

Test Report On
Dual-Band Tri-mode AMPS/CDMA Cellular Phone

FCC Part 22 & 24 Certification
IC RSS-129 & 133

FCC ID: **OVFKWC-KX5**

Models: **KX5**

Date: **April 21, 2005**

STATEMENT OF CERTIFICATION

The data, data evaluation and equipment configuration represented herein are a true and accurate representation of the measurements of the sample's radio frequency interference emissions characteristics as of the dates and at the times of the test under the conditions herein specified.

STATEMENT OF COMPLIANCE

This product has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in §2.947.

Date of Test: April 18, 2005 – April 27, 2005

Test performed by: Kyocera Wireless Corp.
10300 Campus Point Drive
San Diego, Ca 92121

Report Prepared by: Fernando Calimbahin, Engineer

Report Reviewed by: Lin Lu, Principal Engineer

Nemko USA, Inc. performed the tests that required an OATS site.

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1 General Information

Applicant:	Kyocera Wireless Corp 10300 Campus Point Drive San Diego CA 92121		
FCC ID:	OVFKWC-KX5		
Product:	Dual-Band Tri-mode Cellular Phone		
Model Numbers:	KX5		
EUT Serial Number:	94-X----18R5PL (model KX5)		
Type:	☐ Prototype, ☒ Pre-Production, ☐ Production		
Device Category:	Portable		
RF Exposure Environment:	General Population / Uncontrolled		
Antenna:	Fixed Stubby		
Detachable Antenna:	Yes		
External Input:	Audio/Digital Data		
Quantity:	Quantity production is planned		
FCC Rule Parts:	§22H	§22H	§24E
Modes:	800 AMPS	800 CDMA	1900 CDMA
Multiple Access Scheme:	FDMA	CDMA	CDMA
TX Frequency (MHz):	824 - 849	824 – 849	1850 - 1910
Emission Designators:	40K0F1D 40K0F8W	1M25F9W	1M25F9W
Max. Output Power (W):	0.240 ERP	0.197 ERP	0.447 EIRP

2 Product Description

This product is a slide phone. There are two industry designs on the top half of the phone, namely KX5-5C0 and KX5-5C1 (see pictures below).

The KX5 has a fixed LCD cover housings. These two housings are made from the same material and have the same dimensions. The only difference is the design of the navigation key. There is no difference to the RF circuitry, main PCB design, mechanical design, basic frequency determining and stabilization circuitry, basic modulator circuit, transmitter active devices, or tuning targets. Therefore, KX5-5C1 was used for the tests in this report and KX5-5C0 was qualified by similarity.

KX5 models:



3 Electronic Serial Numbers (ESN) Protection

The Tri-mode Phone, FCC ID: OVFKWC-KX5 uses ESN. The ESN is a unique identification number to each phone, which 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.

4 FCC Compliance Emergency 911

FCC § 22.921
When an emergency 911 call is originated by the user, the mobile will attempt to acquire any available system and originate the emergency call on that system, disregarding restrictions set by the roaming list. The FCC NPRM WT99-13, CC94-102 automatic analog A/B roaming option has been implemented for 911 emergency calls. Note that the models that contain the letter "L" have Global Positioning System (GPS) support.

5 TTY compliance

FCC § 255 of the Telecom Act
The OVFKWC-KX5 phone models have been designed for TTY Compliance with Cellular Compatibility Standard.

6 Transmitter RF Power Output

6.1 Conducted Power

FCC: § 2.1046	IC: RSS-129 §7.1, RSS-133 §6.2
Measurement Procedures: The RF output power was measured using a Giga-tronics 8541C Universal Power Meter. Terminated to a resistive coaxial load of 50 ohms.	

Open Position

Mode	Frequency (MHz)	Channel	Power (dBm)
AMPS	824.04	991	25.58
	836.49	383	25.48
	848.97	799	25.50
CDMA 800	824.70	1013	25.38
	836.52	384	25.39
	848.31	777	25.32
CDMA 1900	1851.25	25	23.58
	1880.00	600	23.40
	1908.75	1175	23.52

Close Position

Mode	Frequency (MHz)	Channel	Power (dBm)
AMPS	824.04	991	23.97
	836.49	383	24.02
	848.97	799	23.96
CDMA 800	824.70	1013	23.86
	836.52	384	23.96
	848.31	777	24.04
CDMA 1900	1851.25	25	22.01
	1880.00	600	22.08
	1908.75	1175	22.03

6.2 Radiated Power

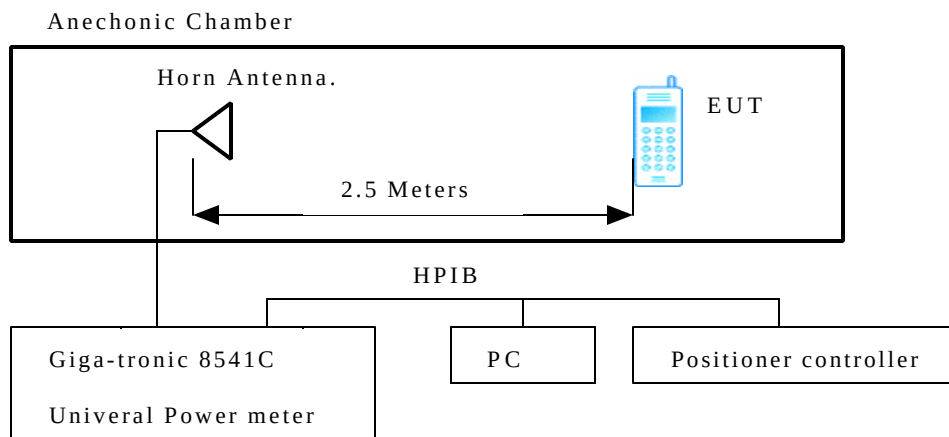
FCC: § 22.913, § 24.232

IC: RSS-129 §7.1 and §9.1, RSS-133 §6.2

Measurement Procedures:

The EUT (SN: 94-X---18R6JD) was positioned on a 2-axis non-conductive positioner inside an anechoic chamber.

The EUT conducted power was set by the phone control software. During tests, the phone was rotated 360 degree in azimuth and elevation by an automated antenna measurement workstation. Maximum radiated power was recorded using a Giga-tronics 8541C Universal Power Meter. All measurement results are EIRP in dBm. For ERP, subtract 2.1 dB from the EIRP data.



Mode	Frequency (MHz)	Channel	Max. Power (dBm)	Ref.
AMPS	824.04	991	22.46	ERP
	836.49	383	23.00	
	848.97	799	23.80	
CDMA 800	824.70	1013	22.81	ERP
	836.52	384	22.92	
	848.31	777	22.94	
CDMA 1900	1851.25	25	26.50	EIRP
	1880.00	600	25.98	
	1908.75	1175	26.30	

Note: the radiated power was measured for both open (slide-up) position and close (slide-down) position. The highest level per channel is listed in the above table.

7 Transmitter Modulation Requirement

7.1 Transmitter Audio Frequency Response

FCC: § 2.1047	IC: RSS-129 §6.2
Measurement Procedures: Measured with HP8924 RF communication test set & R&S FSEA spectrum analyzer. - Operate the transmitter with the compressor disabled, and monitor the output with HP8924 test receiver without de-emphasis. Apply a sine wave audio input to the transmitter external audio input port, vary the modulating frequency from 100 to 3000 Hz, and observe the input levels necessary to maintain a constant ± 2.9 kHz system deviation. - Adjust the audio input level to 20 dB greater than that required to produce ± 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.	

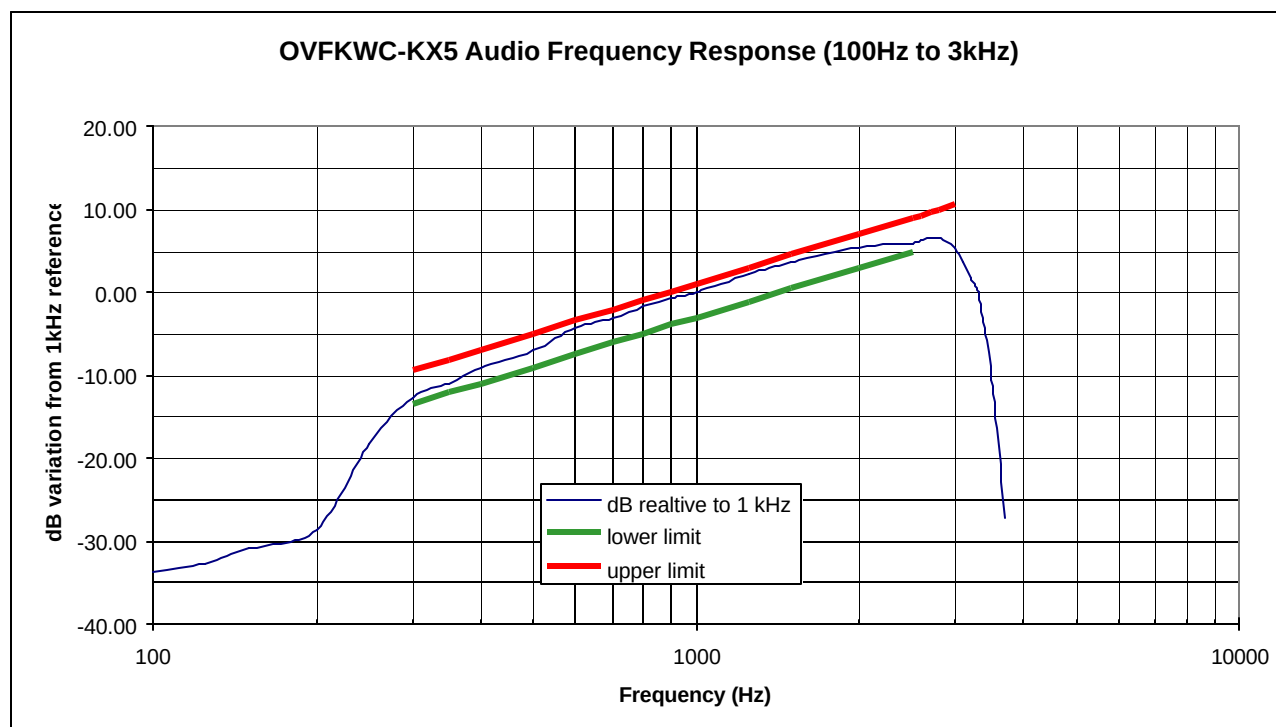


Figure 7.1 Audio Filter Characteristics (100-3000Hz)

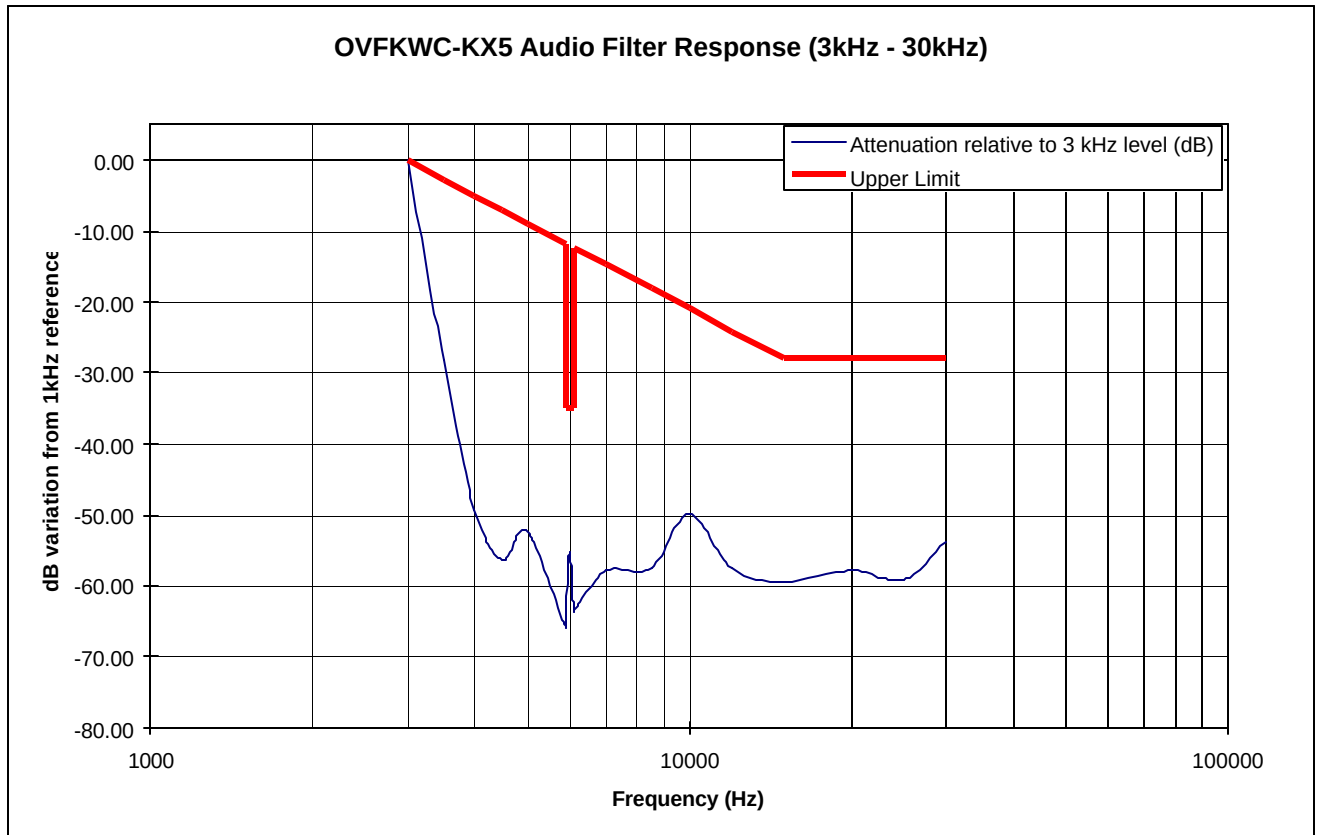


Figure 7.2 Post Limiter Filter Attenuation

7.2 Transmitter Modulation Deviation Limiting

FCC:	§ 2.1047(b)	IC:	RSS-129 §6.1
Measurement Procedures: Measured with HP8924 RF communication test set as an audio signal generator. With the compressor enabled and the SAT disabled, and at three different modulating frequencies (300Hz, 1kHz and 3kHz), adjust the audio input level from -20 dB to +20 dB in reference to the level required to generate 8kHz deviation at 1KHz.			

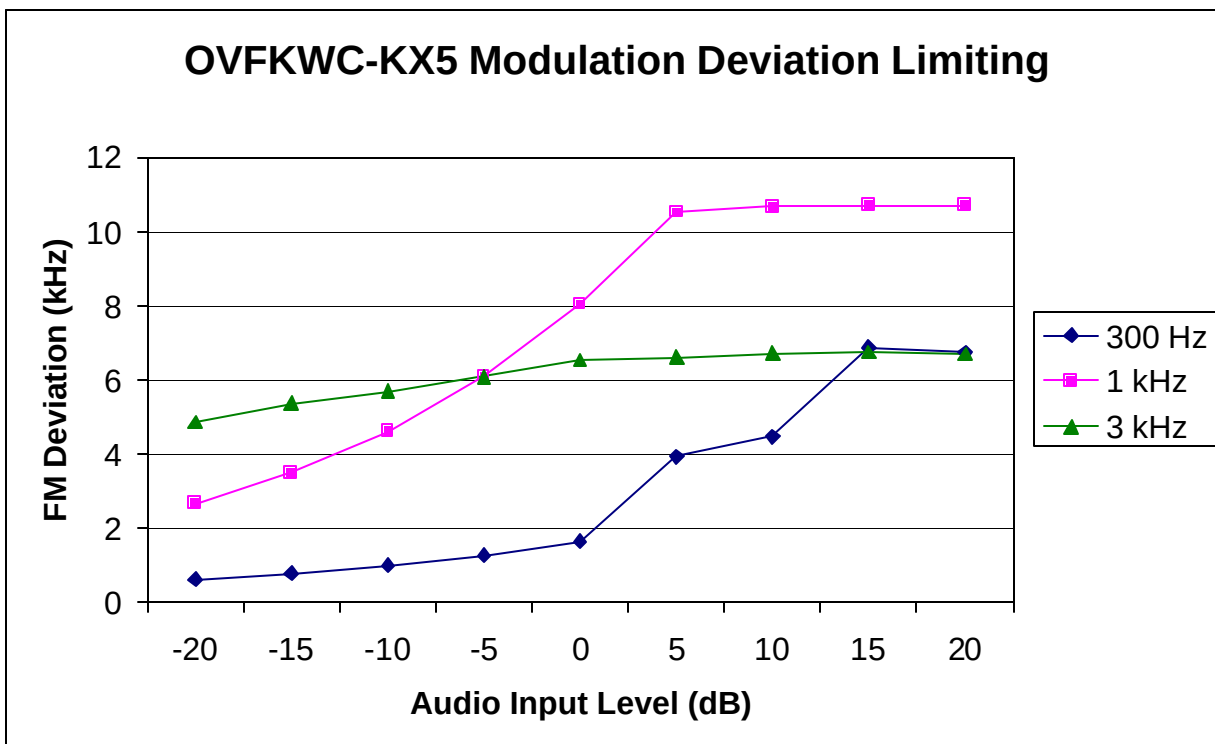


Figure 7.3 Modulation Deviation Limiting

8 Occupied Bandwidth

FCC:	§ 2.1049, § 22.917(b)(d), § 24.238	IC:	RSS-129 §6.3, §8.1
Measurement Procedures: The RF output of the EUT was connected to the input of the spectrum analyzer with sufficient attenuation. The spectrum with no modulation was recorded. <u>For Analog:</u> The audio input signal was adjusted to as followings: (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 ± 8 kHz peak deviation at 1000 Hz and a 6000 Hz SAT with ± 2.0 kHz peak deviation. (2) For combined Signaling Tone and SAT, modulate with a 10 kHz ST with ± 8 kHz peak deviation and a 6000 Hz SAT with ± 2.0 kHz peak deviation. (3) For wideband data, modulate with a quasi-random 10 kbps data pattern with ± 8 kHz peak deviation. (4) For voice only, disable the compressor, modulate with a 2500 Hz sine wave 13.5 dB greater than that required to produce ± 8 kHz peak deviation at 1000 Hz. (5) For SAT only, modulate with a 6000 Hz SAT with ± 2.0 kHz peak deviation. (6) For ST only, modulate with a 10 kHz ST with ± 8 kHz peak deviation. (7) For combined SAT and DTMF, modulate with a 6000 Hz SAT with ± 2.0 kHz peak deviation and one of the DTMF tones. All measurements were performed on middle channel. <u>For Digital:</u> Modulate with full rate.			

List of Figures

Figure	Mode	Description
8-1	AMPS	Un-modulated signal
8-2		SAT
8-3		Voice + SAT
8-4		ST
8-5		SAT+ST
8-6		SAT + DTMF_9
8-7		10kb Wideband Data
8-8	CDMA 800	CDMA @ Ch383
8-9	CDMA 1900	CDMA @ CH600
8-10		Lower Band Edge @ CH 25
8-11		Upper Band Edge @ CH 1175

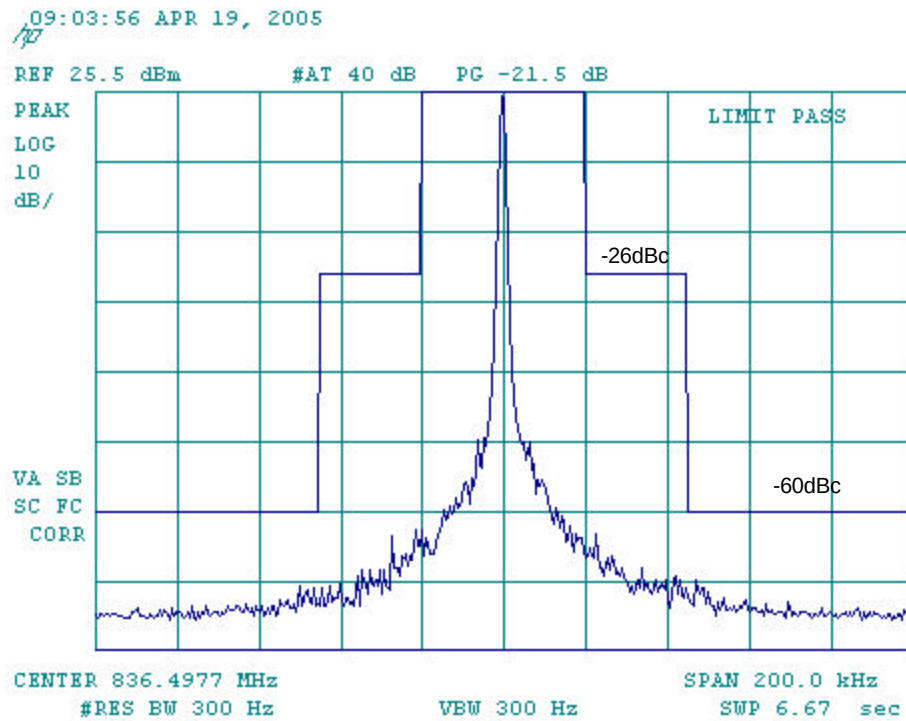


Figure 8-1 AMPS Un-Modulated Signal

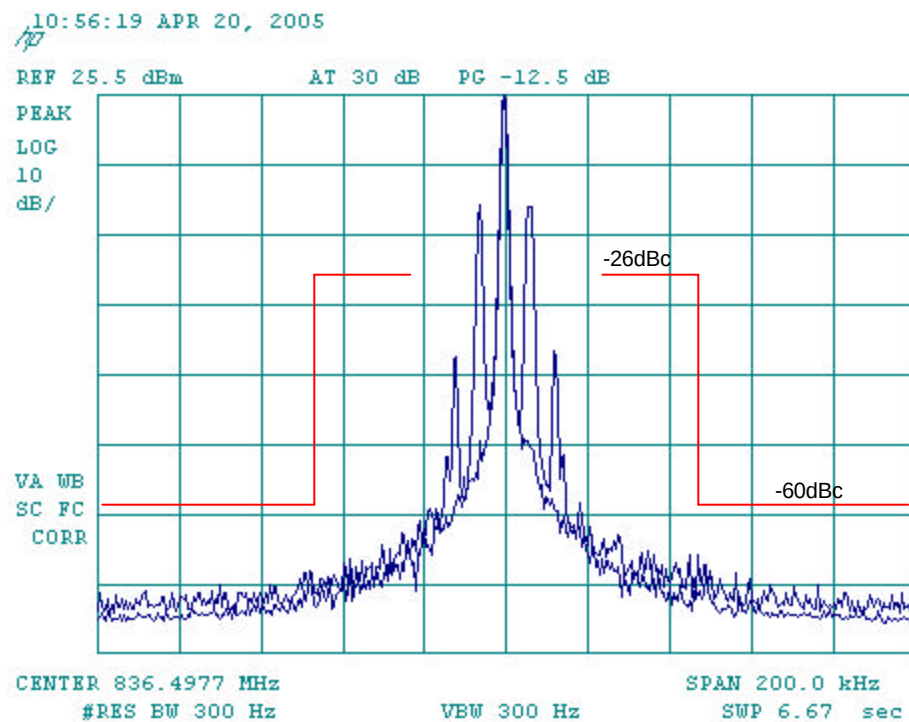


Figure 8-2 AMPS SAT

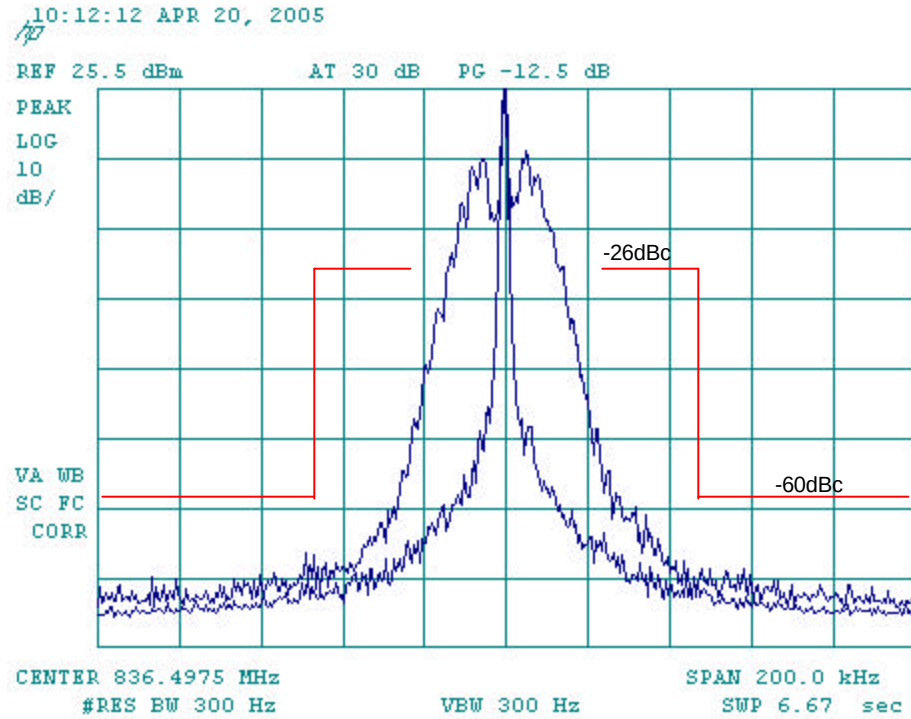


Figure 8-3 AMPS Voice + SAT

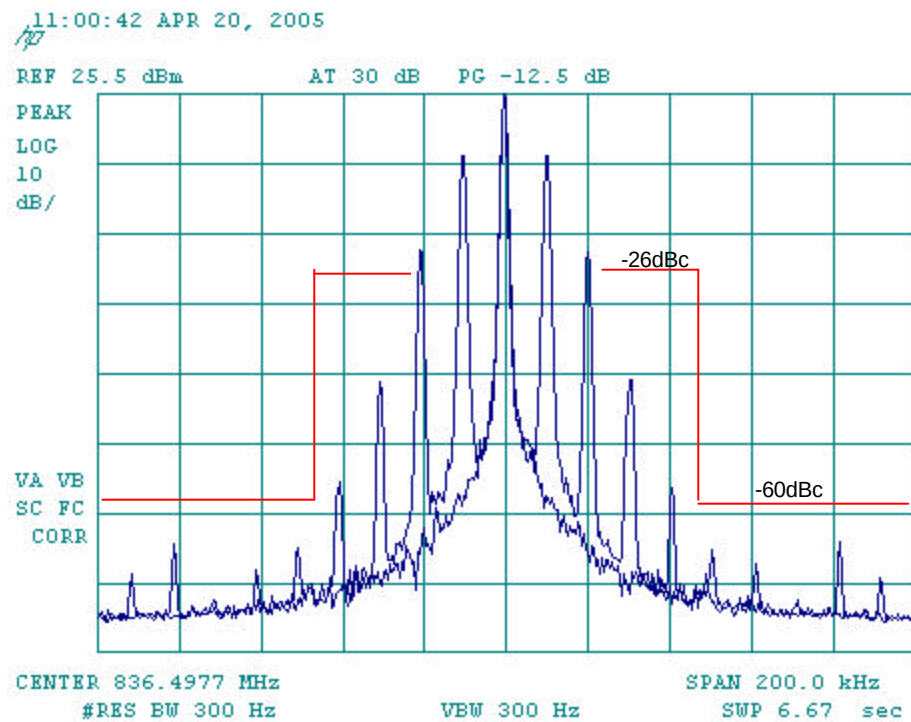


Figure 8-4 AMPS ST

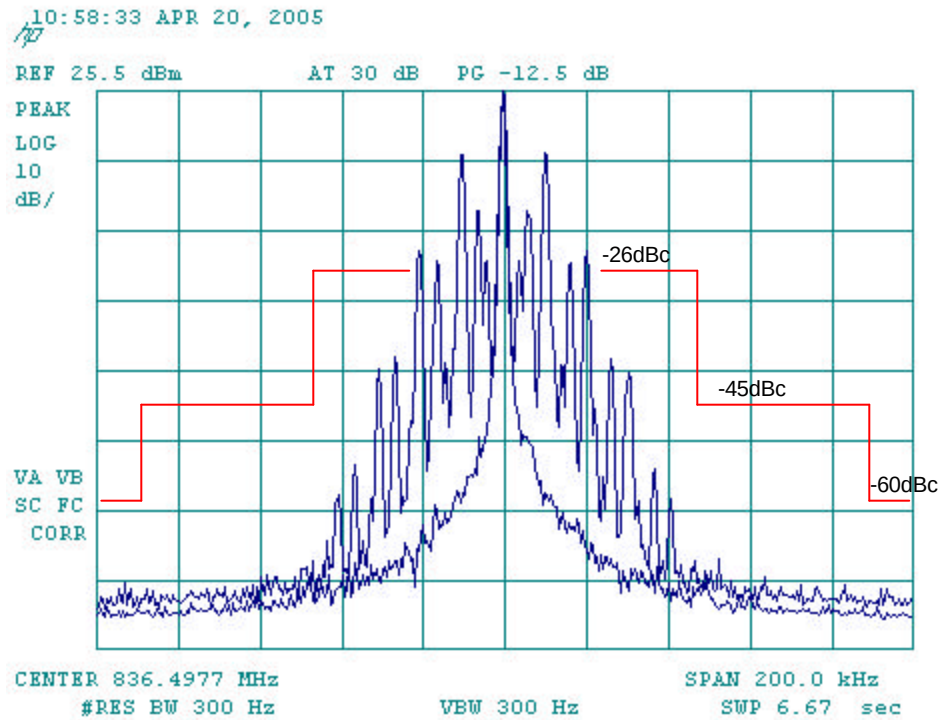


Figure 8-5 AMPS ST + SAT

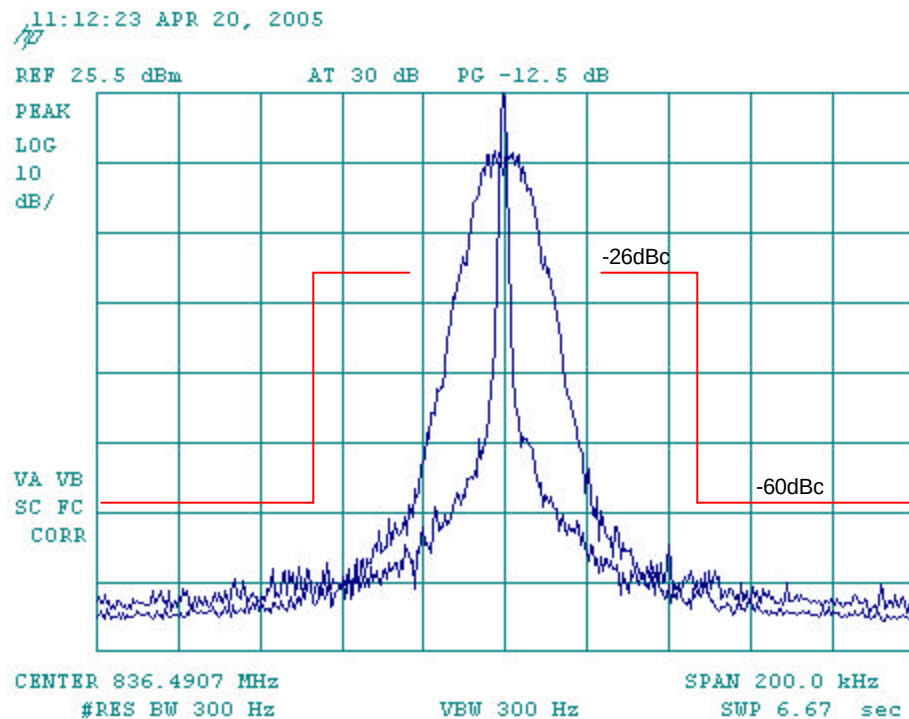


Figure 8-6 SAT + DTMF_9

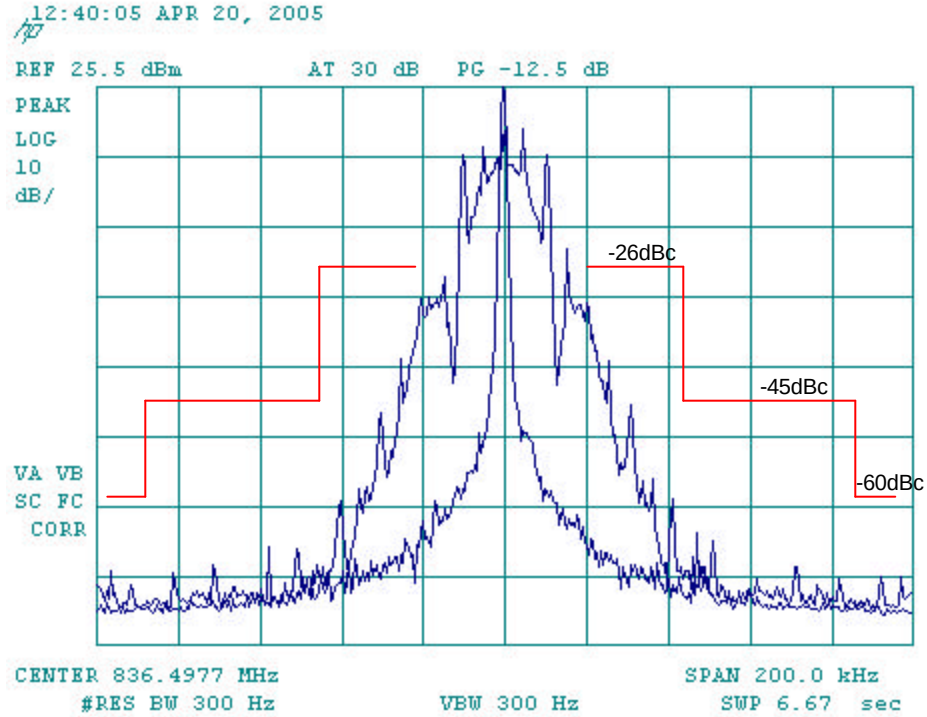


Figure 8-7 AMPS WIDEBAND

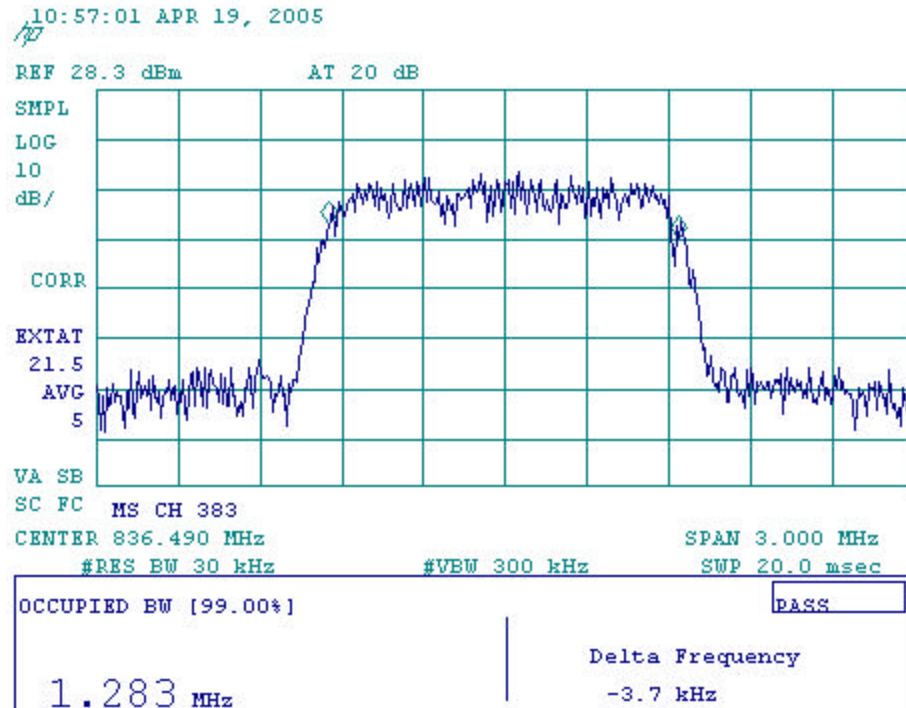


Figure 8-8 CDMA 800 at CH383

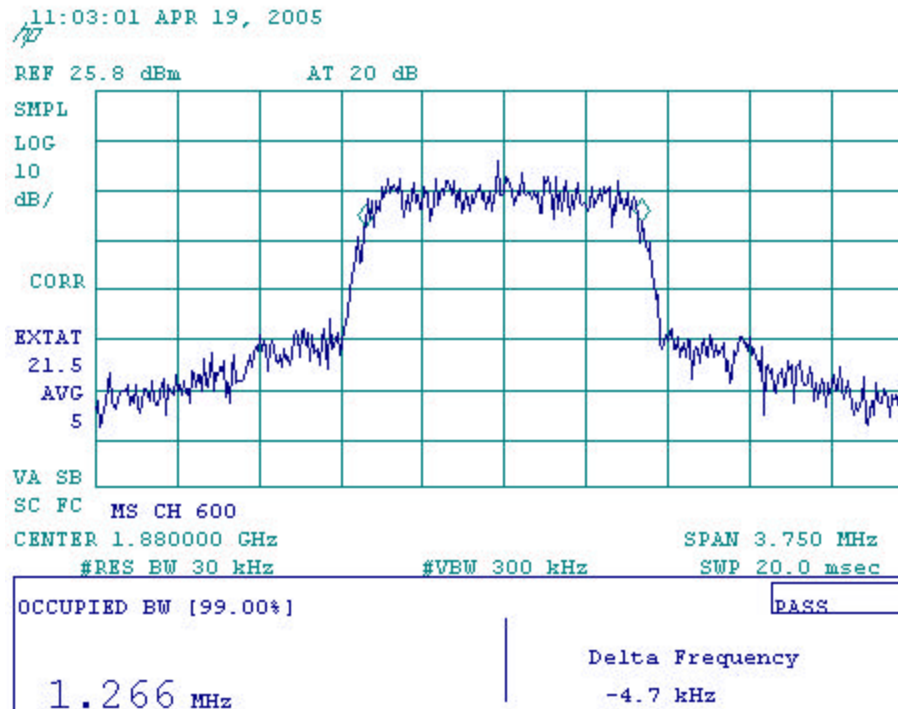


Figure 8-9 CDMA 1900 at 600

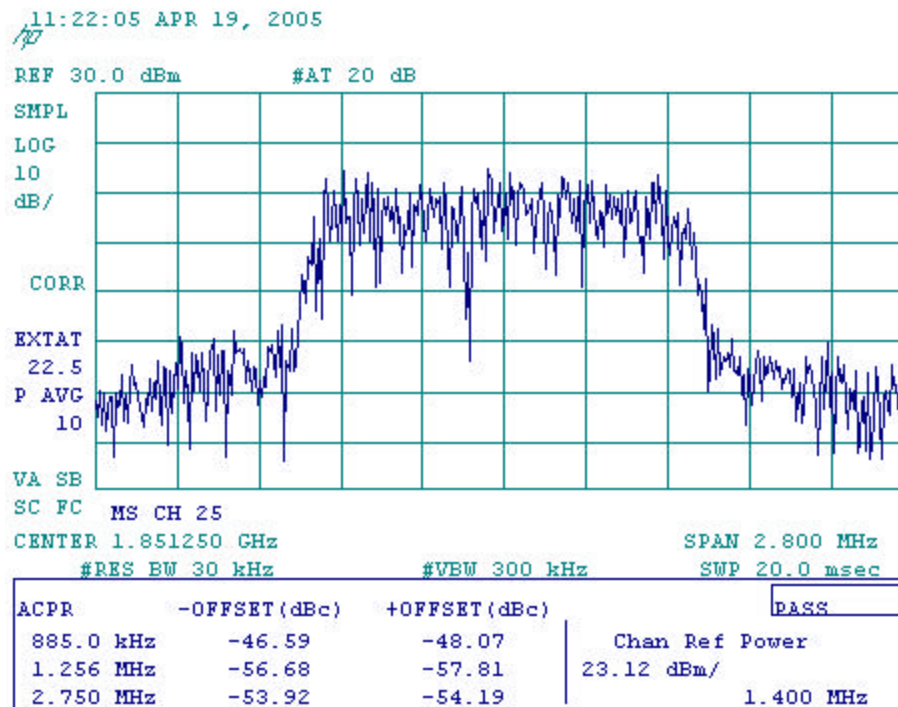


Figure 8-10 CDMA 1900 @ CH25 Lower Band Edge

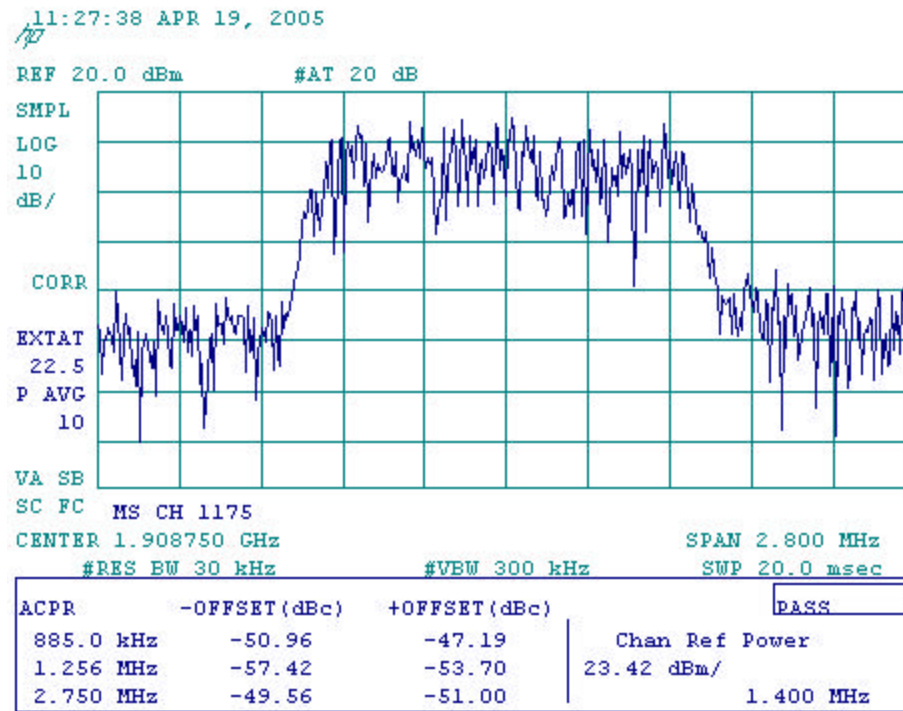


Figure 8-11 CDMA 1900 @ CH1175 Upper Band Edge

9 Spurious Emissions At Antenna Terminals

FCC:	§ 2.1051, § 22.917(e)(f), § 24.238	IC:	RSS-129 §6.3, §8.1, RSS-133 §6.3
Measurement Procedures: <u>Out of Band:</u> The RF output of the EUT was connected to the input of the spectrum analyzer with sufficient attenuation. The modulating signal was applied accordingly. The frequency spectrum was investigated from the lowest frequency signal generated up to at least the tenth harmonic of the fundamental. <u>Base Band:</u> Spectrum was investigated from 869-894 MHz for Cellular.			

List of Figures:

Figure	Mode	Channel	Plot Description
9-1	AMPS	991	Emissions in base station frequency range, 869 - 894 MHz
9-2			Conducted spurious emissions, 9kHz to 10GHz
9-3		383	Emissions in base station frequency range, 869 - 894 MHz
9-4			Conducted spurious emissions, 9kHz to 10GHz
9-5		799	Emissions in base station frequency range, 869 - 894 MHz
9-6			Conducted spurious emissions, 9kHz to 10GHz
9-7	CDMA 800	1013	Emissions in base station frequency range, 869 - 894 MHz
9-8			Conducted spurious emissions, 9kHz to 10GHz
9-9		383	Emissions in base station frequency range, 869 - 894 MHz
9-10			Conducted spurious emissions, 9kHz to 10GHz
9-11		777	Emissions in base station frequency range, 869 - 894 MHz
9-12			Conducted spurious emissions, 9kHz to 10GHz
9-13	CDMA 1900	25	Conducted spurious emissions, 9kHz to 20GHz
9-14		600	Conducted spurious emissions, 9kHz to 20GHz
9-15		1175	Conducted spurious emissions, 9kHz to 20GHz

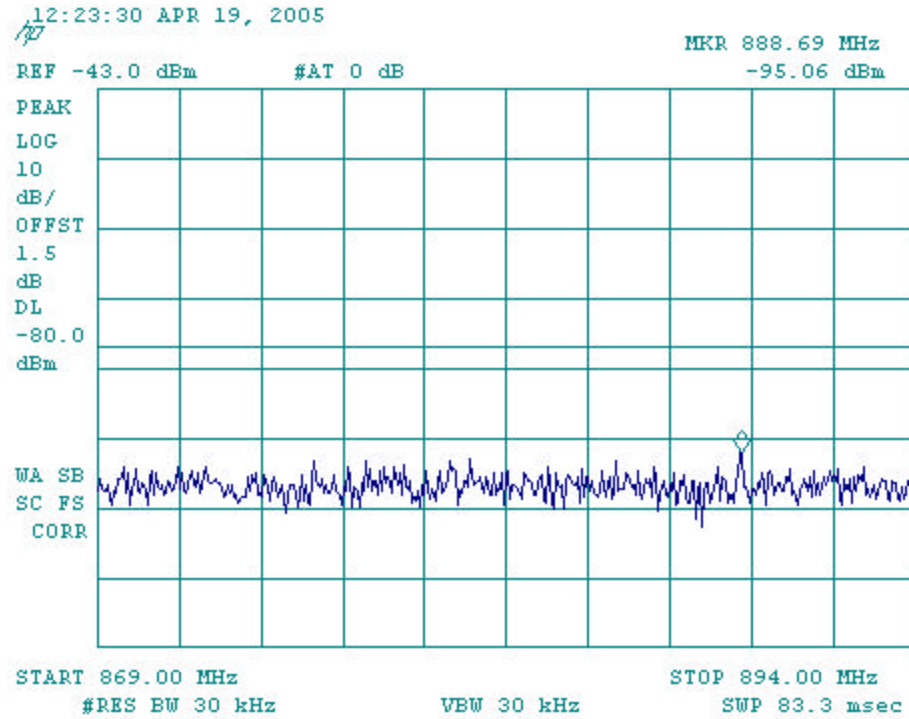


Figure 9-1 AMPS - Emissions in base station frequency range (CH 991)

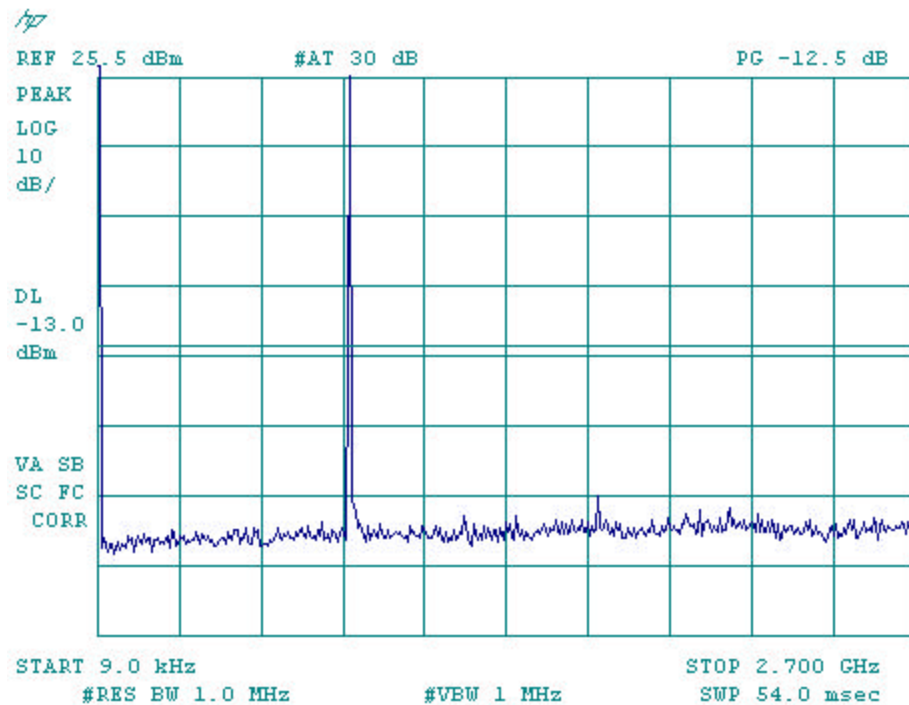


Figure 9-2a AMPS – Conducted Spurious Emission (CH 991)

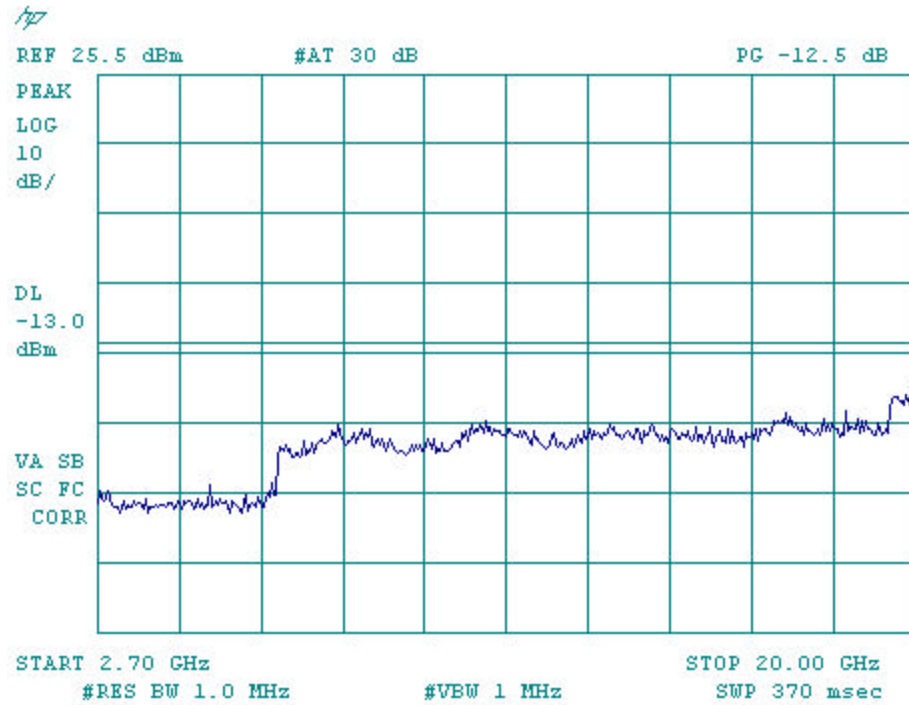


Figure 9-2b AMPS – Conducted Spurious Emission (CH 991)

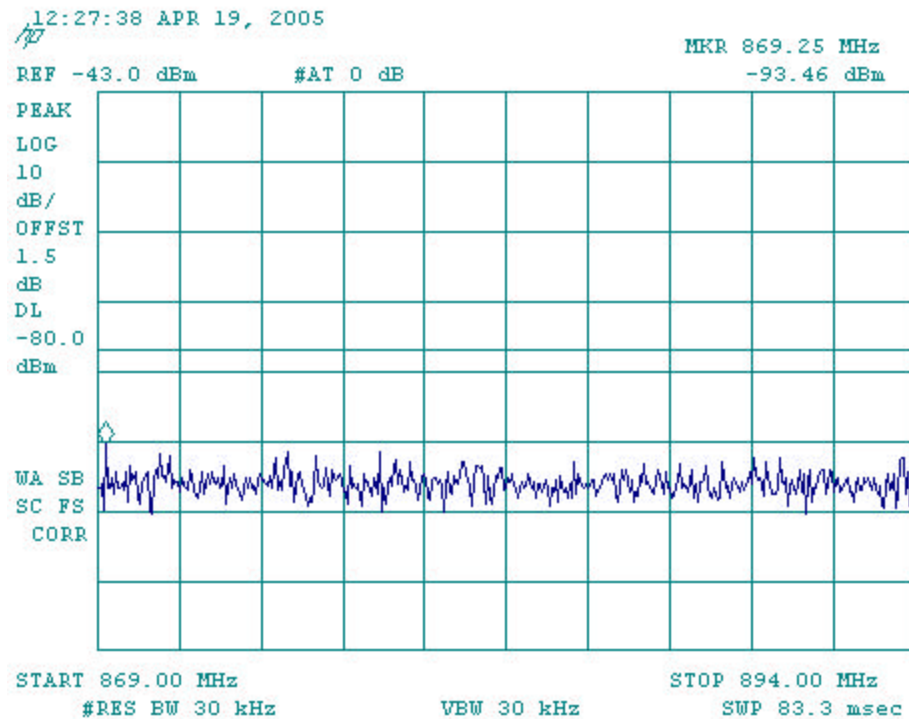


Figure 9-3 AMPS - Emissions in base station frequency range (CH 383)

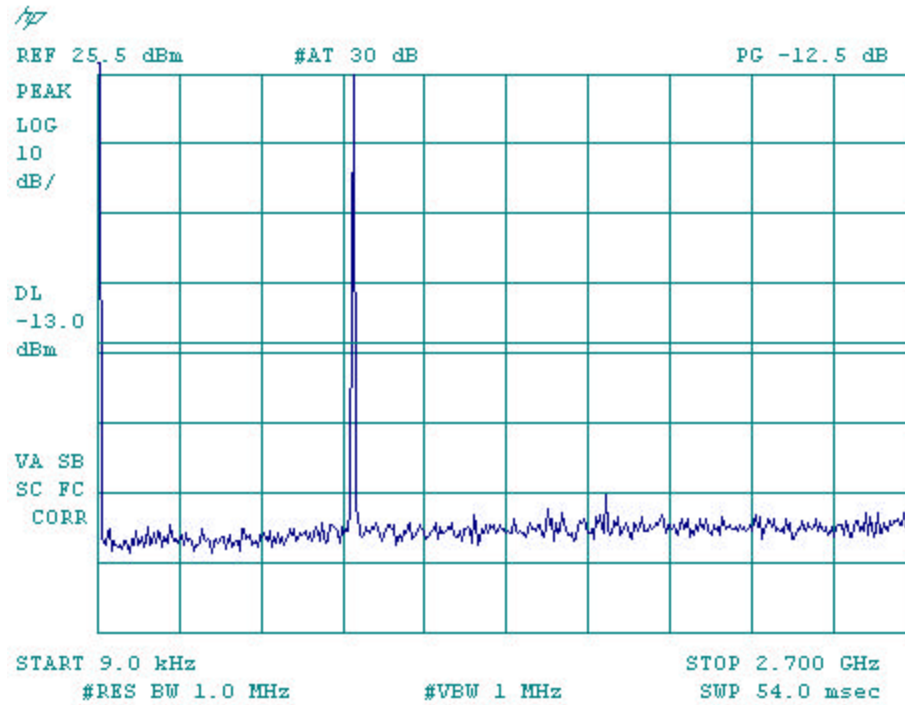


Figure 9-4a AMPS – Conducted Spurious Emission (CH 383)

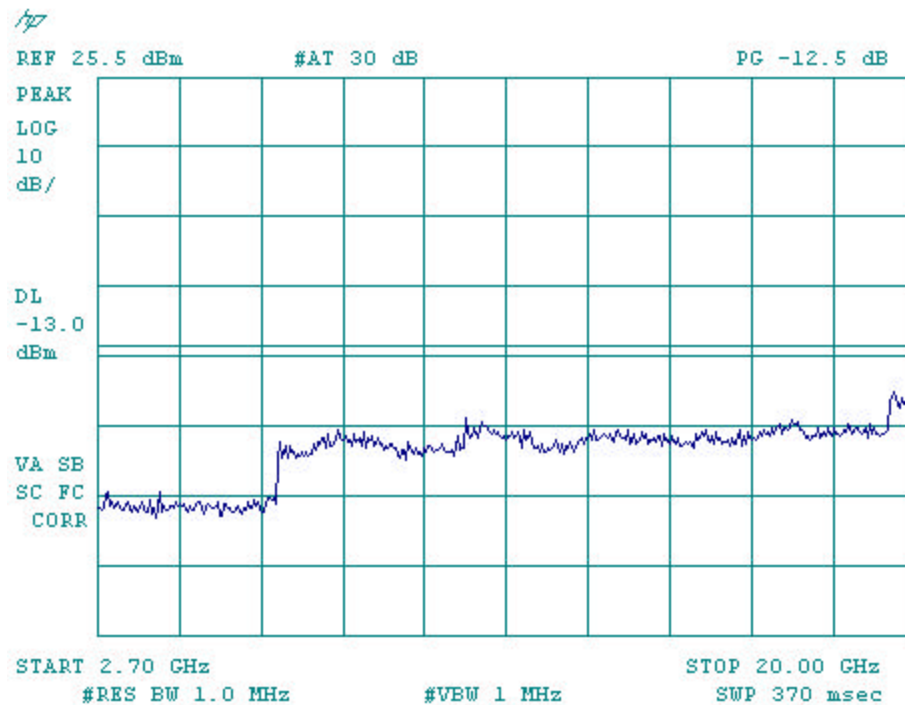


Figure 9-4b AMPS – Conducted Spurious Emission (CH 383)

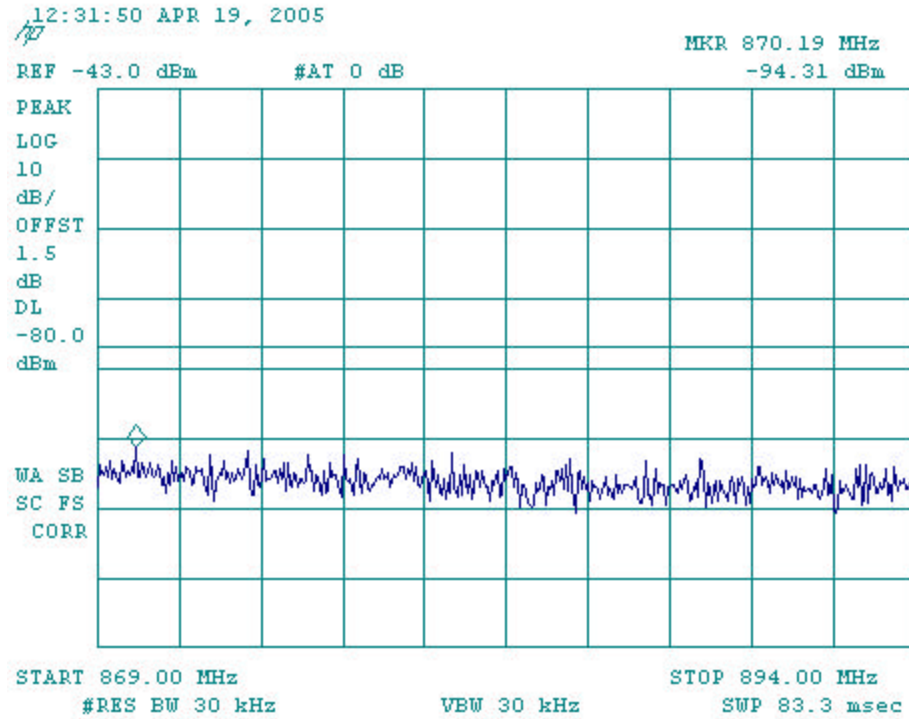


Figure 9-5 AMPS - Emissions in base station frequency range (CH 799)

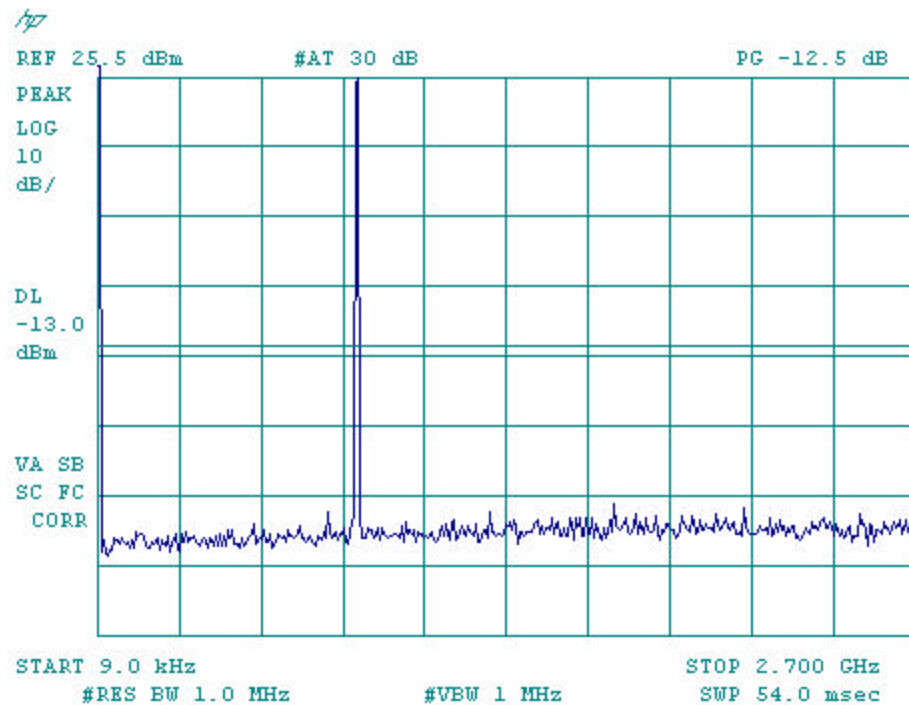


Figure 9-6a AMPS – Conducted Spurious Emission (CH 799)

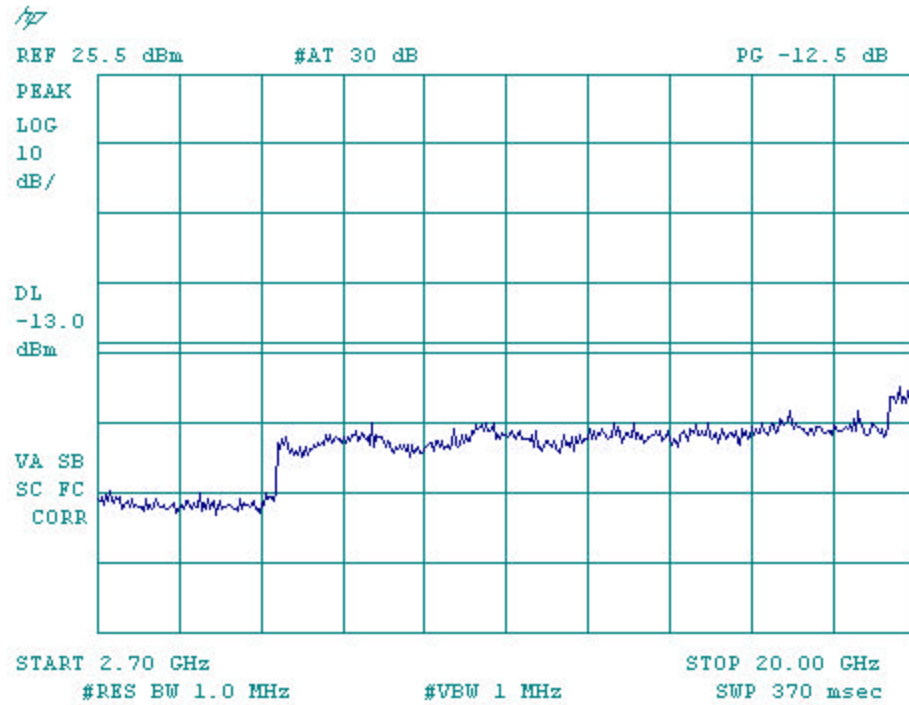


Figure 9-6b AMPS – Conducted Spurious Emission (CH 799)

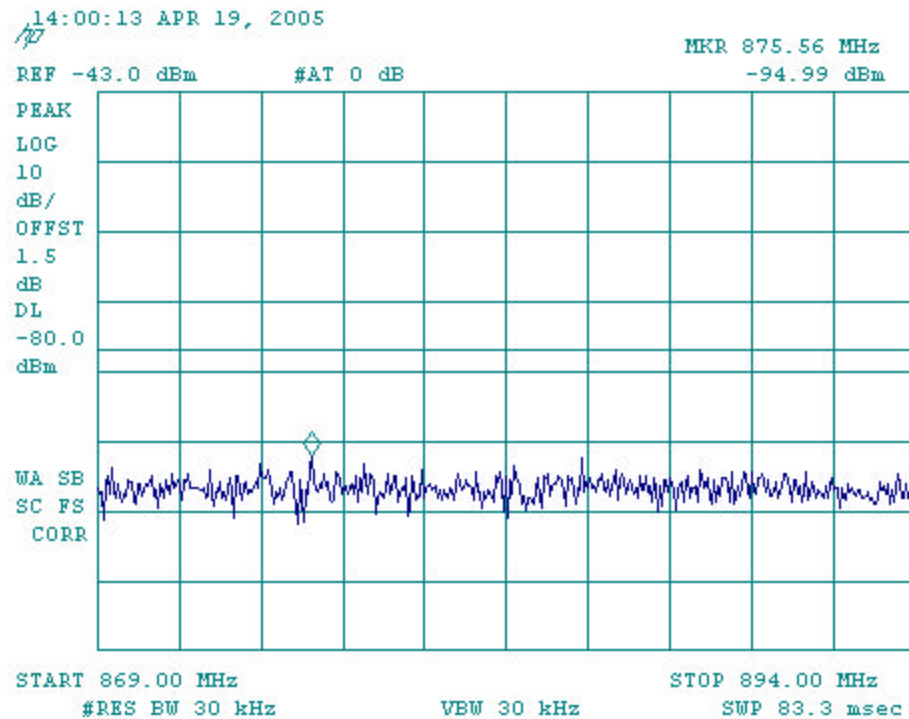


Figure 9-7 CDMA 800 - Emissions in base station frequency range (CH 1013)

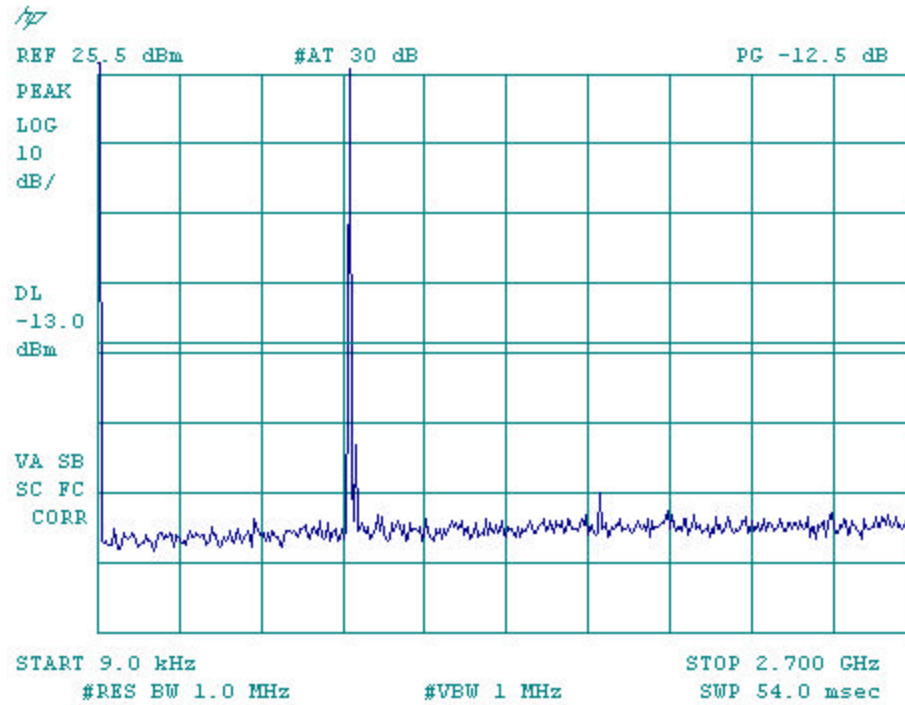


Figure 9-8a CDMA 800 – Conducted Spurious Emission (CH 1013)

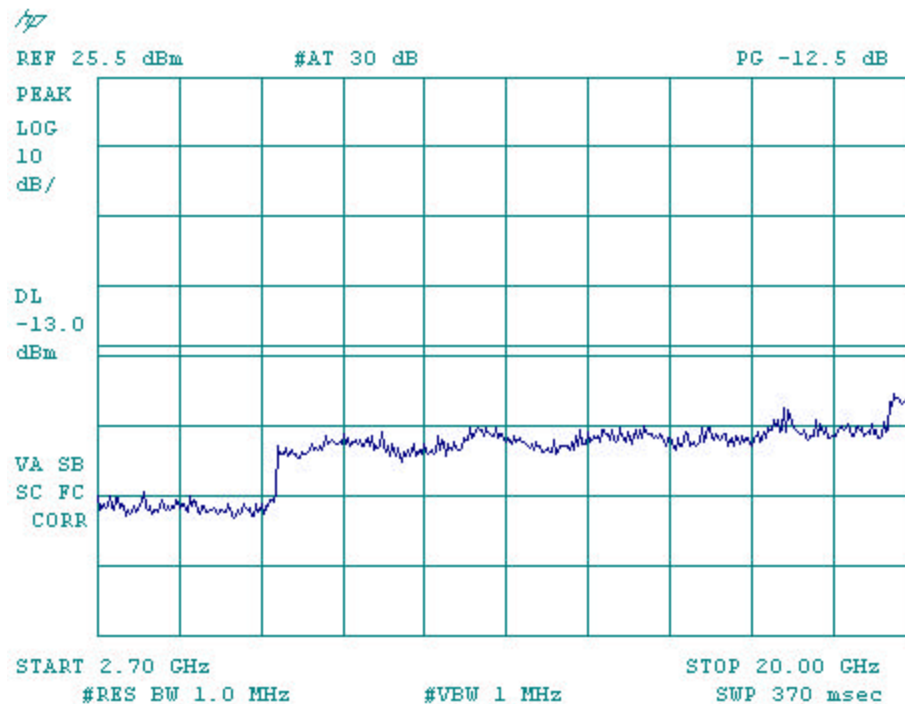


Figure 9-8b CDMA 800 – Conducted Spurious Emission (CH 1013)

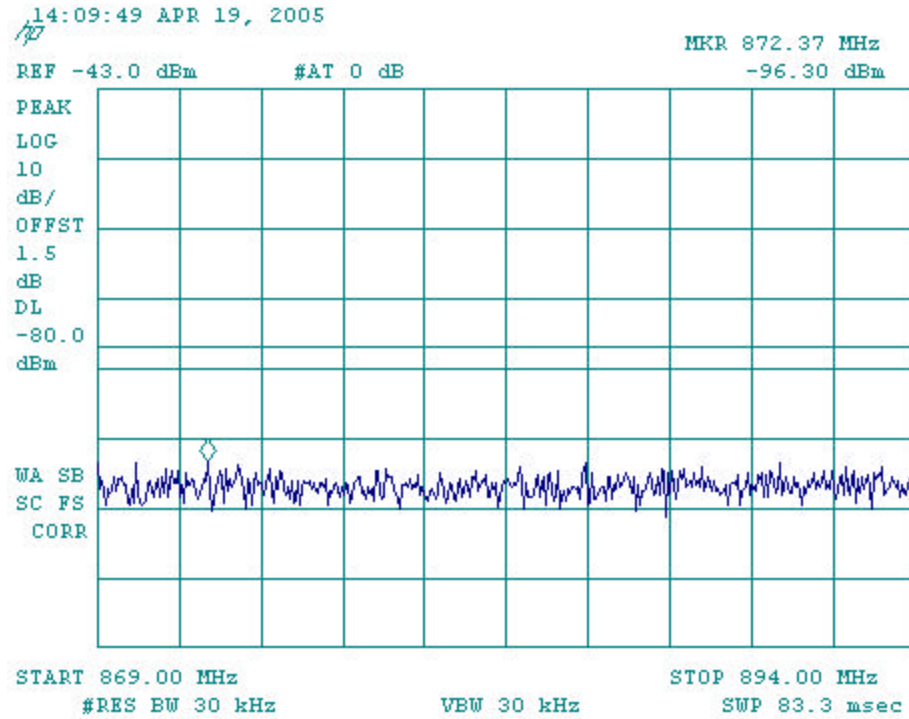


Figure 9-9 CDMA 800 - Emissions in base station frequency range (CH 383)

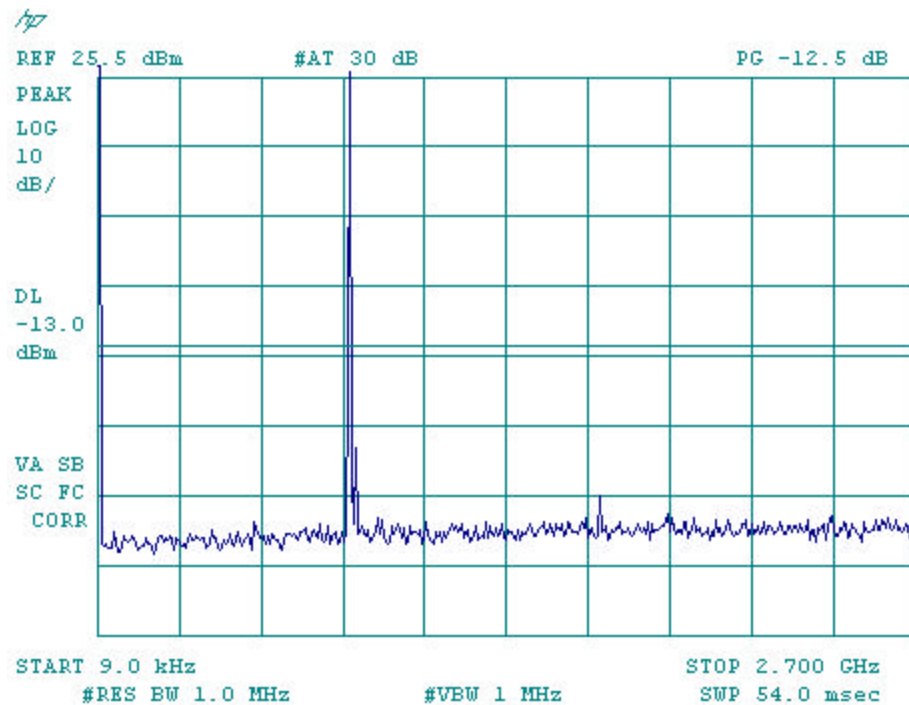


Figure 9-10a CDMA 800 – Conducted Spurious Emission (CH 383)

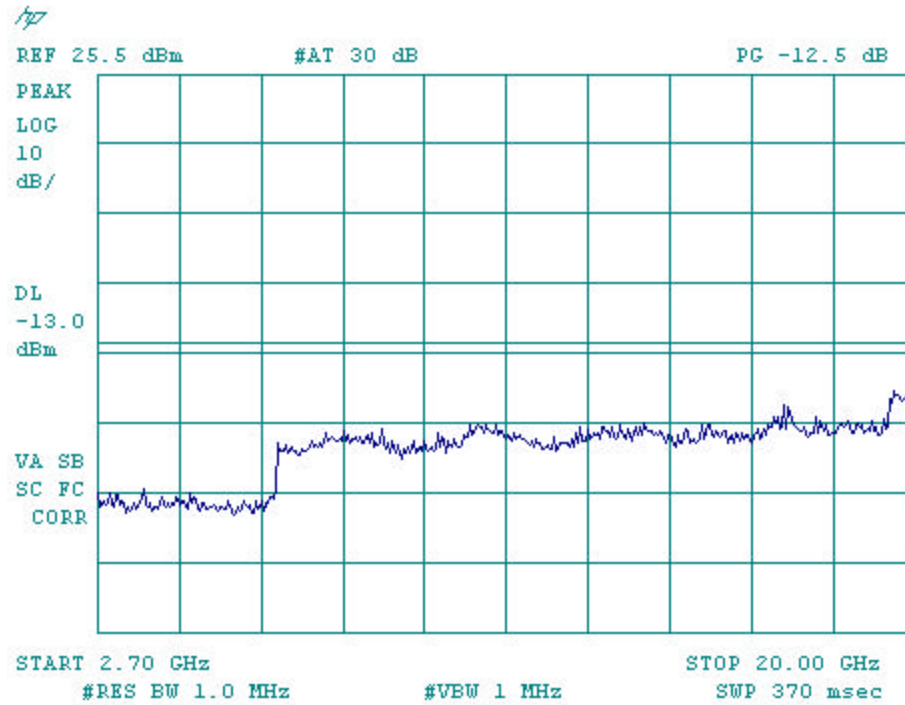


Figure 9-10b CDMA 800 – Conducted Spurious Emission (CH 383)

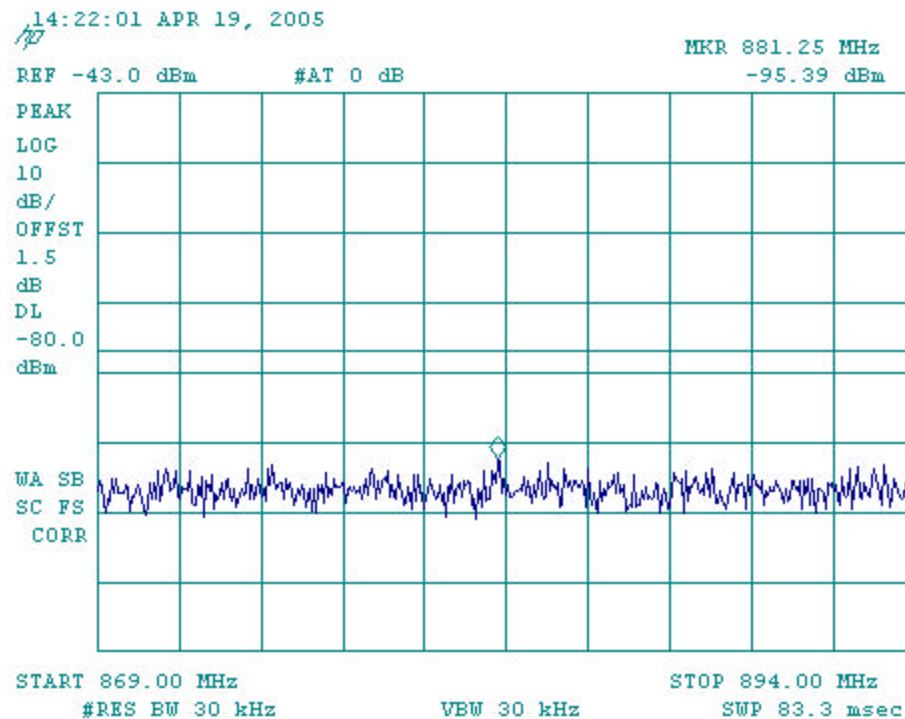


Figure 9-11 CDMA 800 - Emissions in base station frequency range (CH 777)

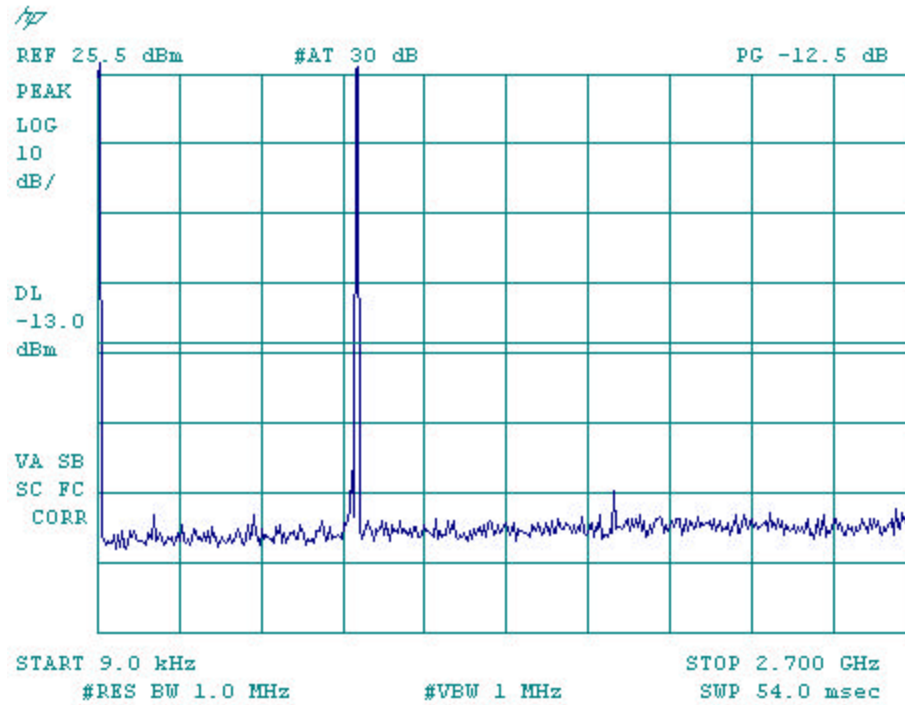


Figure 9-12a CDMA 800 – Conducted Spurious Emission (CH 777)

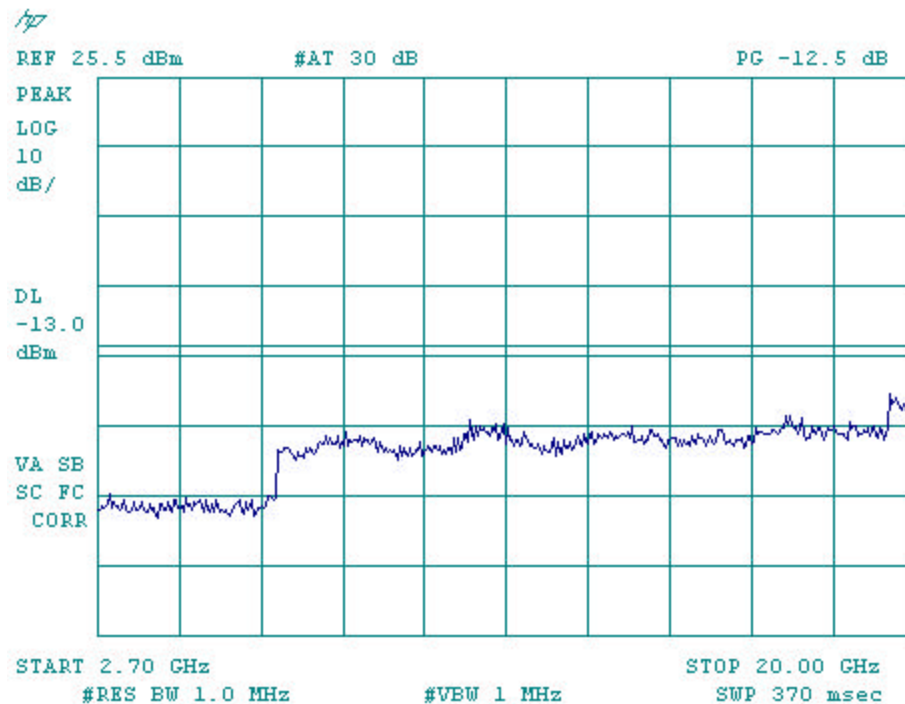


Figure 9-12b CDMA 800 – Conducted Spurious Emission (CH 777)

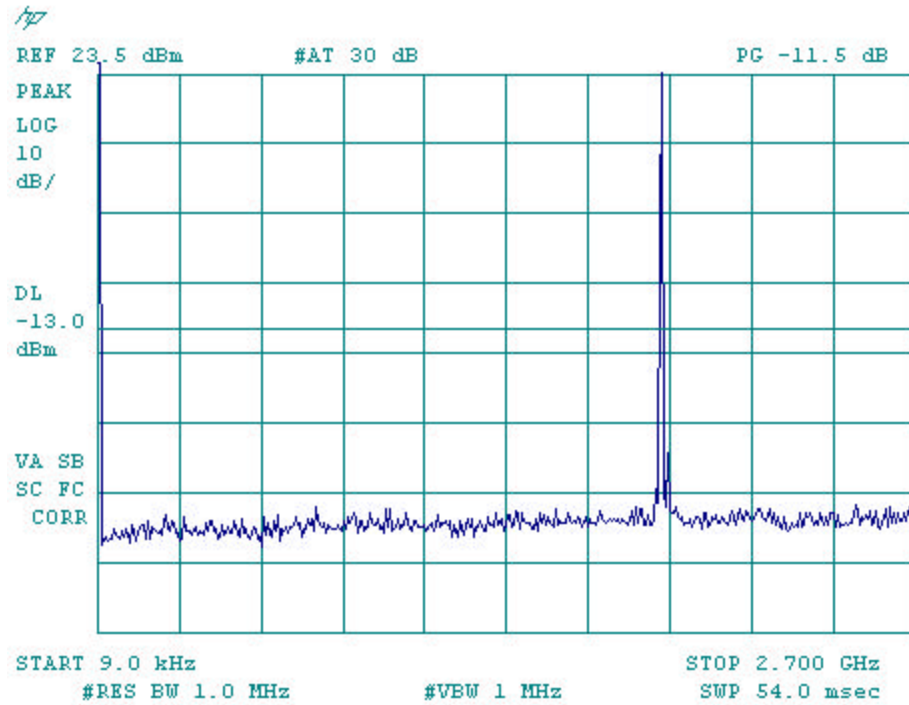


Figure 9-13a CDMA 1900 - Conducted Spurious Emission (CH 25)

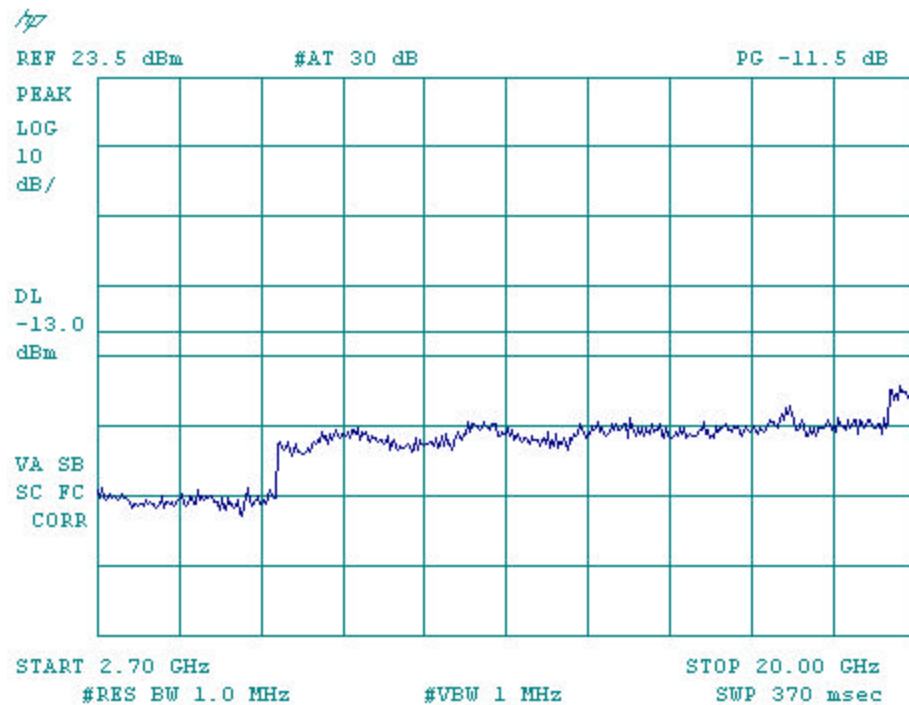


Figure 9-13b CDMA 1900 - Conducted Spurious Emission (CH 25)

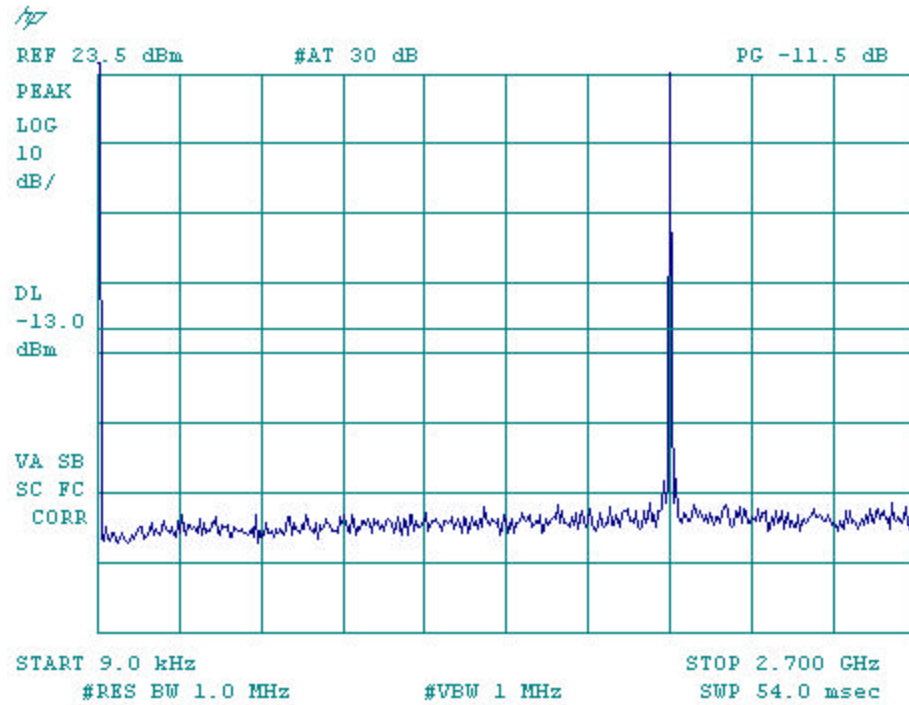


Figure 9-14a CDMA 1900 - Conducted Spurious Emission (CH 600)

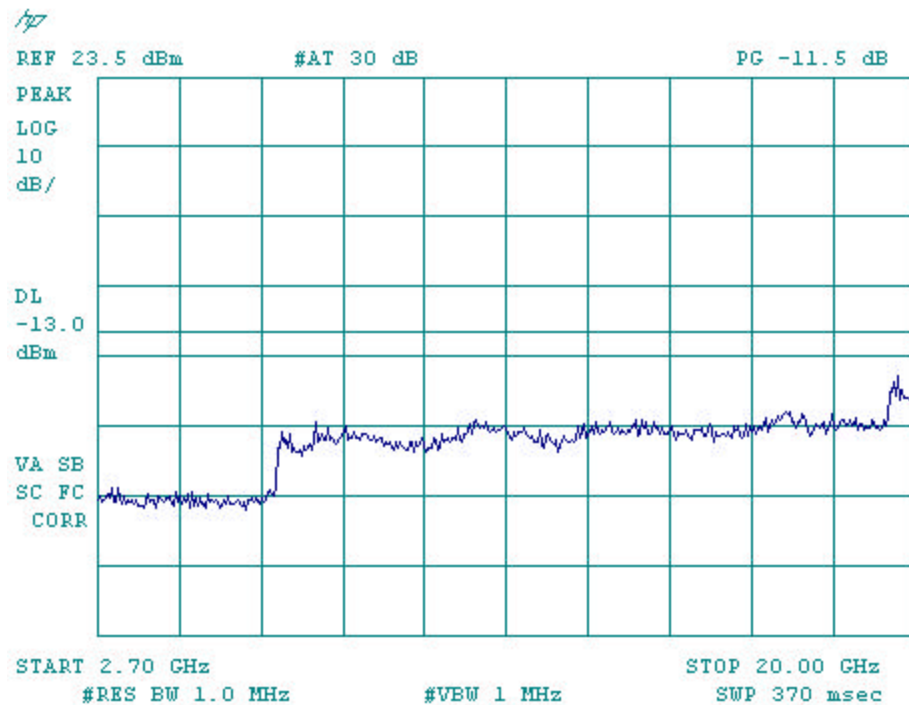


Figure 9-14b CDMA 1900 - Conducted Spurious Emission (CH 600)

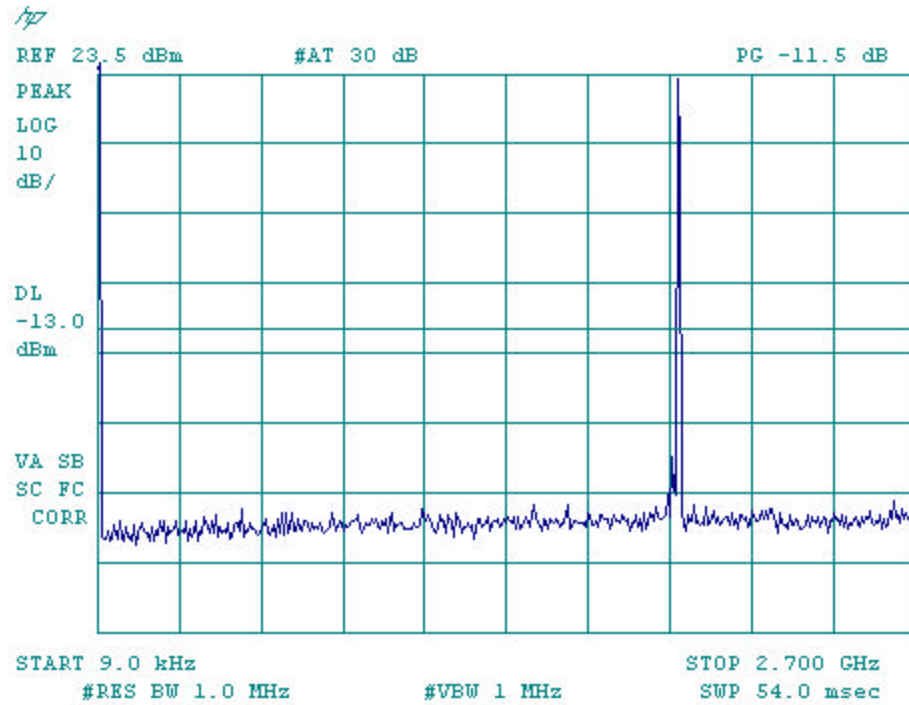


Figure 9-15a CDMA 1900 - Conducted Spurious Emission (CH 1175)

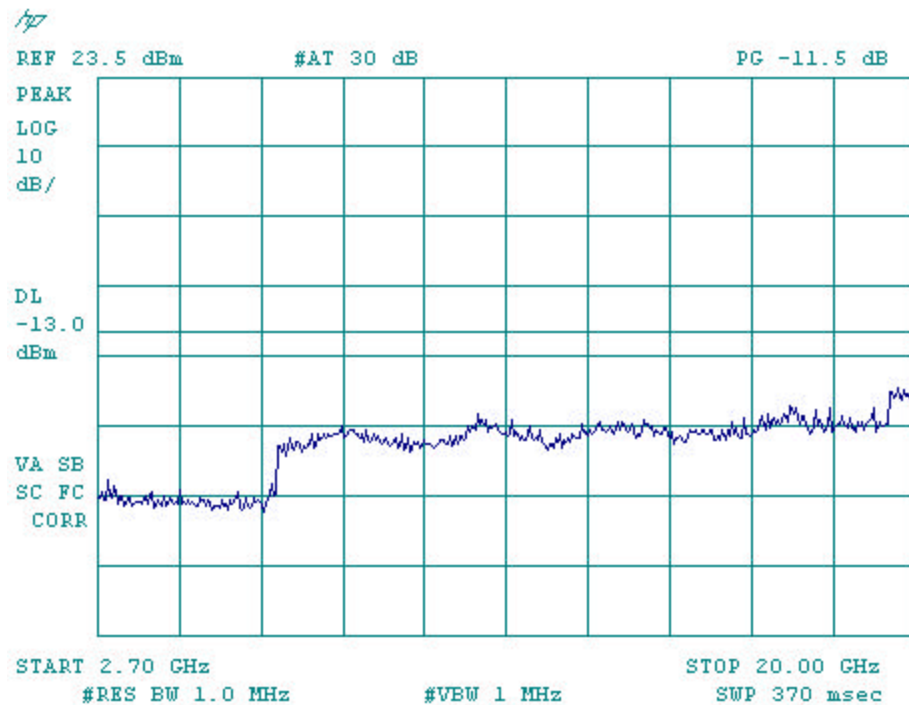


Figure 9-15b CDMA 1900 - Conducted Spurious Emission (CH 1175)

10 Transmitter Radiated Spurious Emissions Measured Data

FCC: § 2.1053, § 22.91, § 24.238	IC: RSS-129 §8.1, RSS-133 §6.3
Measurement Procedures: The radiated spurious emission test was performed at Nemko in San Diego, California. The test report is attached in a separate attachment.	

11 Receiver Spurious Emissions

FCC: § 15.109	IC: RSS-129 §10, RSS-133 §9
Measurement Procedures: The receiver radiated spurious emission test was performed at Nemko in San Diego, California. The test report is attached in a separate attachment.	

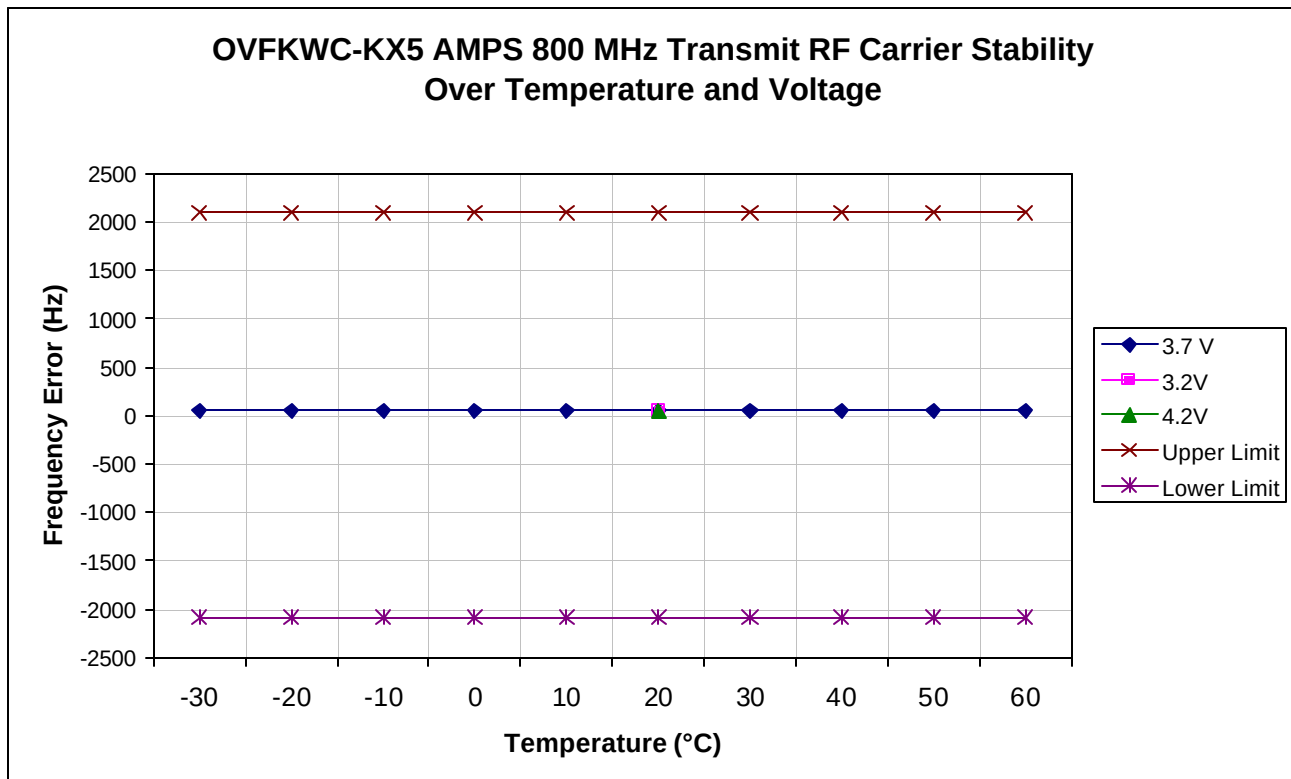
12 Transmitter RF Carrier Frequency Stability

FCC: § 2.1055, § 22.355, § 24.235	IC: RSS-129 §7.2 and §9.2, RSS-133 §7
Measurement Procedures: The EUT was placed in an environmental chamber. The RF output of the EUT was connected to Agilent 8960 Series 10 E5515C. A power supplier was connected as primary voltage supply.	

12.1 AMPS Mode

Tx Frequency:	836.49 MHz	Voltage :	3.7V
Tolerance:	+/- 2.5 Ppm (+/- 2091 Hz)	Ch:	383

Temperature (°C)	Deviation of Carrier (Hz)			Specification (Hz)	
	3.2V (Battery endpoint)	3.7V	4.26V (115%)	Lower limit	Upper limit
-30		49.00		-2091	2091
-20		50.00		-2091	2091
-10		50.00		-2091	2091
0		50.00		-2091	2091
10		50.00		-2091	2091
20	50.00	50.00	50.00	-2091	2091
30		50.00		-2091	2091
40		50.00		-2091	2091
50		50.00		-2091	2091
60		49.00		-2091	2091

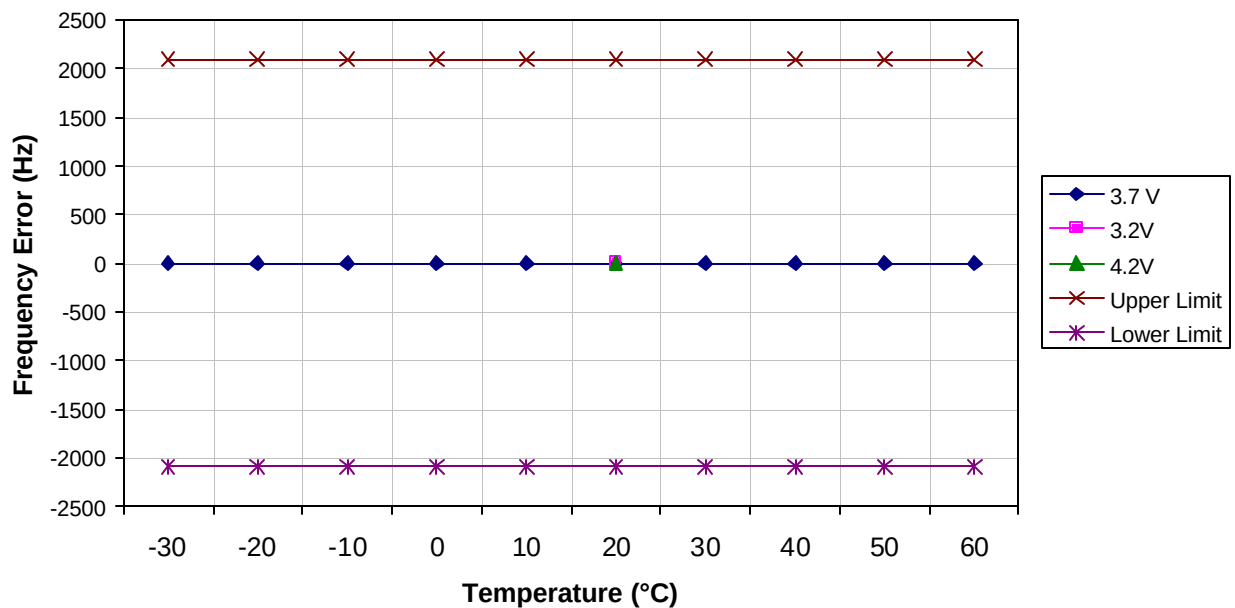


12.2 CDMA 800 Mode

Tx Frequency:	836.49 MHz	Voltage :	3.7V
Tolerance:	+/- 2.5 Ppm (+/- 2091 Hz)	Ch:	383

Temperature (°C)	Deviation of Carrier (Hz)			Specification (Hz)	
	3.2V (Battery endpoint)	3.7V	4.26V (115%)	Lower limit	Upper limit
-30		0.46		-2091	2091
-20		0.62		-2091	2091
-10		0.21		-2091	2091
0		1.13		-2091	2091
10		-0.14		-2091	2091
20	-2.7	-1.43	-1.10	-2091	2091
30		0.69		-2091	2091
40		1.32		-2091	2091
50		0.40		-2091	2091
60		0.66		-2091	2091

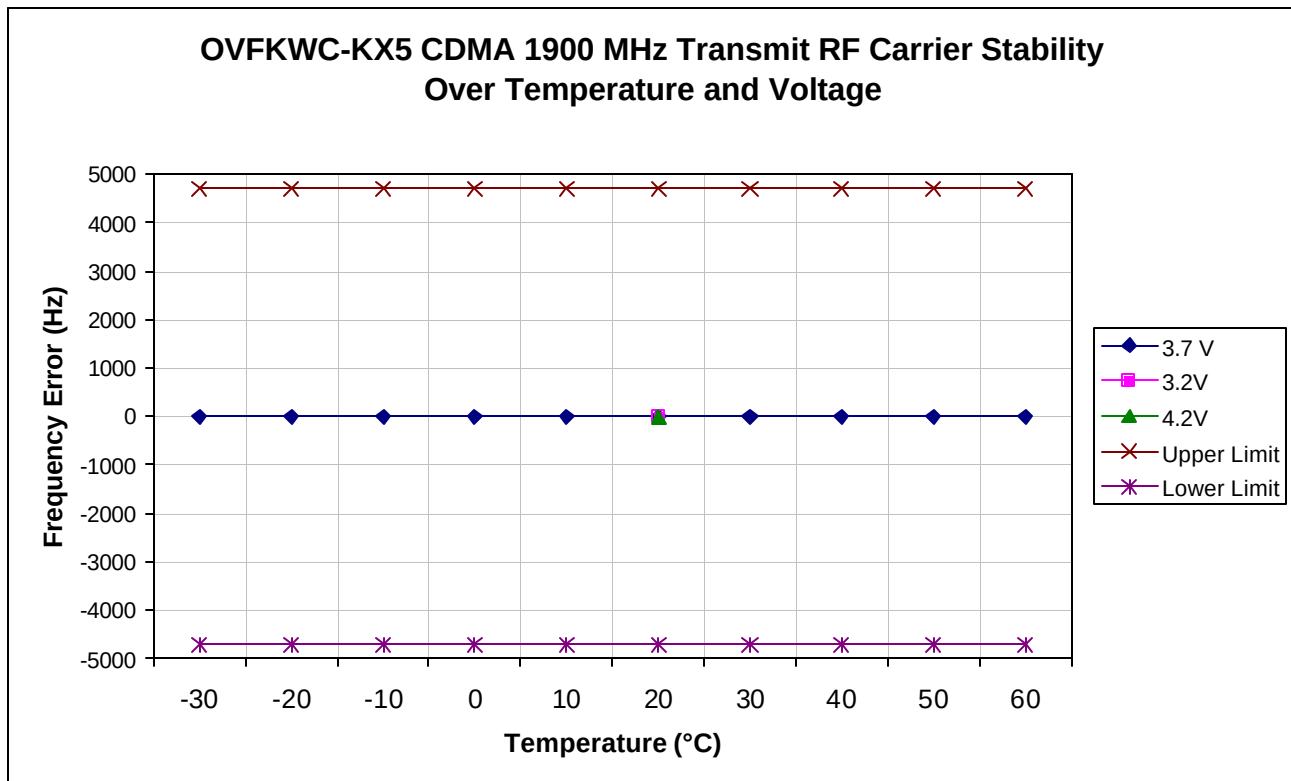
OVFKWC-KX5 CDMA 800 MHz Transmit RF Carrier Stability Over Temperature and Voltage



12.3 CDMA 1900 Mode

Tx Frequency:	1880.00 MHz	Voltage :	3.7V
Tolerance:	+/- 2.5 Ppm (+/-4700 Hz)	Ch:	600

Temperature (°C)	Deviation of Carrier (Hz)			Specification (Hz)	
	3.2V (Battery endpoint)	3.7V	4.26V (115%)	Lower limit	Upper limit
-30		1.12		-4700	4700
-20		0.17		-4700	4700
-10		0.66		-4700	4700
0		0.26		-4700	4700
10		0.59		-4700	4700
20	0.59	1.36	2.40	-4700	4700
30		0.44		-4700	4700
40		0.53		-4700	4700
50		1.53		-4700	4700
60		0.29		-4700	4700



13 Exposure of Humans to RF Fields (SAR)

The SAR Test Report is showed in a separate attachment as Exhibit 9.

14 Test Equipment

Description	Manufacturer	Model Number	Serial Number	Cal Due Date
Power Meter	Giga-tronics	8541C	1835203	12/20/05
Power Meter Sensor	Giga-tronics	80601A	1830321	12/20/05
Spectrum Analyzer	Hewlett Packard	8593EM	3710A00203	03/14/06
Spectrum Analyzer	Hewlett Packard	8594E	3810A04238	04/16/06
Spectrum Analyzer	Rohde & Schwarz	FSEA	001854	03/04/06
Wireless Communications Test Set	Agilent	8960	US41140252	09/16/06
CDMA Mobile Station Test Set	Hewlett Packard	8924C	US37482647	09/16/06
Temperature Chamber	CSZ	Z2033	Z9343034	03/11/06