4.3 6dB BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 TEST INSTRUMENTS

Device	Model No.	Serial No.	Last Cal.	Next Cal
ROHDE & SCHWARZ EMI Test Receiver	ESIB 40	100201	01/23/05	01/23/06

4.3.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100kHz RBW and 100kHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP

4.3.6 EUT OPERATING CONDITIONS

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

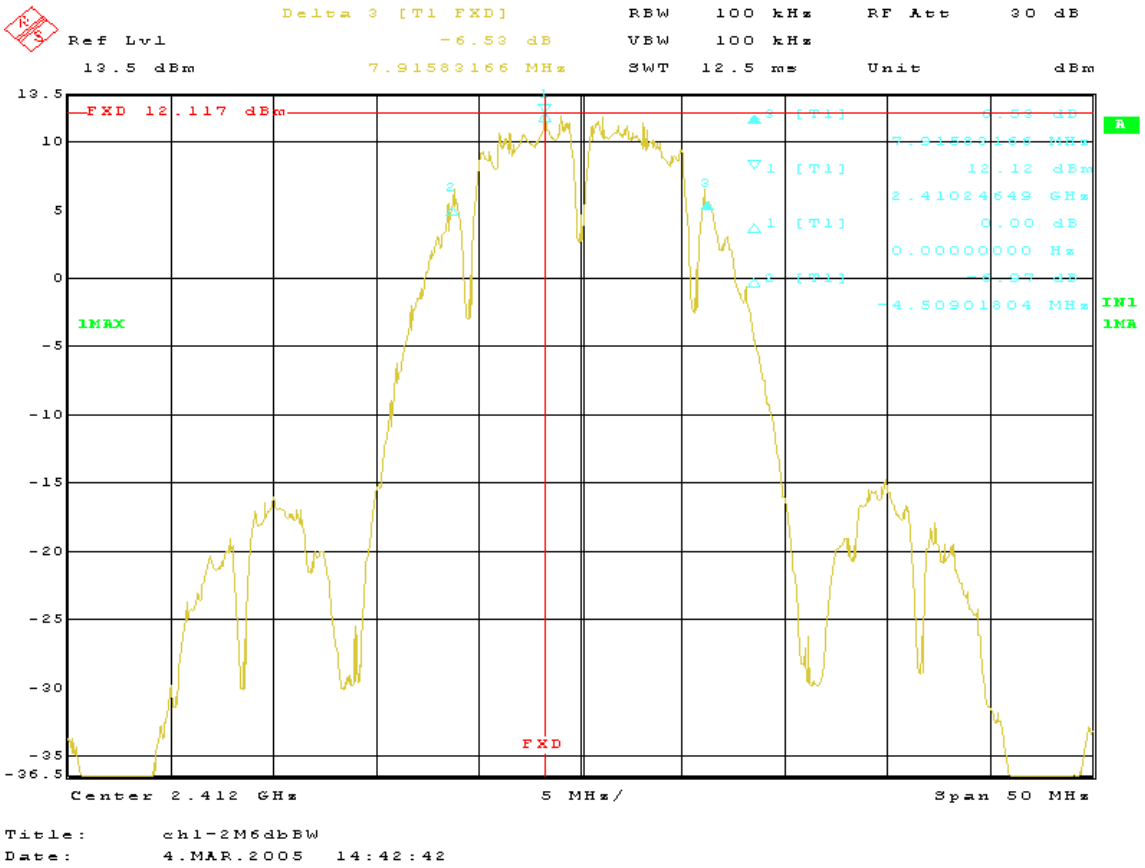
4.3.7 TEST RESULTS (A)

EUT	IEEE 802.11 A/B/G WIRELESS ACCESS POINT	MODEL	ACCESS / ONE NETWORK: OWS2400
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	23deg. C, 49%RH
TESTED BY: Sandra Sohn			

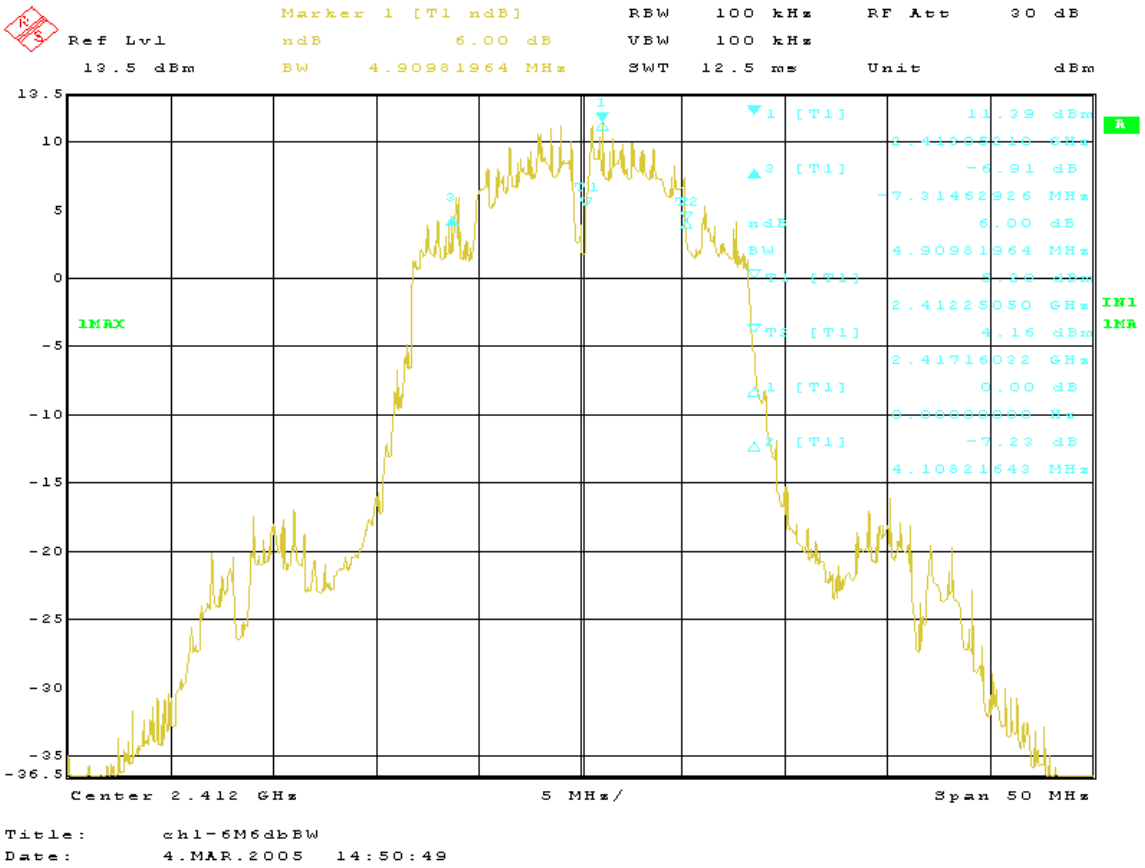
Channel 1

Data Rate (Mbps)	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
2	2412	12.424	0.5	PASS
6	2412	11.422	0.5	PASS
9	2412	9.518	0.5	PASS
11	2412	16.832	0.5	PASS
12	2412	11.322	0.5	PASS
16	2412	13.026	0.5	PASS
24	2412	12.223	0.5	PASS
54	2412	11.322	0.5	PASS

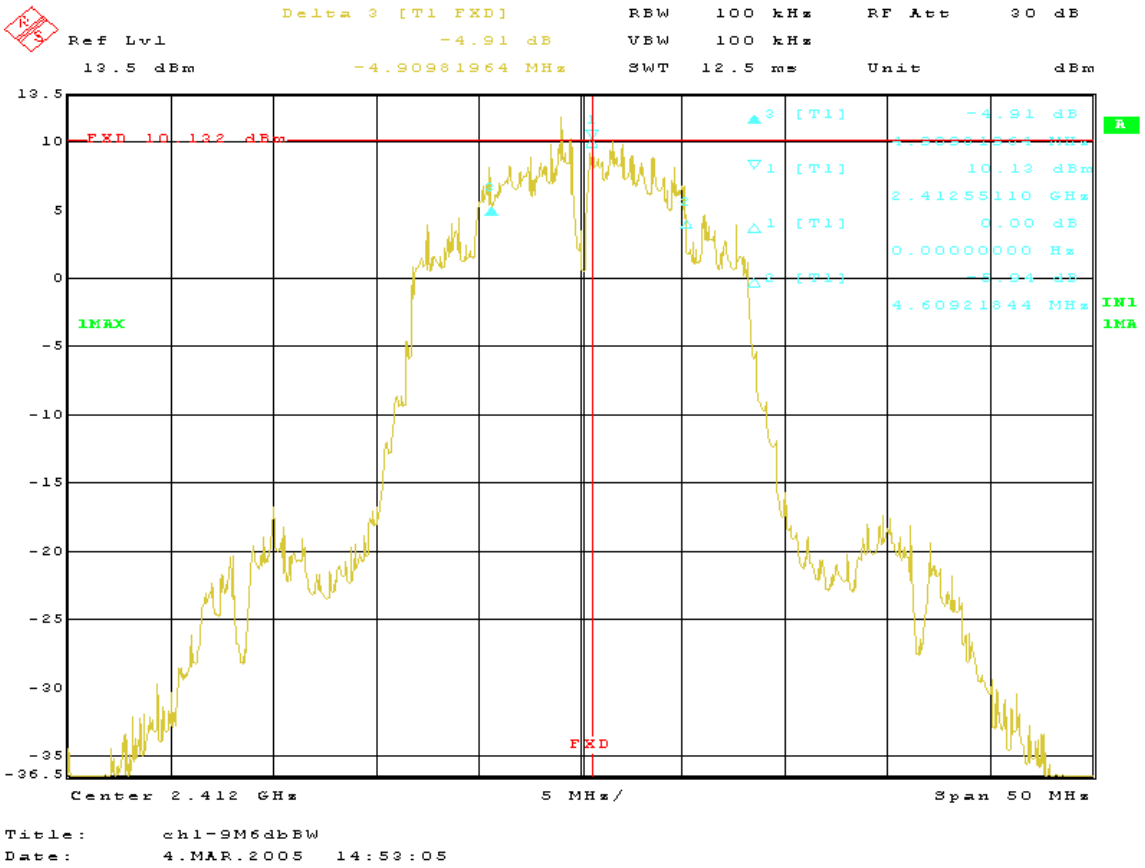
6dB BW
Channel 1
Data rate: 2Mbps



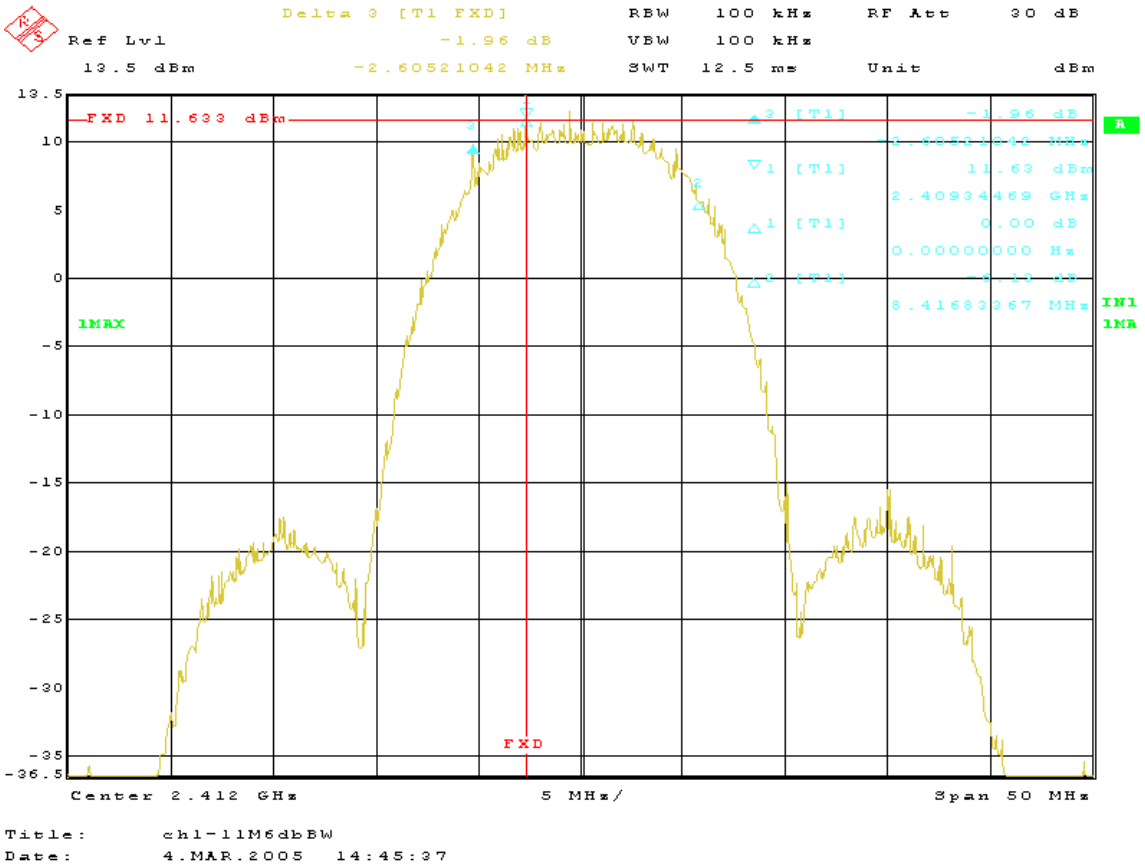
6dB BW
Channel 1
Data rate: 6Mbps



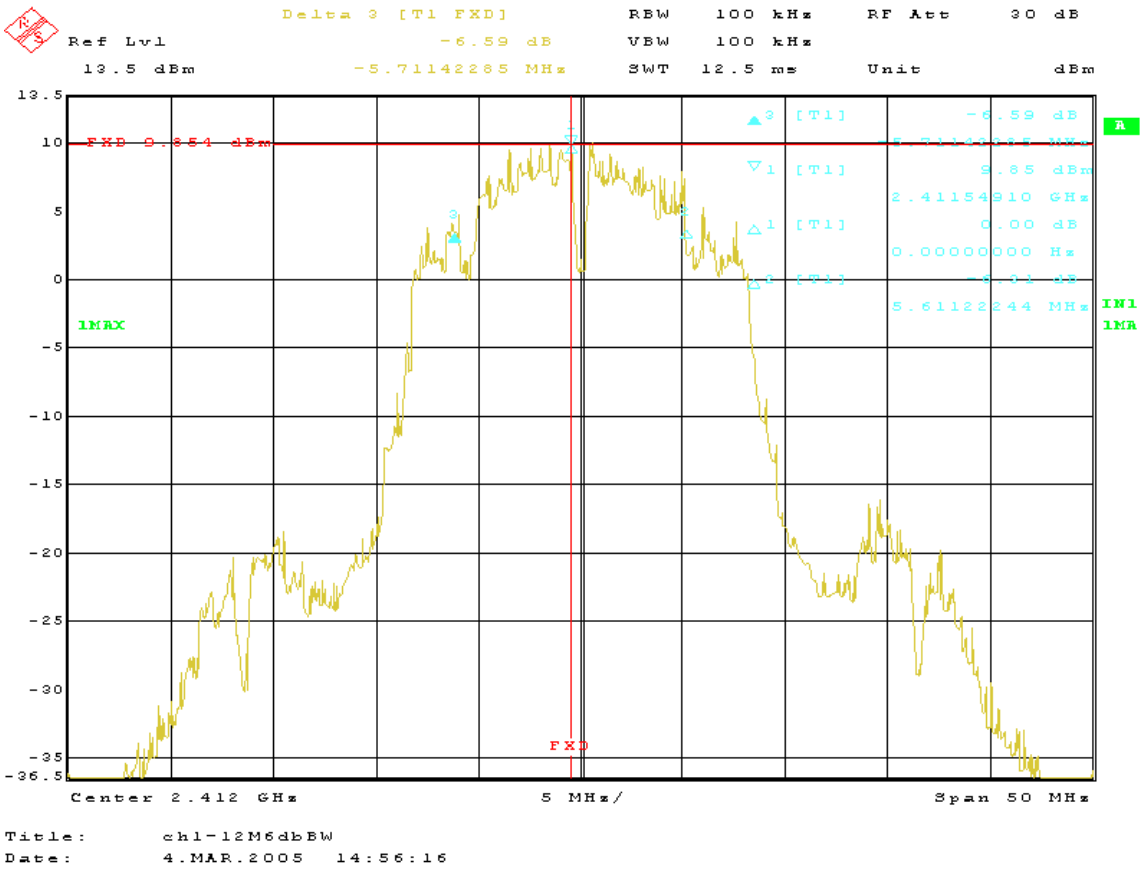
6dB BW
Channel 1
Data rate: 9Mbps



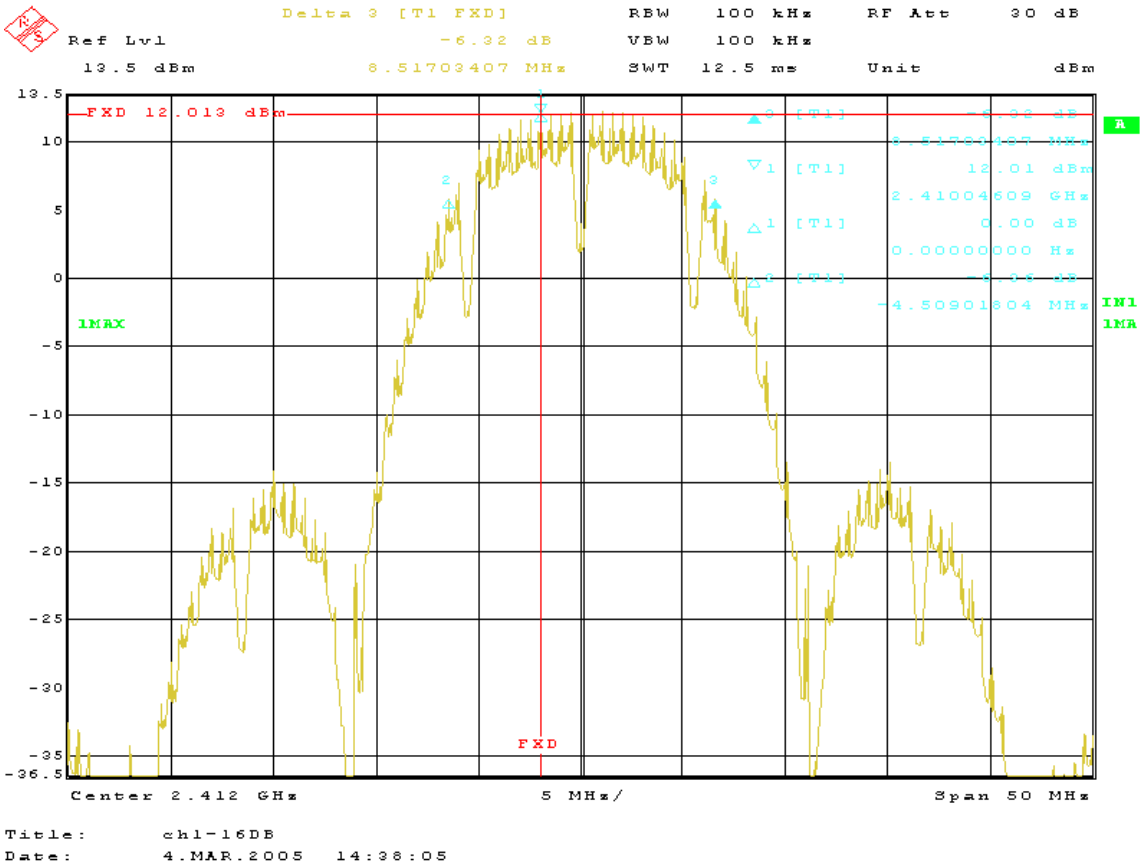
6dB BW
Channel 1
Data rate: 11Mbps



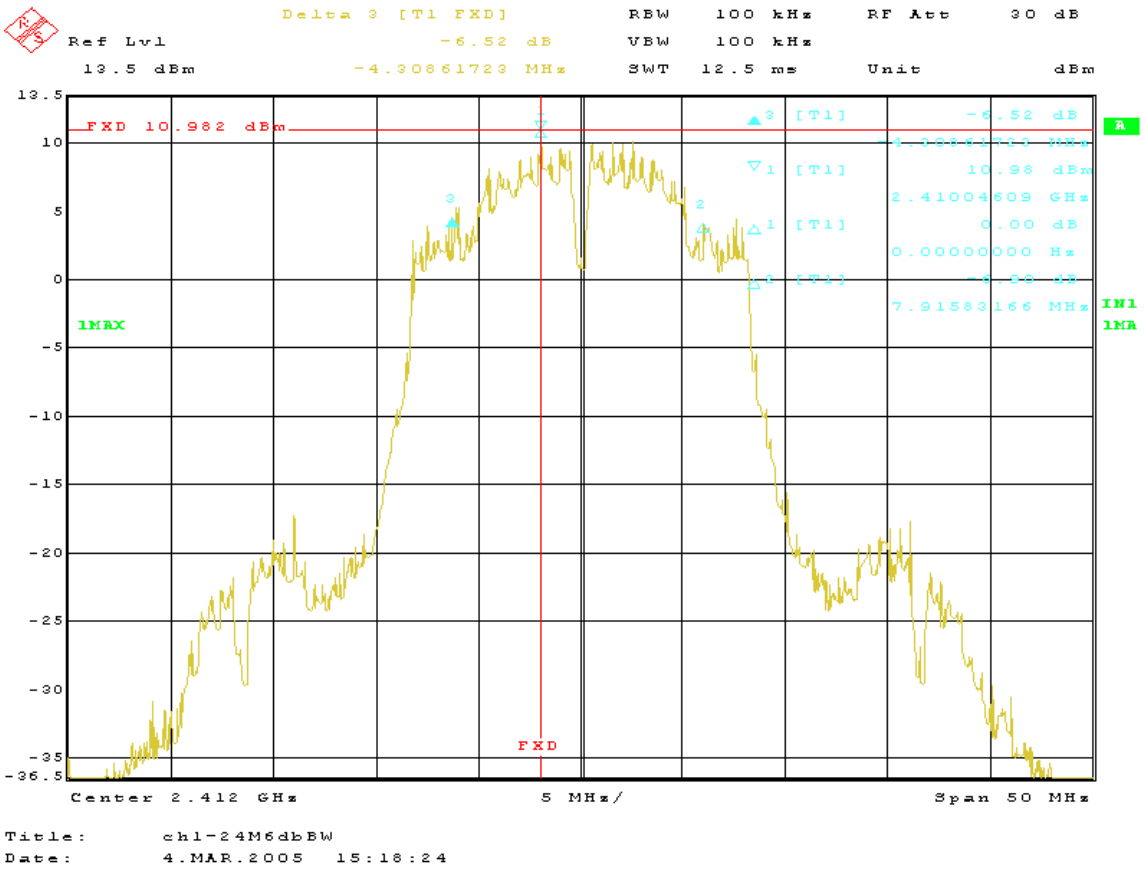
6dB BW
Channel 1
Data rate: 12Mbps



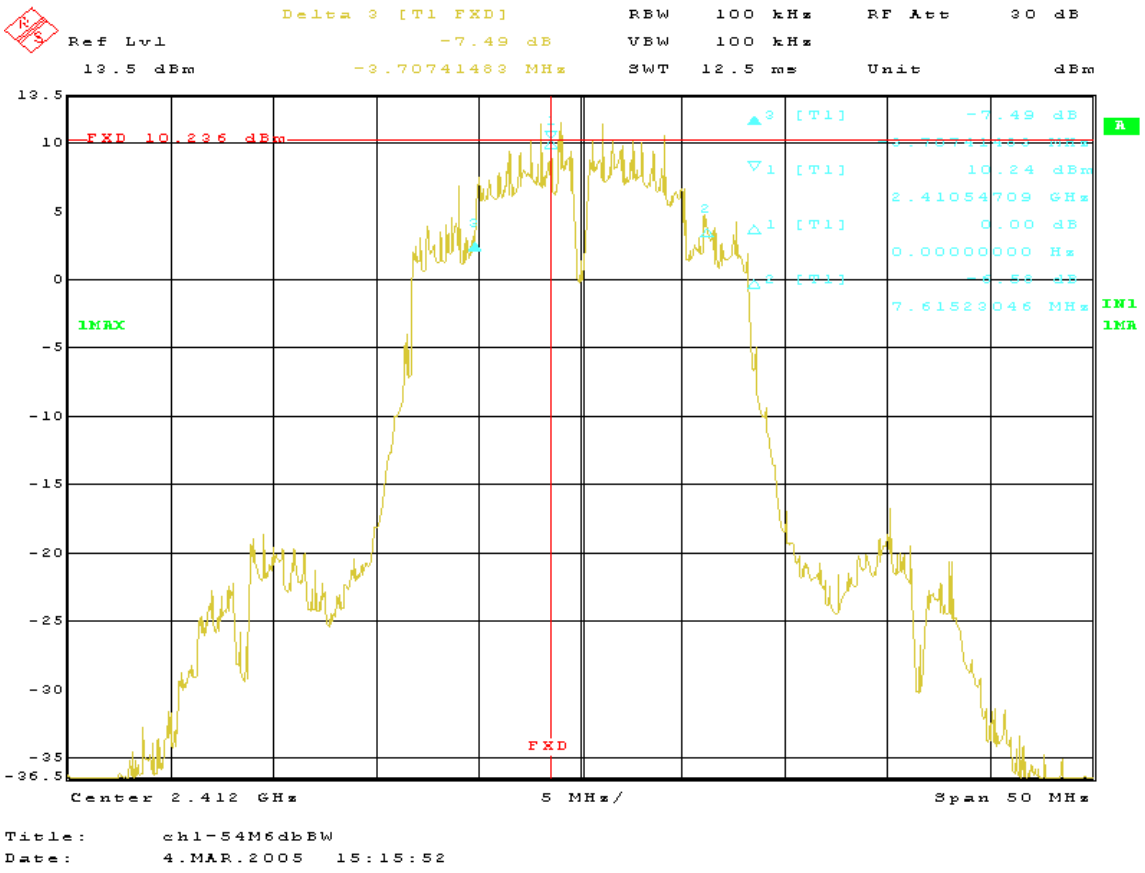
6dB BW
Channel 1
Data rate: 16Mbps



6dB BW
Channel 1
Data rate: 24Mbps



6dB BW
Channel 1
Data rate: 54Mbps



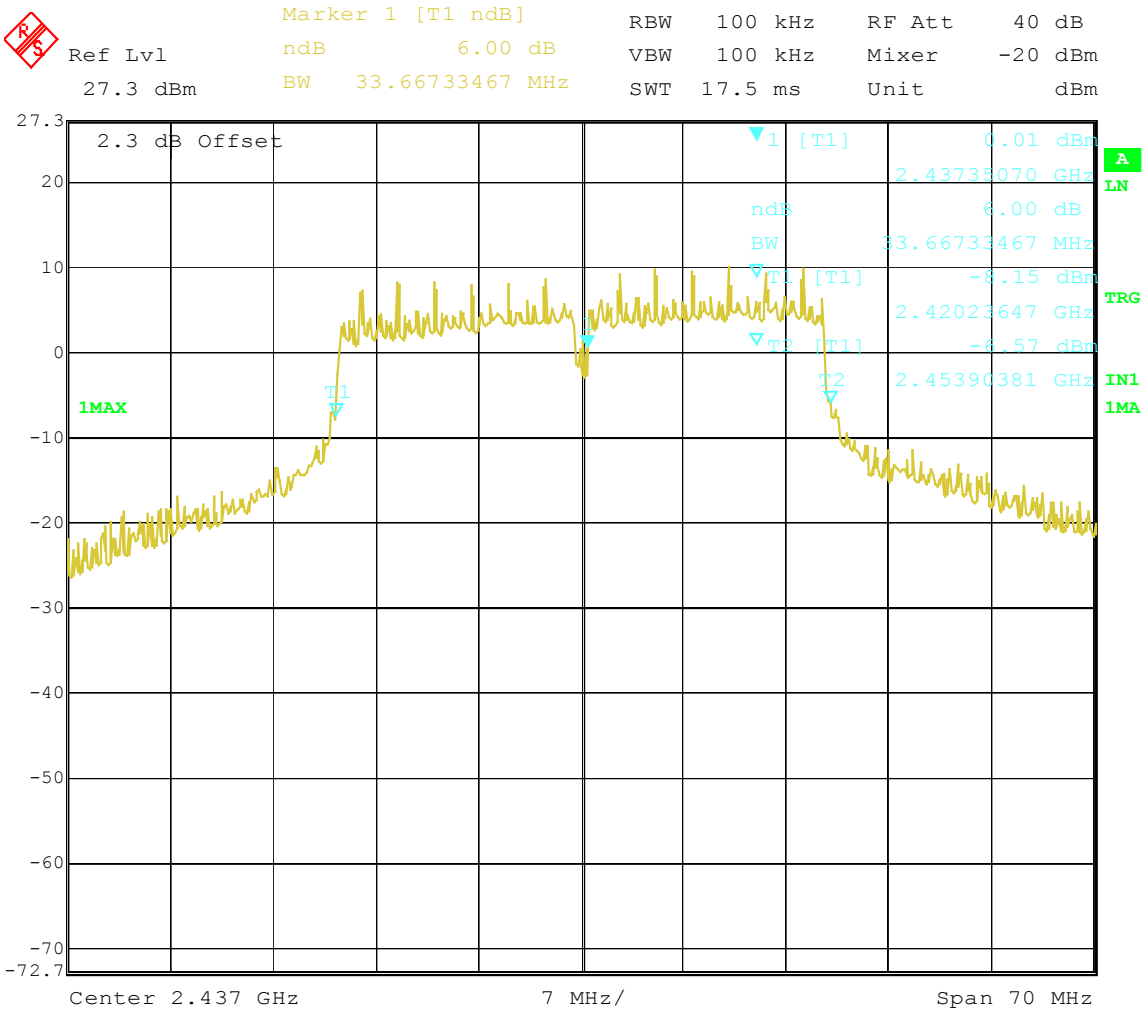
4.3.8 TEST RESULTS (B)

EUT	IEEE 802.11 A/B/G WIRELESS ACCESS POINT	**MODEL**	ACCESS / ONE NETWORK: OWS 2400
INPUT POWER (SYSTEM)	120Vac, 60Hz	**ENVIRONMENTAL CONDITIONS**	23deg. C, 49%RH
TESTED BY: Sandra Sohn			

Turbo mode, Channel 6

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
6 (turbo mode)	2437	33.667	0.5	PASS

6dB BW
Channel 6
Turbo mode



Title: 6turbo-108-6db B/W
Date: 21.MAR.2005 15:57:45

4.4 MAXIMUM PEAK OUTPUT POWER

4.4.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

4.4.2 INSTRUMENTS

Device	Model No.	Serial No.	Last Cal.	Next Cal
ROHDE & SCHWARZ EMI Test Receiver	ESIB 40	100201	01/23/05	01/23/06

4.4.3 TEST PROCEDURES

The transmitter output was connected to the spectrum analyzer through an attenuator. The maximum power level of the fundamental frequency was measured by spectrum analyzer with 10MHz RBW and 10MHz VBW.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation

4.4.5 TEST SETUP

4.4.6 EUT OPERATING CONDITIONS

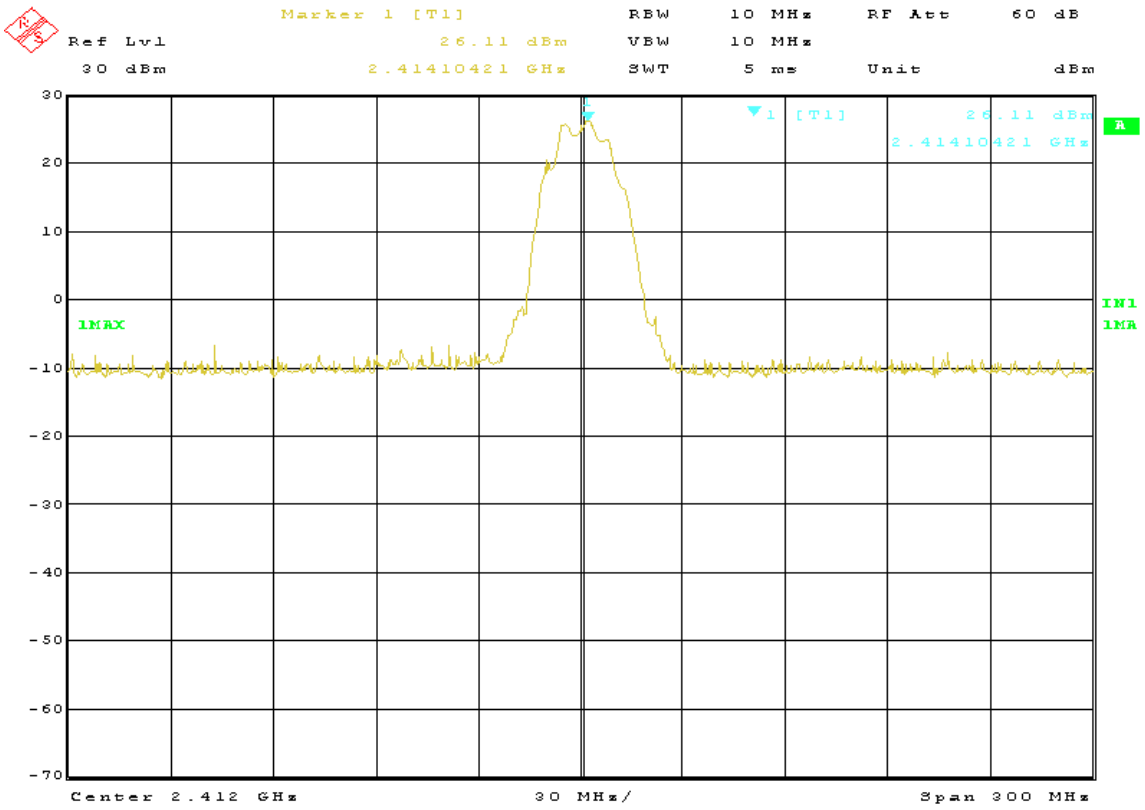
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually. The lowest channel is seen as highest and repeat with the different data rates.

4.4.7 TEST RESULTS (A)

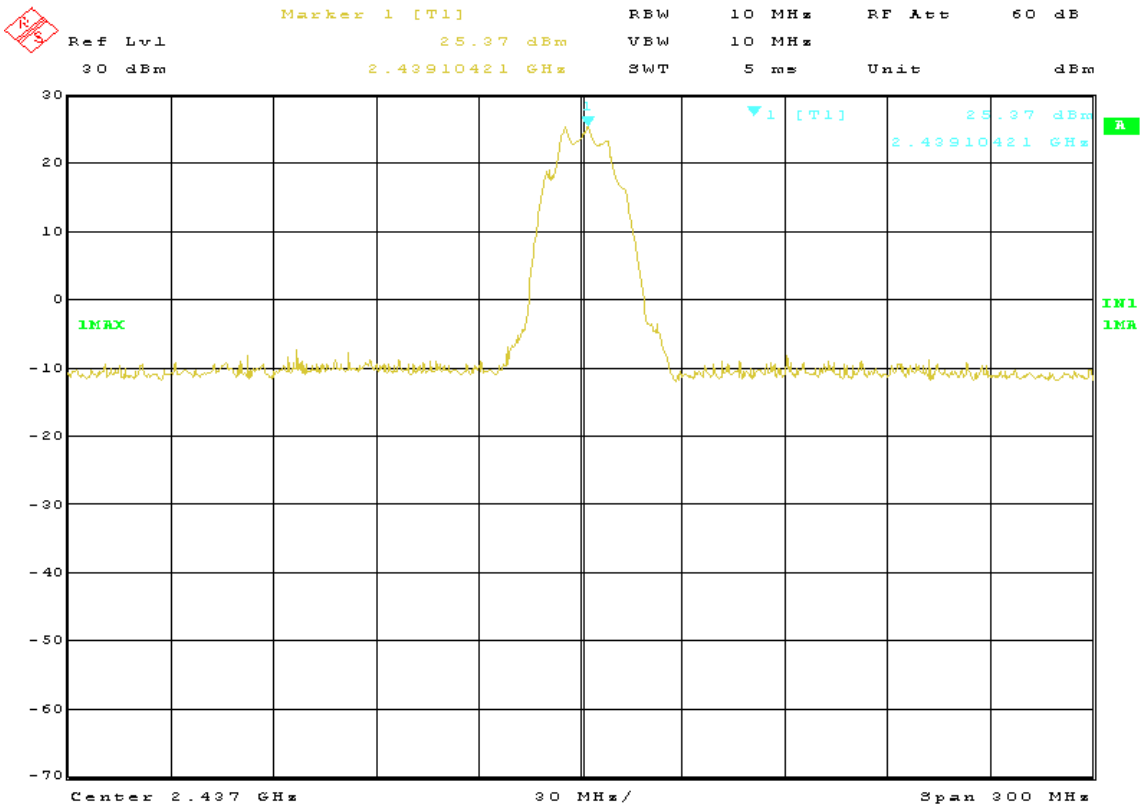
EUT	IEEE 802.11 A/B/G WIRELESS ACCESS POINT	**MODEL**	ACCESS / ONE NETWORK: OWS 2400
INPUT POWER (SYSTEM)	120Vac, 60Hz	**ENVIRONMENTAL CONDITIONS**	22deg. C, 49%RH
TESTED BY: Sandra Sohn			

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2414	26.11	30	PASS
6	2439	25.37	30	PASS
11	2464	25.37	30	PASS

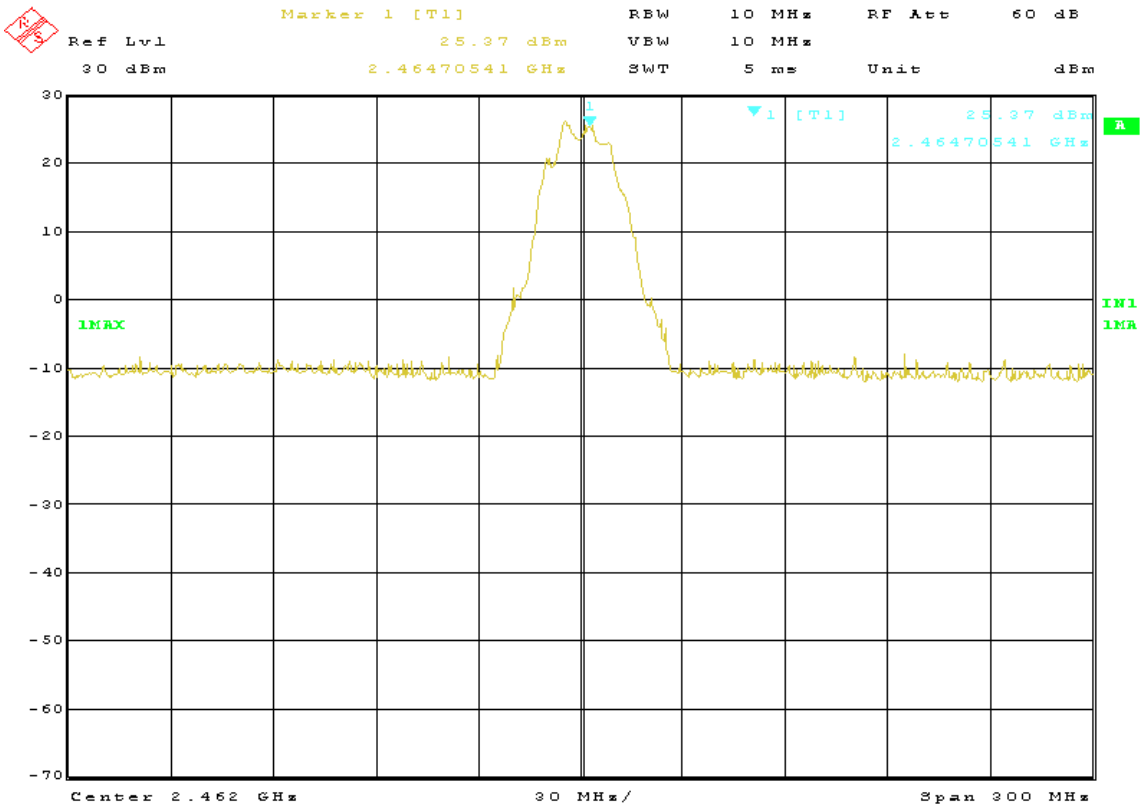
PP
Channel 1
Data rate: 11Mbps



PP
Channel 6
Data rate: 11Mbps



PP
Channel 11
Data rate: 11Mbps



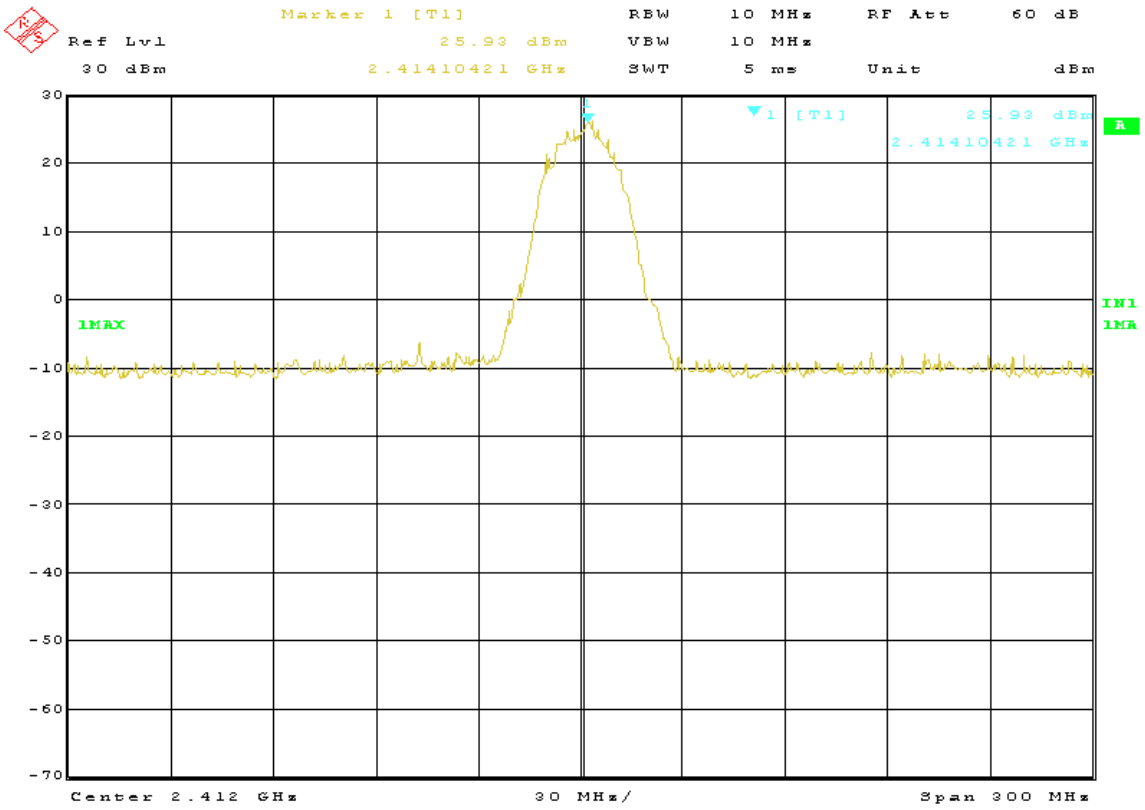
4.4.8 TEST RESULTS (B)

EUT	IEEE 802.11 A/B/G WIRELESS ACCESS POINT	MODEL	ACCESS / ONE NETWORK: OWS 2400
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	21deg. C, 48%RH
TESTED BY: Sandra Sohn			

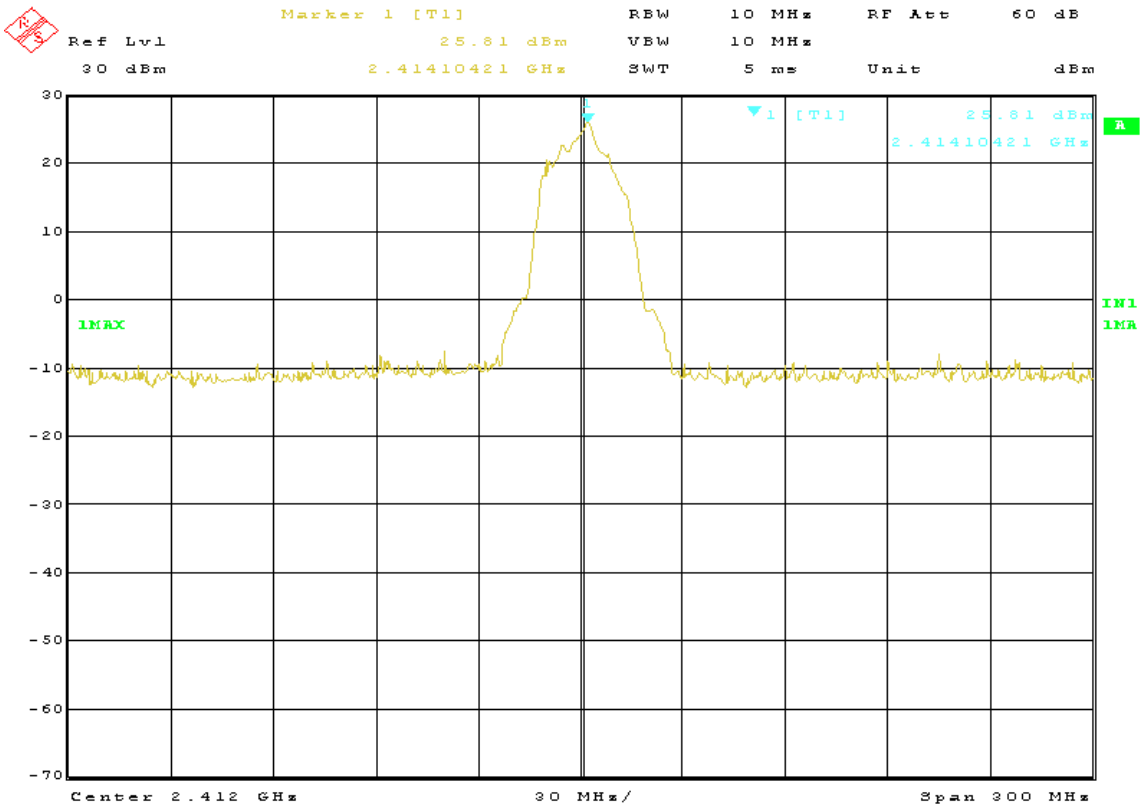
Channel 1

Data Rate (Mbps)	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2414	25.93	30	PASS
2	2414	25.81	30	PASS
6	2414	25.03	30	PASS
9	2413	25.27	30	PASS
11	2414	26.11	30	PASS
12	2413	24.48	30	PASS
18	2413	24.68	30	PASS
24	2413	24.59	30	PASS
36	2413	24.33	30	PASS
48	2413	24.59	30	PASS
54	2413	24.33	30	PASS

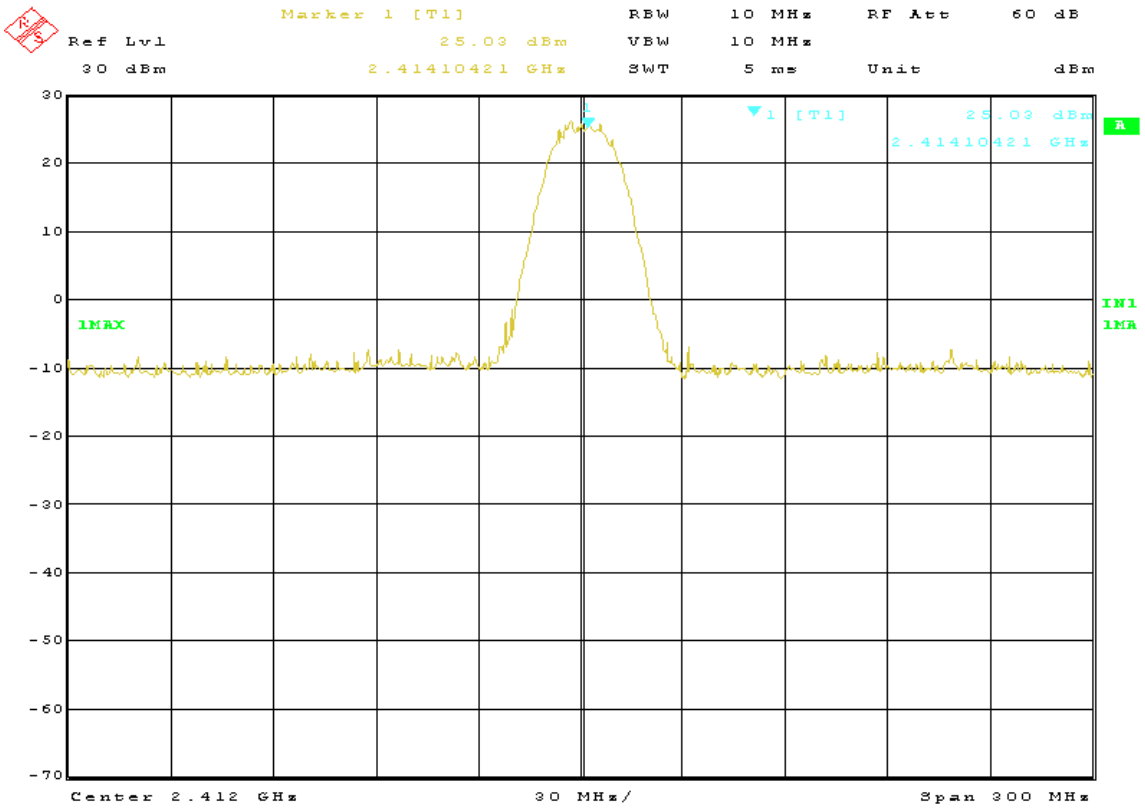
PP
Channel 1
Data rate: 1Mbps



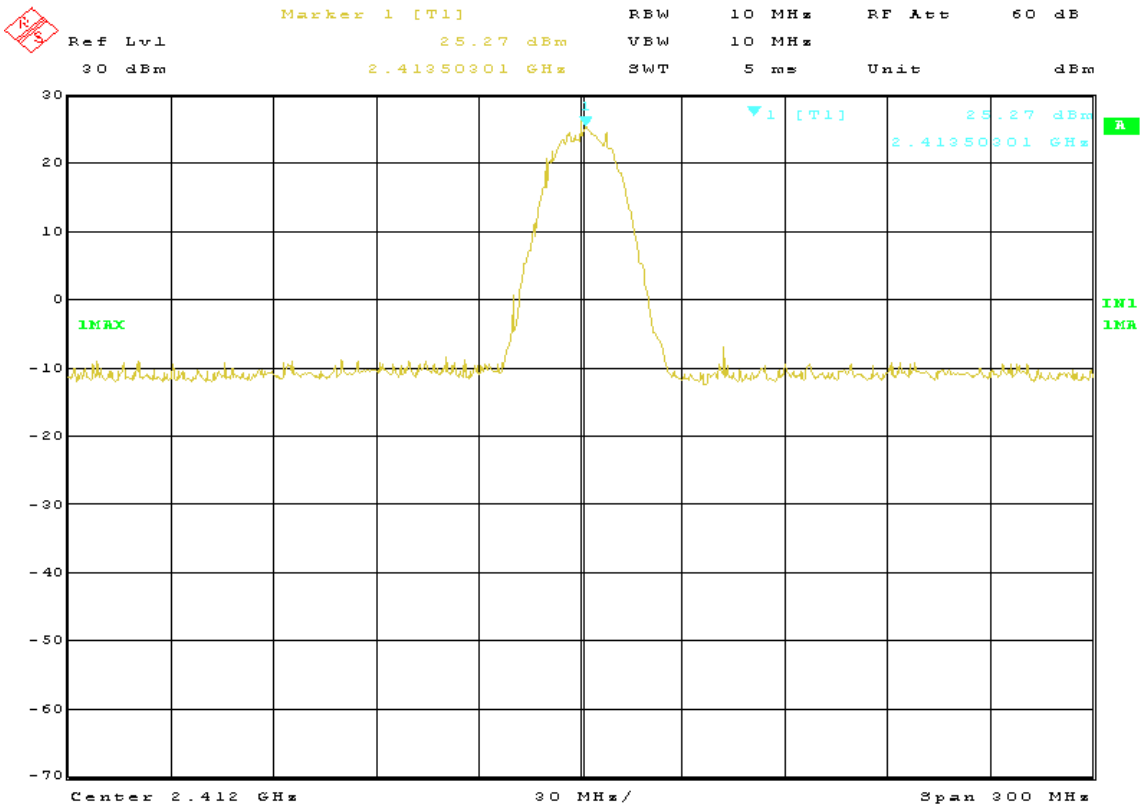
PP
Channel 1
Data rate: 2Mbps



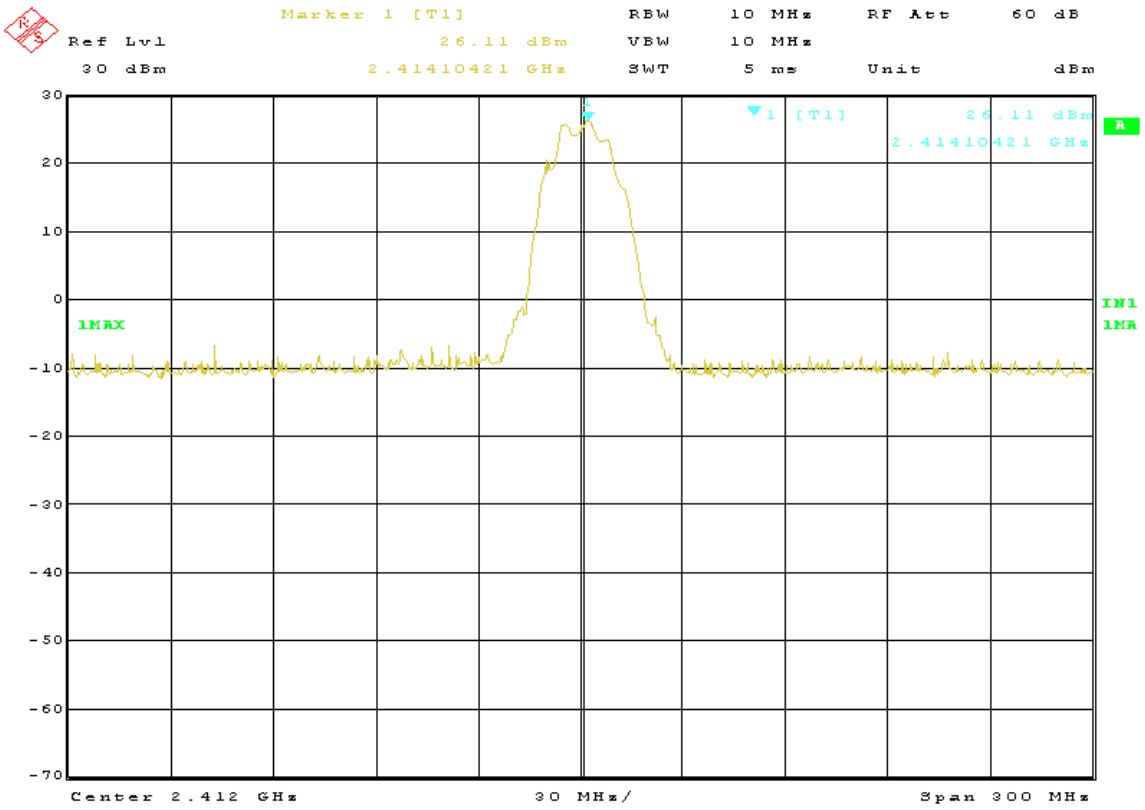
PP
Channel 1
Data rate: 6Mbps



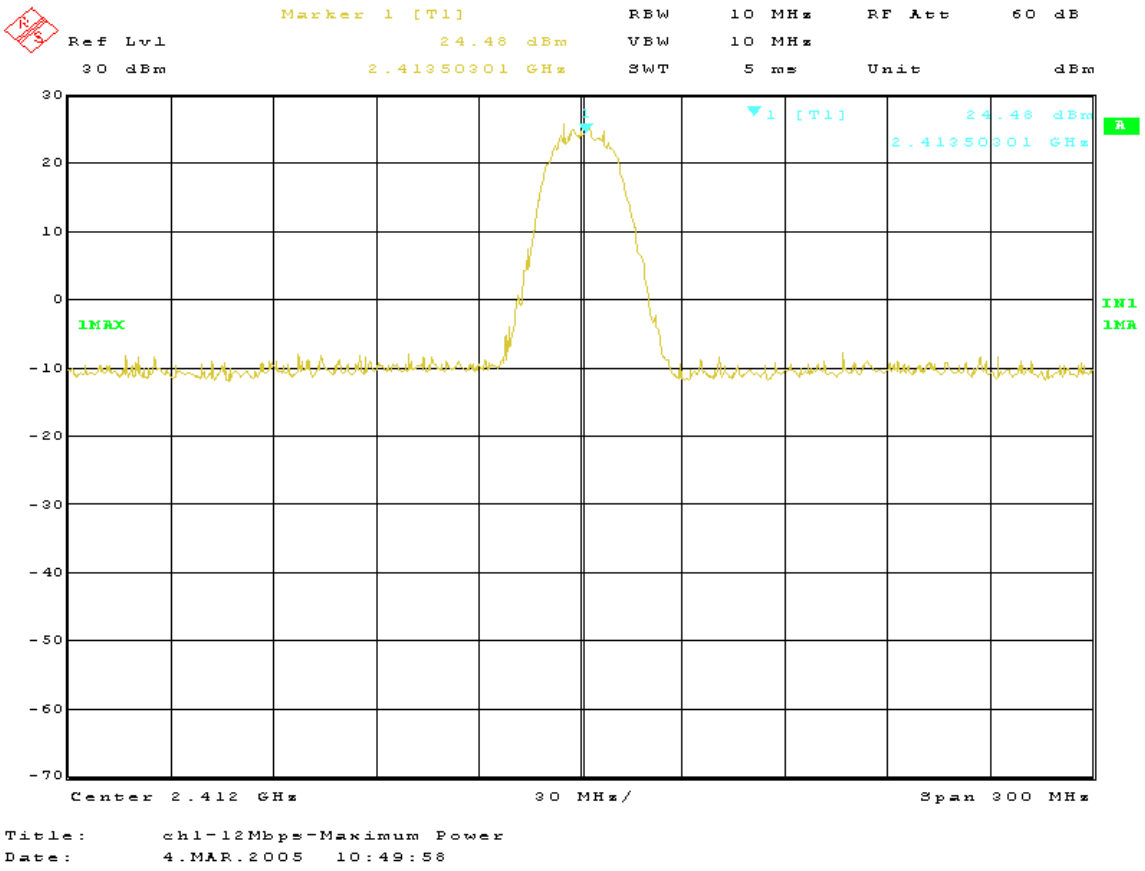
PP
Channel 1
Data rate: 9Mbps



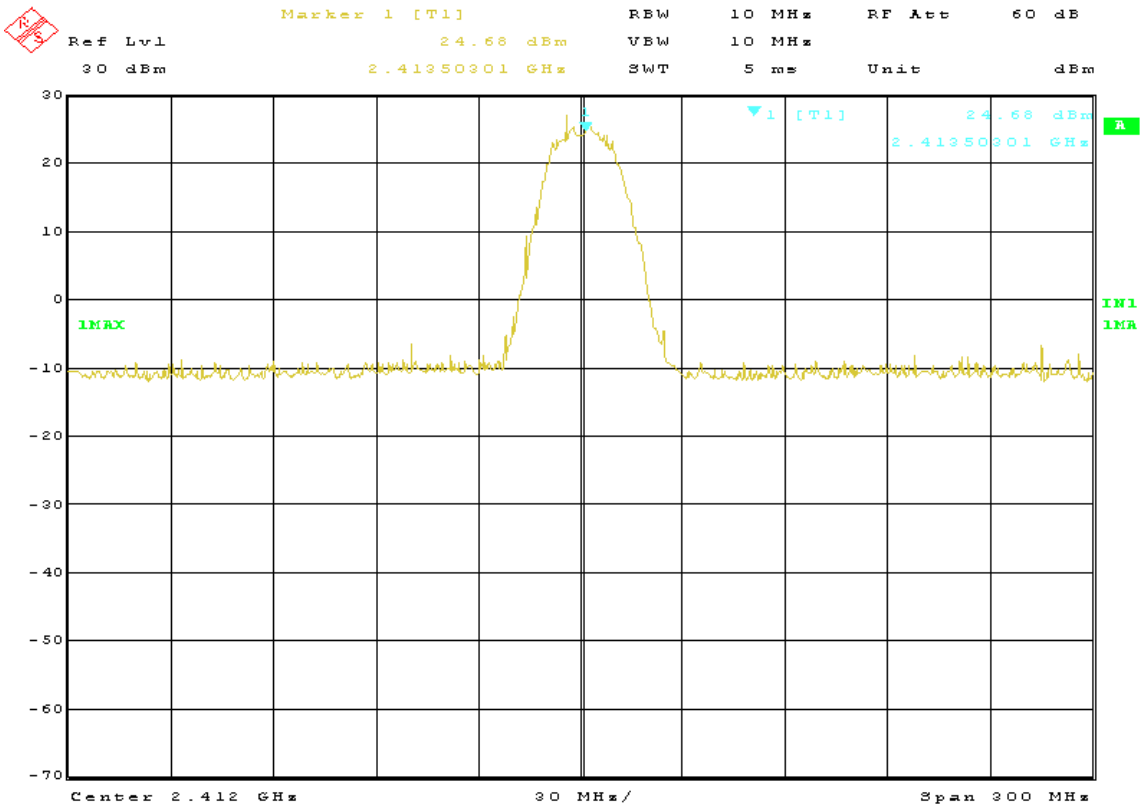
PP
Channel 1
Data rate: 11Mbps



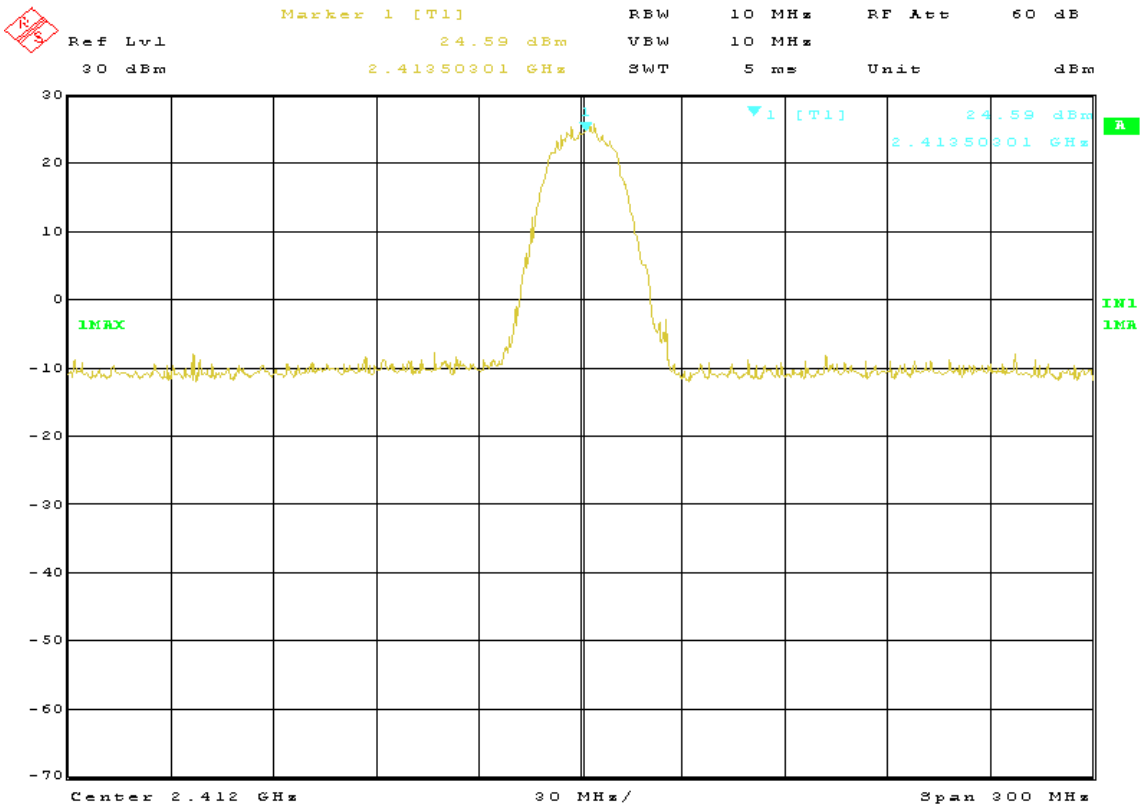
PP
Channel 1
Data rate: 12Mbps



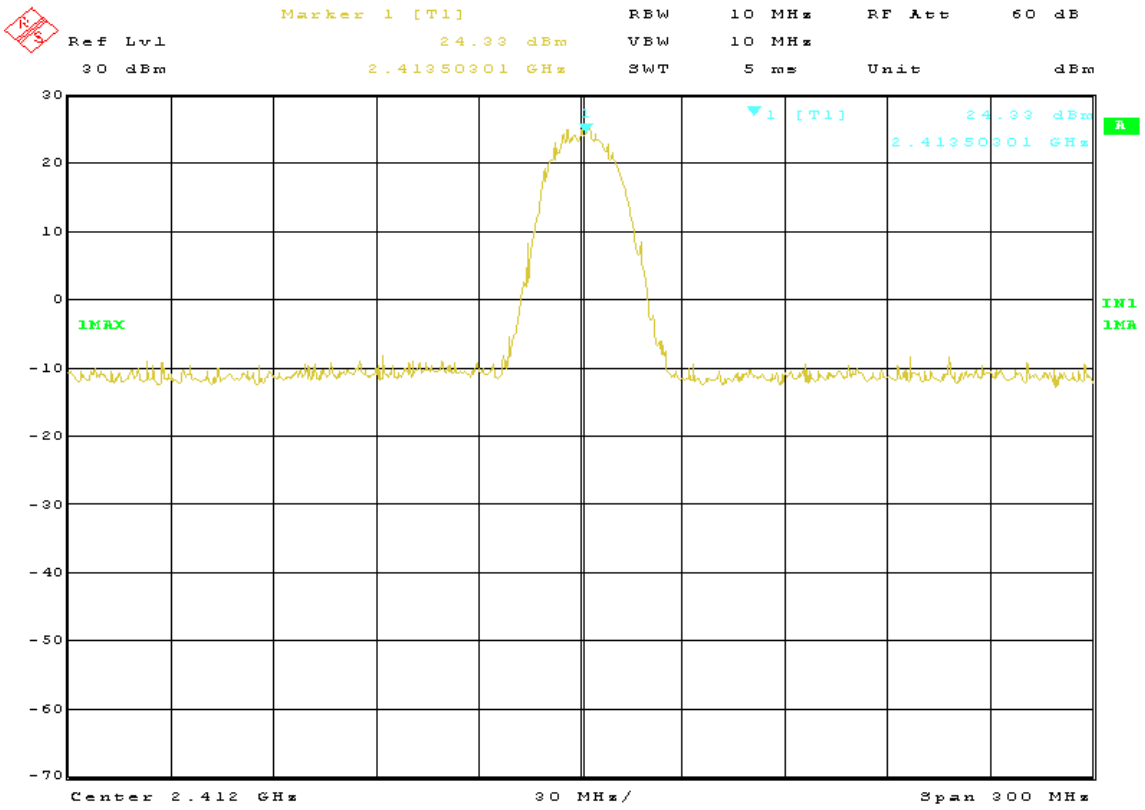
PP
Channel 1
Data rate: 18Mbps



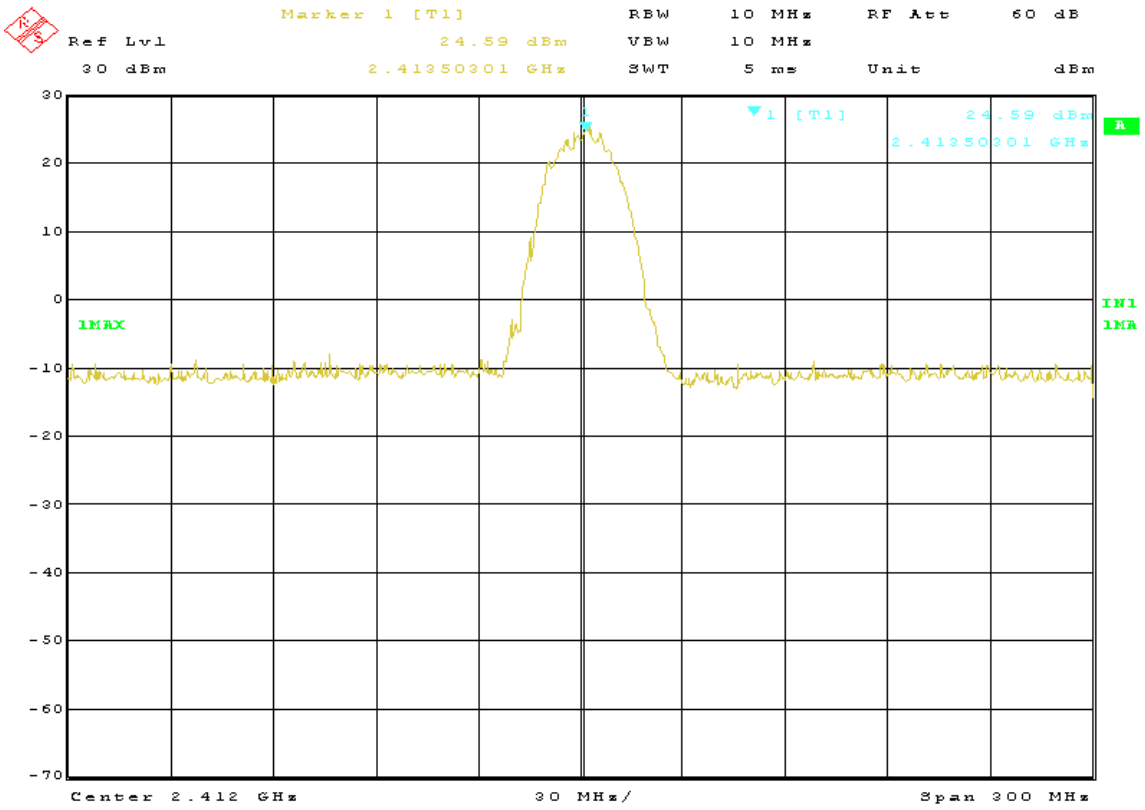
PP
Channel 1
Data rate: 24Mbps



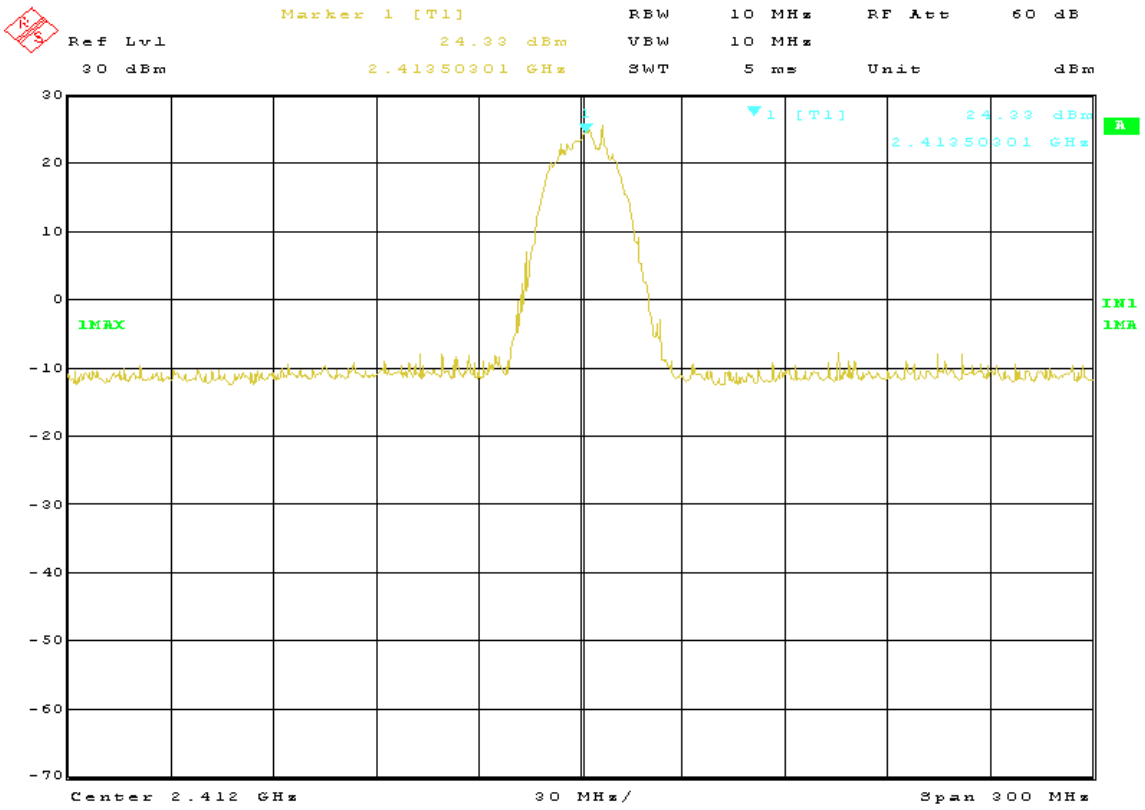
PP
Channel 1
Data rate: 36Mbps



PP
Channel 1
Data rate: 48Mbps



PP
Channel 1
Data rate: 54Mbps

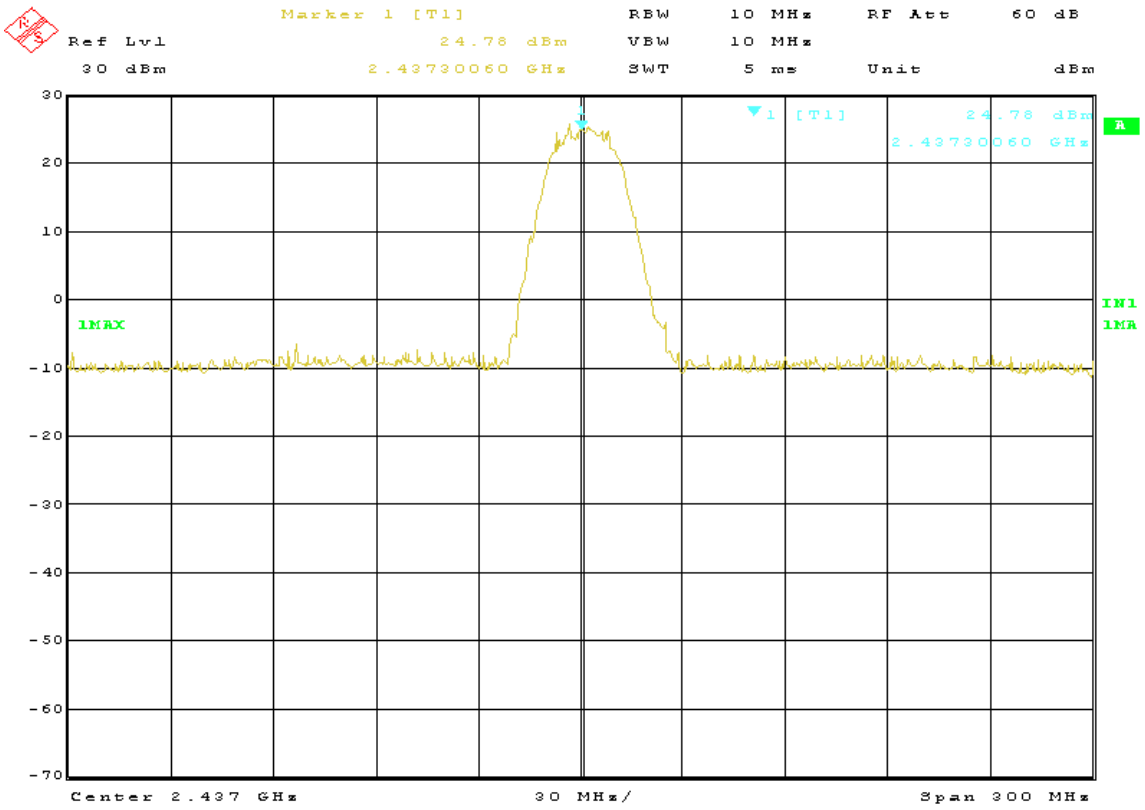


4.4.9 TEST RESULTS (C)

EUT	IEEE 802.11 A/B/G WIRELESS ACCESS POINT	**MODEL**	ACCESS / ONE NETWORK: OWS 2400
INPUT POWER (SYSTEM)	120Vac, 60Hz	**ENVIRONMENTAL CONDITIONS**	21deg. C, 47%RH
TESTED BY: Sandra Sohn			

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
6 (turbo mode)	2437	24.78	30	PASS

PP
Channel 6
Turbo mode



4.5 POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2 TEST INSTRUMENTS

Device	Model No.	Serial No.	Last Cal.	Next Cal
ROHDE & SCHWARZ EMI Test Receiver	ESIB 40	100201	01/23/05	01/23/06

4.5.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3kHz RBW and 10kHz VBW, set sweep time = span/3kHz. The power spectral density was measured and recorded.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP

4.5.6 EUT OPERATING CONDITION

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

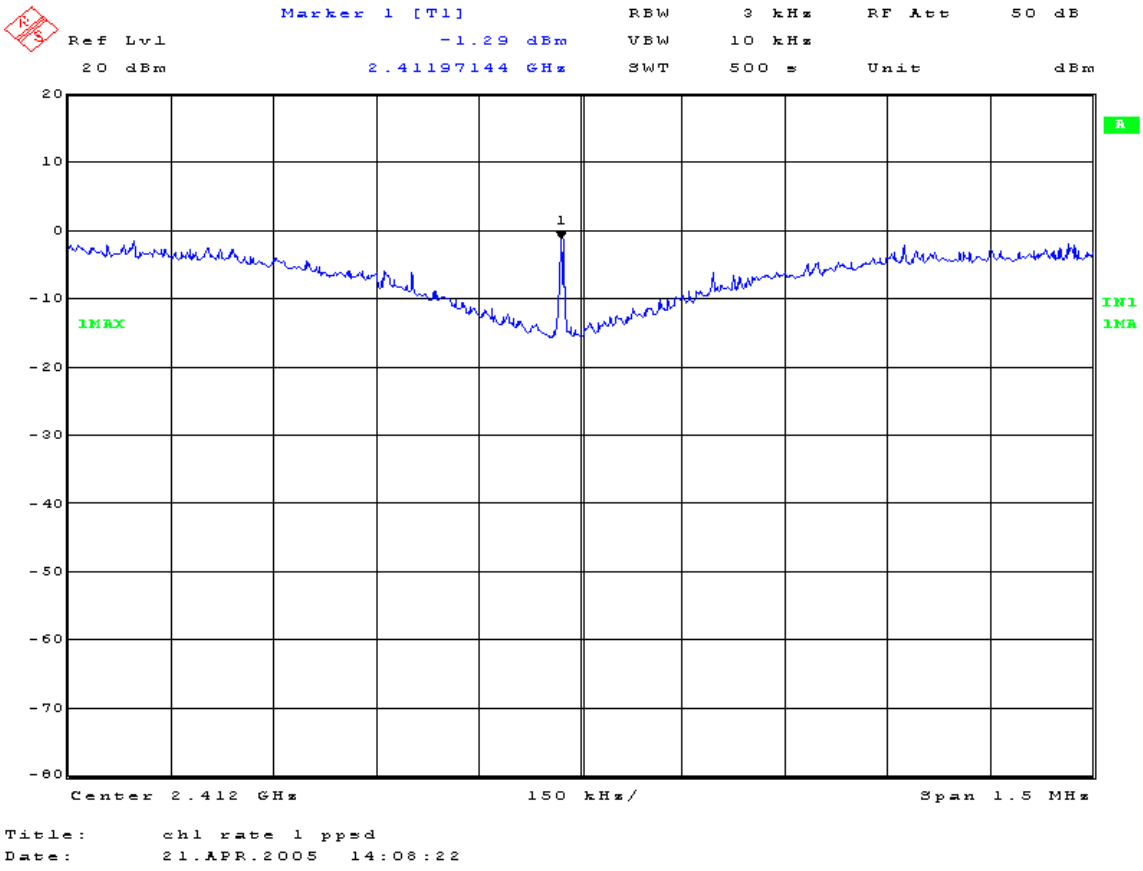
4.5.7 TEST RESULTS (A)

EUT	IEEE 802.11 A/B/G WIRELESS ACCESS POINT	MODEL	ACCESS / ONE NETWORK: OWS 2400
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	21deg. C, 48%RH
TESTED BY: Sandra Sohn			

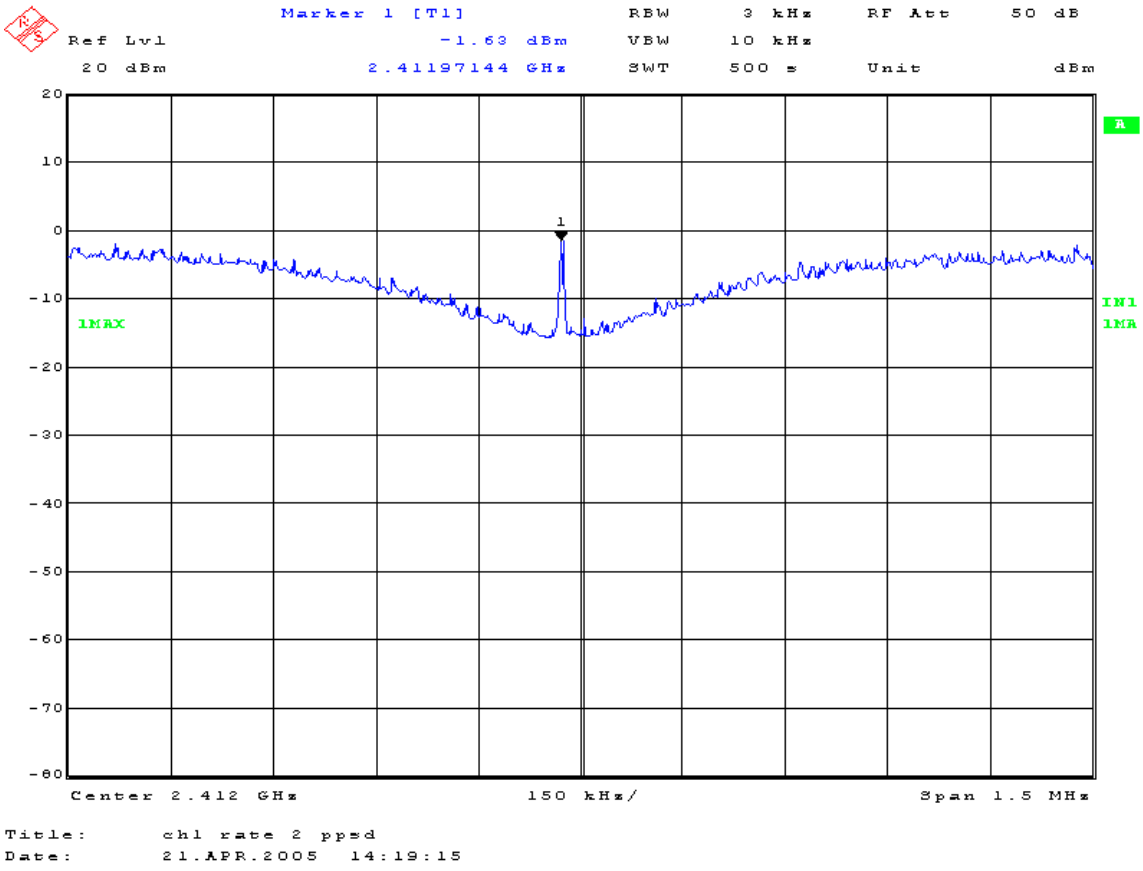
Channel 1

Data rate (Mbps)	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	2412	-1.29	8	PASS
2	2412	-1.63	8	PASS
6	2412	-1.79	8	PASS
9	2412	-2.1	8	PASS
11	2412	0.02	8	PASS
12	2412	-2.44	8	PASS
18	2412	-2.45	8	PASS
24	2412	-2.14	8	PASS
48	2412	-2.76	8	PASS
54	2412	-4.77	8	PASS

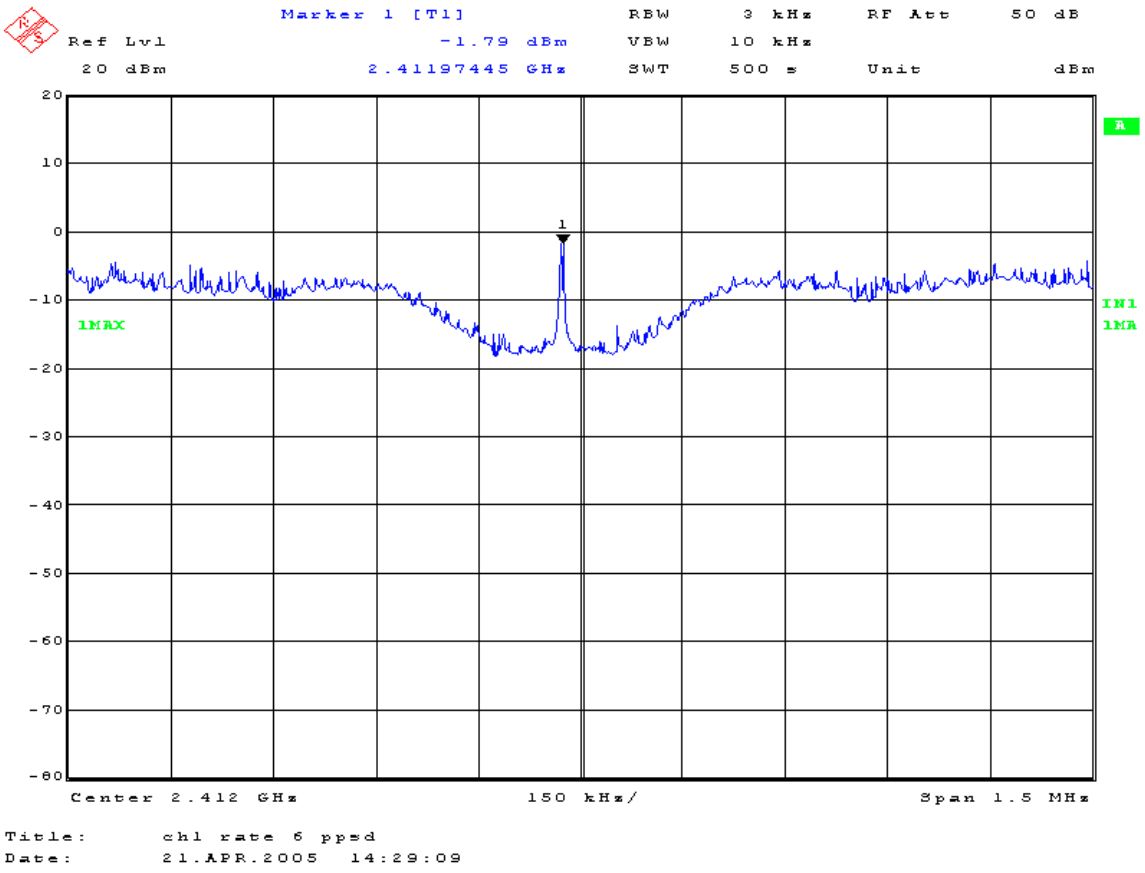
PSD
Channel 1
Data rate: 1Mbps



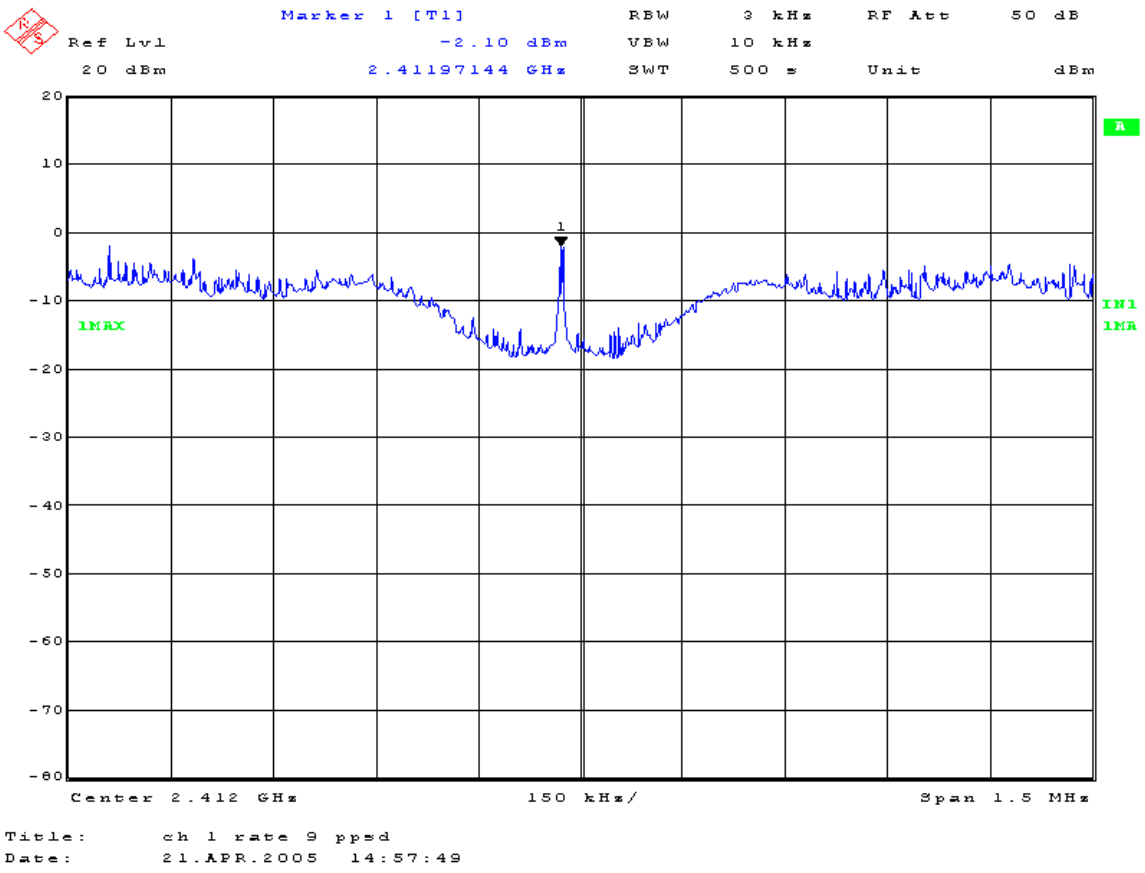
PSD
Channel 1
Data rate: 2Mbps



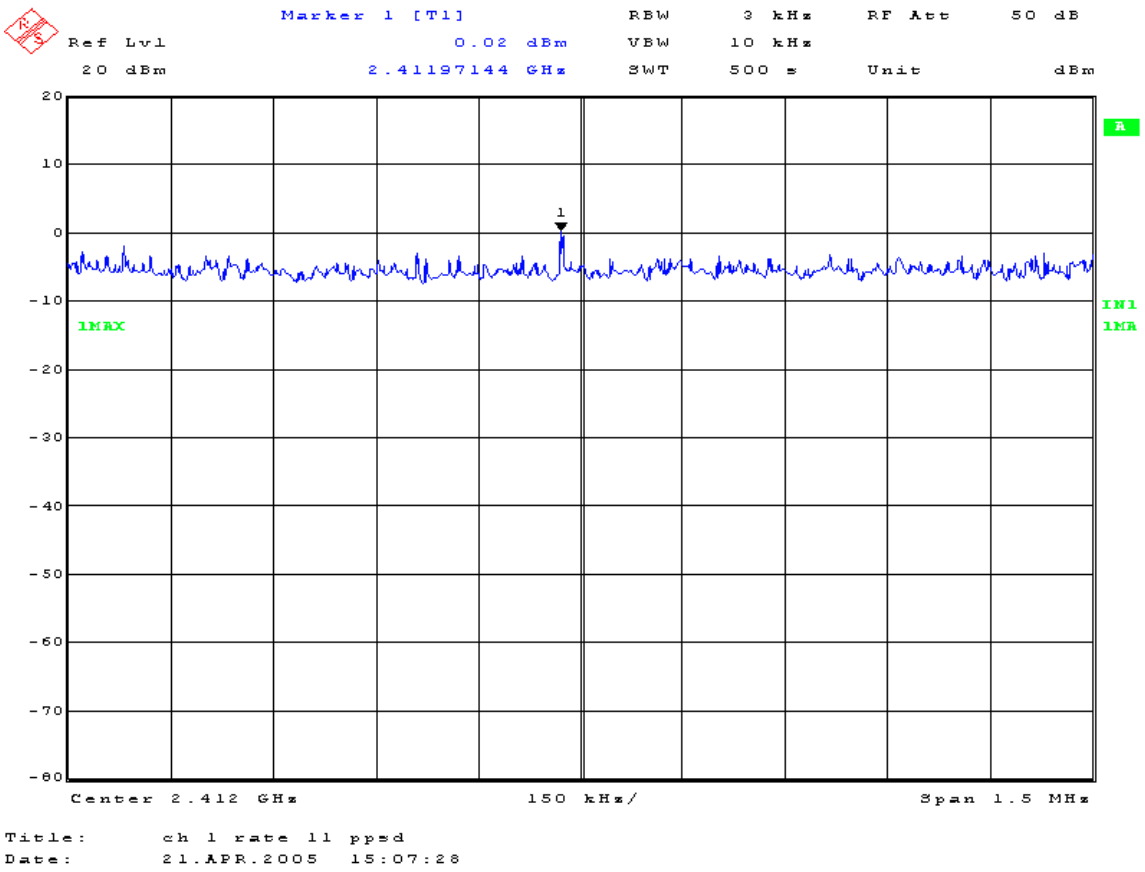
PSD
Channel 1
Data rate: 6Mbps



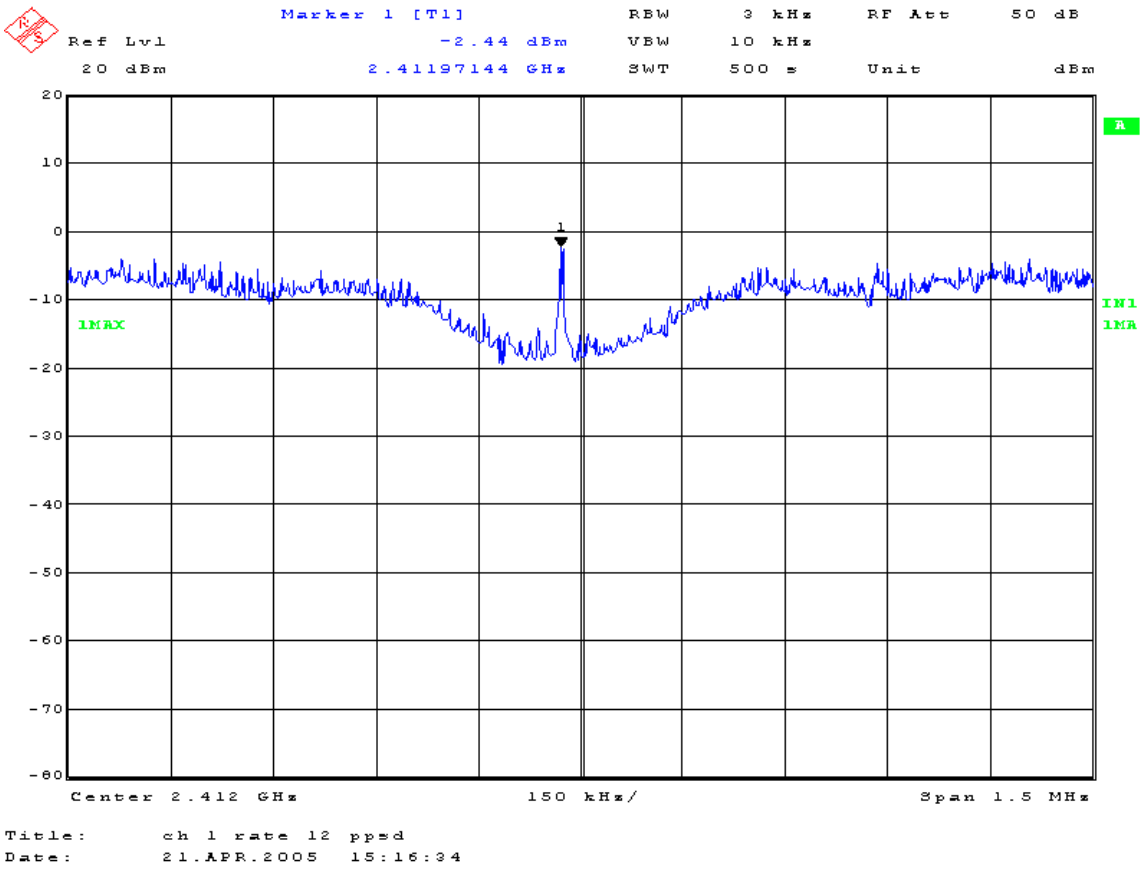
PSD
Channel 1
Data rate: 9Mbps



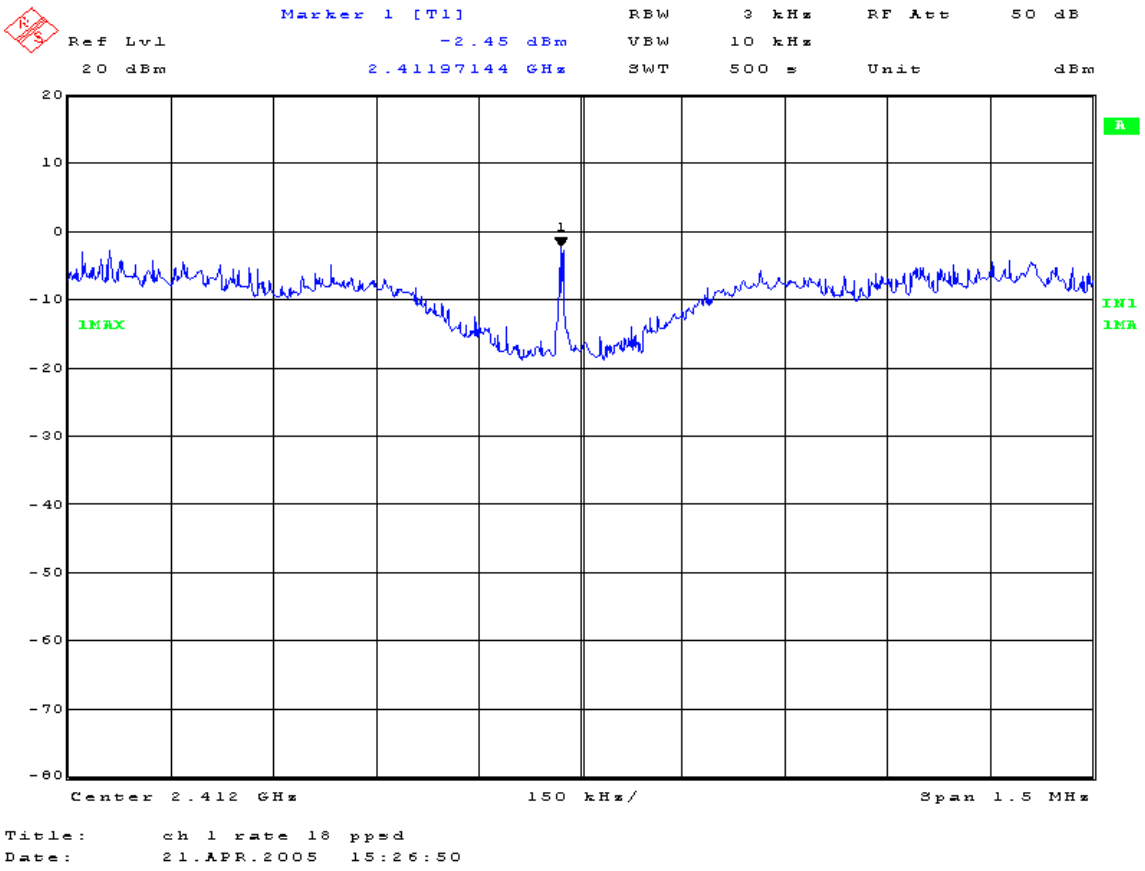
PSD
Channel 1
Data rate: 11Mbps



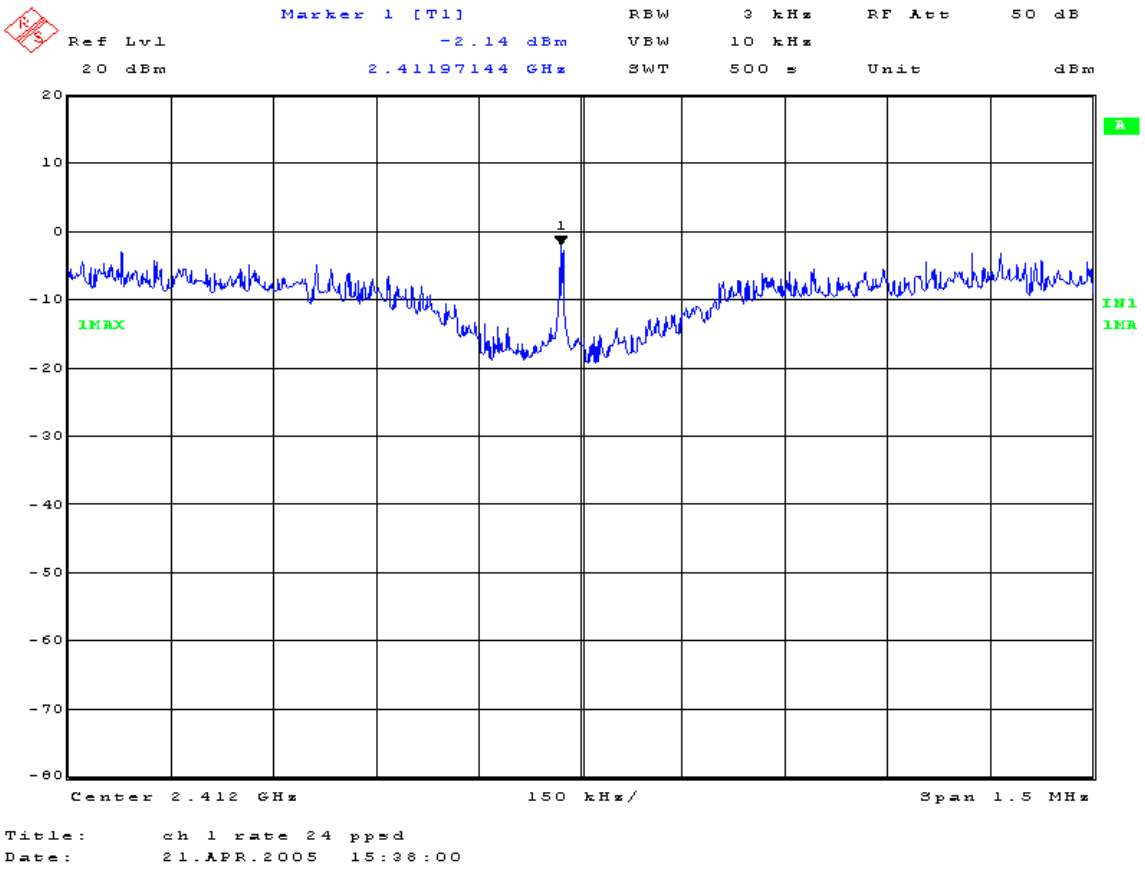
PSD
Channel 1
Data rate: 12Mbps



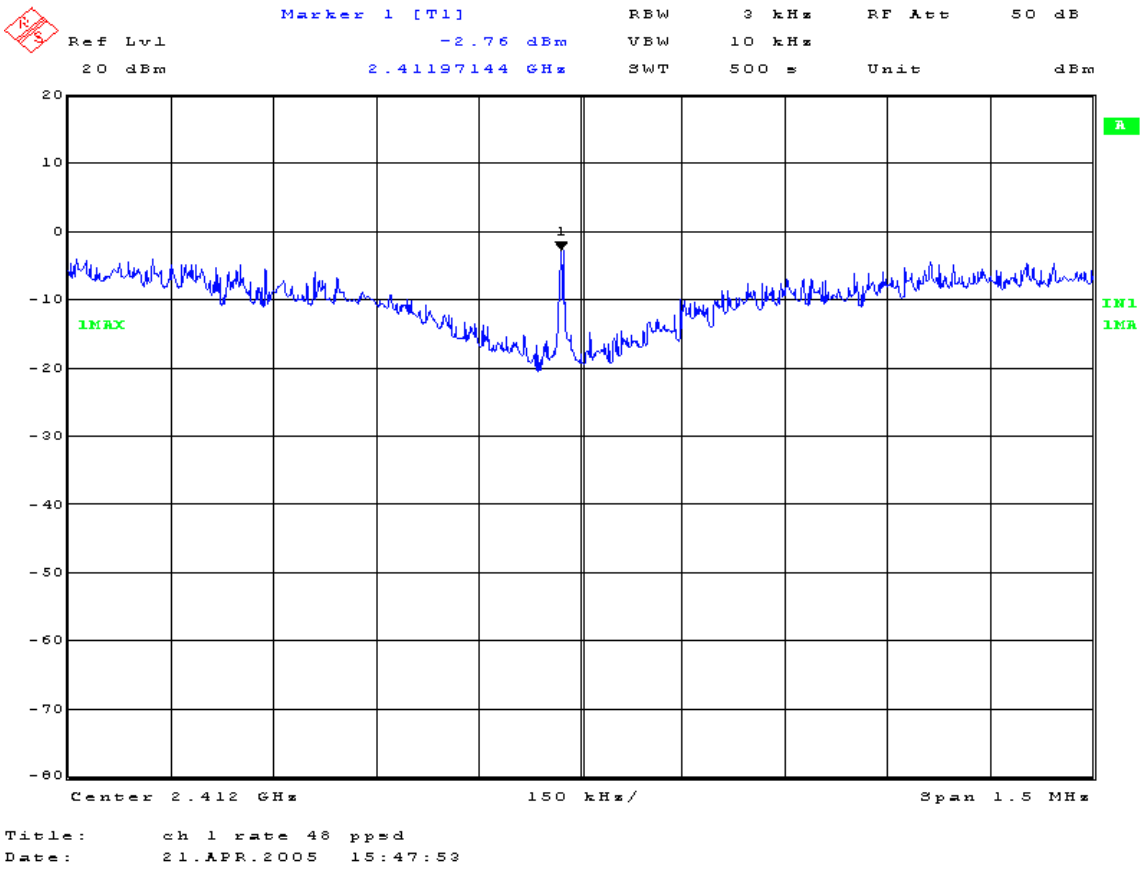
PSD
Channel 1
Data rate: 18Mbps



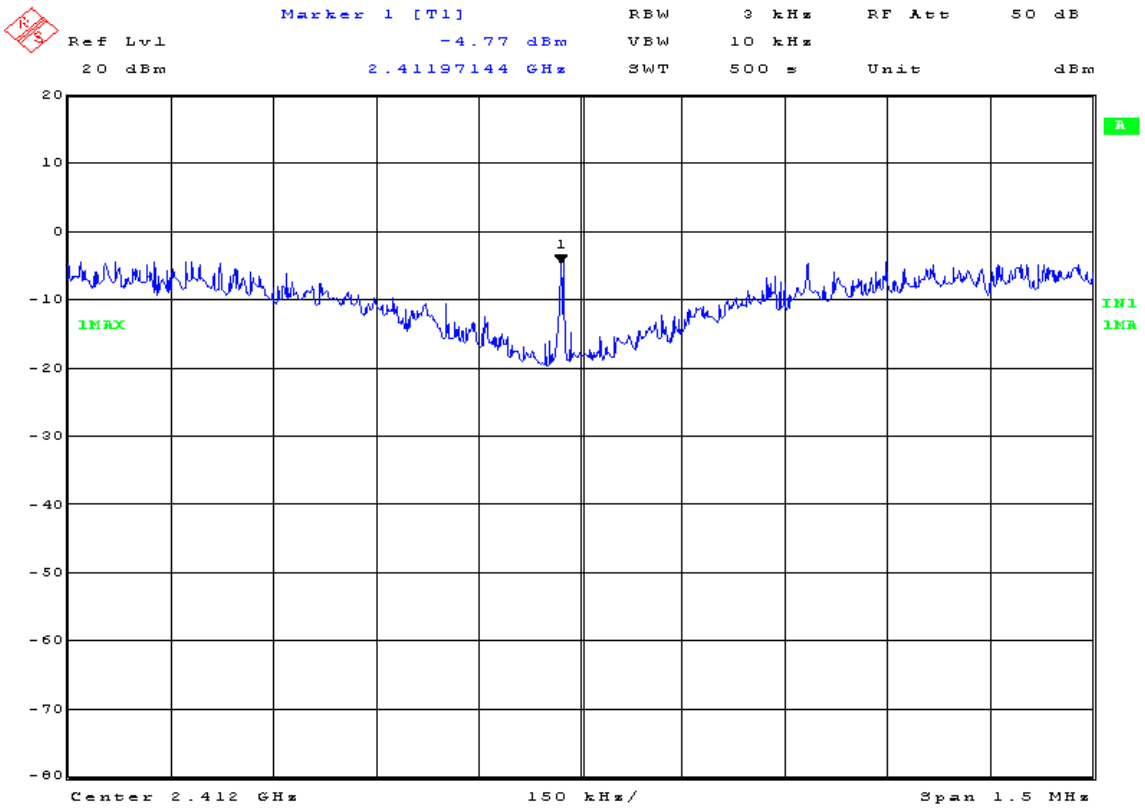
PSD
Channel 1
Data rate: 24Mbps



PSD
Channel 1
Data rate: 48Mbps



PSD
Channel 1
Data rate: 54Mbps



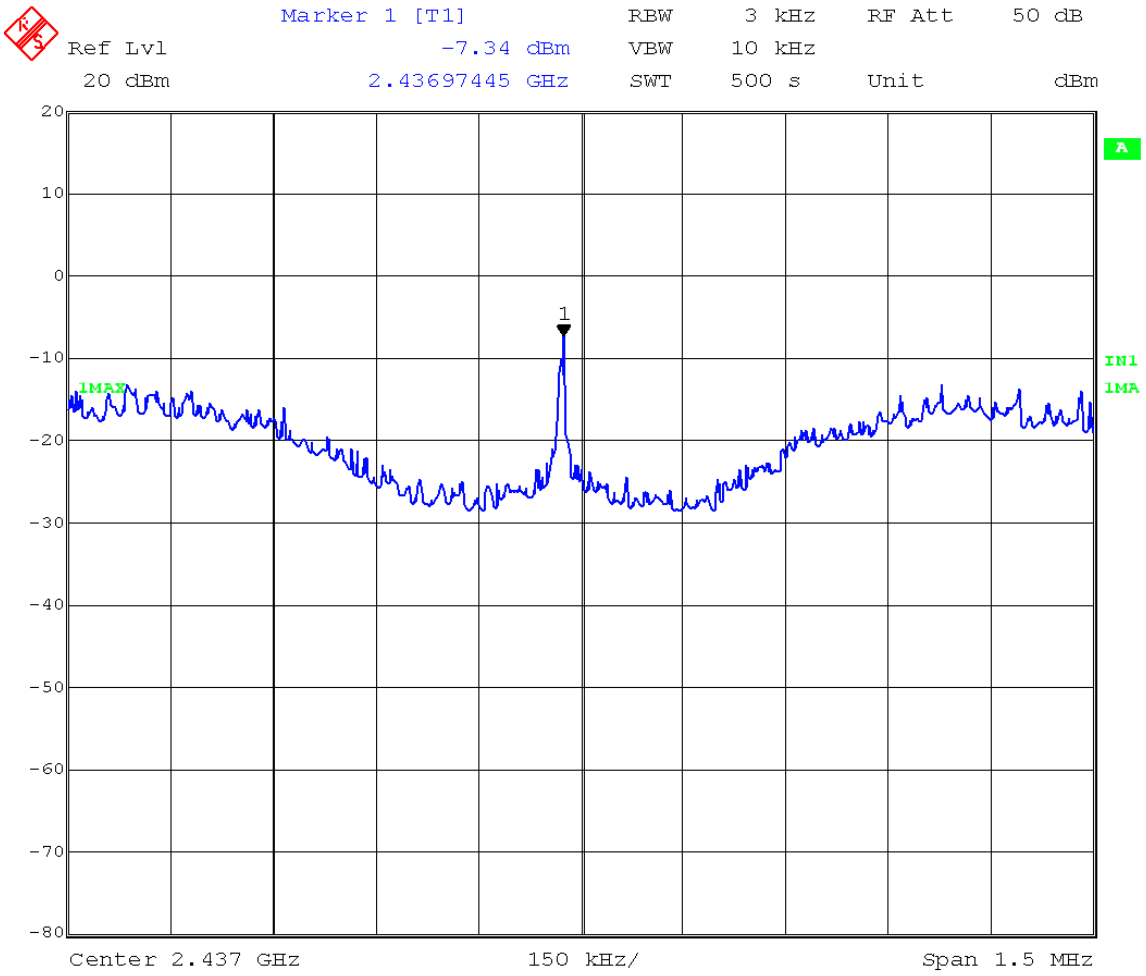
4.5.8 TEST RESULTS (B)

EUT	IEEE 802.11 A/B/G WIRELESS ACCESS POINT	**MODEL**	ACCESS / ONE NETWORK: OWS 2400
INPUT POWER (SYSTEM)	120Vac, 60Hz	**ENVIRONMENTAL CONDITIONS**	22deg. C, 48%RH
TESTED BY: Sandra Sohn			

Channel 6, Turbo mode

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
6 (turbo mode)	2437	-7.34	8	PASS

PSD
Channel 6
Turbo mode



Title: ch 6 rate turbo ppsd
Date: 21.APR.2005 16:12:21

4.6 BAND EDGES MEASUREMENT

4.6.1 LIMITS OF BAND EDGES MEASUREMENT

Below –20dB of the highest emission level of operating band (in 100KHz Resolution Bandwidth).

4.6.2 TEST INSTRUMENTS

Device	Model No.	Serial No.	Last Cal.	Next Cal
ROHDE & SCHWARZ EMI Test Receiver	ESIB 40	100201	01/23/05	01/23/06

4.6.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low loss cable. Set both RBW and VBW of spectrum analyzer to 100 kHz and 300 kHz with suitable frequency span including 50 MHz bandwidth from band edge. The band edges was measured and recorded.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 TEST SET UP

4.6.6 EUT OPERATING CONDITION

The software provided by client to enable the EUT under transmission condition continuously at lowest, highest channel frequency for different data rates individually.

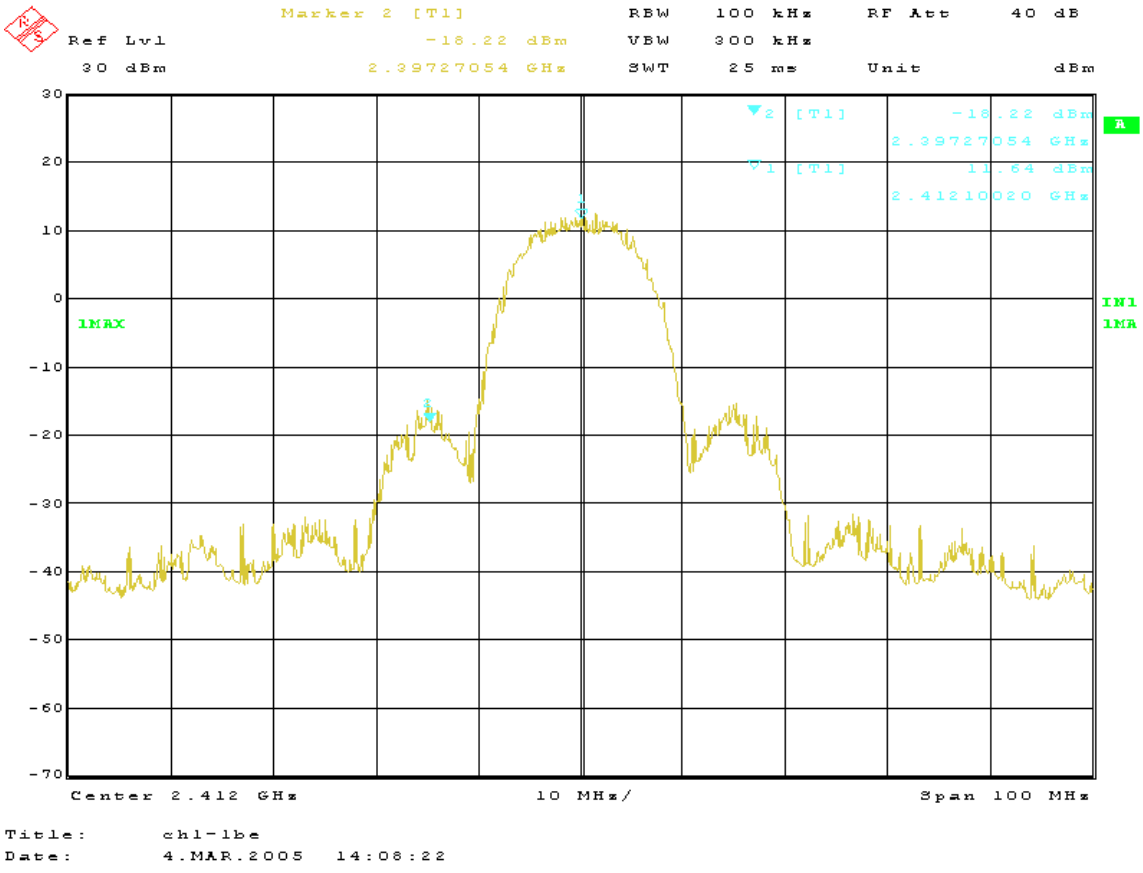
4.6.7 TEST RESULTS (A)

The spectrum plots are attached on the following 8 pages. The marker indicates the highest level. It shows compliance with the requirement in part 15.247(C).

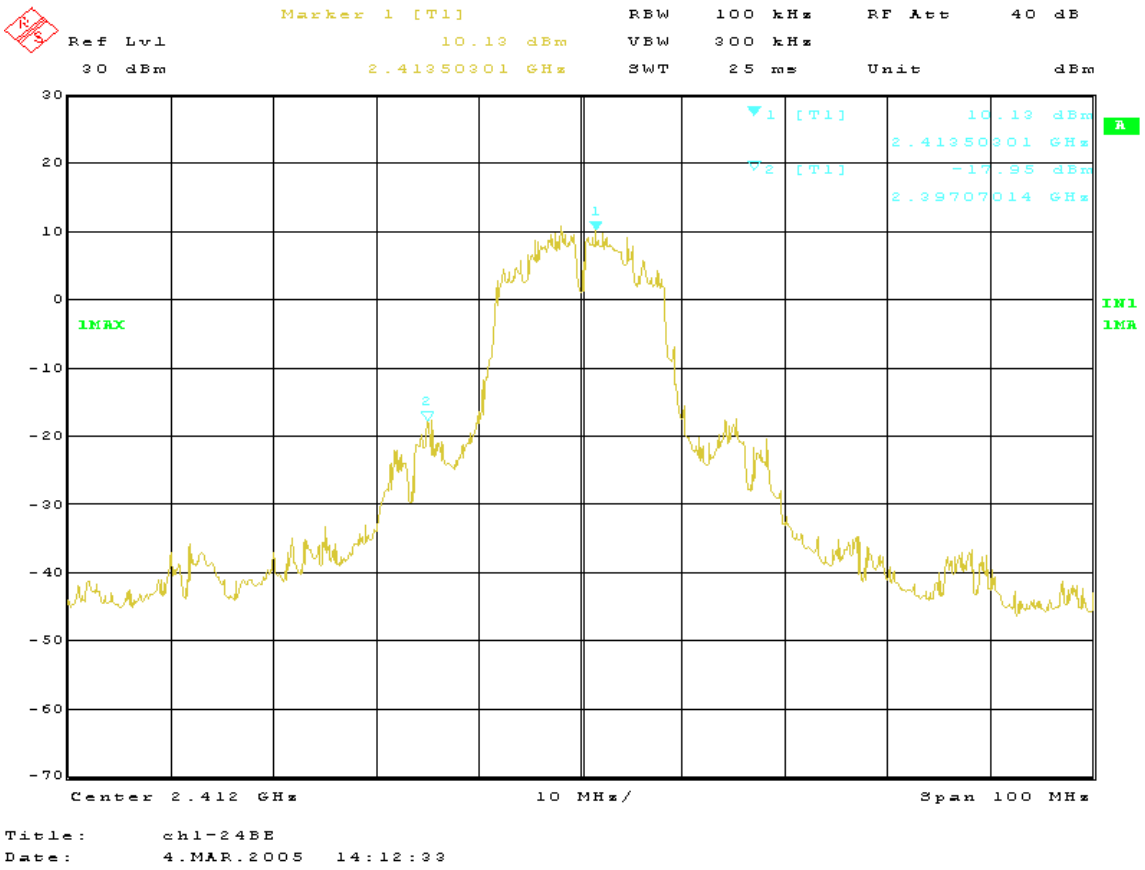
NOTE 1:
The Lower band edge emission plot on the following first 3 page for different Data rates (1Mbps, 24Mbps, 54Mbps) at lowest channel shows at least 20dB

delta between carrier maximum power and local maximum emission outside the frequency band (2.400GHz), based on a RF conducted measurement.

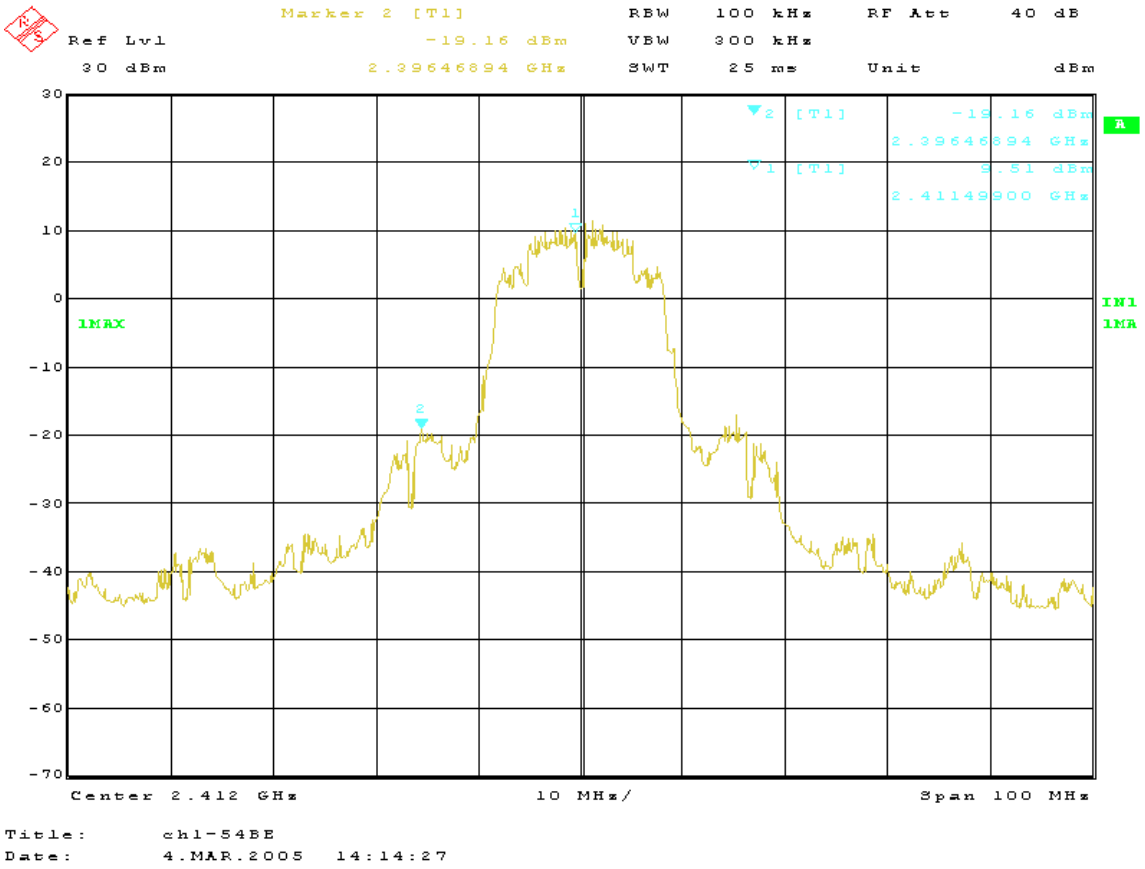
Lower band edge
Channel 1
Data rate: 1Mbps



Lower band edge
Channel 1
Data rate: 24Mbps

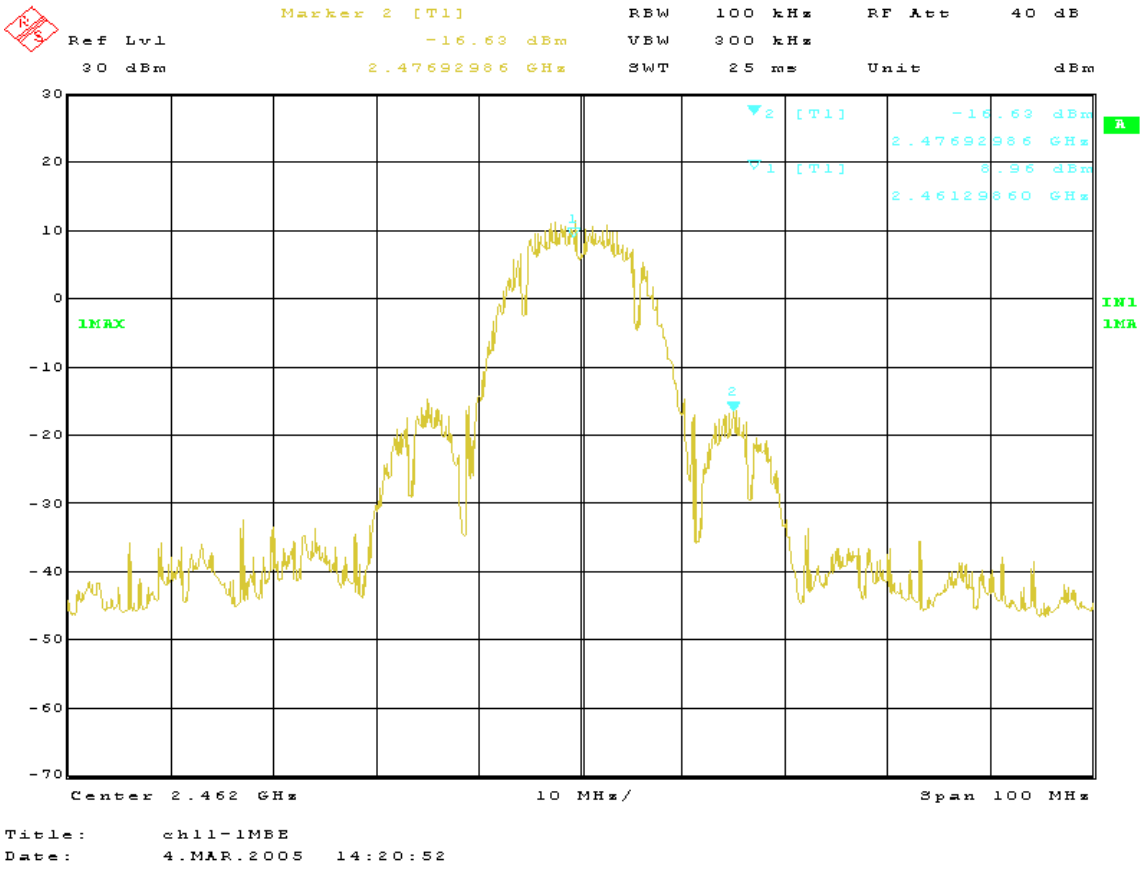


Lower band edge
Channel 1
Data rate: 54Mbps

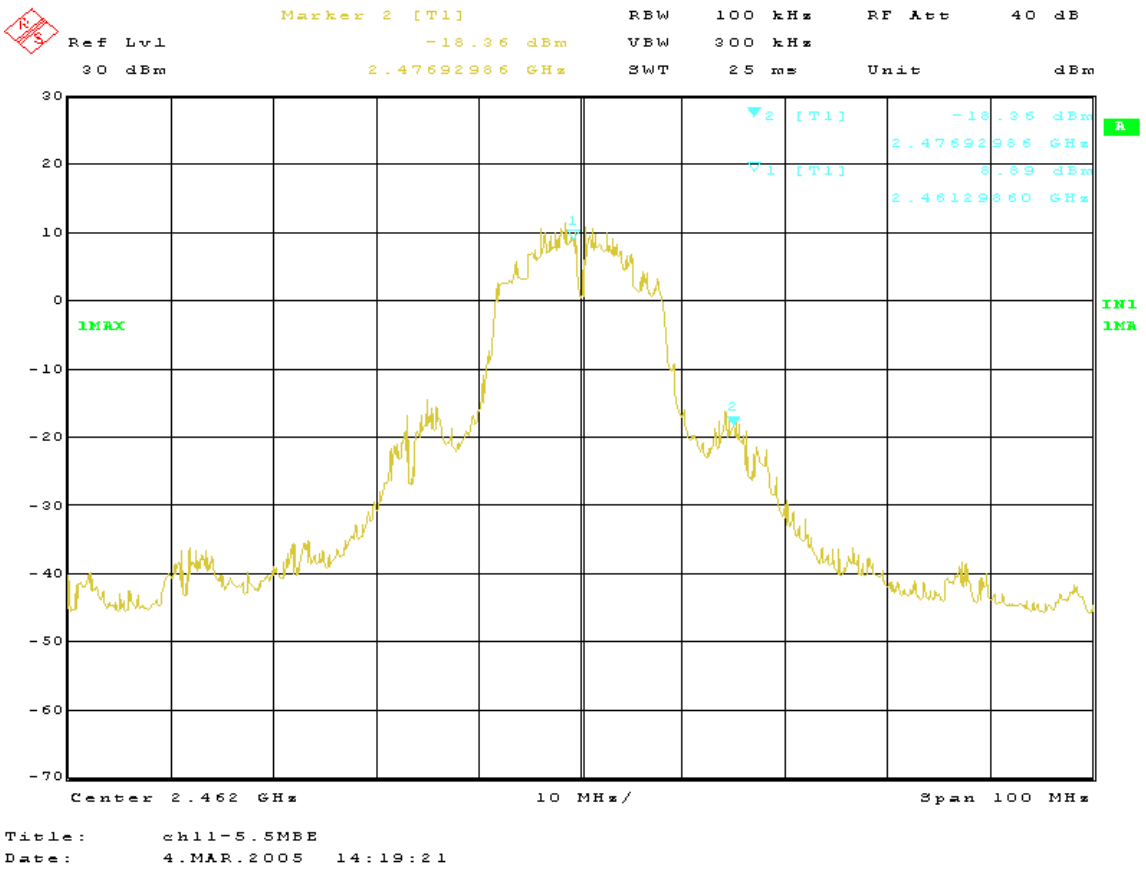


NOTE 2:
The Upper band edge emission plot on the following second 5 pages for different Data rates (1Mbps, 5.5Mbps, 11Mbps, 24Mbps, 54Mbps) at highest shows at least 20dB delta between carrier maximum power and local maximum emission outside the frequency band (2.4835GHz), based on a RF conducted measurement.

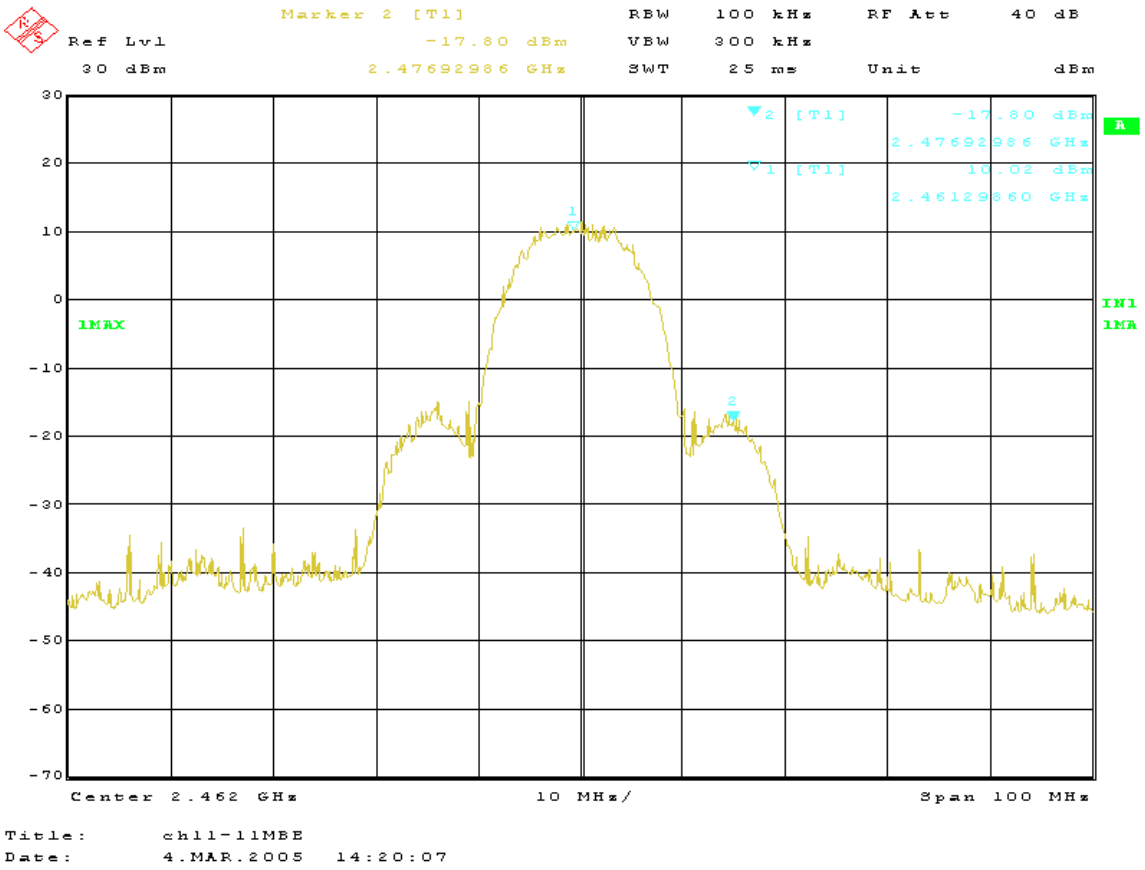
Upper band edge
Channel 11
Data rate: 1Mbps



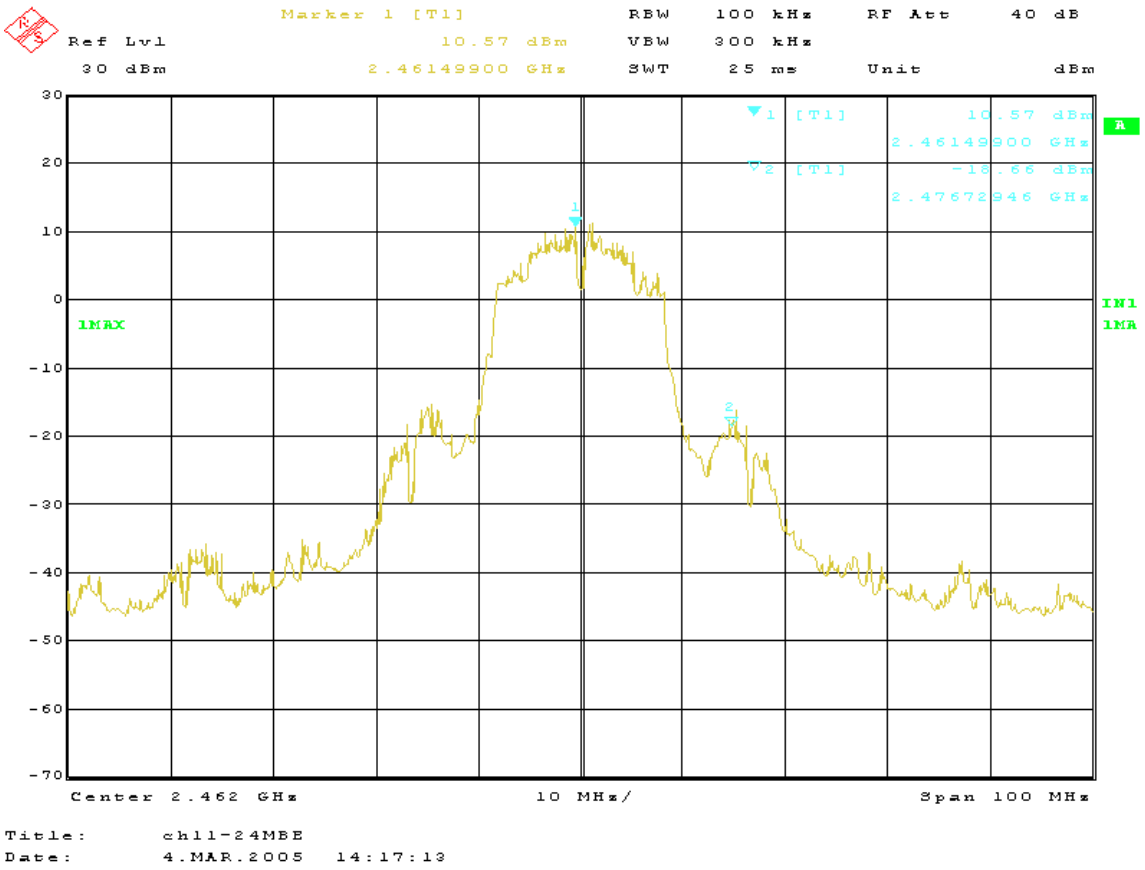
Upper band edge
Channel 11
Data rate: 5.5Mbps



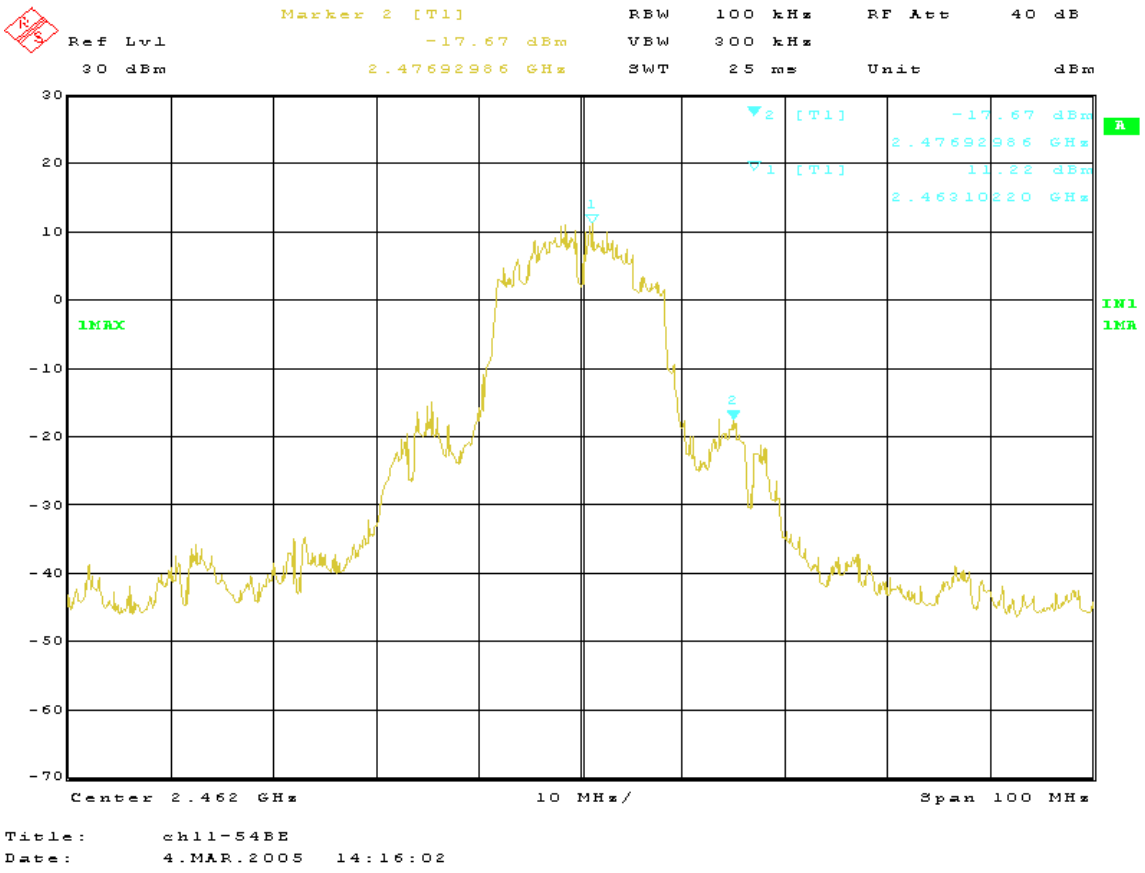
Upper band edge
Channel 11
Data rate: 11Mbps



Upper band edge
Channel 11
Data rate: 24Mbps

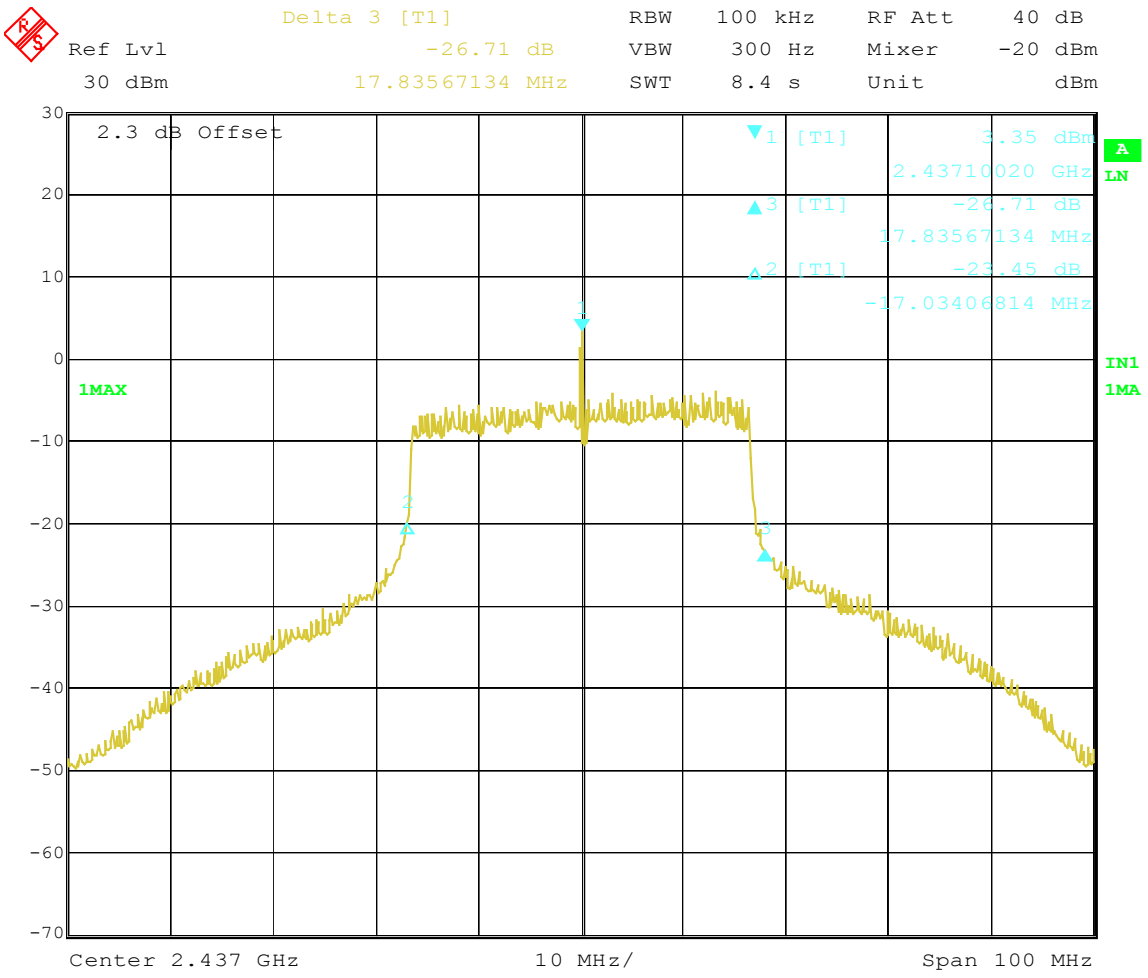


Upper band edge
Channel 11
Data rate: 54Mbps



NOTE 3:
The Lower and Upper band edge emission plot on the following 1 page for Turbo mode shows at least 20dB delta between carrier maximum power and local maximum emission outside the frequency band (2.4GHz and 2.4835GHz), based on a RF conducted measurement.

Channel 6
Turbo mode



Title: turbo mode-b Band edge measurements
Date: 21.MAR.2005 13:18:48

4.7 RESTRICTED BANDS OF OPERATION

4.7.1 LIMITS OF RESTRICTED BANDS OF OPEARATION

54dBuV/m in the following restricted bands of operations: 2310-2390MHz, 2483.5-2500MHz.

4.7.2 TEST INSTRUMENTS

Device	Model No.	Serial No.	Last Cal.	Next Cal
ROHDE & SCHWARZ EMI Test Receiver	ESIB 40	100201	01/23/05	01/23/06

4.7.3 TEST PROCEDURES

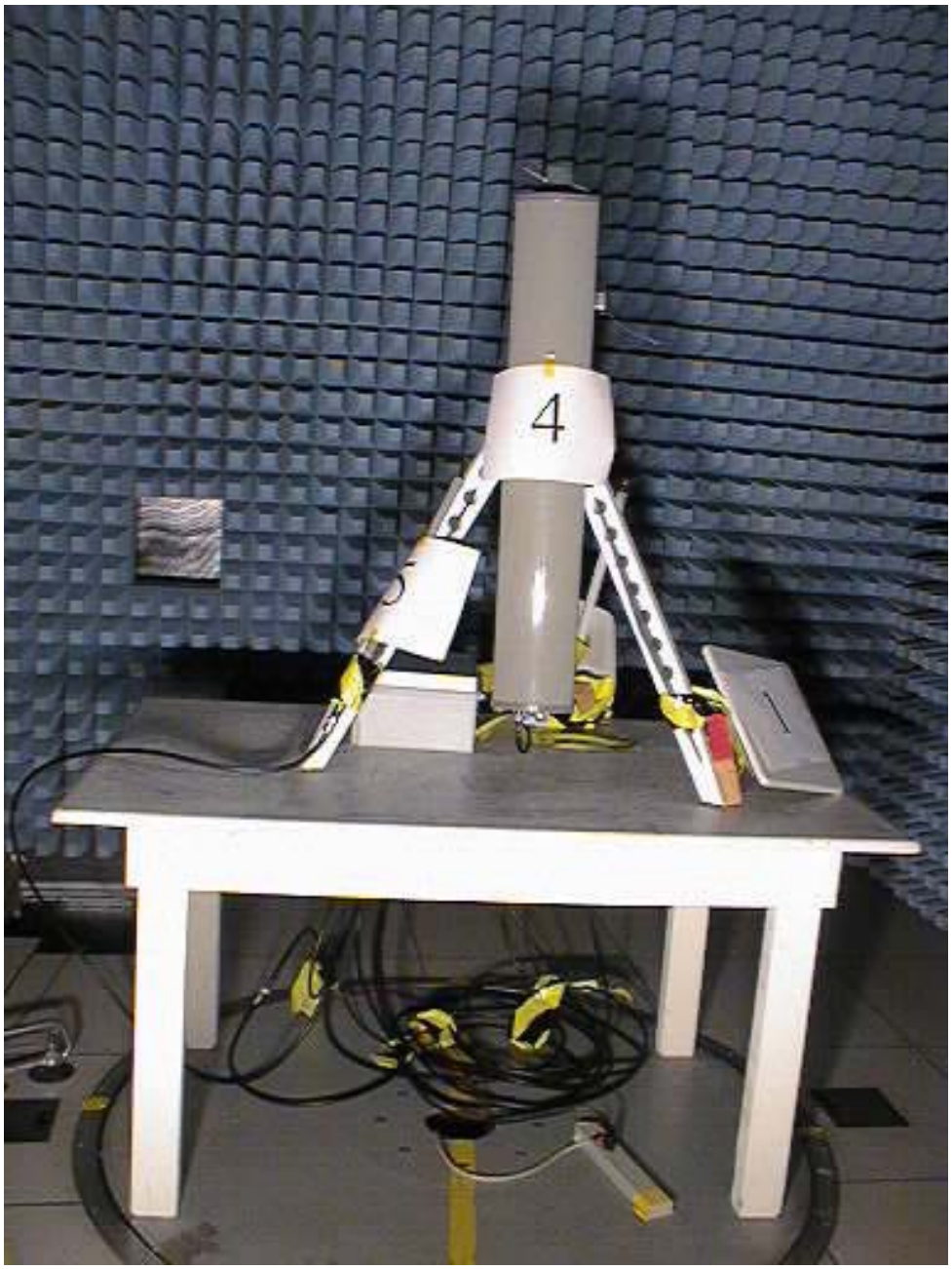
a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter Semi-Anechoic Chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The antenna is a Horn antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using the quasi-peak method or average method as specified and then reported in Data sheet peak mode and QP mode.

NOTE:
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz , 3MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 1 KHz for Average detection (AV) at frequency above 1GHz.

4.7.4 DEVIATION FROM TEST STANDARD

No deviation

4.7.5 TEST SET UP



4.7.6 EUT OPERATING CONDITION

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle, highest channel frequency for b data rates with all antenna.

4.7.7 TEST RESULTS (A)

EUT	IEEE 802.11 A/B/G WIRELESS ACCESS POINT	**MODEL**	ACCESS / ONE NETWORK: OWS 2400
MODE	Channel 1, 6 (11Mbps), Vertically-Polarized Omni-Directional Antenna Gain: 12.0 dBi at 2.4-2.5 GHz Vertically-Polarized Directional 120° Sector Antenna Gain: 16.4 dBi at 2.4-2.5 GHz	**FREQUENCY RANGE**	2310-2390MHz 2483.5-2500MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	**DETECTOR FUNCTION**	Peak (P) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 49%RH	**TESTED BY**: Sandra Sohn	

Vertical is worse case.

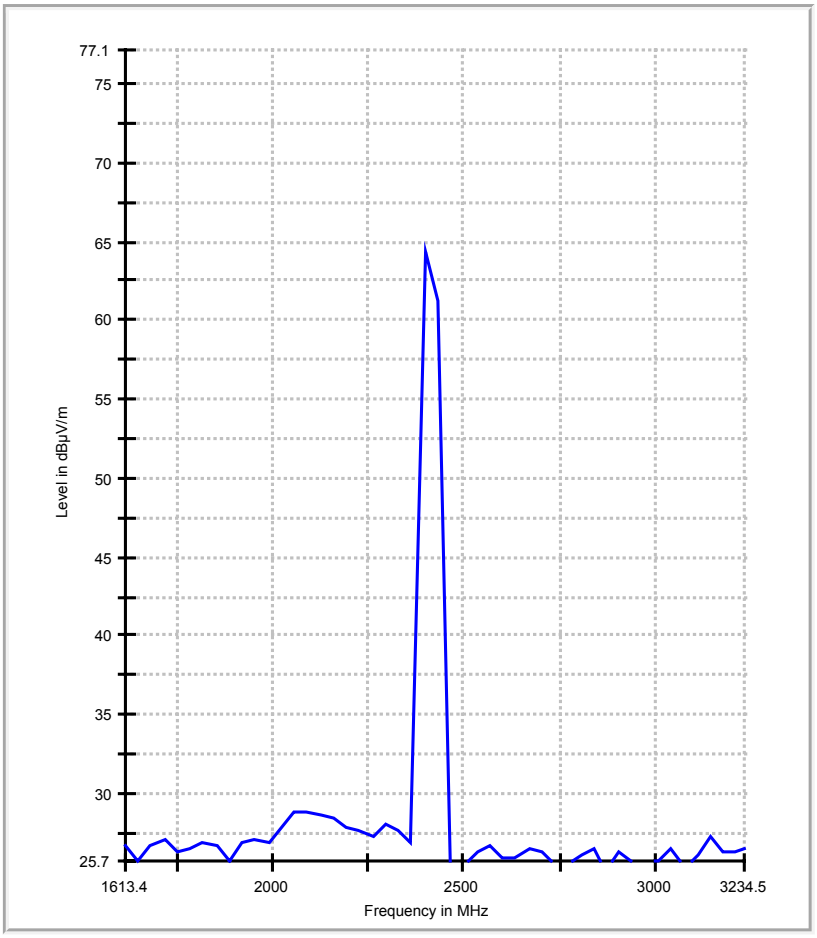
ANTENNA POLARITY & TEST DISTANCE: Vertical AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB)
1_R	2328 (P)	58.4 (P)	74(P)	-15.6	1	5	27.6 (P)	30.8
1_R	2328 (AV)	46.3 (AV)	54(AV)	-7.7	1	5	15.5 (AV)	30.8
2_R	2499 (P)	56.2 (P)	74(P)	-17.8	1	7	25.4 (P)	30.8
2_R	2499 (AV)	43.9 (AV)	54(AV)	-10.1	1	7	13.1 (AV)	30.8

REMARKS:

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. The limit value is defined as per 15.205
6. $_{R}$ is for restricted band.

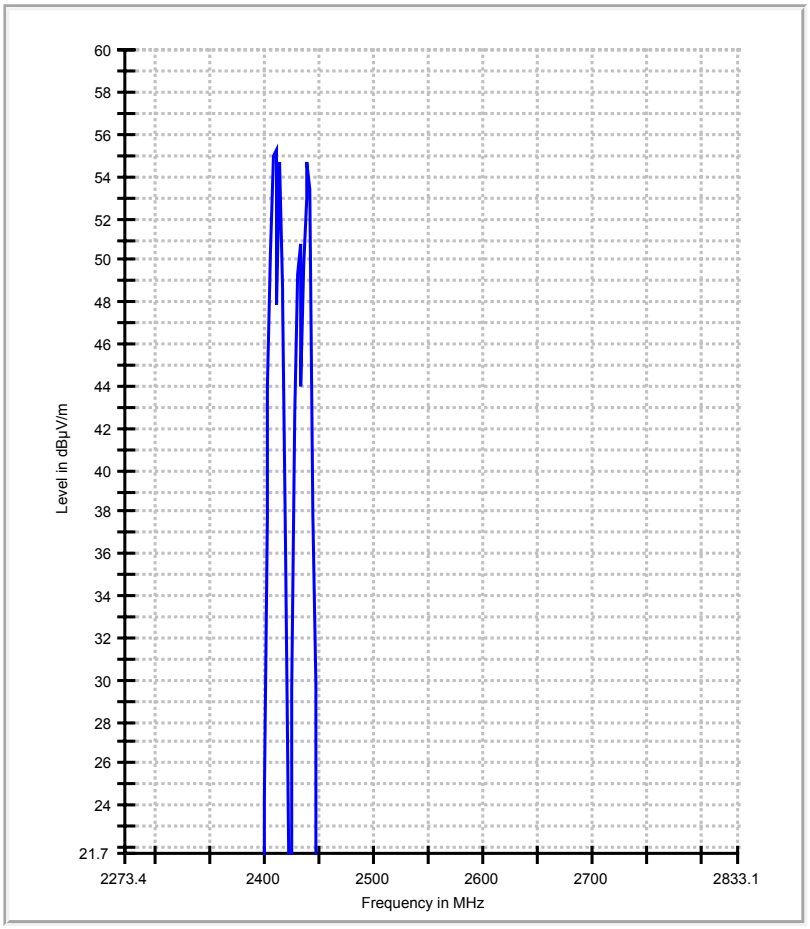
MaxPeak before correction

Resolution Bandwidth: 1MHz
Video Bandwidth: 1MHz



Average before correction

Resolution Bandwidth: 1MHz
Video Bandwidth: 1KHz



EUT	IEEE 802.11 A/B/G WIRELESS ACCESS POINT	**MODEL**	ACCESS / ONE NETWORK: OWS 2400
MODE	Channel 6,11 (11Mbps), Vertically-Polarized Omni-Directional Antenna Gain: 12.0 dBi at 2.4-2.5 GHz Vertically-Polarized Directional 120° Sector Antenna Gain: 16.4 dBi at 2.4-2.5 GHz	**FREQUENCY RANGE**	2310-2390MHz 2483.5-2500MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	**DETECTOR FUNCTION**	Peak (P) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 49%RH	**TESTED BY**: Sandra Sohn	

Vertical is worse case.

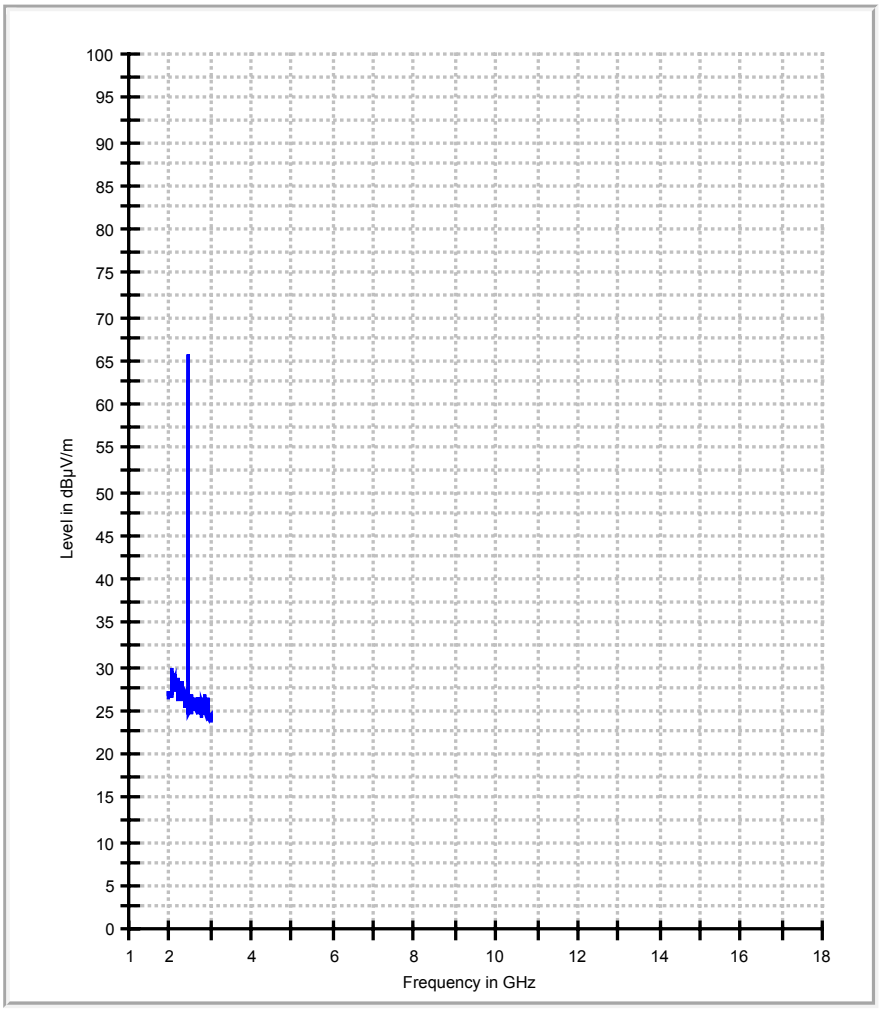
ANTENNA POLARITY & TEST DISTANCE: Vertical AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB)
1_R	2328 (P)	58.4 (P)	74(P)	-15.6	1	5	27.6 (P)	30.8
1_R	2328 (AV)	46.4 (AV)	54(AV)	-7.6	1	5	15.6 (AV)	30.8
2_R	2499 (P)	56.5 (P)	74(P)	-17.5	1	7	25.7 (P)	30.8
2_R	2499 (AV)	44 (AV)	54(AV)	-10	1	7	13.2 (AV)	30.8

REMARKS:

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. The limit value is defined as per 15.205
6. $_R$ is for restricted band.

MaxPeak before correction

Resolution Bandwidth: 1MHz
Video Bandwidth: 1MHz



Average before correction

Resolution Bandwidth: 1MHz
Video Bandwidth: 1KHz