

## EMISSIONS TEST REPORT

**Report Number: 3113910BOX-002**

**Project Number: 3113910**

**Testing performed on the**

**LanTag V3**

**Model: PN83000**

**To**

**FCC Part 15 Subpart C 15.247**

**Industry Canada RSS-210 Issue 6 September 2005 Annex 8**

**For**

**PanGo Networks, Inc.**

Test Performed by:  
Intertek – ETL SEMKO  
70 Codman Hill Road  
Boxborough, MA 01719

Test Authorized by:  
PanGo Networks, Inc.  
959 Concord Ave. Suite 100  
Framingham, MA 01701

Prepared by:

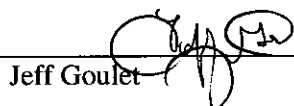


Nicholas Abbondante

Date:

1/31/07

Reviewed by:



Jeff Goulet

Date:

1-31-07

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## 1.0 Job Description

### 1.1 Client Information

This EUT has been tested at the request of:

**Company:** PanGo Networks, Inc.  
959 Concord Ave. Suite 100  
Framingham, MA 01701  
**Contact:** Eric Bachtell  
**Telephone:** 508-626-8900 xt. 289  
**Fax:** 508-626-8901  
**Email:** [Eric.bachtell@pangonetworks.com](mailto:Eric.bachtell@pangonetworks.com)

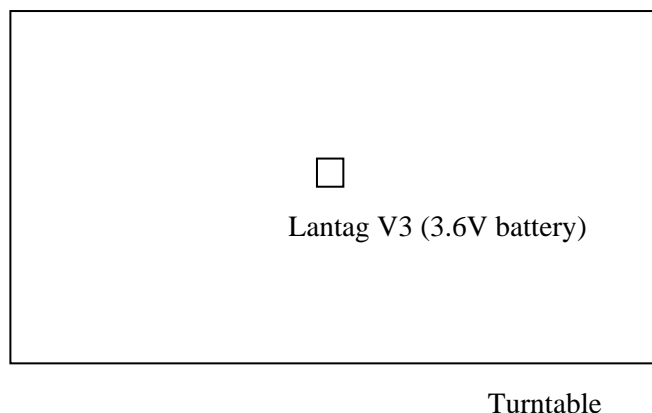
### 1.2 Equipment Under Test

**Equipment Type:** LanTag V3  
**Model Number(s):** PN83000  
**Serial number(s):** 30  
**Manufacturer:** PanGo Networks, Inc.  
**EUT receive date:** 01/22/2007  
**EUT received condition:** Prototype in Good Condition  
**Test start date:** 01/22/2007  
**Test end date:** 01/31/2007

**1.3 Test Plan Reference:** Tested according to the standards listed, FCC Public Notice DA-00-705A1, ANSI C63.4:2003 and RSS-Gen Issue 1 September 2005.

### 1.4 Test Configuration

#### 1.4.1 Block Diagram



**1.4.2. Cables:**

Cable	Shielding	Connector	Length (m)	Qty.
None				

**1.4.3. Support Equipment:**

Name:               None  
Model No.:  
Serial No.:

**1.5 Mode(s) of Operation:**

The EUT was transmitting at nominal power, and was activated from a fresh 3.6V battery.

## 2.0 Test Summary

TEST STANDARD		RESULTS
FCC Part 15 Subpart C 15.247 Industry Canada RSS-210 Issue 6 September 2005 Annex 8		
SUB-TEST	TEST PARAMETER	COMMENT
RF Output Power and Human RF Exposure FCC 15.247(b)(3-5) RSS-210 A8.4, RSS-102 4.3	The RF output power must not exceed 36 dBm EIRP. The human RF Exposure limit is 1 mW/cm <sup>2</sup> .	Pass
6 dB Bandwidth FCC 15.247(a)(2), RSS-210 A8.2	The 6dB bandwidth must exceed 500 kHz.	Pass
Peak Power Spectral Density FCC 15.247(e), RSS-210 A8.2	The peak power spectral density must not exceed 8 dBm in any 3 kHz bandwidth.	Pass
Band Edge Compliance FCC 15.215, 15.247(d) RSS-210 2.1, A8.5	Spurious emissions at the band edges must be at least 20 dB lower than the fundamental field strength when measured with a 100 kHz bandwidth.	Pass
Radiated Emissions FCC 15.205, 15.209, 15.247(d) RSS-210 2.2, 2.7, A8.5	Spurious emissions must be at least 20 dB lower than the fundamental field strength when measured with a 100 kHz bandwidth. Emissions which fall in the restricted bands of 15.205 must meet the general limits of 15.209. Emissions which fall in the restricted bands of RSS-210 2.2 Table 1 must meet the general limits of RSS-210 2.7 Tables 2 and 3.	Pass

Notes: Channels tested include:

Channel 1 2412 MHz  
Channel 6 2437 MHz  
Channel 11 2462 MHz

REVISION SUMMARY – The following changes have been made to this Report:

<u>Date</u>	<u>Project</u> <u>No.</u>	<u>Project</u> <u>Handler</u>	<u>Page(s)</u>	<u>Item</u>	<u>Description of Change</u>
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### 3.0 Sample Calculations

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 $\mu$ V/m
- RA = Receiver Amplitude (including preamplifier) in dB $\mu$ V
- CF = Cable Attenuation Factor in dB
- AF = Antenna Factor in dB
- AG = Amplifier Gain in dB

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

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

RA = 52.0 dB $\mu$ V  
 AF = 7.4 dB/m  
 CF = 1.6 dB  
 AG = 29.0 dB  
 FS = 32 dB $\mu$ V/m

$$\text{Level in } \mu\text{V/m} = [10(32 \text{ dB}\mu\text{V/m})/20] = 39.8 \mu\text{V/m}$$

The following is how net line-conducted readings were determined:

$$NF = RF + LF + CF + AF$$

Where

- NF = Net Reading in dB $\mu$ V
- RF = Reading from receiver in dB $\mu$ V
- LF = LISN Correction Factor in dB
- CF = Cable Correction Factor in dB
- AF = Attenuator Loss Factor in dB

To convert from dB $\mu$ V to  $\mu$ V or mV the following was used:

$$UF = 10^{(NF/20)} \text{ where UF = Net Reading in } \mu\text{V}$$

#### Example:

$$NF = RF + LF + CF + AF = 28.5 + 0.2 + 0.4 + 20.0 = 49.1 \text{ dB}\mu\text{V}$$

$$UF = 10^{(49.1 \text{ dB}\mu\text{V} / 20)} = 254 \mu\text{V/m}$$

### 3.1 Measurement Uncertainty

Compliance of the product is based on the measured value. However, the measurement uncertainty is included for informational purposes.

The expanded uncertainty ( $k = 2$ ) for radiated emissions from 30 to 1000 MHz has been determined to be:  
 $\pm 3.5$  dB at 10m,  $\pm 3.8$  dB at 3m

The expanded uncertainty ( $k = 2$ ) for mains conducted emissions from 150 kHz to 30 MHz has been determined to be:

$\pm 2.6$  dB

The expanded uncertainty ( $k = 2$ ) for telecom port conducted emissions from 150 kHz to 30 MHz has been determined to be:

$\pm 3.2$  for ISN and voltage probe measurements

$\pm 3.1$  for current probe measurements

### 3.2 Site Description

#### Test Site(s): 2

Our OATS are 3m and 10m sheltered emissions measurement ranges located in a light commercial environment in Boxborough, Massachusetts. They meet the technical requirements of ANSI C63.4-2003 and CISPR 22:1993/EN 55022:1994 for radiated and conducted emission measurements. The shelter structure is entirely fiberglass and plastic, with outside dimensions of 33 ft x 57 ft. The structure resembles a quonset hut with a center ceiling height of 16.5 ft.

The testing floor is covered by a galvanized sheet metal groundplane that is earth-grounded via copper rods around the perimeter of the site. The joints between individual metal sheets are bridged with a 2 inch wide metal strips to provide low RF impedance contact throughout. The sheets are screwed in place with stainless steel, round-head screws every three inches. Site illumination and HVAC are provided from beneath the ground reference plane through flush entry ports, the port covers are electrically bonded to the ground plane.

A flush metal turntable with 12 ft. diameter and 5000 lb. load capacity (12,000 lb. in Site 3) is provided for floor-standing equipment. A wooden table 80 cm high is used for table-top equipment. The turntable is electrically connected to the ground plane with three copper straps. The straps are connected to the turntable at the center of it with ground braid. The copper strap is directly connected to the groundplane at the edges of the turntable. The turntable is located on the south end of the structure and the antennas are mounted 3 and 10 meters away to the north. The antenna mast is a non-conductive with remote control of antenna height and polarization. The antenna height is adjustable from 1 to 4 meters.

All final radiated emission measurements are performed with the testing personnel and measurement equipment located below the ground reference plane. The site has a full basement underneath the turntable where support equipment may be remotely located. Operation of the antenna, turntable and equipment under test is controlled by remote controls that manipulate the antenna height and polarization and with a turntable control. Test personnel are located below the ellipse when measurements are performed, however the site maintains the ability of having personnel manipulate cables while monitoring test equipment. Ambient radiated emissions are 6 dB or more below the relevant FCC emission limits.

AC mains power is brought to the equipment under test through a power line filter, to remove ambient conducted noise. 50 Hz (240 VAC single phase), 60 Hz power (120 VAC single phase, 208 VAC three phase), and 60 Hz (480 VAC three phase) are available. Conducted emission measurements are performed with a Line Impedance Stabilization Network (LISN) or Artificial Mains Network (AMN) bonded to the ground reference plane. A removable vertical groundplane (2 meter X 2 meter area) is used for line-conducted measurements for table top equipment. The vertical groundplane is electrically connected to the reference groundplane.

The EMC Lab has two Semi-anechoic Chambers and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference groundplanes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.



**Test Results:** Pass

**Test Standard:** FCC Part 15 Subpart C 15.247, Industry Canada RSS-210 Annex 8

**Test:** RF Output Power and Human RF Exposure, FCC 15.247(b)(3-5), RSS-210 A8.4, RSS-102 4.3

**Performance Criterion:** The RF output power must not exceed 36 dBm EIRP. The human RF Exposure limit is 1 mW/cm<sup>2</sup>.

**Test Environment:**

Environmental Conditions During Testing:	Humidity (%):	25 24 25	Pressure (hPa):	998 998 997	Ambient (°C):	20 19 15
Pretest Verification Performed	Yes	Equipment under Test:		PN83000		

**Test Equipment Used:**

TEST EQUIPMENT LIST					
Item	Equipment Type	Make	Model No.	Serial No.	Next Cal. Due
1	Spectrum Analyzer 20Hz - 40 GHz	Rohde & Schwartz	FSEK-30	100225	10/23/2007
2	HORN ANTENNA	EMCO	3115	9610-4980	06/12/2007
3	High Frequency Cable 40GHz	Megaphase	TM40 K1K1 80	CBL030	12/04/2007
4	Oscilloscope, Digital Storage	Tektronix	TDS3052	B014809	03/03/2007
5	Digital 4 Line Barometer	Mannix	OABA116	BAR2	08/02/2007

**Software Utilized:**

Name	Manufacturer	Version
EXCEL 2000	Microsoft Corporation	9.0.6926 SP-3
EMI BOXBOROUGH	Intertek	9/20/06 Revision

**Test Details:**

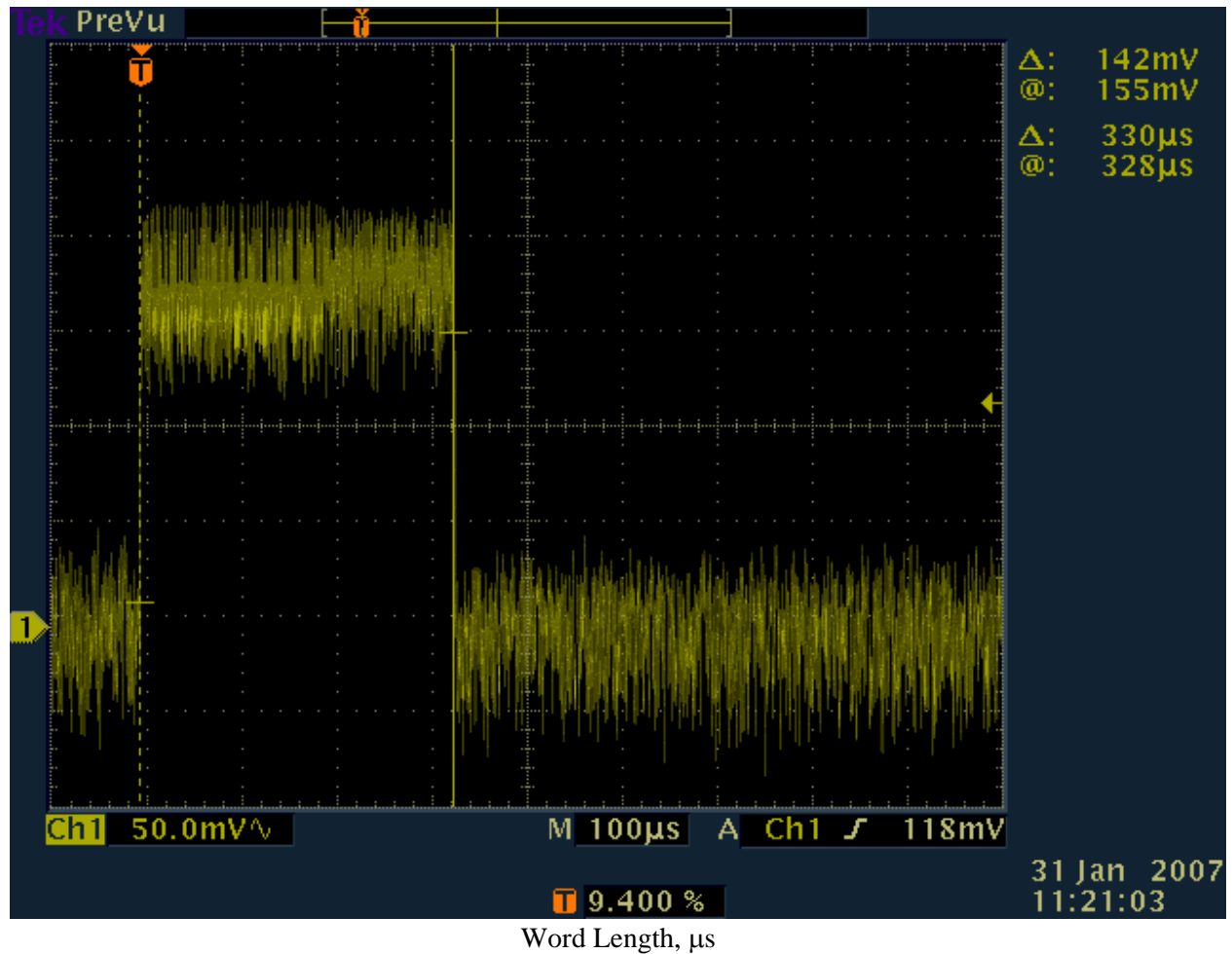
Notes: The EUT was measured in a radiated fashion. The RF output power was measured via integration using a 50 MHz span with a 100 kHz resolution bandwidth and 500 points of resolution. The data obtained was adjusted for equipment losses and converted from a field strength reading to a power reading using the provisions of FCC Public Notice DA-00-705A1 and RSS-Gen 4.6. The human RF exposure limit is 1 mW/cm<sup>2</sup>. The power density S generated by some value of EIRP at a given distance d is related by the equation:

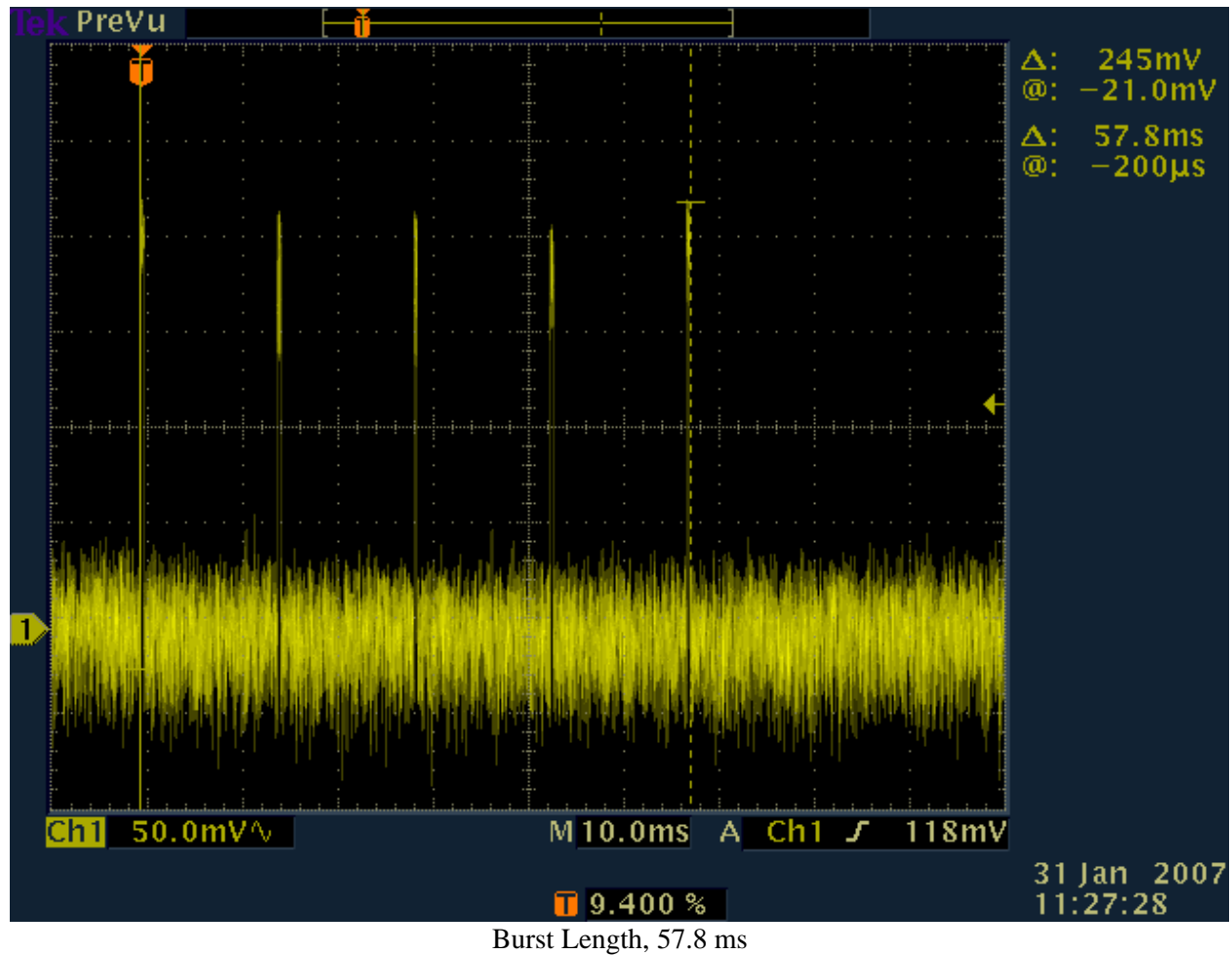
$$S = \text{EIRP} / (4\pi d^2)$$

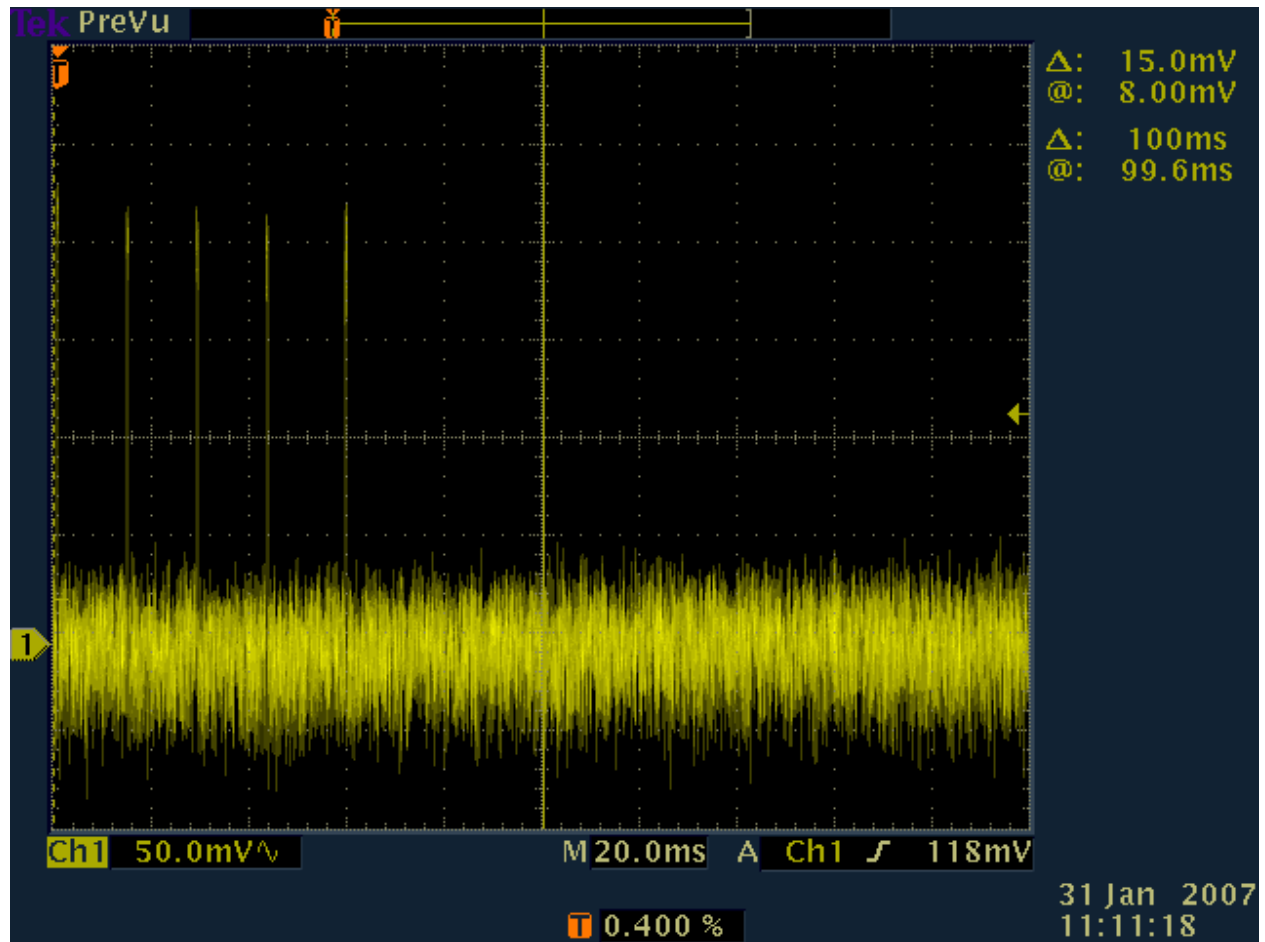
The distance, given a maximum EIRP of 17.73 dBm (59.33 mW), at which the radiated power density of the EUT is equal to the human RF exposure limit is 2.17 cm from the antenna. This result does not take averaging into account.

The EUT is exempt from RF evaluation as referenced in RSS-102 because the operating frequency is above 1.5 GHz and the EIRP does not exceed 5 watts.

A duty cycle averaging factor has been calculated which takes into account the typical EUT duty cycle. Normally the device would transmit a burst every 20 seconds. The worst-case burst length is 57.8 ms. Given the 57.8 ms burst length and the 1.65 ms of on-time during the burst, using the equation  $\text{dB reduction} = 20 * \text{LOG}(\text{dwell time} / \text{burst length})$ , the duty cycle average factor obtained is 30.88 dB. Given a max output power of 17.73 dBm, after adjustment for duty cycle the output power is -13.15 dBm (0.048 mW). The EUT is therefore exempt from SAR evaluation due to the output power being below 20 mW after duty cycle adjustment.

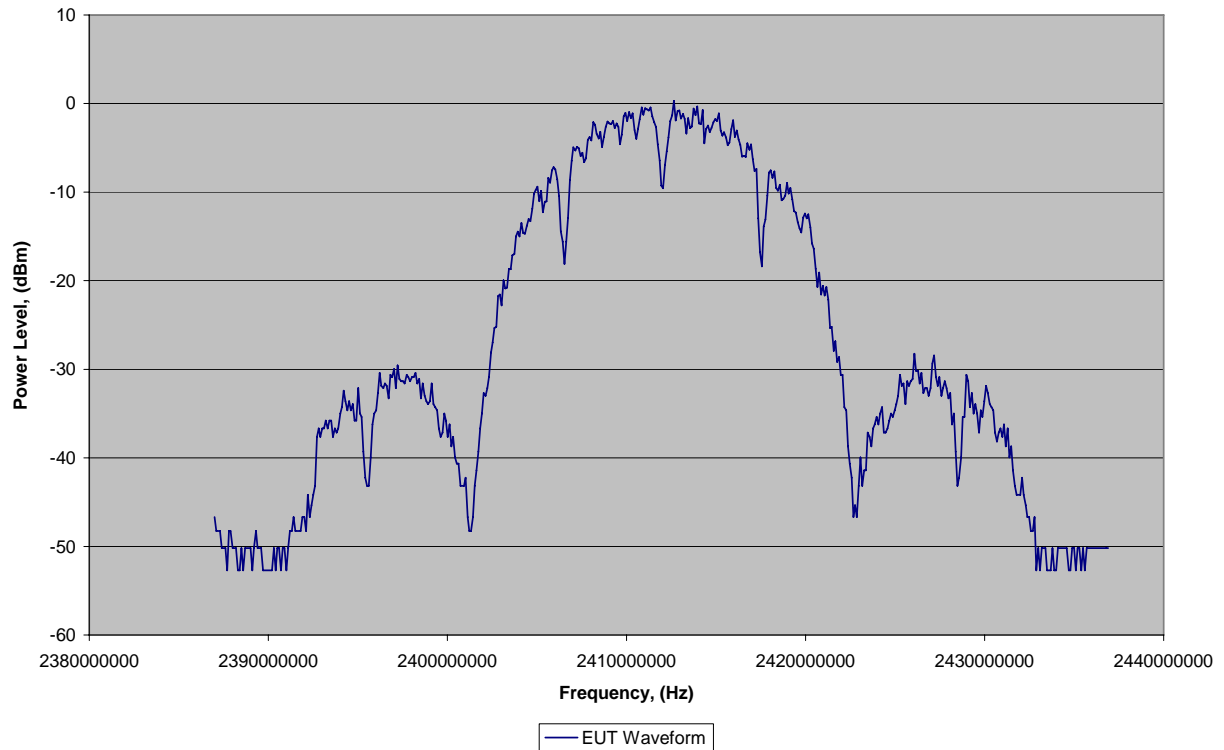




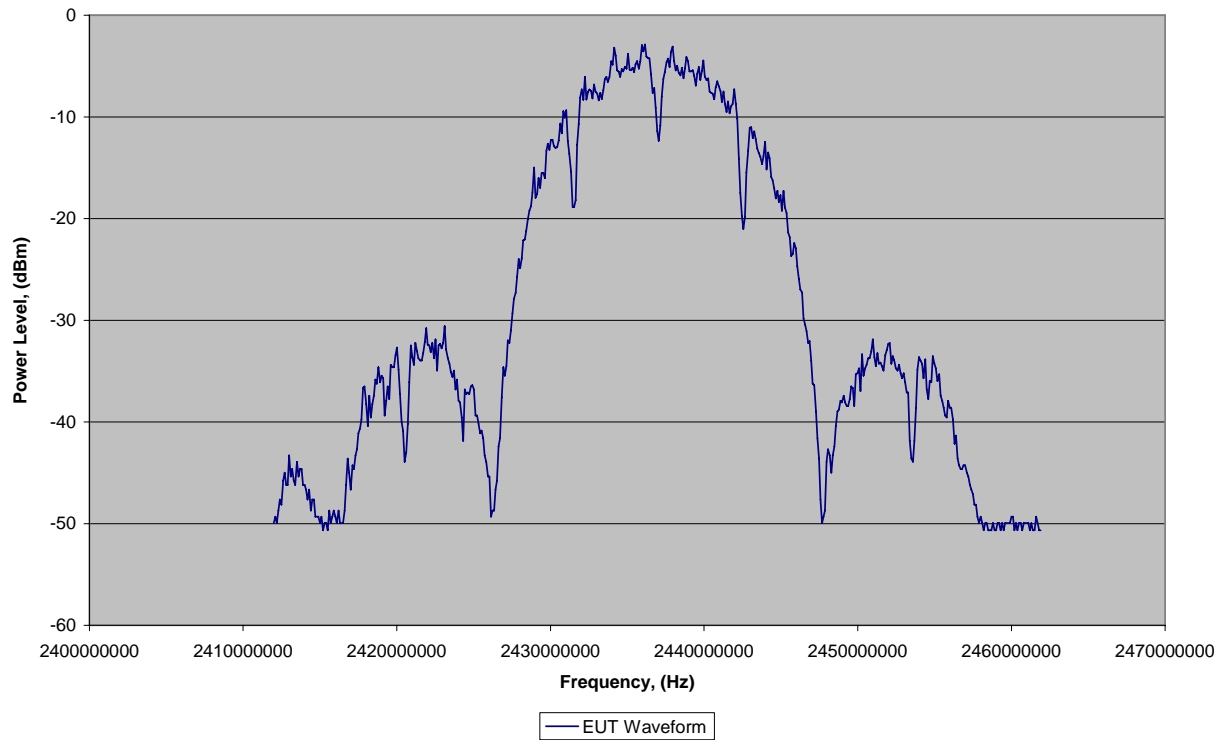


Burst Interval, >100 ms (20 seconds in normal operation)

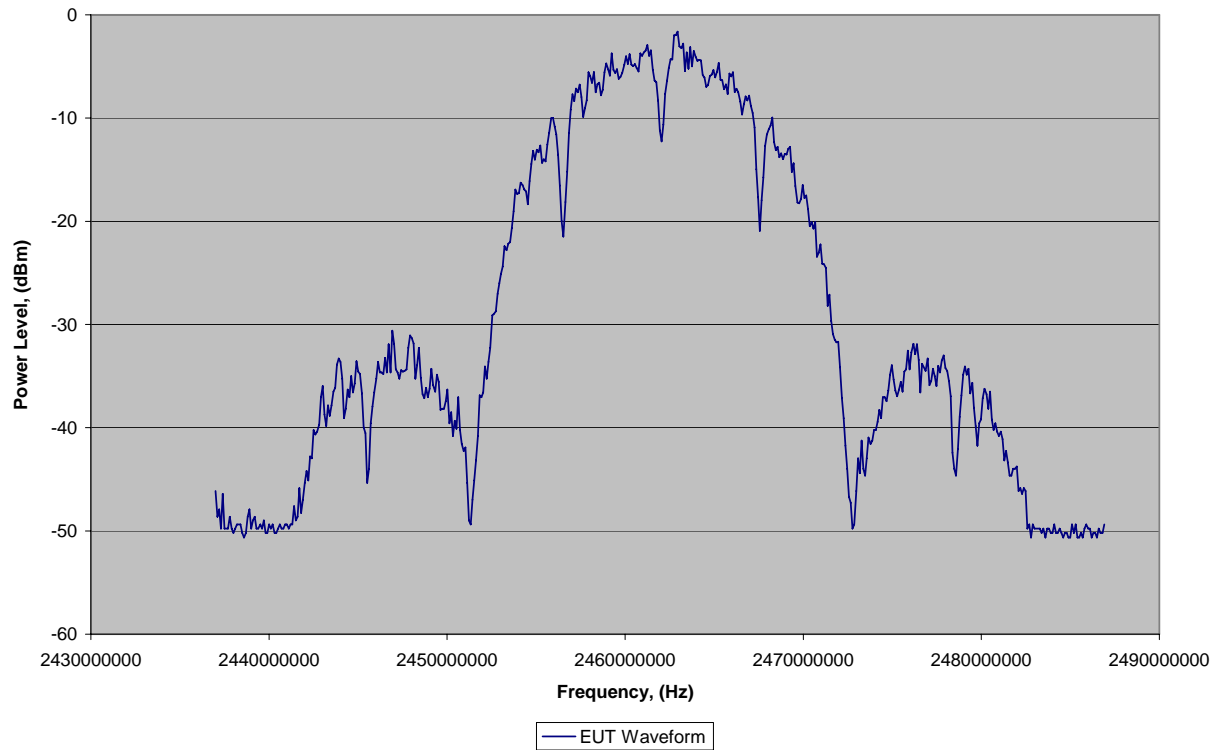
RF Power Trace, Channel 1, 59.326mW, 17.732dBm



RF Power Trace, Channel 6, 28.658mW, 14.572dBm



RF Power Trace, Channel 11, 31.45mW, 14.976dBm





**Test Results:** Pass

**Test Standard:** FCC Part 15 Subpart C 15.247, Industry Canada RSS-210 Annex 8

**Test:** 6 dB Bandwidth FCC 15.247(a)(2), RSS-210 A8.2

**Performance Criterion:** The 6dB bandwidth must exceed 500 kHz.

**Test Environment:**

Environmental Conditions During Testing:	Humidity (%):	25	Pressure (hPa):	998	Ambient (°C):	20
		24		998		19
		25		997		15
Pretest Verification Performed	Yes		Equipment under Test:		PN83000	

**Test Equipment Used:**

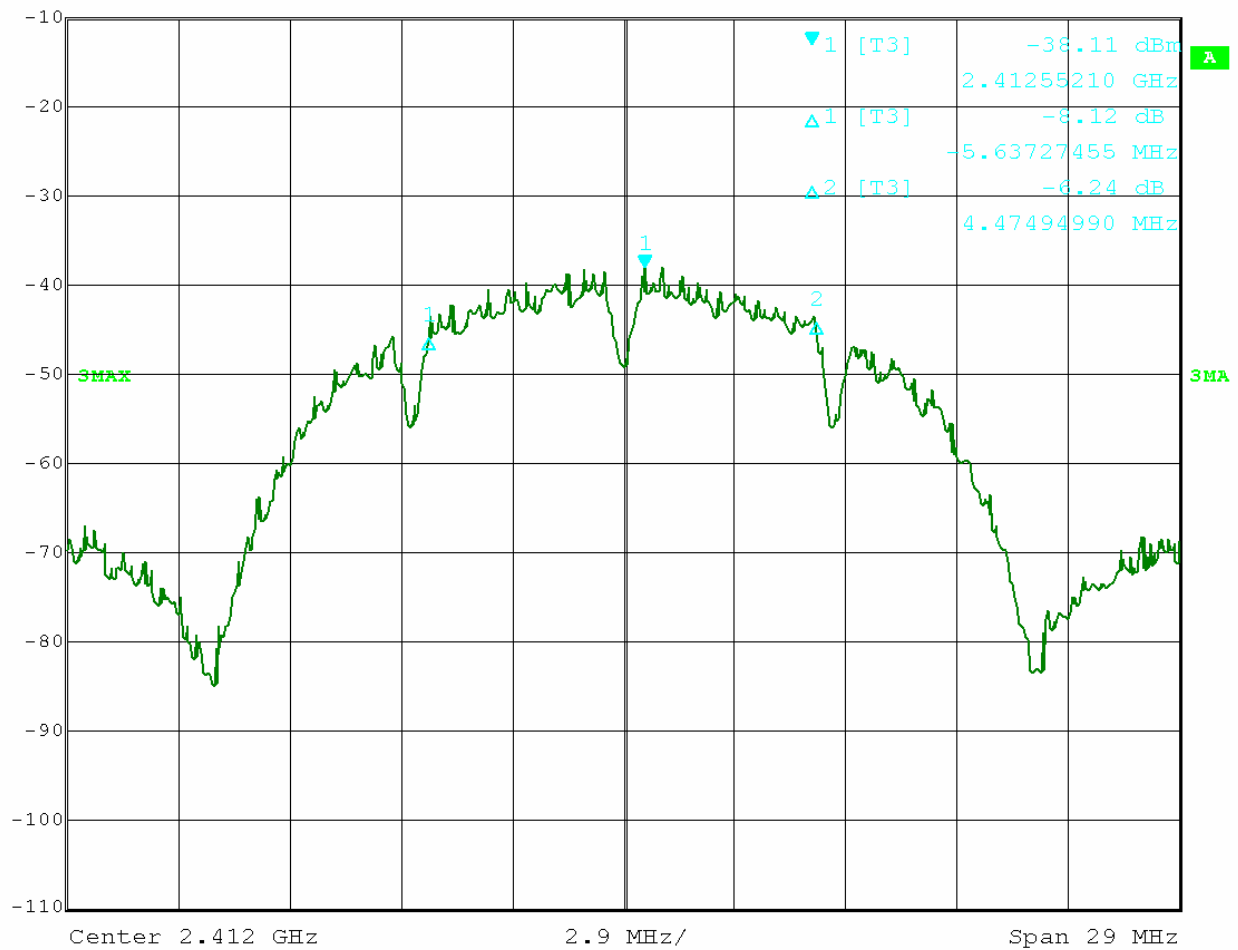
TEST EQUIPMENT LIST					
Item	Equipment Type	Make	Model No.	Serial No.	Next Cal. Due
1	HORN ANTENNA	EMCO	3115	9610-4980	06/12/2007
2	Spectrum Analyzer 20Hz - 40 GHz	Rohde & Schwartz	FSEK-30	100225	10/23/2007
3	Digital 4 Line Barometer	Mannix	0ABA116	BAR2	08/02/2007
4	High Frequency Cable 40GHz	Megaphase	TM40 K1K1 80	CBL030	12/04/2007

**Test Details:**

Notes: RF level in plots is not necessarily indicative of maximum RF output power.



Marker 1 [T3] RBW 100 kHz RF Att 0 dB  
 Ref Lvl -38.11 dBm VBW 300 kHz  
 -10 dBm 2.41255210 GHz SWT 25 ms Unit dBm

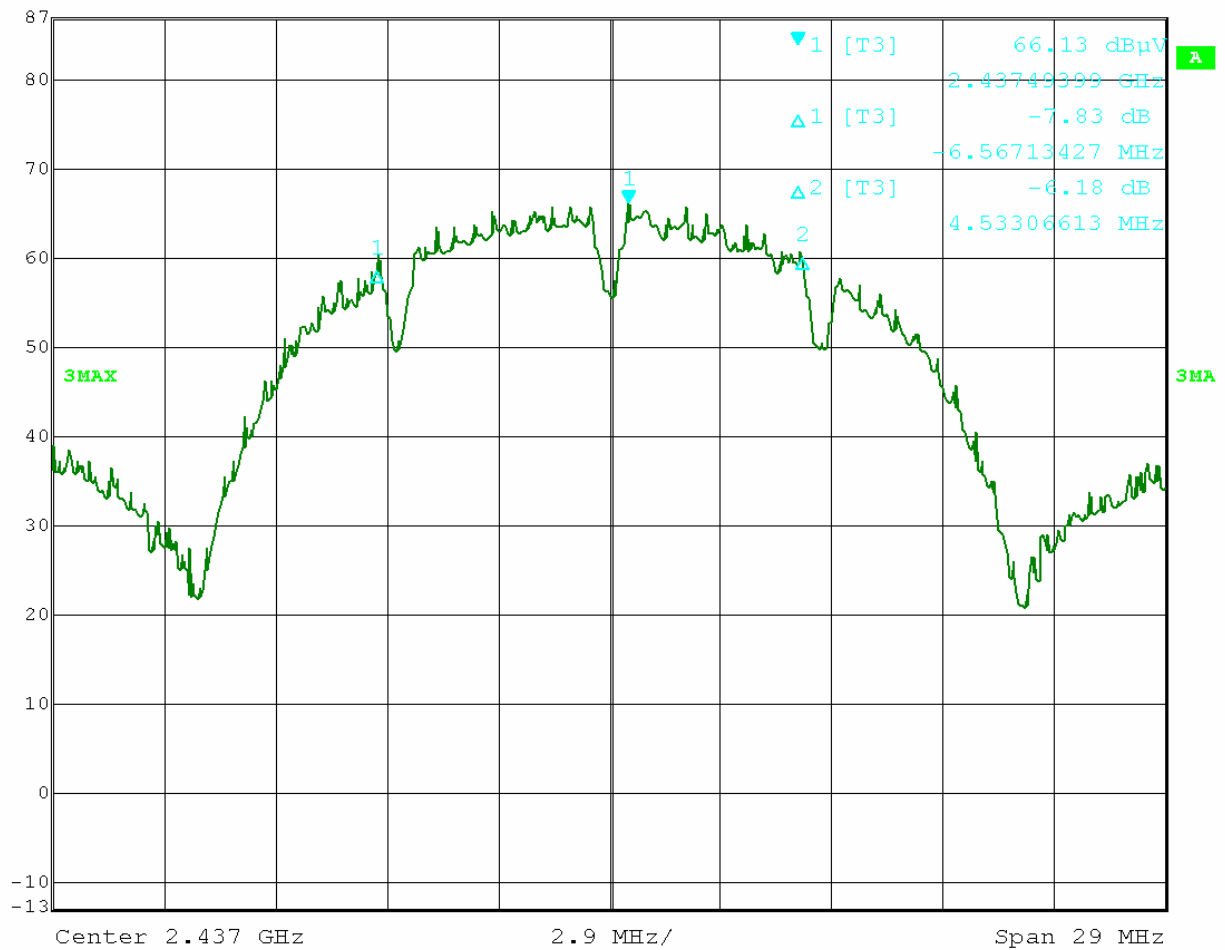


Date: 22.JAN.2007 20:46:49

Channel 1 2412 MHz  
 10.1 MHz 6 dB Bandwidth



Marker 1 [T3] RBW 100 kHz RF Att 0 dB  
 Ref Lvl 66.13 dBμV VBW 300 kHz  
 87 dBμV 2.43749399 GHz SWT 25 ms Unit dBμV

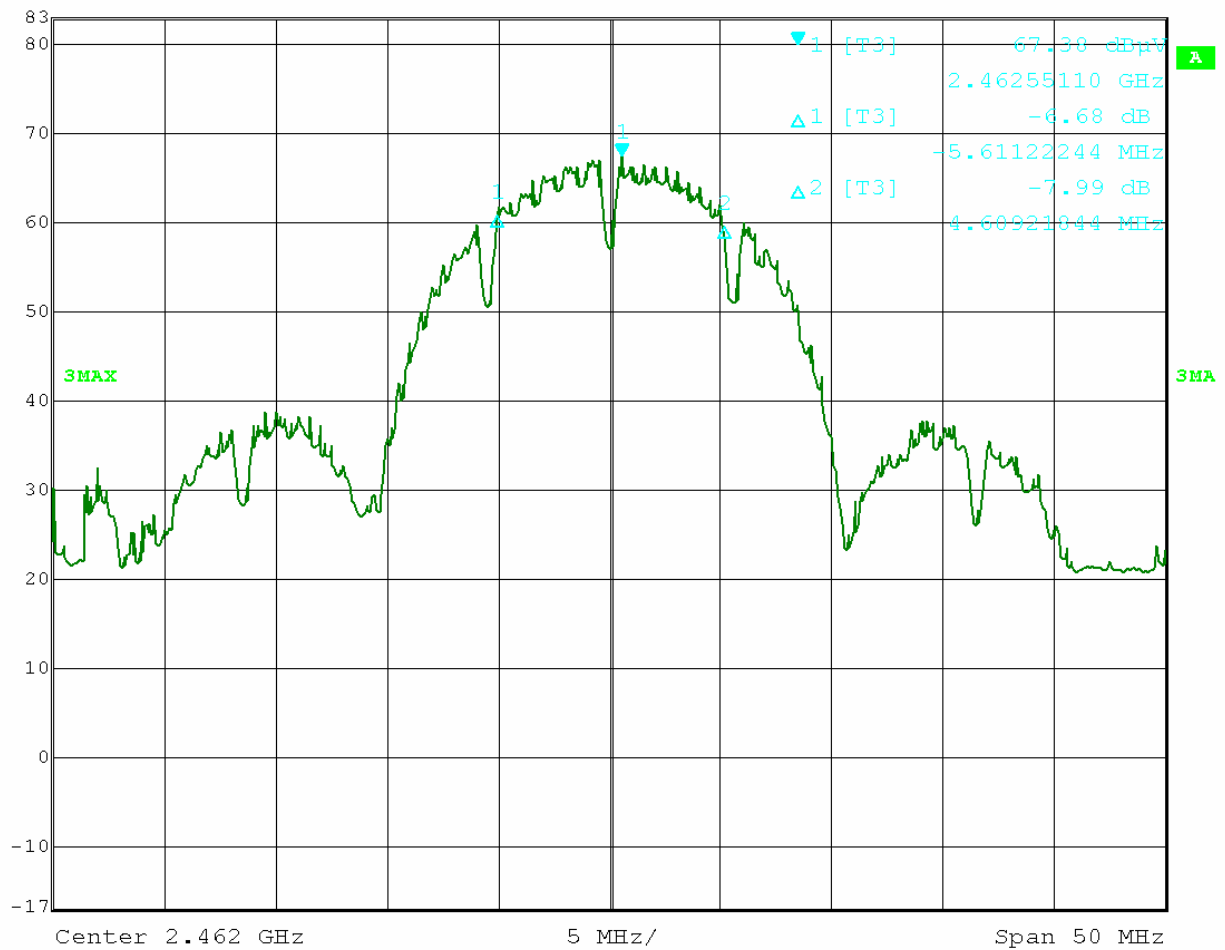


Date: 23.JAN.2007 22:38:23

Channel 6 2437 MHz  
 11.1 MHz 6 dB Bandwidth



Marker 1 [T3] RBW 100 kHz RF Att 0 dB  
 Ref Lvl 67.38 dBμV VBW 300 kHz  
 83 dBμV 2.46255110 GHz SWT 25 ms Unit dBμV



Date: 26.JAN.2007 15:56:25

Channel 11 2462 MHz  
 10.2 MHz 6 dB Bandwidth

**Test Results:** Pass

**Test Standard:** FCC Part 15 Subpart C 15.247, Industry Canada RSS-210 Annex 8

**Test:** Peak Power Spectral Density FCC 15.247(e), RSS-210 A8.2

**Performance Criterion:** The peak power spectral density must not exceed 8 dBm in any 3 kHz bandwidth.

**Test Environment:**

Environmental Conditions During Testing:	Humidity (%):	25 24 25	Pressure (hPa):	998 998 997	Ambient (°C):	20 19 15
Pretest Verification Performed	Yes		Equipment under Test:		PN83000	

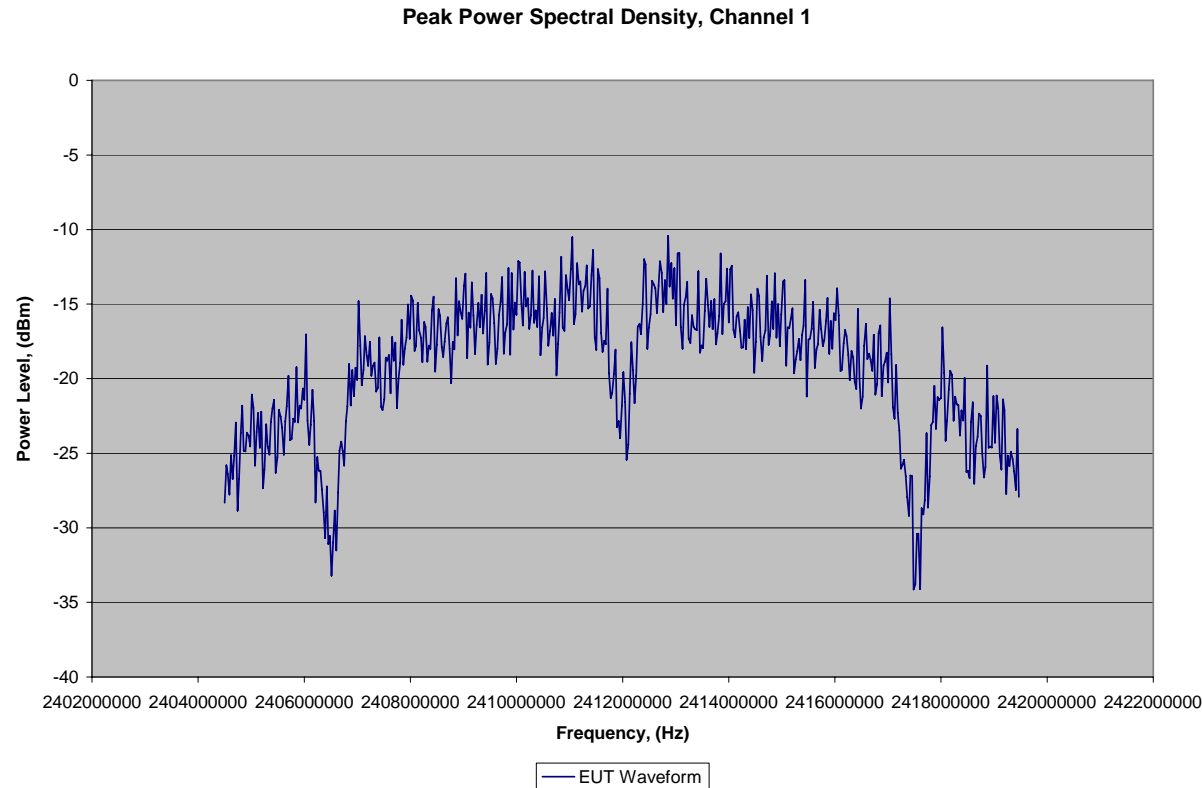
**Test Equipment Used:**

TEST EQUIPMENT LIST					
Item	Equipment Type	Make	Model No.	Serial No.	Next Cal. Due
1	Spectrum Analyzer 20Hz - 40 GHz	Rohde & Schwartz	FSEK-30	100225	10/23/2007
2	HORN ANTENNA	EMCO	3115	9610-4980	06/12/2007
3	High Frequency Cable 40GHz	Megaphase	TM40 K1K1 80	CBL030	12/04/2007
4	Digital 4 Line Barometer	Mannix	0ABA116	BAR2	08/02/2007

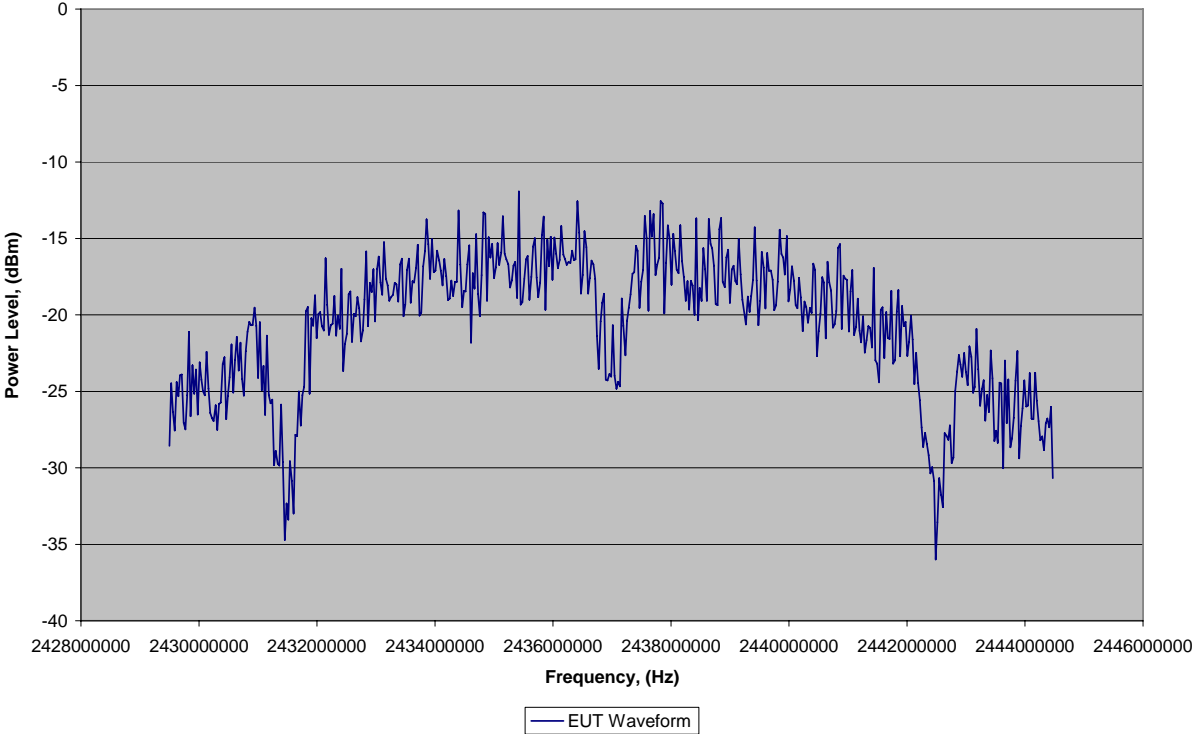
**Software Utilized:**

Name	Manufacturer	Version
EXCEL 2000	Microsoft Corporation	9.0.6926 SP-3
EMI BOXBOROUGH	Intertek	9/20/06 Revision

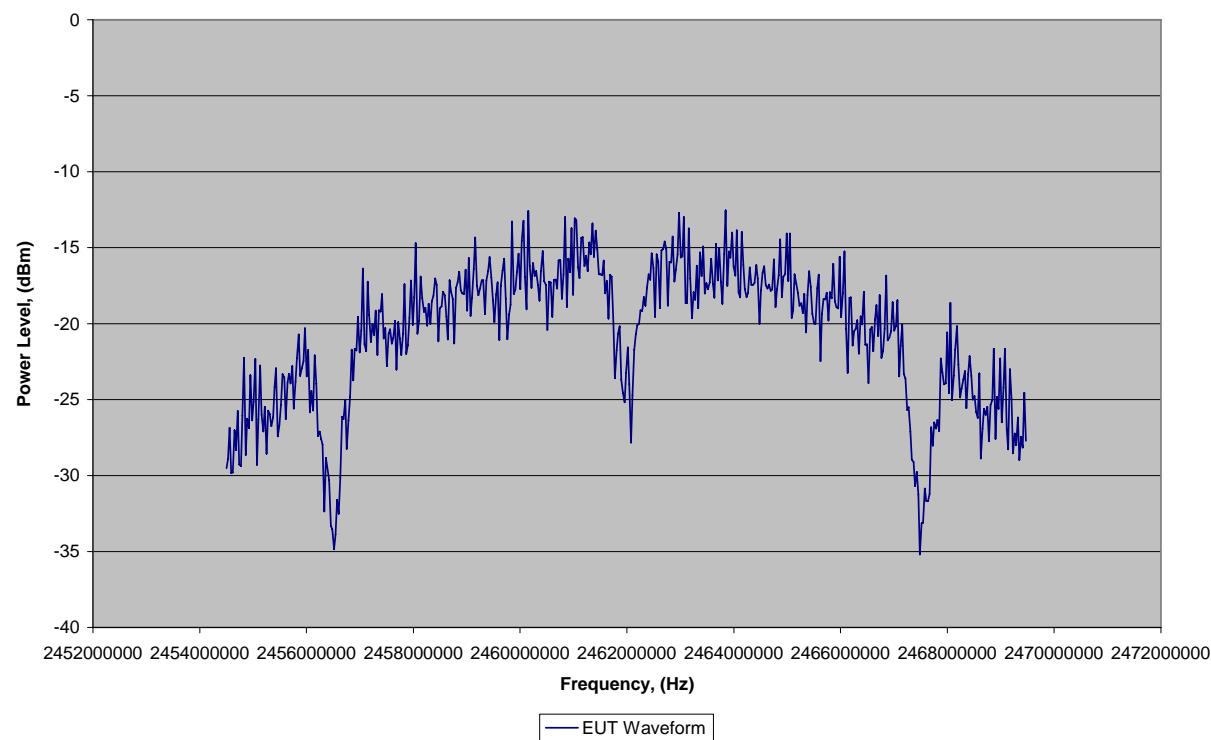
**Test Details:**



Peak Power Spectral Density, Channel 6



Peak Power Spectral Density, Channel 11





**Test Results:** Pass

**Test Standard:** FCC Part 15 Subpart C 15.247, Industry Canada RSS-210 Annex 8

**Test:** Band Edge Compliance FCC 15.215, 15.247(d), RSS-210 2.1, A8.5

**Performance Criterion:** Spurious emissions at the band edges must be at least 20 dB lower than the fundamental field strength when measured with a 100 kHz bandwidth.

**Test Environment:**

Environmental Conditions During Testing:	Humidity (%):	24 25	Pressure (hPa):	998 997	Ambient (°C):	19 15
Pretest Verification Performed	Yes		Equipment under Test:	PN83000		

**Test Equipment Used:**

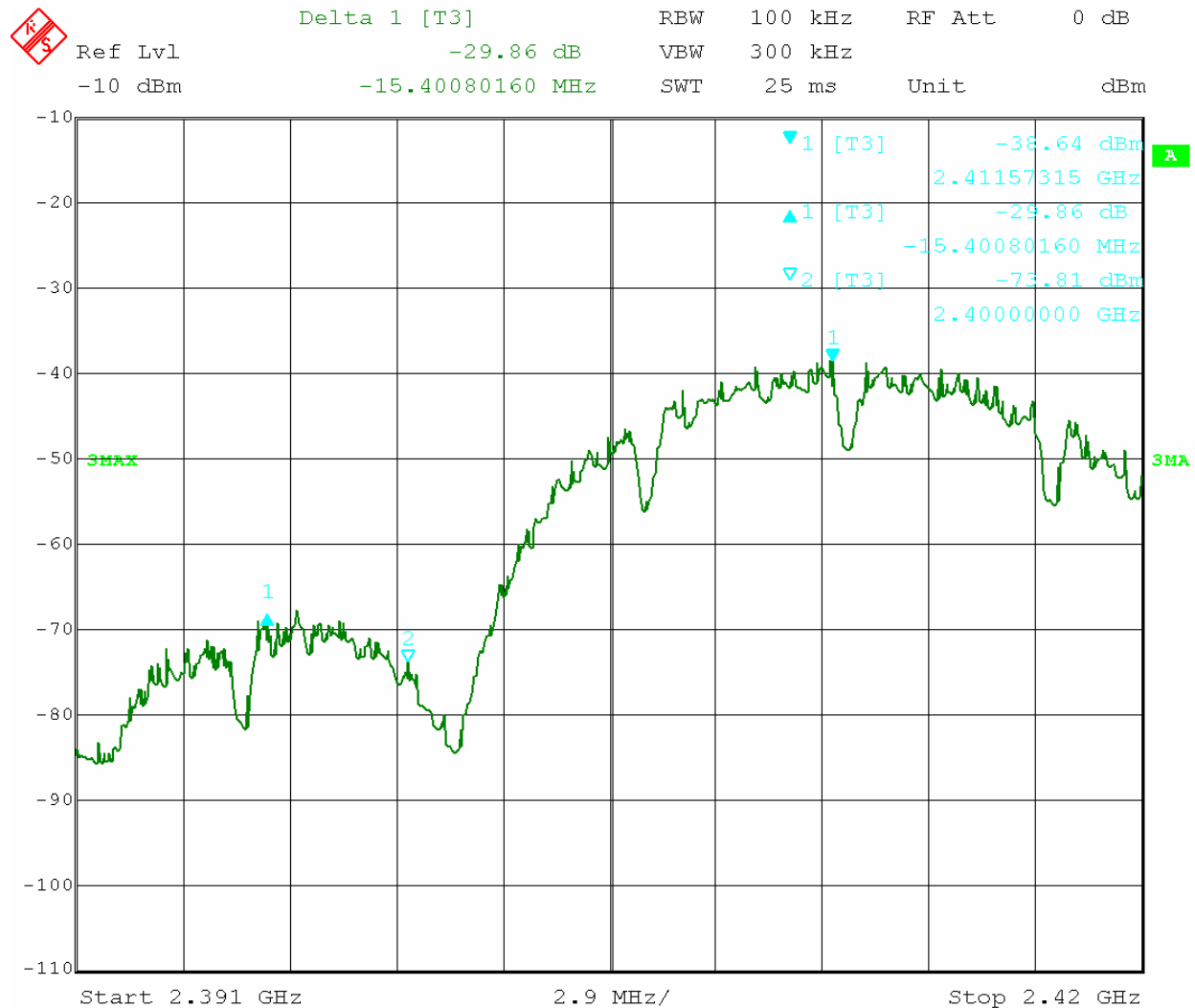
TEST EQUIPMENT LIST					
Item	Equipment Type	Make	Model No.	Serial No.	Next Cal. Due
1	Spectrum Analyzer 20Hz - 40 GHz	Rohde & Schwartz	FSEK-30	100225	10/23/2007
2	Digital 4 Line Barometer	Mannix	0ABA116	BAR2	08/02/2007
3	HORN ANTENNA	EMCO	3115	9610-4980	06/12/2007
4	High Frequency Cable 40GHz	Megaphase	TM40 K1K1 80	CBL030	12/04/2007

**Software Utilized:**

Name	Manufacturer	Version
EXCEL 2000	Microsoft Corporation	9.0.6926 SP-3
EMI BOXBOROUGH	Intertek	9/20/06 Revision

## Test Details:

Notes: There is 29.86 dB of attenuation between the lower peak and the highest emission at the lower band edge, and 43.75 dB of attenuation between the higher peak and the highest emission at the upper band edge. The channel 11 peak value measured in a 1 MHz bandwidth was 104.56 dBuV/m at 3m test distance. Adjusted for the 43.75 dB of attenuation at the band edge, the value at the upper band edge is therefore 60.81 dBuV/m at 3 meters in a 1 MHz resolution bandwidth, which meets the peak restricted band requirements of 74 dBuV/m at 3 meters in a 1 MHz bandwidth. When further adjusted for the 30.89 dB duty cycle averaging factor, the average value at the band edge is 29.92 dBuV/m at 3 meters measured with a 1 MHz bandwidth. This meets the average restricted band emissions requirements of 54 dBuV/m at 3 meters in a 1 MHz resolution bandwidth.

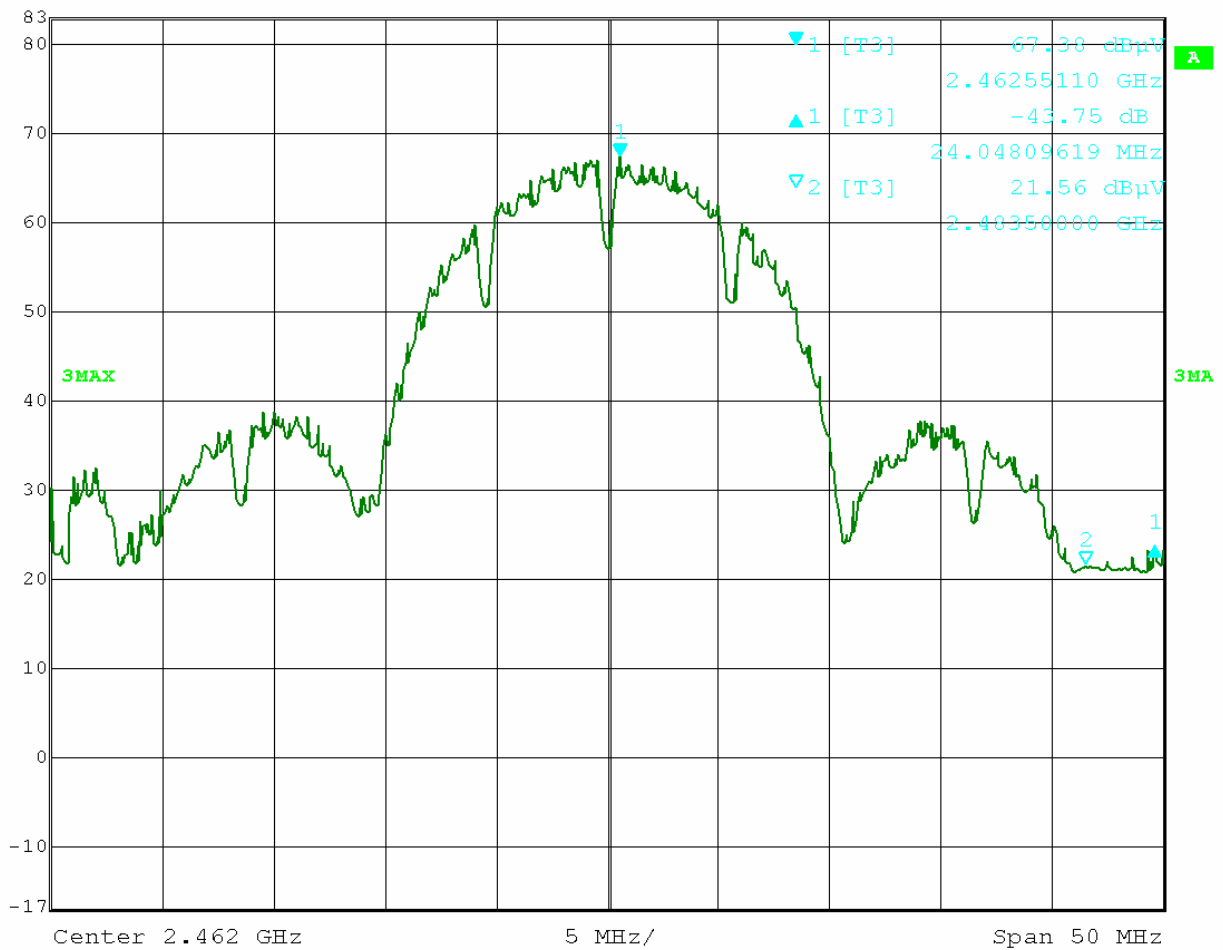


Date: 22.JAN.2007 20:41:05

Lower Band Edge



Delta 1 [T3] RBW 100 kHz RF Att 0 dB  
 Ref Lvl -43.75 dB VBW 300 kHz  
 83 dBμV 24.04809619 MHz SWT 25 ms Unit dBμV



Date: 26.JAN.2007 15:59:29

Upper Band Edge

**Test Results:** Pass

**Test Standard:** FCC Part 15 Subpart C 15.247, Industry Canada RSS-210 Annex 8

**Test:** Radiated Emissions FCC 15.205, 15.209, 15.247(d), RSS-210 2.2, 2.7, A8.5

**Performance Criterion:** Spurious emissions must be at least 20 dB lower than the fundamental field strength when measured with a 100 kHz bandwidth. Emissions which fall in the restricted bands of 15.205 must meet the general limits of 15.209. Emissions which fall in the restricted bands of RSS-210 2.2 Table 1 must meet the general limits of RSS-210 2.7 Tables 2 and 3.

**Test Environment:**

Environmental Conditions During Testing:	Humidity (%):	25 24 25 25	Pressure (hPa):	998 998 997 997	Ambient (°C):	20 19 16 15
Pretest Verification Performed	Yes	Equipment under Test:		PN83000		

**Test Equipment Used:**

TEST EQUIPMENT LIST					
Item	Equipment Type	Make	Model No.	Serial No.	Next Cal. Due
1	Digital 4 Line Barometer	Mannix	0ABA116	BAR2	08/02/2007
2	ANTENNA	EMCO	3142	9711-1223	01/25/2007*
3	HORN ANTENNA	EMCO	3115	9610-4980	06/12/2007
4	ANTENNA, RIDGED GUIDE, 18-40 GHZ	EMCO	3116	2090	12/13/2007
5	Spectrum Analyzer	Agilent	E7405A	US40240205	08/16/2007
6	Spectrum Analyzer 20Hz - 40 GHz	Rohde & Schwartz	FSEK-30	100225	10/23/2007
7	High Frequency Cable 40GHz	Megaphase	TM40 K1K1 80	CBL029	12/04/2007
8	High Frequency Cable 40GHz	Megaphase	TM40 K1K1 80	CBL030	12/04/2007
9	3 Meter In floor cable for site 2	ITS	RG214B/U	S2 3M FLR	09/26/2007
10	PREAMPLIFIER 1- 40 GHz	MITEQ	NSP4000-NF	507145	11/14/2007
11	3GHz High Pass Filter	Reactel, Inc	7HSX-3G/18G-S11	06-1	09/06/2007

\* - This antenna was only used before 01/26/2007

**Software Utilized:**

Name	Manufacturer	Version
EXCEL 2000	Microsoft Corporation	9.0.6926 SP-3
EMI BOXBOROUGH	Intertek	9/20/06 Revision

## Test Details:

### Special Radiated Emissions

Company: PanGo Networks  
 Model #: Lantag V3  
 Serial #: 30  
 Engineers: Nicholas Abbondante  
 Project #: 3113910  
 Standard: FCC Part 15 Subpart C 15.247/IC RSS-210 Annex 8  
 Receiver: Agilent E7405A (AGL001)  
 PreAmp: PRE8 11-14-07.txt  
 Barometer: BAR2  
 Temp/Humidity/Pressure: 19c 24% 998mB  
 Antenna & Cables: N Bands: N, LF, HF, SHF  
 LF Antenna: HORN3 V3m 6-12-07.txt HORN3 H3m 6-12-07.txt  
 N Antenna: LOG2 1-25-07 V3.txt LOG2 1-25-07 H3.txt  
 HF Antenna: HORN3 V3m 6-12-07.txt HORN3 H3m 6-12-07.txt  
 SHF Antenna: EMC04 V 1m 12-13-2007.txt EMC04 H 1m 12-13-2007.txt  
 LF Cable(s): CBL029 12-04-2007.txt CBL030 12-04-2007.txt  
 N Cable(s): S2 3M FLR 9-26-07.txt NONE.  
 HF Cable(s): CBL030 12-04-2007.txt NONE.  
 SHF Cable(s): CBL029 12-04-2007.txt CBL030 12-04-2007.txt  
 Location: Site 2  
 Date(s): 01/23/07  
 Limit Distance (m): 3  
 Test Distance (m): 3  
 PreAmp Used? (Y or N): N Voltage/Frequency: Fresh Battery Frequency Range: 30-1000 MHz  
 Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth	FCC	IC
PK	V	31.650	7.3	15.9	0.7	0.0	0.0	24.0	80.2	-56.2	120/300 kHz		
QP	V	31.650	4.9	15.9	0.7	0.0	0.0	21.6	80.2	-58.6	120/300 kHz		
PK	V	36.050	9.5	13.5	0.9	0.0	0.0	23.9	80.2	-56.3	120/300 kHz		
QP	V	36.050	5.2	13.5	0.9	0.0	0.0	19.6	80.2	-60.6	120/300 kHz		
PK	V	48.000	7.3	8.9	0.9	0.0	0.0	17.2	80.2	-63.0	120/300 kHz		
QP	V	48.000	4.6	8.9	0.9	0.0	0.0	14.5	80.2	-65.7	120/300 kHz		
PK	V	74.520	10.1	7.5	1.2	0.0	0.0	18.8	40.0	-21.2	120/300 kHz	RB	RB
QP	V	74.520	7.1	7.5	1.2	0.0	0.0	15.8	40.0	-24.2	120/300 kHz	RB	RB
PK	V	256.000	0.1	12.8	2.4	0.0	0.0	15.2	46.0	-30.8	120/300 kHz	RB	RB
QP	V	256.000	-6.5	12.8	2.4	0.0	0.0	8.7	46.0	-37.3	120/300 kHz	RB	RB
PK	V	350.000	-1.6	15.2	2.4	0.0	0.0	16.0	80.2	-64.2	120/300 kHz		
QP	V	350.000	-7.2	15.2	2.4	0.0	0.0	10.4	80.2	-69.8	120/300 kHz		

### Special Radiated Emissions

Company: PanGo Networks  
 Model #: Lantag V3  
 Serial #: 30  
 Engineers: Nicholas Abbondante  
 Project #: 3113910  
 Standard: FCC Part 15 Subpart C 15.247/IC RSS-210 Annex 8  
 Receiver: R&S FSEK-30 (ROS001)  
 PreAmp: PRE8 11-14-07.txt  
 Barometer: BAR2  
 Temp/Humidity/Pressure: 19/20/16c 24%/25%/25% 998/997mB  
 Antenna & Cables: HF Bands: N, LF, HF, SHF  
 LF Antenna: HORN3 V3m 6-12-07.txt HORN3 H3m 6-12-07.txt  
 N Antenna: LOG2 1-25-07 V3.txt LOG2 1-25-07 H3.txt  
 HF Antenna: HORN3 V3m 6-12-07.txt HORN3 H3m 6-12-07.txt  
 SHF Antenna: EMC04 V 1m 12-13-2007.txt EMC04 H 1m 12-13-2007.txt  
 LF Cable(s): CBL029 12-04-2007.txt CBL030 12-04-2007.txt  
 N Cable(s): S2 3M FLR 9-26-07.txt NONE.  
 HF Cable(s): CBL030 12-04-2007.txt NONE.  
 SHF Cable(s): CBL029 12-04-2007.txt CBL030 12-04-2007.txt  
 Location: Site 2  
 Date(s): 01/22/07 01/23/07 01/25/07  
 Limit Distance (m): 3  
 Test Distance (m): 3  
 PreAmp Used? (Y or N): N Voltage/Frequency: Fresh Battery Frequency Range: 1-4 GHz  
 Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth	FCC	IC
PK	H	2412.000	68.9	30.0	1.5	0.0	0.0	100.3	-	-	100/300kHz		
PK	V	2437.000	66.5	29.9	1.5	0.0	0.0	97.9	-	-	100/300kHz		
PK	V	2462.000	67.4	30.0	1.5	0.0	0.0	98.9	-	-	100/300kHz		
PK	H	2491.000	27.6	30.2	1.6	0.0	0.0	59.3	74.0	-14.7	1/3 MHz	RB	RB
AVG	H	2491.000	18.7	30.2	1.6	0.0	0.0	50.4	54.0	-3.6	1/3 MHz	RB	RB
PK	H	2491.000	19.0	30.2	1.6	0.0	0.0	50.8	80.2	-29.4	100/300kHz	RB	RB
AVG	H	2491.000	8.3	30.2	1.6	0.0	0.0	40.1	80.2	-40.1	100/300kHz	RB	RB
PK	H	2940.600	21.8	31.6	1.5	0.0	0.0	54.9	80.2	-25.2	100/300kHz		
AVG	H	2940.600	17.0	31.6	1.5	0.0	0.0	50.2	80.2	-30.0	100/300kHz		

## Radiated Emissions

Company: PanGo Networks

Model #: Lantag V3

Serial #: 30

Engineers: Nicholas Abbondante

Location: Site 2

Project #: 3113910

Date(s): 01/22/07 01/25/07 01/26/07

Standard: FCC Part 15 Subpart C 15.247/IC RSS-210 Annex 8

Receiver: R&S FSEK-30 (ROS001)

Limit Distance (m): 3

PreAmp: PRE8 11-14-07.txt

Test Distance (m): 3

Antenna & Cables: LF Bands: N, LF, HF, SHF

LF Antenna: HORN3 V3m 6-12-07.txt HORN3 H3m 6-12-07.txt

N Antenna: LOG2 1-25-07 V3.txt LOG2 1-25-07 H3.txt

HF Antenna: HORN3 V3m 6-12-07.txt HORN3 H3m 6-12-07.txt

SHF Antenna: EMC04 V 1m 12-13-2007.txt EMC04 H 1m 12-13-2007.txt

LF Cable(s): CBL029 12-04-2007.txt CBL030 12-04-2007.txt

N Cable(s): S2 3M FLR 9-26-07.txt NONE.

HF Cable(s): CBL030 12-04-2007.txt NONE.

Barometer: BAR2 Temp/Humidity/Pressure: 19c/16c 24%/25% 998/997mB SHF Cable(s): CBL029 12-04-2007.txt CBL030 12-04-2007.txt

PreAmp Used? (Y or N): Y Voltage/Frequency: Fresh Battery Frequency Range: 4-18 GHz

Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth	FCC	IC
Note: Also using high pass filter REA004 with passband from 3-18 GHz													
PK	V	4824.000	43.5	34.5	3.8	21.6	0.0	60.3	74.0	-13.7	1/3 MHz	RB	RB
AVG	V	4824.000	12.6	34.5	3.8	21.6	0.0	29.4	54.0	-24.6	1/3 MHz	RB	RB
PK	V	7236.000	32.7	37.0	4.8	20.3	0.0	54.2	80.2	-26.0	100kHz/3MHz		
AVG	V	7236.000	1.8	37.0	4.8	20.3	0.0	23.3	80.2	-56.9	100kHz/3MHz		
PK	V	9648.000	32.7	40.4	5.6	18.5	0.0	60.1	80.2	-20.0	100kHz/3MHz		
AVG	V	9648.000	1.8	40.4	5.6	18.5	0.0	29.3	80.2	-50.9	100kHz/3MHz		
PK	H	12060.000	34.3	40.8	6.6	18.2	0.0	63.5	74.0	-10.5	1/3 MHz	RB	RB
AVG	H	12060.000	22.1	40.8	6.6	18.2	0.0	51.3	54.0	-2.7	1/3 MHz	RB	RB
PK	H	14472.000	33.8	43.3	7.6	20.0	0.0	64.7	74.0	-9.3	1/3 MHz	RB	RB
AVG	H	14472.000	22.1	43.3	7.6	20.0	0.0	53.0	54.0	-1.0	1/3 MHz	RB	RB
PK	H	16884.000	21.7	43.0	9.5	23.8	0.0	50.5	80.2	-29.7	100kHz/3MHz		
AVG	H	16884.000	12.3	43.0	9.5	23.8	0.0	41.0	80.2	-39.2	100kHz/3MHz		
PK	V	4874.000	42.6	34.7	3.8	21.6	0.0	59.6	74.0	-14.4	1/3 MHz	RB	RB
AVG	V	4874.000	11.7	34.7	3.8	21.6	0.0	28.7	54.0	-25.3	1/3 MHz	RB	RB
PK	H	7311.000	38.0	38.6	4.9	20.3	0.0	61.2	74.0	-12.8	1/3 MHz	RB	RB
AVG	H	7311.000	7.2	38.6	4.9	20.3	0.0	30.3	54.0	-23.7	1/3 MHz	RB	RB
PK	H	9748.000	35.7	41.7	5.7	18.5	0.0	64.6	80.2	-15.6	100kHz/3MHz		
AVG	H	9748.000	4.8	41.7	5.7	18.5	0.0	33.7	80.2	-46.5	100kHz/3MHz		
PK	H	12185.000	35.2	41.1	6.7	18.3	0.0	64.7	74.0	-9.3	1/3 MHz	RB	RB
AVG	H	12185.000	22.2	41.1	6.7	18.3	0.0	51.7	54.0	-2.3	1/3 MHz	RB	RB
PK	V	14622.000	25.1	42.5	7.7	20.1	0.0	55.1	80.2	-25.1	100kHz/3MHz		
AVG	V	14622.000	17.3	42.5	7.7	20.1	0.0	47.3	80.2	-32.9	100kHz/3MHz		
PK	V	17059.000	24.7	43.3	9.7	23.7	0.0	54.0	80.2	-26.2	100kHz/3MHz		
AVG	V	17059.000	17.5	43.3	9.7	23.7	0.0	46.8	80.2	-33.3	100kHz/3MHz		
PK	V	4924.000	50.3	34.9	3.8	21.7	0.0	67.4	74.0	-6.6	1/3 MHz	RB	RB
AVG	V	4924.000	19.4	34.9	3.8	21.7	0.0	36.5	54.0	-17.5	1/3 MHz	RB	RB
PK	V	7386.000	39.1	37.4	4.9	20.2	0.0	61.2	74.0	-12.8	1/3 MHz	RB	RB
AVG	V	7386.000	8.3	37.4	4.9	20.2	0.0	30.3	54.0	-23.7	1/3 MHz	RB	RB
PK	V	9848.000	33.6	40.6	5.7	18.5	0.0	61.5	80.2	-18.7	100kHz/3MHz		
AVG	V	9848.000	2.7	40.6	5.7	18.5	0.0	30.6	80.2	-49.6	100kHz/3MHz		
PK	V	12310.000	32.8	40.7	6.7	18.4	0.0	61.8	74.0	-12.2	1/3 MHz	RB	RB
AVG	V	12310.000	22.7	40.7	6.7	18.4	0.0	51.7	54.0	-2.3	1/3 MHz	RB	RB
PK	V	14772.000	23.4	42.9	7.7	20.2	0.0	53.9	80.2	-26.3	100kHz/3MHz		
AVG	V	14772.000	16.4	42.9	7.7	20.2	0.0	46.9	80.2	-33.3	100kHz/3MHz		
PK	V	17234.000	22.4	44.5	10.0	23.8	0.0	53.1	80.2	-27.0	100kHz/3MHz		
AVG	V	17234.000	14.3	44.5	10.0	23.8	0.0	45.0	80.2	-35.2	100kHz/3MHz		

## Special Radiated Emissions

Company: PanGo Networks

Model #: Lantag V3

Serial #: 30

Engineers: Nicholas Abbondante

Location: Site 2

Project #: 3113910

Date(s): 01/22/07 01/25/07 01/26/07

Standard: FCC Part 15 Subpart C 15.247/IC RSS-210 Annex 8

Receiver: R&S FSEK-30 (ROS001)

Limit Distance (m): 3

PreAmp: PRE8 11-14-07.txt

Test Distance (m): 1

Barometer: BAR2

Temp/Humidity/Pressure: 19c/16c 24%/25% 998/997mB

Antenna & Cables: SHF Bands: N, LF, HF, SHF

LF Antenna: HORN3 V3m 6-12-07.txt HORN3 H3m 6-12-07.txt

N Antenna: LOG2 1-25-07 V3.txt LOG2 1-25-07 H3.txt

HF Antenna: HORN3 V3m 6-12-07.txt HORN3 H3m 6-12-07.txt

SHF Antenna: EMC04 V 1m 12-13-2007.txt EMC04 H 1m 12-13-2007.txt

LF Cable(s): CBL029 12-04-2007.txt CBL030 12-04-2007.txt

N Cable(s): S2 3M FLR 9-26-07.txt NONE.

HF Cable(s): CBL030 12-04-2007.txt NONE.

SHF Cable(s): CBL029 12-04-2007.txt CBL030 12-04-2007.txt

PreAmp Used? (Y or N): Y

Voltage/Frequency: Fresh Battery

Frequency Range: 18-25 GHz

Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth	FCC	IC
Note: Also using high pass filter REA006 with passband from 18-40 GHz													
PK	H	19296.000	38.6	45.9	10.3	23.9	9.5	61.4	74.0	-12.6	1/3 MHz	RB	RB
AVG	H	19296.000	7.7	45.9	10.3	23.9	9.5	30.5	54.0	-23.5	1/3 MHz	RB	RB
PK	H	21708.000	21.8	45.7	9.9	21.5	9.5	46.4	80.2	-33.8	100/300 kHz		
AVG	H	21708.000	16.0	45.7	9.9	21.5	9.5	40.6	80.2	-39.6	100/300 kHz		
PK	H	24120.000	18.3	46.1	10.4	19.5	9.5	45.7	80.2	-34.5	100/300 kHz		
AVG	H	24120.000	14.4	46.1	10.4	19.5	9.5	41.7	80.2	-38.4	100/300 kHz		
PK	H	19496.000	36.4	46.0	10.1	23.8	9.5	59.2	74.0	-14.8	1/3 MHz	RB	RB
AVG	H	19496.000	5.5	46.0	10.1	23.8	9.5	28.3	54.0	-25.7	1/3 MHz	RB	RB
PK	H	21933.000	25.2	45.6	10.0	21.6	9.5	49.6	80.2	-30.6	100/300 kHz		
AVG	H	21933.000	17.0	45.6	10.0	21.6	9.5	41.4	80.2	-38.7	100/300 kHz		
PK	H	24370.000	24.6	46.2	10.4	20.1	9.5	51.6	80.2	-28.6	100/300 kHz		
AVG	H	24370.000	17.3	46.2	10.4	20.1	9.5	44.3	80.2	-35.9	100/300 kHz		
PK	H	19696.000	34.5	45.8	10.0	23.8	9.5	57.0	74.0	-17.0	1/3 MHz	RB	RB
AVG	H	19696.000	3.6	45.8	10.0	23.8	9.5	26.1	54.0	-27.9	1/3 MHz	RB	RB
PK	H	22158.000	34.2	45.7	10.1	21.7	9.5	58.8	74.0	-15.2	1/3 MHz	RB	RB
AVG	H	22158.000	23.3	45.7	10.1	21.7	9.5	47.9	54.0	-6.1	1/3 MHz	RB	RB
PK	H	24620.000	25.2	46.4	10.5	20.6	9.5	51.8	80.2	-28.3	100/300 kHz		
AVG	H	24620.000	16.4	46.4	10.5	20.6	9.5	43.1	80.2	-37.1	100/300 kHz		



**Setup Photos**





