2. Statements

THE APPLICANT IS AWARE OF THE FOLLOWING:

15.21 INFORMATION TO USER.

The user's 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.

3. LIST OF GENERAL INFORMATION REQUIRED FOR TYPE ACCEPTANCE

IN ACCORDANCE WITH FCC RULES AND REGULATIONS, VOLUME II, PART 2 AND TO PARTS 22 and 90.

Sub-part

2.983 (a) : NAME AND ADDRESS OF APPLICANT:
SONIK TECHNOLOGIES CORPORATION
310 VIA VERA CRUZ, SUITE 111
SAN MARCOS, CA 92069

VENDOR: APPLICANT

2.983 (b) : FCC ID: MNT-DPT-450
MODEL NO:DPT-450

2.983 (c) : QUANTITY PRODUCTION PLANNED.

2.983 (d) : TECHNICAL DESCRIPTION : SEE ATTACHED EXHIBITS

(1) : TYPE OF EMISSION: 16K0F1D, ~~11K0F1D~~

(2) : FREQUENCY RANGE, MHz: 450 to 470

(3) : POWER RATING, Watts: 3

SWITCHABLE ___ ADJUSTABLE ___ N/A _x_

(4) : MAXIMUM POWER RATING, Watts: 350

2.983(d)

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

COLLECTOR CURRENT, A	= <1.6
COLLECTOR VOLTAGE, Vdc	= 12.5
SUPPLY VOLTAGE, Vdc	= 12.5

(6) FUNCTION OF ACTIVE CIRCUIT DEVICES: See Attached Technical Description

(7) CIRCUIT DIAGRAM: PLEASE SEE ATTACHED EXHIBITS

(8) MANUAL: PLEASE SEE ATTACHED EXHIBITS

(9) TUNE-UP PROCEDURE: PLEASE SEE ATTACHED Technical Manual

(10) DESCRIPTION OF CIRCUITRY & DEVICES PROVIDED FOR DETERMINING AND STABILIZING FREQUENCY: PLEASE SEE ATTACHED EXHIBITS

(11)DESCRIPTION OF CIRCUITS OR DEVICES EMPLOYED FOR

(a) SUPPRESSION OF SPURIOUS RADIATION,
(b) LIMITING MODULATION,
(c) LIMITING POWER:
PLEASE SEE ATTACHED EXHIBITS

(12)DIGITAL MODULATION DESCRIPTION: See attached circuit description.

2.983(e) TEST AND MEASUREMENT DATA: FOLLOWS

2.983(f) LABEL INFORMATION: PLEASE SEE EXHIBIT 1.

2.983(g) PHOTOGRAPHS: PLEASE SEE ATTACHED EXHIBIT

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, and 2.999, and the following individual Parts:

90 - Private Land Mobile Radio Services
22 - Public Mobile Service

4. 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	= 12.5V

Prior to testing, the EUT was tuned up in accordance with the manufacturer's alignment procedures. There are no external gain controls on this unit.

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

5. Test Results

5.1 RF Power Output

PARAGRAPH: 47 CFR 2.985 (a)
GUIDE: EIA STANDARD RS 152B, Paragraph 3.3
TEST CONDITIONS: STANDARD TEMPERATURE & HUMIDITY
TEST EQUIPMENT: AS PER ATTACHED PAGE

MEASUREMENT PROCEDURE

1. The EUT was connected to a 50 ohm resistive coaxial attenuator, and the unmodulated output power was measured by means of an RF Power Meter.

2. Measurement accuracy is ±3%.

MEASUREMENT RESULTS

Nominal Frequency	RF Power Output, Watts
450	3.2
460	3.0
470	2.9

5.2 POWER OUTPUT TEST EQUIPMENT

TEST 1: R. F. POWER OUTPUT

(1) COAXIAL ATTENUATOR: NARDA 771-30
(2) POWER METER Bird Model 43
(3) FREQUENCY COUNTER HP 8594A

5.3 MODULATION CHARACTERISTICS -

FREQUENCY RESPONSE OF AUDIO MODULATING CIRCUIT:
- NOT APPLICABLE TO DIGITALLY MODULATED RADIOS-

FREQUENCY RESPONSE OF AUDIO LOW PASS FILTER
- NOT APPLICABLE TO DIGITALLY MODULATED RADIOS-

MODULATION LIMITING
- NOT APPLICABLE DIGITALLY MODULATED RADIOS -

5.4 OCCUPIED BANDWIDTH

PARAGRAPH:	47 CFR 2.989 (c)(1)
GUIDE:	EIA STANDARD RS 152B, Paragraph 17
TEST CONDITIONS:	S. T. & H.
TEST EQUIPMENT	AS PER ATTACHED PAGE

MEASUREMENT PROCEDURE

1. The EUT and test equipment were set up as shown on the following page, with the Spectrum Analyzer connected.

2. The digital modulation mode was operated transmitting random data at 7kbps. The deviation was set to 4.5kHz

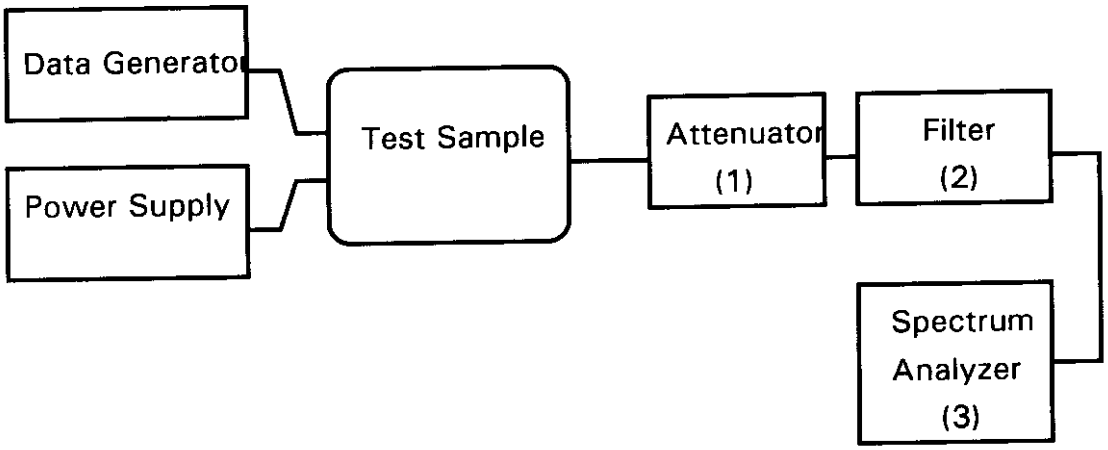
3. The total power was measured with the spectrum analyzer RBW set to 100kHz. The amplitude display was normalized so that the maximum channel power was at the top of the spectrum analyzer display.

4. The Occupied Bandwidth was measured with the Spectrum Analyzer controls set as shown on the test results.

5. MEASUREMENT RESULTS: ATTACHED

5.5 TRANSMITTER SPURIOUS EMISSION AND SPURIOUS OUTPUT TEST SETUP

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



1. COAXIAL ATTENUATOR: NARDA 771-30

2. FILTERS: Custom 500MHz HPF. >20dB below 500MHz, <3dB above 600MHz. Used only in Test B.

3. SPECTRUM ANALYZER: HP 8596E (.0009-2.9GHz)
HP 8593E (.0009-22GHz)

4. Data Generator: HP1645

Test A Occupied Bandwidth and in-band spurious

PARAGRAPH: 47 CFR 2.991
GUIDE: EIA STANDARD RS 152B, Paragraph 17
TEST CONDITIONS: S. T. & H.
TEST EQUIPMENT: AS PER ATTACHED PAGE

MEASUREMENT PROCEDURE

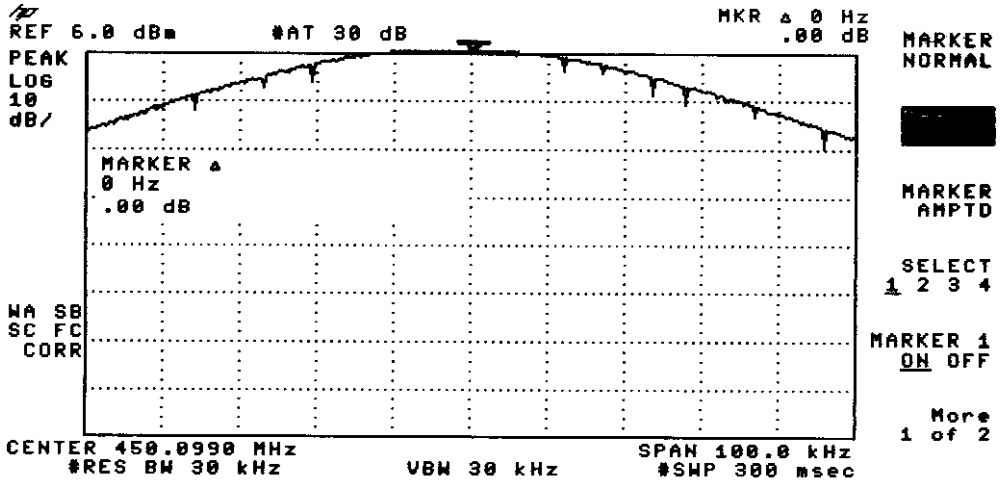
1. The occupied bandwidth was measured for the worst case as follows:

(a): With the spectrum analyzer configured as shown with a 100kHz resolution BW, the total transmitted on-channel power output was measured.

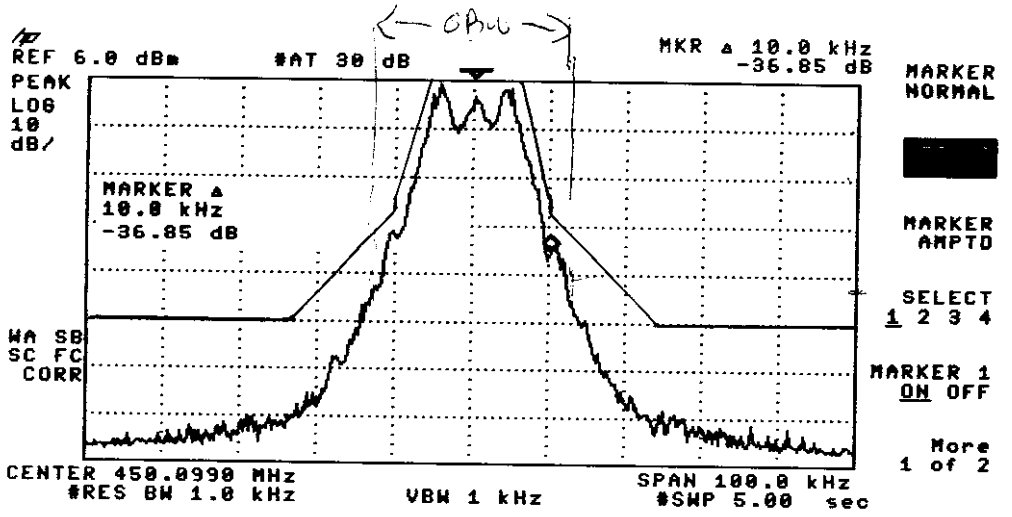
(b): With the spectrum analyzer re-configured as shown in the measurement plot, the transmitted signal was measured, and compared to applicable limits.

2. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

3. MEASUREMENT RESULTS: Attached for worst case of 450MHz. (Measured at 450 MHz,460 MHz & 470 MHz)



On-channel power measurement



7000BPS, 4.5KHz DEVIATION

Occupied Bandwidth
Power: 3 watts
Modulation: Externally applied, 7KBPS, 4.5kHz deviation
Emission limit shown

5.7 Test B TRANSMITTER SPURIOUS EMISSIONS (CONDUCTED)

PARAGRAPH: 47 CFR 2.991
GUIDE: EIA STANDARD RS 152B, Paragraph 17
TEST CONDITIONS: S. T. & H.
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.

2. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

3. The spectrum analyzer was configured to take into account the 20dB external attenuator. Once a reference level was established with the on-channel power measurement, a 500MHz high-pass filter was inserted between the in-line attenuator and the spectrum analyzer. The magnitude of the largest spurious emissions was measured.

3. MEASUREMENT RESULTS: ATTACHED FOR WORST CASE
FREQUENCY OF CARRIER, MHz = 450, 460, 470
SPECTRUM SEARCHED, GHz = 0 to 10 x Fc
MAXIMUM RESPONSE, Hz = N/A
ALL OTHER EMISSIONS = ≥ 20 dB BELOW LIMIT
LIMIT, dBc: -[43 + 10 LOG(P0)] = -47.8 dBc

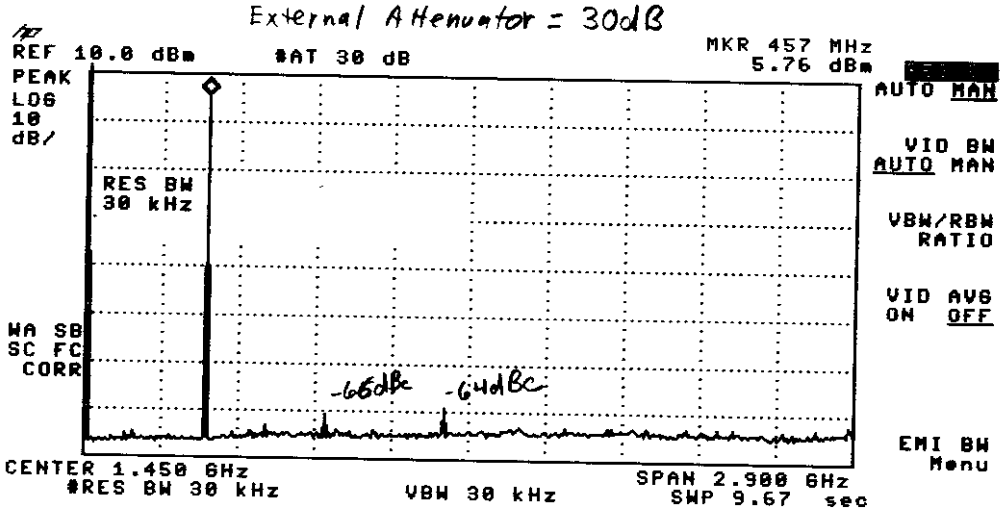
The plot shown displays up to 2.9GHz. An HP8593E spectrum analyzer was also used to check above 2.9GHz, up to the 10th harmonic. No spurious outputs within 20dB of the limit were observed above 2.9GHz.

5.8 Transmitter Conducted Spurious Emissions

Tuned Frequency, MHz	Emission Frequency, MHz	Level, dBc
450	900	-66
450	1350	-64
460	920	-65
460	1380	-67
470	940	-65
470	1410	-64

All other emissions were >20 dB below limit

External Attenuator = 30dB



5.9 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 F.C.C. and was found to be in compliance with the requirements of Section 15.38, by letter from the F.C.C. dated October 21, 1996 FILE 31040/SIT (1300F2). All pertinent changes will be reported to the Commission by up-date prior to December 1997. The radiated field strength measurements were taken at *Electromagnetic Engineering Services, Incorporated*, San Diego, CA (EESI).

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 in an RF shielded room, at a distance of 1 meter from suitable test antennas. Any signal found to be emitted by the unit under test was noted for later field evaluation.

3. In the field, the test sample was placed on a wooden turntable above ground at three 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.

4. 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.

5. Step 4 was repeated with antennas oriented at 90 degrees to the way they were oriented in step 4. The maximum value of step 4 and 5 at each spurious frequency was recorded.

5. The level of each spurious radiation with reference to the transmitter power in dB, was calculated from:

Carrier Power = 3.0 watts = 34.8dBm
Maximum spurious output = -43 - 10Log(P) = -47.8dBc
Field Strength of 3.0W at 3 meters = 34.8 + 95.2 = 130.0dBuV
Maximum Filed strength of spurs = 130.0 - 47.8 = 82.2dBuV = 12,900uV

9. The worst case for all channels is shown.

10. Measurement summary:

FREQUENCY OF CARRIER, MHz	= 450.1, 460.1, 470.1
SPECTRUM SEARCHED, GHz	= 0 TO 4701MHz
ALL OTHER EMISSIONS	= ≥ 20 dB BELOW LIMIT
Worst case measurement	= -81.4dBc
LIMIT, dBuV/m	= -82.2

11. Measurement results: See attached report from EESI for test results.

5.8 FREQUENCY STABILITY - TEMPERATURE VARIATION

PARAGRAPH: 47 CFR 2.995 (a)(1)
GUIDE: EIA STANDARD RS 152B, Paragraph 10
TEST CONDITIONS: AS INDICATED
TEST EQUIPMENT: AS PER ATTACHED 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.

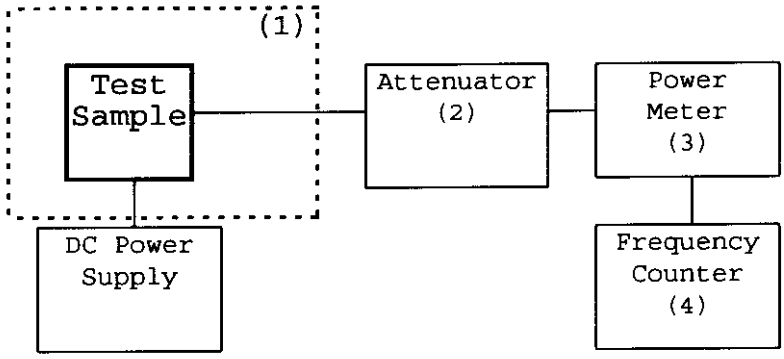
5. MEASUREMENT RESULTS:

Temp	-30°	-20°	-10°	0°	+10°	+20°	+25°	+30°	+40°	+50°	+60°
ppm err	-1.2	-.3	+1.1	+.8	+.5	+.4	0.0	-.6	-1.1	-.3	+.3

Limit: 1.5ppm

Worst case measured: -1.2ppm

TRANSMITTER FREQUENCY STABILITY TEST EQUIPMENT



(1) TEMPERATURE: Thermatron Temp. Chamber
(2) COAXIAL ATTENUATOR: Narda 771-30
(3) R.F. POWER: Bird model 43
(4) FREQUENCY COUNTER: HP 8595E

5.11 FREQUENCY STABILITY - VOLTAGE VARIATION

PARAGRAPH: 47 CFR 2.995 (b)(1)
GUIDE: SEE MEASUREMENT PROCEDURE BELOW
TEST CONDITIONS: AS SHOWN
TEST EQUIPMENT: AS PER PREVIOUS PAGE

MEASUREMENT PROCEDURE

1. The EUT was placed in a temperature chamber at 25±5°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.

MEASUREMENT RESULTS

LIMIT, ppm = 1.5
LIMIT, Hz = 705Hz

Standard Test Voltage	V DC	Change in Frequency in hertz
85%	10.6	-30
100%	12.5	0
115%	14.3	+70

5.12 NECESSARY BANDWIDTH AND EMISSION BANDWIDTH

PARAGRAPH: 47 CFR 2.202(g)
MODULATION = Data, no modulating sub-carrier (F1D)

NECESSARY BANDWIDTH CALCULATION **(25kHz channel spacing)** :

MAXIMUM MODULATION (M) , kHz	= 3.5
MAXIMUM DEVIATION (D), kHz	= 4.5
CONSTANT FACTOR (K)	= 1
NECESSARY BANDWIDTH (Bn), kHz	= (2 x M) + (2 x D x K)= 16.0

Regarding the value of M= for the maximum modulation frequency. This value was chosen for the following four reasons.

1) 7kbps is about the highest modulation frequency that will work with this transmitter, and still have intelligible data transmitted. By 47 CFR 2.202, M=B/2.

2) The deviation in the type of paging system this transmitter will be used is set to 4.5KHz, and thus M=3.5 giving a 16kHz occupied bandwidth.

3) Other transmitters made by our competitors have been approved with designators of 16K0F1D, and Sonik was following them by also specifying a 16kHz bandwidth, which at 4.5kHz deviation means M must equal 3.5.

5.13 TRANSIENT FREQUENCY BEHAVIOR

PARAGRAPH: 47 CFR 90.214
GUIDE: SEE MEASUREMENT PROCEDURE BELOW
TEST CONDITIONS: S. T. & H.
TEST EQUIPMENT: AS PER ATTACHED PAGE

MEASUREMENT PROCEDURE

1. The EUT was set up as per EIA-603 2.2.19.

2. The oscilloscope was set to trigger on any detected RF pulse.

3. The modulation analyzer (test receiver) was adjusted for ranges fixed by user to insure proper dynamic range for power and deviation.

4. All settings were verified with a spectrum analyzer to show a minimum 30 dB difference in the input of the peak detector with the transmitter turned "ON" or "OFF".

5. The RF signal generator was set to a level 50dB below the output of the attenuator, and to ±25kHz deviation.

6. The EUT was keyed on and the Transient Frequency Behavior was measured with the instrument controls set as shown on the test results. The test was also run with modulation enabled sending pseudorandom data, and it should be noted that the transient characteristics did not change.

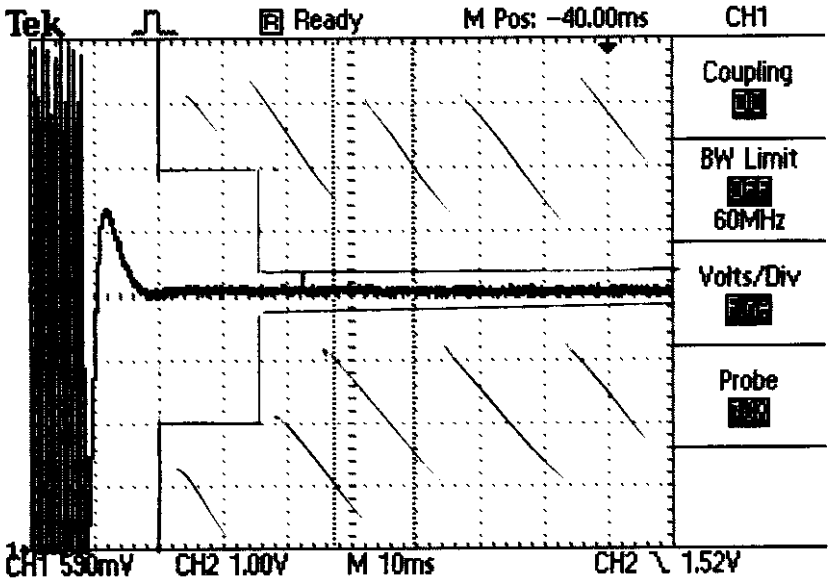
7. MEASUREMENT RESULTS: See following page

8. Test Equipment List:

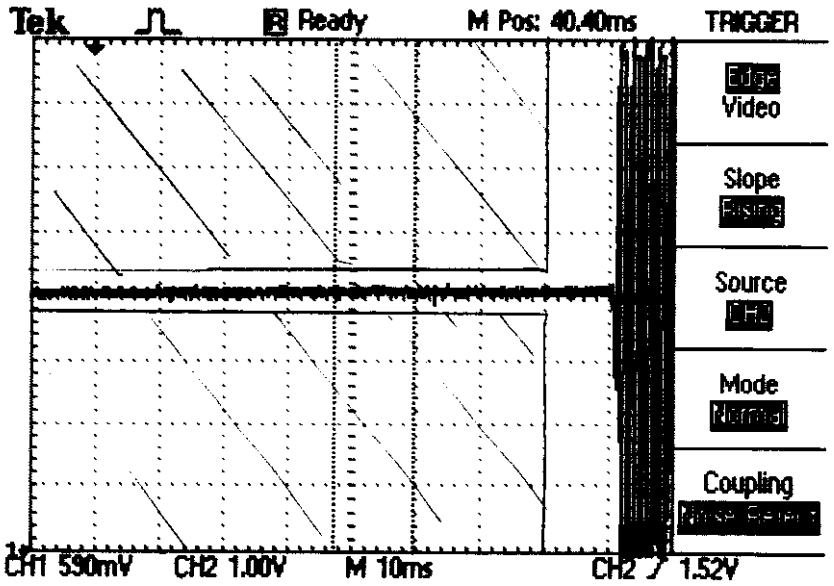
TRANSIENT FREQUENCY BEHAVIOR TEST EQUIPMENT

(1)COAXIAL ATTENUATOR:	NARDA 771-30
(2)COAXIAL ATTENUATOR	BIRD 8329 (30dB)
(3)COMBINER LAB, 10 dB	
(4)RF SIGNAL GENERATOR	HP 8656B
(5)DETECTOR	HP 8595E tuned to Fo.
(6)SCOPE	HP 54502A
(7)FM DEMODULATOR	HP 8595E w/FM demodulator option

TRANSIENT FREQUENCY BEHAVIOR
OSCILLOSCOPE PRESENTATION, NO MODULATION

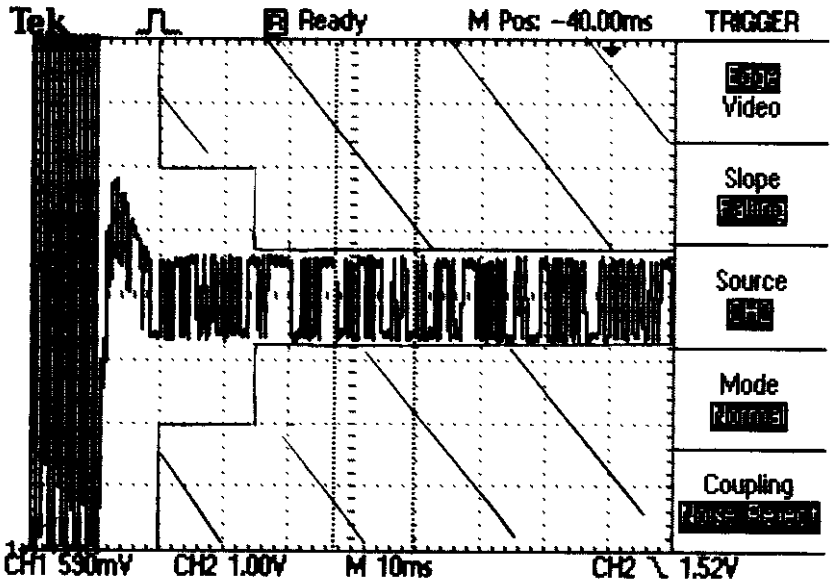


MODULATION: REF GENERATOR = 25 KHz
REMARK: CARRIER ON TIME

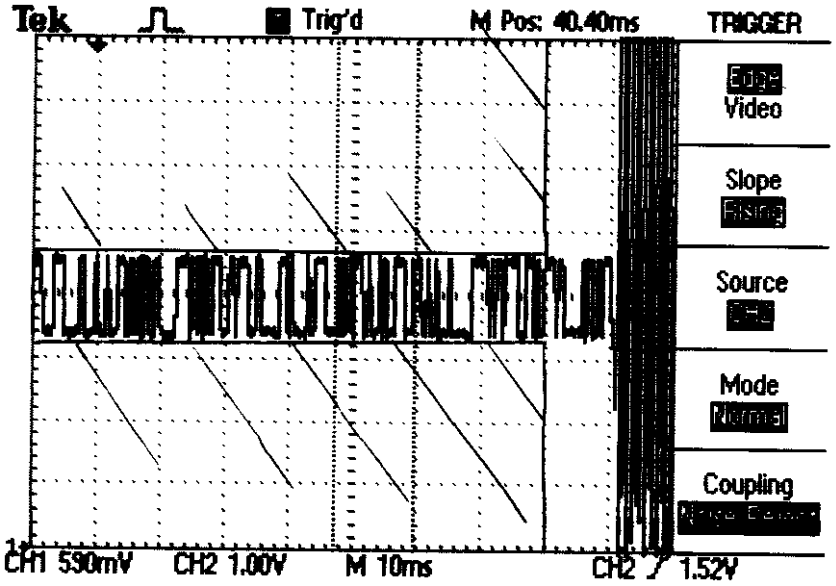


MODULATION: REF GENERATOR ±25 KHz DEVIATION
REMARK: CARRIER OFF TIME

TRANSIENT FREQUENCY BEHAVIOR
OSCILLOSCOPE PRESENTATION, WITH PSEUDORANDOM DATA MODULATION



MODULATION: REF GENERATOR = 25 KHz
REMARK: CARRIER ON TIME



MODULATION: REF GENERATOR ±25 KHz DEVIATION
REMARK: CARRIER OFF TIME

5.14 FUNCTION OF ACTIVE CIRCUIT DEVICES:

Reference	Part Number	Function
Q7	RF652	Final RF power amplifier
Q17	MRF8372	Driver RF power amplifier
Q19,Q18	MMBR941	Pre-driver RF power amplifier
Q5, Q23,Q18,Q16	MPSH10	Buffer RF amplifier
Q23	MMBR571	VCO
Q12,Q11,Q20	MMBT3904	DC switching transistor
Q14	MMBTH10	Crystal oscillator
U1	MC145190	PLL divider chip
U2, U4	LP2982	Voltage regulator
U6	MC68HC705C8	CPU
U7	25043	EEPROM memory
U8	SP232	RS-232 driver/receiver
U9,U10	33174	Splatter Filter

5.15 TESTIMONIAL AND STATEMENT OF CERTIFICATION:

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.

5. THAT, the test equipment used to perform the tests reported herein is calibrated.

By: John Sonnenberg
CEO and Chief Technical Officer
Sonik Technologies Corporation