MEASUREMENT/TECHNICAL REPORT

Company - Model: I.D. Systems, Inc.
Vehicle Asset Communicator
FCC ID: N5VVAC01
May 12, 1999

Description: This is a report to support a request for an original grant of equipment authorization.

Equipment Type: Low Power Communications Device Transmitter

Report prepared for:

I.D. Systems, Inc.
90 William Street
New York, NY 10038
Phone: 212-677-3800
Fax: 212-677-3802

Report prepared by:

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Letter of Agency

I.D. SYSTEMS, INC.

One Silicon Alley Plaza 90 William Street New York, New York 10038
Phone: 212-677-3800 Fax: 212-677-3802

LETTER OF AGENCY

I, an officer of I.D. Systems, Inc., do hereby authorize Curtis-Straus, LLC to act on our behalf in front of the Federal Communications Commission with respect to all matters relating to certification of equipment under Part 15 of the FCC Rules until further notice.

I further certify that no party (as defined in #1,2002(b) of CFR 47, 1992) to this application, including myself, is subject to denial of federal benefits, that includes FCC benefits, pursuant to section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 853(a).

Certified by:

Jeffrey M. Jaffe
Chief Operating Officer/General Counsel

8/11/1998

Introduction

This report is an application for Certification of a Transmitter operating pursuant to Part 15.249 of the FCC Rules, Code of Federal Regulations 47. The model covered by this report is the Vehicle Asset Communicator. This report is designed to demonstrate the compliance of this device with the requirements outlined in Part 15 of CFR 47 using the methods outlined in Part 2 of CFR 47. The current revision date, October 1,1997, of each Part has been used for technical requirements.

The confidential information and descriptions included in this application are detailed descriptions of the products, block diagrams, component specifications, and schematic diagrams. We hereby respectfully request under the provision of section 0.457d of the code that the documents listed below be held confidential.

Exhibit 6.1: Technical Description and Block Diagram

Exhibit 6.2: Schematics

Exhibit 6.3: Bill of Materials

I.D. Systems, Inc. is requesting that the Technical Description, Block Diagram, Schematics and Bill of Materials be kept confidential in the FCC application because of the proprietary design developed by I.D. Systems, Inc. that is unique to the industry.

EXHIBIT 1:

1.0 Statement of Conformity

The I.D. Systems, Inc. Vehicle Asset Communicator has been found to conform with the following parts of the 47 CFR as detailed below:

Part 2	Part 15	Comments
	15.15(b)	The product contains no user accessible controls that increase transmission power above allowable levels.
2.925	15.19	The label is shown in the label exhibit.
	15.21	Information to the user is provided via a leaflet packaged with the product (see Instruction Manual Exhibit 7.0)
	15.27	No special accessories are required for compliance.
	15.203	This device may only be installed by an authorized professional installer.
	15.205 15.209	The fundamental is not in a Restricted band and the spurious and harmonic emissions in the Restricted bands comply with the general emission limits of 15.209.
	15.207	The unit is battery operated and the line conducted limits are, therefore, not applicable.
	15.249(a)	The unit complies with the field strength limits of the 15.249(a) table including the 20dB peak restriction of 15.35(b) and 15.249(d).
	15.249(c)	The unit complies with the field strength limits of the 15.209(a) table.

EXHIBIT 2

2.0 General Description

2.1 Product Description

The VAC is a transceiver device that is attached to a vehicle. It can monitor vehicle usage, fuel level and operator. The unit relays this information to a system monitor which then relays this information to a computer. The unit is operated off of the vehicles battery and has no other connections, other than the RF link, to any other device.

Unit Tested:
Model Number: Vehicle Asset Communicator
Serial Number: Prototype

2.2 Related Submittal(s) Grants

There are no other approvals required for this device.

2.3 Test Methodology

Radiated emission testing was performed according to the procedures in ANSI C63.4 (1992). Radiated testing was performed at an antenna to EUT distance of 3 meters below 1 GHz, and at a distance of 3 or 1 meter(s) above 1 GHz. The actual test distance used is noted in the test data sheets. The device's performance was investigated to 10 times the fundamental frequency. A DC power supply was used during the testing. Although the device does contain voltage regulating circuitry, the emissions in each configuration were maximized and the supply swept to ±15% of the nominal voltage in the maximized configuration just prior to the reading being taken to insure that maximum emissions were recorded.

All other performance tests were made in accordance with the procedures outlined in Part 15 of CFR 47. The applicable sections provided under Part 15 are provided in the measurement section of this report, Exhibit 3.

2.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located at 527 Great Road, Littleton, MA 01460. Site "T" was used. This test facility has been fully described in a report submitted to your office, and a letter from your office dated August 8, 1997 verified receipt of this report and confirmed compliance of this site. Please reference your file # 31040/SIT 1300F2 should you have any questions regarding the test site construction.

2.5 Test Equipment Used

SPECTRUM ANALYZER(S)			
WHITE 8593E 9 kHz-22 GHz	HP	S/N:3547U01252	Calibration Due:05-JAN-00
ANTENNA(S)			
RED 3143 Biconilog 30 MHz-1.1 GHz	EMCO	S/N:1270	Calibration Due:28-MAY-99
BLACK 3115 Horn Antenna	EMCO 1-18 GHz	S/N:9703-5148	Calibration Due:16-MAR-99
PREAMPLIFIER(S)			
BLUE ZFL-1000-LN RF Preamplifier 0.05 - 2000 MHz	MiniCircuits		Calibration Due:14-OCT-99
WHITE SMC-12A RF Preamplifier 2000 - 18000 MHz	MITEQ	S/N:426643	Calibration Due:30-OCT-99
OPEN AREA TEST SITE(S)			
SITE "T"			Calibration Due:28-MAY-99

Unless otherwise noted the calibration interval is one year. All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

EXHIBIT 3

3.0 Measurement Results

3.1 Operating Frequency

The devices operating frequency is 905.6 MHz.

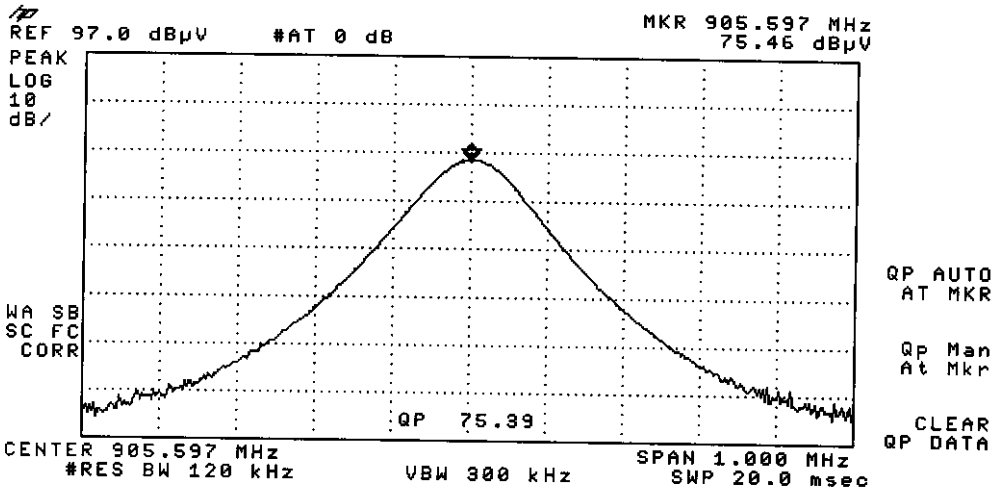
3.2 Electric Field Strength Radiation Measurements

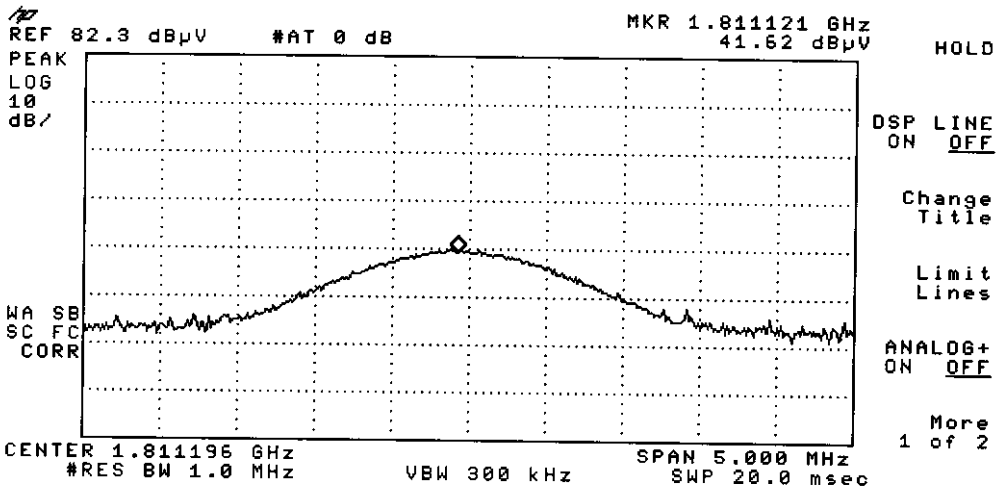
Data was obtained using the procedures outlined in ANSI C63.4 (1992). All signals from the transmitter within 10 dB of the emission limit are reported in the following data table.

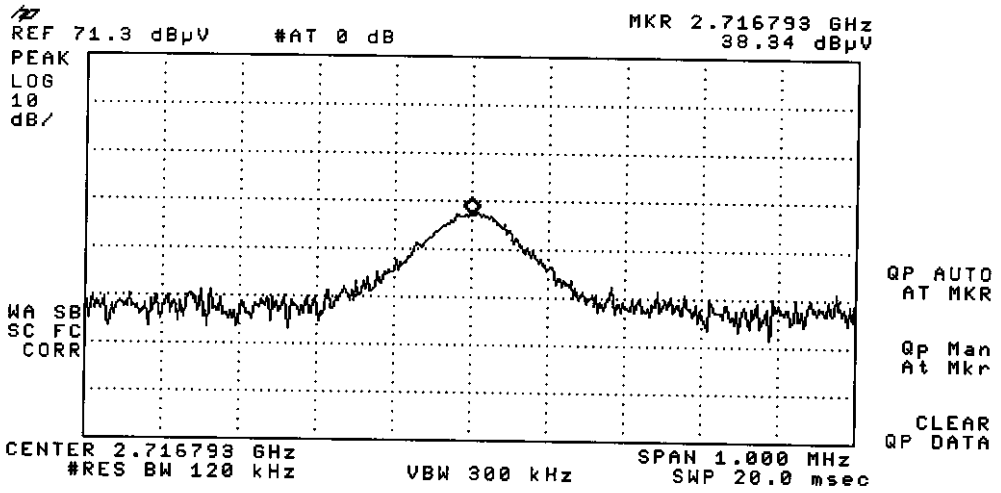
Radiated Emissions Chart — *Curtis-Straus LLC*

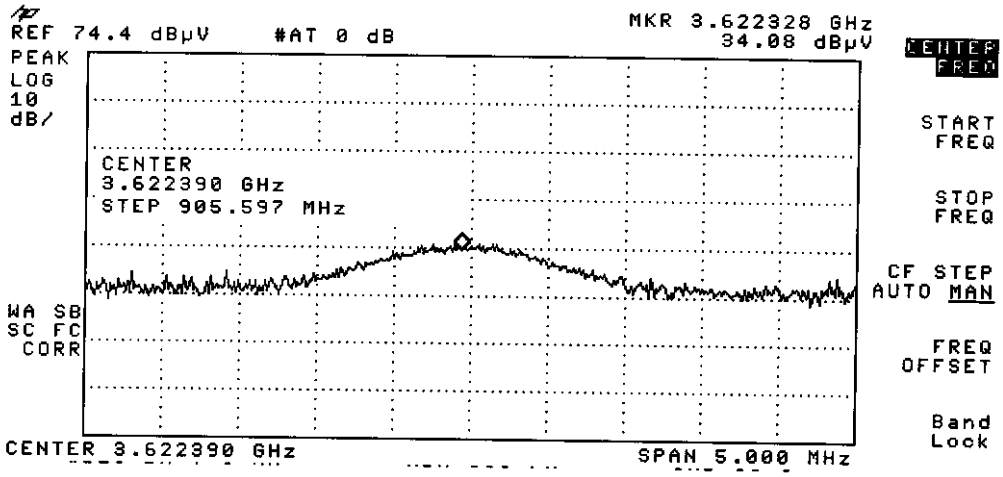
Date: 4/14/98 **Company:** ID Systems **Distance:** 3m / 1m
Engineer: Michael Buchholz **EUT Desc:** VAC **Table No:** 1
Notes: Full Scan FCC Part 15C **Work Order:** 980238

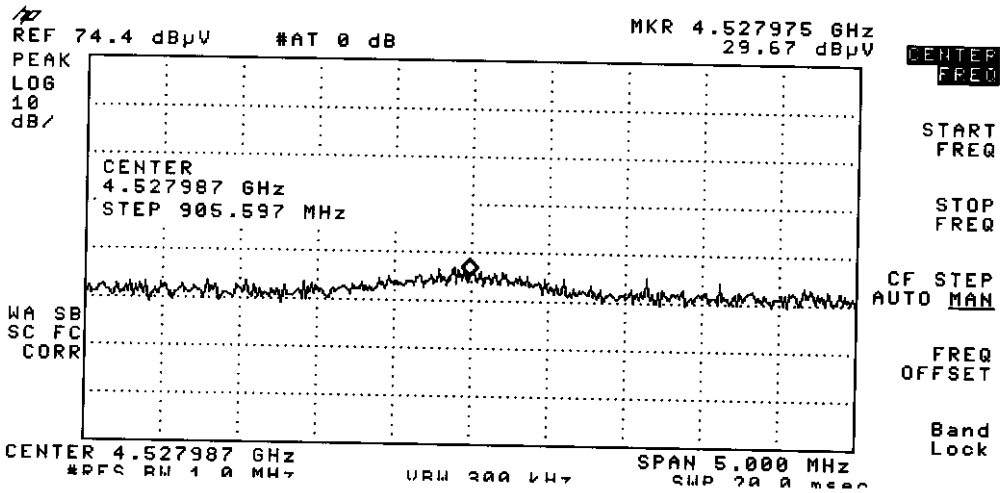
Polarity (H/V)	Frequency (MHz)	Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Distance Factor (dBµV/m)	Averaging Factor (dB)	Adjusted Reading (dBµV/m)	FCC Class B Limit (dBµV/m)	FCC Class B Margin (dB)	FCC Class B Result (Pass/Fail)
Transmit Mode (to 10th Harmonic)											
H	905.6	75.4	21.7	22.7	0.7	0.0	0.0	77.1	94.0	-16.9	Pass
V	1811.2	41.9	18.4	28.0	1.2	0.0	6.7	46.0	54.0	-8.0	Pass
V	2716.7	38.5	19.1	30.8	1.5	0.0	6.7	45.0	54.0	-9.0	Pass
H	3622.3	34.9	18.8	32.9	1.9	10.0	6.7	34.2	54.0	-19.8	Pass
H	4527.9	27.5	18.6	34.5	2.2	10.0	6.7	28.9	54.0	-25.1	Pass
V	5433.5	26.8	18.3	36.2	2.5	10.0	6.7	30.5	54.0	-23.5	Pass
H	6339.1	26.6	18.1	36.5	2.7	10.0	6.7	31.0	54.0	-23.0	Pass
H	7244.8	30.6	17.8	37.9	3.0	10.0	6.7	37.0	54.0	-17.0	Pass
H	8150.4	31.7	17.6	38.9	3.2	10.0	6.7	39.5	54.0	-14.5	Pass
H	9056.0	30.5	17.3	39.7	3.5	10.0	6.7	39.7	54.0	-14.3	Pass
Receive Mode (to 5th Harmonic)											
V	976.6	41.8	21.6	22.7	0.8	0.0	0.0	43.7	54.0	-10.3	Pass
H	1953.2	25.5	0.0	28.7	1.2	10.0	0.0	45.4	54.0	-8.6	Pass
H	2929.8	24.2	0.0	31.6	1.6	10.0	0.0	47.4	54.0	-6.6	Pass
H	3906.4	35.3	18.8	33.1	2.0	10.0	0.0	41.6	54.0	-12.4	Pass
V	4883.0	33.3	18.5	35.3	2.3	0.0	0.0	52.4	54.0	-1.6	Pass
Other Spurious 30-10000MHz											
None detected within 10dB of the limit											

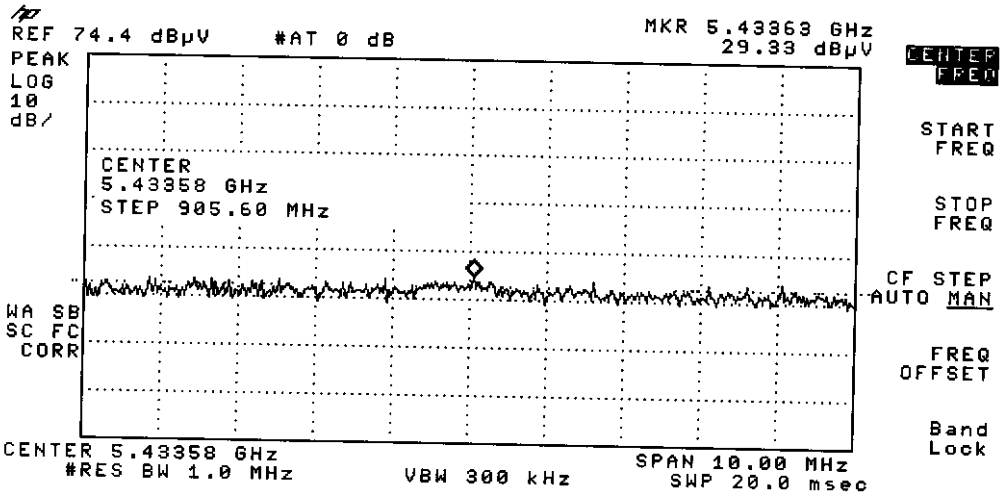

REF 97.0 dBµV
#AT 0 dB
MKR 905.597 MHz
75.46 dBµV
PEAK
LOG
10
dB/
WA SB
SC FC
CORR
QP AUTO
AT MKR
Qp Man
At Mkr
CLEAR
QP DATA
QP 75.39
CENTER 905.597 MHz
#RES BW 120 kHz
VBW 300 kHz
SPAN 1.000 MHz
SWP 20.0 msec

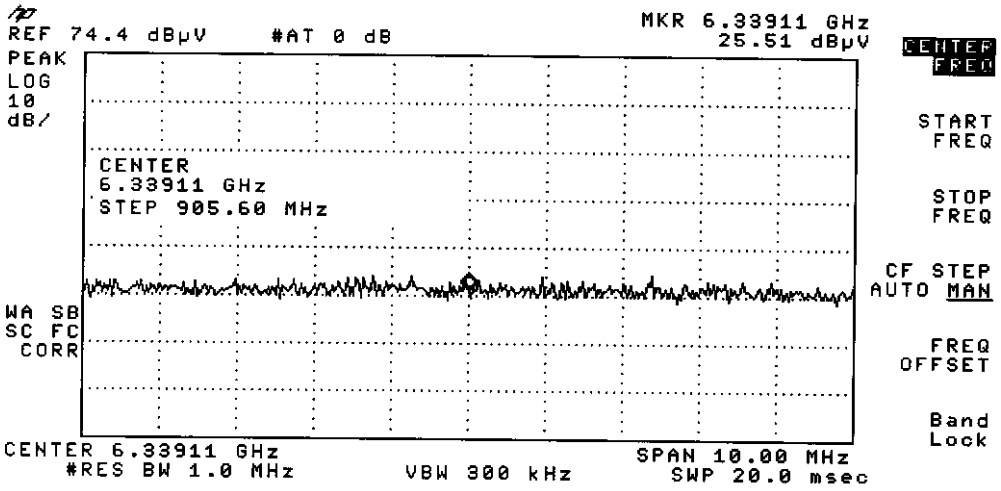

REF 82.3 dBµV
#AT 0 dB
MKR 1.811121 GHz
41.62 dBµV
HOLD
PEAK
LOG
10
dB/
DSP LINE
ON OFF
Change
Title
Limit
Lines
WA SB
SC FC
CORR
ANALOG+
ON OFF
More
1 of 2
CENTER 1.811196 GHz
#RES BW 1.0 MHz
VBW 300 kHz
SPAN 5.000 MHz
SWP 20.0 msec

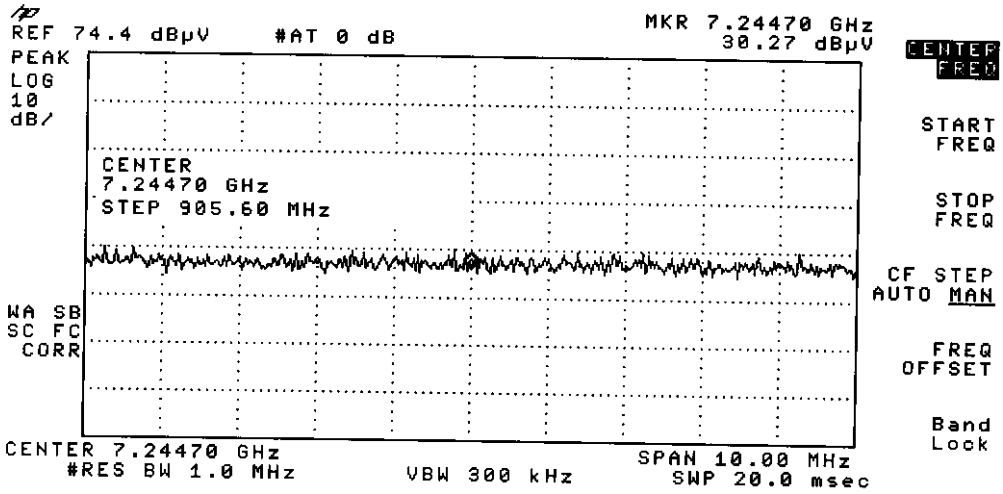

REF 71.3 dBµV
#AT 0 dB
MKR 2.716793 GHz
38.34 dBµV
PEAK
LOG
10
dB/
WA SB
SC FC
CORR
QP AUTO
AT MKR
Qp Man
At Mkr
CLEAR
QP DATA
CENTER 2.716793 GHz
#RES BW 120 kHz
VBW 300 kHz
SPAN 1.000 MHz
SWP 20.0 msec

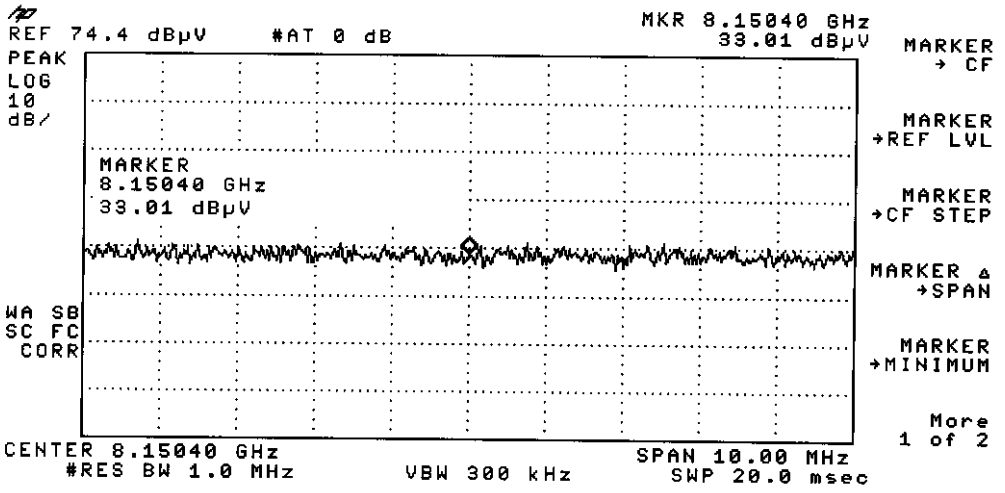

REF 74.4 dBµV
#AT 0 dB
MKR 3.622328 GHz
34.08 dBµV
PEAK
LOG
10
dB/
CENTER
3.622390 GHz
STEP 905.597 MHz
WA SB
SC FC
CORR
CENTER 3.622390 GHz
SPAN 5.000 MHz
CENTER FREQ
START FREQ
STOP FREQ
CF STEP
AUTO MAN
FREQ OFFSET
Band Lock

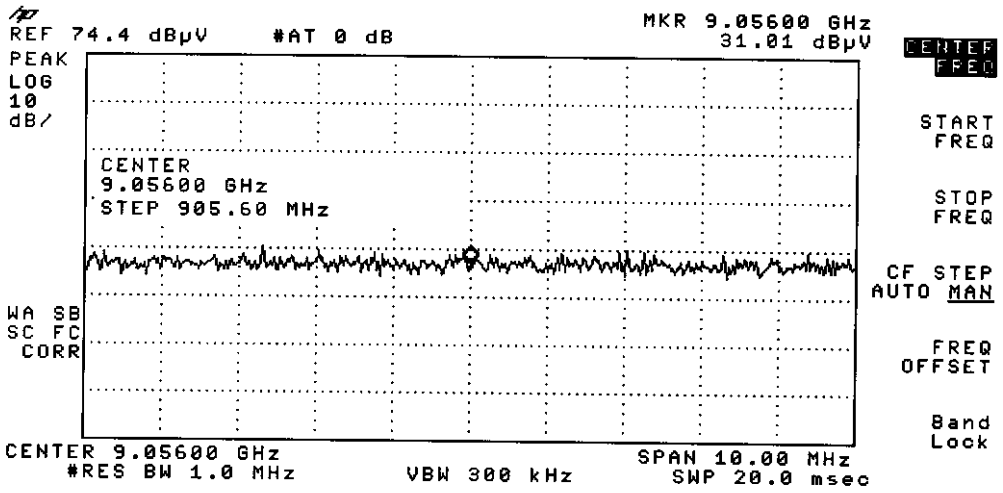

REF 74.4 dBµV
#AT 0 dB
MKR 4.527975 GHz
29.67 dBµV
PEAK
LOG
10
dB/
CENTER
4.527987 GHz
STEP 905.597 MHz
WA SB
SC FC
CORR
CENTER FREQ
START FREQ
STOP FREQ
CF STEP
AUTO MAN
FREQ OFFSET
Band Lock
CENTER 4.527987 GHz
#RES BW 1.0 MHz
VBW 300 kHz
SPAN 5.000 MHz
SWP 20.0 msec


REF 74.4 dBµV
#AT 0 dB
MKR 5.43363 GHz
29.33 dBµV
PEAK
LOG
10
dB/
CENTER
5.43358 GHz
STEP 905.60 MHz
WA SB
SC FC
CORR
CENTER 5.43358 GHz
#RES BW 1.0 MHz
VBW 300 kHz
SPAN 10.00 MHz
SWP 20.0 msec
CENTER FREQ
START FREQ
STOP FREQ
CF STEP
AUTO MAN
FREQ OFFSET
Band Lock


REF 74.4 dBµV
#AT 0 dB
MKR 6.33911 GHz
25.51 dBµV
PEAK
LOG
10
dB/
CENTER
6.33911 GHz
STEP 905.60 MHz
WA SB
SC FC
CORR
CENTER FREQ
START FREQ
STOP FREQ
CF STEP
AUTO MAN
FREQ OFFSET
Band Lock
CENTER 6.33911 GHz
#RES BW 1.0 MHz
VBW 300 kHz
SPAN 10.00 MHz
SWP 20.0 msec

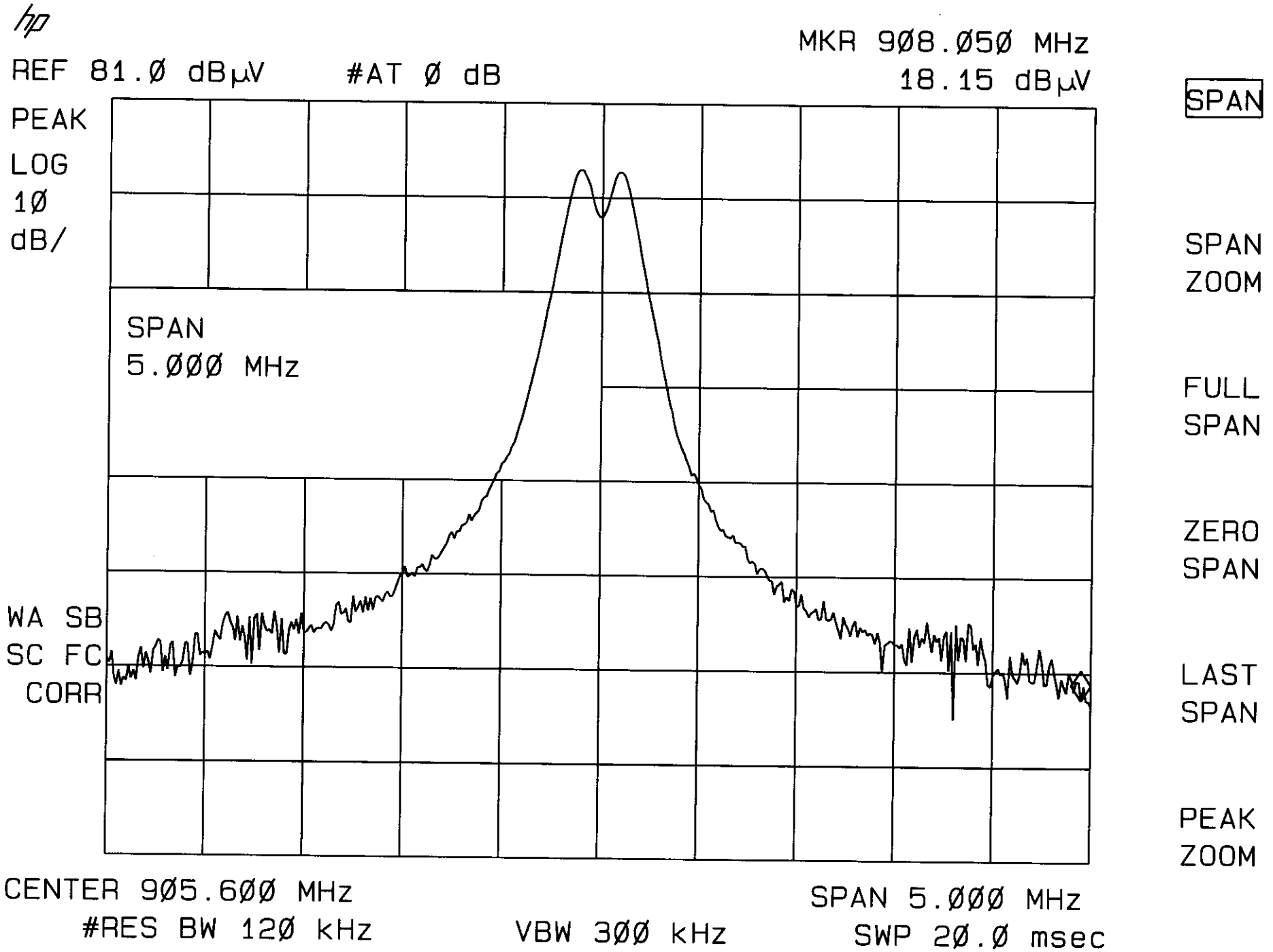

REF 74.4 dBµV
#AT 0 dB
MKR 7.24470 GHz
30.27 dBµV
PEAK
LOG
10
dB/
CENTER
7.24470 GHz
STEP 905.60 MHz
WA SB
SC FC
CORR
CENTER FREQ
START FREQ
STOP FREQ
CF STEP
AUTO MAN
FREQ OFFSET
Band Lock
CENTER 7.24470 GHz
#RES BW 1.0 MHz
VBW 300 kHz
SPAN 10.00 MHz
SWP 20.0 msec


REF 74.4 dBµV
#AT 0 dB
MKR 8.15040 GHz
33.01 dBµV
PEAK
LOG
10
dB/
MARKER
8.15040 GHz
33.01 dBµV
WA SB
SC FC
CORR
MARKER
→ CF
MARKER
→REF LVL
MARKER
→CF STEP
MARKER Δ
→SPAN
MARKER
→MINIMUM
More
1 of 2
CENTER 8.15040 GHz
#RES BW 1.0 MHz
VBW 300 kHz
SPAN 10.00 MHz
SWP 20.0 msec


REF 74.4 dBµV
#AT 0 dB
MKR 9.05600 GHz
31.01 dBµV
PEAK
LOG
10
dB/
CENTER
9.05600 GHz
STEP 905.60 MHz
WA SB
SC FC
CORR
CENTER FREQ
START FREQ
STOP FREQ
CF STEP
AUTO MAN
FREQ OFFSET
Band Lock
CENTER 9.05600 GHz
#RES BW 1.0 MHz
VBW 300 kHz
SPAN 10.00 MHz
SWP 20.0 msec

3.3 Occupied Bandwidth Measurements

A plot was obtained with the unit operating with modulation. The bandwidth observed does not extend outside of the operating band 902-928MHz.

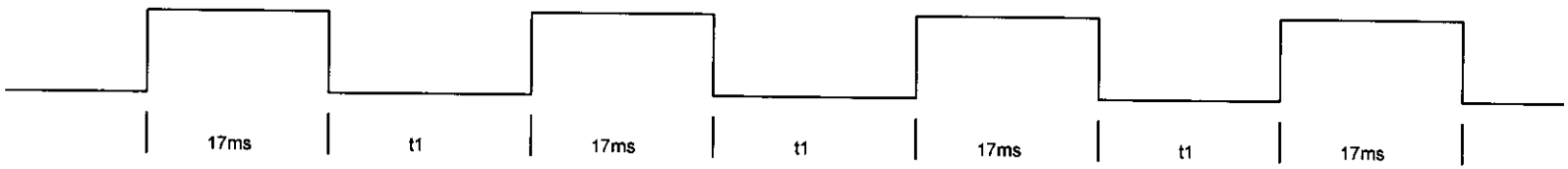

REF 81.Ø dBµV
#AT Ø dB
MKR 9Ø8.Ø5Ø MHz
18.15 dBµV
PEAK
LOG
1Ø
dB/
SPAN
5.ØØØ MHz
WA SB
SC FC
CORR
CENTER 9Ø5.6ØØ MHz
#RES BW 12Ø kHz
VBW 3ØØ kHz
SPAN 5.ØØØ MHz
SWP 2Ø.Ø msec
SPAN
SPAN
ZOOM
FULL
SPAN
ZERO
SPAN
LAST
SPAN
PEAK
ZOOM

3.4 Averaging factor derivation based on worst case 100mS period.

Attached is a timing diagram for the device. As can be seen, the worst case 100mS second period results in an averaging factor of 6.7dB.

Ave Factor = 20 x log (on time / total time)

Ave Factor = 20 x log (17 / 37) = ***-6.7dB***



t1 > = 20ms

Title	Timing Diagram for Transmission Sequence of VAC
Size A	Document Number {Doc}
Rev	{RevCode}
Date:	Tuesday, March 02, 1999
Sheet	1 of 1

EXHIBIT 4

4.0 Equipment Photographs

4.1 External

EXHIBIT 6

6.0 Technical Specifications

6.1 Technical Description and Block Diagram

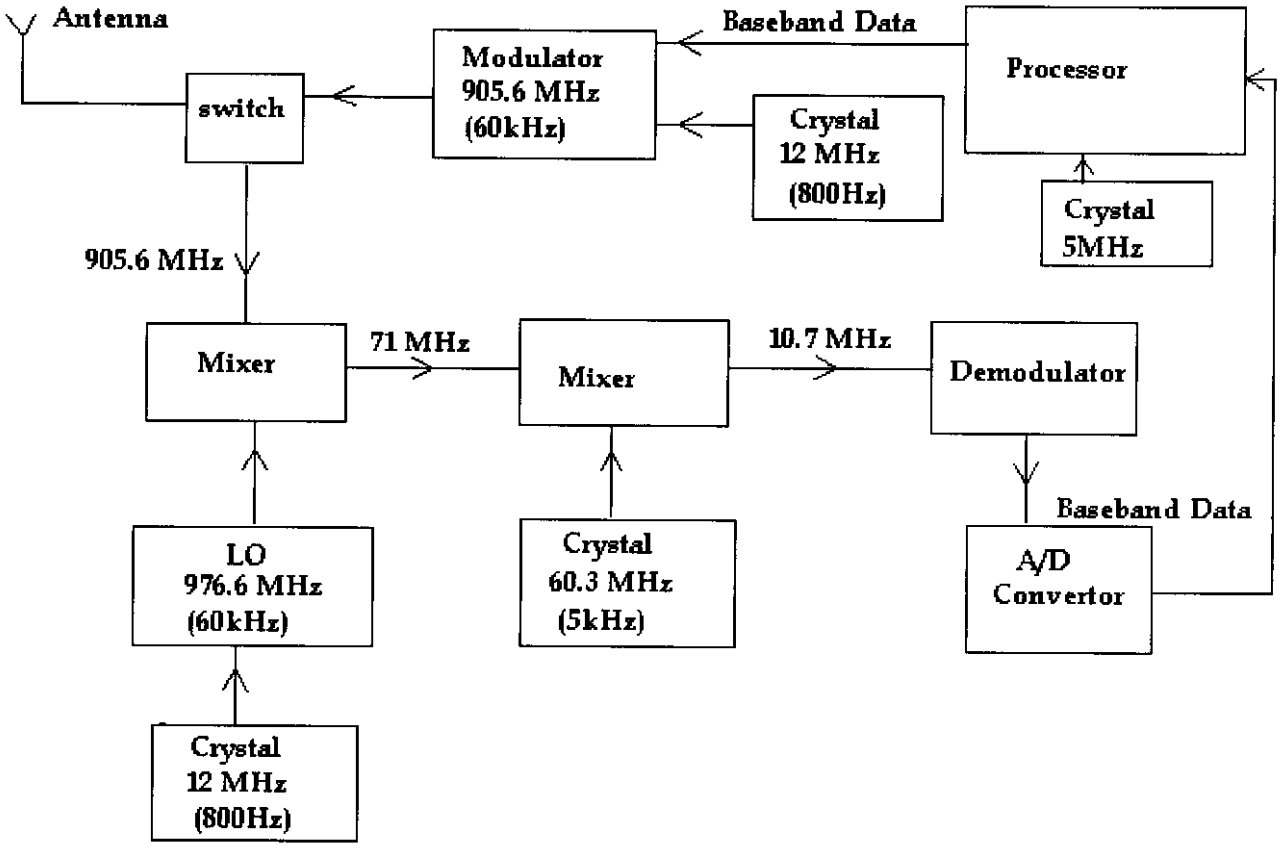
DESCRIPTION OF VEHICLE ASSET COMMUNICATOR

9/16/1998

VAC Operation

The Vehicle Asset Communicator or VAC is an electronic unit that is attached to a vehicle. Its functionality is software controlled so that the unit can be programmed to provide vehicle access control, monitor vehicle usage and provide management a means of assigning vehicles to specific operators.
The VAC consists of a transceiver, antenna, power adapter board, magnetic card reader, keypad and a liquid crystal display (LCD). The transceiver communicates at 905.6MHz to a fixed system monitor that is mounted on a wall. The antenna is a quarter wave helical wound stub antenna that is connected to a SMA bulkhead connector fastened to the chases, a coaxial cable runs from the bulkhead connector to a MCX connector on the PCB board. When an operator needs to use the vehicle, he/she swipes his/her magnetic card through the card reader, the VAC then relays the operator's magnetic card id and time to the system monitor where the operator's id is validated. Only an authorized operator can start a vehicle because the VAC interfaces with and controls the vehicle's ignition system. The system monitor keeps track of which operator is using which vehicle, this information can be downloaded to a computer through a modem attached to the system monitor. This allows management to collect vehicle usage data. The VAC is powered via the device's power adapter board which interfaces with the vehicle's battery power supply. The power adapter board has the capability of sensing weather the vehicle is in motion and relays this information to the device's memory where the amount of motion time and idle time are stored. When the operator is finished with the vehicle the VAC conveys the vehicle usage data to the system monitor, where it is stored and can be accessed with a standard computer via a modem link. Below is a block diagram of the VAC's transceiver, typical tuning ranges are given in parenthesis.

Transceiver Block Diagram



6.2 Schematics

6.3 Bill of Materials

VAC

~~Wake-Up Module~~ **Rev B Bill of Materials**

P/N: 801-0013-01 Rev C

Revised: 10/1/98

Gerber data/PCB: 375-0013-01 Rev C01

Item	Quantity	Reference	Part	Mfg	Mfg Part Num	IDS Part Num	Package
1	6	C2,C31,C5,C8,C22,C36	0.01 uF	Panasonic	ECU-V1H103KBG	541-0103-01	0805 Chip
2	9	C3,C7,C9,C23,C24,C27	1000 pF	Panasonic	ECU-V1H102JCX	541-0102-01	0805 Chip
		C6,C20,C34					
3	3	C30,C4,C35	22 uF	Panasonic	ECS-T1ED226R	566-0226-01	D size
4	11	C10,C11,C12,C16,C25,C29	0.1 uF	Cal-Chip	GMC21X7R104K50N	541-0104-01	0805 Chip
		C37,C38,C39,C40,C41					
5	1	C13	DNL	Johanson	2320-4	571-2320-01	
6	6	C14,C17,C18,C19,C28,C42	100 pF	Panasonic	ECU-V1H101JCG	541-0101-01	0805 Chip
7	3	C15,C33,C21	27 pF	Panasonic	ECU-V1H270JCG	541-0270-01	0805 Chip
8	1	C32	10 pF	Panasonic	ECU-V1H100DCN	541-0100-01	0805 Chip
9	1	J1	CON20A	Samtec	TSW-110-14-L-D	325-0010-01	
10	1	J2	MCX connector	Johnson Comp.	133-3701-211	325-0011-01	Straight Con.
11	1	J3	CON8	Samtec	TSM-108-02-L-SV	325-0012-01	
12	1	L1	INDUCTOR 10nH	Coilcraft	1008HS-100XKBC	581-0100-01	1008 Chip
13	1	R17	62	Panasonic	ERJ-6GEYJ620	501-0620-01	0805 Chip
14	1	R4	97.6K 1%	Panasonic	ERJ-6ENF9762	501-9762-01	0805 Chip
15	1	R2	301K 1%	Panasonic	ERJ-6ENF3013	501-3013-01	0805 Chip
16	1	R3	270	Panasonic	ERJ-6GEYJ271	501-0271-01	0805 Chip
17	3	R5,R6,R11	10K	Panasonic	ERJ-6GEYJ103	501-0330-01	0805 Chip
18	1	R7	24K	Panasonic	ERJ-6GEYJ243	501-0243-01	0805 Chip
19	4	R8,R12,R16,R26	1MEG	Panasonic	ERJ-6GEYJ105	501-0105-01	0805 Chip
20	1	R9	3.6K	Panasonic	ERJ-6GEYJ362	501-0362-01	0805 Chip
21	2	R27,R10	1K	Panasonic	ERJ-6GEYJ102	501-0102-01	0805 Chip
22	1	R13	100	Panasonic	ERJ-6GEYJ101	501-0101-01	0805 Chip
23	1	R14	15K	Panasonic	ERJ-6GEYJ153	501-0153-01	0805 Chip
24	1	R15	DNL	Bourns	3342G	526-3342-01	
25	1	R18	130	Panasonic	ERJ-6GEYJ131	501-0131-01	0805 Chip
26	1	R19	75	Panasonic	ERJ-6GEYJ750	501-0750-01	0805 Chip
27	2	R21,R20	91	Panasonic	ERJ-6GEYJ910	501-0910-01	0805 Chip
28	6	R22,R23,R24,R25,R29,R32	100K	Panasonic	ERJ-6GEYJ104	501-0104-01	0805 Chip
29	1	R30	51	Panasonic	ERJ-6GEYJ510	501-1103-01	0805 Chip
30	1	R28	DNL	Panasonic	ERJ-6GEYJ510	501-0510-01	0805 Chip
31	1	R31	20K	Panasonic	ERJ-6GEYJ203	501-0203-01	0805 Chip
32	1	S1	SW DIP-3	C&K	SD03H0SK	406-0004-01	SOIC 6
33	2	U7,U1	LTF3216L-FR90G	Toko	LTF3216L-FR90G	591-0003-01	1206 Chip
34	2	U2, U10	MIC2951	Micrel	MIC2951-03BM	701-0003-01	SOIC 8
35	1	U3	VAM-6	Mini-Circuits	VAM-6	701-0015-01	
36	1	U4	AT-220	M/A Comm	AT-220	701-0016-01	SOIC 16
37	1	U5	MC145191F	Motorola	MC145191F	701-0017-01	SOIC 20
38	1	U6	MQE001-902	Murata	MQE001-902	650-0003-01	
39	1	U8	XC1736D-SO8	Xilinx	XC1736D-SO8I	775-0004-01	SOIC 8
40	1	U9	XC3042A	Xilinx	XC3042A-7VQ100I	775-0005-01	QFP 100
41	1	Y1	XTAL,12MHZ	US Crystal	USMX-18-120	660-0005-01	USMX-1S

42	1	Y2	Ceramic Res, 5MHz	Panasonic	EF0P5004B5	660-0001-01	

EXHIBIT 7

7.0 Instruction Manual

There is no manual supplied with this unit. The following required FCC user's manual warnings will appear on a leaflet packaged with the product.

Federal Communications Commission (FCC) Notice

This equipment has been tested and been found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used properly, may cause harmful interference to radio communications. However, this is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, you are encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.
Increase the separation between the equipment and receiver.
Connect the equipment to an outlet on a different circuit than the one to which the receiver is connected.
Consult an authorized service person for help.

Note: Unauthorized modification of this device could void the user's authority to operate this equipment.

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