



FCC ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT CERTIFICATION TO FCC PART 15 REQUIREMENTS

for

INTENTIONAL RADIATOR

of

Car Alarm Transmitter

FCC ID Number : ELVATDD

Trade Name : N/A

Model Number : 136B1891

Agency Series : N/A

Report Number : 40616406-RP

Date : October 28, 2004

Prepared for :

NUTEK CORPORATION

5F, NO. 3, ALLEY 6, LANE 45, PAO-HSING RD.,

HSING-TIEN CITY, TAIPEI, TAIWAN

Prepared by :



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**1. VERIFICATION OF COMPLIANCE**

COMPANY NAME : NUTEK CORPORATION
5F, NO. 3, ALLEY 6, LANE 45, PAO-HSING RD.,
HSING-TIEN CITY, TAIPEI, TAIWAN

CONTACT PERSON : RUBY HSIEH / MARKETING DEPT.

TELEPHONE NO. : (886-2) 2918-9478

EUT DESCRIPTION : Car Alarm Transmitter

MODEL NAME/NUMBER : 136B1891

FCC ID : ELVATDD

DATE TESTED : June 25, 2004, Nov. 1, 2004

REPORT NUMBER : 40616406-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:**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	12V Battery
Transmitting Time	Periodic \leq 5 seconds
Associated Receiver	Model: 136C2268 (DoC)

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
SITE NSA	CCS	E Site	N/A	09/13/2005
EMI TEST RECEIVER	R&S	DSAID / ESBI-RF	827832/001 82706/003	03/08/2005
ANTENNA	SCHAFFNER	CBL 6112B	2802	09/27/2005
AMPLIFIER	H.P.	8447D A	2727A05764	04/30/2005
CABLE	BELDEN	9913	N-TYPE#E2&E3	03/05/2005
THERMO- HYGRO METER	TFA	N/A	NO.6	11/23/2004

EQUIPMENTTYPE	MFR	MODEL NUMBER	SERIAL NUMBER	CAL. DUE
EMC ANALYZER (100Hz-22GHz)	HP	8566B	2937A06102	06/25/2005
ANTENNA (1-18GHz)	EMCO	3115	5761	02/02/2005
AMPLIFIER (1-26.5GHz)	HP	8449B	3008A01266	02/15/2005
CABLE (1-18GHz)	JYEBAO HUBER+SUHNER	LL142 SUCOFLEX 104	SMA-RS1&2 SMA-RS3	02/15/2005

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

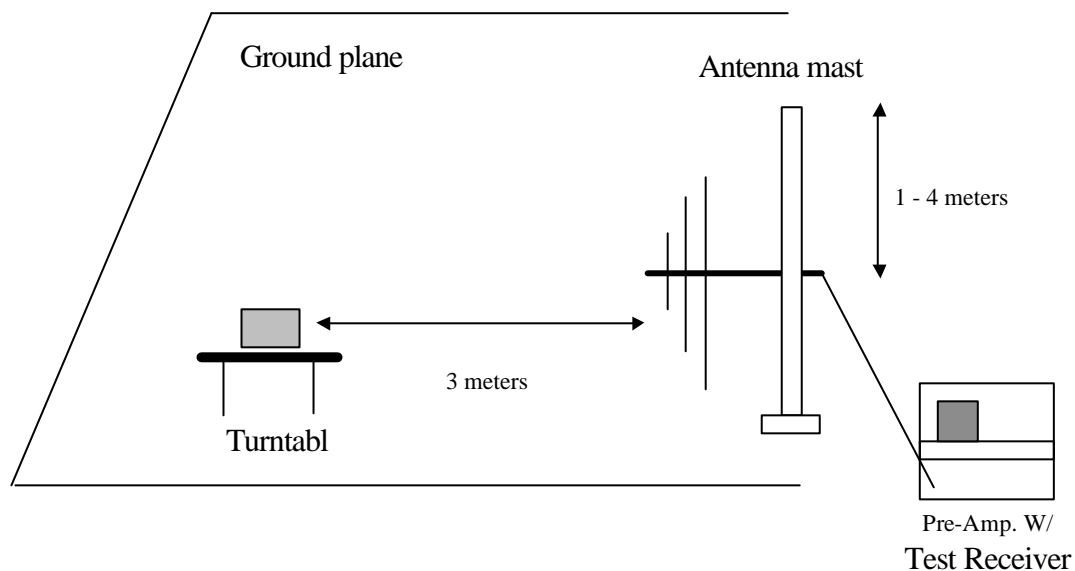
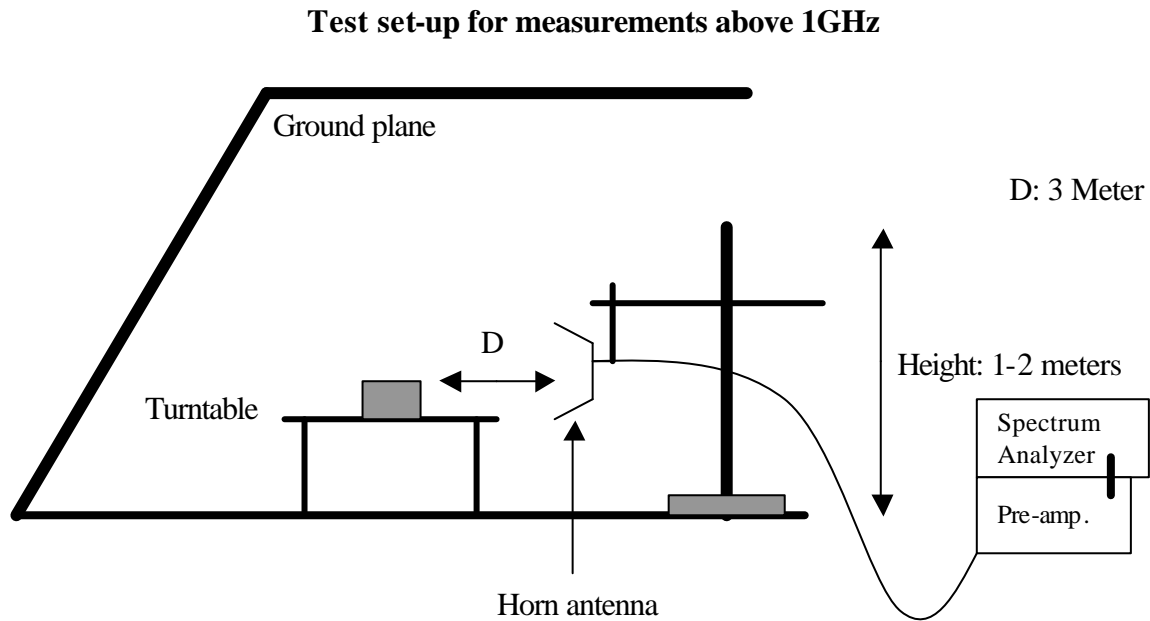


Fig. 1

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:

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	95.28	38*0.190+40*0.520 = 28.02	29.41	-11.051 dB
Button#2	90.12	35*0.180+43*0.540 = 32.75	36.34	-9.6958 dB
Button#3	95.28	37*0.180+42*0.540 = 30.83	32.36	-10.221 dB
Button#4	95.16	34*0.200+45*0.520 = 31.73	26.39	-9.9706 dB

12.2 The Emissions Bandwidth

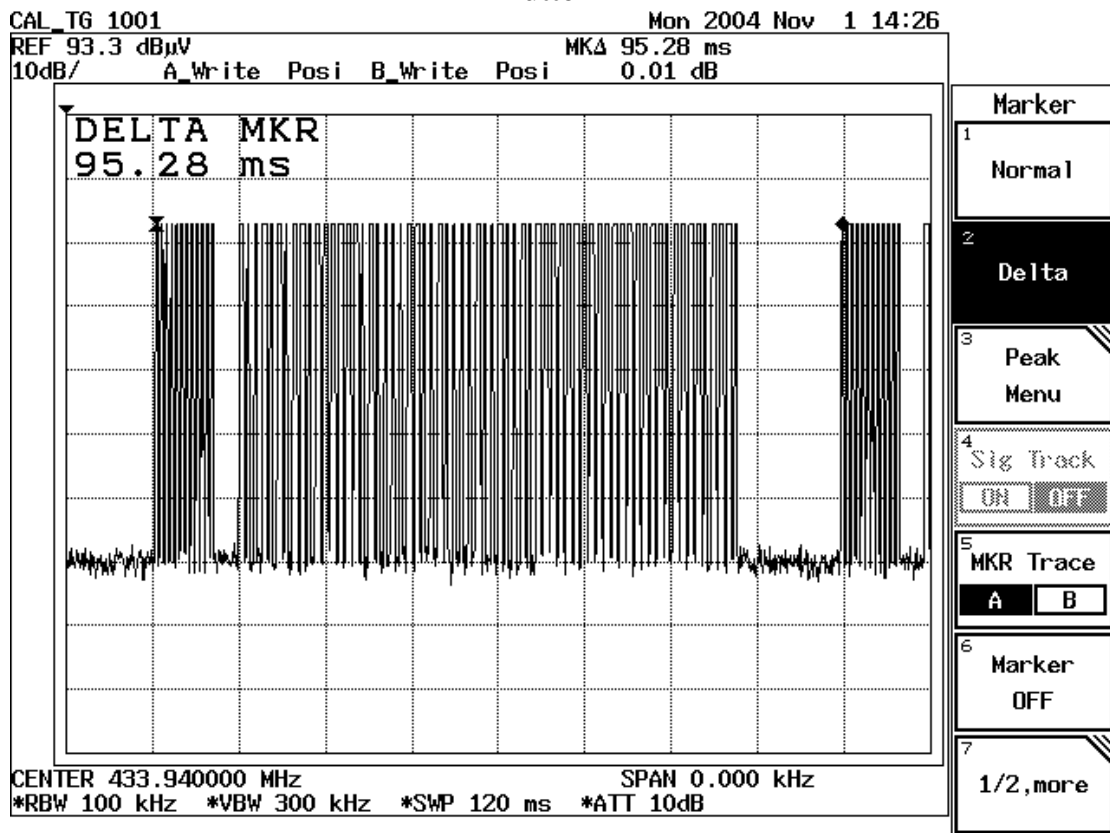
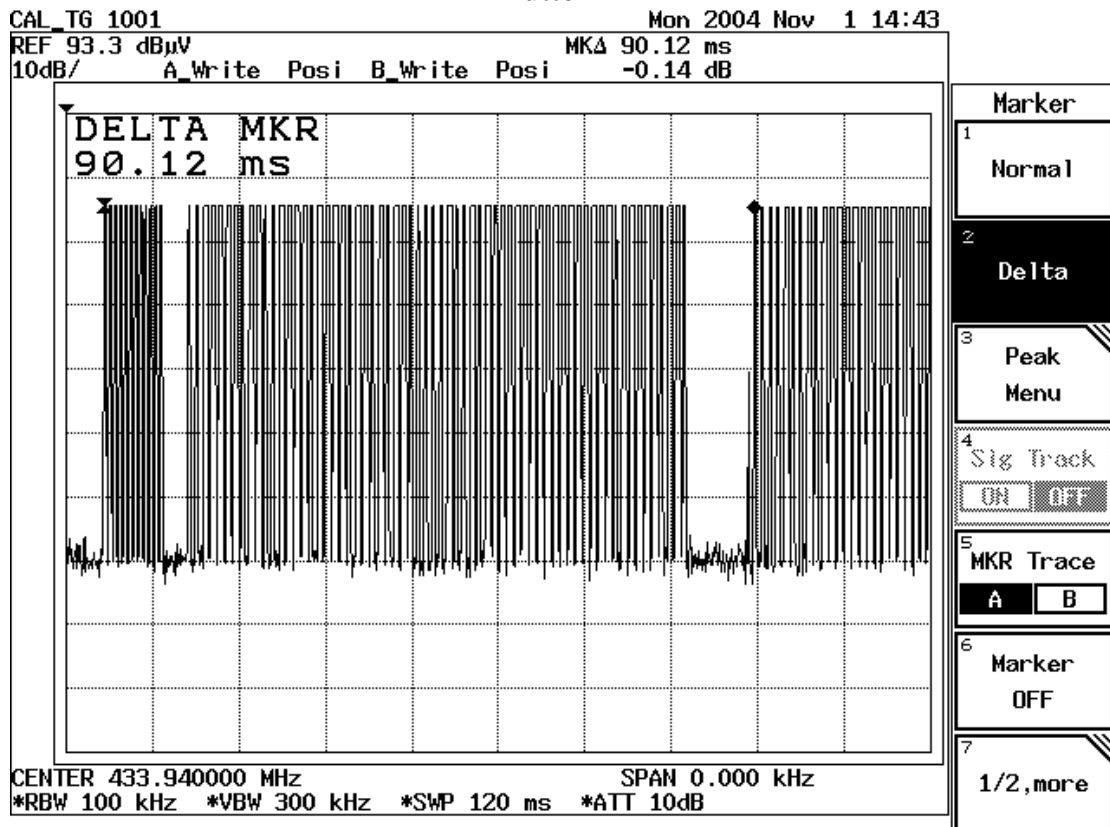
The bandwidth of the emissions were investigated per 15.231(c)

Frequency (MHz)	Botton#1 BW (kHz)	Botton#2 BW (kHz)	Botton#3 BW (kHz)	Botton#4 BW (kHz)	Limit (MHz)	Result
433.92	56.30	55.00	62.50	61.30	1.0848	PASS



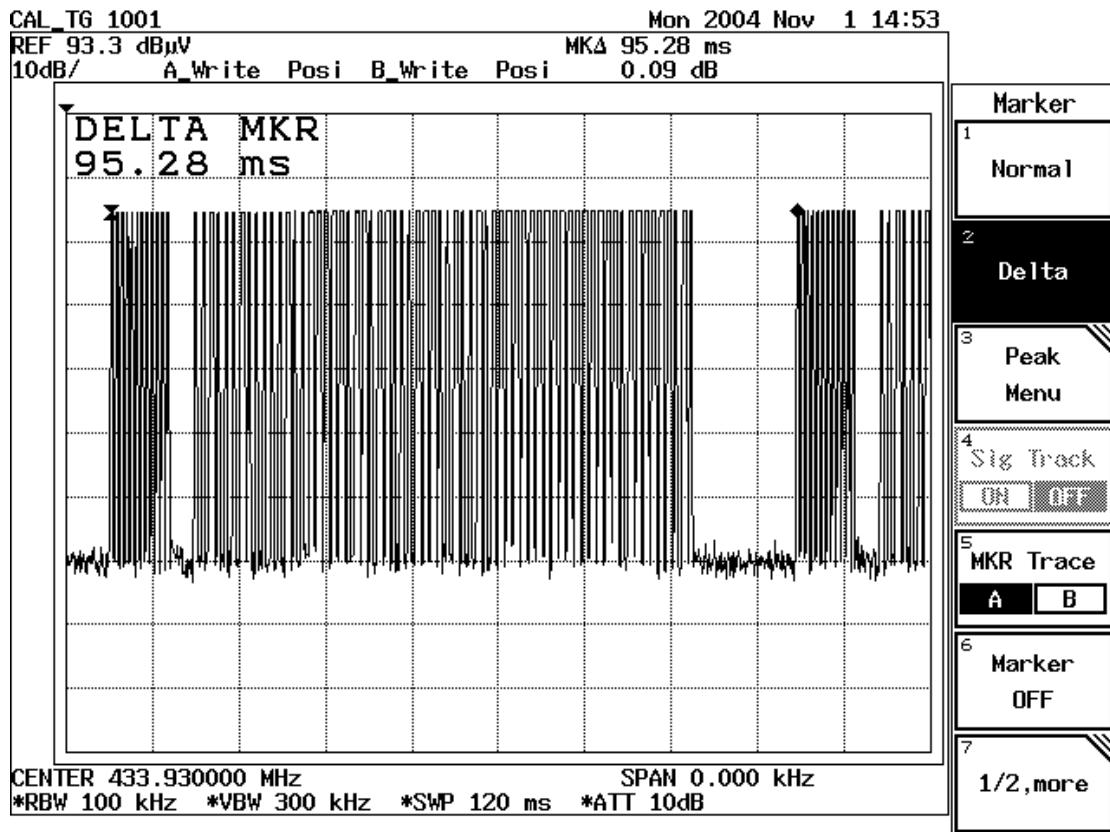
APPENDIX I

TEST DATA

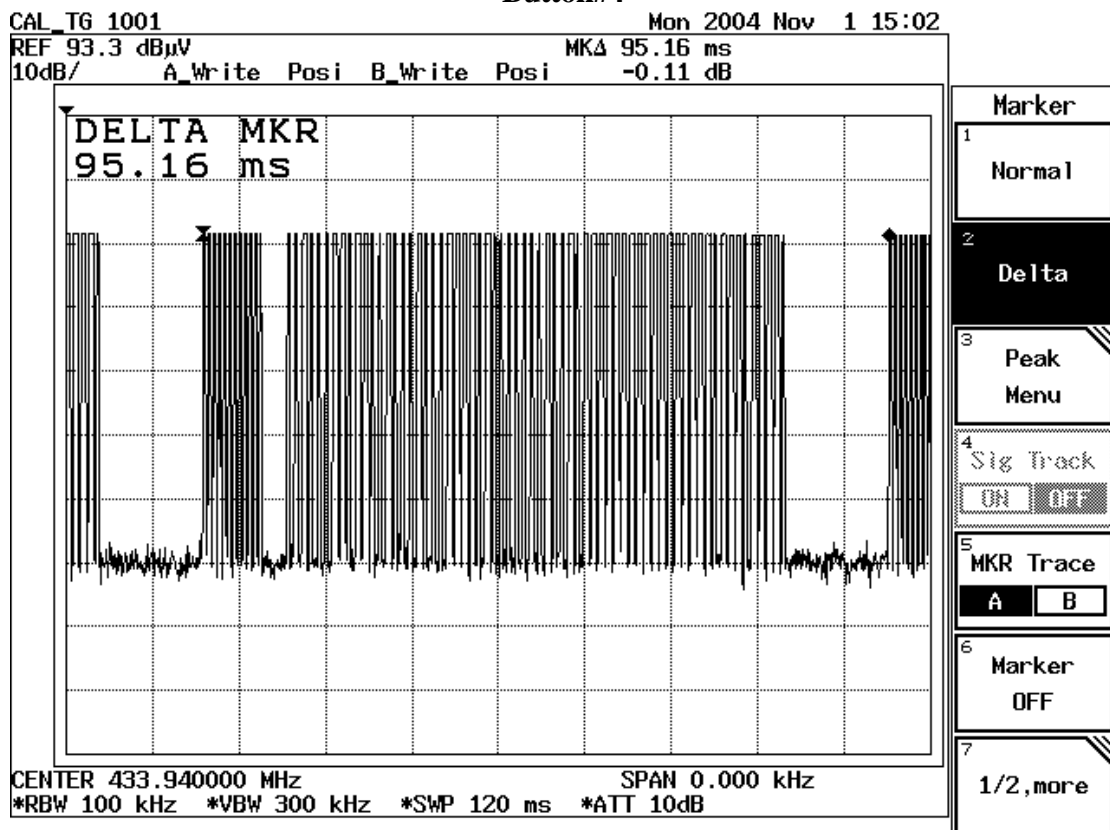
**Test Plot: Maximum Modulation Percentage (M%)****Tp****Button#1****Button#2**

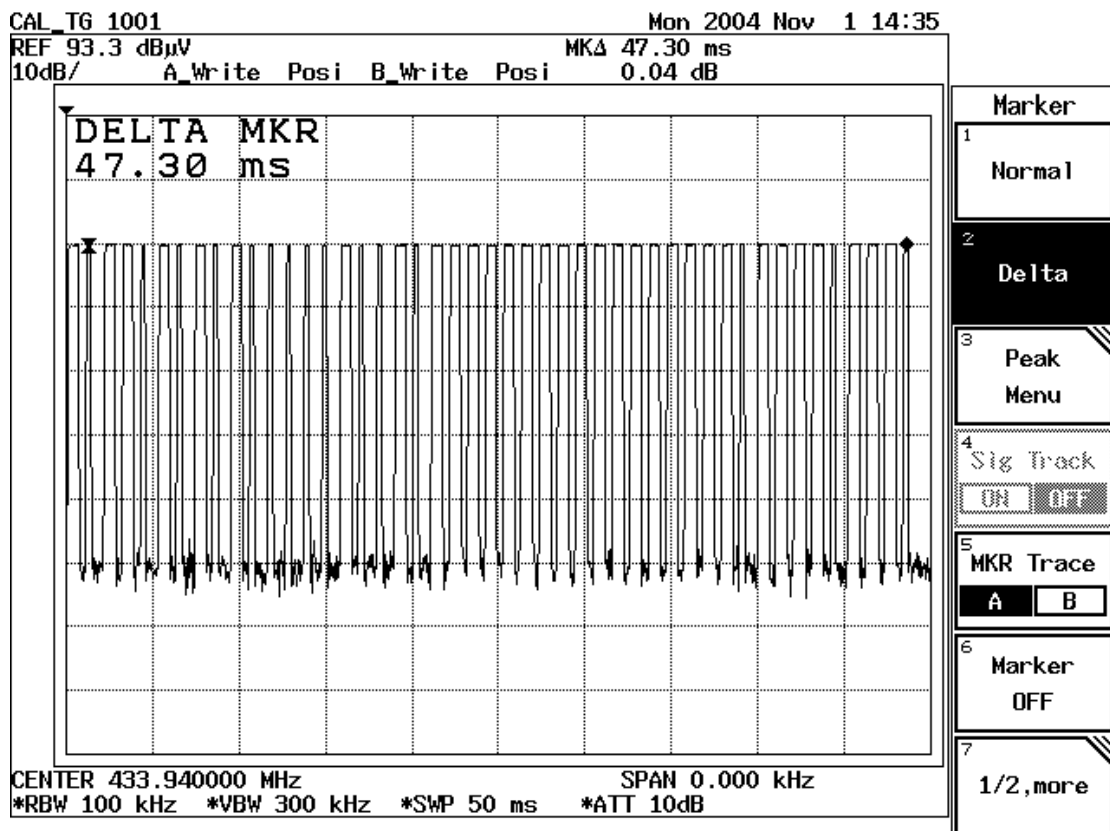
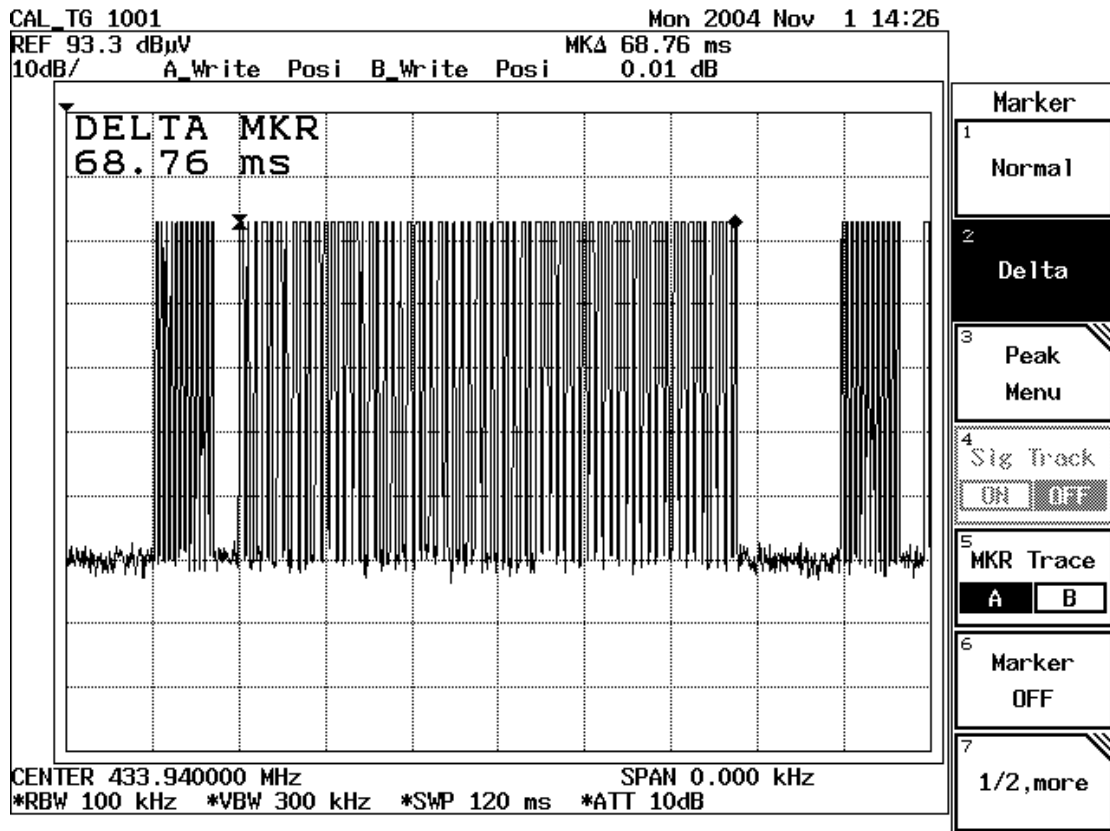


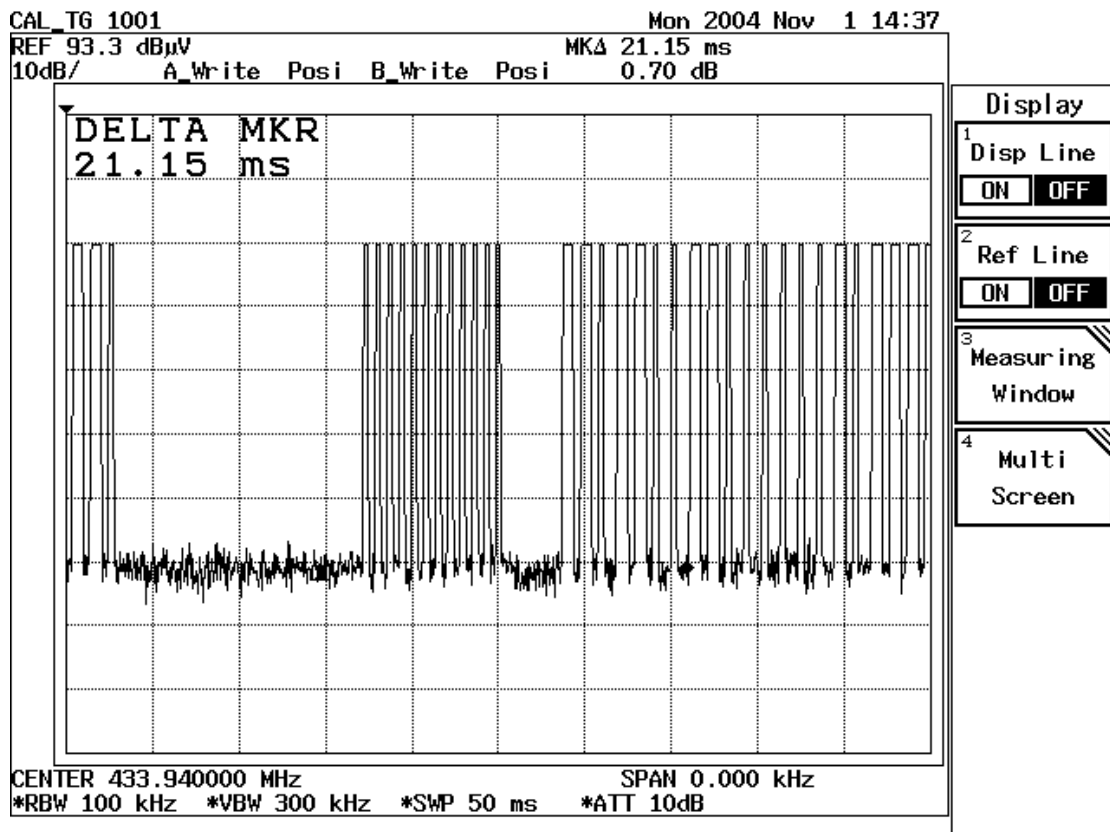
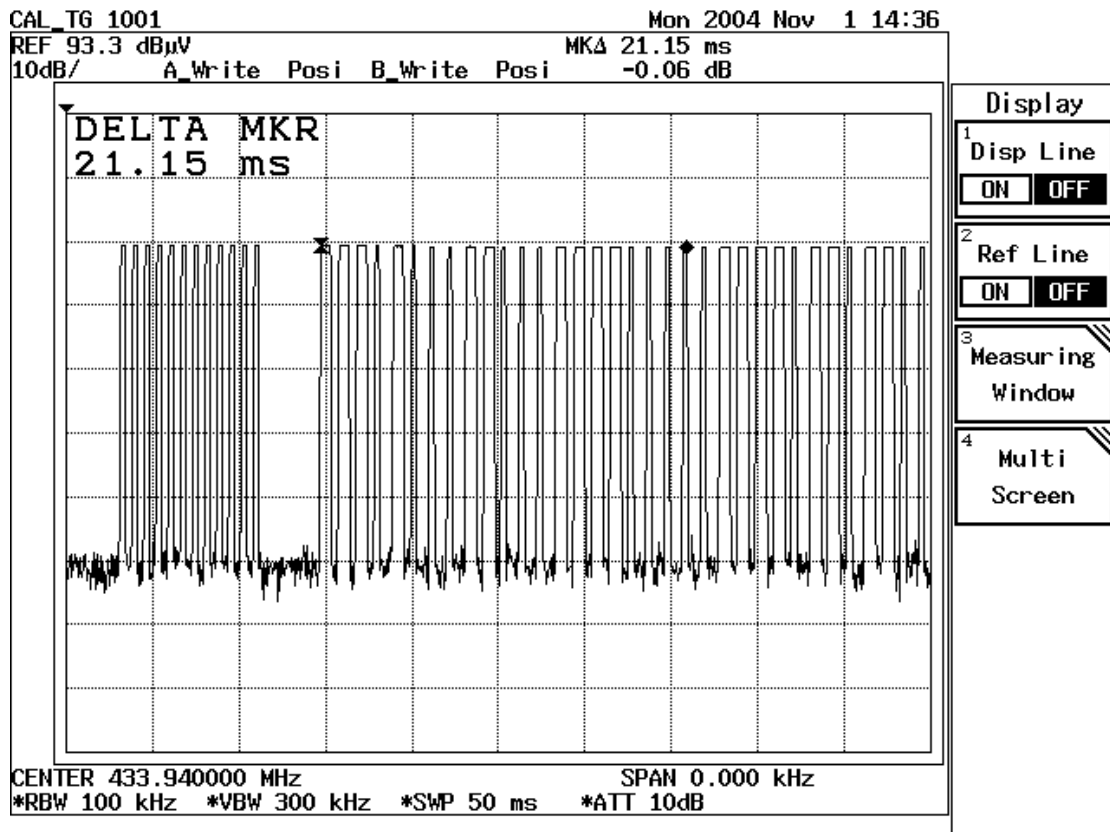
Button#3



Button#4

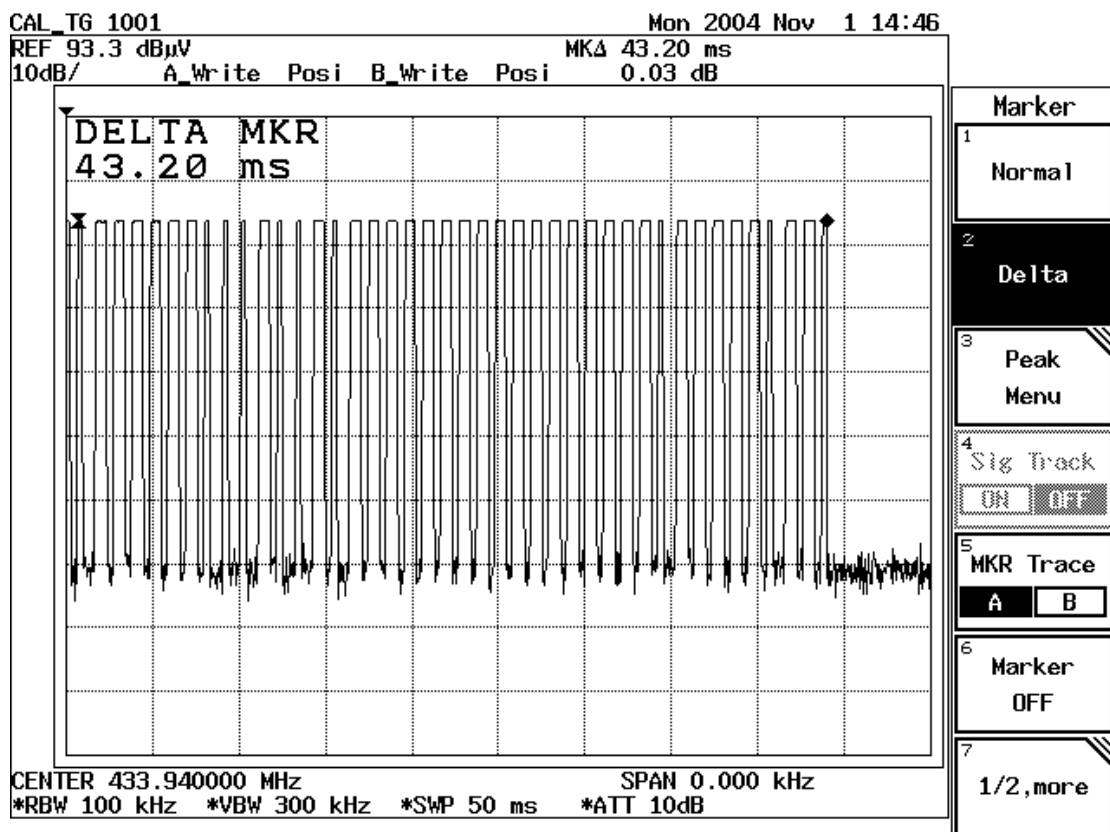
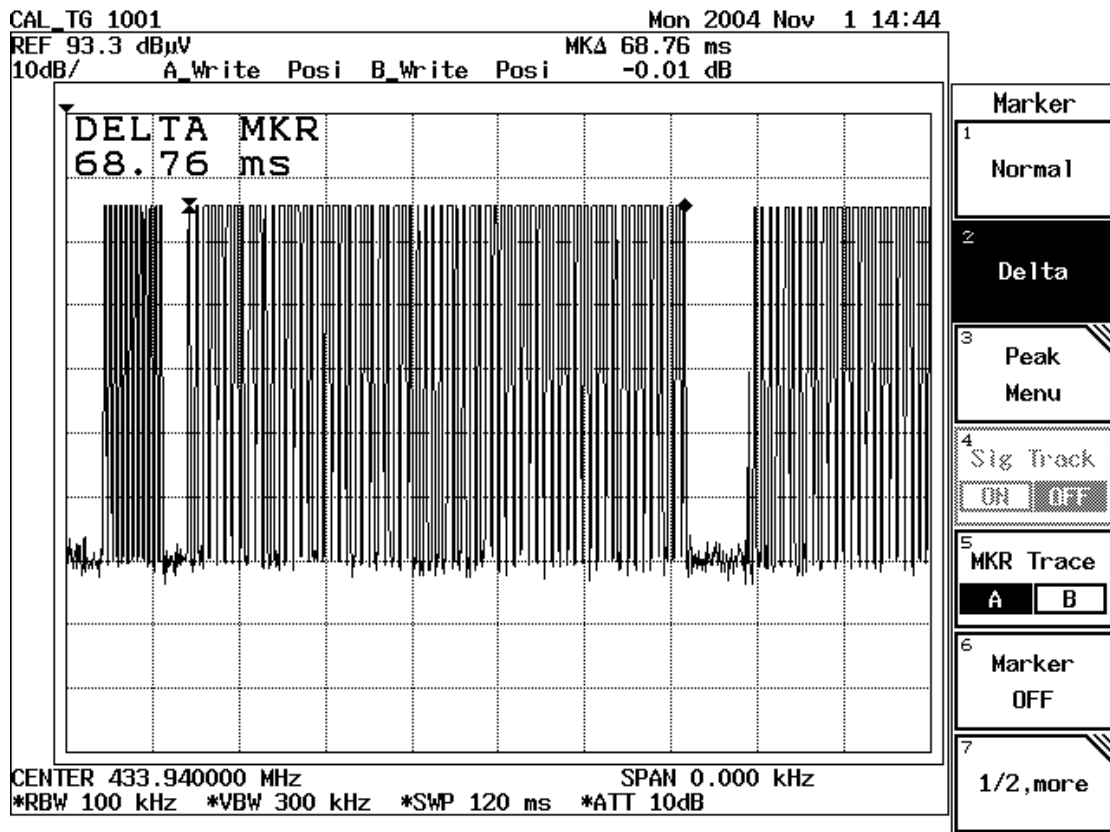


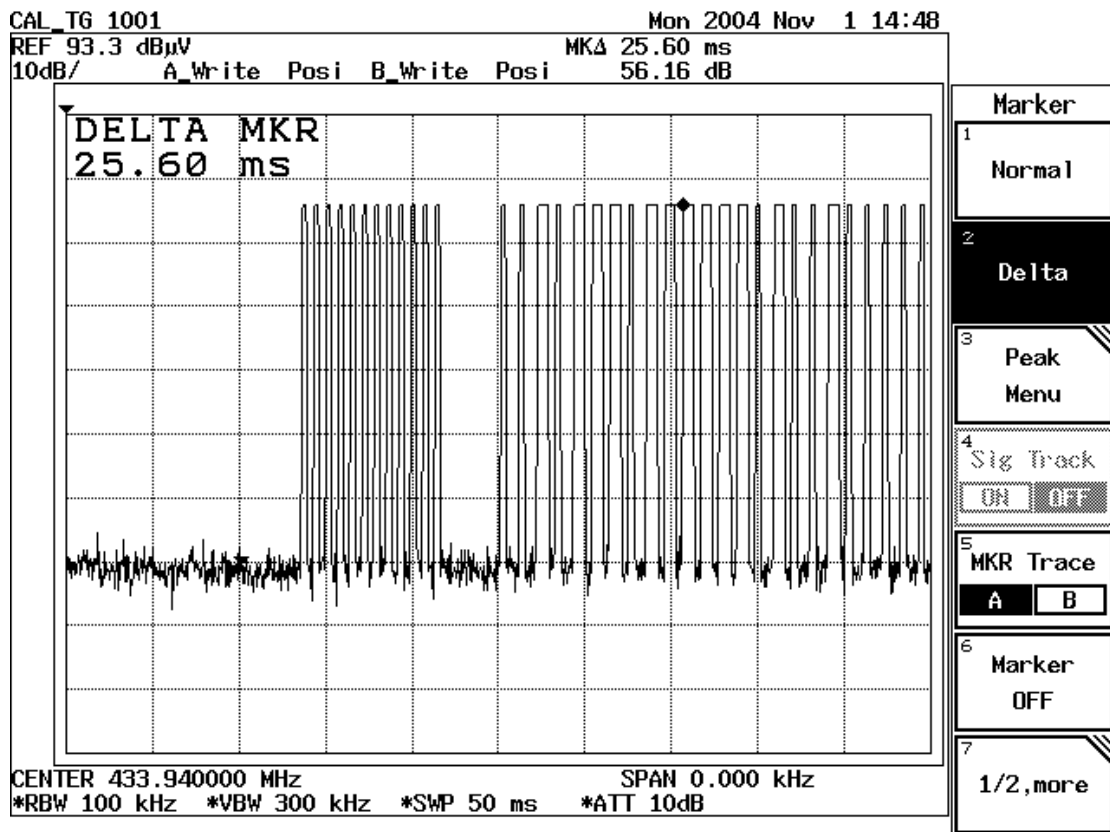
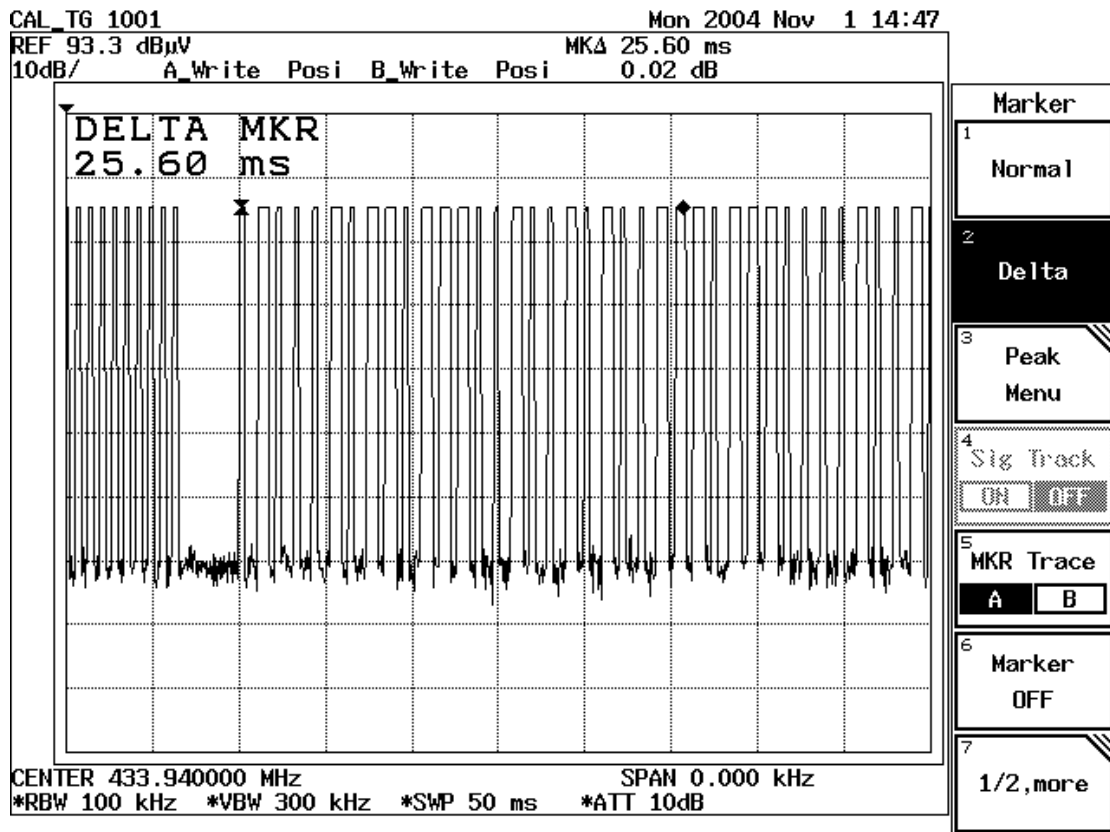
**Channel Number****Button#1**





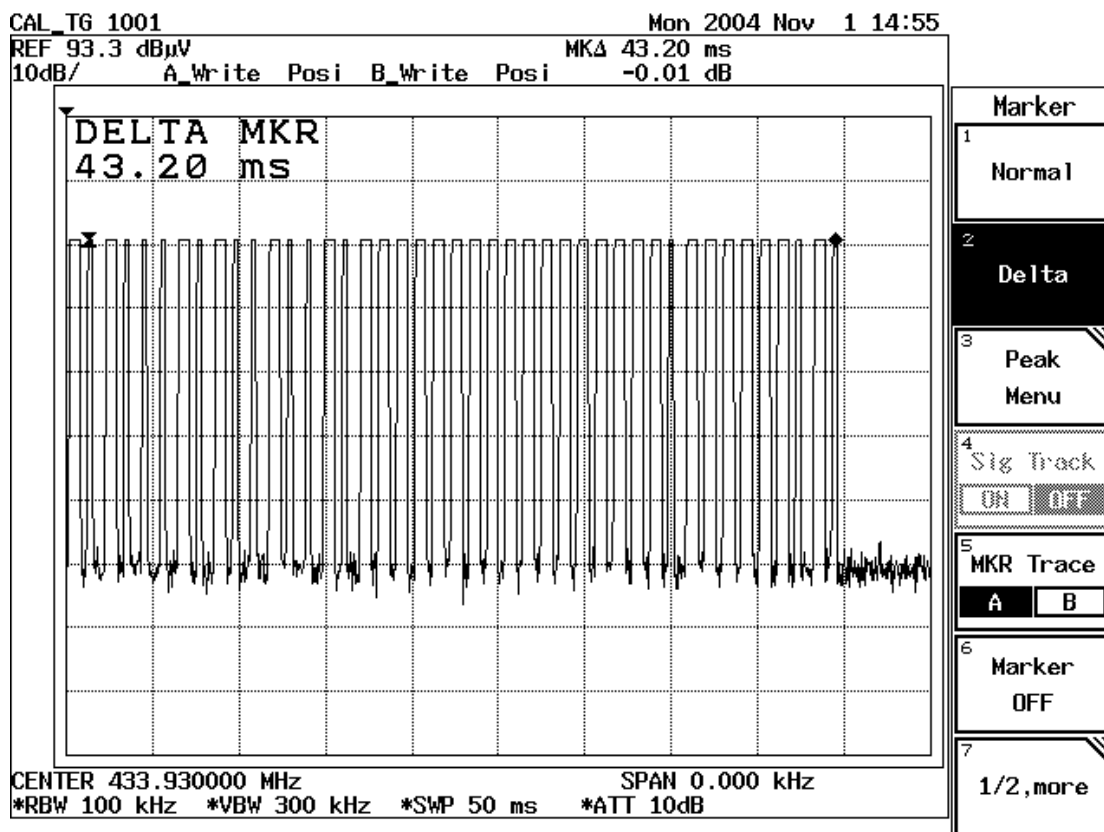
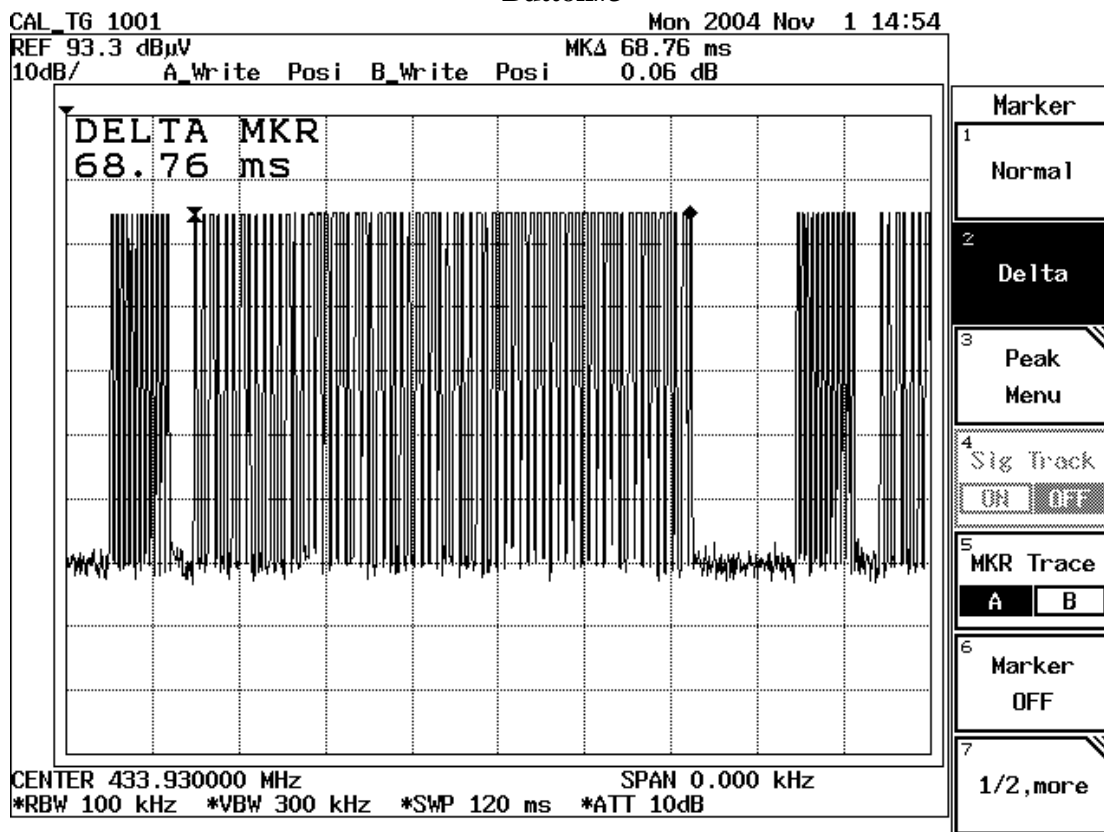
Button#2

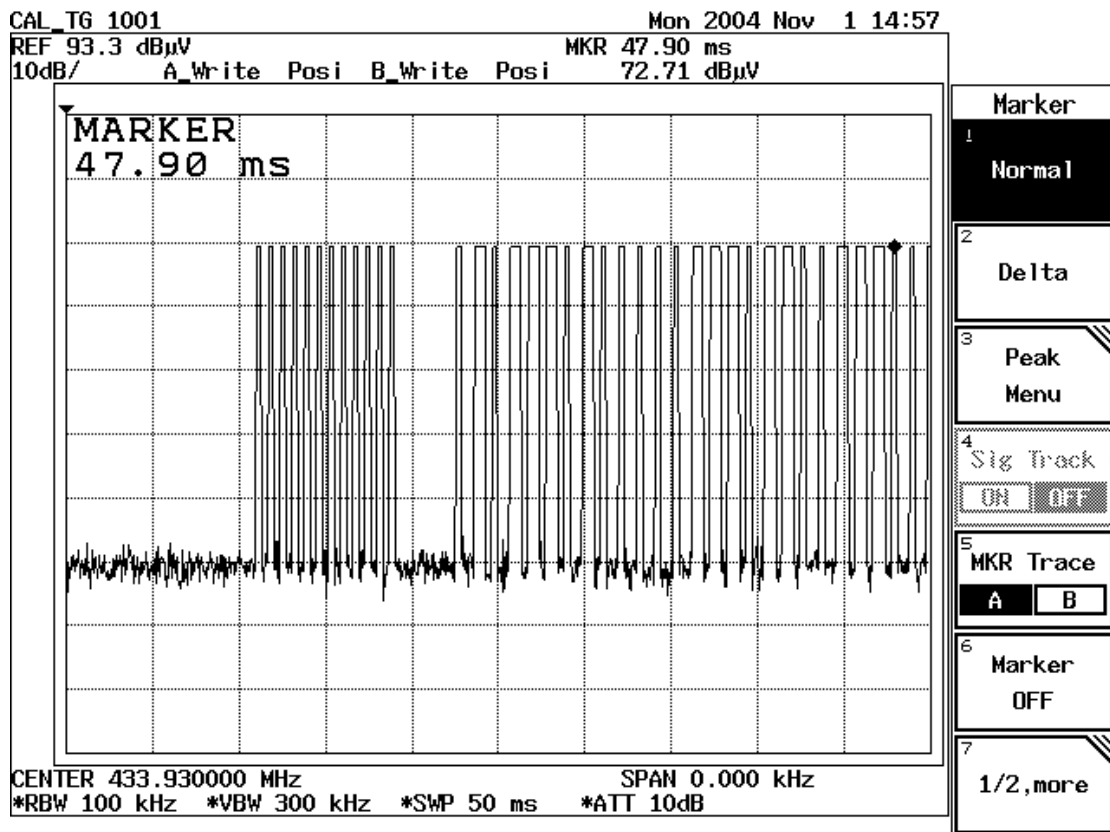
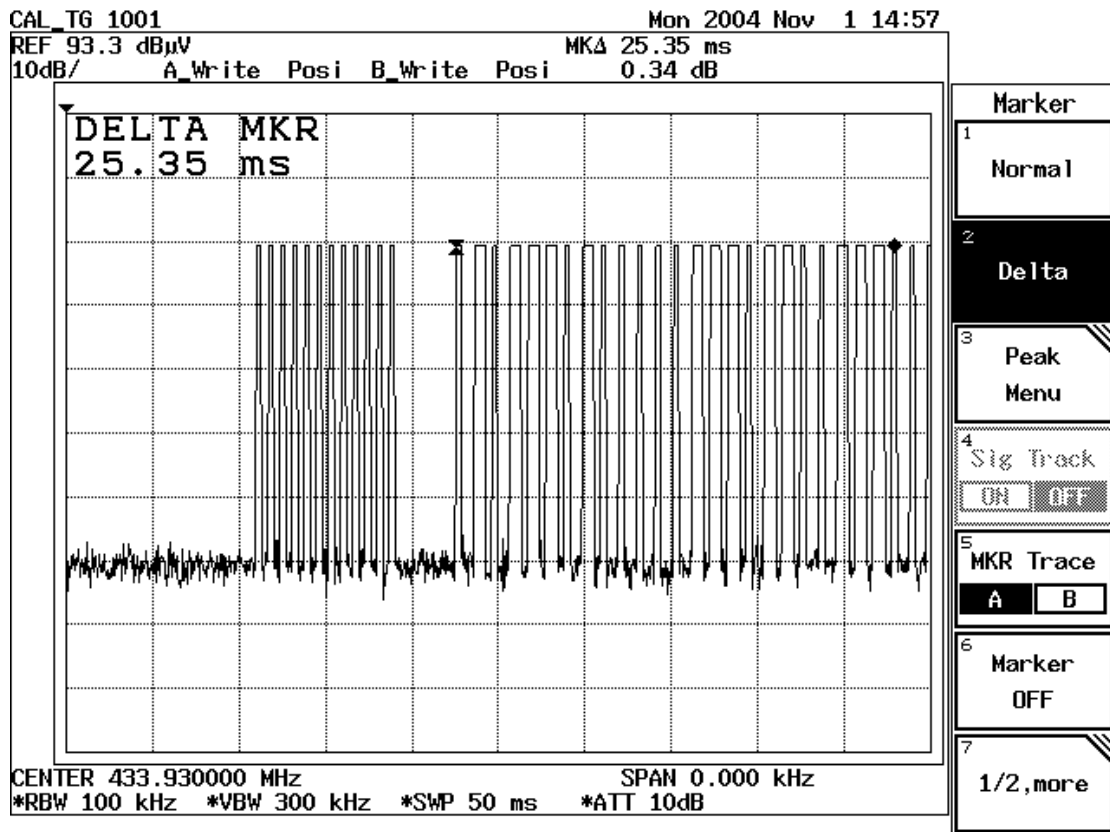






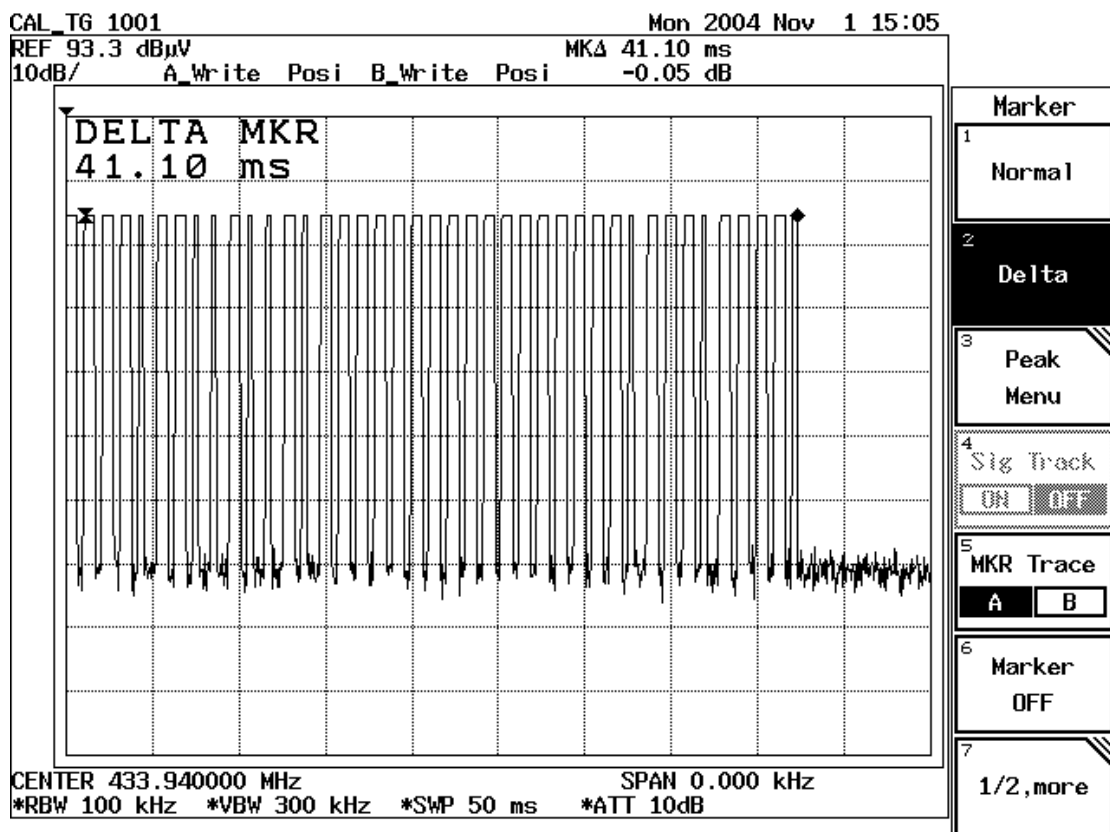
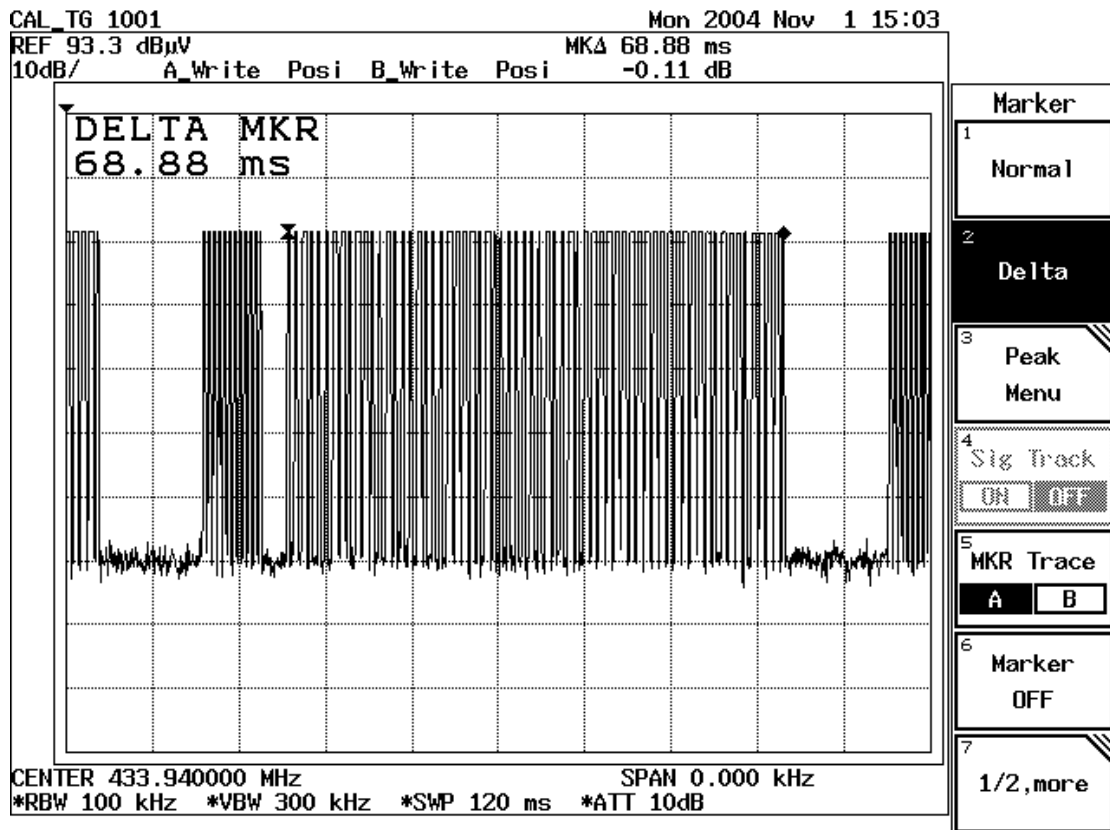
Button#3

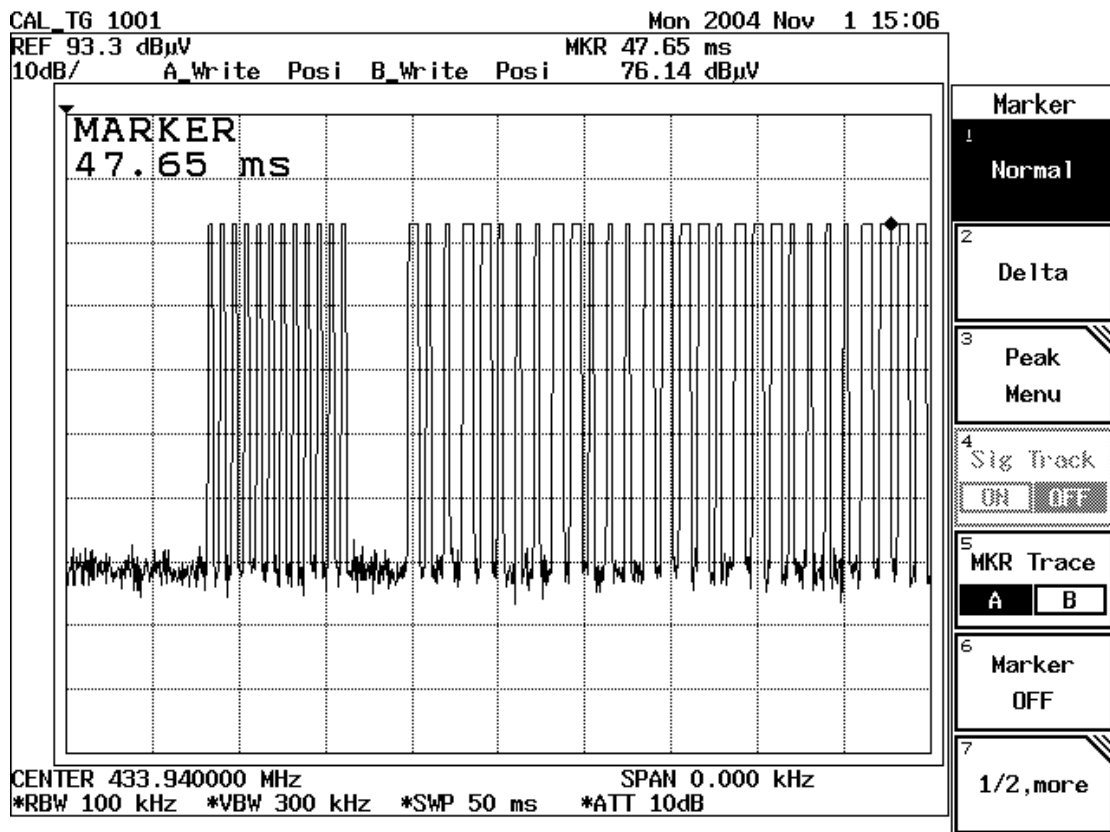
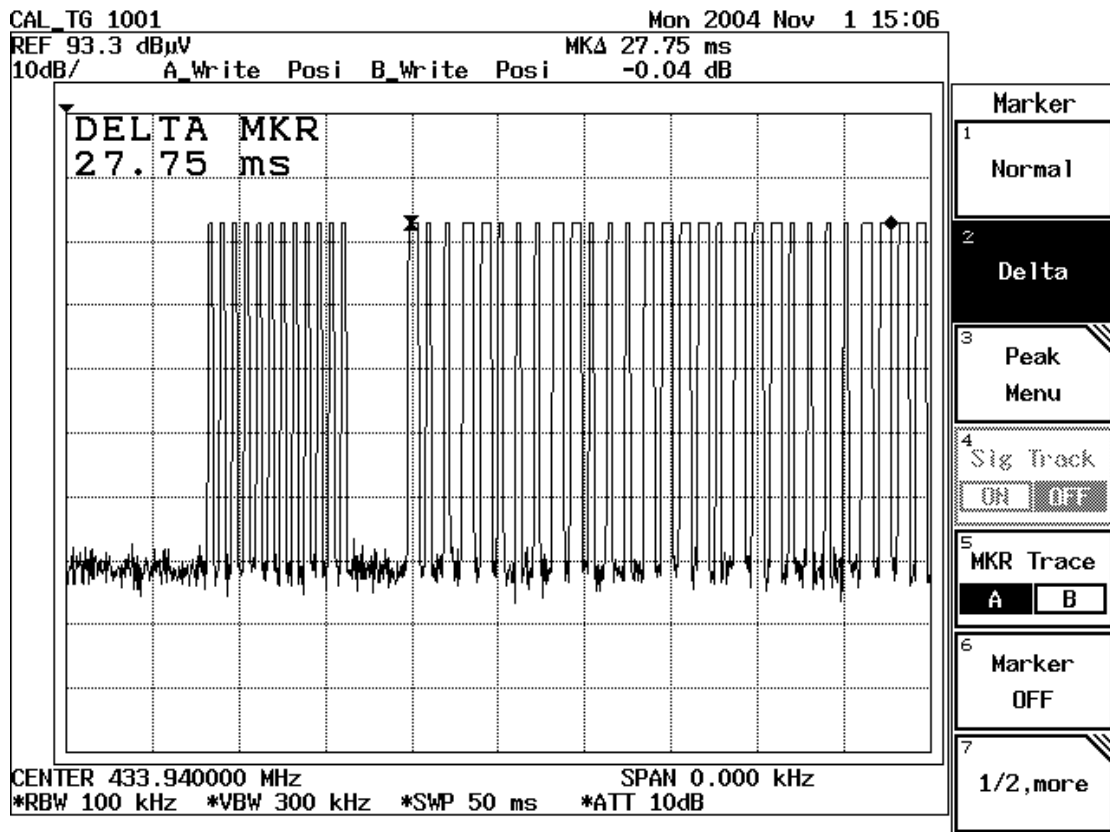


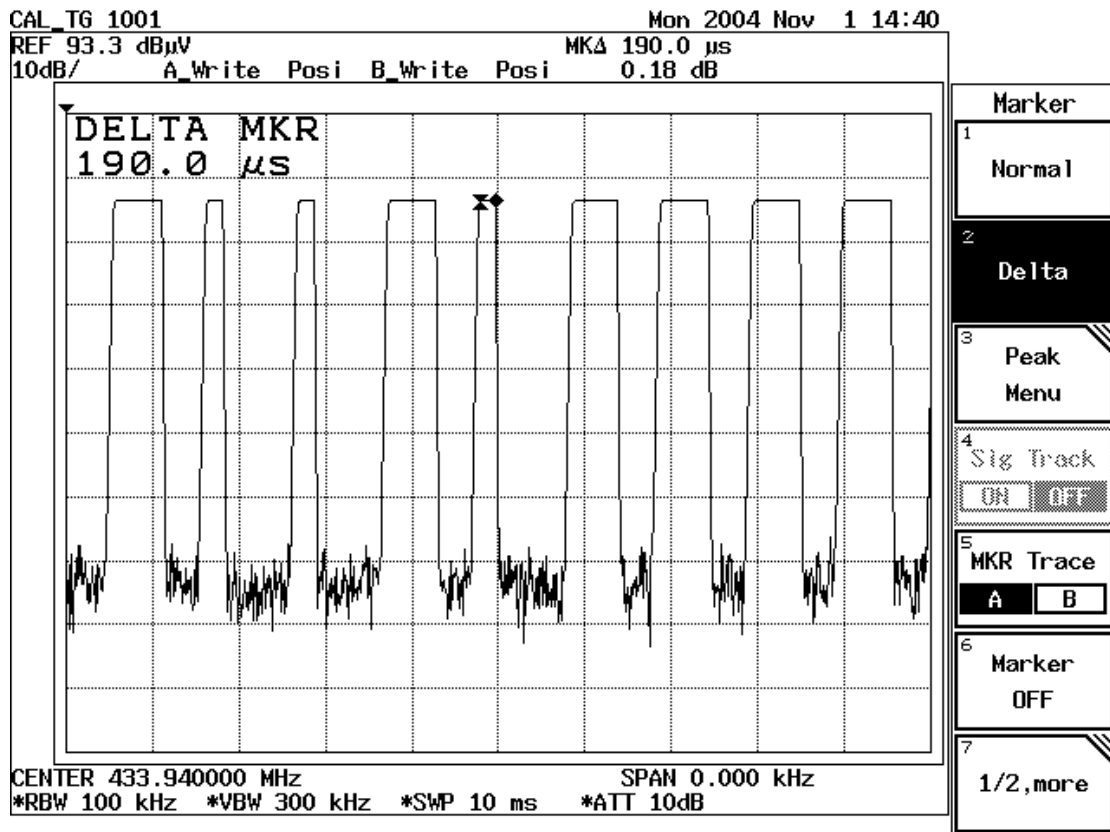
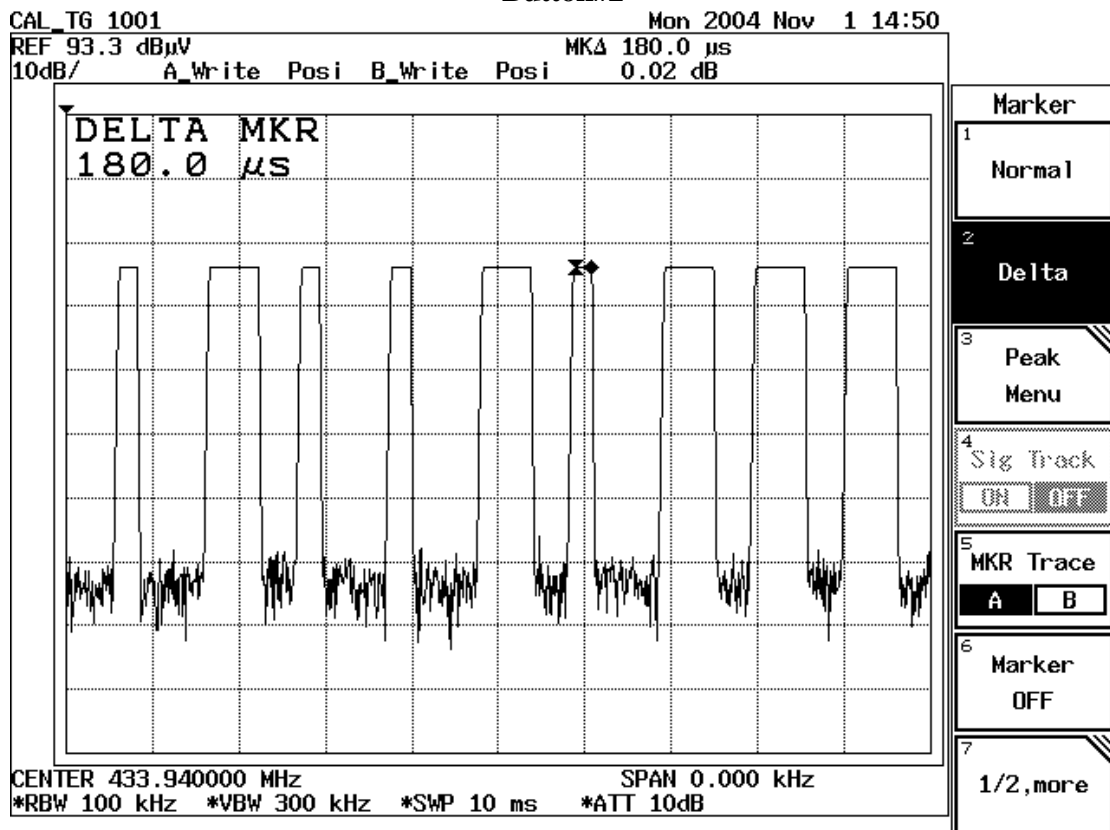




Button#4

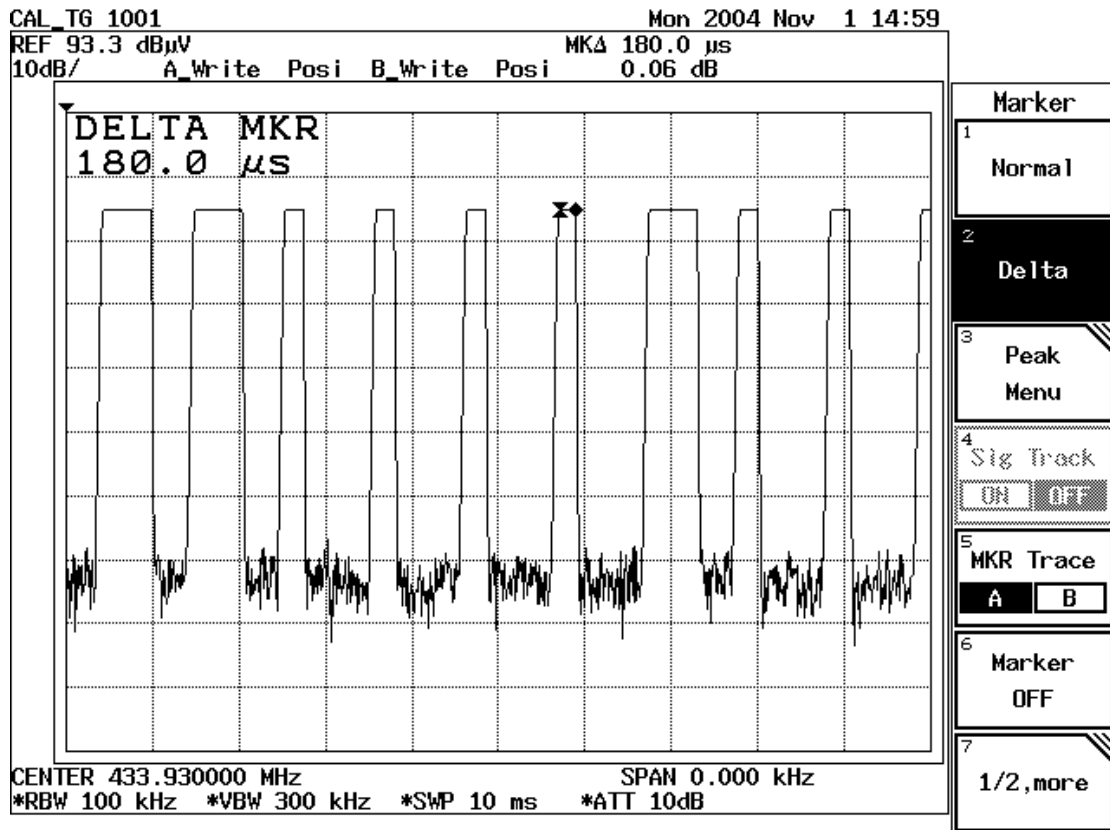




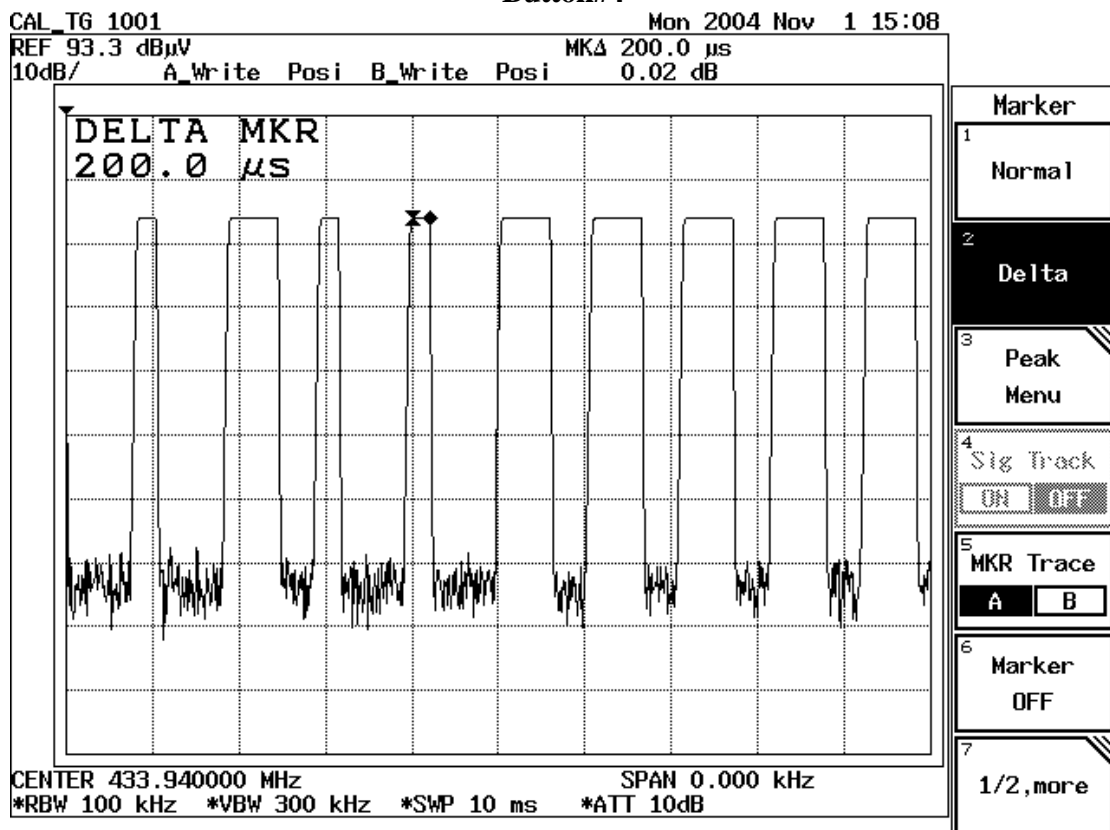
**Ton****Button#1****Button#2**

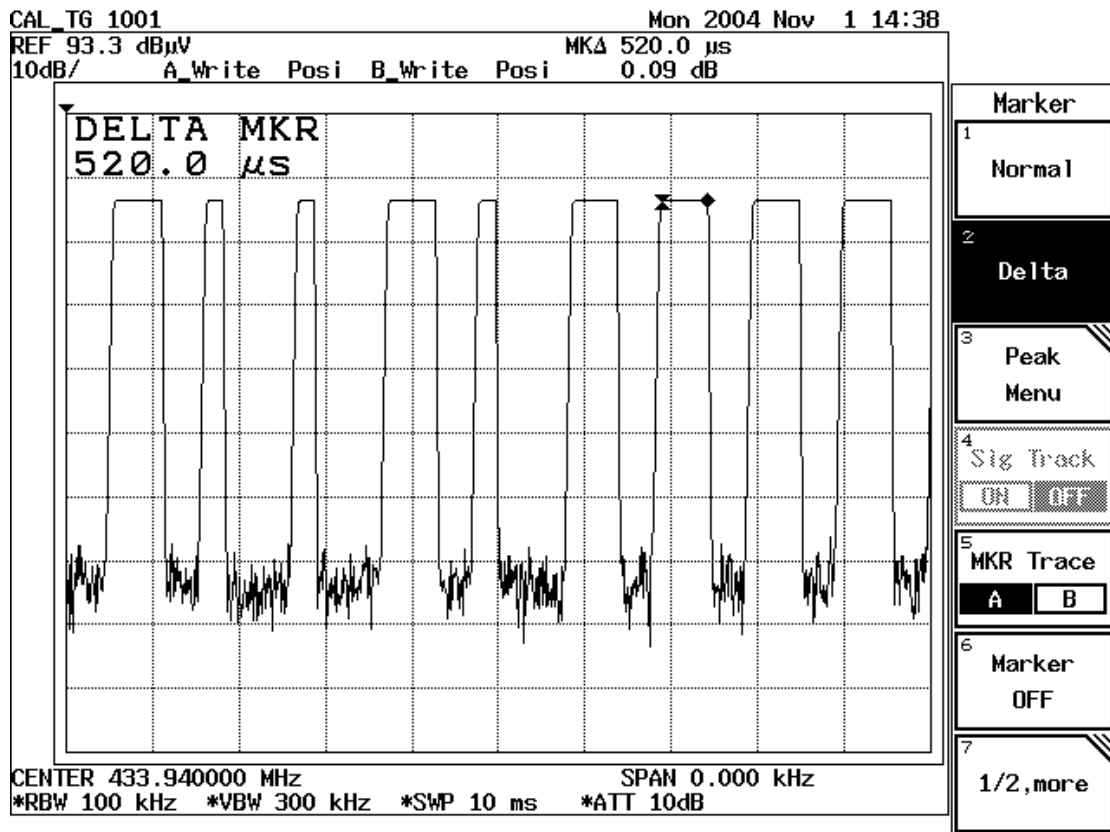
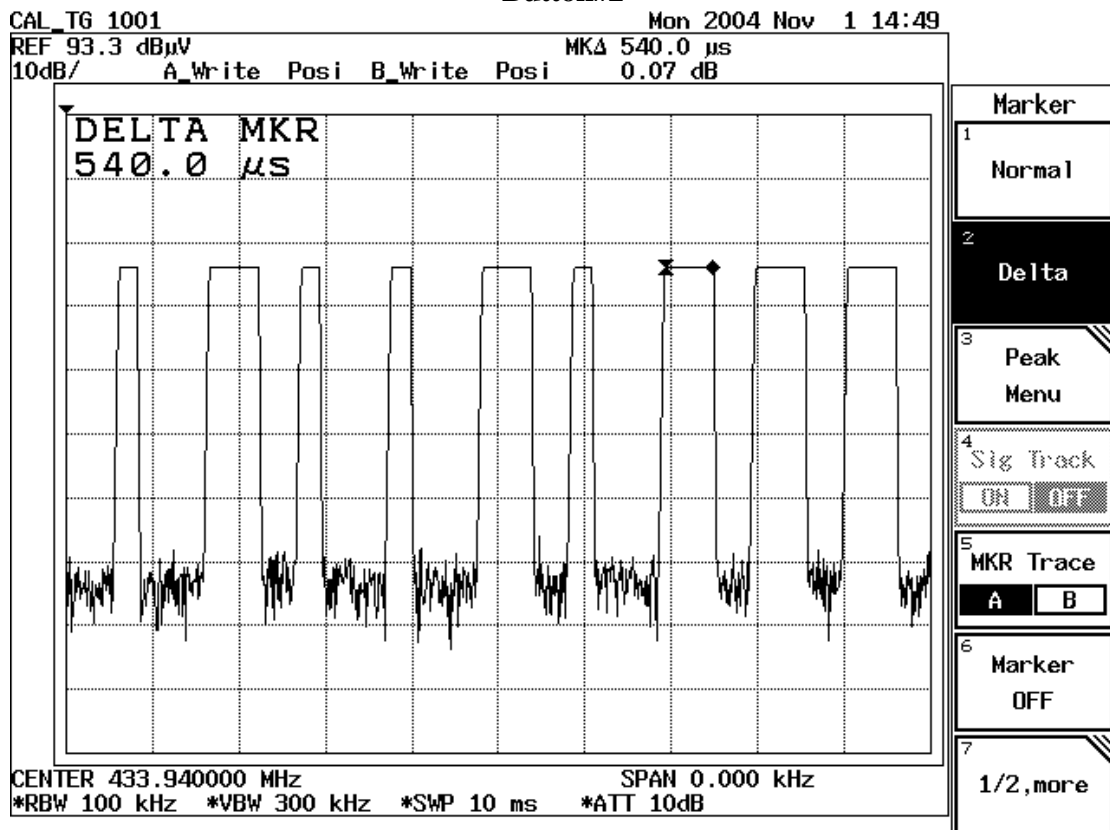


Button#3



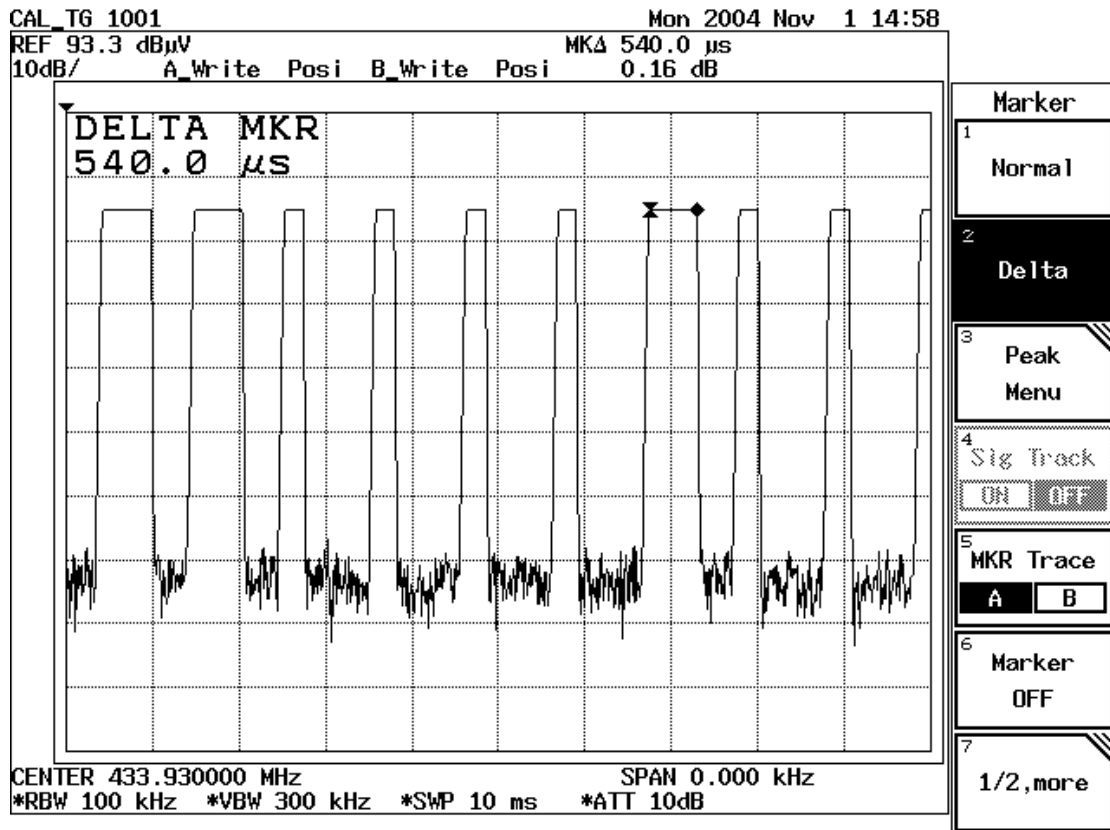
Button#4



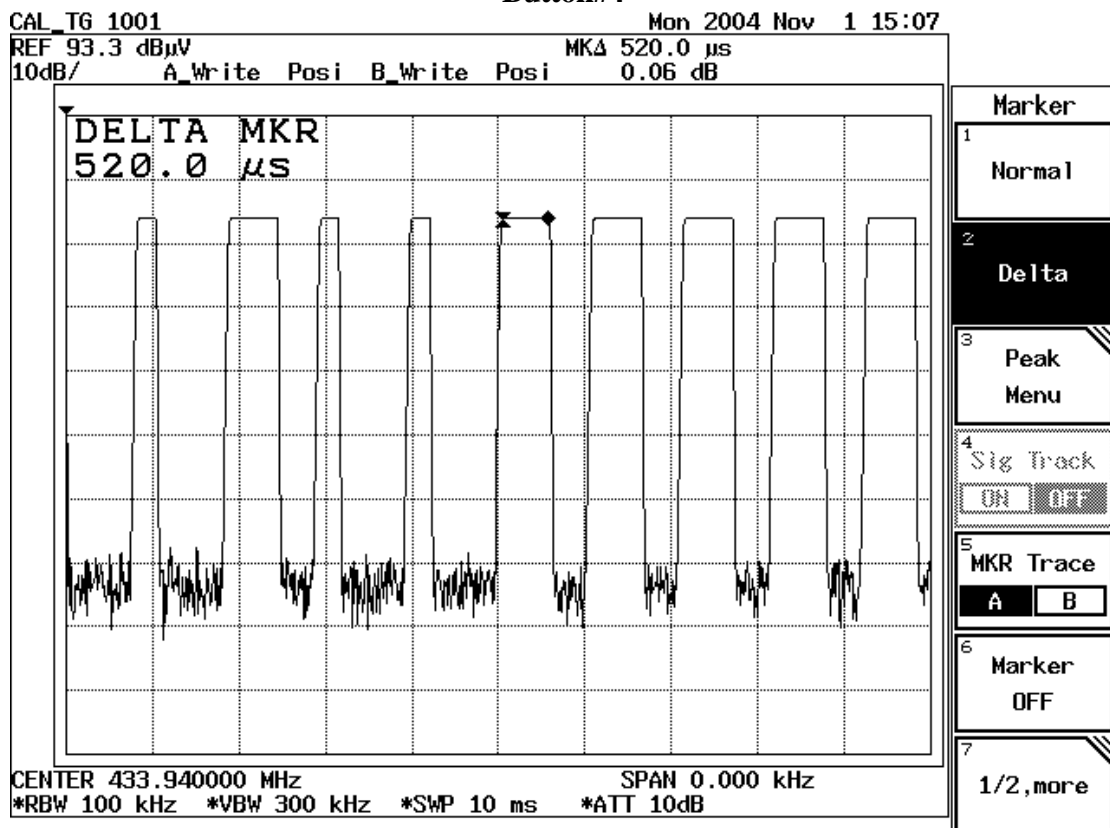
**Ton****Button#1****Button#2**



Button#3



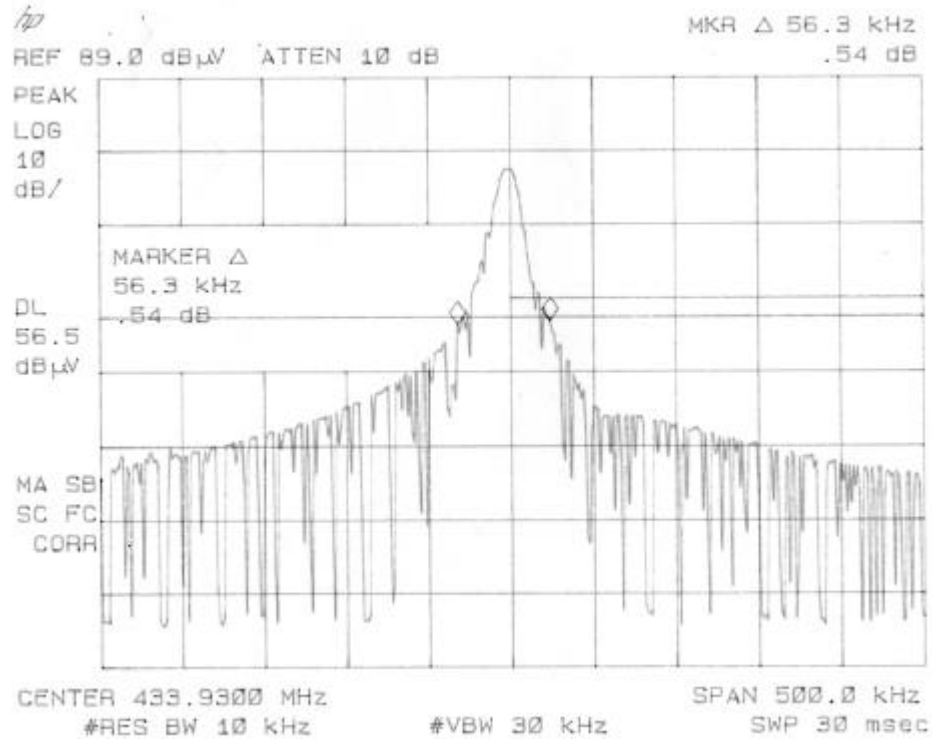
Button#4



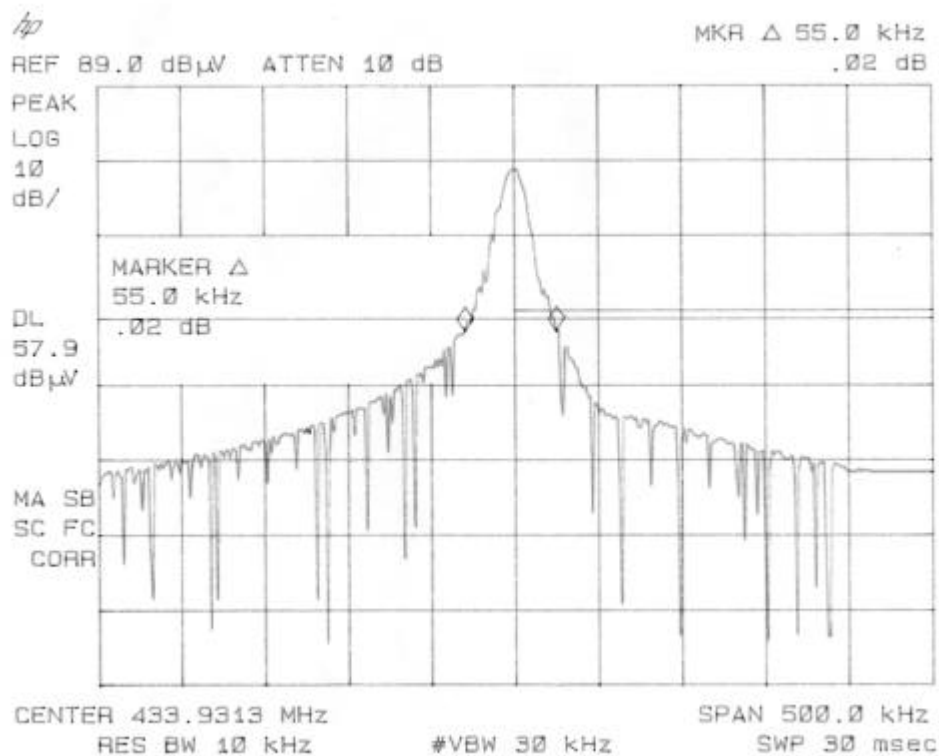


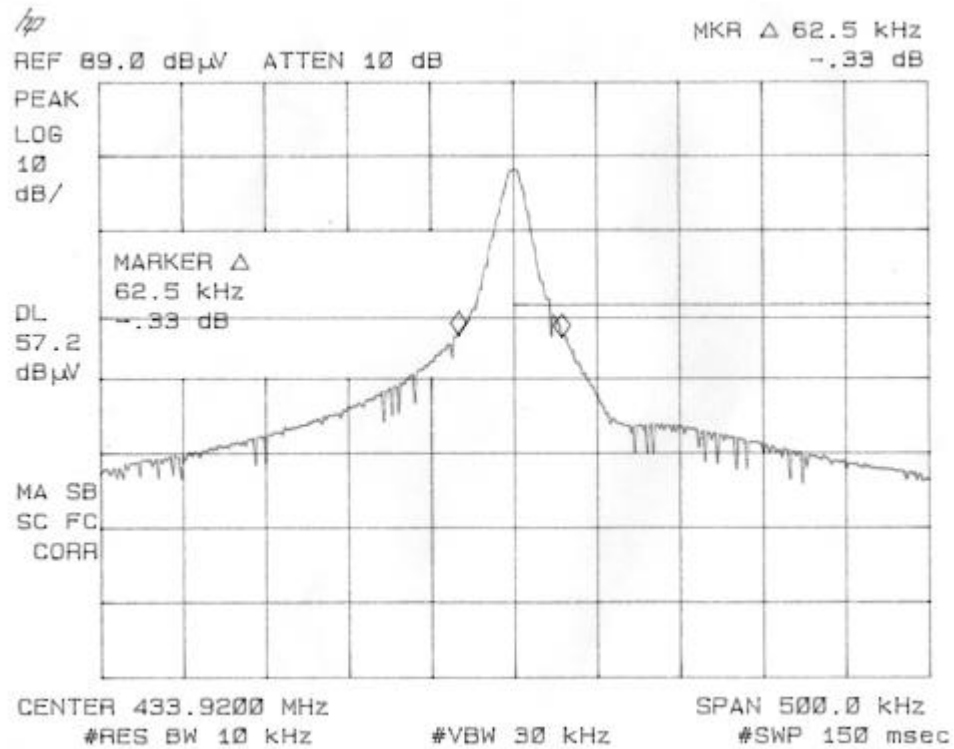
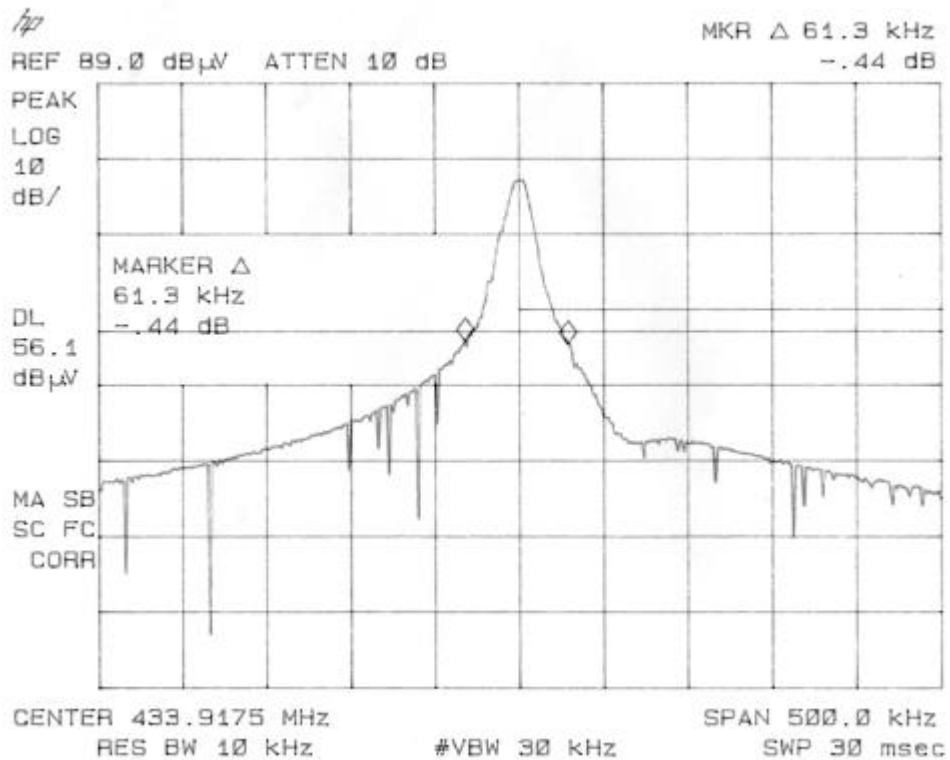
Test Plot: The Emissions Bandwidth

Button#1



Button#2



**Button#3****Button#4**



TEST RESULTS

Below 1 GHz

Operation Mode: TX Mode / Button#1**Test Date:** June 25, 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)
433.89	72.29	61.24	-8.07	53.17	80.82	-27.24	3mV_X
867.81	46.71	35.66	-1.57	34.09	60.82	-26.73	3mV_X
433.89	78.66	67.61	-8.07	59.54	80.82	-21.28	3mV_Y
867.82	56.62	45.57	-1.57	44.00	60.82	-16.82	3mV_Y
433.89	79.70	68.65	-8.07	60.58	80.82	-20.24	3mV_Z
867.82	52.20	41.15	-1.57	39.58	60.82	-21.24	3mV_Z
433.90	77.47	66.42	-8.07	58.35	80.82	-22.47	3mH_X
867.82	50.45	39.40	-1.57	37.83	60.82	-22.99	3mH_X
433.89	76.37	65.32	-8.07	57.25	80.82	-23.57	3mH_Y
867.82	51.36	40.31	-1.57	38.74	60.82	-22.08	3mH_Y
433.89	74.55	63.50	-8.07	55.43	80.82	-25.39	3mH_Z
867.80	43.64	32.59	-1.57	31.02	60.82	-29.80	3mH_Z
Factor = Antenna Factor + Cable Loss - Pre Amplifier							
Av Rdg = Pk Rdg -11.051dB							

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:** June 25, 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)
433.88	79.20	69.50	-8.07	61.43	80.82	-19.39	3mV_X
867.83	55.30	45.60	-1.57	44.03	60.82	-16.79	3mV_X
433.88	71.90	62.20	-8.07	54.13	80.82	-26.69	3mV_Y
867.84	47.80	38.10	-1.57	36.53	60.82	-24.29	3mV_Y
433.88	77.60	67.90	-8.07	59.83	80.82	-20.99	3mV_Z
867.86	52.10	42.40	-1.57	40.83	60.82	-19.99	3mV_Z
433.95	77.80	68.10	-8.07	60.03	80.82	-20.79	3mH_X
867.81	50.90	41.20	-1.57	39.63	60.82	-21.19	3mH_X
433.82	75.20	65.50	-8.07	57.43	80.82	-23.39	3mH_Y
867.58	52.30	42.60	-1.57	41.03	60.82	-19.79	3mH_Y
433.88	73.60	63.90	-8.07	55.83	80.82	-24.99	3mH_Z
867.60	42.80	33.10	-1.57	31.53	60.82	-29.29	3mH_Z
<i>Factor = Antenna Factor + Cable Loss - Pre Amplifier</i>							
<i>Av Rdg = Pk Rdg -9.6958dB</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.

**Operation Mode:** TX Mode / Button#3**Test Date:** June 25, 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)
433.60	70.69	60.47	-8.07	52.40	80.82	-28.42	3mV_X
867.83	47.20	36.98	-1.57	35.41	60.82	-25.41	3mV_X
433.89	79.20	68.98	-8.07	60.91	80.82	-19.91	3mV_Y
867.85	55.70	45.48	-1.57	43.91	60.82	-16.91	3mV_Y
433.89	77.66	67.44	-8.07	59.37	80.82	-21.45	3mV_Z
867.82	51.69	41.47	-1.57	39.90	60.82	-20.92	3mV_Z
433.85	78.30	68.08	-8.07	60.01	80.82	-20.81	3mH_X
867.82	51.90	41.68	-1.57	40.11	60.82	-20.71	3mH_X
433.85	75.30	65.08	-8.07	57.01	80.82	-23.81	3mH_Y
867.22	50.30	40.08	-1.57	38.51	60.82	-22.31	3mH_Y
433.86	74.90	64.68	-8.07	56.61	80.82	-24.21	3mH_Z
867.77	44.80	34.58	-1.57	33.01	60.82	-27.81	3mH_Z
Factor = Antenna Factor + Cable Loss - Pre Amplifier							
Av Rdg = Pk Rdg -10.221dB							

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#4**Test Date:** June 25, 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)
433.85	71.30	61.33	-8.07	53.26	80.82	-27.56	3mV_X
867.83	45.30	35.33	-1.57	33.76	60.82	-27.06	3mV_X
433.87	77.80	67.83	-8.07	59.76	80.82	-21.06	3mV_Y
867.82	55.30	45.33	-1.57	43.76	60.82	-17.06	3mV_Y
433.88	78.70	68.73	-8.07	60.66	80.82	-20.16	3mV_Z
867.89	51.40	41.43	-1.57	39.86	60.82	-20.96	3mV_Z
433.85	76.90	66.93	-8.07	58.86	80.82	-21.96	3mH_X
867.40	51.80	41.83	-1.57	40.26	60.82	-20.56	3mH_X
433.85	75.80	65.83	-8.07	57.76	80.82	-23.06	3mH_Y
867.82	51.80	41.83	-1.57	40.26	60.82	-20.56	3mH_Y
433.84	73.80	63.83	-8.07	55.76	80.82	-25.06	3mH_Z
867.50	44.80	34.83	-1.57	33.26	60.82	-27.56	3mH_Z
Factor = Antenna Factor + Cable Loss - Pre Amplifier							
Av Rdg = Pk Rdg -9.9706dB							

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#2 (Worst)**Test Date:** June 25, 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)
1300	67.00	---	-8.77	58.23	74.00	-15.77	3mV
1300	---	58.93	-8.77	50.16	54.00	-3.84	3mV
1735	60.00	50.30	-6.38	45.55	60.82	-15.27	3mV
2171	46.90	37.20	-3.78	35.05	60.82	-25.77	3mV
1300	67.20	---	-8.77	58.43	74.00	-15.57	3mH
1300	---	59.13	-8.77	50.36	54.00	-3.64	3mH
1735	65.50	55.80	-6.38	51.05	60.82	-9.77	3mH
2171	49.10	39.40	-3.78	37.25	60.82	-23.57	3mH
<i>Factor = Antenna Factor + Cable Loss - Pre Amplifier</i>							

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 – 9.6958dB) for not restricted frequency bands.