



Nemko Test Report: 5L0114RUS4Rev1

Applicant: Motion Computing, Inc.
8601 RR 2222 Bldg 2
Austin, Texas 78730

**Equipment Under Test:
(E.U.T.)** TS01

In Accordance With: **FCC Part 15, Subpart E**
UNII Band Transceiver

Tested By: Nemko Dallas Inc.
802 N. Kealy
Lewisville, Texas 75057-3136

Authorized By:

A handwritten signature in blue ink, appearing to read 'Tom Tidwell', written in a cursive style.

Tom Tidwell, Frontline Group Manager

Date: 1 December, 2005

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EQUIPMENT: TS01

TEST REPORT NO.: 5L0114RUS4Rev1

Section 1. Summary of Test Results

Manufacturer: Motion Computing, Inc.

Model No.: TS01

Name: LS800

Serial No.: Proto 8

General: **All measurements are traceable to national standards.**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15, Subpart E for UNII devices. Radiated tests were conducted in accordance with ANSI C63.4-2001. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC.

- | | | | |
|-------------------------------------|----------------------------|-------------------------------------|---------------------|
| <input checked="" type="checkbox"/> | New Submission | <input type="checkbox"/> | Production Unit |
| <input type="checkbox"/> | Class II Permissive Change | <input checked="" type="checkbox"/> | Pre-Production Unit |

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE. NONE
See " Summary of Test Data".



NVLAP LAB CODE: 100426-0

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Summary Of Test Data

NAME OF TEST	PARA. NO.	RESULT
Powerline Conducted Emissions	15.207(a)	Complies
26 dB Bandwidth	15.407(a)	Complies
Maximum Peak Power Output	15.407(a)	Complies
Peak Excursion	15.407(b)	Comlies
Spurious Emissions (Antenna Conducted)	15.407(a)	Complies
Spurious Emissions (Restricted Bands)	15.407(a)	Complies
Peak Power Spectral Density	15.407(a)	Complies

Footnotes:

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

General Equipment Information

Frequency Band: 5170 – 5240 MHz
 5260 – 5320 MHz
 5745 – 5805 MHz

Channel Spacing: 5 MHz

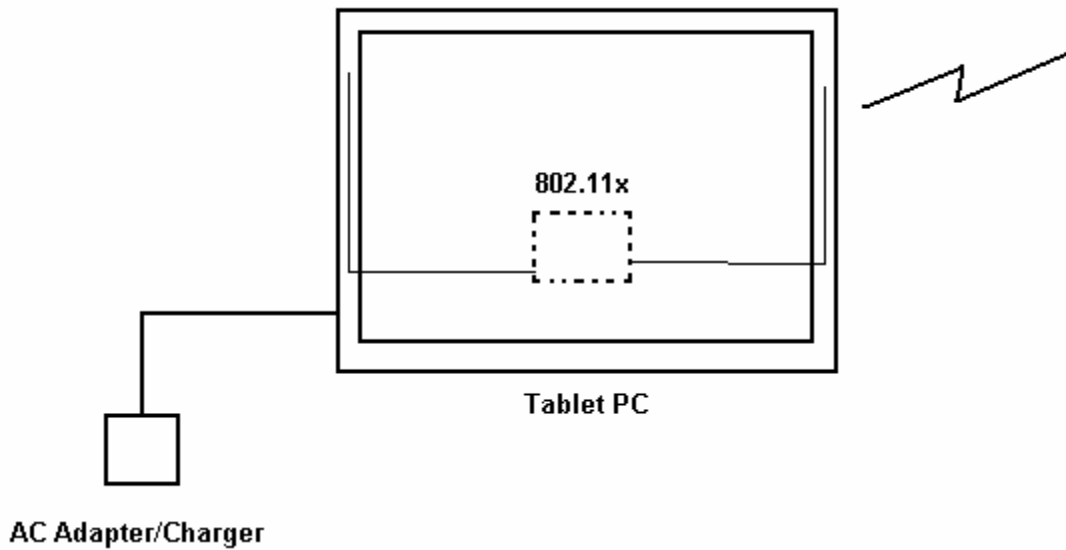
User Frequency Adjustment: Software controlled

Description of EUT

The LS800 TS01 is a portable computer platform based on ultra-portable tablet PC technology utilizing Microsoft's Tablet version of Windows XP. The PC is compatible with 802.11a, b and g technologies.

The PC also has Bluetooth capability.

System Diagram



EQUIPMENT: TS01

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Section 3. Powerline Conducted Emissions

NAME OF TEST: Powerline Conducted Emissions	PARA. NO.: 15.207(a)
TESTED BY: Brian Boyea	DATE: 4/19/05

Test Results: Complies.

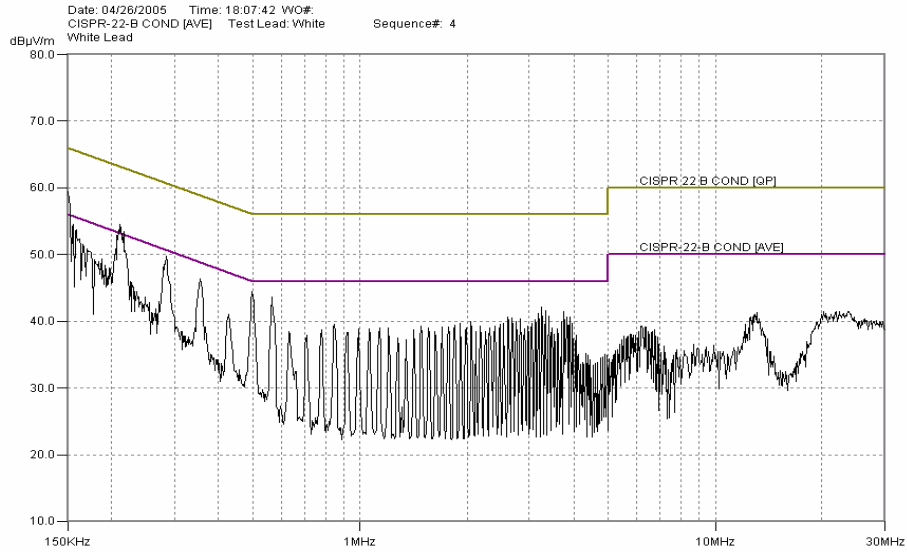
Measurement Data: See attached plots.

Measurement Uncertainty: +/- 1.7 dB

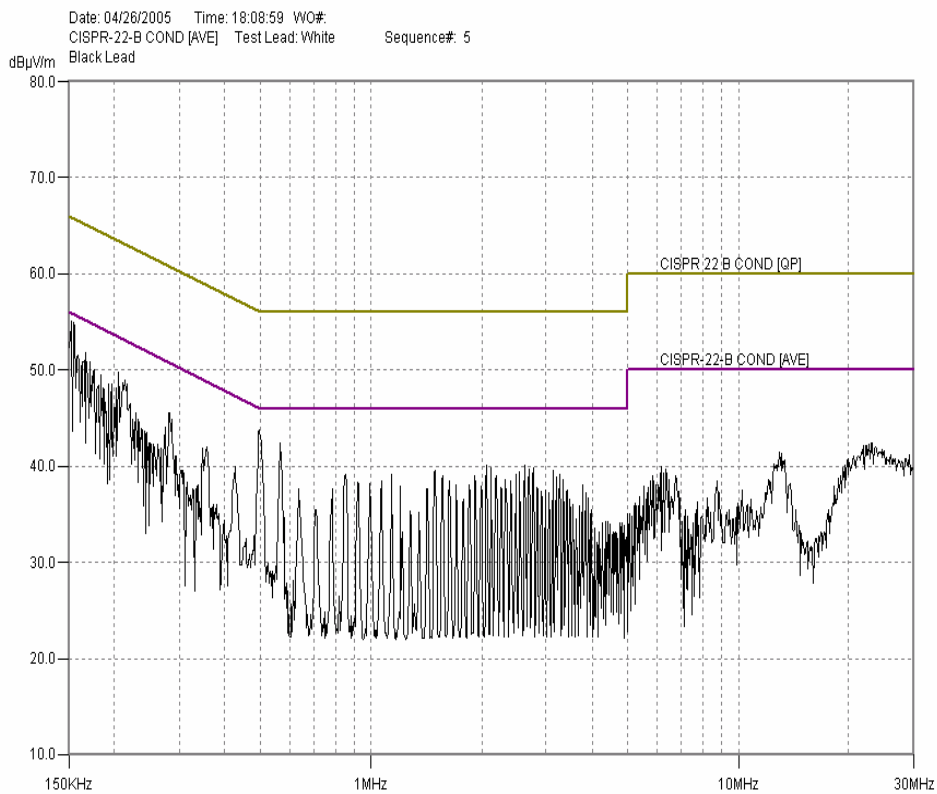
The worst case PEAK emission was 51 dB μ V at 150 kHz on the neutral line. This is 5 dB below the AVERAGE spec limit of 56 dB μ V.

Test Data – Powerline Conducted Emissions

Neutral



Hot



Photos – Powerline Conducted Emissions

Front



Side



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Section 4. 26 dB Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 15.407(a)
TESTED BY: David Light	DATE: 03 May 2005

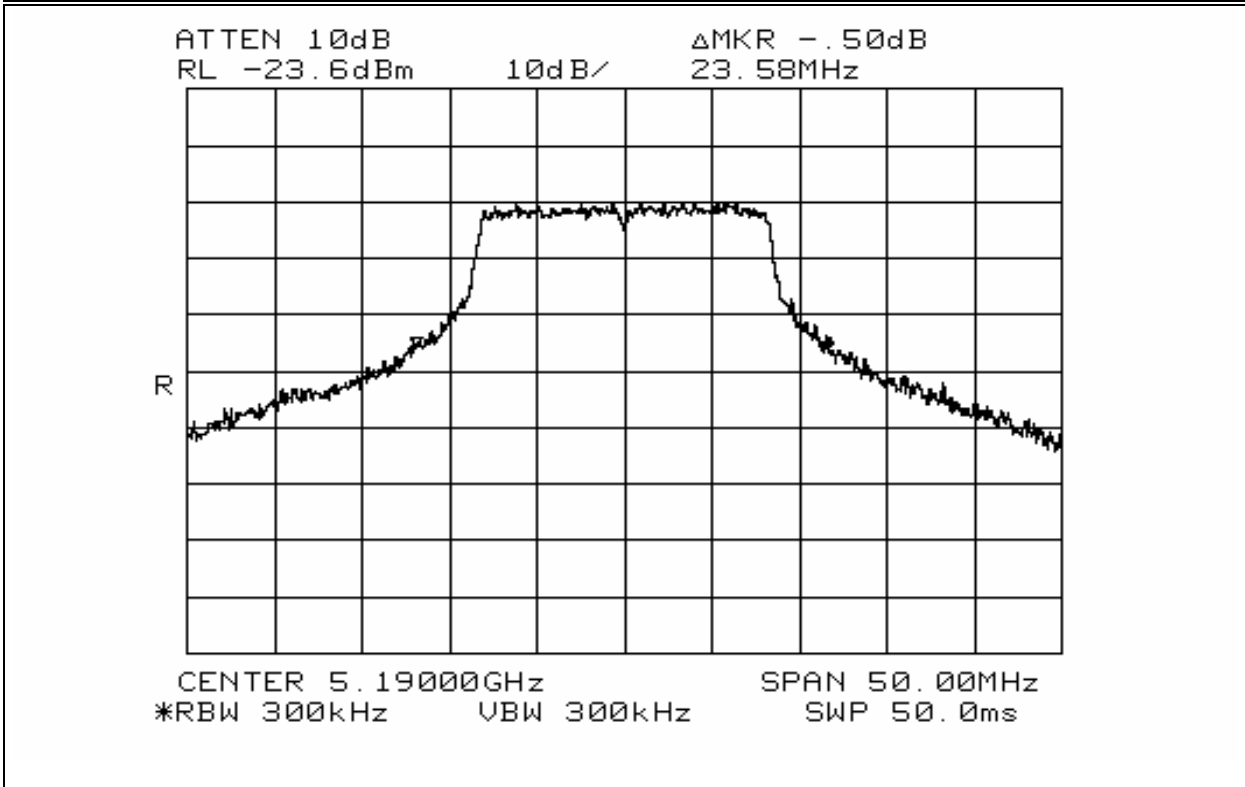
Test Results: Complies.

EQUIPMENT: TS01

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Test Data – 26 dB Bandwidth

Data Plot	Occupied Bandwidth
Page 2 of 9	
Job No.: 5L0114	Date: 5/11/2005
Specification: 15.407(a)	Temperature(°C): 23
Tested By: David Light	Relative Humidity(%) 45
E.U.T.: Tablet PC w/Atheros 802.11 a/b/g radio	
Configuration: Tx	



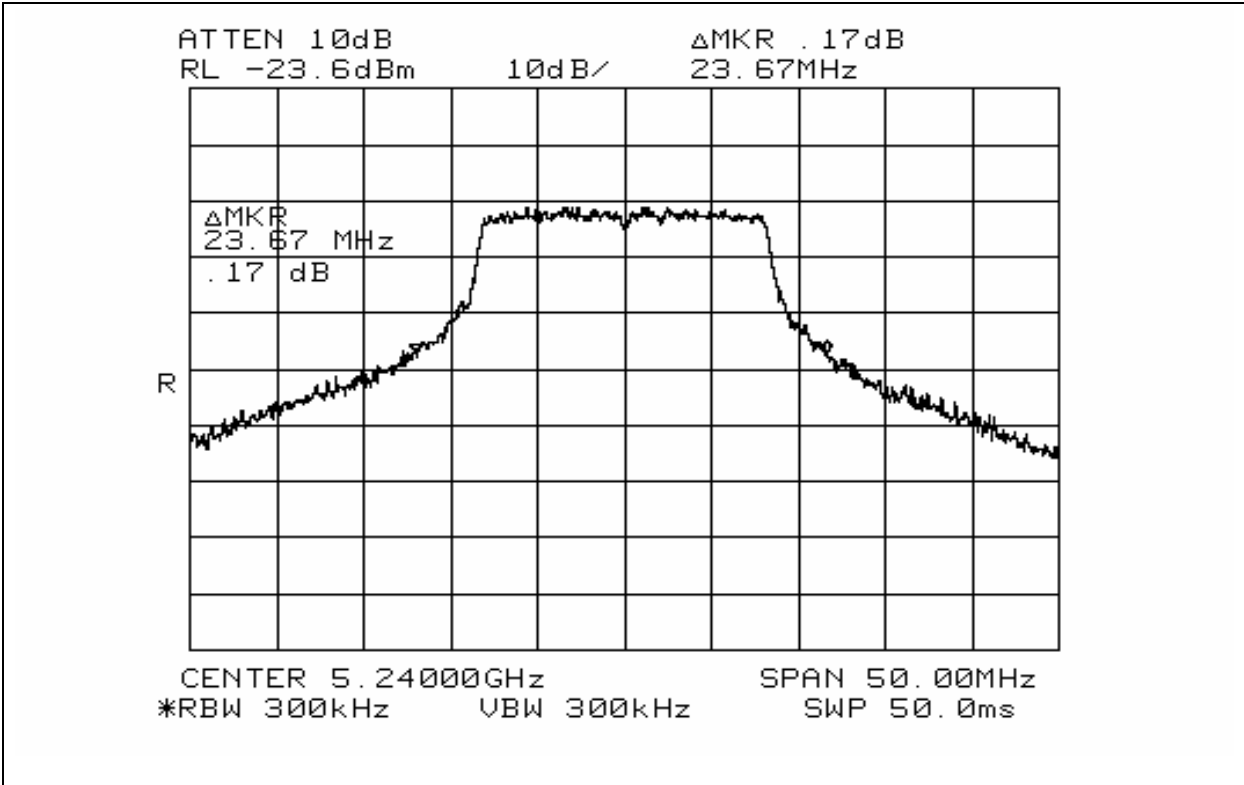
Notes:

EQUIPMENT: TS01

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Test Data – 26 dB Bandwidth

<u>Data Plot</u>	<u>Occupied Bandwidth</u>
Page 3 of 9	
Job No.: 5L0114	Date: 5/11/2005
Specification: 15.407(a)	Temperature(°C): 23
Tested By: David Light	Relative Humidity(%) 45
E.U.T.: Tablet PC w/Atheros 802.11 a/b/g radio	
Configuration: Tx	



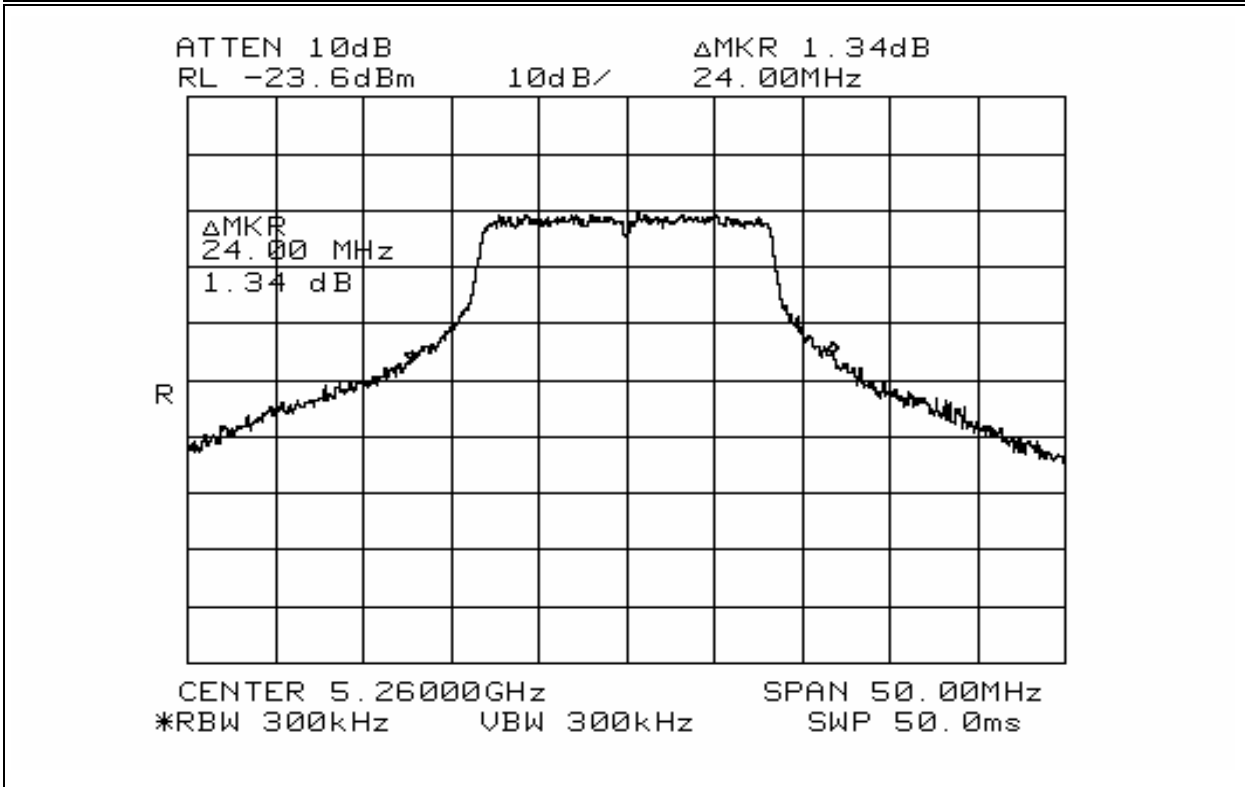
Notes:

EQUIPMENT: TS01

TEST REPORT NO.: 5L0114RUS4Rev1

Test Data – 26 dB Bandwidth

<u>Data Plot</u>	<u>Occupied Bandwidth</u>
Page 4_of 9	
Job No.: 5L0114	Date: 5/11/2005
Specification: 15.407(a)	Temperature(°C): 23
Tested By: David Light	Relative Humidity(%) 45
E.U.T.: Tablet PC w/Atheros 802.11 a/b/g radio	
Configuration: Tx	



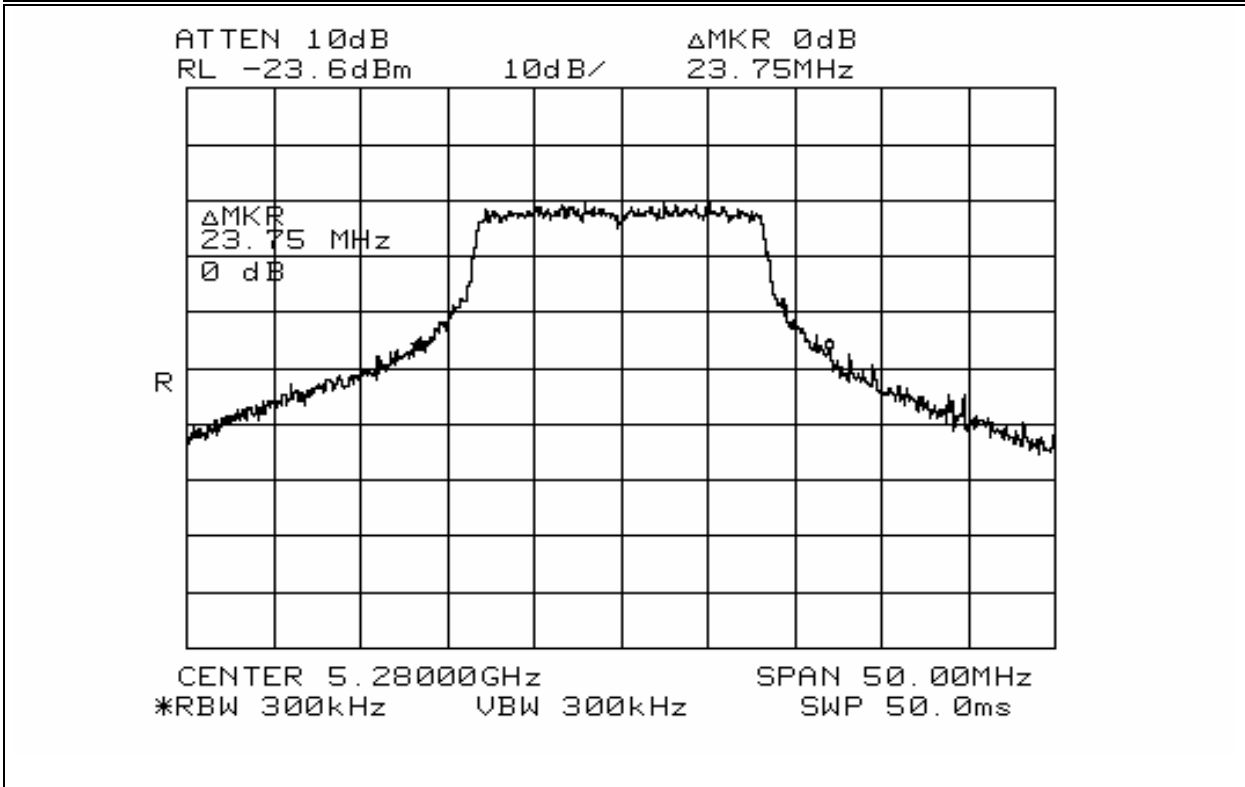
Notes:

EQUIPMENT: TS01

TEST REPORT NO.: 5L0114RUS4Rev1

Test Data – 26 dB Bandwidth

<u>Data Plot</u>		<u>Occupied Bandwidth</u>	
Page 5 of 9			
Job No.:	5L0114	Date:	5/11/2005
Specification:	15.407(a)	Temperature(°C):	23
Tested By:	David Light	Relative Humidity(%)	45
E.U.T.:	Tablet PC w/Atheros 802.11 a/b/g radio		
Configuration:	Tx		



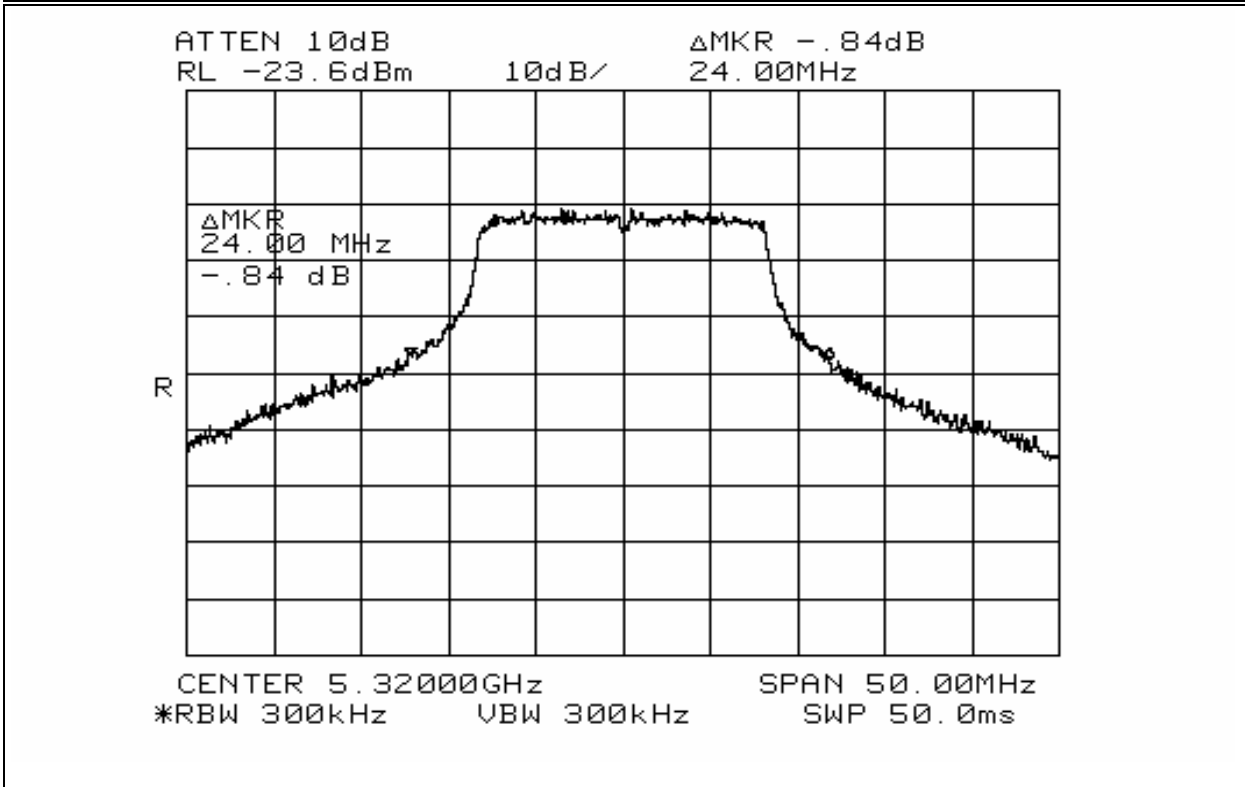
Notes:

EQUIPMENT: TS01

TEST REPORT NO.: 5L0114RUS4Rev1

Test Data – 26 dB Bandwidth

<u>Data Plot</u>	<u>Occupied Bandwidth</u>
Page 6 of 9	
Job No.: 5L0114	Date: 5/11/2005
Specification: 15.407(a)	Temperature(°C): 23
Tested By: David Light	Relative Humidity(%) 45
E.U.T.: Tablet PC w/Atheros 802.11 a/b/g radio	
Configuration: Tx	



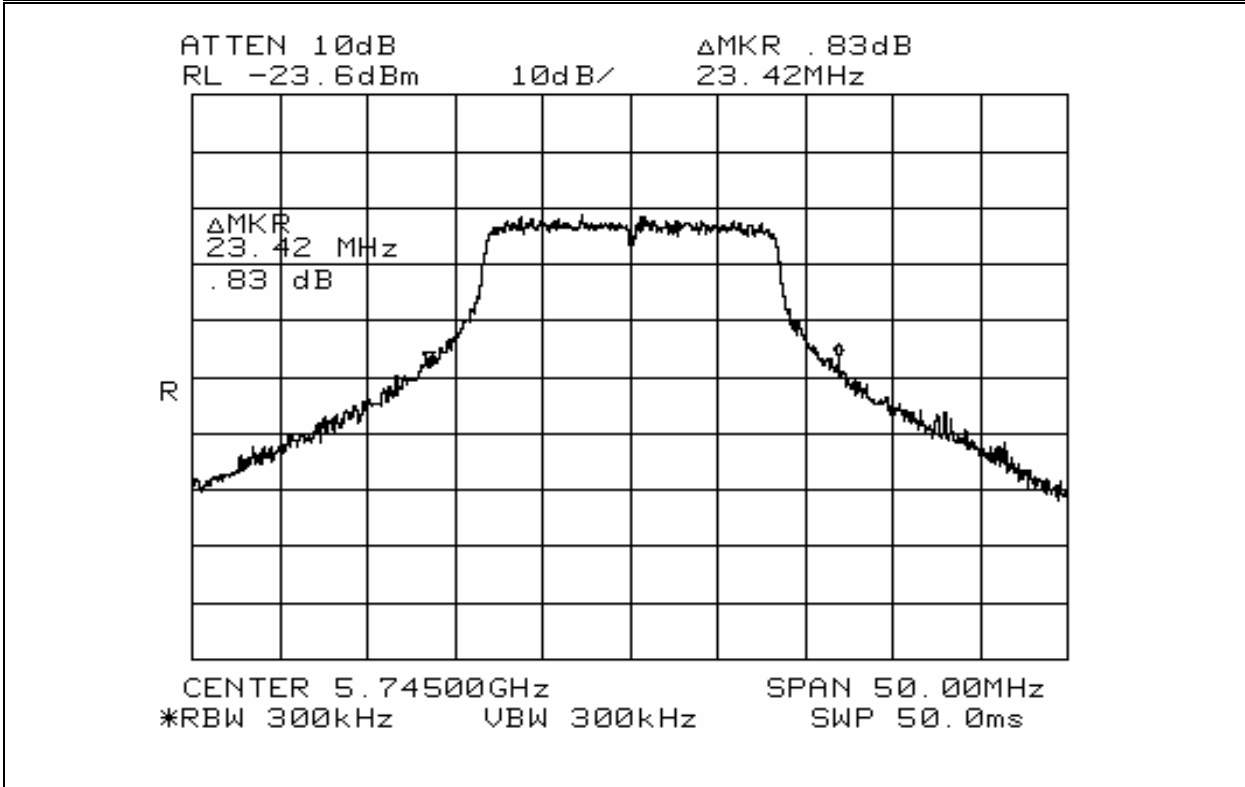
Notes: _____

EQUIPMENT: TS01

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Test Data – 26 dB Bandwidth

Data Plot	Occupied Bandwidth
Page 9_of 9	
Job No.: 5L0114	Date: 5/11/2005
Specification: 15.407(a)	Temperature(°C): 23
Tested By: David Light	Relative Humidity(%) 45
E.U.T.: Tablet PC w/Atheros 802.11 a/b/g radio	
Configuration: Tx	



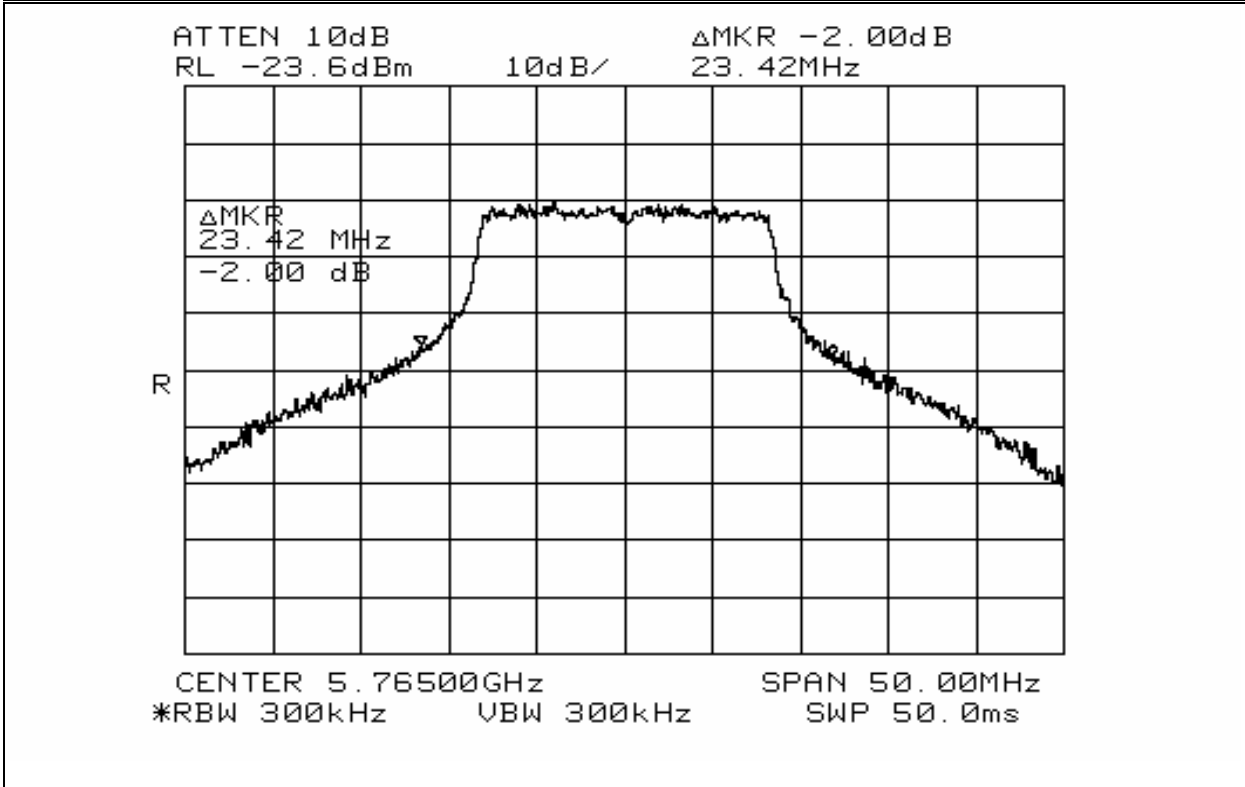
Notes:

EQUIPMENT: TS01

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Test Data – 26 dB Bandwidth

Data Plot	Occupied Bandwidth
Page 9_of 9	
Job No.: 5L0114	Date: 5/11/2005
Specification: 15.407(a)	Temperature(°C): 23
Tested By: David Light	Relative Humidity(%) 45
E.U.T.: Tablet PC w/Atheros 802.11 a/b/g radio	
Configuration: Tx	



Notes:

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Section 5. Maximum Peak Output Power

NAME OF TEST: Maximum Peak Output power	PARA. NO.: 15.407(a)
TESTED BY: David Light	DATE: 03 May 2005

- (1) For the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10 log B, where B is the 26-dB emission bandwidth in MHz.

Limit = lesser of 50 mW(17 dBm) or 4 dBm + 10log(20) = 17 dBm
 Limit = 50 mW(+17 dBm)

- (2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz.

Limit = lesser of 250 mW(24 dBm) or 11 dBm + 10log(20) = +24 dBm
 Limit = 250 mW(+24 dBm)

- (3) For the band 5.725-5.825 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 1 W or 17 dBm + 10 log B, where B is the 26-dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 17 dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain up to 23 dBi without any corresponding reduction in the transmitter peak output power or peak power spectral density. For fixed, point-to-point U-NII transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in peak transmitter power and peak power spectral density for each 1 dB of antenna gain in excess of 23 dBi would be required. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

Limit = lesser of 1 W (30 dBm) or 17 dBm + 10log(20) = +30 dBm
 Limit = 1 W(+30 dBm)

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Test Results: Complies.

Measurement Data: Refer to attached data

The measurement was repeated at +/- 15% of nominal supply voltage with no variation noted in rf power output.

Maximum Peak Power:

Frequency (MHz)	Peak Power (dBm)	Peak Power (mW)
5150 – 5250 MHz band		
5170	12.9	9.8
5240	13.2	9.2
5250 – 5350 MHz band		
5260	10.7	9.0
5320	9.9	8.7
5725 – 5825 MHz band		
5745	8.1	8.2
5805	8.6	8.1

Test Equipment Used: 1464-1973-1472

Test Conditions: 20°C
50% RH

The carrier is continuous and method #1 of FCC Public Notice DA 02-2138 was used to make the measurement.

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Section 6. Peak Excursion

NAME OF TEST: Peak Excursion	PARA. NO.: 15. 407
TESTED BY: David Light	DATE: 13 May 2005

Test Results: Maximum excursion = 13.9 dB.

Measurement Data: See attached plots

EQUIPMENT: TS01

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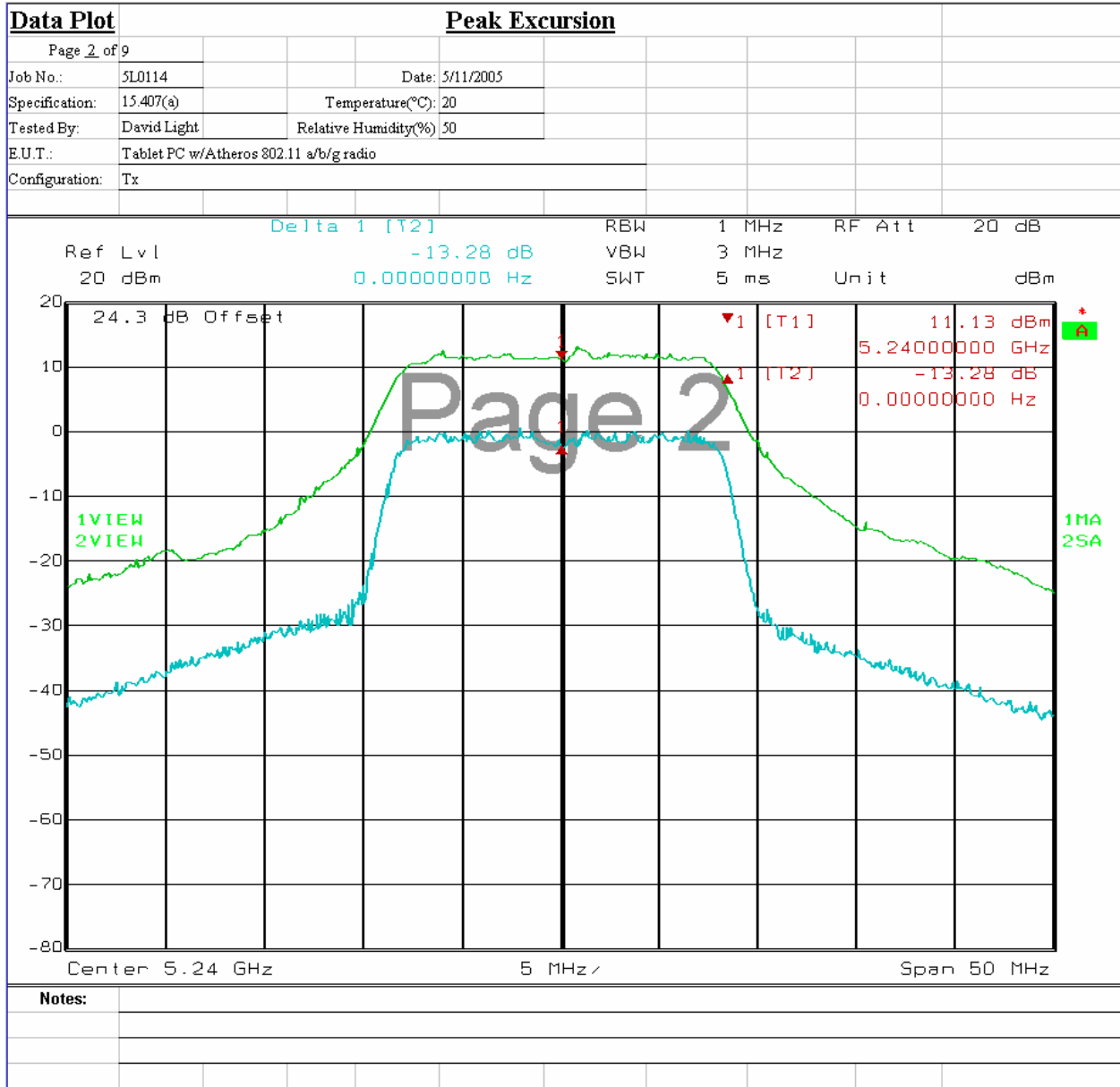
Test Data – Peak Excursion

Data Plot		Peak Excursion	
Page 1 of 9		Complete	X
Job No.:	5L0114	Date:	5/11/2005
Specification:	15.407(a)	Temperature(°C):	20
Tested By:	David Light	Relative Humidity(%):	50
E.U.T.:	Tablet PC w/Atheros 802.11 a/b/g radio		
Configuration:	Tx		
Sample Number:	1		
Location:	Lab 1	RBW:	Refer to plots
Detector Type:	Peak	VBW:	Refer to plots
Test Equipment Used			
Antenna:		Directional Coupler:	
Pre-Amp:		Cable #1:	1081
Filter:		Cable #2:	
Receiver:	1036	Cable #3:	
Attenuator #1:	1472	Cable #4:	
Attenuator #2:		Mixer:	
Additional equipment used:			
Measurement Uncertainty:	+/-1.7 dB		
<p>Ref Lvl 20 dBm Delta 1 [T2] RBW 1 MHz RF Att 20 dB</p> <p> -13.75 dB VBW 3 MHz</p> <p> 0.00000000 Hz SWT 5 ms Unit dBm</p> <p>24.3 dB Offset</p> <p>1V VIEW 1MA</p> <p>2V VIEW 25A</p> <p>Center 5.17 GHz 5 MHz/ Span 50 MHz</p>			
Notes:			

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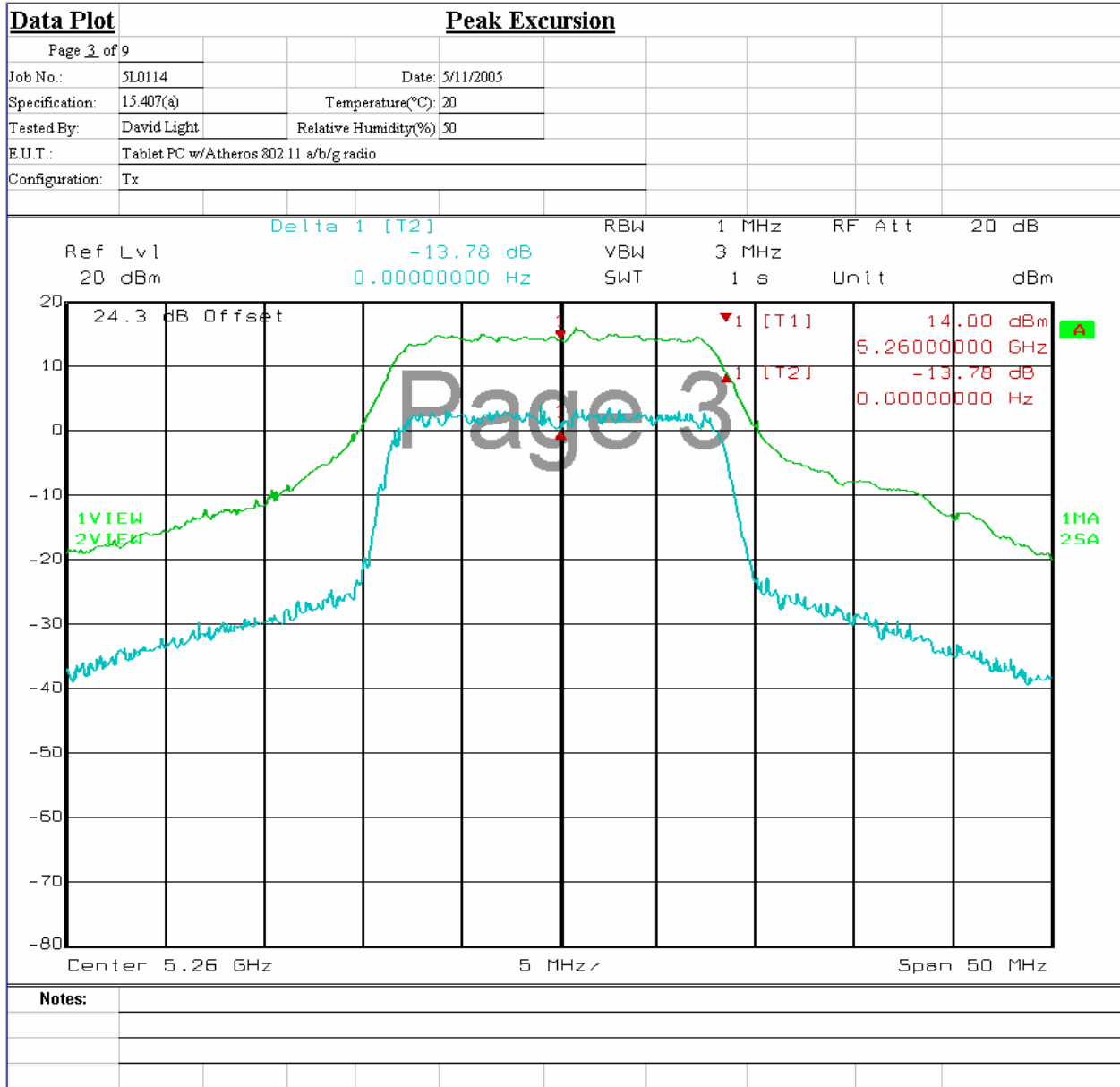
Test Data – Peak Excursion



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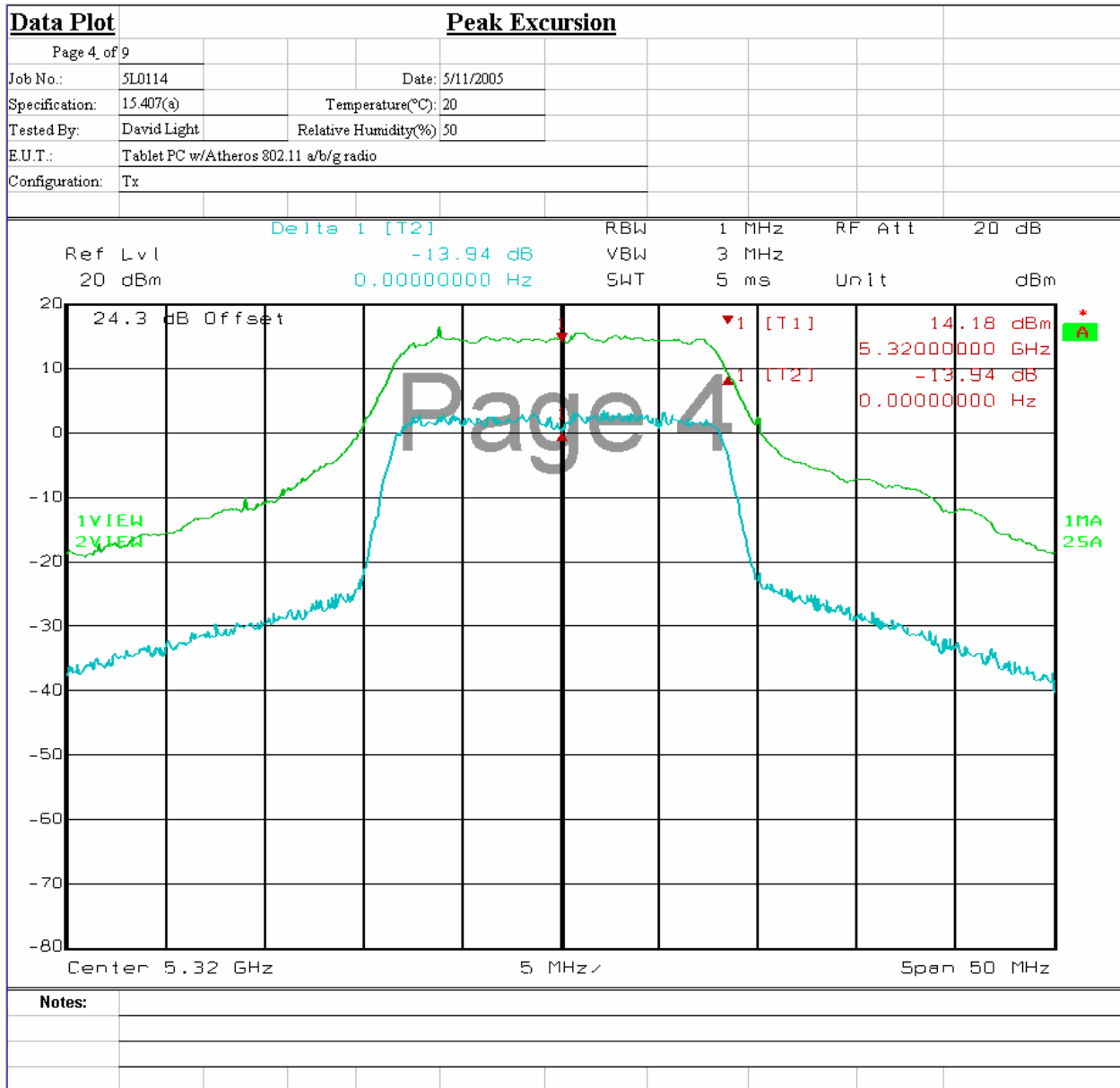
Test Data – Peak Excursion



EQUIPMENT: TS01

TEST REPORT NO.: 5L0114RUS4Rev1

Test Data – Peak Excursion

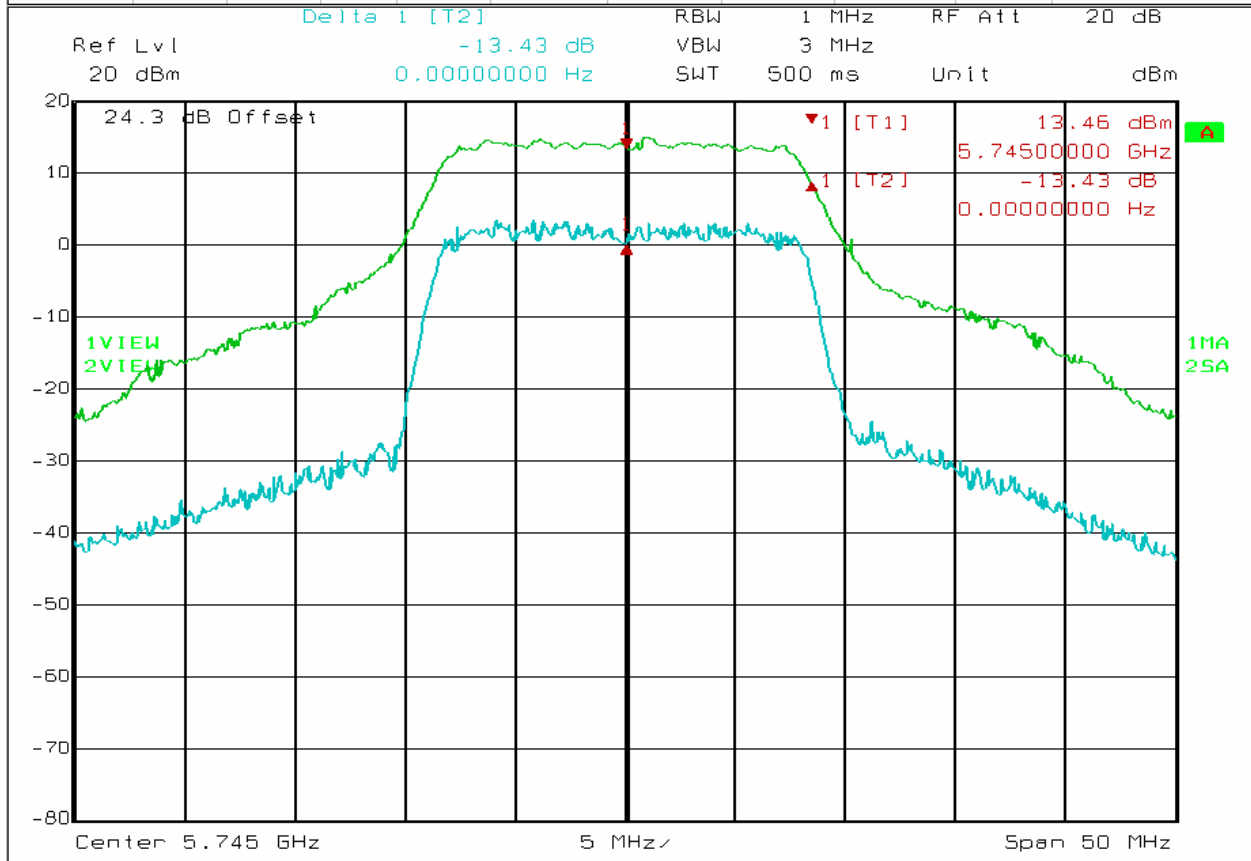


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Test Data – Peak Excursion

Data Plot		Peak Excursion	
Page 7 of 9			
Job No.:	5L0114	Date:	5/11/2005
Specification:	15.407(a)	Temperature(°C):	20
Tested By:	David Light	Relative Humidity(%)	50
E.U.T.:	Tablet PC w/Atheros 802.11 a/b/g radio		
Configuration:	Tx		



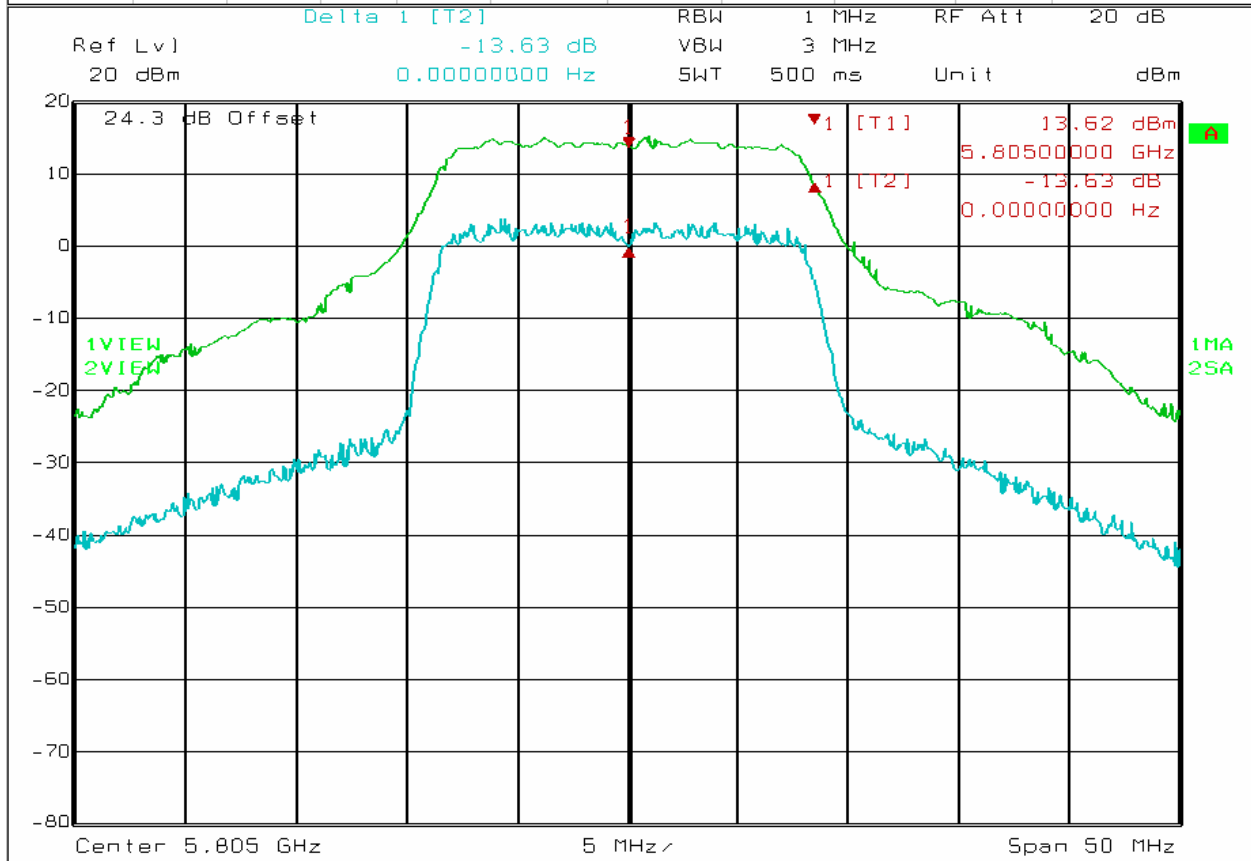
Notes:

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Test Data – Peak Excursion

Data Plot		Peak Excursion	
Page 8 of 9			
Job No.:	5L0114	Date:	5/11/2005
Specification:	15.407(a)	Temperature(°C):	20
Tested By:	David Light	Relative Humidity(%)	50
E.U.T.:	Tablet PC w/Atheros 802.11 a/b/g radio		
Configuration:	Tx		



Notes:	

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Section 7. Spurious Emissions (conducted)

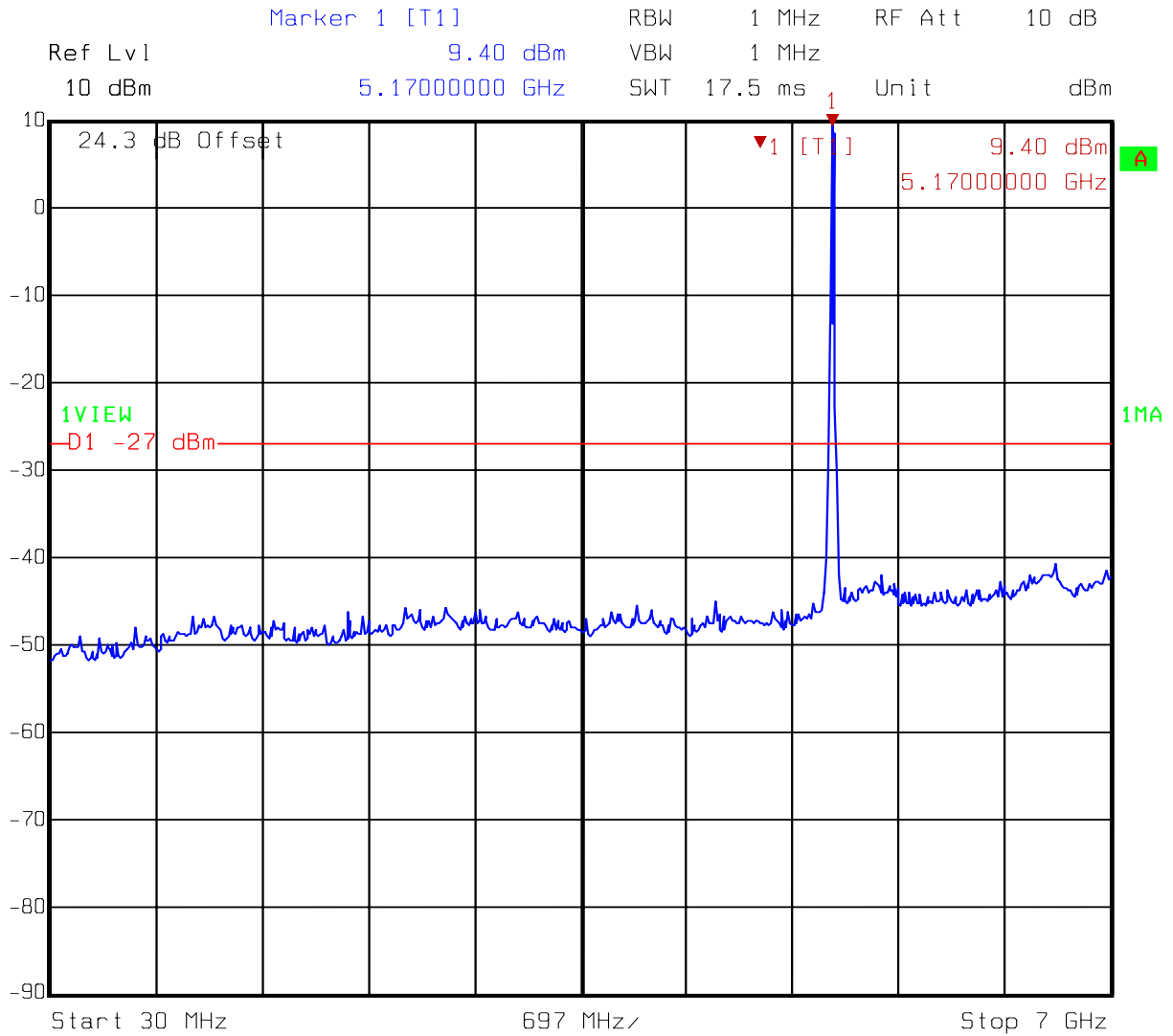
NAME OF TEST: Spurious Emissions (conducted)	PARA. NO.: 15.407
TESTED BY: David Light	DATE: 5/12/05

Test Results: Complies.

Measurement Data: Refer to attached plots

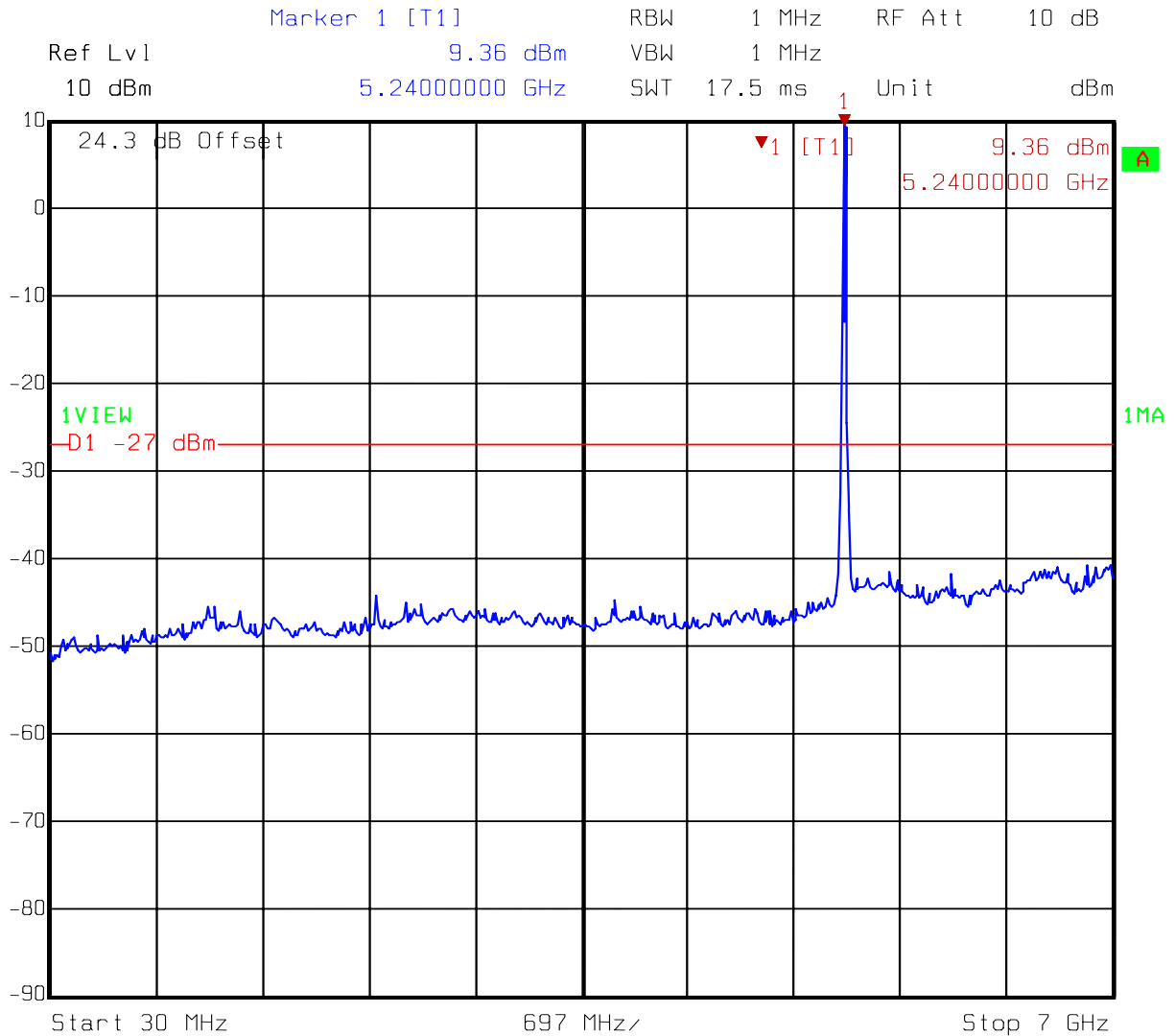
Test Equipment: 1036-1081-1472

Test Data – Spurious Emissions (5170 MHz)



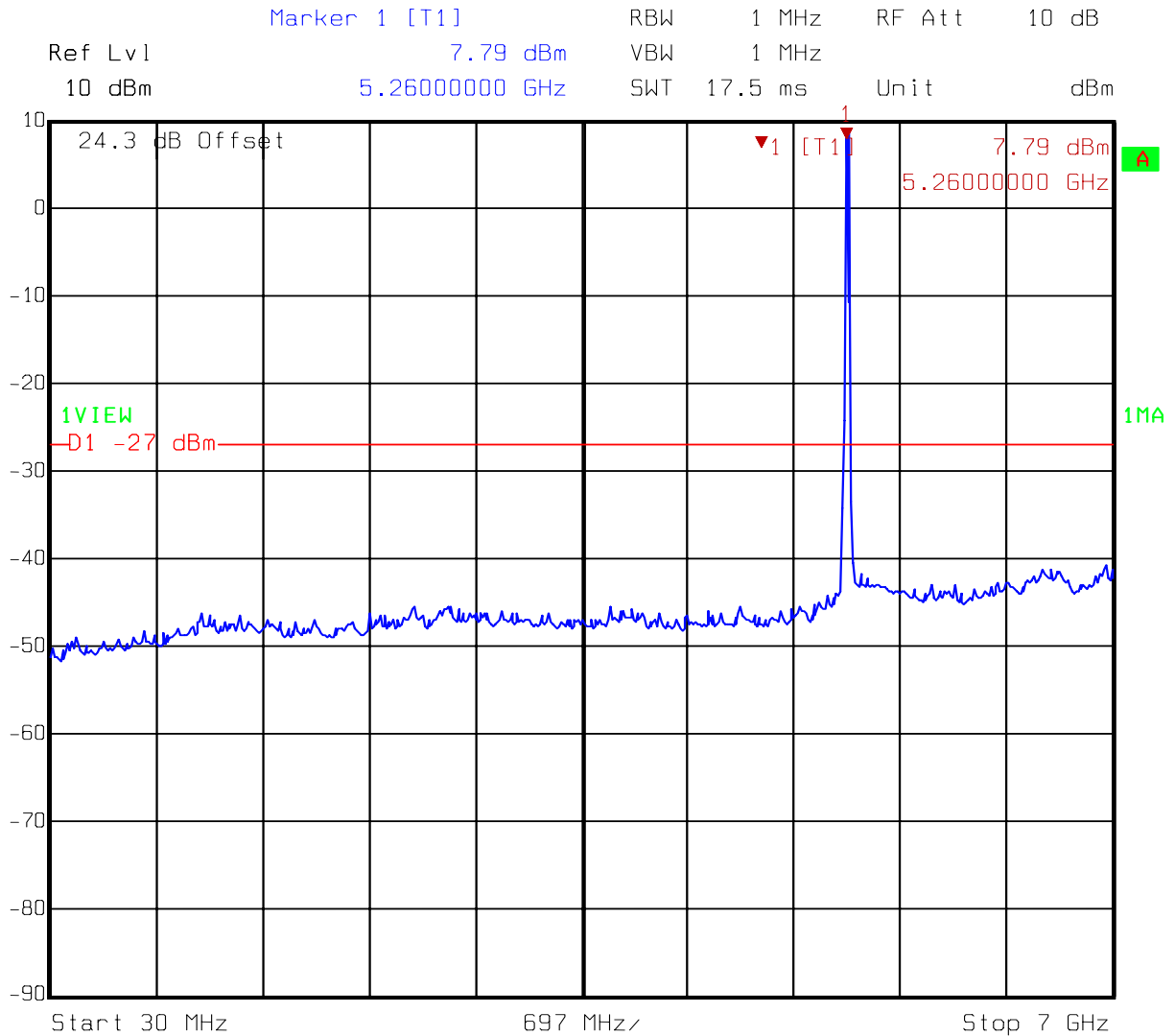
Date: 20.MAY 2005 10:19:12

Test Data – Spurious Emissions (5240 MHz)



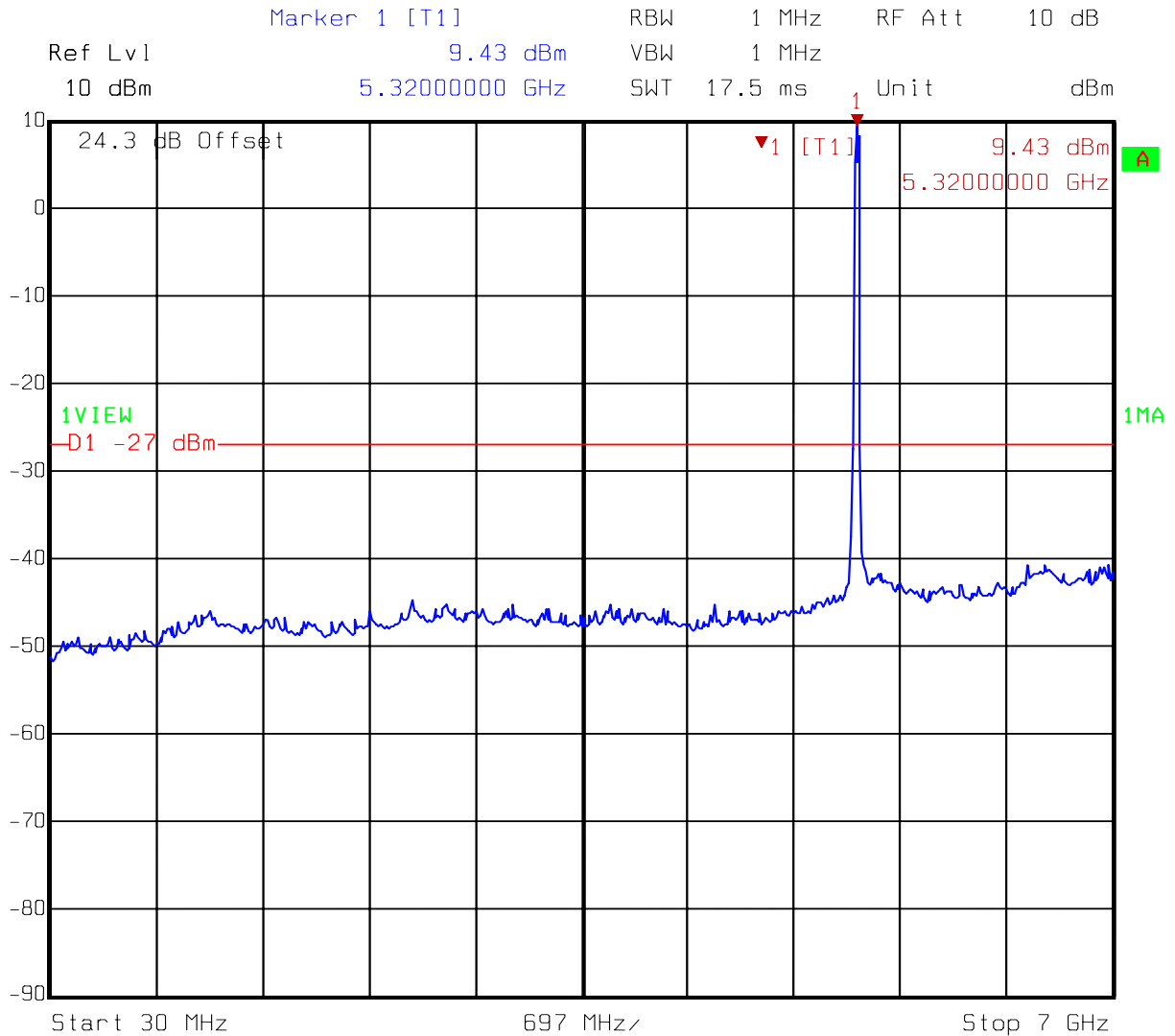
Date: 20.MAY 2005 10:18:34

Test Data – Spurious Emissions (5260 MHz)



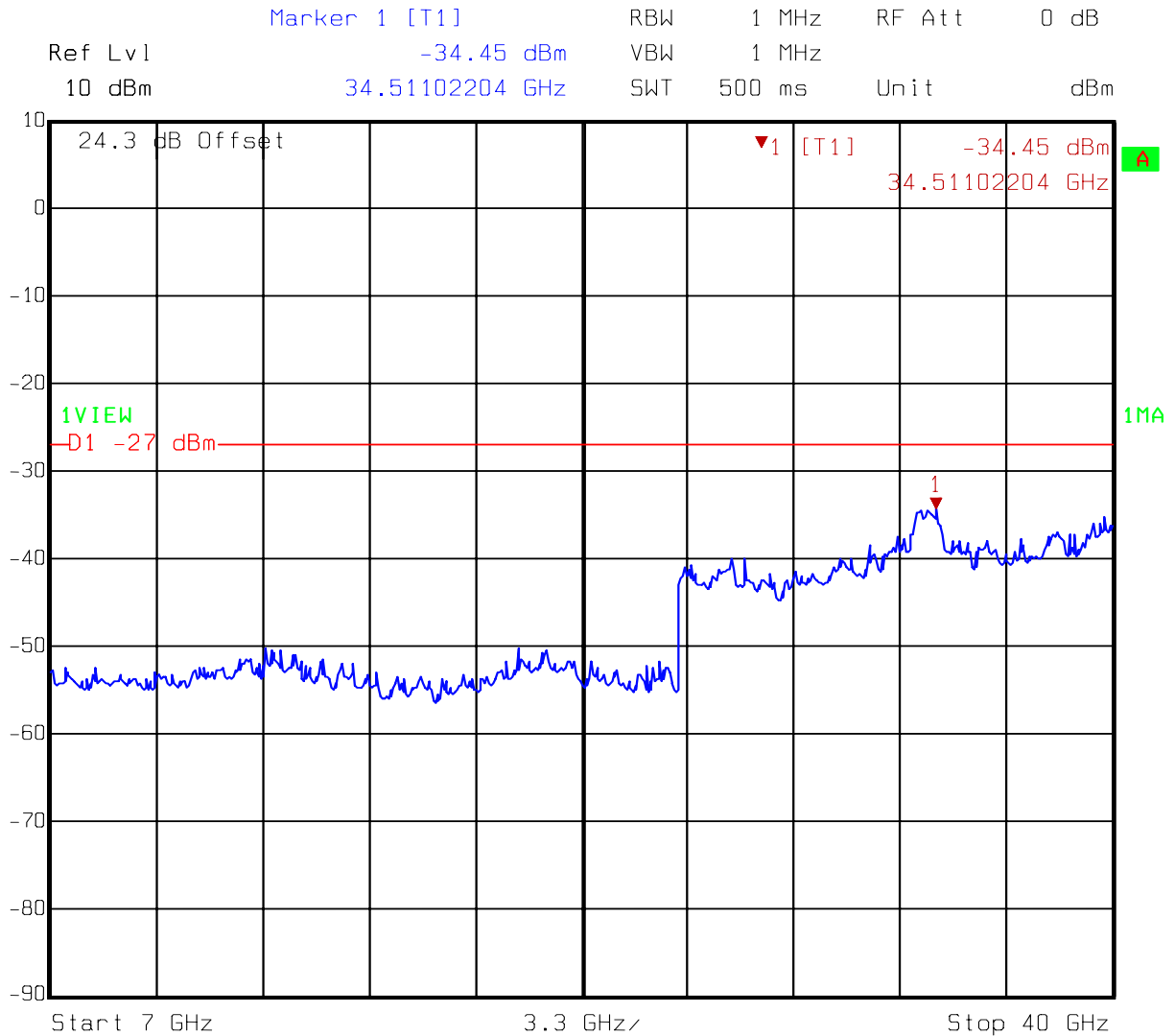
Date: 20.MAY 2005 10:17:57

Test Data – Spurious Emissions (5320 MHz)



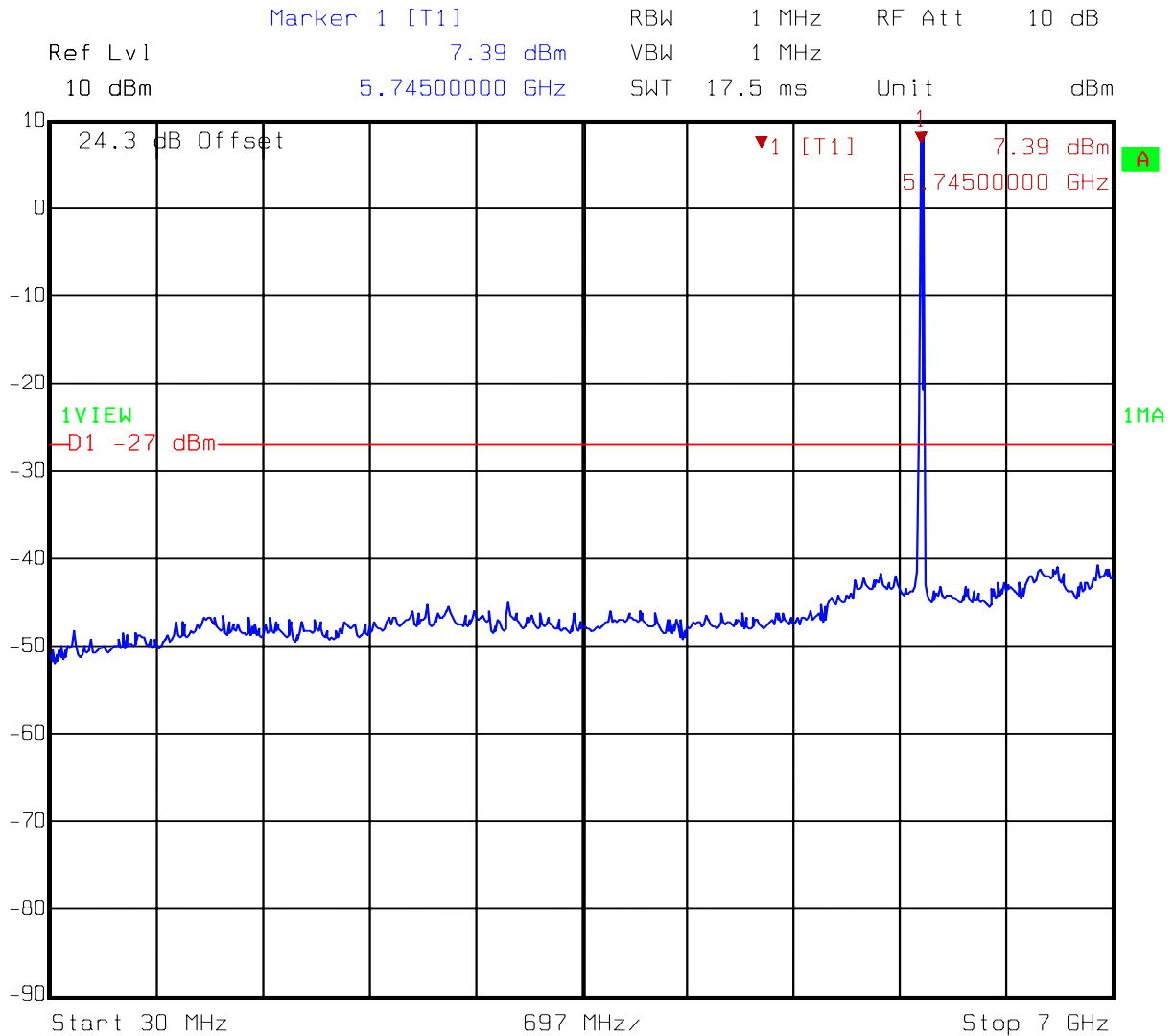
Date: 20.MAY 2005 10:14:41

Test Data – Spurious Emissions (5320 MHz)



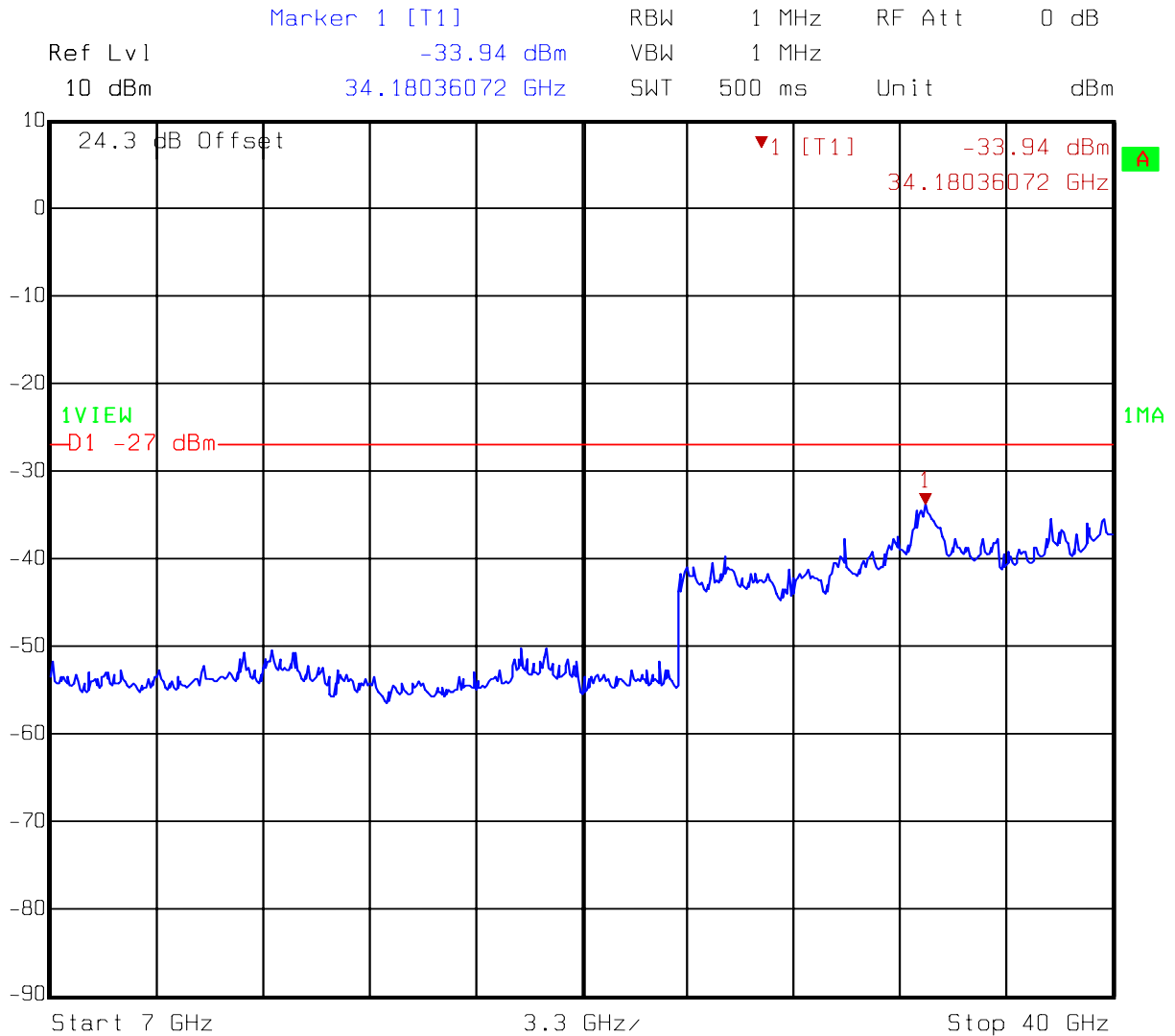
Date: 20.MAY 2005 10:03:55

Test Data – Spurious Emissions (5745 MHz)



Date: 20.MAY 2005 10:12:32

Test Data – Spurious Emissions (5745 MHz)

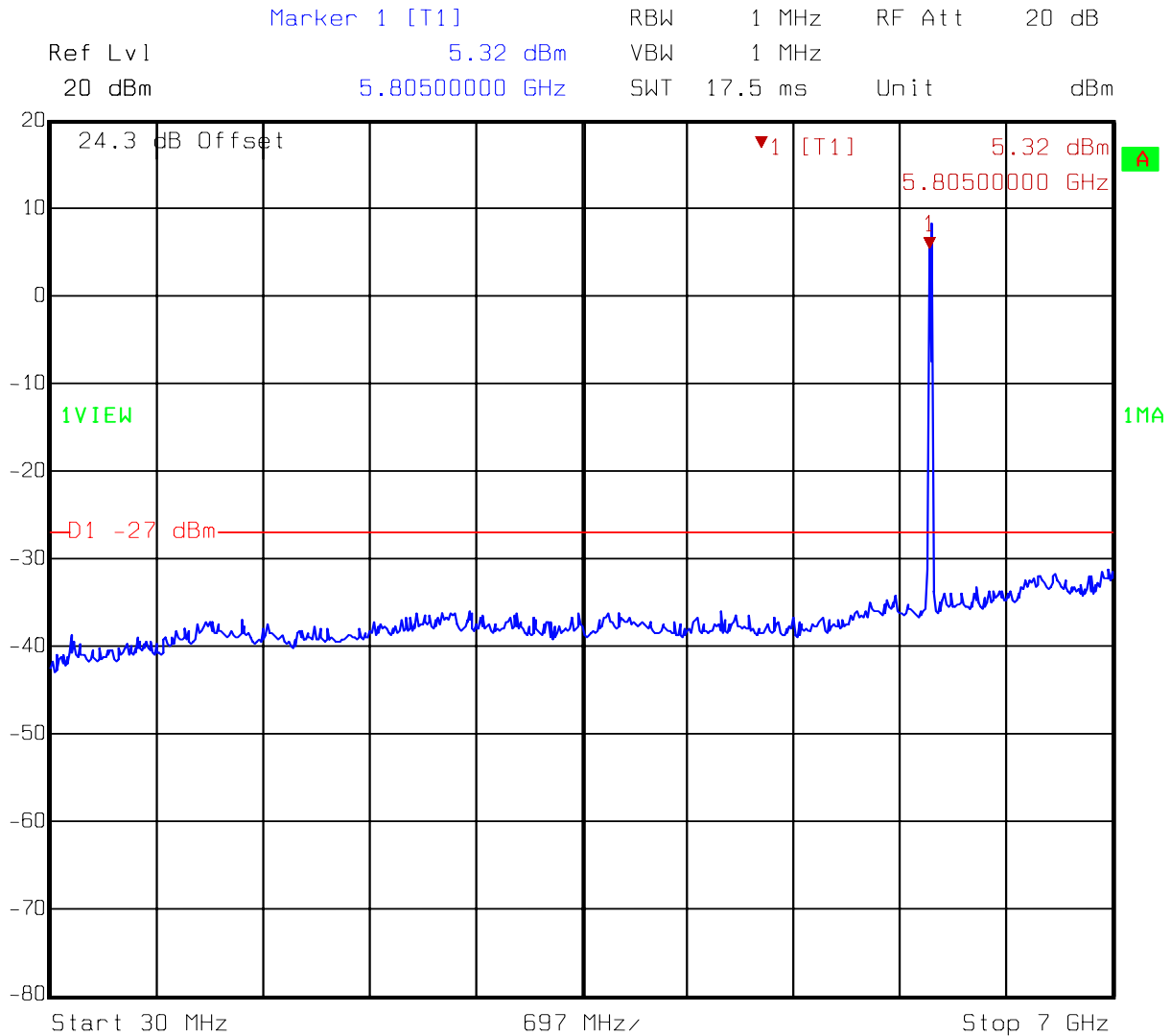


Date: 20.MAY 2005 10:06:35

EQUIPMENT: TS01

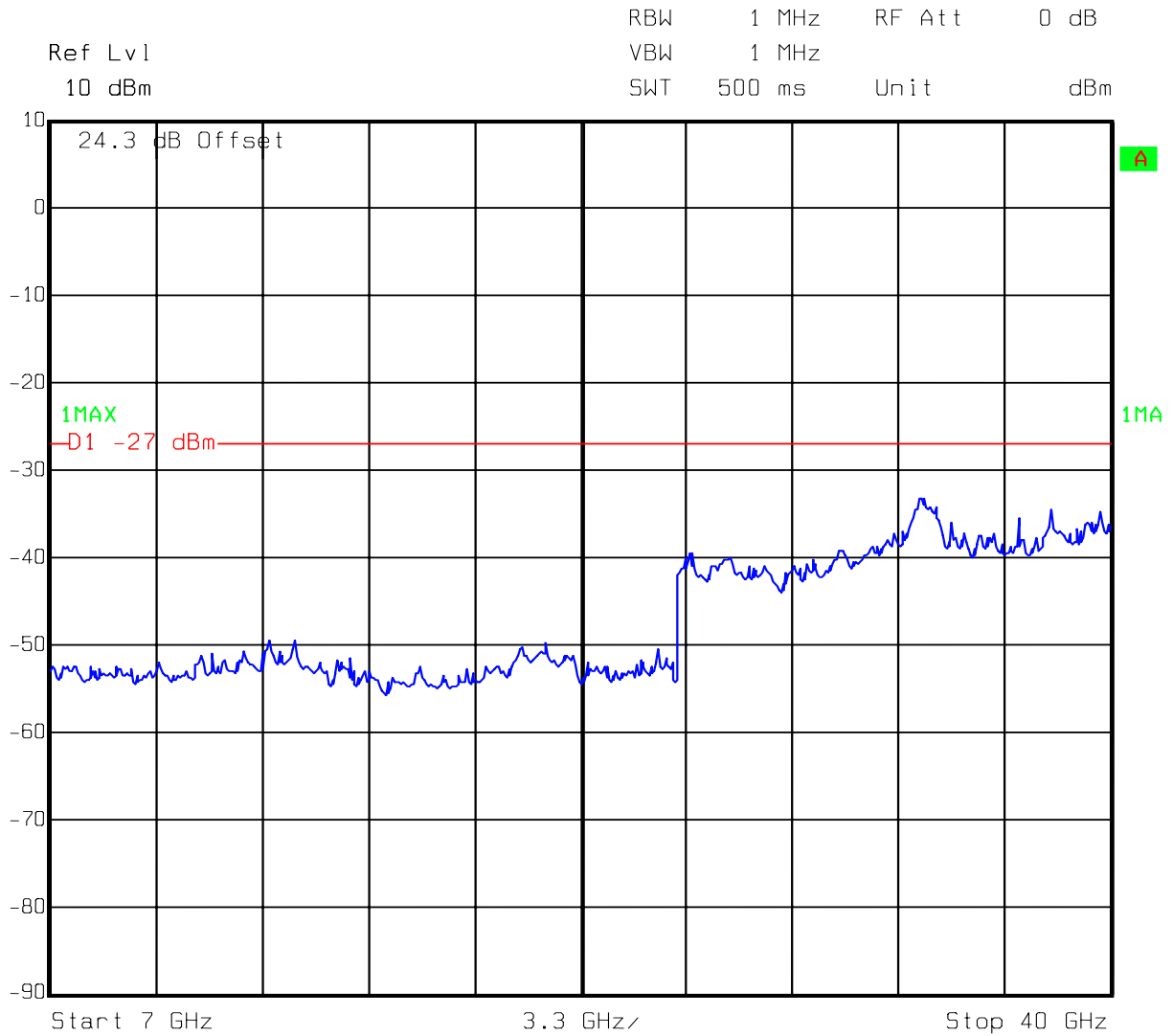
TEST REPORT NO.: 5L0114RUS4Rev1

Test Data – Spurious Emissions (5805 MHz)



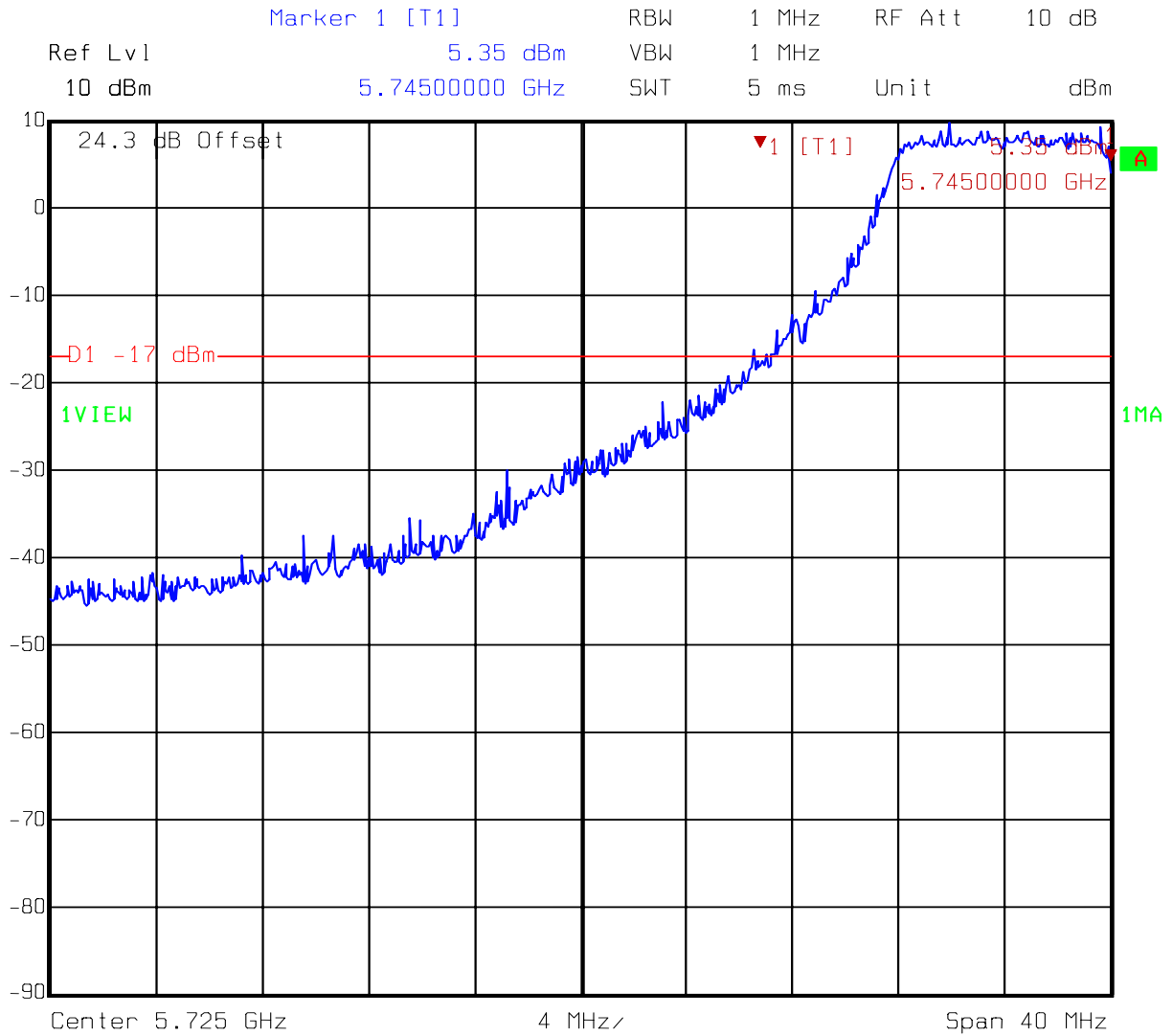
Date: 20.MAY 2005 10:09:48

Test Data – Spurious Emissions (5805 MHz)



Date: 20.MAY 2005 10:07:38

Test Data – Spurious Emissions



Date: 20.MAY 2005 10:11:49

Section 8. Spurious Emissions (radiated)

NAME OF TEST: Spurious Emissions (Radiated)	PARA. NO.: 15.407
TESTED BY: David Light	DATE: 5/12/05

Test Results: Complies.

Measurement Data: Statement:
This transmitter was tested in 802.11a mode and at 5170, 5240, 5260, 5320, 5745, and 5805 MHz. There were no emissions detected above the noise floor. The ambient threshold of sensitivity is sufficient to detect signals within 20 dB of the specification limit. A high-pass filter was used to reject the fundamental transmission.

Test Equipment: 1464-1484-1485-1016-1304-760-759-791

EQUIPMENT: TS01

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Section 9. Peak Power Spectral Density

NAME OF TEST: Peak Power Spectral Density	PARA. NO.: 15.407
TESTED BY: David Light	DATE: 5/11/05

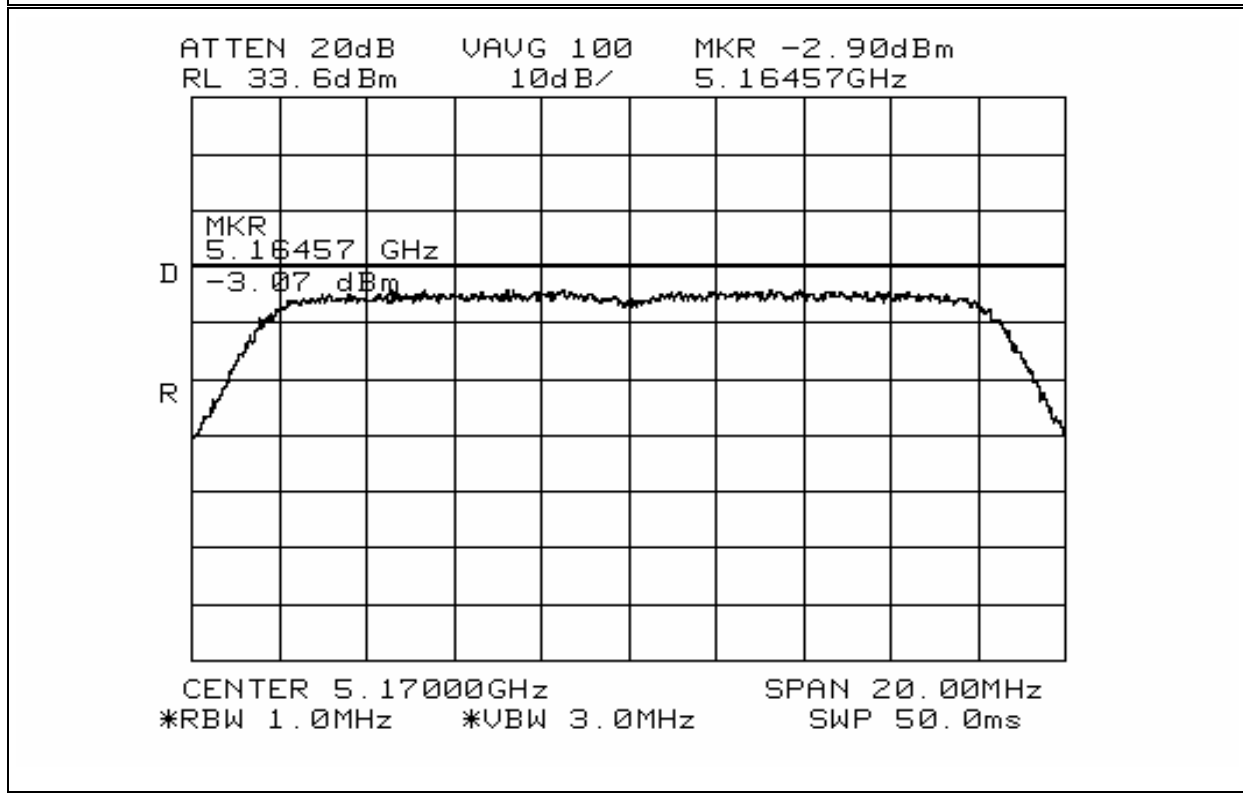
Test Results: Complies.

Measurement Data: See attached data.

EQUIPMENT: TS01

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<u>Data Plot</u>	<u>Peak Power Spectral Density</u>	
Page <u>1</u> of <u>2</u>		Complete <u>X</u>
Job No.: <u>5L0114</u>	Date: <u>5/11/2005</u>	Preliminary: _____
Specification: <u>15.407(a)</u>	Temperature(°C): <u>23</u>	
Tested By: <u>David Light</u>	Relative Humidity(%): <u>45</u>	
E.U.T.: <u>Tablet PC w/Atheros 802.11 a/b/g radio</u>		
Configuration: <u>Tx</u>		
Sample Number: <u>1</u>		
Location: <u>Lab 1</u>	RBW: <u>1 MHz</u>	
Detector Type: <u>Peak</u>	VBW: <u>3 MHz</u>	
<u>Test Equipment Used</u>		
Antenna: _____	Directional Coupler: _____	
Pre-Amp: _____	Cable #1: <u>1973</u>	
Filter: _____	Cable #2: _____	
Receiver: <u>1464</u>	Cable #3: _____	
Attenuator #1: <u>1472</u>	Cable #4: _____	
Attenuator #2: _____	Mixer: _____	
Additional equipment used: _____		
Measurement Uncertainty: <u>+/-1.7 dB</u>		

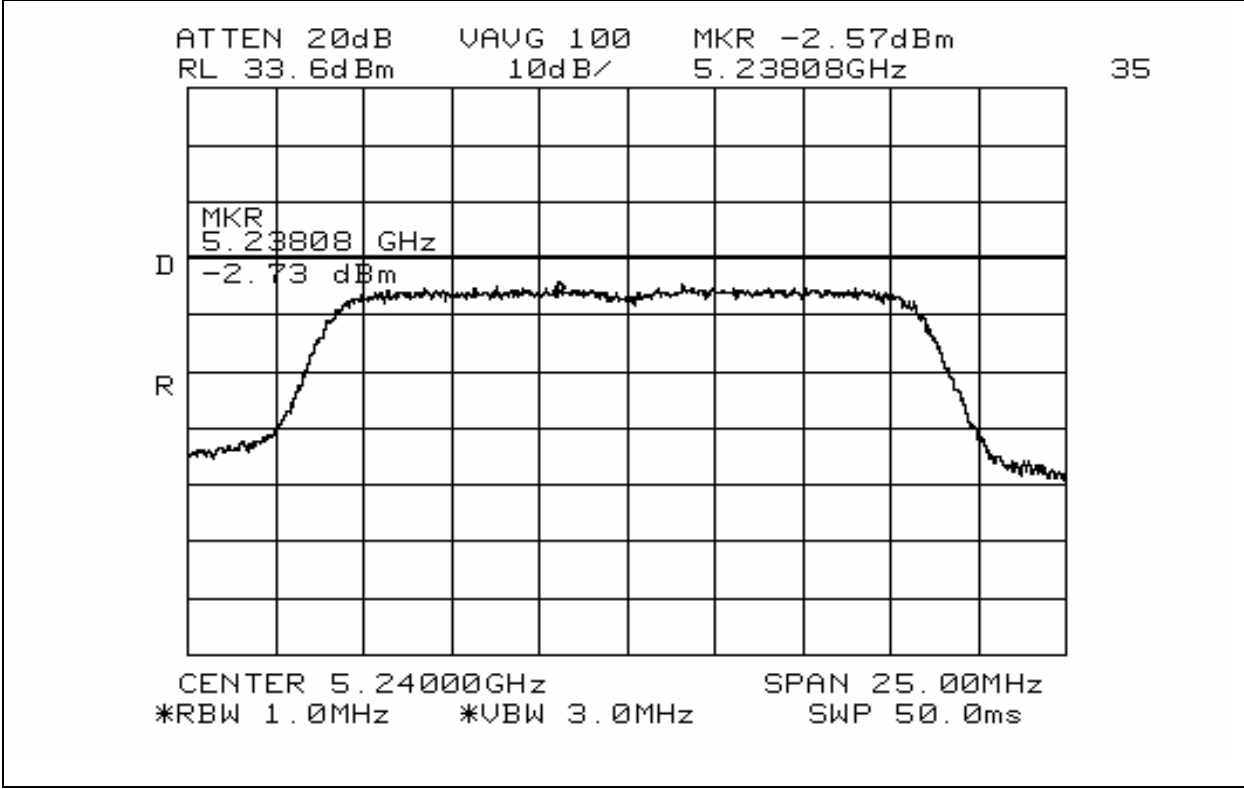


Notes: _____

EQUIPMENT: TS01

TEST REPORT NO.: 5L0114RUS4Rev1

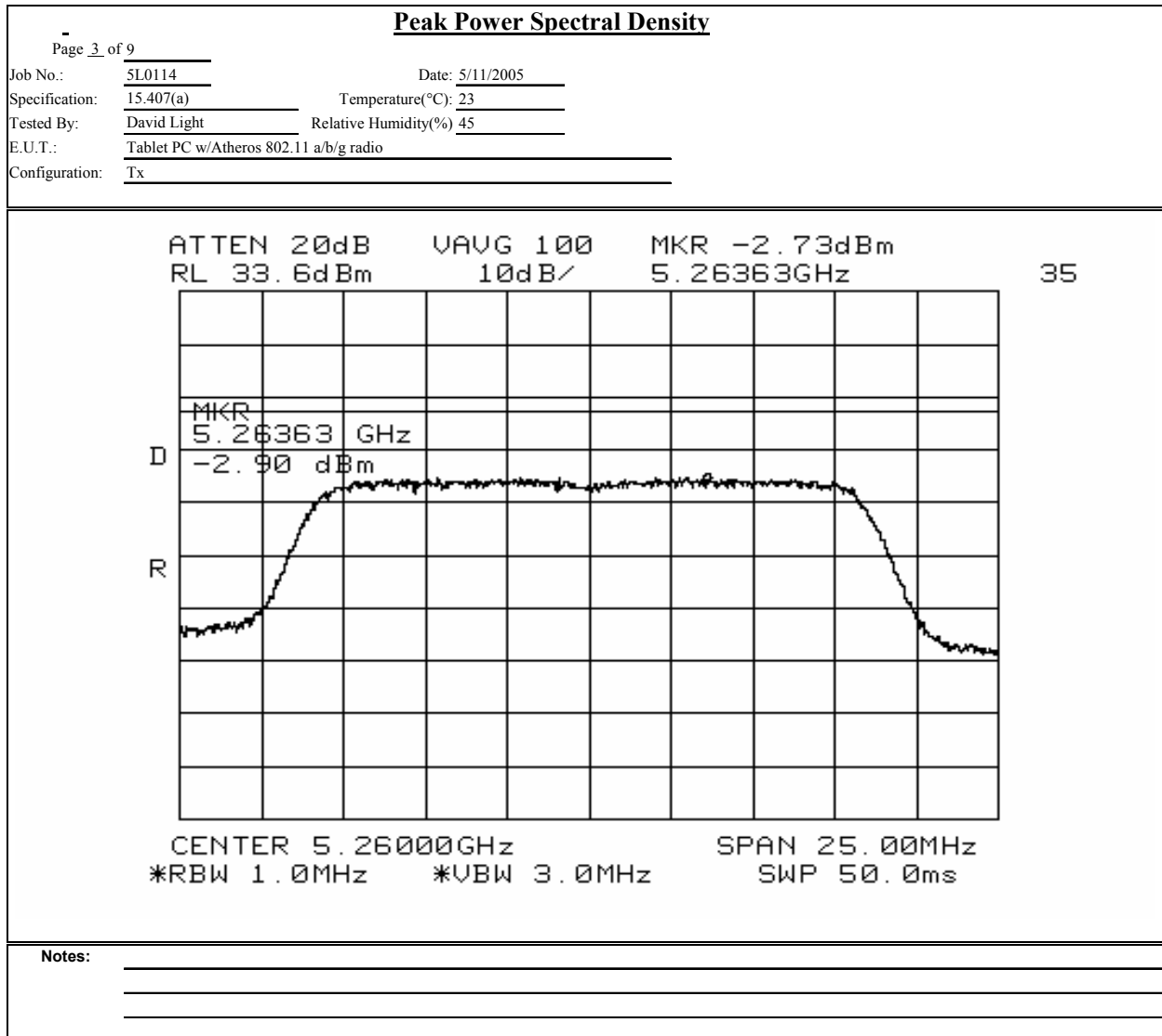
Data Plot	Peak Power Spectral Density
Page 2 of 9	
Job No.: 5L0114	Date: 5/11/2005
Specification: 15.407(a)	Temperature(°C): 23
Tested By: David Light	Relative Humidity(%) 45
E.U.T.: Tablet PC w/Atheros 802.11 a/b/g radio	
Configuration: Tx	



Notes:

EQUIPMENT: TS01

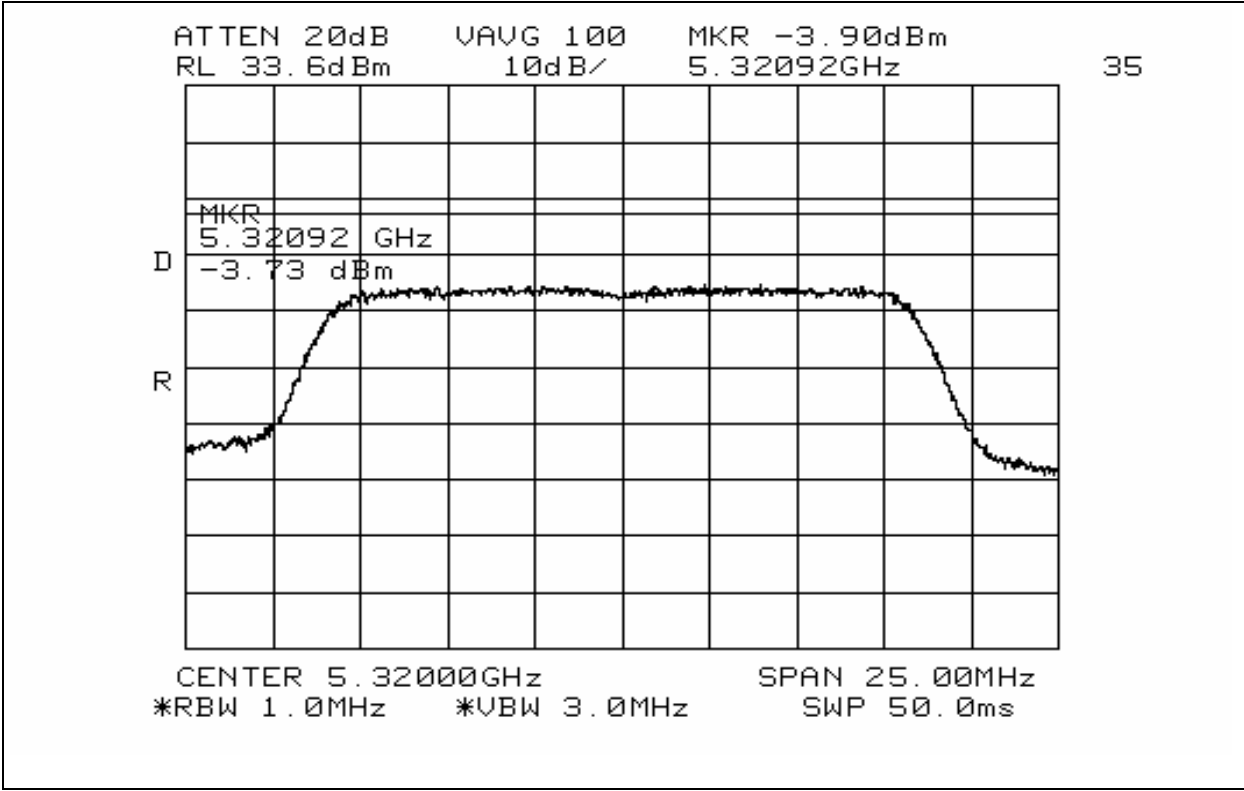
TEST REPORT NO.: 5L0114RUS4Rev1



EQUIPMENT: TS01

TEST REPORT NO.: 5L0114RUS4Rev1

Data Plot	Peak Power Spectral Density
Page 4 of 9	
Job No.: 5L0114	Date: 5/11/2005
Specification: 15.407(a)	Temperature(°C): 23
Tested By: David Light	Relative Humidity(%) 45
E.U.T.: Tablet PC w/Atheros 802.11 a/b/g radio	
Configuration: Tx	



Notes:

EQUIPMENT: TS01

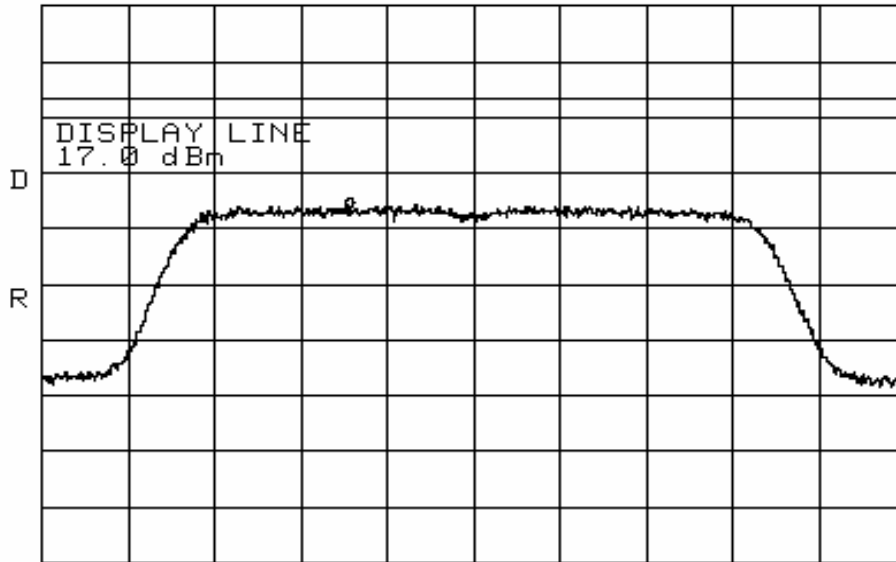
TEST REPORT NO.: 5L0114RUS4Rev1

Data Plot **Peak Power Spectral Density**

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Job No.: 5L0114 Date: 5/11/2005
Specification: 15.407(a) Temperature(°C): 23
Tested By: David Light Relative Humidity(%) 45
E.U.T.: Tablet PC w/Atheros 802.11 a/b/g radio
Configuration: Tx

ATTEN 20dB VAUG 100 MKR -2.73dBm
RL 33.6dBm 10dB/ 5.74142GHz 35



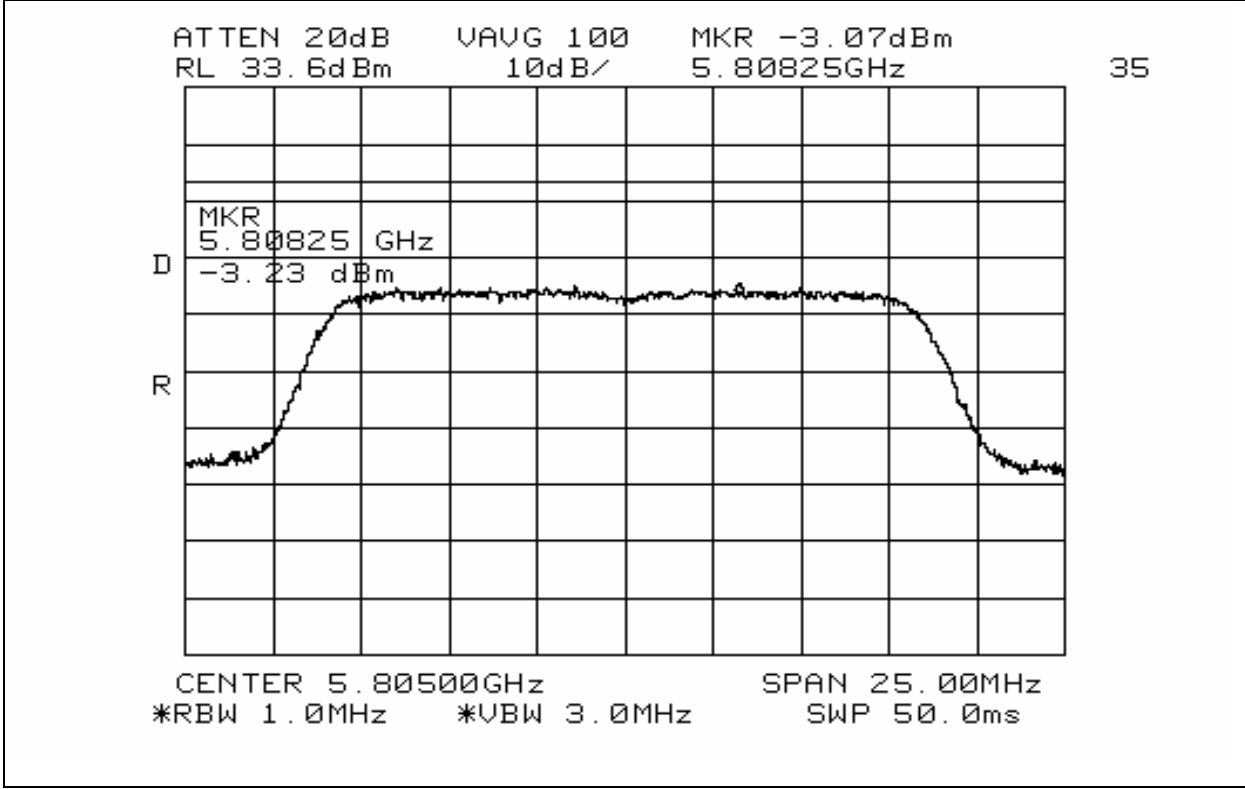
CENTER 5.74500GHz SPAN 25.00MHz
*RBW 1.0MHz *VBW 3.0MHz SWP 50.0ms

Notes:

EQUIPMENT: TS01

TEST REPORT NO.: 5L0114RUS4Rev1

Data Plot	Peak Power Spectral Density
Page 8_of 9	
Job No.: 5L0114	Date: 5/11/2005
Specification: 15.407(a)	Temperature(°C): 23
Tested By: David Light	Relative Humidity(%) 45
E.U.T.: Tablet PC w/Atheros 802.11 a/b/g radio	
Configuration: Tx	



Notes:

EQUIPMENT: TS01

TEST REPORT NO.: 5L0114RUS4Rev1

Section 10. Test Equipment List

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1973	CABLE, 1m	KTL 0	N/A	08/02/04	08/02/05
1472	20db Attenuator DC 18 Ghz	Omni Spectra 20600-20db	NONE	CBU	N/A
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	01/14/05	01/15/07
1484	Cable 2.0-18.0 Ghz	Storm PR90-010-072	N/A	08/26/04	08/26/05
1485	Cable 2.0-18.0 Ghz	Storm PR90-010-216	N/A	08/02/04	08/02/05
1304	HORN ANTENNA	ELECTRO METRICS RGA-60	6151	09/22/03	09/22/05
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	11/12/04	11/12/05
760	Antenna biconical	Electro Metrics MFC-25	477	06/22/04	06/22/05
759	ANTENNA, LOG PERIODIC	A.H. SYSTEMS SAS-200/510	556	07/23/04	07/23/05
791	PREAMP, 25dB	ICC LNA25	398	11/12/04	11/12/05
1081	CABLE 2m	Astrolab 32027-2-29094-72TC	N/A	08/26/04	08/26/05
1036	SPECTRUM ANALYZER	ROHDE & SCHWARZ FSEK30	830844/006	03/22/04	03/23/06
969	lisn	Schwarzbeck 8120	8120281	09/17/04	09/17/05
1547	CABLE .6m	KTL RG223	N/A	06/09/04	06/09/05
1115	CABLE, 4.5m	KTL RG223	N/A	04/27/05	04/27/06
718	HP SPECTRUM ANALYZER	HEWLETT PACKARD 8591EM	3639A00980	04/06/05	04/06/06
966	Receiver	Rohde & Schwartz ESH2	880370/029	09/20/04	09/20/05
1193	LIMITER	FISCHER FCC-450B-1.25N	956	02/24/04	02/24/05
1555	Filter high pass 5KHz	Solar Electronics 7930-5.0	933125	04/20/05	04/20/06

ANNEX A - TEST DETAILS

NAME OF TEST: Powerline Conducted Emissions	PARA. NO.: 15.207(a)
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Minimum Standard: §15.207 Conducted limits.

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 mH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of Conducted Emission (MHz)	Limit (dBmV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

(b) The limit shown in paragraph (a) of this section shall not apply to carrier current systems operating as intentional radiators on frequencies below 30 MHz. In lieu thereof, these carrier current systems shall be subject to the following standards:

(1) For carrier current systems containing their fundamental emission within the frequency band 535-1705 kHz and intended to be received using a standard AM broadcast receiver: no limit on conducted emissions.

(2) For all other carrier current systems: 1000 mV within the frequency band 535-1705 kHz, as measured using a 50 mH/50 ohms LISN.

(3) Carrier current systems operating below 30 MHz are also subject to the radiated emission limits as provided in §15.205 and §§15.209, 15.221, 15.223, 15.225 or 15.227, as appropriate.

(c) Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines. Devices that include, or make provision for, the use of battery chargers which permit operating while charging, AC adaptors or battery eliminators or that connect to the AC power lines indirectly, obtaining their power through another device which is connected to the AC power lines, shall be tested to demonstrate compliance with the conducted limits.

EQUIPMENT: TS01

TEST REPORT NO.: 5L0114RUS4Rev1

NAME OF TEST: Occupied Bandwidth

PARA. NO.: 15.247(a)(2)

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

NAME OF TEST: Maximum Peak Output Power	PARA. NO.: 15.247(b)(1)
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Minimum Standard: The maximum peak output power shall not exceed 1 watt.

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

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

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

Direct Measurement Method For Detachable Antennas:

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

Substitution Antenna Method for Integral Antennas:

The peak field strength of the carrier is measured in a worst-case configuration with a RBW > 5 times the occupied bandwidth of the transmitted waveform. For cases where the RBW of the test instrument is not sufficient, the power is measured using a peak power meter instead of the spectrum analyzer.

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

Number of channels tested:

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

EQUIPMENT: TS01

TEST REPORT NO.: 5L0114RUS4Rev1

NAME OF TEST: Channel Separation

PARA. NO.: 15.247(a)(1)

Minimum Standard:

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

NAME OF TEST: Pseudorandom Hopping Algorithm

PARA. NO.: 15.247(a)(1)

Minimum Standard:

The system shall hop to channel frequencies that are selected from a pseudo-randomly ordered list of hopping frequencies. Each frequency must be used equally on average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their transmitters and shall shift frequencies in synchronization with the transmitted signals.

NAME OF TEST: Time of Occupancy	PARA. NO.: 15.247(a)(1)(ii)
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Minimum Standard:

Frequency Band (MHz)	20 dB Bandwidth	No. of Hopping Channels	Average Time of Occupancy
902 - 928	<250 kHz	50	=<0.4 sec. in 20 sec.
902 – 928	=>250 kHz	25	=<0.4 sec. in 10 sec.
2400 – 2483.5	-----	75	=<0.4 sec. in 30 sec.
5725 – 5850	-----	75	=<0.4 sec. in 30 sec.

Method Of Measurement:

The spectrum analyzer is set as follows:

- RBW: 1 MHz
- VBW: = RBW
- Span: 0 Hz
- LOG dB/div.: 10 dB
- Sweep: Sufficient to see one hop time sequence.
- Trigger: Video

The occupancy time of one hop is measured as above. The average time of occupancy is calculated over the appropriate period of time from above table (10, 20, or 30 seconds).

Avg. time of occupancy = (period from table/duration of one hop)/no. of channels multiplied by the duration of one hop.

For instance:

If a 2.4 GHz system has a measured hop duration time of 1 msec. and uses 75 channels, then the average time of occupancy would be:

$$(30 \text{ sec.} / .001 \text{ sec.}) / 75 \text{ chan.} = 400 \times 1 \text{ msec.} = 400 \text{ msec. or } 0.4 \text{ sec. in } 30 \text{ sec.}$$

EQUIPMENT: TS01

TEST REPORT NO.: 5L0114RUS4Rev1

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 15.247(a)(2)
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Minimum Standard:

Frequency Band (MHz)	Maximum 20 dB Bandwidth
902 - 928	500 kHz
2400 – 2483.5	1 MHz
5725 – 5850	1 MHz

Method Of Measurement:

The spectrum analyzer is set as follows:

RBW: At least 1% of span/div.

VBW: >RBW

Span: Sufficient to display 20 dB bandwidth

LOG dB/div.: 10 dB

Sweep: Auto

Number of channels tested:

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

EQUIPMENT: TS01

TEST REPORT NO.: 5L0114RUS4Rev1

NAME OF TEST: RF Exposure

PARA. NO.: 15.247(b)(4)

Minimum Standard:

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

NAME OF TEST: Spurious Emissions(conducted)	PARA. NO.: 15.247(c)
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Minimum Standard: In any 100kHz bandwidth outside the frequency band in which the transmitter is operating, emissions shall be at least 20 dB below the fundamental emission or shall not exceed the following field strength limits. Emissions falling in the restricted bands of 15.205 shall not exceed the following field strength limits:

Frequency (MHz)	Field Strength ($\mu\text{V/m @ 3m}$)	Field Strength (dB @ 3m)
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
Above 960	500	54.0

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

Method Of Measurement:

30 MHz - 10th harmonic plot

RBW: 100 kHz
 VBW: 300 kHz
 Sweep: Auto
 Display line: -20 dBc

Lower Band Edge

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

Upper Band Edge

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

Number of channels tested:

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

EQUIPMENT: TS01

TEST REPORT NO.: 5L0114RUS4Rev1

NAME OF TEST: Radiated Spurious Emissions

PARA. NO.: 15.247(c)

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

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

Frequency (MHz)	Field Strength (µV/m @ 3m)	Field Strength (dB @ 3m)
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
Above 960	500	54.0

THE SPECTRUM WAS SEARCHED TO THE 10th HARMONIC

15.205 Restricted Bands

MHz	MHz	MHz	GHz
0.09-0.11	16.42-16.423	399.9-410	4.5-5.25
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.125-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2655-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	Above 38.6
13.36-13.41	1718		

Number of channels tested:

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

NAME OF TEST: Transmitter Power Density	PARA. NO.: 15.247(d)
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Minimum Standard: The transmitted power density averaged over any 1 second interval shall not be greater than +8 dBm in any 3 kHz bandwidth.

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

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

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

For Devices With Integral Antenna:

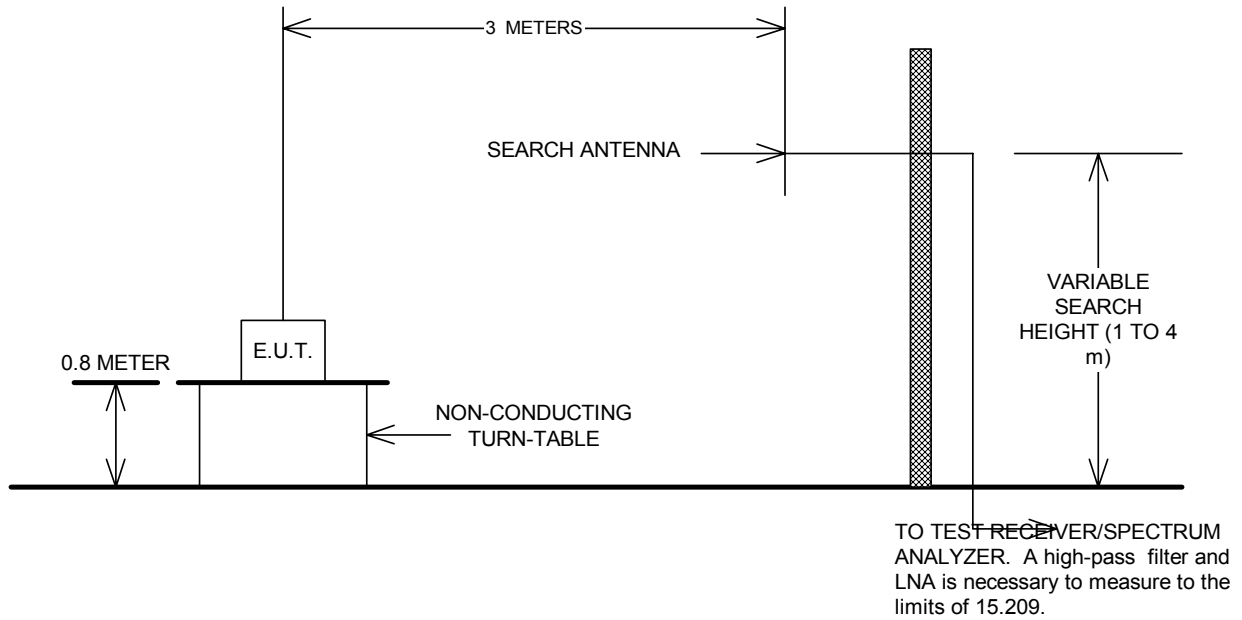
For devices with non-detachable antennas, the received field strength is peaked and the spectrum analyzer is set as above. The peak emission level is then measured and converted to a field strength by adding the appropriate antenna factor and cable loss. This field strength is then converted to an equivalent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

Number of channels tested:

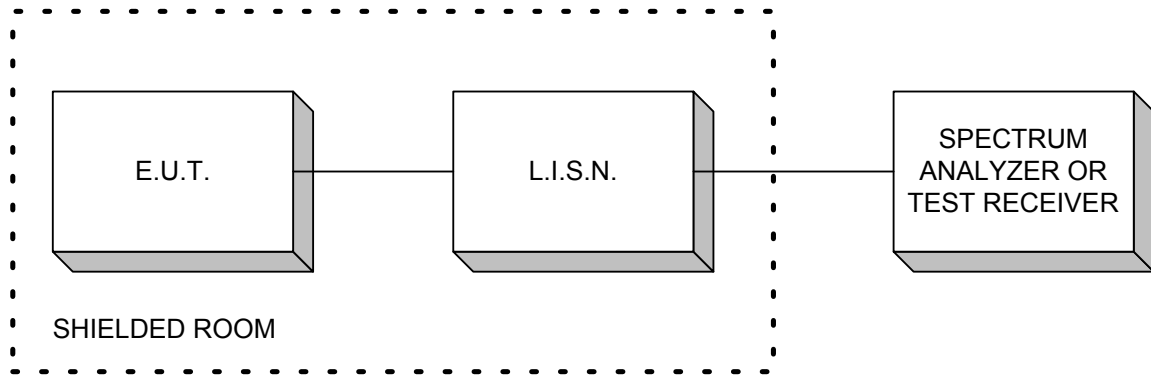
Tuning Range	Number Of Channels Tested	Channel Location In Band
1 MHz or Less	1	Middle
1 to 10 MHz	2	Top And Bottom
More Than 10 MHz	3	Top, Middle, Bottom

ANNEX B - TEST DIAGRAMS

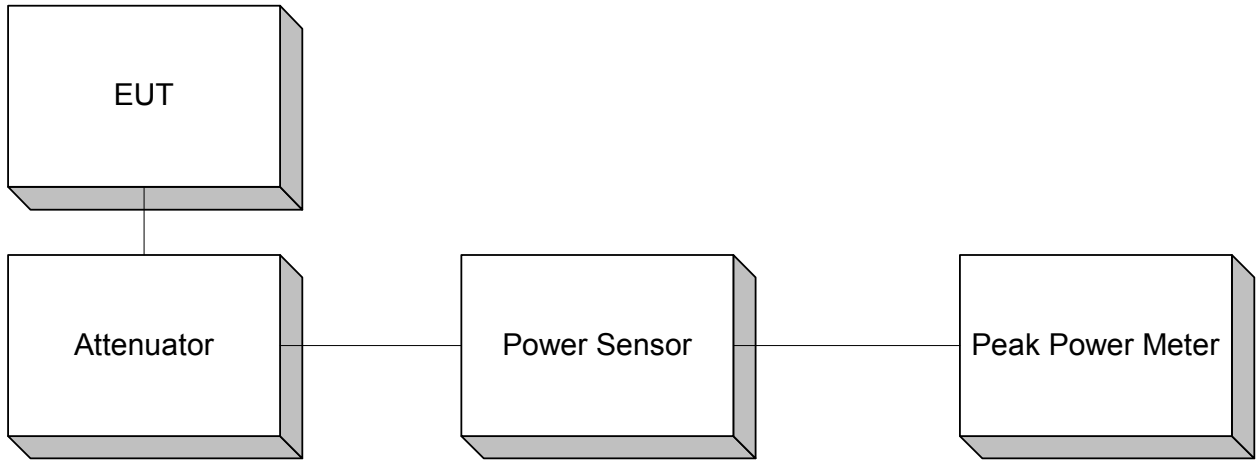
Test Site For Radiated Emissions



Conducted Emissions



Peak Power At Antenna Terminals



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

