MOTOROLA

PERSONAL COMMUNICATIONS SECTOR

PRODUCT SAFETY AND COMPLIANCE EMC LABORATORY

EMC TEST REPORT

Test Report Number – 12431-1 Rev. 1

Report Date – November 6, 2003

The test results contained herein relate only to the model(s) identified. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics.

As the responsible EMC Engineer, I hereby declare that the equipment tested as specified in this report conforms to the requirements indicated.

Signature Name: Michael Hill

Title: Senior Electrical Engineer Date : 11/03/03

A2LA Certificate Number: 1846-01

ACCREDITED

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Test Report Details

Tests Performed By:	Motorola Personal Communications Sector Product Safety and Compliance Group 600 North US Hwy 45 Libertyville, IL 60048 PH (847) 523-3630 Fax (847) 523-4538 Motorola PCS FRN: 0004321311 FCC Registration Number: 316588 Industry Canada Number: IC3908
Tests Requested By:	Motorola Inc. Personal Communications Sector 600 North US Hwy 45 Libertyville, IL 60048
Product Type:	Cellular Phone
Signaling Capability:	AMPS, 800 CDMA, 1900 CDMA
Model Number:	T300P
Serial Numbers:	A8EE70B1, A8EE70C3, A8EE71A2, A8EE70CC, A8EE70C1
Version:	SUG3181ED
Testing Complete Date:	November 3, 2003

Applicable Standards

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-part J as well as the following parts:

__X__ Part 15 Subpart B – Unintentional Radiators
__X__ Part 22 Subpart H - Public Mobile Services
X Part 24 - Personal Communications Services
_____ Part 90 - Private Land Mobile Radio Service

Applicable Standards: TIA EIA 137-A, TIA EIA 98-C, ANSI 63.4 2001, RSS-118 (AMPS), RSS-128 (TDMA), RSS-129 (CDMA), RSS-133 (PCS)

Summary of Testing

Test #	Test Name	Pass/Fail
1	RF Power Output	NA
2	ERP (Effective Radiated Power)	NA
3	Modulation Characteristics	N/A
4	Occupied Bandwidth	Pass
5	Spurious Emissions at Antenna Terminal	Pass
6	Field Strength of Spurious Emissions	Pass
7	Frequency Stability	Pass

Test #	Test Name	Margin with respect to the Limit
1	RF Power Output	NA
2	ERP (Effective Radiated Power)	NA
3	Modulation Characteristics	NA
4	Occupied Bandwidth	See Plots
5	Spurious Emissions at Antenna Terminal	0.9 dB
6	Field Strength of Spurious Emissions	25.6 dB
7	Frequency Stability	118 Hz

The margin with respect to the limit is the minimum margin for all modes and bands. ( ) indicates the margin at which the product exceeds the limit.

General and Special Conditions

The EUT was tested using a fully charged battery when applicable. Where a battery could not be used due to the need for a controlled variation of input voltage, an external power supply was utilized.

All testing was done in an indoor controlled environment with an average temperature of 22º C and relative humidity of 50%.

Equipment and Cable Configurations

The EUT was tested in a stand-alone configuration that is representative of typical use.

Measuring Equipment and Calibration Information

Manufacturer Name	Item Name Description	Model #	Serial Number	Calibration Due Date
Agilent	EMC Analyzer	E7405A	US53944019	11/6/03
Hewlett Packard	QP Adapter	85650A	2811A01069	1/15/04
Hewlett Packard	S/A Display	8566B	2542A12974	1/15/04
Hewlett Packard	S/A	8566B	2637A03376	1/15/04
Hewlett Packard	RF Preselector	85685A	2810A00692	1/15/04
Rohde & Schwarz	S/A	FSEK20	DE2525315	1/14/04
EMCO	Horn Antenna 1-18GHz	3115	2638	7/10/04
EMCO	Horn Antenna 18-26.5GHz	3160-09	9904-1165	N/A*
Chase	Bi-Con Antenna 30-300MHz	VBA6106A	1246	6/23/04
Chase	Log-Periodic Antenna	UPA6108	1120	6/18/04
Weinschel	Attenuator Kit – 10, 6 dB	AS6	6675	10/12/04
Thermotron	Environmental Chamber	S-4	31580	12/19/03
Hewlett Packard	System DC Power Supply	66311B	US38447252	10/13/04
Rohde & Schwarz	Mobile Test Station	CMD80	DE29008	03/17/04
Giga-tronics	Universal Power Meter	8652A	8650494	01/07/04
Giga-tronics	Power Sensor	80701A	1833992	12/12/03

All equipment is on a one-year calibration cycle.

Measurement Procedures and Data

RF POWER OUTPUT

Measurement Procedure

The RF output port of the equipment under test is directly coupled to the input of the 8650 series Giga-Tronics power meter through a specialized RF connector. The power meter is set for Modulated Average Power (MAP) mode. The power output is measured for all channels.

CFR Part 2.1046

Measurement Results

* Data supplied by SAR Lab

AMPS

Frequency (MHz)	Power (dBm)
824.04	27.88
836.52	27.79
848.97	27.70

CDMA 800

Frequency (MHz)	Power (dBm)
824.70	24.98
836.52	24.97
848.31	24.90

CDMA 1900

Frequency (MHz)	Power (dBm)
1851.25	24.93
1880.00	25.01
1908.75	24.90

RADIATED (ERP)

Measurement Procedure

The phone was tested in a 16' cubical anechoic chamber with a 2-axis position system that permits taking complete spherical scans of the EUT's radiation patterns. For all tests, the phone was supported in a free space type environment, vertically oriented in the chamber. Tests were done for Analog three frequencies (824.04, 836.52, and 848.87), CDMA 800 three frequencies (824.70, 836.52, and 848.37 MHz), and CDMA 1900 three frequencies (1851.25, 1880.00, and 1908.75 MHz) with antenna stubby.

CDMA measurements were made with the phone placed in a call using the CMD80 mobile station test set. The phone was weakly coupled to the test set and configured to transmit in full data rate mode. Radiated power was measured at each 15 degree step. The radiated power was measured using a Gigatronics 8542C power meter in "Mod Avg" mode. From these measurements, the software calculates the angle at which maximum radiated power occurs for each case, and the radiated power at this angle was extracted from the data. The max radiated power results for the IHDT56DN1 follows, as EIRP in dBm. To get ERP (effective radiated power referenced to a half-wave dipole), subtract 2.1 dB from these numbers.

Measurement Results

* Data not supplied by EMC Lab

See Attached.

AMPS:
824.04 MHz: 25.10 dBm
836.52 MHz: 25.32 dBm
848.97 MHz: 25.59 dBm

CDMA 800
824.70 MHz: 24.86 dBm
836.52 MHz: 25.46 dBm
848.37 MHz: 25.31 dBm

CDMA 1900
1851.25 MHz: 22.97 dBm
1880.0 MHz: 22.94 dBm
1908.75 MHz: 23.11 dBm

For all measurements, calibration was performed via gain substitution with a half-wave dipole.

Max EIRP in AMPS 800 is 25.59 dBm **(max ERP is 23.49 dBm)**
Max EIRP in CDMA 800 is 25.46 dBm **(max ERP is 23.36 dBm)**
Max EIRP in CDMA 1900 is 23.11 dBm

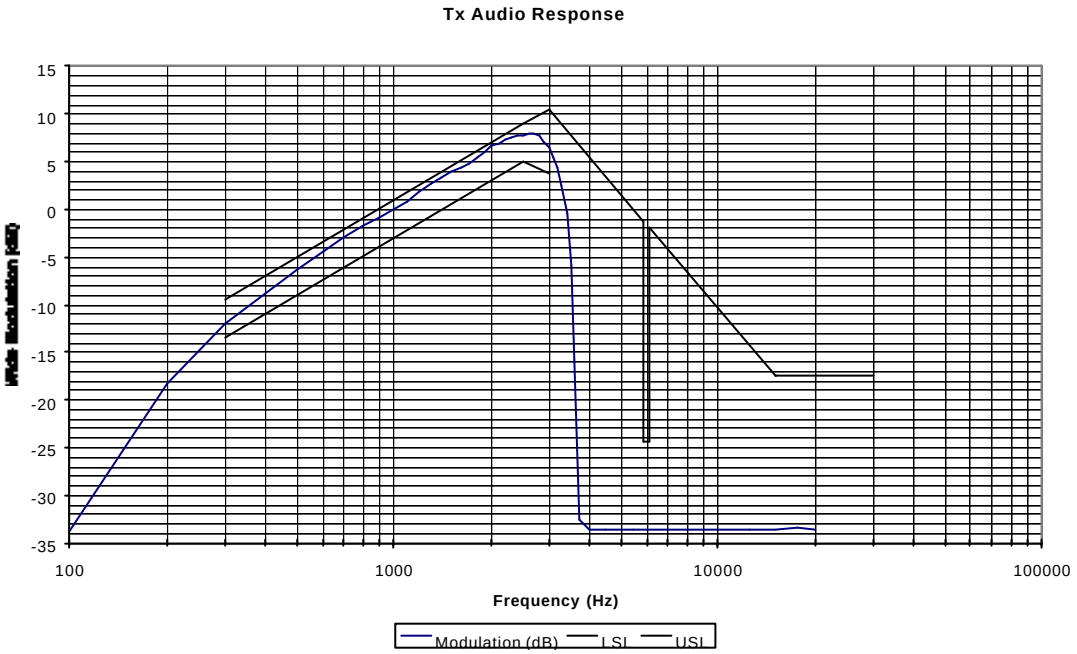
MODULATION CHARACTERISTICS

CFR Part 2.1047, 22.915

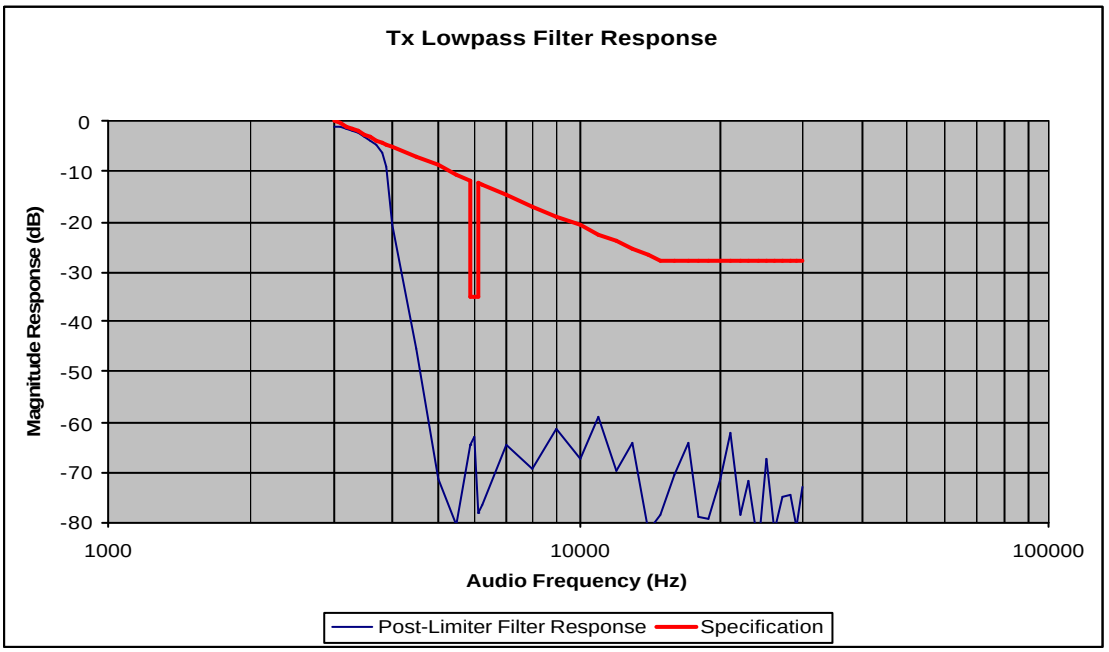
Measurement Results - AMPS

* Data supplied by product group

Transmit Audio Frequency Response

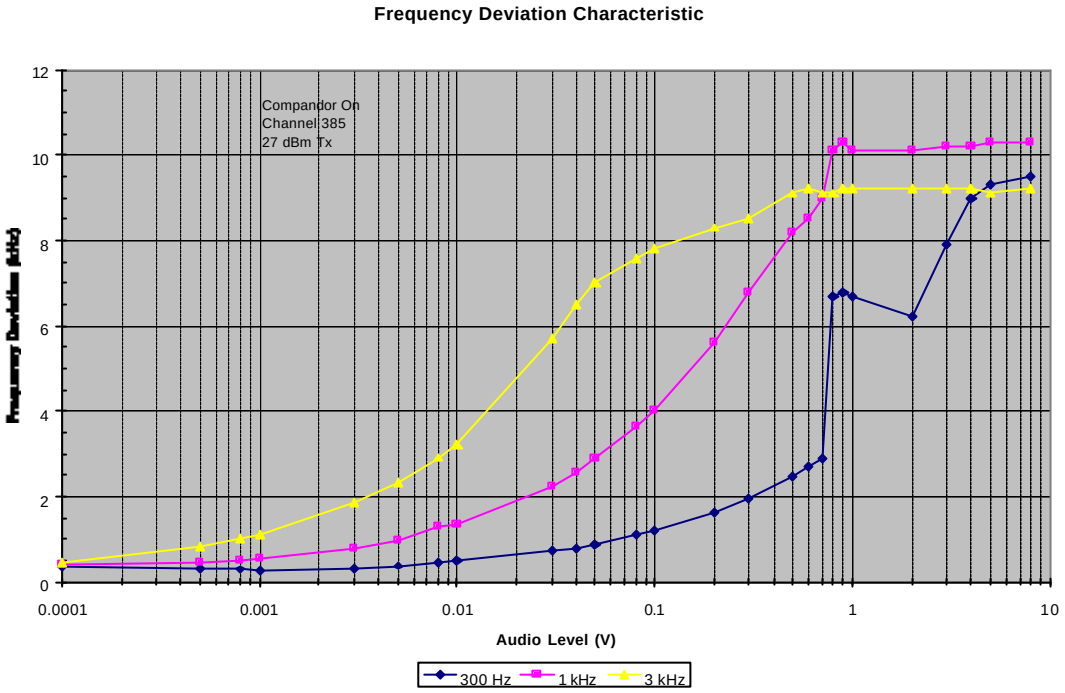


Post Limiter Filter Attenuation

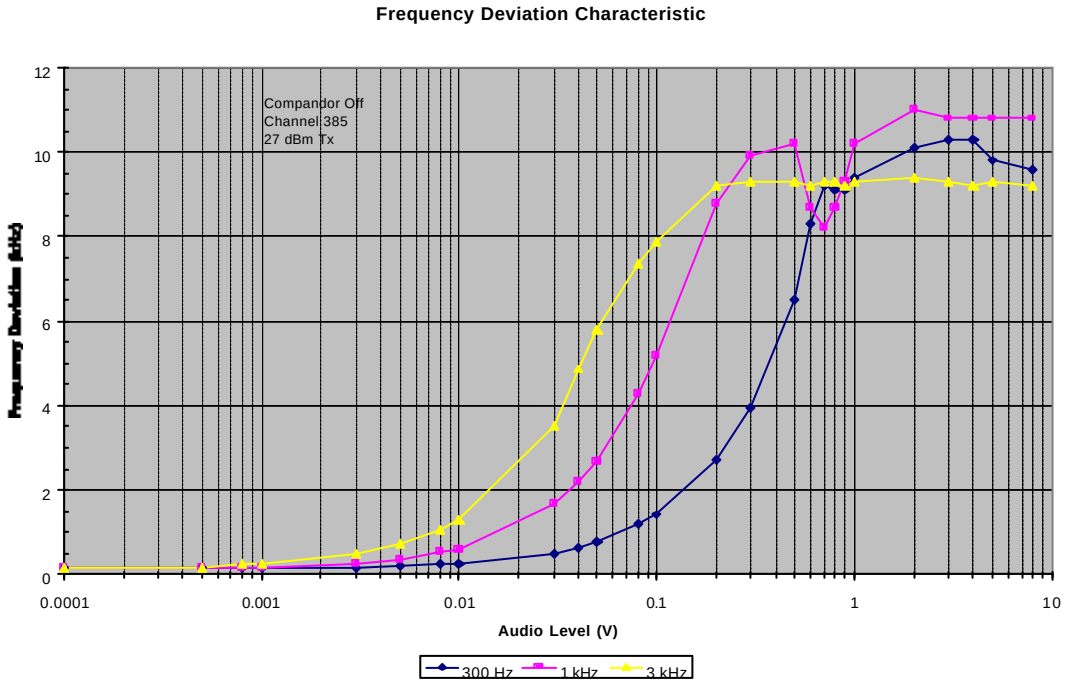


Modulation Limiting vs. Modulation Input Voltage

Compandor On



Compandor Off



OCCUPIED BANDWIDTH

CFR Part 2.1049, 22.917, 24.238

Measurement Procedure

The RF output port of the equipment under test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. The amplitude of the spectrum analyzer is corrected for the attenuator and any other applicable losses. The analyzer is set for Peak Detector and each trace is set for Max Hold. A fully charged battery was used for the supply voltage.

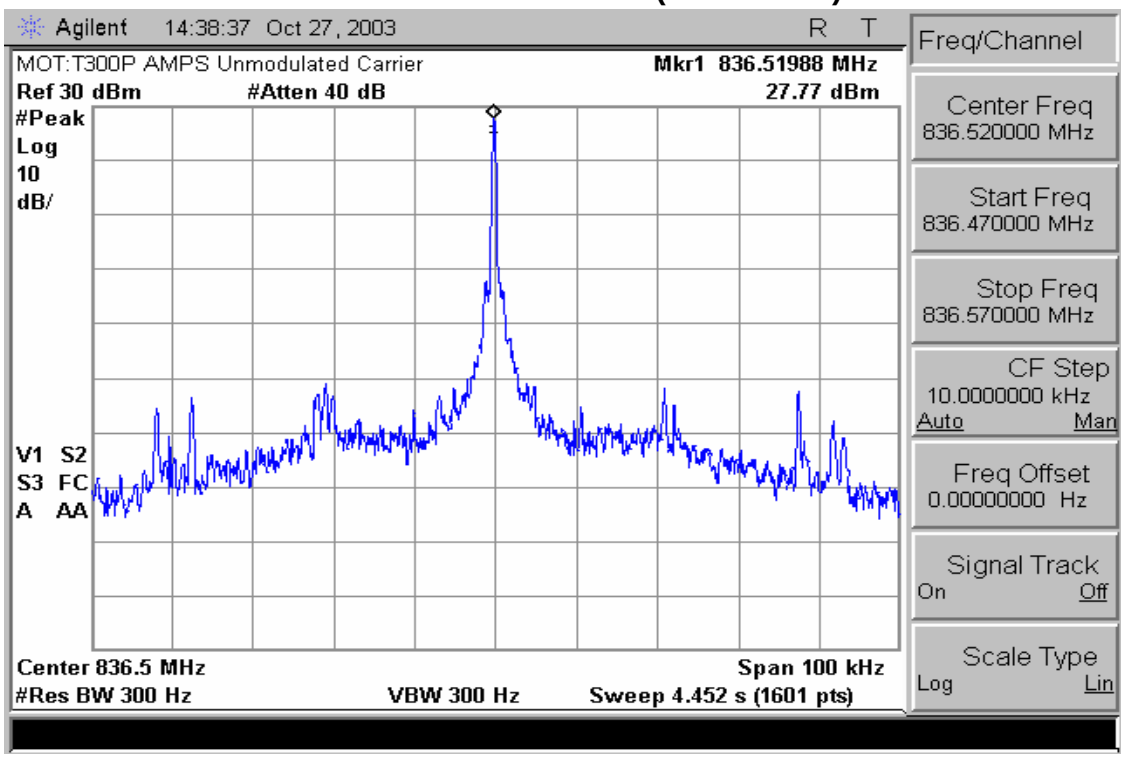
The middle channel within the designated frequency block was measured. For digital modulation, the lower and upper band edge plots are displayed.

Measurement Results

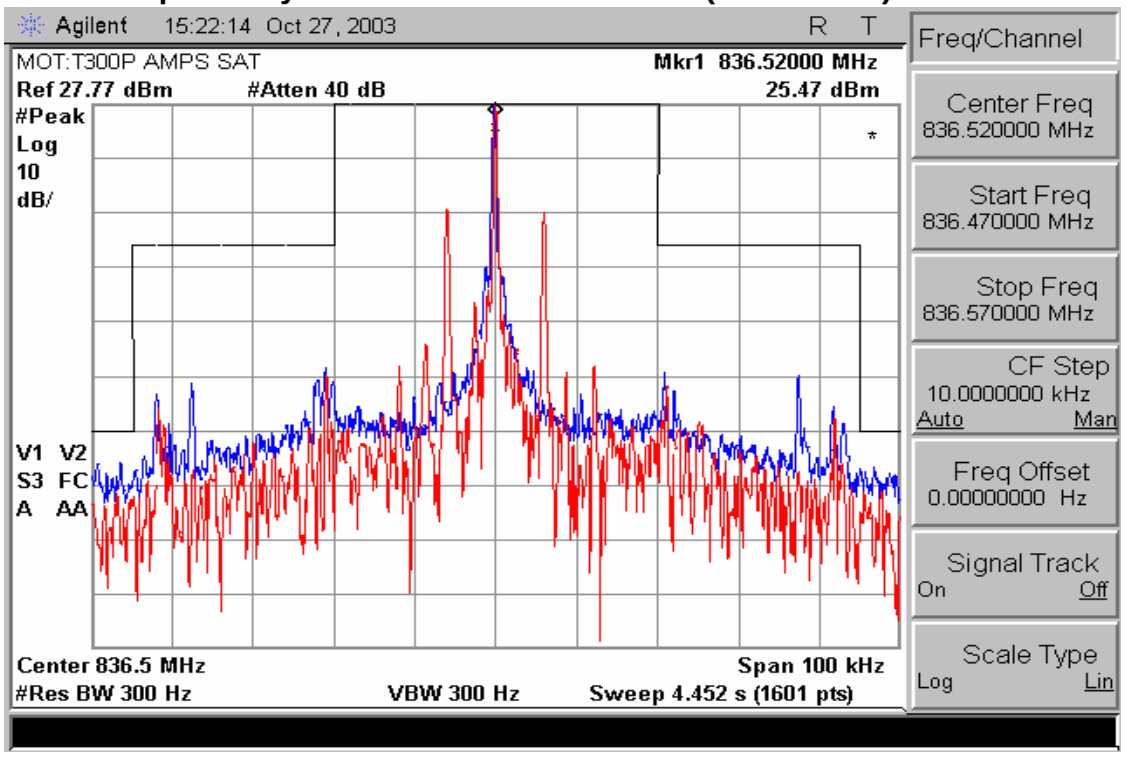
Attached

Measurement Results – AMPS

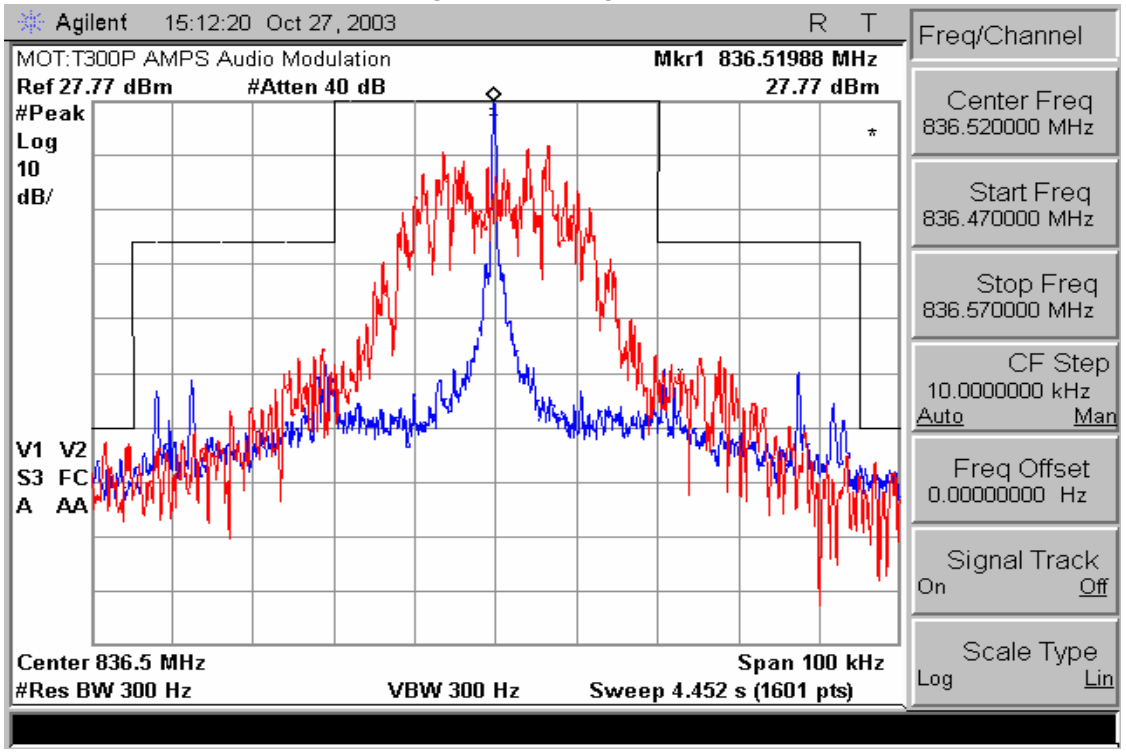
AMPS - Unmodulated Carrier – Channel 384 (836.52 MHz)



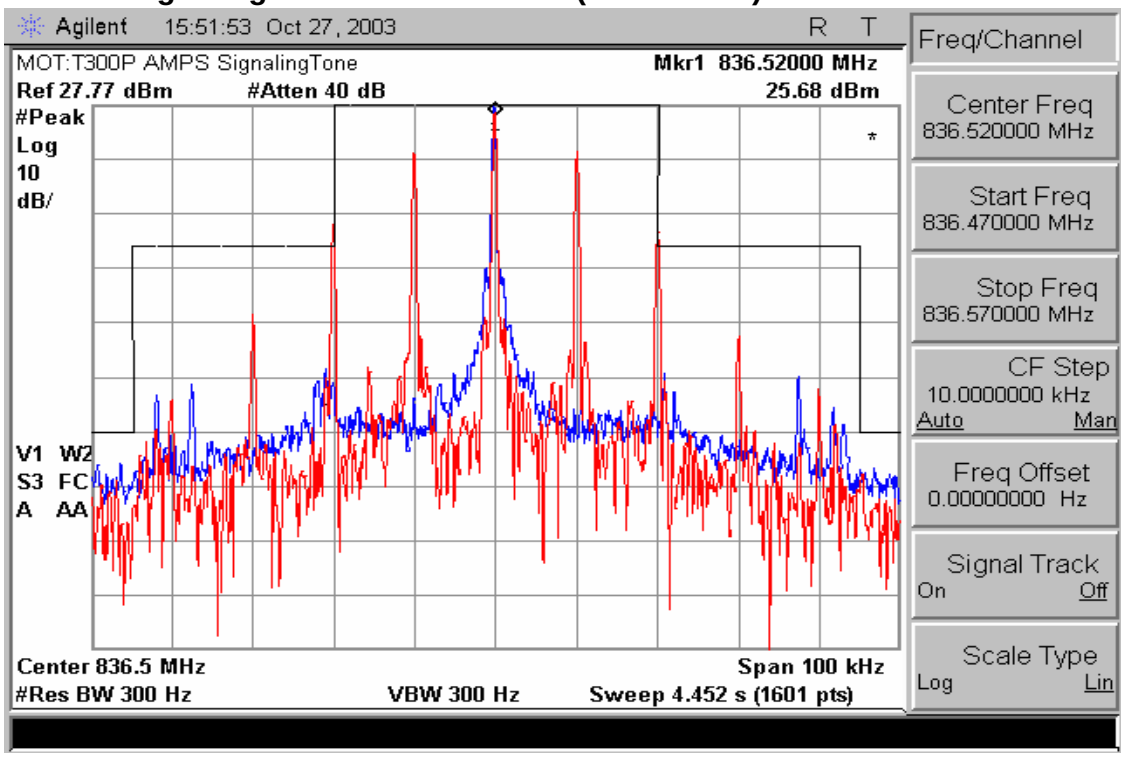
AMPS - Supervisory Audio Tone – Channel 384 (836.52 MHz)



AMPS - Voice – Channel 384 (836.52 MHz)

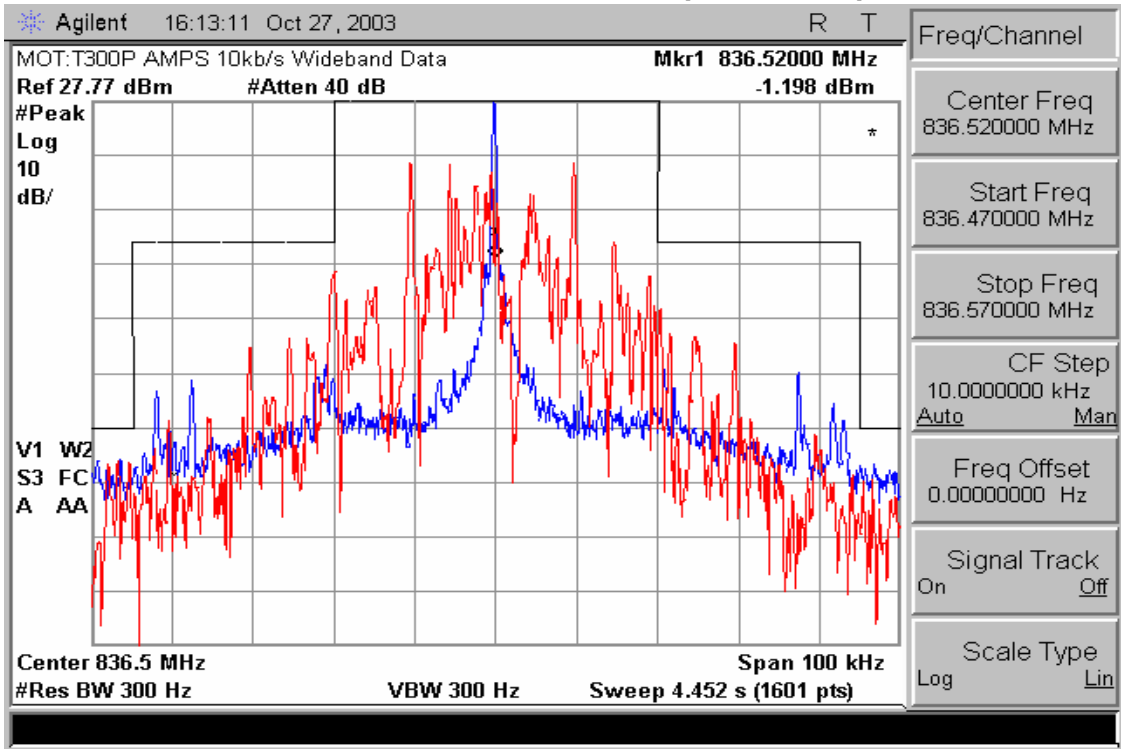


AMPS – Signaling Tone – Channel 384 (836.52 MHz)

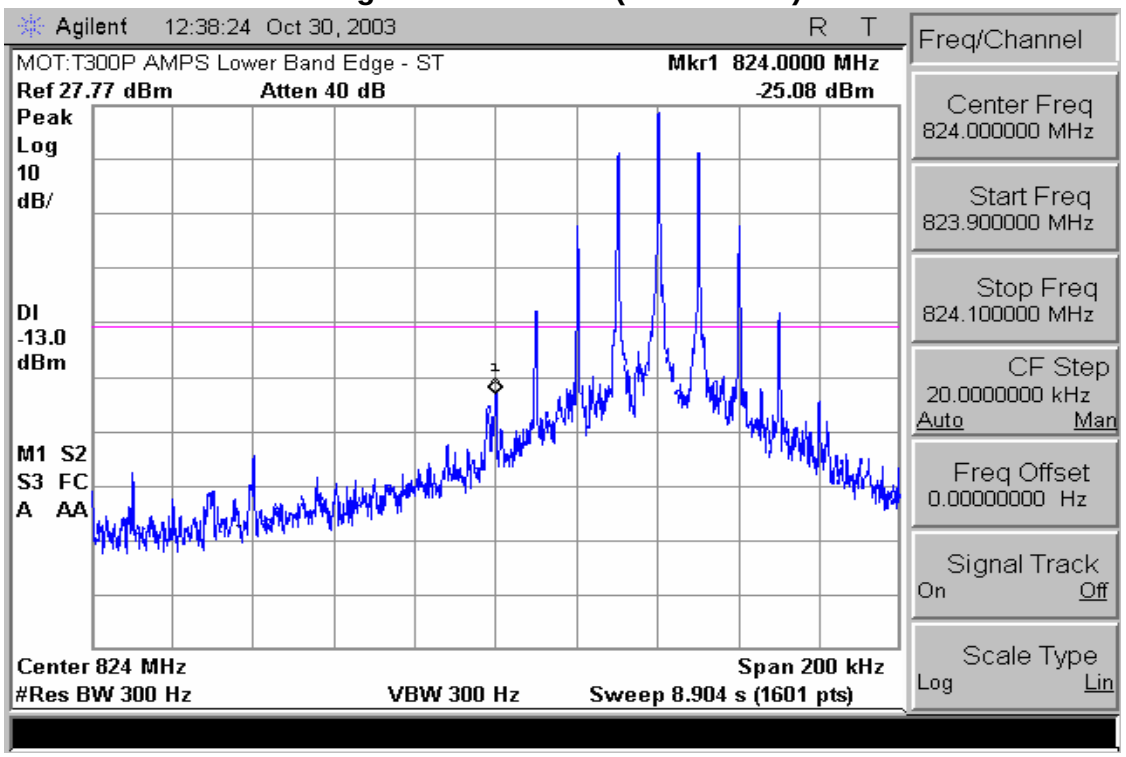


Note: 10 kHz harmonics encroaching on the 26 dB specification appear at exactly a 20 kHz offset, thus are within specification.

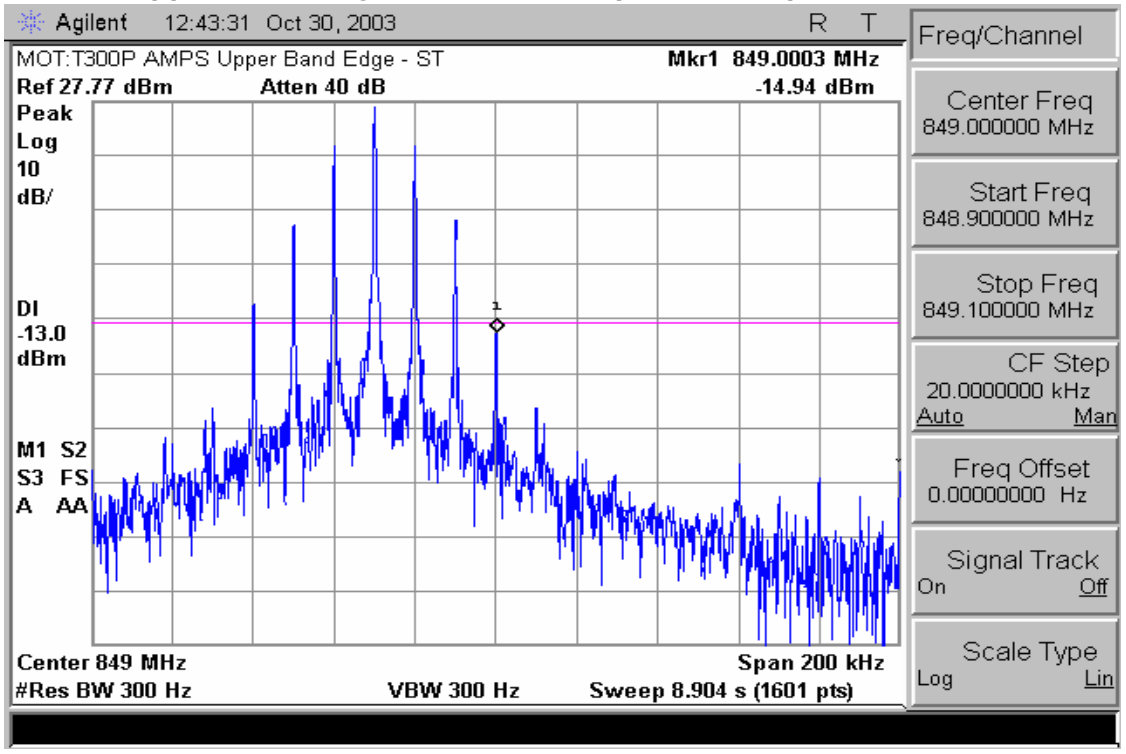
AMPS – 10kb/s Wideband Data – Channel 384 (836.52 MHz)



AMPS – Lower Band Edge – Channel 991 (824.04 MHz)

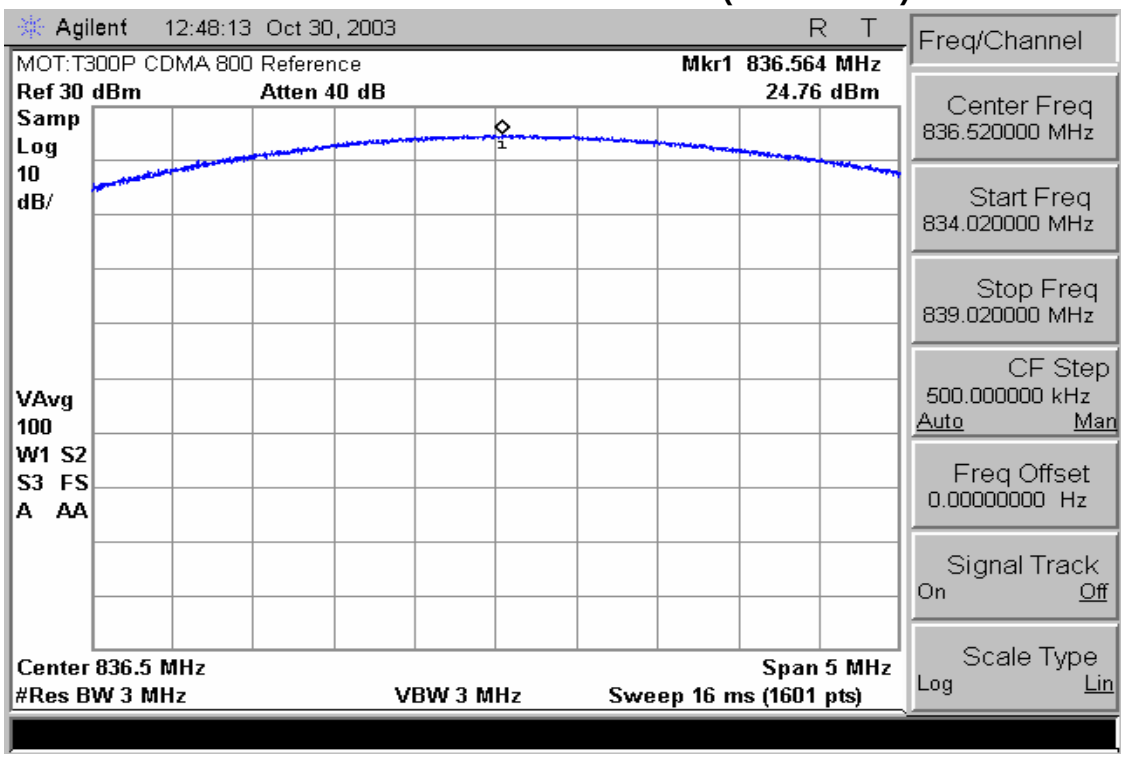


AMPS – Upper Band Edge – Channel 799 (848.97 MHz)

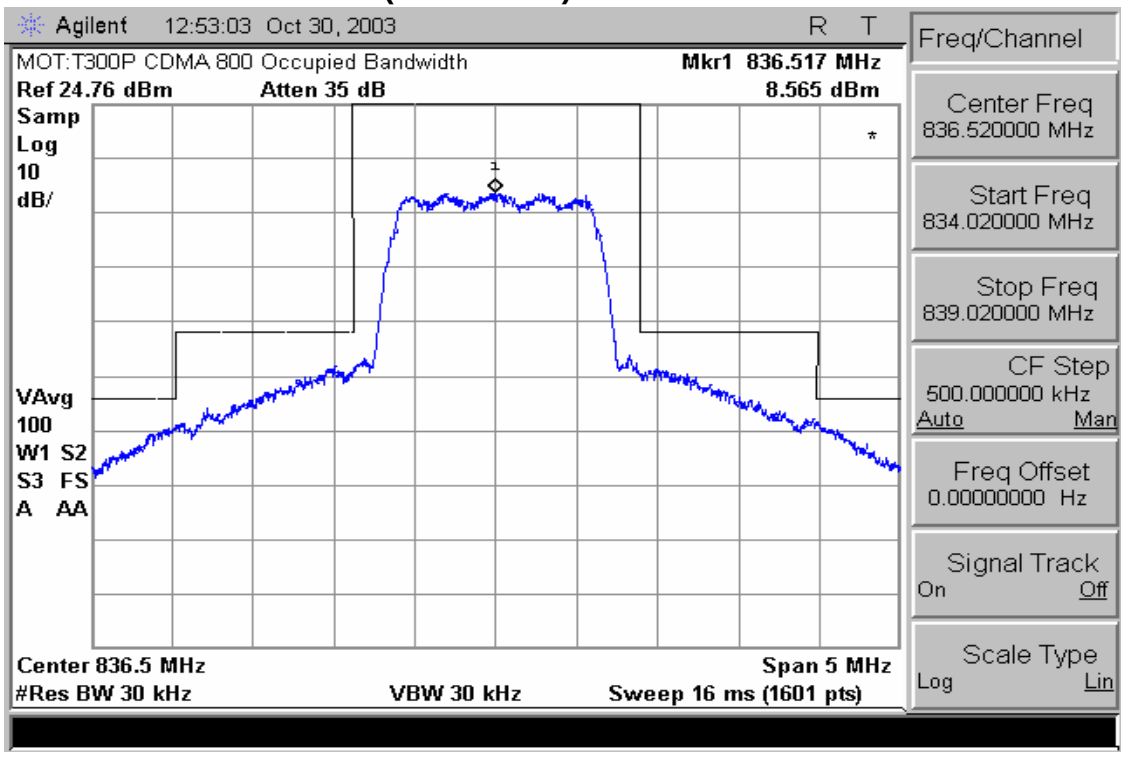


Measurement Results – CDMA 800

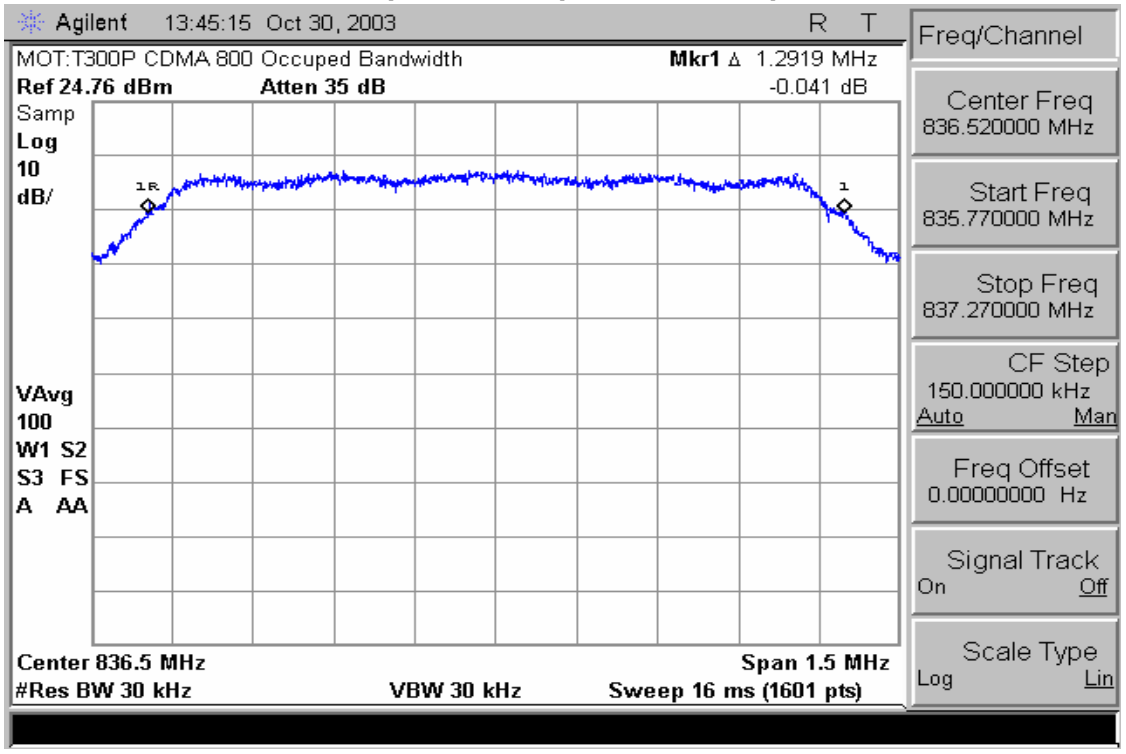
CDMA 800 – Reference Level Plot – Channel 384 (836.52 MHz)



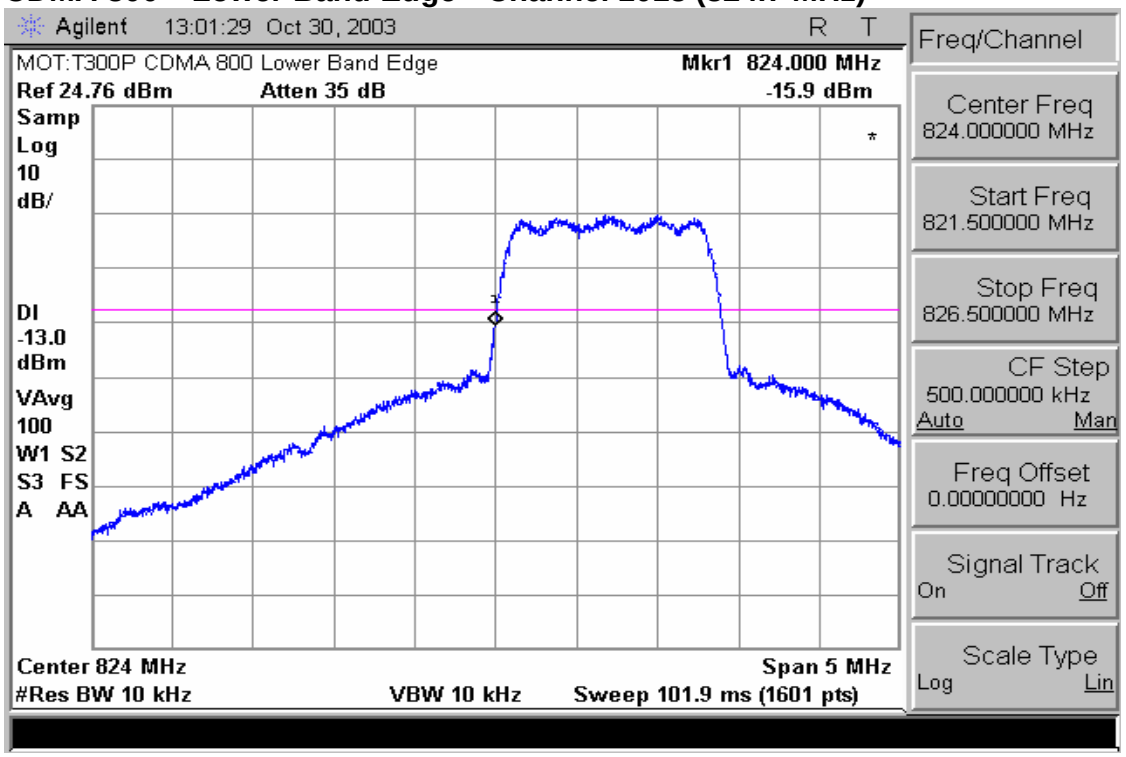
CDMA 800 – Channel 384 (836.52 MHz)



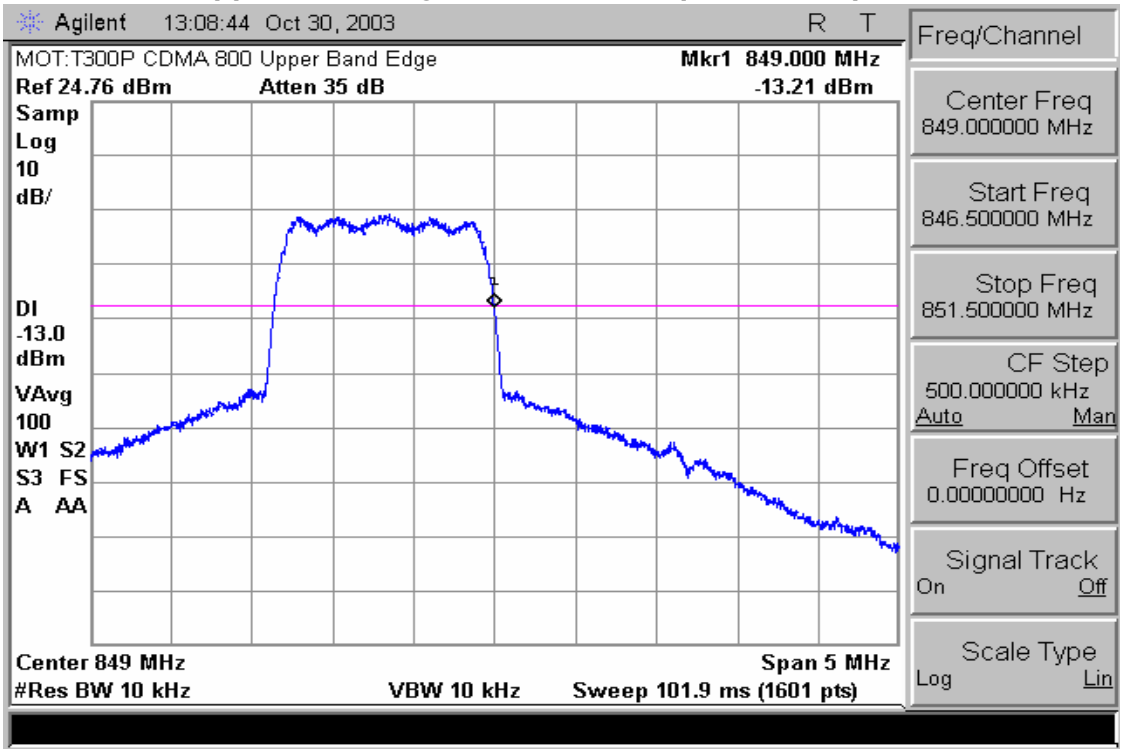
CDMA 800 – Channel 384 (836.52 MHz) Actual Occupied Bandwidth



CDMA 800 – Lower Band Edge – Channel 1013 (824.7 MHz)

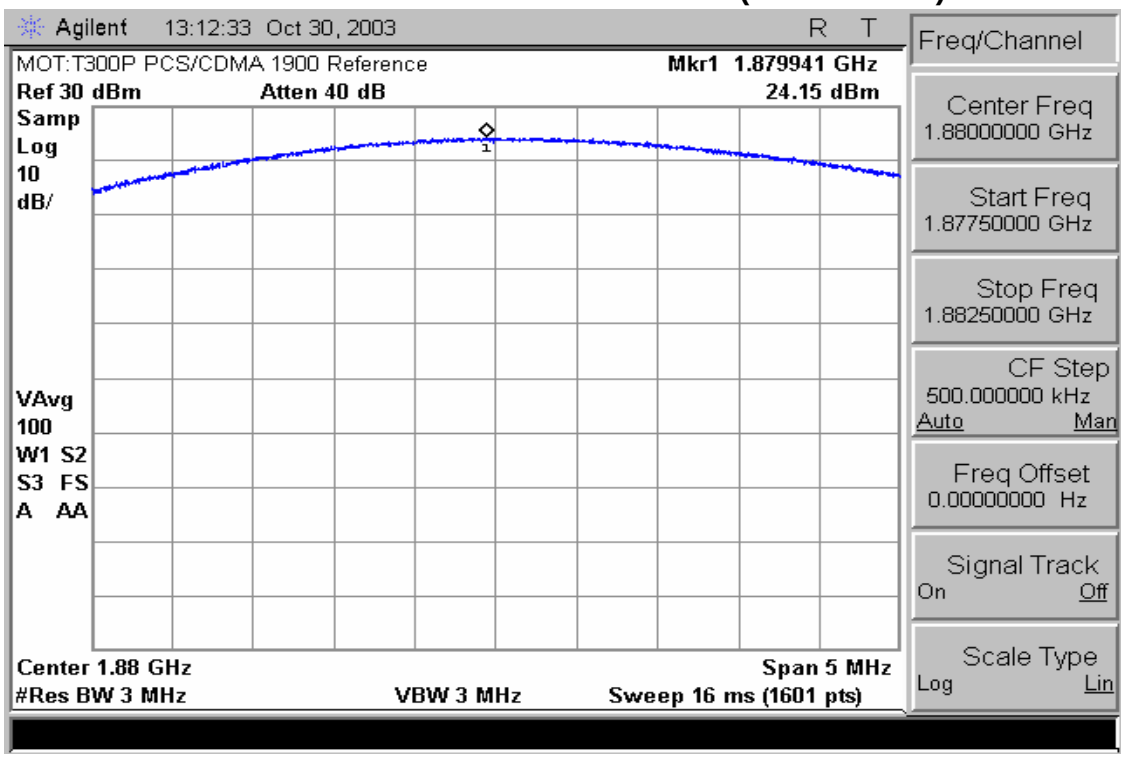


CDMA 800 – Upper Band Edge – Channel 777 (848.31 MHz)

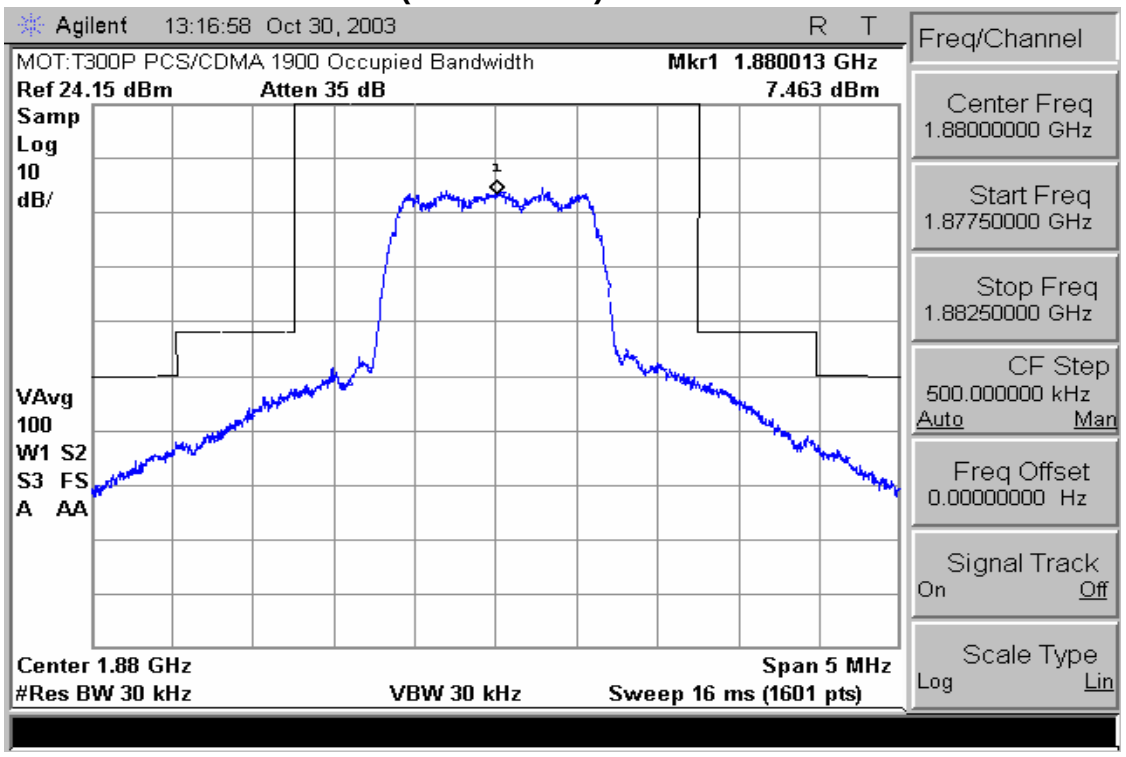


Measurement Results – CDMA 1900

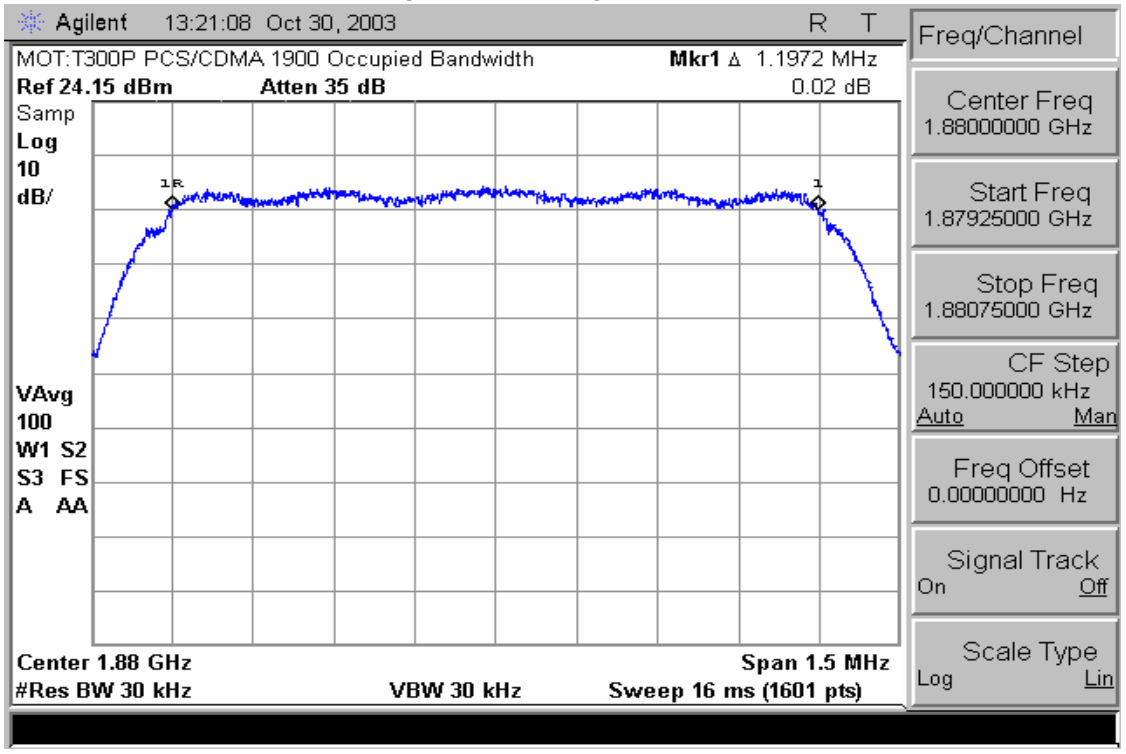
CDMA 1900 – Reference Level Plot – Channel 600 (1880.00 MHz)



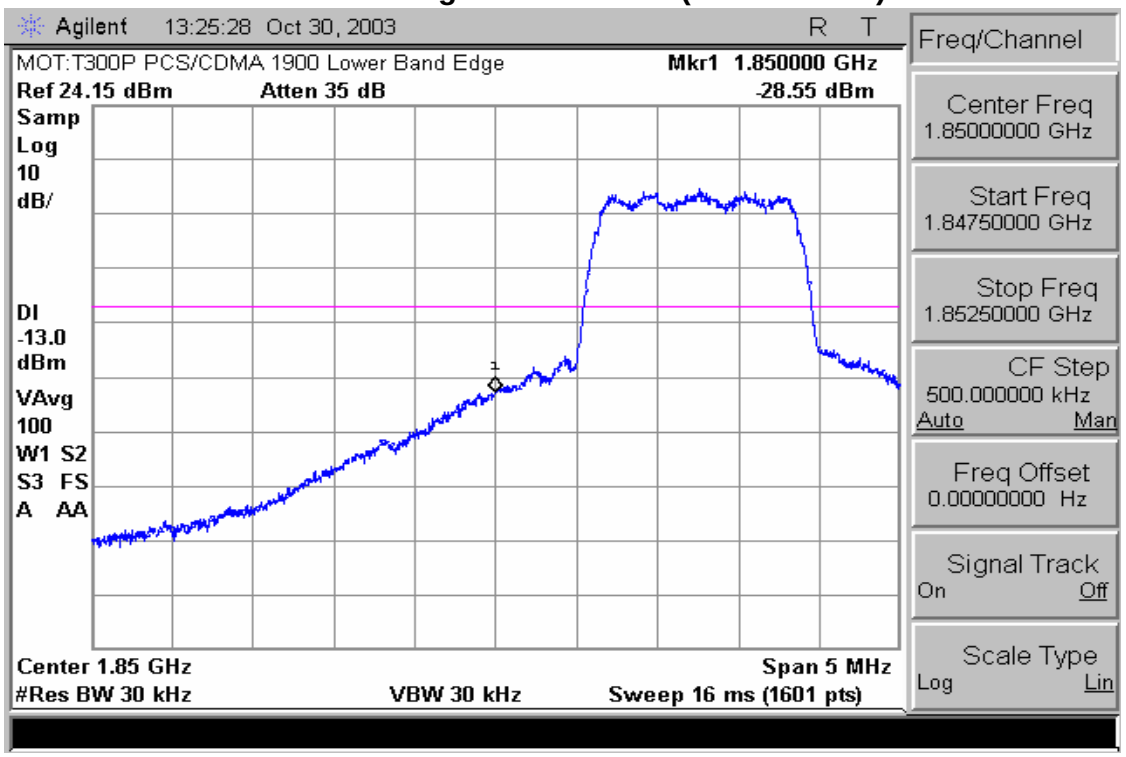
CDMA 1900 – Channel 600 (1880.00 MHz)



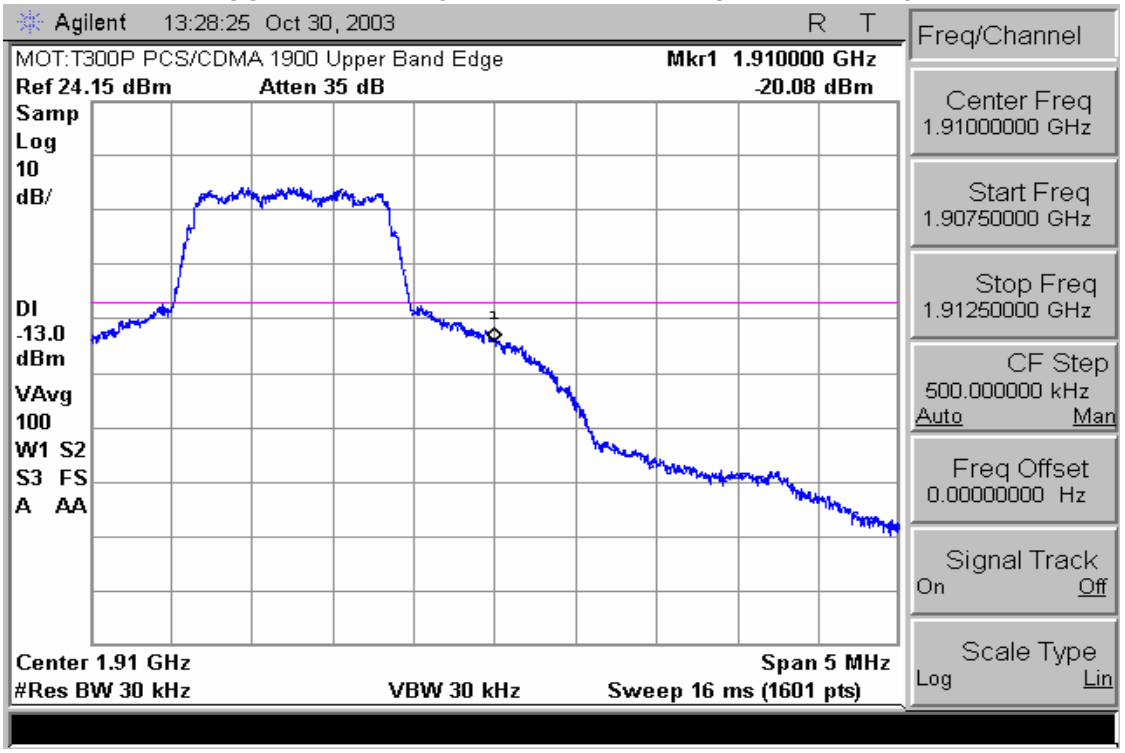
CDMA 1900 – Channel 600 (1880.00 MHz) Actual Bandwidth



CDMA 1900 – Lower Band Edge – Channel 25 (1851.25 MHz)



CDMA 1900 – Upper Band Edge – Channel 1175 (1908.75 MHz)



SPURIOUS EMISSIONS AT ANTENNA TERMINALS

CFR Part 2.1051, 22.917, 24.238

Measurement Procedure

The RF output port of the Equipment Under Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. A fully charged battery was used for the supply voltage.

The spectrum was investigated from the lowest frequency signal generated, without going below 9 kHz, up to at least the tenth harmonic of the fundamental or 40 GHz, whichever is lower.

Measurements were made at the middle channel within the frequency band and within the base station frequency range (869-894 MHz) for cellular.

Instrument Settings

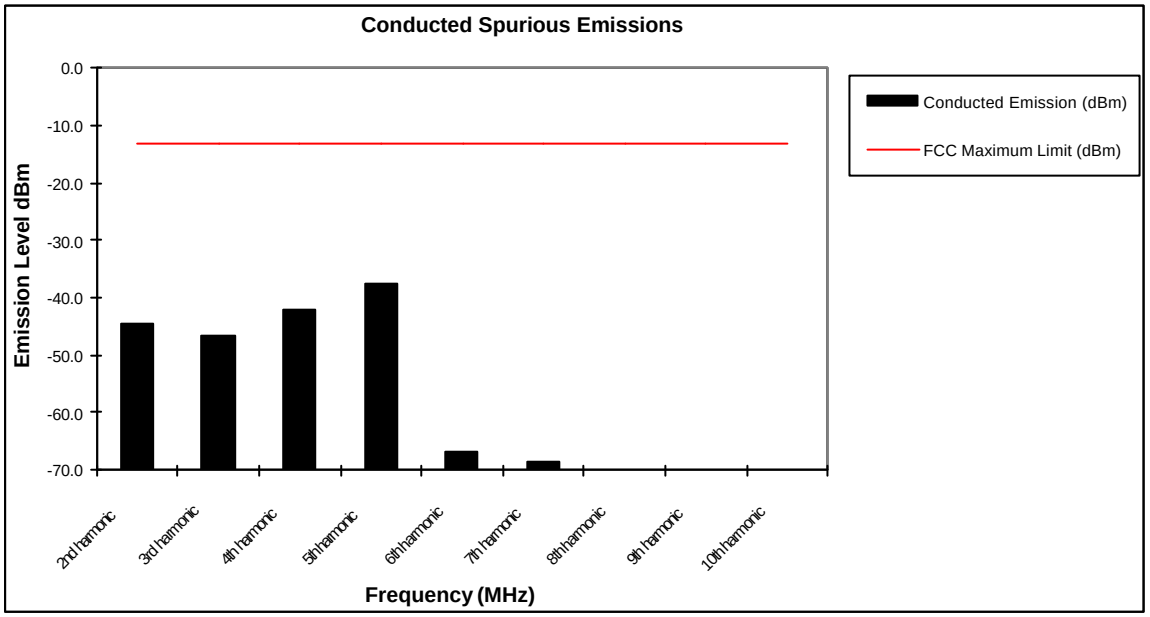
Resolution Bandwidth:	1 MHz (PCS), 100 kHz (GSM 850)
Video Bandwidth:	>= RBW
Detector:	Peak
Sweep:	Auto – Cal
Trace:	Max Hold

Measurement Results

Attached

Measurement Results
Modulation: AMPS

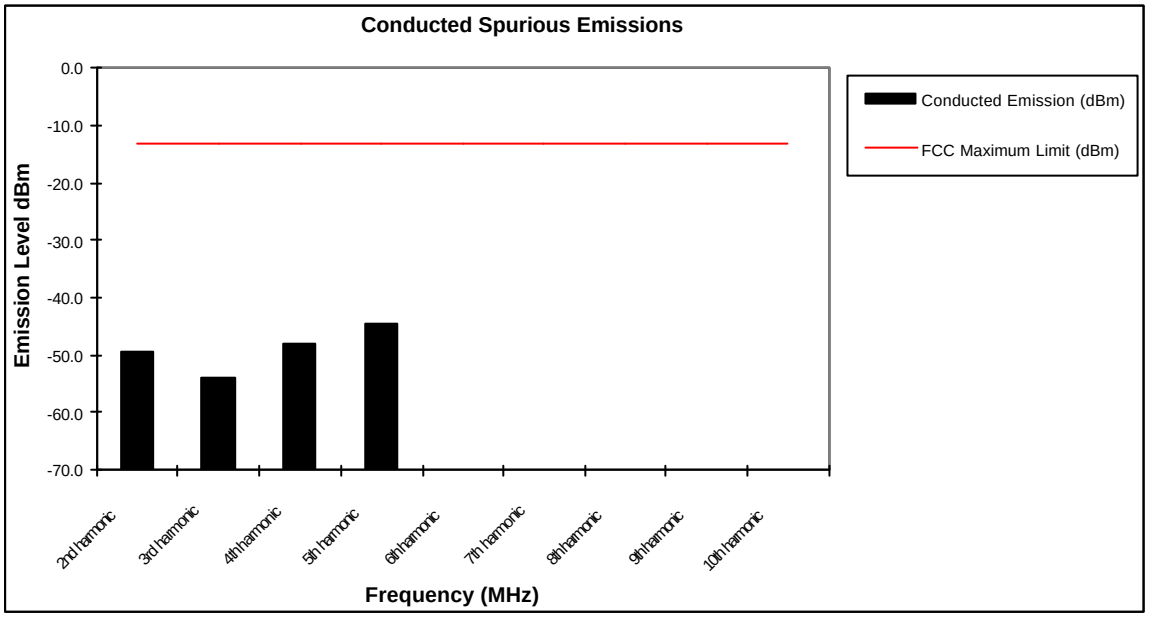
Harmonic of Fundamental	FCC Maximum Limit (dBm)	Conducted Emission (dBm)
2nd harmonic	-13	-44.4
3rd harmonic	-13	-46.6
4th harmonic	-13	-42.1
5th harmonic	-13	-37.7
6th harmonic	-13	-66.7
7th harmonic	-13	-68.6
8th harmonic	-13	-72.2
9th harmonic	-13	*
10th harmonic	-13	*



Notes:
1. * Indicates the spurious emission could not be detected due to noise limitations or ambients.
2. Each emission reported reflects the highest absolute level at the specific harmonic for the low, mid, and high channels at maximum power.
3. The Spectrum was investigated from 9 kHz to the tenth harmonic of the fundamental.

Measurement Results
Modulation: CDMA 800

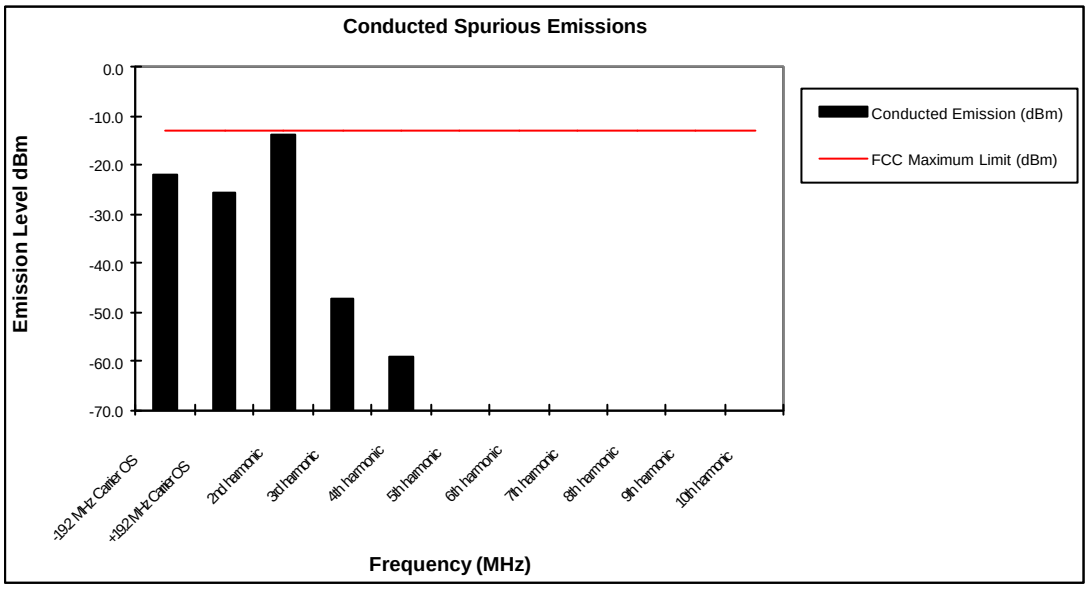
Harmonic of Fundamental	FCC Maximum Limit (dBm)	Conducted Emission (dBm)
2nd harmonic	-13	-49.5
3rd harmonic	-13	-53.9
4th harmonic	-13	-48.0
5th harmonic	-13	-44.6
6th harmonic	-13	*
7th harmonic	-13	*
8th harmonic	-13	*
9th harmonic	-13	*
10th harmonic	-13	*



Notes:
1. * Indicates the spurious emission could not be detected due to noise limitations or ambients.
2. Each emission reported reflects the highest absolute level at the specific harmonic for the low, mid, and high channels at maximum power.
3. The Spectrum was investigated from 9 kHz to the tenth harmonic of the fundamental.

Measurement Results
Modulation: CDMA 1900

Harmonic of Fundamental	FCC Maximum Limit (dBm)	Conducted Emission (dBm)
-19.2 MHz Carrier OS	-13	-29.1
+19.2 MHz Carrier OS	-13	-29.7
2nd harmonic	-13	-13.9
3rd harmonic	-13	-47.2
4th harmonic	-13	-59.3
5th harmonic	-13	*
6th harmonic	-13	*
7th harmonic	-13	*
8th harmonic	-13	*
9th harmonic	-13	*
10th harmonic	-13	*



Notes:
1. * Indicates the spurious emission could not be detected due to noise limitations or ambients.
2. Each emission reported reflects the highest absolute level at the specific harmonic for the low, mid, and high channels at maximum power.
3. The Spectrum was investigated from 9 kHz to the tenth harmonic of the fundamental.

FIELD STRENGTH OF SPURIOUS EMISSIONS

CFR Part 2.1053, 22.917, 24.238

Measurement Procedure

The equipment under test is placed inside the semi-anechoic chamber on a wooden table at the turntable center. For each spurious frequency, the antenna mast is raised and lowered from 1 to 4 meters and the turntable is rotated 360 degrees to obtain a maximum reading on the spectrum analyzer. This is repeated for both horizontal and vertical polarizations of the receive antenna.

The equipment under test is then replaced with a substitution antenna fed by a signal generator. With the signal generator tuned to a particular spurious frequency, the antenna mast is raised and lowered from 1 to 4 meters to obtain a maximum reading at the spectrum analyzer. The output of the signal generator is then adjusted until a reading identical to that obtained with the actual transmitter is achieved.

The power in dBm of each spurious emission is calculated by correcting the signal generator level for cable loss and gain of the substitution antenna referenced to a dipole. A fully charged battery was used for the supply voltage.

Instrument Settings

Resolution Bandwidth:	1 MHz (PCS Band), 30 kHz (Cellular Band)
Video Bandwidth:	>= RBW
Detector:	Peak
Sweep:	Auto – Cal
Trace:	Max Hold

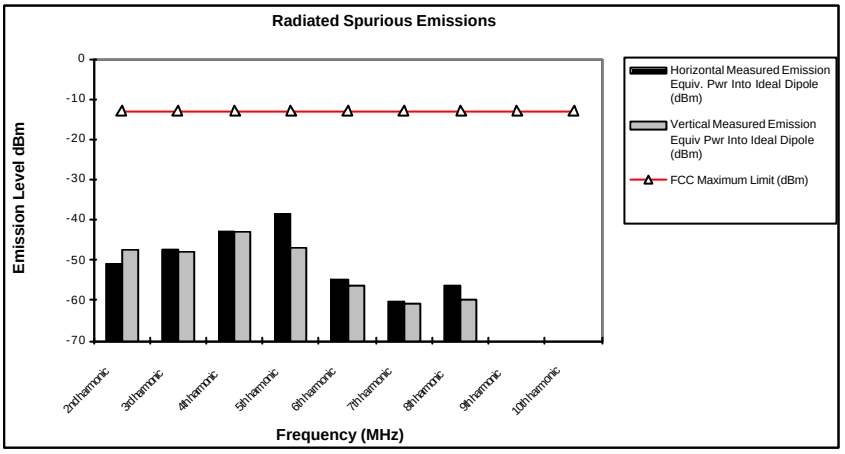
Measurement Results

Attached

Measurement Results
Modulation: AMPS

Radiated Spurious and Harmonic Emissions

Frequency (MHz)	FCC Maximum Limit (dBm)	Horizontal Measured Emission Equiv. Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into Ideal Dipole (dBm)
2nd harmonic	-13	-50.9	-47.5
3rd harmonic	-13	-47.1	-47.9
4th harmonic	-13	-42.9	-43.2
5th harmonic	-13	-38.6	-47.1
6th harmonic	-13	-54.8	-56.2
7th harmonic	-13	-60.2	-60.6
8th harmonic	-13	-56.3	-59.7
9th harmonic	-13	*	*
10th harmonic	-13	*	*

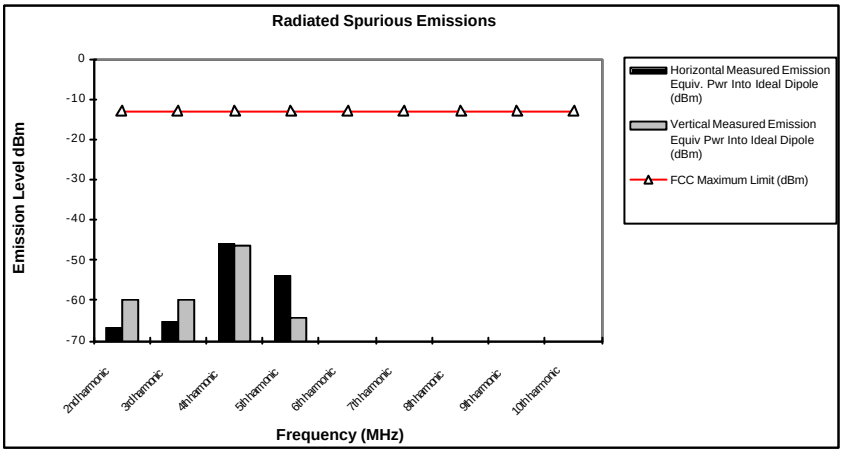


Notes:
1. * Indicates the spurious emission could not be detected due to noise limitations or ambients.
2. Each emission reported reflects the highest absolute level at the specific harmonic for the low, mid, and high channels at maximum power.
3. The Spectrum was investigated from 30 MHz to the tenth harmonic of the fundamental.

Measurement Results
Modulation: CDMA 800

Radiated Spurious and Harmonic Emissions

Frequency (MHz)	FCC Maximum Limit (dBm)	Horizontal Measured Emission Equiv. Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into Ideal Dipole (dBm)
2nd harmonic	-13	-66.9	-60.0
3rd harmonic	-13	-65.5	-59.9
4th harmonic	-13	-46.1	-46.4
5th harmonic	-13	-54.0	-64.3
6th harmonic	-13	*	*
7th harmonic	-13	*	*
8th harmonic	-13	*	*
9th harmonic	-13	*	*
10th harmonic	-13	*	*

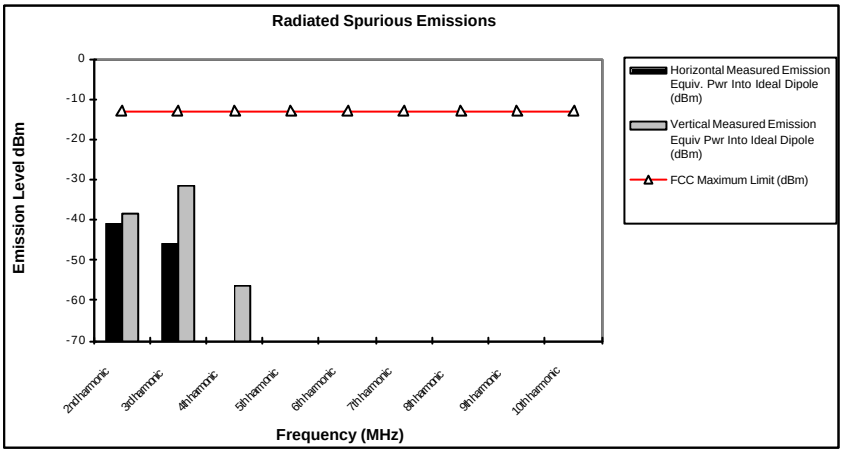


Notes:
1. * Indicates the spurious emission could not be detected due to noise limitations or ambients.
2. Each emission reported reflects the highest absolute level at the specific harmonic for the low, mid, and high channels at maximum power.
3. The Spectrum was investigated from 30 MHz to the tenth harmonic of the fundamental.

Measurement Results
Modulation: CDMA 1900

Radiated Spurious and Harmonic Emissions

Frequency (MHz)	FCC Maximum Limit (dBm)	Horizontal Measured Emission Equiv. Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into Ideal Dipole (dBm)
2nd harmonic	-13	-41.2	-38.4
3rd harmonic	-13	-46.1	-31.7
4th harmonic	-13	*	-56.4
5th harmonic	-13	*	*
6th harmonic	-13	*	*
7th harmonic	-13	*	*
8th harmonic	-13	*	*
9th harmonic	-13	*	*
10th harmonic	-13	*	*



Notes:
1. * Indicates the spurious emission could not be detected due to noise limitations or ambients.
2. Each emission reported reflects the highest absolute level at the specific harmonic for the low, mid, and high channels at maximum power.
3. The Spectrum was investigated from 30 MHz to the tenth harmonic of the fundamental.

FREQUENCY STABILITY

CFR Part 2.1055, 22.355, 24.235

Measurement Procedure

The equipment under test is placed in an environmental chamber. The antenna port of the Equipment Under Test is directly coupled to the input of the measurement equipment through a specialized RF connector. A power supply is attached as the primary voltage supply.

Frequency measurements are made at the extremes of the temperature range -30º C to +60º C and at intervals of 10º C with the primary supply voltage set to the nominal battery operating voltage. A period of time sufficient to stabilize all components of the equipment is allowed at each frequency measurement. The maximum variation of frequency is measured.

At room temperature, the primary supply voltage is reduced to the battery operating endpoint of the equipment under test. The maximum variation of frequency is measured. A battery eliminator was used for the input supply voltage.

Measurement Results

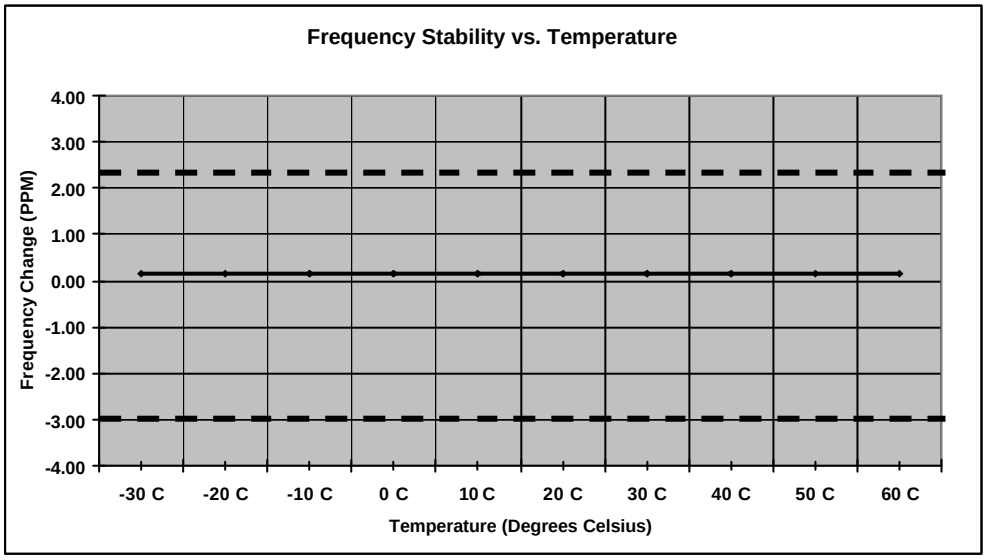
Attached

Measurement Results
Modulation: AMPS

Frequency Stability

Mode: Analog **Operating Frequency:** 836.52 MHz
Channel: 384 **Deviation Limit (PPM):** 2.5ppm

Temperature	Frequency Error	Frequency Error	Voltage	Voltage
C	HZ	(PPM)	(%)	(VDC)
-30 C	**128.00**	**0.153**	100%	3.60
-20 C	**123.00**	**0.147**	100%	3.60
-10 C	**122.00**	**0.146**	100%	3.60
0 C	**122.00**	**0.146**	100%	3.60
10 C	**121.00**	**0.145**	100%	3.60
20 C	**122.00**	**0.146**	100%	3.60
30 C	**123.00**	**0.147**	100%	3.60
40 C	**122.00**	**0.146**	100%	3.60
50 C	**122.00**	**0.146**	100%	3.60
60 C	**121.00**	**0.145**	100%	3.60
20 C	**121.00**	**0.145**	Battery Endpoint	3.20



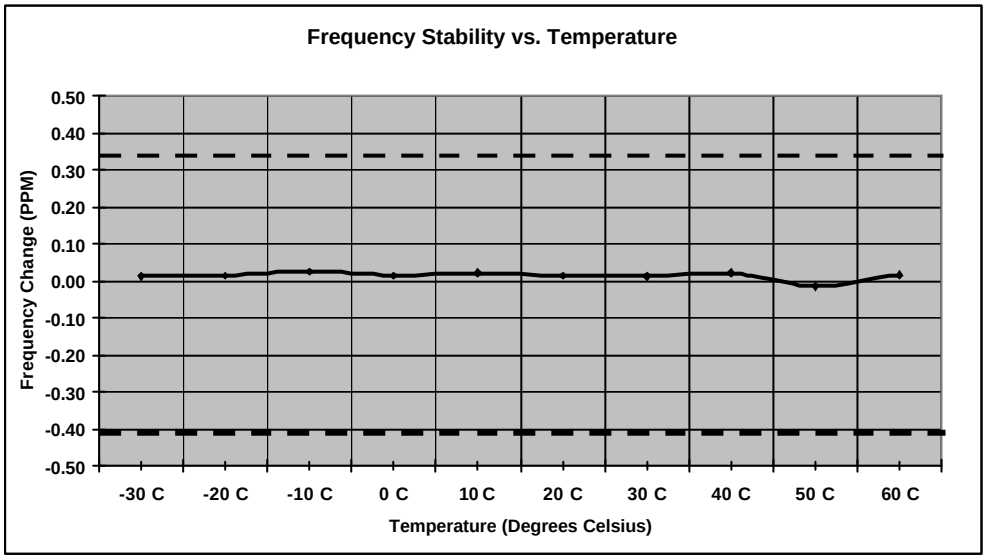
Technician: Kien
Date: 10/24/03
Product Name: T300P
Submission #: 12431-1
S/N: A8EE70C3
CMD80 S/N: 830688/012

Measurement Results
Modulation: CDMA 800

Frequency Stability

Mode: CDMA 800 **Operating Frequency:** 836.52 MHz
Channel: 384 **Deviation Limit (PPM):** 0.359ppm (+/-300 Hz)

Temperature	Frequency Error	Frequency Error	Voltage	Voltage
C	HZ	(PPM)	(%)	(VDC)
-30 C	**11.00**	**0.013**	100%	3.60
-20 C	**13.00**	**0.016**	100%	3.60
-10 C	**22.00**	**0.026**	100%	3.60
0 C	**13.00**	**0.016**	100%	3.60
10 C	**18.00**	**0.022**	100%	3.60
20 C	**13.00**	**0.016**	100%	3.60
30 C	**11.00**	**0.013**	100%	3.60
40 C	**18.00**	**0.022**	100%	3.60
50 C	**-12.00**	**-0.014**	100%	3.60
60 C	**14.00**	**0.017**	100%	3.60
20 C	**-21.00**	**-0.025**	Battery Endpoint	3.20



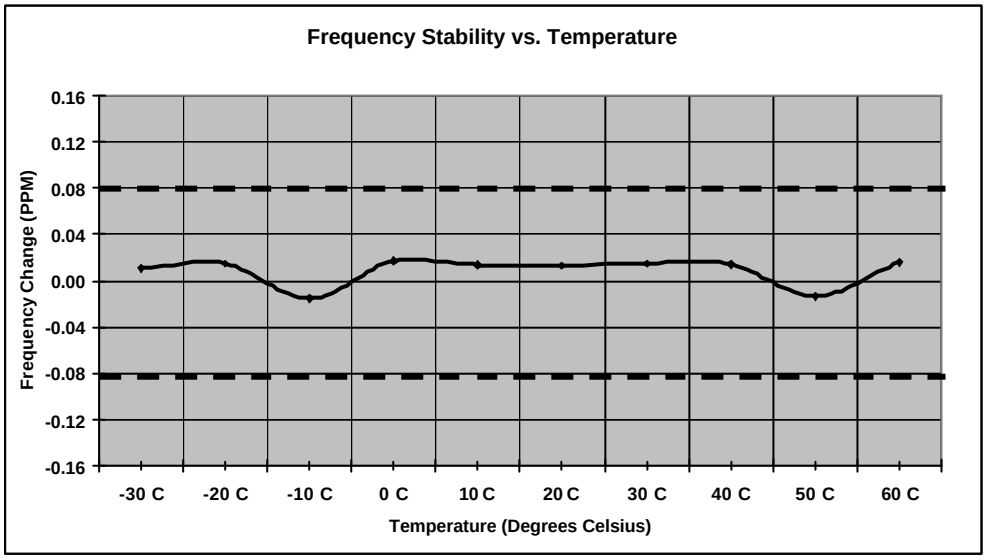
Technician: Kien
Date: 10/24/03
Product Name: T300P
Submission #: 12431-1
S/N: A8EE70C3
CMD80 S/N: 830688/012

Measurement Results
Modulation: CDMA 1900

Frequency Stability

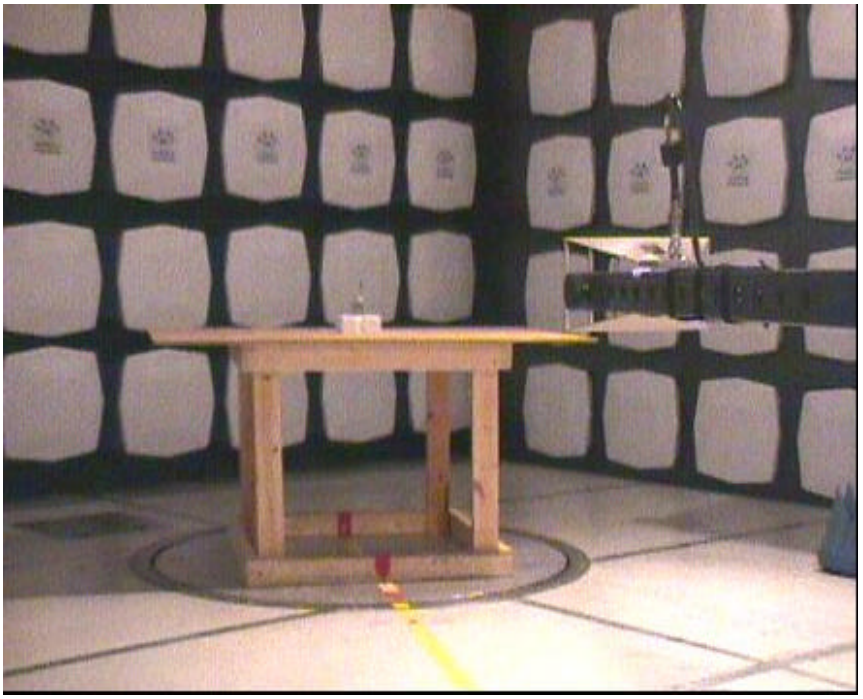
Mode: CDMA 1900 **Operating Frequency:** 1880.0 MHz
Channel: 600 **Deviation Limit (PPM):** 0.08ppm (+/-150Hz)

Temperature	Frequency Error	Frequency Error	Voltage	Voltage
C	HZ	(PPM)	(%)	(VDC)
-30 C	**20.00**	**0.011**	100%	3.60
-20 C	**28.00**	**0.015**	100%	3.60
-10 C	**-28.00**	**-0.015**	100%	3.60
0 C	**32.00**	**0.017**	100%	3.60
10 C	**26.00**	**0.014**	100%	3.60
20 C	**25.00**	**0.013**	100%	3.60
30 C	**28.00**	**0.015**	100%	3.60
40 C	**27.00**	**0.014**	100%	3.60
50 C	**-25.00**	**-0.013**	100%	3.60
60 C	**30.00**	**0.016**	100%	3.60
20 C	**26.00**	**0.014**	Battery Endpoint	3.20

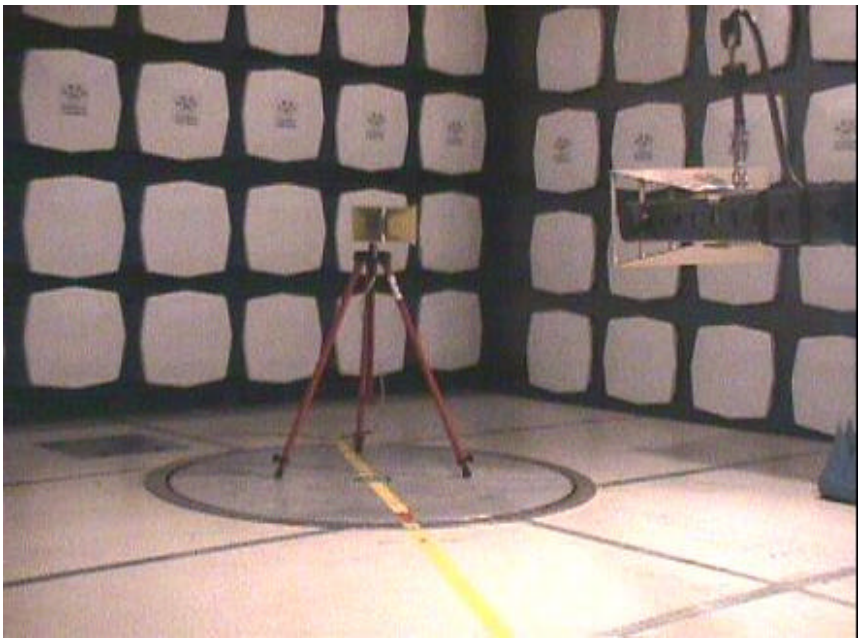


Technician: Kien
Date: 10/24/03
Product Name: T300P
Submission #: 12431-1
S/N: A8EE70C3
CMD80 S/N: 830688/012

Appendix A – Radiated Emissions Test Setup Photos



A.1 Radiated Emissions Measurement



A.2 Substitution Measurement

End of Test Report