5.4 PEAK POWER EXCURSION MEASUREMENT

5.4.1 LIMITS OF PEAK POWER EXCURSION MEASUREMENT

Frequency Band	Limit
5.15 – 5.25 GHz	13dB
5.25 – 5.35 GHz	13dB
5.725 – 5.825 GHz	13dB

5.4.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP30	100019	Dec. 19, 2003

NOTE:
The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

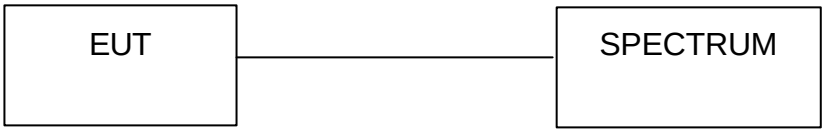
5.4.3 TEST PROCEDURE

1. The transmitter output was connected to the spectrum analyzer.
2. Set the spectrum bandwidth span to view the entire spectrum.
3. Using peak detector and Max-hold function for Trace 1 (RB=1MHz, VB=3MHz) and 2 (RB=1MHz, VB=30KHz).
4. The largest difference between Trace 1 and Trace 2 in any 1MHz band on any frequency was recorded.

5.4.4 DEVIATION FROM TEST STANDARD

No deviation

5.4.5 TEST SETUP



5.4.6 EUT OPERATING CONDITIONS

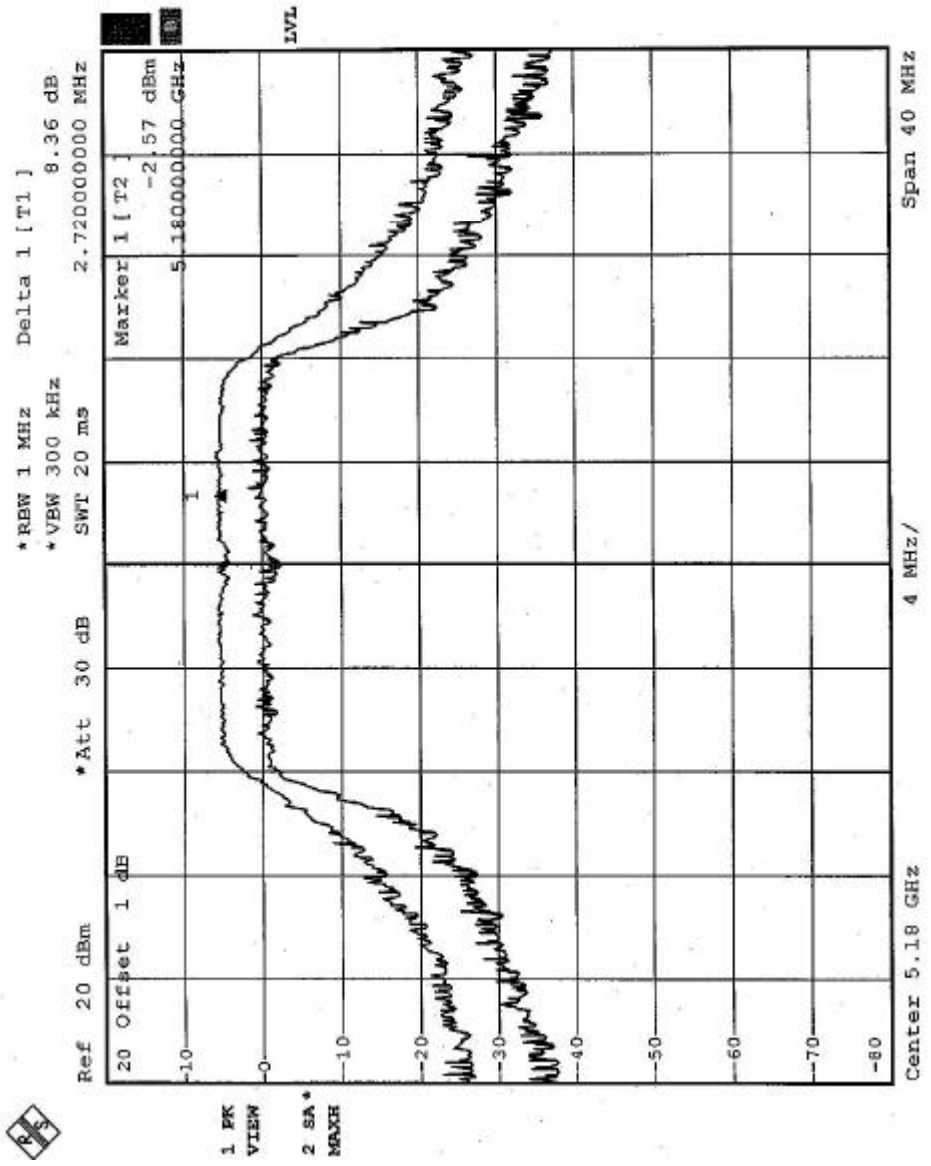
The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.

5.4.7 TEST RESULTS

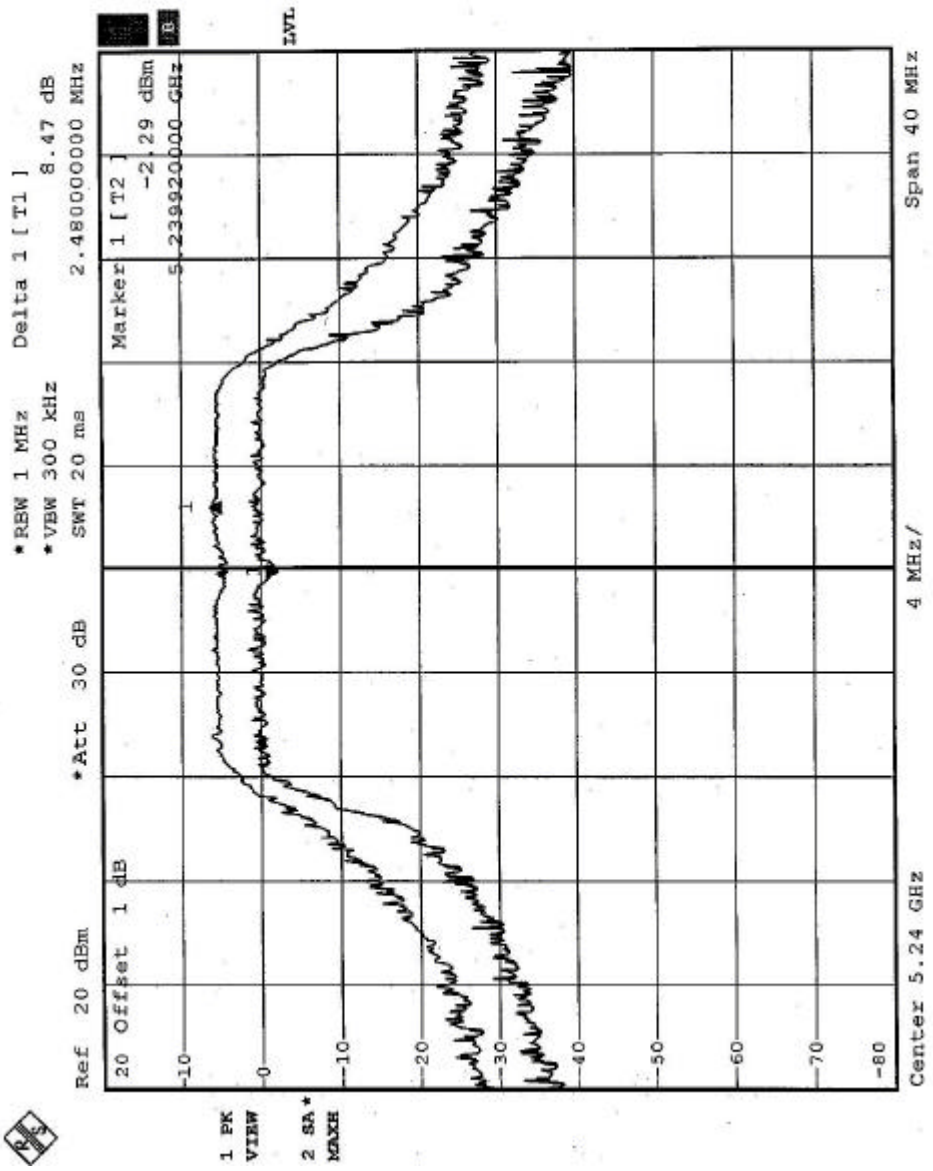
EUT	Wireless miniPCI 802.11 a/g/b adapter	**MODEL**	WN6401C
MODE	Normal	**INPUT POWER (SYSTEM)**	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	21eg. C, 58RH, 966 hPa	**TESTED BY**	Eric Lee

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)	PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS/FAIL
1	5180	8.36	13	PASS
4	5240	8.47	13	PASS
5	5260	8.44	13	PASS
8	5320	7.76	13	PASS

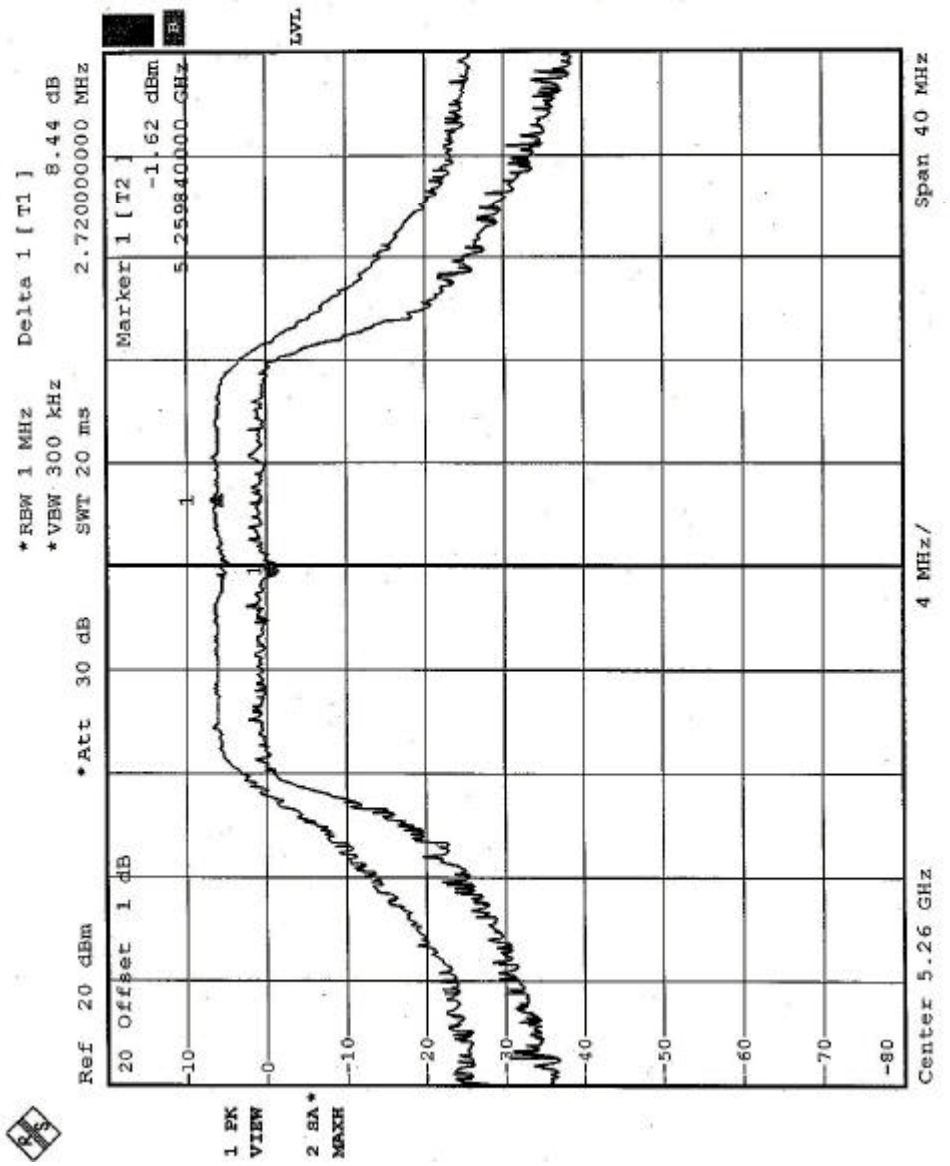
CHANNEL 1


*RBW 1 MHz
*VBW 300 kHz
SWT 20 ms
Delta 1 [T1]
8.36 dB
2.720000000 MHz
Marker 1 [T2]
-2.57 dBm
5.180000000 GHz
Ref 20 dBm
20 Offset 1 dB
*Att 30 dB
LVL
Span 40 MHz
4 MHz/
Center 5.18 GHz
1 PK VIEW
2 SA * MAXH

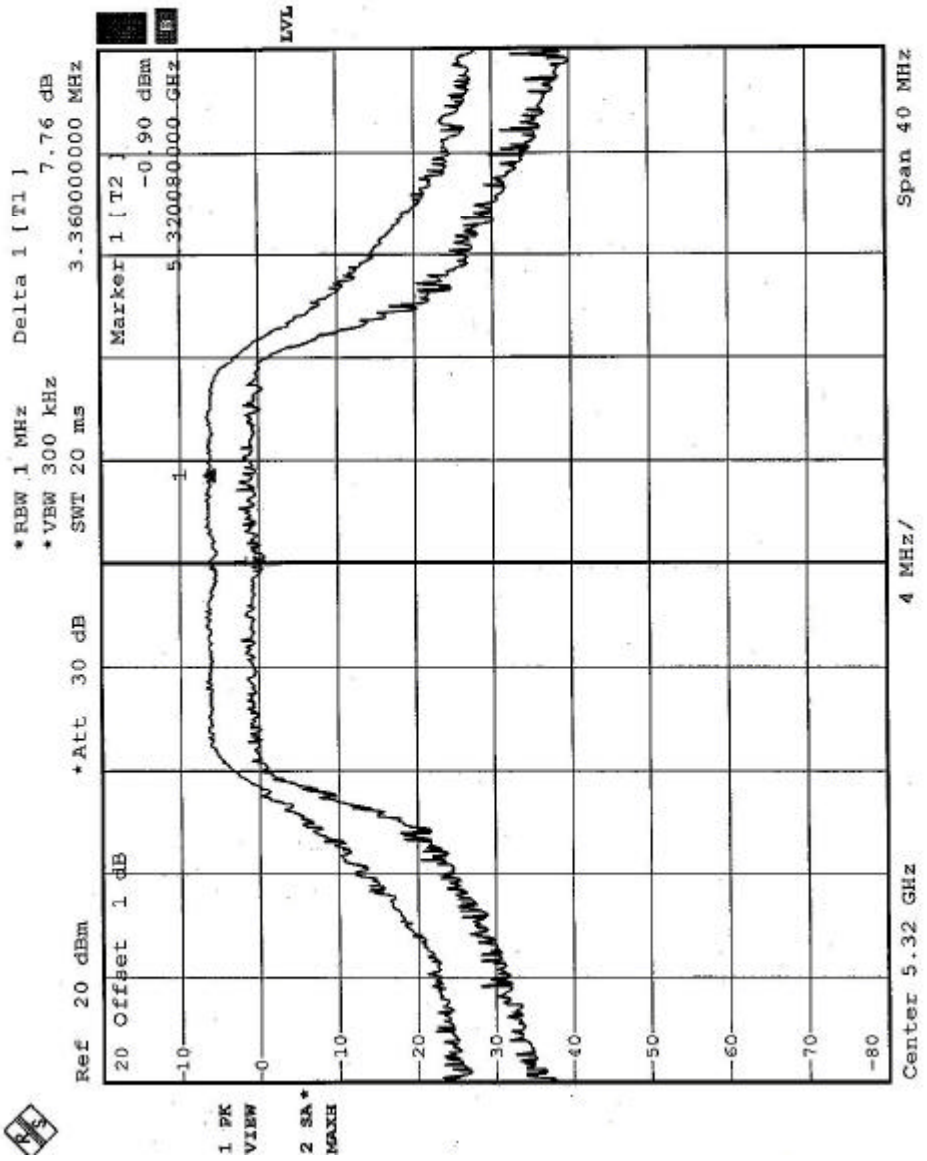
CHANNEL 4


Ref 20 dBm
20 Offset 1 dB
*Att 30 dB
*RBW 1 MHz
*VBW 300 kHz
SWT 20 ms
Delta 1 [T1]
8.47 dB
2.48000000 MHz
Marker 1 [T2]
-2.29 dBm
5.23920000 GHz
1 PK
VIEW
2 SA *
MAXH
Center 5.24 GHz
4 MHz/
Span 40 MHz

CHANNEL 5


*RBW 1 MHz
*VBW 300 kHz
SWT 20 ms
Delta 1 [T1]
8.44 dB
2.72000000 MHz
Marker 1 [T2]
-1.62 dBm
5.25984000 GHz
Ref 20 dBm
20 Offset 1 dB
*Att 30 dB
Center 5.26 GHz
4 MHz/
Span 40 MHz
1 PK
VIEW
2 SA*
MAXH

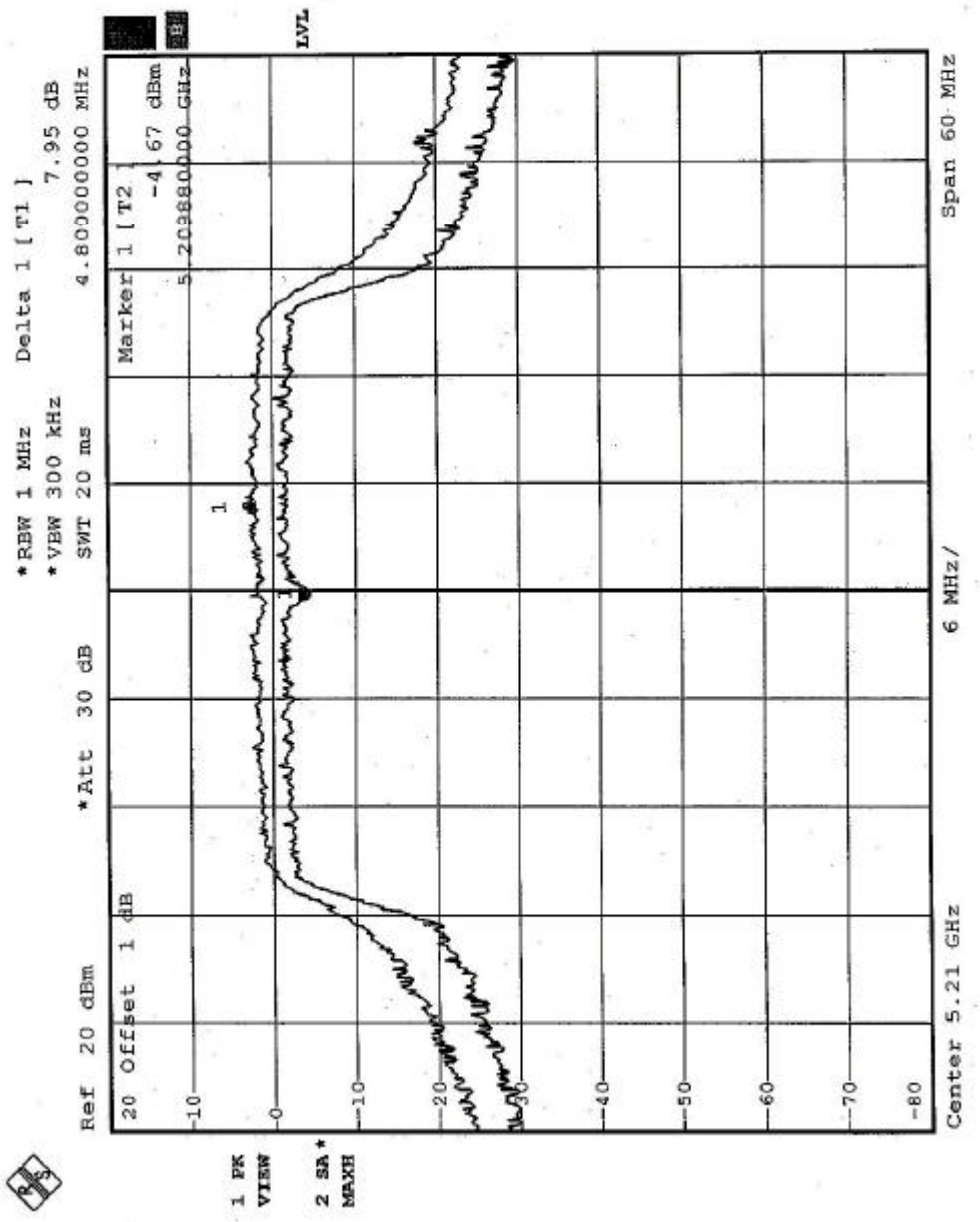
CHANNEL 8


RBW 1 MHz
VBW 300 kHz
SWT 20 ms
Att 30 dB
Offset 1 dB
Ref 20 dBm
Delta 1 [T1]
7.76 dB
3.36000000 MHz
Marker 1 [T2]
-0.90 dBm
5.32080000 GHz
LVL
Span 40 MHz
4 MHz/
Center 5.32 GHz
1 PK VIEW
2 SA MAXH

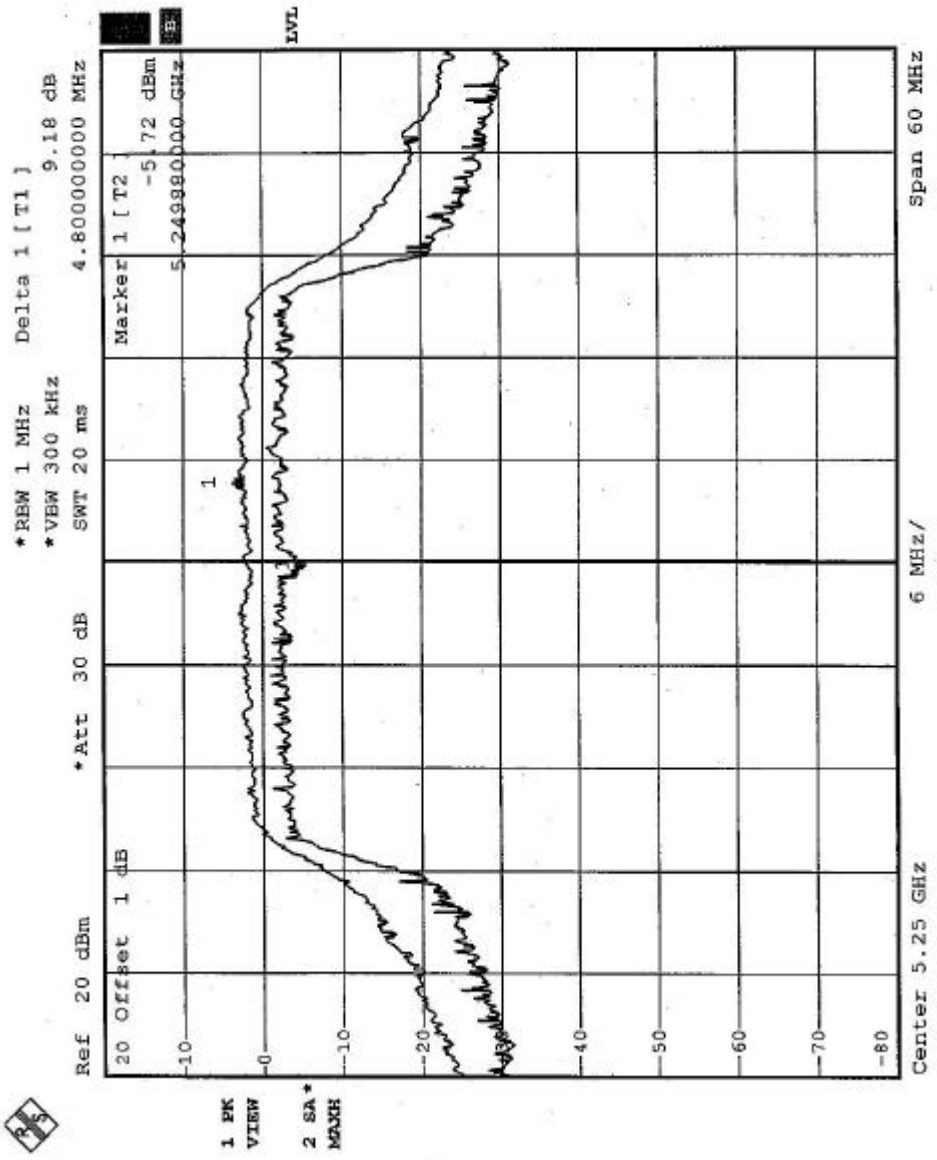
EUT	Wireless miniPCI 802.11 a/g/b adapter	**MODEL**	WN6401C
MODE	Turbo	**INPUT POWER (SYSTEM)**	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	21eg. C, 58RH, 966 hPa	**TESTED BY**	Eric Lee

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)	PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS/FAIL
1	5210	7.95	13	PASS
2	5250	9.18	13	PASS
3	5290	9.00	13	PASS

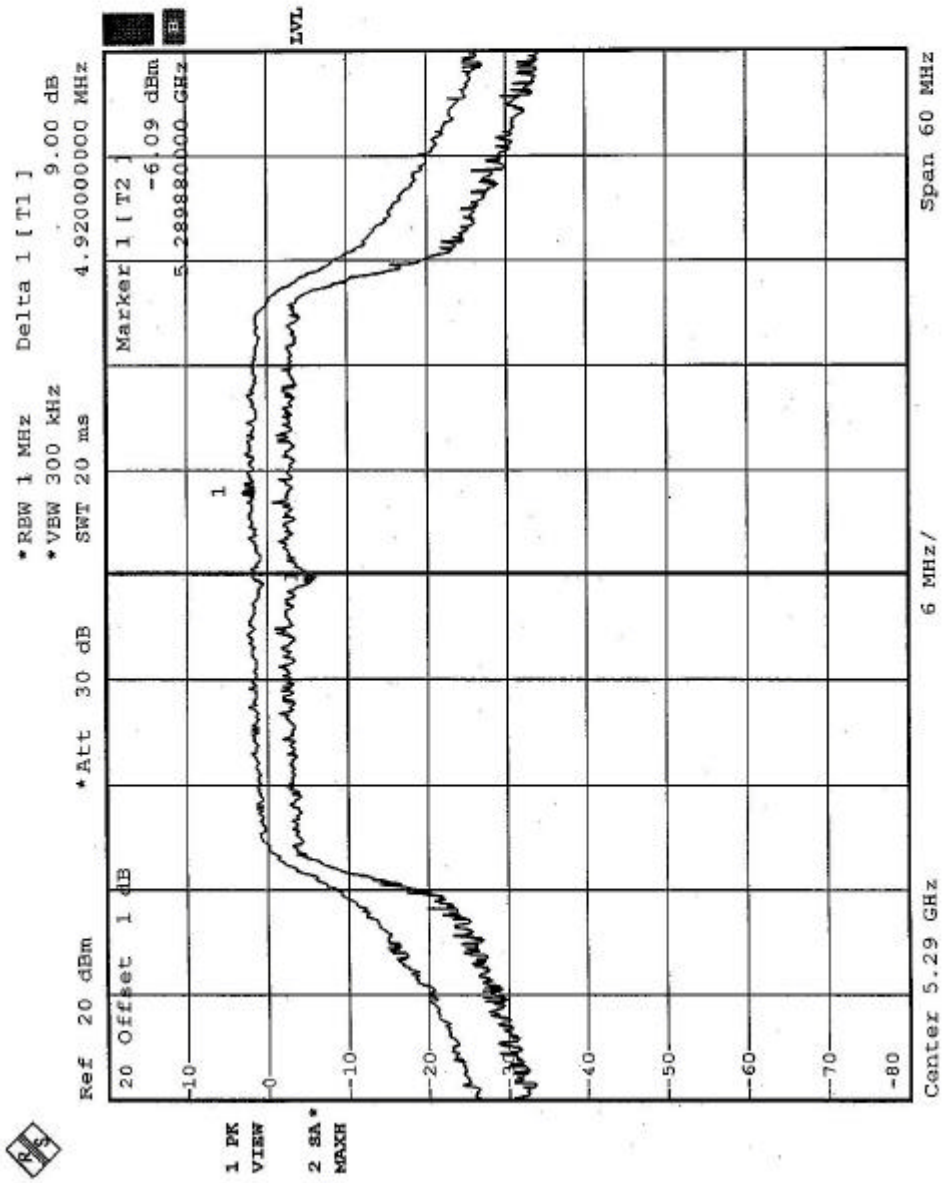
CHANNEL 1


*RBW 1 MHz
*VBW 300 kHz
SWT 20 ms
Delta 1 [T1]
7.95 dB
4.80000000 MHz
Marker 1 [T2]
-4.67 dBm
5.20880000 GHz
Ref 20 dBm
20 Offset 1 dB
*Att 30 dB
LVL
Span 60 MHz
6 MHz/
Center 5.21 GHz
1 PK
VIEW
2 SA *
MAXH

CHANNEL 2


RBW 1 MHz
VBW 300 kHz
SWT 20 ms
Delta 1 [T1]
9.18 dB
4.80000000 MHz
Marker 1 [T2]
-5.72 dBm
5.24980000 GHz
Ref 20 dBm
20 Offset 1 dB
Att 30 dB
Center 5.25 GHz
6 MHz/
Span 60 MHz
1 PK VIEW
2 SA MAXH
LVL

CHANNEL 3


RBW 1 MHz
VBW 300 kHz
SWT 20 ms
Att 30 dB
Ref 20 dBm
Offset 1 dB
Delta 1 [T1]
9.00 dB
4.92000000 MHz
Marker 1 [T2]
-6.09 dBm
5.28980000 GHz
Center 5.29 GHz
6 MHz/
Span 60 MHz
1 PK VIEW
2 SA MAXH

5.5 PEAK POWER SPECTRAL DENSITY MEASUREMENT

5.5.1 LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT

Frequency Band	Limit
5.15 – 5.25 GHz	4dBm
5.25 – 5.35 GHz	11dBm
5.725 – 5.825 GHz	17dBm

5.5.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP30	100019	Dec. 19, 2003

NOTE:
The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

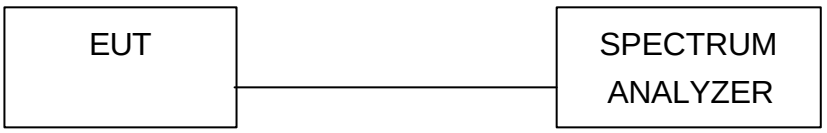
5.5.3 TEST PROCEDURES

1. The transmitter output was connected to the spectrum analyzer.
2. Set RBW=1MHz, VBW=3MHz. The PPSD is the highest level found across the emission in any 1MHz band.

5.5.4 DEVIATION FROM TEST STANDARD

No deviation

5.5.5 TEST SETUP



5.5.6 EUT OPERATING CONDITIONS

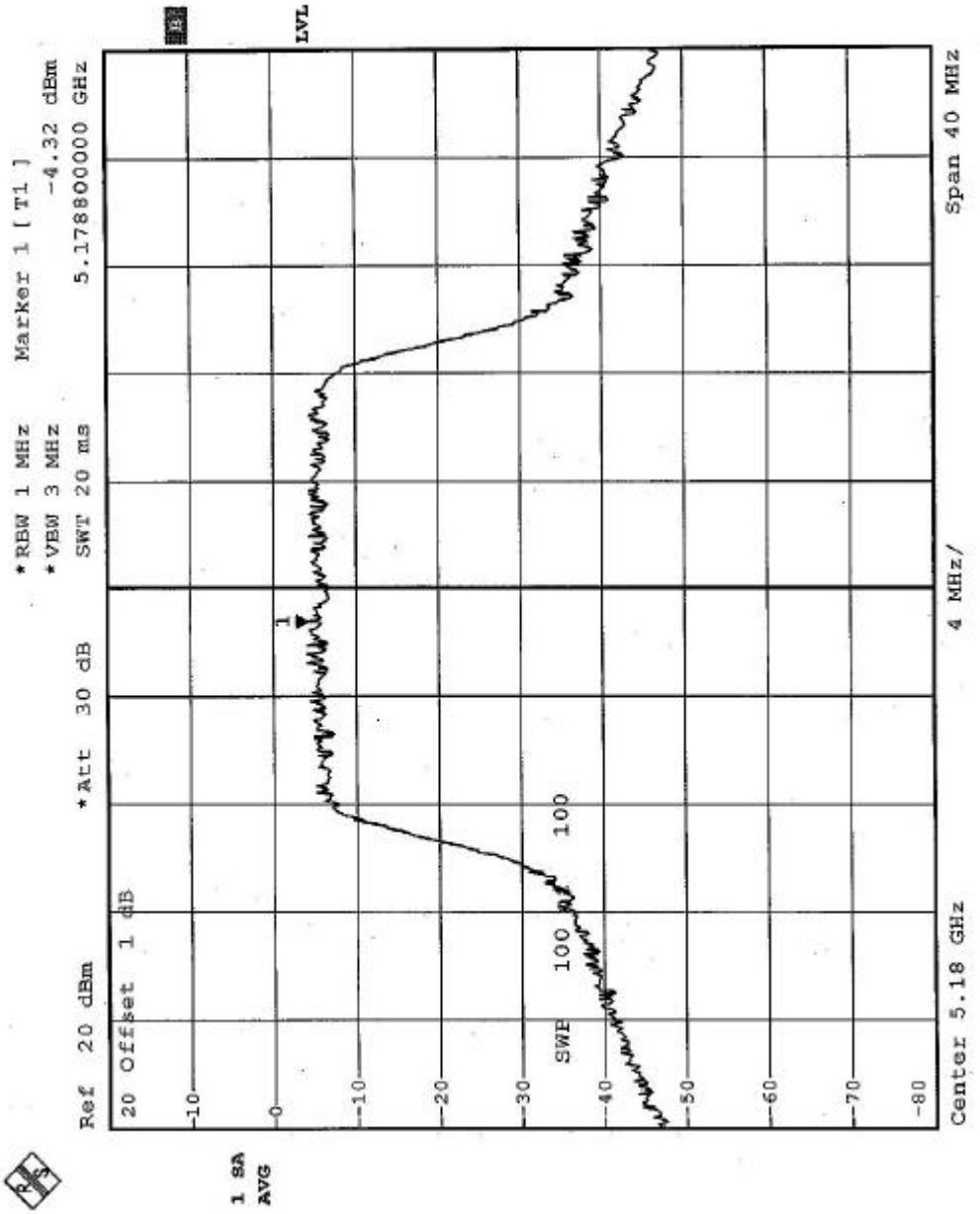
Same as 5.3.6

5.5.7 TEST RESULTS

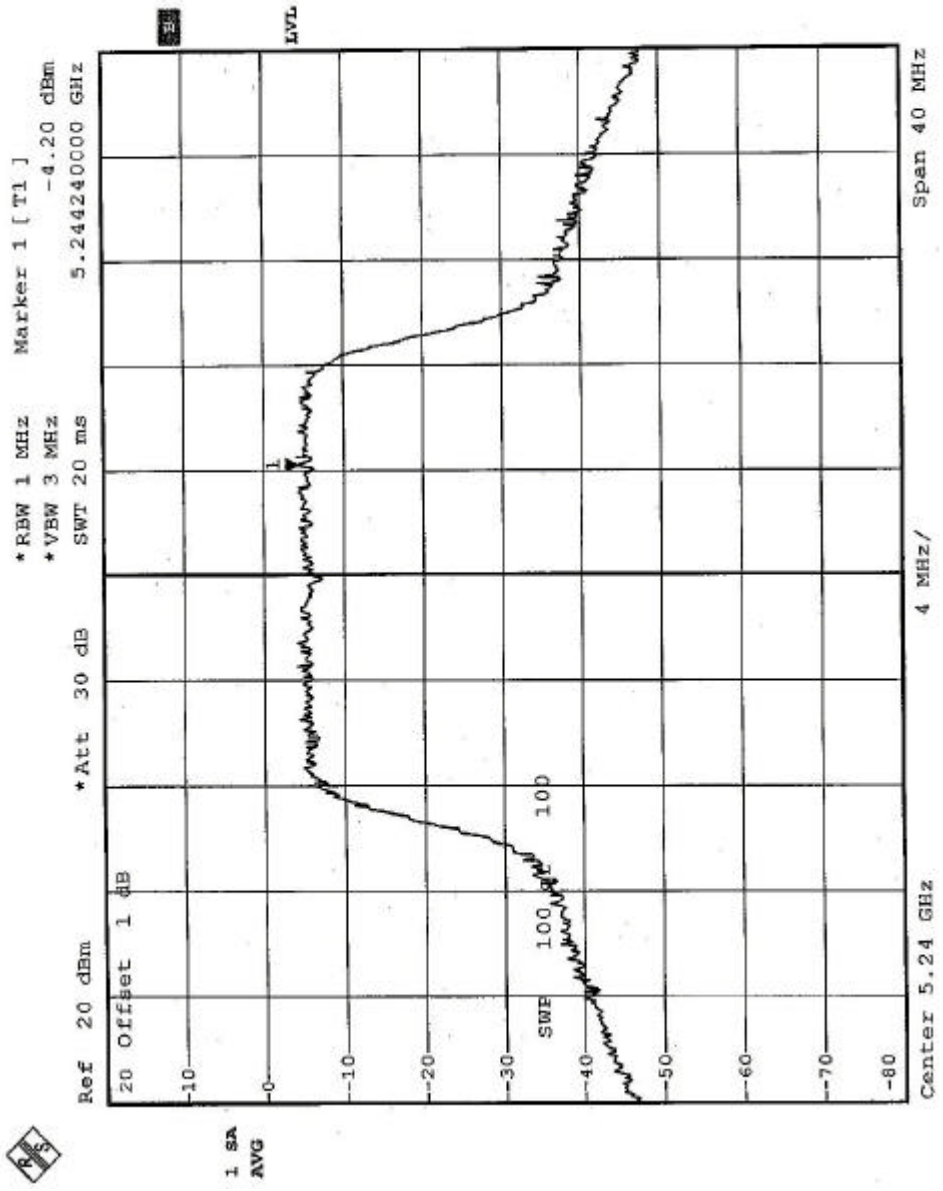
EUT	Wireless miniPCI 802.11 a/g/b adapter	**MODEL**	WN6401C
MODE	Normal	**INPUT POWER (SYSTEM)**	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	21eg. C, 58RH, 966 hPa	**TESTED BY**	Eric Lee

CHANNEL NUMBER	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 1 MHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	5180	-4.32	4	PASS
4	5240	-4.20	4	PASS
5	5260	-2.88	11	PASS
8	5320	-3.75	11	PASS

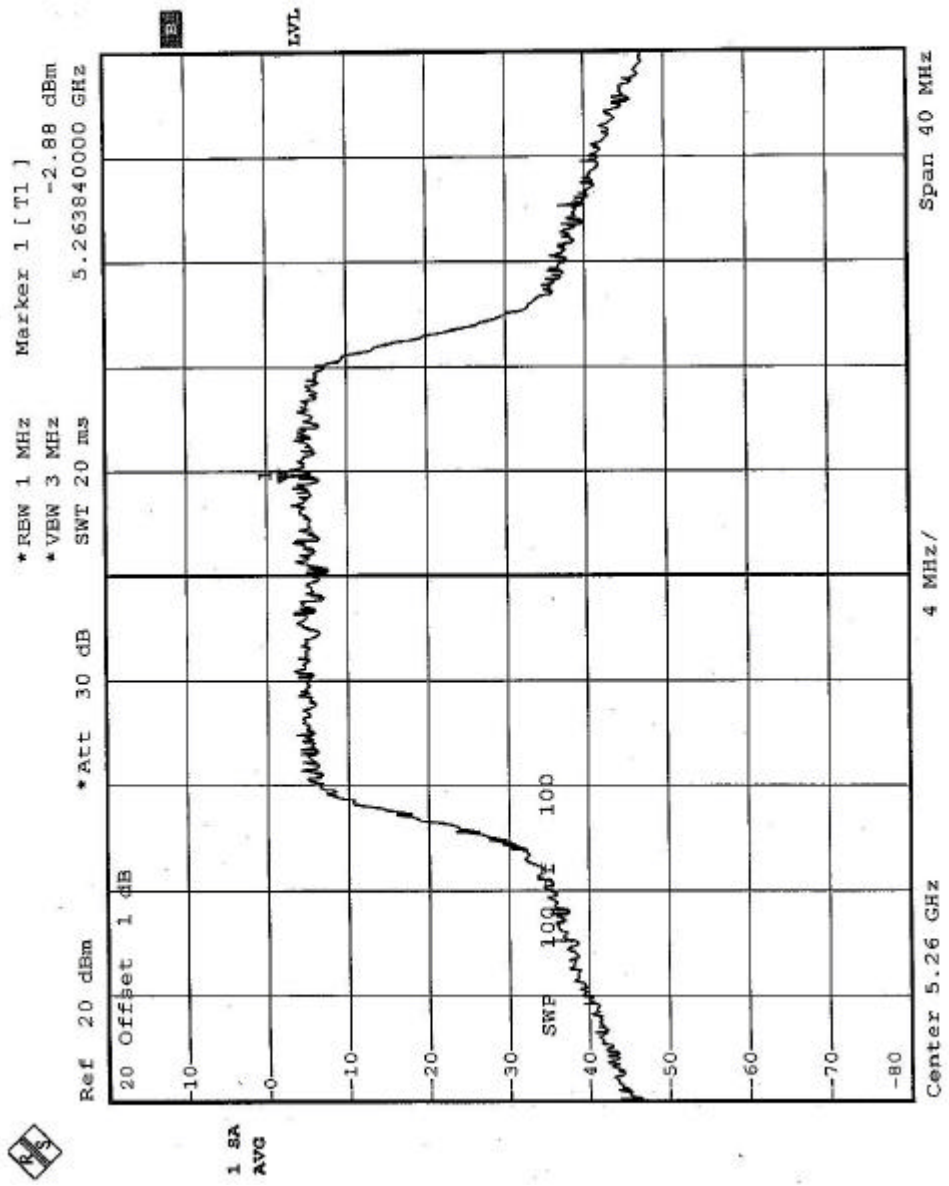
CHANNEL 1


Ref 20 dBm
20 Offset 1 dB
*Att 30 dB
*RBW 1 MHz
*VBW 3 MHz
SWT 20 ms
Marker 1 [T1]
-4.32 dBm
5.17880000 GHz
LVL
1 SA
AVG
SWP 100 100
Center 5.18 GHz
4 MHz/
Span 40 MHz

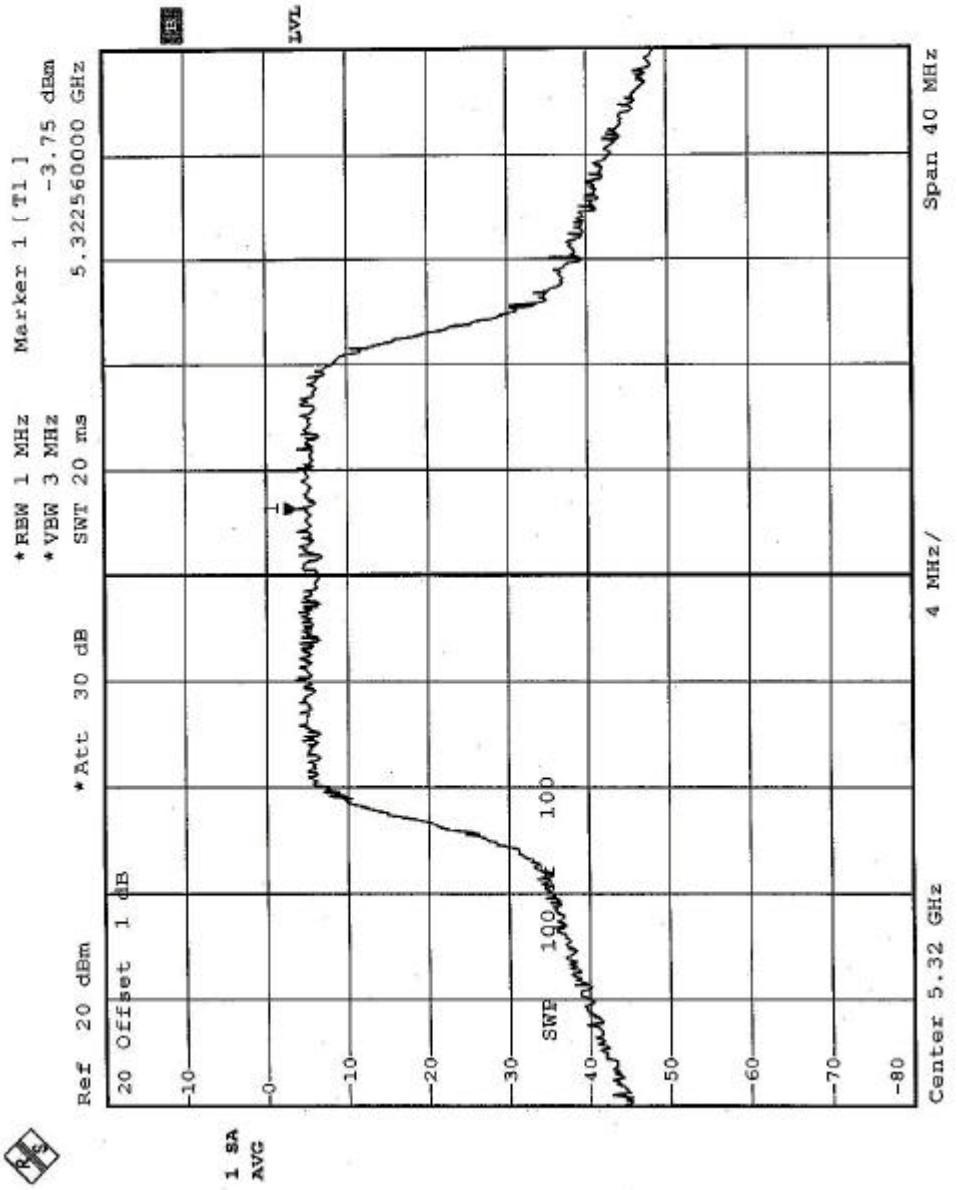
CHANNEL 4


Marker 1 [T1]
-4.20 dBm
5.244240000 GHz
*RBW 1 MHz
*VBW 3 MHz
SWT 20 ms
*Att 30 dB
Ref 20 dBm
Offset 1 dB
Span 40 MHz
4 MHz/
Center 5.24 GHz
1 SA
AVG

CHANNEL 5


Ref 20 dBm
20 Offset 1 dB
*Att 30 dB
*RBW 1 MHz
*VBW 3 MHz
SWT 20 ms
Marker 1 [T1]
-2.88 dBm
5.263840000 GHz
LVL
Span 40 MHz
4 MHz/
Center 5.26 GHz
SWP 100
1 SA
AVG

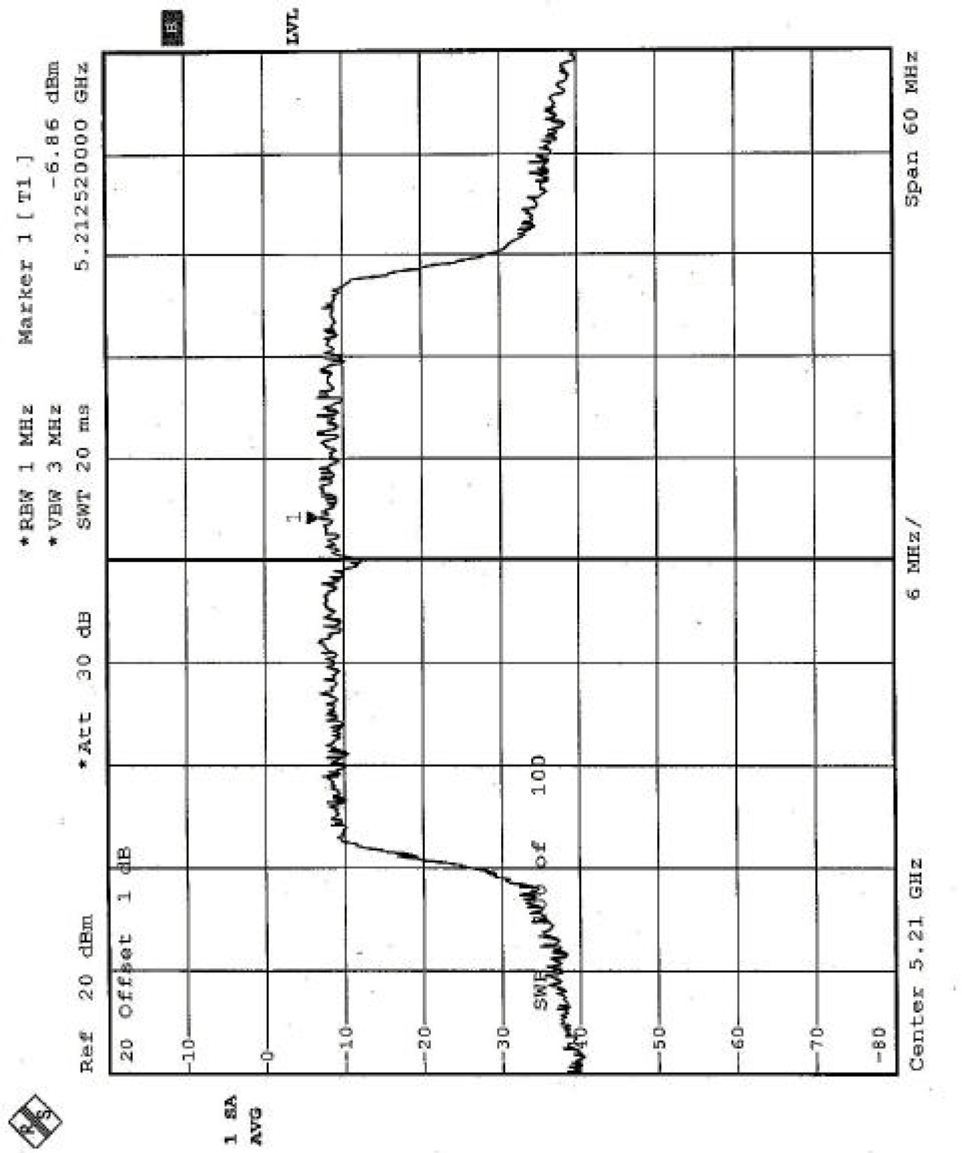
CHANNEL 8


Marker 1 [T1]
-3.75 dBm
5.32560000 GHz
*RBW 1 MHz
*VBW 3 MHz
SWT 20 ms
*Att 30 dB
Ref 20 dBm
20 Offset 1 dB
Center 5.32 GHz
4 MHz/
Span 40 MHz
1 SA
AVG

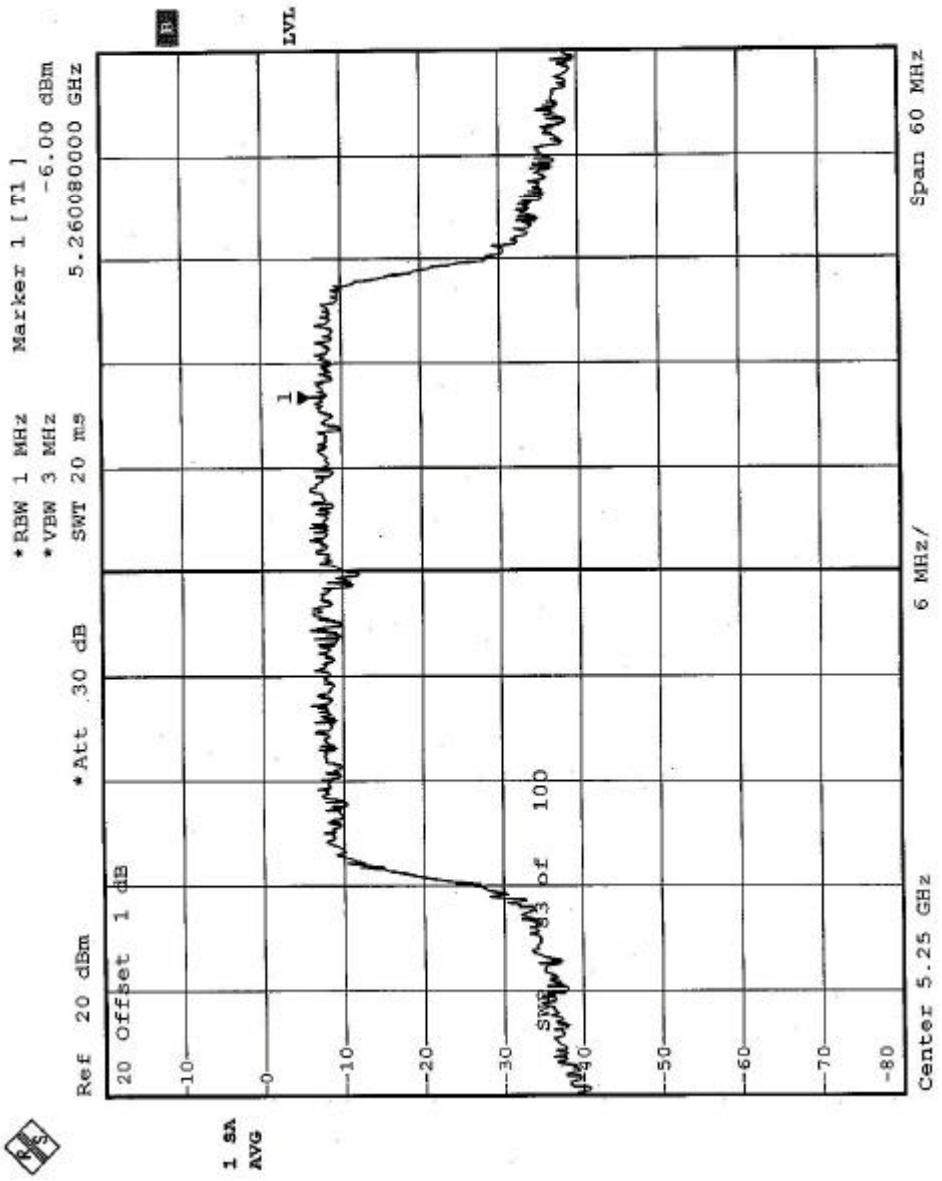
EUT	Wireless miniPCI 802.11 a/g/b adapter	**MODEL**	WN6401C
MODE	Turbo	**INPUT POWER (SYSTEM)**	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	21eg. C, 58RH, 966 hPa	**TESTED BY**	Eric Lee

CHANNEL NUMBER	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 1 MHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	5210	-6.86	4	PASS
2	5250	-6.00	4	PASS
3	5290	-7.01	11	PASS

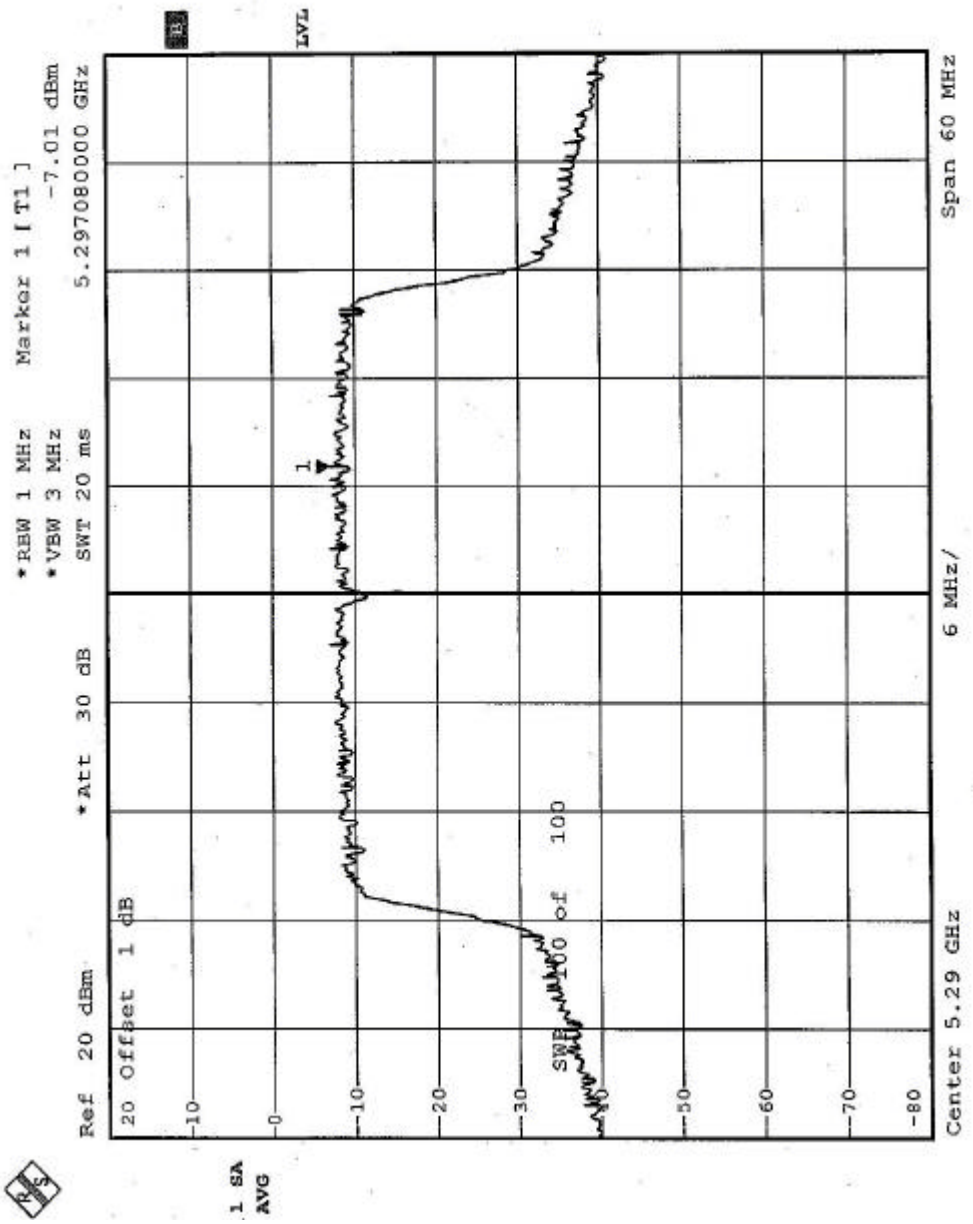
CHANNEL 1


Marker 1 [T1]
-6.86 dBm
5.21252000 GHz
*RBW 1 MHz
*VBW 3 MHz
SWT 20 ms
*Att 30 dB
Ref 20 dBm
Offset 1 dB
LVL
1 SA
AVG
Center 5.21 GHz
6 MHz/
Span 60 MHz

CHANNEL 2


Ref 20 dBm
20 Offset 1 dB
*Att 30 dB
*RBW 1 MHz
*VBW 3 MHz
SWT 20 ms
Marker 1 [T1]
-6.00 dBm
5.260080000 GHz
Center 5.25 GHz
6 MHz/
Span 60 MHz
1 SA
AVG

CHANNEL 3


Ref 20 dBm
20 Offset 1 dB
*Att 30 dB
*VBW 3 MHz
SWT 20 ms
*RBW 1 MHz
Marker 1 [T1]
-7.01 dBm
5.29708000 GHz
Center 5.29 GHz
6 MHz/
Span 60 MHz
1 SA
AVG
SWP 100 of 100

5.6 FREQUENCY STABILITY

5.6.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

The frequency tolerance of the carrier signal shall be maintained within +/- 0.02% of the operating frequency over a temperature variation of –30 degrees to 50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.

5.6.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP30	100019	Dec. 19, 2003

NOTE:
The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

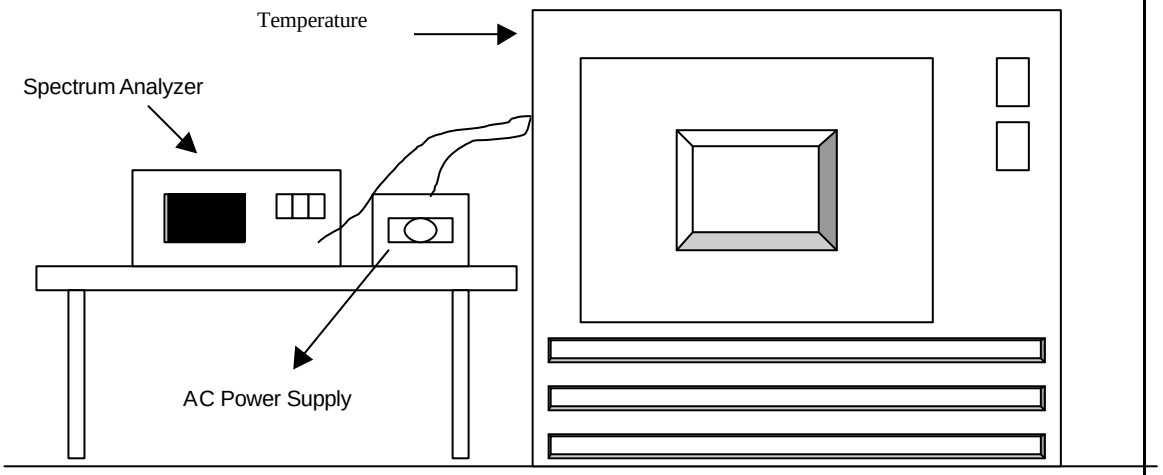
5.6.3 TEST PROCEDURE

1. The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
2. Turn the EUT on and couple its output to a spectrum analyzer.
3. Turn the EUT off and set the chamber to the highest temperature specified.
4. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
5. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
6. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

5.6.4 DEVIATION FROM TEST STANDARD

No deviation

5.6.5 TEST SETUP



5.6.6 EUT OPERATING CONDITION

Same as Item 4.1.6

5.6.7 TEST RESULTS

Operating frequency: 5320MHz				Limit : ± 0.02%			
Temp. (°C)	Power supply (VAC)	2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	126.5	5319.9888	0.000211%	5319.98887	0.000209%	5319.9890	-0.000207%
	110	5319.9887	0.000212%	5319.9888	0.000211%	5319.9889	-0.000209%
	93.5	5319.9989	-0.000021%	5319.9886	-0.000214%	5319.9889	-0.000209%
40	126.5	5319.9748	-0.000474%	5319.9746	-0.000477%	5319.9751	-0.000468%
	110	5319.9747	-0.000476%	5319.9748	-0.000474%	5319.9749	-0.000472%
	93.5	5319.9747	-0.000476%	5319.9747	-0.000476%	5319.9750	-0.000470%
30	126.5	5319.9744	-0.000481%	5319.9744	-0.000481%	5319.9745	-0.000479%
	110	5319.9743	-0.000483%	5319.9744	-0.000481%	5319.9745	-0.000479%
	93.5	5319.9745	-0.000479%	5319.9745	-0.000479%	5319.9745	-0.000479%
20	126.5	5319.9875	-0.000235%	5319.9875	-0.000235%	5319.9875	-0.000235%
	110	5319.9874	-0.000237%	5319.9875	-0.000235%	5319.9874	-0.000237%
	93.5	5319.9875	-0.000235%	5319.9875	-0.000235%	5319.9875	-0.000235%
10	126.5	5319.9874	-0.000237%	5319.9874	-0.000237%	5319.9876	-0.000233%
	110	5319.9874	-0.000237%	5319.9875	-0.000235%	5319.9875	-0.000235%
	93.5	5319.9875	-0.000235%	5319.9874	-0.000237%	5319.9876	-0.000233%
0	126.5	5319.9874	-0.000237%	5319.9875	-0.000235%	5319.9878	-0.000229%
	110	5319.9875	-0.000235%	5319.9876	-0.000233%	5319.9876	-0.000233%
	93.5	5319.9874	-0.000237%	5319.9874	-0.000237%	5319.9874	-0.000237%
-10	126.5	5319.9987	-0.000024%	5319.9987	-0.000024%	5319.9989	-0.000021%
	110	5319.9985	-0.000028%	5319.9988	-0.000023%	5319.9987	-0.000024%
	93.5	5319.9983	-0.000032%	5319.9989	-0.000021%	5319.9986	-0.000026%
-20	126.5	5319.9986	-0.000026%	5319.9981	-0.000036%	5319.9982	-0.000034%
	110	5319.9982	-0.000034%	5319.9985	-0.000028%	5319.9986	-0.000026%
	93.5	5319.9984	-0.000030%	5319.9982	-0.000034%	53193.9984	899.887188
-30	126.5	5319.972	-0.000526%	5319.9872	-0.000240%	5319.9877	-0.000231%
	110	5319.972	-0.000526%	5319.9720	-0.000526%	5319.9876	-0.000233%
	93.5	5319.976	-0.000451%	5319.9724	-0.000519%	5319.9878	-0.000229%

5.7 BAND EDGES MEASUREMENT

5.7.1 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP	1093.4495.30	Dec. 19, 2003

NOTE:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

5.7.2 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low lose cable. Set RBW of spectrum analyzer to 1MHz and VBW of spectrum analyzer to 300Hz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges was measured and recorded.

5.7.3 EUT OPERATING CONDITION

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.

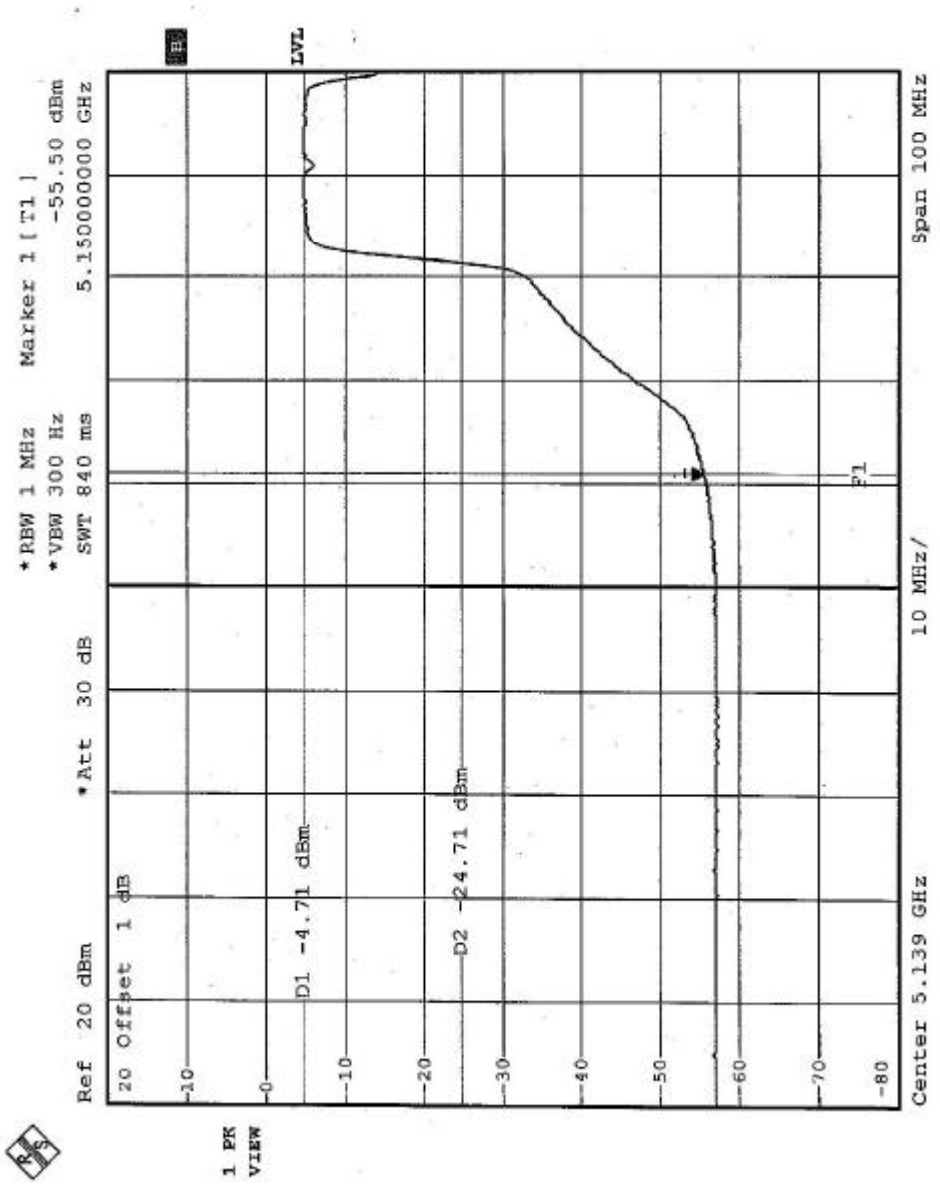
5.7.4 TEST RESULTS

For signals in the restricted bands above and below the 5.15 to 5.35 GHz allocated band a measurement was made of the amplitude of the spurious emissions with respect to the intentional signals. The relative amplitude, in dBc, was applied to the average and peak filed strength of the intentional signal made on the OATS to calculate the field strength of the unintentional signals.

The spectrum plots (Average RBW=1MHz, VBW=300Hz) are attached on the following 4 pages.

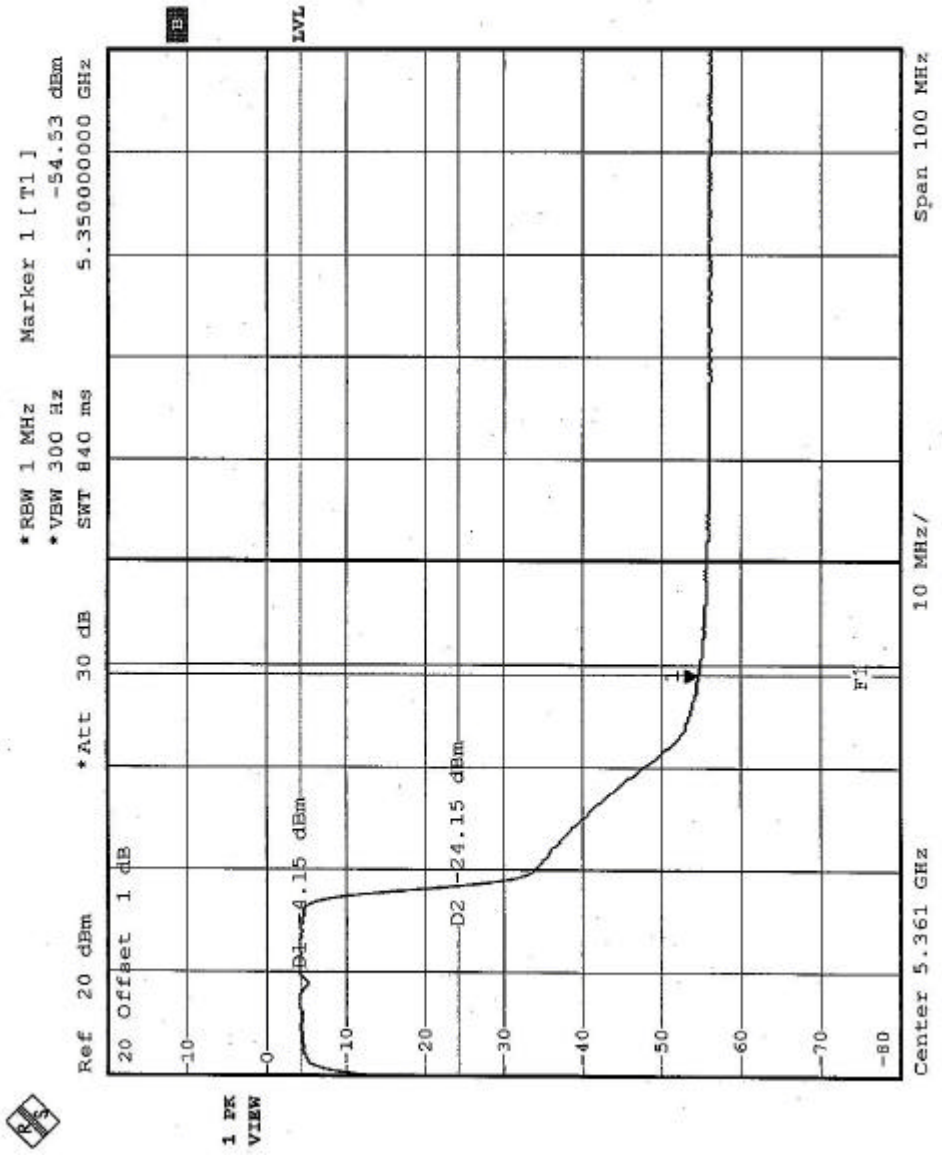
Normal Mode: Channel 1 (5180 MHz)

The band edge emission plot on the following page shows 50.79dBc (Average) between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 1 (normal mode) is 82.0dBuV/m, so the maximum field strength in restrict band is 82.0-50.79=31.21dBuV/m which is under 54dBuV/m limit.



Normal Mode: Channel 8 (5320 MHz)

The band edge emission plot on the following page shows 50.38dBc (Average) between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 8 (normal mode) is 82.7dBuV/m, so the maximum field strength in restrict band is 82.7-50.38=32.32dBuV/m which is under 54dBuV/m limit.



Turbo Mode: Channel 1 (5210 MHz)

The band edge emission plot on the following page shows 47.89dBc (Average) between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 1 (turbo mode) is 78.9dBuV/m, so the maximum field strength in restrict band is 78.9-47.89=31.01dBuV/m which is under 54dBuV/m limit.