

**ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT
CERTIFICATION TO FCC PART 15 REQUIREMENTS**

For

304 MHz WATERPROOF TRANSMITTER

MODEL NO: AMAC

FCC ID NO: KFR-AMAC

REPORT NO: 00E9117

ISSUE DATE: JANUARY 08, 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**



**FCC, VCCI, CISPR, CE
UL, CSA, TÜV, VDE**

U.S.A. : P.O.BOX 612650, SAN JOSE, CA 95161-2650

TAIPEI : P.O.BOX 17-82, HSIN TIEN, TAIWAN, R.O.C.

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TEST DATA

- Maximum Modulation Percentage Plot
- Emission Bandwidth Plot
- Radiated Emission Worksheet for Peak Measurement
- Radiated Emission Worksheet for Average Measurement

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: 304 MHz WATERPROOF TRANSMITTER

MODEL NAME/NUMBER: AMAC

FCC ID: KFR-AMAC

DATE TESTED: DECEMBER 04, 2000

REPORT NUMBER: 00E9117

TYPE OF EQUIPMENT	SECURITY EQUIPMENT (INTENTIONAL RADIATOR)
EQUIPMENT TYPE	304 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 / EMC MANAGER
COMPLIANCE ENGINEERING SERVICES, INC.

2. Product Description

Fundamental Frequency	304 MHz
Power Source	6V Battery
Transmitting Time	Periodic ≤ 5 seconds
Associated Receiver	FCC ID: HNB2Y1500B

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

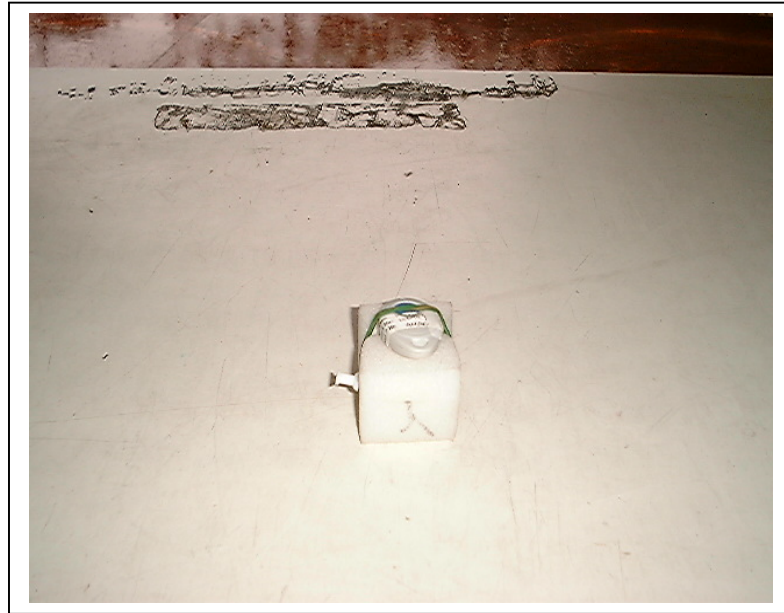
CONNECTED TO AC POWER LINE	SECTION 15.207
CARRIER CURRENT SYSTEM IN THE FREQUENCY RANGE OF 450 kHz TO 30 MHz	SECTION 15.205 AND SECTION 15.209, 15.221, 15.223, 15.225 OR 15.227, AS APPROPRIATE.
BATTERY POWER	NO REQUIRED.

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

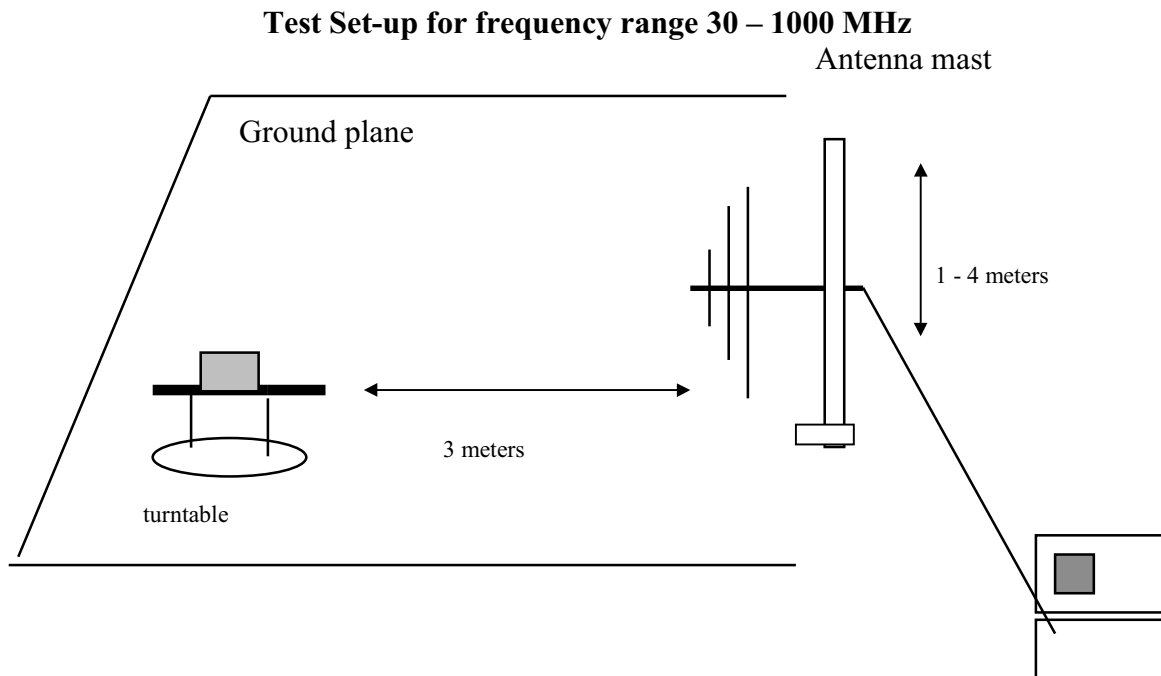
9. SYSTEM TEST CONFIGURATION

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.



10. Test Procedure

Radiated Emissions, 15.231(4)(b)



preamplifier/spectrum analyzer

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.

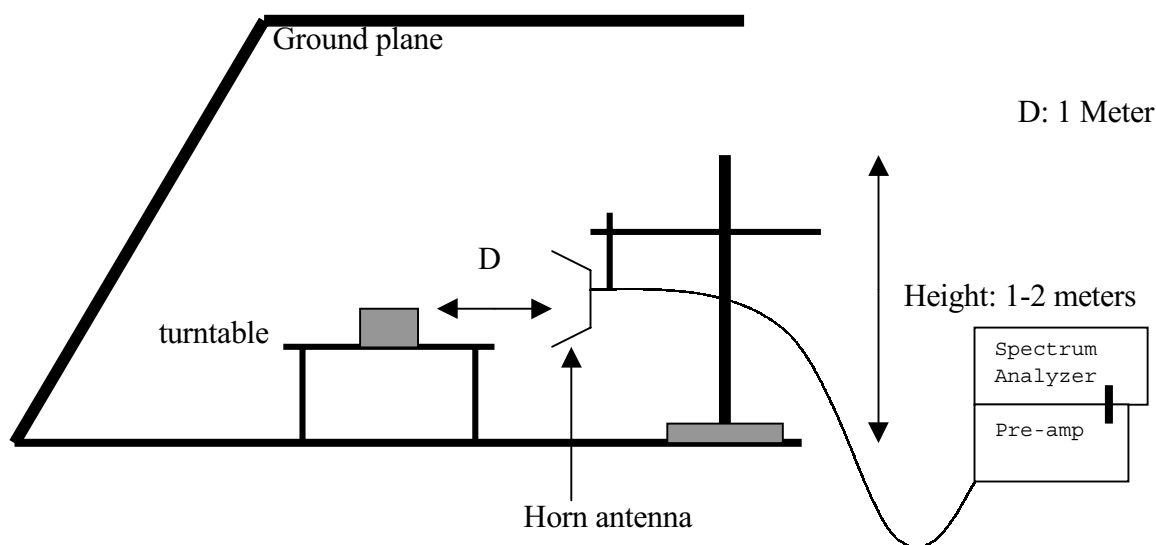
Test set-up for measurements above 1GHz

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:

NOT APPLICABLE

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:

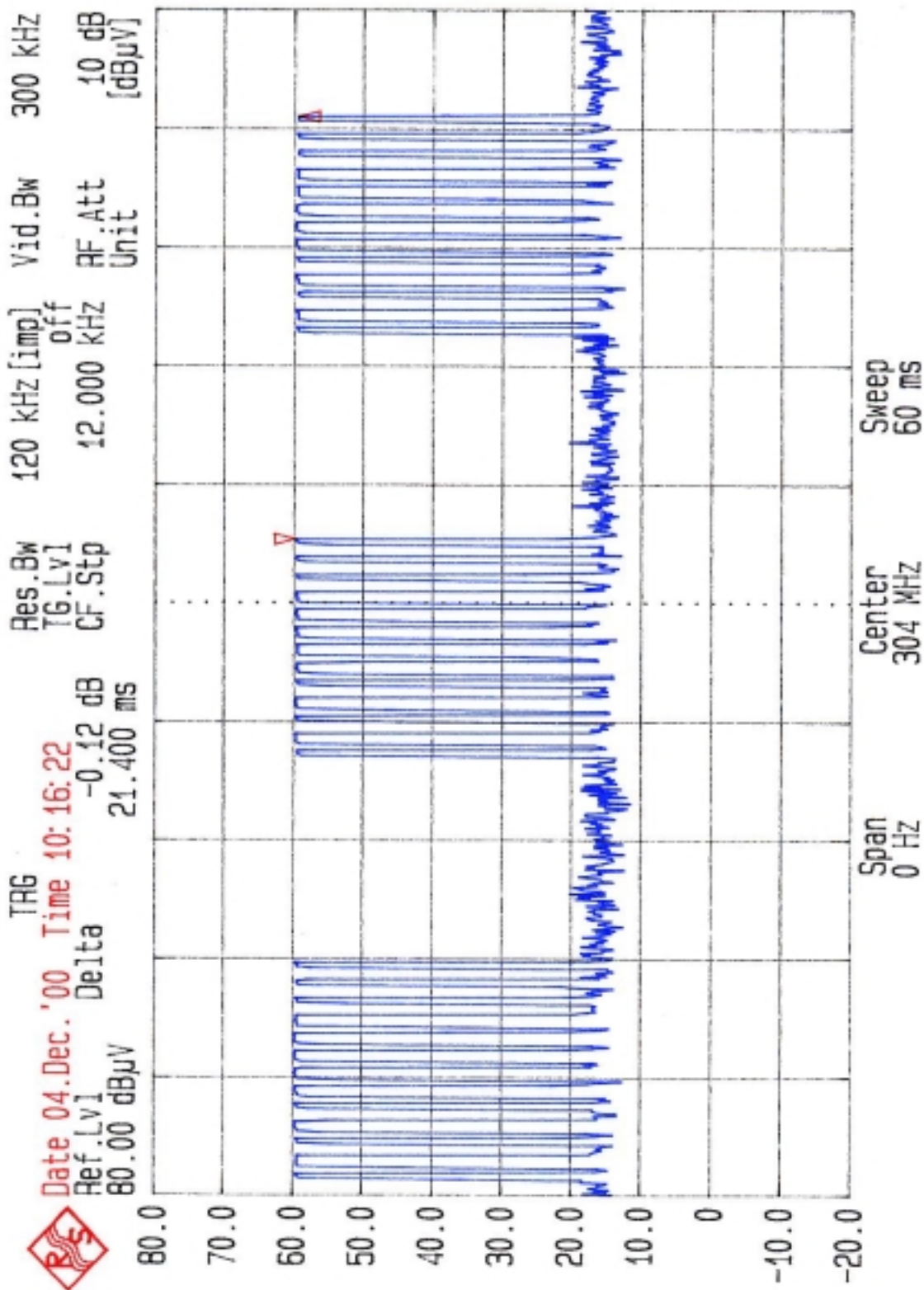
WHERE 1 Period =21.4 mS.
 Long pulse =0.4889 mS
 Short pulse =0.1889 mS
 No of Long pulse =7
 No of Short pulse =6

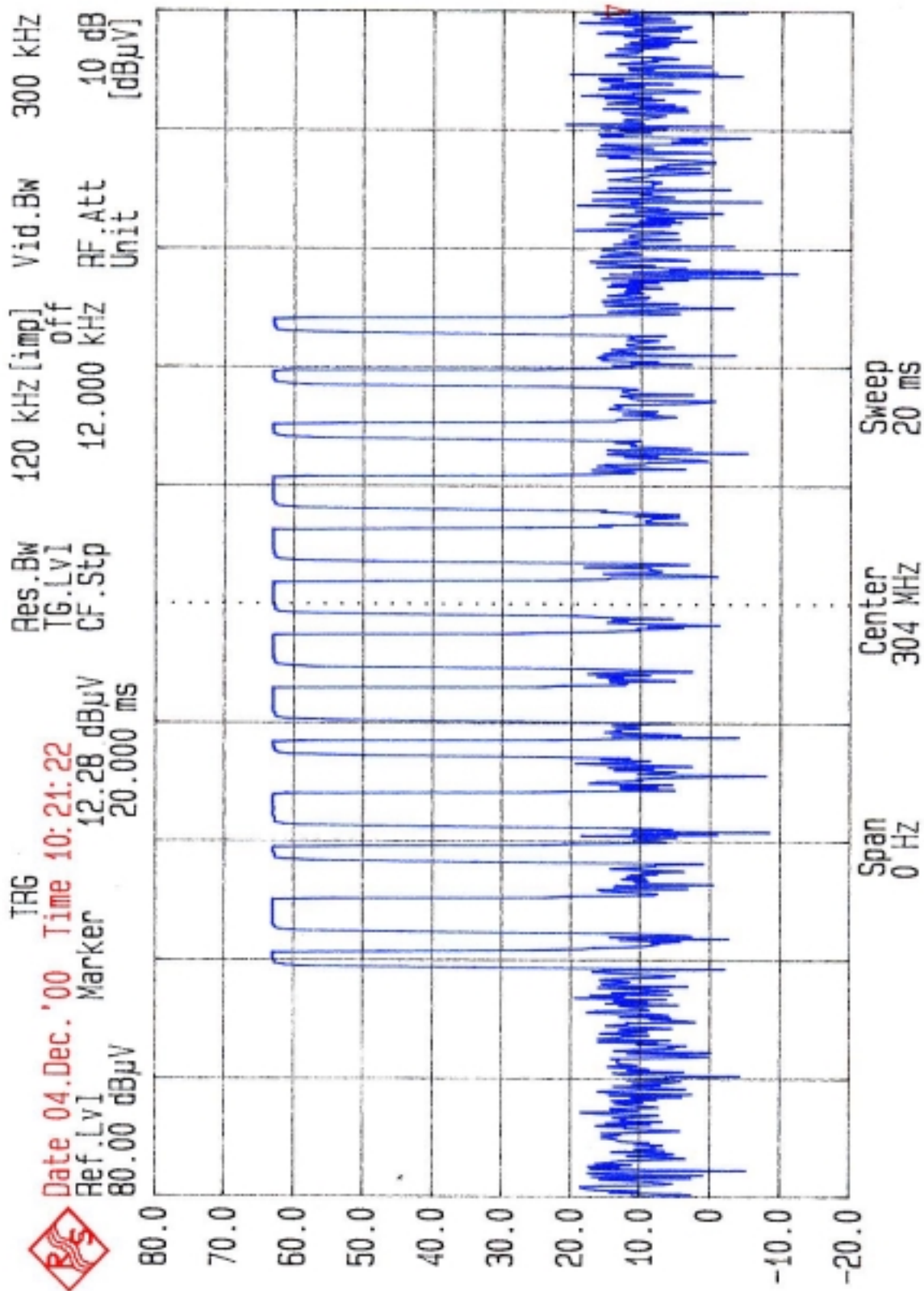
$$\text{Duty Cycle} = (N_1L_1 + N_2L_2 + \dots + N_{n-1}L_{n-1} + N_nL_n) / 100 \text{ or } T$$

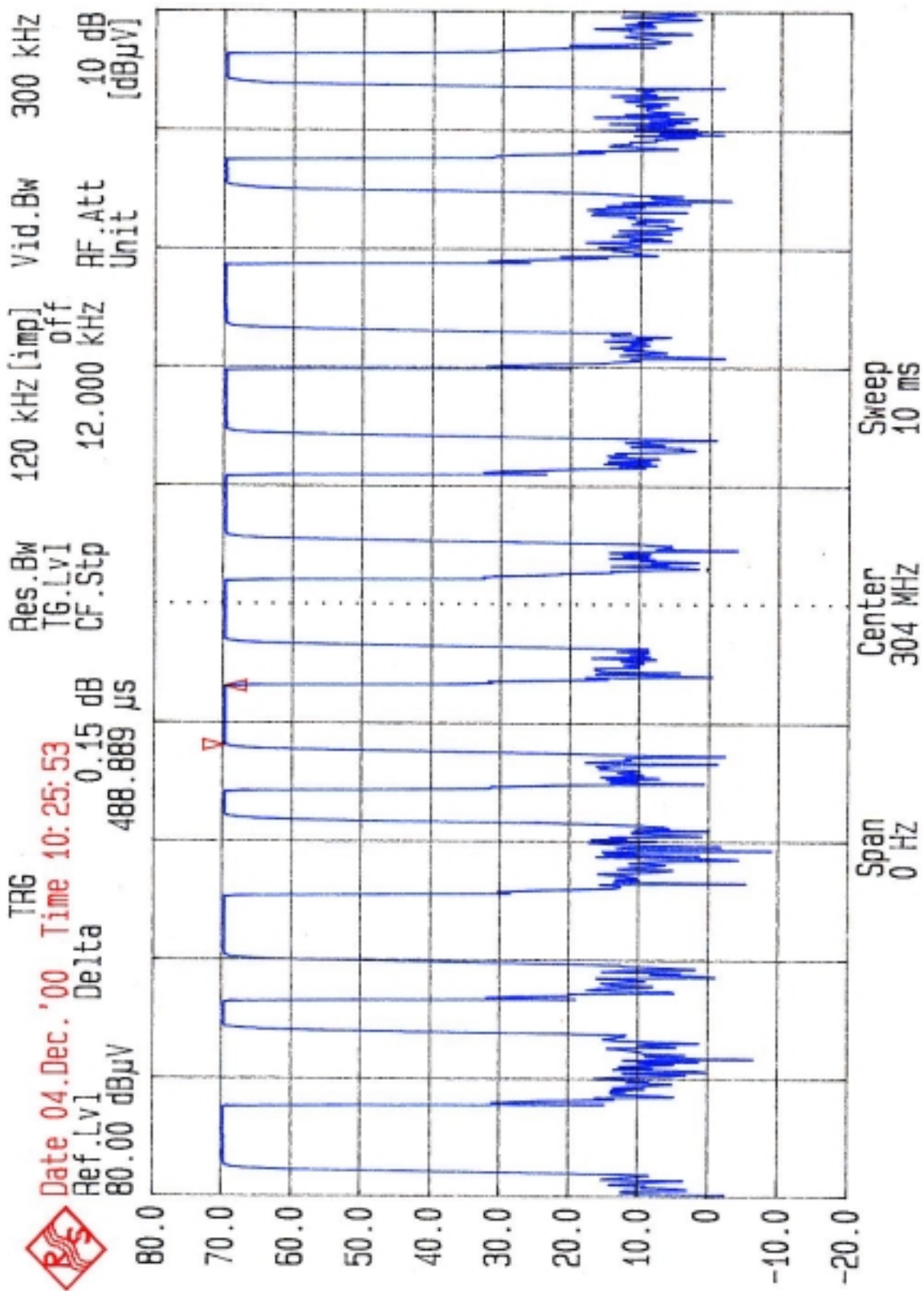
$$\text{Duty Cycle} = ((7 \times 0.4889) + (6 \times 0.1889)) / 21.4 = 0.2129 = 21.29\% \text{ or } -13.437\text{dB}$$
12.2 The Emissions Bandwidth

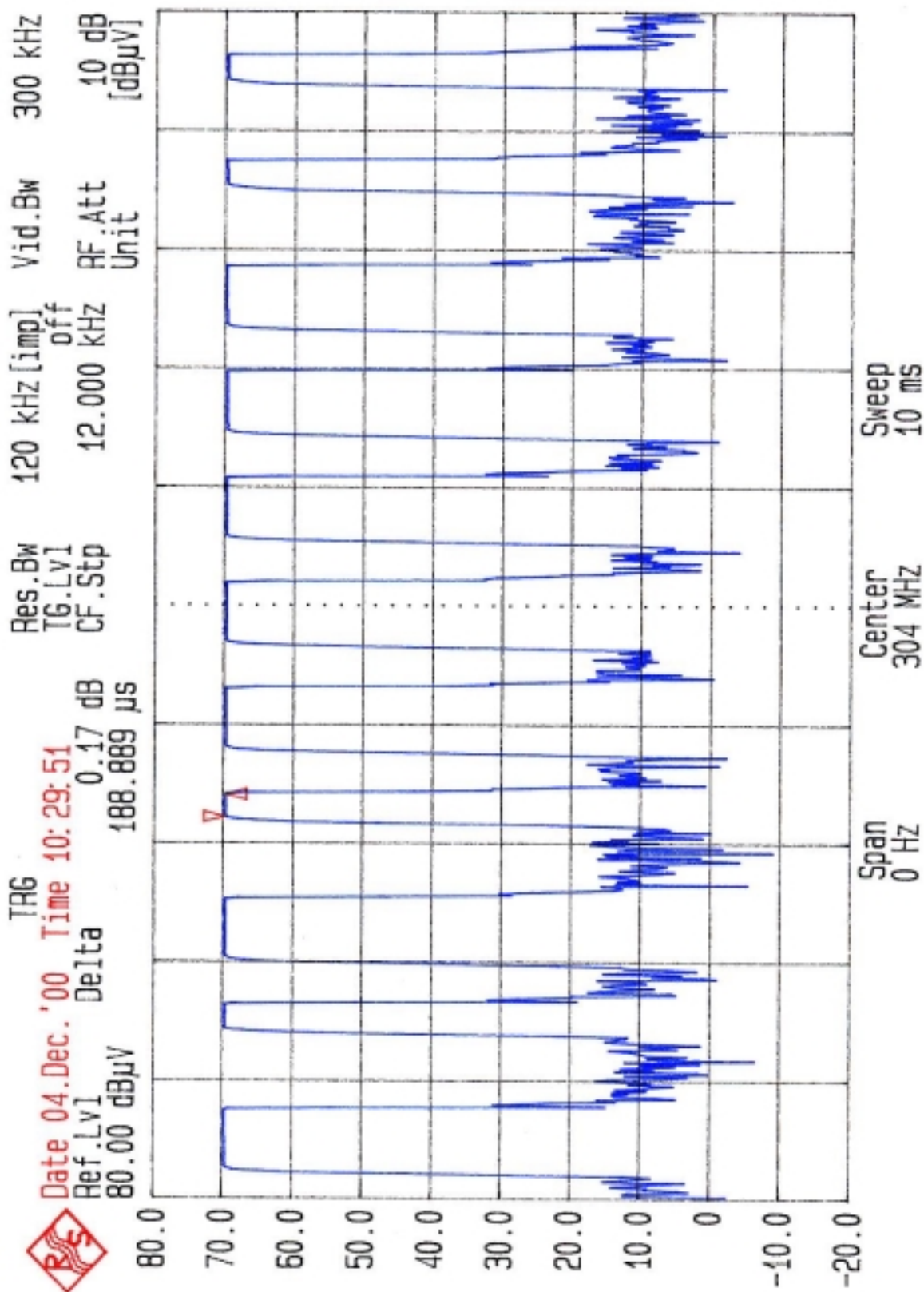
The bandwidth of the emissions were investigated per 15.231(c)

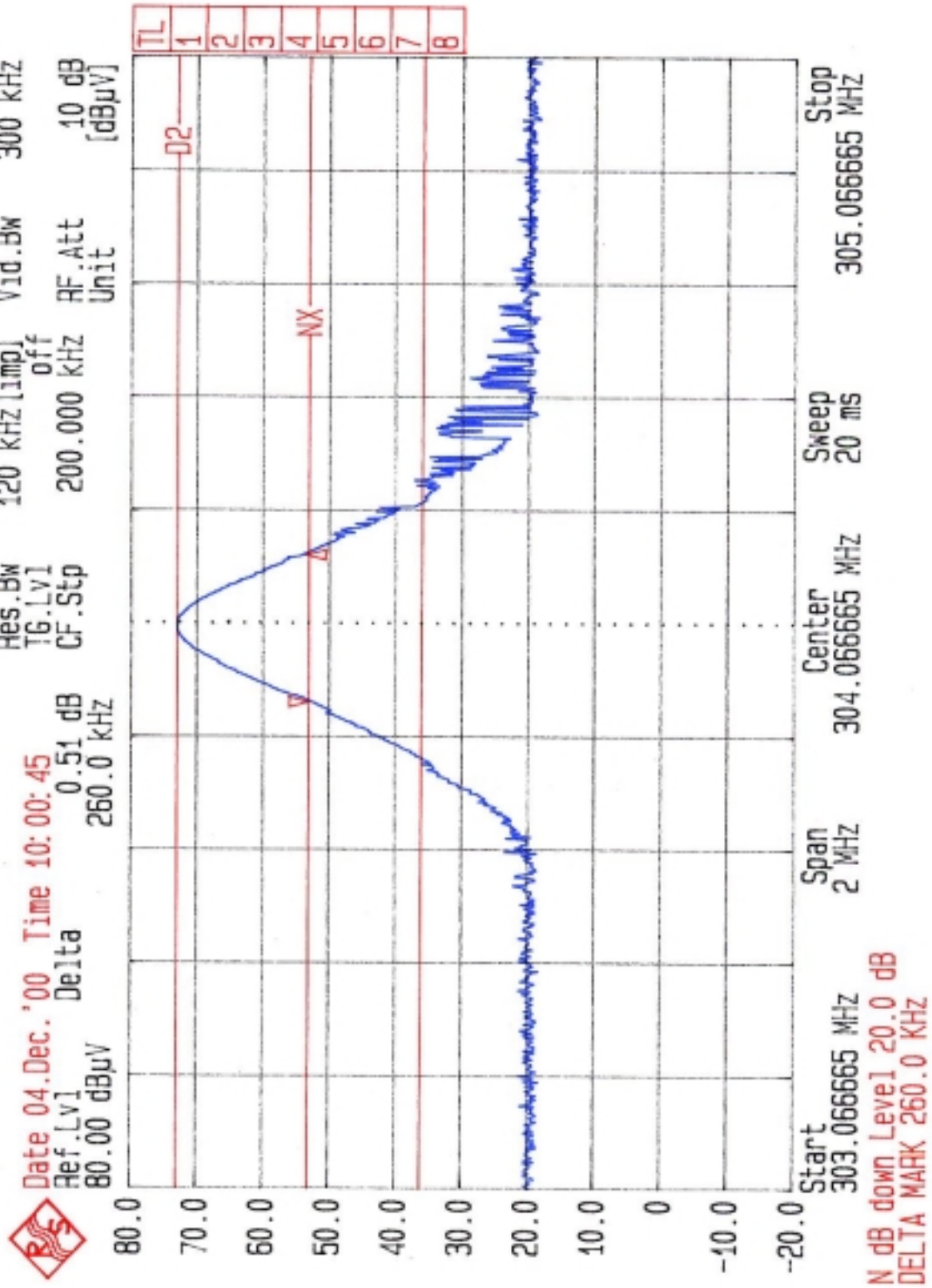
Center Frequency	Measured	Limits
304 MHz	260 kHz < (refer to plot)	304MHzX0.25%=760 kHz













												
FCC, VCCI, CISPR, CE, AUSTEL, NZ UL, CSA, TUV, BSMI, DHHS, NVLAP No. 199 Chung Sheng Road Hsin Tien City, Taipei, Taiwan, R.O.C. PHONE: 02-2217-0894 FAX: 02-2217-1254								<i>Project #:</i> 00E9117 <i>Report #:</i> 9117D1 <i>Date & Time:</i> 12/04/00 <i>Test Engr:</i> MICHAEL HUNG				
<i>Company:</i> VISION AUTOMOBILE ELECTRONICS INDUSTRIAL <i>EUT Description:</i> AMAC (Alarm TX / 304MHz) <i>Test Configuration :</i> EUT ONLY <i>Type of Test:</i> FCC 15.231(b)/FCC 15.209 <i>Mode of Operation:</i> NORMAL MODE												
<input checked="" type="radio"/> D-Site <input type="radio"/> E-Site												
M% = ((I1+I2+I3+...)/T) * 100% = 21.29 %								Av Reading = Pk Reading + 20*log(M%) 20*log(M%) = -13.437				
	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	304.10	54.98	41.54	14.51	1.98	21.31	36.72	74.94	-38.22	3mV	90	1.30
	608.13	35.86	22.42	20.42	3.42	21.13	25.13	54.00	-28.87	3mV	90	1.30
	912.23	29.41	15.97	23.88	4.20	20.60	23.45	54.94	-31.49	3mV	90	1.30
Y	304.08	68.03	54.59	14.51	1.98	21.31	49.77	74.94	-25.17	3mV	0	1.40
	608.15	41.44	28.00	20.42	3.42	21.13	30.71	54.00	-23.29	3mV	0	1.40
	912.25	36.26	22.82	23.88	4.20	20.60	30.30	54.94	-24.64	3mV	0	1.50
Z	304.08	74.84	61.40	14.51	1.98	21.31	56.58	74.94	-18.36	3mV	0	1.25
	608.16	41.70	28.26	20.42	3.42	21.13	30.97	54.00	-23.03	3mV	0	1.50
	912.20	34.44	21.00	23.88	4.20	20.60	28.48	54.94	-26.46	3mV	0	1.50
X	304.10	78.28	64.84	14.51	1.98	21.31	60.02	74.94	-14.92	3mH	180	1.25
	608.13	39.12	25.68	20.42	3.42	21.13	28.39	54.00	-25.61	3mH	180	1.30
	912.24	28.18	14.74	23.88	4.20	20.60	22.22	54.94	-32.72	3mH	0	1.50
Y	304.06	74.01	60.57	14.51	1.98	21.31	55.75	74.94	-19.19	3mH	180	1.25
	608.13	40.06	26.62	20.42	3.42	21.13	29.33	54.00	-24.67	3mH	180	1.30
	912.22	28.20	14.76	23.88	4.20	20.60	22.24	54.94	-32.70	3mH	180	1.50
Z	304.06	73.96	60.52	14.51	1.98	21.31	55.70	74.94	-19.24	3mH	0	1.20
	608.13	40.54	27.10	20.42	3.42	21.13	29.81	54.00	-24.19	3mH	0	1.20
	912.21	29.93	16.49	23.88	4.20	20.60	23.97	54.94	-30.97	3mH	180	1.50
Total data #: 18												

														Project #: 00E9117 Report #: 9117D2 Date & Time: 12/04/00 Test Engr: Michael Hung																																									
FCC, VCCI, CISPR, CE, AUSTEL, NZ UL, CSA, TUV, BSMI, DHS, NVLAP 1366 BORDEAUX DRIVE, SUNNYVALE, CA 94089 PHONE: (408) 752-8168 FAX: (408) 752-8168																																																							
Company: EUT Description: Test Configuration: Type of Test: Mode of Operation:				VISION AUTOMOBILE ELECTRONICS INDUSTRIAL AMAC (Alarm TX / 304MHz) EUT ONLY FCC 15.231(b)/FCC 15.209 NORMAL MODE																																																			
<input checked="" type="checkbox"/> D-Site														<input type="checkbox"/> E-Site														6 Worst Data														Descending													
Freq.	Pk Rdg	Av Rdg	AF	Closs	Pre-amp	Dist	Level	Limit	Margin	Pol	Az	Height	Mark																																										
(MHz)	(dBuV)	(dBuV)	(dB)	(dB)	(dB)	dB	(dBuV/m)	FCC_B	(dB)	(H/V)	(Deg)	(Meter)	(P/Q/A)																																										
1216	60.31	46.87	25.2	2.7	43.31	-9.5	21.93	54.0	-32.07	1mV	90	1.0	A																																										
1216	63.04	49.60	25.2	2.7	43.31	-9.5	24.66	54.0	-29.34	1mH	270	1.0	A																																										
* No other emission were found within 20dB under the limits upto 3.1 GHz.																																																							
Total data #: 2 V.2d				P(Peak): RBW=VBW=1MHz A(Average): Pk Reading-13.437dB				Distance = 20log(1/3) = -9.5dB																																															