



Test & Certification Center (TCC) - Dallas

FCC ID: GMLRH-25

Test Report #: 03-EM-0042.001

August 21, 2003

Accredited Laboratory
Certificate Number: 1819-01

Ver 1.0

CFR 47 Part 2, 22, and 24 Test Report

Test Report Number: 03-EM-0042.001

Terminal device:

FCC ID: GMLRH-25, Model 6560, HW: 3200f, 3210f, SW: 0.22
(Detailed information is listed in section 4).

Originator: Mark Severson
Function: TCC - Dallas - EMC
Version/Status: 1.0, Approved
Location: TCC Directories
Date: 21 August 2003

Change History:

Version	Date	Status	Handled By	Comments
0.1	20 July 03	Draft	Mark Severson	
0.2	21 Aug 03	Reviewed	M.Mobley	
1.0	21 Aug 03	Approved	A. Ewing	

Testing laboratory:

Test & Certification Center (TCC) Dallas
Nokia Mobile Phones, Inc
6021 Connection Drive
Irving, Texas 75039
U.S.A.
Tel. 972-894-5000
Fax. 972-894-4988

Client:

Nokia Mobile Phones, Inc.
FCC ID: GMLRH-25, Model 6560
6021 Connection Drive
Irving, Texas 75039
U.S.A.
Tel. 972-894-5000
Fax. 972-894-4988

Date and signatures:

21 Aug. 03

For the contents:

A handwritten signature of Mark Severson in black ink.

Mark Severson, EMC Engineer
Technical Review

A handwritten signature of Alan C. Ewing in black ink.

Alan C. Ewing, General Manager
Manager 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). The appendix of this report contains the scope of accreditation for A2LA. 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 Corporation
Nokia Mobile Phones
Elektroniikkatie 10
FIN-90570 OULU
FINLAND

Manufacturer: Nokia Brazil Manaus AM
Rod. Torquato Tapajós, 7200 KM 12 - Tarumã
Postal code: 69048-660
Manaus, Amazonas, Brazil

Nokia Mexico, S.A. DE C.V.
Ave. Ind. Rio Bravo s/n, Parque Ind. del Nte.
Cd. Reynosa, Tam. CP, 88730

1.2.2 Sub-part 2.1033(c)(2)

FCC ID: FCC ID: **GMLRH-25**

Model No: Model 6560

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: 40K0F1D, 40K0F8W, 30K0DXW

1.2.5 Sub-part 2.1033(c)(5)

Frequency Range, MHz: 824.04 to 848.97
1850.04 to 1909.92

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1.2.6 Sub-part 2.1033(c)(6)

Power Rating, Watts:

0.200 EDRP AMPS

0.479 ERDP Cellular Band - TDMA

0.794 EIRP PCS - TDMA

☐ 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: 0.794 W

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 = 200mA

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**

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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
RF Power Output (Radiated)	FCC Part 22.913(a) / 24.232(b)	6	Complies
Occupied Bandwidth: Transmitter Conducted Measurements	FCC Part 2.1049(c)(1), 24.238(a)(b)	7	Complies
Spurious Emissions at Antenna Terminals	FCC Part 2.1051	8	Complies
Field Strength of Spurious Radiation	FCC Part 2.1053	9	Complies
Frequency Stability (Temperature Variation)	FCC Part 2.1055(a)(1)(b), 24.235	10	Complies
Frequency Stability (Voltage Variation)	FCC Part 2.1055(d)(1)(2), 24.235	10	Complies

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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	ANSI/TIA/EIA 603-A	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
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

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

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.

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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
22.913(a), 24.232(b)(c), 2.1053	AMPS/TDMA 800/1900	17-Dec-02	Good	Phone	Type: RH-25 Hw Id: 3200f ESN 07201996746 Code: 0510344FK20EZ Hw Id: 3210f ESN 07201996605 Code: 0510344FK20EZ
2.1051, 2.1049(c)(1), 24.238(a)(b), 2.1055(d)(1)(2), 2.1055(a)(1)(b), 24.235	AMPS/TDMA 800/1900	17-Dec-02	Good	Phone	Type: RH-25 Hw Id: 3200f ESN: 07201996576 Code: 0510344 Hw Id: 3210f ESN 07201996840 Code: 0510344
2.1051, 2.1049(c)(1), 24.238(a)(b), 2.1055(d)(1)(2), 2.1055(a)(1)(b), 24.235 22.913(a), 24.232(b)(c), 2.1053	AMPS/TDMA 800/1900	17-Dec-02	Good	Battery	Type: BLD-3 Other: 3.7v Li-ion

4.2 Photograph of Tested Device(s):

Refer to attached EXHIBITS

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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.

Test/ Section of Report	NMP#	Test Equipment	Mfr. #	Model #
7, 8	N/A	3GHz High Pass Filter	Trilithic Inc.	4HC2900/18000-1.1-KK
7, 8	N/A	2GHz High Pass Filter	Trilithic Inc.	3HC1900/18000-1-KK
7, 8	N/A	1GHz High Pass Filter	Wainwright.	WHK949-9SS
7, 8	NMP03155	Power Splitter (must have 6 dB insertion loss)	HP	33120A
7, 8	NMP02661/ NMP02663	EMI Receiver	Agilent	8546A / 85460A
7, 8	N/A	6dB Attenuator	Weinshcel	Model 2
7, 8	NMP02680	Spectrum Analyzer	Agilent	E7405A
6, 9	NMP02886	Biconilog Antenna	ETS	3142B
6, 9	NMP00368 NMP00367	EMI Receiver	Agilent	8546A / 85460A
6, 9	NMP00064	Horn Antenna	EMCO	3115
6, 9	NMP02857	Horn Antenna	EMCO	3115
6, 9	NMP02846	Turntable and Tower Controller	Sunol	FM2022
6, 9	NMP02679	Spectrum Analyzer	Agilent	E7405A
6, 9	NMP02671	Signal Generator	Agilent	83630B
10	NMP00837	Temperature Chamber	Tenney Environmental	N/A
9	NMP00001	RF preamplifier	Agilent	HP8449B
6, 9	NMP00147	Power Meter	Boonton	4232A
6, 9	NMP00163	Power Sensor	Boonton	51015
9	NMP02283	Spectrum Analyzer	Agilent	8593EM
7, 8, 10, 11	NMP0151	Base Station Emulator	Wavetek	4300D
10, 11	NMP00627	DC Power Supply	Hewlett Packard	E3631A
10, 11	NMP00490	Multi-Meter	Fluke	87III
6, 9	NMP02281	Base Station Emulator	Wavetek	4300D
6	NMP02854	Tunable Dipole	Schwarzbeck	D69250

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6. RF POWER OUTPUT (CONDUCTED)

ESN HWID
7201996746 3200f

Protocol	Channel	Power Level (dBm)
AMPS	991	24.8
AMPS	384	25.0
AMPS	799	24.9

Protocol	Channel	Power Level (dBm)
TDMA Cellular	991	27.4
TDMA Cellular	384	27.6
TDMA Cellular	799	27.4

Protocol	Channel	Power Level (dBm)
TDMA PCS	2	26.9
TDMA PCS	999	26.3
TDMA PCS	1998	26.3

ESN HWID
7201996605 3210f

Protocol	Channel	Power Level (dBm)
AMPS	991	24.9
AMPS	384	25.0
AMPS	799	24.9

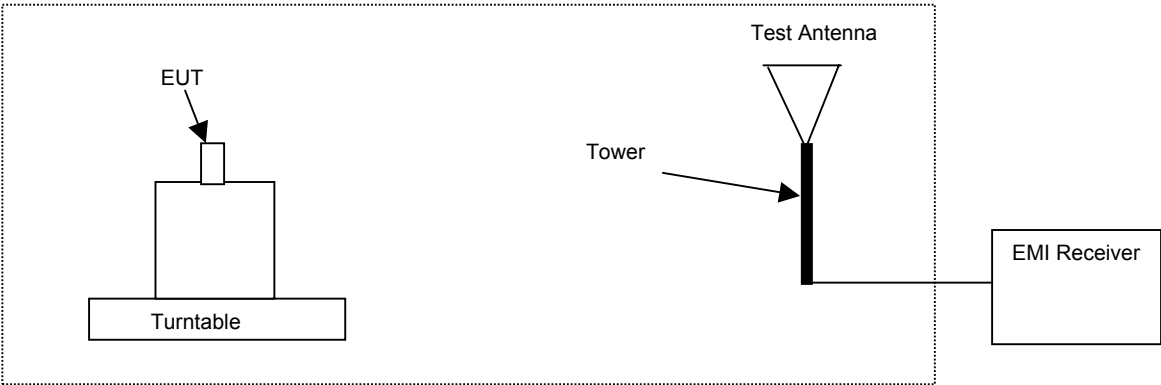
Protocol	Channel	Power Level (dBm)
TDMA Cellular	991	27.7
TDMA Cellular	384	27.7
TDMA Cellular	799	27.8

Protocol	Channel	Power Level (dBm)
TDMA PCS	2	26.8
TDMA PCS	999	26.3
TDMA PCS	1998	26.5

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	J. Love		
Date of Measurement	28 July 2003		
Temperature / Humidity	23 - 24°C	38 – 60 %RH	
Test Result	Complies		

Cellular Band

AMPS, Channel 991

Freq Max (MHz)	EDRP EMI (dBm)	Pol.
824.2	23.0	V

AMPS, Channel 384

Freq Max (MHz)	EDRP EMI (dBm)	Pol.
836.6	22.7	V

AMPS, Channel 799

Freq Max (MHz)	EDRP EMI (dBm)	Pol.
848.8	22.0	V

TDMA Cellular, Channel 991

Freq Max (MHz)	EDRP EMI (dBm)	Pol.
824.2	25.7	V

TDMA Cellular, Channel 384

Freq Max (MHz)	EDRP EMI (dBm)	Pol.
836.6	26.1	V

TDMA Cellular, Channel 799

Freq Max (MHz)	EDRP EMI (dBm)	Pol.
848.8	26.8	V

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PCS Band**TDMA PCS, Channel 2**

Freq Max (MHz)	EIRP EMI (dBm)	Pol.
1850.2	28.8	V

TDMA PCS, Channel 999

Freq Max (MHz)	EIRP EMI (dBm)	Pol.
1880.0	28.9	V

TDMA PCS, Channel 1998

Freq Max (MHz)	EIRP EMI (dBm)	Pol.
1909.8	29.0	V

7.4 Measurement Uncertainty

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

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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

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

8.3 Detailed Test Results

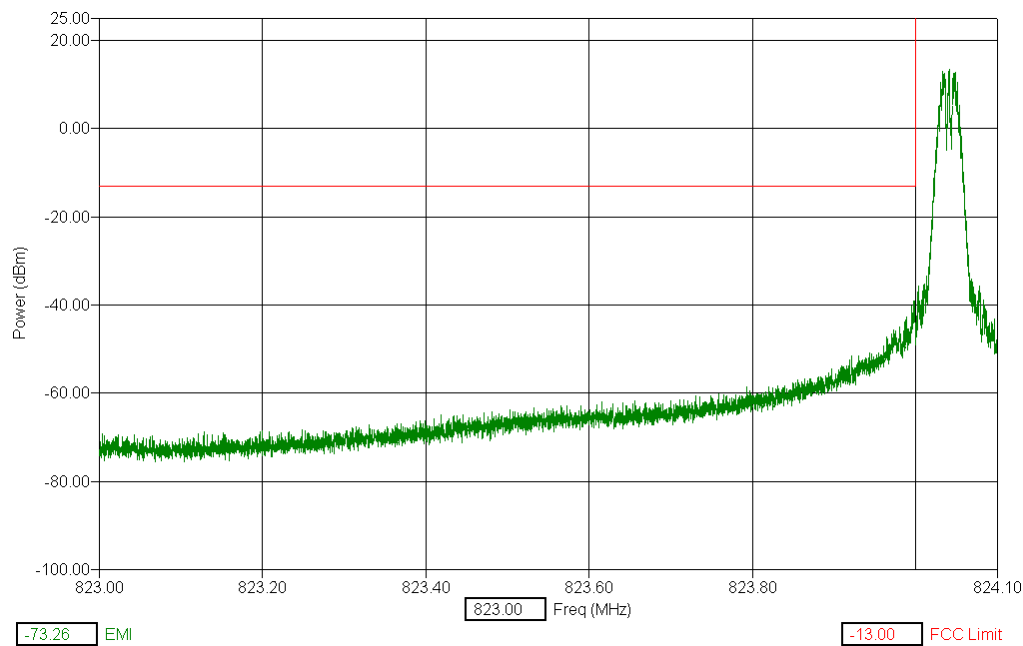
Test Technician / Engineer	Jesse Torres	
Date of Measurement	17-Jul-03 to 18-Jul-03	
Temperature / Humidity	22 to 23 °C	46 to 53 %RH
Test Result	Complies with FCC Part 2.1049	

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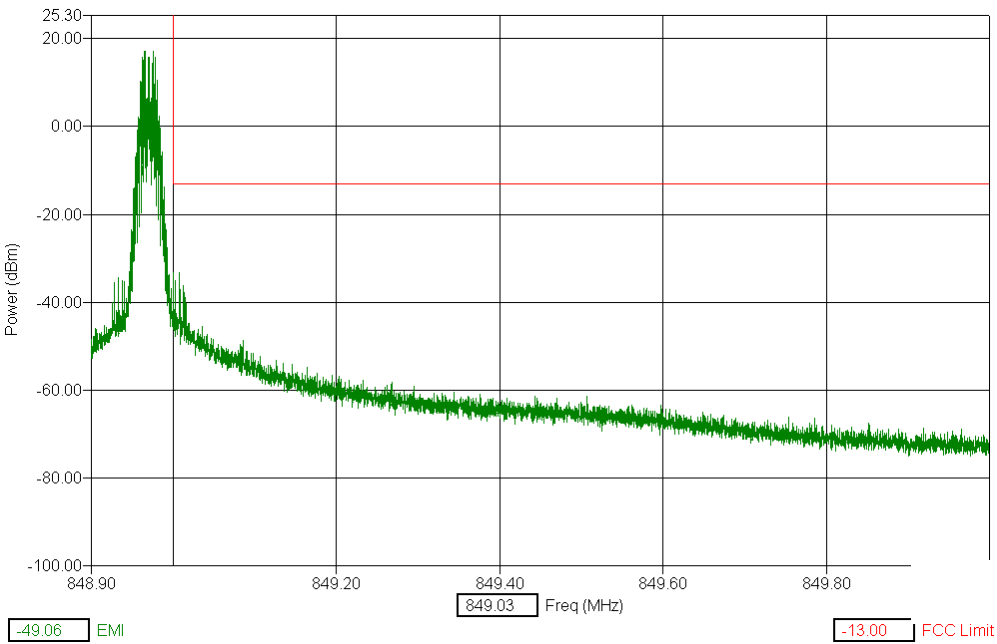
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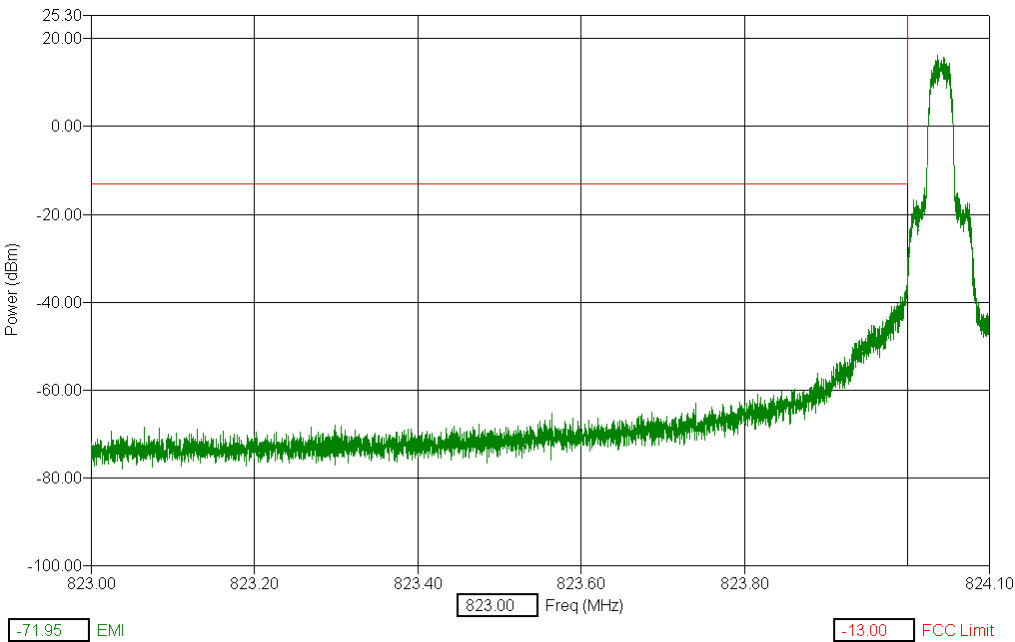
Cellular Band, AMPS, Channel 991



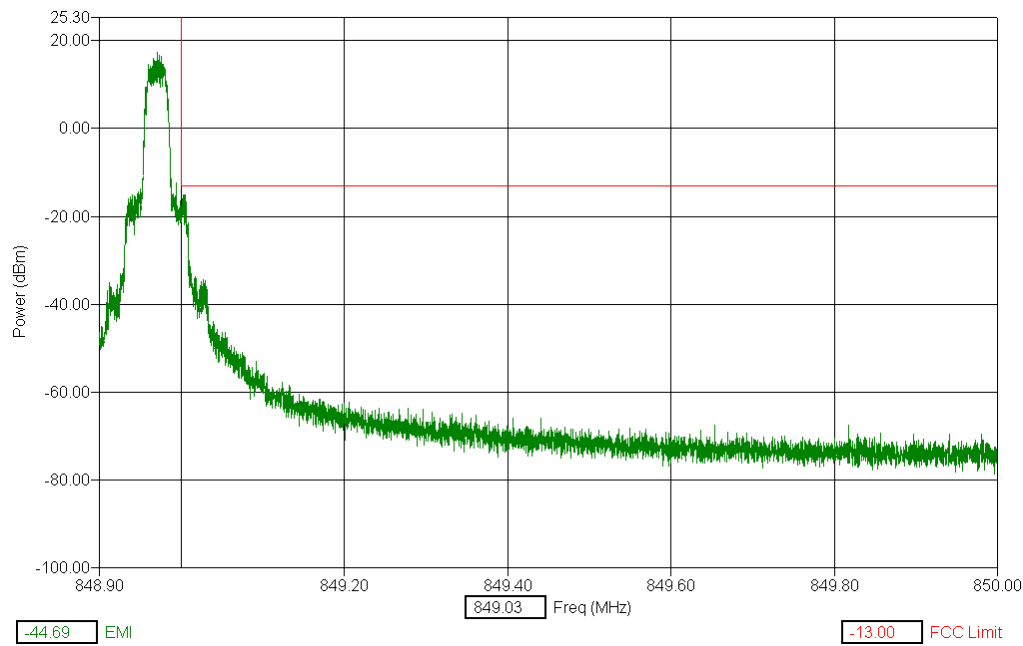
Cellular Band, AMPS, Channel 799



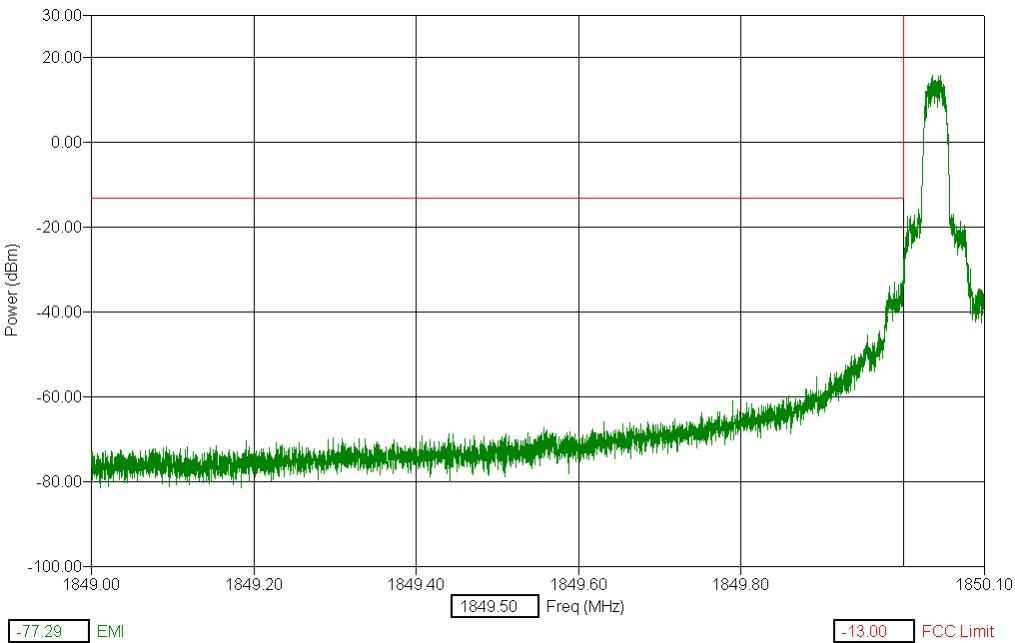
Cellular Band, TDMA 800, Channel 991



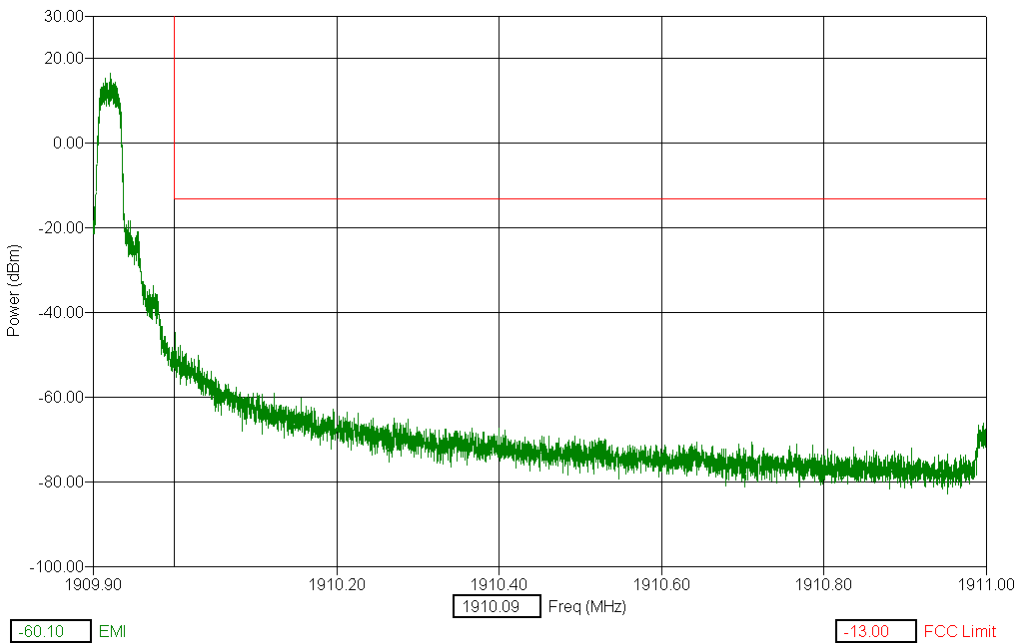
Cellular Band, TDMA 800, Channel 799



PCS Band, TDMA 1900, Channel 2

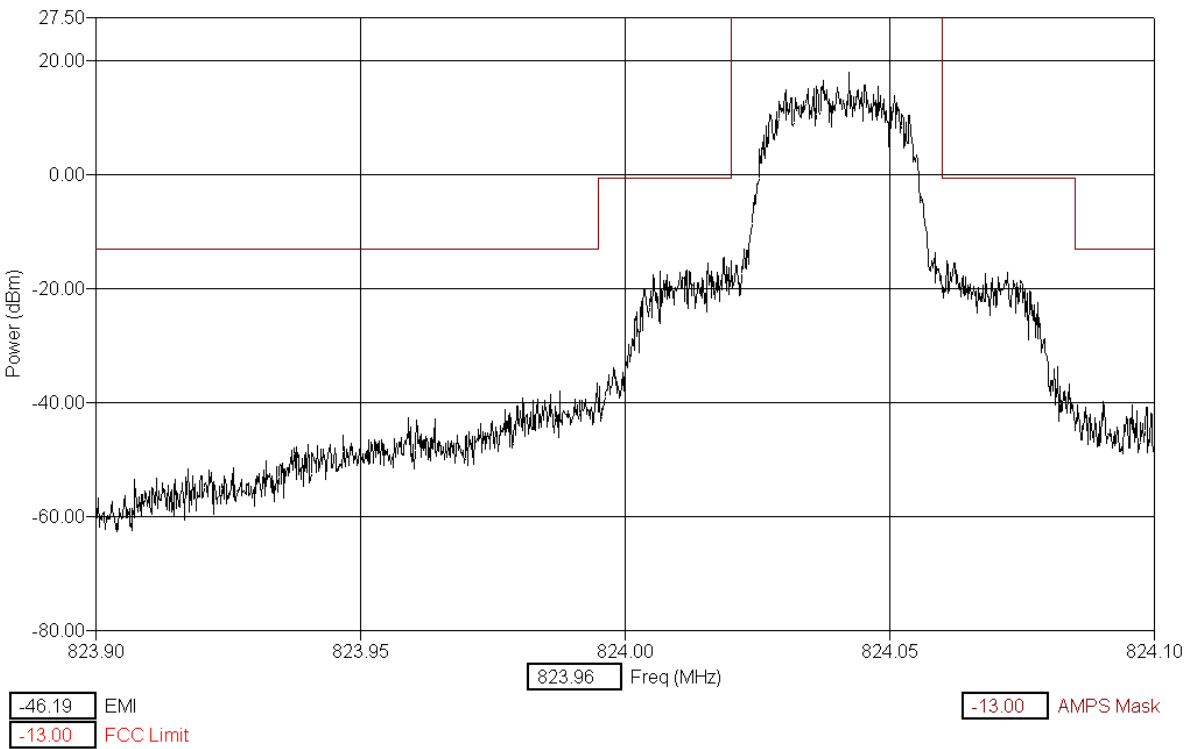


PCS Band. TDMA 1900, Channel 1998



8.4 Block Edge Requirements

Cellular Block A'' Lower Edge TDMA Channel 991

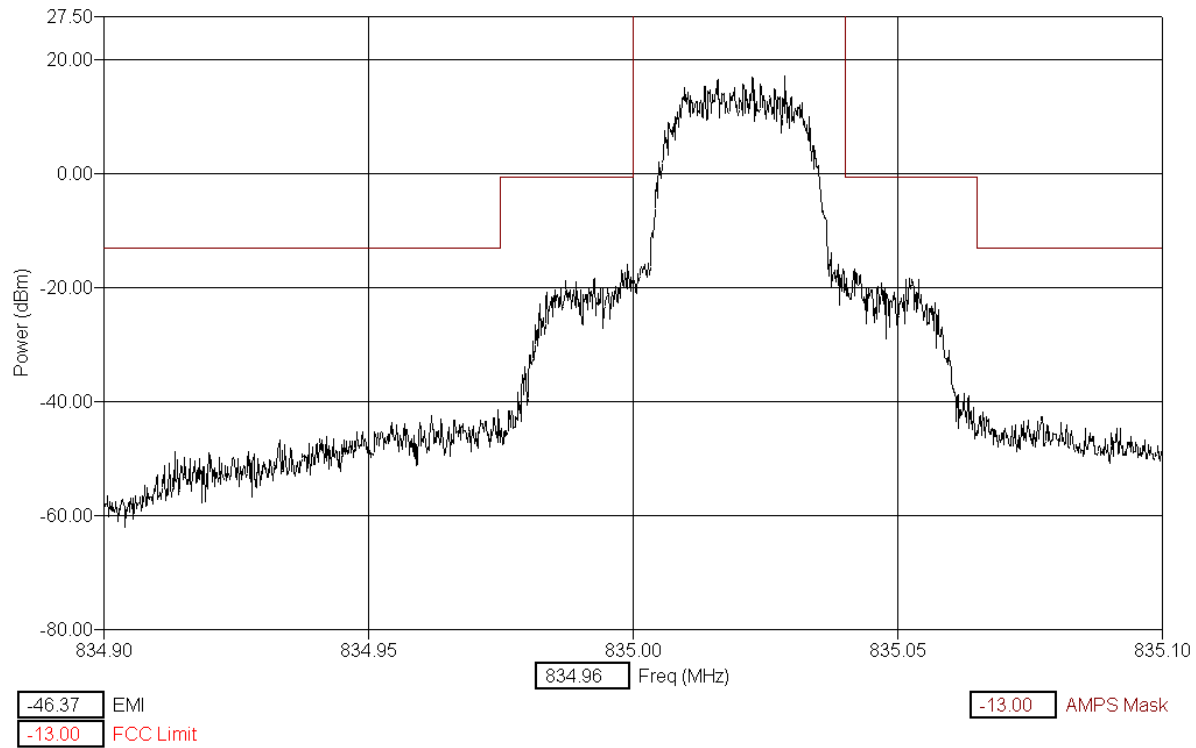


Span: 200kHz RBW: 300 VBW: 300

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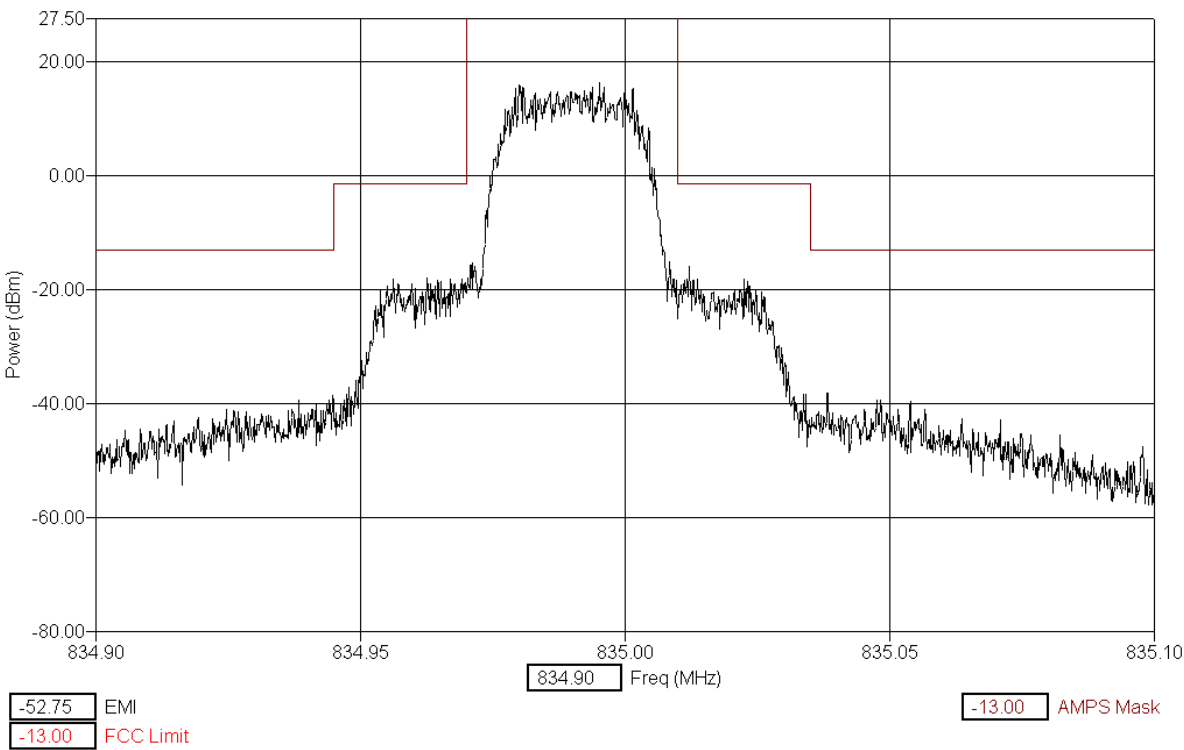
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Cellular Block B Lower Edge TDMA Channel 334



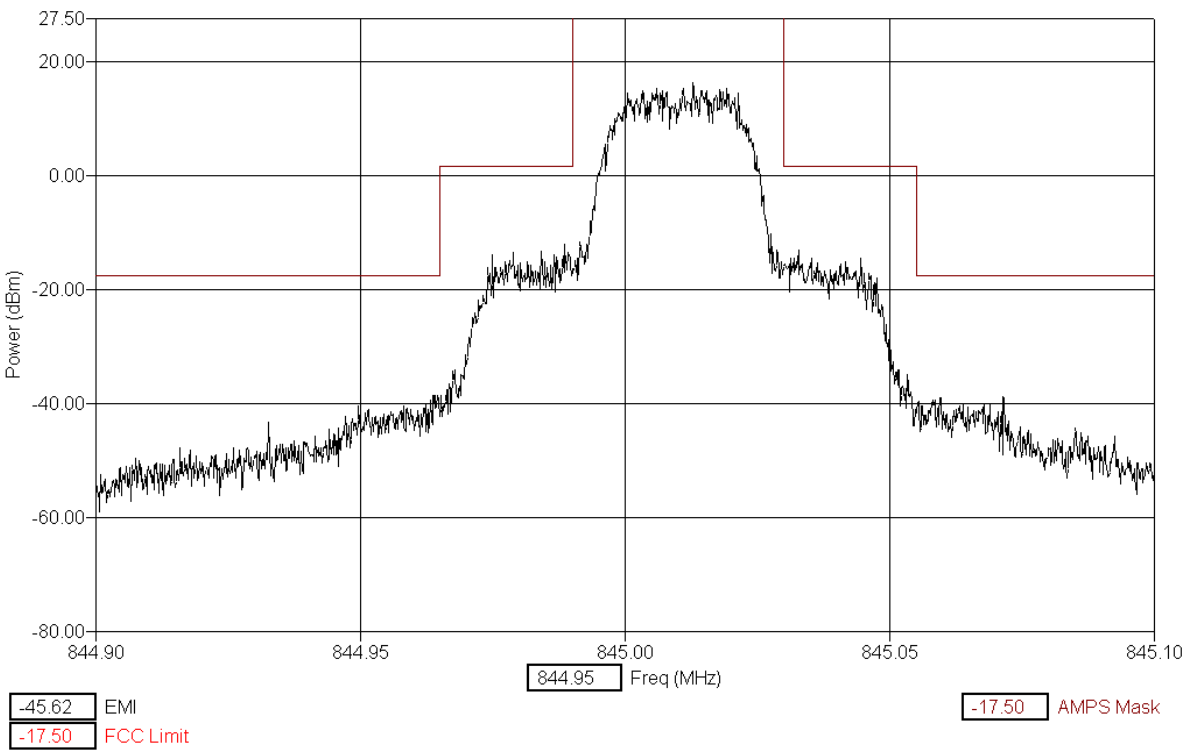
Span: 200kHz RBW: 300 VBW: 300

Cellular Block A Upper Edge TDMA Channel 333



Span: 200kHz RBW: 300 VBW: 300

Cellular Block A' Lower Edge TDMA Channel 667



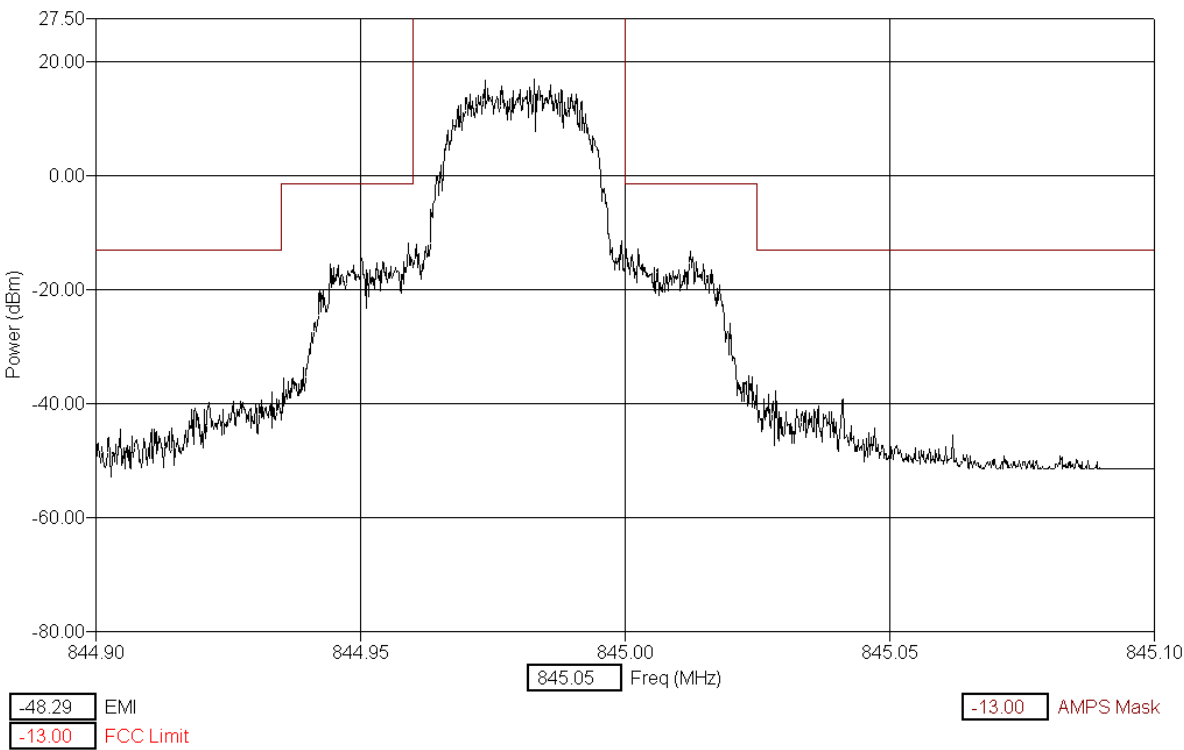
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Cellular Block B Upper Edge TDMA Channel 666

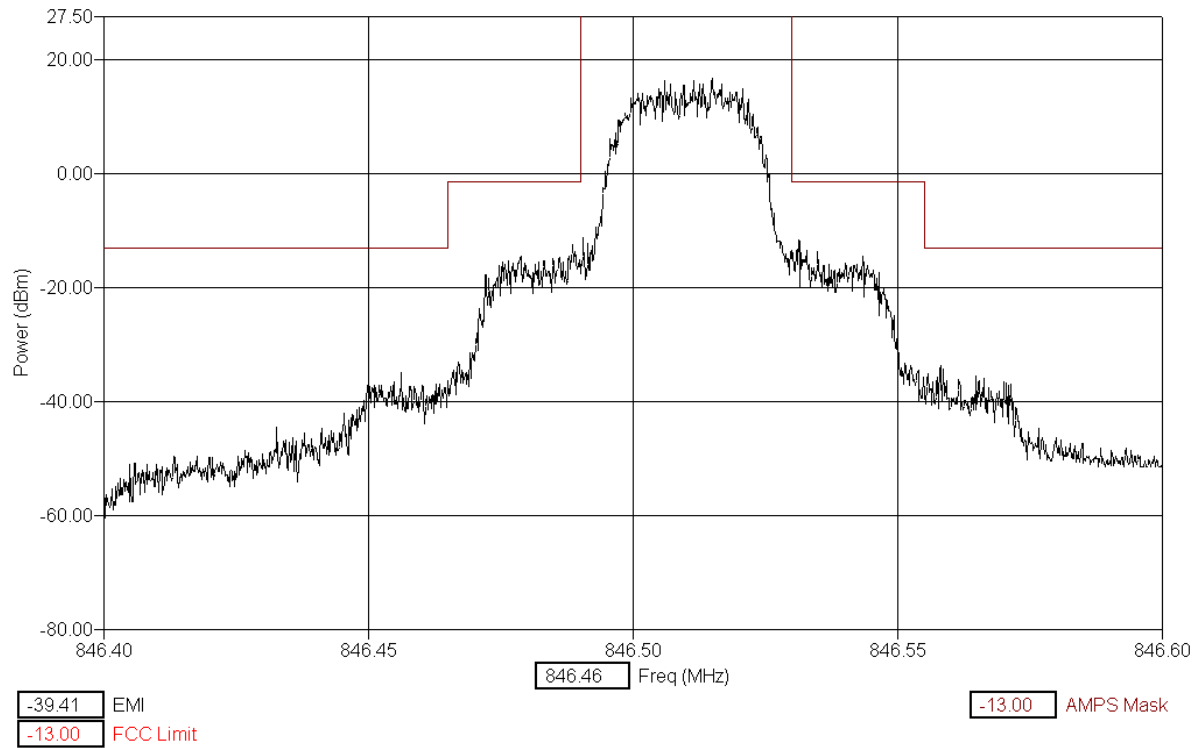


Span: 200kHz RBW: 300 VBW: 300

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Cellular Block B' Lower Edge TDMA Channel 717



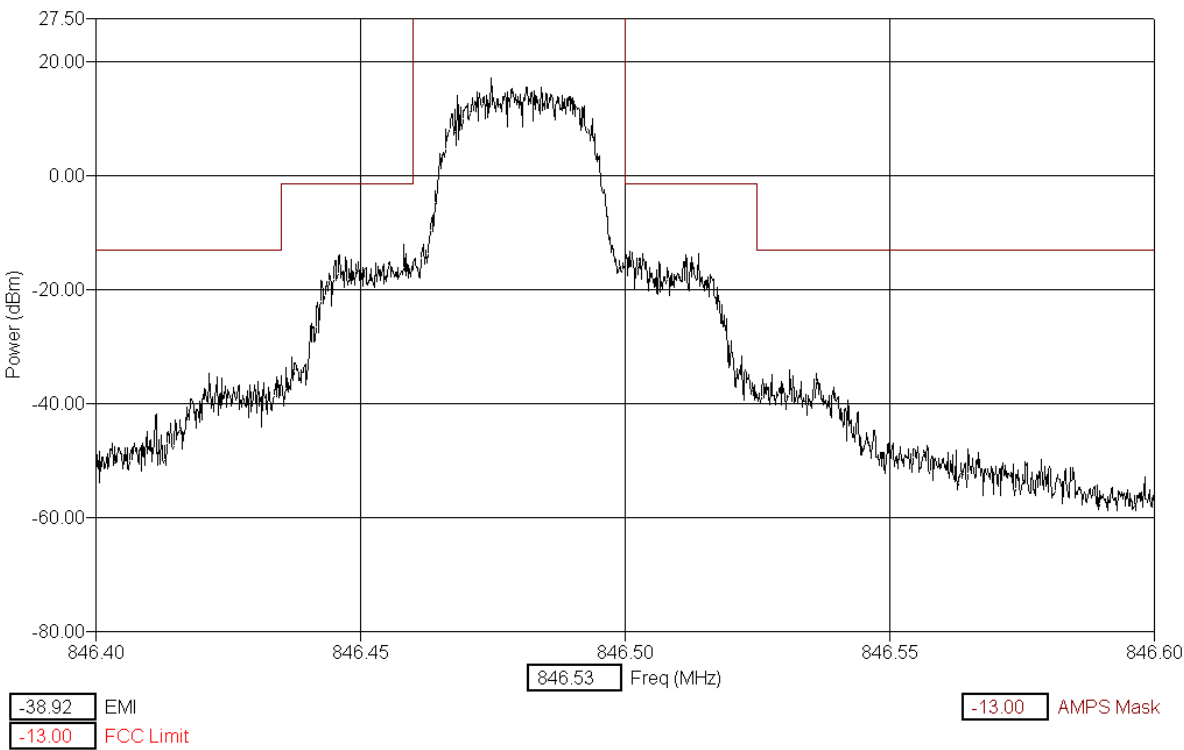
Span: 200kHz RBW: 300 VBW: 300

Test & Certification Center (TCC) - Dallas

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Cellular Block A' Upper Edge TDMA Channel 716

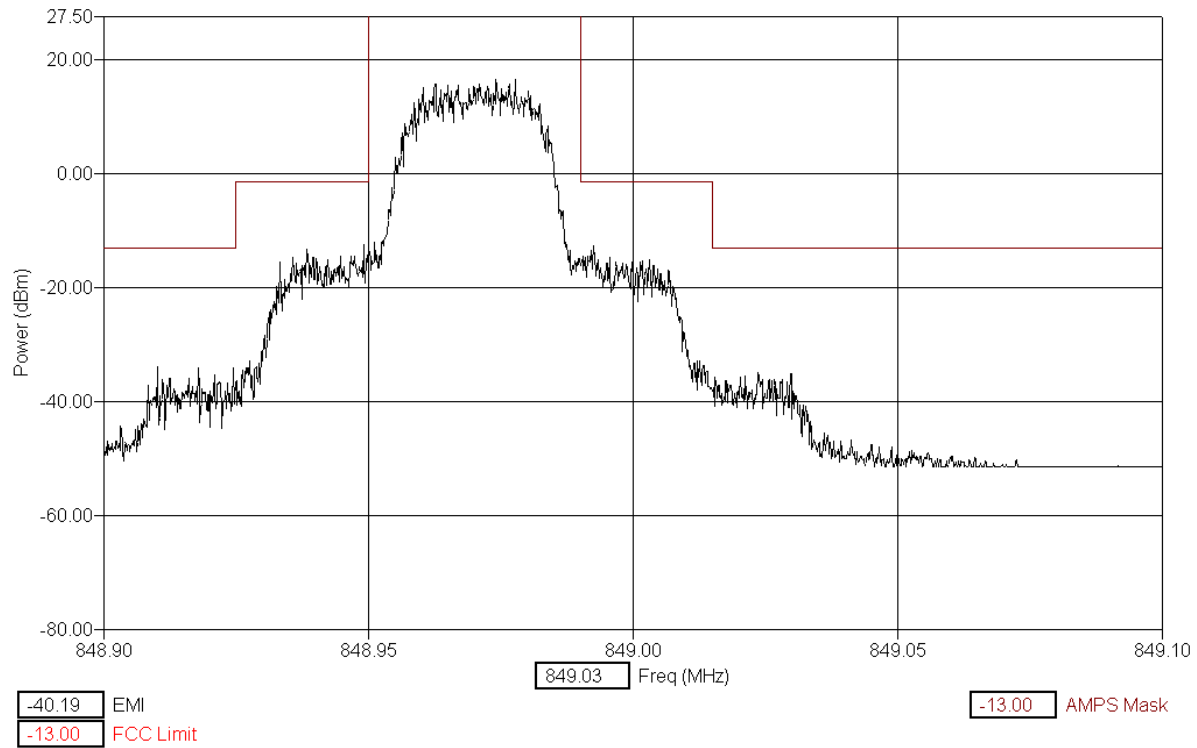


Span: 200kHz RBW: 300 VBW: 300

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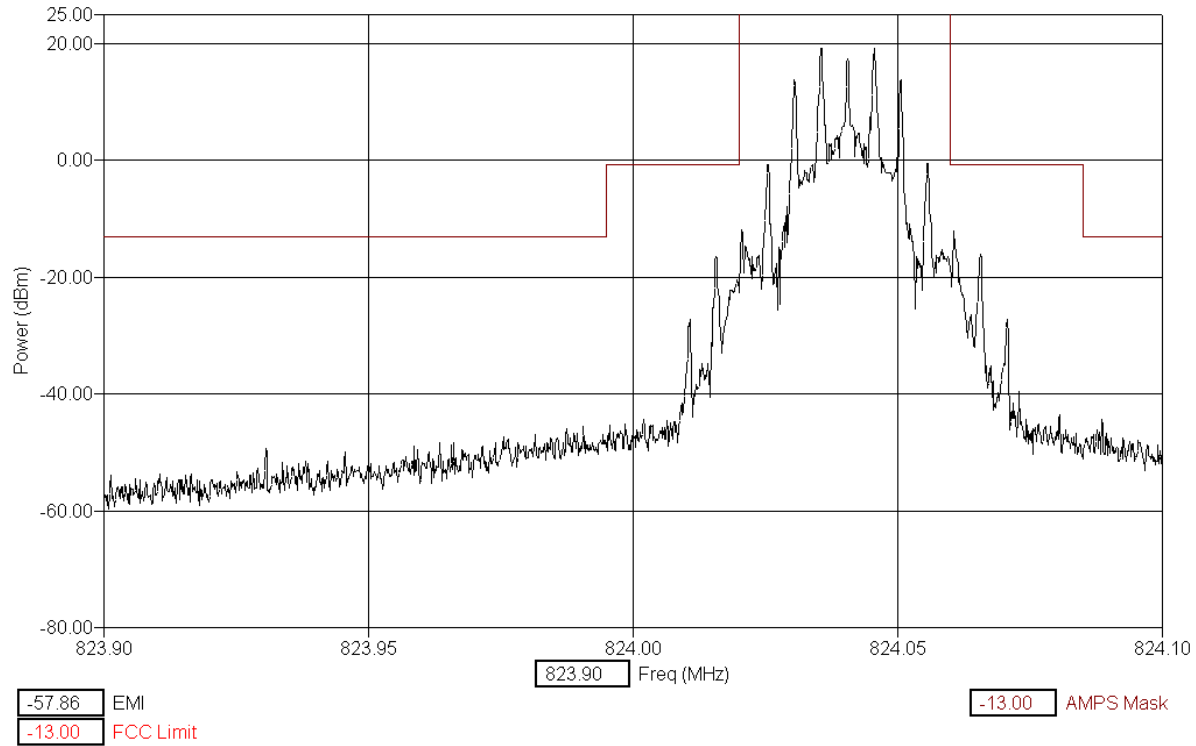
Ver 1.0

Cellular Block B' Upper Edge TDMA Channel 799



Span: 200kHz RBW: 300 VBW: 300

Cellular Block A'' Lower Edge AMPS Channel 991 (WideBand)



Span: 200kHz RBW: 300 VBW: 300

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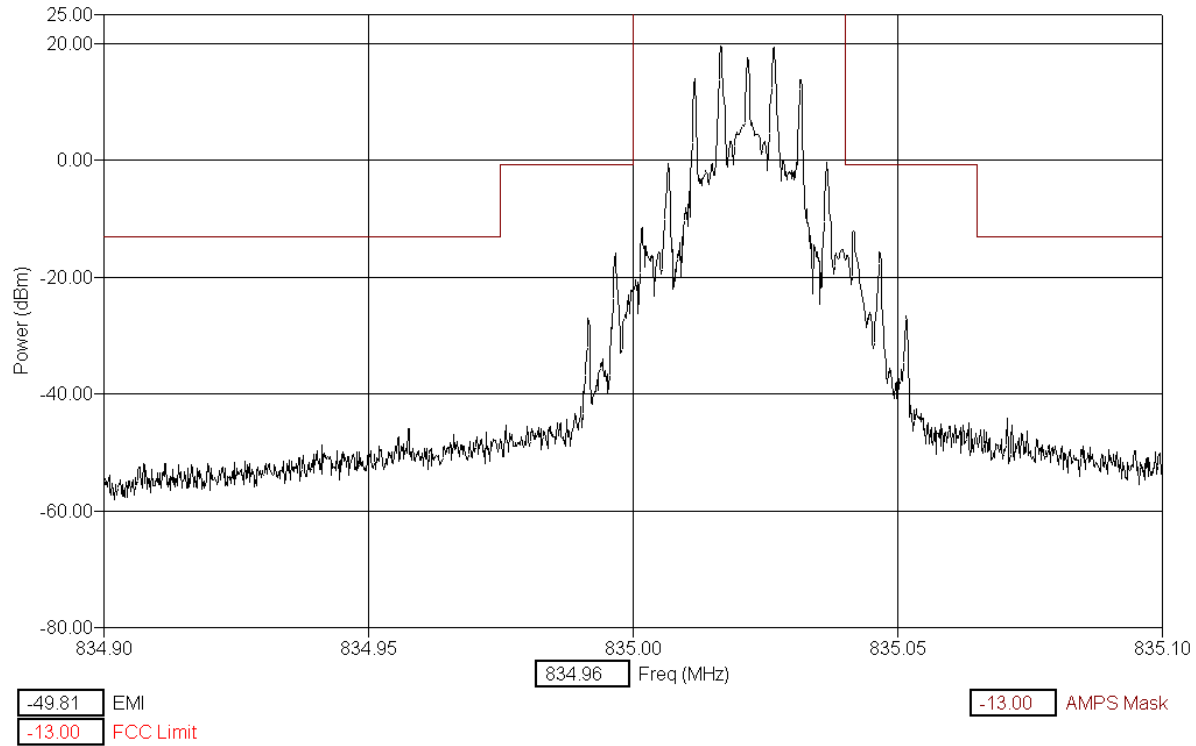
FCC ID: GMLRH-25

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Cellular Block B Lower Edge AMPS Channel 334 (WideBand)



Span: 200kHz RBW: 300 VBW: 300

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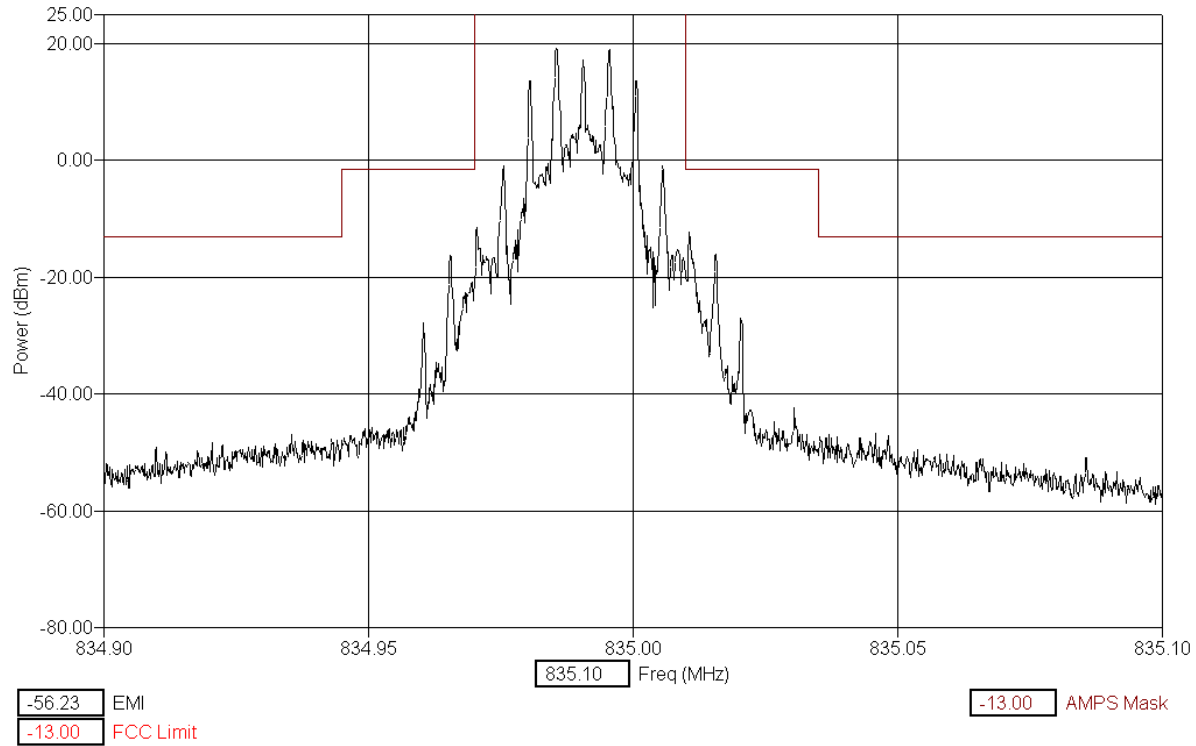
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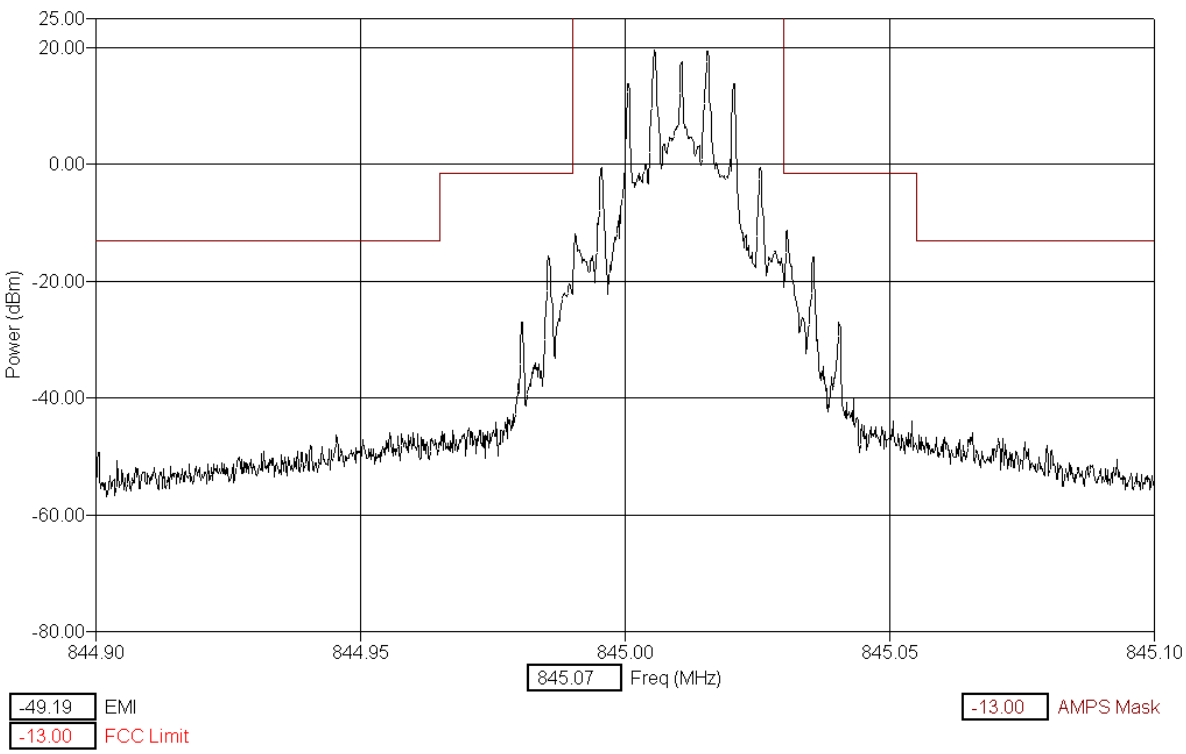
Ver 1.0

Cellular Block A Upper Edge AMPS Channel 333 (WideBand)



Span: 200kHz RBW: 300 VBW: 300

Cellular Block A' Lower Edge AMPS Channel 667 (WideBand)



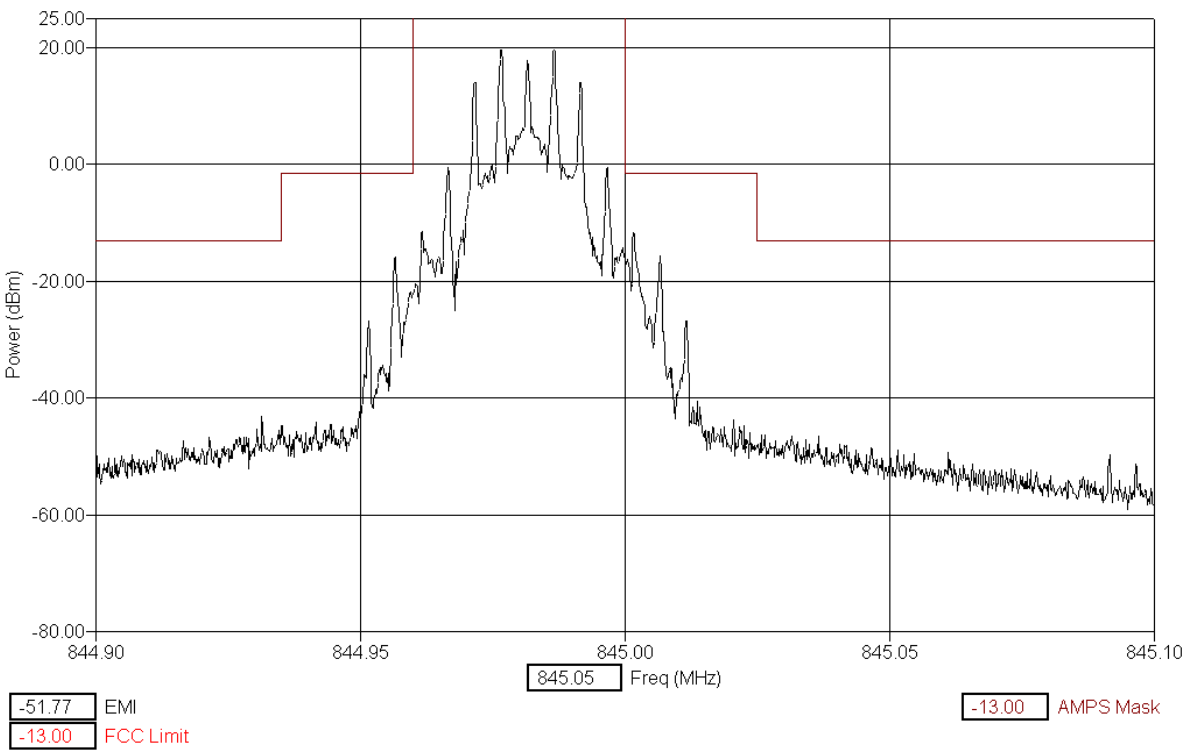
Span: 200kHz RBW: 300 VBW: 300

Test & Certification Center (TCC) - Dallas

FCC ID: GMLRH-25
Test Report #: 03-EM-0042.001
August 22, 2003

Ver 1.0

Cellular Block B Upper Edge AMPS Channel 666 (WideBand)

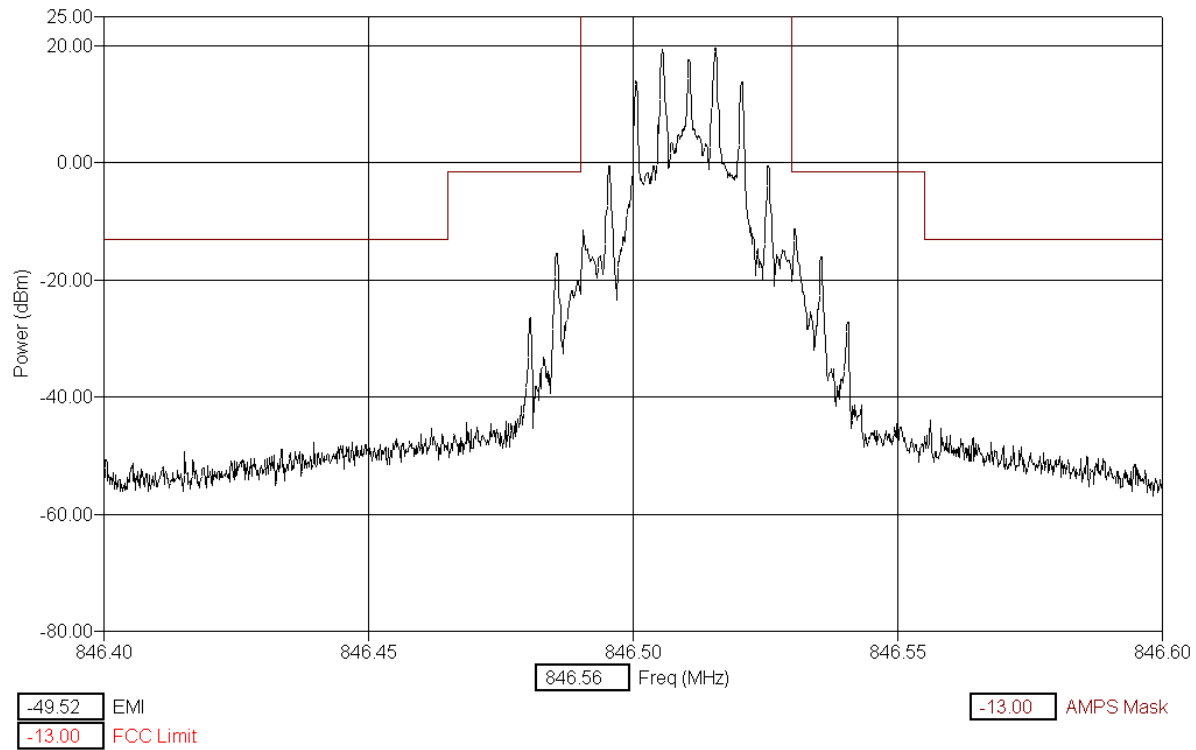


Span: 200kHz RBW: 300 VBW: 300

Test & Certification Center (TCC) - Dallas
 FCC ID: GMLRH-25
 Test Report #: 03-EM-0042.001
 August 22, 2003

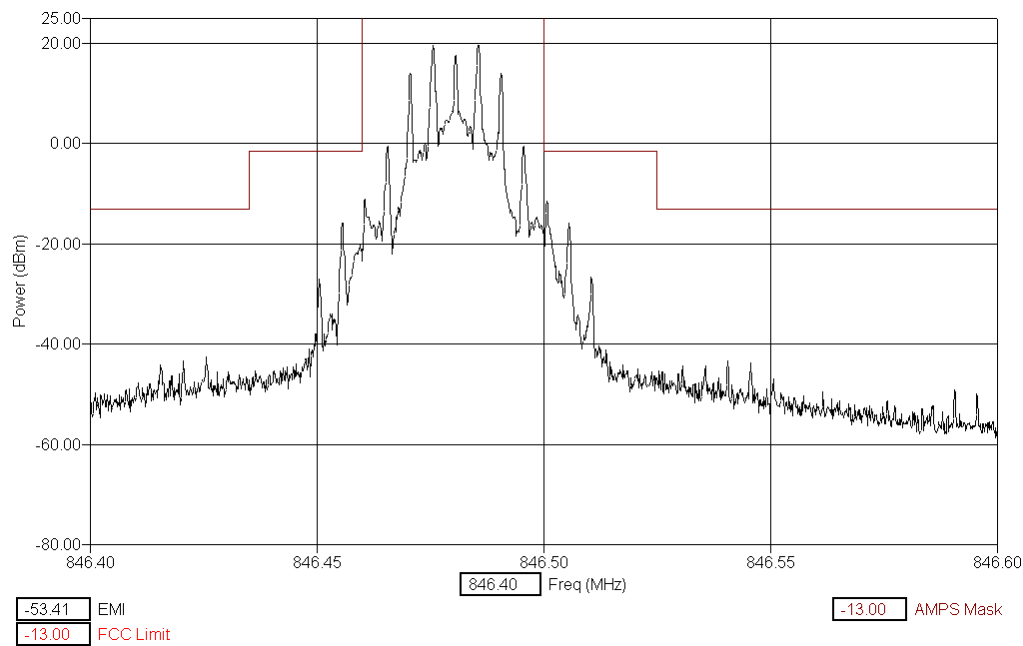
Ver 1.0

Cellular Block B' Lower Edge AMPS Channel 717 (WideBand)



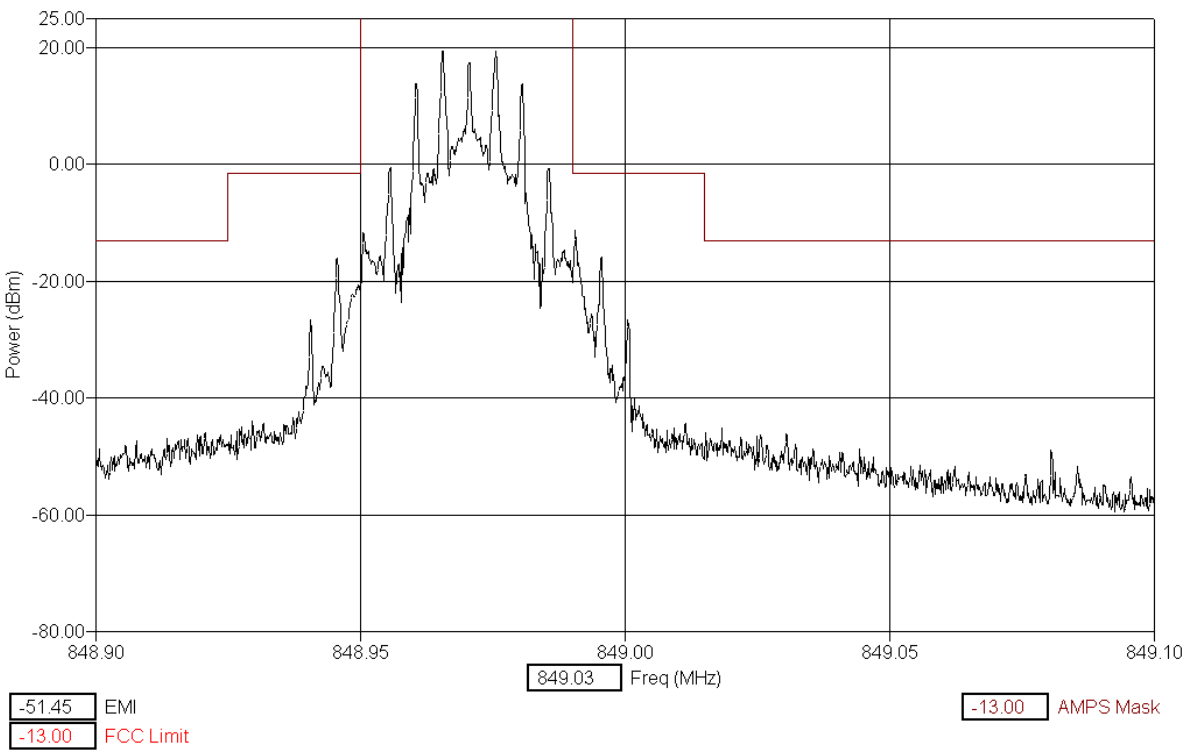
Span: 200kHz RBW: 300 VBW: 300

Cellular Block A' Upper Edge AMPS Channel 716 (WideBand)



Span: 200kHz RBW: 300 VBW: 300

Cellular Block B' Upper Edge AMPS Channel 799 (WideBand)



Span: 200kHz RBW: 300 VBW: 300

Test & Certification Center (TCC) - Dallas

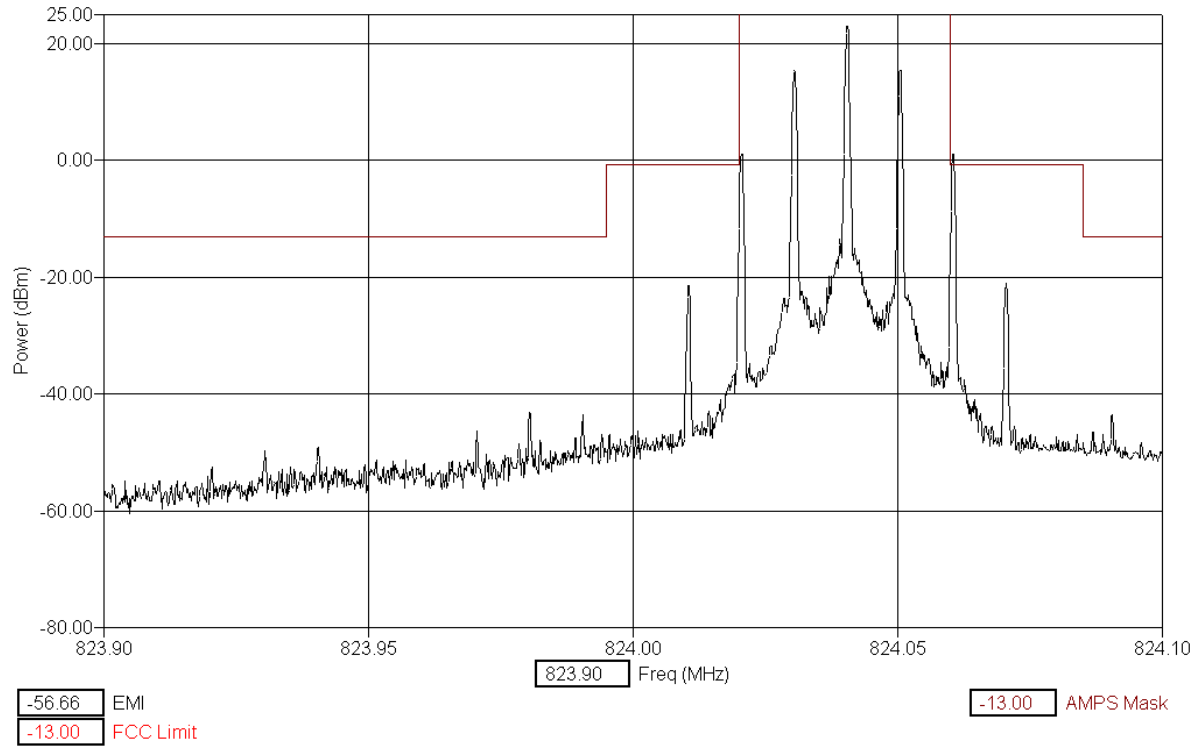
FCC ID: GMLRH-25

Test Report #: 03-EM-0042.001

August 22, 2003

Ver 1.0

Cellular Block A'' Lower Edge AMPS Channel 991 (ST)

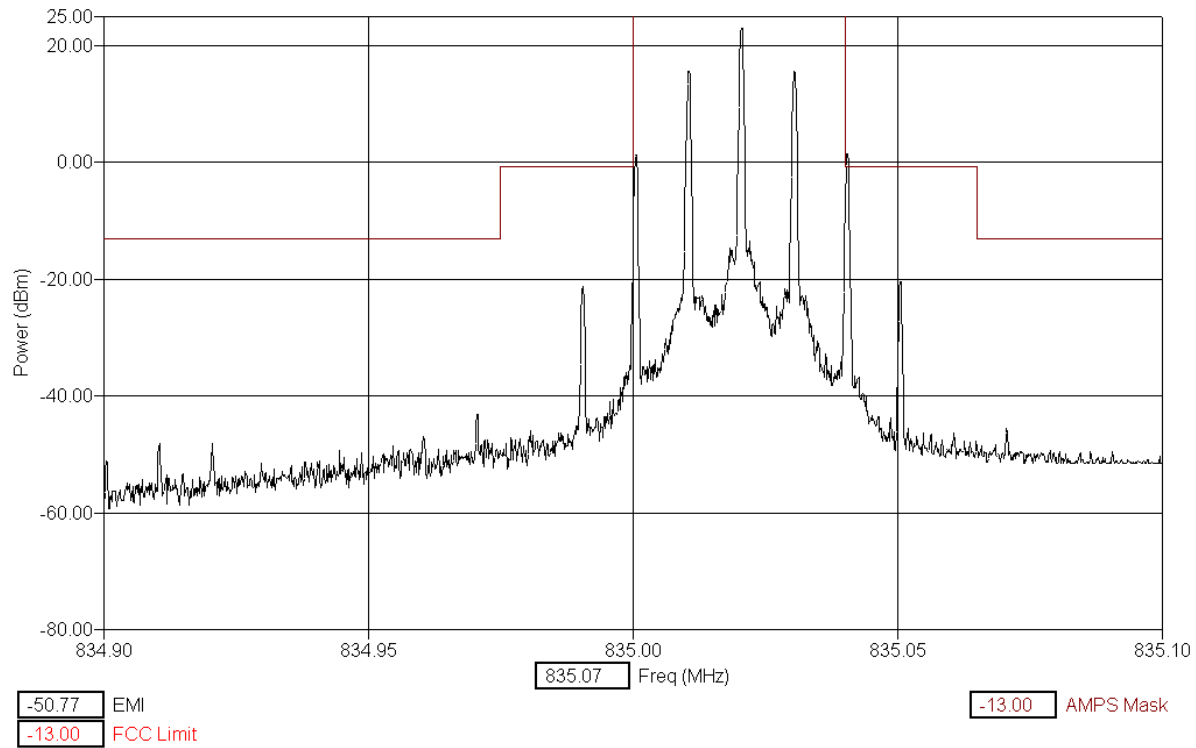


Span: 200kHz RBW: 300 VBW: 300

Test & Certification Center (TCC) - Dallas
 FCC ID: GMLRH-25
 Test Report #: 03-EM-0042.001
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Ver 1.0

Cellular Block B Lower Edge AMPS Channel 334 (ST)



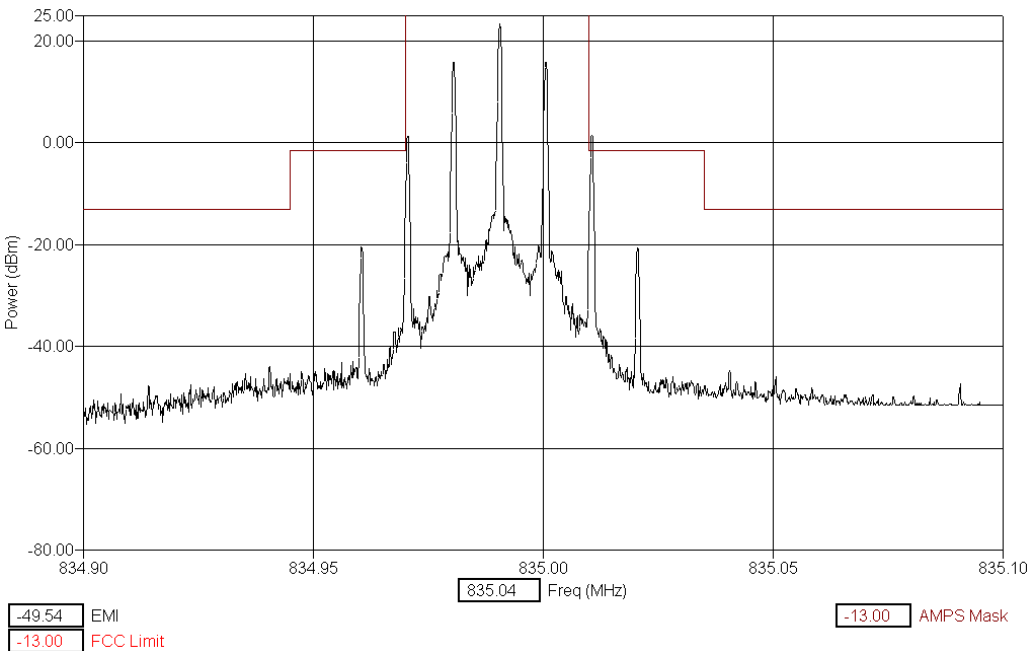
Span: 200kHz RBW: 300 VBW: 300

Test & Certification Center (TCC) - Dallas

FCC ID: GMLRH-25
Test Report #: 03-EM-0042.001
August 22, 2003

Ver 1.0

Cellular Block A Upper Edge AMPS Channel 333 (ST)

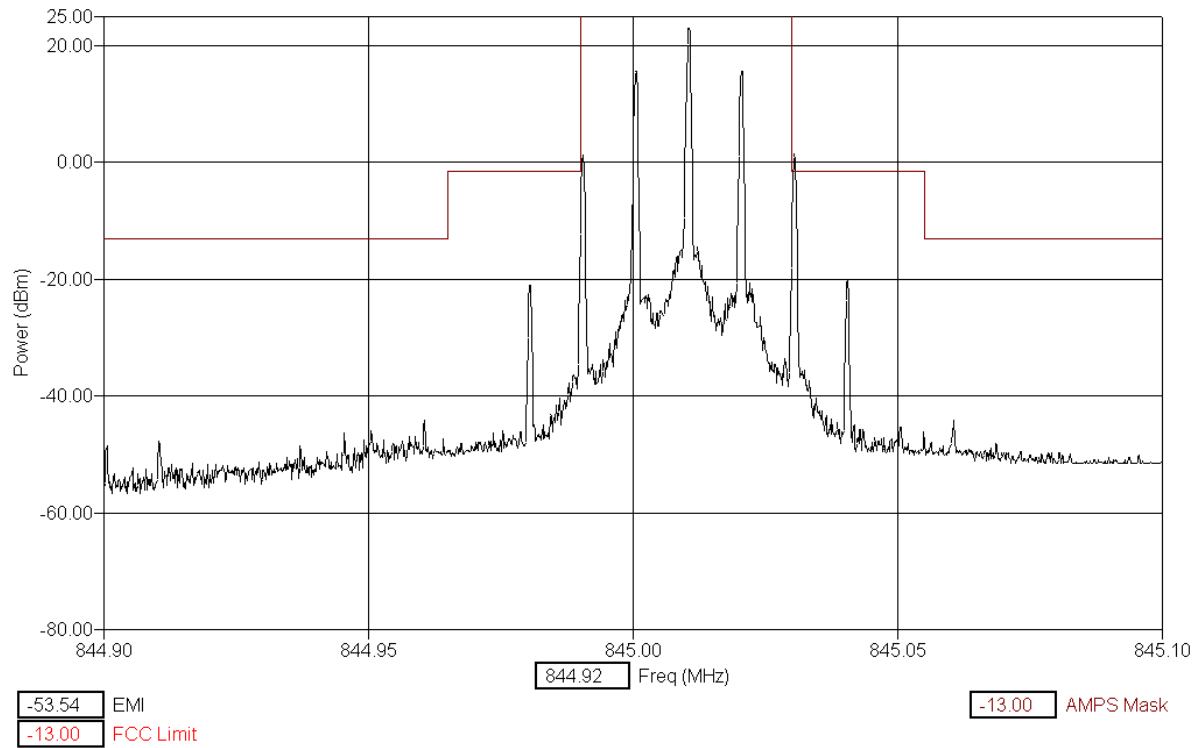


Span: 200kHz RBW: 300 VBW: 300

Test & Certification Center (TCC) - Dallas
 FCC ID: GMLRH-25
 Test Report #: 03-EM-0042.001
 August 22, 2003

Ver 1.0

Cellular Block A' Lower Edge AMPS Channel 667 (ST)



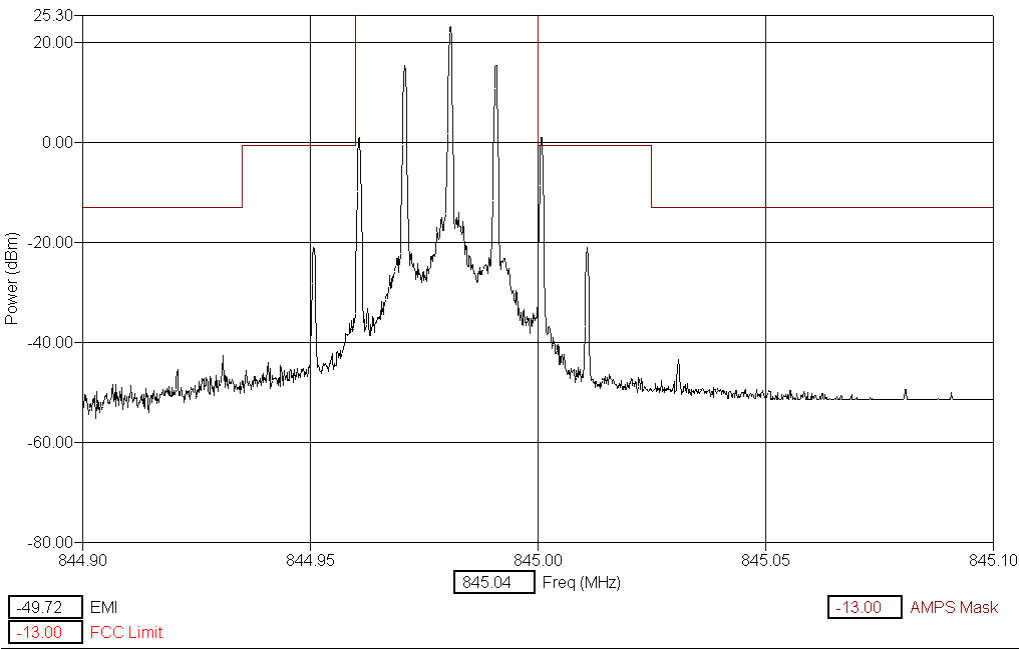
Span: 200kHz RBW: 300 VBW: 300

Test & Certification Center (TCC) - Dallas

FCC ID: GMLRH-25
Test Report #: 03-EM-0042.001
August 22, 2003

Ver 1.0

Cellular Block B Upper Edge AMPS Channel 666 (ST)

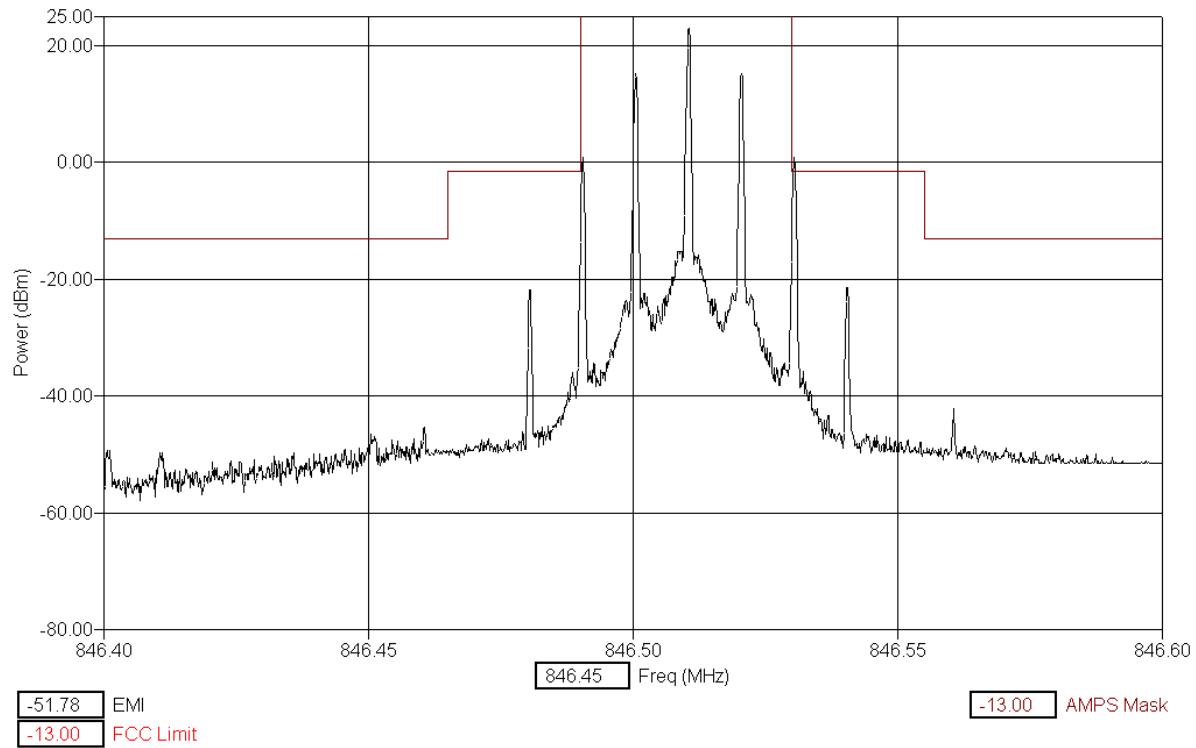


Span: 200kHz RBW: 300 VBW: 300

Test & Certification Center (TCC) - Dallas
 FCC ID: GMLRH-25
 Test Report #: 03-EM-0042.001
 August 22, 2003

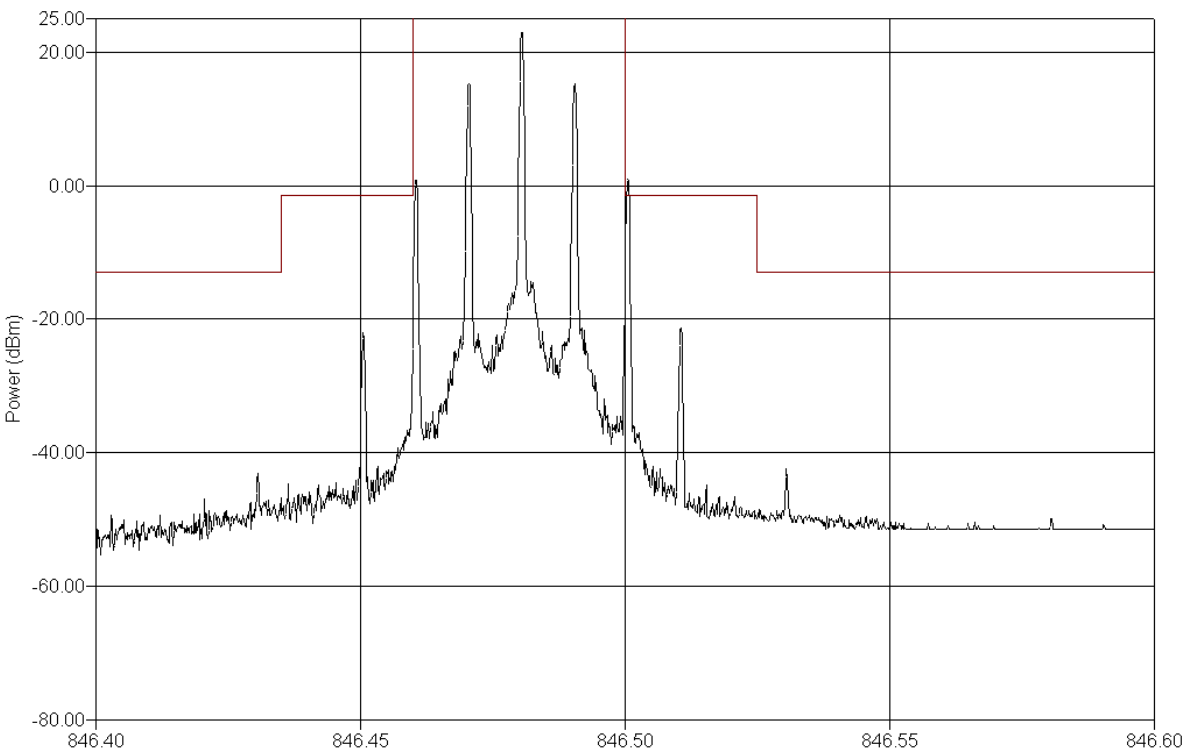
Ver 1.0

Cellular Block B' Lower Edge AMPS Channel 717 (ST)



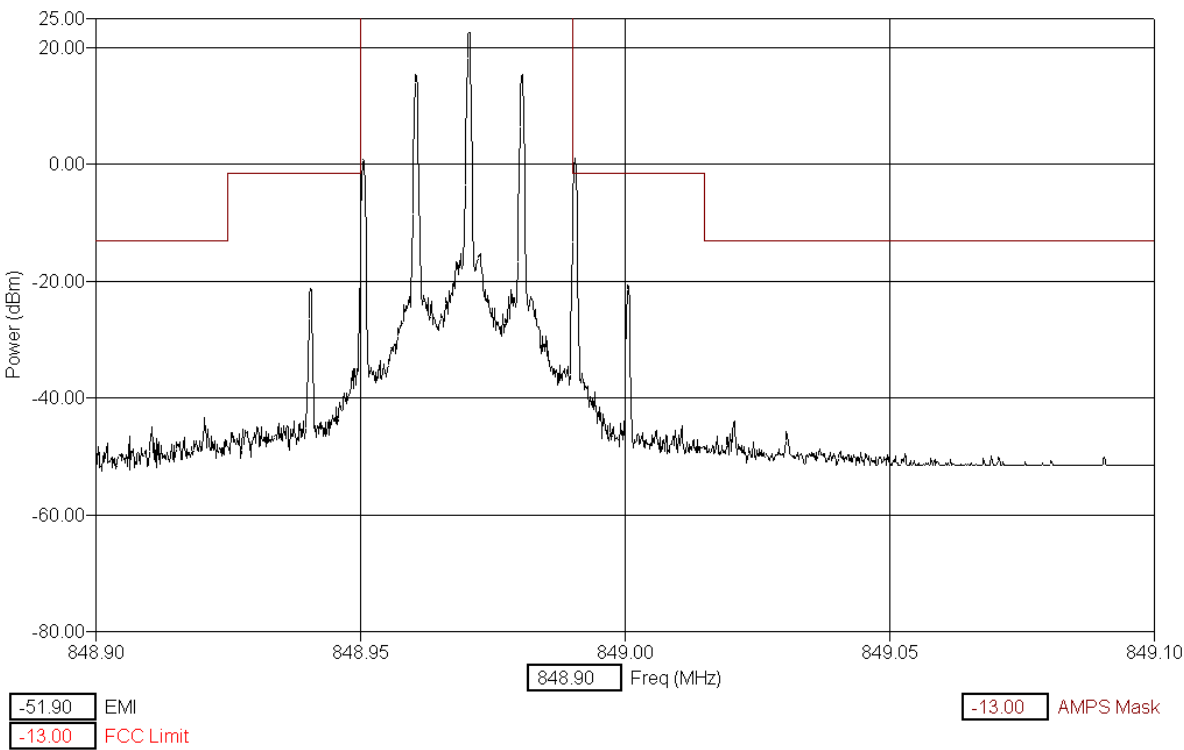
Span: 200kHz RBW: 300 VBW: 300

Cellular Block A' Upper Edge AMPS Channel 716 (ST)



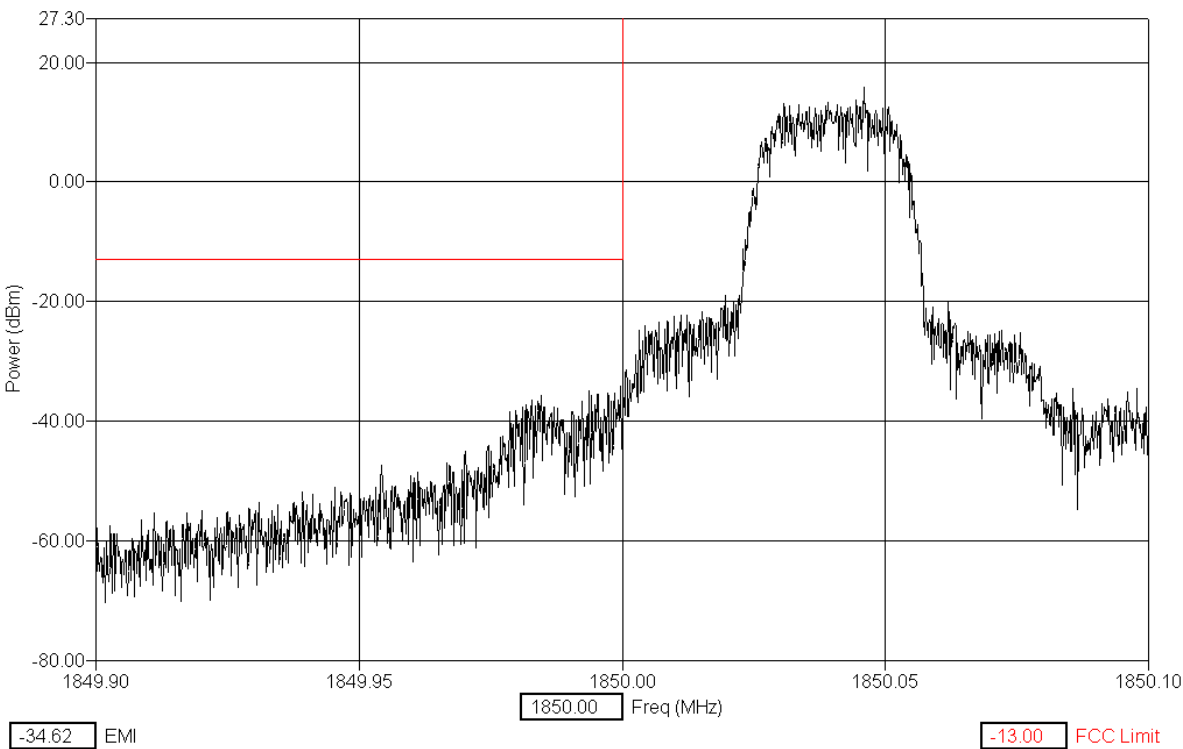
Span: 200kHz RBW: 300 VBW: 300

Cellular Block B' Upper Edge AMPS Channel 799 (ST)



Span: 200kHz RBW: 300 VBW: 300

PCS Block A Lower Edge TDMA Channel 2



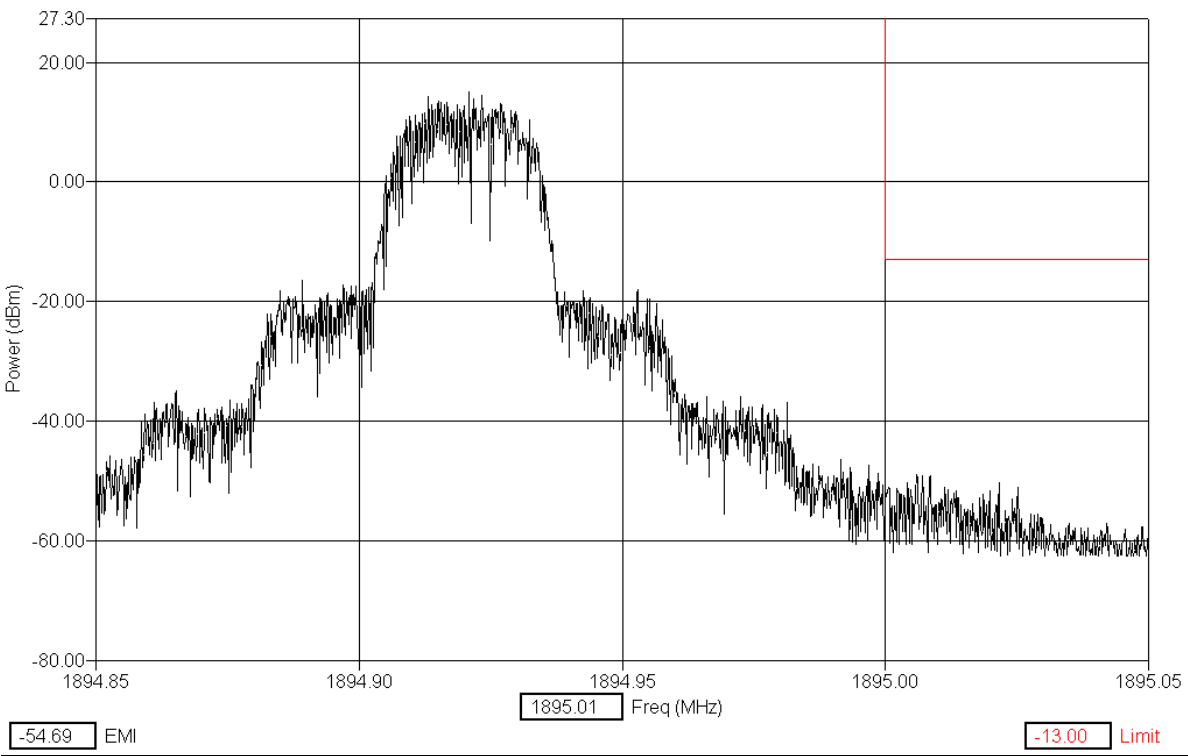
Span: 200kHz RBW: 300 VBW: 300

Test & Certification Center (TCC) - Dallas

FCC ID: GMLRH-25
Test Report #: 03-EM-0042.001
August 22, 2003

Ver 1.0

PCS Block A Upper Edge TDMA Channel 1498



Span: 200kHz RBW: 300 VBW: 300

Test & Certification Center (TCC) - Dallas

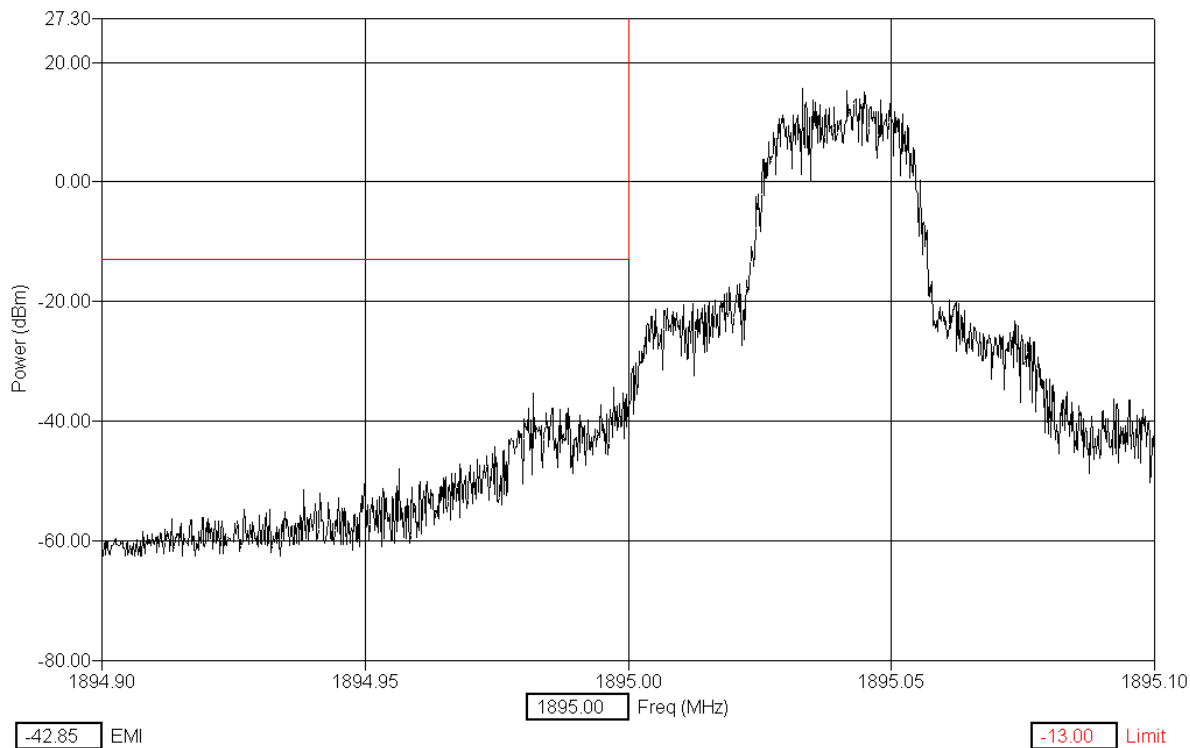
FCC ID: GMLRH-25

Test Report #: 03-EM-0042.001

August 22, 2003

Ver 1.0

PCS Block D Lower Edge TDMA Channel 1502

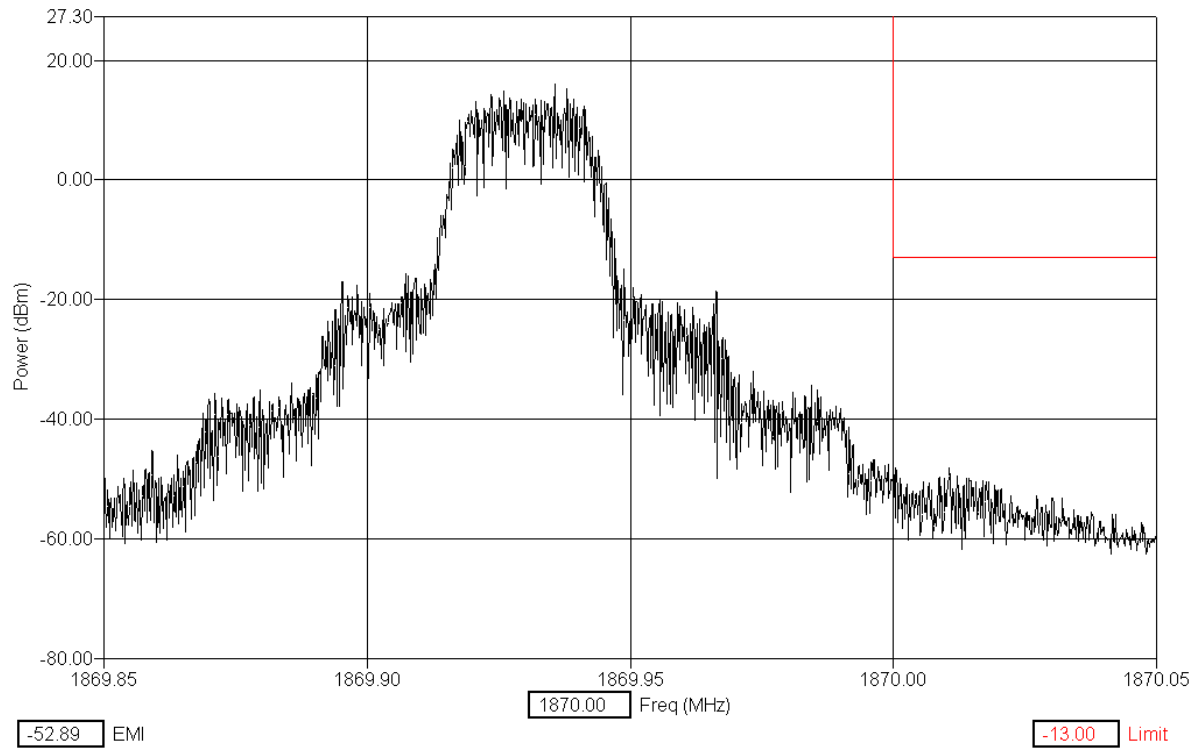


Span: 200kHz RBW: 300 VBW: 300

Test & Certification Center (TCC) - Dallas
 FCC ID: GMLRH-25
 Test Report #: 03-EM-0042.001
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Ver 1.0

PCS Block D Upper Edge TDMA Channel 665



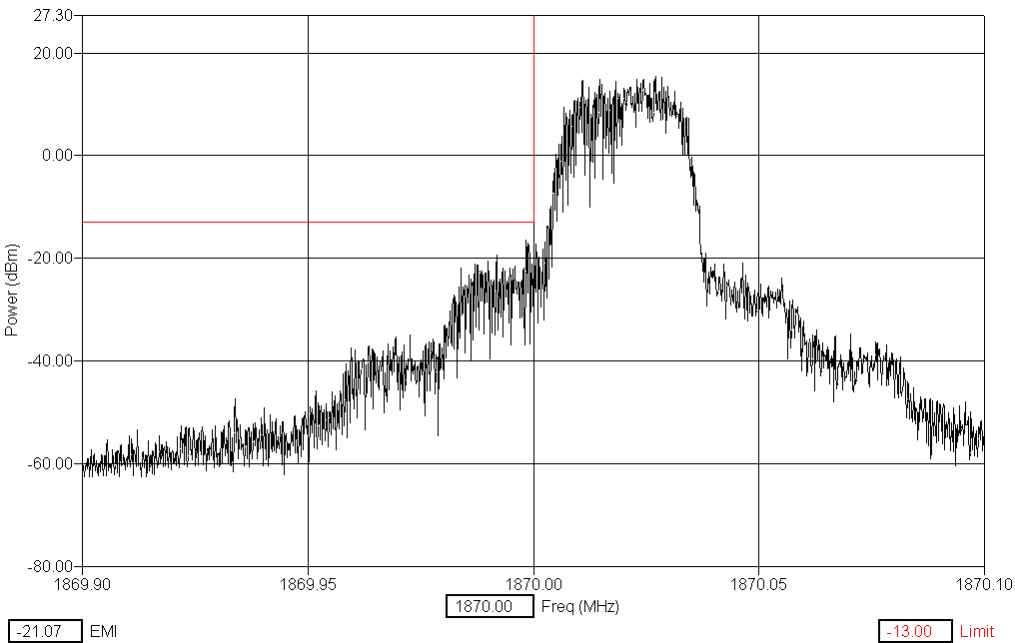
Span: 200kHz RBW: 300 VBW: 300

Test & Certification Center (TCC) - Dallas

FCC ID: GMLRH-25
Test Report #: 03-EM-0042.001
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Ver 1.0

PCS Block B Lower Edge TDMA Channel 668



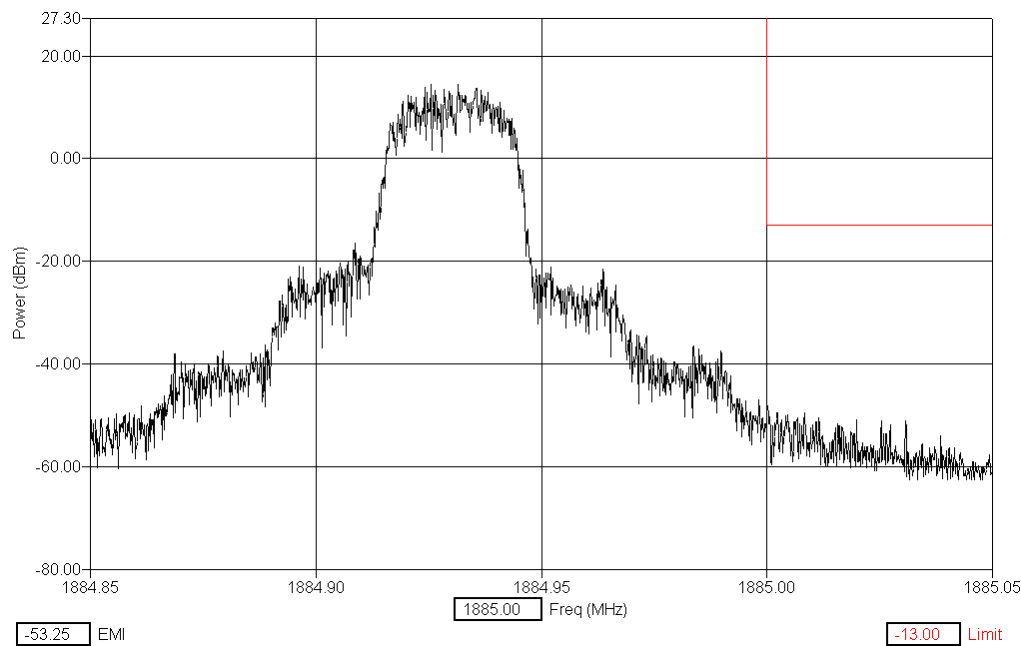
Span: 200kHz RBW: 300 VBW: 300

Test & Certification Center (TCC) - Dallas

FCC ID: GMLRH-25
Test Report #: 03-EM-0042.001
August 22, 2003

Ver 1.0

PCS Block B Upper Edge TDMA Channel 1165



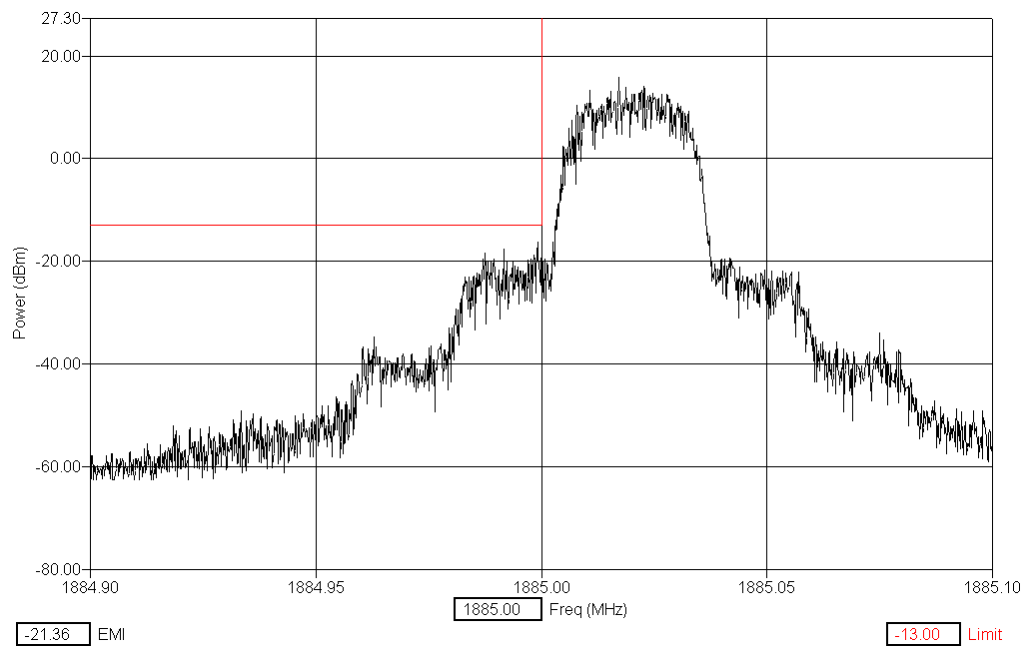
Span: 200kHz RBW: 300 VBW: 300

Test & Certification Center (TCC) - Dallas

FCC ID: GMLRH-25
Test Report #: 03-EM-0042.001
August 22, 2003

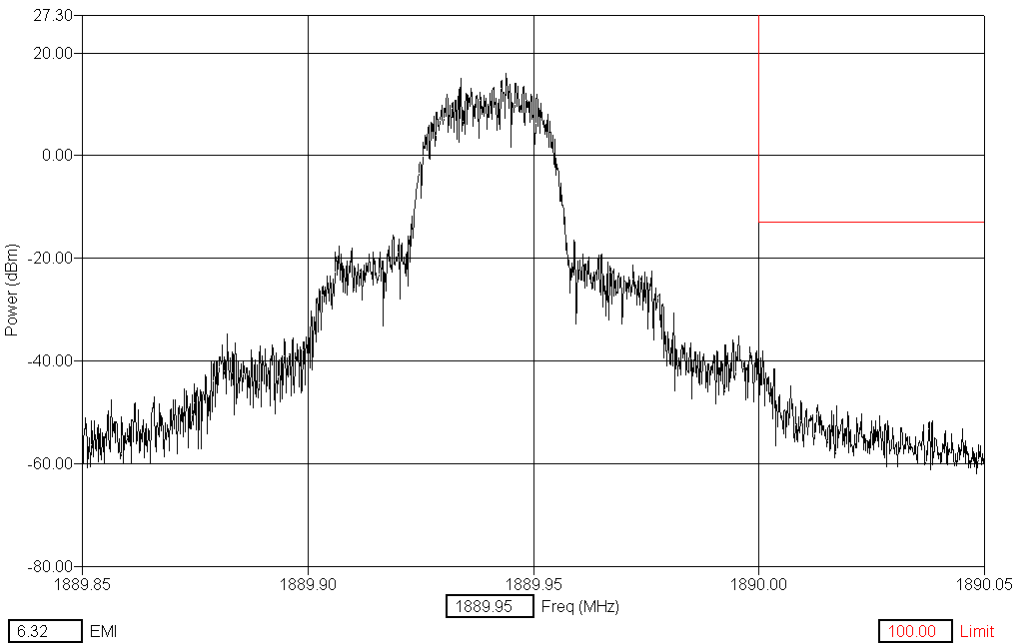
Ver 1.0

PCS Block E Lower Edge TDMA Channel 1168



Span: 200kHz RBW: 300 VBW: 300

PCS Block E Upper Edge TDMA Channel 1332



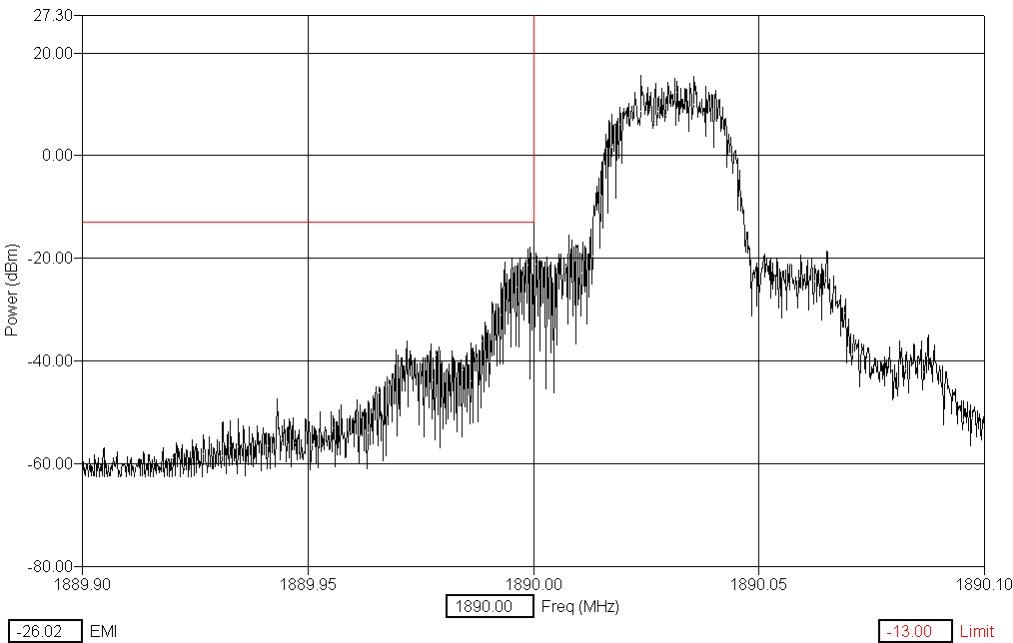
Span: 200kHz RBW: 300 VBW: 300

Test & Certification Center (TCC) - Dallas

FCC ID: GMLRH-25
Test Report #: 03-EM-0042.001
August 22, 2003

Ver 1.0

PCS Block F Lower Edge TDMA Channel 1335



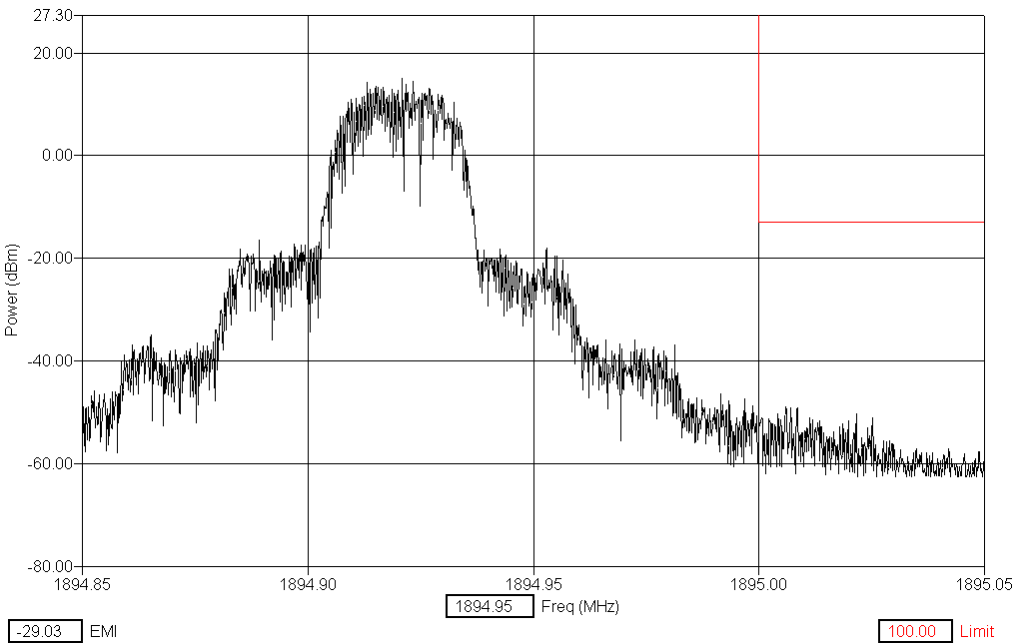
Span: 200kHz RBW: 300 VBW: 300

Test & Certification Center (TCC) - Dallas

FCC ID: GMLRH-25
Test Report #: 03-EM-0042.001
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Ver 1.0

PCS Block F Upper Edge TDMA Channel 1498



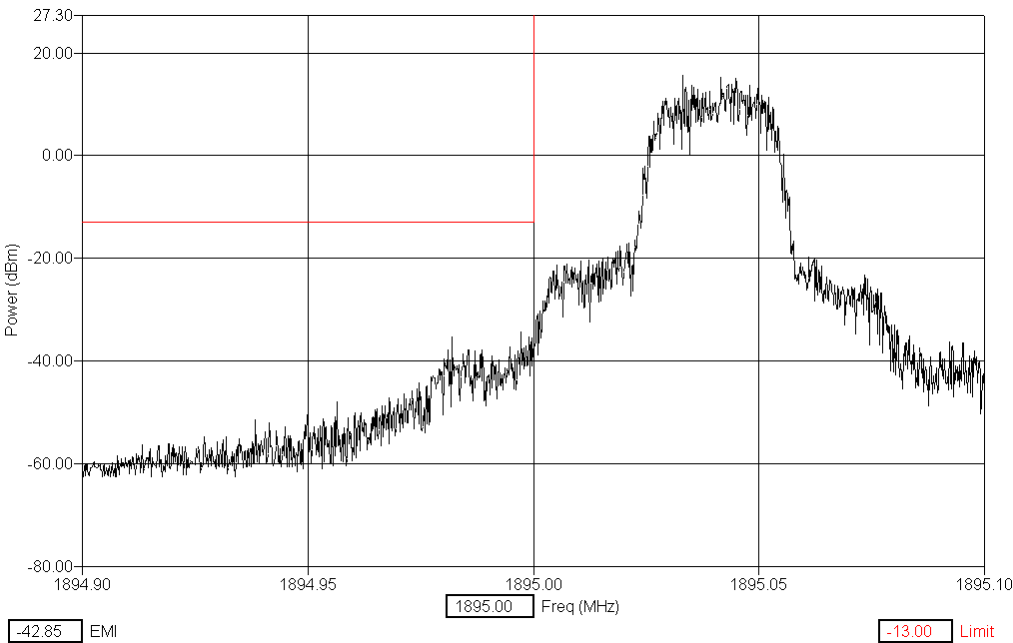
Span: 200kHz RBW: 300 VBW: 300

Test & Certification Center (TCC) - Dallas

FCC ID: GMLRH-25
Test Report #: 03-EM-0042.001
August 22, 2003

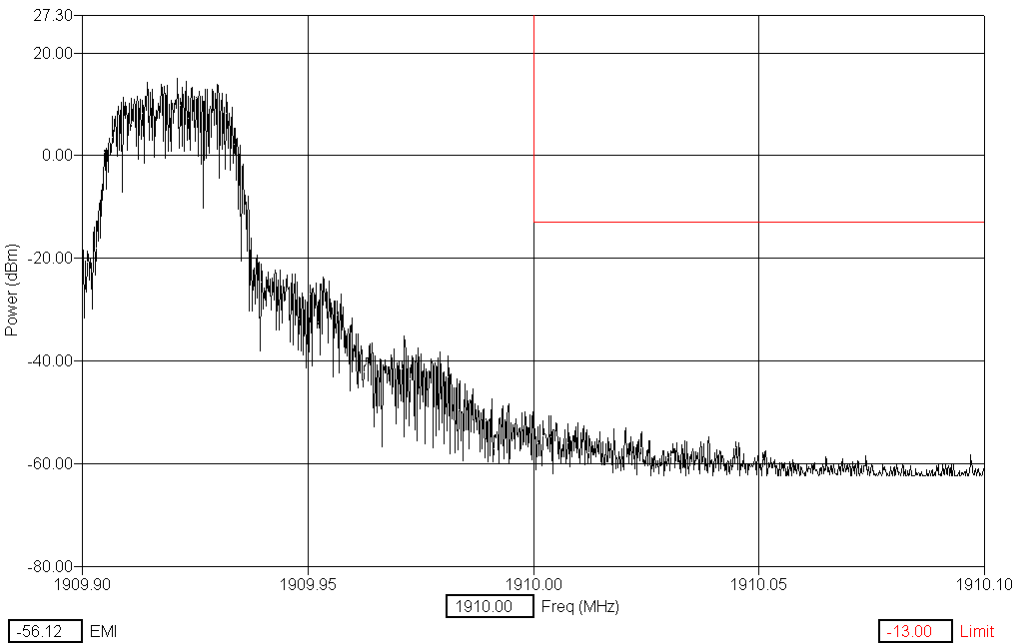
Ver 1.0

PCS Block C Lower Edge TDMA Channel 1502



Span: 200kHz RBW: 300 VBW: 300

PCS Block C Upper Edge TDMA Channel 1998



Span: 200kHz RBW: 300 VBW: 300



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Test & Certification Center (TCC) - Dallas

FCC ID: GMLRH-25

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8.5 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 – 20000 *	-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	Jesse Torres	
Date of Measurement	11-Jul-03 to 14-Jul-03	
Temperature / Humidity	22 to 24 °C	45 to 53 %RH
Test Result	Complies with FCC Part 2.1051	

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

Test & Certification Center (TCC) - Dallas
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Cellular Band, AMPS, Channel 384

Freq (Max) [MHz]	[PK] Trace [dBm]	Cable [dB]	Filter [dB]	[PK] EMI [dBm]	FCC Limit [dBm]
1673.42	-39.06	0.79	2.29	-35.99	-13.00
2510.07	-45.26	1.06	3.00	-41.20	-13.00
3344.91	-47.47	1.27	3.26	-42.93	-13.00
4185.03	-48.41	1.59	3.40	-43.43	-13.00
5020.53	-48.32	1.80	3.51	-43.02	-13.00
5857.76	-48.02	1.97	3.77	-42.28	-13.00
6694.24	-47.60	2.04	4.00	-41.57	-13.00
7525.95	-42.85	2.08	4.20	-36.58	-13.00
8365.05	-45.46	2.30	4.40	-38.76	-13.00

Cellular Band, TDMA 800, Channel 384

Freq (Max) [MHz]	[PK] Trace [dBm]	Cable [dB]	Filter [dB]	[PK] EMI [dBm]	FCC Limit [dBm]
1673.55	-35.84	0.79	2.29	-32.77	-13.00
2510.26	-46.14	1.06	3.00	-42.08	-13.00
3343.69	-47.14	1.27	3.26	-42.61	-13.00
4179.73	-47.33	1.59	3.40	-42.35	-13.00
5019.90	-48.19	1.80	3.51	-42.88	-13.00
5855.91	-47.85	1.97	3.77	-42.11	-13.00
6689.30	-47.62	2.04	4.00	-41.59	-13.00
7528.35	-44.09	2.08	4.20	-37.82	-13.00
8363.67	-45.21	2.30	4.40	-38.51	-13.00

PCS Band, TDMA 1900, Channel 999

Freq MHz [MHz]	[PK] Trace [dBm]	Cable [dB]	Filter [dB]	[PK] EMI [dBm]	FCC Limit [dBm]
3700.3	-43.1	1.5	3.3	-38.3	-13.0
5550.1	-40.8	1.9	3.7	-35.2	-13.0
7402.7	-42.2	2.1	4.2	-36.0	-13.0
9250.5	-43.4	2.8	4.6	-36.1	-13.0
11097.7	-43.2	3.2	5.2	-34.7	-13.0
12951.9	-43.7	3.3	5.9	-34.6	-13.0
14797.4	-39.9	3.3	6.4	-30.2	-13.0
16649.5	-40.8	3.4	7.4	-30.0	-13.0
18499.3	-41.0	4.0	8.3	-28.8	-13.0

9.4 Measurement Uncertainty

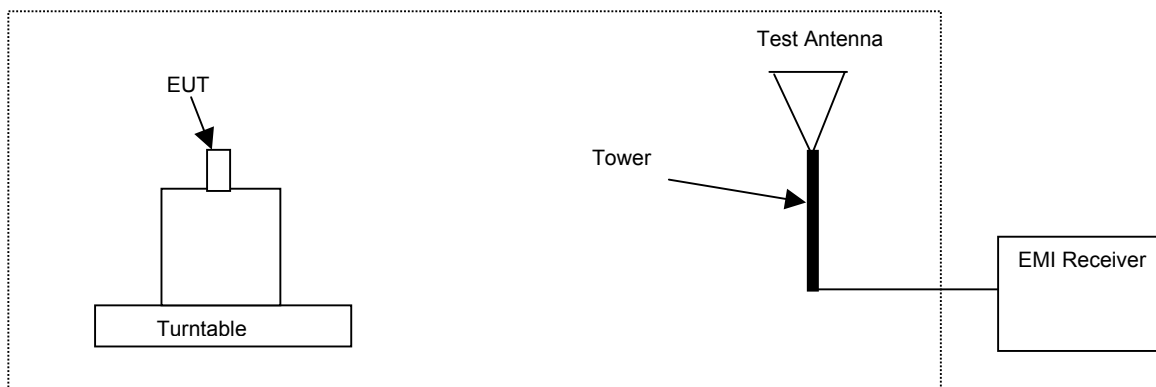
The measurement uncertainty for this test is +/- 3.7dB for 100kHz - 1000MHz and +/- 5.3dB for 1 - 20GHz.

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 – 20000*	-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.

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10.3 Detailed Test Results

Test Technician / Engineer	J. Love/	
Date of Measurement	07 17 July 2003	
Temperature / Humidity	23 - 25°C	37-63%RH
Test Result	Complies	

Cellular Band, AMPS, Channel 384

Tuned Freq (MHz)	Freq Max (MHz)	(PK) EMI (dBm)	dBc	FCC Limit (dBm)	Pol.
836.52	1673.04	-47.6	-70.3	-13	H
836.52	1673.04	-38.03	-60.73	-13	V
836.52	2509.56	-34.17	-56.87	-13	H
836.52	2509.56	-34.03	-56.73	-13	V
836.52	3346.08	-31.39	-54.09	-13	H
836.52	3346.08	-31.02	-53.72	-13	V
836.52	4182.6	-27.01	-49.71	-13	H
836.52	4182.6	-28.11	-50.81	-13	V
836.52	5019.12	-23.91	-46.61	-13	H
836.52	5019.12	-25.42	-48.12	-13	V
836.52	5855.64	-21.48	-44.18	-13	H
836.52	5855.64	-23.28	-45.98	-13	V
836.52	6692.16	-43.5	-66.2	-13	H
836.52	6692.16	-44.17	-66.87	-13	V
836.52	7528.68	-38.69	-61.39	-13	H
836.52	7528.68	-40.72	-63.42	-13	V
836.52	8365.2	-37.75	-60.45	-13	H
836.52	8365.2	-38.92	-61.62	-13	V

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TDMAAd, AMPS, TDMA 800 Channel 384

Tuned Freq (MHz)	Freq Max (MHz)	(PK) EMI (dBm)	dBc	FCC Limit (dBm)	Pol.
836.52	1673.04	-27.7	-53.8	-13	H
836.52	1673.04	-26.6	-52.7	-13	V
836.52	2509.56	-34.06	-60.16	-13	H
836.52	2509.56	-33.77	-59.87	-13	V
836.52	3346.08	-29.93	-56.03	-13	H
836.52	3346.08	-31.94	-58.04	-13	V
836.52	4182.6	-27.09	-53.19	-13	H
836.52	4182.6	-27.61	-53.71	-13	V
836.52	5019.12	-25.14	-51.24	-13	H
836.52	5019.12	-25.43	-51.53	-13	V
836.52	5855.64	-22.64	-48.74	-13	H
836.52	5855.64	-22.5	-48.6	-13	V
836.52	6692.16	-43.16	-69.26	-13	H
836.52	6692.16	-43.62	-69.72	-13	V
836.52	7528.68	-39.98	-66.08	-13	H
836.52	7528.68	-40.27	-66.37	-13	V
836.52	8365.2	-38.89	-64.99	-13	H
836.52	8365.2	-38.61	-64.71	-13	V

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PCS Band, TDMA 1900, Channel 999

Tuned Freq (MHz)	Freq Max (MHz)	(PK) EMI (dBm)	dBc	FCC Limit (dBm)	Pol.
1879.95	3759.9	-27.53	-56.43	-13	H
1879.95	3759.9	-27.39	-56.29	-13	V
1879.95	5639.85	-23.18	-52.08	-13	H
1879.95	5639.85	-23.39	-52.29	-13	V
1879.95	7519.8	-40.73	-69.63	-13	H
1879.95	7519.8	-39.6	-68.5	-13	V
1879.95	9399.75	-35.65	-64.55	-13	H
1879.95	9399.75	-37.12	-66.02	-13	V
1879.95	11279.7	-34.98	-63.88	-13	H
1879.95	11279.7	-35.34	-64.24	-13	V
1879.95	13159.7	-31.4	-60.3	-13	H
1879.95	13159.7	-30.41	-59.31	-13	V
1879.95	15039.6	-29.94	-58.84	-13	H
1879.95	15039.6	-30.26	-59.16	-13	V
1879.95	16919.6	-28.21	-57.11	-13	H
1879.95	16919.6	-29.27	-58.17	-13	V
1879.95	18799.5	-23.67	-52.57	-13	H
1879.95	18799.5	-23.07	-51.97	-13	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 / VOLTAGE VARIATION)

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

Specification: FCC Part 2.1055(d)(1)(2), 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	Jesse Torres		
Date of Measurement	10-Jul-03		
Temperature / Humidity	23 to 26 °C	42 to 53 %RH	
Test Result	Complies with FCC 2.1055		

Temperature (C)	Frequency Error (Hz)		
	TDMA1900	TDMA800	AMPS
-30	-12	-8	290
-20	-12	-9	243
-10	-6	-8	257
0	-18	-8	305
10	-24	-8	302
20	23	7	321
30	22	7	320
40	23	7	342
50	17	6	336

Voltage	Frequency Error (Hz)		
	TDMA1900	TDMA800	AMPS
3.3 (-end point)	4	-2	319
3.8 (Nominal)	18	5	329
4.2 (+end point)	17	6	304

Test & Certification Center (TCC) - Dallas

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APPENDIX

TCC-Dallas is accredited by the American Association for Laboratory Accreditation (A2LA) as shown in the scope below:




American Association for Laboratory Accreditation

SCOPE OF ACCREDITATION TO ISO/IEC 17025:1999

NOKIA MOBILE PHONES
 TEST & CERTIFICATION CENTER - DALLAS
 6021 Connection Drive
 Irving, TX 75039
 Alan Ewing Phone: 972 894 4744

ELECTRICAL

Valid to: November 30, 2003 Certificate Number: 1819-01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following Electromagnetic Compatibility (EMC), Specific Absorption Rate (SAR), and tests on wireless communications devices:

Tests	Test Method
Emissions	
Conducted and Radiated	CFR 47 Part 2, 15, 22, 24 CISPR 22; EN 55022 ICES-003; RSS-128, 132 and 133 3GPP TS 51.010-1 Section 12.2 ETSI EN 301 489-1; EN 301 489-7 (using ANSI C63.4 and RSS-212)
Specific Absorption Rate	IEEE 1528 EN 50360; EN 50361 CFR 47 Parts 2 and 24 OET Bulletin 65 and Supplement C RSS-102
Immunity	
Vehicular Immunity	ISO 7637-1; ETSI EN 301 489-1; EN 301 489-7
Electrostatic Discharge (ESD)	EN 61000-4-2; ETSI EN 301 489-1; EN 301 489-7
RF Radiated	EN 61000-4-3; ETSI EN 301 489-1; EN 301 489-7
Electrical Fast Transient/Burst	EN 61000-4-4; ETSI EN 301 489-1; EN 301 489-7
Surge	EN 61000-4-5; ETSI EN 301 489-1; EN 301 489-7
Conducted	EN 61000-4-6; ETSI EN 301 489-1; EN 301 489-7
Voltage Dips, Short Interruptions and Voltage Variations	EN 61000-4-11; ETSI EN 301 489-1; EN 301 489-7



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 5301 Buckeystown Pike, Suite 350 • Frederick, MD 21704-8373 • Phone: 301-644 3248 • Fax: 301-662 2974



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“This laboratory is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this report have been determined to be in accordance with the laboratory’s terms of accreditation unless stated otherwise in the report.”

Should this report contain any data for tests for which we are not accredited, such data would not be covered by this laboratory’s A2LA accreditation.