MET Laboratories, Inc. *Safety Certification - EMI - Telecom Environmental Simulation*
914 WEST PATAPSCO AVENUE ● BALTIMORE, MARYLAND 21230-3432 ● PHONE (410) 354-3300 ● FAX (410) 354-3313

September 19, 2008

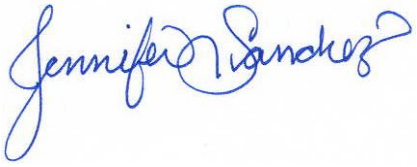
Cellvine, LTD
6 Yoni Netanyahu St. PO Box 57
Or-Yehuda 60376 Israel,

Dear Ziv Shani,

Enclosed is the EMC Wireless test report for compliance testing of the Cellvine, LTD, MPE25K as tested to the requirements of the FCC Certification rules under Title 47 of the CFR Part 22 Subpart H for Cellular Devices, Part 24 Subpart E for Broadband PCS Devices and Part 15 Subpart B for Class A Digital Devices.

Thank you for using the services of MET Laboratories, Inc. If you have any questions regarding these results or if MET can be of further service to you, please contact me.

Sincerely yours,
MET LABORATORIES, INC.



Jennifer Sanchez
Documentation Department

Reference: (\Cellvine, LTD\EMC23790A-FCC Rev. 2)

MET Laboratories, Inc. *Safety Certification - EMI - Telecom Environmental Simulation*
914 WEST PATAPSCO AVENUE ● BALTIMORE, MARYLAND 21230-3432 ● PHONE (410) 354-3300 ● FAX (410) 354-3313

Electromagnetic Compatibility Criteria
Test Report

for the

Cellvine, LTD
Model MPE25K

Tested under
FCC Certification Rules
Title 47 of the CFR, Part 22 Subpart H for Cellular Devices,
Part 24 Subpart E for Broadband PCS Devices
and Part 15 Subpart B for Class A Digital Devices

MET Report: EMC23790A-FCC22 Rev. 2

September 19, 2008

Prepared For:

Cellvine, LTD
6 Yoni Netanyahu St. PO Box 57
Or-Yehuda 60376 Israel,

Prepared By:
MET Laboratories, Inc.
914 W. Patapsco Ave
Baltimore, MD 21230

Electromagnetic Compatibility Criteria
Test Report

for the

Cellvine, LTD
Model MPE25K

Tested Under

FCC Certification Rules
Title 47 of the CFR, Part 22 Subpart H for Cellular Devices,
Part 24 Subpart E for Broadband PCS Devices
and Part 15 Subpart B for Class A Digital Devices

Jeffrey Hazen, Project Engineer
Electromagnetic Compatibility Lab

Jennifer Sanchez
Documentation Department

Engineering Statement: The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of Part 22 Subpart H, Part 24 Subpart E and Part 15 Subpart B of the FCC Rules under normal use and maintenance.

Shawn McMillen, Manager
Electromagnetic Compatibility Lab

Report Status Sheet

Revision	Report Date	Reason for Revision
∅	July 30, 2008	Initial Issue.
1	September 15, 2008	Correct Conducted/Radiated Emissions & Spurious Emissions Section Test Procedures.
2	September 19, 2008	Corrected Output Power Block Diagram.

Table of Contents

List of Tables

List of Figures

List of Plots

List of Photographs

List of Terms and Abbreviations

AC	**A**lternating **C**urrent
ACF	**A**ntenna **C**orrection **F**actor
Cal	**Cal**ibration
d	**M**easurement **D**istance
dB	**D**eci**b**els
dBµA	**D**eci**b**els above one **micro**amp
dBµV	**D**eci**b**els above one **micro**volt
dBµA/m	**D**eci**b**els above one **micro**amp **per m**eter
dBµV/m	**D**eci**b**els above one **micro**volt **per m**eter
DC	**D**irect **C**urrent µ
E	**E**lectric Field
DSL	**D**igital **S**ubscriber **L**ine
ESD	**E**lectro**s**tatic **D**ischarge
EUT	**E**quipment **U**nder **T**est
f	**F**requency
FCC	**F**ederal **C**ommunications **C**ommission
GR-1089-CORE	***(GR)*** **G**eneral **R**equirement(s) imposed by the NEBS standard, **(*CORE*) C**entral **O**ffice **R**ecovery **E**xpress (AT&T), ***(1089)*** specifies various parts of the General Requirements under Bellcore Technical Standard, Requirements for Electromagnetic Compatibility and Electrical Safety - Generic Criteria for Network Telecommunications Equipment
GRP	**G**round **R**eference **P**lane
H	Magnetic Field
HCP	**H**orizontal **C**oupling **P**lane
Hz	**H**ert**z**
IEC	**I**nternational **E**lectrotechnical **C**ommission
kHz	**k**ilo**h**ert**z**
kPa	**k**ilo**pa**scal
kV	**k**ilovolt
LISN	**L**ine **I**mpedance **S**tabilization **N**etwork
MHz	**M**ega**h**ertz
µH	**micro**henry
µ	**micro**farad
µs	**micros**econds
NEBS	**N**etwork **E**quipment-**B**uilding **S**ystem
PRF	**P**ulse **R**epetition **F**requency
RF	**R**adio **F**requency
RMS	**R**oot-**M**ean-**S**quare
TWT	**T**raveling **W**ave **T**ube
V/m	**V**olts **per m**eter
VCP	**V**ertical **C**oupling **P**lane

I. Executive Summary

A. Purpose of Test

An EMC evaluation was performed to determine compliance of the **Cellvine, LTD MPE25K**, with the requirements of Part 22 Subpart H, Part 24 Subpart E and Part 15 Subpart B. All references are to the most current version of Title 47 of the Code of Federal Regulations in effect. In accordance with §2.1033, the following data is presented in support of the Certification of the **MPE25K**. **Cellvine, LTD** should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the **MPE25K**, has been **permanently** discontinued

B. Executive Summary

The following tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 22 Subpart H, Part 24 Subpart E and Part 15 Subpart B,, in accordance with **Cellvine, LTD**, purchase order number 080108-634.

Reference	Description	Compliance
Part 15 Subpart B §15.109(a)	Conducted Emissions	Compliant
Part 15 Subpart B §15.107(a)	Radiated Emissions	Compliant
§2.1046; §22.913, §24.232	RF Power Output	Compliant
§2.1047	Modulation Characteristics	N/A
§2.1049	Occupied Bandwidth	Compliant
§2.1051; §22.917, §24.238	Conducted Spurious Emissions at Antenna Terminals	Compliant
§2.1053; §22.917, §24.238	Radiated Spurious Emissions from the Cabinet	Compliant
§2.1055; §22.355, §24.135	Frequency Stability	N/A
2-11-04/EAB/RF	Out of Band Rejection	Compliant

Table 1 Executive Summary of EMC ComplianceTesting

II. Equipment Configuration

A. Overview

MET Laboratories, Inc. was contracted by Cellvine, LTD to perform testing on the MPE25K, under Cellvine, LTD's purchase order number 080108-634.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the Cellvine, LTD, MPE25K.

The results obtained relate only to the item(s) tested.

Model(s) Tested:	VUV-BDA-MPE25K-52-AA-XBX-VZW			
Model(s) Covered:	VUV-BDA-MPE25K-52-AA-XBX-VZW			
EUT Specifications:	Primary Power: 110-220V			
	FCC ID: VUVMPE25KVZW			
	Type of Modulations:	CDMA		
	Emission Designators:		**Downlink**	**Uplink**
		Cellular:	1M40D7W	1M44D7W
		PCS:	1M44D7W	1M42D7W
	Equipment Code:	PCB		
	RF Output Power:		**Downlink**	**Uplink**
		Cellular:	22 dBm	12.7 dBm
		PCS:	22.5 dBm	13.3 dBm
	EUT Frequency Ranges:	**Downlink**	869 – 894 MHz 1930 – 1990 MHz	
		Uplink	824 – 849 MHz 1850– 1910 MHz	
Analysis:	The results obtained relate only to the item(s) tested.			
Environmental Test Conditions:	Temperature: 15-35º C			
	Relative Humidity: 30-60%			
	Barometric Pressure: 860-1060 mbar			
Evaluated by:	Jeffrey Hazen			
Date(s):	July 11, 2008			

Table 2. EUT Summary Table

B. References

CFR 47, Part 22, Subpart H	Federal Communication Commission, Code of Federal Regulations, Title 47, Part 22: Rules and Regulations for Cellular Devices.
CFR 47, Part 24, Subpart E	Federal Communication Commission, Code of Federal Regulations, Title 47, Part 24: Rules and Regulations for Personal Communications Services
CFR 47, Part 15, Subpart B	Electromagnetic Compatibility: Criteria for Radio Frequency Devices
ANSI C63.4:2003	Methods and Measurements of Radio-Noise Emissions from Low-Voltage Electrical And Electronic Equipment in the Range of 9 kHz to 40 GHz
ANSI/NCSL Z540-1-1994	Calibration Laboratories and Measuring and Test Equipment - General Requirements
ANSI/ISO/IEC 17025:2000	General Requirements for the Competence of Testing and Calibration Laboratories
EIA/TIA-603-A-2001	Land Mobile FM or PM Communication Equipment Measurement and Performance Standards

Table 3. Standard References

C. Test Site

All testing was performed at MET Laboratories, Inc., 914 West Patapsco Ave, Baltimore, MD 21230. All equipment used in making physical determinations is accurate and bears recent traceability to the National Institute of Standards and Technology.

Radiated Emissions measurements were performed in a 3 meter semi-anechoic chamber (equivalent to an Open Area Test Site).

D. Description of Test Sample

The Cellvine, LTD MPE25K Repeater system is to improve coverage for Verizon CDMA and EVDO customers using both cellular (824-894Mhz) and PCS (1850-1990Mhz) in medium size indoor areas. Repeaters are used to fill out uncovered areas in cellular mobile systems, such as base station fringe areas, road tunnels, business and industrial buildings, etc.

Photograph 1. Cellvine, LTD MPE25K

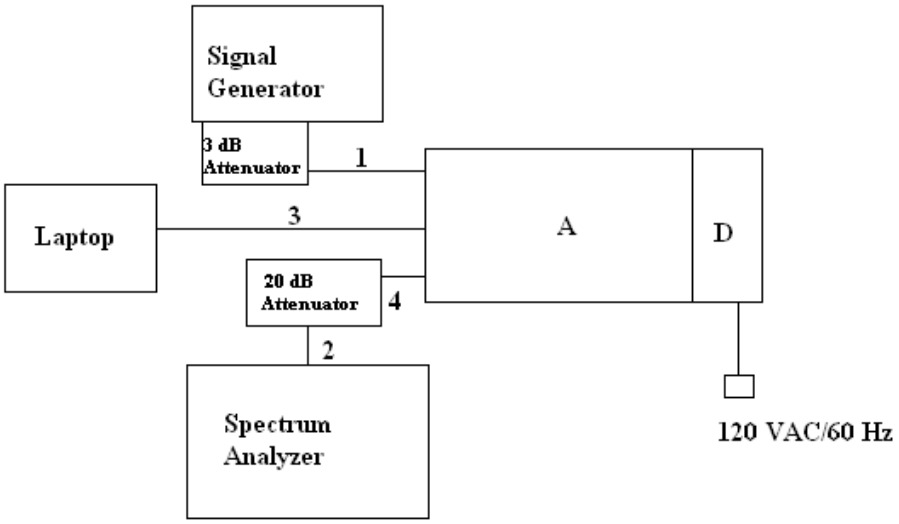


Figure 1. Block Diagram of Test Configuration (Uplink Conducted Measurement)

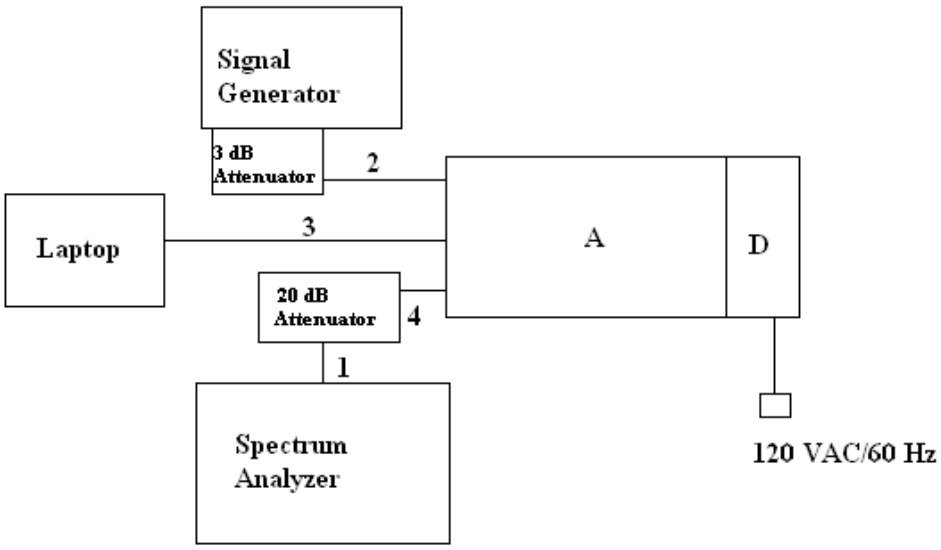


Figure 2. Block Diagram of Test Configuration (Downlink Conducted Measurement)

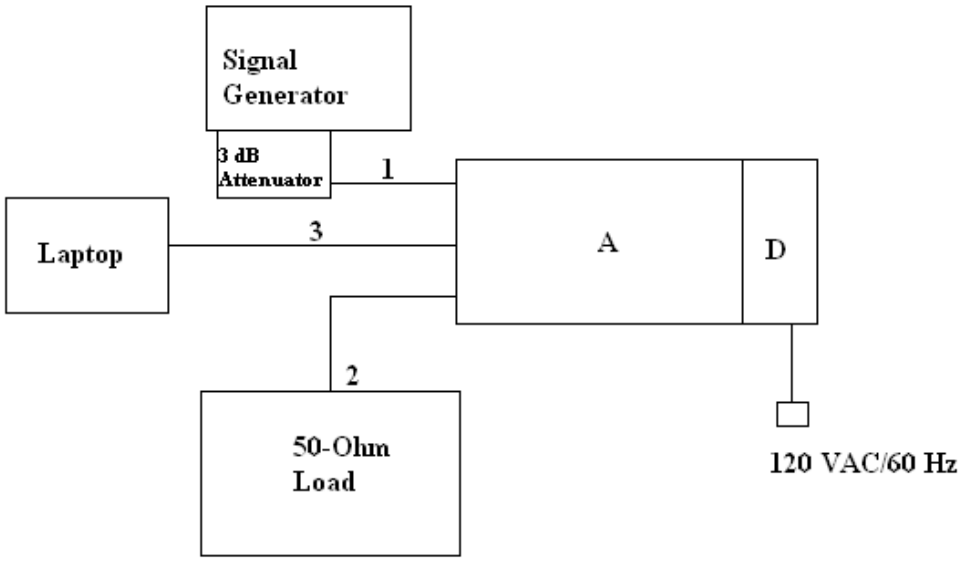


Figure 3. Block Diagram of Test Configuration (Uplink Radiated Measurement)

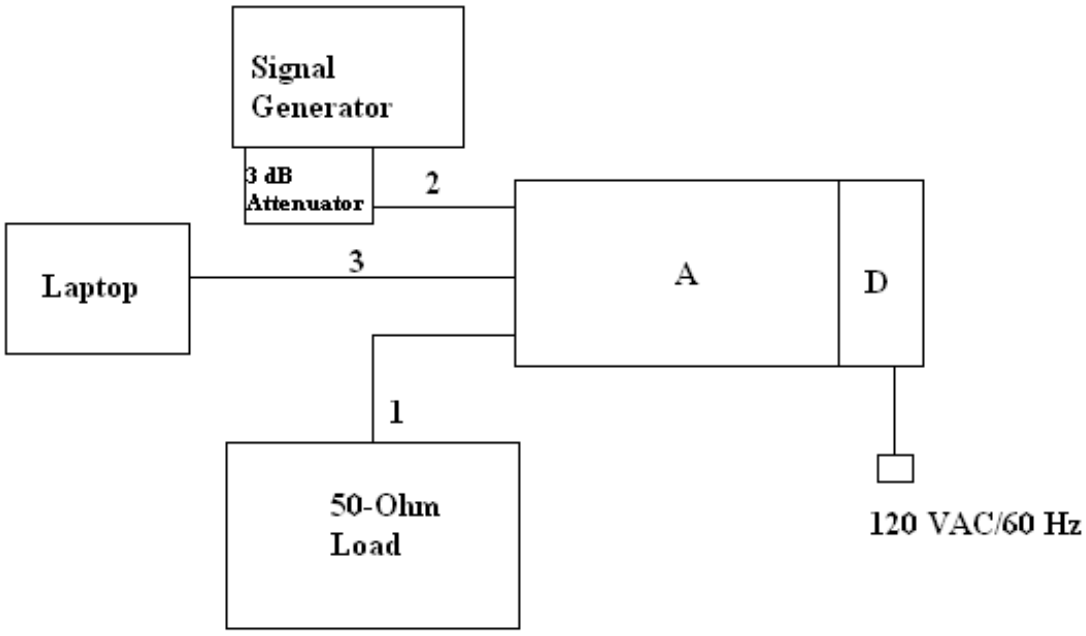


Figure 4. Block Diagram of Test Configuration (Downlink Radiated Measurement)

E. Equipment Configuration

The EUT was set up as outlined in Figure 1, Block Diagram of Test Setup. All cards, racks, etc., incorporated as part of the EUT is included in the following list.

Table 4. Equipment Configuration (Radiated Emissions)

Ref. ID	Name / Description	Model Number	Serial Number
A	MPE25k Repeater	VUV-BDA-MPE25K-52-AA-XBX-VZW	V0C8043-1

Table 5. Equipment Configuration (Conducted Measurement)

F. Support Equipment

Cellvine, LTD supplied support equipment necessary for the operation and testing of the MPE25K. All support equipment supplied is listed in the following Support Equipment List.

Ref. ID	Name / Description	Manufacturer	Model Number	Serial Number
B	Panel antenna	Cellvine	VUV-ANT-SOHO/MP25-52-VZW	ANT8052-1
C	panel indoor antenna	Kenbotong Communication LTD	TDJ-0825BKM	00071
D	AC /DC Switching Adapter	Power Win Technology	PW-130A2-1Y10E	PW 72111816

Table 6. Support Equipment (Radiated Emissions)

G. Ports and Cabling Information

Ref. ID	Port name on EUT	Cable Description or reason for no cable	Qty.	Length (m)	Shielded (Y/N)	Termination Box ID & Port ID
1	Mobile	Coax L-195	1	10	Y	Mobile
2	Base	Coax L-195	1	10	Y	Base
3	Ethernet	CAT-5E	1	5	Y	Laptop/ETH-RJ45
4	Mobile/Base	Coax RG-223	1	0.5	Y	Mobile or Base/20 dB Attenuator

Table 7. Ports and Cabling Information

H. Mode of Operation

A Repeater receives signals from a base station, amplifies the signals and retransmits them to mobile stations. It also receives, amplifies and retransmits signals in the opposite direction. Both directions are served simultaneously.

AGC ON and 2 band selection for Cellular +11 band selection for PCS.

Details: The Repeater Control application main screen enables controlling and monitoring all the Repeaters main parameters.

AGC ON – (Downlink AGC Power) The AGC level is the parameter of the downlink forward power level, which the automatic gain control will try to achieve by changing the Repeater gain. This level is usually set to the maximal linear power of the Repeater. You can determine the level in dBm of the AGC automatic mechanism with the Downlink AGC Power parameter. In AGC ON mode, the change in the downlink gain and the uplink gain is simultaneous and at the same step level unless the "Uplink Downlink Delta" parameter is different from "0".

AGC OFF-In this mode the AGC Mechanism is no longer in control on the decrease or the increase of the Repeater Gain.

The Gain level in AGC OFF operation mode is fixed, and can not be changed during the repeater operation. Due to that it is important to measure and control the input level of the Downlink signal coming from the BTS. In AGC OFF mode, changing the Repeater Gain is been done separately for Downlink path and Uplink path. In order to control the output power in AGC OFF, the user can set the Repeater Gain manually by using the Downlink and Uplink parameter in the GUI screen.

Pass Band Filter Selection-Band MHz- allowing choosing of the filter bandwidth and location in the cellular and PCS band, from the following list:

Cellular Sub Bands

Configuration	Uplink [MHz]	Downlink [MHz]
A1&A2	824-835	869-880
	845-846.5	890-891.5
B1&B2	835-845	880-890
	846.5-849	891.5-894

PCS Sub Bands

Configuration	Uplink [MHz]	Downlink [MHz]
A	1850-1865	1930-1945
D	1865-1870	1945-1950
B	1870-1885	1950-1965
E	1885-1890	1965-1970
F	1890-1895	1970-1975
C	1895-1910	1985-1990
C1	1895-1902.5	1975-1982.5
C2	1902.5-1910	1982.5-1990
C3	1895-1900	1975-1980
C4	1900-1905	1980-1985
C5	1905-1910	1985-1990

I. Method of Monitoring EUT Operation

Control of the Repeaters is performed using a desktop or laptop computer equipped with Cellvine, Operation Software Terminal, which can communicate with the Repeaters, either locally or remotely via modem..

J. Modifications

a) Modifications to EUT
No modifications were made to the EUT.

b) Modifications to Test Standard
No modifications were made to the test standard.

K. Disposition of EUT

The test sample including all support equipment submitted to the Electro-Magnetic Compatibility Lab for testing was returned to Cellvine, LTD upon completion of testing.

III. Electromagnetic Compatibility Criteria for Unintentional Radiators

Electromagnetic Compatibility Criteria for Unintentional Radiators

§ 15.107 Conducted Emissions Limits

Test Requirement(s):

15.107 (a) "Except for Class A digital devices, for equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in Table 8. Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals."

15.107 (b) "For a Class A digital device that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in Table 8. Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals. The lower limit applies at the band edges."

Frequency range (MHz)	15.107(b), Class A Limits (dBµV)		15.107(a), Class B Limits (dBµV)	
	Quasi-Peak	Average	Quasi-Peak	Average
0.15- 0.5	79	66	66 - 56	56 - 46
0.5 – 5.0	73	60	56	46
5.0 - 30	73	60	60	50
Note 1 — The lower limit shall apply at the transition frequencies.				

Table 8. Conducted Limits for Radio Frequency Devices calculated from FCC Part 15 Section 15.107(a) (b)

Test Procedures:

The EUT was place on a 0.8 m-high wooden table inside a shielded room. The method of testing, test conditions, and test procedures of ANSI C63.4 were used. The EUT was powered through a 50Ω/50µH LISN. An EMI receiver, connected to the measurement port of the LISN, scanned the frequency range from 150 kHz to 30 MHz in order to find the peak conducted emissions. All peak emissions within 6 dB of the limit were measured using a quasi-peak and/or average detector as appropriate.

Test Results:

The EUT was found compliant with the Class A requirement(s) of this section. Measured emissions were below applicable limits.

Test Engineer(s):

Len Knight

Test Date(s):

May 16, 2008

Conducted Emissions - Voltage, AC Power, Phase Line (120 VAC, 60 Hz)

Frequency (MHz)	Uncorrected Meter Reading (dBuV) QP	Cable Loss (dB)	Corrected Measurement (dBuV) QP	Limit (dBuV) QP	Margin (dB) QP	Uncorrected Meter Reading (dBuV) Avg.	Cable Loss (dB)	Corrected Measurement (dBuV) AVG	Limit (dBuV) AVG	Margin (dB) AVG
0.1769	64.97	0.13073	65.10073	79	-13.8993	49.13	0.13073	49.26073	66	-16.7393
0.1787	64.73	0.13379	64.86379	79	-14.1362	48.28	0.13379	48.41379	66	-17.5862
0.2219	63.62	0.17	63.79	79	-15.21	50.7	0.17	50.87	66	-15.13
0.2706	51.09	0.17	51.26	79	-27.74	33.23	0.17	33.4	66	-32.6
0.3107	49.1	0.17	49.27	79	-29.73	37.9	0.17	38.07	66	-27.93
0.3555	44.53	0.17	44.7	79	-34.3	33.6	0.17	33.77	66	-32.23
0.4006	41.16	0.17	41.33	79	-37.67	33.98	0.17	34.15	66	-31.85
9.58	32.41	0.3076	32.7176	73	-40.2824	16.66	0.3076	16.9676	60	-43.0324
13.4	53.6	0.33	53.93	73	-19.07	49.5	0.33	49.83	60	-10.17
22.14	36.19	0.29576	36.48576	73	-36.5142	28.54	0.29576	28.83576	60	-31.1642

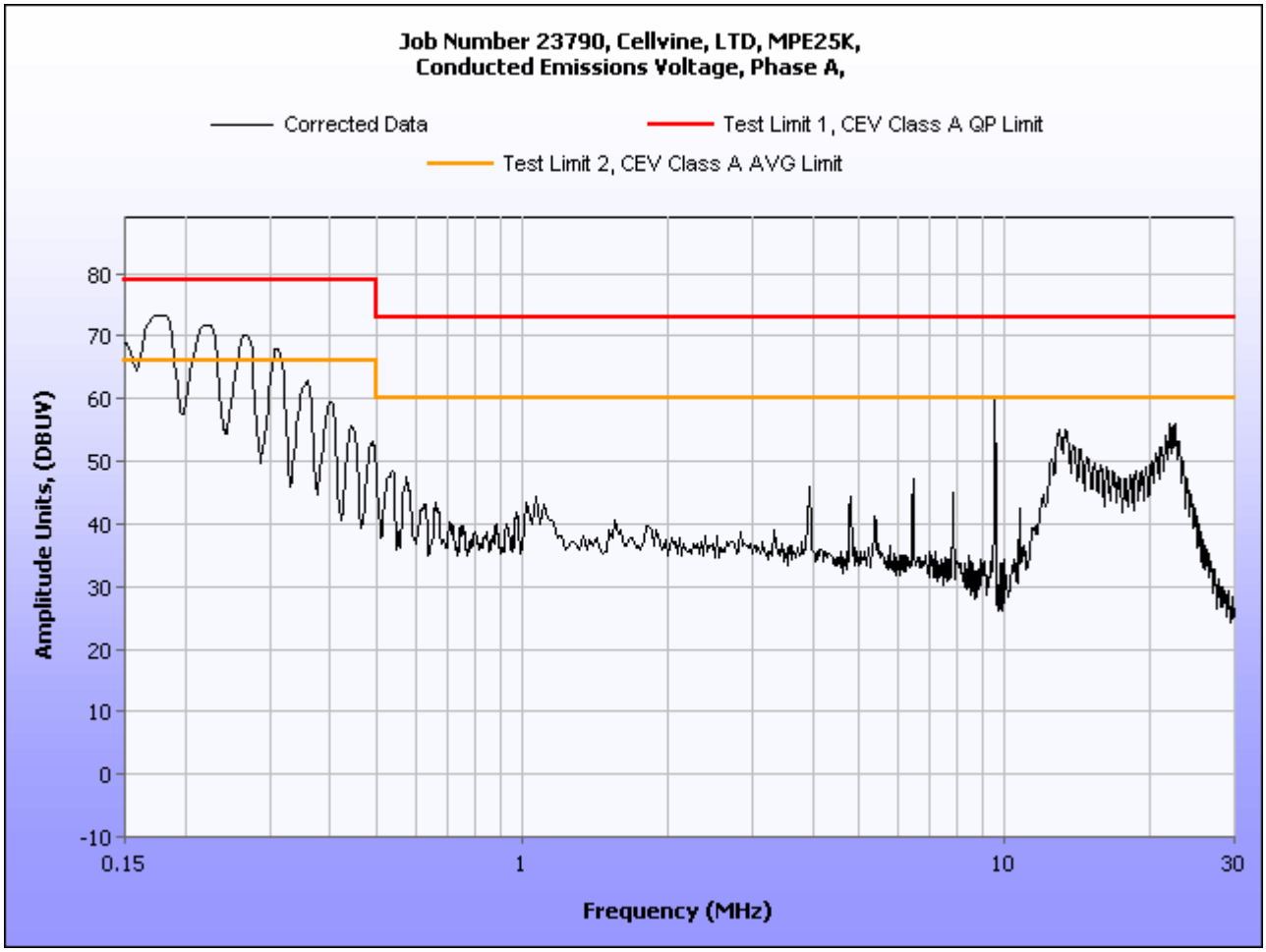
Table 9. Conducted Emissions - Voltage, AC Power, Phase Line (120 VAC, 60 Hz)

Conducted Emissions - Voltage, AC Power, Neutral Line (120 VAC, 60 Hz)

Frequency (MHz)	Uncorrected Meter Reading (dBuV) QP	Cable Loss (dB)	Corrected Measurement (dBuV) QP	Limit (dBuV) QP	Margin (dB) QP	Uncorrected Meter Reading (dBuV) Avg.	Cable Loss (dB)	Corrected Measurement (dBuV) AVG	Limit (dBuV) AVG	Margin (dB) AVG
0.1502	53.59	0.08534	53.67534	79	-25.3247	42.1	0.08534	42.18534	66	-23.8147
0.174	51.78	0.1258	51.9058	79	-27.0942	44.33	0.1258	44.4558	66	-21.5442
0.221	62.8	0.17	62.97	79	-16.03	49.1	0.17	49.27	66	-16.73
0.3096	47.31	0.17	47.48	79	-31.52	35.57	0.17	35.74	66	-30.26
0.3122	46.52	0.17	46.69	79	-32.31	34.28	0.17	34.45	66	-31.55
0.3965	40.21	0.17	40.38	79	-38.62	33.77	0.17	33.94	66	-32.06
0.481	35.02	0.17	35.19	79	-43.81	25.02	0.17	25.19	66	-40.81
1.058	43.9	0.17	44.07	73	-28.93	35.65	0.17	35.82	60	-24.18
9.525	20.01	0.30466667	20.31466667	73	-52.6853	11.49	0.30466667	11.79466667	60	-48.2053
22.55	52.32	0.2892	52.6092	73	-20.3908	46.95	0.2892	47.2392	60	-12.7608

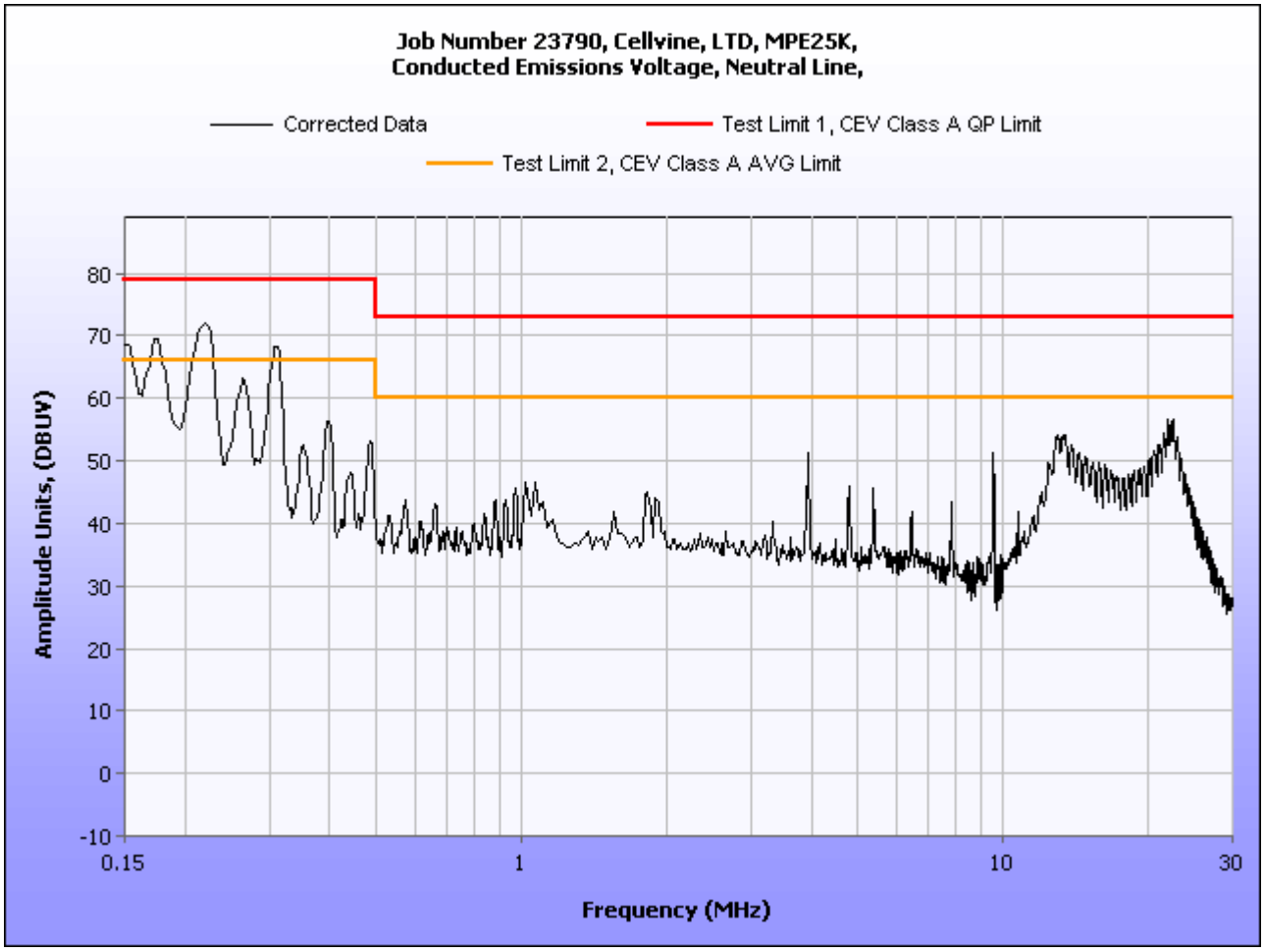
Table 10. Conducted Emissions - Voltage, AC Power, Neutral Line (120 VAC, 60 Hz)

Conducted Emissions - Voltage, Worst Case Emissions, AC Power, (120 VAC, 60 Hz)



Conducted Emission, Phase Line Plots

Conducted Emissions - Voltage, Worst Case Emissions, AC Power, (120 VAC, 60 Hz)



Conducted Emission, Neutral Line Plots

Conducted Emission Limits Test Setup

Photograph 2. Conducted Emissions Test Setup

Radiated Emission Limits

Test Requirement(s): **15.109 (a)** Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the Class B limits expressed in Table 11.

15.109 (b) The field strength of radiated emissions from a Class A digital device, as determined at a distance of 10 meters, shall not exceed the Class A limits expressed in Table 11.

Frequency (MHz)	Field Strength (dBµV/m)	
	§15.109 (b), Class A Limit (dBµV) @ 10m	§15.109 (a),Class B Limit (dBµV) @ 3m
30 - 88	39.00	40.00
88 - 216	43.50	43.50
216 - 960	46.40	46.00
Above 960	49.50	54.00

Table 11. Radiated Emissions Limits calculated from FCC Part 15, §15.109 (a) (b)

Test Procedures: The EUT was placed on a wooden stand inside a semi-anechoic chamber. The method of testing and test conditions of ANSI C63.4 were used. An antenna was located 3 m from the EUT on an adjustable mast. A pre-scan was first performed in order to find prominent radiated emissions. For final emissions measurements at each frequency of interest, the EUT was rotated and the antenna height was varied between 1 m and 4 m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. Unless otherwise specified, measurements were made using a quasi-peak detector with a 120 kHz bandwidth.

Emissions measured at 3m were normalized using an inverse proportionality factor of 20 dB per decade for comparison to the 10 m limit.

Test Results: The EUT was found Compliant with the Class A requirement(s) of this section. Measured emissions were below applicable limits

Test Engineer(s): Jeffrey Hazen

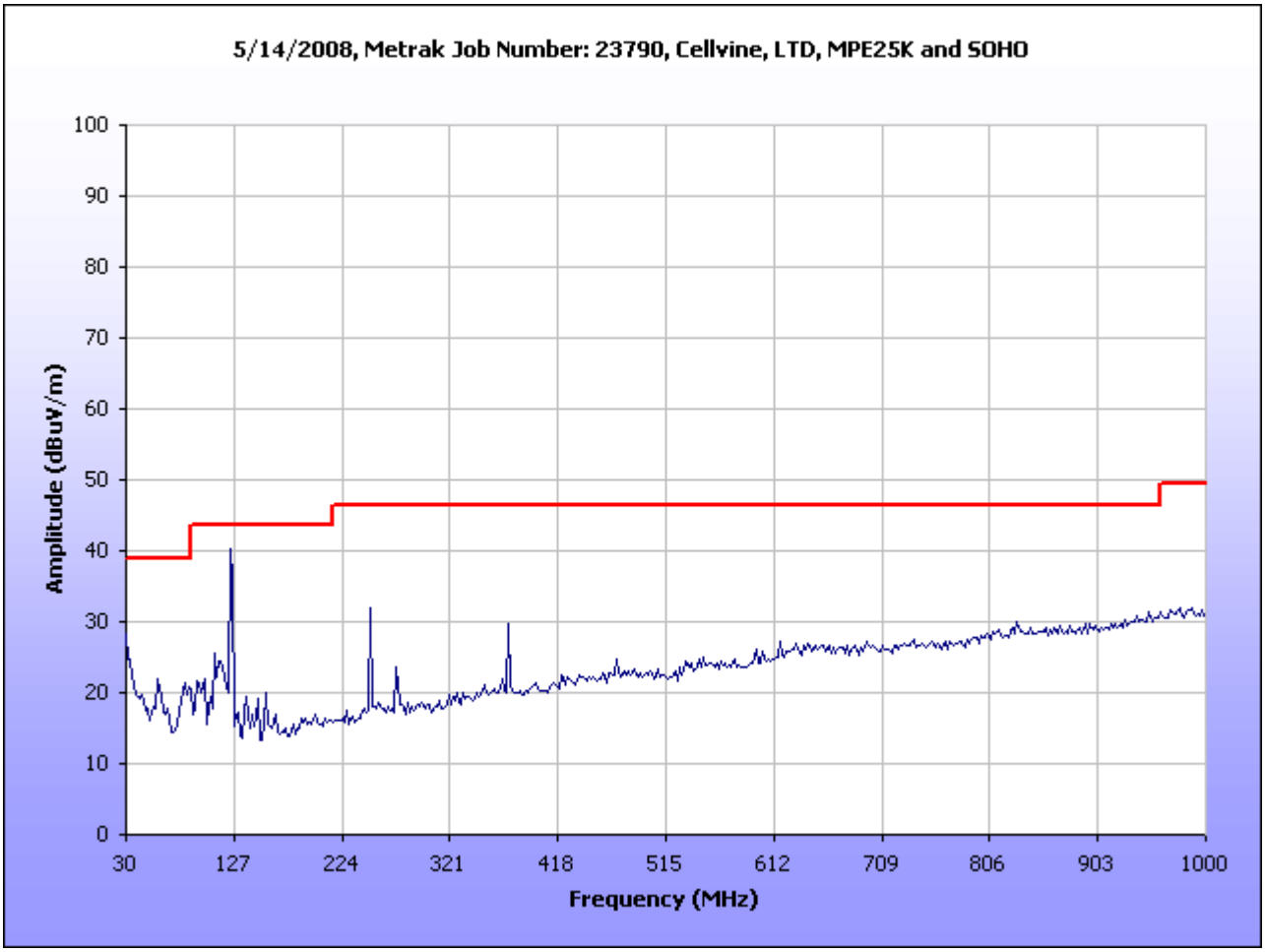
Test Date(s): May 14, 2008

Radiated Emissions Limits Test Results, Class A

Frequency (MHz)	EUT Azimuth (Degrees)	Antenna Polarity (H/V)	Antenna Height (m)	Uncorrected EMI Meter Reading (dBuV)	Antenna Correction Factor (dB/m) (+)	Cable Loss (dB) (+)	Distance Correction Factor (dB) (-)	Corrected Amplitude (dBuV/m)	Limit (dBuV/m)	Margin (dB)
124.8982	313	H	1.41	29.44	7.40	1.03	10.46	27.41	43.5	-16.09
124.8982	297	V	1	41.57	7.90	1.03	10.46	40.04	43.5	-3.46
125.07255	320	H	1.37	16.28	7.40	1.03	10.46	14.25	43.5	-29.25
125.07255	251	V	1	29.04	7.90	1.03	10.46	27.51	43.5	-15.99
249.84569	359	H	1	25.5	12.78	1.20	10.46	29.02	46.4	-17.38
249.84569	356	V	2.4	26.65	12.98	1.20	10.46	30.37	46.4	-16.03
374.70741	42	H	3.68	13.09	14.80	1.20	10.46	18.63	46.4	-27.77
374.70741	42	V	1.35	24.26	14.82	1.20	10.46	29.82	46.4	-16.58
30.311623	160	H	3.84	11.16	5.65	0.69	10.46	7.04	39	-31.96
30.311623	282	V	1.05	30.32	4.25	0.69	10.46	24.80	39	-14.20
110.55812	177	H	1.89	19.37	7.00	1.03	10.46	16.94	43.5	-26.56
110.55812	97	V	1	25.02	7.60	1.03	10.46	23.19	43.5	-20.31

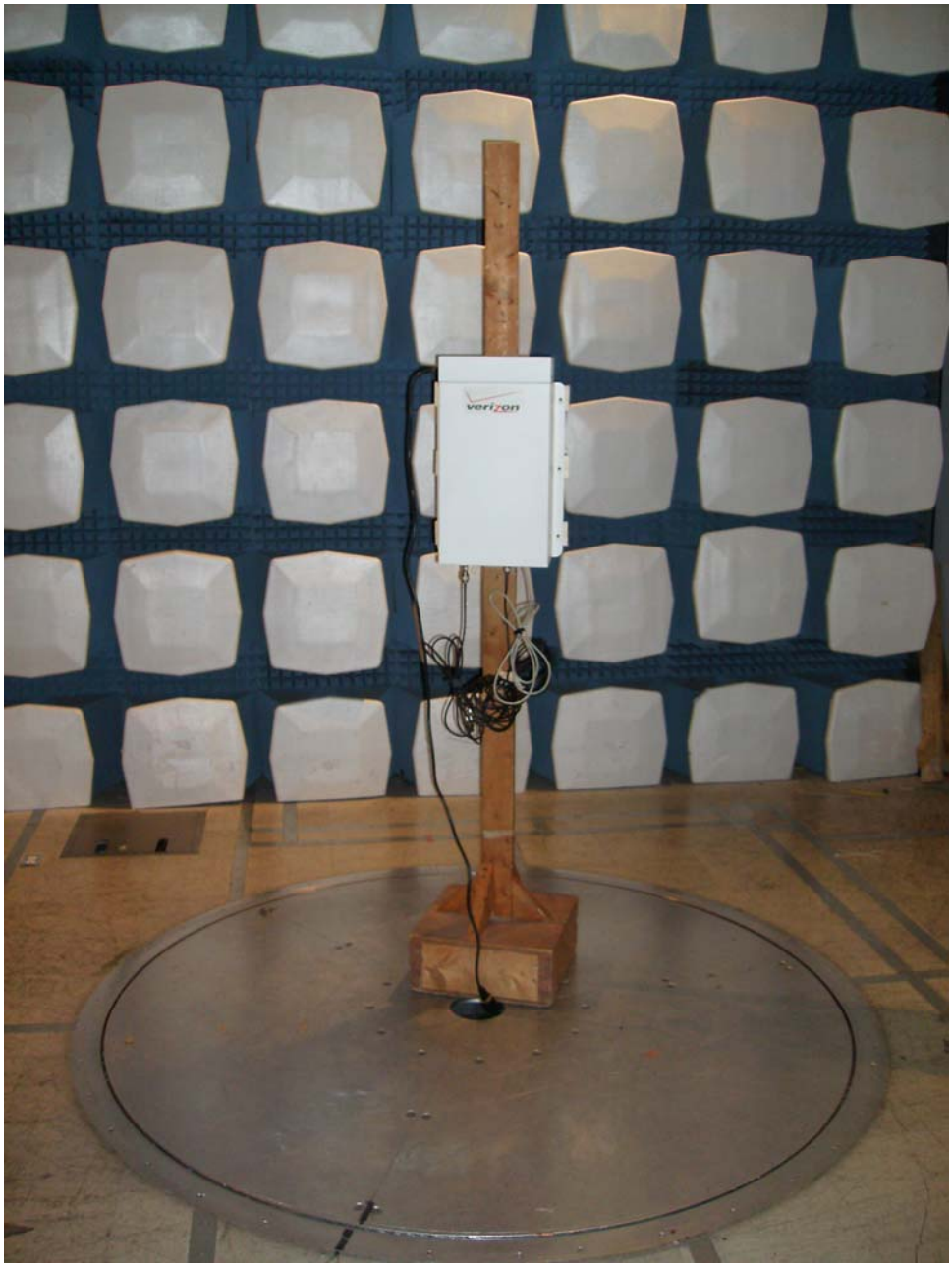
Table 12. Radiated Emissions Limits Test Results

Radiated Emissions Limits Test Results, Class A



Plot 1. Radiated Emissions Test Results

Radiated Emission Limits Test Setup



Photograph 3. Radiated Emission Limits Test Setup

IV. Electromagnetic Compatibility Criteria for Intentional Radiators

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 2.1046 RF Power Output

Test Requirements: **§ 2.1046 Measurements required: RF power output:**

§ 2.1046 (a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in § 2.1033(c)(8).The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.

§ 2.1046 (b) For single sideband, independent sideband, and single channel, controlled carrier radiotelephone transmitters, the procedure specified in paragraph (a) of this section shall be employed and, in addition, the transmitter shall be modulated during the test as specified and as applicable in § 2.1046 (b) (1-5). In all tests, the input level of the modulating signal shall be such as to develop rated peak envelope power or carrier power, as appropriate, for the transmitter.

§ 2.1046 (c) For measurements conducted pursuant to paragraphs (a) and (b) of this section, all calculations and methods used by the applicant for determining carrier power or peak envelope power, as appropriate, on the basis of measured power in the radio frequency load attached to the transmitter output terminals shall be shown. Under the test conditions specified, no components of the emission spectrum shall exceed the limits specified in the applicable rule parts as necessary for meeting occupied bandwidth or emission limitations.

§ 22.913 Power and antenna height limits.

§ 22.913(a): The Effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 watts.

§ 24.232 Power and antenna height limits.

§ 24.232 (b): Mobile/portable stations are limited to 2 watts e.i.r.p. peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

Test Procedures: As required by 47 CFR 2.1046, RF power output measurements were made at the RF output terminals using an attenuator and spectrum analyzer or power meter. The spectrum analyzer was set to its default settings – RBW, VBW, Sweep Time, etc. – except that the detector was set to an average detector. The "Channel Power" measurement feature of the spectrum analyzer was used to determine the input and output power across the Occupied Bandwidth. This test was performed in all applicable modulations.

Test Results: The EUT complies with the requirements of this section. The EUT conducted power does not exceed limit at the carrier frequency.

Downlink	Input	Output	**Uplink**	Input	Output
Freq (MHz)	**Power(dBm)**	**Power(dBm)**	**Freq (MHz)**	**Power(dBm)**	**Power(dBm)**
869.625	-61.3	22	824.625	-72.3	12.1
881.5	-62.3	20.1	836.5	-71.9	12.7
893.375	-60.9	22	848.375	-74.2	12

Table 13. RF Output Power - Cellular

Note: Corrected by -4 dB for the input cable and attenuator and 24.4 dB for output cable and attenuator

Downlink	Input	Output	**Uplink**	Input	Output
Freq (MHz)	**Power(dBm)**	**Power(dBm)**	**Freq (MHz)**	**Power(dBm)**	**Power(dBm)**
1930.625	-70.6	20.23	1850.625	-74.8	13.3
1960	-70.72	22.45	1880	-77.2	12.2
1989.375	-62.68	20.44	1909.375	-72.8	12.9

Table 14. RF Output Power - PCS

Note: Corrected by -8.6 dB for the input cable and attenuator and 24.2 dB for output cable and attenuator

Test Engineer(s): Jeffrey Hazen

Test Date(s): May 28, 2008

Block Diagram 1. RF Power Output Test Setup

§ 2.1049 Occupied Bandwidth

Test Requirement(s): **§ 2.1049 Measurements required: Occupied bandwidth:** The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the specified conditions of § 2.1049 (a) through (i) as applicable.

Test Procedures: As required by 47 CFR 2.1049, *occupied bandwidth measurements* were made with a Spectrum Analyzer connected to the RF ports for both Uplink and Downlink

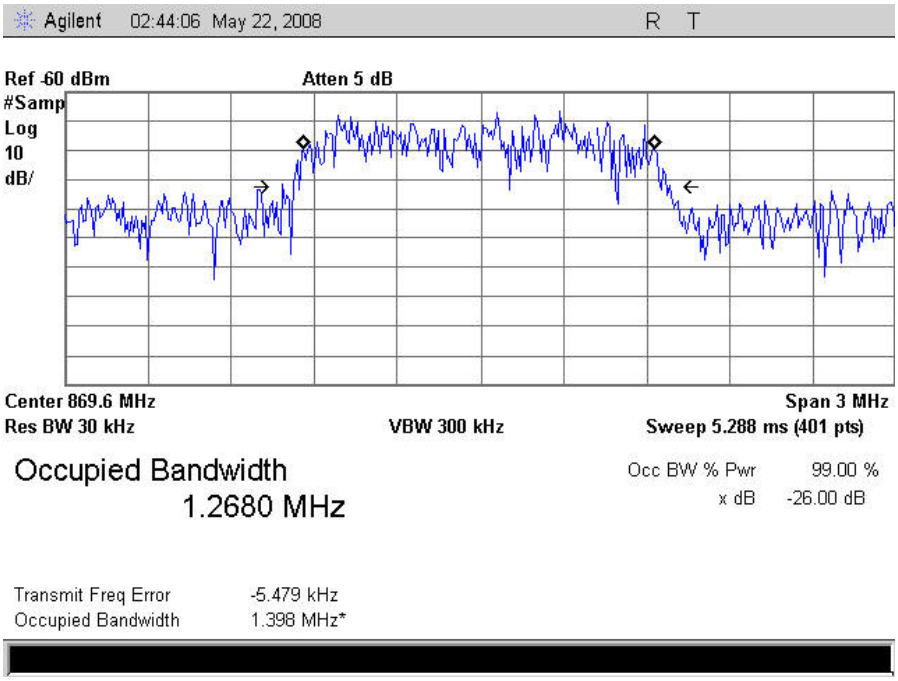
The modulation characteristics of signal generator's carrier was measured first at a maximum RF level prescribed by the OEM. The signal generator was then connected to either the Uplink or Downlink input at the appropriate RF level. The resulting modulated signal through the EUT was measured and compared against the original signal.

Test Results: The EUT complies with the requirements of this section.

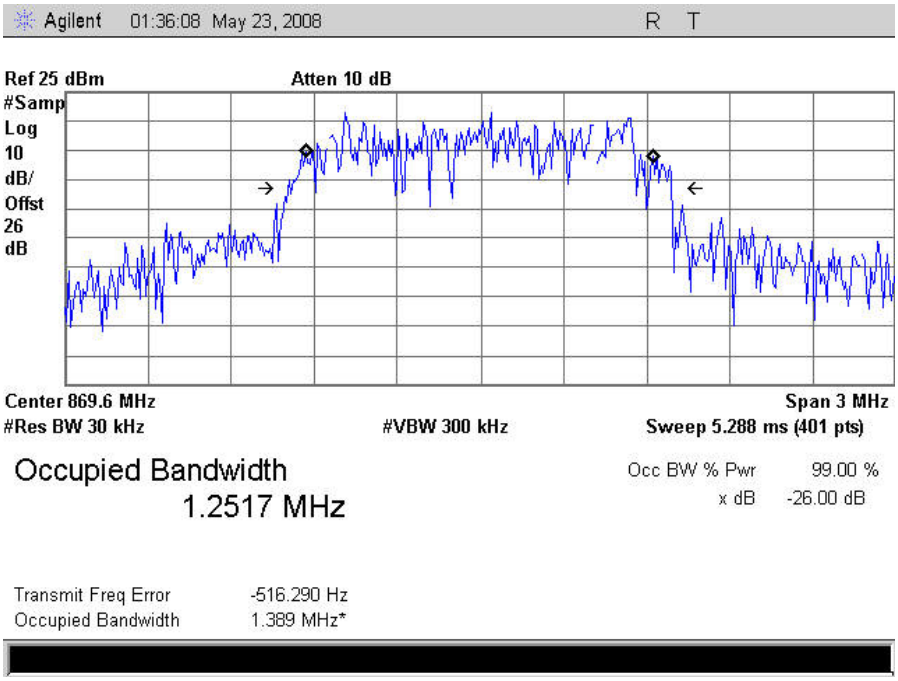
Test Engineer(s): Jeffrey Hazen

Test Date(s): May 22 & 23, 2008

Electromagnetic Compatibility Criteria for Intentional Radiators
Occupied Bandwidth Test Results - Cellular

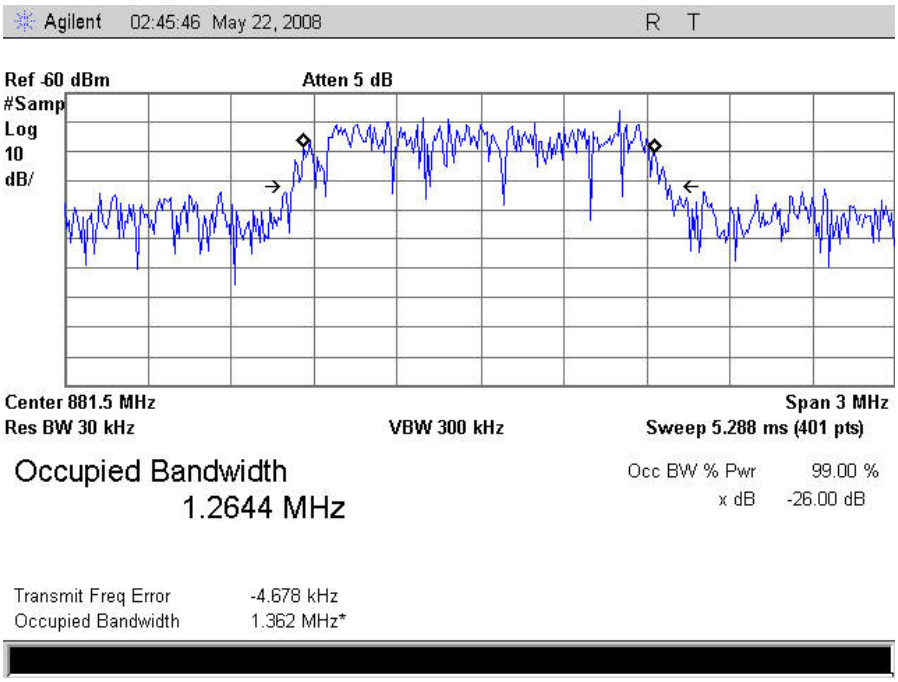


Plot 2. Occupied Bandwidth, CDMA Downlink, Low Channel Input

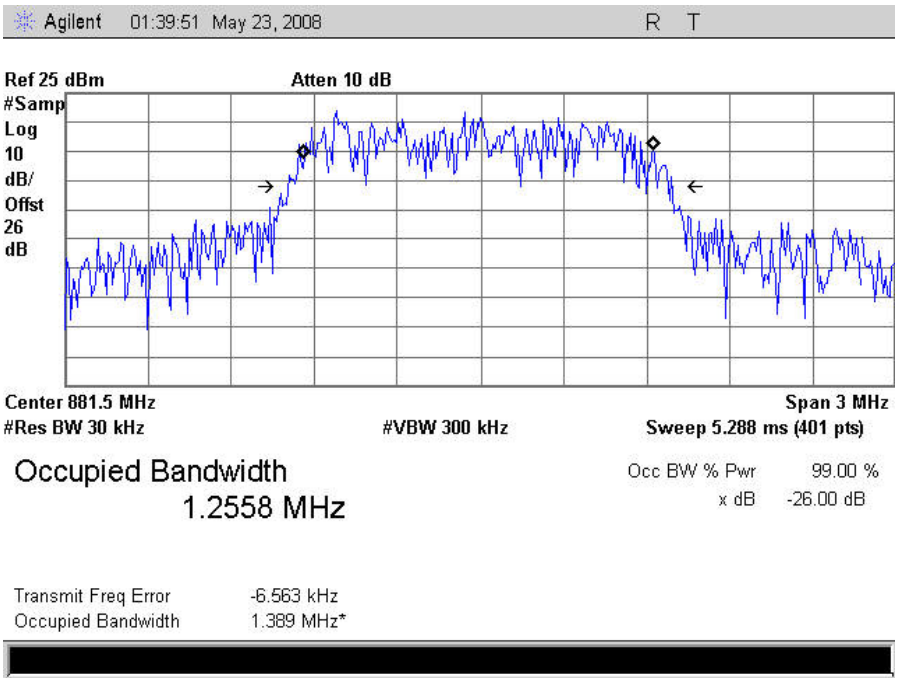


Plot 3. Occupied Bandwidth, CDMA Downlink, Low Channel Output

Occupied Bandwidth Test Results - Cellular

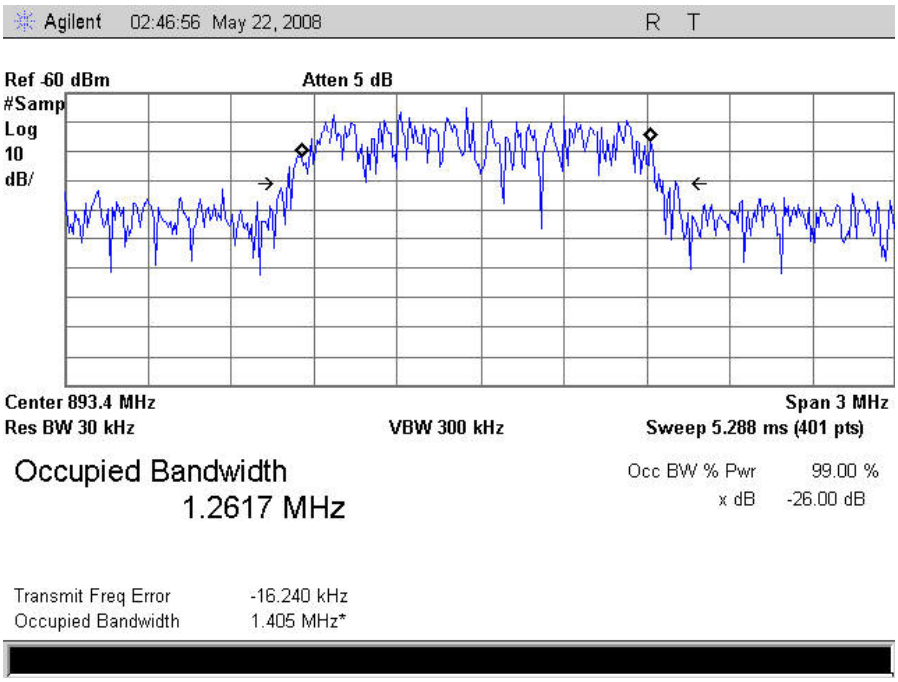


Plot 4. Occupied Bandwidth, CDMA Downlink, Mid Channel Input

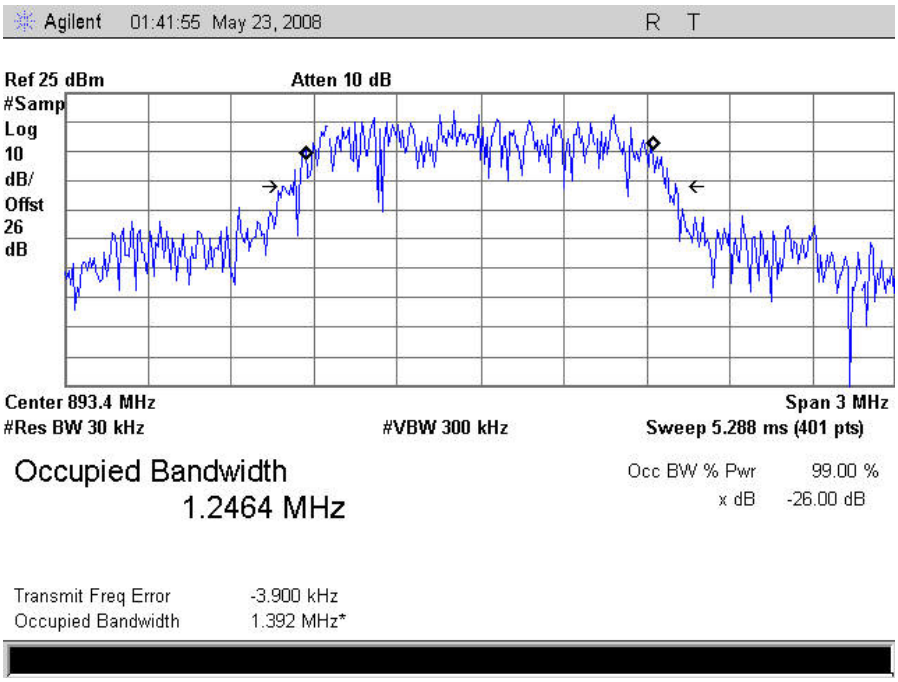


Plot 5. Occupied Bandwidth, CDMA Downlink, Mid Channel Output

Occupied Bandwidth Test Results - Cellular

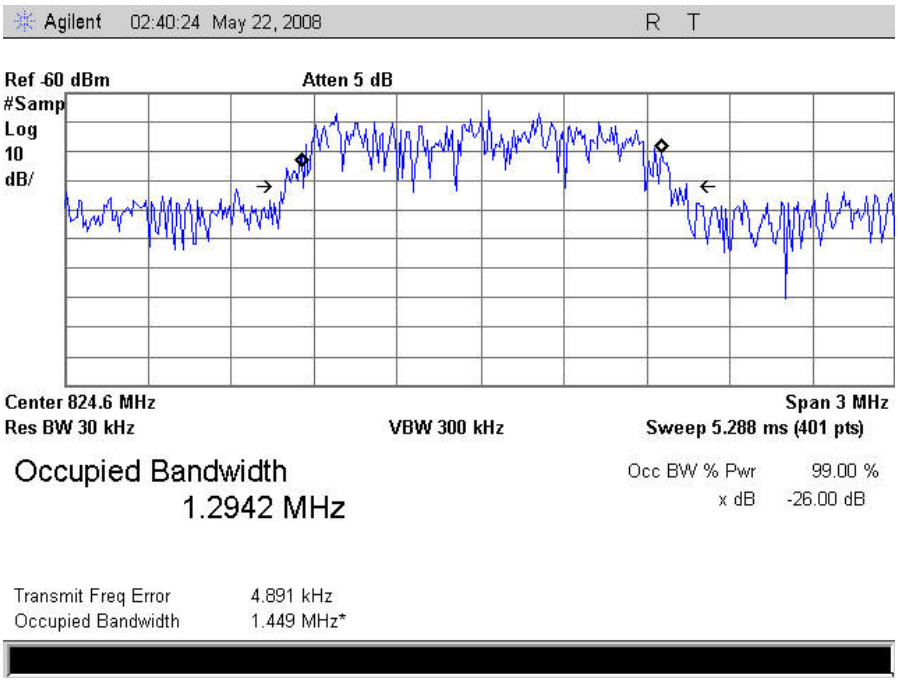


Plot 6. Occupied Bandwidth, CDMA Downlink, High Channel Input

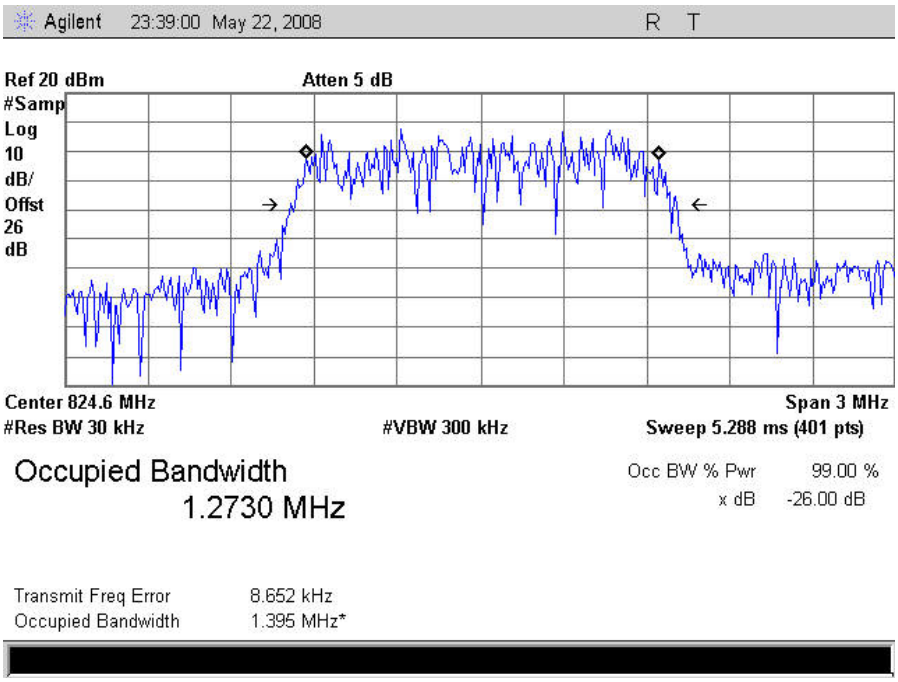


Plot 7. Occupied Bandwidth, CDMA Downlink, High Channel Output

Occupied Bandwidth Test Results - Cellular

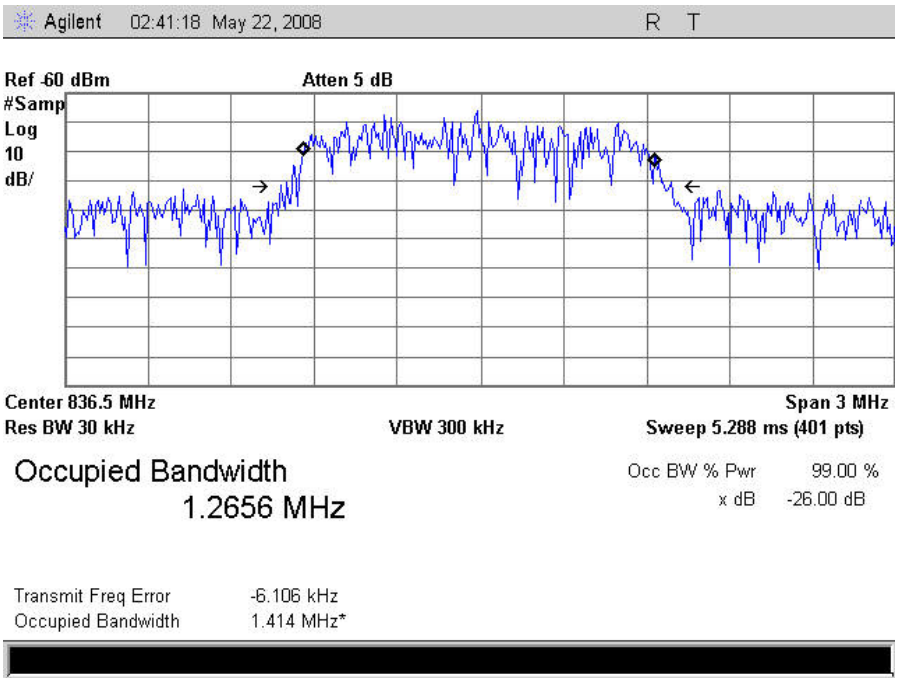


Plot 8. Occupied Bandwidth, CDMA Uplink, Low Channel Input

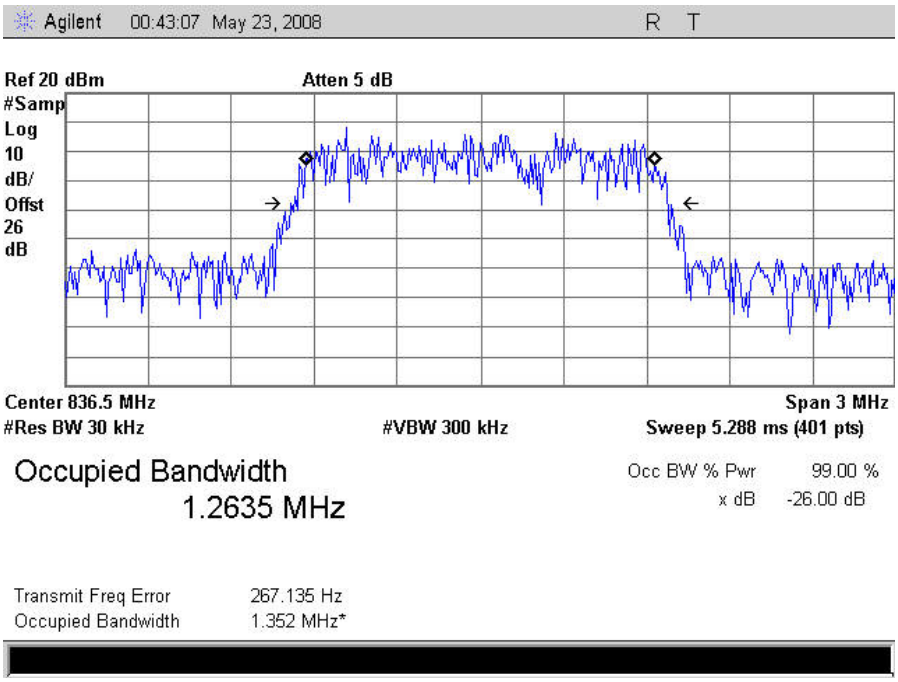


Plot 9. Occupied Bandwidth, CDMA Uplink, Low Channel Output

Occupied Bandwidth Test Results - Cellular

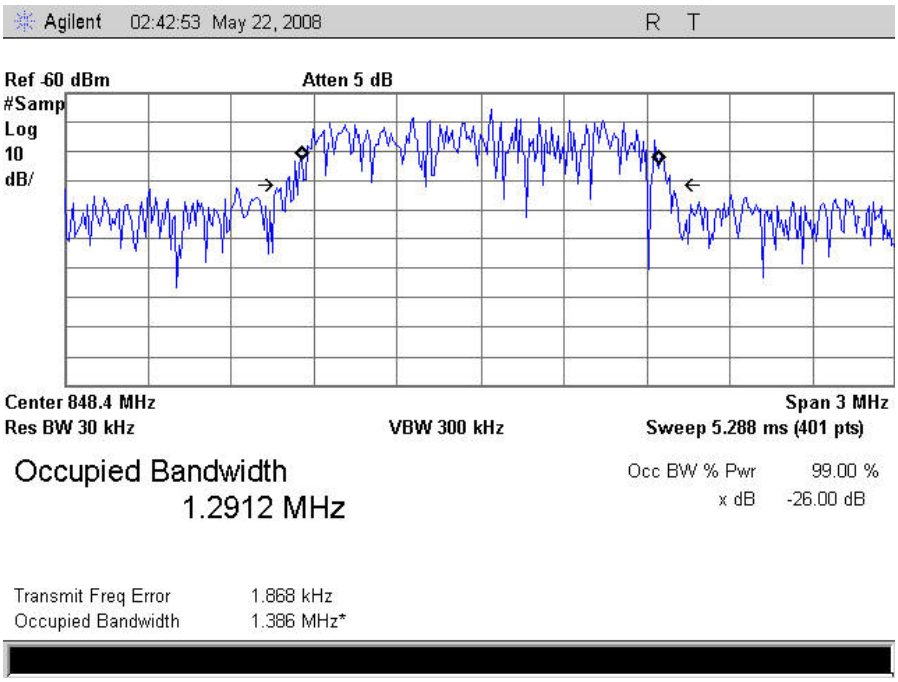


Plot 10. Occupied Bandwidth, CDMA Uplink, Mid Channel Input

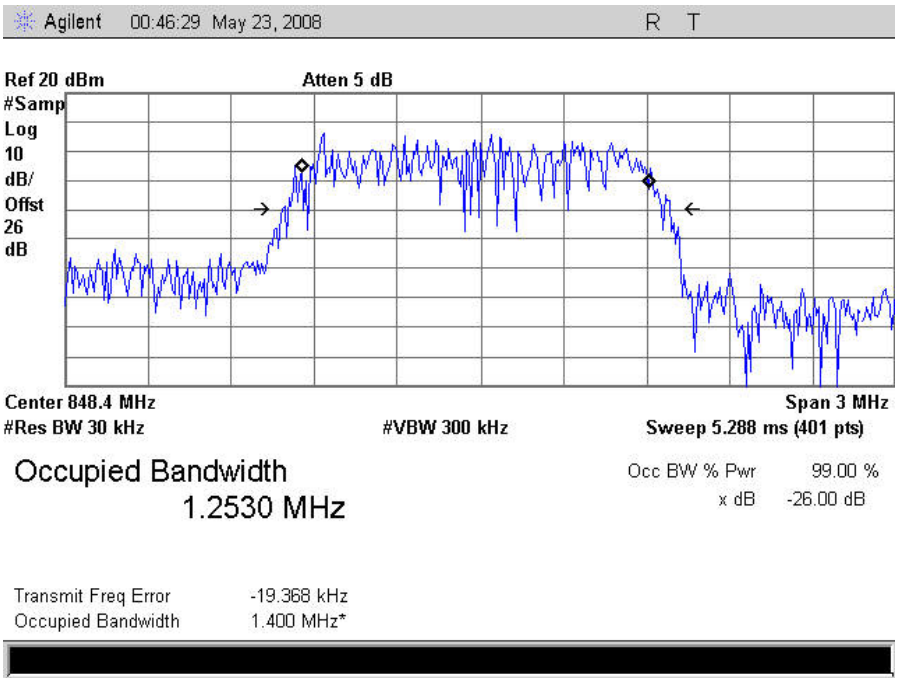


Plot 11. Occupied Bandwidth, CDMA Uplink, Mid Channel Output

Occupied Bandwidth Test Results - Cellular

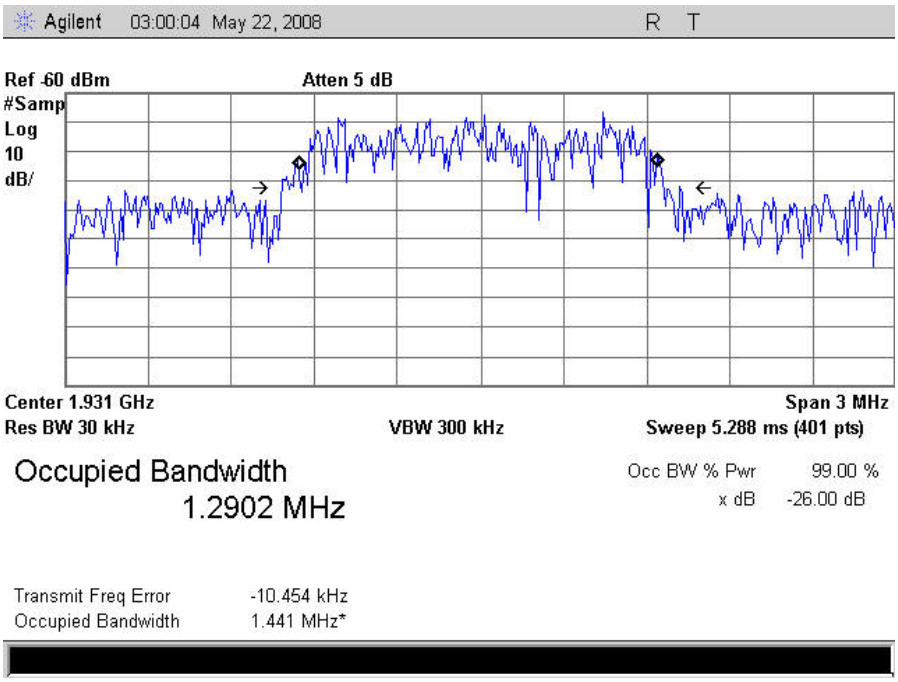


Plot 12. Occupied Bandwidth, CDMA Uplink, High Channel Input

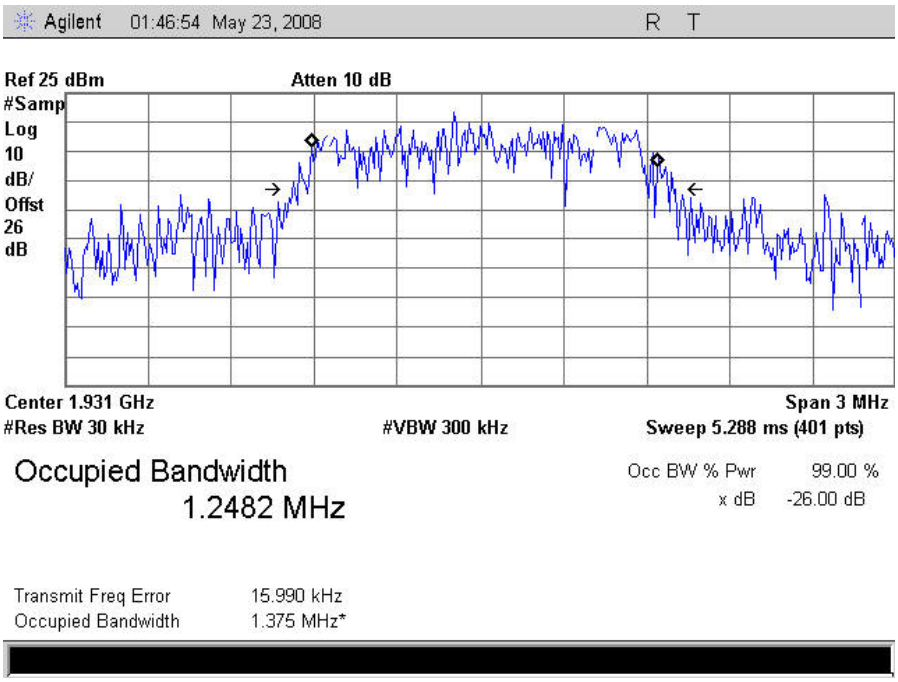


Plot 13. Occupied Bandwidth, CDMA Uplink, High Channel Output

Occupied Bandwidth Test Results - PCS

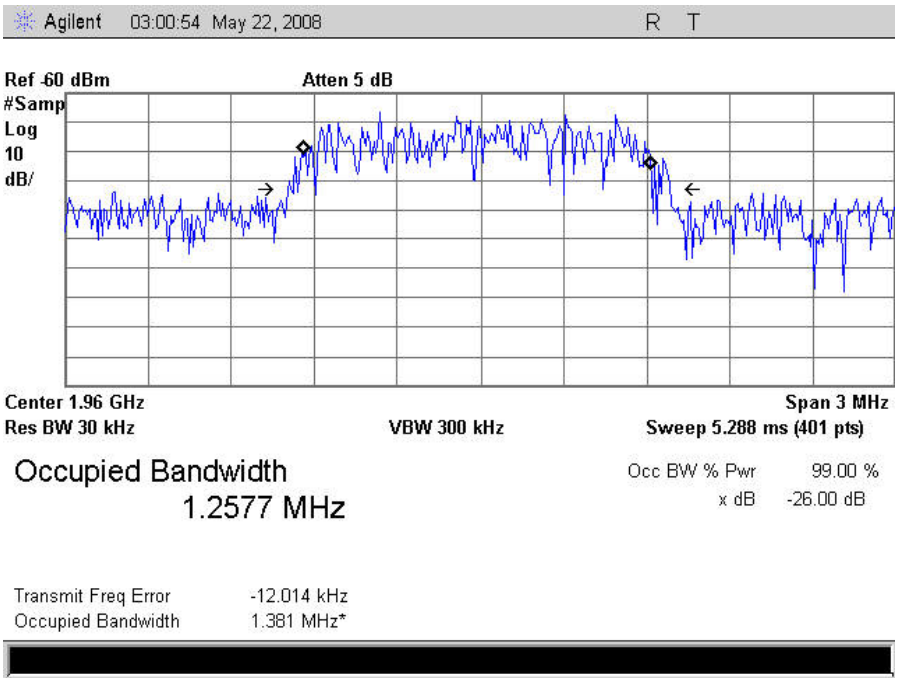


Plot 14. Occupied Bandwidth, CDMA Downlink, Low Channel Input

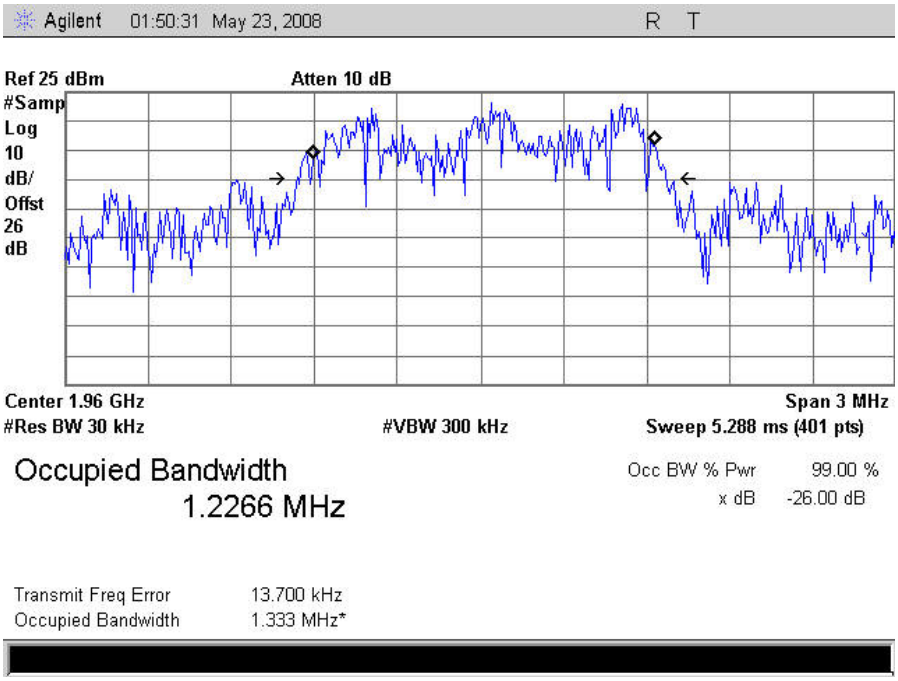


Plot 15. Occupied Bandwidth, CDMA Downlink, Low Channel Output

Occupied Bandwidth Test Results - PCS

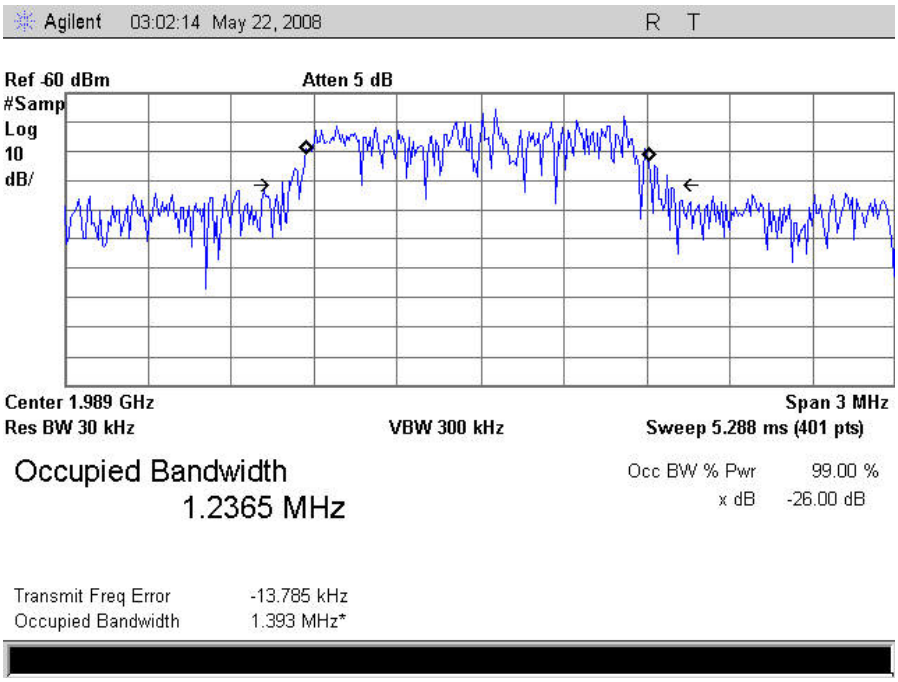


Plot 16. Occupied Bandwidth, CDMA Downlink, Mid Channel Input

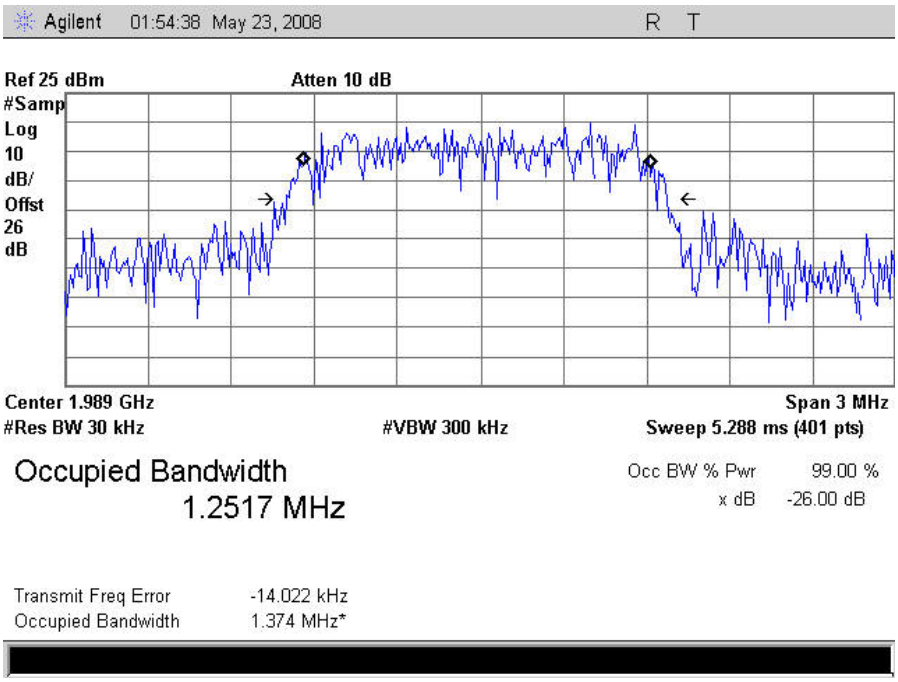


Plot 17. Occupied Bandwidth, CDMA Downlink, Mid Channel Output

Occupied Bandwidth Test Results - PCS

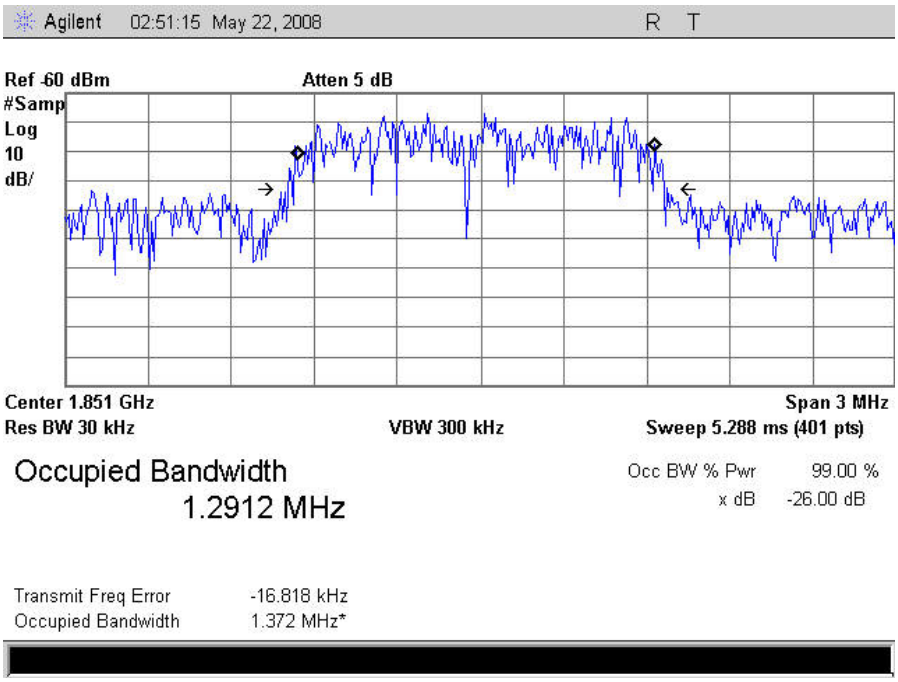


Plot 18. Occupied Bandwidth, CDMA Downlink, High Channel Input

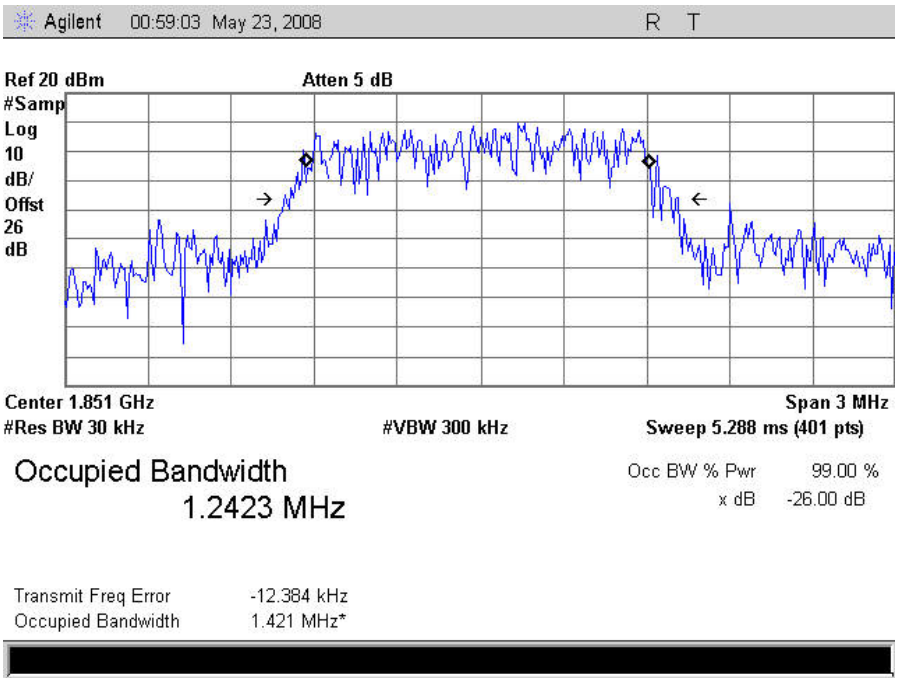


Plot 19. Occupied Bandwidth, CDMA Downlink, High Channel Output

Occupied Bandwidth Test Results - PCS

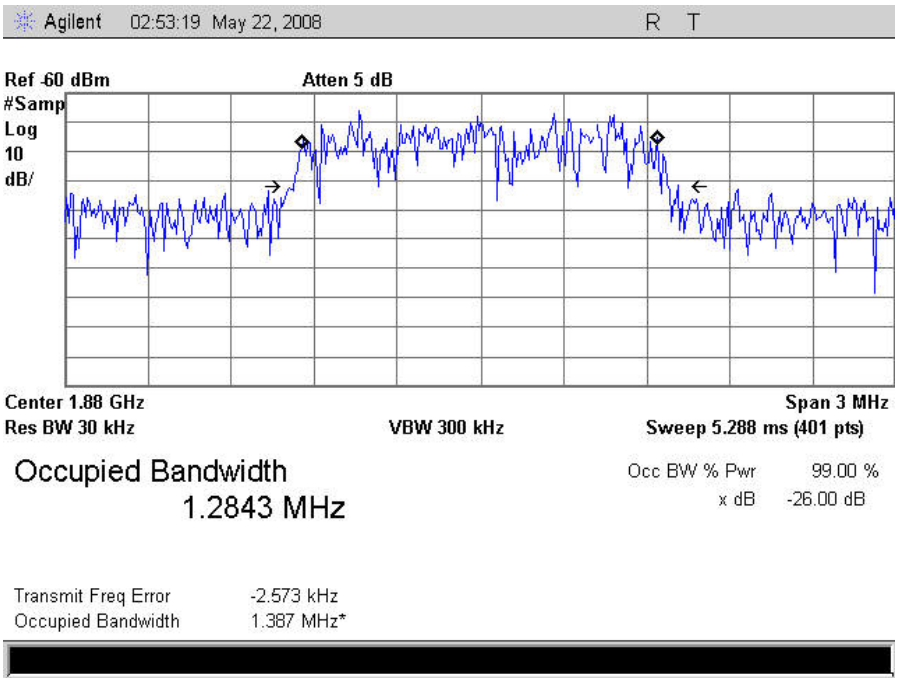


Plot 20. Occupied Bandwidth, CDMA Uplink, Low Channel Input

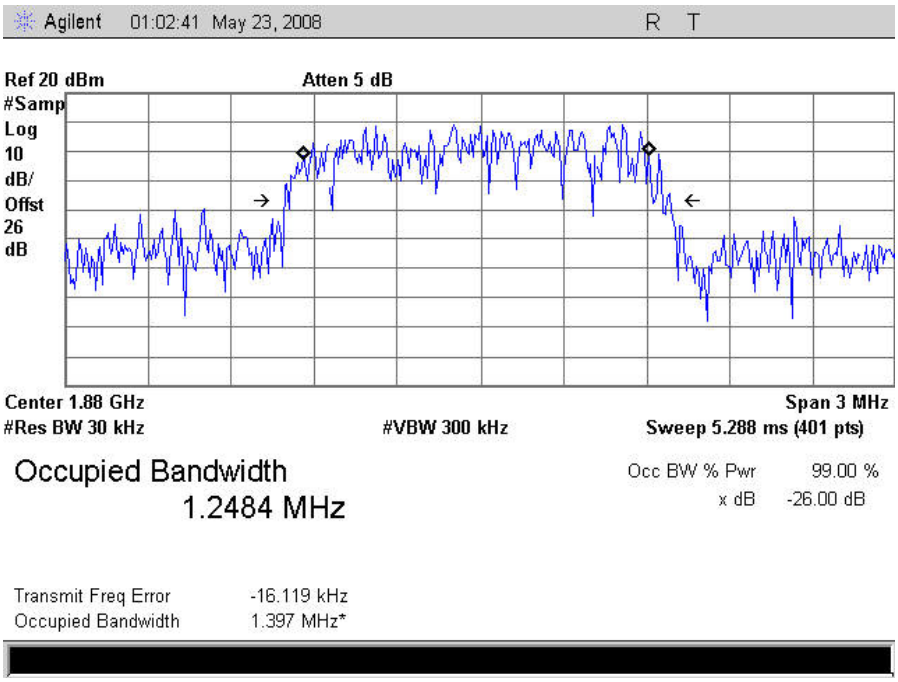


Plot 21. Occupied Bandwidth, CDMA Uplink, Low Channel Output

Occupied Bandwidth Test Results - PCS

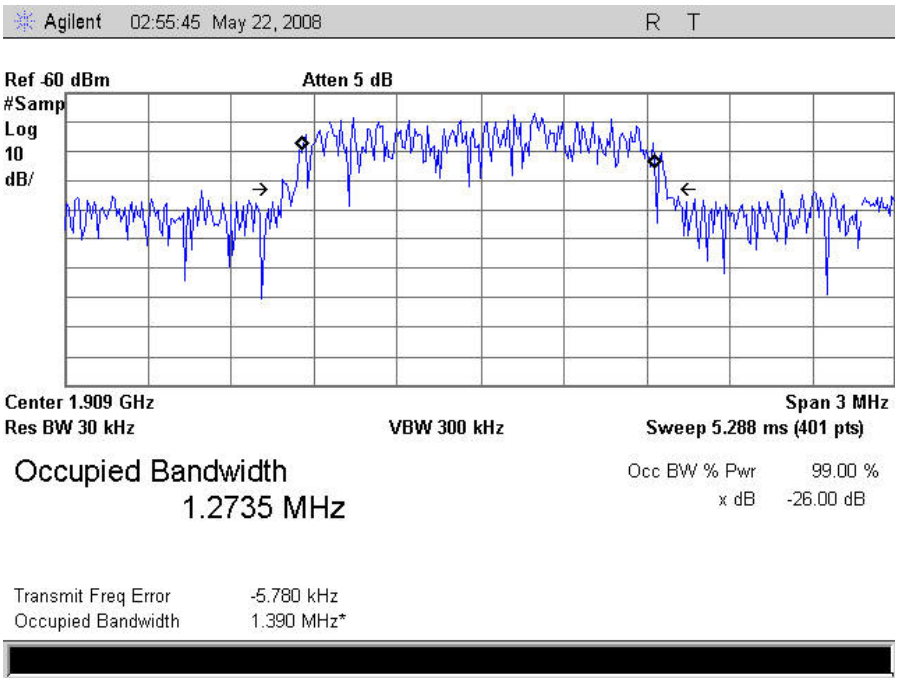


Plot 22. Occupied Bandwidth, CMDA Uplink, Mid Channel Input

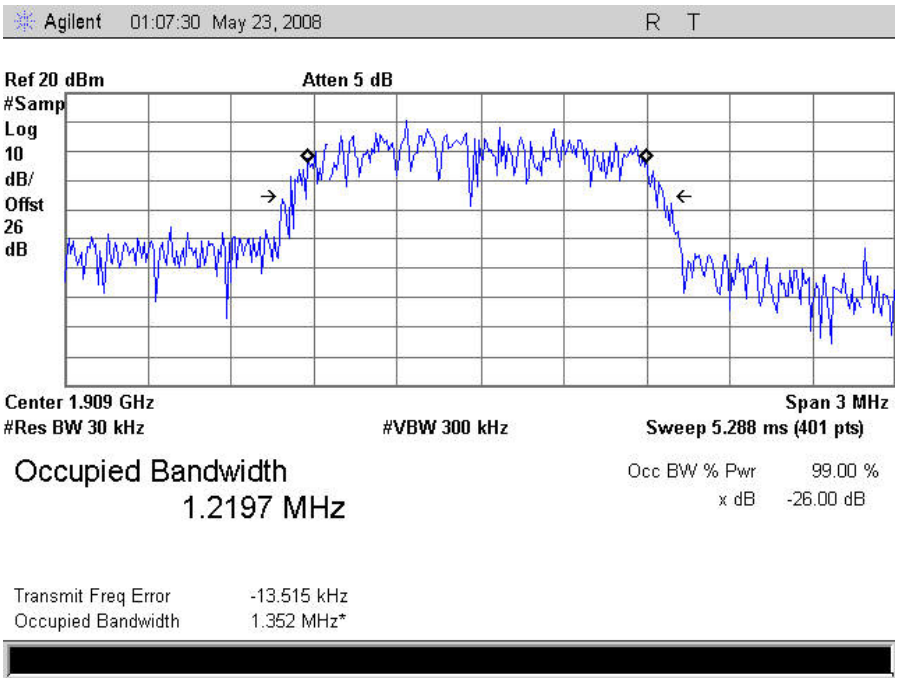


Plot 23. Occupied Bandwidth, CDMA Uplink, Mid Channel Output

Occupied Bandwidth Test Results - PCS



Plot 24. Occupied Bandwidth, CDMA Uplink, High Channel Input



Plot 25. Occupied Bandwidth, CMDA Uplink, High Channel Output

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 2.1053 Radiated Spurious Emissions

Test Requirement(s): **§ 2.1053 Measurements required: Field strength of spurious radiation.**

§ 2.1053 (a) Measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data shall be supplied showing the magnitude of each harmonic and other spurious emission. For this test, single sideband, independent sideband, and controlled carrier transmitters shall be modulated under the conditions specified in paragraph (c) of § 2.1049, as appropriate. For equipment operating on frequencies below 890 MHz, an open field test is normally required with the measuring instrument antenna located in the far-field at all test frequencies. In the event it is either impractical or impossible to make open field measurements (e.g. a broadcast transmitter installed in a building) measurements will be accepted of the equipment as installed. Such measurements must be accompanied by a description of the site where the measurements were made showing the location of any possible source of reflections which might distort the field strength measurements. Information submitted shall include the relative radiated power of each spurious emission with reference to the rated power output of the transmitter, assuming all emissions are radiated from half-wave dipole antennas.

§ 2.1053 (b): The measurements specified in paragraph (a) of this section shall be made for the following equipment:

(1) Those in which the spurious emissions are required to be 60 dB or more below the mean power of the transmitter.

(2) All equipment operating on frequencies higher than 25 MHz.

(3) All equipment where the antenna is an integral part of, and attached directly to the transmitter.

(4) Other types of equipment as required, when deemed necessary by the Commission.

§ 22.917 Emission limitations Cellular equipment, § 24.238 Emission limitations for Broadband PCS equipment: The rules in this section govern the spectral characteristics of emissions in the Cellular Radiotelephone Service.

§ 22.917 (a), § 24.238 (a): Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P).

Test Procedures:

As required by 47 CFR 2.1053, *field strength of radiated spurious measurements* were made in accordance with the procedures of TIA/EIA-603-A-2001 "Land Mobile FM or PM Communications Equipment Measurement and Performance Standards".

Radiated emission measurements were performed inside a 3 meter semi-anechoic chamber. The EUT was set at a distance of 3m from the receiving antenna. The EUT's RF ports were terminated to 50ohm load. The EUT was set to transmit at the low, mid and high channels of the transmitter frequency range at its maximum power level. The EUT was rotated about 360^0 and the receiving antenna scanned from 1-4m in order to capture the maximum emission. A calibrated antenna source was positioned in place of the EUT and the previously recorded signal was duplicated. The maximum EIRP of the emission was calculated by adding the forward power to the calibrated source plus its appropriate gain value. These steps were carried out with the receiving antenna in both vertical and horizontal polarization. Harmonic emissions up to the 10^{th} or 40GHz, which ever was the lesser, were investigated.

A modulated carrier generated by the signal generator carrier was connected to either the Uplink or Downlink RF port at a maximum level as determined by the OEM A spectrum analyzer was connected to either the Uplink or Downlink port depending on the circuitry being measured. The spectrum analyzer was set to 1MHz RBW and 3MHz VBW. The spectrum was investigated from 30MHz to the 10^{th} harmonic of the carrier.

The inter-modulation requirements were performed in a similar manner as described above. The spectrum analyzer was set to 100KHz RBW and 300KHz VBW. Two modulated carriers were injected into the EUT. One carrier was set at the band edge of either the Uplink or Downlink band and the other at carrier set at 6MHz deviation from the first carrier. The in band spurious emissions were investigated.

Test Results: The EUT complies with the requirements of this section.

Test Engineer: Jeffrey Hazen

Test Date(s): May 30, 2008

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 2.1053 Measurements required: Field strength of spurious radiation.

Frequency (GHz)	Polarity (H/V)	Measured (dBuV/m)	Calculated EIRP (dBm)	Test Limit (dBm)	Margin (dB)
1.9278	V	48.54	-46.69	-13	-33.69
2.409	V	39.7	-55.53	-13	-42.53
2.463	V	41.34	-53.89	-13	-40.89
1.589	V	32.75	-62.48	-13	-49.48
1.187	V	34.57	-60.66	-13	-47.66
3.6388	V	48.35	-46.88	-13	-33.88
3.4218	V	39.3	-55.93	-13	-42.93
4.1452	V	41.96	-53.27	-13	-40.27
4.543	V	42.94	-52.29	-13	-39.29
5.142	V	41.34	-53.89	-13	-40.89
6.1983	V	44.11	-51.12	-13	-38.12
1.9278	H	45.72	-49.51	-13	-36.51
2.463	H	41.12	-54.11	-13	-41.11
2.409	H	41.62	-53.61	-13	-40.61
1.44	H	35.02	-60.21	-13	-47.21
1.424	H	41.91	-53.32	-13	-40.32
1.187	H	34.01	-61.22	-13	-48.22
3.6388	H	43.27	-51.96	-13	-38.96
4.1452	H	40.86	-54.37	-13	-41.37
6.1983	H	41.38	-53.85	-13	-40.85
Low Channel					

Table 15. Radiated Spurious Emissions Test Results – PCS Downlink, Low Channel

Frequency (GHz)	Polarity (H/V)	Measured (dBuV/m)	Calculated EIRP (dBm)	Test Limit (dBm)	Margin (dB)
1.9563	V	45.89	-49.34	-13	-36.34
1.8803	V	41.53	-53.7	-13	-40.7
1.8455	V	38.76	-56.47	-13	-43.47
2.2952	V	43.59	-51.64	-13	-38.64
2.4092	V	41.27	-53.96	-13	-40.96
3.5613	V	50.9	-44.33	-13	-31.33
3.7845	V	39.6	-55.63	-13	-42.63
3.8455	V	44.16	-51.07	-13	-38.07
4.543	V	43.7	-51.53	-13	-38.53
2.9878	V	43.52	-51.71	-13	-38.71
5.3387	V	45.39	-49.84	-13	-36.84
5.7882	V	45.83	-49.4	-13	-36.4
6.2567	V	45.35	-49.88	-13	-36.88
1.8487	H	37.96	-57.27	-13	-44.27
1.9563	H	48.24	-46.99	-13	-33.99
2.4155	H	40.1	-55.13	-13	-42.13
4.543	H	40.74	-54.49	-13	-41.49
6.2567	H	41.95	-53.28	-13	-40.28
Mid Channel					

Table 16. Radiated Spurious Emissions Test Results – PCS Downlink, Mid Channel

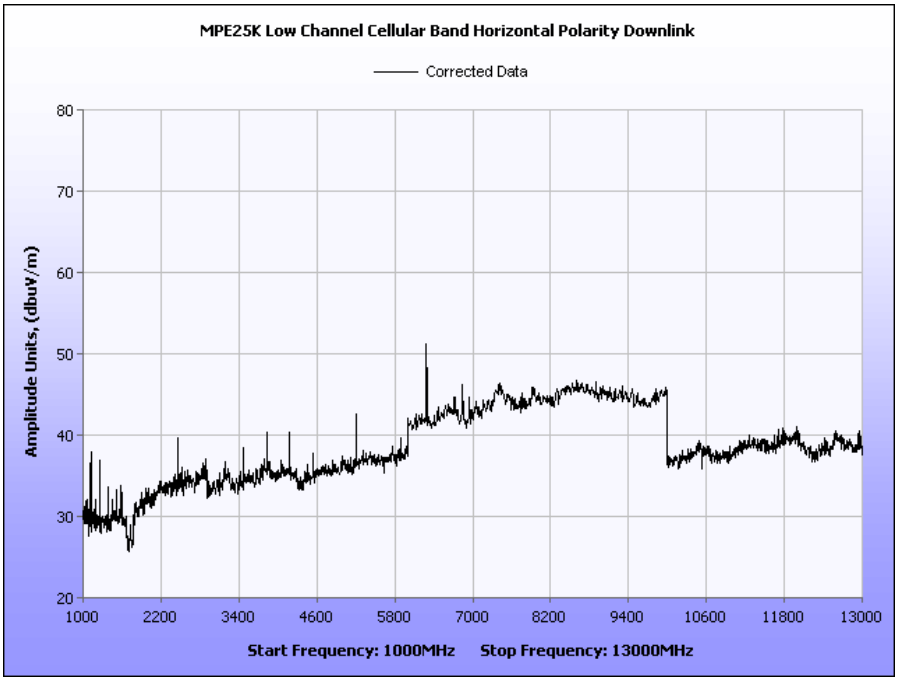
Frequency (GHz)	Polarity (H/V)	Measured (dBuV/m)	Calculated EIRP (dBm)	Test Limit (dBm)	Margin (dB)
1.8455	V	52.22	-43.01	-13	-30.01
1.8803	V	43.83	-51.4	-13	-38.4
1.9848	V	47.82	-47.41	-13	-34.41
2.4123	V	39.75	-55.48	-13	-42.48
1.0032	V	40.3	-54.93	-13	-41.93
5.2767	V	42.95	-52.28	-13	-39.28
4.543	V	42.6	-52.63	-13	-39.63
3.5148	V	39.69	-55.54	-13	-42.54
6.338	V	43.07	-52.16	-13	-39.16
1.9848	H	48.69	-46.54	-13	-33.54
1.5455	H	46.73	-48.5	-13	-35.5
2.4123	H	40.7	-54.53	-13	-41.53
4.543	H	38.61	-56.62	-13	-43.62
High Channel					

Table 17. Radiated Spurious Emissions Test Results – PCS Downlink, High Channel

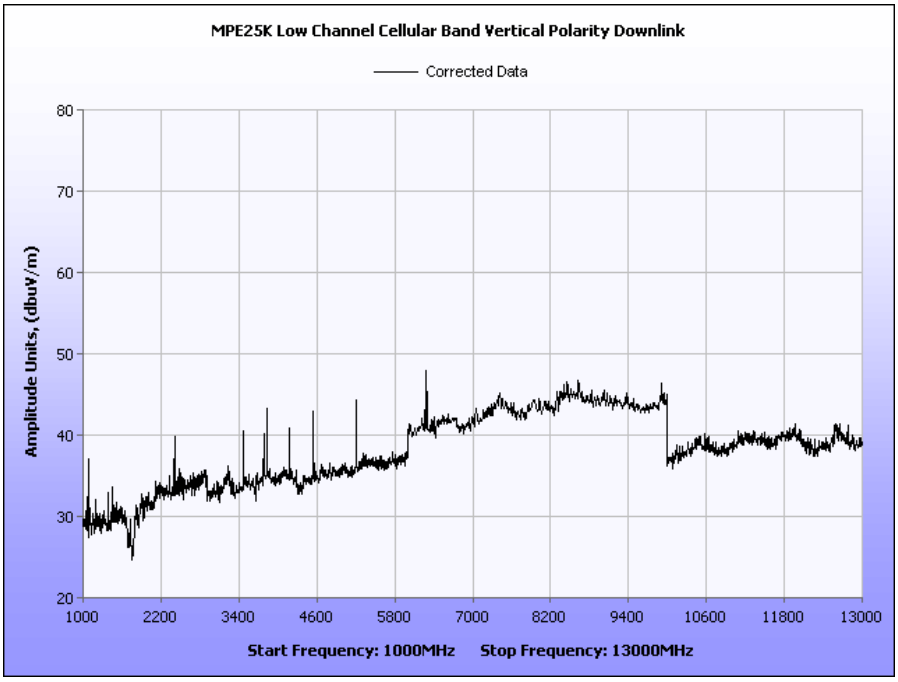
Note: All other emissions were measured at the noise floor of the spectrum analyzer

Electromagnetic Compatibility Criteria for Intentional Radiators

Radiated Spurious Emissions Test Results – Cellular Band

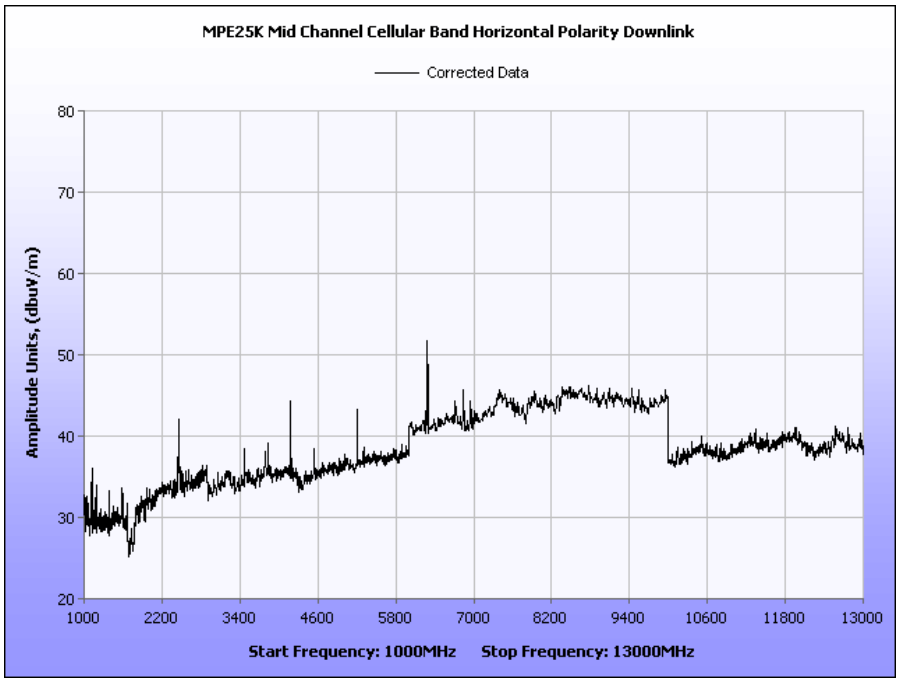


Plot 26. Radiated Spurious Emissions – Low Channel, Horizontal, Downlink

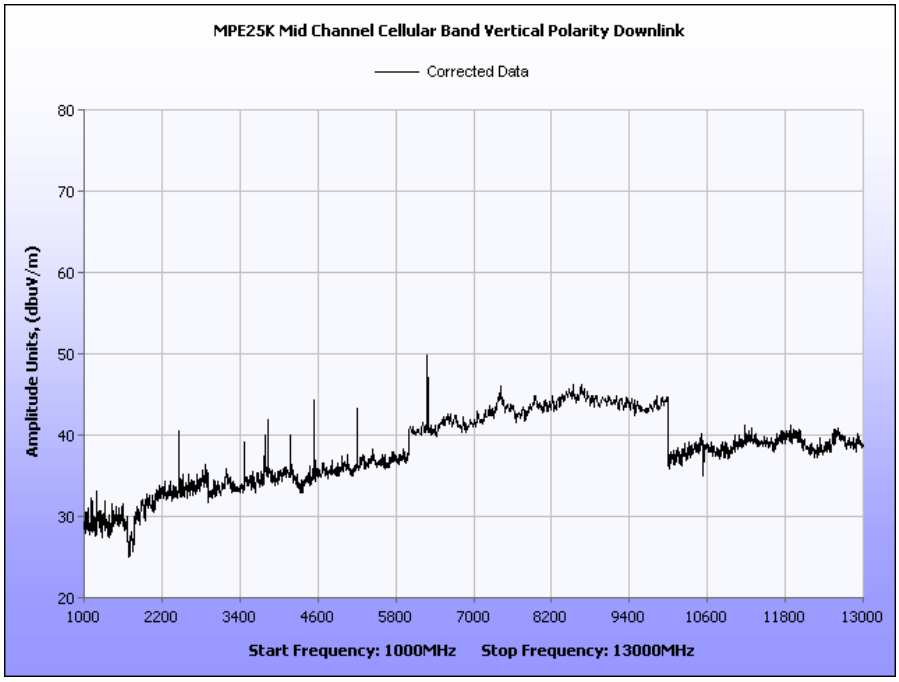


Plot 27. Radiated Spurious Emissions – Low Channel, Vertical, Downlink

Radiated Spurious Emissions Test Results – Cellular Band

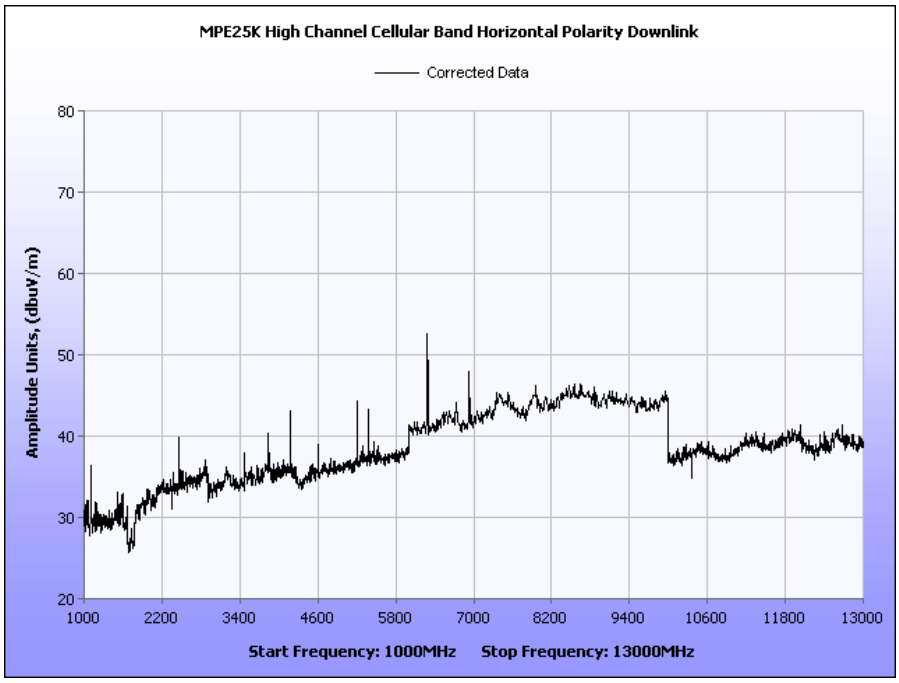


Plot 28. Radiated Spurious Emissions – Mid Channel, Horizontal, Downlink

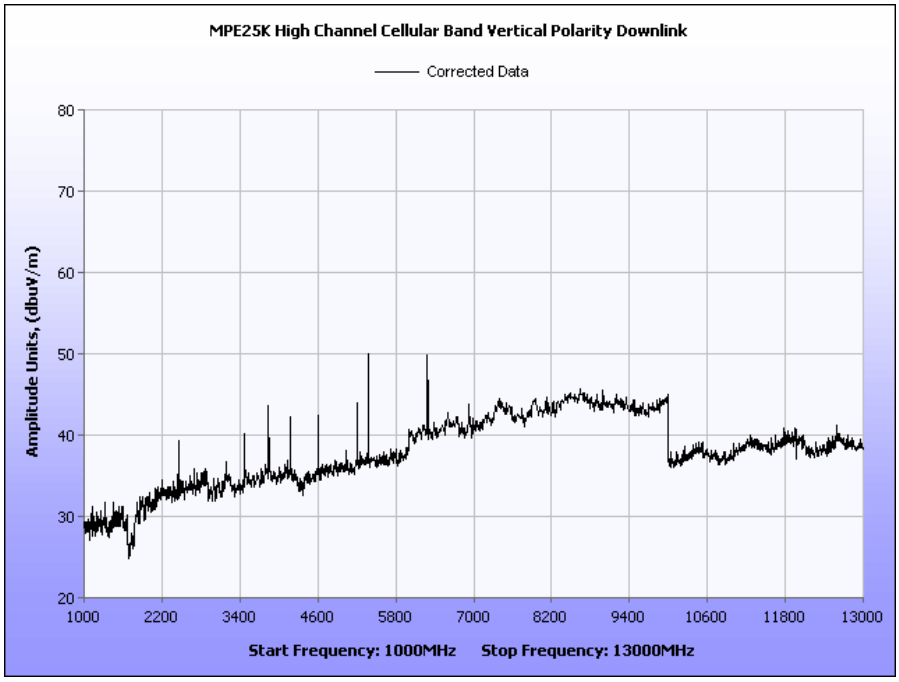


Plot 29. Radiated Spurious Emissions – Mid Channel, Vertical, Downlink

Radiated Spurious Emissions Test Results – Cellular Band

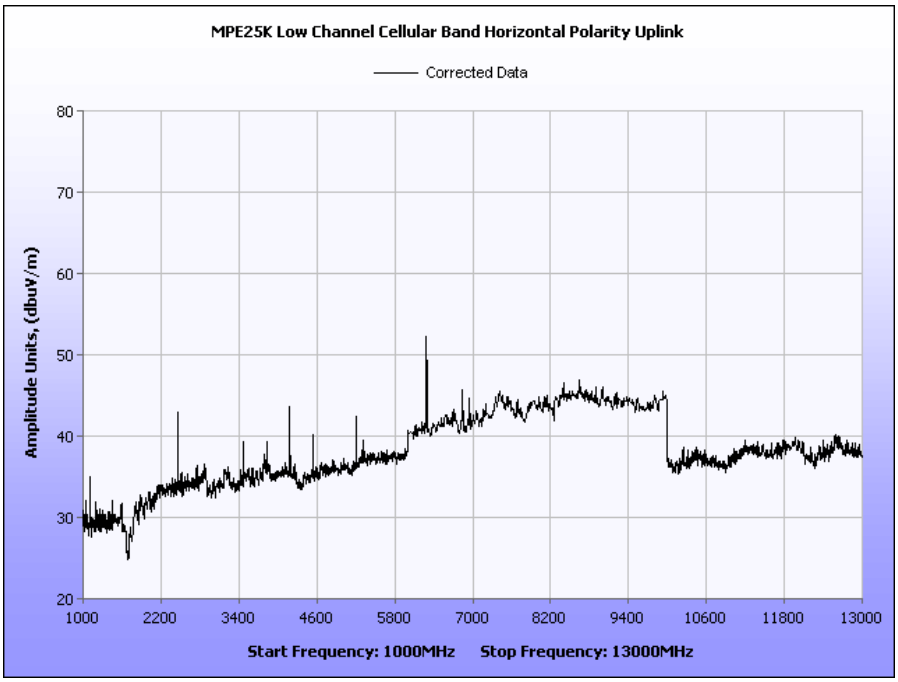


Plot 30. Radiated Spurious Emissions – High Channel, Horizontal, Downlink

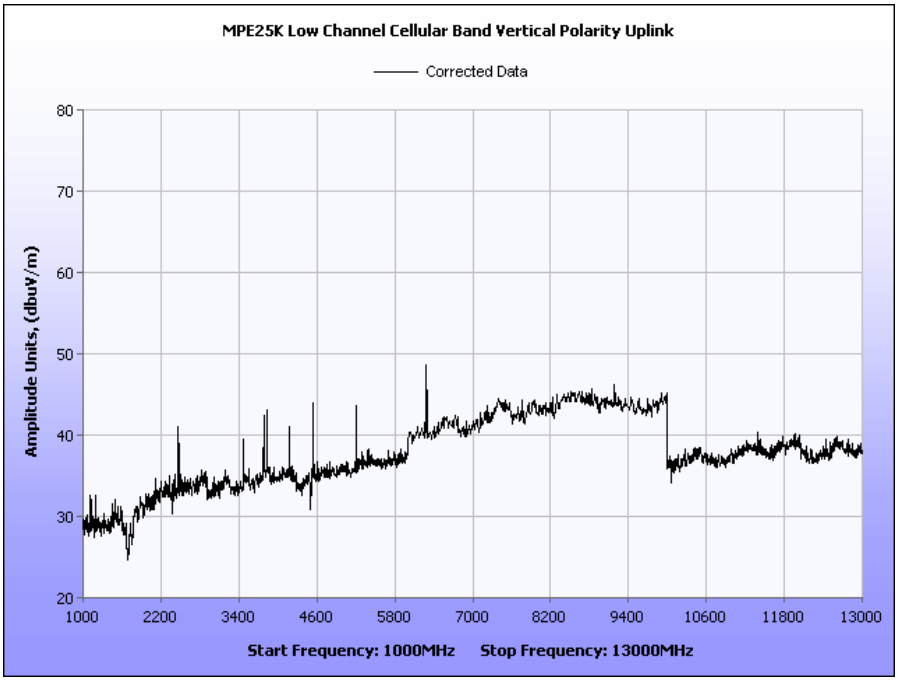


Plot 31. Radiated Spurious Emissions – High Channel, Vertical, Downlink

Radiated Spurious Emissions Test Results – Cellular Band

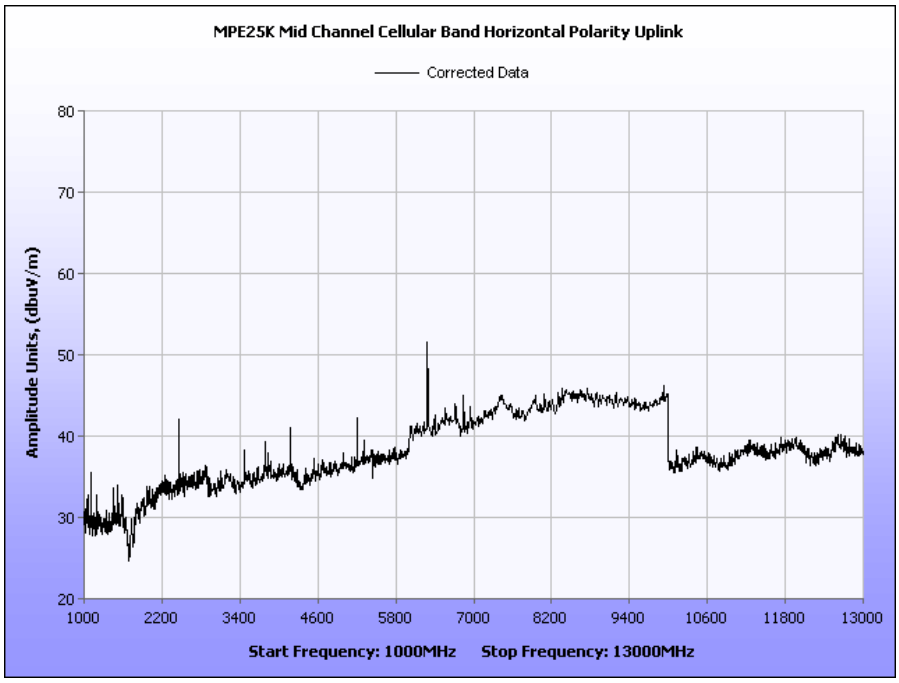


Plot 32. Radiated Spurious Emissions – Low Channel, Horizontal, Uplink

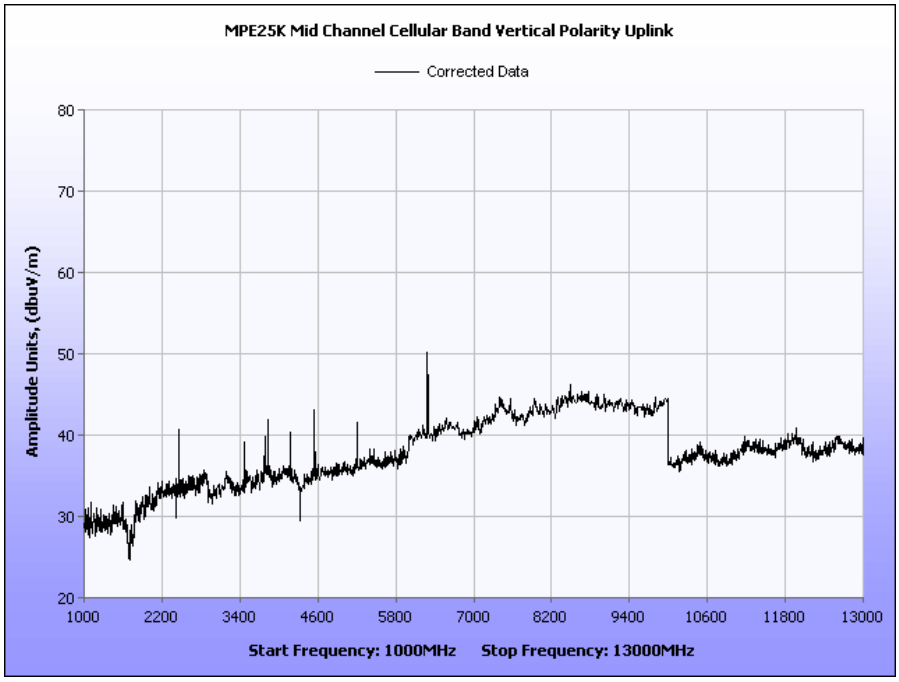


Plot 33. Radiated Spurious Emissions – Low Channel, Vertical, Uplink

Radiated Spurious Emissions Test Results – Cellular Band

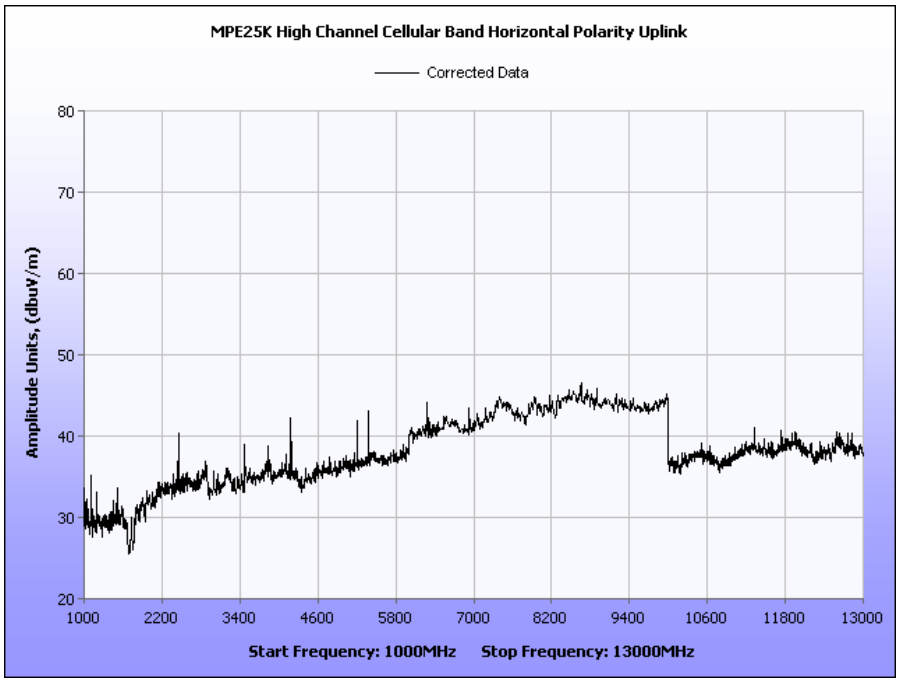


Plot 34. Radiated Spurious Emissions – Mid Channel, Horizontal, Uplink

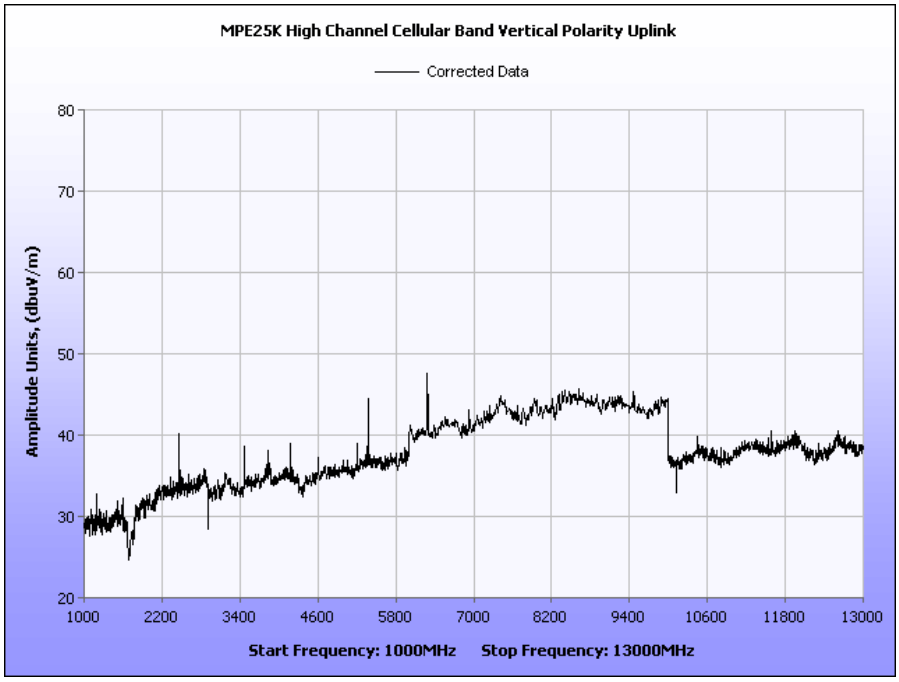


Plot 35. Radiated Spurious Emissions – Mid Channel, Vertical, Uplink

Radiated Spurious Emissions Test Results – Cellular Band

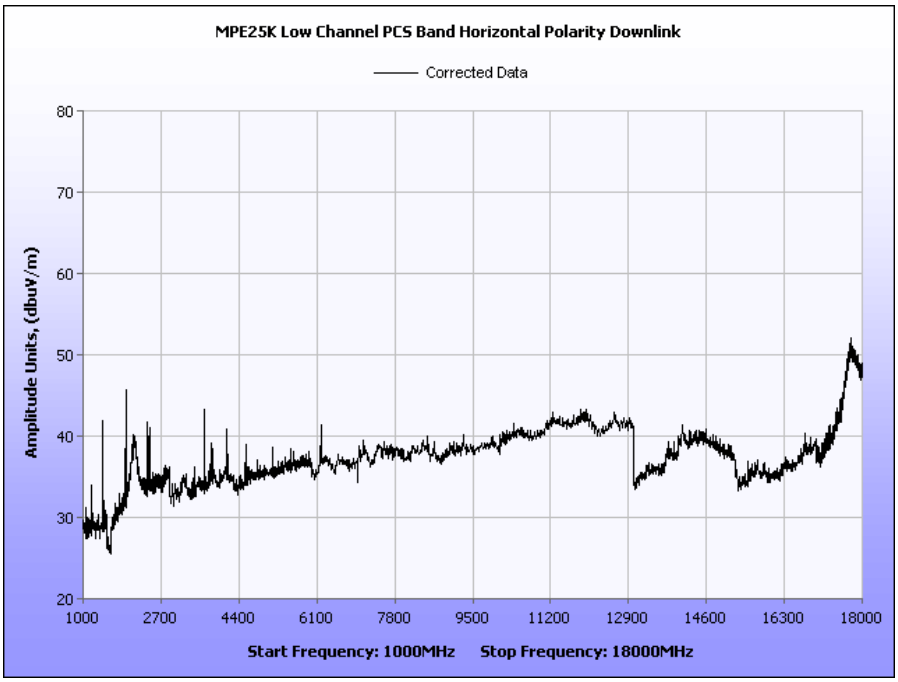


Plot 36. Radiated Spurious Emissions – High Channel, Horizontal, Uplink

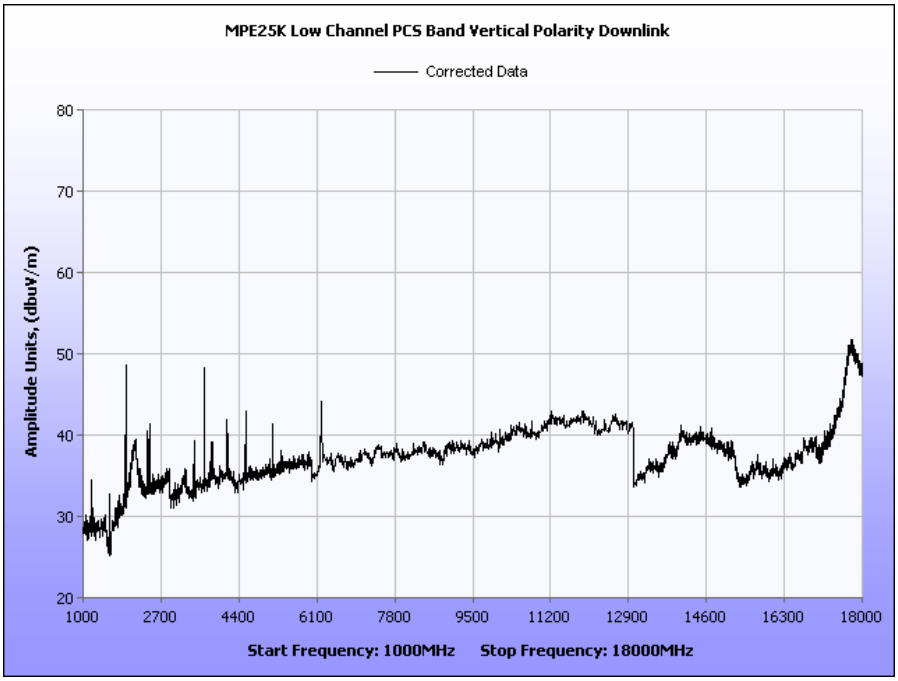


Plot 37. Radiated Spurious Emissions – High Channel, Vertical, Uplink

Radiated Spurious Emissions Test Results – PCS Band

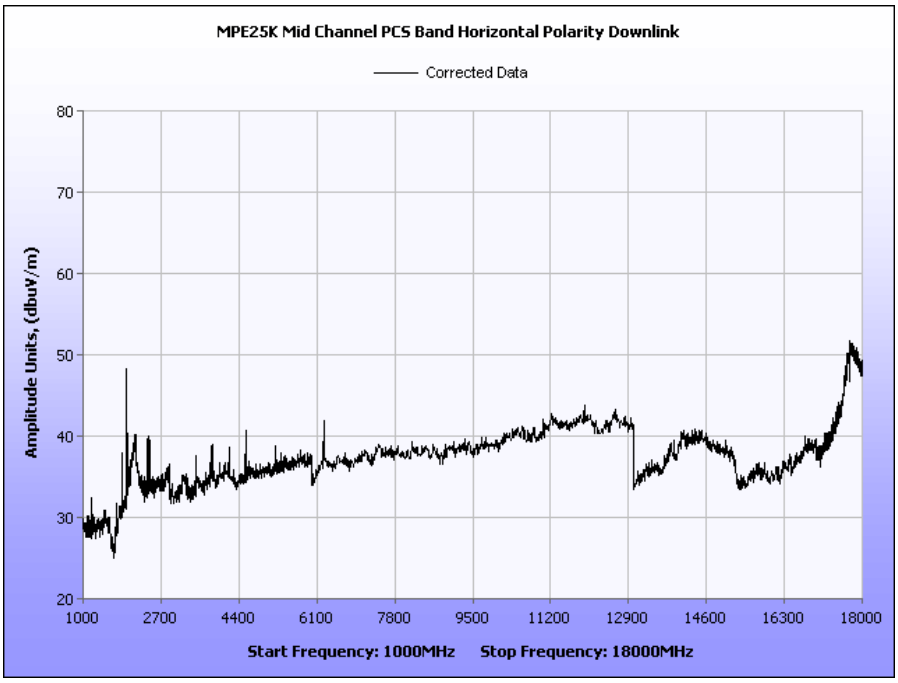


Plot 38. Radiated Spurious Emissions – Low Channel, Horizontal, Downlink

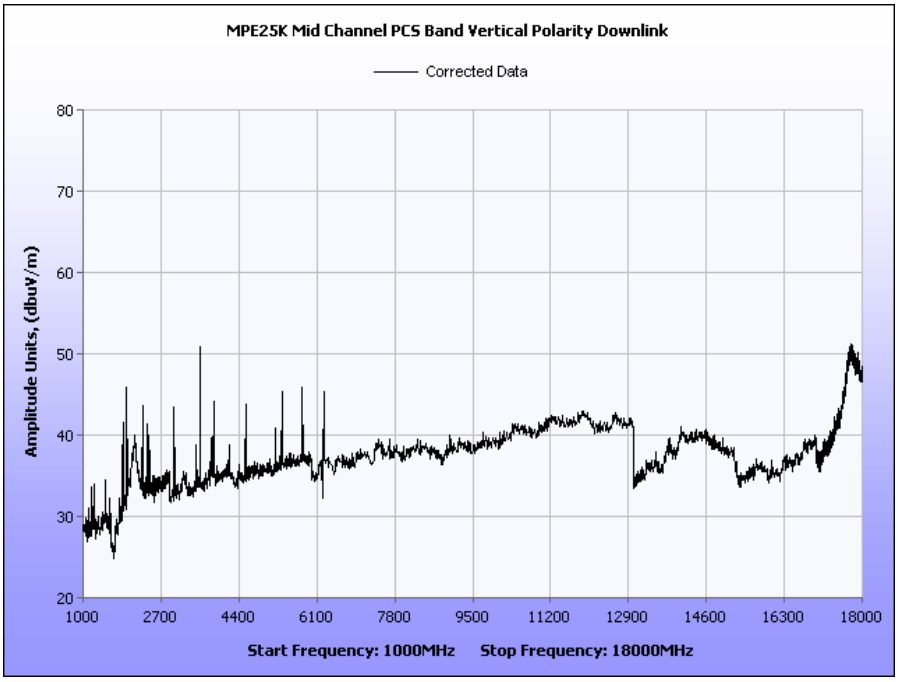


Plot 39. Radiated Spurious Emissions – Low Channel, Vertical, Downlink

Radiated Spurious Emissions Test Results – PCS Band

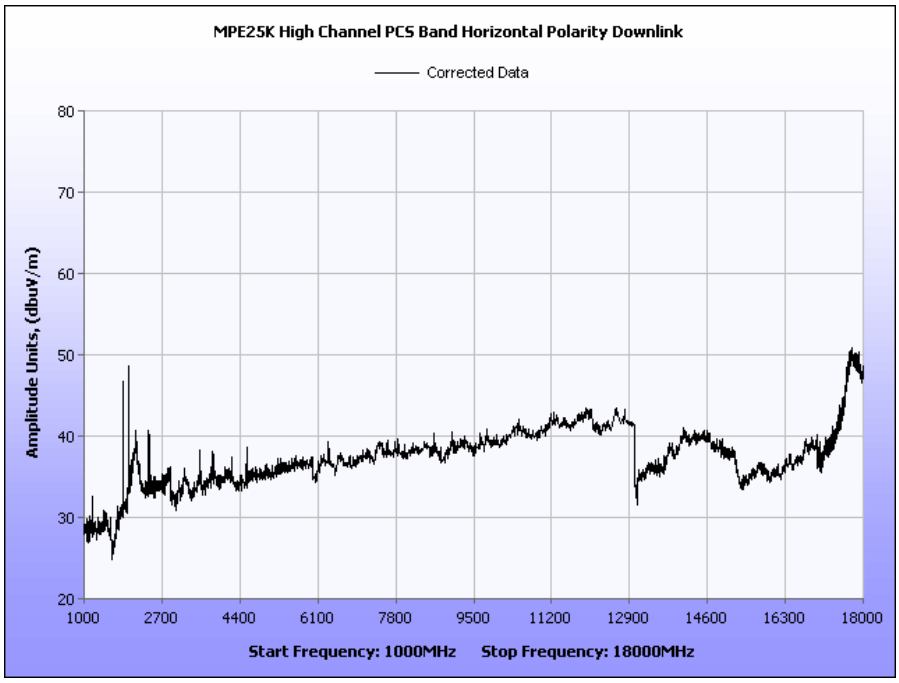


Plot 40. Radiated Spurious Emissions – Mid Channel, Horizontal, Downlink

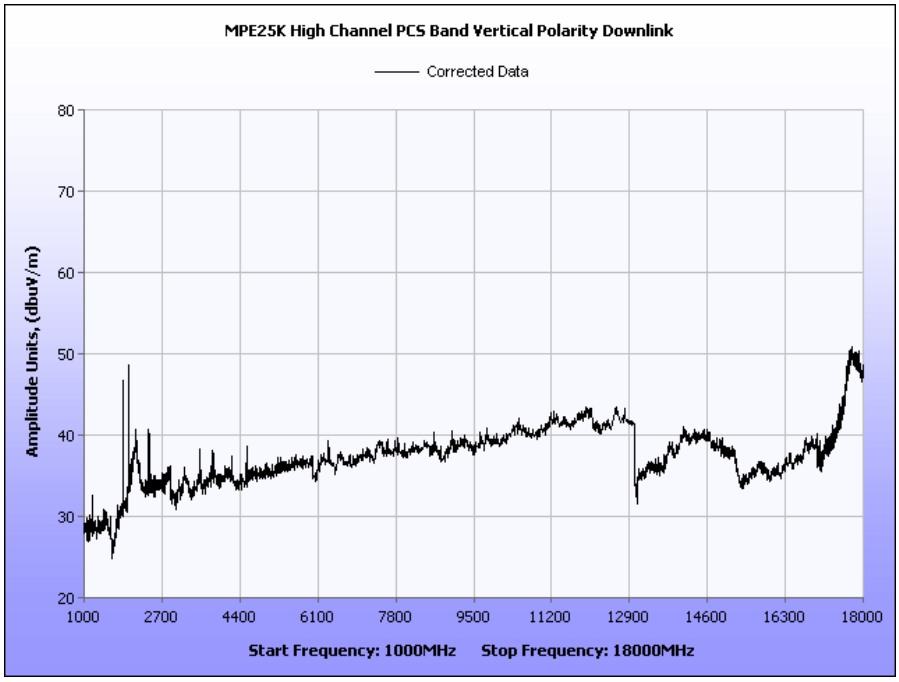


Plot 41. Radiated Spurious Emissions – Mid Channel, Vertical, Downlink

Radiated Spurious Emissions Test Results – PCS Band

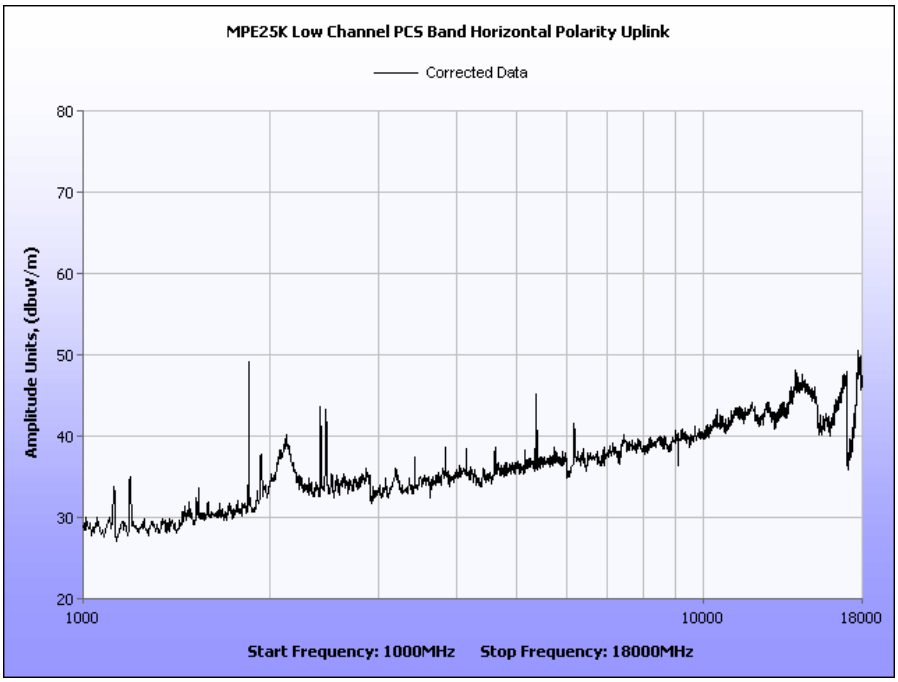


Plot 42. Radiated Spurious Emissions – High Channel, Horizontal, Downlink

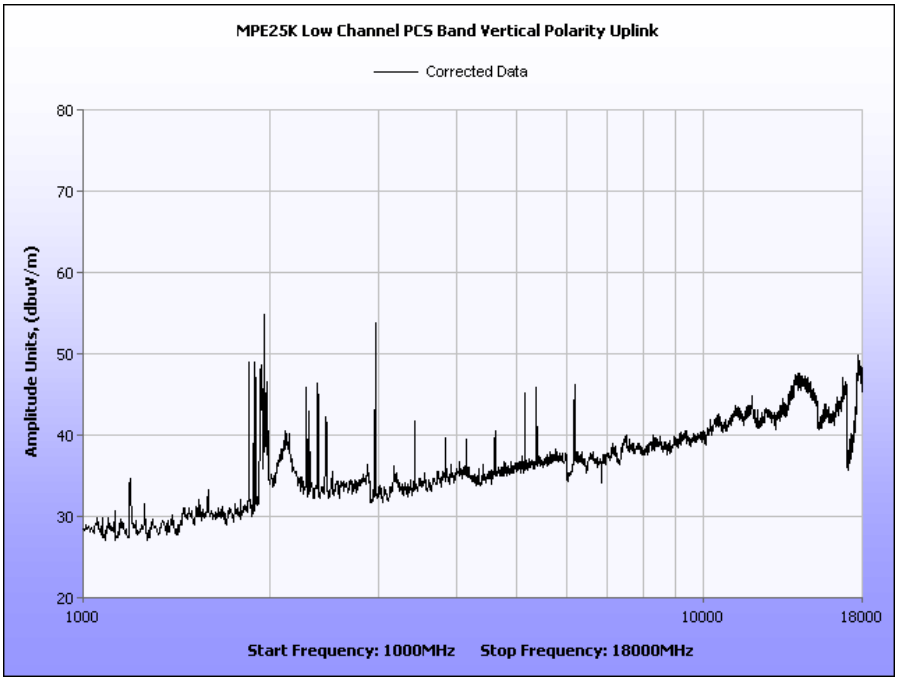


Plot 43. Radiated Spurious Emissions – High Channel, Vertical, Downlink

Radiated Spurious Emissions Test Results – PCS Band

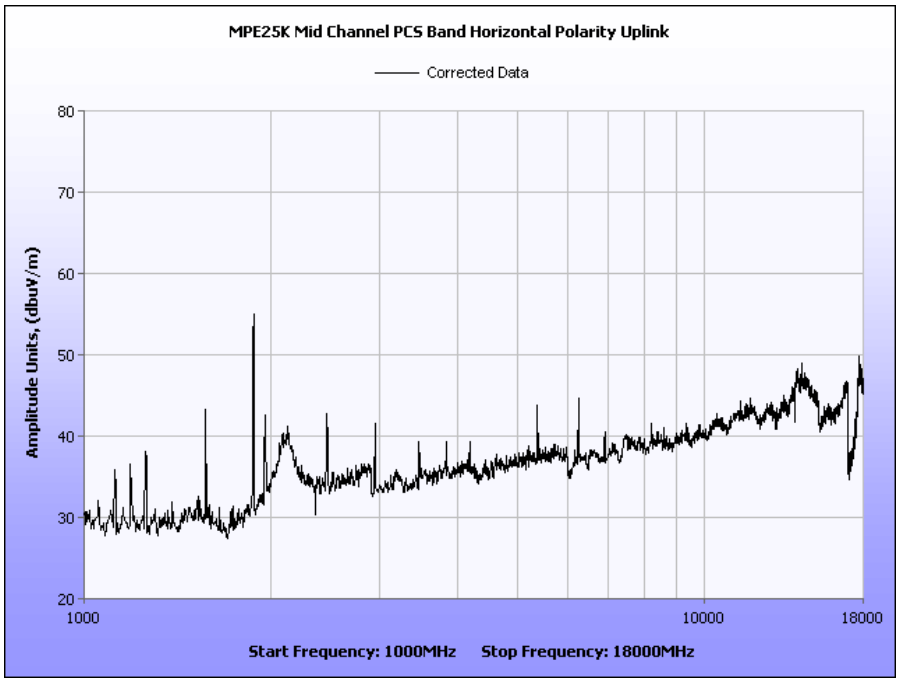


Plot 44. Radiated Spurious Emissions – Low Channel, Horizontal, Uplink

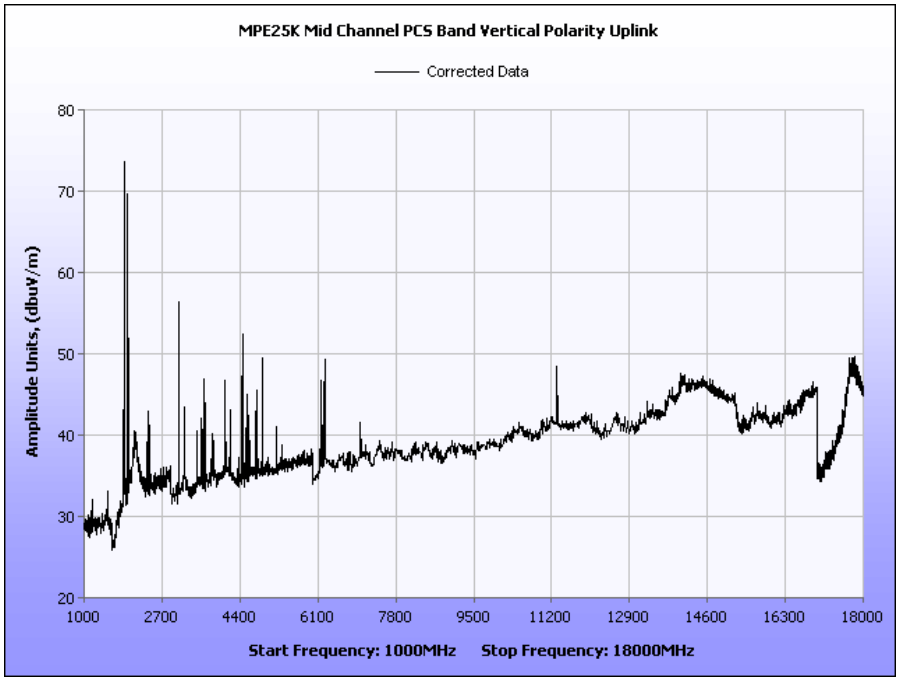


Plot 45. Radiated Spurious Emissions – Low Channel, Vertical, Uplink

Radiated Spurious Emissions Test Results – PCS Band

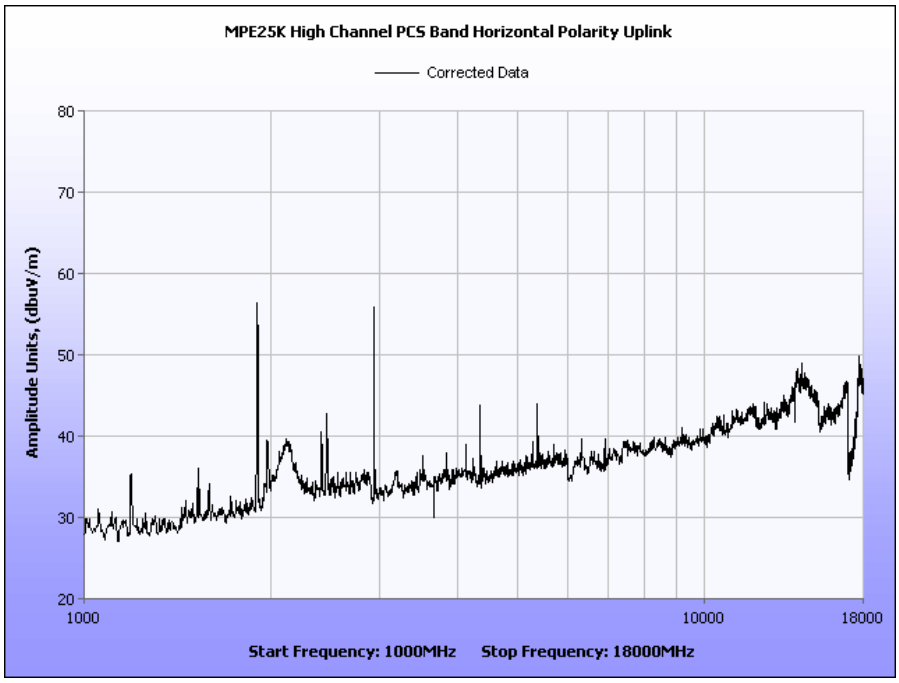


Plot 46. Radiated Spurious Emissions – Mid Channel, Horizontal, Uplink

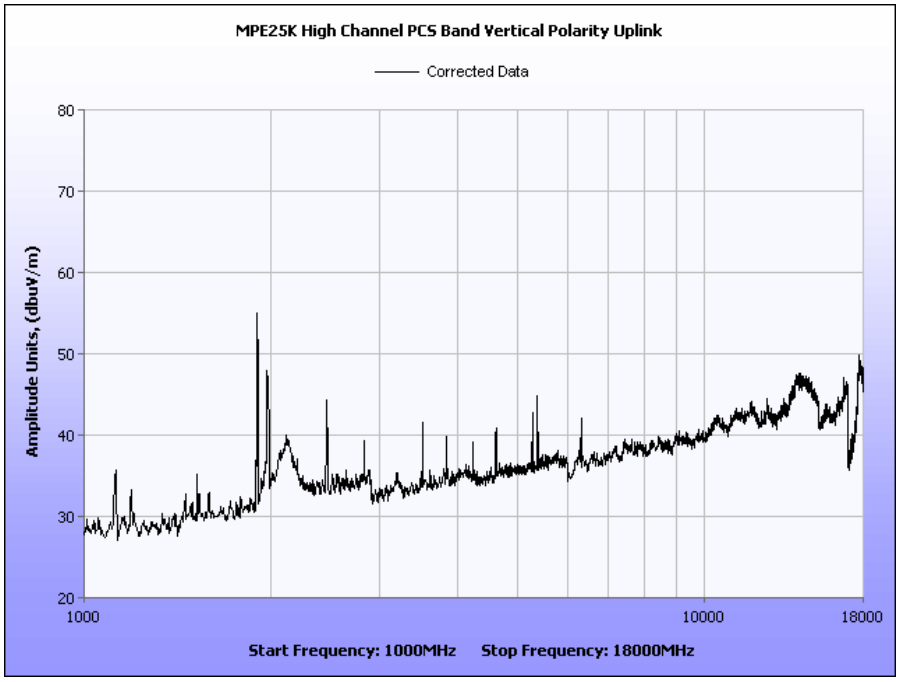


Plot 47. Radiated Spurious Emissions – Mid Channel, Vertical, Uplink

Radiated Spurious Emissions Test Results – PCS Band

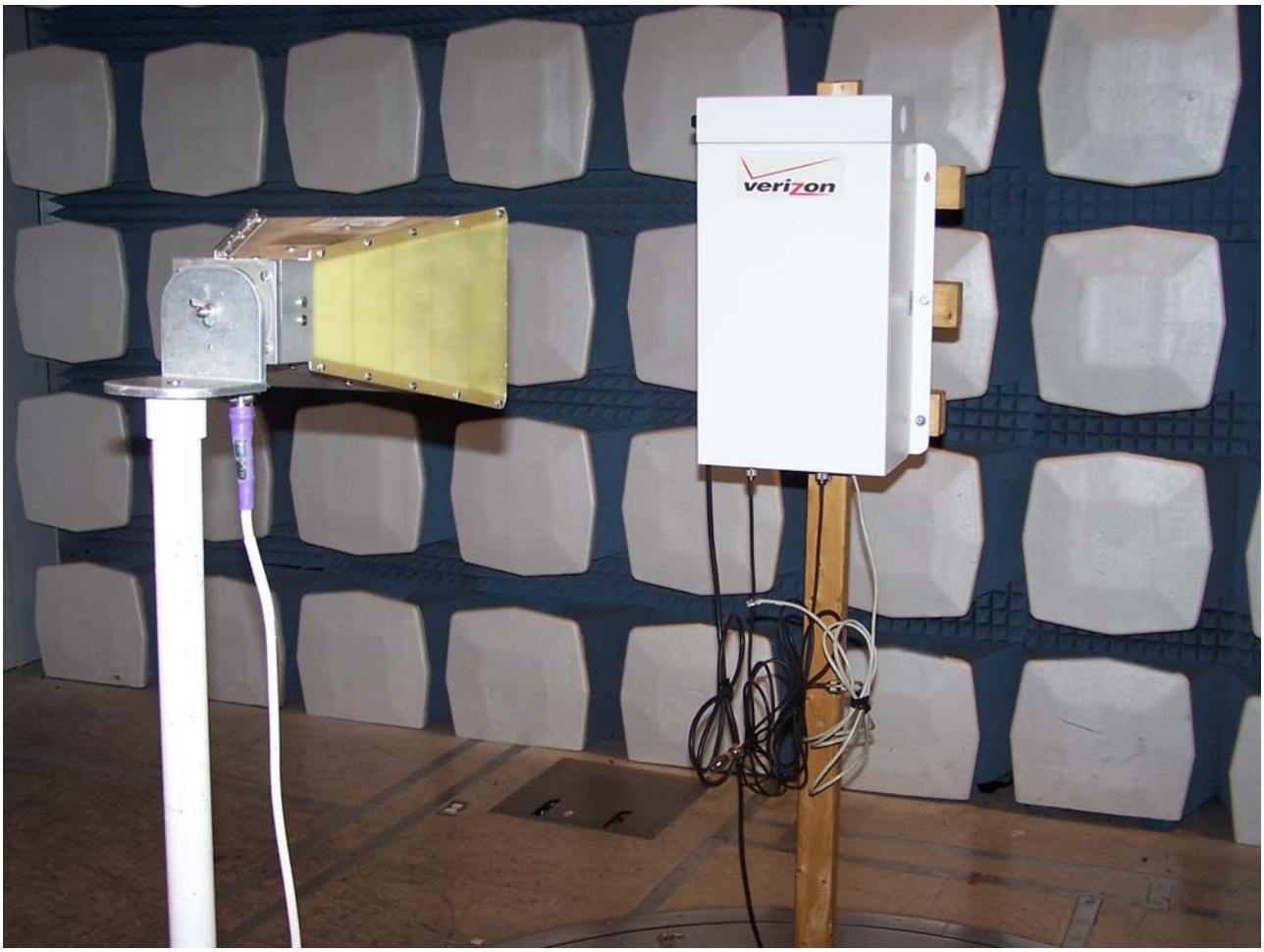


Plot 48. Radiated Spurious Emissions – High Channel, Horizontal, Uplink



Plot 49. Radiated Spurious Emissions – High Channel, Vertical, Uplink

Electromagnetic Compatibility Criteria for Intentional Radiators



Photograph 3. Test Equipment and setup for various Radiated Measurements

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 2.1051 Spurious Emissions at Antenna Terminals

Test Requirement(s):

§ 2.1051 Measurements required: Spurious emissions at antenna terminals: The radio frequency voltage or powers generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in § 2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

§ 22.917, §24.238 Emission limitations for Broadband PCS equipment: The rules in this section govern the spectral characteristics of emissions in the Broadband Personal Communications Service.

§ 22.917 (a), § 24.238 (a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

Test Procedures:

A modulated carrier generated by the signal generator carrier was connected to either the Uplink or Downlink RF port at a maximum level as determined by the OEM A spectrum analyzer was connected to either the Uplink or Downlink port depending on the circuitry being measured. The spectrum analyzer was set to 100 kHz RBW and 300 kHz VBW for testing below 1 GHz, and it was set to 1 MHz RBW and 3 MHz RBW for testing above 1 GHz.

The inter-modulation requirements were performed in a similar manner as described above. The spectrum analyzer was set to 100KHz RBW and 300KHz VBW. Two modulated carriers were injected into the EUT. One carrier was set at the band edge of either the Uplink or Downlink band and the other at carrier set at 6MHz deviation from the first carrier. The in band spurious emissions were investigated.

Test Results:

The EUT complies with the requirements of this section. There were no detectable spurious emissions for this EUT.

Test Engineer(s):

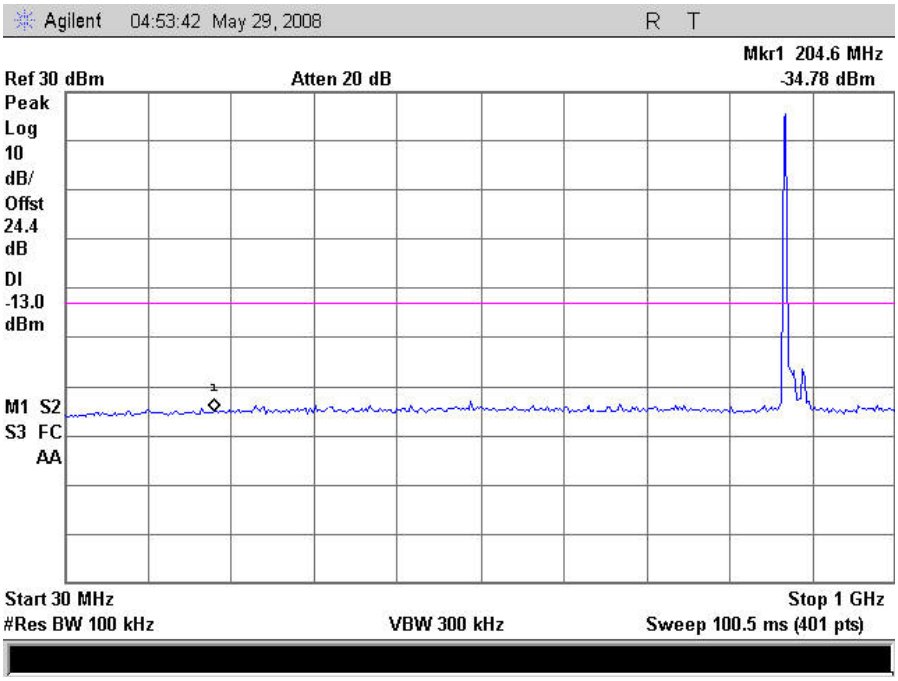
Jeffrey Hazen

Test Date(s):

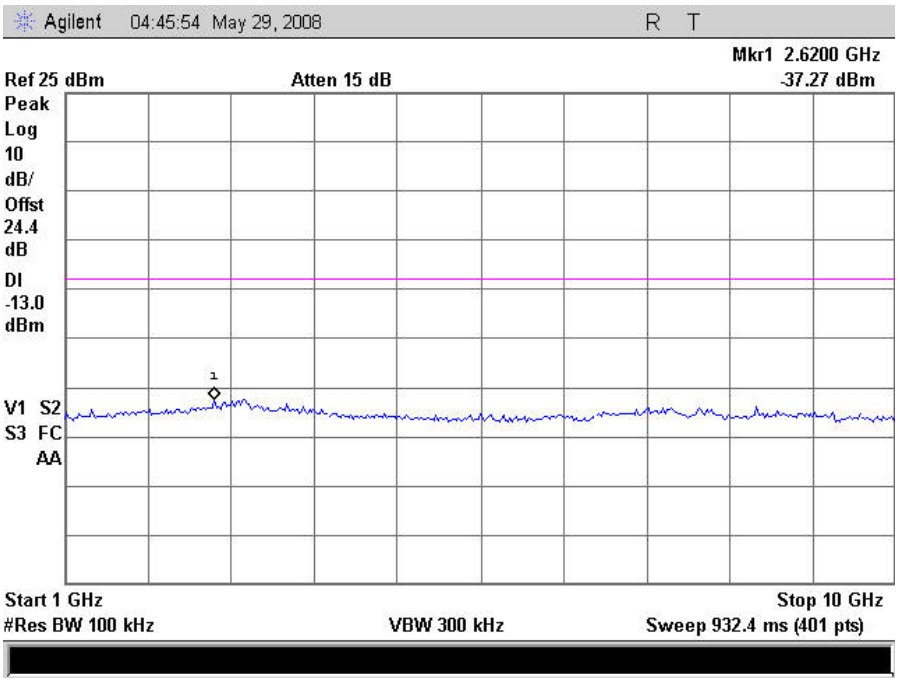
May 16, May 21, May 29 and June 3, 2008

Spurious Emissions at Antenna Terminals Test Results

§ 2.1051 Spurious Emissions at Antenna Terminals - Cellular

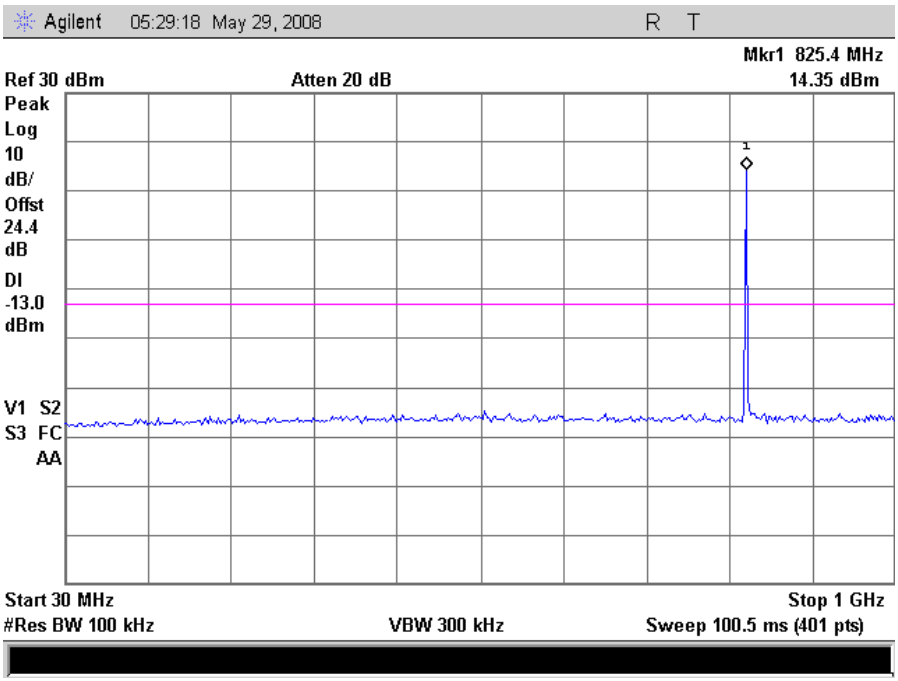


Plot 50. Conducted Spurious Emissions, CDMA Low Channel Downlink, 30MHz – 1GHz

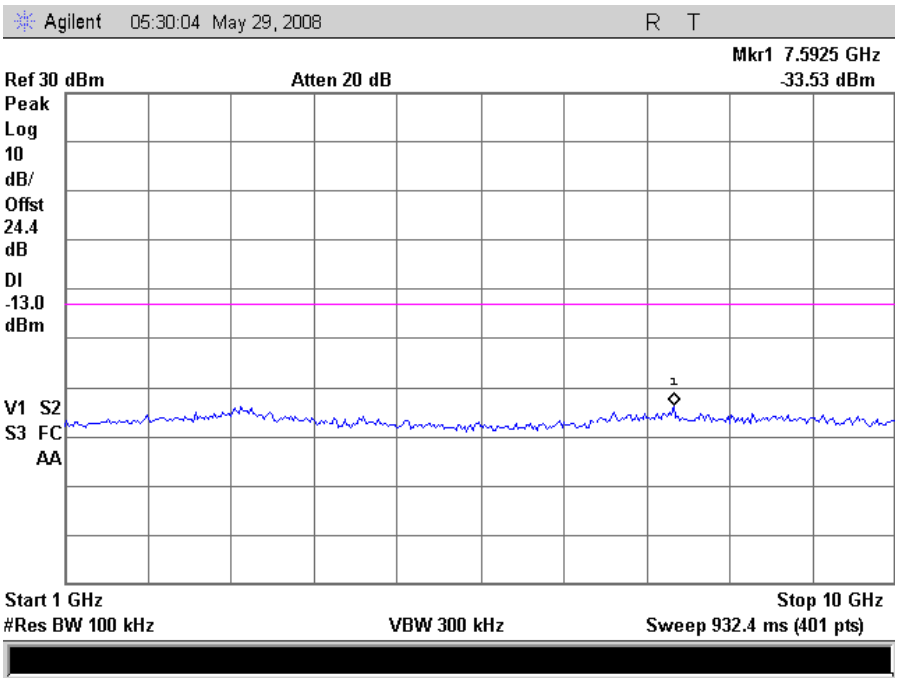


Plot 51. Conducted Spurious Emissions, CDMA Low Channel Downlink, 1GHz – 10GHz

§ 2.1051 Spurious Emissions at Antenna Terminals - Cellular

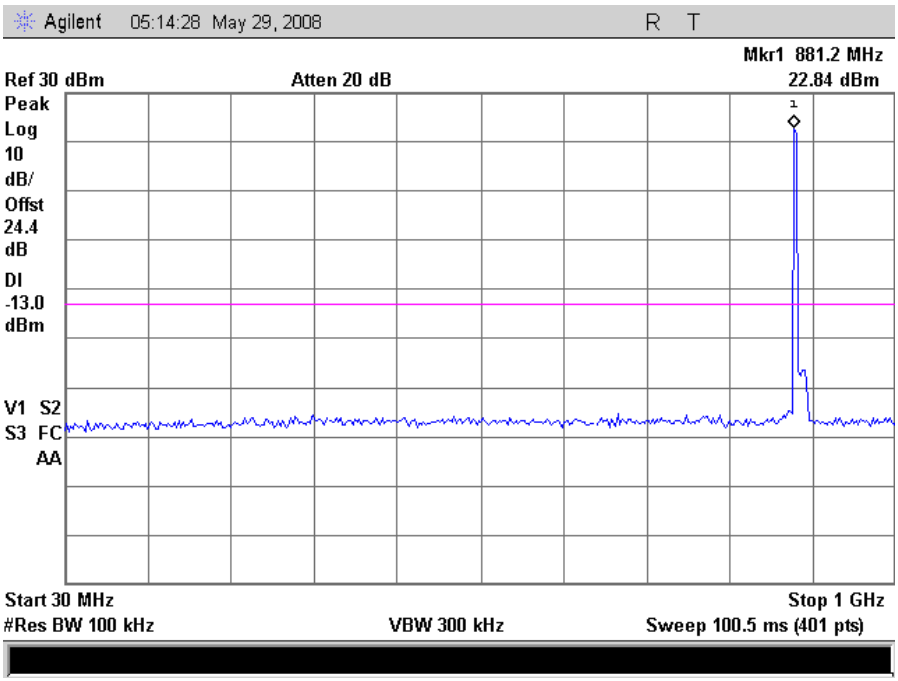


Plot 52. Conducted Spurious Emissions, CDMA Low Channel Uplink, 30MHz – 1GHz

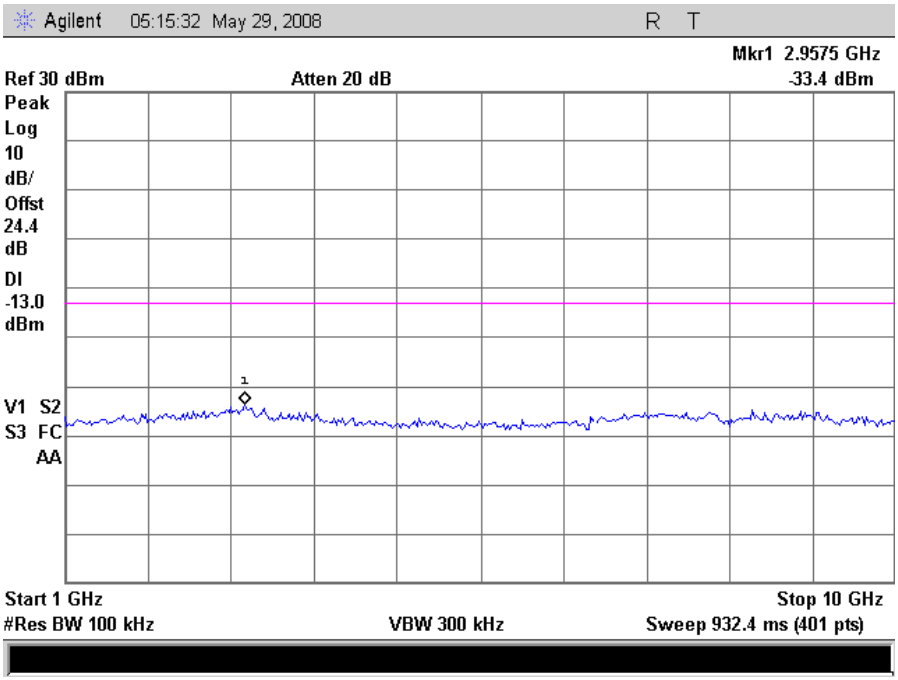


Plot 53. Conducted Spurious Emissions, CDMA Low Channel Uplink, 1GHz – 10GHz

§ 2.1051 Spurious Emissions at Antenna Terminals - Cellular

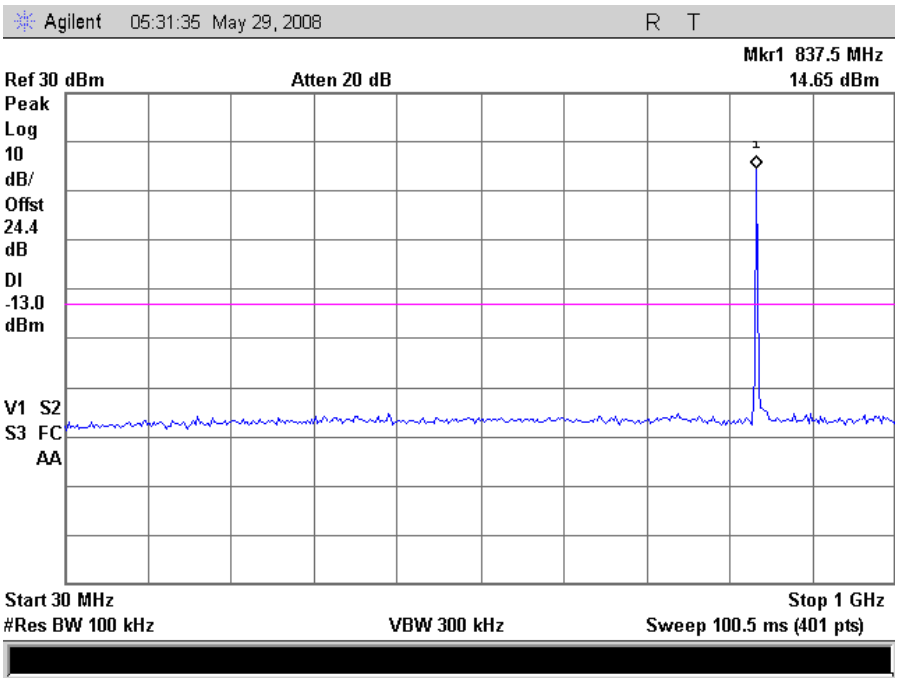


Plot 54. Conducted Spurious Emissions, CDMA Mid Channel Downlink, 30MHz – 1GHz

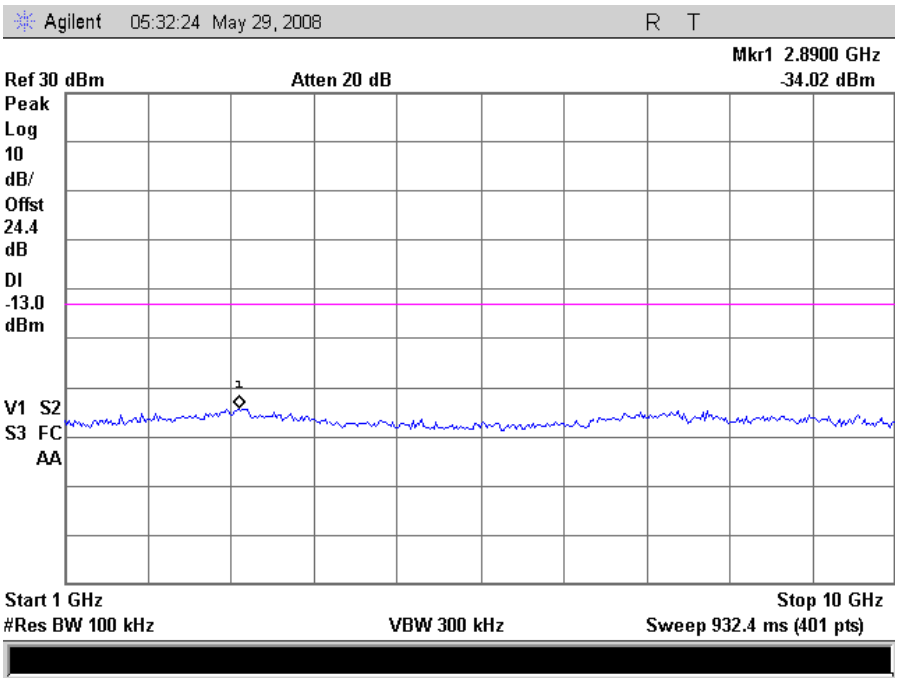


Plot 55. Conducted Spurious Emissions, CDMA Mid Channel Downlink, 1GHz – 10GHz

§ 2.1051 Spurious Emissions at Antenna Terminals - Cellular

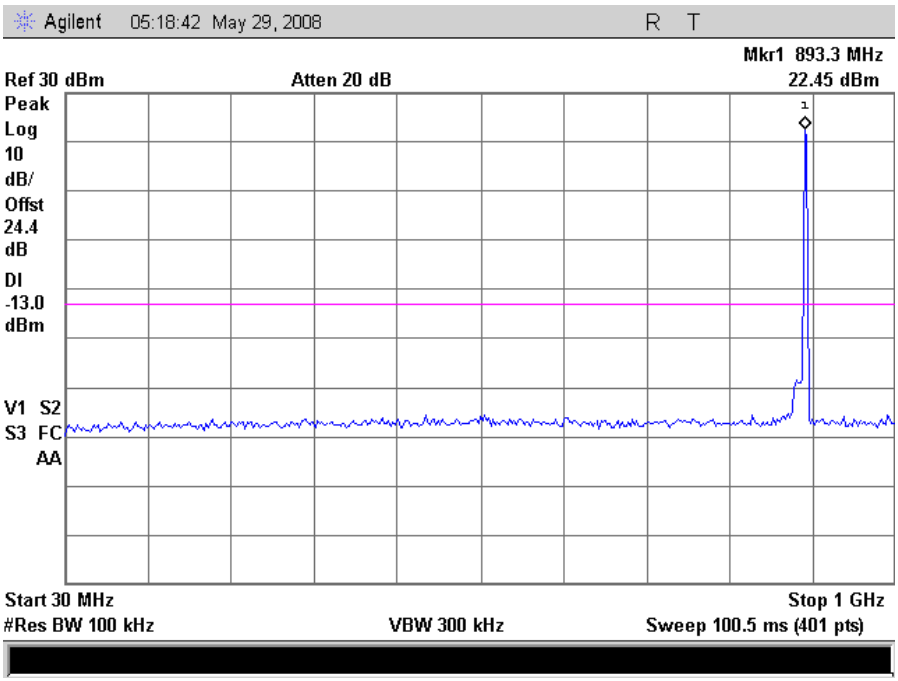


Plot 56. Conducted Spurious Emissions, CDMA Mid Channel Uplink, 30MHz – 1GHz

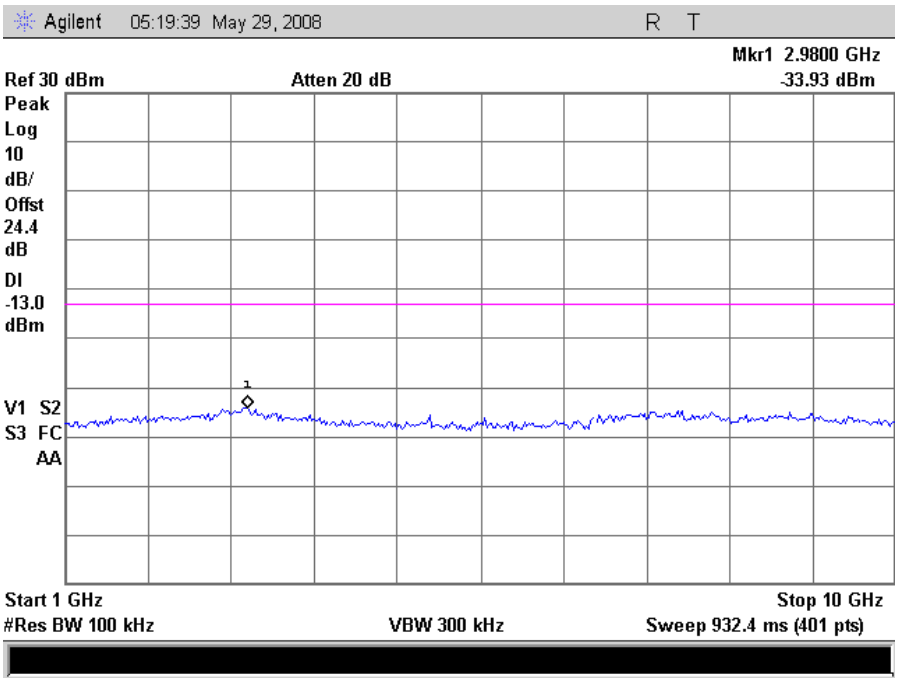


Plot 57. Conducted Spurious Emissions, CDMA Mid Channel Uplink, 1GHz – 10GHz

§ 2.1051 Spurious Emissions at Antenna Terminals - Cellular

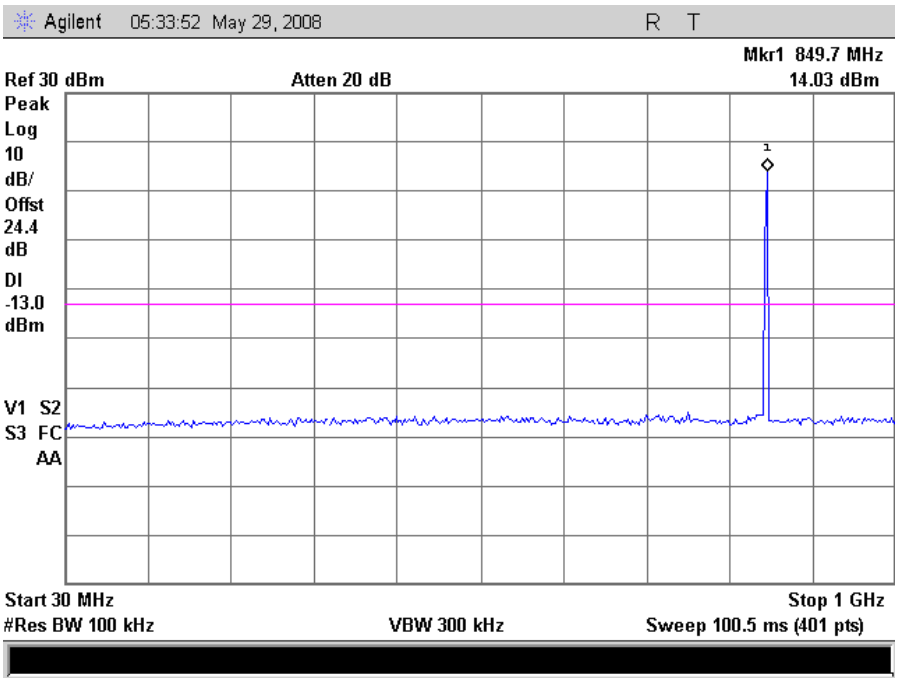


Plot 58. Conducted Spurious Emissions, CDMA High Channel Downlink, 30MHz – 1GHz

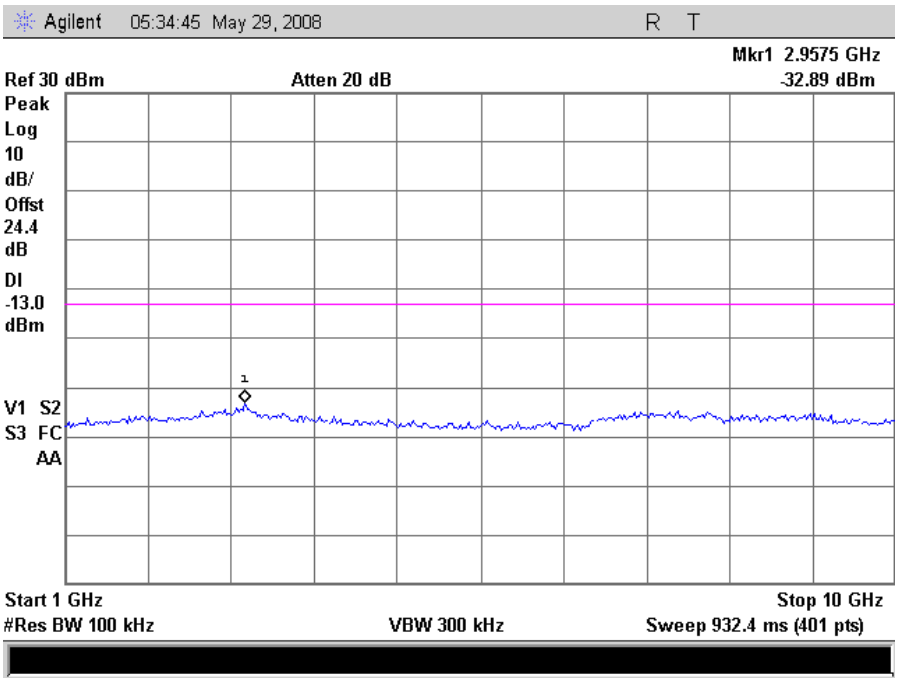


Plot 59. Conducted Spurious Emissions, CDMA High Channel Downlink, 1GHz – 10GHz

§ 2.1051 Spurious Emissions at Antenna Terminals - Cellular

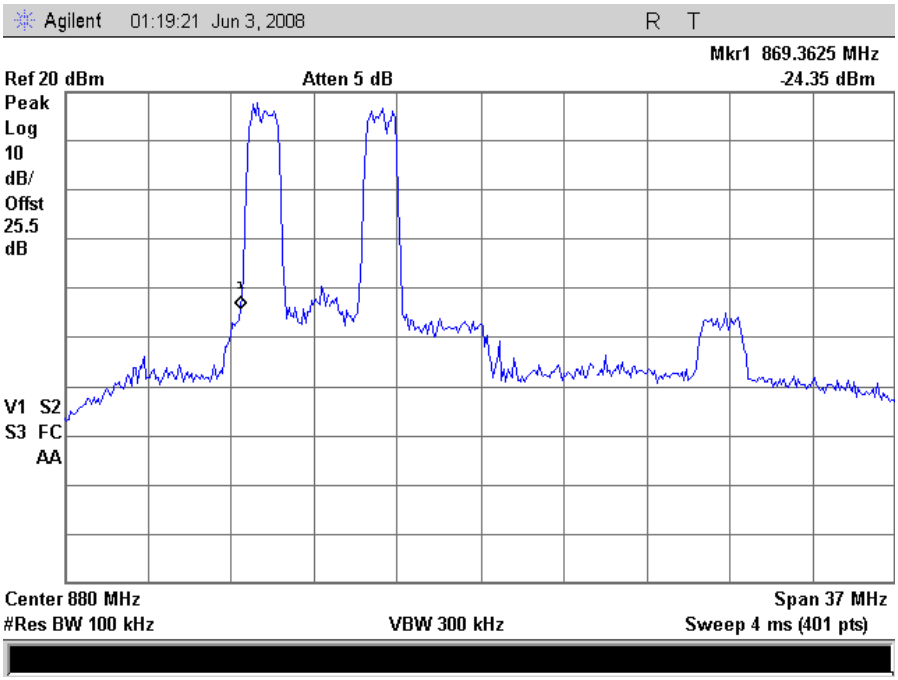


Plot 60. Conducted Spurious Emissions, CDMA High Channel Uplink, 30MHz – 1GHz

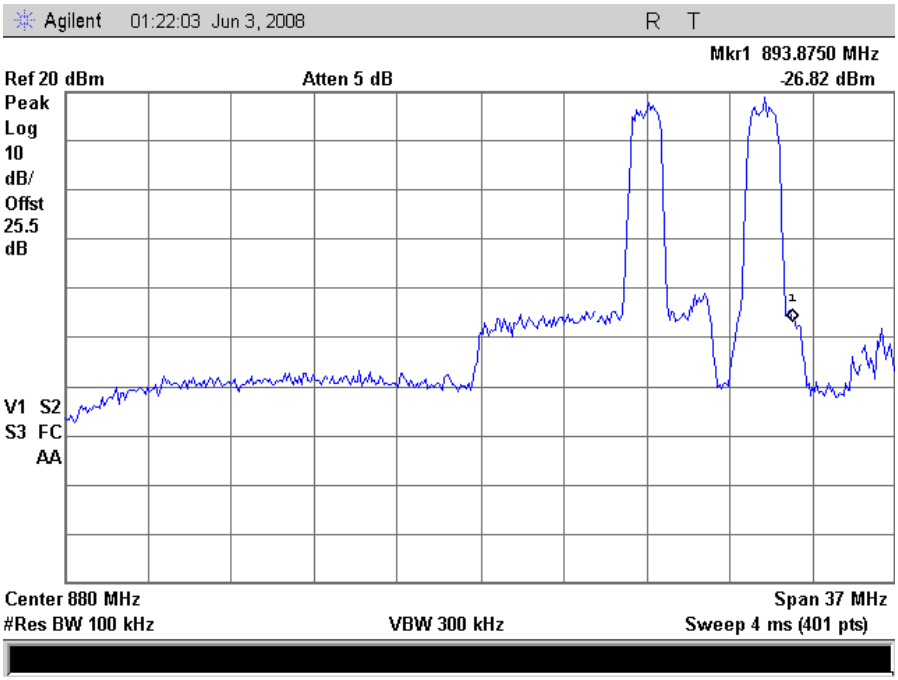


Plot 61. Conducted Spurious Emissions, CDMA High Channel Uplink, 1GHz – 10GHz

§ 2.1051 Spurious Emissions at Antenna Terminals - Cellular

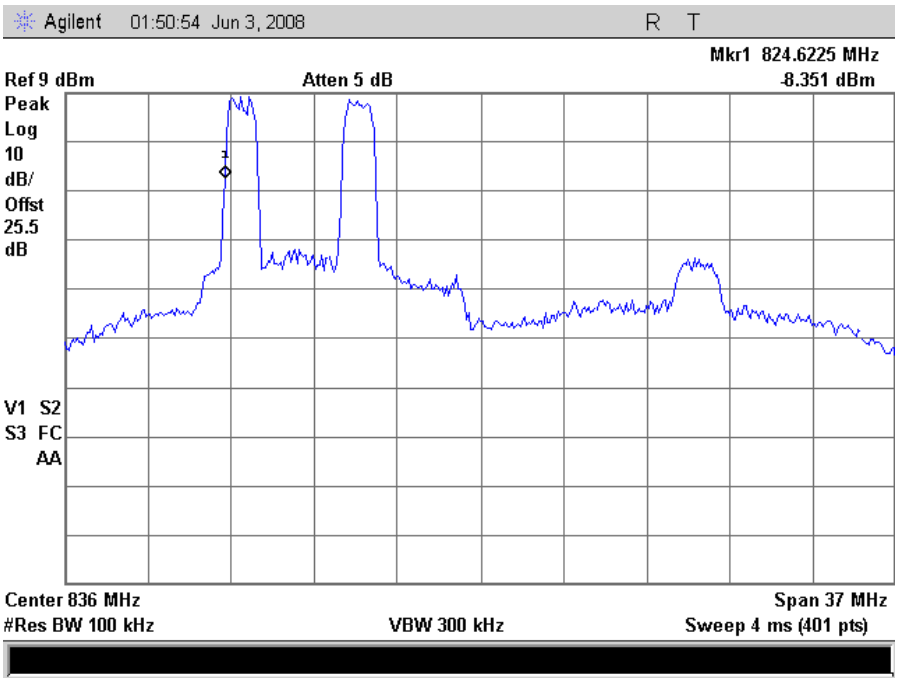


Plot 62. CDMA Intermodulation, Downlink Low End

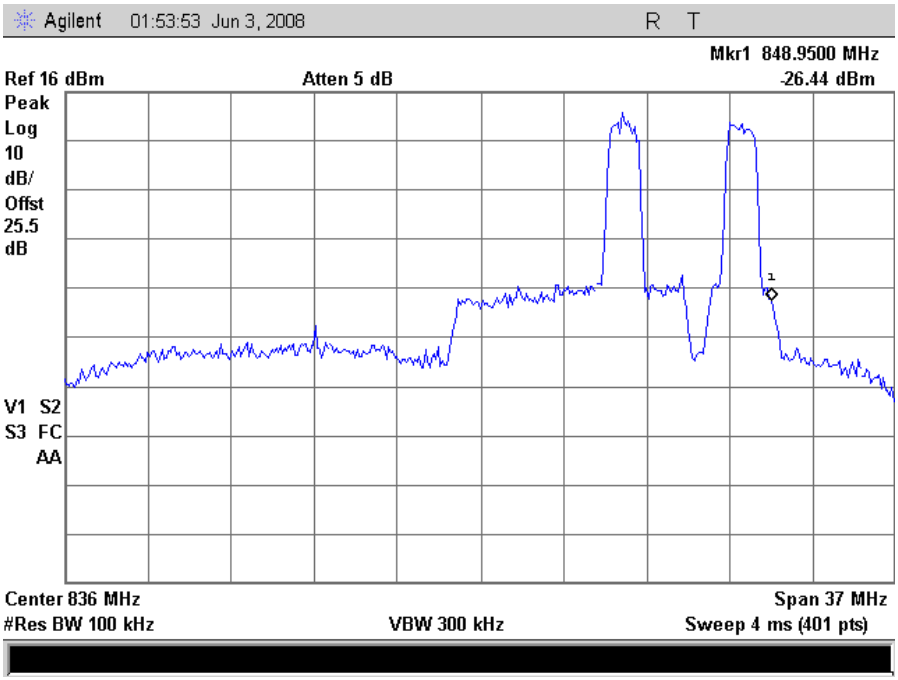


Plot 63. CDMA Intermodulation, Downlink High End

§ 2.1051 Spurious Emissions at Antenna Terminals - Cellular



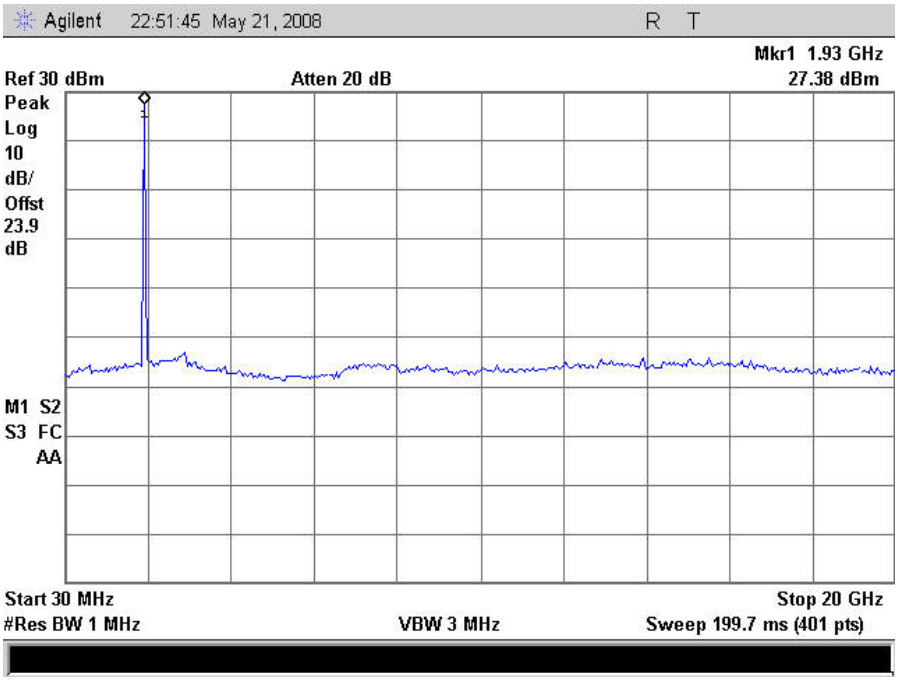
Plot 64. CDMA Intermodulation, Uplink Low End



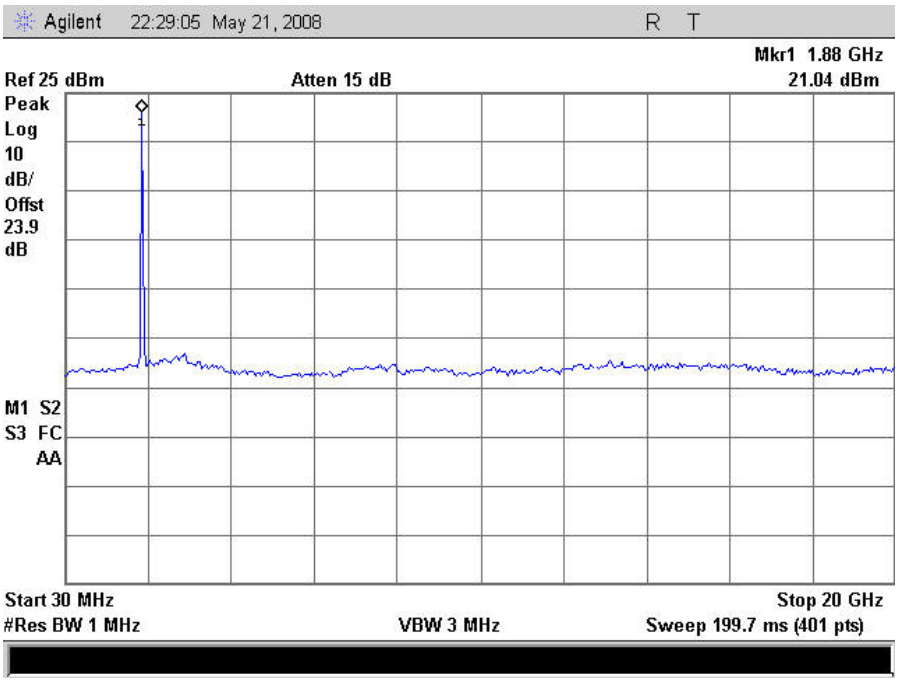
Plot 65. CDMA Intermodulation, Uplink High End

Spurious Emissions at Antenna Terminals Test Results

§ 2.1051 Spurious Emissions at Antenna Terminals - PCS

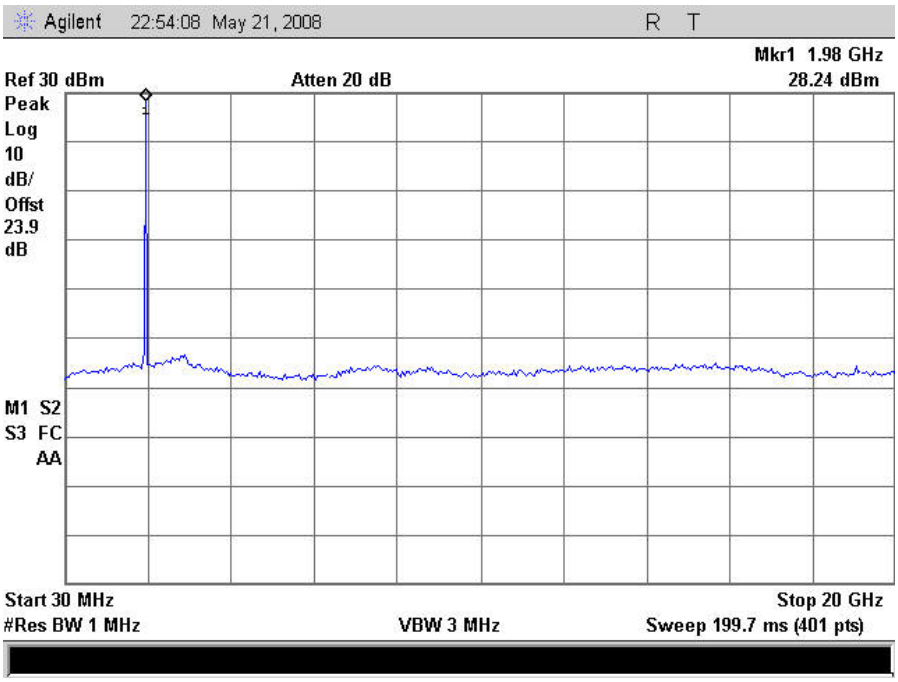


Plot 66. Conducted Spurious Emissions, CDMA Low Channel Downlink

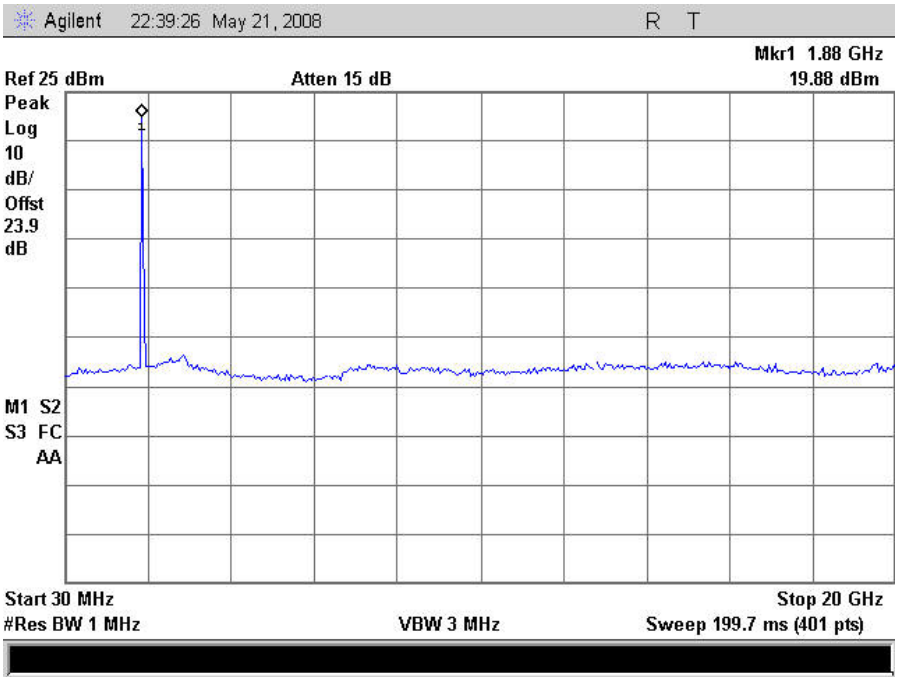


Plot 67. Conducted Spurious Emissions, CDMA Low Channel Uplink

§ 2.1051 Spurious Emissions at Antenna Terminals - PCS

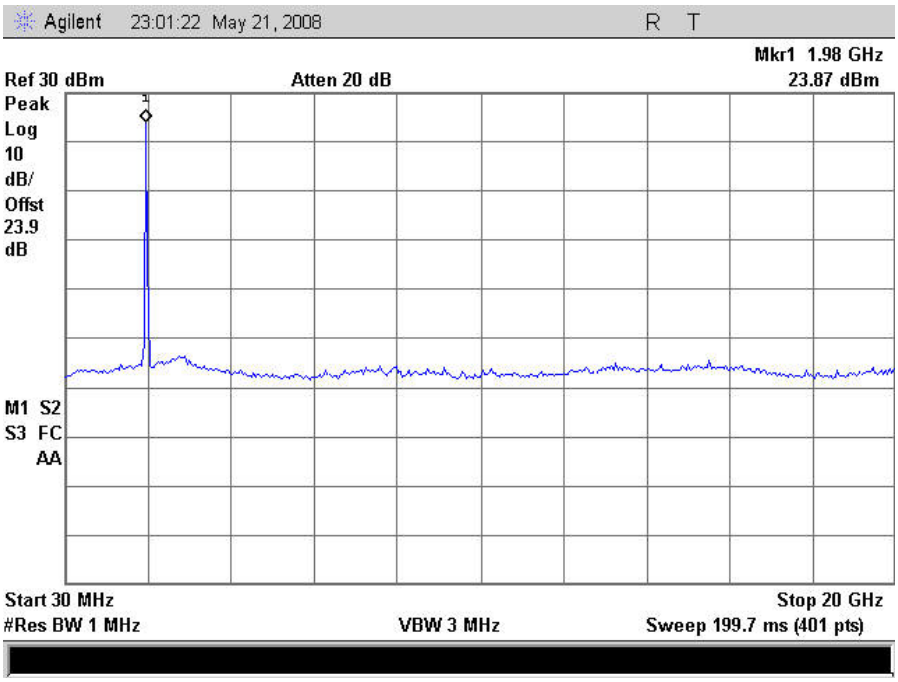


Plot 68. Conducted Spurious Emissions, CDMA Mid Channel Downlink

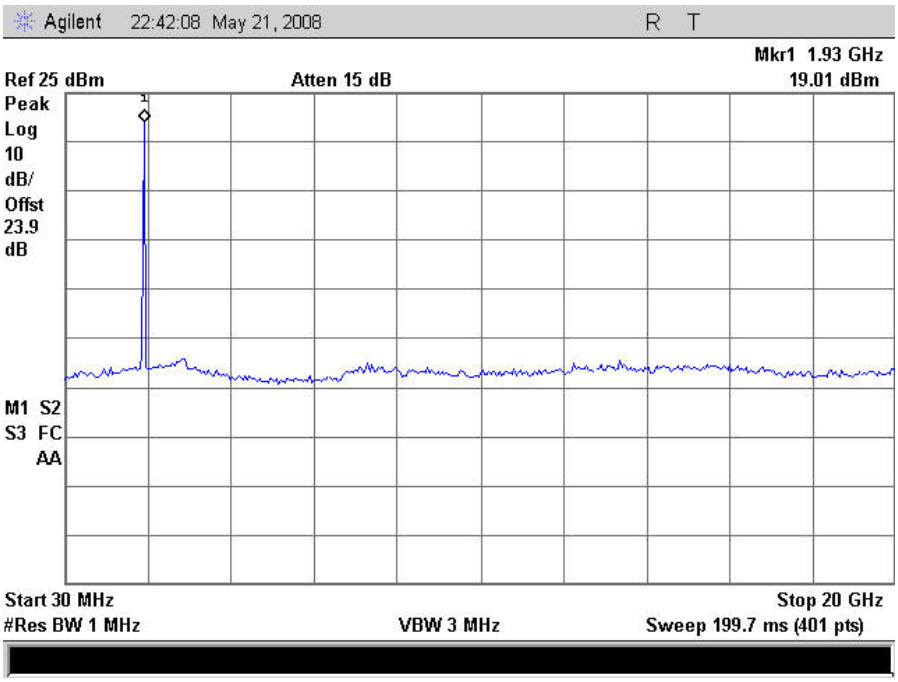


Plot 69. Conducted Spurious Emissions, CDMA Mid Channel Uplink

§ 2.1051 Spurious Emissions at Antenna Terminals - PCS

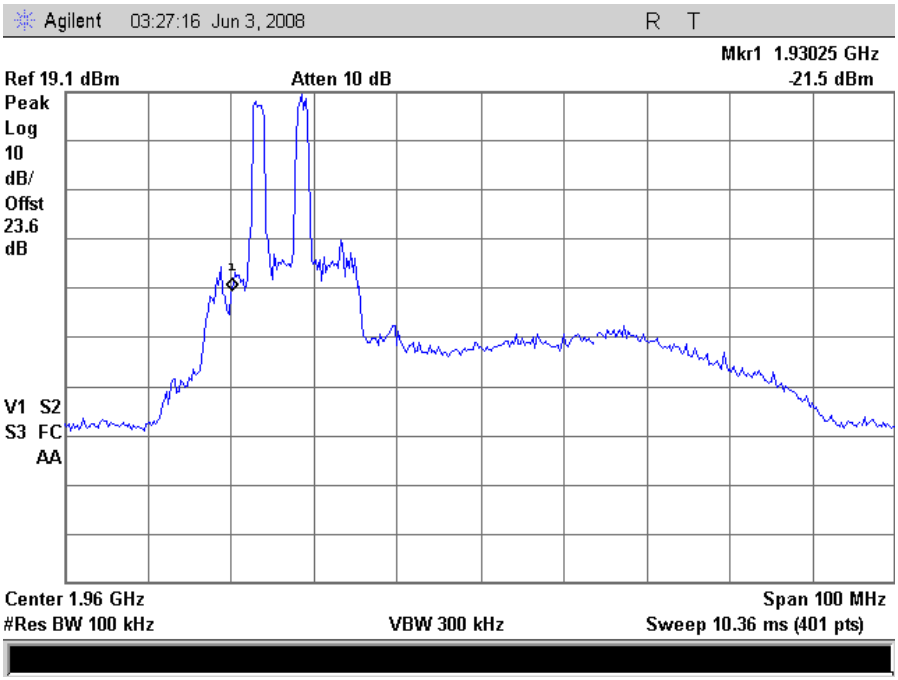


Plot 70. Conducted Spurious Emissions, CDMA High Channel Downlink

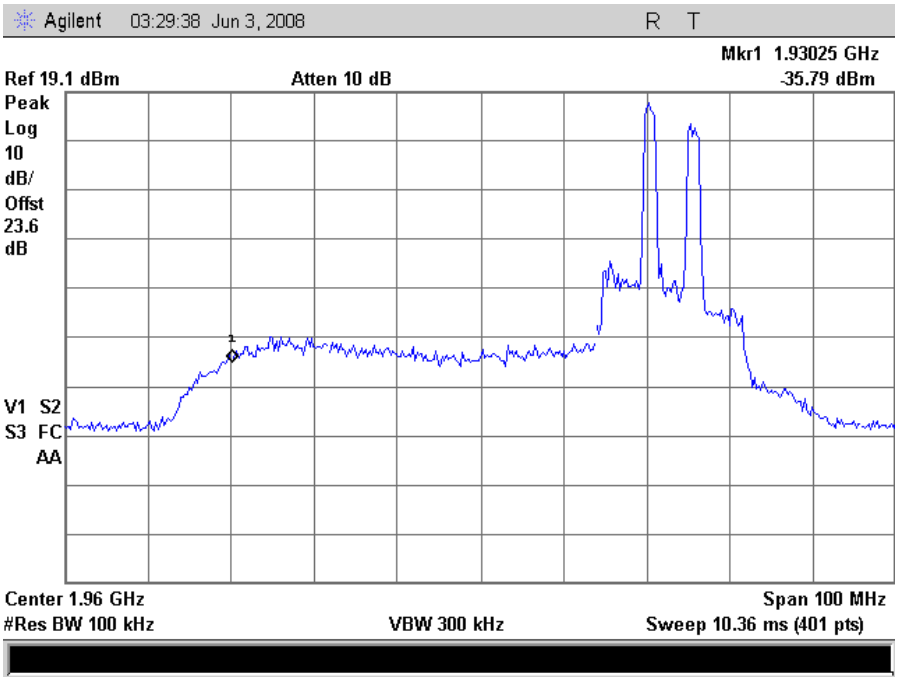


Plot 71. Conducted Spurious Emissions, CDMA High Channel Uplink

§ 2.1051 Spurious Emissions at Antenna Terminals - PCS

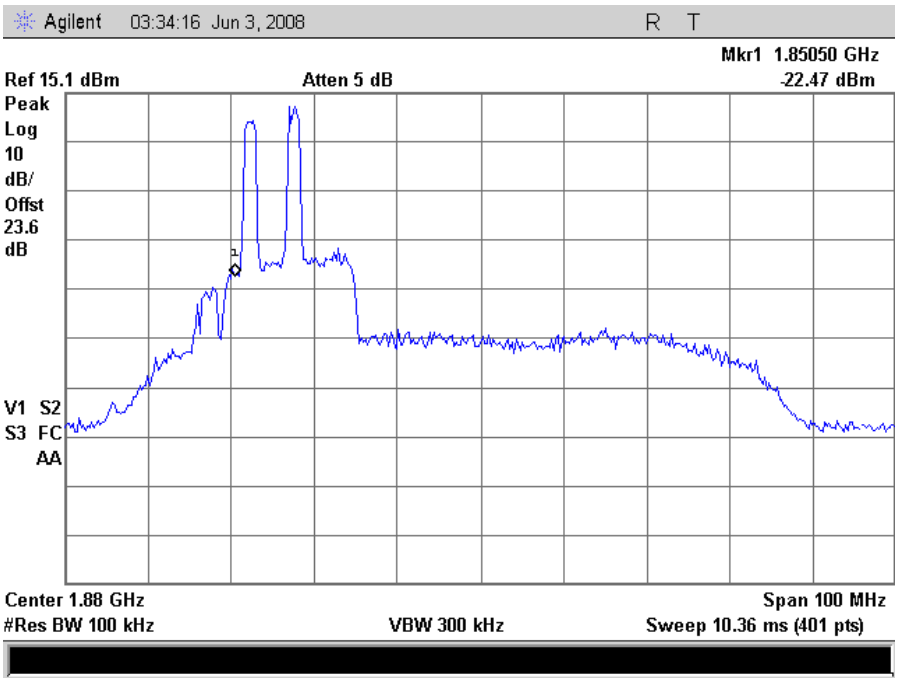


Plot 72. CDMA Intermodulation, Downlink Low End

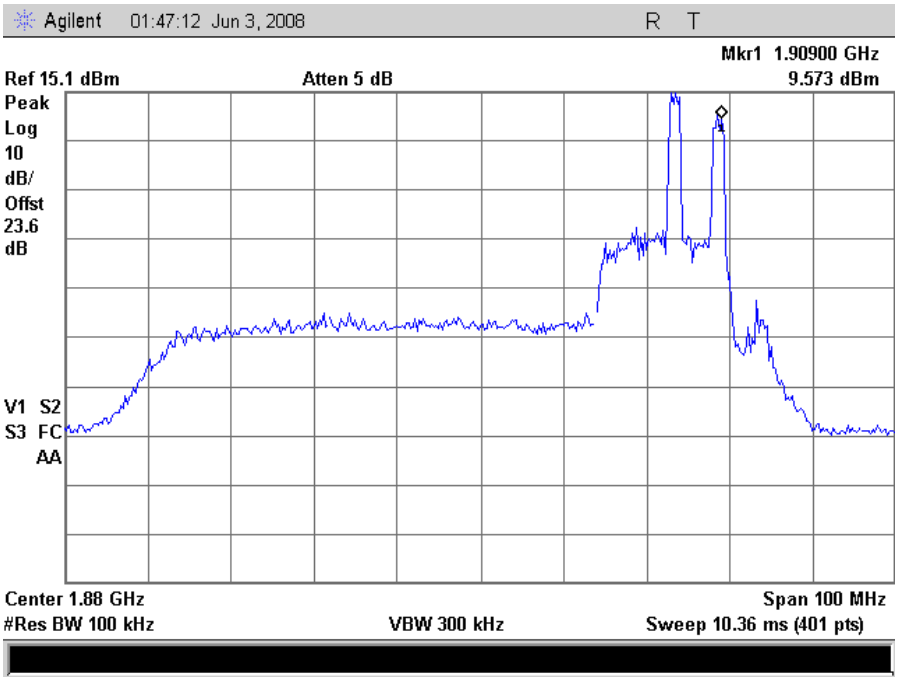


Plot 73. CDMA Intermodulation, Downlink High End

§ 2.1051 Spurious Emissions at Antenna Terminals - PCS

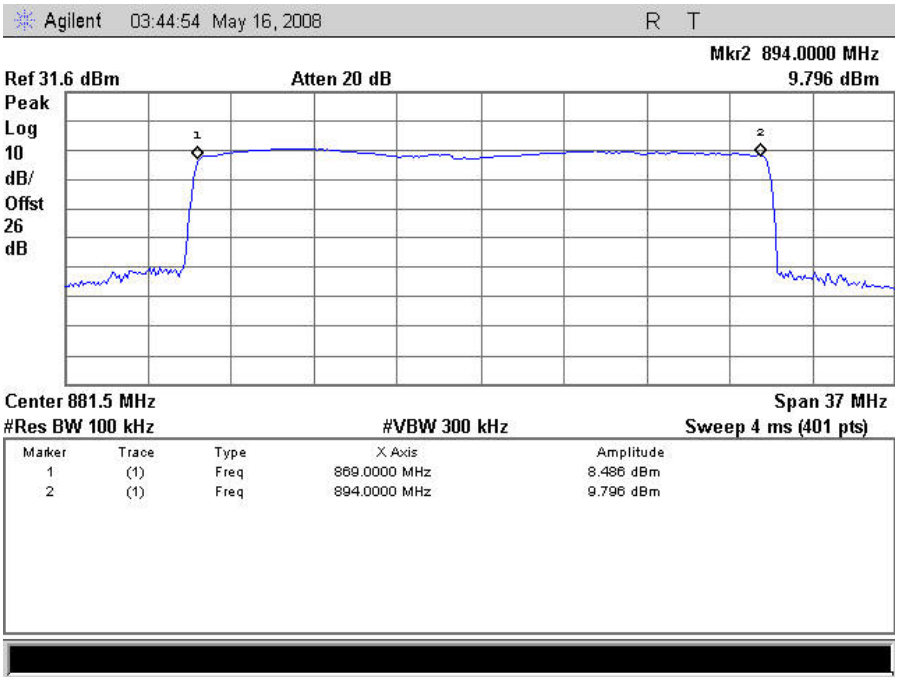


Plot 74. CDMA Intermodulation, Uplink Low End

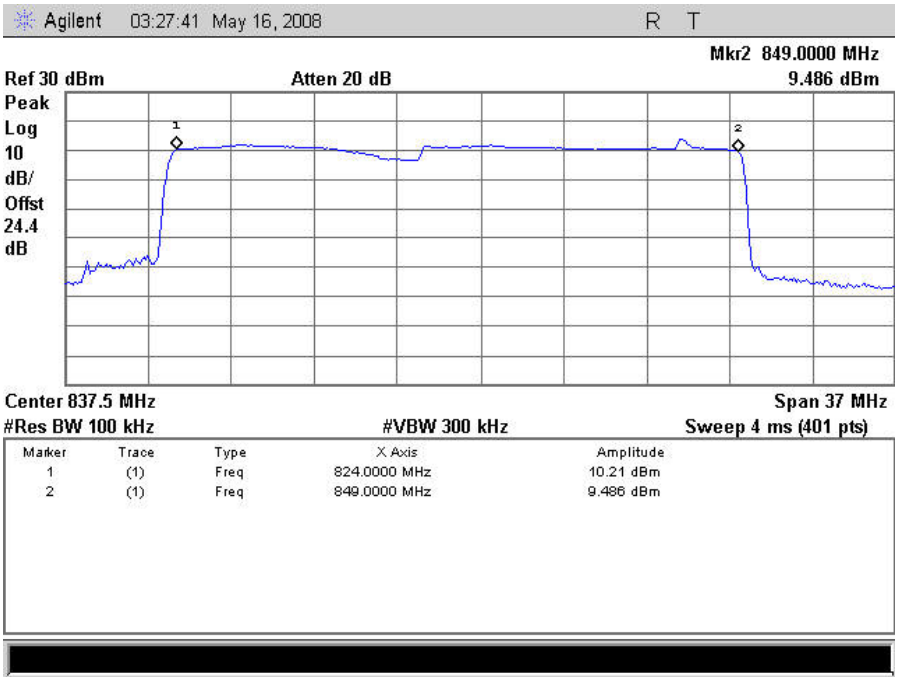


Plot 75. CDMA Intermodulation, Uplink High End

Electromagnetic Compatibility Criteria for Intentional Radiators
2-11-04/EAB/RF Out of Band Rejection – Cellular

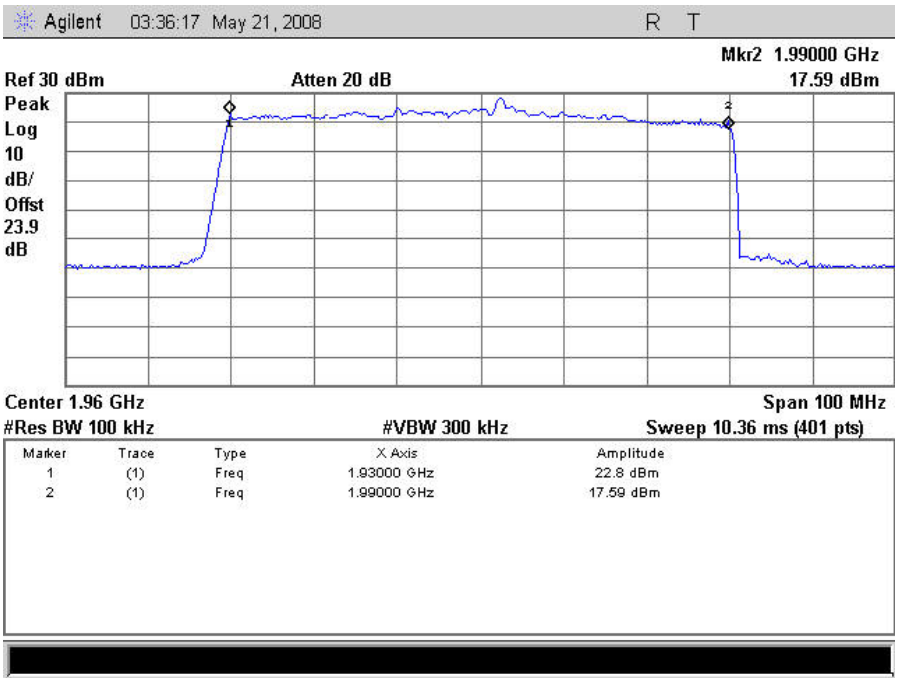


Plot 76. Out of Band Rejection, Downlink

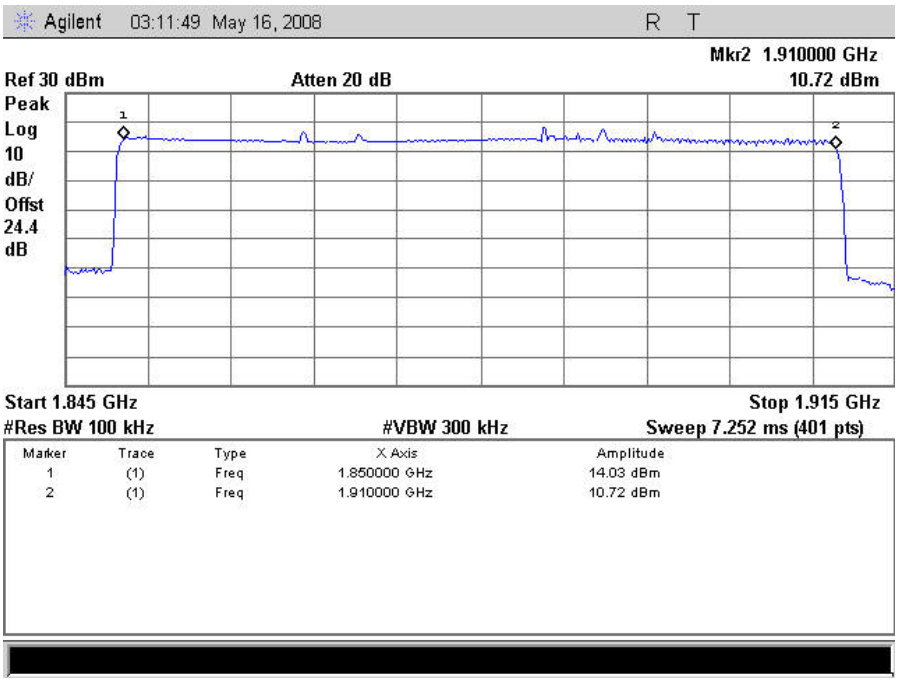


Plot 77. Out of Band Rejection, Uplink

2-11-04/EAB/RF Out of Band Rejection - PCS



Plot 78. Out of Band Rejection, Downlink



Plot 79. Out of Band Rejection, Uplink

IV. Test Equipment

Test Equipment

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of ANSI/NCSL Z540-1-1994 and ANSI/ISO/IEC 17025:2000.

MET #	Equipment	Manufacturer	Model	Cal Date	Cal Due
1T4300	semi-anechoic chamber # 1	EMC Test Systems	NONE	02/17/2006	01/17/2009
1T4303	Antenna; BILOG	SCHAFNER - Chase EMC	CBL6140A	06/29/2007	06/29/2008
1T4409	EMI Receiver	Rohde & Schwarz	ESIB7	04/18/2008	04/18/2009
1T4632	Thermo/Hygrometer	Control Company	S6-627-9	09/25/2007	09/25/2009

Table 18. Test Equipment List – Radiated Emissions

MET #	Equipment	Manufacturer	Model#	Cal Date	Cal Due
1T4502	Comb Generator	Com-Power	CGC-255	08/30/2007	08/30/2008
1T4621	ESA-E Series Spectrum Analyzer	Agilent	E4402B	02/29/2008	03/01/2009
1T4503	Shielded Room	Universal Shielding Corp	N/A	06/01/2007	06/01/2008
1T4563	LISN (10 AMP)	Solar Electronics	9322-50-R-10-BNC	09/10/2007	09/10/2008

Table 19. Test Equipment List – Conducted Emissions

MET #	Equipment	Manufacturer	Model#	Cal Date	Cal Due
1T4300	Semi-Anechoic Chamber # 1	EMC Test Systems	NONE	02/17/2006	01/17/2009
1T4442	Pre-amplifier, Microwave	Miteq	AFS42-01001800-30-10P	See Note	
1T2511	Antenna; Horn	EMCO	3115	07/19/2007	07/19/2008
1T4080	Spectrum Analyzer w/ Memory Module	HP	8563A	09/28/2007	09/28/2008

Table 20. Test Equipment List – Radiated Measurements

MET #	Equipment	Manufacturer	Model	Cal Date	Cal Due
1T4612	ESA-E Series Spectrum Analyzer	Agilent	E4407B	02/20/2008	02/20/2009
1T4299	Signal Generator	HP	E4432B	10/24/2007	10/24/2008
1T4627	Thermo/Hygrometer	Control Company	S6-627-9	09/24/2007	9/24/2009

Table 21. Test Equipment List – Conducted Measurements

Note: Functionally tested equipment is verified using calibrated instrumentation at the time of testing.

V. Certification & User's Manual Information

Certification & User's Manual Information

A. Certification Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 2, Subpart I — Marketing of Radio frequency devices:

§ 2.801 Radio-frequency device defined.

As used in this part, a radio-frequency device is any device which in its operation is capable of Emitting radio-frequency energy by radiation, conduction, or other means. Radio- frequency devices include, but are not limited to:

(a) The various types of radio communication transmitting devices described throughout this chapter.

(b) The incidental, unintentional and intentional radiators defined in Part 15 of this chapter.

(c) The industrial, scientific, and medical equipment described in Part 18 of this chapter.

(d) Any part or component thereof which in use emits radio-frequency energy by radiation, conduction, or other means.

§ 2.803 Marketing of radio frequency devices prior to equipment authorization.

(a) Except as provided elsewhere in this chapter, no person shall sell or lease, or offer for sale or lease (including advertising for sale or lease), or import, ship or distribute for the purpose of selling or leasing or offering for sale or lease, any radio frequency device unless:

(1) In the case of a device subject to certification, such device has been authorized by the Commission in accordance with the rules in this chapter and is properly identified and labeled as required by §2.925 and other relevant sections in this chapter; or

(2) In the case of a device that is not required to have a grant of equipment authorization issued by the Commission, but which must comply with the specified technical standards prior to use, such device also complies with all applicable administrative (including verification of the equipment or authorization under a Declaration of Conformity, where required), technical, labeling and identification requirements specified in this chapter.

(d) Notwithstanding the provisions of paragraph (a) of this section, the offer for sale solely to business, commercial, industrial, scientific or medical users (but not an offer for sale to other parties or to end users located in a residential environment) of a radio frequency device that is in the conceptual, developmental, design or pre-production stage is permitted prior to equipment authorization or, for devices not subject to the equipment authorization requirements, prior to a determination of compliance with the applicable technical requirements *provided* that the prospective buyer is advised in writing at the time of the offer for sale that the equipment is subject to the FCC rules and that the equipment will comply with the appropriate rules before delivery to the buyer or to centers of distribution.

(e)(1) Notwithstanding the provisions of paragraph (a) of this section, prior to equipment authorization or determination of compliance with the applicable technical requirements any radio frequency device may be operated, but not marketed, for the following purposes and under the following conditions:

(i) Compliance testing;

(ii) Demonstrations at a trade show provided the notice contained in paragraph (c) of this section is displayed in a conspicuous location on, or immediately adjacent to, the device;

(iii) Demonstrations at an exhibition conducted at a business, commercial, industrial, scientific or medical location, but excluding locations in a residential environment, provided the notice contained in paragraphs (c) or (d) of this section, as appropriate, is displayed in a conspicuous location on, or immediately adjacent to, the device;

(iv) Evaluation of product performance and determination of customer acceptability, provided such operation takes place at the manufacturer's facilities during developmental, design or pre-production states; or

(v) Evaluation of product performance and determination of customer acceptability where customer acceptability of a radio frequency device cannot be determined at the manufacturer's facilities because of size or unique capability of the device, provided the device is operated at a business, commercial, industrial, scientific or medical user's site, but not at a residential site, during the development, design or pre-production stages.

(e)(2) For the purpose of paragraphs (e)(1)(iv) and (e)(1)(v) of this section, the term *manufacturer's facilities* includes the facilities of the party responsible for compliance with the regulations and the manufacturer's premises, as well as the facilities of other entities working under the authorization of the responsible party in connection with the development and manufacture, but not the marketing, of the equipment.

(f) For radio frequency devices subject to verification and sold solely to business, commercial, industrial, scientific and medical users (excluding products sold to other parties or for operation in a residential environment), parties responsible for verification of the devices shall have the option of ensuring compliance with the applicable technical specifications of this chapter at each end user's location after installation, provided that the purchase or lease agreement includes a proviso that such a determination of compliance be made and is the responsibility of the party responsible for verification of the equipment.

Certification & User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 2, Subpart J — Equipment Authorization Procedures:

§ 2.901 Basis and Purpose

(a) In order to carry out its responsibilities under the Communications Act and the various treaties and international regulations, and in order to promote efficient use of the radio spectrum, the Commission has developed technical standards for radio frequency equipment and parts or components thereof. The technical standards applicable to individual types of equipment are found in that part of the rules governing the service wherein the equipment is to be operated.[1] *In addition to the technical standards provided, the rules governing the service may require that such equipment be verified by the manufacturer or importer*, be authorized under a Declaration of Conformity, or receive an equipment authorization from the Commission by one of the following procedures: certification or registration.

(b) The following sections describe the verification procedure, the procedure for a Declaration of Conformity, and the procedures to be followed in obtaining certification from the Commission and the conditions attendant to such a grant.

§ 2.907 Certification.

(a) Certification is an equipment authorization issued by the Commission, based on representation and test data submitted by the applicant.

(b) Certification attaches to all units subsequently marketed by the grantee which are identical (see Section 2.908) to the sample tested except for permissive changes or other variations authorized by the Commission pursuant to Section 2.1043.

[1] In this case, the equipment is subject to the rules of Part 15. More specifically, the equipment falls under Subpart B (of Part 15), which deals with unintentional radiators.

Certification & User's Manual Information

§ 2.948 Description of measurement facilities.

(a) Each party making measurements of equipment that is subject to an equipment authorization under Part 15 or Part 18 of this chapter, regardless of whether the measurements are filed with the Commission or kept on file by the party responsible for compliance of equipment marketed within the U.S. or its possessions, shall compile a description of the measurement facilities employed.

(1) If the measured equipment is subject to the verification procedure, the description of the measurement facilities shall be retained by the party responsible for verification of the equipment.

(i) If the equipment is verified through measurements performed by an independent laboratory, it is acceptable for the party responsible for verification of the equipment to rely upon the description of the measurement facilities retained by or placed on file with the Commission by that laboratory. In this situation, the party responsible for the verification of the equipment is not required to retain a duplicate copy of the description of the measurement facilities.

(ii) If the equipment is verified based on measurements performed at the installation site of the equipment, no specific site calibration data is required. It is acceptable to retain the description of the measurement facilities at the site at which the measurements were performed.

(2) If the equipment is to be authorized by the Commission under the certification procedure, the description of the measurement facilities shall be filed with the Commission's Laboratory in Columbia, Maryland. The data describing the measurement facilities need only be filed once but must be updated as changes are made to the measurement facilities or as otherwise described in this section. At least every three years, the organization responsible for filing the data with the Commission shall certify that the data on file is current.

Certification & User's Manual Information

Label and User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 15, Subpart A — General:

§ 15.19 Labeling requirements.

(a) In addition to the requirements in Part 2 of this chapter, a device subject to certification or verification shall be labeled as follows:

(1) Receivers associated with the operation of a licensed radio service, e.g., FM broadcast under Part 73 of this chapter, land mobile operation under Part 90, etc., shall bear the following statement in a conspicuous location on the device:

This device complies with Part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.

(2) A stand-alone cable input selector switch, shall bear the following statement in a conspicuous location on the device:

This device is verified to comply with Part 15 of the FCC Rules for use with cable television service.

(3) All other devices shall bear the following statement in a conspicuous location on the device:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

(4) Where a device is constructed in two or more sections connected by wires and marketed together, the statement specified under paragraph (a) of this section is required to be affixed only to the main control unit.

(5) When the device is so small or for such use that it is not practicable to place the statement specified under paragraph (a) of this section on it, the information required by this paragraph shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. However, the FCC identifier or the unique identifier, as appropriate, must be displayed on the device.

§ 15.21 Information to user.

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Verification & User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 15, Subpart B — Unintentional Radiators:

§ 15.105 Information to the user.

(a) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

> Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
>
> – Reorient or relocate the receiving antenna.
>
> – Increase the separation between the equipment and receiver.
>
> – Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
>
> – Consult the dealer or an experienced radio/TV technician for help.

End of Report

