FCC ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT CERTIFICATION TO FCC PART 15 REQUIREMENTS

for

INTENTIONAL RADIATOR

of

Car Alarm Transmitter

FCC ID Number	**:** ELV144
Trade Name	**:** NUTEK CORPORATION
Model Number	**:** 144-05B
Agency Series	**:** N/A
Report Number	**:** 02E0670-D
Date	**:** December 9, 2002

Prepared for **:**

NUTEK CORPORATION

5F, NO. 3, ALLEY 6, LANE 45, PAO-HSING RD.,
HSING-TIEN CITY, TAIPEI, TAIWAN, R. O. C.

Prepared by **:**

C&C LABORATORY CO., LTD.

#B1, 1st Fl., Universal Center,
No. 183, Sec. 1, Tatung Rd., Hsi Chih,
Taipei Hsien, Taiwan, R.O.C.
TEL: (02)8642-2071~3
FAX: (02)8642-2256

TABLE OF CONTENTS

1. VERIFICATION OF COMPLIANCE.....3

2. PRODUCT DESCRIPTION.....4

3. TEST FACILITY.....4

4. MEASUREMENT STANDARDS.....4

5. TEST METHODLOGY 4

6. MEASUREMENT EQUIPMENT USED 5

7. POWERLINE RFI LIMIT.....5

8. RADIATED EMISSION LIMITS.....6

9. SYSTEM TEST CONFIGURATION.....6

10. TEST PROCEDURE 7

11. EQUIPMENT MODIFICATIONS.....8

12. TEST RESULT.....9

12.1. MAXIMUM MODULATION PERCENTAGE(M%) 9

12.2. THE EMISSIONS BANDWIDTH.....9

APPENDIX 1 PHOTOGRAPHS OF EUT.....10

APPENDIX 2 TEST DATA.....14

1. VERIFICATION OF COMPLIANCE

COMPANY NAME	:	NUTEK CORPORATION 5F, NO. 3, ALLEY 6, LANE 45, PAO-HSING RD., HSING-TIEN CITY, TAIPEI, TAIWAN, R. O. C.
CONTACT PERSON	:	RUBY HSIEH / MARKETING DEPT.
TELEPHONE NO.	:	(886-2) 2918-9478
EUT DESCRIPTION	:	Car Alarm Transmitter
MODEL NAME/NUMBER	:	144-05B
FCC ID	:	ELV144
DATE TESTED	:	November 29, 2002
REPORT NUMBER	:	02E0670

TYPE OF EQUIPMENT	SECURITY EQUIPMENT (INTENTIONAL RADIATOR)
EQUIPMENT TYPE	433.92 MHz Car Alarm Transmitter
MEASUREMENT PROCEDURE	ANSI 63.4 / 1992
LIMIT TYPE	CERTIFICATION
FCC RULE	CFR 47, PART 15

The above equipment was tested by C&C Laboratory Co., Ltd. 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 Engineering Services, Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by C&C Laboratory Co., Ltd. will constitute fraud and shall nullify the document.

Vince Chiang For.

James Chan / Manager
C&C Laboratory Co., Ltd.

2. PRODUCT DESCRIPTION

Fundamental Frequency	**433.92 MHz**
Power Source	**3V Battery**
Transmitting Time	**Periodic ≤ 5 seconds**
Associated Receiver	**Model: ELVNTRBA (FCC ID)**

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
H.P.	8595EM	Spectrum Analyzer (9KHz – 6.5GHz)	02/2003
H.P.	8593A	Spectrum Analyzer (9KHz-22GHz)	01/2003
EMCO	3115	Antenna (1-18GHz)	02/2003
SCHWARZBECK	VULB 9160	Antenna (30-2000 MHz)	05/2003
H.P.	8447D	Amplifier	05/2003
H.P.	8449B	Amplifier (1-26.5GHz)	02/2003

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.

Radiated Open Site Test Set-up

10. TEST PROCEDURE

Radiated Emissions, 15.231(4)(b)

Test Set-up for frequency range 30 – 1000 MHz

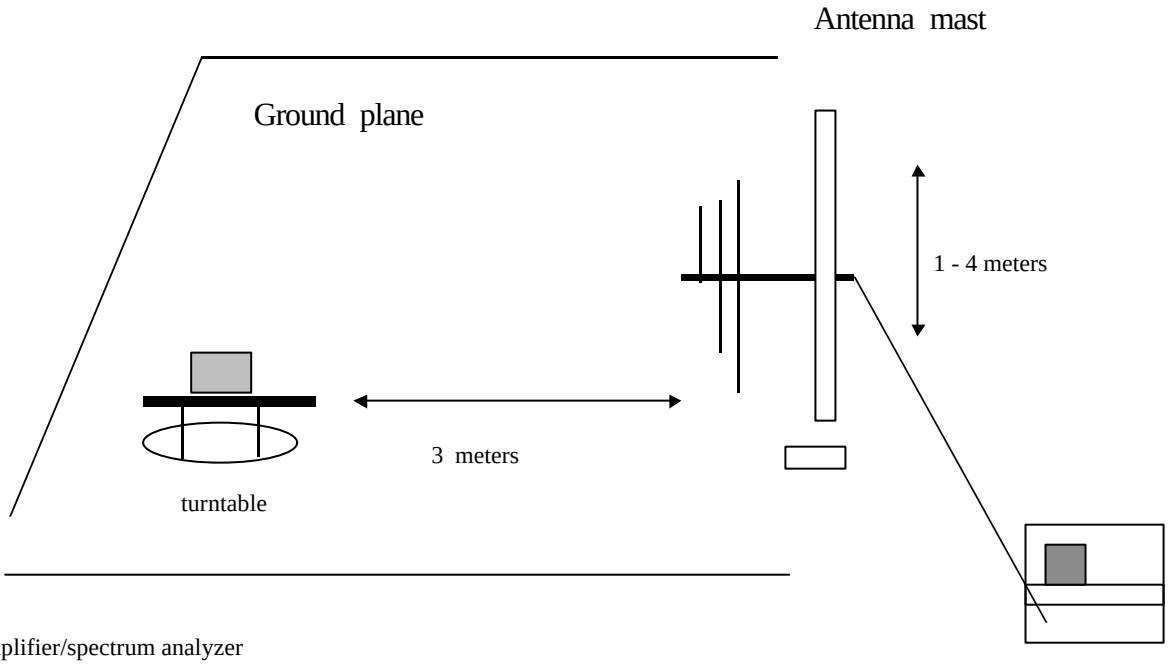


Fig. 1

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

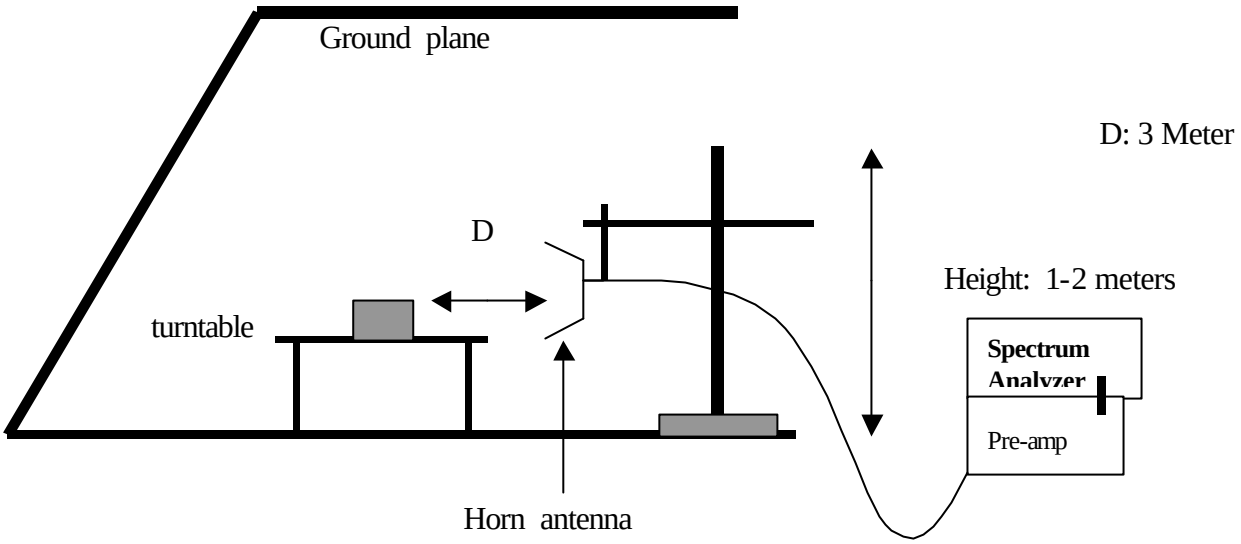


Fig. 2

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:

NONE

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 = 105.38 mS
Long pulse = 0.712 mS
Short pulse = 0.300 mS
No of Long pulse = 41
No of Short pulse = 37

Duty Cycle = (N1L1+N2L2+…+Nn-1Ln-1+NnLn)/100 or T
Duty Cycle = [(41x0.712)+(37x0.300)]/100=0.4029=40.29 % or -7.8961dB

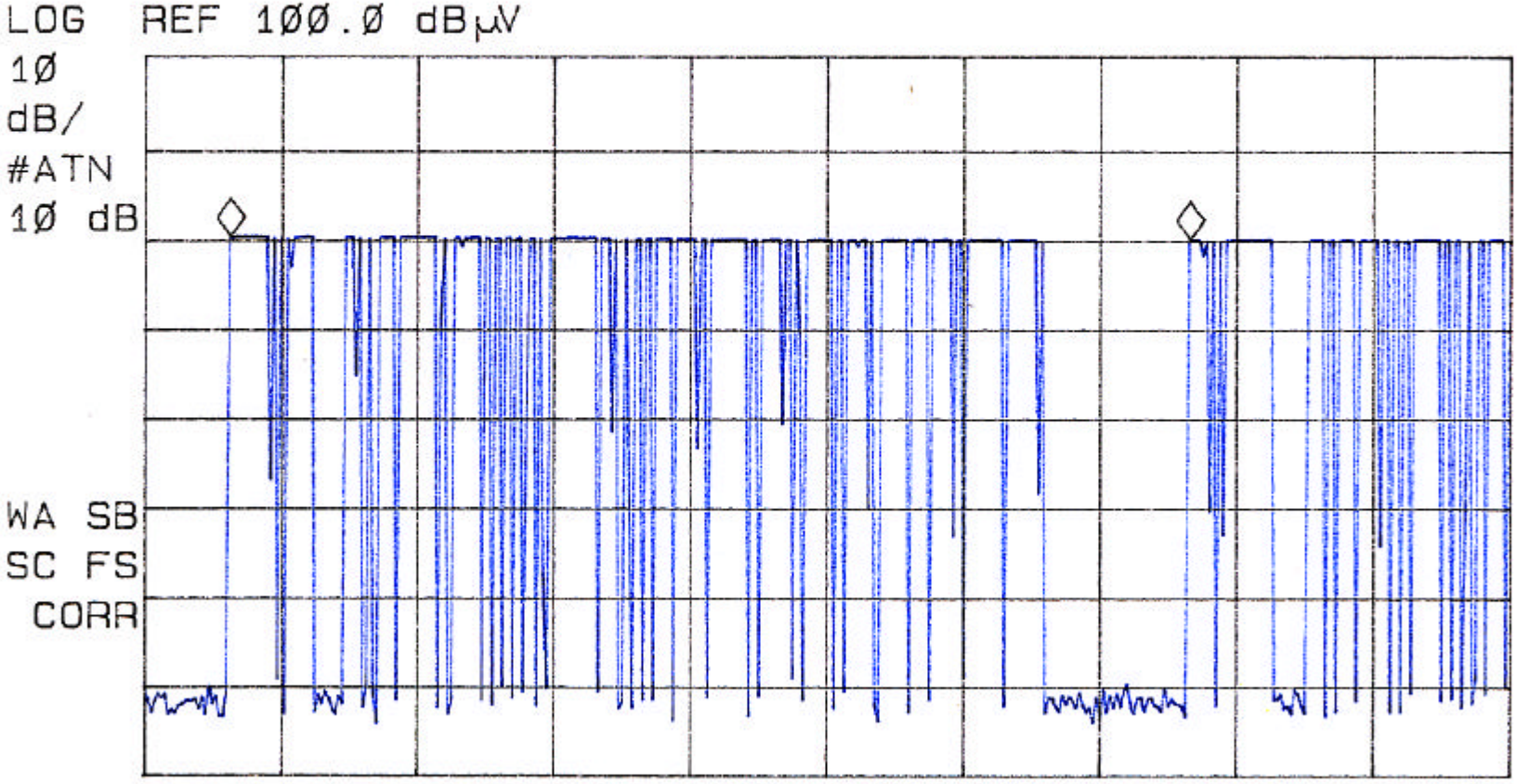
12.2 The Emissions Bandwidth

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

Center Frequency	Measured	Limits
433.92 MHz	**400.0 kHz < (refer to plot)**	**433.92MHzX0.25%=1084.8 kHz**

hp

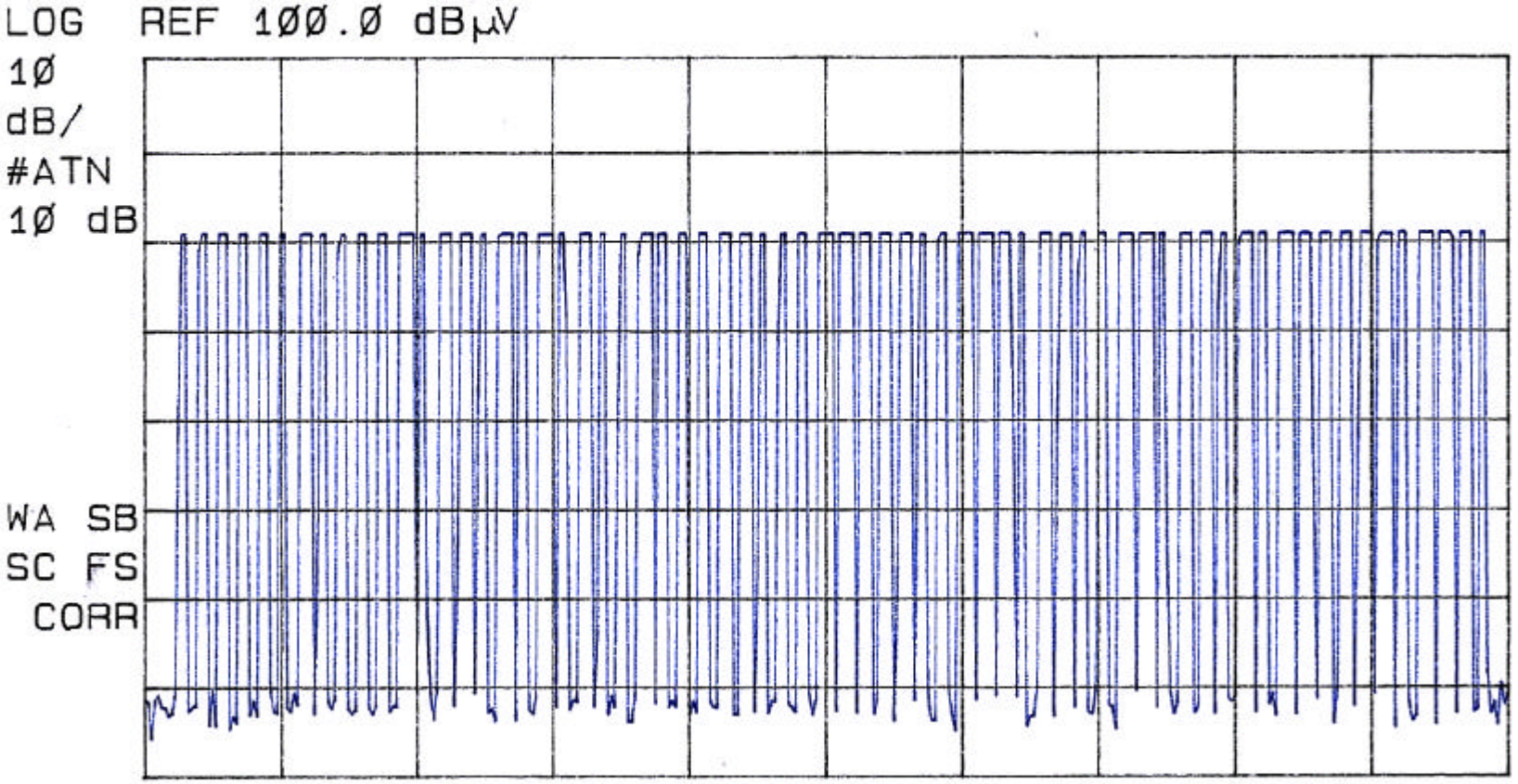
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 1Ø5.38 msec
-.3Ø dB



CENTER 433.895 MHz
SPAN Ø Hz
#IF BW 12Ø kHz
#AVG BW 3ØØ kHz
#SWP 15Ø msec

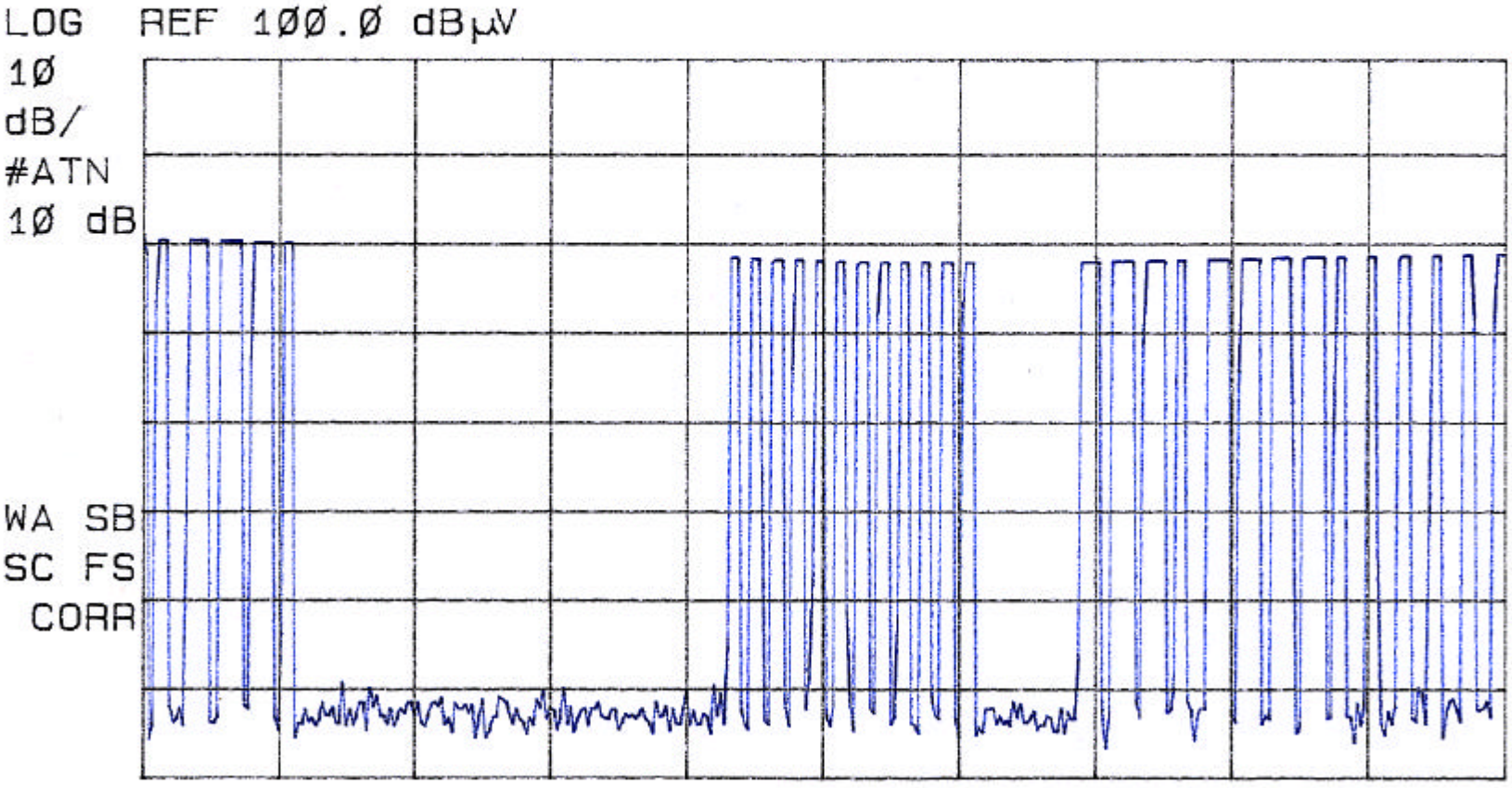
hp

ACTV DET: PEAK
MEAS DET: PEAK QP AVG



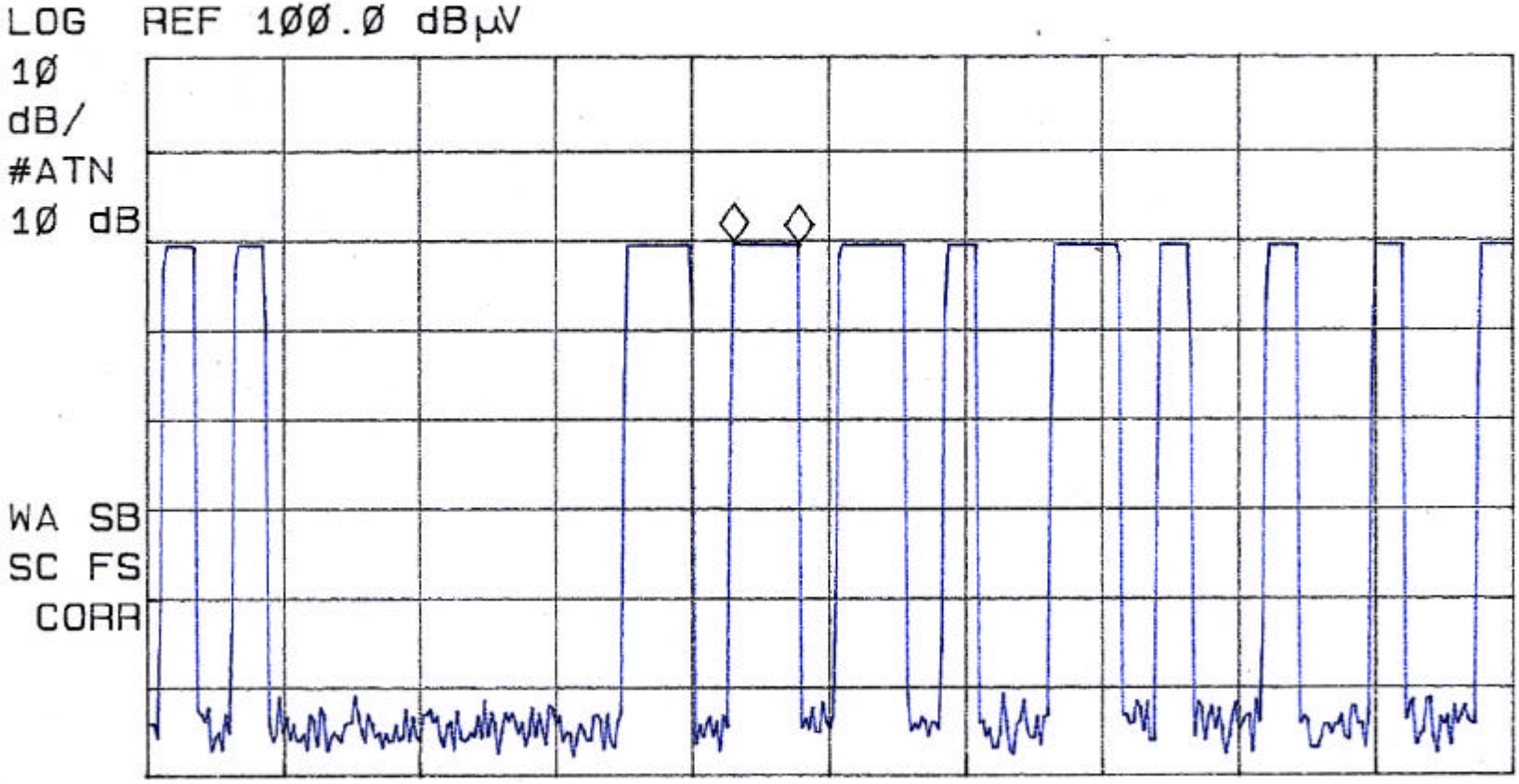
hp

ACTV DET: PEAK
MEAS DET: PEAK QP AVG



hp

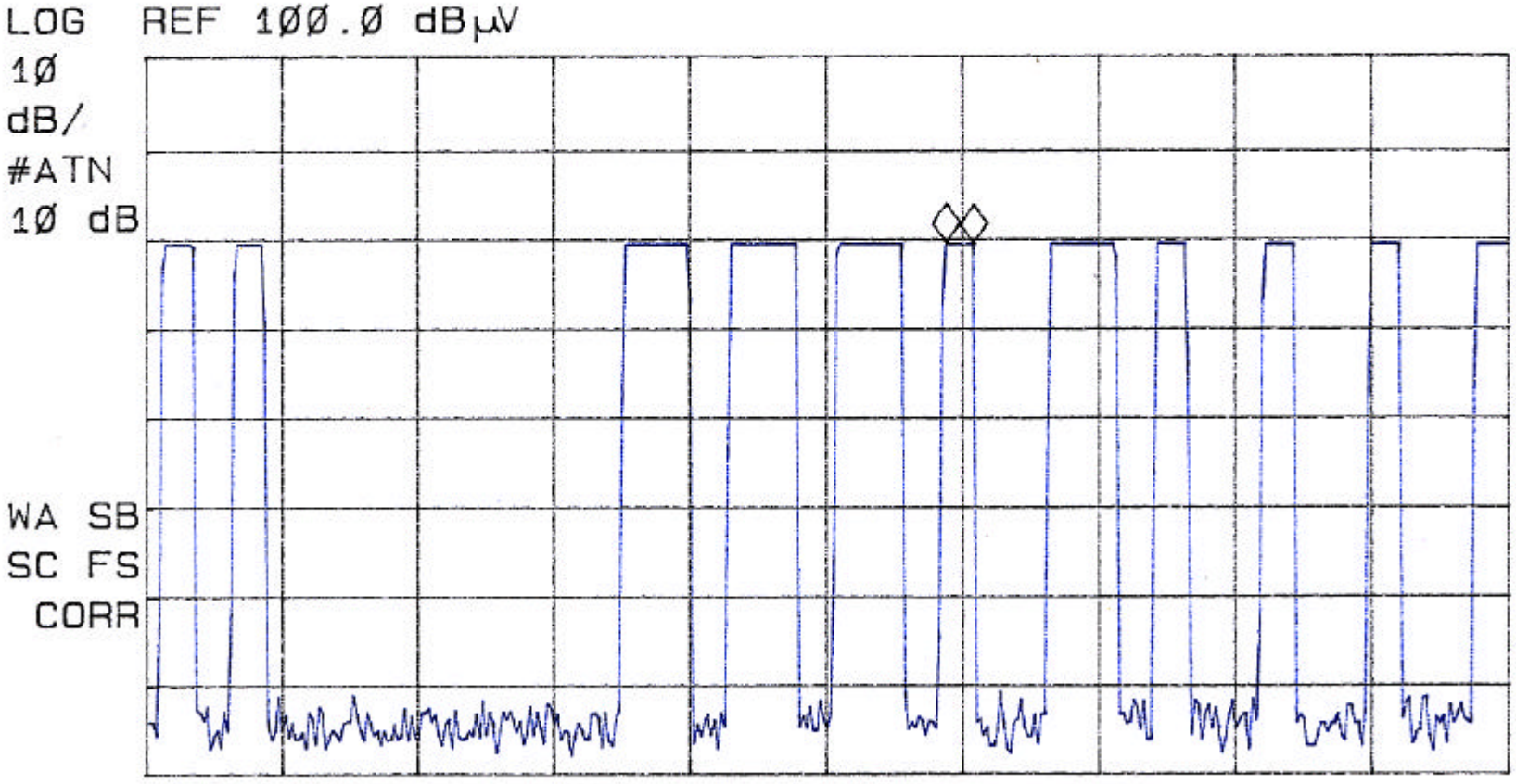
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 712.ØØ µsec
-.23 dB



CENTER 433.895 MHz
SPAN Ø Hz
#IF BW 12Ø kHz
#AVG BW 3ØØ kHz
#SWP 15.Ø msec

hp

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 3ØØ.ØØ µsec
-.14 dB

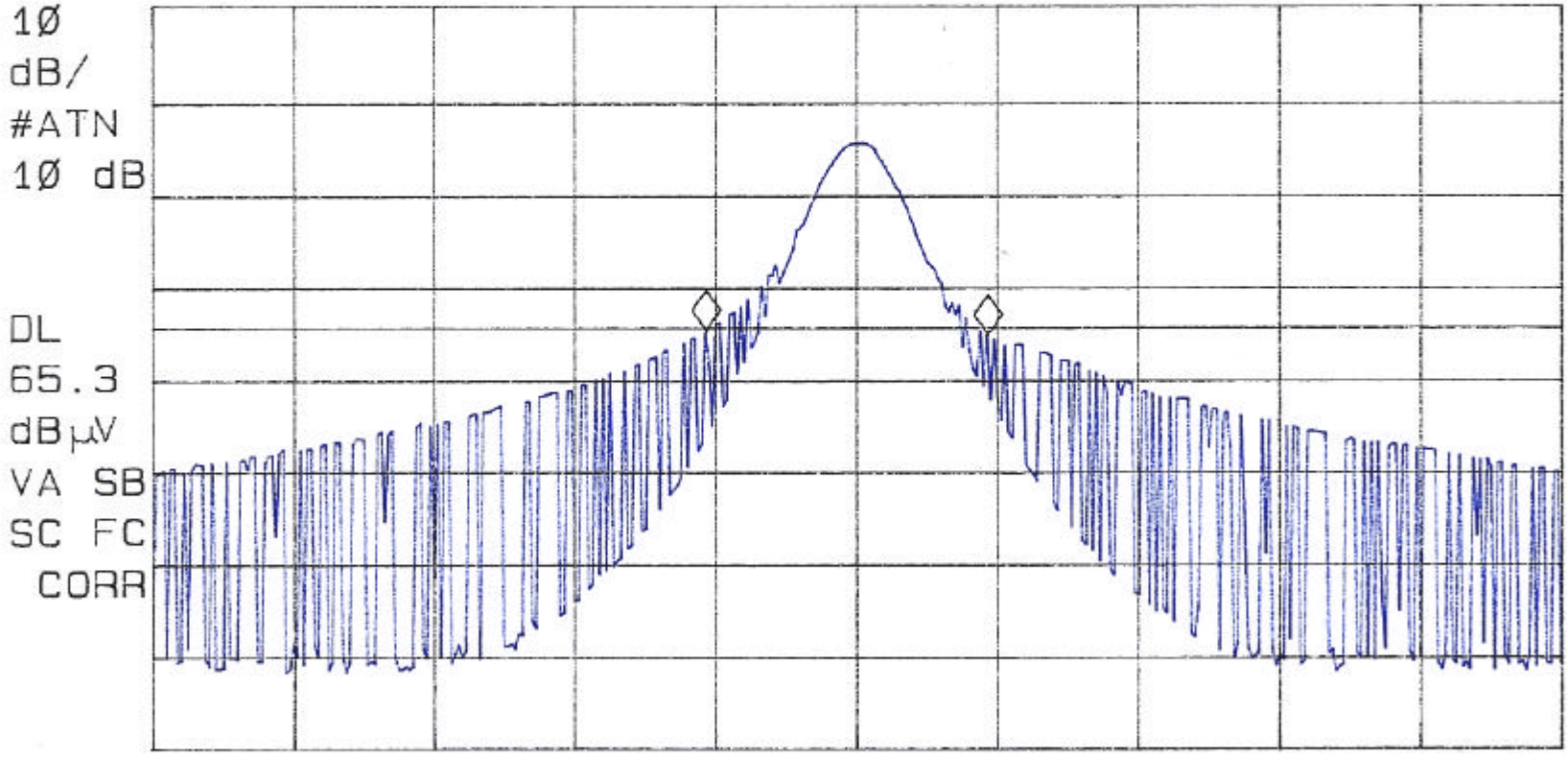


CENTER 433.895 MHz
SPAN Ø Hz
#IF BW 12Ø kHz
#AVG BW 3ØØ kHz
#SWP 15.Ø msec

hp

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 400 kHz
-.49 dB

CISPR CLASS-B (0dB)
VULB_3104(200205) VERTICAL 10m



CENTER 433.920 MHz
SPAN 2.000 MHz
#IF BW 120 kHz
#AVG BW 300 kHz
SWP 20.0 msec

C&C Laboratory CO., LTD.

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

Project #:	02E0670
Report #:	0670D1
Date& Time:	2002/11/29
Test Engr:	DAVID HUNG

Company:	NUTEK CORPORTATION
EUT Description:	144-05B (433.92MHz / Car Alarm Transmitter)
Test Configuration :	EUT ONLY
Type of Test:	FCC 15.231(b)
Mode of Operation:	NORMAL MODE

(•) D-Site

M% = ((t1+t2+t3+…)/T) * 100% = **40.29 %**

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

20*log(M%) = **-7.8961**

	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)
	Button # 1:											
X	433.94	68.05	60.15	18.14	3.19	26.83	54.65	80.83	-26.17	3mV	270	1.00
	867.88	36.55	28.65	24.10	5.05	26.26	31.54	60.83	-29.28	3mV	270	1.20
Y	433.93	84.22	76.32	18.14	3.19	26.83	70.82	80.83	-10.00	3mV	90	1.00
	867.88	39.22	31.32	24.10	5.05	26.26	34.21	60.83	-26.61	3mV	90	1.50
Z	433.93	83.88	75.98	18.14	3.19	26.83	70.48	80.83	-10.34	3mV	0	1.00
	867.87	41.14	33.24	24.10	5.05	26.26	36.13	60.83	-24.69	3mV	0	1.30
X	433.94	78.70	70.80	18.14	3.19	26.83	65.30	80.83	-15.52	3mH	180	1.00
	867.89	36.12	28.22	24.10	5.05	26.26	31.11	60.83	-29.71	3mH	180	1.10
Y	433.94	79.29	71.39	18.14	3.19	26.83	65.89	80.83	-14.93	3mH	270	1.10
	867.89	38.43	30.53	24.10	5.05	26.26	33.42	60.83	-27.40	3mH	270	1.20
Z	433.96	77.34	69.44	18.14	3.19	26.83	63.94	80.83	-16.88	3mH	90	1.00
	867.88	35.19	27.29	24.10	5.05	26.26	30.18	60.83	-30.64	3mH	90	1.30

Peak: RBW= 120KHz
VBW= 300KHz
A(Average): Pk Reading - 7.8961dB

Total Data #12

C&C Laboratory CO., LTD.

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

Project #:	02E0670
Report #:	0670D2
Date& Time:	2002/11/29
Test Engr:	DAVID HUNG

Company:	NUTEK CORPORTATION
EUT Description:	144-05B (433.92MHz / Car Alarm Transmitter)
Test Configuration :	EUT ONLY
Type of Test:	FCC 15.231(b)
Mode of Operation:	NORMAL MODE

D-Site

M% = ((t1+t2+t3+…)/T) * 100% = **40.29 %**

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

20*log(M%) = **-7.8961**

	Freq.	Pk Rdg	Av Rdg	AF	Closs	Pre-amp	Level	Limit	Margin	Pol	Az	Height
	(MHz)	(dBuV)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	FCC_B	(dB)	(H/V)	(Deg)	(Meter)
	Button # 2:											
X	433.94	72.71	64.81	18.14	3.19	26.83	59.31	80.83	-21.51	3mV	90	1.00
	867.86	38.16	30.26	24.10	5.05	26.26	33.15	60.83	-27.67	3mV	90	1.30
Y	433.94	83.58	75.68	18.14	3.19	26.83	70.18	80.83	-10.64	3mV	180	1.20
	867.86	39.55	31.65	24.10	5.05	26.26	34.54	60.83	-26.28	3mV	180	1.30
Z	433.93	84.15	76.25	18.14	3.19	26.83	70.75	80.83	-10.07	3mV	0	1.00
	867.89	40.28	32.38	24.10	5.05	26.26	35.27	60.83	-25.55	3mV	0	1.70
X	433.94	77.82	69.92	18.14	3.19	26.83	64.42	80.83	-16.40	3mH	180	1.00
	867.86	34.53	26.63	24.10	5.05	26.26	29.52	60.83	-31.30	3mH	180	1.30
Y	433.93	80.02	72.12	18.14	3.19	26.83	66.62	80.83	-14.20	3mH	270	1.10
	867.88	35.54	27.64	24.10	5.05	26.26	30.53	60.83	-30.29	3mH	270	1.20
Z	433.93	78.48	70.58	18.14	3.19	26.83	65.08	80.83	-15.74	3mH	90	1.30
	867.87	35.79	27.89	24.10	5.05	26.26	30.78	60.83	-30.04	3mH	90	1.60

Peak: RBW= 120KHz
VBW= 300KHz
A(Average): Pk Reading - 7.8961dB

Total Data #12

C&C Laboratory CO., LTD.

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

Project #:	02E0670
Report #:	0670D3
Date& Time:	2002/11/29
Test Engr:	DAVID HUNG

Company:	NUTEK CORPORTATION
EUT Description:	144-05B (433.92MHz / Car Alarm Transmitter)
Test Configuration :	EUT ONLY
Type of Test:	FCC 15.231(b)
Mode of Operation:	NORMAL MODE

D-Site

M% = ((t1+t2+t3+…)/T) * 100% = **40.29 %**

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

20*log(M%) = **-7.8961**

	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)
	Button # 3:											
X	433.93	72.72	64.82	18.14	3.19	26.83	59.32	80.83	-21.50	3mV	180	1.00
	867.86	37.26	29.36	24.10	5.05	26.26	32.25	60.83	-28.57	3mV	180	1.40
Y	433.93	84.31	76.41	18.14	3.19	26.83	70.91	80.83	-9.91	3mV	90	1.30
	867.86	39.29	31.39	24.10	5.05	26.26	34.28	60.83	-26.54	3mV	90	1.60
Z	433.94	83.67	75.77	18.14	3.19	26.83	70.27	80.83	-10.55	3mV	180	1.00
	867.88	39.41	31.51	24.10	5.05	26.26	34.40	60.83	-26.42	3mV	180	1.50
X	433.93	78.09	70.19	18.14	3.19	26.83	64.69	80.83	-16.13	3mH	90	1.00
	867.87	35.70	27.80	24.10	5.05	26.26	30.69	60.83	-30.13	3mH	90	1.10
Y	433.94	79.18	71.28	18.14	3.19	26.83	65.78	80.83	-15.04	3mH	0	1.00
	867.87	39.95	32.05	24.10	5.05	26.26	34.94	60.83	-25.88	3mH	0	1.60
Z	433.94	78.57	70.67	18.14	3.19	26.83	65.17	80.83	-15.65	3mH	270	1.10
	867.88	33.34	25.44	24.10	5.05	26.26	28.33	60.83	-32.49	3mH	270	1.30

Peak: RBW= 120KHz
VBW= 300KHz
A(Average): Pk Reading - 7.8961dB

Total Data #12

C&C Laboratory CO., LTD.

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

Project #:	02E0670
Report #:	0670D4
Date& Time:	2002/11/29
Test Engr:	DAVID HUNG

Company:	NUTEK CORPORTATION
EUT Description:	144-05B (433.92MHz / Car Alarm Transmitter)
Test Configuration :	EUT ONLY
Type of Test:	FCC 15.231(b)
Mode of Operation:	NORMAL MODE

D-Site

M% = ((t1+t2+t3+…)/T) * 100% = **40.29 %**

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

20*log(M%) = **-7.8961**

	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)
	Button # 4:											
X	433.93	71.94	64.04	18.14	3.19	26.83	58.54	80.83	-22.28	3mV	90	1.00
	867.88	35.41	27.51	24.10	5.05	26.26	30.40	60.83	-30.42	3mV	90	1.30
Y	433.93	84.73	76.83	18.14	3.19	26.83	71.33	80.83	-9.49	3mV	270	1.30
	867.88	40.07	32.17	24.10	5.05	26.26	35.06	60.83	-25.76	3mV	270	1.70
Z	433.93	83.46	75.56	18.14	3.19	26.83	70.06	80.83	-10.76	3mV	0	1.00
	867.86	40.33	32.43	24.10	5.05	26.26	35.32	60.83	-25.50	3mV	0	1.50
X	433.93	78.23	70.33	18.14	3.19	26.83	64.83	80.83	-15.99	3mH	90	1.00
	867.87	35.44	27.54	24.10	5.05	26.26	30.43	60.83	-30.39	3mH	90	1.70
Y	433.93	80.86	72.96	18.14	3.19	26.83	67.46	80.83	-13.36	3mH	180	1.20
	867.84	34.32	26.42	24.10	5.05	26.26	29.31	60.83	-31.51	3mH	180	1.60
Z	433.93	77.98	70.08	18.14	3.19	26.83	64.58	80.83	-16.24	3mH	0	1.10
	867.88	33.23	25.33	24.10	5.05	26.26	28.22	60.83	-32.60	3mH	0	1.40

Peak: RBW= 120KHz
VBW= 300KHz
A(Average): Pk Reading - 7.8961dB

Total Data #12

C&C Laboratory CO., LTD.

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

Project #:	02E0670
Report #:	0670D5
Date& Time:	2002/11/29
Test Engr:	DAVID HUNG

Company:	NUTEK CORPORTATION
EUT Description:	144-05B (433.92MHz / Car Alarm Transmitter)
Test Configuration :	EUT ONLY
Type of Test:	FCC 15.231(b)/FCC 15.209
Mode of Operation:	NORMAL MODE

D-Site

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)	Mark (P/Q/A)
1302	48.91	41.01	33.12	3.59	37.07	40.65	54.0	-13.35	3mV	180	1.0	A
1736	48.32	40.42	26.37	4.44	36.47	34.76	60.8	-26.07	3mV	0	1.0	A
2170	46.04	38.14	27.75	4.47	36.06	34.30	60.8	-26.50	3mV	60	1.0	A
2603	46.72	38.82	28.82	5.64	36.02	37.26	60.8	-23.54	3mV	60	1.0	A
3037	47.91	40.01	30.38	5.81	36.06	52.15	60.8	-8.65	3mV	90	1.0	A
3471	47.98	40.08	31.25	6.13	35.64	41.82	60.8	-18.98	3mV	270	1.0	A
3905	46.32	38.42	32.29	6.67	35.21	42.17	54.0	-11.83	3mV	240	1.0	A
4339	47.12	39.22	32.36	7.15	35.17	43.56	54.0	-10.44	3mV	180	1.0	A
1302	48.12	40.22	24.88	3.59	37.07	31.62	54.0	-22.38	3mH	180	1.0	A
1736	47.76	39.86	26.37	4.44	36.47	34.20	60.8	-26.60	3mH	0	1.0	A
2170	45.81	37.91	27.75	4.47	36.06	34.07	60.8	-26.73	3mH	60	1.0	A
2603	45.35	37.45	28.82	5.64	36.02	35.89	60.8	-24.91	3mH	60	1.0	A
3037	46.68	38.78	30.38	5.81	36.06	52.15	60.8	-8.65	3mH	90	1.0	A
3472	45.60	37.70	31.26	6.13	35.64	39.45	60.8	-21.35	3mH	270	1.0	A
3906	43.76	35.86	32.30	6.68	35.21	39.63	54.0	-14.37	3mH	150	1.0	A
4340	44.51	36.61	32.36	7.15	35.17	40.95	54.0	-13.05	3mH	180	1.0	A

* No other emission were found within 20dB under the limits upto 4.5 GHz.

Total data #16
V.2d

P(Peak): RBW=VBW=1MHz
A(Average): Pk Reading -7.8961dB