TEST:	**RF POWER OUTPUT**
FCC ID:	EO9DATAPAC
Grantee:	Itron, Inc.
Serial No.:	none
Manufacture Rating:	10 Watt +40 dBm
Equipment Authorization Procedure:	Para. 2.985 (a)
Test Equipment:	See Block Diagram
Duty Cycle:	Mobile Network Intermittent
Frequency Measured:	956.99975 MHz

FINAL RADIO FREQUENCY AMPLIFYING DEVICE

Transistor Type Micro Devices:	RF/PM 2105 Module
Measured Power Output:	10 Watt + 40 dBm

Note: Due to the product design it was not possible to physically measure the collector current (IC) and collector voltage (VC) directly for the exciter. The RF/PM 2105 module operates at approximately 50% efficiency over the 951.00 - 962.00 MHz band at the rated temperature and power levels tested. Power level is controlled by varying the voltage to the RF/PM 2105 module under software control. A Motorola power amplifier module MHW2821-2 increases the exciter output power to a fixed 10 watts.

The maximum power output of +40 dBm, was measured at the maximum output level of the modulation square wave form (Amplitude Modulation). Modulation was essentially square-wave and was set for the maximum tone frequency or data rate of 57.78 Hz or tone 14. No data is actually transmitted only the appropriate "wake up" tone. The depth of modulation observed was about 70 dB with +40 dBm output power, when modulated at the maximum rate. The power output was measured at the transceiver's external antenna type "N" connector.

TEST: **OCCUPIED BANDWIDTH**

FCC ID: EO9DATAPAC

Manufacturer: Itron, Inc.

Serial No.: none

Minimum Standard Specified:	Para. 101.111 (a)(5)
Test Results:	Equipment is Compliant with Standard
Equipment Authorization Procedure:	Para. 2.989 (c)(1)
Test Equipment Set Up:	Please refer to Block Diagram #1

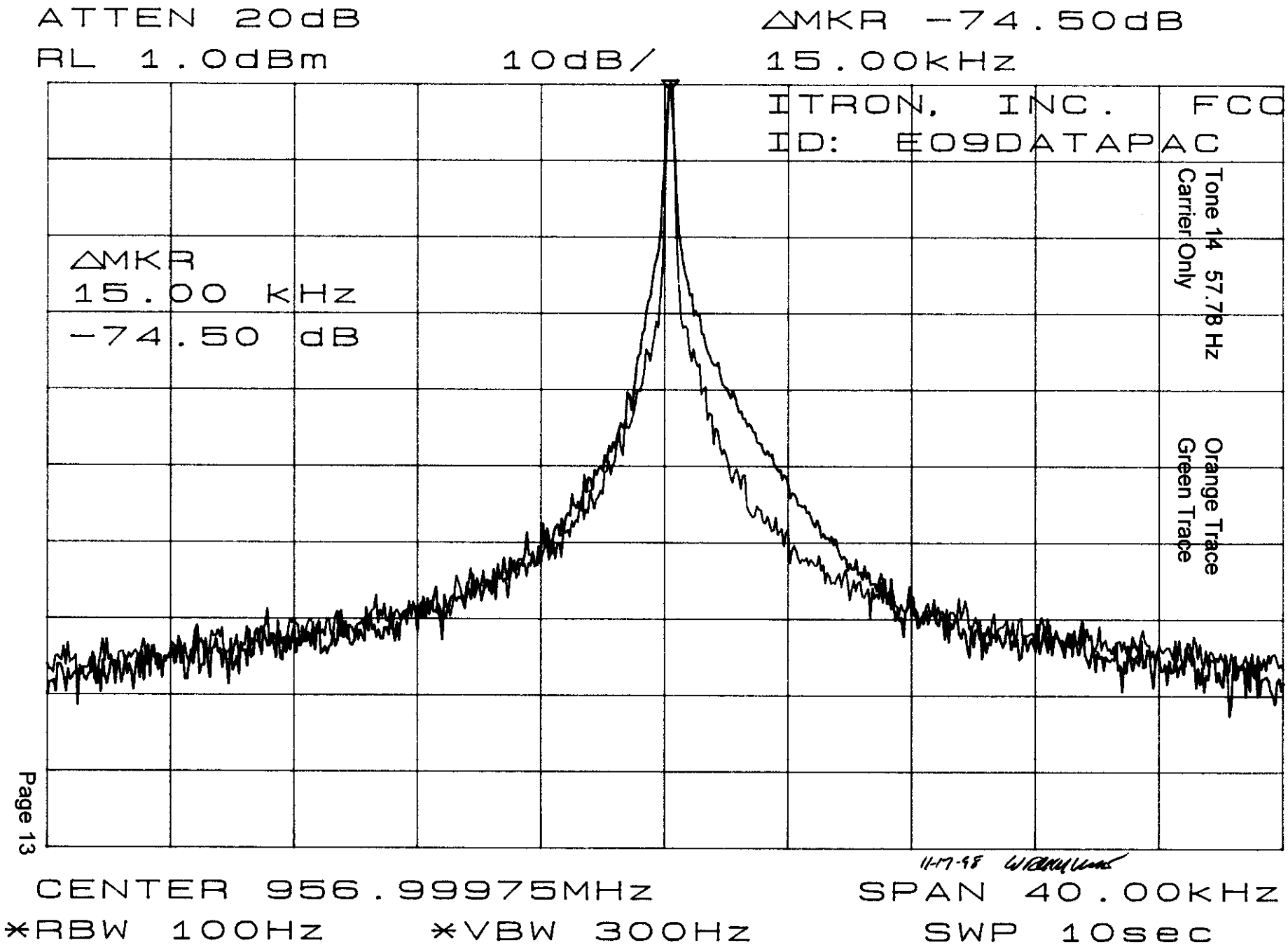
MEASUREMENT DATA

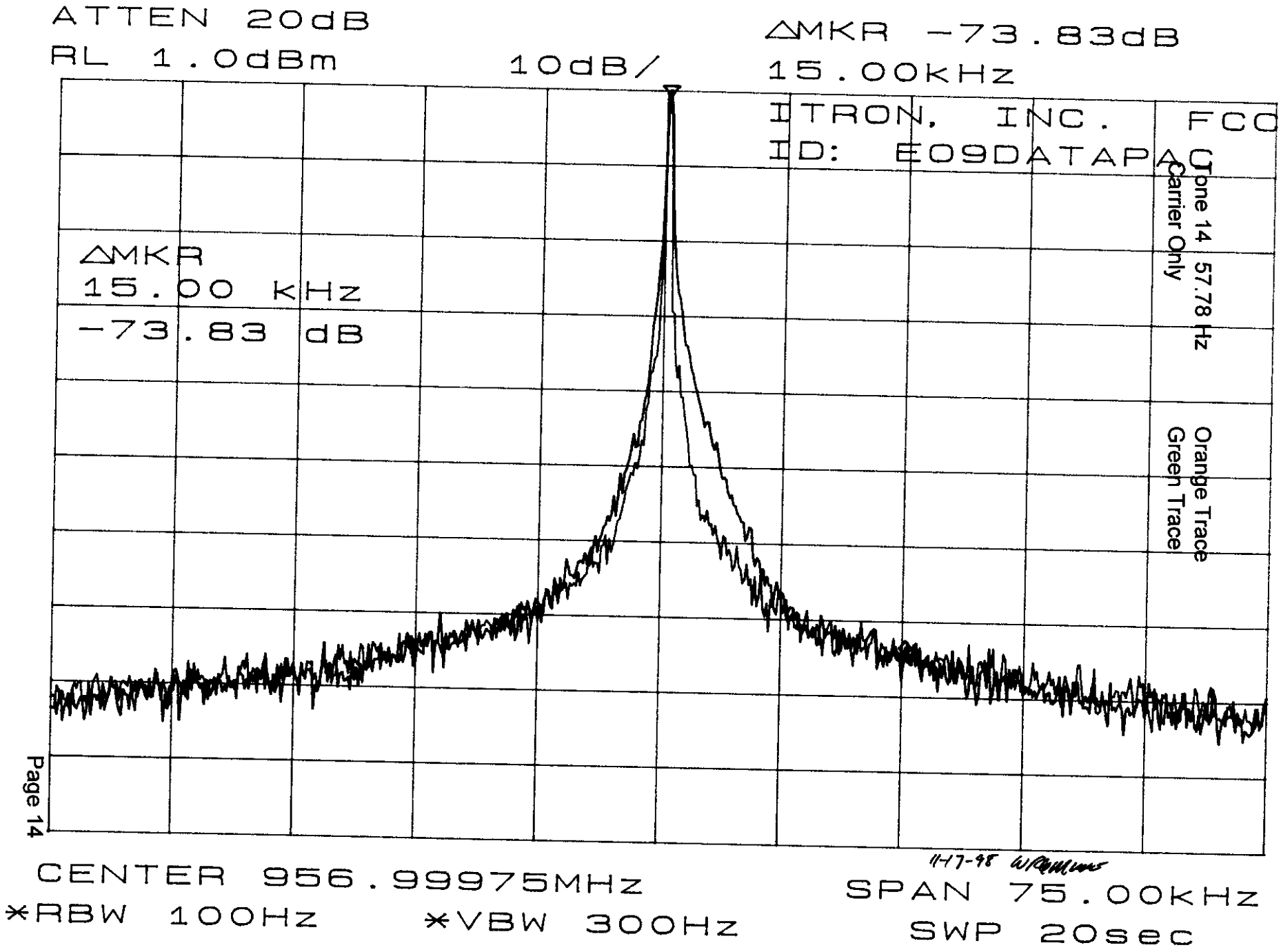
Spectrum Analyzer: Hewlett Packard 8562A

		Plot A	Plot B	
Settings:	Resolution Bandwidth:	100	100	Hz
	Video Filter:	300	300	Hz
	Scan Time:	10	20	sec.
	Scan Width:	40	75	kHz
	Center Frequency:	956.99975	956.99975	MHz

Audio Input: Internal AM data generation, software controlled ERT tone frequency between 24.76 and 57.78 Hz. The 57.78 Hz or The maximum tone rate , tone 14 was used during this test. The tone is essentially a square wave and no data is transmitted.

Two plots of the occupied bandwidth measured follow, with the Scan Width at 40 kHz (PLOT A) and at 75 kHz (PLOT B).


ATTEN 20dB
RL 1.0dBm
10dB/
ΔMKR -74.50dB
15.00kHz
ITRON, INC. FCC
ID: E09DATAPAC
ΔMKR
15.00 kHz
-74.50 dB
Tone 14 57.7B Hz
Carrier Only
Orange Trace
Green Trace
11-17-98
CENTER 956.99975MHz
SPAN 40.00kHz
*RBW 100Hz
*VBW 300Hz
SWP 10sec


ATTEN 20dB
RL 1.0dBm
10dB/
ΔMKR -73.83dB
15.00kHz
ITRON, INC. FCC
ID: E09DATAPAC
ΔMKR
15.00 kHz
-73.83 dB
Tone 14 57.78 Hz
Carrier Only
Orange Trace
Green Trace
Page 14
11-17-98
CENTER 956.99975MHz
*RBW 100Hz
*VBW 300Hz
SPAN 75.00kHz
SWP 20sec

TEST: **SPURIOUS EMISSIONS AT ANTENNA TERMINALS**

FCC ID:	EO9DATAPAC
Manufacturer:	Itron, Inc.
Serial No.:	none
Minimum Standard Specified:	Para.101.111(a)(5)
Test Results:	Equipment compliant with standard
Equipment Authorization Procedure:	Para. 2.991 & 2.989
Test Equipment Set Up:	See Block Diagram
Frequency Range Observed:	0 to 10 GHz
Operating Frequency:	956.99975 MHz
Crystal Frequency:	16.4 MHz TCXO
Power Output:	10 Watt high power (peak)
Spurious Limit = 50 dB + 10Log_{10} PO =	50 + (10) = -60 dBc high power

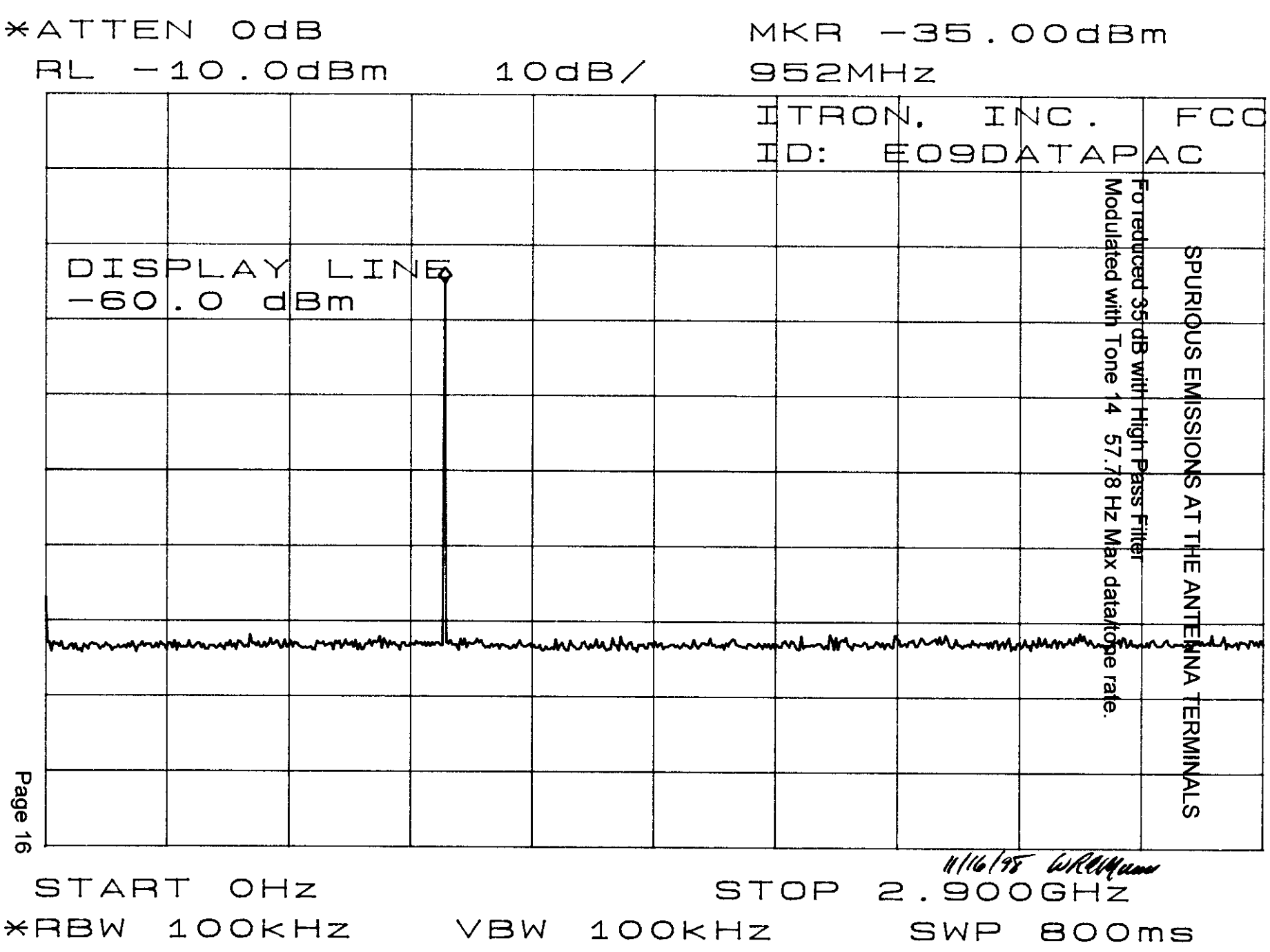
The carrier was modulated at the max data rate of 57.78 Hz as specified in para. 2.989. Fo was reduced 35 dB with a High pass filter E/M, Inc. Model: 3FH-2/18 and needed to be trapped at this power level, to avoid overloading the spectrum analyzer .

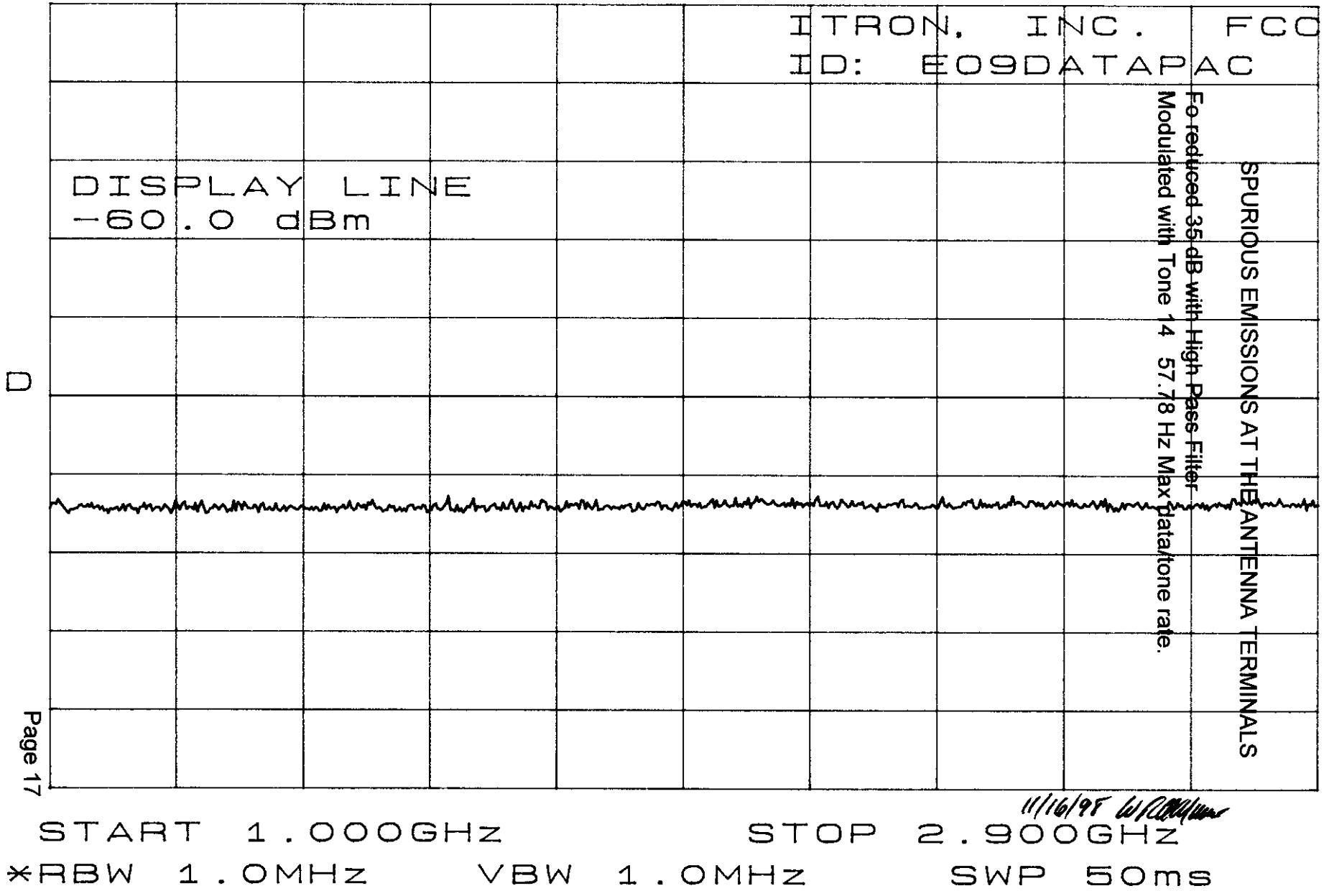
FORMULA	FREQUENCY IN MHz	Level (dB below carrier)
Fo	952.30625	-0-

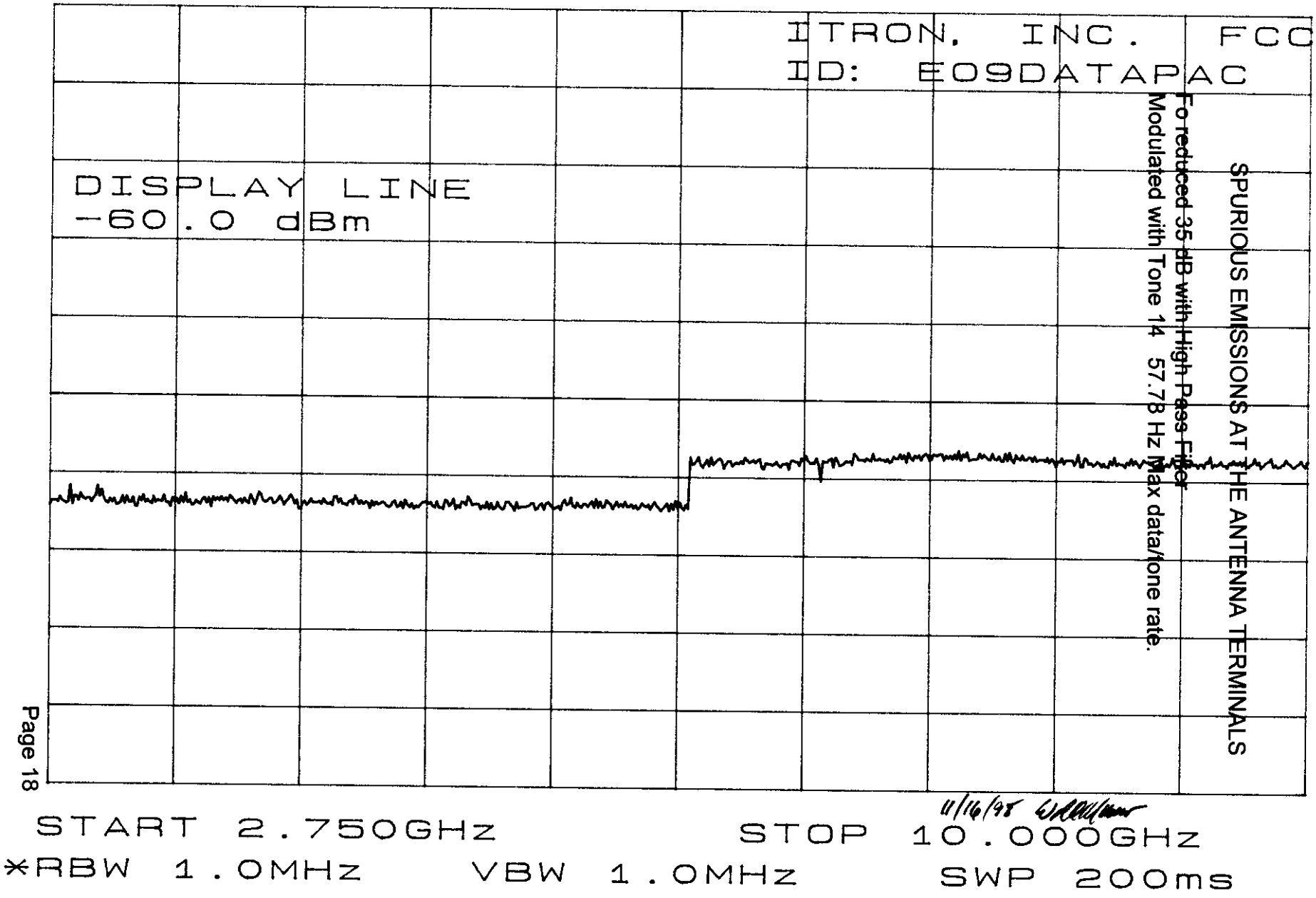
Please refer to the plots on following three pages.

Plot 1.)	0 - 1000 MHz	100 kHz RBW & VBW
Plot 2.)	1. - 2.9 GHz	1.0 MHz RBW & VBW
Plot 3.)	2.75 - 10.0 GHz	1.0 MHz RBW & VBW

No spurious emissions were measurable at the antenna terminals. All were below the spectrum analyzer noise floor at the given RBW & VBW. This would seem reasonable considering the EUT has a low pass filter on the output of the PA.


*ATTEN 0dB
MKR -35.00dBm
RL -10.0dBm
10dB/
952MHz
ITRON, INC. FCC
ID: E09DATAPAC
DISPLAY LINE
-60.0 dBm
SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS
For reduced 35 dB with High Pass Filter
Modulated with Tone 14 57.78 Hz Max data/tone rate.
11/16/98
START 0Hz
STOP 2.900GHz
*RBW 100kHz
VBW 100kHz
SWP 800ms


*ATTEN 0dB
RL -10.0dBm
10dB/
ITRON, INC. FCC
ID: E09DATAPAC
DISPLAY LINE
-60.0 dBm
D
SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS
Fo reduced 35 dB with High Pass Filter
Modulated with Tone 14 57.78 Hz Max data/tone rate.
11/16/95
START 1.000GHz
STOP 2.900GHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 50ms


*ATTEN 0dB
RL -10.0dBm
10dB/
ITRON, INC. FCC
ID: E09DATAPAC
DISPLAY LINE
-60.0 dBm
SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS
Foreduced 35 dB with High Pass Filter
Modulated with Tone 14 57.7B Hz Max data/tone rate.
11/16/95
START 2.750GHz
STOP 10.000GHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 200ms

TEST: **FIELD INTENSITY MEASUREMENTS OF SPURIOUS RADIATION**

FCC ID:	EO9DATAPAC
Manufacturer:	Itron, Inc.
Serial No.:	none
Minimum Standard Specified:	Para. 101.111
Test Results:	Equipment compliant with standard
Equipment Authorization Procedure:	Para. 2.993 & 2.989
Test Equipment Set Up:	See Block Diagram
Frequency Range Observed:	0 to 10 GHz
Operating Frequency:	956.9975 MHz
Crystal Frequency:	16.4 MHz TCXO
Power Output:	10 Watt high power (peak)
Spurious Limit = 50 dB + 10Log_{10} PO =	50 + (10) = -60 dBc

The carrier was modulated at the maximum data rate of 57.78 Hz (tone 14) as specified in para. 2.989.

FORMULA	FREQUENCY IN MHz	high power Level (dB below carrier)
Fo	956.99975	-0-
5Fo	5742.00	-79.07

All other radiated emissions measured were more than 20 dB below the spurious limit when measured at three meters EUT to antenna spacing.

4/18/98

TEST: **OPERATIONAL FREQUENCY STABILITY PERFORMANCE**

FCC ID:	EO9DATAPAC	
Grantee:	Itron, Inc.	
Serial No:	none	
Minimum Standard Specified:	Para. 101	Limit +/- .00015%
Equipment Authorization Procedure:	Para. 2.995	-20 to +50 C
Test Frequency:	957.000 MHz	1.5 ppm = +/- 1434 Hz

The measurement data reported on the following page displays the frequency observed when the transmitter was first keyed immediately following power up, a period of approximately 45-60 seconds during which the DataPac was initialized and software was loaded to allow activation of the transmitter. This value was recorded and is reported. Measurements at -30, 0 and +50 degrees C showed that after the initial 60 seconds or more that the transmitter was powered, that the transmitter was well within the 1.5 ppm limit. The equipment power was turned off during changes in ambient temperature.

Two temperature probes connected to a Fluke 52, were used during the measurements. The first probe was inserted through a small opening in the transceiver cover and placed in contact with the largest internal mass inside the transceiver. The other probe was left outside of the transmitter within the chamber at a location with good air circulation to accurately measure the internal chamber temperature for comparison the internal transmitter temperature and insure that the equipment was stabilized at a given temperature.

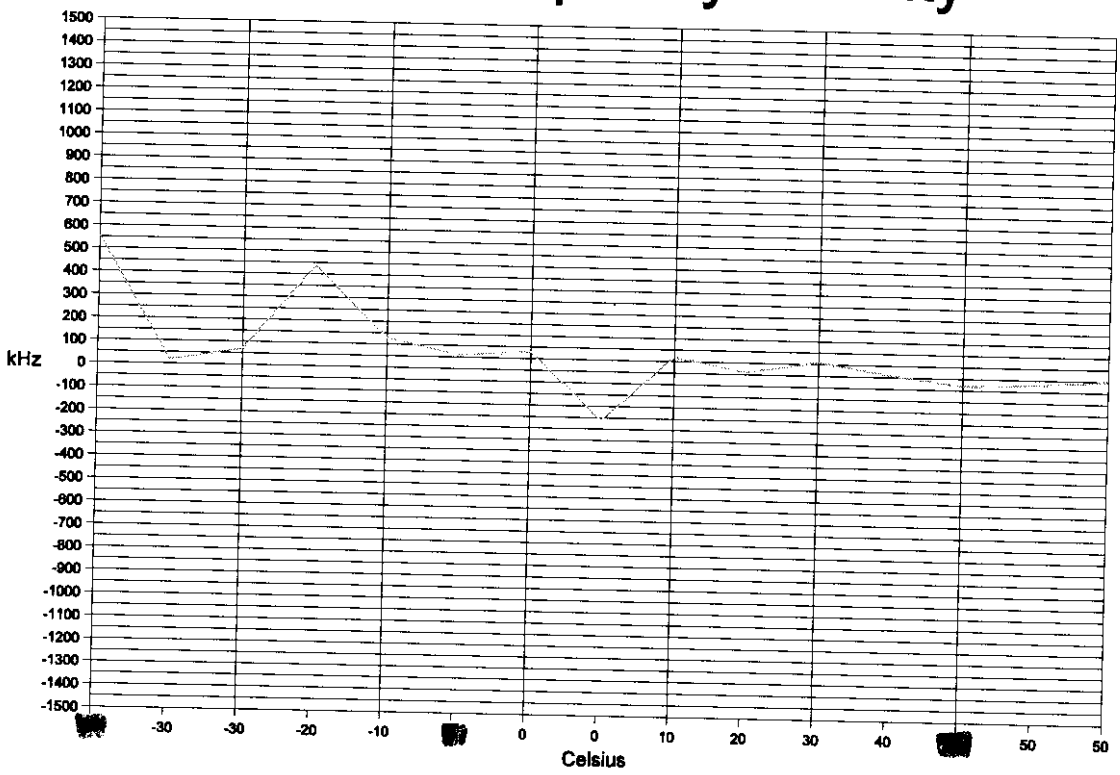
The voltages used for measurements at -30, 0, & +50 degrees Celsius:

+ 15 %	15.87 VDC
Nominal	13.80 VDC
- 15 %	11.73 VDC

TEST: **OPERATIONAL FREQUENCY STABILITY PERFORMANCE**

FCC ID:	EO9DATAPAC	
Grantee:	Itron, Inc.	
Model:	DataPac	
Minimum Standard Specified:	Para. 101.107	.00015% 1.5 ppm @ 957MHz = +/-1435 Hz
Equipment Authorization Procedure:	Para. 2.995	
Test Frequency:	957.000 MHz	951 - 962 MHz Band

Graph Of Frequency Stability



The variation in frequency with voltage are shown on the plot above for +50, 0 and -30 C. Three readings are shown at these temperatures. The left hand reading is the [redacted] VAC and the right hand reading is +15% 138 VDC. The center reading at -30, 0 and +50 degrees C and all of the other reported readings are at the nominal operating voltage of 120 VDC.

TEST EQUIPMENT LIST A
SPECTRUM TECHNOLOGY, INC.

Equipment	Manufacturer	Serial Number	Cal Date/Due Date
Spectrum Analyzer	Hewlett-Packard 8562A	08562-60062	9/14/98 9/14/99
Amplifier 9 kHz-1300 MHz	Hewlett-Packard 8447F OPT H64	2727A02208	9/14/98 9/14/99
RF Signal Gen.	Fluke 6071A	2915016	8/11/98 5/11/99
Service Monitor	IFR FM/AM 500A	4103	---
Oscilloscope	Kikusui C055060	6132295	---
Power Supply	Astron VS35	8601266	---
Voltmeter	Fluke 8020A	N2420658	---
Multimeter	Fluke 25	3710310	---
Wattmeter	Bird 43	56227	---
RF Termination	Bird 8135	10004	---
Dual Phase LISN 50 ohm/50 uH	STI per MP-4	02	1/9/98 1/9/99
Dual Phase LISN 50 ohm/50 uH	Compliance Design	8012-50R-24-BNC	1/9/98 1/9/99
Audio Generator	Hewlett-Packard 205-AG	8689	---
Attenuators:	Texscan FP45-20 Texscan FP45-10 Weinshel 40-10-33 Mini-Circuits CAT30 Pomona 4108-10	 CZ682 8419 01 	
Thermometer	Fluke 52	3965185	---
Test Line Simulator	Teltone TLS-2	none	---
Turn Table, RC	EMCO 1060-2M	8912-1415	---
Antenna Mast, RC	Compliance Design, Inc.	M100	---
Antennas: DiPole Set Diploe Set	 EMCO Model: 3121C EMCO Model: 3121C	 1335 1336	 9/18/97 3/18/99 9/18/97 3/18/99
Bi-Conical Bi-Conical Log-Periodic Active Loop	EMCO 3104 EMCO 3104C EMCO 3146 EMCO 6502	3763 9401-4635 1754 9107-2645	reference only 6/20/97 1/20/99 6/15/98 6/15/99 reference only