FCC ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT CERTIFICATION TO FCC PART 15 REQUIREMENTS

for

INTENTIONAL RADIATOR

of

Car Alarm Transceiver

FCC ID Number : GOH-PAN07
Trade Name : CODE SYSTEMS, INC.
Model Number : ANTENNA
Agency Series : N/A
Report Number : C30530008-RP
Date : September 16, 2003

Prepared for：

CODE SYSTEMS, INC.
525 MINNESOTA
TROY MI 48083, USA

Prepared by：

C&C LABORATORY CO., LTD.
No. 165, Chung Sheng Road, Hsin Tien City,
Taipei, Taiwan, R. O. C.
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Lab. Code: 200617-0

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1. VERIFICATION OF COMPLIANCE

COMPANY NAME	: CODE SYSTEMS, INC. 525 MINNESOTA TROY MI 48083, USA
CONTACT PERSON	: MR. SHANE WILSON / RETAIL PROGRAM MANAGER
TELEPHONE NO.	: 1-248-583-9620
EUT DESCRIPTION	: Car Alarm Transceiver
MODEL NAME/NUMBER	: ANTENNA
FCC ID	: GOH-PAN07
DATE TESTED	: June 06, 2003 ~ June 09, 2003
REPORT NUMBER	: C30530008-RP

TYPE OF EQUIPMENT	SECURITY EQUIPMENT (INTENTIONAL RADIATOR)
EQUIPMENT TYPE	433.92 MHz Car Alarm Transceiver
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 C&C Laboratory Co., Ltd. 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

Vince Chiang / Supervisor
C&C Laboratory Co., Ltd.

2. PRODUCT DESCRIPTION

Fundamental Frequency	**433.92 MHz**
Power Source	**DC 12V**
Transmitting Time	**Periodic ≤ 5 seconds**
Associated Receiver	**Model: H5OTR07AM (FCC ID)**

3. TEST FACILITY

The open area test sites and conducted measurement facilities used to collect the radiated data are located at No. 165 & 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
R&S	ESVS30	MEASURE RECEIVER	09/13/03
ADVANTEST	R3132	SPECTRUM ANALYZER	09/11/03
SCHAFFNER	CBL 6112B	ANTENNA	11/11/03
BELDEN	9913	CABLE	10/13/03
SCHAFFNER	CPA9231A	PRE-AMPLIFIER	10/30/03
ANTENNA (1-18GHz)	3115	EMCO	02/24/04
AMPLIFIER (1-26.5GHz)	8449B	HP	02/20/04
CABLE (1-18GHz)	SUCOFLEX 104	HUBER+SUHNER	02/20/04
EMC ANALYZER (9KHz-22GHz)	8593A	HP	01/09/04

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.

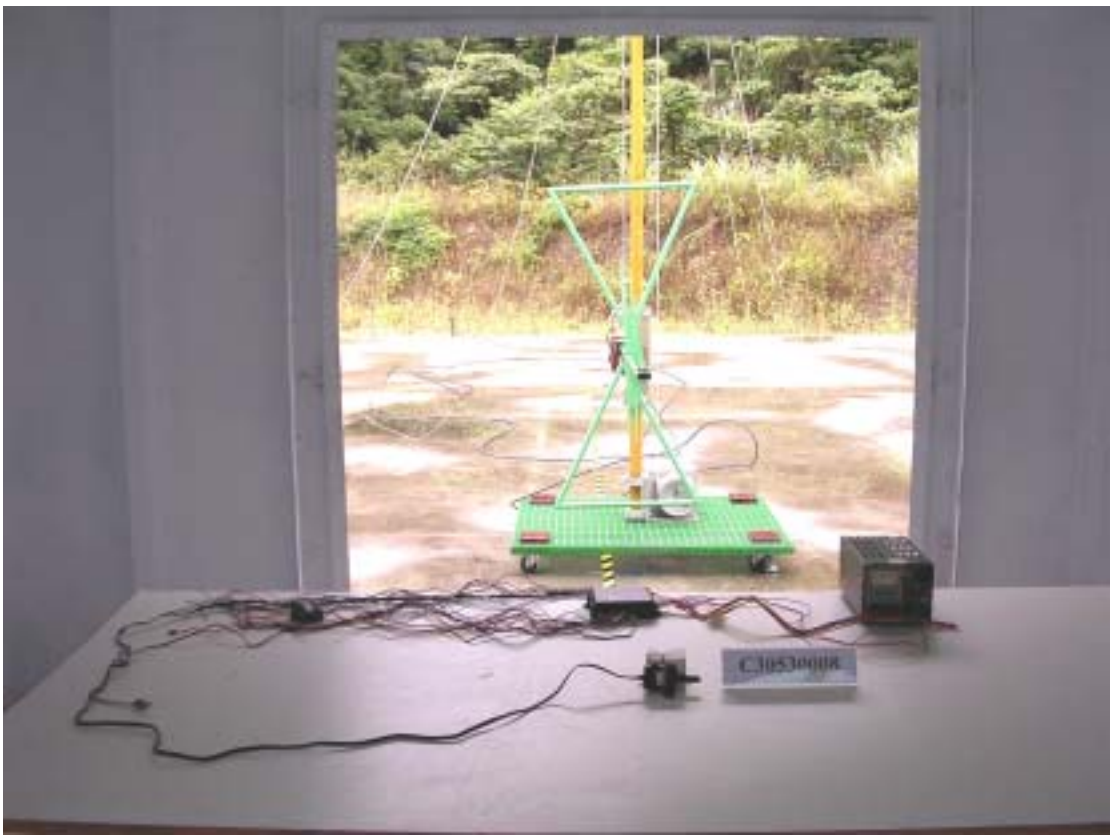
8. RADIATED EMISSION LIMITS

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
RECEIVER MODE	SECTION 15.109

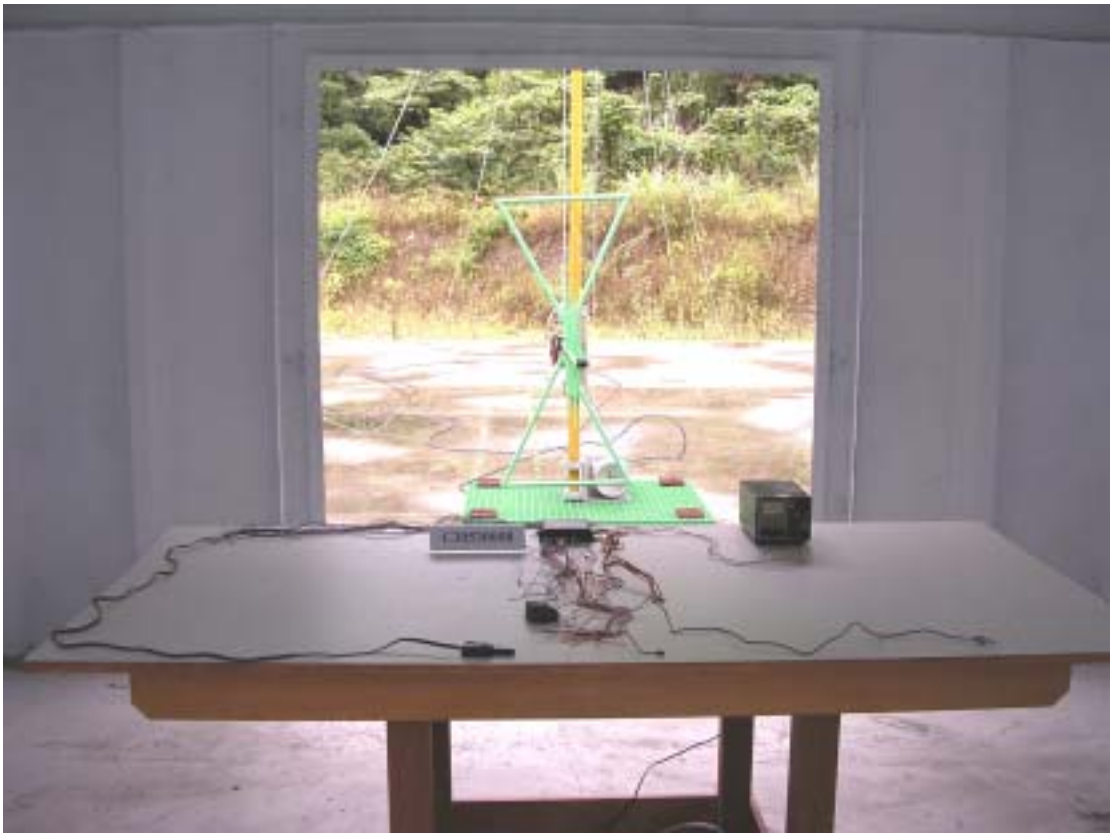
9. SYSTEM TEST CONFIGURATION

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 (Transmitter Mode)



Radiated Open Site Test Set-Up (Receiver Mode)



10. TEST PROCEDURE

Radiated Emissions, 15.231(4)(b)

Test Set-up for frequency range 30 – 1000 MHz

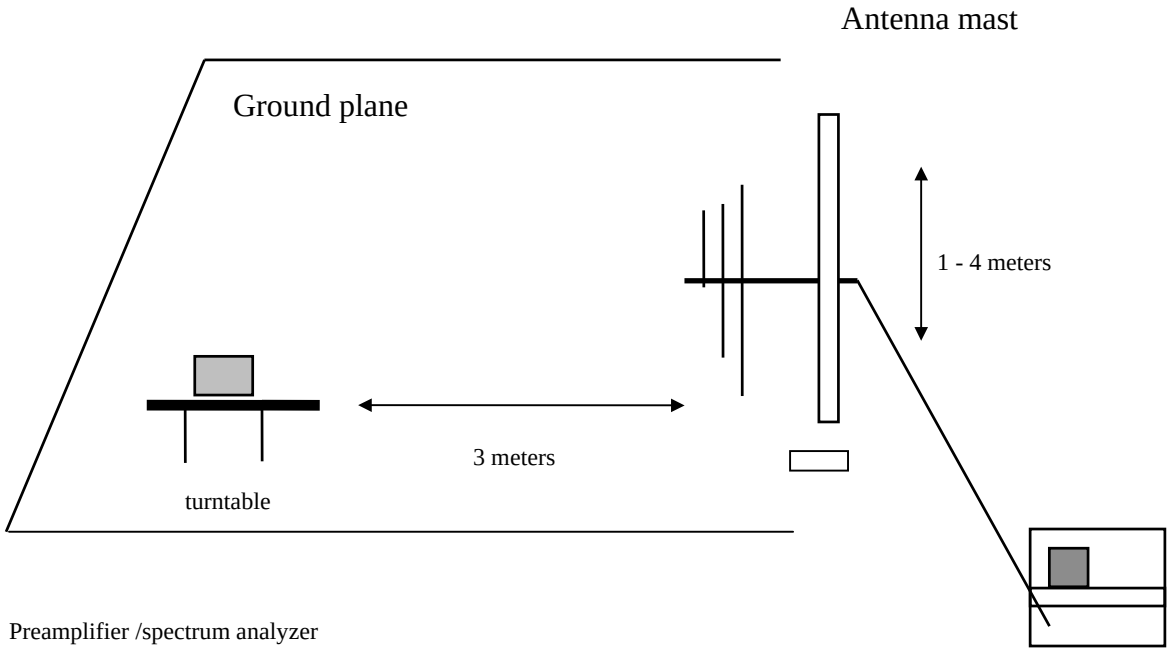


Fig. 1

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

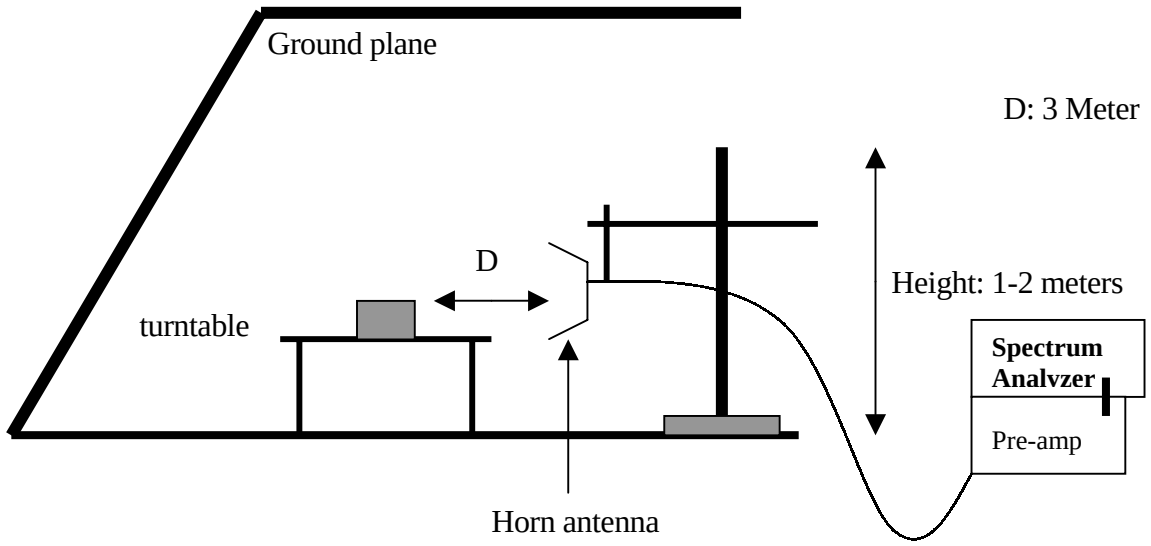


Fig. 2

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)	
		SECTION 15.109	X

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:

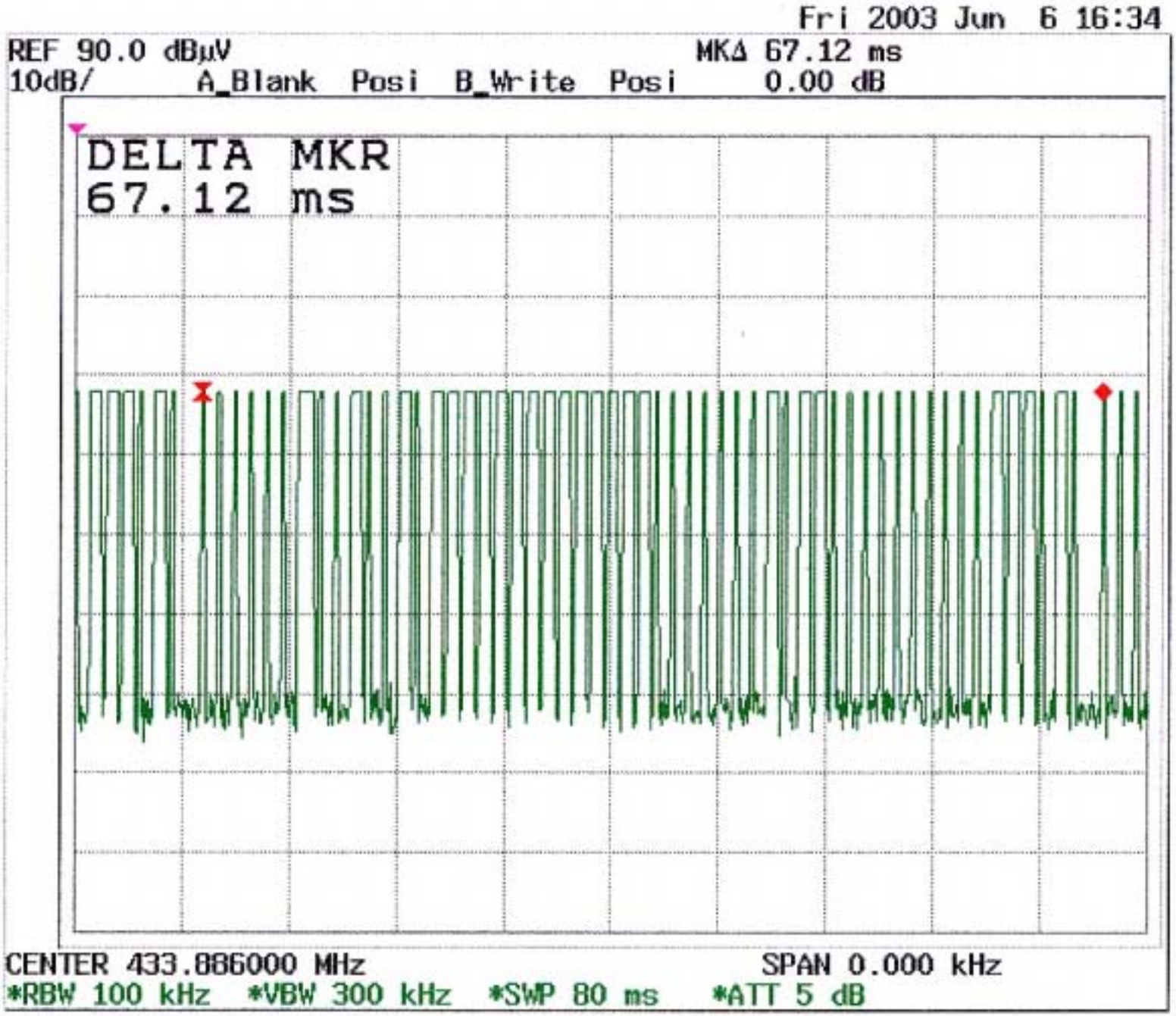
WHERE 1 Period = 67.12 mS
Long pulse = 0.72 mS
Short pulse = 0.17 mS
No of Long pulse = 21
No of Short pulse = 34

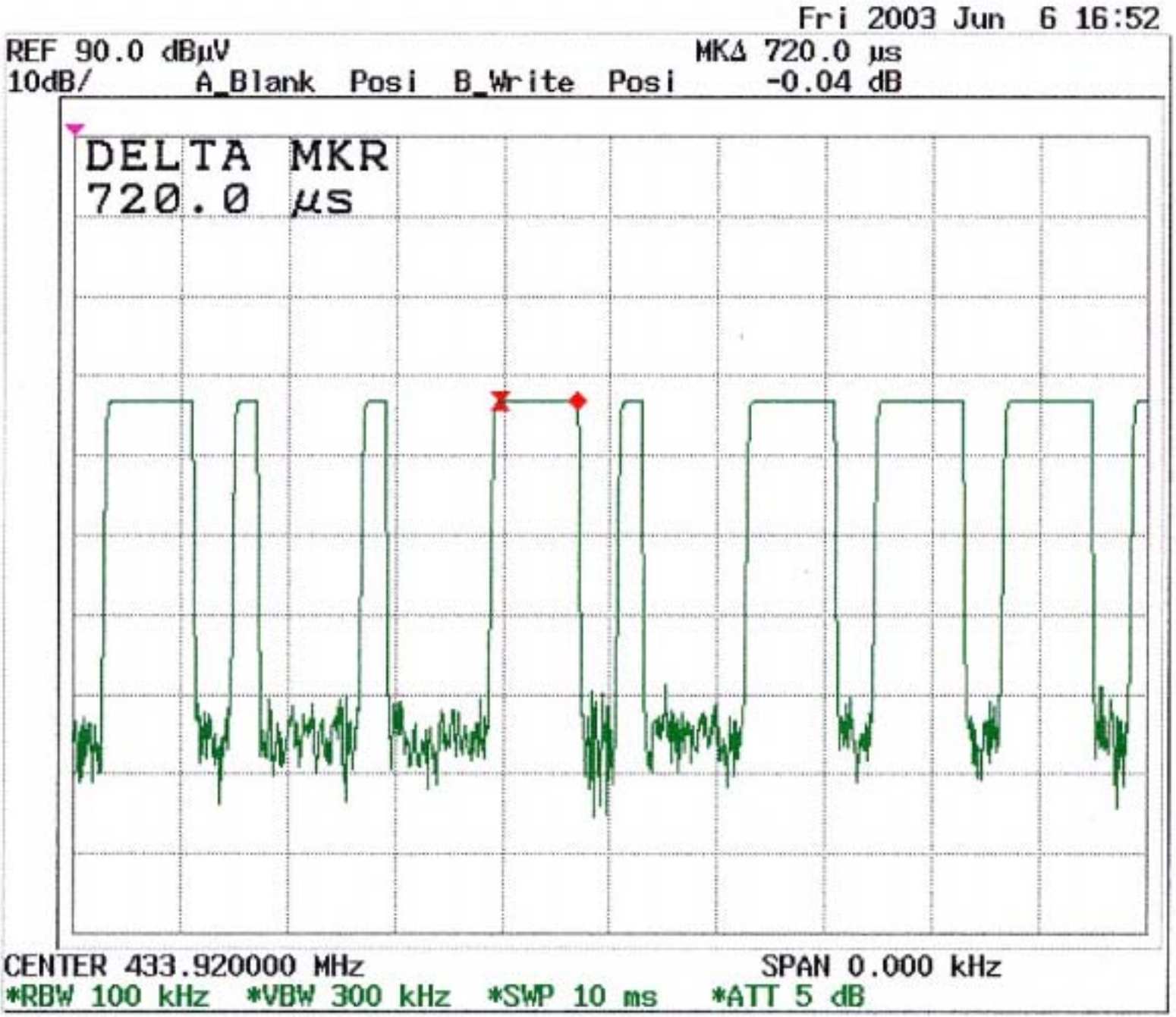
Duty Cycle = (N1L1+N2L2+…+Nn-1Ln-1+NnLn)/100 or T
Duty Cycle = [(21x0.72)+(34x0.17)]/67.12 = 0.3114=31.14％or -10.134dB

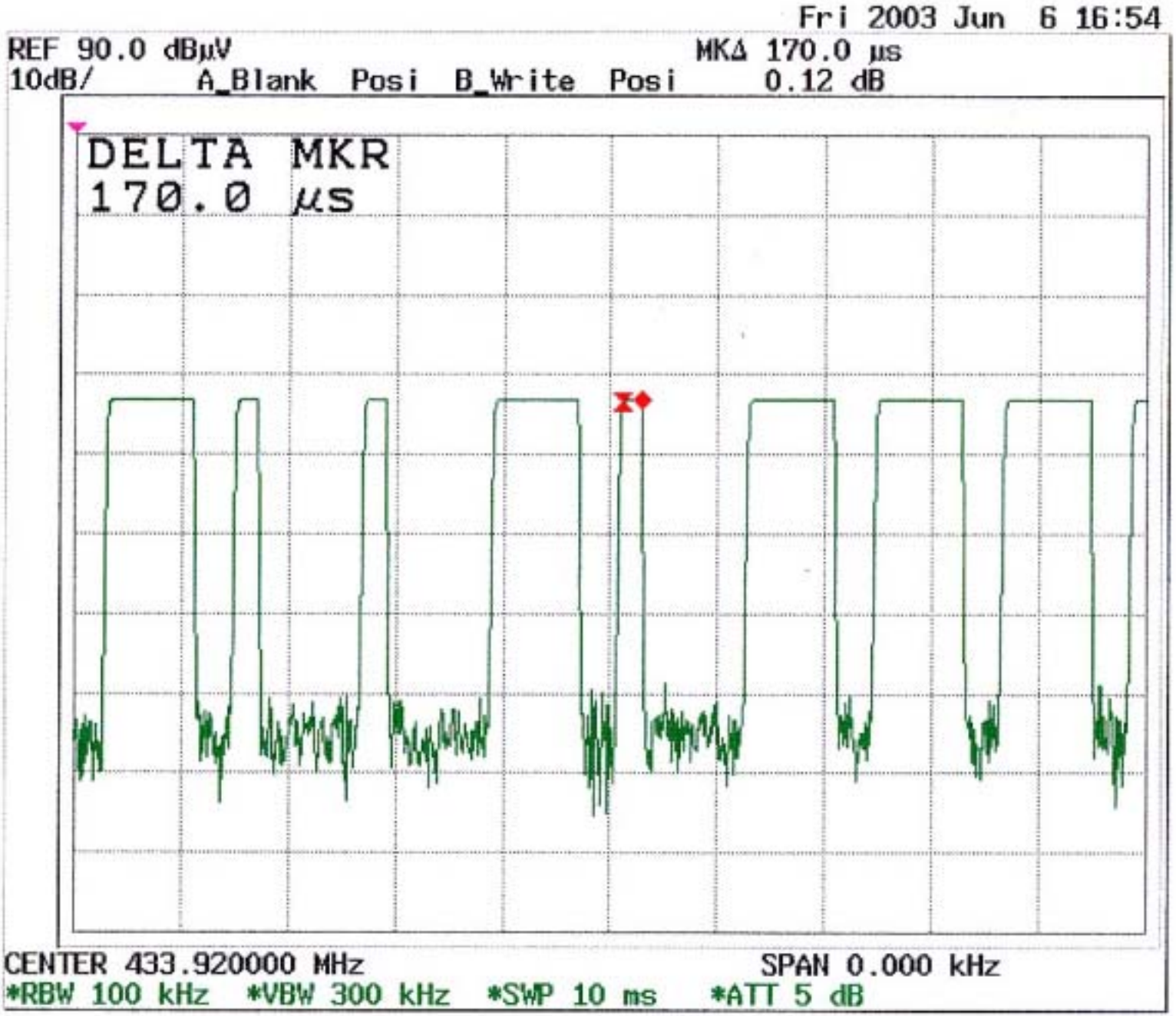
12.2 The Emissions Bandwidth

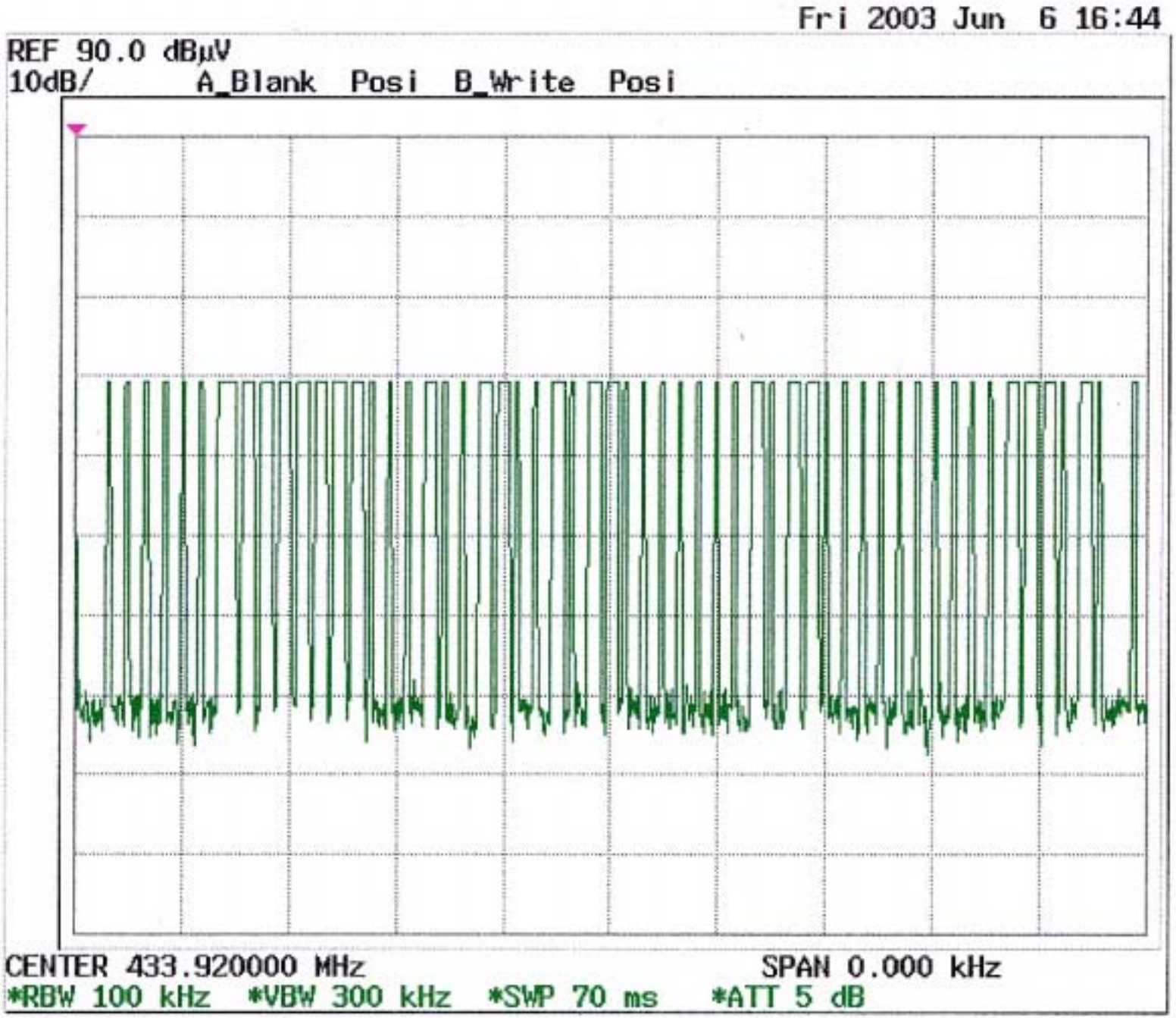
The bandwidth of the emissions were investigated per 15.231(c)

Center Frequency	Measured	Limits
433.92 MHz	**354.0 kHz < (refer to plot)**	**433.92MHzX0.25%=1084.8 kHz**


Fri 2003 Jun 6 16:34
REF 90.0 dBµV
MKΔ 67.12 ms
10dB/ A_Blank Posi B_Write Posi 0.00 dB
DELTA MKR
67.12 ms
CENTER 433.886000 MHz
SPAN 0.000 kHz
*RBW 100 kHz *VBW 300 kHz *SWP 80 ms *ATT 5 dB


Fri 2003 Jun 6 16:52
REF 90.0 dBµV
MKΔ 720.0 µs
10dB/ A_Blank Posi B_Write Posi -0.04 dB
DELTA MKR
720.0 µs
CENTER 433.920000 MHz
SPAN 0.000 kHz
*RBW 100 kHz *VBW 300 kHz *SWP 10 ms *ATT 5 dB


Fri 2003 Jun 6 16:54
REF 90.0 dBµV
MKΔ 170.0 µs
10dB/ A_Blank Posi B_Write Posi 0.12 dB
DELTA MKR
170.0 µs
CENTER 433.920000 MHz
SPAN 0.000 kHz
*RBW 100 kHz *VBW 300 kHz *SWP 10 ms *ATT 5 dB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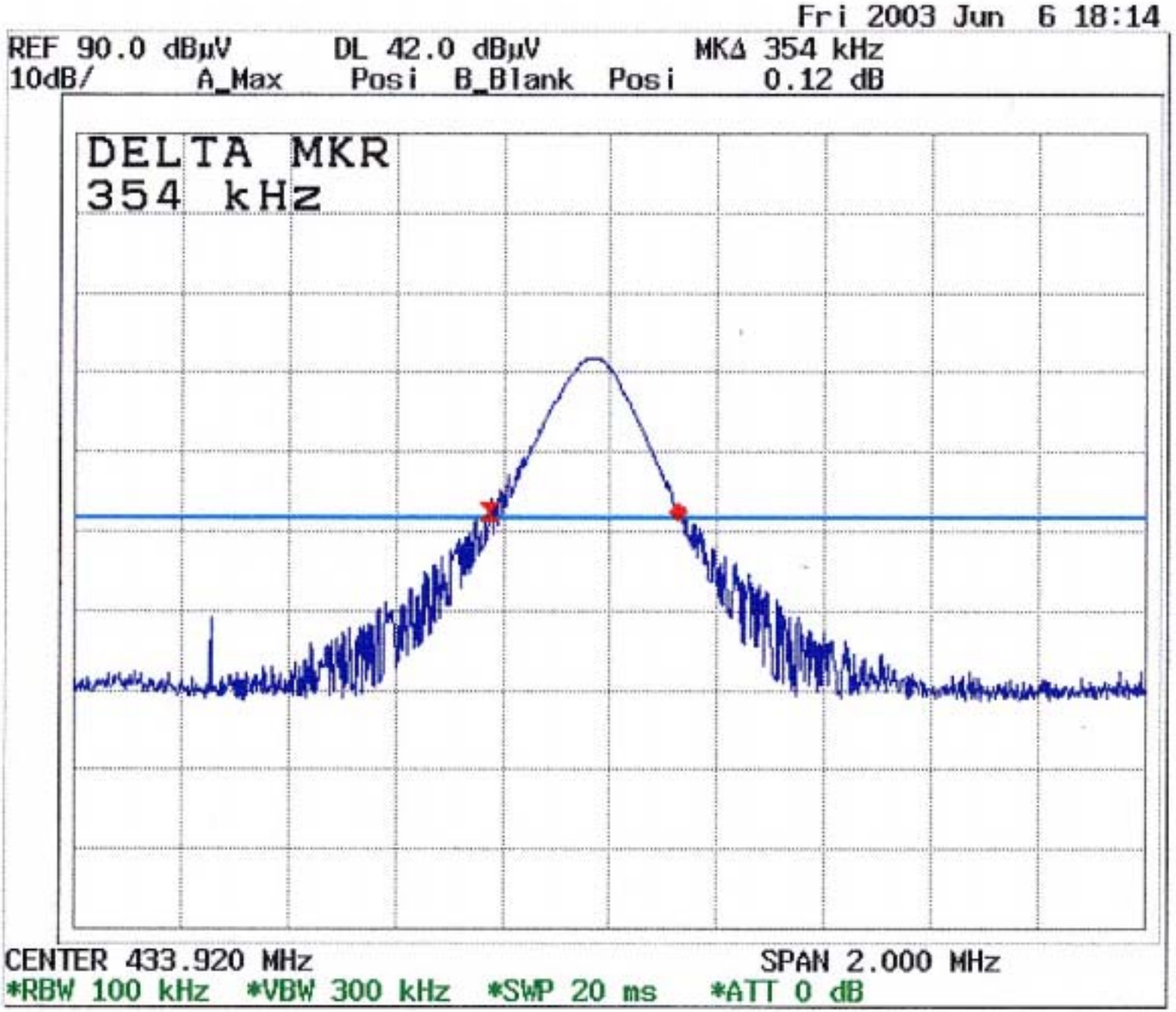
REF 90.0 dBµV
10dB/
A_Blank Posi
B_Write Posi
CENTER 433.920000 MHz
SPAN 0.000 kHz
*RBW 100 kHz
*VBW 300 kHz
*SWP 70 ms
*ATT 5 dB


Fri 2003 Jun 6 18:14
REF 90.0 dBµV
DL 42.0 dBµV
MKΔ 354 kHz
10dB/ A_Max Posi B_Blank Posi 0.12 dB
DELTA MKR
354 kHz
CENTER 433.920 MHz
SPAN 2.000 MHz
*RBW 100 kHz *VBW 300 kHz *SWP 20 ms *ATT 0 dB

C&C Laboratory CO., LTD.

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

No. 163-1, Chung Sheng Road,
Hsin Tien City, Taipei, Taiwan, R.O.C.
PHONE: 02-2217-0894 FAX: 02-2217-1029

Project #:	C30909401
Report #:	C30530008-RP
Date& Time:	2003/06/09
Test Engr:	JIMMY CHEN

Company:	CODE SYSTEMS, INC.
EUT Description:	ANTENNA (433.92 MHz / Car Alarm Transceiver)
Test Configuration :	EUT ONLY
Type of Test:	FCC 15.231(b)
Mode of Operation:	Transmitter Mode

K-Site

M% = ((t1+t2+t3+…)/T) * 100% = **31.14 %**

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

20*log(M%) = **-10.134**

	Freq. (MHz)	Pk Rdg (dBuV)	Av Rdg (dBuV)	AF/AT (dB)	Closs (dB)	Pre-amp (dB)	Level (dBuV/m)	Limit FCC_B	Margin (dB)	Pol (H/V)	Az (Deg)	Height (Meter)
	Button #1:											
X	433.88	52.18	42.05	27.12	3.28	29.68	42.77	80.83	-38.06	3mV	270	1.00
	867.81	38.27	28.14	32.74	5.02	28.79	37.11	60.83	-23.72	3mV	360	1.50
Y	433.86	56.38	46.25	27.12	3.28	29.68	46.97	80.83	-33.86	3mV	180	1.30
	867.81	29.22	19.09	32.74	5.02	28.79	28.06	60.83	-32.77	3mV	180	1.20
Z	433.89	57.72	47.59	27.12	3.28	29.68	48.31	80.83	-32.52	3mV	90	1.20
	867.77	25.61	15.48	32.74	5.02	28.79	24.45	60.83	-36.38	3mV	90	1.00
X	433.88	57.20	47.07	27.12	3.28	29.68	47.79	80.83	-33.04	3mH	90	1.00
	867.78	32.39	22.26	32.74	5.02	28.79	31.23	60.83	-29.60	3mH	90	1.50
Y	433.89	58.41	48.28	27.12	3.28	29.68	49.00	80.83	-31.83	3mH	180	1.00
	867.78	29.02	18.89	32.74	5.02	28.79	27.86	60.83	-32.97	3mH	180	1.40
Z	433.89	59.12	48.99	27.12	3.28	29.68	49.71	80.83	-31.12	3mH	270	1.10
	867.77	27.85	17.72	32.74	5.02	28.79	26.69	60.83	-34.14	3mH	270	1.30

AF/AT=AF+10dB(ATTENUATOR)
Peak: RBW= 120KHz
VBW= 300KHz
A(Average): Pk Reading - 10.134dB

Total Data #12

C&C Laboratory CO., LTD.

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

No. 163-1, Chung Sheng Road,
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PHONE: 02-2217-0894 FAX: 02-2217-1029

Project #:	C30909401
Report #:	C30530008-RP
Date& Time:	2003/06/09
Test Engr:	JIMMY CHEN

Company:	CODE SYSTEMS, INC.
EUT Description:	ANTENNA (433.92 MHz / Car Alarm Transceiver)
Test Configuration :	EUT ONLY
Type of Test:	FCC 15.231(b)/FCC 15.209
Mode of Operation:	Transmitter Mode

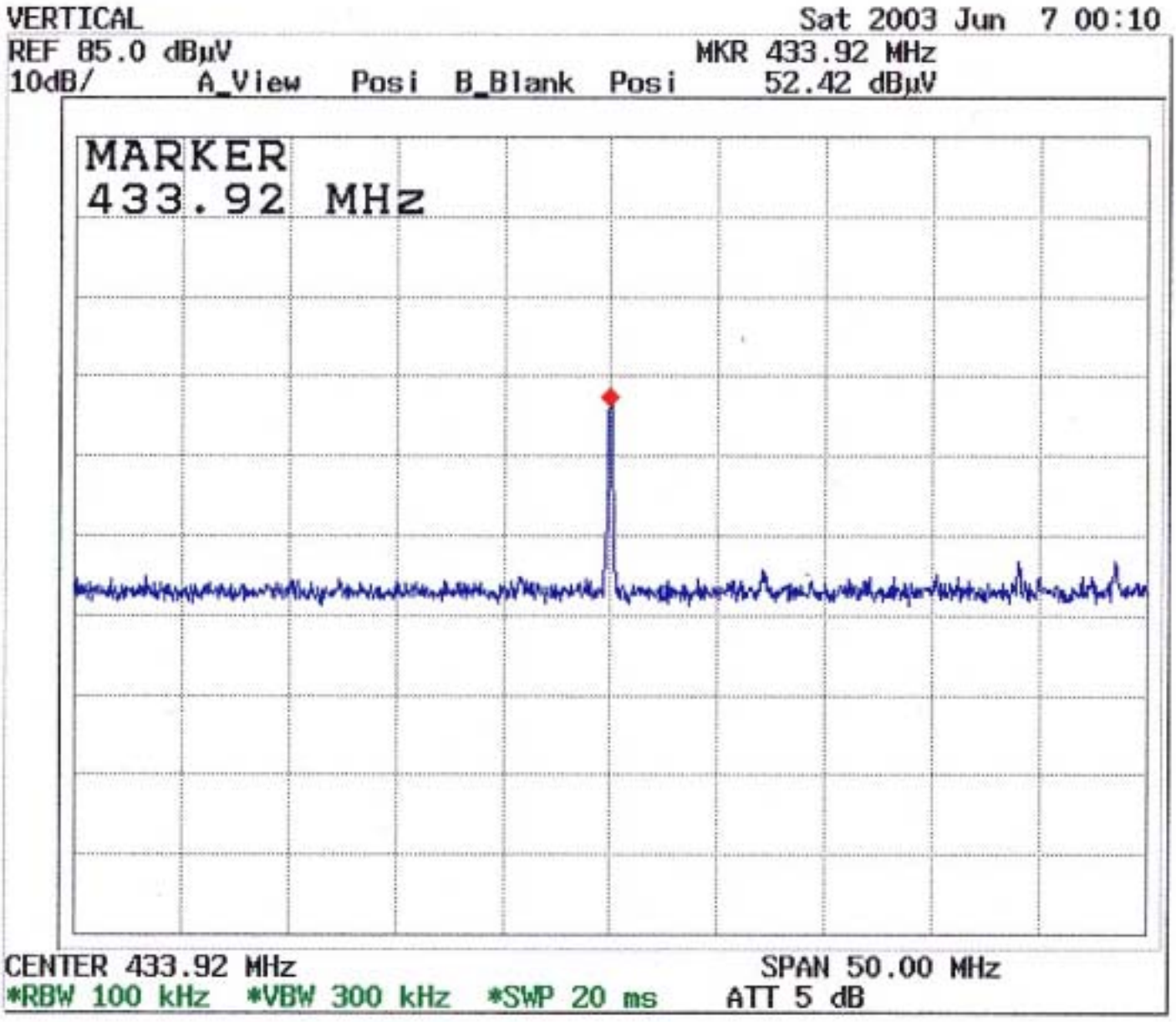
◉ K-Site

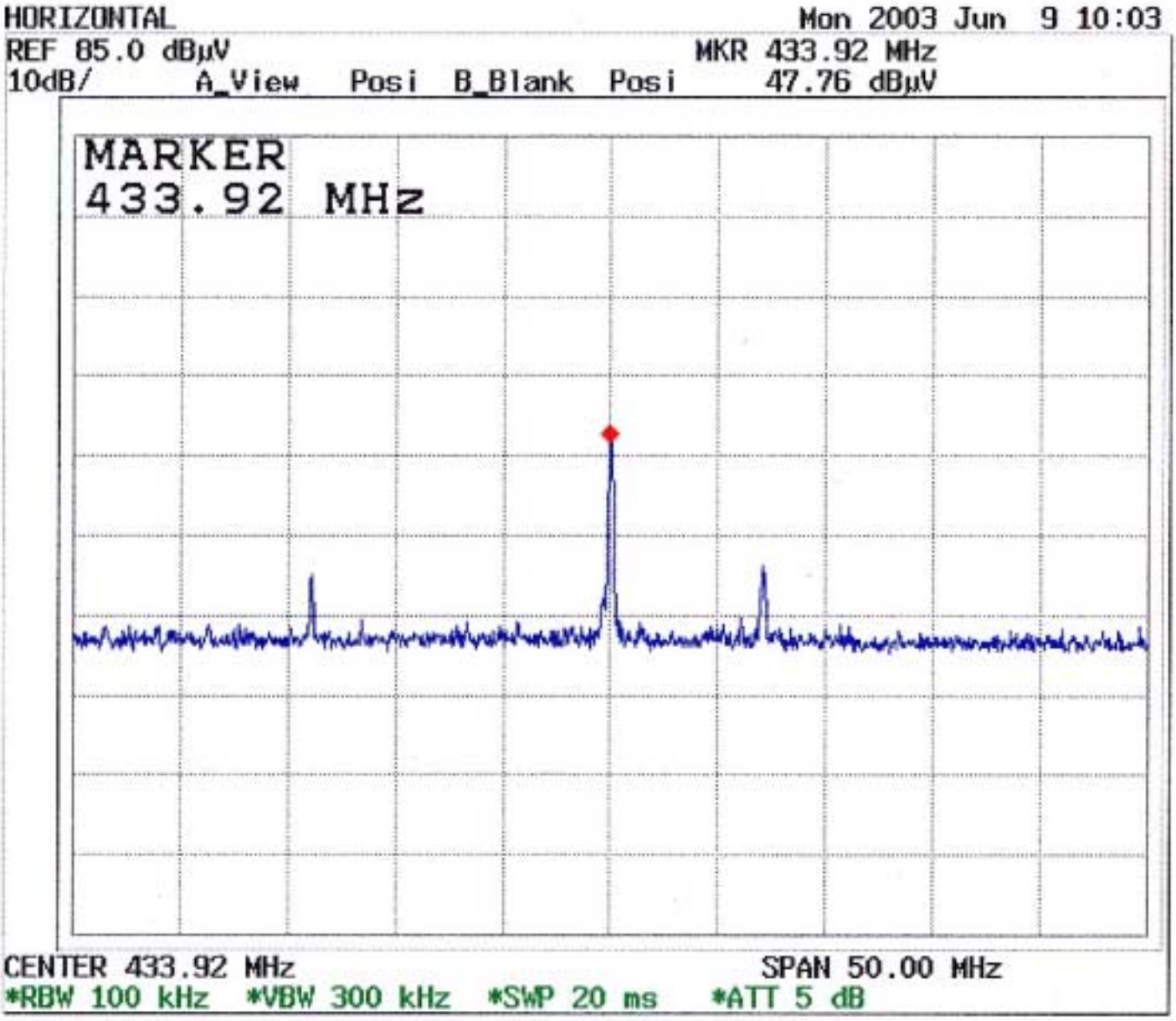
Freq. (MHz)	Pk Rdg (dBuV)	Av Rdg (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Level (dBuV/m)	Limit FCC_B	Margin (dB)	Pol (H/V)	Az (Deg)	Height (Meter)	Mark (P/Q/A)
1302	**44.93**	**34.80**	**25.18**	**4.75**	**32.04**	**32.69**	**54.00**	**-21.31**	**3mV**	**90**	**1.2**	**A**
1735	**44.13**	**34.00**	**26.43**	**5.58**	**32.76**	**33.25**	**60.83**	**-27.58**	**3mV**	**90**	**1.0**	**A**
2170	**43.53**	**33.40**	**27.76**	**6.25**	**33.15**	**34.26**	**60.83**	**-26.57**	**3mV**	**270**	**1.5**	**A**
2604	**44.39**	**34.26**	**28.91**	**6.77**	**33.18**	**36.76**	**60.83**	**-24.07**	**3mV**	**360**	**1.1**	**A**
3038	**50.42**	**40.29**	**30.09**	**7.45**	**33.02**	**44.81**	**60.83**	**-16.02**	**3mV**	**90**	**1.0**	**A**
3471	**45.67**	**35.54**	**31.14**	**8.18**	**32.96**	**41.90**	**60.83**	**-18.93**	**3mV**	**180**	**1.3**	**A**
3905	**44.77**	**34.64**	**32.37**	**8.62**	**32.91**	**42.72**	**54.00**	**-11.28**	**3mV**	**270**	**1.3**	**A**
4339	**45.25**	**35.12**	**32.25**	**9.10**	**32.97**	**43.50**	**54.00**	**-10.50**	**3mV**	**180**	**1.0**	**A**
1302	**45.87**	**35.74**	**25.18**	**4.75**	**32.04**	**33.63**	**54.00**	**-20.37**	**3mH**	**90**	**1.1**	**A**
1735	**44.42**	**34.29**	**26.43**	**5.58**	**32.76**	**33.54**	**60.83**	**-27.29**	**3mH**	**180**	**1.0**	**A**
2170	**43.09**	**32.96**	**27.76**	**6.25**	**33.15**	**33.82**	**60.83**	**-27.01**	**3mH**	**270**	**1.2**	**A**
2604	**44.07**	**33.94**	**28.91**	**6.77**	**33.18**	**36.44**	**60.83**	**-24.39**	**3mH**	**180**	**1.3**	**A**
3037	**45.69**	**35.56**	**30.09**	**7.45**	**33.02**	**40.08**	**60.83**	**-20.75**	**3mH**	**360**	**1.0**	**A**
3471	**44.44**	**34.31**	**31.14**	**8.18**	**32.96**	**40.67**	**60.83**	**-20.16**	**3mH**	**90**	**1.5**	**A**
3905	**45.20**	**35.07**	**32.37**	**8.62**	**32.91**	**43.15**	**54.00**	**-10.85**	**3mH**	**180**	**1.5**	**A**
4340	**44.10**	**33.97**	**32.25**	**9.10**	**32.97**	**42.35**	**54.00**	**-11.65**	**3mH**	**90**	**1.0**	**A**

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

Total data #16
V.2d

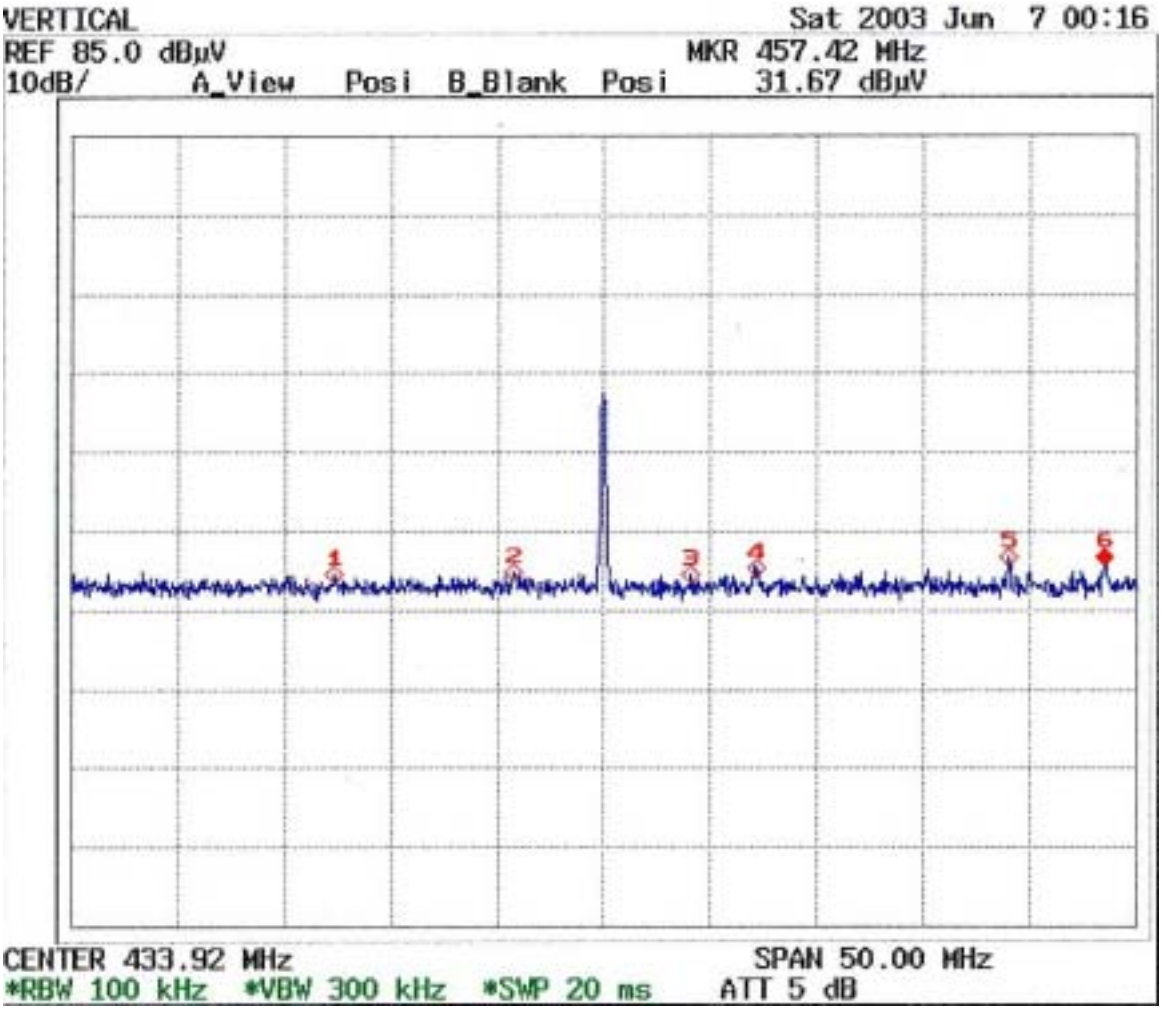
P(Peak): RBW=VBW=1MHz
A(Average): Pk Reading -10.134dB


VERTICAL
Sat 2003 Jun 7 00:10
REF 85.0 dBµV
MKR 433.92 MHz
10dB/ A_View Posi B_Blank Posi 52.42 dBµV
MARKER
433.92 MHz
CENTER 433.92 MHz
SPAN 50.00 MHz
*RBW 100 kHz *VBW 300 kHz *SWP 20 ms ATT 5 dB


HORIZONTAL
Mon 2003 Jun 9 10:03
REF 85.0 dBµV
MKR 433.92 MHz
10dB/ A_View Posi B_Blank Posi 47.76 dBµV
MARKER
433.92 MHz
CENTER 433.92 MHz
SPAN 50.00 MHz
*RBW 100 kHz *VBW 300 kHz *SWP 20 ms *ATT 5 dB

Measurement Result

Operation Mode:	Receiver Mode	Test Date:	June 07, 2003
Fundamental Frequency:	433.92 MHz	Test By:	Jimmy Chen
Temperature:	26 ℃	Pol:	Vertical
Humidity:	68 %		

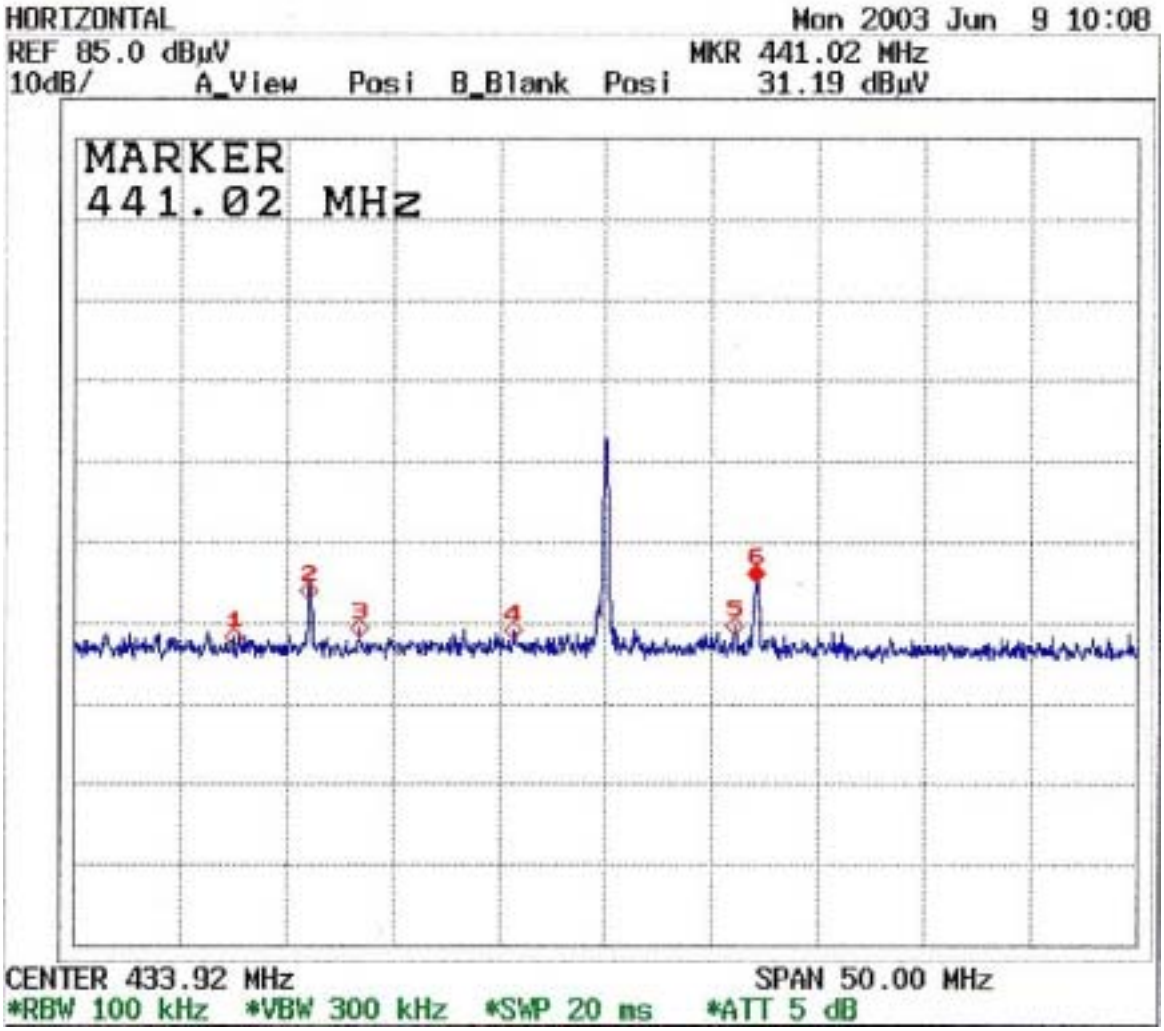


Freq. (MHz)	Ant.Pol. H/V	DetectorMode (PK/AV)	Reading (dBuV)	Ant./CL/ Amp. CF(dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
415.620	V	Peak	28.39	0.27	28.66	46.00	-17.34
419.120	V	Peak	28.57	0.36	28.93	46.00	-17.07
429.670	V	Peak	32.21	0.61	32.82	46.00	-13.18
444.370	V	Peak	28.04	0.96	29.00	46.00	-17.00
448.570	V	Peak	28.24	1.07	29.31	46.00	-16.69
453.970	V	Peak	28.62	1.37	29.99	46.00	-16.01

No other emissions were found within 20dB below the limits from 30-2000MHz.

Measurement Result

Operation Mode:	Receiver Mode	Test Date:	June 09, 2003
Fundamental Frequency:	433.92 MHz	Test By:	Jimmy Chen
Temperature:	26 ℃	Pol:	Horizontal
Humidity:	68 %		



Freq. (MHz)	Ant.Pol. H/V	DetectorMode (PK/AV)	Reading (dBuV)	Ant./CL/ Amp. CF(dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
416.420	H	Peak	23.25	0.29	23.54	46.00	-22.46
419.970	H	Peak	29.08	0.38	29.46	46.00	-16.54
422.320	H	Peak	24.41	0.44	24.85	46.00	-21.15
429.570	H	Peak	24.02	0.61	24.63	46.00	-21.37
439.970	H	Peak	24.57	0.86	25.43	46.00	-20.57
441.020	H	Peak	31.09	0.88	31.97	46.00	-14.03

No other emissions were found within 20dB below the limits from 30-2000MHz.