CFR 47 Part 2, 22,24 Test Report

Test Report Number: WR961.201

Terminal device: FCC ID: QMNRM-120, HWID: 3002 SW: V MR100b01.nep
(Detailed information is listed in section 4).

Originator:	Viet Do
Function:	TCC – Dallas – EMC
Version/Status:	1.0 Approved
Location:	QATrax Directories
Date:	21-Mar-06

Change History:

Version	*Date*	*Status*	*Handled By*	*Comments*
0.1	21-Mar-06	Draft	Viet Do	
0.2	21-Mar-06	Proposal	Viet Do	
0.3	21-Mar-06	Reviewed	Hai To	
1.0	21-Mar-06	Approved	Hai To	

Testing laboratory:
Test & Certification Center (TCC) Dallas
Nokia Inc
6021 Connection Drive
Irving, Texas 75039
U.S.A.

Tel. 972-894-5000

Client:
Nokia Inc.
San Diego
12278 Script Summit Drive.
San Diego, Ca 92131
USA
Tel. +1858 831 5000
Fax. +1858 8316500

Date and signatures: **21-Mar-06**

For the contents:

Viet Do
Test Operator

Hai To
Technical Review

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1. GENERAL

1.1 Quality System

The quality system in place for TCC-Dallas conforms to ISO/IEC 17025 and has been audited to the standard by A2LA (American Association of Laboratory Accreditation). TCC – Dallas has also been audited using the ISO 9000 Quality System, as part of Nokia Mobile Phones, Inc., by ABS (American Bureau of Shipping) Quality Evaluations Inc.

TCC-Dallas is a recognized laboratory with the Federal Communications Commission in filing applications for Certification under Parts 15 and 18, Registration Number 100060, and Industry Canada, Registration Number IC 661N.

1.2 Objective

All tests and measurement data shown was performed to determine whether the selected handset was in compliance as specified in FCC: CFR47 Parts 2.947, 2.1033©, 2.1041, 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057, Part 22, and Part 24.

1.3 Test Summary

Test Results: *The test result relates only to those tested devices mentioned in Section 4 of this test report.*

Test Performed	Reference	Section of Report	Complies / Does not comply / Not Tested
RF Power Output (Conducted	FCC Part 2.1046	6	Complies
Modulation Requirements: TX Audio Frequency Response	FCC Part 2.1047(a)	7	Complies
Modulation Requirements: Modulation Limiting	FCC Part 2.1047(b)	8	Complies
Occupied Bandwidth: Transmitter Conducted Measurements	FCC Part 2.1049	9	Complies
Spurious Emissions at Antenna Terminals	FCC Part 2.1051	10	Complies
Frequency Stability (Temperature Variation)	FCC Part 2.1055(a)	11	Complies
Frequency Stability (Voltage Variation)	FCC Part 2.1055(d)	12	Complies

2. STANDARDS BASIS

Testing has been carried out in accordance with:

REF.	Code of the standard	Name of the standard
1	ANSI C63.4	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz.
2	FCC: CFR 47 Part 2	Code of Federal Regulations (CFR) Title 47, Part 2 – Frequency Allocations and Radio Treaty Matters; General Rules and Regulations: Subpart J – Equipment Authorization Procedures
3	FCC: CFR 47 Part 22	Code of Federal Regulations (CFR) Title 47, Part 22 – Public Mobile Services: Subpart H – Cellular Radiotelephone Service
4	FCC: CFR 47 Part 24	Code of Federal Regulations (CFR) Title 47, Part 24 – Personal Communications Services: Subpart E – Broadband PCS
5	RSS-129	800 MHz Dual-Mode CDMA Cellular Telephones
6	RSS-132	800 MHz Cellular Telephones Employing New Technologies
7	RSS-133	2 GHz Personal Communications Services, Industry Canada
8	RSS-212	Test Facilities and Test Methods for Radio Equipment, Industry Canada (Provisional)
9	RSP-100	Radio Equipment Certification Procedure

Note: Unless otherwise stated, (by reference to a version number and a publication date), the latest version of the above documents applies.

Deviations:

Not Applicable.

3. LIST OF ABBREVIATIONS, ACRONYMS AND TERMS

3.1 Abbreviations

dB - decibel

dBc - decibels from carrier

dBm - decibels per milliwatt (absolute measurement)

GHz - gigahertz or 1000000000 hertz

kHz - kilohertz or 1000 hertz

MHz - megahertz or 1000000 hertz

3.2 Acronyms

AMPS - Advanced Mobile Phone System

BSS - Base Station Simulator

CDMA - Code Division Multiple Access

EDRP - Effective Dipole Radiated Power

EIRP - Effective Isotropic Radiated Power

EMC - Electromagnetic Compatibility

EMI - Electromagnetic Interference

ERP - Effective Radiated Power

EUT - Equipment under Test

GSM - Global System for Mobile communications

PCS - Personal Communications Services

RF - Radio Frequency

TDMA - Time Division Multiple Access

3.3 Terms

Base Station Simulator (BSS) - simulates all the necessary signals that a phone would experience while on a live network. There are many types of base station simulators catering for all current protocols, i.e., GSM, AMPS, TDMA, and CDMA.

Cellular - refers to a frequency in the 800MHz band.

PCS - refers to a frequency in the 1900MHz band.

4. EQUIPMENT-UNDER-TEST (EUT)

The results in this report relate only to the items listed below:

4.1 Description of Tested Device(s):

Test Performed	Mode of Operation	Date of Receipt	Condition of Sample	Item	Identifying Information
FCC Part 2.1046 FCC Part 2.1047 FCC Part 2.1049 FCC Part 2.1051 FCC Part 2.1055	AMPS 800/1900	17-Mar-06	Working	Phone	FCC ID: QMNRM-120 Type: RM-120 HW: 3002 SW: V MR100b01.nep ESN: 02603563168
FCC Part 2.1046 FCC Part 2.1047 FCC Part 2.1049 FCC Part 2.1051 FCC Part 2.1055	AMPS 800/1900	17-Mar-06	Working	Battery	Type: BL-5C

4.2 Photograph of Tested Device(s):

Refer to attached EXHIBITS

5. TEST EQUIPMENT LIST

The listing below indicates the test equipment utilized for the test (s). Calibration interval on all items listed can be obtained from the Engineering Services Group within NMP, Product Creation - Dallas. Where relevant, measuring equipment is subjected to in-service checks between testing. TCC - Dallas shall notify clients promptly, in writing, of identification of defective measuring equipment that casts doubt on the validity of results given in this report.

Section of Report	NMP#	Test Equipment	Mfr. #	Model #	Calibration Due Date	Calibration Interval
6,7,8,9,10	N/A	6dB Attenuator	Weinshcel	Model 2	Na	12 months
6,7,8,9,10,11,12	02666	Base Station	R&S	CMU200	30 Jun 06	12 months
6,7,8,9	02679	EMI Receiver	HP	E7405A	01 Jun 06	12 Months
8,9	00087	Synthesized Fun/Sweep Generator	HP	3324A	20 May 06	12Months
11,12	00837	Temperature Chamber	Tenney Environmental	N/A	03 May 06	12 months

6. RF POWER OUTPUT (CONDUCTED)

Specification: FCC Part 2.1046(a), 22.913(a), 24.232(b)(c)

6.1 Setup

Testing was performed with the EUT connected to a 6dB splitter and then to the RF Power Meter to measure the conducted RF power output. The base station simulator was connected to the other port of the splitter to establish a call.

6.2 Pass/Fail Criteria

Not Applicable

6.3 Detailed Test Results

Test Technician / Engineer	Julian Kim
Date of Measurement	15-Mar-06
Temperature	24°C
Humidity	27 %RH
Test Result	Was operated at max power and tested in accordance with FCC Part 2.1046(a), 22.913(a), 24.232(b)(c).

Note: RF Conducted measurements were performed with, Average Power reading.

AMPS

Channel	Freq Max (MHz)	Max (mW)	Max (dBm)
991	824.04 MHz	354.8	25.5
384	836.52 MHz	354.8	25.5
799	848.97 MHz	354.8	25.5

CDMA 800

Channel	Freq Max (MHz)	Max (mW)	Max (dBm)
1013	824.70 MHz	281.8	24.5
384	836.52 MHz	281.8	24.5
777	848.31 MHz	281.8	24.5

CDMA 1900

Channel	Freq Max (MHz)	Max (mW)	Max (dBm)
25	1851.25 MHz	234.4	23.7
600	1880.00 MHz	229.1	23.6
1175	1908.75 MHz	229.1	23.6

7. TX AUDIO FREQUENCY RESPONSE

Specification: FCC Part 2.1047(a)

7.1 Setup

The audio signal generator was connected to the audio input circuit/microphone of the EUT.

The audio signal input was adjusted to obtain 20% modulation at 1kHz, and this point was taken as the 0dB reference level.

With input levels held constant and below limiting at all frequencies, the audio generator was varied from 100Hz to 50kHz.

The response in dB relative to 1kHz was then measured, using the HP 8901B modulation analyzer.

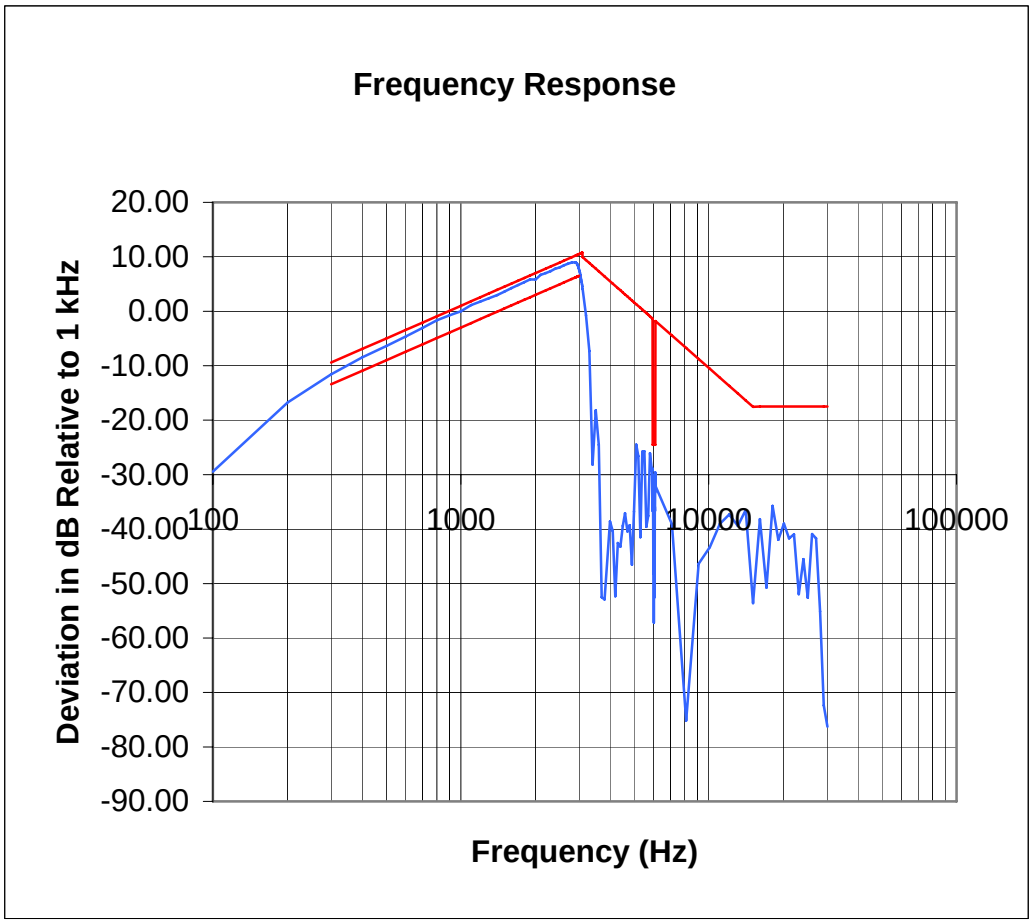
7.2 Pass/Fail Criteria

Emissions mask.

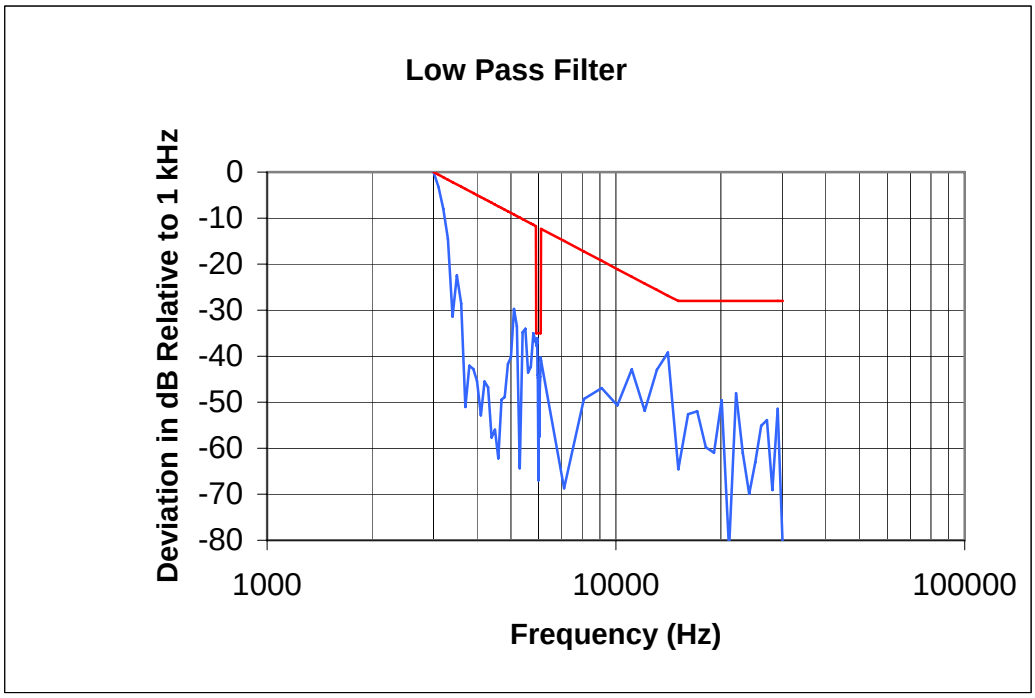
7.3 Detailed Test Results

Test Technician / Engineer	Viet Do
Date of Measurement	20-Mar-06
Temperature	22 °C
Humidity	47 %RH
Test Result	Was tested in accordance with FCC Part 2.1047(a)

Frequency Response



Low Pass Filter



8. MODULATION LIMITING

Specification: FCC Part 2.1047(b)

8.1 Setup

The audio signal generator was connected to the audio input circuit/microphone of the EUT.

The modulation response was measured for each of three tones (one of which was the frequency of maximum response), and the input voltage was varied and was observed on the HP 8901B modulation analyzer.

The audio input level was varied from 30% modulation (+/-3.6kHz deviation) to at least 20dB higher than the saturation point.

Measurements were performed for both negative and positive modulation and the respective results were recorded.

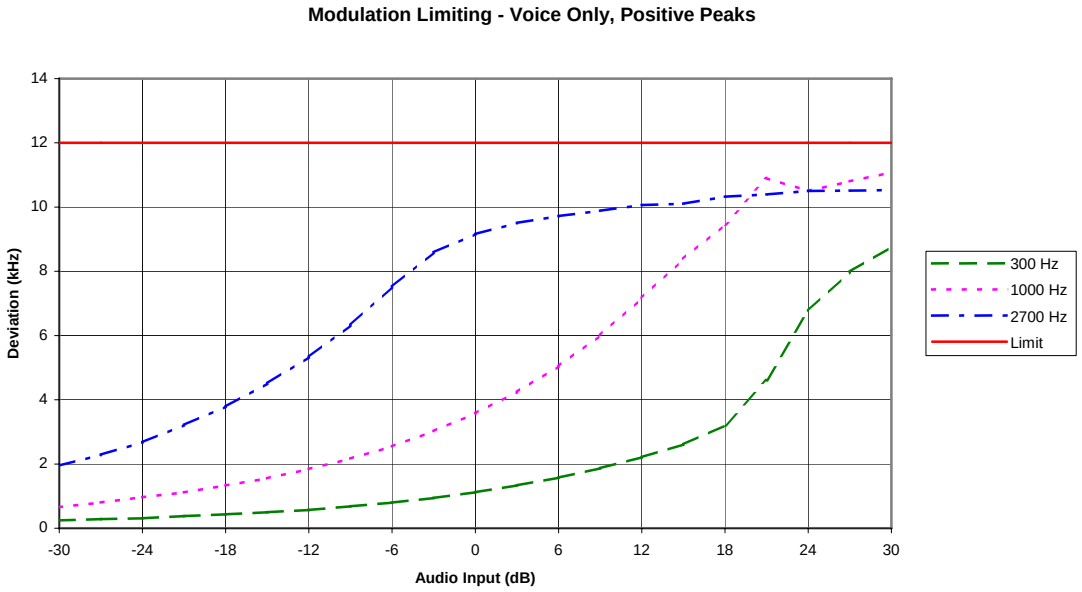
8.2 Pass/Fail Criteria

No pass/fail criteria

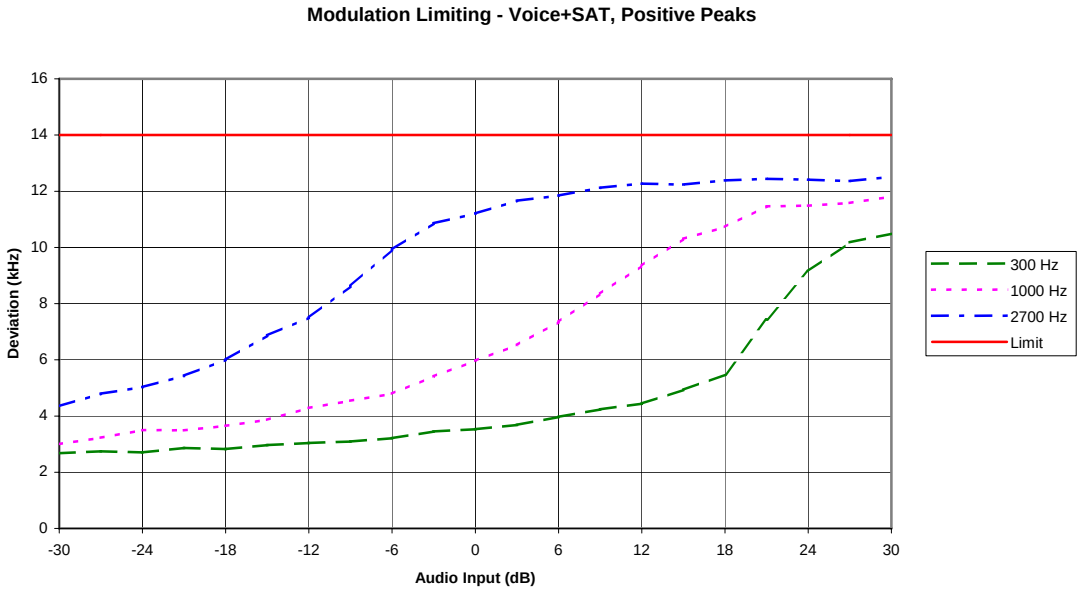
8.3 Detailed Test Results

Test Technician / Engineer	Viet Do
Date of Measurement	20-Mar-06
Temperature	22°C
Humidity	47%RH
Test Result	Was tested in accordance with FCC Part 2.1047(b)

Modulation Limiting – Voice Only, Positive Peaks



Modulation Limiting – Voice + SAT, Positive Peaks



9. OCCUPIED BANDWIDTH (TRANSMITTER CONDUCTED MEASUREMENTS)

Specification: FCC Part 2.1049(c)(1), 24.238(a)(b)

9.1 Setup

Testing was performed with the EUT connected to a 6dB attenuator, 6dB splitter, filter bank and then to the EMI receiver. The base station simulator was connected to the other port of the splitter to establish a call.

9.2 Pass/Fail Criteria

Occupied Bandwidth, Out of Band

Band	Frequency Range (MHz)	FCC Limits (dBm)
Cellular 800, Low Channel	< 824	-13
Cellular 800, High Channel	> 849	-13
PCS 1900, Low Channel	< 1850	-13
PCS 1900, High Channel	> 1910	-13

Occupied Bandwidth, In Band

No pass/fail, these plots are used to determine the emission designators.

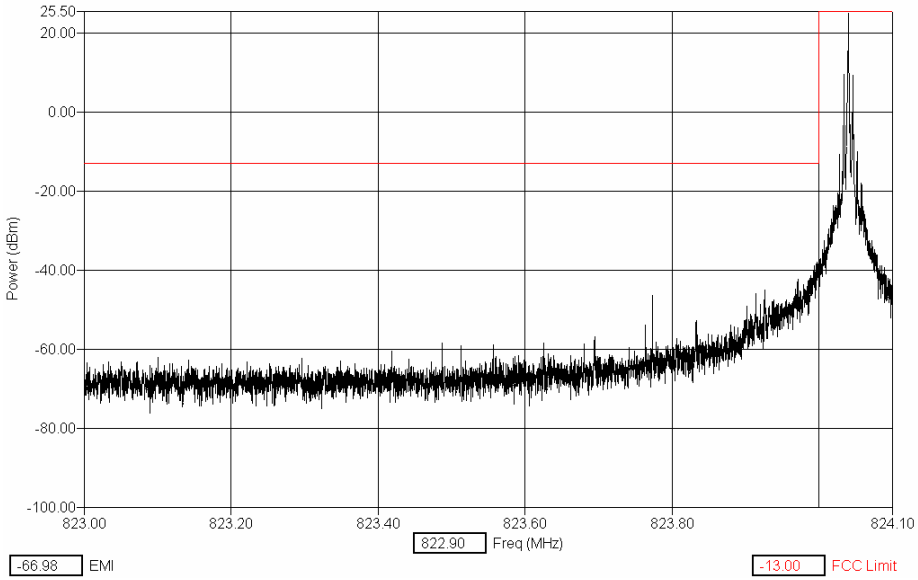
9.3 Detailed Test Results

Test Technician / Engineer	Viet Do
Date of Measurement	17-Mar-06
Temperature	23 °C
Humidity	46 %RH
Test Result	Complies with FCC Part 2.1049(c)(1), 24.238(a)(b)

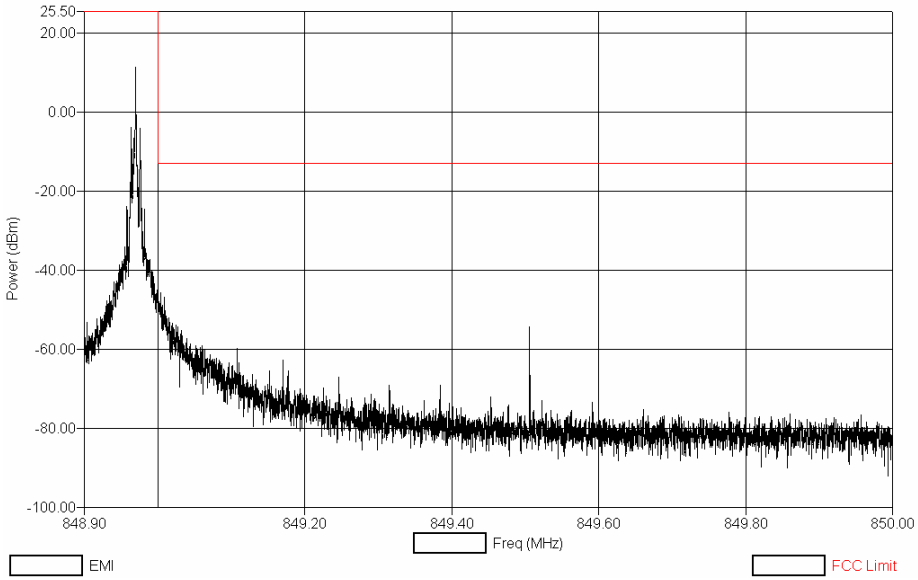
Note1: Amps measurements were performed with 300Hz RBW/VBW.

Occupied Bandwidth, Out of Band

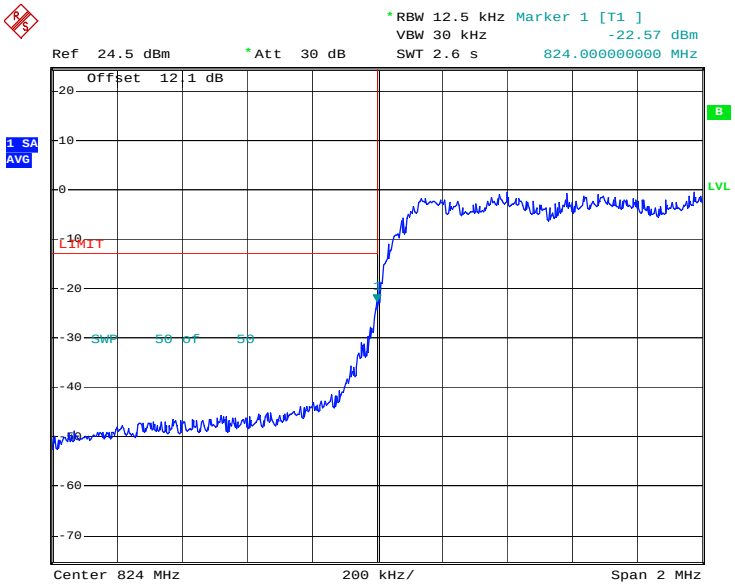
AMPS - Channel 991 (824.04 MHz)



AMPS - Channel 799 (848.97 MHz)



CDMA 800 - Channel 1013 (824.70 MHz)



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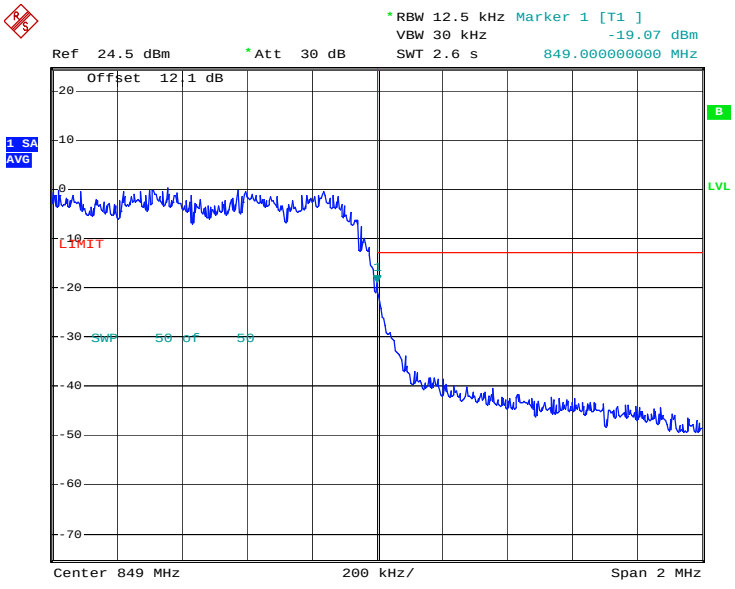
CDMA 800 – Channel 777 (848.31 MHz)



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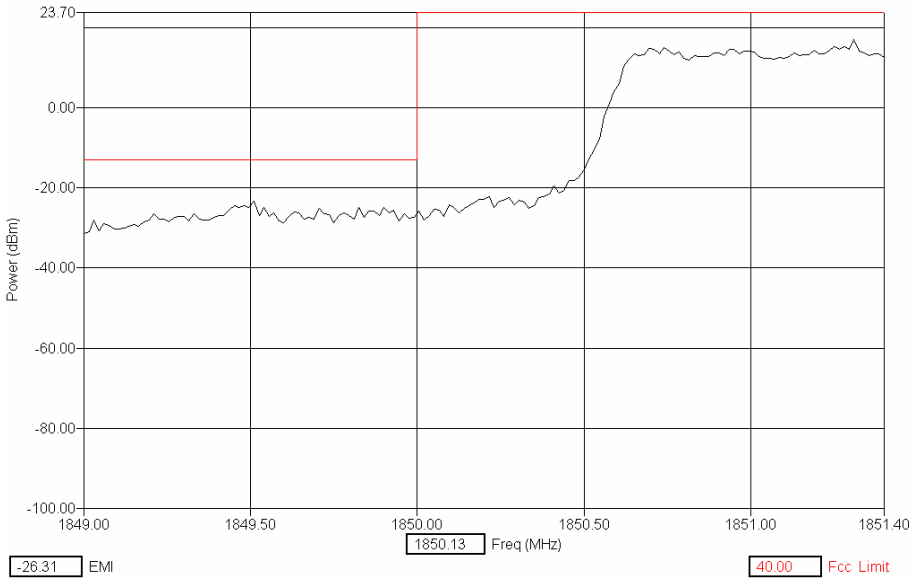
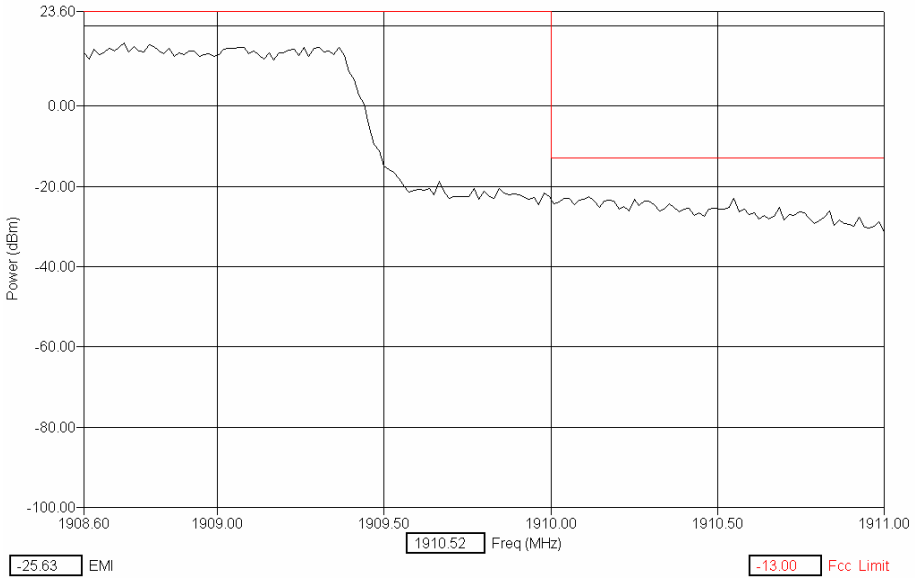
CDMA 1900 – Channel 25 (1851.25 MHz)

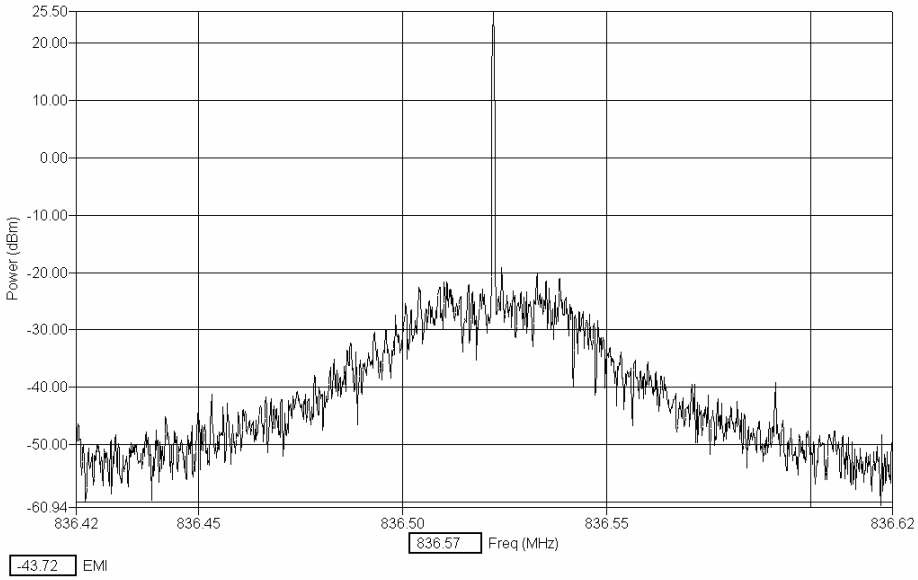


CDMA 1900 – Channel 1175 (1908.75 MHz)

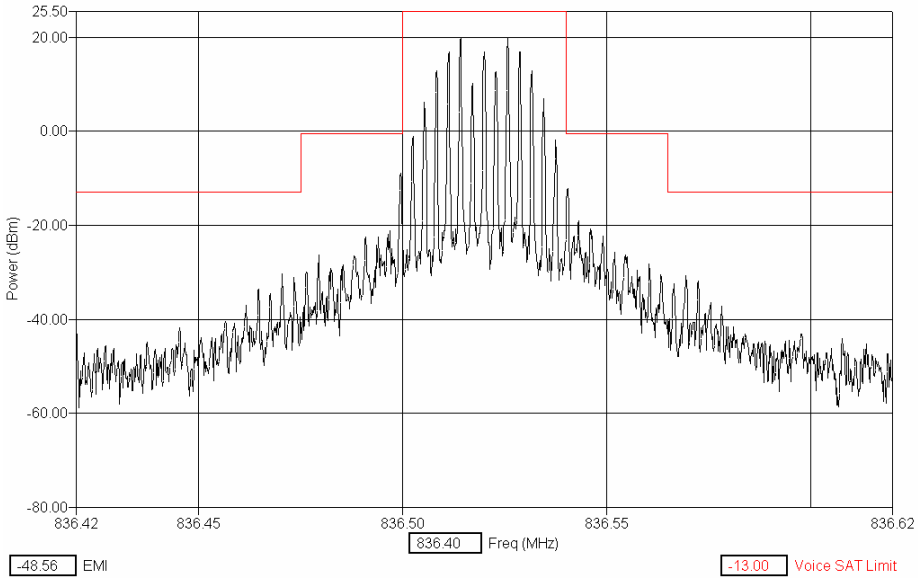


Occupied Bandwidth, In Band

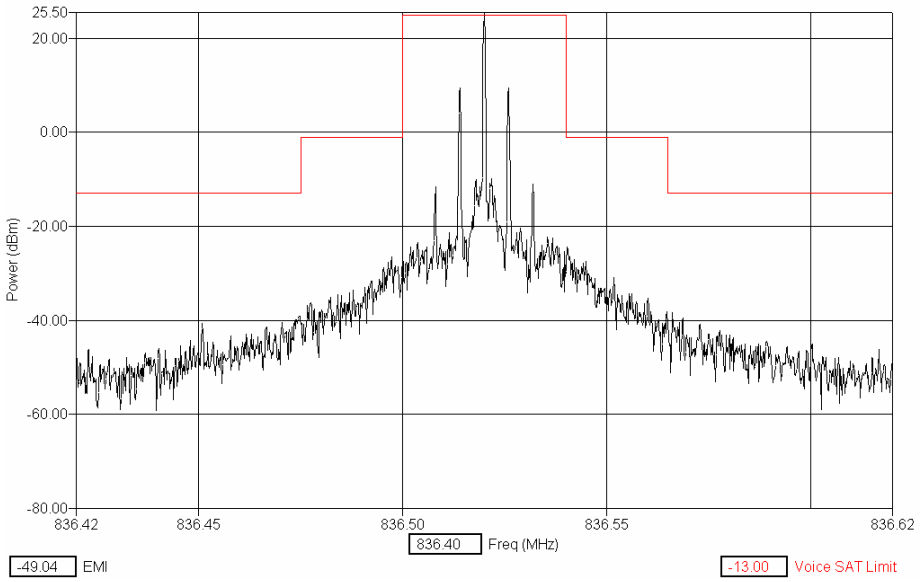
AMPS – Channel 384, CW:



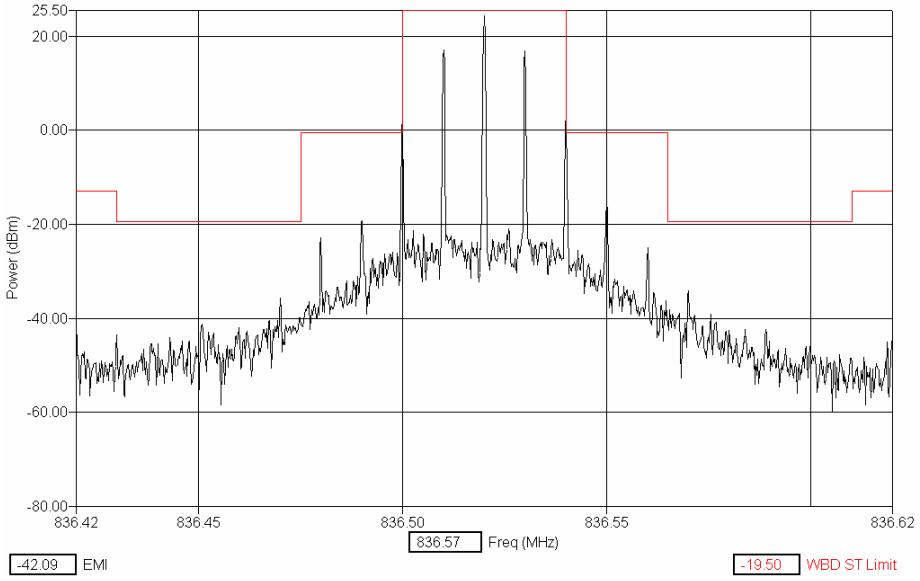
AMPS - Channel 384 Voice + Sat:



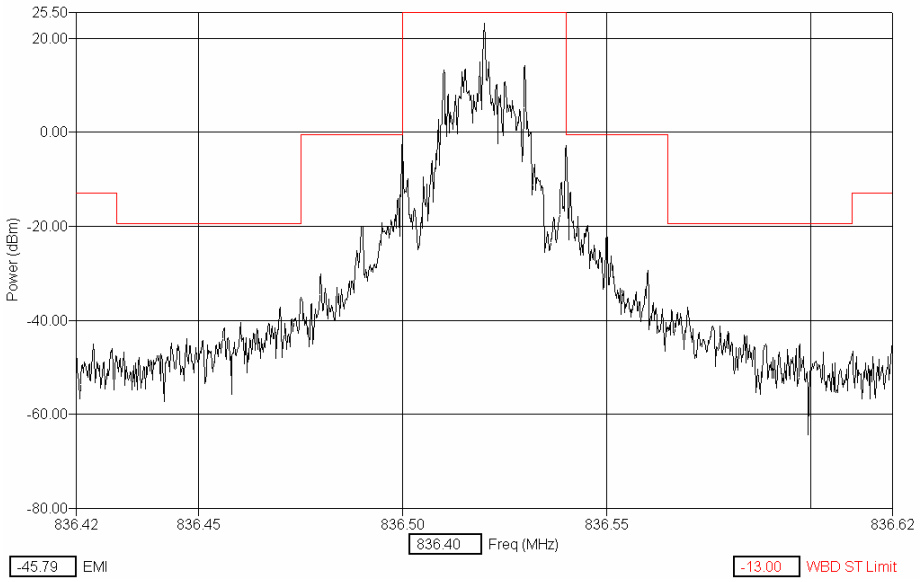
AMPS - Channel 384; Sat :



AMPS - Channel 384; ST:

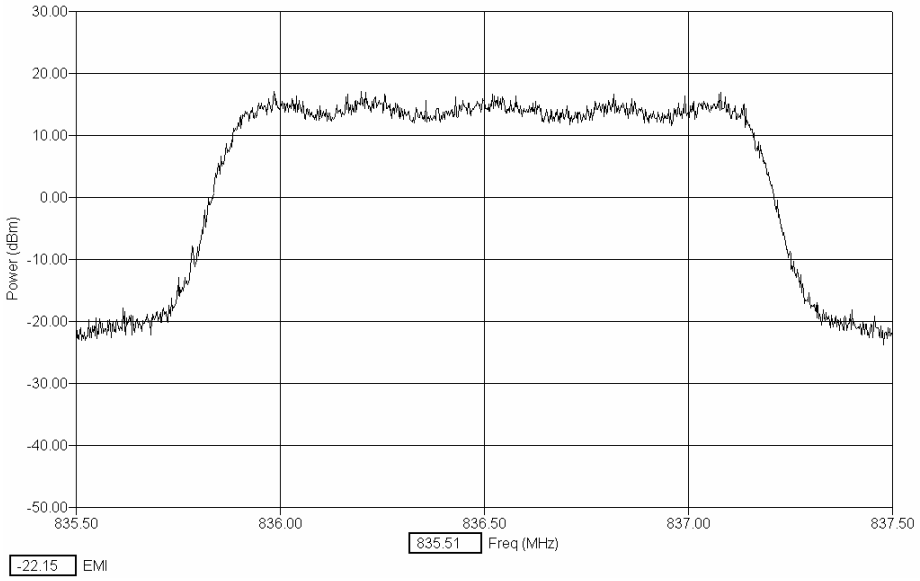


AMPS – Channel 384; WBD:

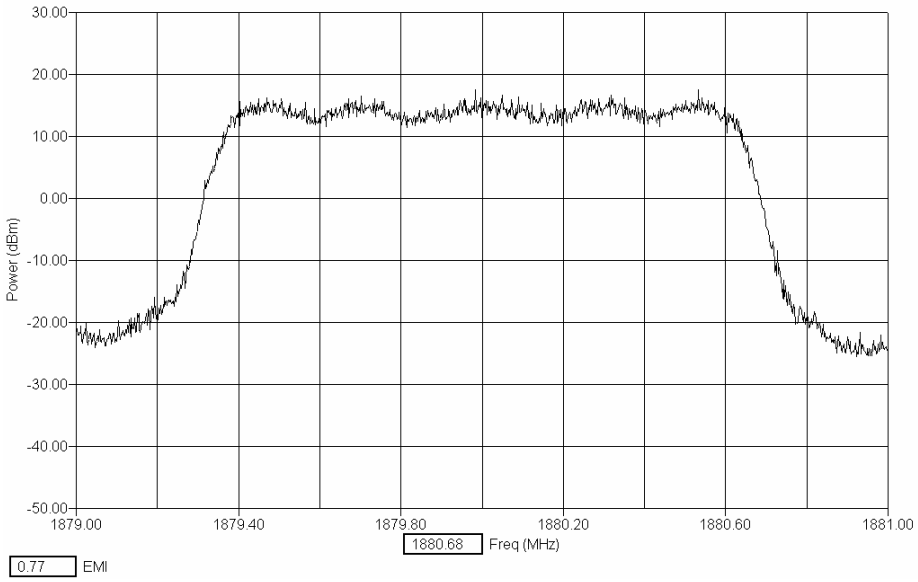


CDMA 800 - Channel 384

30KHz RBW/VBW



CDMA 1900 - Channel 600



10. SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Specification: FCC Part 2.1051

10.1 Setup

Testing was performed with the EUT connected to a 6dB attenuator, 6dB splitter, filter bank and then to the EMI receiver. The base station simulator was connected to the other port of the splitter to establish a call. Filters were introduced to reduce or eliminate spurious emission, which could be generated internally in the EMI receiver.

10.2 Pass/Fail Criteria

Band	Frequency Range (MHz)	FCC Limits (dBm)
Cellular / PCS	30 – 20000 *	-13

* Frequency to be investigated up to the 10th harmonic of the highest clock or frequency used.

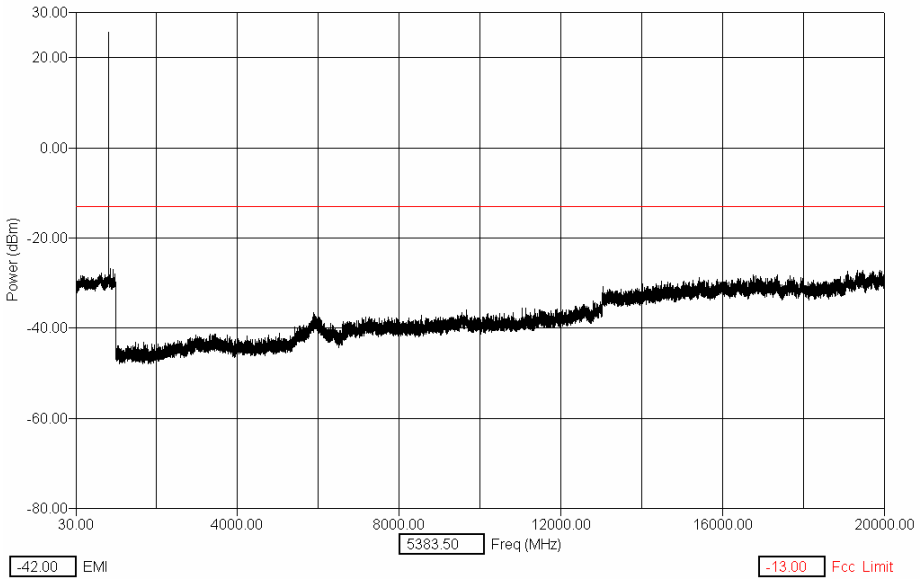
10.3 Detailed Test Results

Test Technician / Engineer	Viet Do
Date of Measurement	16-Mar-06
Temperature	22 °C
Humidity	47 %RH
Test Result	Complies with FCC Part 2.1051

Note 1: EMI (dBm) = trace (dBuV) + cable loss (dB) + filter loss (dB).

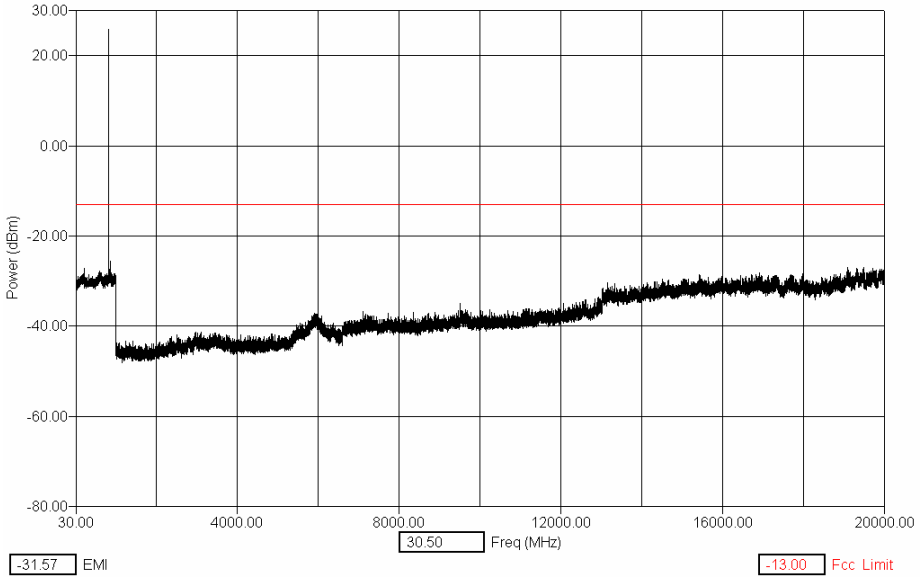
Note 2: measurements were performed with 1MHz RBW/VBW.

AMPS - Channel 991, 824.04 MHz



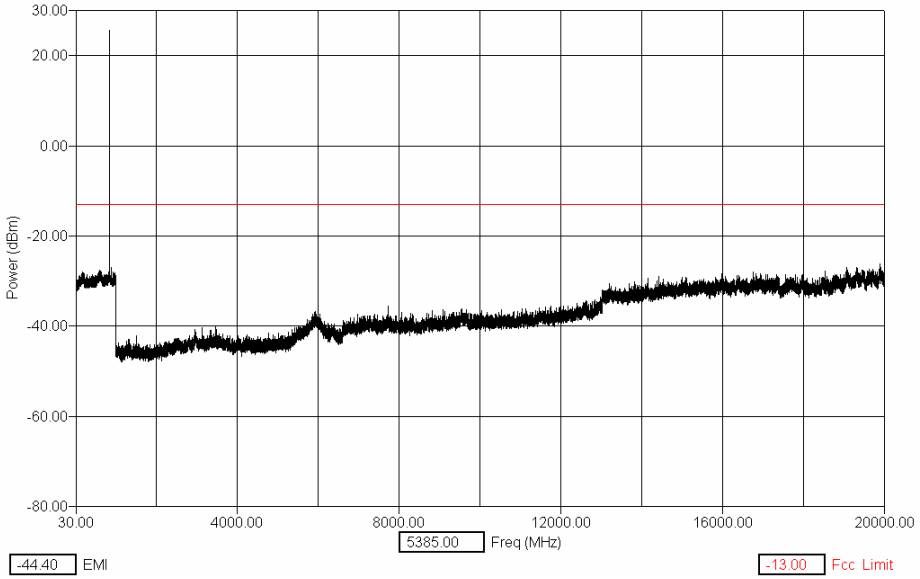
Freq (Max) (MHz)	(PEAK) Trace (dBm)	Cable (dB)	Filter (dB)	(PEAK) EMI (dBm)	Limit (dBm)
1648.9	-65.2	0.4	14.67	-50.2	-13.0
2472.3	-62.4	0.6	15.45	-46.4	-13.0
3296.1	-63.0	0.8	16.01	-46.2	-13.0
4120.6	-66.3	0.9	16.13	-49.3	-13.0
4945.5	-65.4	1.1	17.03	-47.3	-13.0
5769.0	-65.9	1.2	19.93	-44.8	-13.0
6592.1	-65.5	1.2	18.06	-46.2	-13.0
7416.8	-61.9	1.3	18.11	-42.5	-13.0
8238.6	-62.5	1.4	18.93	-42.2	-13.0

AMPS - Channel 384, 836.52 MHz



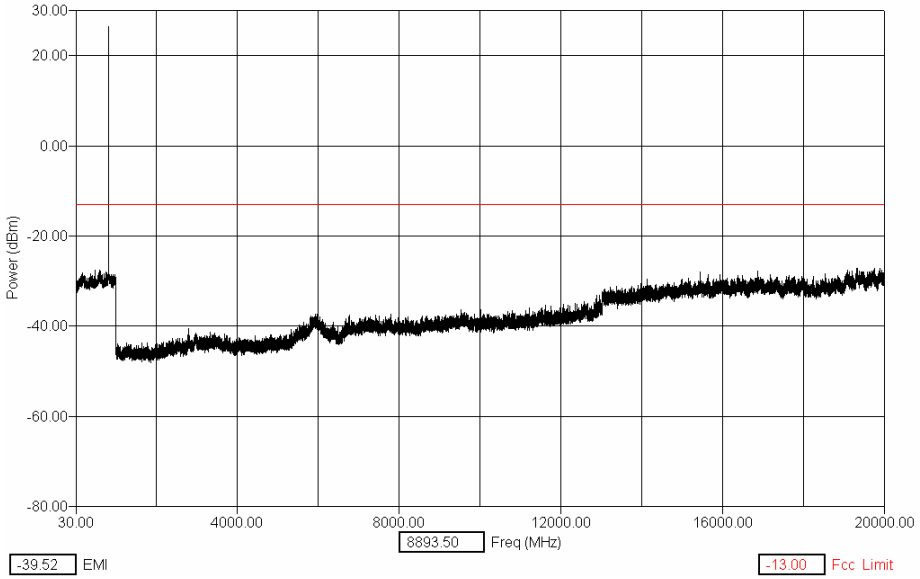
Freq (Max) (MHz)	(PEAK) Trace (dBm)	Cable (dB)	Filter (dB)	(PEAK) EMI (dBm)	Limit (dBm)
1673.4	-64.9	0.4	14.60	-50.0	-13.0
2509.5	-60.8	0.6	15.65	-44.6	-13.0
3346.2	-62.4	0.8	16.10	-45.5	-13.0
4182.3	-63.5	0.9	16.12	-46.4	-13.0
5018.0	-65.0	1.1	17.16	-46.8	-13.0
5855.9	-65.5	1.2	21.33	-43.0	-13.0
6692.5	-63.6	1.3	17.75	-44.6	-13.0
7529.0	-62.2	1.3	18.06	-42.8	-13.0
8366.2	-62.9	1.4	19.00	-42.5	-13.0

AMPS - Channel 799, 848.97 MHz



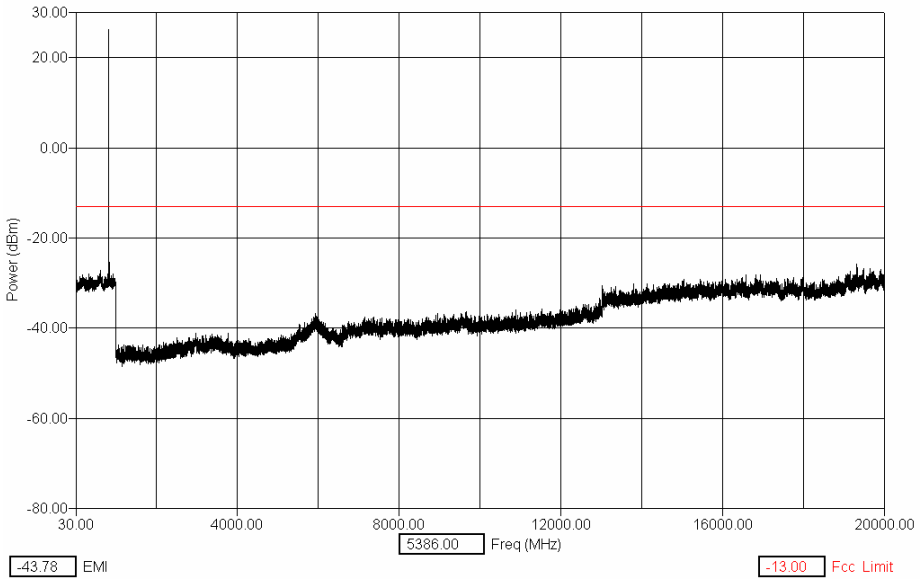
Freq (Max) (MHz)	(PEAK) Trace (dBm)	Cable (dB)	Filter (dB)	(PEAK) EMI (dBm)	Limit (dBm)
1698.1	-65.1	0.4	14.59	-50.2	-13.0
2546.8	-63.3	0.6	15.49	-47.2	-13.0
3395.6	-62.4	0.8	16.02	-45.6	-13.0
4244.7	-62.7	0.9	16.39	-45.3	-13.0
5092.4	-65.1	1.1	17.25	-46.8	-13.0
5942.5	-64.1	1.2	22.11	-40.8	-13.0
6791.9	-62.0	1.3	17.87	-42.8	-13.0
7639.5	-62.1	1.3	17.97	-42.8	-13.0
8490.1	-62.5	1.4	18.55	-42.5	-13.0

CDMA 800 - Channel 1013, 824.70 MHz



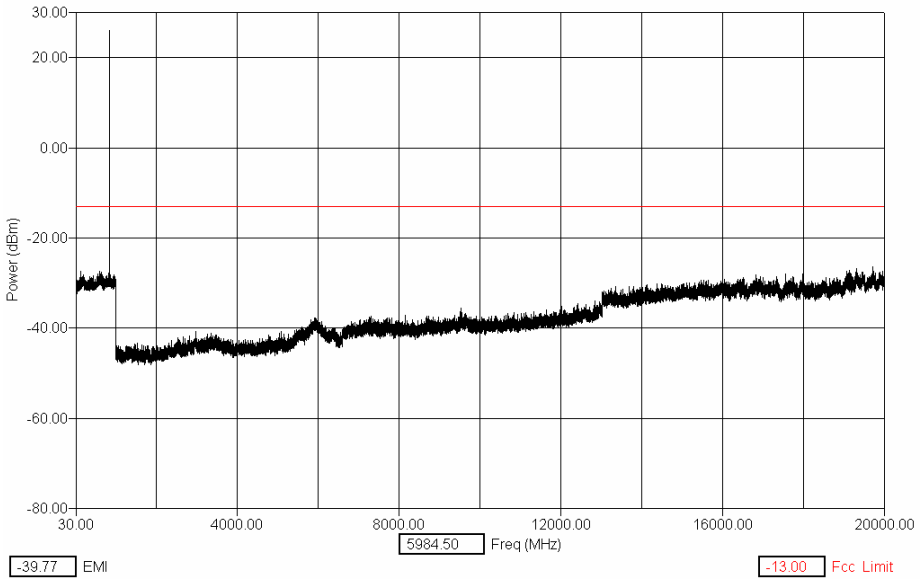
Freq (Max) (MHz)	(PEAK) Trace (dBm)	Cable (dB)	Filter (dB)	(PEAK) EMI (dBm)	Limit (dBm)
1649.2	-64.6	0.4	14.67	-49.6	-13.0
2474.3	-63.5	0.6	15.46	-47.4	-13.0
3300.1	-64.2	0.8	15.98	-47.4	-13.0
4122.9	-63.9	0.9	16.09	-46.9	-13.0
4948.9	-65.7	1.1	17.03	-47.6	-13.0
5771.3	-65.9	1.2	19.98	-44.8	-13.0
6597.7	-65.4	1.2	18.06	-46.1	-13.0
7423.9	-61.9	1.3	17.98	-42.6	-13.0
8247.1	-64.1	1.4	18.97	-43.8	-13.0

CDMA 800 - Channel 384, 836.52 MHz



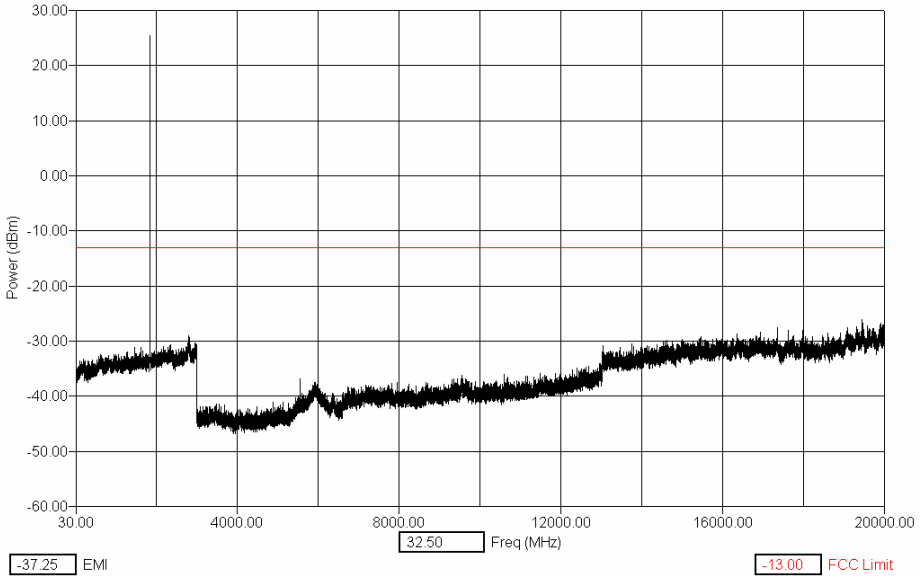
Freq (Max) (MHz)	(PEAK) Trace (dBm)	Cable (dB)	Filter (dB)	(PEAK) EMI (dBm)	Limit (dBm)
1672.0	-65.0	0.4	14.60	-50.0	-13.0
2510.2	-64.2	0.6	15.65	-47.9	-13.0
3347.4	-63.3	0.8	16.10	-46.5	-13.0
4181.4	-65.0	0.9	16.12	-47.9	-13.0
5019.4	-65.9	1.1	17.16	-47.7	-13.0
5855.4	-66.4	1.2	21.33	-43.9	-13.0
6692.1	-64.3	1.3	17.75	-45.3	-13.0
7527.9	-63.2	1.3	18.06	-43.8	-13.0
8367.1	-63.2	1.4	19.00	-42.8	-13.0

CDMA 800 - Channel 777, 848.31 MHz



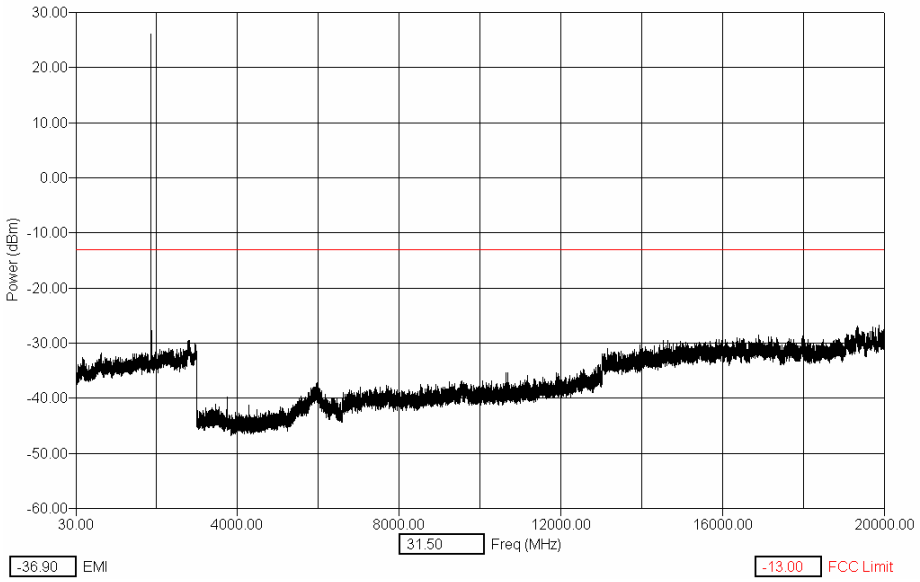
Freq (Max) (MHz)	(PEAK) Trace (dBm)	Cable (dB)	Filter (dB)	(PEAK) EMI (dBm)	Limit (dBm)
1698.1	-66.1	0.4	14.59	-51.1	-13.0
2545.2	-62.1	0.6	15.53	-46.0	-13.0
3392.8	-62.1	0.8	16.05	-45.3	-13.0
4241.6	-64.8	0.9	16.35	-47.5	-13.0
5088.1	-64.6	1.1	17.26	-46.3	-13.0
5937.2	-65.5	1.2	22.09	-42.3	-13.0
6785.5	-61.8	1.3	17.96	-42.5	-13.0
7634.3	-63.9	1.3	17.98	-44.6	-13.0
8481.8	-63.2	1.4	18.53	-43.2	-13.0

CDMA 1900 - Channel 25, 1851.25 MHz



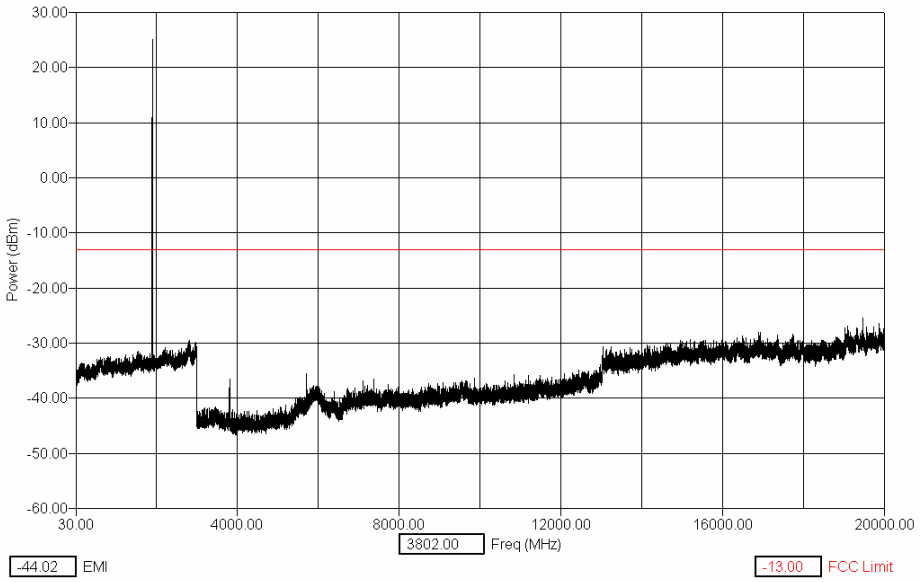
Freq (Max) (MHz)	(PEAK) Trace (dBm)	Cable (dB)	Filter (dB)	(PEAK) EMI (dBm)	Limit (dBm)
3702.5	-62.9	0.85	16.2	-45.8	-13.0
5554.9	-60.9	1.13	18.4	-41.3	-13.0
7405.4	-59.5	1.32	18.4	-39.8	-13.0
9255.5	-62.9	1.48	19.5	-41.8	-13.0
11106.8	-63.9	1.60	20.2	-42.1	-13.0
12960.6	-63.9	1.71	22.6	-39.6	-13.0
14811.0	-59.7	1.80	22.8	-35.1	-13.0
16663.0	-58.9	1.88	23.8	-33.3	-13.0
18512.6	-60.7	1.95	24.9	-33.9	-13.0

CDMA 1900 - Channel 600, 1880.00 MHz



Freq (Max) (MHz)	(PEAK) Trace (dBm)	Cable (dB)	Filter (dB)	(PEAK) EMI (dBm)	Limit (dBm)
3760.6	-61.6	0.86	16.8	-44.0	-13.0
5640.1	-62.9	1.14	18.5	-43.3	-13.0
7519.8	-61.6	1.34	18.1	-42.2	-13.0
9400.3	-62.8	1.49	18.9	-42.4	-13.0
11279.7	-62.6	1.61	20.2	-40.8	-13.0
13161.5	-62.7	1.72	21.8	-39.2	-13.0
15039.5	-59.3	1.81	23.7	-33.8	-13.0
16920.9	-59.2	1.89	25.0	-32.3	-13.0
18799.7	-60.9	1.96	25.1	-33.8	-13.0

CDMA 1900 - Channel 1175, 1908.75 MHz



Freq (Max) (MHz)	(PEAK) Trace (dBm)	Cable (dB)	Filter (dB)	(PEAK) EMI (dBm)	Limit (dBm)
3817.7	-57.6	0.87	16.7	-40.1	-13.0
5725.3	-58.6	1.15	19.4	-38.0	-13.0
7634.9	-60.1	1.35	18.0	-40.8	-13.0
9543.1	-61.2	1.50	20.3	-39.4	-13.0
11452.7	-62.9	1.62	20.5	-40.7	-13.0
13361.6	-59.2	1.73	22.0	-35.4	-13.0
15271.7	-59.6	1.82	23.3	-34.5	-13.0
17177.9	-59.9	1.90	24.3	-33.7	-13.0
19088.7	-60.2	1.97	26.3	-31.9	-13.0

11. FREQUENCY STABILITY (TEMPERATURE VARIATION)

Specification: FCC Part 2.1055(a)(1)(b), 24.235

11.1 Setup

The EUT was connected to the base station simulator to measure the RF power output.

11.2 Pass/Fail Criteria

Not Applicable

11.3 Detailed Test Results

Test Technician / Engineer	Viet Do
Date of Measurement	20-Mar-06
Temperature	23°C
Humidity	50 %RH
Test Result	Tested in accordance with 2.1055(a)(1)(b), 24.235 at maximum power setting.

Temp. (°C)	AMPS, Channel 384	CDMA 800, Channel 384	CDMA 1900, Channel 600
	Change (Hz)	Change (Hz)	Change (Hz)
-30	233	12	28
-20	235	12	27
-10	210	12	28
0	293	13	25
10	252	13	28
20	239	13	30
30	218	12	28
40	225	13	29
50	218	12	28

12. FREQUENCY STABILITY (VOLTAGE VARIATION)

Specification: FCC Part 2.1055(d)(1)(2), 24.235

12.1 Setup

The EUT was connected to the base station simulator to measure the RF power output.

12.2 Pass/Fail Criteria

Not Applicable

12.3 Detailed Test Results

Test Technician / Engineer	Viet Do
Date of Measurement	20-Mar-06
Temperature	24 °C
Humidity	50 %RH
Test Result	Tested in accordance with 2.1055(d)(1)(2), 24.235 at maximum power setting.

AMPS, Call Mode, Channel 384

% of STV	Voltage	Change (Hz)
85	3.2	155
100 (Nominal)	3.7	160
115	4.2	171

CDMA 800, Call Mode, Channel 384

% of STV	Voltage	Change (Hz)
85	3.2	16
100 (Nominal)	3.7	17
115	4.2	18

CDMA 1900, Call Mode, Channel 600

% of STV	Voltage	Change (Hz)
85	3.2	17
100 (Nominal)	3.7	16
115	4.2	18