



Test Report: 4W06996, Issue 2

Applicant: Kone Industrial S.p.A.
Via Figino 41
Pero, 20016
Italy

**Equipment Under Test:
(EUT)** TX3-HCS-433, TX2-HCS-433 Wireless Transmitters

FCC ID: RUI806950

In Accordance With: **FCC Part 15, Subpart C, 15.231**

Tested By: Nemko Canada Inc.
303 River Road, R.R. 5
Ottawa, Ontario K1V 1H2

A handwritten signature in blue ink, appearing to read 'Glen Westwell'.

Authorized By: Glen Westwell, Wireless Technologist

Date: 17 March 2004

Total Number of Pages: 17

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Section 1. Summary of Test Results

General

All measurements are traceable to national standards.

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15, Subpart C. All tests were conducted using measurement procedure ANSI C63.4-1992. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC.

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE.

See "Summary of Test Data".

Kevin Carr

TESTED BY: _____
Kevin Carr, EMC/EMI/Wireless Specialist

DATE: 9 March 2004

Daxesh Thakker

TESTED BY: _____
Daxesh Thakker, Wireless Test Engineer

DATE: 9 March 2004

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The tests included in this report are within the scope of this accreditation.

Summary Of Test Data

Name of Test	Para. Number	Results
Transmission Requirements	15.231(a)	Complied
Radiated Emissions	15.231(b)	Complied
Occupied Bandwidth	15.231(c)	Complied
Frequency Tolerance	15.231(d)	N/A(1)
Periodic Alternate Field Strength Requirements	15.231(e)	N/A(2)
Powerline Conducted Emissions	15.207	N/A(3)

N/A(1) – The EUT does not transmit within the 40.66 – 40.70 MHz band.

N/A(2) – The Applicant is not applying for this section of the standard

N/A(3) – The Eut is battery operated

Test Conditions:**Indoor**

Temperature: 24°C

Humidity: 2%

Outdoor

Temperature: 8°C

Humidity: 54%

Section 2. Equipment Under Test

General Equipment Information

Manufacturer:	Kone Industrial S.p.A. Via Figino, 41 Pero, 20016 Italy
Model No.:	TX3-HCS-433, TX2-HCS-433
Serial No.:	None
Date Received In Laboratory:	3 Feb. 2004
Nemko Identification No.:	1, 2, 3, 4
Tunable Bands:	1
Number of Channels:	Fixed frequency. 433.92MHz
Channel Spacing:	N/A, fixed frequency
User Frequency Adjustment:	None
Type of Modulation:	OOK (ON Off Keying)
Power Source:	One “23AE 12V” Battery

Section 3. Transmission Requirements

Para. No.: 15.231(a)

Test Performed By: Kevin Carr

Date of Test: 11 Feb 04

Minimum Standard: 15.231(a) Continuous transmissions such as voice, video or data transmissions are not permitted.

15.231(a)(1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds after being released.

15.231(a)(2) A transmitter activated automatically shall cease transmission within 5 seconds of activation.

15.231(a)(3) Periodic transmissions at regular pre-determined intervals are not permitted. However polling or supervisory transmissions to determine system integrity of transmitters used in security or safety applications are allowed if the periodic rate of transmission does not exceed one transmission of not more than one second duration per hour for each transmitter.

15.231(a)(4) Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm.

Test Results: Complied.

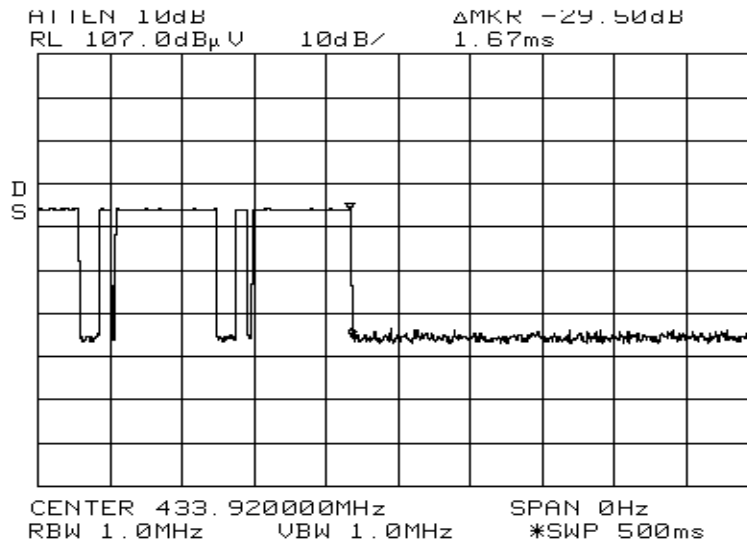
Test Data: Compliance was determined by verification of technical specifications and a functional test on the equipment.

Rationale for Compliance with Transmission Requirements

- 15.231(a):** The EUT does not continuously transmit
- 15.231(a)(1) :** The EUT is a manually operated transmitter and ceases to Transmit upon release of the switch
- 15.231(a)(2) :** The EUT is not Automatically activated
- 15.231(a)(3) :** The EUT has no polling functions, or periodically transmit
- 15.231(a)(4) :** Not applicable, The EUT is not used for safety of life, fire, or security purposes

EQUIPMENT: TX3-HCS-433, TX2-HCS-433 Wireless Transmitters

15.231(a)(1)



Section 4. Radiated Emissions**Para. No.: 15.231(b)****Test Performed By: Daxesh Thakker****Date of Test: 09 Mar. 2004****Minimum Standard:**

Fundamental Frequency (MHz)	Field Strength of Fundamental ($\mu\text{V/m @ 3m}$)	Field Strength of Spurious Emissions ($\mu\text{V/m @ 3m}$)
40.66 - 40.70	2,250	225
70-130	1, 250	125
130-174	1,250 to 3,750*	125 to 375
174-260 (note 1)	3,750	375
260-470 (note 1)	3,750 to 12,500*	375 to 1,250
Above 470	12,500	1,250

Restricted Band Limits		
Frequency (MHz)	Field Strength ($\mu\text{V/m @ 3m}$)	Field Strength (dB $\mu\text{V/m @ 3m}$)
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
Above 960	500	54.0

Note: The Eut was un-modulated and continuously transmitting during radiated emissions testing

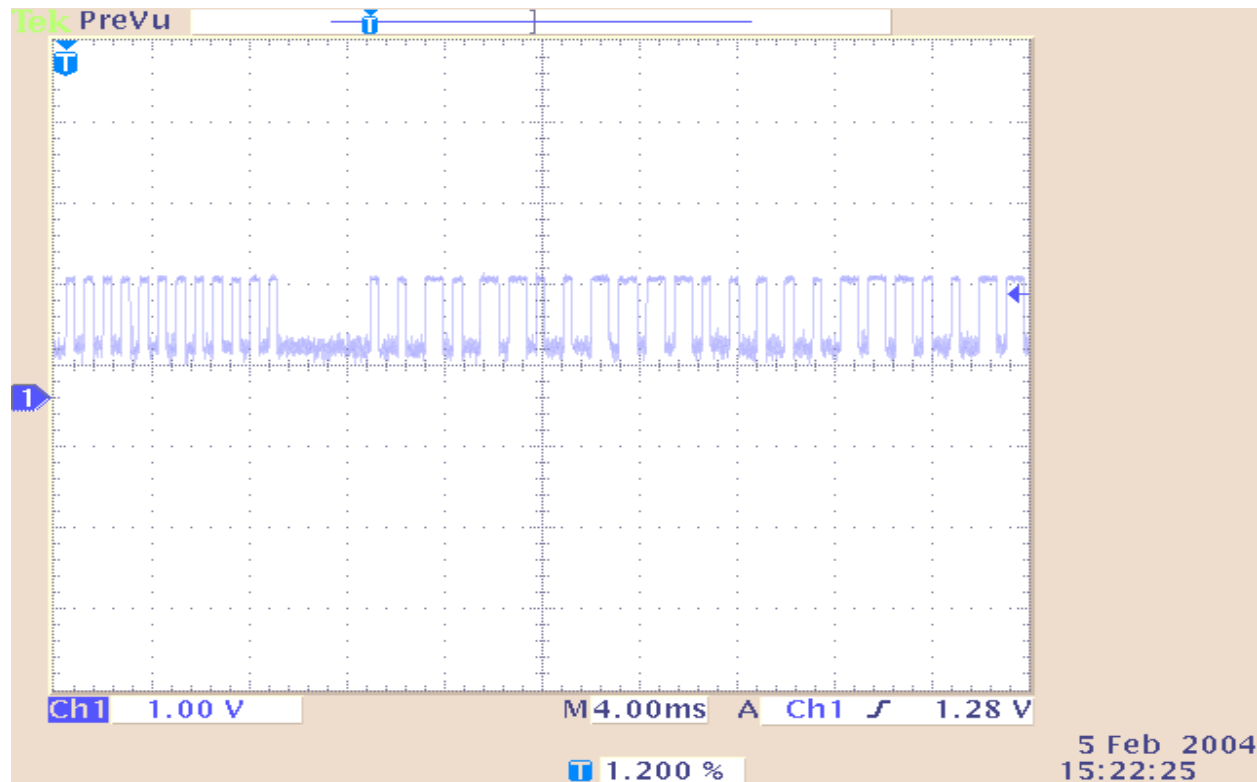
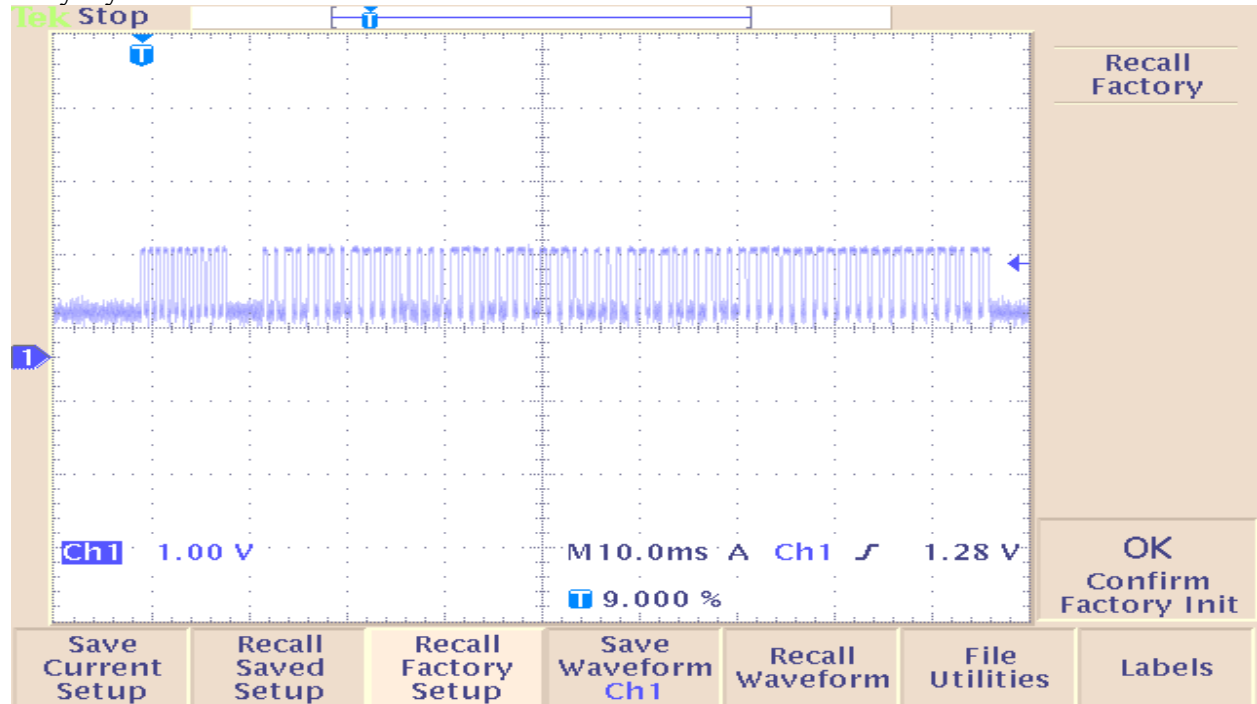
Test Results: Complies**Test Data:** As per attached tabulated data.

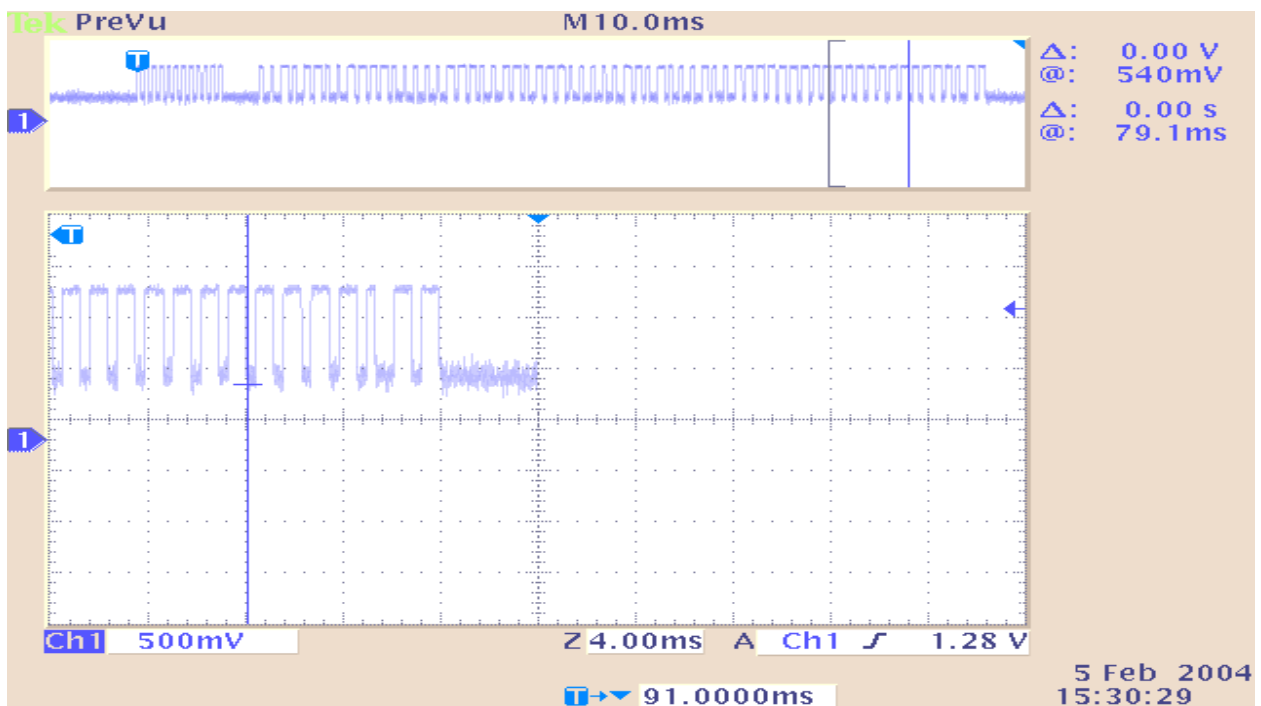
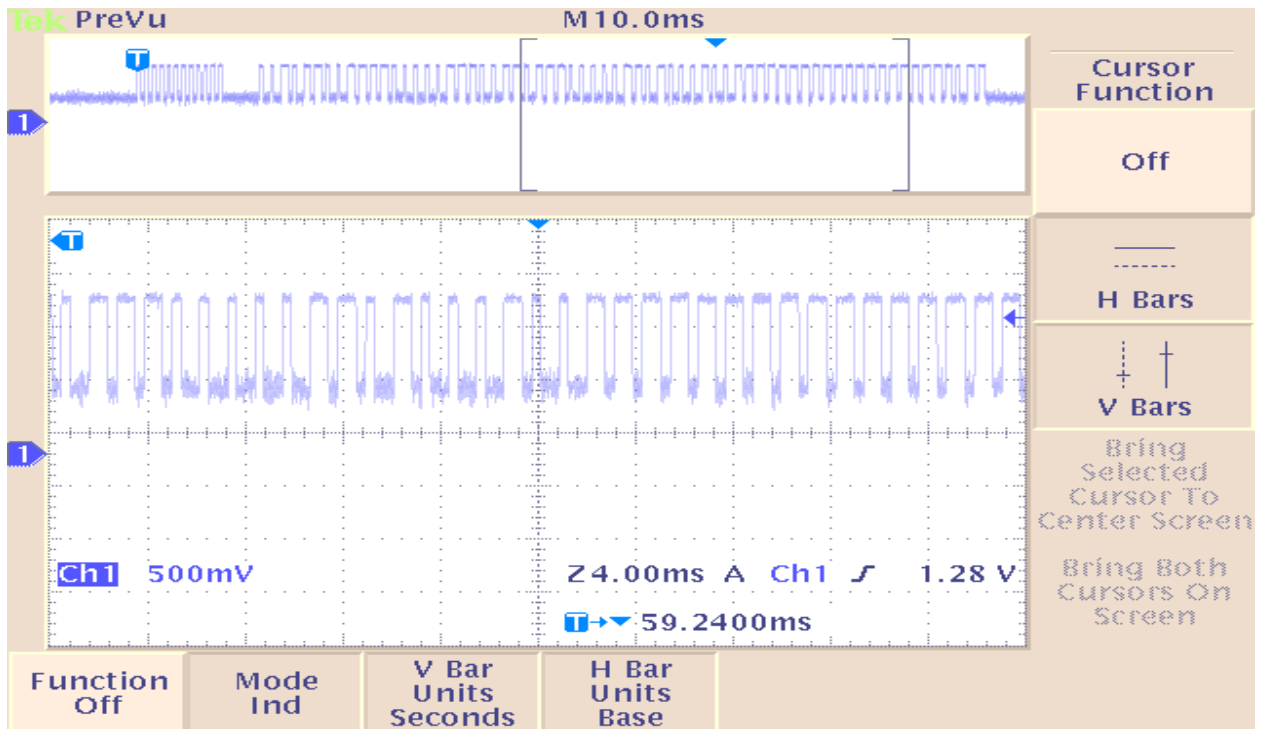
EQUIPMENT: TX3-HCS-433, TX2-HCS-433 Wireless Transmitters

Radiated Disturbance Test Data:

Test Date: Mar. 9, 2004											
Engineer's Name: Daxesh Thakker											
Temperature (C°): 18							Humidity %: 22				
Tested as per: Table Top											
Test Distance (meters): 3							Range: 1				
Freq. (MHz)	Ant.	Pol. V/H	RCVD Signal (dBμV)	Ant. Factor (dB)	Amp. Gain (dB)	Duty Cycle Corr. (-dB)	Cable Loss (dB)	Field Strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Amp.
433.8300	ED4	V	55.5	21.6		-6.8	2.7	73.0	80.4	7.4	None
433.8300	ED4	H	51.0	21.6		-6.8	2.7	68.5	80.4	11.9	None
867.8400	LP1	V	30.5	22.1		-6.8	3.9	49.7	60.4	10.7	None
867.8400	LP1	H	31.5	23.1		-6.8	3.9	51.7	60.4	8.7	None
1301.4880	Horn2	V	62.9	26.6	46.5	-6.8	3.3	39.5	54.0	14.5	1-2GHz
1301.5900	Horn2	H	59.0	26.6	46.5	-6.8	3.3	35.6	54.0	18.4	1-2GHz
1735.3000	Horn2	V	59.0	28.4	46.6	-6.8	3.9	37.8	60.4	22.6	1-2GHz
1735.4000	Horn2	H	51.0	28.8	46.6	-6.8	3.9	30.3	60.4	30.1	1-2GHz
2169.4100	Horn2	V	58.0	28.9	55.3	-6.8	4.7	29.4	60.4	31.0	2-4GHz
2169.4900	Horn2	H	58.0	28.9	55.3	-6.8	4.7	29.5	60.4	30.9	2-4GHz
2603.2000	Horn2	V	59.0	30.0	56.5	-6.8	8.0	33.7	60.4	26.7	2-4GHz
2603.1900	Horn2	H	60.0	29.9	56.5	-6.8	8.0	34.6	60.4	25.8	2-4GHz
3036.8800	Horn2	V	55.0	31.0	56.1	-6.8	6.1	29.2	60.4	31.2	2-4GHz
3036.9100	Horn2	H	54.0	31.0	56.1	-6.8	6.1	28.1	60.4	32.3	2-4GHz
3470.7100	Horn2	V	53.0	31.1	55.1	-6.8	7.2	29.4	60.4	31.0	2-4GHz
3470.7000	Horn2	H	53.0	31.1	55.1	-6.8	7.2	29.4	60.4	31.0	2-4GHz
3904.7200	Horn2	V	53.0	32.8	54.6	-6.8	7.6	32.0	54.0	22.0	2-4GHz
3904.7200	Horn2	H	53.0	32.9	54.6	-6.8	7.6	32.1	54.0	21.9	2-4GHz
4338.4300	Horn2	V	50.0	32.6	52.5	-6.8	8.3	31.7	54.0	22.3	4-8GHz
4338.4300	Horn2	H	49.5	33.0	52.5	-6.8	8.3	31.5	54.0	22.5	4-8GHz
Note 1: Antenna Legend: BC = Biconical, BL = Bilog, LP = Log-Periodic, Horn = Horn, ED = EMCO Dipole											
Note 2: Detector Legend: Q-Peak = 120 kHz RBW, Average = 1.0 MHz RBW, N.D. = Not Detected											
Notes:		All emissions to the 10 th harmonic were searched.									
		Spectrum analyzer bandwidth of 100KHz was used below 1GHz, & 1MHz bandwidth was used on emissions above 1GHz. Emissions were measured at the Ottawa Facility, Range A, at 3 meters and measured using a Pos. Peak detector.									

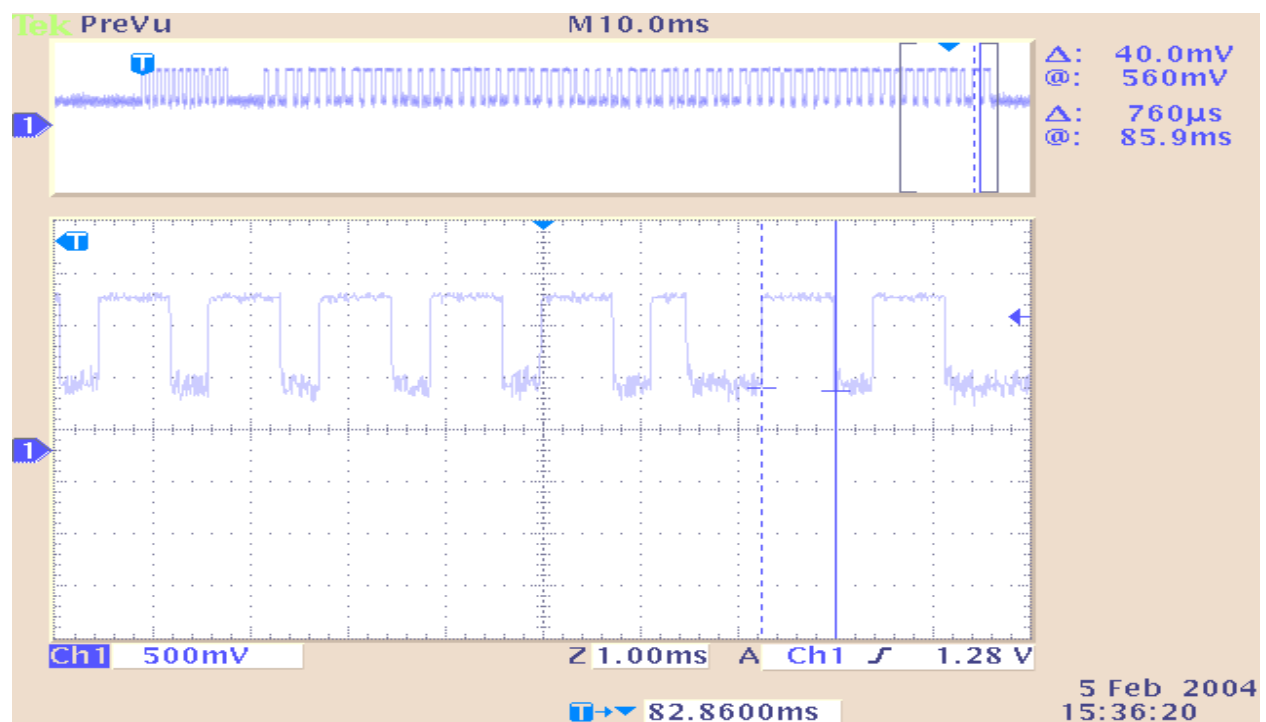
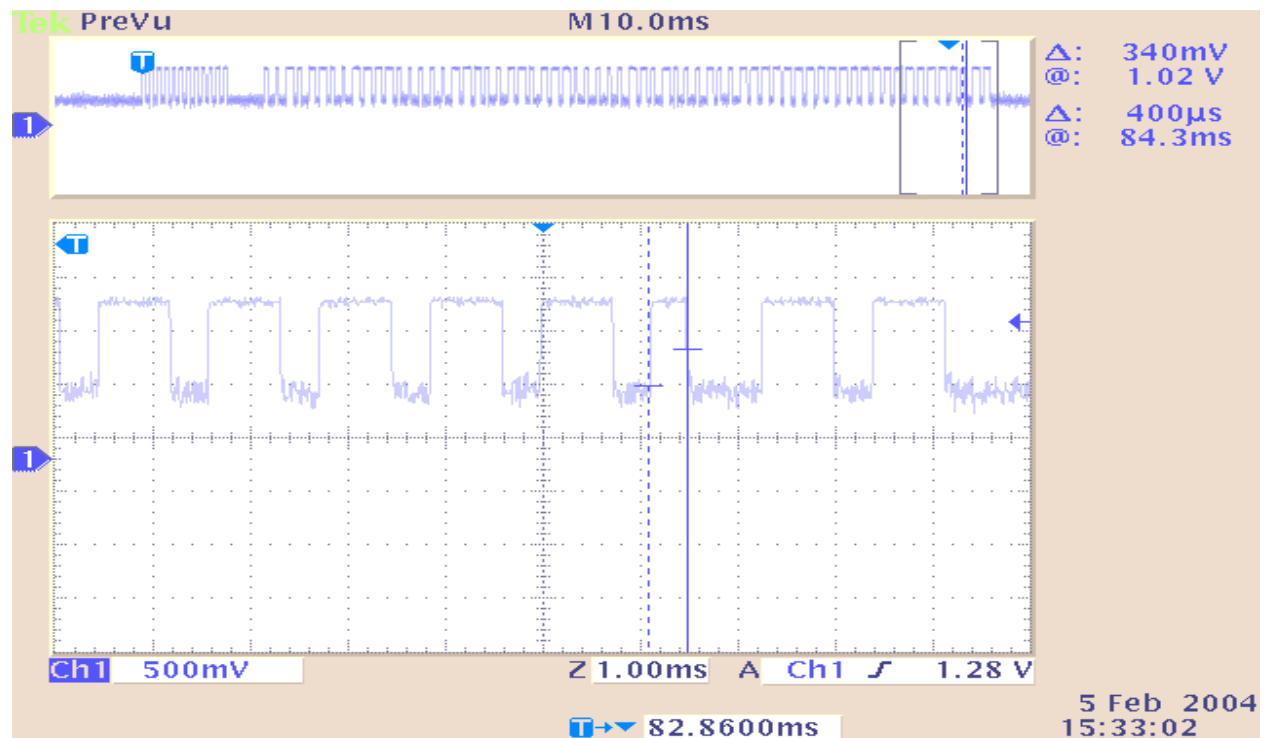
Duty Cycle



EQUIPMENT: TX3-HCS-433, TX2-HCS-433 Wireless Transmitters

When summing the “on” time for the above plot, all pulses to the left of the vertical maker were accounted for in the previous plot.

EQUIPMENT: TX3-HCS-433, TX2-HCS-433 Wireless Transmitters



Duty cycle calculation: $20\text{Log}\{((37*0.4\text{mS})+(41*0.76\text{mS}))/100\text{mS}\} = -6.7\text{dB}$

Section 5. Occupied Bandwidth

Para. No.: 15.231(c)

Test Performed By: Kevin Carr	Date of Test: 11 Feb. 2004
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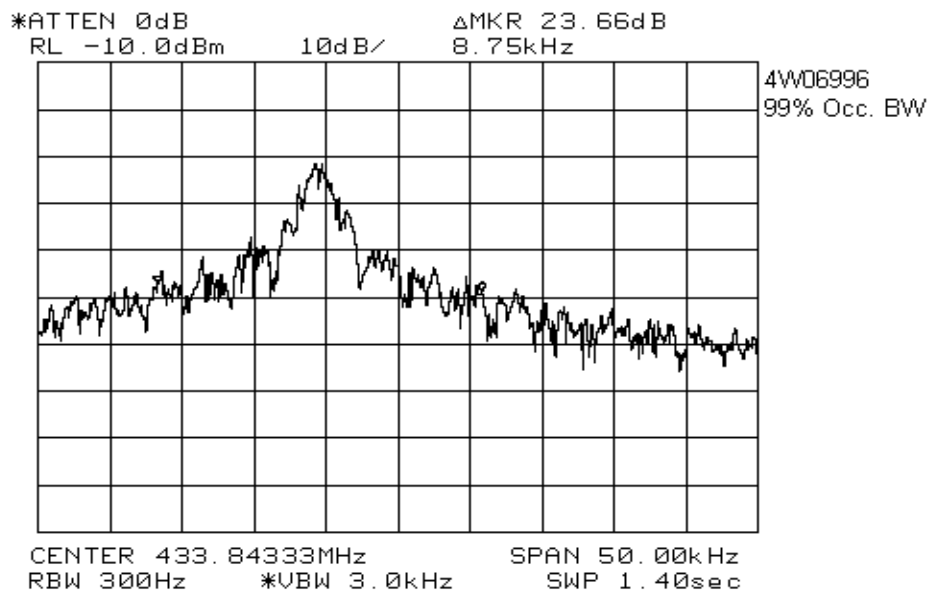
Minimum Standard: 15.231(c) The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

Test Results: Complied

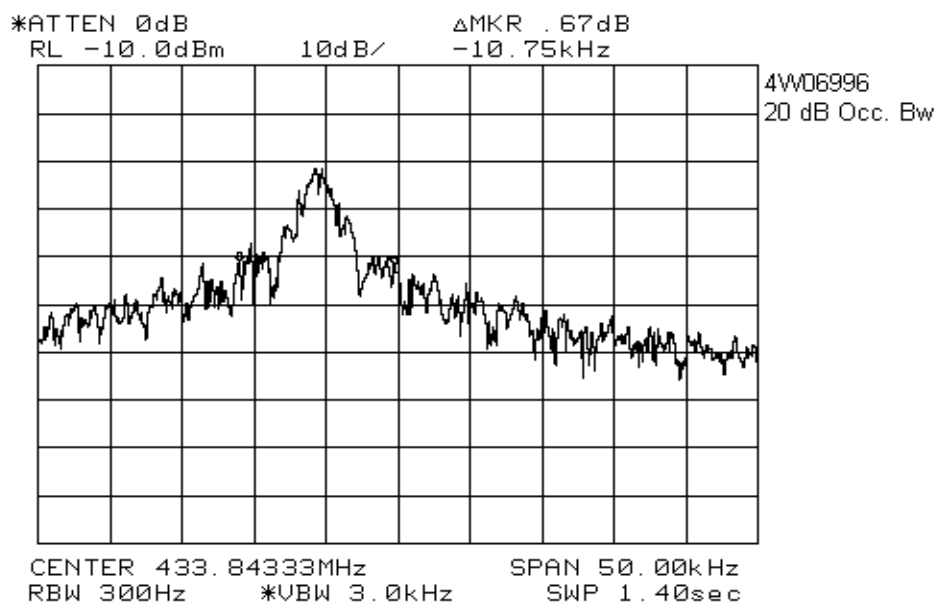
Test Data: See attached graph.

EQUIPMENT: TX3-HCS-433, TX2-HCS-433 Wireless Transmitters

99% Occupied Bandwidth

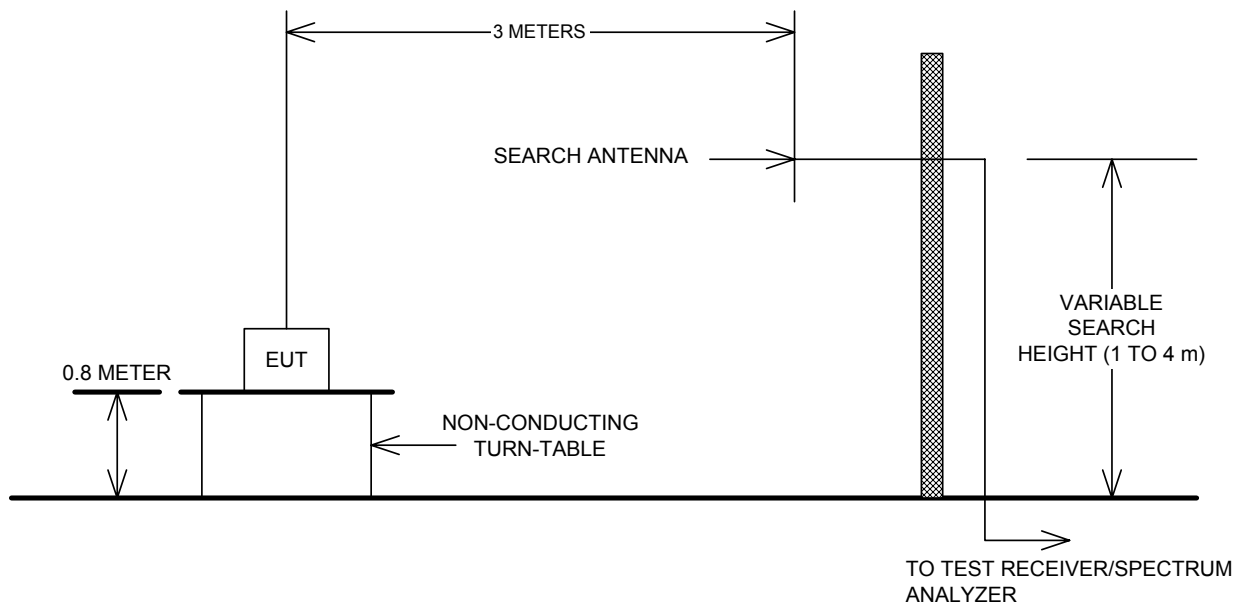


20 dB Occupied bandwidth



Section 6. Block Diagrams

Outdoor Test Site For Radiated Emissions



The spectrum was searched up to the 10th harmonic of the fundamental frequency of operation.

EQUIPMENT: TX3-HCS-433, TX2-HCS-433 Wireless Transmitters

Section 7. Test Equipment List

Equipment List - Radiated Emissions

CAL Cycle	Equipment	Manufacturer	Model No.	Asset/Serial No.	Last Cal.	Next Cal.
1 Year	Spectrum Analyzer	Hewlett-Packard	8565E	FA000981	July. 03/03	July. 03/04
1 Year	Dipole Antenna Set	EMCO #1	3121C	FA000814	May. 09/03	May. 09/04
1 Year	Horn Antenna #2	EMCO	3115	FA000825	Dec. 10/03	Dec. 10/04
1 Year	Log Periodic Antenna #1	EMCO	LPA-25	FA000477	Sept. 02/03	Sept. 02/04
1 Year	1.0 – 2.0 GHz Amplifier	JCA	12-400	FA001498	June. 18/03	June. 18/04
1 Year	2.0 – 4.0 GHz Amplifier	JCA	24-600	FA001496	June. 18/03	June. 18/04
1 Year	4.0 – 8.0 GHz Amplifier	JCA	48-600	FA001497	June. 18/03	June. 18/04

Note: N/A = Not Applicable, NCR = No Cal Required, COU = CAL On Use, OUT = Out For CAL/Repair