

## Exhibit 12

### Occupied Bandwidth and Spurious Emission Measured Data -- for CDMA mode when operating in P\_REV 6 or above

Land-Cellular module 200 (M2) supports additional reverse channels, as per IS-98D, additional measurements have taken to show compliance. Below is the applicable section from IS-98D

#### 4.5 Limitations on Emissions

##### 4.5.1 Conducted Spurious Emissions

###### 4.5.1.1 Definition

Conducted spurious emissions are emissions at frequencies that are outside the assigned CDMA Channel, measured at the mobile station antenna connector. This test measures the spurious emissions during continuous transmission.

###### 4.5.1.2 Method of Measurement

1. Connect the base station to the mobile station antenna connector as shown in Figure 6.5.1-4. The AWGN generator and the interference generator are not applicable in this test. Connect a spectrum analyzer (or other suitable test equipment) to the mobile station antenna connector.
2. For each band class and radio configuration that the mobile station supports, configure the base station and mobile station to operate in that band class and perform steps 3 through 17.
  - Thus Band Class 0 and Band Class 1 for the M2
3. Set the following parameters of the *Access Parameters Message* as specified below:

Parameter	Value (Decimal)
NOM_PWR	7 (7 dB)
INIT_PWR	15 (15 dB)
PWR_STEP	7 (7 dB/step)
NUM_STEP	15 (16 probes/sequence)
MAX_RSP_SEQ	15 (15 sequences)

If the Enhanced Access Channel is used, set the following parameters of the *Enhanced Access Parameters Message* as specified below (N/A so Table not included below)

4. If the mobile station supports Reverse Traffic Channel Radio Configuration 1 and Forward Traffic Channel Radio Configuration 1, set up a call using Fundamental Channel Test Mode 1 (see 1.3) with 9600 bps data rate only and perform steps 15 through 17.
  - Test Mode 1 implies an S02 call(Rate Set 1) on RC1/RC2....this is equivalent to what was performed already h-1 through h-4 of Exhibit 8 and a, b, c, and d of Exhibit 9
5. If the mobile station supports the Radio Configuration 3 Reverse Fundamental Channel and demodulation of Radio Configuration 3, 4, or 5, set up a call using Fundamental Channel Test Mode 3 (see 1.3) with 9600 bps data rate only and perform steps 15 through 17.
  - Test Mode 3 implies using a Rate Set 1 loopback service option.
6. If the mobile station supports the Radio Configuration 3 Reverse Dedicated Control Channel and demodulation of Radio Configuration 3, 4, or 5, set up a call using Dedicated Control Channel Test Mode 3 (see 1.3) with 9600 bps data rate only and 100% frame activity and perform steps 15 through 17.
  - N/A, the M2 will not support F/R-DCCH

7. If the mobile station supports the Radio Configuration 3 Reverse Fundamental Channel, Radio Configuration 3 Reverse Dedicated Control Channel and demodulation of Radio Configuration 3, 4, or 5, set up a call using Fundamental Channel Test Mode 3 (see 1.3) with 1500 bps Fundamental Channel data rate only and 9600 bps Dedicated Control Channel with 100 % frame activity, and perform steps 15 through 17.
  - N/A, the M2 will not support F/R-DCCH
8. If the mobile station supports the Radio Configuration 3 Reverse Fundamental Channel, Radio Configuration 3 Reverse Supplemental Channel 0 and demodulation of Radio Configuration 3, 4, or 5, set up a call using Supplemental Channel Test Mode 3 (see 1.3) with 9600 bps Fundamental Channel and 9600 bps Supplemental Channel 0 data rate, and perform steps 15 through 17.
  - Test Mode 3 implies using a Rate Set 1 loopback service option.
9. If the mobile station supports the Radio Configuration 3 Reverse Dedicated Control Channel, Radio Configuration 3 Reverse Supplemental Channel 0 and demodulation of Radio Configuration 3, 4, or 5, set up a call using Supplemental Channel Test Mode 3 (see 1.3) with 9600 bps Dedicated Control Channel with 100% frame activity and 9600 bps Supplemental Channel 0 data rate, and perform steps 15 through 17.
  - N/A, the M2 will not support F/R-DCCH
10. If the mobile station supports the Radio Configuration 5 Reverse Fundamental Channel and demodulation of Radio Configuration 6, 7, 8, or 9, set up a call using Fundamental Channel Test Mode 7 (see 1.3) with 9600 bps data rate only and perform steps 15 through 17.
  - N/A, the M2 will not support RC5 on the reverse link, nor RC6, 7, 8, or 9 on the forward link.
11. If the mobile station supports the Radio Configuration 5 Reverse Dedicated Control Channel and demodulation of Radio Configuration 6, 7, 8, or 9, set up a call using Dedicated Control Channel Test Mode 7 (see 1.3) with 9600 bps data rate only and 100% frame activity and perform steps 15 through 17.
  - N/A, the M2 will not support RC5 on the reverse link, nor RC6, 7, 8, or 9 on the forward link.
12. If the mobile station supports the Radio Configuration 5 Reverse Fundamental Channel, Radio Configuration 5 Reverse Dedicated Control Channel and demodulation of Radio Configuration 6, 7, 8, or 9, set up a call using Fundamental Channel Test Mode 7 (see 1.3) with 1500 bps Fundamental Channel data rate only and 9600 bps Dedicated Control Channel with 100 % frame activity, and perform steps 15 through 17.
  - N/A, the M2 will not support RC5 on the reverse link, nor RC6, 7, 8, or 9 on the forward link.
13. If the mobile station supports the Radio Configuration 5 Reverse Fundamental Channel, Radio Configuration 5 Reverse Supplemental Channel 0 and demodulation of Radio Configuration 6, 7, 8, or 9, set up a call using Supplemental Channel Test Mode 7 (see 1.3) with 9600 bps Fundamental Channel and 9600 bps Supplemental Channel 0 data rate, and perform steps 15 through 17.
  - N/A, the M2 will not support RC5 on the reverse link, nor RC6, 7, 8, or 9 on the forward link.
14. If the mobile station supports the Radio Configuration 5 Reverse Dedicated Control Channel, Radio Configuration 5 Reverse Supplemental Channel 0 and demodulation of Radio Configuration 6, 7, 8, or 9, set up a call using Supplemental Channel Test Mode 7 (see 1.3) with 9600 bps Dedicated Control Channel with 100% frame activity and 9600 bps Supplemental Channel 0 data rate, and perform steps 10 through 17.
  - N/A, the M2 will not support RC5 on the reverse link, nor RC6, 7, 8, or 9 on the forward link.
15. Set the test parameters as specified in Table 4.5.1.2-1.
16. Send continuously ,’0’ power control bits to the mobile station.
17. Measure the spurious emission levels.

**Table 4.5.1.2-1. Test Parameters for Testing Spurious Emissions at Maximum RF Output Power**

Parameter	Units	Value
Ior <sup>^</sup>	dBm/1.23 MHz	-104
Pilot Ec / Ior	dB	-7.0
Traffic Ec / Ior	dB	-7.4

## 4.5.1.3 Minimum Standard

Depending on local radio regulations, the mobile station shall meet ITU Category A or B emissions rules as appropriate. For Band Class 5, 6, 8, and 9, a mobile station shall meet ITU Category B emission rules.

## 4.5.1.3.1 Spreading Rate 1

When transmitting in Band Class 0, 2, 3, 5, 7 or 9 with Spreading Rate 1, the spurious emissions shall be less than all limits specified in Table 4.5.1.3.1-1.

**Table 4.5.1.3.1-1. Band Class 0, 2, 3, 5, 7 and 9 Transmitter Spurious Emission Limits for Spreading Rate 1**

For $ \Delta f $ Within the Range	Emission Limit
885 kHz to 1.98 MHz	Less stringent of -42 dBc/30 kHz or -54 dBm/1.23 MHz
1.98 MHz to 4.00 MHz	Less stringent of -54 dBc/30 kHz or -54 dBm/1.23 MHz
<del><math>\geq 1.98</math> MHz (Band Class 3 only)</del>	<del>54 dBc/30 kHz</del>
<del>2.25 MHz to 4.00 MHz (Band Class 7 only)</del>	<del>-35 dBm/6.25 kHz</del>
$> 4.00$ MHz (ITU Category A only)	-13 dBm / 1 kHz; $9 \text{ kHz} < f < 150 \text{ kHz}$ -13 dBm / 10 kHz; $150 \text{ kHz} < f < 30 \text{ MHz}$ -13 dBm/100 kHz; $30 \text{ MHz} < f < 1 \text{ GHz}$ -13 dBm / 1 MHz; $1 \text{ GHz} < f < 5 \text{ GHz}$
<del><math>&gt; 4.00</math> MHz (ITU Category B only) (required for Band Class 5 and 9)</del>	<del>-35 dBm / 1 kHz; <math>9 \text{ kHz} &lt; f &lt; 150 \text{ kHz}</math> -36 dBm / 10 kHz; <math>150 \text{ kHz} &lt; f &lt; 30 \text{ MHz}</math> -36 dBm/100 kHz; <math>30 \text{ MHz} &lt; f &lt; 1 \text{ GHz}</math> -36 dBm / 1 MHz; <math>1 \text{ GHz} &lt; f &lt; 12.75 \text{ GHz}</math></del>

Note: All frequencies in the measurement bandwidth shall satisfy the restrictions on  $|\Delta f|$  where  $\Delta f$  = center frequency - closer measurement edge frequency (f). Compliance with the -35 dBm / 6.25 kHz limit is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral power in a 6.25 kHz segment. For Band Class 3, the lower and upper limits of the frequency measurement are currently 10 MHz and 3 GHz in Japan radio measurement documents.

When transmitting in Band Class 1, 4, 6 or 8 with Spreading Rate 1, the spurious emissions shall be less than all limits specified in Table 4.5.1.3.1-2.

**Table 4.5.1.3.1-2. Band Class 1, 4, 6 and 8 Transmitter Spurious Emission Limit for Spreading Rate 1**

For $ \Delta f $ Within the Range	Emission Limit
1.25 MHz to 1.98 MHz	less stringent of -42 dBc/30 kHz or -54 dBm/1.23 MHz
1.98 MHz to 4.00 MHz	less stringent of -50 dBc/30 kHz or -54 dBm/1.23 MHz
2.25 MHz to 4.00 MHz (Band Class 6 only)	$[-13 + 1 \times (\Delta f - 2.25 \text{ MHz})] \text{ dBm} / 1 \text{ MHz}$
$> 2.25 \text{ MHz}$ (Band Class 6 in Japan only)	13 dBm/ 1 MHz
$> 4.00 \text{ MHz}$ (ITU Category A)	-13 dBm / 1 kHz; $9 \text{ kHz} < f < 150 \text{ kHz}$ -13 dBm / 10 kHz; $150 \text{ kHz} < f < 30 \text{ MHz}$ -13 dBm/100 kHz; $30 \text{ MHz} < f < 1 \text{ GHz}$ -13 dBm / 1 MHz; $1 \text{ GHz} < f < 10 \text{ GHz}$
$> 4.00 \text{ MHz}$ (ITU Category B) (required for Band Class 6 and 8)	-36 dBm / 1 kHz; $9 \text{ kHz} < f < 150 \text{ kHz}$ -36 dBm / 10 kHz; $150 \text{ kHz} < f < 30 \text{ MHz}$ -36 dBm/100 kHz; $30 \text{ MHz} < f < 1 \text{ GHz}$ -30 dBm / 1 MHz; $1 \text{ GHz} < f < 12.75 \text{ GHz}$

Note: All frequencies in the measurement bandwidth shall satisfy the restrictions on  $|\Delta f|$  where  $\Delta f$  = center frequency - closer measurement edge frequency (f). The lower and upper limits of the frequency measurement for Band Class 6 greater than 2.25 MHz offset are currently unspecified in Japan radio measurement documents.

All other sub-sections of the Emissions section have been omitted since the MS does not support.

After all this, the bottom line for M2 is to perform Tests as per #5 and #8. Four additional fundamental set-ups are,

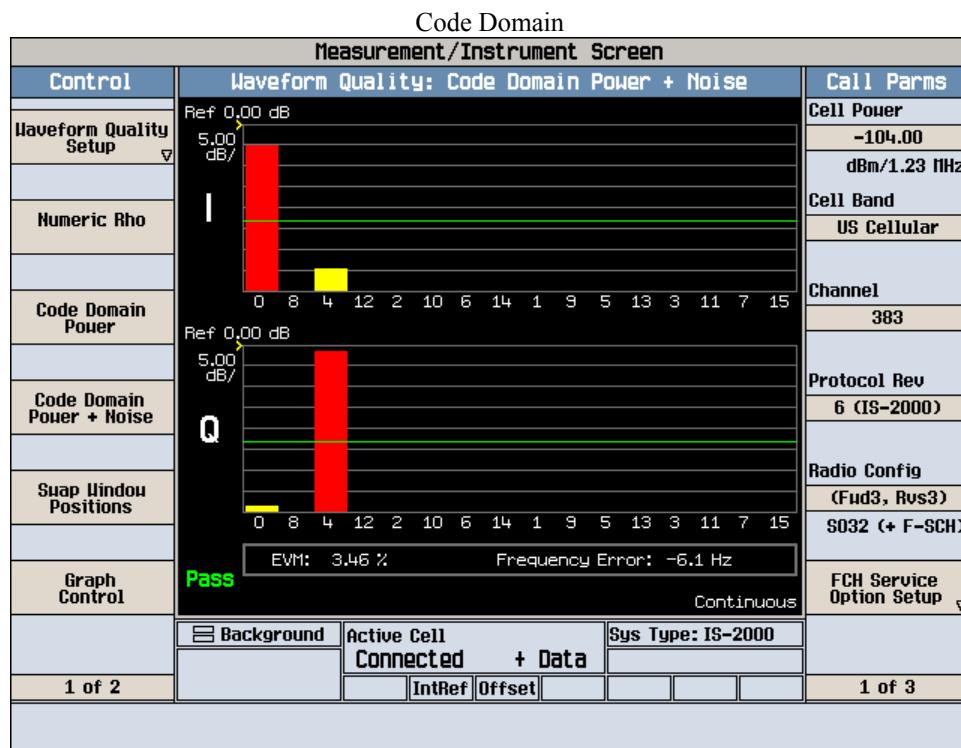
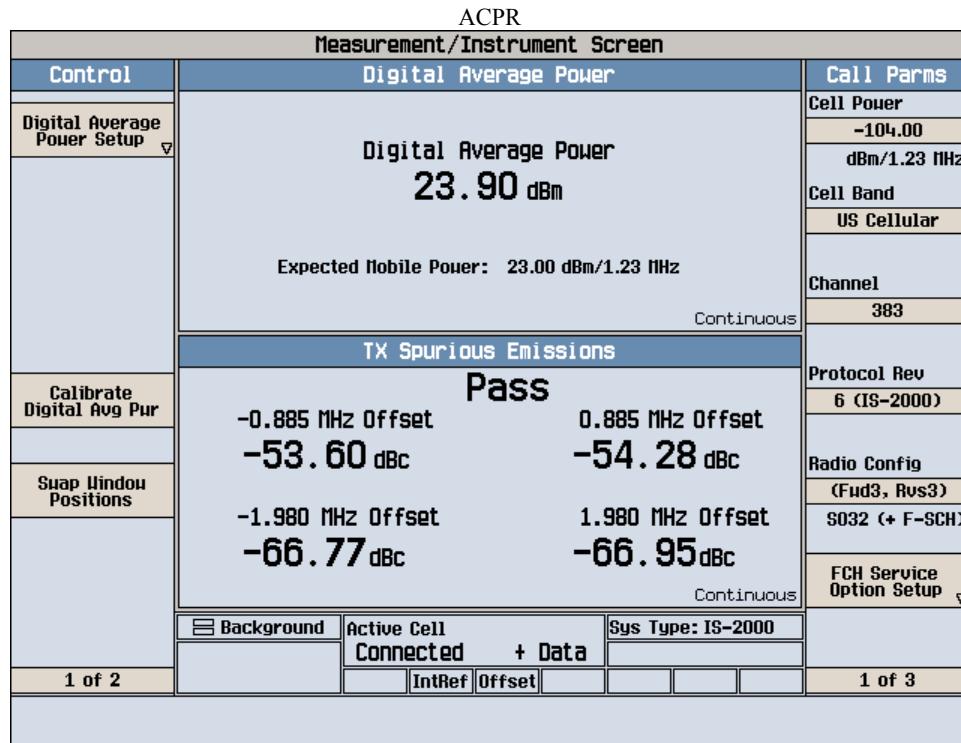
1. Cellular CDMA F/R-FCH at RC3 using a rate set 1 loopback service option
2. Cellular CDMA F-FCH and R-FCH + F/R-SCH at RC3 using a rate set 1 loopback service option @ 9600bps for both Reverse channels
3. PCS CDMA F/R-FCH at RC3 using a rate set 1 loopback service option
4. PCS CDMA F-FCH and R-FCH + F/R-SCH at RC3 using a rate set 1 loopback service option @ 9600bps for both Reverse channels

The test results show M2 is in compliance with IS-98D and FCC requirements. Test data as follows.

## Occupied Bandwidth & Spurious Emission

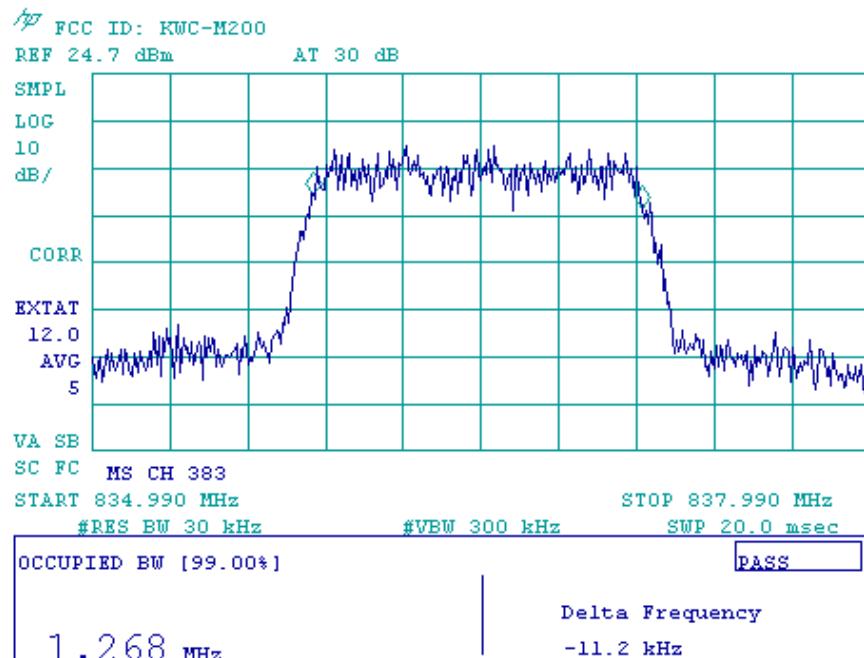
### Cellular Band Ch383

#### 1. CDMA F/R-FCH at RC3

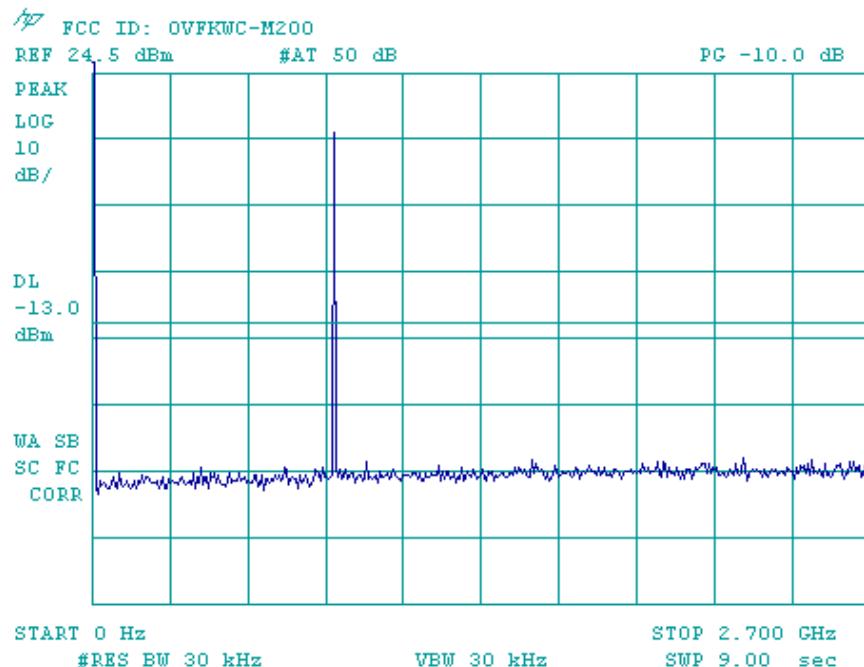


## Occupied Bandwidth

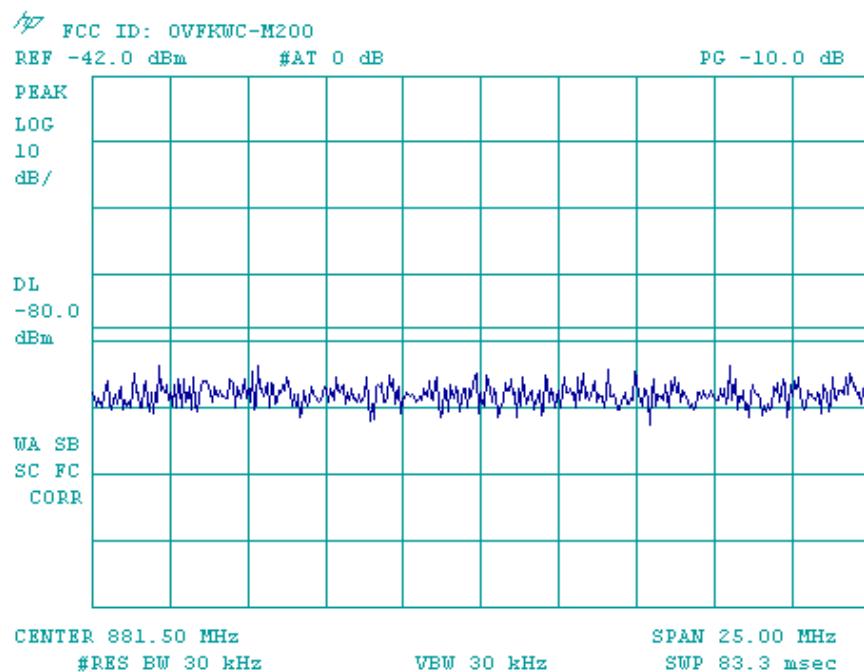
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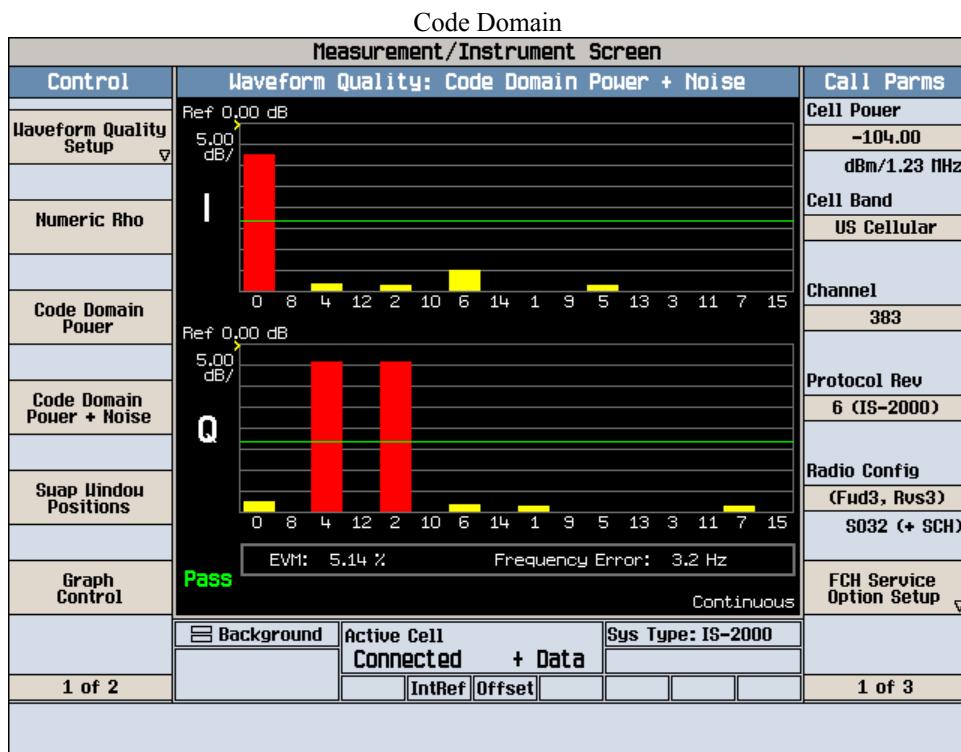
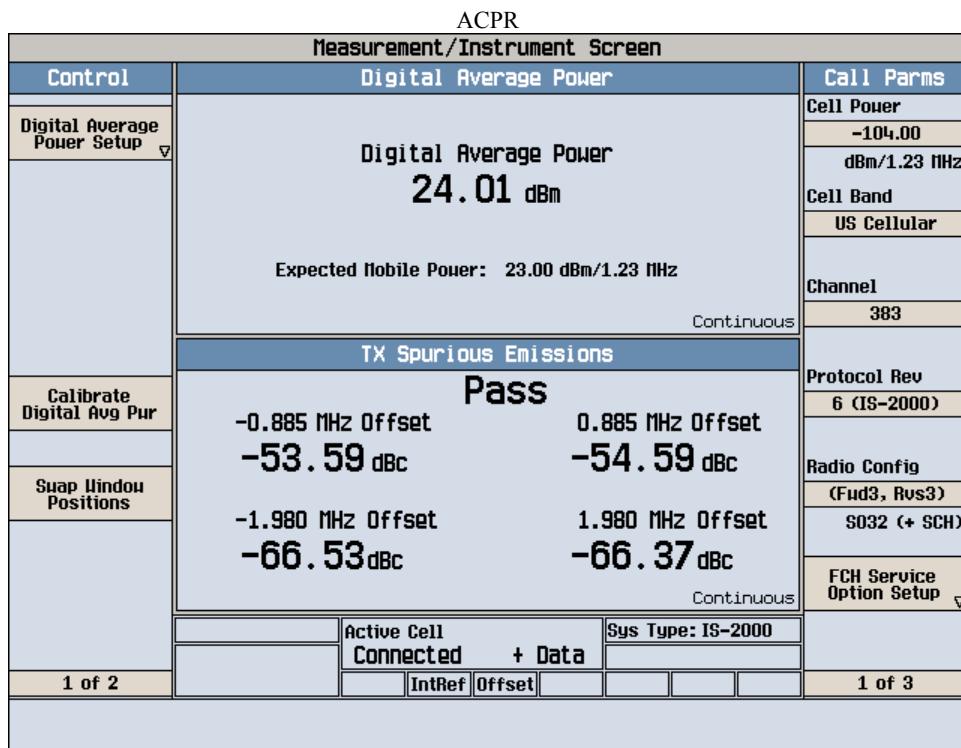


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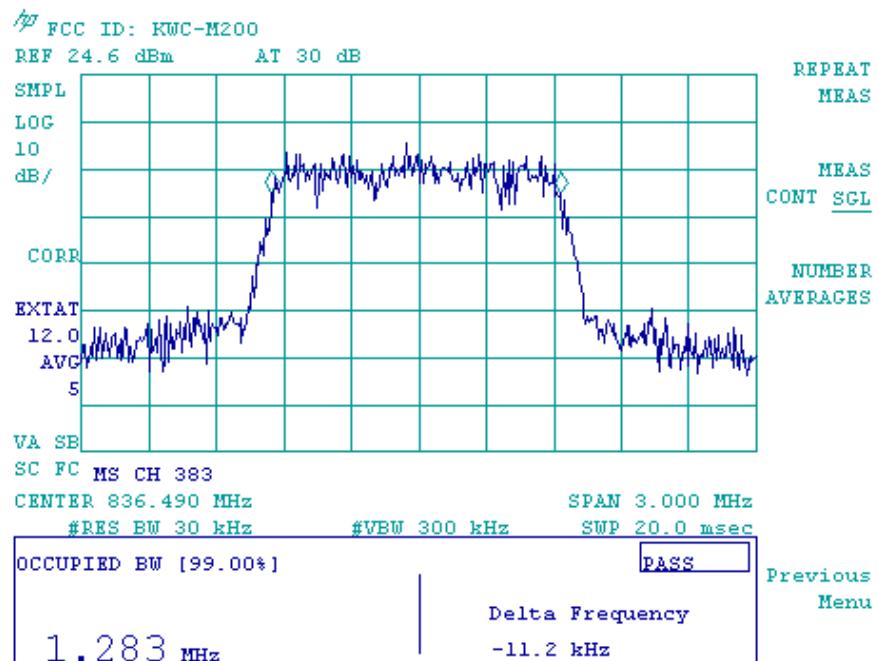
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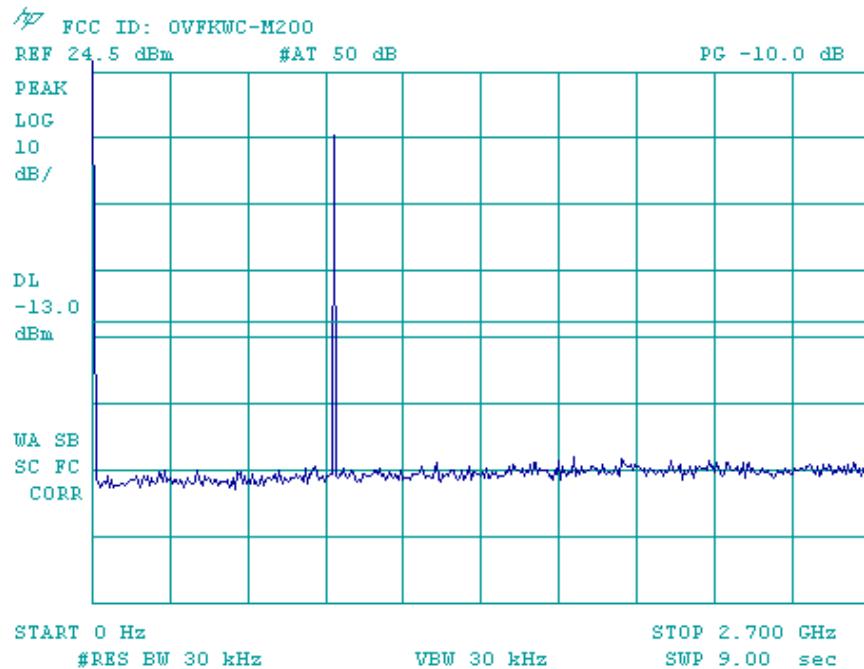
2. CDMA F/R-FCH + F/R-SCH at RC3

## Occupied Bandwidth

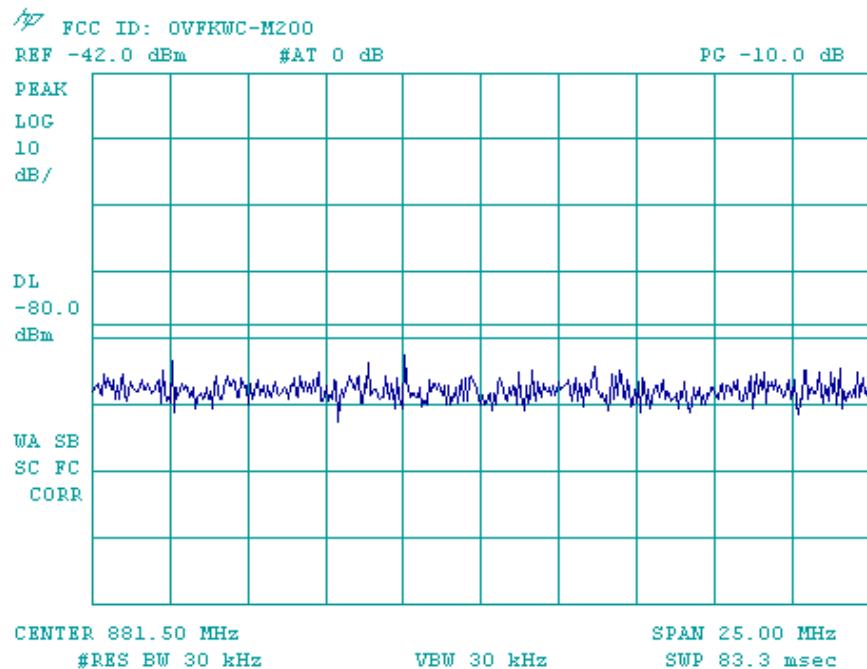
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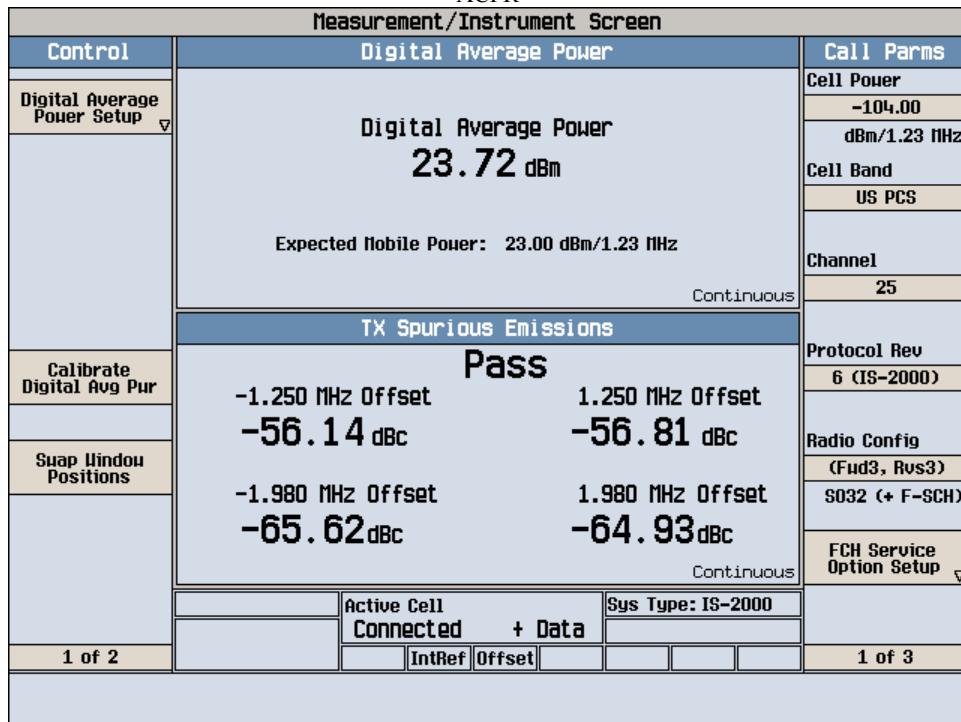


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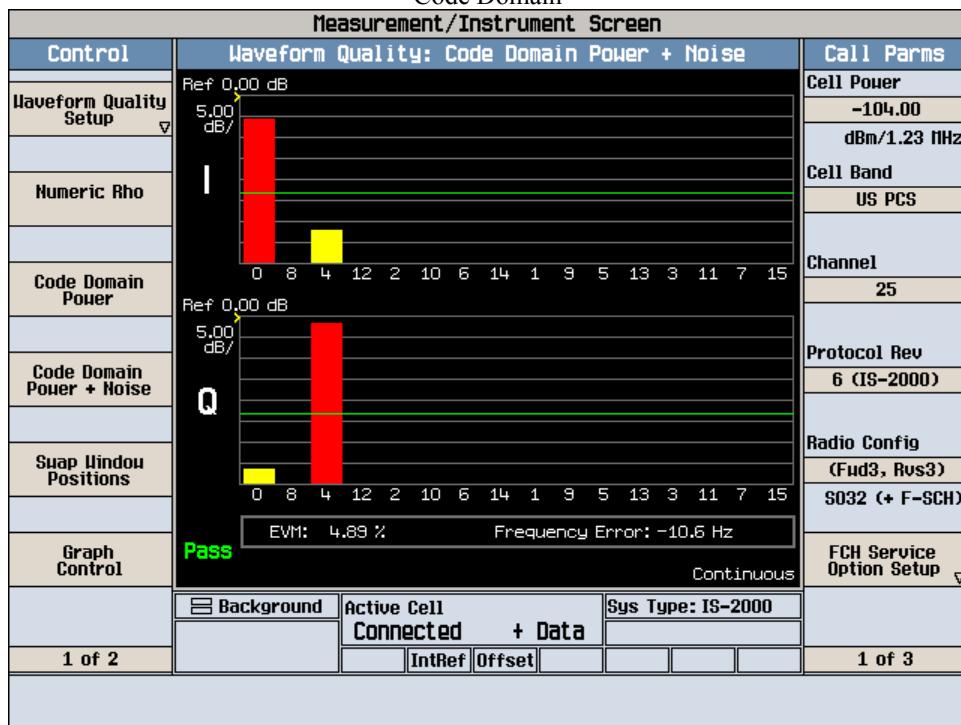


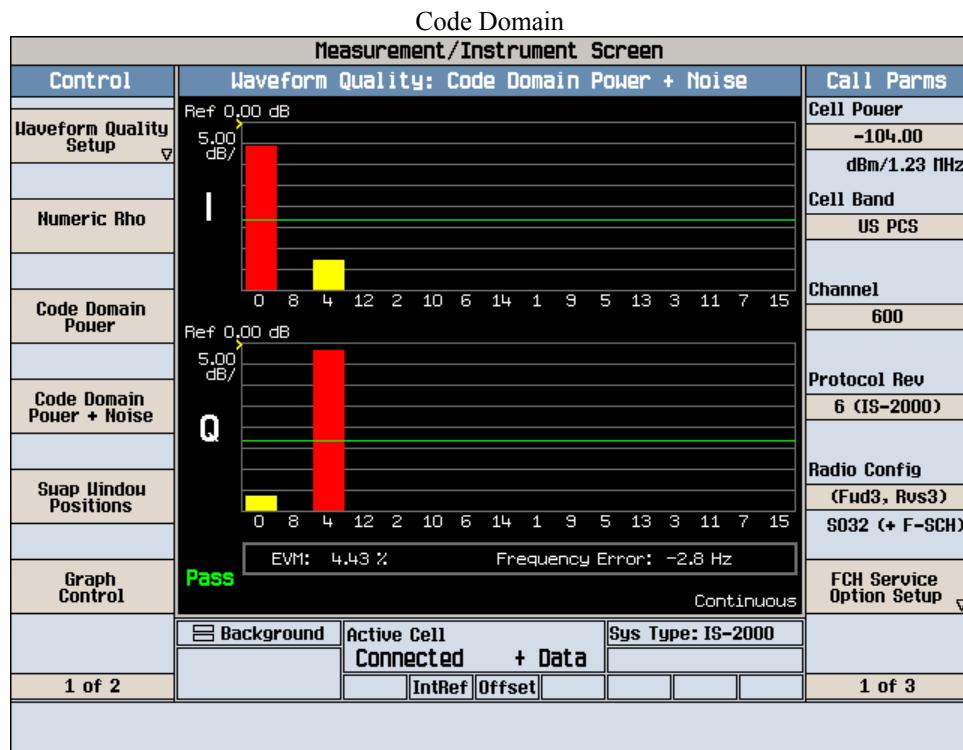
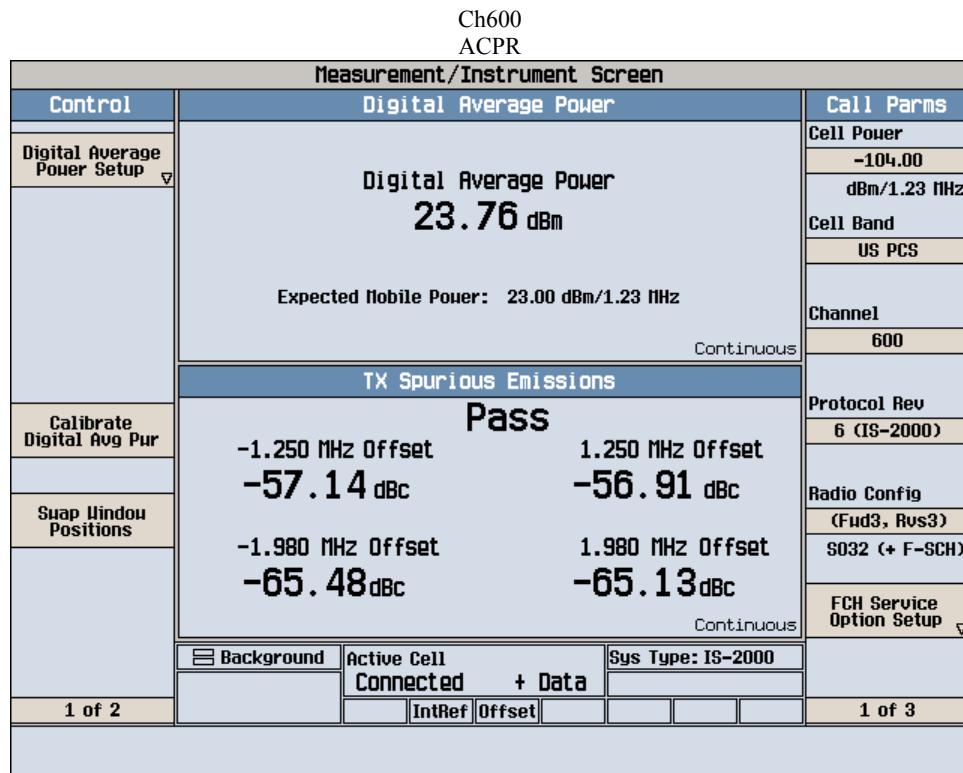
## PCS Band

## 3. PCS CDMA F/R-FCH at RC3

Ch25  
ACPR

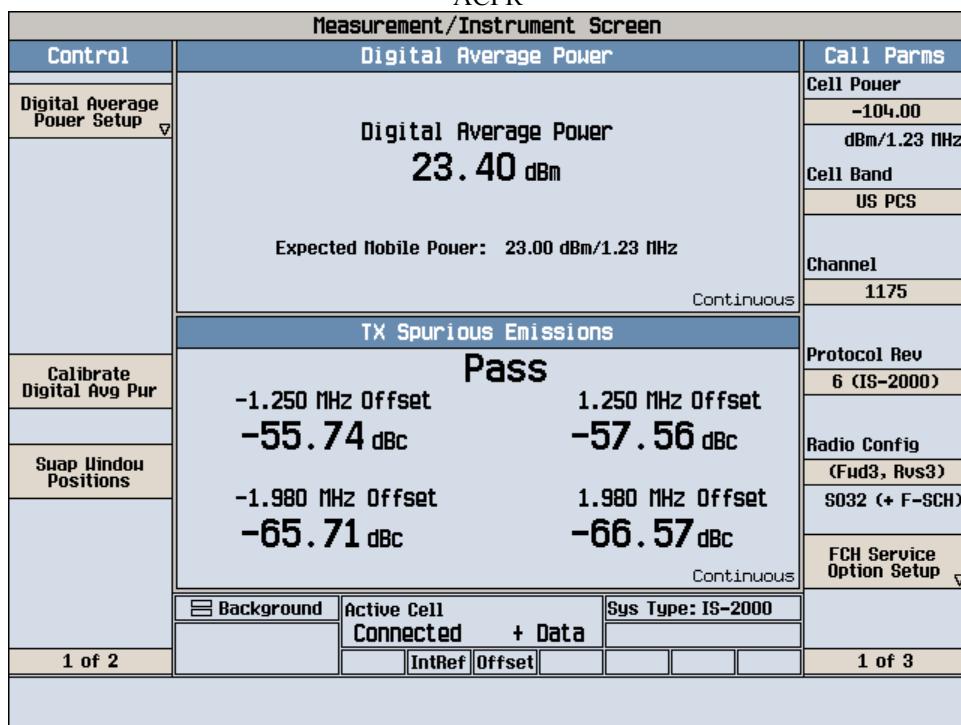
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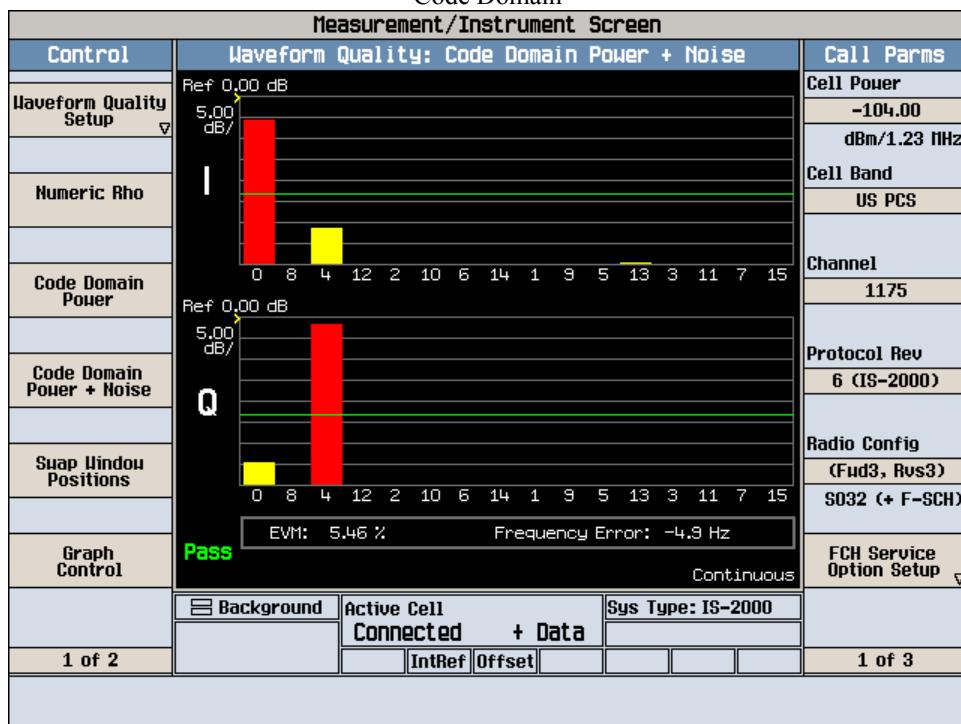


Ch1175

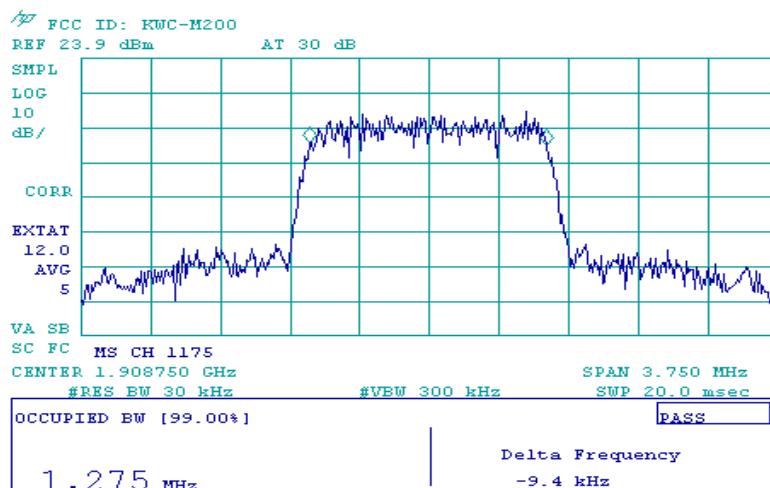
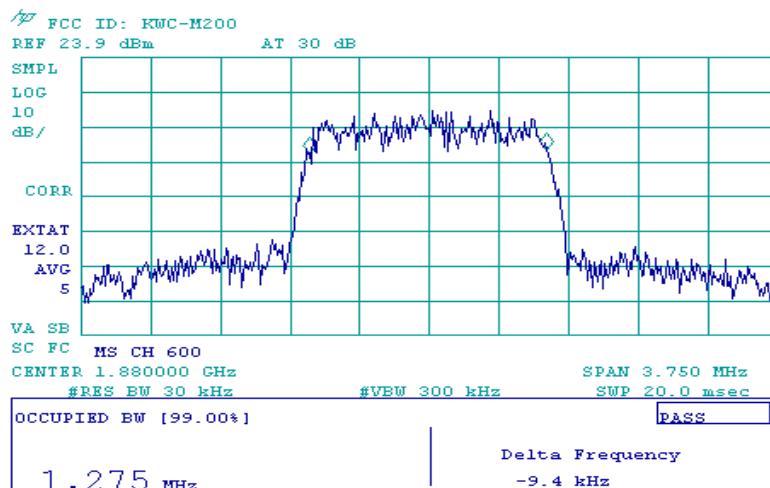
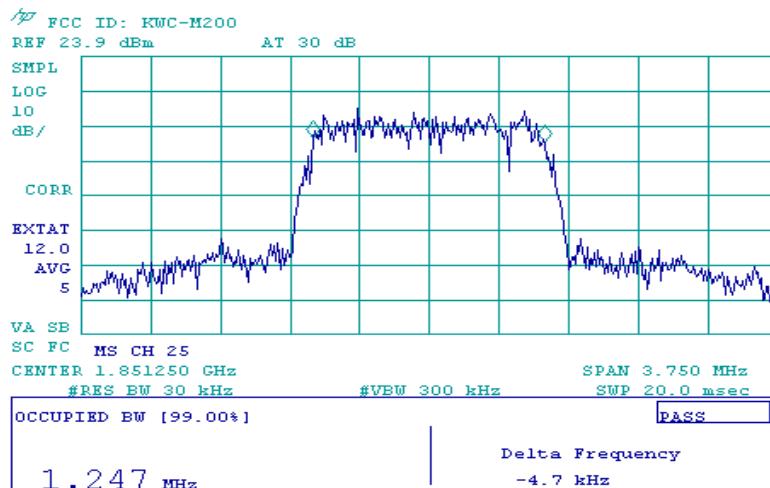
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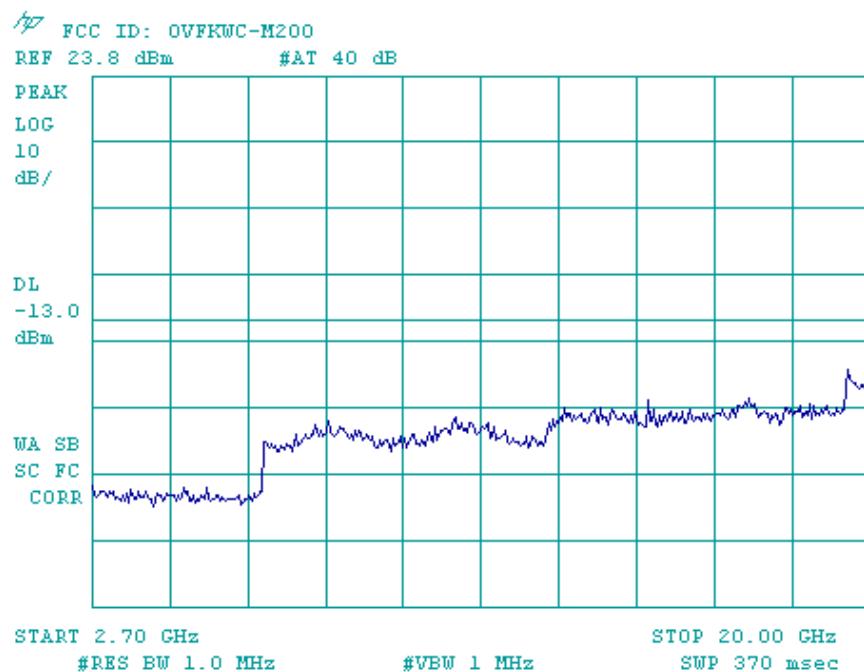
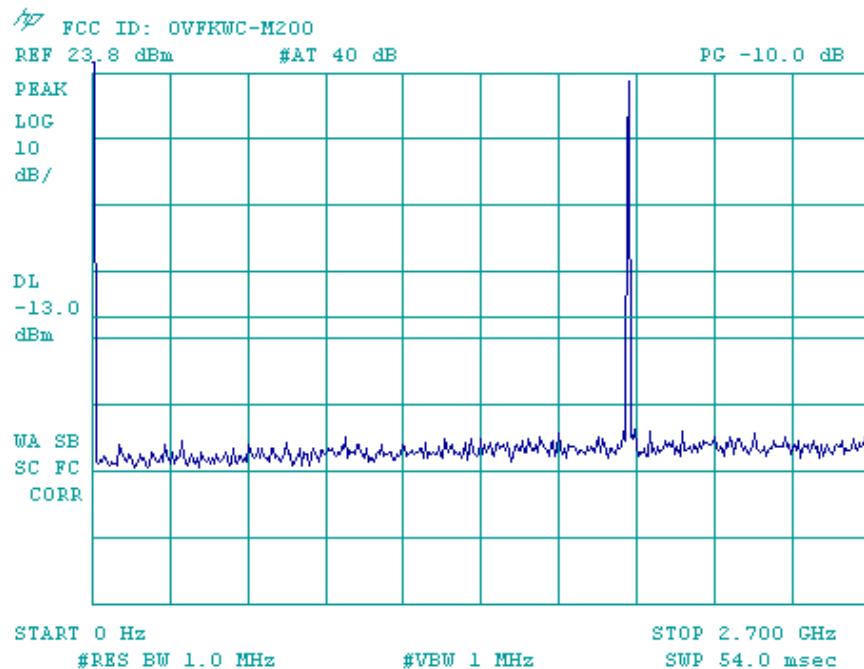


## Occupied Bandwidth

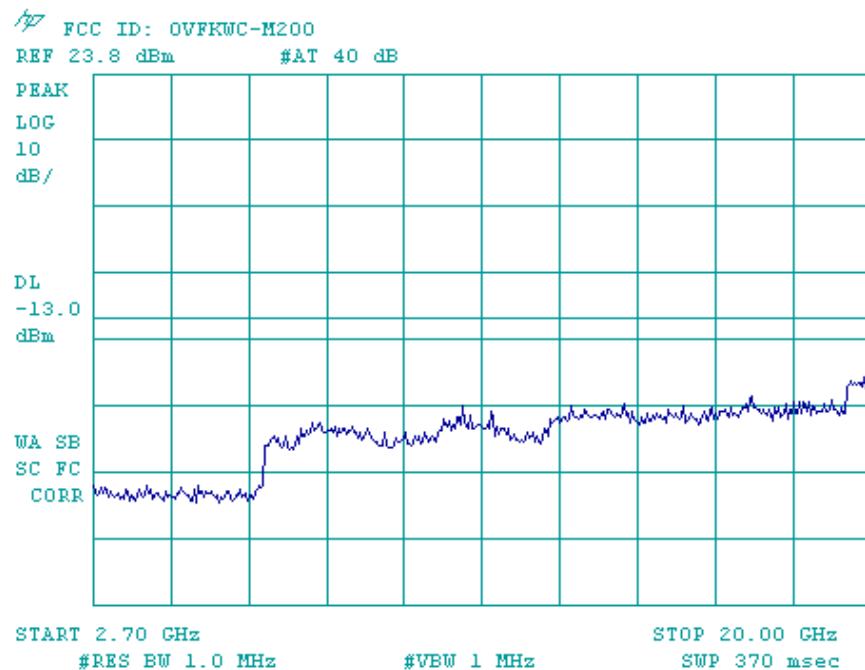
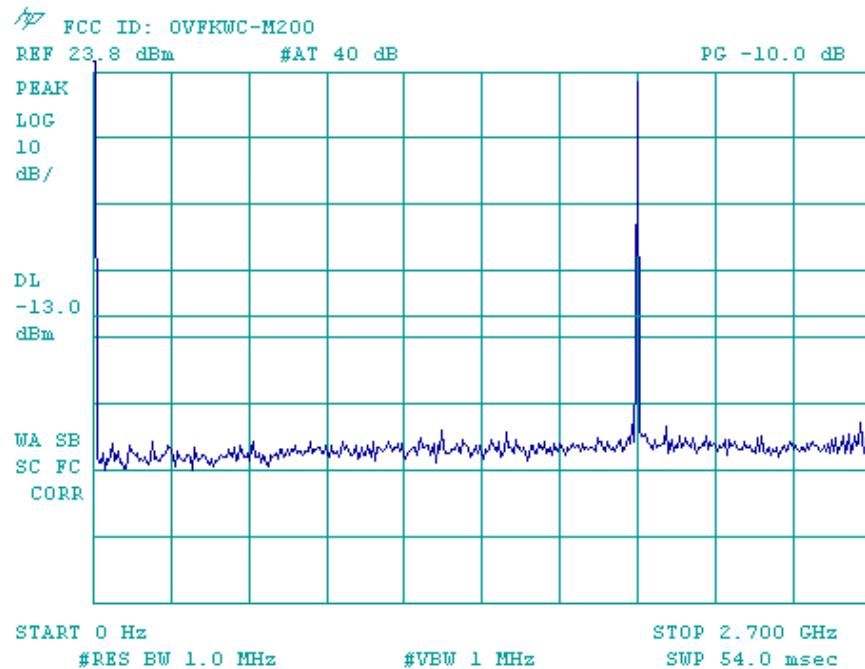


Spurious Emission up to 10<sup>th</sup> Harmonics

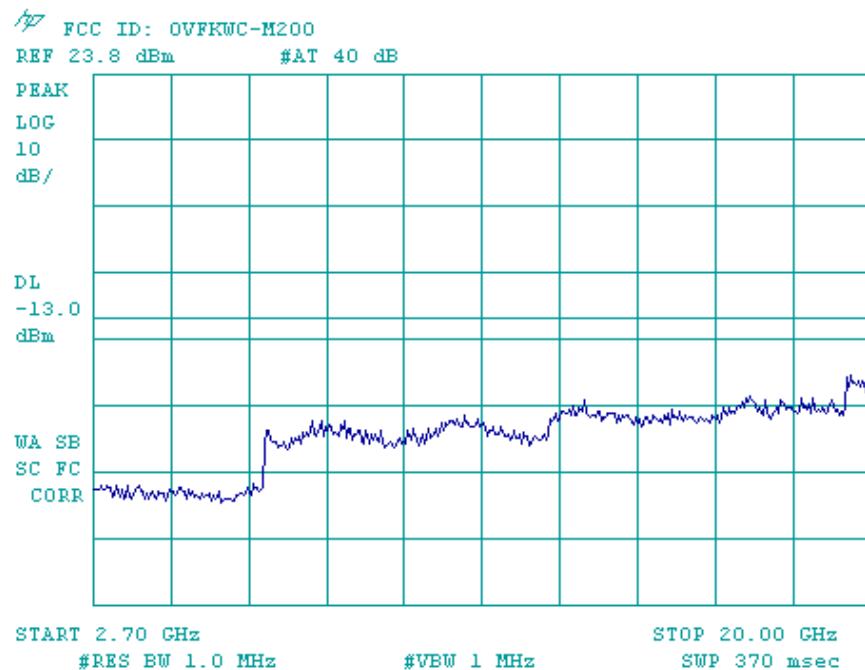
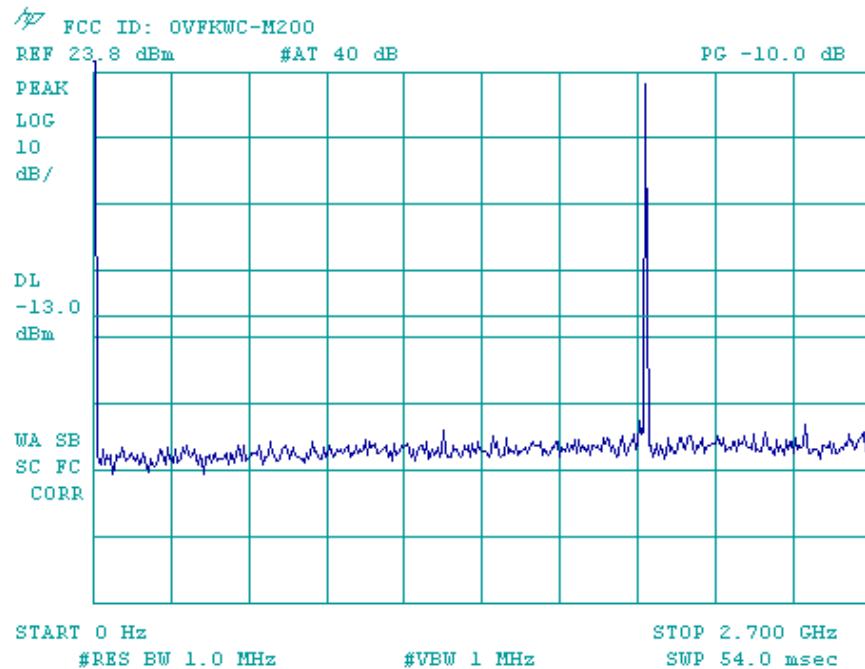
Ch25



Ch600



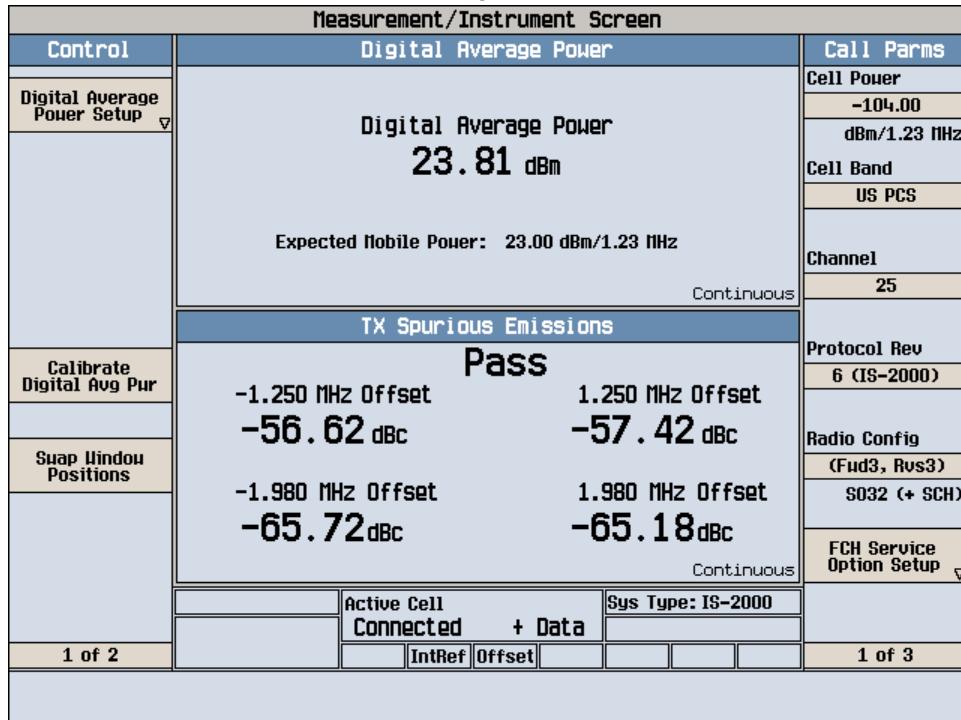
Ch1175



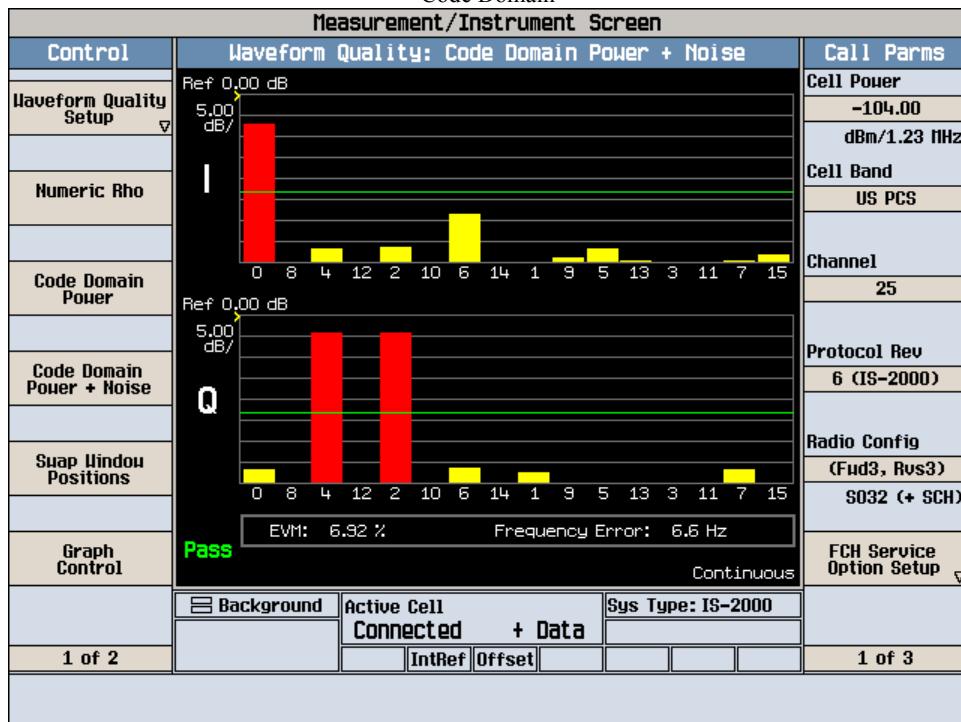
## 4. PCS CDMA F/R-FCH + F/R-SCH at RC3

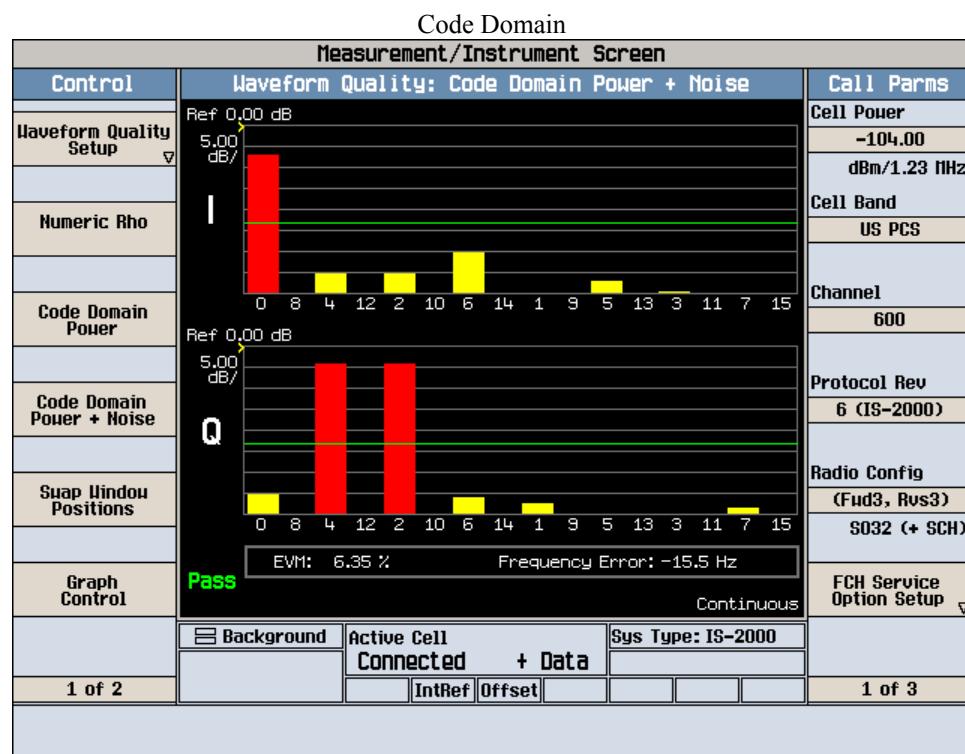
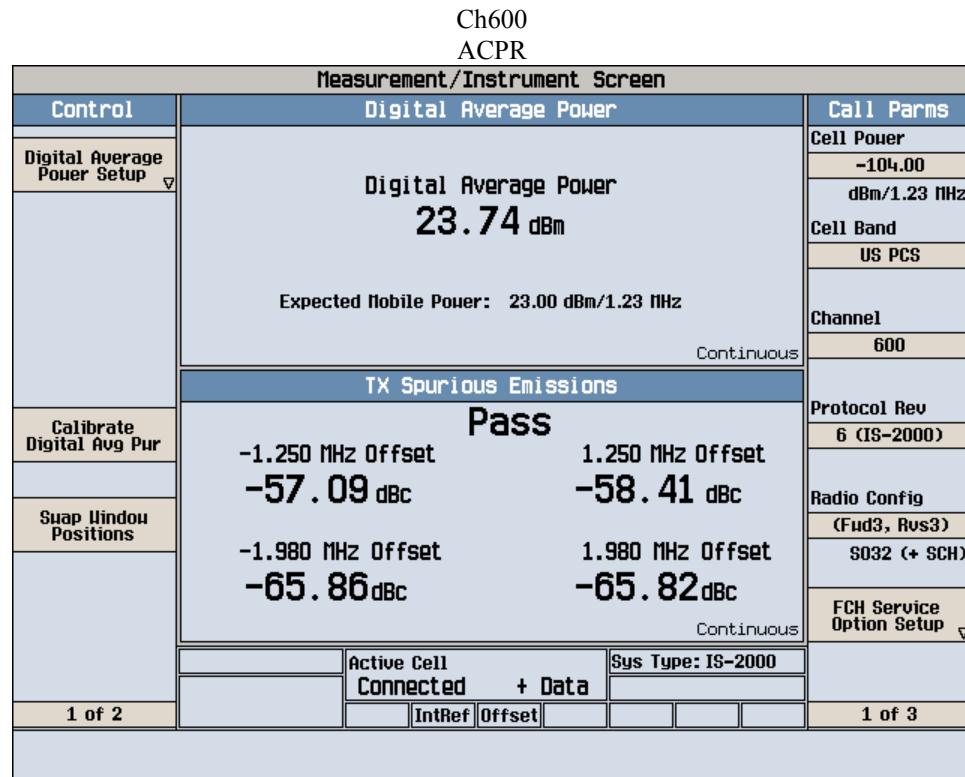
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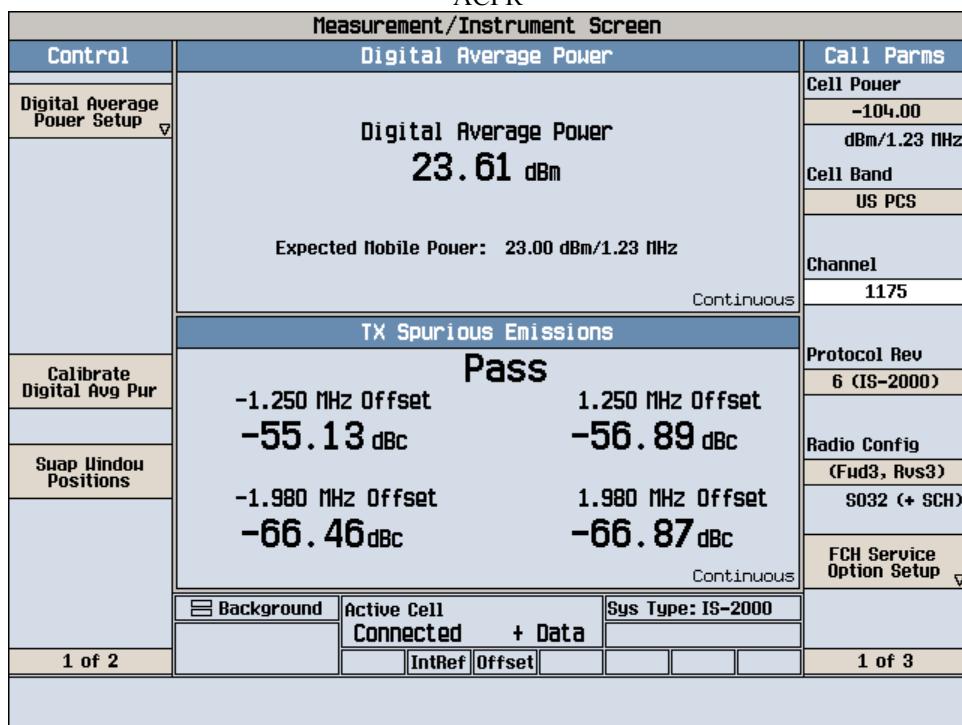
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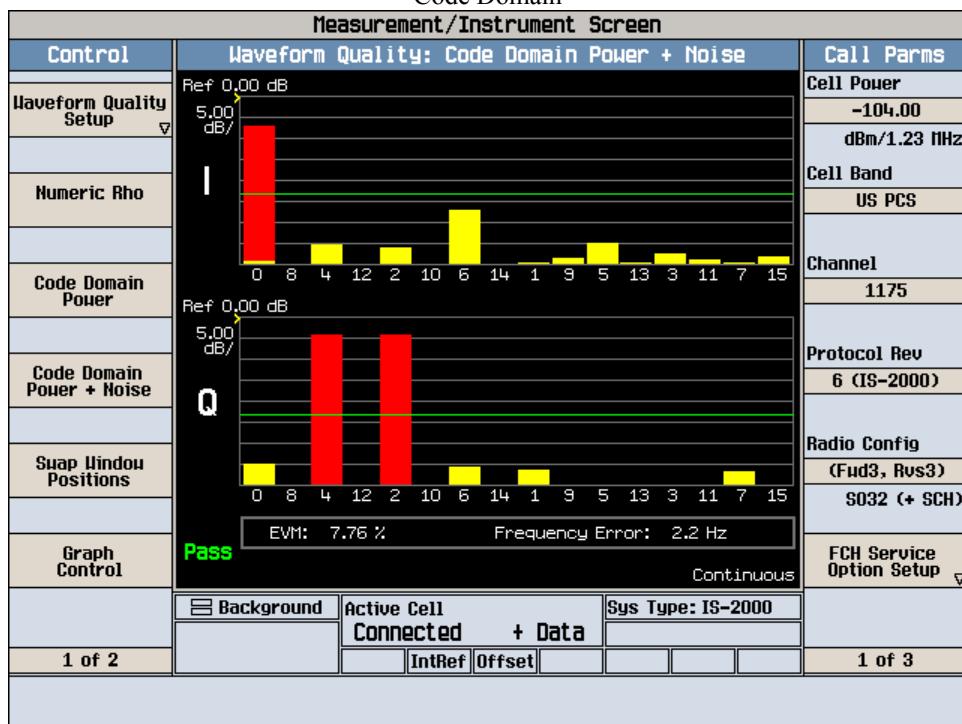


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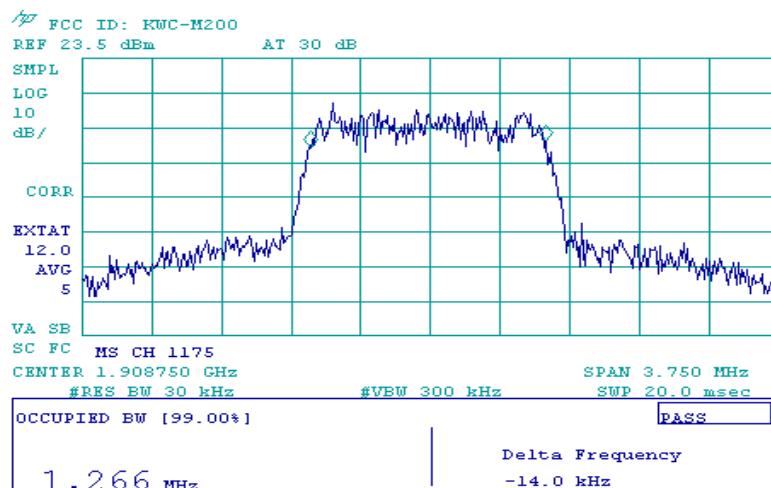
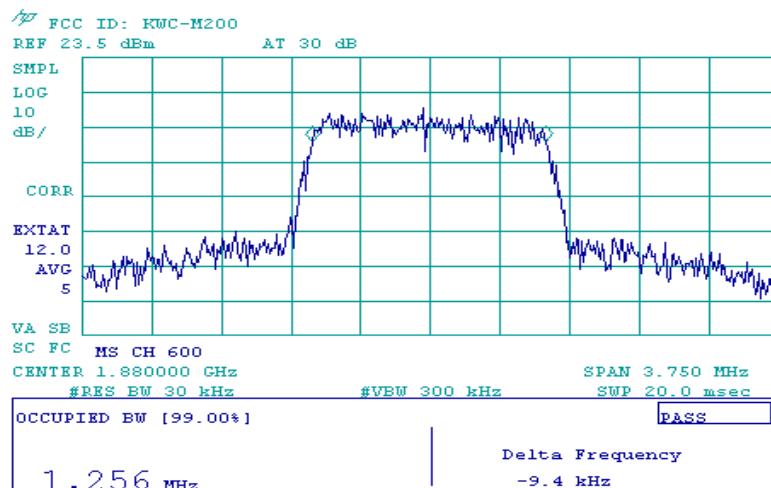
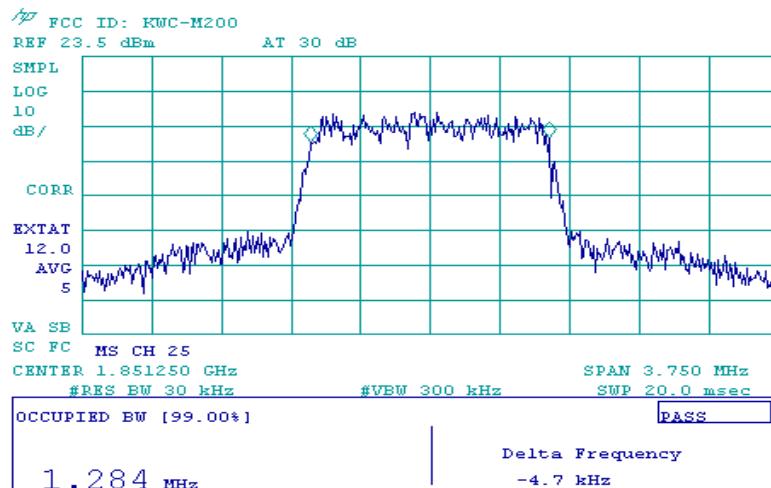
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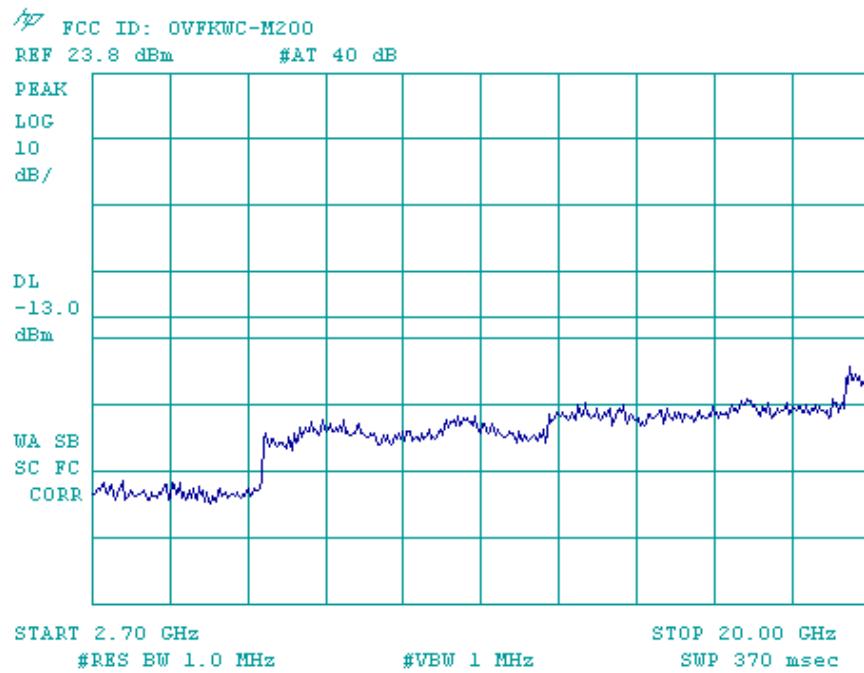
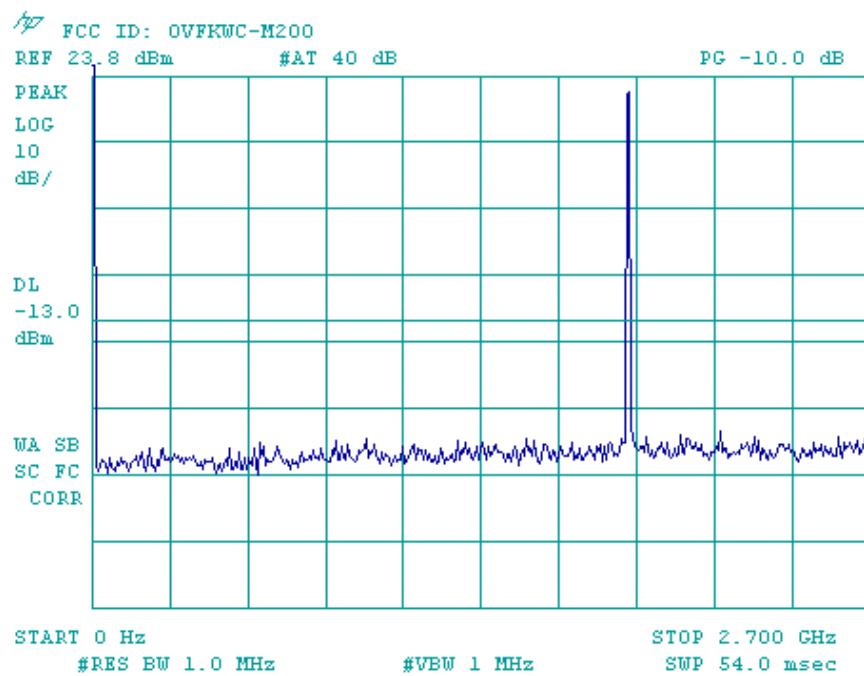


## Occupied Bandwidth

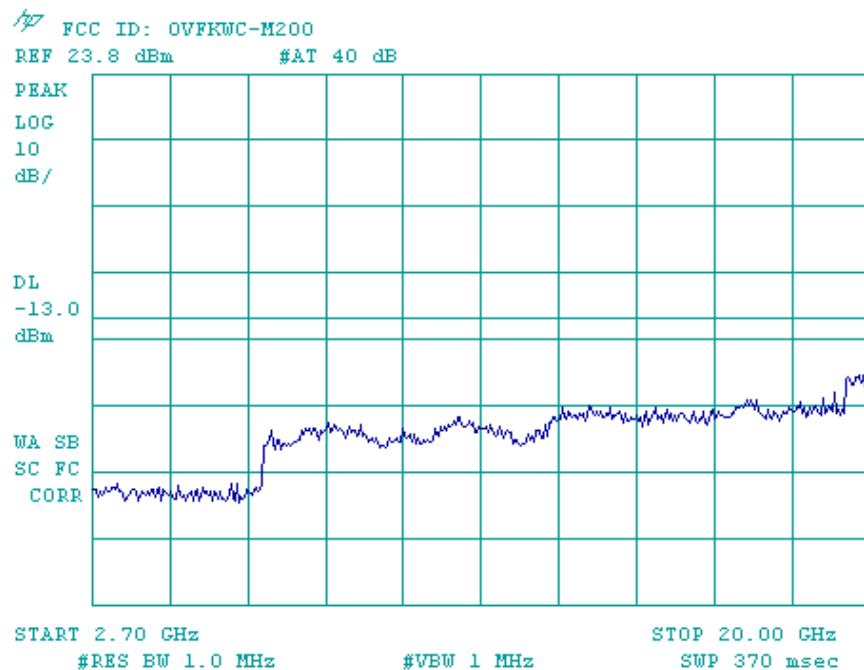
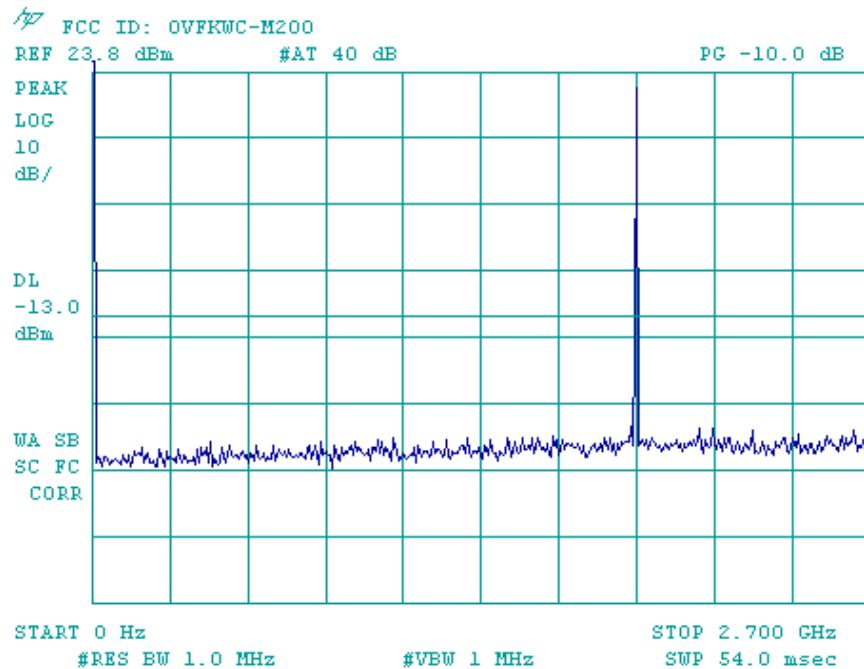


Spurious Emission up to 10<sup>th</sup> Harmonics

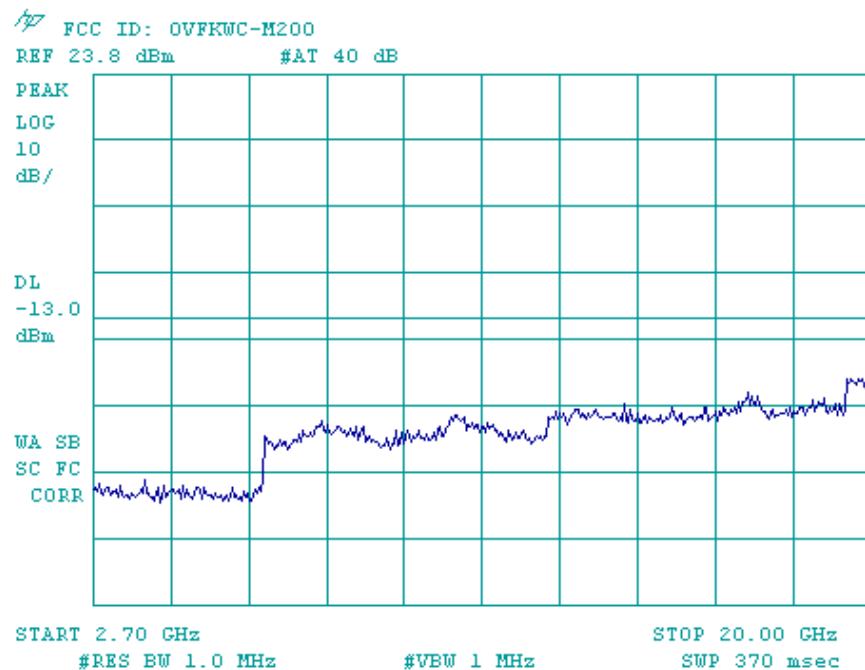
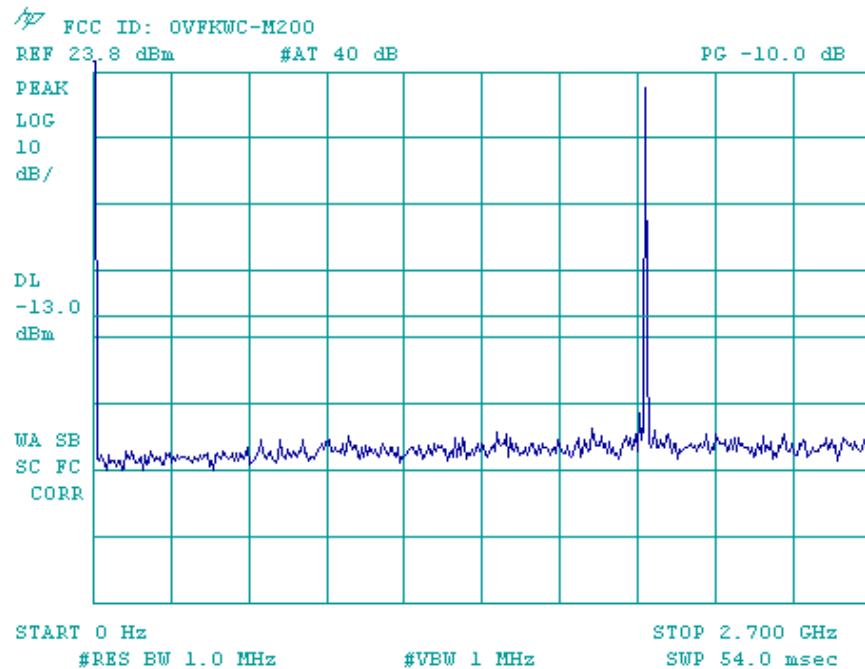
Ch25



Ch600



Ch1175



**Cover Letter**

Federal Communications Commission  
Authorization and Evaluation Division

Re: Application for Cellular and PCS Transceiver Type Acceptance

Land-Cellular Corp. herein submits the Application for Equipment Authorization (FCC Form 731) and Exhibits for Type Acceptance of a Cellular & PCS Transceiver, FCC ID: RD5-LCC0308.

Applicant: Land-Cellular Corp.  
12068 Miramar Parkway  
Miramar, Florida 33025

The equipment, LCC series 200 module, is for mobile station cellular and PCS system use. The series 200 module is in full compliance with all parts of EIA/TIA/IS-98-B&D Mobile Station-Land Station Compatibility Specification, issue July 2000 and March 2001, and also in full compliance with all parts of ANSI J-STD-018, Recommended Minimum Performance Requirements for 1.8 to 2 GHz Code Division Multiple Access (CDMA) Personal Stations, issue July 1996.

Information concerning how the ESN protection requirements are met is provided in Exhibit 3.

Land-Cellular Corp.

Robet Moses  
President

# ***LAND-CELLULAR CORP.***

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Miramar, Florida 33025  
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Land-Cellular Corporation

April 30th, 2003

Federal Communications Commission  
Authorization and Evaluation Division

Re: Request for Confidentiality

To whom it may concern:

Pursuant to Sections 0.457 and 0.459 of the Commission's Rules, the applicant here by requests confidential treatment of information accompanying this application as outlined below.

All schematics  
All diagrams  
Part Lists  
Product Description  
Technical Specifications

If you have any questions, please do not hesitate to contact our office.

Sincerely,

A handwritten signature in black ink, appearing to read "Robert W. Moses".

Robert W. Moses  
President

**List of Exhibits**

<u>Exhibit</u>	<u>Description</u>	<u>FCC Reference</u>
1	Operation Description	2.1033(c), 2.1061,
2	ESN Protection	22.919
3	RF Output Power Measured Data - Cellular	2.1046
4	RF Output Power Measured Data - PCS	2.1046, 24.232
5	Modulation Audio Response Measured Data	2.1047(a)
6	Modulation Limiting Measured Data	2.1047(b), 22.917
7	Occupied Bandwidth and Spurious Emission Measured Data - Cellular	2.1049, 22.917
8	Occupied Bandwidth and Spurious Emission Measured Data - PCS	2.1049, 24.238
9	Conducted Harmonics Emissions Measured Data - Cellular	2.1051, 22.917, 22.901(d)
10	Frequency Stability vs. Temperature and Voltage Measured Data - Cellular	2.1055
11	Frequency Stability vs. Temperature and Voltage Measured Data - PCS	2.1055, 24.235
12	Occupied Bandwidth and Spurious Emission Measured Data - CDMA mode when operating in a P-REV 6 or above (additional testing)	2.1049, 22.917, 24.238, IS98D
13	Measurement Procedures and Techniques	
14	List of Semiconductor Devices	2.1033(c)
15	Circuit Diagram	2.1033(c)
16	FCC Identification Label	2.1033(c)
17	Photographs	2.1033(c)
18	User's Manual	2.1033(c)

**Exhibit 1**

General Information – operation description

See a separate attachment.

**Exhibit 2**

**ELECTRONIC SERIAL NUMBERS (ESN) Protection**

The LCC series 200 module, FCC ID: RD5-LCC0308 uses ESN. The ESN is a unique identification number to each module that is contained in the Numeric Assignment Module and is automatically transmitted to the base station whenever a call is placed. The ESN is stored in an EPROM and is isolated from fraudulent contact and tampering. Any attempt to change the ESN will render the portable phone inoperative.

The phone complies with all requirements for ESN under Part 22.919.

**Exhibit 3****Transmitter RF Power Output - FCC part 2, Paragraph 2.1046**

May 2003

**Conducted Power --**

The RF output power was measured using a Giga-tronics 8541C Universal Power Meter and HP 8594E Spectrum Analyzer that has the CDMA personality option. Terminated to a resistive coaxial load of 50 ohms.

carrier frequency (MHz)	channel	RF output power (dBm) - Cellular	
		FM	CDMA
824.04	991	27.00dBm	
824.7	1013		24.53dBm
836.49	383	27.06dBm	24.57dBm
848.31	777		24.49dBm
848.97	799	27.02dBm	

**Exhibit 4****Transmitter RF Power Output - FCC part 24, Paragraph 2.1046, 24.232 (b)**

May 2003

**Conducted power --**

The RF output power was measured using a HP 8594 Spectrum Analyzer that has the CDMA personality option. Terminated to a resistive coaxial load of 50 ohms.

		RF output power (dBm) - PCS
carrier frequency (MHz)	channel	CDMA
		measured
1851.25	25	23.80dBm
1880	600	23.85dBm
1908.75	1175	23.81dBm

**Exhibit 5****Transmitter Modulation Requirement - FCC part 2, Paragraph 2.1047 (a), FCC part 22,  
Paragraph 22.917**

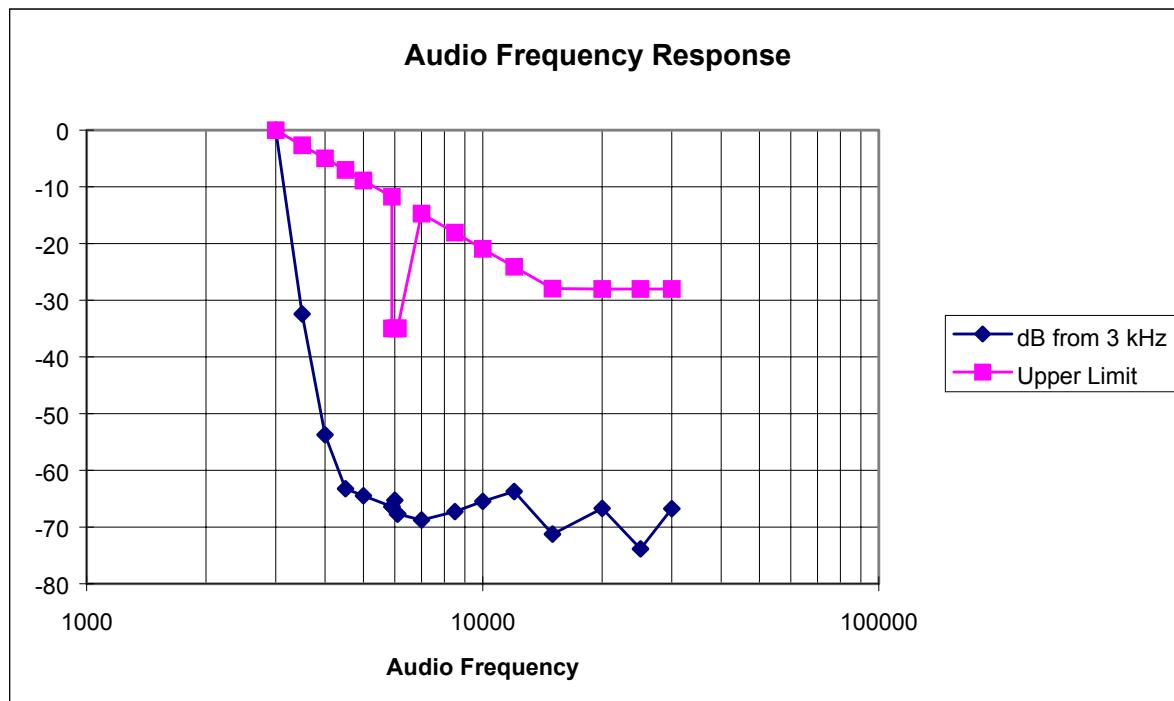
Measured with HP8920 RF communication test set & HP 3588A spectrum analyzer. The test procedures and technique are stated in Exhibit 13.

**Audio Frequency Response (<3 kHz)**

<b>Note: All FM TX tests on HP8920 done at channel 384</b>				
<b>FM Data</b>				
<b>AUDIO FREQ RES</b>	<b>Units</b>	<b>MEASURED VALUES</b>		
		<b>Measured</b>	<b>Lower limit</b>	<b>Upper limit</b>
TX audio resp @ .30 kHz	dB	0.70	-3	1
TX audio resp @ .80 kHz	dB	0.30	-3	1
TX audio resp @ 1.30 kHz	dB	0.30	-3	1
TX audio resp @ 1.80 kHz	dB	0.40	-3	1
TX audio resp @ 2.30 kHz	dB	0.70	-3	1
TX audio resp @ 2.80 kHz	dB	-0.60	-4	1
TX audio resp @ 3.00 kHz	dB	-2.50	-4.6	1

**Audio Frequency Response (> 3 kHz)**

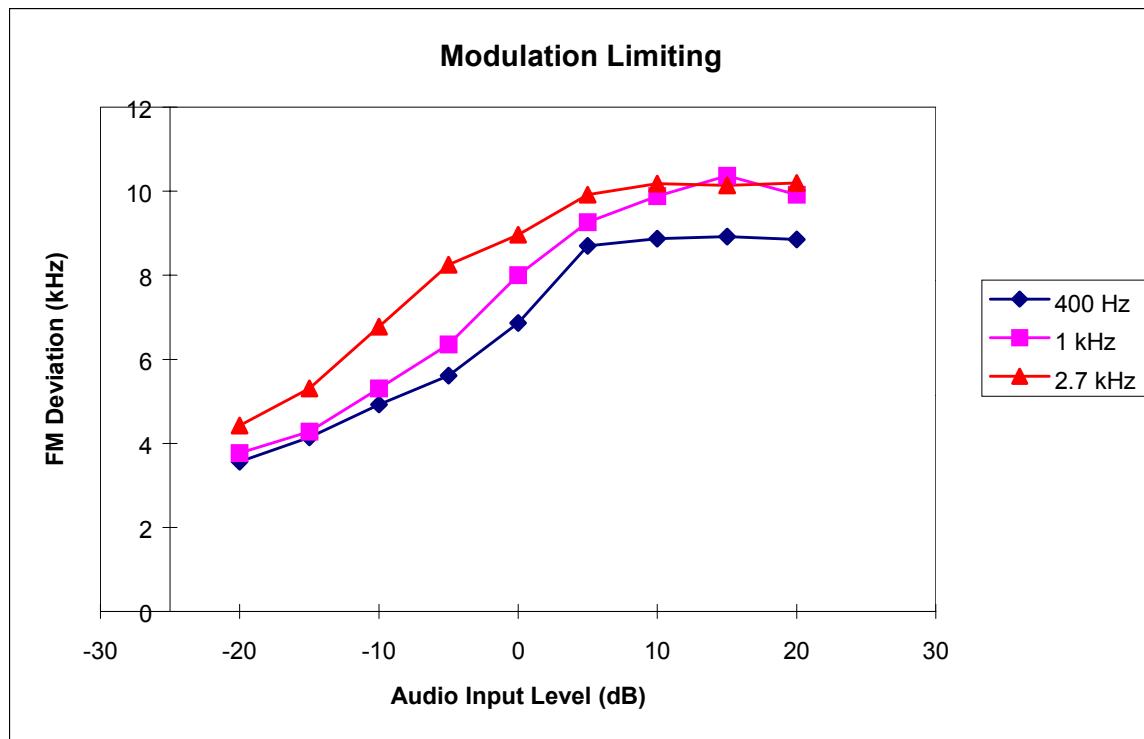
freq	dev (dB)	dB from 3 kHz	upper limit
3000	-1.64	0.00	0.00
3500	-34.08	-32.44	-2.68
4000	-55.37	-53.73	-5.00
4500	-64.9	-63.26	-7.04
5000	-66.1	-64.46	-8.87
5900	-68.02	-66.38	-11.75
5900	-68.02	-66.38	-11.75
6000	-66.89	-65.25	-35.00
6100	-69.33	-67.69	-35.00
6100	-69.33	-67.69	-35.00
7000	-70.39	-68.75	-35.00
8500	-68.93	-67.29	-14.72
10000	-67.1	-65.46	-18.09
12000	-65.34	-63.70	-20.92
15000	-72.9	-71.26	-24.08
20000	-68.32	-66.68	-27.96
25000	-75.5	-73.86	-28.00
30000	-68.4	-66.76	-28.00



**Exhibit 6**Transmitter Modulation Requirement - FCC Part 2, Paragraph 2.1047 (b)

Measured with HP8920 RF communication test set. The test procedures and technique are stated in Exhibit 13.

Audio Input Level (dB)	FM deviation (kHz peak)		
	Modulation frequency		
(0dB=8kHz dev)	400 Hz	1 kHz	2.7 kHz
-20	3.56	3.77	4.42
-15	4.14	4.28	5.31
-10	4.92	5.31	6.78
-5	5.61	6.35	8.25
0	6.86	8	8.96
5	8.70	9.26	9.92
10	8.87	9.88	10.18
15	8.92	10.37	10.14
20	8.85	9.92	10.20



**Exhibit 7****Occupied Bandwidth and Spurious Emission Measured Data**

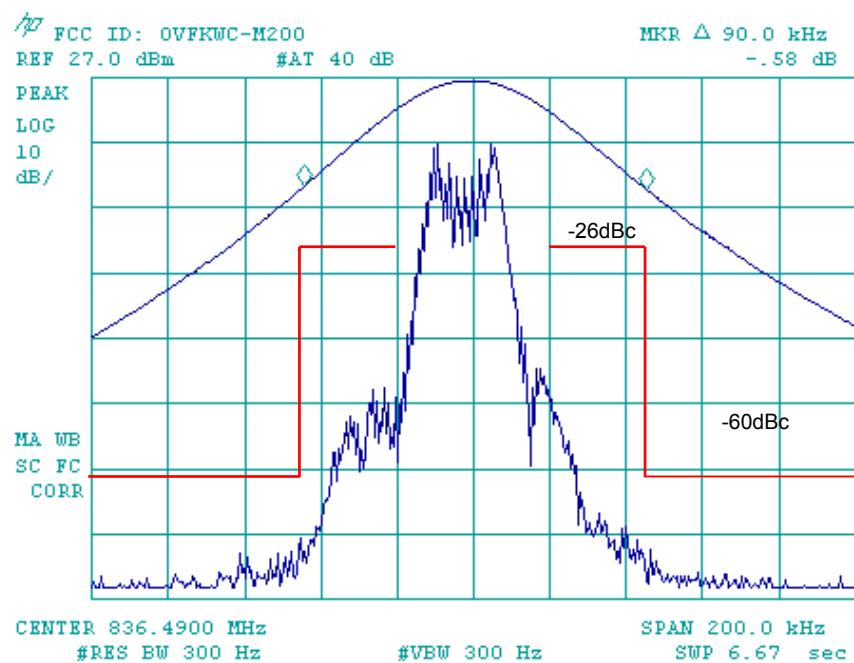
The test procedures and technique are stated in Exhibit 13.

**List of Exhibits**

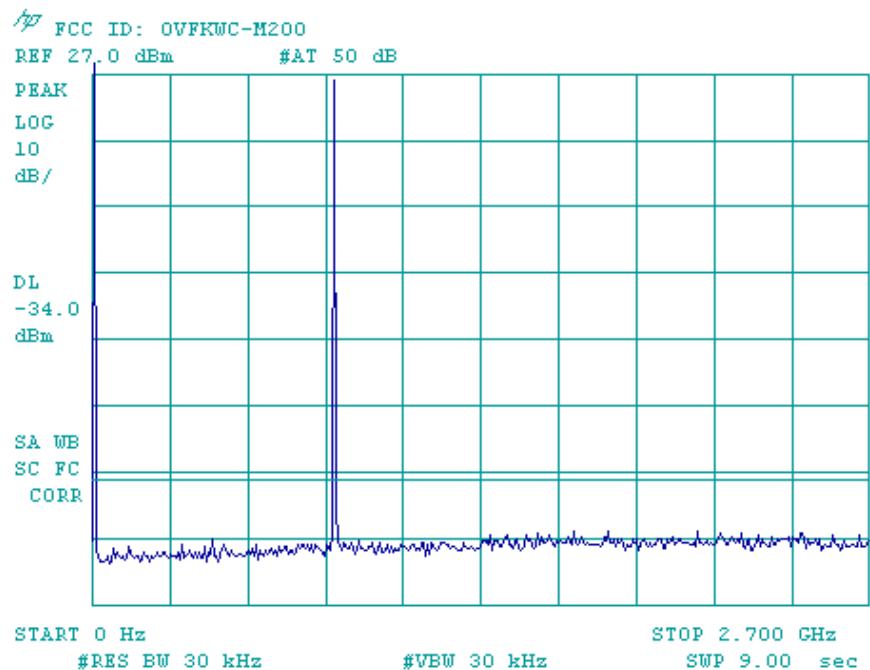
<u>Exhibit</u>	<u>Description</u>	<u>FCC Reference</u>
a-1	AMPS voice, $\pm 100$ kHz from carrier frequency	2.1049, 22.917
a-2	AMPS voice, 0 Hz to 3 <sup>rd</sup> harmonic	2.1049, 22.917
a-3	AMPS voice, 869 - 894 MHz	2.1049, 22.917
b-1	AMPS voice + SAT, $\pm 100$ kHz from carrier frequency	2.1049, 22.917
b-2	AMPS voice + SAT, 0 Hz to 3 <sup>rd</sup> harmonic	2.1049, 22.917
b-3	AMPS voice + SAT, 869 - 894 MHz	2.1049, 22.917
c-1	AMPS SAT, $\pm 100$ kHz from carrier frequency	2.1049, 22.917
c-2	AMPS SAT, 0 Hz to 3 <sup>rd</sup> harmonic	2.1049, 22.917
c-3	AMPS SAT, 869 - 894 MHz	2.1049, 22.917
d-1	AMPS ST, $\pm 100$ kHz from carrier frequency	2.1049, 22.917
d-2	AMPS ST, 0 Hz to 3 <sup>rd</sup> harmonic	2.1049, 22.917
d-3	AMPS ST, 869 - 894 MHz	2.1049, 22.917
e-1	AMPS ST + SAT, $\pm 100$ kHz from carrier frequency	2.1049, 22.917
e-2	AMPS ST + SAT, 0 Hz to 3 <sup>rd</sup> harmonic	2.1049, 22.917
e-3	AMPS ST + SAT, 869 - 894 MHz	2.1049, 22.917
f-1	SAT & DTMF, $\pm 100$ kHz from carrier frequency	2.1049, 22.917
f-2	SAT & DTMF, 0 Hz to 3 <sup>rd</sup> harmonic	2.1049, 22.917
f-4	SAR & DTMF, 869 - 894 MHz	2.1049, 22.917
g-1	AMPS WIDEBAND, $\pm 100$ kHz from carrier frequency	2.1049, 22.917
g-2	AMPS WIDEBAND, 0 Hz to 3 <sup>rd</sup> harmonic	2.1049, 22.917
g-3	AMPS WIDEBAND, 869 - 894 MHz	2.1049, 22.917
h-1	Cellular CDMA at RC1, 99% occupy bandwidth	2.1049, 22.917
h-2	Cellular CDMA at RC1, 0 Hz to 3 <sup>rd</sup> harmonic	2.1049, 22.917
h-3	Cellular CDMA at RC1, 869 - 894 MHz	2.1049, 22.917
i	Cellular CDMA at RC3 <i>note: KWC-M200 supports additional reverse channels, as per IS-98D (CDMA 1x), therefore, additional measurements were taken to show compliance. Please see a separate attachment (Exhibit 19)</i>	2.1049, 22.917 IS-98D

## AMPS Voice

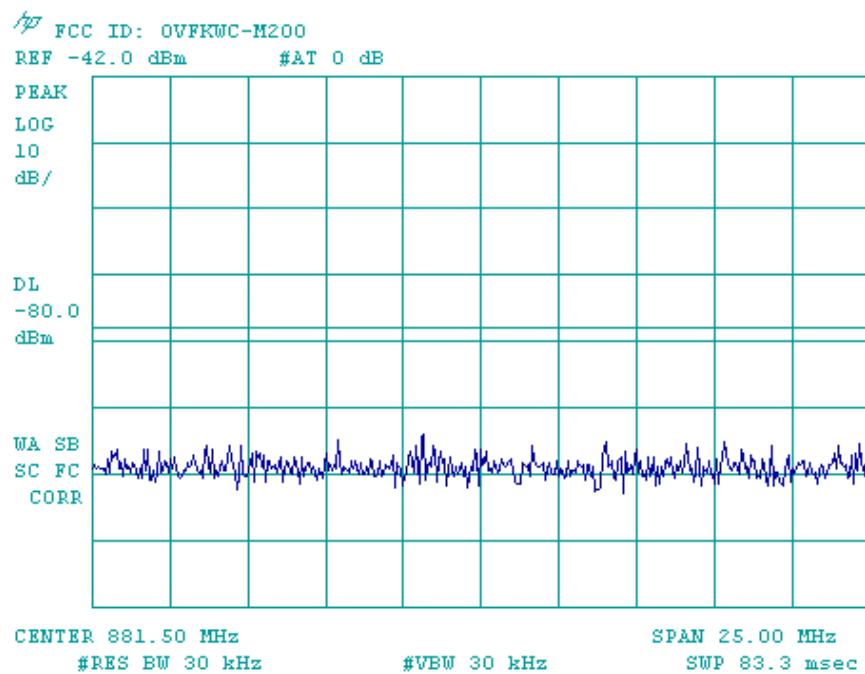
a-1



a-2

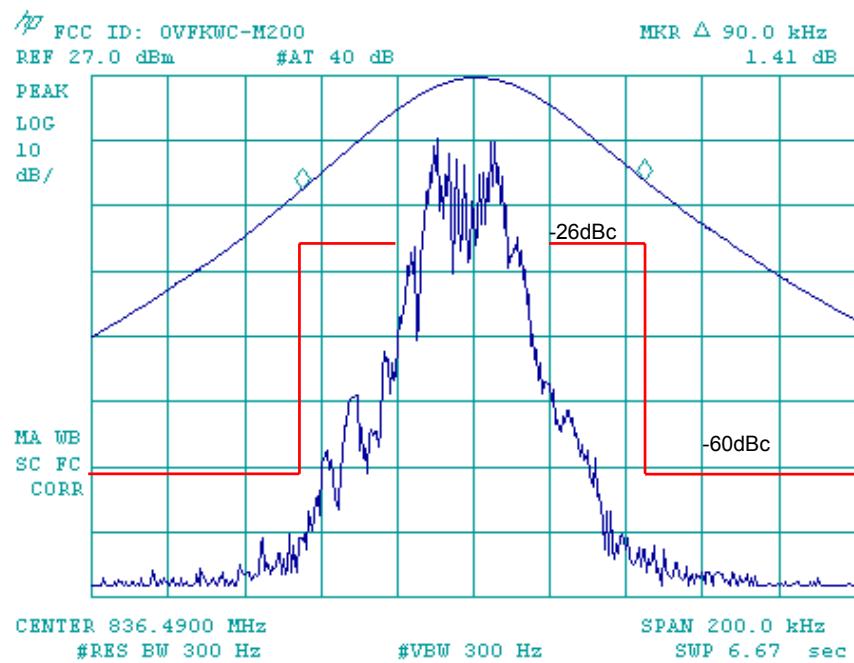


a-3

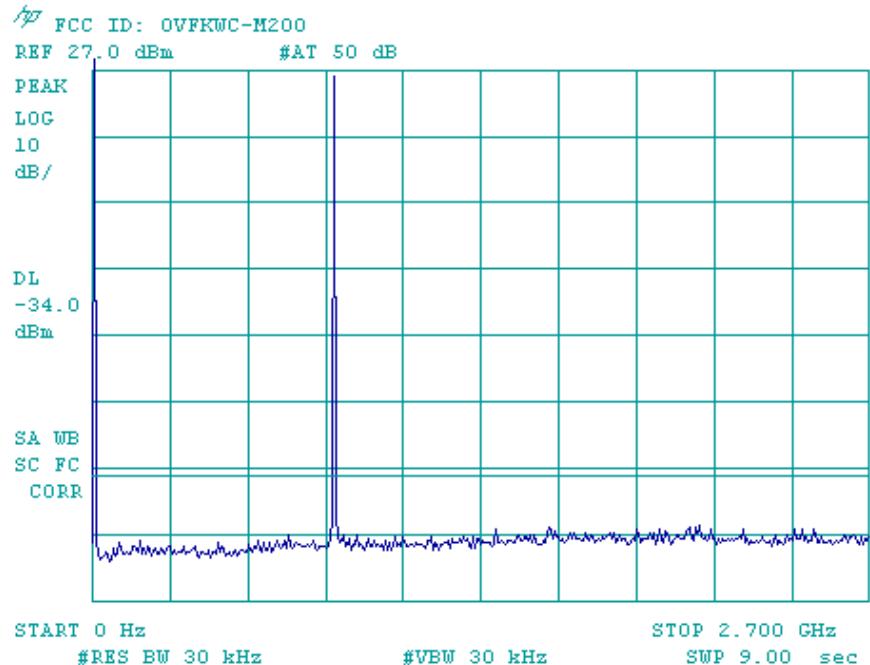


## AMPS Voice + SAT

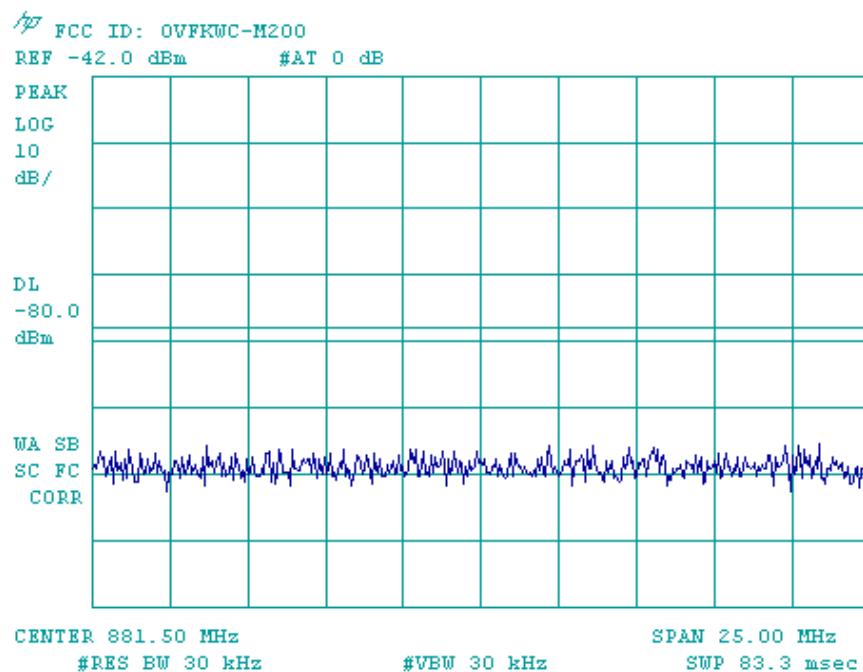
b-1



b-2

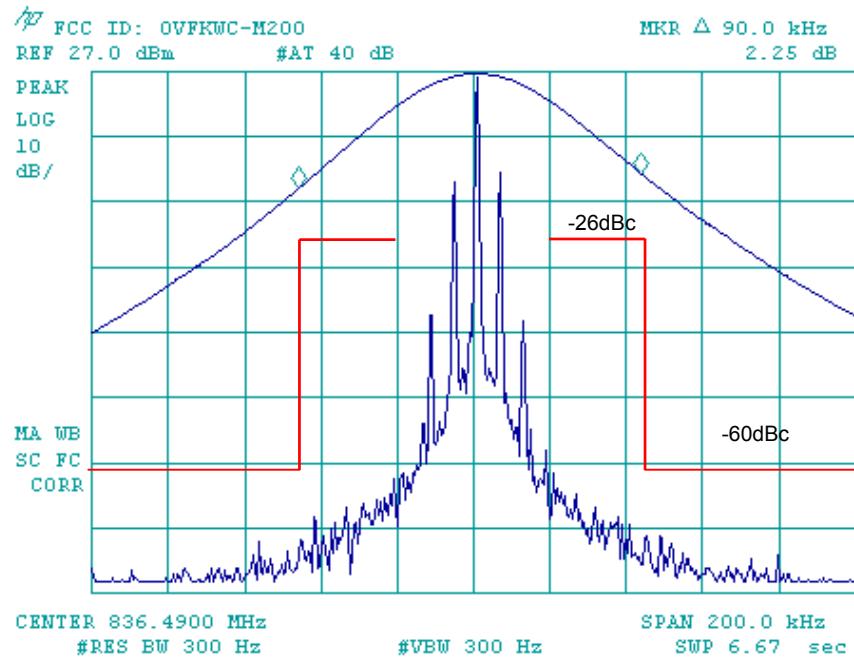


b-3

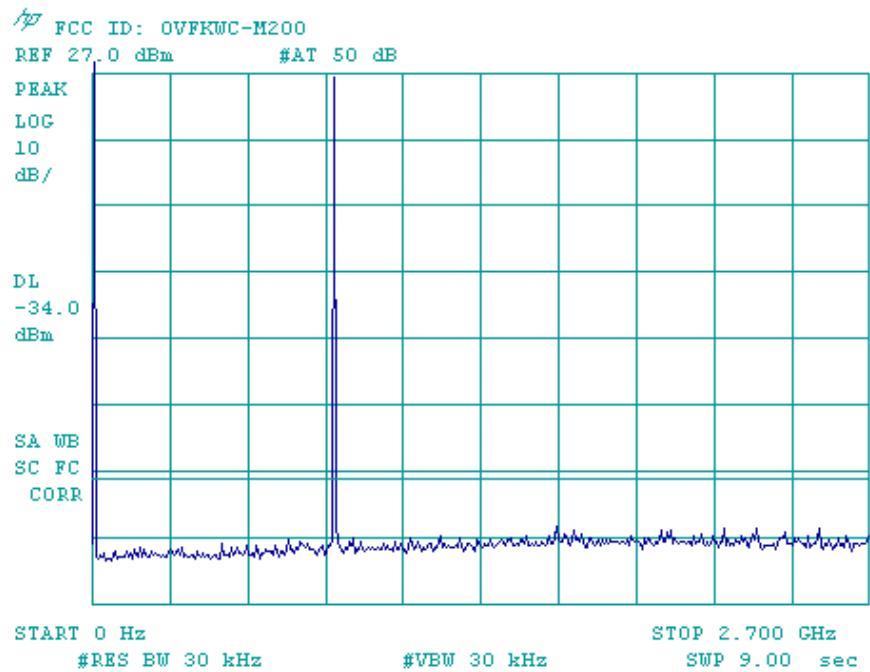


## AMPS SAT

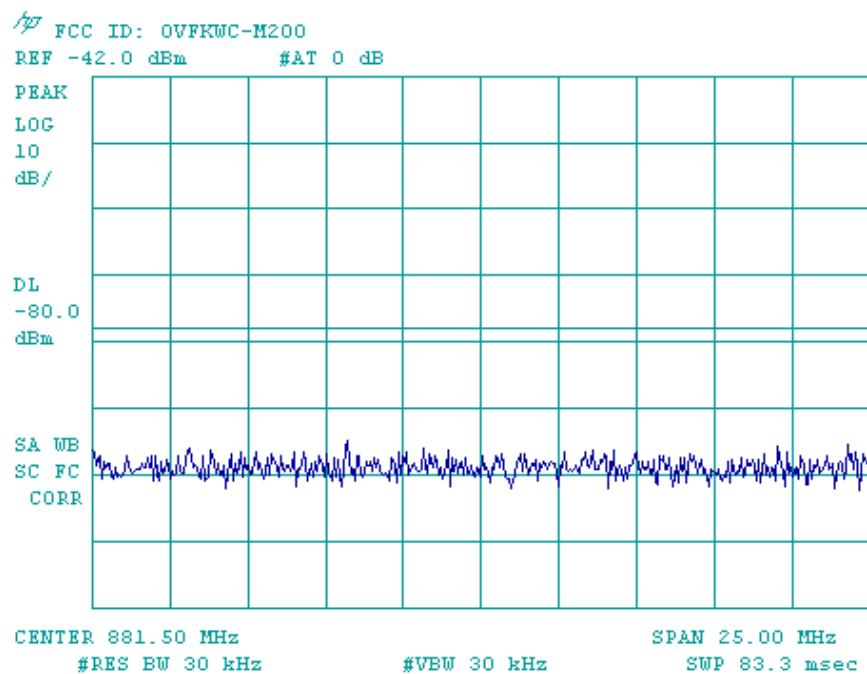
c-1



c-2

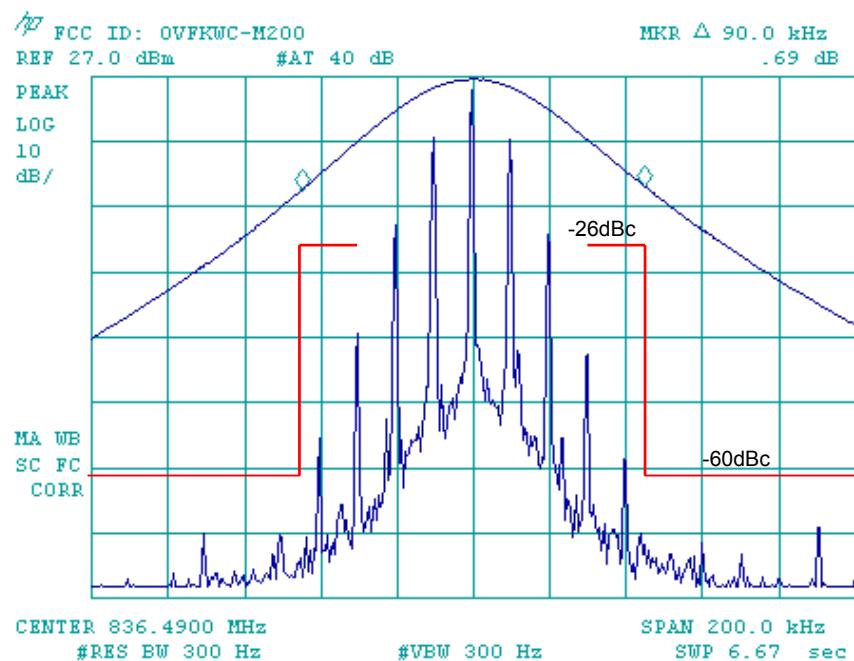


c-3

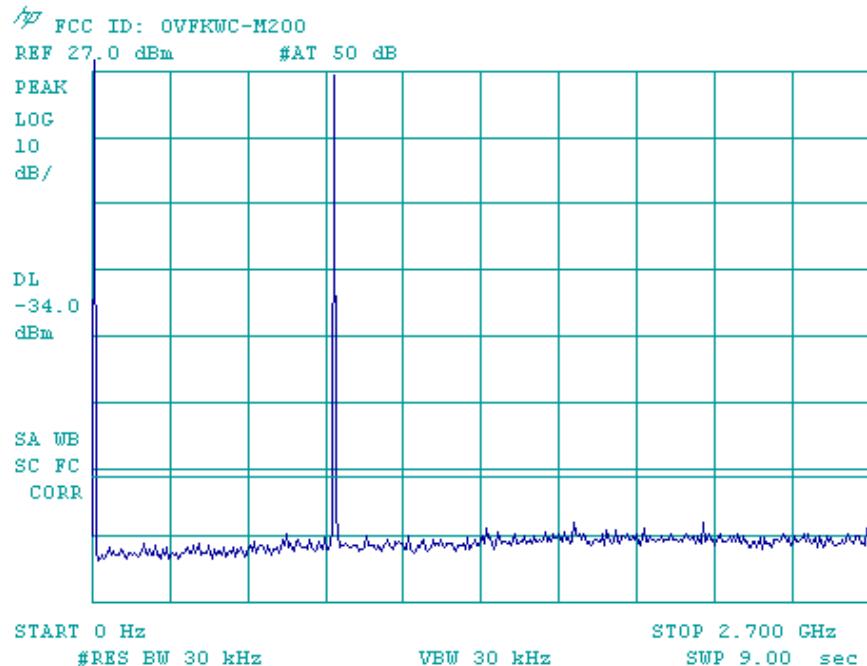


## AMPS ST

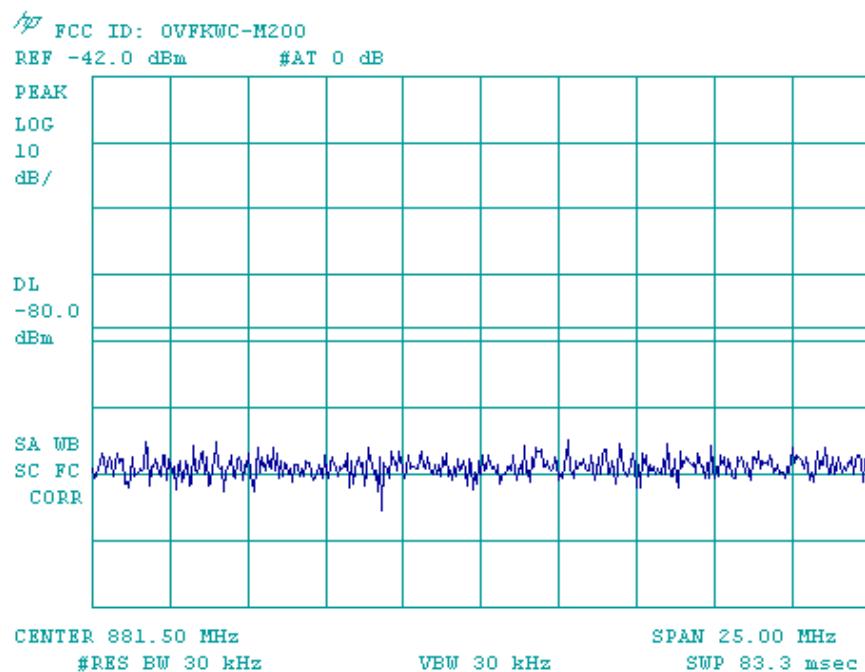
d-1



d-2

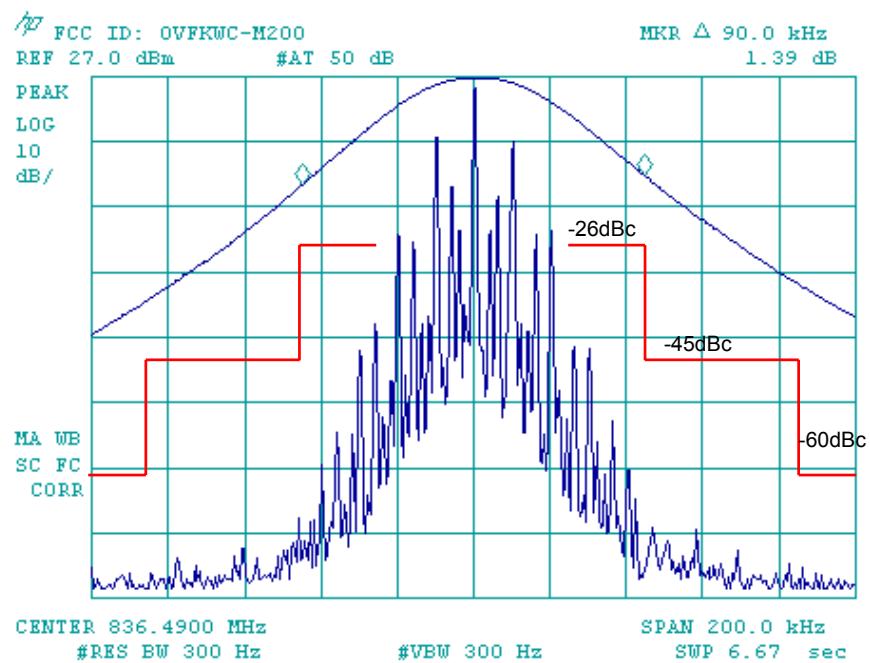


d-3

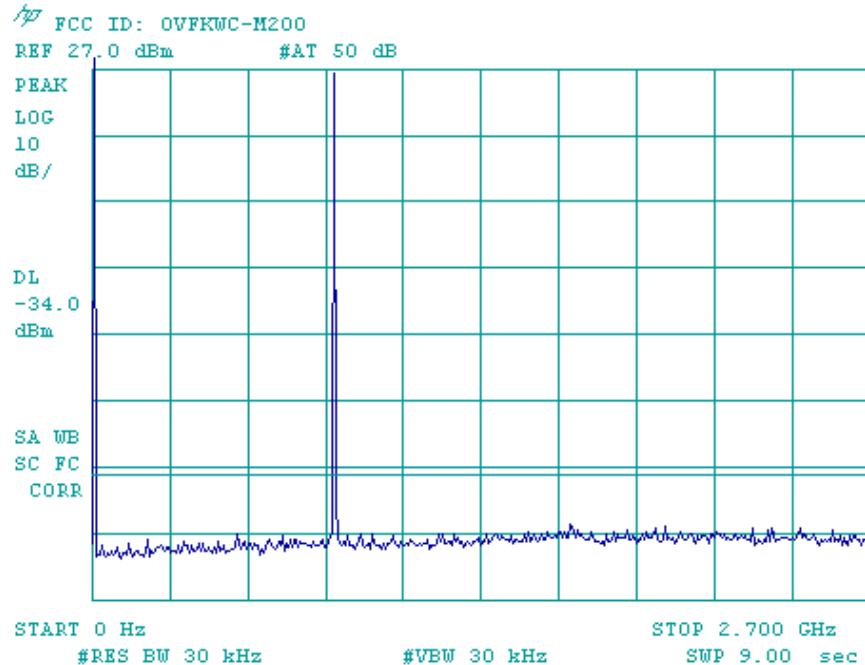


## AMPS ST + SAT

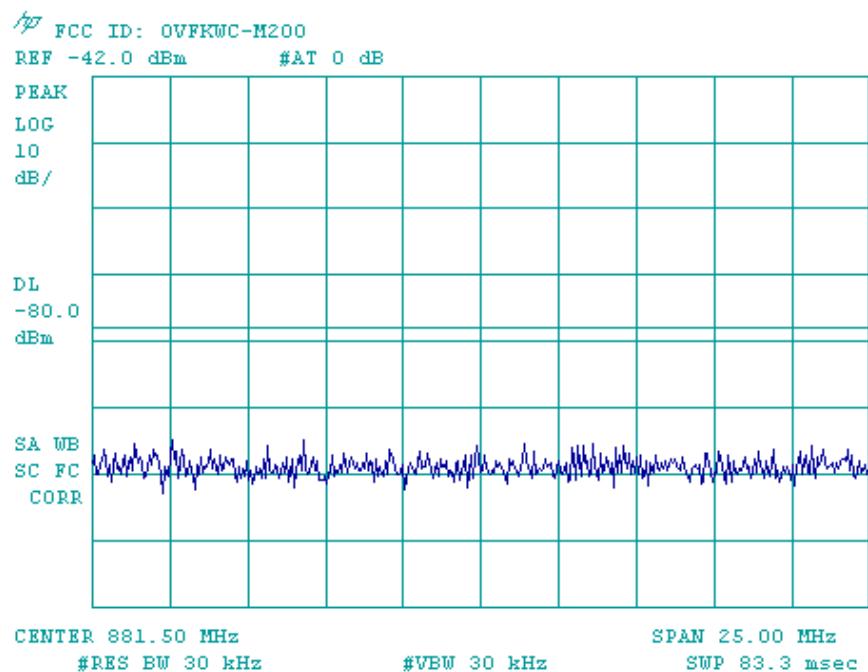
e-1



e-2

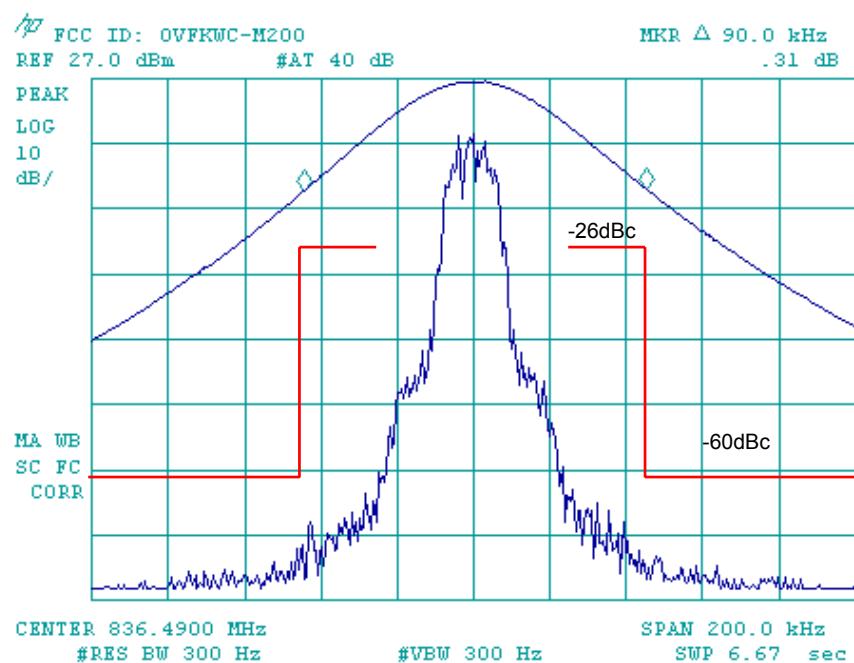


e-3

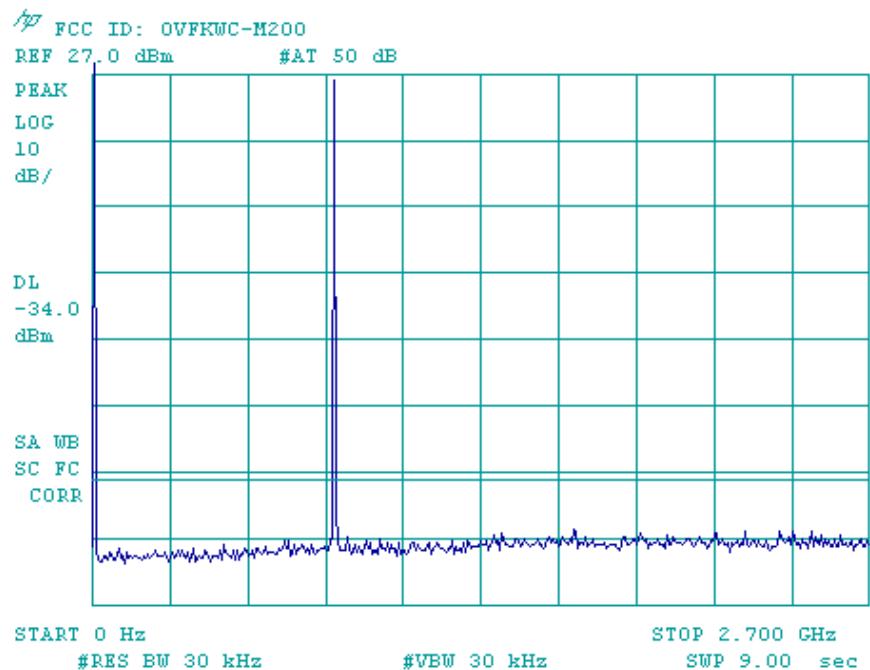


## SAT + DTMF

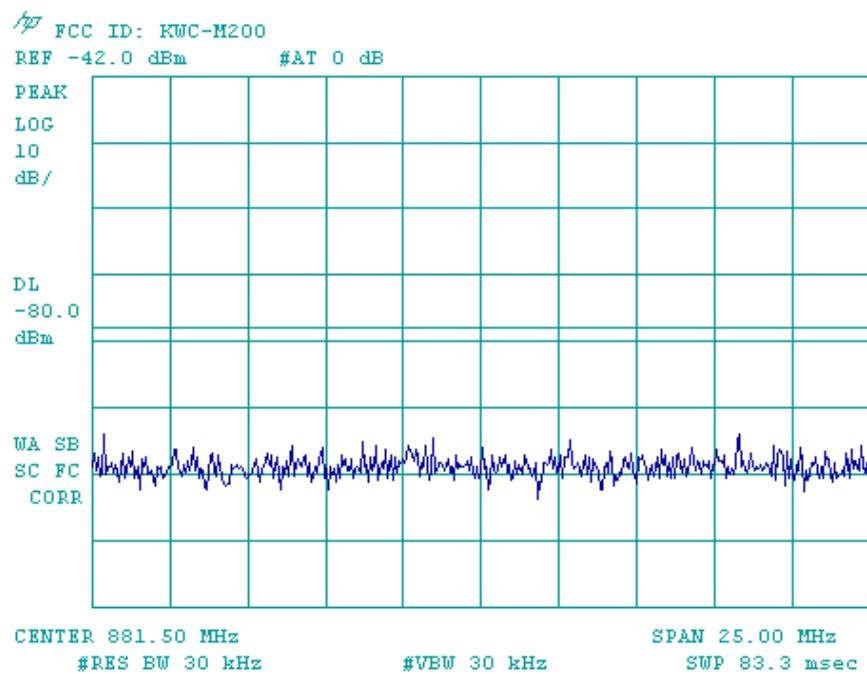
f-1



f-2

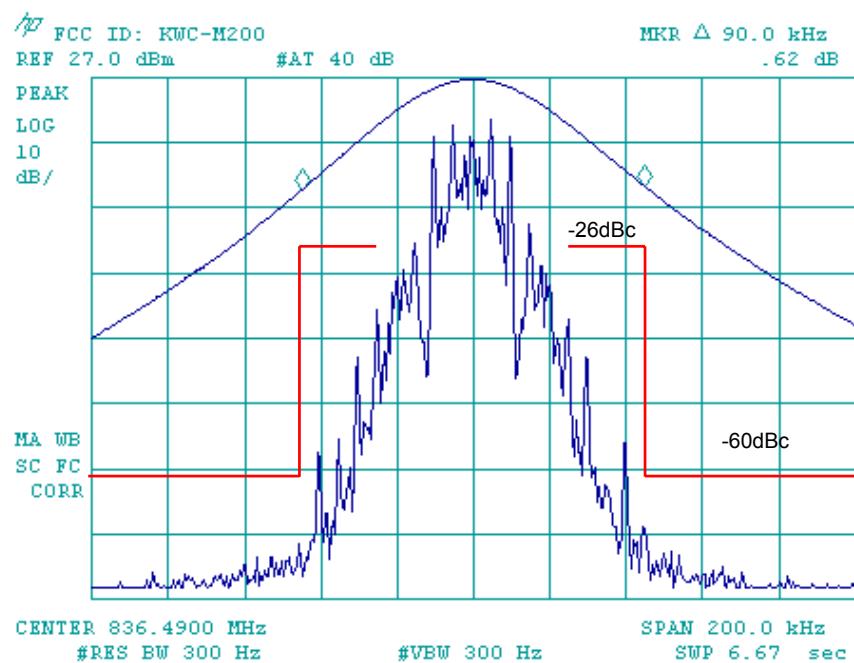


f-3

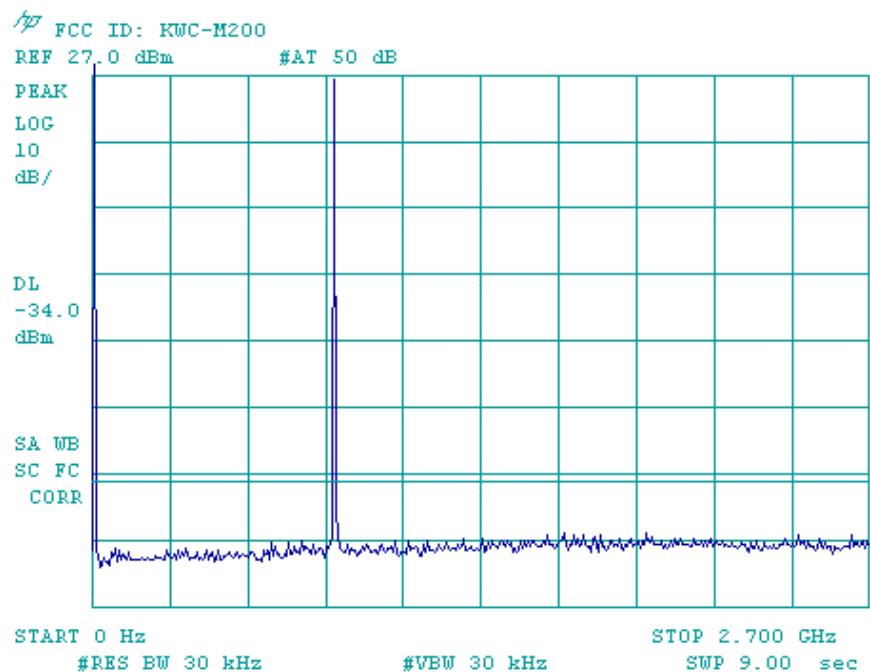


## AMPS WIDEBAND

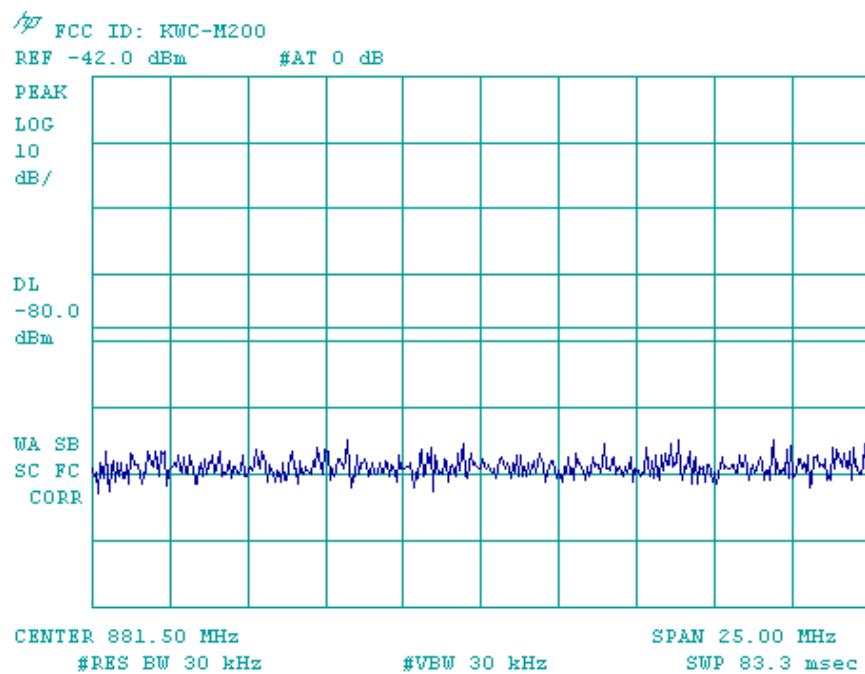
g-1



g-2

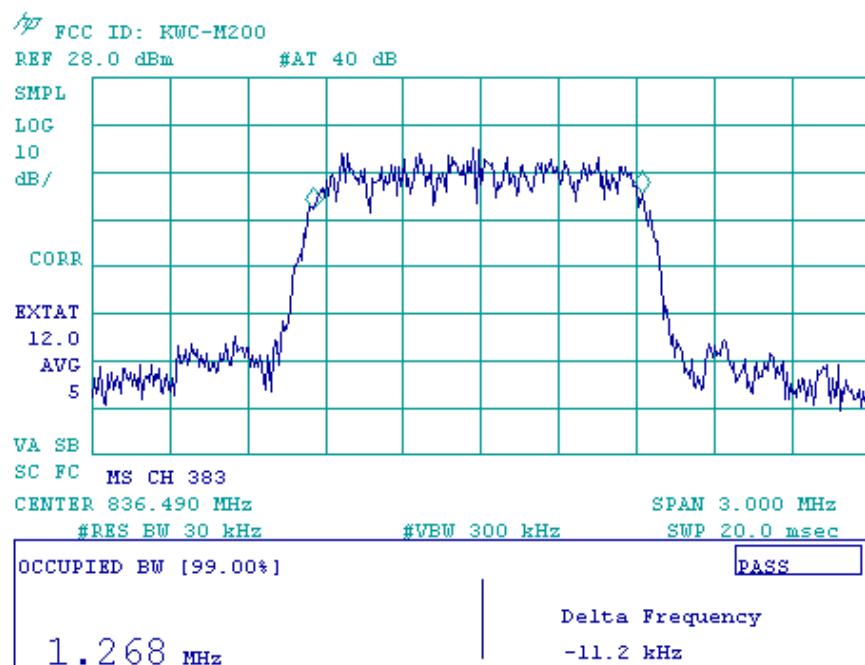


g-3

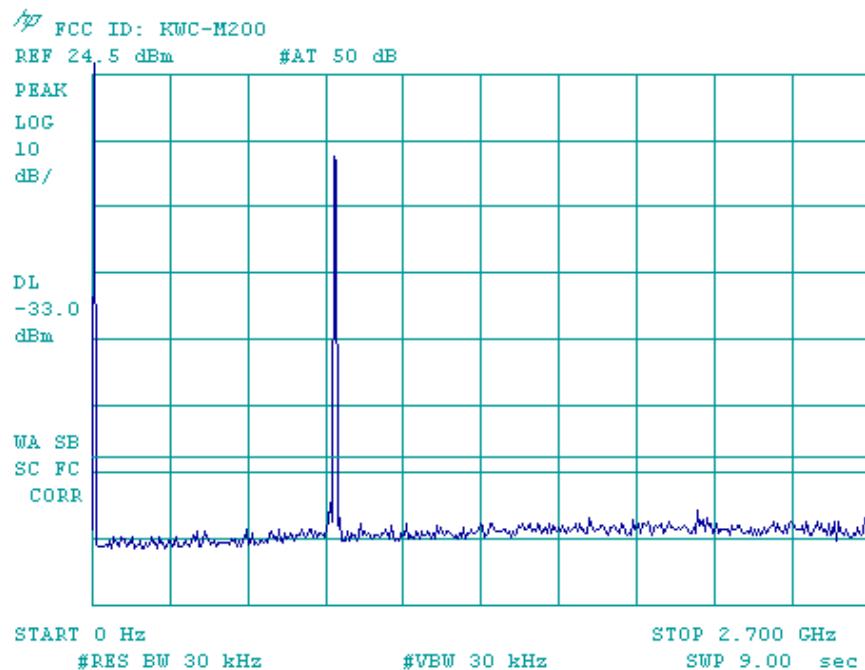


## Cellular CDMA at RC1

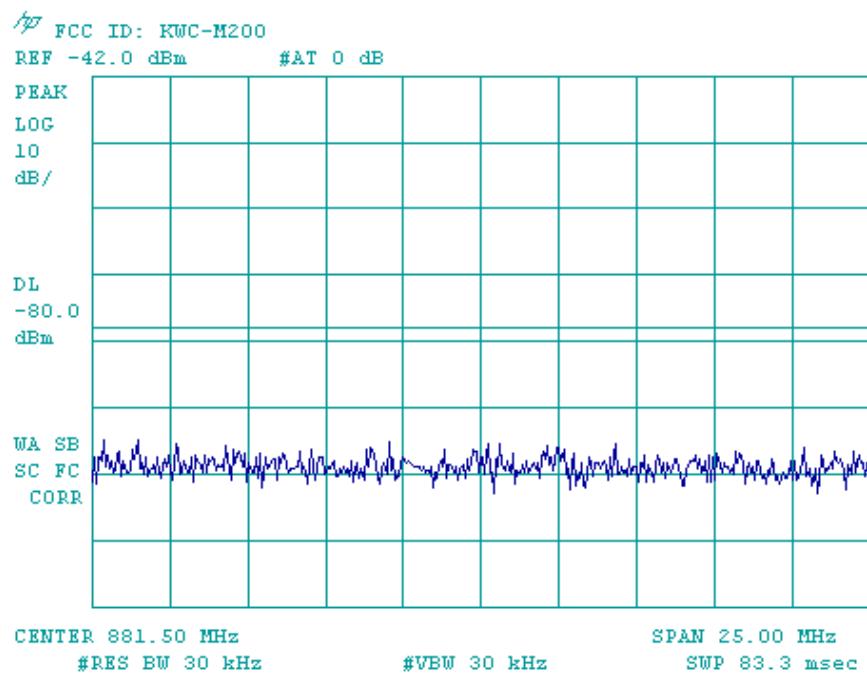
h-1



h-2



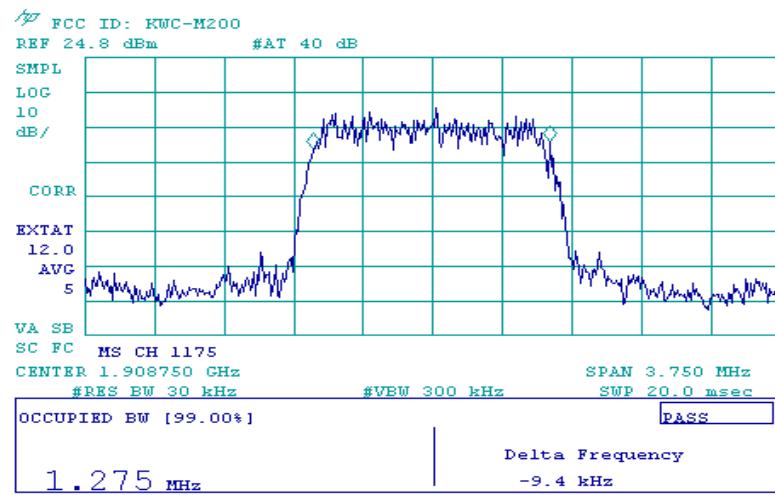
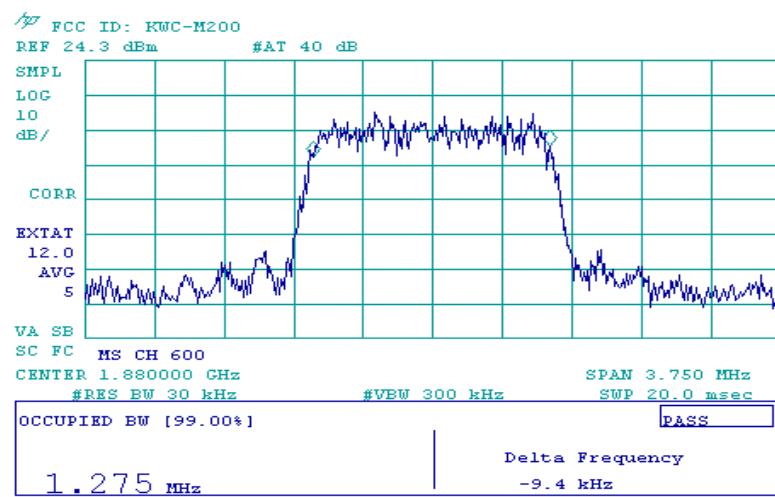
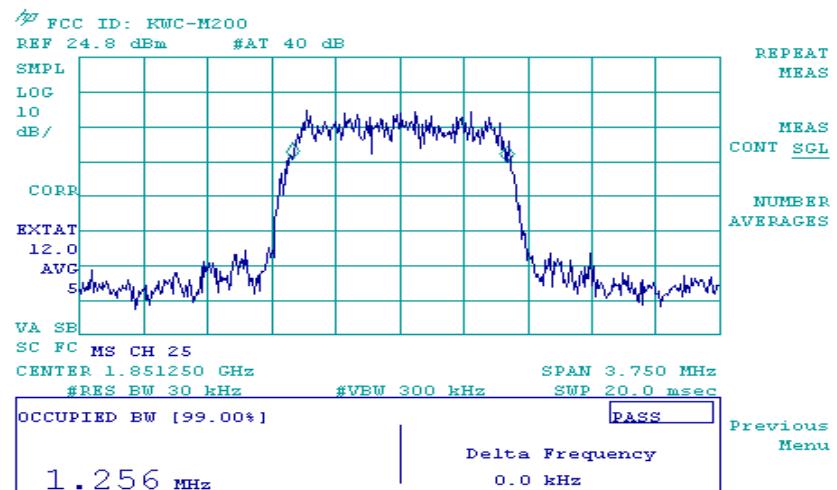
h-3



**Exhibit 8****Occupied Bandwidth and Spurious Emission Measured Data – FCC Part 2.1049, 24.238**

The following data shows compliance for CDMA mode when operating in a P\_REV 5 or less network. For CDMA mode when operating in a P\_REV 6 or above, see a separate attachment (exhibit 24).

**1. Occupied Bandwidth**



## 2. Spurious Emission at Antenna Terminals

### **Out of Band Spurious Emission Measurement Procedures**

#### **(a) 1 MHz band immediately adjacent to the PCS band**

We performed a numerical integration of the power as performed by the spectrum analyzer (HP8594E) in the 1 MHz band immediately outside of the PCS block. As specified in Part 24.238 of the rules, we used a Resolution Bandwidth of 1% of the fundamental emission bandwidth, which in this instance equates to the measurement bandwidth of 12.5 kHz.

The ACPR (Adjacent Channel Power Ratio) function of the HP CDMA measurement personality was used on spectrum analyzer, which provides the power integration. The ACPR function and the spectrum analyzer settings used to complete the measurement will be addressed in section (c).

#### **(b) 2<sup>nd</sup> 1 MHz band adjacent to PCS Block**

As specified in Part 24.238 of the rules, the 2<sup>nd</sup> 1 MHz band outside of the PCS block was measured using a resolution bandwidth of 1 MHz.

The ACPR function of the HP CDMA measurement personality was used to complete the measurement. See section (c) for the ACPR function and the spectrum analyzer settings.

#### **(c) ACPR measurement and spectrum analyzer settings**

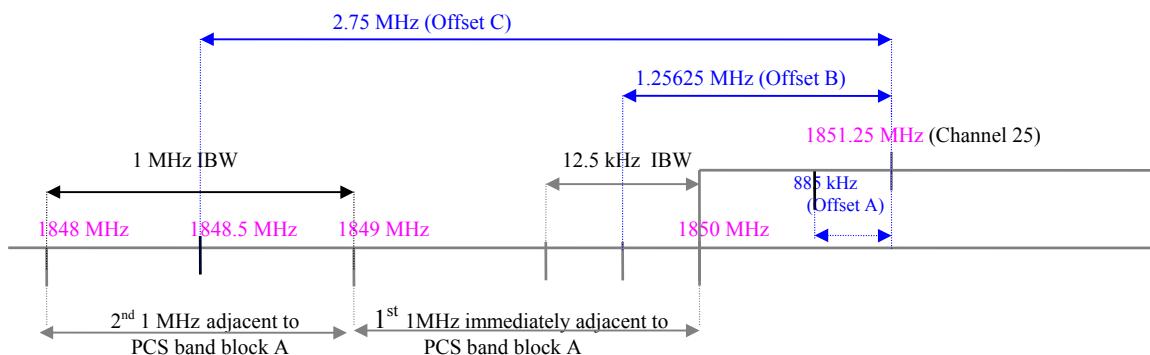
The ACPR (Adjacent Channel Power Ratio) is the power contained in a specified frequency-channel bandwidth relative to the total carrier power. It can measure up to three pairs of offset channels and relates them to the carrier power. ACPR measurement uses an integration bandwidth method (IBW) to measure the carrier power and the offset powers. IBW method performs a frequency sweep through the bandwidth of integration (set up by the user) using a resolution bandwidth (automatically set) much narrower than the channel bandwidth (e.g. 30 kHz RBW for a channel bandwidth of 1.25 MHz). The measurement computes an average power of the channel over a specified number of sweeps, automatically compensating for noise and scaling.

The following settings were used in the ACPR integration bandwidth method to complete the above measurements (a) and (b). An example to explain the settings is given.

Settings used in ACPR measurement

	Frequency (Hz)	Offset Limit	IBW (Hz)	Offset Span (Hz)	Comments
Offset A	$\pm 885k$	n/a	n/a	n/a	not required on a mobile station
Offset B	$\pm 1.25625M$	-36.0dB (43+10logP)	12.5k	25k	setup for 1 MHz band immediately adjacent to PCS band
Offset C	$\pm 2.75M$	-36.0dB (43+10logP)	1M	2M	setup for 2 <sup>nd</sup> 1 MHz band adjacent to PCS band

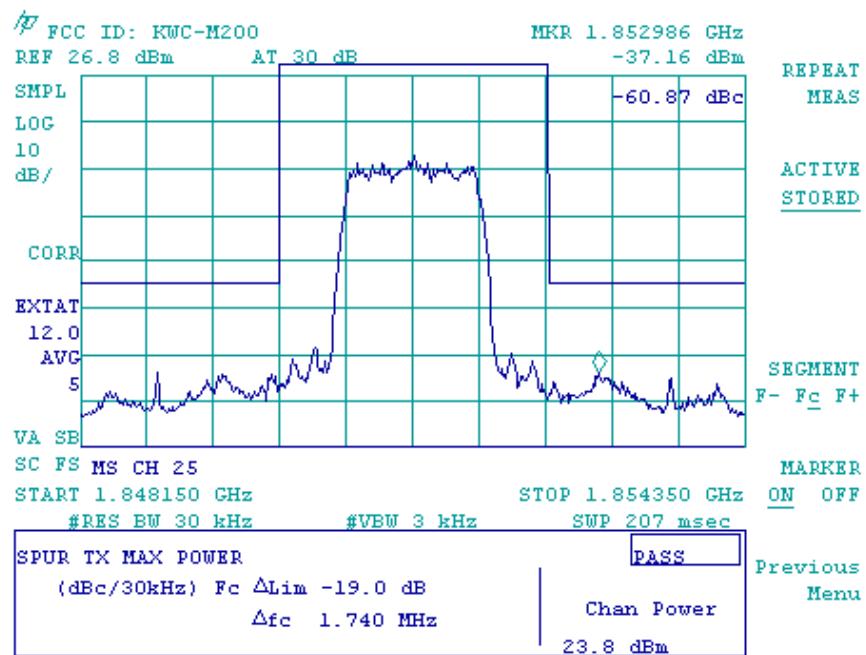
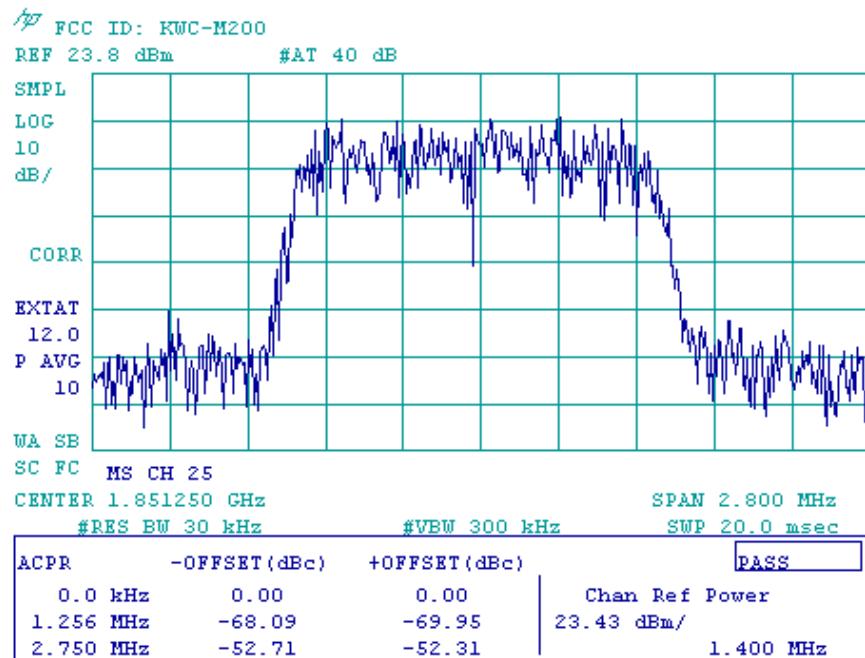
As an example of channel 25, the center frequency is 1851.25 MHz. The interpretation of the settings in the above table is shown in following drawing.

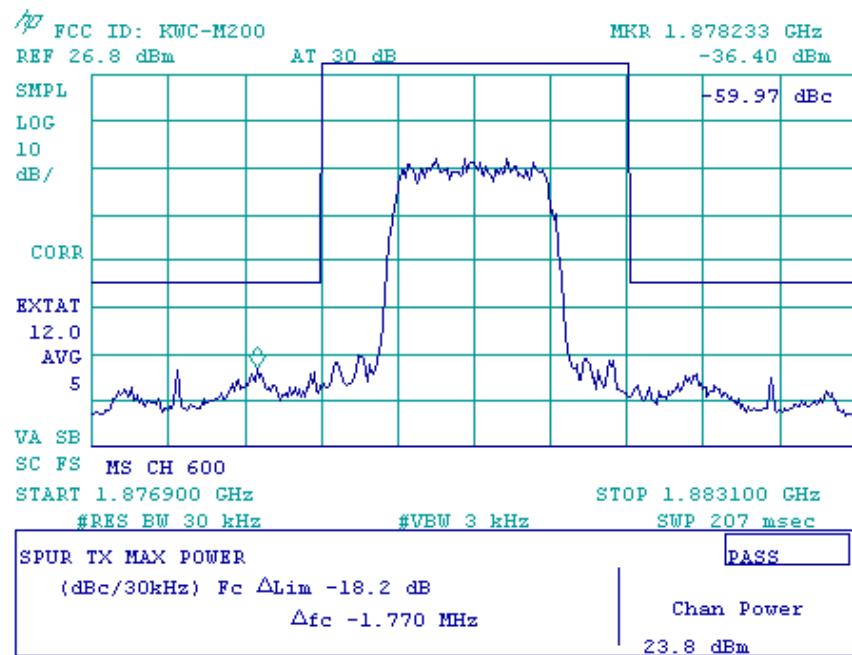
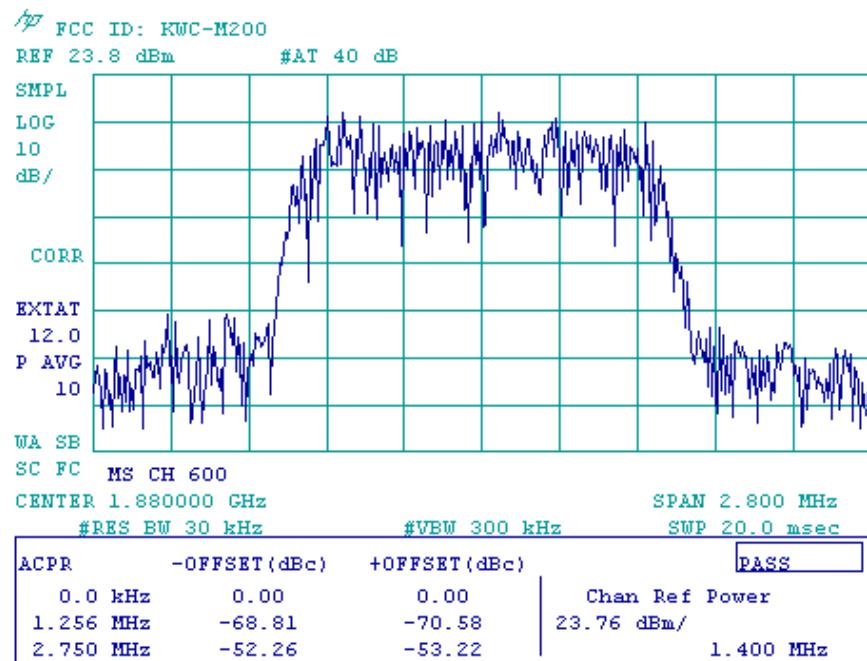


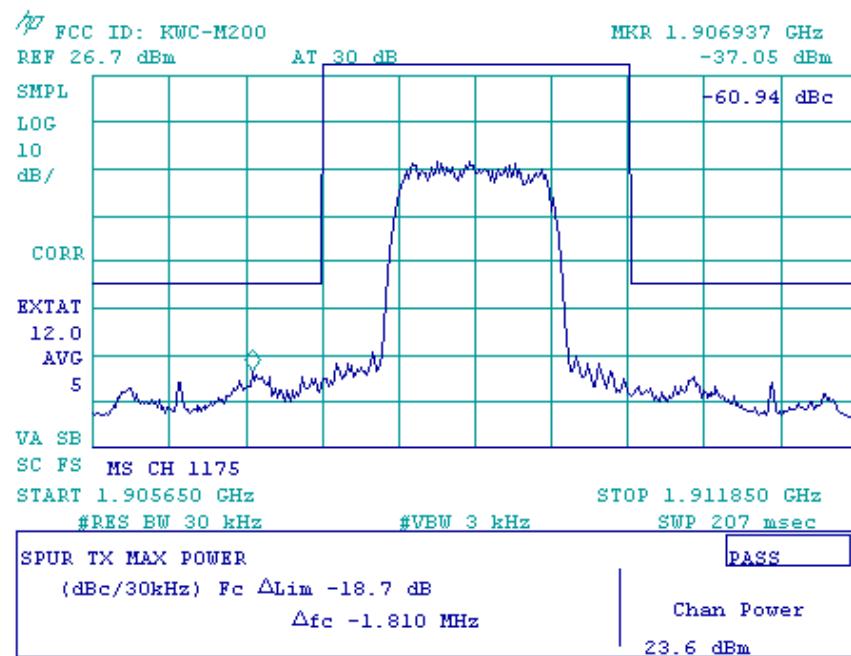
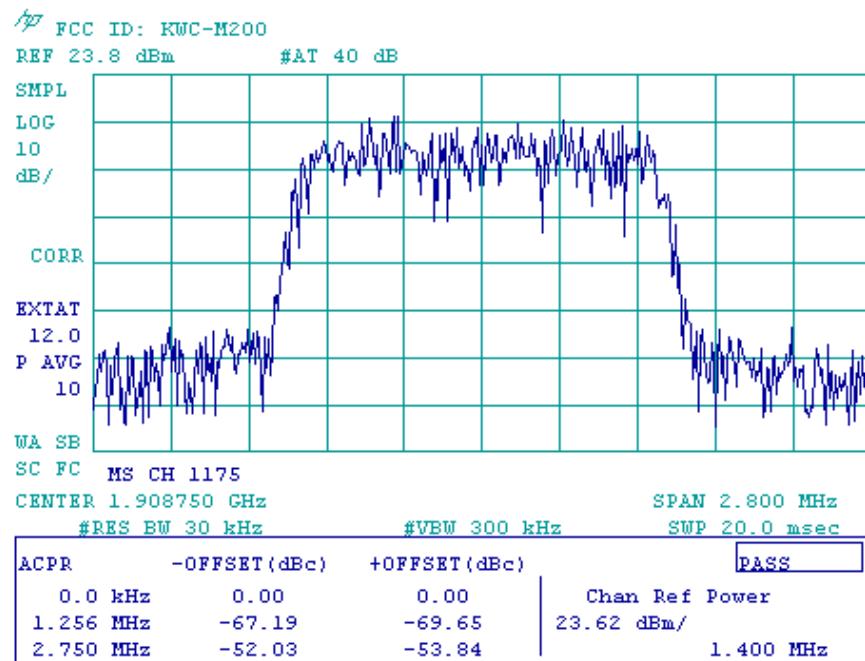
Note: The above drawing is not in scale.

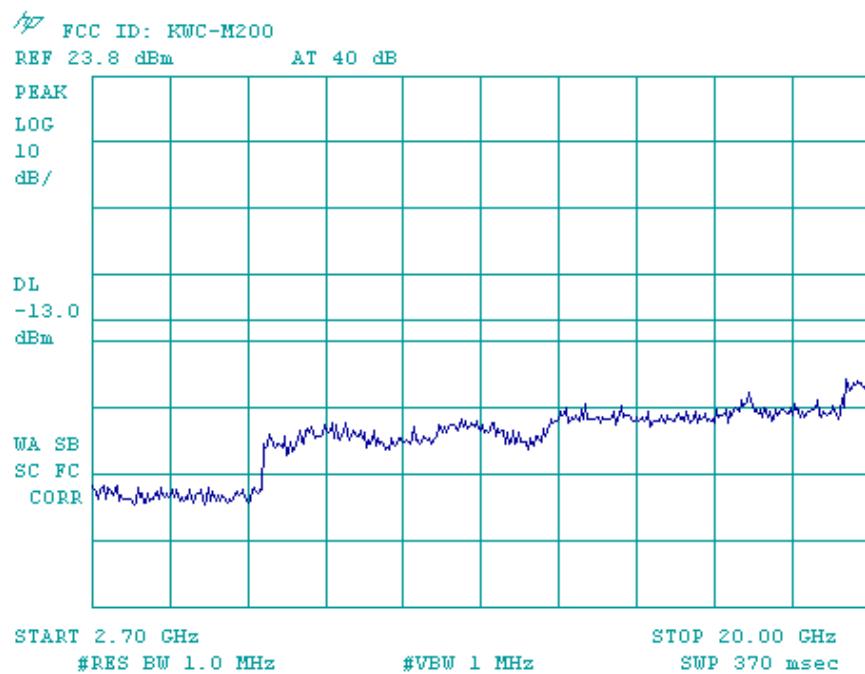
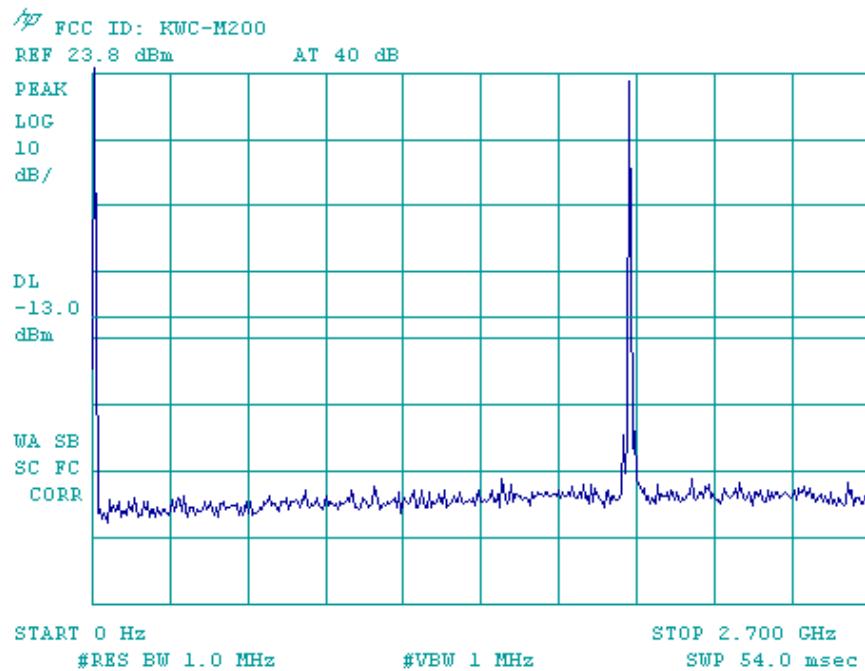
#### (d) Spurious emission up to 10<sup>th</sup> harmonic of the transmitting frequency

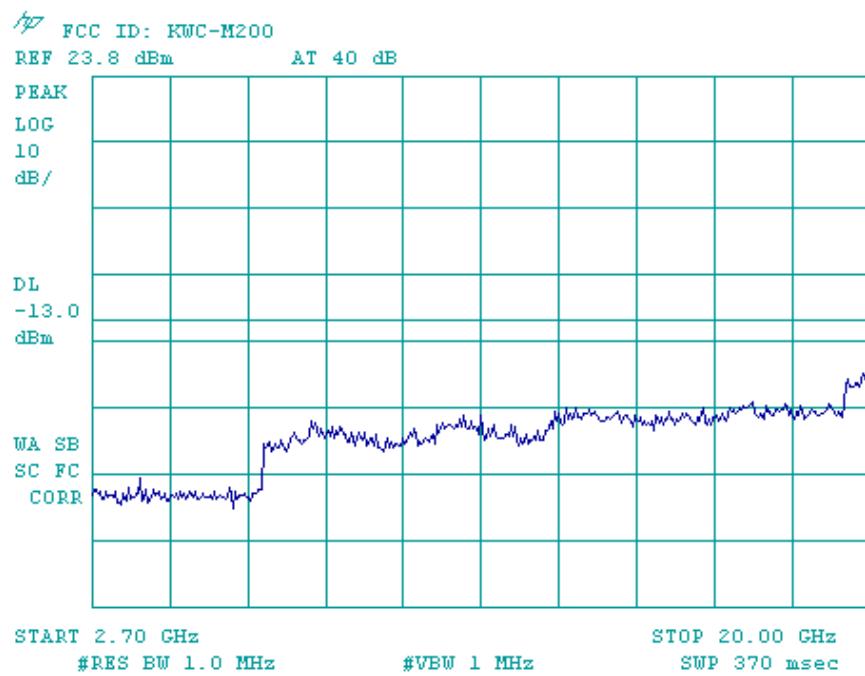
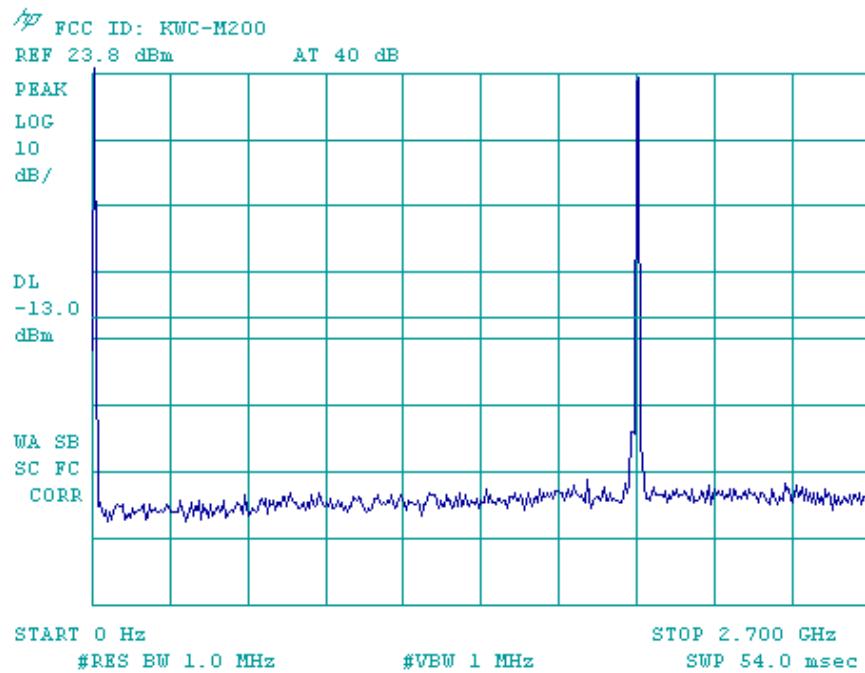
The harmonic and spurious emissions from 0 Hz to 22 GHz were measured using a RBW of 1 MHz and a VBW of 1 MHz on the spectral analyzer.

**Test Results**ACPR measurement (1<sup>st</sup> and 2<sup>nd</sup> 1MHz adjacent to PCS)

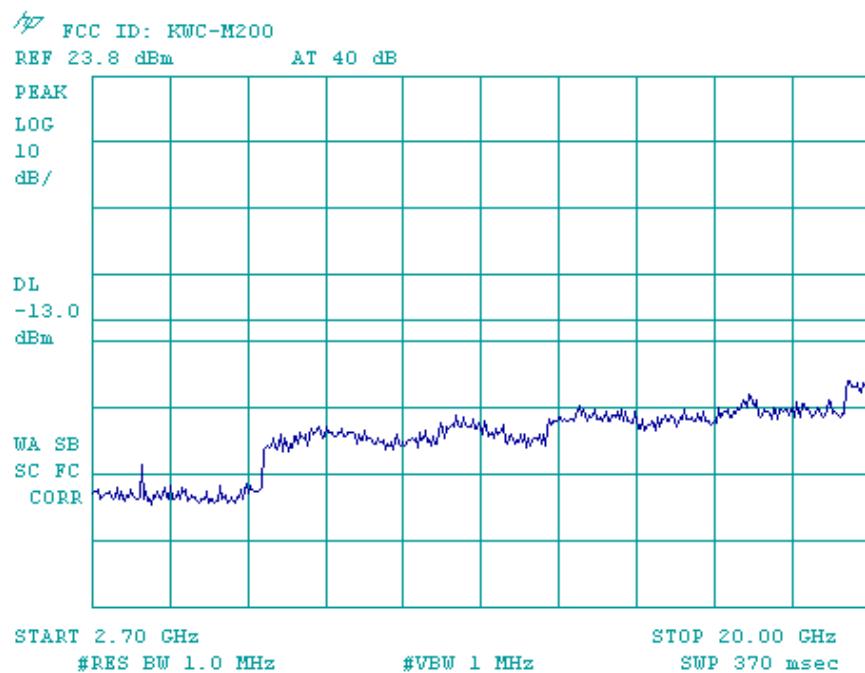
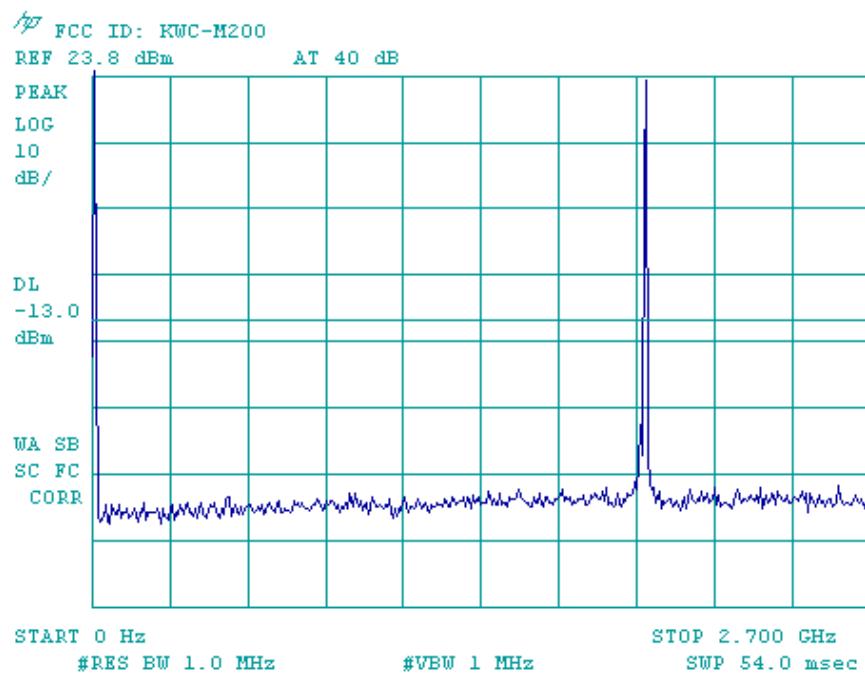




Spurious Emission Up to 10<sup>th</sup> harmonicsCh25

Ch600

Ch1175



**Exhibit 9****Conducted Emissions Test Results (harmonics) - FCC Part 2 and 22, Paragraph 2.1051, 22.917**

05/17/2003

**FM High Power**

## low band – channel 991

	Frequency (MHz)	Measured Level (dBm)	specification limit (dBm)
Fundamental	824.04	27.01	-
2 <sup>nd</sup> harmonic	1648.08	-32.66	-13
3 <sup>rd</sup> harmonic	2472.12	-48.70	-13
4 <sup>th</sup> harmonic	3296.16	-65.72	-13
5 <sup>th</sup> harmonic	4120.2	-67.30	-13
6 <sup>th</sup> harmonic	4944.24	-77.69	-13
7 <sup>th</sup> harmonic	5768.28	-76.43	-13
8 <sup>th</sup> harmonic	6592.32	-57.11	-13
9 <sup>th</sup> harmonic	7416.36	-59.35	-13
10 <sup>th</sup> harmonic	8240.4	< -85	-13

## mid band – channel 383

	Frequency (MHz)	Measured Level (dBm)	specification limit (dBm)
Fundamental	836.49	27.07	-
2 <sup>nd</sup> harmonic	1672.98	-31.86	-13
3 <sup>rd</sup> harmonic	2509.47	-47.25	-13
4 <sup>th</sup> harmonic	3345.96	-68.69	-13
5 <sup>th</sup> harmonic	4182.45	-67.28	-13
6 <sup>th</sup> harmonic	5018.94	-75.39	-13
7 <sup>th</sup> harmonic	5855.43	-76.93	-13
8 <sup>th</sup> harmonic	6691.92	-50.64	-13
9 <sup>th</sup> harmonic	7528.41	-58.30	-13
10 <sup>th</sup> harmonic	8364.9	< -85	-13

## high band – channel 799

	Frequency (MHz)	Measured Level (dBm)	specification limit (dBm)
Fundamental	848.97	27.1	-
2 <sup>nd</sup> harmonic	1697.94	-38.46	-13
3 <sup>rd</sup> harmonic	2546.91	-48.81	-13
4 <sup>th</sup> harmonic	3395.88	-70.18	-13
5 <sup>th</sup> harmonic	4244.85	-68.70	-13
6 <sup>th</sup> harmonic	5093.82	-74.19	-13
7 <sup>th</sup> harmonic	5942.79	-77.22	-13
8 <sup>th</sup> harmonic	6791.76	-51.33	-13
9 <sup>th</sup> harmonic	7640.73	-65.07	-13
10 <sup>th</sup> harmonic	8489.7	< -85	-13

**CDMA High Power**

## low band – channel 1013

	Frequency (MHz)	Measured Level (dBm)	specification limit (dBm)
Fundamental	824.04	24.48	-
2 <sup>nd</sup> harmonic	1648.08	-27.50	-13
3 <sup>rd</sup> harmonic	2472.12	-42.78	-13
4 <sup>th</sup> harmonic	3296.16	-70.00	-13
5 <sup>th</sup> harmonic	4120.2	-68.96	-13
6 <sup>th</sup> harmonic	4944.24	-77.98	-13
7 <sup>th</sup> harmonic	5768.28	-78.53	-13
8 <sup>th</sup> harmonic	6592.32	-62.86	-13
9 <sup>th</sup> harmonic	7416.36	-69.31	-13
10 <sup>th</sup> harmonic	8240.4	< -85	-13

## mid band – channel 383

	Frequency (MHz)	Measured Level (dBm)	specification limit (dBm)
Fundamental	836.49	24.5	-
2 <sup>nd</sup> harmonic	1672.98	-34.33	-13
3 <sup>rd</sup> harmonic	2509.47	-43.75	-13
4 <sup>th</sup> harmonic	3345.96	-72.33	-13
5 <sup>th</sup> harmonic	4182.45	-66.48	-13
6 <sup>th</sup> harmonic	5018.94	-74.23	-13
7 <sup>th</sup> harmonic	5855.43	-79.33	-13
8 <sup>th</sup> harmonic	6691.92	-60.41	-13
9 <sup>th</sup> harmonic	7528.41	-68.79	-13
10 <sup>th</sup> harmonic	8364.9	< -85	-13

## high band – channel 777

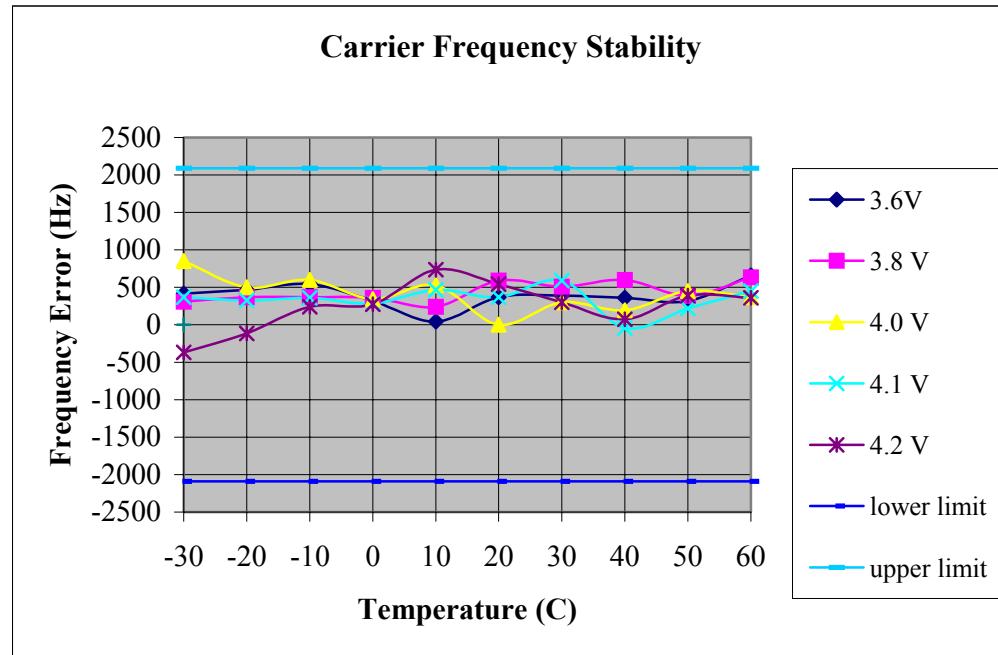
	Frequency (MHz)	Measured Level (dBm)	specification limit (dBm)
Fundamental	848.31	24.53	-
2 <sup>nd</sup> harmonic	1676.62	-37.22	-13
3 <sup>rd</sup> harmonic	2514.93	-42.98	-13
4 <sup>th</sup> harmonic	3353.24	-77.00	-13
5 <sup>th</sup> harmonic	4191.55	-79.75	-13
6 <sup>th</sup> harmonic	5029.86	-68.53	-13
7 <sup>th</sup> harmonic	5868.17	< -85	-13
8 <sup>th</sup> harmonic	6706.48	-69.41	-13
9 <sup>th</sup> harmonic	7544.79	< -85	-13
10 <sup>th</sup> harmonic	8383.1	< -85	-13

**Exhibit 10**Transmitter RF Carrier Frequency Stability - FCC part 2.1055**Transmitter RF Carrier Frequency Stability - FCC part 2.1055****Phone transmitting in FM mode in cellular band, but with no modulation on the carrier**

Measured with HP 8560A Spectrum Analyzer, The test procedures and technique are stated in Exhibit 15.

Carrier Frequency : 836.49 MHz FM

Temperature (C)	Transmitter Carrier Frequency Deviation (Hz)					Specification	
	3.6V	3.8 V	4.0 V	4.1 V	4.2 V	lower limit	upper limit
-30	416	308	849	366	-367	-2091	2091
-20	466	366	499	324	-117	-2091	2091
-10	541	366	599	358	241	-2091	2091
0	316	358	341	283	274	-2091	2091
10	41	241	524	466	733	-2091	2091
20	366	591	0	366	541	-2091	2091
30	390	508	299	591	299	-2091	2091
40	358	599	191	-42	74	-2091	2091
50	316	383	449	216	391	-2091	2091
60	658	633	366	449	358	-2091	2091

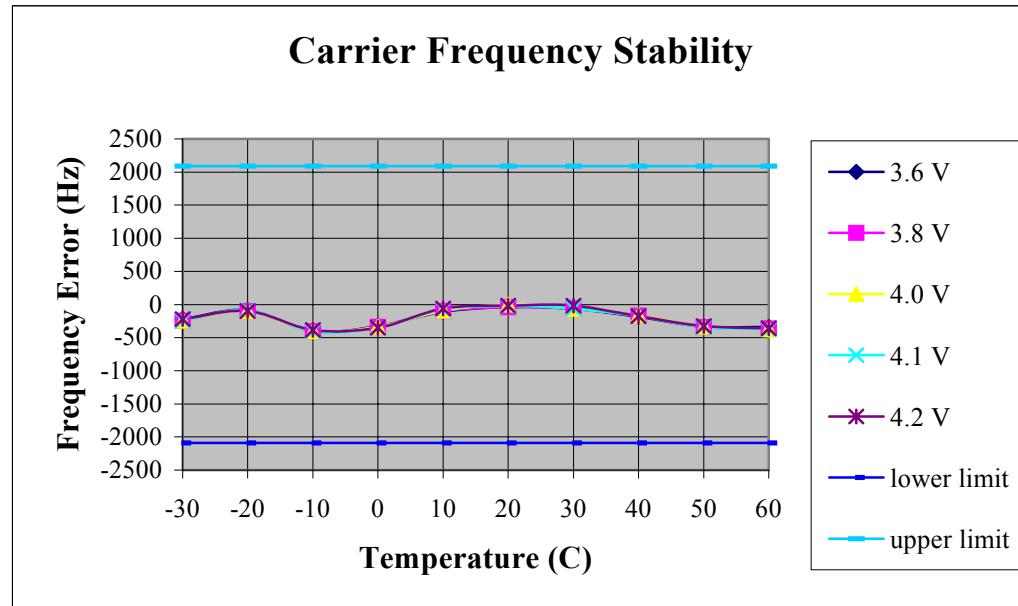


**Transmitter RF Carrier Frequency Stability - FCC part 2.1055**  
**Phone transmitting in CDMA mode in cellular band, but with no modulation on the carrier**

Measured with HP 8560A Spectrum Analyzer, The test procedures and technique are stated in Exhibit 15.

Carrier Frequency : 836.49 MHz CDMA

Temperature (C)	Transmitter Carrier Frequency Deviation (Hz)					Specification	
	3.6 V	3.8 V	4.0 V	4.1 V	4.2 V	lower limit	upper limit
-30	-217	-242	-242	-242	-217	-2091	2091
-20	-84	-101	-101	-84	-101	-2091	2091
-10	-401	-401	-401	-401	-384	-2091	2091
0	-326	-334	-334	-351	-351	-2091	2091
10	-109	-101	-92	-76	-59	-2091	2091
20	-42	-42	0	-25	-17	-2091	2091
30	-67	-59	-67	-59	-17	-2091	2091
40	-184	-167	-167	-176	-176	-2091	2091
50	-334	-342	-334	-342	-326	-2091	2091
60	-342	-359	-376	-376	-359	-2091	2091

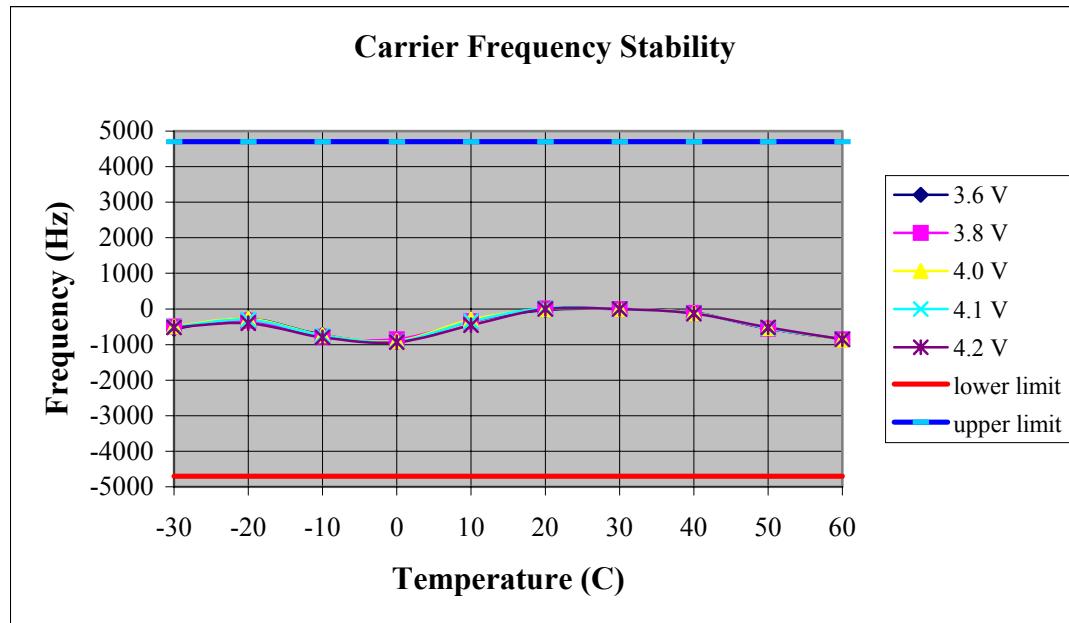


**Exhibit 11****Transmitter RF Carrier Frequency Stability - FCC part 2.1055, 24.235****Transmitter RF Carrier Frequency Stability - FCC part 2.1055, 24.235****Phone transmitting in CDMA mode in PCS band, but with no modulation on the carrier**

Measured with HP 8560A Spectrum Analyzer, The test procedures and technique are stated in Exhibit 15.

Carrier Frequency : 1880.00 MHz CDMA

Temperature (C)	Transmitter Carrier Frequency Deviation (Hz)					Specification	
	3.6 V	3.8 V	4.0 V	4.1 V	4.2 V	lower limit	upper limit
-30	-550	-492	-492	-500	-517	-4700	4700
-20	-275	-333	-275	-300	-400	-4700	4700
-10	-725	-775	-733	-742	-800	-4700	4700
0	-933	-850	-892	-917	-933	-4700	4700
10	-342	-350	-300	-350	-458	-4700	4700
20	-33	17	0	25	0	-4700	4700
30	-8	-8	0	0	0	-4700	4700
40	-108	-117	-117	-125	-133	-4700	4700
50	-558	-550	-532	-533	-517	-4700	4700
60	-850	-850	-858	-850	-850	-4700	4700



**Exhibit 12**

**Occupied Bandwidth and Spurious Emission Measured Data --**  
**for CDMA mode when operating in P\_REV 6 or above**

KWC Module 200 supports additional reverse channels, as per IS-98D, additional measurements have taken to show compliance. Please see the separate attachment for the test results

**Exhibit 13****Measurement Procedures, Techniques and Minimum Requirements****List of Equipment**

Computer with Phone\_T software

Spectrum Analyzers

HP 8593EM, CAL DUE 4/15/2004

HP8594E, CAL DUE 03/03/2004

HP 8593EM, Cal due 08-November-2004

Agilent 8960, Cal due 27-June-2003

Audio Spectrum Analyzer

HP3588A, CAL DUE 02/08/2004

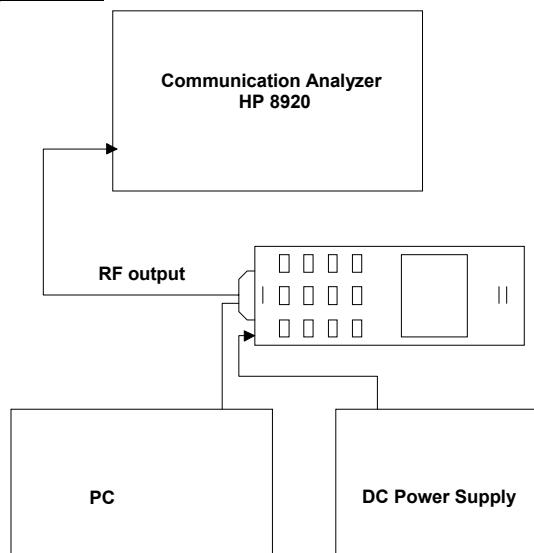
Communication Test Set

HP8920B, CAL DUE 12/12/2003

Power Meter

Giga-tronics 8541C, CAL DUE 2/19/2004

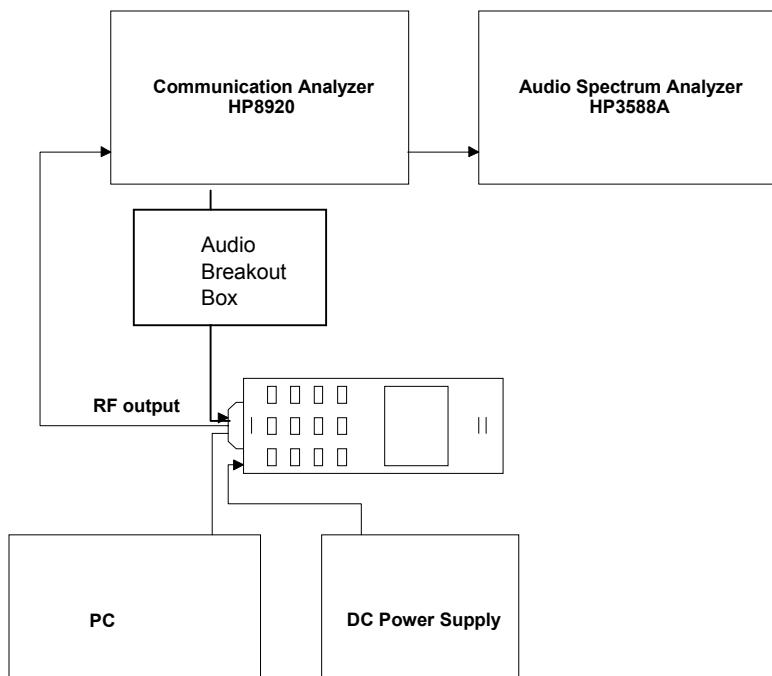
DC Power Supply

**Measurement Procedures****RF Output Power**

**Definition** - The output power rating of the transmitter is the power available at the output terminal of the transmitter when the terminal is connected to the normal load.

**Method of Measurement** - Measure the transmitter output carrier power without modulation using a communication test set for FM which has a RF wattmeter. A HP 8594E spectrum analyzer with the CDMA personality was used to measure CDMA mode.

**Minimum Standard** - The transmitter output power shall be maintained within +2 / -4 dB.

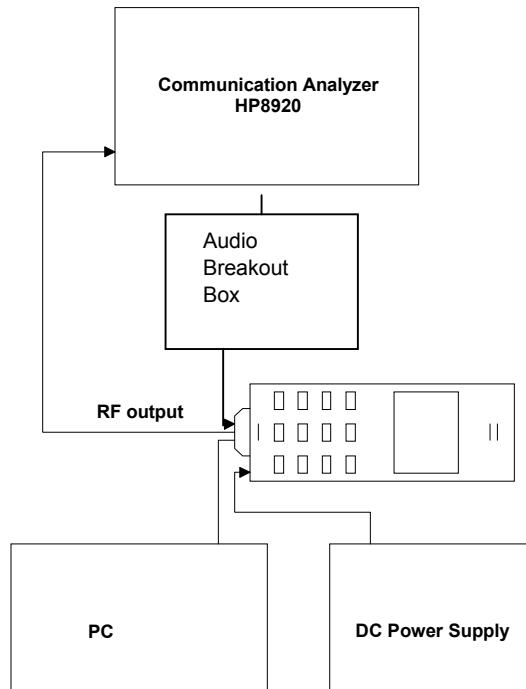
Modulation Audio Response

**Definition** - The transmitter audio frequency response is defined in terms of the degree of closeness with which the frequency deviation of the transmitter follows the prescribed 6 dB/octave pre-emphasis characteristic over a specified continuous audio frequency range while conforming to the required band-limiting conditions outside of that range.

**Method of Measurement** - Operate the transmitter with the compressor disabled, and monitor the output with HP8920 test receiver without de-emphasis. Apply a sine wave audio input to the transmitter external audio input port, vary the modulating frequency from 300 to 3000 Hz, and observe the input levels necessary to maintain a constant  $\pm 2.9$  kHz system deviation. Record the results. Adjust the audio input level to 20 dB greater than that required to produce  $\pm 8$  kHz deviation with 1 kHz tone. Vary the modulation frequency from 3 kHz to 30 kHz and observe the deviation while maintaining a constant audio input level. Use the audio spectrum analyzer to measure the output deviation at the same frequency as the input signal.

**Minimum Standard** - From 300 to 3000 Hz, the audio frequency response shall not vary more than +1 to -3 dB from a true 6 dB/octave pre-emphasis characteristic as referred to the 1000 Hz level (with the exception of a permissible 6 dB/octave roll-off from 2500 to 3000 Hz). Between 3 kHz to 30 kHz, the response shall not exceed that defined by the following table:

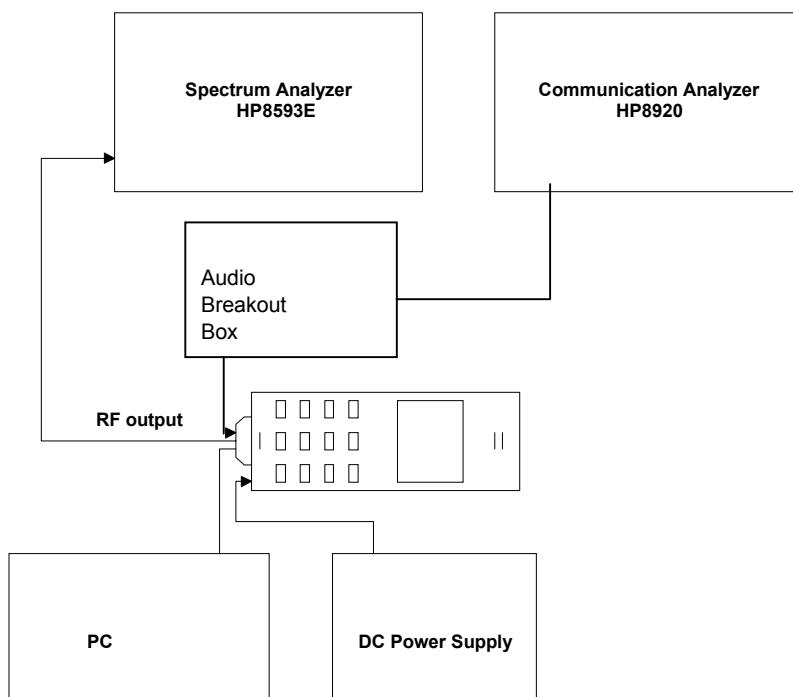
Frequency Range (f in kHz)	Attenuation Relative to 3 kHz (dB)
$3 \text{ kHz} \leq f \leq 5.9 \text{ kHz}$	$40 \log(f/3)$
$5.9 \text{ kHz} \leq f \leq 6.1 \text{ kHz}$	35
$6.1 \text{ kHz} \leq f \leq 15 \text{ kHz}$	$40 \log(f/3)$
$15 \text{ kHz} \leq f \leq 30 \text{ kHz}$	28

Modulation Limiting

**Definition** - Modulation limiting refers to the ability of the transmitter circuits to prevent the transmitter from producing deviation in excess of rated system deviation.

**Method of Measurement** - With the compressor enabled and the SAT disabled, adjust the audio input for  $\pm 8$  kHz peak deviation at 1000 Hz. Increase the audio input level by 20 dB. With the input level held constant at the 20 dB, and observe the deviation for 400 Hz, 1000 Hz, and 2.7 kHz.

**Minimum Standard** - The peak deviation shall not exceed the rated system peak frequency deviation of  $\pm 12$  kHz at any time.

Occupied Bandwidth – (In Cellular Band)

**Definition** - The occupied bandwidth is defined as the spectrum noise produced at discrete frequency separations from the carrier due to all sources of unwanted noise within the transmitter in a modulated condition.

**Method of Measurement** - Use the spectrum analyzer and measure the following 8 modulating conditions: (1) For combined voice and SAT, disable the compressor, modulate with a 2500 Hz sine wave 13.5 dB greater than that required to produce  $\pm 8$  kHz peak deviation at 1000 Hz and a 6000 Hz SAT with  $\pm 2.0$  kHz peak deviation. (2) For combined Signaling Tone and SAT, modulate with a 10 kHz ST with  $\pm 8$  kHz peak deviation and a 6000 Hz SAT with  $\pm 2.0$  kHz peak deviation. (3) For wideband data, modulate with a quasi-random 10 kbps data pattern with  $\pm 8$  kHz peak deviation. (4) For CDMA, modulate with full rate. (4) For voice only, disable the compressor, modulate with a 2500 Hz sine wave 13.5 dB greater than that required to produce  $\pm 8$  kHz peak deviation at 1000 Hz. (5) For SAT only, modulate with a 6000 Hz SAT with  $\pm 2.0$  kHz peak deviation. (6) For ST only, modulate with a 10 kHz ST with  $\pm 8$  kHz peak deviation. (7) For combined SAT and DTMF, modulate with a 6000 Hz SAT with  $\pm 2.0$  kHz peak deviation and one of the DTMF tones.

**Minimum Standard** - The mean power of emissions from the transmitter with modulated carrier shall be attenuated below the mean power of the unmodulated carrier in accordance with the following.

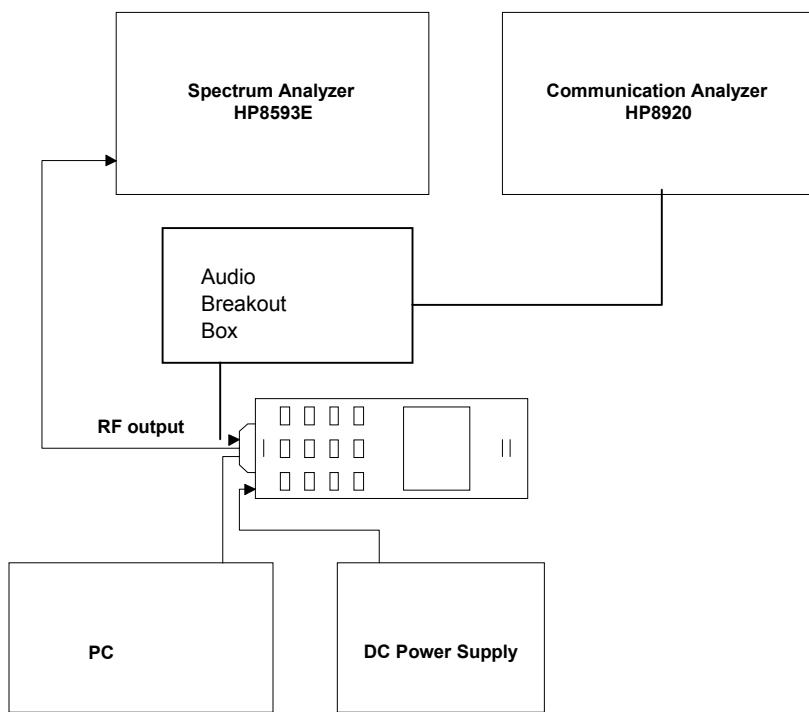
- (1) For all modulation: In a 300 Hz bandwidth centered on any frequency removed from the carrier by greater than 20 kHz up to and including 45 kHz, at least 26 dB.
- (2) For modulation by combined voice and SAT: In a 300 Hz bandwidth centered on any frequency removed from the carrier frequency by greater than 45 kHz, at least  $63 + 10 \log$  (mean output power in Watts) dBc. Since the equipment is rated 27.0dBm, the limit is 60dBc.
- (3) For modulation by wideband data and combined ST and SAT: In a 300 Hz bandwidth centered on any frequency:

- (a) More than 45 kHz up to and including 90 kHz, at least 45 dBc.
- (b) More than 90 kHz up to the first multiple of the carrier frequency, at least  $63 + 10 \log$  (mean power in Watts) dBc.

In addition, in a 30 kHz bandwidth centered anywhere between 869 and 894 MHz, the mean power of emissions from the transmitter with modulated carrier shall not exceed -80 dBm.

Occupied Bandwidth – (In PCS Band)

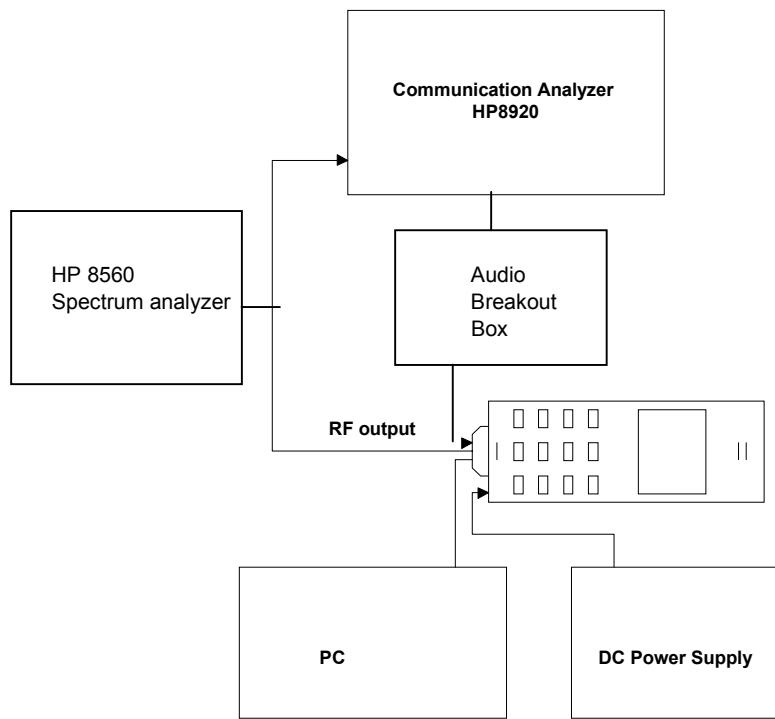
The procedure has been stated in Exhibit 8

Conducted Spurious and Harmonic Emissions at Antenna Terminal

**Definition** - The conducted harmonic and spurious emissions are emissions at the antenna terminals on a frequency or frequencies that are outside the authorized bandwidth of the transmitter.

**Method of Measurement** - The transmitter shall be alternately modulated with combined voice and SAT and with wideband data. For combined voice and SAT measurements, disable the compressor, modulate with a 2500 Hz sine wave 13.5 dB greater than that required to produce  $\pm 8$  kHz peak deviation at 1000 Hz and a 6000 SAT with  $\pm 2.0$  kHz peak deviation. For wideband data measurements, the transmitter shall be modulated with a quasi-random 10 kbps data pattern with  $\pm 8$  kHz peak deviation. The measurement shall be made with a spectrum analyzer from the lowest radio frequency generated in the equipment to the 10th harmonic of the carrier except for that region within 75 kHz of the carrier frequency.

**Minimum Standard** - Conducted harmonic and spurious emissions shall be attenuated below the level of emissions of the carrier frequency by at least  $43 + 10 \log$  (mean output power in Watts) dB.

Frequency Stability

**Definition** - The frequency stability is the ability of the transmitter to maintain an assigned carrier frequency.

**Method of Measurement** - Use the communication tester to sample the transmitter RF output signal and measure its frequency. Vary the ambient temperature from -30 to +60 °C, and also vary the DC supply voltage to the equipment from 3.4 to 4.2 V at each temperature.

**Minimum Standard** - The transmitter carrier frequency shall be maintained within  $\pm 2.5$  ppm.

**Exhibit 14**

**List of Semiconductor Devices**

Included in the part list in separate attachments

**Exhibit 15**

**Circuit Diagrams**

Block and circuit diagrams are included in separate attachments.

**Exhibit 16**

**FCC Identification Label Information**

Included in the separate attachment.

**Exhibit 17**

**Photographs**

The photographs are in a separate attachment.

**Exhibit 18**

**Users Manual**

The user's guide is in a separate attachment.