ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT
CERTIFICATION TO FCC PART 15 REQUIREMENTS

For

300 MHz WATERPROOF TRANSMITTER

MODEL NO: Z-TECH

FCC ID NO: KFRZ-TECH

REPORT NO: 00E9007

ISSUE DATE: JANUARY 12, 2001

Prepared for

VISION AUTOMOBILE ELECTRONICS INDUSTRIAL CO., LTD.
NO. 17, ALLEY 92, LANE 189, SEC. 1,
AN CHUNG RD., TAINAN,
TAIWAN, R.O.C.

Prepared by

COMPLIANCE ENGINEERING SERVICES, INC.
No. 199, CHUNG SHENG ROAD
HSIN TIEN CITY, TAIPEI, TAIWAN R.O.C.
TEL: (02) 2217-0894
FAX: (02) 2217-1254

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1. VERIFICATION OF COMPLIANCE

COMPANY NAME: VISION AUTOMOBILE ELECTRONICS INDUSTRIAL CO., LTD.
NO. 17, ALLEY 92, LANE 189, SEC. 1,
AN CHUNG RD., TAINAN,
TAIWAN, R.O.C.

CONTACT PERSON: WANG TSUNG CHIN / ENGINEER

TELEPHONE NO.: 06-255-1269

EUT DESCRIPTION: 300 MHz WATERPROOF TRANSMITTER

MODEL NAME/NUMBER: Z-TECH

FCC ID: KFRZ-TECH

DATE TESTED: DECEMBER 15 , 2000 & JANUARY 12, 2001

REPORT NUMBER: 00E9007

TYPE OF EQUIPMENT	SECURITY EQUIPMENT (INTENTIONAL RADIATOR)
EQUIPMENT TYPE	300 MHz WATERPROOF TRANSMITTER
MEASUREMENT PROCEDURE	ANSI C63.4 / 1992
LIMIT TYPE	CERTIFICATION
FCC RULE	CFR 47, PART 15

The above equipment was tested by Compliance Certification Services for compliance with the requirements set forth in the FCC CFR 47, PART 15. The results of testing in this report apply to the product/system which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties. **Warning** : This document reports conditions under which testing was conducted and results of tests performed. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification will constitute fraud and shall nullify the document.

Rick Yeo

RICK YEO / EMC MANAGER
COMPLIANCE ENGINEERING SERVICES, INC.

2. Product Description

Fundamental Frequency	**300 MHz**
Power Source	**6V Battery**
Transmitting Time	**Periodic ≤ 5 seconds**
Associated Receiver	**FCC ID: DCP7FG800**

3. Test Facility

The open area test sites and conducted measurement facilities used to collect the radiated data are located at No. 199, Chung Sheng Road, Hsin Tien City, Taipei, Taiwan R.O.C. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

4. Measurement Standards

The site is constructed and calibrated in conformance with the requirements of ANSI C63.4/1992.

5. Test Methodology

For an intentional radiator, the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 KHz, up to at least the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower. (CFR 47 Section 15.33)

6. Measurement Equipment Used

Manufacturer	Model Number	Description	Cal Due Date
HP	8595EM	Spectrum Analyzer	01/01
R & S	ESBI-RF/1005.4300.52	EMI Test Receiver (20Hz-5GHz)	11/01
EMCO	3115	Antenna (1-18GHz)	09/01
EMCO	3142	Antenna (30-2000MHz)	06/01
T.E.C.	PA-102	Amplifier(30-2000MHz)	05/01
MITEQ	NSP2600-44	Amplifier(1-26GHz)	12/01

7. POWERLINE RFI LIMIT

CONNECTED TO AC POWER LINE	SECTION 15.207
CARRIER CURRENT SYSTEM IN THE FREQUENCY RANGE OF 450 kHZ TO 30 MHz	SECTION 15.205 AND SECTION 15.209, 15.221, 15.223, 15.225 OR 15.227, AS APPROPRIATE.
BATTERY POWER	NO REQUIRED.

8. RADIATED EMISSION LIMITS

GENERAL REQUIREMENTS	SECTION 15.209
RESTRICTED BANDS OF OPERATION	SECTION 15.205
PERIODIC OPERATION IN THE BAND 40.66 -40.70 MHz AND ABOVE 70 MHz.	SECTION 15.231

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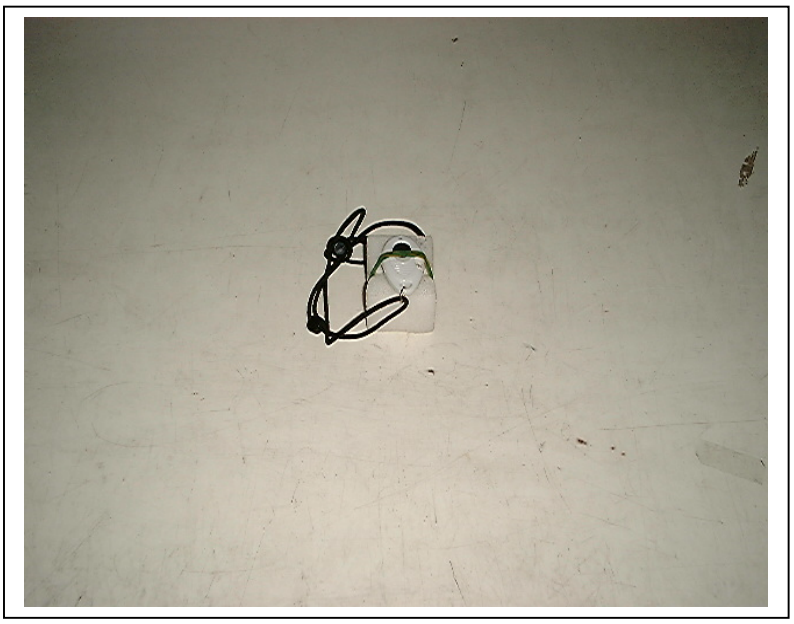
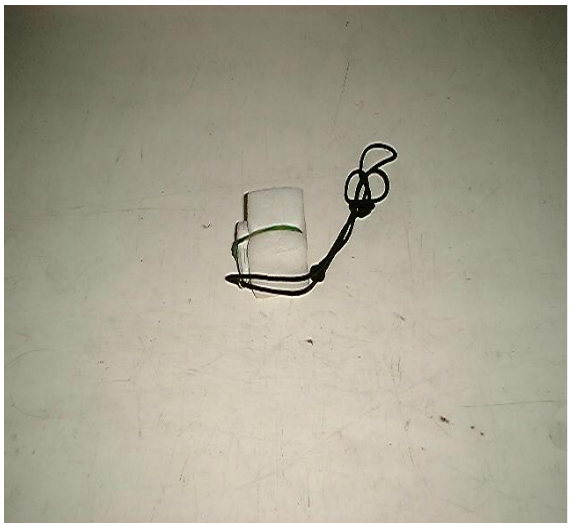
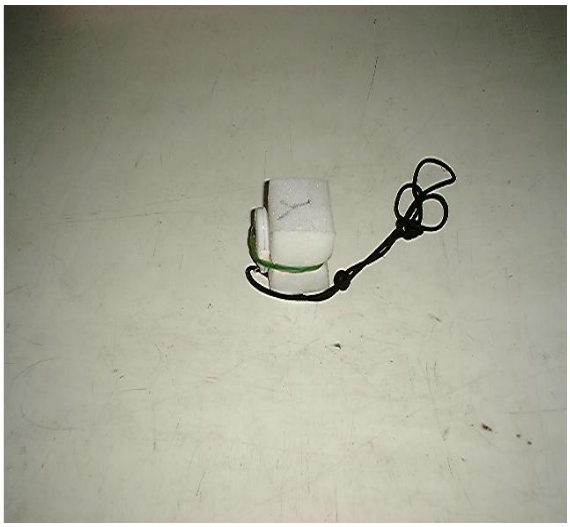
9. SYSTEM TEST CONFIGURATION

Use a block of foam and combined it with EUT wrapping rubber band around it. This way it can test X.Y, and Z axis. To activate continuous transmission, place a small plastic block between rubber band and EUT push button.







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10. Test Procedure
Radiated Emissions, 15.231(4)(b)

Test Set-up for frequency range 30 – 1000 MHz

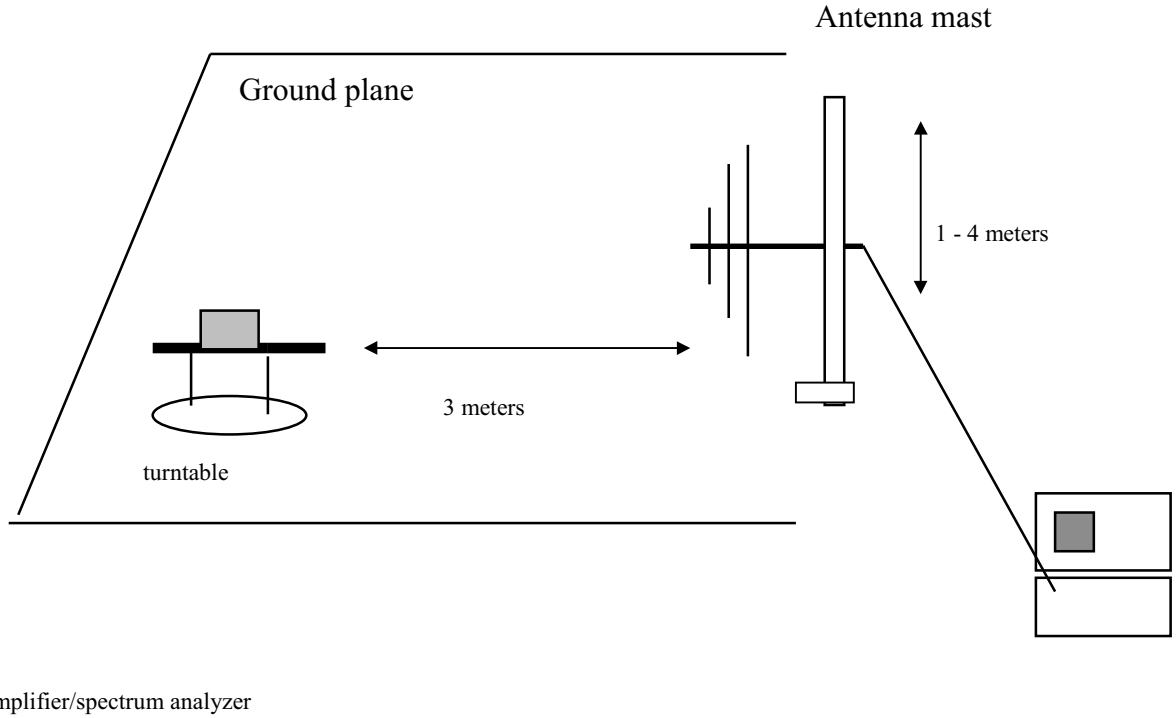

Fig. 1

1. The EUT was placed on a wooden table on the outdoor ground plane. The search antenna was placed 3-meters from the EUT.

2. The turntable was slowly rotated to locate the direction of maximum emission at each emission falling in the restricted bands of 15.205. The EUT was moved throughout the XY, XZ, and YZ planes to maximize emissions received by the search antenna.

3. Once maximum direction was determined, the search antenna was raised and lowered in both vertical and horizontal polarizations. The maximum readings so obtained are recorded in the data listed below.

Test set-up for measurements above 1GHz

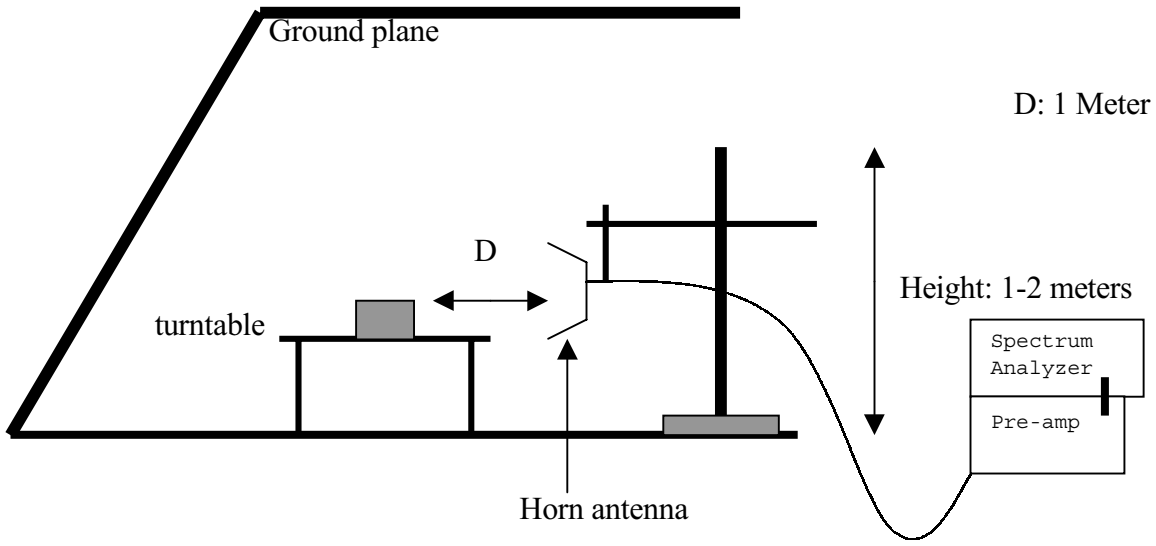

FIG. 2

1. The EUT was placed on a wooden table on the outdoor ground plane. The search antenna was placed 1-meters from the EUT. The EUT antenna was mounted vertically as per normal installation.

2. The turntable was slowly rotated to locate the direction of maximum emission at each emission falling in the restricted bands of 15.205. The EUT was moved throughout the XY, XZ, and YZ planes to maximize emissions received by the search antenna.

3. Once maximum direction was determined, the search antenna was raised and lowered in both vertical and horizontal polarizations. The maximum readings so obtained are recorded in the data listed below.

11. Equipment Modifications

To achieve compliance to FCC Section 15.231 technical limits, the following change(s) were made during compliance testing:

Mod. #1 Change Resistance R2 to 120Ω.
Mod. #2 Change Resistance R1 to 82kΩ.

12. TEST RESULT

Powerline RFI Class B	Eut	Radiated Emission Limits	Eut
SECTION 15.207		SECTION 15.209	X
SECTION 15.205, 15.209, 15.221, 15.223, x 15.225 OR 15.227		SECTION 15.205	
BATTERY POWER	X	SECTION 15.231 (b)	X
		SECTION 15.231 (e)	

12.1 Maximum Modulation Percentage (M%)

CALCULATION:

Average Reading = Peak Reading (dBuV/m)+ 20log (Duty Cycle)

In order to determine possible Maximum Modulation percentage, alternations are made to the EUT. We measured:

WHERE	1 Period	=20.666 mS.
	Long pulse	=0.7822 mS
	Short pulse	=0.08 mS
	No of Long pulse	=8
	No of Short pulse	=10

Duty Cycle = (N1L1+N2L2+…+Nn-1Ln-1+NnLn)/100 or T

Duty Cycle = ((8X0.7822)+(10X0.08)/20.666=0.3415=34.15% or –9.332dB

12.2 The Emissions Bandwidth

The bandwidth of the emissions were investigated per 15.231(c)

Center Frequency	Measured	Limits
300 MHz	**517.7 kHz < (refer to plot)**	**300X0.25%=750 kHz**

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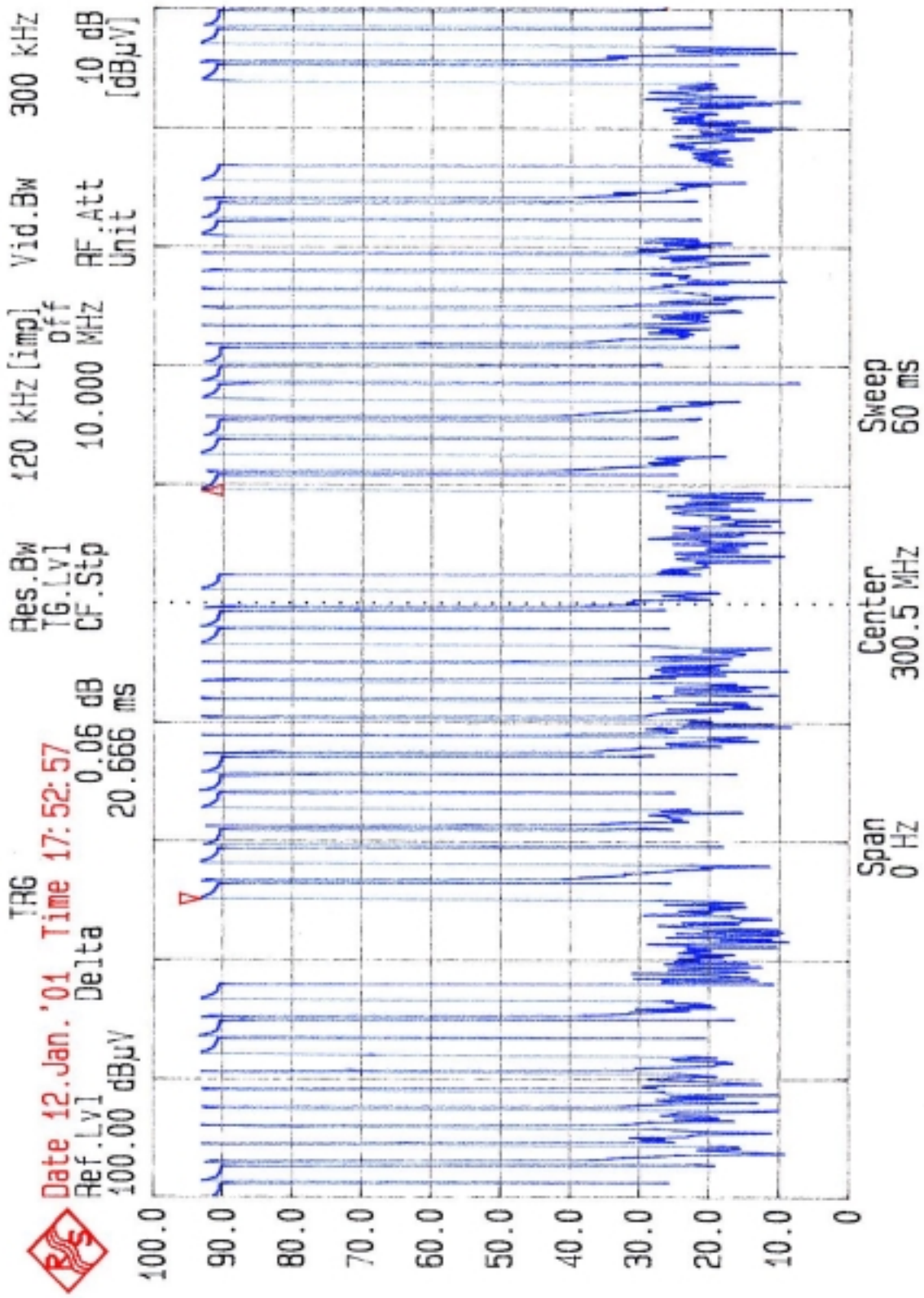
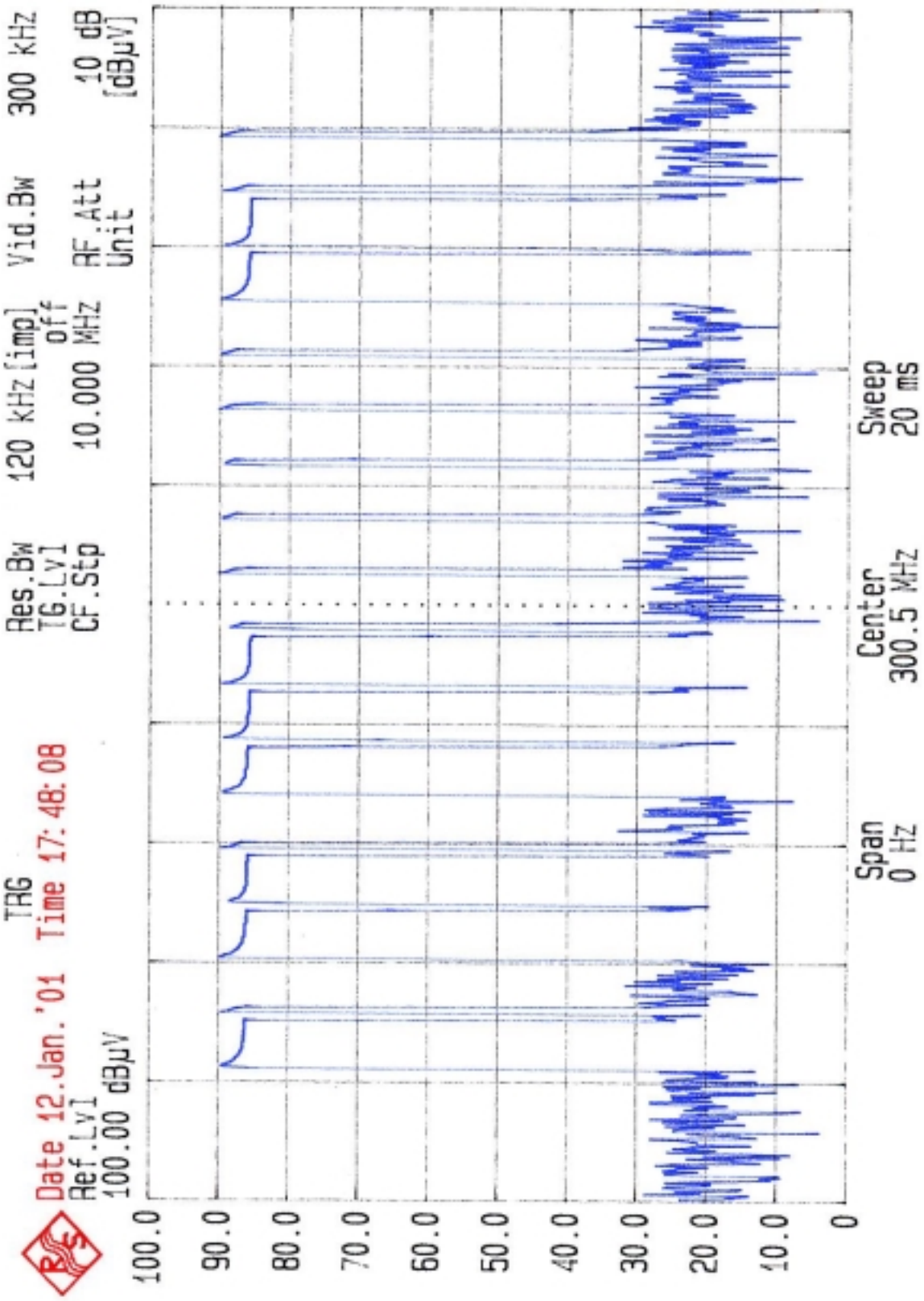
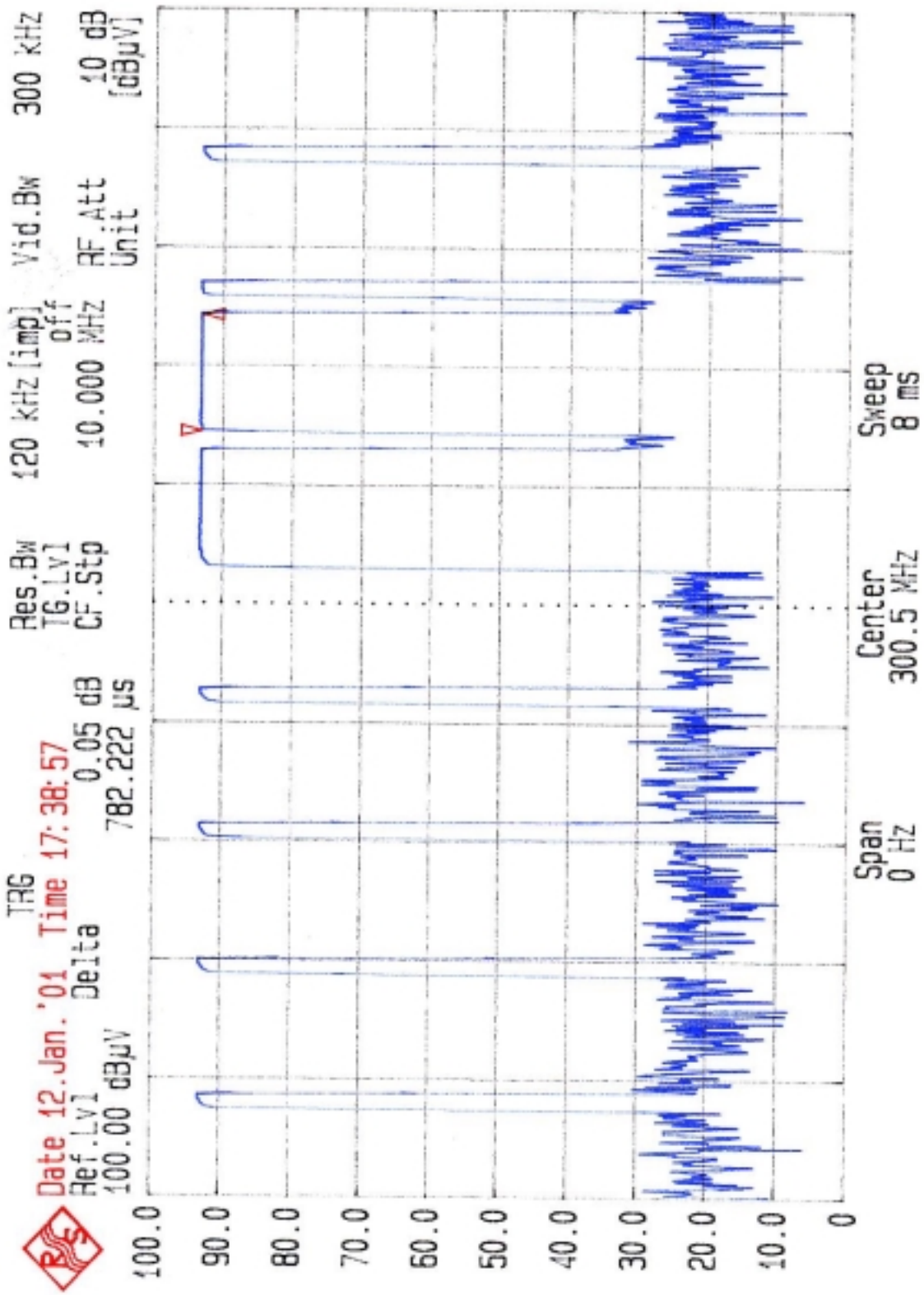
data-1 (1100x1434x24b jpeg)



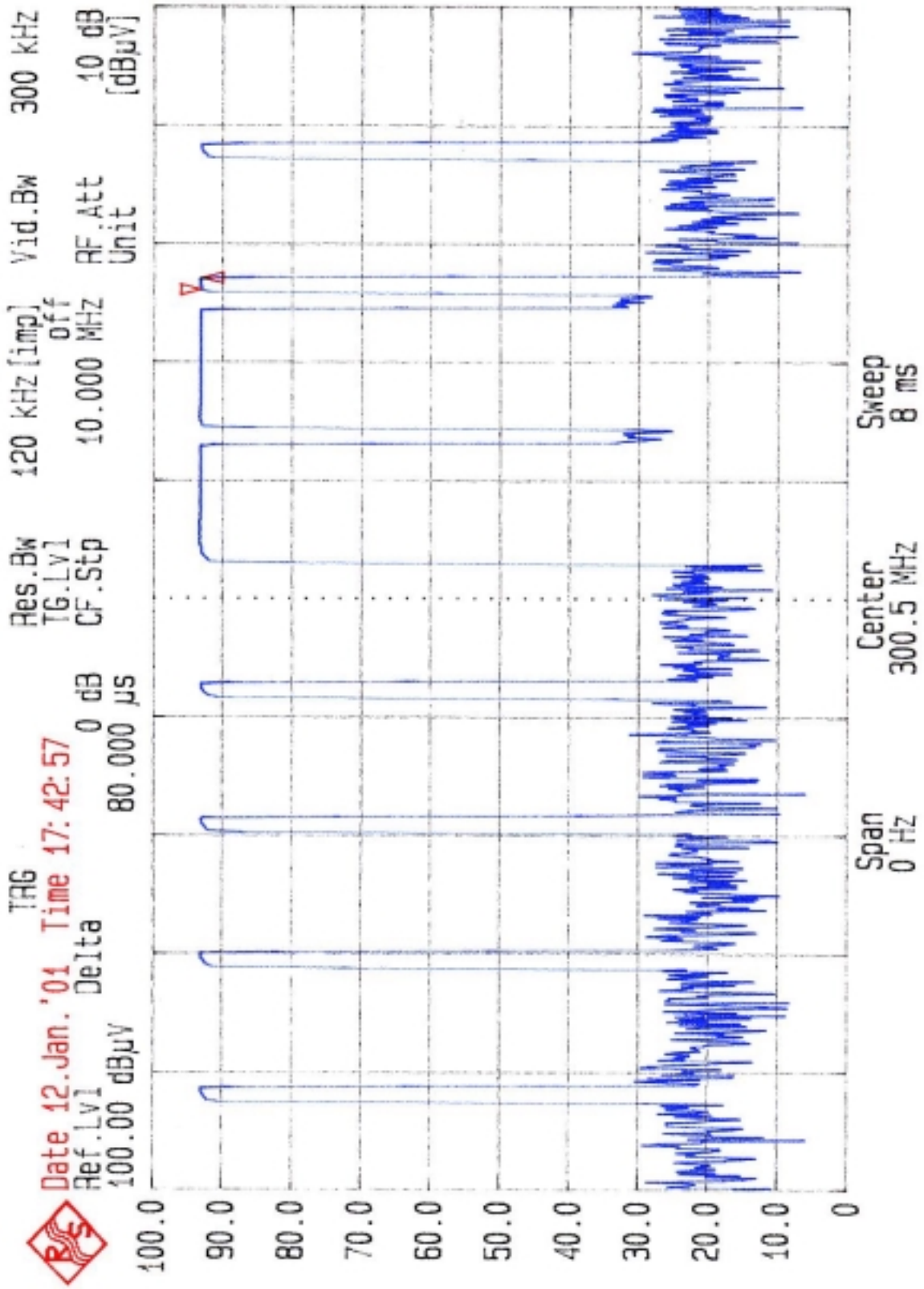
data-2 (1083x1425x24b jpeg)



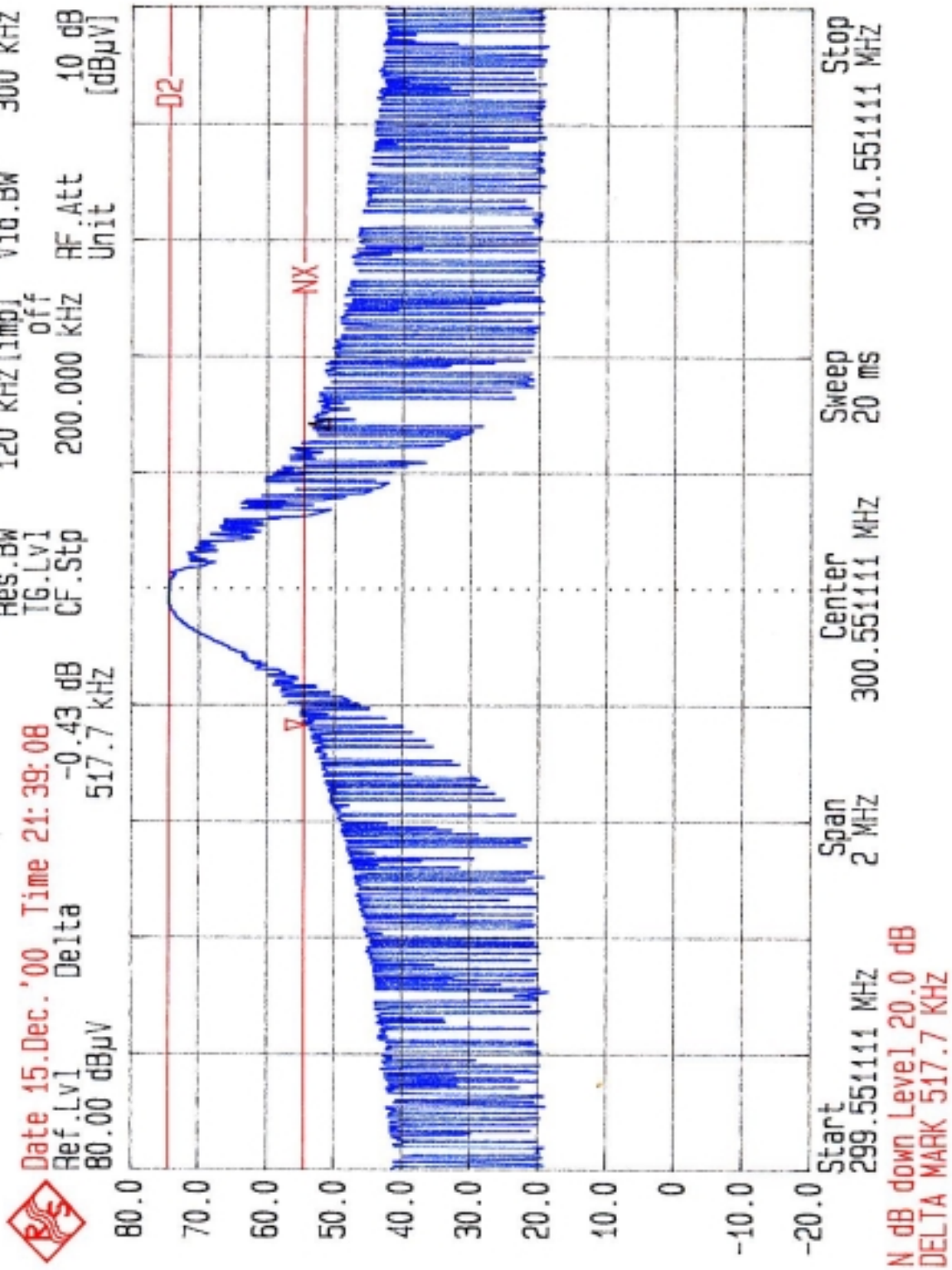
data-3 (1112x1478x24b jpeg)



data-4 (1088x1454x24b jpeg)



data-5 (1145x1506x24b jpeg)



data-6 (1149x1425x24b jpeg)

COMPLIANCE Certification Services

FCC, VCCI, CISPR, CE, AUSTEL, NZ
UL, CSA, TUV, BSMI, DHHS, NVLAP
No. 199 Chung Sheng Road
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PHONE: 02-2217-0894 FAX: 02-2217-1254

Project #:	00E9007
Report #:	00E9007D1
Date& Time:	12/18/00
Test Engr:	MICHAEL HUNG

Company:	VISION AUTOMOBILE ELECTRONICS INDUSTRIAL
EUT Description:	Z-TECH (Alarm TX / 300MHz)
Test Configuration :	EUT ONLY
Type of Test:	FCC 15.231(b)
Mode of Operation:	NORMAL MODE

(•) D-Site ( ) E-Site

M% = ((t1+t2+t3+...)/T) * 100% = **34.15 %**

Av Reading = Pk Reading + 20*log(M%)
20*log(M%) = **-9.3322**

	Freq. (MHz)	Pk Rdg (dBuV)	Av Rdg (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Level (dBuV/m)	Limit FCC_B	Margin (dB)	Pol (H/V)	Az (Deg)	Height (Meter)
X	299.56	73.12	63.79	14.37	1.98	21.31	58.83	74.65	-15.82	3mV	0	1.00
	599.15	38.44	29.11	20.28	3.20	21.11	31.48	54.65	-23.17	3mV	180	1.00
	898.71	43.17	33.84	23.77	4.15	20.80	40.96	54.65	-13.69	3mV	0	1.50
Y	299.53	77.19	67.86	14.37	1.98	21.31	62.90	74.65	-11.75	3mV	0	1.50
	599.24	44.76	35.43	20.28	3.20	21.11	37.80	54.65	-16.85	3mV	180	1.00
	898.69	44.73	35.40	23.77	4.15	20.80	42.52	54.65	-12.13	3mV	180	2.00
Z	299.61	80.76	71.43	14.37	1.98	21.31	66.47	74.65	-8.18	3mV	0	1.50
	599.22	49.91	40.58	20.28	3.20	21.11	42.95	54.65	-11.70	3mV	0	2.20
	898.66	46.12	36.79	23.77	4.15	20.80	43.91	54.65	-10.74	3mV	0	1.75
X	299.53	85.28	75.95	14.37	1.98	21.31	70.99	74.65	-3.66	3mH	0	1.00
	599.23	49.32	39.99	20.28	3.20	21.11	42.36	54.65	-12.29	3mH	180	1.00
	898.63	37.29	27.96	23.77	4.15	20.80	35.08	54.65	-19.57	3mH	0	1.50
Y	299.65	78.22	68.89	14.37	1.98	21.31	63.93	74.65	-10.72	3mH	0	1.50
	599.43	43.61	34.28	20.28	3.20	21.11	45.98	54.65	-8.67	3mH	180	1.00
	898.64	37.44	28.11	23.77	4.15	20.80	35.23	54.65	-19.42	3mH	180	2.00
Z	299.71	77.92	68.59	14.37	1.98	21.31	63.63	74.65	-11.02	3mH	0	1.50
	599.42	41.20	31.87	20.28	3.20	21.11	34.24	54.65	-20.41	3mH	0	2.20
	898.62	36.70	27.37	23.77	4.15	20.80	34.49	54.65	-20.16	3mH	0	1.75

Total data #: 18

data-7 (1193x1137x24b jpeg)

COMPLIANCE Certification Services

FCC, VCCI, CISPR, CE, AUSTEL, NZ
UL, CSA, TUV, BSMI, DHHS, NVLAP

1366 BORDEAUX DRIVE, SUNNYVALE, CA 94089
PHONE: (408) 752-8166 FAX: (408) 752-8168

Project #:	00E9007
Report #:	9007D2
Date& Time:	12/20/2000
Test Engr:	Michael Hung

Company:	VISION AUTOMOBILE ELECTRONICS INDUSTRIAL
EUT Description:	Z-TECH (Alarm TX / 300MHz)
Test Configuration :	EUT ONLY
Type of Test:	FCC 15.231(b)/FCC 15.209
Mode of Operation:	NORMAL MODE

(•) D-Site ( ) E-Site 6 Worst Data Descending

Freq. (MHz)	Pk Rdg (dBuV)	Av Rdg (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Dist dB	Level (dBuV/m)	Limit FCC_B	Margin (dB)	Pol (H/V)	Az (Deg)	Heigh Meter	Mark (P/Q/A)
1198	*66.56*	*57.23*	*24.9*	*2.7*	*43.32*	*-9.5*	*31.96*	*54.0*	*-22.04*	*1mV*	*0*	*1.2*	*A*
1498	*55.91*	*46.58*	*24.8*	*3.0*	*43.17*	*-9.5*	*21.77*	*54.0*	*-32.23*	*1mV*	*0*	*1.2*	*A*
2696	*49.10*	*39.77*	*30.0*	*4.0*	*42.55*	*-9.5*	*21.72*	*54.0*	*-32.28*	*1mV*	*270*	*1.2*	*A*
1797	**34.96**	**25.63**	**26.0**	**3.4**	**43.01**	**-9.5**	**2.49**	**54.7**	**-52.16**	**1mV**	**270**	**1.2**	**A**
2097	**31.34**	**22.01**	**27.2**	**3.6**	**42.86**	**-9.5**	**0.53**	**54.7**	**-54.12**	**1mV**	**270**	**1.2**	**A**
1198	*42.79*	*33.46*	*24.9*	*2.7*	*43.32*	*-9.5*	*8.19*	*54.0*	*-45.81*	*1mH*	*0*	*1.2*	*A*
1498	*44.93*	*35.60*	*24.8*	*3.0*	*43.17*	*-9.5*	*10.79*	*54.0*	*-43.21*	*1mH*	*0*	*1.2*	*A*
2995	**29.96**	**20.63**	**31.4**	**4.1**	**42.39**	**-9.5**	**4.30**	**54.7**	**-50.35**	**1mH**	**270**	**1.2**	**A**

* No other emission were found within 20dB under the limits upto 3 GHz.

Total data #: 8
V.2d

P(Peak): RBW=VBW=1MHz
A(Average): Pk Reading-9.3322dB

Distance = 20log(1/3)= -9.5dB