

REV	Δ	Description	Sheet Effected	Date	Drawn	Checked
A				17.03.04	D.Lanuel	S.Cohen

EMC Laboratory

SA-04G Panic Button Remote Control

FCCID: GCD-SA04G
Manufactured by
Rosslare Ltd.

EMC Test Report

According FCC Part 15 Requirements

Feb 2004

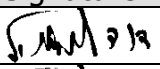
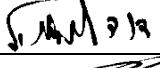
	Function/Title	Name	Signature	Date
Prepared by	Test Engineer	D.Lanuel		17.03.04
Checked by	Test Engineer	D.Lanuel		17.03.04
Approved by	EMC Lab. Manager	S.Cohen		17.03.04

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1 Introduction

a. Scope

This document describes the measurement procedures and tests for FCC part 15 of the SA-04-G-Panic Manufactured by Rosslare Ltd.

b. Description of equipment Under Test

Equipment Under Test:	SA-04G Panic Button Remote Control
FCCID	GCD-SA04G
Manufacturer:	Rosslare Ltd.
Serial Numbers:	3003722
Mode of Operation:	TX MODE
Receiver operating frequency:	433.92MHZ
Year of Manufacture:	2004

c. Applicant Information:

Applicant Address	FLAT 12, 9/F WING FAT IND BLDG. 12 WANG TAI RD., KOWLOON BAY. KOWLOON HONG KONG
Applicant Address	22, Hamelachal Street Rosh-Ha-ayin
Telephone:	+972-3-9386838
FAX:	+972-3-9386830
The testing was observed by:	ALLEN GREEN
Following applicant's personnel:	

d. Test Performance:

Date of reception for testing:	10.03.04
Dates of testing	11.03.04
Test Laboratory Location	TADIRAN EMC LAB , Hashoftim 26 Holon 58102 ISRAEL Tel: 972-3-5574476 Fax: 972-3-5575320

Applicable EMC Specification: (FCC),	Federal Communication Commission Code of Federal Regulations 47, FCC Docket 89-103,Part 15: Radio Frequency Devices, Sections 15.109, 15.209 & 15.231.
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2 Test Summary and Signatures.

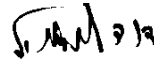
TADIRAN EMC Laboratory has completed testing of E.U.T in accordance with the requirements of the FCC Part 15 Regulations for Class B equipment.

The E.U.T was found to comply with the requirements of the FCC Part 15 Regulations given below

Test	Test Description	Section	PASS/FAIL
1	Bandwidth of the emission	15.231	PASS
2	Field strength of fundamental	15.231	PASS
3	Radiation emission	15.109	PASS
4	Radiation emission	15.231 & 15.205	PASS

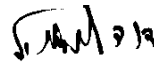
a. Test performed by:

Mr. D. Lanuel Test Engineer



b. Test Report prepared by:

Mr. D. Lanuel Test Engineer



c. Test Report Approved by:

Mr. Samuel Cohen EMC Lab. Manager



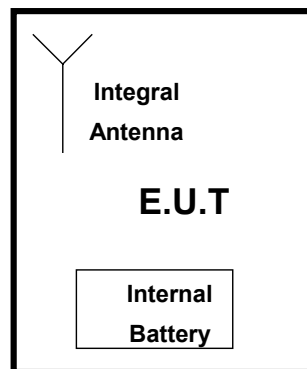
3 E.U.T Information

a. E.U.T description

- (1) The SA-04 Panic Button Remote Control is a small handheld remote control transmitter worn by the user, to activate the security system in times of emergency.
- (2) The SA-04 Panic Button Remote Control is a stand-alone unit, operating only on internal battery power supply. The unit consists of one (1) PCB, one (1) microcontroller – which controls the detector operation, and a RF transmitter section. The unit does not have a RF receiver section.
- (3) The SA-04 Panic Button Remote Control has one RF channel, at 433.92 Mhz carrier with OOK modulation.
- (4) The SA-04 Panic Button Remote Control in active mode transmits identification and status signals in 100ms. No supervisory signal is transmitted from the device.
- (5) When the Remote Control detects activity 5 identical transmissions are sent. The time between the end of one transmission and the start of the subsequent one being random. This time interval varies between 105ms and 400 ms. However, the total TX period is always less than 1 s.
- (6) The battery used is a 3vdc non-replaceable lithium.

b. E.U.T Test Configuration

E.U.T. test configuration is shown in figure bellow



c. E.U.T Mode of Operation description

- (1) 433.92MHz TX Mode operated by battery

4 BANDWIDTH OF THE EMISSION part 15.231—TEST RESULTS

E.U.T: SA-04-G-PANIC S/N 3003722
Test Method: ANSI 63.4
Date: 11/03/04
Relative Humidity: 29%
Ambient Temperature: 21c
Air Pressure: 1053hpa
Test Setup: Figure 11

Testing Engineer: D.Lanuel



Date 17/03/04

a. Test Results Summary & Conclusions

The E.U.T was found in compliance with Bandwidth of Radiated Emission fundamental frequency requirement

b. Limits of bandwidth

The test unit shall meet the limits of Table 1

TABLE- 1 Limits For Bandwidth

Frequency (MHz)	Bandwidth Max Limits (%)	Bandwidth Max Limits (KHz)
433.92	0.25	1085

c. Test Instrumentation and Equipment

TABLE- 2 Test Instrumentation and Equipment

Item	Model	Manufacturer	Next Date Calibration
Spectrum Analyzer	8593E	HP	31/01/05
Broadband Antenna	BTA-L	FRANKONIA	10.04.06

d. Test Results

TABLE- 3 Bandwidth Test Result

Frequency (MHz)	Bandwidth (KHz)	Bandwidth Max Limit (KHz)	Plot No	PASS /FAIL
433.92	55.5	1085	Plot-1	PASS

e. Procedure

The Bandwidth is determined at the point 20db down from the modulated carrier, while the spectrum analyzer was set to "max hold" and VBW –10KHz.

5 field strength of fundamental part 15.231-TEST RESULTS

E.U.T: SA-04-G-PANIC S/N 3003722
Test Method: ANSI 63.4
Date: 11/03/04
Relative Humidity: 29%
Ambient Temperature: 20c
Air Pressure: 1053hpa
Test Setup: Figure 11

Testing Engineer: D.Lanuel



Date 17/03/04

a. Test Results Summary & Conclusions

The E.U.T was found in compliance with fundamental frequency requirement

b. Limits of Field Strength for fundamental according 15.231

The test unit shall meet the limits of Table 4

TABLE- 4 Limits For Fundamental

Frequency (MHz)	Average Max Limits (dB μ V/m)	Peak Max Limits (dB μ V/m)
433.92	81	101

c. Test Instrumentation and Equipment

TABLE- 5 Test Instrumentation and Equipment

Item	Model	Manufacturer	Next Date Calibration
Spectrum Analyzer	8593E	HP	31/01/05
Broadband Antenna	BTA-L	FRANKONIA	10.04.06

d. Test Results

TABLE- 6 **Average Factor**

TX Period(min)	Duty Cycle(min)	Average Factor(db)
13.02ms	$13.02/100=0.1302$	$20\log 0.1302=-17.7$

TABLE- 7 **Peak Result of Fundamental**

Frequency (MHz)	Peak Result (dB μ V/m)	peak Limits (dB μ V/m)	Margine d (dB)	Plot No	Pass/ Fail
433.916	86.7	101	14.3	Plot-2	PASS

TABLE- 8 **Average Result of Fundamental**

Peak Result (dB μ V/m)	Average Factor	Calculation Results	Average Limits (dB μ V/m)	Margine d (dB)	Pass/ Fail
86.7	-17.7	69	81	12	PASS

e. Test Procedure

The EUT was placed on the top of rotating table 0.8 meters above the ground and the table was rotated 360°, the height of antenna is varied from one to 4 meters (vertical and horizontal polarization) to determine the max field strength of fundamental

6 Radiated emission part 15.231 & 15.205-test results

E.U.T: SA-04-G-PANIC S/N 3003722
Test Method: ANSI 63.4
Date: 10/03/04
Relative Humidity: 29%
Ambient Temperature: 21c
Air Pressure: 1053hpa
Test Setup: Figure 11

Testing Engineer: D.Lanuel



Date 17/03/04

a. Test Results Summary & Conclusions

The E.U.T was found in compliance with 15.231

b. Limits of Radiated Interference Field Strength according 15.231

The test unit shall meet the limits of Table 9.

TABLE- 9 **Limits For 15.231(b)**

Frequency range(MHz)	Average Limits (dB μ V/m)	peak Limits (dB μ V/m)
0.009 – 3500	61	81

c. Test Instrumentation and Equipment

TABLE- 10 **Test Instrumentation and Equipment**

Item	Model	Manufacturer	Next Date Calibration
Spectrum Analyzer	8593E	HP	31/01/05
Rode Antenna(10KHz-30MHz)	95010-1	ETN	13.11.05
Double Ridge Guide Antenna(1-18GHz)	3105	EMCO	24.04.05
Broadband Antenna	BTA-L	FRANKONIA	10.04.05
Low Noise Amplifier (0-1GHz)	AM-1300-N	MITEQ	14.01.05
Low Noise Amplifier (1-2GHz)	SMC-09	MITEQ	14.01.05
Low Noise Amplifier (2-6GHz)	SMC-09	MITEQ	14.01.05

d. Preliminary Test Results

TABLE- 11 Preliminary Test Results for intentional Emissions in TX Mode 15.231

Antenna Polarization	Freq. Range MHz	Res. BW (kHz)	Plot No.	PASS/FAIL
Both Hor.& Ver	0.009 – 0.15	0.2	Plot-3	Pass
	0.15 - 30	9	Plot-4	Pass
	30-1000	120	Plot-5	Pass
	1000-2.000	1000	Plot-6	Pass
	2000-2.800	1000	Plot-7	Pass
	2.800-5000	1000	Plot-8	Pass

e. Final Results

TABLE- 12 Six Highest Peak Emission Test Results

Mode Of Operation	Freq. (MHz)	peak Reading (*) (dB μ V/m)	Limit dB μ V/m	Margin (dB)	Pass/Fail
TX	1301.721	59.6	74*	14.4	PASS

***Restricted bands**

TABLE- 13 Six Highest Average Emission Test Results

Mode Of Operation	Freq. (MHz)	Calculated (dB μ V/m)	Limit dB μ V/m	Margin (dB)	Pass/Fail
TX	1301.721	41.9	54	12.1	PASS

f. Test Procedure

(1) **Preliminary Test Procedure**

- 1) *The EUT was placed on the top of a rotating table 0.8 meters above the ground at a chamber shielded*
- 2) *The E.U.T was set 3 meters away from the receiving antenna, which was mounted on the top of a variable-height antenna tower.*
- 3) *The Antenna height varied from one meter above the ground over its full-allowed range of travel and the table was rotated 360°to determine the maximum value of the field strength*
- 4) *The antenna was set both horizontal and vertical polarization.*

(2) **Final Test Procedure**

- 1) *The EUT was tested at open area for each suspected emission*
- 2) *The test procedure was performed according paragraph (1) and figure 11*

g. Final Test Setup

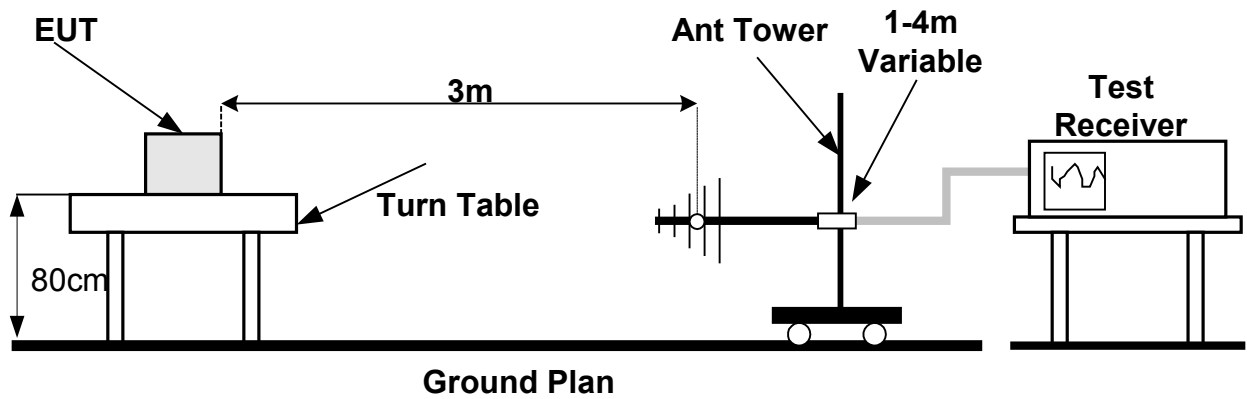


Figure 11 Radiated Emission Set up

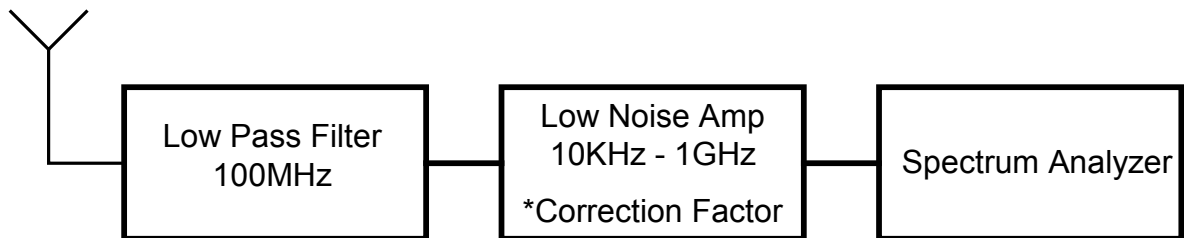


Figure 12 Radiated Emission test 10KHz – 30MHz

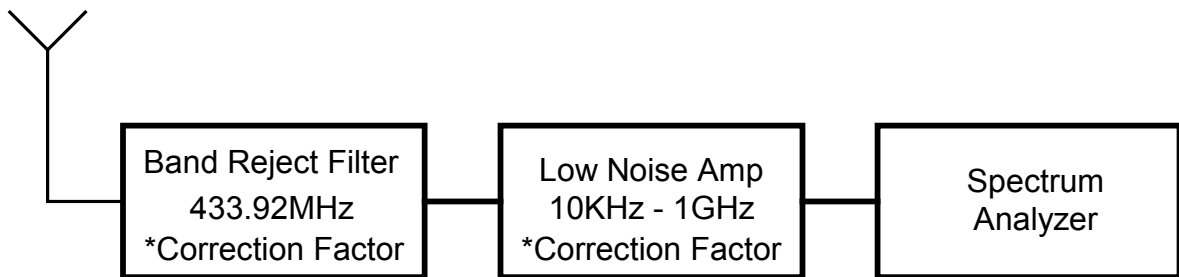


Figure 13 Radiated Emission test 30MHz – 1GHz

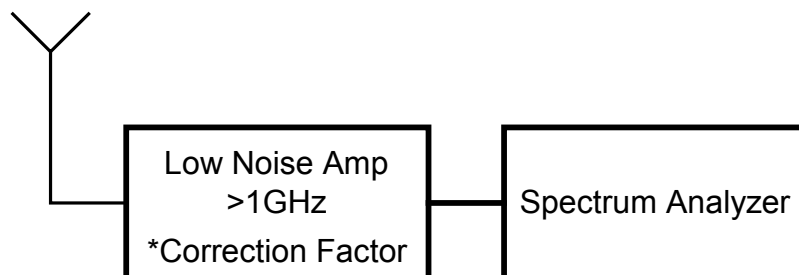


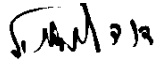
Figure 14 Radiated Emission test above 1GHz

7 Radiated emission part 15.109-test results.

a. Preliminary Radiated emission Test Result According Part 15.109

E.U.T:	SA-04-G-PANIC	S/N 3003722
Test Method:	ANSI 63.4	
Date:	10/03/04	
Relative Humidity:	29%	
Ambient Temperature:	21c	
Air Pressure:	1053hpa	
Test Setup:	Figure 11	

Testing Engineer: D.Lanuel



Date 17/03/04

b. Test Results Summary & Conclusions

The E.U.T was found in compliance with 15.109

c. Limits of Radiated Interference Field Strength according 15.109

The test unit shall meet the limits of Table 14 for Class B equipment.

TABLE- 14 **Limits For 15.109 Class B equipment**

Frequency Range (MHz)	Quasi-peak Limits (dB μ V/m)
30 - 88	40
88 - 216	43
216 - 960	46
960 - 2000	54

d. Test Instrumentation and Equipment

TABLE- 15 Test Instrumentation and Equipment

Item	Model	Manufacturer	Next Date Calibration
Spectrum Analyzer	8593E	HP	31/01/05
Double Ridge Guide Antenna(1-18GHz)	3105	EMCO	24.04.05
Broadband Antenna(30-1000MHz)	BTA-L	FRANKONIA	10.04.05
Low Noise Amplifier (0-1GHz)	AM-1300-N	MITEQ	14.01.05
Low Noise Amplifier (1-2GHz)	SMC-09	MITEQ	14.01.05
Low Noise Amplifier (2-6GHz)	SMC-09	MITEQ	14.01.05

e. Preliminary Results

TABLE- 16 Preliminary Test Results for Unintentional Emissions in **RX** Mode 15.109

Configuration	Antenna Polarization	Freq. Range MHz	Res. BW (kHz)	Plot No.	PASS/F AIL
TX	Both	30-1000	120	Plot-9	Pass
		1000-2.800	120	-	Pass
		2000-50000	2000	-	Pass

f. Final Test Results

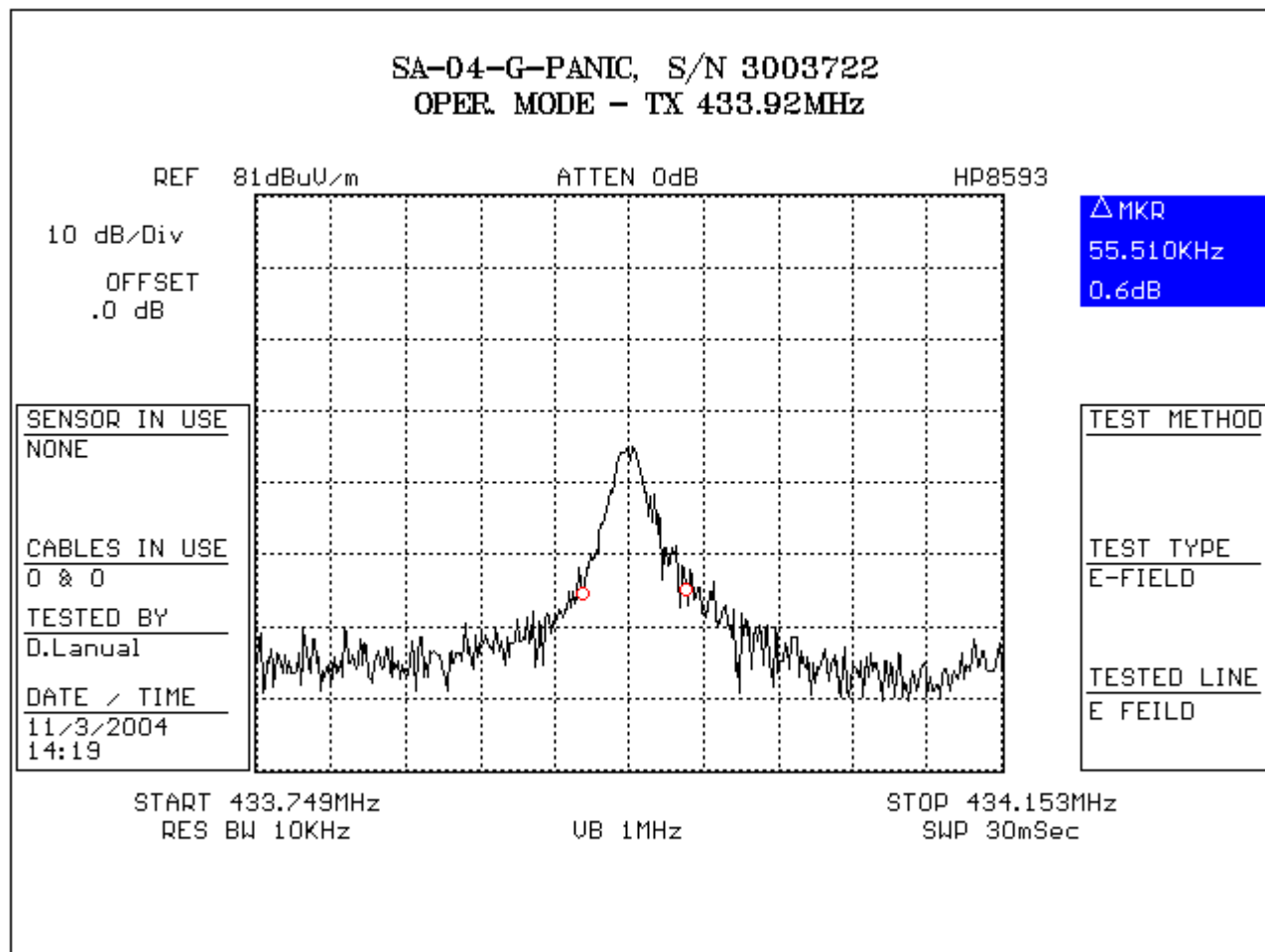
TABLE- 17 Six Highest **RX** Mode 15.109

Mode Of Operation	Freq. (MHz)	peak Reading (*) (dB μ V/m)	Limit dB μ V/m	Margin (dB)	Polarity Ver/Hor	Height (m)
TX	30-1000	The Emissions are at least 20db below the unintentional limits				
	1000-5000	No Emission-Background noise only				

g. Test Procedure

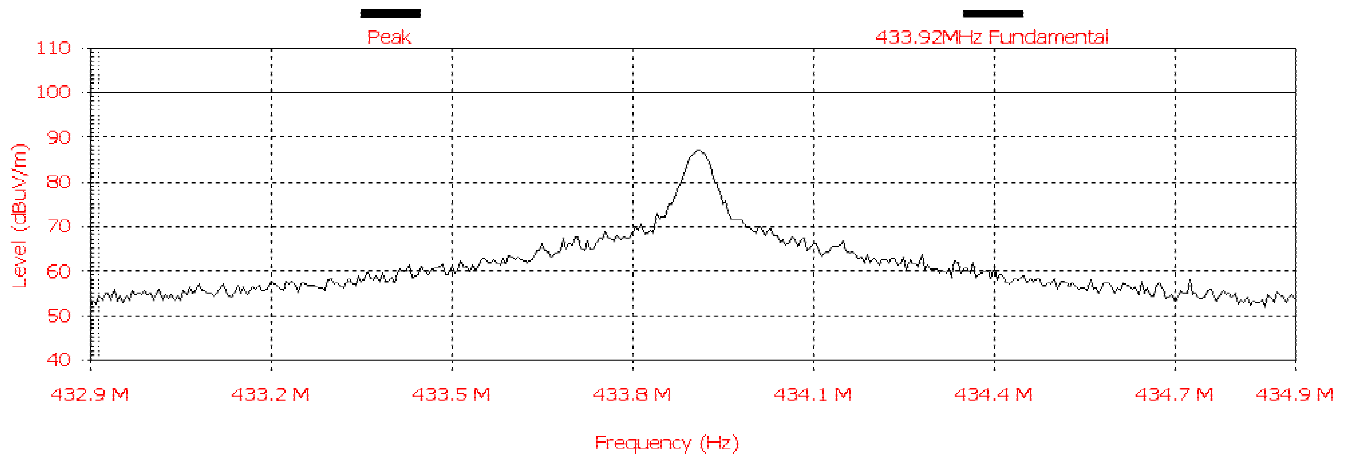
See paragraph 7.f

8 plots

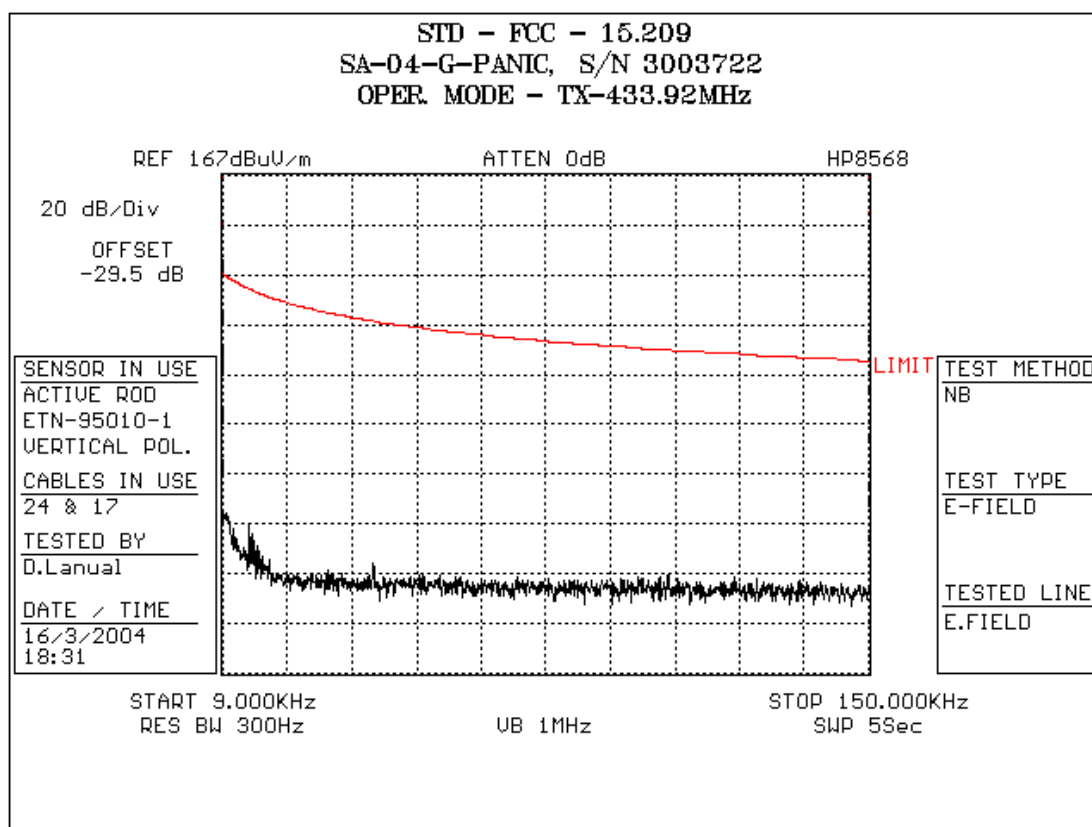


Plot 1 Bandwidth

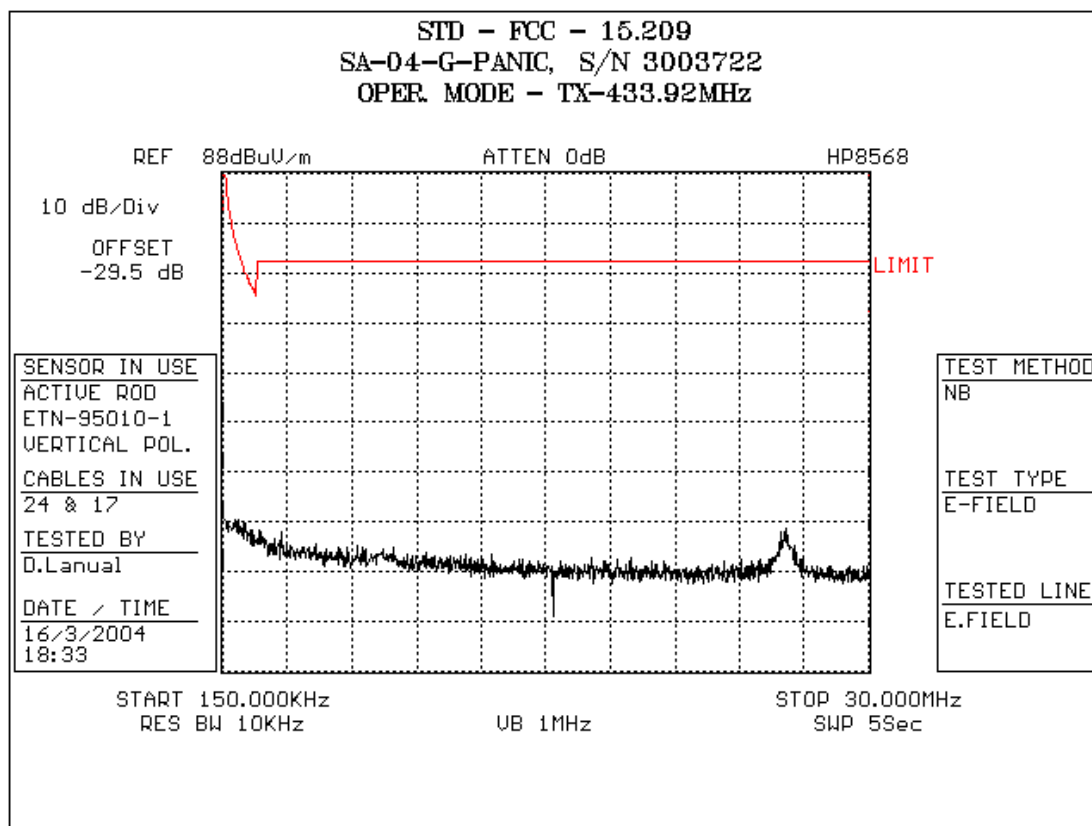
Frequency (MHz)	Pk
433.907	86.7



Plot 2 Field strength of fundamental



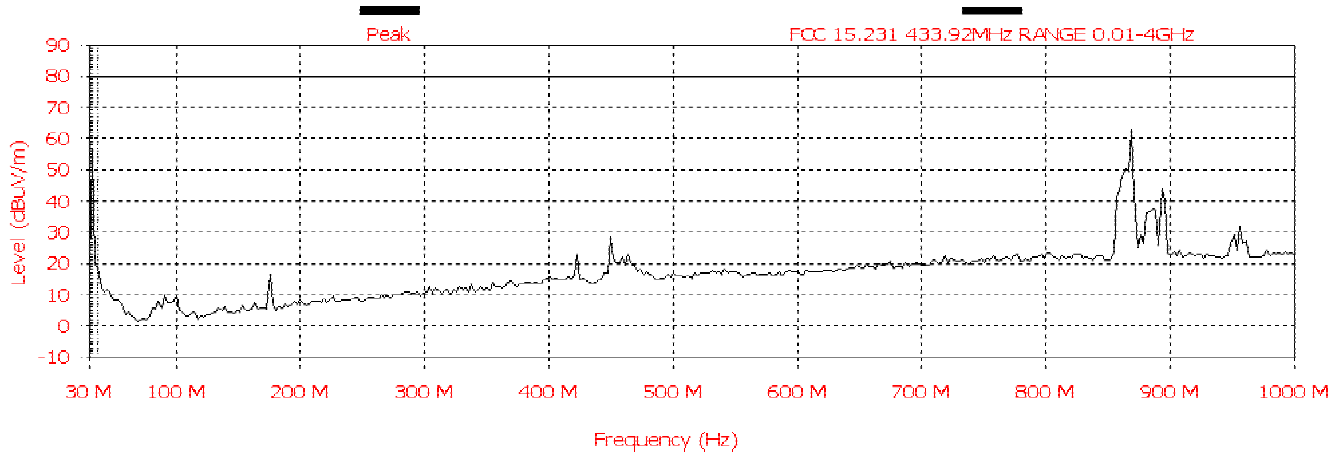
Plot 3 15.231 Radiated Emission



Plot 4 15.231 Radiated Emission

Frequency (MHz)	QP
867.5	67.5

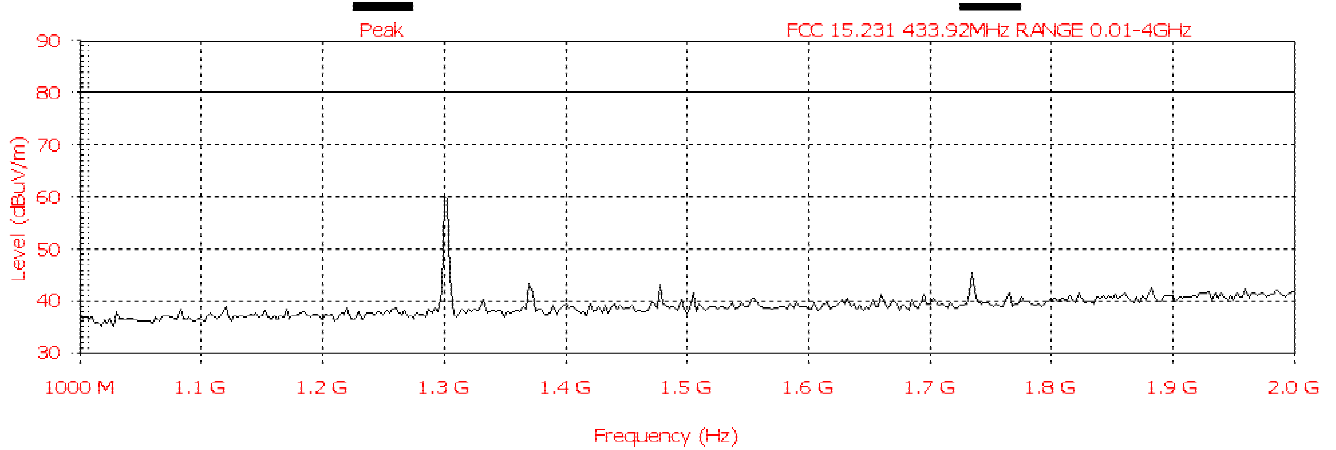
Analyzer setting: R.BW-120K, V.BW-1MHz, QP detector



Plot 5 15.231 Radiated Emission

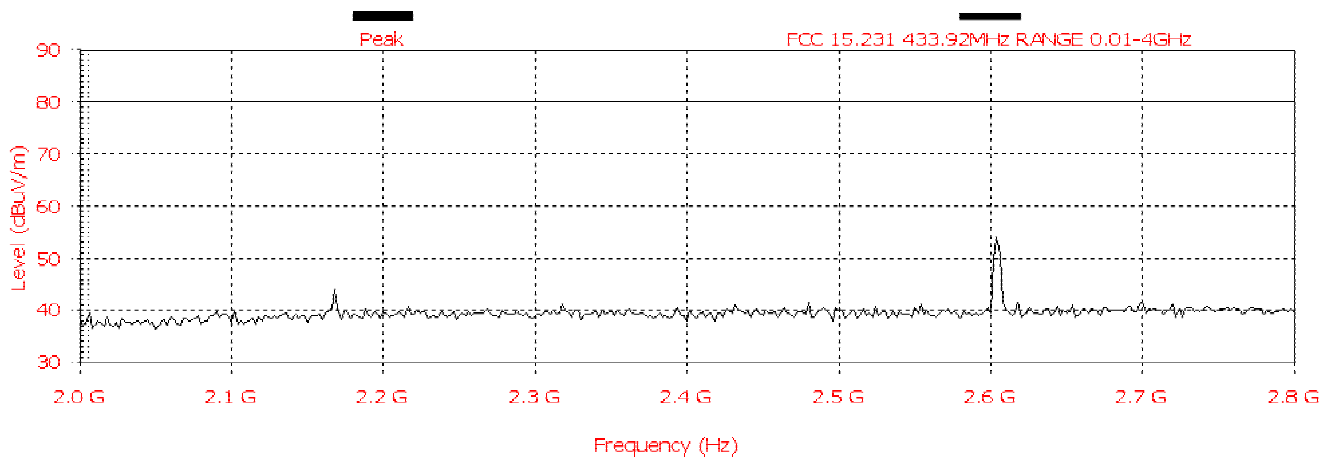
Frequency (MHz)	QP
1301.721	59.6

Analyzer setting: R.BW-1M, V.BW-3MHz, peak detector



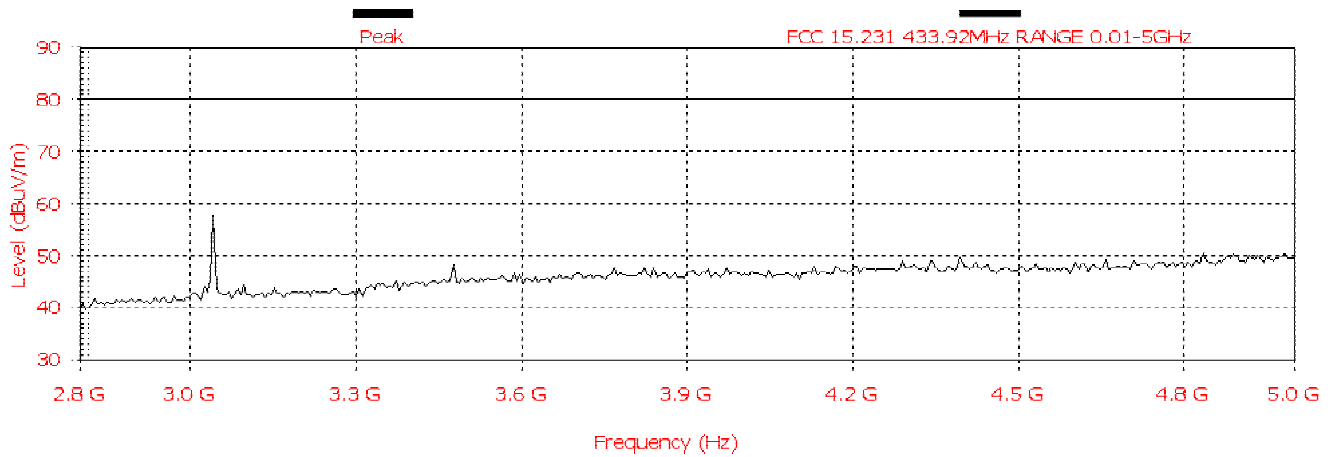
Plot 6 15.231 Radiated Emission

Analyzer setting: R.BW-1M, V.BW-3MHz, peak detector



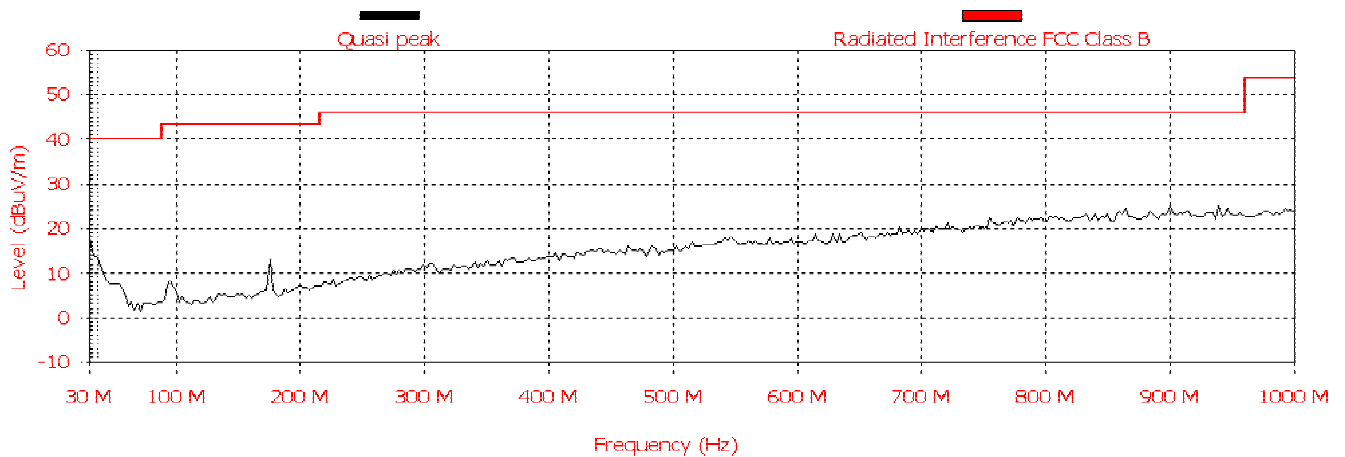
Plot 7 15.231 Radiated Emission

Analyzer setting: R.BW-1M, V.BW-3MHz, peak detector

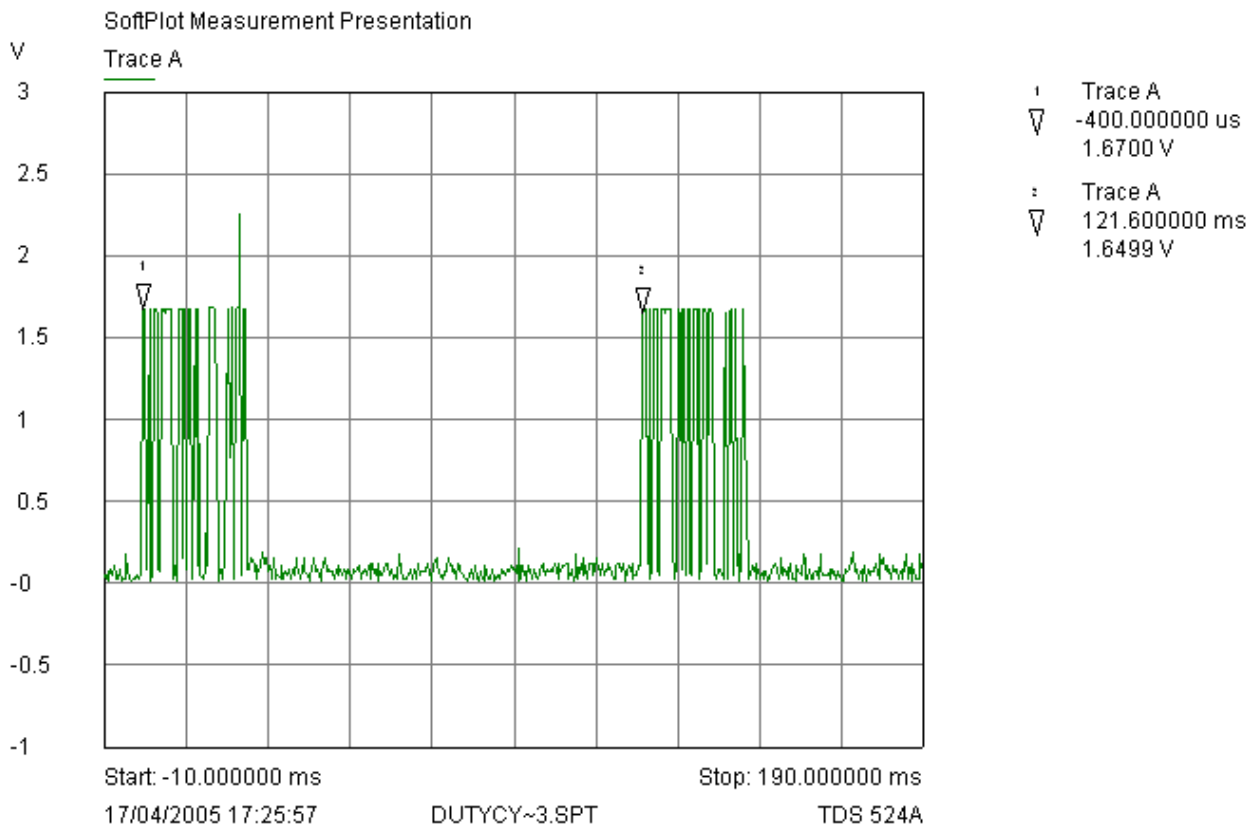


Plot 8 15.231 Radiated Emission

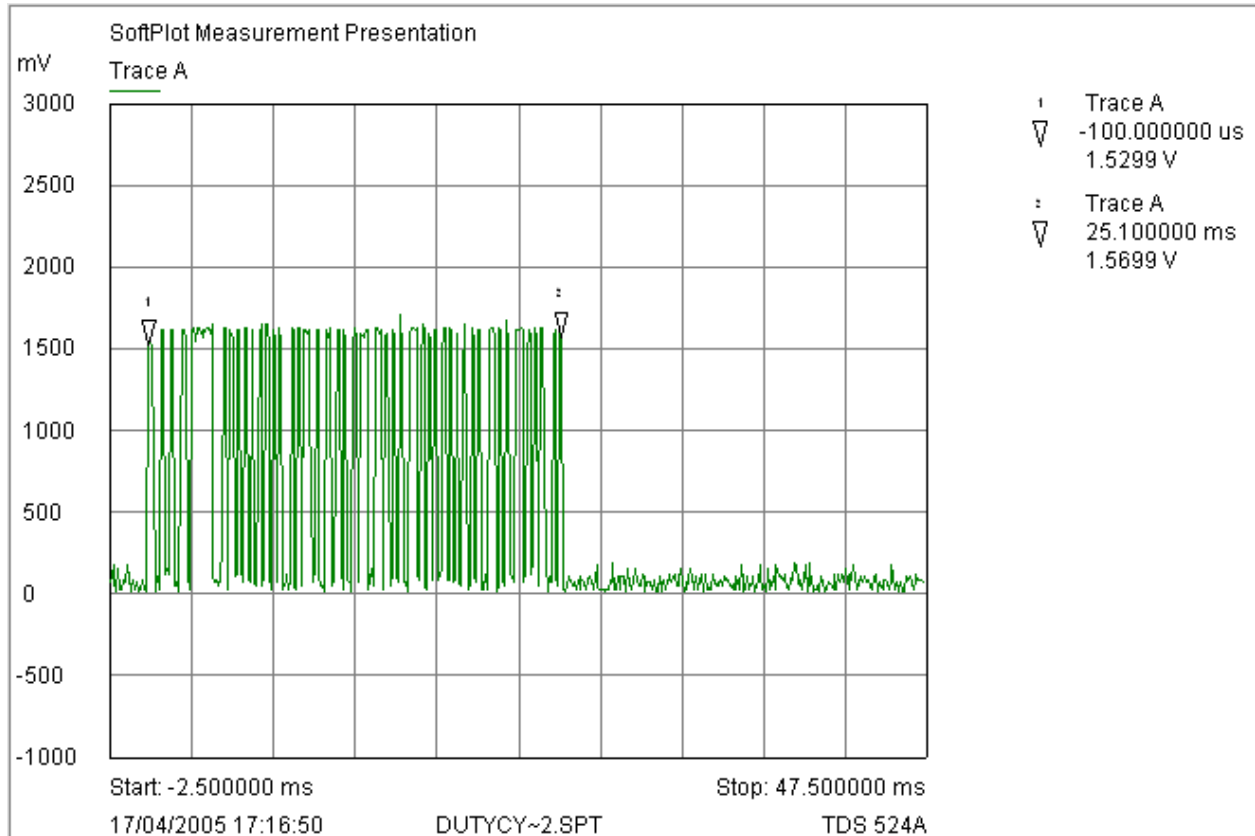
Analyzer setting: R.BW-120K, V.BW-1MHz, QP detector



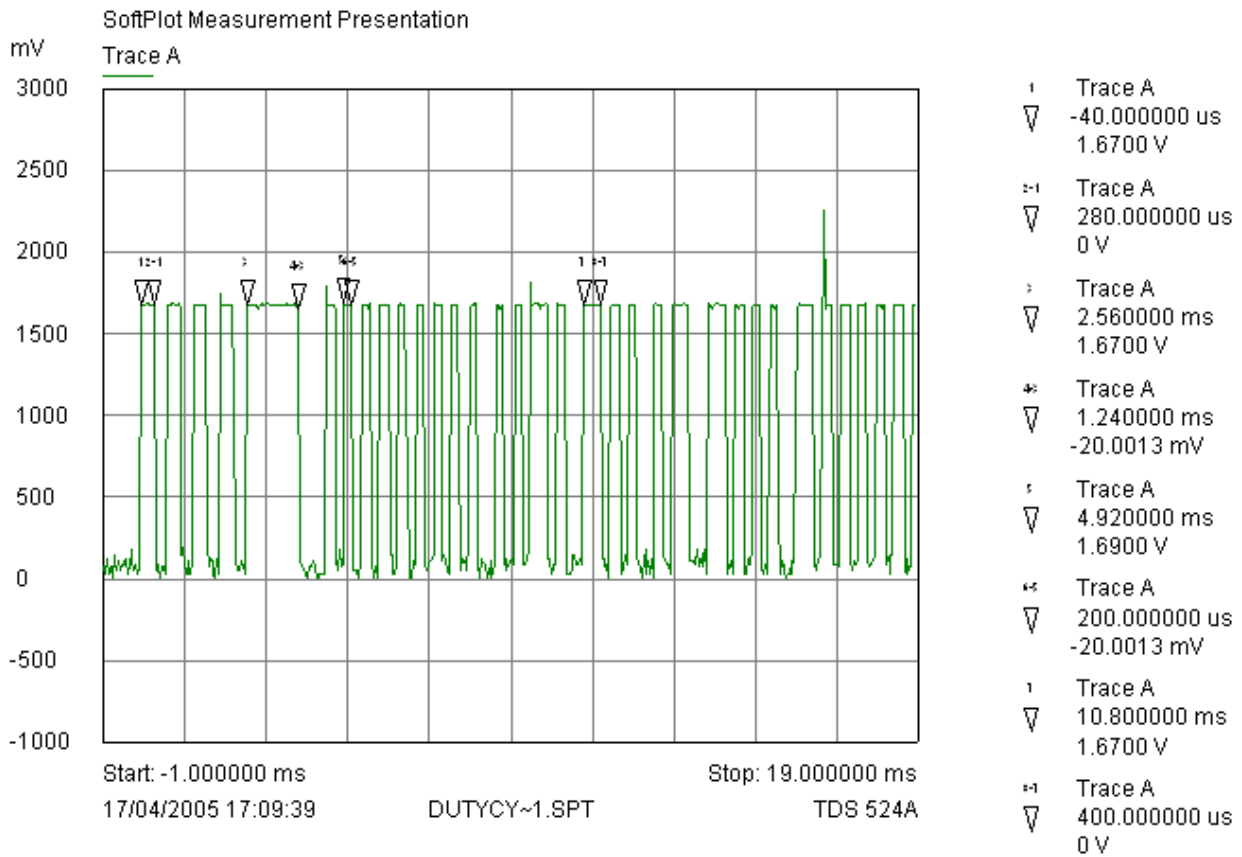
Plot 9 15.109 Radiated Emission



Plot 10-Duty Cycle_1



Plot 11-Duty Cycle_2



Plot 12-Duty Cycle_3

$$TX/ON = 4 \times 312 \mu s + 1248 \mu s + 41 \times 208 \mu s + 5 \times 400 \mu s = 13.02 \text{ msec}$$

$$\text{Average Factor} = 20 \log(TXON/100)$$

$$20 \log 13.02/100 = -17.70$$

