FCC ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT CERTIFICATION TO FCC PART 15 REQUIREMENTS

for

INTENTIONAL RADIATOR

of

CAR ALARM TRANSMITTER

FCC ID Number	**:** ELVATDC
Trade Name	**:** N/A
Model Number	**:** 136B3659
Agency Series	**:** N/A
Report Number	**:** C40309407-RP
Date	**:** March 19, 2004

Issued for

NUTEK CORPORATION

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

Issued by

Compliance Certification Services Inc.
Hsintien Lab.
No. 165, Chunghsen Road, Hsintien City
Taipei Hsien, Taiwan
TEL: (02) 2217-0894
FAX: (02) 2217-1029

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 I TEST DATA.....10

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
TELEPHONE NO.	: (886-2) 2918-9478
EUT DESCRIPTION	: CAR ALARM TRANSMITTER
MODEL NAME/NUMBER	: 136B3659
FCC ID	: ELVATDC
DATE TESTED	: March 10, 2004
REPORT NUMBER	: C40309407-RP

TYPE OF EQUIPMENT	SECURITY EQUIPMENT (INTENTIONAL RADIATOR)
EQUIPMENT TYPE	433.92 MHz CAR ALARM TRANSMITTER
MEASUREMENT PROCEDURE	ANSI 63.4 / 2003
LIMIT TYPE	CERTIFICATION
FCC RULE	CFR 47, PART 15

The above equipment was tested by Compliance Certification Services Inc. 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 Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services Inc. will constitute fraud and shall nullify the document.

Approved by:

David Wang
Manager of Hsintien Laboratory
Compliance Certification Services Inc.

Reviewed by:

Vince Chiang
Section Manager of Hsintien Laboratory
Compliance Certification Services Inc.

2. PRODUCT DESCRIPTION

Fundamental Frequency	**433.92 MHz**
Power Source	**12V Battery**
Transmitting Time	**Periodic ≤ 5 seconds**
Associated Receiver	**FCC ID: ELVAR8B**

3. TEST FACILITY

The open area test sites and conducted measurement facilities used to collect the radiated data are located at No. 81-1, Lane 210, Bade Rd. 2, Luchu Hsiang, Taoyuan Hsien, 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 C63.4/2003.

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

Open Area Test Site # E				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
SPECTRUM ANALYZER	HP	8568B	2848A18276/2928 A04814	08/18/04
AMPLIFIER	H.P.	8447D A	2727A05764	05/03/04
ANTENNA	SCHAFFNER	CBL 6143	5084	03/19/05
CABLE	BELDEN	9913	N-TYPE E1	07/29/04
Site NSA	CCS	N/A	N/A	09/13/04
ANTENNA (1-18GHz)	EMCO	3115	5761	02/02/05
AMPLIFIER (1-26.5GHz)	HP	8449B	3008A01266	02/15/05
CABLE (1-18GHz)	JYEBAO	LL143	1m-1	02/15/05
CABLE (1-18GHz)	JYEBAO	LL142	12m-1	02/15/05
EMC ANALYZER (100Hz-22GHz)	HP	8566B	2937A06102	06/25/04

Remark: Each piece of equipment is scheduled for calibration once a year.

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 transmitting & receiving, 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

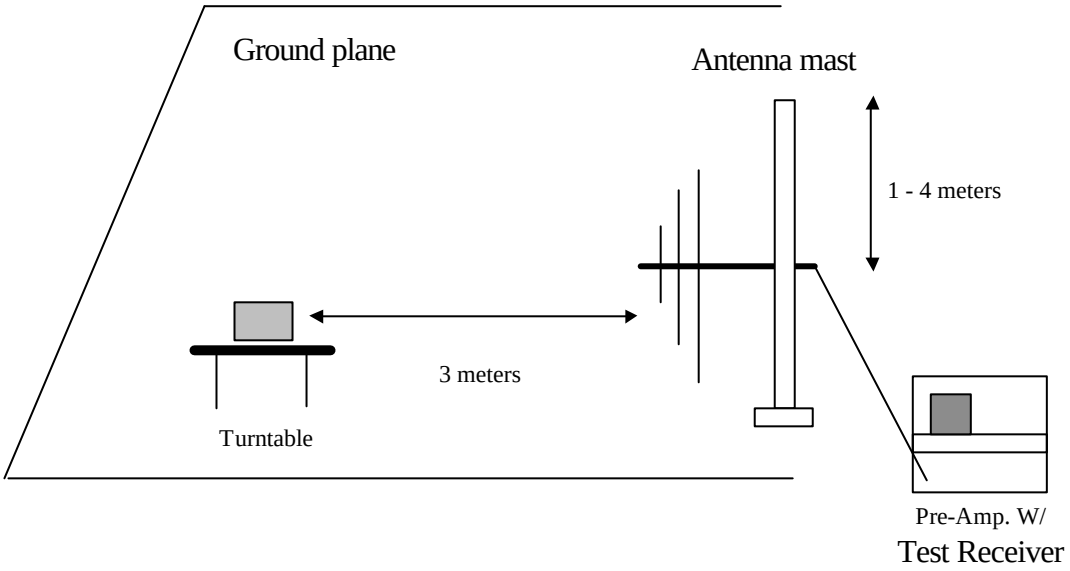


Fig. 1

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

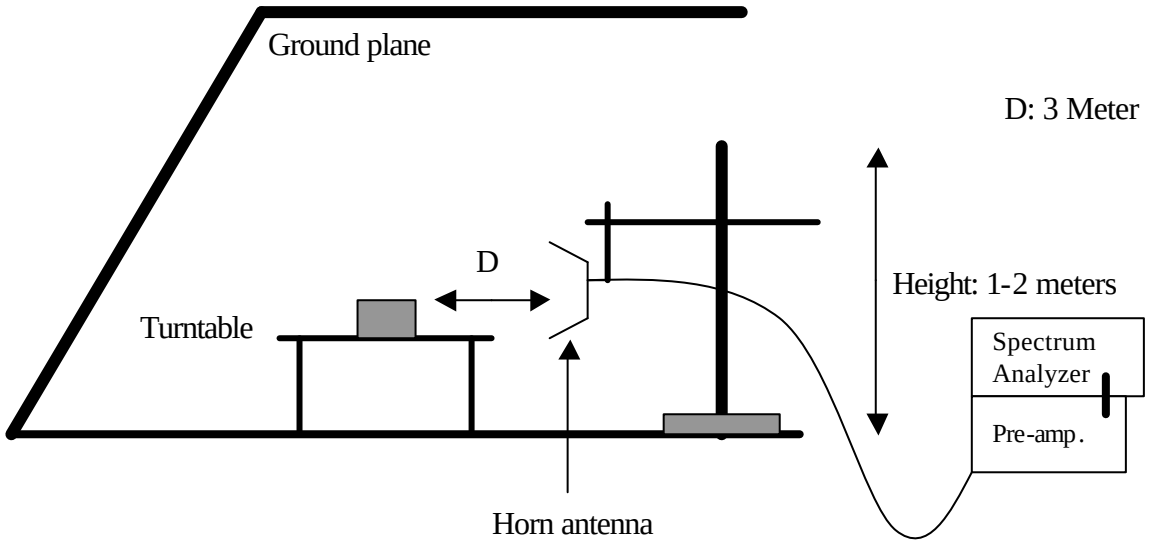


Fig. 2

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:

	Tp (ms)	Ton (ms)	M% = (Ton/Tp)*100%	C.F. = 20*log(M%)
Button#1	100	(20x0.975)+(17x0.45) = 27.15	27.15	–11.325 dB
Button#2	100	(18x0.975)+(19x0.4875) = 26.8	26.80	–11.436 dB
Button#3	100	(15x0.9375)+(22x0.45) = 23.96	23.96	–12.412 dB

12.2 The Emissions Bandwidth

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

Frequency (MHz)	Botton#1 BW (kHz)	Botton#2 BW (kHz)	Botton#3 BW (kHz)	Limit (MHz)
433.92	370.00	555.00	570.00	1.0848

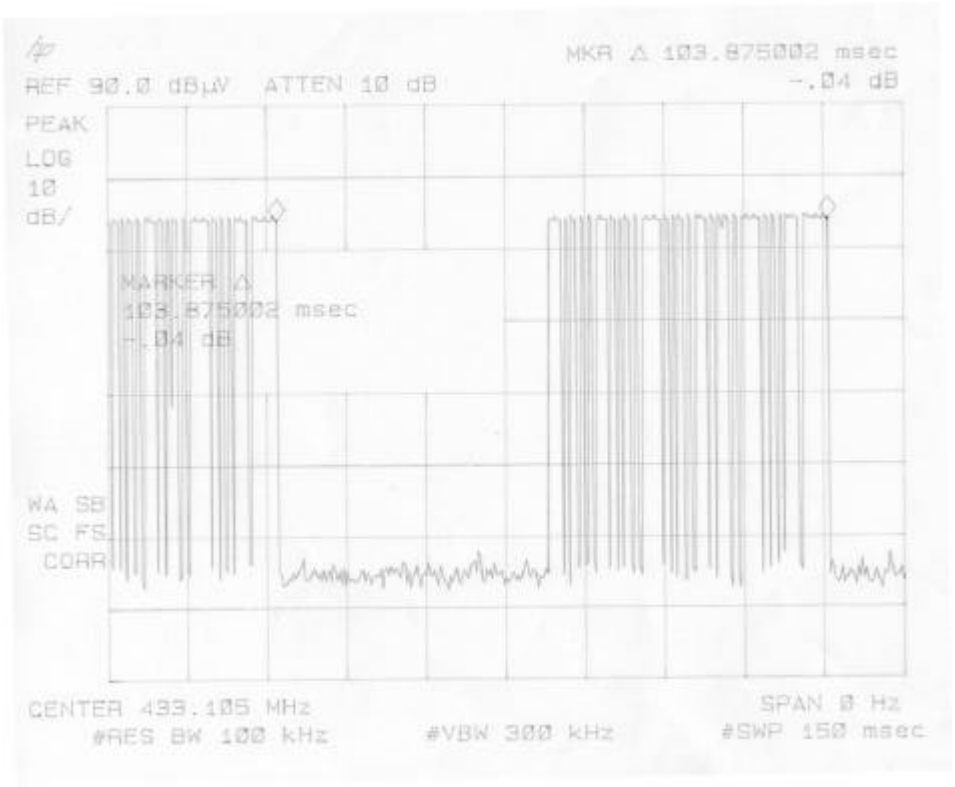
APPENDIX I

TEST DATA

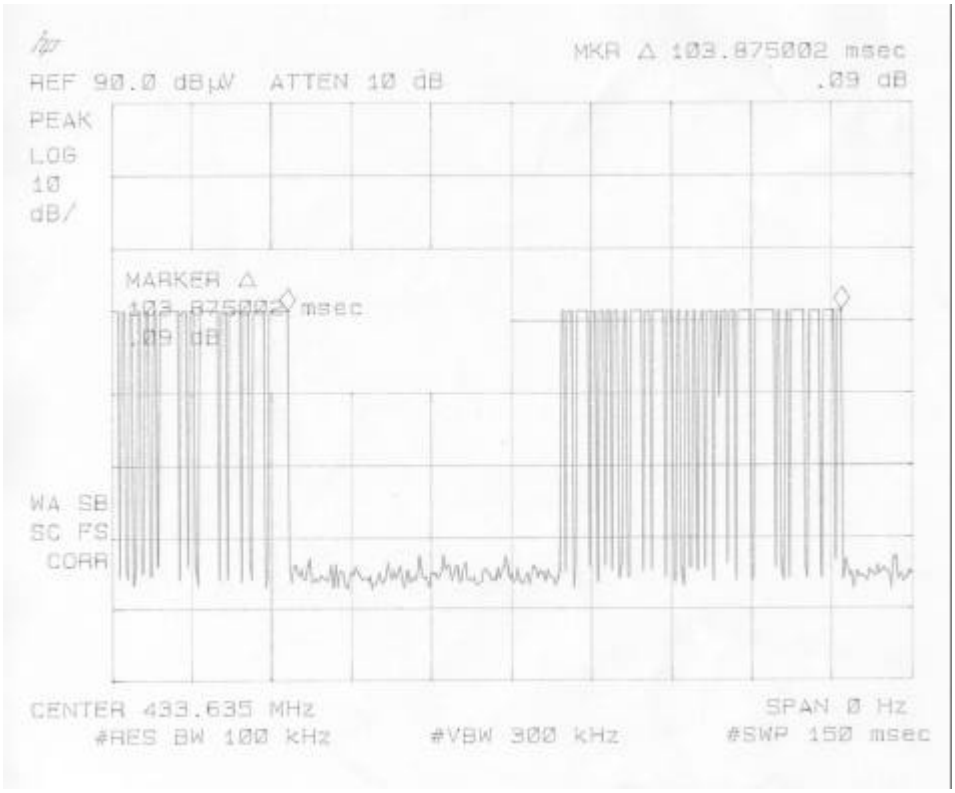
Test Plot: Maximum Modulation Percentage (M%)

Tp

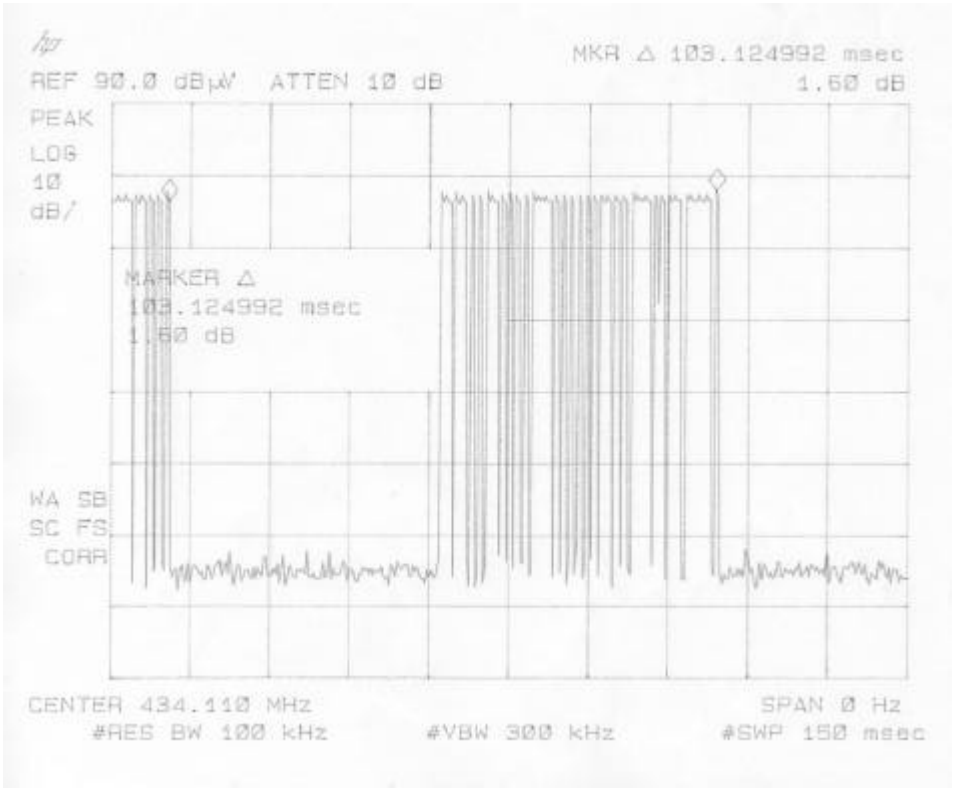
Button#1



Button#2

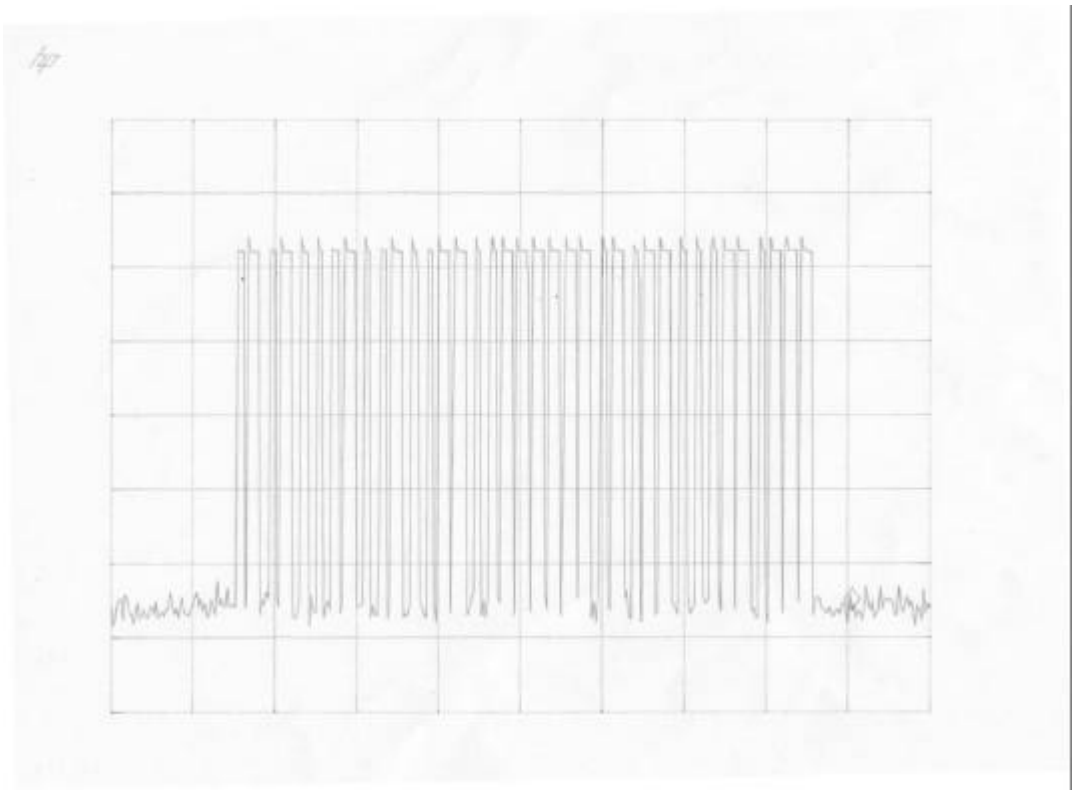


Button#3

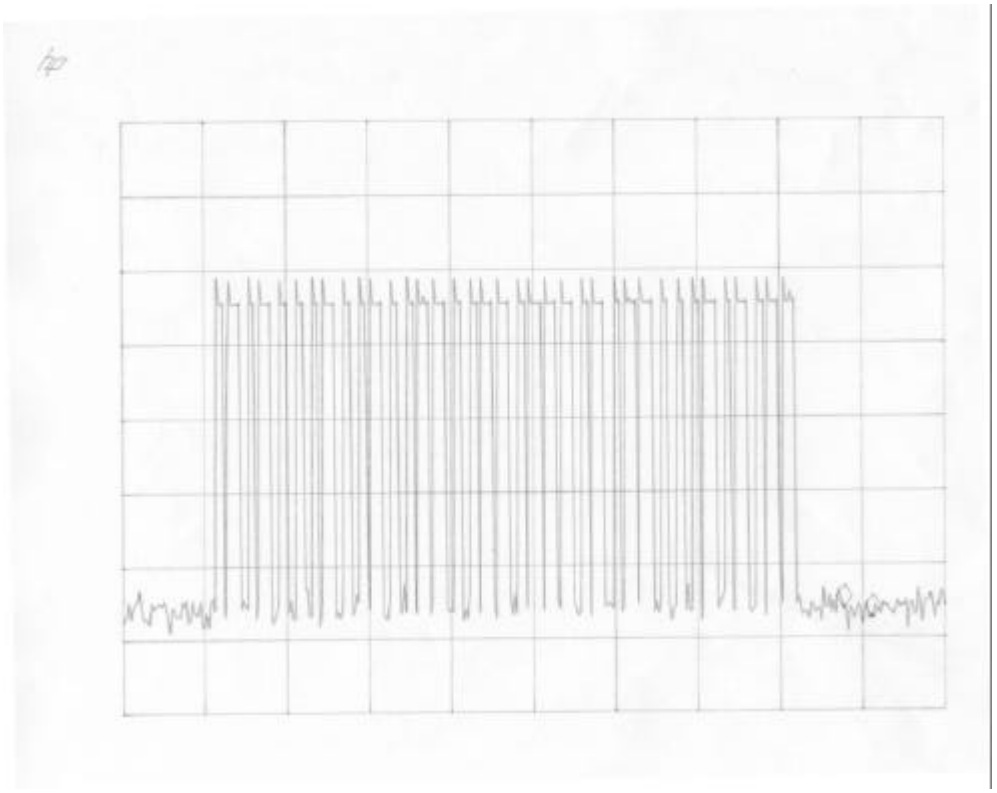


Channel Number

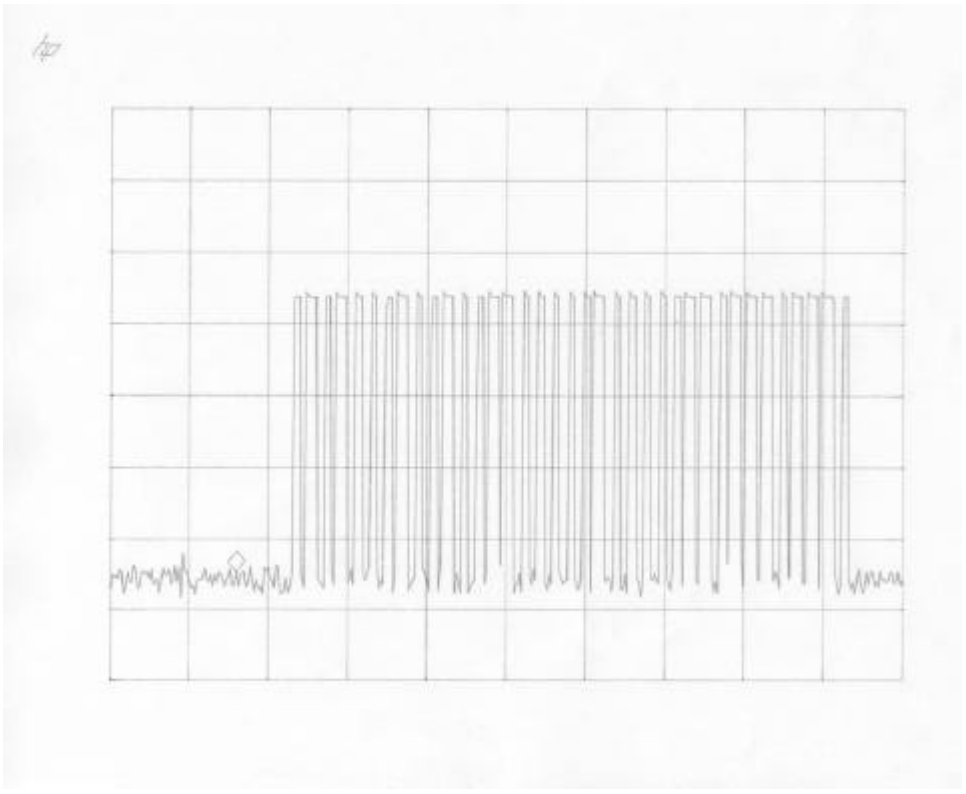
Button#1



Button#2

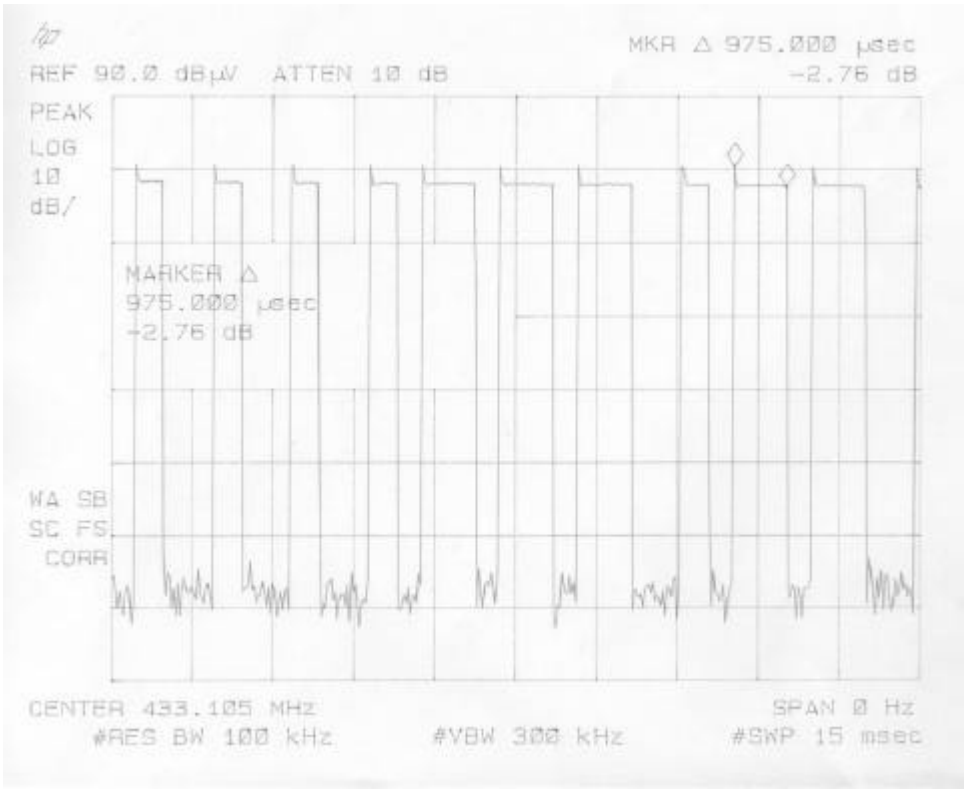


Button#3

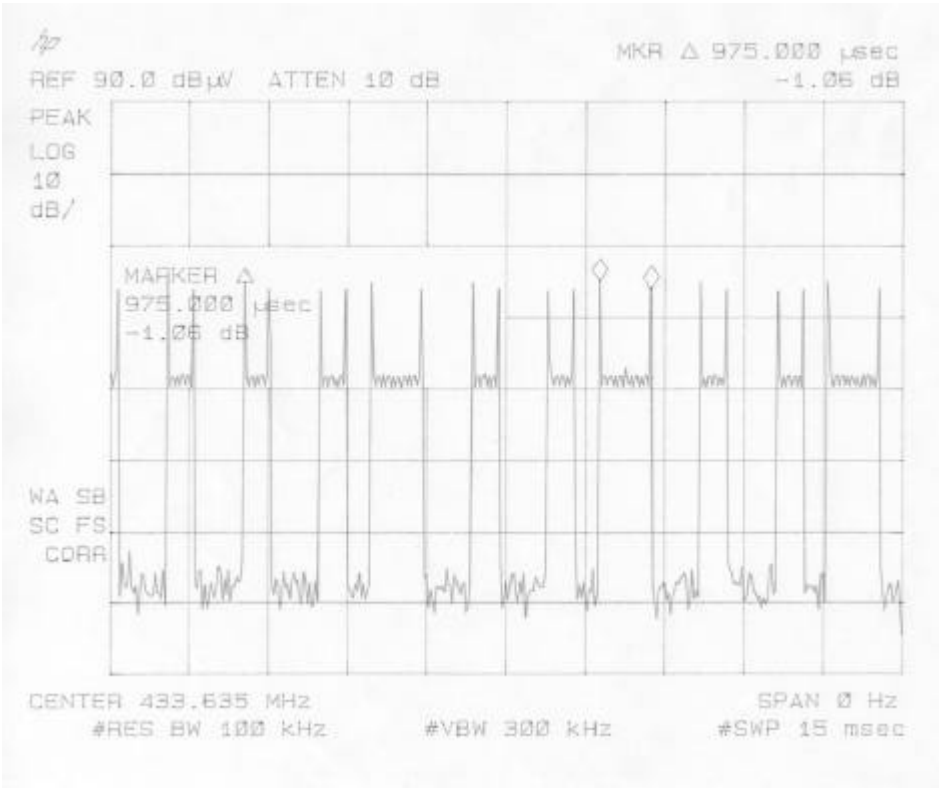


Ton

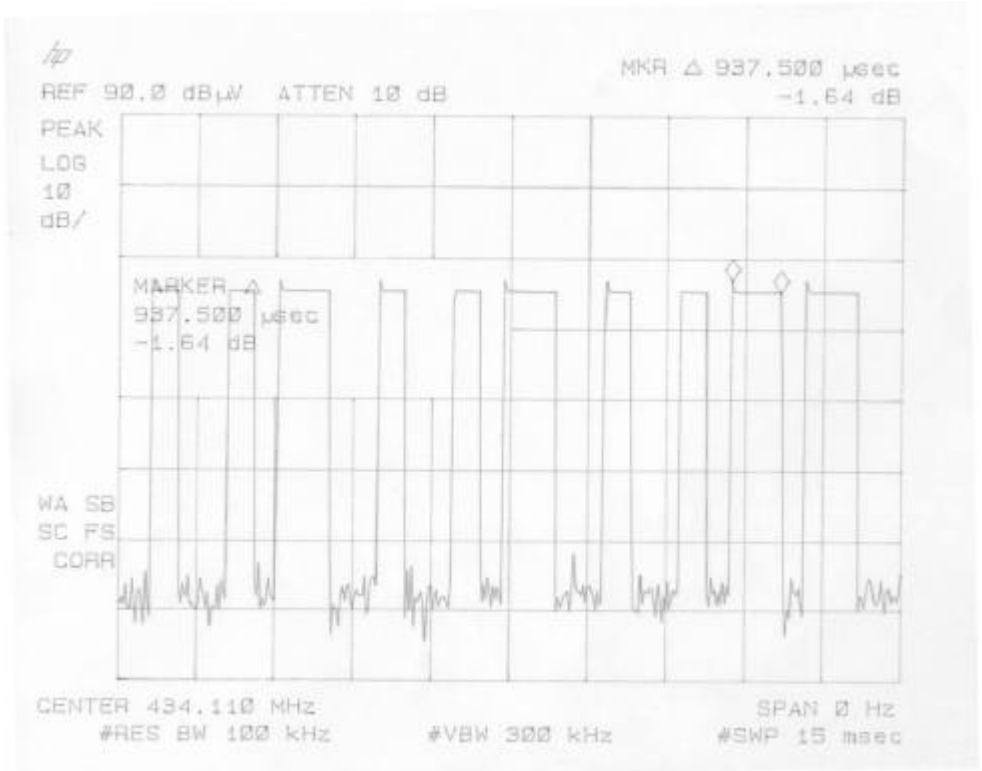
Button#1



Button#2

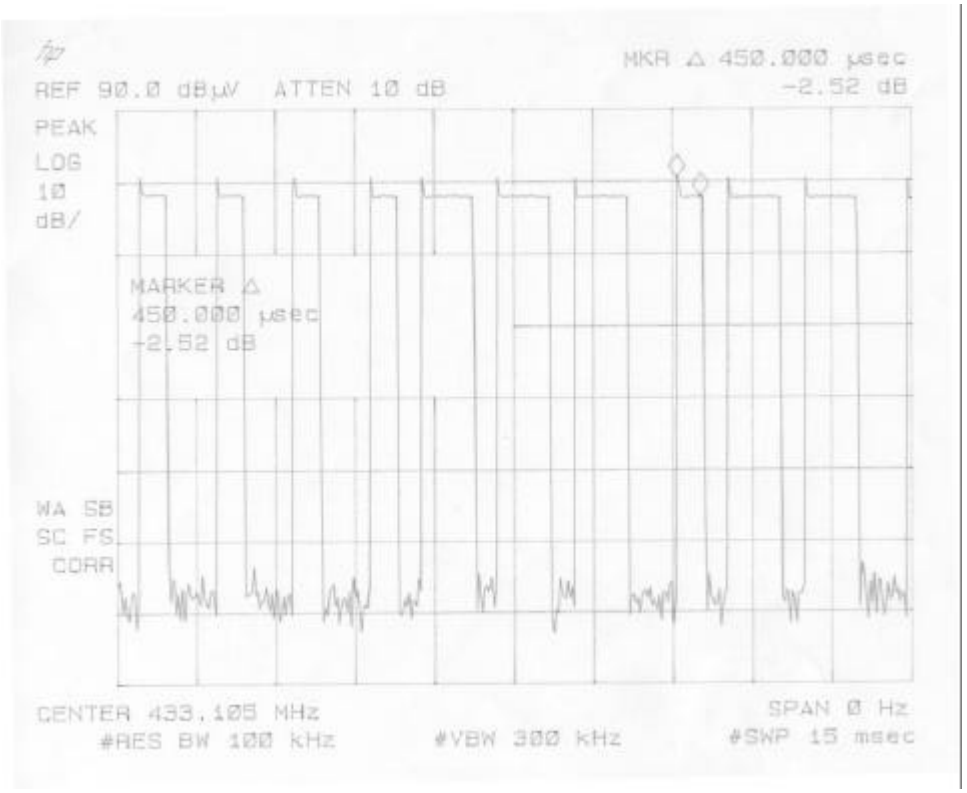


Button#3



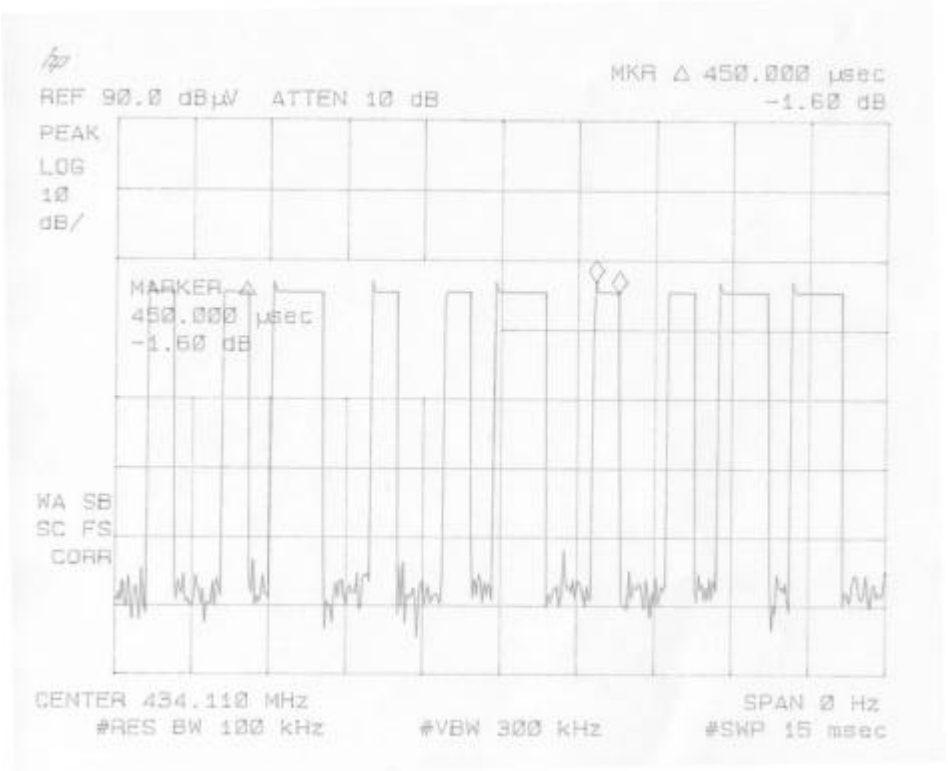
Ton

Button#1



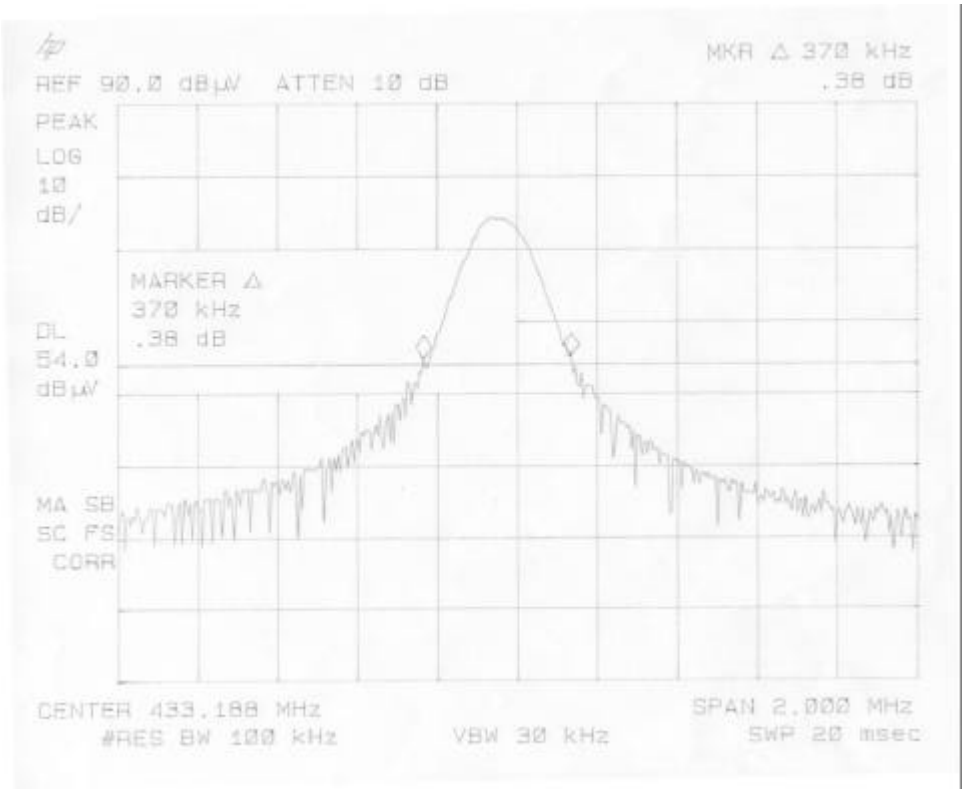
Button#2

Button#3

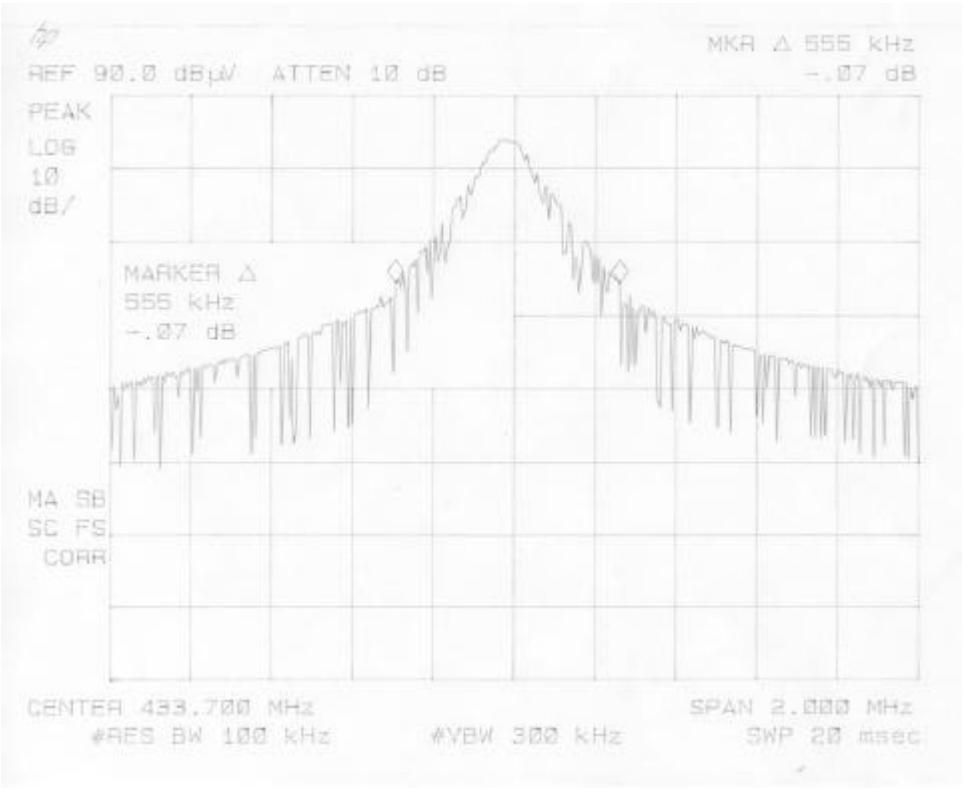


Test Plot: The Emissions Bandwidth

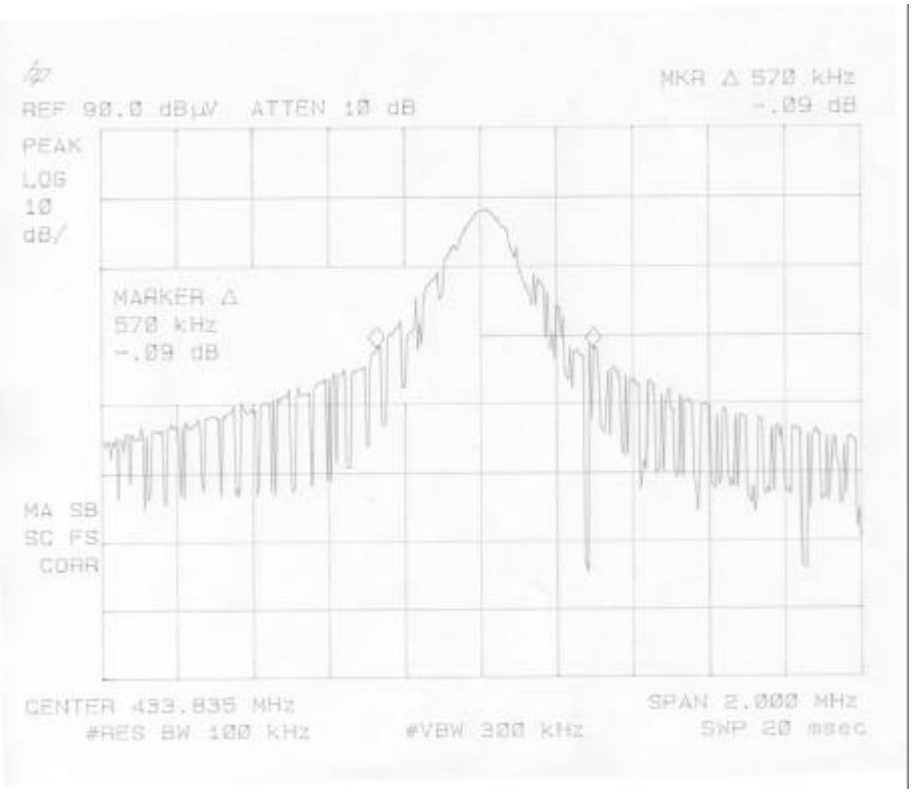
Button#1



Button#2



Button#3


MKR Δ 570 kHz
-.09 dB
REF 90.0 dBµV ATTEN 10 dB
PEAK
LOG
10
dB/
MARKER Δ
570 kHz
-.09 dB
MA SB
SC FS
CORR
CENTER 433.835 MHz
SPAN 2.000 MHz
#RES BW 100 kHz
#VBW 300 kHz
SWP 20 msec

TEST RESULTS

Below 1 GHz

Operation Mode: TX Mode / Button#1 **Test Date:** March 10, 2004

Temperature: 28°C **Humidity:** 68 % RH

Tested by: Jason Lee

Freq. (MHz)	Pk Rdg (dBuV)	Av Rdg (dBuV)	Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol (H/V)
433.42	68.10	56.78	-7.71	49.07	80.81	-31.75	3mV_X
866.69	35.87	24.55	-2.84	21.71	60.81	-39.11	3mV_X
433.56	66.90	55.58	-7.71	47.87	80.81	-32.95	3mV_Y
866.75	37.00	25.68	-2.84	22.84	60.81	-37.98	3mV_Y
433.87	69.00	57.68	-7.71	49.97	80.81	-30.85	3mV_Z
866.69	37.00	25.68	-2.84	22.84	60.81	-37.98	3mV_Z
433.38	78.90	67.58	-7.71	59.87	80.81	-20.95	3mH_X
866.79	37.24	25.92	-2.84	23.08	60.81	-37.74	3mH_X
433.60	77.00	65.68	-7.71	57.97	80.81	-22.85	3mH_Y
866.69	40.00	28.68	-2.84	25.84	60.81	-34.98	3mH_Y
433.25	75.00	63.68	-7.71	55.97	80.81	-24.85	3mH_Z
866.19	39.00	27.68	-2.84	24.84	60.81	-35.98	3mH_Z

Factor = Antenna Factor + Cable Loss - Pre Amplifier
Av Rdg = Pk Rdg -11.325dB

Notes:

1. *Measuring frequencies from 30 MHz to the 1GHz.*
2. *Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.*
3. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
4. *The IF bandwidth of SPA between 30MHz to 1GHz was 100kHz.*

Operation Mode: TX Mode / Button#2 **Test Date:** March 10, 2004

Temperature: 28°C **Humidity:** 68 % RH

Tested by: Jason Lee

Freq. (MHz)	Pk Rdg (dBuV)	Av Rdg (dBuV)	Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol (H/V)
433.58	66.70	55.26	-7.71	47.55	80.81	-33.26	3mV_X
866.35	34.20	22.76	-2.84	19.92	60.81	-40.89	3mV_X
433.59	65.00	53.56	-7.71	45.85	80.81	-34.96	3mV_Y
866.53	36.00	24.56	-2.84	21.72	60.81	-39.09	3mV_Y
433.25	65.00	53.56	-7.71	45.85	80.81	-34.96	3mV_Z
866.52	37.00	25.56	-2.84	22.72	60.81	-38.09	3mV_Z
433.65	76.20	64.76	-7.71	57.05	80.81	-23.76	3mH_X
866.32	39.30	27.86	-2.84	25.02	60.81	-35.79	3mH_X
433.66	76.50	65.06	-7.71	57.35	80.81	-23.46	3mH_Y
866.32	40.50	29.06	-2.84	26.22	60.81	-34.59	3mH_Y
433.56	78.00	66.56	-7.71	58.85	80.81	-21.96	3mH_Z
866.54	41.00	29.56	-2.84	26.72	60.81	-34.09	3mH_Z

Factor = Antenna Factor + Cable Loss - Pre Amplifier
Av Rdg = Pk Rdg -11.436dB

Notes:

1. *Measuring frequencies from 30 MHz to the 1GHz.*
2. *Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.*
3. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
4. *The IF bandwidth of SPA between 30MHz to 1GHz was 100kHz.*

Operation Mode: TX Mode / Button#3 **Test Date:** March 10, 2004

Temperature: 28°C **Humidity:** 68 % RH

Tested by: Jason Lee

Freq. (MHz)	Pk Rdg (dBuV)	Av Rdg (dBuV)	Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol (H/V)
433.66	65.20	52.79	-7.71	45.08	80.81	-35.73	3mV_X
866.25	34.60	22.19	-2.84	19.35	60.81	-41.46	3mV_X
433.66	64.20	51.79	-7.71	44.08	80.81	-36.73	3mV_Y
866.59	33.90	21.49	-2.84	18.65	60.81	-42.16	3mV_Y
433.27	65.40	52.99	-7.71	45.28	80.81	-35.53	3mV_Z
866.32	34.20	21.79	-2.84	18.95	60.81	-41.86	3mV_Z
433.68	76.50	64.09	-7.71	56.38	80.81	-24.43	3mH_X
866.53	39.50	27.09	-2.84	24.25	60.81	-36.56	3mH_X
433.25	76.40	63.99	-7.71	56.28	80.81	-24.53	3mH_Y
866.52	39.30	26.89	-2.84	24.05	60.81	-36.76	3mH_Y
433.28	76.40	63.99	-7.71	56.28	80.81	-24.53	3mH_Z
866.21	38.50	26.09	-2.84	23.25	60.81	-37.56	3mH_Z

Factor = Antenna Factor + Cable Loss - Pre Amplifier
Av Rdg = Pk Rdg -12.412dB

Notes:

1. *Measuring frequencies from 30 MHz to the 1GHz.*
2. *Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.*
3. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
4. *The IF bandwidth of SPA between 30MHz to 1GHz was 100kHz.*

Above 1 GHz

Operation Mode: TX Mode / Button#1 (Worst) **Test Date:** March 10, 2004

Temperature: 28°C **Humidity:** 68 % RH

Tested by: Jason Lee

Freq. (MHz)	Pk Rdg (dBuV)	Av Rdg (dBuV)	Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol (H/V)
1059	63.40	52.08	-9.17	42.91	54.00	-11.10	3mV
1301	58.00	46.68	-7.81	50.19	54.00	-3.81	3mV
1015	54.10	42.78	-9.17	33.61	54.00	-20.40	3mH
1298	64.10	52.78	-7.83	44.95	54.00	-9.06	3mH

Factor = Antenna Factor + Cable Loss - Pre Amplifier

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode (RBW=VBW=1MHz) of the emission shown in Rdg column.
4. Average detector mode (RBW=1MHz, VBW=10Hz) for restricted frequency bands.
5. Average measured mode (Pk Rdg – 11.325dB) for not restricted frequency bands.