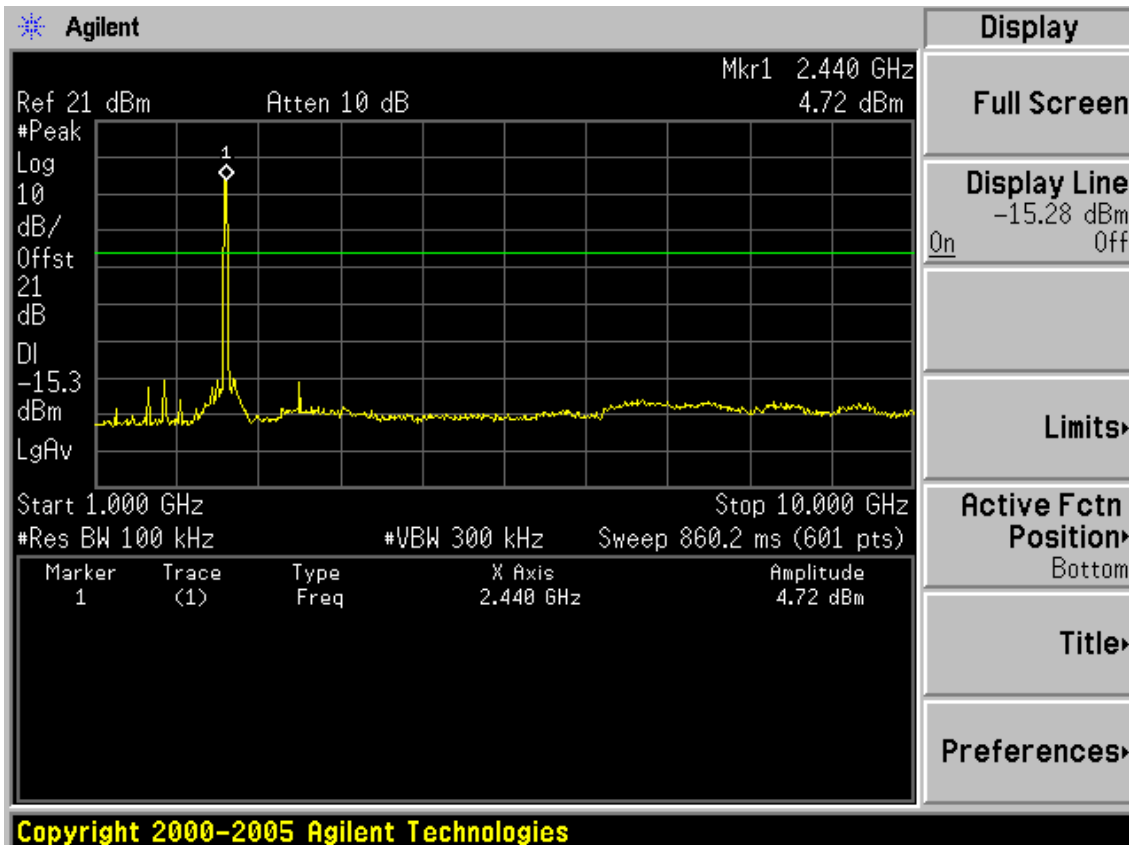
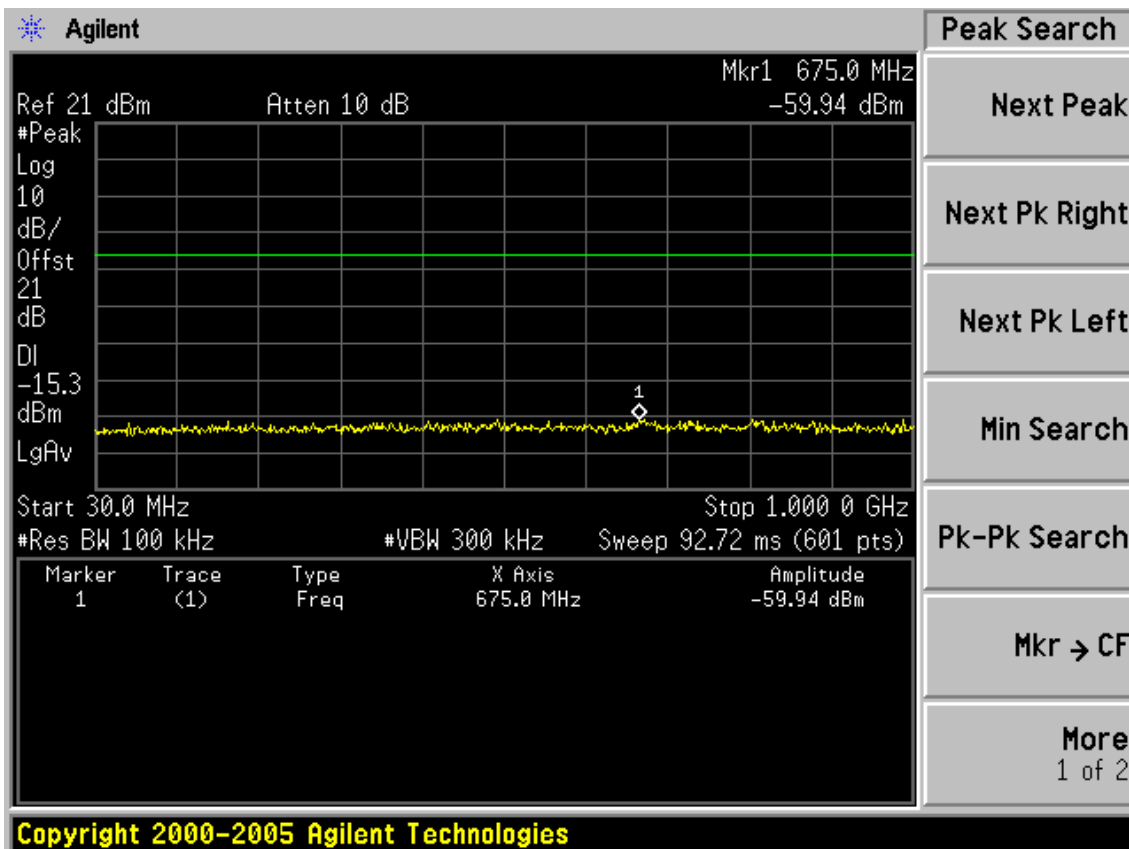
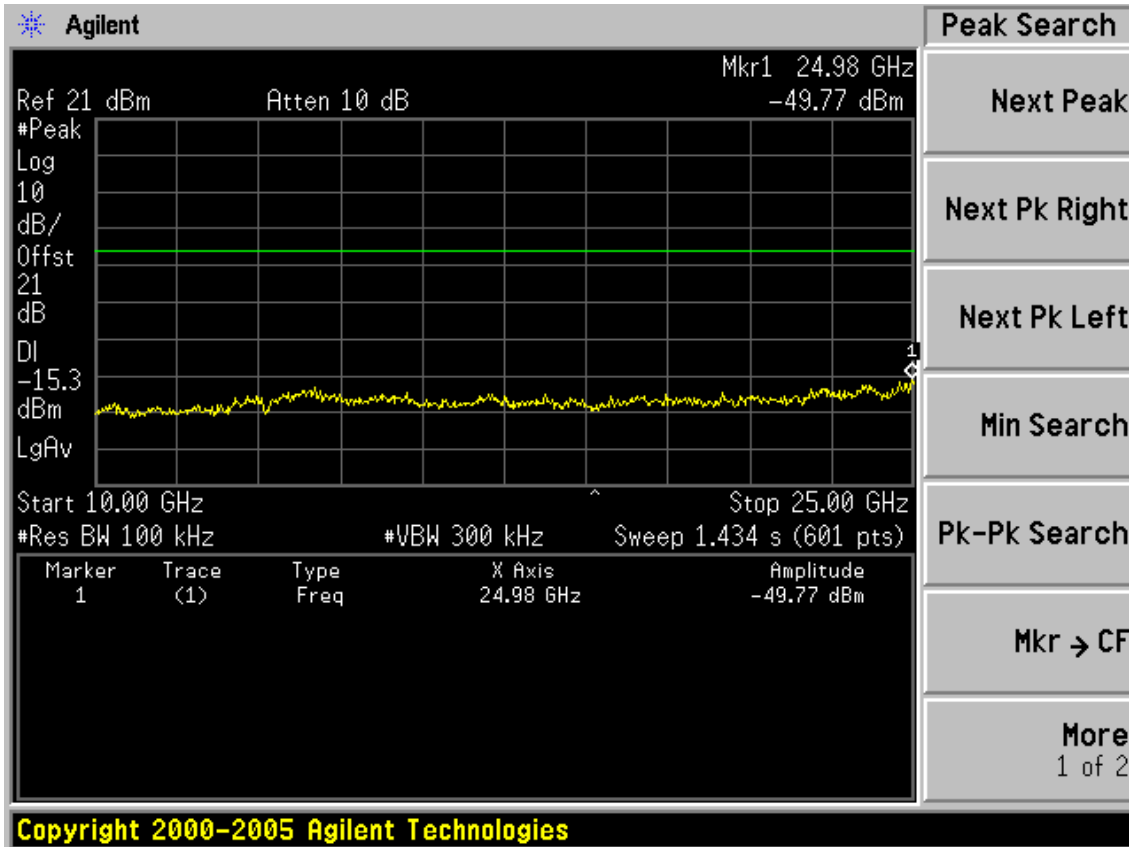
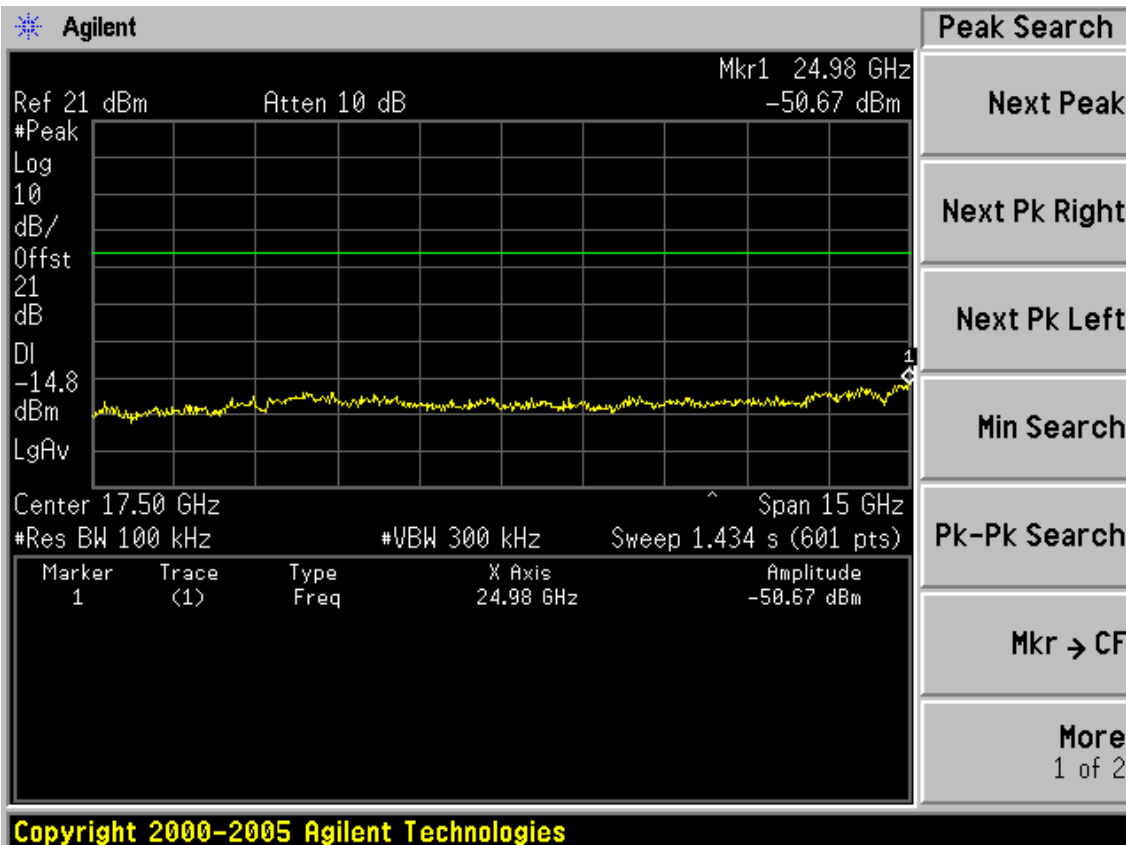
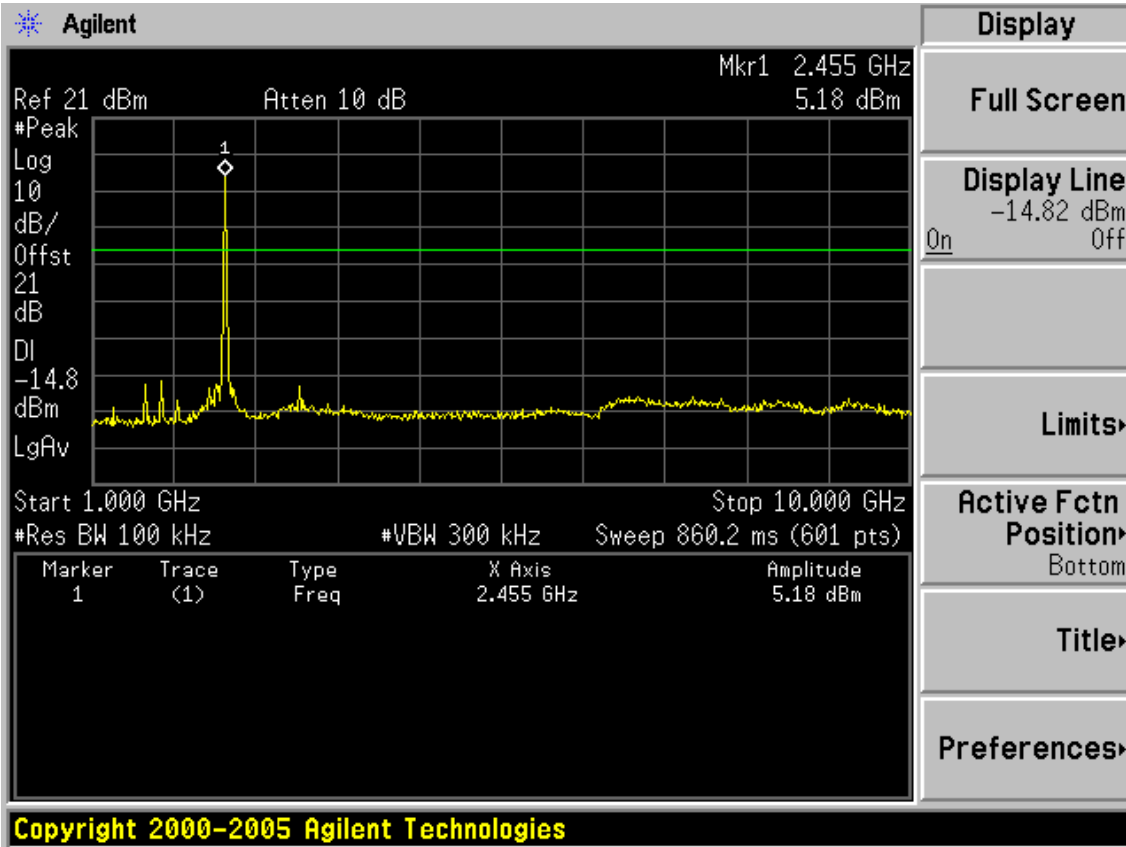


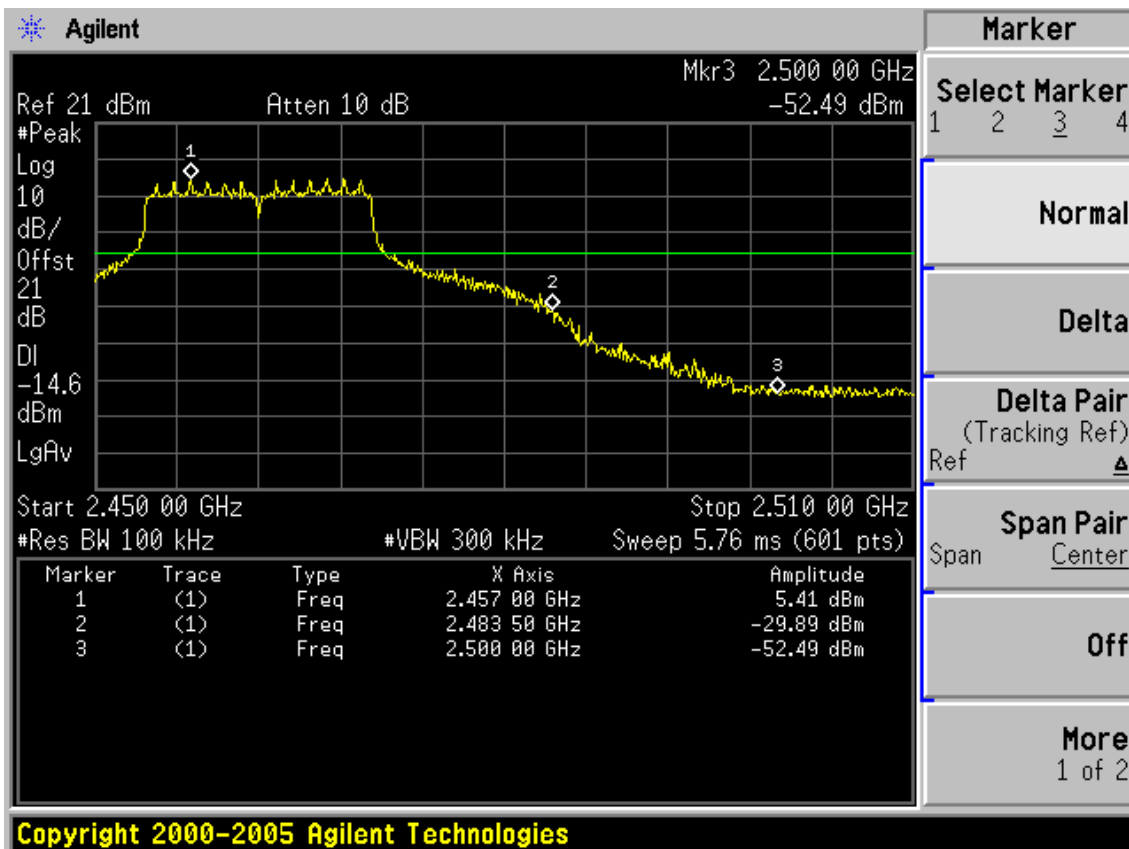
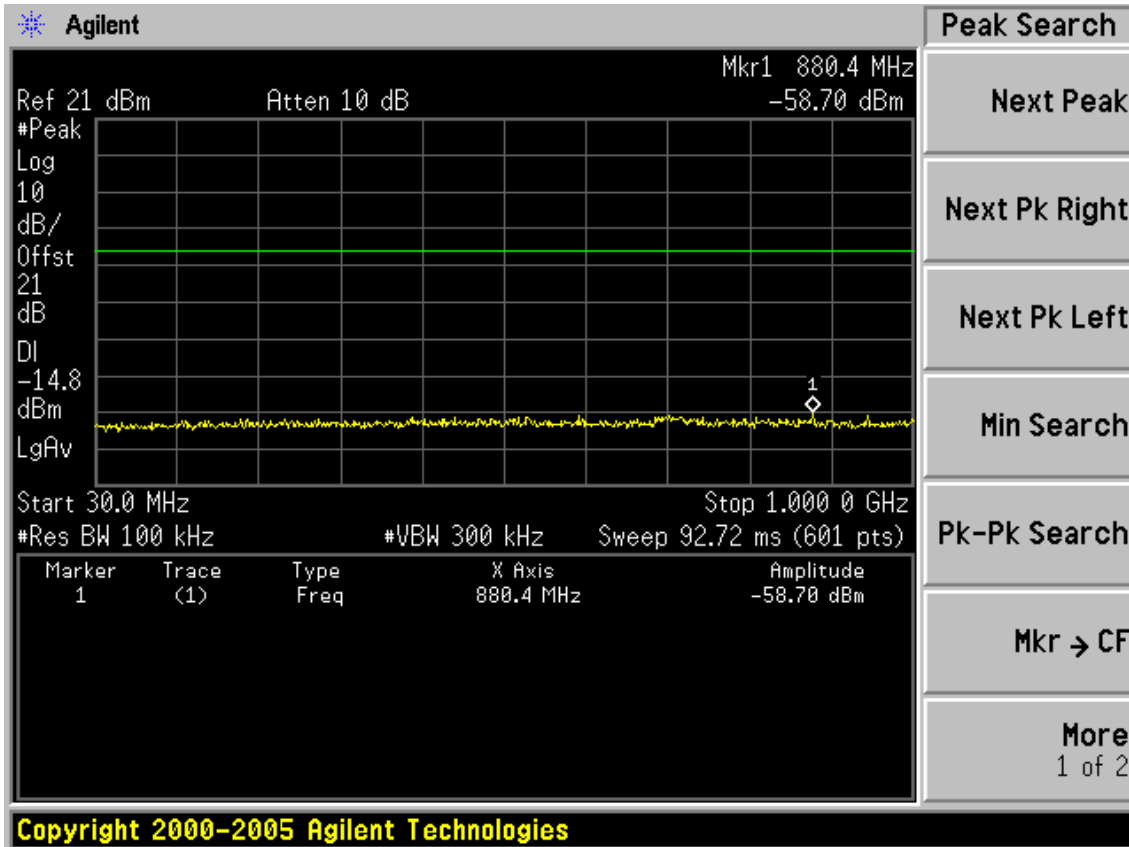
Test CH6: 2437MHz



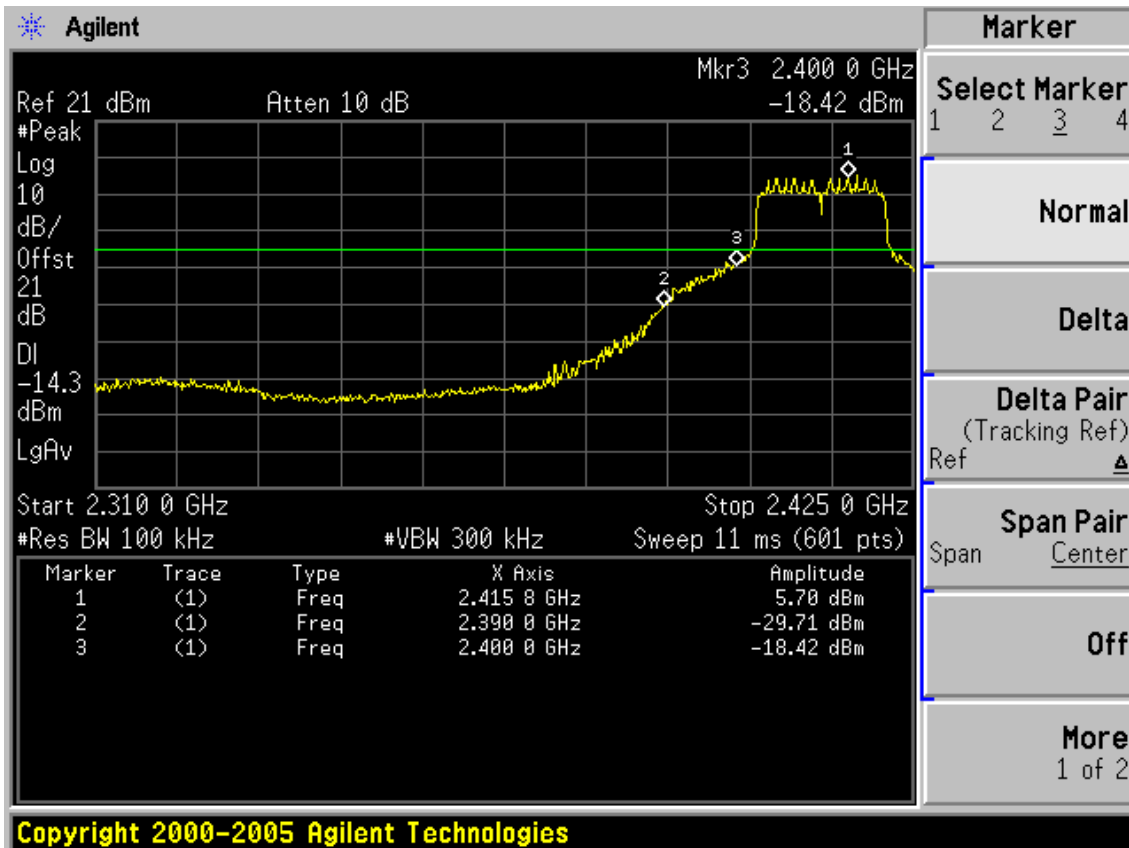
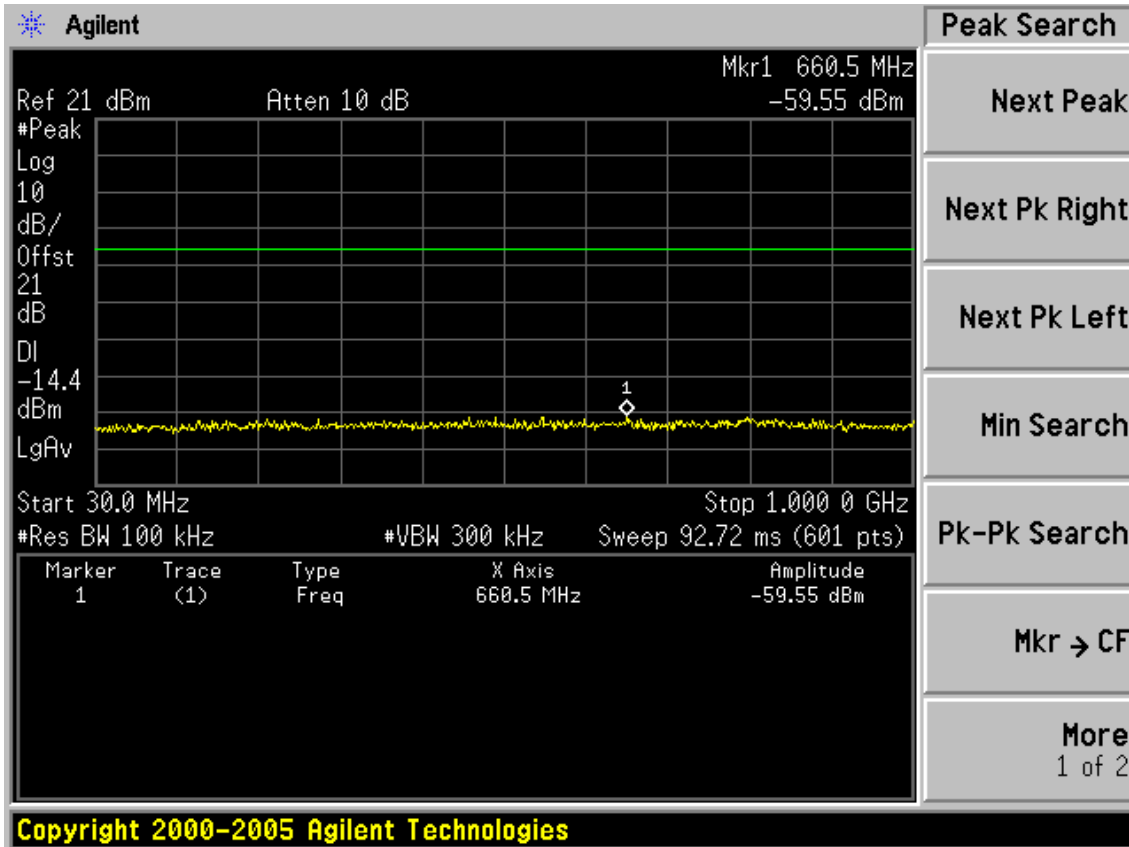


Test CH11: 2462MHz

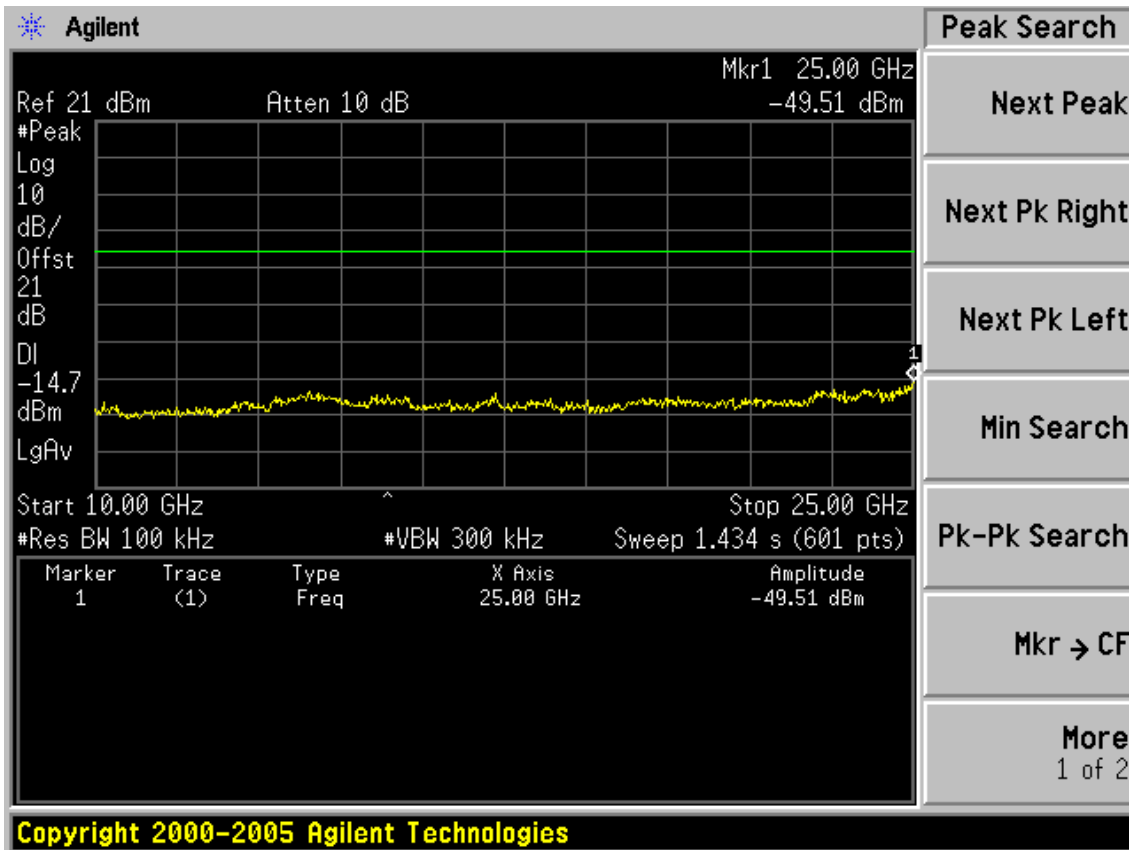
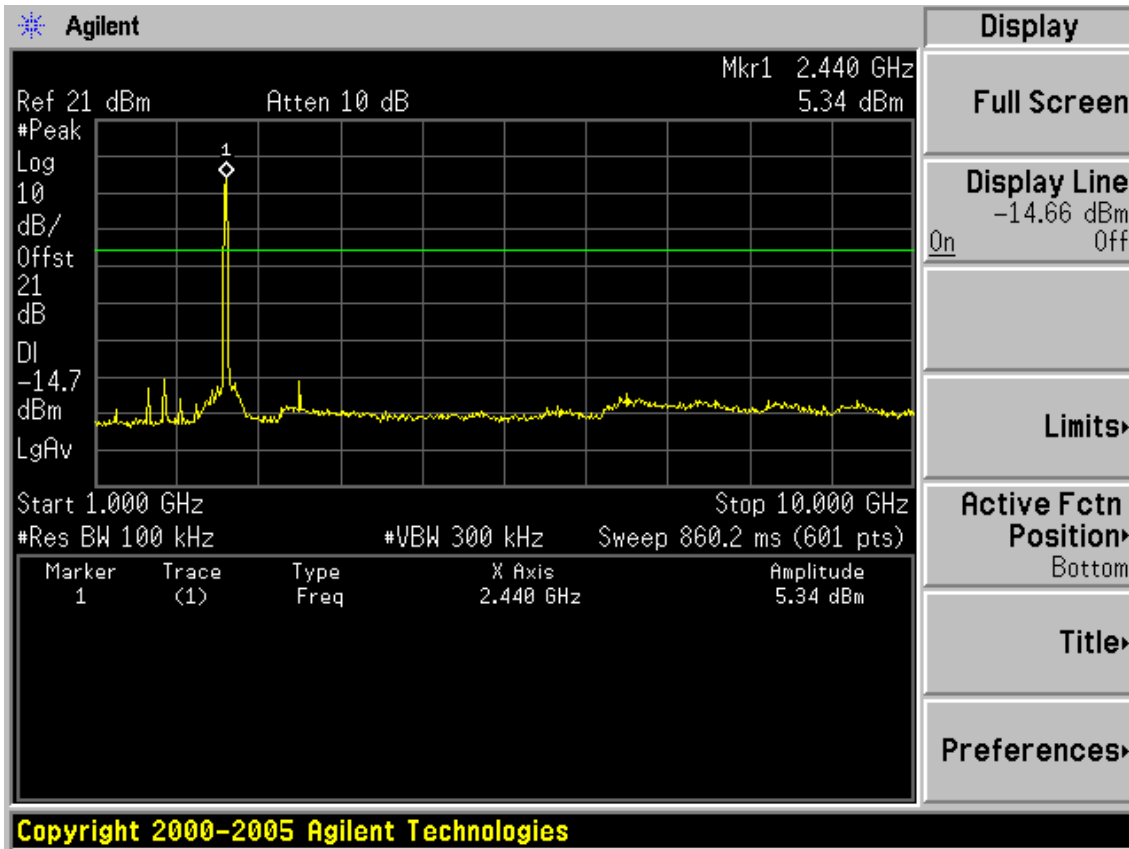


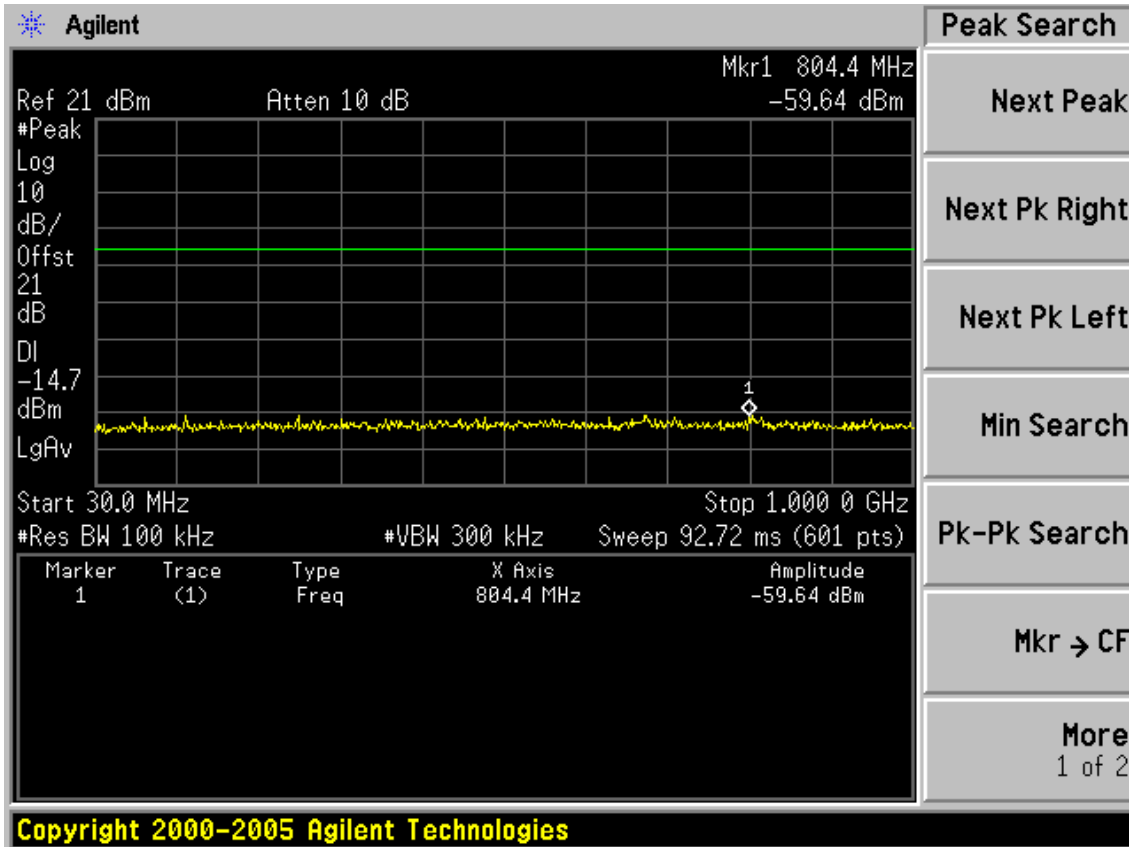




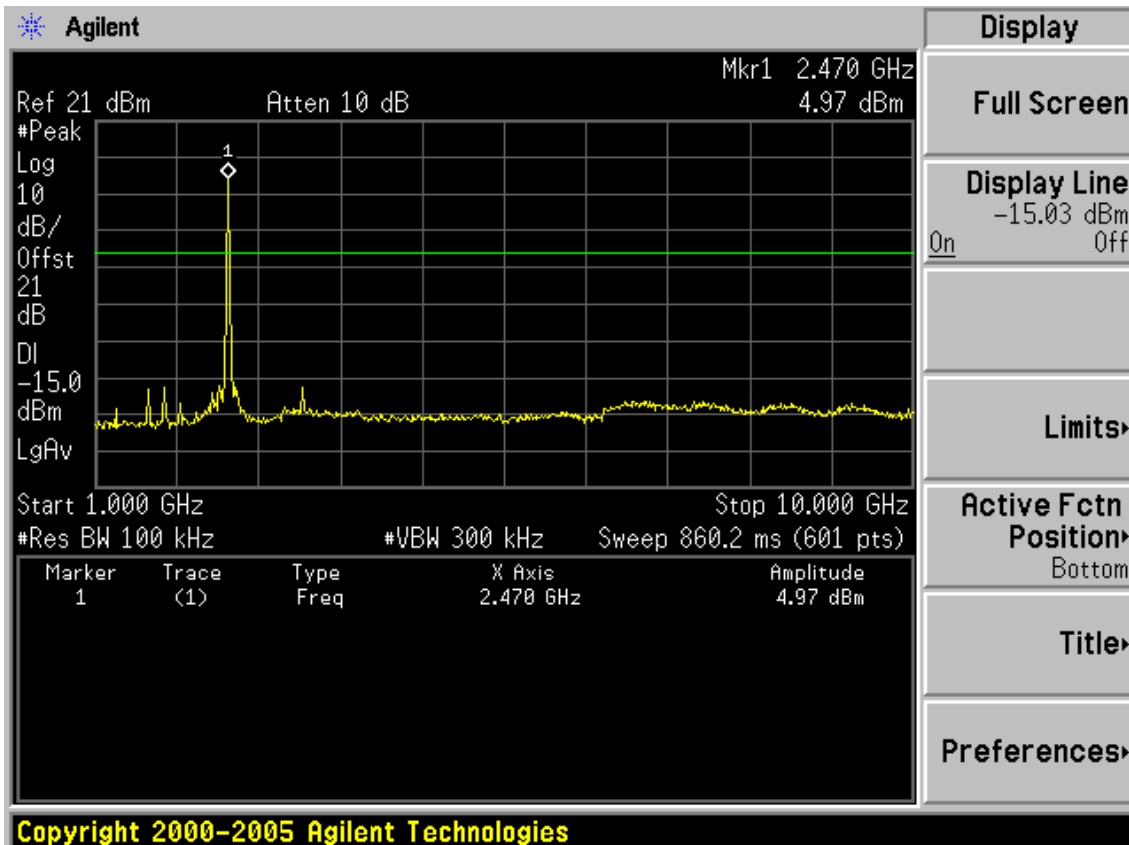


Test CH6: 2437MHz

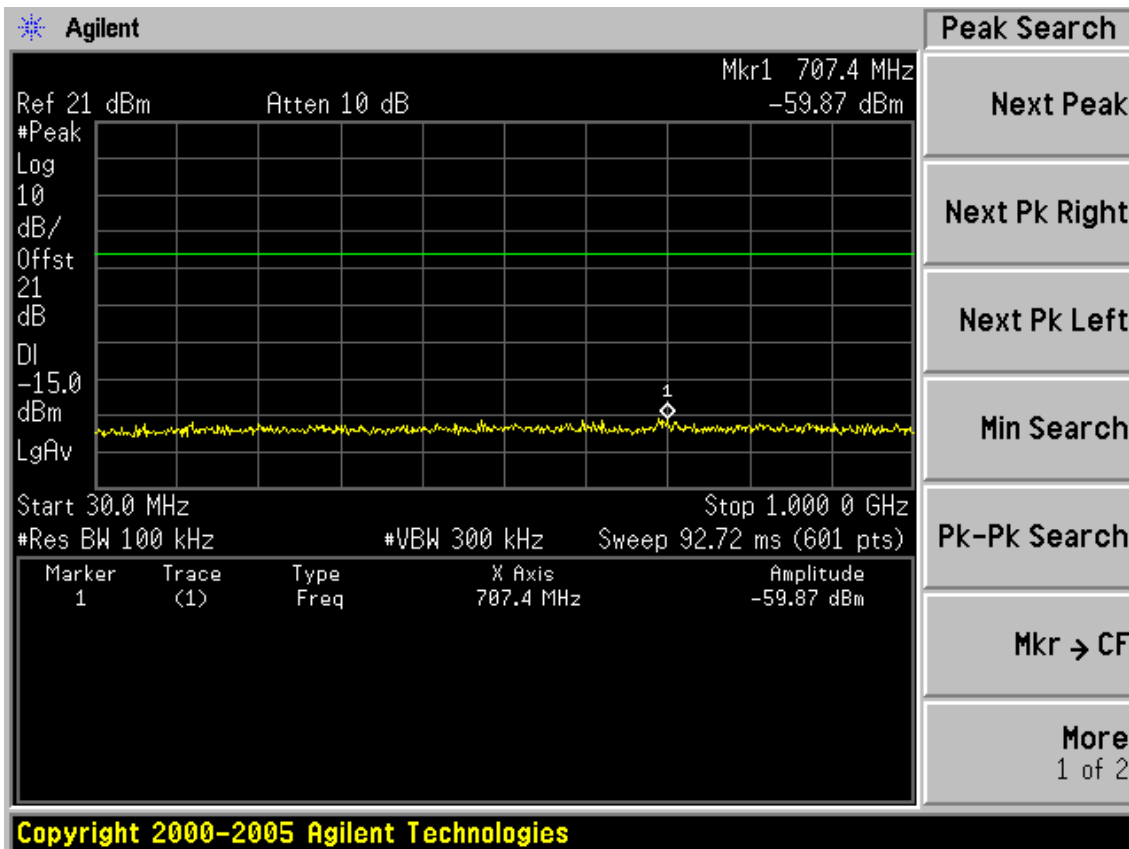
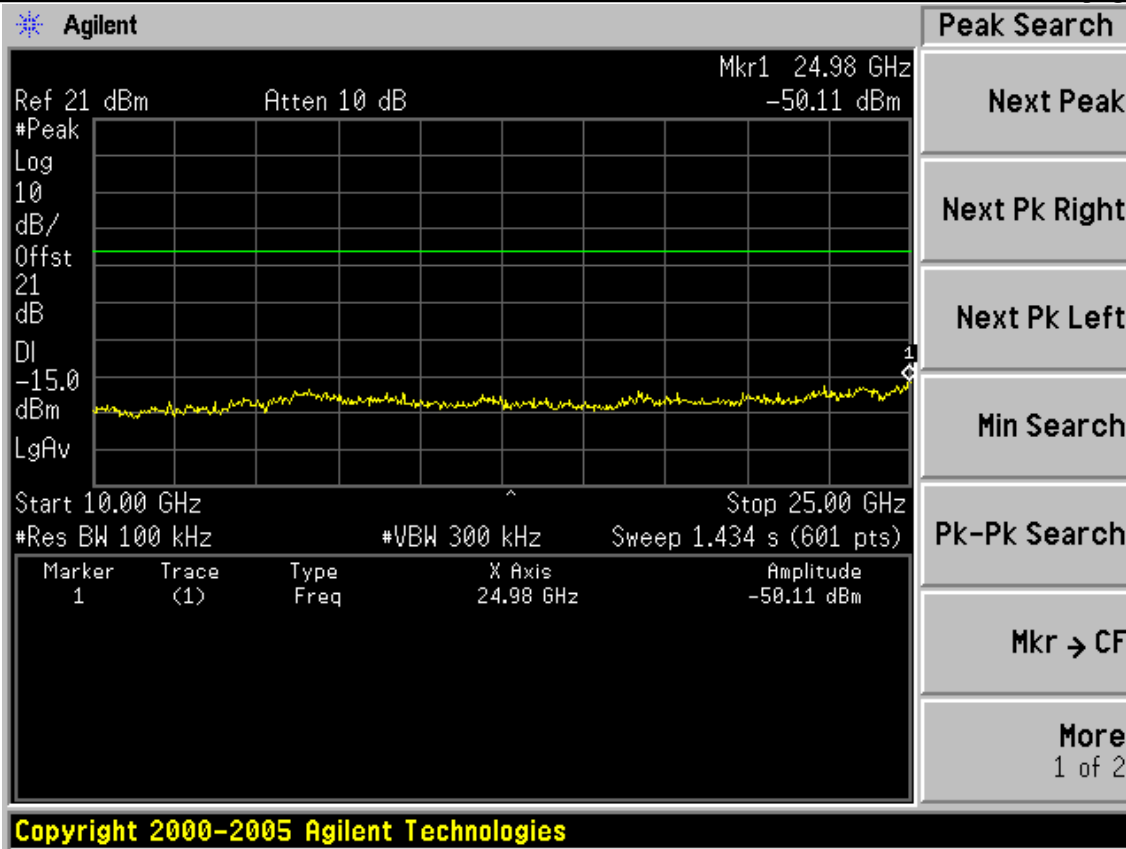


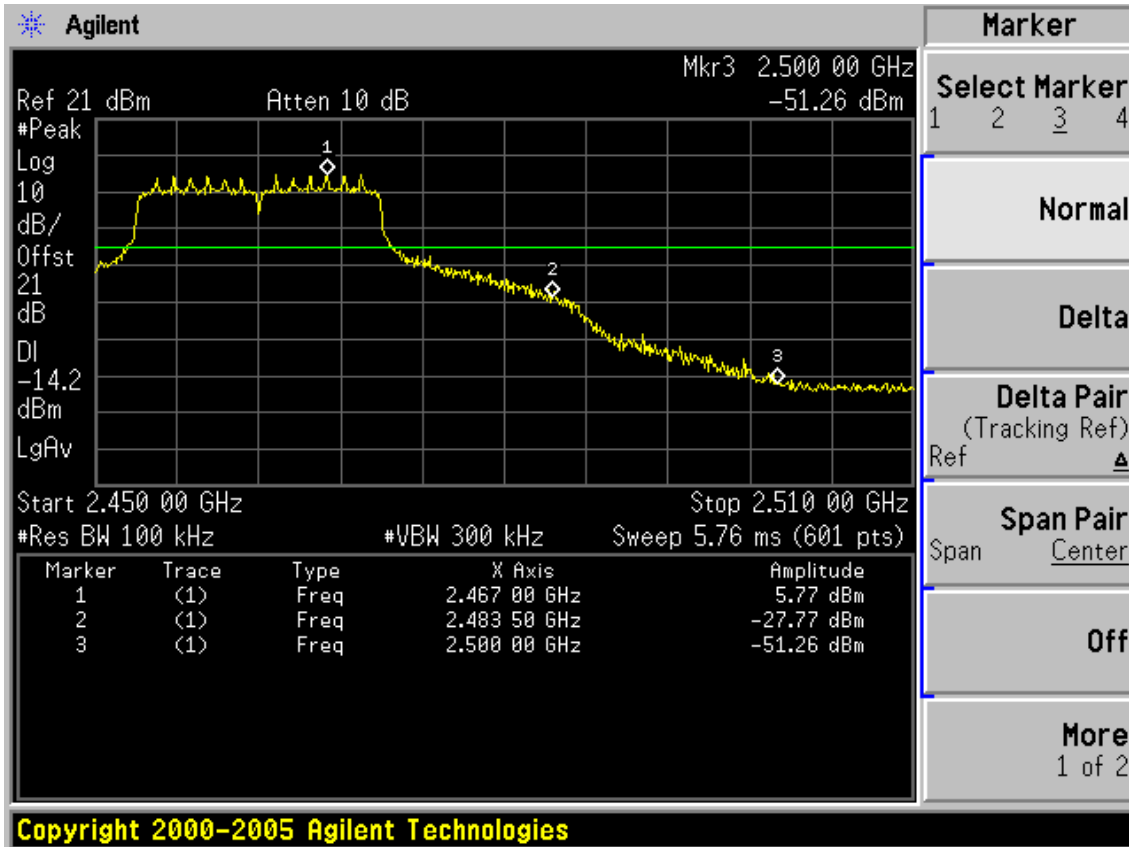


Test CH11: 2462MHz

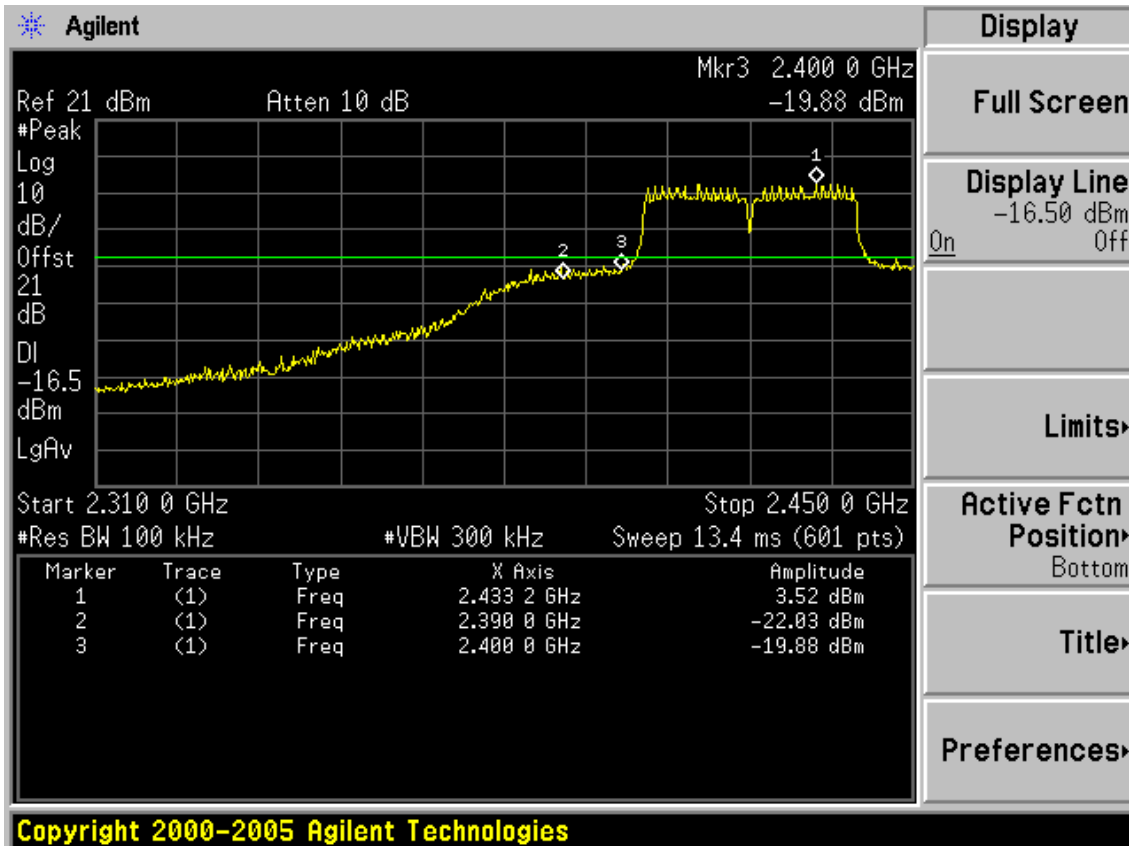


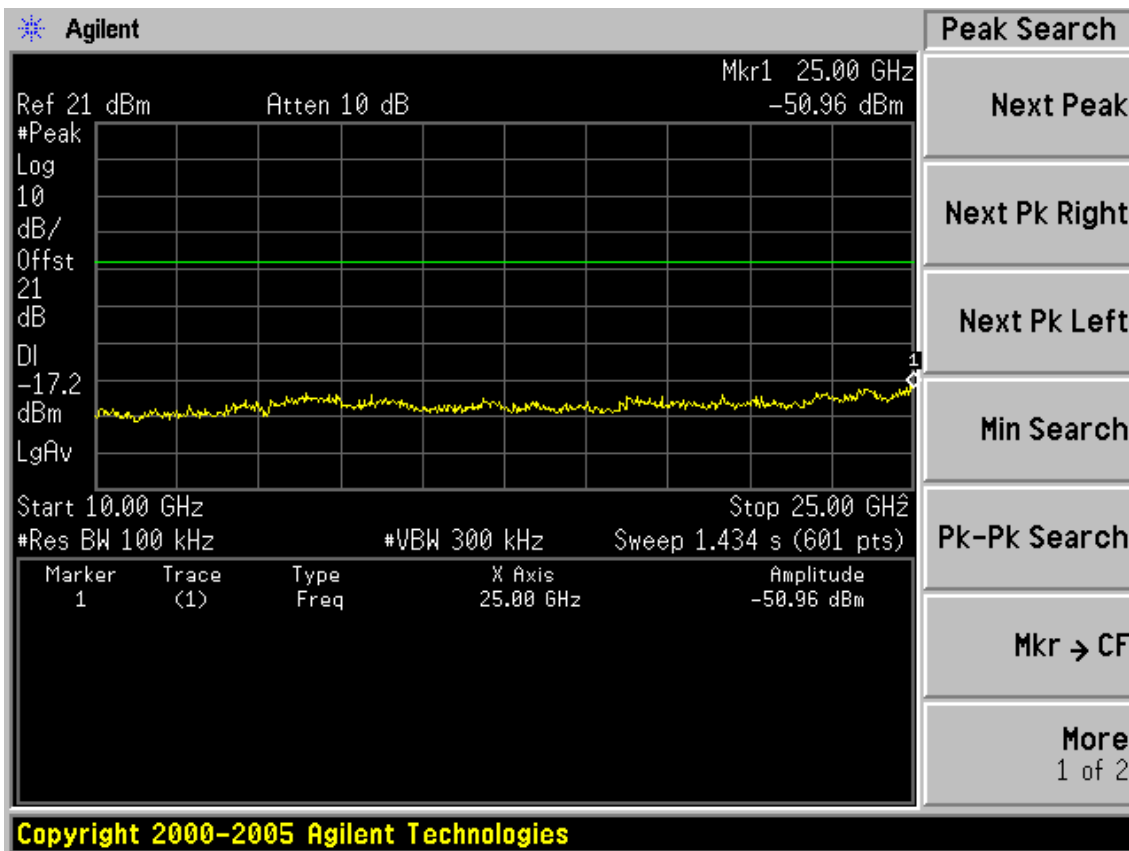
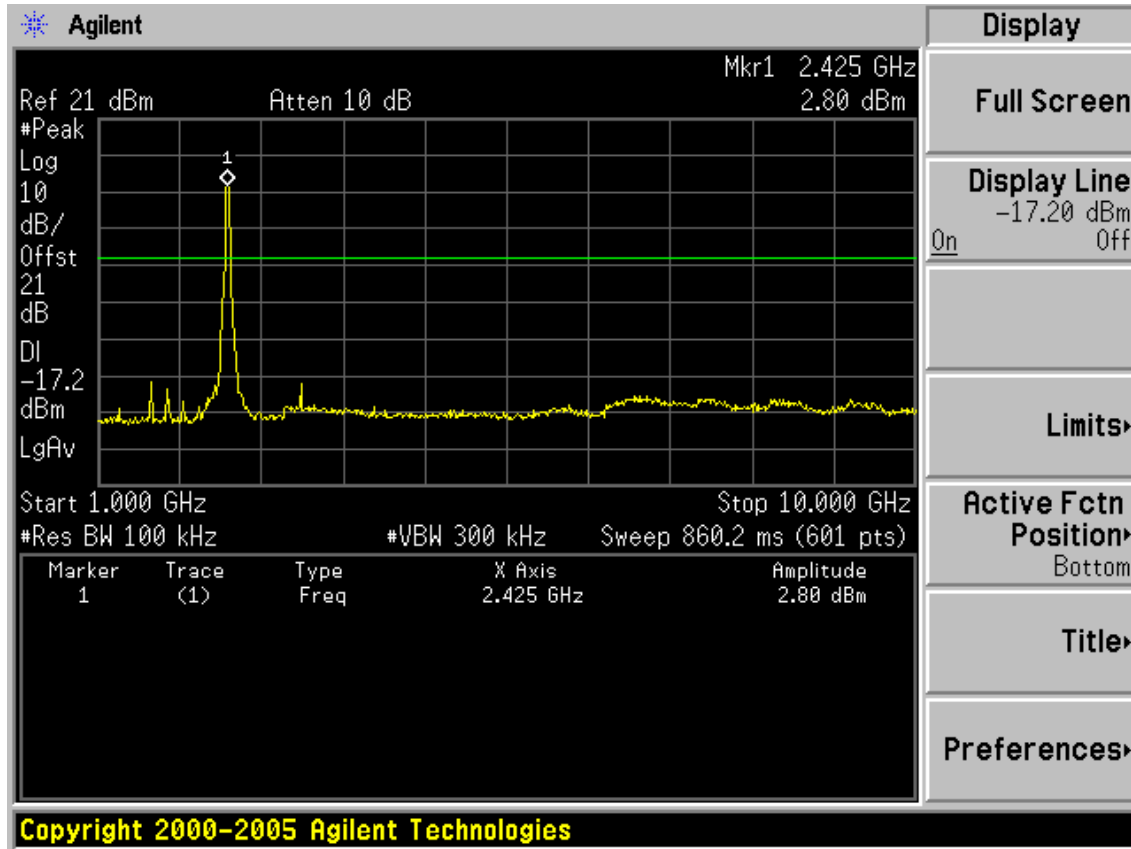


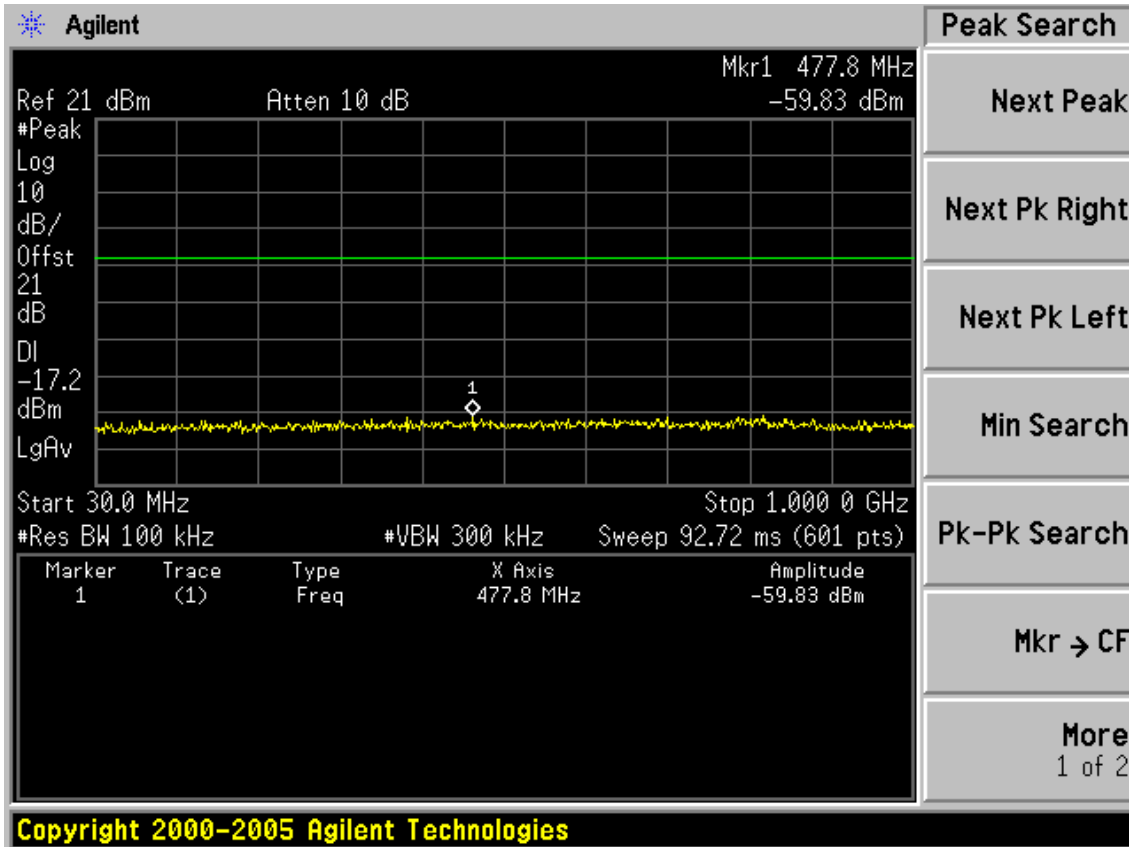




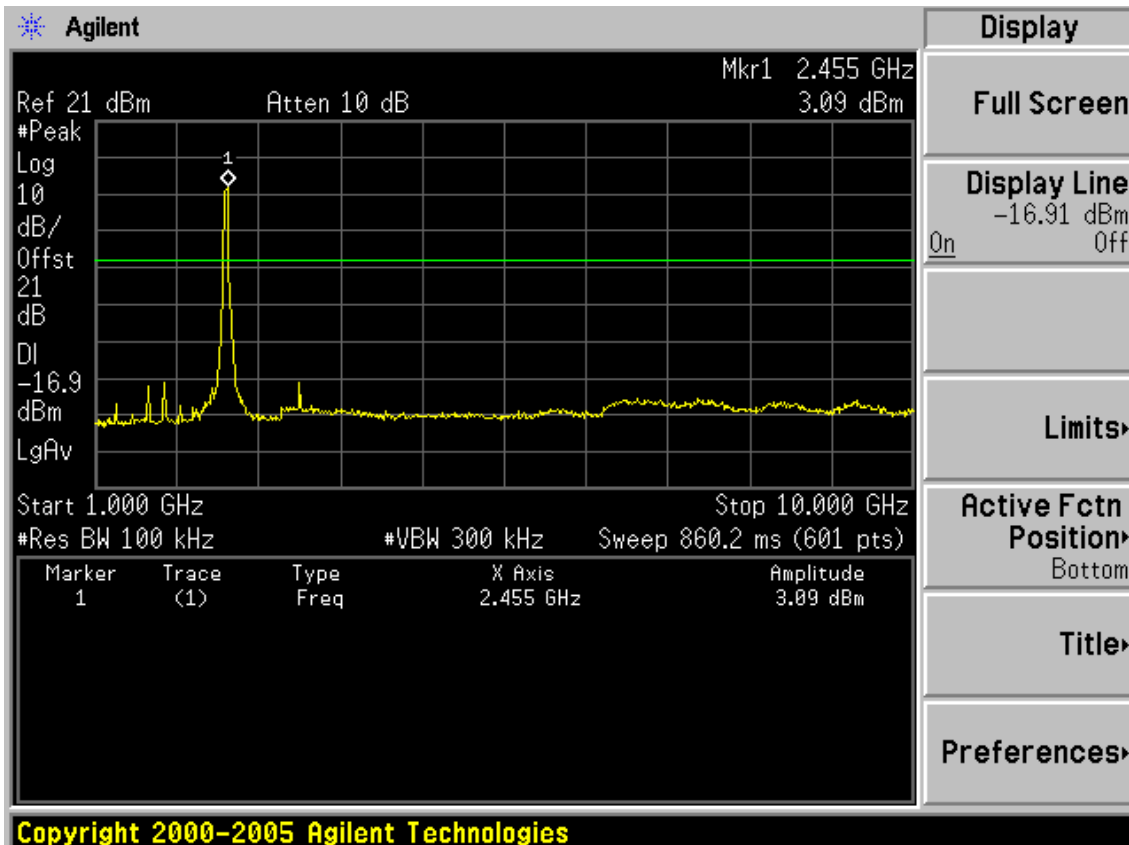
Test Mode: IEEE 802.11n HT40 TX  
 Test CH1: 2422MHz

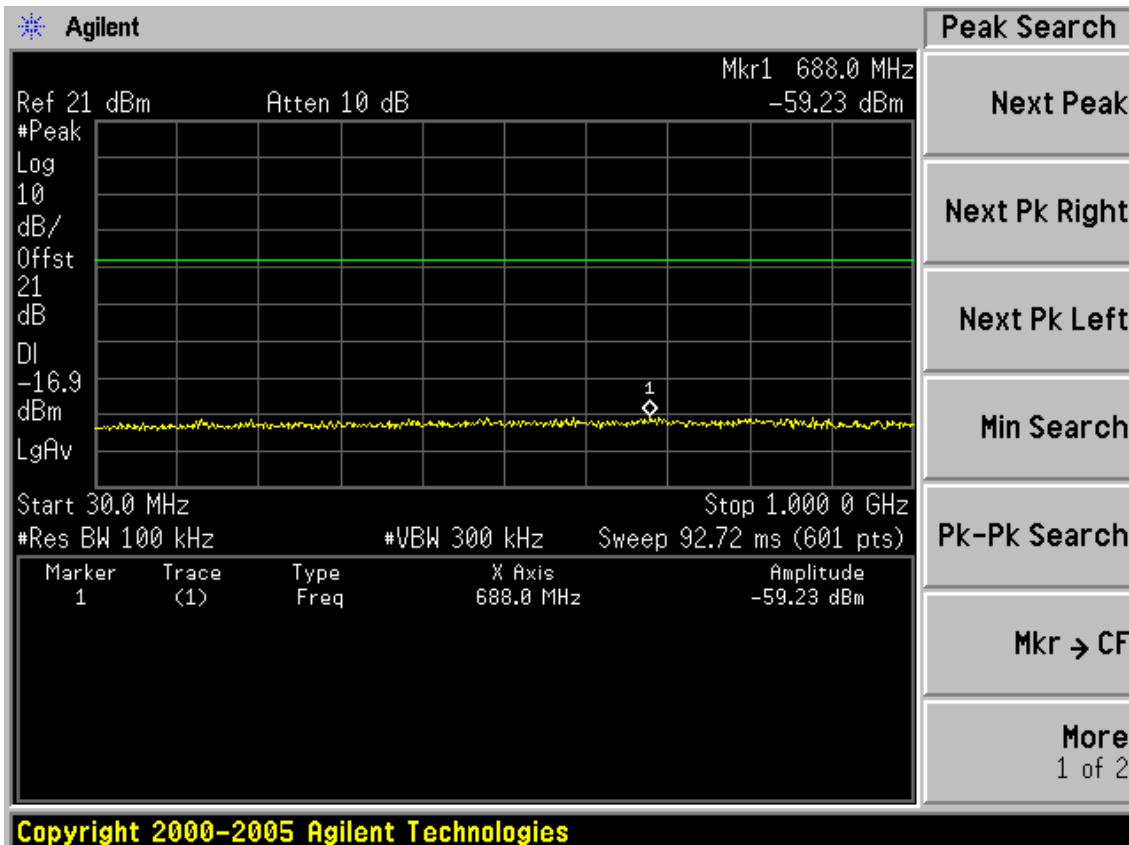
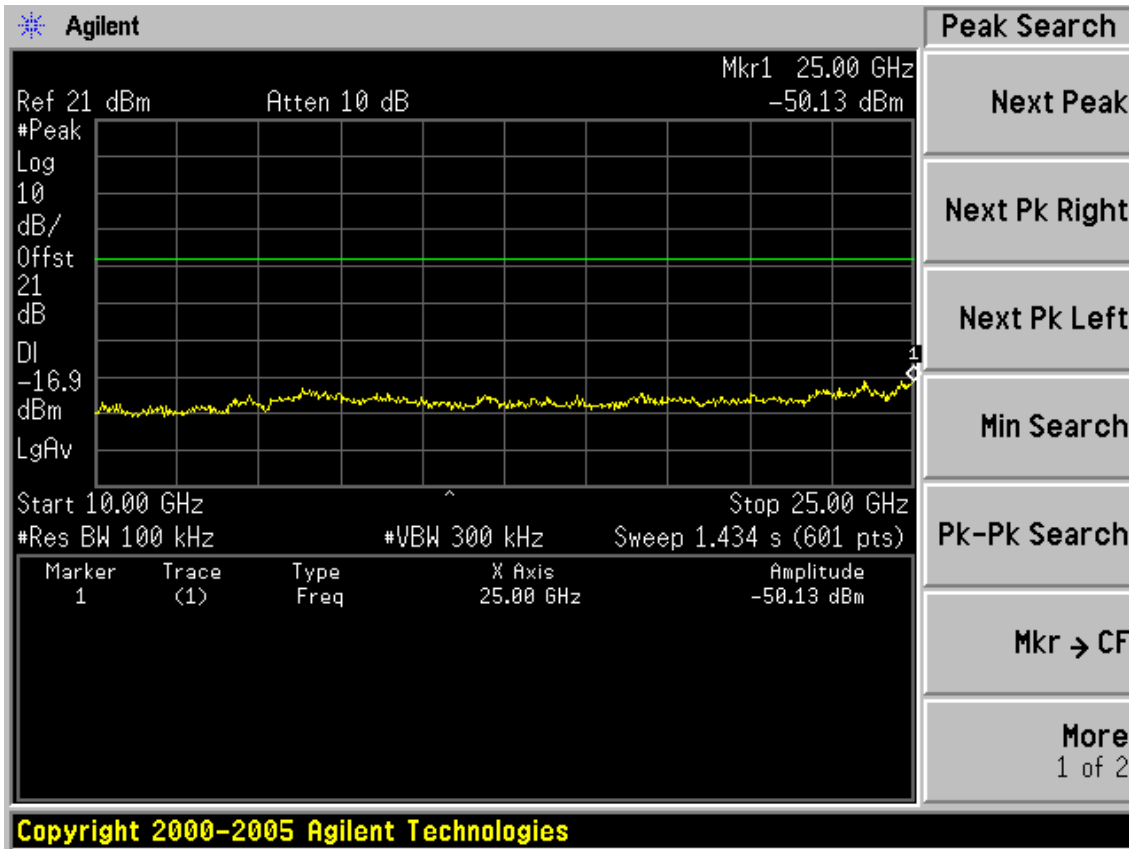




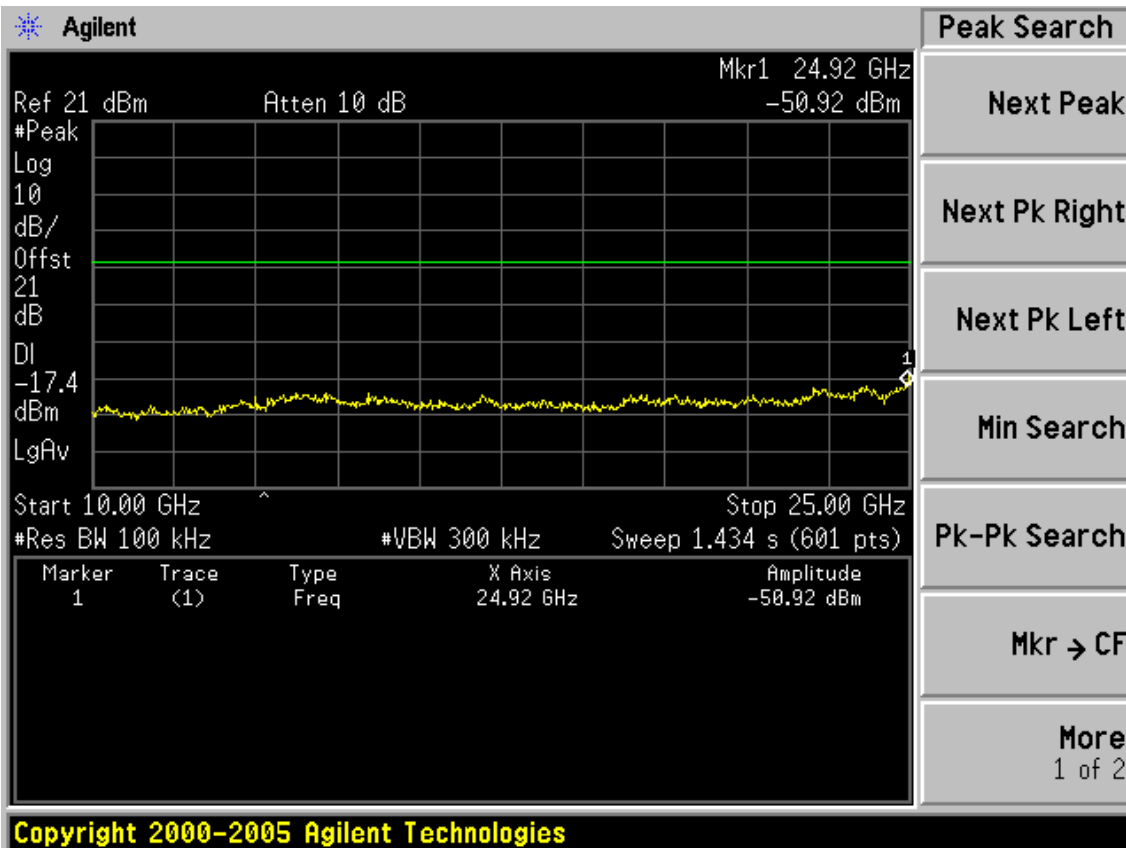
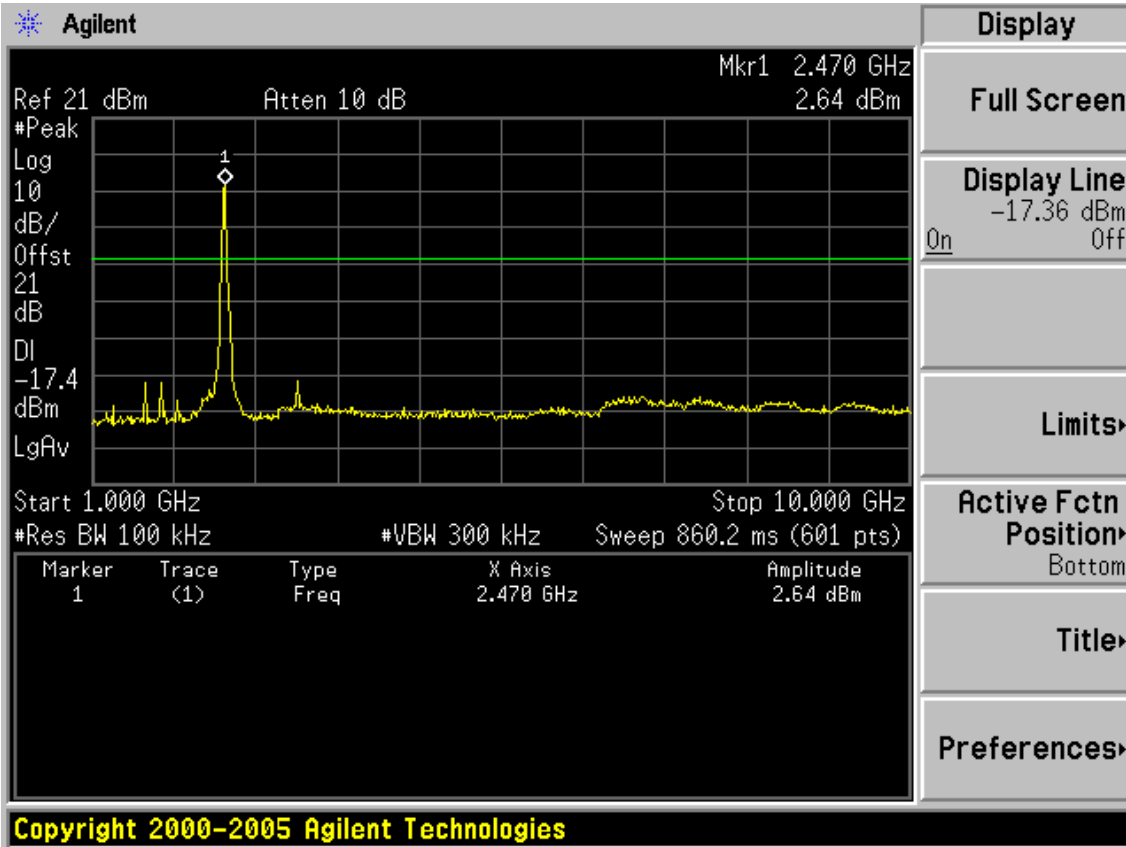


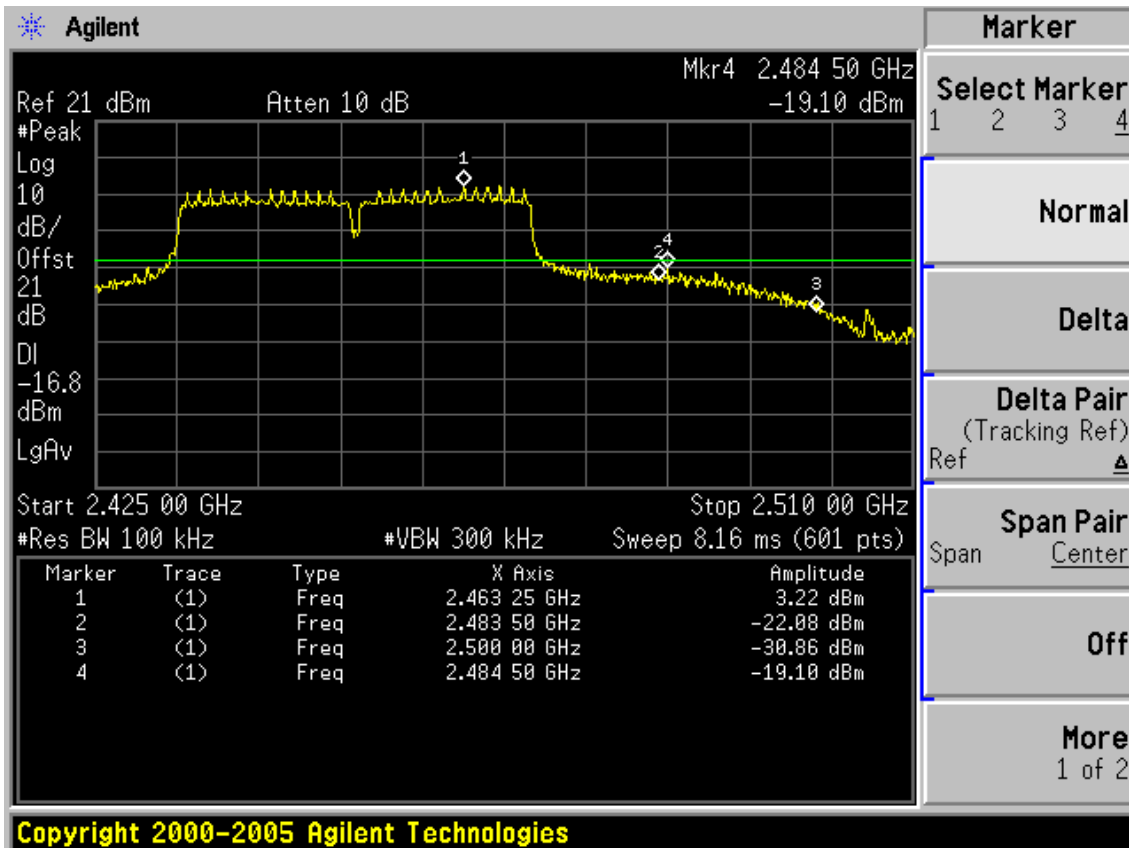
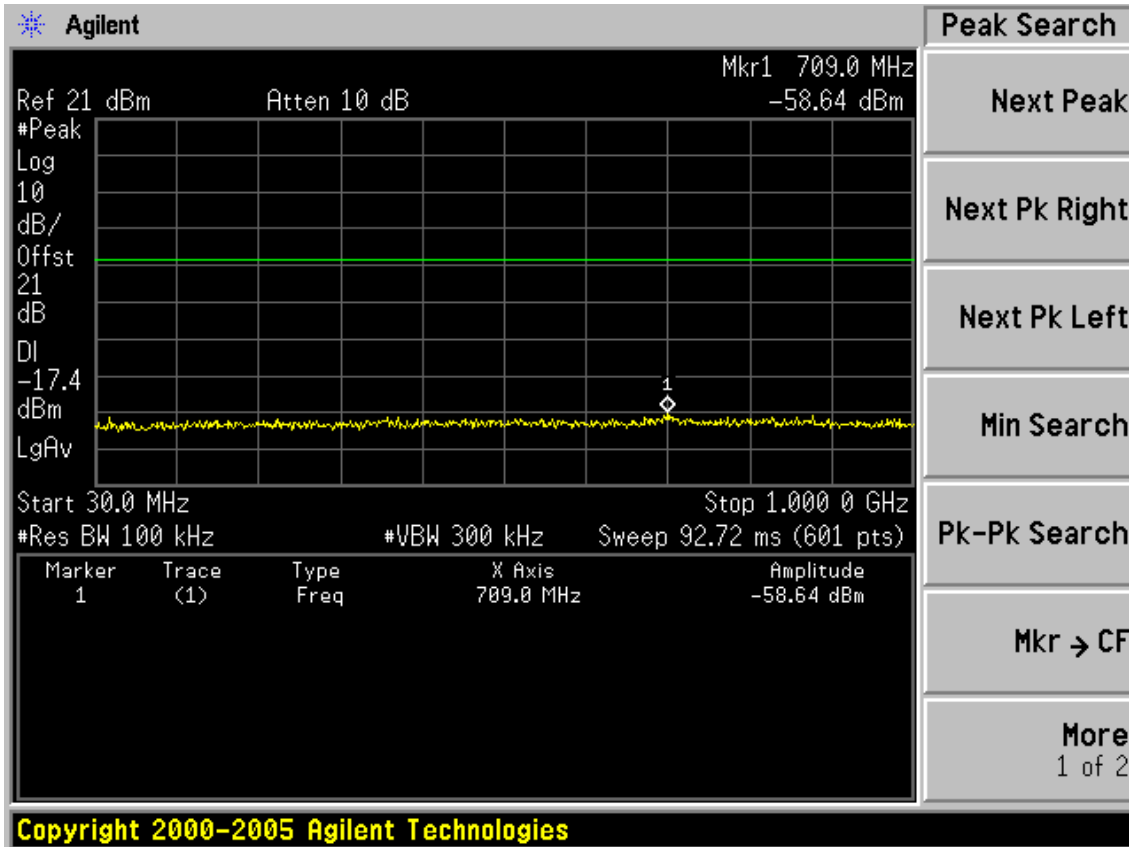
Test CH4: 2437MHz





Test CH7: 2452MHz





## 6. BAND EDGE COMPLIANCE TEST

### 6.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum	Agilent	E4446A	US44300459	May.08, 12	1 Year
2.	Amp	HP	8449B	3008A08495	May.08, 12	1 Year
3.	Antenna	EMCO	3115	9510-4580	May.08, 12	1Year
4.	HF Cable	Hubersuhne	Sucoflex104	-	May.08, 12	1 Year

### 6.2. Limit

All the lower and upper band-edges emissions appearing within 2310MHz to 2390MHz and 2483.5MHz to 2500MHz restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions outside operation frequency band 2400MHz to 2483.5MHz shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

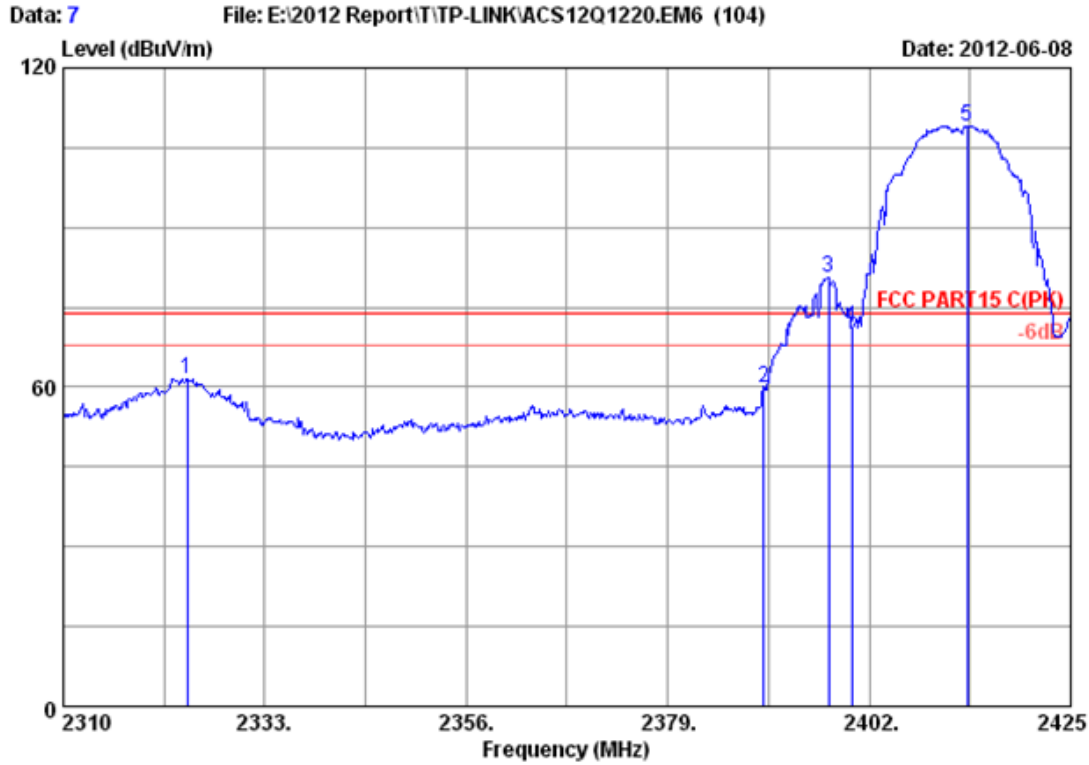
### 6.3. Test Produce

1. The EUT is placed on a turntable, which is 0.8m above the ground plane and worked at highest radiated power.
2. The turntable was rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
  - (a) PEAK: RBW=1MHz; VBW=3MHz; Sweep=AUTO
  - (b) AVERAGE: RBW=1MHz; VBW=10Hz; Sweep=AUTO

### 6.4. Test Results

Pass (The testing data was attached in the next pages.)





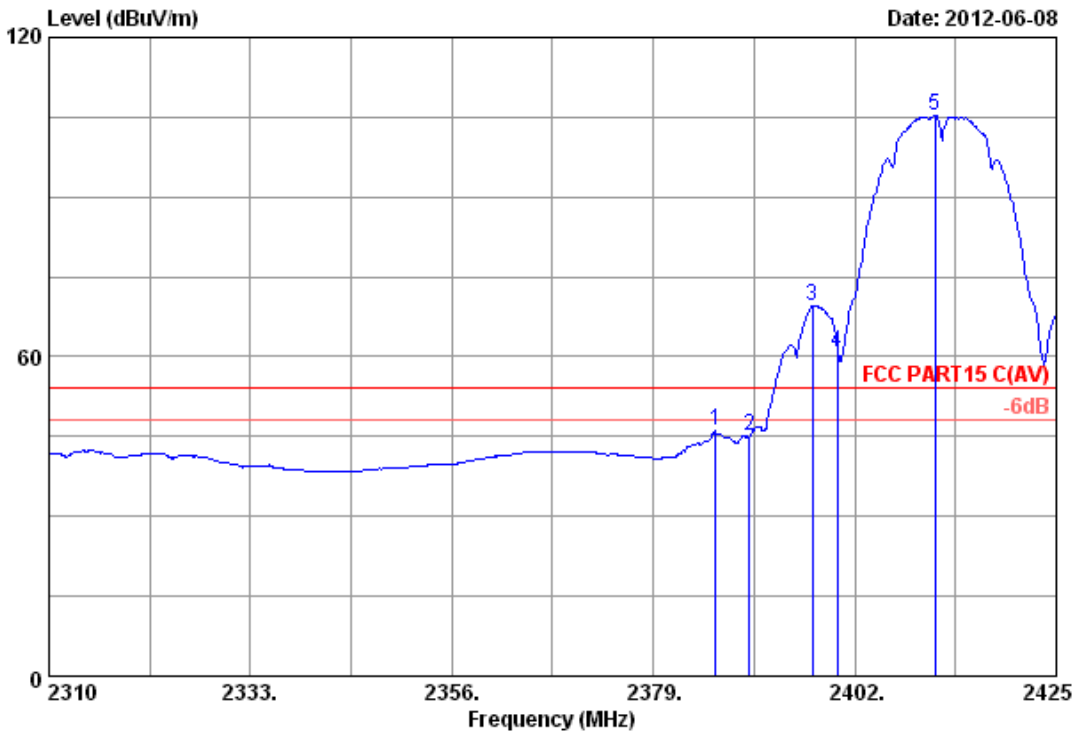
Site no. : 3m Chamber Data no. : 7  
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : VERTICAL  
 Limit : FCC PART15 C(PK)  
 Env. / Ins. : 23\*C/54% Engineer : Leo-Li  
 EUT : 3G/4G Wireless N Router  
 Power supply : DC 9V From Adapter Input AC 120V/60Hz  
 Test mode : IEEE802.11b CH1 2412MHz Tx  
 M/N : TL-MR3220

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2324.145	27.86	5.89	34.43	62.35	61.67	74.00	12.33	Peak
2	2390.000	27.96	6.01	34.44	60.30	59.83	74.00	14.17	Peak
3	2397.400	27.96	6.01	34.44	81.17	80.70	74.00	-6.70	Peak
4	2400.000	27.96	6.01	34.44	71.79	71.32	74.00	2.68	Peak
5	2413.155	27.98	6.03	34.44	109.45	109.02	74.00	-35.02	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

Data: 8 File: E:\2012 Report\ITP-LINK\ACS12Q1220.EM6 (104) Date: 2012-06-08

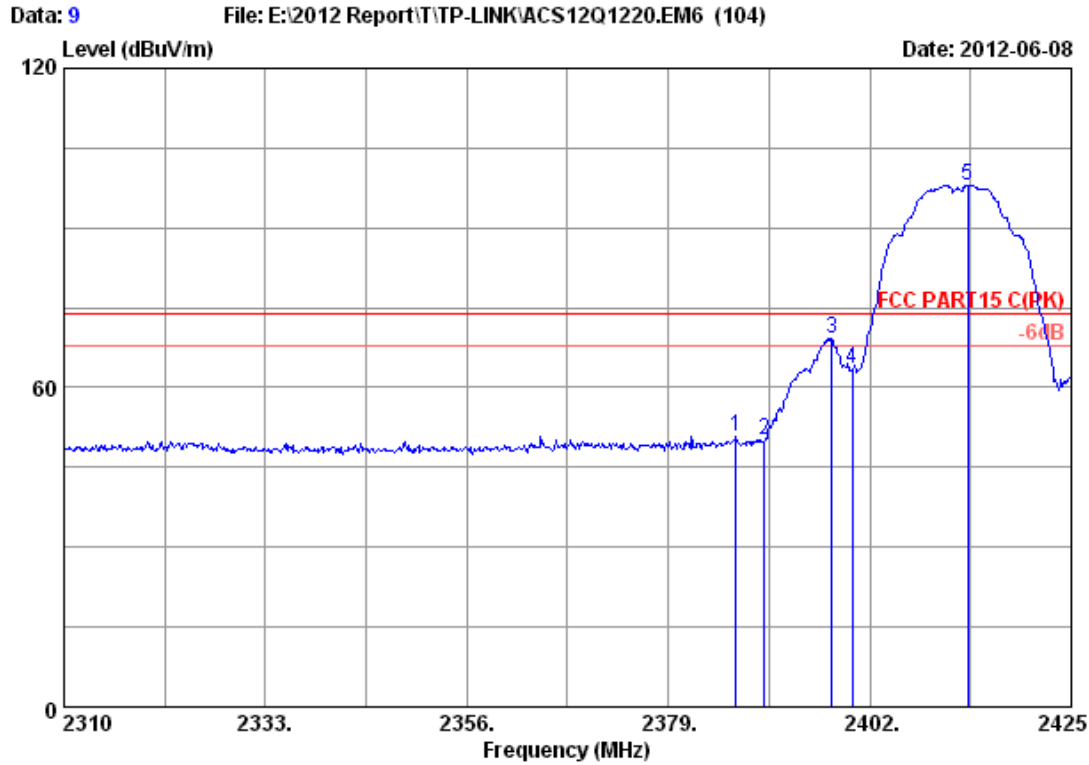


Site no. : 3m Chamber Data no. : 8  
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : VERTICAL  
 Limit : FCC PART15 C(AV)  
 Env. / Ins. : 23°C/54% Engineer : Leo-Li  
 EUT : 3G/4G Wireless N Router  
 Power supply : DC 9V From Adapter Input AC 120V/60Hz  
 Test mode : IEEE802.11b CH1 2412MHz Tx  
 M/N : TL-MR3220

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2386.130	27.96	6.01	34.44	46.50	46.03	54.00	7.97	Average
2	2390.000	27.96	6.01	34.44	45.53	45.06	54.00	8.94	Average
3	2397.170	27.96	6.01	34.44	70.06	69.59	54.00	-15.59	Average
4	2400.000	27.96	6.01	34.44	61.27	60.80	54.00	-6.80	Average
5	2411.200	27.98	6.03	34.44	105.64	105.21	54.00	-51.21	Average

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



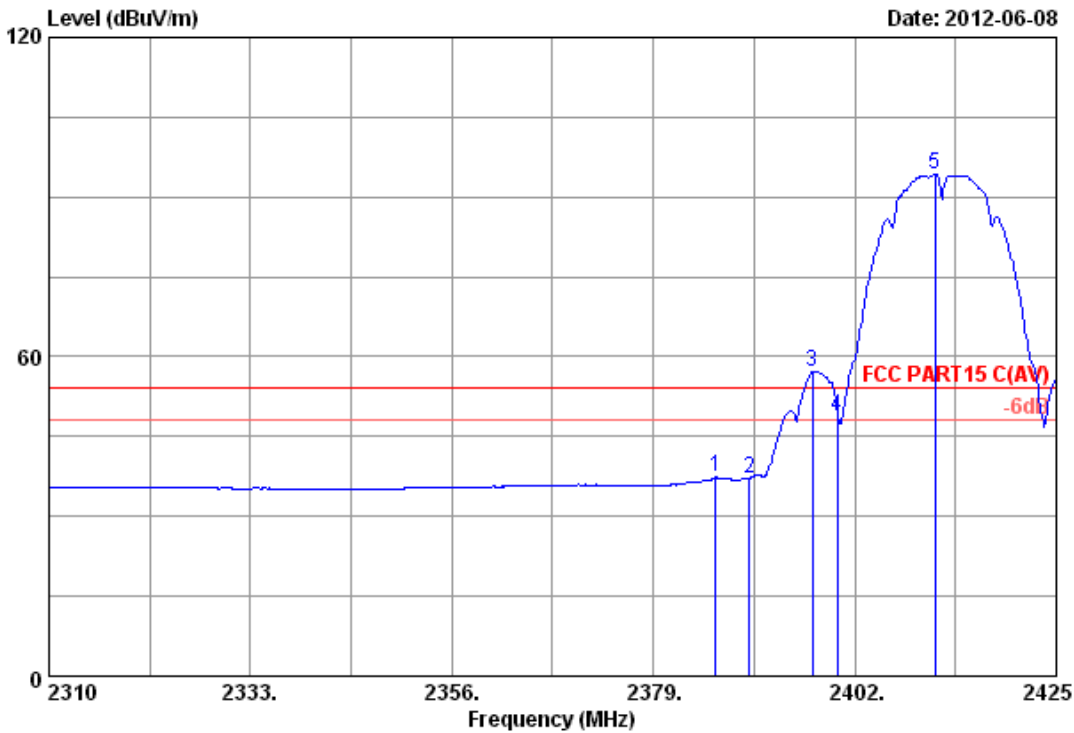
Site no. : 3m Chamber Data no. : 9  
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : HORIZONTAL  
 Limit : FCC PART15 C(PK)  
 Env. / Ins. : 23°C/54% Engineer : Leo-Li  
 EUT : 3G/4G Wireless N Router  
 Power supply : DC 9V From Adapter Input AC 120V/60Hz  
 Test mode : IEEE802.11b CH1 2412MHz Tx  
 M/N : TL-MR3220

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2386.705	27.96	6.01	34.44	51.17	50.70	74.00	23.30	Peak
2	2390.000	27.96	6.01	34.44	50.69	50.22	74.00	23.78	Peak
3	2397.630	27.96	6.01	34.44	69.57	69.10	74.00	4.90	Peak
4	2400.000	27.96	6.01	34.44	64.09	63.62	74.00	10.38	Peak
5	2413.155	27.98	6.03	34.44	98.41	97.98	74.00	-23.98	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

Data: 10 File: E:\2012 Report\ITP-LINK\ACS12Q1220.EM6 (104) Date: 2012-06-08

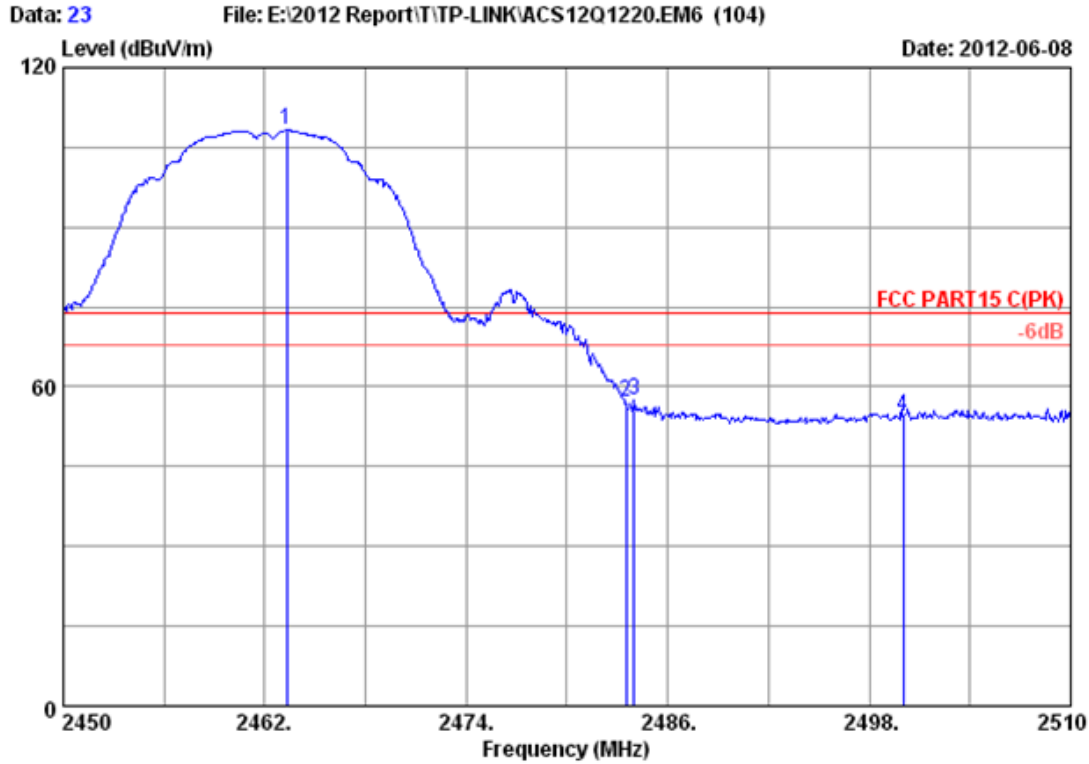


Site no. : 3m Chamber Data no. : 10  
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : HORIZONTAL  
 Limit : FCC PART15 C(AV)  
 Env. / Ins. : 23°C/54% Engineer : Leo-Li  
 EUT : 3G/4G Wireless N Router  
 Power supply : DC 9V From Adapter Input AC 120V/60Hz  
 Test mode : IEEE802.11b CH1 2412MHz Tx  
 M/N : TL-MR3220

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2386.130	27.96	6.01	34.44	37.76	37.29	54.00	16.71	Average
2	2390.000	27.96	6.01	34.44	37.70	37.23	54.00	16.77	Average
3	2397.170	27.96	6.01	34.44	57.72	57.25	54.00	-3.25	Average
4	2400.000	27.96	6.01	34.44	49.34	48.87	54.00	5.13	Average
5	2411.200	27.98	6.03	34.44	94.66	94.23	54.00	-40.23	Average

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

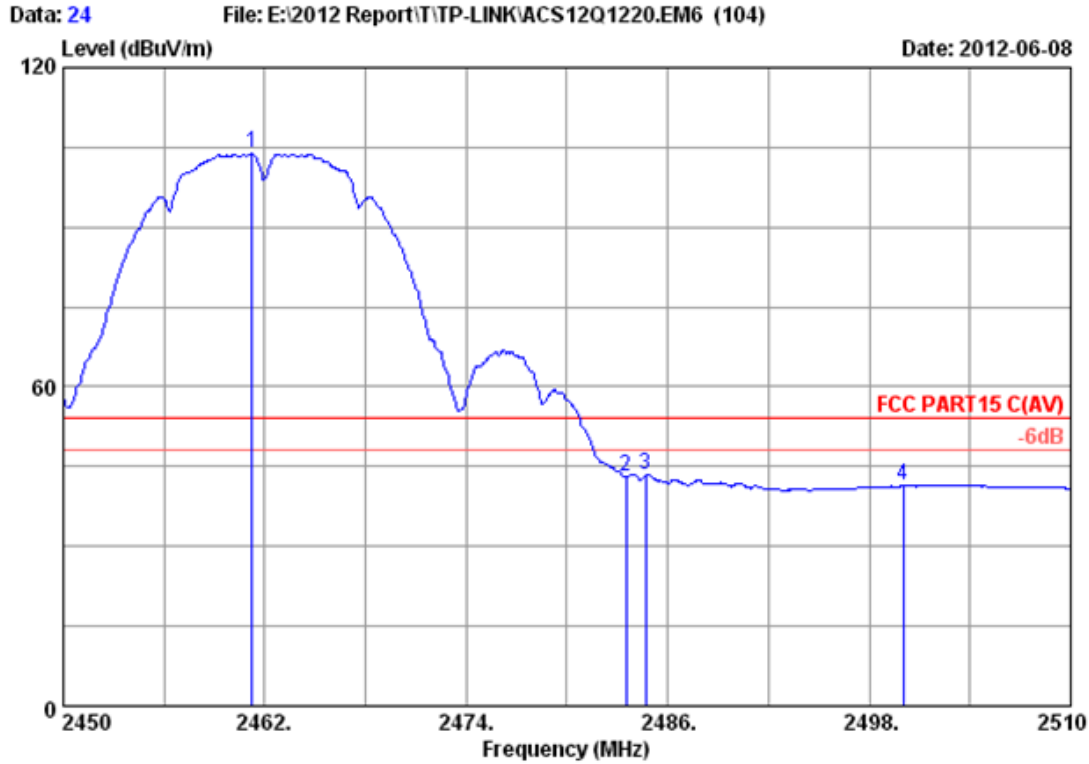


Site no. : 3m Chamber Data no. : 23  
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : VERTICAL  
 Limit : FCC PART15 C(PK)  
 Env. / Ins. : 23°C/54% Engineer : Leo-Li  
 EUT : 3G/4G Wireless N Router  
 Power supply : DC 9V From Adapter Input AC 120V/60Hz  
 Test mode : IEEE802.11b CH11 2462MHz Tx  
 M/N : TL-MR3220

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2463.320	28.05	6.12	34.45	108.45	108.17	74.00	-34.17	Peak
2	2483.500	28.08	6.15	34.45	57.39	57.17	74.00	16.83	Peak
3	2484.020	28.08	6.15	34.45	57.73	57.51	74.00	16.49	Peak
4	2500.000	28.10	6.18	34.45	54.63	54.46	74.00	19.54	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



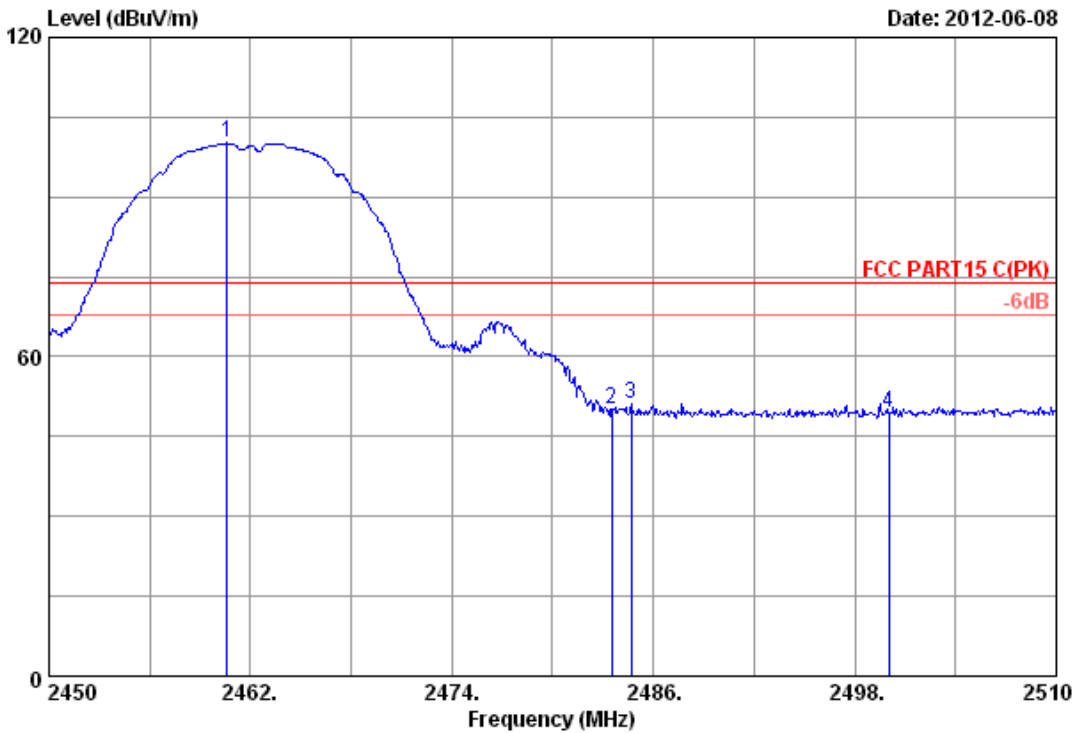
Site no. : 3m Chamber Data no. : 24  
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : VERTICAL  
 Limit : FCC PART15 C(AV)  
 Env. / Ins. : 23°C/54% Engineer : Leo-Li  
 EUT : 3G/4G Wireless N Router  
 Power supply : DC 9V From Adapter Input AC 120V/60Hz  
 Test mode : IEEE802.11b CH11 2462MHz Tx  
 M/N : TL-MR3220

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2461.220	28.05	6.12	34.44	104.12	103.85	54.00	-49.85	Average
2	2483.500	28.08	6.15	34.45	43.34	43.12	54.00	10.88	Average
3	2484.680	28.08	6.15	34.45	43.75	43.53	54.00	10.47	Average
4	2500.000	28.10	6.18	34.45	41.53	41.36	54.00	12.64	Average

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

Data: 25 File: E:\2012 Report\ITP-LINK\ACS12Q1220.EM6 (104) Date: 2012-06-08

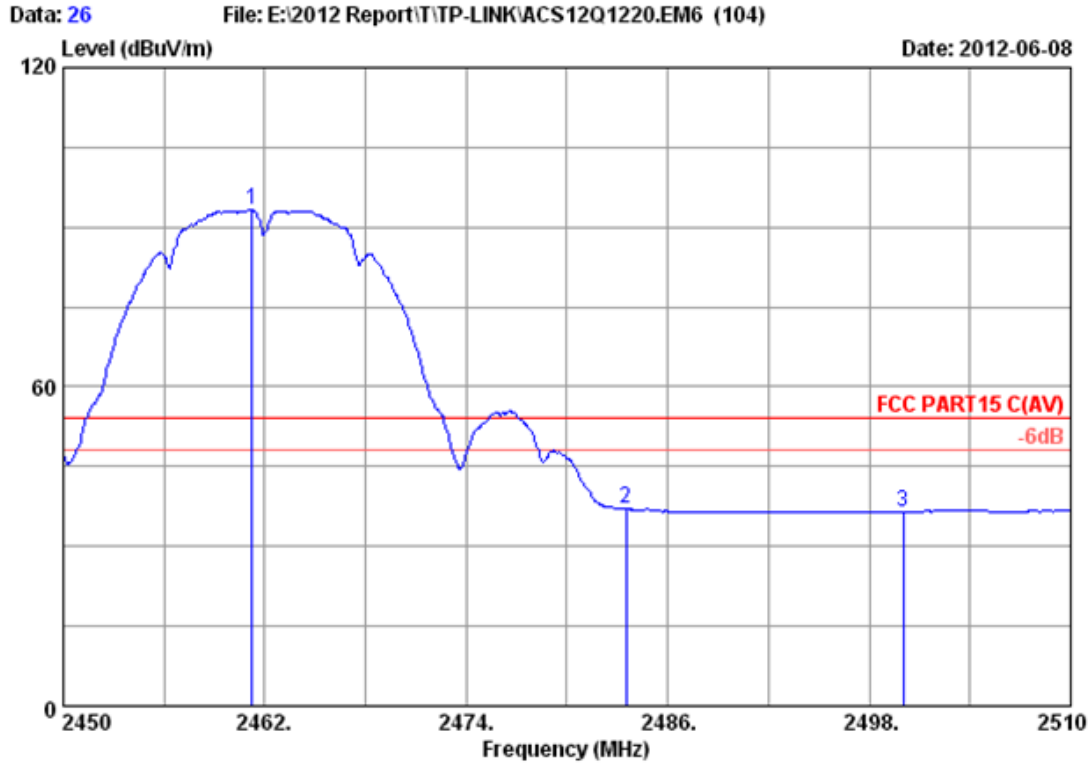


Site no. : 3m Chamber Data no. : 25  
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : HORIZONTAL  
 Limit : FCC PART15 C(PK)  
 Env. / Ins. : 23°C/54% Engineer : Leo-Li  
 EUT : 3G/4G Wireless N Router  
 Power supply : DC 9V From Adapter Input AC 120V/60Hz  
 Test mode : IEEE802.11b CH11 2462MHz Tx  
 M/N : TL-MR3220

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2460.620	28.05	6.12	34.44	100.40	100.13	74.00	-26.13	Peak
2	2483.500	28.08	6.15	34.45	50.32	50.10	74.00	23.90	Peak
3	2484.680	28.08	6.15	34.45	51.34	51.12	74.00	22.88	Peak
4	2500.000	28.10	6.18	34.45	49.67	49.50	74.00	24.50	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 26  
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : HORIZONTAL  
 Limit : FCC PART15 C(AV)  
 Env. / Ins. : 23°C/54% Engineer : Leo-Li  
 EUT : 3G/4G Wireless N Router  
 Power supply : DC 9V From Adapter Input AC 120V/60Hz  
 Test mode : IEEE802.11b CH11 2462MHz Tx  
 M/N : TL-MR3220

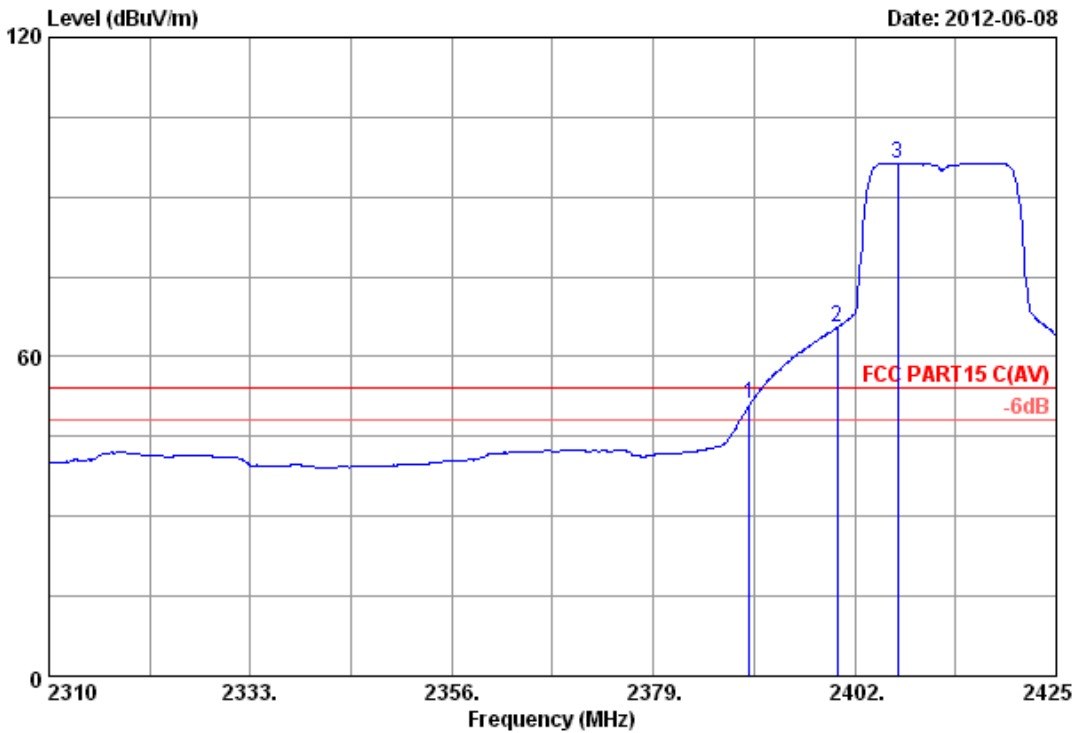
	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2461.220	28.05	6.12	34.44	93.58	93.31	54.00	-39.31	Average
2	2483.500	28.08	6.15	34.45	37.22	37.00	54.00	17.00	Average
3	2500.000	28.10	6.18	34.45	36.72	36.55	54.00	17.45	Average

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



Data: 27 File: E:\2012 Report\ITP-LINK\ACS12Q1220.EM6 (104) Date: 2012-06-08

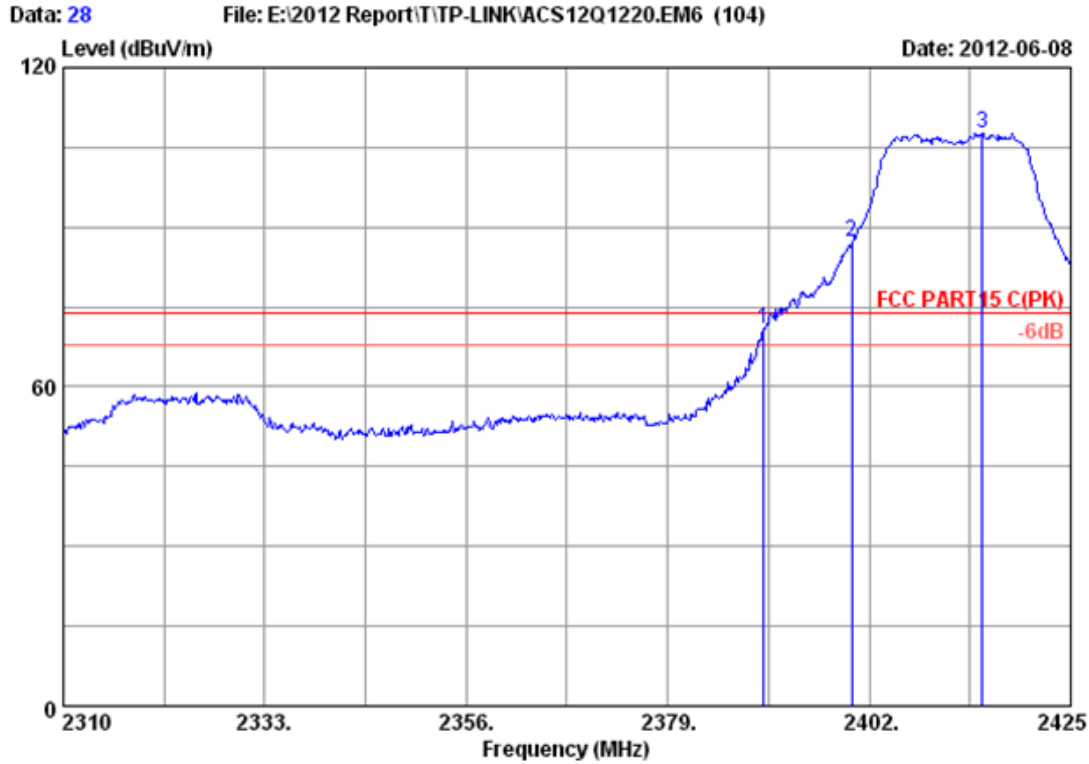


Site no. : 3m Chamber Data no. : 27  
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : VERTICAL  
 Limit : FCC PART15 C(AV)  
 Env. / Ins. : 23°C/54% Engineer : Leo-Li  
 EUT : 3G/4G Wireless N Router  
 Power supply : DC 9V From Adapter Input AC 120V/60Hz  
 Test mode : IEEE802.11g CH1 2412MHz Tx  
 M/N : TL-MR3220

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.000	27.96	6.01	34.44	51.45	50.98	54.00	3.02	Average
2	2400.000	27.96	6.01	34.44	66.03	65.56	54.00	-11.56	Average
3	2406.945	27.98	6.03	34.44	96.86	96.43	54.00	-42.43	Average

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

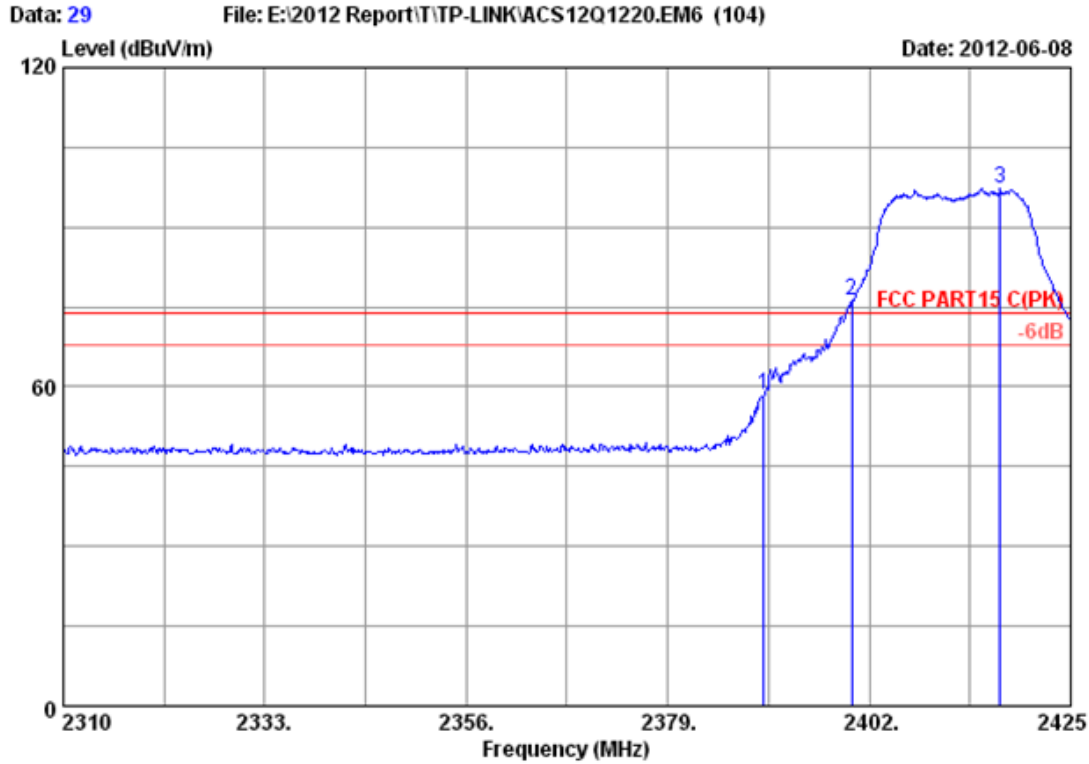


Site no. : 3m Chamber Data no. : 28  
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : VERTICAL  
 Limit : FCC PART15 C(PK)  
 Env. / Ins. : 23°C/54% Engineer : Leo-Li  
 EUT : 3G/4G Wireless N Router  
 Power supply : DC 9V From Adapter Input AC 120V/60Hz  
 Test mode : IEEE802.11g CH1 2412MHz Tx  
 M/N : TL-MR3220

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.000	27.96	6.01	34.44	71.27	70.80	74.00	3.20	Peak
2	2400.000	27.96	6.01	34.44	87.67	87.20	74.00	-13.20	Peak
3	2414.880	27.98	6.03	34.44	108.18	107.75	74.00	-33.75	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

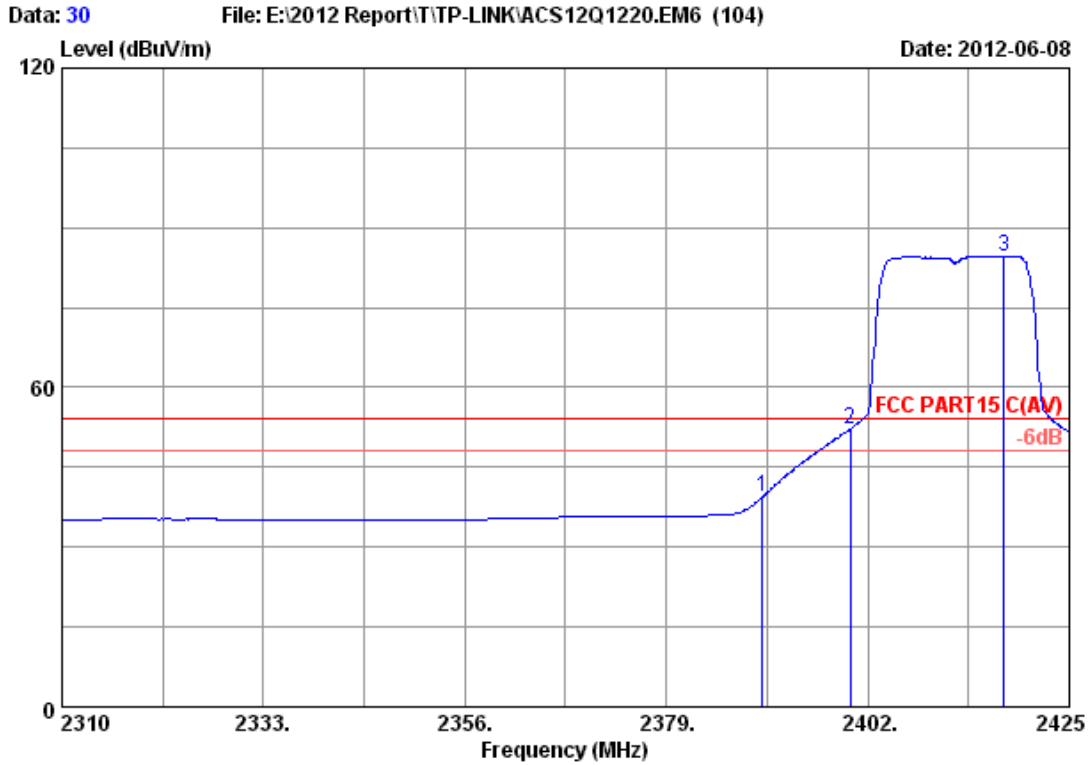


Site no. : 3m Chamber Data no. : 29  
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : HORIZONTAL  
 Limit : FCC PART15 C(PK)  
 Env. / Ins. : 23°C/54% Engineer : Leo-Li  
 EUT : 3G/4G Wireless N Router  
 Power supply : DC 9V From Adapter Input AC 120V/60Hz  
 Test mode : IEEE802.11g CH1 2412MHz Tx  
 M/N : TL-MR3220

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.000	27.96	6.01	34.44	59.04	58.57	74.00	15.43	Peak
2	2400.000	27.96	6.01	34.44	76.63	76.16	74.00	-2.16	Peak
3	2416.950	27.98	6.03	34.44	97.61	97.18	74.00	-23.18	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

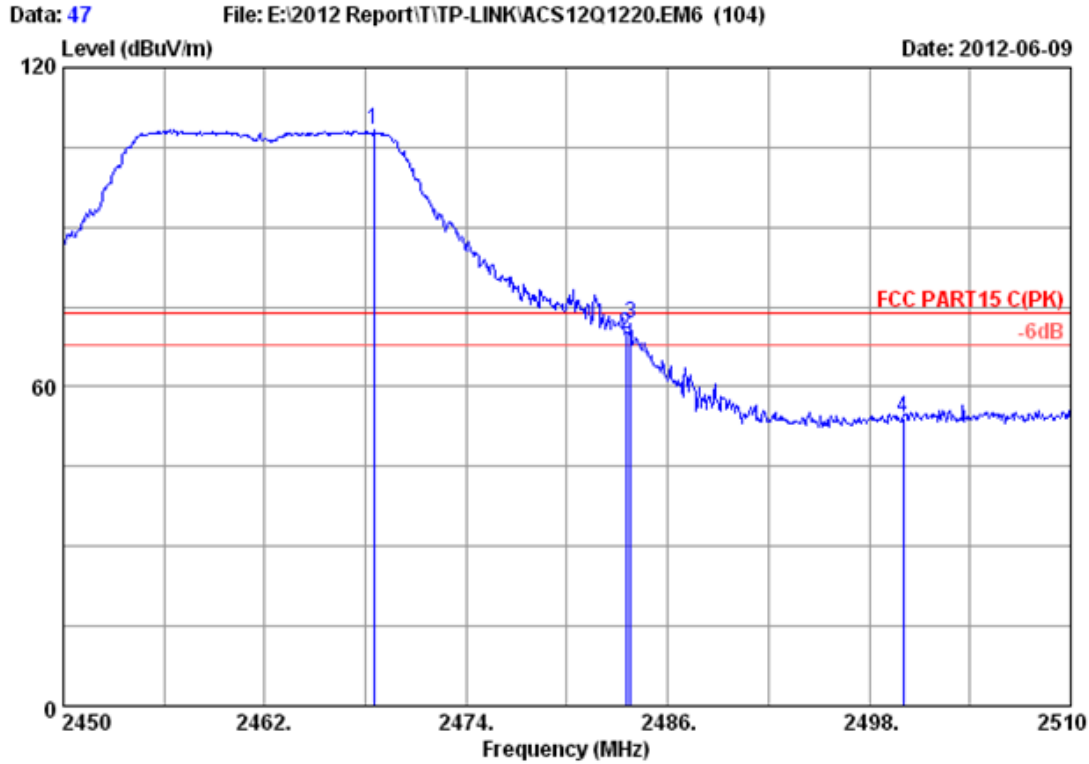


Site no. : 3m Chamber Data no. : 30  
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : HORIZONTAL  
 Limit : FCC PART15 C(AV)  
 Env. / Ins. : 23°C/54% Engineer : Leo-Li  
 EUT : 3G/4G Wireless N Router  
 Power supply : DC 9V From Adapter Input AC 120V/60Hz  
 Test mode : IEEE802.11g CH1 2412MHz Tx  
 M/N : TL-MR3220

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.000	27.96	6.01	34.44	39.97	39.50	54.00	14.50	Average
2	2400.000	27.96	6.01	34.44	52.75	52.28	54.00	1.72	Average
3	2417.525	27.98	6.03	34.44	85.13	84.70	54.00	-30.70	Average

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

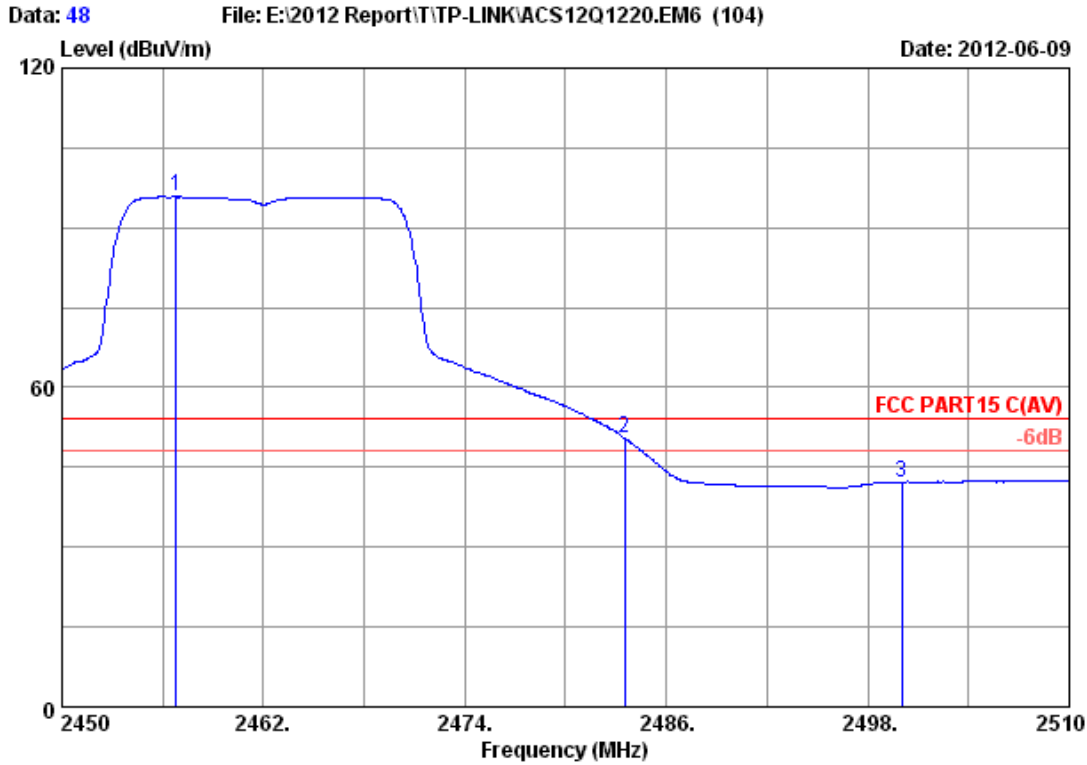


Site no. : 3m Chamber Data no. : 47  
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : VERTICAL  
 Limit : FCC PART15 C(PK)  
 Env. / Ins. : 23°C/54% Engineer : Leo-Li  
 EUT : 3G/4G Wireless N Router  
 Power supply : DC 9V From Adapter Input AC 120V/60Hz  
 Test mode : IEEE802.11g CH11 2462MHz Tx  
 M/N : TL-MR3220

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2468.480	28.05	6.12	34.45	108.54	108.26	74.00	-34.26	Peak
2	2483.500	28.08	6.15	34.45	70.16	69.94	74.00	4.06	Peak
3	2483.780	28.08	6.15	34.45	72.08	71.86	74.00	2.14	Peak
4	2500.000	28.10	6.18	34.45	54.40	54.23	74.00	19.77	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

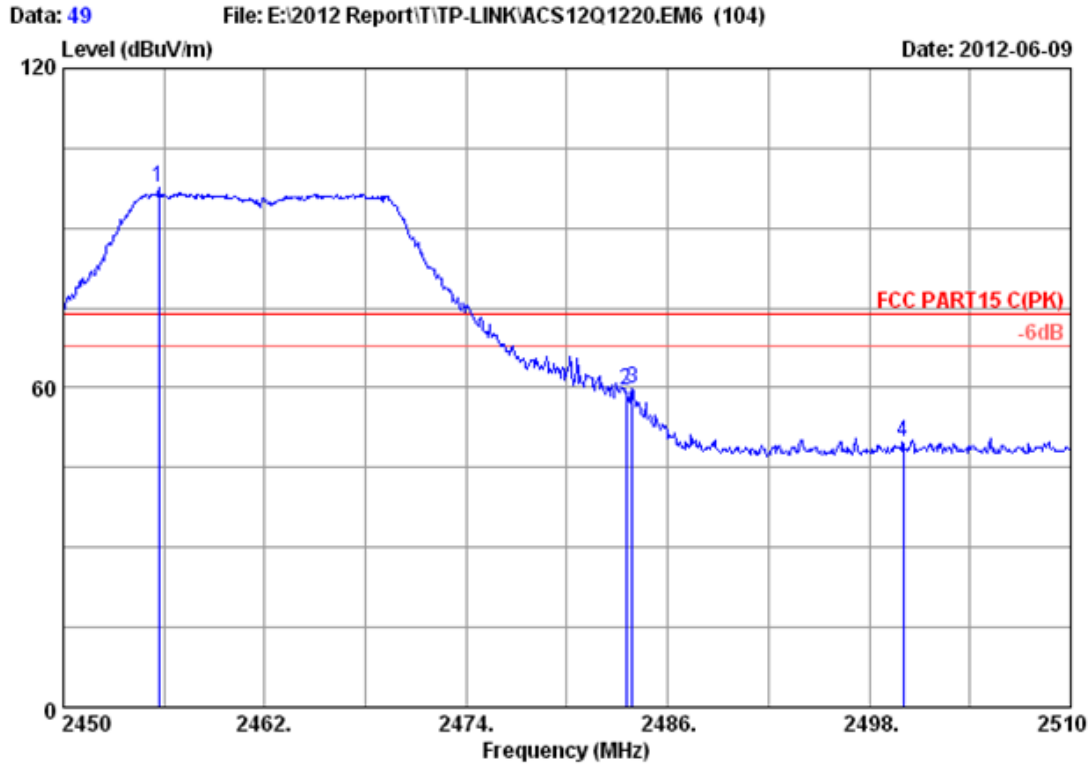


Site no. : 3m Chamber Data no. : 48  
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : VERTICAL  
 Limit : FCC PART15 C(AV)  
 Env. / Ins. : 23°C/54% Engineer : Leo-Li  
 EUT : 3G/4G Wireless N Router  
 Power supply : DC 9V From Adapter Input AC 120V/60Hz  
 Test mode : IEEE802.11g CH11 2462MHz Tx  
 M/N : TL-MR3220

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2456.780	28.05	6.12	34.44	96.09	95.82	54.00	-41.82	Average
2	2483.500	28.08	6.15	34.45	50.69	50.47	54.00	3.53	Average
3	2500.000	28.10	6.18	34.45	42.44	42.27	54.00	11.73	Average

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



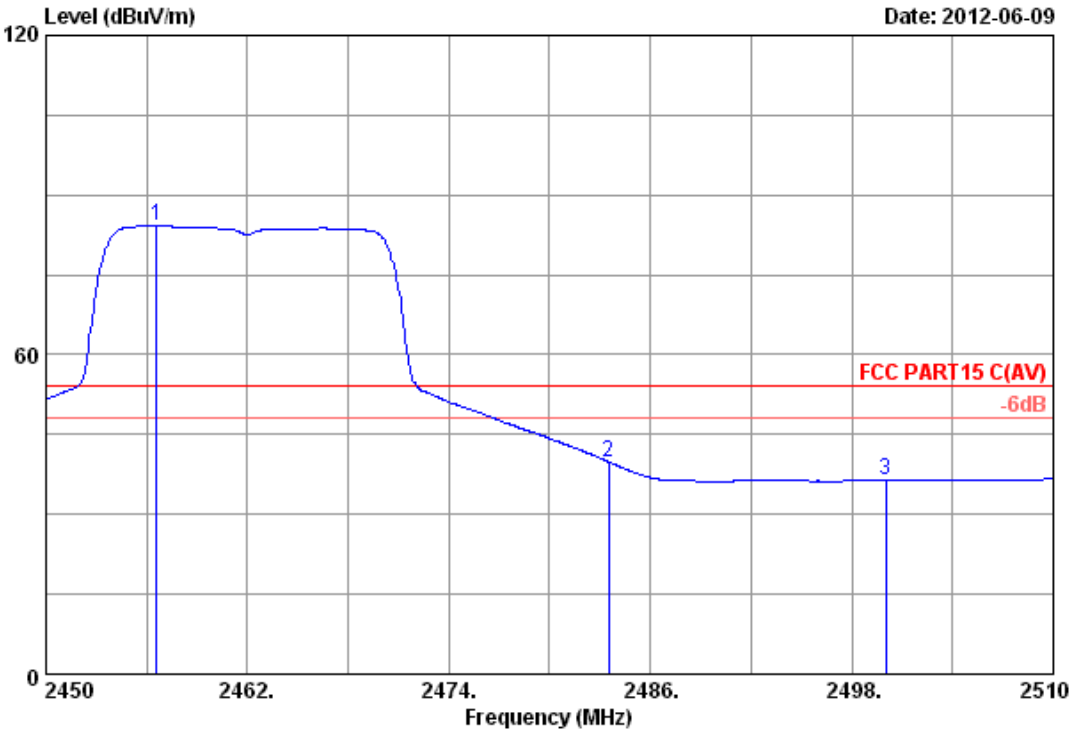
Site no. : 3m Chamber Data no. : 49  
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : HORIZONTAL  
 Limit : FCC PART15 C(PK)  
 Env. / Ins. : 23°C/54% Engineer : Leo-Li  
 EUT : 3G/4G Wireless N Router  
 Power supply : DC 9V From Adapter Input AC 120V/60Hz  
 Test mode : IEEE802.11g CH11 2462MHz Tx  
 M/N : TL-MR3220

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2455.700	28.05	6.09	34.44	97.76	97.46	74.00	-23.46	Peak
2	2483.500	28.08	6.15	34.45	59.71	59.49	74.00	14.51	Peak
3	2483.900	28.08	6.15	34.45	59.95	59.73	74.00	14.27	Peak
4	2500.000	28.10	6.18	34.45	49.81	49.64	74.00	24.36	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

Data: 50 File: E:\2012 Report\ITP-LINK\ACS12Q1220.EM6 (104) Date: 2012-06-09



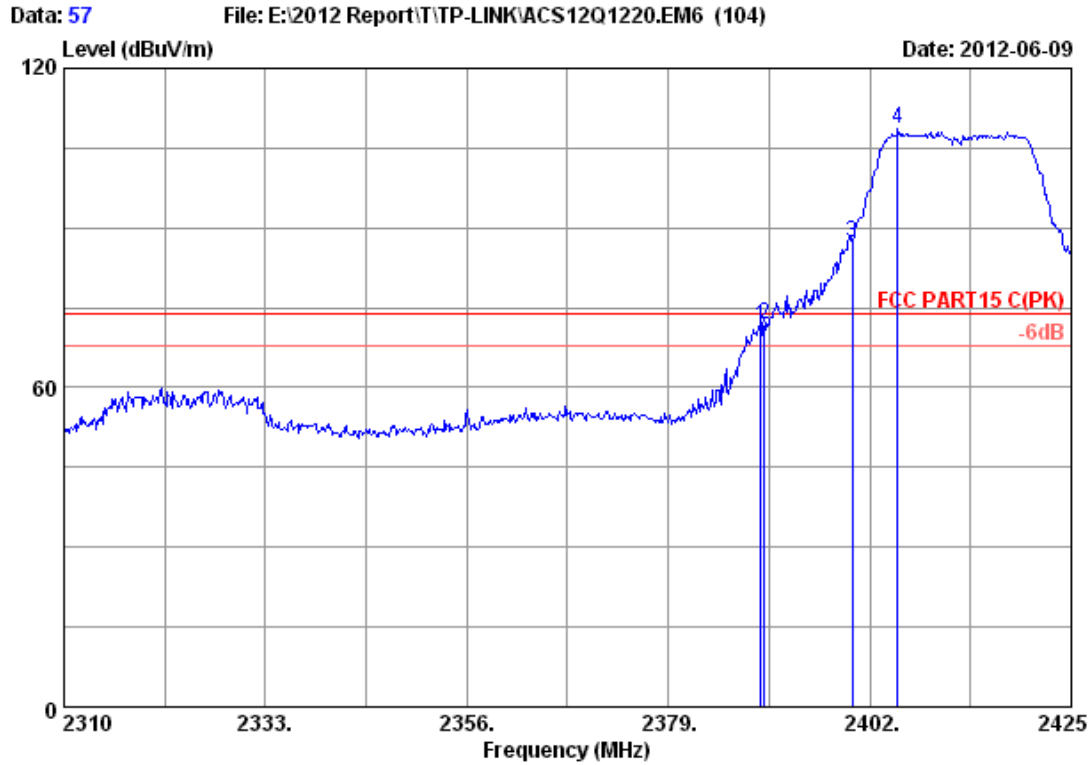
Site no. : 3m Chamber Data no. : 50  
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : HORIZONTAL  
 Limit : FCC PART15 C(AV)  
 Env. / Ins. : 23°C/54% Engineer : Leo-Li  
 EUT : 3G/4G Wireless N Router  
 Power supply : DC 9V From Adapter Input AC 120V/60Hz  
 Test mode : IEEE802.11g CH11 2462MHz Tx  
 M/N : TL-MR3220

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2456.600	28.05	6.12	34.44	84.46	84.19	54.00	-30.19	Average
2	2483.500	28.08	6.15	34.45	40.08	39.86	54.00	14.14	Average
3	2500.000	28.10	6.18	34.45	36.66	36.49	54.00	17.51	Average

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



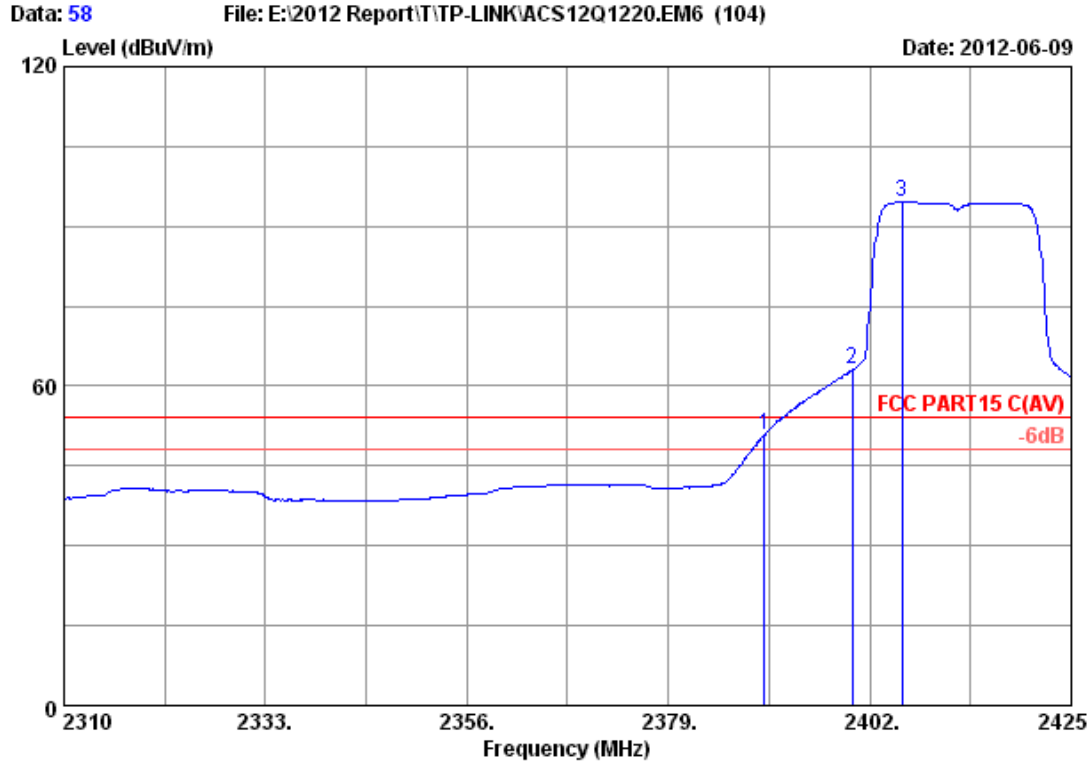


Site no. : 3m Chamber Data no. : 57  
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : VERTICAL  
 Limit : FCC PART15 C(PK)  
 Env. / Ins. : 23°C/54% Engineer : Leo-Li  
 EUT : 3G/4G Wireless N Router  
 Power supply : DC 9V From Adapter Input AC 120V/60Hz  
 Test mode : IEEE802.11nHT20 CH1 2412MHz Tx  
 M/N : TL-MR3220

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2389.580	27.96	6.01	34.44	71.90	71.43	74.00	2.57	Peak
2	2390.000	27.96	6.01	34.44	72.28	71.81	74.00	2.19	Peak
3	2400.000	27.96	6.01	34.44	87.87	87.40	74.00	-13.40	Peak
4	2405.220	27.98	6.03	34.44	109.03	108.60	74.00	-34.60	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

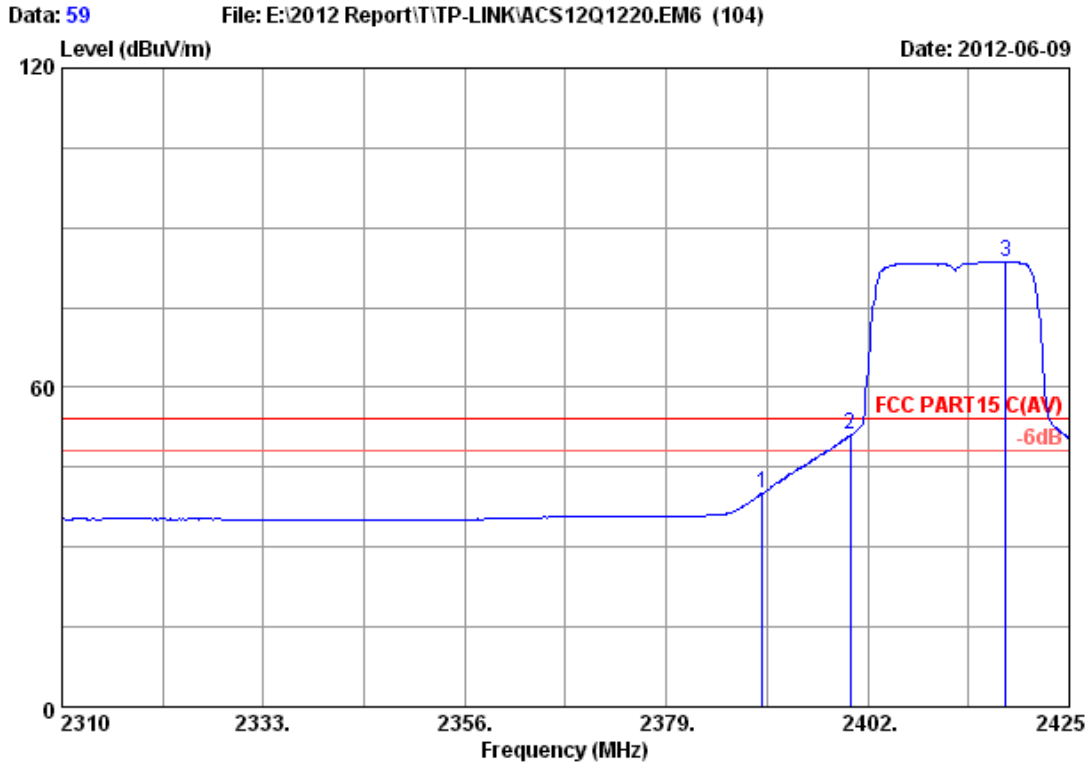


Site no. : 3m Chamber Data no. : 58  
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : VERTICAL  
 Limit : FCC PART15 C(AV)  
 Env. / Ins. : 23\*C/54% Engineer : Leo-Li  
 EUT : 3G/4G Wireless N Router  
 Power supply : DC 9V From Adapter Input AC 120V/60Hz  
 Test mode : IEEE802.11nHT20 CH1 2412MHz Tx  
 M/N : TL-MR3220

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.000	27.96	6.01	34.44	51.40	50.93	54.00	3.07	Average
2	2400.000	27.96	6.01	34.44	63.61	63.14	54.00	-9.14	Average
3	2405.680	27.98	6.03	34.44	95.01	94.58	54.00	-40.58	Average

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

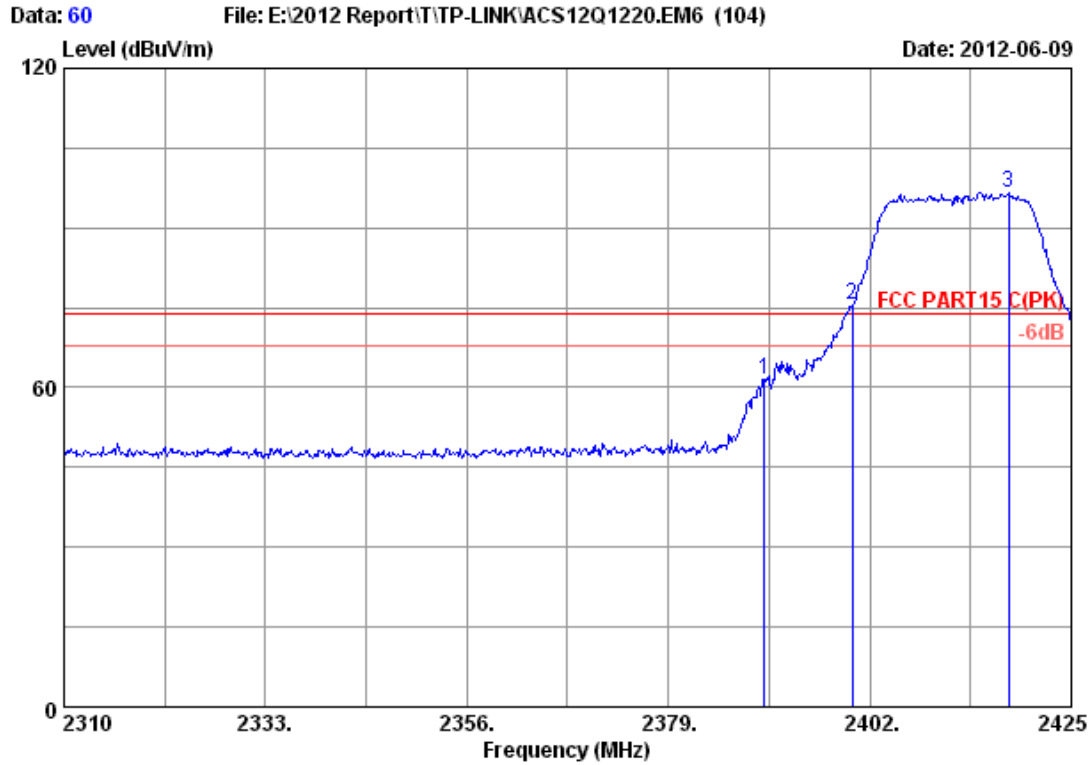


Site no. : 3m Chamber Data no. : 59  
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : HORIZONTAL  
 Limit : FCC PART15 C(AV)  
 Env. / Ins. : 23°C/54% Engineer : Leo-Li  
 EUT : 3G/4G Wireless N Router  
 Power supply : DC 9V From Adapter Input AC 120V/60Hz  
 Test mode : IEEE802.11nHT20 CH1 2412MHz Tx  
 M/N : TL-MR3220

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.000	27.96	6.01	34.44	40.62	40.15	54.00	13.85	Average
2	2400.000	27.96	6.01	34.44	51.52	51.05	54.00	2.95	Average
3	2417.755	27.98	6.03	34.44	84.08	83.65	54.00	-29.65	Average

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

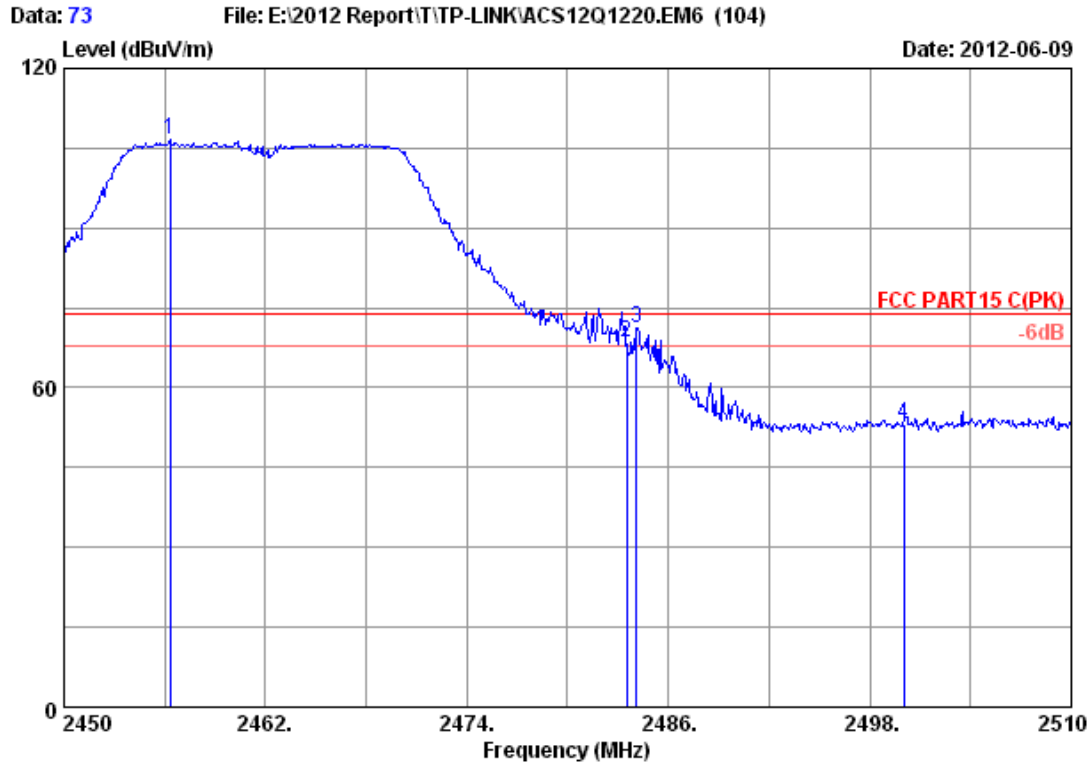


Site no. : 3m Chamber Data no. : 60  
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : HORIZONTAL  
 Limit : FCC PART15 C(PK)  
 Env. / Ins. : 23°C/54% Engineer : Leo-Li  
 EUT : 3G/4G Wireless N Router  
 Power supply : DC 9V From Adapter Input AC 120V/60Hz  
 Test mode : IEEE802.11nHT20 CH1 2412MHz Tx  
 M/N : TL-MR3220

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.000	27.96	6.01	34.44	61.89	61.42	74.00	12.58	Peak
2	2400.000	27.96	6.01	34.44	76.02	75.55	74.00	-1.55	Peak
3	2417.870	27.98	6.03	34.44	97.06	96.63	74.00	-22.63	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



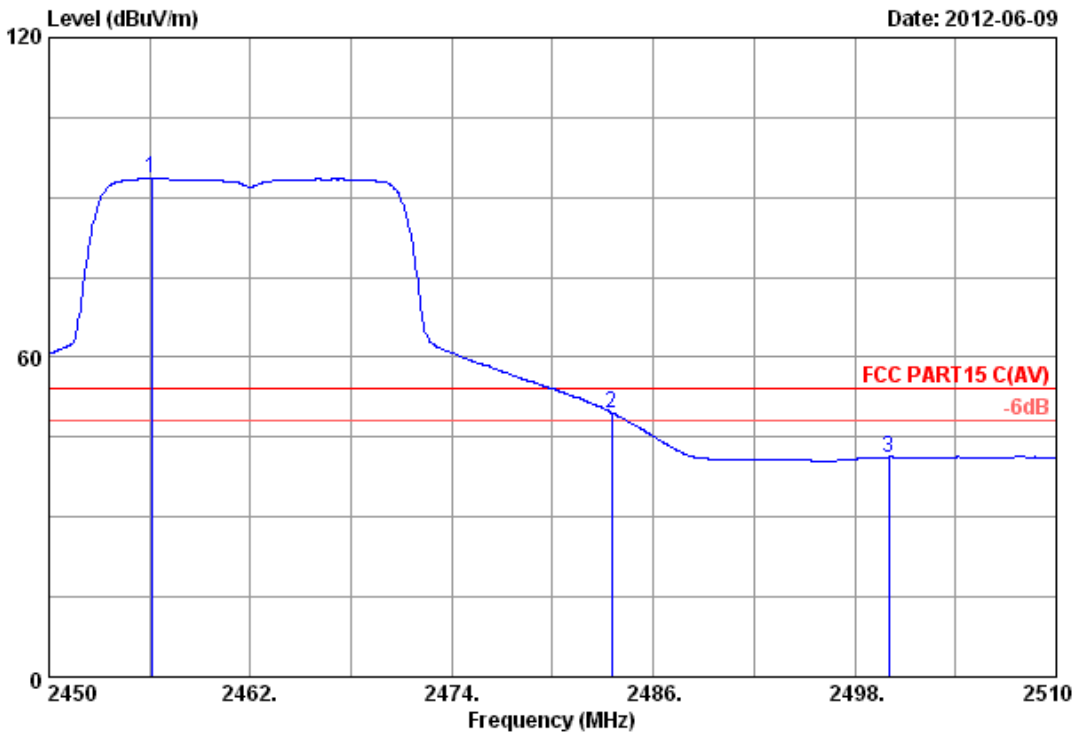
Site no. : 3m Chamber Data no. : 73  
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : VERTICAL  
 Limit : FCC PART15 C(PK)  
 Env. / Ins. : 23°C/54% Engineer : Leo-Li  
 EUT : 3G/4G Wireless N Router  
 Power supply : DC 9V From Adapter Input AC 120V/60Hz  
 Test mode : IEEE802.11nHT20 CH11 2462MHz Tx  
 M/N : TL-MR3220

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2456.300	28.05	6.12	34.44	106.92	106.65	74.00	-32.65	Peak
2	2483.500	28.08	6.15	34.45	68.74	68.52	74.00	5.48	Peak
3	2484.080	28.08	6.15	34.45	71.35	71.13	74.00	2.87	Peak
4	2500.000	28.10	6.18	34.45	53.32	53.15	74.00	20.85	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

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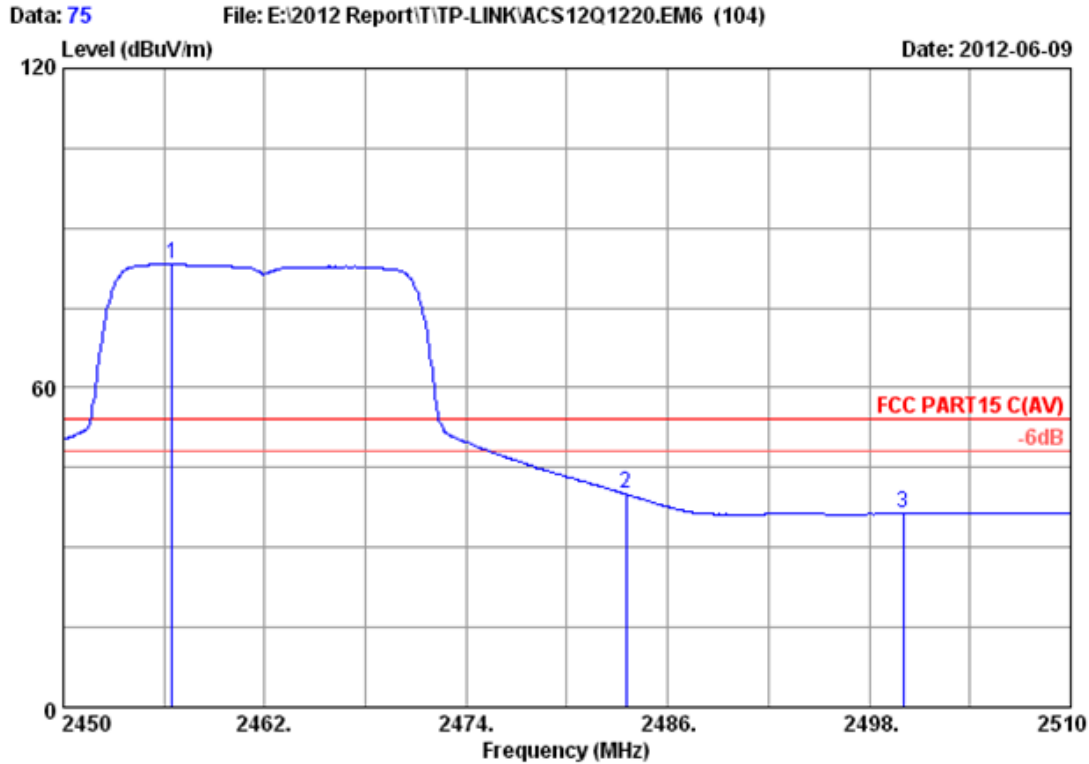


Site no. : 3m Chamber Data no. : 74  
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : VERTICAL  
 Limit : FCC PART15 C(AV)  
 Env. / Ins. : 23\*C/54% Engineer : Leo-Li  
 EUT : 3G/4G Wireless N Router  
 Power supply : DC 9V From Adapter Input AC 120V/60Hz  
 Test mode : IEEE802.11nHT20 CH11 2462MHz Tx  
 M/N : TL-MR3220

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2456.120	28.05	6.09	34.44	93.84	93.54	54.00	-39.54	Average
2	2483.500	28.08	6.15	34.45	49.85	49.63	54.00	4.37	Average
3	2500.000	28.10	6.18	34.45	41.44	41.27	54.00	12.73	Average

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



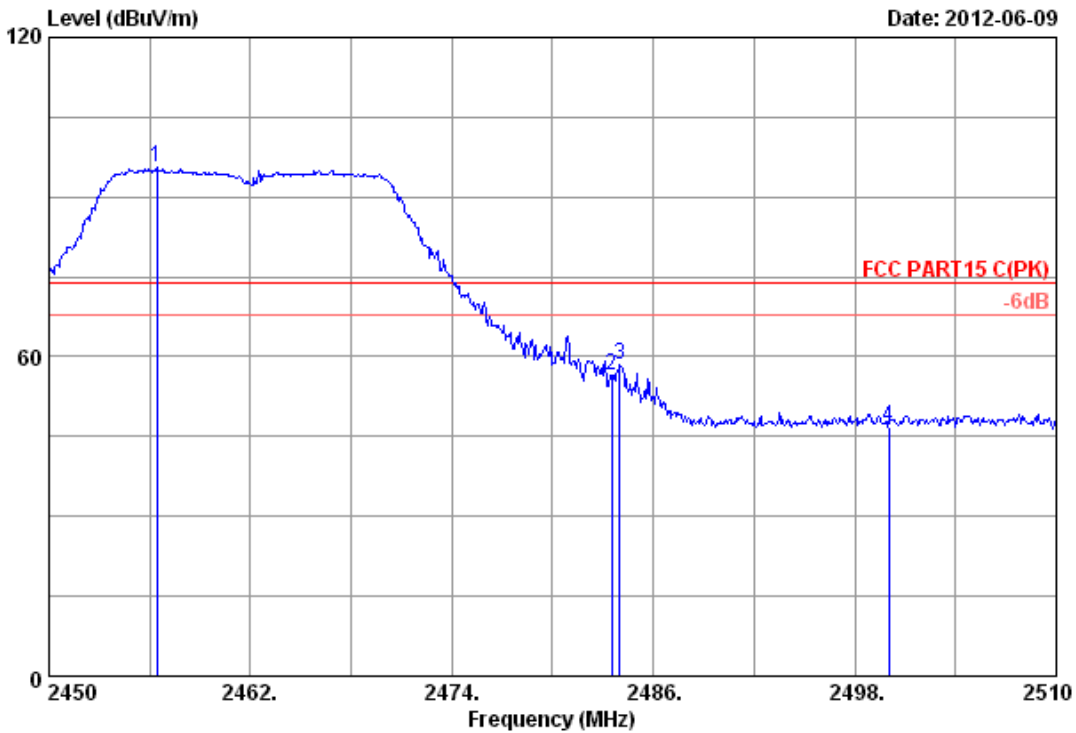
Site no. : 3m Chamber Data no. : 75  
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : HORIZONTAL  
 Limit : FCC PART15 C(AV)  
 Env. / Ins. : 23°C/54% Engineer : Leo-Li  
 EUT : 3G/4G Wireless N Router  
 Power supply : DC 9V From Adapter Input AC 120V/60Hz  
 Test mode : IEEE802.11nHT20 CH11 2462MHz Tx  
 M/N : TL-MR3220

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2456.480	28.05	6.12	34.44	83.48	83.21	54.00	-29.21	Average
2	2483.500	28.08	6.15	34.45	40.24	40.02	54.00	13.98	Average
3	2500.000	28.10	6.18	34.45	36.56	36.39	54.00	17.61	Average

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

Data: 76 File: E:\2012 Report\ITP-LINK\ACS12Q1220.EM6 (104) Date: 2012-06-09



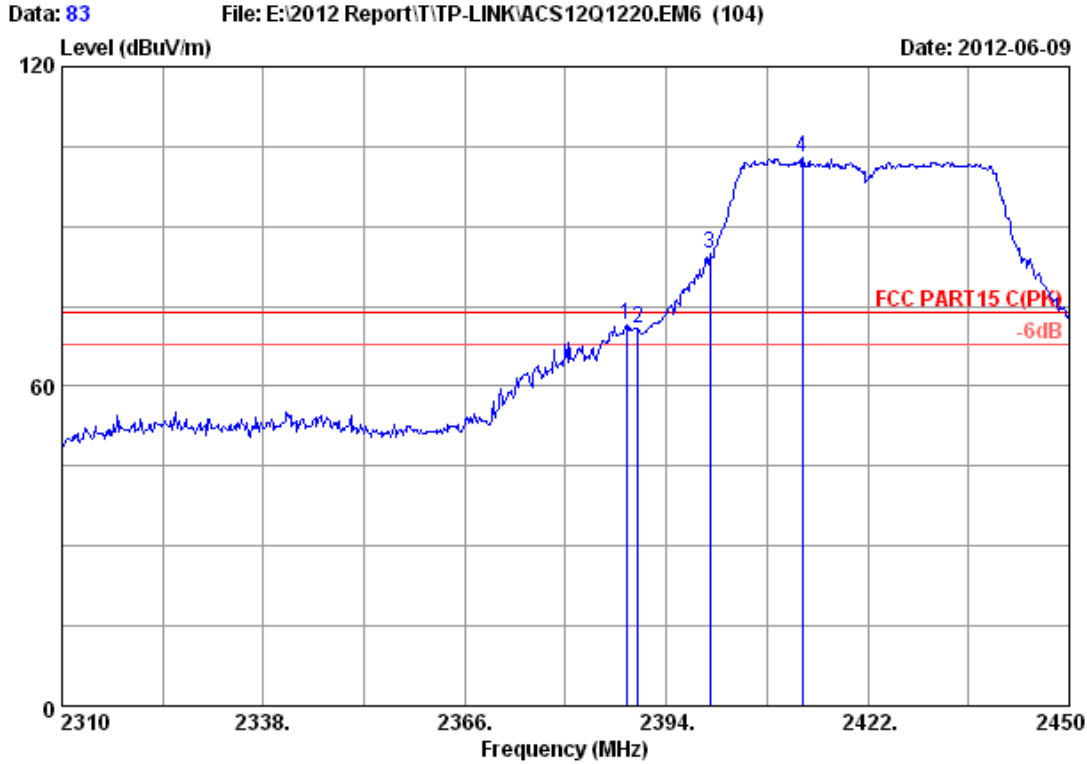
Site no. : 3m Chamber Data no. : 76  
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : HORIZONTAL  
 Limit : FCC PART15 C(PK)  
 Env. / Ins. : 23°C/54% Engineer : Leo-Li  
 EUT : 3G/4G Wireless N Router  
 Power supply : DC 9V From Adapter Input AC 120V/60Hz  
 Test mode : IEEE802.11nHT20 CH11 2462MHz Tx  
 M/N : TL-MR3220

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2456.420	28.05	6.12	34.44	95.97	95.70	74.00	-21.70	Peak
2	2483.500	28.08	6.15	34.45	56.80	56.58	74.00	17.42	Peak
3	2484.020	28.08	6.15	34.45	58.77	58.55	74.00	15.45	Peak
4	2500.000	28.10	6.18	34.45	47.13	46.96	74.00	27.04	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



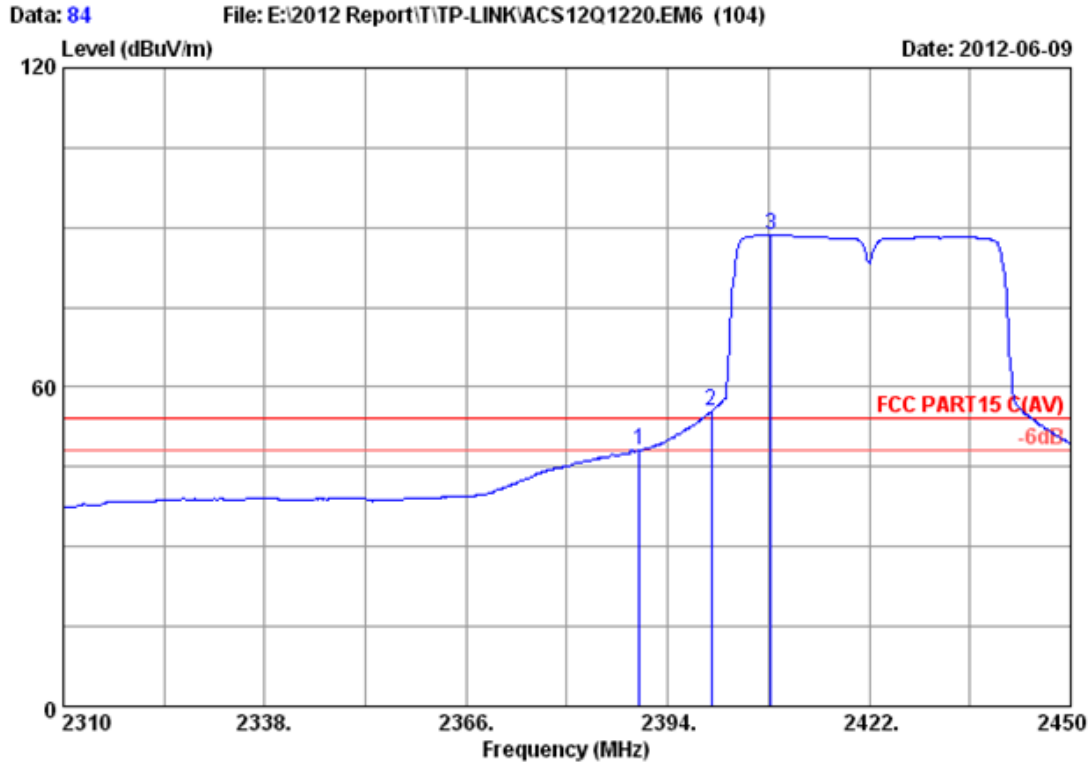


Site no. : 3m Chamber Data no. : 83  
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : VERTICAL  
 Limit : FCC PART15 C(PK)  
 Env. / Ins. : 23°C/54% Engineer : Leo-Li  
 EUT : 3G/4G Wireless N Router  
 Power supply : DC 9V From Adapter Input AC 120V/60Hz  
 Test mode : IEEE802.11nHT40 CH1 2422MHz Tx  
 M/N : TL-MR3220

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2388.400	27.96	6.01	34.44	71.96	71.49	74.00	2.51	Peak
2	2390.000	27.96	6.01	34.44	71.33	70.86	74.00	3.14	Peak
3	2400.000	27.96	6.01	34.44	85.46	84.99	74.00	-10.99	Peak
4	2412.900	27.98	6.03	34.44	103.51	103.08	74.00	-29.08	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



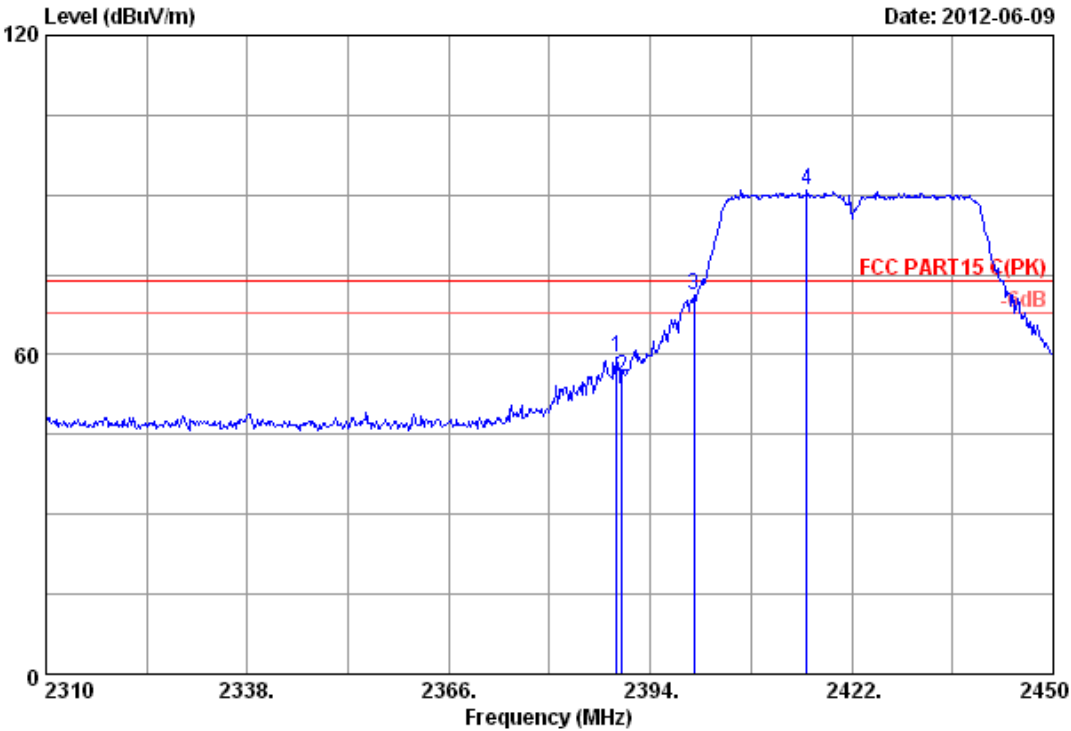
Site no. : 3m Chamber Data no. : 84  
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : VERTICAL  
 Limit : FCC PART15 C(AV)  
 Env. / Ins. : 23\*C/54% Engineer : Leo-Li  
 EUT : 3G/4G Wireless N Router  
 Power supply : DC 9V From Adapter Input AC 120V/60Hz  
 Test mode : IEEE802.11nHT40 CH1 2422MHz Tx  
 M/N : TL-MR3220

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.000	27.96	6.01	34.44	48.61	48.14	54.00	5.86	Average
2	2400.000	27.96	6.01	34.44	55.89	55.42	54.00	-1.42	Average
3	2408.280	27.98	6.03	34.44	89.01	88.58	54.00	-34.58	Average

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

Data: 85 File: E:\2012 Report\ITP-LINK\ACS12Q1220.EM6 (104) Date: 2012-06-09

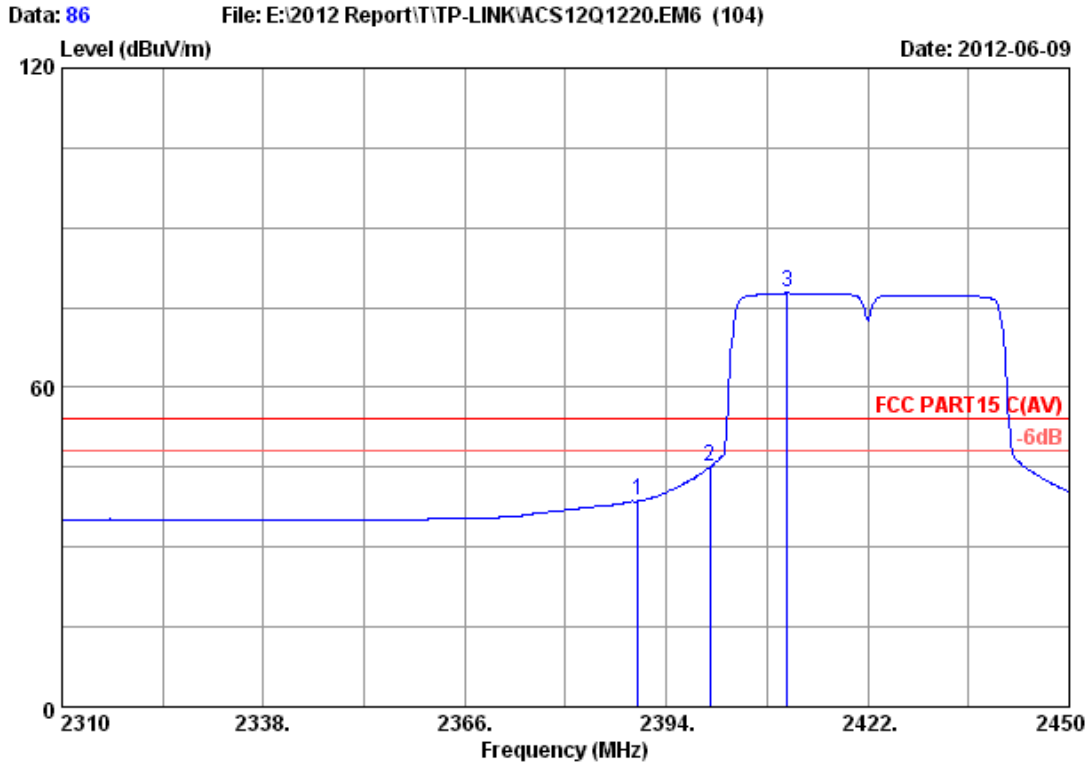


Site no. : 3m Chamber Data no. : 85  
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : HORIZONTAL  
 Limit : FCC PART15 C(PK)  
 Env. / Ins. : 23°C/54% Engineer : Leo-Li  
 EUT : 3G/4G Wireless N Router  
 Power supply : DC 9V From Adapter Input AC 120V/60Hz  
 Test mode : IEEE802.11nHT40 CH1 2422MHz Tx  
 M/N : TL-MR3220

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2389.380	27.96	6.01	34.44	59.97	59.50	74.00	14.50	Peak
2	2390.000	27.96	6.01	34.44	56.39	55.92	74.00	18.08	Peak
3	2400.000	27.96	6.01	34.44	71.63	71.16	74.00	2.84	Peak
4	2415.700	27.98	6.03	34.44	91.30	90.87	74.00	-16.87	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

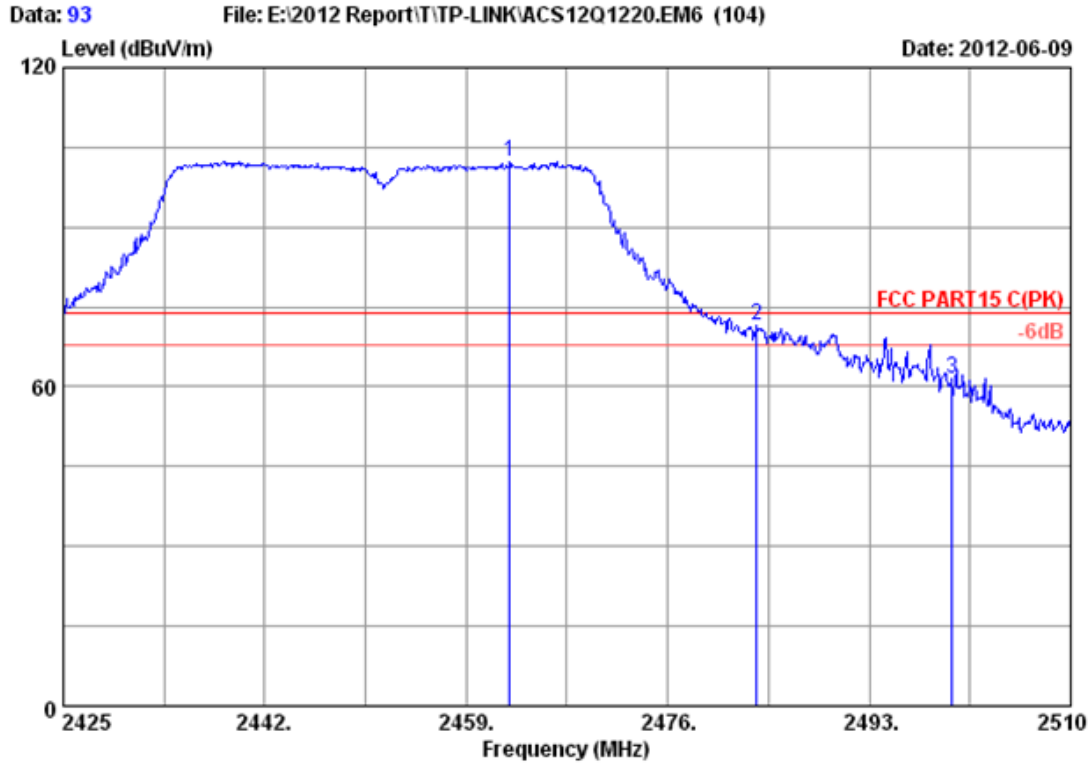


Site no. : 3m Chamber Data no. : 86  
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : HORIZONTAL  
 Limit : FCC PART15 C(AV)  
 Env. / Ins. : 23°C/54% Engineer : Leo-Li  
 EUT : 3G/4G Wireless N Router  
 Power supply : DC 9V From Adapter Input AC 120V/60Hz  
 Test mode : IEEE802.11nHT40 CH1 2422MHz Tx  
 M/N : TL-MR3220

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.000	27.96	6.01	34.44	39.10	38.63	54.00	15.37	Average
2	2400.000	27.96	6.01	34.44	45.51	45.04	54.00	8.96	Average
3	2410.800	27.98	6.03	34.44	78.17	77.74	54.00	-23.74	Average

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

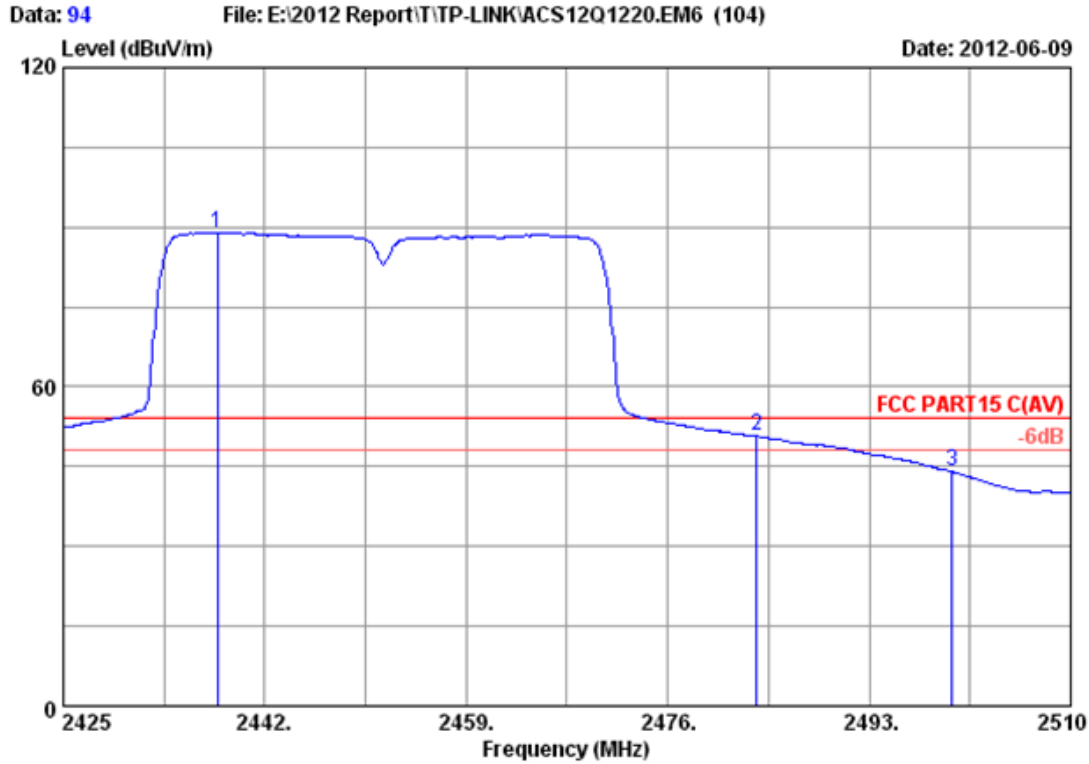


Site no. : 3m Chamber Data no. : 93  
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : VERTICAL  
 Limit : FCC PART15 C(PK)  
 Env. / Ins. : 23°C/54% Engineer : Leo-Li  
 EUT : 3G/4G Wireless N Router  
 Power supply : DC 9V From Adapter Input AC 120V/60Hz  
 Test mode : IEEE802.11nHT40 CH7 2452MHz Tx  
 M/N : TL-MR3220

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2462.655	28.05	6.12	34.45	102.68	102.40	74.00	-28.40	Peak
2	2483.500	28.08	6.15	34.45	71.66	71.44	74.00	2.56	Peak
3	2500.000	28.10	6.18	34.45	61.80	61.63	74.00	12.37	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

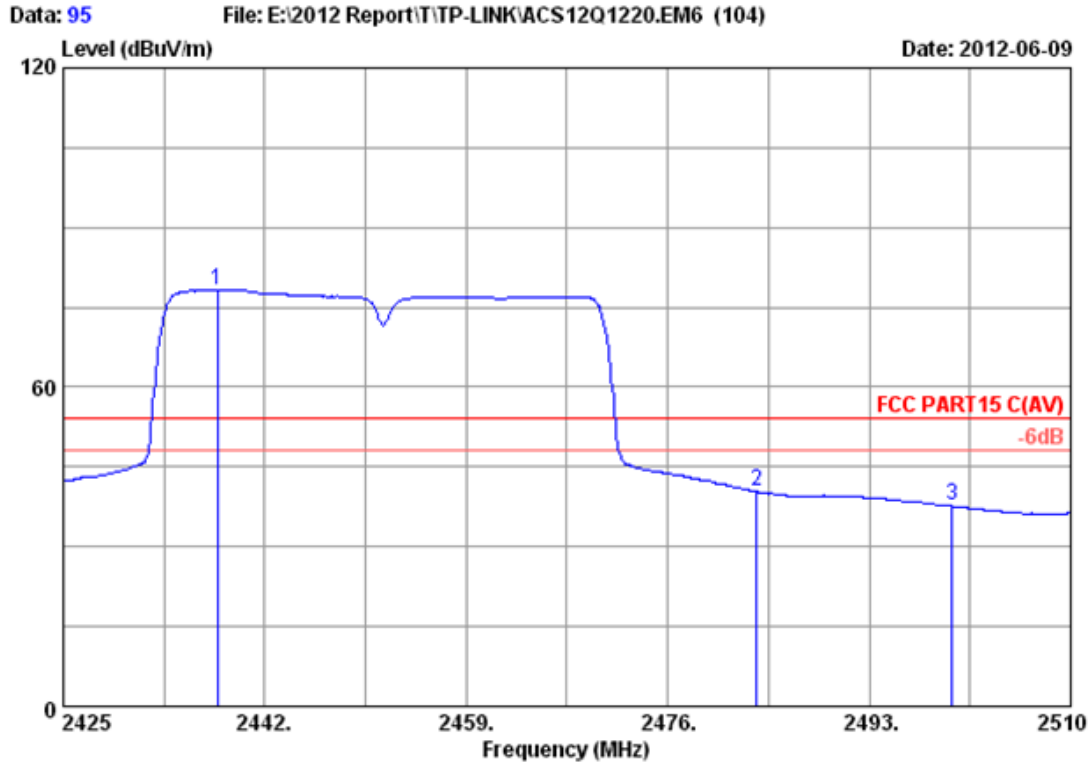


Site no. : 3m Chamber Data no. : 94  
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : VERTICAL  
 Limit : FCC PART15 C(AV)  
 Env. / Ins. : 23°C/54% Engineer : Leo-Li  
 EUT : 3G/4G Wireless N Router  
 Power supply : DC 9V From Adapter Input AC 120V/60Hz  
 Test mode : IEEE802.11nHT40 CH7 2452MHz Tx  
 M/N : TL-MR3220

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2438.005	28.03	6.06	34.44	89.32	88.97	54.00	-34.97	Average
2	2483.500	28.08	6.15	34.45	50.92	50.70	54.00	3.30	Average
3	2500.000	28.10	6.18	34.45	44.33	44.16	54.00	9.84	Average

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

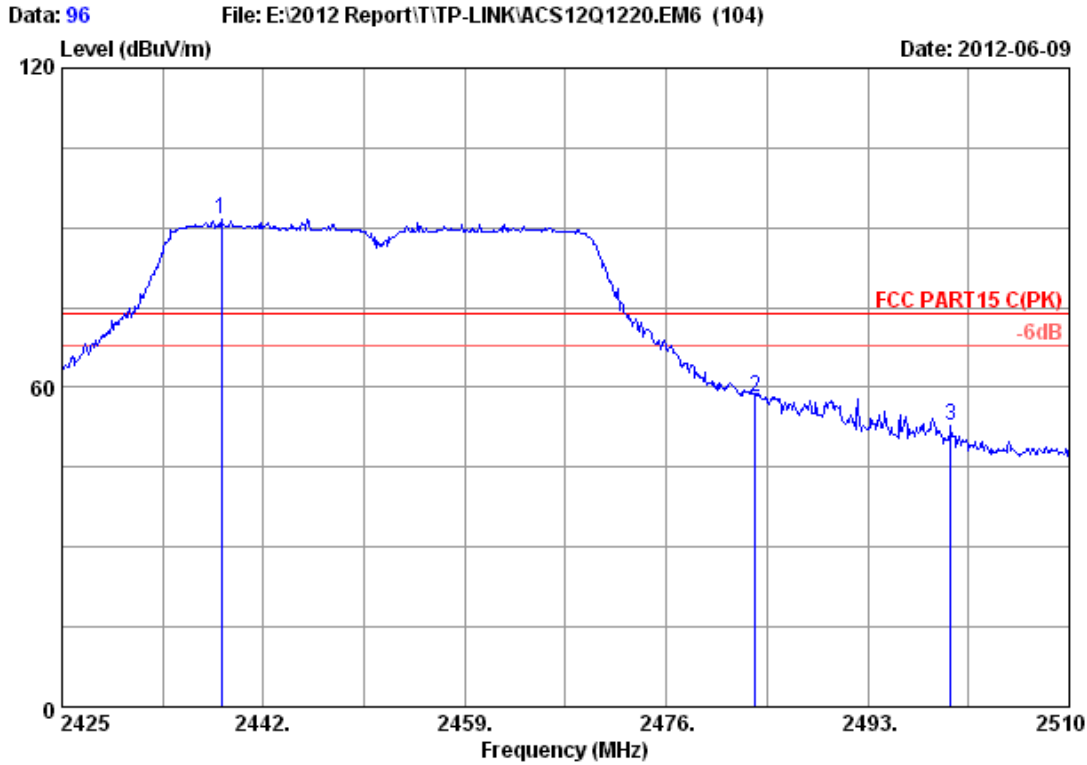


Site no. : 3m Chamber Data no. : 95  
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : HORIZONTAL  
 Limit : FCC PART15 C(AV)  
 Env. / Ins. : 23°C/54% Engineer : Leo-Li  
 EUT : 3G/4G Wireless N Router  
 Power supply : DC 9V From Adapter Input AC 120V/60Hz  
 Test mode : IEEE802.11nHT40 CH7 2452MHz Tx  
 M/N : TL-MR3220

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2438.005	28.03	6.06	34.44	78.69	78.34	54.00	-24.34	Average
2	2483.500	28.08	6.15	34.45	40.52	40.30	54.00	13.70	Average
3	2500.000	28.10	6.18	34.45	37.82	37.65	54.00	16.35	Average

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 96  
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : HORIZONTAL  
 Limit : FCC PART15 C(PK)  
 Env. / Ins. : 23°C/54% Engineer : Leo-Li  
 EUT : 3G/4G Wireless N Router  
 Power supply : DC 9V From Adapter Input AC 120V/60Hz  
 Test mode : IEEE802.11nHT40 CH7 2452MHz Tx  
 M/N : TL-MR3220

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2438.430	28.03	6.09	34.44	91.78	91.46	74.00	-17.46	Peak
2	2483.500	28.08	6.15	34.45	58.50	58.28	74.00	15.72	Peak
3	2500.000	28.10	6.18	34.45	53.06	52.89	74.00	21.11	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



## 7. 6dB Bandwidth Test

### 7.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum	Agilent	E4446A	US44300459	May.08, 12	1 Year
2.	Amp	HP	8449B	3008A08495	May.08, 12	1 Year
3.	Antenna	EMCO	3115	9510-4580	May.08, 12	1 Year
4.	HF Cable	Hubersuhner	Sucoflex104	-	May.08, 12	1 Year

### 7.2. Limit

For direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz

### 7.3. Test Procedure

The transmitter output was connected to a spectrum analyzer, The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100kHz RBW and 300 kHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

### 7.4. Test Results

EUT: 3G/4G Wireless N Router		
M/N: TL-MR3220		
Test date: 2012-07-16	Pressure: 101.3 kpa	Humidity: 45.3%
Tested by: Leo-Li	Test site: RF Site	Temperature : 23.8 °C

Cable loss: 1 dB		Attenuator loss: 20 dB	
Test Mode	CH	6dB bandwidth (MHz)	Limit (KHz)
11b	CH1	10.284	>500
	CH6	10.279	>500
	CH11	10.269	>500
11g	CH1	16.479	>500
	CH6	16.470	>500
	CH11	16.487	>500
11n HT20	CH1	17.666	>500
	CH6	17.685	>500
	CH11	17.732	>500
11n HT40	CH1	36.539	>500
	CH4	36.573	>500
	CH7	36.492	>500
Conclusion : PASS			

Test Mode: IEEE 802.11b TX  
 Test CH1: 2412MHz

**Agilent**

Ch Freq 2.412 GHz Trig Free

Occupied Bandwidth

**Ref Level 21.00 dBm**

Ref 21 dBm Atten 10 dB Mkr1 2.412 90 GHz 6.23 dBm

Center 2.412 00 GHz Span 30 MHz  
 #Res BW 300 kHz #VBW 1 MHz #Sweep 1 ms (601 pts)

**Occupied Bandwidth 14.1019 MHz**

Transmit Freq Error -2.602 kHz  
 x dB Bandwidth 10.284 MHz

**Meas Setup**

**Avg Number**  
 On 10 Off

**Avg Mode**  
 Exp Repeat

**Max Hold**  
 On Off

**Occ BW % Pwr**  
 99.00 %

**OBW Span**  
 30.0000000 MHz

**x dB**  
 -6.00 dB

**Optimize Ref Level**

**File Operation Status, A:\SCREN267.GIF file saved**

Test CH6: 2437MHz

**Agilent**

Ch Freq 2.437 GHz Trig Free

Occupied Bandwidth

**Center 2.437000000 GHz**

Ref 21 dBm Atten 10 dB Mkr1 2.437 90 GHz 5.94 dBm

Center 2.437 00 GHz Span 30 MHz  
 #Res BW 300 kHz #VBW 1 MHz #Sweep 1 ms (601 pts)

**Occupied Bandwidth 14.0786 MHz**

Transmit Freq Error 14.833 kHz  
 x dB Bandwidth 10.279 MHz

**Trace**

Trace 1 2 3

Clear Write

Max Hold

Min Hold

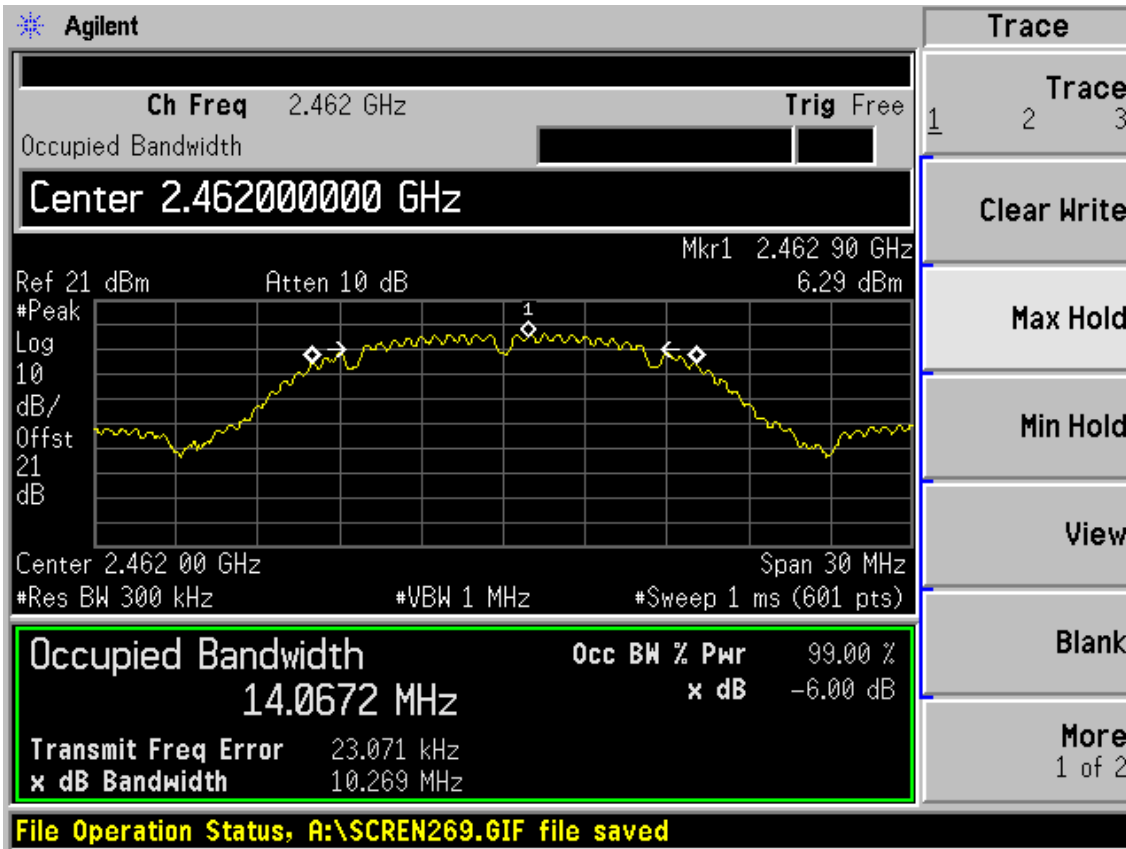
View

Blank

More 1 of 2

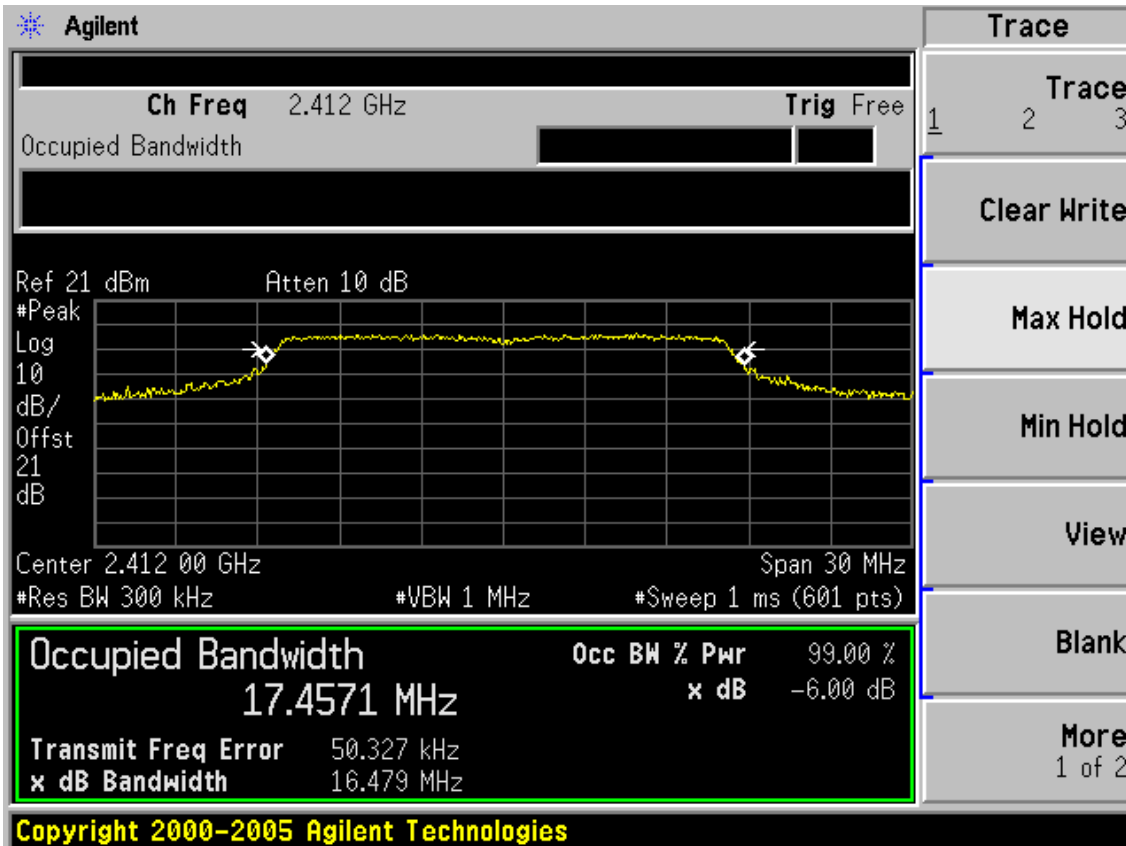
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Test CH11: 2462MHz

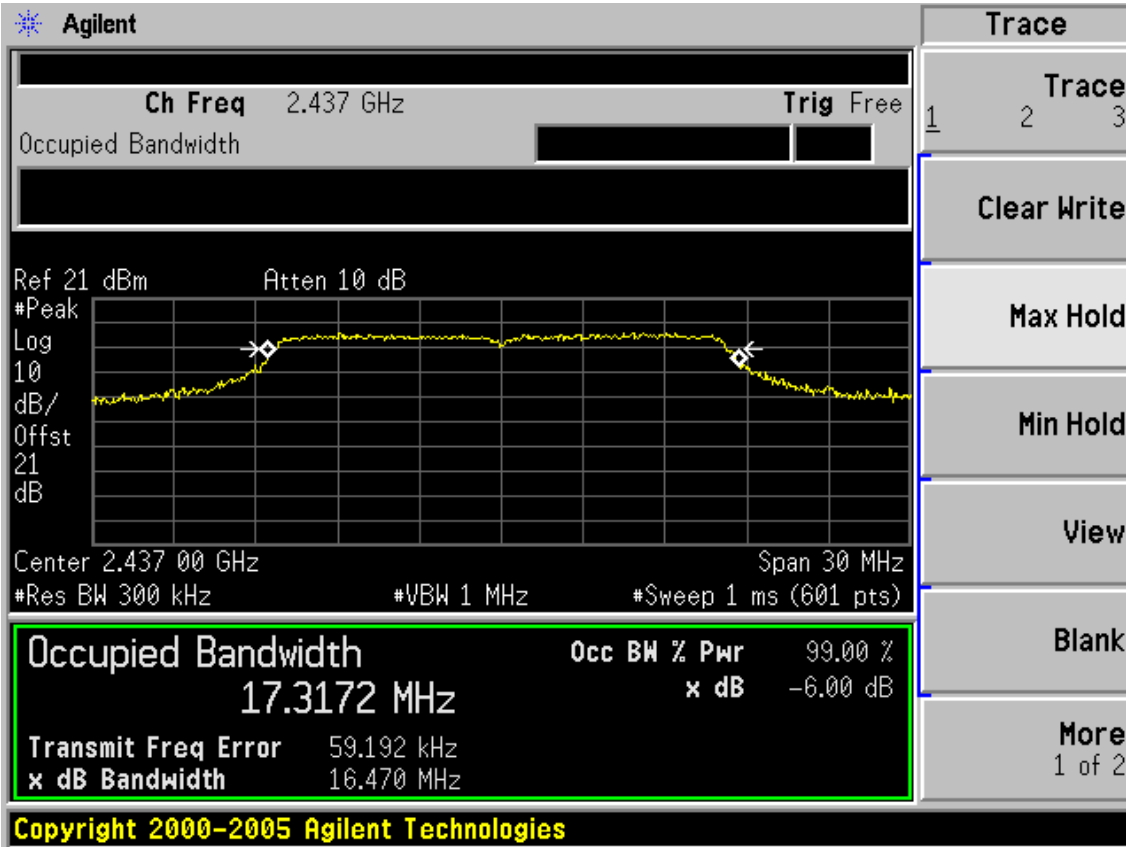


Test Mode: IEEE 802.11g TX

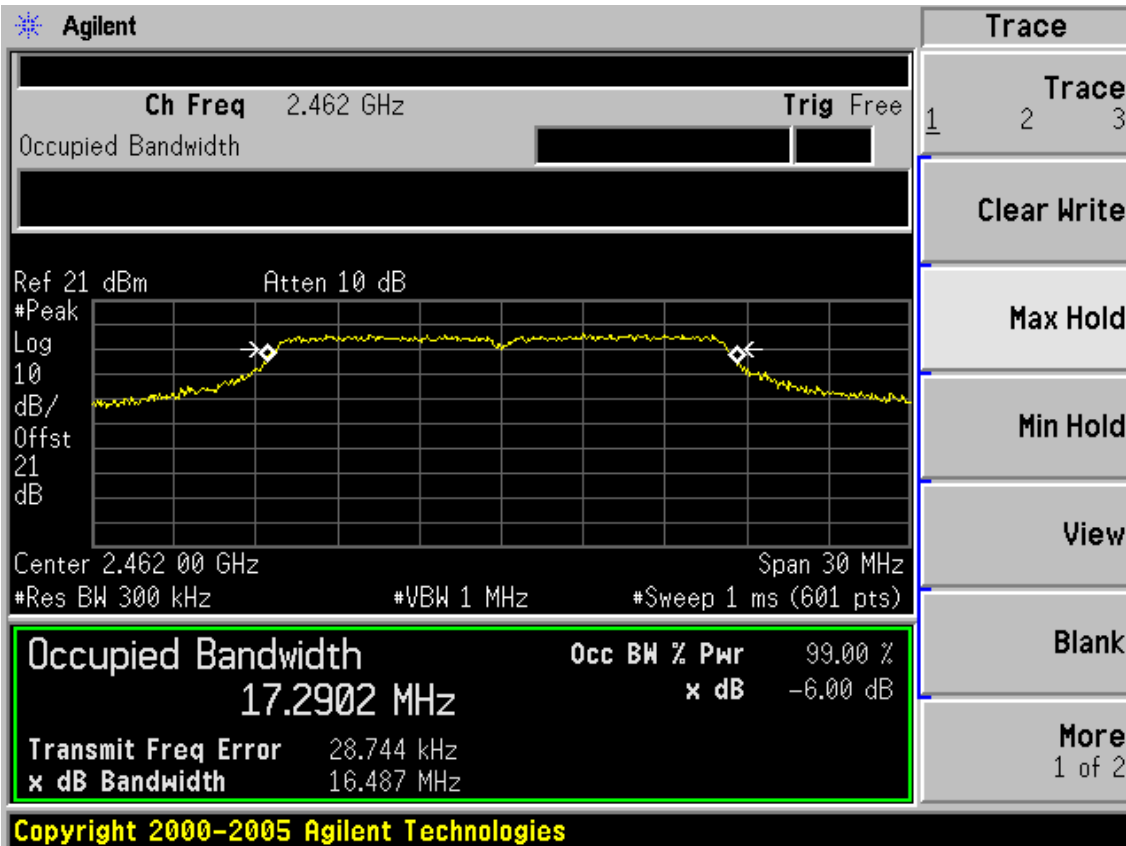
Test CH1: 2412MHz



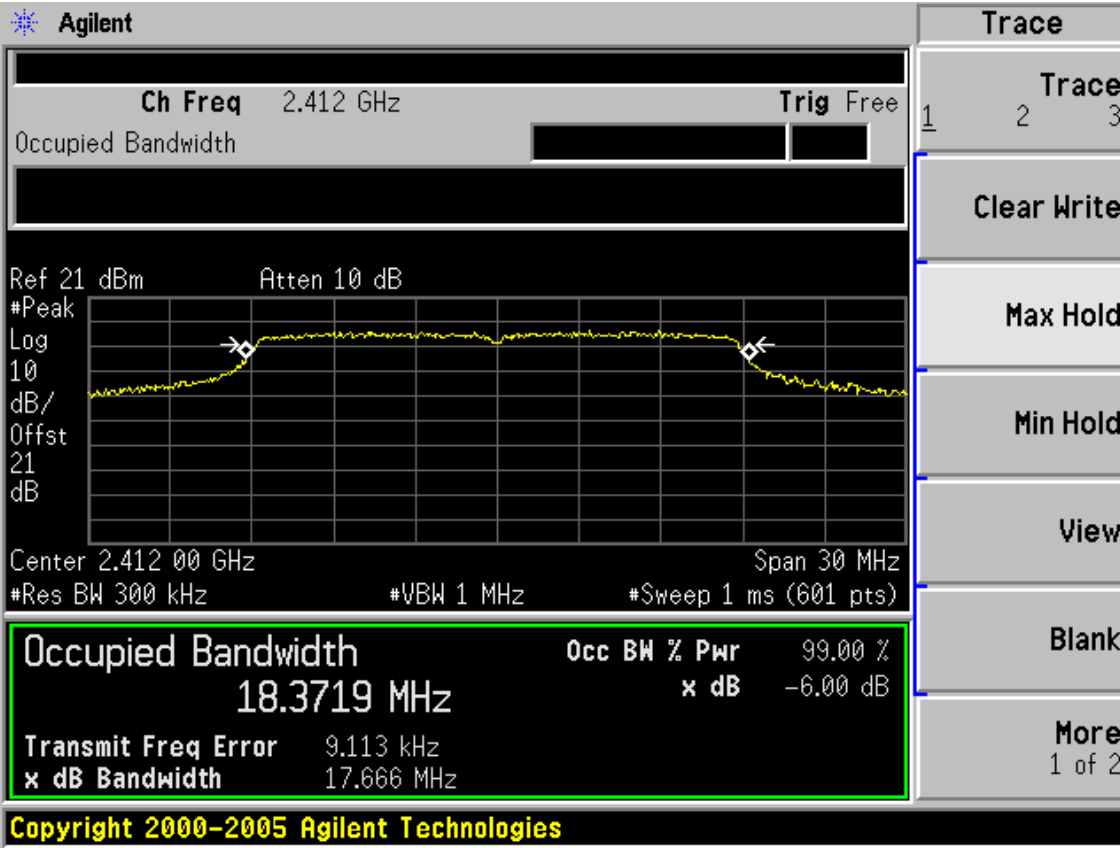
Test CH6: 2437MHz



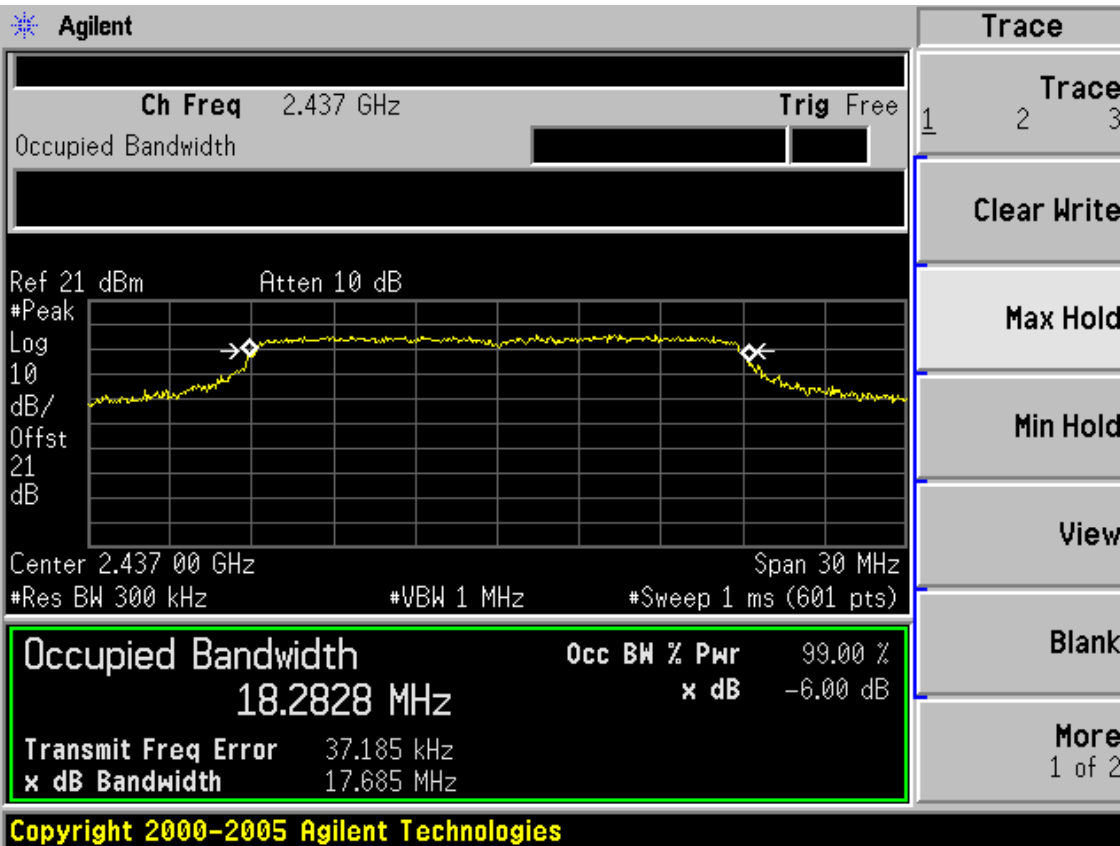
Test CH11: 2462MHz



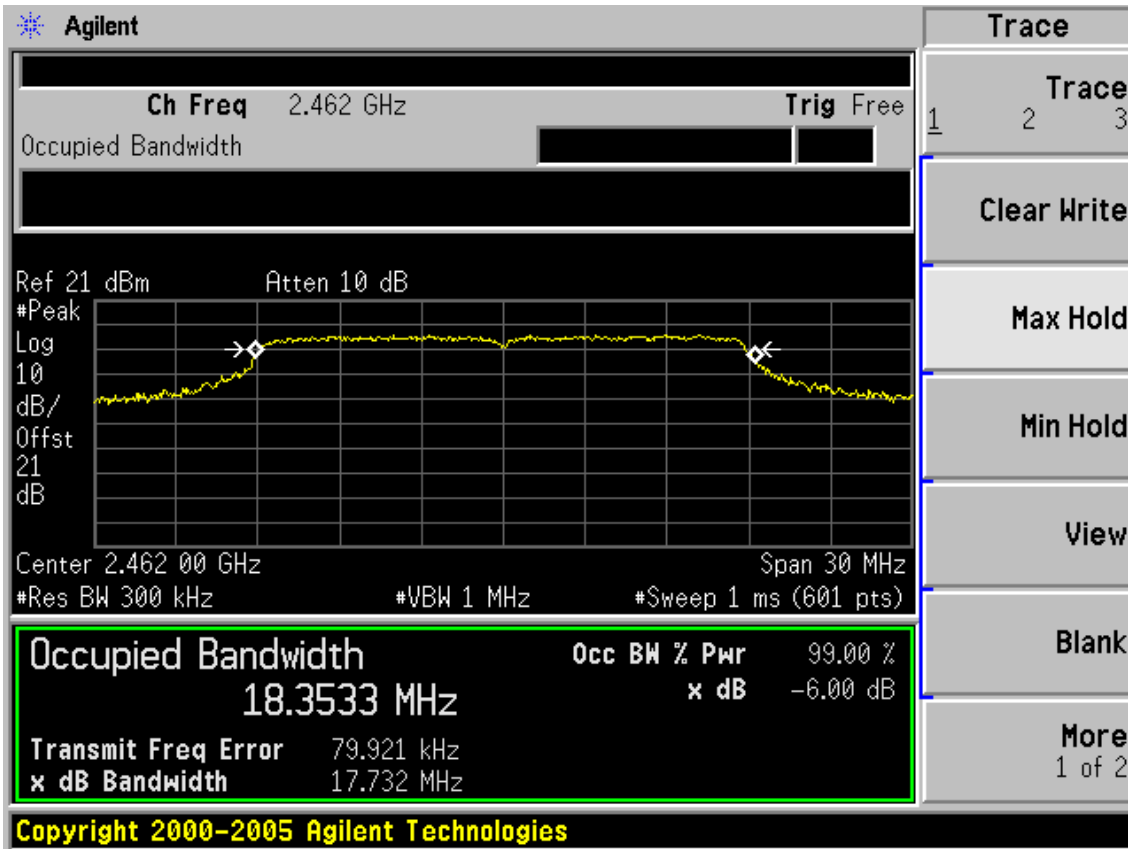
Test Mode: IEEE 802.11n HT20 TX  
 Test CH1: 2412MHz



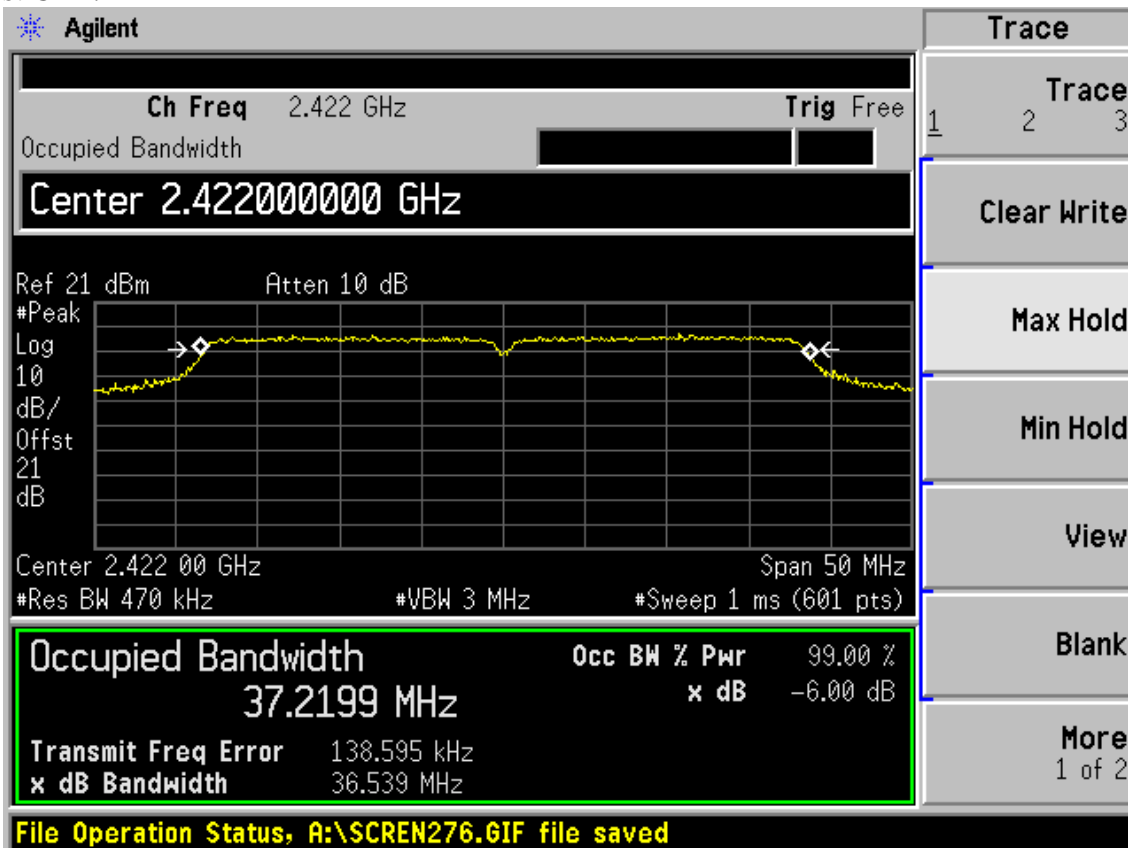
Test CH6: 2437MHz



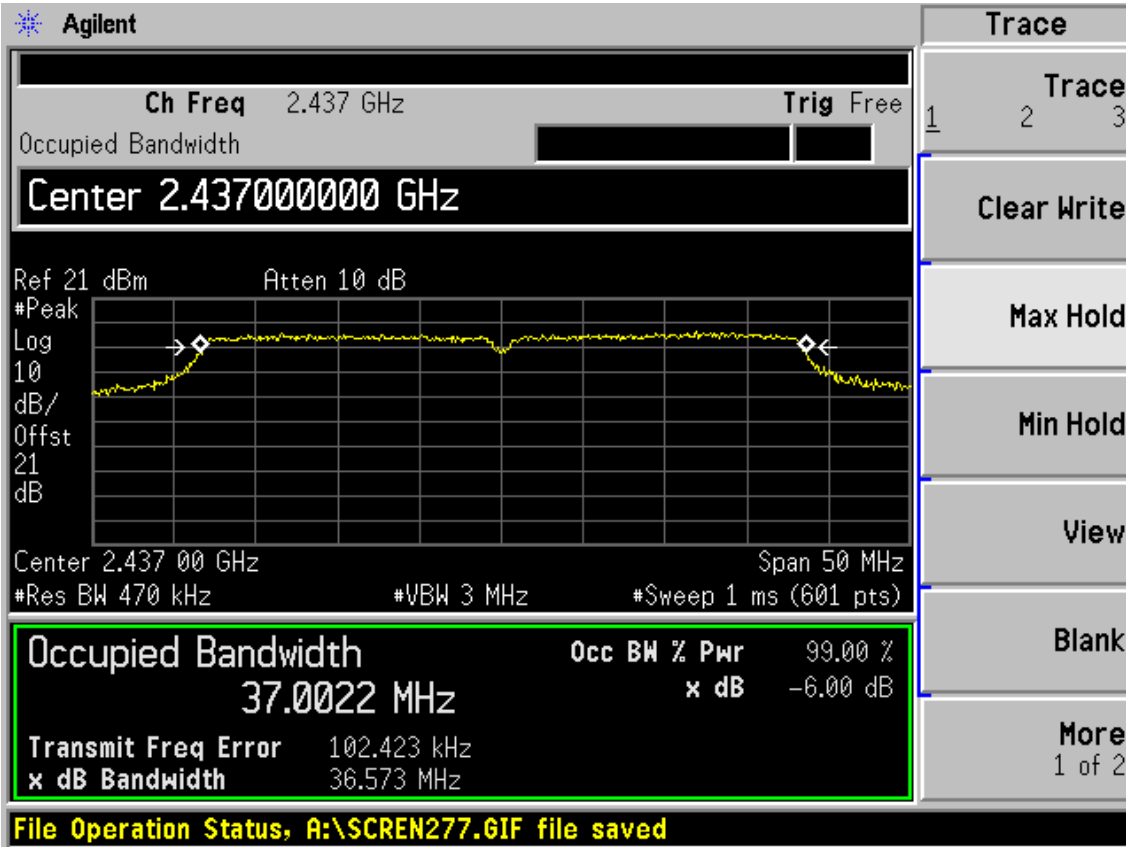
Test CH11: 2462MHz



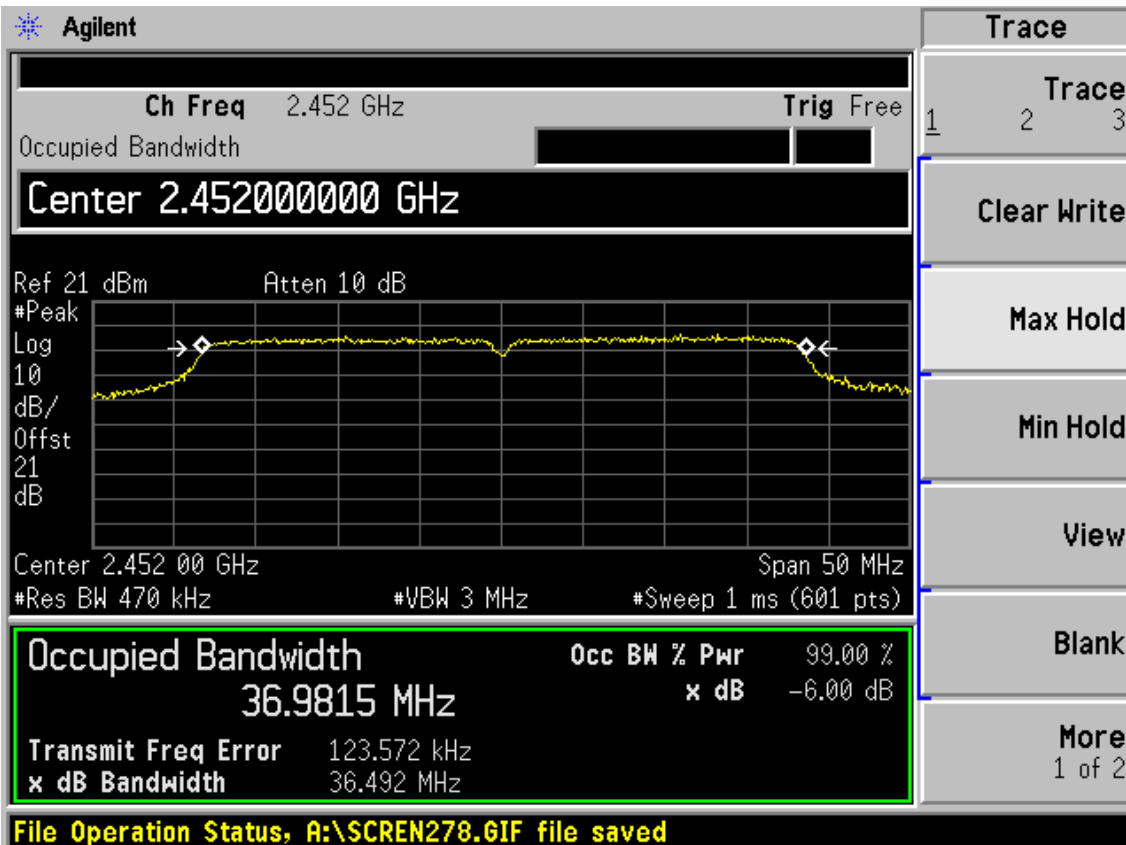
Test Mode: IEEE 802.11n HT40 TX  
 Test CH1: 2422MHz



Test CH4: 2437MHz



Test CH7: 2452MHz



## 8. OUTPUT POWER TEST

### 8.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum	Agilent	E4446A	US44300459	May.08, 12	1 Year
2.	Amp	HP	8449B	3008A08495	May.08, 12	1 Year
3.	Antenna	EMCO	3115	9510-4580	May.08, 12	1Year
4.	HF Cable	Hubersuhne	Sucoflex104	-	May.08, 12	1 Year
5.	Power Meter	Anritsu	ML2487A	6K00002472	May.08, 12	1Year
6.	Power Sensor	Anritsu	MA2491A	033005	May.08, 12	1Year

### 8.2. Limit (FCC Part 15C 15.247 b(3))

For systems using digital modulation in the 2400—2483.5MHz, The Peak out put Power shall not exceed 1W(30dBm)

### 8.3. Test Procedure

- 1, Connected the EUT's antenna port to measure device by 26dB attenuator.
- 2, For IEEE 802.11b/g and IEEE802.11n HT20 mode, use a PK power meter which's bandwidth is 20MHz and above 26dB bandwidth of signal to measure out each test modes' PK output power.
- 3, For IEEE802.11n HT40 mode, because the signal's bandwidth is about 40MHz and above 20MHz bandwidth of power sensor ML2491A. So Bandwidth correction method according to ANSI C63.10 clause 6.10.2.1 part (c) was used:
  - 1) Set the RBW=3MHz and VBW =8MHz
  - 2) Turn averaging off
  - 3) Set sweep to automatic
  - 4) Set the span just large enough to capture the emission
  - 5) Use a peak detector on max hold
  - 6) Record the measured power
  - 7) Calculate Output power of EUT use the formula:

Peak output power =measured power+ 10log[(26dB bandwidth of emission)/(analyzer RBW)]

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.



### 8.4. Test Results

EUT: 3G/4G Wireless N Router			
M/N: TL-MR3220			
Test date: 2012-07-17		Pressure: 101.2 kpa	Humidity: 48.7 %
Tested by: Leo-Li		Test site: RF site	Temperature: 24.2 °C
Cable loss: 1 dB		Attenuator loss: 20 dB	
Test Mode	CH (MHz)	Peak output Power (dBm)	Limit (dBm)
11b	CH1	18.12	30
	CH6	18.86	30
	CH11	19.61	30
11g	CH1	18.97	30
	CH6	26.53	30
	CH11	21.08	30
11n HT20	CH1	18.49	30
	CH6	26.46	30
	CH11	20.16	30

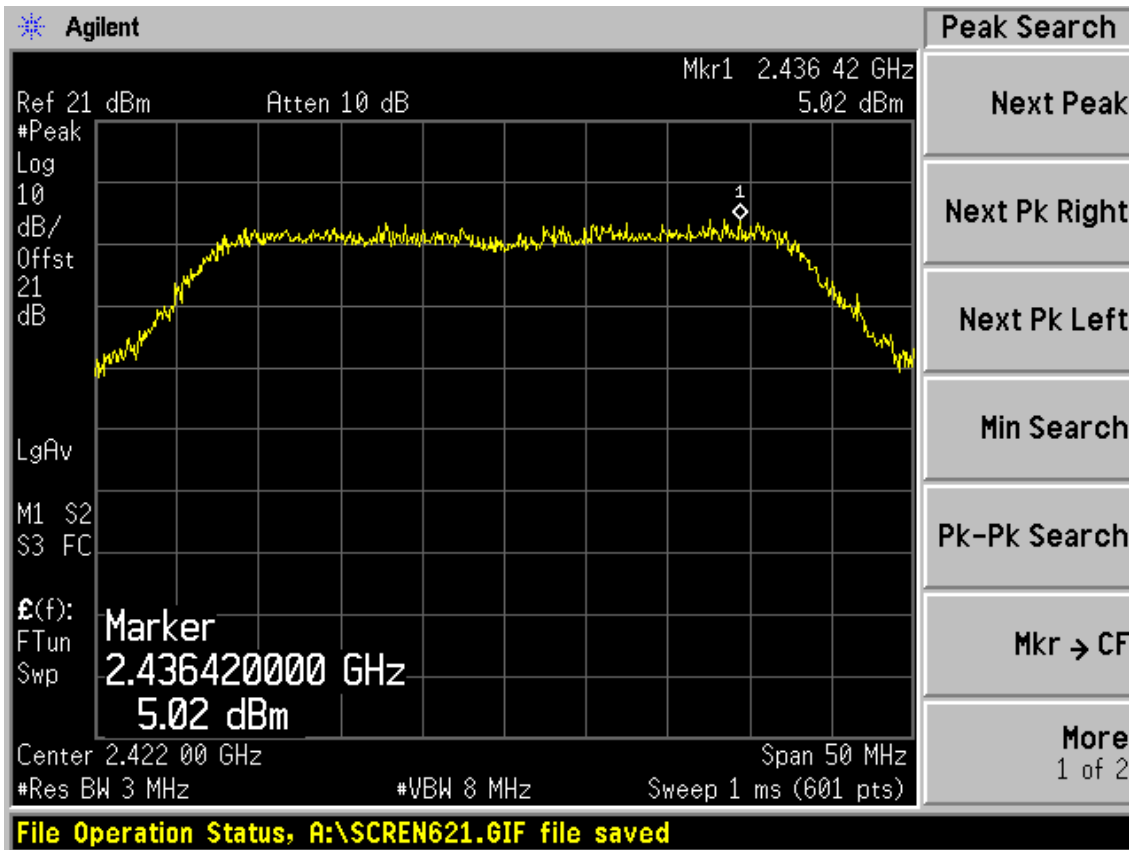
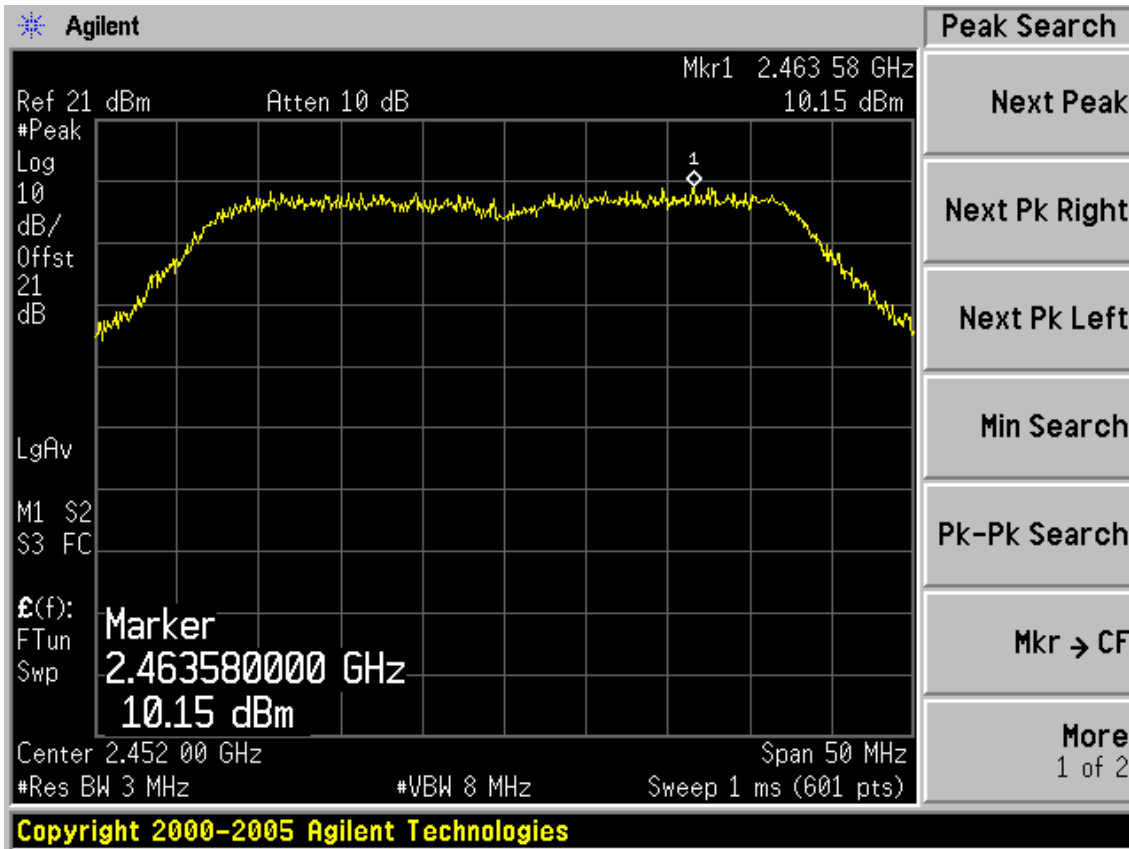
Test Mode	CH	Result		Limit (dBm)
		Measured power(dBm)/3MHz	PK Output power (dBm)	
11n HT40	CH1	5.02	17.13	30
	CH4	15.12	27.23	30
	CH7	10.15	22.26	30

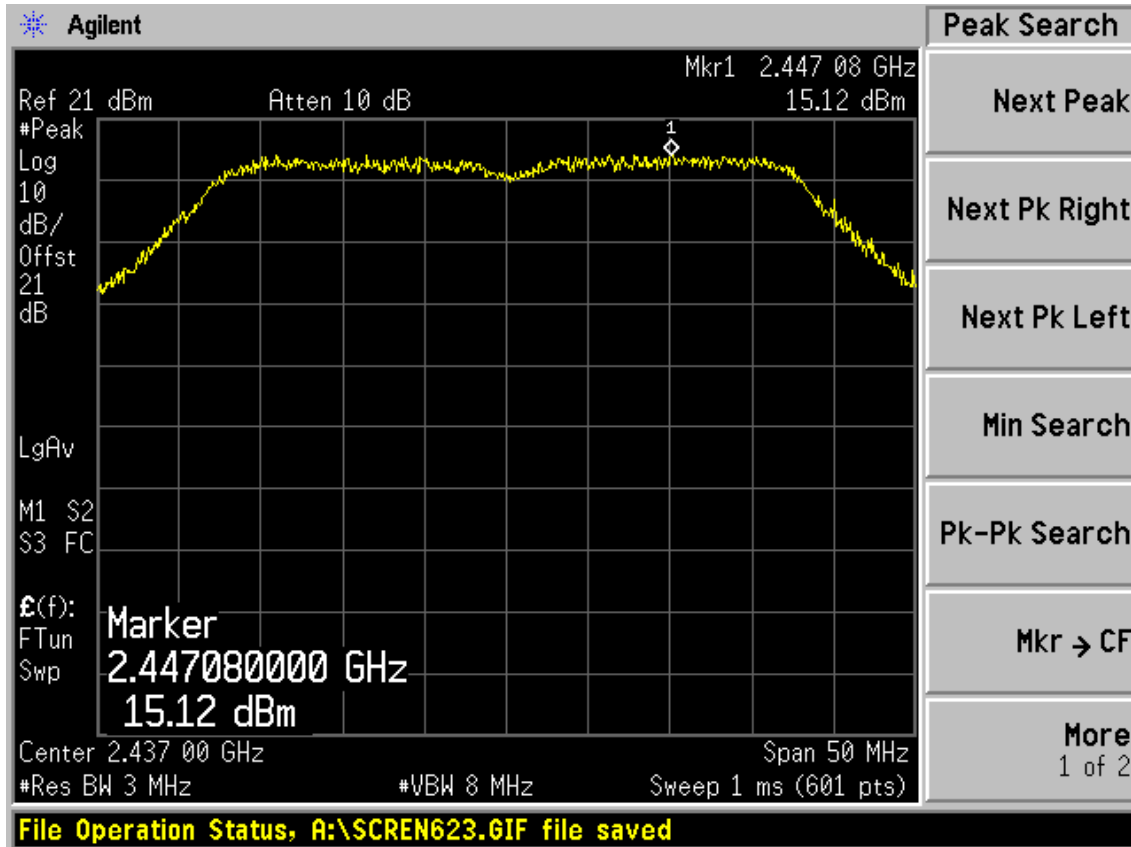
26dB Bandwidth for 11n HT40: 48.716MHz

BW correction factor =  $10\log[(48.716\text{MHz})/(3\text{MHz})] = 12.11\text{dB}$

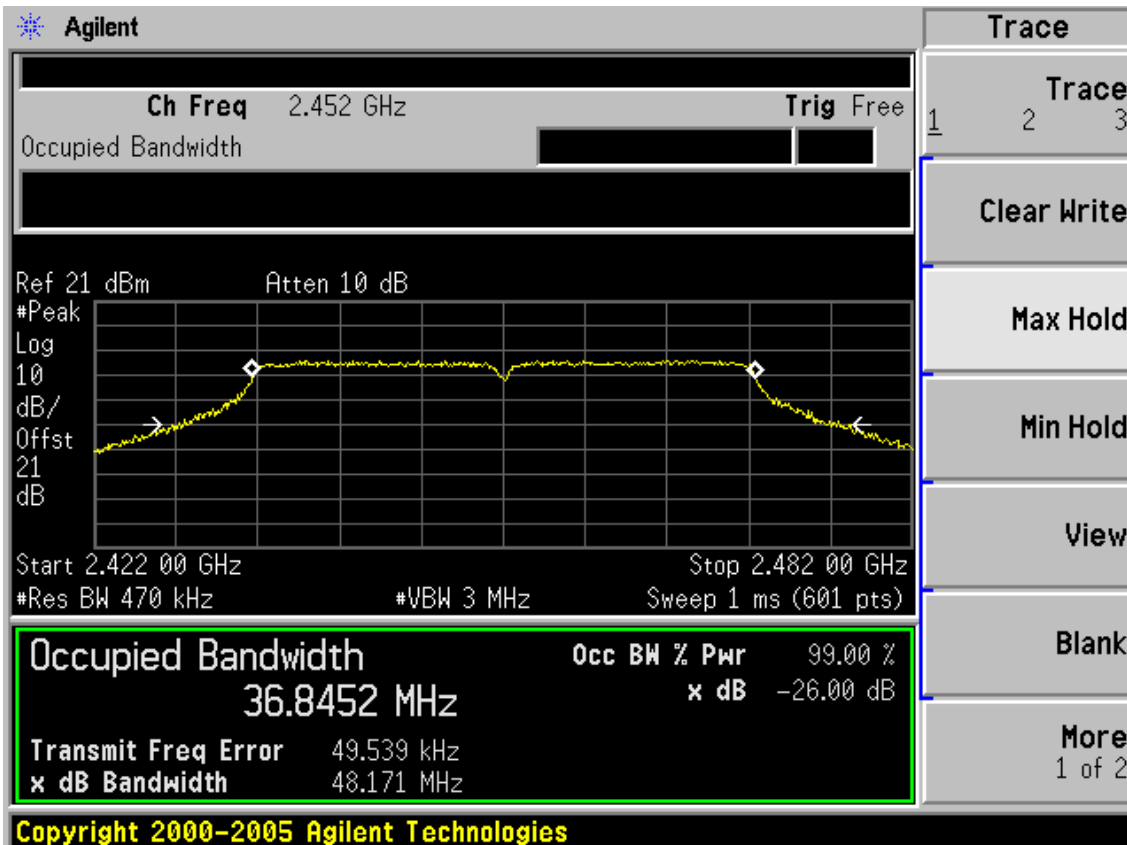
Conclusion: PASS

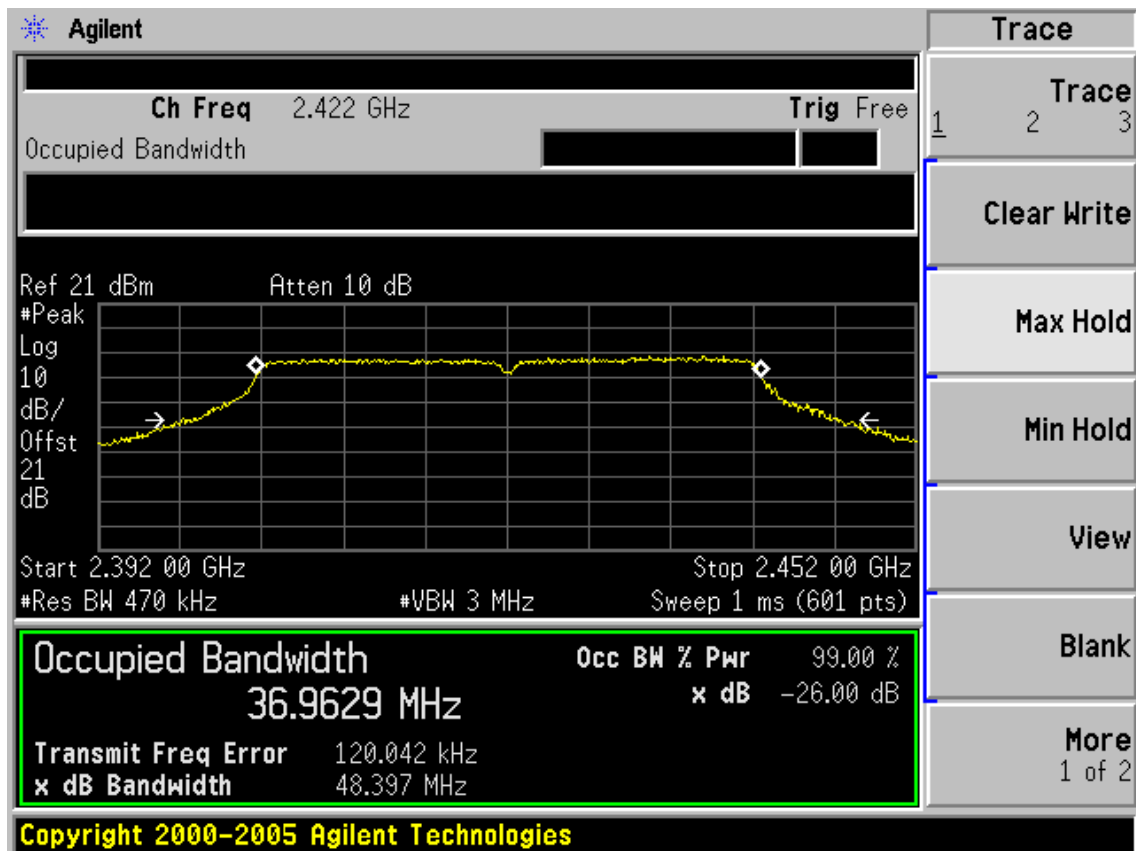
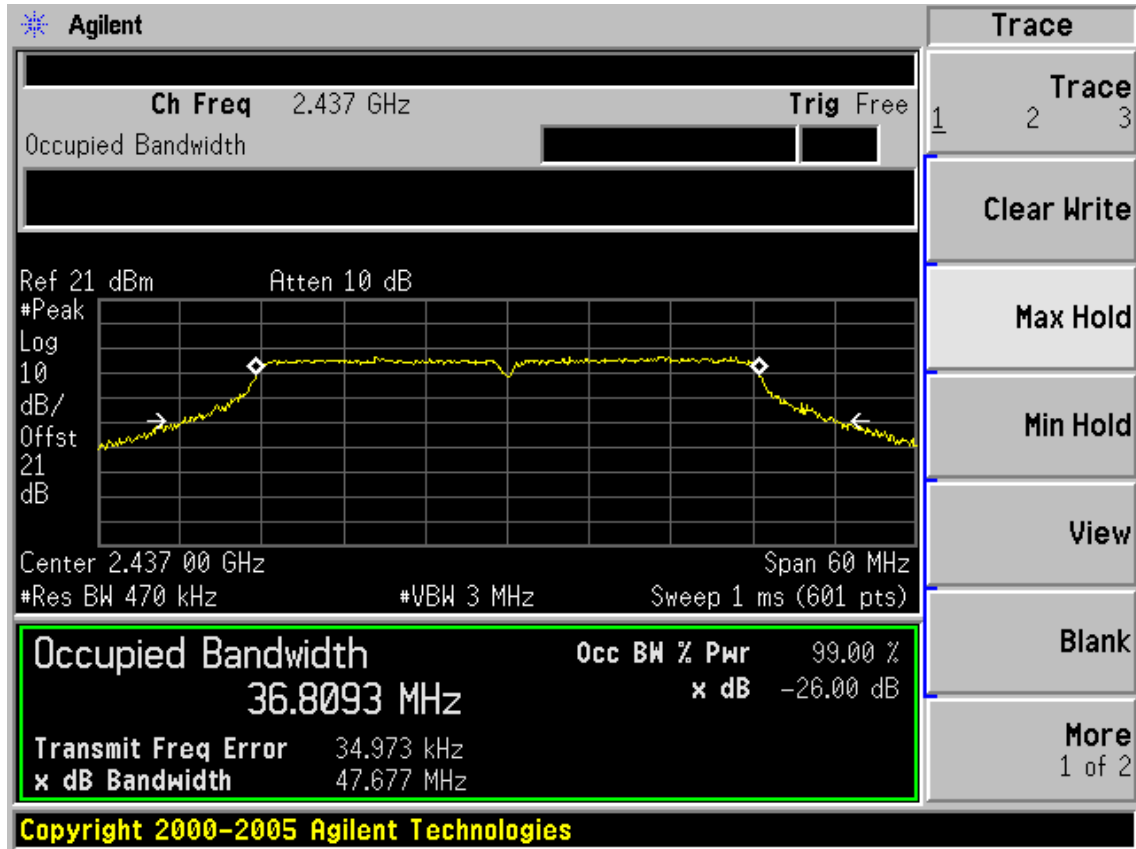
Test Mode: IEEE 802.11n HT40





26dB Bandwidth





## 9. POWER SPECTRAL DENSITY TEST

### 9.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum	Agilent	E4446A	US44300459	May.08, 12	1 Year
2.	Amp	HP	8449B	3008A08495	May.08, 12	1 Year
3.	Antenna	EMCO	3115	9510-4580	May.08, 12	1 Year
4.	HF Cable	Hubersuhne	Sucoflex104	-	May.08, 12	1 Year

### 9.2. Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.

### 9.3. Test Procedure

1. Connected the EUT's antenna port to spectrum analyzer device by 20dB attenuator.
- 2 , Set the test frequency as center frequency,Set RBW=3KHz,VBW=10KHz,Span large enough capture the entire frequency,Read out maximum peak level frequency
- 3, Set the frequency read from produce 2 as center frequency,then set the span=300KHz, Sweep time=Span/RBW,Then Max hold,read out each mode and each chain's Power density.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude

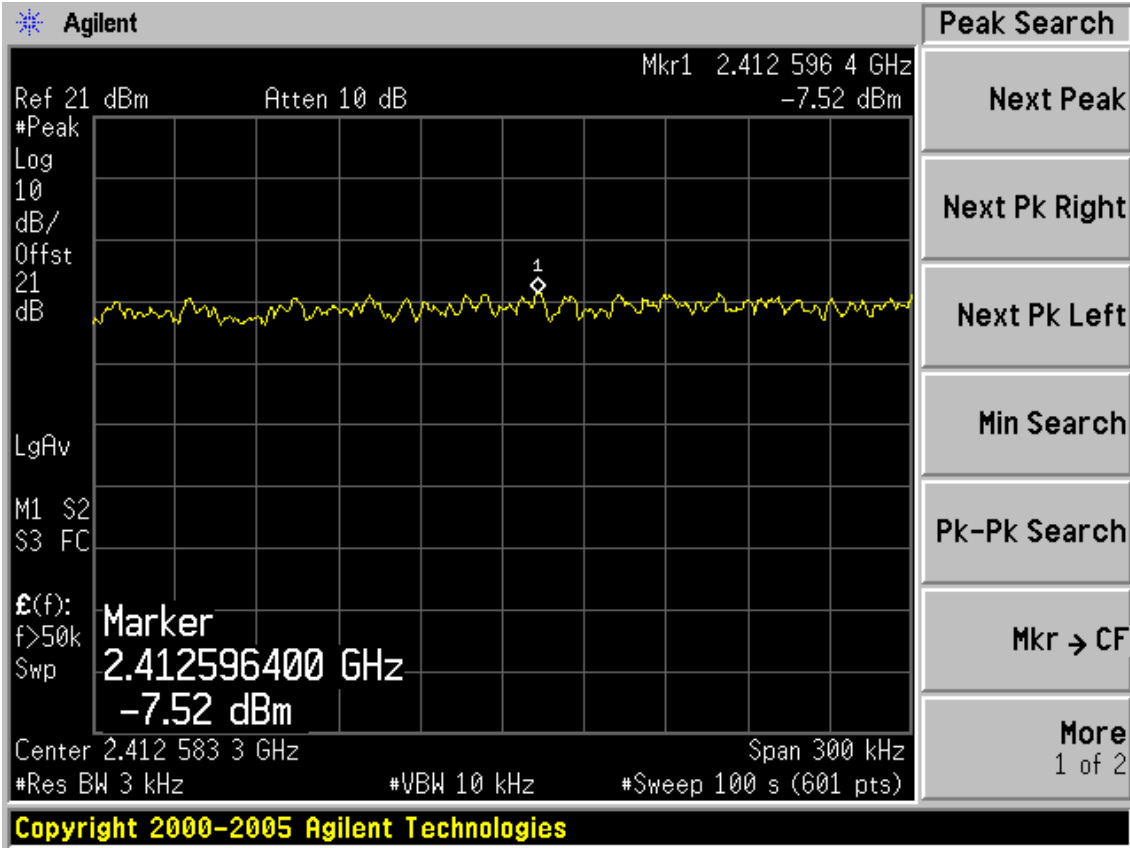
9.4. Test Results

EUT: 3G/4G Wireless N Router		
M/N: TL-MR3220		
Test date: 2012-07-17	Pressure: 101.2kpa	Humidity: 45.9 %
Tested by: Leo-Li	Test site: RF Site	Temperature : 24.2°C

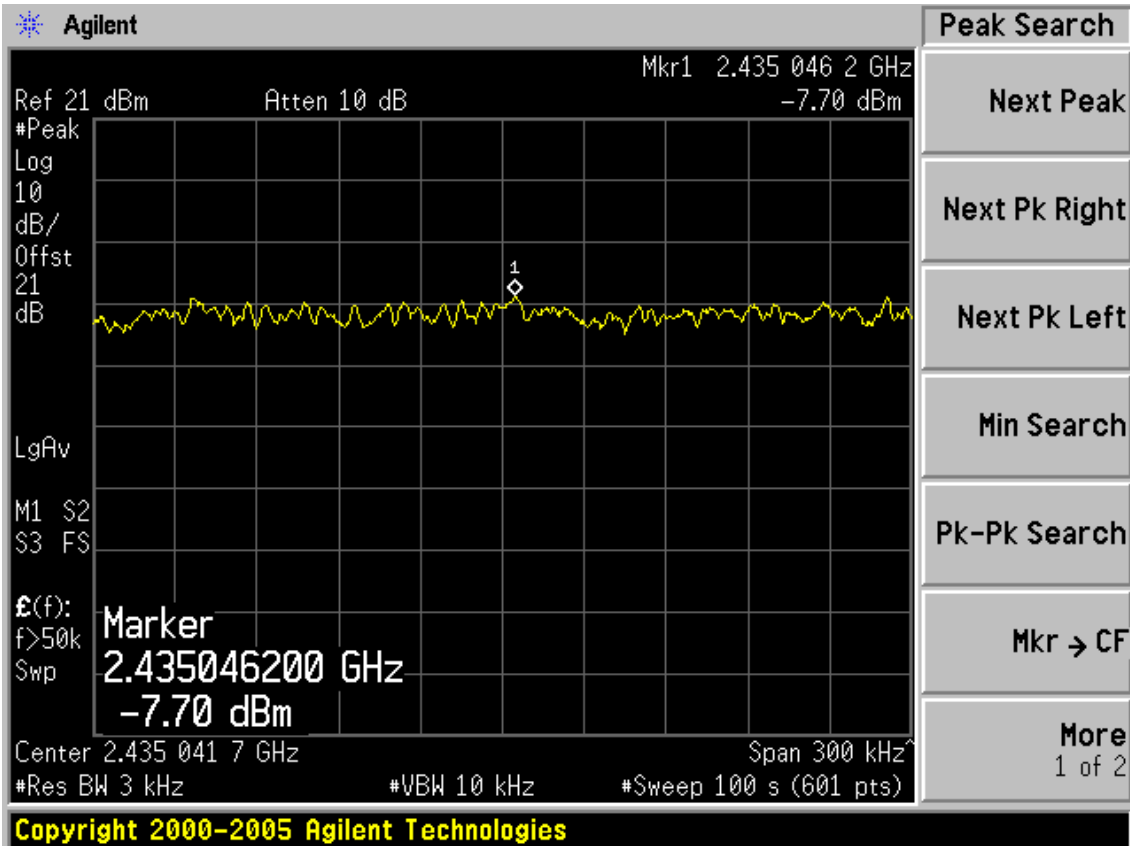
Cable loss: 1 dB		Attenuator loss: 20 dB	
Test Mode	CH	Power density ( dBm/3KHz )	Limit (dBm/3KHz)
11b	CH1	-7.52	8
	CH6	-7.70	8
	CH11	-6.99	8
11g	CH1	-11.53	8
	CH6	-6.13	8
	CH11	-11.79	8
11n HT20	CH1	-13.33	8
	CH6	-6.91	8
	CH11	-13.06	8
11n HT40	CH1	-18.45	8
	CH4	-8.95	8
	CH7	-16.61	8

Conclusion : PASS

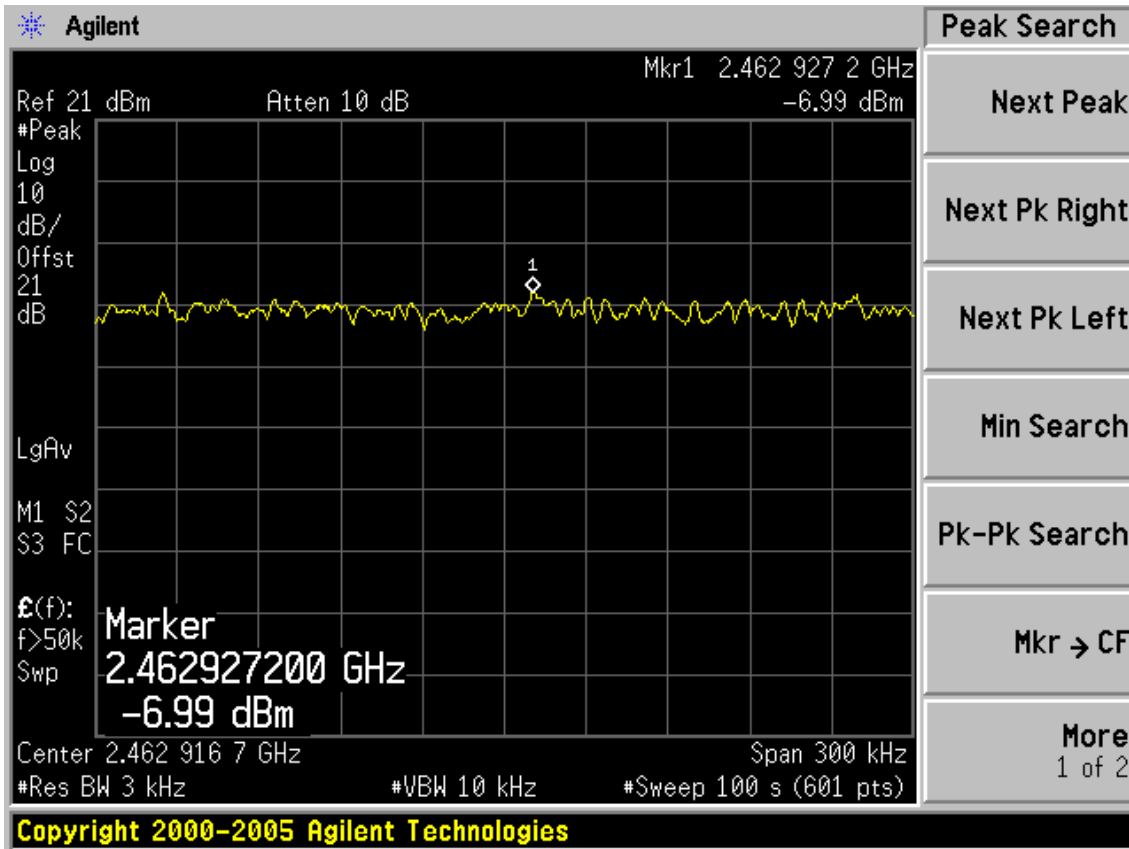
Test Mode: IEEE 802.11b TX  
 Test CH1: 2412MHz



Test CH6: 2437MHz

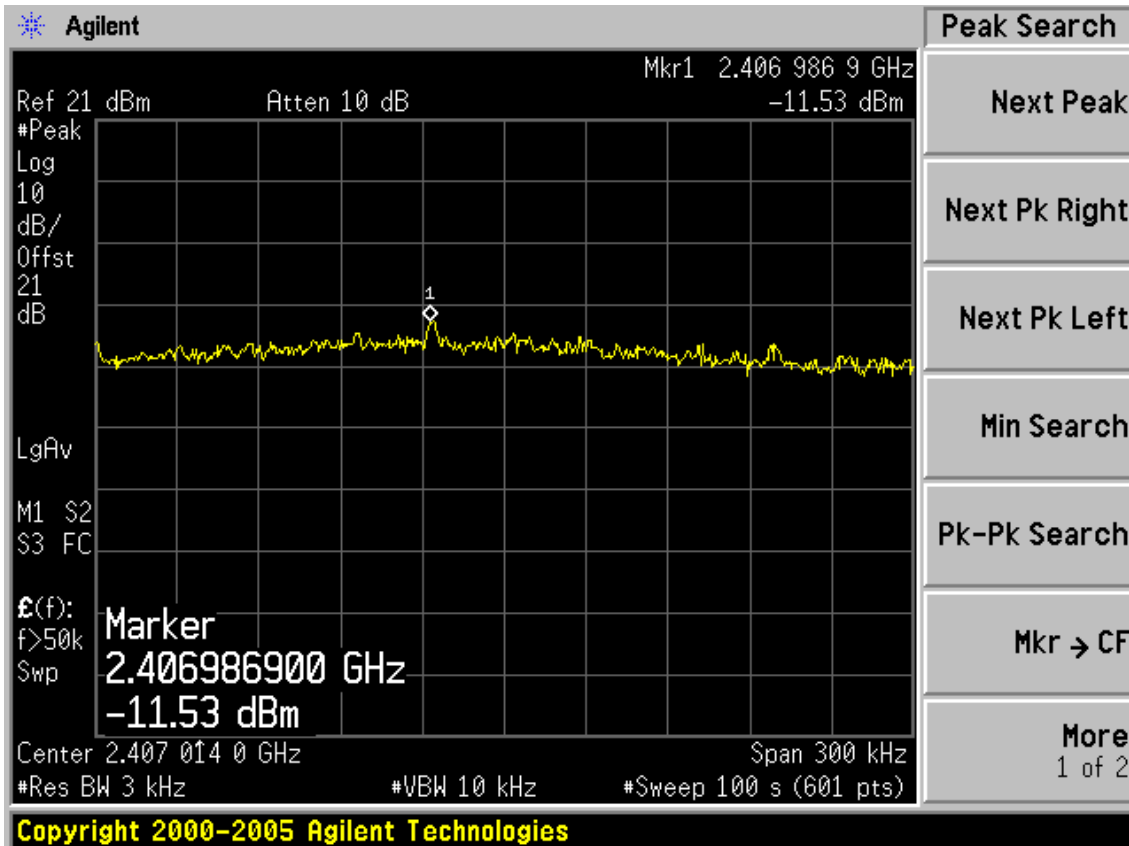


Test CH11: 2462MHz



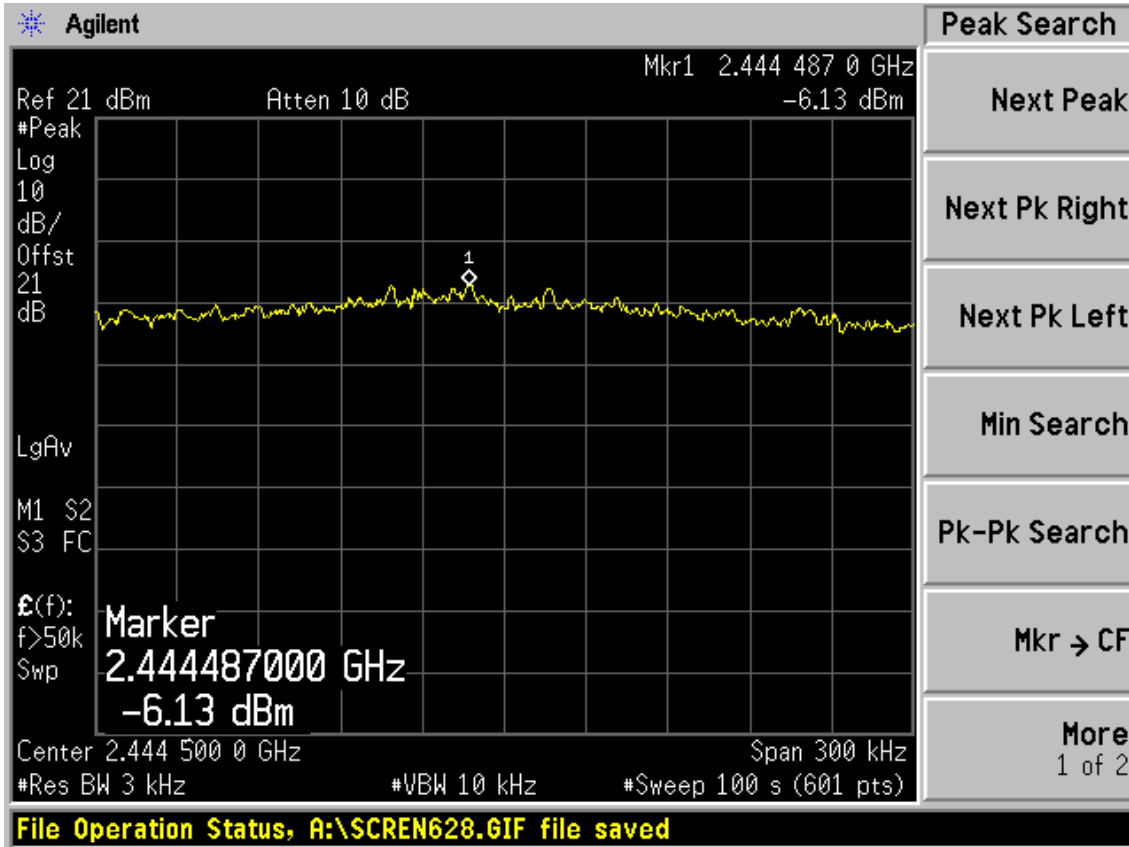
Test Mode: IEEE 802.11g TX

Test CH1: 2412MHz

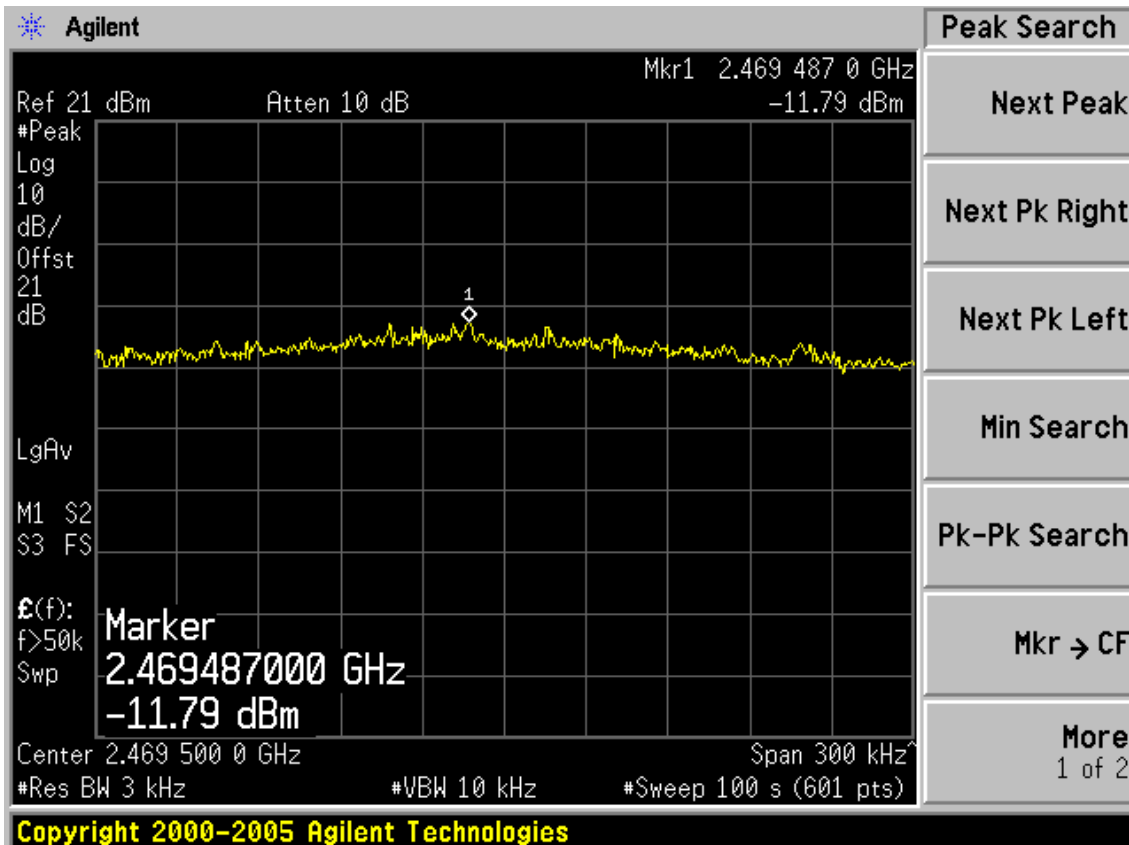




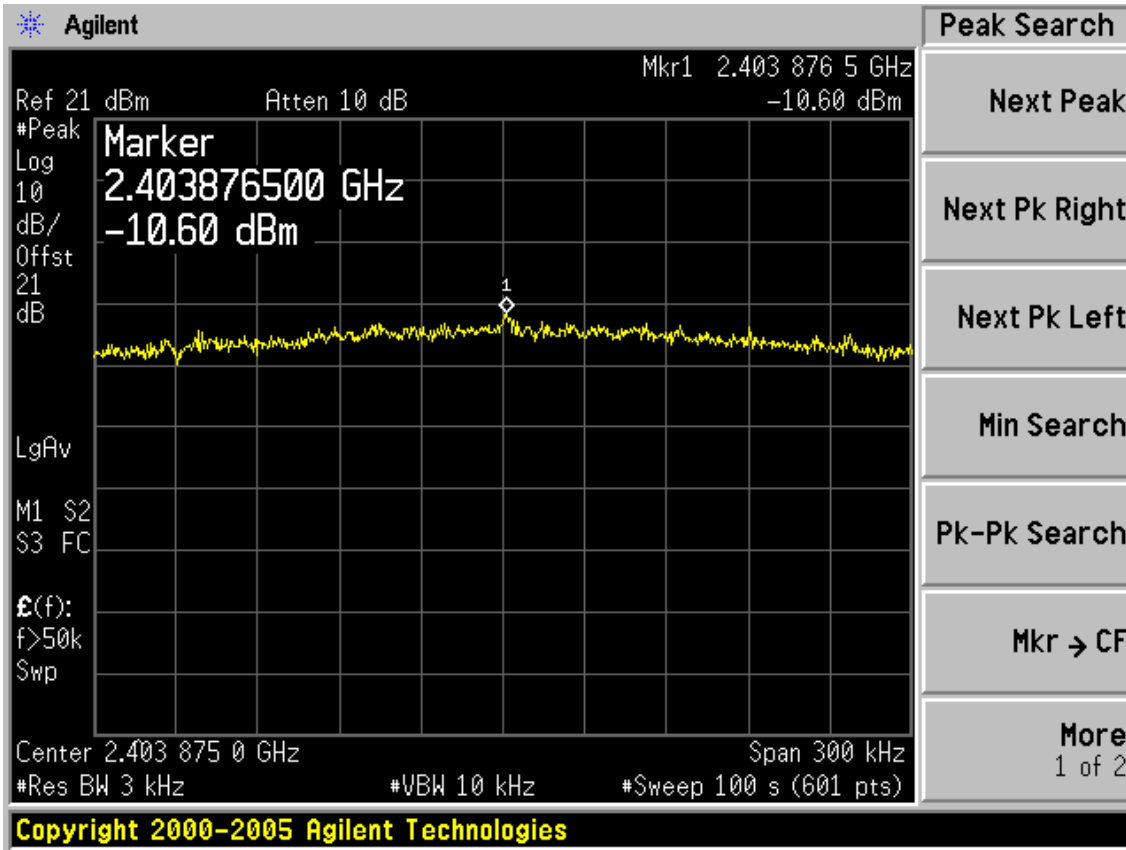
Test CH6: 2437MHz



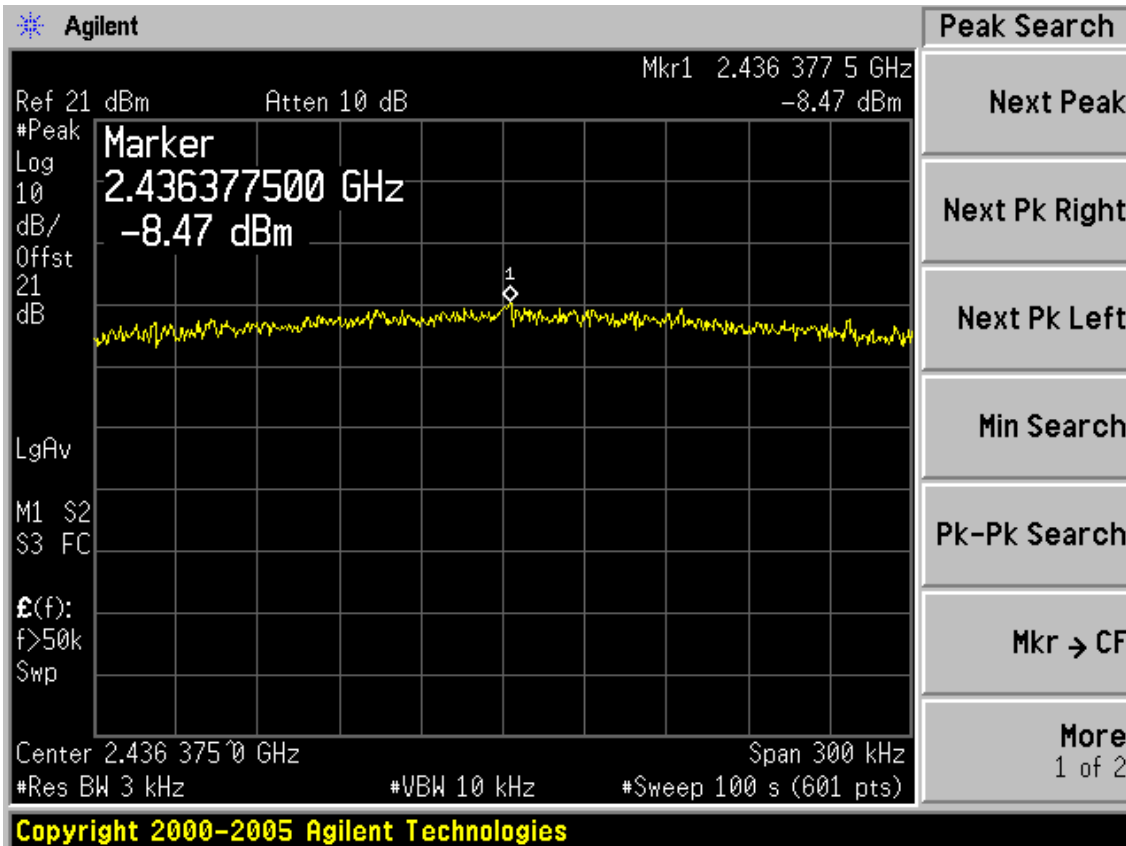
Test CH11: 2462MHz



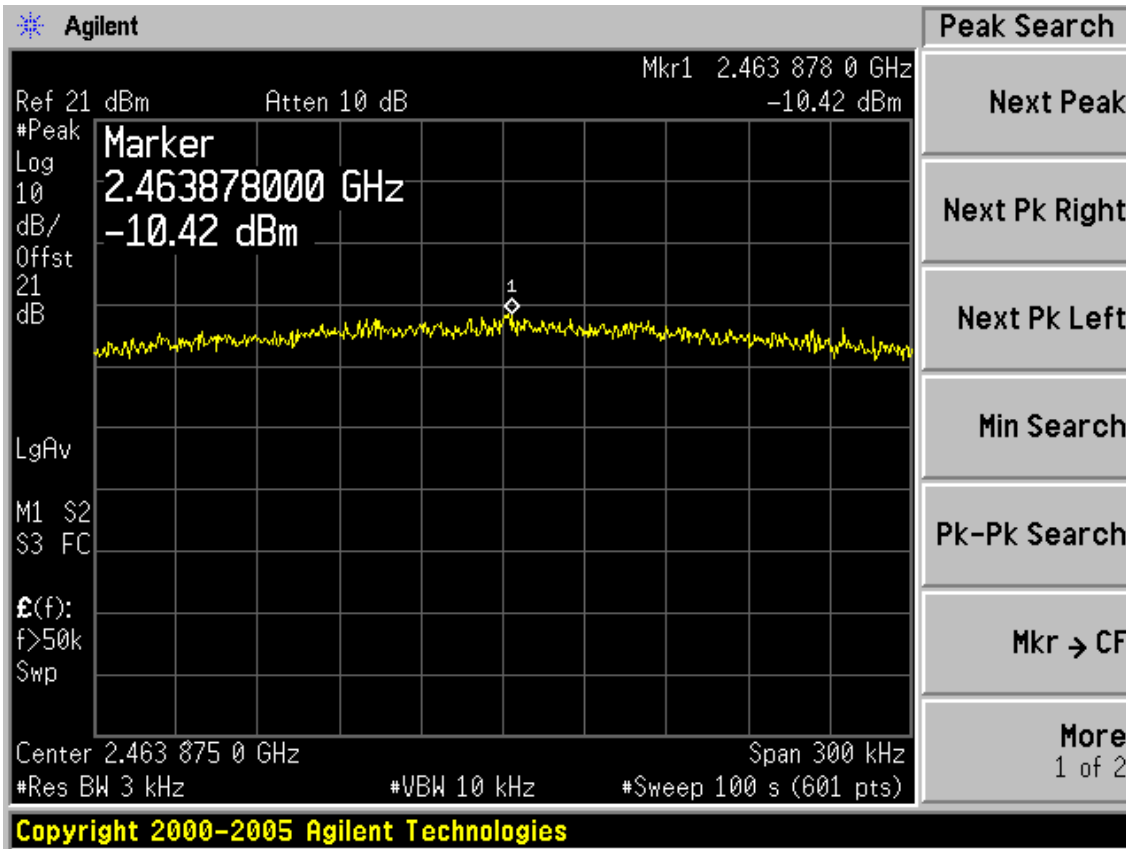
Test Mode: IEEE 802.11n HT20 TX  
 Test CH1: 2412MHz



Test CH6: 2437MHz

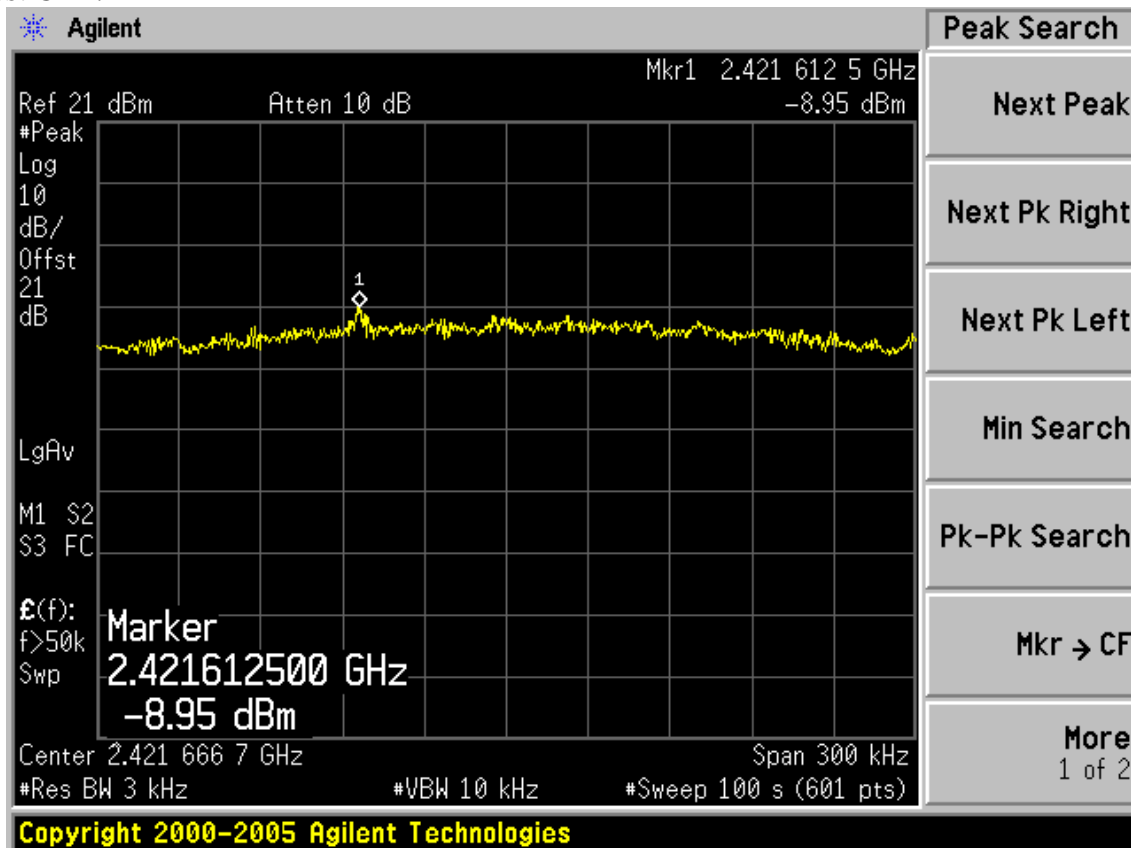


Test CH11: 2462MHz

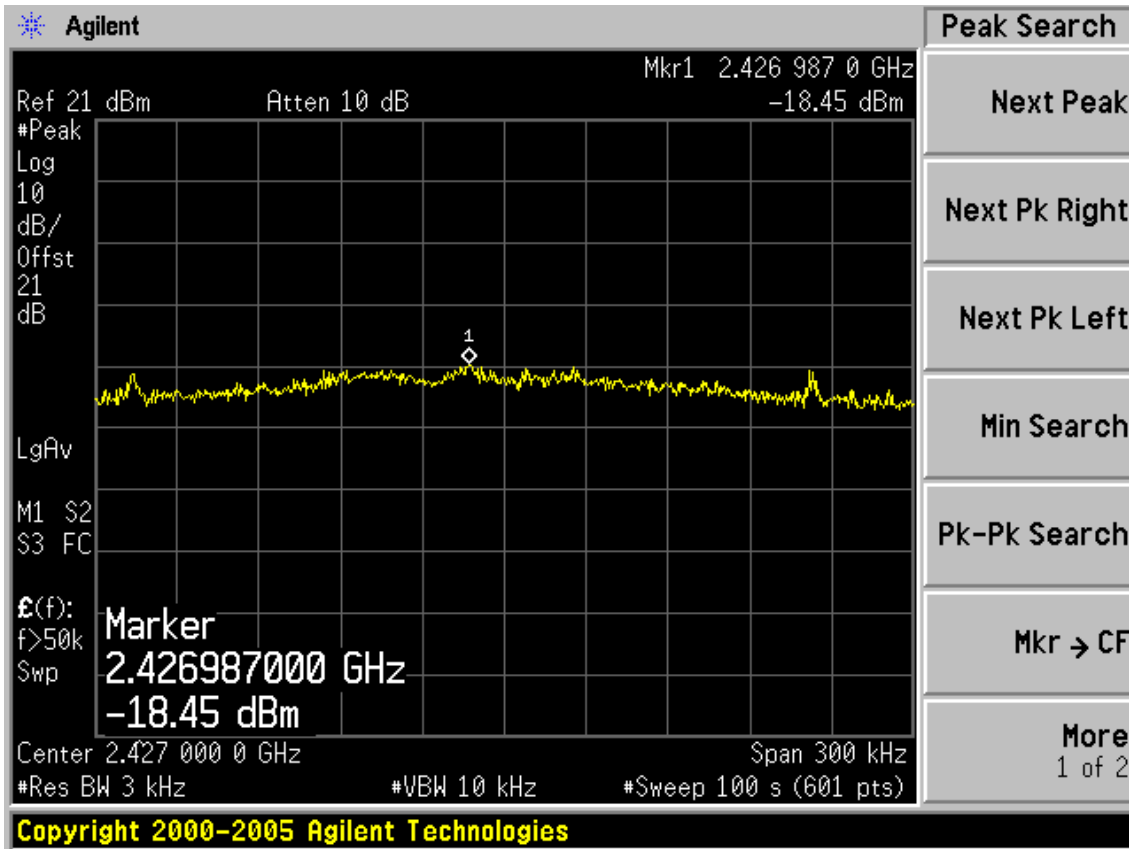


Test Mode: IEEE 802.11n HT40 TX

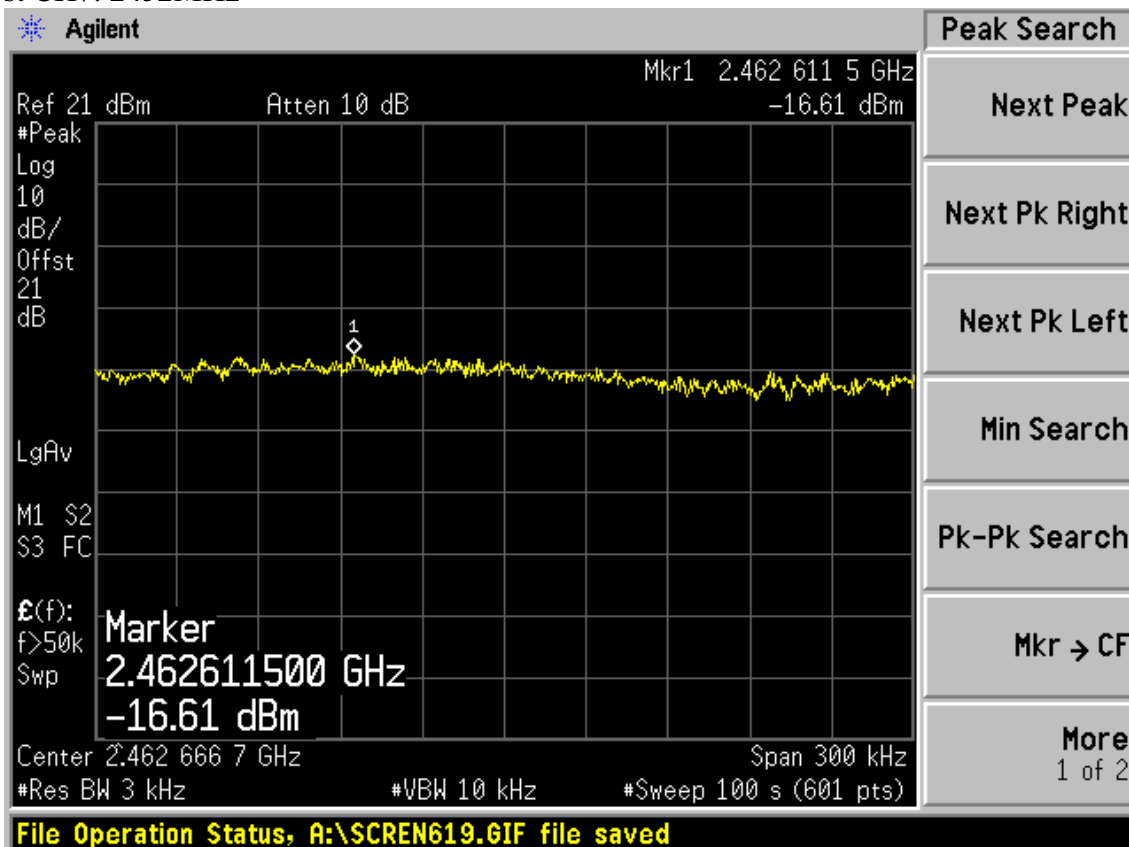
Test CH1: 2422MHz



Test CH4: 2437MHz



Test CH7: 2452MHz



## **10. ANTENNA REQUIREMENT**

### **10.1. STANDARD APPLICABLE**

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

### **10.2. ANTENNA CONNECTED CONSTRUCTION**

The antennas used for this product are Dipole antenna that no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is 5dBi.

## 11.MPE ESTIMATION

### 11.1.Limit for General Population/ Uncontrolled Exposures

Frequency	Power density (mW/ cm <sup>2</sup> )	Averaging time(minutes)
300MHz----1.5GHz	F/1500	30
1.5GHz---100GHz	1.0	30

Frequency(MHz)	Power density (mW/ cm <sup>2</sup> )	Averaging time(minutes)
2412	1	30
2437	1	30
2462	1	30

Note: F= Frequency in MHz

### 11.2. Estimation Result

EUT: Wireless N Router		
M/N: TL-MR3220		
Test date:2012-07-21	Pressure: 101.3 kpa	Humidity: 50.6 %
Tested by: Leo-Li	Test site: RF Site	Temperature : 25.4°C

Cable loss: 1 dB		Attenuator loss: 20 dB				Antenna Gain: 5 dBi	
Test Mode	CH	Frequency (MHz)	Peak Output Power (dBm)	Output Power (mW)	Antenna Gain (dBi)	Antenna Gain (Linear)	MPE
11b	CH1	2412	18.12	64.86	5	3.16	0.0408
	CH6	2437	18.86	76.91	5	3.16	0.0484
	CH11	2462	19.61	91.41	5	3.16	0.0575
11g	CH1	2412	18.97	78.89	5	3.16	0.0497
	CH6	2437	26.53	449.78	5	3.16	0.2831
	CH11	2462	21.08	128.23	5	3.16	0.0807
11n HT20	CH1	2412	18.49	70.63	5	3.16	0.0445
	CH6	2437	26.46	442.59	5	3.16	0.2786
	CH11	2462	20.16	103.75	5	3.16	0.0653
11n HT40	CH1	2412	17.13	51.64	5	3.16	0.0325
	CH4	2437	27.23	528.45	5	3.16	0.3326
	CH7	2462	22.26	168.27	5	3.16	0.1059

## 12.DEVIATION TO TEST SPECIFICATIONS

[ NONE ]