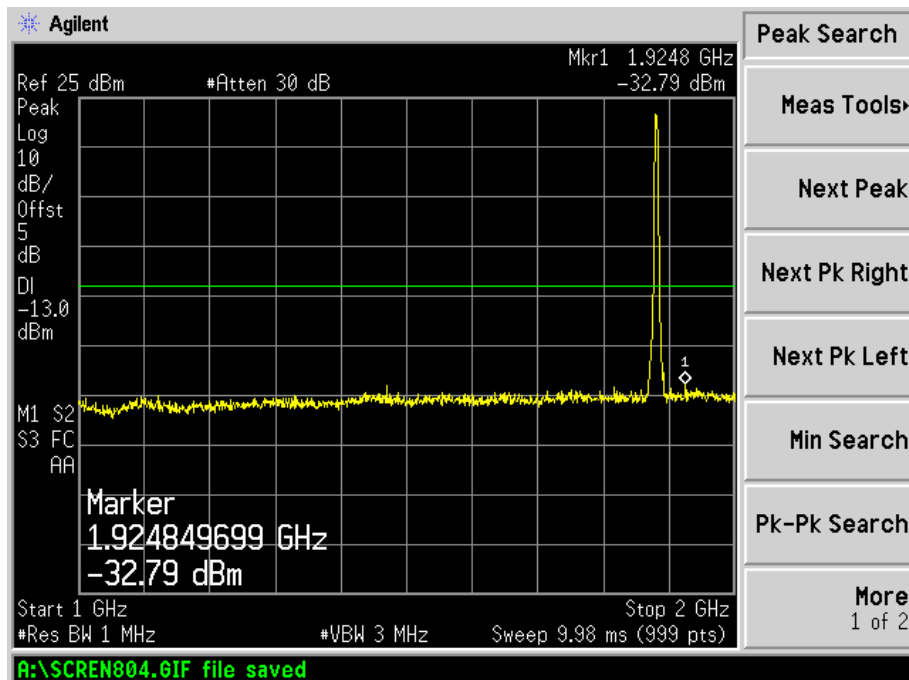
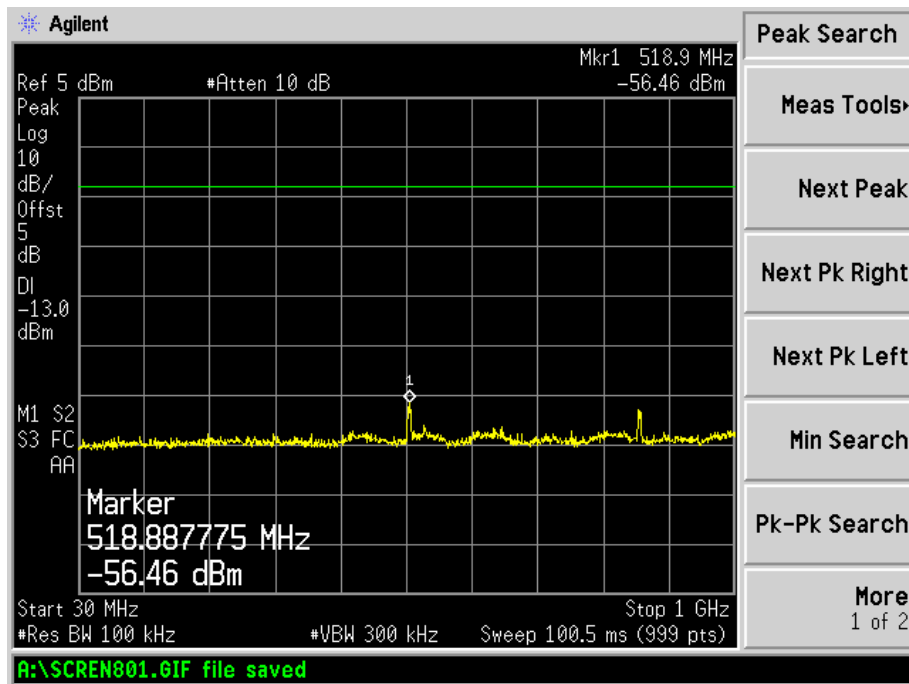
### WCDMA Low Channel

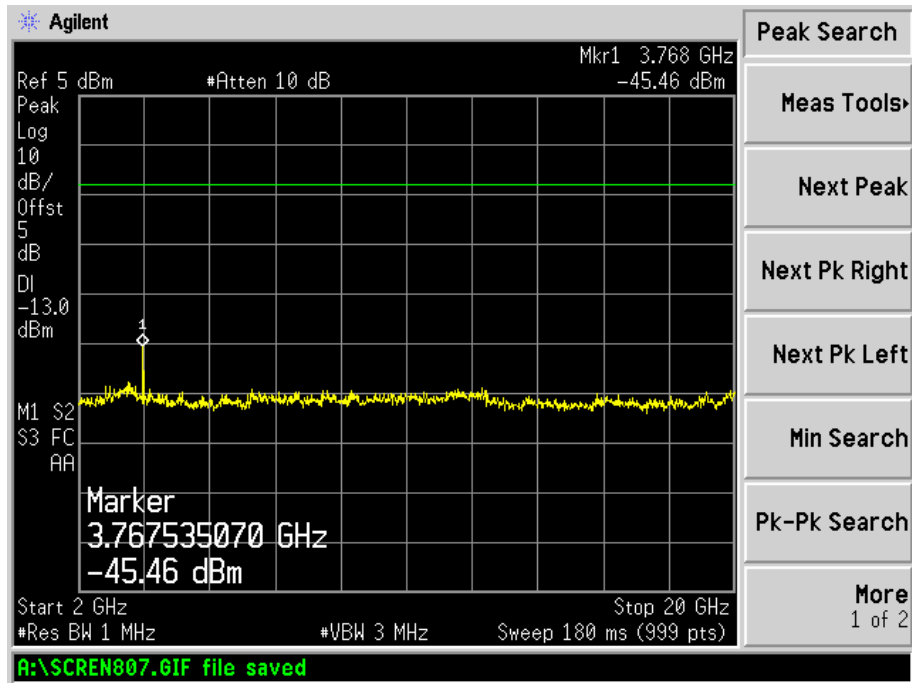




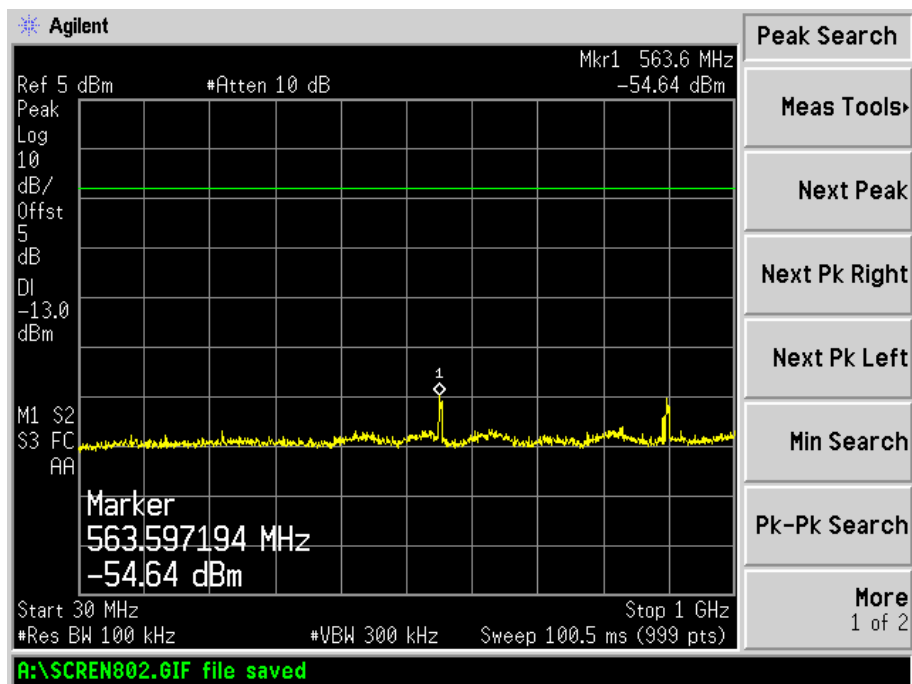


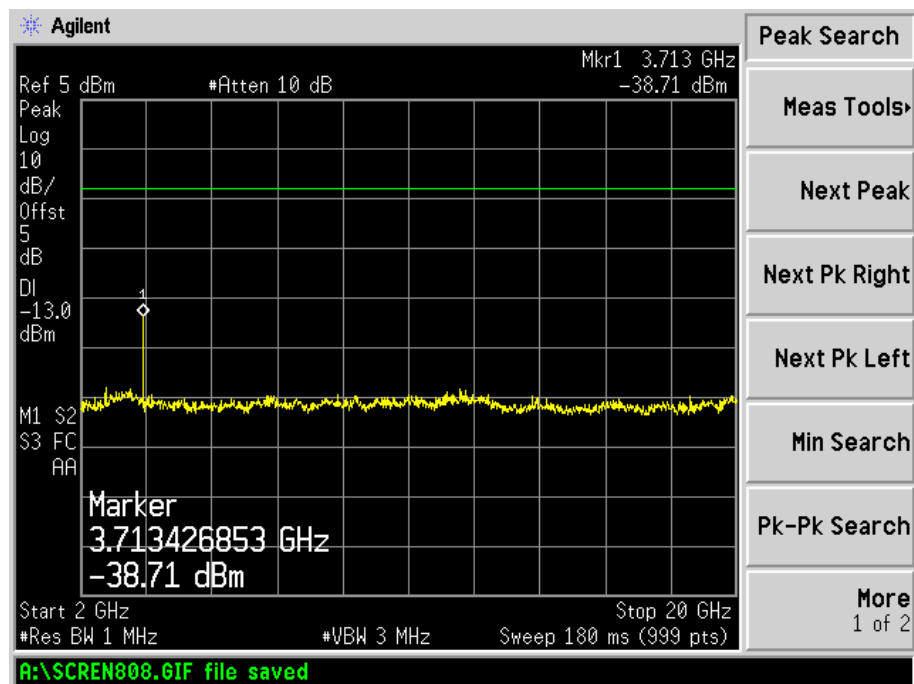
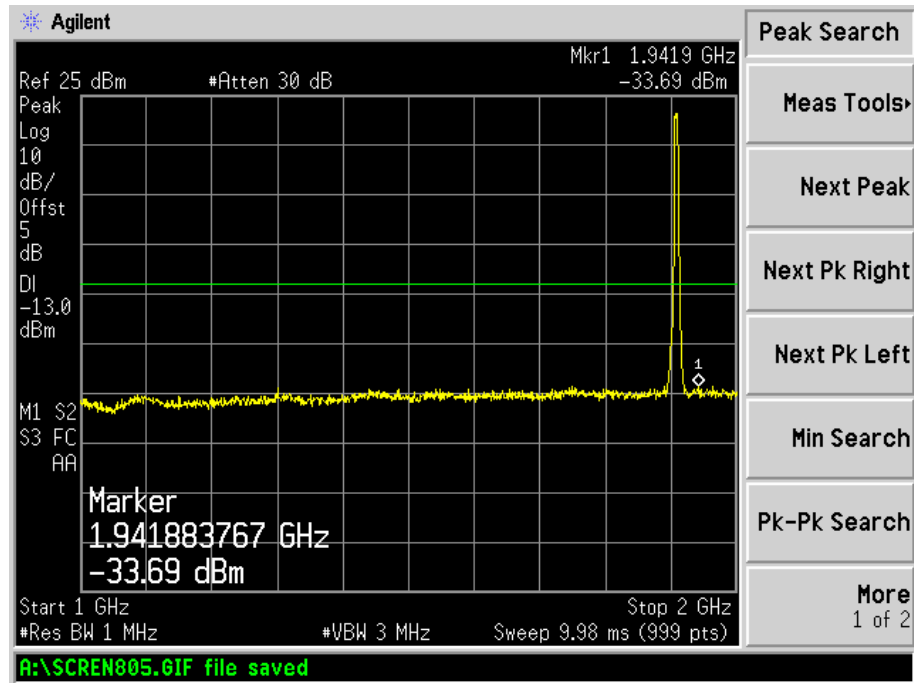
## WCDMA Middle Channel



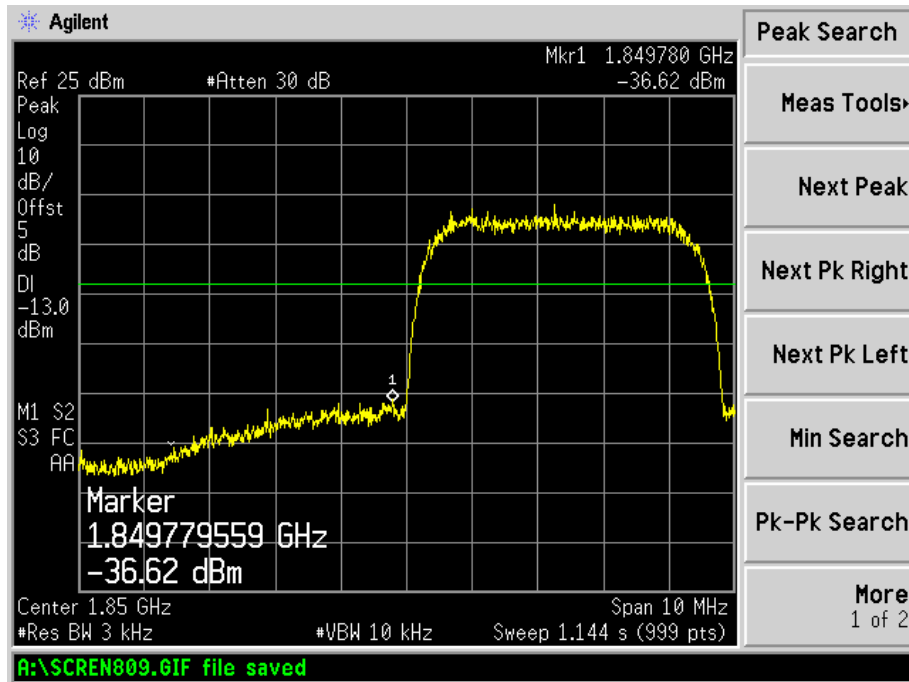


## WCDMA High Channel

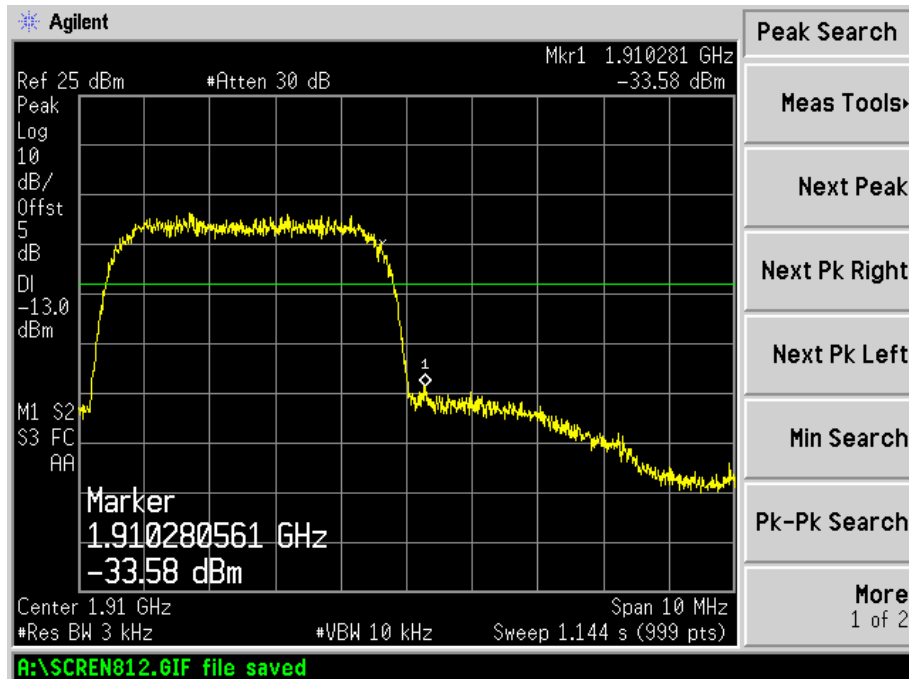




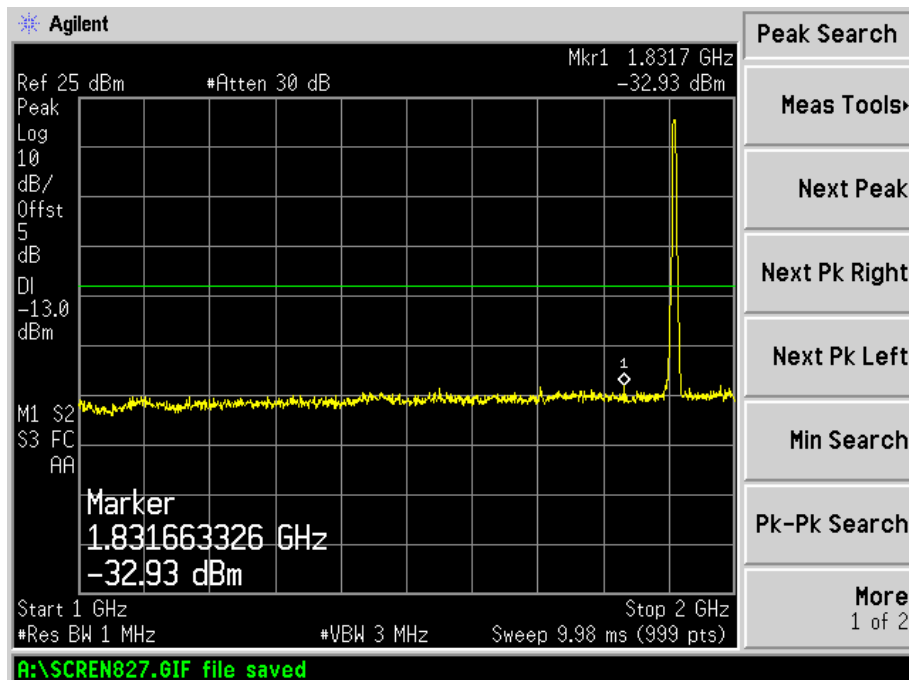
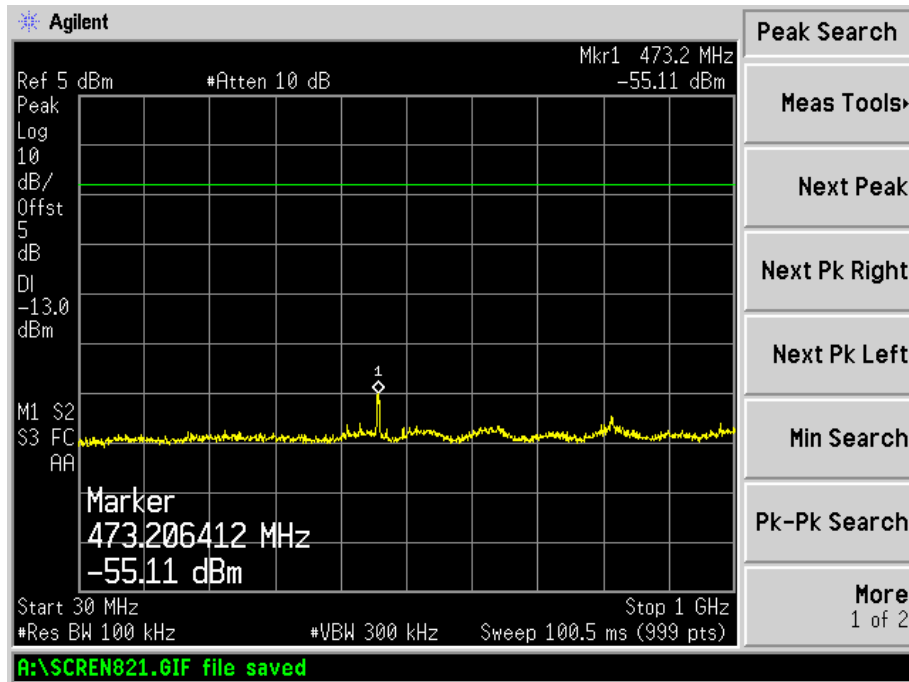
### WCDMA Low Band Spurious Emission

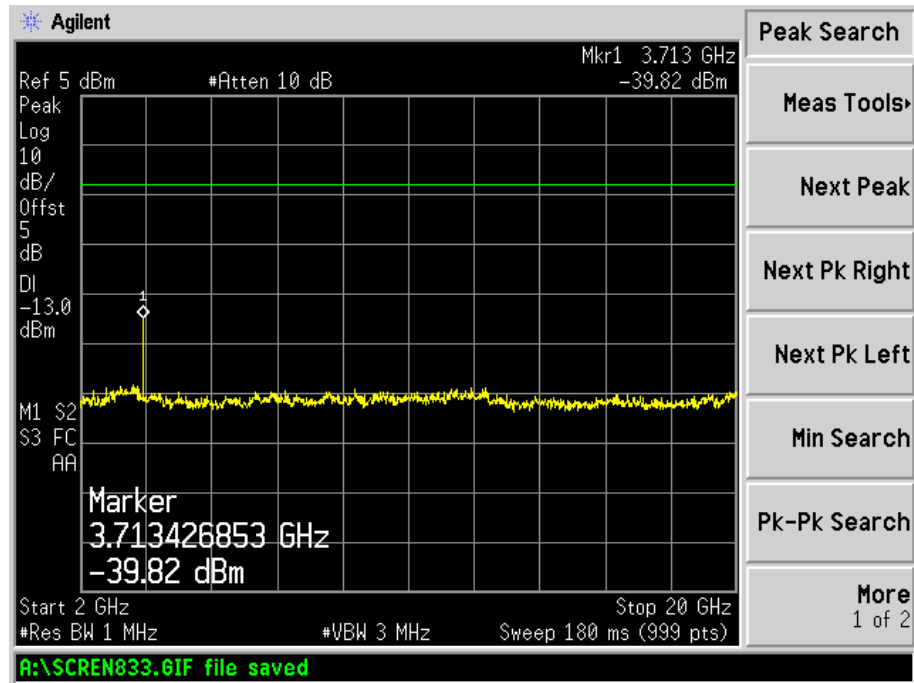


### WCDMA High Band Spurious Emission

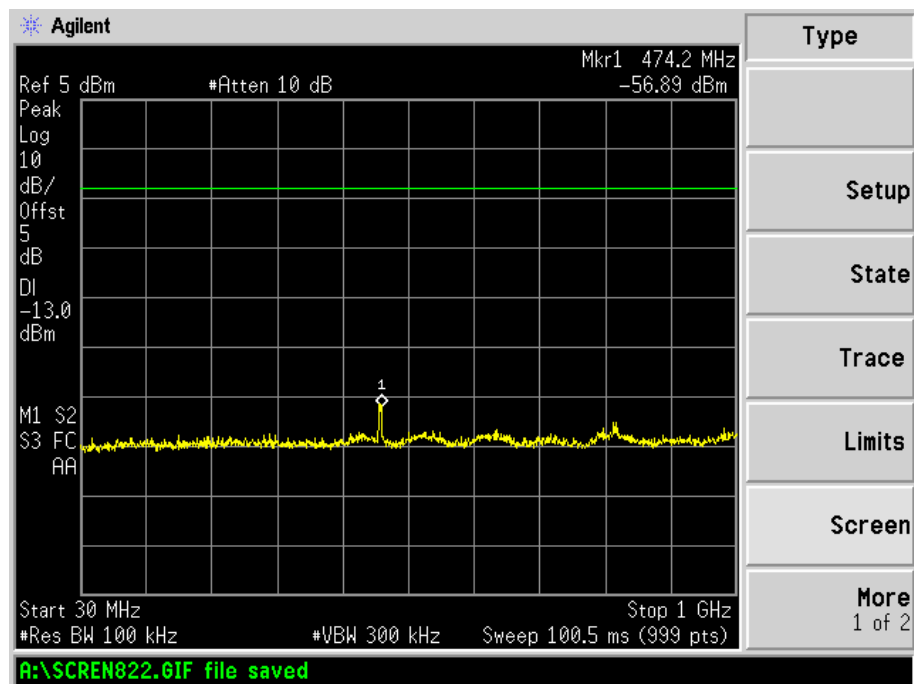


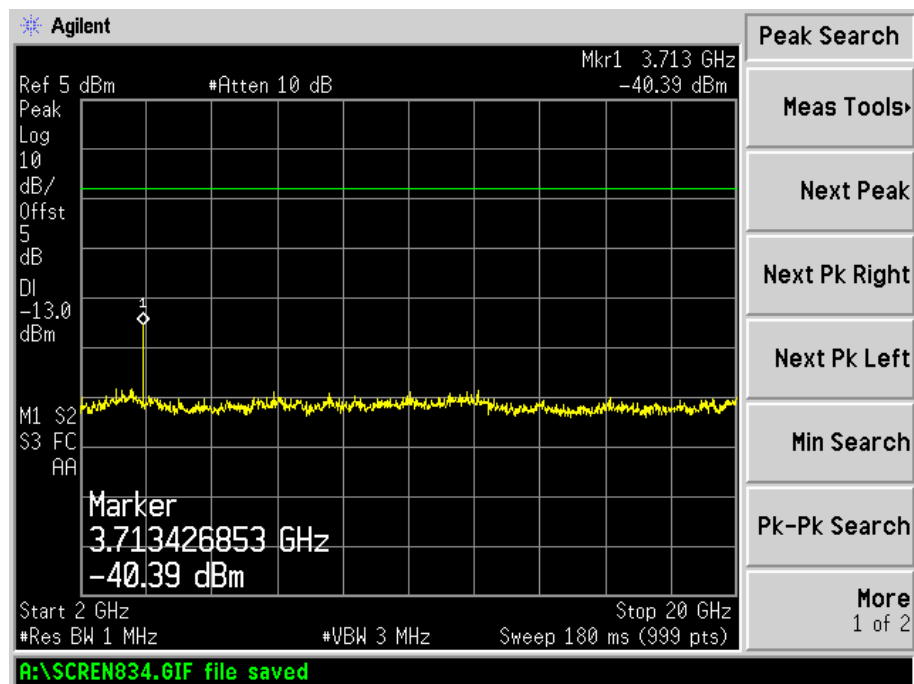
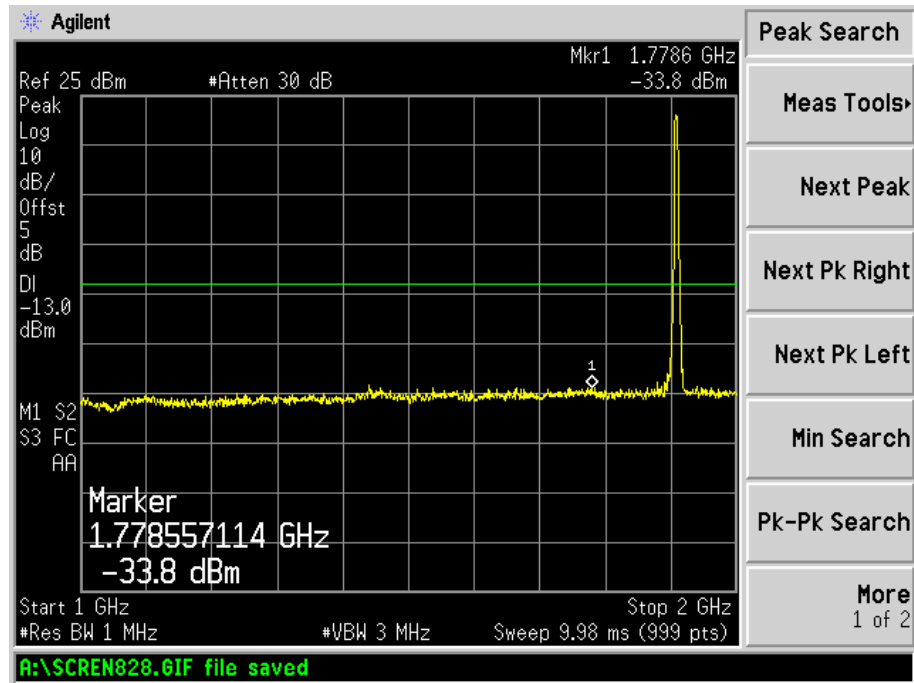
## HSDPA Low Channel



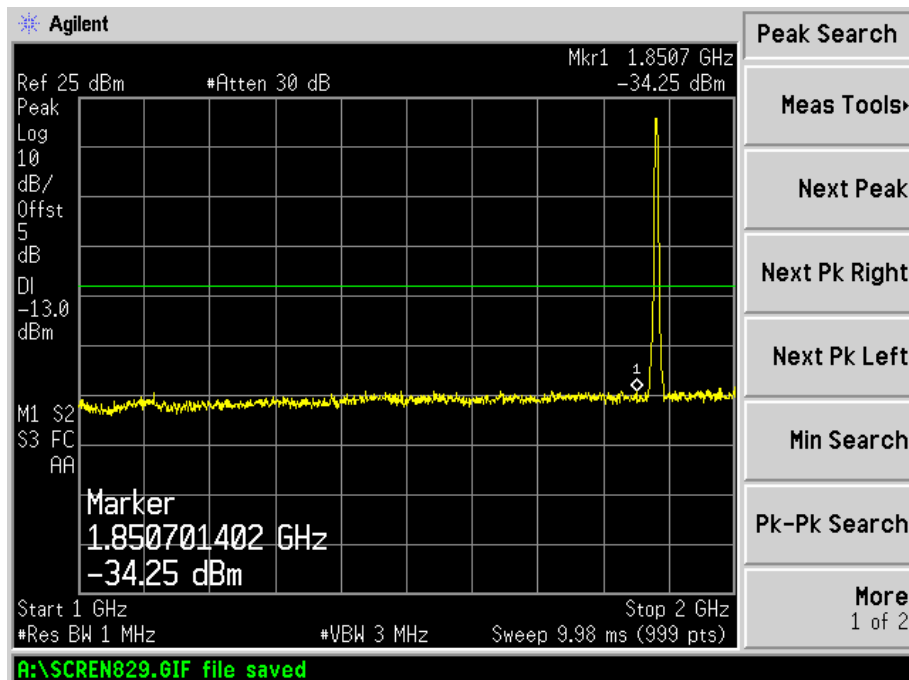
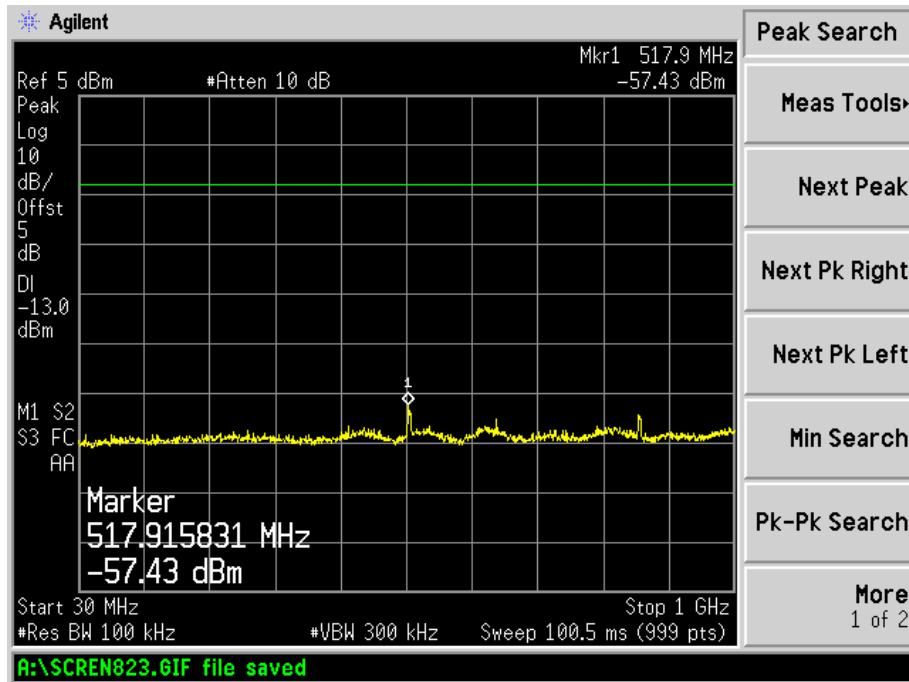


## HSDPA Middle Channel

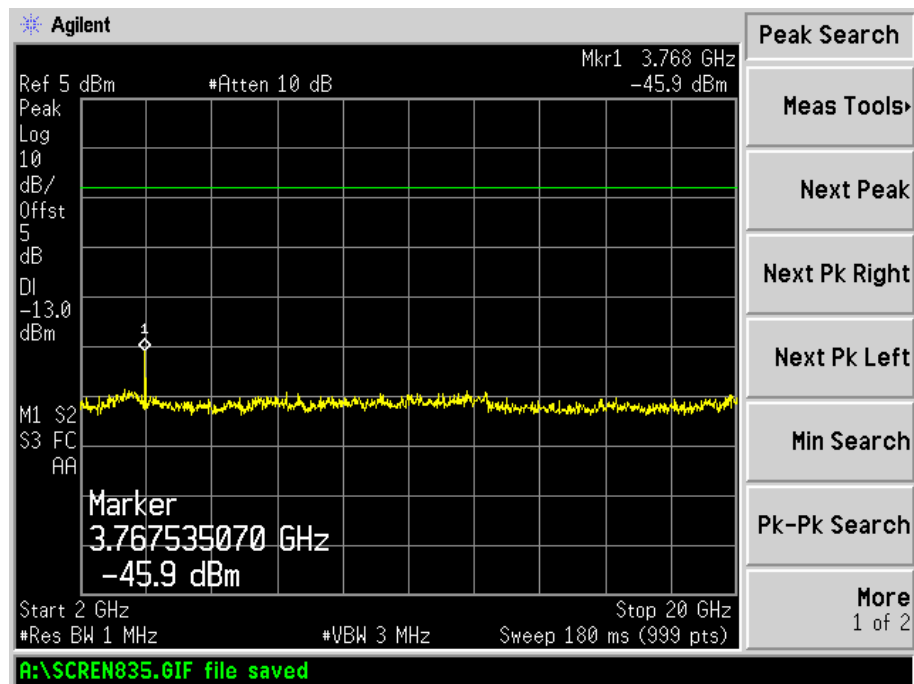




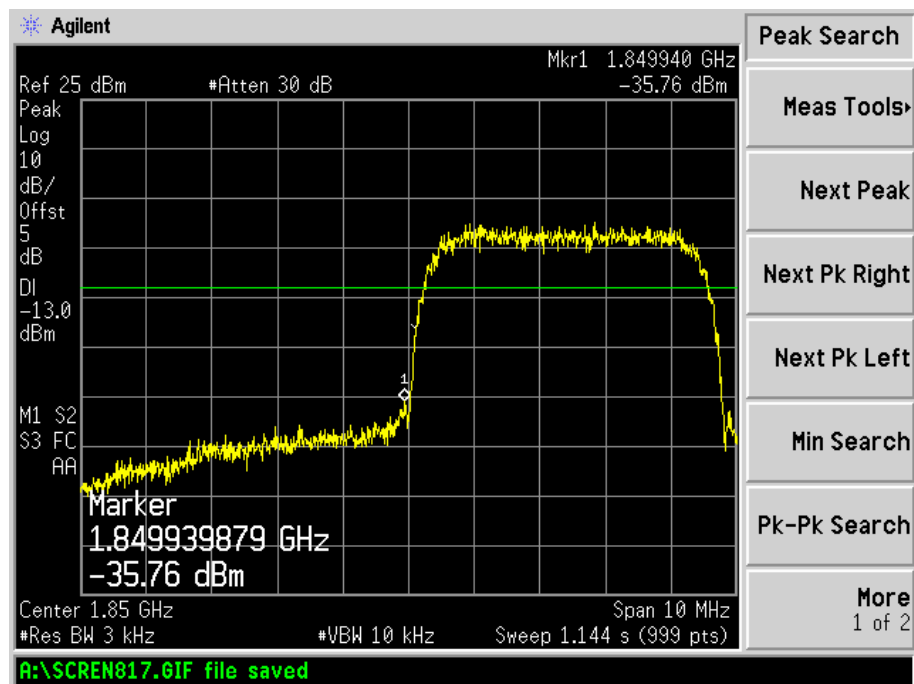
## HSDPA High Channel



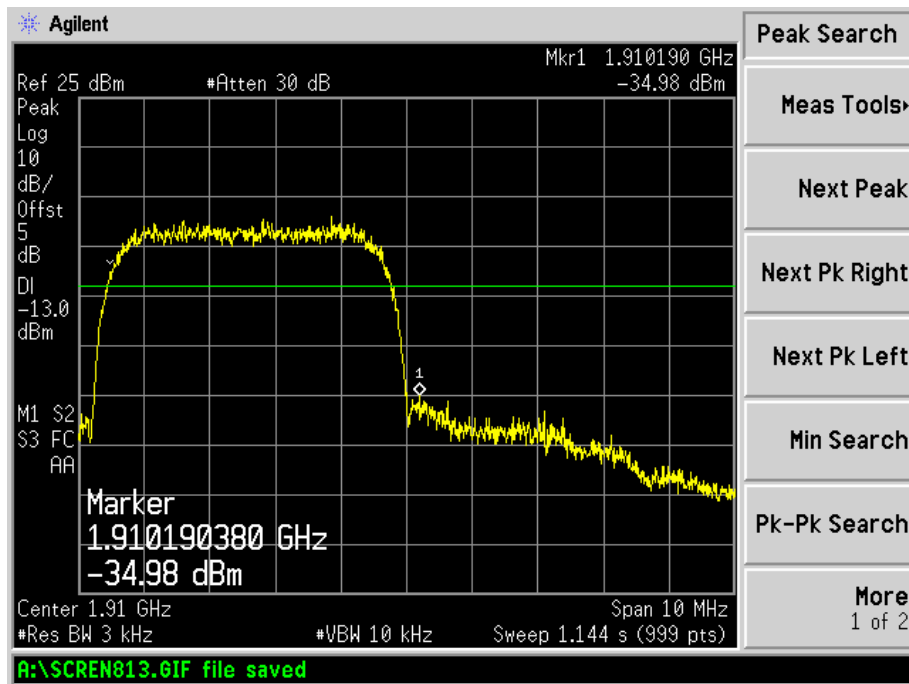




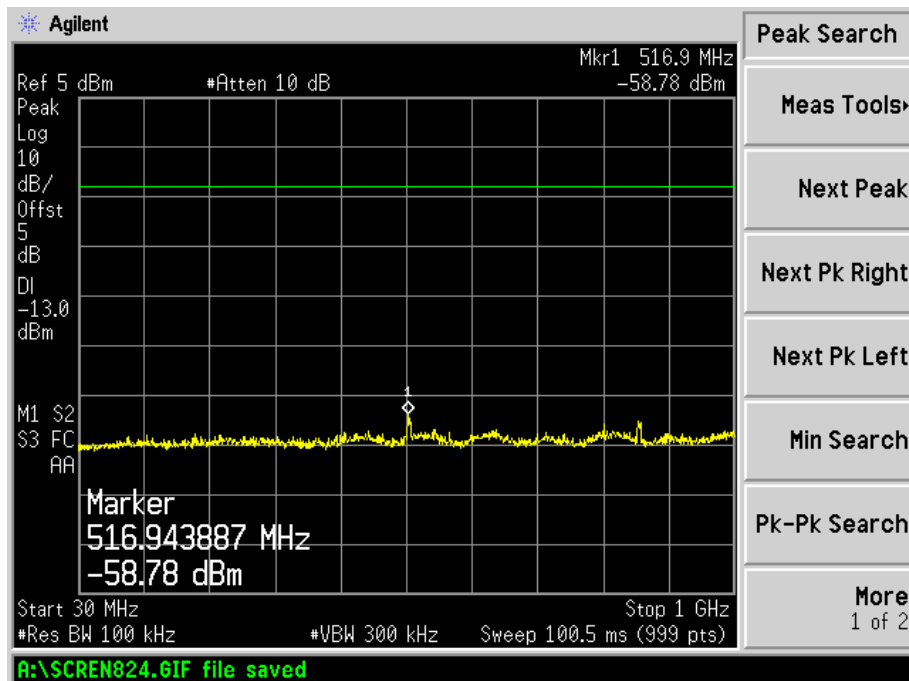
### HSDPA Low Band Spurious Emission

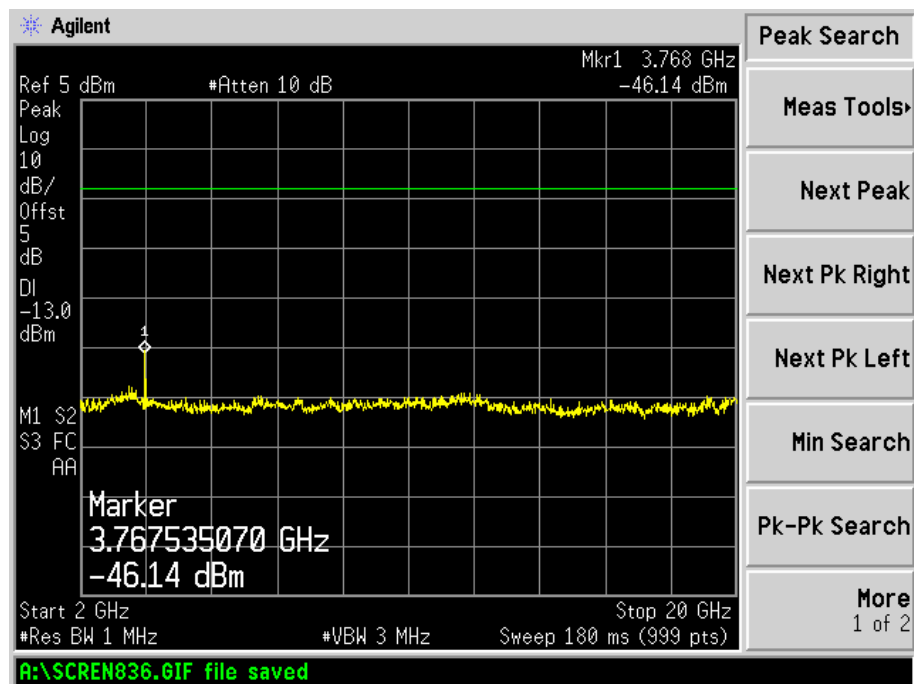
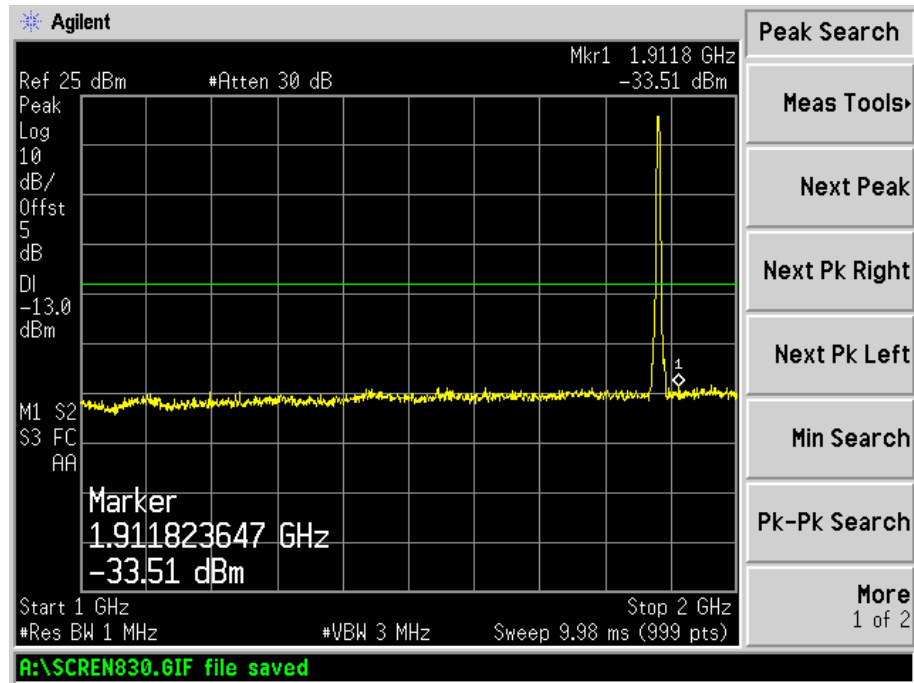


## HSDPA High Band Spurious Emission

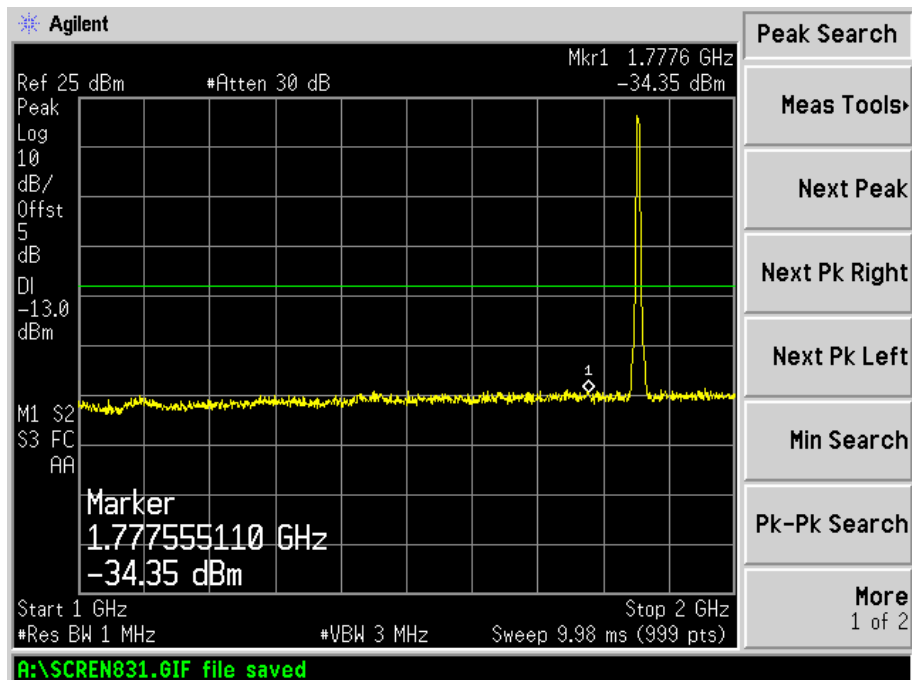
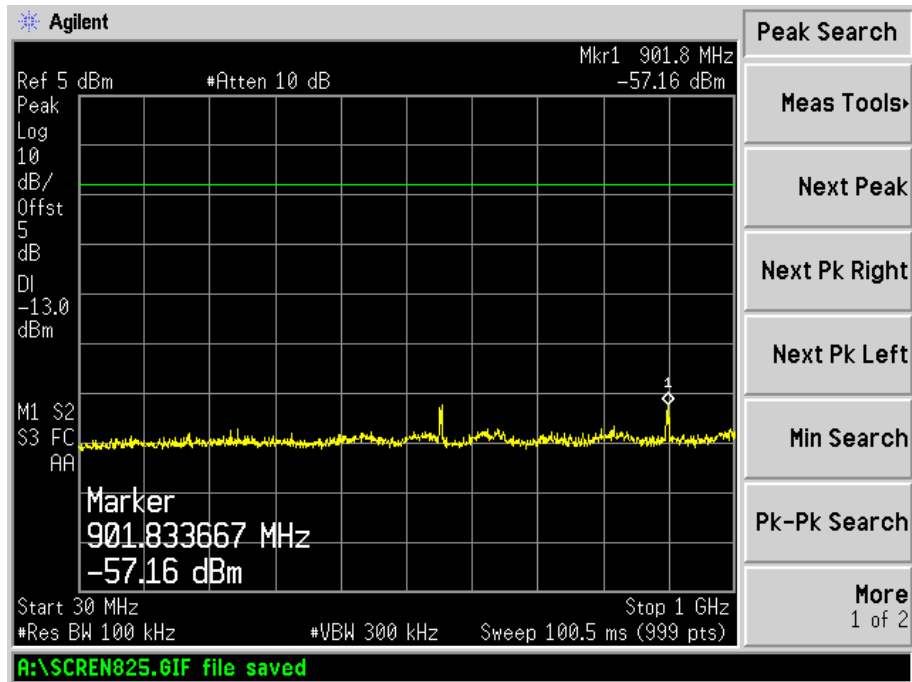


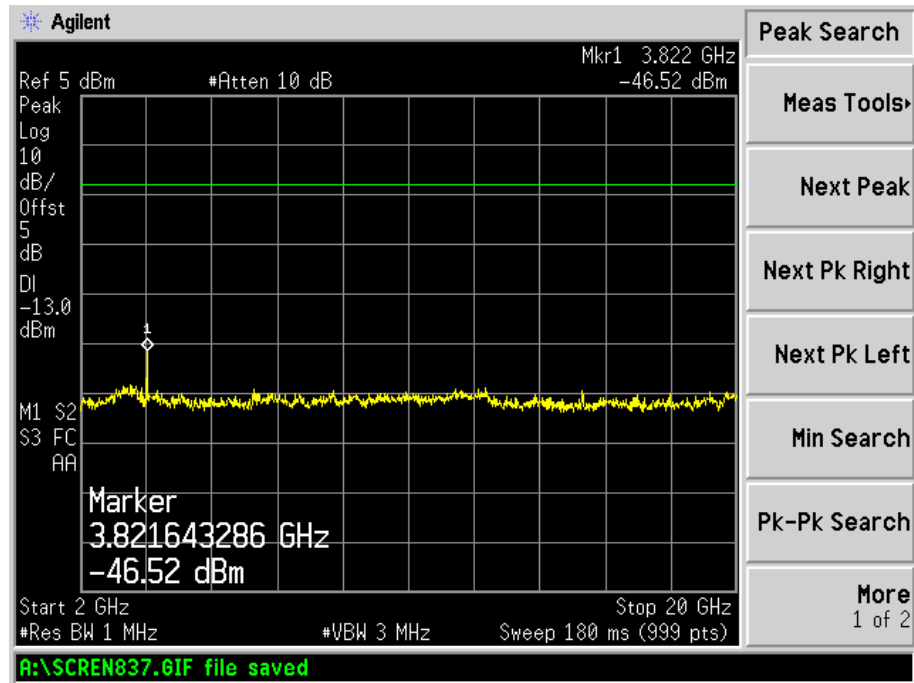
## HSUPA Low Channel



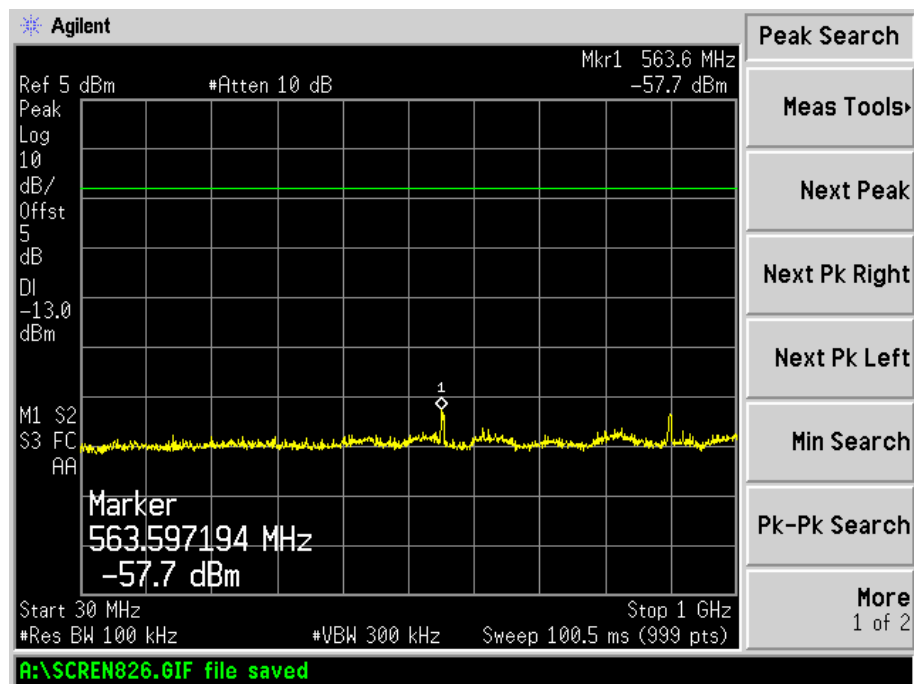


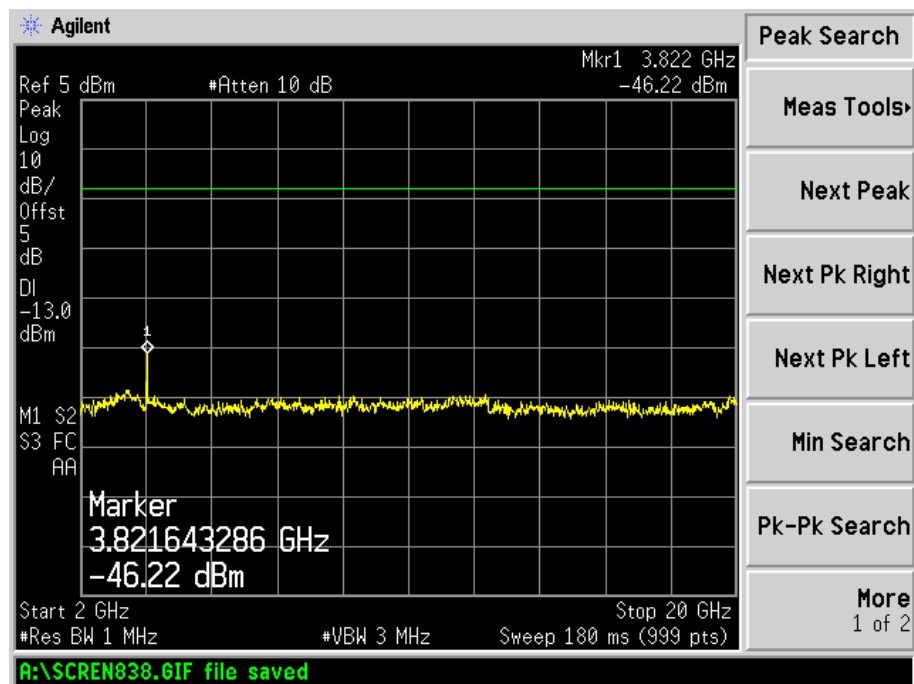
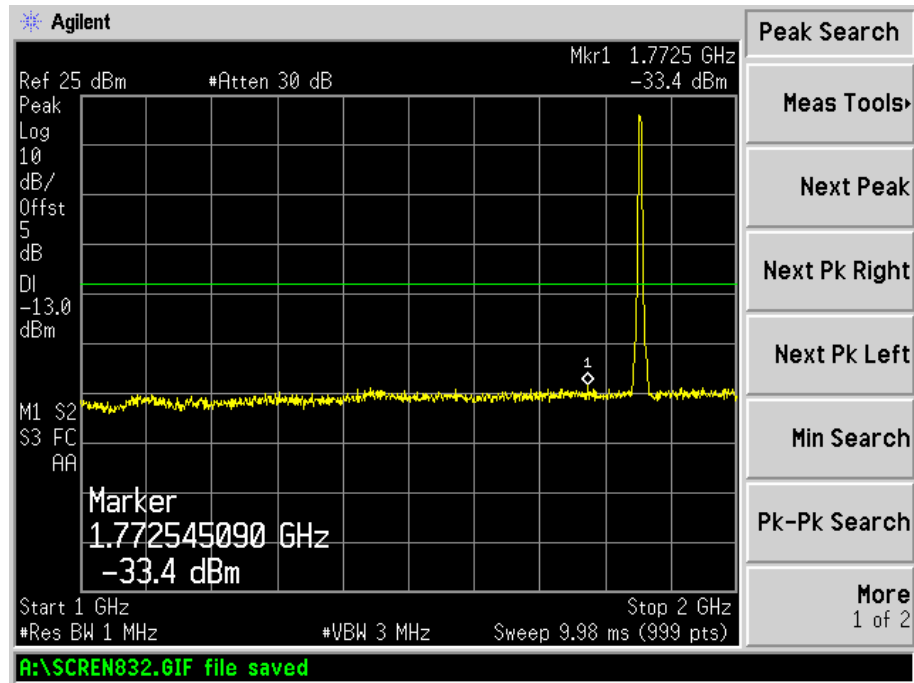
## HSUPA Middle Channel



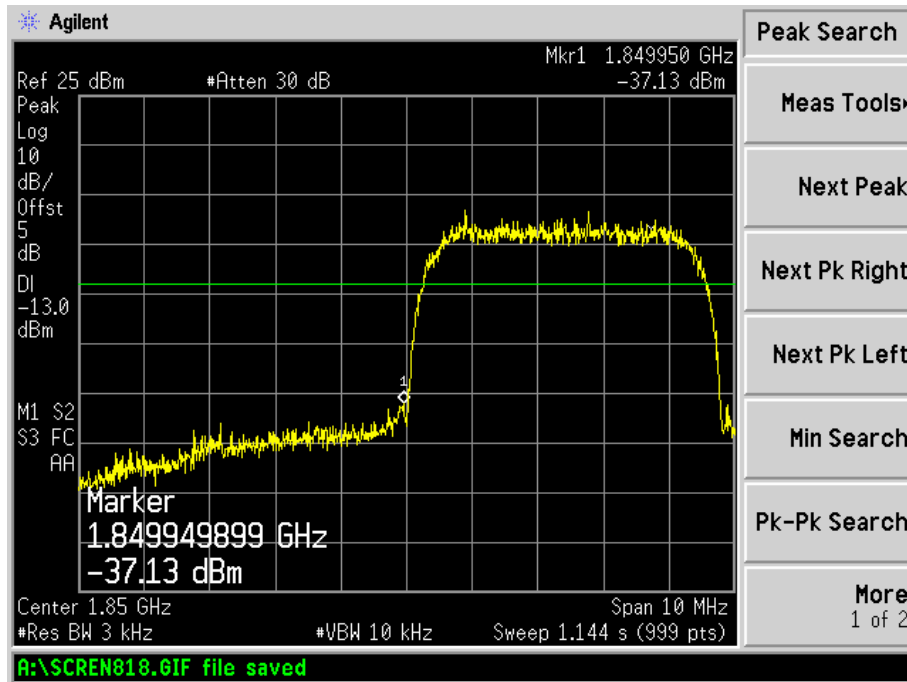


## HSUPA High Channel

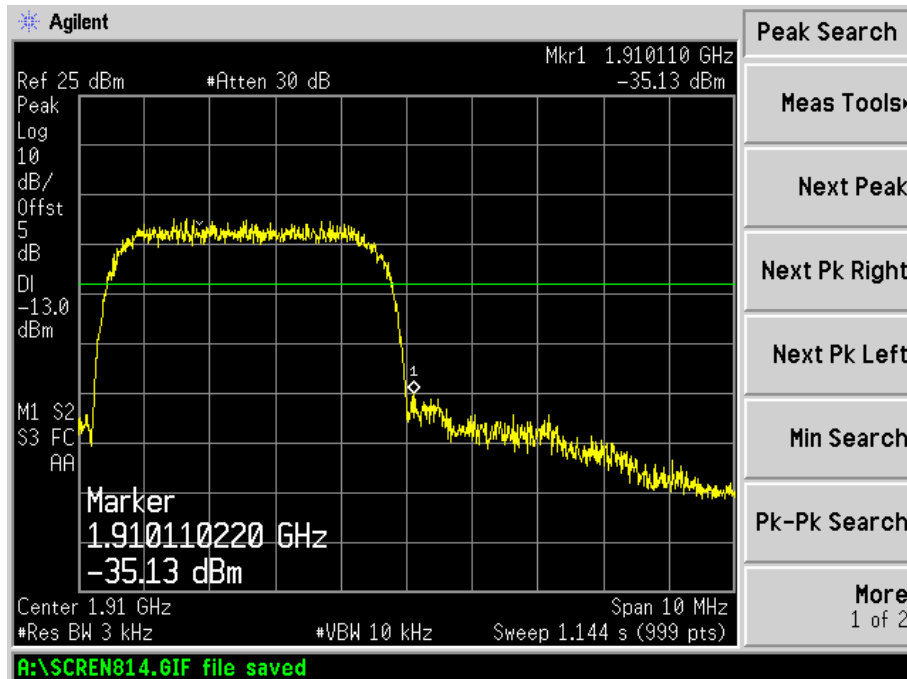




### HSUPA Low Band Spurious Emission



### HSUPA High Band Spurious Emission



## 8. Spurious Radiated Emissions

### 8.1 Standard Applicable

According to §22.917(a), the power of any emissions 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.

According to §24.238(a), the power of any emissions 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.

According to §27.53 (h), the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log_{10}(P)$  dB.

### 8.2 Test Procedure

1. The setup of EUT is according with per ANSI/TIA Standard 603D and ANSI C63.4-2014 measurement procedure.
2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.
3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
4. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious attenuation limit in dB =  $43 + 10 \log_{10}(\text{power out in Watts})$

### 8.3 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	52%
ATM Pressure:	1012 mbar

### 8.4 Summary of Test Results/Plots

According to the data below, the FCC Part 22.917 and 24.238 standards, and had the worst margin of:

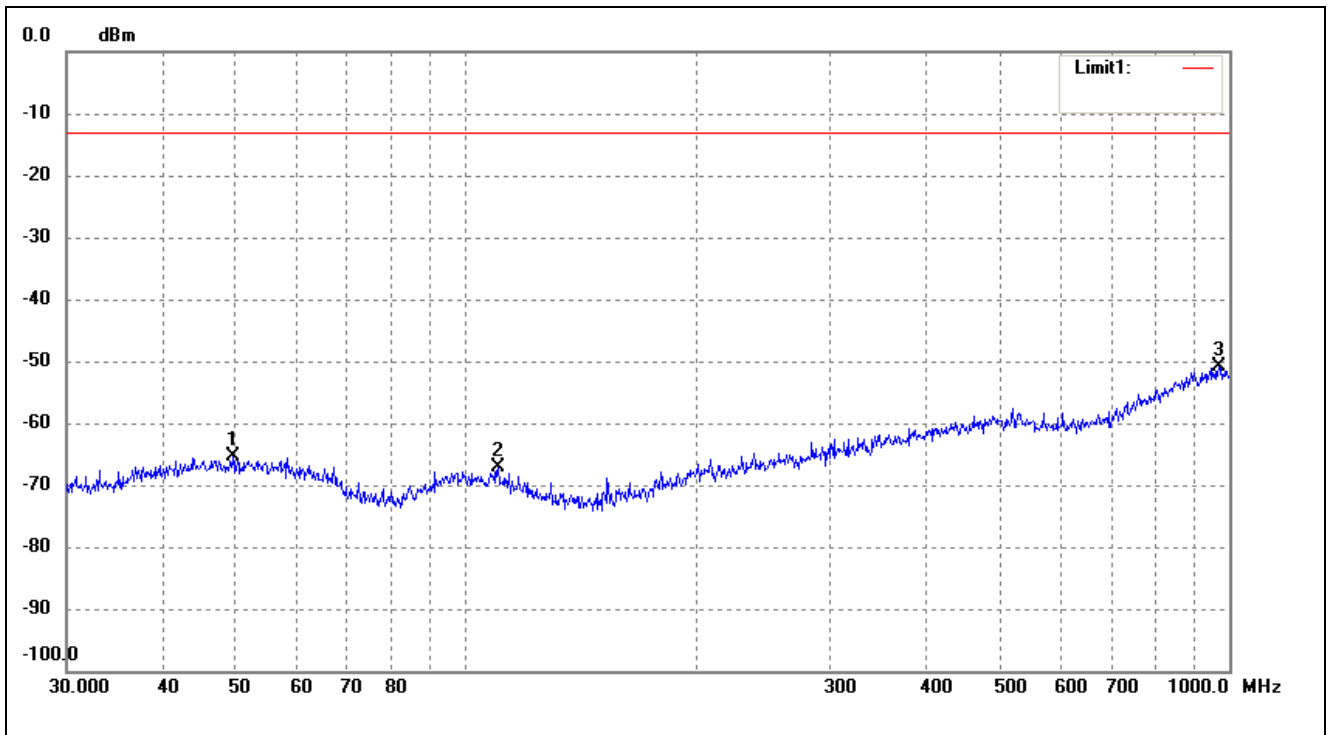
*Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.*



Spurious Emission From 30MHz to 1GHz

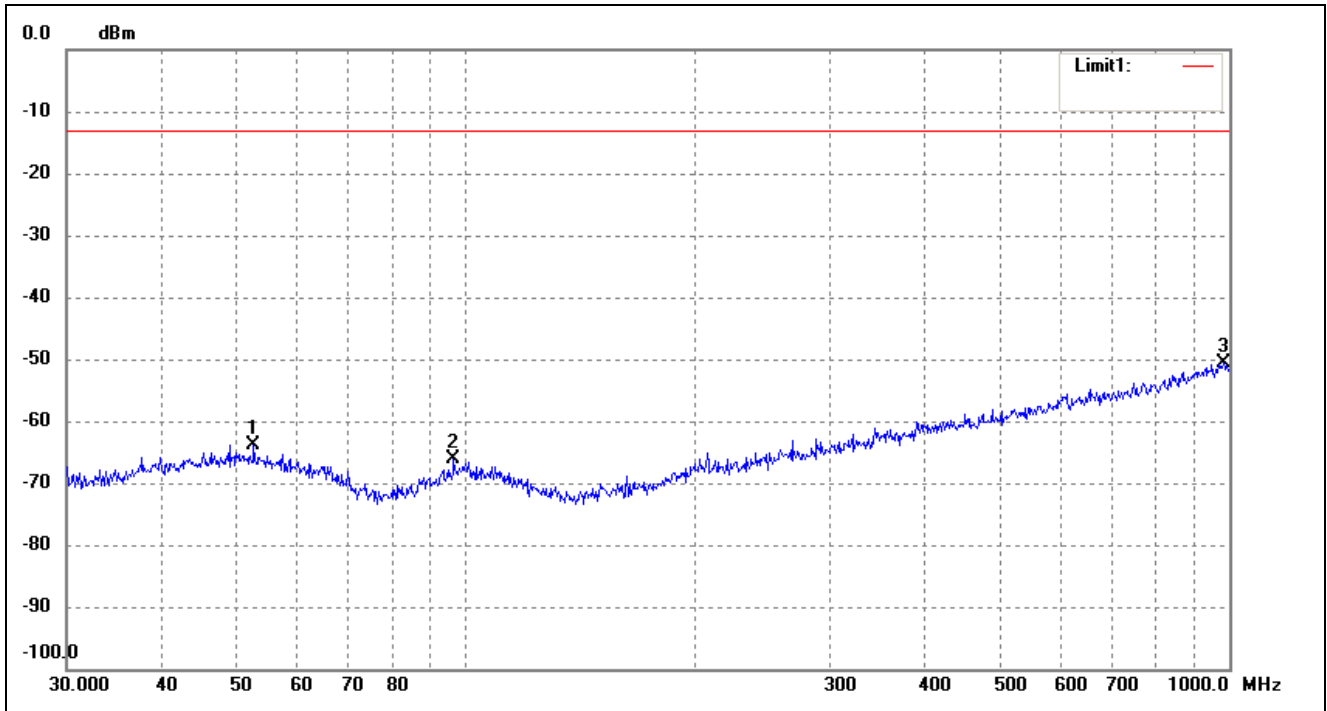
For Cellular Band\_ GSM850 Mode

Horizontal:



No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	49.5328	-69.71	4.35	-65.36	-13.00	-52.36	ERP
2	110.1816	-69.27	2.17	-67.10	-13.00	-54.10	ERP
3	968.9338	-68.86	18.01	-50.85	-13.00	-37.85	ERP

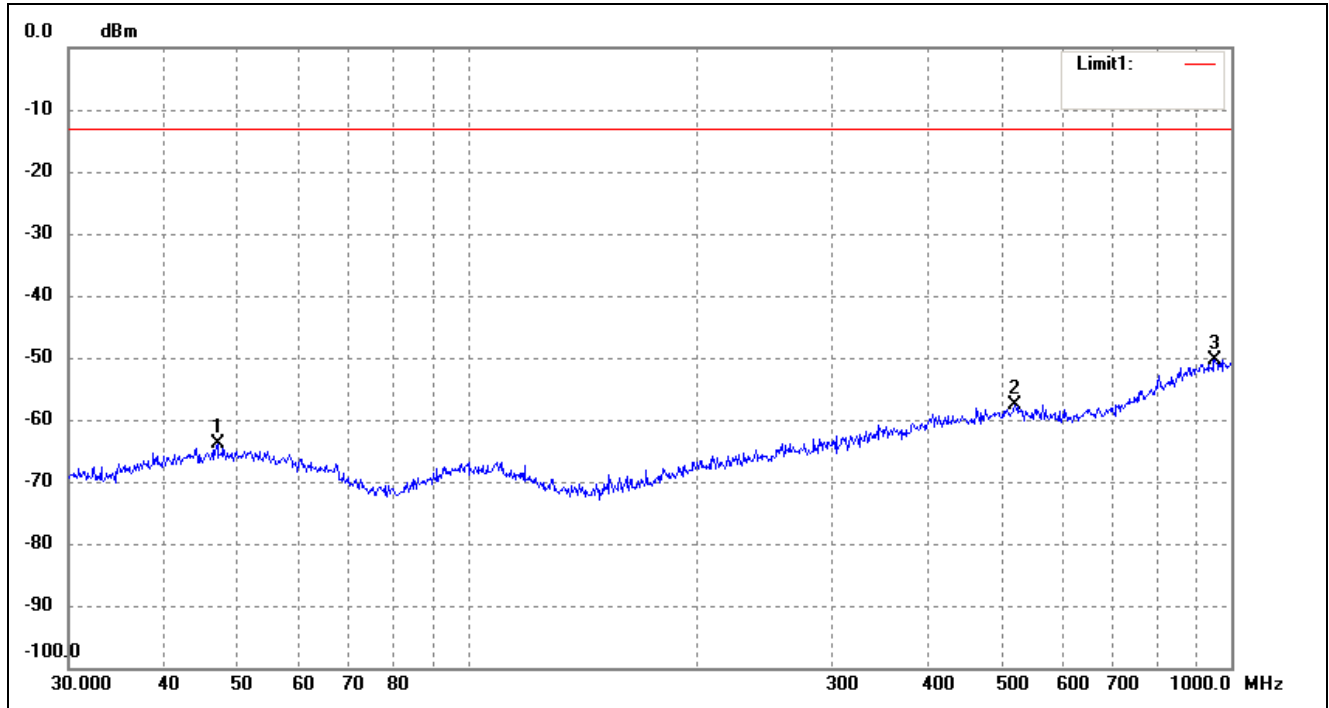
Vertical:



No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	52.7600	-67.91	4.07	-63.84	-13.00	-50.84	ERP
2	96.4362	-67.90	1.81	-66.09	-13.00	-53.09	ERP
3	982.6200	-68.92	18.22	-50.70	-13.00	-37.70	ERP

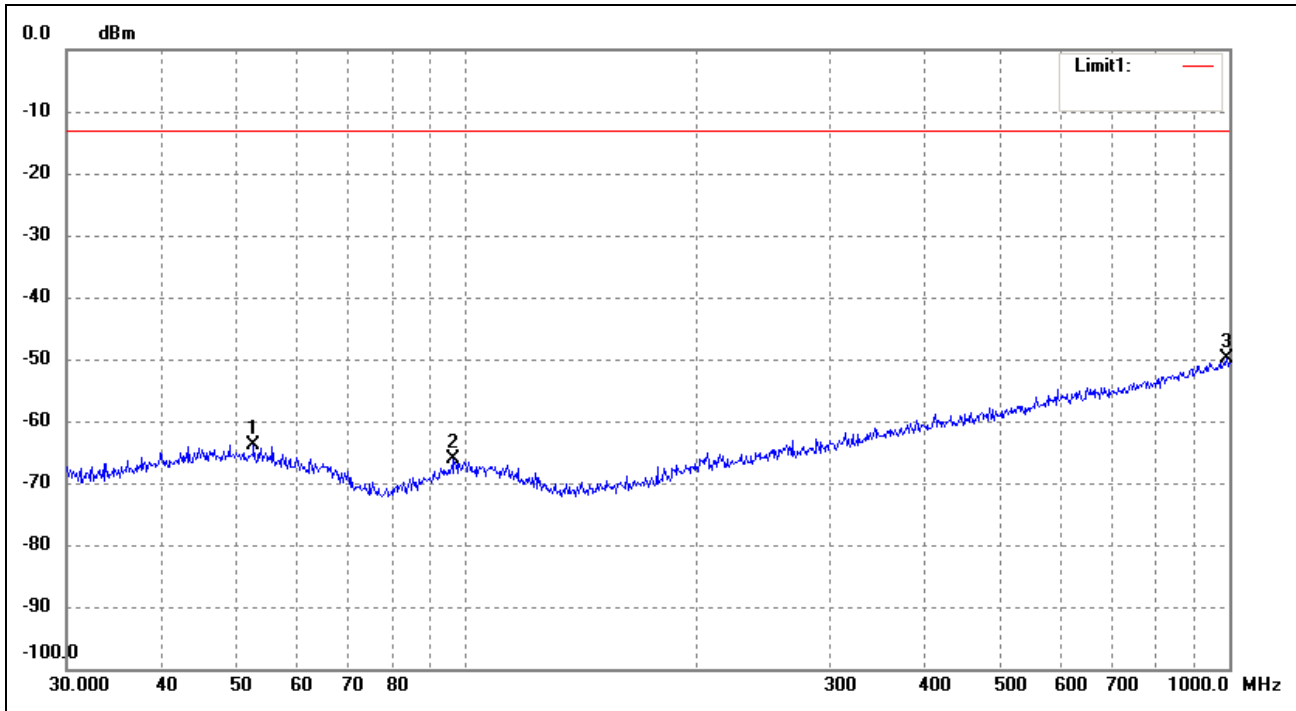
For Cellular Band\_ GSM1900 Mode

Horizontal:



No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	46.9948	-68.28	4.35	-63.93	-13.00	-50.93	ERP
2	520.8882	-68.29	10.57	-57.72	-13.00	-44.72	ERP
3	952.0937	-68.14	17.76	-50.38	-13.00	-37.38	ERP

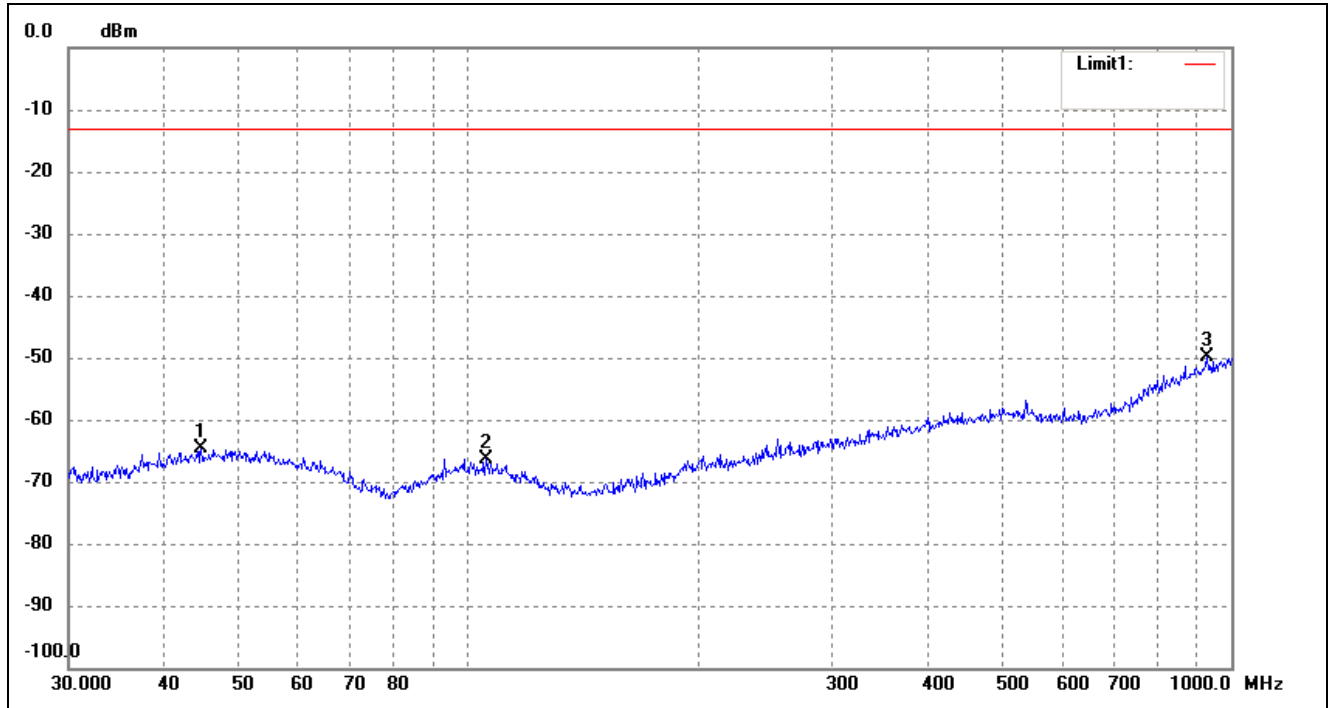
Vertical:



No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	52.7600	-67.91	4.07	-63.84	-13.00	-50.84	ERP
2	96.4362	-67.90	1.81	-66.09	-13.00	-53.09	ERP
3	993.0114	-68.26	18.38	-49.88	-13.00	-36.88	ERP

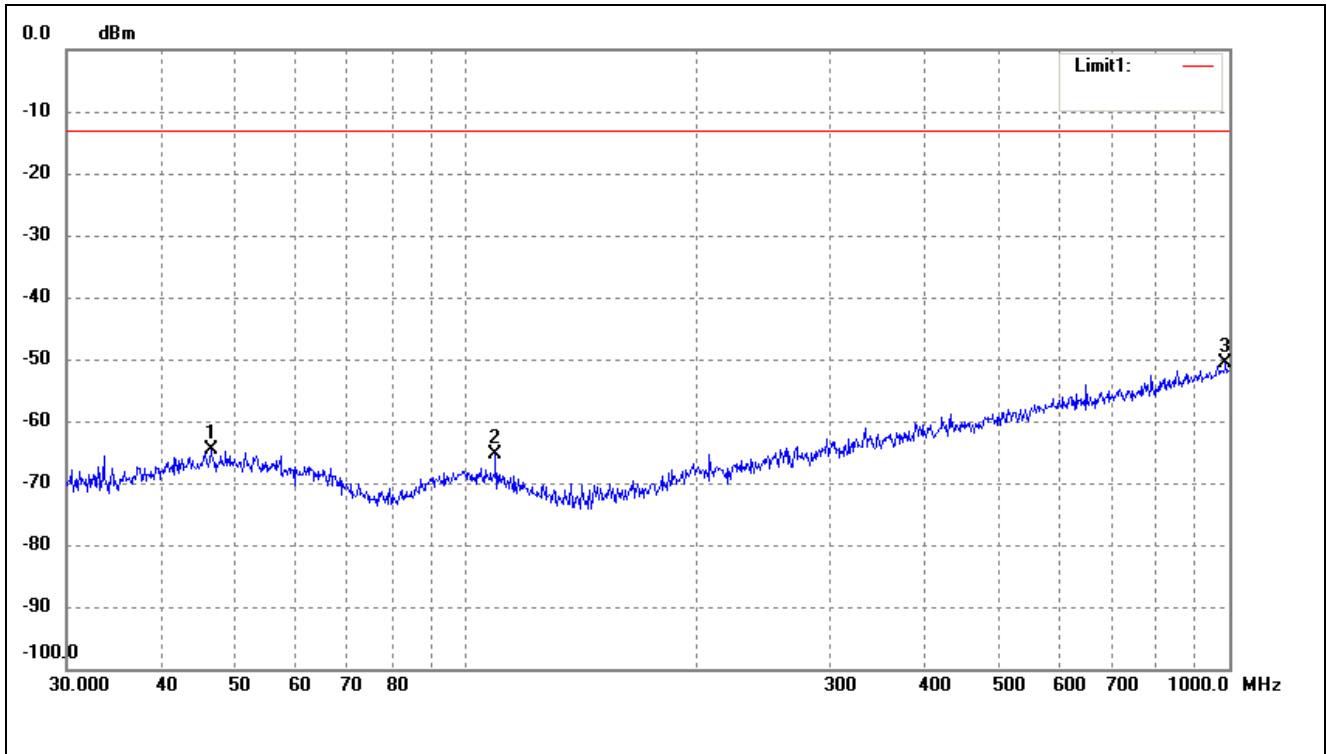
For band 5 Mode

Horizontal:



No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	44.7434	-68.86	4.28	-64.58	-13.00	-51.58	ERP
2	105.6415	-68.50	2.22	-66.28	-13.00	-53.28	ERP
3	929.0082	-67.31	17.50	-49.81	-13.00	-36.81	ERP

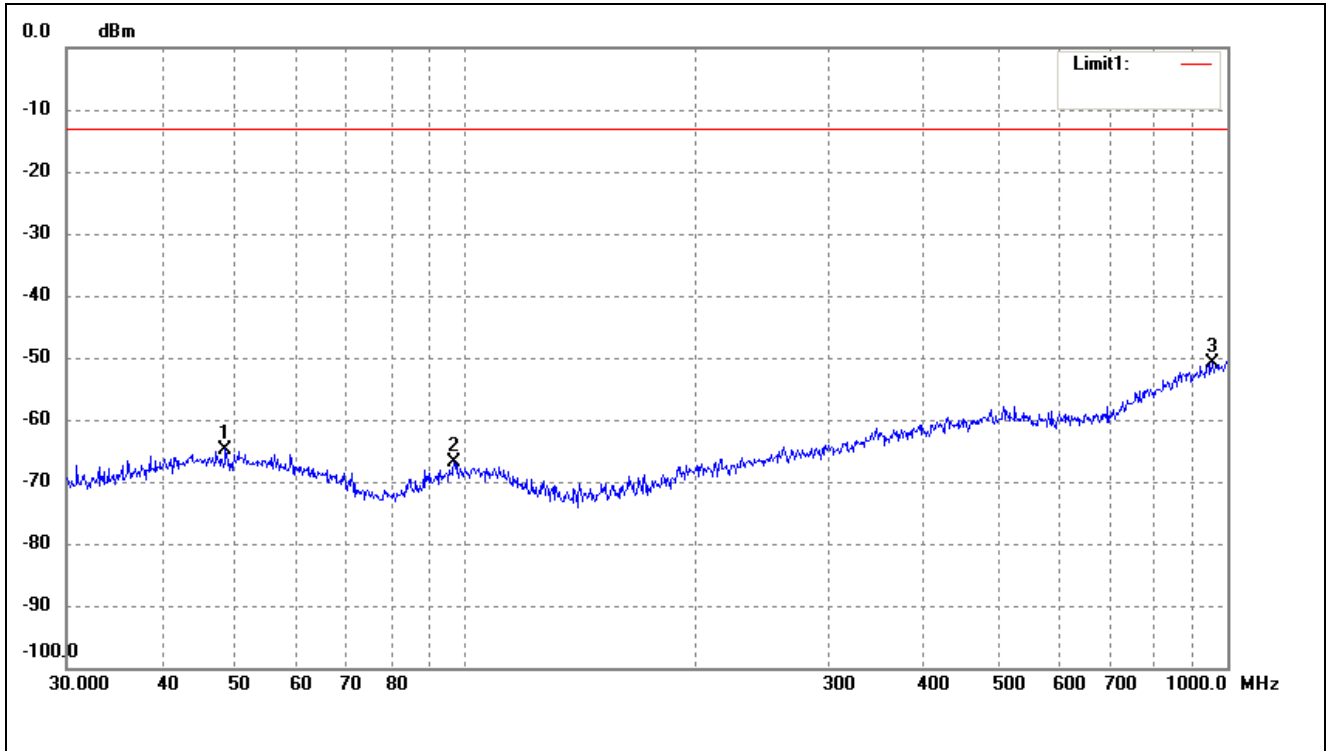
Vertical:



No.	Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	46.3402	-69.04	4.34	-64.70	-13.00	-51.70	ERP
2	109.4116	-67.57	2.21	-65.36	-13.00	-52.36	ERP
3	989.5355	-68.85	18.32	-50.53	-13.00	-37.53	ERP

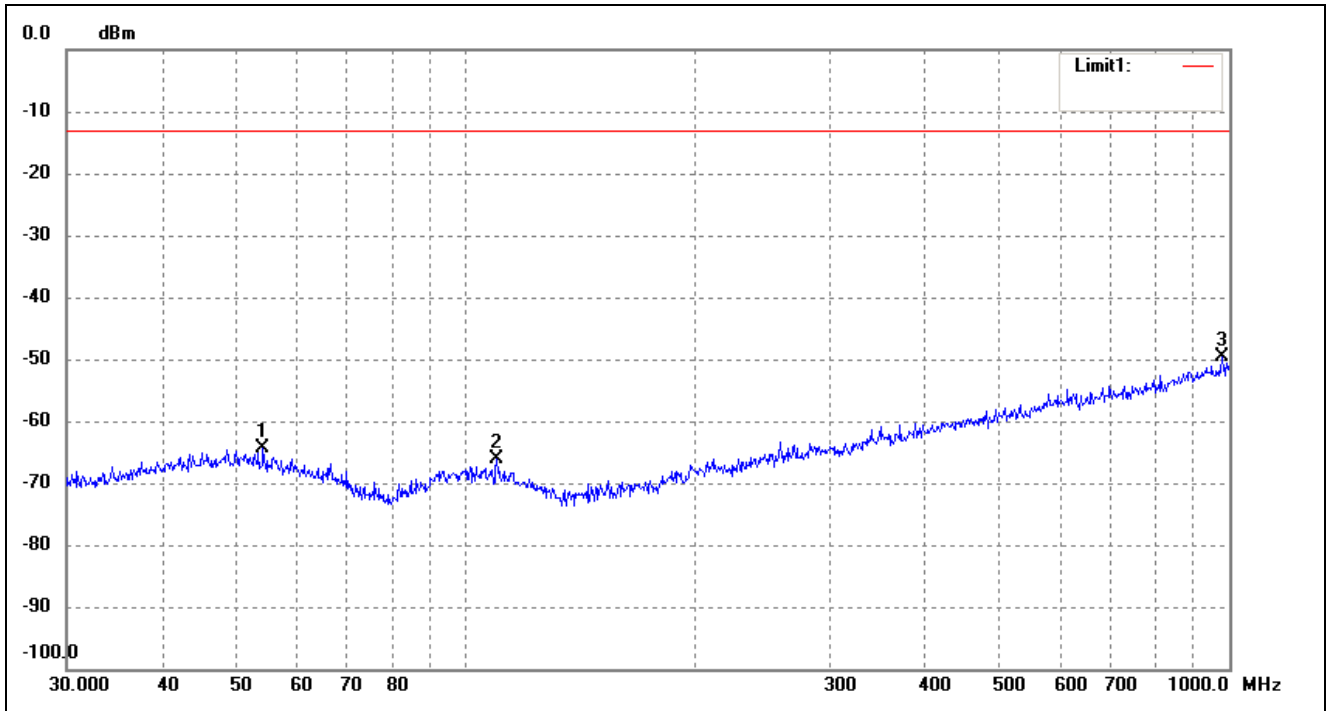
For band 2 Mode

Horizontal:



No.	Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	48.5016	-69.10	4.35	-64.75	-13.00	-51.75	ERP
2	96.7749	-68.65	1.85	-66.80	-13.00	-53.80	ERP
3	955.4381	-68.75	17.81	-50.94	-13.00	-37.94	ERP

Vertical:



No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	54.2610	-68.33	3.92	-64.41	-13.00	-51.41	ERP
2	109.7960	-68.29	2.20	-66.09	-13.00	-53.09	ERP
3	979.1804	-67.81	18.17	-49.64	-13.00	-36.64	ERP

Note: Margin= (Reading+ Correct)- Limit



*Spurious Emissions Above 1GHz*  
*For Cellular Band\_GSM850 Mode*

Frequency	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
Low Channel (824.2MHz)						
1648.4	-54.14	4.94	-49.20	13.00	-36.20	H
2472.6	-52.99	8.46	-44.53	13.00	-31.53	H
1648.4	-50.36	4.94	-45.42	13.00	-32.42	V
2472.6	-50.92	8.46	-42.46	13.00	-29.46	V
Middle Channel (836.6MHz)						
1673.2	-54.14	5.11	-49.03	13.00	-36.03	H
2509.8	-52.99	8.54	-44.45	13.00	-31.45	H
1673.2	-50.36	5.11	-45.25	13.00	-32.25	V
2509.8	-50.92	8.54	-42.38	13.00	-29.38	V
High Channel (848.8MHz)						
1697.6	-49.16	5.29	-43.87	13.00	-30.87	H
2546.4	-51.53	8.59	-42.94	13.00	-29.94	H
1697.6	-49.03	5.29	-43.74	13.00	-30.74	V
2546.4	-51.46	8.59	-42.87	13.00	-29.87	V

*For PCS Band\_GSM1900 Mode*

Frequency	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
Low Channel (1850.2MHz)						
3700.4	-53.66	10.54	-43.12	13.00	-30.12	H
5550.6	-56.38	13.37	-43.01	13.00	-30.01	H
3700.4	-52.66	10.54	-42.12	13.00	-29.12	V
5550.6	-56.38	13.37	-43.01	13.00	-30.01	V
Middle Channel (1880MHz)						
3760.0	-51.76	10.64	-41.12	13.00	-28.12	H
5640.0	-56.55	13.54	-43.01	13.00	-30.01	H
3760.0	-51.76	10.64	-41.12	13.00	-28.12	V
5640.0	-56.55	13.54	-43.01	13.00	-30.01	V
High Channel (1909.8MHz)						
3819.6	-53.16	10.74	-42.42	13.00	-29.42	H
5729.4	-56.69	13.71	-42.98	13.00	-29.98	H
3819.6	-53.86	10.74	-43.12	13.00	-30.12	V
5729.4	-56.19	13.71	-42.48	13.00	-29.48	V

## For Band 5 Mode

Frequency	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
Low Channel (826.4MHz)						
1652.8	-58.21	4.94	-53.27	13.00	-40.27	H
2479.2	-58.73	8.46	-50.27	13.00	-37.27	H
1652.8	-57.18	4.94	-52.24	13.00	-39.24	V
2479.2	-58.41	8.46	-49.95	13.00	-36.95	V
Middle Channel (836.6MHz)						
1672.8	-57.44	5.11	-52.33	13.00	-39.33	H
2509.2	-57.93	8.54	-49.39	13.00	-36.39	H
1672.8	-58.39	5.11	-53.28	13.00	-40.28	V
2509.2	-59.42	8.54	-50.88	13.00	-37.88	V
High Channel (846.6MHz)						
1693.2	-56.52	5.29	-51.23	13.00	-38.23	H
2539.8	-59.54	8.59	-50.95	13.00	-37.95	H
1693.2	-57.02	5.29	-51.73	13.00	-38.73	V
2539.8	-58.46	8.59	-49.87	13.00	-36.87	V

## For Band 2 Mode

Frequency	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
Low Channel (1852.4MHz)						
3704.8	-57.57	10.17	-47.40	13.00	-34.40	H
5557.2	-58.13	14.69	-43.44	13.00	-30.44	H
3704.8	-58.63	10.17	-48.46	13.00	-35.46	V
5557.2	-58.86	14.69	-44.17	13.00	-31.17	V
Middle Channel (1880MHz)						
3760.8	-58.05	10.26	-47.79	13.00	-34.79	H
5640.0	-57.90	14.78	-43.12	13.00	-30.12	H
3760.8	-57.62	10.26	-47.36	13.00	-34.36	V
5640.0	-58.17	14.78	-43.39	13.00	-30.39	V
High Channel (1907.6MHz)						
3815.2	-58.06	10.59	-47.47	13.00	-34.47	H
5722.8	-58.1	15.03	-43.07	13.00	-30.07	H
3815.2	-58.36	10.59	-47.77	13.00	-34.77	V
5722.8	-57.69	15.03	-42.66	13.00	-29.66	H

Note: Result=Reading+ Correct, Margin= Result- Limit

Testing is carried out with frequency rang 9kHz to 20GHz, which above 3<sup>th</sup> Harmonics are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured, so the data is not display.

## 9. Frequency Stability

### 9.1 Standard Applicable

According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table below:

Frequency Tolerance for Cellular Band

Frequency range (MHz)	Base, fixed (ppm)	Mobile ≤3 watts (ppm)	Mobile ≤3 watts (ppm)
25 to 50	20.0	20.0	50.0
50 to 450	5.0	5.0	50.0
450 to 512	2.5	5.0	5.0
821 to 896	1.5	2.5	2.5
928 to 929	5.0	N/A	N/A
929 to 960	1.5	N/A	N/A
2110 to 2220	10.0	N/A	N/A

According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

According to §27.54 The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

### 9.2 Test Procedure

According to §2.1055, the following test procedure was performed.

The Frequency Stability is measured directly with a Frequency Domain Analyzer. Frequency Deviation in ppm is calculated from the measured peak to peak value.

The Carrier Frequency Stability over Power Supply Voltage and over Temperature is measured with a Frequency Domain Analyzer in histogram mode

Temperature:	Supply Voltage
20°C	DC 3.3-4.2V of nominal voltage declared by manufacturer
-30°C to +50°C	Normal

### 9.3 Environmental Conditions

Temperature:	20°C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

## 9.4 Summary of Test Results/Plots

For Cellular Band GSM Mode

Reference Frequency(Middle Channel): 836.6 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	80	0.0956
40	3.7	77	0.0920
30	3.7	71	0.0849
20	3.7	69	0.0825
10	3.7	66	0.0789
0	3.7	60	0.0717
-10	3.7	70	0.0837
-20	3.7	72	0.0861
-30	3.7	78	0.0932

For PCS Band GSM Mode

Reference Frequency(Middle Channel): 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	80	0.0426
40	3.7	75	0.0399
30	3.7	70	0.0372
20	3.7	68	0.0362
10	3.7	64	0.0340
0	3.7	32	0.0170
-10	3.7	42	0.0223
-20	3.7	53	0.0282
-30	3.7	60	0.0319

## For Cellular Band GPRS Mode

Reference Frequency(Middle Channel): 836.6MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	66	0.0789
40	3.7	52	0.0622
30	3.7	49	0.0586
20	3.7	36	0.0430
10	3.7	30	0.0359
0	3.7	28	0.0335
-10	3.7	34	0.0406
-20	3.7	38	0.0454
-30	3.7	43	0.0514

## For PCS Band GPRS Mode

Reference Frequency(Middle Channel): 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	76	0.0404
40	3.7	69	0.0367
30	3.7	66	0.0351
20	3.7	60	0.0319
10	3.7	52	0.0277
0	3.7	34	0.0181
-10	3.7	49	0.0261
-20	3.7	55	0.0293
-30	3.7	63	0.0335

## For Cellular Band EDGE Mode

Reference Frequency(Middle Channel): 836.6MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	73	0.0873
40	3.7	68	0.0813
30	3.7	60	0.0717
20	3.7	55	0.0657
10	3.7	43	0.0514
0	3.7	38	0.0454
-10	3.7	42	0.0502
-20	3.7	48	0.0574
-30	3.7	51	0.0550

## For PCS Band EDGE Mode

Reference Frequency(Middle Channel): 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	70	0.0372
40	3.7	67	0.0356
30	3.7	66	0.0351
20	3.7	50	0.0266
10	3.7	46	0.0245
0	3.7	33	0.0176
-10	3.7	42	0.0223
-20	3.7	61	0.0324
-30	3.7	76	0.0404

## For WCDMA Band 5 Mode

Reference Frequency(Middle Channel): 836.6 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	76	0.0908
40	3.7	68	0.0813
30	3.7	55	0.0657
20	3.7	43	0.0514
10	3.7	29	0.0347
0	3.7	16	0.0191
-10	3.7	43	0.0514
-20	3.7	62	0.0741
-30	3.7	70	0.0837

## For WCDMA Band 2 Mode

Reference Frequency(Middle Channel): 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	69	0.0367
40	3.7	64	0.0340
30	3.7	59	0.0314
20	3.7	55	0.0293
10	3.7	42	0.0223
0	3.7	29	0.0154
-10	3.7	16	0.0085
-20	3.7	36	0.0191
-30	3.7	50	0.0266

## For HSDPA Band 5 Mode

Reference Frequency(Middle Channel): 836.6 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	72	0.0861
40	3.7	70	0.0837
30	3.7	64	0.0765
20	3.7	50	0.0598
10	3.7	42	0.0502
0	3.7	30	0.0359
-10	3.7	51	0.0610
-20	3.7	60	0.0717
-30	3.7	72	0.0861

## For HSDPA Band 2 Mode

Reference Frequency(Middle Channel): 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	61	0.0324
40	3.7	52	0.0277
30	3.7	41	0.0218
20	3.7	34	0.0181
10	3.7	28	0.0149
0	3.7	16	0.0085
-10	3.7	22	0.0117
-20	3.7	32	0.0170
-30	3.7	40	0.0213



## For HSUPA Band 5 Mode

Reference Frequency(Middle Channel): 836.6 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	68	0.0813
40	3.7	52	0.0622
30	3.7	41	0.0490
20	3.7	29	0.0347
10	3.7	22	0.0263
0	3.7	19	0.0227
-10	3.7	25	0.0299
-20	3.7	31	0.0371
-30	3.7	56	0.0669

## For HSUPA Band 2 Mode

Reference Frequency(Middle Channel): 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	68	0.0362
40	3.7	64	0.0340
30	3.7	34	0.0181
20	3.7	16	0.0085
10	3.7	10	0.0053
0	3.7	09	0.0048
-10	3.7	22	0.0117
-20	3.7	36	0.0191
-30	3.7	42	0.0223

So, Frequency Stability Versus Input Voltage is:

Reference Frequency(Middle Channel): GSM 836.6MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	3.3	39	0.0466
	3.7	22	0.0263
	4.5	33	0.0394
Reference Frequency(Middle Channel): GSM 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	3.3	38	0.0202
	3.7	16	0.0085
	4.5	25	0.0133
Reference Frequency(Middle Channel): GPRS 836.6MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	3.3	35	0.0418
	3.7	16	0.0191
	4.5	28	0.0335
Reference Frequency(Middle Channel): GPRS 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	3.3	46	0.0245
	3.7	25	0.0133
	4.5	55	0.0293

Reference Frequency(Middle Channel): EDGE 836.6MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	3.3	52	0.0622
	3.7	15	0.0179
	4.5	38	0.0454
Reference Frequency(Middle Channel): EDGE 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	3.3	59	0.0314
	3.7	22	0.0117
	4.5	46	0.0245
Reference Frequency(Middle Channel): WCDMA 836.6MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	3.3	50	0.0598
	3.7	34	0.0406
	4.5	52	0.0622
Reference Frequency(Middle Channel): WCDMA 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	3.3	44	0.0234
	3.7	34	0.0181
	4.5	52	0.0277

Reference Frequency(Middle Channel): HSDPA 836.6MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	3.3	46	0.0550
	3.7	28	0.0335
	4.5	39	0.0466
Reference Frequency(Middle Channel): HSDPA 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	3.3	46	0.0245
	3.7	25	0.0133
	4.5	39	0.0207
Reference Frequency(Middle Channel): HSUPA 836.6MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	3.3	52	0.0622
	3.8	42	0.0502
	4.3	56	0.0669
Reference Frequency(Middle Channel): HSUPA 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	3.3	57	0.0303
	3.7	36	0.0191
	4.5	52	0.0277

\*\*\*\*\* END OF REPORT \*\*\*\*\*