

Nemko Test Report: 122666-1TRFWL

Applicant: Load Systems International Inc.
4495 Blvd Hamel, Suite 110,
Quebec, QC
G1P 2J7

Apparatus: GS320 Stand Alone Windspeed Display
GS375 Stand Alone A2B Display

FCC ID: QVBGS300

In Accordance With: FCC Part 15 Subpart C, 15.247
FHSS System and Digitally Modulated Radiators
902-928 MHz, 2400-2483.5 MHz, 5725-5850 MHz

Authorized By:

A handwritten signature in blue ink, appearing to read 'Andrey Adelberg', is written over a faint, large 'NEMKO' watermark.

Andrey Adelberg, EMC/Wireless Specialist

Date: February 18, 2009

Total Number of Pages: 23

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Section 1 : Report Summary

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15, Subpart C. Radiated tests were conducted in accordance with ANSI C63.4-2003.

The assessment summary is as follows:

Apparatus Assessed:	GS320 Stand Alone Windspeed Display GS375 Stand Alone A2B Display
Specification:	FCC Part 15 Subpart C, 15.247
Compliance Status:	Complies
Exclusions:	None
Non-compliances:	None
Report Release History:	Original Release
Test Location:	Nemko Canada Inc. 303 River Road Ottawa, Ontario K1V 1H2
Registration Number:	176392 (3 m Semi-Anechoic Chamber)
Tests Performed By:	Jason Nixon, Wireless/Telecom Specialist
Test Dates:	February 13 and 16, 2009

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025. All results contain in this report are within Nemko Canada's ISO/IEC 17025 accreditation.

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Section 2 : Equipment Under Test

2.1 Identification of Equipment Under Test (EUT)

The following information identifies the EUT under test:

Type of Equipment:	Windspeed Display
Brand Name:	Load Systems
Model Name or Number:	GS320
Serial Number:	90001
Nemko Sample Number:	1
FCC ID:	QVBGS300
Date of Receipt:	February 13, 2009

Type of Equipment:	A2B Alarm
Brand Name:	Load Systems
Model Name or Number:	GS375

2.2 Accessories

No accessories were used during this assessment.

2.3 EUT Description

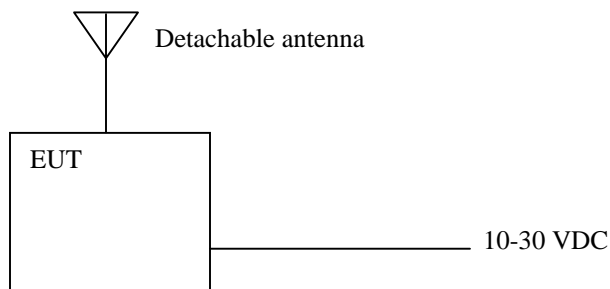
The GS320 communicates with one wind speed and displays the wind speed. The communication is bi-directional. If the GS320 detects that the wind speed is too high or that communication is lost it will go into an alarm state.

The GS375 uses the same circuitry, as the GS320 except for the display of the unit is different. The GS375 can communicate with up to two Anti-two-block sensors and shows there status. If there is a problem detected with the sensors the GS375 will go into an alarm state.

2.4 Technical Specifications of the EUT

Operating Band:	902-928 MHz
Operating Frequency:	903-927 MHz
Modulation:	FSK
Occupied Bandwidth:	809.6 kHz
Emission Designator:	F1D
Antenna Data:	Removable R-SMA, 2 dBi half-wave dipole
Power Supply Requirements:	10-30 VDC

2.5 EUT Setup diagram



2.6 Operation of the EUT during testing

The EUT was modified in software to continuously transmit on a low, mid and high channel.

2.7 Modifications incorporated in the EUT

There were no modifications performed to the EUT during this assessment.

Section 3 : Test Conditions

3.1 Specifications

The apparatus was assessed against the following specifications:

FCC Part 15 Subpart C, 15.247

FHSS System and Digitally Modulated Radiators

902 - 928 MHz, 2400 - 2483.5 MHz, 5725 - 5850 MHz

3.2 Deviations From Laboratory Test Procedures

No deviations were made from laboratory test procedures.

3.3 Test Environment

All tests were performed under the following environmental conditions:

Temperature range	:	15 – 30 °C
Humidity range	:	20 - 75 %
Pressure range	:	86 - 106 kPa
Power supply range	:	+/- 5 % of rated voltages

3.4 Measurement Uncertainty

Nemko Canada measurement uncertainty has been calculated using guidance of UKAS LAB 34:2003 and TIA-603-B Nov 7, 2002. All calculations have been performed to provide a confidence level of 95 % and can be found in Nemko Canada document MU-003.



3.5 Test Equipment

Equipment	Manufacturer	Model No.	Asset/Serial No.	Cal. Date	Next Cal.
Spectrum Analyzer	Rohde & Schwarz	FSU46	FA001877	Aug 28/08	Aug 28/09
Signal Generator	Rohde & Schwarz	SMR40	FA001879	Aug 13/08	Aug 13/09
Notch Filter	Microwave Circuits	902-928MHz	FA002096	COU	COU
3 m EMI Test Chamber	TDK	SAC-3	FA002047	May 06/08	May 06/09
Bilog	Sunol	JB3	FA002108	Jan. 27/09	Jan. 27/10
Flush Mount Turntable	Sunol	FM2022	FA002082	NCR	NCR
Controller	Sunol	SC104V	FA002060	NCR	NCR
Mast	Sunol	TLT2	FA002061	NCR	NCR
Receiver/Spectrum Analyzer	Rohde & Schwarz	ESU 26	FA002043	Dec. 16/08	Dec. 16/09
International Power Supply	California Inst.	3001i	FA001021	Jan. 13/09	Jan. 13/10
Horn Antenna #2	EMCO	3115	FA000825	Jan. 21/09	Jan. 21/10
1 – 18 GHz Amplifier	JCA	JCA118-503	FA002091	Oct 2/08	Oct 2/09
50 Coax cable	HUBER + SUHNER	None	FA002022	July 07/08	July 07/09
50 Coax cable	HUBER + SUHNER	None	FA002074	July 07/08	July 07/09

COU – Calibrate on Use

NCR – No Calibration Required

Section 4 : Results Summary

This section contains the following:

FCC Part 15 Subpart C : Test Results

The column headed 'Required' indicates whether the associated clauses were invoked for the apparatus under test. The following abbreviations are used:

- N No : not applicable / not relevant.
- Y Yes : Mandatory i.e. the apparatus shall conform to these tests.
- N/T Not Tested, mandatory but not assessed. (See Report Summary)

4.1 FCC Part 15 Subpart C : Test Results

Part 15	Test Description	Required	Result
15.31(e)	Variation of power supply	Y	PASS
15.207(a)	Powerline Conducted Emissions	N	
15.209(a)	Radiated Emissions within Restricted Bands	Y	PASS
15.247(a)(1)	Frequency hopping systems	N	
15.247(a)(2)	Systems using digital modulation techniques	Y	PASS
15.247(b)(1)	Maximum peak output power of Frequency hopping systems operating in the 2400-2483.5 MHz band and 5725-5850 MHz band	N	
15.247(b)(2)	Maximum peak output power of Frequency hopping systems operating in the 902-928 MHz band	N	
15.247(b)(3)	Maximum peak output power of systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands	Y	PASS
15.247(b)(4)	Maximum peak output power	Y	PASS
15.247(c)(1)	Fixed point-to-point Operation with directional antenna gains greater than 6 dBi	N	
15.247(c)(2)	Transmitters operating in the 2400-2483.5 MHz band that emit multiple directional beams	N	
15.247(d)	Radiated Emissions Not in Restricted Bands	Y	PASS
15.247(e)	Power Spectral Density for Digitally Modulated Devices	Y	PASS
15.247(f)	Time of Occupancy for Hybrid Systems	N	



Appendix A : Test Results

Clause 15.209(a) Radiated Emissions within Restricted Bands

Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvoltsmeter)	Measurement Distance (meters)
0.009-0.490	2400/F (kHz)	300
0.490-1.705	24000/F (kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Results: Pass

No emissions were detected within 20 dB below the spurious emission limit.

Additional Observations:

The Spectrum was searched from 30 MHz to 10 GHz at a distance of 3 m.

These results apply to emissions found in the Restricted Bands defined in FCC Part 15 Subpart C, 15.205.

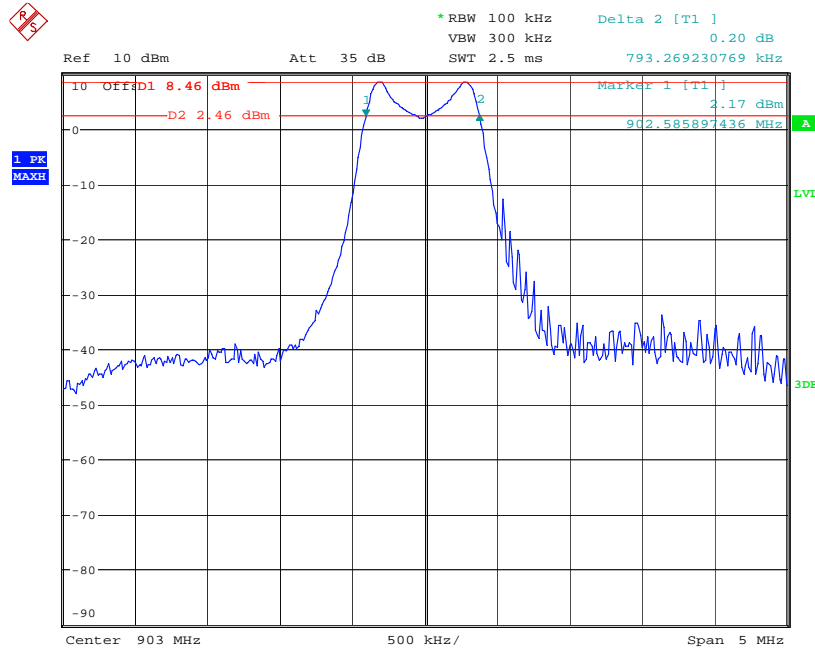
The EUT was provided with a flexible antenna. Emissions were searched with the antenna orientated in both the vertical and horizontal position.

Clause 15.247(a)(2) Systems using digital modulation techniques

Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

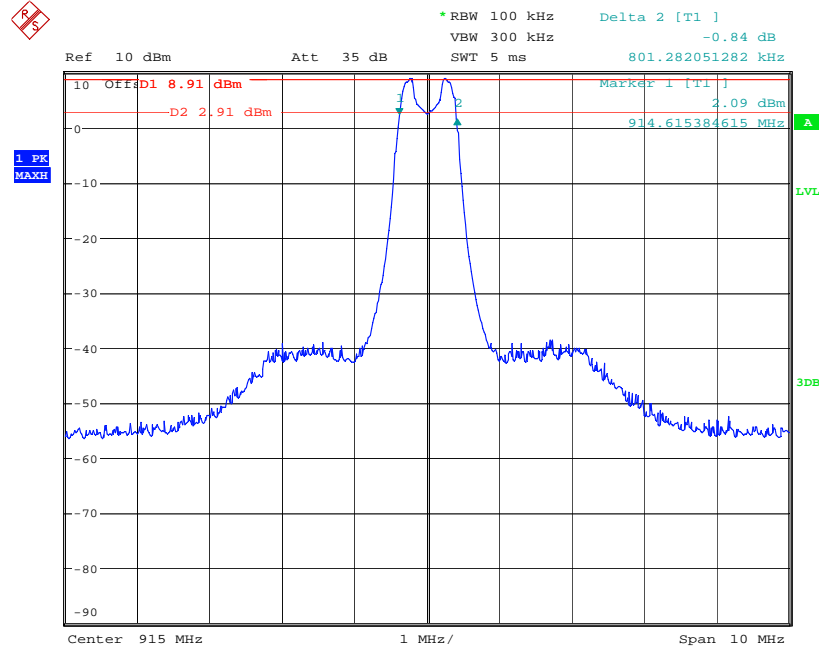
Test Results: Pass

6 dB Bandwidth:
Low



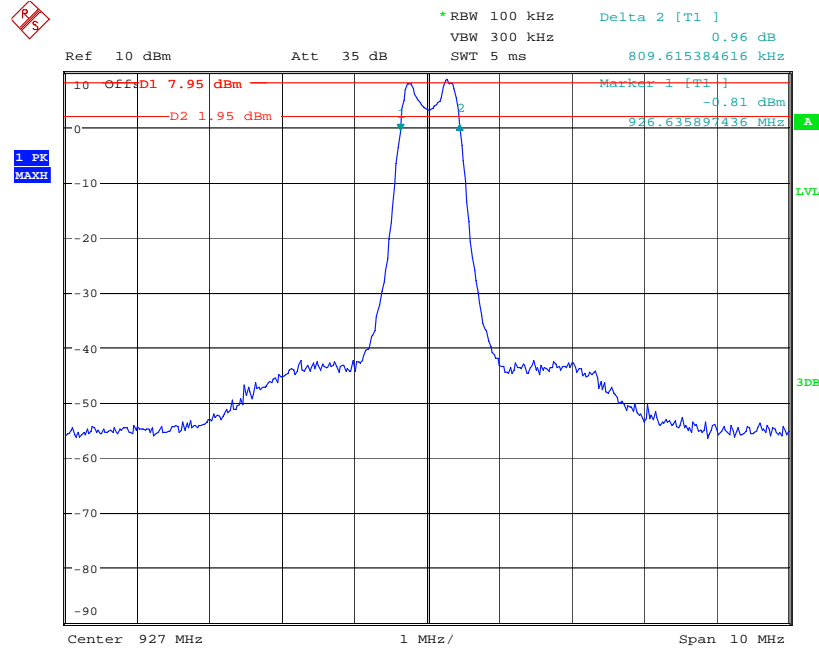
Date: 17.FEB.2009 08:55:02

Mid



Date: 17.FEB.2009 08:36:24

High



Date: 17.FEB.2009 08:43:57



Clause 15.247(b)(3) Maximum peak output power of systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 W. As an alternative to a peak power measurement, compliance with the 1 W limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signalling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

Test Results: Pass

Conducted Output Power:

Channel Range	Measured Output Power (dBm)	Measured Output Power (W)	Limit (W)	Margin (W)
Low	9.22	0.0084	1.0	0.9916
Mid	9.26	0.0084	1.0	0.9916
High	9.04	0.0080	1.0	0.9920

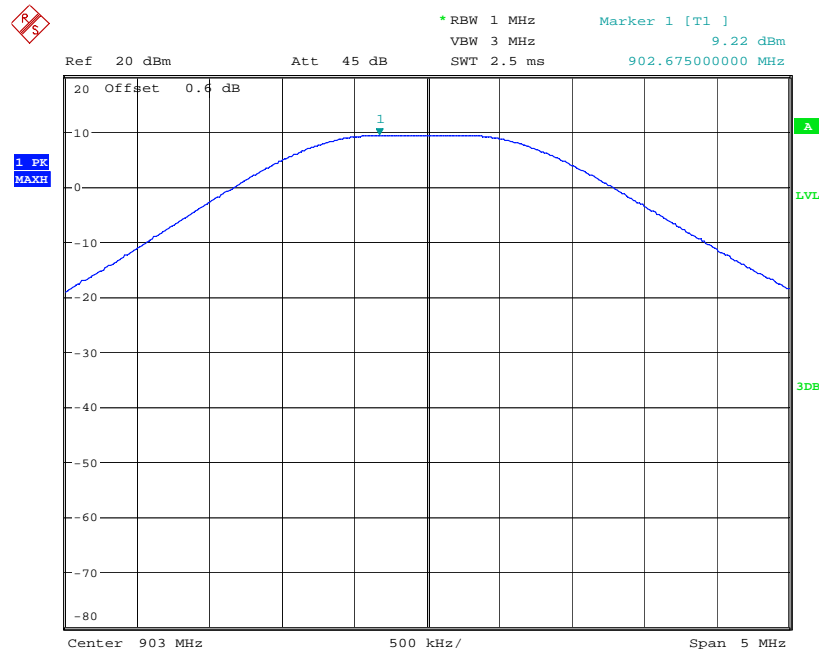
The output power was measured at +/-15 % of the supply voltage and found that there was no change.

Output power was measured using a spectrum analyzer with a Peak detector of 1 MHz RBW / 3MHz VBW.



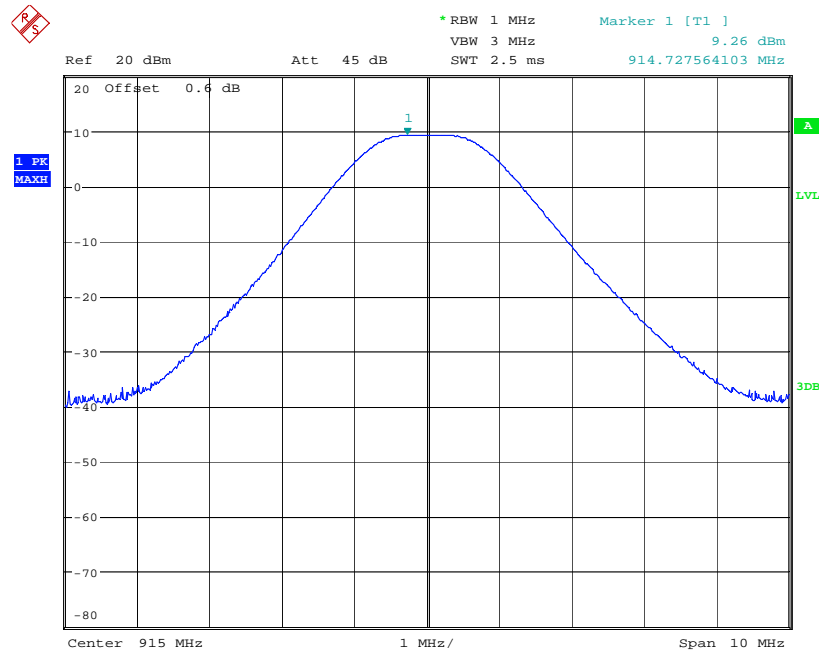
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Low Channel:



Date: 17.FEB.2009 08:55:19

Mid Channel:



Date: 17.FEB.2009 08:36:46

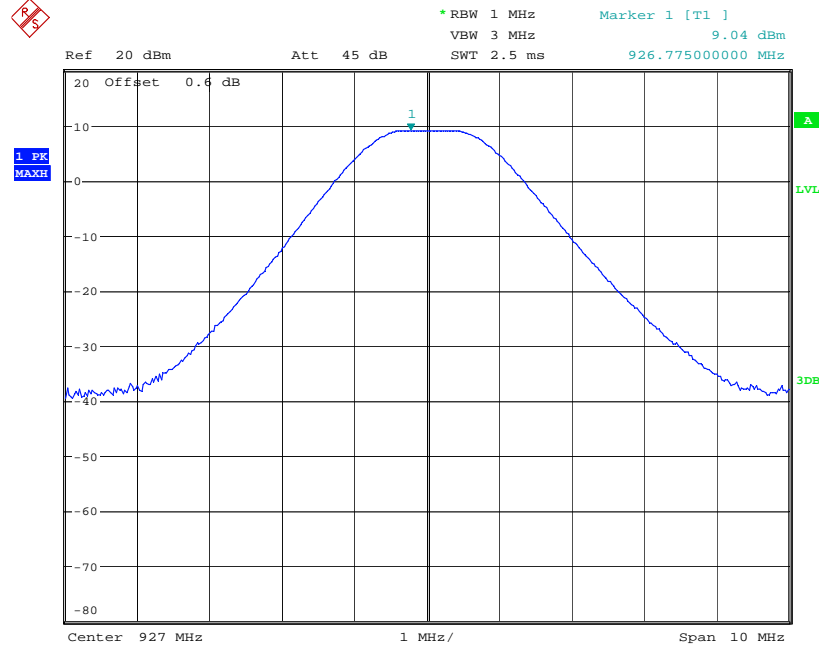


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Specification: FCC Part 15 Subpart C, 15.247

High Channel:



Date: 17.FEB.2009 08:44:14



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Clause 15.247(b)(4) Maximum peak output power

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Test Results: Pass

Conducted Output Power:

Measured output power = 9.26 dBm

Maximum output power = 9.26 dBm + 2 dBi = 11.26 dBm EIRP

Limit = 36 dBm EIRP



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Clause 15.247(d) Radiated Emissions Not in Restricted Bands

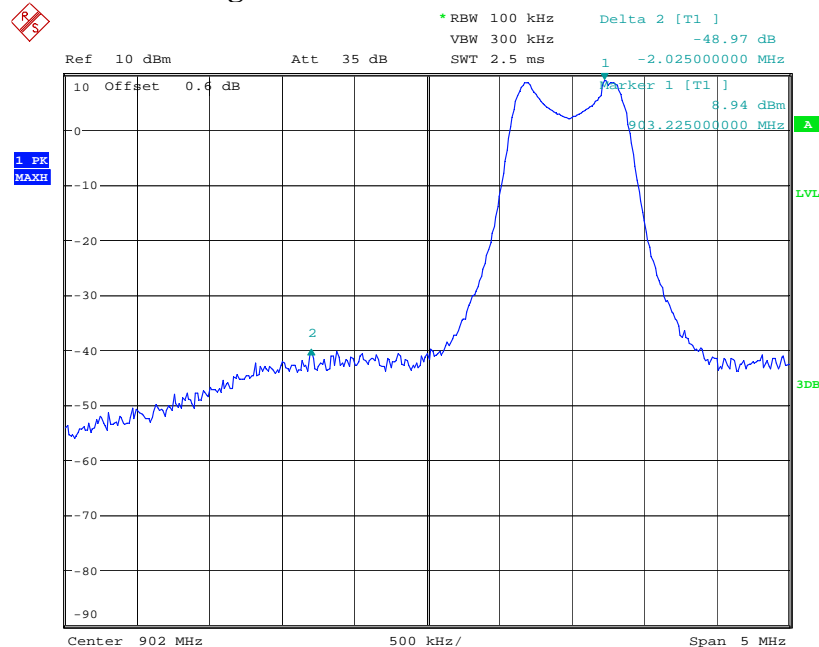
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Test Results: Pass

No emissions were detected within 20 dB below the spurious emissions limits.

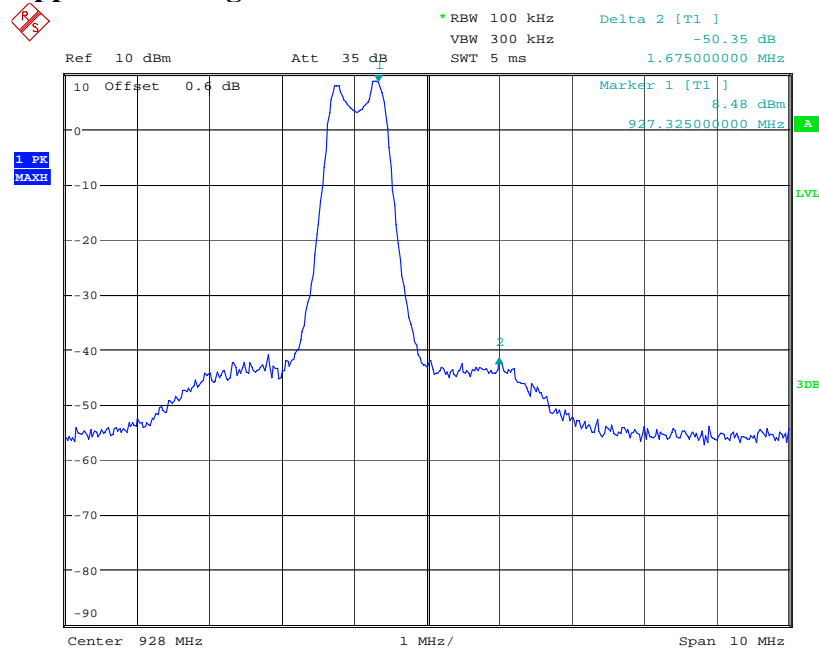
The Spectrum was searched from 30 MHz to 10 GHz at a distance of 3 m.

Lower Band Edge:



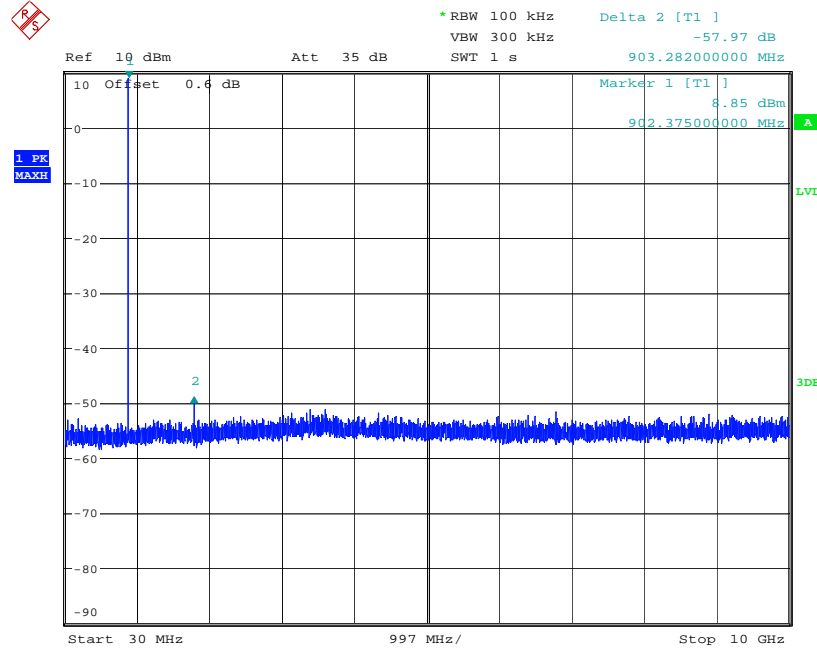
Date: 17.FEB.2009 08:59:25

Upper Band Edge:



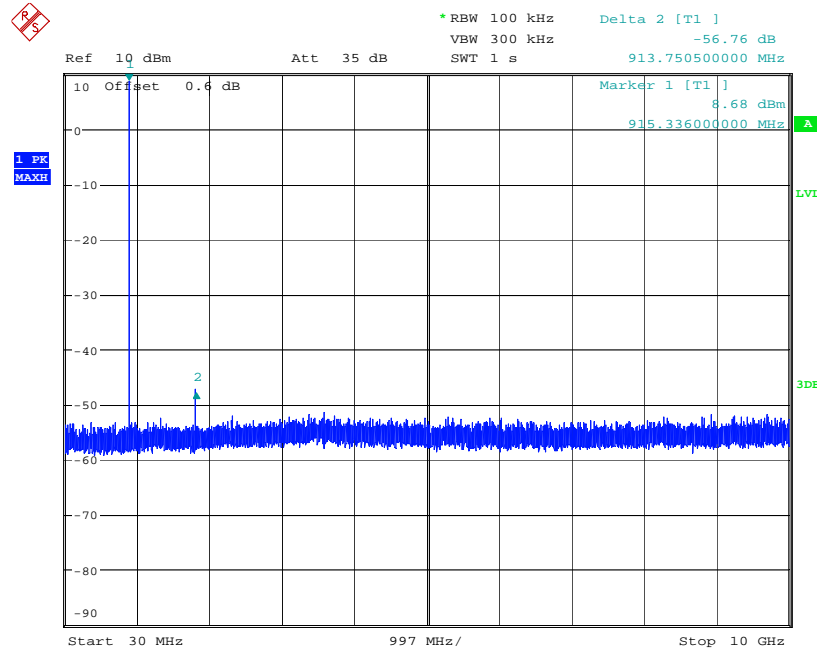
Date: 17.FEB.2009 08:43:18

Low



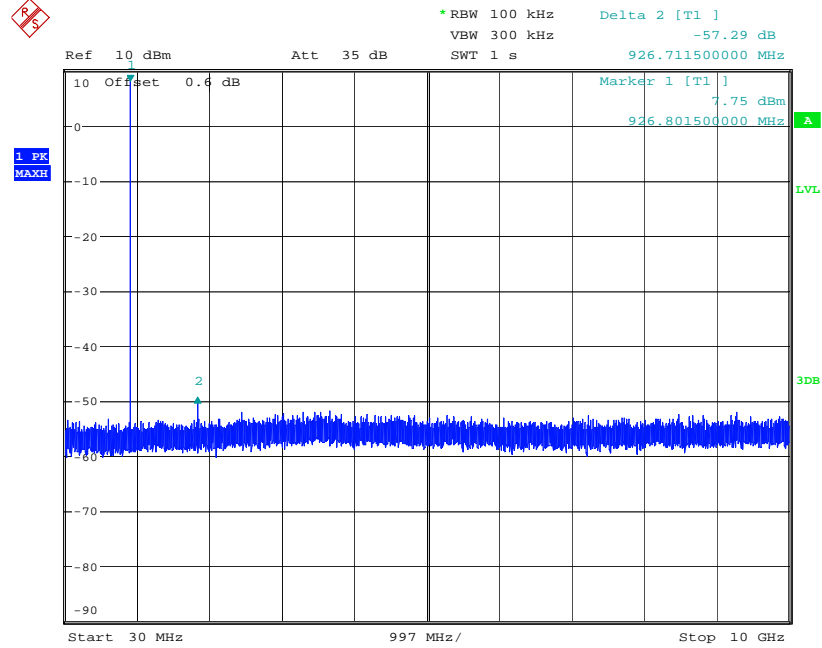
Date: 17.FEB.2009 09:00:20

Mid



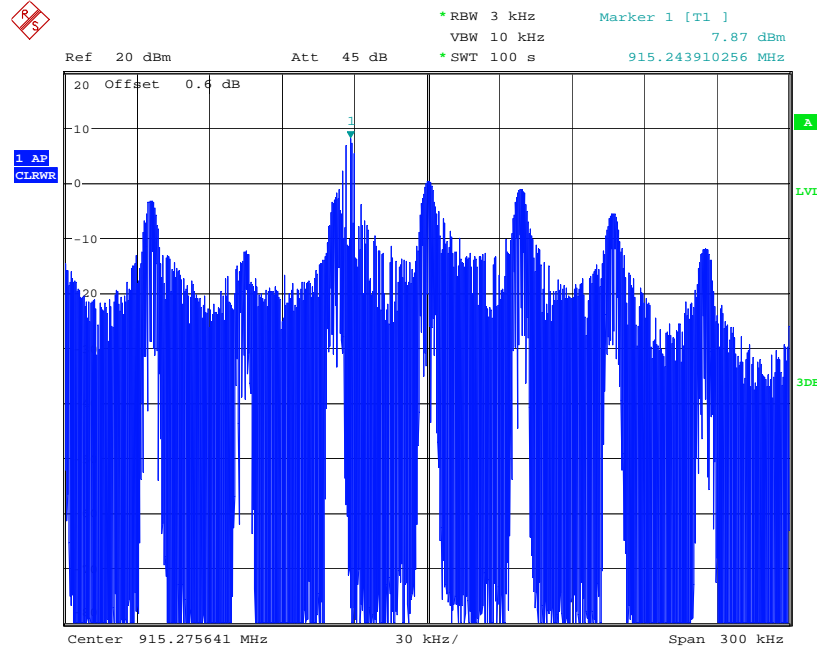
Date: 17.FEB.2009 08:42:09

High



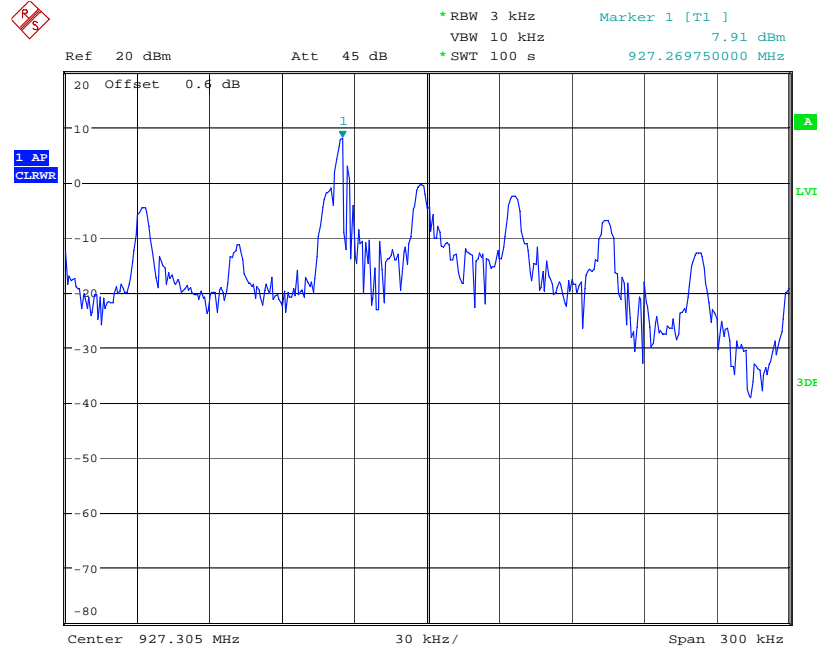
Date: 17.FEB.2009 08:42:44

Mid



Date: 17.FEB.2009 08:40:34

High



Date: 17.FEB.2009 08:52:54

Appendix B : Setup Photographs

Spurious Emissions Setup:



Appendix C : Block Diagram of Test Setups

Radiated Emissions above 30 MHz Test Site

