



Engineering and Testing for EMC and Safety Compliance

CERTIFICATION APPLICATION REPORT
FCC PART 15.247 & INDUSTRY CANADA RSS-210 AND RSS-139

Test Lab: Rhein Tech Laboratories, Inc. 360 Herndon Parkway Suite 1400 Herndon, VA 20170 Phone: 703-689-0368 Fax: 703-689-2056 Web Site: www.rheintech.com Email: ATCBINFO@rheintech.com		Applicant: Teletronics International Inc. Contact: Nusrat Jamal 1803 Research Blvd. Suite 404 Rockville, MD 20850 Email: njamal@teletronics.com Phone: 301-309-8500 Fax: 301-309-8851	
FCC ID:	MFMSAMP24W	GRANTEE FRN NUMBER:	0007415805.
PLAT FORM:	N/A	RTL WORK ORDER NUMBER:	2002123
MODEL(S):	Extended Amplified WLAN System (SMARTAMP 1W)	RTL QUOTE NUMBER:	QRTL02-495
TEST REPORT DATE:	September 12, 2002		
American National Standard Institute:	ANSI/TIA/EIA603 and ANSI/TIA/EIA 603-1		
FCC Classification:	DSS – Spread Spectrum Transmitter		
FCC Rule Part(s):	Part 15.247: Operation within the bands 920-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz Direct Sequence System		
Industry Canada Standard:	RSS-210: Low Power License-Exempt Radio Communication Devices (All Frequency Bands) RSS-139: Licensed Radio communications Devices (All Frequency Bands)		
Digital Interface Information	Digital Interface was found to be compliant		
Receiver Information	Receiver was found to be compliant		
Frequency Range (MHz)	Output Power (W)	Frequency Tolerance	Emission Designator
2422-2452	0.87	N/A	N/A

We, the undersigned, hereby declare that the equipment tested and referenced in this report conforms to the identified standard(s) as described in this test report. No modifications were made to the equipment during testing in order to achieve compliance with these standards.

Furthermore, there was no deviation from, additions to, or exclusions from the FCC Part 2, FCC Part 15, Industry Canada RSS-210 & RSS-139, ANSI C63.4, ANSI/TIA/EIA603, and ANSI/TIA/EIA 603-1.

Signature: 

Date: September 12, 2002

Typed/Printed Name: Desmond A. Fraser

Position: President

360 Herndon Parkway
 Suite 1400
 Herndon, VA 20170
 Phone : 703-689-0368 Fax : 703-689-2056

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1 GENERAL INFORMATION

1.1 SCOPE

FCC Rules Part 15.247: Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz.

IC RSS-210 Section 6.2.2(o): Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz.

IC RSS-139 appendix (B): Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz.

A direct sequence (DS) system is a spread spectrum (SS) system in which the carrier has been modulated by a high speed spreading code and an information data stream. The high-speed code sequence dominates the “modulating function” and is the direct cause of the wide spreading of the transmitted signal.

1.2 TEST FACILITY

The open area test site and conducted measurement facility used to collect the radiated data is located at 360 Herndon Parkway, Suite 1400, Herndon, Virginia 20170. This site has been fully described in a report and approved by the Federal Communications Commission to perform AC line conducted and radiated emissions testing (ANSI C63.4 1992).

1.3 RELATED SUBMITTAL(S)/GRANT(S)

This is an original application for Certification for the Teletronics International Inc. Extended Range Amplified WLAN System, SMARTAMP 1W, FCC ID: MFMSAMP24W. It consists of the Cisco WLAN card with the Teletronics 1W SmartAmp amplifier, Teletronics DC Power Injector, antenna(s), and cabling. The IF, LO and up to the 2nd LO were investigated and tested.

2 TEST INFORMATION

2.1 TEST JUSTIFICATION

The EUT was tested in all three orthogonal planes in order to determine worst-case emissions. Channel 3 at 2422 MHz, Channel 6 at 2437 MHz and channel 9 at 2452 MHz were tested and investigated from 9 kHz to 24 GHz. Data for all three channels is presented in this report.

In order to complete the configuration required for testing, a WLAN PCMCIA card, Cisco 352 series, inserted in an Access Point configured with a Cisco 352 WLAN card, was connected to a notebook computer through its Ethernet port. The PCMCIA WLAN radio output port was connected to a DC injector, in turn the DC injector was connected to a 1Watt amplifier; the output of the amplifier was connected to different families of external antennas (Omni, Patch, Grid, Dish). The lowest and the highest antenna gain of each family type has been tested.

Because the LMR 600 (nominal cable loss 4.4 dB/100 ft) provides a lower cable loss than the LMR 400 (nominal cable loss 6.8 dB/100 ft), the LMR 600 was used for all testing, to produce the worst case configuration.

The DC injector and the amplifier were connected with 3' LMR 600 cable. The cable length between the amplifier and the antenna used for the testing was minimized to provide a worst case configuration.

The antenna transmits, receives, and connects to the only antenna port available. The worst-case data taken in this report represents the highest data rate at 11 MBPS. Data rates of 5.5 MBPS, 2 MBPS and 1 MBPS were investigated and found to be in compliance. The change in envelope did not cause the EUT to be non-compliant in any of the aforementioned modes.

TABLE 2-1: SYSTEM CONFIGURATIONS

Antenna Part # (Antenna Type)	Specified Antenna Gain (dBi)	Maximum Cisco Aironet Radio Output Power (dBm)	Maximum Amplifier Output Power (dBm)	Minimum Cable Length (dB loss) Between Antenna & Power Amplifier for LMR 600/LMR 400	Maximum Extended Range WLAN System EIRP (dBm)	Maximum Permissible Exposure (MPE) Distance cm (inches)
ANT-O2412 (Omni directional)	12	100mW (+20dBm)	1 Watt (+30dBm)	150'/98' (6.6 dB)	35.0	20cm (7.9 inches)
ANT-O2409 (Omni directional)	9	100mW (+20dBm)	1 Watt (+30dBm)	113'/74' (5.0 dB)	34.0	20cm (7.9 inches)
ANT-O2408 (Omni directional)	8	100mW (+20dBm)	1 Watt (+30dBm)	100'/65' (4.4 dB)	34.0	20cm (7.9 inches)
ANT-P2419 (Patch)	19	100mW (+20dBm)	1 Watt (+30dBm)	305'/197' (13.4 dB)	35.8	200cm (79 inches)
ANT-P2418 (Patch)	18	100mW (+20dBm)	1 Watt (+30dBm)	277'/179' (12.2 dB)	35.8	200cm (79 inches)
ANT-P2415 (Patch)	15	100mW (+20dBm)	1 Watt (+30dBm)	216'/140' (9.5 dB)	35.7	200cm (79 inches)
ANT-P2413 (Patch)	13	100mW (+20dBm)	1 Watt (+30dBm)	159'/103' (7.0 dB)	35.7	200cm (79 inches)
ANT-P2412 (Patch)	12	100mW (+20dBm)	1 Watt (+30dBm)	152'/99' (6.7 dB)	35.7	200cm (79 inches)
ANT-G2418 (Grid)	18	100mW (+20dBm)	1 Watt (+30dBm)	150'/98' (6.6 dB)	41.0	200cm (79 inches)
ANT-G2424 (Grid)	24	100mW (+20dBm)	1 Watt (+30dBm)	250'/162' (11.0 dB)	43.0	200cm (79 inches)
ANT-D2421 (Dish)	20.5	100mW (+20dBm)	1 Watt (+30dBm)	150'/98' (6.6 dB)	44.0	200cm (79 inches)

2.2 EXERCISING THE EUT

The EUT was provided with software to continuously transmit during testing. The carrier was also checked to verify that the information was being transmitted.

2.3 TEST RESULT SUMMARY

TABLE 2-2: TEST RESULT SUMMARY WITH FCC RULES AND REGULATIONS

STANDARD	TEST	PASS/FAIL OR N/A
FCC 15.205	Compliance with the Restricted Band Edge	Pass
FCC 15.207	Conducted Emissions	Pass
FCC 15.209	Radiated Emissions	Pass
FCC 15.247(a)(2)	Modulated Bandwidth	Pass
FCC 15.247(b)	Power Output	Pass
FCC 15.247(c)	Antenna Conducted Spurious Emissions	Pass
FCC 15.247(d)	Power Spectral Density	Pass

2.4 TEST SYSTEM DETAILS

The FCC Identifiers for all equipment, plus descriptions of all cables used in the tested system are in Table 2-3:

TABLE 2-3: EQUIPMENT UNDER TEST (EUT)

PART	MANUFACTURER	MODEL	SERIAL NUMBER	FCC ID	CABLE DESCRIPTION	RTL BAR CODE
AMPLIFIER	TELECTRONICS	SMART AMP 1W	NA	MFMSAMP24W	NA	14530
DC INJECTOR	TELECTRONICS	DC INJECTOR	NA	NA	NA	14529
ACCESS POINT	CISCO	AP 350 SERIES	VDF0536517K	LDK102040	NA	14315
AMPLIFIER	TELECTRONICS	SMART AMP 1W	NA	NA	NA	14525
CABLE	NA	LMR 600	NA	NA	250'	NA
CABLE	NA	LMR 600	NA	NA	100'	NA
CABLE	NA	LMR 600	NA	NA	50'	NA
CABLE	NA	LMR 600	NA	NA	3'	NA

TABLE 2-4: EXTERNAL COMPONENTS IN TEST CONFIGURATION

PART	MANUFACTURER	MODEL	SERIAL NUMBER	FCC ID	CABLE DESCRIPTION	RTL BAR CODE
NOTEBOOK PC	SAMSUNG ELECTRONICS	STORM	019492/B	A3LSQ10	NA	

2.5 CONFIGURATION OF TESTED SYSTEM

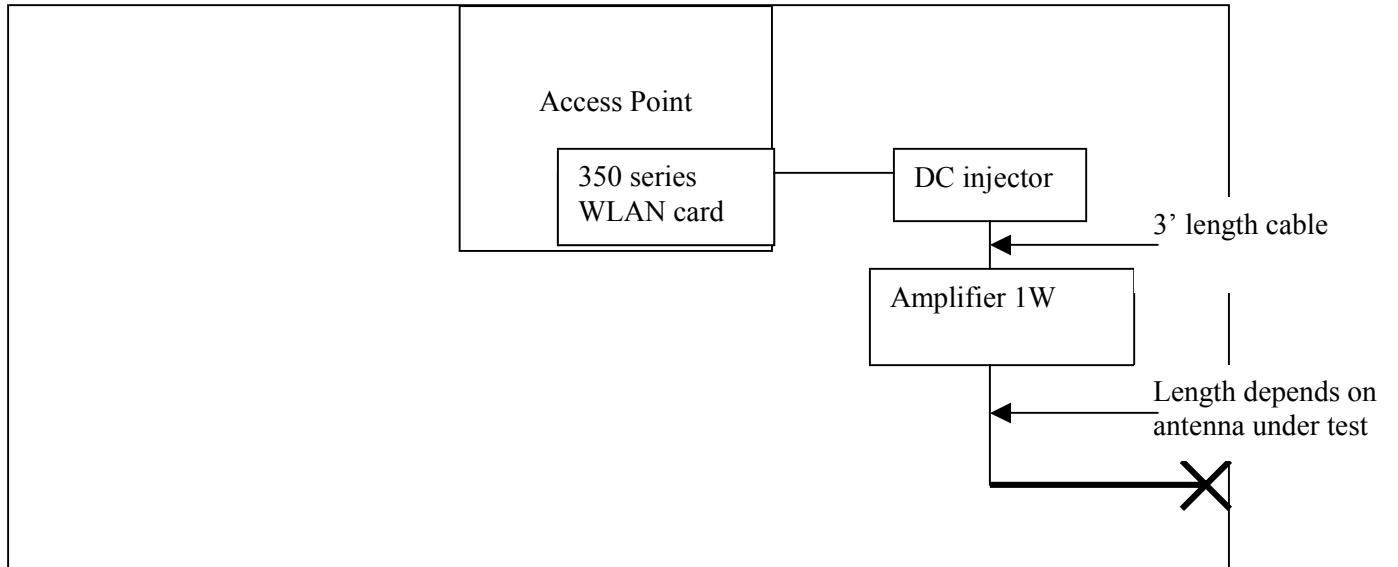


FIGURE 1: WORST CASE CONFIGURATION OF SYSTEM UNDER TEST

3 COMPLIANCE WITH THE RESTRICTED BAND EDGE - §15.205

3.1 TEST PROCEDURE

Compliance with the band edges was performed using the rules found in FCC parts 15.205 and 15.209 respectively. The final data derived below were from radiated measurements applying absolute detector values only. The data taken in this report represents the worst case at 11 MBPS. Data rates of 5.5MBPS, 2 MBPS and 1 MBPS were investigated and found to be in compliance.

3.2 COMPLIANCE WITH THE RESTRICTED BAND EDGE TEST DATA

Operating Frequency (MHz): 2422-2452
 Channel: 3 & 9
 Distance (m): 3
 Limit (dBuV/m): 54

TABLE 3-1: RESTRICTED BAND EDGE TEST DATA ANT-OMNI-8

Channel Set to	Frequency tested (MHz)	Detector	Field Strength Level (dBµV/m)	Level Corrected (dBµV/m)	FCC Limit (dBµV/m)	FCC Margin (dB)
3	2390.0	Absolute measurement	24.1	50.5	54	-3.5
9	2483.5	Absolute measurement	22.3	48.7	54	-5.3

TABLE 3-2: RESTRICTED BAND EDGE TEST DATA ANT-OMNI-12

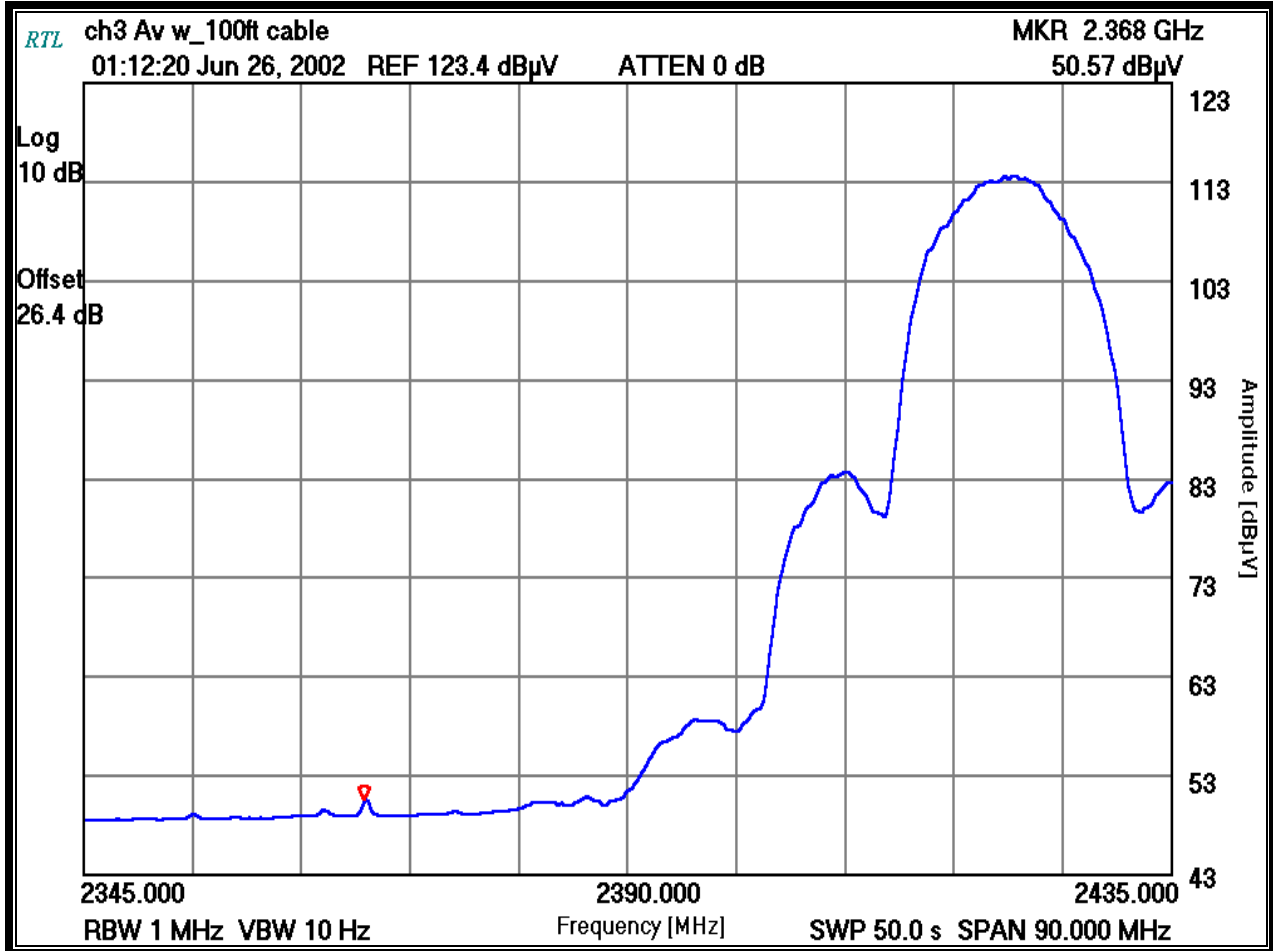
Channel Set to	Frequency tested (MHz)	Detector	Field Strength Level (dBµV/m)	Level Corrected (dBµV/m)	FCC Limit (dBµV/m)	FCC Margin (dB)
3	2390.0	Absolute measurement	23.5	49.9	54	-4.1
9	2483.5	Absolute measurement	22.5	48.9	54	-5.1

TEST PERSONNEL:

Franck Schuppis Test Technician/Engineer	 Signature	06/26/02 Date Of Test
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Channel Number: 3
Frequency (MHz): 2422
Resolution Bandwidth (MHz): 1
Video Bandwidth (Hz): 10
Sweep Time (s): 50.0

PLOT 3-1: BAND EDGE: AVERAGE MEASUREMENT FOR CHANNEL 3 (ANT-OMNI-8)



TEST PERSONNEL:

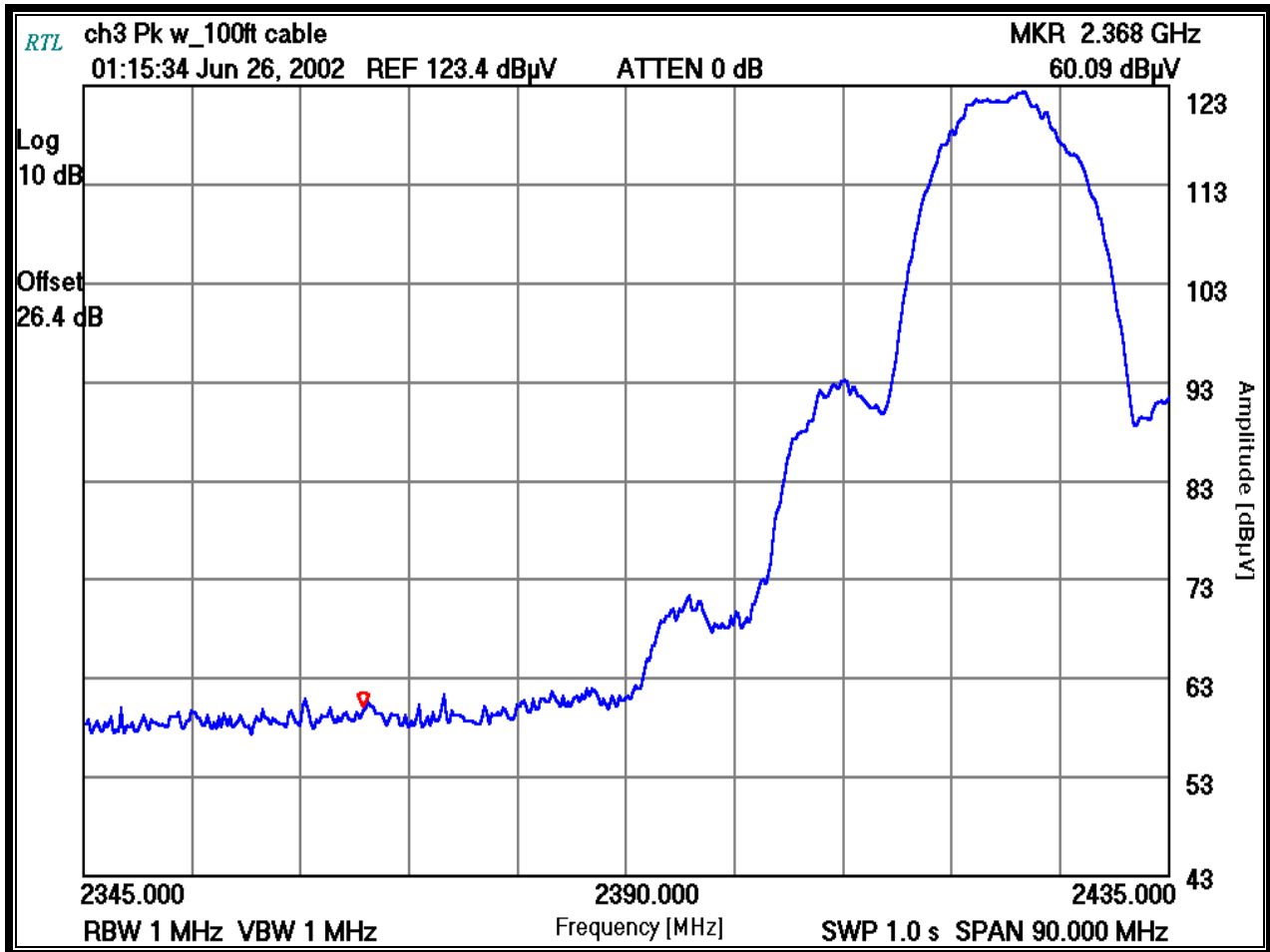
Franck Schuppius
Test Technician/Engineer

Signature

06/26/02
Date Of Test

Channel Number: 3
Frequency (MHz): 2422
Resolution Bandwidth (MHz): 1
Video Bandwidth (MHz): 1
Sweep Time (s): 1.0

PLOT 3-2: BAND EDGE: PEAK MEASUREMENT FOR CHANNEL 3 (ANT-OMNI-8)



TEST PERSONNEL:

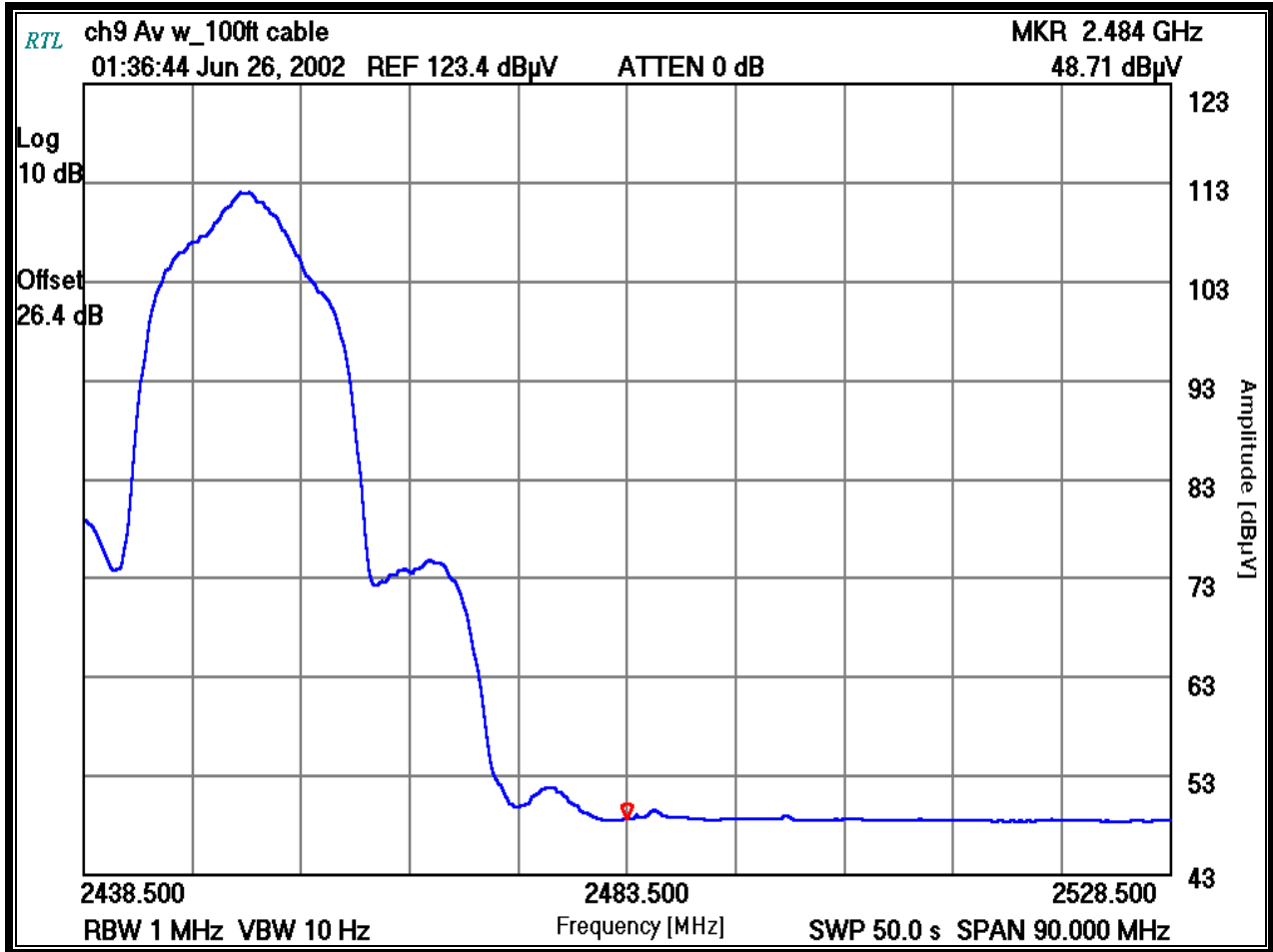
Franck Schuppius
Test Technician/Engineer

Signature

06/26/02
Date Of Test

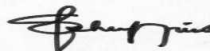
Channel Number: 9
Frequency (MHz): 2452
Resolution Bandwidth (MHz): 1
Video Bandwidth (Hz): 10
Sweep Time (s): 50.0

PLOT 3-3: BAND EDGE: AVERAGE MEASUREMENT FOR CHANNEL 9 (ANT-OMNI-8)



TEST PERSONNEL:

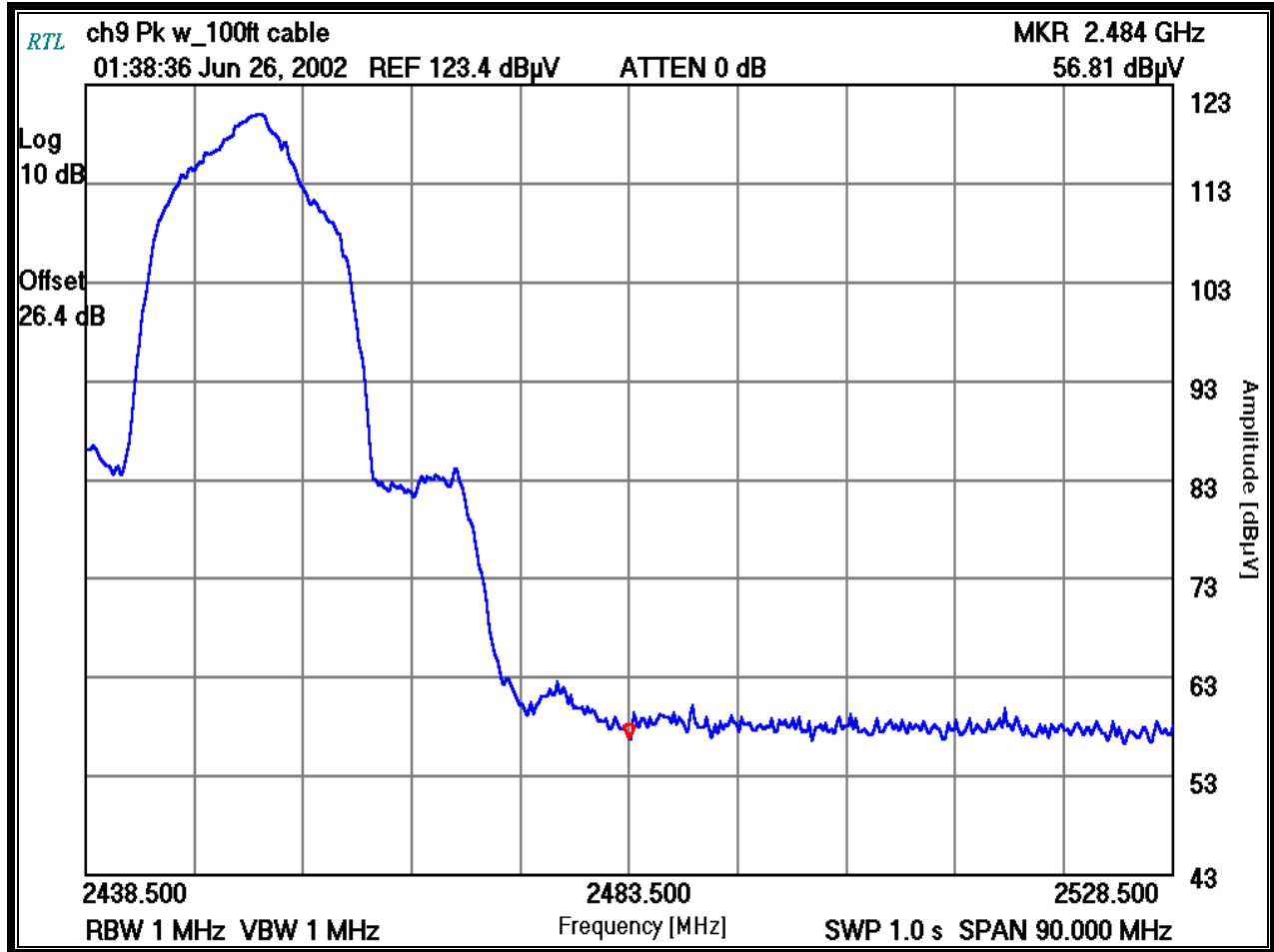
Franck Schuppius
Test Technician/Engineer


Signature

06/26/02
Date Of Test

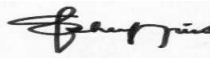
Channel Number: 9
Frequency (MHz): 2452
Resolution Bandwidth (MHz): 1
Video Bandwidth (MHz): 1
Sweep Time: 1.0s

PLOT 3-4: BAND EDGE: PEAK MEASUREMENT FOR CHANNEL 9 (ANT-OMNI-8)



TEST PERSONNEL:

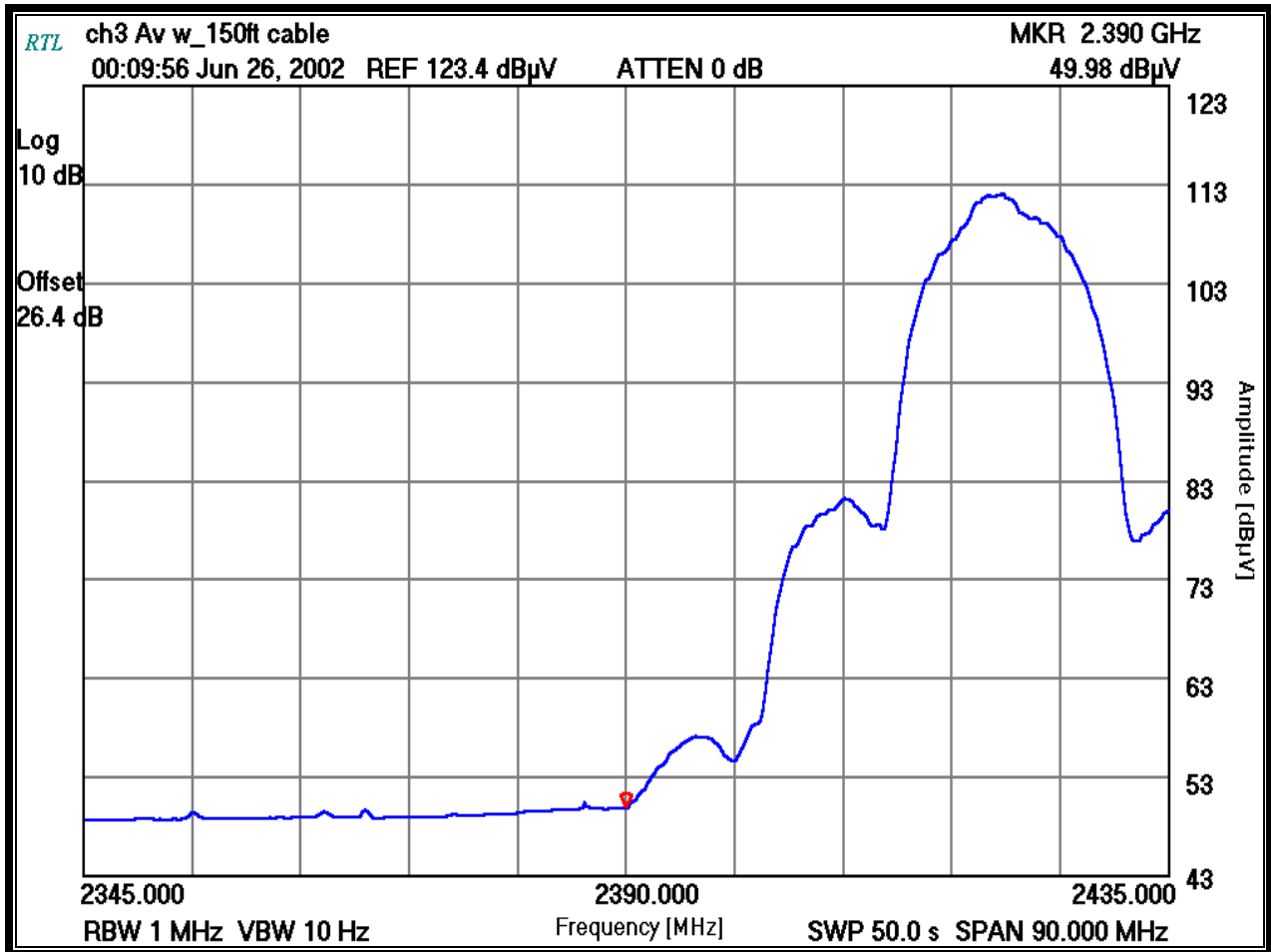
Franck Schuppius
Test Technician/Engineer


Signature

06/26/02
Date Of Test

Channel Number: 3
Frequency (MHz): 2422
Resolution Bandwidth (MHz): 1
Video Bandwidth (Hz): 10
Sweep Time (s): 50.0

PLOT 3-5: BAND EDGE: AVERAGE MEASUREMENT FOR CHANNEL 3 (ANT-OMNI-12)



TEST PERSONNEL:

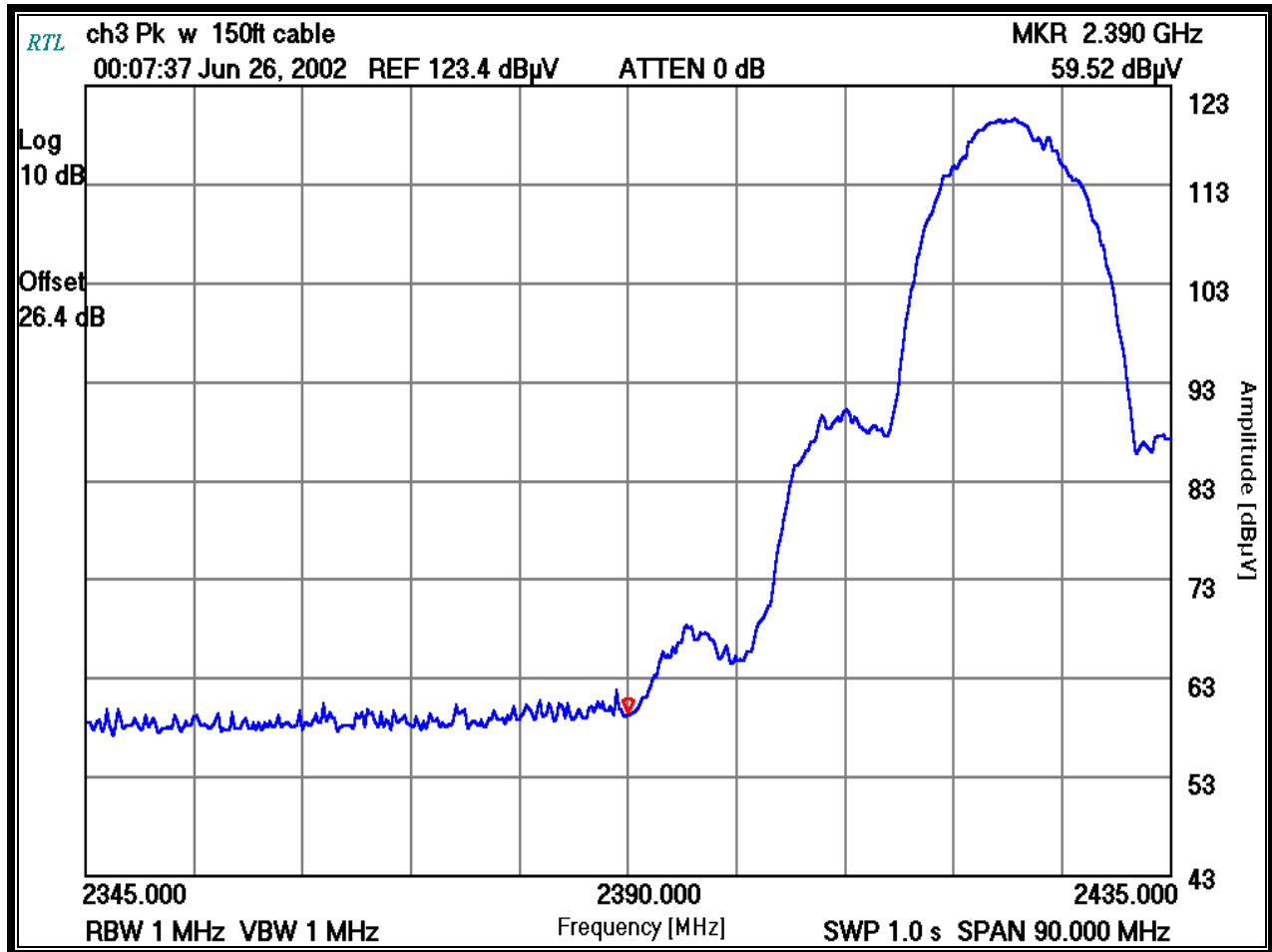
Franck Schuppius
Test Technician/Engineer

Signature

06/26/02
Date Of Test

Channel Number: 3
Frequency (MHz): 2422
Bandwidth Resolution (MHz): 1
Video Bandwidth (MHz): 1
Sweep Time (s): 1.0

PLOT 3-6: BAND EDGE: PEAK MEASUREMENT FOR CHANNEL 3 (ANT-OMNI-12)



TEST PERSONNEL:

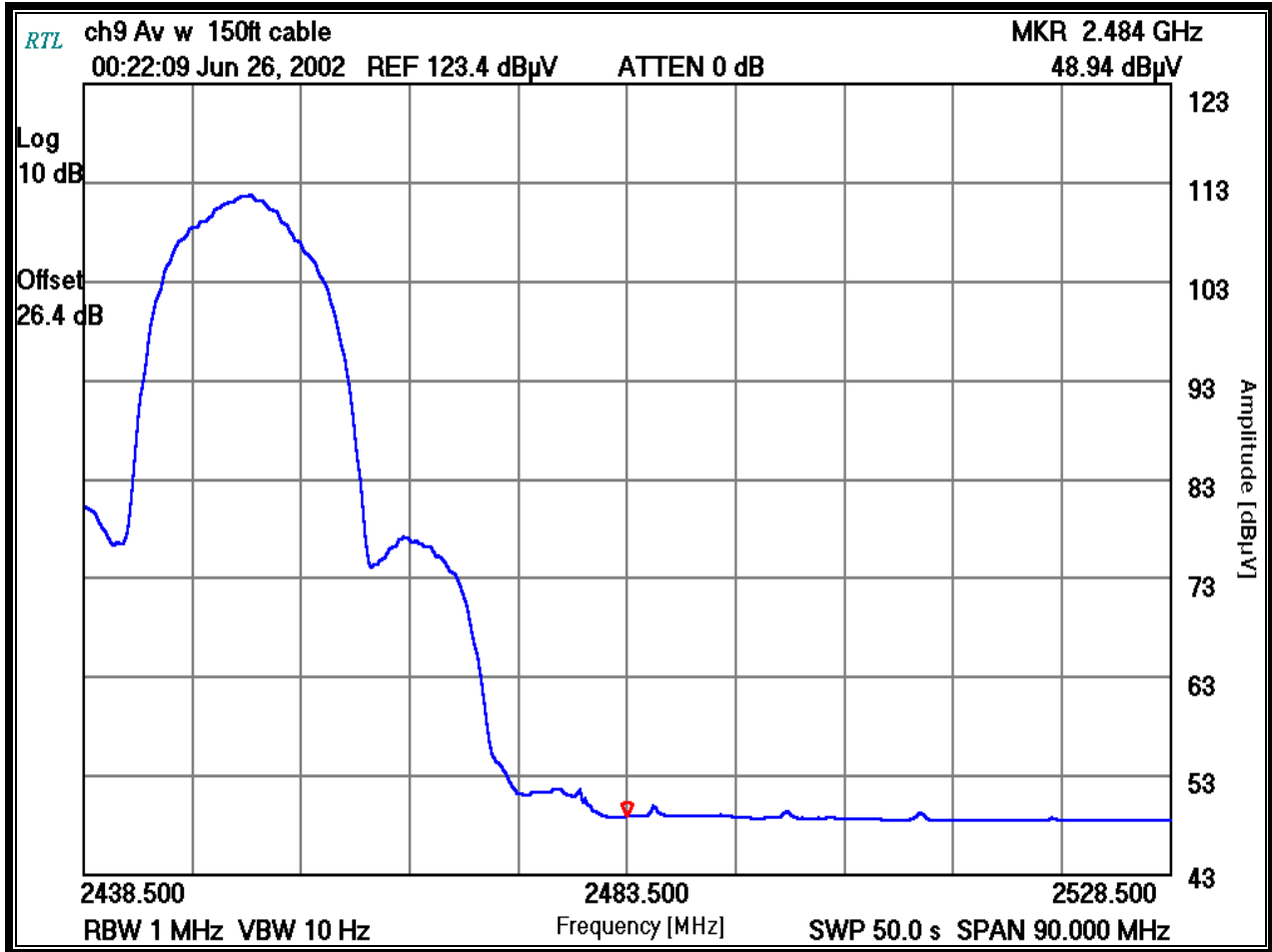
Franck Schuppis
Test Technician/Engineer

Signature

06/26/02
Date Of Test

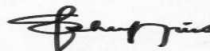
Channel Number: 9
 Frequency (MHz): 2452
 Resolution Bandwidth (MHz): 1
 Video Bandwidth (Hz): 10
 Sweep Time (s): 50.0

PLOT 3-7: BAND EDGE: AVERAGE MEASUREMENT FOR CHANNEL 9 (ANT-OMNI-12)



TEST PERSONNEL:

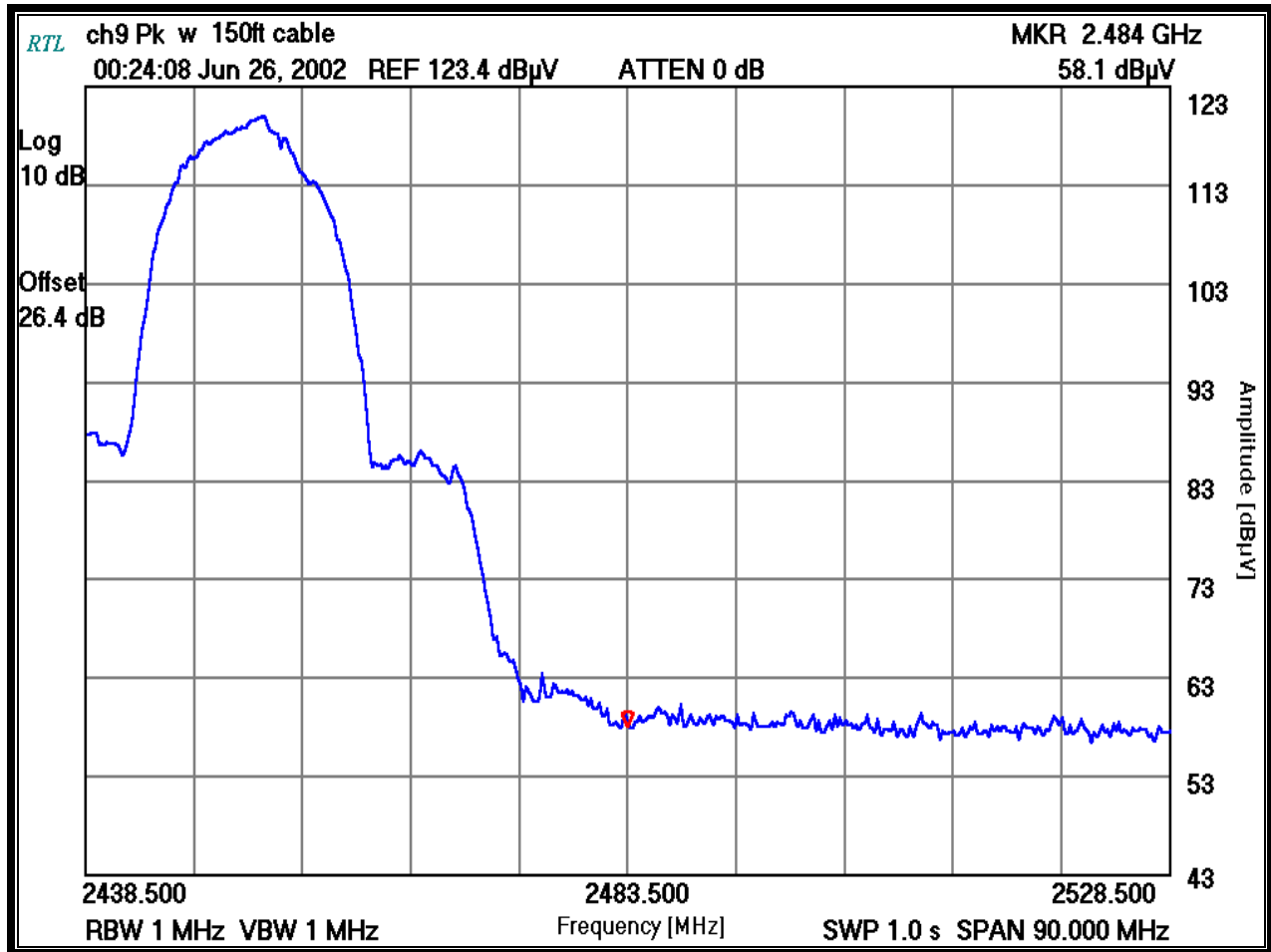
Franck Schuppius
 Test Technician/Engineer


 Signature

06/26/02
 Date Of Test

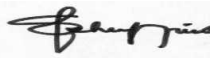
Channel Number: 9
Frequency (MHz): 2452
Resolution Bandwidth (MHz): 1
Video Bandwidth (MHz): 1
Sweep Time (s): 1.0

PLOT 3-8: BAND EDGE: PEAK MEASUREMENT FOR CHANNEL 9 (ANT-OMNI-12)



TEST PERSONNEL:

Franck Schuppis
Test Technician/Engineer


Signature

06/26/02
Date Of Test

TABLE 3-3: RESTRICTED BAND EDGE TEST DATA ANT-PATCH-12

Channel Set to	Frequency tested (MHz)	Detector	Field Strength Level (dB μ V/m)	Level Corrected (dB μ V/m)	FCC Limit (dB μ V/m)	FCC Margin (dB)
3	2390.0	Absolute measurement	23.8	50.2	54	-3.8
9	2483.5	Absolute measurement	22.8	49.2	54	-4.8

TABLE 3-4: RESTRICTED BAND EDGE TEST DATA ANT-PATCH-19

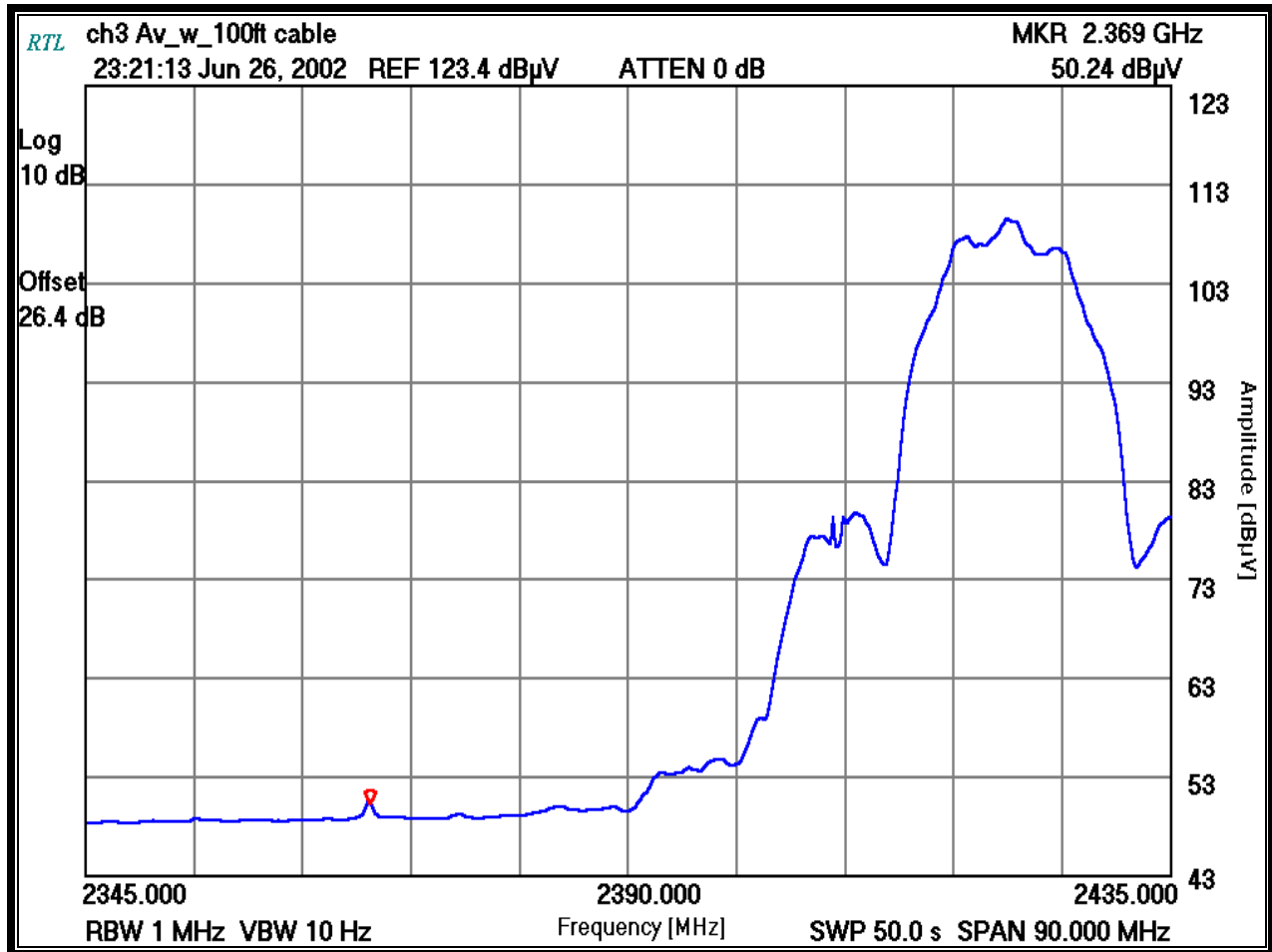
Channel Set to	Frequency tested (MHz)	Detector	Field Strength Level (dB μ V/m)	Level Corrected (dB μ V/m)	FCC Limit (dB μ V/m)	FCC Margin (dB)
3	2390.0	Absolute measurement	25.1	51.5	54	-2.5
9	2483.5	Absolute measurement	26.3	52.7	54	-1.3

TEST PERSONNEL:

Franck Schuppius Test Technician/Engineer	 Signature	06/26/02 Date Of Test
--	--	--------------------------

Channel Number: 3
Frequency (MHz): 2422
Resolution Bandwidth (MHz): 1
Video Bandwidth (Hz): 10
Sweep Time (s): 50.0

PLOT 3-9: BAND EDGE: AVERAGE MEASUREMENT FOR CHANNEL 3 (ANT-PATCH-12)



TEST PERSONNEL:

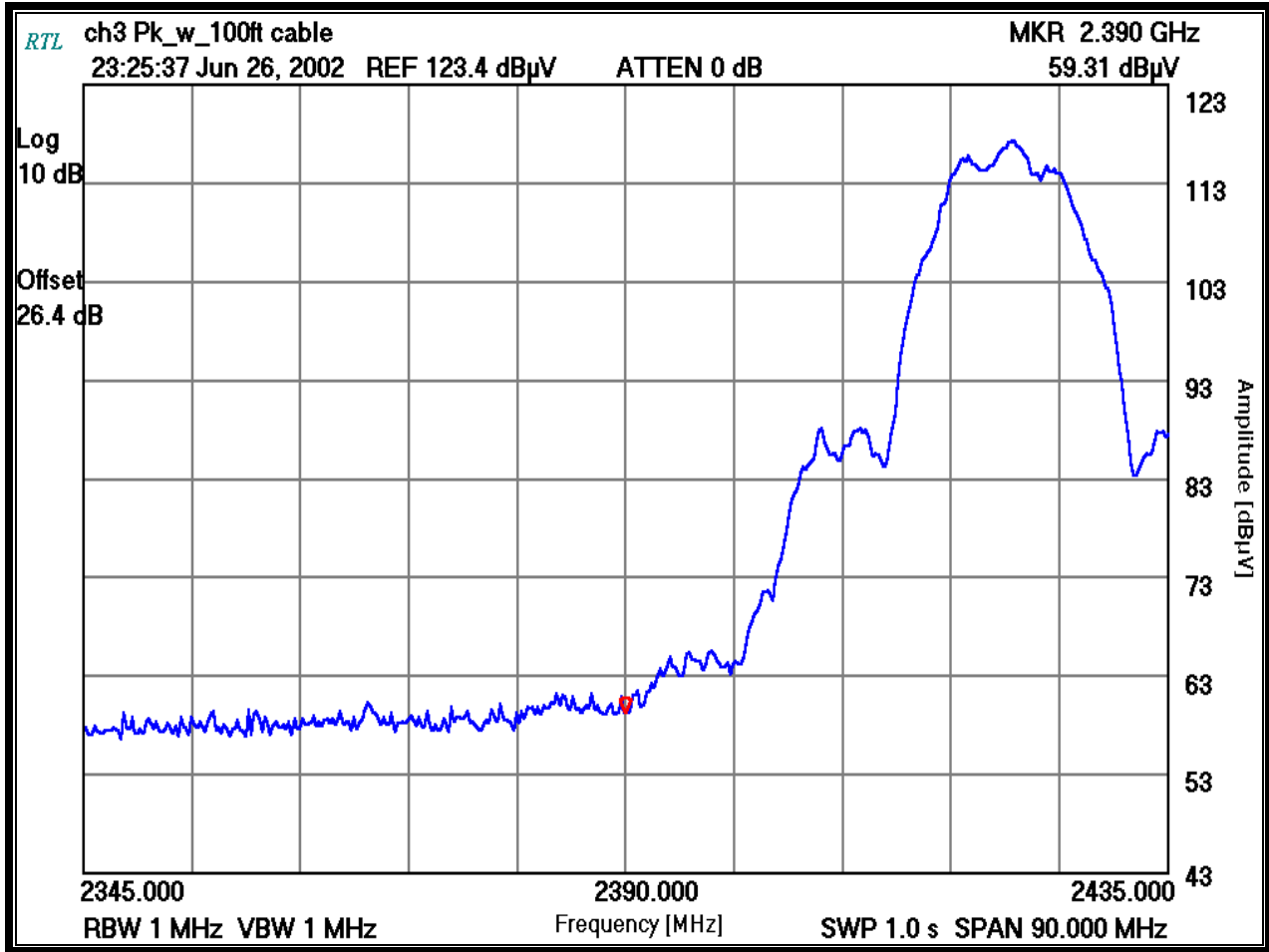
Franck Schuppius
Test Technician/Engineer

Signature

06/26/02
Date Of Test

Channel Number: 3
 Frequency (MHz): 2422
 Bandwidth Resolution (MHz): 1
 Video Bandwidth (MHz): 1
 Sweep Time (s): 1.0

PLOT 3-10: BAND EDGE: PEAK MEASUREMENT FOR CHANNEL 3 (ANT-PATCH-12)



TEST PERSONNEL:

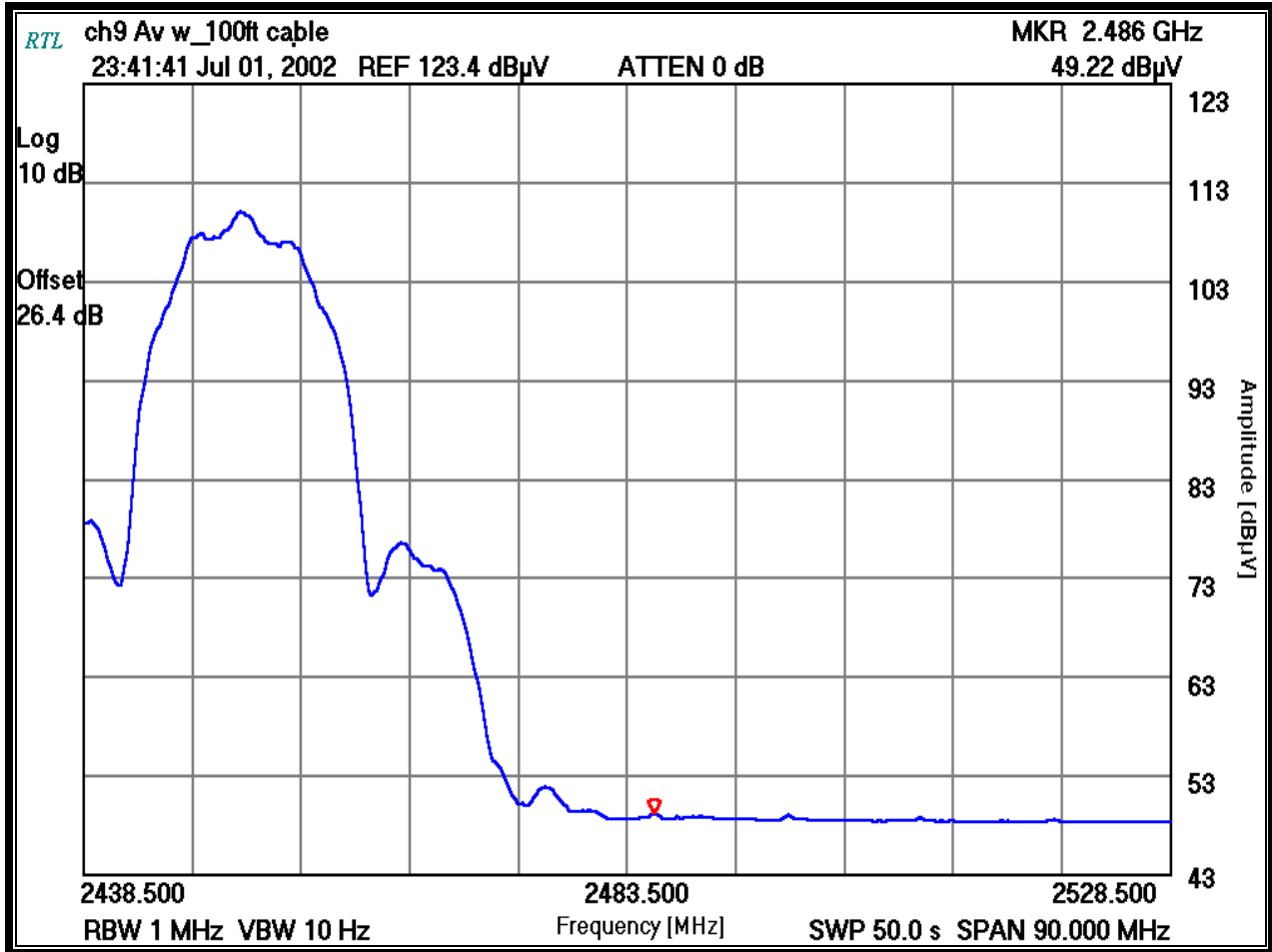
Franck Schuppis
 Test Technician/Engineer

Franck Schuppis
 Signature

06/26/02
 Date Of Test

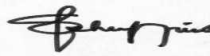
Channel Number: 9
Frequency (MHz): 2452
Resolution Bandwidth (MHz): 1
Video Bandwidth (Hz): 10
Sweep Time (s): 50.0

PLOT 3-11: BAND EDGE: AVERAGE MEASUREMENT FOR CHANNEL 9 (ANT-PATCH-12)



TEST PERSONNEL:

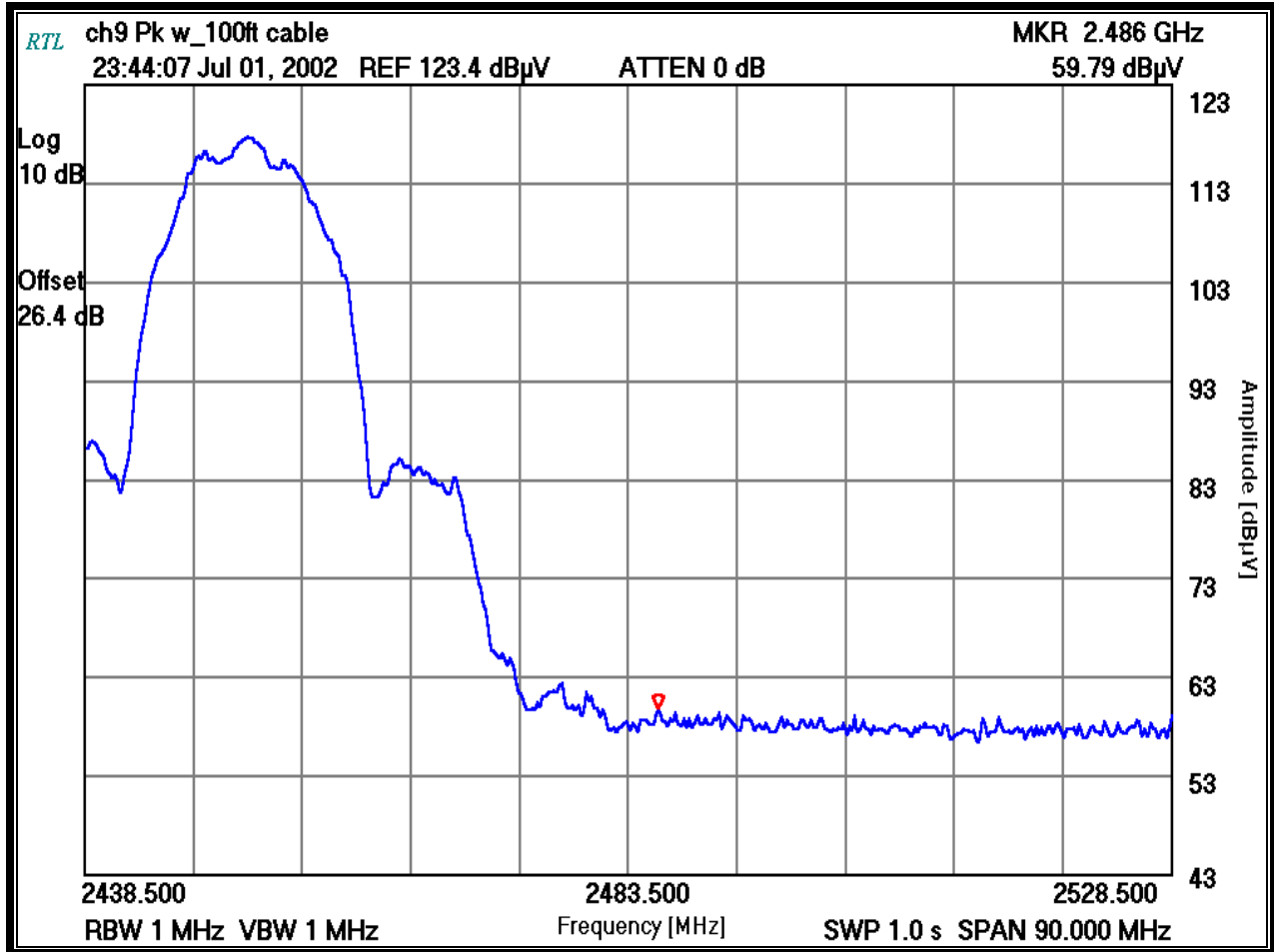
Franck Schuppius
Test Technician/Engineer


Signature

07/01/02
Date Of Test

Channel Number: 9
Frequency (MHz): 2452
Resolution Bandwidth (MHz): 1
Video Bandwidth (MHz): 1
Sweep Time (s): 1.0

PLOT 3-12: BAND EDGE: PEAK MEASUREMENT FOR CHANNEL 9 (ANT-PATCH-12)



TEST PERSONNEL:

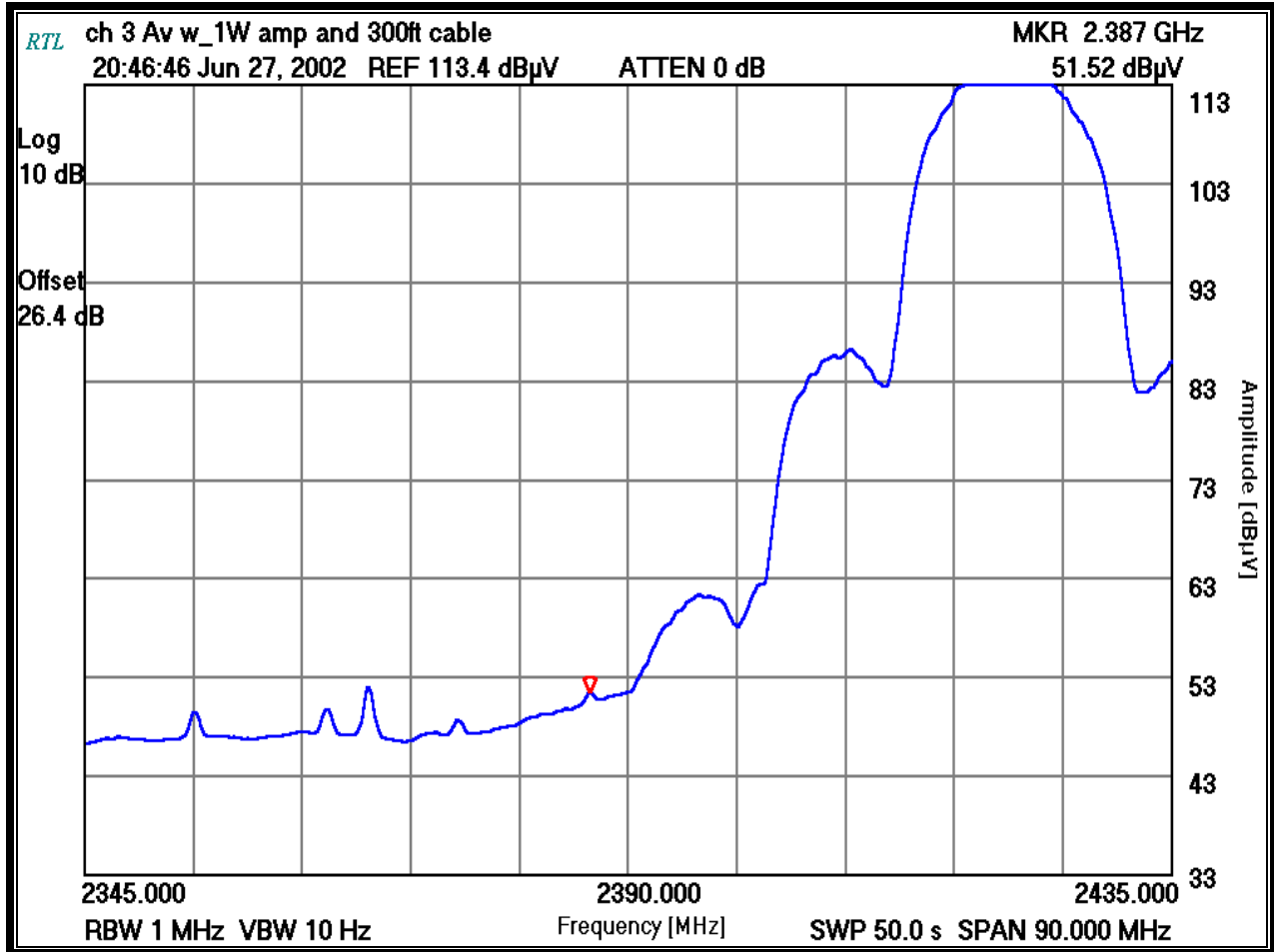
Franck Schuppius
Test Technician/Engineer


Signature

07/01/02
Date Of Test

Channel Number: 3
 Frequency (MHz): 2422
 Resolution Bandwidth (MHz): 1
 Video Bandwidth (Hz): 10
 Sweep Time (s): 50.0

PLOT 3-13: BAND EDGE: AVERAGE MEASUREMENT FOR CHANNEL 3 (ANT-PATCH 19)



TEST PERSONNEL:

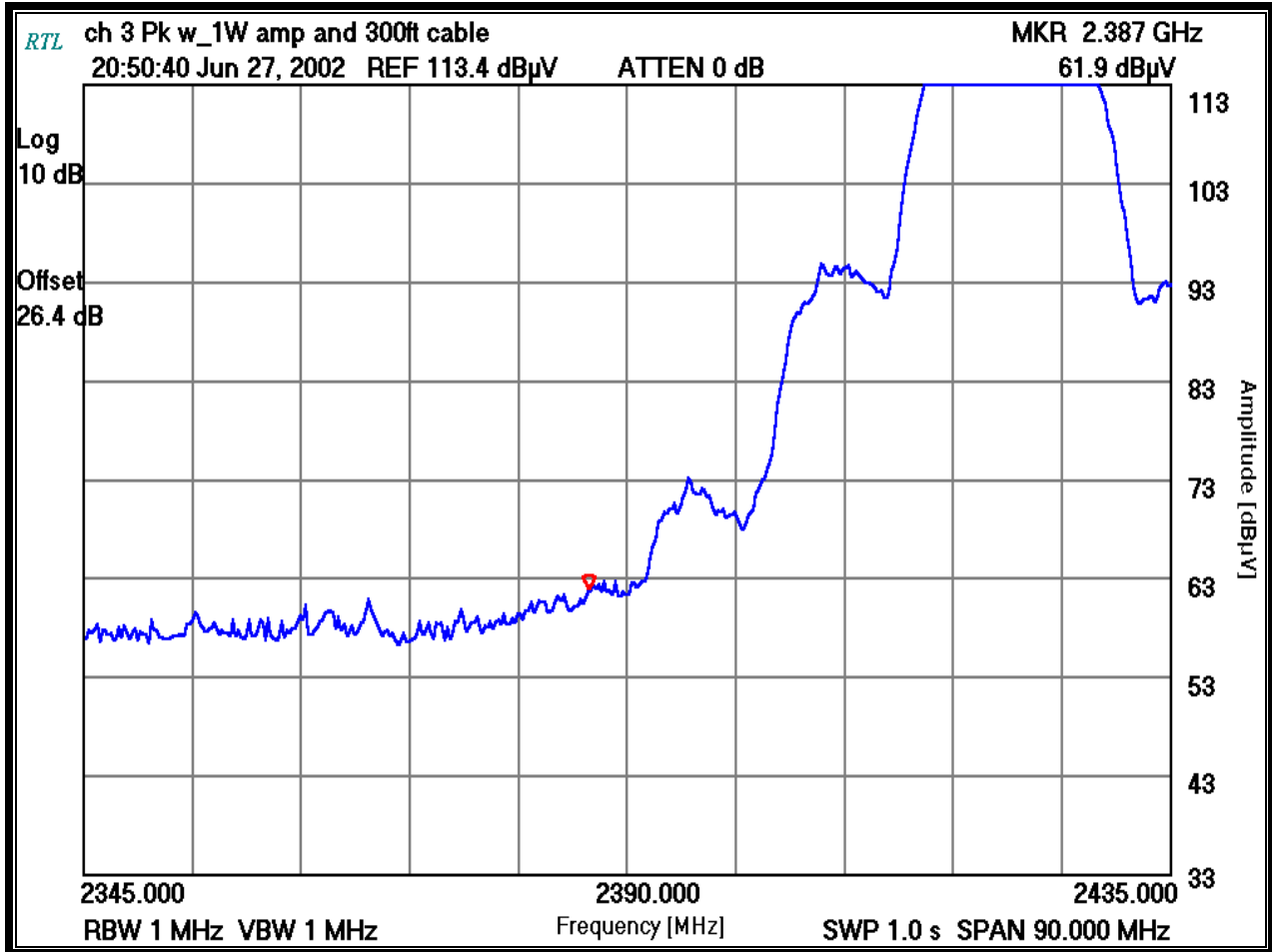
Franck Schuppis
 Test Technician/Engineer

Franck Schuppis
 Signature

06/27/02
 Date Of Test

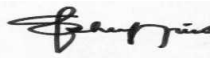
Channel Number: 3
Frequency (MHz): 2422
Bandwidth Resolution (MHz): 1
Video Bandwidth (MHz): 1
Sweep Time (s): 1.0

PLOT 3-14: BAND EDGE: PEAK MEASUREMENT FOR CHANNEL 3 (ANT-PATCH-19)



TEST PERSONNEL:

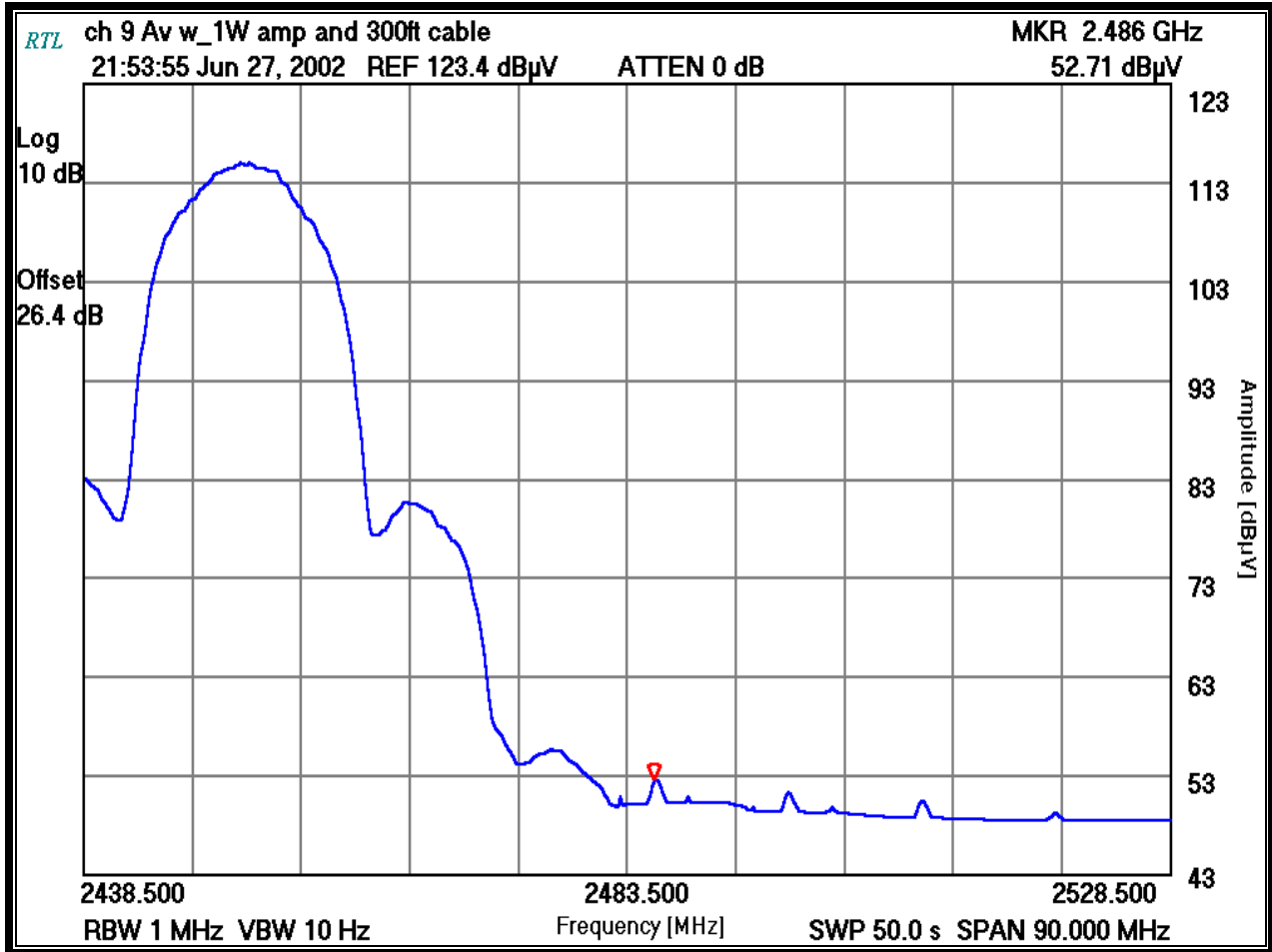
Franck Schuppius
Test Technician/Engineer


Signature

06/27/02
Date Of Test

Channel Number: 9
 Frequency (MHz): 2452
 Resolution Bandwidth (MHz): 1
 Video Bandwidth (Hz): 10
 Sweep Time (s): 50.0

PLOT 3-15: BAND EDGE: AVERAGE MEASUREMENT FOR CHANNEL 9 (ANT-PATCH-19)



TEST PERSONNEL:

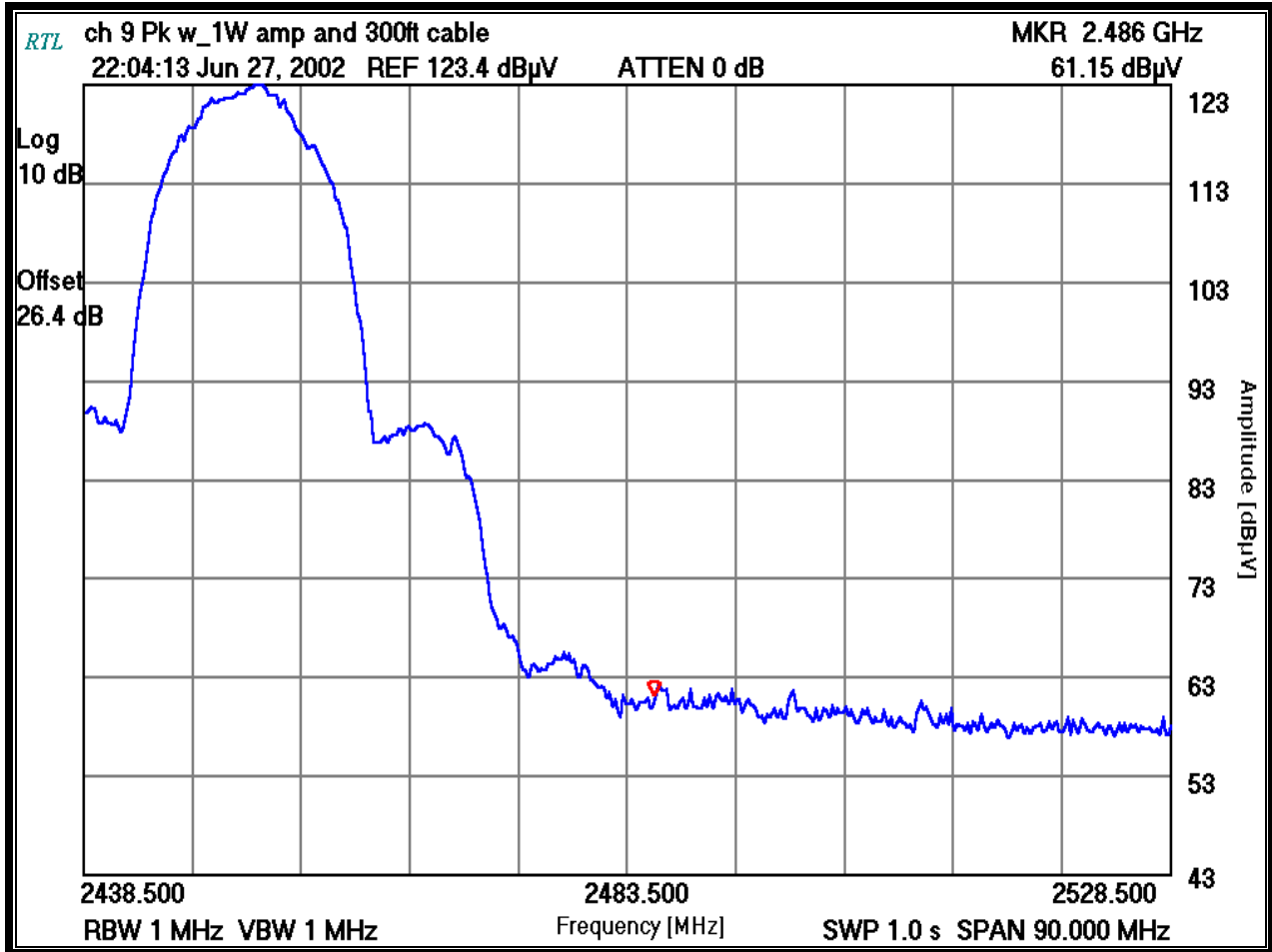
Franck Schuppius
 Test Technician/Engineer

Franck Schuppius
 Signature

06/27/02
 Date Of Test

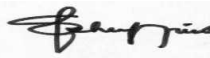
Channel Number: 9
Frequency (MHz): 2452
Resolution Bandwidth (MHz): 1
Video Bandwidth (MHz): 1
Sweep Time (s): 1.0

PLOT 3-16: BAND EDGE: PEAK MEASUREMENT FOR CHANNEL 9 (ANT-PATCH-19)



TEST PERSONNEL:

Franck Schuppis
Test Technician/Engineer


Signature

06/27/02
Date Of Test

TABLE 3-5: RESTRICTED BAND EDGE TEST DATA ANT-RFLCTR-24

Channel Set to	Frequency tested (MHz)	Detector	Field Strength Level (dBµV/m)	Level Corrected (dBµV/m)	FCC Limit (dBµV/m)	FCC Margin (dB)
3	2390.0	Absolute measurement	24.3	50.7	54	-3.3
9	2483.5	Absolute measurement	23.1	49.5	54	-4.5

TABLE 3-6: RESTRICTED BAND EDGE TEST DATA ANT-RFLCTR-18

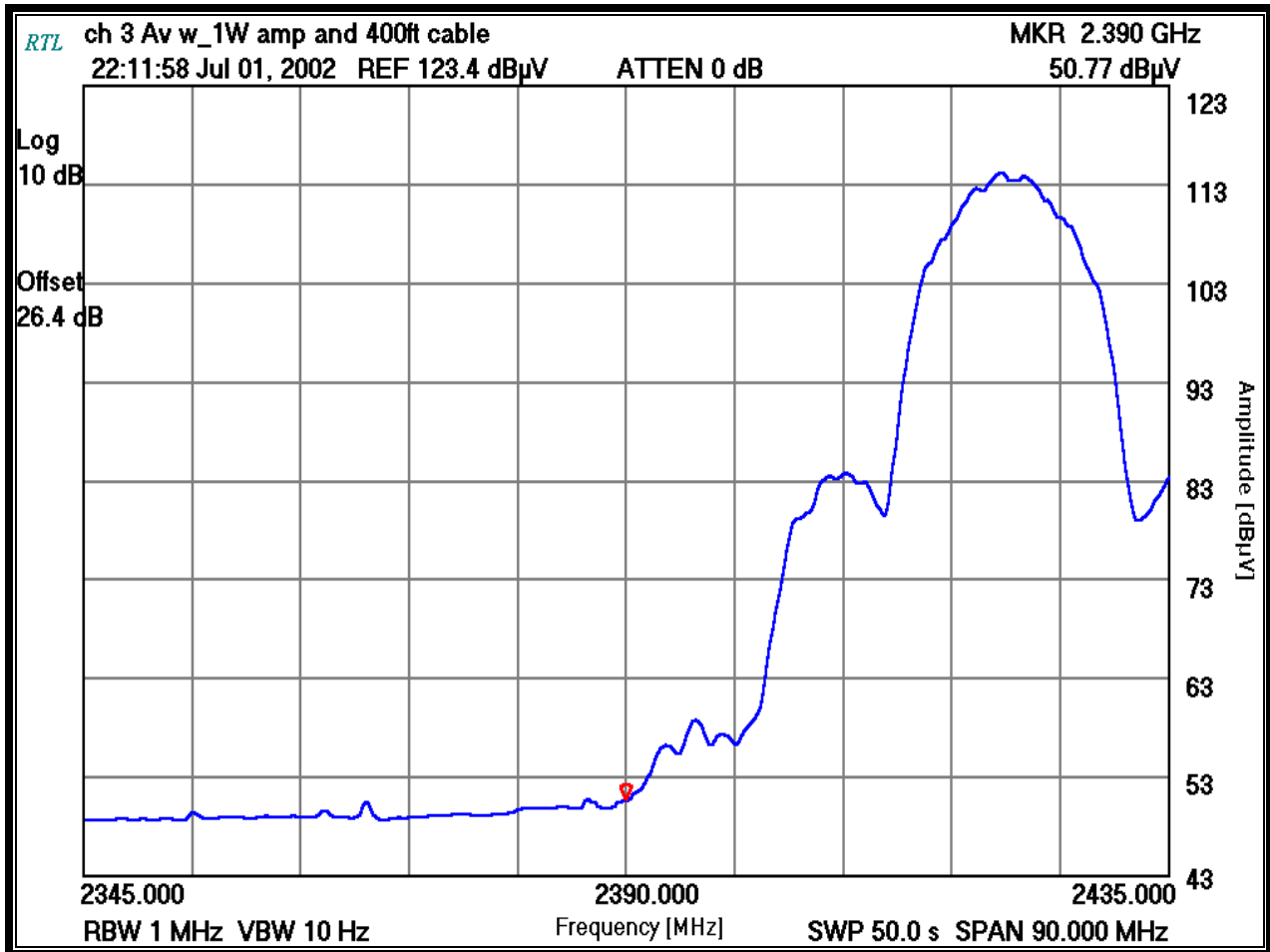
Channel Set to	Frequency tested (MHz)	Detector	Field Strength Level (dBµV/m)	Level Corrected (dBµV/m)	FCC Limit (dBµV/m)	FCC Margin (dB)
3	2390.0	Absolute measurement	24.5	50.9	54	-3.1
9	2483.5	Absolute measurement	23.6	50	54	-4

TEST PERSONNEL:

Franck Schuppius Test Technician/Engineer	 Signature	07/02/02 Date Of Test
--	--	--------------------------

Channel Number: 3
Frequency (MHz): 2422
Resolution Bandwidth (MHz): 1
Video Bandwidth (Hz): 10
Sweep Time (s): 50.0

PLOT 3-17: BAND EDGE: AVERAGE MEASUREMENT FOR CHANNEL 3 (ANT-RFLCTR-24)



TEST PERSONNEL:

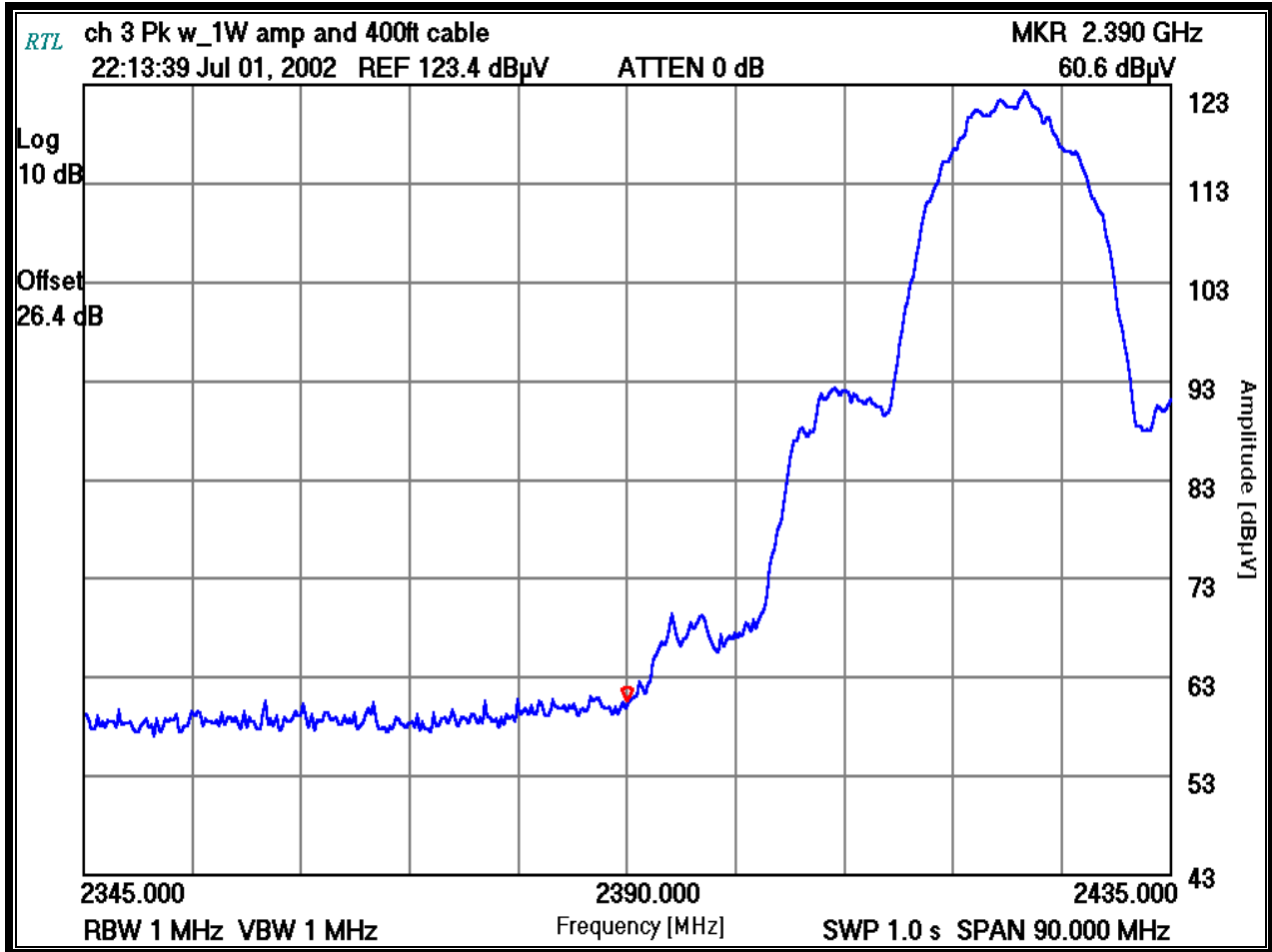
Franck Schuppius
Test Technician/Engineer

Signature

07/01/02
Date Of Test

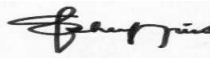
Channel Number: 3
Frequency (MHz): 2422
Bandwidth Resolution (MHz): 1
Video Bandwidth (MHz): 1
Sweep Time (s): 1.0

PLOT 3-18: BAND EDGE: PEAK MEASUREMENT FOR CHANNEL 3 (ANT-RFLCTR-24)



TEST PERSONNEL:

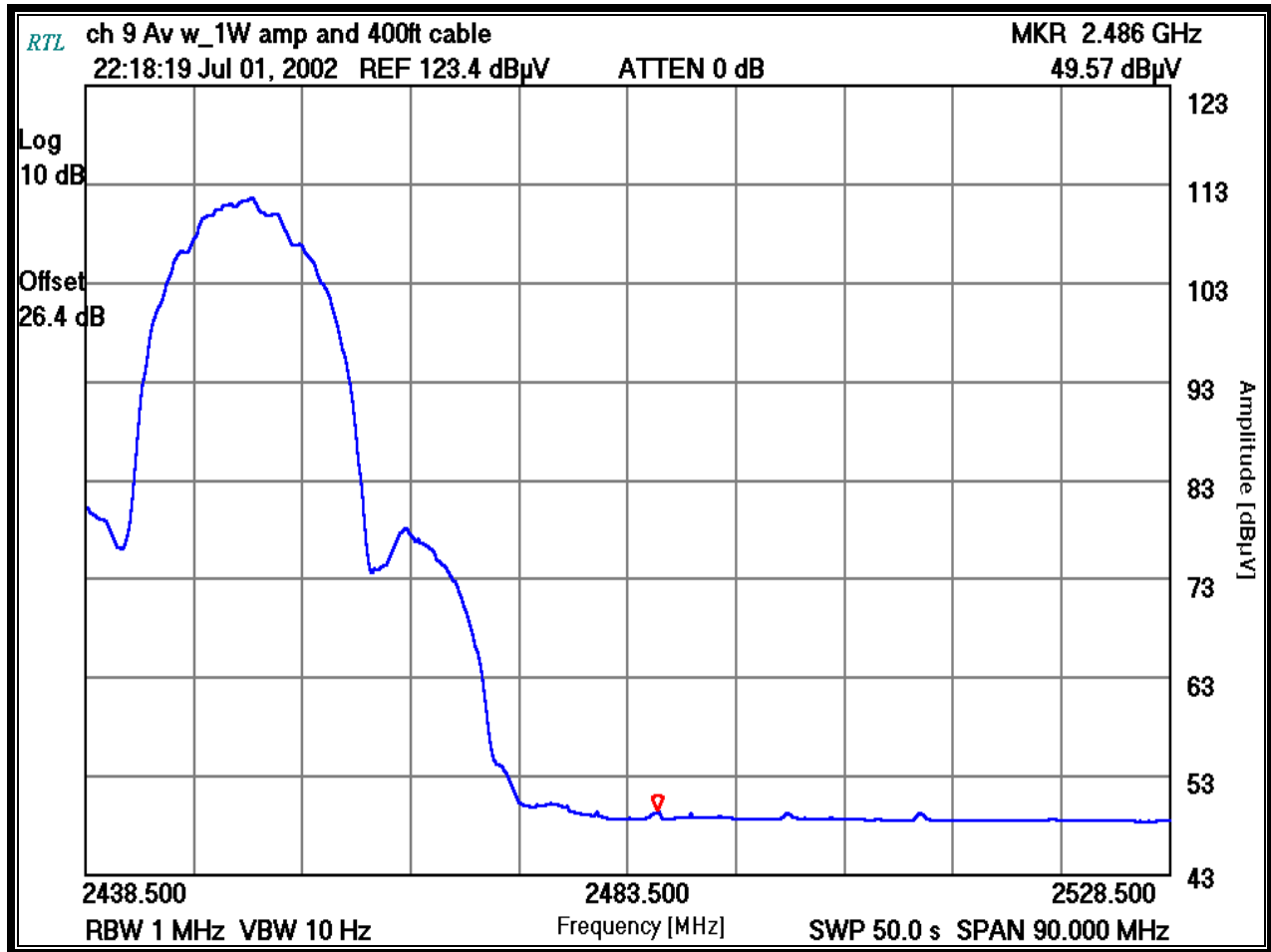
Franck Schuppius
Test Technician/Engineer


Signature

07/01/02
Date Of Test

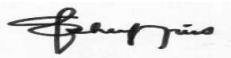
Channel Number: 9
Frequency (MHz): 2452
Resolution Bandwidth (MHz): 1
Video Bandwidth (Hz): 10
Sweep Time (s): 50.0

PLOT 3-19: BAND EDGE: AVERAGE MEASUREMENT FOR CHANNEL 9 (ANT-RFLCTR-24)



TEST PERSONNEL:

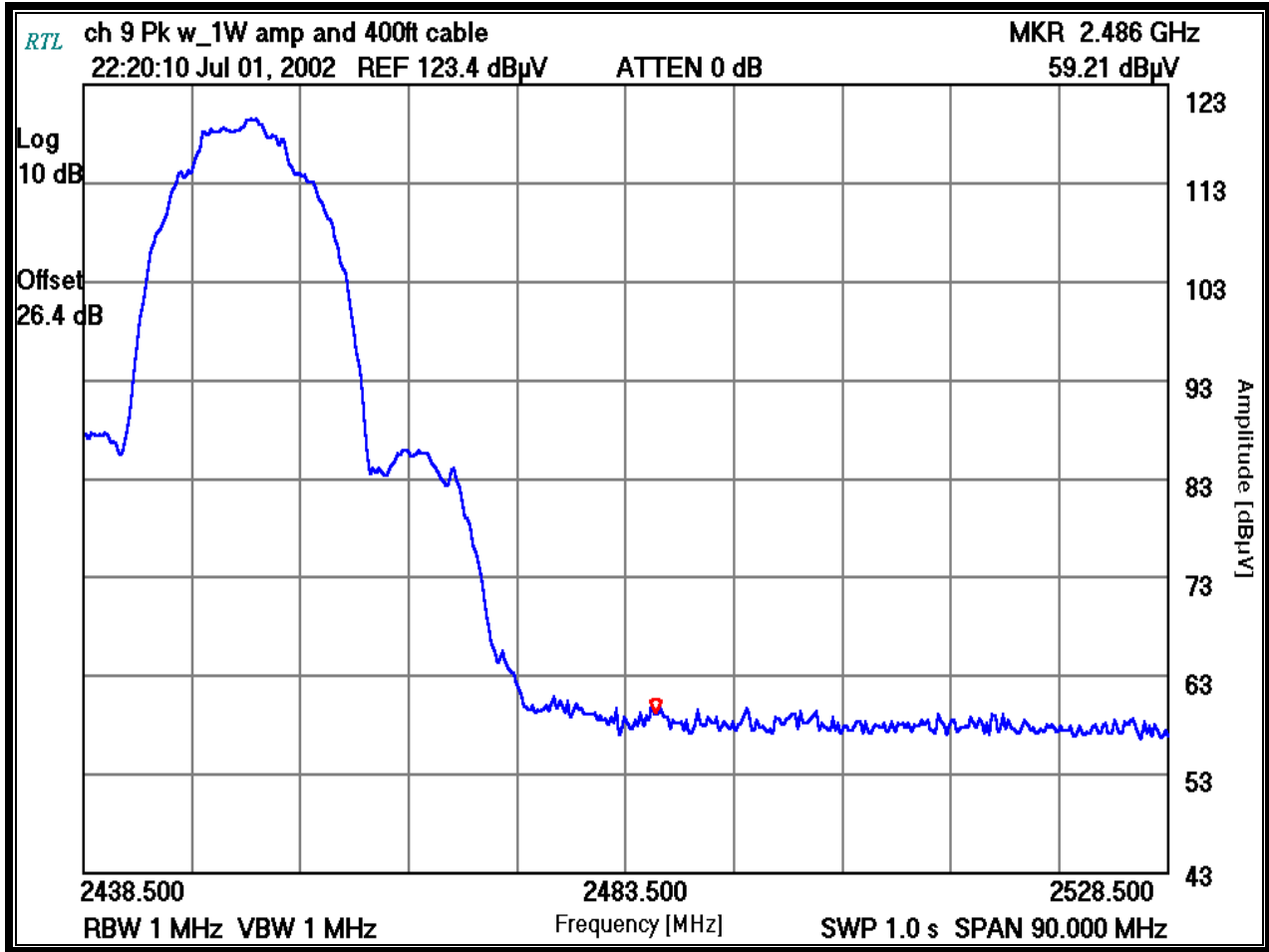
Franck Schuppius
Test Technician/Engineer


Signature

07/01/02
Date Of Test

Channel Number: 9
 Frequency (MHz): 2452
 Resolution Bandwidth (MHz): 1
 Video Bandwidth (MHz): 1
 Sweep Time (s): 1.0

PLOT 3-20: BAND EDGE: PEAK MEASUREMENT FOR CHANNEL 9 (ANT-RFLCTR-24)



TEST PERSONNEL:

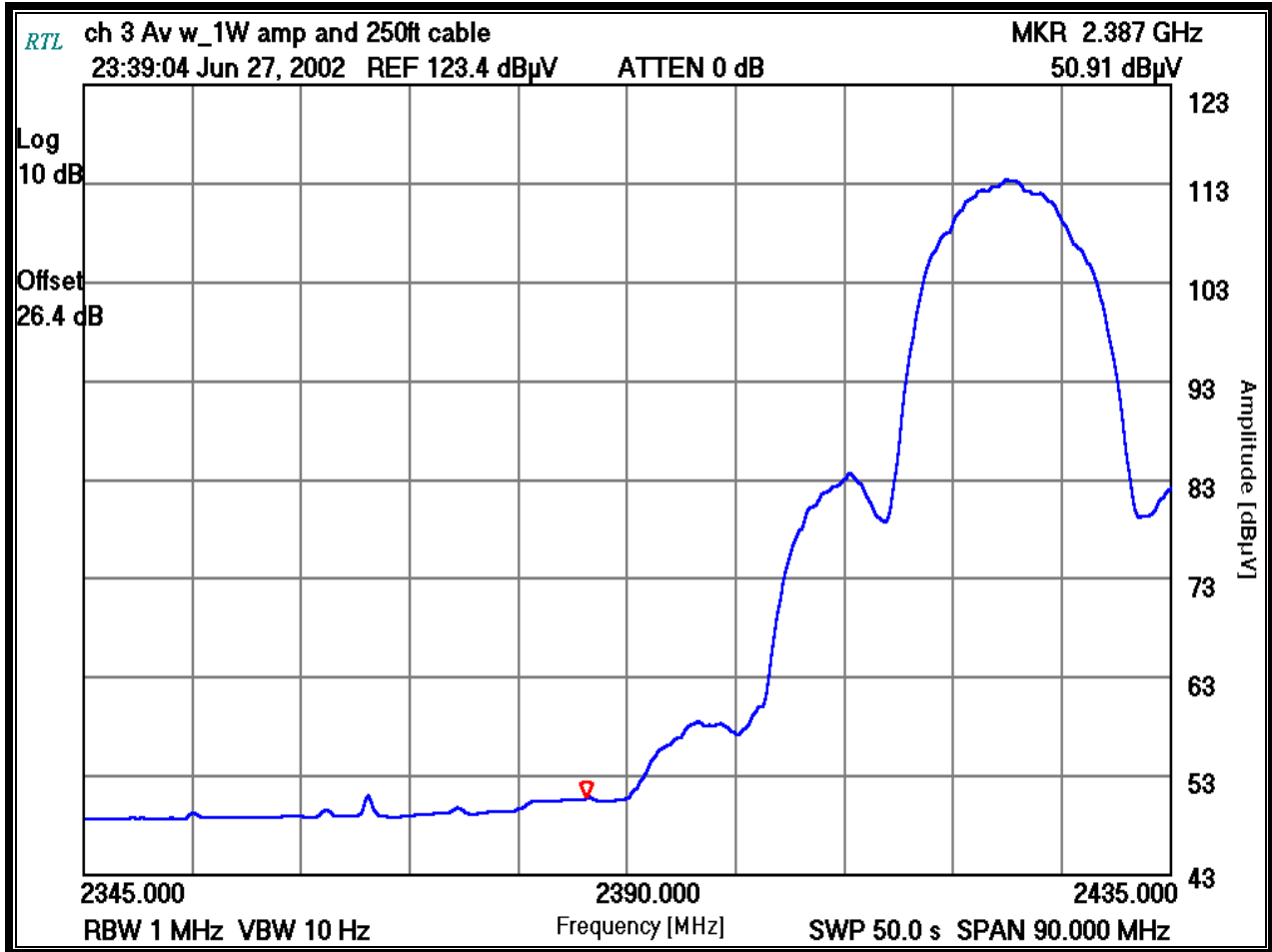
Franck Schuppis
 Test Technician/Engineer

Franck Schuppis
 Signature

07/01/02
 Date Of Test

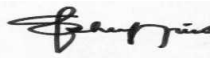
Channel Number: 3
Frequency (MHz): 2422
Resolution Bandwidth (MHz): 1
Video Bandwidth (Hz): 10
Sweep Time (s): 50.0

PLOT 3-21: BAND EDGE: AVERAGE MEASUREMENT FOR CHANNEL 3 (ANT-RFLCTR-18)



TEST PERSONNEL:

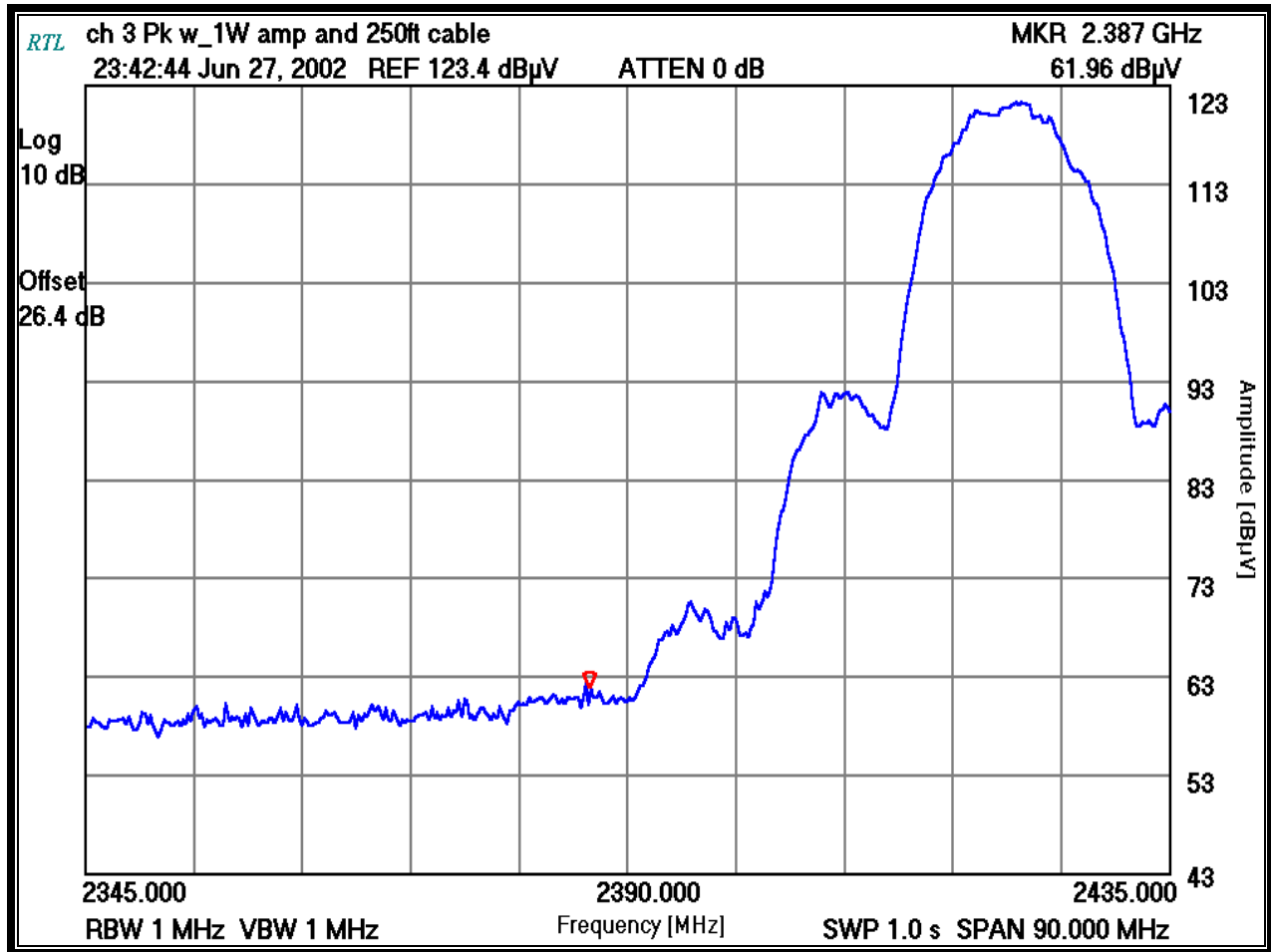
Franck Schuppius
Test Technician/Engineer


Signature

06/27/02
Date Of Test

Channel Number: 3
Frequency (MHz): 2422
Bandwidth Resolution (MHz): 1
Video Bandwidth (MHz): 1
Sweep Time (s): 1.0

PLOT 3-22: BAND EDGE: PEAK MEASUREMENT FOR CHANNEL 3 (ANT-RFLCTR-18)



TEST PERSONNEL:

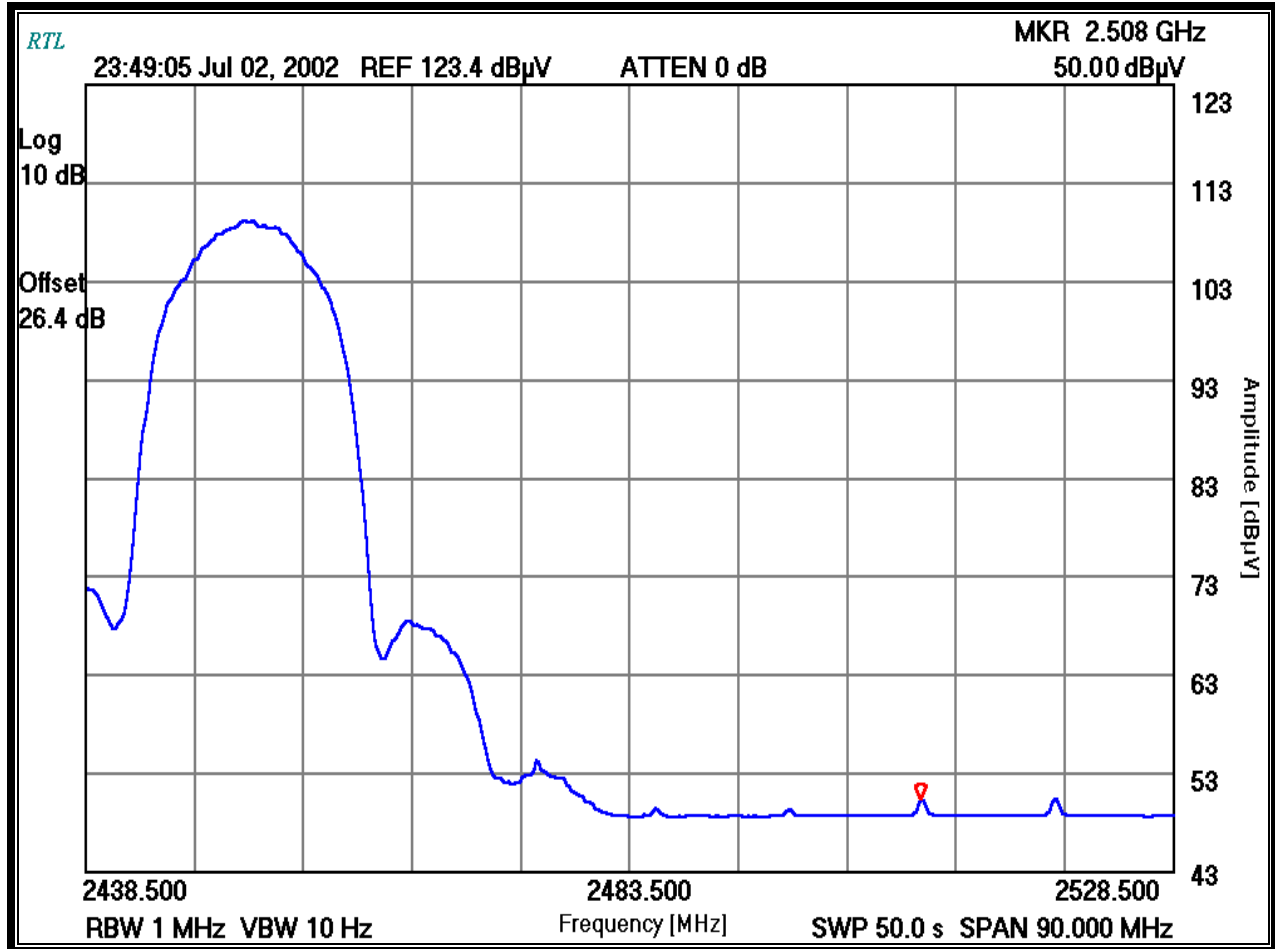
Franck Schuppius
Test Technician/Engineer


Signature

06/27/02
Date Of Test

Channel Number: 9
Frequency (MHz): 2452
Resolution Bandwidth (MHz): 1
Video Bandwidth (Hz): 10
Sweep Time (s): 50.0

PLOT 3-23: BAND EDGE: AVERAGE MEASUREMENT FOR CHANNEL 9 (ANT-RFLCTR-18)



TEST PERSONNEL:

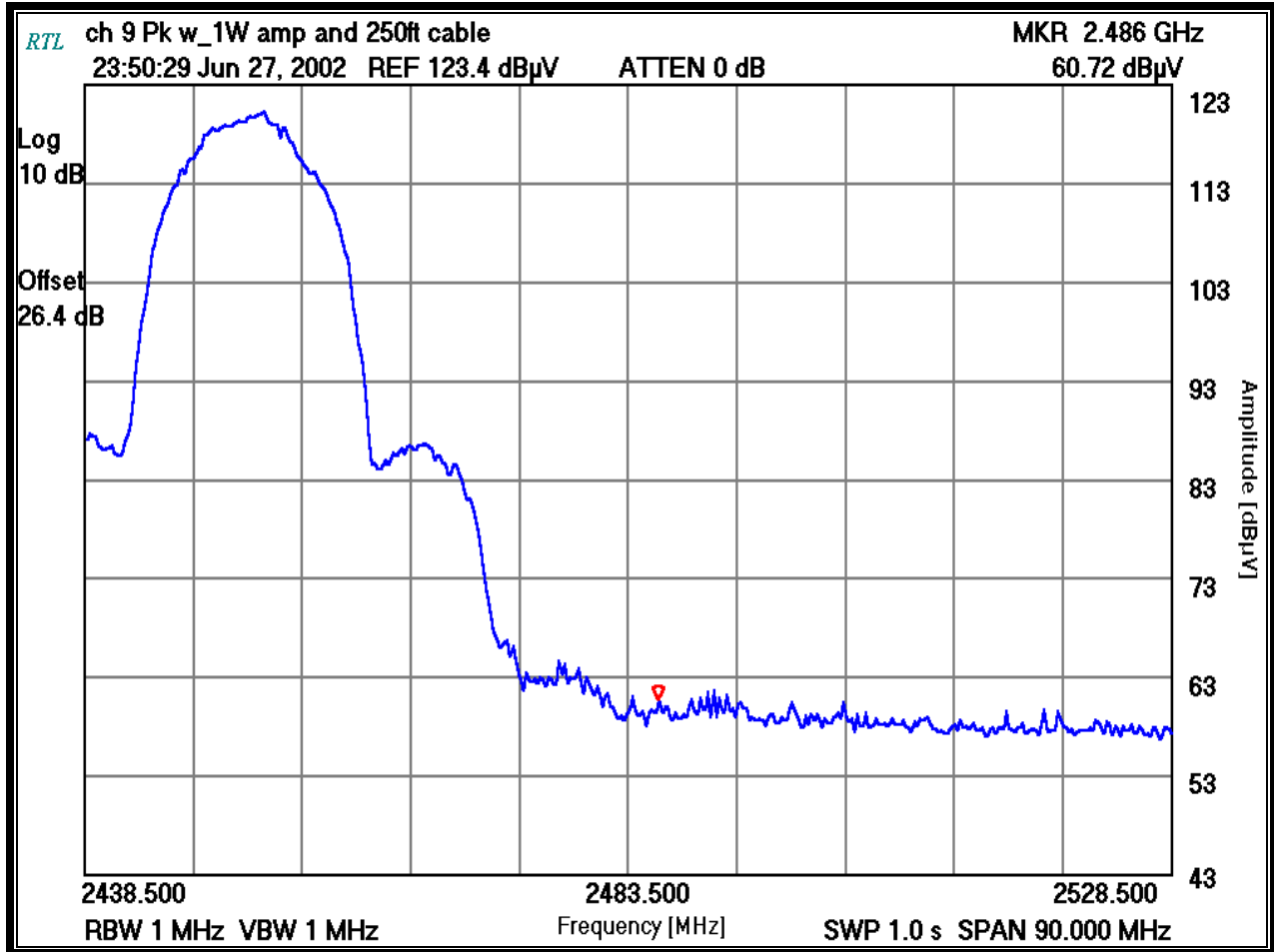
Franck Schuppius
Test Technician/Engineer


Signature

07/02/02
Date Of Test

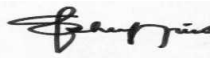
Channel Number: 9
Frequency (MHz): 2452
Resolution Bandwidth (MHz): 1
Video Bandwidth (MHz): 1
Sweep Time (s): 1.0

PLOT 3-24: BAND EDGE: PEAK MEASUREMENT FOR CHANNEL 9 (ANT-RFLCTR-18)



TEST PERSONNEL:

Franck Schuppius
Test Technician/Engineer



Signature

06/27/02
Date Of Test

TABLE 3-7: RESTRICTED BAND EDGE TEST DATA ANT-D2421

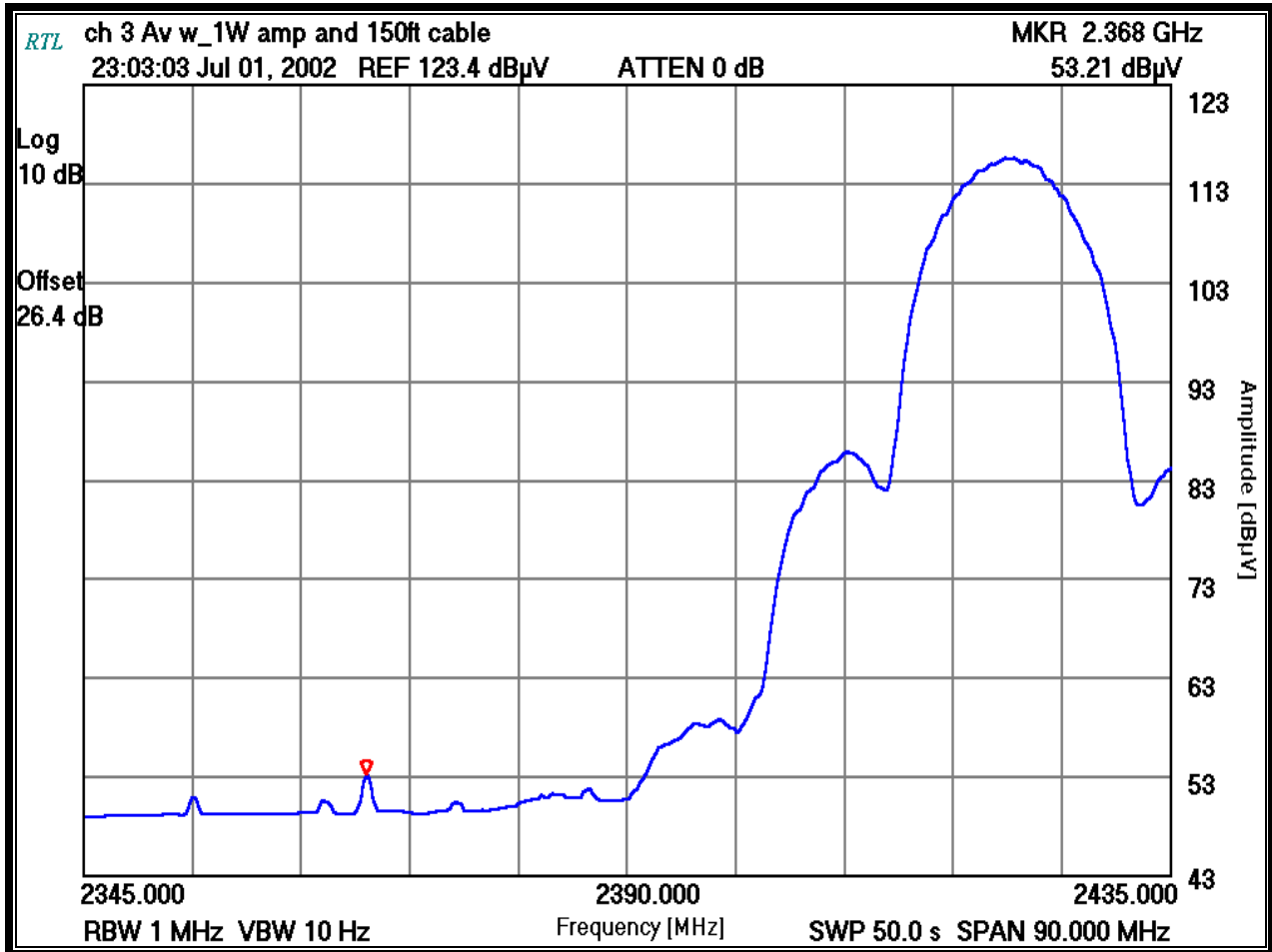
Channel Set to	Frequency tested (MHz)	Detector	Field Strength Level (dB μ V/m)	Level Corrected (dB μ V/m)	FCC Limit (dB μ V/m)	FCC Margin (dB)
3	2390.0	Absolute measurement	26.8	53.2	54	-0.8
9	2483.5	Absolute measurement	23.8	50.2	54	-3.8

TEST PERSONNEL:

Franck Schuppius		07/01/02
Test Technician/Engineer	Signature	Date Of Test

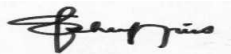
Channel Number: 3
Frequency (MHz): 2422
Resolution Bandwidth (MHz): 1
Video Bandwidth (Hz): 10
Sweep Time (s): 50.0

PLOT 3-25: BAND EDGE: AVERAGE MEASUREMENT FOR CHANNEL 3 (ANT-D2421)



TEST PERSONNEL:

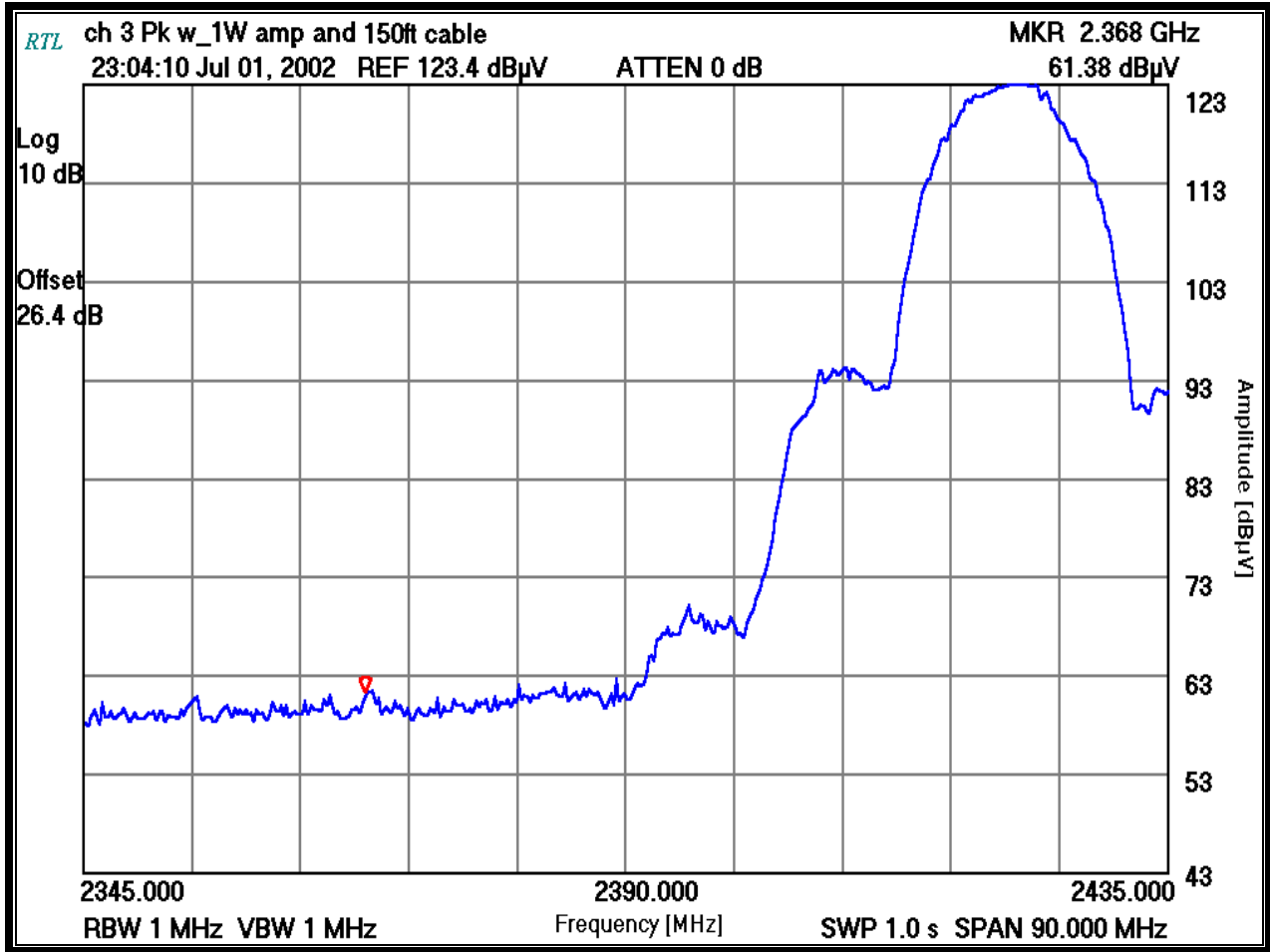
Franck Schuppis
Test Technician/Engineer


Signature

07/01/02
Date Of Test

Channel Number: 3
 Frequency (MHz): 2422
 Bandwidth Resolution (MHz): 1
 Video Bandwidth (MHz): 1
 Sweep Time (s): 1.0

PLOT 3-26: BAND EDGE: PEAK MEASUREMENT FOR CHANNEL 3 (ANT-D2421)



TEST PERSONNEL:

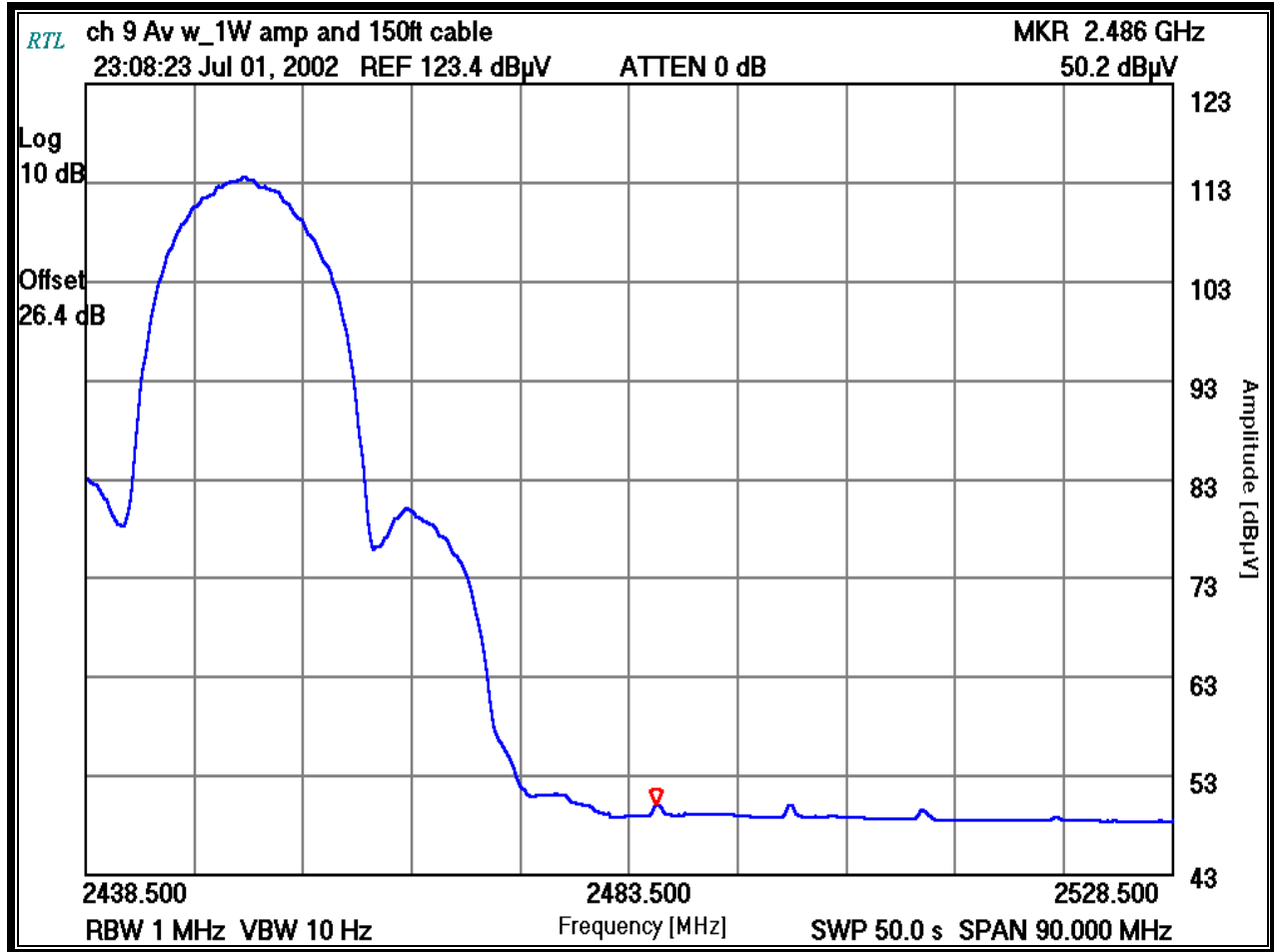
Franck Schuppis
 Test Technician/Engineer

Franck Schuppis
 Signature

07/01/02
 Date Of Test

Channel Number: 9
 Frequency (MHz): 2452
 Resolution Bandwidth (MHz): 1
 Video Bandwidth (Hz): 10
 Sweep Time (s): 50.0

PLOT 3-27: BAND EDGE: AVERAGE MEASUREMENT FOR CHANNEL 9 (ANT-D2421)



TEST PERSONNEL:

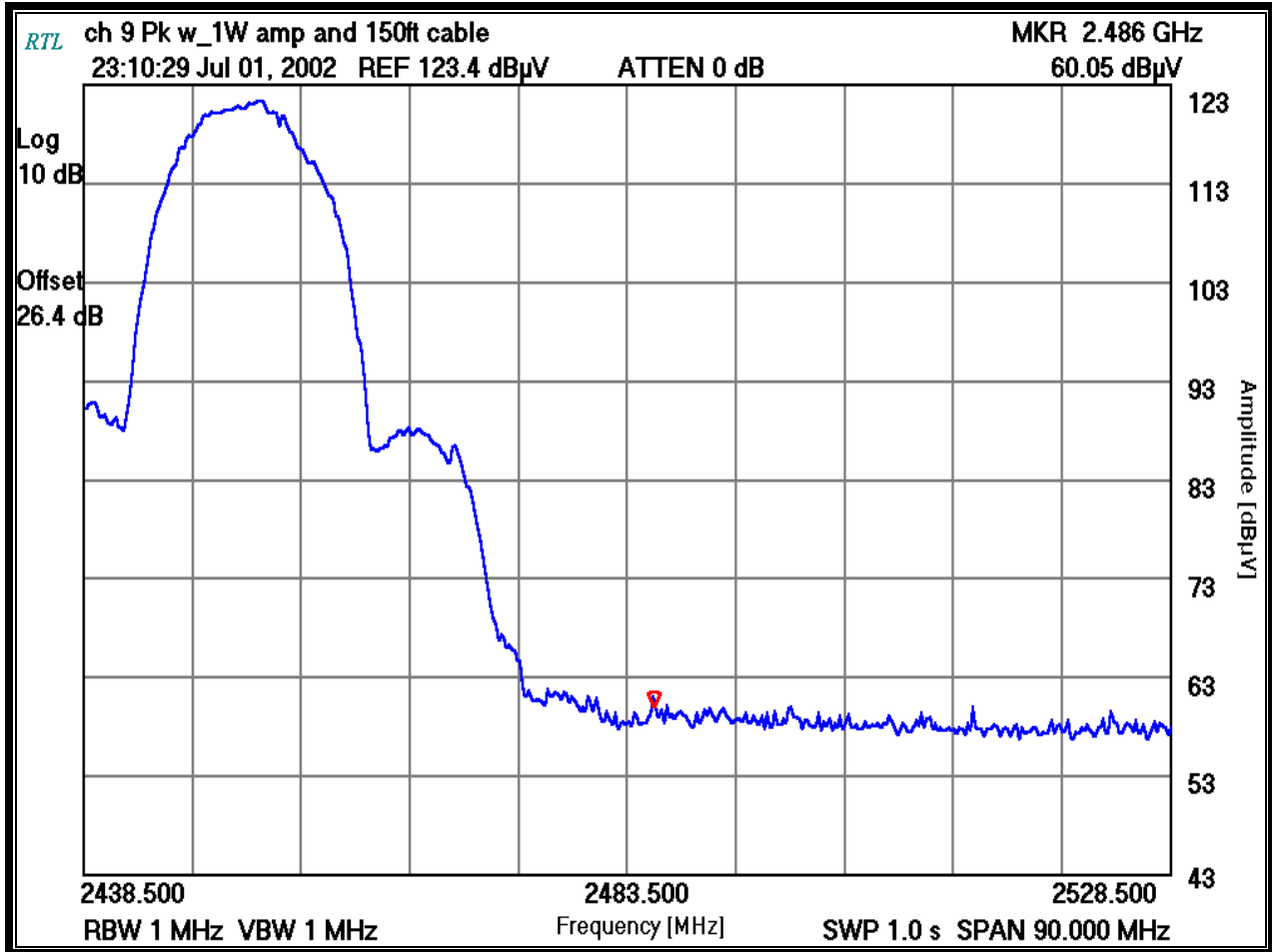
Franck Schuppius
 Test Technician/Engineer

Franck Schuppius
 Signature

07/01/02
 Date Of Test

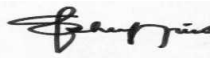
Channel Number: 9
Frequency (MHz): 2452
Resolution Bandwidth (MHz): 1
Video Bandwidth (MHz): 1
Sweep Time (s): 1.0

PLOT 3-28: BAND EDGE: PEAK MEASUREMENT FOR CHANNEL 9 (ANT-D2421)



TEST PERSONNEL:

Franck Schuppis
Test Technician/Engineer


Signature

07/01/02
Date Of Test

4 CONDUCTED LIMITS - §15.207

4.1 TEST METHODOLOGY FOR CONDUCTED EMISSIONS MEASUREMENTS

The power line conducted emission measurements were performed in a Series 81 type shielded enclosure manufactured by Rayproof. The EUT was assembled on a wooden table 80 centimeters high. Power was fed to the EUT through a 50 ohm / 50 microhenry Line Impedance Stabilization Network (EUT LISN). The EUT LISN was fed power through an A.C. filter box on the outside of the shielded enclosure. The filter box and EUT LISN housing are bonded to the ground plane of the shielded enclosure. A second LISN, the peripheral LISN, provides isolation for the EUT test peripherals. This peripheral LISN was also fed A.C. power. A metal power outlet box, which is bonded to the ground plane and electrically connected to the peripheral LISN, powers the EUT host peripherals.

The spectrum analyzer was connected to the A.C. line through an isolation transformer. The 50-ohm output of the EUT LISN was connected to the spectrum analyzer input through a Solar 400 kHz high-pass filter. The filter is used to prevent overload of the spectrum analyzer from noise below 400 kHz. Conducted emission levels were measured on each current-carrying line with the spectrum analyzer operating in the CISPR quasi-peak mode (or peak mode if applicable). The analyzer's 6 dB bandwidth was set to 9 kHz. No video filter less than 10 times the resolution bandwidth was used. Average measurements are performed in linear mode using a 10 kHz resolution bandwidth, a 1 Hz video bandwidth, and by increasing the sweep time in order to obtain a calibrated measurement. The emission spectrum was scanned from (150/450) kHz to 30 MHz. The highest emission amplitudes relative to the appropriate limit were measured and have been recorded in this report.

Note: Rhein Tech Laboratories, Inc. has implemented procedures to minimize errors that occur from test instruments, calibration, procedures, and test setups. Test instrument and calibration errors are documented from the manufacturer or calibration lab. Other errors have been defined and calculated within the Rhein Tech quality manual, section 6.1. Rhein Tech implements the following procedures to minimize errors that may occur: yearly as well as daily calibration methods, technician training, and emphasis to employees on avoiding error.

4.2 CONDUCTED EMISSION TEST

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. If the conducted emissions exceed the limit with the instrument set to the quasi-peak mode, then measurements are made in the average mode. If the quasi-peak measurement is at least 6dB higher than the amplitude in the average mode, the level measured in the quasi-peak mode may be reduced by 13dB before comparing it to the limit.

The conducted test was performed with the EUT exercise program loaded, and the emissions were scanned between 450 kHz to 30 MHz on the NEUTRAL SIDE and PHASE SIDE. The EUT is composed of the Access Point and the DC Injector, each part has been tested and investigated, and only the worst case for the DC Injector will be listed in the Tables 4-2 and 4-3 below. The EUT was investigated and tested in channels namely 3, 6, and 9; the worst case conducted data for both transmitting and receiving is for channel 6, and is provided in this report.

4.3 TEST EQUIPMENT USED FOR TESTING

TABLE 4-1: CONDUCTED EMISSIONS TEST EQUIPMENT

RTL ASSET #	MANUFACTURER	MODEL	PART TYPE	SERIAL NUMBER
900931	HP	8566B	Spectrum Analyzer (100 Hz - 22 GHz)	3138A07771
900070	Solar		LISN	

4.4 CONDUCTED EMISSIONS TEST DATA

TABLE 4-2: CONDUCTED EMISSIONS (NEUTRAL SIDE) TRANSMITTING CH 6

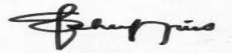
		Temperature: 72°F			Humidity: 45%			
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC B QP Limit (dBuV)	FCC B QP Margin (dBuV)	FCC B AV Limit (dBuV)	FCC B AV Margin (dBuV)
0.508	Pk	45.7	0.1	45.8	48.0	-2.2	48.0	-2.2
0.684	Pk	40.4	0.1	40.5	48.0	-7.5	48.0	-7.5
1.204	Pk	37.8	0.1	37.9	48.0	-10.1	48.0	-10.1
12.250	Pk	33.5	0.5	34.0	48.0	-14.0	48.0	-14.0
14.480	Pk	31.8	0.5	32.3	48.0	-15.7	48.0	-15.7
21.500	Pk	41.7	0.7	42.4	48.0	-5.6	48.0	-5.6

TABLE 4-3: CONDUCTED EMISSIONS (PHASE SIDE) TRANSMITTING CH 6

		Temperature: 72°F			Humidity: 40%			
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC B QP Limit (dBuV)	FCC B QP Margin (dBuV)	FCC B AV Limit (dBuV)	FCC B AV Margin (dBuV)
0.512	Pk	44.1	0.1	44.2	48.0	-3.8	48.0	-3.8
0.680	Pk	36.3	0.1	36.4	48.0	-11.6	48.0	-11.6
1.204	Pk	37.0	0.1	37.1	48.0	-10.9	48.0	-10.9
12.480	Pk	32.9	0.5	33.4	48.0	-14.6	48.0	-14.6
14.600	Pk	33.0	0.5	33.5	48.0	-14.5	48.0	-14.5
21.080	Pk	40.3	0.7	41.0	48.0	-7.0	48.0	-7.0

TEST PERSONNEL:

Franck Schuppius
 Test Technician/Engineer


 Signature

5/19/2002
 Date Of Test

TABLE 4-4: CONDUCTED EMISSIONS (PHASE SIDE) RECEIVING CH 6

		Temperature: 70°F		Humidity: 45%				
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC B QP Limit (dBuV)	FCC B QP Margin (dBuV)	FCC B AV Limit (dBuV)	FCC B AV Margin (dBuV)
0.508	Pk	45.1	0.1	45.2	48.0	-2.8	48.0	-2.8
0.684	Pk	38.9	0.1	39.0	48.0	-9.0	48.0	-9.0
1.204	Pk	37.8	0.1	37.9	48.0	-10.1	48.0	-10.1
12.350	Pk	33.6	0.5	34.1	48.0	-13.9	48.0	-13.9
14.580	Pk	33.5	0.5	34.0	48.0	-14.0	48.0	-14.0
20.630	Pk	39.4	0.7	40.1	48.0	-7.9	48.0	-7.9

TABLE 4-5: CONDUCTED EMISSIONS (NEUTRAL SIDE) RECEIVING CH 6

		Temperature: 70°F		Humidity: 45%				
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC B QP Limit (dBuV)	FCC B QP Margin (dBuV)	FCC B AV Limit (dBuV)	FCC B AV Margin (dBuV)
0.507	Pk	44.4	0.1	44.5	48.0	-3.5	48.0	-3.5
0.682	Pk	36.8	0.1	36.9	48.0	-11.1	48.0	-11.1
1.204	Pk	36.9	0.1	37.0	48.0	-11.0	48.0	-11.0
12.300	Pk	36.0	0.5	36.5	48.0	-11.5	48.0	-11.5
14.550	Pk	32.4	0.5	32.9	48.0	-15.1	48.0	-15.1
21.130	Pk	41.1	0.7	41.8	48.0	-6.2	48.0	-6.2

TEST PERSONNEL:

Franck Schuppius		5/19/2002
Test Technician/Engineer	Signature	Date Of Test

5 RADIATED EMISSION LIMITS RECEIVER/DIGITAL INTERFACE - §15.209

5.1 RADIATED EMISSION LIMITS TEST PROCEDURE

Radiated Spurious Emissions applies to harmonics and spurious emissions that fall in the restricted and non-restricted bands. The restricted bands are listed in Part 15.205. The maximum permitted average field strength for the restricted band is listed in Part 15.209. The IF, LO and up to the 2nd LO were investigated and tested. Channels 3, 6, and 9 were tested and investigated in the transmitting and receiving mode between 10kHz and 1GHz. The worst –case, channel 6 in both modes and both setups, is presented in the table below.

5.2 RADIATED EMISSION LIMITS TEST DATA RECEIVER/DIGITAL MODE CH6

TABLE 5-1; RADIATED EMISSION LIMITS TEST DATA RECEIVER/DIGITAL MODE CH6

		Temperature: 48°F			Humidity: 80%				
Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
47.435	Qp	H	180	1.0	29.2	-15.0	14.2	40.0	-25.8
132.006	Qp	H	180	3.0	36.8	-10.5	26.3	43.5	-17.2
189.618	Qp	H	275	2.0	32.7	-12.1	20.6	43.5	-22.9
215.210	Qp	H	275	2.0	26.0	-11.0	15.0	43.5	-28.5
220.214	Qp	H	315	1.0	26.9	-10.9	16.0	46.0	-30.0
250.377	Qp	H	180	2.0	33.7	-7.9	25.8	46.0	-20.2

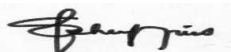
5.3 RADIATED EMISSION LIMITS TEST DATA TX/DIGITAL MODE CH6

TABLE 5-2: RADIATED EMISSION LIMITS TEST DATA TX/DIGITAL MODE CH6

		Temperature: 48°F			Humidity: 80%				
Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
72.839	Qp	V	215	2.0	32.4	-18.1	14.3	40.0	-25.7
156.095	Qp	H	275	1.0	31.8	-11.5	20.3	43.5	-23.2
220.112	Qp	V	315	1.0	38.4	-11.0	27.4	46.0	-18.6
255.618	Qp	H	215	1.0	34.5	-7.5	27.0	46.0	-19.0
301.712	Qp	H	215	1.0	28.3	-6.3	22.0	46.0	-24.0
402.281	Qp	V	180	1.0	31.0	-2.9	28.1	46.0	-17.9

TEST PERSONNEL:

Franck Schuppis
 Test Technician/Engineer


 Signature

5/19/2002
 Date Of Test

6 RADIATED EMISSION LIMITS RADIATED HARMONICS - §15.247

6.1 RADIATED EMISSION LIMITS TEST PROCEDURE

Radiated Spurious Emissions applies to harmonics and spurious emissions that fall in the restricted and non-restricted bands. The restricted bands are listed in Part 15.205. The maximum permitted average field strength for the restricted band is listed in Part 15.209. The EUT was tested in the X-Y, X-Z and Y-Z orthogonal planes.

6.2 RADIATED EMISSION TEST DATA

Operating Frequency (MHz): 2422
 Channel: 3
 Measured Cond. Pwr. (dBm): 29.4
 Antenna: ANT-OMNI-8

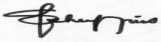
TABLE 6-1: RADIATED EMISSIONS HARMONICS/SPURIOUS (CHANNEL 3) (ANT-OMNI-8)

Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)
4844.00	Av	V	20	1.3	35.5	13.3	48.8	54.0
4844.00	Pk	V	20	1.3	48.7	13.3	62.0	
7266.00	Av	V	20	1.2	38.5	11.8	50.3	54.0
7266.00	Pk	V	20	1.3	50.6	11.8	62.4	
9688.00	Av	V	20	1.2	28.6	16.9	45.5	54.0
9688.00	Pk	V	20	1.2	41.0	16.9	57.9	
12110.00	Av	V	20	1.3	28.7	19.7	48.4	54.0
12110.00	Pk	V	20	1.2	40.4	19.7	60.1	

PEAK: RES. =1 MHz, VID= 1MHz; AVERAGE: RES. =1 MHz, VID= 10Hz; <20dB= 20dB BELOW THE LIMIT

TEST PERSONNEL:

Franck Schuppius
 Test Technician/Engineer


 Signature

5/19/2002
 Date Of Test

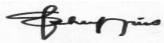
Operating Frequency (MHz): 2437
Channel: 6
Measured Cond. Pwr. (dBm): 28.9
Antenna: ANT-OMNI-8

TABLE 6-2: RADIATED EMISSIONS HARMONICS/SPURIOUS (CHANNEL 6) (ANT-OMNI-8)

Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)
4874.00	Av	V	30	1.3	32.5	13.9	46.4	54.0
4874.00	Pk	V	30	1.3	45.0	13.9	58.9	
7311.00	Av	V	20	1.2	33.1	11.8	44.9	54.0
7311.00	Pk	V	20	1.3	43.4	11.8	55.2	
9748.00	Av	V	40	1.2	30.6	16.7	47.3	54.0
9748.00	Av	V	40	1.2	41.1	16.7	57.8	
12185.00	Pk	V	20	1.3	30.2	18.2	48.4	54.0
12185.00	Av	V	10	1.2	41.5	18.2	59.7	

AVERAGE: RES. =1 MHz, VID= 10Hz; <20dB= 20dB BELOW THE LIMIT

TEST PERSONNEL:

Franck Schuppis		5/19/2002
Test Technician/Engineer	Signature	Date Of Test

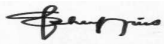
Operating Frequency (MHz): 2452
Channel: 9
Measured Cond. Pwr. (dBm): 28.4
Antenna: ANT-OMNI-8

TABLE 6-3: RADIATED EMISSIONS HARMONICS/SPURIOUS (CHANNEL 9) (ANT-OMNI-8)

Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)
4904.00	Av	V	20	1.3	30.0	13.8	43.8	54.0
4904.00	Pk	V	20	1.3	41.7	13.8	55.5	
7356.00	Av	V	20	1.2	29.7	12.0	41.7	54.0
7356.00	Pk	V	20	1.3	40.5	12.0	52.5	
9808.00	Av	V	20	1.2	30.5	16.4	46.9	54.0
9808.00	Pk	V	20	1.2	41.0	16.4	57.4	
12260.00	Av	V	20	1.3	30.3	18.5	48.8	54.0
12260.00	Pk	V	20	1.2	40.3	18.5	58.8	

AVERAGE: RES. =1 MHz, VID= 10Hz; NF = NOISE FLOOR; <20dB= 20dB BELOW THE LIMIT

TEST PERSONNEL:

Franck Schuppis Test Technician/Engineer	 Signature	5/19/2002 Date Of Test
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Operating Frequency (MHz): 2422
Channel: 3
Measured Cond. Pwr. (dBm): 29.4
Antenna: ANT-OMNI-12

TABLE 6-4: RADIATED EMISSIONS HARMONICS/SPURIOUS (CHANNEL 3) (ANT-OMNI-12)

Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)
2353.82	Av	V	20	1.3	23.3	26.4	49.7	54.0
2353.72	Pk	V	20	1.3	34.2	26.4	60.6	
2368.56	Av	V	20	1.2	23.3	26.4	49.7	54.0
2368.67	Pk	V	20	1.2	33.0	26.4	59.4	
2376.04	Av	V	20	1.2	23.6	26.4	50.0	54.0
2376.04	Pk	V	20	1.2	33.0	26.4	59.4	
4844.00	Av	V	20	1.2	34.9	13.3	48.2	54.0
4844.00	Pk	V	20	1.2	48.4	13.3	61.7	
7266.00	Av	V	20	1.2	31.2	11.6	42.8	54.0
7266.00	Pk	V	20	1.2	42.3	11.6	53.9	
9688.00	Av	V	20	1.2	30.6	16.9	47.5	54.0
9688.00	Pk	V	20	1.2	41.1	16.9	58.0	
12110.00	Av	V	10	1.2	30.8	19.7	50.5	54.0
12110.00	Pk		10	1.2	42.1	19.7	61.8	

PEAK: RES. =1 MHz, VID= 1MHz; AVERAGE: RES. =1 MHz, VID= 10Hz; <20dB= 20dB BELOW THE LIMIT

TEST PERSONNEL:

Franck Schuppis Test Technician/Engineer	 Signature	5/19/2002 Date Of Test
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Operating Frequency (MHz): 2437
Channel: 6
Measured Cond. Pwr. (dBm): 28.9
Antenna: ANT-OMNI-12

TABLE 6-5: RADIATED EMISSIONS HARMONICS/SPURIOUS (CHANNEL 6) (ANT-OMNI-12)

Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)
2437.00	Av	V	20	1.3	83.4	26.4	109.8	Fundamental
2437.00	Pk	V	20	1.3	94.5	26.4	120.9	Fundamental
4874.00	Av	V	20	1.2	31.7	13.9	45.6	54.0
4874.00	Pk	V	20	1.2	43.2	13.9	57.1	
7311.00	Av	V	20	1.2	30.8	11.8	42.6	54.0
7311.00	Pk		20	1.2	42.0	11.8	53.8	
9748.00	Av	V	20	1.2	31.1	16.7	47.8	54.0
9748.00	Pk		20	1.2	42.6	16.7	59.3	
12185.00	Av	V	10	1.2	30.8	18.2	49.0	54.0
12185.00	Pk		10	1.2	42.3	18.2	60.5	

AVERAGE: RES. =1 MHz, VID= 10Hz; <20dB= 20dB BELOW THE LIMIT

TEST PERSONNEL:

Franck Schuppis Test Technician/Engineer	 Signature	5/19/2002 Date Of Test
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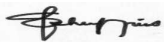
Operating Frequency (MHz): 2452
Channel: 9
Measured Cond. Pwr. (dBm): 28.4
Antenna: ANT-OMNI-12

TABLE 6-6: RADIATED EMISSIONS HARMONICS/SPURIOUS (CHANNEL 9) (ANT-OMNI-12)

Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)
2486.00	Av	V	20	1.3	23.2	26.4	49.6	54.0
2486.00	Pk	V	20	1.2	33.0	26.4	59.4	
4904.00	Av	V	20	1.2	30.6	13.8	44.4	54.0
4904.00	Pk	V	20	1.2	41.7	13.8	55.5	
7356.00	Av	V	20	1.2	30.5	12.0	42.5	54.0
7356.00	Pk	V	20	1.2	41.5	12.0	53.5	
9808.00	Av	V	20	1.2	31.1	16.4	47.5	54.0
9808.00	Pk	V	10	1.2	42.7	16.4	59.1	
12260.00	Av	V	10	1.2	30.6	18.5	49.1	54.0
12260.00	Pk	V	10	1.0	43.0	18.5	61.5	

AVERAGE: RES. =1 MHZ, VID= 10HZ; NF = NOISE FLOOR; <20dB= 20dB BELOW THE LIMIT

TEST PERSONNEL:

Franck Schuppius Test Technician/Engineer	 Signature	5/19/2002 Date Of Test
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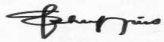
Operating Frequency (MHz): 2422
 Channel: 3
 Measured Cond. Pwr. (dBm): 29.4
 Antenna: ANT-PATCH-12

TABLE 6-7: RADIATED EMISSIONS HARMONICS/SPURIOUS (CHANNEL 3) (ANT-PATCH-12)

Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)
2354.00	Av	V	20	1.3	25.0	26.4	51.4	54.0
2354.00	Pk	V	20	1.3	36.1	26.4	62.5	
4844.00	Av	V	20	1.2	33.1	13.3	46.4	54.0
4844.00	Pk	V	20	1.2	42.1	13.3	55.4	
7266.00	Av	V	20	1.2	38.8	11.6	50.4	54.0
7266.00	Pk	V	20	1.2	48.0	11.6	59.6	
9688.00	Av	V	20	1.2	36.6	16.9	53.5	54.0
9688.00	Pk	V	20	1.2	45.0	16.9	61.9	
12110.00	Av	V	10	1.2	33.2	19.7	52.9	54.0
12110.00	Pk	V	10	1.2	44.1	19.7	63.8	

PEAK: RES. =1 MHz, VID= 1MHz; AVERAGE: RES. =1 MHz, VID= 10Hz; <20dB= 20dB BELOW THE LIMIT

TEST PERSONNEL:

Franck Schuppius		5/19/2002
Test Technician/Engineer	Signature	Date Of Test

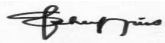
Operating Frequency (MHz): 2437
Channel: 6
Measured Cond. Pwr. (dBm): 28.9
Antenna: ANT-PATCH-12

TABLE 6-8: RADIATED EMISSIONS HARMONICS/SPURIOUS (CHANNEL 6) (ANT-PATCH-12)

Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)
4874.00	Av	V	20	1.0	38.9	13.9	52.8	54.0
4874.00	Pk	V	20	1.0	52.1	13.9	66.0	
7311.00	Av	V	20	1.0	38.8	11.8	50.6	54.0
7311.00	Pk	V	20	1.0	48.5	11.8	60.3	
9748.00	Av	V	10	1.2	36.6	16.7	53.3	54.0
9748.00	Pk	V	10	1.2	46.7	16.7	63.4	
12185.00	Av	V	10	1.2	38.2	18.2	56.4	54.0
12185.00	Pk	V	10	1.2	47.1	18.2	65.3	

AVERAGE: RES. =1 MHz, VID= 10Hz; <20dB= 20dB BELOW THE LIMIT

TEST PERSONNEL:

Franck Schuppius Test Technician/Engineer	 Signature	5/19/2002 Date Of Test
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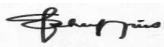
Operating Frequency (MHz): 2452
Channel: 9
Measured Cond. Pwr. (dBm): 28.4
Antenna: ANT-PATCH-12

TABLE 6-9: RADIATED EMISSIONS HARMONICS/SPURIOUS (CHANNEL 9) (ANT-PATCH-12)

Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)
2486.00	Av	V	20	1.2	19.7	26.4	46.1	54.0
2486.00	Pk	V	20	1.2	35.3	26.4	61.7	
2496.60	Av	V	20	1.2	23.0	26.4	49.4	54.0
2496.50	Pk	V	20	1.2	32.5	26.4	58.9	
2508.10	Av	V	20	1.2	22.9	26.4	49.3	54.0
2507.90	Pk	V	20	1.2	33.3	26.4	59.7	
4904.20	Av	V	20	1.2	16.8	13.8	30.6	54.0
4904.10	Pk	V	20	1.2	27.9	13.8	41.7	
7356.00	Av	V	10	1.2	18.5	12.0	30.5	54.0
7356.00	Av	V	10	1.2	29.5	12.0	41.5	
9808.00	Av	V	10	1.0	14.7	16.4	31.1	54.0
9808.00	Av	V	10	1.0	26.3	16.4	42.7	
12260.00	Av	V	10	1.0	12.1	18.5	30.6	54.0
12260.00	Av	V	10	1.2	24.5	18.5	43.0	

AVERAGE: RES. =1 MHz, VID= 10Hz; NF = NOISE FLOOR; <20dB= 20dB BELOW THE LIMIT

TEST PERSONNEL:

Franck Schuppius Test Technician/Engineer	 Signature	5/19/2002 Date Of Test
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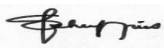
Operating Frequency (MHz): 2422
 Channel: 3
 Measured Cond. Pwr. (dBm): 29.4
 Antenna: ANT-PATCH-19

TABLE 6-10: RADIATED EMISSIONS HARMONICS/SPURIOUS (CHANNEL 3) (ANT-PATCH-19)

Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)
4845.88	Av	V	10	1.0	39.7	13.3	53.0	54.0
4844.04	Pk	V	10	1.0	53.4	13.3	66.7	
7265.46	Av	V	10	1.0	33.8	11.8	45.6	54.0
7277.48	Pk	V	10	1.0	49.6	11.8	61.4	
9697.68	Av	V	20	1.0	32.9	16.9	49.8	54.0
9695.62	Pk	V	20	1.0	46.3	16.9	63.2	
12105.19	Av	V	10	1.0	15.1	19.7	34.8	54.0
12113.60	Pk	V	10	1.0	28.2	19.7	47.9	

PEAK: RES. =1 MHz, VID= 1MHz; AVERAGE: RES. =1 MHz, VID= 10Hz; <20dB= 20dB BELOW THE LIMIT

TEST PERSONNEL:

Franck Schuppis Test Technician/Engineer	 Signature	5/19/2002 Date Of Test
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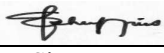
Operating Frequency (MHz): 2437
Channel: 6
Measured Cond. Pwr. (dBm): 28.9
Antenna: ANT-PATCH-19

TABLE 6-11: RADIATED EMISSIONS HARMONICS/SPURIOUS (CHANNEL 6) (ANT-PATCH-19)

Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)
4871.90	Av	V	20	1.2	37.9	13.9	51.8	54.0
4874.18	Pk	V	20	1.2	50.3	13.9	64.2	
7312.06	Av	V	20	1.0	33.2	11.8	45.0	54.0
7304.91	Pk	V	20	1.0	48.0	11.8	59.8	
9752.38	Av	V	10	1.2	32.8	16.7	49.5	54.0
9753.11	Pk	V	20	1.0	46.3	16.7	63.0	
12184.60	Av	V	10	1.0	31.7	18.2	49.9	54.0
12178.60	Pk	V	10	1.2	44.0	18.2	62.2	

AVERAGE: RES. =1 MHz, VID= 10Hz; <20dB= 20dB BELOW THE LIMIT

TEST PERSONNEL:

Franck Schuppius Test Technician/Engineer	 Signature	5/19/2002 Date Of Test
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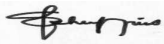
Operating Frequency (MHz): 2452
Channel: 9
Measured Cond. Pwr. (dBm): 28.4
Antenna: ANT-PATCH-19

TABLE 6-12: RADIATED EMISSIONS HARMONICS/SPURIOUS (CHANNEL 9) (ANT-PATCH-19)

Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)
4901.89	Av	V	20	1.2	32.3	13.8	46.1	54.0
4904.11	Pk	V	20	1.2	45.6	13.8	59.4	
7360.43	Av	V	20	1.2	37.6	12.0	49.6	54.0
7357.40	Pk	V	20	1.2	49.6	12.0	61.6	
9810.28	Av	V	10	1.2	35.9	16.4	52.3	54.0
9810.04	Pk	V	20	1.2	49.5	16.4	65.9	
12184.66	Av	V	10	1.0	17.8	18.5	36.3	54.0
12185.41	Pk	V	10	1.0	30.4	18.5	48.9	

AVERAGE: RES. =1 MHz, VID= 10Hz; NF = NOISE FLOOR; <20dB= 20dB BELOW THE LIMIT

TEST PERSONNEL:

Franck Schuppis Test Technician/Engineer	 Signature	5/19/2002 Date Of Test
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Operating Frequency (MHz): 2422
 Channel: 3
 Measured Cond. Pwr. (dBm): 29.4
 Antenna: ANT-RFLCTR-24

TABLE 6-13: RADIATED EMISSIONS HARMONICS/SPURIOUS (CHANNEL 3) (ANT-RFLCTR-24)

Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)
4844.00	Av	V	10	1.0	33.8	13.3	47.1	54.0
4844.00	Pk	V	10	1.0	47.4	13.3	60.7	
4844.11	Av	V	10	1.0	22.0	11.8	33.8	54.0
4844.00	Pk	V	10	1.0	32.8	11.8	44.6	
7266.11	Av	V	20	1.0	20.0	16.9	36.9	54.0
7266.09	Pk	V	20	1.0	29.2	16.9	46.1	
12110.00	Av	V	10	1.0	18.7	19.7	38.4	54.0
12109.94	Pk	V	10	1.0	26.5	19.7	46.2	

PEAK: RES. =1 MHz, VID= 1MHz; AVERAGE: RES. =1 MHz, VID= 10Hz; <20dB= 20dB BELOW THE LIMIT

TEST PERSONNEL:

Franck Schuppis Test Technician/Engineer	 Signature	5/19/2002 Date Of Test
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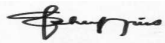
Operating Frequency (MHz): 2437
Channel: 6
Measured Cond. Pwr. (dBm): 28.9
Antenna: ANT-RFLCTR-24

TABLE 6-14: RADIATED EMISSIONS HARMONICS/SPURIOUS (CHANNEL 6) (ANT-RFLCTR-24)

Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)
4874.09	Av	V	20	1.2	27.6	13.9	41.5	54.0
4874.09	Pk	V	20	1.2	40.6	13.9	54.5	
7310.91	Av	V	20	1.0	26.1	11.8	37.9	54.0
7310.97	Pk	V	20	1.0	34.3	11.8	46.1	
9748.06	Av	V	10	1.2	20.8	16.7	37.5	54.0
9747.94	Pk	V	20	1.0	29.8	16.7	46.5	
12185.00	Av	V	10	1.0	19.6	18.2	37.8	54.0
12185.11	Pk	V	10	1.2	28.3	18.2	46.5	

AVERAGE: RES. =1 MHz, VID= 10Hz; <20dB= 20dB BELOW THE LIMIT

TEST PERSONNEL:

Franck Schuppius Test Technician/Engineer	 Signature	5/19/2002 Date Of Test
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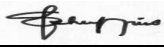
Operating Frequency (MHz): 2452
Channel: 9
Measured Cond. Pwr. (dBm): 28.4
Antenna: ANT-RFLCTR-24

TABLE 6-15: RADIATED EMISSIONS HARMONICS/SPURIOUS (CHANNEL 9) (ANT-RFLCTR-24)

Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)
4904.03	Av	V	10	1.2	26.4	13.8	40.2	54.0
4904.14	Pk	V	20	1.2	38.9	13.8	52.7	
7355.97	Av	V	10	1.0	26.2	12.0	38.2	54.0
7356.03	Pk	V	10	1.0	35.0	12.0	47.0	
9807.89	Av	V	10	1.0	21.7	16.4	38.1	54.0
9808.06	Pk	V	10	1.2	30.9	16.4	47.3	
12260.11	Av	V	10	1.0	28.3	18.5	46.8	54.0
12260.06	Pk	V	10	1.0	19.6	18.5	38.1	

AVERAGE: RES. =1 MHz, VID= 10Hz; NF = NOISE FLOOR; <20dB= 20dB BELOW THE LIMIT

TEST PERSONNEL:

Franck Schuppius Test Technician/Engineer	 Signature	5/19/2002 Date Of Test
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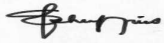
Operating Frequency (MHz): 2422
 Channel: 3
 Measured Cond. Pwr. (dBm): 29.4
 Antenna: ANT-RFLCTR-18

TABLE 6-16: RADIATED EMISSIONS HARMONICS/SPURIOUS (CHANNEL 3) (ANT-RFLCTR-18)

Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)
4845.88	Av	V	10	1.0	39.7	13.3	53.0	54.0
4844.04	Pk	V	10	1.0	53.4	13.3	66.7	
7265.46	Av	V	10	1.0	33.8	11.8	45.6	54.0
7277.48	Pk	V	10	1.0	49.6	11.8	61.4	
9697.68	Av	V	20	1.0	32.9	16.9	49.8	54.0
9695.62	Pk	V	20	1.0	46.3	16.9	63.2	
12105.19	Av	V	10	1.0	15.1	19.7	34.8	54.0
12113.60	Pk	V	10	1.0	28.2	19.7	47.9	

PEAK: RES. =1 MHz, VID= 1MHz; AVERAGE: RES. =1 MHz, VID= 10Hz; <20dB= 20dB BELOW THE LIMIT

TEST PERSONNEL:

Franck Schuppis Test Technician/Engineer	 Signature	5/19/2002 Date Of Test
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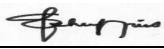
Operating Frequency (MHz): 2437
Channel: 6
Measured Cond. Pwr. (dBm): 28.9
Antenna: ANT-RFLCTR-18

TABLE 6-17: RADIATED EMISSIONS HARMONICS/SPURIOUS (CHANNEL 6) (ANT-RFLCTR-18)

Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)
4871.90	Av	V	20	1.0	37.9	13.9	51.8	54.0
4874.18	Pk	V	20	1.0	50.3	13.9	64.2	
7312.06	Av	V	10	1.2	33.2	11.8	45.0	54.0
7304.91	Pk	V	20	1.0	48.0	11.8	59.8	
9752.38	Av	V	10	1.0	32.8	16.7	49.5	54.0
9753.11	Pk	V	10	1.2	46.3	16.7	63.0	
12184.60	Av	V	10	1.0	31.7	18.2	49.9	54.0
12178.60	Pk	V	10	1.0	44.0	18.2	62.2	

AVERAGE: RES. =1 MHz, VID= 10Hz; <20dB= 20dB BELOW THE LIMIT

TEST PERSONNEL:

Franck Schuppius Test Technician/Engineer	 Signature	5/19/2002 Date Of Test
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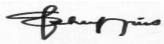
Operating Frequency (MHz): 2452
 Channel: 9
 Measured Cond. Pwr. (dBm): 28.4
 Antenna: ANT-RFLCTR-18

TABLE 6-18: RADIATED EMISSIONS HARMONICS/SPURIOUS (CHANNEL 9) (ANT-RFLCTR-18)

Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)
4901.89	Av	V	20	1.3	32.3	13.8	46.1	54.0
4904.11	Pk	V	20	1.3	45.6	13.8	59.4	
7360.43	Av	V	20	1.2	37.6	12.0	49.6	54.0
7357.40	Pk	V	20	1.2	49.6	12.0	61.6	
9810.28	Av	V	10	1.2	35.9	16.4	52.3	54.0
9810.04	Pk	V	20	1.2	49.5	16.4	65.9	
12184.66	Av	V	10	1.0	17.8	18.5	36.3	54.0
12185.41	Pk	V	10	1.0	30.4	18.5	48.9	

AVERAGE: RES. =1 MHz, VID= 10Hz; NF = NOISE FLOOR; <20dB= 20dB BELOW THE LIMIT

TEST PERSONNEL:

Franck Schuppis Test Technician/Engineer	 Signature	5/19/2002 Date Of Test
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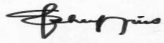
Operating Frequency (MHz): 2422
 Channel: 3
 Measured Cond. Pwr. (dBm): 29.4
 Antenna: ANT-D2421

TABLE 6-19: RADIATED EMISSIONS HARMONICS/SPURIOUS (CHANNEL 3) (ANT-D2421)

Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)
4840.51	Av	V	10	1.0	38.7	13.3	52.0	54.0
4843.97	Pk	V	10	1.0	52.6	13.3	65.9	
7266.74	Av	V	10	1.0	36.4	11.8	48.2	54.0
7266.06	Pk	V	10	1.0	48.6	11.8	60.4	
9689.08	Av	V	10	1.0	34.0	16.9	50.9	54.0
9689.59	Pk	V	10	1.0	45.3	16.9	62.2	
12110.08	Av	V	20	1.0	15.1	19.7	34.8	54.0
12110.52	Pk	V	20	1.0	43.7	19.7	63.4	

PEAK: RES. =1 MHz, VID= 1MHz; AVERAGE: RES. =1 MHz, VID= 10Hz; <20dB= 20dB BELOW THE LIMIT

TEST PERSONNEL:

Franck Schuppius Test Technician/Engineer	 Signature	5/19/2002 Date Of Test
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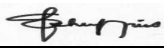
Operating Frequency (MHz): 2437
Channel: 6
Measured Cond. Pwr. (dBm): 28.9
Antenna: ANT-D2421

TABLE 6-20: RADIATED EMISSIONS HARMONICS/SPURIOUS (CHANNEL 6) (ANT-D2421)

Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)
4871.84	Av	V	20	1.2	35.6	13.9	49.5	54.0
4873.57	Pk	V	20	1.2	48.4	13.9	62.3	
7303.43	Av	V	20	1.0	35.0	11.8	46.8	54.0
7322.45	Pk	V	20	1.0	47.8	11.8	59.6	
9752.18	Av	V	10	1.2	35.1	16.7	51.8	54.0
9743.66	Pk	V	20	1.0	47.1	16.7	63.8	
12180.02	Av	V	10	1.2	18.5	18.2	36.7	54.0
12188.86	Pk	V	10	1.0	31.4	18.2	49.6	

AVERAGE: RES. =1 MHz, VID= 10Hz; <20dB= 20dB BELOW THE LIMIT

TEST PERSONNEL:

Franck Schuppius		5/19/2002
Test Technician/Engineer	Signature	Date Of Test

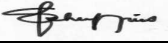
Operating Frequency (MHz): 2452
 Channel: 9
 Measured Cond. Pwr. (dBm): 28.4
 Antenna: ANT-D2421

TABLE 6-21: RADIATED EMISSIONS HARMONICS/SPURIOUS (CHANNEL 9) (ANT-D2421)

Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)
4901.78	Av	V	20	1.2	30.9	13.8	44.7	54.0
4904.91	Pk	V	20	1.2	44.4	13.8	58.2	
7355.05	Av	V	20	1.2	37.3	12.0	49.3	54.0
7379.18	Pk	V	20	1.2	50.1	12.0	62.1	
9803.84	Av	V	10	1.2	34.2	16.4	50.6	54.0
9807.54	Pk	V	20	1.2	47.2	16.4	63.6	
12258.90	Av	V	10	1.0	15.7	18.5	34.2	54.0
12263.47	Pk	V	10	1.0	43.9	18.5	62.4	

AVERAGE: RES. =1 MHz, VID= 10Hz; NF = NOISE FLOOR; <20dB= 20dB BELOW THE LIMIT

TEST PERSONNEL:

Franck Schuppius Test Technician/Engineer	 Signature	5/19/2002 Date Of Test
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6.3 TEST EQUIPMENT USED FOR TESTING

TABLE 6-22: RADIATED SPURIOUS EMISSIONS TEST EQUIPMENT

RTL ASSET #	MANUFACTURER	MODEL	PART TYPE	SERIAL NUMBER
900931	HP	8566B	Spectrum Analyzer (100Hz – 22 GHz)	3138A07771
900772	EMCO	3161-02	Horn Antenna (2-4 GHz)	900772
900321	EMCO	3161-03	Horn Antennas (4-8.2 GHz)	9508-1020
900356	EMCO	3160-08	Horn Antennas (12.4 – 18 GHz)	9607-1044
900323	EMCO	3160-7	Horn Antennas (8.2-12.4 GHz)	9605-1054
900325	EMCO	3160-9	Horn Antennas (18 - 26.5 GHz)	9605-1051
900791	Schaffner - Chase	CBL6112	Antenna (25 MHz - 2 GHz)	2099
900723	Miteq	NA	AMP 100MHz-26GHz	N/A

7 MODULATED BANDWIDTH - §15.247(A)(2)

7.1 MODULATED BANDWIDTH TEST PROCEDURE

The minimum 6 dB bandwidth per FCC 15.247 (a)(2) was measured using a 50 ohm spectrum analyzer with the resolution bandwidth set at 100 kHz, and the video bandwidth set at 300 kHz. The minimum 6 dB modulated bandwidths for the 1W configuration follow below. The worst case bandwidth plots for the 1W configuration are included.

7.2 TEST EQUIPMENT USED FOR TESTING

TABLE 7-1: MODULATED BANDWIDTH TEST EQUIPMENT

RTL ASSET #	MANUFACTURER	MODEL	PART TYPE	SERIAL NUMBER
900931	HP	8566B	Spectrum Analyzer (100Hz – 22 GHz)	3138A07771

7.3 MODULATED BANDWIDTH TEST DATA

TABLE 7-2: MINIMUM 6 DB MODULATED BANDWIDTHS

CHANNEL	1W 6 dB BANDWIDTH (MHz)
3	10.5
6	10.3
9	11.0

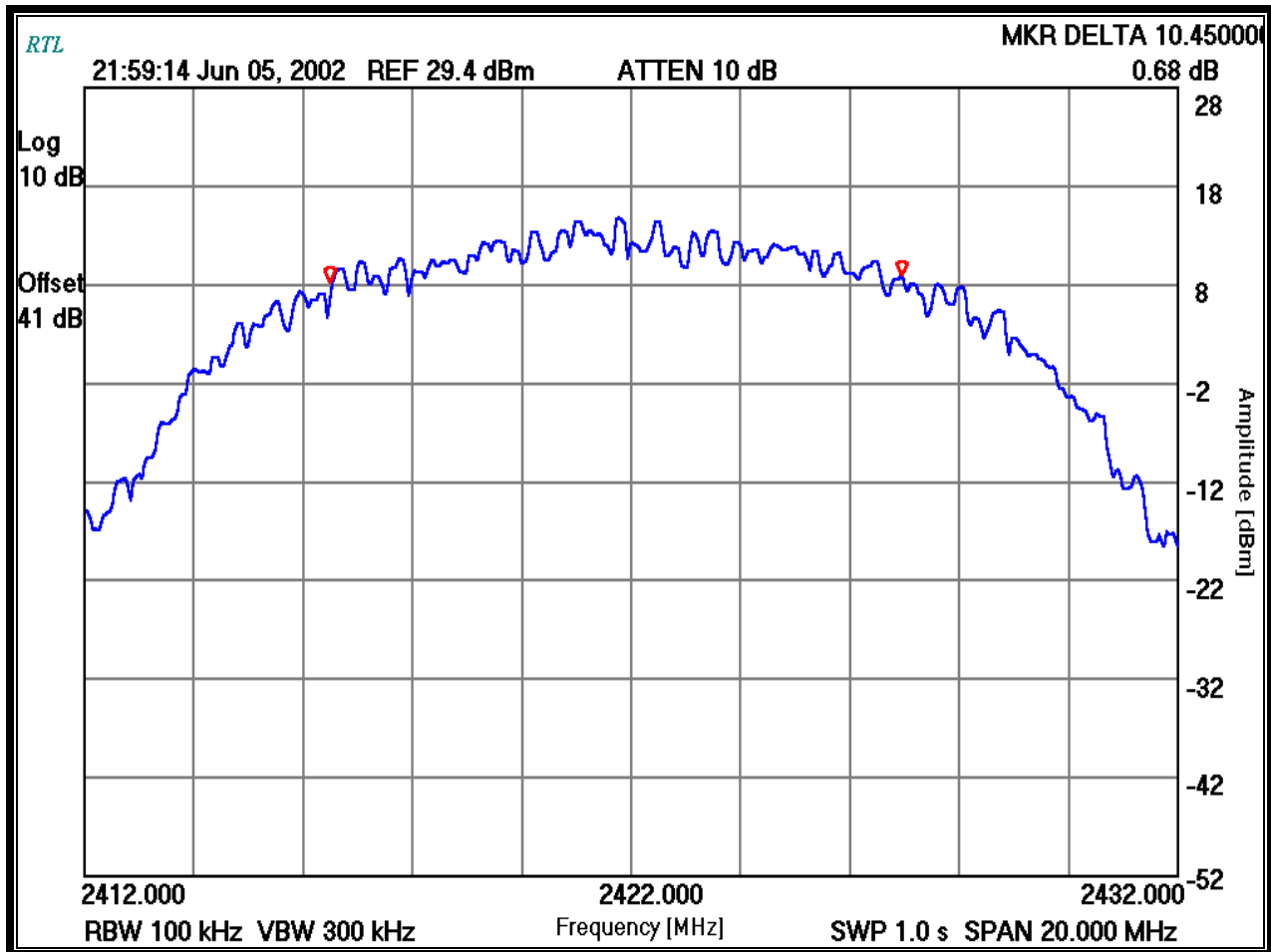
TEST PERSONNEL:

Franck Schuppius Test Technician/Engineer	 Signature	06/05/02 Date Of Test
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7.4 MODULATED BANDWIDTH PLOTS

Channel Number: 3
Frequency (MHz): 2422
Resolution Bandwidth (kHz): 100
Video Bandwidth (kHz): 300
Sweep Time (s): 1.0

PLOT 7-1: MODULATED BANDWIDTH CHANNEL 3-1W MODE



TEST PERSONNEL:

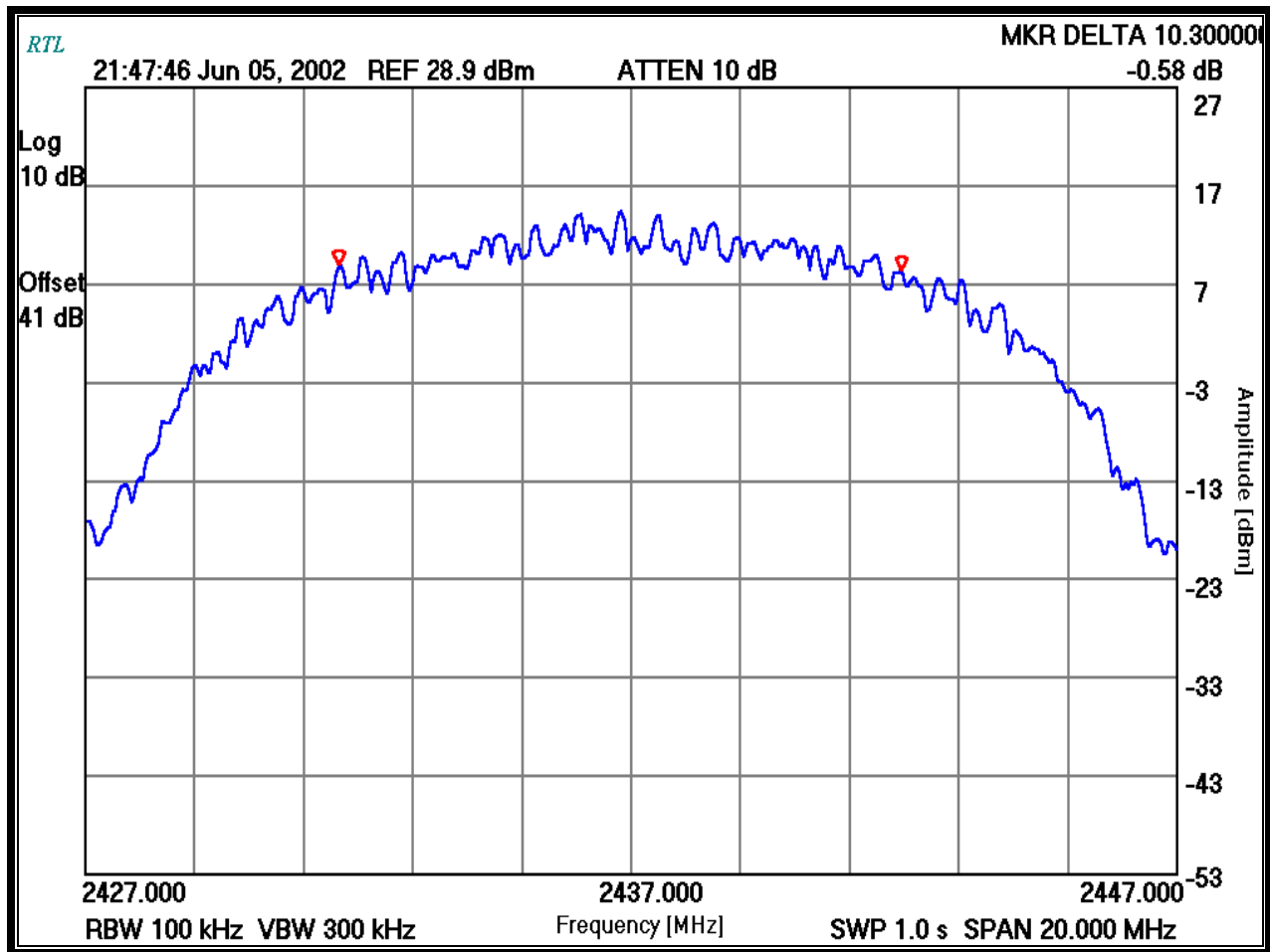
Kinh Ly
Test Engineer

Kinh Ly
Signature

06/05/02
Date Of Test

Channel Number: 6
Frequency (MHz): 2437
Resolution Bandwidth (kHz): 100
Video Bandwidth (kHz): 300
Sweep Time (s): 1.0

PLOT 7-2: MODULATED BANDWIDTH CHANNEL 6-1W MODE



TEST PERSONNEL:

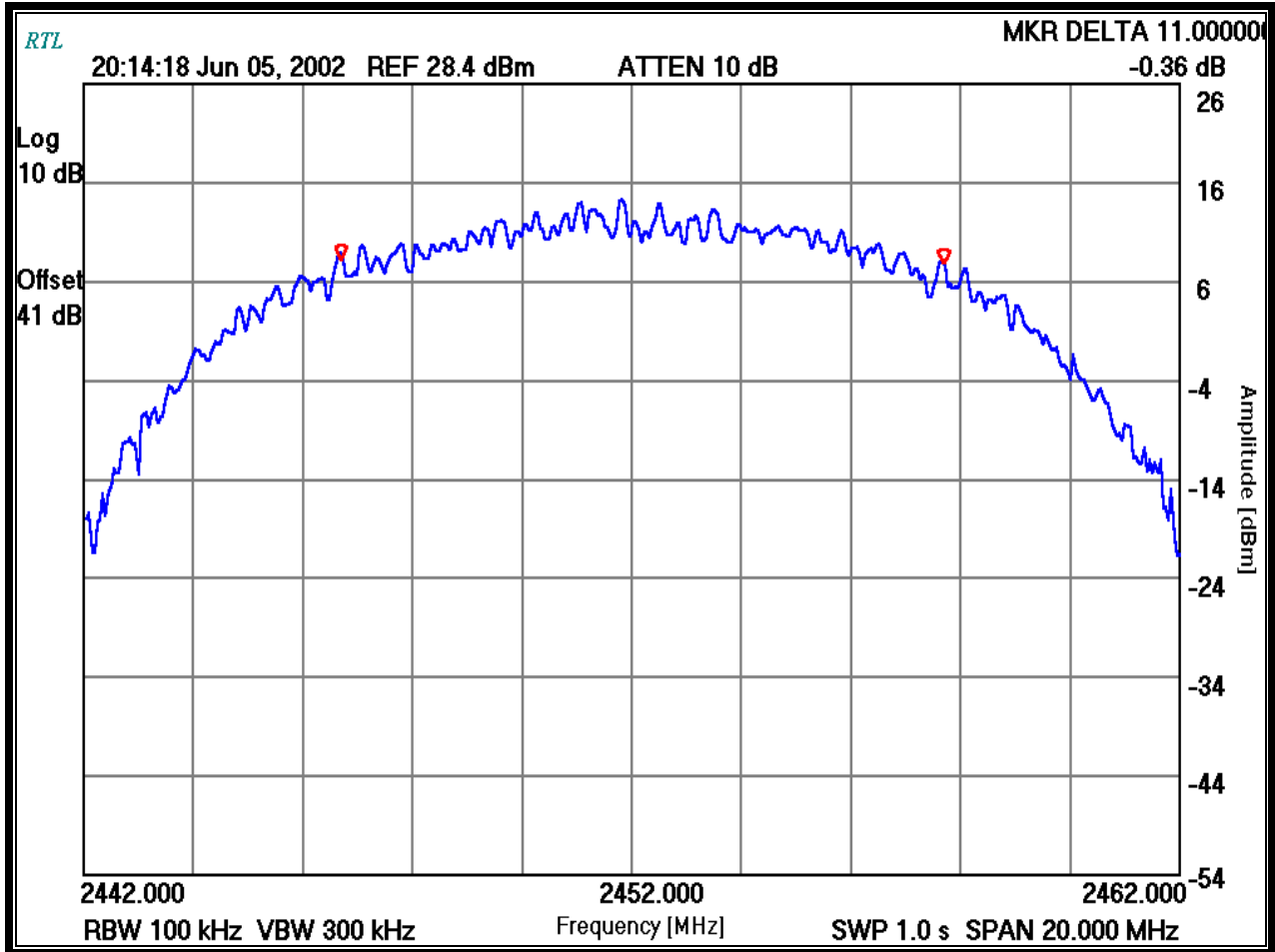
Kinh Ly
Test Engineer

Kinh Ly
Signature

06/05/02
Date Of Test

Channel Number: 9
Frequency (MHz): 2452
Resolution Bandwidth (kHz): 100
Video Bandwidth (kHz): 300
Sweep Time (s): 1.0

PLOT 7-3: MODULATED BANDWIDTH CHANNEL 9-1W MODE



TEST PERSONNEL:

Kinh Ly
Test Engineer

Kinh Ly
Signature

06/05/02
Date Of Test

8 POWER OUTPUT - §15.247(B)

8.1 POWER OUTPUT TEST PROCEDURE

The peak conducted output power of the EUT was measured using an Agilent 4416A EPM-P Series Power Meter with an E9323A Peak and Average Power Sensor. The EIRP measurement was calculated as follows:
 Power Output + Antenna Gain - Cable Loss.

8.2 TEST EQUIPMENT USED FOR TESTING

TABLE 8-1: RADIATED RF OUTPUT – EIRP TEST EQUIPMENT

RTL ASSET #	MANUFACTURER	MODEL	PART TYPE	SERIAL NUMBER
901186	Agilent Technologies	E9323A (50MHz-6GHz)	Peak & Avg. Power Sensor	US40410380
901184	Agilent Technologies	E4416A	EPM-P Power Meter, single channel	GB41050573
900931	HP	8566B	Spectrum Analyzer (100Hz – 22 GHz)	3138A07771

8.3 POWER OUTPUT TEST DATA

TABLE 8-2: POWER OUTPUT TEST DATA

Operating Frequency (MHz): 2422, 2437 & 2452
Channel: 3, 6 & 9
Measured Cond. Pwr. (dBm): 29.4, 28.9 & 28.4

TABLE 8-3: POWER OUTPUT TEST DATA

CHANNEL	POWER CONDUCTED OUTPUT (dBm)
3	29.4
6	28.9
9	28.4

*Measurement accuracy is +/- 1.5 dB

TEST PERSONNEL:

Franck Schuppius Test Technician/Engineer	 Signature	5/18/2002 Date Of Test
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9 ANTENNA CONDUCTED SPURIOUS EMISSIONS - §15.247(C)

9.1 ANTENNA CONDUCTED SPURIOUS EMISSIONS TEST PROCEDURES

Antenna spurious emission per FCC 15.247(c) was measured from the EUT antenna port using a 50 ohm spectrum analyzer with the resolution bandwidth set at 100 kHz, and the video bandwidth set at 300 kHz. The modulated carrier was identified at 2.422GHz for Channel 3, 2.437GHz for Channel 6 and 2.452GHz for Channel 9. No other harmonics or spurs were found within 20 dB of the carrier level, and from 9kHz to the carriers 10th harmonic. See the antenna conducted spurious noise table below. Channels 3, 6, and 9 were investigated and tested.

9.2 ANTENNA CONDUCTED SPURIOUS EMISSIONS TEST DATA

Operating Frequency (MHz): 2422
 Channel: 3
 Measured Cond. Pwr. (dBm): 29.4
 Peak@100KHz(dBm): 17
 Limit (dBm): -3

TABLE 9-1: ANTENNA CONDUCTED SPURIOUS EMISSIONS

Frequency (MHz)	Measured Level (dBm)	Notch Filter Insertion Loss (dB)	Corrected Measured Level (dBm)	Margin (dB)
4844	-30.3	2.2	-28.2	-25.2
7266	-34.0	1.5	-32.5	-29.5
9688	-35.2	6.8	-28.3	-25.3
12110	-33.5	7.8	-25.7	-22.7
14532	-31.2	4.7	-26.5	-23.5
16954	-32.5	10.3	-22.2	-19.2
19376	-32.3	11.5	-20.8	-17.8
21798	-32.7	11.3	-21.4	-18.4
24220	-30.8	11.5	-19.3	-16.3

TEST PERSONNEL:

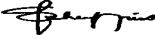
Franck Schuppius Test Technician/Engineer	 Signature	5/17/2002 Date Of Test
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Operating Frequency (MHz): 2437
Channel: 6
Measured Cond. Pwr. (dBm): 28.9
Peak@100KHz(dBm): 17.2
Limit (dBm): -2.8

TABLE 9-2: ANTENNA CONDUCTED SPURIOUS EMISSIONS

Frequency (MHz)	Measured Level (dBm)	Notch Filter Insertion Loss (dB)	Corrected Measured Level (dBm)	Margin (dB)
4874	-33.2	1.8	-31.3	-28.5
7311	-33.3	4.2	-29.1	-26.3
9748	-34.7	3.5	-31.2	-28.4
12185	-34.0	9.8	-24.2	-21.4
14622	-30.8	7.8	-23.0	-20.2
17059	-34.2	8.8	-25.3	-22.5
19496	-33.0	14.2	-18.8	-16.0
21933	-32.2	14.0	-18.2	-15.4
24370	-31.7	14.3	-17.4	-14.6

TEST PERSONNEL:

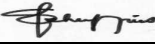
Franck Schuppius Test Technician/Engineer	 Signature	5/17/2002 Date Of Test
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Operating Frequency (MHz): 2452
Channel: 9
Measured Cond. Pwr. (dBm): 28.4
Peak@100KHz(dBm): 16.7
Limit (dBm): -3.3

TABLE 9-3: ANTENNA CONDUCTED SPURIOUS EMISSIONS

Frequency (MHz)	Measured Level (dBm)	Notch Filter Insertion Loss (dB)	Corrected Measured Level (dBm)	Margin (dB)
4904	-33.2	1.5	-31.7	-28.4
7356	-31.8	4.5	-27.3	-24.0
9808	-33.0	8.8	-24.2	-20.9
12260	-34.3	12.0	-22.3	-19.0
14712	-31.5	5.7	-25.8	-22.5
17164	-32.3	8.3	-24.0	-20.7
19616	-32.2	13.2	-19.0	-15.7
22068	-31.7	13.3	-18.4	-15.1
24520	-28.7	13.3	-15.4	-12.1

TEST PERSONNEL:

Franck Schuppius Test Technician/Engineer	 Signature	5/17/2002 Date Of Test
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10 POWER SPECTRAL DENSITY - §15.247(D)

10.1 POWER SPECTRAL DENSITY TEST PROCEDURE

The power spectral density per FCC 15.247(d) was measured using a 50 ohm spectrum analyzer with the resolution bandwidth set at 3kHz, the video bandwidth set at 30kHz, and the sweep time set at 1000 second. . The spectral lines were resolved for the modulated carriers at 2.422GHz, 2.437GHz, and 2.452GHz respectively. These levels are well below the +8 dBm limit. See the power spectral density test data and plots.

10.2 TEST EQUIPMENT USED FOR TESTING

TABLE 10-1: POWER SPECTRAL DENSITY TEST EQUIPMENT

RTL ASSET #	MANUFACTURER	MODEL	PART TYPE	SERIAL NUMBER
900931	HP	8566B	Spectrum Analyzer (100Hz – 22 GHz)	3138A07771

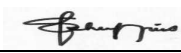
10.3 POWER SPECTRAL DENSITY TEST DATA

Operating Frequency (MHz): 2422, 2437 & 2452
 Channel: 3, 6 & 9
 Measured Cond. Pwr. (dBm): 29.4, 28.9 & 28.4
 Limit (dBm): 8

TABLE 10-2: POWER SPECTRAL DENSITY DATA

CHANNEL	1000mW-POWER SPECTRAL DENSITY LIMIT = +8dBm
3	1.6
6	1.4
9	0.5

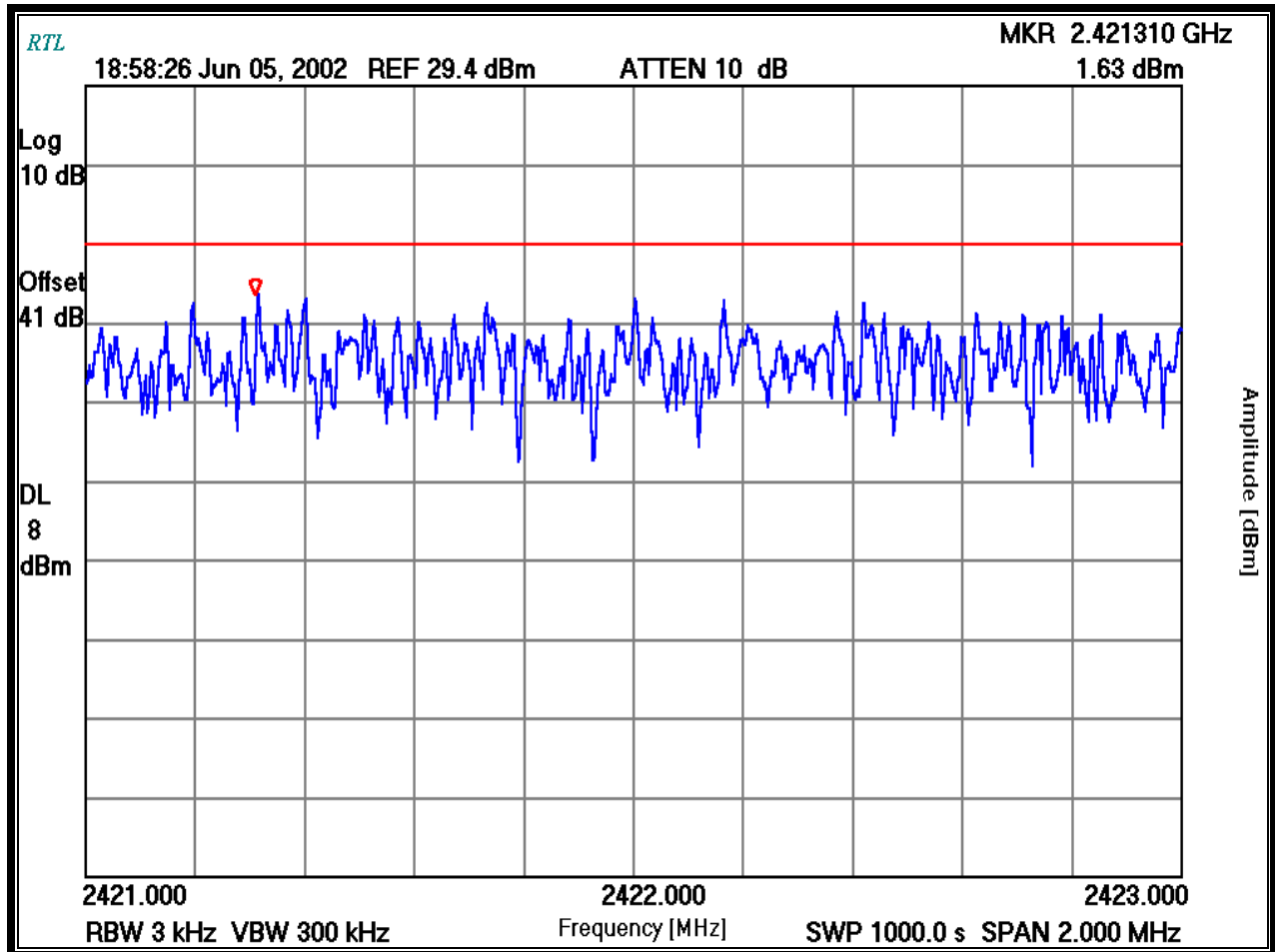
TEST PERSONNEL:

Franck Schuppis Test Technician/Engineer	 Signature	06/05/02 Date Of Test
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10.4 POWER SPECTRAL DENSITY PLOTS

Operating Frequency (MHz): 2422
 Channel: 3
 Measured Cond. Pwr. (dBm): 29.4
 Bandwidth Resolution (kHz): 3
 Bandwidth Video (kHz): 300
 Sweep Time (s): 1000.0

PLOT 10-1: POWER SPECTRAL DENSITY: CHANNEL 3



TEST PERSONNEL:

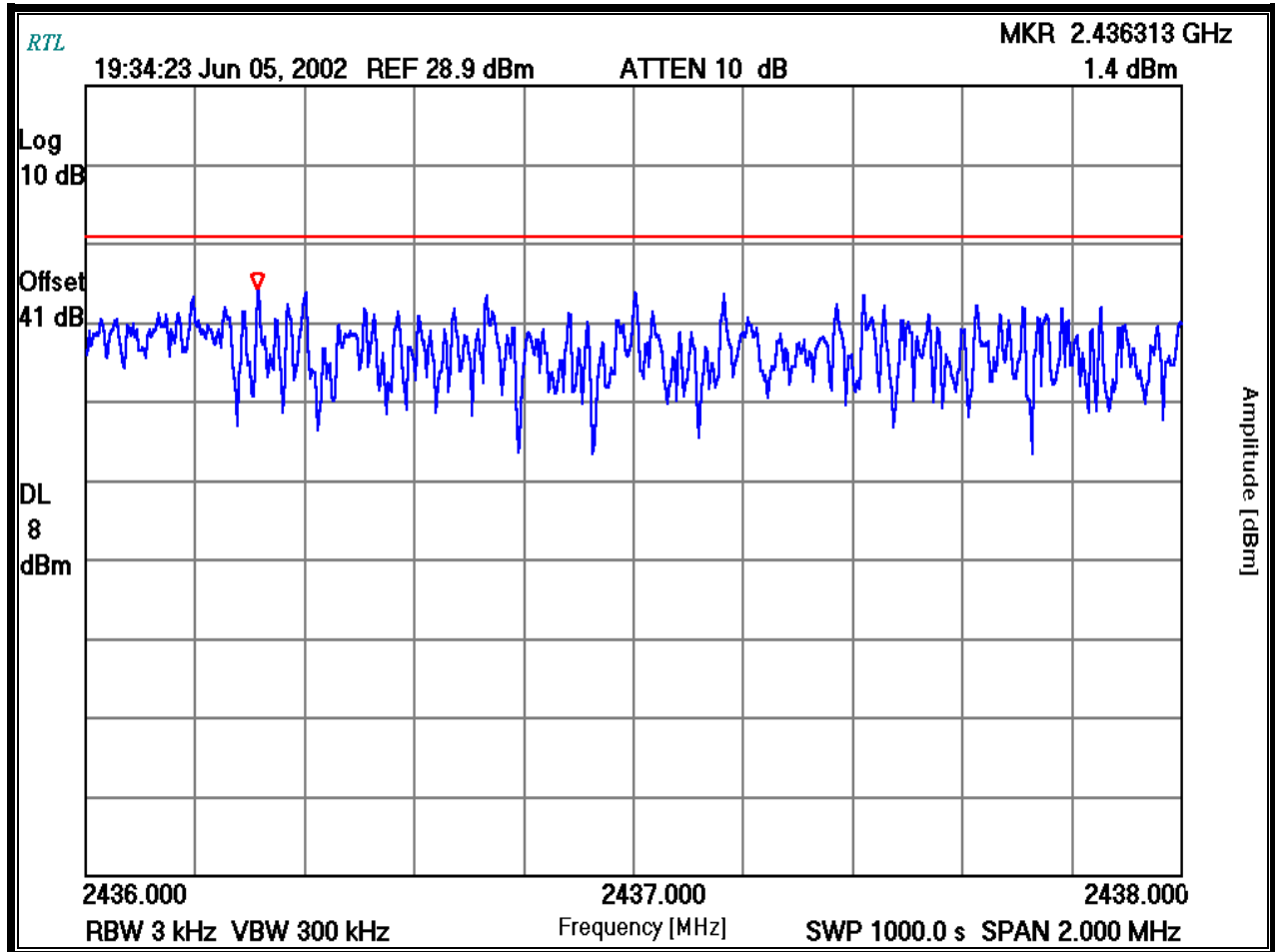
Franck Schuppis
 Test Technician/Engineer

Franck Schuppis
 Signature

06/05/02
 Date Of Test

Operating Frequency (MHz): 2437
 Channel: 6
 Measured Cond. Pwr. (dBm): 28.9
 Bandwidth Resolution (kHz): 3
 Bandwidth Video (kHz): 300
 Sweep Time (s): 1000.0

PLOT 10-2: POWER SPECTRAL DENSITY: CHANNEL 6



TEST PERSONNEL:

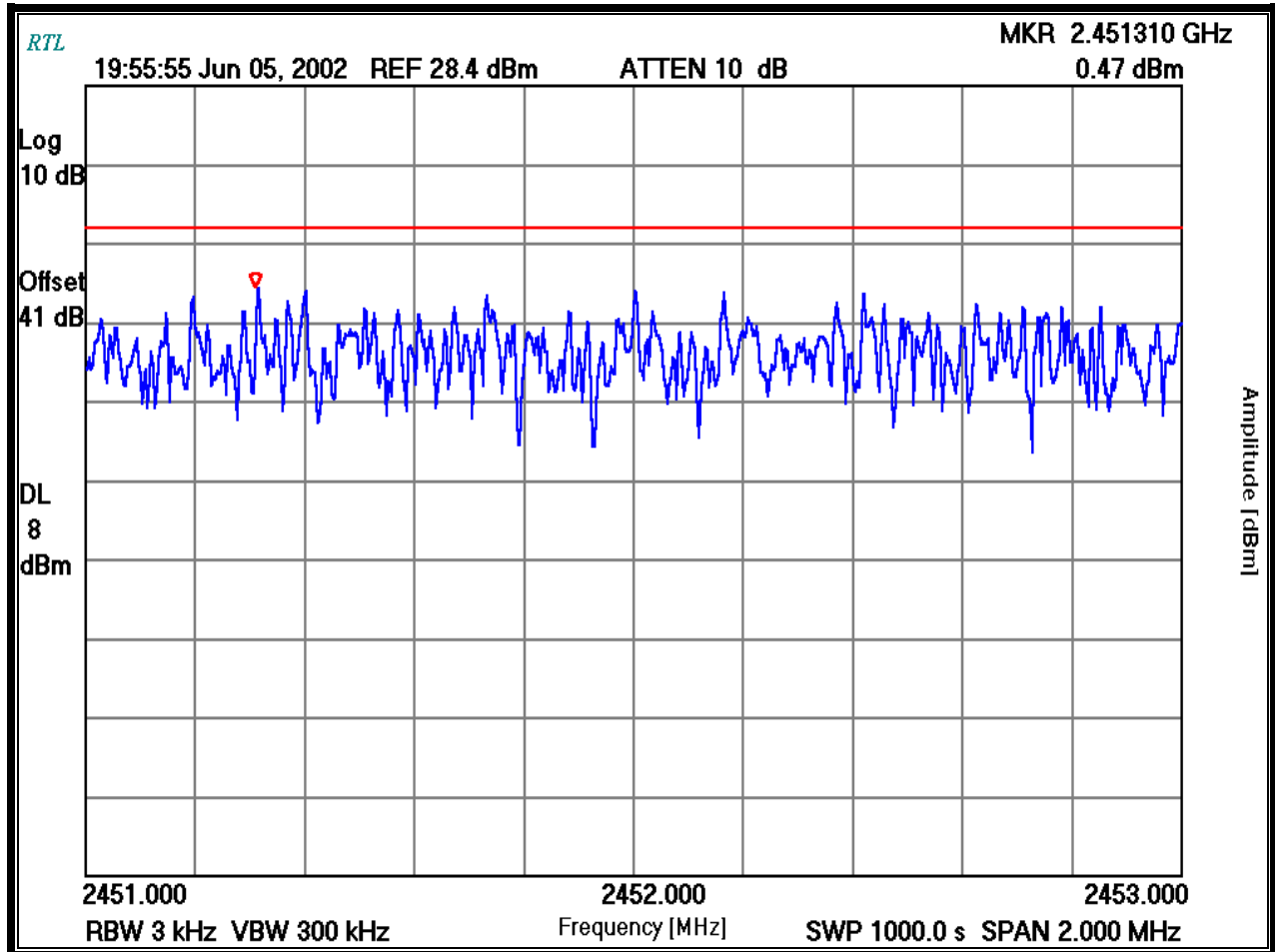
Franck Schuppis
 Test Technician/Engineer

Franck Schuppis
 Signature

06/05/02
 Date Of Test

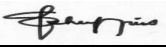
Operating Frequency (MHz): 2452
Channel: 9
Measured Cond. Pwr. (dBm): 28.4
Bandwidth Resolution (kHz): 3
Bandwidth Video (kHz): 300
Sweep Time (s): 1000.0

PLOT 10-3: POWER SPECTRAL DENSITY: CHANNEL 9



TEST PERSONNEL:

Franck Schuppis
Test Technician/Engineer


Signature

06/05/02
Date Of Test

Rhein Tech Laboratories
360 Herndon Parkway
Suite 1400
Herndon, VA 20170
<http://www.rheintech.com>

Report number: 2002123 – Rev. 1
FCC: Part 15.247
Industry Canada: RSS-139 & RSS-210
FCC ID: MFMSAMP24W
Model Name: Extended Amplified WLAN
System (SMARTAMP 1W)

11 CONCLUSION

The data in this measurement report shows that the Teletronics, Inc. Model: Extended Amplified WLAN System (SMARTAMP 1W) FCC ID: MFMSAMP24W, complies with all the requirements of Parts 2 and 15 of the FCC Rules and Industry Canada RSS-139 and RSS-210.