Nemko Test Report:	116936-1TRFWL
Applicant:	Digital Security Control, a Division of Tyco Safety Products Canada Ltd. 3301 Langstaff Road Concord, Ontario L4K 4L2
Apparatus:	Outdoor Siren (M/N: WT4911)
FCC ID:	F5309WT4911
In Accordance With:	FCC Part 15 Subpart C, 15.231 Periodic operation in the band 40.66–40.70MHz and above 70 MHz.
Authorized By:	Sim Jagpal, Production Manager
Date:	April 2, 2009
Total Number of Pages:	18

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Section 1 : 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.

The assessment summary is as follows:

Apparatus Assessed:	Outdoor Siren (M/N: WT4911)
Specification:	FCC Part 15 Subpart C, 15.231
Compliance Status:	Complies
Exclusions:	None
Non-compliances:	None
Report Release History:	Original Release
Test Location:	Nemko Canada Inc. 303 River Road Ottawa, Ontario K1V 1H2
Registration Number:	176392 (3 m Semi-Anechoic Chamber)
Tests Performed By:	Andrey Adelberg, EMC/Wireless Specialist
Test Dates:	March 27 to April 1, 2009

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. All results contain in this report are within Nemko Canada's ISO/IEC 17025 accreditation.

Section 2 : Equipment Under Test

2.1 Identification of Equipment Under Test (EUT)

The following information identifies the EUT under test:

Type of Equipment:	Wireless Outdoor Siren
Brand Name:	DSC
Model Name or Number:	WT4911
Serial Number:	S4
Nemko Sample Number:	2
FCC ID:	F5309WT4911
Date of Receipt:	March 27, 2009

2.2 Accessories

No accessories were used during this testing.

2.3 EUT Description

The EUT is a wireless Outdoor Siren that transmits at 433.92 MHz used as part of an alarm system.

2.4 Technical Specifications of the EUT

Operating Frequency: 433.92 MHz

Modulation: On/Off Keying

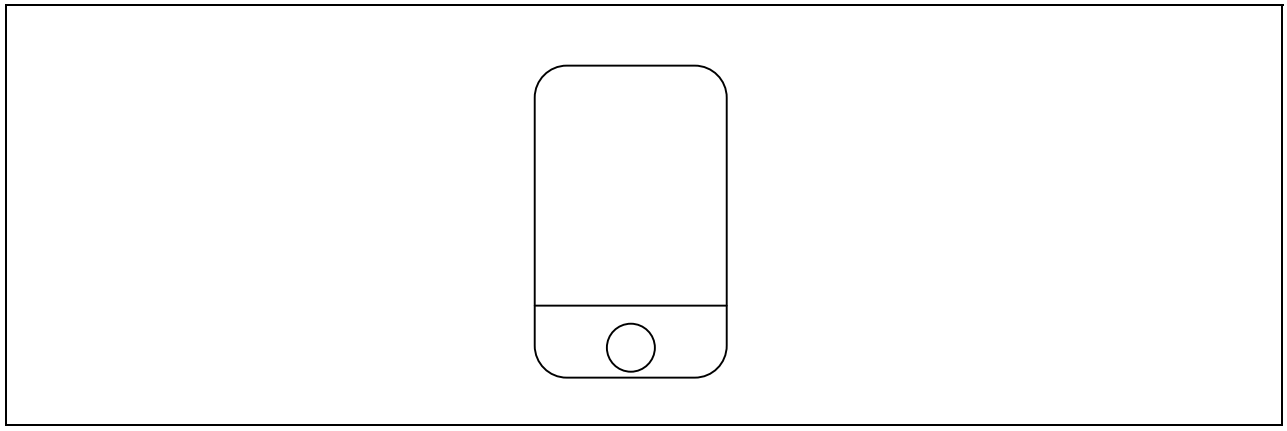
Occupied Bandwidth: 86.5 kHz

Emission Designator: K1D

Antenna Data: Integral printed antenna

Power Supply Requirements: 3.6 VDC battery

2.5 EUT Setup diagram



2.6 Operation of the EUT during testing

A modified sample was provided for CW transmission to complete radiated measurements and a normal sample for occupied bandwidth and timing requirements.

2.7 Modifications incorporated in the EUT

There were no modifications performed to the EUT during this assessment.

Section 3 : Test Conditions

3.1 Specifications

The apparatus was assessed against the following specifications:

FCC Part 15 Subpart C, 15.231
Periodic operation in the band 40.66–40.70 MHz and above 70 MHz.

3.2 Deviations From Laboratory Test Procedures

No deviations were made from laboratory test procedures.

3.3 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

3.4 Measurement Uncertainty

Nemko Canada measurement uncertainty has been calculated using guidance of UKAS LAB 34:2003 and TIA-603-B Nov 7, 2002. All calculations have been performed to provide a confidence level of 95 % and can be found in Nemko Canada document MU-003.

3.5 Test Equipment

Equipment	Manufacturer	Model No.	Asset/Serial No.	Cal. Date	Next Cal.
Spectrum Analyzer	Rohde & Schwarz	FSP40	FA001920	April 14/08	April 14/09
3 m EMI Test Chamber	TDK	SAC-3	FA002047	May 06/08	May 06/09
Bilog	Sunol	JB3	FA002108	Jan. 21/08	Jan. 21/09
Flush Mount Turntable	Sunol	FM2022	FA002082	NCR	NCR
Controller	Sunol	SC104V	FA002060	NCR	NCR
Mast	Sunol	TLT2	FA002061	NCR	NCR
Receiver/Spectrum Analyzer	Rohde & Schwarz	ESU 40	FA002071	Nov. 25/08	Nov. 25/09
50 Coax cable	HUBER + SUHNER	None	FA002015	Aug. 05/08	Aug. 05/09
50 Coax cable	HUBER + SUHNER	None	FA002022	July 07/08	July 07/09
Horn Antenna #2	EMCO	3115	FA000825	Jan. 15/08	Jan. 15/09
1–18 GHz Amplifier	JCA	JCA118-503	FA002091	Oct 2/08	Oct 2/09

COU – Calibrate on Use
NCR – No Calibration Required

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 Report Summary)

4.1 FCC Part 15 Subpart C : Test Results

Part 15	Test Description	Required	Result
15.31(e)	Variation of Power source	N	
15.207(a)	Powerline Conducted Emissions	N	
15.209(a)	Radiated Emissions within Restricted Bands	Y	PASS
15.231(a)(1)	Manually operated transmitter	N	
15.231(a)(2)	Automatically activated transmitter	Y	PASS
15.231(a)(3)	Periodic transmissions at regular predetermined intervals	N	
15.231(a)(4)	Radiators used in cases of emergency	N	
15.231(a)(5)	Set-up information for security systems	N	
15.231(b)	Radiated Emissions	Y	PASS
15.231(c)	20 dB Bandwidth	Y	PASS
15.231(d)	Devices operating within the frequency band 40.66–40.70 MHz	N	
15.231(e)	Radiated emissions for Periodic radiators	N	

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		Measurement Distance (meters)
	(µV/m)	(dBµV/m)	
0.009–0.490	2400/F	67.6−20log(F)	300
0.490–1.705	24000/F	87.6−20log(F)	30
1.705–30.0	30	29.5	30
30–88	100	40.0	3
88–216	150	43.5	3
216–960	200	46.0	3
Above 960	500	54.0	3

Note: F = fundamental frequency in kHz

Test Results: Pass

Additional Observations:

The Spectrum was searched from 30 MHz to the 10th Harmonic.

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

The EUT was assessed with a fresh new battery.

All measurements were performed using a Peak Detector with 100 kHz RBW/VBW below 1 GHz and a 1 MHz RBW/VBW above 1 GHz at a distance of 3 m.

No emissions within Restricted bands were found.

Clause 15.231(a) Conditions for intentional radiators to comply with periodic operation

The provisions of this section are restricted to periodic operation within the band 40.66–40.70 MHz and above 70 MHz. Except as shown in paragraph (e) of this section, the intentional radiator is restricted to the transmission of a control signal such as those used with alarm systems, door openers, remote switches, etc. Continuous transmissions, voice, video and the radio control of toys are not permitted. Data is permitted to be sent with a control signal. The following conditions shall be met to comply with the provisions for this periodic operation:

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

(2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.

(3) Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour.

(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 condition.

(5) Transmission of set-up information for security systems may exceed the transmission duration limits in paragraphs (a)(1) and (a)(2) of this section, provided such transmissions are under the control of a professional installer and do not exceed ten seconds after a manually operated switch is released or a transmitter is activated automatically. Such set-up information may include data.

Test Results: Pass

(1) The EUT is not manually triggered.

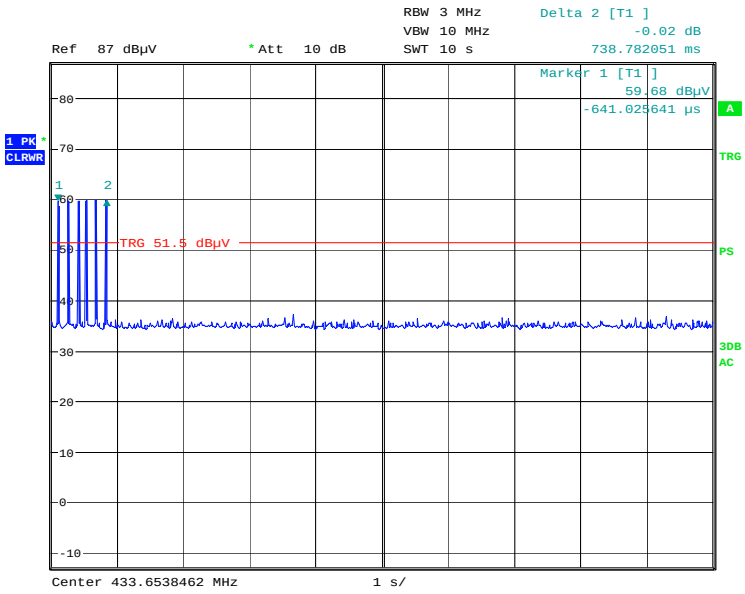
(2) The EUT is automatically triggered and ceases transmission within 739 ms, see attached plots.

(3) The EUT does not periodically transmit.

(4) The EUT is used in security systems but complies with the automatically triggered device requirements.

(5) The EUT does not have an installer mode.

Transmission Time



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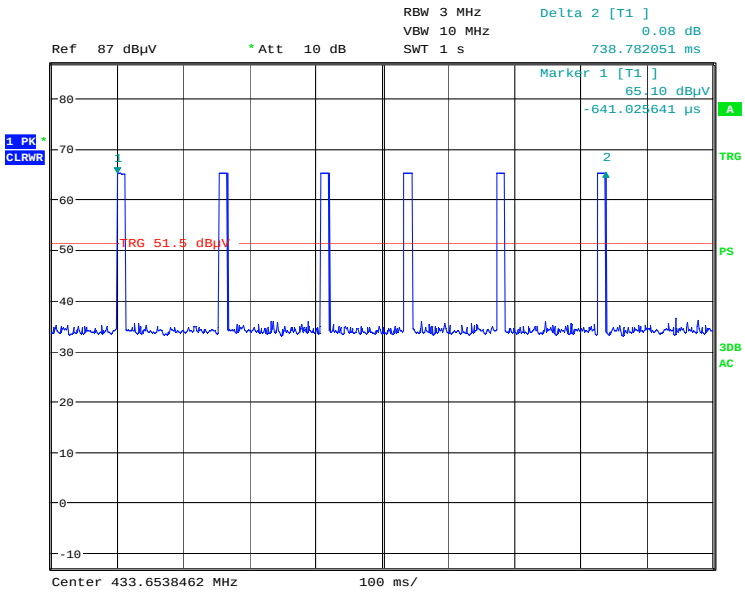

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Clause 15.231(b) Radiated Emissions

In addition to the provisions of §15.205, the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

Fundamental Frequency	Field Strength of Fundamental		Field Strength of Spurious Emissions	
(MHz)	(µV/m)	(dBµV/m)	(µV/m)	(dBµV/m)
40.66–40.70	2,250	67	225	47
70–130	1,250	61.9	125	41.9
130–174	1,250 to 3,750	61.9 to 71.5	125 to 375	41.9 to 51.5
174–260	3,750	71.5	375	51.5
260–470	3,750 to 12,500	71.5 to 81.9	375 to 1,250	51.5 to 61.9
Above 470	12,500	81.9	1,250	61.9

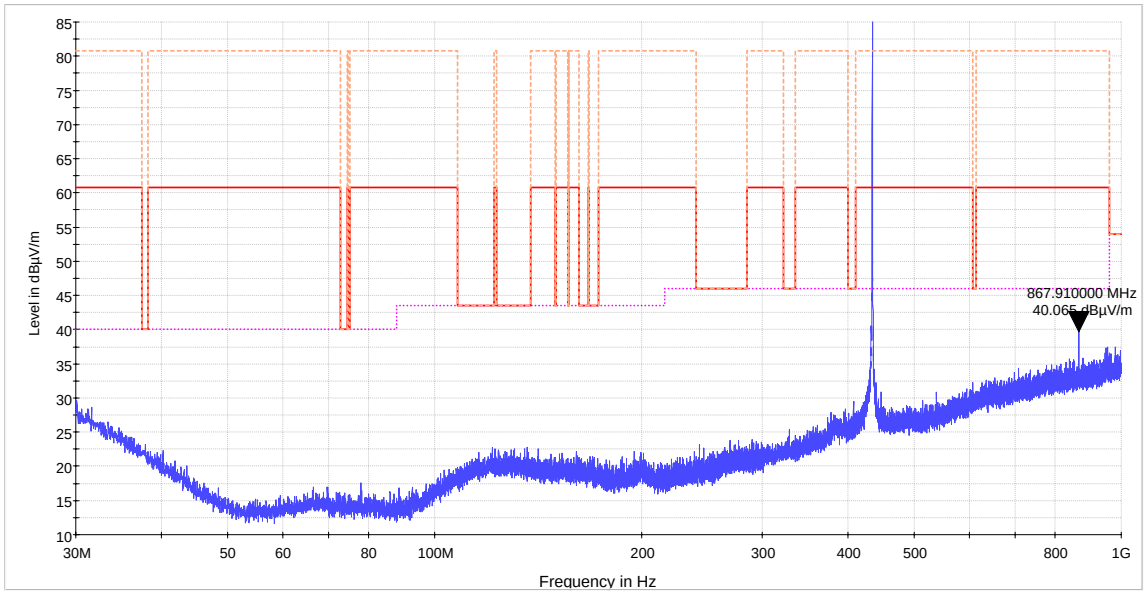
Test Results: Pass

Additional Observations:

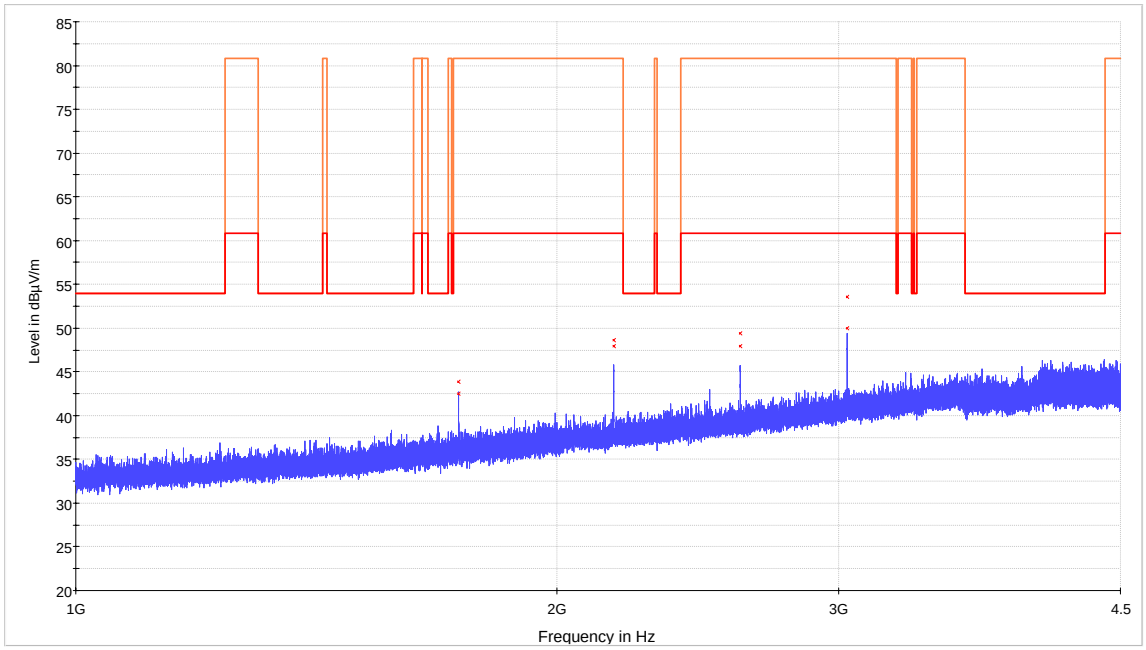
The Spectrum was searched from 30 MHz to the 10th Harmonic.

The EUT was assessed with a fresh new battery.

All measurements were performed using a Peak Detector with 100 kHz RBW/VBW below 1 GHz and a 1 MHz RBW/VBW above 1 GHz at a distance of 3 m.



Radiated Spurious Emissions
MaxPeak-MaxHold
FCC Part 15 Class B Electric Field Strength Quasi-Peak
FCC Part 15.231 433 MHz - Spurious Average
FCC Part 15.231 433 MHz - Spurious Peak



MaxPeak-MaxHold
FCC Part 15.231 433 MHz 1000-4500 MHz - Spurious Peak
MaxPeak (Single)
FCC Part 15.231 433 MHz 1000-4500 MHz - Spurious Avg

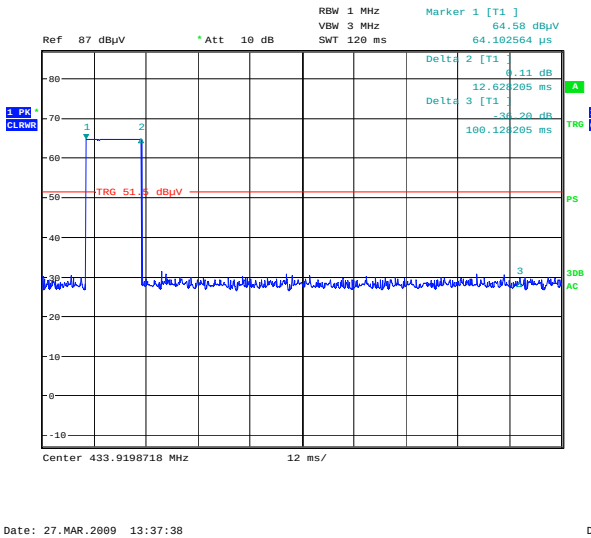
Peak Emissions

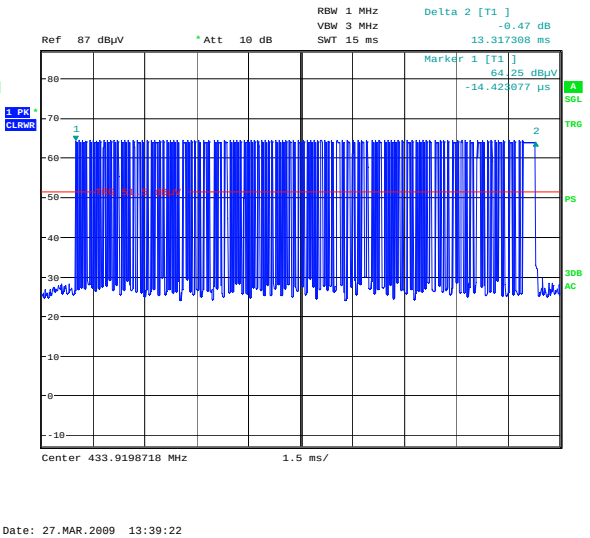
Freq. (MHz)	Pol. V/H	Max Peak (dBµV/m)	Corr. Factor (dB)	Limit (dBµVm)	Margin (dB)
433.92	H	90.4	18.7	100.8	10.4
433.92	V	100.0	18.2	100.8	0.8
867.84	V	40.1	24.4	80.8	40.7
867.84	H	35.7	24.4	80.8	45.1
1735.6	H	43.8	−16.3	80.8	37.0
1735.6	V	42.5	−16.3	80.8	38.3
2169.6	V	47.9	−14.0	80.8	32.9
2169.6	H	48.6	−14.1	80.8	32.2
2603.6	H	49.4	−12.4	80.8	31.4
2603.6	V	47.9	−12.2	80.8	32.9
3037.6	V	53.6	−10.6	80.8	27.2
3037.6	H	50.0	−10.7	80.8	30.8
Max Peak value includes Corr. Factor. Corr. Factor = Ant factor + Cable loss – Amp Gain					

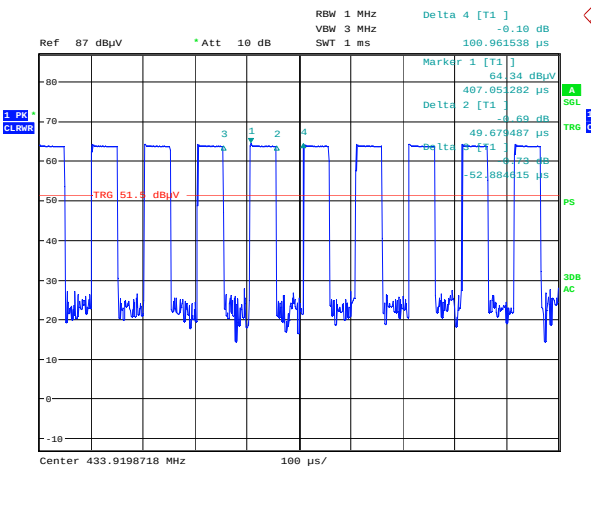
Average Emissions

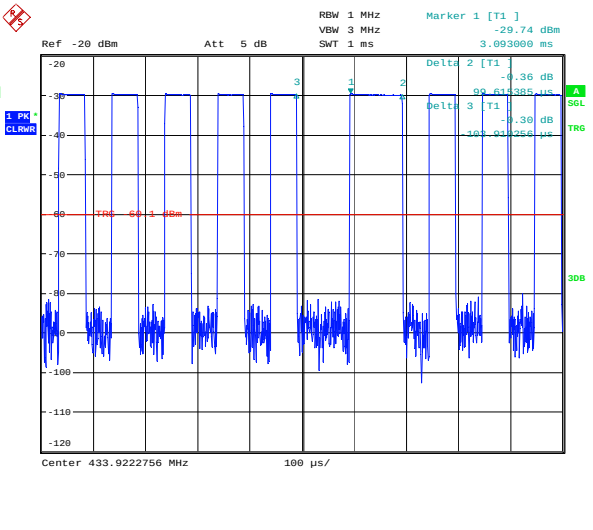
Freq. (MHz)	Max Peak (dBµV/m)	Duty Cycle, (dB)	Average (dBµV/m)	Limit (dBµVm)	Margin (dB)
433.92	90.4	23.7	66.7	80.8	14.1
433.92	100.0	23.7	76.3	80.8	4.5
867.84	40.1	23.7	16.4	60.8	44.4
867.84	35.7	23.7	12.0	60.8	48.8
1735.6	43.8	23.7	20.1	60.8	40.7
1735.6	42.5	23.7	18.8	60.8	42.0
2169.6	47.9	23.7	24.2	60.8	36.6
2169.6	48.6	23.7	24.9	60.8	35.9
2603.6	49.4	23.7	25.7	60.8	35.1
2603.6	47.9	23.7	24.2	60.8	36.6
3037.6	53.6	23.7	29.9	60.8	30.9
3037.6	50.0	23.7	26.3	60.8	34.5
Duty Cycle = Duty cycle correction factor based on transmission duration within 100 ms. Average = Max Peak – Duty Cycle					

Duty Cycle:









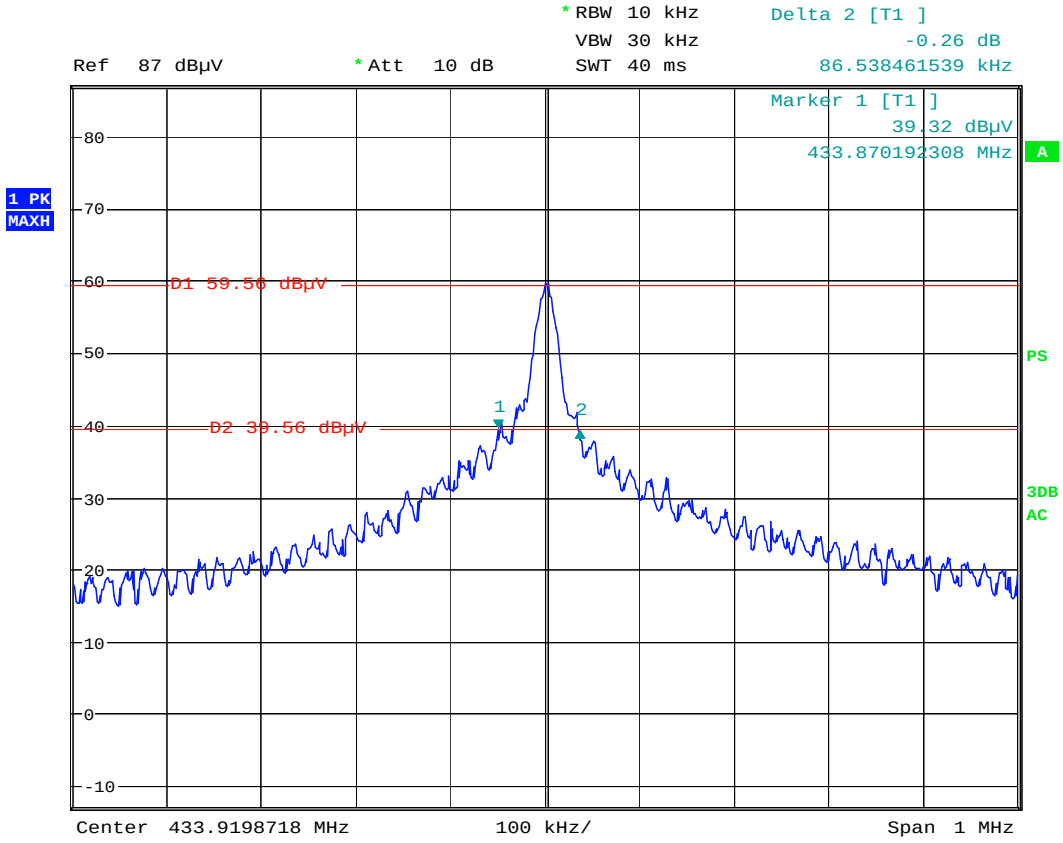
Burst duration: 13.32 ms
Short Pulse duration: 49.6 µs
Silent period duration: 52.88 µs
Short Pulse period: 101 µs
Assume all pulses are short:
Number of short pulses within 1 burst: 13.32 ms / 0.101 ms = 131.8 ~ 132 short pulses
On-time = 132 x 49.6 µs = 6.5 ms
Duty cycle correction = $20 \cdot \log_{10}(6.5/100) = -23.7$ dB

Clause 15.231(c) 20 dB Bandwidth

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: Pass

20 dB Bandwidth:



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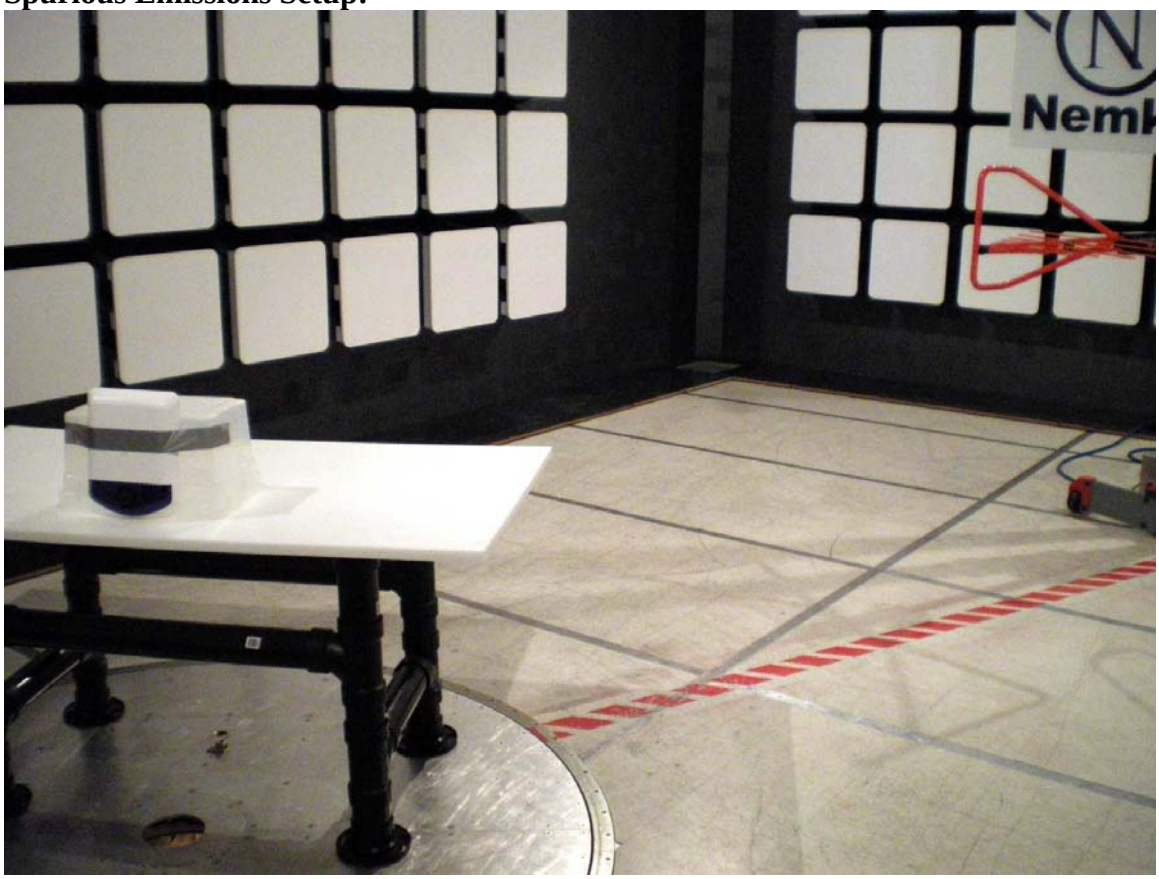
Appendix B : Setup Photograph

Spurious Emissions Setup:



Appendix C : Block Diagram of Test Setup

Radiated Emissions above 30 MHz Test Site