9. MAXIMUM PERMISSIBLE EXPOSURE

9.1 RF Exposure Calculation

According to the FCC rule 1.1310 table 1B, the limit for the maximum permissible RF exposure for an uncontrolled environment is 1mW/cm².

The electric field generated for a 1mW/cm²exposure is calculated as follows:

$E = \sqrt{(30 * P * G)} / d$, and $S = E^2 / Z = E^2 / 3770$, because 1mW/ cm² = 10W/m²

Where

S = Power density in mW/cm², Z = Impedance of free space, 377Ω

E = Electric filed strength in Volts/m, G = Numeric antenna gain, and d = distance in meter

Combing equations and rearranging the terms to express the distance as a function of the remaining variable

$d = \sqrt{(30*P*G) / (3770 *S)}$

Changing to units of mW and cm, using P (mW) = P (W) / 1000, d (cm) = 100 * d (m)

$d = 0.282 * \sqrt{(P*G) / S}$

Where

d = distance in cm, P = Power in mW, G = Numeric antenna gain, and S = Power density in mW/cm²

7.2 Calculated MPE Safe Distance

According to above equation, the following result was obtained.

Operating Mode	Peak Output Power		Antenna Gain	Calculated RF Exposure
	(dBm)	(mW)	dBi	Separation Distance (cm)
802.11b	23.2	208.93	2.0	5.76
802.11g	26.6	457.09	2.0	8.53
802.11a	24.4	275.42	2.0	6.62

Following Caution on the manual will be described.

"CAUTION: Exposure to Radio Frequency Radiation.

Antenna shall be mounted in such a manner to minimize the potential for human contact during normal operation. The antenna should not be contacted during operation to avoid the possibility of exceeding the FCC radio frequency exposure limit."

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10. 100 kHz BANDWIDTH OUTSIDE THE FREQUENCY BAND

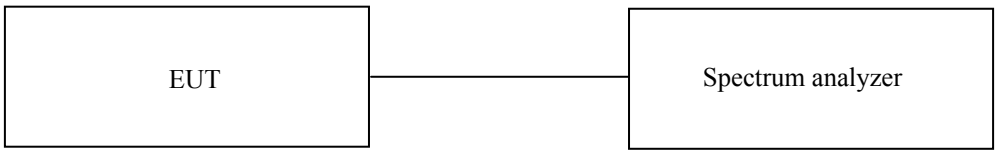
10.1 Operating environment

Temperature : 19°C

Relative humidity : 35 %

10.2 Test set-up for conducted measurement

The antenna output of the EUT was connected to the spectrum analyzer. The resolution and video bandwidth is set to 100 kHz, and peak detection was used.



10.3 Test set-up for radiated measurement

The radiated emissions measurements were performed on the 3meters, open-field test site. The EUT was placed on a non-conductive turntable approximately 0.8 meters above the ground plane.

The frequency spectrum from 30MHz to 25GHz was scanned and maximum emission levels at each frequency recorded. The system was rotated 360°, and the antenna was varied in the height between 1.0 and 4.0 meters in order to determine the maximum emission levels. This procedure was performed for horizontal and vertical polarization of the receiving antenna.

10.4 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Due Cal.
■ -	8564E	Hewlett-Packard	Spectrum Analyzer	3650A00756	July 10, 2005
■ -	8449B	Hewlett-Packard	Preamplifier	3008A00833	June 10, 2005
□ -	83051A	Agilent	Preamplifier	3950M00201	June 10, 2005
■ -	MA220	HD	Turn Table	N/A	N/A
■ -	HD240	HD	Antenna Mast	N/A	N/A
■ -	BBHA9170	Schwarzbeck	Horn Antenna	BBHA9170178	June 6, 2005
■ -	YSE 500B	YoungShin Eng.	Frequency Converter	950413001	N/A
■ -	ETCR-10	DaeHa	Automatic Voltage Com.	N/A	N/A

All test equipment used is calibrated on a regular basis.

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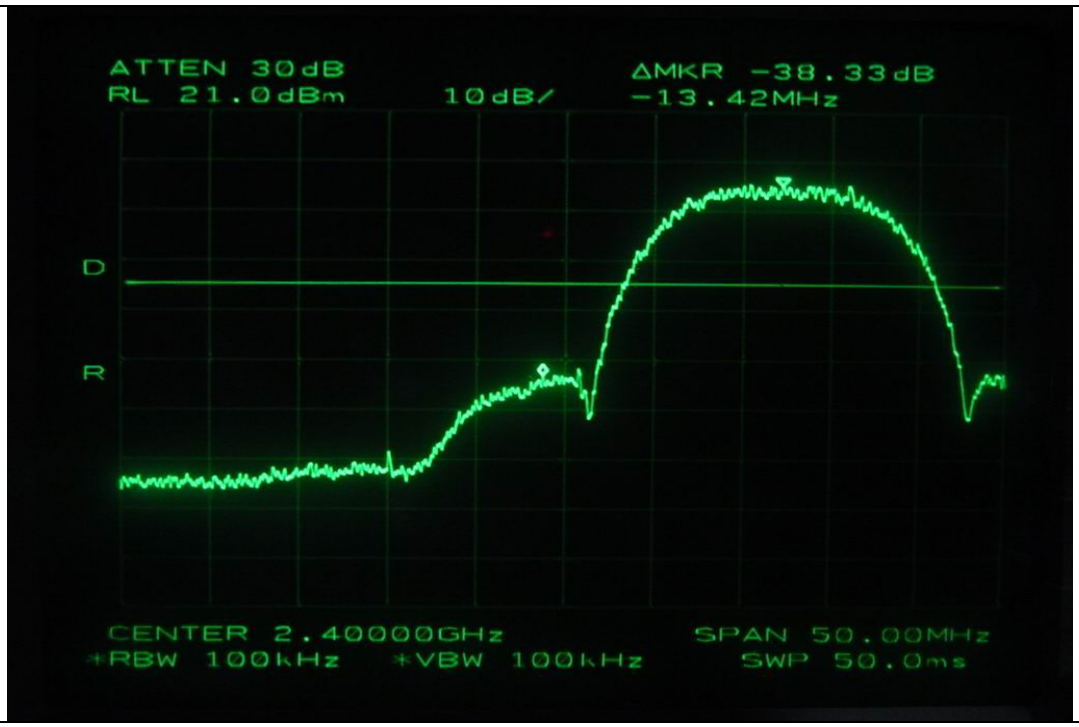
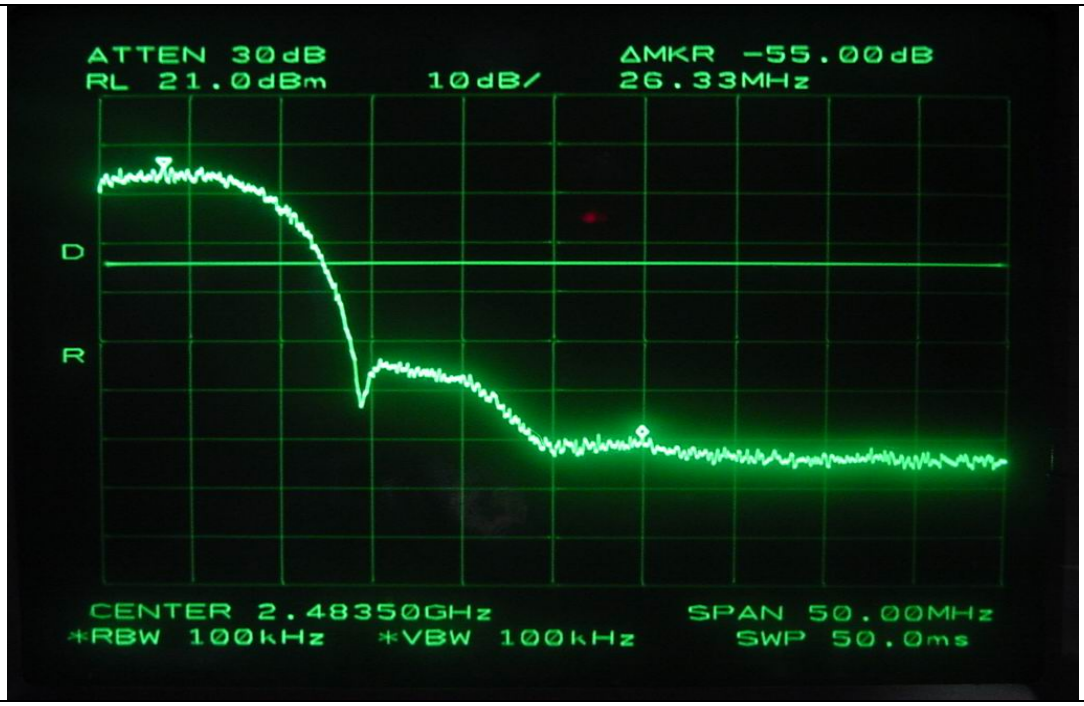
10.5. Test data for conducted emission

10.5.1. Test data for 802.11b



Low Channel



High Channel

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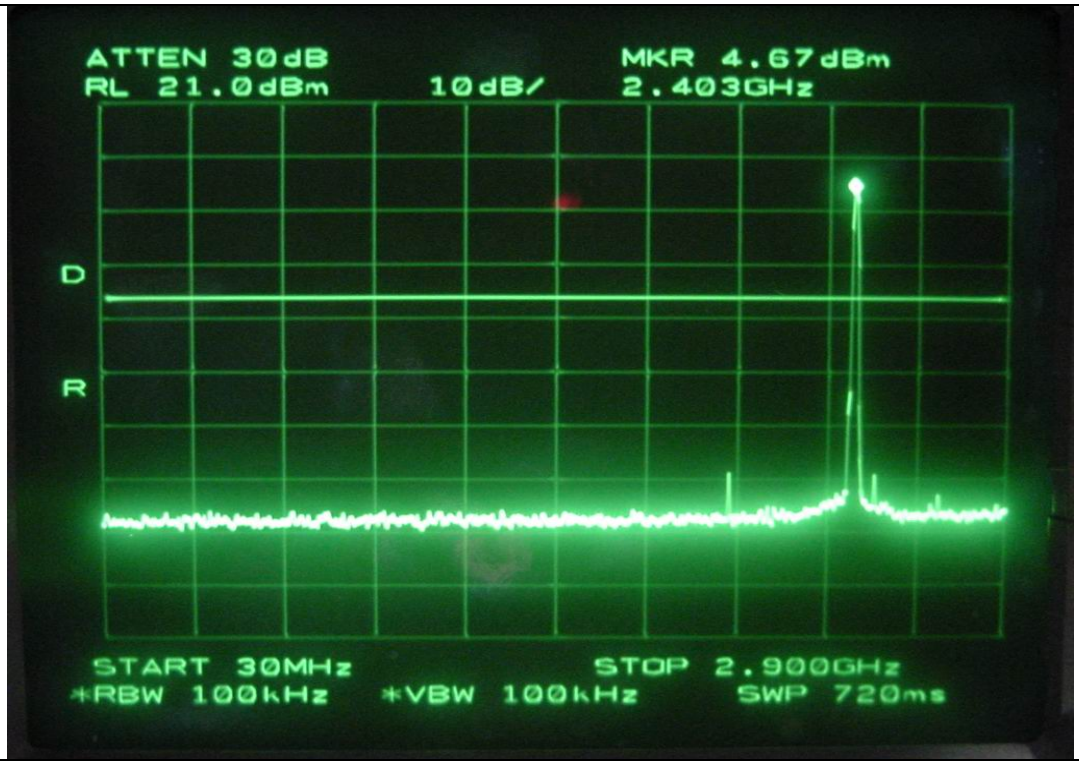

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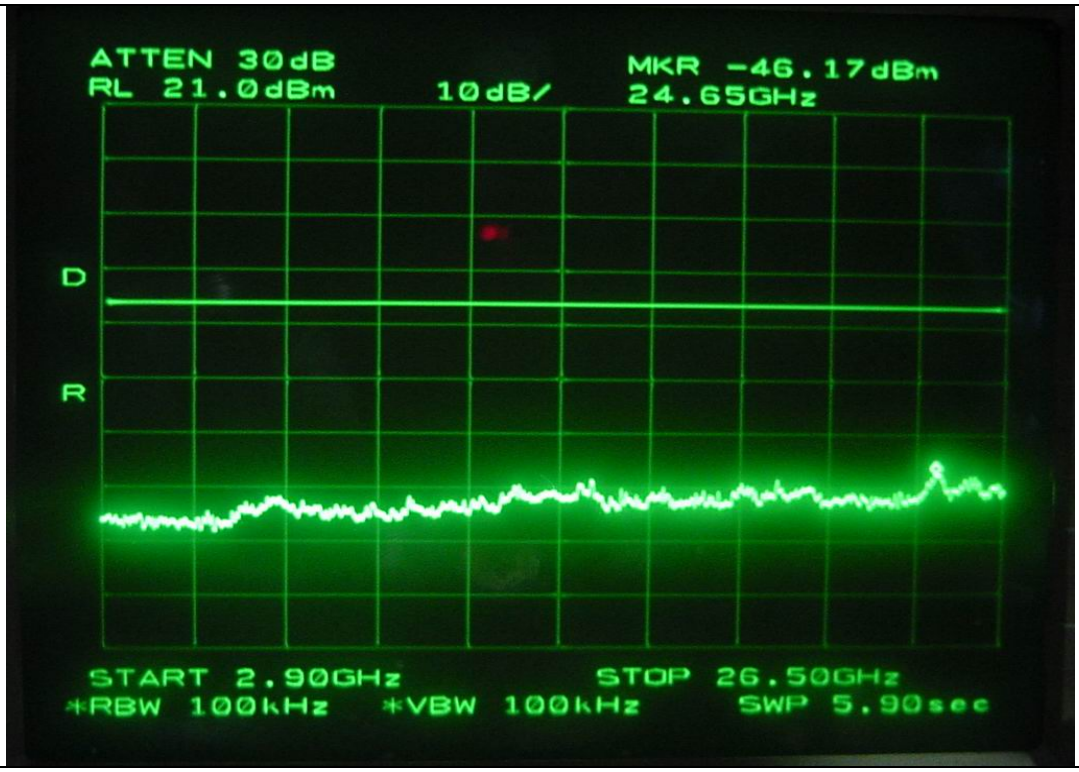

Low Channel

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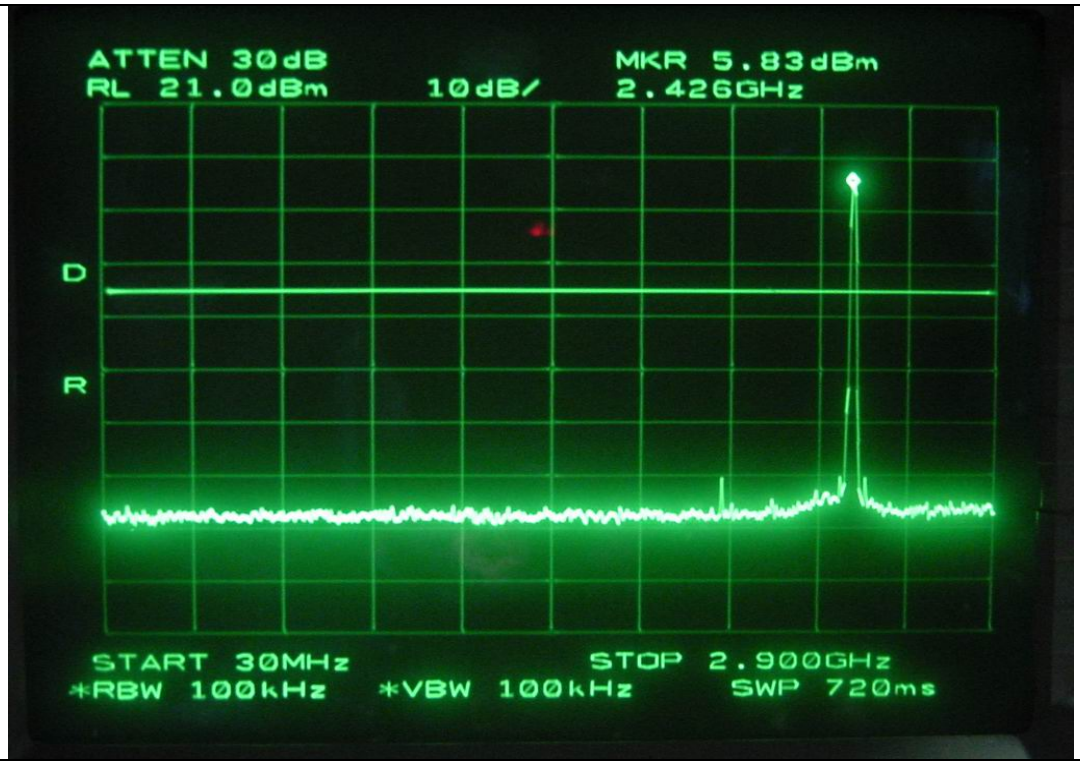
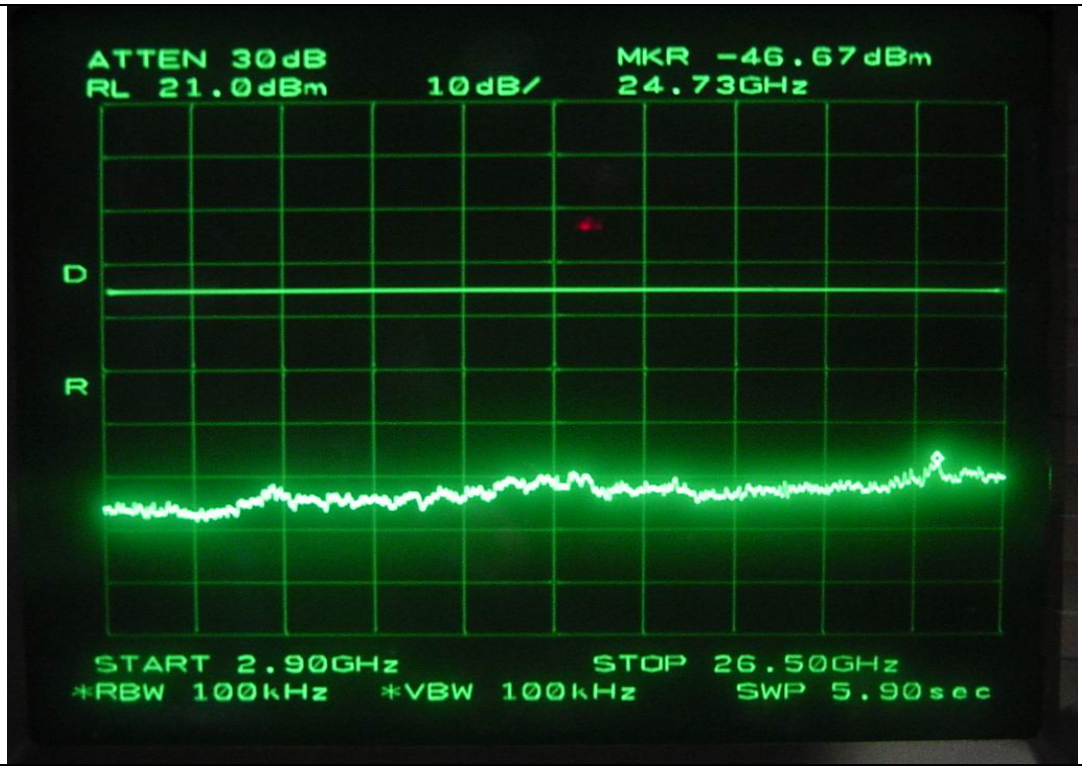


Middle Channel



Middle Channel

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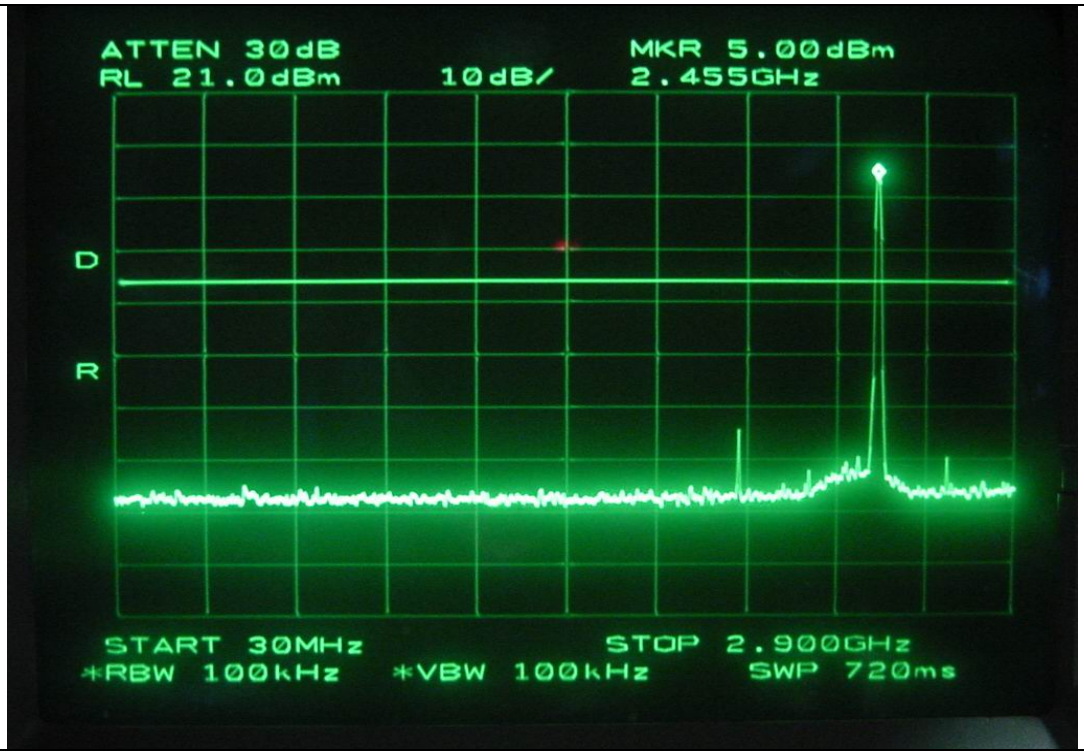
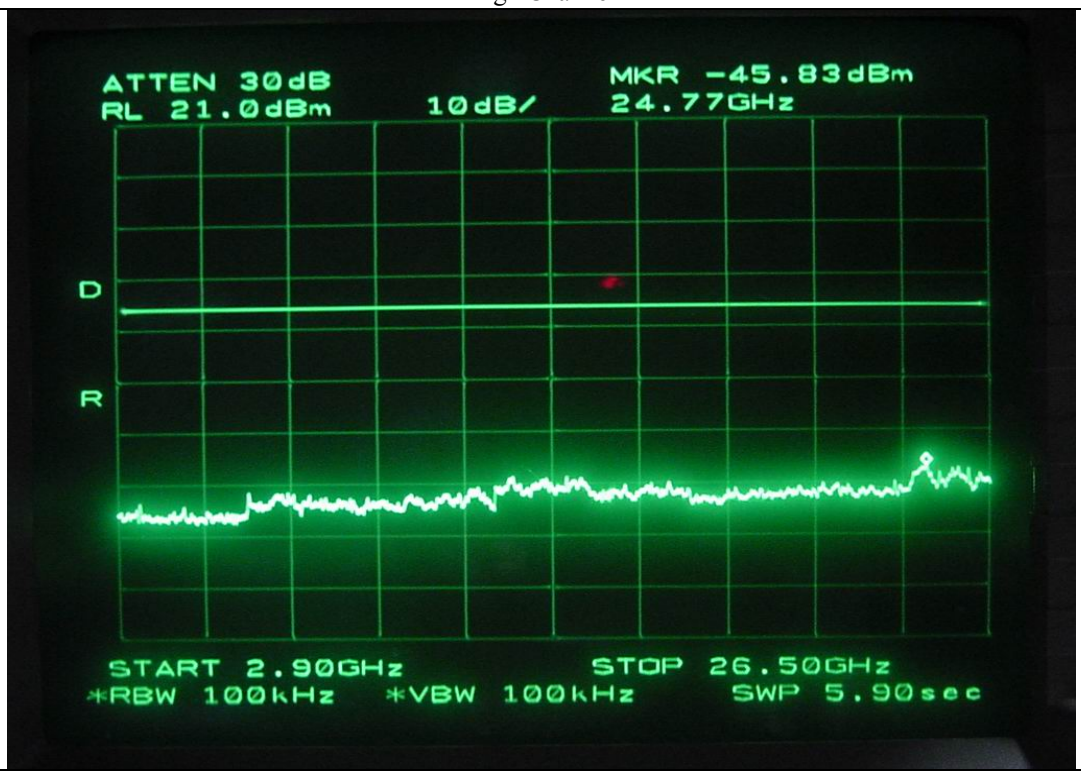


High Channel



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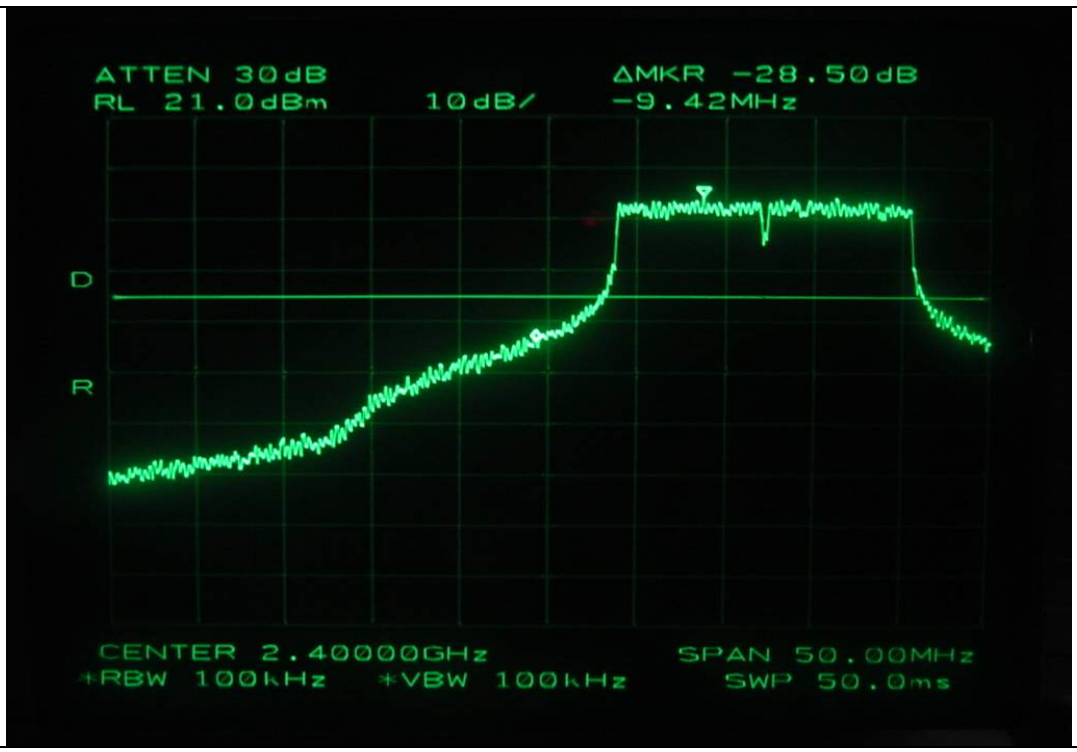
10.5.2 Test data for 802.11g



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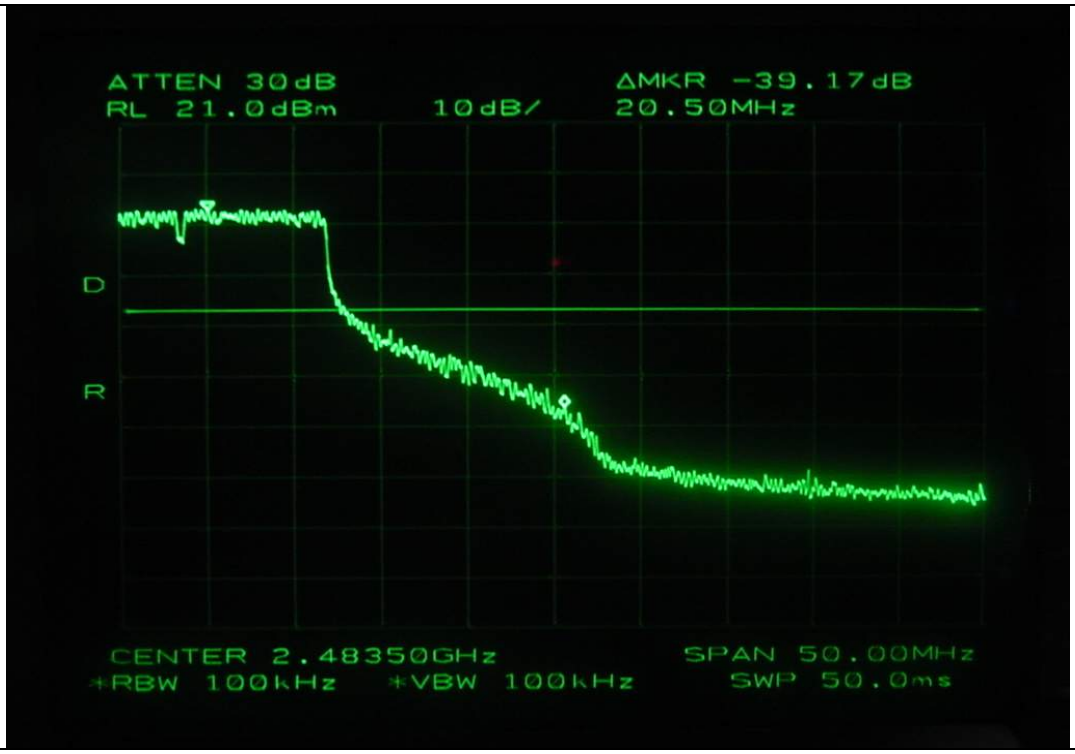

High Channel

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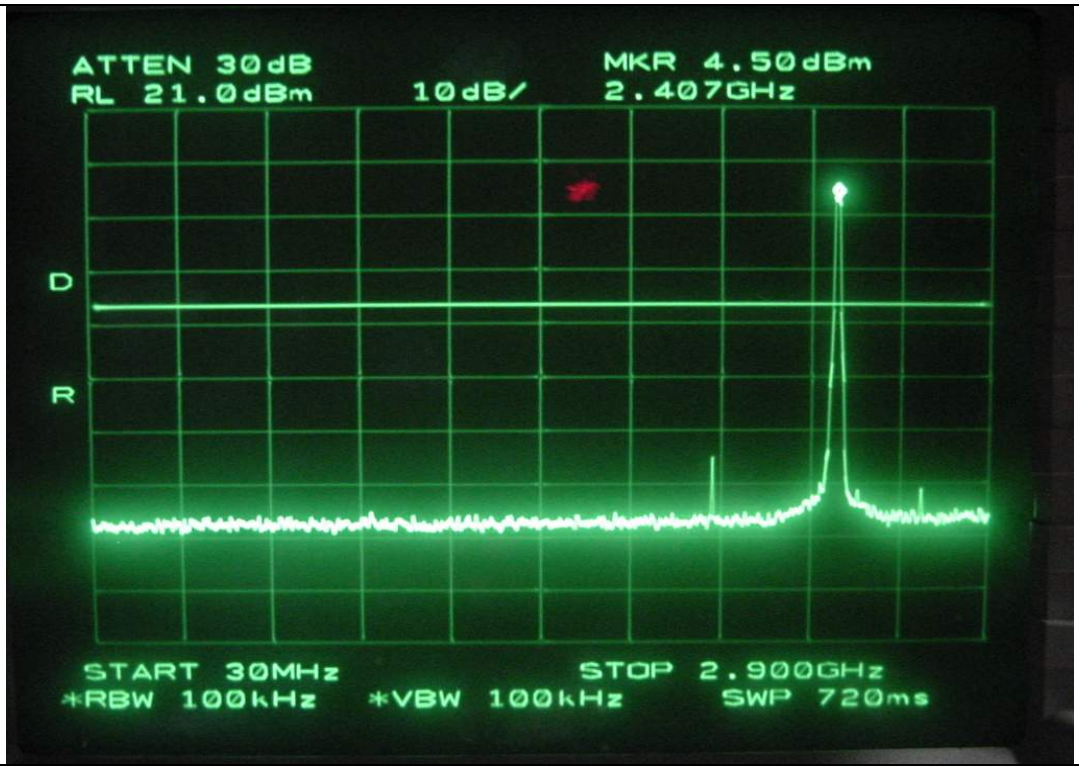

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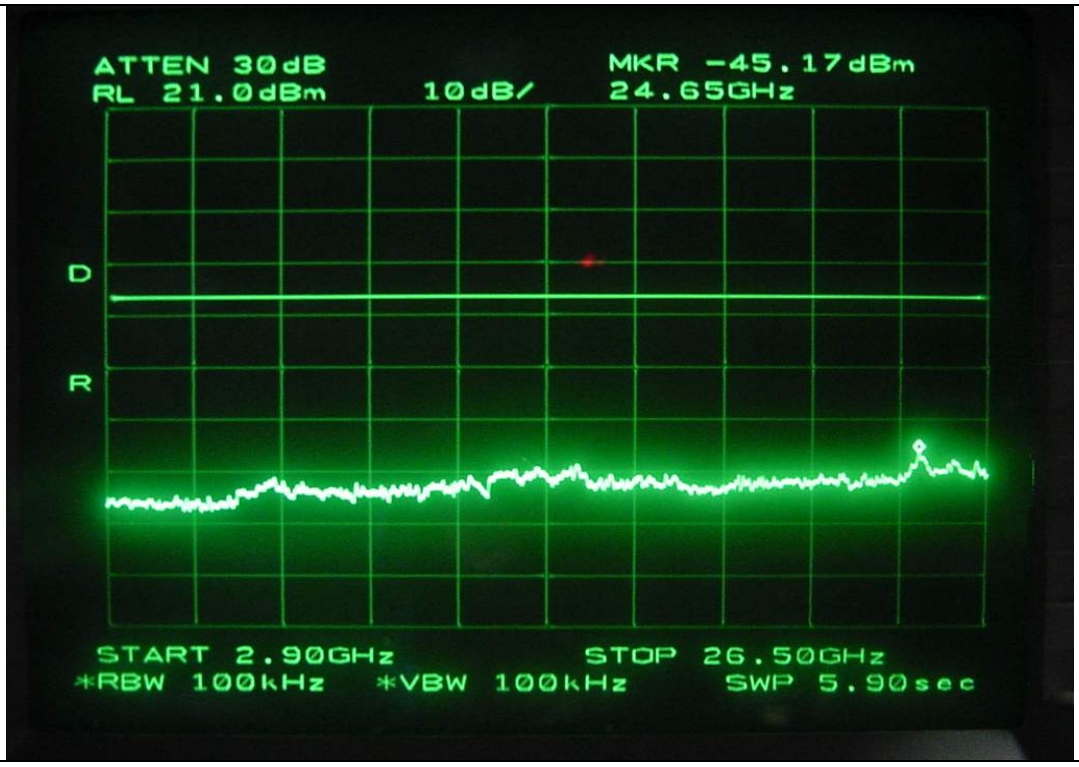

Low Channel

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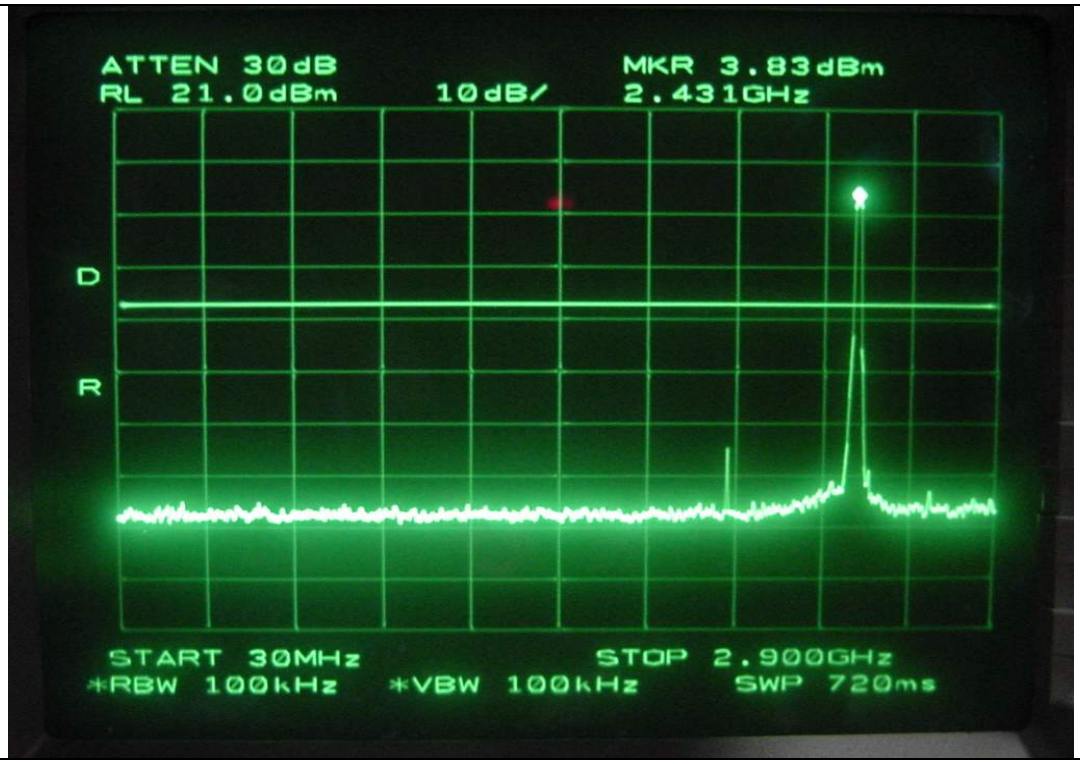
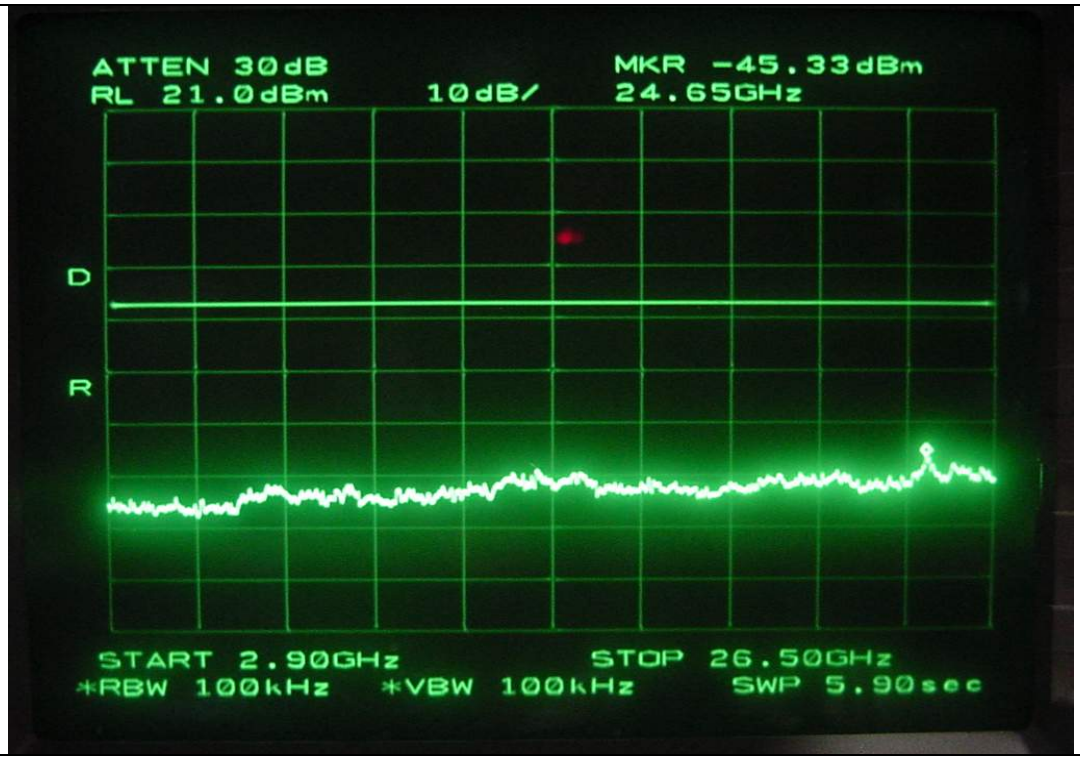


Middle Channel



Middle Channel

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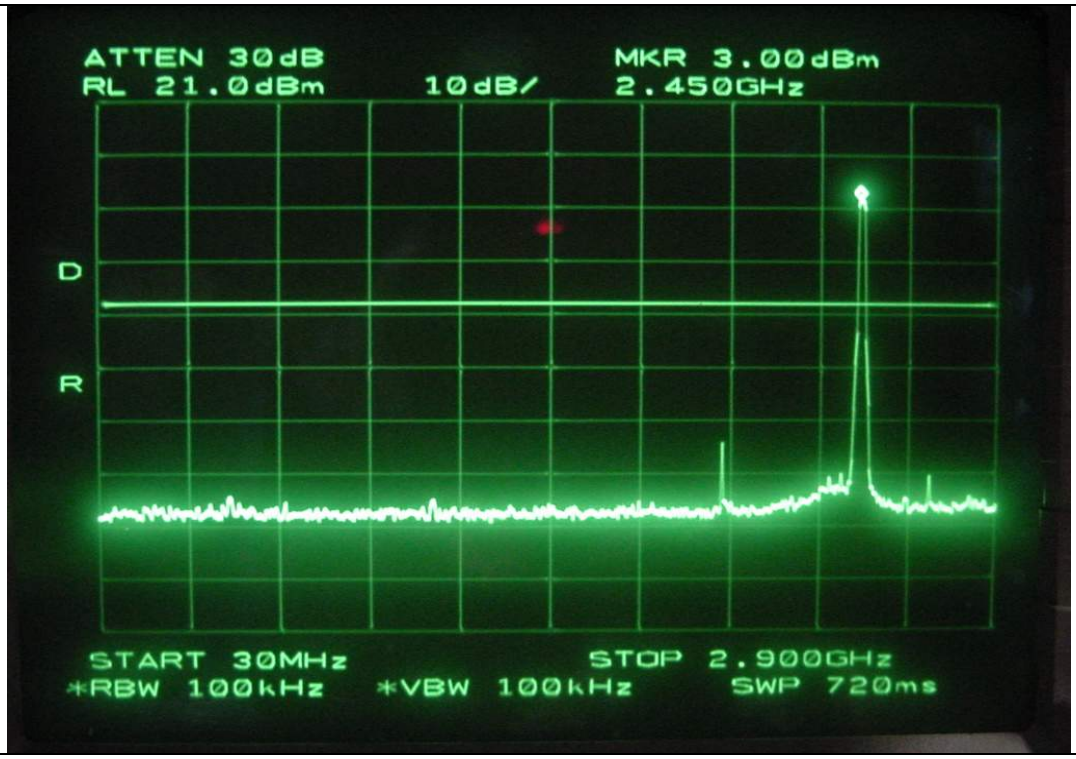

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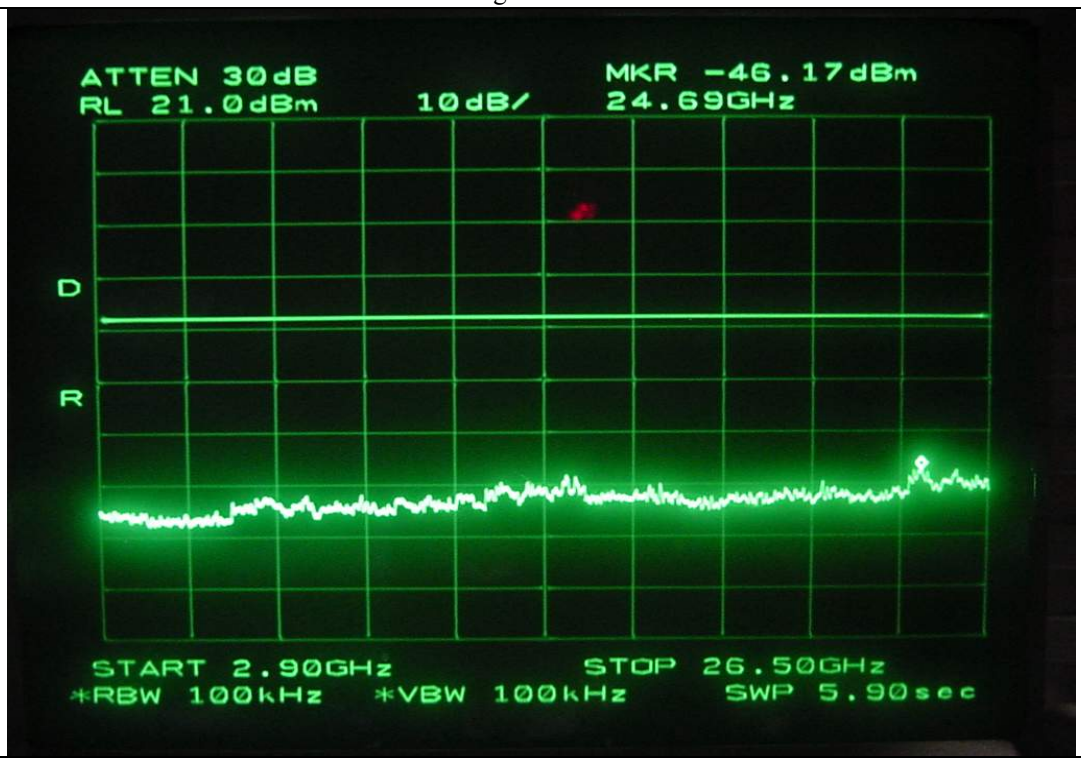

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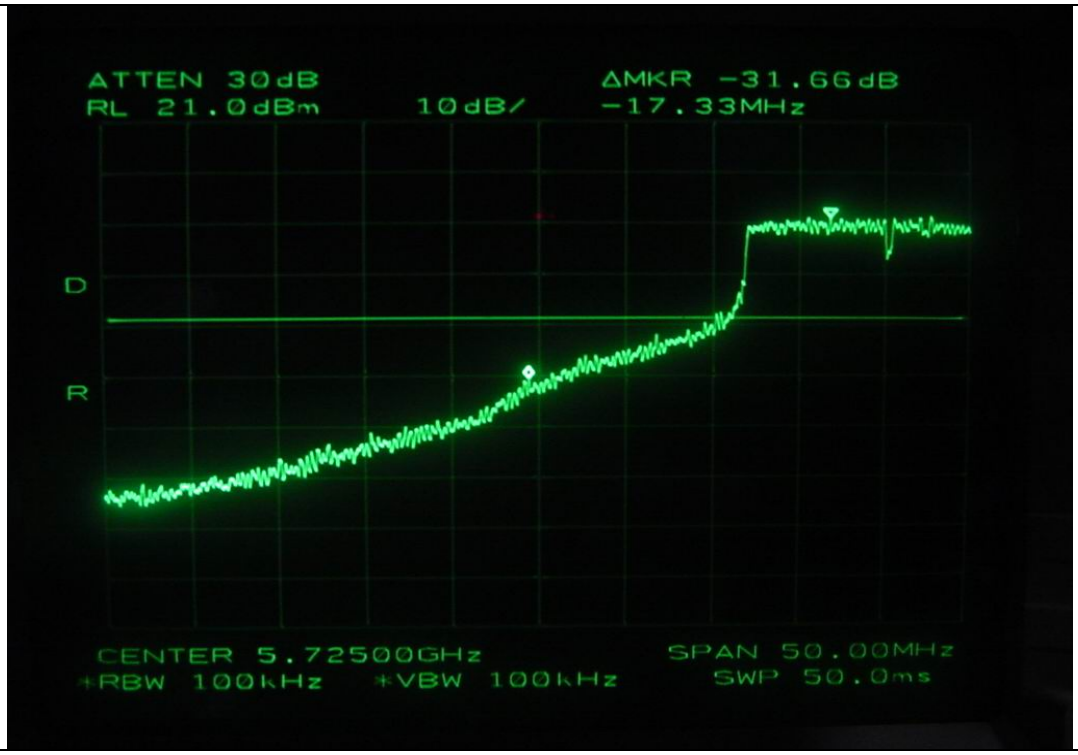
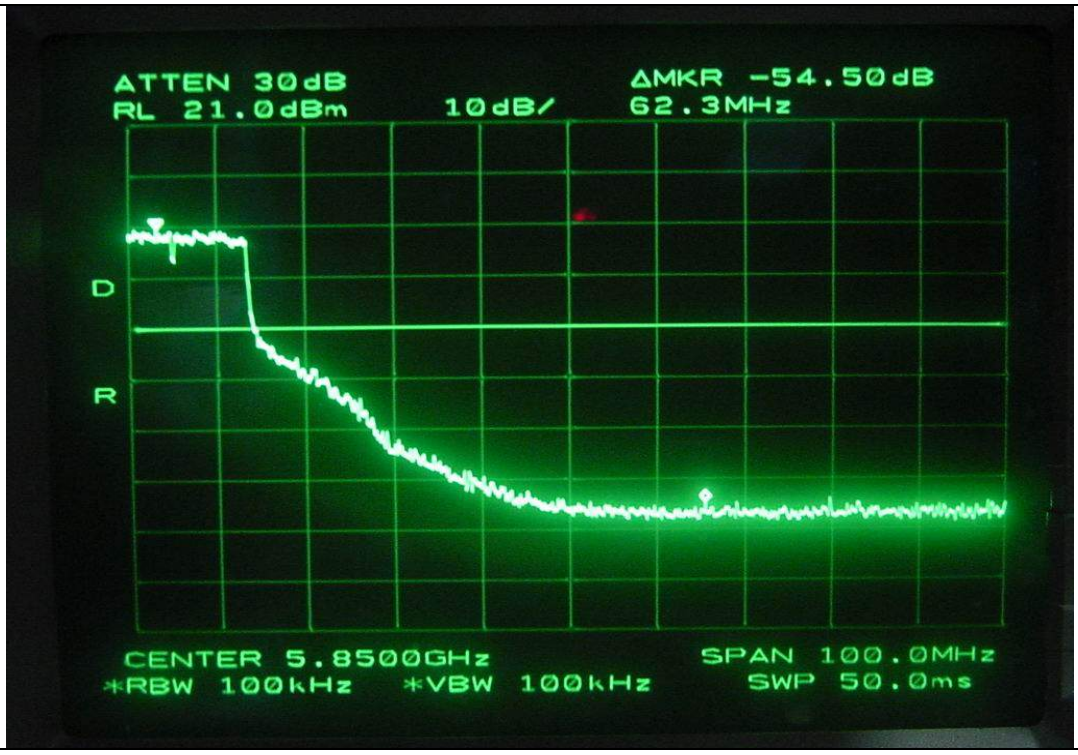
10.5.3 Test data for 802.11a



Low Channel



High Channel

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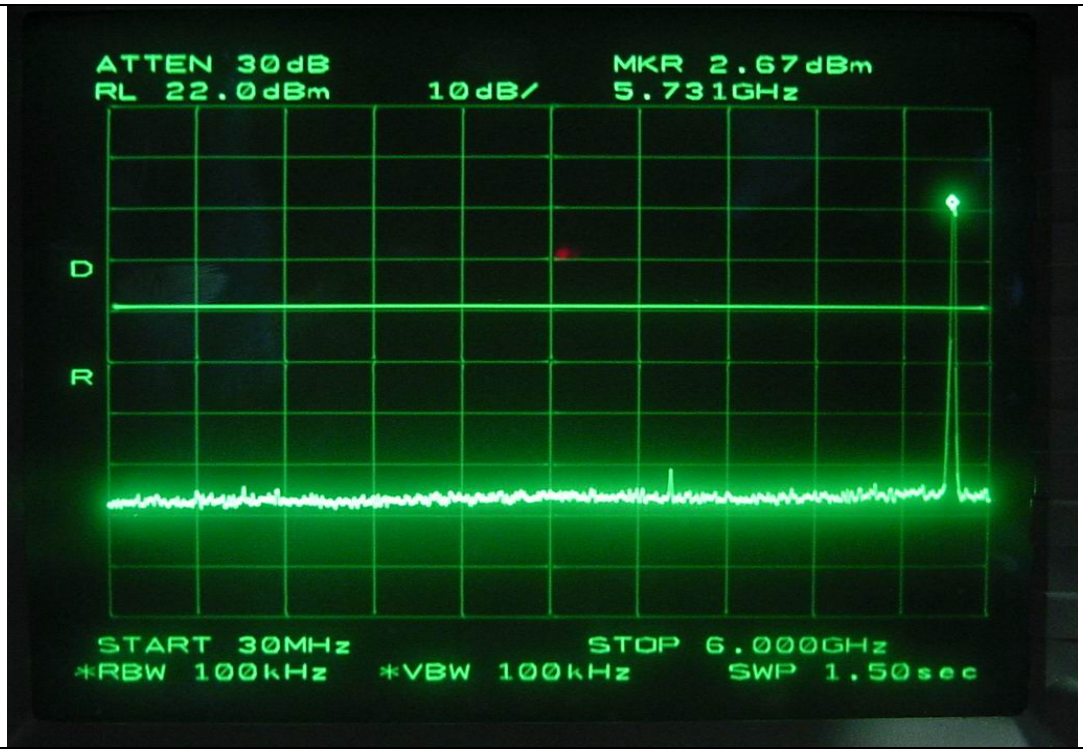

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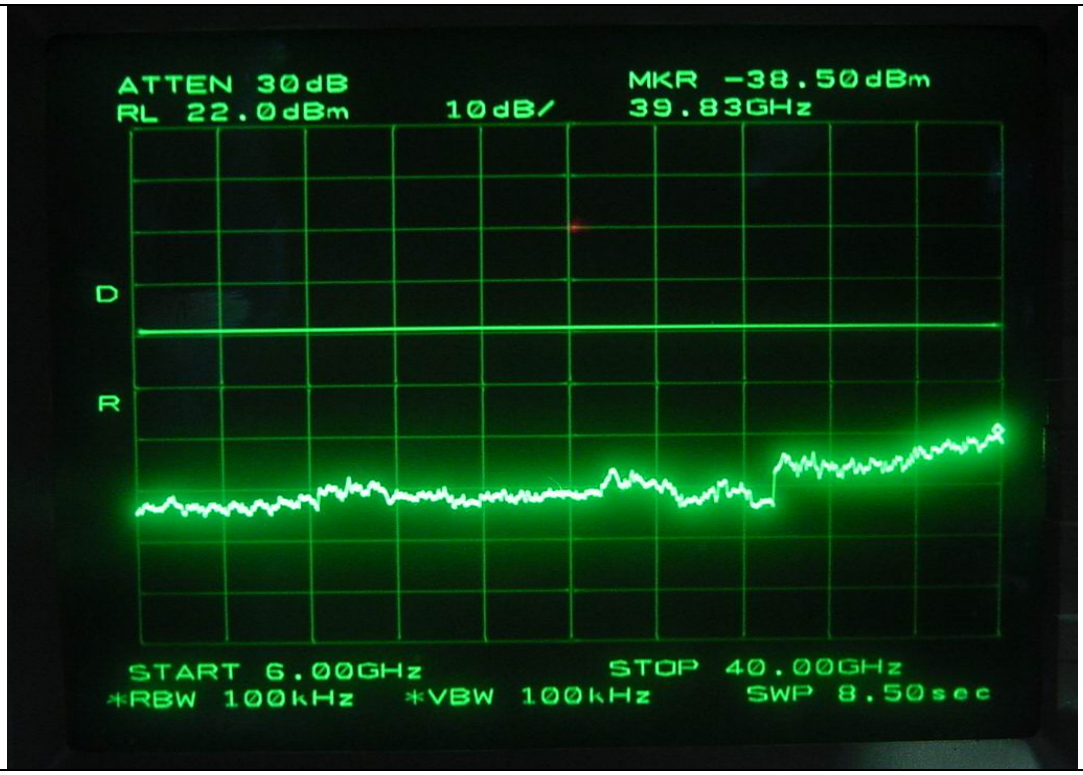

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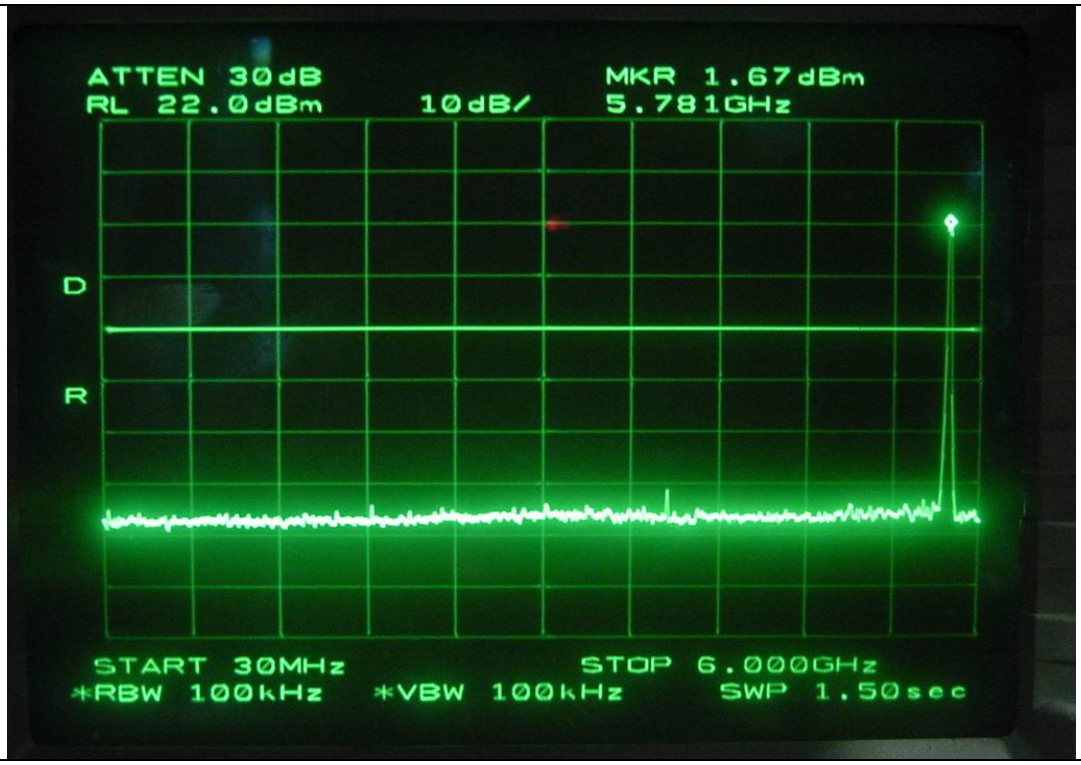
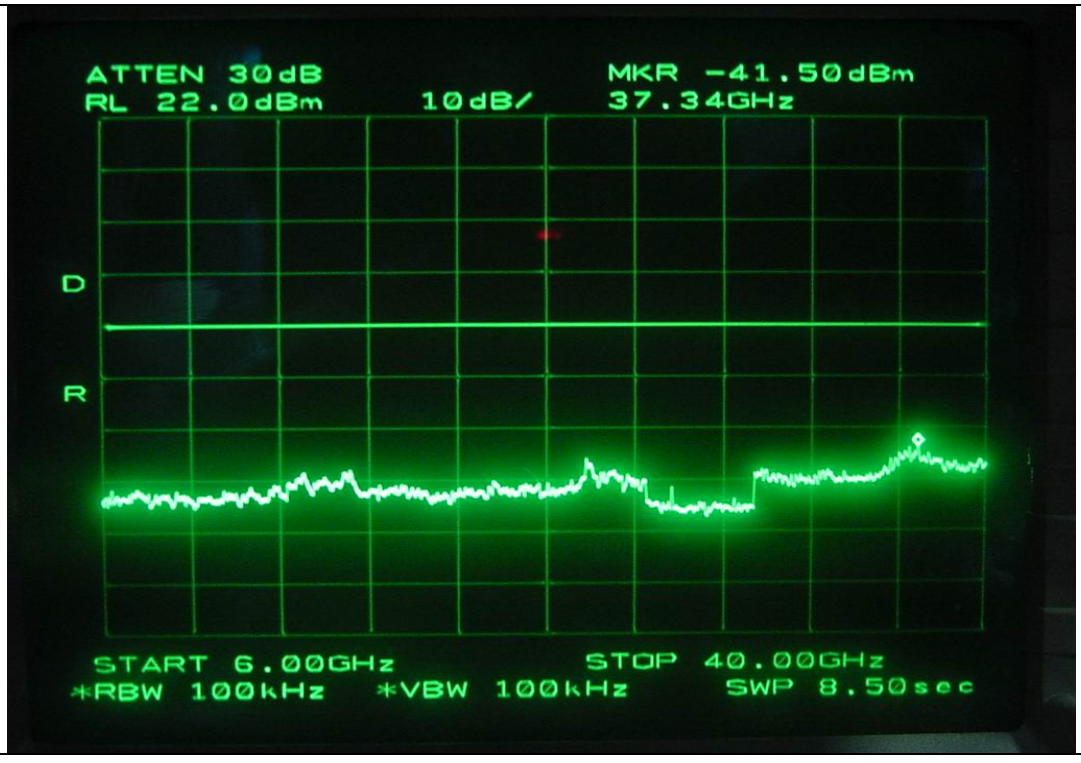


Middle Channel



Middle Channel

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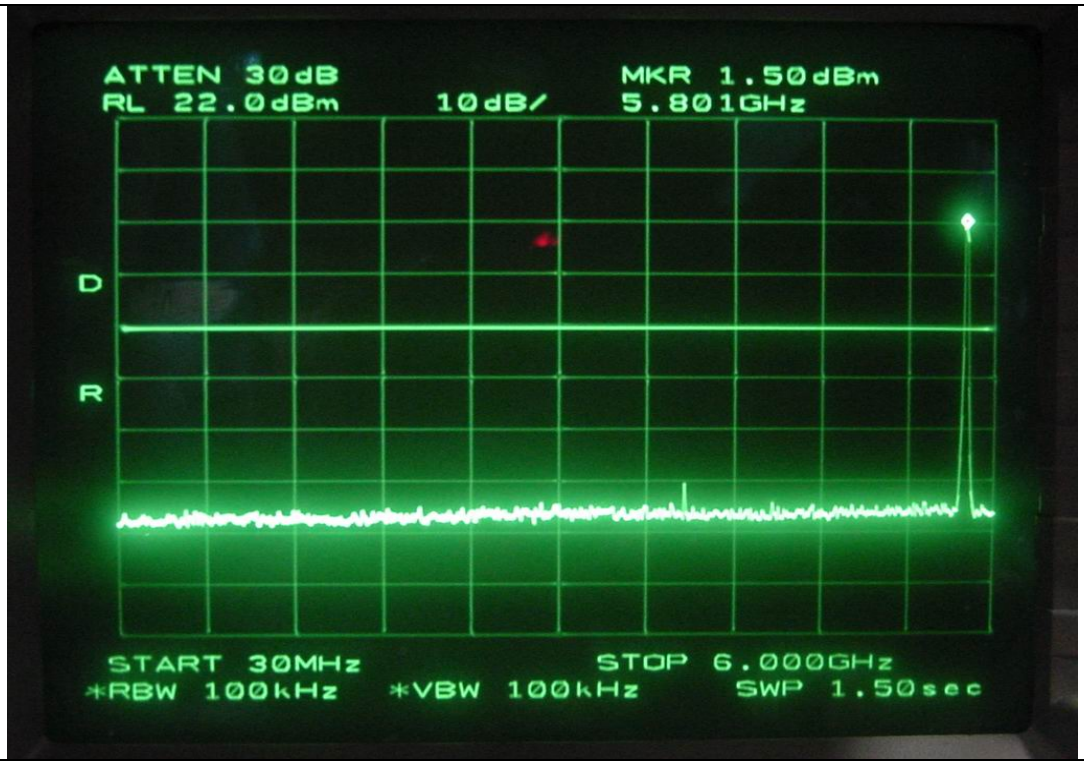

High Channel

High Channel

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