

Sub-part
2.983(e):

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 2.981, 2.983, 2.985, 2.987, 2.989, 2.991, 2.993, 2.995, 2.997, 2.999 and the following individual Parts:

- ___ 21 - Domestic Public Fixed Radio Services
- ___ 22 - Public Mobile Services
- x 22 Subpart H - Cellular Radiotelephone Service
- X 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)

GENERAL INFORMATION

1. Prior to testing, the deviation for audio modulation and each of the respective SAT + ST tones were set as close to 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	<u> x </u>
(b) WIDEBAND DATA	<u> x </u>
(c) SAT	<u> x </u>
(d) ST	<u> x </u>
(e) SAT + VOICE	<u> x </u>
(f) SAT + DTMF	<u> x </u>
(g) CDMA	<u> </u>
(h) TDMA	<u> </u>
(i) NAMPS VOICE	<u> x </u>
(j) NAMPS DSAT	<u> x </u>
(k) NAMPS ST	<u> x </u>
(l) NAMPS VOICE + DSAT	<u> </u>

STANDARD TEST CONDITIONS
and
ENGINEERING PRACTICES

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

ROOM TEMPERATURE	= 25±5°C
ROOM HUMIDITY	= 20-50%
D.C. SUPPLY VOLTAGE, Vdc	= 3.6
A.C. SUPPLY VOLTAGE, Vac	= N/A
A.C. SUPPLY FREQUENCY, Hz	= N/A

Prior to testing, the E.U.T. 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.

NAME OF TEST: R. F. POWER OUTPUT (CONDUCTED)
PARAGRAPH: 47 CFR 2.985 (a)
GUIDE: TIA/EIA STANDARD IS-19-B
TEST CONDITIONS: STANDARD TEMPERATURE & HUMIDITY
TEST EQUIPMENT: AS PER ATTACHED PAGE

MEASUREMENT PROCEDURE

1. The E.U.T. 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 OUTPUT, WATTS	
		Lo	Hi
✓ AMPS MODE:			
824.040	991	0.006	0.5
836.400	380	0.006	0.5
848.970	799	0.006	0.5
✓ CDMA/TDMA/NAMPS (AS APPROPRIATE) MODE:			
825.290		0.006	0.5
836.400		0.006	0.5
847.720		0.006	0.5

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MORTON FLOM, P. Eng.

NAME OF TEST: R. F. POWER OUTPUT (RADIATED)
PARAGRAPH: 47 CFR 2.985 (a)
GUIDE: TIA/EIA STANDARD IS-19-B
TEST CONDITIONS: STANDARD TEMPERATURE & HUMIDITY
TEST EQUIPMENT: AS PER ATTACHED PAGE

MEASUREMENT PROCEDURE

1. The E.U.T. 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

NOMINAL, MHz	CHANNEL	R.F. POWER OUTPUT, WATTS	
		Lo	Hi
ERP			

AMPS MODE:

0.005	0.389
0.007	0.593
0.006	0.502

,42

NAMPS MODE:

991	0.0095	0.631
380	0.010	0.741
799	0.0085	0.707

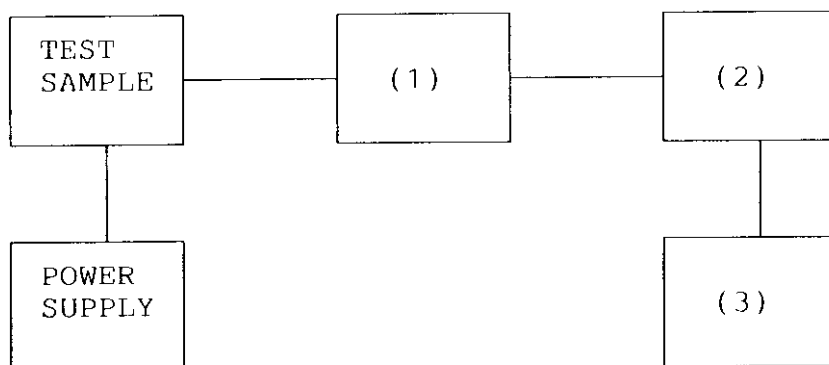
-0.52

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R.F. POWER OUTPUT (A.M. OR F.M.)

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

(1) COAXIAL ATTENUATOR

NARDA 766-10	<u>x</u>
SIERRA 661A-30	<u> </u>
BIRD 8329 (30 dB)	<u> </u>
<u> </u>	<u> </u>

(2) POWER METERS

HP 435A	<u> </u>
HP 436A	<u>x</u>
HP 8901A	<u>x</u>
<u> </u>	<u> </u>

(3) FREQUENCY COUNTER

HP 5383A	<u> </u>
HP 5334B	<u>x</u>
HP 8901A FREQUENCY MODE	<u>x</u>
<u> </u>	<u> </u>

NAME OF TEST: MODULATION CHARACTERISTICS --
FREQUENCY RESPONSE OF AUDIO MODULATING CIRCUIT

PARAGRAPH: 47 CFR 2.987 (a)

GUIDE: TIA/EIA STANDARD IS-19-B

TEST CONDITIONS: S. T. & H.

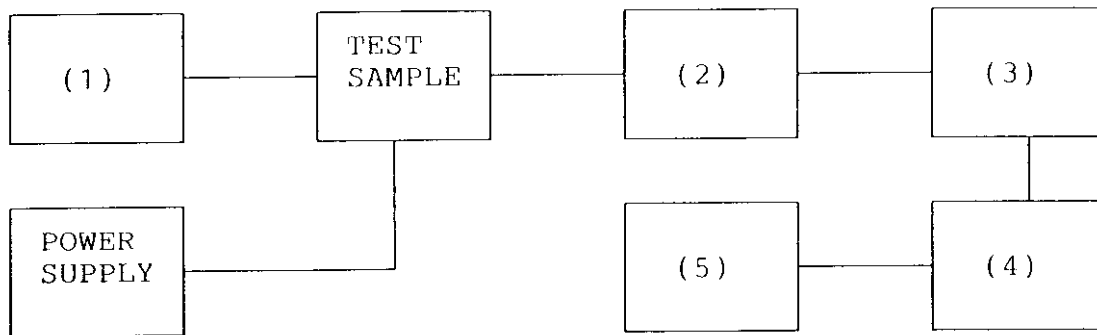
TEST EQUIPMENT: AS PER ATTACHED PAGE

MEASUREMENT PROCEDURE

1. The E.U.T. 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 E.U.T.
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

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

(1) AUDIO OSCILLATOR/GENERATOR

HP 204D _____
 HP 8903A x

(2) COAXIAL ATTENUATOR

NARDA 766-10 _____
 SIERRA 661A-30 x
 BIRD 8329 (30 dB) _____

(3) MODULATION ANALYZER

HP 8901A x

(4) AUDIO ANALYZER

HP 8903A x

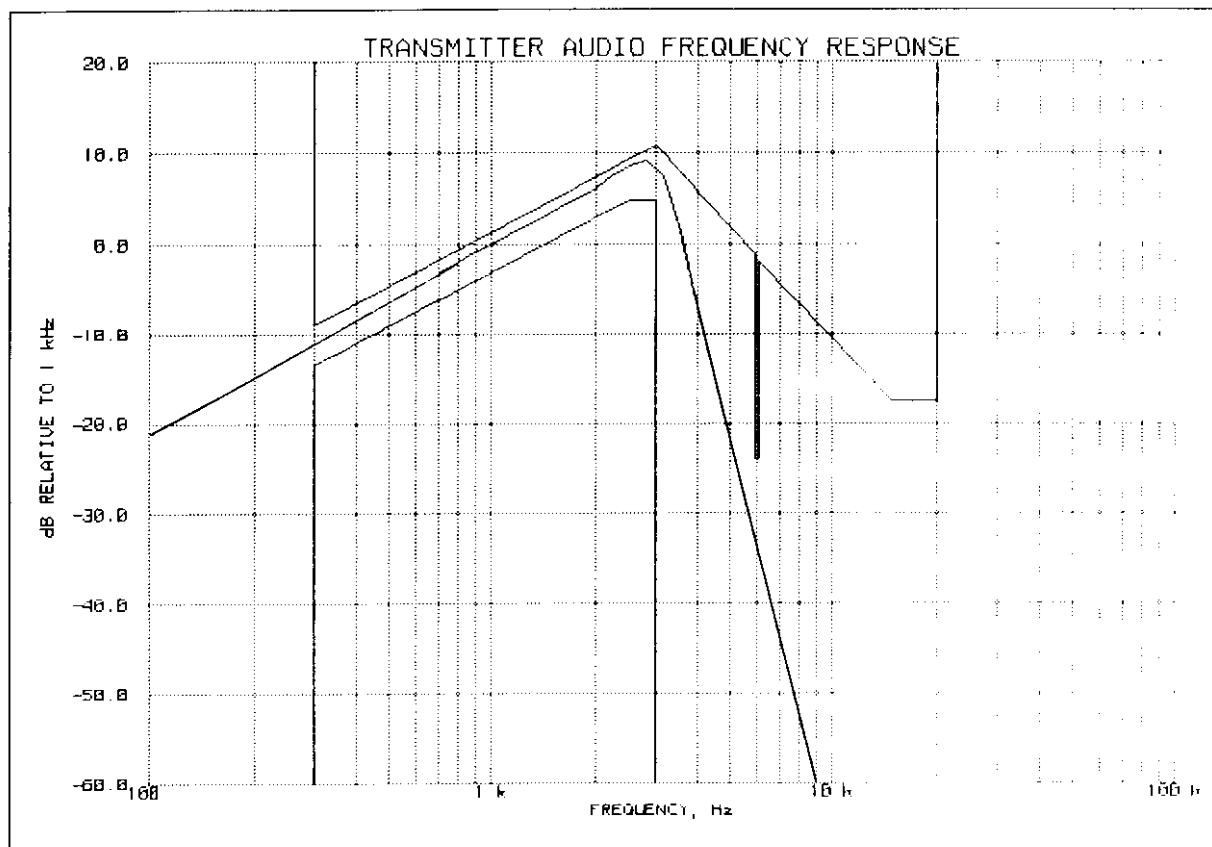
(5) SCOPE

HP 54502A _____

PAGE 11.1.

GML NHA-9S

TRANSMITTER AUDIO FREQUENCY RESPONSE
NOKIA, 282N, NHA-9SA AMPS
1 JUL 1998, 11:30



PEAK AUDIO FREQUENCY, Hz: 2820

TABLE VALUES:

FREQUENCY, Hz	LEVEL, dB	FREQUENCY, Hz	LEVEL, dB	FREQUENCY, Hz	LEVEL, dB
300	-9.1	30000	-12.5		
20000	-12.7	50000	-12.5		

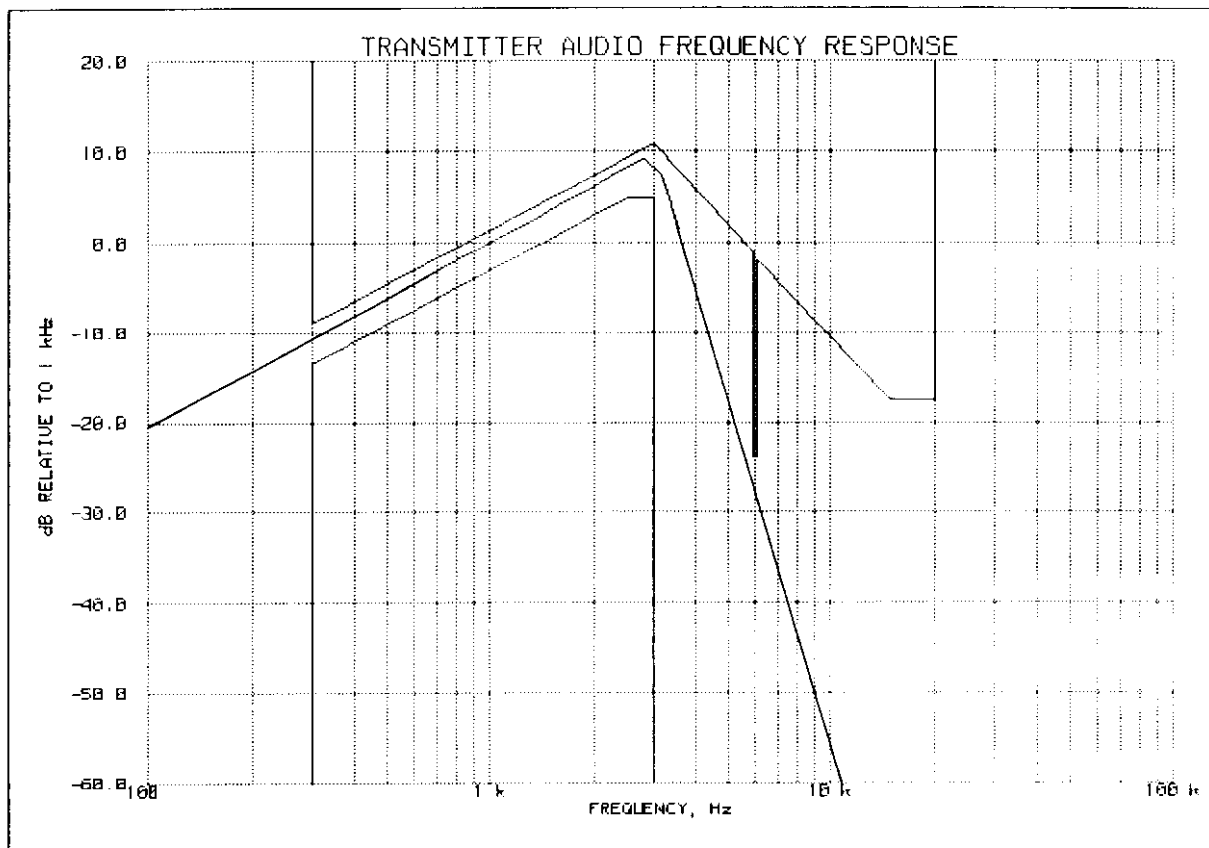
M. Morton P. Eng.

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MORTON FLOM, P. Eng.

TRANSMITTER AUDIO FREQUENCY RESPONSE
 NOKIA, 282N, NHA-9SA NAMPS
 1 JUL 1998, 08:45

GML NHA-9S



PEAK AUDIO FREQUENCY, Hz: 2820

TABLE VALUES:

FREQUENCY, Hz	LEVEL, dB	FREQUENCY, Hz	LEVEL, dB	FREQUENCY, Hz	LEVEL, dB
300	-8.5	30000	-11.7		
20000	-11.6	50000	-11.6		

M. Flom P. Eng.

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MORTON FLOM, P. Eng.

NAME OF TEST: MODULATION CHARACTERISTICS -
FREQUENCY RESPONSE OF AUDIO LOW PASS FILTER

PARAGRAPH: 47 CFR 2.987 (a)

GUIDE: TIA/EIA STANDARD IS-19-B

TEST CONDITIONS: S. T. & H.

TEST EQUIPMENT: AS PER PREVIOUS PAGE

MEASUREMENT PROCEDURE

1. The E.U.T. 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

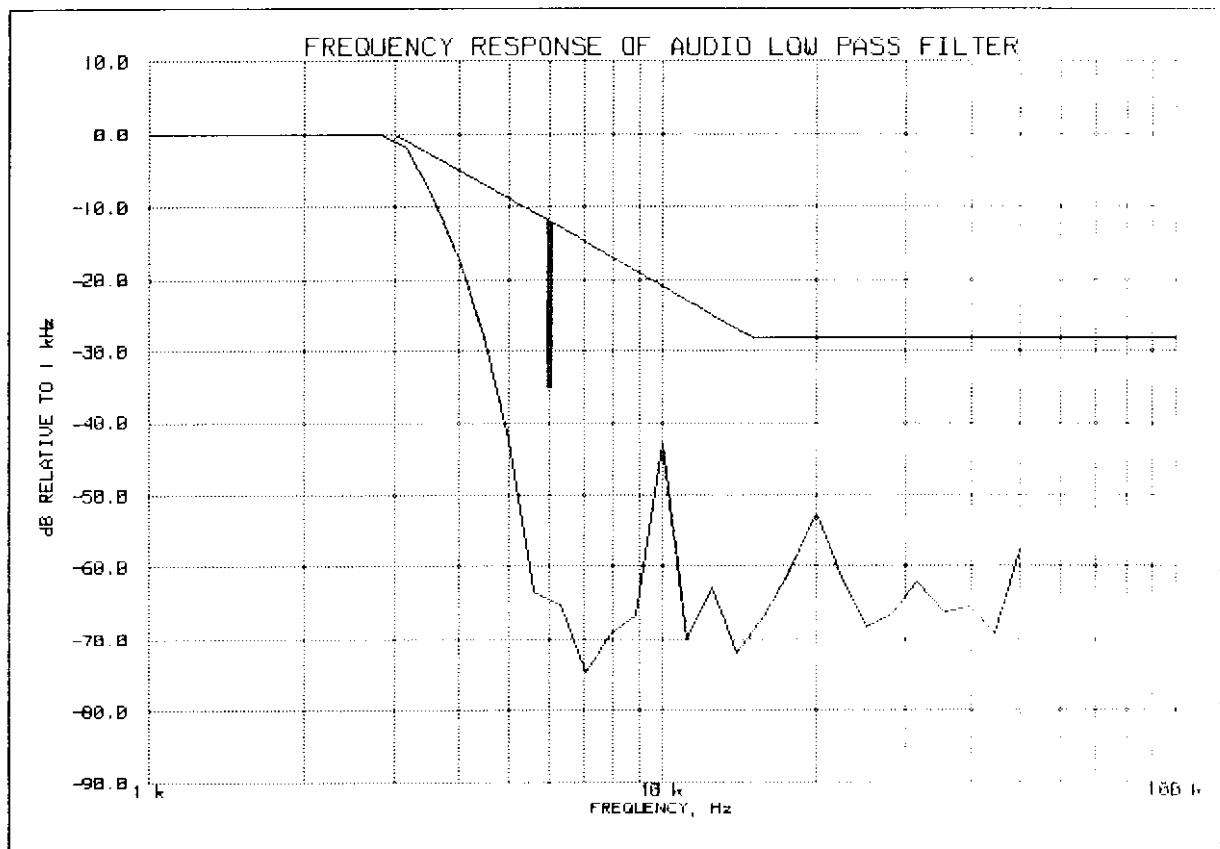
PAGE 13.1.

GML NHA-9S

FREQUENCY RESPONSE OF AUDIO LOW PASS FILTER

NOKIA, 282N, NHA-9SA AMPS

1 JUL 1998, 11:34



PEAK AUDIO FREQUENCY, Hz: 2820

M. Flom P. Eng.

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MORTON FLOM, P. Eng.

PAGE 13.2.

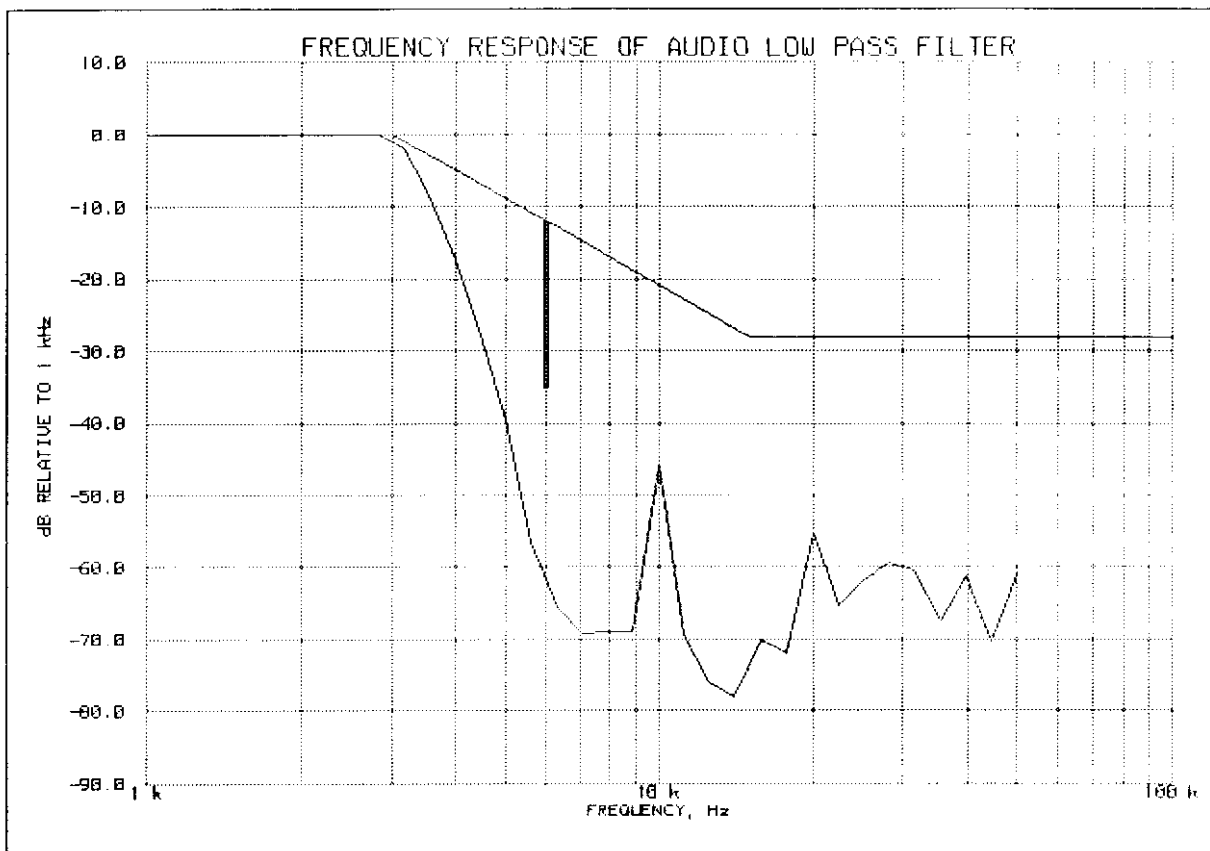
FREQUENCY RESPONSE OF AUDIO LOW PASS FILTER

NOKIA, 282N, NHA-9SA

NAMPS

1 JUL 1998, 08:48

GML NHA-9S



PEAK AUDIO FREQUENCY, Hz: 2820

M. F. Eng.

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MORTON FLOM, P. Eng.

NAME OF TEST: MODULATION CHARACTERISTICS -
MODULATION LIMITING

PARAGRAPH: 47 CFR 2.987 (b)

GUIDE: TIA/EIA STANDARD IS-19-B

TEST CONDITIONS: S. T. & H.

TEST EQUIPMENT: AS PER PREVIOUS PAGE

MEASUREMENT PROCEDURE

1. The audio signal generator was connected to the audio input circuit/microphone of the E.U.T. 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

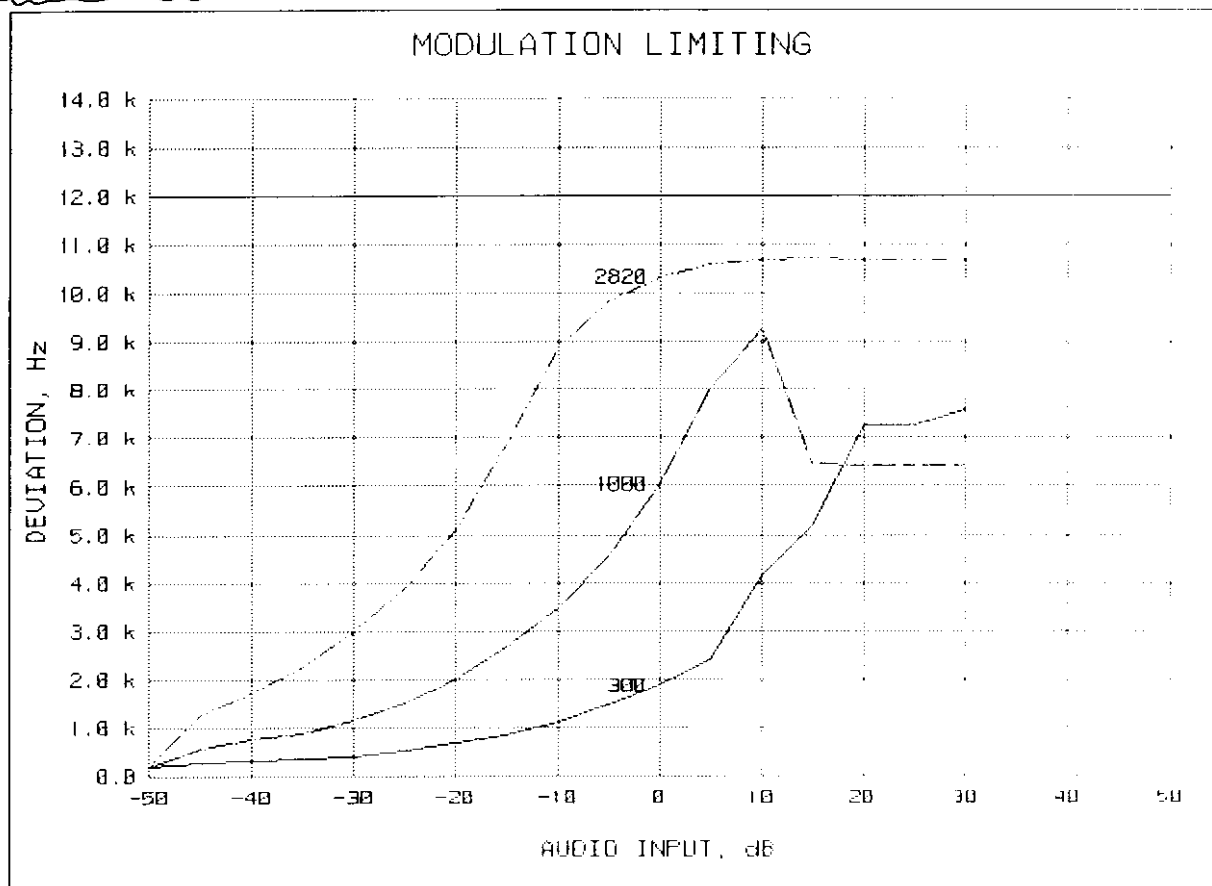
COMPANDOR ON:

1.	VOICE	<u>x</u>
2.	VOICE + SAT	<u>x</u>

PAGE 15.1.
MODULATION LIMITING
NOKIA, 282N, NHA-9SA AMPS
1998-JUL-01, 11:38

GML NHA-9S

VOICE ONLY



REFERENCE DEVIATION, kHz = 6
REFERENCE MODULATION, Hz = 1000
PEAKS = POSITIVE
AUDIO AMPLITUDE, mV = 158.15

M. Morton P. Eng

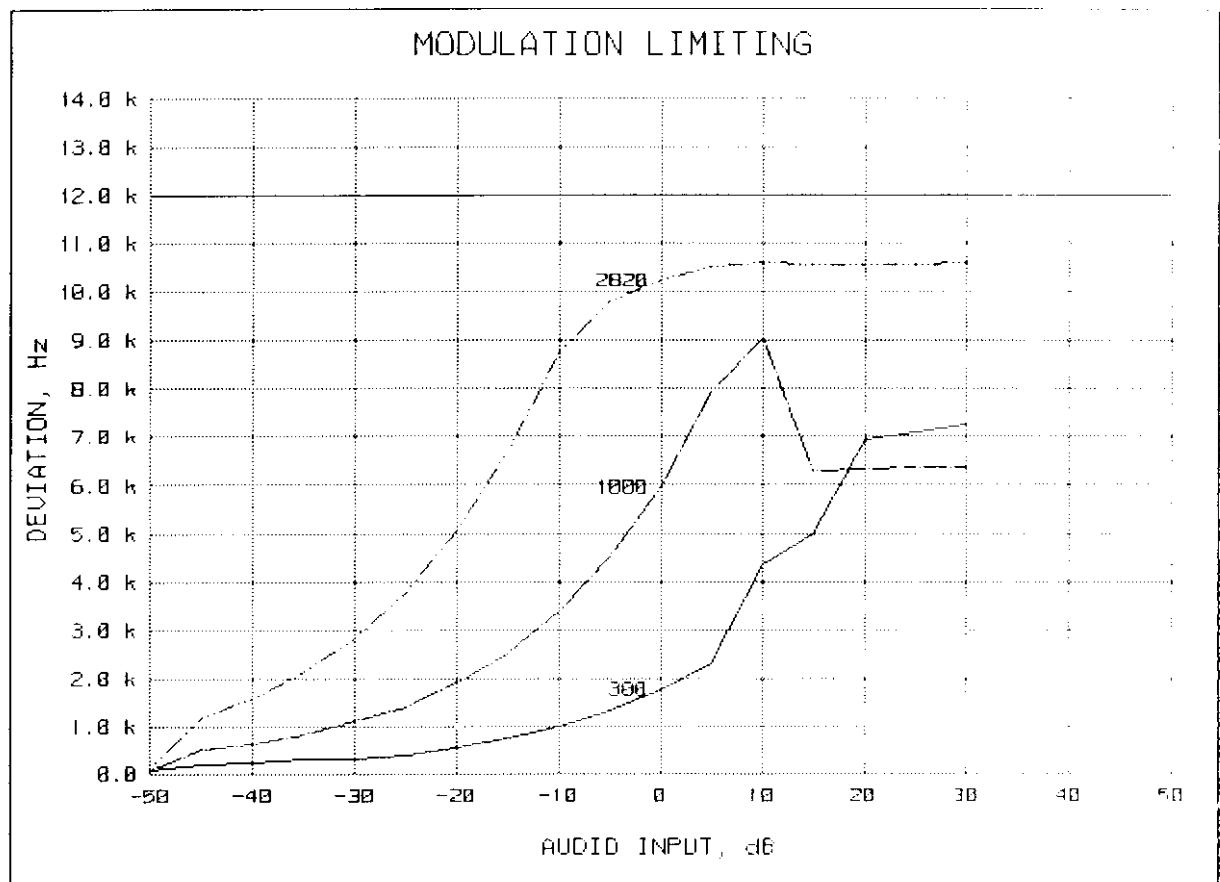
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PAGE 15.2
 MODULATION LIMITING
 NOKIA, 282N, NHA-9SA AMPS
 1998-JUL-01, 11:38

GML NHA-9S

VOICE ONLY



REFERENCE DEVIATION, kHz	= 6
REFERENCE MODULATION, Hz	= 1000
PEAKS	= NEGATIVE
AUDIO AMPLITUDE, mV	= 158.15

M. Flom P. Eng.

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PAGE 15.3.

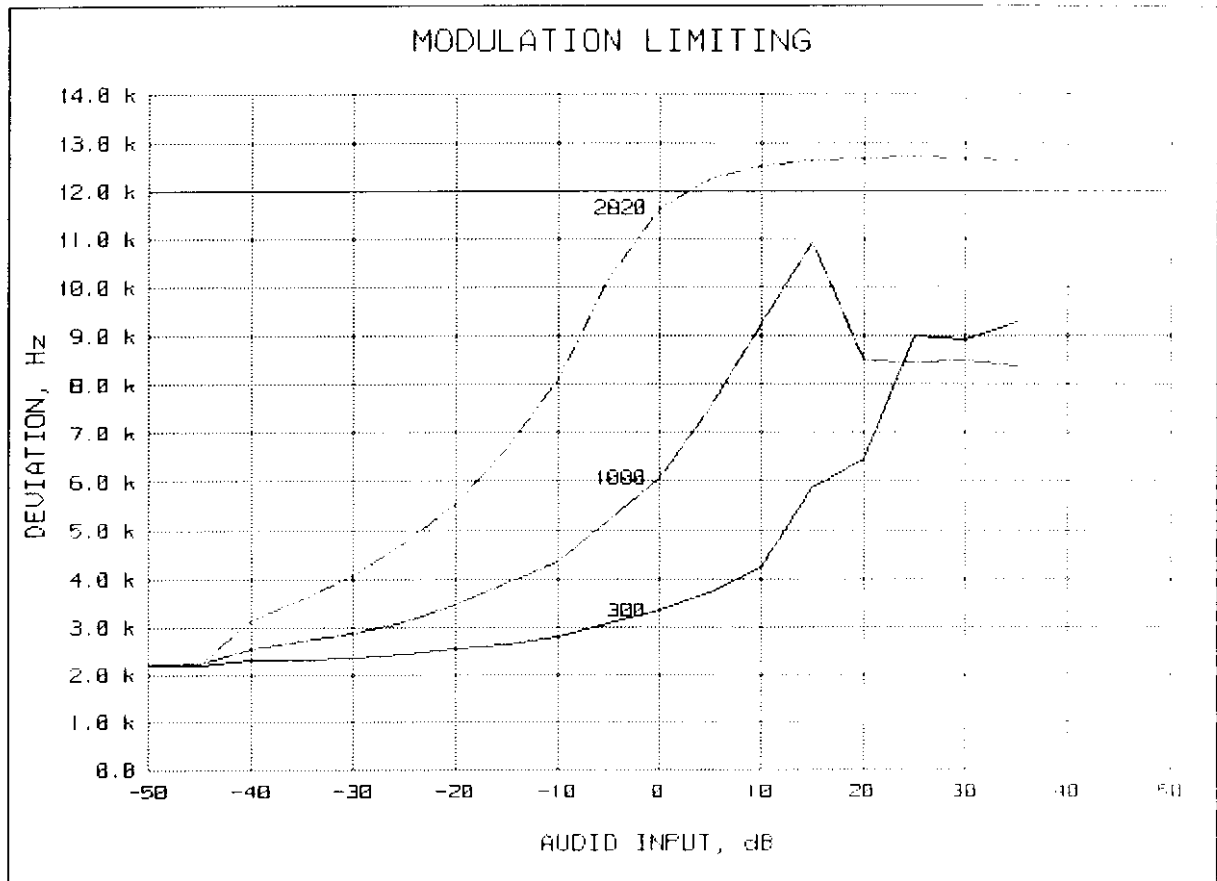
MODULATION LIMITING

NOKIA, 282N, NHA-9SA AMPS

1998-JUL-01, 11:42

GML NHA-9S

VOICE + SAT



REFERENCE DEVIATION, kHz = 6

REFERENCE MODULATION, Hz = 1000

PEAKS = POSITIVE

AUDIO AMPLITUDE, mV = 73.13

M. F. Eng.

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PAGE 15.4.

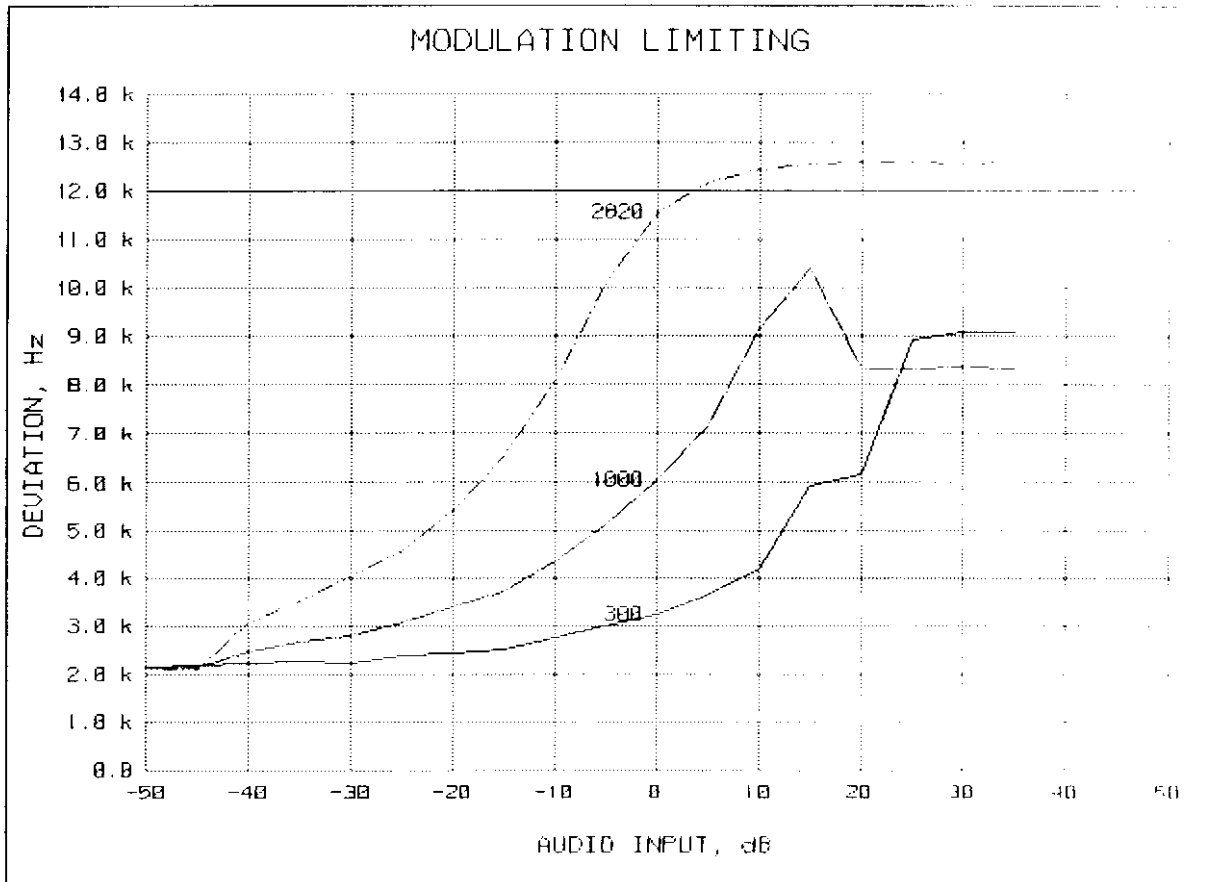
MODULATION LIMITING

NOKIA, 282N, NHA-9SA AMPS

1998-JUL-01, 11:42

VOICE + SAT

GML NHA-9S



REFERENCE DEVIATION, kHz = 6

REFERENCE MODULATION, Hz = 1000

PEAKS = NEGATIVE

AUDIO AMPLITUDE, mV = 73.13

Morton P. Eng.

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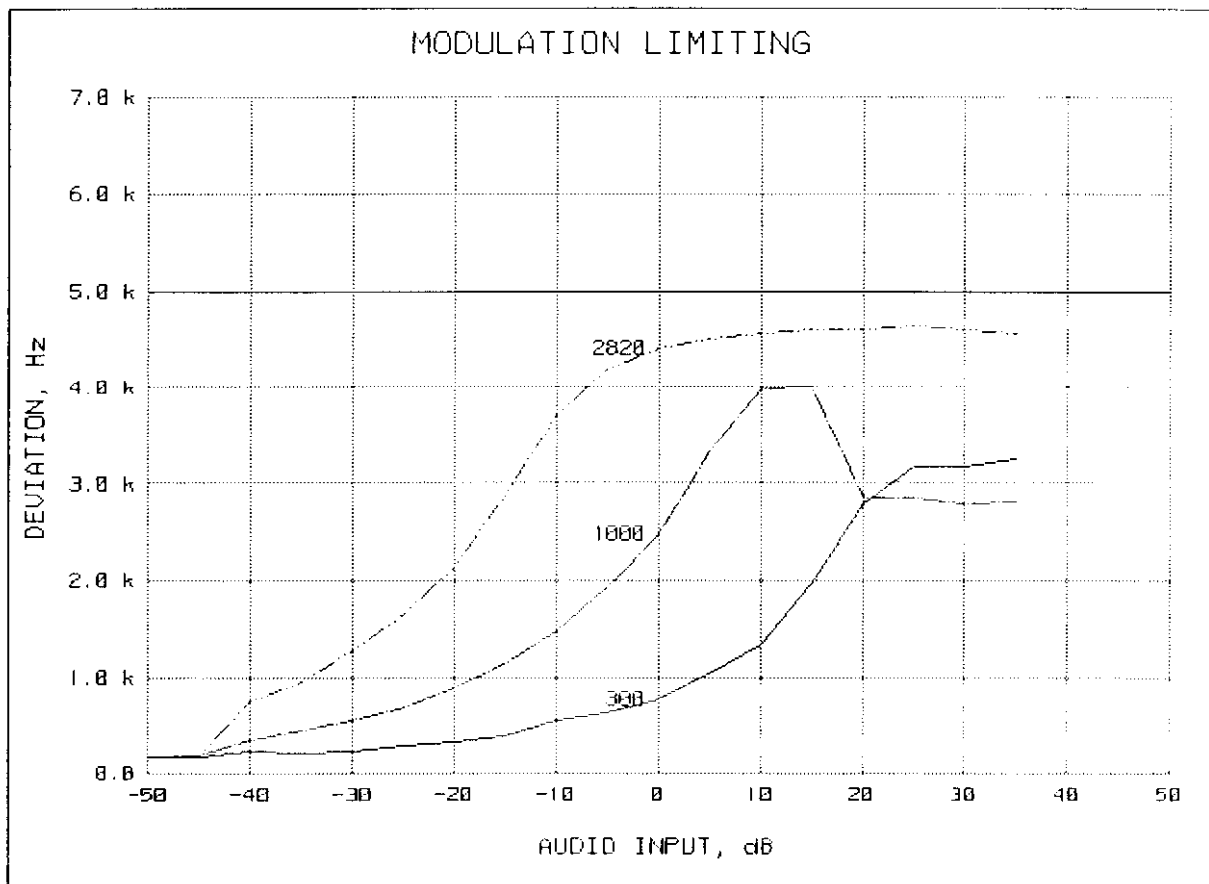
MORTON FLOM, P. Eng.

PAGE 15.5.
MODULATION LIMITING
NOKIA, 282N, NHA-9SA
1998-JUL-01, 09:03

GML NHA-9S

NAMPS

VOICE ONLY



REFERENCE DEVIATION, kHz = 2.5
REFERENCE MODULATION, Hz = 1000
PEAKS = POSITIVE
AUDIO AMPLITUDE, mV = 94.21

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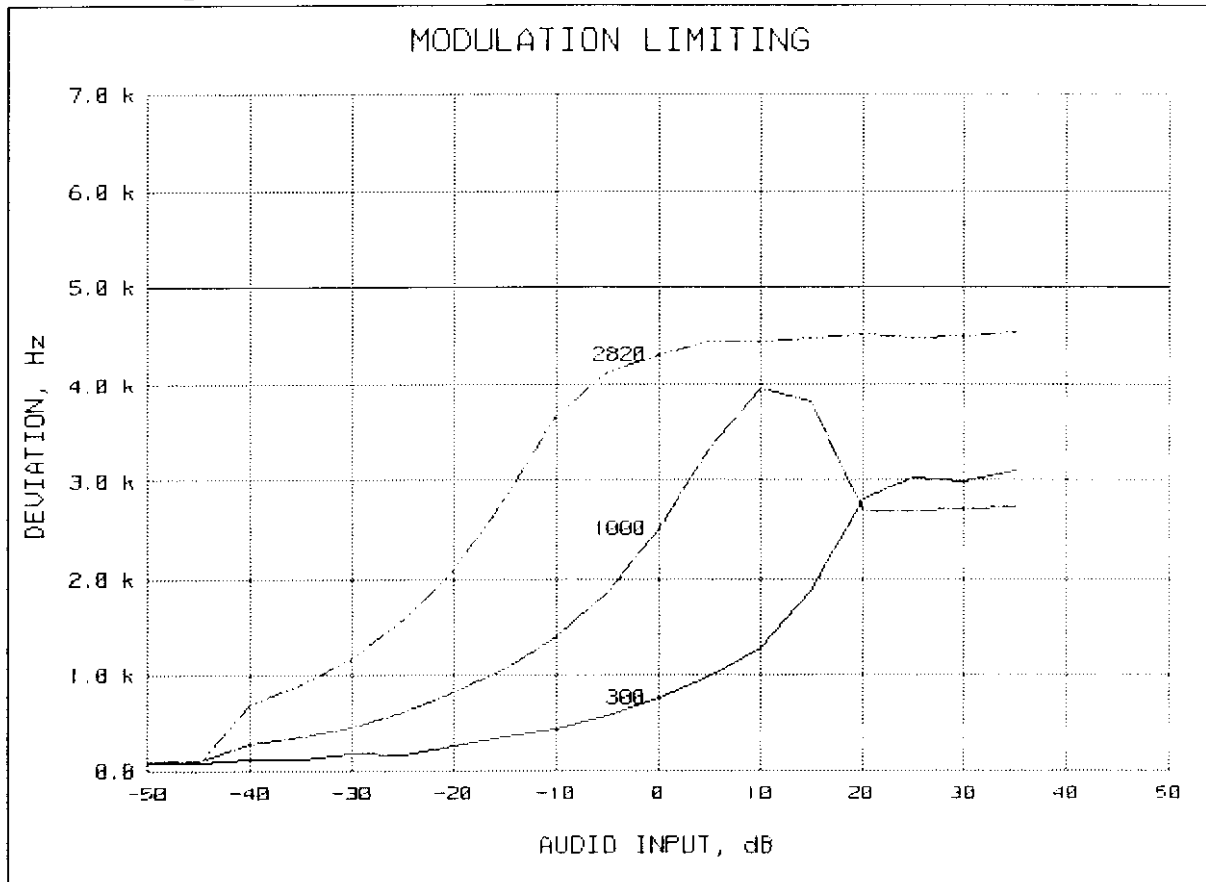
PAGE 15.6.

GML NHA-9S

MODULATION LIMITING
NOKIA, 282N, NHA-9SA
1998-JUL-01, 09:03

NAMPS

VOICE ONLY



REFERENCE DEVIATION, kHz = 2.5
REFERENCE MODULATION, Hz = 1000
PEAKS = NEGATIVE
AUDIO AMPLITUDE, mV = 100.94

Morton Flom P. Eng.

SUPERVISED BY:

MORTON FLOM, P. Eng.

NAME OF TEST: OSCILLOSCOPE PRESENTATION OF TONES
MEASUREMENT OF MAXIMUM DEVIATION

PARAGRAPH:

GUIDE: TIA/EIA STANDARD IS-19-B

TEST CONDITIONS: S. T. & H.

TEST EQUIPMENT: AS PER ATTACHED PAGE

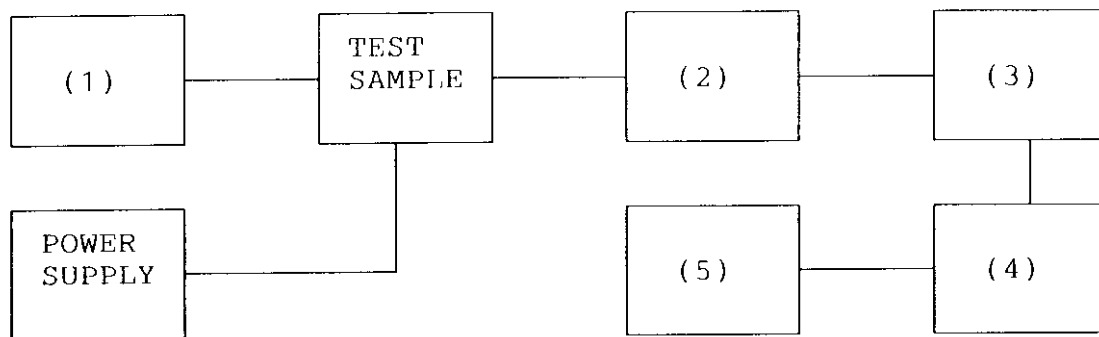
MEASUREMENT PROCEDURE

1. The presentation of tones was obtained by attaching the HP 54502A Oscilloscope to the modulation output of the HP 8901 Modulation Analyzer.
2. The E.U.T. was modulated by an HP 8903 Audio Analyzer and/or internally generated signals.
3. Oscillographic presentations and maximum deviation measurements were recorded for the various configurations.
4. MEASUREMENT RESULTS: ATTACHED SUMMARY FOR DEVIATION
5. MEASUREMENT RESULTS: ATTACHED PLOTS FOR TONES

TRANSMITTER SPURIOUS EMISSION

TEST A. OCCUPIED BANDWIDTH (IN-BAND SPURIOUS)

TEST B. OUT-OF-BAND SPURIOUS

(1) AUDIO OSCILLATOR/GENERATOR

HP 204D
 HP 8903A

x(2) COAXIAL ATTENUATOR

NARDA 766-10
 SIERRA 661A-30

x(3) FILTERS; NOTCH, HP, LP, BP

CIRQTEL FHT
 EAGLE TNF-1
 PHELPS DODGE PD-495-8

x(4) SPECTRUM ANALYZER

HP 8566B
 HP 8563E

x(5) SCOPE

HP 54502A

x

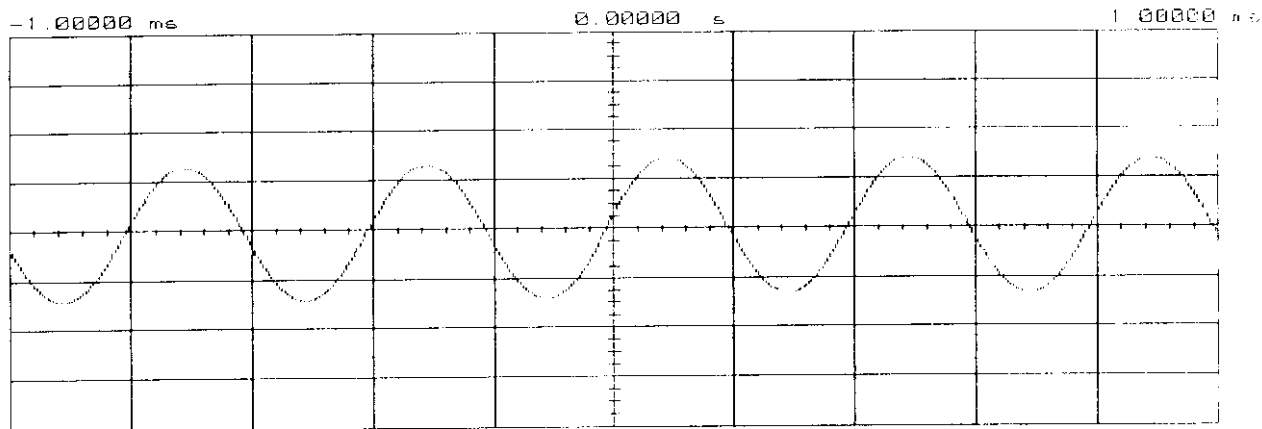
MEASUREMENT SUMMARY: OSCILLOSCOPE PRESENTATION OF TONES
MEASUREMENT OF MAXIMUM DEVIATION

MODULATION	DEVIATION, $\pm$ kHz
(a) VOICE	10.7
(b) WIDEBAND DATA	9.0
(c) SAT	2.1
(d) ST	8.0
(e) SAT + VOICE	12.5
(f) SAT + DTMF	12.5
(g) CDMA	N/A
(h) TDMA	N/A
(i) NAMPS VOICE	N/A
(j) NAMPS DSAT	N/A
(k) NAMPS ST	N/A
(l) NAMPS VOICE	N/A

SUPERVISED BY:


MORTON FLOM, P. Eng.

MODULATION: VOICE (AMPS)



Main	Timebase 200 us/div	Delay/Pos. 0.00000 s	Reference Center	Mode Real-time (EXTENDED)
Channel 1	Sensitivity 20.0 mV/div	Offset 0.00000 V	Probe 1.000 :1	Coupling dc (50 ohm)
Trigger mode Edge				
On Positive Edge Of Chan1				
Trigger Level				
Chan1 = 11.200 mV (noise reject OFF)				
Holdsuff = 40.000 ns				

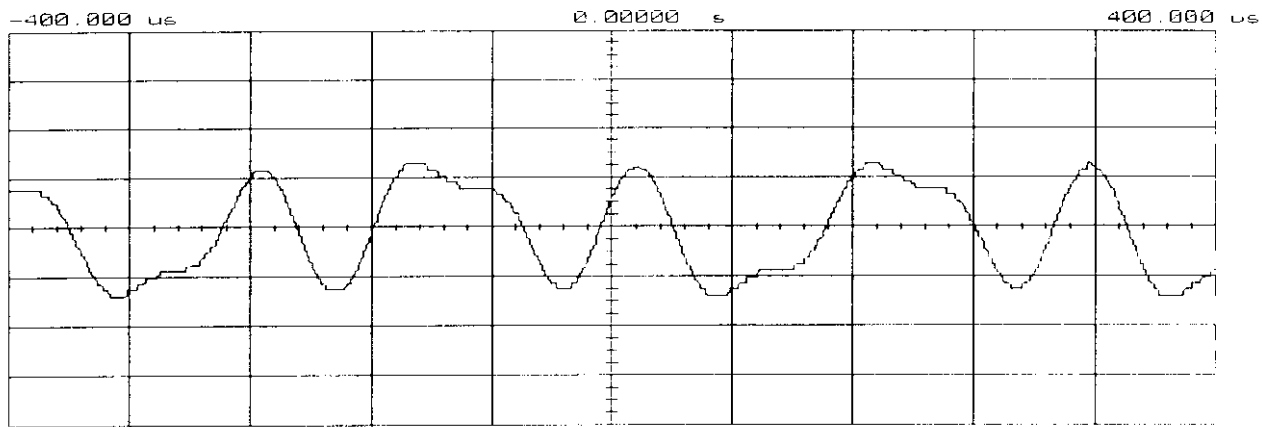
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OSCILLOSCOPE PRESENTATION

NOKIA, 282N, NHA-9SA (AMPS/NAMPS)

1998-JUL-01, 09:38, WED

MODULATION: WBD (AMPS)

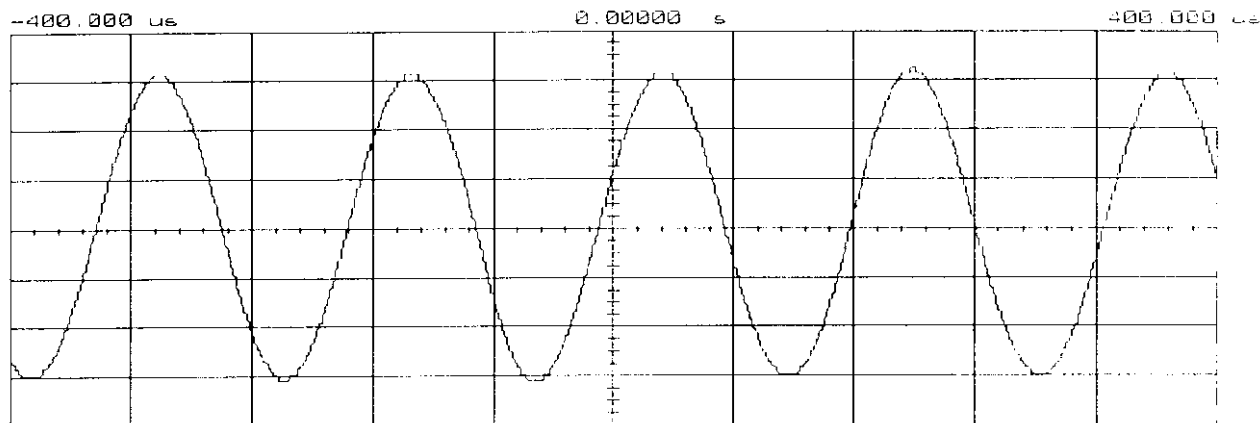


Main	Timebase 80.0 ns/div	Delay/Pos 0.00000 s	Reference Center	Mode Real Time (1.000 MHz)
Channel 1	Sensitivity 50.0 mV/div	Offset 0.00000 V	Probe 1.000 :1	Coupling dc (50 ohm)
Trigger mode: Edge				
On Positive Edge of Chan1				
Trigger Level				
Chan1 = 21.600 mV (noise reject OFF)				
Holdoff = 40.000 ns				

PAGE 19.3.
OSCILLOSCOPE PRESENTATION
NOKIA, 282N, NHA-9SA (AMPS/NAMPS)
1998-JUL-01, 09:40, WED

GML NHA-9S

MODULATION: SAT (AMPS)

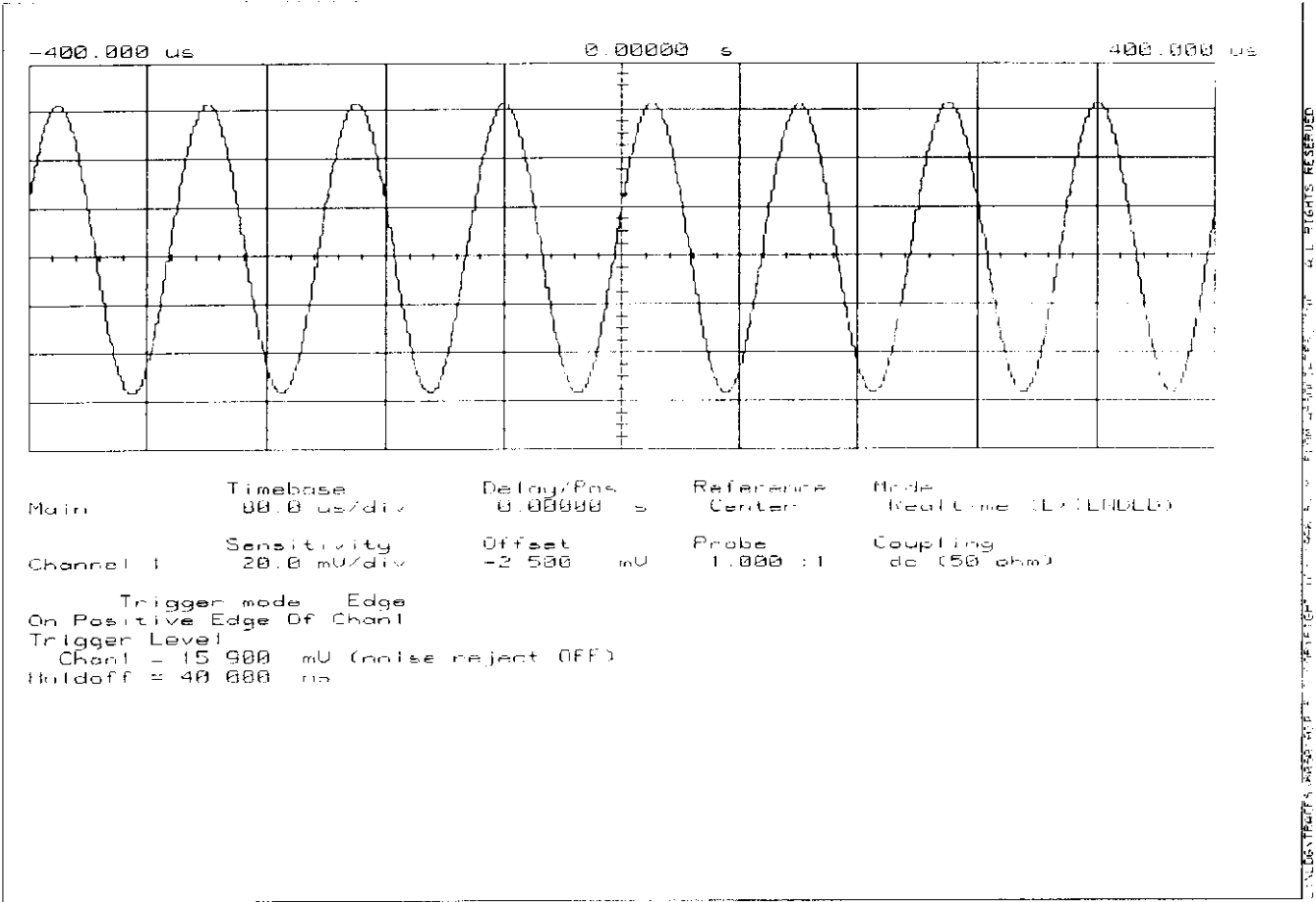


Main	Timebase 80.0 us/div	Delay/Pos 0.00000 s	Reference Center	Mode Realtime (UNFOLD)
Channel 1	Sensitivity 50.0 mV/div	Offset 0.00000 V	Probe 1.000 :1	Coupling dc (50 ohm)
Trigger mode Edge				
On Positive Edge Of Chan1				
Trigger Level				
Chan1 = 50.400 mV (noise reject OFF)				
Holds off = 40.000 ns				

THE TRUTH ABOUT THE NOKIA 282N NHA-9SA (AMPS/NAMPS) IS THAT IT'S A REALITY CHECK.

OSCILLOSCOPE PRESENTATION
NOKIA, 282N, NHA-9SA (AMPS/NAMPS)
1998-JUL-01, 09:41, WED

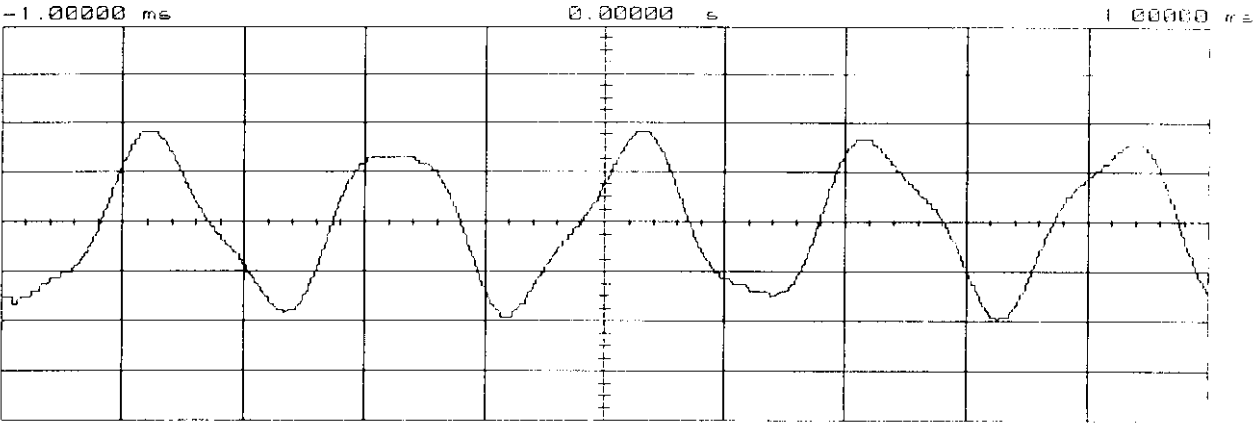
MODULATION: ST (AMPS)



OSCILLOSCOPE PRESENTATION
NOKIA, 282N, NHA-9SA (AMPS/NAMPS)
1998-JUL-01, 09:43, WED

GML NHA-9S

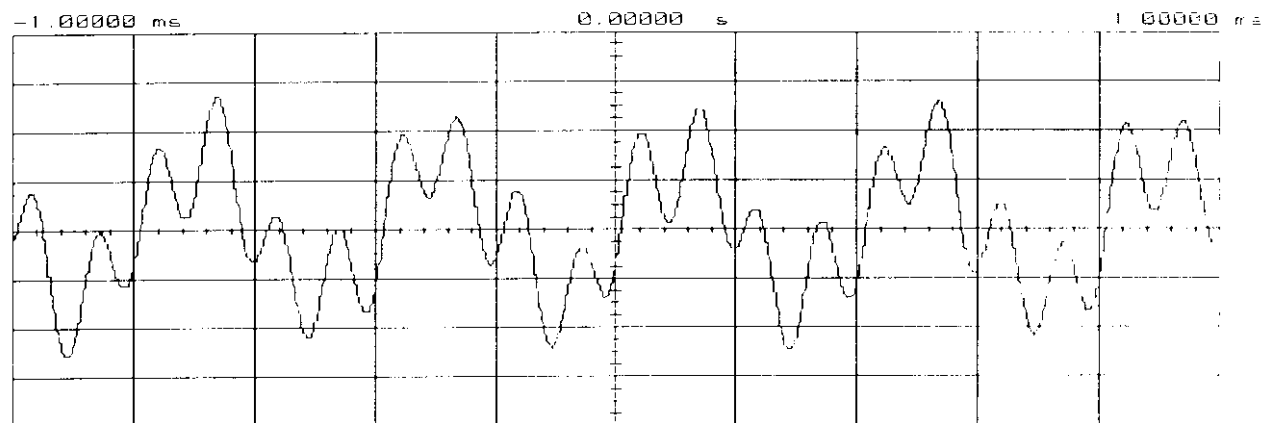
MODULATION: SAT+VOICE (AMPS)



Main	Timebase 200 us/div	Delay/Pos. 0.00000 s	Reference Center	Mode Realtime (EXTRALED)
Channel 1	Sensitivity 50.0 mV/div	Offset 0.00000 V	Probe 1.000 :1	Coupling ac (50 ohm)

Trigger mode Edge
On Positive Edge Of Chan1
Trigger Level
Chan1 = 30.400 mV (noise reject OFF)
Holdoff = 40.000 ns

MODULATION: SAT + ST (AMPS)

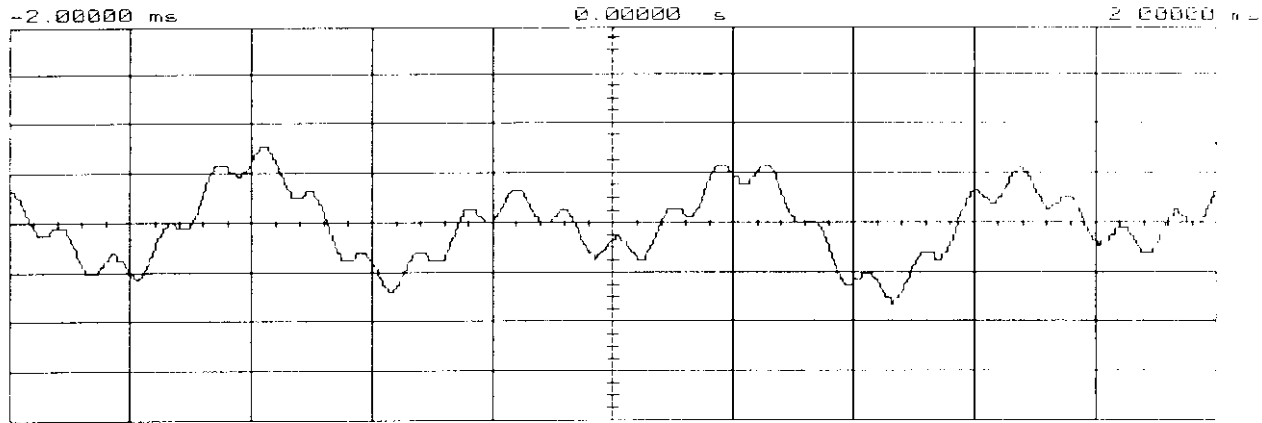


Main	Timebase	Delay/Pos	Reference	Mode
	200 μ s/div	0.00000 s	Center	Real Time (100 MHz)

Channel 1	Sensitivity	Offset	Probe	Coupling
	50.0 mV/div	-7.500 mV	1.000 :1	ac 150 μ sec

Trigger mode: Edge
On Positive Edge Of Chan1
Trigger Level:
Chan1 = -47.500 mV (coarse reject OFF)
Holdoff = 40.000 ns

MODULATION: SAT+DTMF (AMPS)

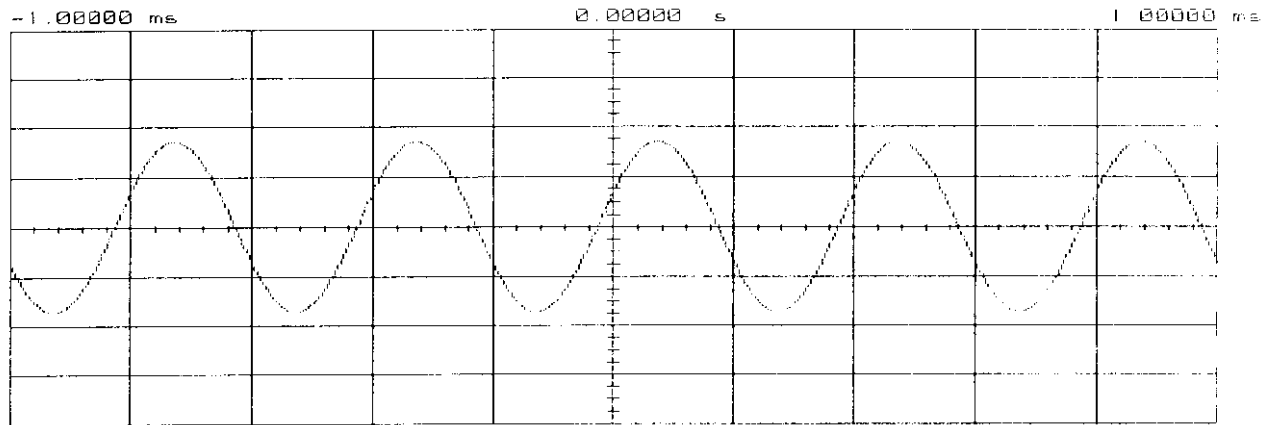


Main:	Timebase	Delay/Pos	Reference	Mode
	400 us/div	0.00000 s	Center	Real Time (EXTENDED)
Channel 1:	Sensitivity	Offset	Probe	Coupling
	50.0 mV/div	-2.500 mV	1.000 x1	ac (50 ohm)
Trigger mode: Edge				
On Positive Edge Of Chan1				
Trigger Level:				
Chan1 = -26.500 mV (noise reject OFF)				
Holdoff = 40.000 ns				

1998-JUL-01, 09:28, WED

GML NHA-9S

MODULATION: VOICE NAMPS



Main	Timebase 200 us/div	Delay/Pos 0.00000 s	Reference Center	Mode Real Time (EXTENDED)
Channel 1	Sensitivity 20.0 mV/div	Offset 0.00000 V	Probe 1.000 : 1	Coupling dc (50 ohm)
Trigger mode Edge				
On Positive Edge Of Chan1				
Trigger Level				
Chan1 = 11.200 mV (noise reject OFF)				
Holds off = 40.000 ns				

[illegible]

NAME OF TEST: OCCUPIED BANDWIDTH
PARAGRAPH: 47 CFR 2.989 (c)(1)
GUIDE: TIA/EIA STANDARD IS-19-B
TEST CONDITIONS: S. T. & H.
TEST EQUIPMENT: AS PER PREVIOUS PAGE

MEASUREMENT PROCEDURE

1. The E.U.T. and test equipment were set up as shown on the previous page, with the Spectrum Analyzer connected.
2. For voice modulated equipment, the audio signal generator was adjusted to the frequency of maximum response and with output level set for ± 6 kHz deviation (or 50% modulation).
3. With level constant, the frequency was set at 6 kHz, then the signal level was increased 16 dB.
4. The Occupied Bandwidth was measured with the Spectrum Analyzer controls set as shown on the test results.
5. All other modulations for this equipment as available from appropriate interface devices.
6. MEASUREMENT RESULTS: ATTACHED

MEASUREMENT SUMMARY: OCCUPIED BANDWIDTH

MODULATION	MEASURED DEVIATION ±kHz (HP 8901A)	LIMIT ±kHz	B/W @ -26 dB PLOTS, kHz
NONE	0.0	0	0
VOICE	10.7	12	-32
WIDEBAND DATA	9.0	8	-22
SAT + VOICE		N/A	-32
SAT + DTMF		N/A	-22
CDMA	N/A	N/A	N/A
TDMA	N/A	N/A	N/A
NAMPS	N/A	N/A	-17

FOR ALL OCCUPIED BANDWIDTH PLOTS:

- | | | |
|----|----------------------|------------------|
| 1. | 0 dB REFERENCE LEVEL | = TOP |
| 2. | HORIZONTAL | = AS INDICATED |
| 3. | VERTICAL | = AS INDICATED |
| 4. | I.F. BANDWIDTH | = AS INDICATED |
| 5. | VIDEO FILTER | = OFF |
| 6. | POWER OUTPUT | = AS PER PAGE 2. |
| 7. | WORST CHANNEL | = 380 |
| 8. | WORST CASE | = VOICE + SAT |

SUPERVISED BY:

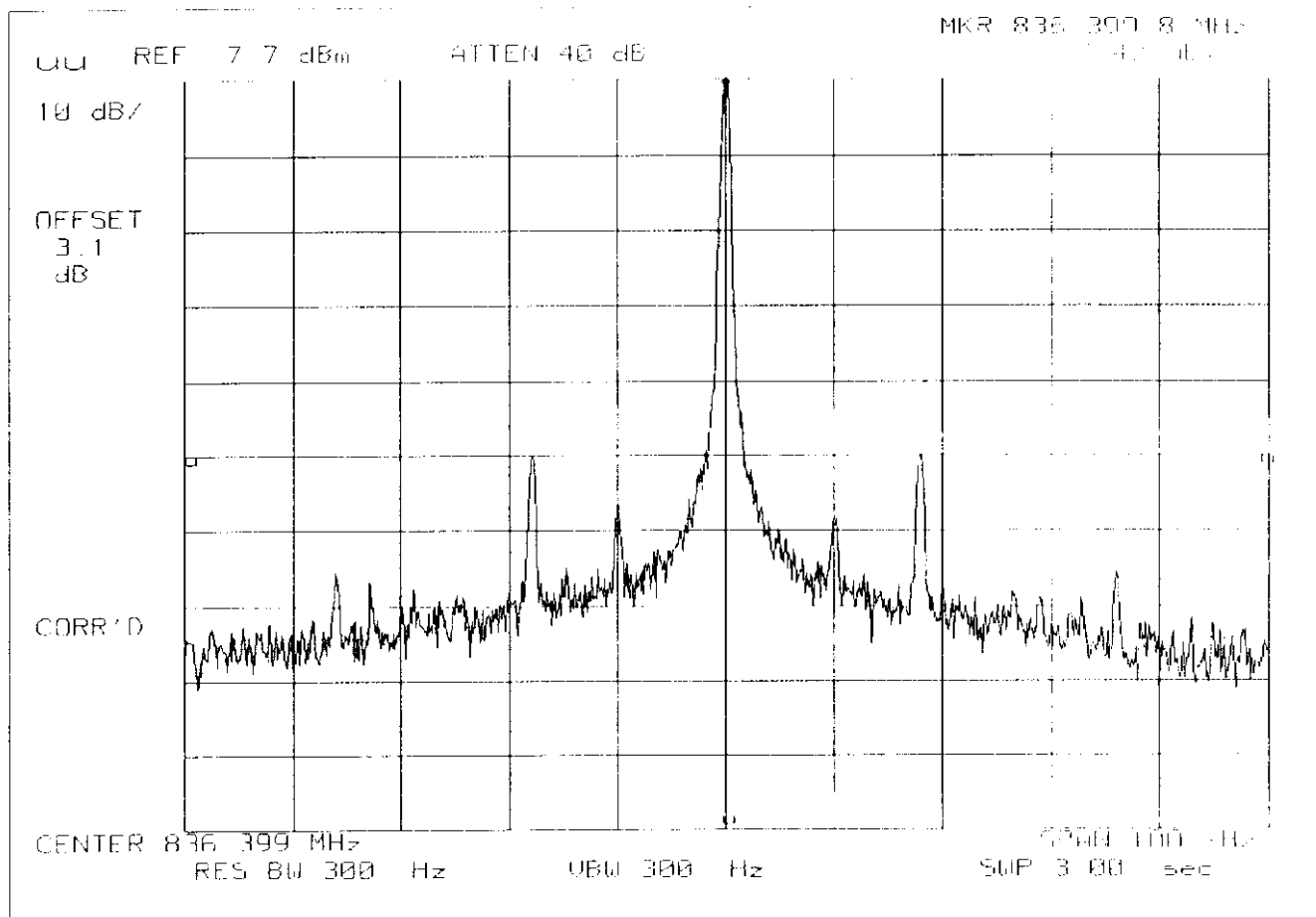
M. J. F. Eng.
MORTON FLOM, P. Eng.

SPECTRUM ANALYZER PRESENTATION

NOKIA, 282N, NHA-9SA AMPS

1998-JUL-01, 10:16, WED

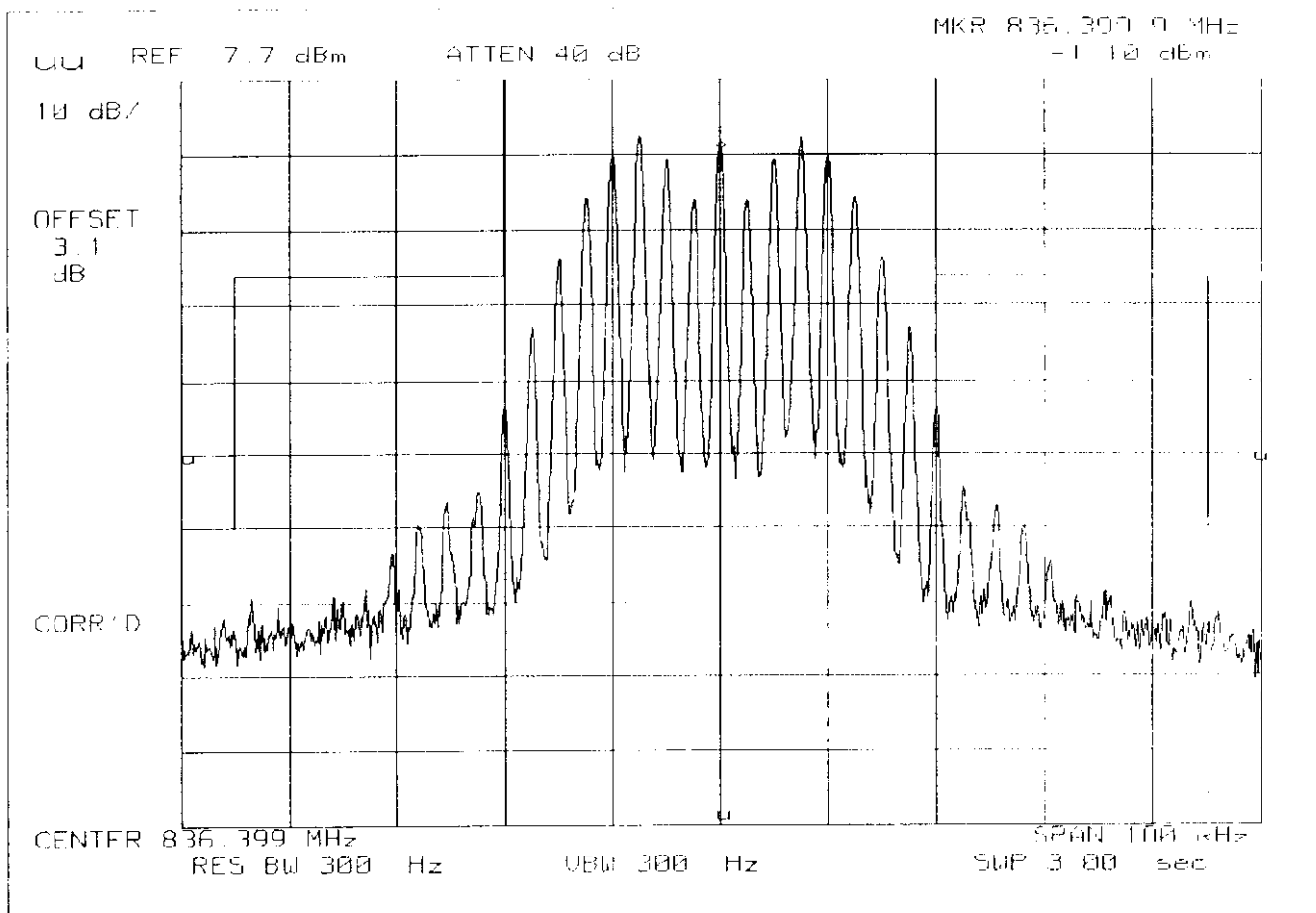
POWER: LOW
MODULATION: NONE



PAGE 22.2.
SPECTRUM ANALYZER PRESENTATION
NOKIA, 282N, NHA-9SA AMPS
1998-JUL-01, 10:10, WED

GML NHA-9S

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



PAGE 22.3.

GML NHA-9S

SPECTRUM ANALYZER PRESENTATION

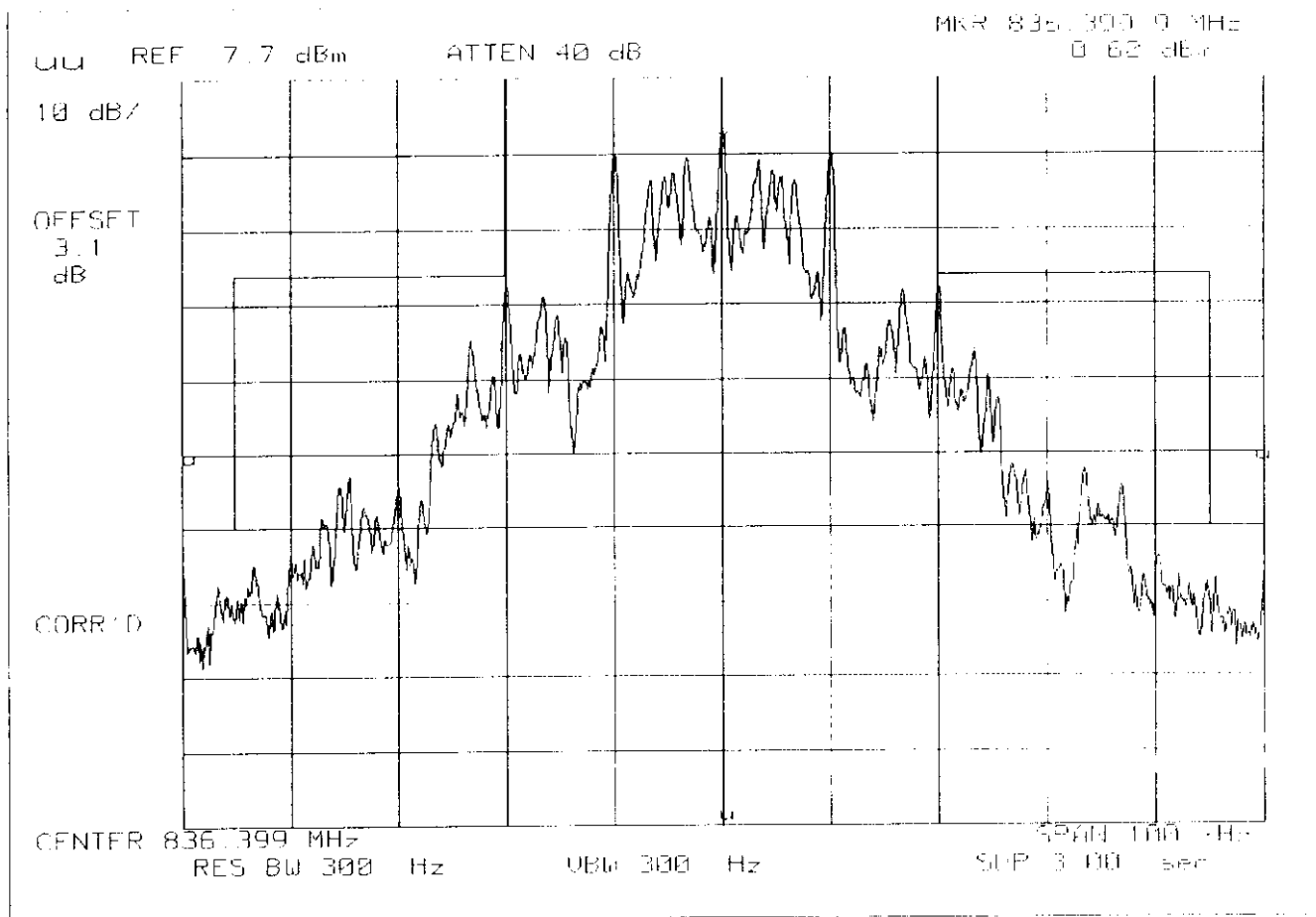
NOKIA, 282N, NHA-9SA AMPS

1998-JUL-01, 10:18, WED

POWER: LOW

MODULATION: WBD

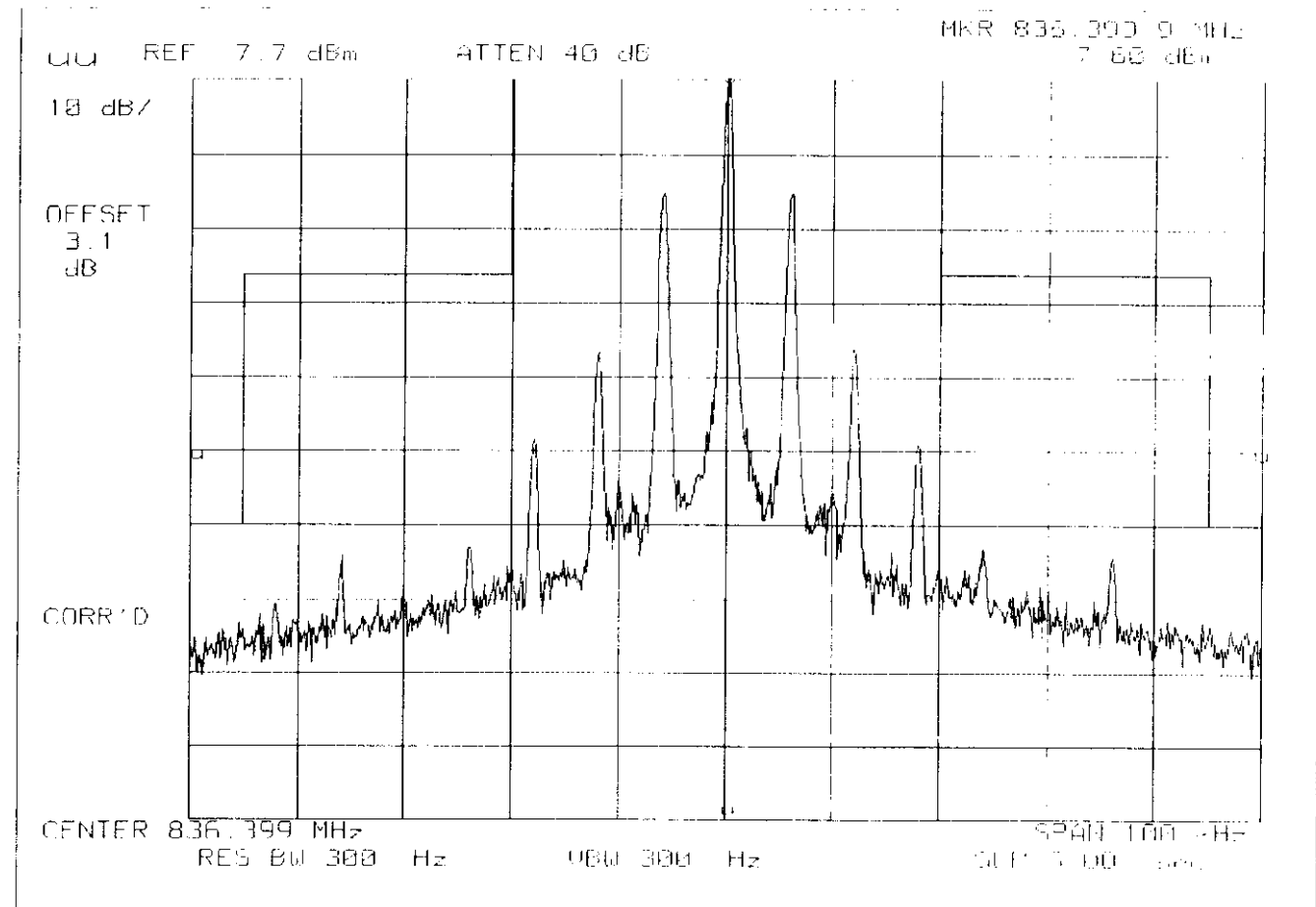
MASK: AMPS CELLULAR, F3E/F3D w/LPF



POWER: LOW

MODULATION: SAT

MASK: AMPS CELLULAR, F3E/F3D w/LPF



PAGE 22.5.

SPECTRUM ANALYZER PRESENTATION

NOKIA, 282N, NHA-9SA AMPS

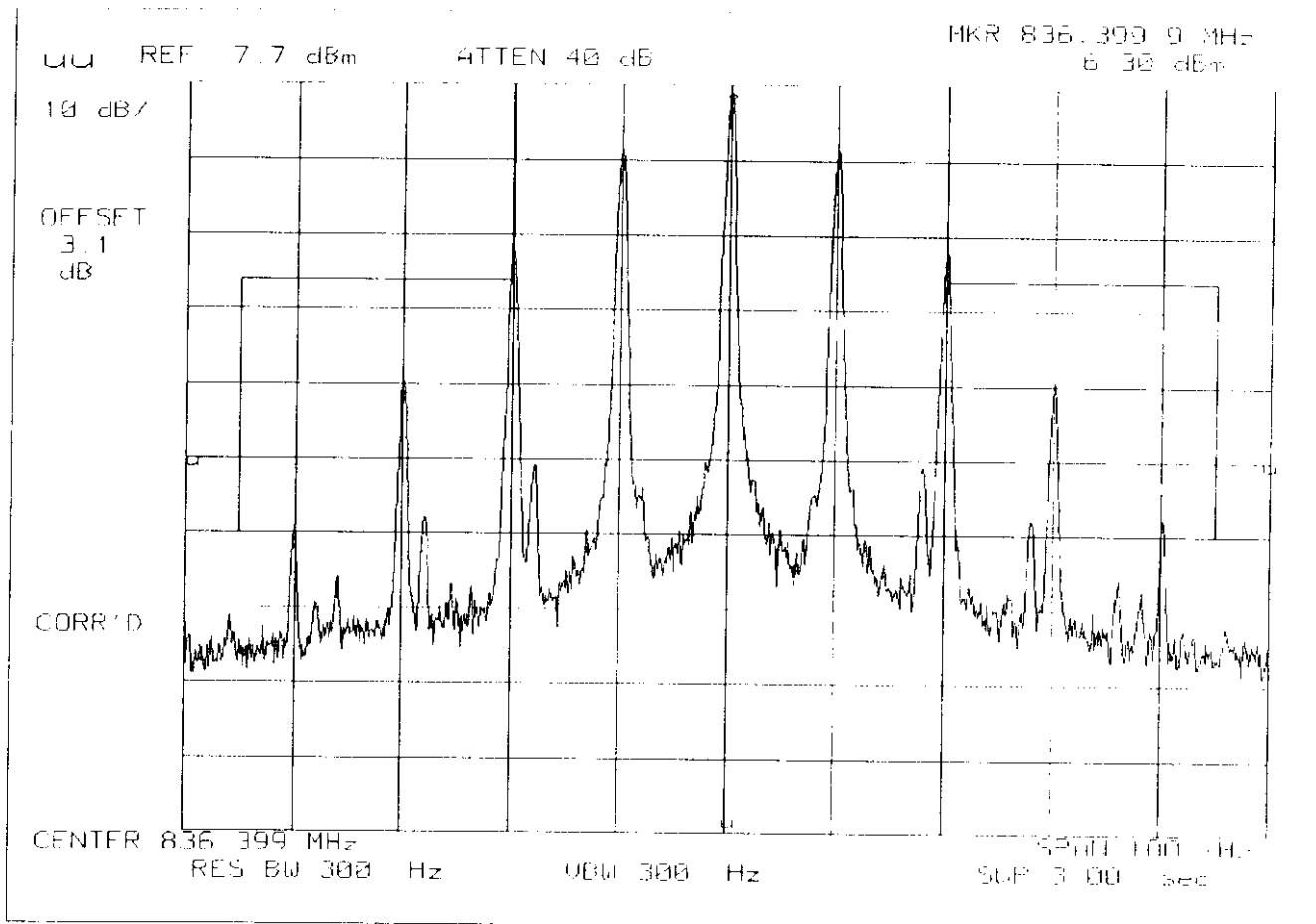
1998-JUL-01, 10:23, WED

GML NHA-9S

POWER: LOW

MODULATION: ST

MASK: AMPS CELLULAR, F3E/F3D w/LPF



PAGE 22.6.

SPECTRUM ANALYZER PRESENTATION

NOKIA, 282N, NHA-9SA AMPS

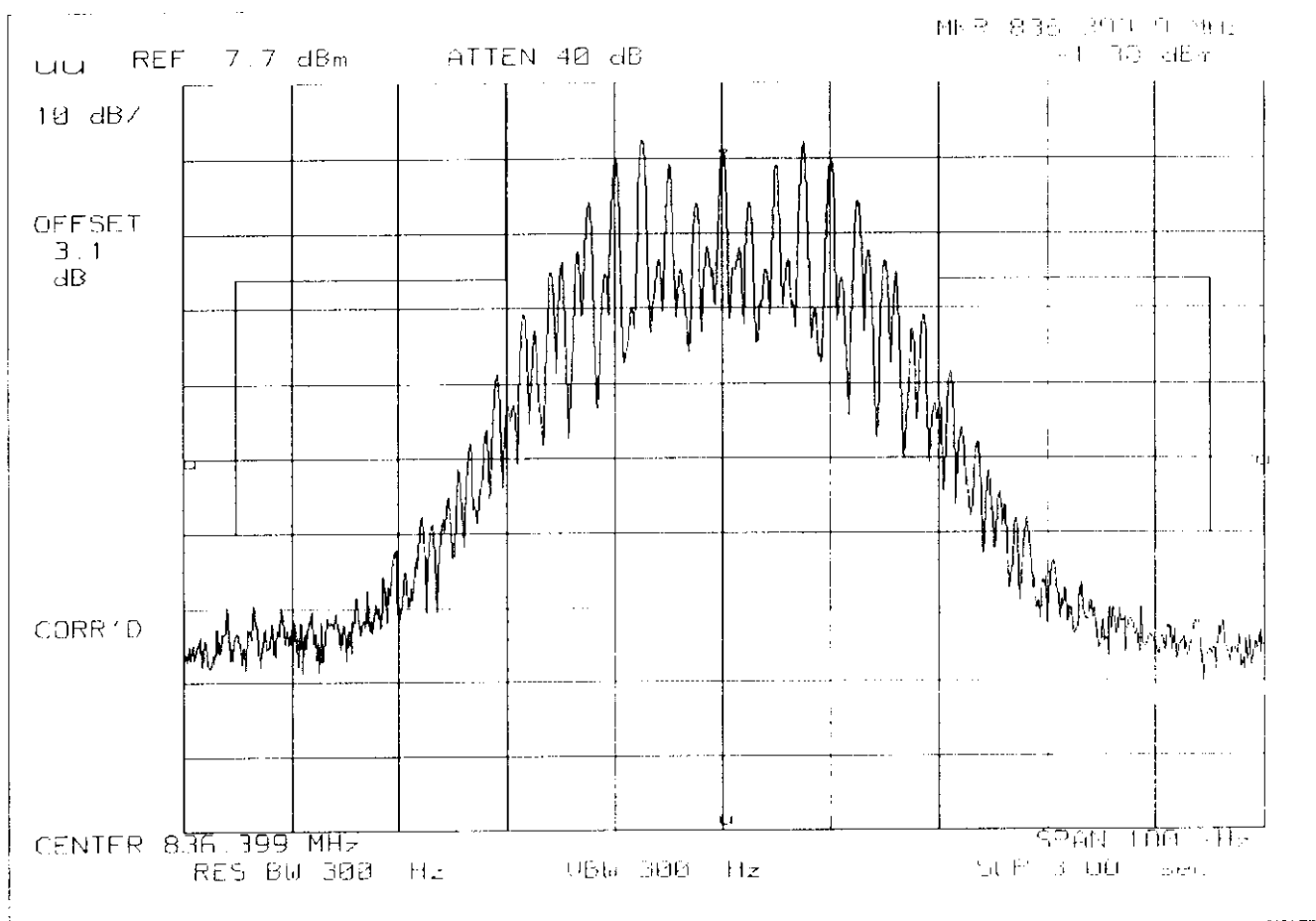
1998-JUL-01, 10:26, WED

GML NHA-9S

POWER: LOW

MODULATION: SAT+VOICE

MASK: AMPS CELLULAR, F3E/F3D w/LPF

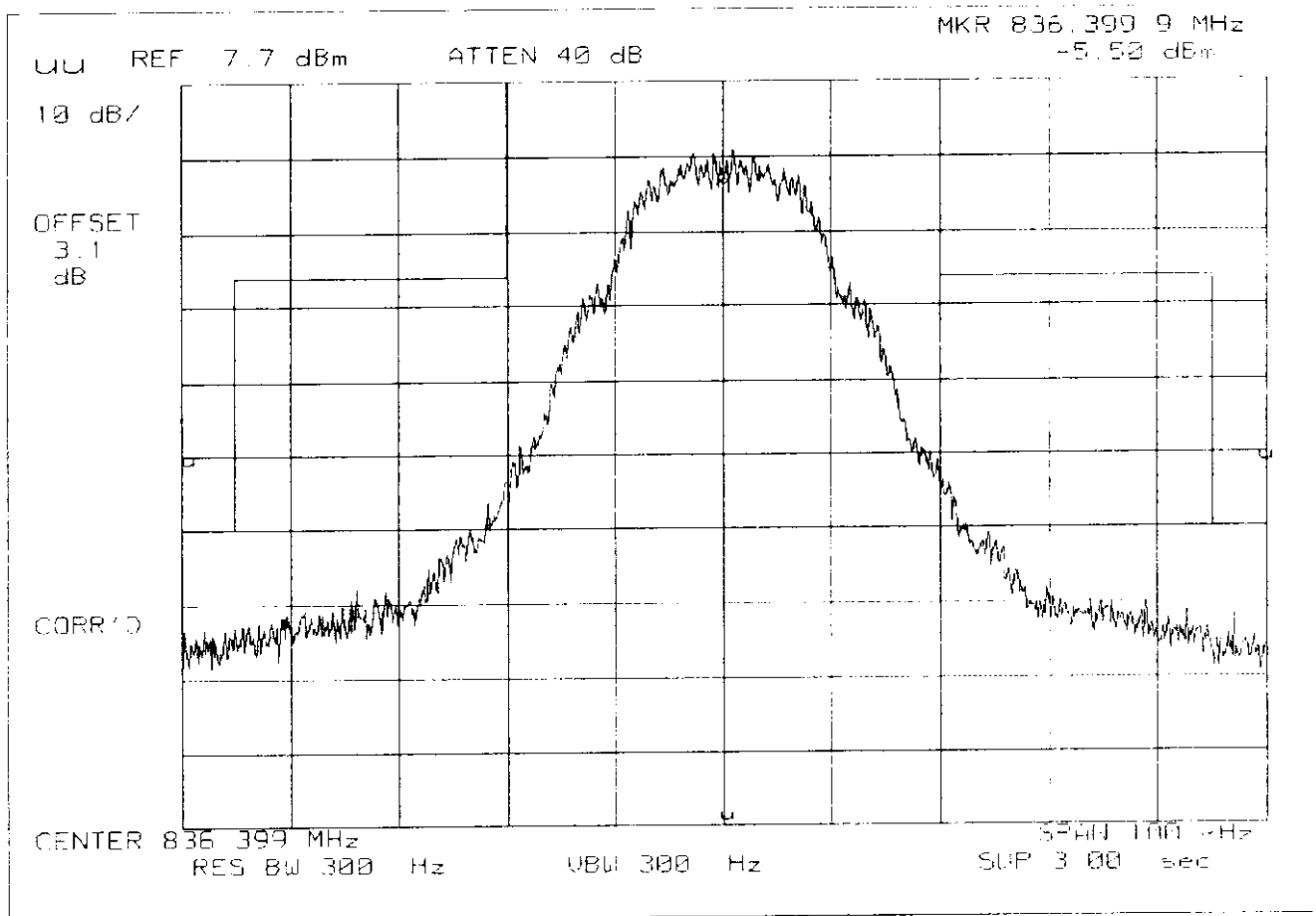


PAGE 22.7.

GML NHA-9S

SPECTRUM ANALYZER PRESENTATION
NOKIA, 282N, NHA-9SA AMPS
1998-JUL-01, 10:29, WED

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



PAGE 22.8.

GML NHA-9S

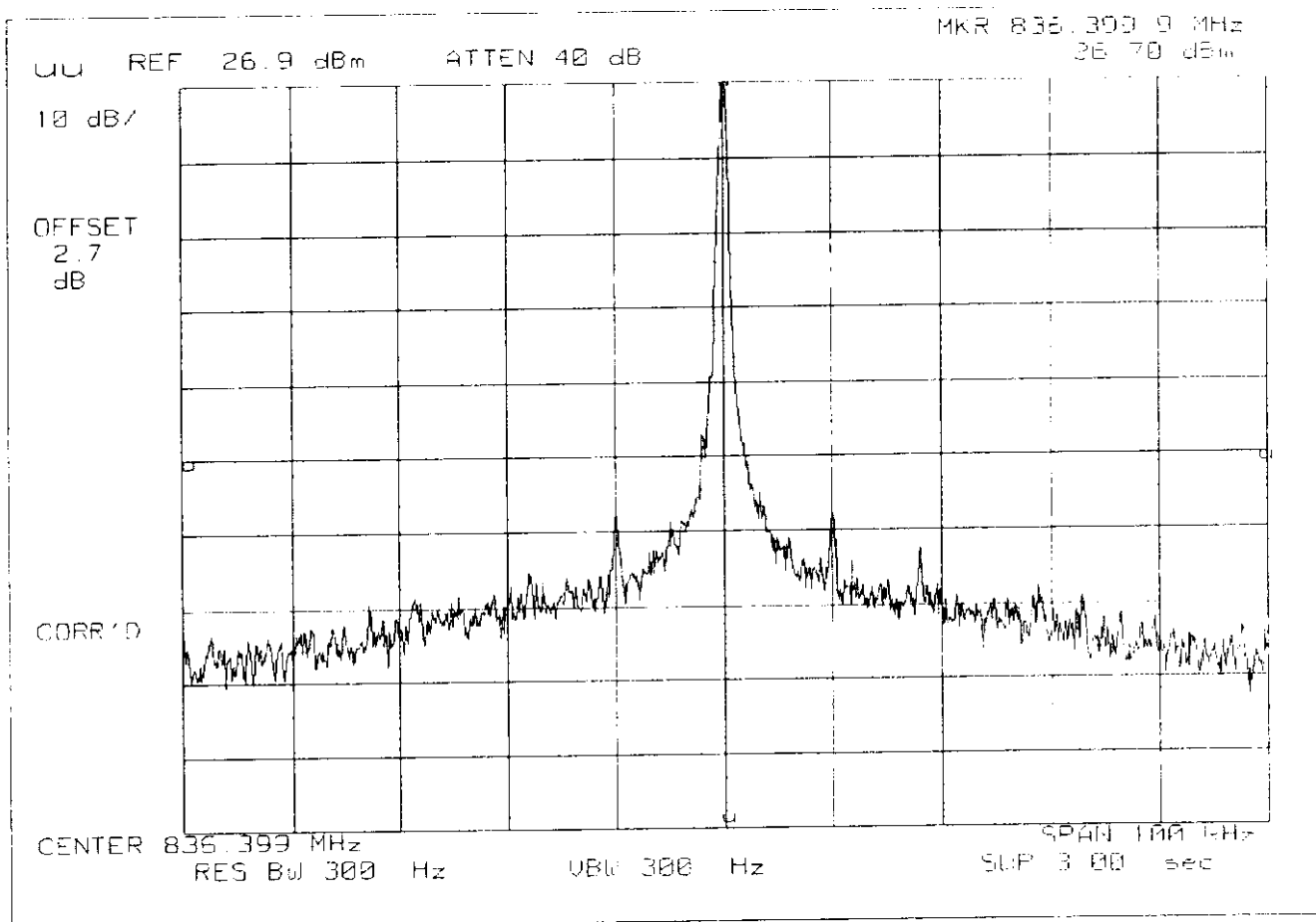
SPECTRUM ANALYZER PRESENTATION

NOKIA, 282N, NHA-9SA AMPS

1998-JUL-01, 10:12, WED

POWER: HIGH

MODULATION: NONE



PAGE 22.9.

SPECTRUM ANALYZER PRESENTATION

NOKIA, 282N, NHA-9SA AMPS

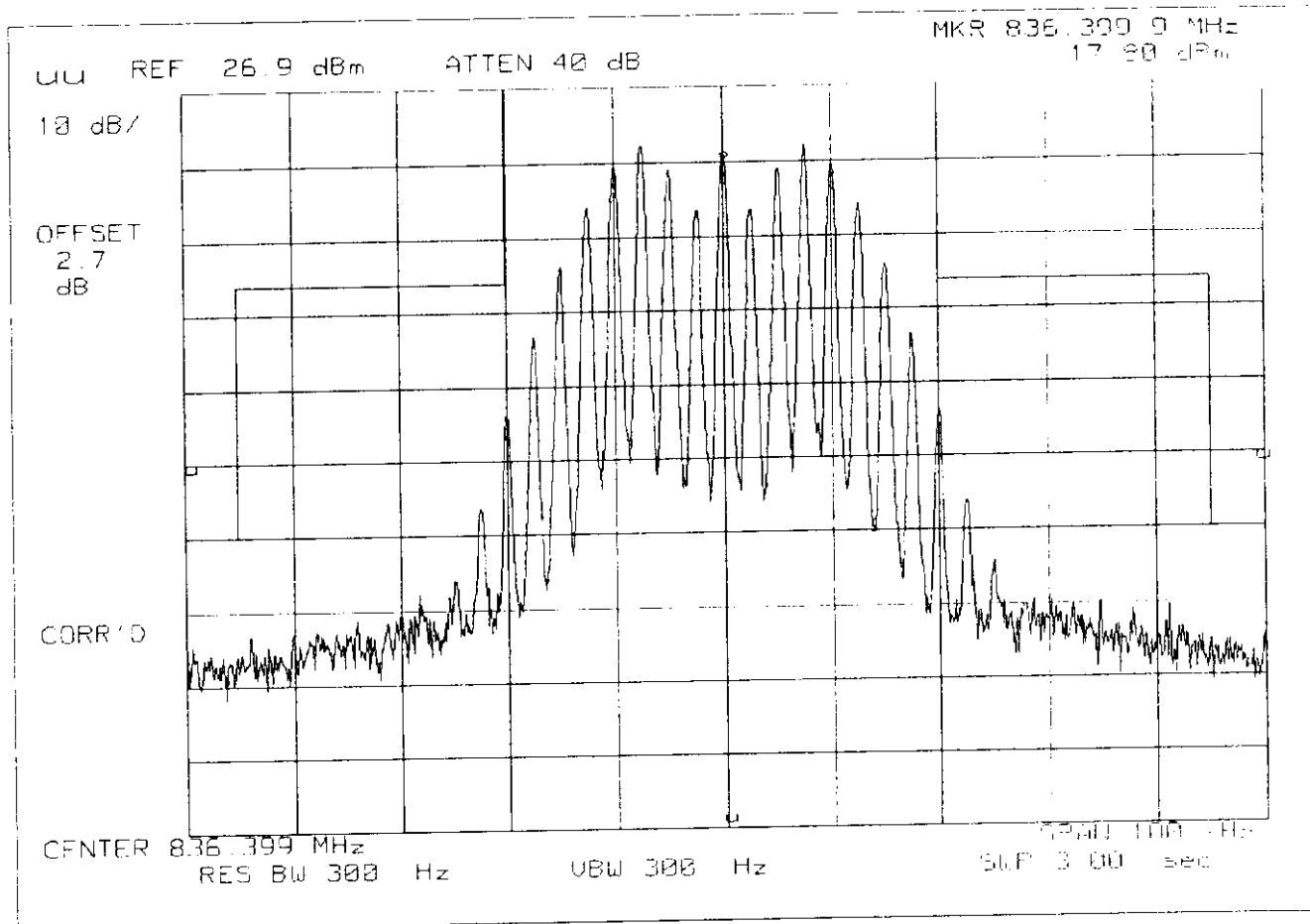
1998-JUL-01, 10:09, WED

GML NHA-9S

POWER: HIGH

MODULATION: VOICE: 2500 Hz SINE WAVE

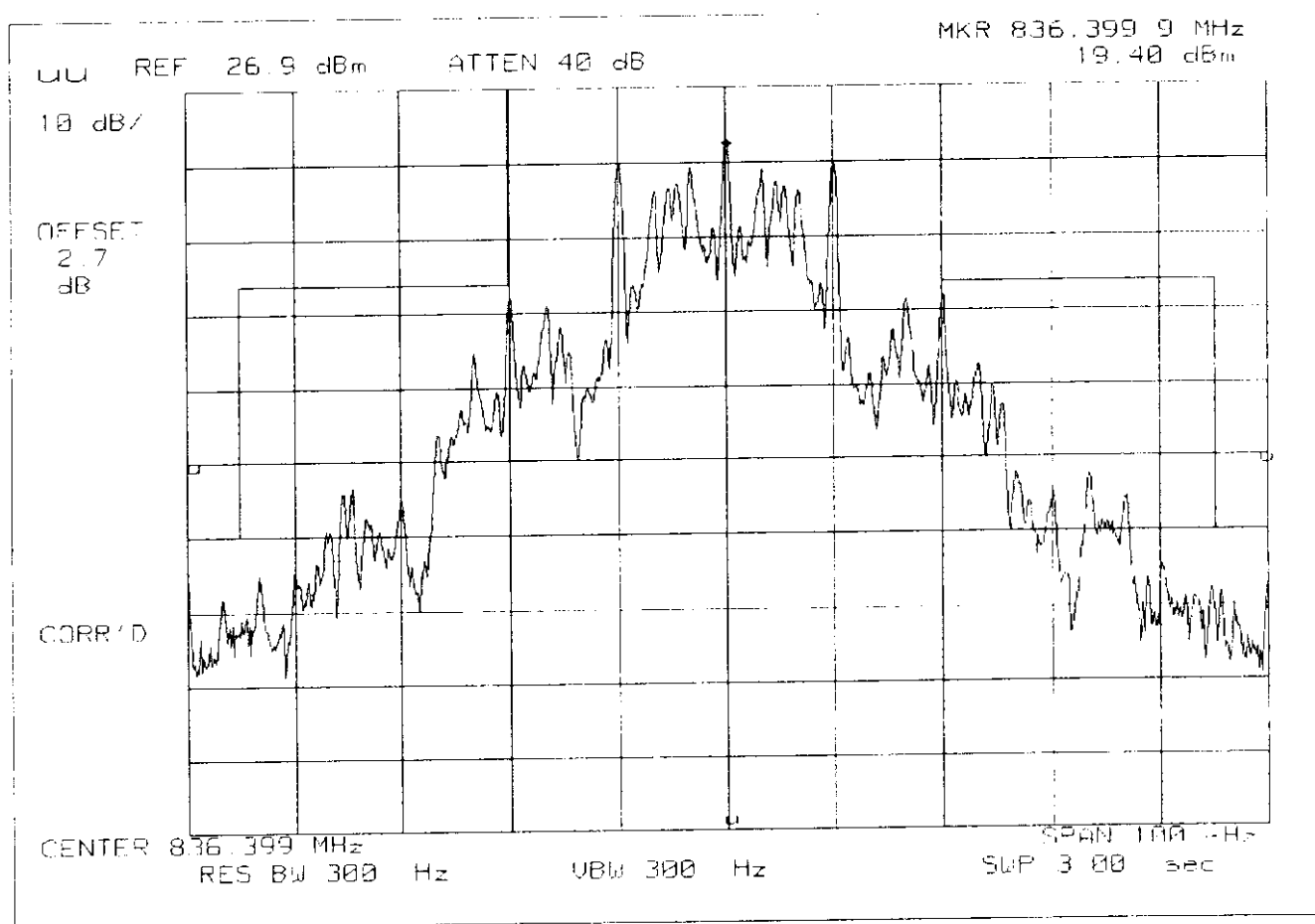
MASK: AMPS CELLULAR, F3E/F3D w/LPF



PAGE 22.10.
SPECTRUM ANALYZER PRESENTATION
NOKIA, 282N, NHA-9SA AMPS
1998-JUL-01, 10:18, WED

GML NHA-9S

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



PAGE 22.11.

GML NHA-9S

SPECTRUM ANALYZER PRESENTATION

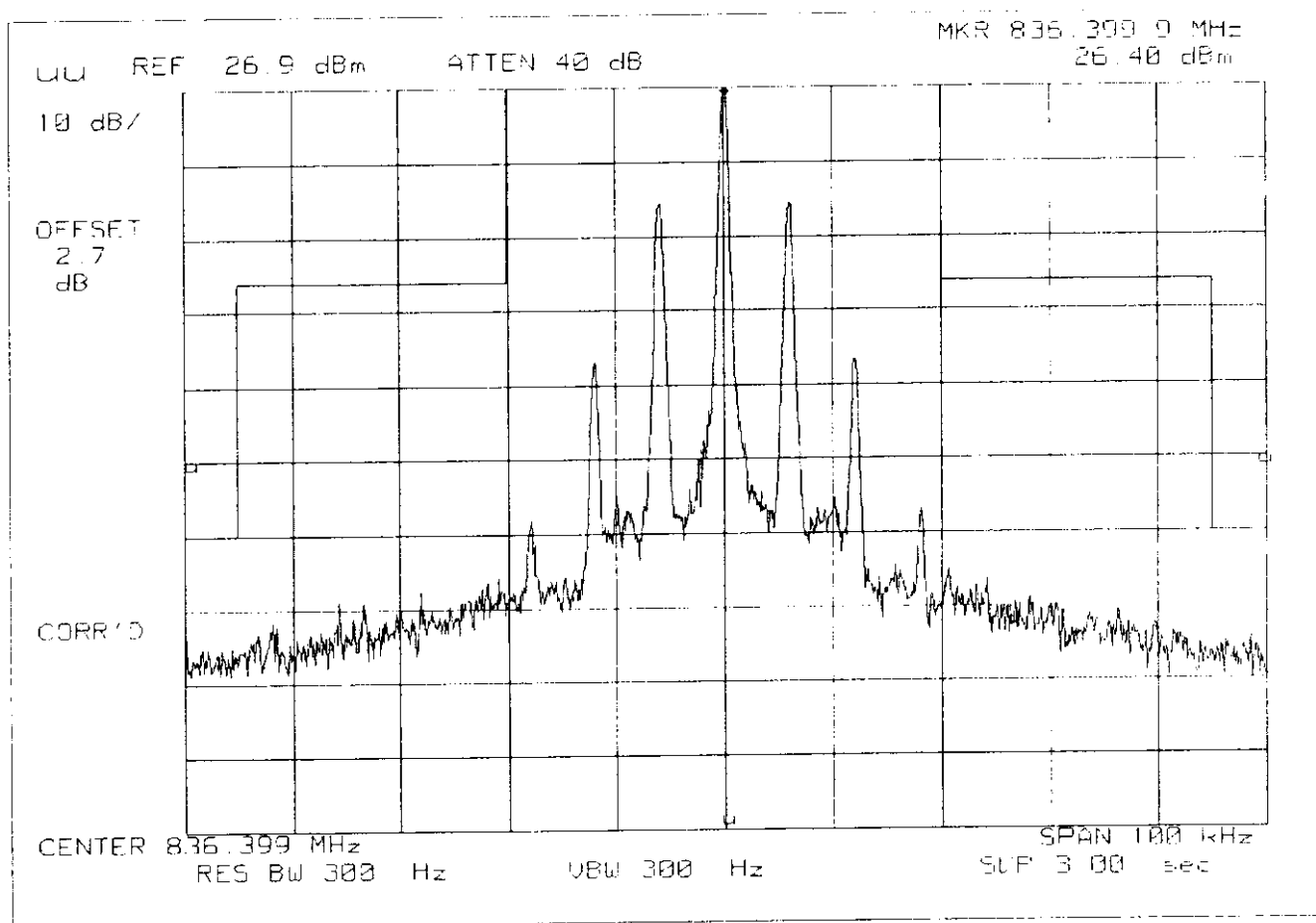
NOKIA, 282N, NHA-9SA AMPS

1998-JUL-01, 10:20, WED

POWER: HIGH

MODULATION: SAT

MASK: AMPS CELLULAR, F3E/F3D w/LPF



PAGE 22.12.

GML NHA-9S

SPECTRUM ANALYZER PRESENTATION

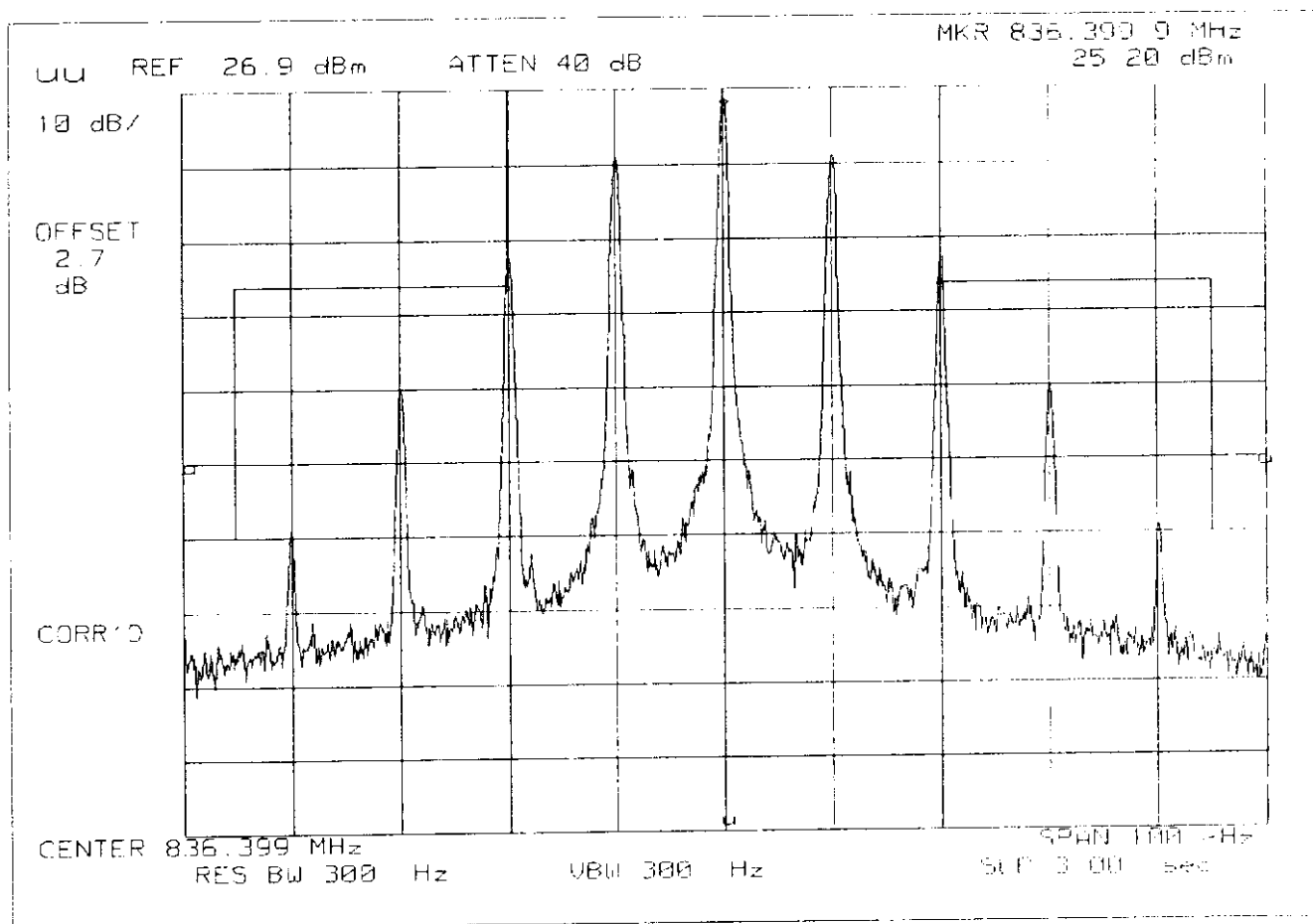
NOKIA, 282N, NHA-9SA AMPS

1998-JUL-01, 10:23, WED

POWER: HIGH

MODULATION: ST

MASK: AMPS CELLULAR, F3E/F3D w/LPF



PAGE 22.13.

SPECTRUM ANALYZER PRESENTATION

NOKIA, 282N, NHA-9SA AMPS

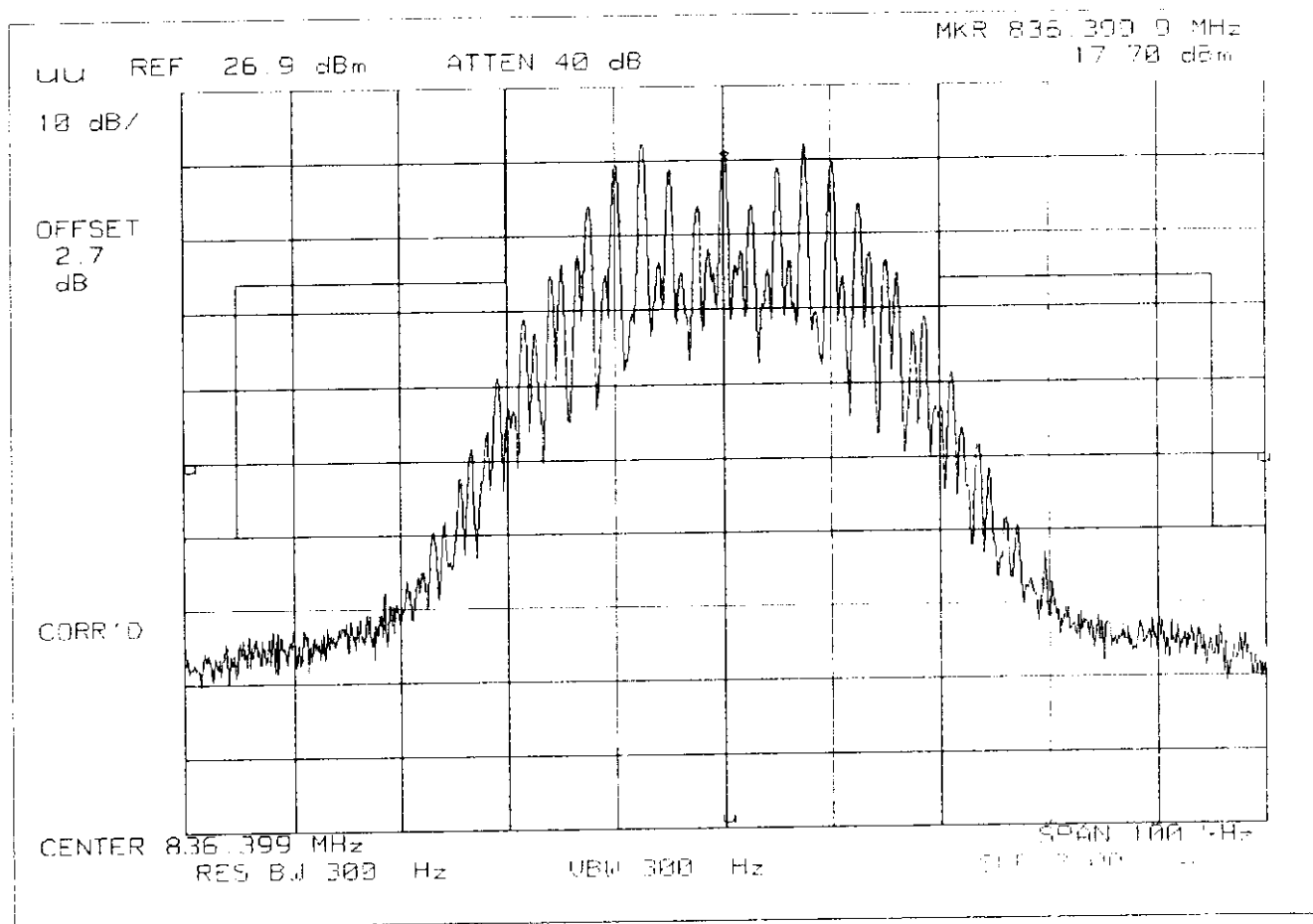
1998-JUL-01, 10:25, WED

GML NHA-9S

POWER: HIGH

MODULATION: SAT+VOICE

MASK: AMPS CELLULAR, F3E/F3D w/LPF



PAGE 22.14.

GML NHA-9S

SPECTRUM ANALYZER PRESENTATION

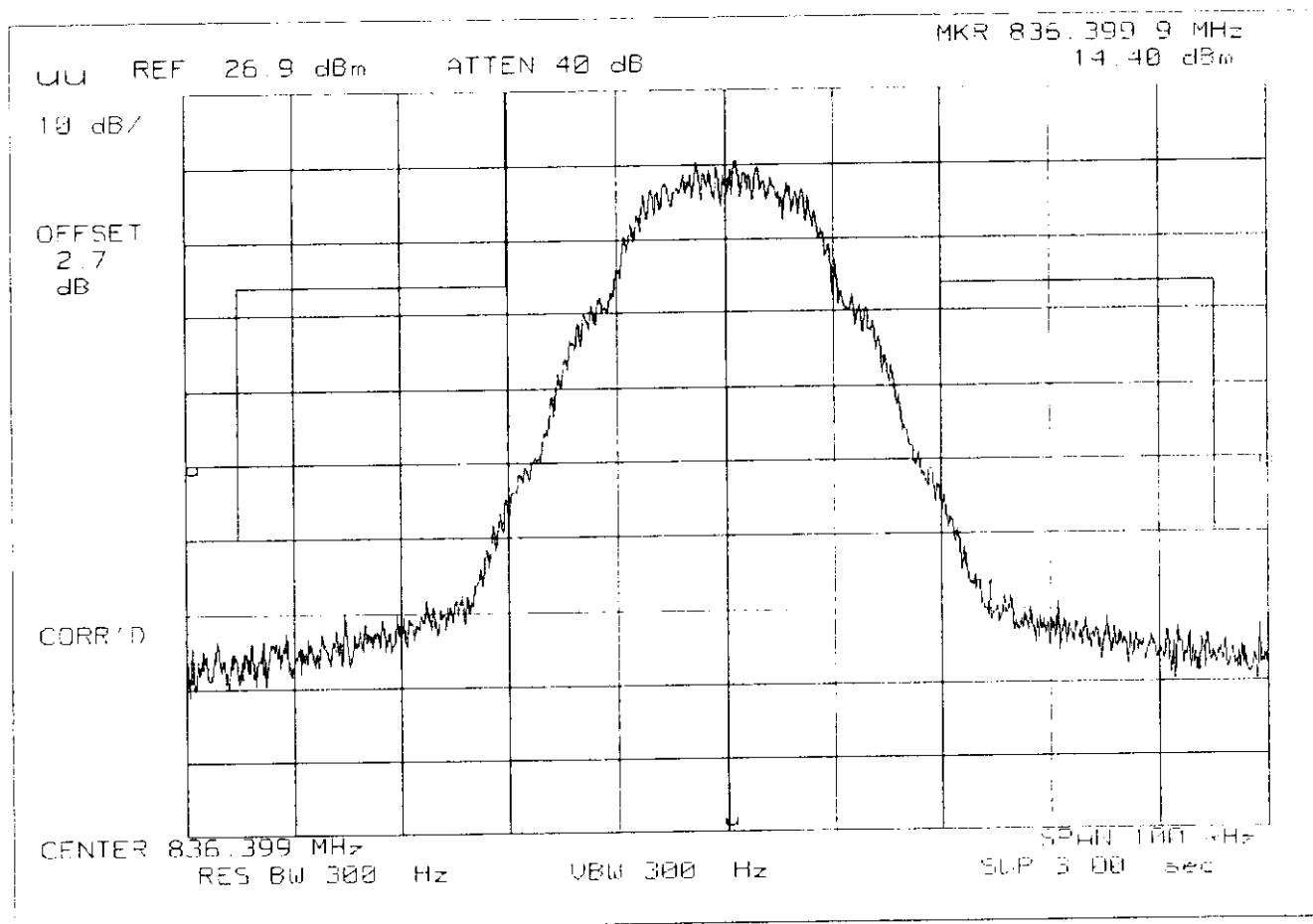
NOKIA, 282N, NHA-9SA AMPS

1998-JUL-01, 10:28, WED

POWER: HIGH

MODULATION: SAT+DTMF

MASK: AMPS CELLULAR, F3E/F3D w/LPF

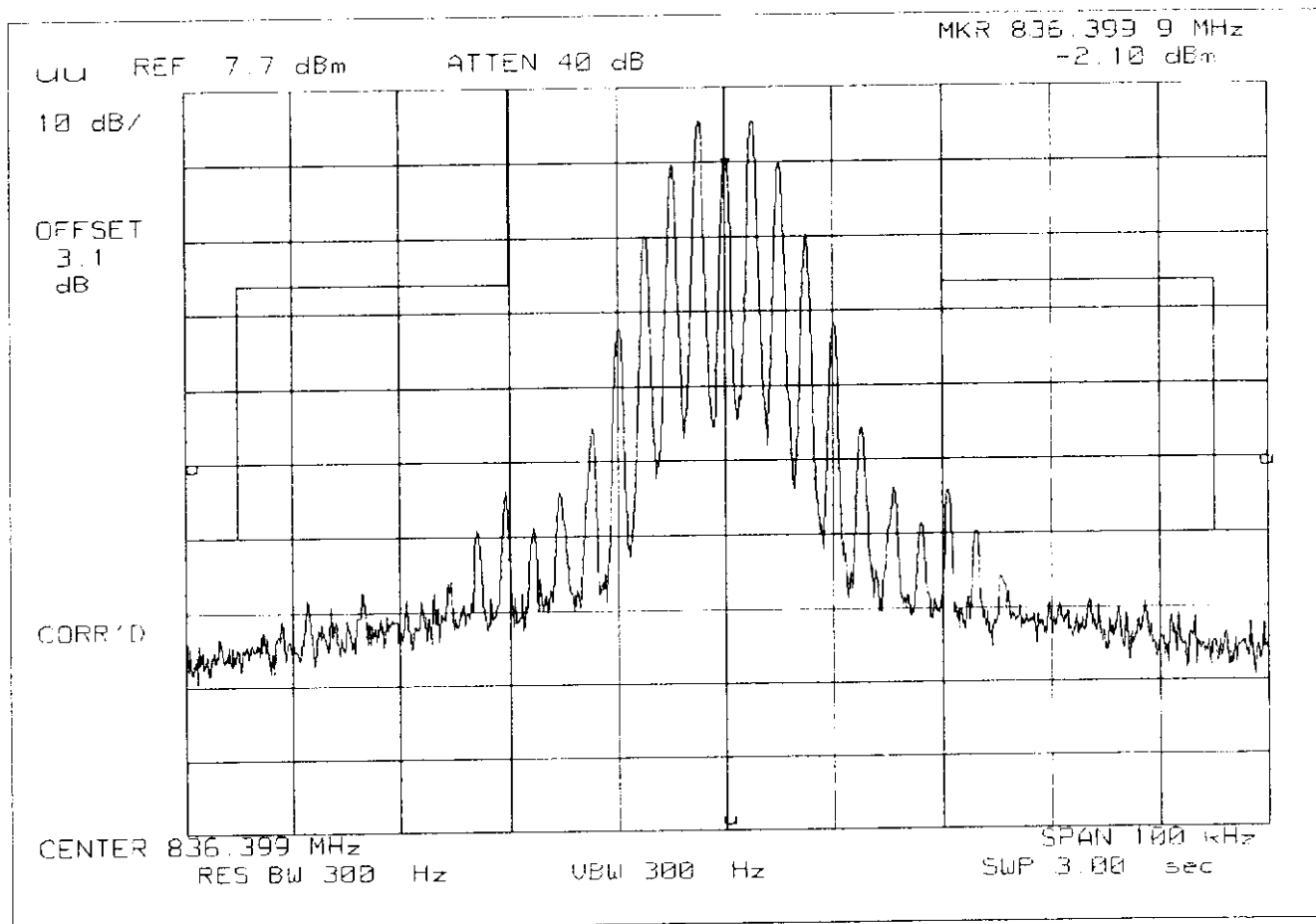


PAGE 22.15.

GML NHA-9S

SPECTRUM ANALYZER PRESENTATION
NOKIA, 282N, NHA-9SA (AMPS/NAMPS)
1998-JUL-01, 08:15, WED

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

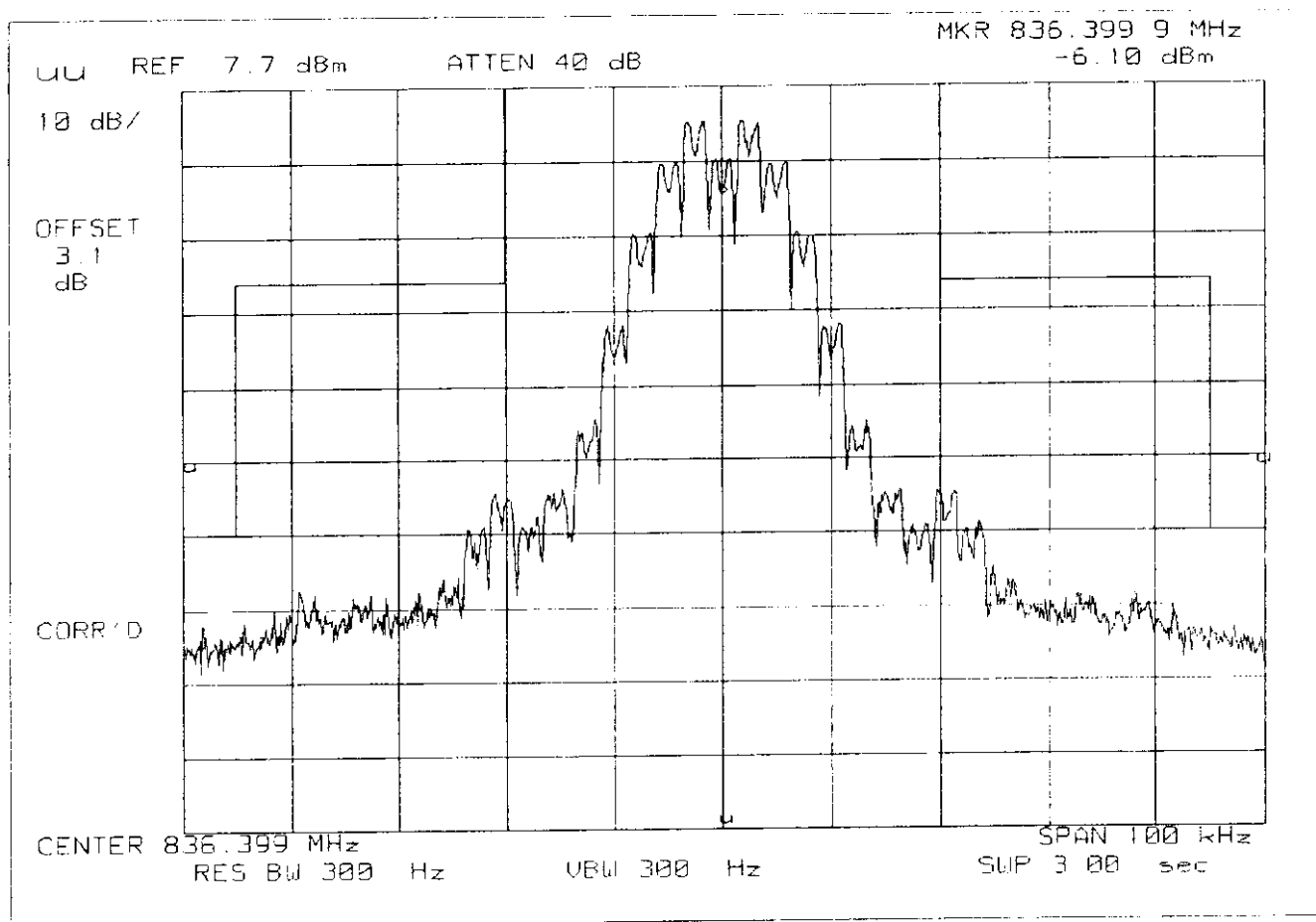


PAGE 22.16.

GML NHA-9S

SPECTRUM ANALYZER PRESENTATION
NOKIA, 282N, NHA-9SA (AMPS/NAMPS)
1998-JUL-01, 08:18, WED

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

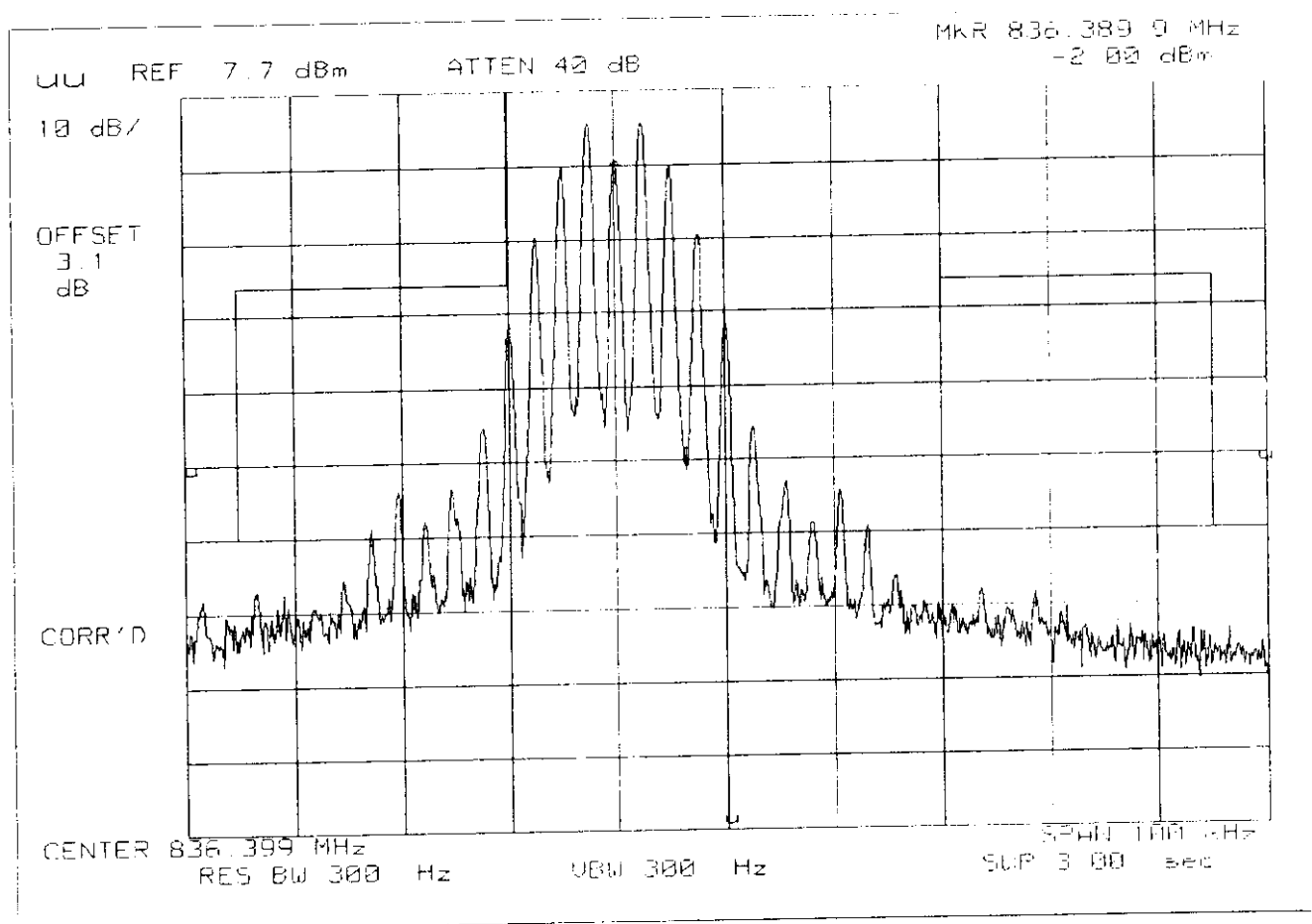


PAGE 22.17.

GML NHA-9S

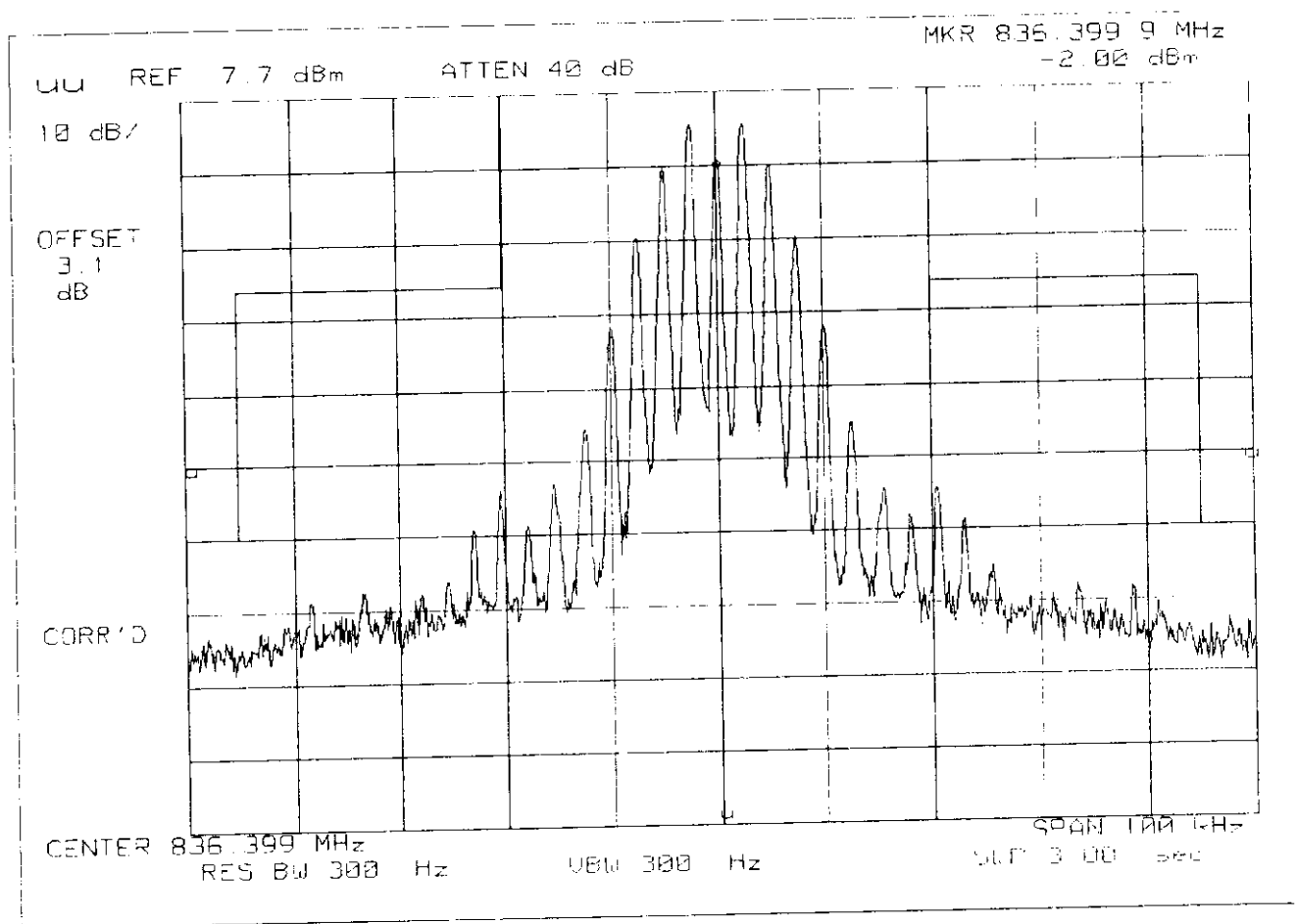
SPECTRUM ANALYZER PRESENTATION
NOKIA, 282N, NHA-9SA (AMPS/NAMPS)
1998-JUL-01, 08:33, WED

POWER: LOW
MODULATION: NAMPS VOICE (LOW CH)
MASK: AMPS CELLULAR, F3E/F3D w/LPF



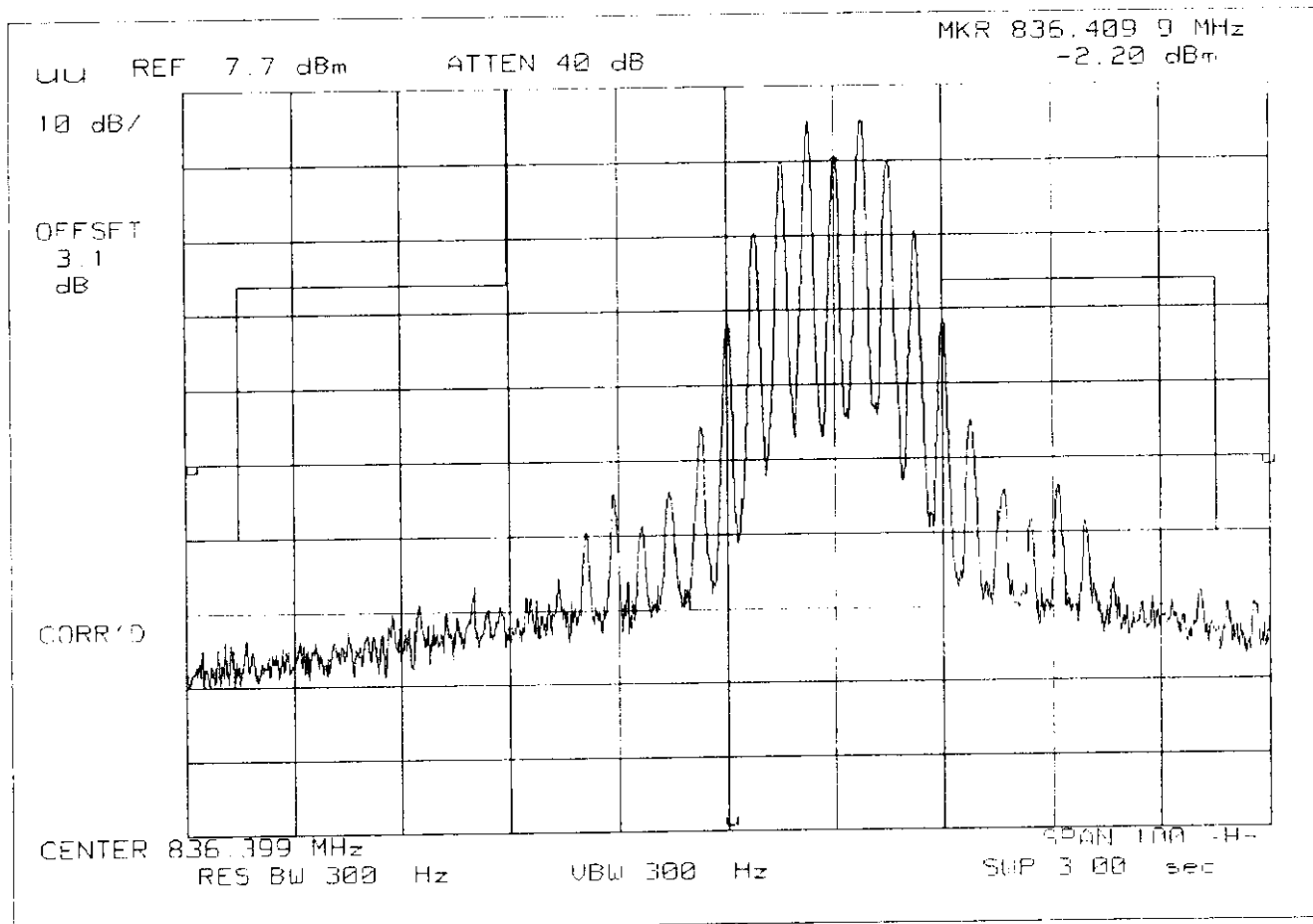
SPECTRUM ANALYZER PRESENTATION
NOKIA, 282N, NHA-9SA (AMPS/NAMPS)
1998-JUL-01, 08:30, WED

POWER: LOW
MODULATION: NAMPS VOICE (MID CH)
MASK: AMPS CELLULAR, F3E/F3D w/LPF



GML NHA-9S

POWER: LOW
MODULATION: NAMPS VOICE (HIGH CH)
MASK: AMPS CELLULAR, F3E/F3D w/LPF

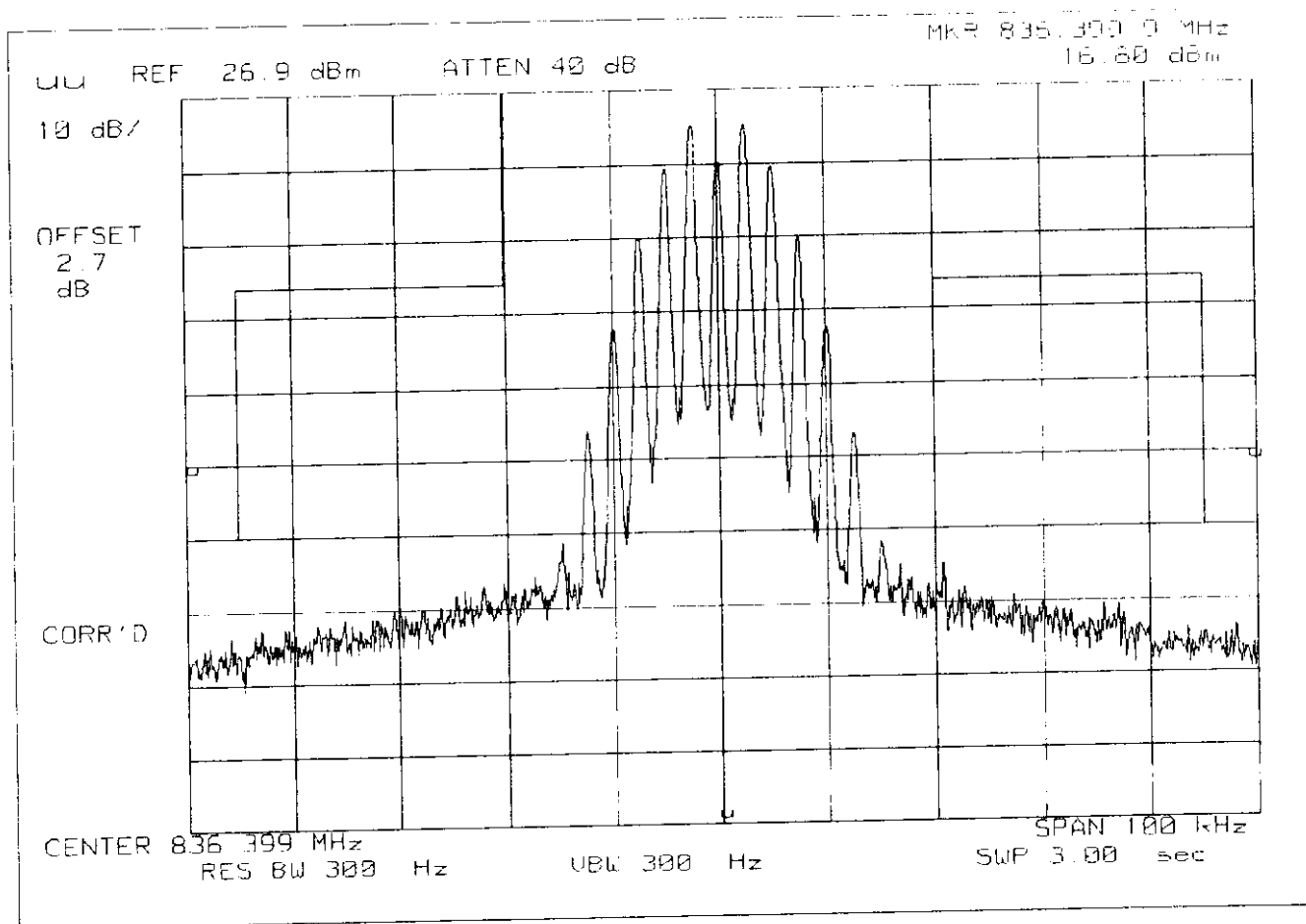


PAGE 22.20.

GML NHA-9S

SPECTRUM ANALYZER PRESENTATION
NOKIA, 282N, NHA-9SA (AMPS/NAMPS)
1998-JUL-01, 08:14, WED

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



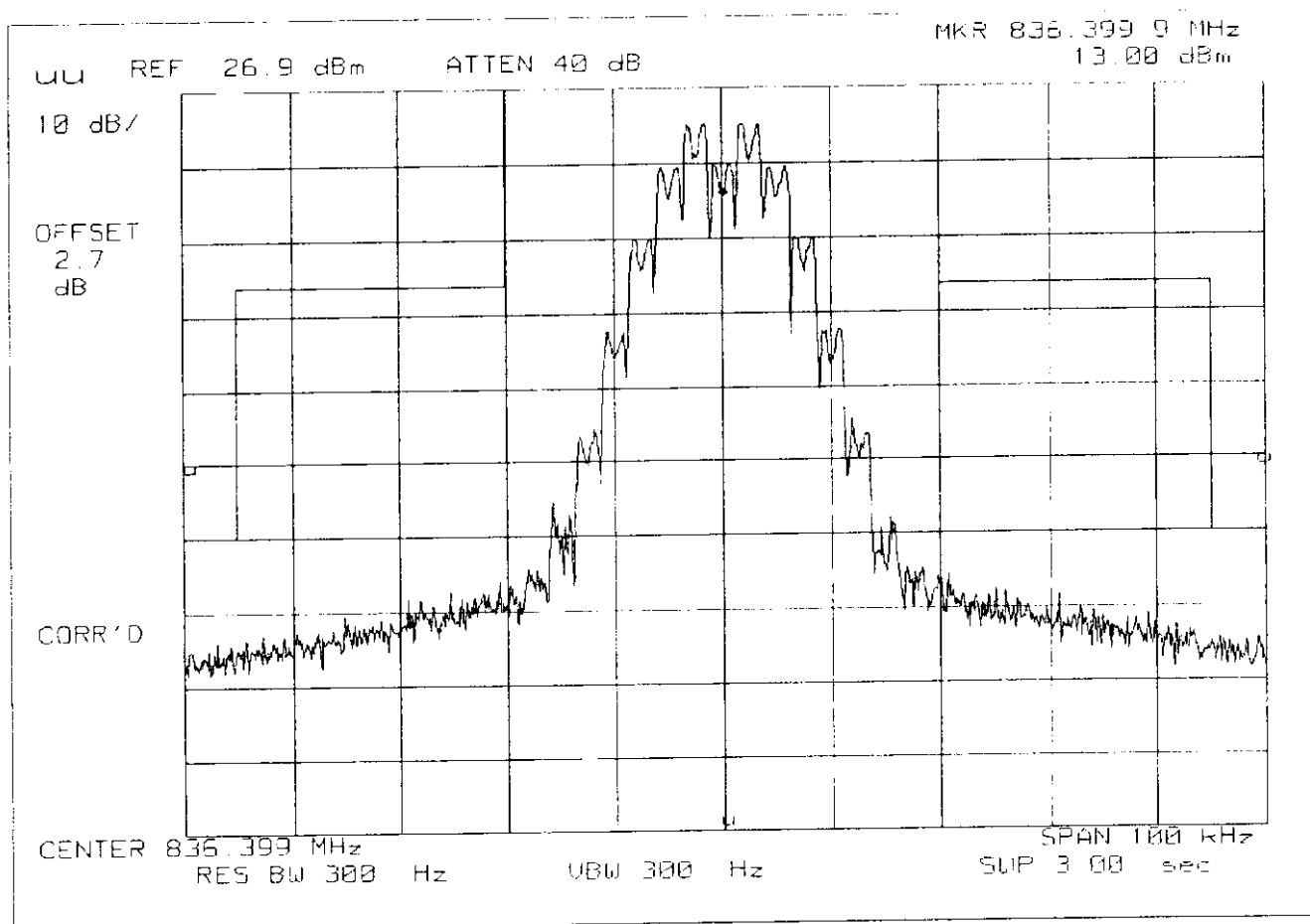
ALL RIGHTS RESERVED

PAGE 22.21.

SPECTRUM ANALYZER PRESENTATION
NOKIA, 282N, NHA-9SA (AMPS/NAMPS)
1998-JUL-01, 08:17, WED

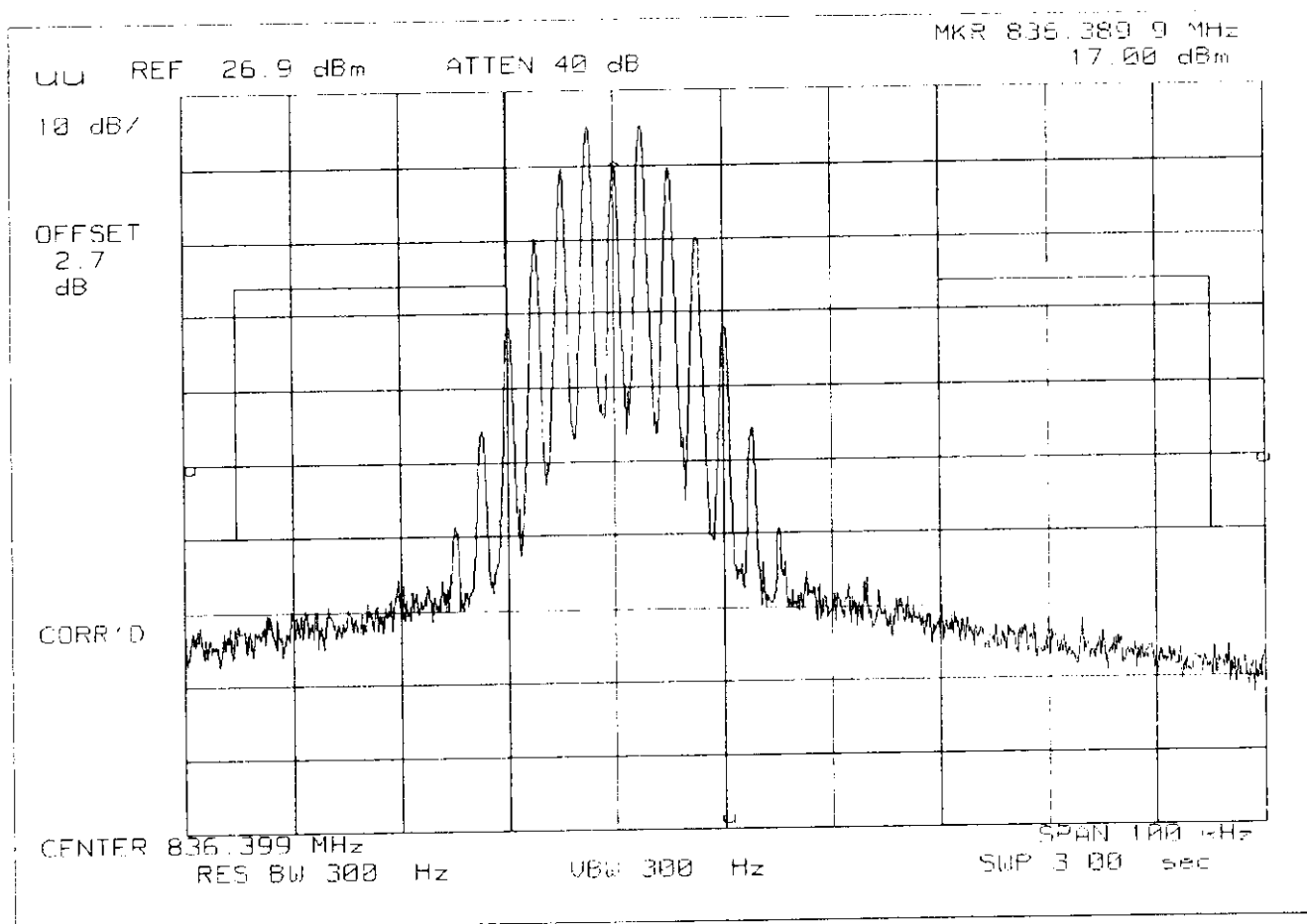
GML NHA-9S

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



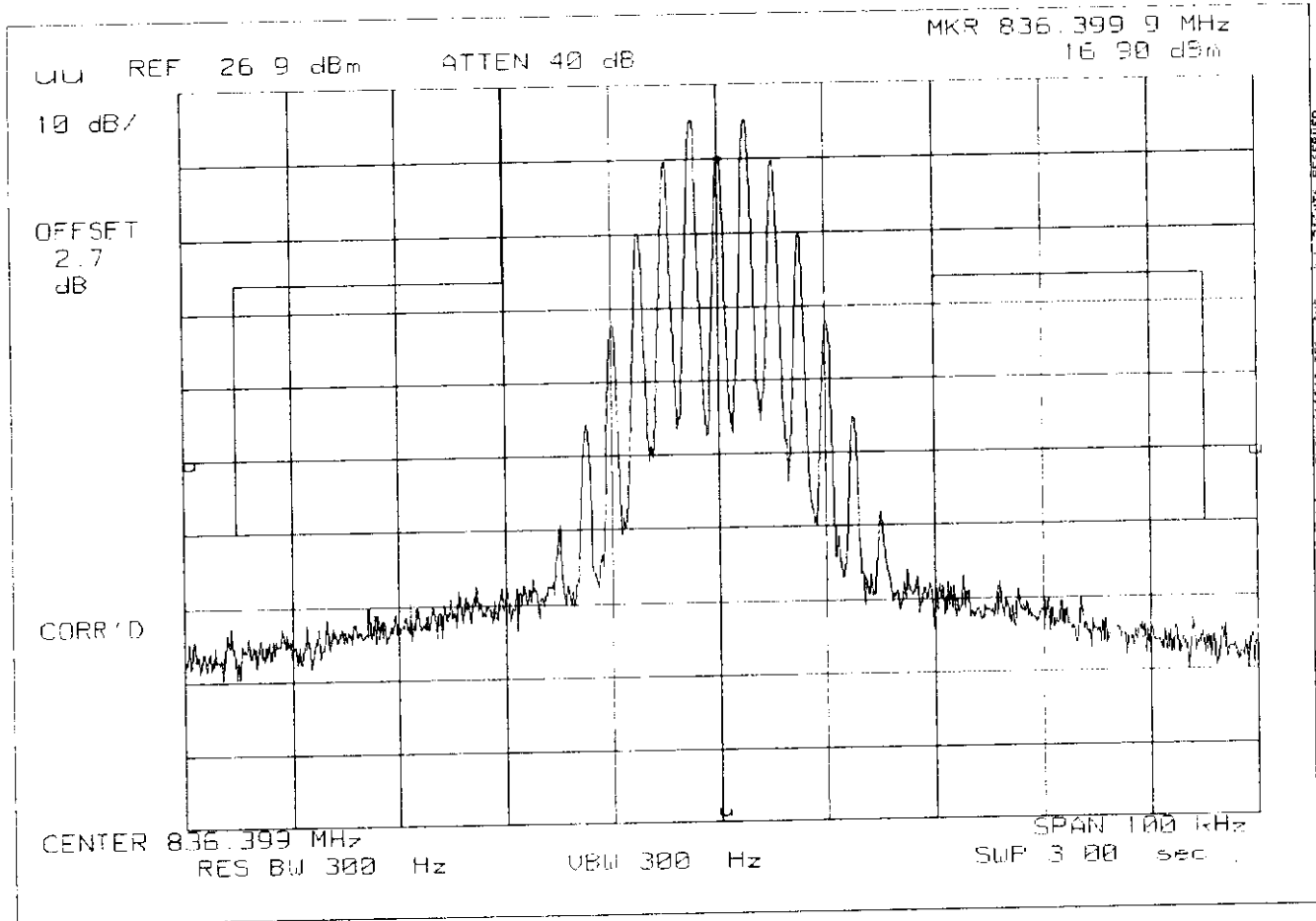
SPECTRUM ANALYZER PRESENTATION
NOKIA, 282N, NHA-9SA (AMPS/NAMPS)
1998-JUL-01, 08:32, WED

POWER: HIGH
MODULATION: NAMPS VOICE (LOW CH)
MASK: AMPS CELLULAR, F3E/F3D w/LPF



SPECTRUM ANALYZER PRESENTATION
NOKIA, 282N, NHA-9SA (AMPS/NAMPS)
1998-JUL-01, 08:29, WED

POWER: HIGH
MODULATION: NAMPS VOICE (MID CH)
MASK: AMPS CELLULAR, F3E/F3D w/LPF

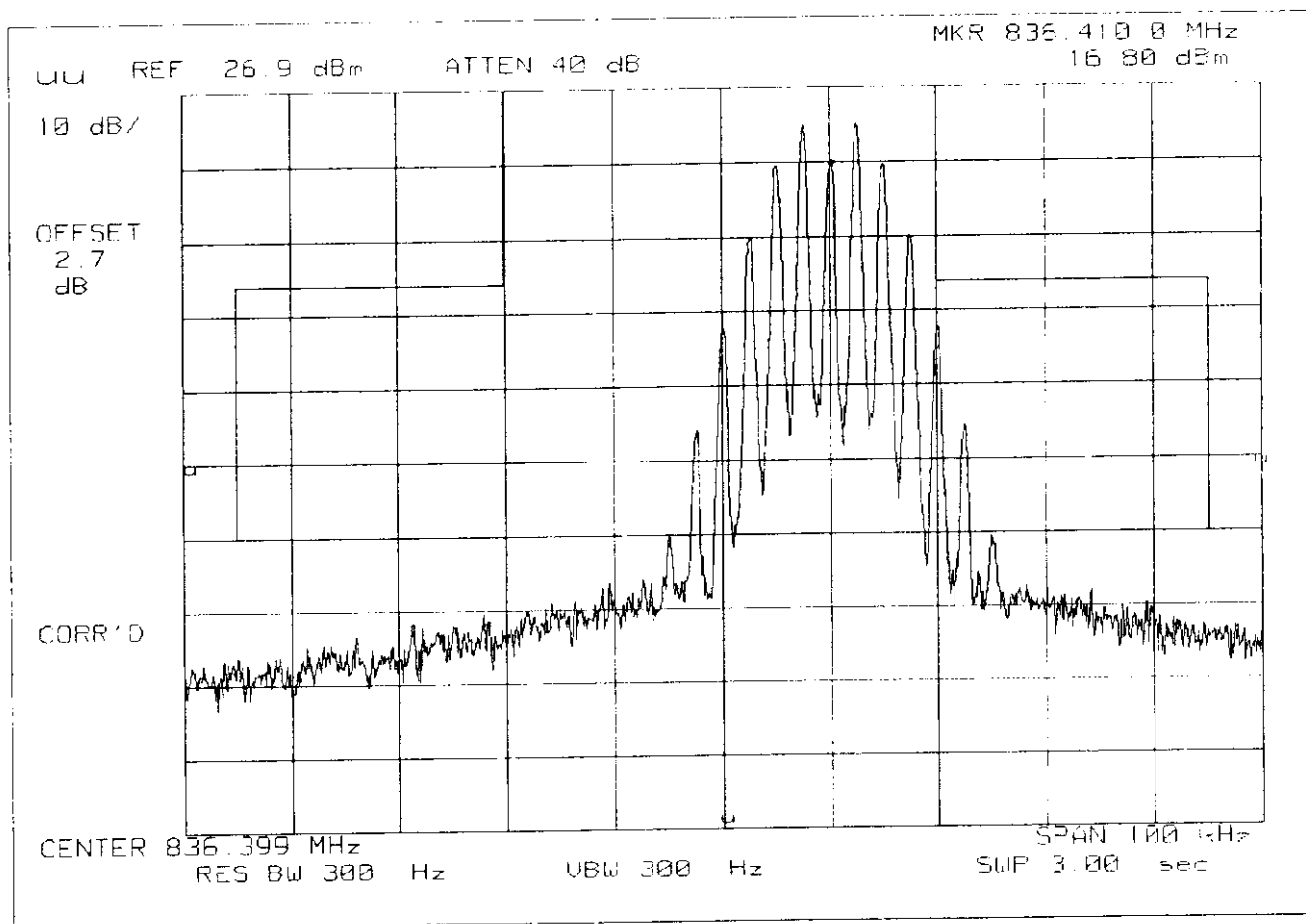


PAGE 22.24.

GML NHA-9S

SPECTRUM ANALYZER PRESENTATION
NOKIA, 282N, NHA-9SA (AMPS/NAMPS)
1998-JUL-01, 08:25, WED

POWER: HIGH
MODULATION: NAMPS VOICE (HIGH CH)
MASK: AMPS CELLULAR, F3E/F3D w/LPF



NAME OF TEST: EMISSION REQUIREMENTS -
WORST CASE MODULATION & WIDEBAND DATA

PARAGRAPH: 47 CFR 22.917

GUIDE: TIA/EIA STANDARD IS-19-B

TEST CONDITIONS: S. T. & H.

TEST EQUIPMENT: AS PER PREVIOUS PAGE

MEASUREMENT PROCEDURE

1. The E.U.T. 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 to 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

MEASUREMENT SUMMARY: EMISSION REQUIREMENTS -
WORST CASE MODULATION

WORST CASE MODULATION

= VOICE + SAT

EMISSION, MHz/HARM.	LIMIT, dBc	<u>SPURIOUS EMISSIONS, dBc</u>	
		Lo	Hi
Fo + (Fo + 20 kHz) to Fo + 45 kHz	≤ -26	< -45	< -47
Fo + (Fo + 45 kHz) to Fo + 90 kHz	≤ -45 (≤ -13 dBm)	< -74	< -77
2nd to 10th	≤ -51 (≤ -13 dBm)	< -91	< -92

MEASUREMENT RESULTS

= ATTACHED OFFSET PLOTS

EMISSIONS IN THE RECEIVER CRITICAL BAND

EMISSION, MHz/HARM.	LIMIT, dBm	<u>SPURIOUS EMISSIONS, dBm</u>	
		Lo	Hi
869 to 894	≤ -80	< -91	< -91

MEASUREMENT RESULTS

= ATTACHED PLOTS

SUPERVISED BY:

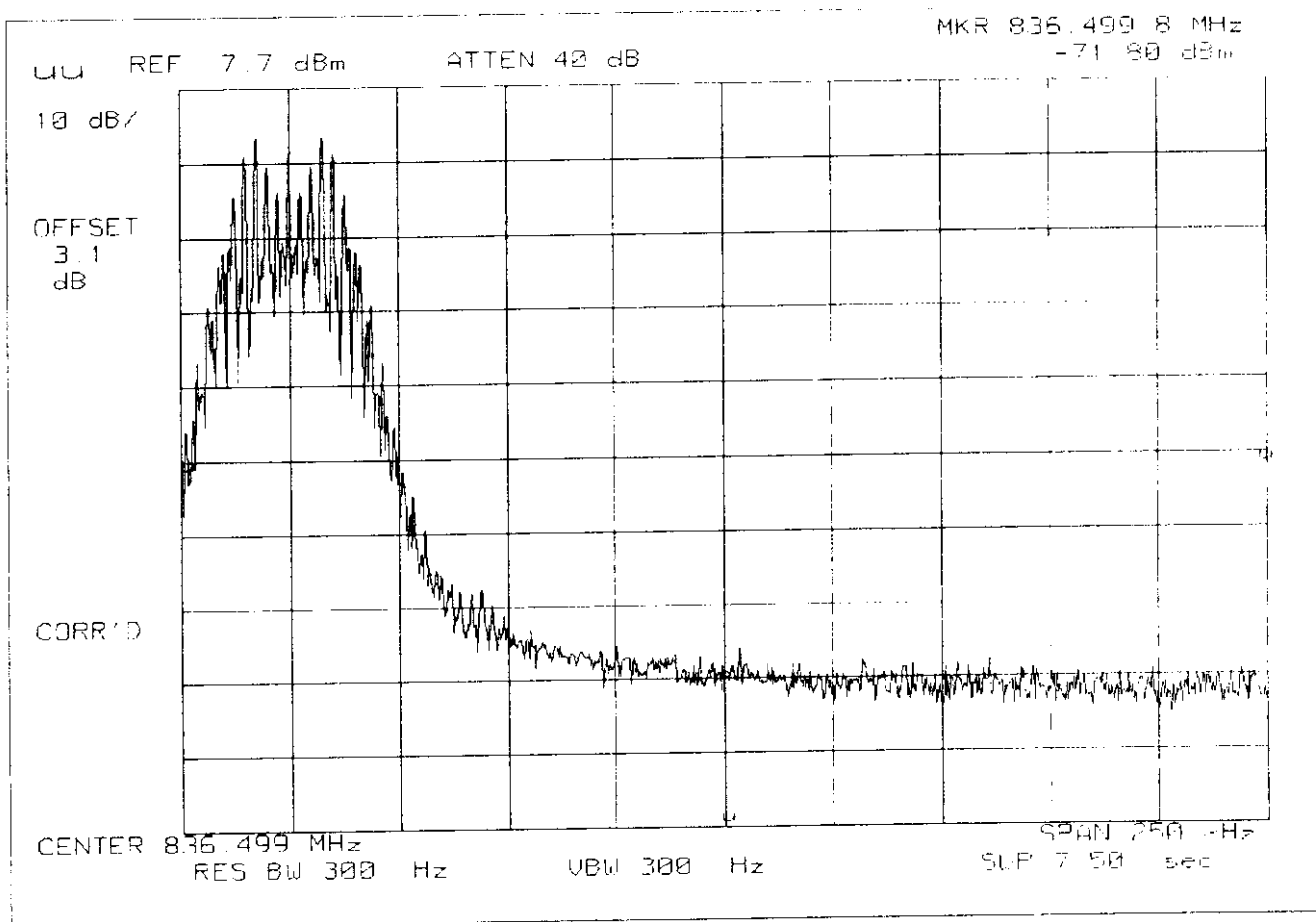
M. J. Flom, P. Eng.
MORTON FLOM, P. Eng.

PAGE 25.1.

GML NHA-9S

SPECTRUM ANALYZER PRESENTATION
NOKIA, 282N, NHA-9SA (AMPS/NAMPS)
1998-JUL-01, 14:12, WED

POWER: LOW
MODULATION: OFFSET VOICE + SAT

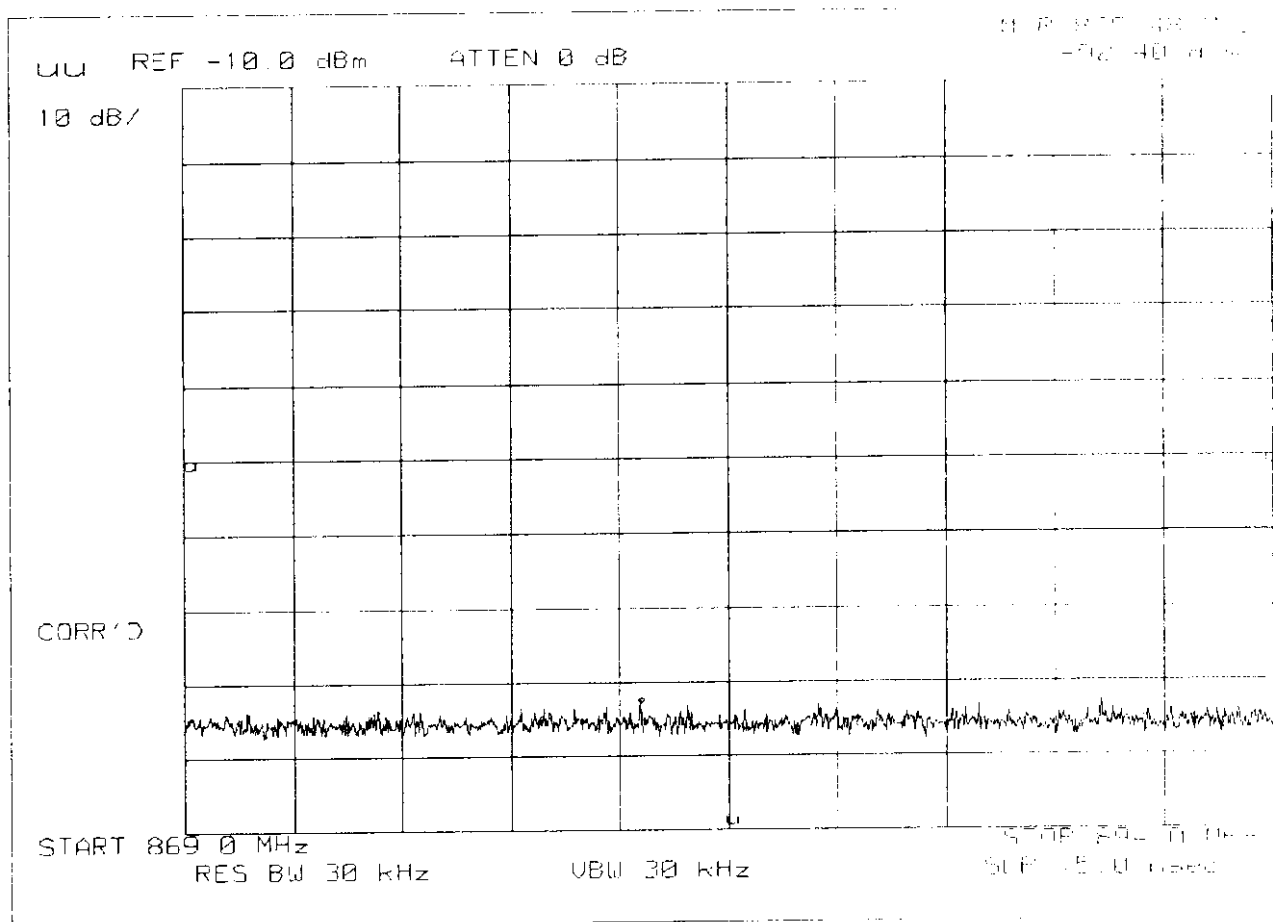


PAGE 25.2.

GML NHA-9S

SPECTRUM ANALYZER PRESENTATION
NOKIA, 282N, NHA-9SA (AMPS/NAMPS)
1998-JUL-01, 14:14, WED

POWER: LOW POWER
MODULATION: CH 380 991, 799
REMARK: RECEIVER CRITICAL BAND

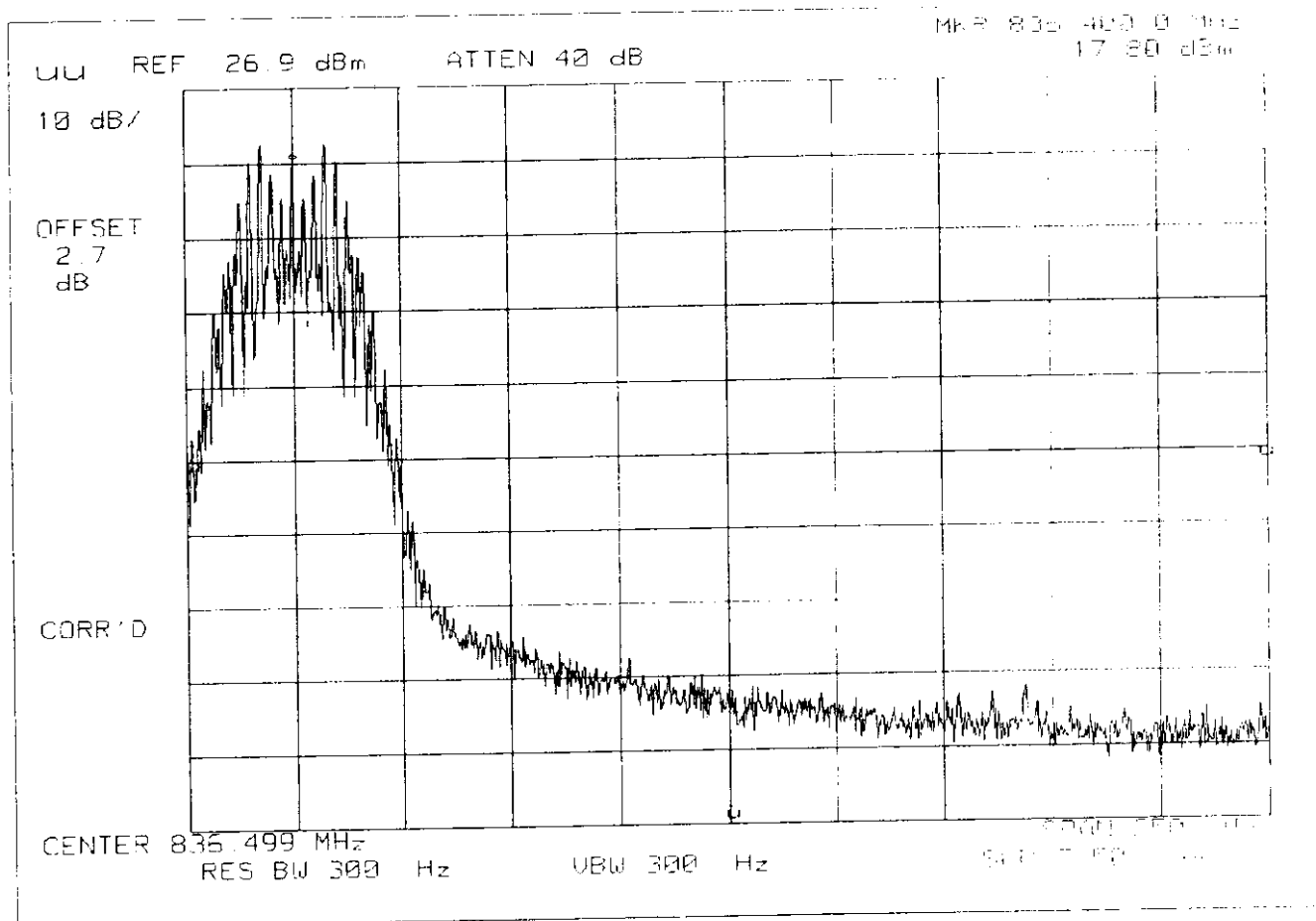


PAGE 25.3.

GML NHA-9S

SPECTRUM ANALYZER PRESENTATION
NOKIA, 282N, NHA-9SA (AMPS/NAMPS)
1998-JUL-01, 14:09, WED

POWER: HIGH
MODULATION: OFFSET VOICE + SAT

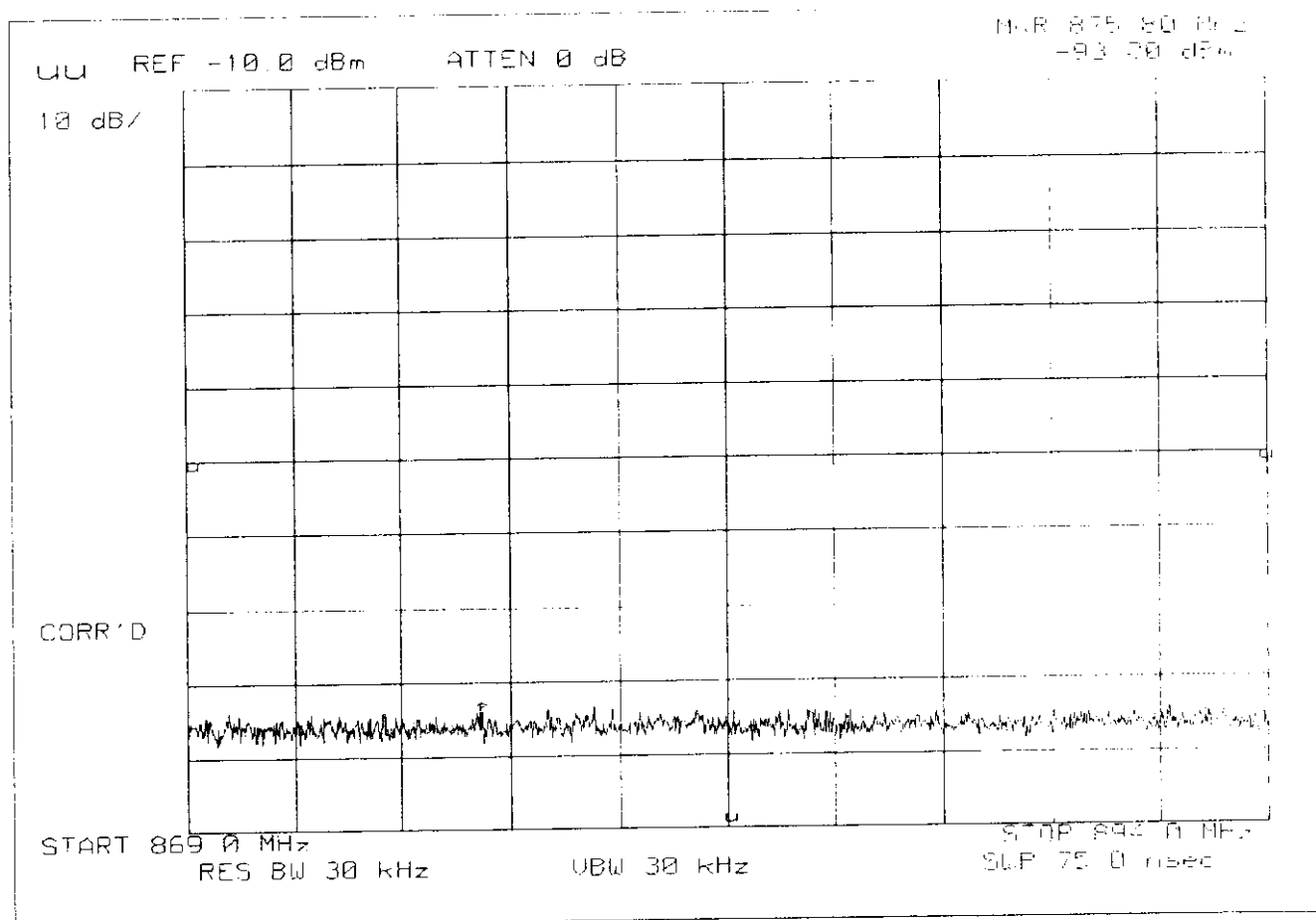


PAGE 25.4.

GML NHA-9S

SPECTRUM ANALYZER PRESENTATION
NOKIA, 282N, NHA-9SA (AMPS/NAMPS)
1998-JUL-01, 14:15, WED

POWER: HIGH POWER
MODULATION: CH 380 991, 799
REMARK: RECEIVER CRITICAL BAND



MEASUREMENT SUMMARY: EMISSION REQUIREMENTS -
WIDEBAND DATA (F9D, 10 kb/s)

MEASURED CHANNELS

= 380, 799, 991

EMISSION, MHz/HARM.	LIMIT, dBc	SPURIOUS EMISSIONS, dBc	
		Lo	Hi
Fo + (Fo + 20 kHz) to Fo + 45 kHz	≤ -26	< -35	< -37
Fo + (Fo + 45 kHz) to Fo + 90 kHz	≤ -45	< -64	< -63
Fo + (Fo + 90 kHz) to 2nd Harmonic	≤ -60 (≤ -13 dBm)	< -77	< -83
2nd to 10th	≤ -51 (≤ -13 dBm)	< -91	< -92

MEASUREMENT RESULTS

= ATTACHED OFFSET PLOTS

EMISSIONS IN THE RECEIVER CRITICAL BAND

EMISSION, MHz/HARM.	LIMIT, dBm	SPURIOUS EMISSIONS, dBm	
		Lo	Hi
869 to 894	≤ -80	< -91	< -91

MEASUREMENT RESULTS

= ATTACHED PLOTS

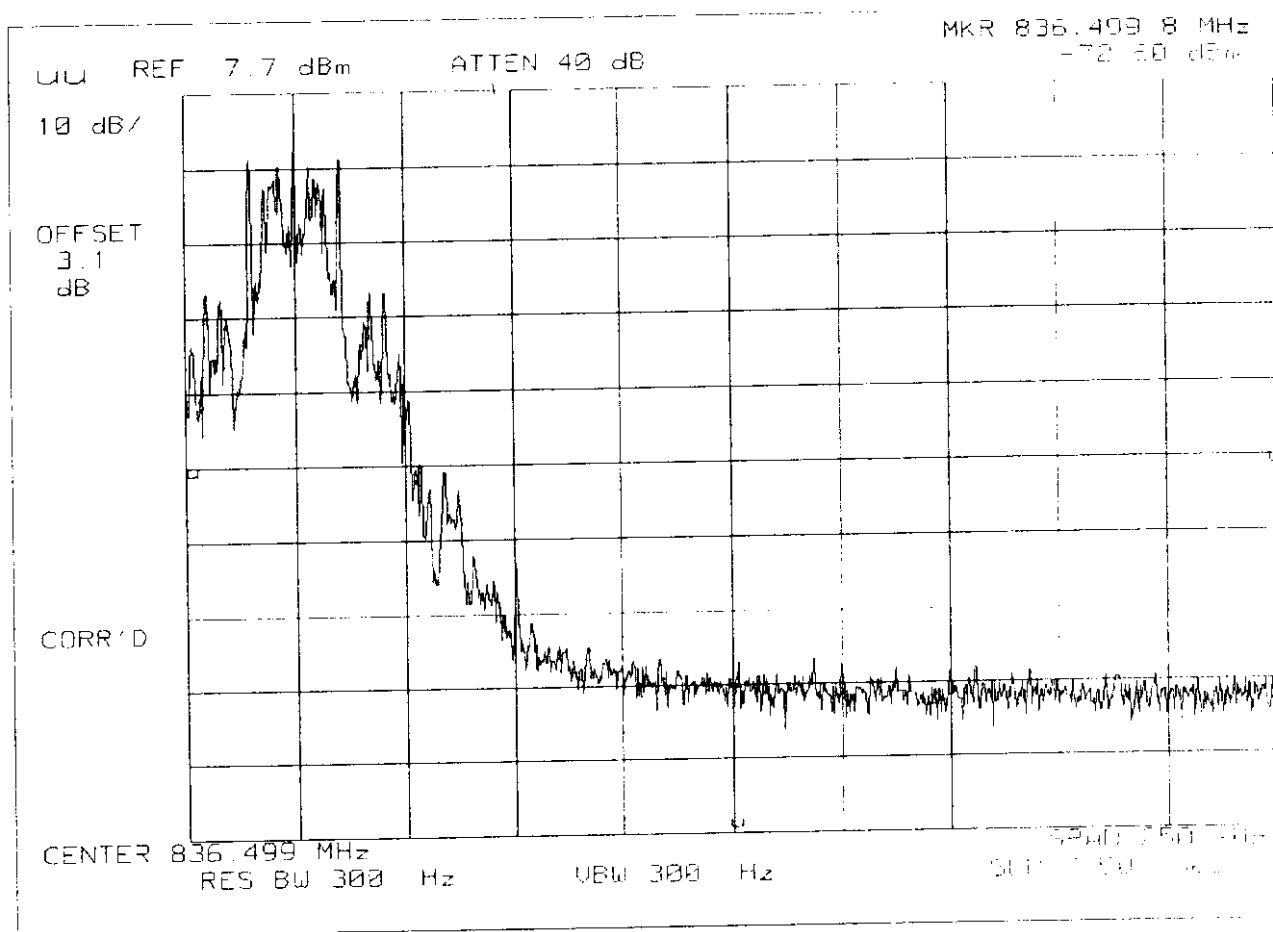
SUPERVISED BY:

M. J. Flom P. Eng.
MORTON FLOM, P. Eng.

PAGE 27.1.
SPECTRUM ANALYZER PRESENTATION
NOKIA, 282N, NHA-9SA (AMPS/NAMPS)
1998-JUL-01, 14:00, WED

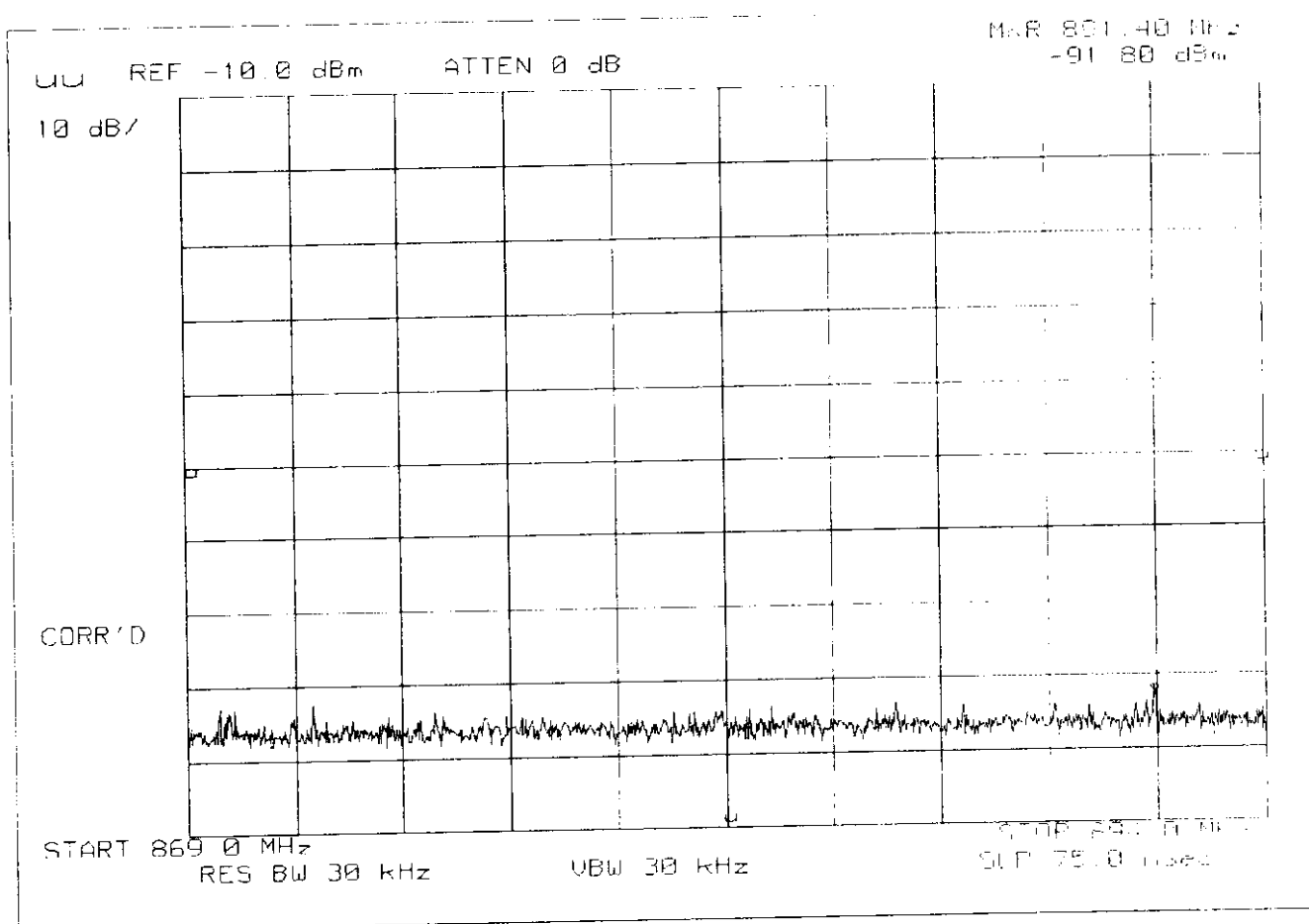
GML NHA-9S

POWER: LOW
MODULATION: OFFSET WIDEBAND DATA



SPECTRUM ANALYZER PRESENTATION
 NOKIA, 282N, NHA-9SA (AMPS/NAMPS)
 1998-JUL-01, 14:05, WED

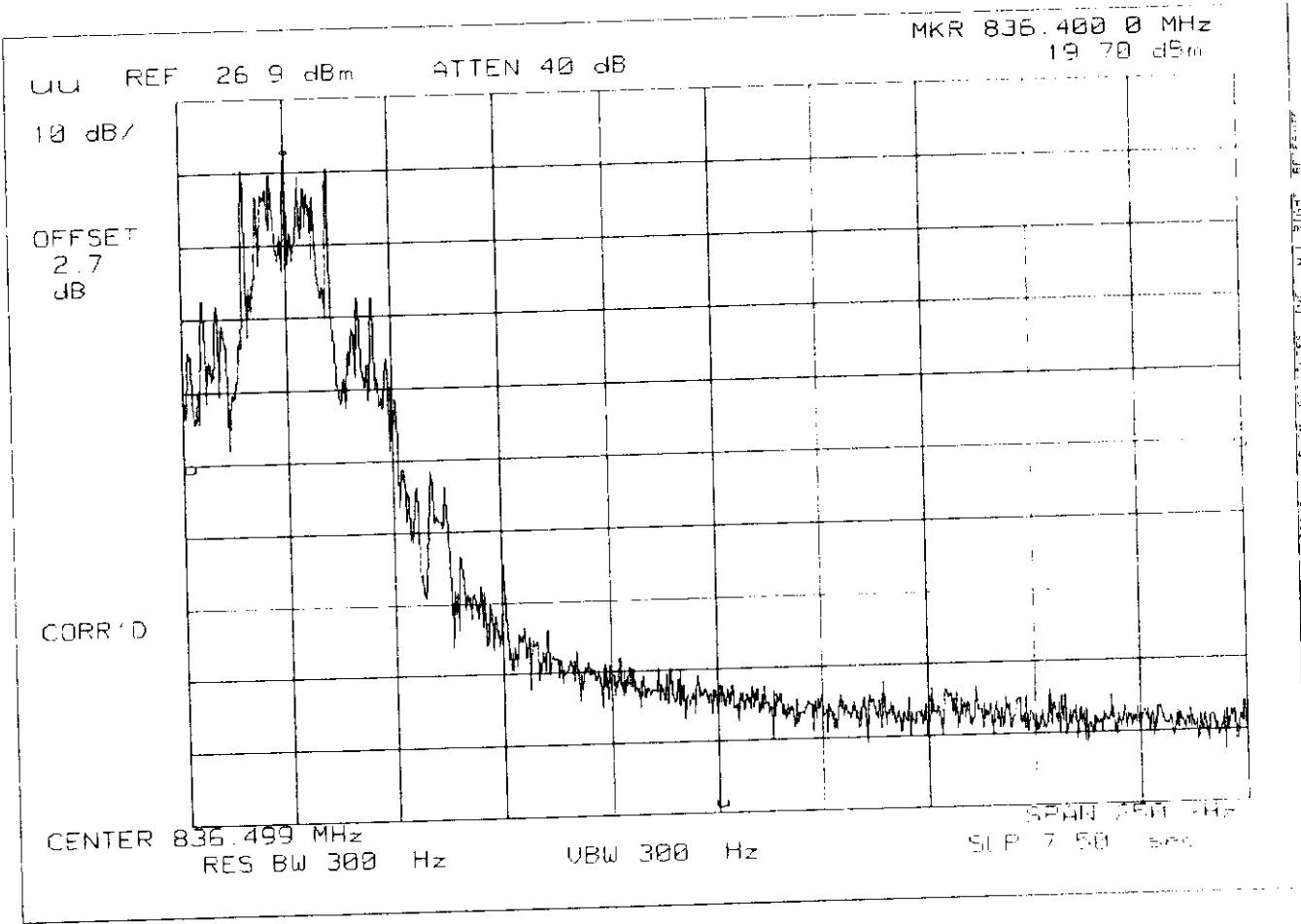
POWER: LOW POWER
MODULATION: CH 380, 991, 799
REMARK: RECEIVER CRITICAL BAND



PAGE 27.3.
SPECTRUM ANALYZER PRESENTATION
NOKIA, 282N, NHA-9SA (AMPS/NAMPS)
1998-JUL-01, 13:59, WED

GML NHA-9S

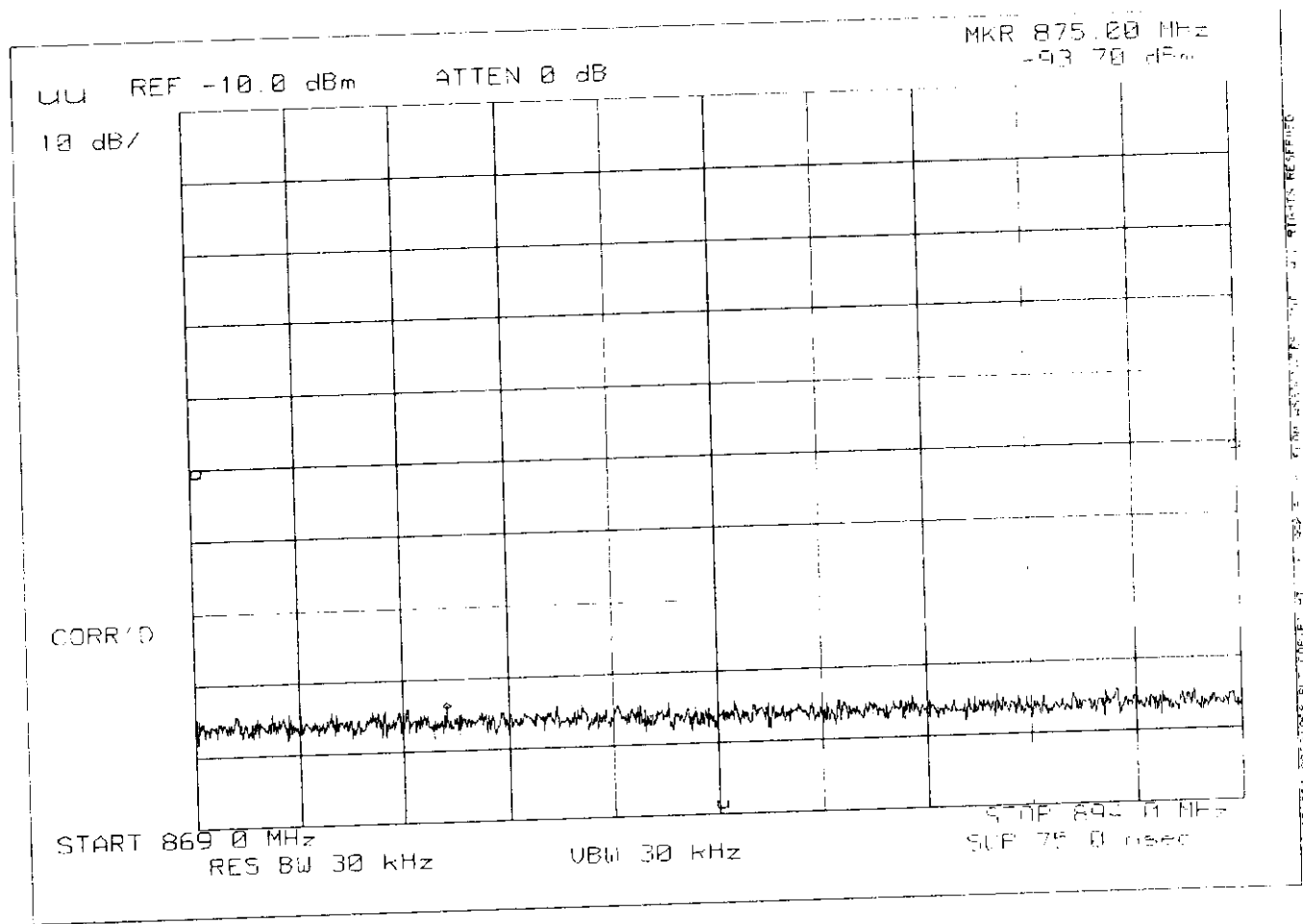
POWER: HIGH
MODULATION: OFFSET WIDEBAND DATA



PAGE 27.4.
SPECTRUM ANALYZER PRESENTATION
NOKIA, 282N, NHA-9SA (AMPS/NAMPS)
1998-JUL-01, 14:04, WED

GML NHA-9S

POWER: HIGH POWER
MODULATION: CH 380, 991, 799
REMARK: RECEIVER CRITICAL BAND



PAGE 28.

GML NHA-9S

NAME OF TEST: SPURIOUS EMISSIONS AT ANTENNA TERMINALS
PARAGRAPH: 47 CFR 2.991, 22.917
GUIDE: TIA/EIA STANDARD IS-19-B
TEST CONDITIONS: S. T. & H.
TEST EQUIPMENT: AS PER ATTACHED PAGE

MEASUREMENT PROCEDURE

1. The E.U.T. was connected to a coaxial attenuator and then to a Spectrum Analyzer.
2. A notch filter was introduced to reduce or eliminate spurious emissions which could be generated internally in the spectrum analyzer.
3. Measurements were made over the range from 45 kHz to 10 GHz for the worst case modulation at both the highest and lowest R.F. power settings.
4. All other emissions were 20 dB or more below the limit.
5. Spectrum analyzer bandwidth was set to section 22.917(h) as applicable.
6. MEASUREMENT RESULTS: ATTACHED

29.1.

PAGE NO.

G871003

TRANSMITTER SPURIOUS EMISSIONS (CONDUCTED)

POWER: LOW

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	LEVEL, dBm	LEVEL, dBc	LEVEL, μ W
836.400	1672.795	-48.4	-56.1	0
836.400	2508.724	-52.1	-59.8	0
836.400	3346.013	-52.8	-60.5	0
836.400	4182.027	-53.2	-60.9	0
836.400	5017.967	-53.1	-60.8	0
836.400	5854.938	-46.2	-53.9	0
836.400	6690.935	-47.1	-54.8	0
836.400	7527.714	-46.6	-54.3	0
836.400	8364.449	-46.3	-54.0	0
836.400	9200.114	-46.4	-54.1	0
836.400	10036.768	-46.0	-53.7	0
836.400	10872.894	-46.0	-53.7	0
836.400	11709.245	-45.1	-52.8	0
836.400	12546.257	-41.2	-48.9	0

PAGE NO.

29.2.

GML NHA-9S

G871004

TRANSMITTER SPURIOUS EMISSIONS (CONDUCTED)

POWER: HIGH

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	LEVEL, dBm	LEVEL, dBc	LEVEL, μ W
836.400	1672.810	-40.7	-67.6	0
836.400	2509.220	-45.8	-72.7	0
836.400	3345.622	-53.5	-80.4	0
836.400	4182.308	-52.5	-79.4	0
836.400	5018.332	-53.3	-80.2	0
836.400	5855.055	-47.6	-74.5	0
836.400	6691.325	-47.2	-74.1	0
836.400	7527.848	-46.1	-73.0	0
836.400	8363.564	-47.2	-74.1	0
836.400	9200.528	-47.7	-74.6	0
836.400	10037.149	-47.2	-74.1	0
836.400	10873.543	-47.2	-74.1	0
836.400	11709.418	-45.0	-71.9	0
836.400	12546.154	-42.5	-69.4	0

NAME OF TEST: FIELD STRENGTH OF SPURIOUS RADIATION
PARAGRAPH: 47 CFR 2.993 (a)
GUIDE: SEE MEASUREMENT PROCEDURE BELOW
TEST CONDITIONS: S. T. & H.
TEST EQUIPMENT: AS PER ATTACHED PAGE

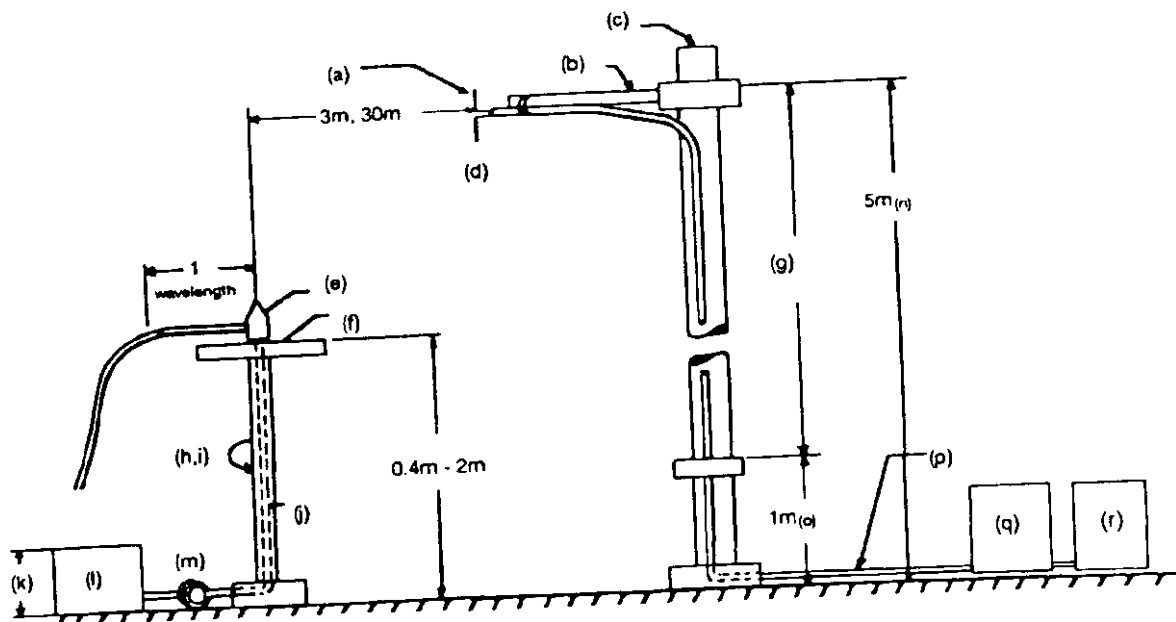
MEASUREMENT PROCEDURE

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. The test sample was connected to an R.F. Wattmeter and a 50 ohm dummy load, and adjusted to its rated output.

In order to obtain the maximum response at each spurious frequency, the turntable was rotated. Also, the Search Antennas were raised and lowered vertically, and all cables were oriented. Excess power lead was coiled near the power supply.

4. A signal generator, connected with a non-radiating cable to a vertically polarized half-wave antenna (for each frequency involved) was substituted for the transmitter. The Search Antenna was raised and lowered to obtain maximum indicated.
5. The signal generator output was adjusted until a signal level indication equal to that from the transmitter was obtained.
6. Steps 4 and 5 were repeated, using a horizontally polarized half-wave antenna. The higher of the two observations was noted.
7. Power into the half-wave antenna was calculated from the characteristic impedance of the line, and the voltage output from the signal generator.
8. The level of each spurious radiation with reference to the transmitter power in dB, was calculated from:
$$\text{SPURIOUS LEVEL, dB} = 10 \text{ LOG } \frac{\text{(Calculated Spurious Power)} \quad \text{[from Para. 7]}}{\text{Tx Power (Wattmeter)}}$$
9. The worst case for all channels is shown.
10. MEASUREMENT RESULTS: ATTACHED

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', 1 m normally.
- (p) Calibrated Cable at least 10 m in length.
- (q) Amplifier (optional).
- (r) Spectrum Analyzer.

PAGE NO. 33.1.
 RADIATED EMISSIONS (TX2), LOW POWER
 1998-JUN-30, 13:03, TUE

GML NHA-9S

TUNED, MHz	EMISSION, MHz	METER, dBuV	C.F., dB	ERP, dBm
824.040	1648.08	29.3	33.5	-32.4
836.400	1672.79	29.7	33.6	-31.9
848.970	1697.94	29.3	33.8	-32.1
824.040	2472.12	40.8	5.8	-48.6
836.400	2509.19	40.2	6.0	-49.1
848.970	2546.91	39.2	6.2	-49.9
824.040	3296.16	40.0	9.3	-45.9
836.400	3345.58	39.7	9.5	-46.1
848.970	3395.88	42.0	9.7	-43.6
824.040	4120.20	42.0	11.3	-41.9
824.040	4120.20	41.3	11.3	-42.6
836.400	4181.98	38.8	11.3	-45.1
848.970	4244.85	39.0	11.3	-44.9
824.040	4944.24	40.0	13.2	-42.1
836.400	5018.38	40.0	13.5	-41.8
848.970	5093.82	39.3	13.7	-42.2
824.040	5768.27	36.8	15.6	-42.8
836.400	5854.77	38.8	15.7	-40.7
848.970	5942.79	37.7	15.9	-41.7
824.040	6592.31	36.7	16.8	-41.8
836.400	6691.17	37.0	17.1	-41.2
848.970	6791.76	37.3	17.4	-40.5
824.040	7416.35	36.3	19.2	-39.7
836.400	7527.57	40.5	19.5	-35.2
848.970	7640.73	39.0	19.7	-36.6
824.040	8240.39	36.5	20.6	-38.1
836.400	8363.96	40.0	20.8	-34.4
848.970	8489.70	37.3	21.0	-36.9

PAGE NO. 33.2.
 RADIATED EMISSIONS (TX1), HIGH POWER
 1998-JUN-30, 11:51, TUE

GML NHA-9S

TUNED, MHz	EMISSION, MHz	METER, dBuV	C.F., dB	ERP, dBm
824.040	1648.08	43.5	33.5	-18.3
824.040	1648.08	44.3	33.5	-17.4
836.400	1672.80	42.7	33.6	-18.9
836.400	1672.80	43.8	33.6	-17.8
848.970	1697.94	40.5	33.8	-20.9
848.970	1697.94	42.0	33.8	-19.4
824.040	2472.12	41.0	5.8	-48.4
836.400	2509.20	56.5	6.0	-32.7
848.970	2546.92	50.5	6.2	-38.5
824.040	3296.16	43.7	9.3	-42.2
836.400	3345.60	50.0	9.5	-35.7
848.970	3395.89	45.3	9.7	-40.2
824.040	4120.20	46.3	11.3	-37.6
836.400	4181.99	43.7	11.3	-40.2
848.970	4245.26	40.3	11.3	-43.6
824.040	4944.24	43.8	13.2	-38.2
836.400	5018.39	46.8	13.5	-34.9
848.970	5094.23	46.2	13.7	-35.3
824.040	5768.28	42.3	15.6	-37.3
836.400	5854.79	40.0	15.7	-39.5
848.970	5943.21	39.3	15.9	-40.0
824.040	6592.32	40.2	16.8	-38.3
836.400	6691.19	42.0	17.1	-36.2
848.970	6792.18	39.7	17.4	-38.2
824.040	7416.36	40.2	19.2	-35.8
836.400	7527.59	42.3	19.5	-33.4
848.970	7641.15	43.0	19.7	-32.6
824.040	8240.40	41.8	20.6	-32.8
836.400	8363.99	39.8	20.8	-34.6
848.970	8490.12	40.5	21.0	-33.7

PAGE 34.

GML NHA-9S

NAME OF TEST: FREQUENCY STABILITY - TEMPERATURE VARIATION
PARAGRAPH: 47 CFR 2.995 (a)(1)
GUIDE: TIA/EIA STANDARD IS-19-B
TEST CONDITIONS: AS INDICATED
TEST EQUIPMENT: AS PER ATTACHED PAGE

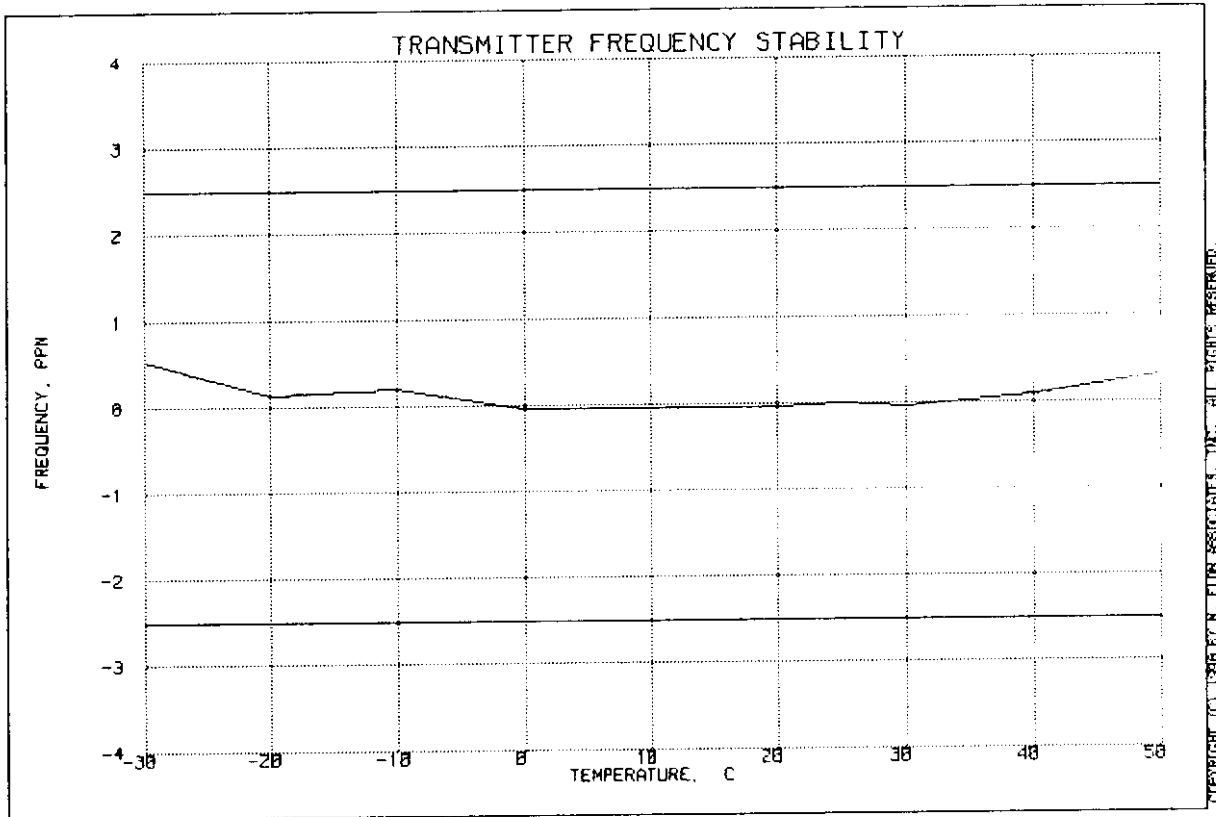
MEASUREMENT PROCEDURE

1. The E.U.T. 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

PAGE 36.

GML NHA-9S

TRANSMITTER FREQUENCY STABILITY
NOKIA, 282N, NHA-9SA (AMPS/NAMPS)
1 JUL 1998, 16:28



FREQUENCY OF CARRIER, MHz = 836.39984

LIMIT, ppm = 2.5

LIMIT, Hz = 2091

SUPERVISED BY:

M. Flom P. Eng.

MORTON FLOM, P. Eng.

NAME OF TEST: FREQUENCY STABILITY - VOLTAGE VARIATION
PARAGRAPH: 47 CFR 2.995 (b)(1)
GUIDE: SEE MEASUREMENT PROCEDURE BELOW
TEST CONDITIONS: S. T. & H.
TEST EQUIPMENT: AS PER PREVIOUS PAGE

MEASUREMENT PROCEDURE

1. The E.U.T. 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 E.U.T. was varied from 85% to 115% of the nominal value measured at the input to the E.U.T.
3. The variation in frequency was measured for the worst case.

MEASUREMENT RESULTS

LIMIT, ppm = 2.5
LIMIT, Hz = 2091

STV, %	Vdc	<u>CHANGE IN FREQUENCY, Hz</u>	
85	3.1	836400020	20
100	3.6	836400000	0
115	4.1	836400000	0
BATTERY END POINT:	3.1	836400020	20

SUPERVISED BY:


MORTON FLOM, P. Eng.

TESTIMONIAL
AND
STATEMENT OF CERTIFICATION

GML NHA-9S

THIS IS TO CERTIFY:

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.

F.C.C. HAS RULED SAR REPORT
CAN BE KEPT CONFIDENTIAL

ATTACHED IS SAR DATA EXTRACTED
RESULTS

NOKIA MOBILE PHONES

5.5 Results of SAR for 1g.

Appendix: 10

The plots in Appendix 10 are a graphical representation of the SAR values over the whole area being scanned.

Appendix 10, page 7 (Nr:7), has sketch of the phone added on the plot for clarifying the position of the phone with respect to the measured SAR values.

The size of the area being scanned is sufficiently large to ensure that all possible regions of peak SAR are measured. This is indicated by the fact that the position of peak SAR is in the measured area, and the value of SAR reduces asymptotically in the x- and y- directions as the probe is moved towards the border of the measured area.



meas nr:	Phone position	Frequency MHz / channel	Power [dBm]	Whip in (1g) [mW/g]	Whip up (1g) [mW/g]
1, 2	90°	824.0 / 991	25.6	0.31	0.53
3, 4	90°	836.0 / 384	26.9	0.31	0.66
5, 6	90°	849.0 / 799	26.1	0.23	0.64
FCC ID: GML NHA-9S MEASURED: 17.07.1997 / NMP		FCC limit		1.60 [mW/g] (ANSI/IEEE)	1.60 [mW/g] (ANSI/IEEE)

S Olin

24 July 1998.

See SAR plots, data in
table is for GML-NHA-9
not -9S
max SAR is 0.778 W/kg