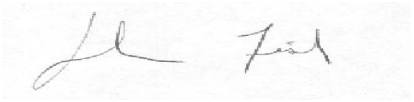
Nemko Dallas Test Report:	2L0132RUS2
Applicant:	Indyme 9085 Aero Avenue San Diego, CA 92123
Equipment Under Test: **(E.U.T.)**	CB520 Callbox
In Accordance With:	**FCC Part 15, Subpart C** For Low Power Transmitters Operating Periodically In The Band 40.66 - 40.77 MHz And Above 70 MHz
Tested By:	Nemko Dallas, Inc. 802 N. Kealy Lewisville, TX 75057-3136
Authorized By:	 John Fish, EMC Engineer
Date:	5/31/02
Total Number of Pages:	28

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Section 1. Summary of Test Results

Manufacturer: Indyme

Model No.: CB520 Callbox

Sample No.: 2

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, Paragraph 15.231. 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.

☒ New Submission ☐ Production Unit

☐ Class II Permissive Change ☒ Pre-Production Unit

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. NONE
See " Summary of Test Data".

NVLAP LAB CODE: 100426-0

Summary Of Test Data

Name of Test	Paragraph No.	Results
Transmission Requirements	15.231(a)	Complies
Radiated Emissions	15.231(b)	Complies
Occupied Bandwidth	15.231(c)	Complies
Frequency Tolerance	15.231(d)	N/A
Alternate Field Strength Requirements	15.231(e)	N/A
Powerline Conducted Emissions	15.207	N/A

Footnotes:

1) The device operates above 70 MHz
2) The device is not a periodic transmitter
3) The device is battery powered.

Section 2. Equipment Under Test (E.U.T.)

General Equipment Information

Frequency Range:	303.825 MHz (Nominal)
Operating Frequency(ies) of Sample:	303.78 MHz
Type of Emission:	Digital
Supply Power Requirement:	Lifetime integral battery
Duty Cycle Correction Factor:	-15.1 dB

Description of E.U.T.

The unit is a microprocessor controlled callbox that is a self contained low transmit power unit with an integral lifetime battery (estimated lifetime is 7-10 years under normal use). It is installed in a nonconductive plastic enclosure with customer specific graphic overlays.

The unit operates at a nominal frequency of 303.825 MHz using an RFM HX1002-1 hybrid transmitter module and a permanently attached wire antenna

Modifications Incorporated in E.U.T.

The EUT has not been modified from what is described by the brand name and unique type identification stated above.

Justification

The E.U.T. was configured for testing as per typical installation.

The following combinations were investigated to establish worst case configuration:

(1) Lying flat

(2) Upright

(3) Lying on edge

Exercise Mode

The E.U.T. exercise mode used during radiated and conducted testing was designed to exercise the various system components in a manner similar to typical use.

Exercise mode:

(1) Transmit full power

(2)

(3)

(4)

(5)

(6)

Section 3. Equipment Configuration

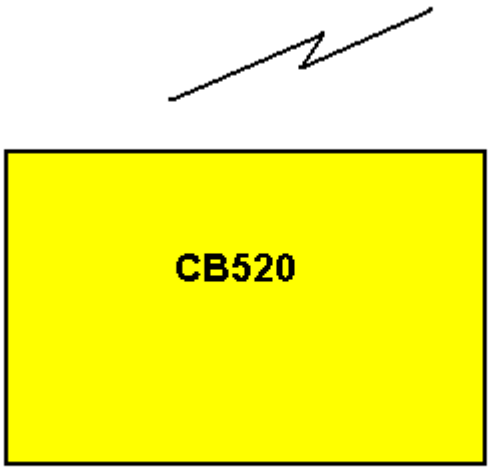
Equipment Configuration List:

Item	Description	Model No.	Serial.	Rev.
(A)	Callbox	CB520	None	
(B)				

Inter-connection Cables:

Item	Description	Length (m)
(1)	There are no interconnecting cables	
(2)		

Configuration of the Equipment Under Test (E.U.T)



Section 4. Transmission Requirements

NAME OF TEST: Transmission Requirements	PARA. NO.: 15.231(a)
TESTED BY: David Light	DATE: 5/30/2002

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: Complies.

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)(1) **15.231(a)(2) :**	☒ Manual activation ☐ Automatic activation	TX deactivation time:
15.231(a)(3) :	☐ Regular, predetermined transmissions ☐ Polling or supervisory transmissions	TX rate and duration:
15.231(a)(4) :	☐ Alarm device operating during the pendancy of alarm condition	
	☐ Non-alarm device	

Test Data – Transmission Requirements

Dallas Headquarters:
802 N. Kealy
Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667

Nemko Dallas, Inc.

Data Plot — **Transmitter Release Time**

Page 1 of 1 — Complete X

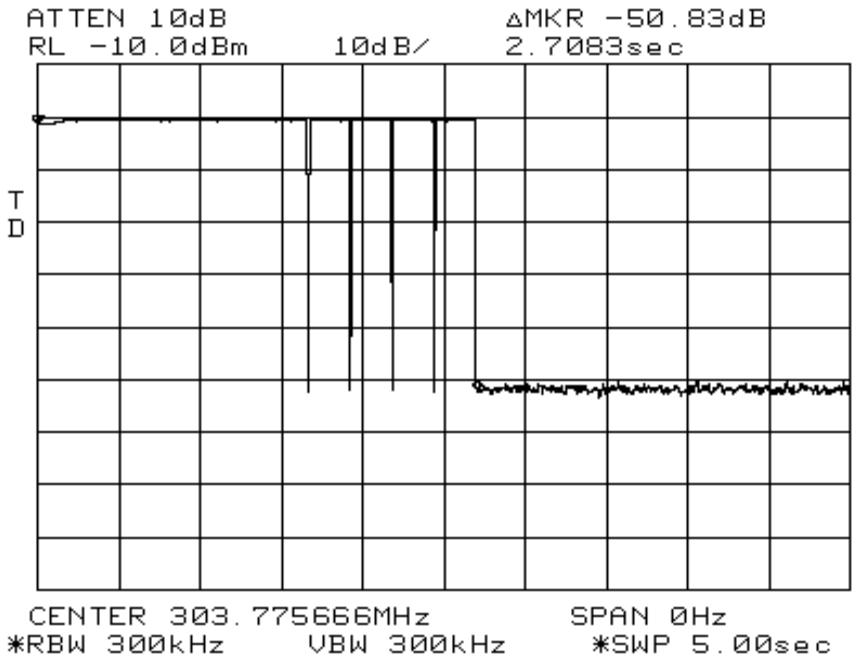
Job No.:	2L0132	Date:	5/30/2002	Preliminary:	
Specification:	15.231(a)(1)	Temperature(°C):	24		
Tested By:	David Light	Relative Humidity(%)	40		
E.U.T.:	CB520				
Configuration:	TX				
Sample Number:	1				
Location:	Lab 1	RBW:	Refer to plots	Measurement	
Detector Type:	Peak	VBW:	Refer to plots	Distance:	m

Test Equipment Used

Antenna:		Directional Coupler:	
Pre-Amp:		Cable #1:	1629
Filter:		Cable #2:	
Receiver:	1464	Cable #3:	
Attenuator #1		Cable #4:	
Attenuator #2:		Mixer:	

Additional equipment used: 802

Measurement Uncertainty: +/-1.7 dB



Notes: **Transmitter release time equals 2.71 seconds**

Section 5. Radiated Emissions

NAME OF TEST: Radiated Emissions	PARA. NO.: 15.231(b)
TESTED BY: David Light	DATE: 5/31/2002

Minimum Standard:

Permissible Field Strength Limits (Momentarily Operated Devices

Fundamental Frequency (MHz)	Field Strength of Fundamental Microvolts/Meter at 3 meters; (watts)	Field Strength of Unwanted Emissions Microvolts/Meter at 3 meters; (watts)
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

Notes:

# Use quasi-peak or averaging meter.	*For 130 - 174 MHz: FS (microvolts/m) = (56.82 x F) - 6136*
** Linear interpolation with frequency F in MHz*	*For 260 - 470 MHz: FS (microvolts/m) = (41.67 x F) - 7083*

Any emissions that fall within the restricted bands of 15.205 shall not exceed the following limits:

Frequency (MHz)	Field Strength (µV/m @ 3m)	Field Strength (dB @ 3m)
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
Above 960	500	54.0

Test Results: Complies. The worst-case emission level is 50.0 dBµV/m @ 3m at 911.4 MHz. This is 4.7 dB below the specification limit of 54.7 dBµV/m.

Test Data: See attached table.

Above 1 GHz a spectrum analyzer and low noise amplifier are used to measure emission levels. The spectrum analyzer resolution bandwidth was set to 1 MHz and video bandwidth was 3 MHz.

In the case of handheld equipment, the E.U.T. is rotated in three planes to obtain worst-case results.

Test Data - Radiated Emissions

Dallas Headquarters:
802 N. Kealy
Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667

Nemko Dallas, Inc.

Data Plot **Duty Cycle**

Page 1 of 2 Complete X

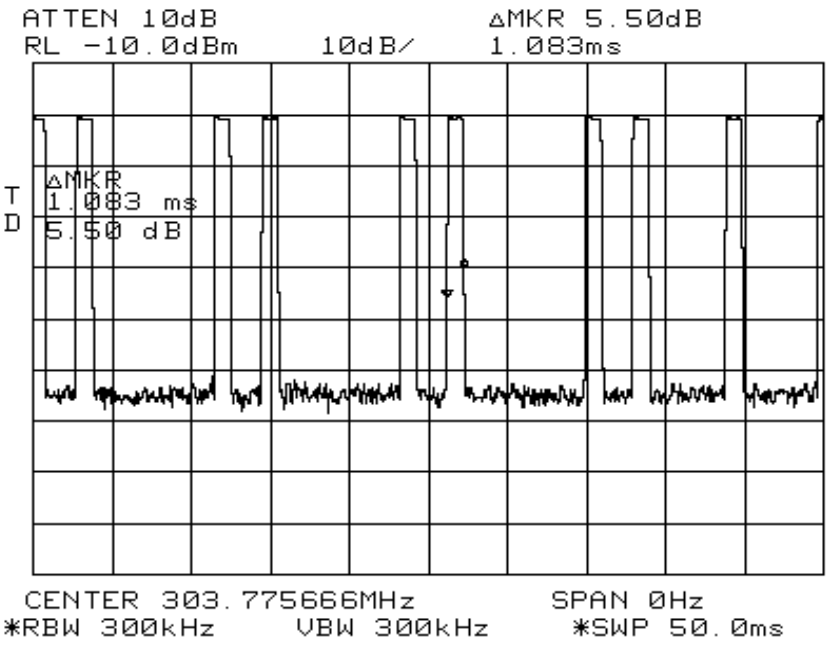
Job No.:	2L0132	Date:	5/30/2002	Preliminary:	
Specification:	15.231	Temperature(°C):	24		
Tested By:	David Light	Relative Humidity(%)	40		
E.U.T.:	CB520				
Configuration:	TX				
Sample Number:	2				
Location:	Lab 1	RBW:	Refer to plots	Measurement	
Detector Type:	Peak	VBW:	Refer to plots	Distance:	m

Test Equipment Used

Antenna:		Directional Coupler:	
Pre-Amp:		Cable #1:	1629
Filter:		Cable #2:	
Receiver:	1464	Cable #3:	
Attenuator #1		Cable #4:	
Attenuator #2:		Mixer:	

Additional equipment used: 802

Measurement Uncertainty: +/-1.7 dB



Notes: **Each pulse width equals 1.1mS**

Test Data – Continued

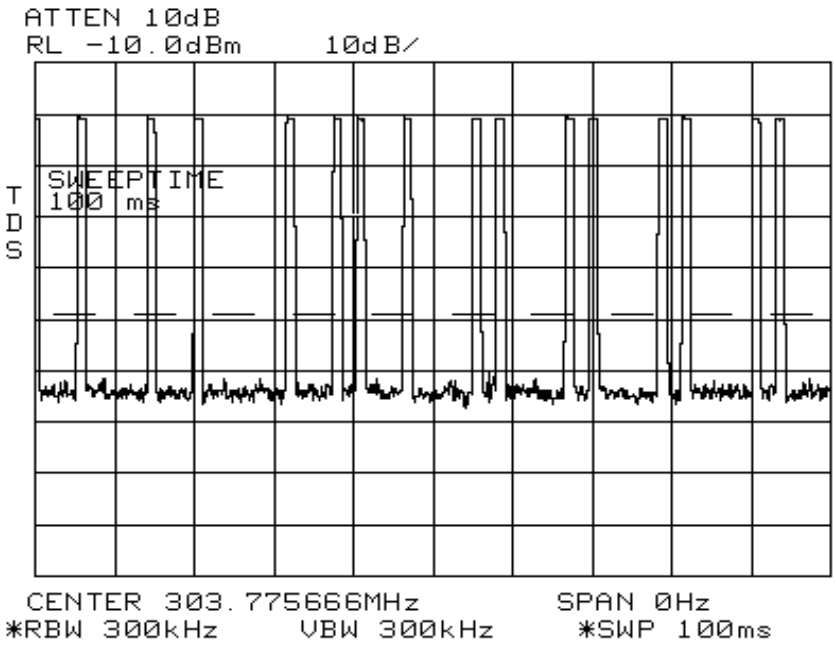
Dallas Headquarters:
802 N. Kealy
Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667

Nemko Dallas, Inc.

Data Plot **Duty Cycle**

Page 2 of 2

Job No.:	2L0132	Date:	5/30/2002
Specification:	15.2	Temperature(°C):	24
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	CB520		
Configuration:	TX		



Notes: **1 pulses per 100mS equals 17.6 mS per 100 mS**
20log(17.6/100) = -15.1 dB Correction factor

Test Data – Continued

NEMKO Dallas, Inc.

Dallas Headquarters:
802 N. Kealy
Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667

Radiated Emissions Data

Complete	X			Job # : 2L0132R	Test # : RE-1
Preliminary				Page 1	of 1
Client Name :	INDYME				
EUT Name :	CALLBOX				
EUT Model # :	CB520				
EUT Part # :	NA				
EUT Serial # :	None				
EUT Config. :	Lying flat (worst case) Tx full power				
Specification :	15.231(b)			Reference :	
Rod. Ant. #:		Temp. (deg. C) :	22	Date :	5/31/02
Bicon Ant.#:		Humidity (%) :	45	Time :	6:30
Log Ant.#:	1034			Staff :	Light
Bilog Ant.#:				Photo ID:	None
Dipole Ant.#:				Peak Bandwidth:	100 kHz
Cable#:	1983	Location:	AOATS	Video Bandwidth	100 kHz
Preamp#:	791	Distance:	3m		
Limiter#:	NA				
Atten #:	NA				
Detector#:	1464				

Meas. Freq. (MHz)	Ant. Pol. (H/V)	Duty Cycle (dB)	Meter Reading (dBuV)	Antenna Factor (dB)	Path Loss (dB)	RF Gain (dB)	Corrected Reading (dBuV/m)	Spec. limit (dBuV/m)	CR/SL Diff. (dB)	Pass Fail Unc.	Comment
303.8	V	-15.1	54.5	20.4	4.6	0.0	64.4	74.7	-10.3	Pass	
607.6	V	-15.1	36.2	19.2	6.7	0.0	47.0	54.7	-7.7	Pass	
911.4	V	-15.1	31.5	24.7	8.6	0.0	49.7	54.7	-5.0	Pass	Noise floor
303.8	H	-15.1	59.2	20.4	4.6	0.0	69.1	74.7	-5.6	Pass	
607.6	H	-15.1	35.8	18.9	6.7	0.0	46.3	54.7	-8.4	Pass	
911.4	H	-15.1	34.7	21.8	8.6	0.0	50.0	54.7	-4.7	Pass	

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Test Data - Continued

Nemko Dallas, Inc.

Dallas Headquarters:
802 N. Kealy
Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667

Radiated Emissions

Page 1 of 1

Job No.:	2L0132	Date:	5/31/02
Specification:	15.231	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	45
E.U.T.:	CB520		
Configuration:	UPRIGHT - TX FULL POWER		
Sample Number:	2		
Location:	AC 3	RBW:	1 MHz
Detector Type:	Peak	VBW:	1 MHz

Test Equipment Used

Antenna:	1304	Directional Coupler:	#N/A
Pre-Amp:	1016	Cable #1:	1484
Filter:	#N/A	Cable #2:	1485
Receiver:	1464	Cable #3:	#N/A
Attenuator #1	#N/A	Cable #4:	#N/A
Attenuator #2:	#N/A	Mixer:	#N/A

Measurement Uncertainty: +/- .7 dB

Frequency (GHz)	Meter Reading (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Pre-Amp Gain (dB)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Comment
								Refer to legend below
1.215	52.5	23.1	1.6	32.2	45.0	54.0	-9.0	H - RB - P
1.519	50.5	24.3	2.4	32.8	44.4	54.0	-9.6	H - RB - P
1.823	45.0	27.6	2.7	33.3	42.0	54.7	-12.7	H - NF - P
2.127	38.7	27.9	2.9	33.3	36.2	54.7	-18.5	H - DC
2.430	42.9	28.2	3.1	33.8	40.4	54.7	-14.3	H - DC
2.734	55.3	28.2	3.7	33.5	53.7	74.0	-20.3	H - RB - P
2.734	40.2	28.2	3.7	33.5	38.6	54.0	-15.4	H - RP - A
3.038	29.9	30.0	3.4	33.8	29.5	54.7	-25.2	H - DC
1.215	51.0	23.1	1.6	32.2	43.5	54.0	-10.5	V - RB - P
1.519	46.3	24.3	2.4	32.8	40.2	54.0	-13.8	V - RB - P
1.823	35.1	27.6	2.7	33.3	32.1	54.7	-22.6	V - P
2.127	37.7	27.9	2.9	33.3	35.2	54.7	-19.5	V - DC
2.430	46.6	28.2	3.1	33.8	44.1	54.7	-10.6	V - DC
2.734	54.1	28.2	3.7	33.5	52.5	74.0	-21.5	V - RB - P
2.734	39.0	28.2	3.7	33.5	37.4	54.0	-16.6	V - RP - A
3.038	32.9	30.0	3.4	33.8	32.5	54.7	-22.2	V - DC

Legend:	V=Vertical	RB=Restricted band	
	H=Horizontal	DC=Duty cycle correction	Scanned to the 10th
	P=Peak Detector		harmonic
	A=Average detector		

Notes: If the PEAK measurement passed the AVERAGE limit in the restricted bands by more than 2 dB, then Avera
an average measurement was not made.

Radiated Photographs (Worst Case Configuration)

FRONT VIEW

REAR VIEW

Section 6. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 15.231(c)
TESTED BY: David Light	DATE: 5/30/2002

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: Complies. See attached graph.

Test Data: See attached graph.

Test Data – Occupied Bandwidth

Dallas Headquarters:
802 N. Kealy
Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667

Nemko Dallas, Inc.

Data Plot — **20 dB Bandwidth**

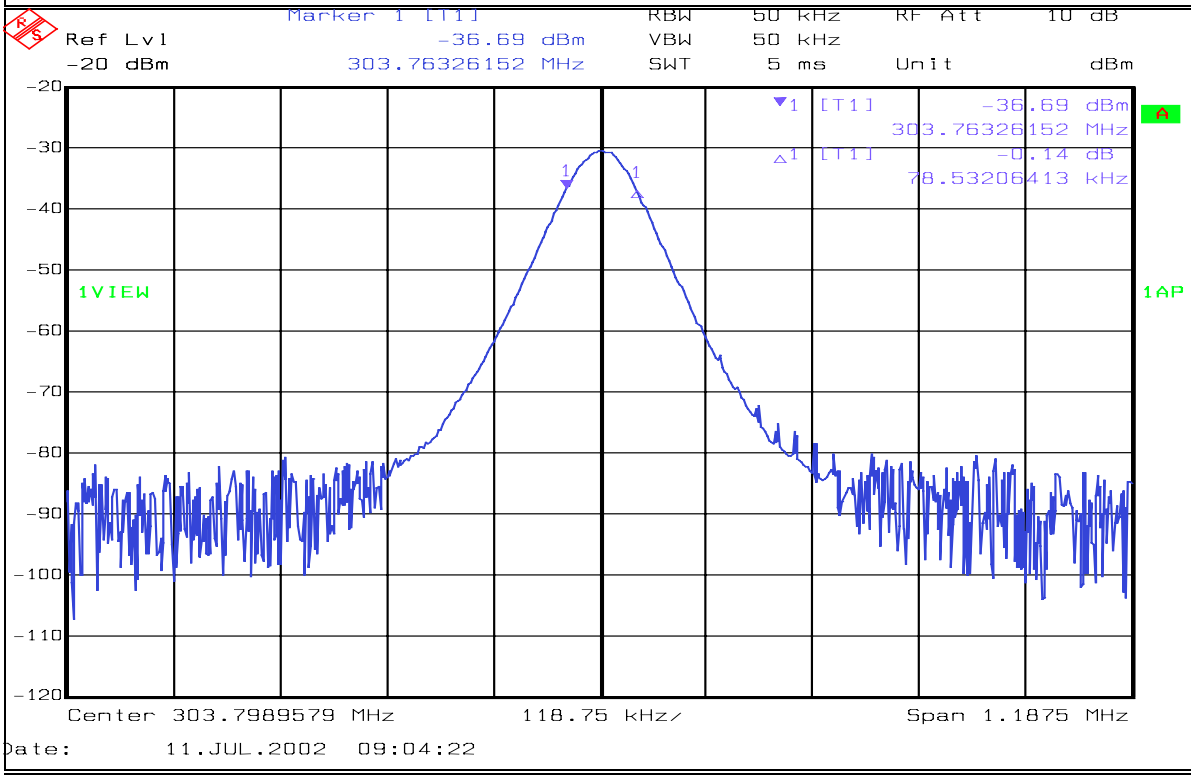
Page 1 of 1

Complete X
Preliminary:

Job No.: 2L0132 Date: 7/11/2002
Specification: 15.231(c) Temperature(°C): 24
Tested By: David Light Relative Humidity(%) 40
E.U.T.: CB520
Configuration: Tx
Sample Number: 1
Location: Lab 1 RBW: Refer to plots Measurement
Detector Type: Peak VBW: Refer to plots Distance: na m

Test Equipment Used

Antenna: Directional Coupler:
Pre-Amp: Cable #1: 1629
Filter: Cable #2:
Receiver: 1036 Cable #3:
Attenuator #1 Cable #4:
Attenuator #2: Mixer:
Additional equipment used: 802
Measurement Uncertainty: +/-1.7 dB



Notes:

Section 7. Frequency Tolerance
Devices in the Frequency Band 40.66 - 40.77 MHz

NAME OF TEST: Frequency Tolerance	PARA. NO.: 15.231(d)
TESTED BY:	DATE:

Minimum Standard: 15.231(d) For devices operating within the frequency band 40.66 - 40.70 MHz, the bandwidth of the emission shall be confined within the band edges and the frequency tolerance of the carrier shall be ±0.01%. This frequency tolerance shall be maintained for a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary power supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

Test Results: **Not Applicable. The device does not operate in this range.**

Test Data: See attached graph.

Section 8. Periodic Alternate Field Strength Requirements

NAME OF TEST: Periodic Alternate Field Strength Requirements	PARA. NO.: 15.231(e)
TESTED BY:	DATE:

Minimum Standard:

15.231(e) Intentional radiators may operate at a periodic rate exceeding that specified in paragraph (a) of this section and may be employed for any type of operation, including operation prohibited in paragraph (a) of this section, provided the intentional radiator complies with the provisions of paragraphs (b) through (d) of this section, except the field strength table in paragraph (b) of this section is replaced by the following.

Fundamental Frequency (MHz)	Field Strength of Fundamental (microvolts/meter)	Field Strength of Spurious Emissions (microvolts/meter)
40.66 - 40.70	1,000	100
70 - 130	500	50
130 - 174	500 to 1,500	50 to 150
174 - 260	1,500	150
260-470	1,500 to 5,000	150 to 500
Above 470	5,000	500

In addition, devices operated under the provisions of this paragraph shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.

Test Results: **Not applicable. The device is not a periodic transmitter.**

Test Data: See attached table.

Section 9. Powerline Conducted Emissions

NAME OF TEST: Powerline Conducted Emissions	PARA. NO.: 15.207
TESTED BY:	DATE:

Minimum Standard:

Frequency(MHz)	Maximum Powerline Conducted RF Voltage	
	µV	dBµV
0.45 - 30.0	250	48

Test Results: **Not applicable. The device is battery powered.**

Test Data: See attached graphs and table.

Method Of Measurement: (Procedure ANSI C63.4-1992)

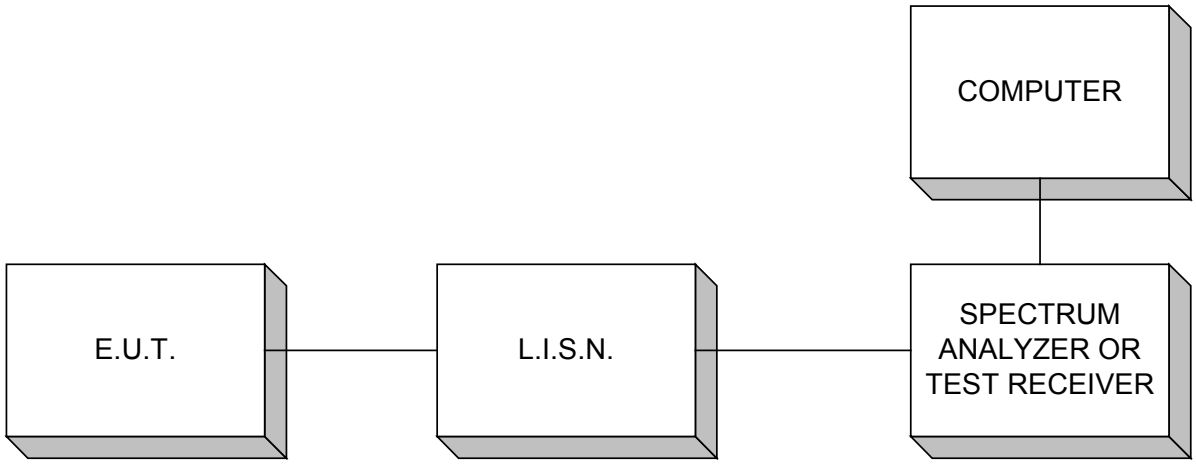
Measurements were made using a spectrum analyzer with 10 kHz RBW, Peak detector. Any emissions that are close to the limit are measured using a test receiver with 10 kHz bandwidth, CISPR Quasi-Peak detector.

Broadband emissions are identified by switching the receiver detector function from Quasi-Peak to Average. If the amplitude of the emission drops by 6 dB or more then the emission is classified as broadband and the Quasi-Peak level is reduced by a factor of 13 dB.

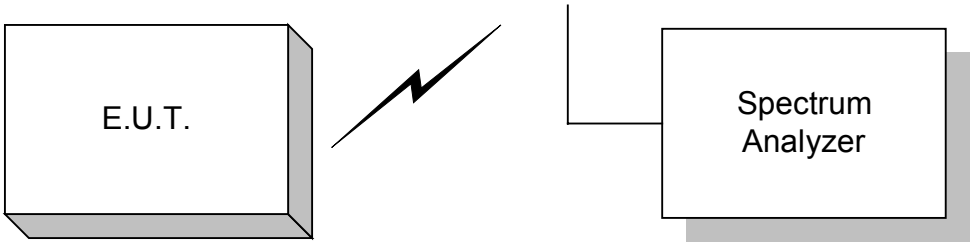
All emissions within 10 dB of limit have been recorded.

Section 10. Block Diagrams

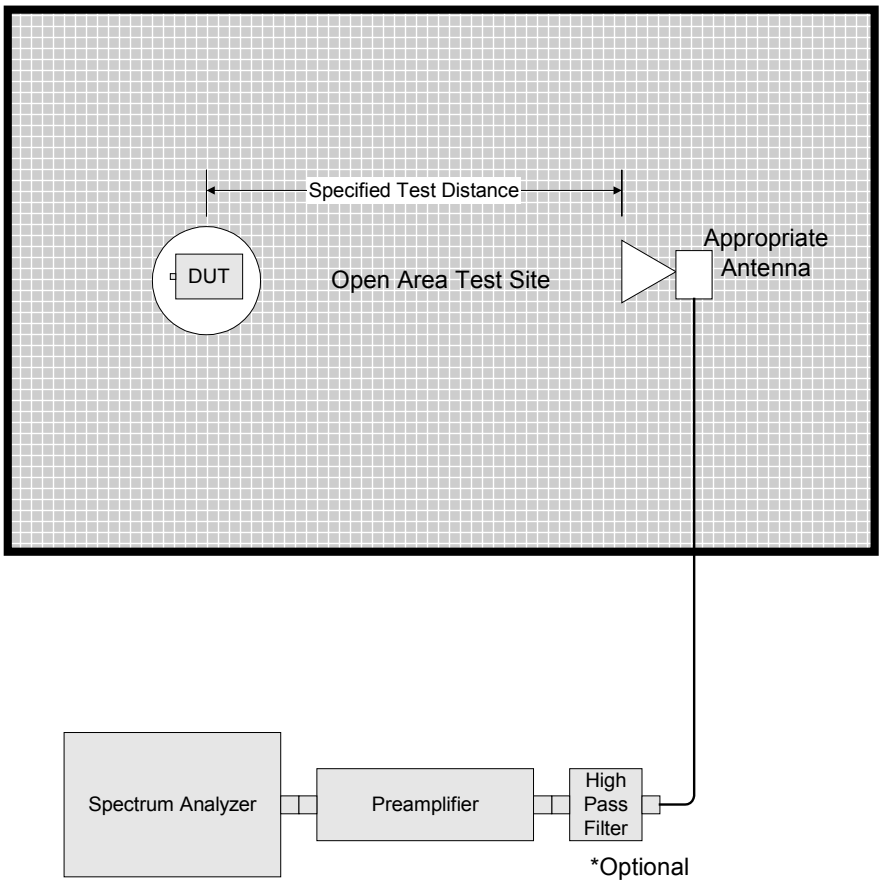
Conducted Emissions



Occupied Bandwidth, Duty Cycle

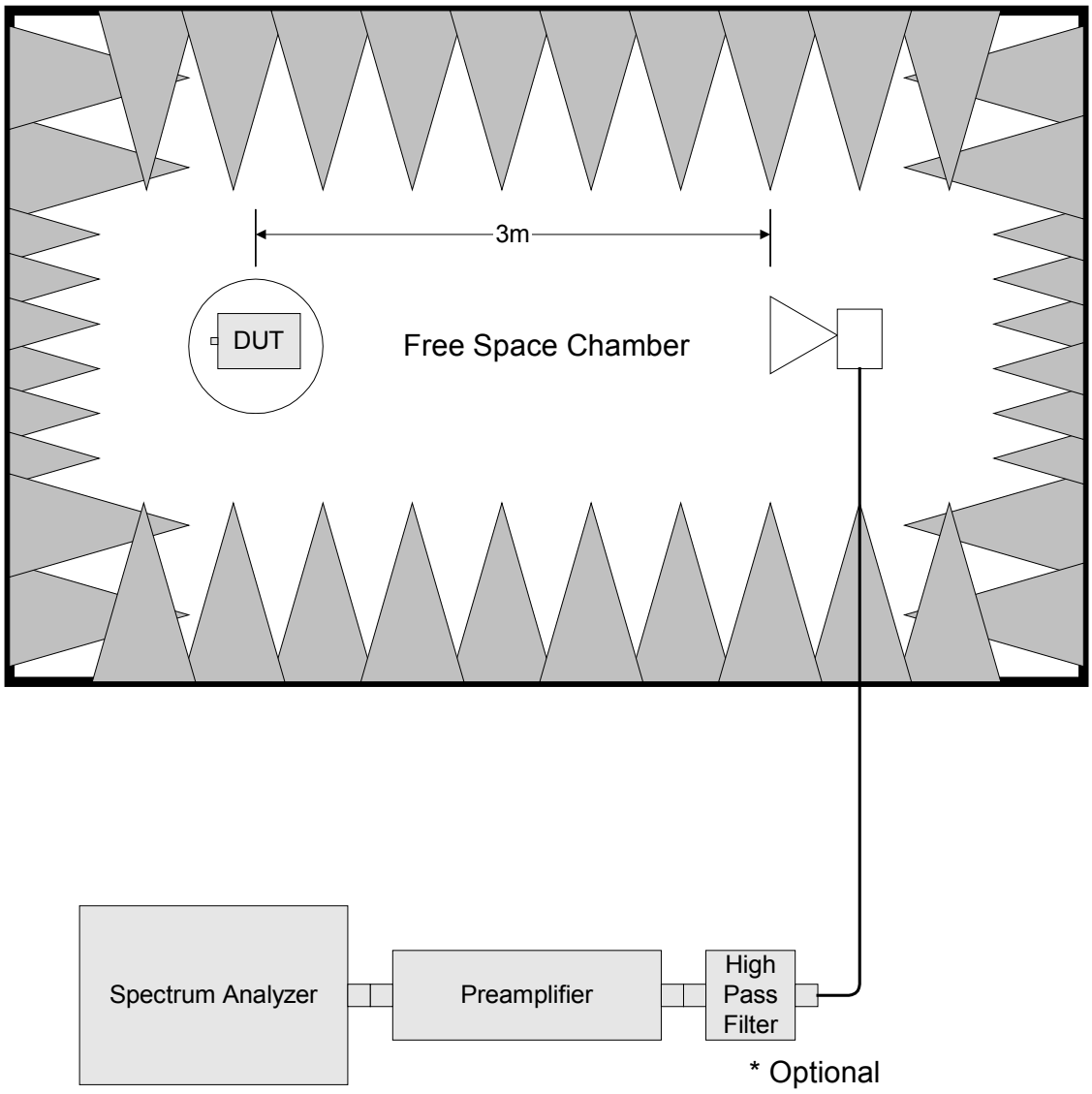


Outdoor Test Site For Radiated Emissions



Radiated Emissions 30 MHz - 1 GHz

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



Radiated Emissions above 1 GHz

Section 11. Test Equipment List

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date
1484	Cable 2.0-18.0 Ghz	Storm PR90-010-072	N/A	06/01/01
1485	Cable 2.0-18.0 Ghz	Storm PR90-010-216	N/A	06/01/01
1464	Spectrum analyzer (2 yr cal)	Hewlett Packard 8563E	3551A04428	01/02/01
1304	HORN ANTENNA	ELECTRO METRICS RGA-60	6151	07/30/01
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	05/30/01
791	PREAMP, 25dB	ICC LNA25	398	08/16/01
1034	ANTENNA,LP	A.H. SYSTEMS SAS-200/510	121	05/09/02
1983	CABLE	KTL Site A OATS	N/A	09/25/01
1629	CABLE, 6 ft	MEGAPHASE 10311 1GVT4	N/A	CBU
802	Near Field Probe Set	EMCO 7405	103	N/A
1036	Spectrum analyzer 2 yr cal	Rohde & Schwarz FSEK30	830844/006	12/18/01

ANNEX A - RESTRICTED BANDS

Annex A Restricted Bands of Operation

(a) Except as shown in paragraph (d) of this section , only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42-16.423	399.9-410	4.5-5.15
0.49 - 0.51	16.69475-16.69525	608-614	5.35-5.46
2.1735 - 2.1905	16.80425-16.80475	960-1240	7.25-7.75
3.020 - 3.026	25.5-25.67	1300-1427	8.025-8.5
4.125 - 4.128	37.5-38.25	1435-1626.6	9.0-9.2
4.17725 - 4.17775	73-74.6	1645.5-1646.5	9.3-9.5
4.20725 - 4.20775	74.8-75.2	1660-1710	10.6-12.7
6.215 - 6.218	108-121.94	1718.8-1722.2	13.25-13.4
6.31175 - 6.31225	123-138	2220-2300	14.47-14.5
8.291 - 8.294	149.9-150.05	2310-2390	15.35-16.2
8.362 - 8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625 - 8.38675	156.7-156.9	2655-2900	22.01-23.12
8.41425 - 8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29 - 12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975 - 12.52025	240-285	3345.8-3358	36.43-36.5
12.57675 - 12.57725	322-335.4	3600-4400	Above 38.6
13.36 - 13.41			