

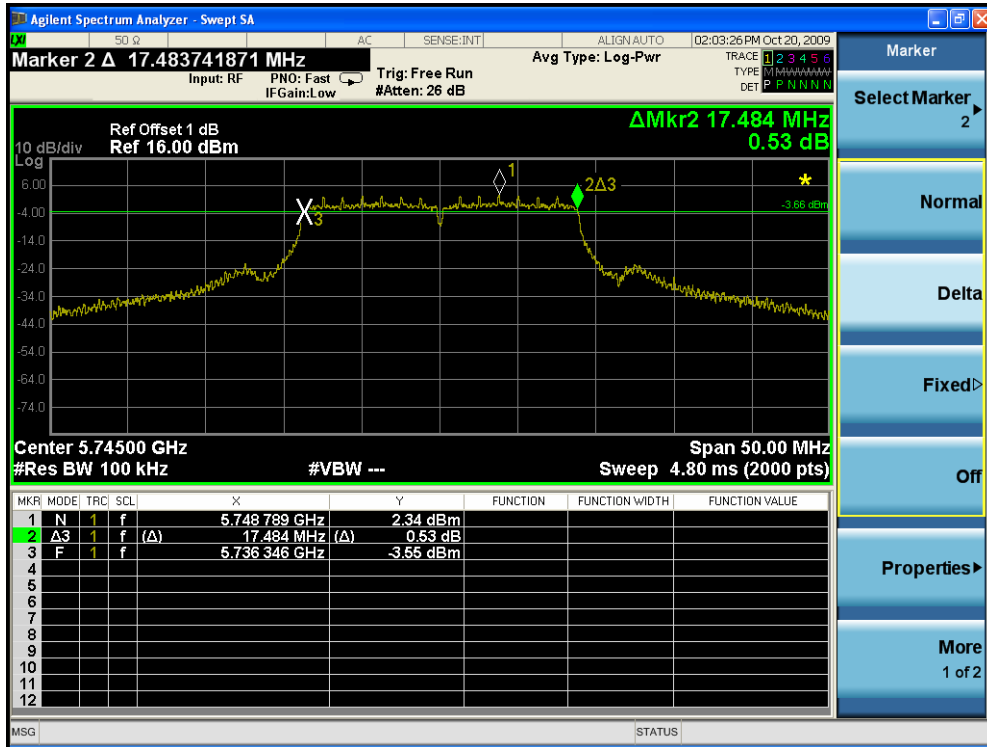
Channel 06 (2437MHz)



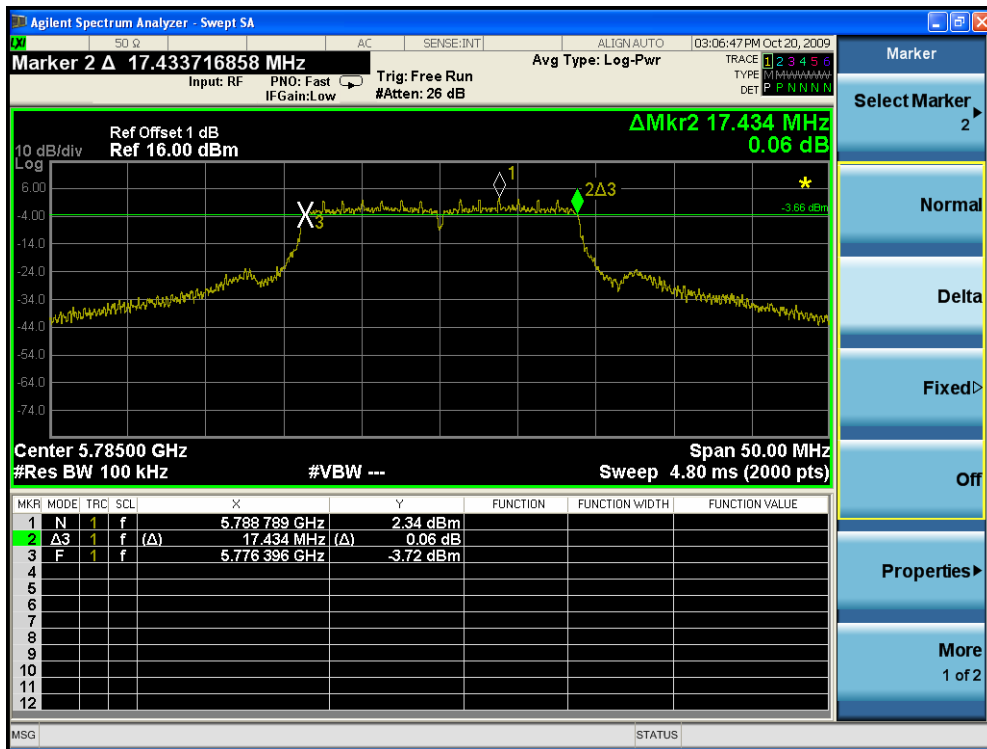
Channel 11 (2462MHz)



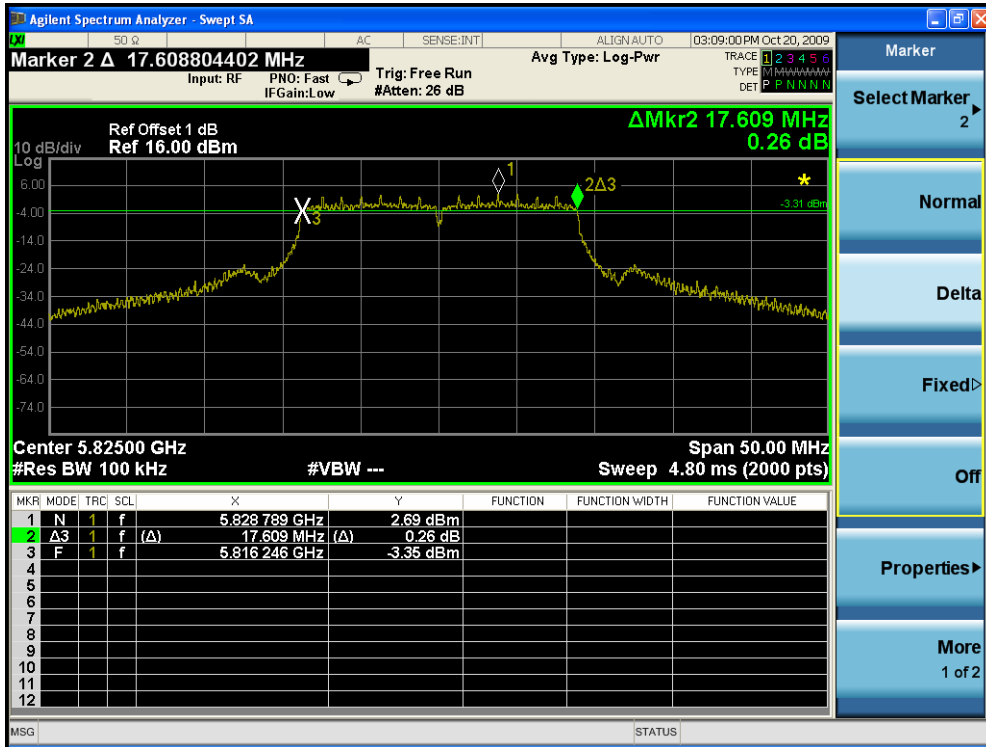
Channel 149 (5745MHz)



Channel 157 (5785MHz)



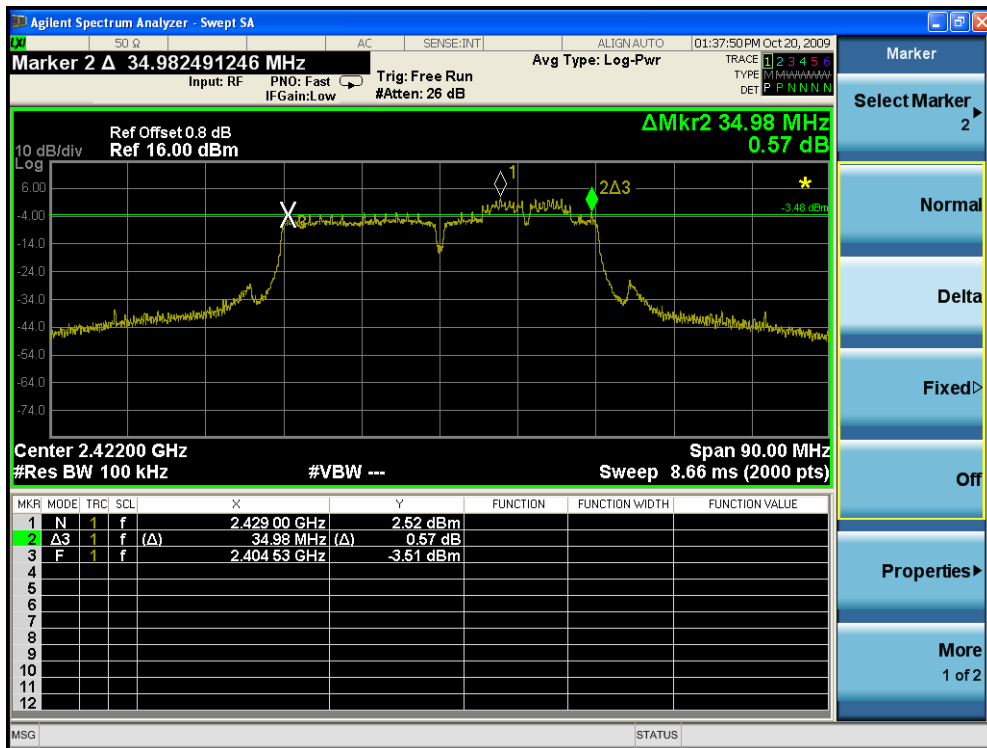
Channel 165 (5825MHz)



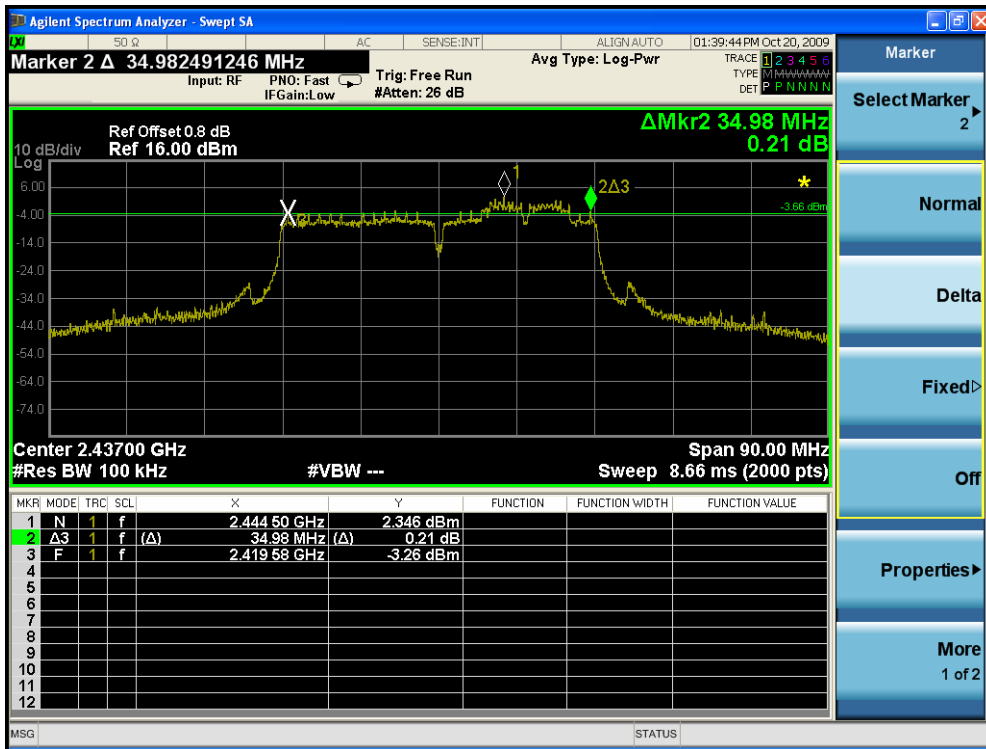
Product	: 802.11a/b/g/n WLAN Module
Test Item	: 6dB Occupied Bandwidth
Test Site	: AC-6
Test Mode	: Mode 5: Transmit by 802.11n (40MHz) (Chain 0)

Channel No.	Frequency (MHz)	Occupied Bandwidth (kHz)	Limit (kHz)	Result
03	2422	34980	500	Pass
06	2437	34980	500	Pass
09	2452	34980	500	Pass
151	5755	35930	500	Pass
159	5795	35480	500	Pass

### Channel 03 (2422MHz)



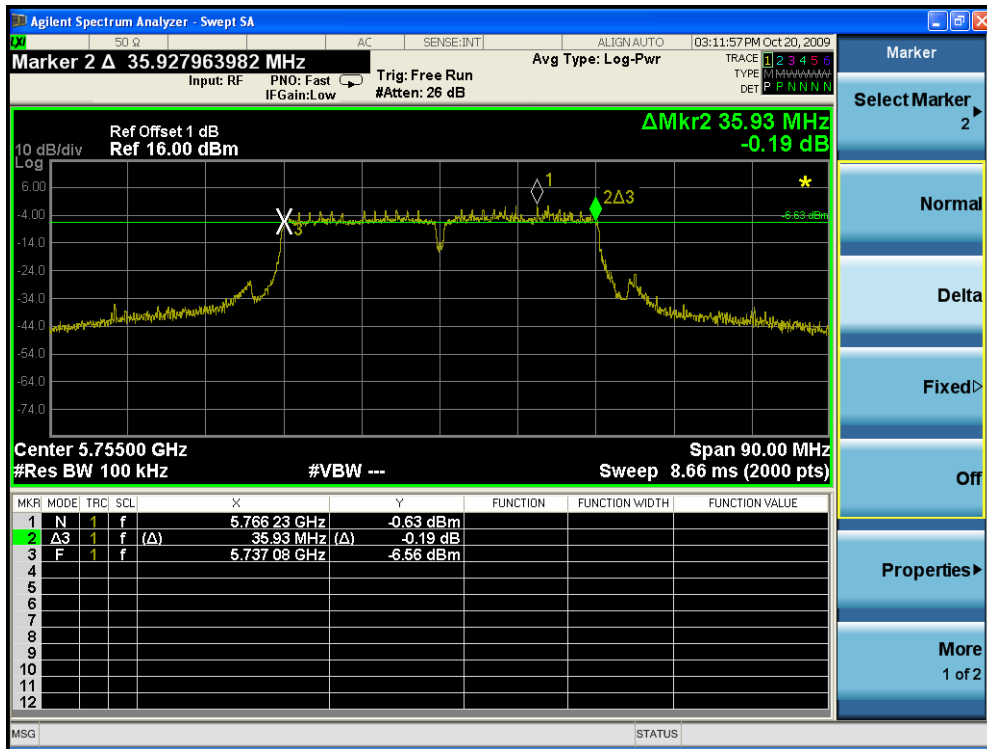
Channel 06 (2437MHz)



Channel 09 (2452MHz)



Channel 151 (5755MHz)



Channel 159 (5795MHz)



Product	: 802.11a/b/g/n WLAN Module
Test Item	: 6dB Occupied Bandwidth
Test Site	: AC-6
Test Mode	: Mode 1: Transmit by 802.11b (Chain 1)

Channel No.	Frequency (MHz)	Occupied Bandwidth (kHz)	Limit (kHz)	Result
01	2412	10180	500	Pass
06	2437	10155	500	Pass
11	2462	10155	500	Pass

### Channel 01 (2412MHz)



Channel 06 (2437MHz)



Channel 11 (2462MHz)

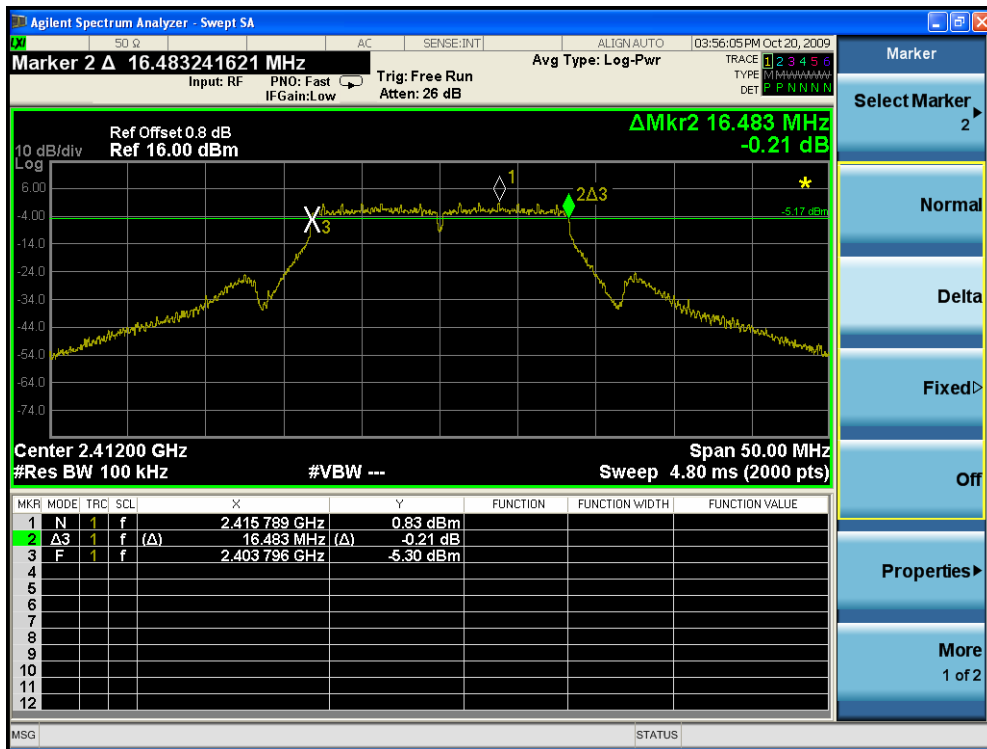




Product	: 802.11a/b/g/n WLAN Module
Test Item	: 6dB Occupied Bandwidth
Test Site	: AC-6
Test Mode	: Mode 2: Transmit by 802.11g (Chain 1)

Channel No.	Frequency (MHz)	Occupied Bandwidth (kHz)	Limit (kHz)	Result
01	2412	16483	500	Pass
06	2437	16458	500	Pass
11	2462	16483	500	Pass

### Channel 01 (2412MHz)



Channel 06 (2437MHz)



Channel 11 (2462MHz)



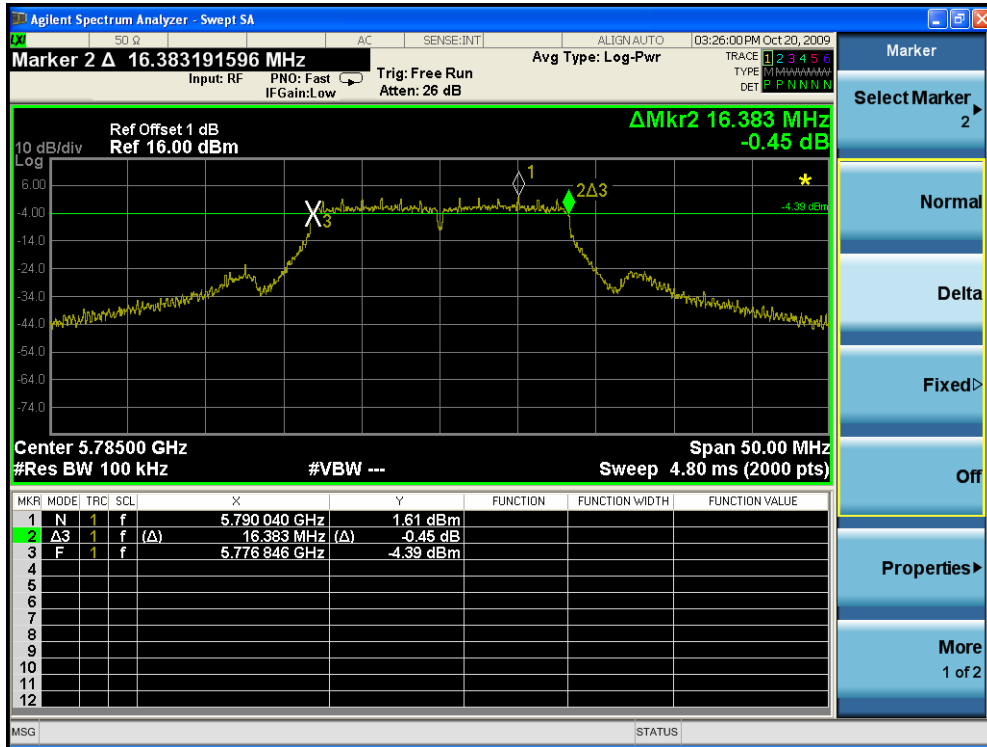
Product	: 802.11a/b/g/n WLAN Module
Test Item	: 6dB Occupied Bandwidth
Test Site	: AC-6
Test Mode	: Mode 3: Transmit by 802.11a (Chain 1)

Channel No.	Frequency (MHz)	Occupied Bandwidth (kHz)	Limit (kHz)	Result
149	5745	16408	500	Pass
157	5785	16383	500	Pass
165	5825	16408	500	Pass

### Channel 149 (5745MHz)



Channel 157 (5785MHz)



Channel 165 (5825MHz)



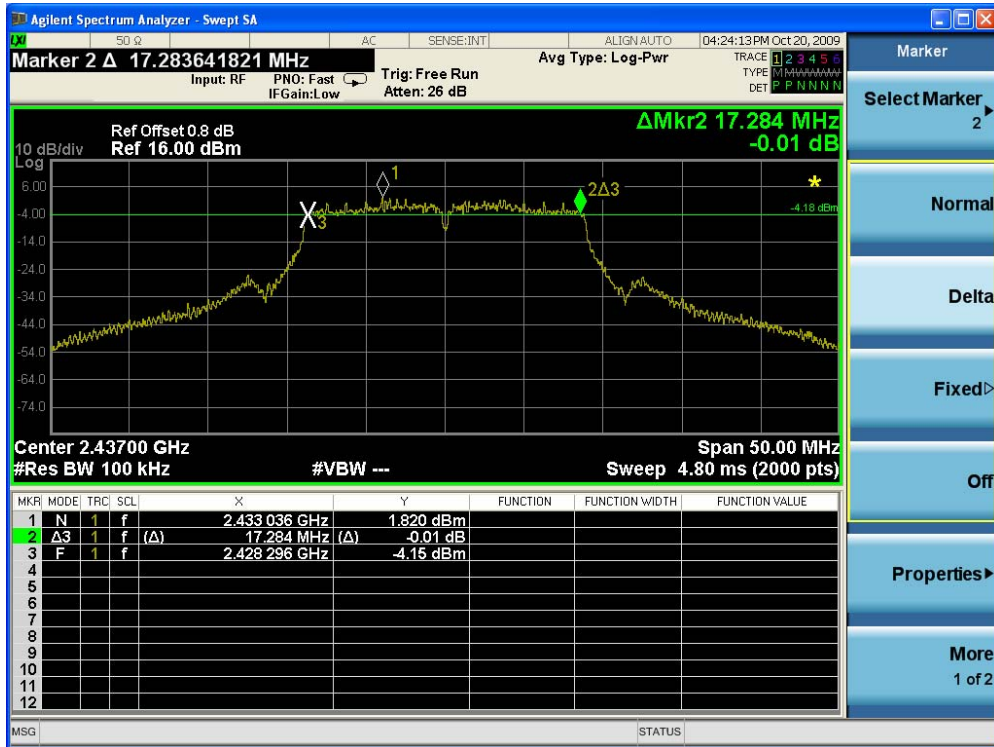
Product	: 802.11a/b/g/n WLAN Module
Test Item	: 6dB Occupied Bandwidth
Test Site	: AC-6
Test Mode	: Mode 4: Transmit by 802.11n (20MHz) (Chain 1)

Channel No.	Frequency (MHz)	Occupied Bandwidth (kHz)	Limit (kHz)	Result
01	2412	17284	500	Pass
06	2437	17284	500	Pass
11	2462	17484	500	Pass
149	5745	17459	500	Pass
157	5785	17259	500	Pass
165	5825	17459	500	Pass

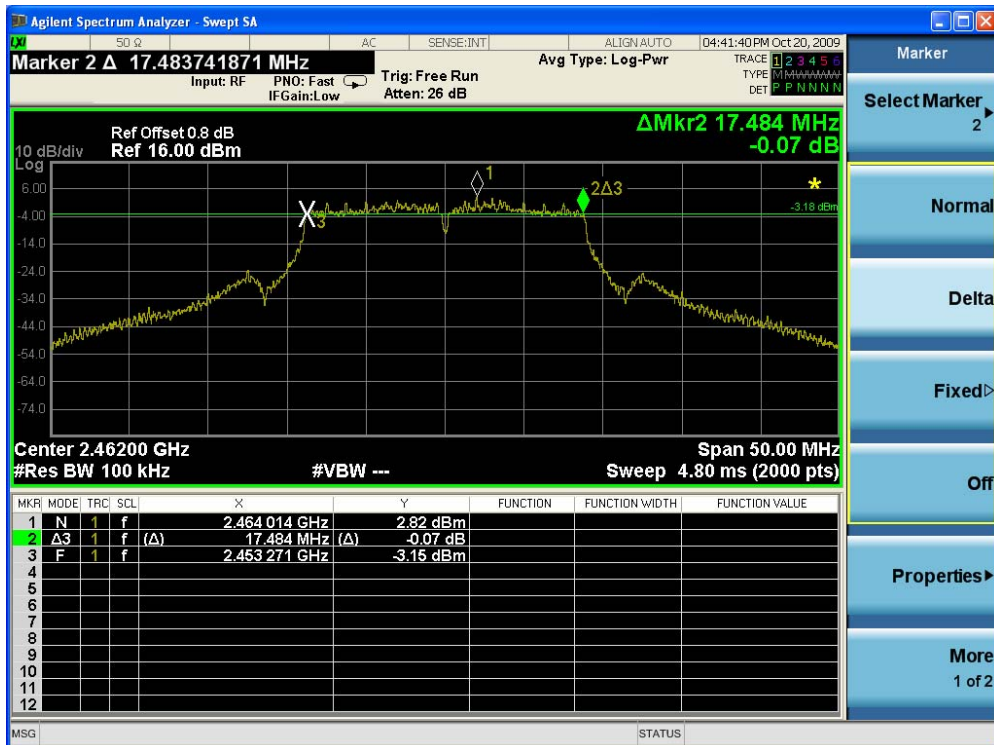
### Channel 01 (2412MHz)



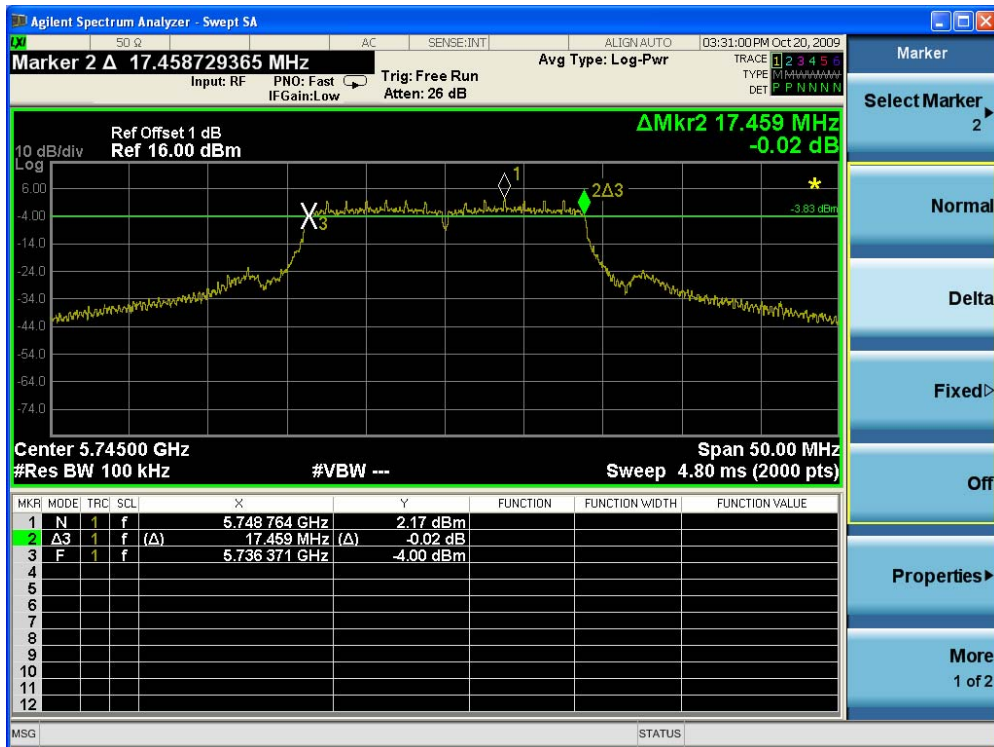
Channel 06 (2437MHz)



Channel 11 (2462MHz)



Channel 149 (5745MHz)



Channel 157 (5785MHz)



Channel 165 (5825MHz)





Product	: 802.11a/b/g/n WLAN Module
Test Item	: 6dB Occupied Bandwidth
Test Site	: AC-6
Test Mode	: Mode 5: Transmit by 802.11n (40MHz) (Chain 1)

Channel No.	Frequency (MHz)	Occupied Bandwidth (kHz)	Limit (kHz)	Result
03	2422	34805	500	Pass
06	2437	34980	500	Pass
09	2452	34980	500	Pass
151	5755	35880	500	Pass
159	5795	35880	500	Pass

### Channel 03 (2422MHz)



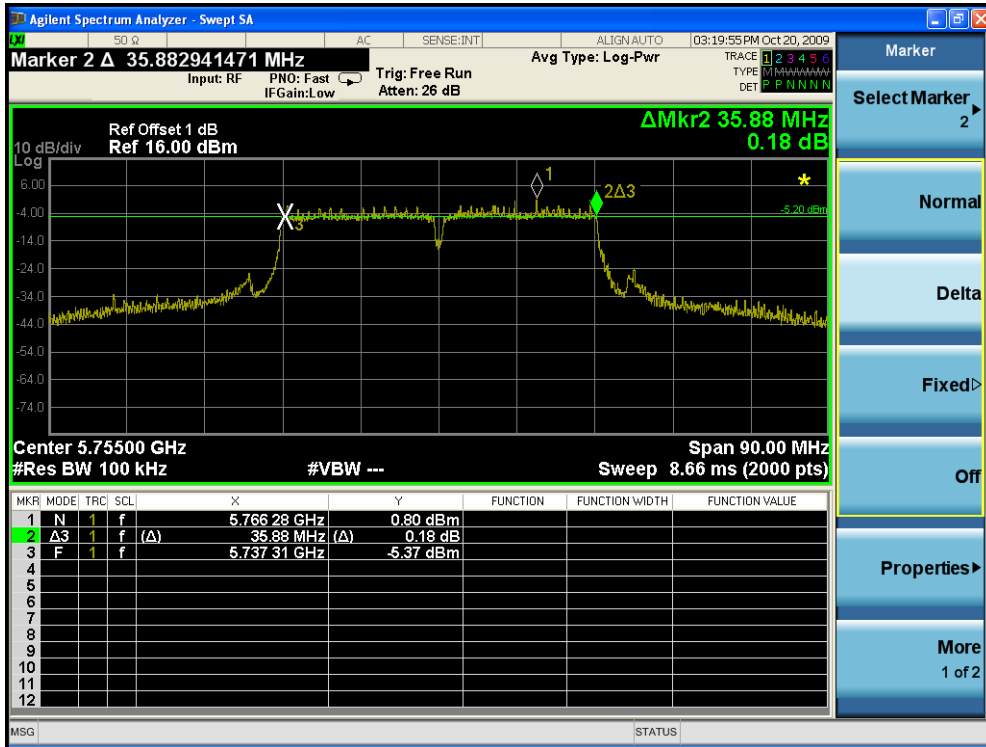
Channel 06 (2437MHz)



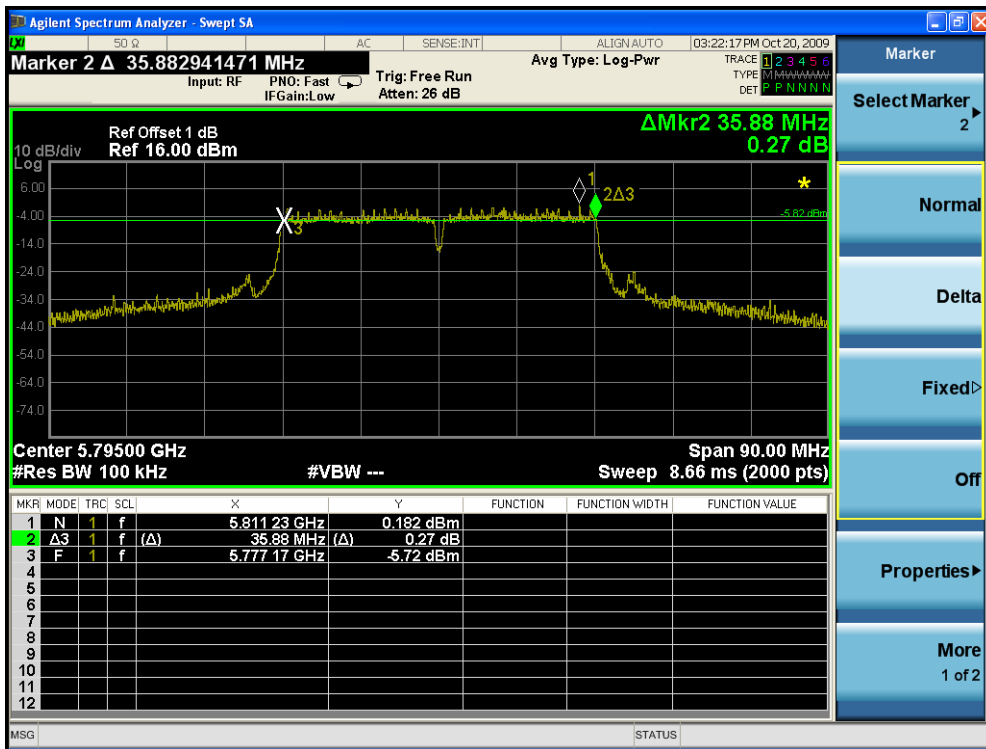
Channel 09 (2452MHz)



Channel 151 (5755MHz)



Channel 159 (5795MHz)



## 9. Power Output

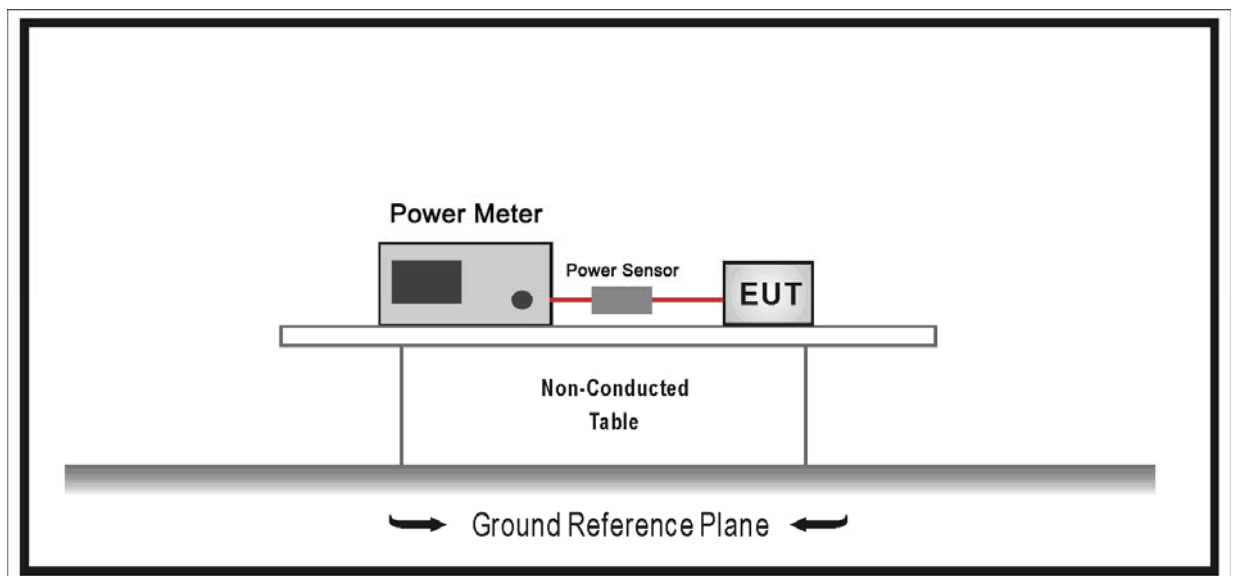
### 9.1. Test Equipment

Power Output / AC-6

Instrument	Manufacturer	Type No.	Serial No.	Cal. Date
Wideband Peak Power Meter	Anritsu	ML2495A	0905006	2009/02/12
Power Sensor	Anritsu	MA2411B	0846014	2009/01/12
Coaxial Cable	Huber+Suhner	AC4-RF	09	2008/11/25
Temperature/Humidity Meter	zhicheng	ZC1-2	QT-TH007	2009/03/09

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

### 9.2. Test Setup



### 9.3. Limit

The maximum peak power shall be less 1 Watt (30dBm).

Note: the conducted output power limit specified above is based on the use the antennas with directional gains that do not exceed 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values above, as appropriate, by the amount in dB that the directional gain of antenna exceeds 6 dBi.

#### **9.4. Test Procedure**

The EUT was tested according to DTS test procedure of Oct 2002 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

Use the wideband power meter to test peak power and record the result.

#### **9.5. Uncertainty**

The measurement uncertainty is defined as  $\pm 1.27$  dB

**9.6. Test Result**

Power output test was verified over all data rates of each mode shown as below, and then choose the maximum power output (blue marker) for final test of each channel.

MCS Index for 802.11n	Spatial Streams	Data Rate (Mbps)						
		802.11b	802.11g	802.11a	20MHz Bandwidth		40MHz Bandwidth	
					800ns GI	400ns GI	800ns GI	400ns GI
0	1	1	6	6	6.5	7.2	13.5	15.0
1	1	2	9	9	13.0	14.4	27.0	30.0
2	1	5.5	12	12	19.5	21.7	40.5	45.0
3	1	11	18	18	26.0	28.9	54.0	60.0
4	1	---	24	24	39.0	43.3	81.0	90.0
5	1	---	36	36	52.0	57.8	108.0	120.0
6	1	---	48	48	58.5	65.0	121.5	135.0
7	1	---	54	54	65.0	72.2	135.0	150.0
8	2	---	---	---	13.0	14.4	27.0	30.0
9	2	---	---	---	26.0	28.9	54.0	60.0
10	2	---	---	---	39.0	43.3	81.0	90.0
11	2	---	---	---	52.0	57.8	108.0	120.0
12	2	---	---	---	78.0	86.7	162.0	180.0
13	2	---	---	---	104.0	115.6	216.0	240.0
14	2	---	---	---	117.0	130.0	243.0	270.0
15	2	---	---	---	130.0	144.0	270.0	300.0

Power output at various data rates:

Test Mode	Chain	Bandwidth	Frequency (MHz)	Channel	Data Rate	Peak Power (dBm)
802.11b	0	20	2437	6	1	18.40
					5.5	18.32
					11	16.17
802.11b	1	20	2437	6	1	18.10
					5.5	18.02
					11	17.86
802.11g	0	20	2437	6	6	17.82
					24	17.73
					54	17.56
802.11g	1	20	2437	6	6	17.10
					24	17.01
					54	16.84
802.11a	0	20	5785	157	6	18.77
					24	18.64
					54	18.53
802.11a	1	20	5785	157	6	18.75
					24	18.67
					54	18.48
802.11n	0	20	2437	6	HT0	18.38
					HT4	18.19
					HT7	18.04
802.11n	1	20	2437	6	HT0	17.89
					HT4	17.81
					HT7	17.68
802.11n	0	40	2437	6	HT0	16.17
					HT4	16.11
					HT7	16.03
802.11n	1	40	2437	6	HT0	16.30
					HT4	16.21
					HT7	16.16

Product	: 802.11a/b/g/n WLAN Module
Test Item	: Power Output
Test Site	: AC-6
Test Mode	: Mode 1: Transmit by 802.11b (Chain 0)

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)		Total Power (dBm)	Limit (dBm)	Result
		Chain 0	Chain 1			
1	2412	18.16	N/A	18.16	30.00	Pass
6	2437	18.40	N/A	18.40	30.00	Pass
11	2462	18.62	N/A	18.62	30.00	Pass

Product	: 802.11a/b/g/n WLAN Module
Test Item	: Power Output
Test Site	: AC-6
Test Mode	: Mode 2: Transmit by 802.11g (Chain 0)

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)		Total Power (dBm)	Limit (dBm)	Result
		Chain 0	Chain 1			
1	2412	17.08	N/A	17.08	30.00	Pass
6	2437	17.82	N/A	17.82	30.00	Pass
11	2462	17.50	N/A	17.50	30.00	Pass

Product	: 802.11a/b/g/n WLAN Module
Test Item	: Power Output
Test Site	: AC-6
Test Mode	: Mode 3: Transmit by 802.11a (Chain 0)

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)		Total Power (dBm)	Limit (dBm)	Result
		Chain 0	Chain 1			
149	5745	18.99	N/A	18.99	30.00	Pass
157	5785	18.77	N/A	18.77	30.00	Pass
165	5825	19.20	N/A	19.20	30.00	Pass



Product	:	802.11a/b/g/n WLAN Module
Test Item	:	Power Output
Test Site	:	AC-6
Test Mode	:	Mode 4: Transmit by 802.11n(20MHz) (Chain 0)

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)		Total Power (dBm)	Limit (dBm)	Result
		Chain 0	Chain 1			
1	2412	18.08	N/A	18.08	30.00	Pass
6	2437	18.38	N/A	18.38	30.00	Pass
11	2462	18.46	N/A	18.46	30.00	Pass
149	5745	19.02	N/A	19.02	30.00	Pass
157	5785	18.87	N/A	18.87	30.00	Pass
165	5825	19.27	N/A	19.27	30.00	Pass

Product	:	802.11a/b/g/n WLAN Module
Test Item	:	Power Output
Test Site	:	AC-6
Test Mode	:	Mode 5: Transmit by 802.11n(40MHz) (Chain 0)

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)		Total Power (dBm)	Limit (dBm)	Result
		Chain 0	Chain 1			
3	2422	16.30	N/A	16.30	30.00	Pass
6	2437	16.17	N/A	16.17	30.00	Pass
9	2452	16.30	N/A	16.30	30.00	Pass
151	5755	16.81	N/A	16.81	30.00	Pass
159	5795	16.88	N/A	16.88	30.00	Pass

Product	: 802.11a/b/g/n WLAN Module
Test Item	: Power Output
Test Site	: AC-6
Test Mode	: Mode 1: Transmit by 802.11b (Chain 1)

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)		Total Power (dBm)	Limit (dBm)	Result
		Chain 0	Chain 1			
1	2412	N/A	18.48	18.48	30.00	Pass
6	2437	N/A	18.10	18.10	30.00	Pass
11	2462	N/A	18.30	18.30	30.00	Pass

Product	: 802.11a/b/g/n WLAN Module
Test Item	: Power Output
Test Site	: AC-6
Test Mode	: Mode 2: Transmit by 802.11g (Chain 1)

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)		Total Power (dBm)	Limit (dBm)	Result
		Chain 0	Chain 1			
1	2412	N/A	17.00	17.00	30.00	Pass
6	2437	N/A	17.10	17.10	30.00	Pass
11	2462	N/A	16.98	16.98	30.00	Pass

Product	: 802.11a/b/g/n WLAN Module
Test Item	: Power Output
Test Site	: AC-6
Test Mode	: Mode 3: Transmit by 802.11a (Chain 1)

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)		Total Power (dBm)	Limit (dBm)	Result
		Chain 0	Chain 1			
149	5745	N/A	18.97	18.97	30.00	Pass
157	5785	N/A	18.75	18.75	30.00	Pass
165	5825	N/A	19.14	19.14	30.00	Pass

Product	:	802.11a/b/g/n WLAN Module
Test Item	:	Power Output
Test Site	:	AC-6
Test Mode	:	Mode 4: Transmit by 802.11n(20MHz) (Chain 1)

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)		Total Power (dBm)	Limit (dBm)	Result
		Chain 0	Chain 1			
1	2412	N/A	17.95	17.95	30.00	Pass
6	2437	N/A	17.89	17.89	30.00	Pass
11	2462	N/A	17.90	17.90	30.00	Pass
149	5745	N/A	18.92	18.92	30.00	Pass
157	5785	N/A	18.88	18.88	30.00	Pass
165	5825	N/A	19.17	19.17	30.00	Pass

Product	:	802.11a/b/g/n WLAN Module
Test Item	:	Power Output
Test Site	:	AC-6
Test Mode	:	Mode 5: Transmit by 802.11n(40MHz) (Chain 1)

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)		Total Power (dBm)	Limit (dBm)	Result
		Chain 0	Chain 1			
3	2422	N/A	16.72	16.72	30.00	Pass
6	2437	N/A	16.30	16.30	30.00	Pass
9	2452	N/A	16.41	16.41	30.00	Pass
151	5755	N/A	17.10	17.10	30.00	Pass
159	5795	N/A	17.02	17.02	30.00	Pass

Product	:	802.11a/b/g/n WLAN Module
Test Item	:	Power Output
Test Site	:	AC-6
Test Mode	:	Mode 4: Transmit by 802.11n(20MHz) (Chain 0+1)

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)		Total Power (dBm)	Limit (dBm)	Result
		Chain 0	Chain 1			
1	2412	16.09	16.00	19.06	30.00	Pass
6	2437	16.12	15.62	18.89	30.00	Pass
11	2462	16.58	15.89	<b>19.26</b>	30.00	Pass
149	5745	19.30	18.39	21.88	30.00	Pass
157	5785	19.19	18.88	22.05	30.00	Pass
165	5825	19.43	19.03	<b>22.24</b>	30.00	Pass

Product	:	802.11a/b/g/n WLAN Module
Test Item	:	Power Output
Test Site	:	AC-6
Test Mode	:	Mode 5: Transmit by 802.11n(40MHz) (Chain 0+1)

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)		Total Power (dBm)	Limit (dBm)	Result
		Chain 0	Chain 1			
3	2422	16.18	16.50	19.35	30.00	Pass
6	2437	15.78	16.12	18.96	30.00	Pass
9	2452	16.31	16.82	<b>19.58</b>	30.00	Pass
151	5755	17.89	17.87	20.89	30.00	Pass
159	5795	18.00	18.13	<b>21.08</b>	30.00	Pass

## 10. Power Spectral Density

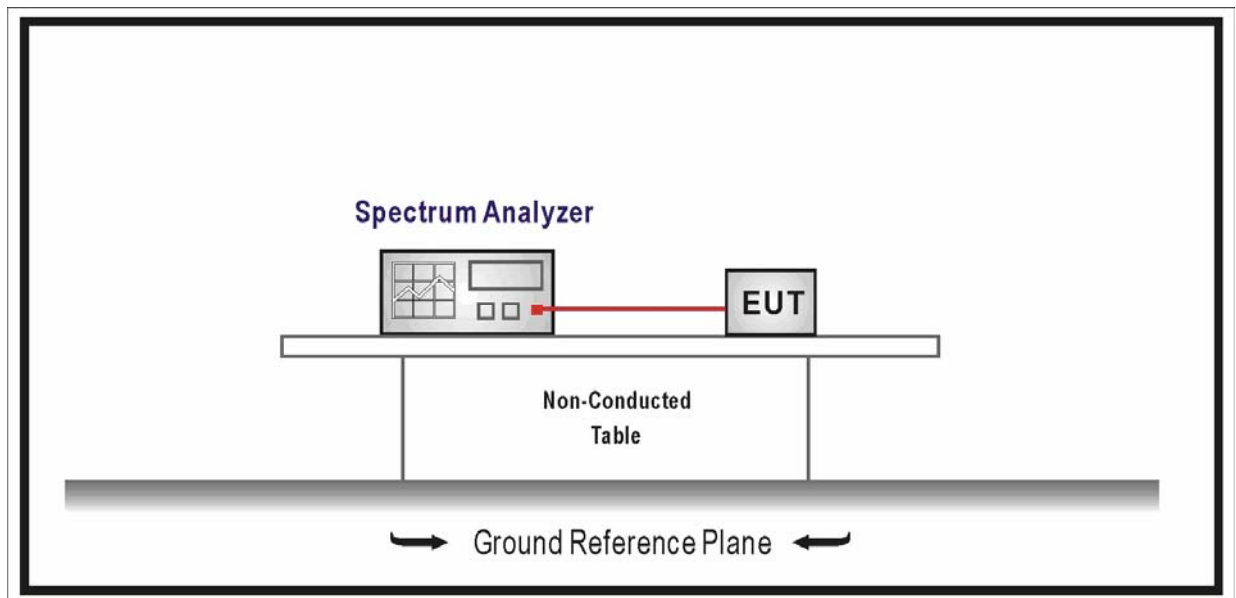
### 10.1. Test Equipment

Power Spectral Density / AC-6

Instrument	Manufacturer	Type No.	Serial No.	Cal. Date
Spectrum Analyzer	Agilent	N9020A	MY49100159	2009/05/06
Coaxial Cable	Huber+Suhner	AC4-RF	09	2008/11/25
Temperature/Humidity Meter	zhicheng	ZC1-2	QT-TH007	2009/03/30

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

### 10.2. Test Setup



### 10.3. Limit

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

#### **10.4. Test Procedure**

The EUT was tested according to DTS test procedure of Oct 2002 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

Set RBW= 3 kHz, Set VBW  $\cong$  10 kHz, Sweep time=100s, Set detector=Peak detector.

#### **10.5. Uncertainty**

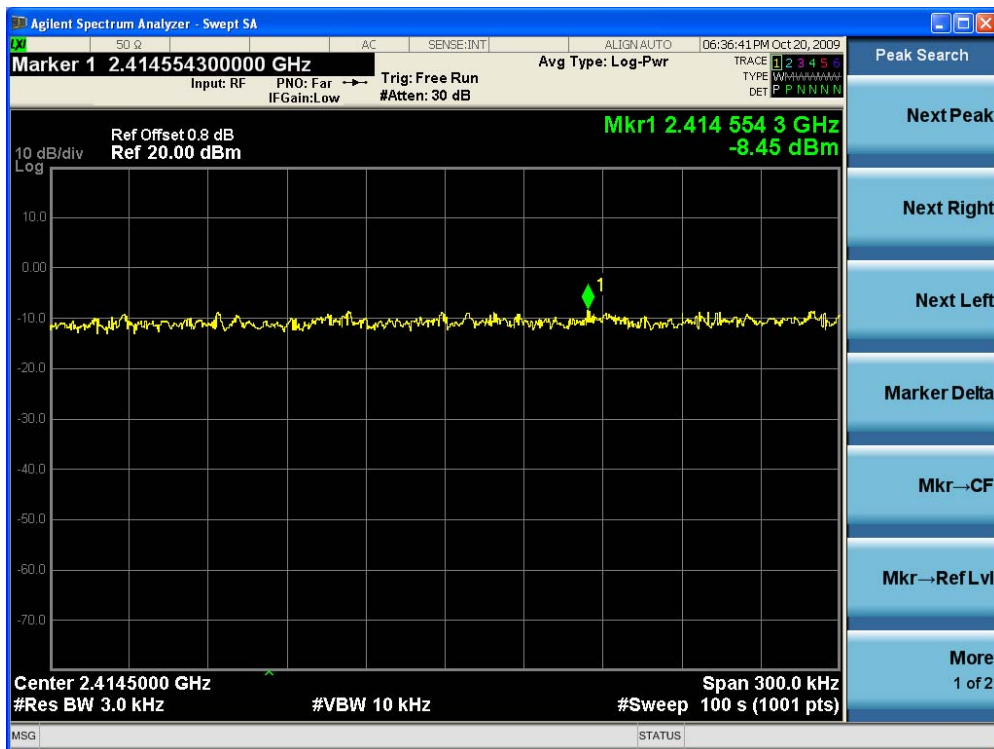
The measurement uncertainty is defined as  $\pm 1.27$  dB

10.6. Test Result

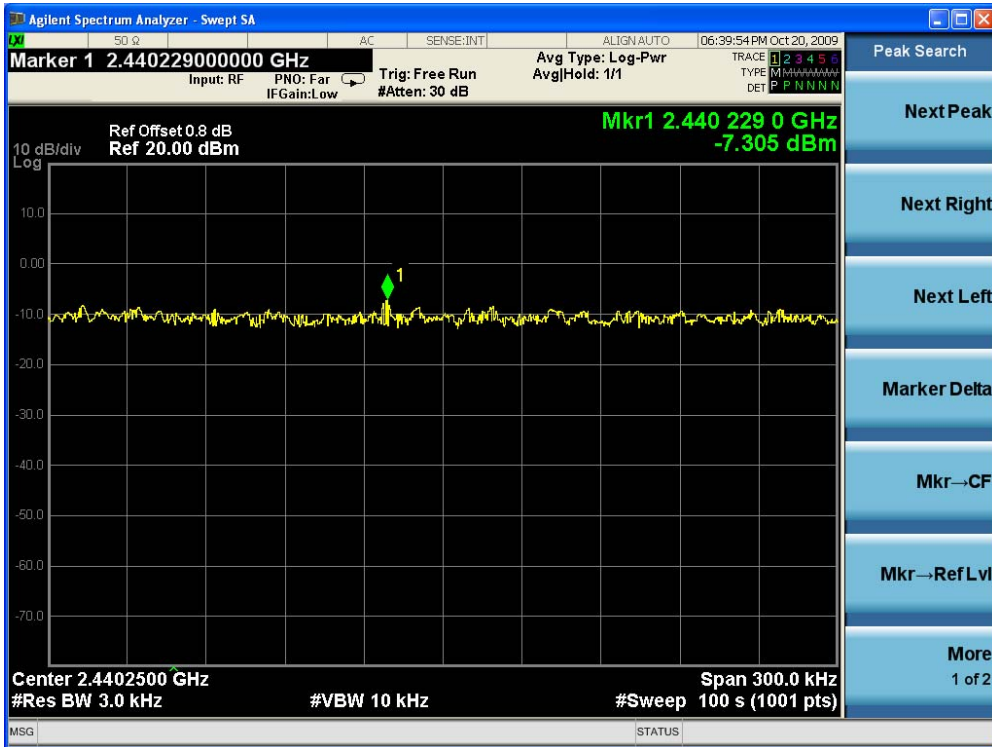
Product	:	802.11a/b/g/n WLAN Module
Test Item	:	Power Spectral Density
Test Site	:	AC-6
Test Mode	:	Mode 1: Transmit by 802.11b (Chain 0)

Channel No.	Frequency (MHz)	Measurement PPSD (dBm)		Total PPSD (dBm)	Limit (dBm)	Result
		Chain 0	Chain 1			
01	2412	-8.45	N/A	-8.45	8	Pass
06	2437	-7.30	N/A	-7.30	8	Pass
11	2462	-8.38	N/A	-8.38	8	Pass

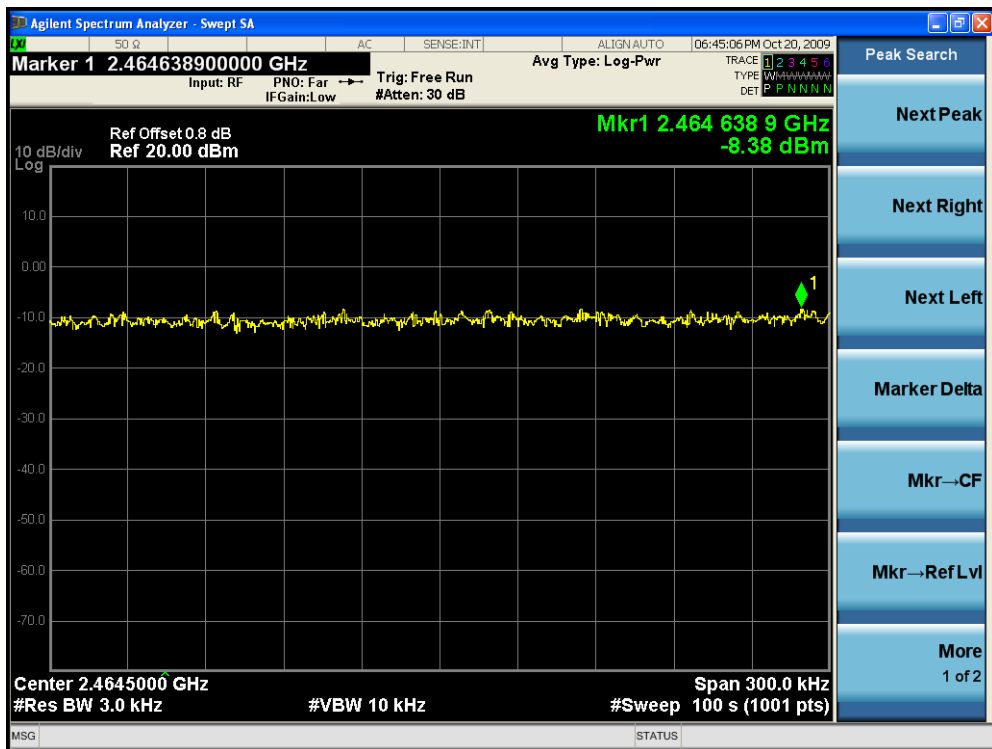
Channel 01 (2412MHz)



Channel 06 (2437MHz)



Channel 11 (2462MHz)

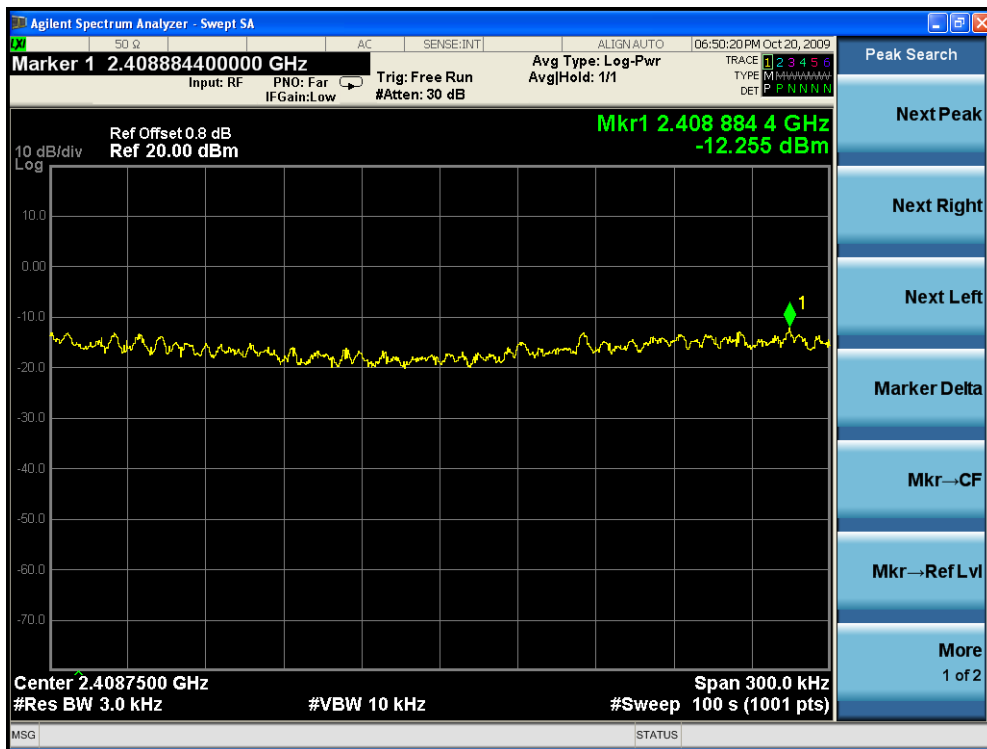




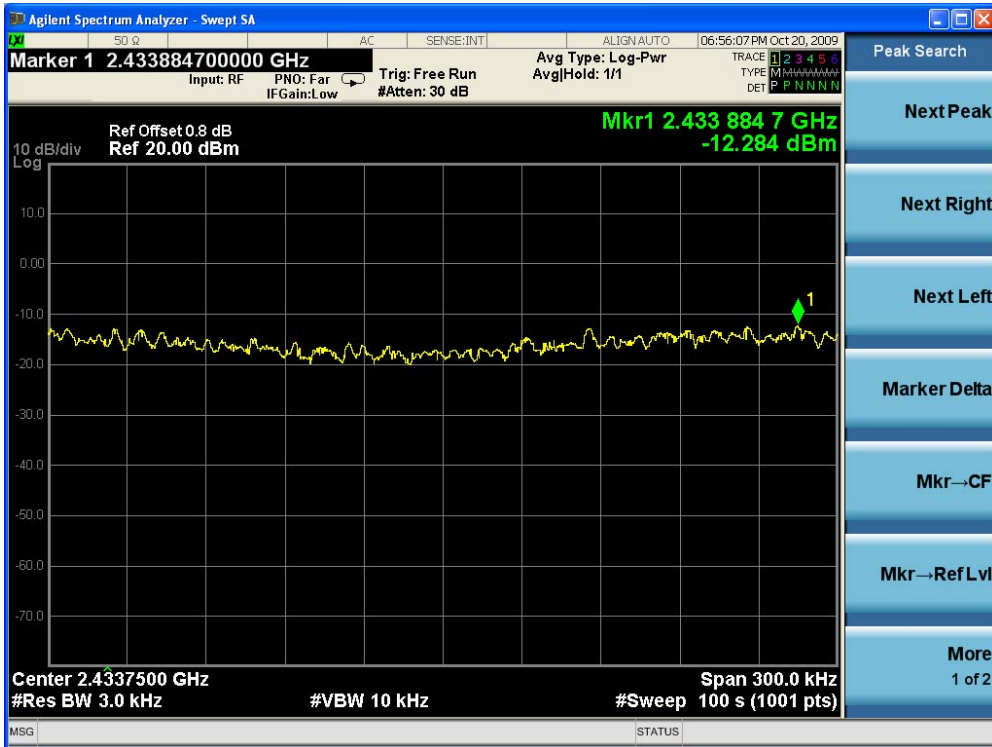
Product	:	802.11a/b/g/n WLAN Module
Test Item	:	Power Spectral Density
Test Site	:	AC-6
Test Mode	:	Mode 2: Transmit by 802.11g (Chain 0)

Channel No.	Frequency (MHz)	Measurement PPSD (dBm)		Total PPSD (dBm)	Limit (dBm)	Result
		Chain 0	Chain 1			
01	2412	-12.25	N/A	-12.25	8	Pass
06	2437	-12.28	N/A	-12.28	8	Pass
11	2462	-11.58	N/A	-11.58	8	Pass

### Channel 01 (2412MHz)



Channel 06 (2437MHz)



Channel 11 (2462MHz)



Product	:	802.11a/b/g/n WLAN Module
Test Item	:	Power Spectral Density
Test Site	:	AC-6
Test Mode	:	Mode 3: Transmit by 802.11a (Chain 0)

Channel No.	Frequency (MHz)	Measurement PPSD (dBm)		Total PPSD (dBm)	Limit (dBm)	Result
		Chain 0	Chain 1			
149	5745	-11.73	N/A	-11.73	8	Pass
157	5785	-12.07	N/A	-12.07	8	Pass
165	5825	-11.58	N/A	-11.58	8	Pass

### Channel 149 (5745MHz)

