TEST REPORT

Report Number: 3175796MPK-002
Project Number: 3175796
May 14, 2009

Testing performed on the
Remote Door Opener
Model Number: ADAEZ
FCC ID: XEO-ADAEZ
to

FCC Part 15.231
RSS210

For

Dynatool Industries

Test Performed by:	**Test Authorized by:**
Intertek Testing Services	Dynatool Industries
1365 Adams Court	3540 St. Patrick
Menlo Park, CA 94025 USA	Montreal, Canada H4E 1A2

Prepared by: _____ **Date:** May 14, 2009
Bruce Gordon, Test Engineer

Reviewed by: _____ **Date:** May 14, 2009
Krishna K Vemuri

TABLE OF CONTENTS

1.0 Summary of Tests

MODEL: ADAEZ
FCC ID: XEO-ADAEZ

TEST	FCC REFERENCE	IC REFERENCE	RESULTS
Radiated Emission	15.231(b)	RSS-210 A1.1.2	**Complies**
Out of Band Radiated Emission	15.231(b)	RSS-210 A1.1.2	**Complies**
AC Conducted Emission	15.207	ICES-003	**Complies**
20 dB Bandwidth	15.231(c)	RSS-210 A1.1.3	**Complies**
Transmitter Deactivation Time	15.231(a)	RSS-210 A1.1.1(a)	**Complies**
Frequency Tolerance	15.231(d)	-	**Not Applicable**
Antenna Requirement	15.203	-	**Complies** (The EUT has an internal antenna, which is permanently attached)

We attest to the accuracy of this report:

Bruce Gordon
EMC Project Engineer

Krishna K Vemuri
Senior EMC Engineer

2.0 General Description

2.1 Product Description

Remote Door Opener.

Overview of the EUT

Applicant	Dynatool Industries
Trade Name & Model No.	Dynatool Inustries / ADAEZ
FCC Identifier	XEO-ADAEZ
Use of product	Remote Door Opener
Transmitter activation	[X] Manual and automatically deactivate within 5 seconds of being released [ ] Periodic transmissions
Frequency Range (MHz)	315 MHz
Antenna Requirement	The EUT uses a permanently connected antenna.
Manufacturer name & address	Dynatool Industries 3540 St. Patrick Montreal, Canada H4E 1A2

A production version of the EUT was received on 3/23/2009 in good operating condition

Test Start Date: 3/24/09
Test End Date: 5/6/09

2.2 Related Submittal(s) Grants

This report is for use with an application for certification of a low power transmitter. One transmitter is included in the application.

2.3 Test Methodology

Both AC mains line-conducted and radiated emissions measurements were performed according to the procedures in ANSI C63.4 (2003). Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the **"Data Sheet"** of this Application. All other measurements were made in accordance with the procedures in part 2 of CFR 47.

2.4 Test Facility

The test facility is located at 1365 Adams Court, Menlo Park, California. The site meets the characteristics of CISPR 16-1 and ANSI C63.4. Ambient temperature is maintained at 70° F, with an approximate relative humidity of 45%.

Radiated RF emissions testing is performed in a calibrated anechoic chamber. This room meets the field uniformity requirements of ANSI C63.4.

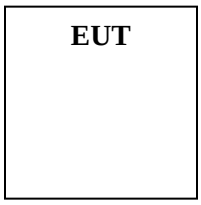
The A2LA certificate number for this site is 1755-01.

3.0 System Test Configuration

3.1 Support Equipment and description

None. The EUT was evaluated as a stand-alone system

3.2 Block Diagram of Test Setup



3.3 Justification

For emission testing the test procedures, as described in American National Standards Institute C63.4, were employed. The equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it).

During testing (if applicable) all cables were manipulated to produce worst case emissions.

If the EUT attaches to peripherals they are connected and operational (as typical as possible). The EUT is wired to transmit continuously, with normal modulation and at full power.

3.4 Software Exercise Program

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. For emissions testing the units were setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing.

3.5 Mode of Operation During Test

The EUT is setup to transmit continuously, with normal modulation and at full power.

3.6 Modifications Required for Compliance

No modifications were installed by Intertek Testing Services during compliance testing in order to bring the product into compliance (Please note that this does not include changes made specifically by Dynatool Industries prior to compliance testing)

3.7 Additions, deviations and exclusions from standards

No additions, deviations or exclusions from the standard were made.

4.0 Measurement Results

4.1 Radiated Emission
FCC Rule 15.231(b) or 15.231(e)

The limit specified in section 15.231(e) was used.

15.231 Limits

Fundamental Frequency (MHz)	*Field Strength of Fundamental (uV/m) @ 3m*	*Field Strength of Spurious Emissions (uV/m) @ 3m*
40.66 – 40.7	2,250 (67 dBuV/m)	225 (47 dBuV/m)
70 – 130	1,250 (61.9 dBuV/m)	125 (41.9 dBuV/m)
130 - 174	1,250 to 3,750 (61.9 to 71.5 dBuV/m)	125 to 375 (41.9 to 51.5 dBuV/m)
174 – 260	3,750 (71.5 dBuV/m)	375 (51.5 dBuV/m)
260 – 470	3,750 to 12,500 (71.5 to 81.9 dBuV/m)	375 to 1,250 (51.5 to 61.9 dBuV/m)
Above 470	12,500 (81.9 dBuV/m)	1,250 (61.9 dBuV/m)

Procedure

Equipment setup for radiated disturbance tests followed the guidelines of ANSI C63.4. Measurements are conducted with a quasi-peak detector instrument in the frequency range of 30 MHz to 1000 MHz. The measuring receiver meets the requirements of Section One of CISPR 16 and the measuring antenna correlates to a balanced dipole.

Measurements below 1 GHz of the radiated field are made with the antenna located at a distance of 3 meters from the EUT.

For all measurements the search antenna is adjusted between 1m and 4m in height above the ground plane for maximum meter reading at each test frequency.

The antenna-to-EUT azimuth is varied during the measurement to find the maximum field-strength readings.

The antenna-to-EUT polarization (horizontal and vertical) is varied during the measurements to find the maximum field-strength readings.

The EUT, where intended for tabletop use, is placed on a table whose top is 0.8m above the ground plane. The table is constructed of non-conductive materials. Its dimensions are 1m by 1.5m, but may be extended for a larger EUT.

Floor standing EUTs are placed on a horizontal metal ground plane and isolated from the ground plane by 3 to 12 mm of insulating material.

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG
Where FS = Field Strength in dBµV/m
RA = Receiver Amplitude (including preamplifier) in dBµV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows:

FS = RR + LF
Where FS = Field Strength in dBµV/m
RR = RA - AG in dBµV
LF = CF + AF in dB

Assume a receiver reading of 52.0 dBµV is obtained. The antennas factor of -7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving field strength of 32 dBµV/m. This value in dBµV/m was converted to its corresponding level in µV/m.

RA = 52.0 dBµV
AF = 7.4 dB
CF = 1.6 dB
AG = 29.0 dB
RR = 23.0 dBµV
LF = 9.0 dB
FS = RR + LF
FS = 23 + 9 = 32 dBµV/m

Level in µV/m = Common Antilogarithm [(32 dBµV/m)/20] = 39.8 µV/m

Test Result

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

Intertek Testing Services
Radiated Emissions
FCC Part 15.231

Operator: BG

Model Number: ADAEZ
ITS Job Number: 3175796

6-May-09

Company: Dynatool

Frequency Hz	Pk FS dB(uV/m)	Limit dB(uV/m)	Margin dB	RA dB(uV)	CF dB	AG dB	AF dB(1/m)	DCCF dB
3.15E+08	69.3	75.6	-6.3	56.5	4.9	0.0	14.1	6.2
6.30E+08	37.5	55.6	-18.1	18.7	5.7	0.0	19.3	6.2
9.45E+08	44.0	55.6	-11.6	21.2	6.3	0.0	22.7	6.2
1.26E+09	45.6	55.6	-10.0	57.1	3.8	34.1	25.0	6.2
1.57E+09	39.9	55.6	-15.7	50.6	4.3	34.2	25.4	6.2
1.89E+09	28.0	55.6	-27.6	36.3	4.8	34.2	27.3	6.2
2.20E+09	31.3	55.6	-24.3	38.1	5.3	34.2	28.3	6.2
2.52E+09	31.0	55.6	-24.6	37.0	5.6	34.3	28.9	6.2
2.83E+09	32.0	55.6	-23.6	36.9	6.0	34.4	29.7	6.2
3.15E+09	34.6	55.6	-21.0	38.3	6.4	34.3	30.4	6.2

Test mode: Tx at 315MHz
Temperature: 20 C
Humidity: 50 %

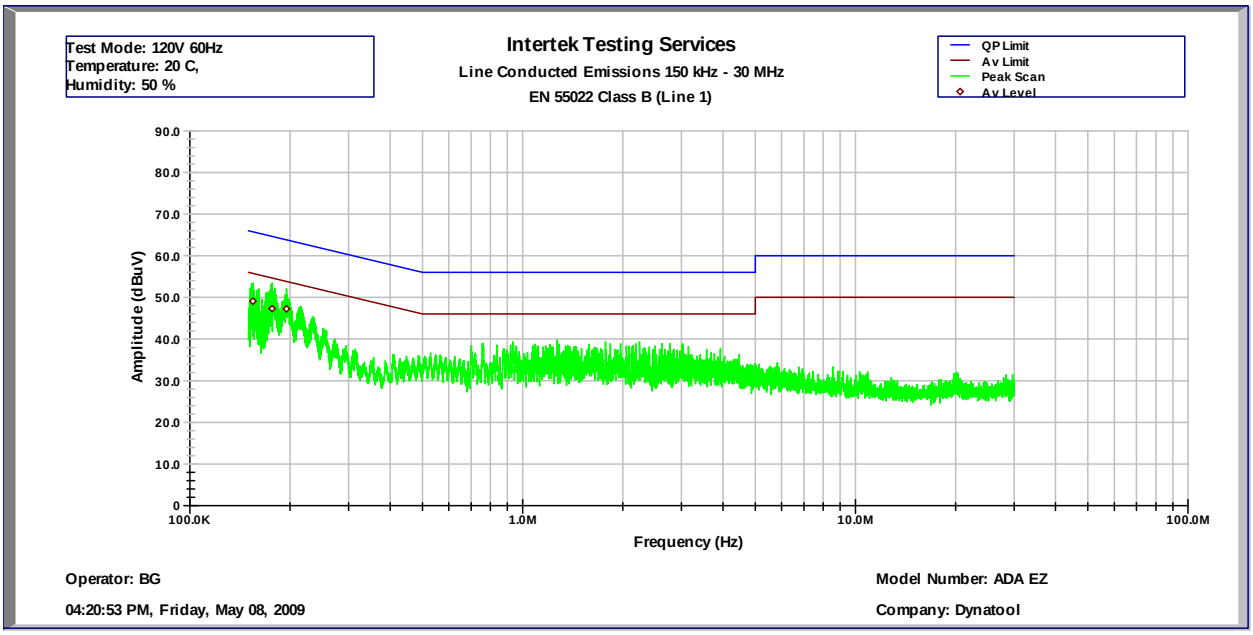
Notes: Margin = RA + CF - AG + AF - DCCF
RA = Receiver Amplitude
CF = Cable Factor
AG = Amplifier Gain
AF = Antenna Factor
DCCF = Duty Cycle Correction Factor
Duty Cycle calculation: 20Log(16.59/33.92) = 6.2dB. See Duty Cycle Graphs for timing measurements

4.2 AC Line Conducted Emission
FCC Rule 15.207

AC line conducted emission test was performed according the ANSI C63.4 standard. The EUT was connected to the AC Line through the LISN's.

A complete scan from 0.15 - 30 MHz was made.

For the test result, see attached plots.

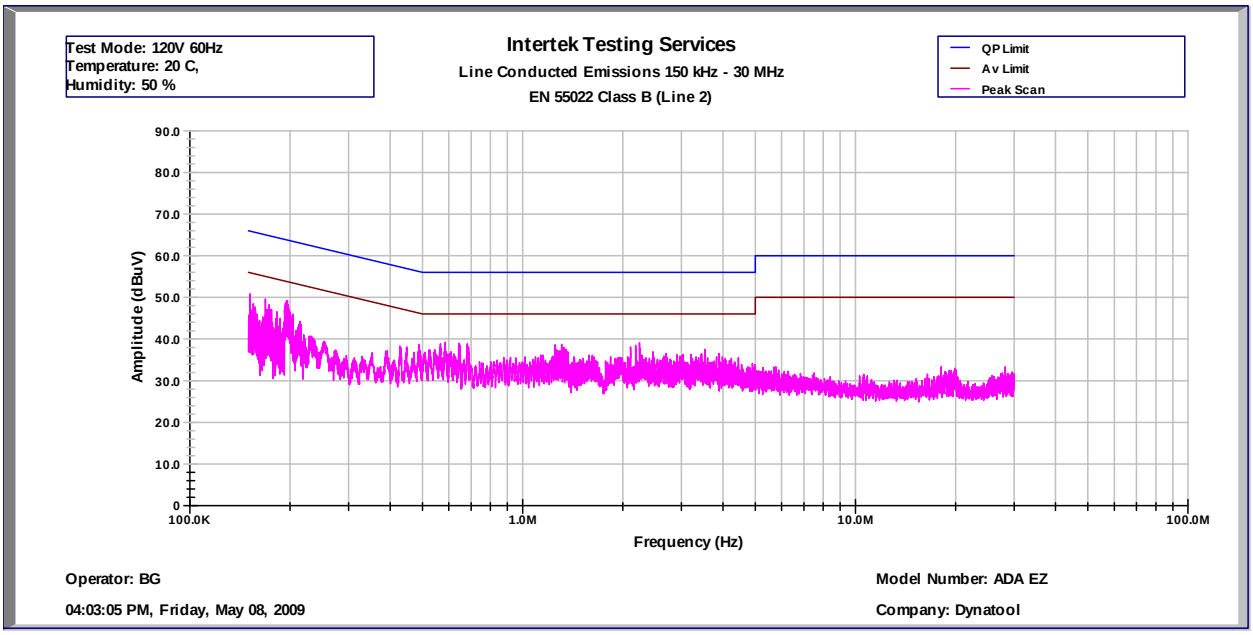


Intertek Testing Services
Line Conducted Emissions 150 kHz - 30 MHz
EN 55022 Class B (Line 1)

Operator: BG
Model Number: AD AEZ
ITS Job Number: 3175796
May 8, 2009
Company: Dynatool

Frequency Hz	Pk Level dB(uV)	Av Level dB(uV)	Av Limit dB(uV)	QP Limit dB(uV)	Pk Margin dB	QP Margin dB	Av Margin dB
154500	53.4	49.0	55.9	65.9	-	-12.5	-6.8
154849	53.3	-	55.9	65.9	-2.5	-	-
160909	52.1	-	55.7	65.7	-3.6	-	-
174416	51.8	-	55.3	65.3	-3.5	-	-
175109	53.0	-	55.3	65.3	-2.3	-	-
175802	52.3	-	55.3	65.3	-3.0	-	-
176667	53.5	47.3	55.2	65.2	-	-11.8	-8.0
180304	52.1	-	55.1	65.1	-3.0	-	-
195000	52.1	47.3	54.7	64.7	-	-13.0	-7.5

Test Mode: 120V 60Hz
Temperature: 20 C,
Humidity: 50 %



Intertek Testing Services
Line Conducted Emissions 150 kHz - 30 MHz
EN 55022 Class B (Line 2)

Operator: BG
Model Number: AD AEZ
ITS Job Number: 3175796
May 8, 2009
Company: Dynatool

Frequency Hz	Pk Level dB(uV)	Av Limit dB(uV)	QP Limit dB(uV)	Pk Margin dB
151385	50.9	56.0	66.0	-5.1
168529	49.6	55.5	65.5	-5.9
193118	48.1	54.8	64.8	-6.7
193984	48.8	54.7	64.7	-6.0
194677	48.9	54.7	64.7	-5.9
195369	49.3	54.7	64.7	-5.4
196235	49.1	54.7	64.7	-5.5
196928	48.3	54.7	64.7	-6.3

Test Mode: 120V 60Hz
Temperature: 20 C,
Humidity: 50 %

4.3 Occupied Bandwidth Plot

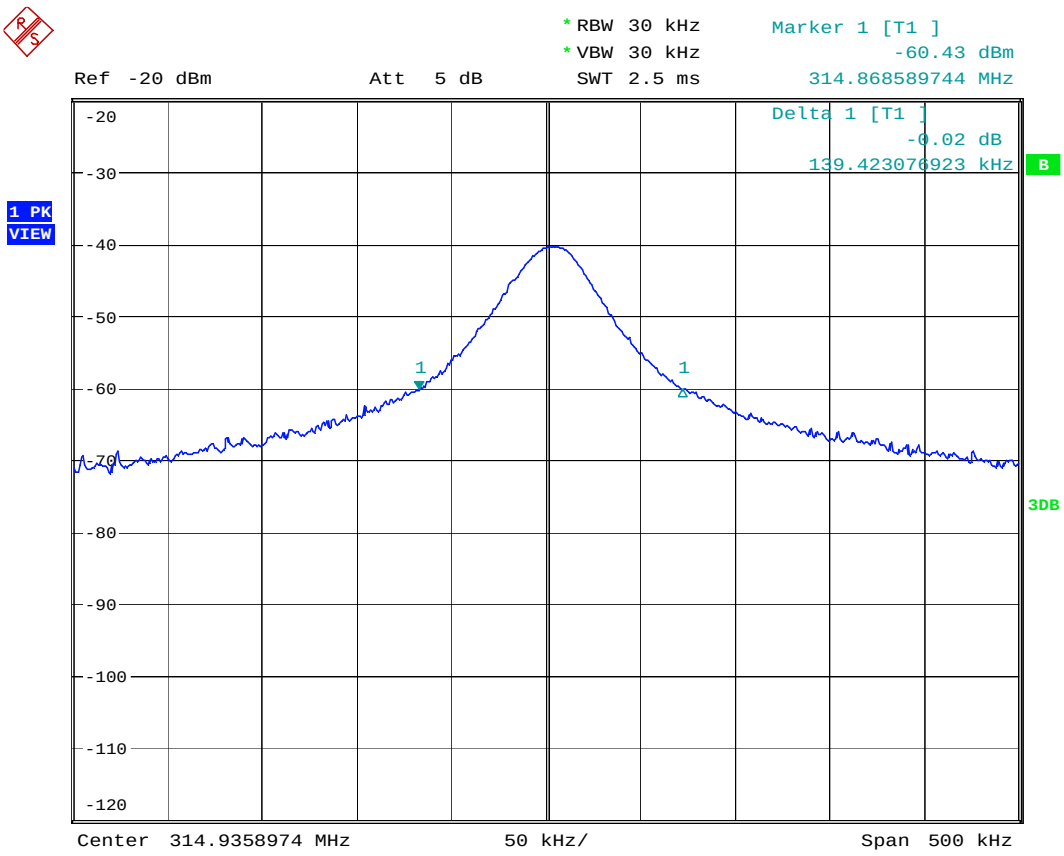
The 15.231(c) emission bandwidth requirement: **0.25%** of fundamental frequency

Test Results:

The worst-case (widest) emission bandwidth at 20dBc is 139.42 kHz, which is 0.044% of the fundamental frequency.

The following plots show the emission bandwidth of the transmitter:

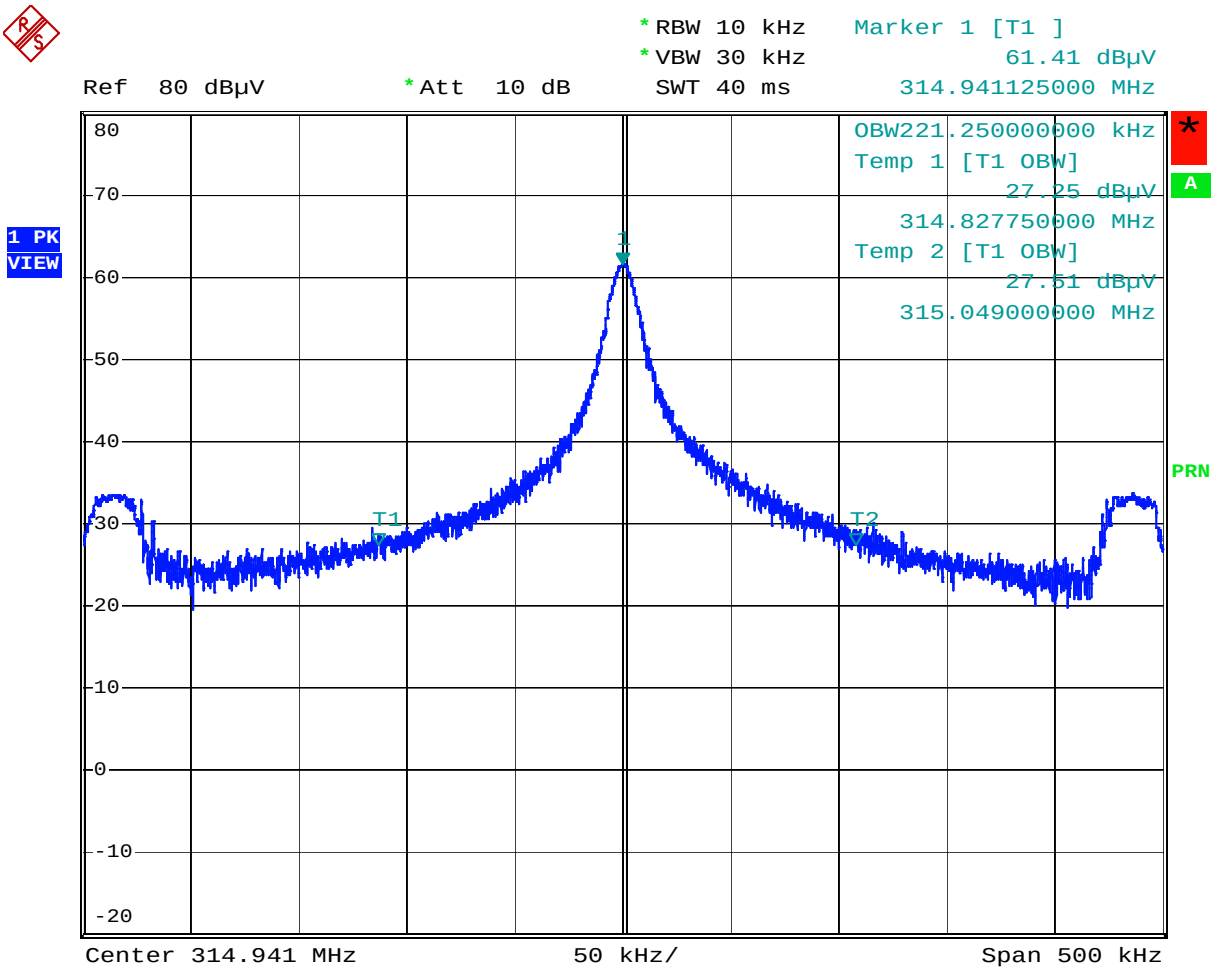
FCC 20dB BW



20 dB Bandwidth

Date: 22.APR.2009 20:37:54

Industry Canada Occupied Bandwidth measured at 99%: 221.25KHz



Comment: out power high channel
Date: 24.MAR.2009 21:03:50

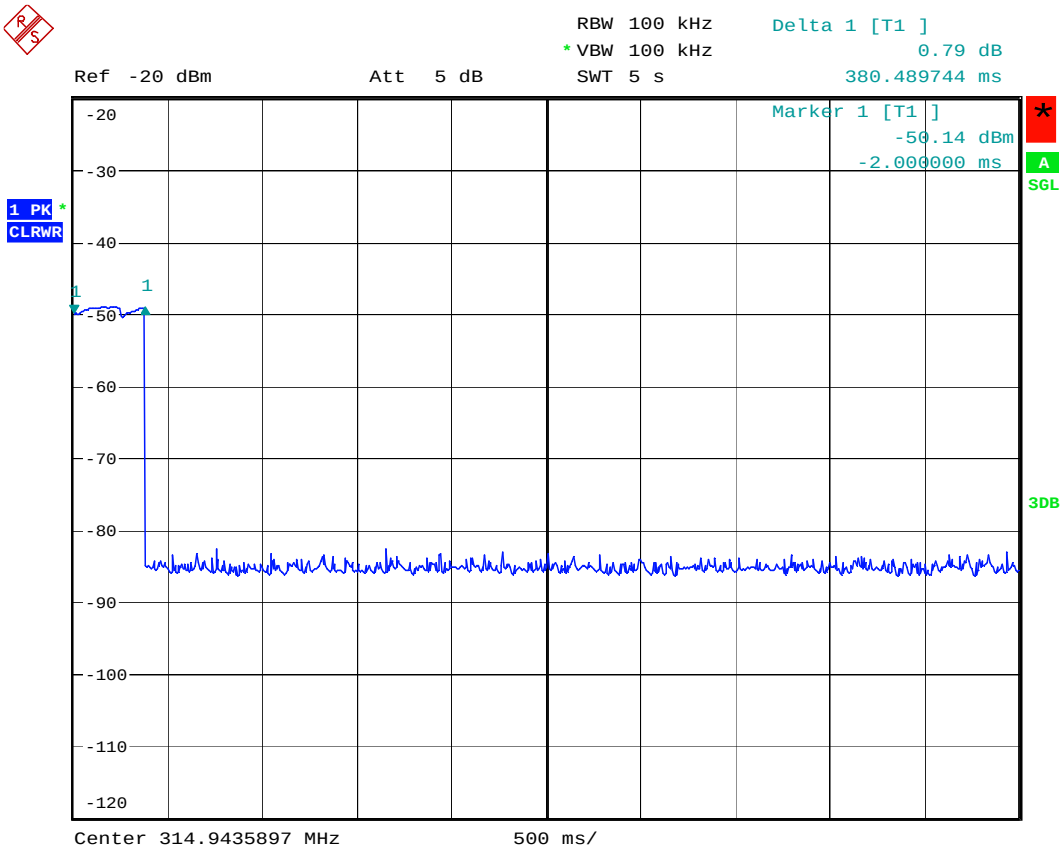
4.4 Transmitter De-activation Time

FCC Rule 15.231(a) and RSS-210 A1.1.1
Maximum allowed deactivation time: 5 Seconds

Manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

Test Results:

Date of the test April 22, 2009



Total Transmission Time. No greater than 5 seconds.

Date: 22.APR.2009 19:46:18

4.5 Transmitter Duty Cycle Calculation and Measurements

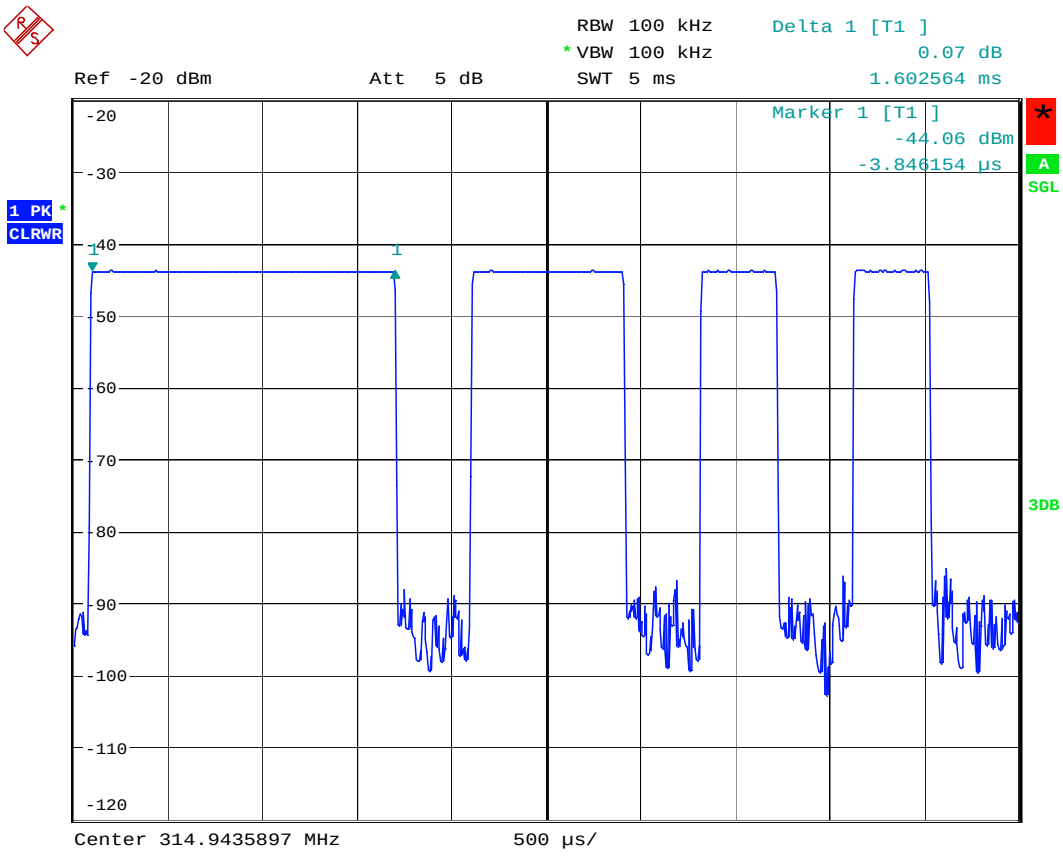
The following plots show the Duty Cycle (DC) of the transmission signal. The Duty Cycle relaxation is 6.2 dB.

	See attached spectrum analyzer chart(s) for transmitter timing
	See transmitter timing diagram provided by manufacturer

4.5.1 Duty Cycle Graphs

Graph 1:

Date of the test April 22, 2009



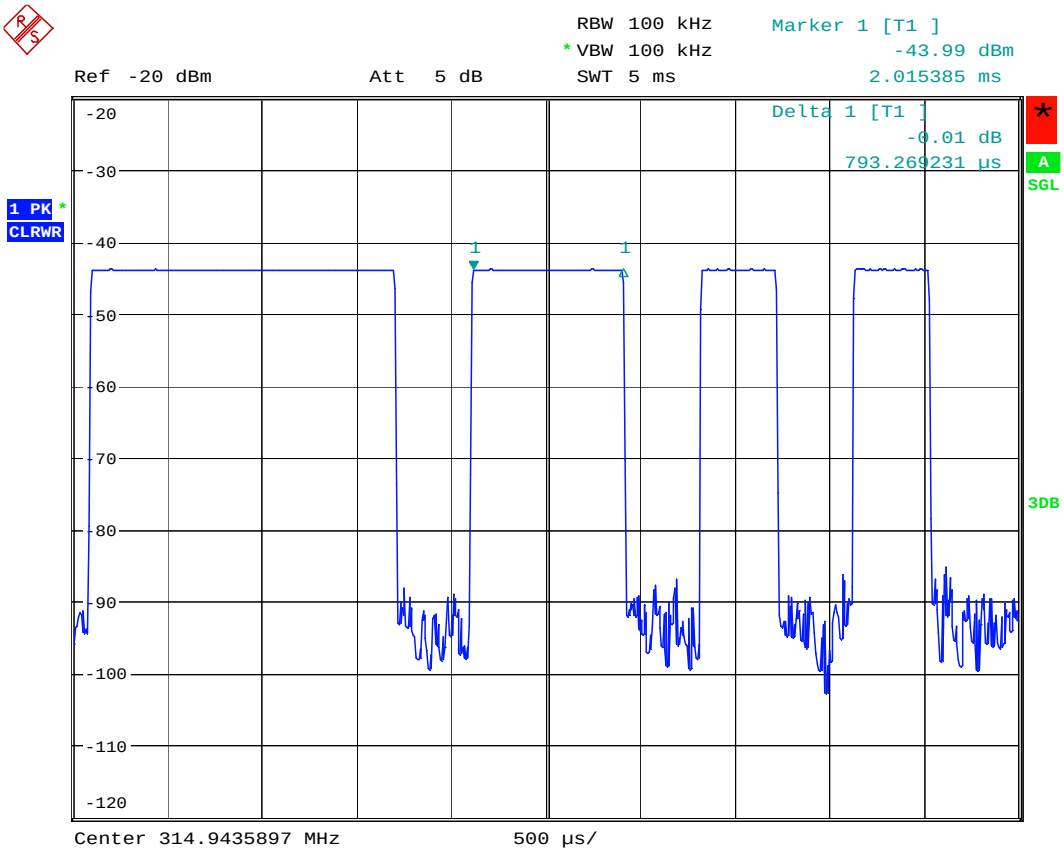
Duty Cycle. Long Bit.

Date: 22.APR.2009 19:17:17

4.5.1 Duty cycle graphs (Continued)

Graph 2:

Date of the test April 22, 2009



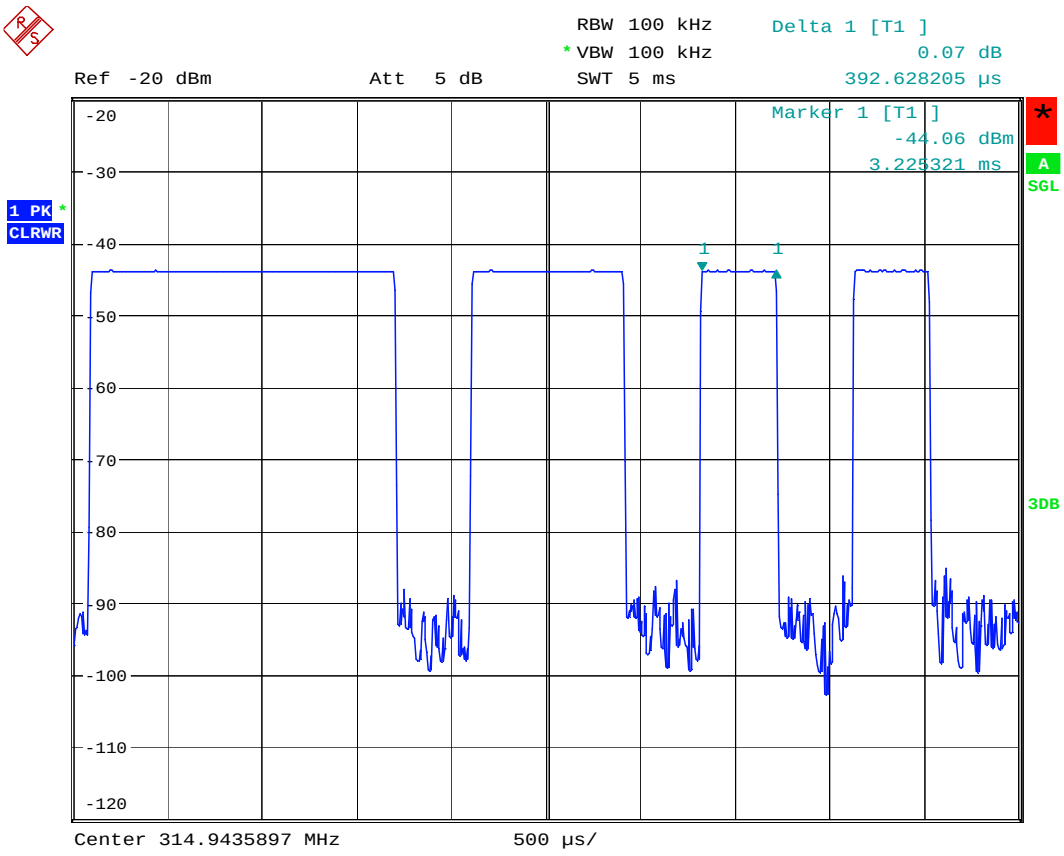
Duty Cycle. Medium Bit.

Date: 22.APR.2009 19:23:18

4.5.1 Duty cycle graphs (Continued)

Graph 3:

Date of the test April 22, 2009



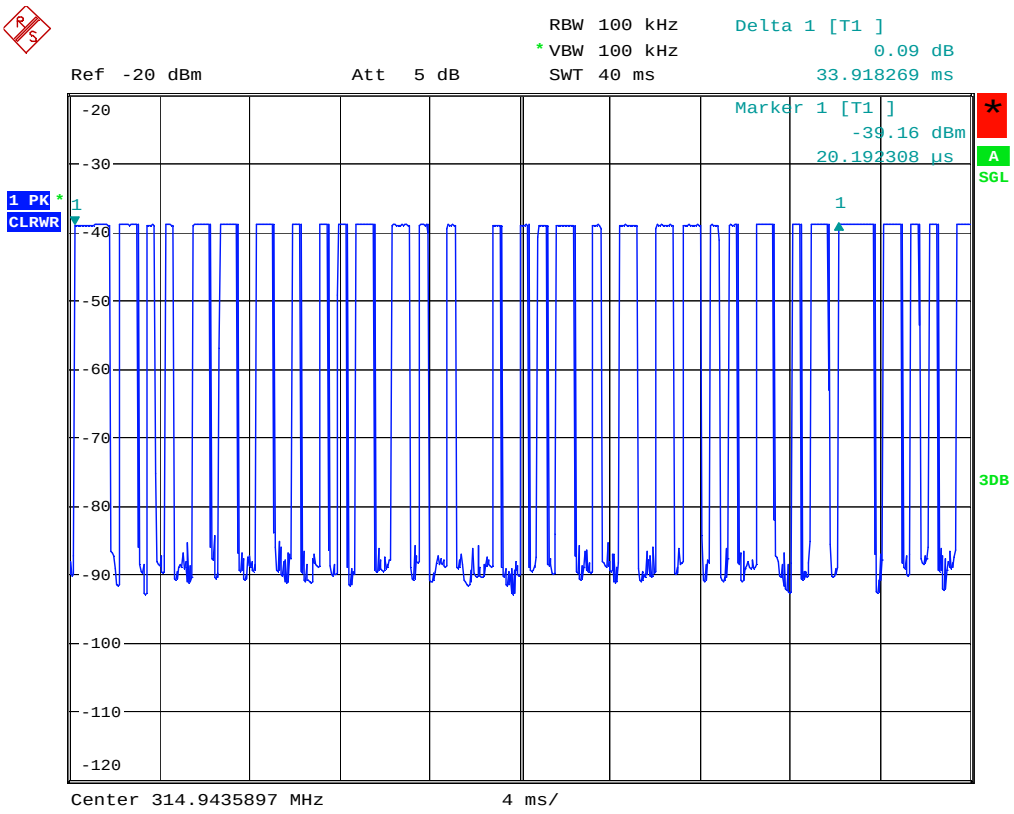
Duty Cycle. Short Bit.

Date: 22.APR.2009 19:24:13

4.5.1 Duty cycle graphs (Continued)

Graph 4:

Date of the test April 22, 2009



Duty Cycle. 1 Complete Bit Stream.
Date: 22.APR.2009 19:29:06

Duty Cycle calculation:
Long Bit: 1.602 mS x 1 = 1.602 mS
Medium Bit: 793 us x 12 = 9.5 mS
Short Bit: 392 uS x 14 = 5.488 mS
Bit Total = 16.59 mS
1 Complete Bit Stream = 33.92 mS

20Log(16.59/33.92) = 6.2dB

5.0 Antenna Requirement

Complies	The transmitter uses a permanently connected antenna.

6.0 List of test equipment

Equipment	Manufacturer	Model/Type	Serial #	Cal Int	Cal Due
RF Filter Section	Hewlett Packard	85460A	3448A00267	12	10/03/09
EMI Receiver	Hewlett Packard	8546A	3710A00373	12	10/03/09
BI-Log Antenna	ARA	LPB-2513/A	1154	12	6/11/09
Pre-Amplifier	Sonoma	310N	185634	12	11/10/09
Spectrum Analyzer	Rohde and Schwarz	FSU	200482	12	11/20/09
Pre-Amplifier	Miteq	AMF-4D-001180-24-1	799159	12	7/28/09
Horn Antenna	EMCO	3115	9107-3712	12	10/22/09
LISN	FCC	FCC-LISN-50-50-M-H	2011	12	9/19/09

7.0 Document History

Revision/ Job Number	Writer Initials	Date	Change
1.0 / 3175796	BG	May 14, 2009	Original document