

**M. Flom Associates, Inc. - Global Compliance Center**

3356 North San Marcos Place, Suite 107, Chandler, Arizona 85225-7176

www.mflom.com general@mflom.com (480) 926-3100, FAX: 926-3598

Date: June 9, 2000

Federal Communications Commission
Via: Electronic Filing

Attention: Authorization & Evaluation Division

Applicant: Nokia Mobile Phones, Inc.
Equipment: 5180i, Type NSD-1GW
FCC ID: GMLNSD-1GW
FCC Rules: 22, 22.901(d), Confidentiality

Gentlemen:

On behalf of the Applicant, enclosed please find Application Form 731, Engineering Test Report and all pertinent documentation, the whole for approval of the referenced equipment as shown.

Filing fees are attached.

We trust the same is in order. Should you need any further information, kindly contact the writer who is authorized to act as agent.

Sincerely yours,

A handwritten signature in black ink, appearing to read 'M. Flom P. Eng.', with a horizontal line drawn underneath.

Morton Flom, P. Eng.

enclosure(s)
cc: Applicant
MF/cvr

LIST OF EXHIBITS
(FCC **CERTIFICATION** (CELLULAR TRANSMITTERS) - REVISED 9/28/98)

APPLICANT: Nokia Mobile Phones, Inc.

FCC ID: GMLNSD-1GW

BY APPLICANT:

1. LETTER OF AUTHORIZATION
2. IDENTIFICATION DRAWINGS, 2.1033(c)(11)
 - ___ LABEL
 - ___ LOCATION OF LABEL
 - ___ COMPLIANCE STATEMENT
 - ___ LOCATION OF COMPLIANCE STATEMENT
3. PHOTOGRAPHS, 2.1033(c)(12)
4. CONFIDENTIALITY REQUEST: 0.457 and 0.459
5. DOCUMENTATION: 2.1033(c)
 - (3) USER MANUAL
 - (9) TUNE UP INFO
 - (10) SCHEMATIC DIAGRAM
 - (10) CIRCUIT DESCRIPTION
 - BLOCK DIAGRAM
 - PARTS LIST
 - ACTIVE DEVICES
6. ATTESTATION: ESN: Section 22.919
7. ATTESTATION: OET: Section 22.933

BY M.F.A. INC.

- A. TESTIMONIAL & STATEMENT OF CERTIFICATION
- B. STATEMENT OF QUALIFICATIONS



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Sub-part
2.1033(c):

EQUIPMENT IDENTIFICATION

FCC ID: GMLNSD-1GW

NAMEPLATE DRAWING

ATTACHED, EXHIBIT 1.

LOCATION

AS PER LABEL DRAWING(S)

DATE OF REPORT

June 9, 2000

SUPERVISED BY:

A handwritten signature in black ink, reading 'M. Flom P. Eng.', is written over a horizontal line.

Morton Flom, P. Eng.

THE APPLICANT HAS BEEN CAUTIONED AS TO THE FOLLOWING:

15.21 INFORMATION TO USER.

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

15.27(a) SPECIAL ACCESSORIES.

Equipment marketed to a consumer must be capable of complying with the necessary regulations in the configuration in which the equipment is marketed. Where special accessories, such as shielded cables and/or special connectors are required to enable an unintentional or intentional radiator to comply with the emission limits in this part, the equipment must be marketed with, i.e. shipped and sold with, those special accessories. However, in lieu of shipping or packaging the special accessories with the unintentional or intentional radiator, the responsible party may employ other methods of ensuring that the special accessories are provided to the consumer, without additional charge.

Information detailing any alternative method used to supply the special accessories for a grant of equipment authorization or retained in the verification records, as appropriate. The party responsible for the equipment, as detailed in § 2.909 of this chapter, shall ensure that these special accessories are provided with the equipment. The instruction manual for such devices shall include appropriate instructions on the first page of text concerned with the installation of the device that these special accessories must be used with the device. It is the responsibility of the user to use the needed special accessories supplied with the equipment.

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Required information per ISO/IEC Guide 25-1990, paragraph 13.2:

a)

TEST REPORT

- b) Laboratory: M. Flom Associates, Inc.
(FCC: 31040/SIT) 3356 N. San Marcos Place, Suite 107
(Canada: IC 2044) Chandler, AZ 85225
- c) Report Number: d0060015
- d) Client: Nokia Mobile Phones
12278 Scripps Summit Dr.
San Diego, CA 92131
- e) Identification: 5180i, Type NSD-1GW
FCC ID: GMLNSD-1GW
Description: Dual Mode AMPS Band CDMA Cellular Telephone
- f) EUT Condition: Not required unless specified in individual tests.
- g) Report Date: June 9, 2000
EUT Received: May 24, 2000
- h, j, k): As indicated in individual tests.
- i) Sampling method: No sampling procedure used.
- l) Uncertainty: In accordance with MFA internal quality manual.
- m) Supervised by:
- 
Morton Flom, P. Eng.
- n) Results: The results presented in this report relate only to the item tested.
- o) Reproduction: This report must not be reproduced, except in full, without written permission from this laboratory.

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LIST OF GENERAL INFORMATION REQUIRED FOR CERTIFICATION

IN ACCORDANCE WITH FCC RULES AND REGULATIONS,
VOLUME II, PART 2 AND TO

22, 22.901(d), Confidentiality

Sub-part 2.1033

(c)(1): NAME AND ADDRESS OF APPLICANT:

Nokia Mobile Phones, Inc.
6200 Courtney Campbell Causeway, Suite 900
P.O. Box 30730
Tampa, Florida 33630-3730

MANUFACTURER:

Nokia Mobile Phones Manufacturing (USA), Inc.
5650 Alliance Gateway
Fort Worth, TX 76178

(c)(2): FCC ID: GMLNSD-1GW

MODEL NO: 5180i, Type NSD-1GW

(c)(3): INSTRUCTION MANUAL(S):

PLEASE SEE ATTACHED EXHIBITS

(c)(4): TYPE OF EMISSION: 1M25F9W, 40K0F1D, 40K0F9W

(c)(5): FREQUENCY RANGE, MHz: 824.04 to 848.97 FM-AMPS
824.73 to 848.19 CDMA-AMPS

(c)(6): POWER RATING, Watts: 0.005 to 0.5 ERP
___ Switchable ___ x 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.

(c)(7): MAXIMUM POWER RATING, Watts: 7

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Subpart 2.1033 (continued)

(c)(8): VOLTAGES & CURRENTS IN ALL ELEMENTS IN FINAL R. F. STAGE,
INCLUDING FINAL TRANSISTOR OR SOLID STATE DEVICE:

COLLECTOR CURRENT, A = per manual
COLLECTOR VOLTAGE, Vdc = per manual
SUPPLY VOLTAGE, Vdc = 3.9

(c)(9): TUNE-UP PROCEDURE:

PLEASE SEE ATTACHED EXHIBITS

(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.

PLEASE SEE ATTACHED EXHIBITS

(c)(11): LABEL INFORMATION:

PLEASE SEE ATTACHED EXHIBITS

(c)(12): PHOTOGRAPHS:

PLEASE SEE ATTACHED EXHIBITS

(c)(13): DIGITAL MODULATION DESCRIPTION:

 ATTACHED EXHIBITS
 X N/A

(c)(14): TEST AND MEASUREMENT DATA:

FOLLOWS

PAGE NO.

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M. Flom Associates, Inc. is accredited by the American Association for Laboratory Association (A2LA) as shown in the scope below.



**THE AMERICAN
ASSOCIATION
FOR LABORATORY
ACCREDITATION**

ACCREDITED LABORATORY

A2LA has accredited

M. FLOM ASSOCIATES, INC.
Chandler, AZ

for technical competence in the field of

Electrical (EMC) Testing

The accreditation covers the specific tests and types of tests listed on the agreed scope of accreditation. This laboratory meets the requirements of ISO/IEC Guide 25-1990 "General Requirements for the Competence of Calibration and Testing Laboratories" (equivalent to relevant requirements of the ISO 9000 series of standards) and any additional program requirements in the identified field of testing.

Presented this 24th day of November, 1998.



Peter Nijzen
President
For the Accreditation Council
Certificate Number 1008.01
Valid to December 31, 2000

For tests or types of tests to which this accreditation applies, please refer to the laboratory's Electrical (EMC) Scope of Accreditation



American Association for Laboratory Accreditation

SCOPE OF ACCREDITATION TO ISO/IEC GUIDE 25-1990 AND EN 45001

M. FLOM ASSOCIATES, INC.
Electronic Testing Laboratory
3356 North San Marcos Place, Suite 107
Chandler, AZ 85225
Morton Flom Phone: 480 926 3100

ELECTRICAL (EMC)

Valid to: December 31, 2000 Certificate Number: 1008-01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following electromagnetic compatibility tests:

Tests	Standard(s)
RF Emissions	FCC Part 15 (Subparts B and C) using ANSI C63.4-1992; CISPR 11; CISPR 13; CISPR 14; CISPR 22; EN 55011; EN 55013; EN 55014; EN 55022; EN 50081-1; EN 50081-2; FCC Part 18; ICES-003; AS/NZS 1044; AS/NZS 1053; AS/NZS 3548; AS/NZS 4251.1; CNS 13438
RF Immunity	EN 50082-1; EN 50082-2; AS/NZS 4251.1
Radiated Susceptibility	EN 61000-4-3; ENV 50140; ENV 50204; IEC 1000-4-3; IEC 801-3
ESD	EN 61000-4-2; IEC 1000-4-2; IEC 801-2
EFT	EN 61000-4-4; IEC 1000-4-4; IEC 801-4
Surge	EN 61000-4-5; ENV 50142; IEC 1000-4-5; IEC 801-5
47 CFR (FCC)	2, 21, 22, 23, 24, 74, 80, 87, 90, 95, 97

Revised 2/2/2000

Peter Nijzen

5301 Buckeystown Pike, Suite 350 • Frederick, MD 21704-8370 • Phone: 301 644 3248 • Fax: 301 662 2974

"This laboratory is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this report have been determined 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, or which have been undertaken by a subcontractor that is not A2LA accredited, such data would not covered by this laboratory's A2LA accreditation.

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Sub-part

2.1033(c)(14):

TEST AND MEASUREMENT DATA

All tests and measurement data shown were performed in accordance with FCC Rules and Regulations, Volume II; Part 2, Sub-part J, Sections 2.947, 2.1033(c), 2.1041, 2.1046, 2.1047, 2.1079, 2.1051, 2.1053, 2.1055, 2.1057 and the following individual Parts:

- ☐ 21 - Domestic Public Fixed Radio Services
- ☒ 22 - Public Mobile Services
- ☐ 22 Subpart H - Cellular Radiotelephone Service
- ☒ 22.901(d) - Alternative technologies and auxiliary services
- ☐ 23 - International Fixed Public Radiocommunication services
- ☐ 24 - Personal Communications Services
- ☐ 74 Subpart H - Low Power Auxiliary Stations
- ☐ 80 - Stations in the Maritime Services
- ☐ 80 Subpart E - General Technical Standards
- ☐ 80 Subpart F - Equipment Authorization for Compulsory Ships
- ☐ 80 Subpart K - Private Coast Stations and Marine Utility Stations
- ☐ 80 Subpart S - Compulsory Radiotelephone Installations for Small Passenger Boats
- ☐ 80 Subpart T - Radiotelephone Installation Required for Vessels on the Great Lakes
- ☐ 80 Subpart U - Radiotelephone Installations Required by the Bridge-to-Bridge Act
- ☐ 80 Subpart V - Emergency Position Indicating Radiobeacons (EPIRB'S)
- ☐ 80 Subpart W - Global Maritime Distress and Safety System (GMDSS)
- ☐ 80 Subpart X - Voluntary Radio Installations
- ☐ 87 - Aviation Services
- ☐ 90 - Private Land Mobile Radio Services
- ☐ 94 - Private Operational-Fixed Microwave Service
- ☐ 95 Subpart A - General Mobile Radio Service (GMRS)
- ☐ 95 Subpart C - Radio Control (R/C) Radio Service
- ☐ 95 Subpart D - Citizens Band (CB) Radio Service
- ☐ 95 Subpart E - Family Radio Service
- ☐ 95 Subpart F - Interactive Video and Data Service (IVDS)
- ☐ 97 - Amateur Radio Service
- ☐ 101 - Fixed Microwave Services

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GENERAL INFORMATION

1. Prior to testing, the deviation for audio modulation and each of the respective SAT + ST tones were set as close as possible to the required limit.
2. Except for audio modulation, which was applied externally, Wideband Data SAT, ST and all other tones and operational modes were provided by a test control unit incorporating appropriate software. Worst case repetition rate for Wideband Data was 10 kb/s.
3. Spurious radiation was measured at three (3) meters.
4. The two cellular frequency bands are available to the user automatically. Please refer to the manual contained in the documentation.
5. The normal modes of modulation are:
 - ☒ (a) VOICE
 - ☒ (b) WIDEBAND DATA
 - ☒ (c) SAT
 - ☒ (d) ST
 - ☒ (e) SAT + VOICE
 - ☒ (f) SAT + DTMF
 - ☒ (g) CDMA
 - ☐ (h) TDMA
 - ☐ (i) NAMPS VOICE
 - ☐ (j) NAMPS DSAT
 - ☐ (k) NAMPS ST
 - ☐ (l) NAMPS VOICE + DSAT

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STANDARD TEST CONDITIONS
and
ENGINEERING PRACTICES

Except as noted herein, the following conditions and procedures were observed during the testing:

In accordance with ANSI C63.4-1992, section 6.1.9, and unless otherwise indicated in the specific measurement results, the ambient temperature of the actual EUT was maintained within the range of 10° to 40°C (50° to 104 °F) unless the particular equipment requirements specify testing over a different temperature range. Also, unless otherwise indicated, the humidity levels were in the range of 10% to 90% relative humidity.

Prior to testing, the EUT was tuned up in accordance with the manufacturer's alignment procedures. All external gain controls were maintained at the position of maximum and/or optimum gain throughout the testing.

Measurement results, unless otherwise noted, are worst case measurements.

GUIDES:

This device was tested using the following Guide(s):

TIA/EIA/IS-95A-1995

PAGE NO. 8 of 67.
NAME OF TEST: Carrier Output Power (Conducted)
SPECIFICATION: 47 CFR 2.1046(a)
GUIDE: As indicated on page 7
TEST EQUIPMENT: As per attached page

MEASUREMENT PROCEDURE

1. The EUT was connected to a resistive coaxial attenuator of normal load impedance, and the unmodulated output power was measured by means of an R. F. Power Meter.
2. Measurement accuracy is $\pm 3\%$.

MEASUREMENT RESULTS

NOMINAL, MHz	CHANNEL	R. F. POWER, WATTS	
		Lo	Hi
AMPS MODE:			
824.040	991	0.004	0.447
836.400	380	0.004	0.447
848.970	799	0.004	0.447
CDMA MODE:			
825.290	991	8 x 10 ⁻⁹	0.282
836.400	380	8 x 10 ⁻⁹	0.282
847.720	799	8 x 10 ⁻⁹	0.282

SUPERVISED BY:

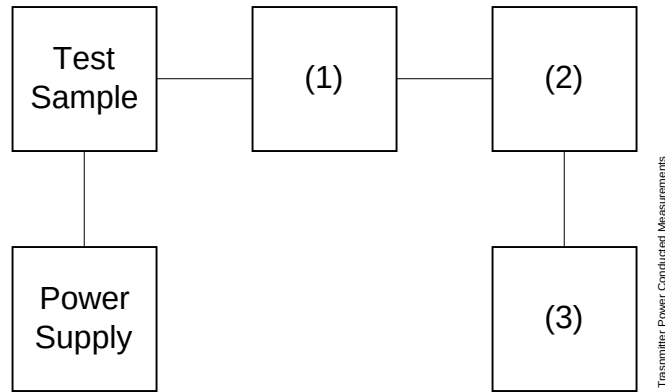

 Morton Flom, P. Eng.

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TRANSMITTER POWER CONDUCTED MEASUREMENTS

TEST 1: R. F. POWER OUTPUT
 TEST 2: FREQUENCY STABILITY



Asset	Description (as applicable)	s/n
(1)	<u>COAXIAL ATTENUATOR</u>	
i00122	Narda 766-10	7802
i00123	Narda 766-10	7802A
i00069	Bird 8329 (30 dB)	1006
i00113	Sierra 661A-3D	1059
(2)	<u>POWER METERS</u>	
i00014	HP 435A	1733A05836
i00039	HP 436A	2709A26776
i00020	HP 8901A POWER MODE	2105A01087
(3)	<u>FREQUENCY COUNTER</u>	
i00042	HP 5383A	1628A00959
i00019	HP 5334B	2704A00347
i00020	HP 8901A FREQUENCY MODE	2105A01087

PAGE NO. 10 of 67.
NAME OF TEST: R. F. Power Output (Radiated)
SPECIFICATION: 47 CFR 2.1046(a)
GUIDE: As indicated on page 7
TEST EQUIPMENT: As per attached page

MEASUREMENT PROCEDURE (RADIATED)

1. The EUT was placed on an open-field site and its radiated field strength at a known distance was measured by means of a spectrum analyzer. Equivalent loading was calculated from the equation $P_t = ((E \times R)^2 / 49.2)$ watts, where $R = 3m$.
2. Measurement accuracy is ± 1.5 dB.

MEASUREMENT RESULTS

g0020271: 2000-Feb-14 Mon 09:44:00

STATE: 2:High Power AMPS MODE

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	METER, dBuV/m	CF, dB	ERP, dBm	ERP, Watts
824.040000	824.040000	94.26	29.98	26.9	0.50
836.400000	836.410000	93.74	30.01	26.4	0.44
848.970000	848.970000	93.15	30.04	25.8	0.38

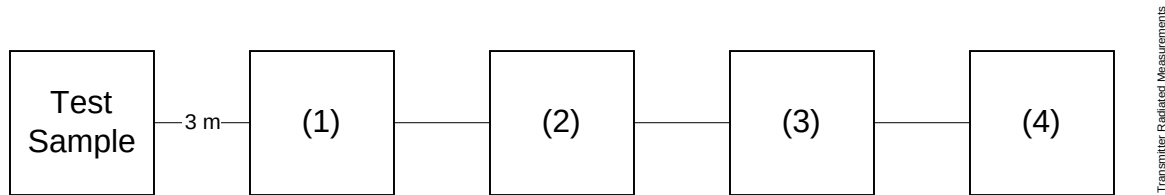
g0020272: 2000-Feb-14 Mon 10:54:00

STATE: 2:High Power CDMA MODE

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	METER, dBuV/m	CF, dB	ERP, dBm	ERP, Watts
824.730000	824.860000	92.32	29.97	24.9	0.30
836.400000	836.500000	92.14	30.01	24.8	0.28
848.190000	848.170000	91.09	30.04	23.8	0.235

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TRANSMITTER RADIATED MEASUREMENTS

Asset	Description (as applicable)	s/n
(1)	TRANSDUCER	
i00091	Emco 3115	001469
i00089	Apel Log Periodic	001500
(2)	HIGH PASS FILTER	
i00	Narda μ PAD (In-Band Only)	
i00	Trilithic (Out-Of-Band Only)	
(3)	PREAMP	
i00028	HP 8449 (+30 dB)	2749A00121
(4)	SPECTRUM ANALYZER	
i00048	HP 8566B	2511A01467
i00057	HP 8557A	1531A00191
i00029	HP 8563E	3213A00104

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NAME OF TEST: Unwanted Emissions (Transmitter Conducted)

SPECIFICATION: 47 CFR 2.1051

GUIDE: ANSI/TIA/EIA-603-1992, Paragraph 2.2.13

TEST EQUIPMENT: As per attached page

MEASUREMENT PROCEDURE

1. The emissions were measured for the worst case as follows:
 - (a): within a band of frequencies defined by the carrier frequency plus and minus one channel.
 - (b): from the lowest frequency generated in the EUT and to at least the 10th harmonic of the carrier frequency, or 40 GHz, whichever is lower.
2. The magnitude of spurious emissions that are attenuated more than 20 dB below the permissible value need not be specified.
3. MEASUREMENT RESULTS: ATTACHED FOR WORST CASE

FREQUENCY OF CARRIER, MHz	=	836.4, 824.04, 848.97, 836.4, 824.73, 848.19
SPECTRUM SEARCHED, GHz	=	0 to 10 x F _c
MAXIMUM RESPONSE, Hz	=	2510 Hz
ALL OTHER EMISSIONS	=	≥ 20 dB BELOW LIMIT

SUPERVISED BY:

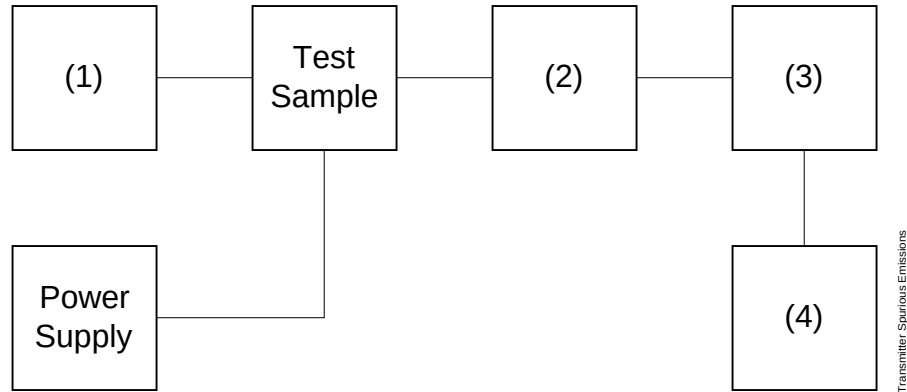

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TRANSMITTER SPURIOUS EMISSION

TEST A. OCCUPIED BANDWIDTH (IN-BAND SPURIOUS)
 TEST B. OUT-OF-BAND SPURIOUS



Asset Description (as applicable)	s/n
(1) <u>AUDIO OSCILLATOR/GENERATOR</u>	
i00010 HP 204D	1105A04683
i00017 HP 8903A	2216A01753
i00012 HP 3312A	1432A11250
(2) <u>COAXIAL ATTENUATOR</u>	
i00122 Narda 766-10	7802
i00123 Narda 766-10	7802A
i00069 Bird 8329 (30 dB)	1006
i00113 Sierra 661A-3D	1059
(3) <u>FILTERS; NOTCH, HP, LP, BP</u>	
i00126 Eagle TNF-1	100-250
i00125 Eagle TNF-1	50-60
i00124 Eagle TNF-1	250-850
(4) <u>SPECTRUM ANALYZER</u>	
i00048 HP 8566B	2511A01467
i00029 HP 8563E	3213A00104

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AMPS-FM

TRANSMITTER CONDUCTED EMISSIONS (TX2)

NOKIA, 5180i

GA2G001: 2000-FEB-16, 11:47, WED

TUNED MHz	EMISSION MHz	LEVEL dBm	LEVEL dBc	LEVEL uW	MARGIN dB
824.040	1648.093000	-50.1	-76.6	0	-37.1
836.400	1672.799000	-53.6	-80.1	0	-40.6
848.970	1697.954000	-49.1	-75.6	0	-36.1
824.040	2472.124000	-52.1	-78.6	0	-39.1
836.400	2509.223000	-52.3	-78.8	0	-39.3
848.970	2546.895000	-52.9	-79.4	0	-39.9
824.040	3296.144000	-55.5	-82.0	0	-42.5
836.400	3345.966000	-54.3	-80.8	0	-41.3
848.970	3395.633000	-55.4	-81.9	0	-42.4
824.040	4119.760000	-54.5	-81.0	0	-41.5
836.400	4182.478000	-54.6	-81.1	0	-41.6
848.970	4244.786000	-54.9	-81.4	0	-41.9
824.040	4944.357000	-55.4	-81.9	0	-42.4
836.400	5018.595000	-55.2	-81.7	0	-42.2
848.970	5093.515000	-55.5	-82.0	0	-42.5
824.040	5767.862000	-54.7	-81.2	0	-41.7
836.400	5854.448000	-49.5	-76.0	0	-36.5
848.970	5943.147000	-49.2	-75.7	0	-36.2
824.040	6591.878000	-49.5	-76.0	0	-36.5
836.400	6690.973000	-49.5	-76.0	0	-36.5
848.970	6791.827000	-48.8	-75.3	0	-35.8
824.040	7415.872000	-50.0	-76.5	0	-37.0
836.400	7527.648000	-49.7	-76.2	0	-36.7
848.970	7640.785000	-49.5	-76.0	0	-36.5
824.040	8240.551000	-49.1	-75.6	0	-36.1
836.400	8363.916000	-50.3	-76.8	0	-37.3
848.970	8489.849000	-49.8	-76.3	0	-36.8
824.040	9064.653000	-49.5	-76.0	0	-36.5
836.400	9199.977000	-50.1	-76.6	0	-37.1
848.970	9338.744000	-49.6	-76.1	0	-36.6
824.040	9887.986000	-49.4	-75.9	0	-36.4
836.400	10036.605000	-49.6	-76.1	0	-36.6
848.970	10187.697000	-48.7	-75.2	0	-35.7
824.040	10712.711000	-48.7	-75.2	0	-35.7
836.400	10873.149000	-49.5	-76.0	0	-36.5
848.970	11036.327000	-48.2	-74.7	0	-35.2
824.040	11536.134000	-48.9	-75.4	0	-35.9
836.400	11709.757000	-49.7	-76.2	0	-36.7
848.970	11885.756000	-48.0	-74.5	0	-35.0
824.040	12361.026000	-48.5	-75.0	0	-35.5
836.400	12545.795000	-45.2	-71.7	0	-32.2
848.970	12734.943000	-45.6	-72.1	0	-32.6

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AMPS-CDMA

TRANSMITTER CONDUCTED EMISSIONS (TX1)

NOKIA, 5180i

GA2G002: 2000-FEB-16, 11:54, WED

TUNED MHz	EMISSION MHz	LEVEL dBm	LEVEL dBc	LEVEL uW	MARGIN dB
824.730	1649.754000	-53.1	-77.6	0	-40.1
836.400	1672.364000	-53.9	-78.4	0	-40.9
848.190	1696.373000	-53.6	-78.1	0	-40.6
824.730	2474.339000	-52.9	-77.4	0	-39.9
836.400	2509.281000	-54.7	-79.2	0	-41.7
848.190	2544.205000	-53.4	-77.9	0	-40.4
824.730	3298.525000	-55.2	-79.7	0	-42.2
836.400	3345.393000	-55.5	-80.0	0	-42.5
848.190	3393.192000	-55.5	-80.0	0	-42.5
824.730	4123.660000	-55.5	-80.0	0	-42.5
836.400	4181.628000	-54.8	-79.3	0	-41.8
848.190	4240.922000	-55.5	-80.0	0	-42.5
824.730	4948.855000	-55.2	-79.7	0	-42.2
836.400	5018.128000	-54.9	-79.4	0	-41.9
848.190	5088.838000	-53.1	-77.6	0	-40.1
824.730	5773.375000	-56.0	-80.5	0	-43.0
836.400	5855.133000	-48.1	-72.6	0	-35.1
848.190	5937.370000	-49.7	-74.2	0	-36.7
824.730	6597.481000	-48.5	-73.0	0	-35.5
836.400	6690.891000	-50.0	-74.5	0	-37.0
848.190	6785.604000	-49.9	-74.4	0	-36.9
824.730	7422.253000	-49.7	-74.2	0	-36.7
836.400	7527.409000	-50.1	-74.6	0	-37.1
848.190	7633.384000	-49.1	-73.6	0	-36.1
824.730	8247.533000	-49.5	-74.0	0	-36.5
836.400	8363.884000	-50.2	-74.7	0	-37.2
848.190	8481.784000	-49.7	-74.2	0	-36.7
824.730	9071.936000	-50.1	-74.6	0	-37.1
836.400	9199.965000	-50.3	-74.8	0	-37.3
848.190	9330.187000	-49.8	-74.3	0	-36.8
824.730	9896.554000	-48.3	-72.8	0	-35.3
836.400	10036.599000	-49.3	-73.8	0	-36.3
848.190	10178.458000	-49.9	-74.4	0	-36.9
824.730	10721.944000	-50.1	-74.6	0	-37.1
836.400	10872.746000	-49.7	-74.2	0	-36.7
848.190	11026.857000	-49.0	-73.5	0	-36.0
824.730	11546.025000	-48.2	-72.7	0	-35.2
836.400	11709.827000	-49.3	-73.8	0	-36.3
848.190	11874.176000	-49.4	-73.9	0	-36.4
824.730	12371.120000	-49.2	-73.7	0	-36.2
836.400	12546.056000	-45.0	-69.5	0	-32.0
848.190	12723.080000	-43.3	-67.8	0	-30.3

PAGE NO. 16 of 67.
NAME OF TEST: Audio Frequency Response
SPECIFICATION: 47 CFR 2.1047(a)
GUIDE: As indicated on page 7
TEST EQUIPMENT: As per previous page

MEASUREMENT PROCEDURE

1. The EUT and test equipment were set up as shown on the following page.
2. The audio signal generator was connected to the audio input circuit/microphone of the EUT.
3. The audio signal input was adjusted to obtain 20% modulation at 1 kHz, and this point was taken as the 0 dB reference level.
4. With input levels held constant and below limiting at all frequencies, the audio signal generator was varied from 100 Hz to 50 kHz.
5. The response in dB relative to 1 kHz was then measured, using the HP 8901A Modulation Analyzer.
6. MEASUREMENT RESULTS: ATTACHED

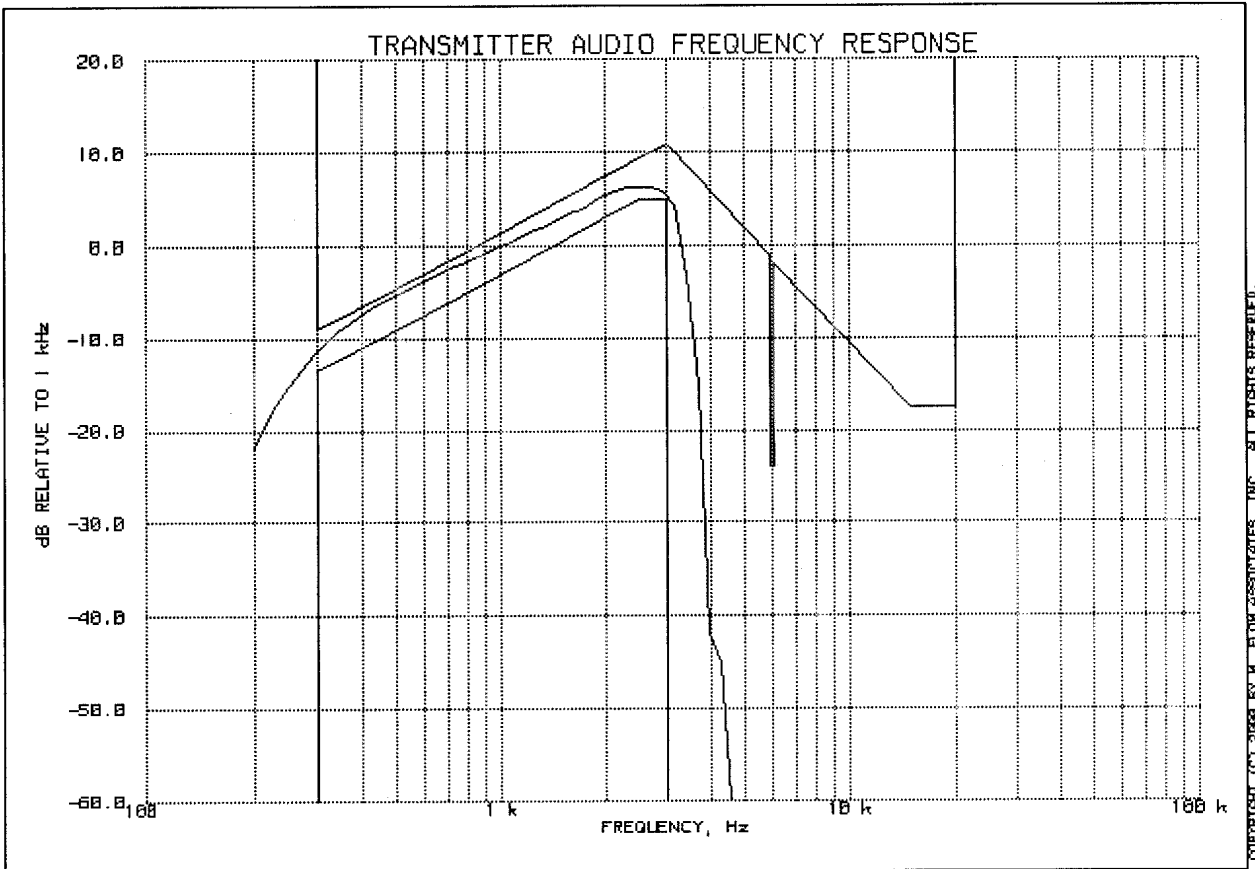
PAGE NO.

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TRANSMITTER AUDIO FREQUENCY RESPONSE

p0020015: NOKIA, 5180i

g0020115: 15 FEB 2000, 11:40



PEAK AUDIO FREQUENCY, Hz: 2510

TABLE VALUES:

FREQUENCY, Hz	LEVEL, dB	FREQUENCY, Hz	LEVEL, dB
300	-11.3	30000	-47.4
20000	-41.1	50000	-50.5

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NAME OF TEST: Audio Low Pass Filter (Voice Input)
SPECIFICATION: 47 CFR 2.1047(a)
GUIDE: As indicated on page 7
TEST EQUIPMENT: As per attached page

MEASUREMENT PROCEDURE

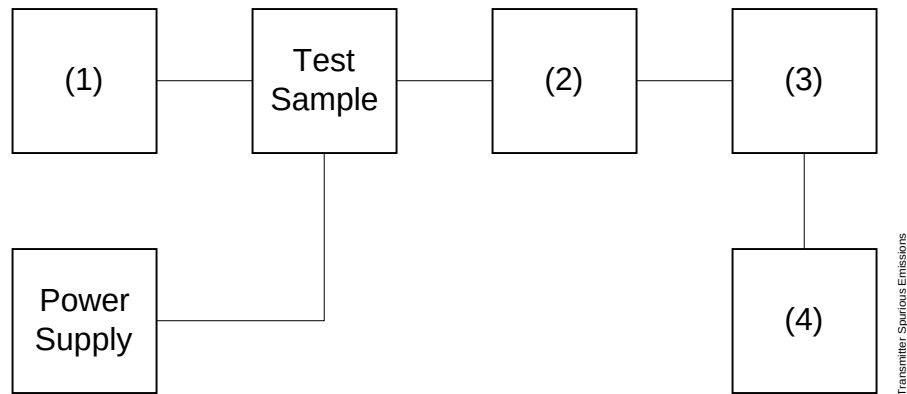
1. The EUT and test equipment were set up such that the audio input was connected at the input to the modulation limiter, and the modulated stage.
2. The audio output was connected at the output to the modulated stage.
3. MEASUREMENT RESULTS: ATTACHED

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TRANSMITTER SPURIOUS EMISSION

TEST A. OCCUPIED BANDWIDTH (IN-BAND SPURIOUS)
 TEST B. OUT-OF-BAND SPURIOUS



Asset Description (as applicable)	s/n
(1) <u>AUDIO OSCILLATOR/GENERATOR</u>	
i00010 HP 204D	1105A04683
i00017 HP 8903A	2216A01753
i00012 HP 3312A	1432A11250
(2) <u>COAXIAL ATTENUATOR</u>	
i00122 Narda 766-10	7802
i00123 Narda 766-10	7802A
i00069 Bird 8329 (30 dB)	1006
i00113 Sierra 661A-3D	1059
(3) <u>FILTERS; NOTCH, HP, LP, BP</u>	
i00126 Eagle TNF-1	100-250
i00125 Eagle TNF-1	50-60
i00124 Eagle TNF-1	250-850
(4) <u>SPECTRUM ANALYZER</u>	
i00048 HP 8566B	2511A01467
i00029 HP 8563E	3213A00104

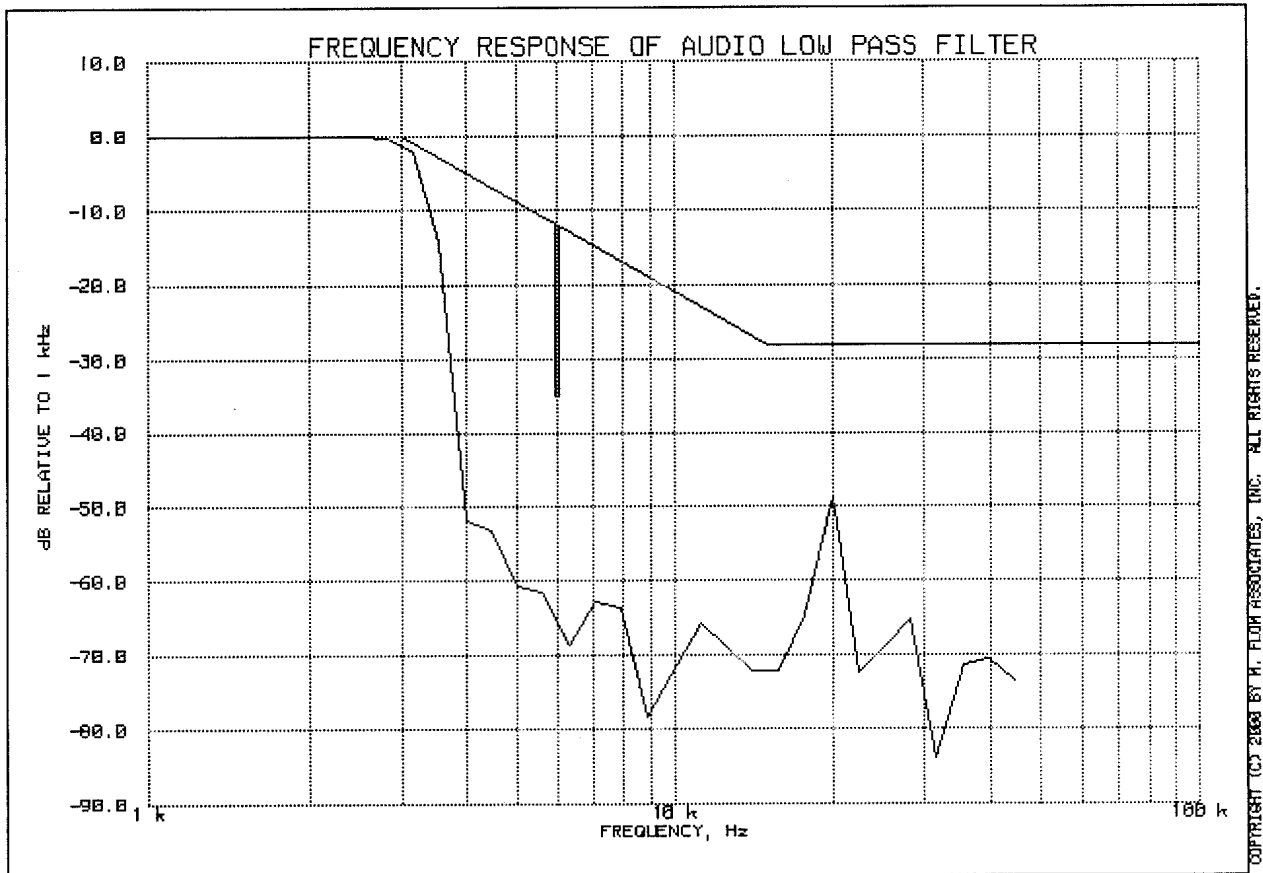
PAGE NO.

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FREQUENCY RESPONSE OF AUDIO LOW PASS FILTER

p0020015: NOKIA, 5180i

g0020117: 15 FEB 2000, 11:56



PEAK AUDIO FREQUENCY, Hz: 2510

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NAME OF TEST: Modulation Limiting

SPECIFICATION: 47 CFR 2.1047(b)

GUIDE: As indicated on page 7

TEST EQUIPMENT: As per previous page

MEASUREMENT PROCEDURE

1. The audio signal generator was connected to the audio input circuit/microphone of the EUT as for Frequency Response of the Audio Modulating Circuit.
2. 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 an HP 8901A Modulation Analyzer.
3. The audio input level was varied from 30% modulation (± 3.6 kHz deviation) to at least 20 dB higher than the saturation point.
4. Measurements were performed for both negative and positive modulation and the respective results were recorded.
5. MEASUREMENT RESULTS ATTACHED FOR:

COMPANDER ON:

 x VOICE
 x VOICE + SAT

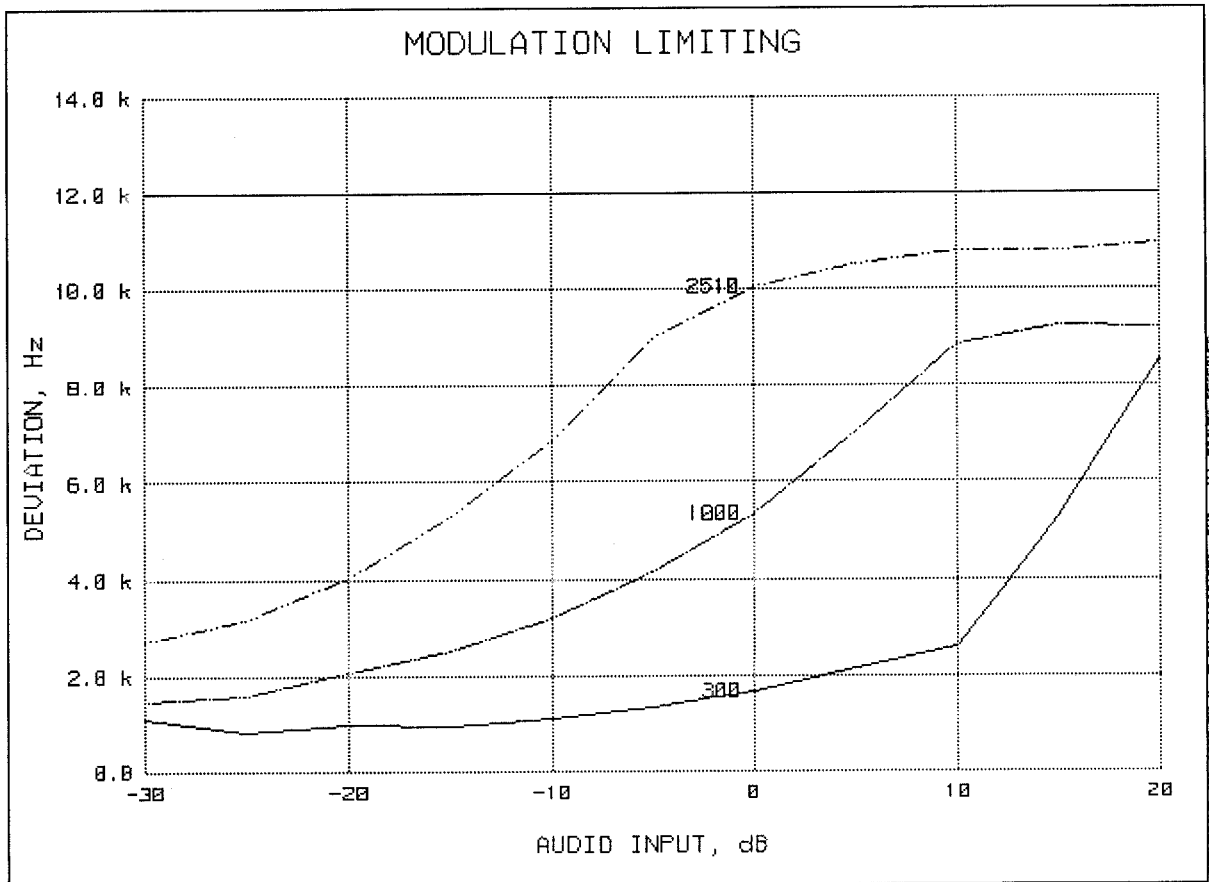
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MODULATION LIMITING

p0020015: NOKIA, 5180i

g0020124: 2000-FEB-15, 12:34



COMMENT	= VOICE ONLY
REFERENCE DEVIATION, kHz	= 6
REFERENCE MODULATION, Hz	= 1000
PEAKS	= POSITIVE
AUDIO AMPLITUDE, mV	= 1000

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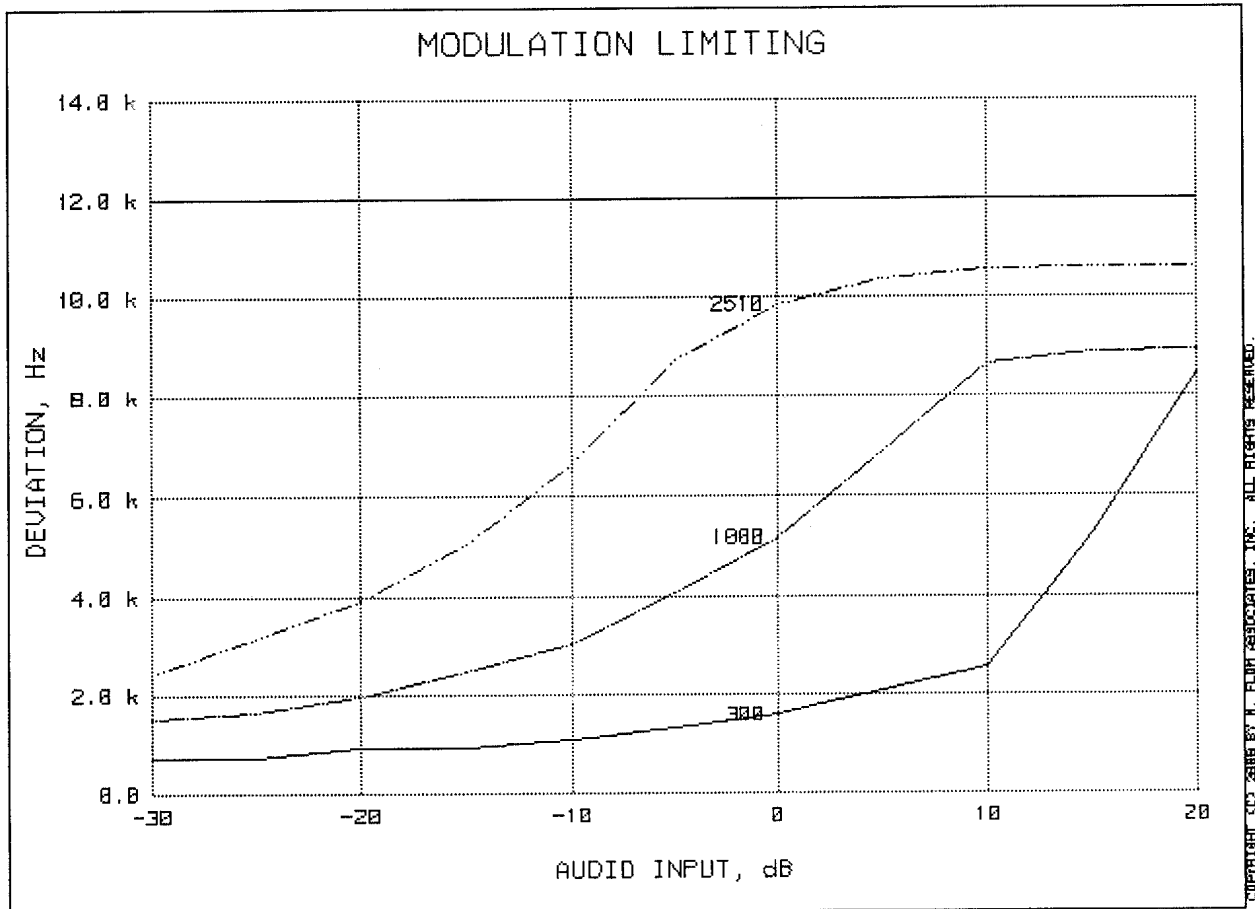
PAGE NO.

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MODULATION LIMITING

p0020015: NOKIA, 5180i

g0020124: 2000-FEB-15, 12:34



COMMENT	= VOICE ONLY
REFERENCE DEVIATION, kHz	= 6
REFERENCE MODULATION, Hz	= 1000
PEAKS	= NEGATIVE
AUDIO AMPLITUDE, mV	= 1000

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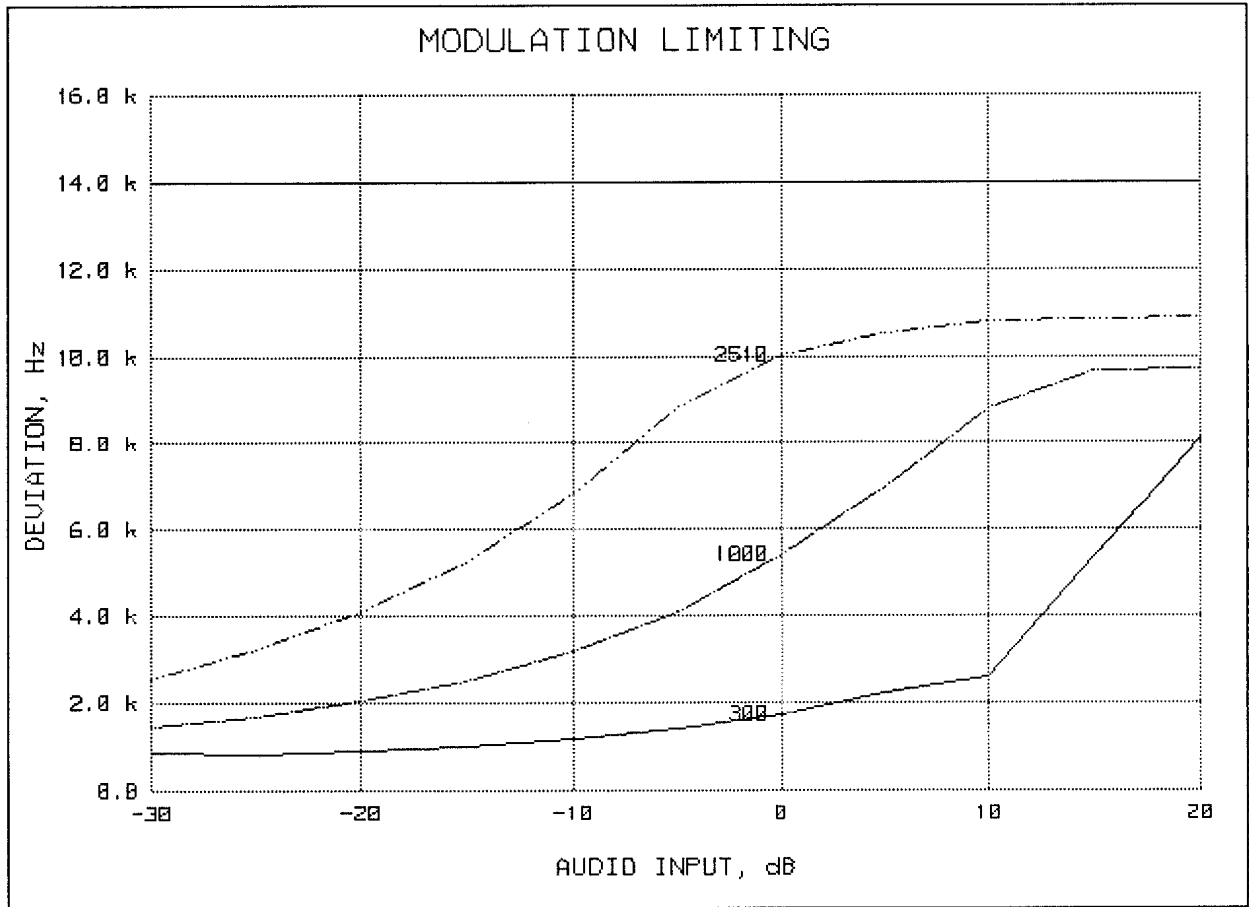
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MODULATION LIMITING

p0020015: NOKIA, 5180i

g0020125: 2000-FEB-15, 13:20



COMMENT	= VOICE + SAT
REFERENCE DEVIATION, kHz	= 6
REFERENCE MODULATION, Hz	= 1000
PEAKS	= POSITIVE
AUDIO AMPLITUDE, mV	= 1000

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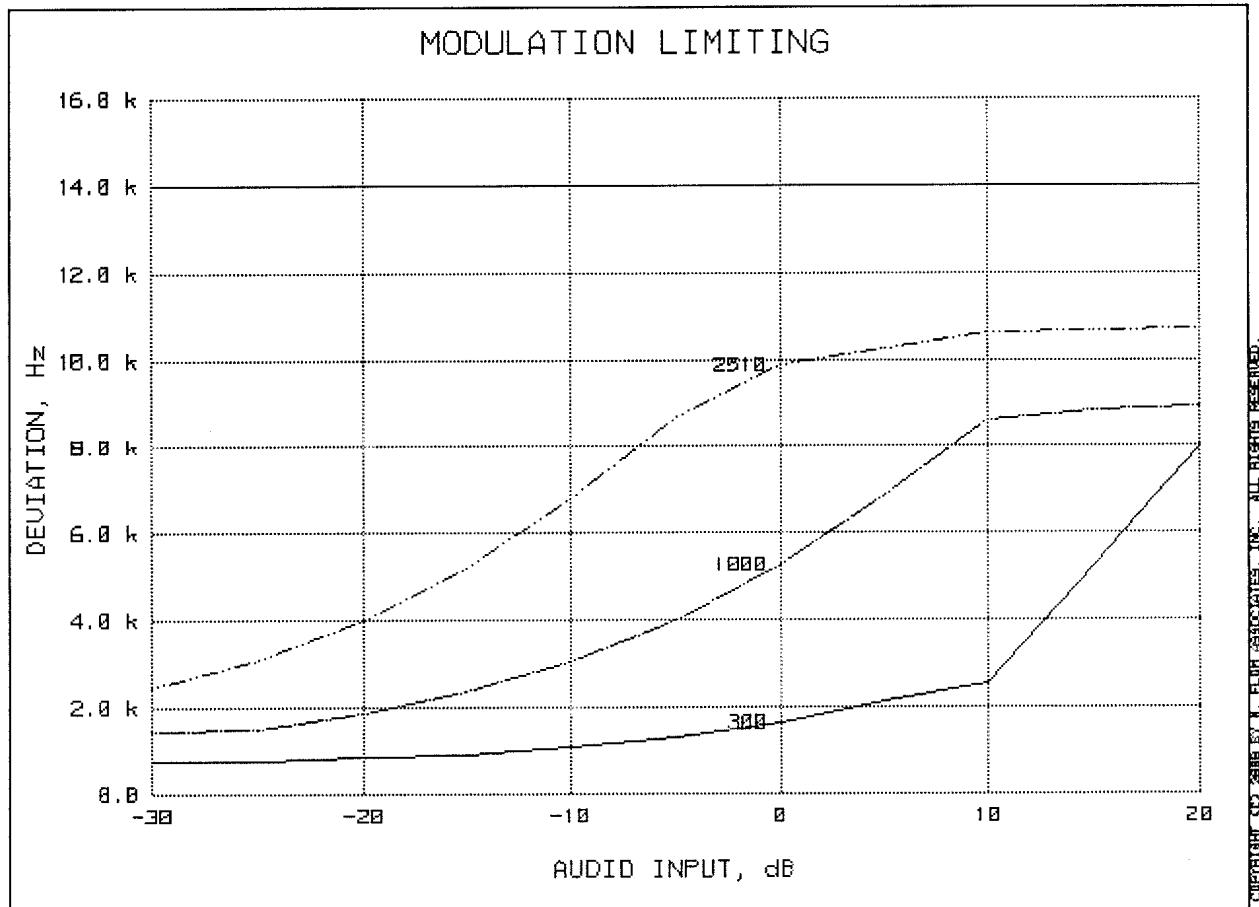
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MODULATION LIMITING

p0020015: NOKIA, 5180i

g0020125: 2000-FEB-15, 13:20



COMMENT	= VOICE + SAT
REFERENCE DEVIATION, kHz	= 6
REFERENCE MODULATION, Hz	= 1000
PEAKS	= NEGATIVE
AUDIO AMPLITUDE, mV	= 1000

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PAGE NO. 26 of 67.
NAME OF TEST: Measurement Of Maximum Deviation
GUIDE: As indicated on page 7
TEST EQUIPMENT: As per attached page

MEASUREMENT PROCEDURE

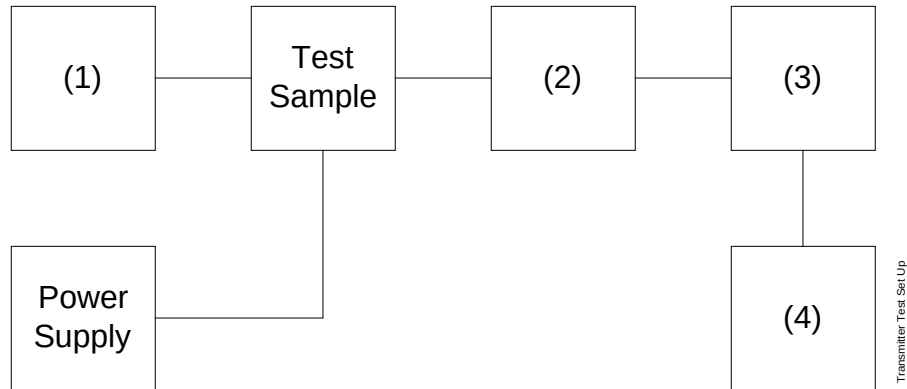
1. The presentation of tones was obtained by attaching the HP 8903A Oscilloscope to the Modulation Output of the HP 8901 Modulation Analyzer.
2. The EUT was modulated by an HP 8903 Audio Analyzer and/or internally generated signals.
3. Maximum deviation measurements were recorded for the various configurations.
4. MEASUREMENT RESULTS: ATTACHED SUMMARY FOR DEVIATION

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TRANSMITTER TEST SET-UP

TEST A. MODULATION CAPABILITY/DISTORTION
 TEST B. AUDIO FREQUENCY RESPONSE
 TEST C. HUM AND NOISE LEVEL
 TEST D. RESPONSE OF LOW PASS FILTER
 TEST E. MODULATION LIMITING



Asset Description (as applicable)	s/n
(1) <u>Audio Oscillator</u>	
i00010 HP 204D	1105A04683
i00017 HP 8903A	2216A01753
i00118 HP 33120A	US36002064
(2) <u>COAXIAL ATTENUATOR</u>	
i00122 NARDA 766-10	7802
i00123 NARDA 766-10	7802A
i00113 SIERRA 661A-3D	1059
i00069 BIRD 8329 (30 dB)	10066
(3) <u>MODULATION ANALYZER</u>	
i00020 HP 8901A	2105A01087
(4) <u>AUDIO ANALYZER</u>	
i00017 HP 8903A	2216A01753

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MEASUREMENT SUMMARY: Measurement Of Maximum Deviation

MODULATION	LIMIT, kHz	DEVIATION, MHz
(a) Voice	$\geq 10.8 \text{ \& } \leq 13.2$	11.1
(b) Wideband Data	$\geq 7.2 \text{ \& } \leq 8.8$	8.2
(c) SAT	$\geq 1.8 \text{ \& } \leq 2.2$	2.1
(d) ST	$\geq 7.2 \text{ \& } \leq 8.8$	8.7
(e) SAT + VOICE	N/A	12.8
(f) SAT + DTMF	N/A	9.8
(i) NAMPS VOICE	N/A	N/A
(j) NAMPS DSAT	N/A	N/A
(k) NAMPS ST	N/A	N/A
(l) NAMPS VOICE	N/A	N/A

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NAME OF TEST: Emission Masks (Occupied Bandwidth)
SPECIFICATION: 47 CFR 2.1049(c)(1), 22
GUIDE: As indicated on page 7
TEST EQUIPMENT: As per previous page

MEASUREMENT PROCEDURE

1. The EUT and test equipment were set up as shown on the following page, with the Spectrum Analyzer connected.
2. For EUTs supporting audio modulation, the audio signal generator was adjusted to the frequency of maximum response and with output level set for ± 2.5 kHz deviation (or 50% modulation). With level constant, the signal level was increased 16 dB.
3. For EUTs supporting digital modulation, the digital modulation mode was operated to its maximum extent.
4. The Occupied Bandwidth was measured with the Spectrum Analyzer controls set as shown on the test results.
5. MEASUREMENT RESULTS: ATTACHED

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MEASUREMENT SUMMARY: Emission Masks (Occupied Bandwidth)

MODULATION	MEASURED DEVIATION ±kHz (HP 8901A)	LIMIT ±kHz	B/W @-26 dB PLOTS, kHz
NONE	0.0	0.0	0.0
VOICE	11.1	$\geq 10.8 \text{ \& } \leq 13.2$	32
WIDEBAND DATA	8.2	$\geq 7.2 \text{ \& } \leq 8.8$	22
SAT + VOICE	12.8	N/A	31
SAT + DTMF	9.8	N/A	24
CDMA	N/A	N/A	N/A
TDMA	N/A	N/A	N/A
NAMPS	N/A	N/A	N/A

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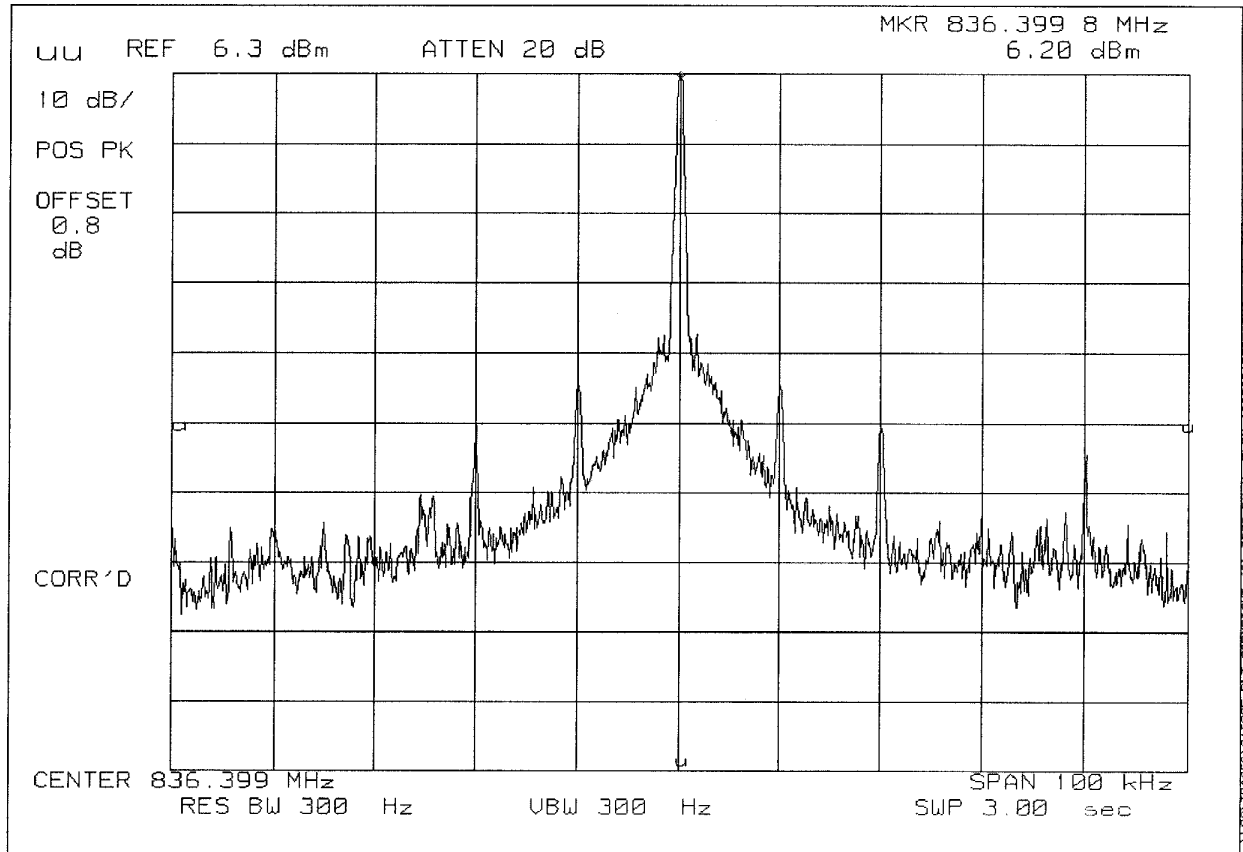
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SPECTRUM ANALYZER PRESENTATION
NOKIA, 5180i
2000-FEB-16, 09:05, WED

POWER: LOW
MODULATION: NONE



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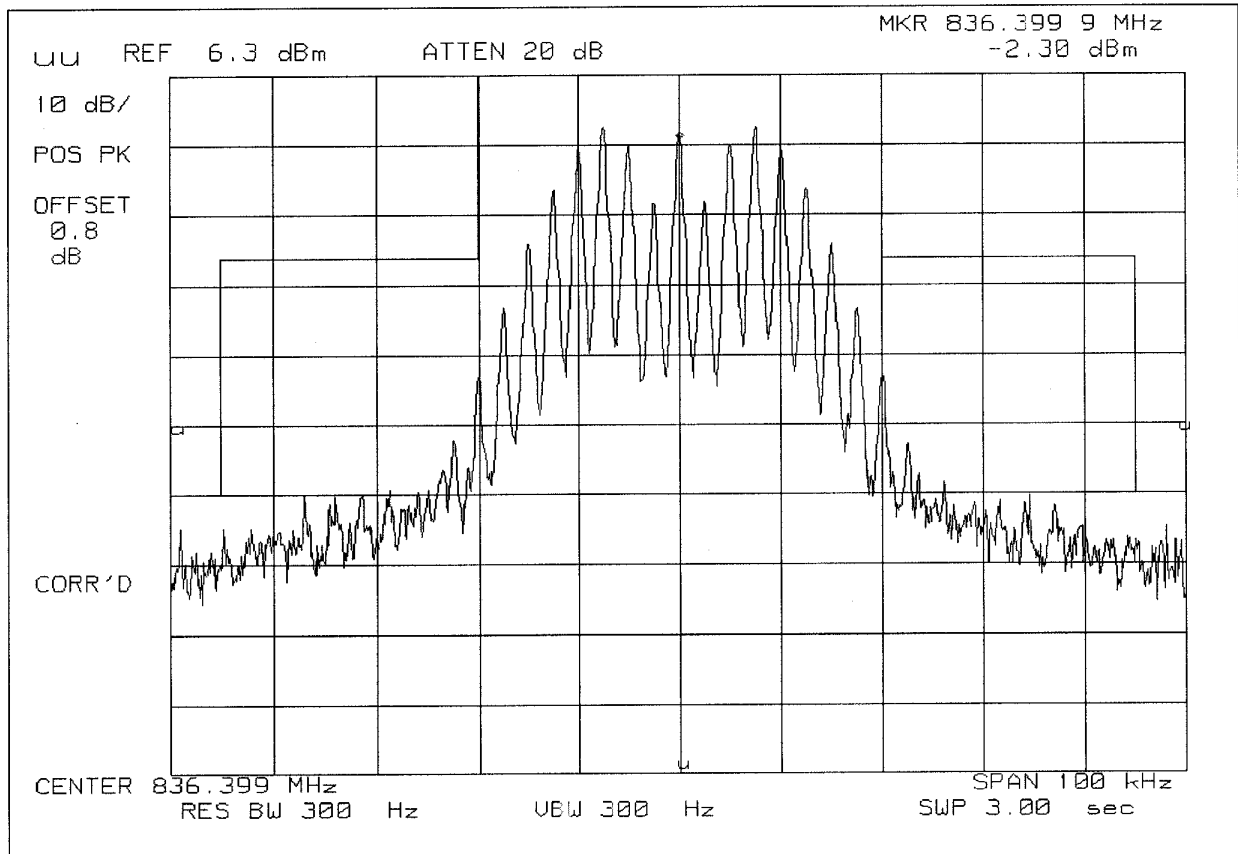
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SPECTRUM ANALYZER PRESENTATION
 NOKIA, 5180i
 2000-FEB-16, 09:19, WED

POWER: LOW
 MODULATION: VOICE: 2500 Hz SINE WAVE
 MASK: AMPS CELLULAR, F3E/F3D w/LPF



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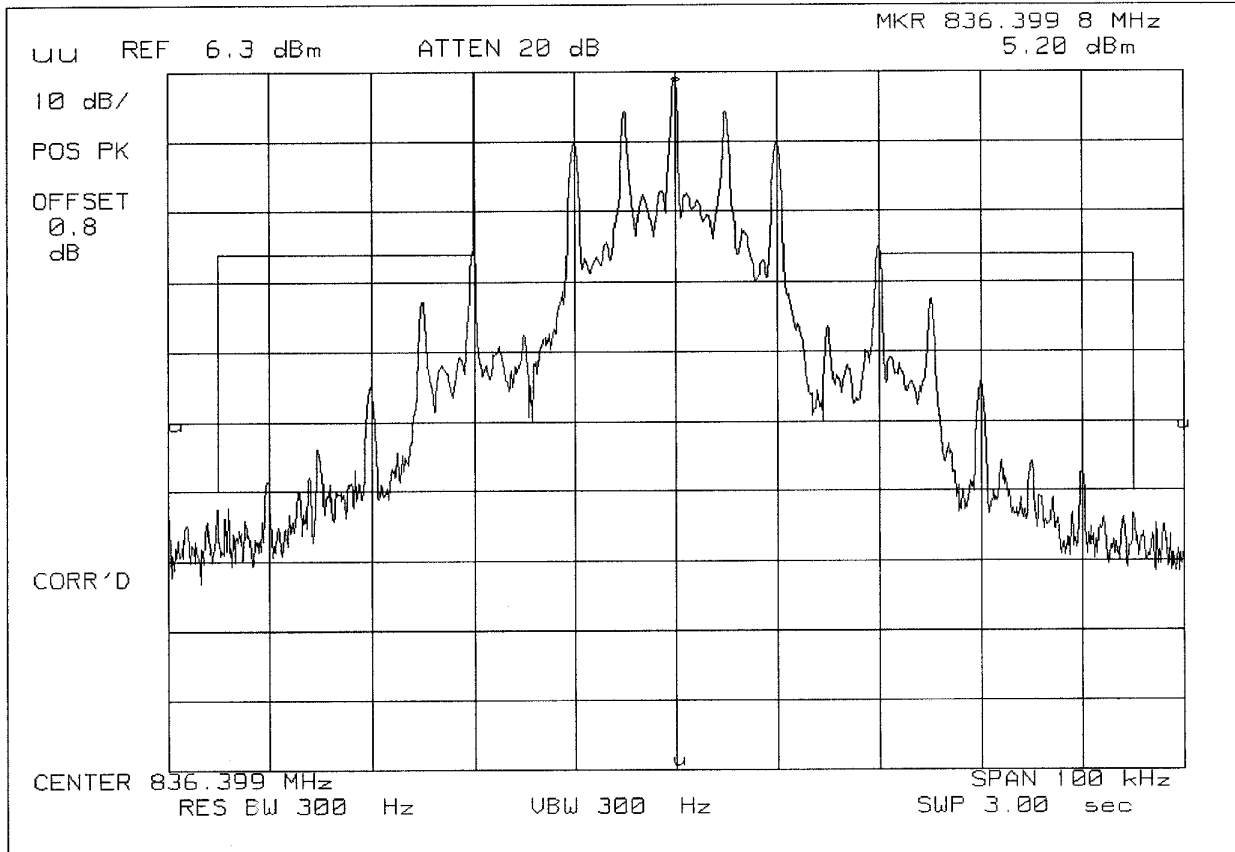
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SPECTRUM ANALYZER PRESENTATION
 NOKIA, 5180i
 2000-FEB-16, 09:52, WED

POWER: LOW
 MODULATION: WBD
 MASK: AMPS CELLULAR, F3E/F3D w/LPF



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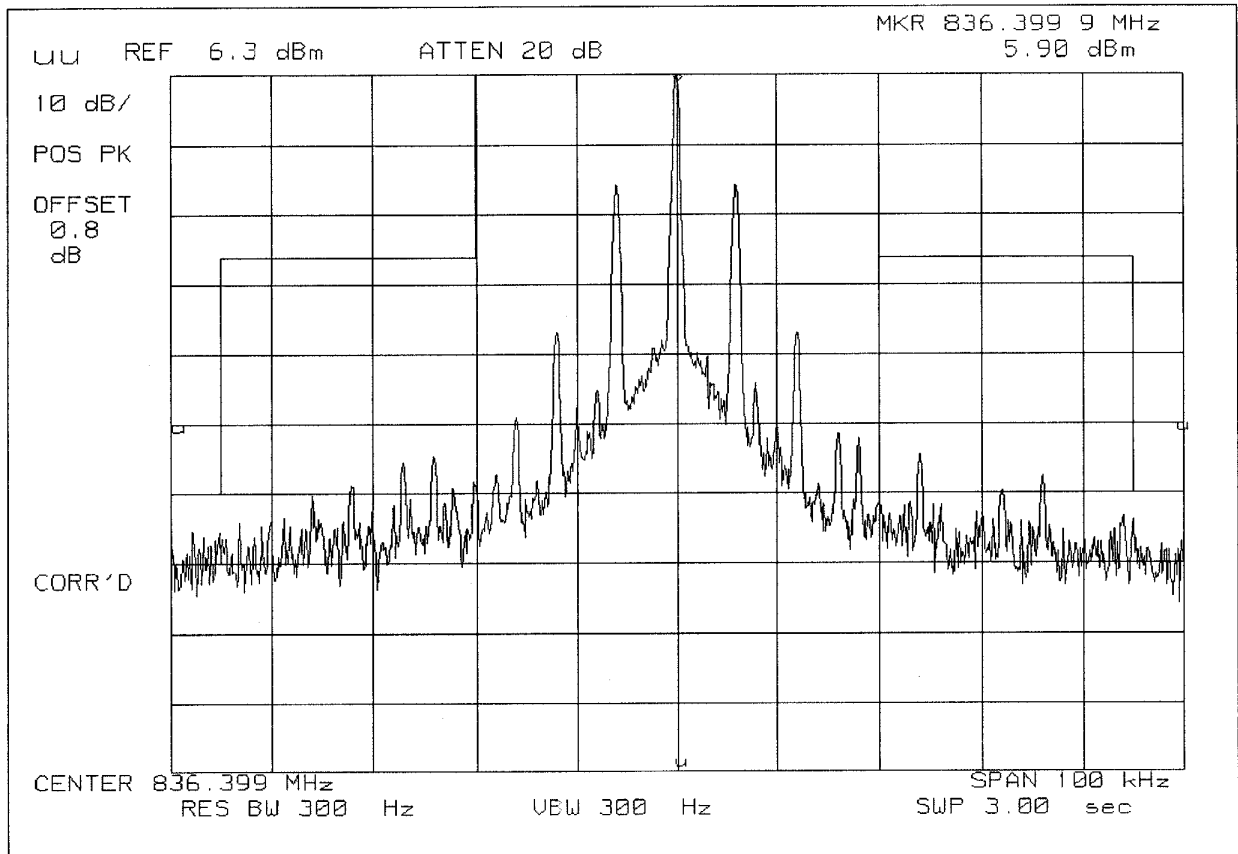
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SPECTRUM ANALYZER PRESENTATION
NOKIA, 5180i
2000-FEB-16, 09:29, WED

POWER: LOW
MODULATION: SAT
MASK: AMPS CELLULAR, F3E/F3D w/LPF



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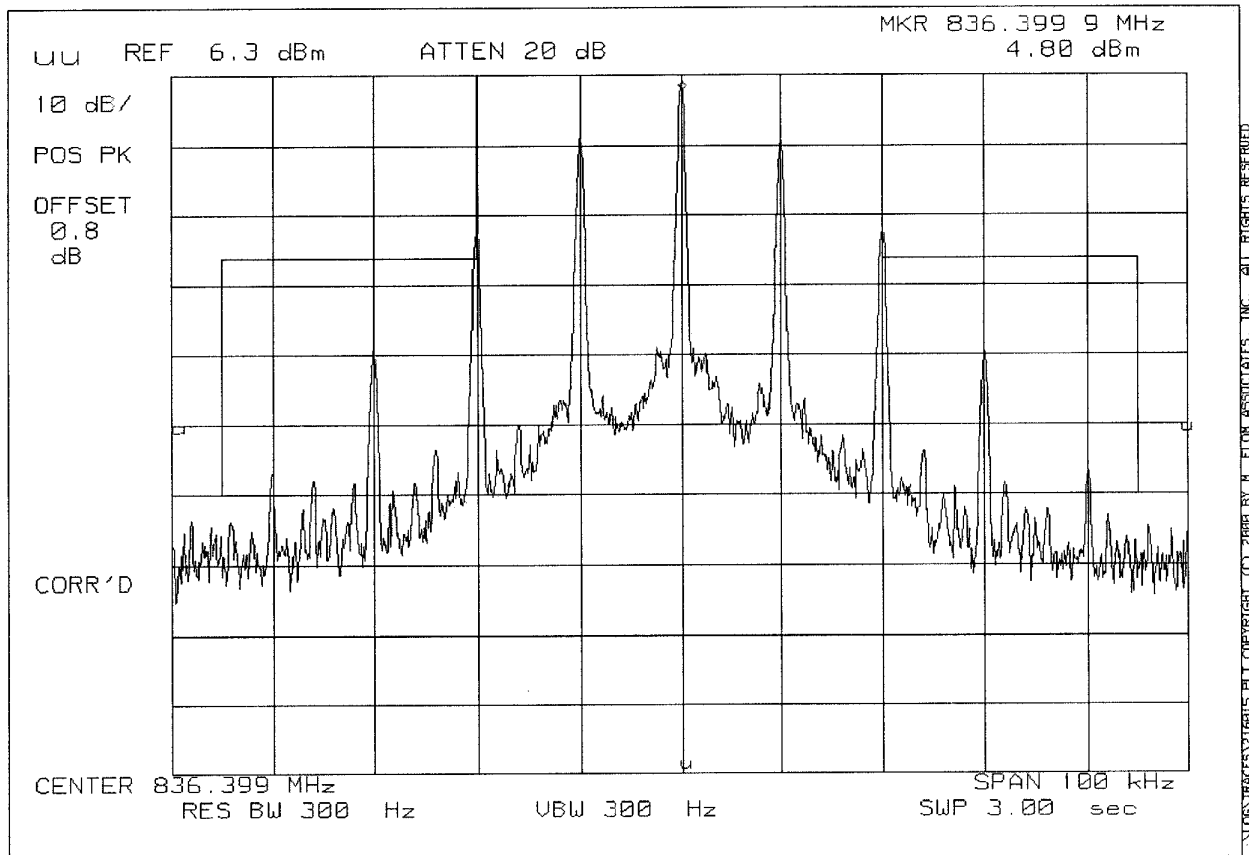
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SPECTRUM ANALYZER PRESENTATION
 NOKIA, 5180i
 2000-FEB-16, 09:45, WED

POWER: LOW
 MODULATION: ST
 MASK: AMPS CELLULAR, F3E/F3D w/LPF



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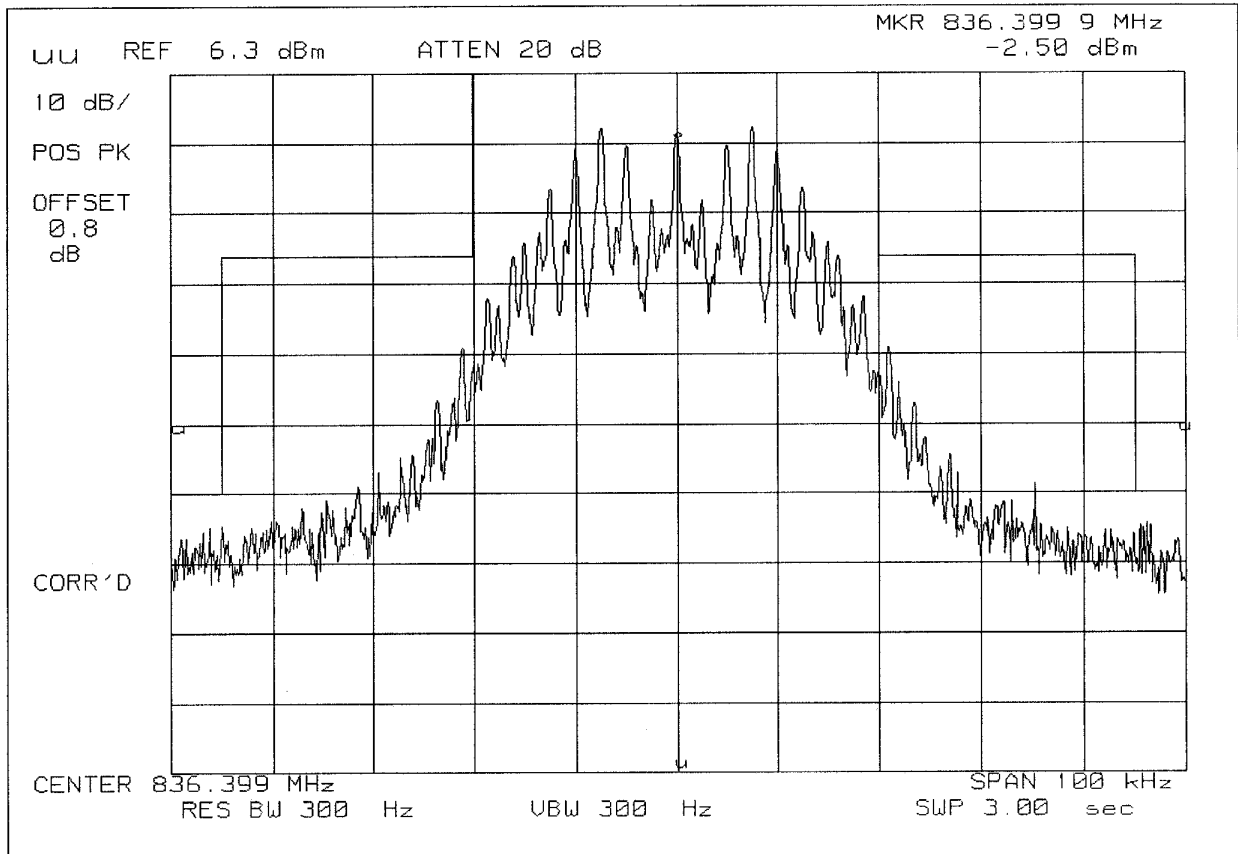
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SPECTRUM ANALYZER PRESENTATION
 NOKIA, 5180i
 2000-FEB-16, 09:21, WED

POWER: LOW
 MODULATION: SAT+VOICE
 MASK: AMPS CELLULAR, F3E/F3D w/LPF



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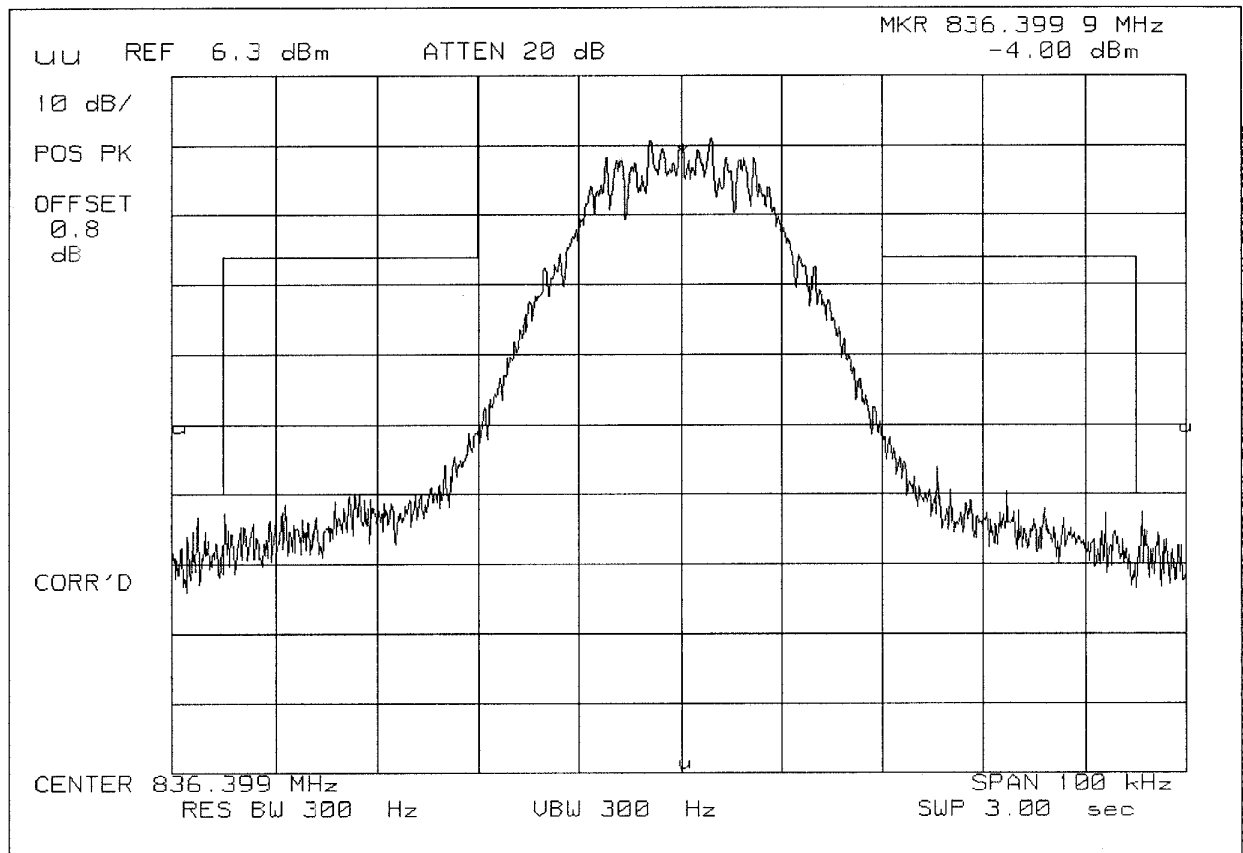
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SPECTRUM ANALYZER PRESENTATION
 NOKIA, 51801
 2000-FEB-16, 10:08, WED

POWER: LOW
 MODULATION: SAT+DTMF
 MASK: AMPS CELLULAR, F3E/F3D w/LPF



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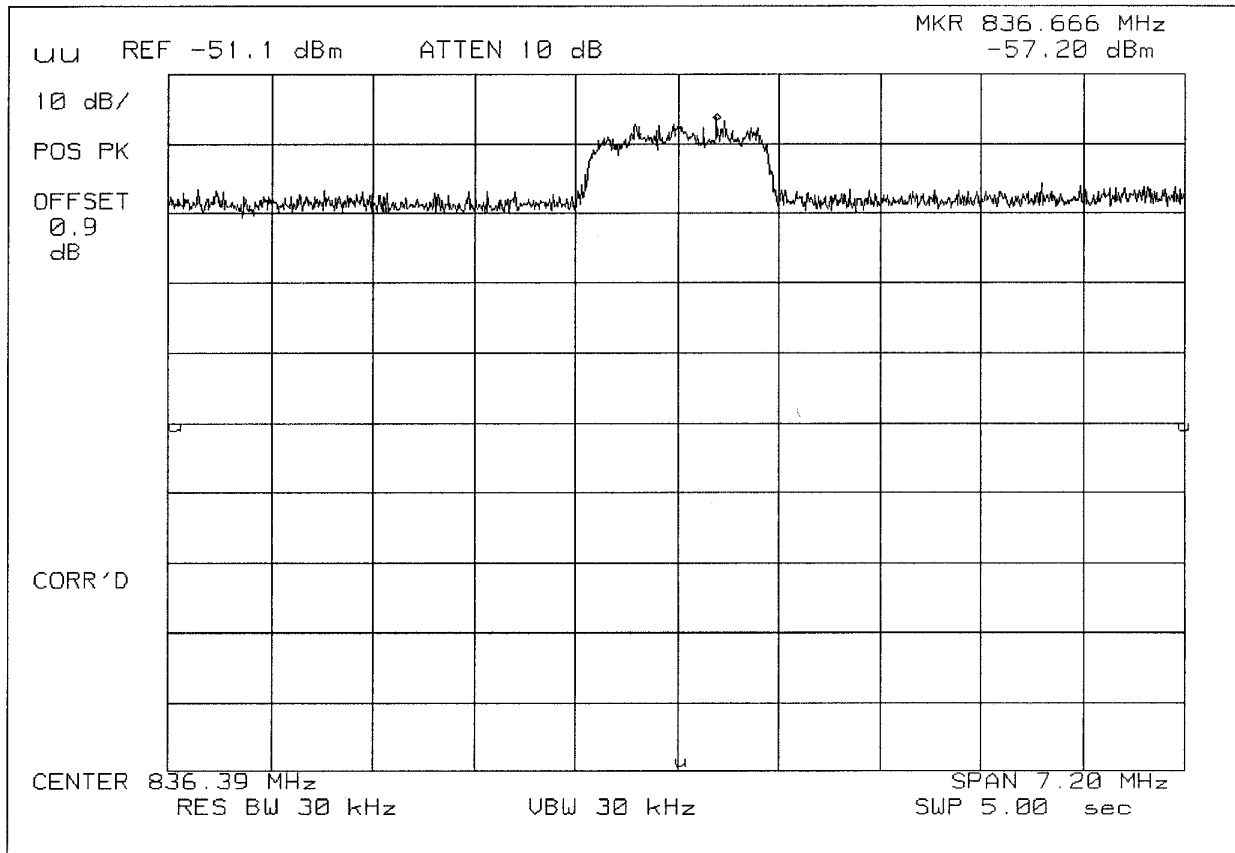
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SPECTRUM ANALYZER PRESENTATION
 NOKIA, 51801
 2000-FEB-16, 11:34, WED

POWER: LOW
 MODULATION: CDMA AMPS



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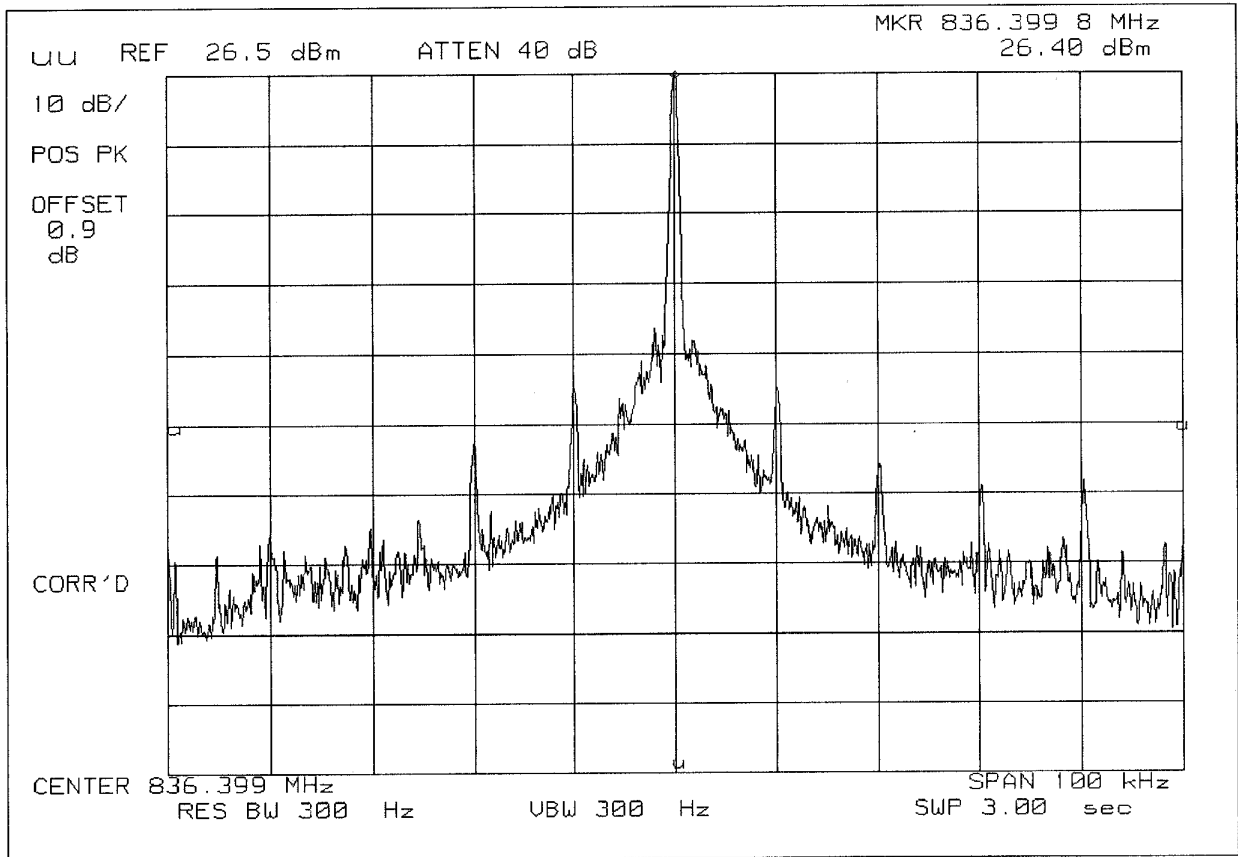
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SPECTRUM ANALYZER PRESENTATION
NOKIA, 5180i
2000-FEB-16, 09:03, WED

POWER: HIGH
MODULATION: NONE



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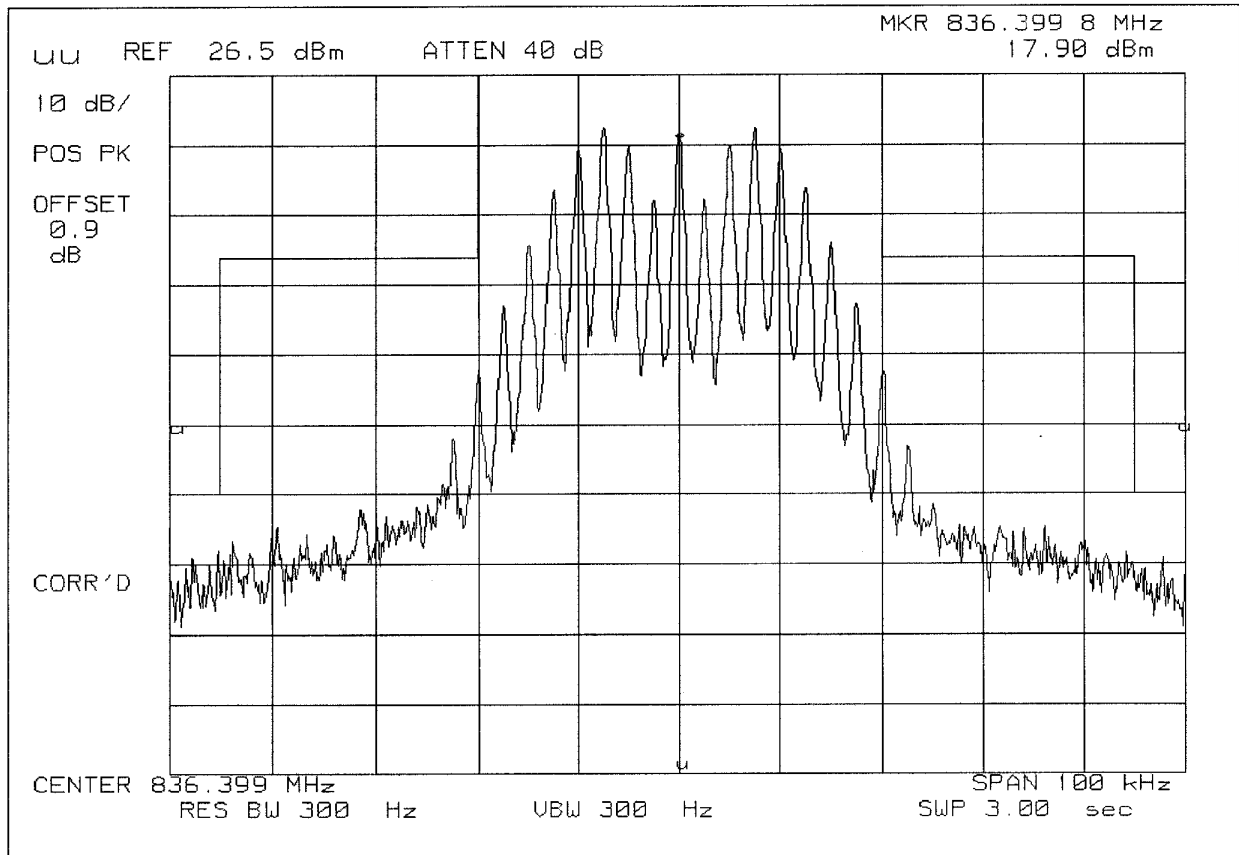
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SPECTRUM ANALYZER PRESENTATION
 NOKIA, 5180i
 2000-FEB-16, 09:18, WED

POWER: HIGH
 MODULATION: VOICE: 2500 Hz SINE WAVE
 MASK: AMPS CELLULAR, F3E/F3D w/LPF



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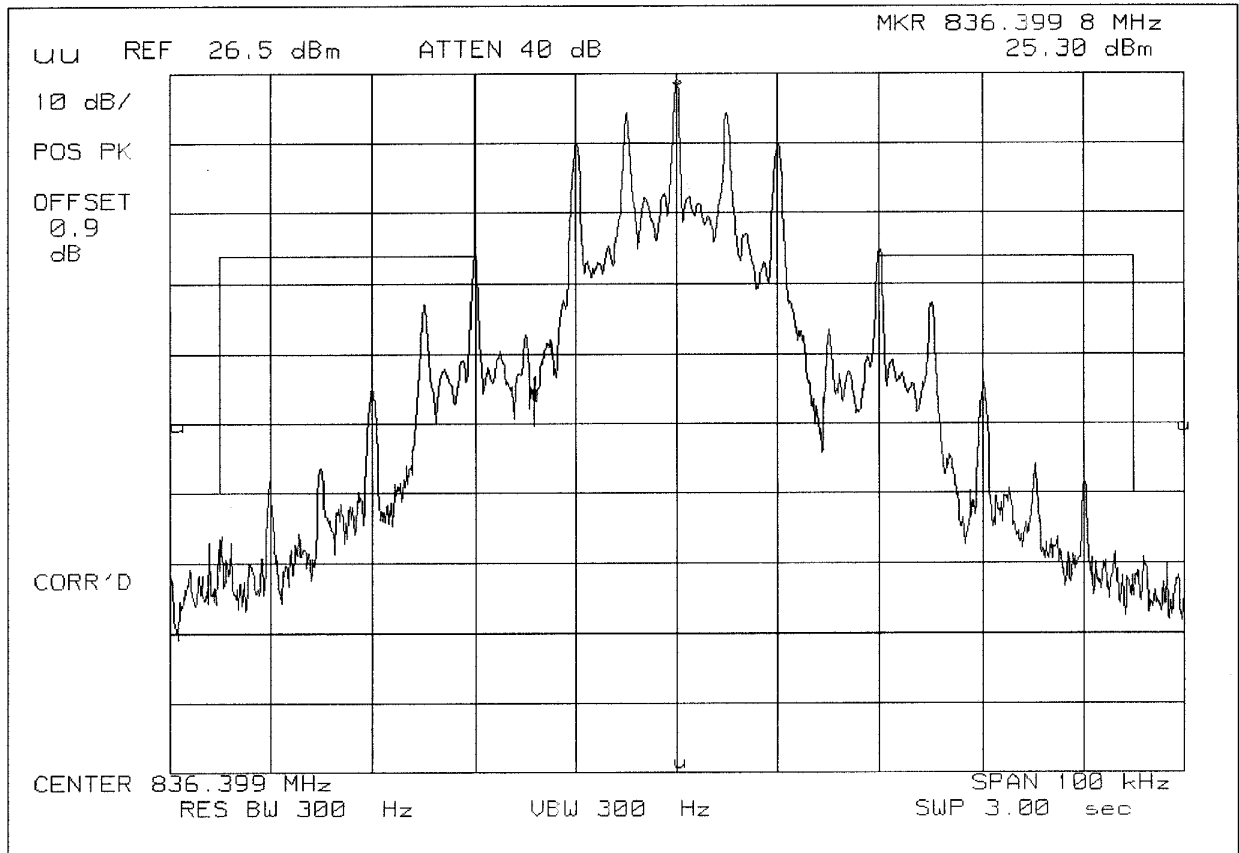
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SPECTRUM ANALYZER PRESENTATION
 NOKIA, 5180i
 2000-FEB-16, 09:49, WED

POWER: HIGH
 MODULATION: WBD
 MASK: AMPS CELLULAR, F3E/F3D w/LPF



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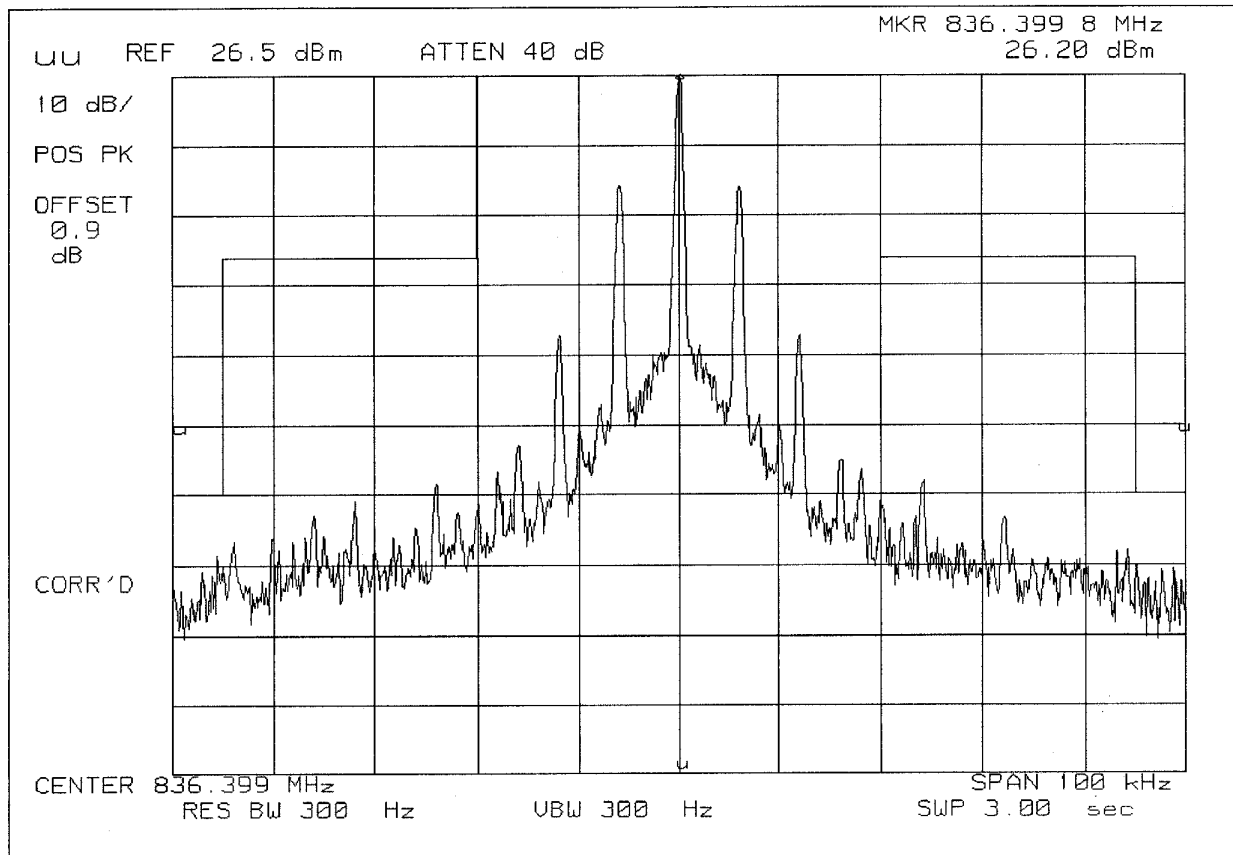
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SPECTRUM ANALYZER PRESENTATION
 NOKIA, 5180i
 2000-FEB-16, 09:27, WED

POWER: HIGH
 MODULATION: SAT
 MASK: AMPS CELLULAR, F3E/F3D w/LPF



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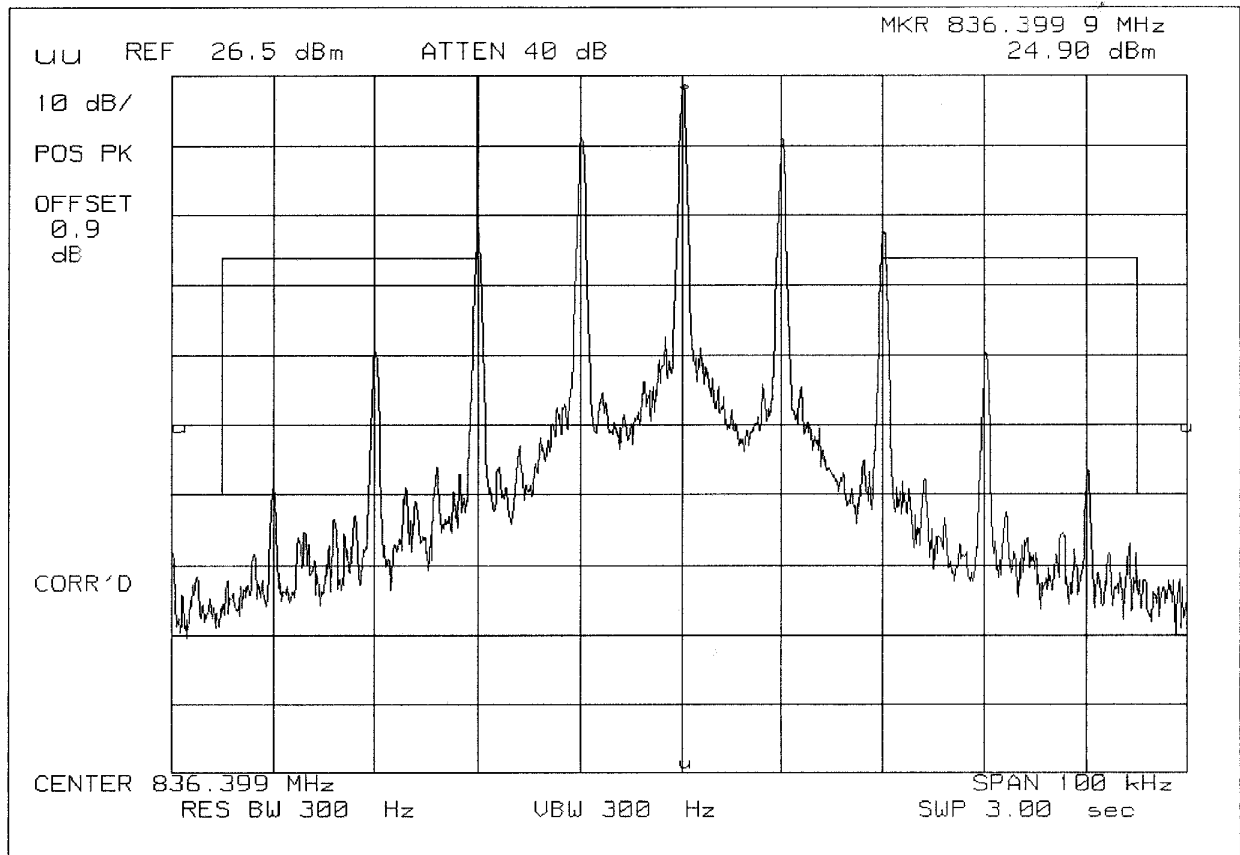
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SPECTRUM ANALYZER PRESENTATION
 NOKIA, 5180i
 2000-FEB-16, 09:43, WED

POWER: HIGH
 MODULATION: ST
 MASK: AMPS CELLULAR, F3E/F3D w/LPF



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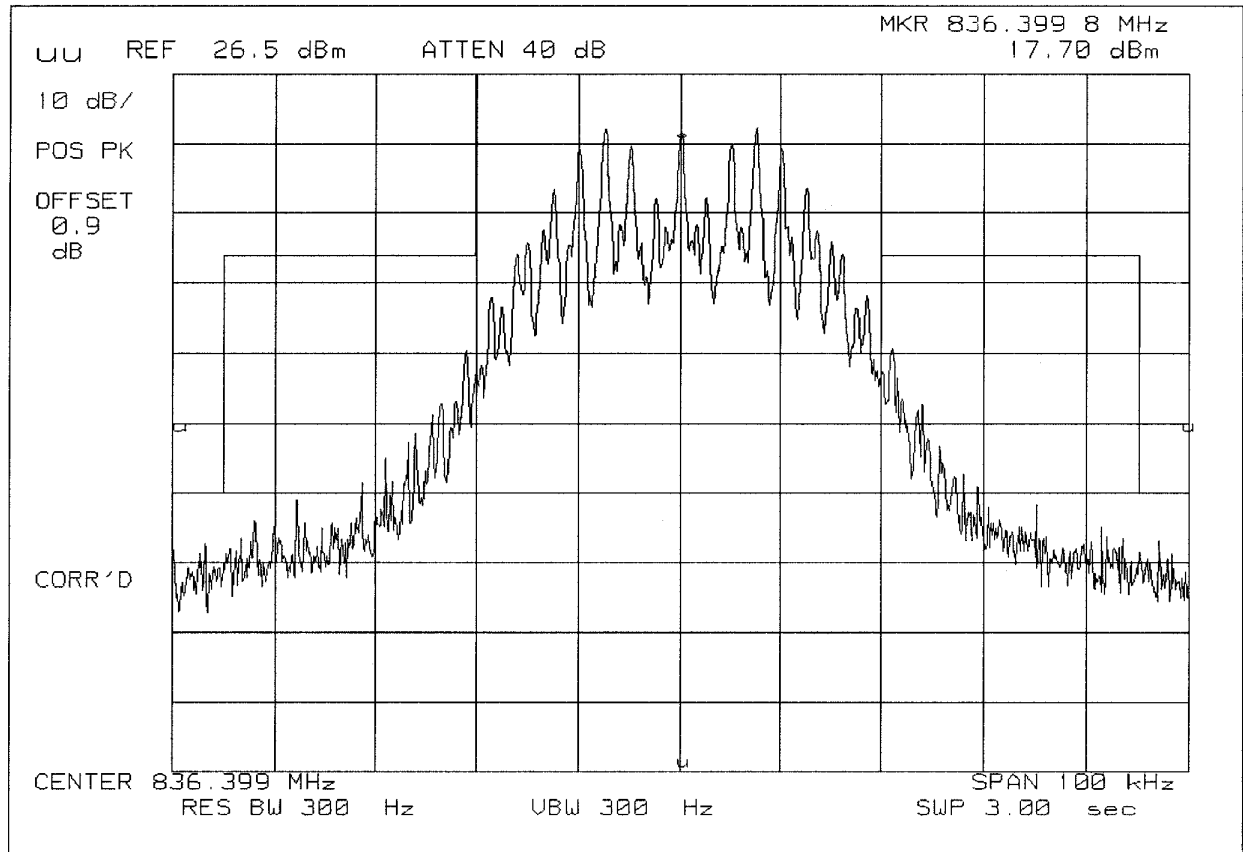
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SPECTRUM ANALYZER PRESENTATION
 NOKIA, 5180i
 2000-FEB-16, 09:22, WED

POWER: HIGH
 MODULATION: SAT+VOICE
 MASK: AMPS CELLULAR, F3E/F3D w/LPF



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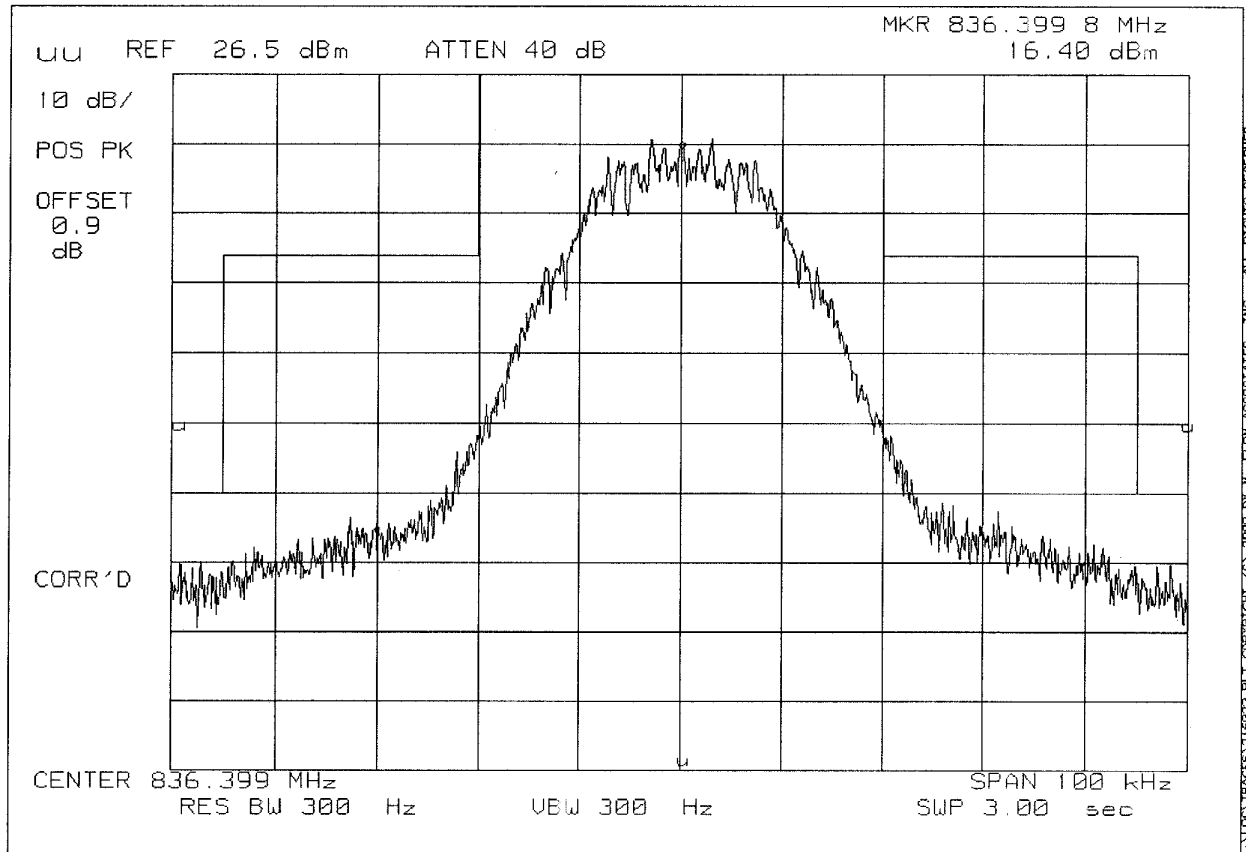
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SPECTRUM ANALYZER PRESENTATION
 NOKIA, 5180i
 2000-FEB-16, 10:07, WED

POWER: HIGH
 MODULATION: SAT+DTMF
 MASK: AMPS CELLULAR, F3E/F3D w/LPF



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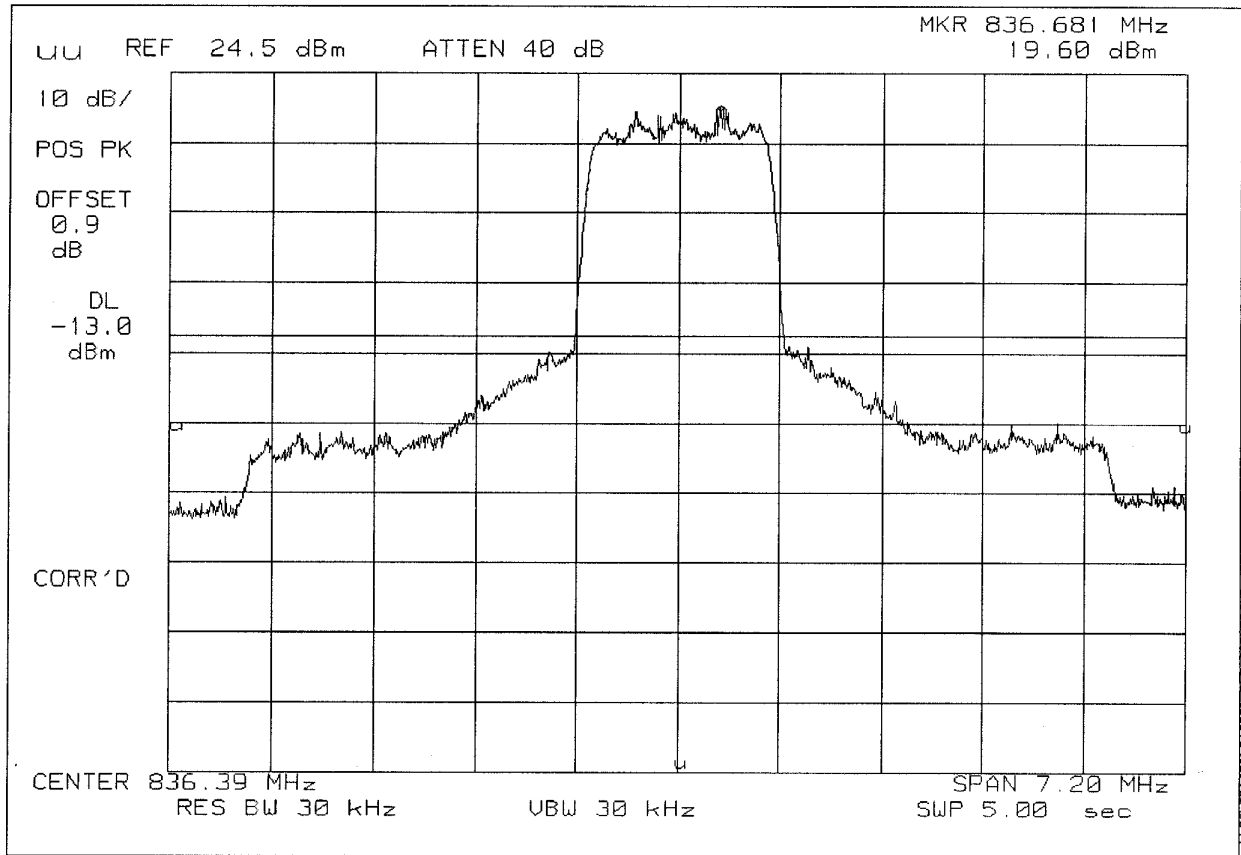
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SPECTRUM ANALYZER PRESENTATION
 NOKIA, 5180i
 2000-FEB-16, 10:50, WED

POWER: HIGH
 MODULATION: CDMA AMPS



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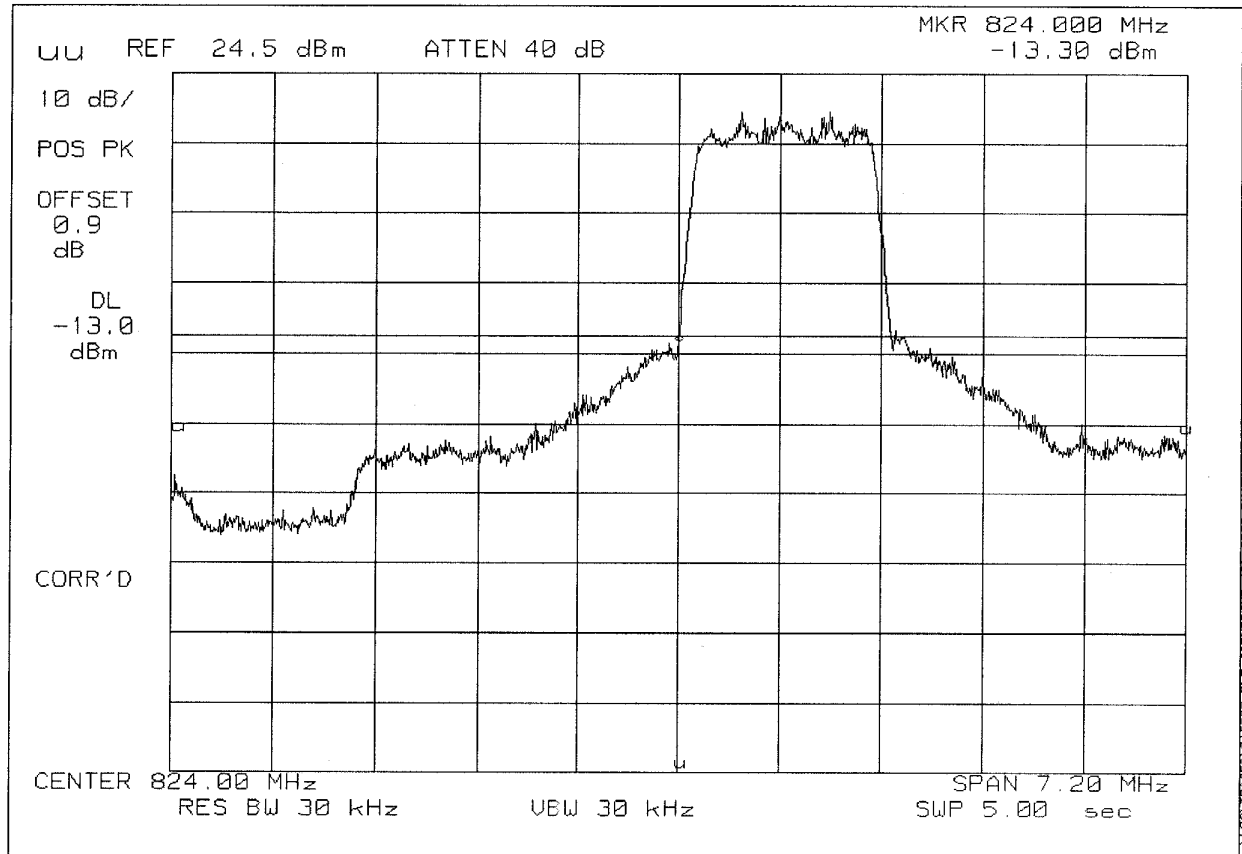
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SPECTRUM ANALYZER PRESENTATION
NOKIA, 5180i
2000-FEB-16, 11:02, WED

POWER: HIGH
MODULATION: CDMA AMPS
REMARK: LOWER BANDEDGE CHANNEL 1014



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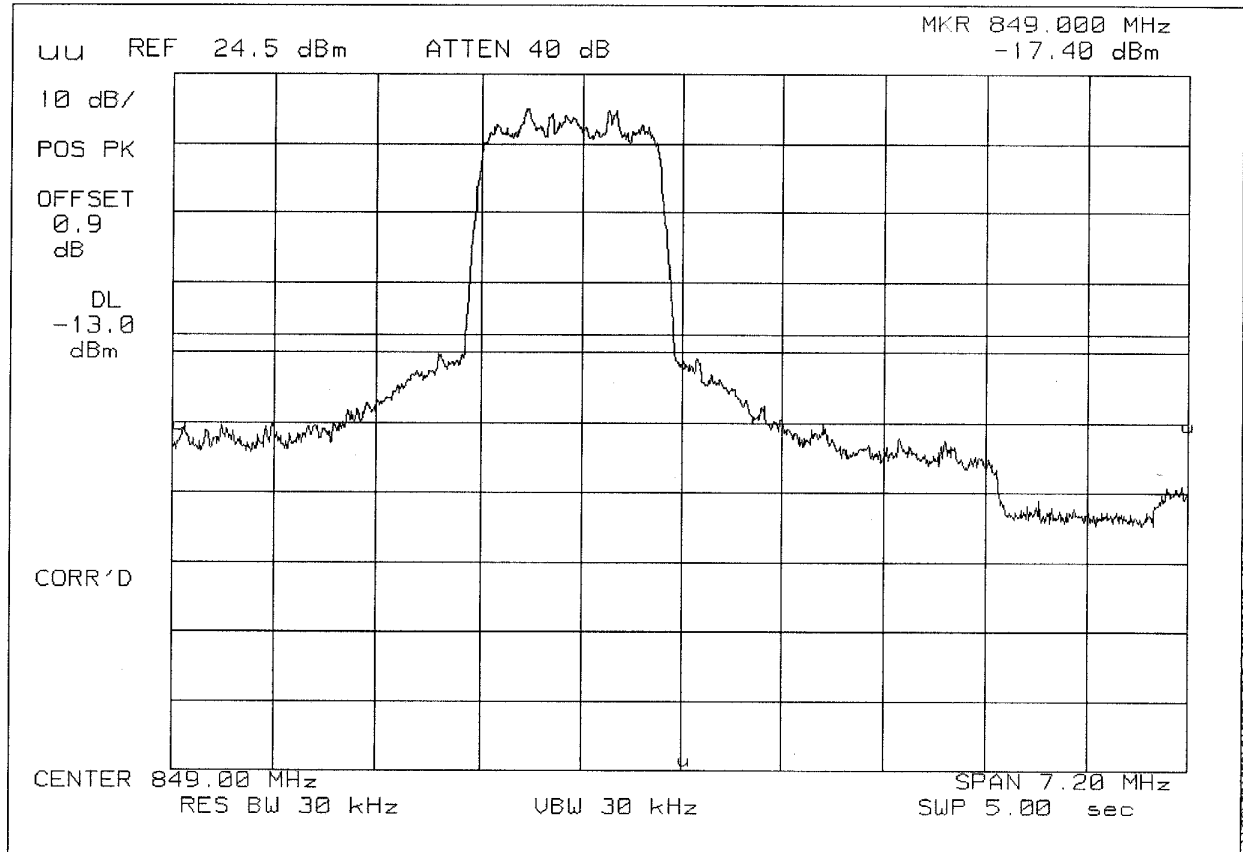
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SPECTRUM ANALYZER PRESENTATION
 NOKIA, 5180i
 2000-FEB-16, 11:09, WED

POWER: HIGH
 MODULATION: CDMA AMPS
 REMARK: UPPER BANDEDGE CHANNEL 773



SUPERVISED BY:

M. Flom P. Eng.

Morton Flom, P. Eng.

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NAME OF TEST: Emission Requirements -
Worst Case Modulation & Wideband Data

SPECIFICATION: 47 CFR 22.917

GUIDE: As indicated on page 7

TEST EQUIPMENT: As per previous page

MEASUREMENT PROCEDURE

1. The EUT was connected to a coaxial attenuator and then to a spectrum analyzer. The unmodulated carrier was set for 0 dB reference level.
2. A notch filter was introduced to reduce or eliminate any spectrum analyzer internally generated spurious for measurements of the harmonics and the carrier level.
3. Spectrum analyzer bandwidth was set to section 22.917(h) as applicable.
4. Measurements were made on channels 380, 799 and 991. The equipment was first modulated for the Worst Case Modulation, then for Wideband Data (F8W, F1D).
5. All other spurious emissions over the range of 0 the beyond the 10th harmonic (10 GHz) were 20 dB or more below the limit
6. The data presented here is for the Worst Case.
7. MEASUREMENT RESULTS: ATTACHED

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MEASUREMENT SUMMARY: Emission Requirements -
Worst Case Modulation

WORST CASE MODULATION = VOICE +_SAT

EMISSION, MHz/HARM.	LIMIT, dBc	SPURIOUS EMISSIONS, dBc	
		Lo	Hi
F0 + 20 kHz To F0 + 45 kHz	≤ -26	≤ -40	≤ -40
F0 + 45 kHz To 2 nd Harmonic	≤ -60 or $43 + 10 \log P$	≤ -68	≤ -70
2 nd to 10 th	$(\leq -13 \text{ dBm})$	≤ -67.8	≤ -67.8

MEASUREMENT RESULTS = ATTACHED OFFSET PLOTS

EMISSION IN THE RECEIVER CRITICAL BAND

EMISSION, MHz/HARM.	LIMIT, dBm	SPURIOUS EMISSIONS, dBm	
		Lo	Hi
869 to 894	≤ -80	≤ -86.9	≤ -85.8

MEASUREMENT RESULTS = ATTACHED PLOTS

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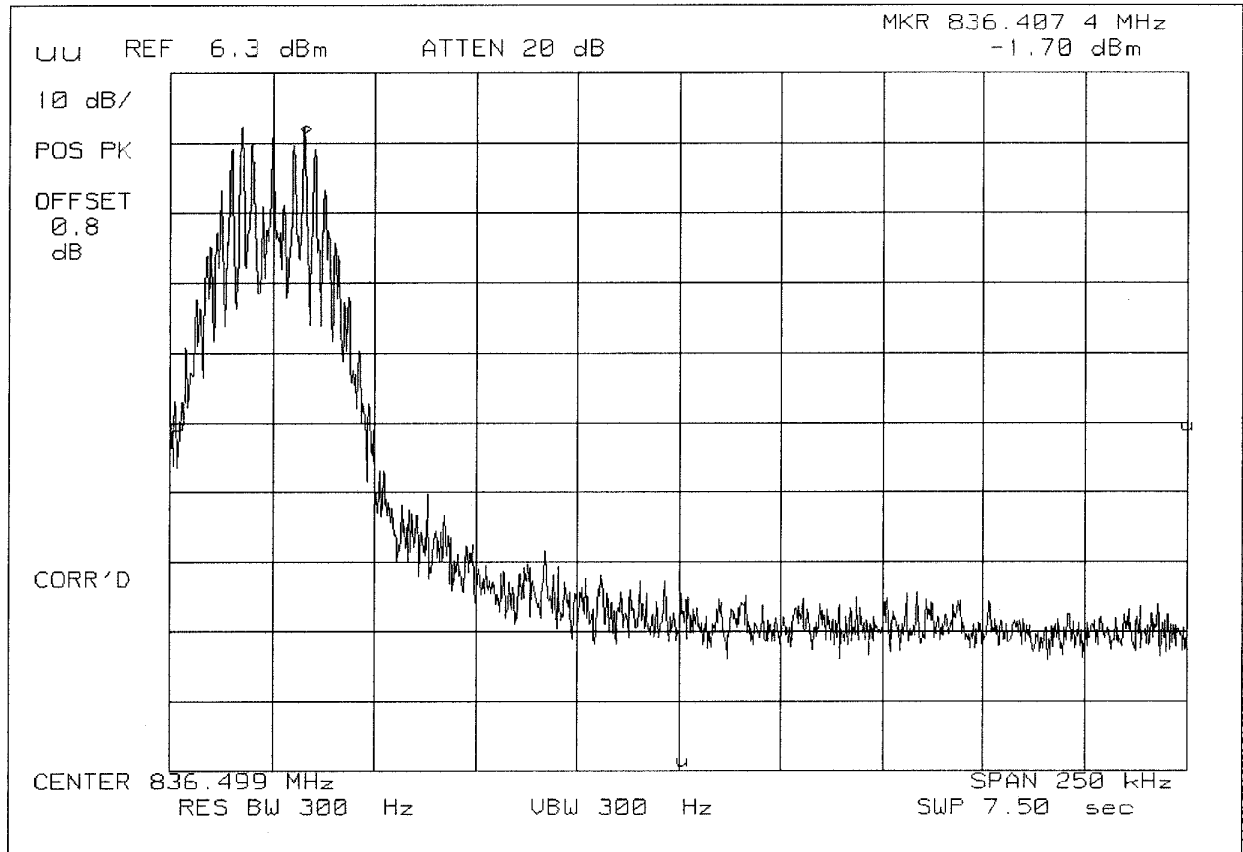
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SPECTRUM ANALYZER PRESENTATION
NOKIA, 5180i
2000-FEB-16, 10:13, WED

POWER: LOW
MODULATION: SAT+VOICE
REMARK: OFFSET OCCUPIED BANDWIDTH



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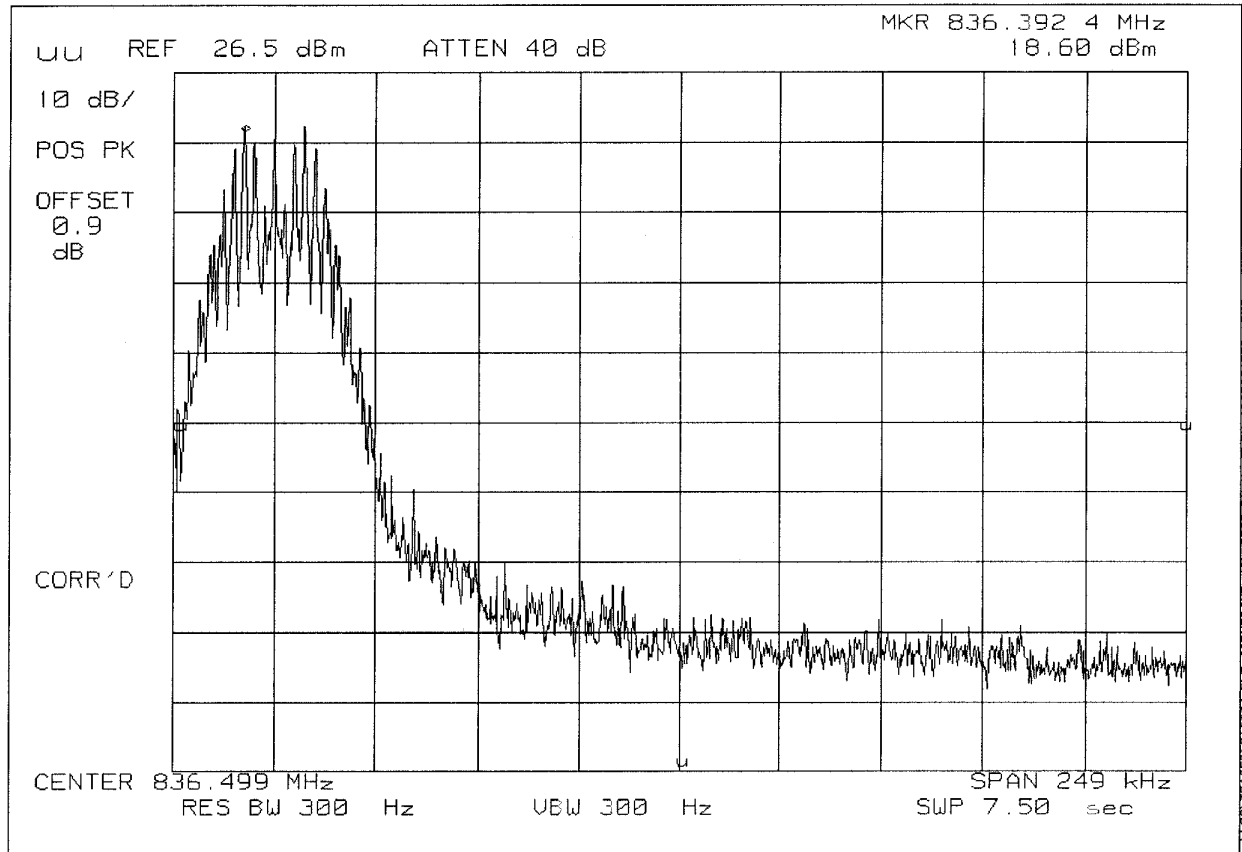
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SPECTRUM ANALYZER PRESENTATION
NOKIA, 5180i
2000-FEB-16, 10:11, WED

POWER: HIGH
MODULATION: SAT+VOICE
REMARK: OFFSET OCCUPIED BANDWIDTH



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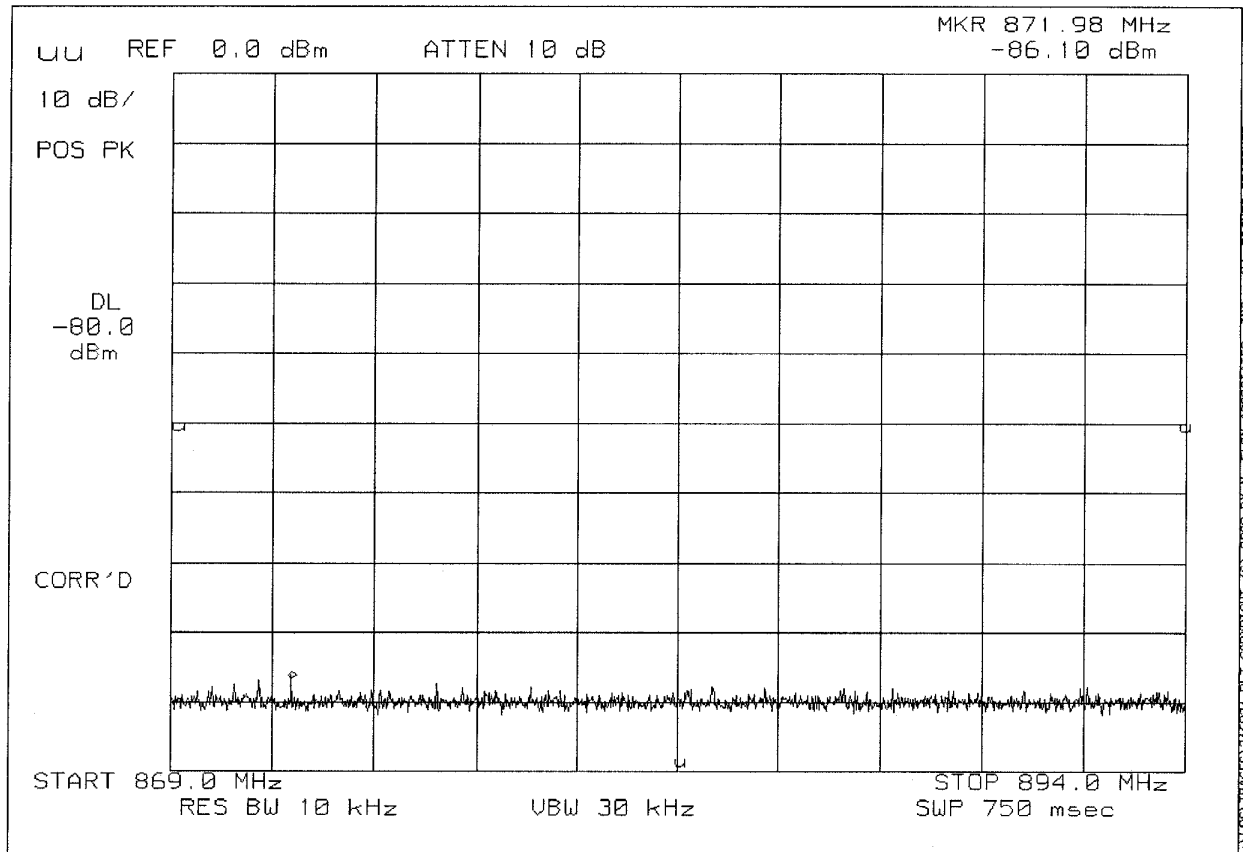
M. Morton P. Eng.
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SPECTRUM ANALYZER PRESENTATION
 NOKIA, 5180i
 2000-FEB-16, 10:04, WED

POWER: LOW
 MODULATION: ANY
 REMARK: TX SPURS IN RX CRITICAL BAND



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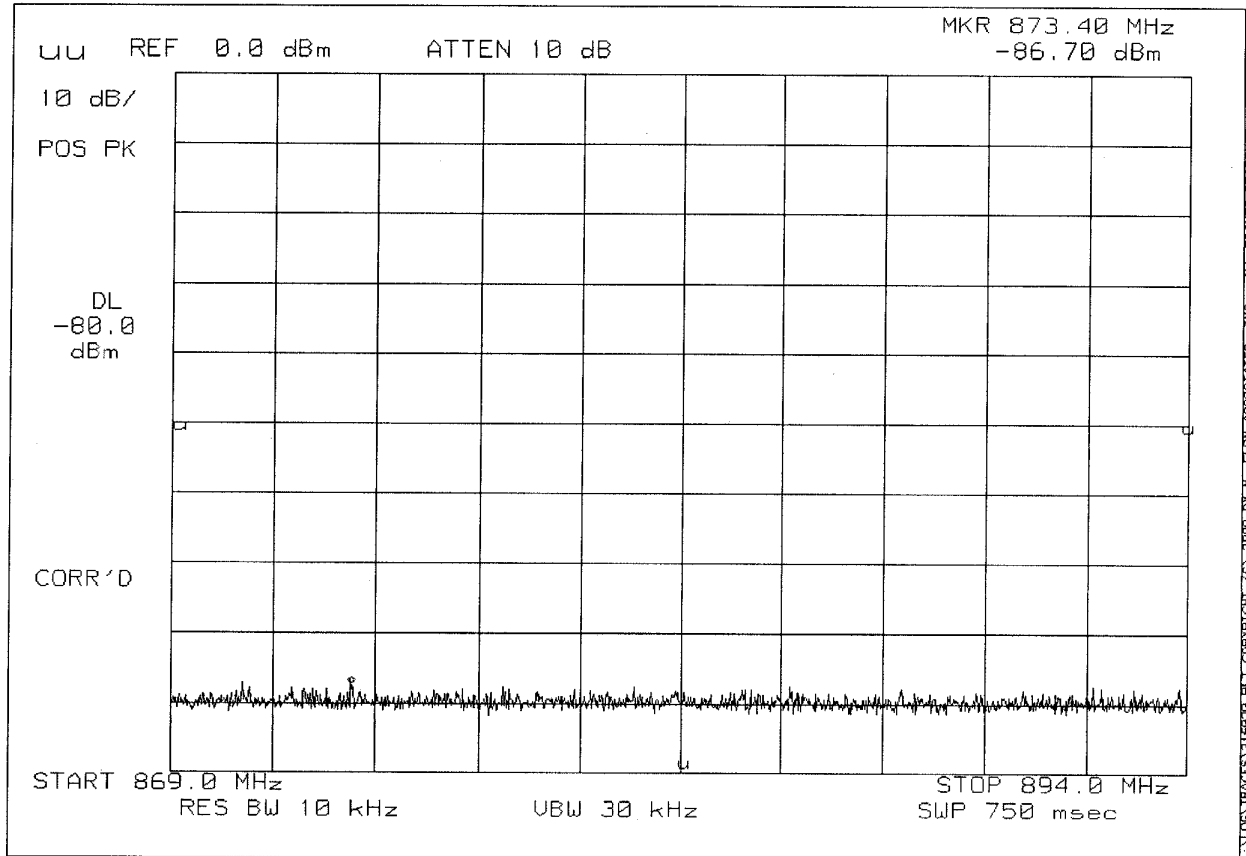
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SPECTRUM ANALYZER PRESENTATION
 NOKIA, 5180i
 2000-FEB-16, 10:03, WED

POWER: HIGH
 MODULATION: ANY
 REMARK: TX SPURS IN RX CRITICAL BAND



SUPERVISED BY:

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MEASUREMENT SUMMARY: Emission Requirements -
Wideband Data (F1D, 10 kb/s)

EMISSION, MHz/HARM.	LIMIT, dBc	SPURIOUS EMISSIONS, dBc	
		Lo	Hi
F0 + 20 kHz to F0 + 45 kHz	≤ -26	≤ -32	≤ -32
F0 + 45 kHz to F0 + 90 kHz	≤ -45	≤ -67	≤ -69
F0 + 90 kHz to 2 nd Harmonic	≤ -60 (≤ -13 dBm)	≤ -75.6	≤ -75.6
2 nd to 10 th	(≤ -13 dBm)	≤ -67.8	≤ -67.8

MEASUREMENT RESULTS = ATTACHED OFFSET PLOTS

EMISSION IN THE RECEIVER CRITICAL BAND

EMISSION, MHz/HARM.	LIMIT, dBm	SPURIOUS EMISSIONS, dBm	
		Lo	Hi
869 to 894	≤ -80	≤ -86.9	≤ -85.8

MEASUREMENT RESULTS = ATTACHED PLOTS

SUPERVISED BY:



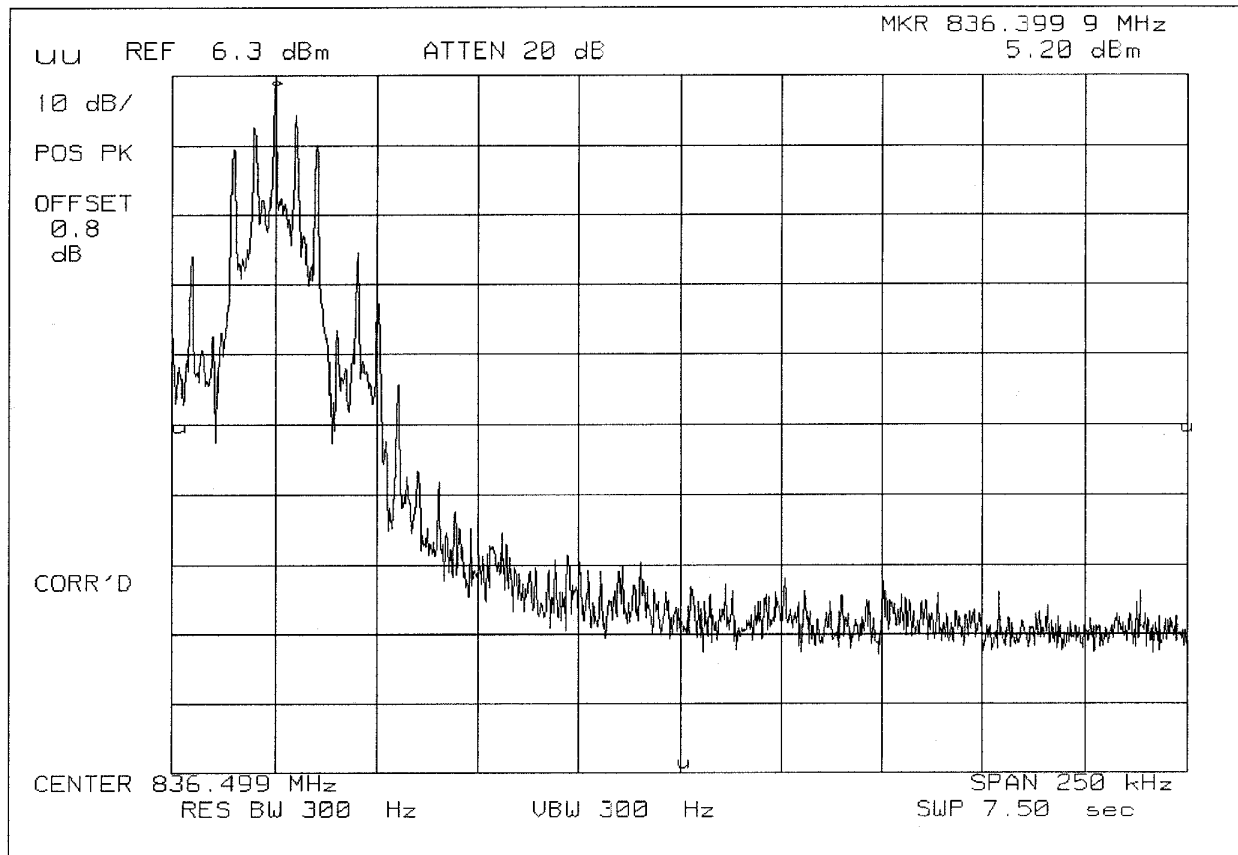
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SPECTRUM ANALYZER PRESENTATION
 NOKIA, 5180i
 2000-FEB-16, 09:54, WED

POWER: LOW
 MODULATION: WBD
 REMARK: OFFSET OCCUPIED BANDWIDTH



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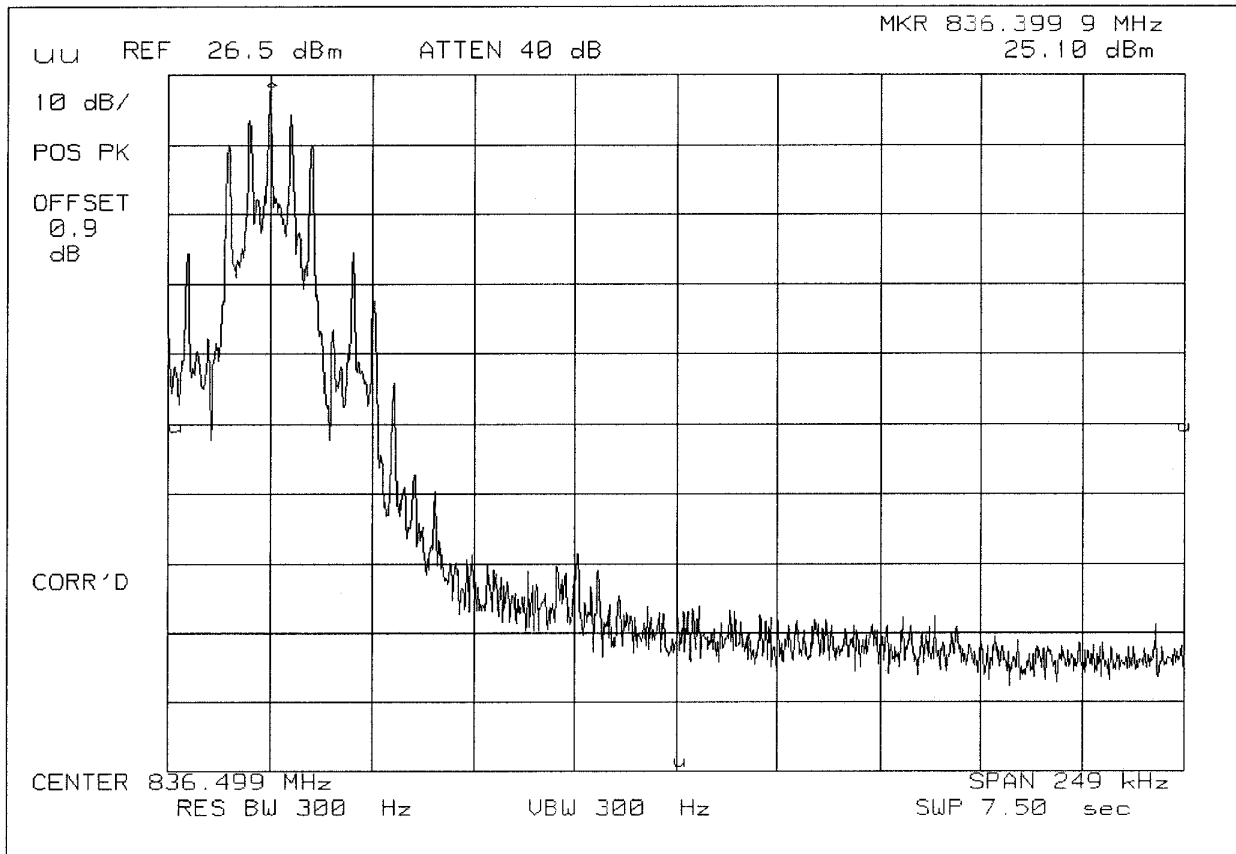
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SPECTRUM ANALYZER PRESENTATION
 NOKIA, 5180i
 2000-FEB-16, 10:00, WED

POWER: HIGH
 MODULATION: WBD
 REMARK: OFFSET OCCUPIED BANDWIDTH



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M. Flom P. Eng.

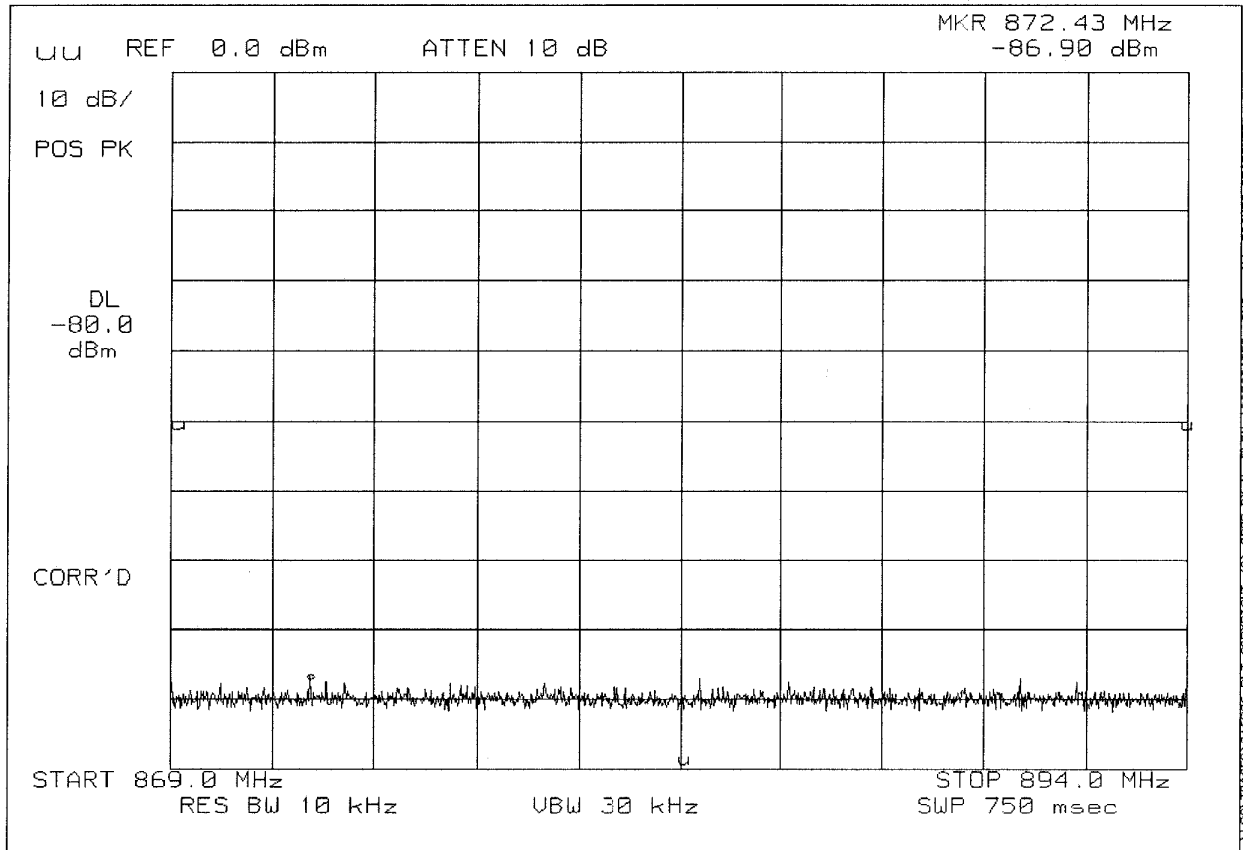
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SPECTRUM ANALYZER PRESENTATION
 NOKIA, 5180i
 2000-FEB-16, 10:15, WED

POWER: LOW
 MODULATION: ANY
 REMARK: TX SPURS IN RX CRITICAL BAND



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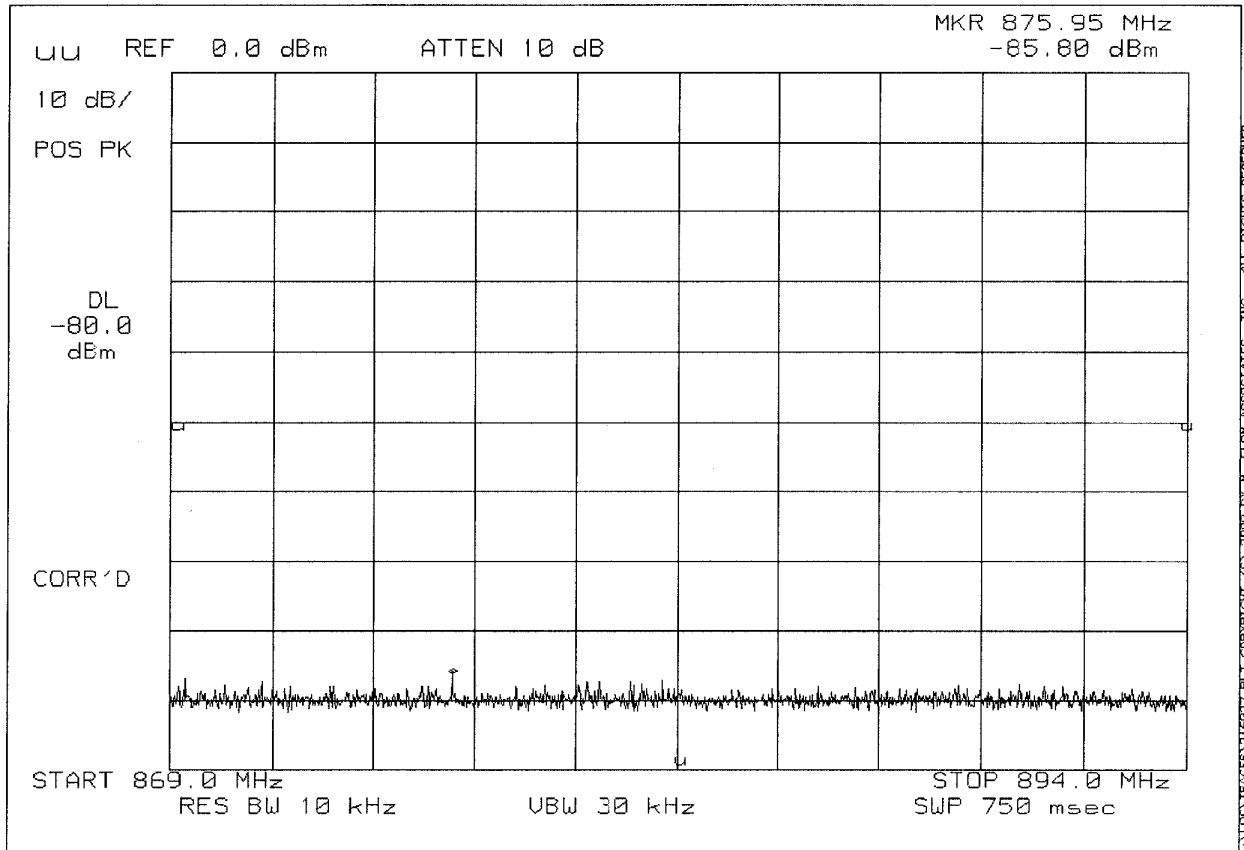
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SPECTRUM ANALYZER PRESENTATION
 NOKIA, 5180i
 2000-FEB-16, 10:16, WED

POWER: HIGH
 MODULATION: ANY
 REMARK: TX SPURS IN RX CRITICAL BAND



SUPERVISED BY:

Morton P. Eng
 Morton Flom, P. Eng.

PAGE NO. 60 of 67.
NAME OF TEST: Field Strength of Spurious Radiation
SPECIFICATION: 47 CFR 2.1053(a)
GUIDE: As indicated on page 7
TEST EQUIPMENT: As per attached page

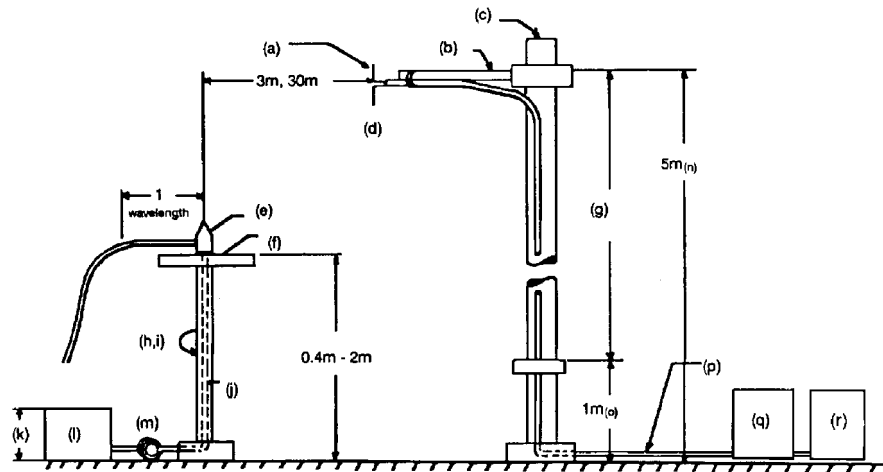
MEASUREMENT PROCEDURE

1. A description of the measurement facilities was filed with the FCC and was found to be in compliance with the requirements of Section 15.38, by letter from the FCC dated March 3, 1997, FILE 31040/SIT. All pertinent changes will be reported to the Commission by up-date prior to March 2000.
2. At first, in order to locate all spurious frequencies and approximate amplitudes, and to determine proper equipment functioning, the test sample was set up at a distance of three meters from the test instrument. Valid spurious signals were determined by switching the power on and off.
3. In the field, the test sample was placed on a wooden turntable above ground at three (or thirty) meters away from the search antenna. Excess power leads were coiled near the power supply.

The cables were oriented in order to obtain the maximum response. At each emission frequency, the turntable was rotated and the search antennas were raised and lowered vertically.
4. The emission was observed with both a vertically polarized and a horizontally polarized search antenna and the worst case was used.
6. The field strength of each emission within 20 dB of the limit was recorded and corrected with the appropriate cable and transducer factors.
7. The worst case for all channels is shown.
8. Measurement results: ATTACHED FOR WORST CASE

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RADIATED TEST SETUP

NOTES:

- (a) Search Antenna - Rotatable on boom
 (b) Non-metallic boom
 (c) Non-metallic mast
 (d) Adjustable horizontally
 (e) Equipment Under Test
 (f) Turntable
 (g) Boom adjustable in height.
 (h) External control cables routed horizontally at least one wavelength.
 (i) Rotatable
 (j) Cables routed through hollow turntable center
 (k) 30 cm or less
 (l) External power source
 (m) 10 cm diameter coil of excess cable
 (n) 25 cm (V), 1 m-7 m (V, H)
 (o) 25 cm from bottom end of 'V', 1m normally
 (p) Calibrated Cable at least 10m in length
 (q) Amplifier (optional)
 (r) Spectrum Analyzer

Asset Description
(as applicable)

s/n

Cycle

Last Cal

Per ANSI C63.4-1992, 10.1.4

TRANSDUCER

i00088	EMCO 3109-B 25MHz-300MHz	2336	12 mo.	Sep-99
i00089	Apriel 2001 200MHz-1GHz	001500	12 mo.	Sep-99
i00103	EMCO 3115 1GHz-18GHz	9208-3925	12 mo.	Sep-99
i00065	EMCO 3301-B Active Monopole	2635	12 mo.	Sep-99

AMPLIFIER

i00028	HP 8449A	2749A00121	12 mo.	Mar-99
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SPECTRUM ANALYZER

i00029	HP 8563E	3213A00104	12 mo.	Aug-99
i00033	HP 85462A	3625A00357	12 mo.	May-99
i00048	HP 8566B	2511AD1467	6 mo.	May-99

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MEASUREMENT RESULTS: FIELD STRENGTH OF SPURIOUS RADIATION

Measurement Distance, m = 3

Spectrum Searched, GHz = 0 to 10

AMPS-FM

TUNED, MHz	CHANNEL NUMBER	EMISSION MHz/HARM.	LEVEL, dBc	
			Lo	Hi
824.040	991	2 nd - 10 th	<-70	<-70
836.400	380	2 nd - 10 th	<-70	<-70
848.970	799	2 nd - 10 th	<-70	<-70

AMPS-CDMA

TUNED, MHz	CHANNEL NUMBER	EMISSION MHz/HARM.	LEVEL, dBc	
			Lo	Hi
824.040	991	2 nd - 10 th	<-70	<-70
836.400	380	2 nd - 10 th	<-70	<-70
848.970	799	2 nd - 10 th	<-70	<-70

NOTE:

For channels 380, 799 and 991, the field strength of spurious radiation over the above noted range measured 20 dB or more below the limit.

SUPERVISED BY:



Morton Flom, P. Eng.

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NAME OF TEST: Field Strength of Spurious Radiation
 g0020273: 2000-Feb-14 Mon 12:04:00
 STATE: 2:High Power AMPS-FM

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	METER, dBuV	CF, dB	ERP, dBm	MARGIN, dB
836.400000	1672.798000	43.17	28.38	-25.8	-12.9
836.400000	2509.201667	31.5	31.64	-34.2	-21.3
836.400000	3345.599250	27.67	4.16	-65.5	-52.6
836.400000	4181.999117	35.67	6.26	-55.4	-42.5
836.400000	5018.398917	32.33	7.74	-57.3	-44.3
836.400000	5854.798700	28.17	9.35	-59.9	-46.9
836.400000	6691.198700	10.83	11.79	-74.8	-61.8
836.400000	7527.598700	13.83	12.52	-71	-58.1
836.400000	8363.998700	-1.17	12.42	-86.1	-73.2

NAME OF TEST: Field Strength of Spurious Radiation
 g0020274: 2000-Feb-14 Mon 14:20:00
 STATE: 2:High Power AMPS-CDMA

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	METER, dBuV	CF, dB	ERP, dBm	MARGIN, dB
836.400000	1672.882500	39.5	28.39	-29.5	-16.5
836.400000	2509.282500	44.83	1.65	-50.9	-37.9
836.400000	3345.682500	31	4.16	-62.2	-49.2
836.400000	4182.082500	31.17	6.26	-59.9	-47
836.400000	5018.482500	30	7.74	-59.6	-46.7
836.400000	5854.882500	29.33	9.35	-58.7	-45.7
836.400000	6691.282500	29.17	11.79	-56.4	-43.4
836.400000	7527.682500	28.67	12.52	-56.2	-43.2
836.400000	8364.082500	29.33	12.42	-55.6	-42.7

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NAME OF TEST: Frequency Stability (Temperature Variation)

SPECIFICATION: 47 CFR 2.1055(a)(1)

GUIDE: As indicated on page 7

TEST CONDITIONS: As Indicated

TEST EQUIPMENT: As per previous page

MEASUREMENT PROCEDURE

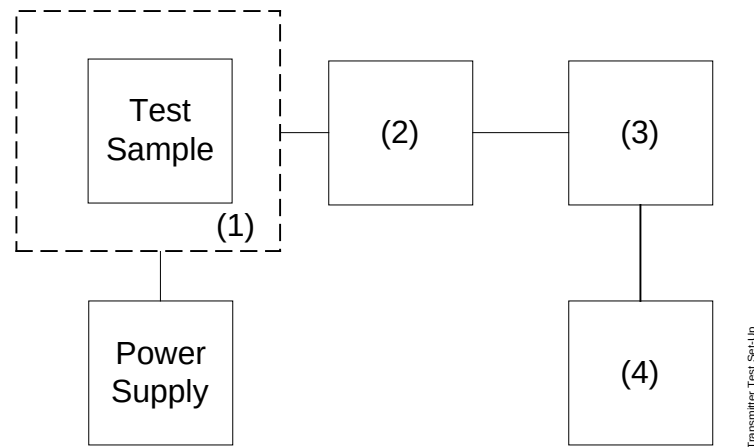
1. The EUT and test equipment were set up as shown on the following page.
2. With all power removed, the temperature was decreased to -30°C and permitted to stabilize for three hours. Power was applied and the maximum change in frequency was noted within one minute.
3. With power OFF, the temperature was raised in 10°C steps. The sample was permitted to stabilize at each step for at least one-half hour. Power was applied and the maximum frequency change was noted within one minute.
4. The temperature tests were performed for the worst case.
5. MEASUREMENT RESULTS: ATTACHED

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TRANSMITTER TEST SET-UP

TEST A. OPERATIONAL STABILITY
 TEST B. CARRIER FREQUENCY STABILITY
 TEST C. OPERATIONAL PERFORMANCE STABILITY
 TEST D. HUMIDITY
 TEST E. VIBRATION
 TEST F. ENVIRONMENTAL TEMPERATURE
 TEST G. FREQUENCY STABILITY: TEMPERATURE VARIATION
 TEST H. FREQUENCY STABILITY: VOLTAGE VARIATION



Asset	Description (as applicable)	s/n
(1)	<u>TEMPERATURE, HUMIDITY, VIBRATION</u>	
i00027	Tenny Temp. Chamber	9083-765-234
i00	Weber Humidity Chamber	
i00	L.A.B. RVH 18-100	
(2)	<u>COAXIAL ATTENUATOR</u>	
i00122	NARDA 766-10	7802
i00123	NARDA 766-10	7802A
i00113	SIERRA 661A-3D	1059
i00069	BIRD 8329 (30 dB)	10066
(3)	<u>R.F. POWER</u>	
i00014	HP 435A POWER METER	1733A05839
i00039	HP 436A POWER METER	2709A26776
i00020	HP 8901A POWER MODE	2105A01087
(4)	<u>FREQUENCY COUNTER</u>	
i00042	HP 5383A	1628A00959
i00019	HP 5334B	2704A00347
i00020	HP 8901A	2105A01087

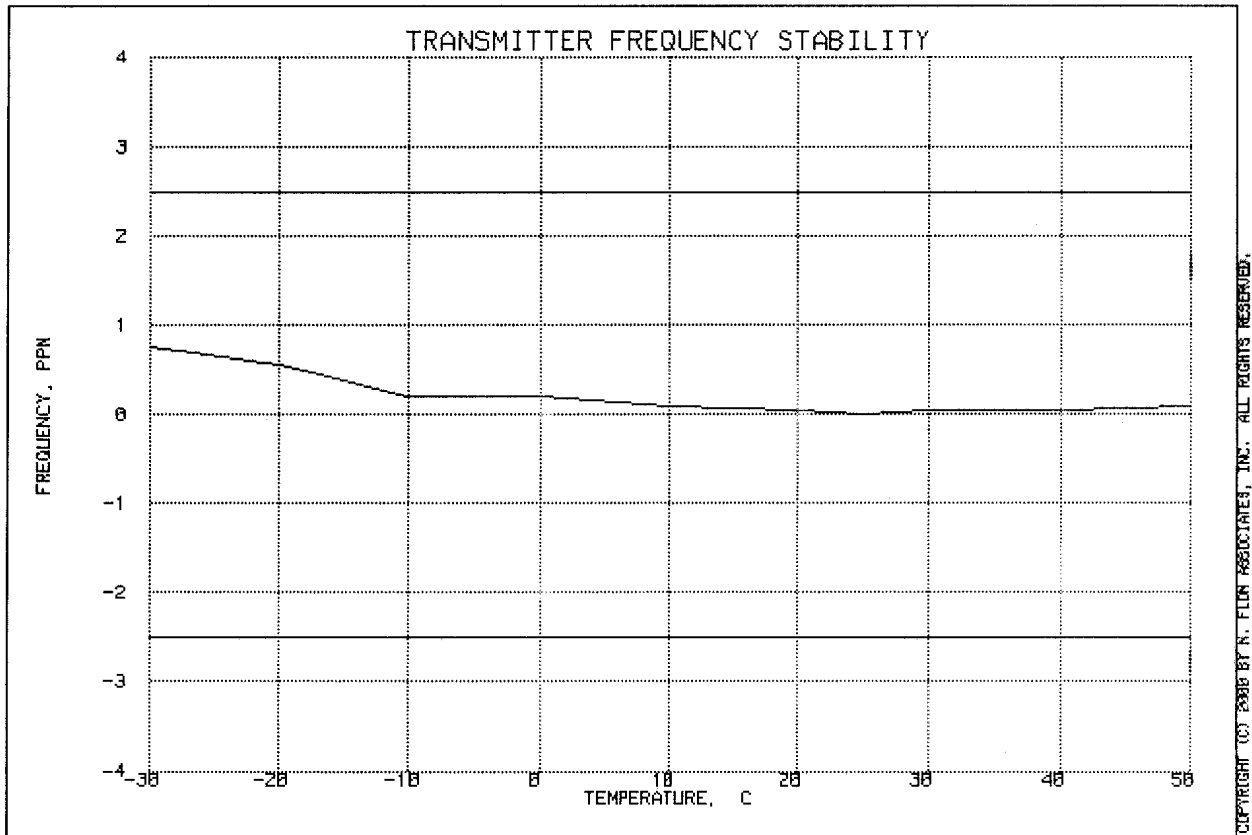
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TRANSMITTER FREQUENCY STABILITY

p0020015: NOKIA, 5180i

g0020127: 15 FEB 2000, 16:59



FREQUENCY OF CARRIER, MHz = 836.39974

LIMIT, ppm = 2.5

LIMIT, Hz = 2091

SUPERVISED BY:

Morton Flom P. Eng.
Morton Flom, P. Eng.

PAGE NO. 67 of 67.

NAME OF TEST: Frequency Stability (Voltage Variation)

SPECIFICATION: 47 CFR 2.1055 (b)(1)

GUIDE: As indicated on page 7

TEST EQUIPMENT: As per previous page

MEASUREMENT PROCEDURE

1. The EUT was placed in a temperature chamber at $25 \pm 5^{\circ}\text{C}$ and connected as for "Frequency Stability - Temperature Variation" test.
2. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.
3. The variation in frequency was measured for the worst case.
Use 'best' data only.');

RESULTS: Frequency Stability (Voltage Variation)

STATE:

LIMIT, ppm = ± 2.5
 LIMIT, Hz = 2,091
 BATTERY END POINT (Voltage) = 3 Vdc

% of STV	Voltage	Frequency, MHz	Change, Hz	Change, ppm
-15	3.06	848.969	0	0
0	3.6	848.970	0	0
+15	1.14	848.970	0	0

SUPERVISED BY:



Morton Flom, P. Eng.

TESTIMONIAL
AND
STATEMENT OF CERTIFICATION

THIS IS TO CERTIFY THAT:

1. THAT the application was prepared either by, or under the direct supervision of, the undersigned.
2. THAT the technical data supplied with the application was taken under my direction and supervision.
3. THAT the data was obtained on representative units, randomly selected.
4. THAT, to the best of my knowledge and belief, the facts set forth in the application and accompanying technical data are true and correct.

CERTIFYING ENGINEER:


Morton Flom, P. Eng.