Nemko USA, Inc.
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VERIFICATION TEST REPORT

Report Number:	2009 06130094 FCC
Project Number:	29282-1
Nex Number:	130094
Applicant:	INDYME SOLUTIONS, INC. 9085 AERO DRIVE SAN DIEGO, CA 92123 USA
Equipment Under Test (EUT):	SHOPPER CALL BOX
Model:	CB526
In Accordance With:	FCC Part 15 Subpart C, 15.231 FCC Part 15 Subpart C, 15.109
Tested By:	Nemko USA Inc. 11696 Sorrento Valley Road, Suite F San Diego, CA 92121
Authorized By:	 Alan Laudani, EMC/RF Test Engineer
Date:	June 16, 2009
Total Number of Pages:	26

Section1: 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 FCC Part 15; Subpart C. Radiated tests were conducted is 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:

Apparatus Assessed:	Shopper Call Box
Model:	CB526
Specification:	FCC Part 15 Subpart C, 15.231 FCC Part 15 Subpart C, 15.109
Date Received in Laboratory:	June 15, 2009
Compliance Status:	Complies
Exclusions:	None
Non-compliances:	None

1.1 Report Release History

REVISION	DATE	COMMENTS
-	June 16, 2009	Prepared By: Ferdinand Custodio
-	June 16, 2009	Initial Release: Alan Laudani

NOTE: Nemko USA, Inc. hereby makes the following statements so as to conform to Chapter 10 (Test Reports) Requirements of ANSI C63.4 (2003) "Methods and Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz":

- The unit described in this report was received at Nemko USA, Inc.'s facilities on June 10, 2009.
- Testing was performed on the unit described in this report on June 11, 2009 to June 19, 2009
- The Test Results reported herein apply only to the Unit actually tested, and to substantially identical Units.
- This report does not imply the endorsement of the Federal Communications Commission (FCC), Industry Canada, NVLAP or any other government agency.

TESTED BY: _____ Date: June 16, 2009
Ferdinand Custodio, EMC Test Engineer

TABLE OF CONTENTS

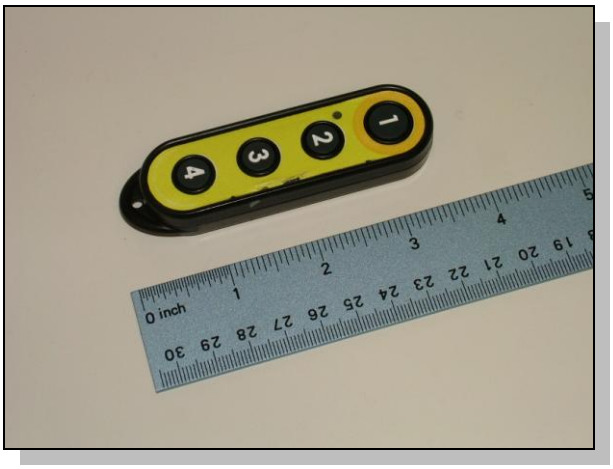
Section 2: Equipment Under Test

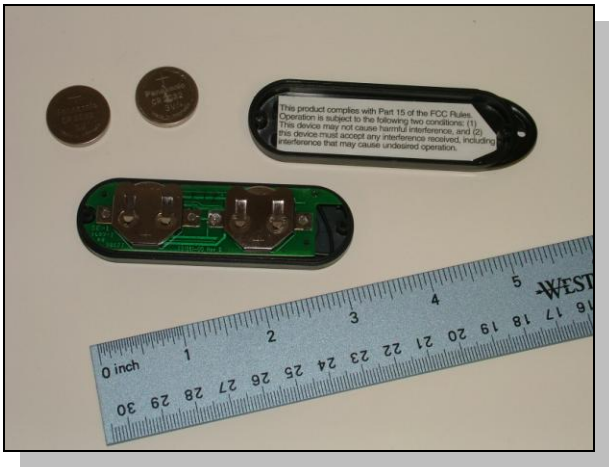
2.1 Product Identification

The Equipment Under Test was indentified as follows:

Indyme Solutions, Inc. Model # CB526 Shopper Call Box

Production sample, serial number not available during assessment:





2.2 Samples Submitted for Assessment

The following sample of the apparatus has been submitted for type assessment:

Sample No.	Description	Serial No.
130094-1	Shopper Call Box	NA

2.3 Theory of Operation

The CB526 is a Shopper Call Box. Its function is a local alert transmitter used for customer service notification in a retail service environment. The EUT was exercised in a test mode-providing interval transmitting of a fixed frequency pulse position transmission at 303.825 Mhz at full strength. The EUT was powered with two CR2032 coin cell batteries and internal voltage is held constant by a charge pump regulator.

2.4 Technical Specifications of the EUT

Manufacturer:	Indyme Solutions, Inc.
Operating Frequency:	303.825MHz
Number of Operating Frequencies:	1
Rated Power:	67.6 dBµV/m @ 3 m
Modulation:	Pulse Position (OOK)
Antenna Connector:	Internal/Integral
Power Source:	3.0VDC (2 coin cells CR2032)

Section 3: Test Conditions

3.1 Specifications

The apparatus was assessed against the following specifications:

FCC Part 15 Subpart B, 15.109
Radio Frequency Devices – Unintentional Radiators - Radiated Emission Limits

FCC Part 15 Subpart C, 15.231
Radio Frequency Devices – Intentional Radiators – Radiated Emission Limits: Periodic operation in the band 40.66–40.70 MHz and above 70 MHz.

3.2 Deviations from Laboratory Test Procedures

No deviations from Laboratory Test Procedure

3.3 Test Environment

All tests were performed under the following environmental conditions:

Temperature range	:	21 – 22 ^{o}C
Humidity range	:	47-66 %
Pressure range	:	100.9 - 101.2 kPa
Power supply range	:	3VDC (Batteries)

3.4 Test Equipment

Nemko ID	Device	Manufacturer	Model	Serial Number	Cal Date	Cal Due Date
128	Antenna, Bicon	EMCO	3104	2882	09-Feb-09	09-Feb-11
901	pre amp	Sonoma	310 N	130607	27-Mar-09	27-Mar-10
317	Preamplifier	HP	8449A	2749A00167	16-Apr-09	16-Apr-10
111	Antenna, LPA	EMCO	3146	1382	20-Oct-08	20-Oct-10
877	Antenna, DRG Horn, .7-18GHz	AH Systems	SAS-571	688	28-Jul-08	28-Jul-10
911	Spectrum Analyzer	Agilent	E4440A	US41421266	06-Nov-08	06-Nov-09

2040B-1 OATS

Section 4: Observations

4.1 Modifications Performed During Assessment

No modifications were performed during assessment.

4.2 Record Of Technical Judgements

No technical judgements were made during the assessment.

4.3 EUT Parameters Affecting Compliance

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

4.4 Test Deleted

No Tests were deleted from this assessment.

4.5 Additional Observations

There were no additional observations made during this assessment.

Section 5: Results Summary

This section contains the following:

FCC Part 15 Subpart C: Test Results
§ 15.231 Periodic operation in the band 40.66–40.70 MHz and above 70 MHz.

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 test.
N/T Not Tested, mandatory but not assessed. (See section 4.4 Test deleted)

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

5.1 Test Results

Part 15C	Test Description	Required	Result
15.109 (b)	Unintentional Radiator Radiated Emission Limits	Y	Pass
15.231 (a)(1)	Transmitter deactivation within 5 seconds	Y	Pass
15.231 (a)(3)	Transmission Time	N*	
15.231 (b)	Field strength of emissions	Y	Pass
15.231 (c)	20 dB Bandwidth	Y	Pass
15.231 (e)	Field strength of emissions (if 15.231 (a) is not met)	N**	

**EUT does not transmit at predetermined interval or polling (supervision transmission)*
***EUT satisfies 15.231 (a)*

Appendix A: Test Results

Section 15.109 – Radiated Emission Limits

(a) Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency of emission (MHz)	Field strength (microvolts/meter)
30–88	100
88–216	150
216–960	200
Above 960	500

(b) The field strength of radiated emissions from a Class A digital device, as determined at a distance of 10 meters, shall not exceed the following:

Frequency of emission (MHz)	Field strength (microvolts/meter)
30–88	**90**
88–216	**150**
216–960	**210**
Above 960	**300**

(c) In the emission tables above, the tighter limit applies at the band edges. Sections 15.33 and 15.35 which specify the frequency range over which radiated emissions are to be measured and the detector functions and other measurement standards apply.

Test Conditions:

Sample Number:	CB526	Temperature:	21.0°C
Date:	June 15, 2009	Humidity:	66%
Modification State:	Transmit @ max power	Tester:	FSCustodio
		Laboratory:	NOATS

Test Results:

See attached plots.

Additional Observations:

- Emissions were searched over a range of 30 MHz to 5000 MHz while in transmit mode. No other emissions found above 1GHz..
- Investigations were made at 3 meters. The EUT was investigated and maximized in the OATS.
- EUT is handheld, worst orientation base from fundamental measurement was used during this investigation.
- A correction factor was added to compensate for antenna factor and cable loss at the fundamental frequencies, example below.
- Measurements were made after fresh batteries were installed.

- Sample Computation:
  Correction factor @ 206.0MHz = -17.1
  = Antenna factor + Cable loss – Preamp gain
  = 12.2 + 2.4 – 31.7
  Corrected reading = Max. reading + Correction factor
  = 31 + (-17.1)
  = 14.0 dBµV/m

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Radiated Emissions Data

Job # :	29282	Date :	6/15/2009	Page	1 of 1
NEX #:	130094	Time :	1PM		
		Staff :	FSC		
Client Name :	Indyme Solutions Inc.			EUT Voltage :	Battery
EUT Name :	Shopper Call Box			EUT Frequency :	
EUT Model # :	CB526			Phase:	
EUT Serial # :	N/A			NOATS	X
EUT Config. :	Transmitting every 30 seconds			SOATS	
				Distance < 1000 MHz:	3 m
				Distance > 1000 MHz:	3 m
Specification :	CFR47 Part 15, Subpart B, Class B				
Loop Ant. #:	NA				
Bicon Ant.#:	128_3m	Temp. (°C) :	21		
Log Ant.#:	111_3m	Humidity (%) :	66		
DRG Ant. #	877	Spec An.#:	911		
Cable LF#:	NOATS	Spec An. Display #:	911		
Cable HF#:	60ft	QP #:	NA		
Preamp LF#:	901	PreSelect#:	NA		
Preamp HF#	317				

Quasi-Peak	RBW:	120 kHz
	Video Bandwidth	300 kHz
Peak	RBW:	1 MHz
	Video Bandwidth	3 MHz
Average	RBW:	1 MHz
	Video Bandwidth	10 Hz

Measurements below 1GHz are Quasi-Peak values, unless otherwise stated.
Measurements above 1GHz are Average values, unless otherwise stated.

Meas. Freq. (MHz)	Meter Reading **Vertical**	Meter Reading **Horizontal**	Det.	EUT Side F/L/R/B	Ant. Height m	Max. Reading (dBµV)	Corrected Reading (dBµV/m)	Spec. limit (dBµV/m)	CR/SL Diff. (dB)	Pass Fail	Comment
206.0	26.7	31.0	Q	RB	1.0	31	14.0	43.5	-29.6	Pass	
270.8	24.7	27.5	Q	RB	1.0	27.52	13.5	46.0	-32.5	Pass	
334.5	28.7	25.8	Q	RB	1.0	28.71	16.5	46.0	-29.5	Pass	
364.5	27.5	24.3	Q	RB	1.0	27.47	14.5	46.0	-31.6	Pass	
396.0	28.6	27.2	Q	RB	1.0	28.64	16.2	46.0	-29.8	Pass	
617.2	30.6	33.3	Q	RB	1.0	33.25	25.6	46.0	-20.5	Pass	
921.9	24.2	25.1	Q	RB	1.0	25.05	22.9	46.0	-23.1	Pass	

Section 15.231(a)(1) – Transmitter deactivation within 5 seconds

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

Test Conditions:

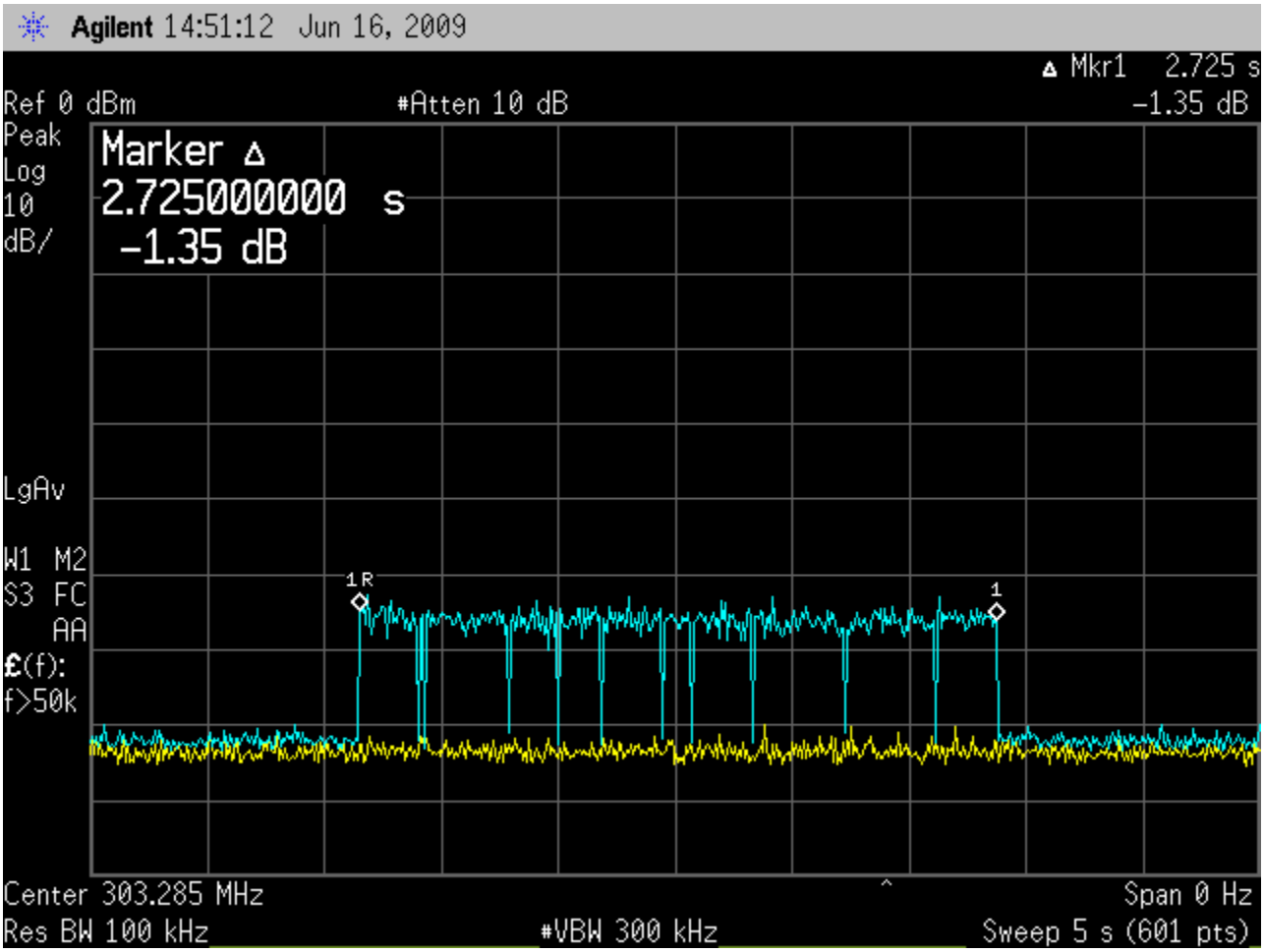
Sample Number:	CB526	Temperature:	21.2°C
Date:	June 16, 2009	Humidity:	47%
Modification State:	Transmit @ max power	Tester:	FSCustodio
		Laboratory:	Shield Room #1

Test Results:

See attached plots.

Additional Observations:

- Using a 5 seconds sweep, the EUT was activated and the transmit button released. The transmission was observed to verify that the unit ceases transmitting within 5 seconds.
- RBW was set to 100kHz; VBW was set at 3 times RBW.
- Span is set to zero.
- Detector function is peak with a secondary trace set at Max Hold.
- Verification was done inside a shield room with the receiving antenna distance adjusted to obtain a satisfactory signal from the EUT.
- Total transmit time was measured at 2.725 seconds.



Section 15.231(c) – 20 dB Bandwidth

(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 Conditions:

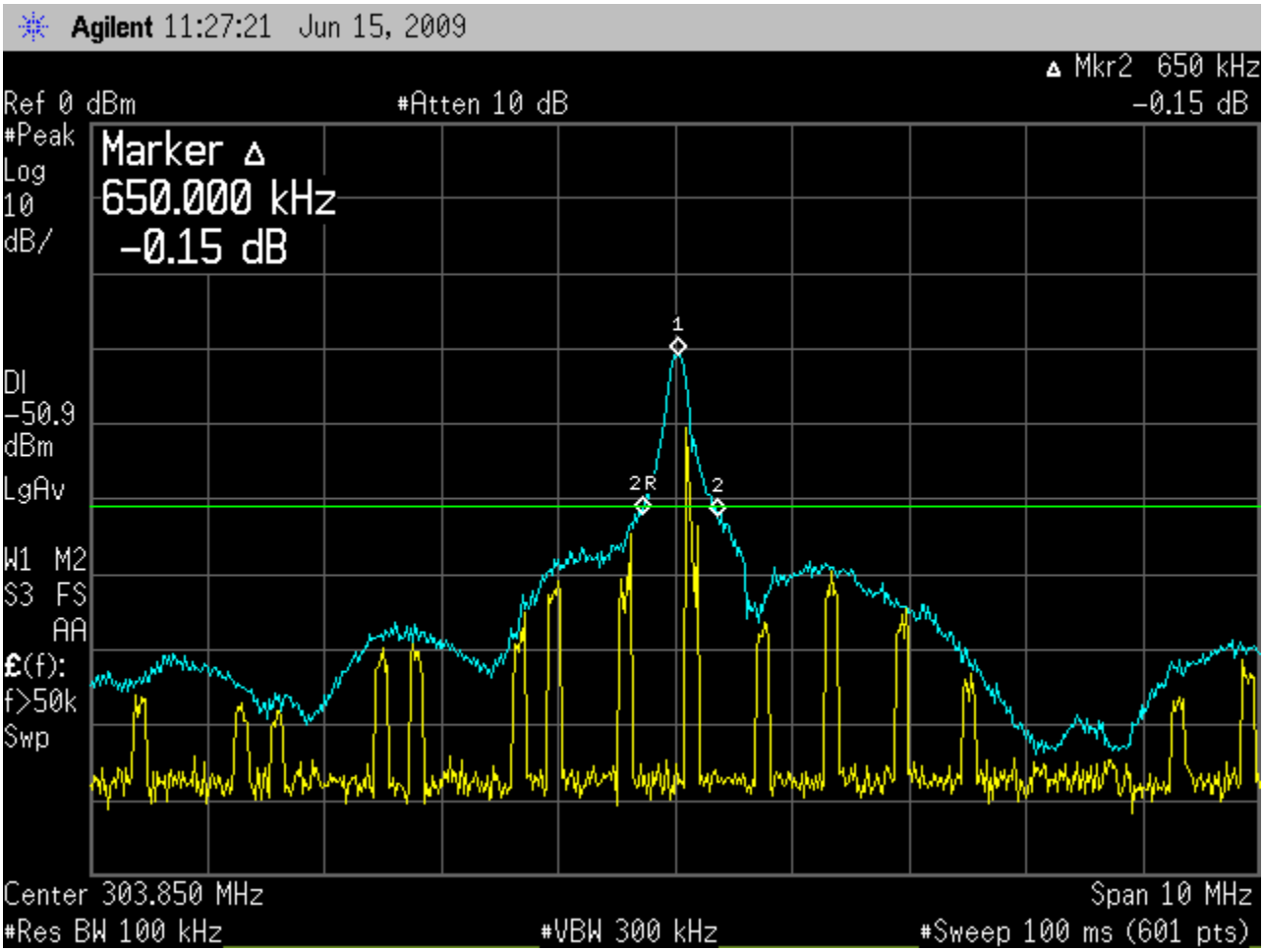
Sample Number:	CB526	Temperature:	21.0°C
Date:	June 15, 2009	Humidity:	45%
Modification State:	Transmit @ max power	Tester:	FSCustodio
		Laboratory:	Shield Room #1

Test Results:

See attached plots.

Additional Observations:

- RBW was set to 1% of the span while VBW was set at 3 times RBW.
- Detector function is peak with a secondary trace set at Max Hold.
- Verification was done inside a shield room with the receiving antenna distance adjusted to obtain a satisfactory signal from the EUT.
- The spectrum analyzer center frequency was set to the channel carrier. After a PEAK output reading was taken, a line was drawn 20 dB lower than PEAK level. The bandwidth was determined from where the channel output spectrum intersected the display line.
- Limit is 760kHz base from a center frequency of 303.825MHz (0.25% of carrier frequency).
- Measured 20dB Bandwidth is 650kHz.



Section 15.231(b) – Field Strength of Emissions

(b) 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 (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emissions (microvolts/meter)
40.66–40.70	2,250	225
70–130	1,250	125
130–174	[1]1,250 to 3,750	[1]125 to 375
174–260	3,750	375
260–470	[1]3,750 to 12,500	[1]375 to 1,250
Above 470	12,500	1,250

[1]Linear interpolations.

(1) The above field strength limits are specified at a distance of 3 meters. The tighter limits apply at the band edges.

(2) Intentional radiators operating under the provisions of this section shall demonstrate compliance with the limits on the field strength of emissions, as shown in the above table, based on the average value of the measured emissions. As an alternative, compliance with the limits in the above table may be based on the use of measurement instrumentation with a CISPR quasi-peak detector. The specific method of measurement employed shall be specified in the application for equipment authorization. If average emission measurements are employed, the provisions in §15.35 for averaging pulsed emissions and for limiting peak emissions apply. Further, compliance with the provisions of §15.205 shall be demonstrated using the measurement instrumentation specified in that section.

(3) The limits on the field strength of the spurious emissions in the above table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in §15.209, whichever limit permits a higher field strength.

Test Conditions:

Sample Number:	CB526	Temperature:	21.0°C
Date:	June 15, 2009	Humidity:	66%
Modification State:	Transmit @ max power	Tester:	FSCustodio
		Laboratory:	NOATS

Test Results:

See attached plots.

Additional Observations:

- Emissions were searched over a range of 30 MHz to 5000 MHz while in transmit mode. No other emissions found above 1GHz..
- Investigations were made at 3 meters. The EUT was investigated and maximized in the OATS.

- EUT is handheld. The EUT was investigated in three orthogonal axes.
- A correction factor was added to compensate for antenna factor and cable loss at the fundamental frequencies, example below.
- Measurements were made after fresh batteries were installed.
- Sample Computation:

Correction factor @ 303.825MHz	= -12.8
	= Antenna factor + Cable loss – Preamp gain
	= 16.1 + 2.9 – 31.8
Corrected reading	= Max. reading + Correction factor
	= 80.27 + (-12.8)
	= 67.6 dBµV/m

- Measurement is peak, average measurements were obtained using the formula:

  Average = Peak + 20 x log (duty cycle)

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Radiated Emissions Data

Job # :	29282	Date :	6/15/2009	Page	1 of 1
NEX #:	130094	Time :	1PM		
		Staff :	FSC		
Client Name :	Indyme Solutions Inc.			EUT Voltage :	Battery
EUT Name :	Shopper Call Box			EUT Frequency :	
EUT Model # :	CB526			Phase:	
EUT Serial # :	N/A			NOATS	X
EUT Config. :	Transmitting every 30 seconds			SOATS	
				Distance < 1000 MHz:	3 m
				Distance > 1000 MHz:	3 m
Specification :	CFR47 Part 15, Subpart B, Class B				
Loop Ant. #:	NA				
Bicon Ant.#:	128_3m	Temp. (°C) :	21		
Log Ant.#:	111_3m	Humidity (%) :	66		
DRG Ant. #	877	Spec An.#:	911		
Cable LF#:	NOATS	Spec An. Display #:	911		
Cable HF#:	60ft	QP #:	NA		
Preamp LF#:	901	PreSelect#:	NA		
Preamp HF#	317	DCCF:	-15.9		

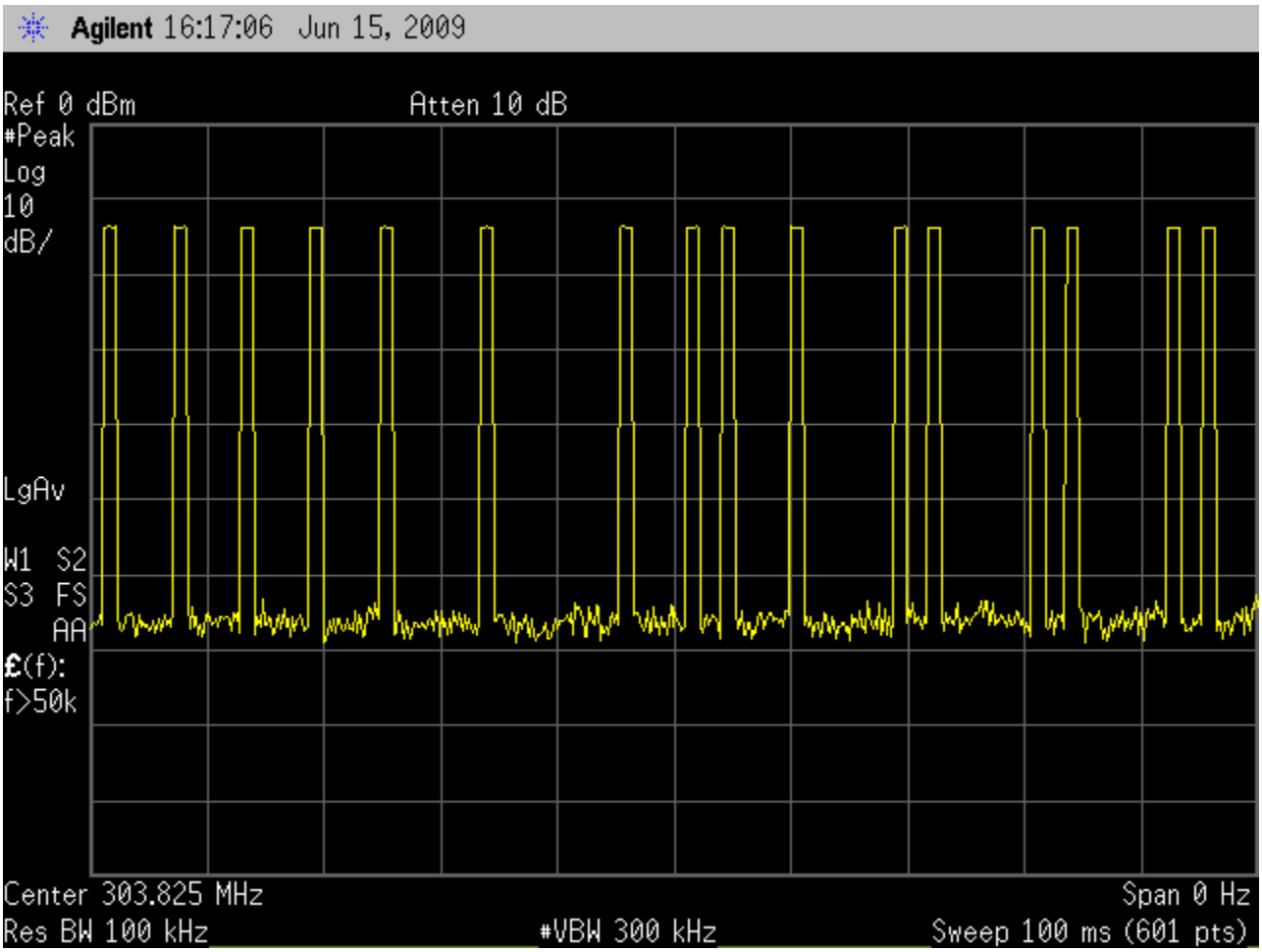
Quasi-Peak	RBW:	120 kHz
	Video Bandwidth	300 kHz
Peak	RBW:	1 MHz
	Video Bandwidth	3 MHz
Average	RBW:	1 MHz
	Video Bandwidth	10 Hz

Measurements below 1GHz are Quasi-Peak values, unless otherwise stated.

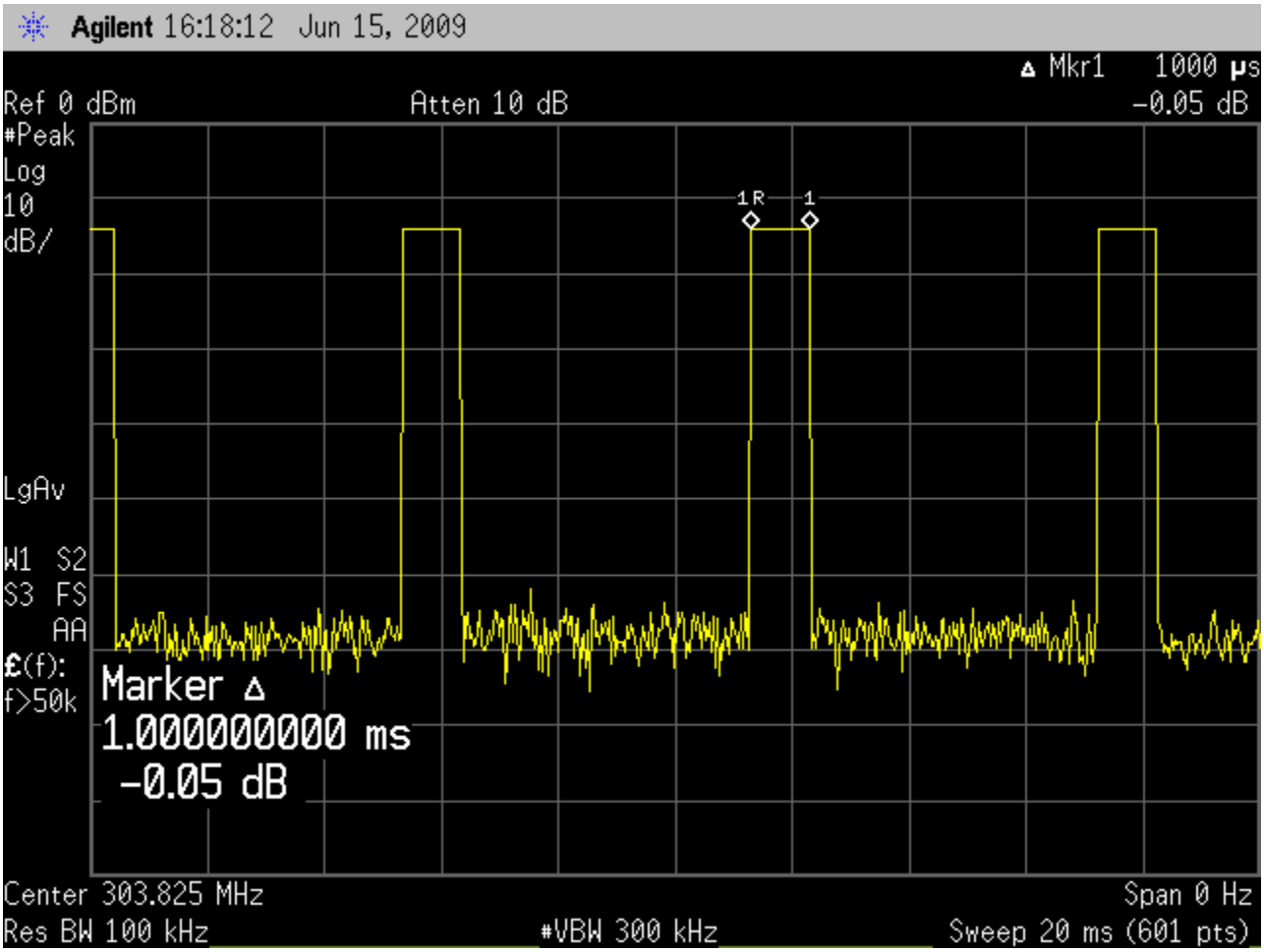
Measurements above 1GHz are Average values, unless otherwise stated.

Meas. Freq. (MHz)	Meter Reading **Vertical**	Meter Reading **Horizontal**	Det.	EUT Side F/L/R/B	Ant. Height m	Max. Reading (dBµV)	Corrected Reading (dBµV/m)	Spec. limit (dBµV/m)	CR/SL Diff. (dB)	Pass Fail	Comment
Fundamental Measurements (Peak Detector)											
303.8	86.4	88.4	Q	RB	1.0	88.44	75.7				"X" Fundamental
303.8	73.0	91.1	Q	RB	1.0	91.11	78.4				"Y" Fundamental
303.8	80.9	96.2	Q	RB	1.0	96.17	83.5				"Z" Fundamental
Fundamental Measurements with Duty Cycle factored In (Average)											
303.8	70.5	72.5	A	RB	1.0	72.54	59.8	74.9	-15.1	Pass	"X" Fundamental
303.8	57.1	75.2	A	RB	1.0	75.21	62.5	74.9	-12.4	Pass	"Y" Fundamental
303.8	65.0	80.3	A	RB	1.0	80.27	67.6	74.9	-7.3	Pass	"Z" Fundamental
206.0	26.7	31.0	Q	RB	1.0	31	14.0	43.5	-29.6	Pass	
270.8	24.7	27.5	Q	RB	1.0	27.52	13.5	46.0	-32.5	Pass	
334.5	28.7	25.8	Q	RB	1.0	28.71	16.5	46.0	-29.5	Pass	
364.5	27.5	24.3	Q	RB	1.0	27.47	14.5	46.0	-31.6	Pass	
396.0	28.6	27.2	Q	RB	1.0	28.64	16.2	46.0	-29.8	Pass	
617.2	30.6	33.3	Q	RB	1.0	33.25	25.6	46.0	-20.5	Pass	
921.9	24.2	25.1	Q	RB	1.0	25.05	22.9	46.0	-23.1	Pass	

Duty Cycle Factor



16 emissions in 100ms



1.0 ms per emission

Duty Cycle Correction Factor computation:

= 1.0 x 16

= 16.0 ms or 16.0%

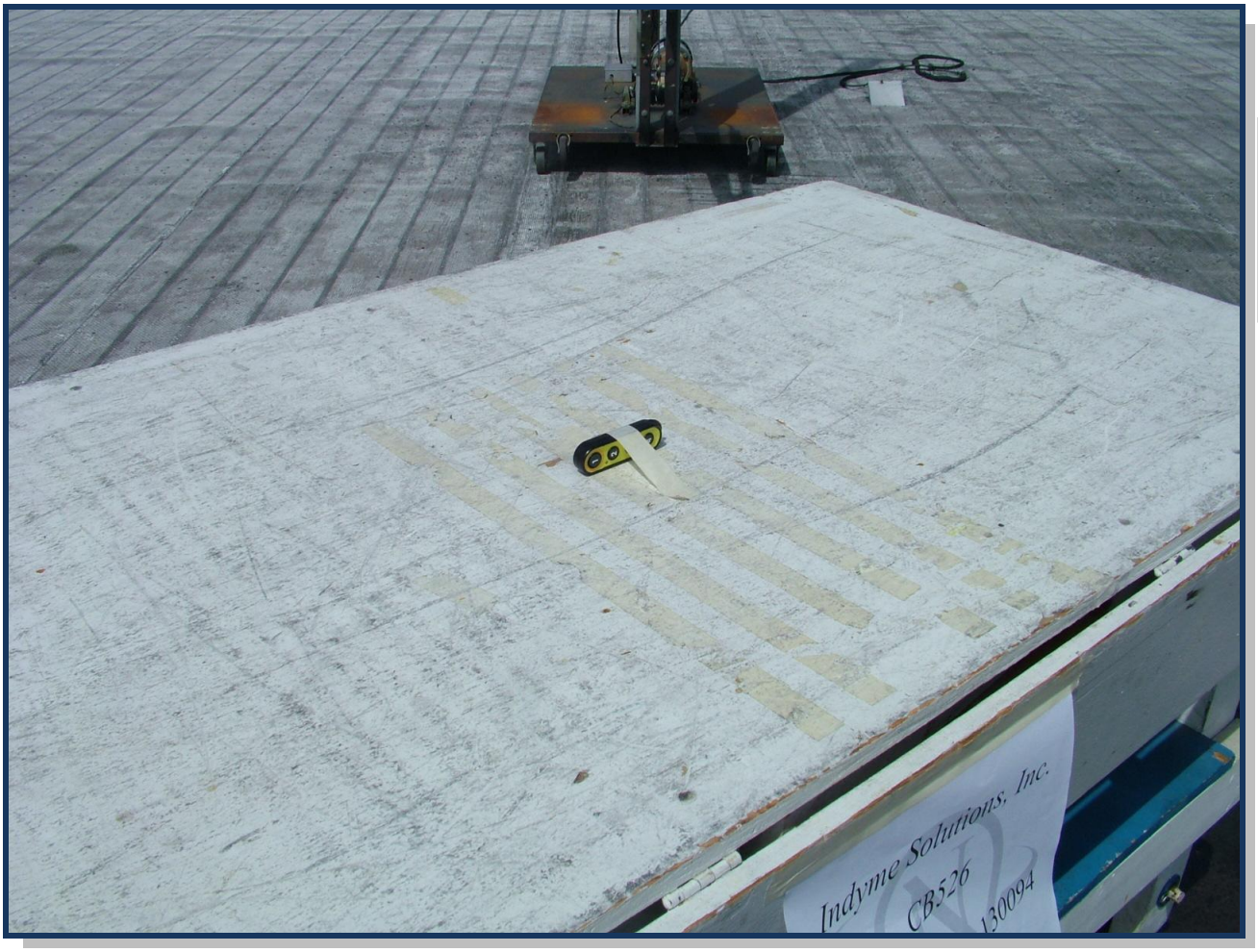
= 20log(0.16)

= **-15.9**

Appendix B: Test Setup Photographs

"X" Configuration

"Y" Configuration



"Z" Configuration

Appendix C: Block Diagram of Test Setups

Test Site For Radiated Emissions