7 - 100 KHZ BANDWIDTH OF BAND EDGES

7.1 Standard Applicable

According to §15.247(c), in *any* 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) see §15.205(c)).

7.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

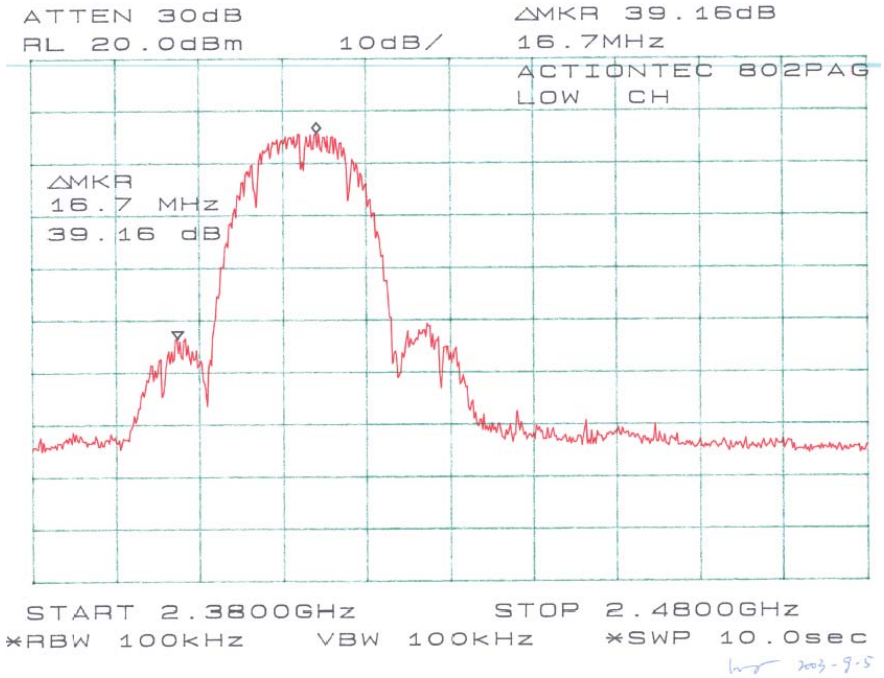
7.3 Equipment Lists

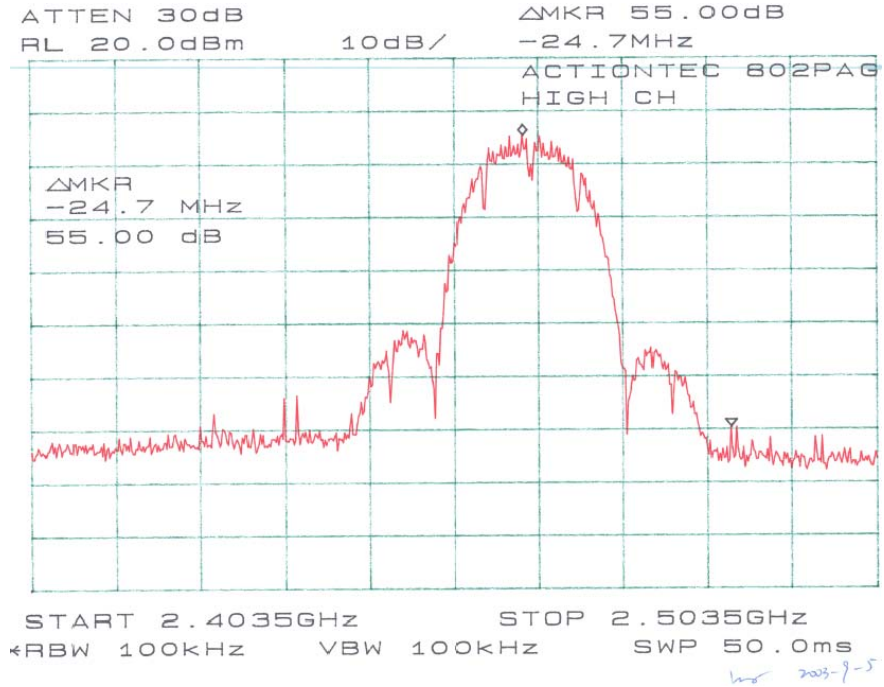
Manufacturer	Model No.	Description	Calibration Due Date
Agilent	8564E	Spectrum Analyzer	2004-08-26

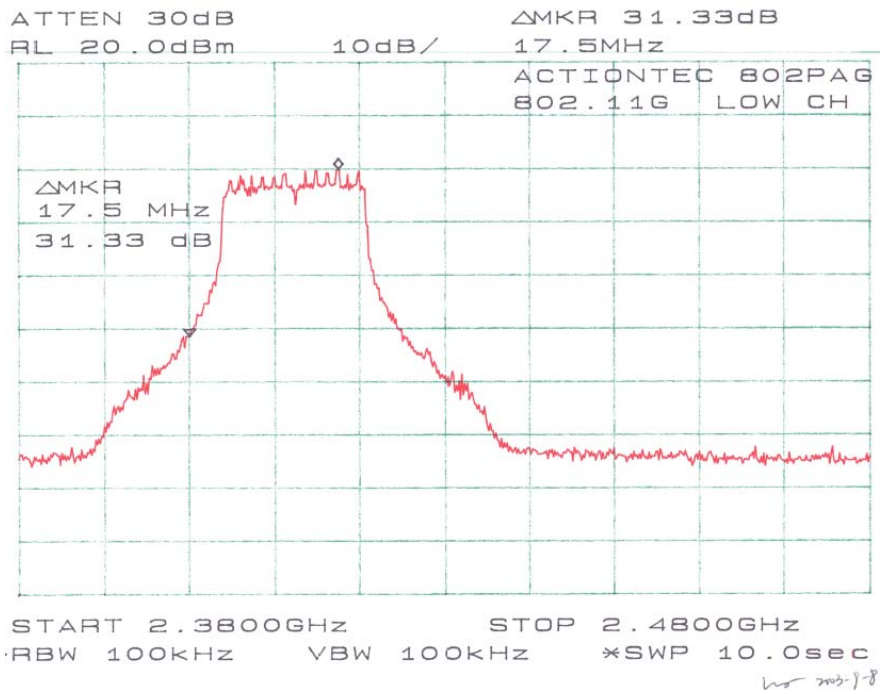
7.4 Measure Results

Please refer to following pages for plots of band edge.

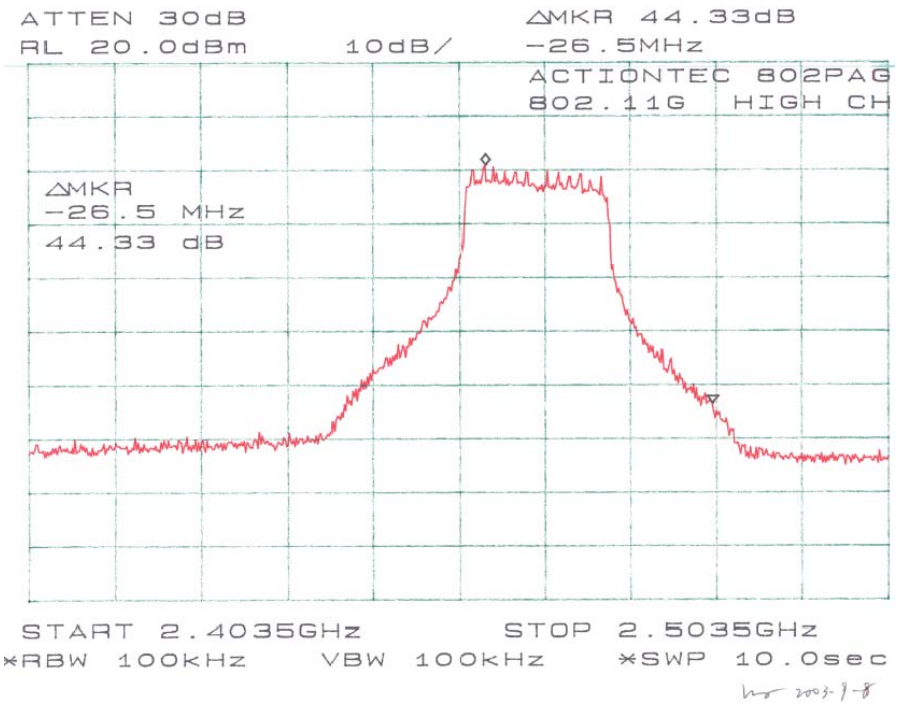
Plots of Band Edge for 802.11b (15.247)

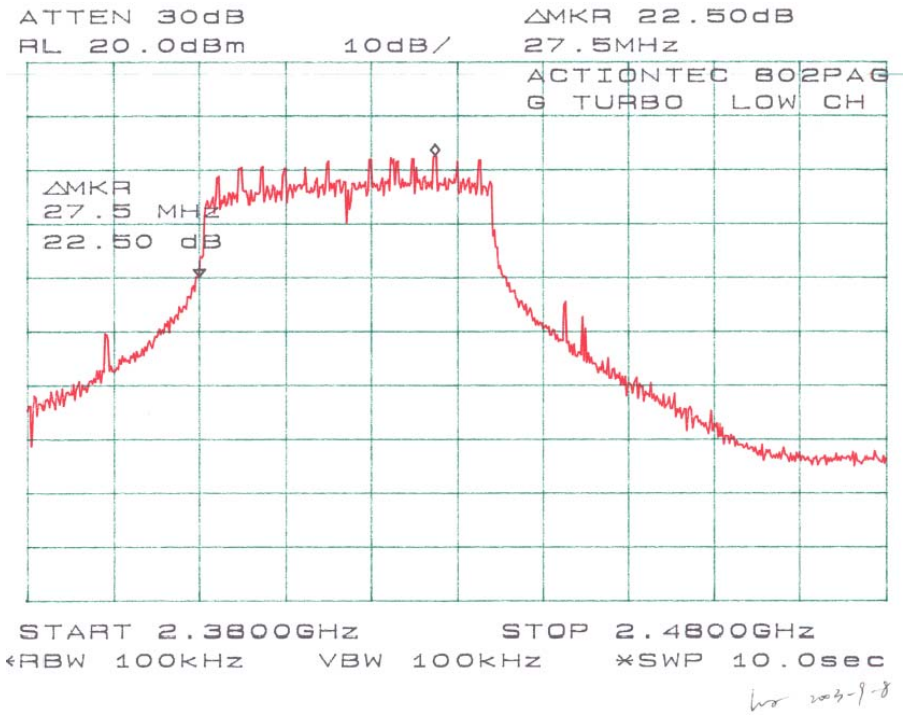






Plots of Band Edge for 802.11g (15.247)




ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR 22.50dB
27.5MHz
ACTIONTEC 802PAG
G TURBO LOW CH
ΔMKR
27.5 MHz
22.50 dB
START 2.3800GHz
STOP 2.4800GHz
#RBW 100kHz
VBW 100kHz
*SWP 10.0sec


ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR 32.50dB
-33.2MHz
ACTIONTEC 802PAG
G TURBO HIGH CH
ΔMKR
-33.2 MHz
32.50 dB
START 2.4035GHz
STOP 2.5035GHz
#RBW 100kHz
VBW 100kHz
*SWP 10.0sec

8 - Peak Excursion To Average Ratio

8.1 Standard Applicable

According to §15.407(a)(6), the ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13dB across any 1MHz bandwidth or the emission bandwidth whichever is less.

8.2 Test Procedure

For this test, the EUT's antenna was removed and replaced with a SAM jack to UMP2.0 plug test calbe, so output power levels were calculated from conducted emission levels.

For trace A, set RBW=1MHz, VBW≥ 3MHz with peak detector and max-hold. For trace B, set average mode.

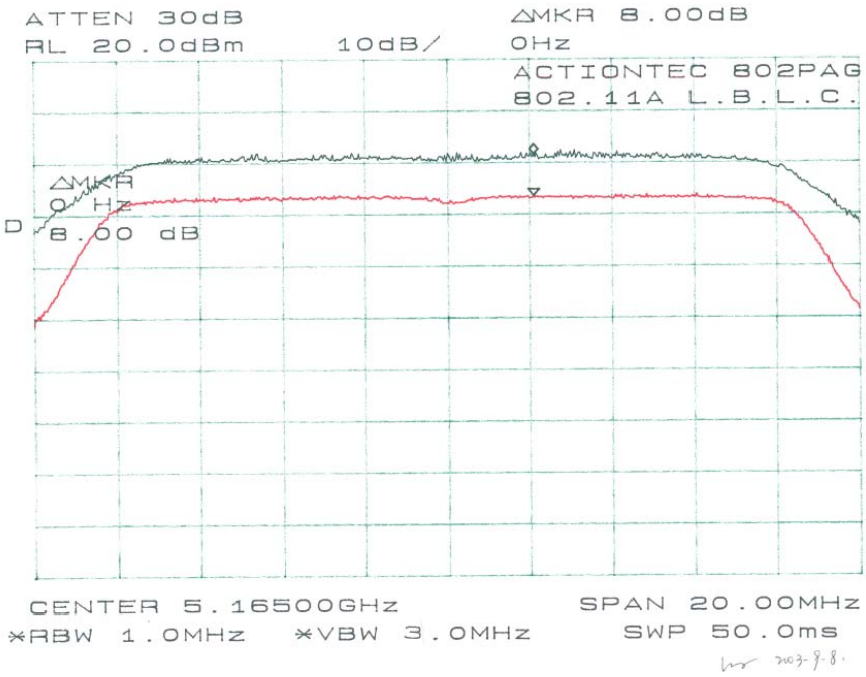
8.3 Equipment Lists

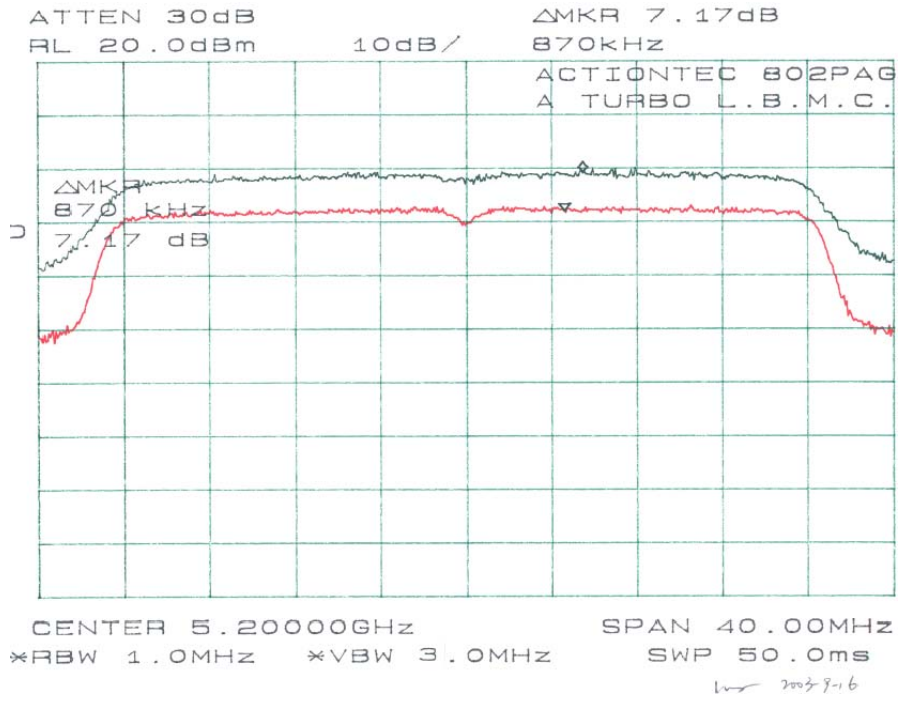
Manufacturer	Model No.	Description	Calibration Due Date
Agilent	8564E	Spectrum Analyzer	2004-08-26

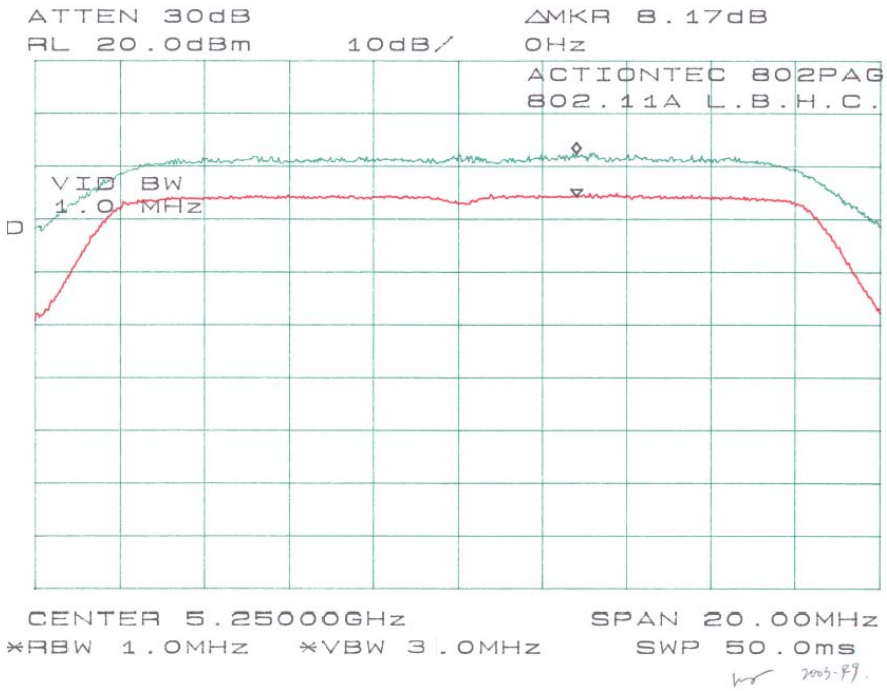
8.4 Test Result for 15.407

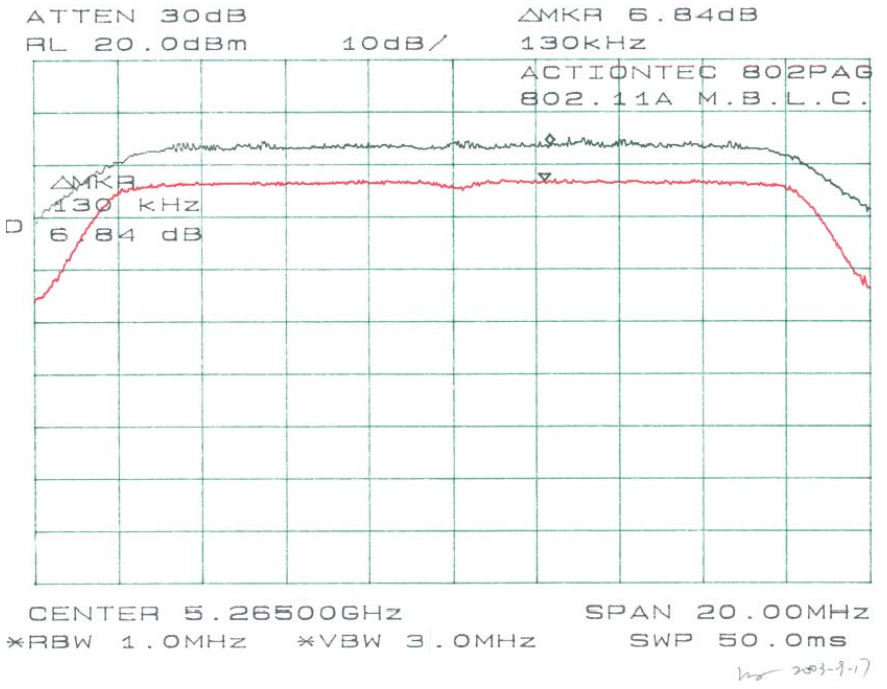
Band	Channel	Frequency (MHz)	Reading (dB)	Limit (dBm)	Result
Low	Low	5165	8.00	13	Compliant
	Mid	5200	7.17	13	Compliant
	High	5250	8.17	13	Compliant
Mid	Low	5265	6.84	13	Compliant
	Mid	5300	7.66	13	Compliant
	High	5330	7.50	13	Compliant
High	Low	5740	7.33	13	Compliant
	Mid	5770	7.00	13	Compliant
	High	5810	7.33	13	Compliant

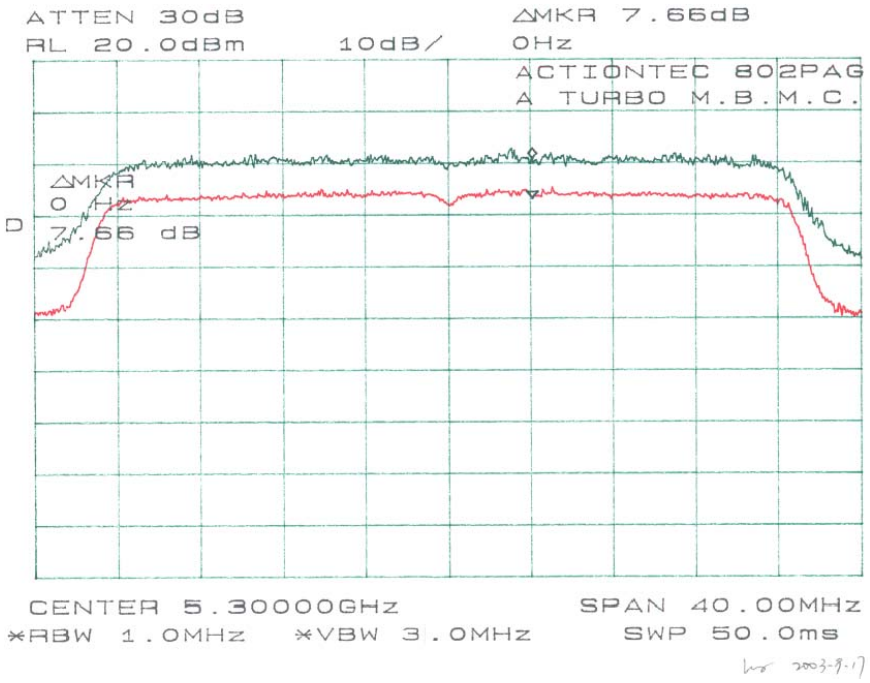
Please see the hereinafter plots for more detail.

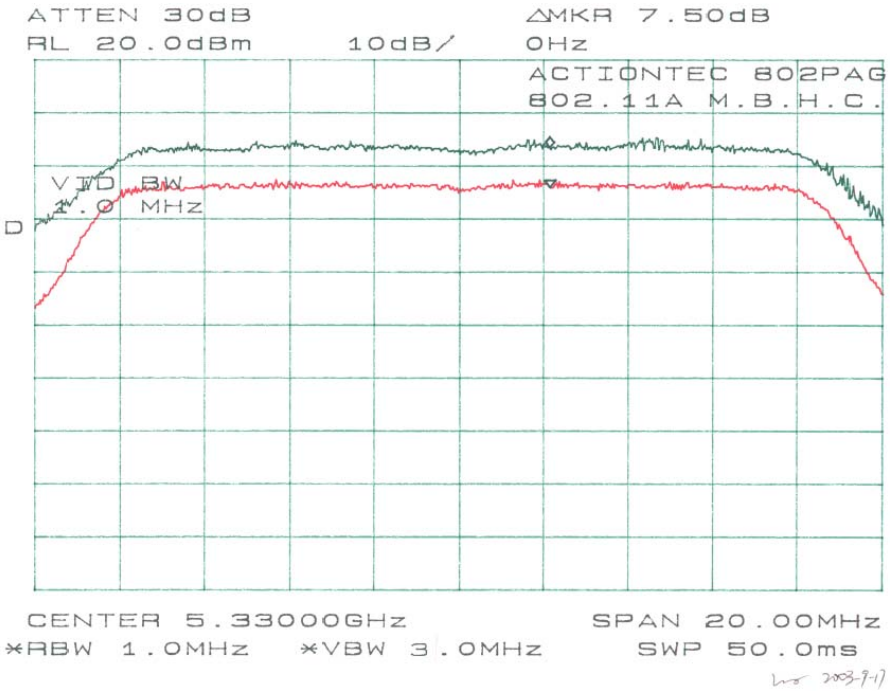

ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR 8.00dB
0Hz
ACTIONTEC 802PAG
802.11A L.B.L.C.
ΔMKR
0 Hz
8.00 dB
CENTER 5.16500GHz
SPAN 20.00MHz
*RBW 1.0MHz
*VBW 3.0MHz
SWP 50.0ms

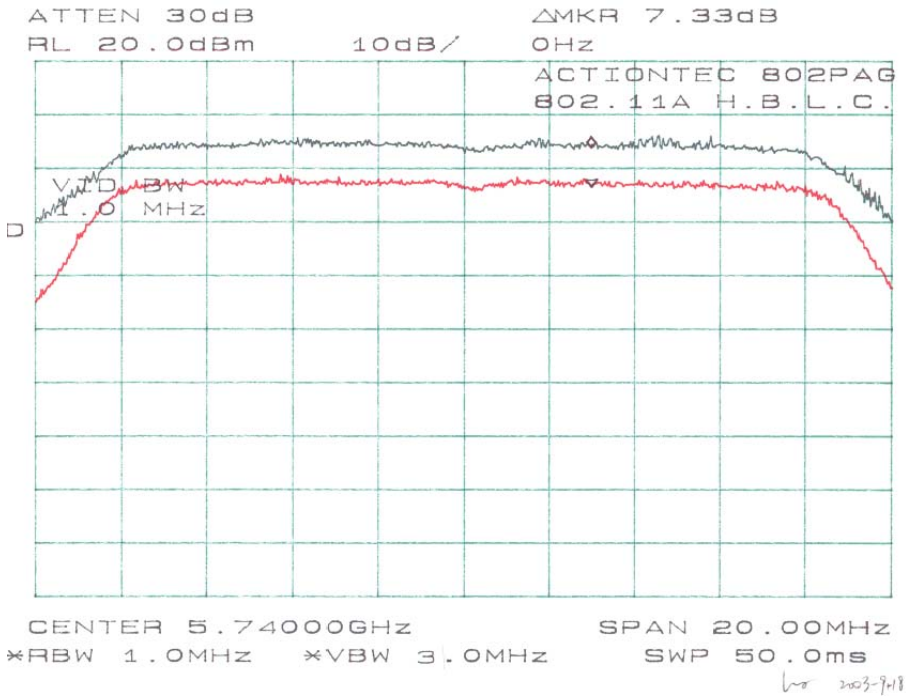

ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR 7.17dB
870kHz
ACTIONTEC 802PAG
A TURBO L.B.M.C.
ΔMKR
870 kHz
7.17 dB
CENTER 5.20000GHz
SPAN 40.00MHz
*RBW 1.0MHz
*VBW 3.0MHz
SWP 50.0ms

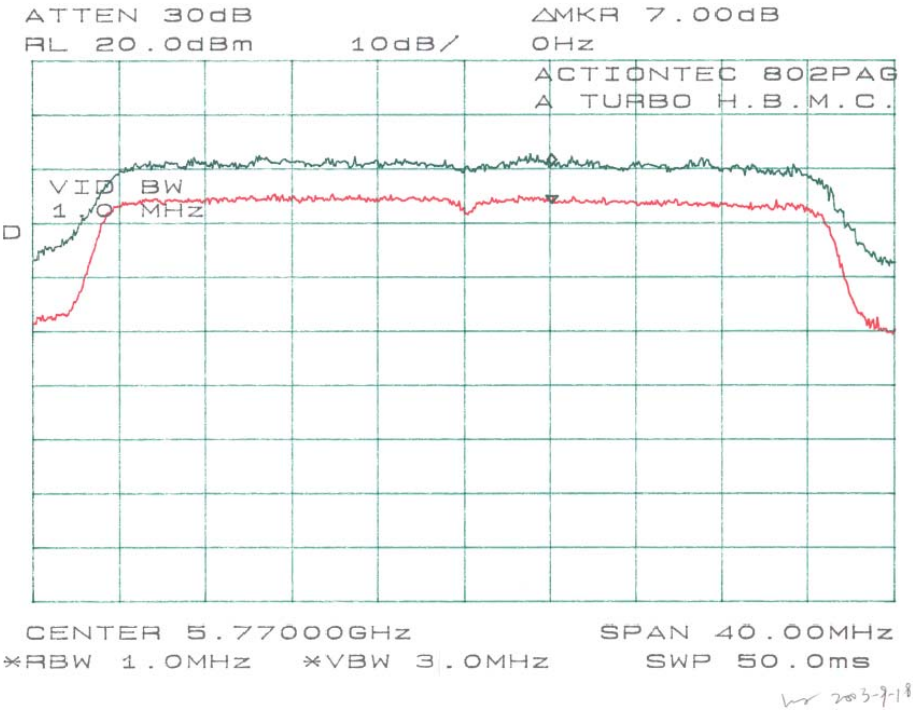

ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR 8.17dB
0Hz
ACTIONTEC 802PAG
802.11A L.B.H.C.
VID BW
1.0 MHz
D
CENTER 5.25000GHz
SPAN 20.00MHz
*RBW 1.0MHz
*VBW 3.0MHz
SWP 50.0ms

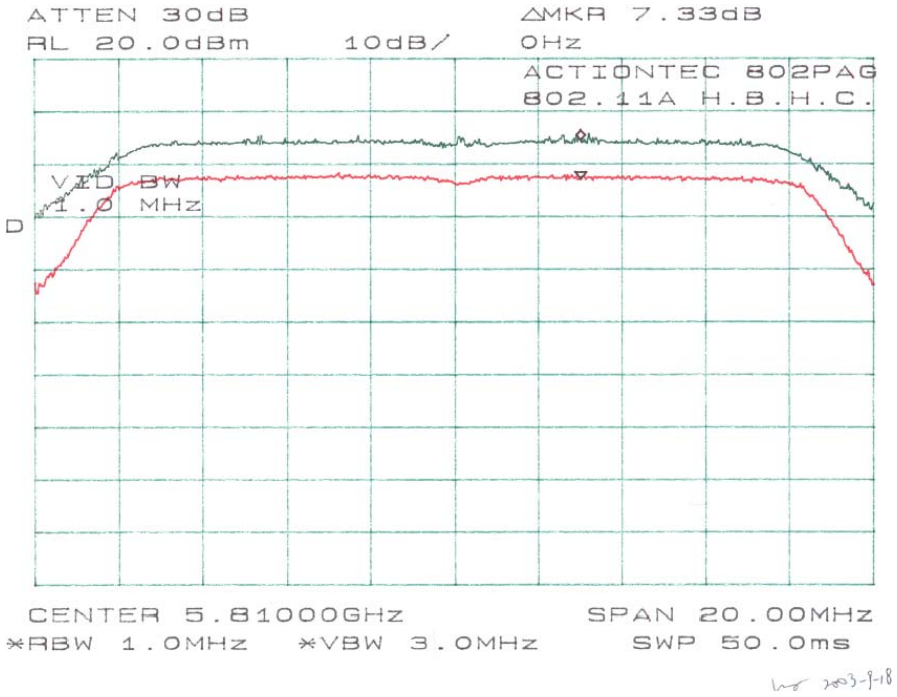

ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR 6.84dB
130kHz
ACTIONTEC 802PAG
802.11A M.B.L.C.
ΔMKR
130 kHz
6.84 dB
D
CENTER 5.26500GHz
SPAN 20.00MHz
*RBW 1.0MHz
*VBW 3.0MHz
SWP 50.0ms


ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR 7.66dB
0Hz
ACTIONTEC 802PAG
A TURBO M.B.M.C.
ΔMKR
0 Hz
7.66 dB
CENTER 5.30000GHz
SPAN 40.00MHz
*RBW 1.0MHz
*VBW 3.0MHz
SWP 50.0ms
2003-9-17


ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR 7.50dB
0Hz
ACTIONTEC 802PAG
802.11A M.B.H.C.
VID BW
1.0 MHz
CENTER 5.33000GHz
SPAN 20.00MHz
*RBW 1.0MHz
*VBW 3.0MHz
SWP 50.0ms
2003-9-17


ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR 7.33dB
0Hz
ACTIONTEC 802PAG
802.11A H.B.L.C.
VID BW
1.0 MHz
D
CENTER 5.74000GHz
SPAN 20.00MHz
*RBW 1.0MHz
*VBW 3.0MHz
SWP 50.0ms
2003-9-18


ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR 7.00dB
0Hz
ACTIONTEC 802PAG
A TURBO H.B.M.C.
VID BW
1.0 MHz
D
CENTER 5.77000GHz
SPAN 40.00MHz
*RBW 1.0MHz
*VBW 3.0MHz
SWP 50.0ms
2003-9-18


ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR 7.33dB
0Hz
ACTIONTEC 802PAG
802.11A H.B.H.C.
VID BW
1.0 MHz
D
CENTER 5.81000GHz
SPAN 20.00MHz
*RBW 1.0MHz
*VBW 3.0MHz
SWP 50.0ms
2003-9-18

9 - Out Of Band Emission for 15.407

9.1 Standard Applicable

§15.407 (b), undesirable emission limits: except as shown in paragraph (b)(6) of this section, the peak emission outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

§15.407 (b)(1), for transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz.

§15.407 (b)(2), for transmitters operating in the 5.25 – 5.35 GHz band: all emissions outside of the 5.15 – 5.25 GHz band shall not exceed an EIRP of –27 dBm/MHz. Devices operating in the 5.25 – 5.35 GHz band that generate emissions in the 5.15 – 5.25 GHz band must meet all applicable technical requirements for operation in the 5.15 – 5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of –27 dBm/MHz in the 5.15 – 5.25 GHz band.

§15.407 (b)(3), for transmitters operating in the 5.725 – 5.825 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of –17dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emission shall not exceed an EIRP of –27 dBm/MHz.

9.2 Test Procedure

For this test, the EUT's antenna was removed and replaced with a low loss cable, so output power levels were calculated from conducted emission levels.

The analyzer center frequency was set to the EUT carrier frequency. The analyzer resolution and video bandwidth were set to 1MHz. The entire band from 30kHz to 40GHz was investigated.

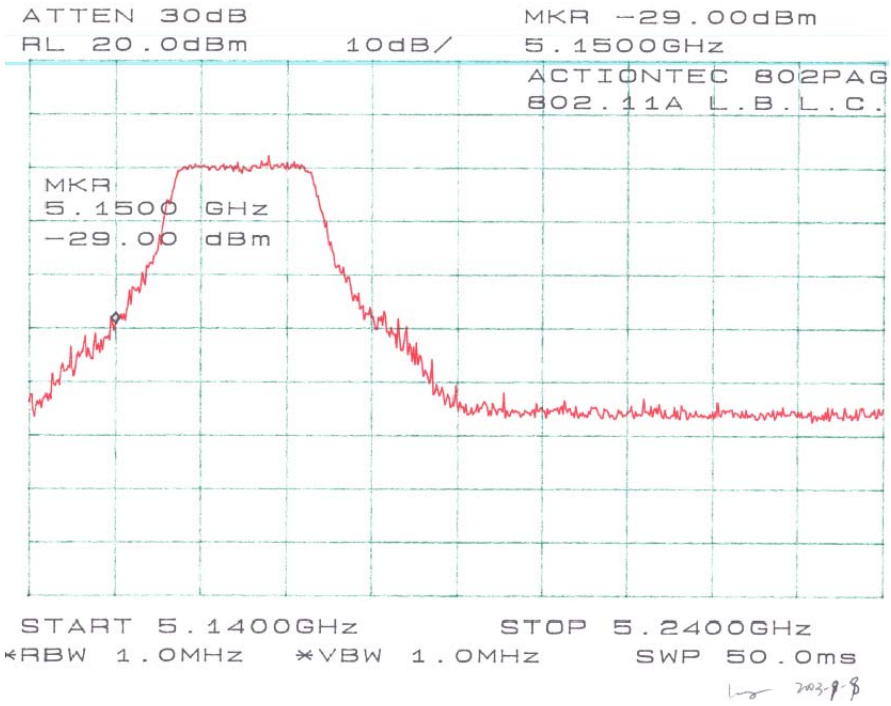
Every suspected signal was also investigated through radiated emission. Refer to section 15.205 restricted bands of operation.

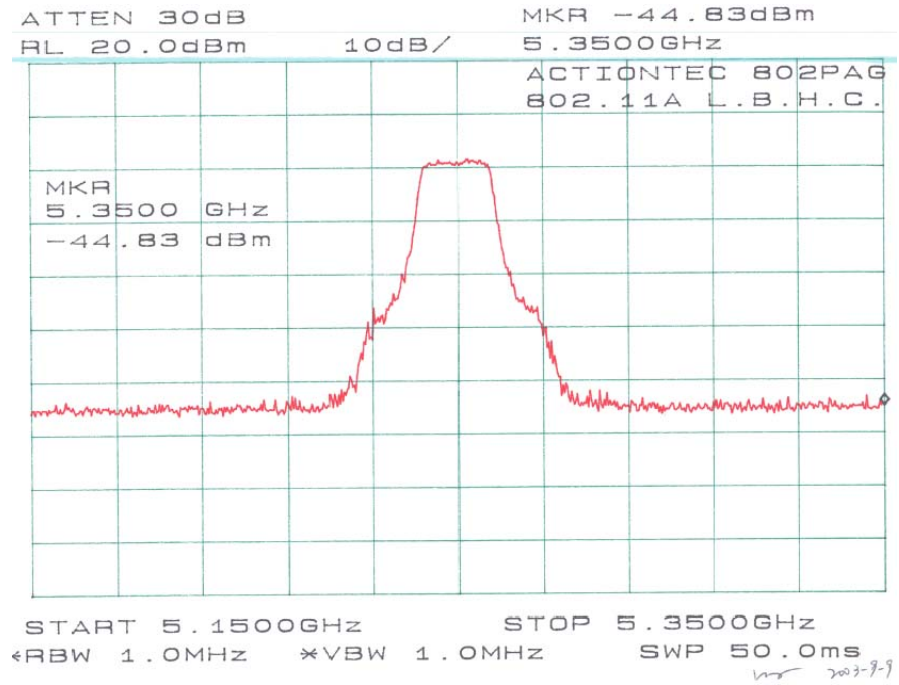
9.3 Equipment Lists

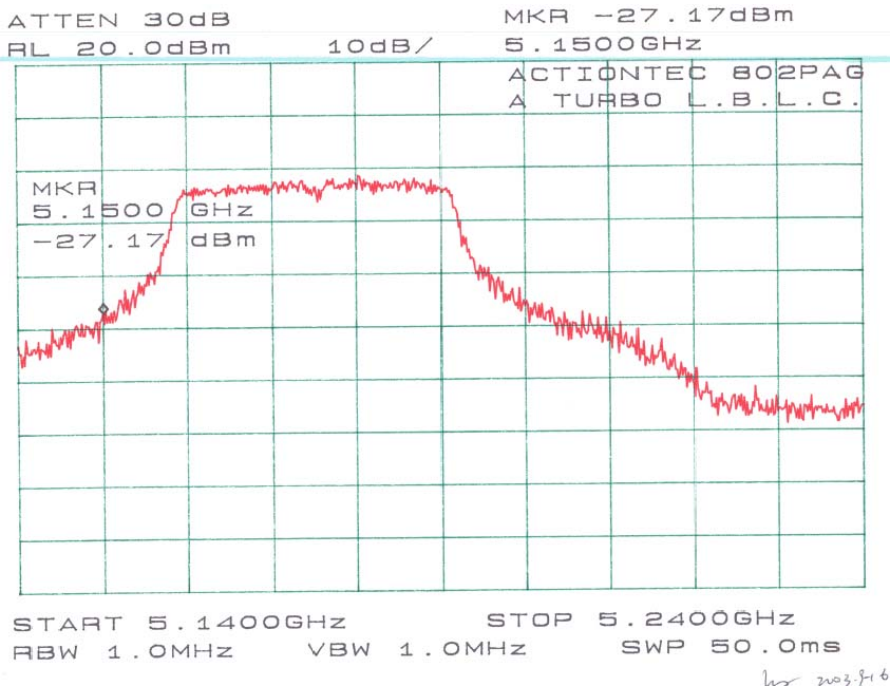
Manufacturer	Model No.	Description	Calibration Due Date
Agilent	8564E	Spectrum Analyzer	2004-08-26

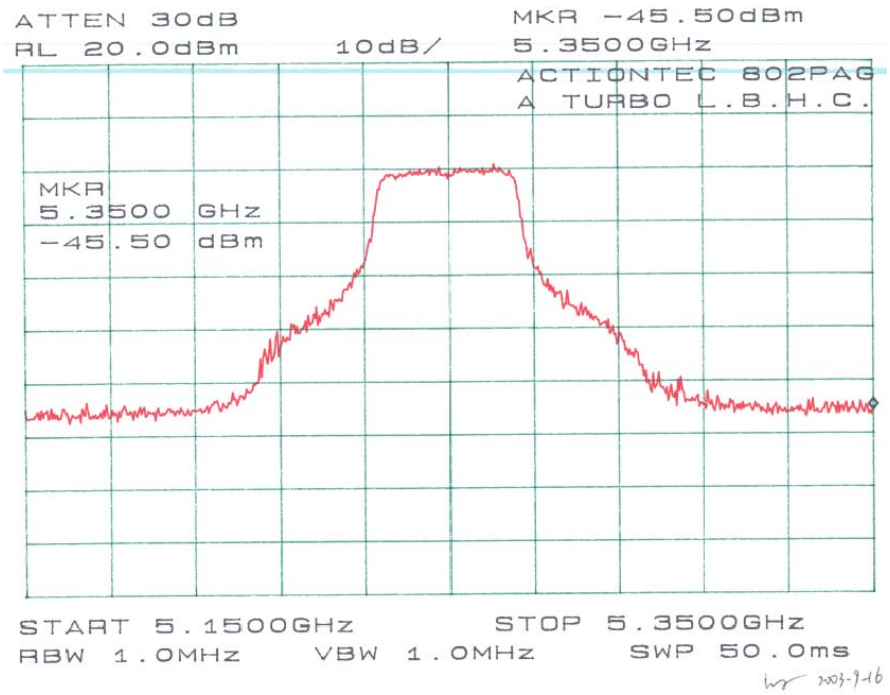
9.4 Test Result

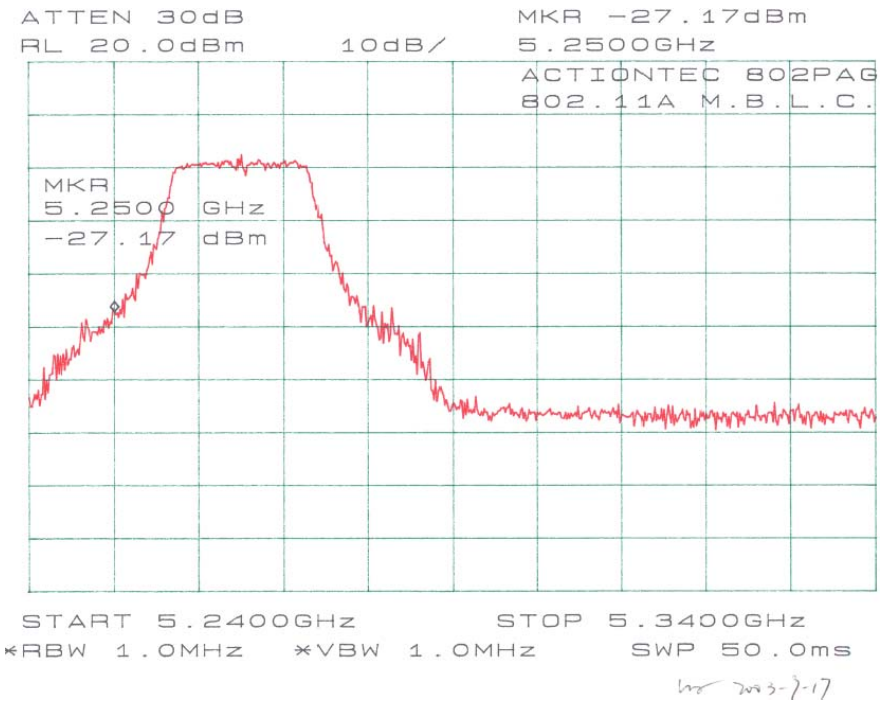
Please refer to the following plots.

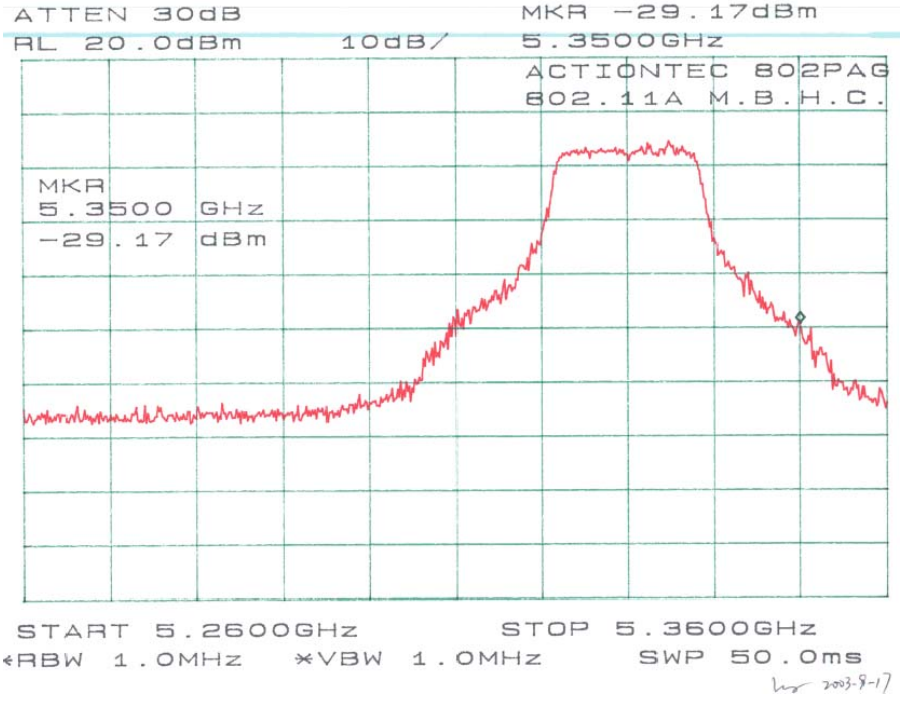

ATTEN 30dB
RL 20.0dBm
10dB/
MKR -29.00dBm
5.1500GHz
ACTIONTEC 802PAG
802.11A L.B.L.C.
MKR
5.1500 GHz
-29.00 dBm
START 5.1400GHz
STOP 5.2400GHz
*RBW 1.0MHz
*VBW 1.0MHz
SWP 50.0ms

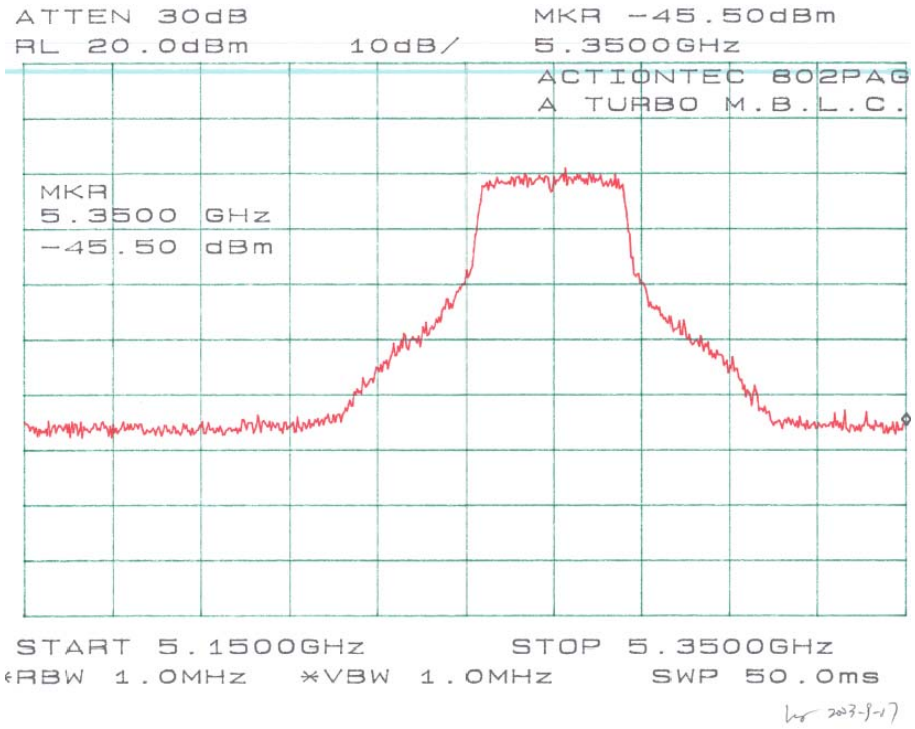

ATTEN 30dB
RL 20.0dBm
10dB/
MKR -44.83dBm
5.3500GHz
ACTIONTEC 802PAG
802.11A L.B.H.C.
MKR
5.3500 GHz
-44.83 dBm
START 5.1500GHz
STOP 5.3500GHz
*RBW 1.0MHz
*VBW 1.0MHz
SWP 50.0ms

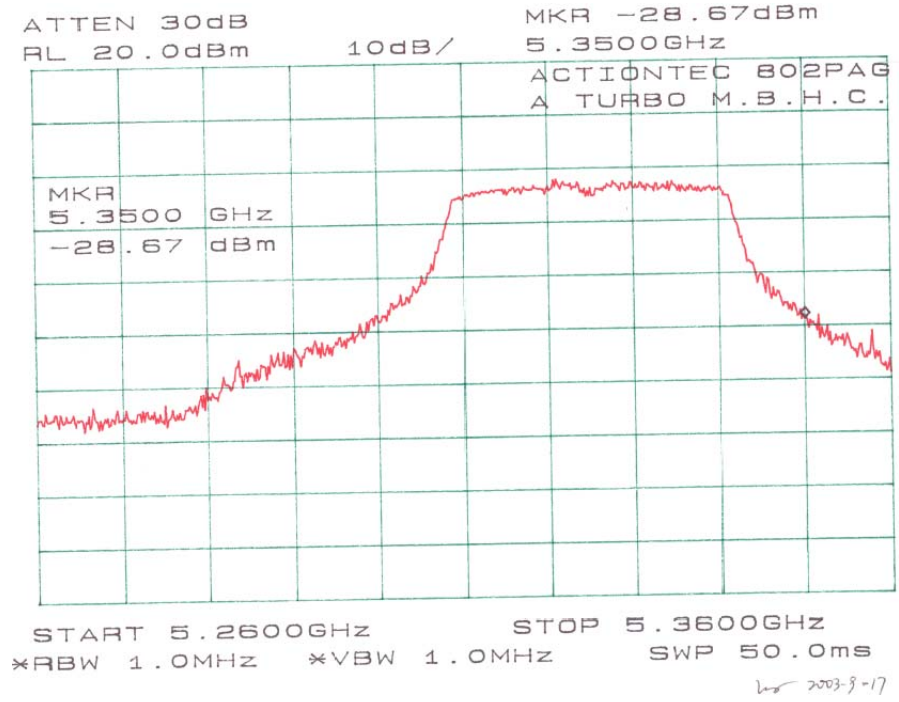

ATTEN 30dB
RL 20.0dBm
10dB/
MKR -27.17dBm
5.1500GHz
ACTIONTEC 802PAG
A TURBO L.B.L.C.
MKR
5.1500 GHz
-27.17 dBm
START 5.1400GHz
STOP 5.2400GHz
RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms

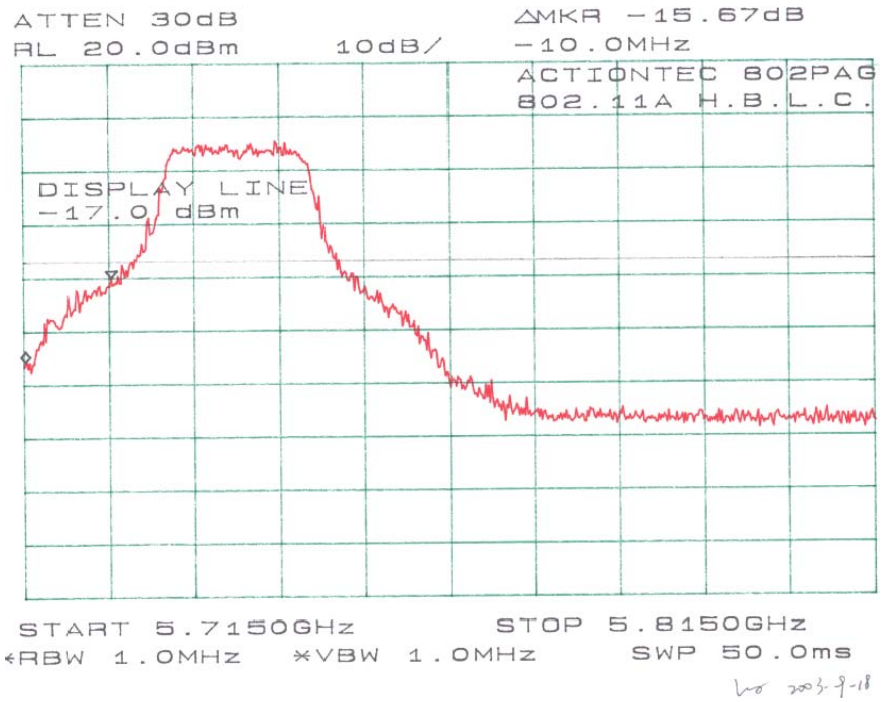

ATTEN 30dB
RL 20.0dBm
10dB/
MKR -45.50dBm
5.3500GHz
ACTIONTEC 802PAG
A TURBO L.B.H.C.
MKR
5.3500 GHz
-45.50 dBm
START 5.1500GHz
STOP 5.3500GHz
RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms

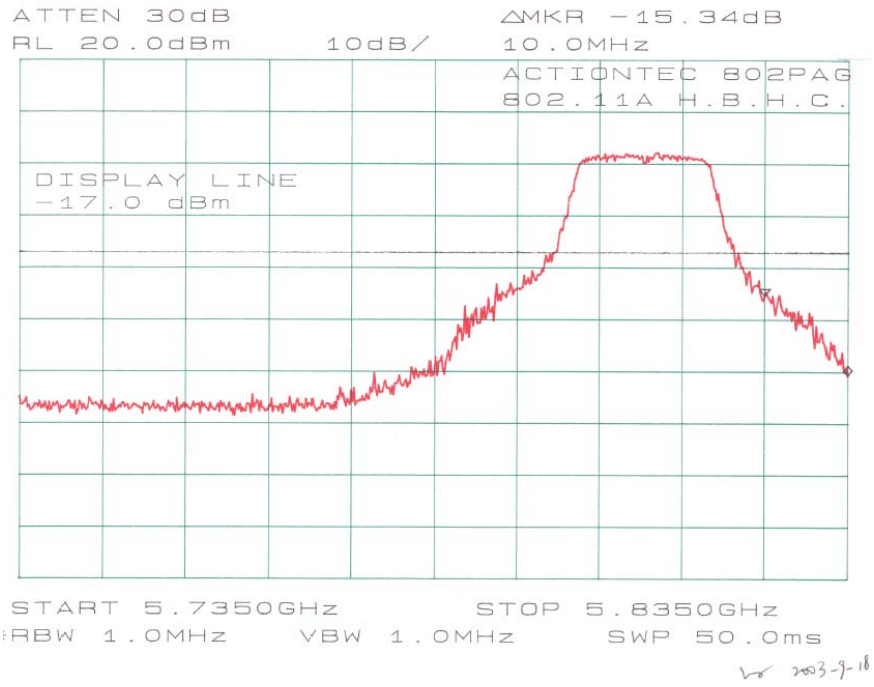

ATTEN 30dB
RL 20.0dBm
10dB/
MKR -27.17dBm
5.2500GHz
ACTIONTEC 802PAG
802.11A M.B.L.C.
MKR
5.2500 GHz
-27.17 dBm
START 5.2400GHz
STOP 5.3400GHz
*RBW 1.0MHz
*VBW 1.0MHz
SWP 50.0ms
2003-8-17

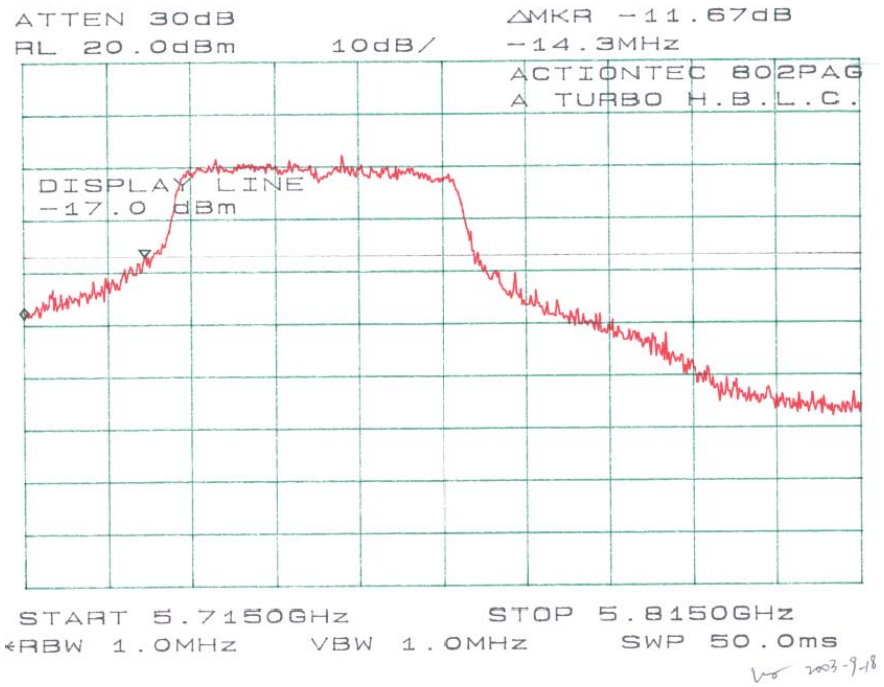

ATTEN 30dB
RL 20.0dBm
10dB/
MKR -29.17dBm
5.3500GHz
ACTIONTEC 802PAG
802.11A M.B.H.C.
MKR
5.3500 GHz
-29.17 dBm
START 5.2600GHz
STOP 5.3600GHz
*RBW 1.0MHz
*VBW 1.0MHz
SWP 50.0ms
2003-8-17

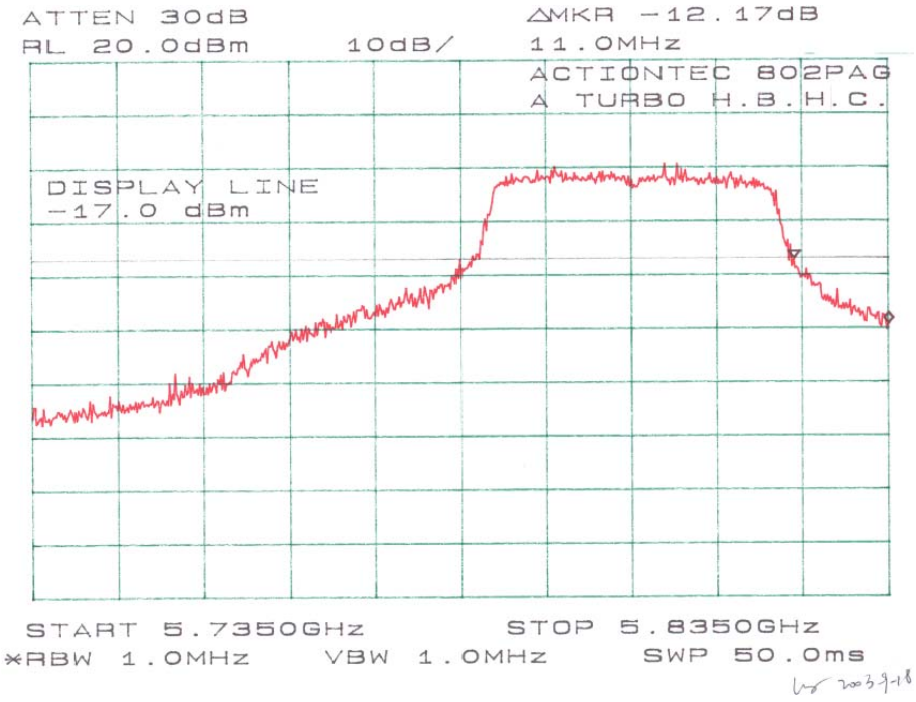

ATTEN 30dB
RL 20.0dBm
10dB/
MKR -45.50dBm
5.3500GHz
ACTIONTEC 802PAG
A TURBO M.B.L.C.
MKR
5.3500 GHz
-45.50 dBm
START 5.1500GHz
STOP 5.3500GHz
#RBW 1.0MHz
#VBW 1.0MHz
SWP 50.0ms
2003-9-17


ATTEN 30dB
RL 20.0dBm
10dB/
MKR -28.67dBm
5.3500GHz
ACTIONTEC 802PAG
A TURBO M.B.H.C.
MKR
5.3500 GHz
-28.67 dBm
START 5.2600GHz
STOP 5.3600GHz
#RBW 1.0MHz
#VBW 1.0MHz
SWP 50.0ms
2003-9-17


ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR -15.67dB
-10.0MHz
ACTIONTEC 802PAG
802.11A H.B.L.C.
DISPLAY LINE
-17.0 dBm
START 5.7150GHz
STOP 5.8150GHz
RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms


ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR -15.34dB
10.0MHz
ACTIONTEC 802PAG
802.11A H.B.H.C.
DISPLAY LINE
-17.0 dBm
START 5.7350GHz
STOP 5.8350GHz
RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms


ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR -11.67dB
-14.3MHz
ACTIONTEC 802PAG
A TURBO H.B.L.C.
DISPLAY LINE
-17.0 dBm
START 5.7150GHz
STOP 5.8150GHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms
2003-9-18


ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR -12.17dB
11.0MHz
ACTIONTEC 802PAG
A TURBO H.B.H.C.
DISPLAY LINE
-17.0 dBm
START 5.7350GHz
STOP 5.8350GHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms
2003-9-18