Nemko Test Report:	1L0472RUS1
Applicant:	Contec Co. Ltd. 3-9-31 Himesato, Nishiyodogawa-ku Osaka 555-0025, Japan
FCC ID#	**PQRDS110-PCC**
Equipment Under Test: **(E.U.T.)**	FX-DS110-PCC
In Accordance With:	**FCC Part 15, Subpart C, 15.247** Direct Sequence Spread Spectrum Transmitters
Tested By:	Nemko Dallas Inc. 802 N. Kealy Lewisville, Texas 75057-3136
Authorized By:	 Tom Tidwell, RF Group Manager
Date:	7/31/01
Total Number of Pages:	45

Table of Contents

Section 1. Summary of Test Results

Manufacturer: Contec Co. Ltd.

Model No.: FX-DS110-PCC

Serial No.: None

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 15.247 for Direct Sequence Spread Spectrum devices. Radiated tests were conducted is accordance with 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.
See " Summary of Test Data".

NVLAP LAB CODE: 100426-0

Summary Of Test Data

NAME OF TEST	PARA. NO.	SPEC.	MEAS.	RESULT
Powerline Conducted Emissions	15.207(a)	48 dBµV	< 48 dBuV	Complies
Minimum 6 dB Bandwidth	15.247(a)(2)	>500 kHz	10 MHz	Complies
Maximum Peak Power Output	15.247(b)(1)	<1 Watt	<1 Watt	Complies
Spurious Emissions (Antenna Conducted)	15.247(c)	-20 dBc/100kHz	< -20 dBc	Complies
Spurious Emissions (Restricted Bands)	15.247(c)	< 74 dBuV/m Peak < 54 dBuV/m Avg	< 74 dBuV/m Peak < 54 dBuV/m Avg	Complies
Peak Power Spectral Density	15.247(d)	+8 dBm/3kHz	< +8 dBm	Complies
Processing Gain	15.247(e)	10 dB	> 10 dB	Complies

Footnotes:

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

General Equipment Information

Frequency Band:

☐ 902 – 928 MHz
☒ 2400 – 2483.5 MHz
☐ 5725 – 5850 MHz

Tuning Range: 2411.93 - 2471.61

User Frequency Adjustment: Software controlled

Description of Modification for Modification Filing

Not Applicable

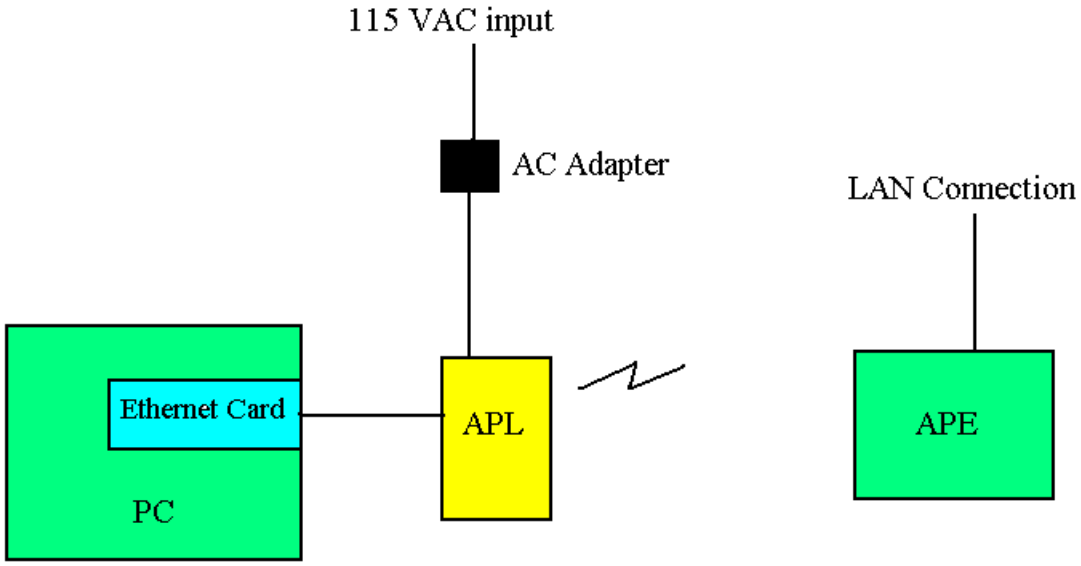
Family List Rational

Not Applicable

Theory of Operation

The equipment is a wireless LAN transmitter and receiver for use in an indoor environment. The equipment includes an integral antenna.

System Diagram



Section 3. Powerline Conducted Emissions

NAME OF TEST: Powerline Conducted Emissions	PARA. NO.: 15.207(a)
TESTED BY: David Light	DATE:7/23/01

Test Results: Complies.

Measurement Data: See attached plots.

Measurement Uncertainty: +/- 1.7 dB

Test Data – Powerline Conducted Emissions

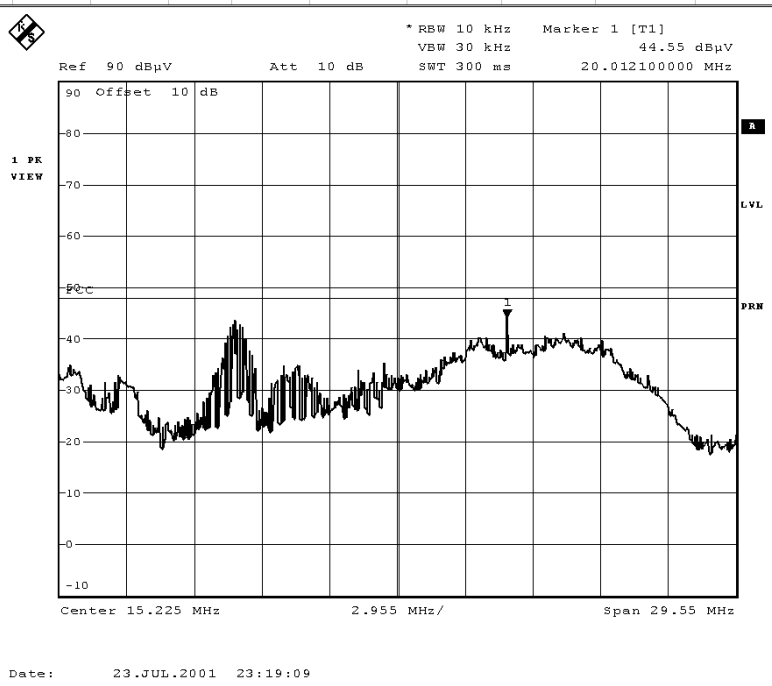
Nemko Dallas, Inc.
Dallas Headquarters:
802 N. Kealy
Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667

Data Plot — **Powerline Conducted Emissions**

Page 1 of 2				Complete	x
Job No.:	1L0183R	Date:	7/23/01	Preliminary	
Specification:	15.207	Temperature(°C):	22		
Tested By:	David Light	Relative Humidity(%)	50		
E.U.T.:	Wireless LAN				
Configuration:	Transmit - Wireless link established				
Sample Number:	S01				
Location:	Lab 3	RBW:	10 kHz	Measurement	
Detector Type:	Peak	VBW:	30 kHz	Distance:	N/A m

Test Equipment Used

Antenna:		Directional Coupler:	
Pre-Amp:		Cable #1:	970
Filter:	704	Cable #2:	1976
Receiver:		L.I.S.N.	1258
Attenuator #1		Limiter	674
Attenuator #2:		Mixer:	
Additional equipment used:	Telogy Asset 86329 (Rohde & Scwarz Spectrum analyzer FSP Cal'd 4/9/01)		
Measurement Uncertainty:	+/-1.7 dB		



Notes: L1

Test Data – Powerline Conducted Emissions

Nemko Dallas, Inc.

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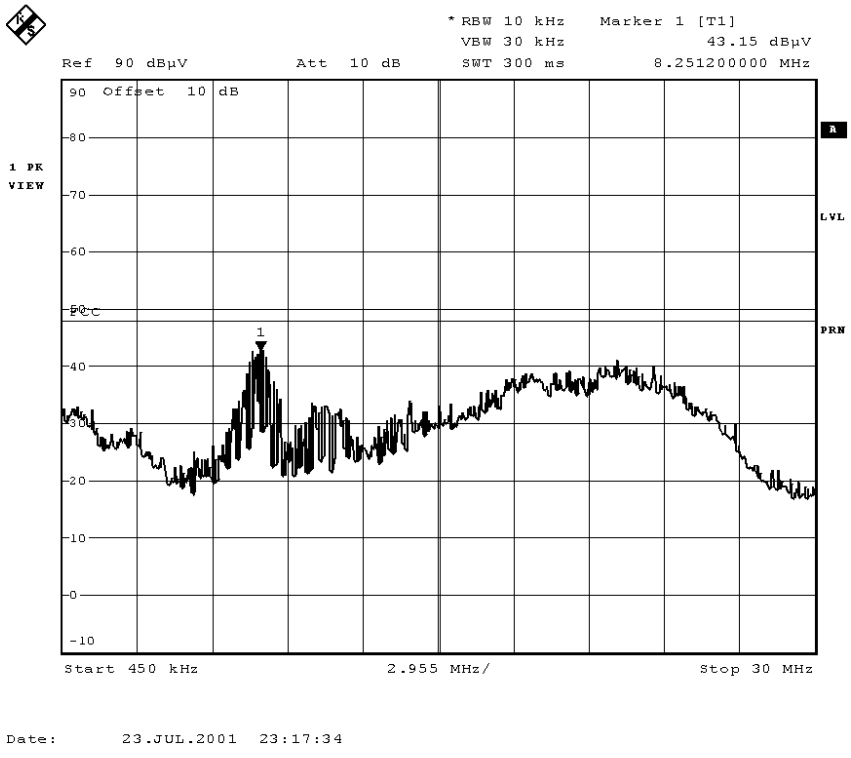
Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667

Data Plot **Powerline Conducted Emissions**

Page 2 of 2			
Job No.:	1L0183R	Date:	7/23/01
Specification:	15.2	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	50
E.U.T.:	Wireless LAN		
Configuration:	Transmit - Wireless link established		

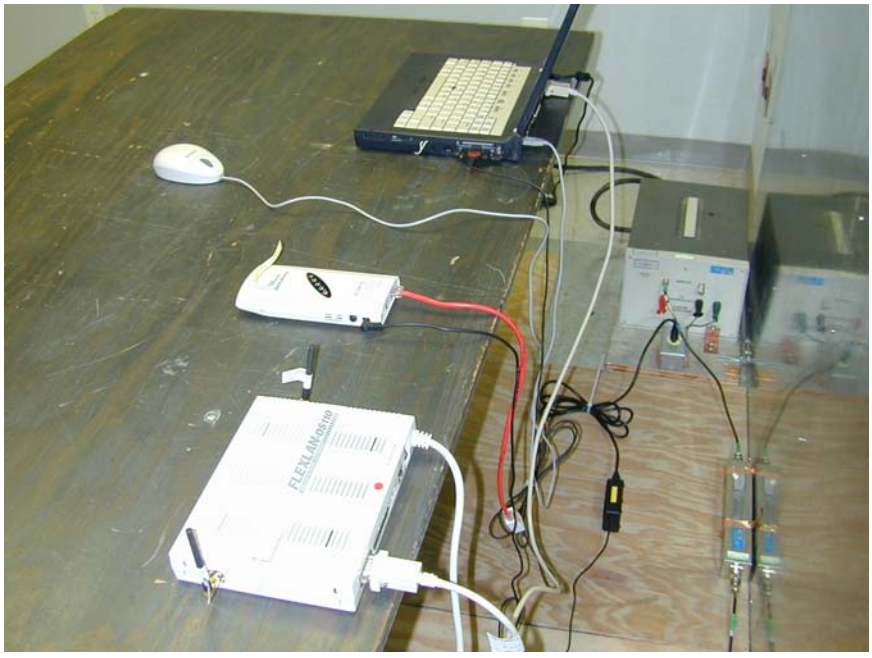


Notes: L2

Photos – Powerline Conducted Emissions

Front

Side



Section 4. Minimum 6 dB Bandwidth

NAME OF TEST: Minimum 6 dB Bandwidth	PARA. NO.: 15.247(a)(2)
TESTED BY: David Light	DATE: 7/18/01

Test Results: Complies.

Measurement Data: See 6 dB BW plot

Measured 6 dB bandwidth:	10.08 MHz
Channel Separation:	5 MHz

Measurement Uncertainty: +/- 1.7 dB

Test Data – Minimum 6 dB Bandwidth

Nemko Dallas, Inc.

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

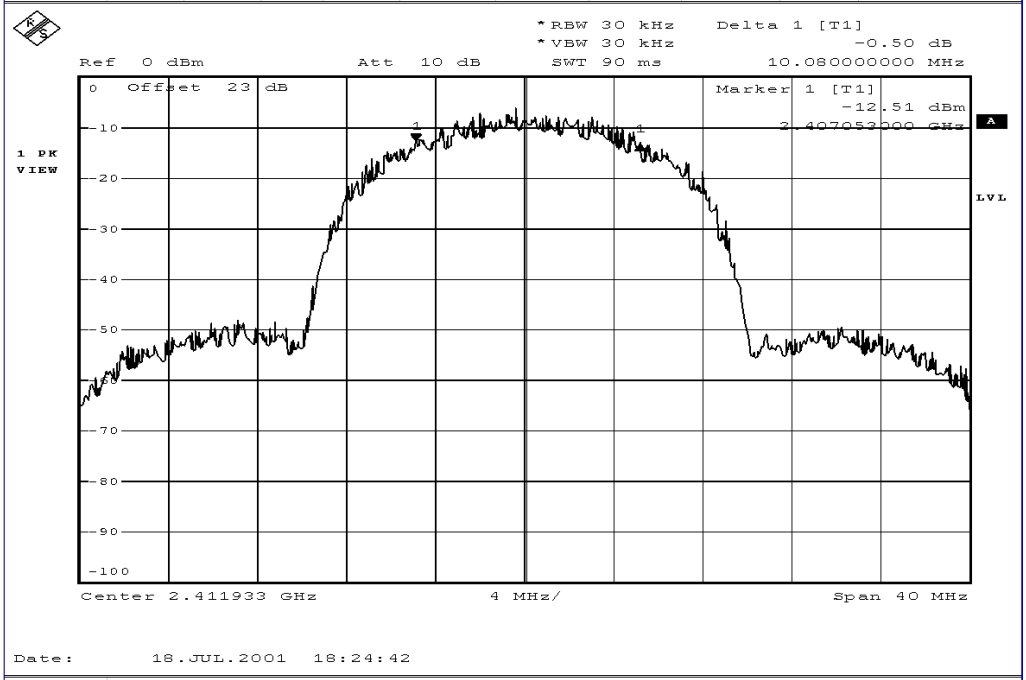
Data Plot — **OCCUPIED BANDWIDTH**

Page 1 of 3				Complete	X
Job No.:	1L0183R	Date:	7/18/2001	Preliminary	
Specification:	15.247	Temperature(°C):	22		
Tested By:	David Light	Relative Humidity(%)	50		
E.U.T.:	WIRELESS LAN				
Configuration:	CONTINUOUS TRANSMIT				
Sample Number:	S01				
Location:	Lab 1	RBW:	30 kHz	Measurement	
Detector Type:	Peak	VBW:	30 kHz	Distance:	N/A m

Test Equipment Used

Antenna:		Directional Coupler:	
Pre-Amp:		Cable #1:	1046
Filter:		Cable #2:	
Receiver:	FSP RENTAL	Cable #3:	
Attenuator #1	1473	Cable #4:	
Attenuator #2:		Mixer:	

Additional equipment used: GENERIC TEST CABLE SUPPLIED BY CLIENT 1.5 dB LOSS
Measurement Uncertainty: +/-1.7 dB



Notes: CHANNEL 1

Test Data – Minimum 6 dB Bandwidth

Nemko

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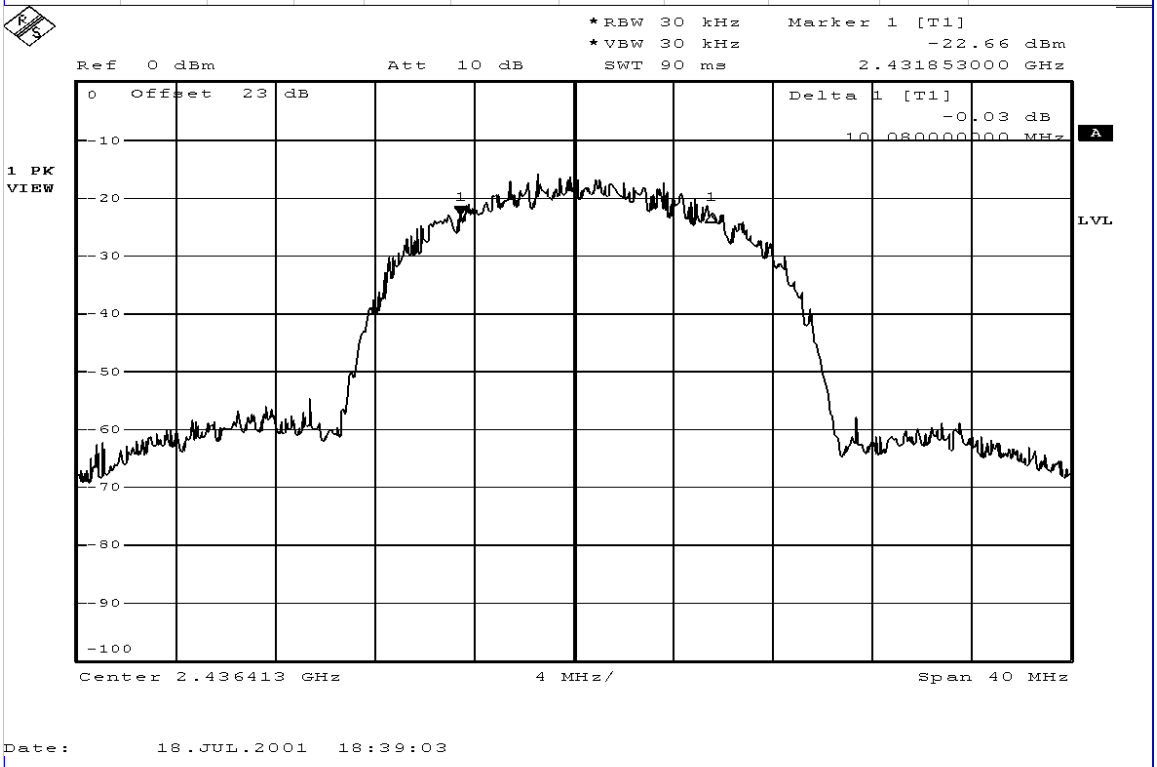
Nemko Dallas, Inc.

Data Plot **OCCUPIED BANDWIDTH**

Page 2 of 3			
Job No.:	1L0183R	Date:	7/18/2001
Specification:	15.2	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%):	50
E.U.T.:	WIRELESS LAN		
Configuration:	CONTINUOUS TRANSMIT		



Notes:	**CHANNEL 6**

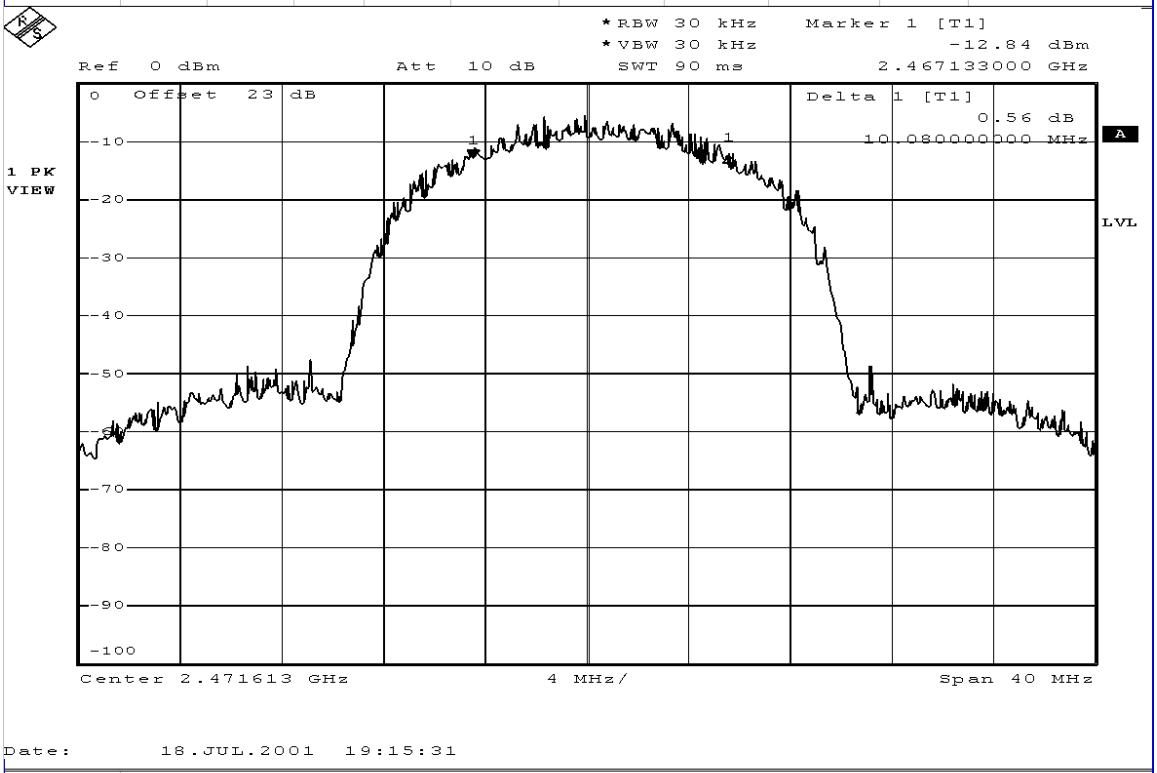
Test Data – Minimum 6 dB Bandwidth

Nemko Dallas, Inc.

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

Data Plot **OCCUPIED BANDWIDTH**

Page 3 of 3			
Job No.:	1L0183R	Date:	7/18/2001
Specification:	15.247	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	50
E.U.T.:	WIRELESS LAN		
Configuration:	CONTINUOUS TRANSMIT		



Notes:	CHANNEL 13

Section 5. Maximum Peak Output Power

NAME OF TEST: Maximum Peak Output power	PARA. NO.: 15.247(b)(1)
TESTED BY: David Light	DATE:7/24/01

Test Results: Complies.

Measurement Data: Complies

Antennas: **Integral**

Channel	Frequency (MHz)	Power Output (dBm)	Antenna Gain (dBi)	E.I.R.P. (dBm)
1	2412	16.3	2.14	18.44
6	2437	15.6	2.14	17.74
13	2472	15.3	2.14	17.44

Note – The AC adapter supplied with the device operates from 100-250 Vac. The device was tested at +/-15% of U.S. normal voltage (98 & 132 Vac) with no effect on output power.

Equipment Used: 1473-1046-Telogy asset #86329 (Rohde & Schwarz FSP spectrum analyzer cal'd 4/9/01)

Measurement Uncertainty: +/- 1.7 dB

Temperature: 22 °C

Relative Humidity: 50 %

Section 6. RF Exposure

NAME OF TEST: RF Exposure	PARA. NO.: 15.247(b)(4)
TESTED BY: David Light	DATE: 7/25/01

Test Results: Complies.

Measurement Data:

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = \frac{PG}{4\pi R^2}$$

where: S = power density
P = power input to the antenna
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna

Maximum peak output power at antenna input terminal:	16.30	
Maximum peak output power at antenna input terminal:	42.65795	(mW)
Antenna gain(typical):	2.14	(dBi)
Maximum antenna gain:	1.636817	(numeric)
Prediction distance:	5	(cm)
Prediction frequency:	2400	(MHz)
MPE limit for uncontrolled exposure at prediction frequency:	1	(mW/cm^2)
Power density at prediction frequency:	0.222254	(mW/cm^2)
Maximum allowable antenna gain:	8.671499	(dBi)

Section 7. Spurious Emissions (conducted)

NAME OF TEST: Spurious Emissions (conducted)	PARA. NO.: 15.247(c)
TESTED BY: David Light	DATE: 7/19/01

Test Results: Complies.

Measurement Data: See attached plots.

Measurement Uncertainty: +/- 1.7 dB

Test Data – Spurious Emissions (Conducted)

Nemko Dallas, Inc.
Dallas Headquarters:
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Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667

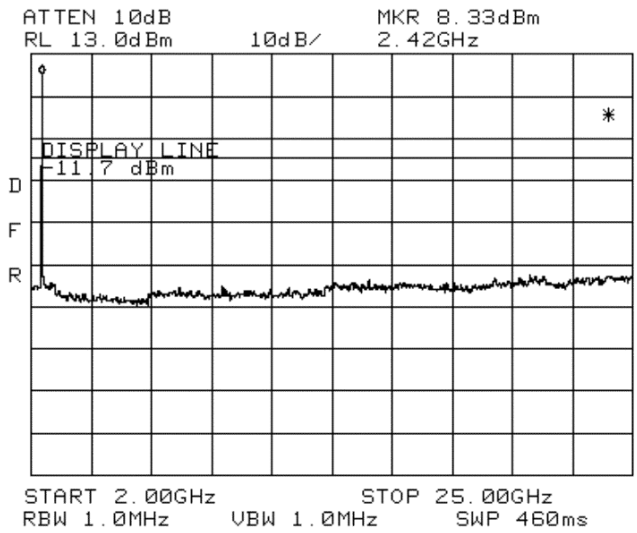
Data Plot **SPURIOUS EMISSIONS AT ANTENNA TERMINALS**

Page 1 of 3				Complete	X
Job No.:	1L0183R	Date:	7/19/2001	Preliminary	
Specification:	15.247	Temperature(°C):	22		
Tested By:	David Light	Relative Humidity(%)	50		
E.U.T.:	WIRELESS LAN				
Configuration:	TRANSMIT FULL POWER				
Sample Number:	S01				
Location:	Lab 1	RBW:	1 MHz	Measurement	
Detector Type:	Peak	VBW:	1 MHz	Distance:	N/A m

Test Equipment Used

Antenna:		Directional Coupler:	
Pre-Amp:		Cable #1:	1046
Filter:		Cable #2:	
Receiver:	1464	Cable #3:	
Attenuator #1	1473	Cable #4:	
Attenuator #2:		Mixer:	

Additional equipment used:
Measurement Uncertainty: +/-1.7 dB



Notes: CHANNEL 1

Test Data – Spurious Emissions (Conducted)

Nemko Dallas, Inc.

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Lewisville, TX 75057
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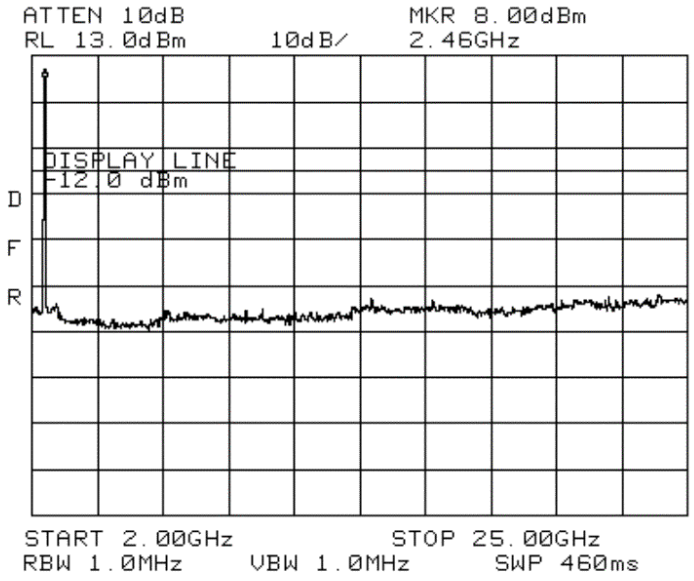
Fax: (972) 436-2667

Data Plot **SPURIOUS EMISSIONS AT ANTENNA TERMINALS**

Page 2 of 3			
Job No.:	1L0183R	Date:	7/19/2001
Specification:	15.2	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	50
E.U.T.:	WIRELESS LAN		
Configuration:	TRANSMIT FULL POWER		



Notes:	CHANNEL 6

Test Data – Spurious Emissions (Conducted)

Nemko Dallas, Inc.

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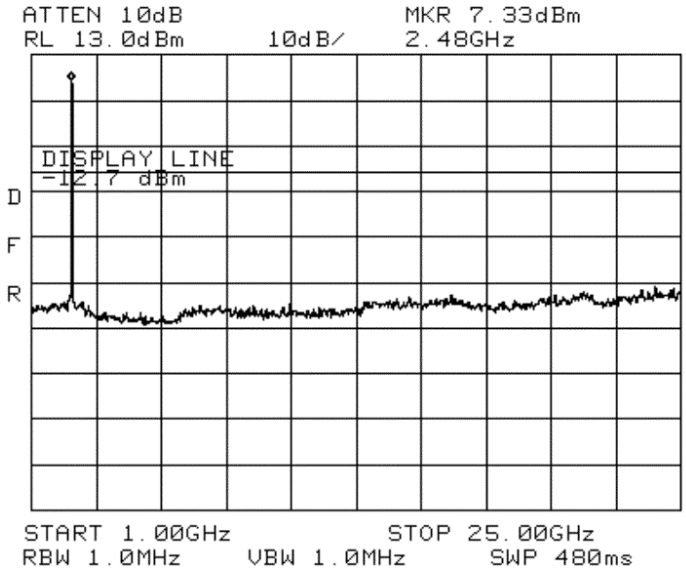
Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667

Data Plot **SPURIOUS EMISSIONS AT ANTENNA TERMINALS**

Page 3 of 3			
Job No.:	1L0183R	Date:	7/19/2001
Specification:	15.247	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	50
E.U.T.:	WIRELESS LAN		
Configuration:	TRANSMIT FULL POWER		



Notes:	**CHANNEL 13**

Section 8. Spurious Emissions (radiated)

NAME OF TEST: Peak Power Output	PARA. NO.: 15.247 (c)
TESTED BY: David Light	DATE: 7/23/01

Test Results: Complies.

Measurement Data: See attached table.

Duty Cycle Calculation: N/A

Duty Cycle correction factor(dB) = 20 log (rf_{ON} in ms/100ms)

Measurement Uncertainty: +/- 3.6 dB

Test Data – Spurious Emissions (Radiated)

Nemko Dallas, Inc.

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

Radiated Emissions

Page 1 of 1

Job No.: Date: 9/14/01
Specification: CFR 47, Part 15 Temperature(°C): 22
Tested By: ance Walker Relative Humidity(%) 50
E.U.T.: Wireless LAN
Configuration: Transmit - Wireless link w/base unit
Sample Number: S01
Location: AC 3 RBW: 1 MHz
Detector Type: Peak VBW: 1 kHz

Test Equipment Used

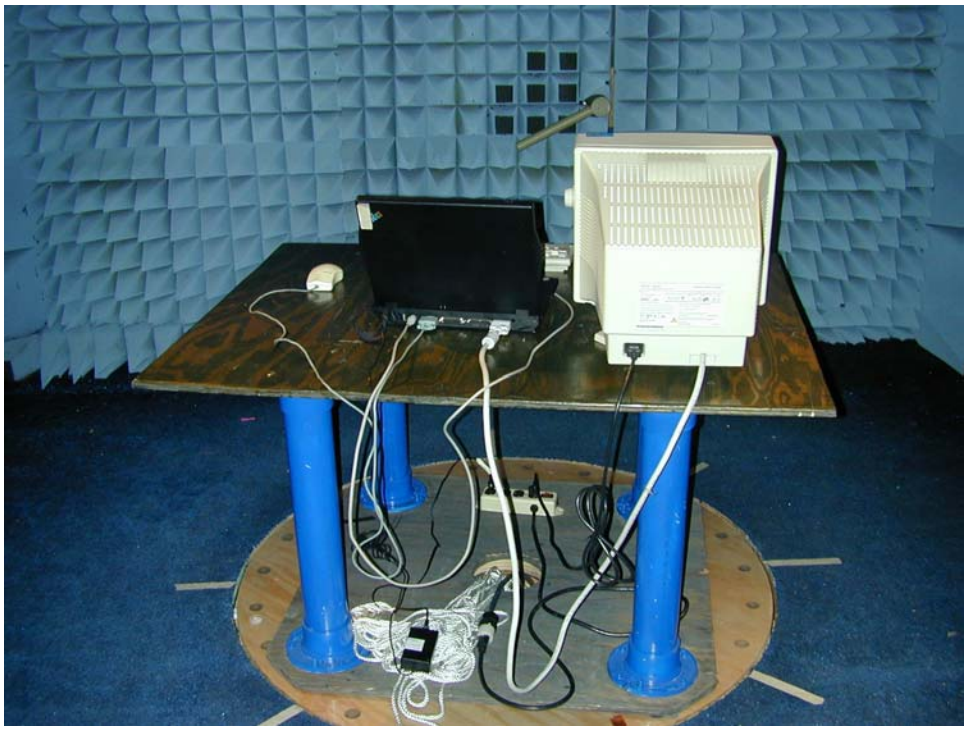
Antenna: #N/A Directional Coupler: #N/A
Pre-Amp: 1016 Cable #1: 1484
Filter: 1482 Cable #2: 1485
Receiver: 1464 Cable #3: #N/A
Attenuator #1 #N/A Cable #4: #N/A
Attenuator #2: #N/A Mixer: #N/A
Measurement Uncertainty: +/- 3.6 dB

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
								Channel 1
4.824	32.1	33.9	5	33.7	37.3	54	-16.7	Horizontal - Noise floor (NF)
7.236	32	36.5	6.1	33	41.6	54	-12.4	Horizontal - NF
12.06	32.7	39.4	8.5	35.7	44.9	54	-9.1	Horizontal - NF
14.472	33	42.7	7.5	32.7	50.5	54	-3.5	Horizontal - NF
4.824	32.1	33.9	5	33.7	37.3	54	-16.7	Vertical - NF
7.236	32	36.5	6.1	33	41.6	54	-12.4	Vertical - NF
12.06	32.7	39.4	8.5	35.7	44.9	54	-9.1	Vertical - NF
14.472	33	42.7	7.5	32.7	50.5	54	-3.5	Vertical - NF
								Channel 6 - Upright
4.874	32	33.9	5	33.7	37.2	54	-16.8	Horizontal - NF
7.311	32	36.5	6.1	33	41.6	54	-12.4	Horizontal - NF
12.185	32.7	39.4	8.5	35.7	44.9	54	-9.1	Horizontal - NF
4.874	32	33.9	5	33.7	37.2	54	-16.8	Vertical - NF
7.311	32	36.5	6.1	33	41.6	54	-12.4	Vertical - NF
12.185	32.7	39.4	8.5	35.7	44.9	54	-9.1	Vertical - NF
								Channel 11 - Upright
2.4735	30.7	29.1	3.5	33.8	29.5	54	-24.5	Horizontal - Bandedge
4.924	31.3	33.9	5	33.7	36.5	54	-17.5	Horizontal - NF
7.386	31.8	36.5	6.1	33	41.4	54	-12.6	Horizontal - NF
12.31	32.7	39.4	8.5	35.7	44.9	54	-9.1	Horizontal - NF
2.4735	30.7	29.1	3.5	33.8	29.5	54	-24.5	Vertical - Bandedge
4.924	31.3	33.9	5	33.7	36.5	54	-17.5	Vertical - NF
7.386	31.8	36.5	6.1	33	41.4	54	-12.6	Vertical - NF
12.31	32.7	39.4	8.5	35.7	44.9	54	-9.1	Vertical - NF
Notes:								
	Checked all harmonics in the restricted bands of operation per 15.205							
	Scanned to 10th harmonic.							

Radiated Photographs (Worst Case Configuration)

Front

Rear



Section 9. Peak Power Spectral Density

NAME OF TEST: Peak Power Spectral Density	PARA. NO.: 15.247(d)
TESTED BY: David Light	DATE: 7/18/01

Test Results: Complies.

Measurement Data: See attached plots.

Measurement Uncertainty: +/- 1.7 dB

Test Data – Peak Power Spectral Density

Nemko Dallas, Inc.
Dallas Headquarters:
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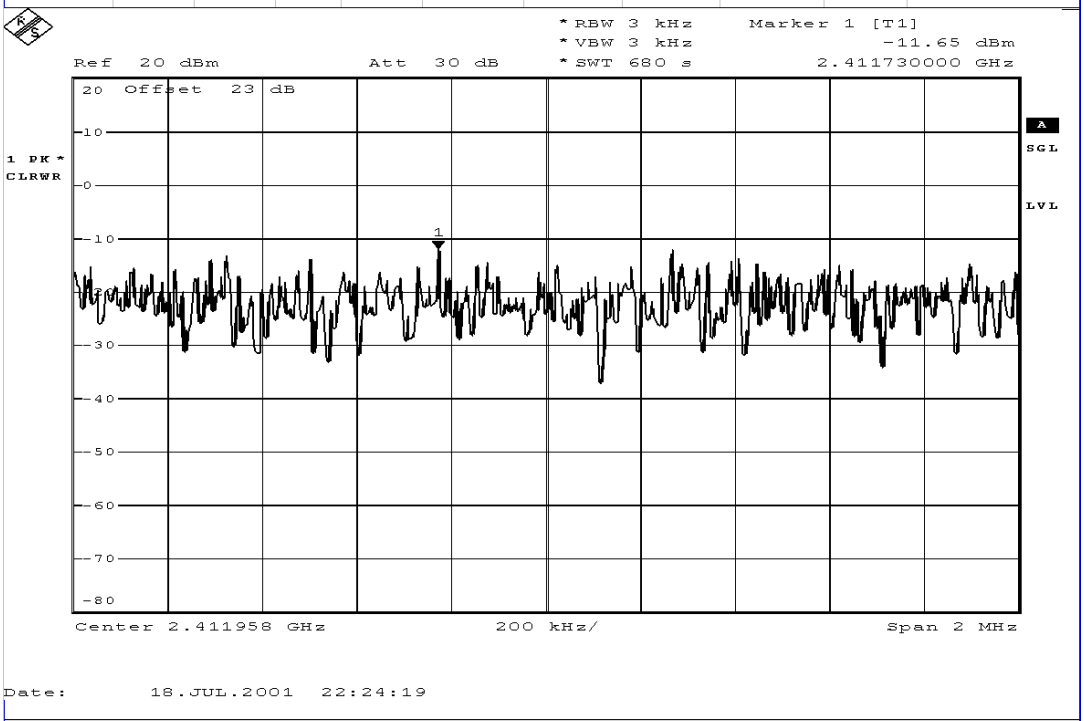
Data Plot **SPECTRAL DENSITY**

Page 1 of 3				Complete	X
Job No.:	1L0183R	Date:	7/18/2001	Preliminary	
Specification:	15.247	Temperature(°C):	22		
Tested By:	David Light	Relative Humidity(%)	50		
E.U.T.:	WIRELESS LAN				
Configuration:	CONTINUOUS TRANSMIT				
Sample Number:	S01				
Location:	Lab 1	RBW:	30 kHz	Measurement	
Detector Type:	Peak	VBW:	30 kHz	Distance:	N/A m

Test Equipment Used

Antenna:		Directional Coupler:	
Pre-Amp:		Cable #1:	1046
Filter:		Cable #2:	
Receiver:	FSP RENTAL	Cable #3:	
Attenuator #1	1473	Cable #4:	
Attenuator #2:		Mixer:	
Additional equipment used:	GENERIC TEST CABLE SUPPLIED BY CLIENT 1.5 dB LOSS		
Measurement Uncertainty:	+/-1.7 dB		



Notes:	CHANNEL 1

Test Data – Peak Power Spectral Density

Nemko

Nemko Dallas, Inc.

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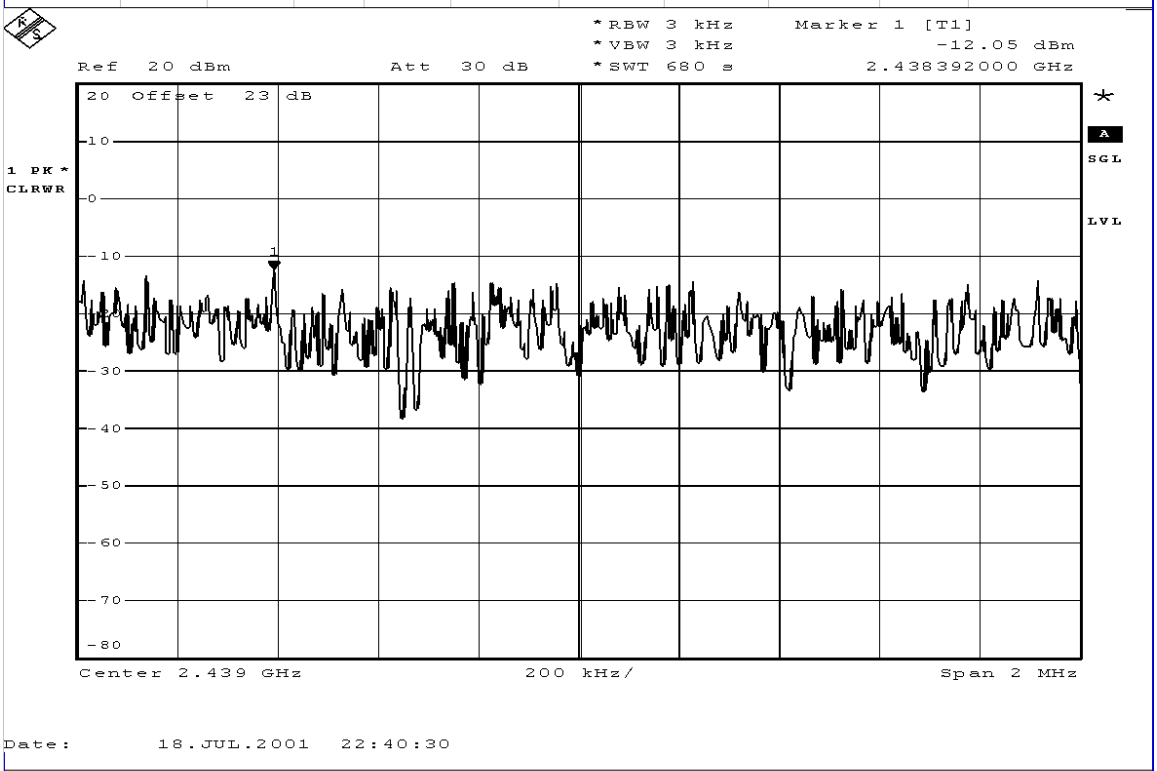
Data Plot **SPECTRAL DENSITY**

Page 2 of 3			
Job No.:	1L0183R	Date:	7/18/2001
Specification:	15.2	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	50
E.U.T.:	WIRELESS LAN		
Configuration:	CONTINUOUS TRANSMIT		



Notes:	CHANNEL 6

Test Data – Peak Power Spectral Density

Nemko Dallas, Inc.

Dallas Headquarters:
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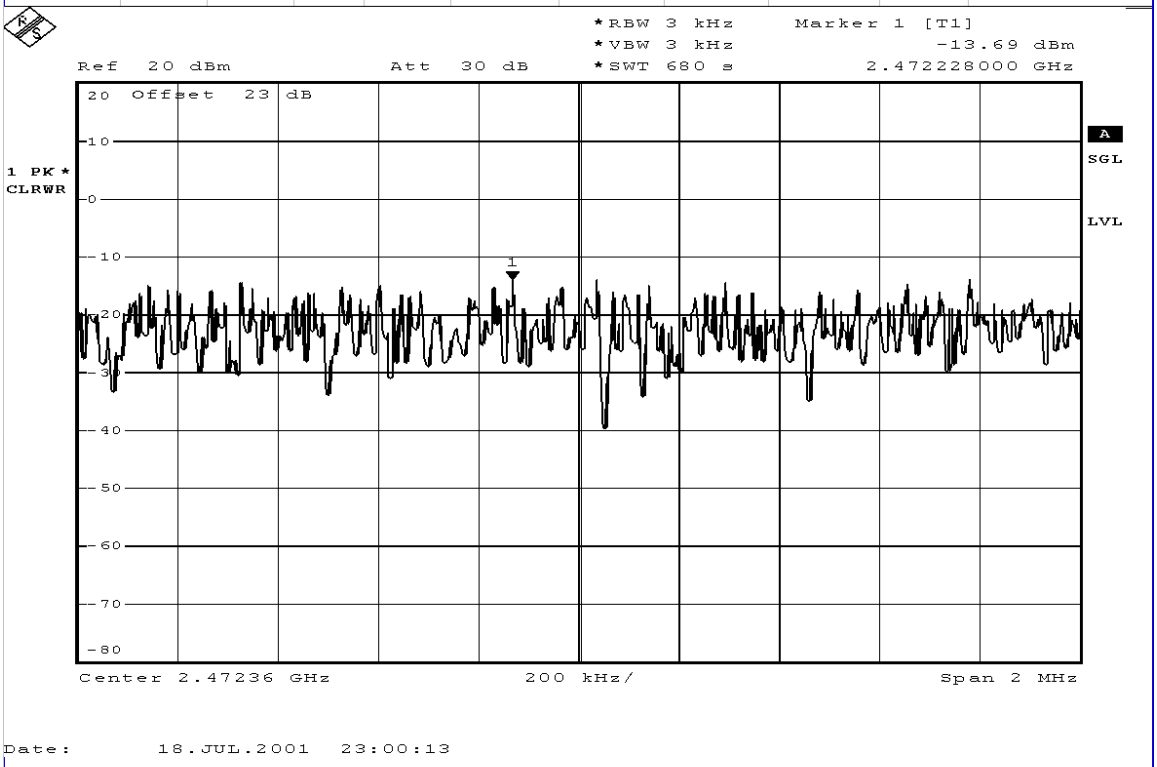
Fax: (972) 436-2667

Data Plot **SPECTRAL DENSITY**

Page 3 of 3			
Job No.:	1L0183R	Date:	7/18/2001
Specification:	15.247	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	50
E.U.T.:	WIRELESS LAN		
Configuration:	CONTINUOUS TRANSMIT		



Notes:	CHANNEL 13

Section 10. Minimum Processing Gain

NAME OF TEST: Minimum Processing Gain	PARA. NO.: 15.247(e)
TESTED BY: Tom Tidwell	DATE: 7/31/01

Test Results: Complies.

Measurement Data: Data supplied in a separate exhibit.

Measurement Uncertainty: +/- 0.7 dB

Temperature: 31 °C

Relative Humidity: 23 %

Section 11. Test Equipment List

ASSET	Description	Manufacturer Model Number	Serial Number	Cal. Date	Cal. Due
674	LIMITER	HP 11947A	3107A02200	11/04/00	11/04/01
970	CABLE, 14.8m	KTL RG223	N/A	05/29/01	05/29/02
1258	LISN .15mhz-30mhz	EMCO 0	1305	04/04/01	04/04/02
1976	CABLE .5m	KTL RG223	N/A	12/16/00	12/16/01
704	FILTER, HIGH PASS, 5 KHz	SOLAR 7930-5.0	933126	11/04/00	11/04/01
1473	20db Attenuator DC 18 Ghz	Midwest Microwave 290-20db	NONE	CBU	N/A
1046	Flex cable 1m	Astrolab Inc. 32022-2-29094K-1M	N/A	01/29/01	01/29/02
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	01/02/01	01/02/02
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	05/30/01	05/30/02
1482	Band Pass Filter	K & L 11SH10-4000/T12000-0/0	2	Cal B4 Use	N/A
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	01/02/01	01/02/02
1484	Cable 2.0-18.0 Ghz	Storm PR90-010-072	N/A	06/01/01	06/01/02
1485	Cable 2.0-18.0 Ghz	Storm PR90-010-216	N/A	06/01/01	06/01/02
Telogy Asset 86329	Spectrum analyzer	Rohde & Schwarz FSP7	100124	04/09/01	04/09/02

ANNEX A - TEST DETAILS

NAME OF TEST: Powerline Conducted Emissions	PARA. NO.: 15.207(a)

Minimum Standard: The R.F. that is conducted back onto the AC power line on any frequency within the band 0.45 to 30 MHz shall not exceed 250µV (48 dBµV) across 50 ohms.

NAME OF TEST: Minimum 6 dB bandwidth	PARA. NO.: 15.247(a)(2)

Minimum Standard: The minimum 6 dB bandwidth shall be at least 500 kHz

NAME OF TEST: Maximum Peak Output Power	PARA. NO.: 15.247(b)(1)

Minimum Standard: The maximum peak output power shall not exceed 1 watt.

If transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Systems operating in the 2400-2483.5 MHz band that are used exclusively for fixed, point to point operation may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceed 6 dBi.

Systems operating in the 5725 – 5850 MHz band that are used exclusively for fixed, point-to-point operation may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter peak output power.

Direct Measurement Method For Detachable Antennas:
If the antenna is detachable, a peak power meter is used to measure the power output with the transmitter operating into a 50 ohm load. The dBi gain of the antenna(s) employed shall be reported.

Calculation Of EIRP For Integral Antenna:
If the antenna is not detachable from the circuit then the Peak Power Output is derived from the peak radiated field strength of the fundamental emission by using the plane wave relation $GP/4\pi R^2 = E^2/120\pi$ and proceeding as follows:

$$P = \frac{E^2 R^2}{30G} = \frac{E^2 3^2}{30G}$$

where,

P = the equivalent isotropic radiated power in watts
E = the maximum measured field strength in V/m
R = the measurement range (3 meters)
G = the numeric gain of the transmit antenna in relation to an isotropic radiator

The RBW of the spectrum analyzer shall be set to a value greater than the measured 6 dB occupied bandwidth of the E.U.T.

Number of channels tested:

Tuning range	Number of channels tested	Channel location in band
1 MHz or less	1	middle
1 to 10 MHz	2	top and bottom
more than 10 MHz	3	top, middle, bottom

NAME OF TEST: RF Exposure	PARA. NO.: 15.247(b)(4)

Minimum Standard: Systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines stipulated in 1.1307(b)(1) of CFR 47.

NAME OF TEST: Spurious Emissions(conducted) PARA. NO.: 15.247(c)

Minimum Standard: In any 100kHz bandwidth outside the frequency band in which the transmitter is operating, emissions shall be at least 20 dB below the fundamental emission or shall not exceed the following field strength limits. Emissions falling in the restricted bands of 15.205 shall not exceed the following field strength 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

THE SPECTRUM IS SEARCHED TO THE 10th HARMONIC OF THE HIGHEST FREQUENCY GENERATED IN THE EUT.

Method Of Measurement:

30 MHz - 10th harmonic plot
RBW: 100 kHz
VBW: 300 kHz
Sweep: Auto
Display line: -20 dBc

Lower Band Edge
RBW: At least 1% of span/div.
VBW: >RBW
Span: As necessary to display any spurious at band edge.
Sweep: Auto
Center Frequency: 902 MHz, 2400 MHz, or 5725 MHz
Marker: Peak of fundamental emission
Marker Δ: Peak of highest spurious level below center frequency.

Upper Band Edge
RBW: At least 1% of span/div.
VBW: >RBW
Span: As necessary to display any spurious at band edge.
Sweep: Auto
Center Frequency: 928 MHz, 2483.5 MHz, or 5850 MHz
Marker: Peak of fundamental emission
Marker Δ: Peak of highest spurious level above center frequency.

Number of channels tested:

Tuning range	Number of channels tested	Channel location in band
1 MHz or less	1	middle
1 to 10 MHz	2	top and bottom
more than 10 MHz	3	top, middle, bottom

NAME OF TEST: Radiated Spurious Emissions	PARA. NO.: 15.247(c)

Minimum Standard: In any 100kHz bandwidth outside the frequency band in which the transmitter is operating, emissions shall be at least 20 dB below the fundamental emission or shall not exceed the following field strength limits:

Emissions falling in the restricted bands of 15.205 shall not exceed the following field strength 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

THE SPECTRUM WAS SEARCHED TO THE 10th HARMONIC

15.205 Restricted Bands

MHz	MHz	MHz	GHz
0.09-0.11	16.42-16.423	399.9-410	4.5-5.25
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.125-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	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	1718		

Number of channels tested:

Tuning range	Number of channels tested	Channel location in band
1 MHz or less	1	middle
1 to 10 MHz	2	top and bottom
more than 10 MHz	3	top, middle, bottom

NAME OF TEST: Transmitter Power Density	PARA. NO.: 15.247(d)

Minimum Standard: The transmitted power density averaged over any 1 second interval shall not be greater than +8 dBm in any 3 kHz bandwidth.

Method Of Measurement: The spectrum analyzer is set as follows:

RBW: 3 kHz
VBW: >3 kHz
Span: => measured 6 dB bandwidth
Sweep: Span(kHz)/3 (i.e. for a span of 1.5 MHz the sweep rate is 1500/3 = 500 sec.
LOG dB/div.: 2 dB

Note: For devices with spectrum line spacing =< 3 kHz, the RBW of the analyzer is reduced until the spectral lines are resolved. The measurement data is normalized to 3 kHz by summing the power of all the individual spectral lines within a 3 kHz band in linear power units.

For Devices With Integral Antenna:

For devices with non-detachable antennas, the received field strength is peaked and the spectrum analyzer is set as above. The peak emission level is then measured and converted to a field strength by adding the appropriate antenna factor and cable loss. This field strength is then converted to an equivalent isotropic radiated power using the same method as described for Peak Power output.

Number of channels tested:

Tuning Range	Number Of Channels Tested	Channel Location In Band
1 MHz or Less	1	Middle
1 to 10 MHz	2	Top And Bottom
More Than 10 MHz	3	Top, Middle, Bottom

NAME OF TEST: Processing Gain	PARA. NO.: 15.247(e)

Minimum Standard: The processing gain shall be at least 10 dB.

Method Of Measurement: The CW jamming margin method was used to determine the processing gain. A CW signal generator is stepped across the passband of the receiver in 50 kHz increments. At each point the signal generator level required to obtain the recommended bit error rate is recorded. The jammer to signal ratio (J/S) is then calculated. The worst 20% of the J/S points is discarded. The lowest remaining J/S ratio is used to calculate the processing gain.

Calculation Of Processing Gain:

The processing gain was determined by measuring the jamming margin of the E.U.T. and using the following formula:

Jamming Margin = G_p - $(S/N)_{out}$ - L_{sys}

For a receiver using non-coherent detection the value $(S/N)_{out}$ is calculated using the formula:

$P_e = (1/2)EXP\{-E/2N_o\}$ where P_e is the probability of error (minimum Bit Error Rate required for proper operation).

E/N_o is $(S/N)_{out}$
for example, for a bit error rate of 10^{-4} a S/N ratio of 12.3 dB is required.

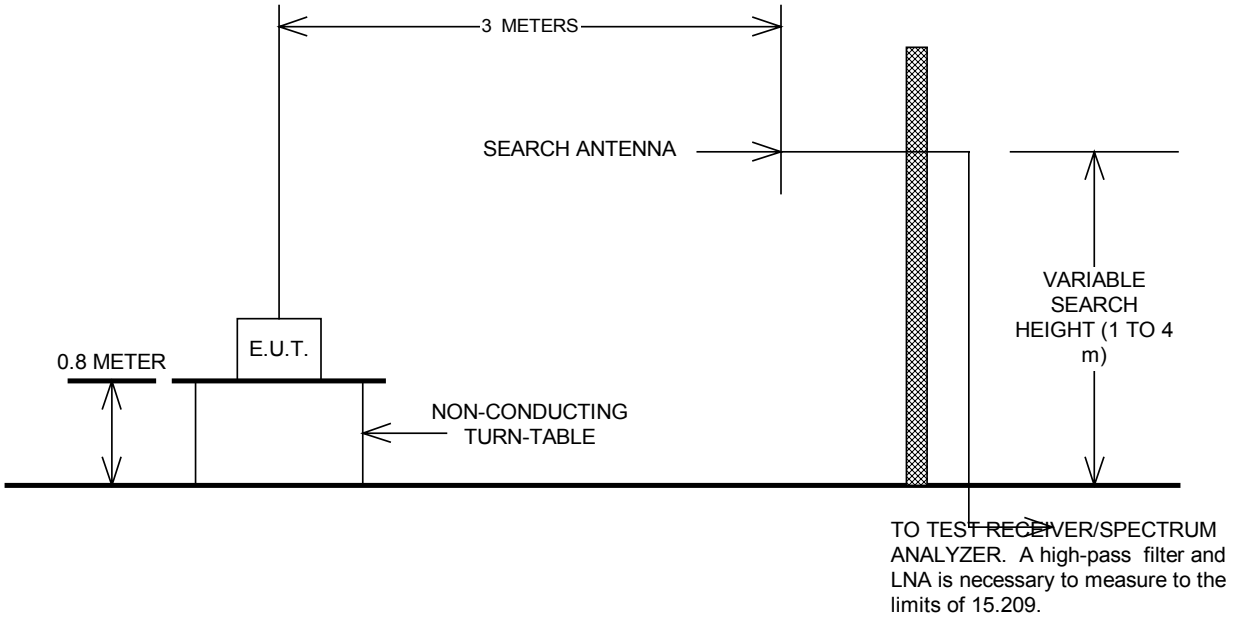
$L_{sys\ (system\ losses)}$ is assumed to be 2 dB.

Therefore $G_p = Mj + (S/N)_{out} + L_{sys}$

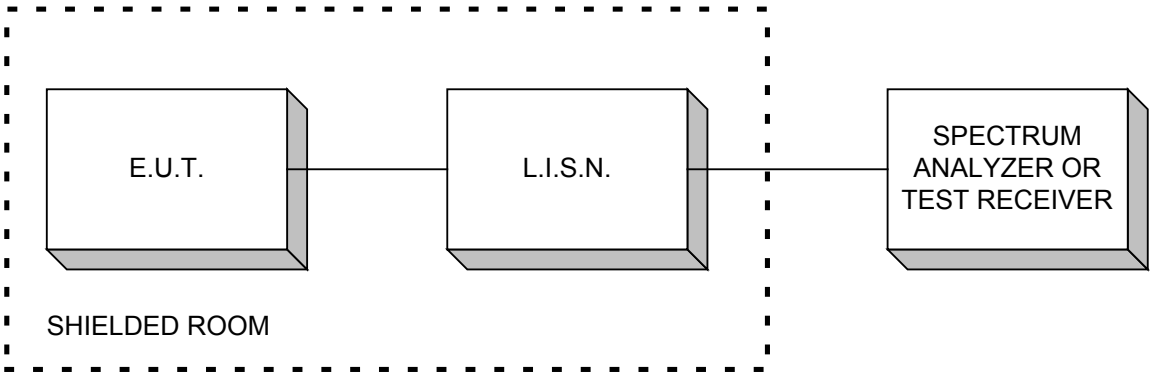
Measurement performed at a channel in the center of the operating band of the EUT.

ANNEX B - TEST DIAGRAMS

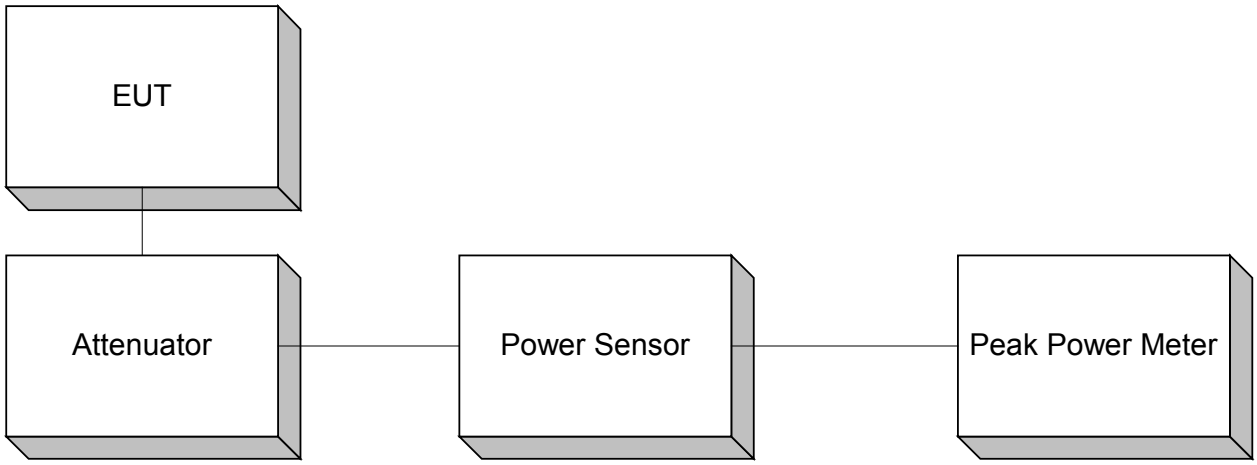
Test Site For Radiated Emissions



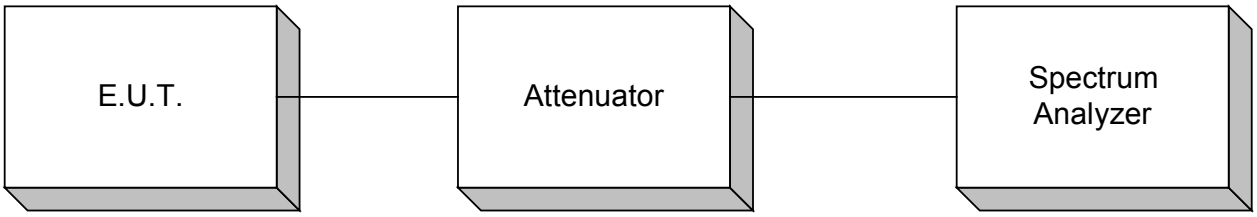
Conducted Emissions



Peak Power At Antenna Terminals



Minimum 6 dB Bandwidth
Peak Power Spectral Density
Spurious Emissions (conducted)



Processing Gain