



FCC ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT CERTIFICATION TO FCC PART 15 REQUIREMENTS

for

INTENTIONAL RADIATOR

of

Car Alarm Transmitter

FCC ID Number : H5OT29

Trade Name : Advance Security Inc.

Model Number : CA-RC6HF

Agency Series : N/A

Report Number : 50218214-RP1

Date : February 24, 2005

Issued to

Advance Security Inc.

**3F, 48 Ta An Street, Hsi Chih, Taipei Hsien,
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



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1. VERIFICATION OF COMPLIANCE

COMPANY NAME : Advance Security Inc.
 3F, 48 Ta An Street, Hsi Chih, Taipei Hsien,
 TAIWAN R.O.C.

CONTACT PERSON : Michael Chen / President

TELEPHONE NO. : 886-2-8648-1688

EUT DESCRIPTION : Car Alarm Transmitter

MODEL NAME/NUMBER : CA-RC6HF

FCC ID : H5OT29

DATE TESTED : February 22, 2005

REPORT NUMBER : 50218214-RP1

| | |
|-----------------------|---|
| 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:

Reviewed by:

David Wang
 Manager of Hsintien Laboratory
 Compliance Certification Services Inc.

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



2. PRODUCT DESCRIPTION

| | |
|-----------------------|---|
| Fundamental Frequency | 433.92 MHz |
| Power Source | 3V Battery |
| Transmitting Time | Periodic \leq 5 seconds |
| Associated Receiver | FCC ID: H5OR41 |

3. TEST FACILITY

The open area test sites and conducted measurement facilities used to collect the radiated data are located at No. 165 & 199, Chungsen Road, Hsintien City, Taipei Hsien, Taiwan. 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 # I | | | | |
|----------------------------|--------------|-----------|---------------|-------------------------|
| Name of Equipment | Manufacturer | Model | Serial Number | Calibration Due |
| SITE NSA | CCS | I Site | N/A | 09/17/2005 |
| MEASURE RECEIVER | SCHAFFNER | SCR3501 | 338 | 07/05/2005 |
| SPECTRUM ANALYZER | ADVANTEST | R3132 | 120900008 | No Calibration Required |
| ANTENNA | SCHAFFNER | CBL 6112B | 2809 | 09/24/2005 |
| AMPLIFIER | SCHAFFNER | CPA9231A | 3626 | 10/08/2005 |
| CABLE | BELDEN | 9913 | N-TYPE #I2 | 02/18/2006 |
| ATTENUATOR | MCL | UNAT-6 | AT06-3 | 10/08/2005 |
| THERMO-HYGRO METER | TFA | N/A | NO.2 | 11/09/2005 |
| EMC ANALYZER (100Hz-22GHz) | HP | 8566B | 2937A06102 | 07/26/2005 |
| ANTENNA (1-18GHz) | EMCO | 3115 | 5761 | 01/17/2006 |
| AMPLIFIER (1-18GHz) | HP | 8449B | 3008A01266 | 02/16/2006 |
| CABLE (1-18GHz) | JYBAO | LL142 | SMA#RS1&2 | 02/16/2006 |

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

7. POWERLINE RFI LIMIT

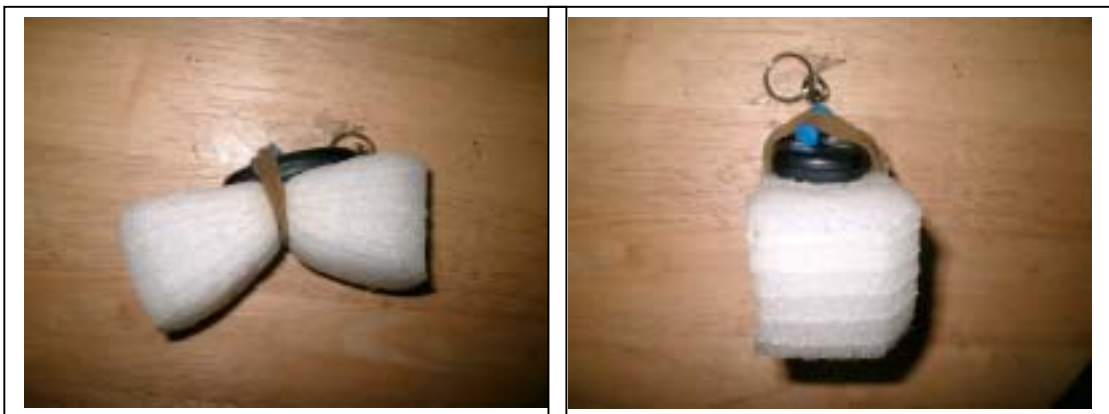
| | |
|--|--|
| CONNECTED TO AC POWER LINE | SECTION 15.207 |
| CARRIER CURRENT SYSTEM IN THE FREQUENCY RANGE OF 450 KHz TO 30 MHz | SECTION 15.205 AND SECTION 15.209, 15.221, 15.223, 15.225 OR 15.227, AS APPROPRIATE. |
| BATTERY POWER | NO REQUIRED. |

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

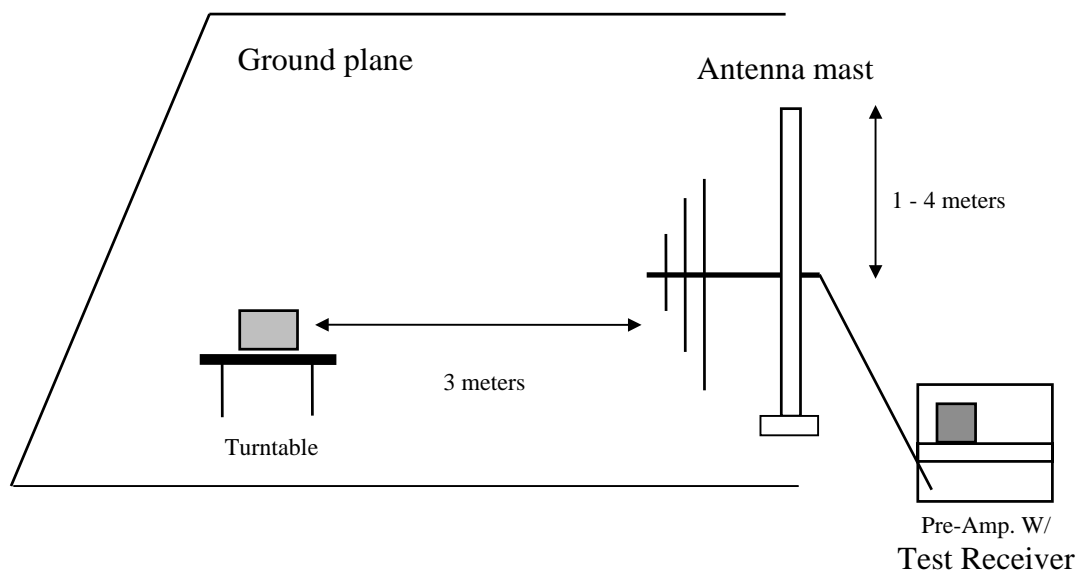
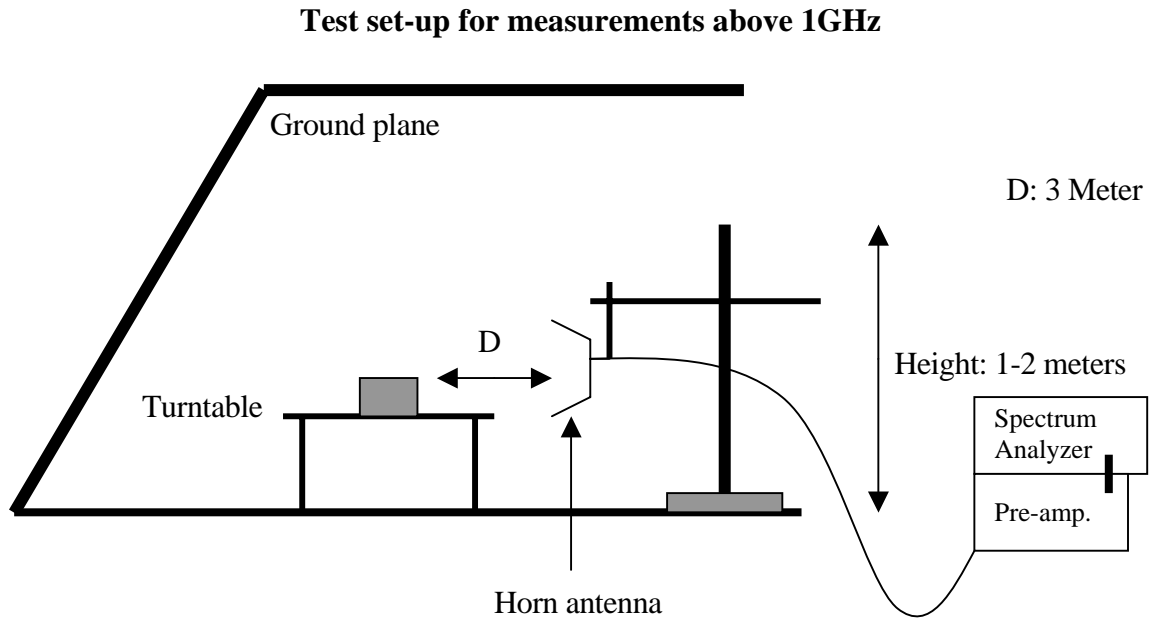


Fig. 1

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.



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:

$$\text{Average Reading} = \text{Peak Reading (dBuV/m)} + 20 \log (\text{Duty Cycle})$$

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 | $0.9375*11+0.1875*26 = 15.19$ | 15.19 | -16.37 dB |
| Button#2 | 100 | $1.0875*11+0.375*26 = 21.71$ | 21.71 | -13.266 dB |
| Button#3 | 100 | $1.125*11+0.3375*26 = 21.15$ | 21.15 | -13.494 dB |
| Button#4 | 100 | $1.125*10+0.3375*27 = 20.36$ | 20.36 | -13.823 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) | Botton#4 BW (kHz) | Limit (MHz) | Result |
|--------------------|----------------------|----------------------|----------------------|----------------------|----------------|--------|
| 433.92 | 458.00 | 443.00 | 435.00 | 450.00 | 1.0848 | PASS |



APPENDIX I

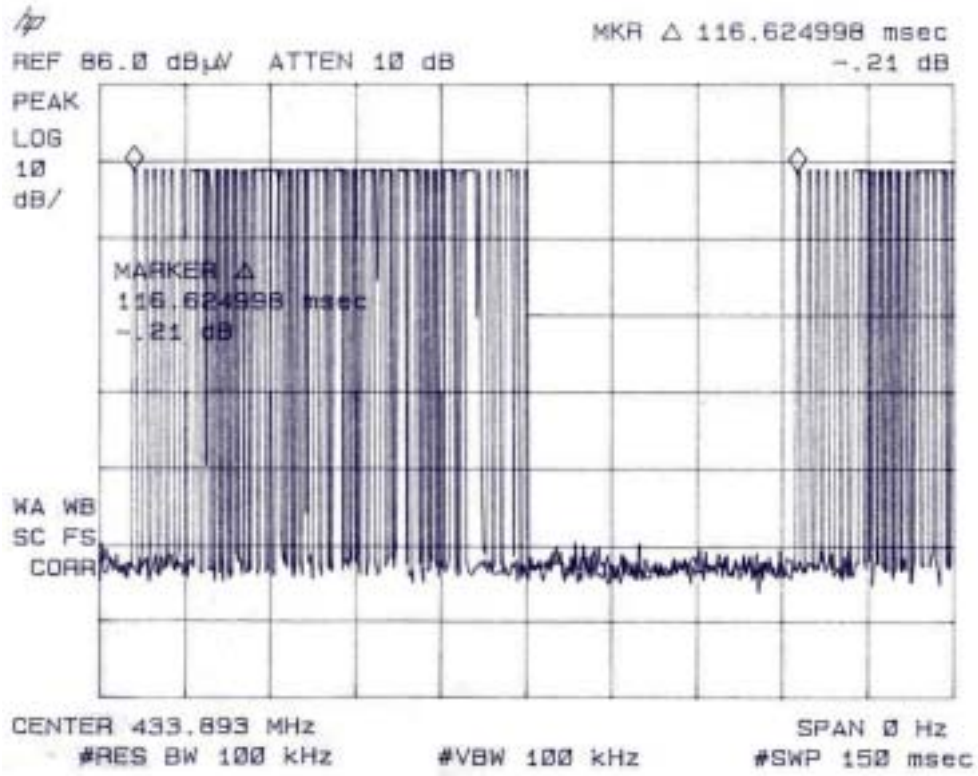
TEST DATA



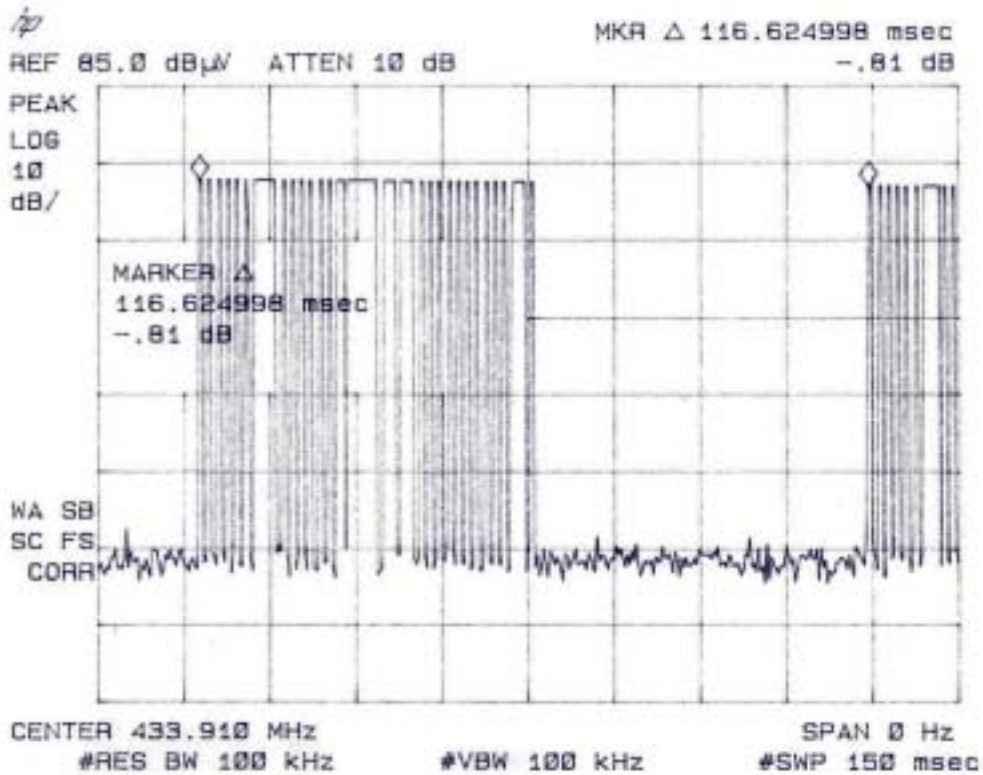
Test Plot: Maximum Modulation Percentage (M%)

Tp

Button#1

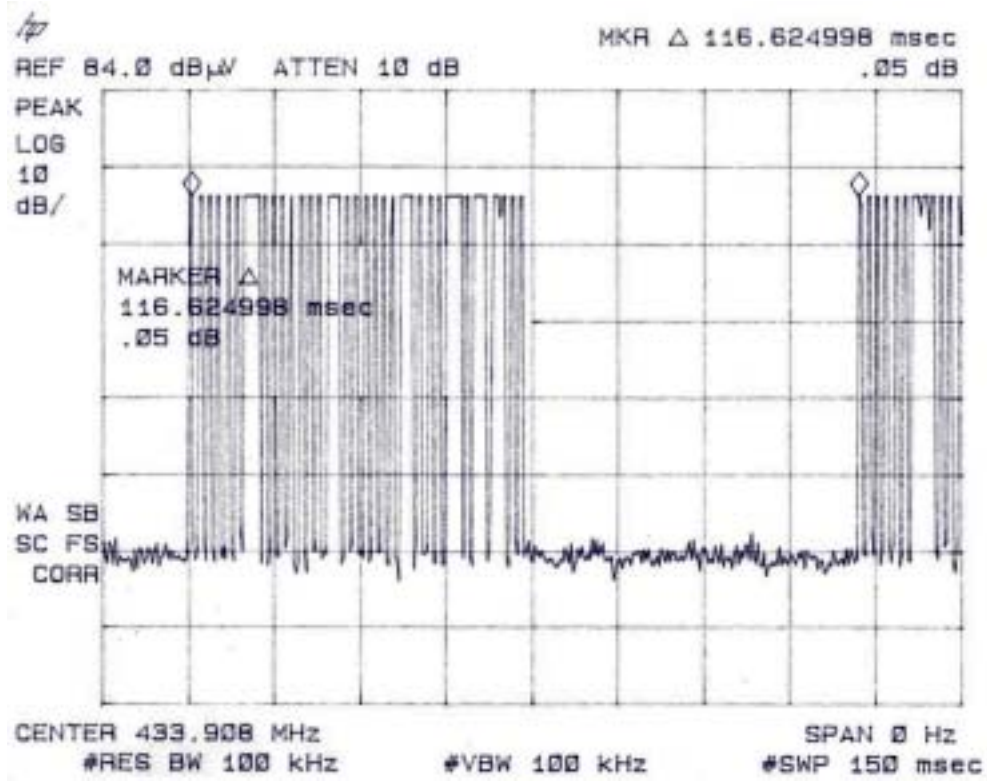


Button#2

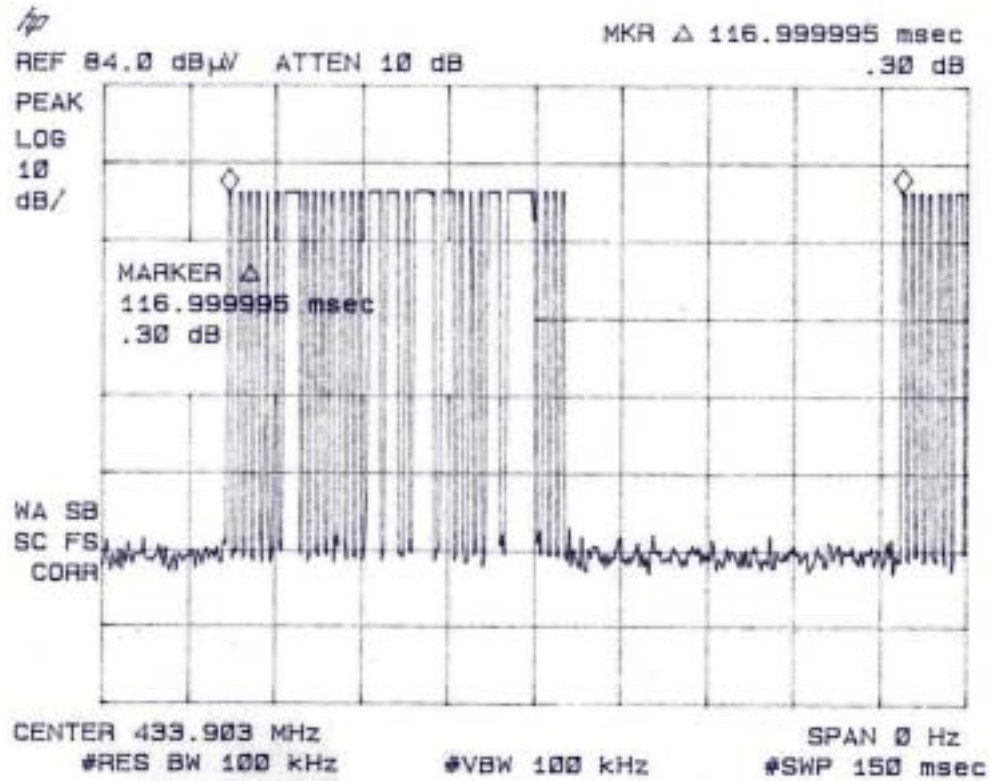




Button#3



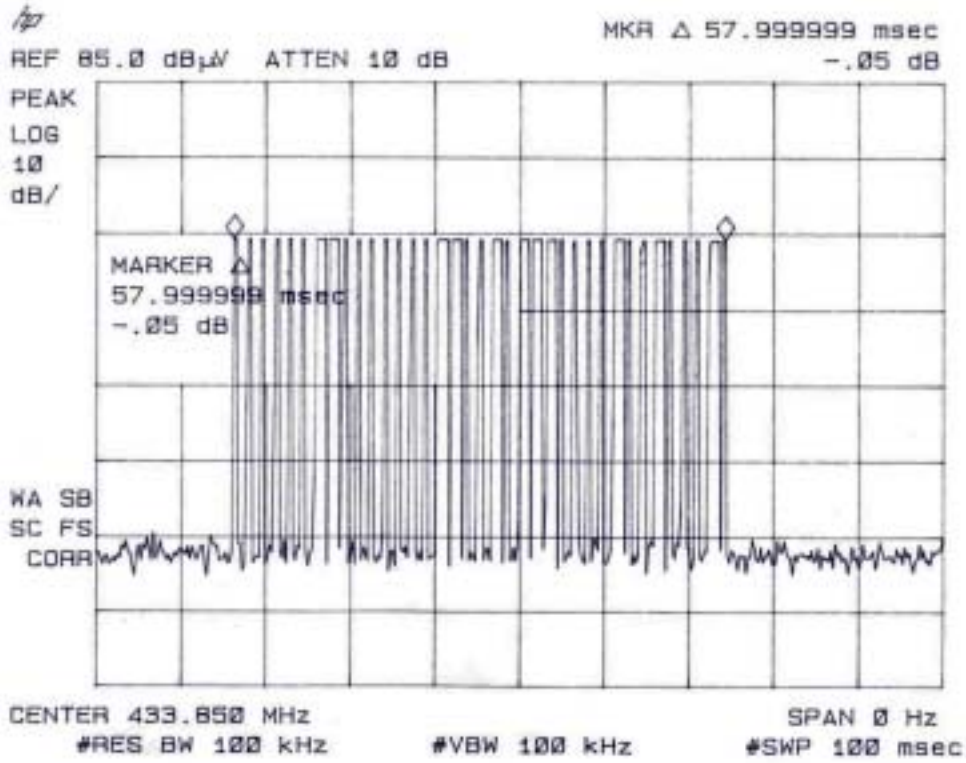
Button#4



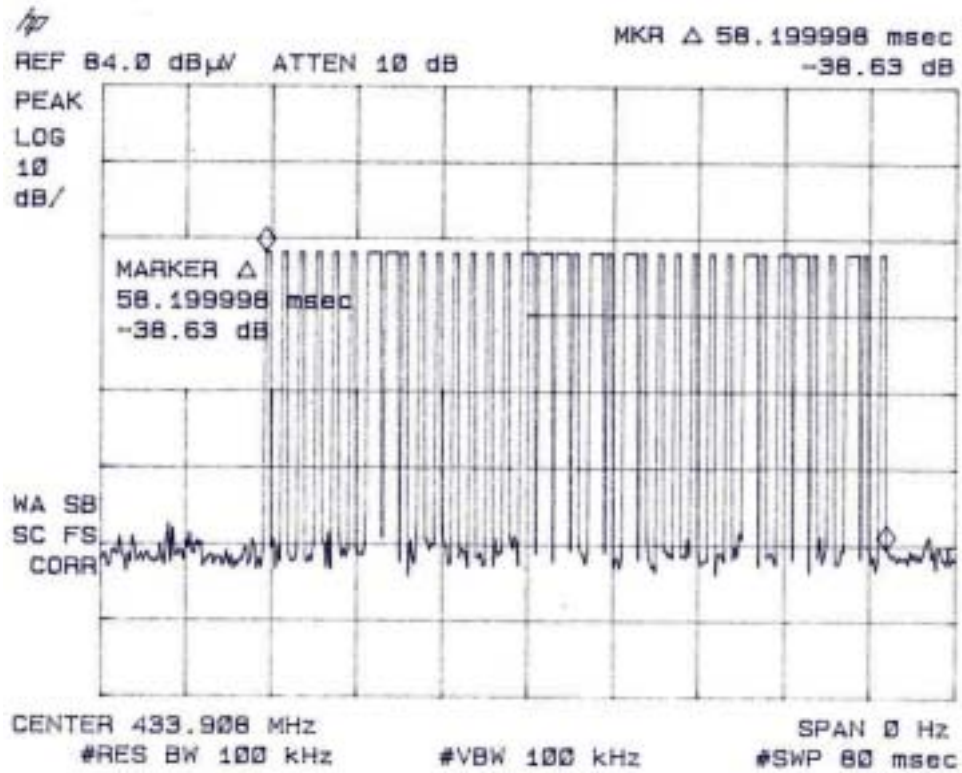


Channel Number

Button#1

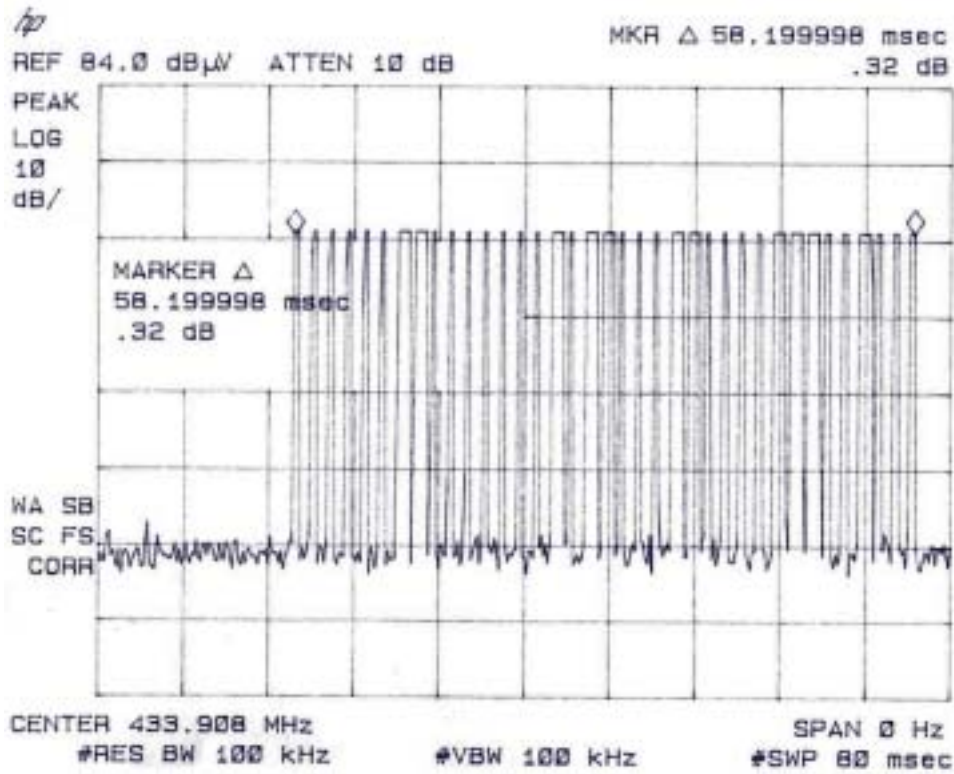


Button#2

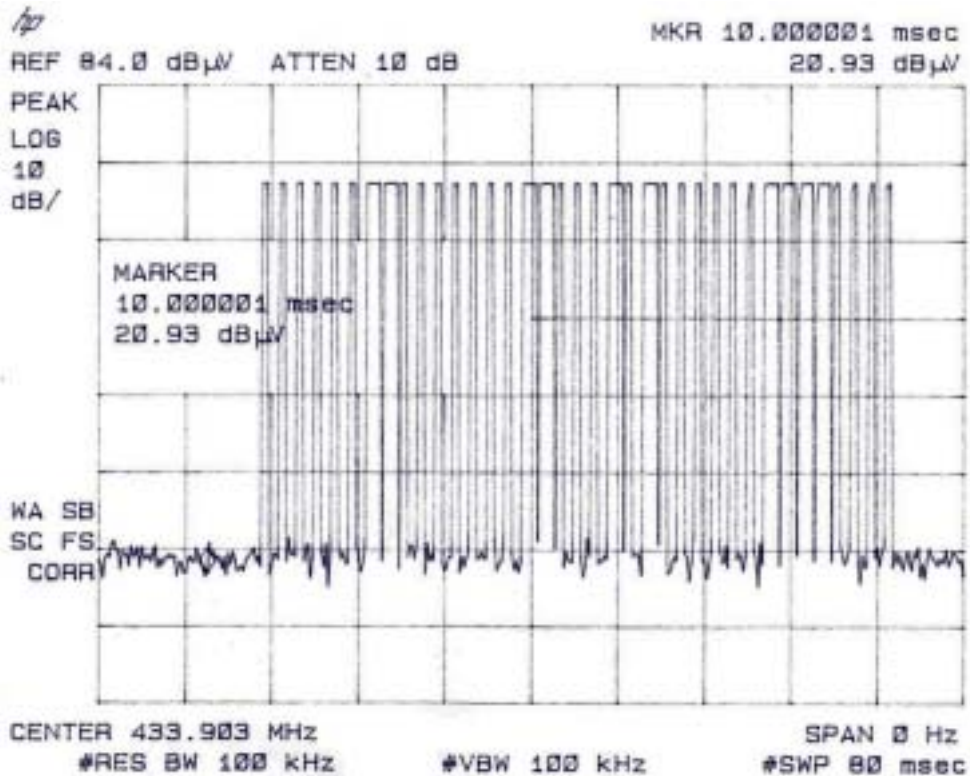




Button#3



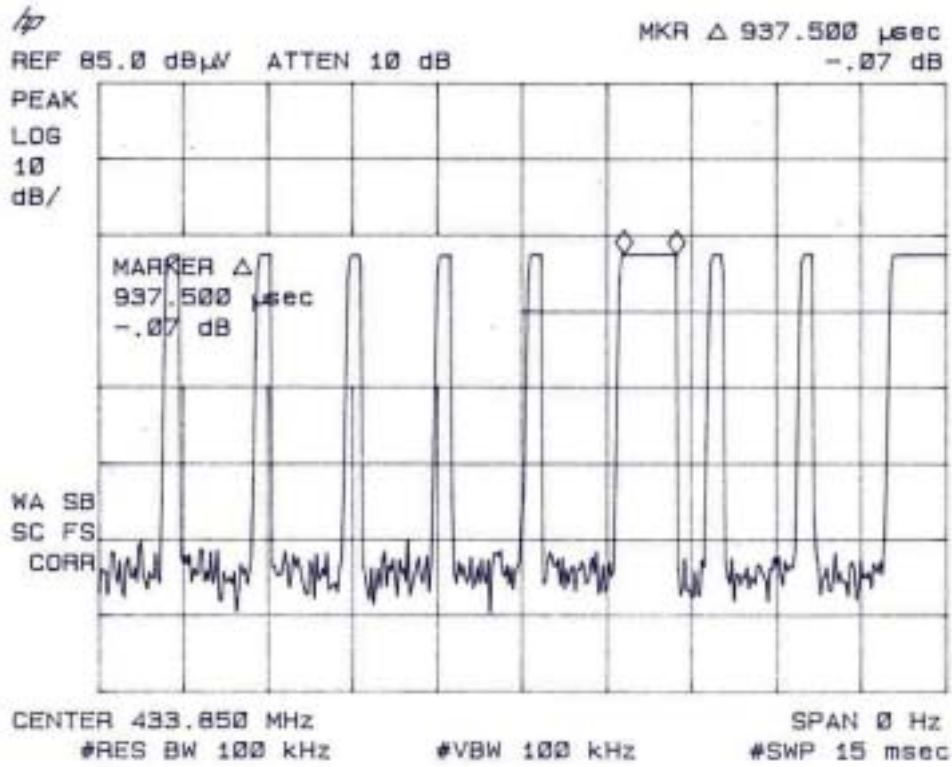
Button#4



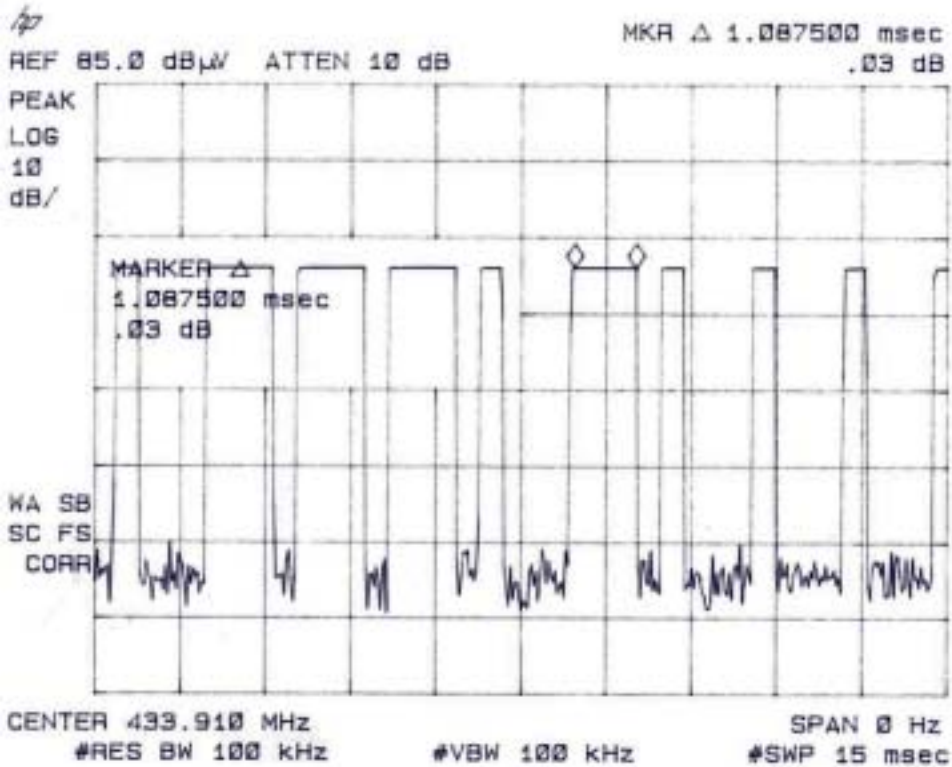


Ton

Button#1

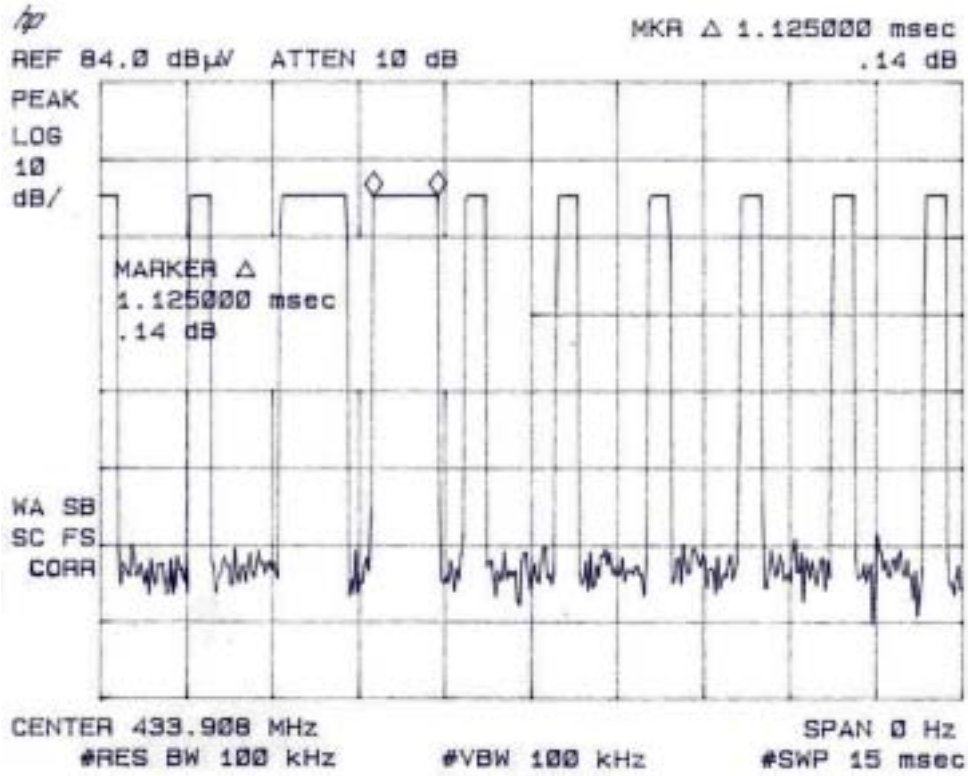


Button#2

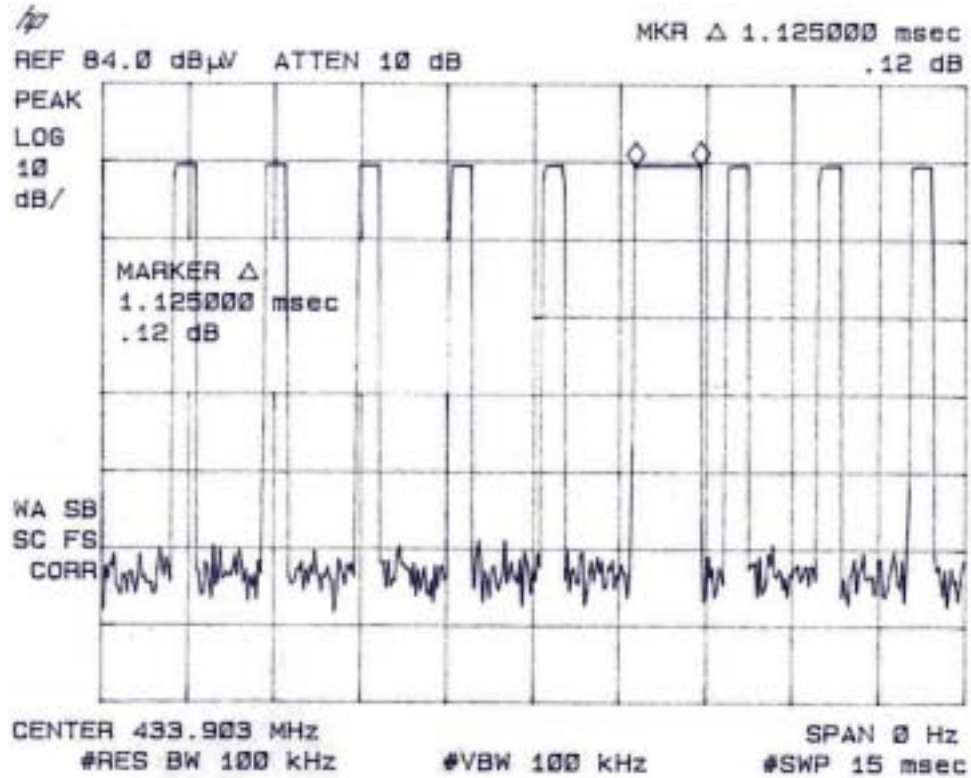




Button#3



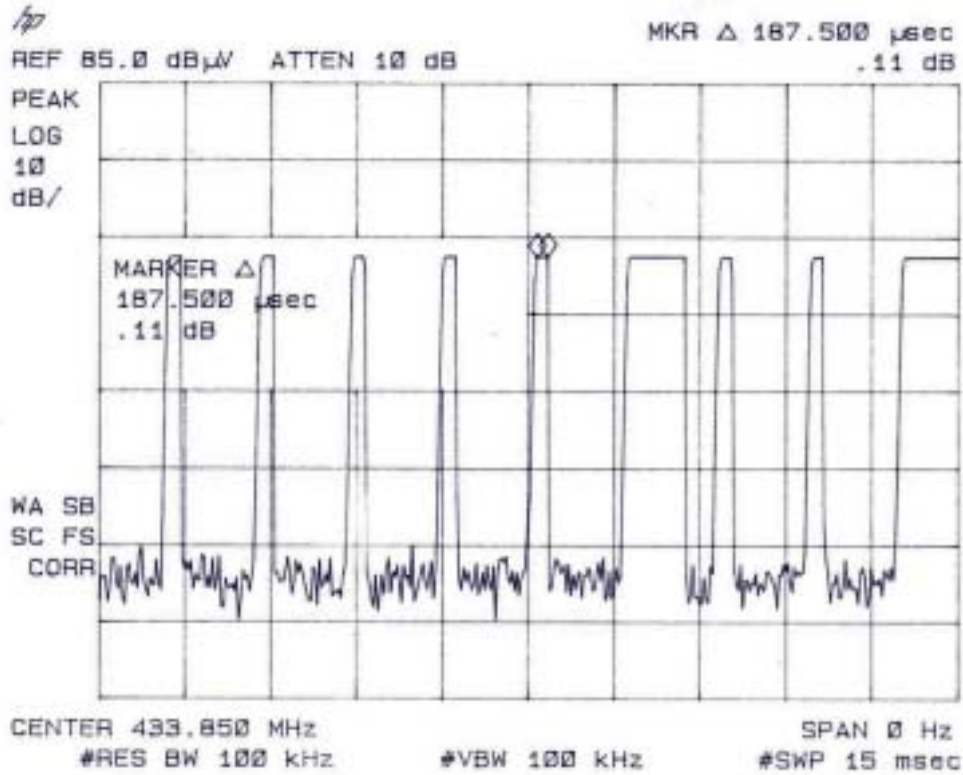
Button#4



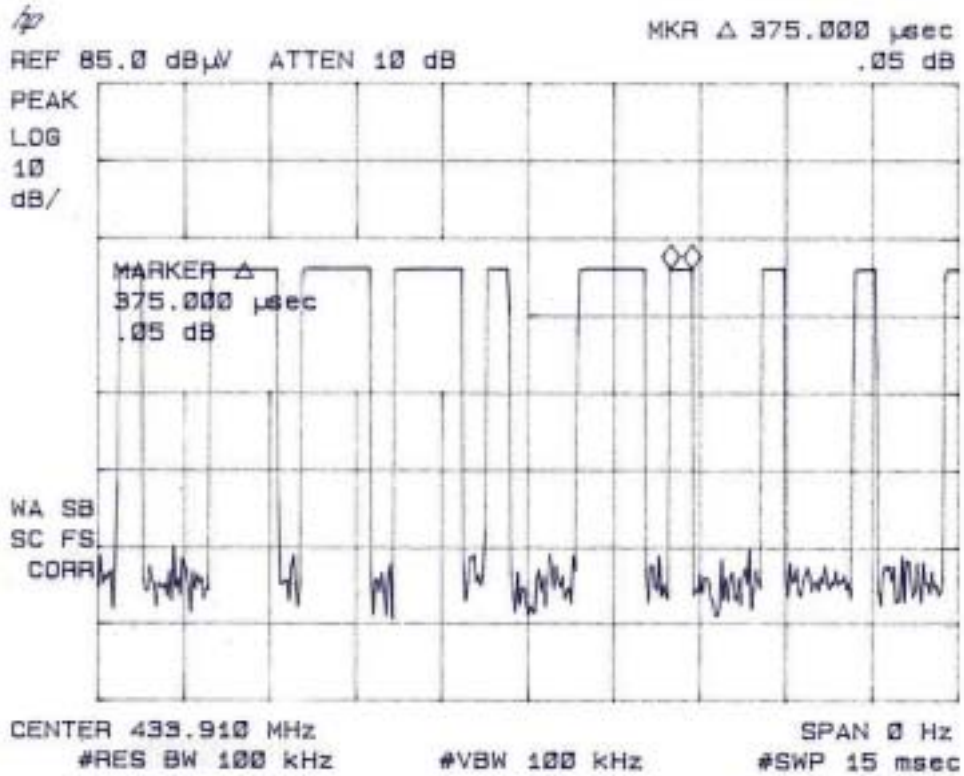


Ton

Button#1

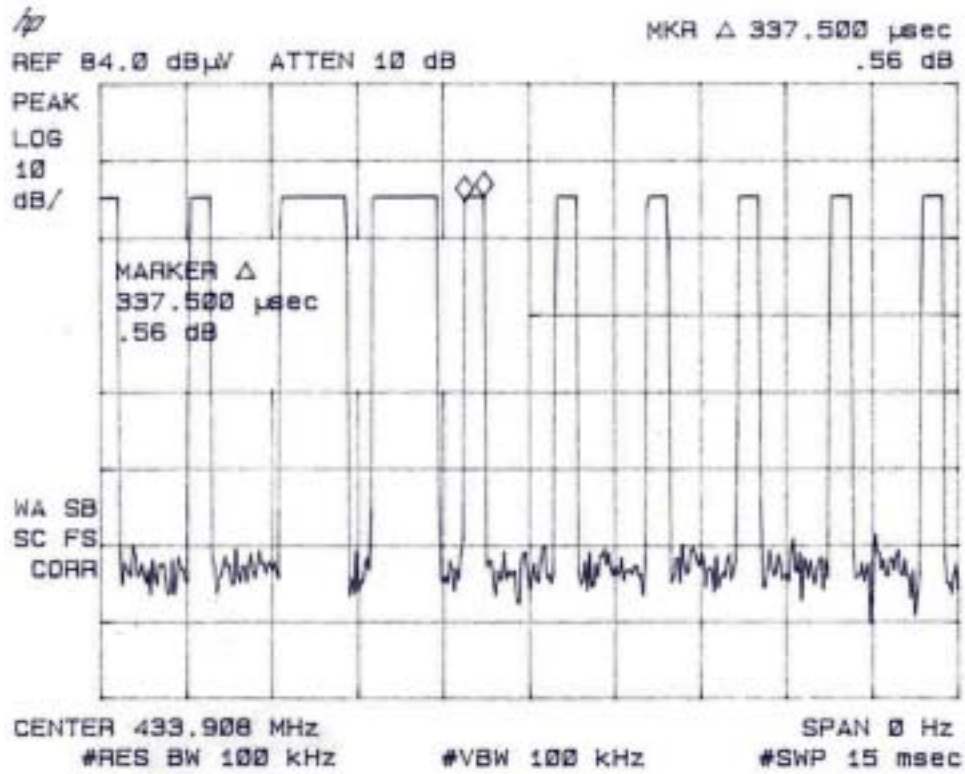


Button#2

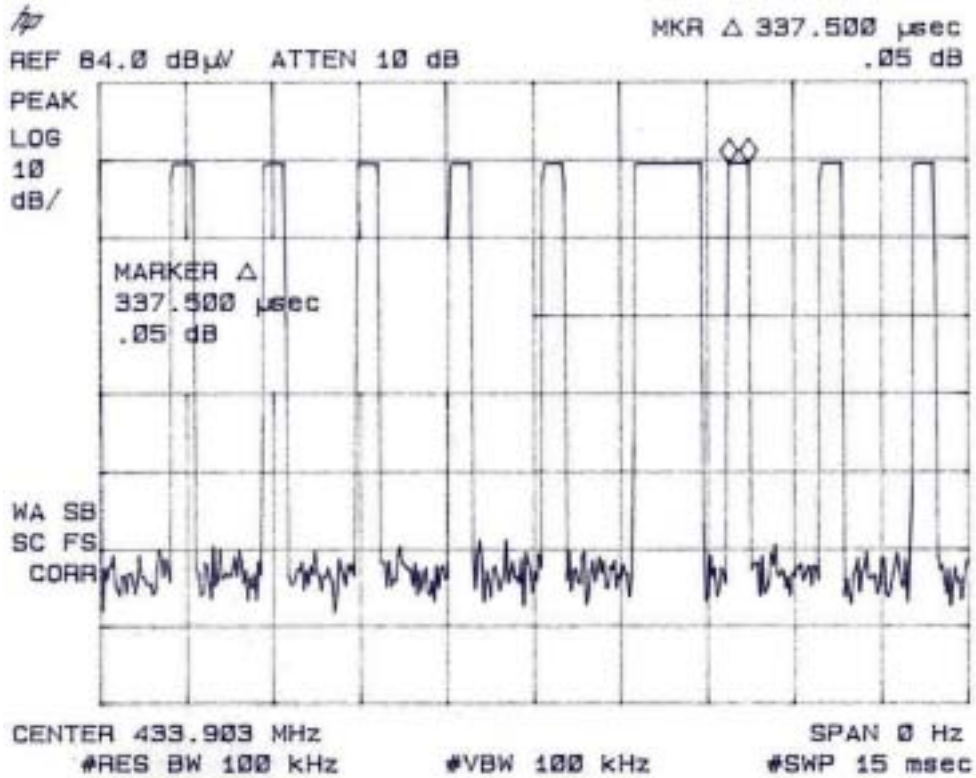




Button#3



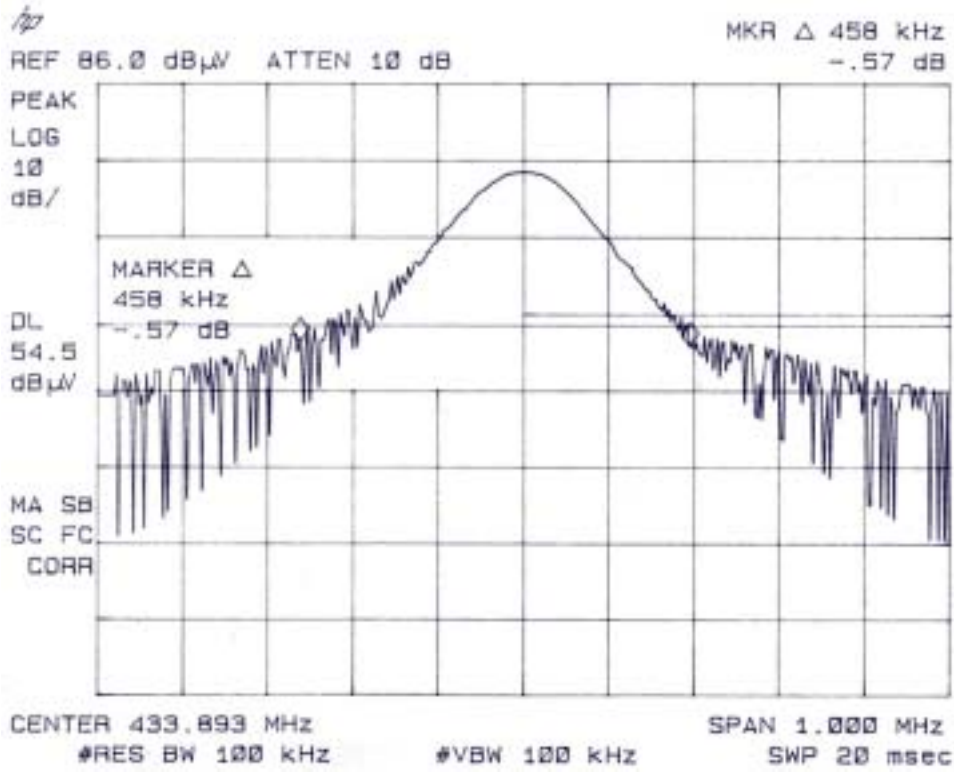
Button#4



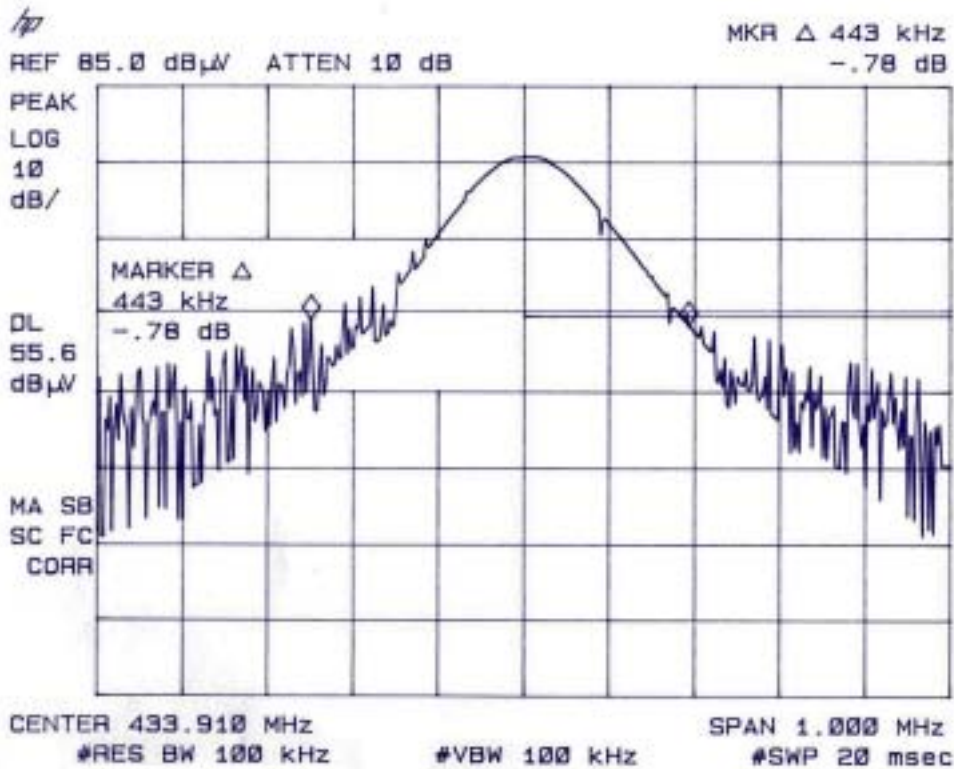


Test Plot: The Emissions Bandwidth

Button#1

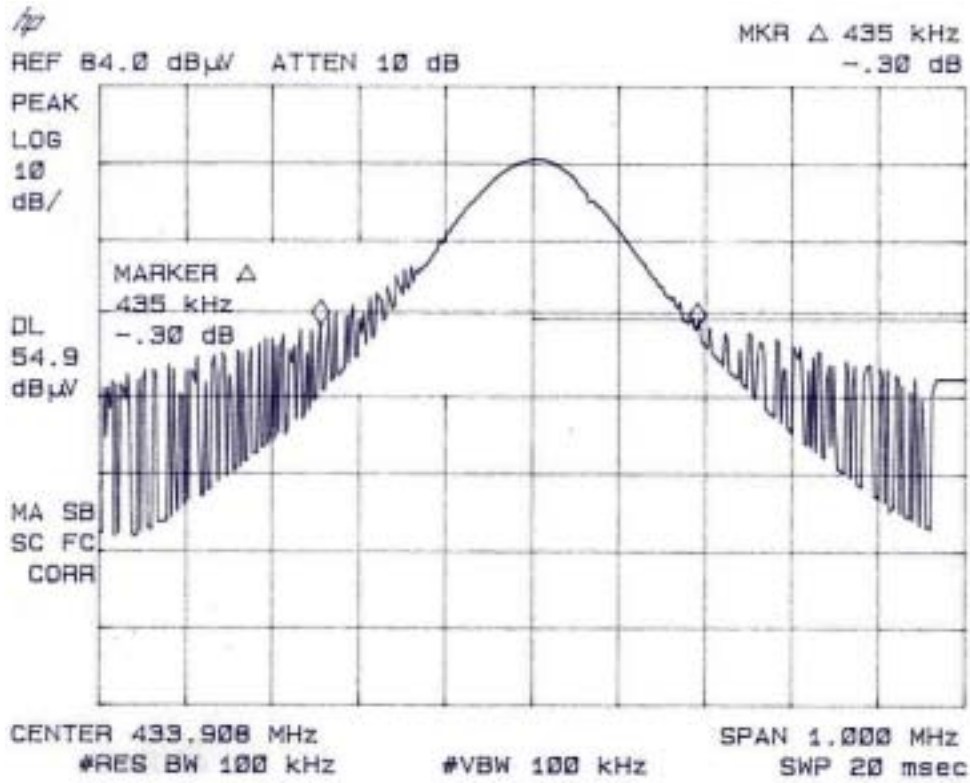


Button#2

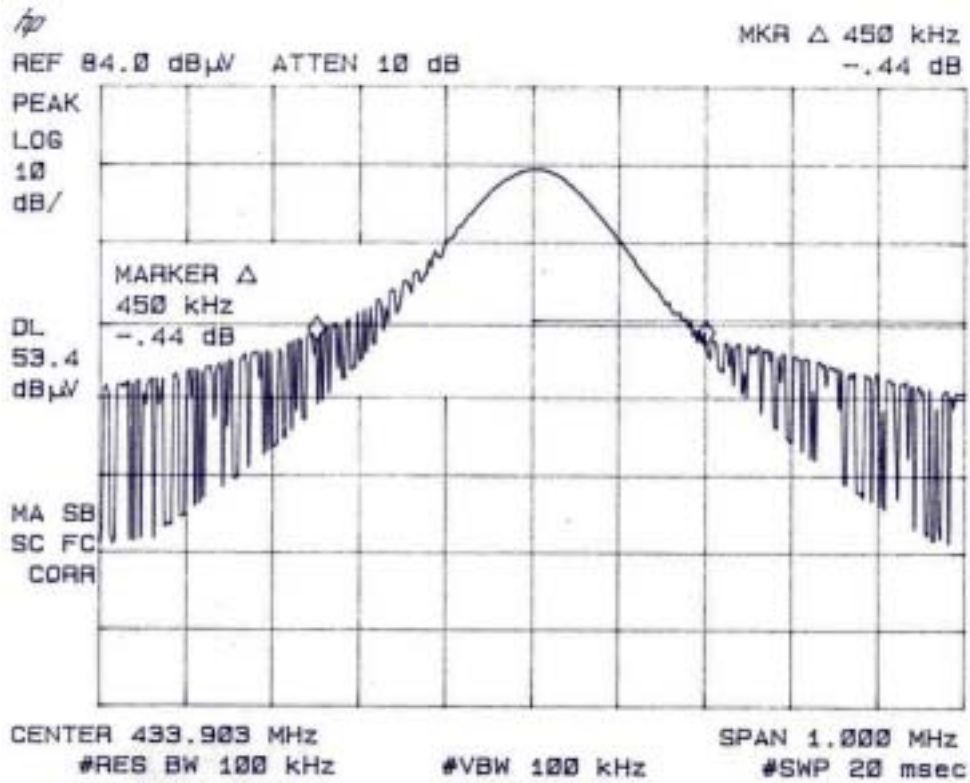




Button#3



Button#4



**TEST RESULTS****Below 1 GHz****Operation Mode:** TX Mode / Button#1**Test Date:** February 22, 2005**Temperature:** 15°C**Humidity:** 82% 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) |
|---|---------------|---------------|-------------|----------------|----------------|-------------|-----------|
| 433.90 | 60.99 | 44.62 | -1.95 | 42.67 | 80.82 | -38.15 | 3mV_X |
| 866.62 | 32.30 | 15.93 | 3.18 | 19.11 | 60.82 | -41.71 | 3mV_X |
| 433.88 | 70.36 | 53.99 | -1.95 | 52.04 | 80.82 | -28.78 | 3mV_Y |
| 866.68 | 32.70 | 16.33 | 3.18 | 19.51 | 60.82 | -41.31 | 3mV_Y |
| 433.88 | 70.85 | 54.48 | -1.95 | 52.53 | 80.82 | -28.29 | 3mV_Z |
| 866.91 | 32.99 | 16.62 | 3.18 | 19.80 | 60.82 | -41.02 | 3mV_Z |
| 433.88 | 67.49 | 51.12 | -1.95 | 49.17 | 80.82 | -31.65 | 3mH_X |
| 867.76 | 34.85 | 18.48 | 3.18 | 21.66 | 60.82 | -39.16 | 3mH_X |
| 433.88 | 70.90 | 54.53 | -1.95 | 52.58 | 80.82 | -28.24 | 3mH_Y |
| 867.76 | 34.34 | 17.97 | 3.18 | 21.15 | 60.82 | -39.67 | 3mH_Y |
| 433.88 | 67.80 | 51.43 | -1.95 | 49.48 | 80.82 | -31.34 | 3mH_Z |
| 866.91 | 32.15 | 15.78 | 3.18 | 18.96 | 60.82 | -41.86 | 3mH_Z |
| | | | | | | | |
| | | | | | | | |
| <i>Factor = Antenna Factor + Cable Loss - Pre Amplifier</i> | | | | | | | |
| <i>Av Rdg = Pk Rdg -16.37dB</i> | | | | | | | |

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.

**Below 1 GHz****Operation Mode:** TX Mode / Button#2**Test Date:** February 22, 2005**Temperature:** 15°C**Humidity:** 82% 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) |
|-------------|---------------|---------------|-------------|----------------|----------------|-------------|-----------|
| 433.87 | 60.75 | 47.48 | -1.95 | 45.53 | 80.82 | -35.29 | 3mV_X |
| 866.84 | 32.98 | 19.71 | 3.18 | 22.89 | 60.82 | -37.93 | 3mV_X |
| 433.86 | 70.28 | 57.01 | -1.95 | 55.06 | 80.82 | -25.76 | 3mV_Y |
| 866.87 | 34.20 | 20.93 | 3.18 | 24.11 | 60.82 | -36.71 | 3mV_Y |
| 433.88 | 70.55 | 57.28 | -1.95 | 55.33 | 80.82 | -25.49 | 3mV_Z |
| 866.89 | 33.10 | 19.83 | 3.18 | 23.01 | 60.82 | -37.81 | 3mV_Z |
| 433.88 | 68.59 | 55.32 | -1.95 | 53.37 | 80.82 | -27.45 | 3mH_X |
| 866.89 | 34.43 | 21.16 | 3.18 | 24.34 | 60.82 | -36.48 | 3mH_X |
| 433.88 | 70.13 | 56.86 | -1.95 | 54.91 | 80.82 | -25.91 | 3mH_Y |
| 866.79 | 34.14 | 20.87 | 3.18 | 24.05 | 60.82 | -36.77 | 3mH_Y |
| 433.85 | 70.17 | 56.90 | -1.95 | 54.95 | 80.82 | -25.87 | 3mH_Z |
| 866.82 | 33.52 | 20.25 | 3.18 | 23.43 | 60.82 | -37.39 | 3mH_Z |
| | | | | | | | |
| | | | | | | | |

Factor = Antenna Factor + Cable Loss - Pre Amplifier
Av Rdg = Pk Rdg -13.266dB

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.

**Below 1 GHz****Operation Mode:** TX Mode / Button#3**Test Date:** February 22, 2005**Temperature:** 15°C**Humidity:** 82% 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) |
|-------------|---------------|---------------|-------------|----------------|----------------|-------------|-----------|
| 433.87 | 61.69 | 48.20 | -1.95 | 46.25 | 80.82 | -34.58 | 3mV_X |
| 866.85 | 32.55 | 19.06 | 3.18 | 22.24 | 60.82 | -38.58 | 3mV_X |
| 433.89 | 70.25 | 56.76 | -1.95 | 54.81 | 80.82 | -26.02 | 3mV_Y |
| 866.90 | 33.49 | 20.00 | 3.18 | 23.18 | 60.82 | -37.64 | 3mV_Y |
| 433.87 | 70.20 | 56.71 | -1.95 | 54.76 | 80.82 | -26.07 | 3mV_Z |
| 866.93 | 33.15 | 19.66 | 3.18 | 22.84 | 60.82 | -37.98 | 3mV_Z |
| 433.88 | 66.99 | 53.50 | -1.95 | 51.55 | 80.82 | -29.28 | 3mH_X |
| 866.88 | 33.69 | 20.20 | 3.18 | 23.38 | 60.82 | -37.44 | 3mH_X |
| 433.90 | 70.50 | 57.01 | -1.95 | 55.06 | 80.82 | -25.77 | 3mH_Y |
| 867.76 | 34.10 | 20.61 | 3.18 | 23.79 | 60.82 | -37.03 | 3mH_Y |
| 433.90 | 68.96 | 55.47 | -1.95 | 53.52 | 80.82 | -27.31 | 3mH_Z |
| 866.93 | 33.52 | 20.03 | 3.18 | 23.21 | 60.82 | -37.61 | 3mH_Z |
| | | | | | | | |
| | | | | | | | |

Factor = Antenna Factor + Cable Loss - Pre Amplifier
Av Rdg = Pk Rdg -13.494dB

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.

**Below 1 GHz****Operation Mode:** TX Mode / Button#4**Test Date:** February 22, 2005**Temperature:** 15°C**Humidity:** 82% 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) |
|-------------|---------------|---------------|-------------|----------------|----------------|-------------|-----------|
| 433.87 | 68.96 | 55.14 | -1.95 | 53.19 | 80.82 | -27.64 | 3mV_X |
| 866.88 | 33.20 | 19.38 | 3.18 | 22.56 | 60.82 | -38.26 | 3mV_X |
| 433.83 | 70.20 | 56.38 | -1.95 | 54.43 | 80.82 | -26.40 | 3mV_Y |
| 866.86 | 33.52 | 19.70 | 3.18 | 22.88 | 60.82 | -37.94 | 3mV_Y |
| 433.87 | 70.20 | 56.38 | -1.95 | 54.43 | 80.82 | -26.40 | 3mV_Z |
| 866.86 | 34.26 | 20.44 | 3.18 | 23.62 | 60.82 | -37.20 | 3mV_Z |
| 433.86 | 66.52 | 52.70 | -1.95 | 50.75 | 80.82 | -30.08 | 3mH_X |
| 866.88 | 33.24 | 19.42 | 3.18 | 22.60 | 60.82 | -38.22 | 3mH_X |
| 433.88 | 70.38 | 56.56 | -1.95 | 54.61 | 80.82 | -26.22 | 3mH_Y |
| 867.00 | 34.28 | 20.46 | 3.18 | 23.64 | 60.82 | -37.18 | 3mH_Y |
| 433.86 | 68.53 | 54.71 | -1.95 | 52.76 | 80.82 | -28.07 | 3mH_Z |
| 866.98 | 33.92 | 20.10 | 3.18 | 23.28 | 60.82 | -37.54 | 3mH_Z |
| | | | | | | | |
| | | | | | | | |

Factor = Antenna Factor + Cable Loss - Pre Amplifier
Av Rdg = Pk Rdg -13.823dB

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**Test Date:** February 22, 2005**Temperature:** 17°C**Humidity:** 80% 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) |
|-------------|---------------|---------------|-------------|----------------|----------------|-------------|-----------|
| 1414.00 | 47.90 | 31.53 | -9.09 | 38.81 | 54.00 | -15.19 | 3mV |
| 1844.00 | 57.70 | 41.33 | -6.80 | 34.53 | 60.80 | -26.27 | 3mV |
| 1499.50 | 46.60 | 30.23 | -8.62 | 37.98 | 54.00 | -16.02 | 3mH |
| 1844.50 | 56.60 | 40.23 | -6.80 | 33.43 | 60.80 | -27.37 | 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 measured mode (Pk Rdg – 16.37dB) for not restricted frequency bands.