CFR 47 Part 2, 22, and 24 Test Report

Test Report Number: WR479.001

Terminal device: FCC ID: QMNRM-18 Model: 6638 Type: RM-18 HW: B3.5 SW: L125b004
(Detailed information is listed in section 4).

Originator:	Engineer / Technician
Function:	TCC - Dallas – EMC
Version/Status:	2.0 Approved
Location:	TCC Directories
Date:	March 23, 2005

Change History:

Version	*Date*	*Status*	*Handled By*	*Comments*
0.1	1/17/05	Draft	Mark Severson	
0.2	1/17/05	Proposal	Mark Severson	
0.3	1/17/05	Reviewed	Mark Severson	
1.0	1/17/05	Approved	Mark Severson	
1.1	3/23/05	Reviewed	Nerina Walton	
2.0	3/23/05	Approved	Nerina Walton	

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 Scripps Summit Dr.
San Diego
CA 92131
USA
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Date and signatures: March 23, 2005

For the contents:

Mark Severson
Technical Review

Nerina Walton
Manager Review

TABLE OF CONTENTS

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 661.

1.2 List of General Information Required for Certification

This list is in accordance with FCC Rules and Regulations, CFR 47, Part 2, and to 22H, 24E, Confidentiality.

1.2.1 Sub-part 2.1033(c)(1)

Name and Address of Applicant:

Nokia Inc.
San Diego
12278 Scripps Summit Dr.
San Diego
CA 92131
USA
Tel. +1858 831 5000
Fax. +1 858 831 6500

Manufacturer:

Nokia Inc.
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1.2.2 Sub-part 2.1033(c)(2)

FCC ID: QMNRM-18

Model No: 6638

1.2.3 Sub-part 2.1033(c)(3)

Instruction Manual(s): Refer to attached EXHIBITS

1.2.4 Sub-part 2.1033(c)(4)

Type of Emission: 1M25F9W

1.2.5 Sub-part 2.1033(c)(5)

Frequency Range, MHz: 824.7-848.31 MHz

1851.25-1908.75 MHz

1.2.6 Sub-part 2.1033(c)(6)

Power Rating, Watts: 0.195W Cellular

0.347W PCS

☐ Switchable ☒ Variable ☐ N/A

FCC Grant Note: BC- The output power is continuously variable from the value listed in this entry to 5%-10% of the value listed.

1.2.7 Sub-part 2.1033(c)(7)

Maximum Power Rating, Watts: 0.347W

1.2.8 Sub-part 2.1033(c)(8)

Voltages & Currents in all elements in final R.F. Stage, including final transistor or solid-state device:
Collector Current, A = 0.49
Collector Voltage, Vdc = 3.7
Supply Voltage, Vdc = 3.7

1.2.9 Sub-part 2.1033(c)(9)

Tune-up Procedure: Refer to attached EXHIBITS

1.2.10 Sub-part 2.1033(c)(10)

Circuit Diagram/Circuit Description:
Including description of circuitry & devices provided for determining and stabilizing frequency, for suppression of spurious radiation, for limiting modulation and limiting power.
Refer to attached EXHIBITS

1.2.11 Sub-part 2.1033(c)(11)

Label Information: Refer to attached EXHIBITS

1.2.12 Sub-part 2.1033(c)(12)

Photographs: Refer to attached EXHIBITS

1.2.13 Sub-part 2.1033(c)(13)

Digital Modulation Description: N/A

1.2.14 Sub-part 2.1033(c)(14)

Test and Measurement Data: FOLLOWS

1.3 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(c), 2.1041, 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057, Part 22, and Part 24.

1.4 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(a) / 22.913(a) / 24.232(b)(c)	6	Complies
RF Power Output (Radiated)	FCC Part 22.913(a) / 24.232(b)	7	Complies
Occupied Bandwidth: Transmitter Conducted Measurements	FCC Part 2.1049(c)(1), 24.238(a)(b)	8	Complies
Spurious Emissions at Antenna Terminals	FCC Part 2.1051	9	Complies
Field Strength of Spurious Radiation	FCC Part 2.1053	10	Complies
Frequency Stability (Temperature Variation)	FCC Part 2.1055(a)(1)(b), 24.235	11	Complies
Frequency Stability (Voltage Variation)	FCC Part 2.1055(d)(1)(2), 24.235	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-132	800 MHz Cellular Telephones Employing New Technologies
6	RSS-133	2 GHz Personal Communications Services, Industry Canada
7	RSS-212	Test Facilities and Test Methods for Radio Equipment, Industry Canada (Provisional)
8	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 Parts 2.10646(a), 22.913(a) / 24.232(b), 2.1053	CDMA 1900 / CDMA 800	27 Dec 04	Operational	Handset	Model: 6638 Type: RM-18 SW: L125b004 HWID: B3.5 ESN: 044/00485679 Code: 0518212LL10EZ
FCC Parts 2.1049(c)(1), 24.238(a)(b), 2.1051, 2.1055	CDMA 1900 / CDMA 800	7-Jan-05	Operational	Handset	Model: 6638 Type: RM-18 SW: L125b004 HWID: B3.5 ESN: 044/00485685 Code: 0518212LL10EZ
N/A	N/A	27 Dec 04	Operational	Battery	Type: BL-6C Other: 3.7 vdc

Note: phones used for test were configured for FBUS functionality by installing zero Ohm jumpers on the PWB at the flash pins. This configuration was chosen to support FBUS functionality at the bottom connector instead of the USB.

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
8, 9	02663 02661	EMI Receiver	Agilent	85460A	3/23/2005	12mos
6, 8, 9	02625	Base Station	Rhode & Schwarz	CMU200	6/30/2005	12mos
9	03155	Temperature/ Humidity Sensor	Pinnacle	ID/TRH	7/15/2005	12mos
9	02680	EMI Analyzer	Agilent	E7405A	12/29/2005	12mos
7, 10	01472	Biconilog Antenna	EMC Test Systems	3142B	4/08/2005	12mos
7, 10	02846	Turntable and Tower Controller	Sunol	FM2022 & 2846	N/A	N/A
7, 10	00065	Horn Antenna	EMCO	3115	7/16/2005	12mos
7, 10	02664	EMI Receiver	Agilent	8546A / 85460A	2/23/2005	12mos
7, 10	02665	EMI Receiver	Agilent	8546A / 85460A	2/23/2005	12mos
7, 10	02679	EMI Analyzer	Agilent	E7405	3/13/2005	12mos
12	00837	Temperature Chamber	Tenney	Tenney Environmental	1/20/2006	12mos
6	02549	Power Meter	Agilent	E4418B	10/06/2005	12mos
6	02672	Power Sensor	Agilent	E9304A	9/21/2005	12mos

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	Darreyl Roberts
Date of Measurement	12/30/2004
Temperature	22.0°C
Humidity	32.0%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).

CDMA 800

Channel	Freq Max (MHz)	Max (mW)	Max (dBm)
1013	824.70 MHz	316.2	25.0
384	836.52 MHz	331.1	25.2
777	848.31 MHz	323.6	25.1

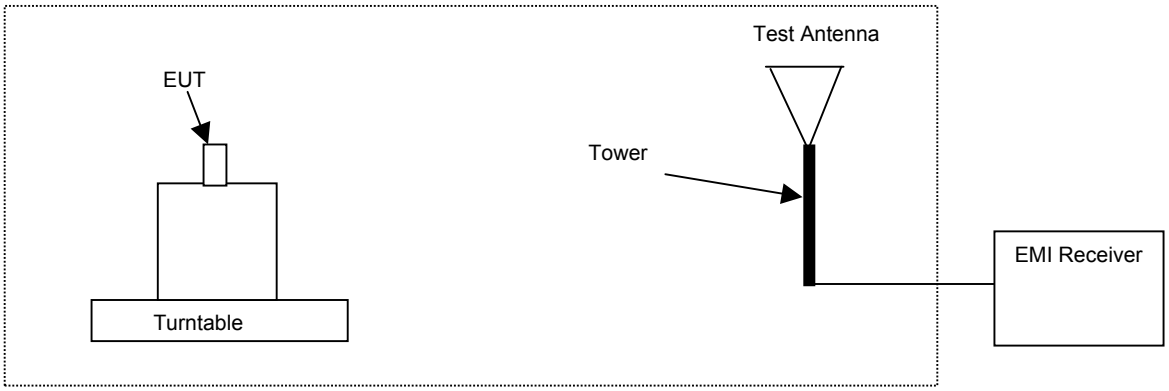
CDMA 1900

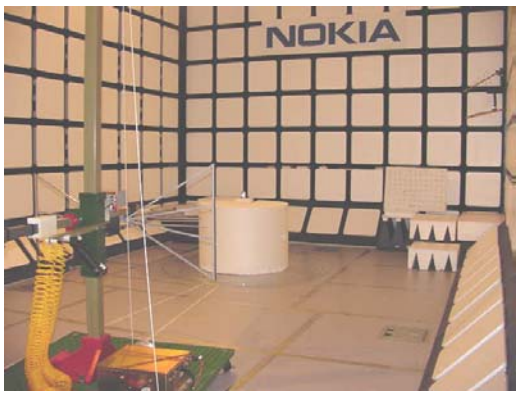
Channel	Freq Max (MHz)	Max (mW)	Max (dBm)
25	1851.25 MHz	204.2	23.1
600	1880.0 MHz	199.5	23.0
1175	1908.75 MHz	204.2	23.1

7. RF POWER OUTPUT (RADIATED)

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

7.1 Setup





7.2 Pass/Fail Criteria

Band	FCC Limit (dBm)
Cellular	38.5 (EDRP)
PCS	33.0 (EIRP)

7.3 Detailed Test Results

Test Technician / Engineer	Bob Alexander
Date of Measurement	1/11/05
Temperature	22°C
Humidity	42 %RH
Test Result	Complies with FCC Part 22.913(a) and FCC Part 24.232(b)

Note: measurements were performed with 3MHz RBW/VBW.

Antenna Retracted

Cellular Band, CDMA 800

Channel	Freq Max (MHz)	EDRP EMI (mW)	EDRP EMI (dBm)	Pol.
1013	824.70	104.7	20.2	V
384	836.52	169.8	22.3	V
777	848.31	141.3	21.5	V

PCS Band, CDMA 1900

Channel	Freq Max (MHz)	EIRP EMI (mW)	EIRP EMI (dBm)	Pol.
25	1851.25	195.0	22.9	V
600	1880.00	257.0	24.4	V
1175	1908.75	346.7	25.4	V

Antenna Extended

Cellular Band, CDMA 800

Channel	Freq Max (MHz)	EDRP EMI (mW)	EDRP EMI (dBm)	Pol.
1013	824.70	144.5	21.6	V
384	836.52	195.0	22.9	V
777	848.31	190.5	22.8	V

PCS Band, CDMA 1900

Channel	Freq Max (MHz)	EIRP EMI (mW)	EIRP EMI (dBm)	Pol.
25	1851.25	141.3	21.5	V
600	1880.00	166.0	22.2	V
1175	1908.75	182.0	22.6	V

7.4 Measurement Uncertainty

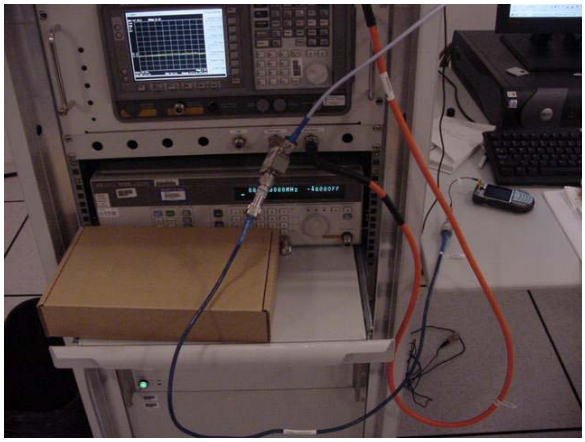
The measurement uncertainty for this test is +/- 2.4dB for 800 to 2000 MHz.

8. OCCUPIED BANDWIDTH (TRANSMITTER CONDUCTED MEASUREMENTS)

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

8.1 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.



8.2 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

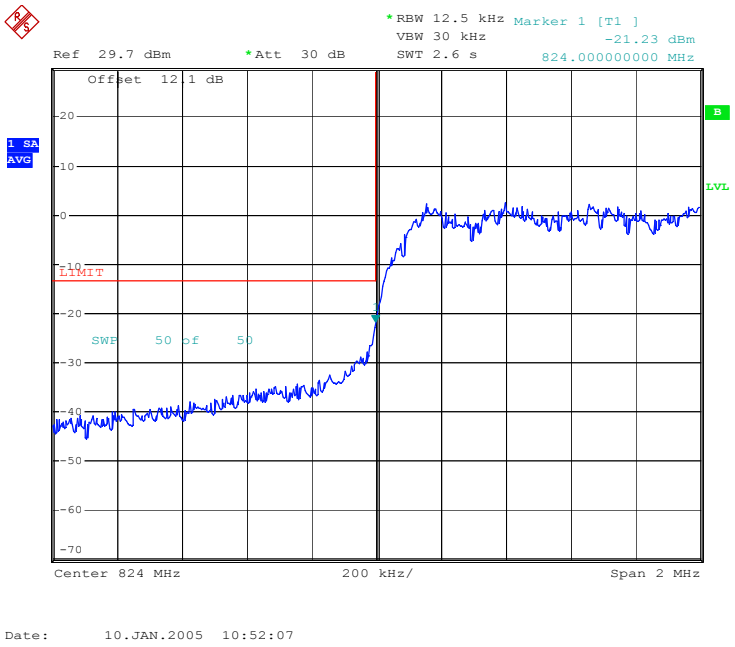
No pass/fail, these plots are used to determine the emission designators.

8.3 Detailed Test Results

Test Technician / Engineer	Darreyl Roberts
Date of Measurement	1/07/05
Temperature	22°C
Humidity	32.0%RH
Test Result	Complies with FCC Part 2.1049(c)(1), 24.238(a)(b)

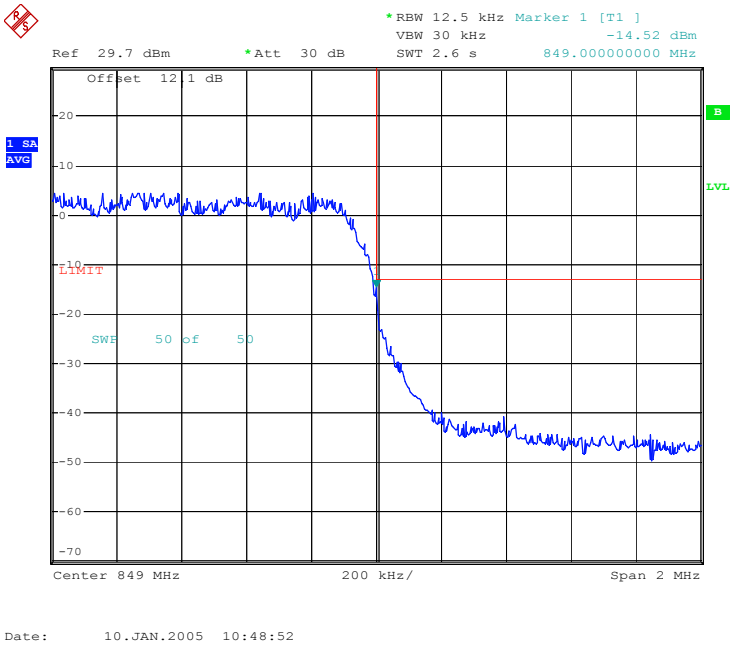
Cellular Band, CDMA 800, Channel 1013

12.5 kHz RBW, 30 kHz VBW, 2.6s Sweep Time



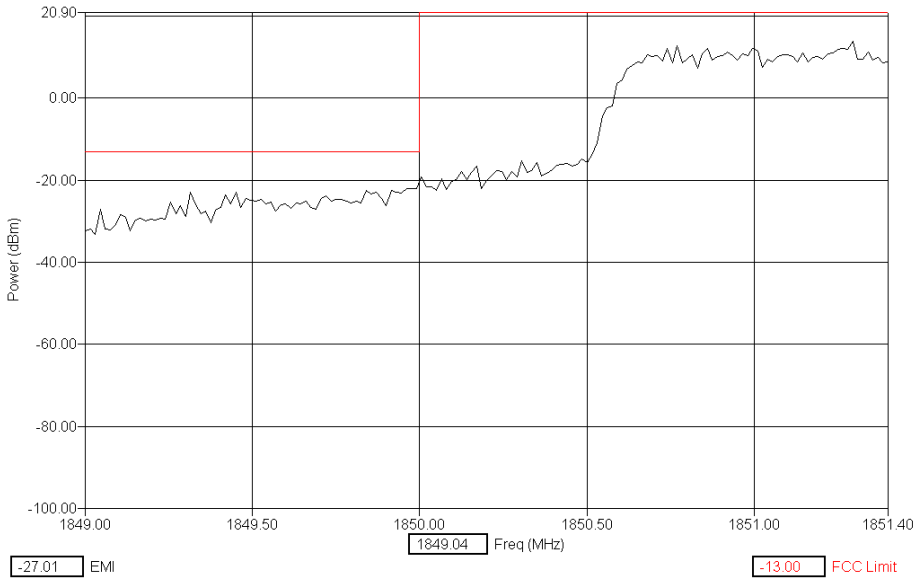
Cellular Band, CDMA, Channel 777

12.5 kHz RBW, 30kHz VBW, 2.6s Sweep Time



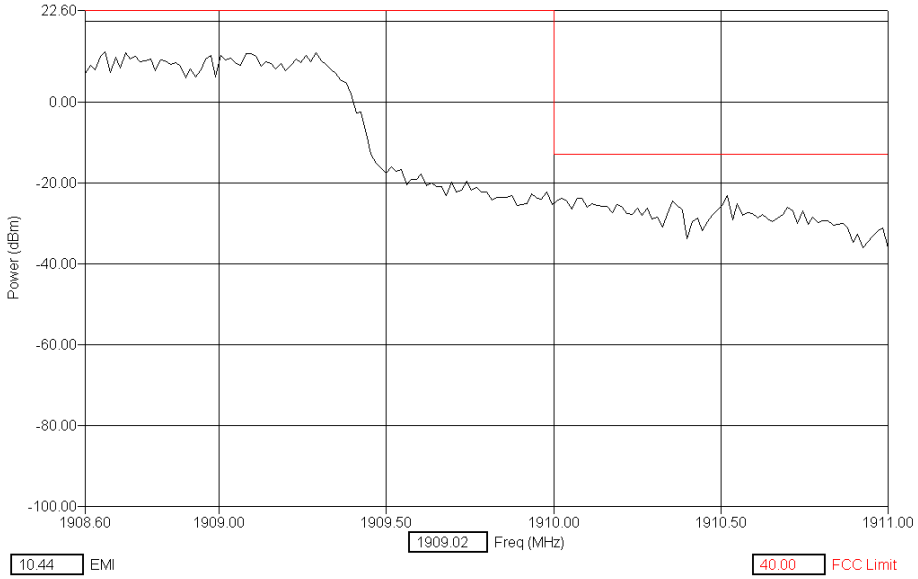
PCS Band, CDMA1900 Low ch25

30 kHz RBW/VBW, 100ms Sweep Time



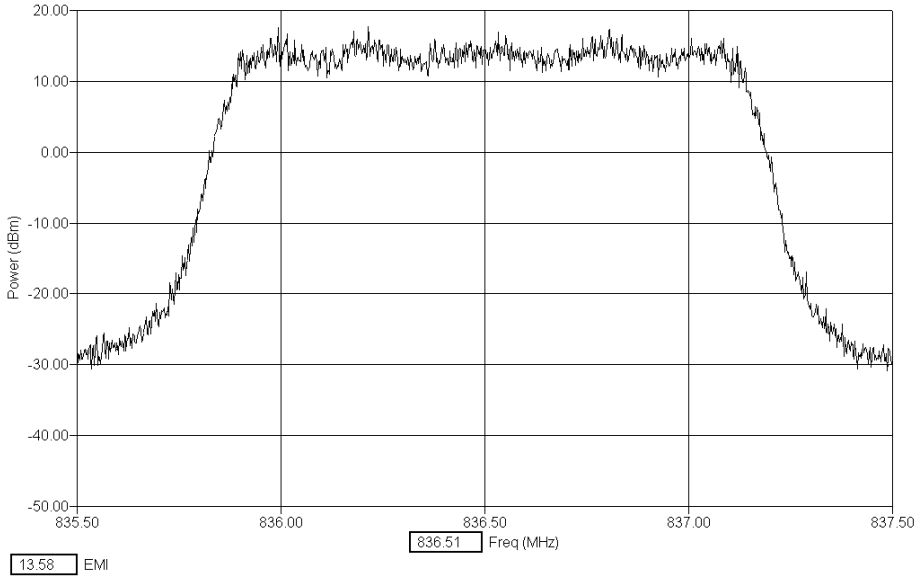
PCS Band. CDMA 1900, Channel 1175

30 kHz RBW/VBW, 100ms Sweep Time



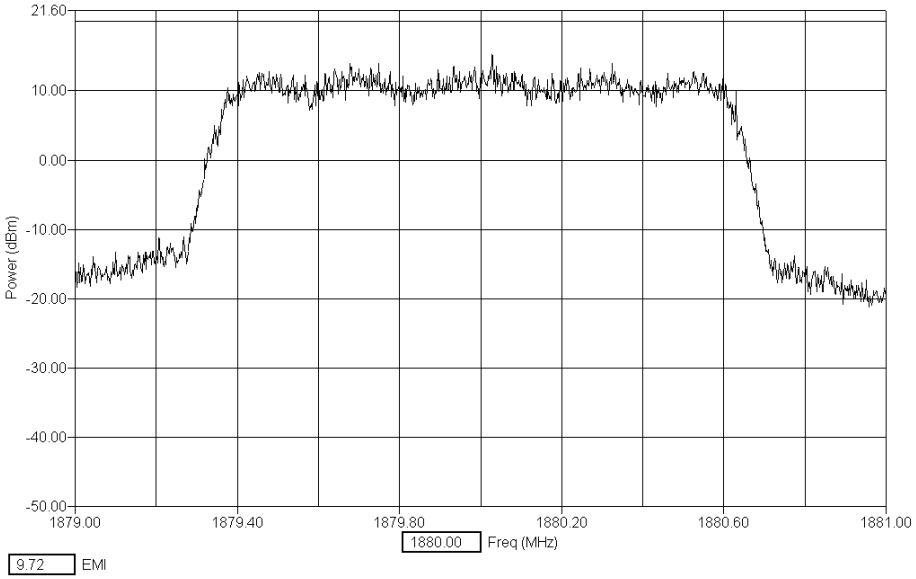
Occupied Bandwidth, In Band; Cellular, CDMA 800, Channel 384

3 kHz RBW/VBW, 100ms Sweep Time, ref to power level



Occupied Bandwidth, In Band; PCS, CDMA 1900, Channel 600

3 kHz RBW/VBW, 100ms Sweep Time, ref to power level



8.4 Measurement Uncertainty

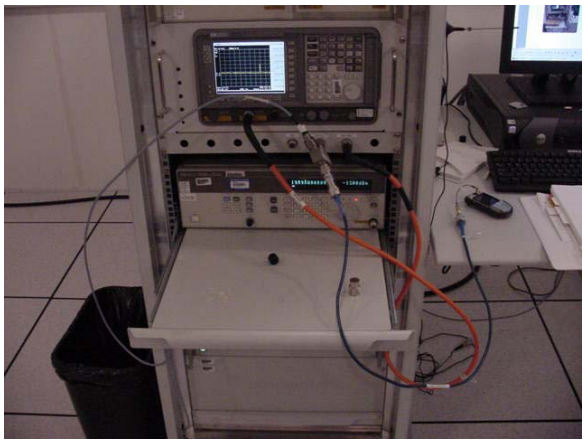
The measurement uncertainty for this test is +/- 3.7dB for 100kHz - 1000MHz and +/- 5.3dB for 1 - 20GHz.

9. SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Specification: FCC Part 2.1051

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. Filters were introduced to reduce or eliminate spurious emission, which could be generated internally in the EMI receiver.



9.2 Pass/Fail Criteria

Band	Frequency Range (MHz)	FCC Limits (dBm)
Cellular / PCS	30 – 18000 *	-13

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

9.3 Detailed Test Results

Test Technician / Engineer	Darreyl Roberts
Date of Measurement	January 07, 2005
Temperature	22.0 °C
Humidity	32.0 %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 3MHz RBW/VBW.

CDMA 1900 Low Ch25

Freq Max (MHz)	(Pk) EMI (dBm)	FCC Limit **(dBm)**
3702.5	-37.12	-13
5553.75	-45.15	-13
7405	-45.86	-13
9256.25	-47.21	-13
11107.5	-46.1	-13
12958.75	-46.45	-13
14810	-45.86	-13
16661.25	-44.09	-13
18512.5	-46.31	-13

CDMA 1900 Mid Ch600

Freq Max (MHz)	(Pk) EMI (dBm)	FCC Limit **(dBm)**
3760	-40.2	-13
5640	-47.38	-13
7520	-46.51	-13
9400	-47.1	-13
11280	-47.42	-13
13160	-44.1	-13
15040	-46.02	-13
16920	-45.39	-13
18800	-46.36	-13

CDMA 1900 High Ch1175

Freq Max (MHz)	(Pk) EMI (dBm)	FCC Limit **(dBm)**
3817.5	-40.64	-13
5726.25	-48.49	-13
7635	-45.96	-13
9543.75	-47.24	-13
11452.5	-47.5	-13
13361.25	-44.06	-13
15270	-44.12	-13
17178.75	-45.63	-13
19087.5	-46.37	-13

CDMA 800 Low Ch1013

Freq Max (MHz)	(Pk) EMI (dBm)	FCC Limit **(dBm)**
1649.4	-48.37	-13
2474.1	-48.61	-13
3298.8	-49.38	-13
4123.5	-49.37	-13
4948.2	-49.86	-13
5772.9	-49.66	-13
6597.6	-49.42	-13
7422.3	-46.41	-13
8247	-46.55	-13

CDMA 800 Mid Ch384

Freq Max (MHz)	(Pk) EMI (dBm)	FCC Limit **(dBm)**
1673.04	-47.66	-13
2509.56	-48.26	-13
3346.08	-49.33	-13
4182.6	-49.94	-13
5019.12	-49.87	-13
5855.64	-49.79	-13
6692.16	-46.72	-13
7528.68	-47.53	-13
8365.2	-46.94	-13

CDMA 800 High Ch777

Freq Max (MHz)	(Pk) EMI (dBm)	FCC Limit **(dBm)**
1696.62	-48.49	-13
2544.93	-45.77	-13
3393.24	-47.8	-13
4241.55	-49.73	-13
5089.86	-49.3	-13
5938.17	-49.36	-13
6786.48	-47.83	-13
7634.79	-46.71	-13
8483.1	-47.78	-13

9.4 Measurement Uncertainty

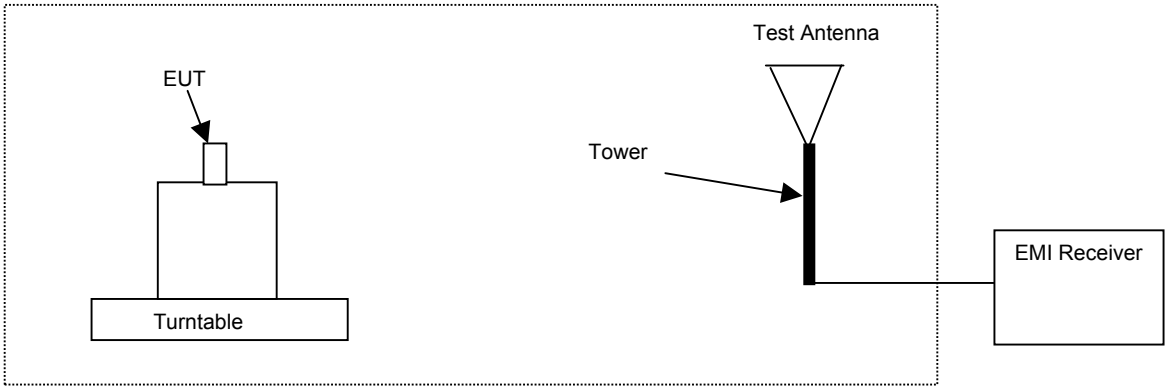
The measurement uncertainty for this test is +/- 3.7dB for 100kHz - 1000MHz and +/- 5.3dB for 1 - 20GHz.

10. FIELD STRENGTH OF SPURIOUS RADIATION

Specification: FCC Part 2.1053

10.1 Setup

Test equipment set-up.



10.2 Pass/Fail Criteria

Band	Frequency Range (MHz)	FCC Limit (dBm)
Cellular / PCS	30 – 18000*	-13

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

Substitution method according to ANSI/TIA/EIA 603-1 was used for final measurements.

10.3 Detailed Test Results

Test Technician / Engineer	Michael Sundstrom	
Date of Measurement	27 December 2004	
Temperature / Humidity	23-24°C	24-33%RH
Test Result	Complies	

Note: Measurements were performed with 1MHz RBW/VBW.

CDMA Cellular, Channel 384

EDRP for Channel 384: 22.9 dBm

Freq Max (MHz)	(PK) EMI (dBm)	dBc	FCC Limit (dBm)	Pol.
1673.0	-34.2	-57.1	-13.0	H
1673.0	-35.0	-57.9	-13.0	V
2509.6	-29.2	-52.1	-13.0	H
2509.6	-30.0	-52.9	-13.0	V
3346.1	-51.1	-74.0	-13.0	H
3346.1	-54.6	-77.5	-13.0	V
4182.6	-54.8	-77.7	-13.0	H
4182.6	-54.0	-76.9	-13.0	V
5019.1	-46.3	-69.2	-13.0	H
5019.1	-52.9	-75.8	-13.0	V
5855.6	-50.0	-72.9	-13.0	H
5855.6	-50.7	-73.6	-13.0	V
6692.2	-50.3	-73.2	-13.0	H
6692.2	-51.5	-74.4	-13.0	V
7528.7	-48.9	-71.8	-13.0	H
7528.7	-47.5	-70.4	-13.0	V
8365.2	-48.5	-71.4	-13.0	H
8365.2	-48.6	-71.5	-13.0	V

CDMA PCS, Channel 600

EIRP Value for Channel 600: 24.1 dBm

Freq Max (MHz)	(PK) EMI (dBm)	dBc	FCC Limit (dBm)	Pol.
3760.0	-33.2	-57.3	-13.0	H
3760.0	-43.9	-68.0	-13.0	V
5640.0	-37.5	-61.6	-13.0	H
5640.0	-35.6	-59.7	-13.0	V
7520.0	-35.8	-59.9	-13.0	H
7520.0	-42.1	-66.2	-13.0	V
9400.0	-42.4	-66.5	-13.0	H
9400.0	-47.1	-71.2	-13.0	V
11280.0	-44.1	-68.2	-13.0	H
11280.0	-45.4	-69.5	-13.0	V
13160.0	-40.3	-64.4	-13.0	H
13160.0	-42.0	-66.1	-13.0	V
15040.0	-42.8	-66.9	-13.0	H
15040.0	-42.7	-66.8	-13.0	V
16920.0	-44.3	-68.4	-13.0	H
16920.0	-40.9	-65.0	-13.0	V

10.4 Measurement Uncertainty

The measurement uncertainty for this test is +/- 5.2dB for 30-300MHz; +/- 5.2dB for 300-1000MHz, +/- 5.6dB for 1-6GHz and +/-6.8 for 6-18GHz.

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	Darreyl Roberts
Date of Measurement	26-Jan-05 - 27-Jan-05
Temperature	24 °C
Humidity	32 %RH
Test Result	Tested in accordance with 2.1055(a)(1)(b), 24.235 at maximum power setting.

Temp. (ºC)	CDMA 800, Channel 384	CDMA 1900, Channel 600
	Change (Hz)	Change (Hz)
-30	30Hz	19Hz
-20	15Hz	51Hz
-10	22Hz	47Hz
0	27Hz	49Hz
10	23Hz	66Hz
20	27Hz	45Hz
30	21Hz	46Hz
40	25Hz	42Hz
50	22Hz	40Hz

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	Darreyl Roberts
Date of Measurement	28-Jan-05
Temperature	15.0 ° - 28.0 ° C
Humidity	15.0 % - 85.0% RH
Test Result	Tested in accordance with 2.1055(d)(1)(2), 24.235 at maximum power setting.

CDMA 800, Call Mode, Channel 384

% of STV	Voltage	Change (Hz)
85	3.14vdc	N/A
100 (Nominal)	3.7vdc	29Hz
115	4.3vdc	22Hz
Battery End Point	3.2vdc	15Hz

CDMA 1900, Call Mode, Channel 600

% of STV	Voltage	Change (Hz)
85	3.14vdc	N/A
100 (Nominal)	3.7vdc	41Hz
115	4.3vdc	28Hz
Battery End Point	3.2vdc	46Hz