



**Test Report:** 5W47503


**Applicant:** Biologa GmbH & Co KG  
Dorfstrasse 42  
Hohentengen Stetten  
79801 Germany

**Apparatus:** Remote Control Demand Switch

**FCC ID:** TZE-NEFA16PLUSF-1

**In Accordance With:** FCC Part 15 Subpart C, 15.249  
Operation in the 902-928MHz, 2400 - 2483.5 MHz,  
5725-5850MHz and 24.0-24.25 GHz

**Tested By:** Nemko Canada Inc.  
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Ottawa, Ontario  
K1V 1H2

**Authorized By:**   
Roman Kuleba, Wireless Specialist

**Date:** June 21, 2006

**Total Number of Pages:** 19

## Report Summary

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15, Subpart C. Radiated tests were conducted in accordance with ANSI C63.4-2003. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC.

The assessment summary is as follows:

<b>Apparatus Assessed:</b>	Remote Control Demand Switch
<b>Specification:</b>	FCC Part 15 Subpart C, 15.249
<b>Compliance Status:</b>	Complies
<b>Exclusions:</b>	None
<b>Non-compliances:</b>	None
<b>Report Release History:</b>	Original Release

Author: Jason Nixon, Telecom Specialist

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025.

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## **Section 1 : Equipment Under Test**

### **1.1 Product Identification**

The Equipment Under Test was identified as follows:

Remote Control Demand Switch (M/N: NEFA 16 Plus F/1)

### **1.2 Samples Submitted for Assessment**

The following samples of the apparatus have been submitted for type assessment:

<b>Sample No.</b>	<b>Description</b>	<b>Serial No.</b>
1	Remote Control Demand Switch	None
7	Remote Control Demand Switch	None

The first samples were received on: June 23, 2005

### **1.3 Theory of Operation**

The EUT is used to control a remote switch, which would turn lights on and off.

### **1.4 Technical Specifications of the EUT**

<b>Manufacturer:</b>	Aurel S.p.A.
<b>Operating Frequency:</b>	916.5MHz
<b>Emission Designator</b>	L1D
<b>Modulation:</b>	Pulse Width Modulated
<b>Antenna Data:</b>	Integral
<b>Power Source:</b>	3VDC CR2032 Battery

## Section 2 : Test Conditions

### 2.1 Specifications

The apparatus was assessed against the following specifications:

FCC Part 15 Subpart C, 15.249

Operation in the 902-928MHz, 2400 - 2483.5 MHz, 5725-5850MHz  
and 24.0-24.25 GHz bands

### 2.2 Deviations From Laboratory Test Procedures

No deviations were made from laboratory test procedures.

### 2.3 Test Environment

All tests were performed under the following environmental conditions:

Temperature range	:	15 – 30 °C
Humidity range	:	20 - 75 %
Pressure range	:	86 - 106 kPa
Power supply range	:	+/- 5% of rated voltages

### 2.4 Test Equipment

Equipment	Manufacturer	Model No.	Asset/Serial No.	Next Cal.
Spectrum Analyser	R&S	FSU	FA001877	May 18/06
Receiver	Rohde & Schwarz	ESVS-30	FA001437	July 27/06
Dipole Antenna Set	EMCO #1	3121C	FA000814	April 29/06
Horn Antenna #1	EMCO	3115	FA000649	Dec 22/05
Biconical (1) Antenna	EMCO	3109	FA000805	April 22/06
Log Periodic Antenna #1	EMCO	LPA-25	FA000477	Aug. 29/06
1.0 – 2.0 GHz Amplifier	JCA	12-400	FA001498	July 14/06
2.0 – 4.0 GHz Amplifier	JCA	24-600	FA001496	July 14/06
4.0 – 8.0 GHz Amplifier	JCA	48-600	FA001497	July 14/06
5.0 – 18.0 GHz Amplifier	NARDA	DWT-186N23U40	FA001409	COU

COU – Cal On Use

## **Section 3 : Observations**

### **3.1 Modifications Performed During Assessment**

No modifications were performed during assessment.

### **3.2 Record Of Technical Judgements**

No technical judgements were made during the assessment.

### **3.3 EUT Parameters Affecting Compliance**

The user of the apparatus could not alter parameters that would affect compliance.

### **3.4 Test Deleted**

No Tests were deleted from this assessment.

### **3.5 Additional Observations**

There were no additional observations made during this assessment.

## **Section 4 : Results Summary**

This section contains the following:

FCC Part 15 Subpart C : Test Results

The column headed 'Required' indicates whether the associated clauses were invoked for the apparatus under test. The following abbreviations are used:

- N      No : not applicable / not relevant.
- Y      Yes : Mandatory i.e. the apparatus shall conform to these tests.
- N/T    Not Tested, mandatory but not assessed. (See section 3.4 Test deleted)

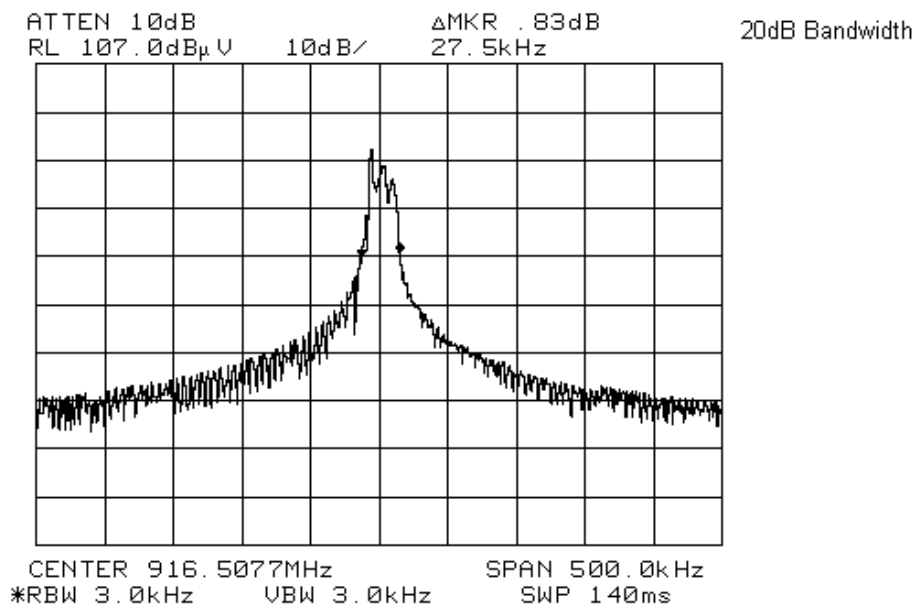
The results contained in this section are representative of the operation of the apparatus as originally submitted.

**4.1 FCC Part 15 Subpart C : Test Results**

Part 15	Test Description	Required	Result
15.207(a)	Powerline Conducted Emissions	N (1)	
15.209(a)	Radiated Emissions within Restricted Bands	Y	Pass
15.249(a)	Radiated emissions not in Restricted Bands	Y	Pass
15.249(b)	Fixed Point-to-Point operation in the 24.0-24.25 GHz Band	N	
15.249(d)	Spurious emissions (except Harmonics)	Y	Pass

Notes:

(1) EUT was battery powered.

**20dB Bandwidth**



## Appendix A : Test Results

### Clause 15.209(a) Radiated Emissions within Restricted Bands

Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009-0.490	2400/F (kHz)	300
0.490-1.705	24000/F (kHz)	30
1.705-30.0	30	30
30-88	1001	3
88-216	1502	3
216-960	2003	3
Above 960	500	3

### Test Conditions:

<b>Sample Number:</b>	7	<b>Temperature:</b>	10
<b>Date:</b>	December 20, 2005	<b>Humidity:</b>	79
<b>Modification State:</b>	0	<b>Tester:</b>	Jason Nixon
		<b>Laboratory:</b>	OATS

### Test Results:

See Attached Table for Results

### Additional Observations:

The Spectrum was searched from 30MHz to the 10GHz.

These results apply to emissions found in the Restricted bands defined in FCC Part 15 Subpart C, 15.205.

The EUT was measured on three orthogonal axis.

	Frequency (MHz)	Antenna	Polarity	RCVD Signal (dBuV)	Ant. Factor (dB)	Amp. Gain / Cable Loss (dB)	Duty Cycle Corr.	Distance Correction	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2749.5000	Horn1	V	75.4	30.3	53.8	-4.5	0.0	51.9 47.4	74.0 54.0	22.1 6.6	Peak Average
2	2749.5000	Horn1	H	75.9	30.3	53.8	-4.5	0.0	52.4 47.9	74.0 54.0	21.6 6.1	Peak Average
3	3666.0000	Horn1	V	68.6	32.6	51.8	-4.5	0.0	49.4 44.9	74.0 54.0	24.6 9.1	Peak Average
4	3666.0000	Horn1	H	70.8	32.7	51.8	-4.5	0.0	51.7 47.2	74.0 54.0	22.3 6.8	Peak Average

**Clause 15.249(a) Radiated emissions not in Restricted Bands**

Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Frequency	Field Strength of Fundamental (millivolts/meter)	Field Strength of Harmonics (microvolts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

**Test Conditions:**

<b>Sample Number:</b>	1	<b>Temperature:</b>	10
<b>Date:</b>	December 20, 2005	<b>Humidity:</b>	79
<b>Modification State:</b>	0	<b>Tester:</b>	Jason Nixon
		<b>Laboratory:</b>	OATS

**Test Results:** See attached Table

**Additional Observations:**

The Spectrum was searched from 30MHz to the 10GHz.

The EUT was measured on three orthogonal axis.

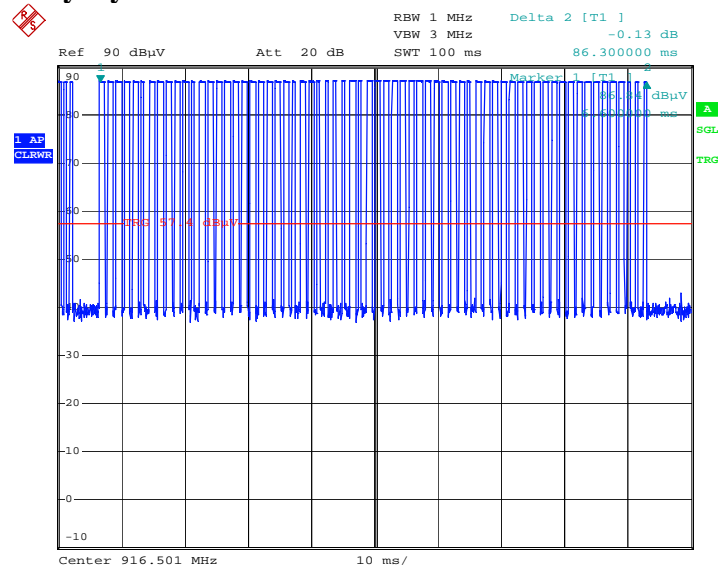
The EUT was tested using a fresh new battery.

All measurements were performed at 3m. Measurements below 1GHz were performed using a 100kHz RBW/VBW peak detector and measurements above 1GHz were performed using a 1MHz RBW/VBW peak detector.

Freq. (MHz)	Ant	Pol. V/H	RCVD Signal (dBμV)	Ant. Factor (dB)	Cable Loss (dB)	Amp. Gain (dB)	Duty Cycle Corr. (dB)	Level (dBμV)	Limit (dBμV)	Margin (dB)
916.5000	ED4	V	51.4	28.5	4.6	N/A	N/A	84.5	94.0	9.5
916.5000	ED4	H	54.2	28.5	4.6	N/A	N/A	87.3	94.0	6.7
1833.0000	Horn1	V	65.2	27.4	4.1	47.9	N/A	48.7	74.0	25.3
1833.0000	Horn1	H	68.8	27.5	4.1	47.9	N/A	52.4	74.0	21.6
1833.0000	Horn1	V	65.2	27.4	4.1	47.9	-4.5	44.2	54.0	9.8
1833.0000	Horn1	H	68.8	27.5	4.1	47.9	-4.5	47.9	54.0	6.1

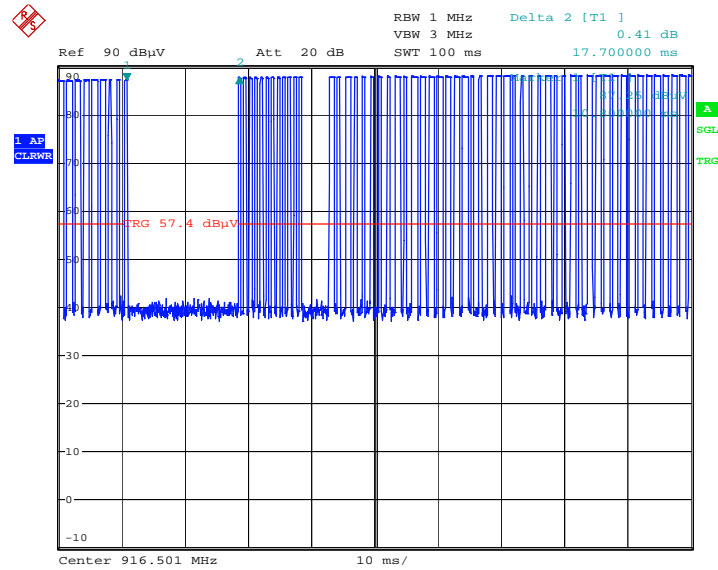
Note 1: Antenna Legend: BC = Biconical, BL = Bilog, LP = Log-Periodic, Horn = Horn, ED = EMCO Dipole

## Duty Cycle:



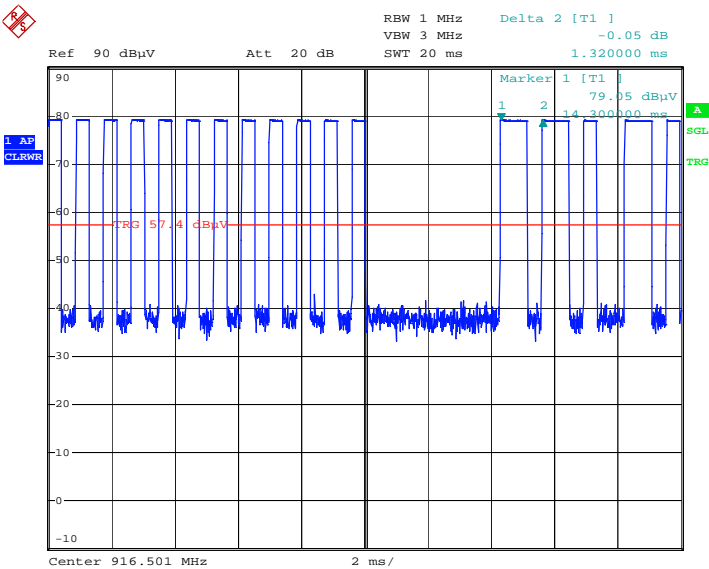
Data transmit time

Date: 9.AUG.2005 18:42:04

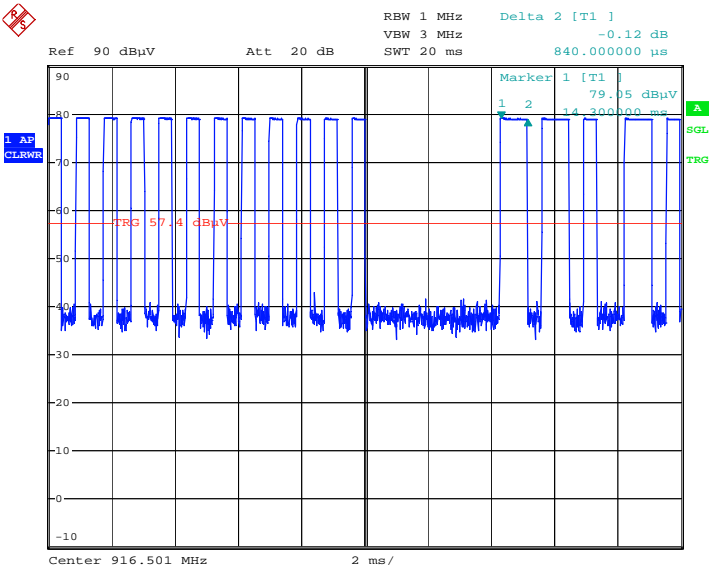


Inter Packet Time

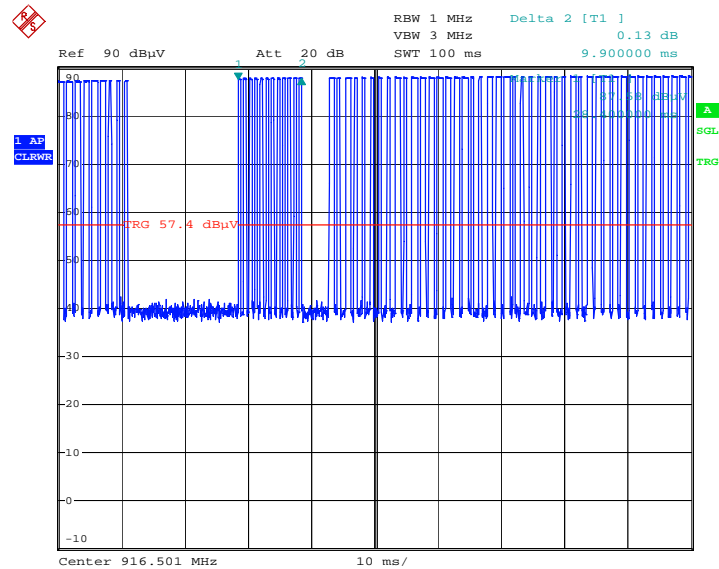
Date: 9.AUG.2005 18:45:37



Total Digit Time  
Date: 9.AUG.2005 19:10:26

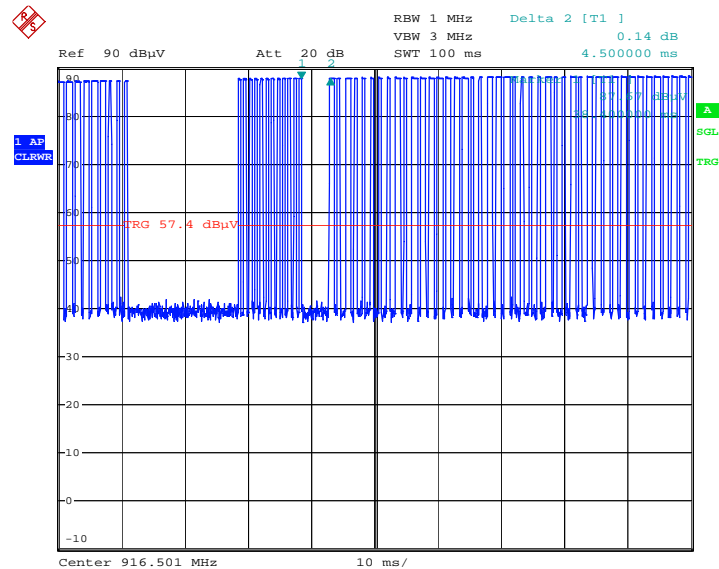


Long-Pulse time  
Date: 9.AUG.2005 19:08:59



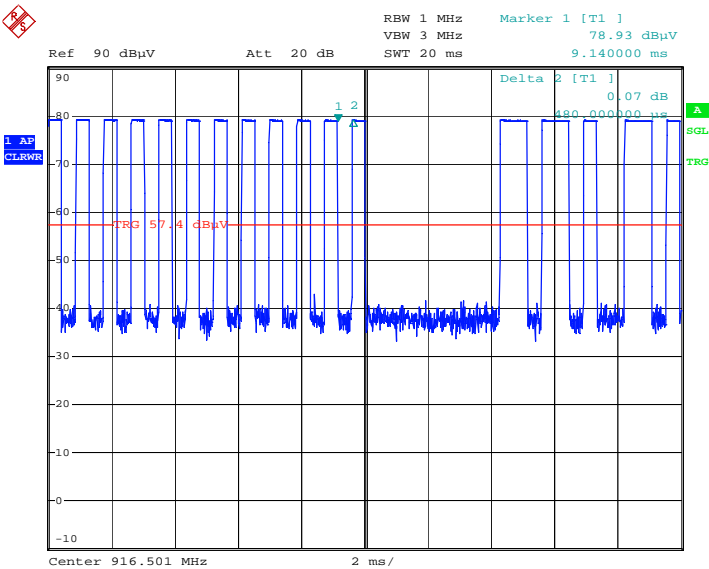
Sync transmit time

Date: 9.AUG.2005 18:44:27

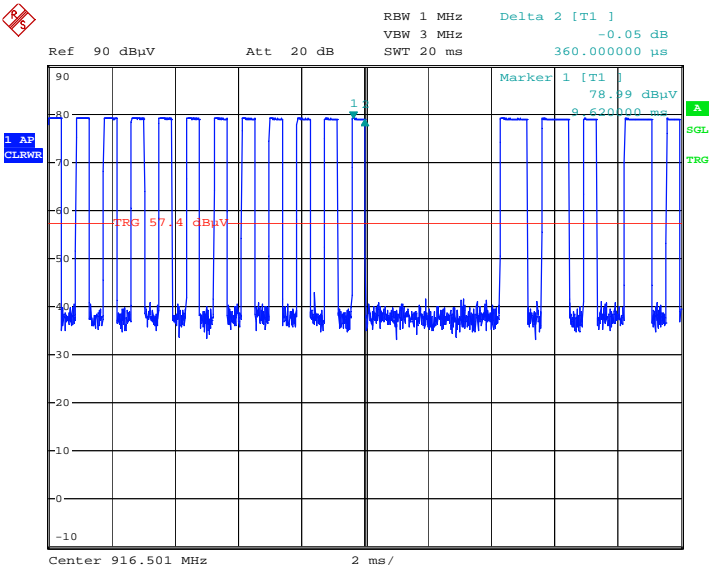


Sync/Data Space

Date: 9.AUG.2005 18:43:39



sync off-time  
Date: 9.AUG.2005 19:05:20



sync on-time  
Date: 9.AUG.2005 19:04:14

Duty cycle calculation:

Each time the button is pressed a sync train is sent before and data.

The sync pulse train is 9.9msec in length and there is a 4.5msec pause before the data packet.

The data packet is 86.3msec long. This causes the worst case on-time.

The total on-time during the sync train is 4.32msec. The total on-time for the data before 100msec is 55.44msec.

Therefore the duty cycle correction is:

$$20 \log (59.76 / 100) = -4.5\text{dB}$$



**Clause 15.249(d) Spurious emissions (except Harmonics)**

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

**Test Conditions:**

<b>Sample Number:</b>	7	<b>Temperature:</b>	10
<b>Date:</b>	December 20, 2005	<b>Humidity:</b>	79
<b>Modification State:</b>	0	<b>Tester:</b>	Jason Nixon
		<b>Laboratory:</b>	OATS

**Test Results:** No spurious emissions were detected within 20dB below the limit.

**Additional Observations:**

None

## **Appendix B : Setup Photographs**

### **Spurious Emissions Setup:**



## Appendix C : Block Diagram of Test Setups

### Test Site For Radiated Emissions

