TEST REPORT

Report Number: 30536141
Project Number: 3053614
April 10, 2004

Testing performed on the

Frequency Hopping Spread Spectrum (FHSS) Transmitter Module
Model Numbers: LPT-24
FCC ID: IA9LPT24RC
to
FCC Part 15.247

for

OMNEX Control Systems, Inc.

A2LA Certificate Number: 1755-01

Test Performed by:	**Test Authorized by:**
Intertek	OMNEX Control Systems Inc.
1365 Adams Court	Bld. 74 – 1833 Coast Meridian Road
Menlo Park, CA 94025	Port Coquitlam, British Columbia

Prepared by: Bruce Gordon **Date:** April 10, 2004

Reviewed by: David Chernomordik **Date:** April 10, 2004

TABLE OF CONTENTS

1.0 Summary of Tests

TEST	REFERENCE	RESULTS
Max. Output power	15.247(b)	Complies
20 dB Bandwidth	15.247(a)(1)	Complies
Min. Channel Separation	15.247(a)(1)	Complies
Min. Hopping Channels	15.247(a)(1)	Complies
Average Channel Occupancy Time	15.47(a)(1)	Complies
Out-of-Band Radiated Emission	15.247(c)	Complies
Radiated Emission in Restricted Bands	15.247(c), 15.205	Complies
Out-of-band Antenna Conducted Emission	15.247(c)	Not performed. The EUT passed Out-of-band Radiated Emission
AC Conducted Emission	15.207	Complies
Radiated Emission from Digital Part	15.109	Complies
Radiated Emission from Receiver L.O.	15.109	Not Applicable. The receiver tuned frequency is above 960 MHz
Antenna Requirement	15.203	Complies. The antenna is integral part of the radio.

2.0 General Description

2.1 Product Description

The EUT is a frequency hopping spread spectrum (FHSS) module that will typically be mounted on a carrier circuit board, which will be used in a variety of housings. General applications will be for hand-held remote control of industrial equipment.

Overview of the EUT

Applicant	OMNEX Control Systems, Inc.		
Trade Name & Model No.	Frequency Hopping Spread Spectrum (FHSS) Transmitter Module, Model: LPT-24		
FCC Identifier	IA9LPT24RC		
Use of Product	Transmitter for hand-held remote control of industrial equipment.		
Type of Transmission	Spread Spectrum, Frequency Hopping		
Rated RF Output	10 mW (Typical), 12 mW (Maximum)		
Frequency Range	2403.1-2478.6 MHz		
Number of Channel(s)	756 (12 groups of 63 frequency channels)		
Data Rates and Modulation Type	Symbol Rate	Modulation	Raw Data Rate
	4800 sym/s	FSK	4800 bps
Antenna(s) type & Gain	2.45 GHz Chip Antenna, Average Gain 1.0 dBi		
Antenna Requirement	The antenna is an integrated on-board chip antenna; therefore, there is no external antenna connector.		
Manufacturer name & address	OMNEX Control Systems Inc. #74-1833 Coast Meridian Rd. Port Coquitlam, B.C., Canada V3C 6G5 Tel: 604/944-9247 Fax: 604/944-9267		

A pre-production version of the EUT was received on January 15, 2004 in good operating condition. As declared by the Applicant, it is identical to the production units.

Date of Test: January 15, 2004 – January 25, 2004

2.2 Related Submittal(s) Grants

None.

2.3 Test Methodology

Radiated emissions measurements were performed according to the procedures in ANSI C63.4 (1992). 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

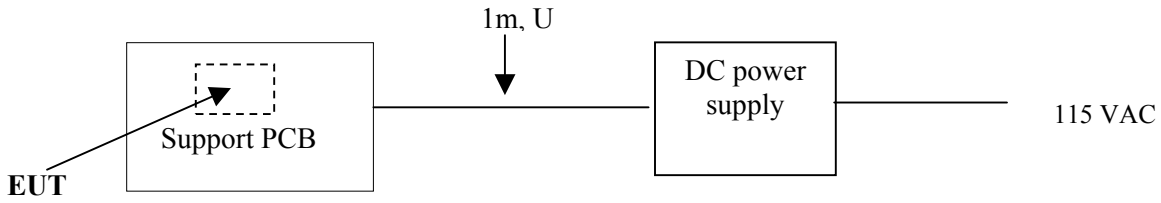
The test site and conducted measurement facility used to collect the radiated data is site 1 (10 m semi-anechoic chamber) located in Menlo Park, California. This test facility and site measurement data have been fully placed on file with the FCC and A2LA accredited.

3.0 System Test Configuration

3.1 Support Equipment

Item #	Description	Model No.	Serial No.
1	DC power supply	HP E363A	Not labeled

3.2 Block Diagram of Test Setup



m: Length in meters
U: Unshielded
S: Shielded

3.3 Justification

For radiated emission measurements the EUT is placed on a non-conductive table. The EUT is wired to transmit full power. During testing, all external I/O cables are manipulated to produce worst-case emissions.

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters and the table is rotated 360^0. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance. All readings are extrapolated back to the equivalent three-meter reading using inverse scaling with distance.

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.

3.5 Mode of Operation During Test

The EUT was tested in 2 operation modes: Transmitting at a single frequency (low, middle and high) and transmitting employing the FHSS technique. In both modes the modulation was applied.

3.6 Modifications Required for Compliance

The following modifications were installed during compliance testing in order to bring the product into compliance (Please note that this list does not include changes made specifically by OMNEX Control Systems, Inc. Inc. prior to compliance testing):

Intertek installed no modifications.

4.0 Measurement Results

4.1 Conducted Output Power at Antenna Terminals
FCC 15.247(b)(1)

Requirements

For systems operating in the 2400-2483.5 MHz band employing at least 75 hopping channels, the maximum peak output power is 1 watt (30 dBm), for all other systems – 0.125 W (21 dBm).

Procedure

Since the antenna port is not accessible, the alternative method was used to obtain the EUT output power. The field strength was measured at 3 m distance and the output power was calculated as below:

P (dBm) = E(dBuV/m) – 95.23 - G(dBi)

Where G is antenna gain of the EUT.

Test Results

Frequency (MHz)	SA Reading dB(uV)	AF dB(1/m)	CL dB	FS dB(uV/m)	Calculated Power dBm
2403	71.7	29.2	7.2	108.1	11.9
2442	71.5	29.3	7.2	108.0	11.8
2479	70.4	29.4	7.2	107.0	10.8

NOTE: Hopping function was disabled during the test

4.2 Hopping Channel 20 dB Bandwidth
FCC 15.247(a)(ii)(iii)

Requirements

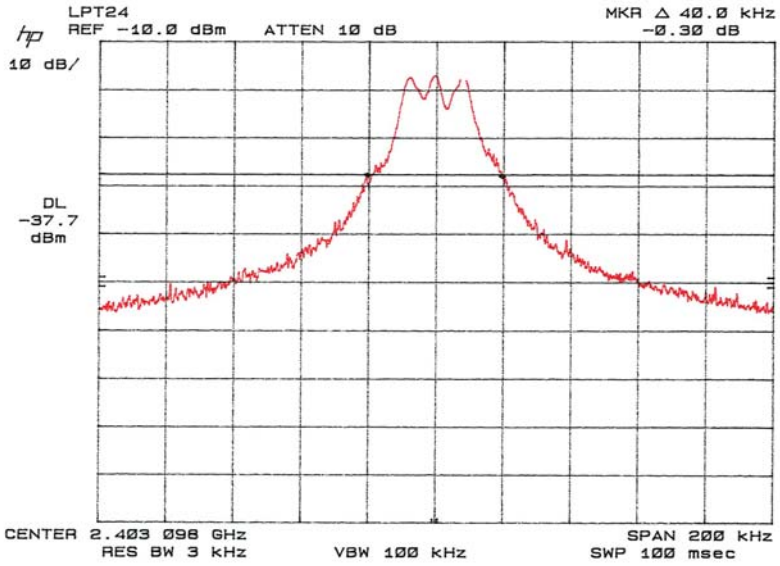
For systems operating in the 2400-2483.5 MHz band employing at least 75 hopping channels, the maximum 20 dB bandwidth of the hopping channel is 1 MHz. Systems may utilize hopping channels whose 20 dB bandwidth is greater than 1 MHz provided the system use at least 15 non-overlapping channels.

Test Results

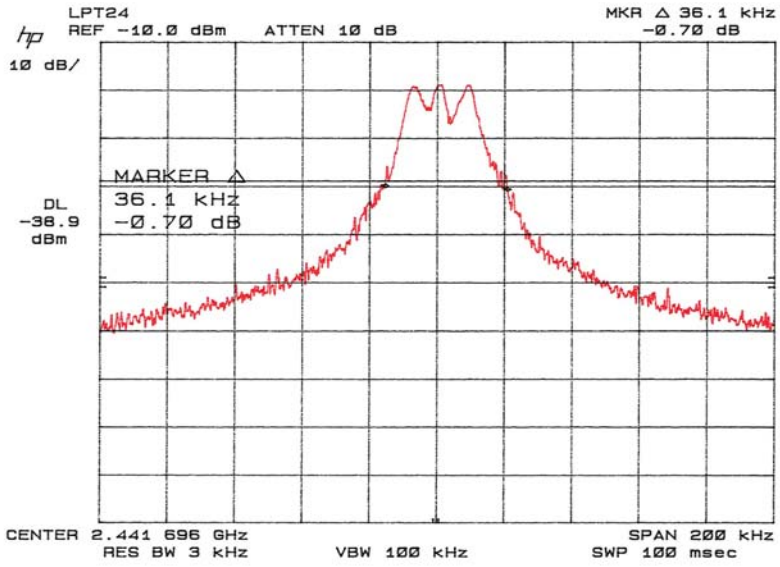
The test result is presented in the table below and spectrum analyzer plots.

Frequency (MHz)	20-dB channel bandwidth	Plot
2403	40.0 kHz	2.1
2442	36.1 kHz	2.5
2479	34.3 kHz	2.9

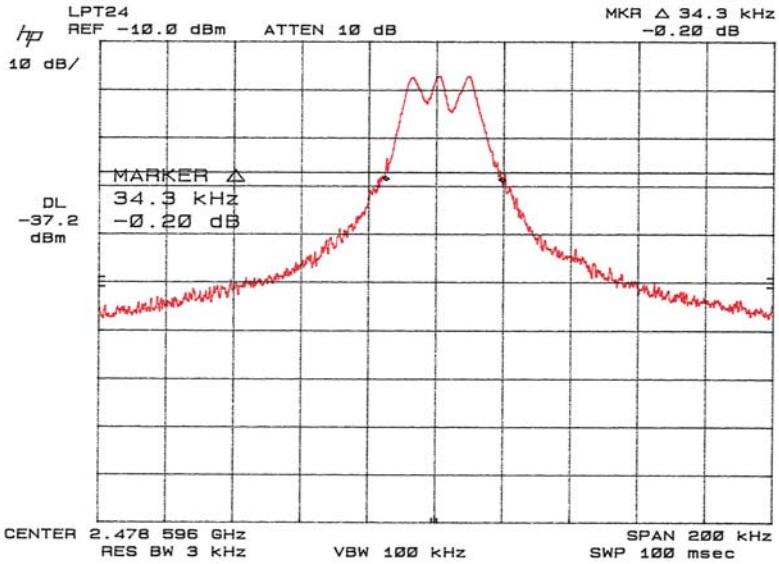
Plot 2.1



Plot 2.2



Plot 2.3


LPT24
REF -10.0 dBm
ATTEN 10 dB
MKR Δ 34.3 kHz
-0.20 dB
10 dB/
MARKER Δ
34.3 kHz
-0.20 dB
DL
-37.2
dBm
CENTER 2.478 596 GHz
RES BW 3 kHz
VBW 100 kHz
SPAN 200 kHz
SWP 100 msec

4.3 Minimum Hopping Channel Carrier Frequency Separation
FCC Ref: 15.247(a)(1)

Requirements

Systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth, whichever is greater.

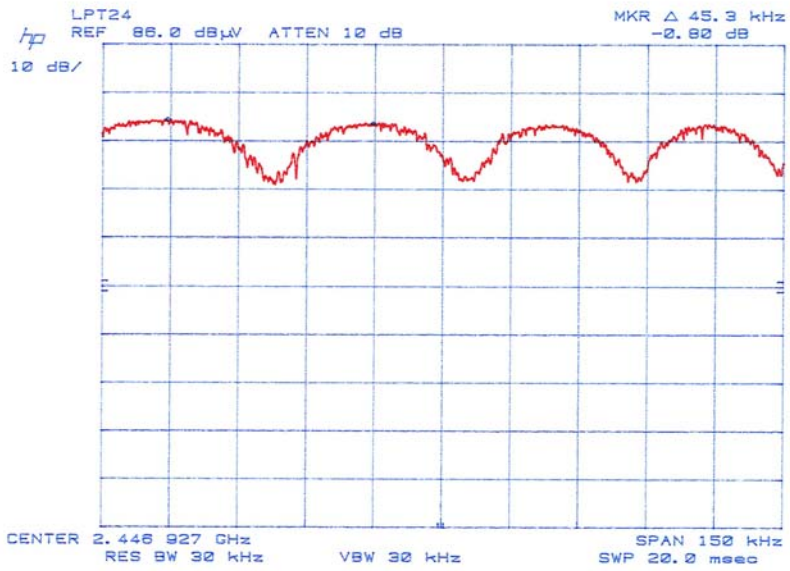
Procedure

Using the DELTA MARKER function of the analyzer, the frequency separation between two adjacent channels was measured and compared against the limit.

Test Results

Please refer to the spectrum analyzer plot # 3.1. The channel separation is 45.3 kHz.

Plot 3.1



4.4 Minimum Number of Hopping
FCC Ref: 15.247(a)(1)(i&ii)

Requirements

Systems operating in the 2400-2483.5 MHz band shall use at least 75 hopping channels having the 20 dB bandwidth of 1 MHz or less, and at least 15 non-overlapping channels having the 20 dB bandwidth of more than 1 MHz.

Procedure

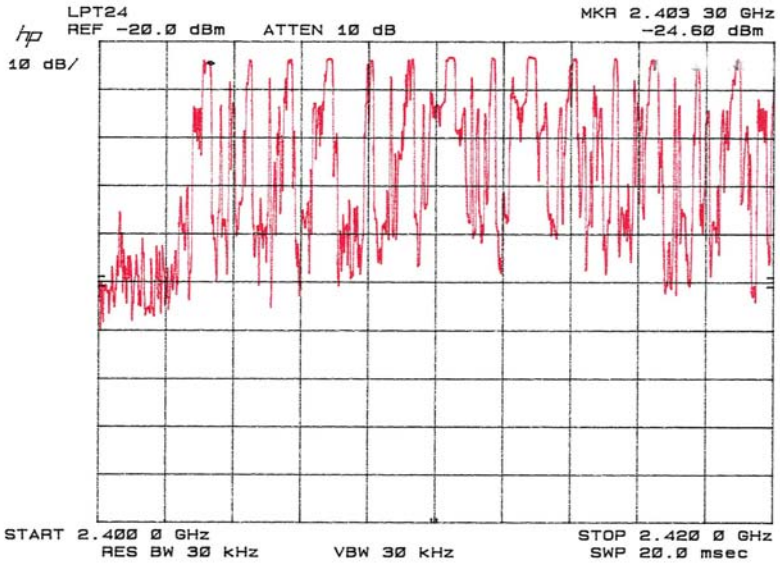
The RF passband of the EUT was divided into 3 approximately equal bands. With the analyzer set to MAX HOLD, readings were taken for 2 - 3 minutes in each band. The channel peaks so recorded were added together, and the total number compared to the minimum number of channels required in the regulation.

Test Results

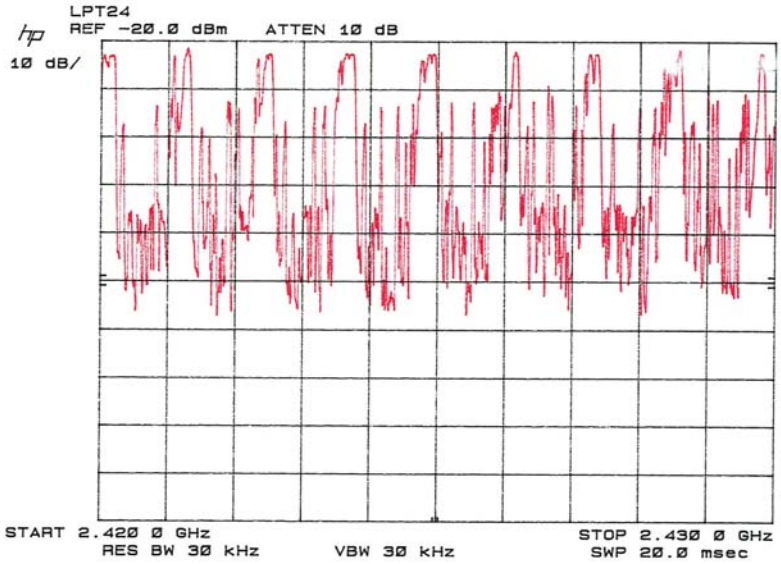
Number of hopping channels with the bandwidth of 35 kHz	>75

Refer to attached spectrum analyzer plots: plots 4.1-4.7.

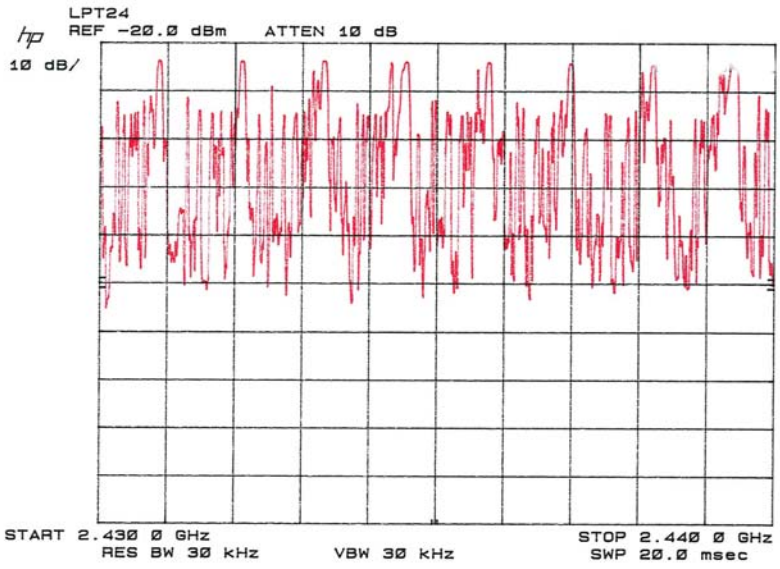
Plot 4.1



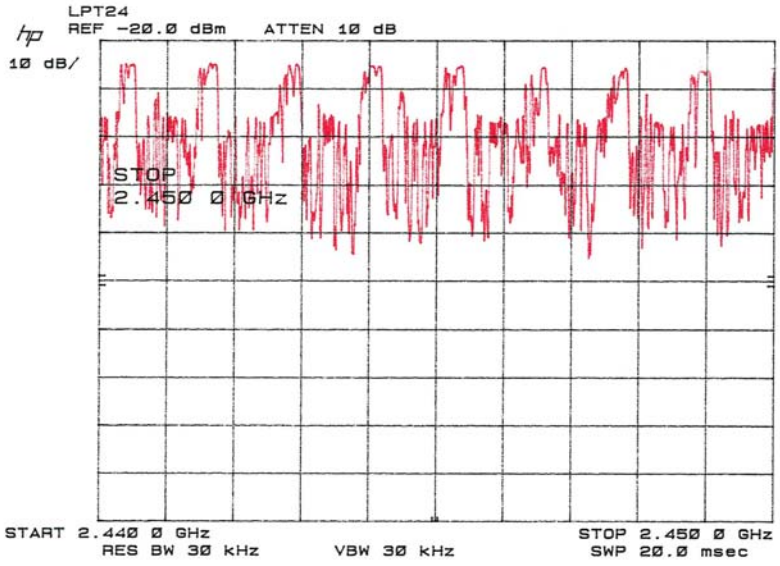
Plot 4.2



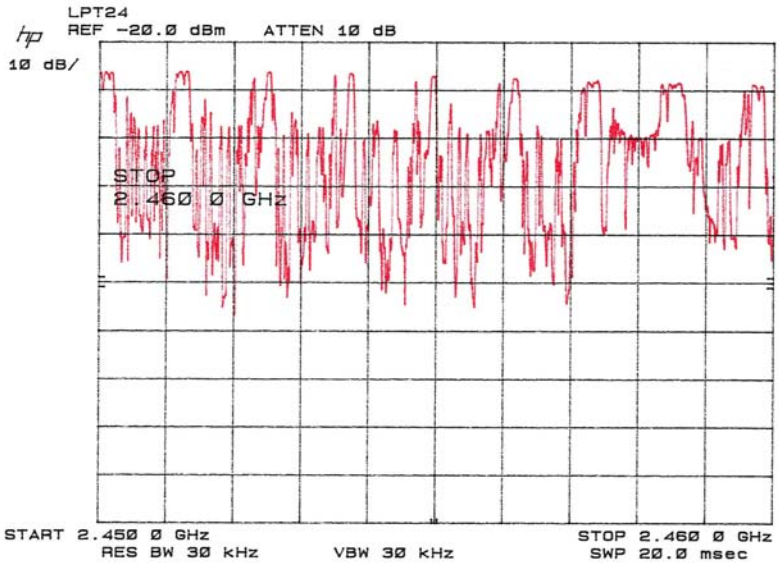
Plot 4.3



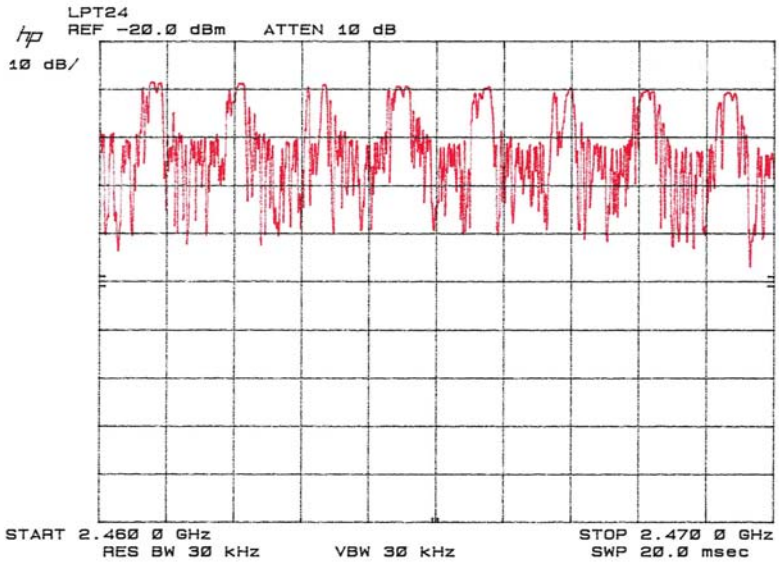
Plot 4.4



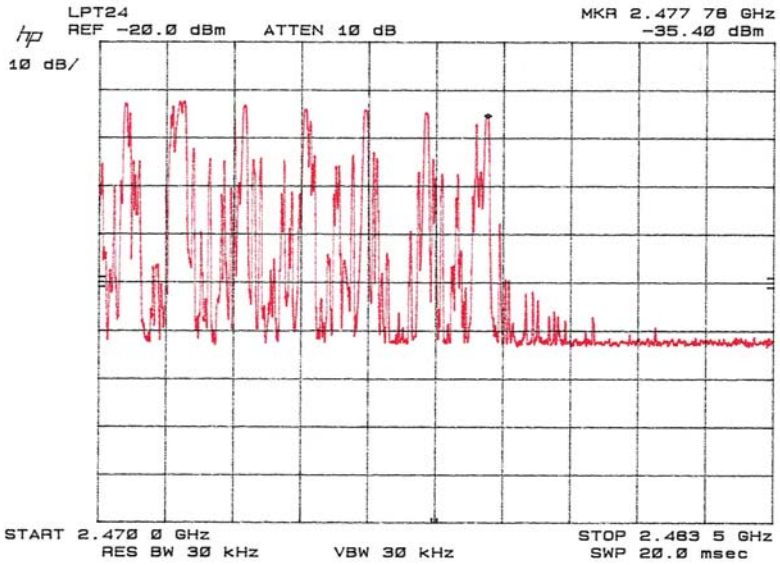
Plot 4.5



Plot 4.6



Plot 4.7


LPT24
REF -20.0 dBm
ATTEN 10 dB
MKR 2.477 78 GHz
-35.40 dBm
10 dB/
START 2.470 0 GHz
RES BW 30 kHz
VBW 30 kHz
STOP 2.483 5 GHz
SWP 20.0 msec

4.5 Average Channel Occupancy Time
FCC 15.247(a)(1)(ii)(iii)

Requirements

For systems operating in the 2400-2483.5 MHz band and using at least 75 hopping channels with the 20-dB bandwidth of 1 MHz or less, the average time of occupancy on any frequency shall not be greater than 0.4 second within a 30 second period.
For systems operating in the 2400-2483.5 MHz band and using at least 15 hopping channels with the 20-dB bandwidth greater than 1 MHz, the average time of occupancy on any frequency shall not be greater than 0.4 second within the time period required to hop through all channels.

Procedure

The spectrum analyzer center frequency was set to one of the known hopping channels. The SWEEP was set to 0.4 second, the SPAN was set to ZERO SPANS, and the TRIGGER was set to VIDEO. The time duration of the transmission so captured was measured with the MARKER DELTA function.

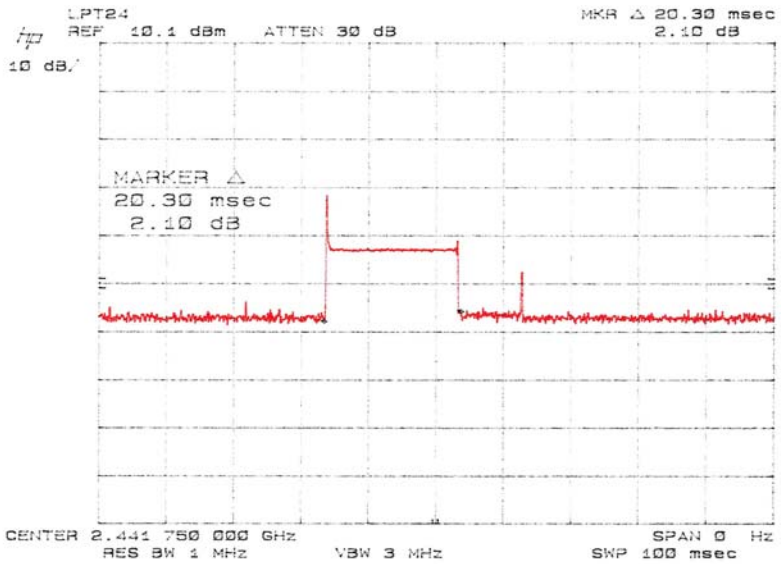
The SWEEP was then set to the time required by the regulation (30 seconds). The analyzer was set to SINGLE SWEEP, the total ON time was added and compared against the limit (0.4 seconds).

Test Results

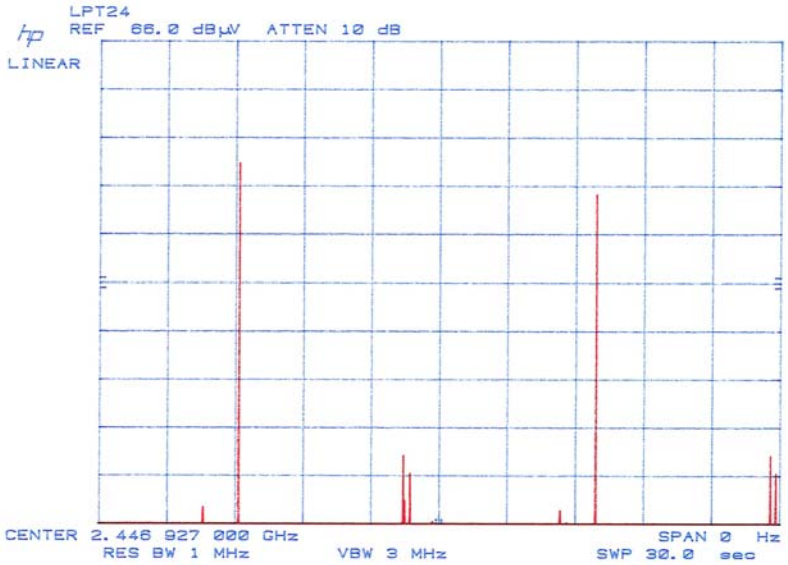
The average time occupancy is: 20.3 ms × 2 = 40.6 ms.

Refer to attached spectrum analyzer plots 5.1-5.2 for details.

Plot 5.1



Plot 5.2



4.6 Out-of-Band Radiated Emissions (except emissions in restricted bands) FCC 15.247(c)

Requirement

In any 100 kHz bandwidth outside the EUT pass-band, the RF power shall be at least 20 dB below that of the maximum in-band 100 kHz emission.

Procedure

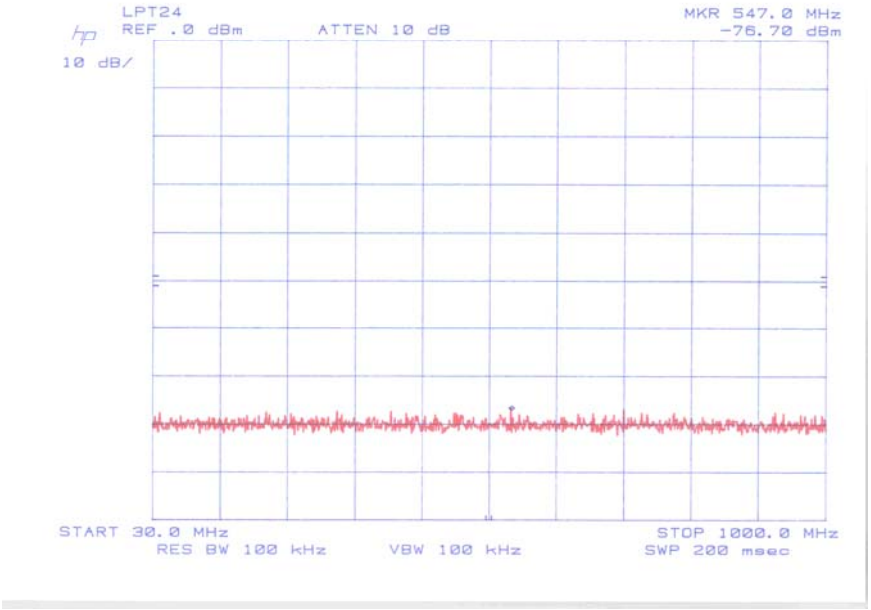
An antenna was setup at a distance of 0.2 m from the EUT. A spectrum analyzer was connected to the antenna. Analyzer Resolution Bandwidth was set to 100 kHz. For each channel investigated, the in-band and out-of-band emission, measured with the spectrum analyzer, were plotted.

Test Result

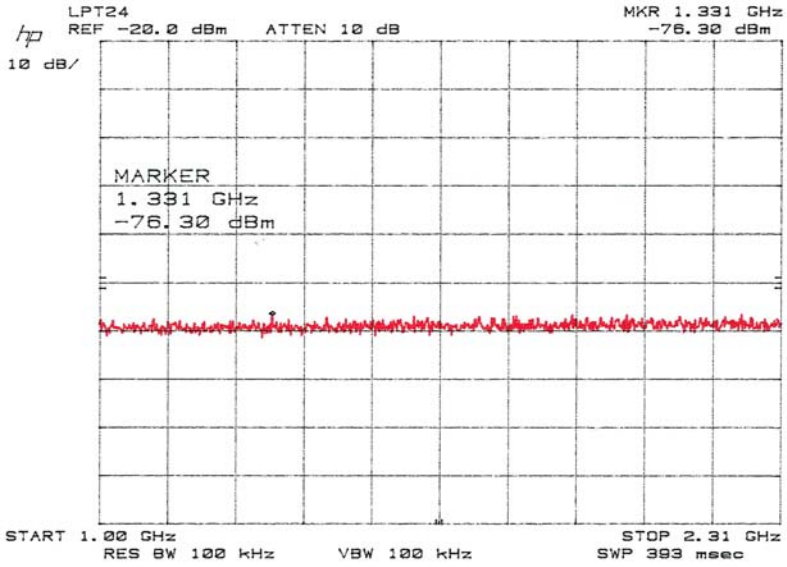
The test result is presented on the following plots. The EUT passed by more than 20 dB.

Frequency	Description	Plot
2403	Scan 30 MHz – 1 GHz	6.1
	Scan 1 GHz – 2.31 GHz	6.2
	Scan 2.31 – 2.39 GHz	6.3
	Scan 2.39 – 2.4835 GHz	6.4
	Scan 2.4835 – 2.5 GHz	6.5
	Scan 2.5 GHz – 18 GHz	6.6
	Scan 18 GHz – 24 GHz	6.7
2442	Scan 30 MHz – 1 GHz	6.8
	Scan 1 GHz – 2.31 GHz	6.9
	Scan 2.31 – 2.39 GHz	6.10
	Scan 2.39 – 2.4 GHz	6.11
	Scan 2.4 – 2.4835 GHz	6.12
	Scan 2.4835 – 2.5 GHz	6.13
	Scan 2.5 GHz – 18 GHz	6.14
	Scan 18 GHz – 24 GHz	6.15
2479	Scan 30 MHz – 1 GHz	6.16
	Scan 1 GHz – 2.4 GHz	6.17
	Scan 2.4 – 2.4835 GHz	6.18
	Scan 2.4835 – 2.5 GHz	6.19
	Scan 2.5 GHz – 18 GHz	6.20
	Scan 18 GHz – 24 GHz	6.21

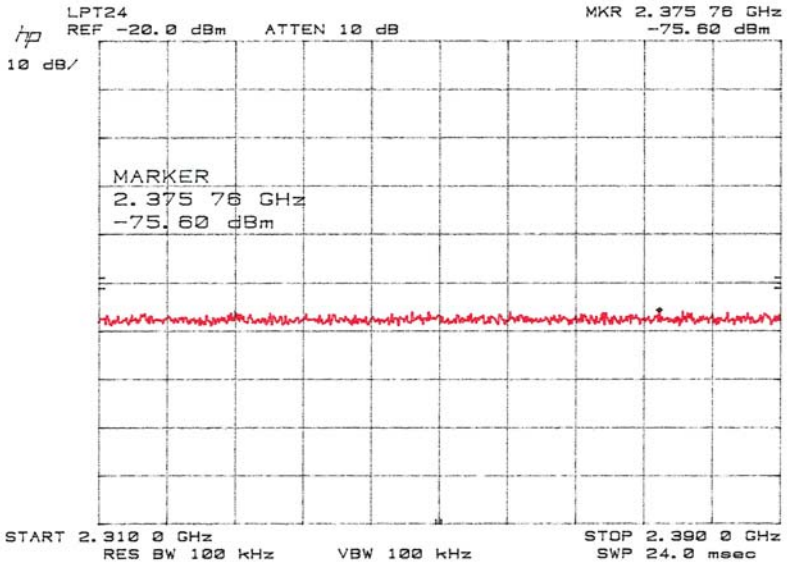
Plot 6.1



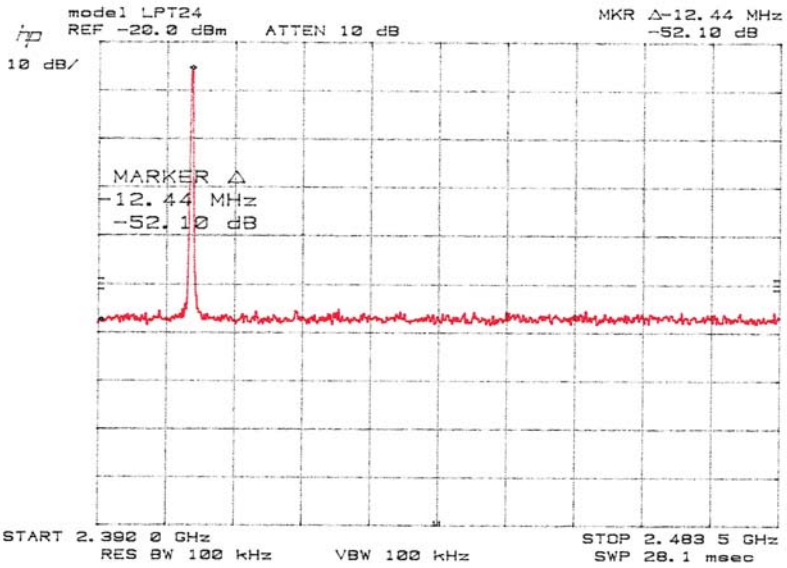
Plot 6.2



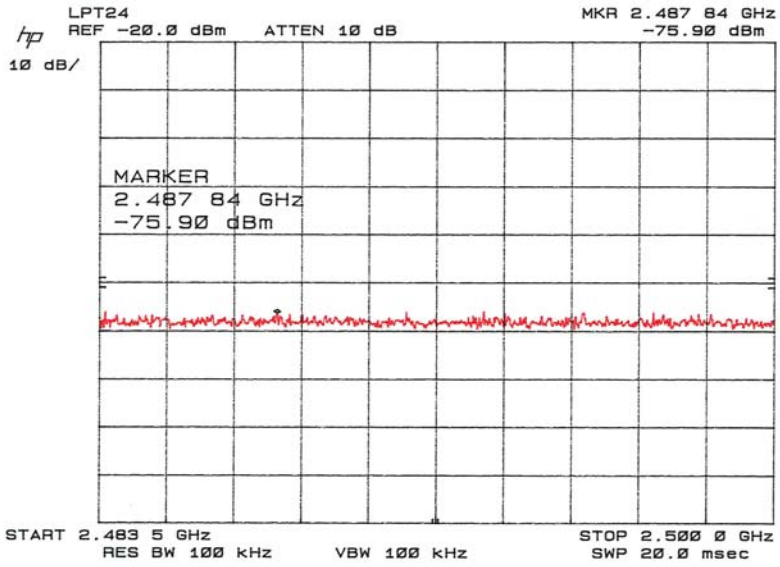
Plot 6.3



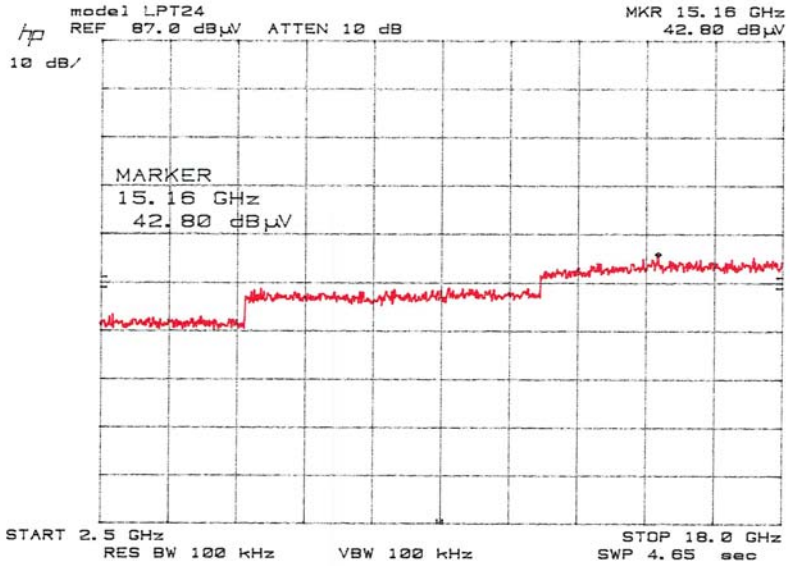
Plot 6.4



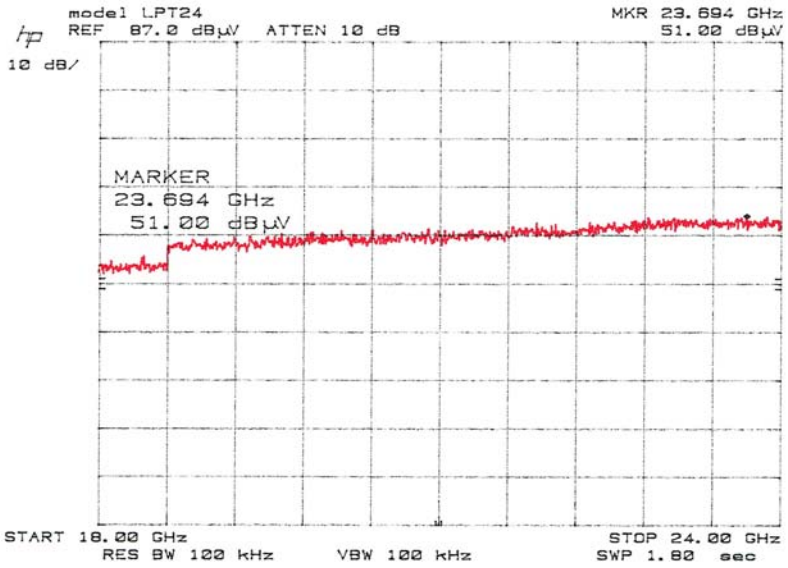
Plot 6.5



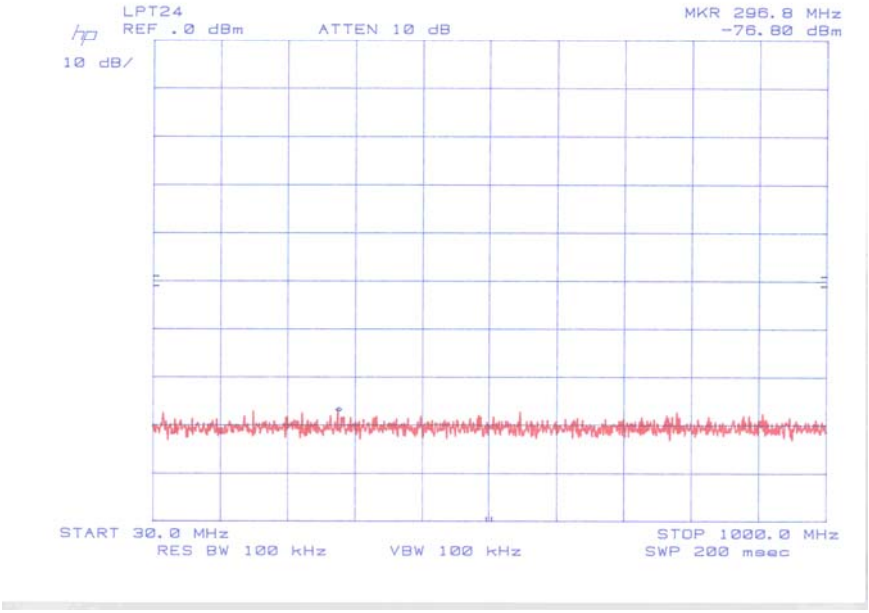
Plot 6.6



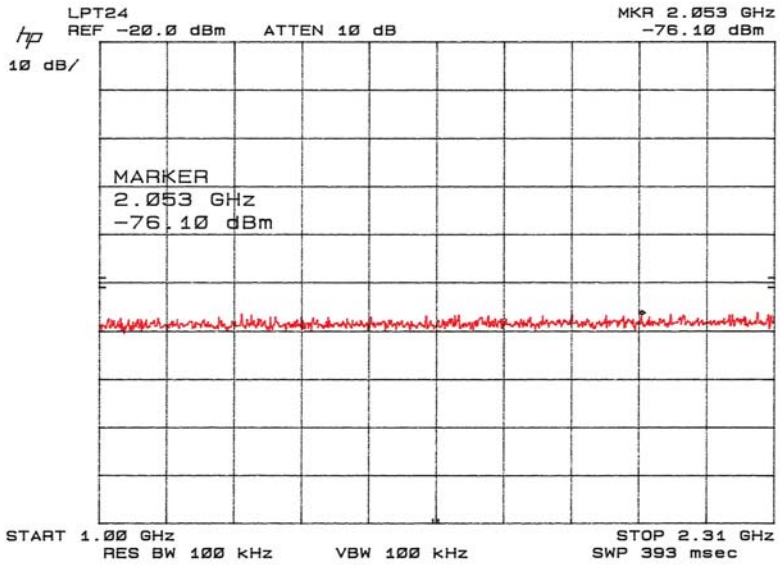
Plot 6.7



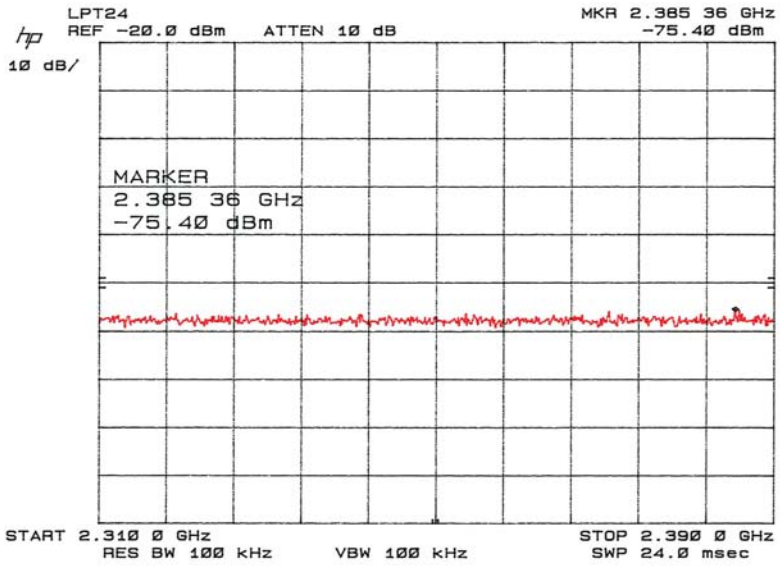
Plot 6.8



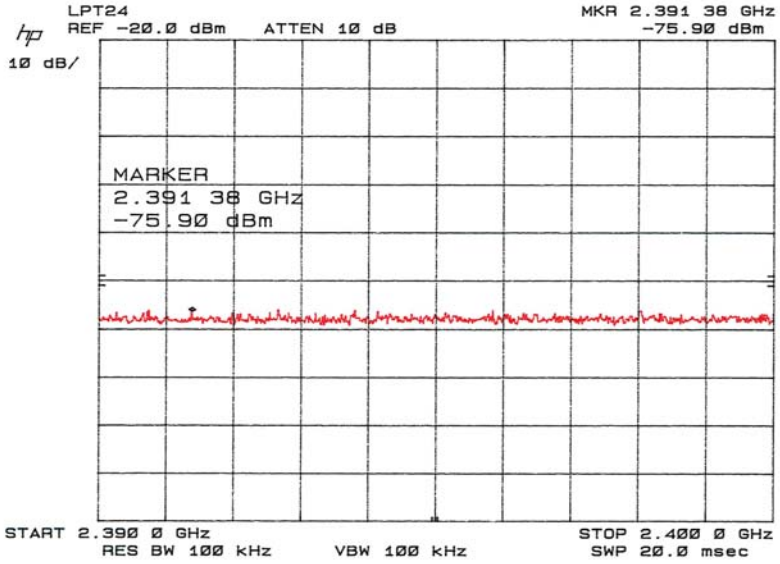
Plot 6.9



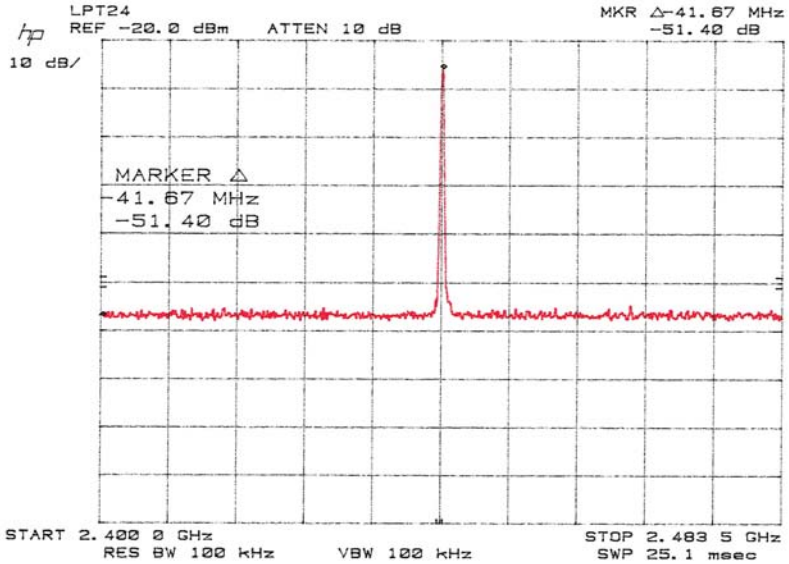
Plot 6.10



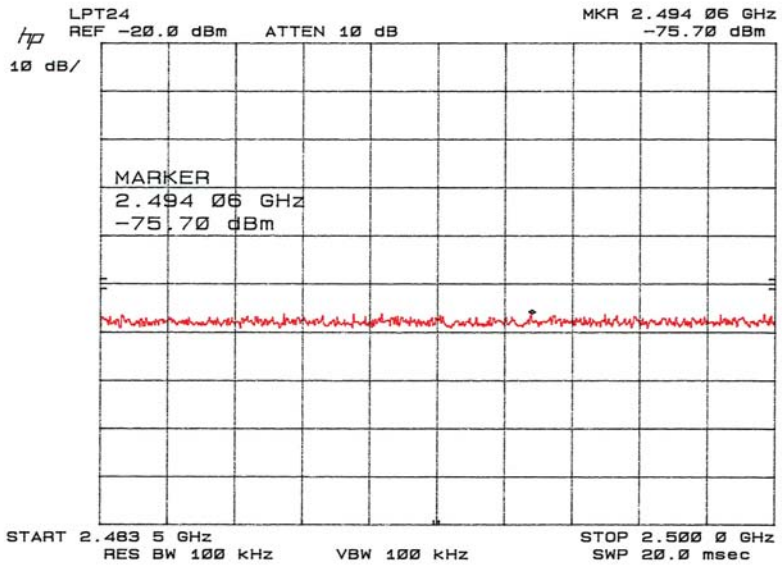
Plot 6.11



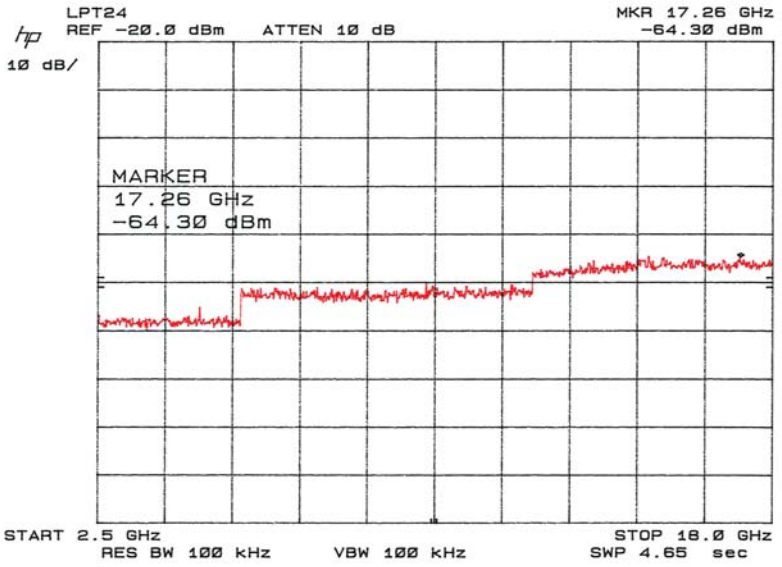
Plot 6.12



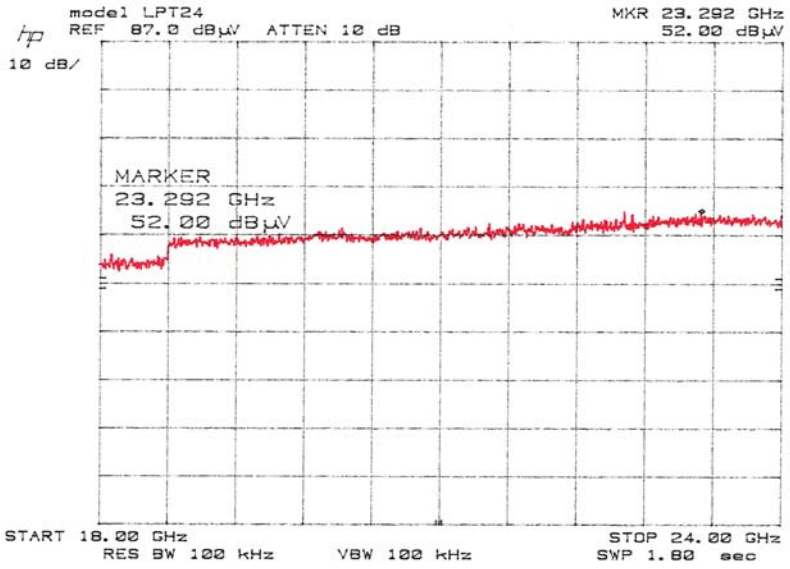
Plot 6.13



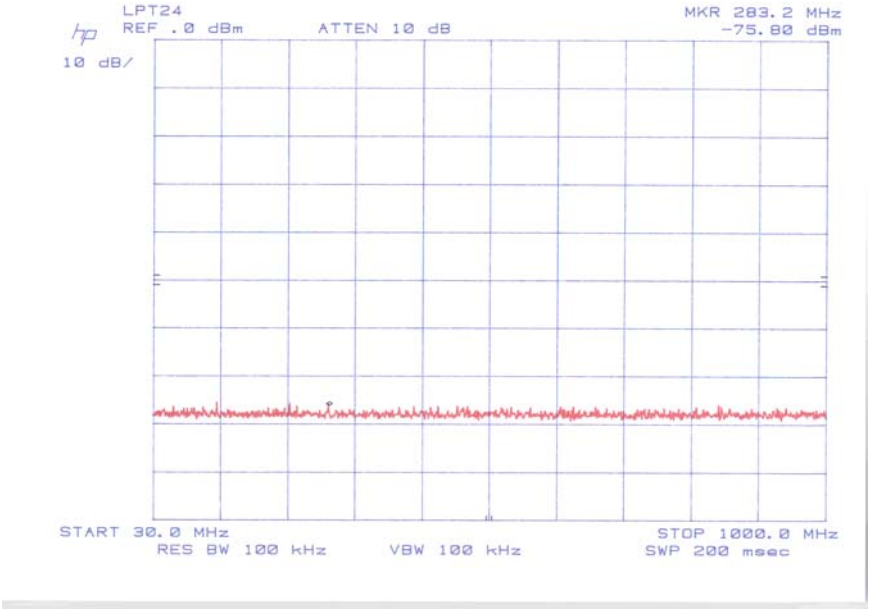
Plot 6.14



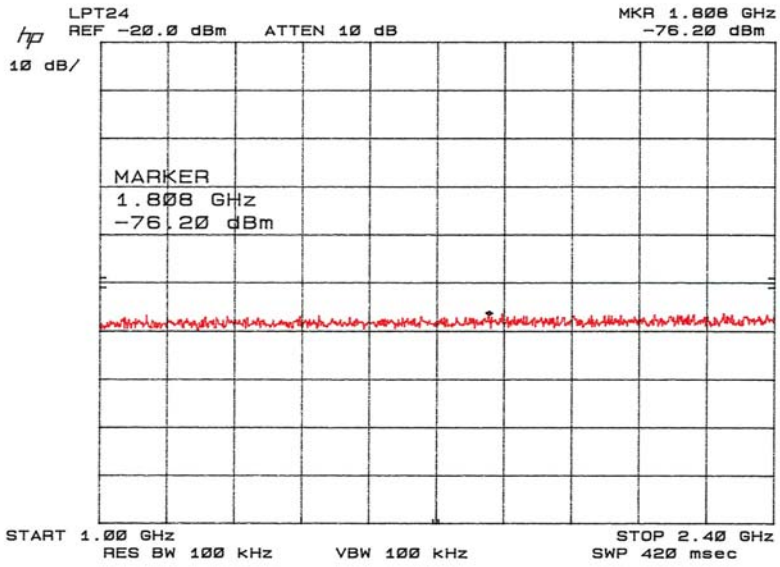
Plot 6.15



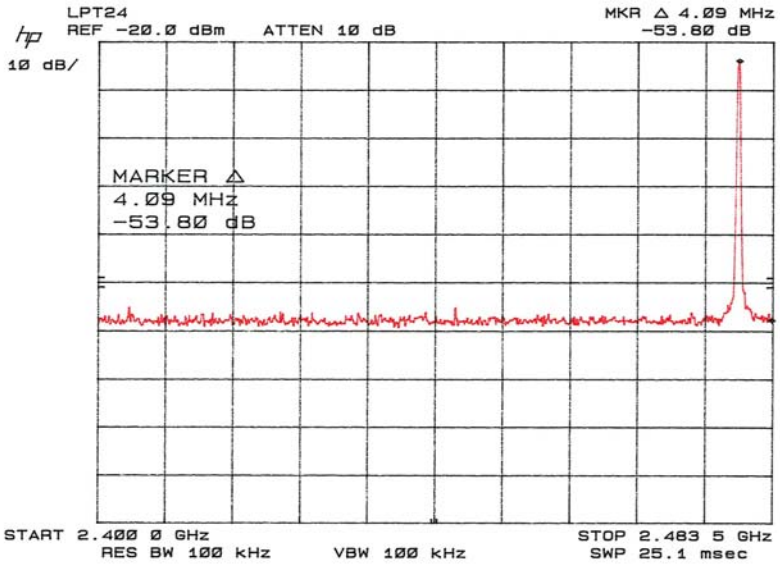
Plot 6.16



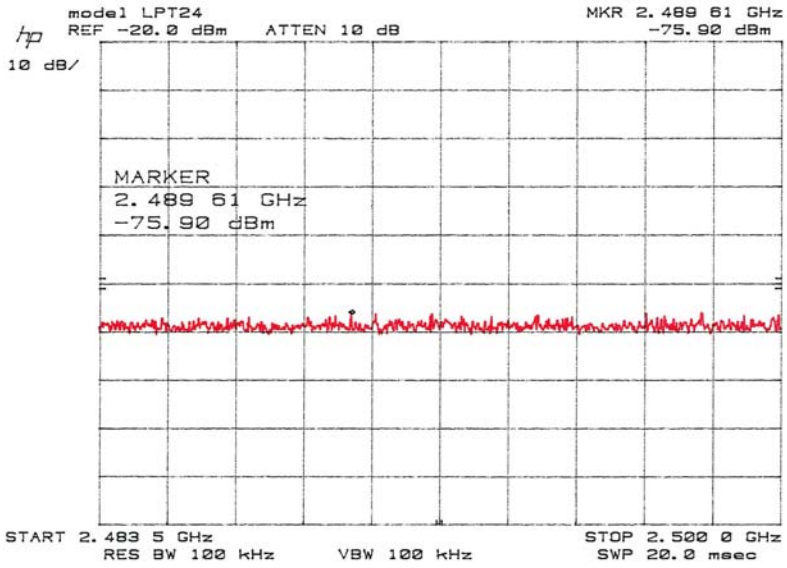
Plot 6.17



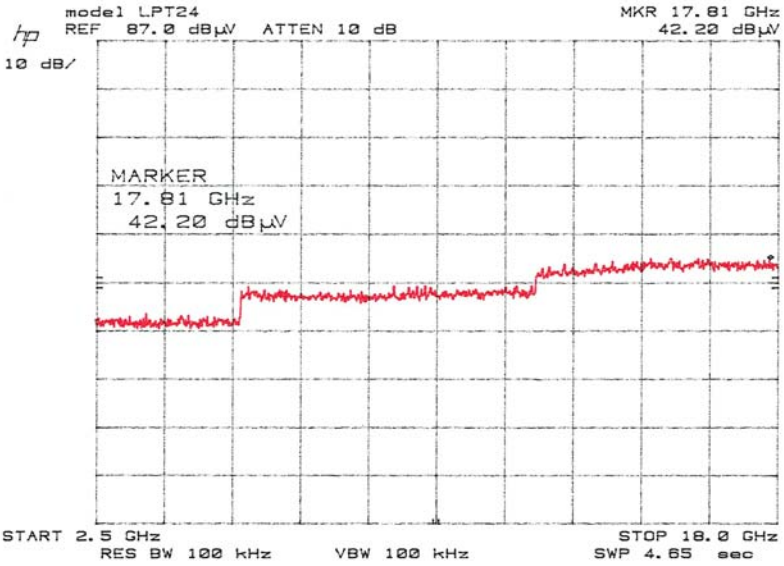
Plot 6.18



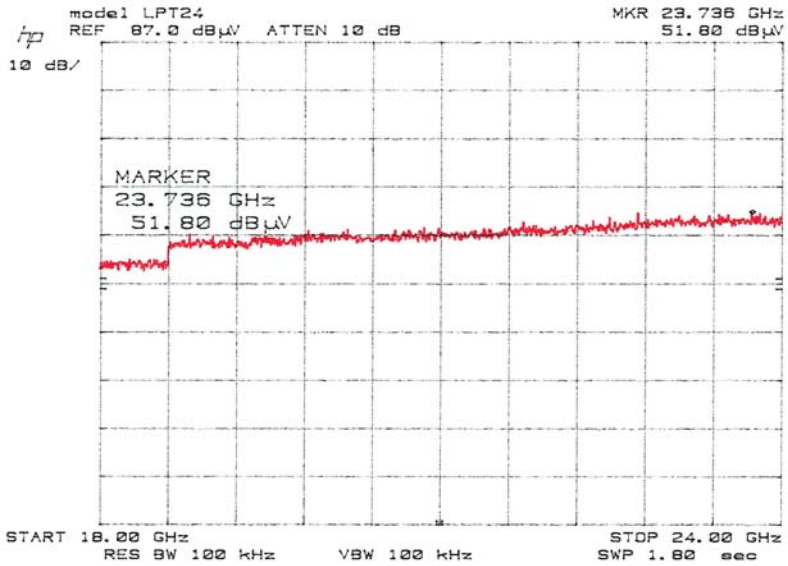
Plot 6.19



Plot 6.20



Plot 6.21


model LPT24
MKR 23.736 GHz
REF 87.0 dBµV
ATTEN 10 dB
51.80 dBµV
10 dB/
MARKER
23.736 GHz
51.80 dBµV
START 18.00 GHz
STOP 24.00 GHz
RES BW 100 kHz
VBW 100 kHz
SWP 1.80 sec

4.7 Transmitter Radiated Emissions in Restricted Bands
FCC 15.247 (c), 15.205

Procedure

Radiated emission measurements were performed from 30 MHz to 25,000 MHz. Spectrum Analyzer Resolution Bandwidth is 100 kHz or greater for frequencies 30 MHz to 1000 MHz, 1 MHz - for frequencies above 1000 MHz.

The EUT is placed on the non-conductive turntable. If the EUT attaches to peripherals, they are connected and operational (as typical as possible). During testing, all cables were manipulated to produce worst case emissions. The signal is maximized through rotation. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters.

Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance. All readings are extrapolated back to the equivalent three-meter reading using inverse scaling with distance.

A sample calculation, configuration photographs and data tables of the emissions are included. All measurements were performed with peak detection unless otherwise specified.

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 dB(μV/m)
RA = Receiver Amplitude (including preamplifier) in dB(μV)
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB(1/m)
AG = Amplifier Gain in dB

Assume a receiver reading of 52.0 dB(μV) is obtained. The antenna factor of 7.4 dB(1/m) and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving field strength of 32 dB(μV/m). This value in dB(μV/m) was converted to Intertek corresponding level in μV/m.

RA = 52.0 dB(μV); CF = 1.6 dB; AF = 7.4 dB(1/m); AG = 29.0 dB
FS = 52 + 7.4 + 1.6 - 29 = 32 dB(μV/m)
Level in μV/m = Common Antilogarithm [(32 dB(μV/m)/20] = 39.8 μV/m

Result

Data is included of the worst-case configuration (the configuration which resulted in the highest emission levels).

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.
For some frequencies the Duty Cycle Correction Factor (DCCF) = 20log(20.3 ms/100 ms) = -13.9 dB is included.

The results also include emissions in the restricted bands: 2.4835-2.5 GHz and 2.31-2.39 GHz.

The "delta-marker" method was used to calculate the field strength (FS_b) on the band-edge frequency 2483.5 MHz.

$$FS_b = FS_0 + \Delta + DCCF,$$

where

FS_0 is the field strength on fundamental frequency (highest channel),
Δ is the delta from plot 7.1 (on the next page)

The EUT passed by 11.1 dB.

Intertek								
Restricted Band Emissions								
FCC Part 15, Subpart C								
Operator:BG	Company Name: OMNEX Control Systems, Inc.							
January 16, 2004	Model: LPT-24							
Frequency GHz	**FS Level dB(uV/m)**	**Detector**	**Limit@3m dB(uV/m)**	**Margin (dB)**	**Raw dB(uV)**	**Cable (dB)**	**Preamp (dB)**	**Antenna dB(1/m)**
Tx at 2.403 GHz								
2.31-2.39	** 42.9	Av	54.0	***-11.2***	26.4	1.0	-	29.3
2.31-2.39	** 53.5	Pk	74.0	***-20.5***	37.0	1.0	-	29.3
4.806	** 42.5	Av	54.0	***-11.5***	57.7	1.0	35.9	33.8
4.806	57.8	Pk	74.0	***-16.2***	58.9	1.0	35.9	33.8
12.015	39.0	Av	54.0	***-15.0***	34.0	2.5	37.2	39.7
12.015	47.2	Pk	74.0	***-26.8***	42.2	2.5	37.2	39.7
19.224	** 31.6	Av	54.0	***-22.4***	* 24.0	4.2	23.0	40.3
19.224	55.5	Pk	74.0	***-18.5***	* 34.0	4.2	23.0	40.3
Tx at 2.441 GHz								
4.883	** 42.9	Av	54.0	***-11.1***	57.6	1.0	35.9	34.0
4.883	57.3	Pk	74.0	***-16.7***	58.1	1.0	35.9	34.0
7.325	** 33.4	Av	54.0	***-20.6***	44.8	1.3	35.4	36.6
7.325	49.1	Pk	74.0	***-24.9***	46.6	1.3	35.4	36.6
12.209	40.7	Av	54.0	***-13.3***	36.2	2.1	37.1	39.5
12.209	47.0	Pk	74.0	***-27.0***	42.5	2.1	37.1	39.5
19.533	** 31.6	Av	54.0	***-22.4***	* 24.0	4.2	23.0	40.3
19.533	55.5	Pk	74.0	***-18.5***	* 34.0	4.2	23.0	40.3
Tx at 2.478 GHz								
2.4835-2.5	*** 38.1	Av	54.0	***-15.9***	-	-	-	-
2.4835-2.5	*** 39.4	Pk	74.0	***-34.6***	-	-	-	-
4.957	** 42.3	Av	54.0	***-11.7***	56.7	1.0	35.8	34.3
4.957	56.5	Pk	74.0	***-17.5***	57.0	1.0	35.8	34.3
7.435	42.4	Av	54.0	***-11.6***	39.9	1.3	35.4	36.6
7.435	47.2	Pk	74.0	***-26.8***	44.7	1.3	35.4	36.6
12.393	37.1	Av	54.0	***-16.9***	33.1	1.7	37.1	39.3
12.393	45.0	Pk	74.0	***-29.0***	41.0	1.7	37.1	39.3
19.828	** 31.8	Av	54.0	***-22.2***	* 24.0	4.4	23.0	40.3
19.828	55.7	Pk	74.0	***-18.3***	* 34.0	4.4	23.0	40.3
22.307	** 33.1	Av	54.0	***-20.9***	* 24.0	5.7	23.0	40.3
22.307	57.0	Pk	74.0	***-17.0***	* 34.0	5.7	23.0	40.3

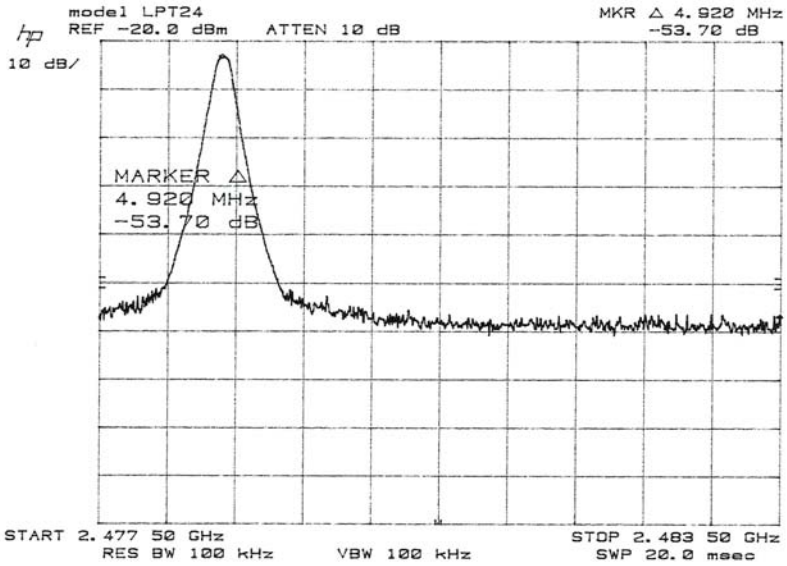
* ground floor measurement

** includes a Duty Cycle Correction Factor (DCCF)

*** calculated using the "delta-marker" method

note: peak FS_0=107.0 dB(uV/m); Average FS_0=105.7 dB(uV/m)

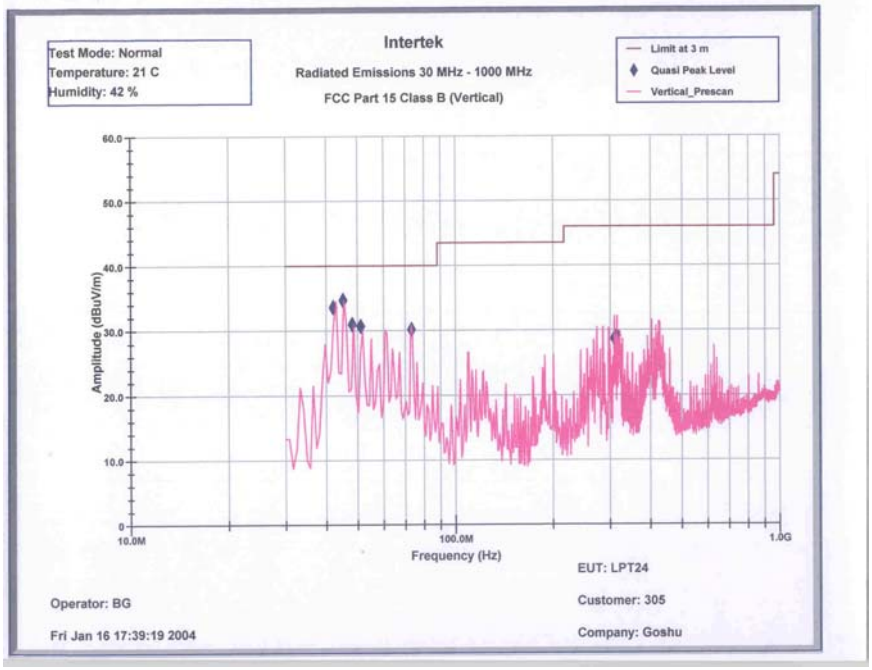
Plot 7.1


model LPT24
REF -20.0 dBm
ATTEN 10 dB
MKR Δ 4.920 MHz
-53.70 dB
10 dB/
MARKER Δ
4.920 MHz
-53.70 dB
START 2.477 50 GHz
RES BW 100 kHz
VBW 100 kHz
STOP 2.483 50 GHz
SWP 20.0 msec

4.8 Radiated Emissions from digital part and receiver
FCC Ref: 15.109

Radiated emission measurements were performed from 30 MHz to 1000 MHz. Spectrum Analyzer Resolution Bandwidth is 100 kHz or greater. See also section 4.7.

Test results are attached. The EUT passed the test by 5.3 dB.



Intertek
Radiated Emissions 30 MHz - 1000 MHz
FCC Part 15 Class B (QP-Vertical)

Operator: BG

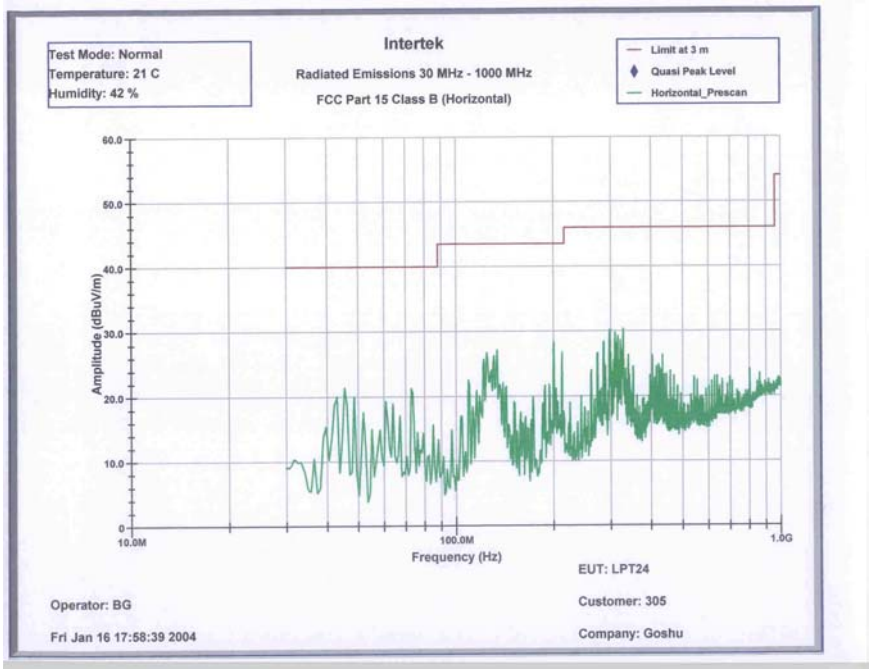
05:44:00 PM, Friday, January 16, 2004

Model Number: LPT24
ITS Job Number: 305
Company: Goshu

	1	2	3	4	5	6	7	8
Frequency	Quasi Pk FS	Limit@3	Margin	RA	AG	CF	AF	Atten
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB(1/m)	dB
42.075 MHz	33.6	40.0	-6.4	54.7	32.4	0.6	7.7	3.0
45.100 MHz	34.7	40.0	-5.3	54.9	32.4	0.6	8.5	3.0
48.109 MHz	30.9	40.0	-9.1	52.9	32.4	0.6	6.8	3.0
51.113 MHz	30.7	40.0	-9.3	53.3	32.4	0.6	6.1	3.0
73.216 MHz	30.1	40.0	-9.9	53.0	32.3	0.9	5.6	3.0
309.600 MHz	28.7	46.0	-17.3	42.2	32.2	1.9	13.8	3.0
315.000 MHz	29.1	46.0	-16.9	41.8	32.2	2.0	14.4	3.0

Test Mode: Normal
Temperature: 21 C
Humidity: 42 %

Page 1



Intertek
Radiated Emissions 30 MHz - 1000 MHz
FCC Part 15 Class B (Pk-Horizontal)

Operator: BG

08:19:39 PM, Monday, January 19, 2004

Model Number: LPT24
ITS Job Number: 305
Company: Goshu

	1	2	3	4	5	6	7	8
Frequency	Pk	Limit@3m	Margin	RA	PA	CF	AF	Atten
(MHz)	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB(1/m)	dB
122.150 MHz	25.7	43.5	-17.8	47.1	32.3	1.0	6.9	3.0
134.275 MHz	27.2	43.5	-16.3	47.3	32.3	1.0	8.2	3.0
200.558 MHz	28.3	43.5	-15.2	45.1	32.3	1.3	11.1	3.0
212.683 MHz	26.8	43.5	-16.7	43.5	32.2	1.4	11.1	3.0
273.308 MHz	26.7	46.0	-19.3	41.5	32.2	1.5	12.9	3.0
285.433 MHz	28.3	46.0	-17.7	42.6	32.2	1.5	13.4	3.0
288.667 MHz	24.7	46.0	-21.3	39.0	32.2	1.5	13.4	3.0
297.558 MHz	30.1	46.0	-15.9	43.9	32.2	1.6	13.8	3.0
308.875 MHz	29.7	46.0	-16.3	42.9	32.2	1.9	14.2	3.0
312.108 MHz	28.1	46.0	-17.9	41.3	32.2	2.0	14.0	3.0
315.342 MHz	29.2	46.0	-16.8	42.3	32.2	2.1	14.1	3.0
321.000 MHz	28.5	46.0	-17.5	40.8	32.2	2.2	14.8	3.0
327.467 MHz	30.3	46.0	-15.7	42.2	32.2	2.0	15.4	3.0
339.592 MHz	26.4	46.0	-19.6	38.4	32.2	1.7	15.5	3.0
350.908 MHz	24.6	46.0	-21.4	36.6	32.2	1.7	15.6	3.0
403.450 MHz	26.3	46.0	-19.7	37.0	32.3	1.9	16.7	3.0
415.575 MHz	24.6	46.0	-21.4	35.0	32.3	1.9	17.0	3.0
421.233 MHz	24.9	46.0	-21.1	35.0	32.3	1.9	17.3	3.0
423.658 MHz	24.4	46.0	-21.6	34.4	32.3	1.9	17.5	3.0
433.358 MHz	26.4	46.0	-19.6	36.0	32.3	1.9	17.8	3.0

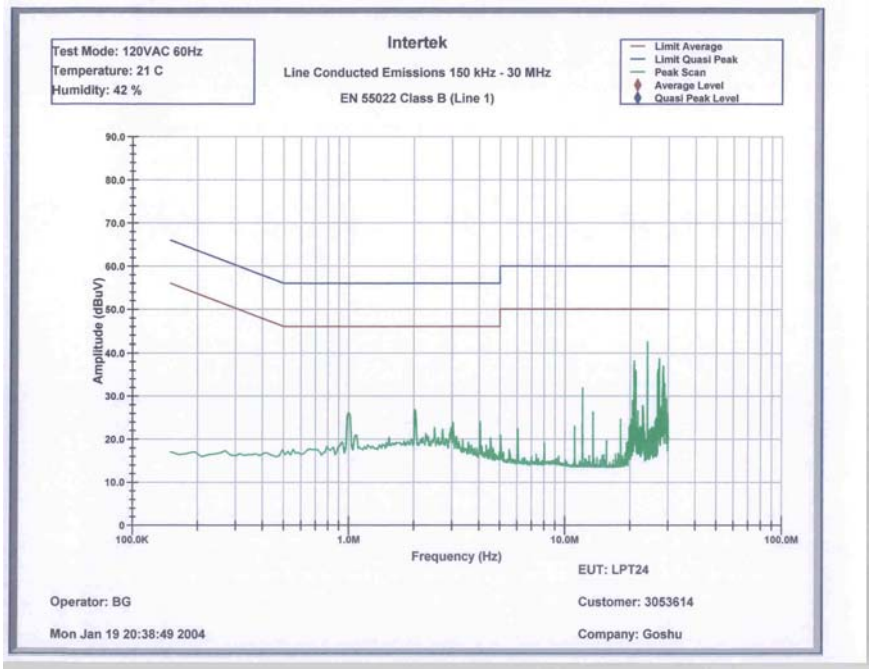
Test Mode: Normal
Temperature: 21 C
Humidity: 42 %

Page 1

4.9 AC Line Conducted Emission
FCC 15.207:

AC line conducted emission test was performed according the ANSI C63.4 standard. The DC power supply, used to power the EUT, was connected to AC Line through the LISN.

For the test result, see attached plots.
The EUT passed by 7.6 dB.



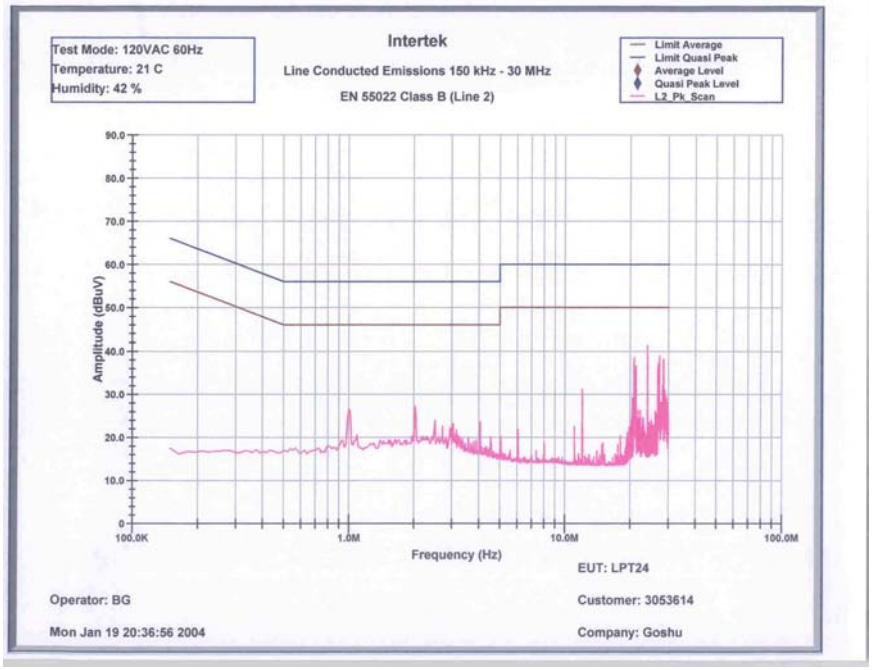
Intertek
Line Conducted Emissions 150 kHz - 30 MHz
EN 55022 Class B (Line 1)

Operator: BG
Model Number: LPT24
ITS Job Number: 3053614
08:33:33 PM, Monday, January 19, 2004
Company: Goshu

Frequency MHz	1 Pk Level (dBuV)	2 Av Limit (dBuV)	3 QP Limit (dBuV)	4 Pk Margin (dBuV)
12.030 MHz	31.9	50.0	60.0	-18.1
20.508 MHz	29.0	50.0	60.0	-21.0
20.821 MHz	38.2	50.0	60.0	-11.8
20.866 MHz	36.6	50.0	60.0	-13.4
20.941 MHz	35.4	50.0	60.0	-14.6
21.045 MHz	34.1	50.0	60.0	-15.9
21.224 MHz	35.9	50.0	60.0	-14.1
22.821 MHz	27.8	50.0	60.0	-22.2
24.030 MHz	42.4	50.0	60.0	-7.6
26.836 MHz	35.5	50.0	60.0	-14.5
26.881 MHz	36.2	50.0	60.0	-13.8
27.060 MHz	35.8	50.0	60.0	-14.2
27.239 MHz	37.9	50.0	60.0	-12.1
27.299 MHz	38.7	50.0	60.0	-11.3
28.224 MHz	31.9	50.0	60.0	-18.1
28.299 MHz	32.1	50.0	60.0	-17.9
28.433 MHz	37.0	50.0	60.0	-13.0
28.836 MHz	32.9	50.0	60.0	-17.1
29.030 MHz	27.7	50.0	60.0	-22.3
29.373 MHz	29.4	50.0	60.0	-20.6

Test Mode: 120VAC 60Hz
Temperature: 21 C
Humidity: 42 %

Page 1



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

Operator: BG
08:36:38 PM, Monday, January 19, 2004

Model Number: LPT24
ITS Job Number: 3053614
Company: Goshu

Frequency MHz	1 Pk Level (dBuV)	2 Av Limit (dBuV)	3 QP Limit (dBuV)	4 Pk Margin (dBuV)
12.030 MHz	31.2	50.0	60.0	-18.8
20.508 MHz	29.2	50.0	60.0	-20.8
20.821 MHz	38.6	50.0	60.0	-11.4
20.866 MHz	35.7	50.0	60.0	-14.3
21.045 MHz	34.5	50.0	60.0	-15.5
21.224 MHz	35.6	50.0	60.0	-14.4
21.284 MHz	36.5	50.0	60.0	-13.5
24.030 MHz	41.3	50.0	60.0	-8.7
24.075 MHz	39.0	50.0	60.0	-11.0
26.821 MHz	35.9	50.0	60.0	-14.1
26.881 MHz	37.1	50.0	60.0	-12.9
26.955 MHz	34.0	50.0	60.0	-16.0
27.060 MHz	36.9	50.0	60.0	-13.1
27.239 MHz	38.1	50.0	60.0	-11.9
27.299 MHz	38.9	50.0	60.0	-11.1
28.224 MHz	32.1	50.0	60.0	-17.9
28.433 MHz	38.3	50.0	60.0	-11.7
28.851 MHz	30.9	50.0	60.0	-19.1
28.955 MHz	30.0	50.0	60.0	-20.0
29.373 MHz	29.3	50.0	60.0	-20.7

Test Mode: 120VAC 60Hz
Temperature: 21 C
Humidity: 42 %

Page 1

5.0 List of test equipment

Measurement equipment used for emission compliance testing utilized the equipment on the following list:

Equipment	Manufacturer	Model/Type	Serial #	Cal Int	Cal Due
Spectrum Analyzer w/85650 QP Adapter	Hewlett Packard	8566B	2416A00317 2043A00251	12	10/28/04
Spectrum Analyzer	Hewlett Packard	8565E	AE9674	12	5/27/04
BI-Log Antenna	EMCO	3143	9509-1160	12	4/24/04
Horn Antenna	EMCO	3115	8812-3049	12	4/08/04
Horn Antenna	EMCO	3160-09	Not Labeled	#	#
Pre-Amplifier	Miteq	AMF-4D-001180-24-10P	799159	12	4/06/04
Pre-Amplifier	Avantek	AFT-18855	8723H705	12	4/10/04
Pre-amplifier	CTT	ACO/400	47526	12	4/10/04
RF Filter Section	Hewlett Packard	85460A	3448A00267	12	9/9/04
EMI Receiver	Hewlett Packard	8546A	3710A00373	12	9/8/04
LISN	FCC	FCC-LISN-50-50-M-H	2012	12	1/23/05

No calibration required

6.0 Document History

Revision/ Job Number	Writer Initials	Date	Change
1.0 / 3053614	BG	April 10, 2004	Original document