

**Test Report No. 7191024569-EEC12/01**  
dated 01 Feb 2012



PSB Singapore

**Note:** This report is issued subject to the Testing and Certification Regulations of the TÜV SÜD Group and the General Terms and Conditions of Business of TÜV SÜD PSB Pte Ltd. In addition, this report is governed by the terms set out within this report.

FORMAL REPORT ON TESTING IN ACCORDANCE WITH  
47 CFR FCC Parts 15B & C : 2011  
OF A  
**COMPACT STEREO SYSTEM**  
[ Model : SC-AP01 ]  
[ FCC ID : ACJ-11GR1202 ]

Choose certainty.  
Add value.

**TEST FACILITY** TÜV SÜD PSB Pte Ltd,  
Electrical & Electronics Centre (EEC), Product Services,  
No. 1 Science Park Drive, Singapore 118221

TÜV SÜD PSB Pte Ltd,  
Electrical & Electronics Centre (EEC), Product Services,  
13 International Business Park #01-01, Singapore 609932

**FCC REG. NO.** 99142 (3m and 10m Semi-Anechoic Chamber, Science Park)  
160581 (3m and 10m Semi-Anechoic Chamber, International Business Park)

**IND. CANADA REG. NO.** 2932I-1 (3m and 10m Semi-Anechoic Chamber, Science Park)  
2932N-1 (10m Semi-Anechoic Chamber, International Business Park)

**PREPARED FOR** Panasonic AVC Networks (S) Pte Ltd  
202, Bedok South Avenue 1,  
Singapore 469332

Tel : +65 6240 1891 Fax : +65 6245 8804

**QUOTATION NUMBER** 219143816

**JOB NUMBER** 7191024569

**TEST PERIOD** 12 Jan 2012 – 19 Jan 2012

**PREPARED BY**

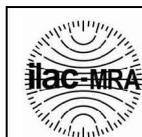
**APPROVED BY**

Quek Keng Huat  
Associate Engineer

Lim Cher Hwee  
Assistant Vice President



Laboratory:  
TÜV SÜD PSB Pte. Ltd.  
No.1 Science Park Drive  
Singapore 118221



LA-2007-0380-A  
LA-2007-0381-F  
LA-2007-0382-B  
LA-2007-0383-G  
LA-2007-0384-G  
LA-2007-0385-E  
LA-2007-0386-C  
LA-2010-0464-D

The results reported herein have been performed in accordance with the laboratory's terms of accreditation under the Singapore Accreditation Council - Singapore Laboratory Accreditation Scheme. Tests/Calibrations marked "Not SAC-SINGLAS Accredited" in this Report are not included in the SAC-SINGLAS Accreditation Schedule for our laboratory.

Phone : +65-6885 1333  
Fax : +65-6776 8670  
E-mail: testing@tuv-sud-psb.sg  
www.tuv-sud-psb.sg  
Co. Reg : 199002667R

Regional Head Office:  
TÜV SÜD Asia Pacific Pte. Ltd.  
3 Science Park Drive, #04-01/05  
The Franklin, Singapore 118223  
**TUV®**



**TABLE OF CONTENTS**

TEST SUMMARY .....	3
PRODUCT DESCRIPTION .....	5
SUPPORTING EQUIPMENT DESCRIPTION.....	6
EUT OPERATING CONDITIONS.....	7
CONDUCTED EMISSION TEST .....	8
RADIATED EMISSION TEST.....	13
SPECTRUM BANDWIDTH (6dB BANDWIDTH MEASUREMENT) TEST .....	20
MAXIMUM PEAK POWER TEST .....	47
RF CONDUCTED SPURIOUS EMISSIONS TEST .....	50
BAND EDGE COMPLIANCE (CONDUCTED) TEST.....	94
BAND EDGE COMPLIANCE (RADIATED) TEST .....	112
PEAK POWER SPECTRAL DENSITY TEST.....	119
ANNEX A EUT PHOTOGRAPHS / DIAGRAMS .....	148
ANNEX B USER MANUAL TECHNICAL DESCRIPTION BLOCK & CIRCUIT DIAGRAMS.....	149
ANNEX C FCC LABEL & POSITION.....	150



**TEST SUMMARY**

The product was tested in accordance with the customer's specifications.

**Test Results Summary**

Test Standard	Description	Pass / Fail
47 CFR FCC Part 15: 2011		
15.107(a), 15.207	Conducted Emissions	Pass
15.109(a), 15.205, 15.209	Radiated Emissions (Spurious Emissions inclusive Restricted Bands Requirement)	Pass
15.247(a)(2)	Spectrum Bandwidth (6dB Bandwidth Measurement)	Pass
15.247(b)(3)	Maximum Peak Power	Pass
15.247(d)	RF Conducted Spurious Emissions	Pass
15.247(d)	Band Edge Compliance (Conducted)	Pass
15.247(d)	Band Edge Compliance (Radiated)	Pass
15.247(e)	Peak Power Spectral Density	Pass
1.1310	Maximum Permissible Exposure	Pass
15.35(c)	Duty Cycle Factor Computation	Refer to Note 6

**TEST SUMMARY**

**Notes**

1. The channels as listed below, under the different configurations were tested for Wi-Fi 802.11b.

Transmit Channel	Frequency (GHz)	Modulation	Data Rate
Channel 1	2.412	DBPSK	1Mbps
Channel 6	2.437	DBPSK	1Mbps
Channel 11	2.462	DBPSK	1Mbps
Channel 1	2.412	DQPSK	2Mbps
Channel 6	2.437	DQPSK	2Mbps
Channel 11	2.462	DQPSK	2Mbps
Channel 1	2.412	CCK	11Mbps
Channel 6	2.437	CCK	11Mbps
Channel 11	2.462	CCK	11Mbps

2. The channels as listed below, under the different configurations were tested for Wi-Fi 802.11g.

Transmit Channel	Frequency (GHz)	Modulation	Data Rate
Channel 1	2.412	BPSK	9Mbps
Channel 6	2.437	BPSK	9Mbps
Channel 11	2.462	BPSK	9Mbps
Channel 1	2.412	QPSK	18Mbps
Channel 6	2.437	QPSK	18Mbps
Channel 11	2.462	QPSK	18Mbps
Channel 1	2.412	16QAM	36Mbps
Channel 6	2.437	16QAM	36Mbps
Channel 11	2.462	16QAM	36Mbps
Channel 1	2.412	64QAM	54Mbps
Channel 6	2.437	64QAM	54Mbps
Channel 11	2.462	64QAM	54Mbps

2. All the measurements in section 15.247 were done based on conducted measurements except Band Edge Compliance (Radiated).
3. The Equipment Under Test (EUT) is a Class B device when in non-transmitting state and meets the 47 CFR FCC Part15B Class B requirements.
4. All test measurement procedures are according to ANSI C63.4: 2003.
5. The maximum measured RF power of the Equipment Under Test is 10.53dBm.
6. The Equipment Under Test (EUT) was configured to do a continuous transmission, ie 0 uty cycle.

**Modifications**

No modifications were made.



**PRODUCT DESCRIPTION**

Description : The Equipment Under Test (EUT) is a **Compact Stereo System**.

Manufacturer : Panasonic Corporation  
1-15 Matsuo-cho, Kadoma-shi, Osaka 571-8504,  
Japan

Model Number : SC-AP01

FCC ID : ACJ-11GR1202

Serial Number : Nil

Microprocessor : BridgeCo DM870 AirPlay module

Operating / Transmitting Frequency : Wi-Fi 2.412MHz (lower channel) to 2.462MHz (upper channel)  
11 channels in total

Clock / Oscillator Frequency : 24MHz

Modulation : 802.11b WLAN DBPSK @ 1Mbps  
DQPSK @ 2Mbps  
CCK @ 5.5Mbps  
CCK @ 11Mbps

802.11g WLAN BPSK @ 9Mbps  
QPSK @ 18Mbps  
16QAM @ 36Mbps  
64QAM @ 54Mbps

Antenna Gain : 0.35dBi

Port / Connectors : Refer to manufacturer's user manual / operating manual.

Rated Input Power : 120V 60Hz, 3A

Accessories : 1 x AC power supply cord



**SUPPORTING EQUIPMENT DESCRIPTION**

<b>Equipment Description (Including Brand Name)</b>	<b>Model, Serial &amp; FCC ID Number</b>	<b>Cable Description (List Length, Type &amp; Purpose)</b>
Apple iPOD	M/N: A1367 S/N: C3LDDCGSDCP7 FCC ID: DoC	Nil



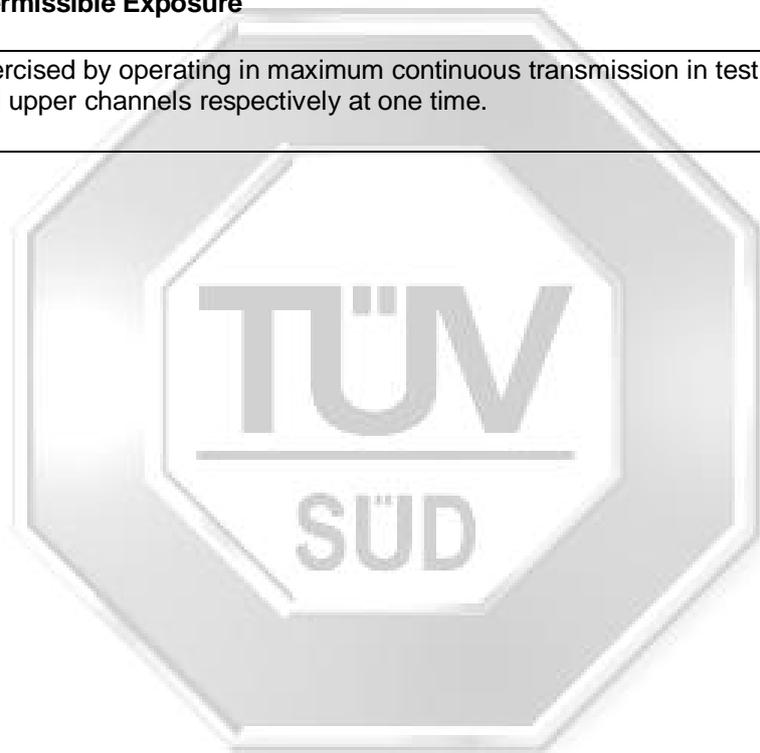


**EUT OPERATING CONDITIONS**

**47 CFR FCC Part 15**

1. **Conducted Emissions**
2. **Radiated Emissions (Spurious Emissions inclusive Restricted Bands Requirement)**
3. **Spectrum Bandwidth (6dB Bandwidth Measurement)**
4. **Maximum Peak Power**
5. **RF Conducted Spurious Emissions**
6. **Band Edge Compliance (Conducted)**
7. **Band Edge Compliance (Radiated)**
8. **Peak Power Spectral Density**
9. **Maximum Permissible Exposure**

The EUT was exercised by operating in maximum continuous transmission in test mode, i.e transmitting at lower, middle and upper channels respectively at one time.





**CONDUCTED EMISSION TEST**

**47 CFR FCC Parts 15.107(a) and 15.207 Conducted Emission Limits**

Frequency Range (MHz)	Limit Values (dBµV)	
	Quasi-peak (Q-P)	Average (AV)
0.15 - 0.5	66 – 56 *	56 – 46 *
0.5 - 5.0	56	46
5.0 - 30.0	60	50

\* Decreasing linearly with the logarithm of the frequency

**47 CFR FCC Parts 15.107(a) and 15.207 Conducted Emission Test Instrumentation**

Instrument	Model	S/No	Cal Due Date
Schaffner EMI Receiver	SMR4503	040	10 Jun 2012
Agilent EMC Analyzer-SA7	E7403A	US41160167	27 May 2012
Schaffner LISN –LISN7 (Ref)	NNB42	00008	16 Jun 2012
Britz-Link AC Power Adapter	Nil	Nil	04 Nov 2012





**CONDUCTED EMISSION TEST**

**47 CFR FCC Parts 15.107(a) and 15.207 Conducted Emission Test Setup**

1. The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table.
2. The power supply for the EUT was fed through a 50Ω/50μH EUT LISN, connected to filtered mains.
3. The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable.
4. All other supporting equipment were powered separately from another LISN.

**47 CFR FCC Parts 15.107(a) and 15.207 Conducted Emission Test Method**

1. The EUT was switched on and allowed to warm up to its normal operating condition.
2. A scan was made on the NEUTRAL line over the required frequency range using an EMI test receiver.
3. High peaks, relative to the limit line, were then selected.
4. The EMI test receiver was then tuned to the selected frequencies and the necessary measurements made with a receiver bandwidth setting of 9kHz. Both Quasi-peak and Average measurements were made.
5. Steps 2 to 4 were then repeated for the LIVE line.

**Sample Calculation Example**

At 20 MHz	Q-P limit (Class B) = 1000 μV = 60.0 dBμV
Transducer factor of LISN, pulse limiter & cable loss at 20 MHz = 11.2 dB	
Q-P reading obtained directly from EMI Receiver = 40.0 dBμV (Calibrated for system losses)	
Therefore, Q-P margin = 40.0 - 60.0 = -20.0	i.e. 20.0 dB below Q-P limit



**CONDUCTED EMISSION TEST**

**47 CFR FCC Parts 15.107(a) and 15.207 Conducted Emission Results**

Test Input Power	120V 60Hz	Temperature	19°C
Line Under Test	AC Mains	Relative Humidity	56%
Test Mode	Standby with iPod Charging	Atmospheric Pressure	1030mbar
		Tested By	Tan Keng Xin

Frequency (MHz)	Q-P Value (dBµV)	Q-P Limit (dBµV)	Q-P Margin (dB)	AV Value (dBµV)	AV Limit (dBµV)	AV Margin (dB)	Line
0.1598	40.3	65.5	25.2	21.4	55.5	34.2	Neutral
0.2115	34.2	63.1	28.9	19.9	53.1	33.2	Live
0.4997	37.0	56.0	19.0	23.9	46.0	22.1	Live
0.5089	36.3	56.0	19.7	24.0	46.0	22.0	Neutral
0.9479	26.7	56.0	29.3	18.7	46.0	27.3	Live
15.1973	32.5	60.0	27.5	24.7	50.0	25.3	Neutral

**Notes**

- All possible modes of operation were investigated from 150kHz to 30MHz. Only the worst case emissions measured, using the correct CISPR detectors, are reported. All other emissions were relatively insignificant.
- A "positive" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency. Conversely, a "negative" margin indicates a FAIL.
- EMI receiver Resolution Bandwidth (RBW) and Video Bandwidth (VBW) settings:  
9kHz - 30MHz  
RBW: 9kHz                      VBW: 30kHz
- Conducted Emissions Measurement Uncertainty  
All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95%, with a coverage factor of 2, in the range 9kHz – 30MHz is ±2.2dB.



**CONDUCTED EMISSION TEST**

**47 CFR FCC Parts 15.107(a) and 15.207 Conducted Emission Results**

Test Input Power	120V 60Hz	Temperature	19°C
Line Under Test	AC Mains	Relative Humidity	56%
Antenna	1 (external)	Atmospheric Pressure	1030mbar
Test Mode	802.11b 11Mbps (worst mode)	Tested By	Tan Keng Xin

Frequency (MHz)	Q-P Value (dBµV)	Q-P Limit (dBµV)	Q-P Margin (dB)	AV Value (dBµV)	AV Limit (dBµV)	AV Margin (dB)	Line	Channel
0.1500	41.3	66.0	24.7	24.8	56.0	31.2	Live	1
0.2653	29.3	61.3	32.0	14.9	51.3	36.4	Neutral	1
0.4992	38.4	56.0	17.3	27.0	46.0	19.0	Neutral	1
0.8891	26.4	56.0	29.6	19.5	46.0	26.5	Live	1
1.7968	24.3	56.0	31.8	13.0	46.0	33.0	Live	1
15.7670	33.2	60.0	26.8	26.2	50.0	23.8	Neutral	1

Test Input Power	120V 60Hz	Temperature	19°C
Line Under Test	AC Mains	Relative Humidity	56%
Antenna	1 (external)	Atmospheric Pressure	1030mbar
Test Mode	802.11g 54Mbps (worst mode)	Tested By	Tan Keng Xin

Frequency (MHz)	Q-P Value (dBµV)	Q-P Limit (dBµV)	Q-P Margin (dB)	AV Value (dBµV)	AV Limit (dBµV)	AV Margin (dB)	Line	Channel
0.1521	40.9	65.9	25.0	24.5	55.9	31.4	Live	1
0.2665	29.1	61.2	32.1	14.9	51.2	36.3	Neutral	1
0.4981	37.9	56.0	18.2	26.5	46.0	19.5	Neutral	1
0.7668	24.2	56.0	31.9	15.9	46.0	30.1	Neutral	1
0.8894	26.5	56.0	29.5	18.8	46.0	27.2	Live	1
1.7271	24.2	56.0	31.8	13.1	46.0	32.9	Live	1

**Notes**

- All possible modes of operation were investigated from 150kHz to 30MHz. Only the worst case emissions measured, using the correct CISPR detectors, are reported. All other emissions were relatively insignificant.
- A "positive" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency. Conversely, a "negative" margin indicates a FAIL.
- EMI receiver Resolution Bandwidth (RBW) and Video Bandwidth (VBW) settings:  
9kHz - 30MHz  
RBW: 9kHz      VBW: 30kHz
- Conducted Emissions Measurement Uncertainty**  
All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95%, with a coverage factor of 2, in the range 9kHz – 30MHz is ±2.2dB.



**CONDUCTED EMISSION TEST**

**47 CFR FCC Parts 15.107(a) and 15.207 Conducted Emission Results**

Test Input Power	120V 60Hz	Temperature	19°C
Line Under Test	AC Mains	Relative Humidity	56%
Antenna	2 (internal)	Atmospheric Pressure	1030mbar
Test Mode	802.11b 11Mbps (worst mode)	Tested By	Tan Keng Xin

Frequency (MHz)	Q-P Value (dBµV)	Q-P Limit (dBµV)	Q-P Margin (dB)	AV Value (dBµV)	AV Limit (dBµV)	AV Margin (dB)	Line	Channel
0.1519	41.1	65.9	24.8	24.3	55.9	31.6	Live	1
0.2107	34.1	63.2	29.1	18.6	53.2	34.6	Neutral	1
0.3355	23.9	59.3	35.4	14.5	49.3	34.8	Neutral	1
0.4982	38.3	56.0	17.7	27.2	46.0	18.8	Neutral	1
0.9517	26.3	56.0	29.7	18.1	46.0	27.9	Neutral	1
1.0114	24.5	56.0	31.5	17.7	46.0	28.3	Live	1

Test Input Power	120V 60Hz	Temperature	19°C
Line Under Test	AC Mains	Relative Humidity	56%
Antenna	2 (internal)	Atmospheric Pressure	1030mbar
Test Mode	802.11g 54Mbps (worst mode)	Tested By	Tan Keng Xin

Frequency (MHz)	Q-P Value (dBµV)	Q-P Limit (dBµV)	Q-P Margin (dB)	AV Value (dBµV)	AV Limit (dBµV)	AV Margin (dB)	Line	Channel
0.1518	40.9	65.9	25.0	24.9	55.9	31.0	Neutral	1
0.2276	33.4	62.5	29.1	19.1	52.5	33.4	Neutral	1
0.4980	37.7	56.0	18.3	25.8	46.0	20.2	Live	1
0.7818	21.2	56.0	34.8	9.9	46.0	36.1	Neutral	1
0.8855	24.8	56.0	31.2	15.1	46.0	30.9	Live	1
1.9748	21.9	56.0	34.1	10.6	46.0	35.4	Live	1

**Notes**

- All possible modes of operation were investigated from 150kHz to 30MHz. Only the worst case emissions measured, using the correct CISPR detectors, are reported. All other emissions were relatively insignificant.
- A "positive" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency. Conversely, a "negative" margin indicates a FAIL.
- EMI receiver Resolution Bandwidth (RBW) and Video Bandwidth (VBW) settings:  
9kHz - 30MHz  
RBW: 9kHz      VBW: 30kHz
- Conducted Emissions Measurement Uncertainty  
All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95%, with a coverage factor of 2, in the range 9kHz – 30MHz is ±2.2dB.



**RADIATED EMISSION TEST**

**47 CFR FCC Part 15.205 Restricted Bands**

MHz		MHz		MHz		GHz	
0.090	- 0.110	16.42	- 16.423	399.9	- 410	4.5	- 5.15
0.495	- 0.505	16.69475	- 16.69525	608	- 614	5.35	- 5.46
2.1735	- 2.1905	16.80425	- 16.80475	960	- 1240	7.25	- 7.75
4.125	- 4.128	25.5	- 25.67	1300	- 1427	8.025	- 8.5
4.17725	- 4.17775	37.5	- 38.25	1435	- 1626.5	9.0	- 9.2
4.20725	- 4.20775	73	- 74.6	1645.5	- 1646.5	9.3	- 9.5
6.215	- 6.218	74.8	- 75.2	1660	- 1710	10.6	- 12.7
6.26775	- 6.26825	108	- 121.94	1718.8	- 1722.2	13.25	- 13.4
6.31175	- 6.31225	123	- 138	2200	- 2300	14.47	- 14.5
8.291	- 8.294	149.9	- 150.05	2310	- 2390	15.35	- 16.2
8.362	- 8.366	156.52475	- 156.52525	2483.5	- 2500	17.7	- 21.4
8.37625	- 8.38675	156.7	- 156.9	2690	- 2900	22.01	- 23.12
8.41425	- 8.41475	162.0125	- 167.17	3260	- 3267	23.6	- 24.0
12.29	- 12.293	167.72	- 173.2	3332	- 3339	31.2	- 31.8
12.51975	- 12.52025	240	- 285	3345.8	- 3358	36.43	- 36.5
12.57675	- 12.57725	322	- 335.4	3600	- 4400	Above 38.6	
13.36	- 13.41						

**47 CFR FCC Parts 15.109(a) and 15.209 Radiated Emission Limits**

Frequency Range (MHz)	Quasi-Peak Limit Values (dBµV/m) @ 3m
30 - 88	40.0
88 - 216	43.5
216 - 960	46.0
Above 960	54.0*

\* Above 1GHz, average detector was used. A peak limit of 20dB above the average limit does apply.

**47 CFR FCC Parts 15.109(a) and 15.209 Radiated Emission Test Instrumentation**

Instrument	Model	S/No	Cal Due Date
R&S Test Receiver – ESI1	ESI40	100010	06 Jun 2012
Schaffner Bilog Antenna(30MHz-2GHz) – BL4	CBL6112B	2593	27 Jul 2012
EMCO Horn Antenna(1GHz-18GHz) – H15	3115	0003-6008	20 May 2012
ETS Horn Antenna(18GHz-40GHz)	3116	0004-2474	19 Apr 2012
Toyo Preamplifier (26.5GHz-40GHz)	HAP26-40W	00000005	19 Apr 2012
Agilent Preamplifier(1GHz-26.5GHz) (PA18)	8449D	3008A02305	07 Oct 2012
Teseq Preamplifier (9kHz-1GHz)	LNA6901	72266	23 Jun 2012
Micro-Tronics Notch Filter (Stopband 2.4 - 2.5GHz)	BRM50701	017	13 Aug 2012



## RADIATED EMISSION TEST

### 47 CFR FCC Parts 15.109(a) and 15.209 Radiated Emission Test Setup

1. The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m X 1.0m X 0.8m high, non-metallic table.
2. The filtered power supply for the EUT and supporting equipment were tapped from the appropriate power sockets located on the turntable.
3. The relevant broadband antenna was set at the required test distance away from the EUT and supporting equipment boundary.

### 47 CFR FCC Parts 15.109(a) and 15.209 Radiated Emission Test Method

1. The EUT was switched on and allowed to warm up to its normal operating condition.
2. A prescan was carried out to pick the worst emission frequencies from the EUT. For EUT which is a portable device, the prescan was carried out by rotating the EUT through three orthogonal axes to determine which altitude and equipment arrangement produces such emissions.
3. The test was carried out at the selected frequency points obtained from the prescan in step 2. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner:
  - a. Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen.
  - b. The EUT was then rotated to the direction that gave the maximum emission.
  - c. Finally, the antenna height was adjusted to the height that gave the maximum emission.
4. A Quasi-peak measurement was made for that frequency point if it was less than or equal to 1GHz. For frequency point that above 1GHz, both Peak and Average measurements were carried out.
5. Steps 3 and 4 were repeated for the next frequency point, until all selected frequency points were measured.
6. The frequency range covered was from 30MHz to 10<sup>th</sup> harmonics of the EUT fundamental frequency, using the Bi-log antenna for frequencies from 30MHz up to 1GHz, and the Horn antenna above 1GHz.

### Sample Calculation Example

At 300 MHz	Q-P limit (Class B) = 200 $\mu$ V/m = 46.0 dB $\mu$ V/m
Log-periodic antenna factor & cable loss at 300 MHz = 18.5 dB	
Q-P reading obtained directly from EMI Receiver = 40.0 dB $\mu$ V/m (Calibrated level including antenna factors & cable losses)	
Therefore, Q-P margin = 40.0 - 46.0 = -6.0	i.e. 6 dB below Q-P limit



**RADIATED EMISSION TEST**

**47 CFR FCC Parts 15.109(a), 15.205 and 15.209 Radiated Emission Results**

Test Input Power	120V 60Hz	Temperature	21°C
Test Distance	3m	Relative Humidity	58%
Test Mode	Standby with iPod Charging	Atmospheric Pressure	1030mbar
		Tested By	Tan Keng Xin Lim Kay Tak

Emissions ranging from 30MHz – 1GHz

Frequency (MHz)	Q-P Value (dBμV/m)	Q-P Limit (dBμV/m)	Q-P Margin (dB)	Height (cm)	Azimuth (Degrees)	Polarisation (H/V)
50.4210	25.7	40.0	14.3	139	594	V
208.8970	38.0	43.5	5.5	100	167	V
320.0010	42.3	46.0	3.7	100	181	H
480.0130	38.9	46.0	7.1	202	136	H
880.5750	38.1	46.0	7.9	100	199	H
960.0060	40.5	54.0	13.5	100	319	H

Emissions above 1GHz

Freq (GHz)	Peak Value (dBμV/m)	Peak Limit (dBμV/m)	Peak Margin (dB)	AV Value (dBμV/m)	AV Limit (dBμV/m)	AV Margin (dB)	Height (cm)	Azimuth (Degrees)	Pol (H/V)
5.1872	46.3	74.0	27.7	33.8	54.0	20.2	354	4	H
5.4338	48.0	74.0	26.0	35.3	54.0	18.7	155	183	V
9.9182	54.1	74.0	19.9	41.3	54.0	12.7	207	242	V
14.2658	58.1	74.0	15.9	45.7	54.0	8.3	184	90	H
16.4695	60.0	74.0	14.0	47.9	54.0	6.1	215	223	H
17.7649	64.1	74.0	9.9	51.9	54.0	2.1	159	112	V

Notes

- All possible modes of operation were investigated. Only the worst case emissions measured, using the correct CISPR detectors, are reported. All other emissions were relatively insignificant.
- A "positive" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency. Conversely, a "negative" margin indicates a FAIL.
- EMI receiver Resolution Bandwidth (RBW) and Video Bandwidth (VBW) settings:  
30MHz - 1GHz  
 RBW: 120kHz      VBW: 1MHz  
>1GHz  
 RBW: 1MHz      VBW: 1MHz
- Radiated Emissions Measurement Uncertainty  
 All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95%, with a coverage factor of 2, in the range 30MHz – 25.0GHz is ±4.0dB.

**RADIATED EMISSION TEST**

**47 CFR FCC Parts 15.109(a), 15.205 and 15.209 Radiated Emission Results**

Test Input Power	120V 60Hz	Temperature	21°C
Test Distance	3m	Relative Humidity	58%
Antenna	1 (external)	Atmospheric Pressure	1030mbar
Test Mode	802.11g 54Mbps (worst mode)	Tested By	Zechs Ng Chee Siong

Spurious Emissions ranging from 30MHz – 1GHz

Frequency (MHz)	Q-P Value (dBµV/m)	Q-P Limit (dBµV/m)	Q-P Margin (dB)	Height (cm)	Azimuth (Degrees)	Pol (H/V)	Channel
480.0050	40.5	46.0	5.5	101	178	V	6
559.9880	43.8	46.0	2.2	100	313	V	6
700.4860	26.2	46.0	19.8	100	217	H	6
720.0910	36.4	46.0	9.6	107	204	H	6
791.9970	22.8	46.0	23.2	106	200	H	6
880.0010	45.2	46.0	0.8	100	24	H	6

Spurious Emissions above 1GHz – 25GHz

Freq (GHz)	Peak Value (dBµV/m)	Peak Limit (dBµV/m)	Peak Margin (dB)	AV Value (dBµV/m)	AV Limit (dBµV/m)	AV Margin (dB)	Height (cm)	Azimuth (Degrees)	Pol (H/V)	Ch
1.0667	25.8	74.0	48.2	24.6	54.0	29.4	101	359	V	1
1.1201	32.3	74.0	41.7	30.0	54.0	24.1	101	359	V	1
1.1968	34.2	74.0	39.8	33.9	54.0	20.1	105	273	V	1
1.3647	43.7	74.0	30.3	26.1	54.0	27.9	101	346	V	1
4.6067	33.9	74.0	40.1	33.8	54.0	20.2	104	29	H	1
5.9245	38.5	74.0	35.5	38.1	54.0	15.9	150	220	H	1

Spurious Emissions above 1GHz – 25GHz

Freq (GHz)	Peak Value (dBµV/m)	Peak Limit (dBµV/m)	Peak Margin (dB)	AV Value (dBµV/m)	AV Limit (dBµV/m)	AV Margin (dB)	Height (cm)	Azimuth (Degrees)	Pol (H/V)	Ch
1.0400	29.9	74.0	44.1	29.7	54.0	24.3	101	359	V	6
1.1201	32.1	74.0	41.9	30.9	54.0	23.1	101	359	V	6
1.1968	32.9	74.0	41.2	32.7	54.0	21.3	100	359	V	6
1.3647	44.3	74.0	29.7	27.0	54.0	27.0	100	351	V	6
4.6213	33.8	74.0	40.2	33.6	54.0	20.4	280	315	H	6
5.7074	37.4	74.0	36.6	37.3	54.0	16.7	124	347	H	6



**RADIATED EMISSION TEST**

**47 CFR FCC Parts 15.109(a), 15.205 and 15.209 Radiated Emission Results**

Spurious Emissions above 1GHz – 25GHz

Freq (GHz)	Peak Value (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Peak Margin (dB)	AV Value (dB $\mu$ V/m)	AV Limit (dB $\mu$ V/m)	AV Margin (dB)	Height (cm)	Azimuth (Degrees)	PoI (H/V)	Ch
1.0399	29.9	74.0	44.1	29.7	54.0	24.3	101	359	V	11
1.1201	36.2	74.0	37.8	31.1	54.0	22.9	113	263	V	11
1.1968	33.3	74.0	40.7	33.2	54.0	20.8	101	359	V	11
1.3814	23.2	74.0	50.8	23.2	54.0	30.9	102	347	V	11
4.6920	33.2	74.0	40.8	33.1	54.0	20.9	157	260	H	11
5.9658	52.1	74.0	21.9	38.8	54.0	15.3	302	21	V	11

Notes

- All possible modes of operation were investigated. Only the worst case emissions measured, using the correct CISPR detectors, are reported. All other emissions were relatively insignificant.
- Quasi-peak measurement was used for frequency measurement up to 1GHz. Average and peak measurements were used for emissions above 1GHz. The average measurement was done by averaging over a complete cycle of the pulse train, including the blanking interval as the pulse train duration does not exceed 0.1 second.
- A "positive" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency. Conversely, a "negative" margin indicates a FAIL.
- EMI receiver Resolution Bandwidth (RBW) and Video Bandwidth (VBW) settings:  
30MHz - 1GHz  
 RBW: 120kHz                      VBW: 1MHz  
>1GHz  
 RBW: 1MHz                        VBW: 1MHz
- The upper frequency of radiated emission investigations was according to requirements stated in Section 15.33(a) for intentional radiators & Section 15.33(b) for unintentional radiators.
- The channel in the table refers to the transmit channel of the EUT.
- Radiated Emissions Measurement Uncertainty  
 All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95%, with a coverage factor of 2, in the range 30MHz – 25GHz is  $\pm 4.0$ dB.



**RADIATED EMISSION TEST**

**47 CFR FCC Parts 15.109(a), 15.205 and 15.209 Radiated Emission Results**

Test Input Power	120V 60Hz	Temperature	21°C
Test Distance	3m	Relative Humidity	58%
Antenna	2 (internal)	Atmospheric Pressure	1030mbar
Test Mode	802.11b 11Mbps (worst mode)	Tested By	Zechs Ng Chee Siong

Spurious Emissions ranging from 30MHz – 1GHz

Frequency (MHz)	Q-P Value (dBµV/m)	Q-P Limit (dBµV/m)	Q-P Margin (dB)	Height (cm)	Azimuth (Degrees)	Pol (H/V)	Channel
479.9930	40.2	46.0	5.8	171	86	H	1
559.9930	43.4	46.0	2.6	100	310	V	1
654.7970	41.4	46.0	4.6	126	318	H	1
700.4620	28.0	46.0	18.0	113	206	H	1
792.6020	21.3	46.0	24.7	108	13	H	1
879.9860	43.3	46.0	2.7	99	298	V	1

Spurious Emissions above 1GHz – 25GHz

Freq (GHz)	Peak Value (dBµV/m)	Peak Limit (dBµV/m)	Peak Margin (dB)	AV Value (dBµV/m)	AV Limit (dBµV/m)	AV Margin (dB)	Height (cm)	Azimuth (Degrees)	Pol (H/V)	Ch
1.0401	28.5	74.0	45.5	26.8	54.0	27.2	101	359	V	1
1.1200	32.3	74.0	41.7	29.7	54.0	24.3	101	359	V	1
1.1968	32.9	74.0	41.1	32.8	54.0	21.3	101	359	V	1
4.4936	33.4	74.0	40.6	33.3	54.0	20.7	228	71	V	1
5.8801	38.1	74.0	35.9	37.9	54.0	16.1	276	94	V	1
7.2254	49.4	74.0	24.6	34.4	54.0	19.6	101	216	V	1

Spurious Emissions above 1GHz – 25GHz

Freq (GHz)	Peak Value (dBµV/m)	Peak Limit (dBµV/m)	Peak Margin (dB)	AV Value (dBµV/m)	AV Limit (dBµV/m)	AV Margin (dB)	Height (cm)	Azimuth (Degrees)	Pol (H/V)	Ch
1.0400	28.4	74.0	45.6	26.2	54.0	27.8	100	359	V	6
1.2132	43.1	74.0	30.9	26.6	54.0	27.4	100	279	V	6
4.2712	48.2	74.0	25.8	34.4	54.0	19.6	100	279	H	6
5.7021	50.3	74.0	23.7	37.3	54.0	16.7	224	346	V	6
7.1985	43.5	74.0	30.5	27.9	54.0	26.1	102	219	H	6
9.6090	41.2	74.0	32.8	28.1	54.0	25.9	102	228	H	6



**RADIATED EMISSION TEST**

**47 CFR FCC Parts 15.109(a), 15.205 and 15.209 Radiated Emission Results**

Spurious Emissions above 1GHz – 25GHz

Freq (GHz)	Peak Value (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Peak Margin (dB)	AV Value (dB $\mu$ V/m)	AV Limit (dB $\mu$ V/m)	AV Margin (dB)	Height (cm)	Azimuth (Degrees)	PoI (H/V)	Ch
1.1968	37.1	74.0	36.9	36.9	54.0	17.1	104	10	V	11
2.4701	37.9	74.0	36.1	24.7	54.0	29.3	101	229	H	11
4.6528	48.7	74.0	25.3	35.1	54.0	18.9	399	37	H	11
5.7750	51.2	74.0	22.8	37.5	54.0	16.5	399	316	H	11
7.3466	52.4	74.0	21.6	38.5	54.0	15.5	101	173	V	11
9.8110	47.9	74.0	26.2	35.0	54.0	19.0	101	176	V	11

Notes

- All possible modes of operation were investigated. Only the worst case emissions measured, using the correct CISPR detectors, are reported. All other emissions were relatively insignificant.
- Quasi-peak measurement was used for frequency measurement up to 1GHz. Average and peak measurements were used for emissions above 1GHz. The average measurement was done by averaging over a complete cycle of the pulse train, including the blanking interval as the pulse train duration does not exceed 0.1 second.
- A "positive" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency. Conversely, a "negative" margin indicates a FAIL.
- EMI receiver Resolution Bandwidth (RBW) and Video Bandwidth (VBW) settings:  
30MHz - 1GHz  
 RBW: 120kHz                      VBW: 1MHz  
>1GHz  
 RBW: 1MHz                        VBW: 1MHz
- The upper frequency of radiated emission investigations was according to requirements stated in Section 15.33(a) for intentional radiators & Section 15.33(b) for unintentional radiators.
- The channel in the table refers to the transmit channel of the EUT.
- Radiated Emissions Measurement Uncertainty  
 All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95%, with a coverage factor of 2, in the range 30MHz – 25GHz is  $\pm 4.0$ dB.



**SPECTRUM BANDWIDTH (6dB BANDWIDTH MEASUREMENT) TEST**

**47 CFR FCC Part 15.247(a)(2) Spectrum Bandwidth (6dB Bandwidth Measurement) Limits**

The EUT shows compliance to the requirements of this section, which states that the minimum bandwidth of the EUT employing digital modulation techniques shall be at least 500kHz.

**47 CFR FCC Part 15.247(a)(2) Spectrum Bandwidth (6dB Bandwidth Measurement) Test Instrumentation**

Instrument	Model	S/No	Cal Due Date
Agilent EMC Analyzer (9kHz-26.5GHz)	E7405A	US40240195	16 Mar 2012

**47 CFR FCC Part 15.247(a)(2) Spectrum Bandwidth (6dB Bandwidth Measurement) Test Setup**

1. The EUT and supporting equipment were set up as shown in the setup photo.
2. The power supply for the EUT was connected to a filtered mains.
3. The RF antenna connector was connected to the spectrum analyser via a low-loss coaxial cable.
4. The resolution bandwidth (RBW) and the video bandwidth (VBW) of the spectrum analyser were respectively set to 100kHz and 300kHz.
5. All other supporting equipment were powered separately from another filtered mains.

**47 CFR FCC Part 15.247(a)(2) Spectrum Bandwidth (6dB Bandwidth Measurement) Test Method**

1. The EUT was switched on and allowed to warm up to its normal operating condition. The EUT was then configured to operate in the test mode at Channel 1 (2.412GHz) (*lower ch*) with specified modulation and data rate.
2. The center frequency of the spectrum analyser was set to the transmitting frequency with the frequency span wide enough to capture the 6dB bandwidth of the transmitting frequency.
3. The spectrum analyser was set to max hold to capture the transmitting frequency. The signal capturing was continuous until no further changes were observed.
4. The peak of the transmitting frequency was detected with the marker peak function of the spectrum analyser. The frequencies below the 6dB peak frequency at lower ( $f_L$ ) and upper ( $f_H$ ) sides of the transmitting frequency were marked and measured by using the marker-delta function of the spectrum analyser.
5. The 6dB bandwidth of the transmitting frequency is the frequency difference between the marked lower and upper frequencies,  $|f_H - f_L|$ .
6. Repeat steps 1 to 5 with all possible modulations and data rates.
7. The steps 2 to 6 were repeated with the transmitting frequency was set to Channel 6 (2.437GHz) (*mid ch*) and Channel 11 (2.462GHz) (*upper ch*) respectively.



**SPECTRUM BANDWIDTH (6dB BANDWIDTH MEASUREMENT) TEST**

**47 CFR FCC Part 15.247(a)(2) Spectrum Bandwidth (6dB Bandwidth Measurement) Results**

Test Input Power	120V 60Hz	Temperature	23°C
Attached Plots	1 - 21	Relative Humidity	55%
Antenna	1 (external)	Atmospheric Pressure	1030mbar
		Tested By	Kyaw Soe Hein

**802.11b**

Channel	Channel Frequency (GHz)	6dB Bandwidth (MHz)	Modulation @ Data Rate
1	2.412	12.125	DBPSK @ 1Mbps
		12.375	DQPSK @ 2Mbps
		11.750	CCK @ 11Mbps
6	2.437	12.000	DBPSK @ 1Mbps
		12.375	DQPSK @ 2Mbps
		10.625	CCK @ 11Mbps
11	2.462	12.125	DBPSK @ 1Mbps
		12.875	DQPSK @ 2Mbps
		10.875	CCK @ 11Mbps

**802.11g**

Channel	Channel Frequency (GHz)	6dB Bandwidth (MHz)	Modulation @ Data Rate
1	2.412	16.625	BPSK@9Mbps
		15.625	QPSK @ 18Mbps
		16.500	16QAM @ 36Mbps
		16.625	64QAM @ 54Mbps
6	2.437	15.750	BPSK@9Mbps
		15.875	QPSK @ 18Mbps
		16.625	16QAM @ 36Mbps
		16.500	64QAM @ 54Mbps
11	2.462	16.375	BPSK@9Mbps
		16.500	QPSK @ 18Mbps
		16.500	16QAM @ 36Mbps
		16.500	64QAM @ 54Mbps



**SPECTRUM BANDWIDTH (6dB BANDWIDTH MEASUREMENT) TEST**

**47 CFR FCC Part 15.247(a)(2) Spectrum Bandwidth (6dB Bandwidth Measurement) Results**

Test Input Power	120V 60Hz	Temperature	23°C
Attached Plots	22 - 42	Relative Humidity	55%
Antenna	2 (internal)	Atmospheric Pressure	1030mbar
		Tested By	Kyaw Soe Hein

**802.11b**

Channel	Channel Frequency (GHz)	6dB Bandwidth (MHz)	Modulation @ Data Rate
1	2.412	12.375	DBPSK @ 1Mbps
		12.250	DQPSK @ 2Mbps
		11.375	CCK @ 11Mbps
6	2.437	11.875	DBPSK @ 1Mbps
		11.375	DQPSK @ 2Mbps
		10.625	CCK @ 11Mbps
11	2.462	12.625	DBPSK @ 1Mbps
		11.875	DQPSK @ 2Mbps
		11.500	CCK @ 11Mbps

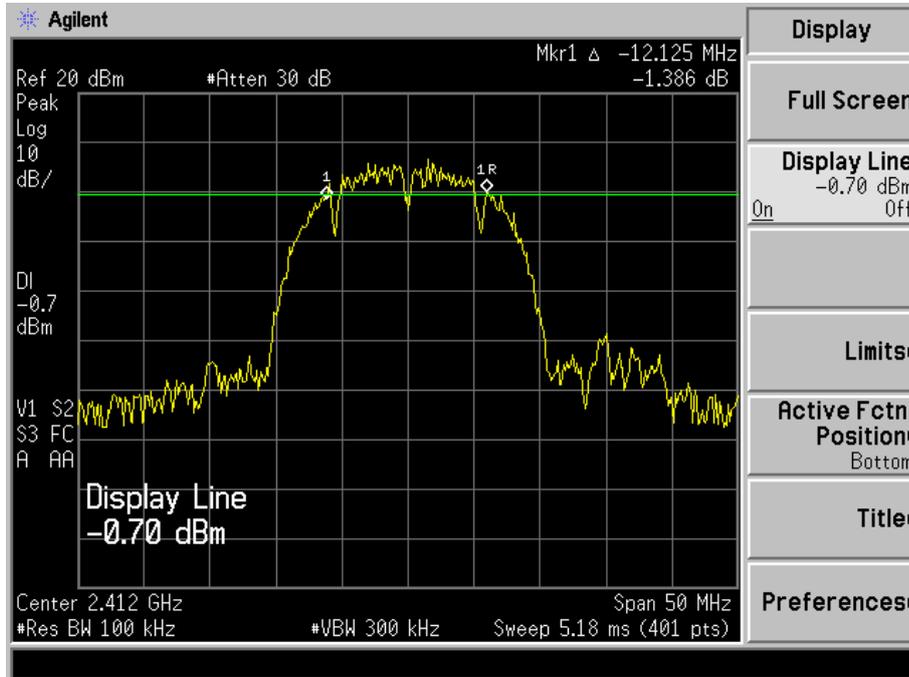
**802.11g**

Channel	Channel Frequency (GHz)	6dB Bandwidth (MHz)	Modulation @ Data Rate
1	2.412	16.250	BPSK@9Mbps
		16.125	QPSK @ 18Mbps
		16.500	16QAM @ 36Mbps
		16.250	64QAM @ 54Mbps
6	2.437	16.000	BPSK@9Mbps
		16.500	QPSK @ 18Mbps
		16.125	16QAM @ 36Mbps
		16.500	64QAM @ 54Mbps
11	2.462	16.250	BPSK@9Mbps
		16.375	QPSK @ 18Mbps
		16.500	16QAM @ 36Mbps
		16.250	64QAM @ 54Mbps

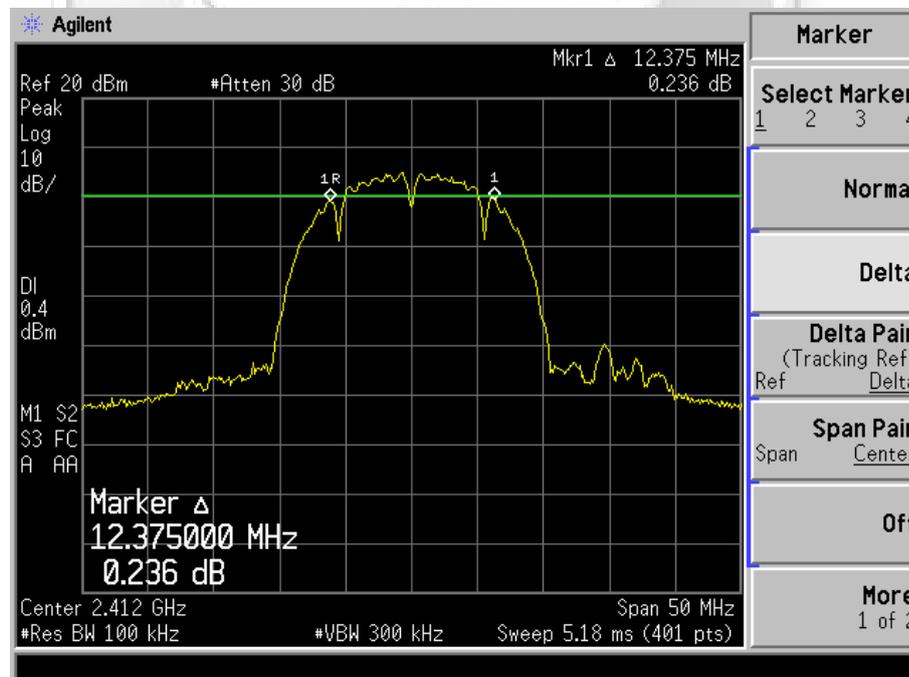


**SPECTRUM BANDWIDTH (6dB BANDWIDTH MEASUREMENT) TEST**

**Spectrum Bandwidth (6dB Bandwidth Measurement) Plots - Antenna 1 (External), 802.11b**



Plot 1 - Channel 1 (lower ch) @ DBPSK 1Mbps

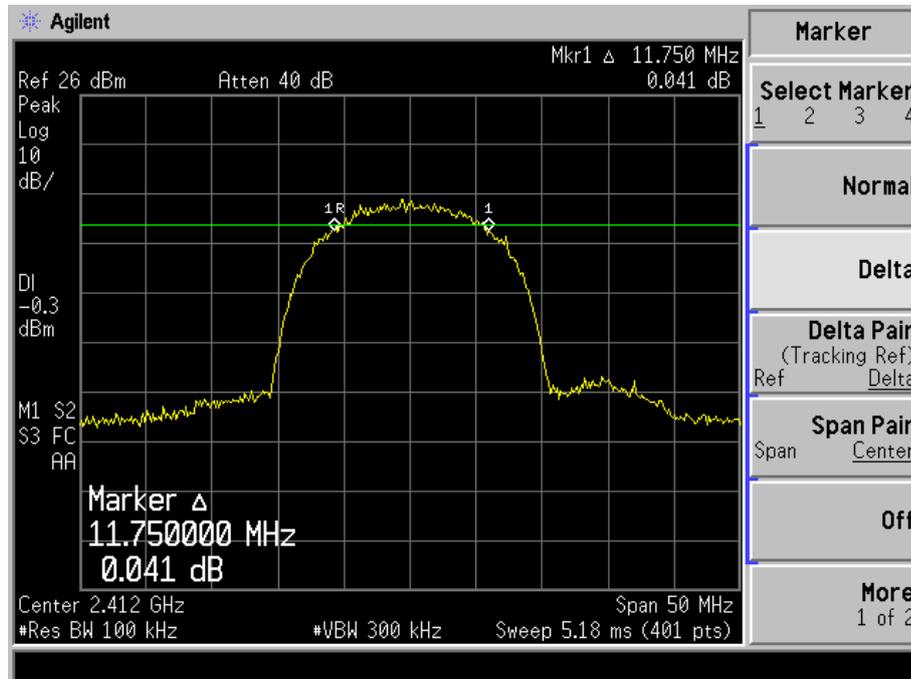


Plot 2 - Channel 1 (lower ch) @ DQPSK 2Mbps

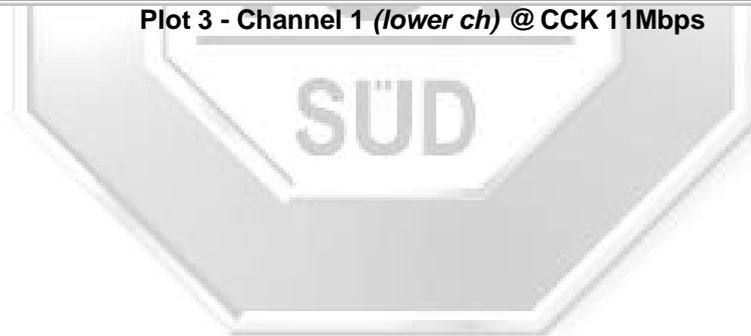


**SPECTRUM BANDWIDTH (6dB BANDWIDTH MEASUREMENT) TEST**

**Spectrum Bandwidth (6dB Bandwidth Measurement) Plots - Antenna 1 (External), 802.11b**



**Plot 3 - Channel 1 (lower ch) @ CCK 11Mbps**



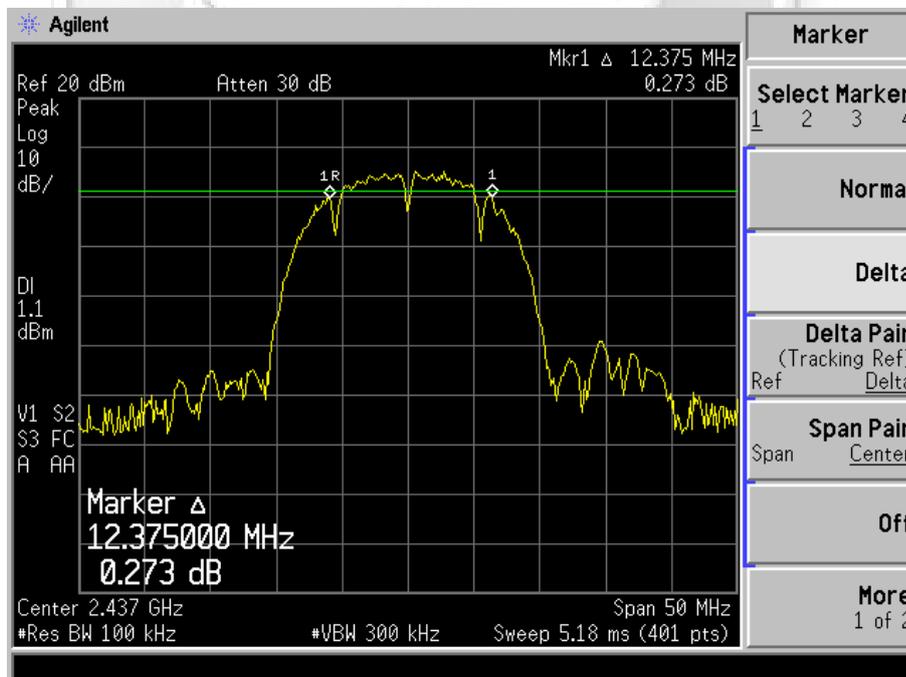


**SPECTRUM BANDWIDTH (6dB BANDWIDTH MEASUREMENT) TEST**

**Spectrum Bandwidth (6dB Bandwidth Measurement) Plots - Antenna 1 (External), 802.11b**



**Plot 4 - Channel 6 (mid ch) @ DBPSK 1Mbps**

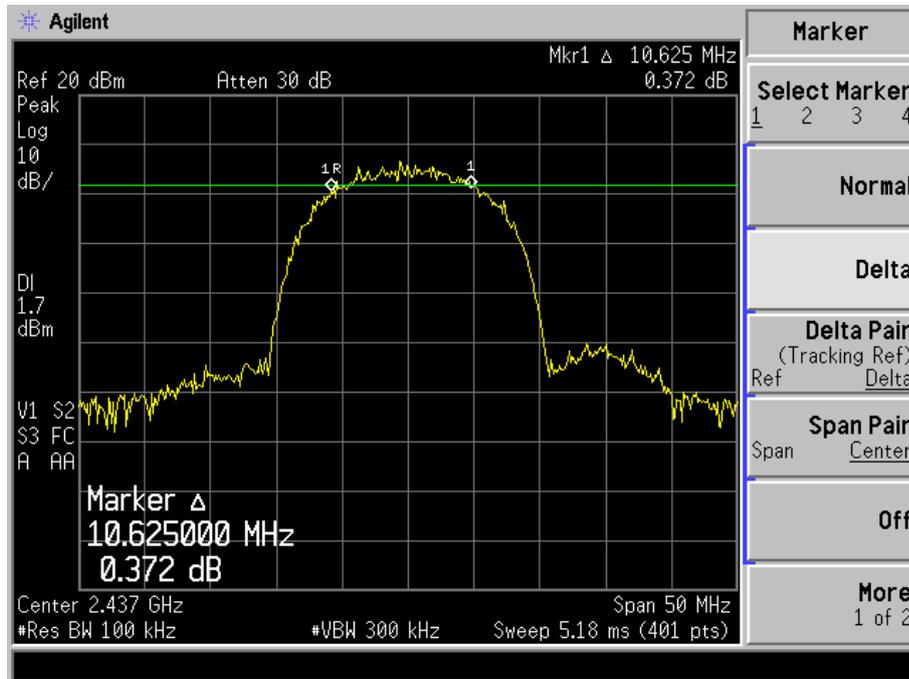


**Plot 5 - Channel 6 (mid ch) @ DQPSK 2Mbps**

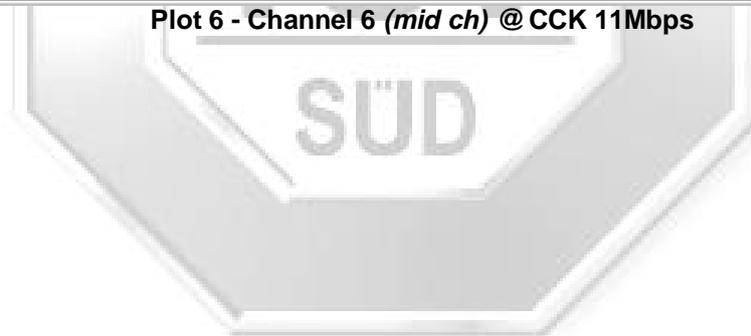


**SPECTRUM BANDWIDTH (6dB BANDWIDTH MEASUREMENT) TEST**

**Spectrum Bandwidth (6dB Bandwidth Measurement) Plots - Antenna 1 (External), 802.11b**



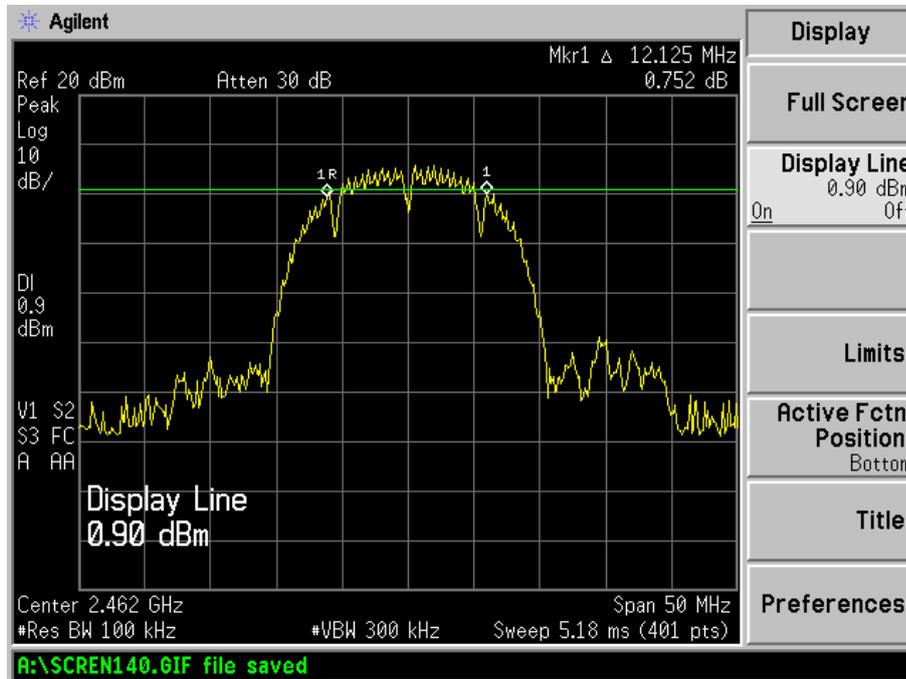
**Plot 6 - Channel 6 (mid ch) @ CCK 11Mbps**



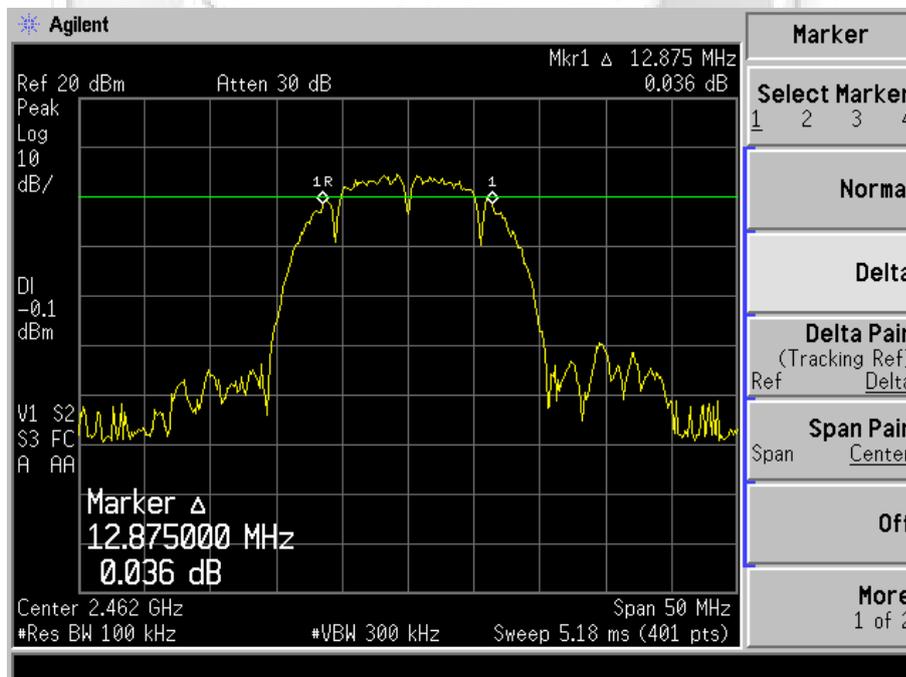


**SPECTRUM BANDWIDTH (6dB BANDWIDTH MEASUREMENT) TEST**

**Spectrum Bandwidth (6dB Bandwidth Measurement) Plots - Antenna 1 (External), 802.11b**



**Plot 7 - Channel 11 (upper ch) @ DBPSK 1Mbps**

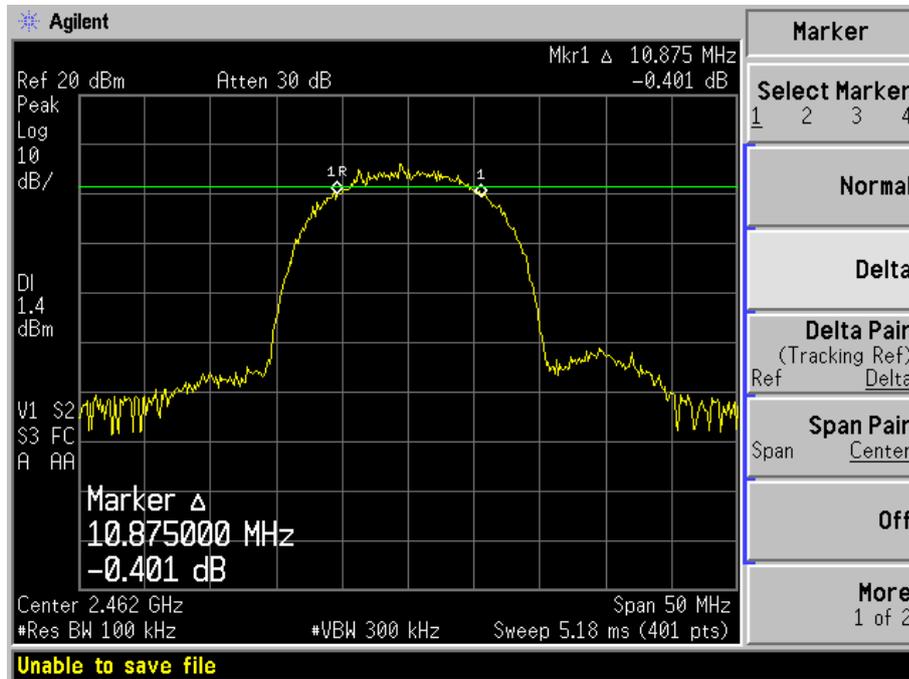


**Plot 8 - Channel 11 (upper ch) @ DQPSK 2Mbps**



**SPECTRUM BANDWIDTH (6dB BANDWIDTH MEASUREMENT) TEST**

**Spectrum Bandwidth (6dB Bandwidth Measurement) Plots - Antenna 1 (External), 802.11b**



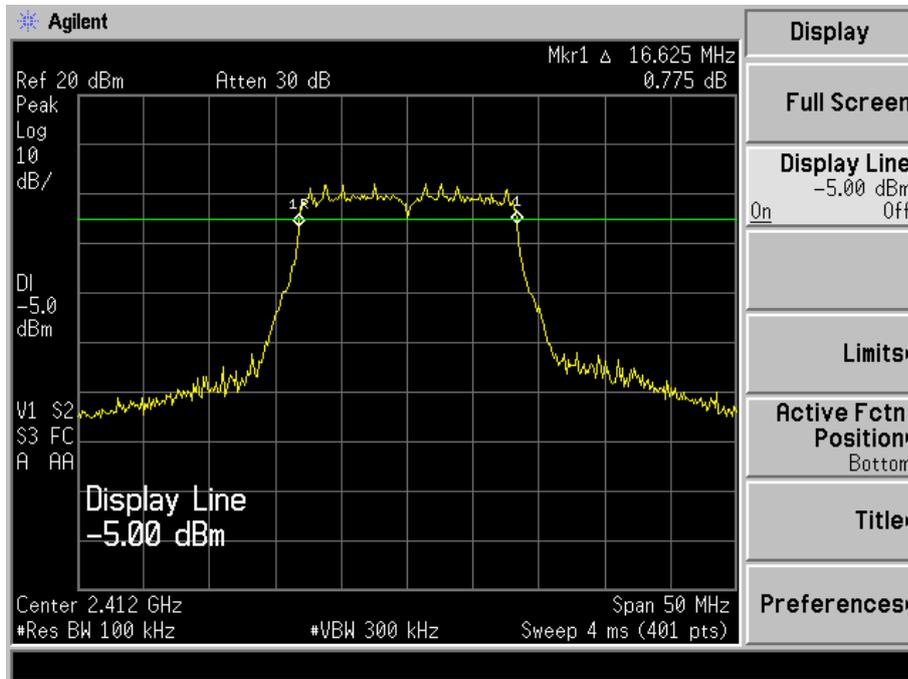
Plot 9 - Channel 11 (upper ch) @ CCK 11Mbps



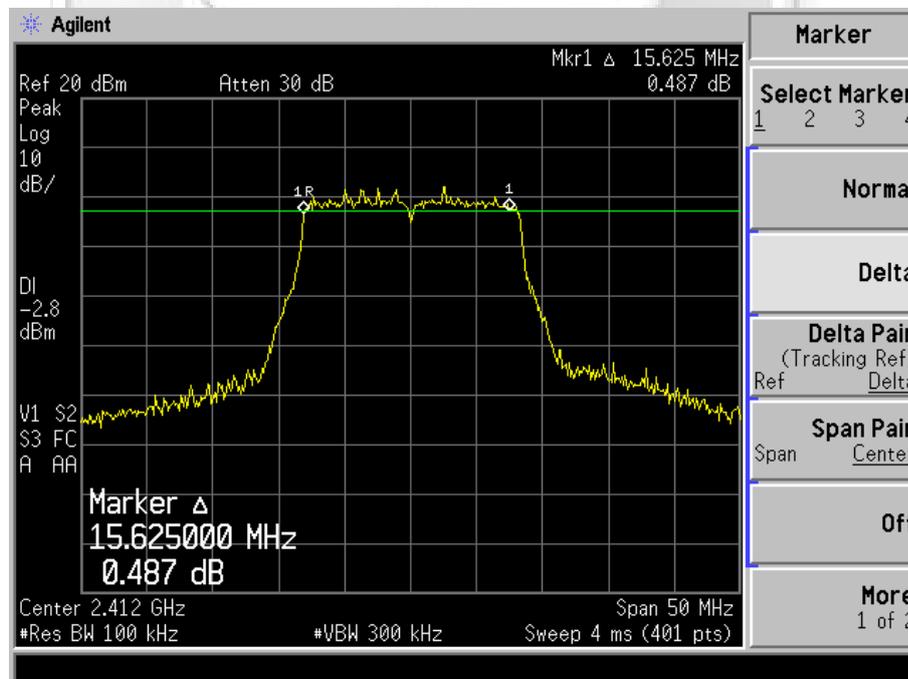


**SPECTRUM BANDWIDTH (6dB BANDWIDTH MEASUREMENT) TEST**

**Spectrum Bandwidth (6dB Bandwidth Measurement) Plots - Antenna 1 (External), 802.11g**



Plot 10 - Channel 1 (lower ch) @ BPSK 9Mbps

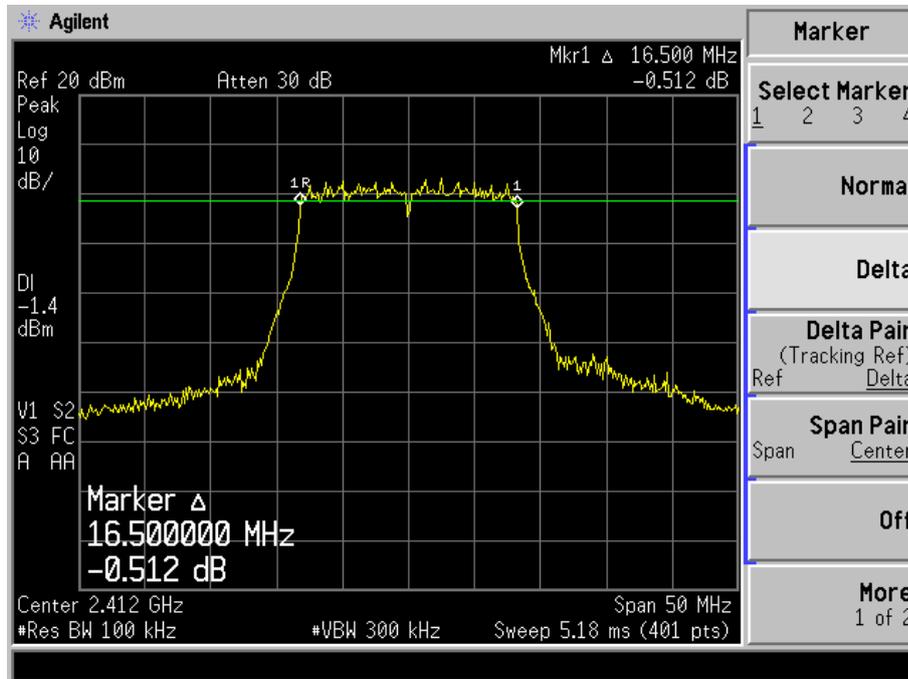


Plot 11 - Channel 1 (lower ch) @ QPSK 18Mbps

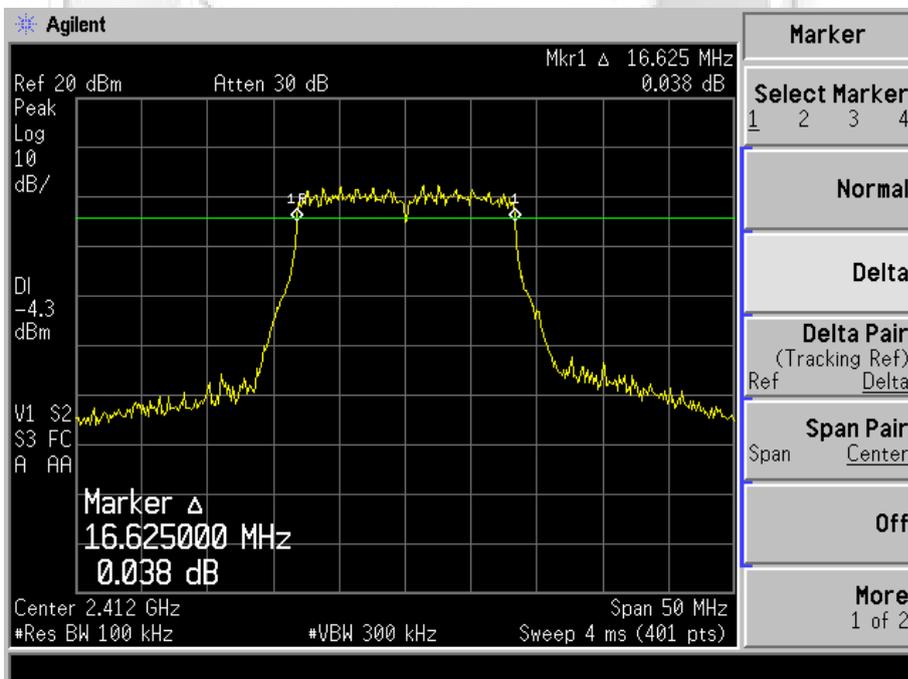


**SPECTRUM BANDWIDTH (6dB BANDWIDTH MEASUREMENT) TEST**

**Spectrum Bandwidth (6dB Bandwidth Measurement) Plots - Antenna 1 (External), 802.11g**



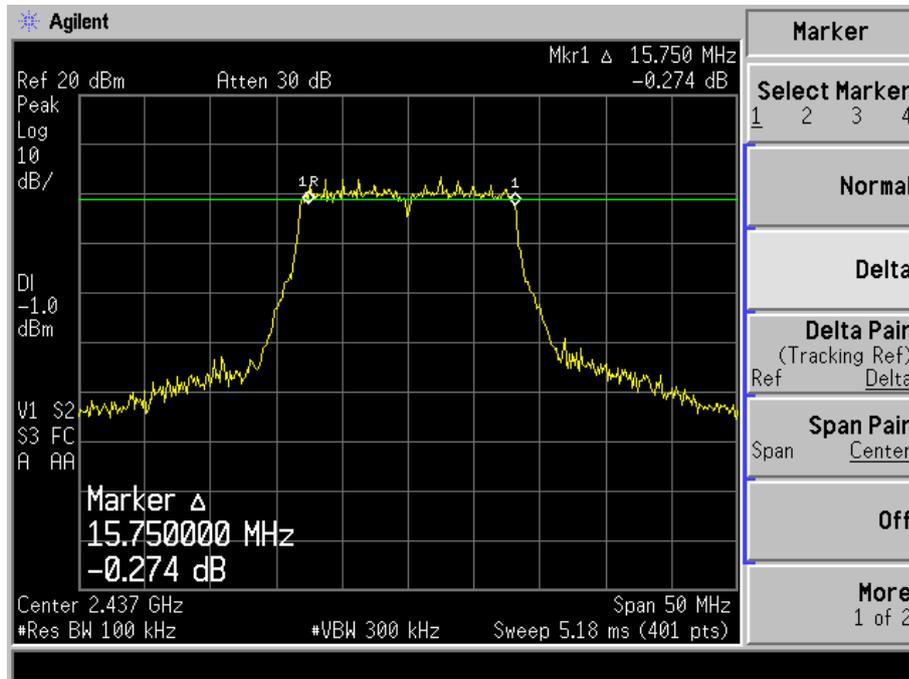
**Plot 12 - Channel 1 (lower ch) @ 16QAM 36Mbps**



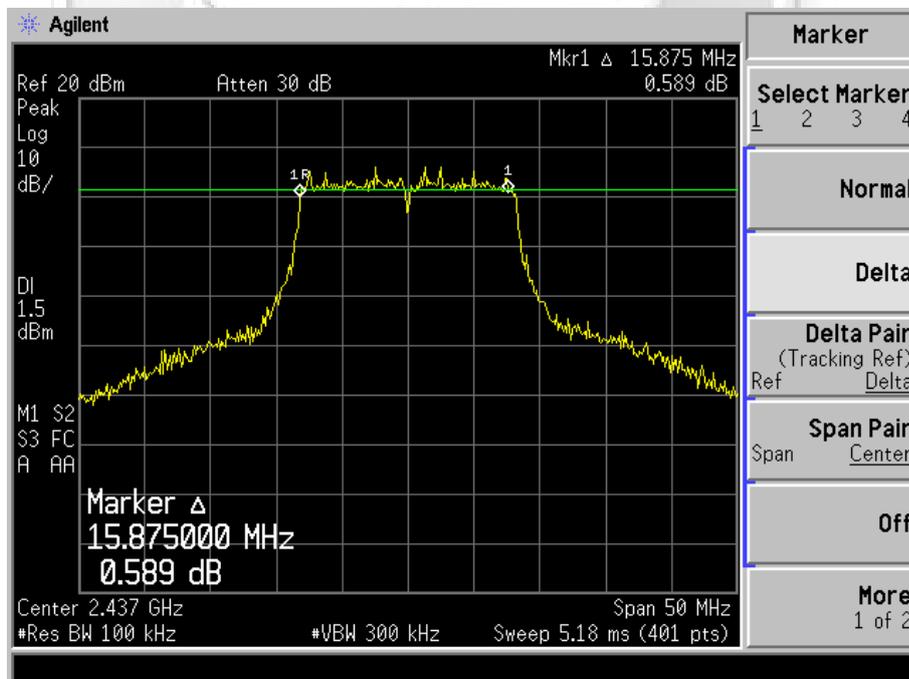
**Plot 13 - Channel 1 (lower ch) @ 64QAM 54Mbps**

**SPECTRUM BANDWIDTH (6dB BANDWIDTH MEASUREMENT) TEST**

**Spectrum Bandwidth (6dB Bandwidth Measurement) Plots - Antenna 1 (External), 802.11g**



Plot 14 - Channel 6 (mid ch) @ BPSK 9Mbps

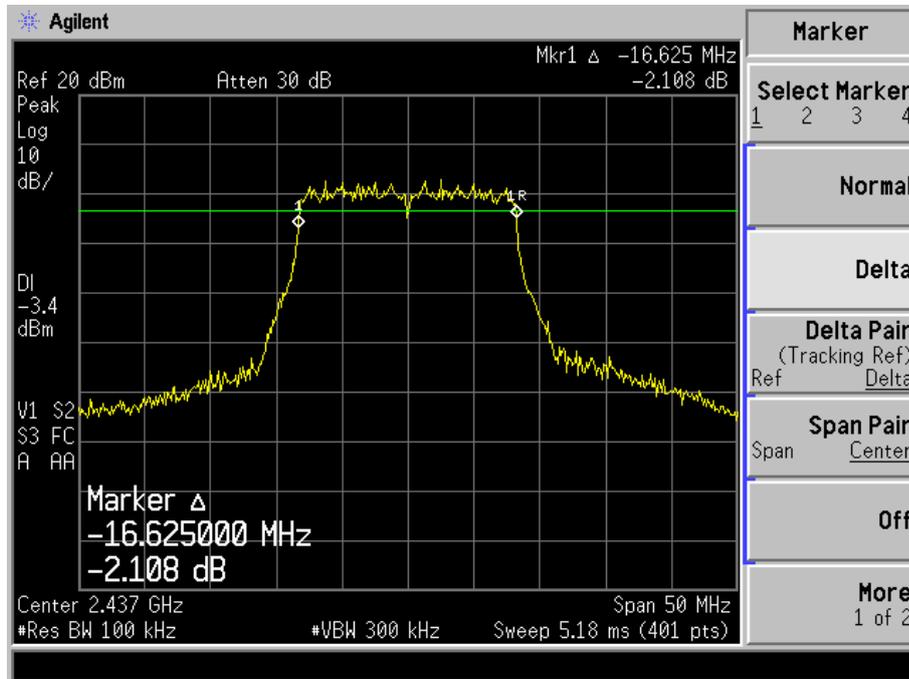


Plot 15 - Channel 6 (mid ch) @ QPSK 18Mbps

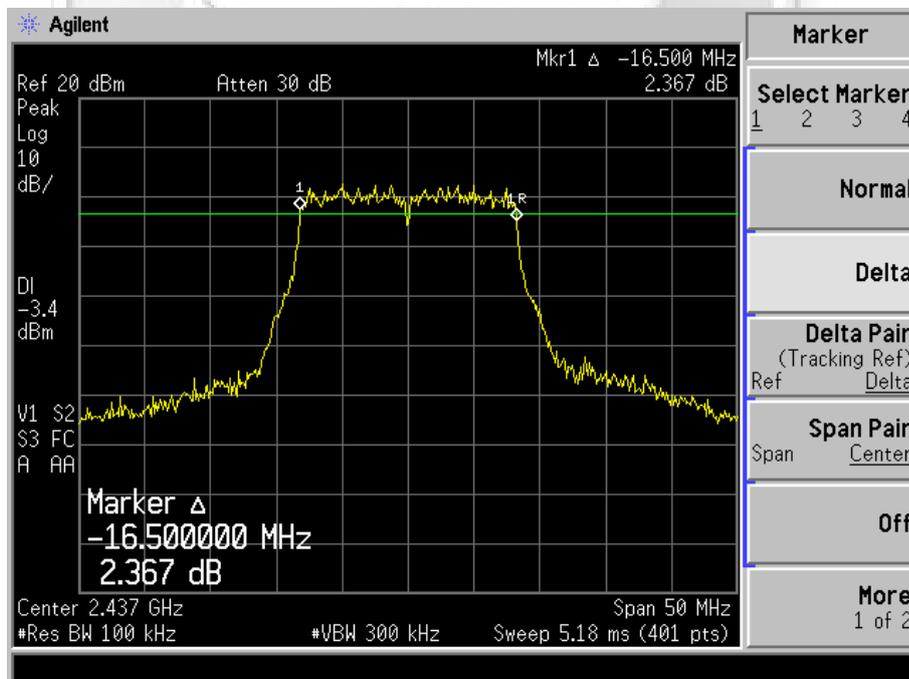


**SPECTRUM BANDWIDTH (6dB BANDWIDTH MEASUREMENT) TEST**

**Spectrum Bandwidth (6dB Bandwidth Measurement) Plots - Antenna 1 (External), 802.11g**



**Plot 16 - Channel 6 (mid ch) @ 16QAM 36Mbps**

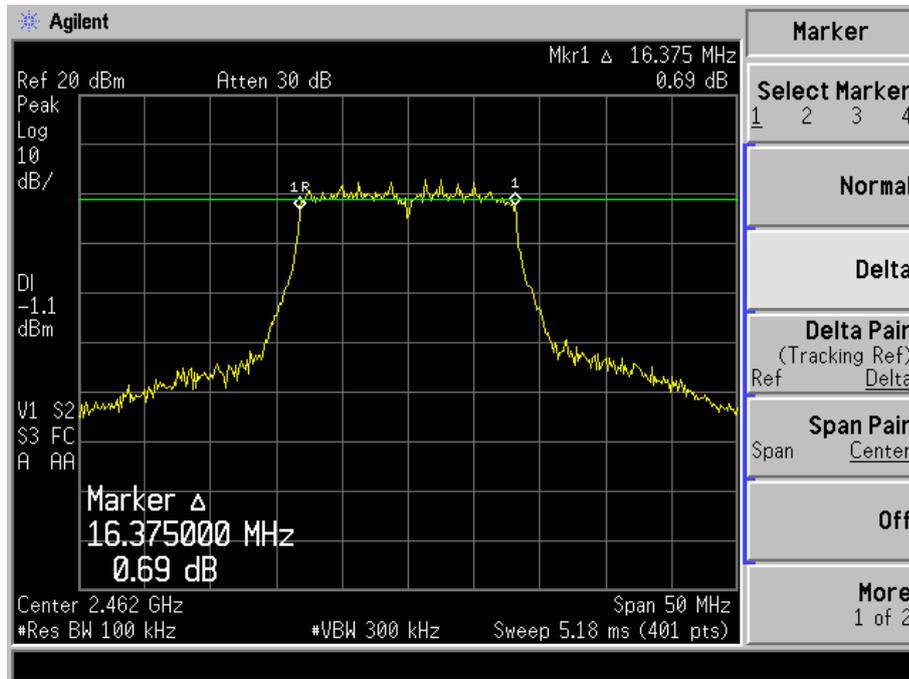


**Plot 17 - Channel 6 (mid ch) @ 64QAM 54Mbps**

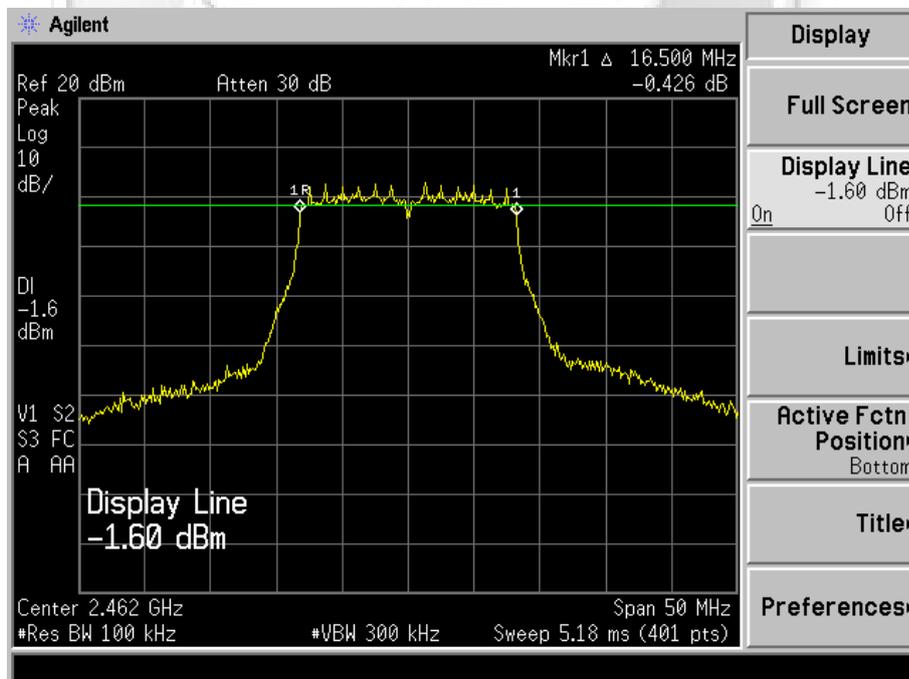


**SPECTRUM BANDWIDTH (6dB BANDWIDTH MEASUREMENT) TEST**

**Spectrum Bandwidth (6dB Bandwidth Measurement) Plots - Antenna 1 (External), 802.11g**



**Plot 18 - Channel 11 (upper ch) @ BPSK 9Mbps**

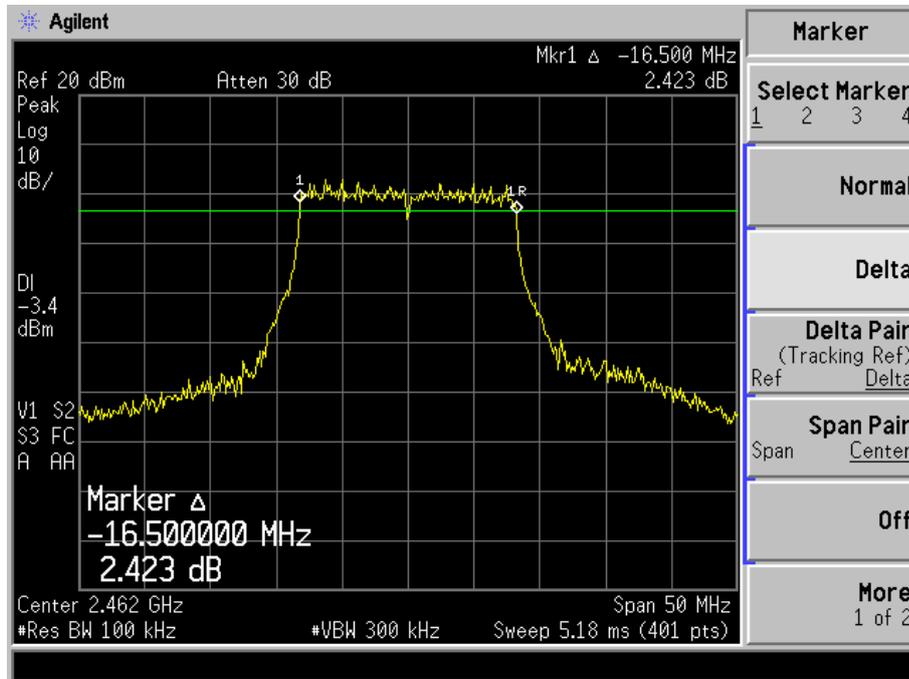


**Plot 19 - Channel 11 (upper ch) @ QPSK 18Mbps**

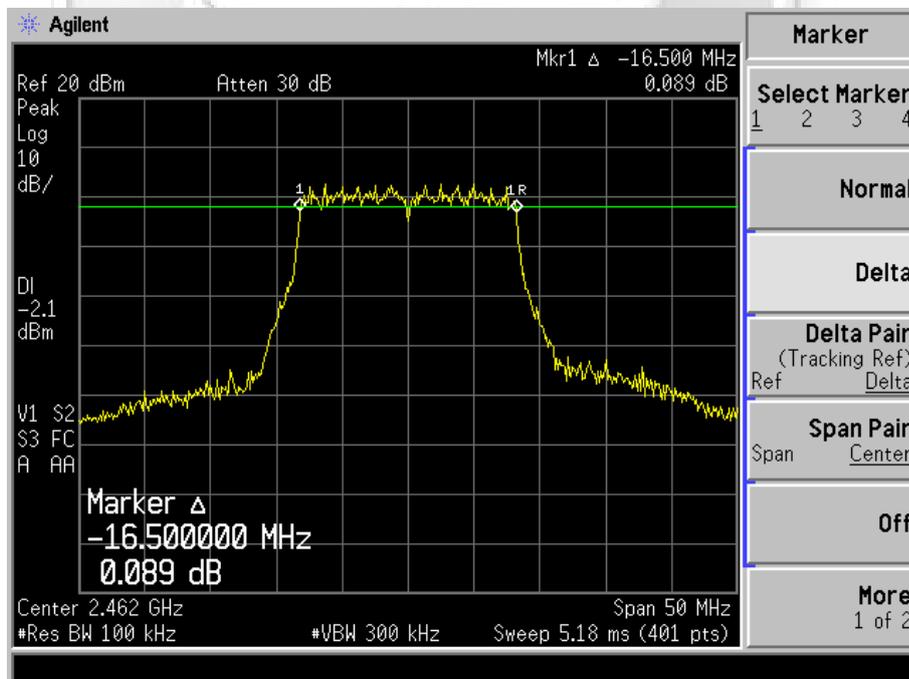


**SPECTRUM BANDWIDTH (6dB BANDWIDTH MEASUREMENT) TEST**

**Spectrum Bandwidth (6dB Bandwidth Measurement) Plots - Antenna 1 (External), 802.11g**



**Plot 20 - Channel 11 (upper ch) @ 16QAM 36Mbps**

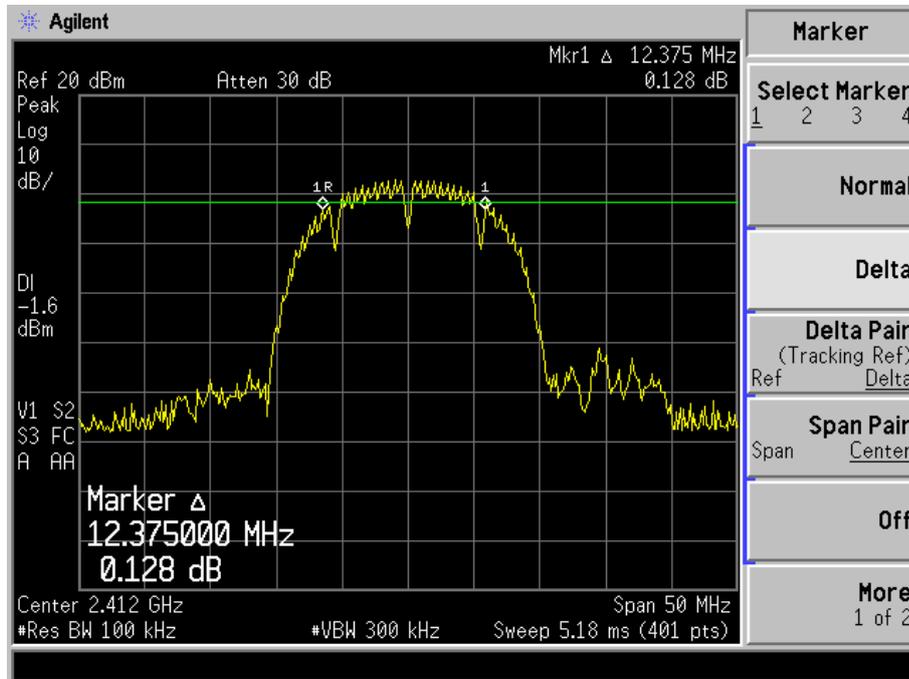


**Plot 21 - Channel 11 (upper ch) @ 64QAM 54Mbps**

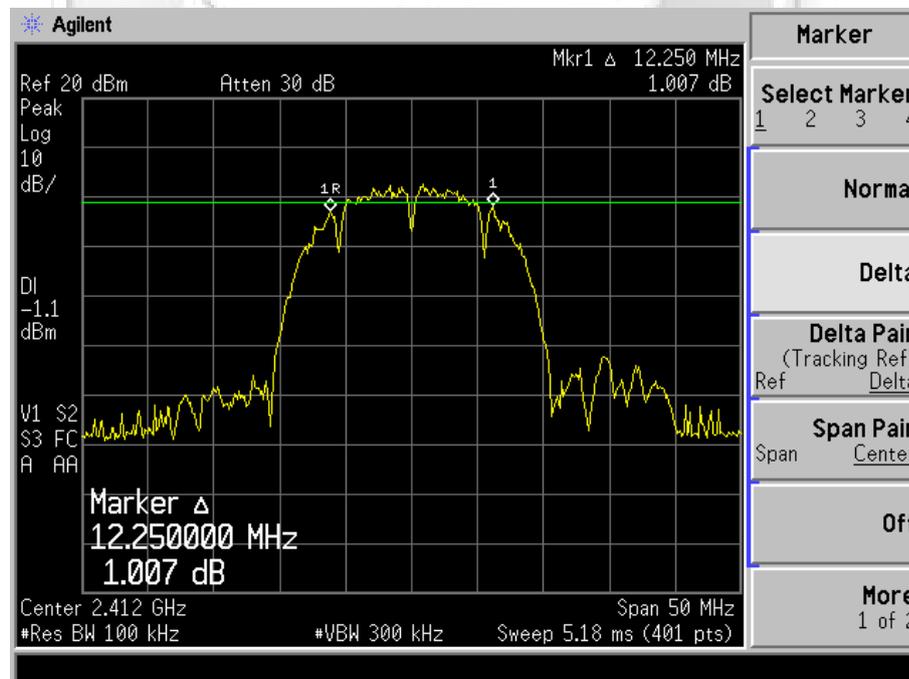


**SPECTRUM BANDWIDTH (6dB BANDWIDTH MEASUREMENT) TEST**

**Spectrum Bandwidth (6dB Bandwidth Measurement) Plots - Antenna 2 (Internal), 802.11b**



**Plot 22 - Channel 1 (lower ch) @ DBPSK 1Mbps**

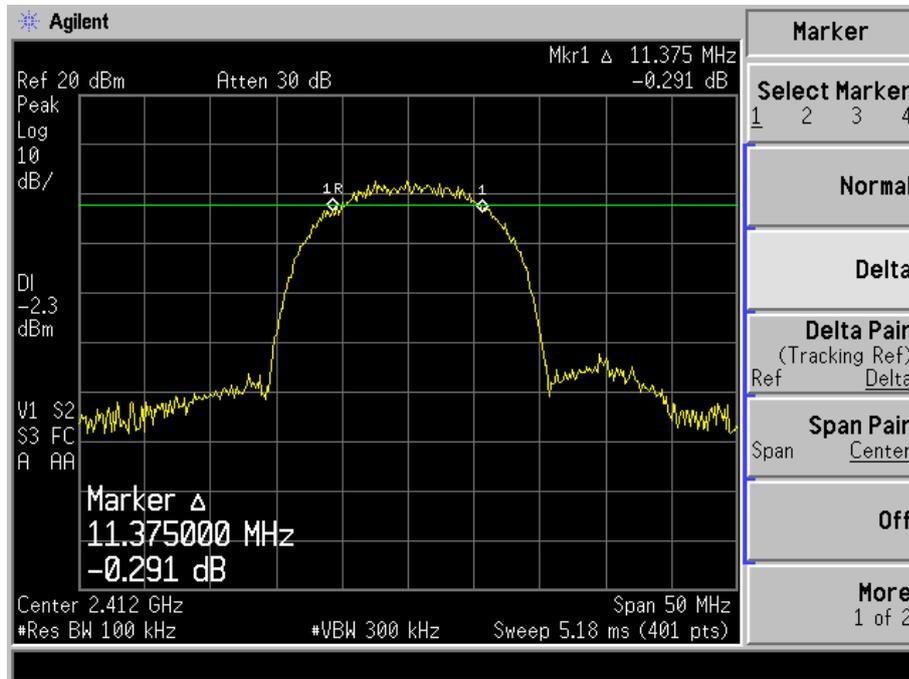


**Plot 23 - Channel 1 (lower ch) @ DQPSK 2Mbps**

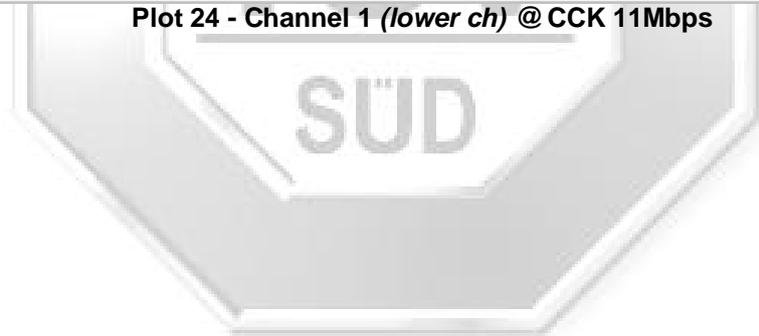


**SPECTRUM BANDWIDTH (6dB BANDWIDTH MEASUREMENT) TEST**

**Spectrum Bandwidth (6dB Bandwidth Measurement) Plots - Antenna 2 (Internal), 802.11b**



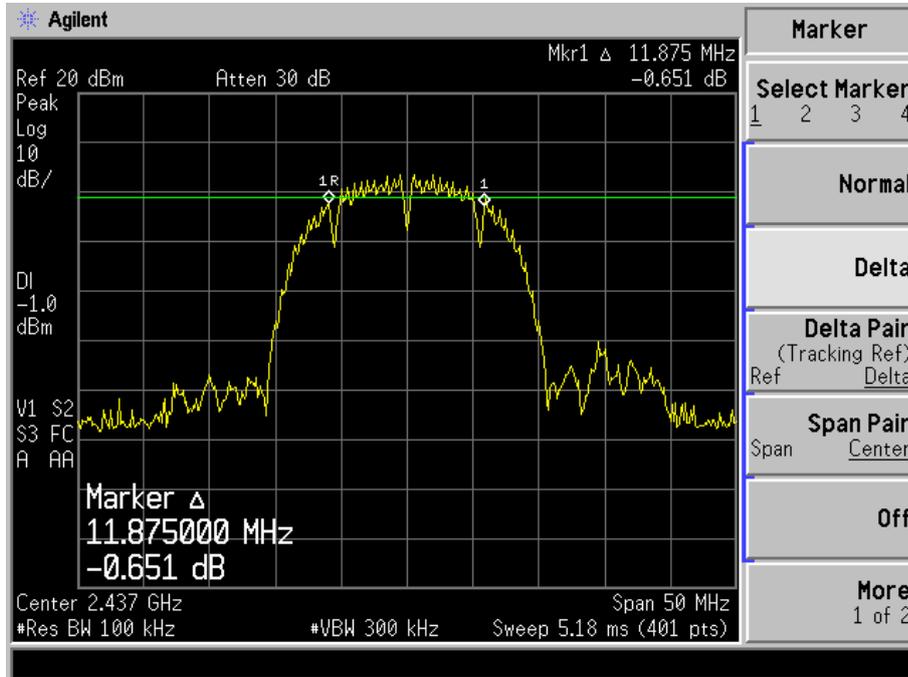
Plot 24 - Channel 1 (lower ch) @ CCK 11Mbps



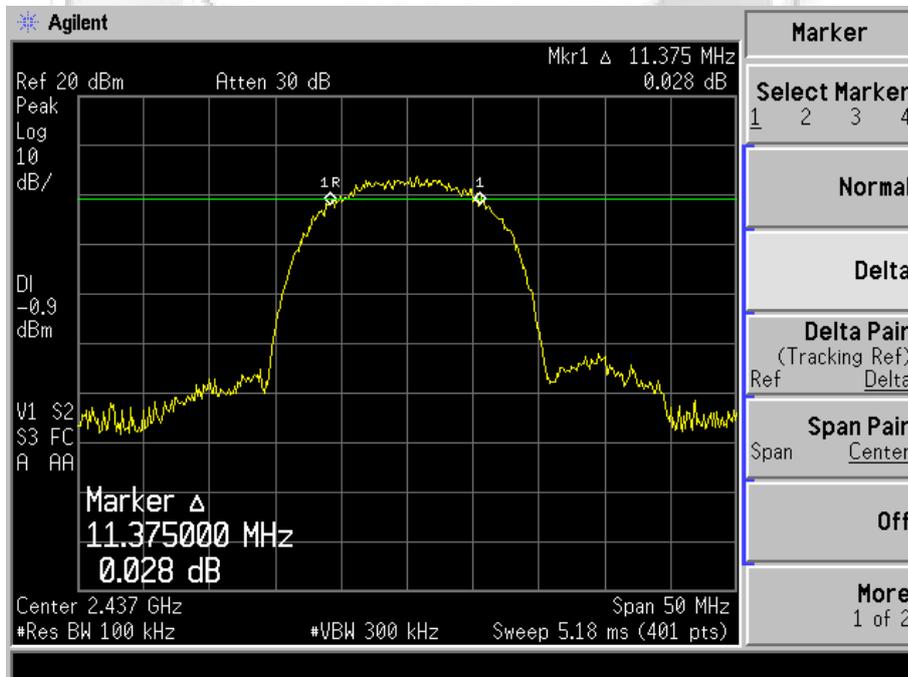


**SPECTRUM BANDWIDTH (6dB BANDWIDTH MEASUREMENT) TEST**

**Spectrum Bandwidth (6dB Bandwidth Measurement) Plots - Antenna 2 (Internal), 802.11b**



Plot 25 - Channel 6 (mid ch) @ DBPSK 1Mbps

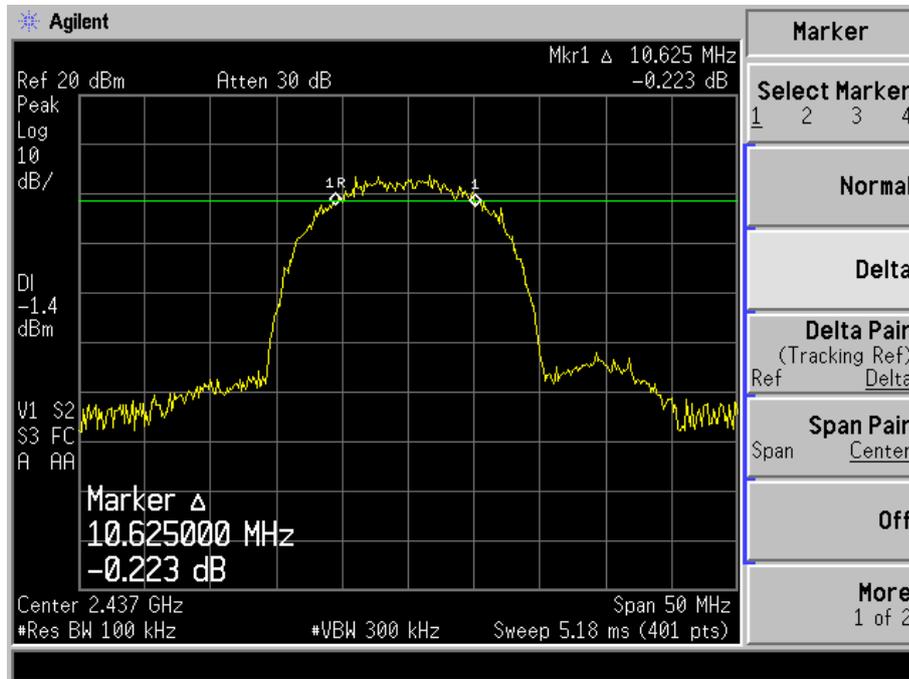


Plot 26 - Channel 6 (mid ch) @ DQPSK 2Mbps



**SPECTRUM BANDWIDTH (6dB BANDWIDTH MEASUREMENT) TEST**

**Spectrum Bandwidth (6dB Bandwidth Measurement) Plots - Antenna 2 (Internal), 802.11b**



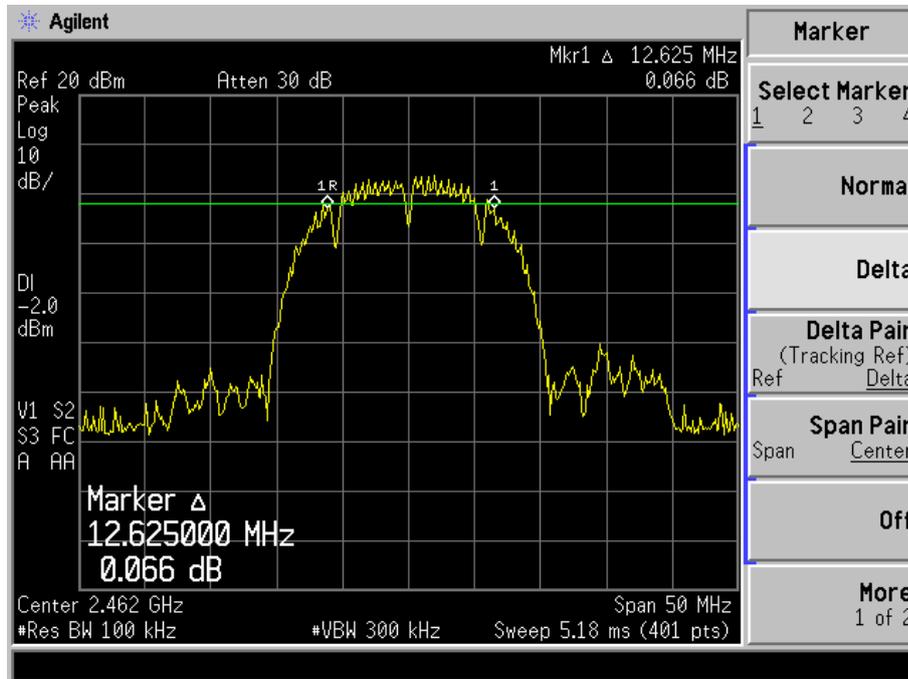
Plot 27 - Channel 6 (mid ch) @ CCK 11Mbps



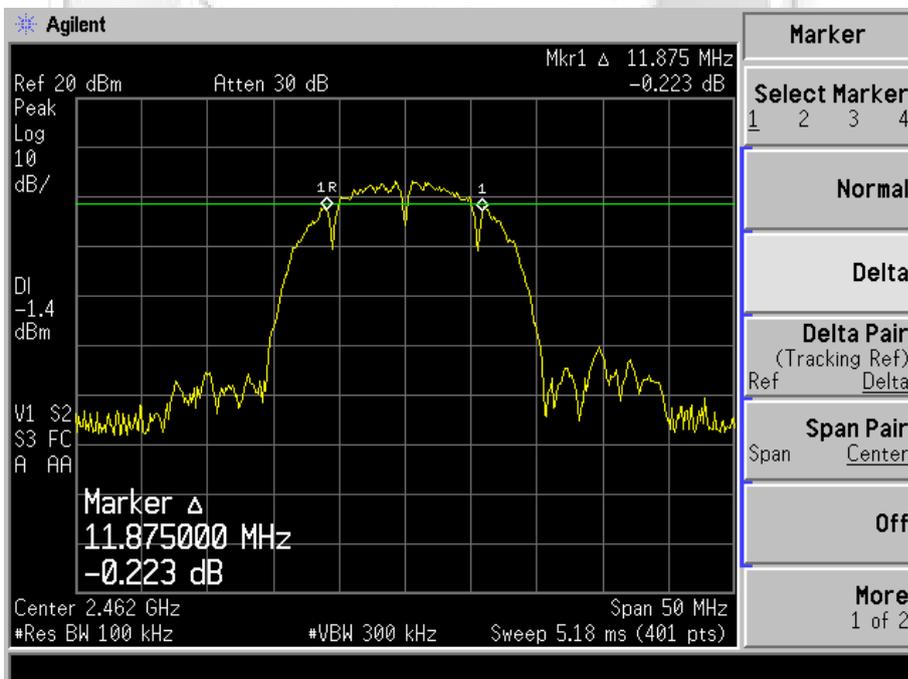


**SPECTRUM BANDWIDTH (6dB BANDWIDTH MEASUREMENT) TEST**

**Spectrum Bandwidth (6dB Bandwidth Measurement) Plots - Antenna 2 (Internal), 802.11b**



**Plot 28 - Channel 11 (upper ch) @ DBPSK 1Mbps**

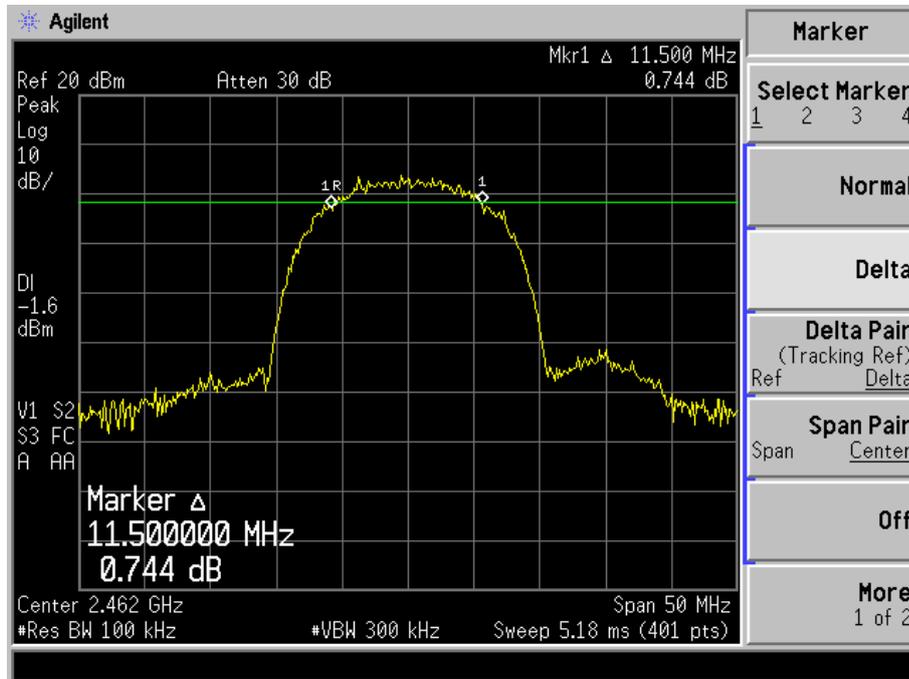


**Plot 29 - Channel 11 (upper ch) @ DQPSK 2Mbps**

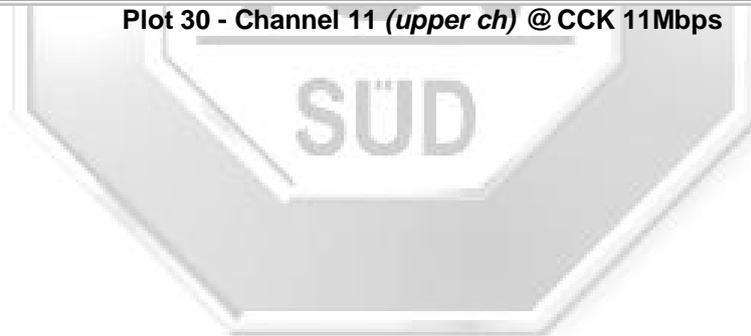


**SPECTRUM BANDWIDTH (6dB BANDWIDTH MEASUREMENT) TEST**

**Spectrum Bandwidth (6dB Bandwidth Measurement) Plots - Antenna 2 (Internal), 802.11b**



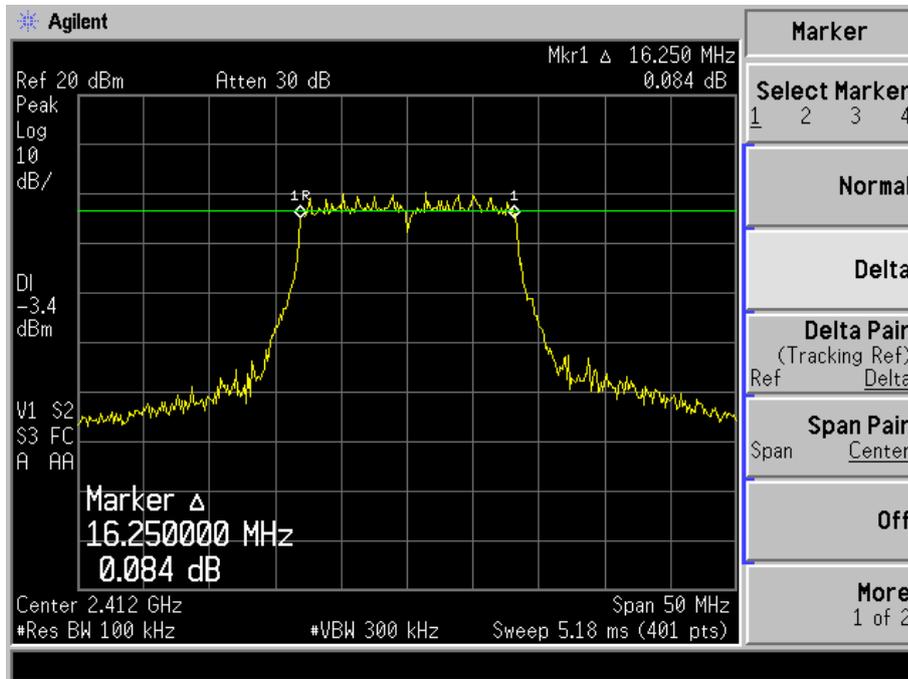
**Plot 30 - Channel 11 (upper ch) @ CCK 11Mbps**



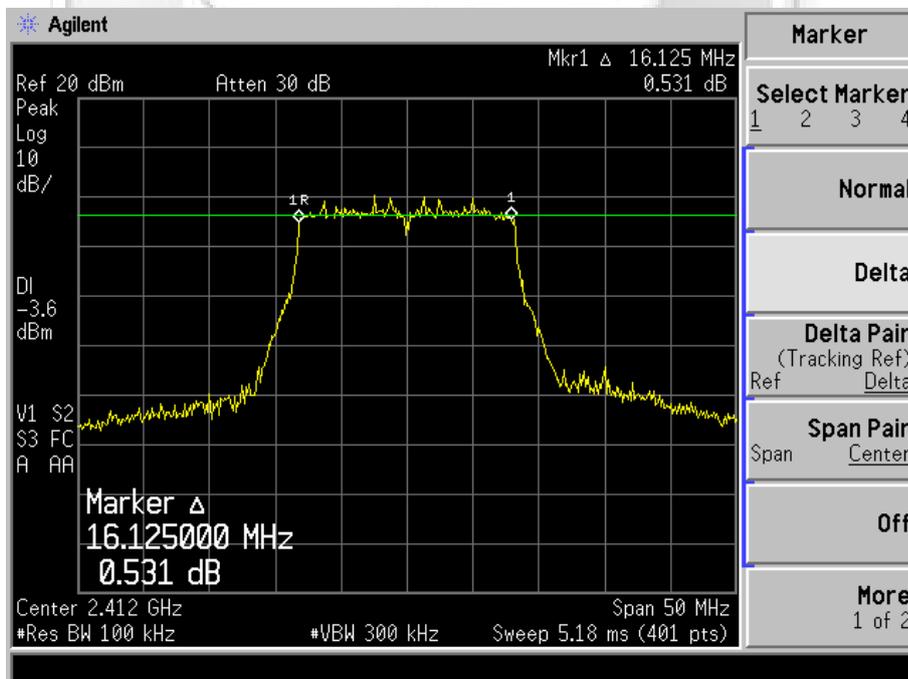


**SPECTRUM BANDWIDTH (6dB BANDWIDTH MEASUREMENT) TEST**

**Spectrum Bandwidth (6dB Bandwidth Measurement) Plots - Antenna 2 (Internal), 802.11g**



**Plot 31 - Channel 1 (lower ch) @ BPSK 9Mbps**

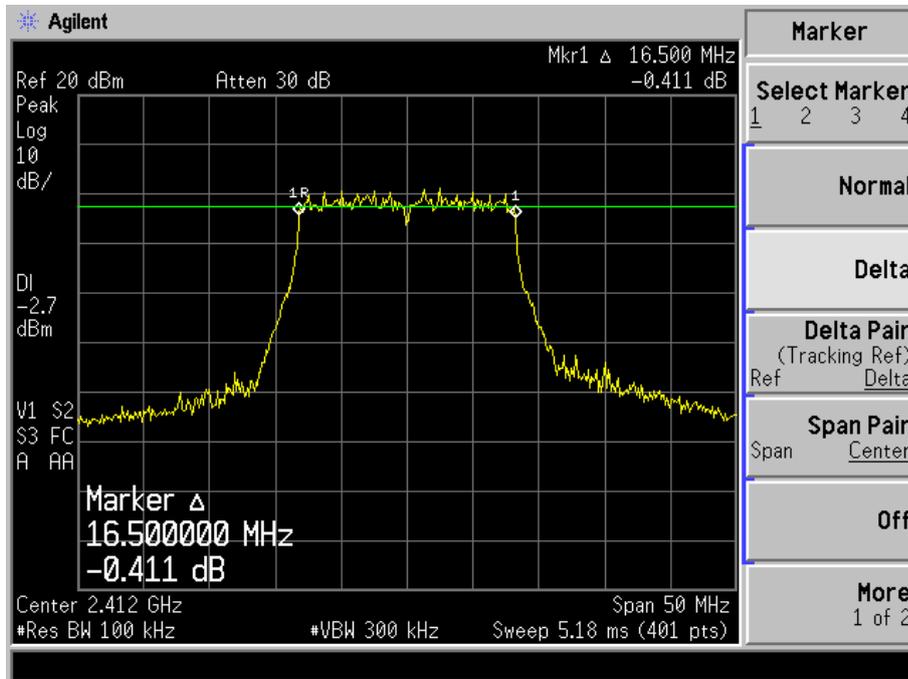


**Plot 32 - Channel 1 (lower ch) @ QPSK 18Mbps**

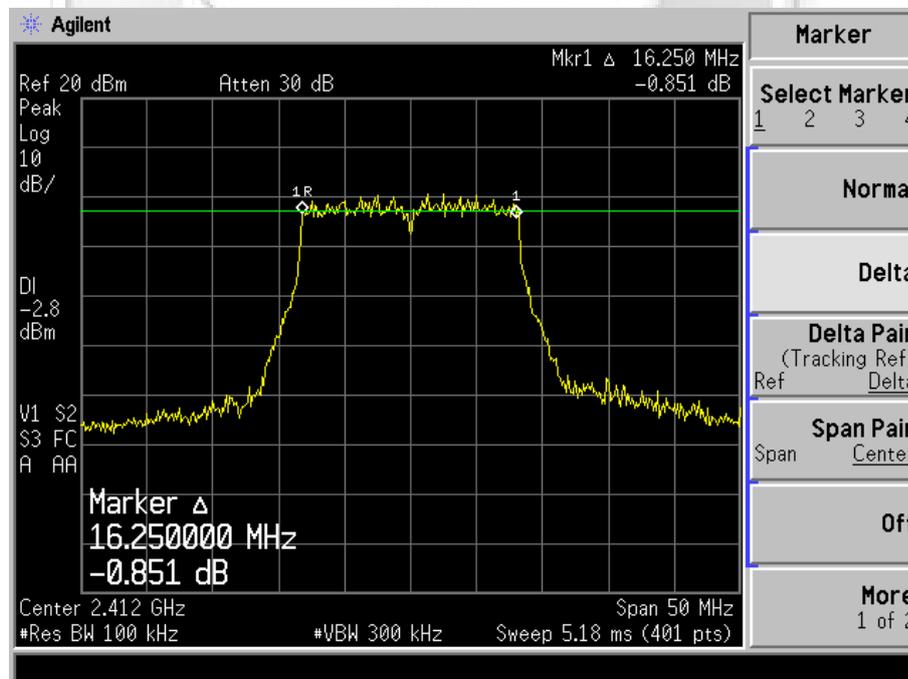


**SPECTRUM BANDWIDTH (6dB BANDWIDTH MEASUREMENT) TEST**

**Spectrum Bandwidth (6dB Bandwidth Measurement) Plots - Antenna 2 (Internal), 802.11g**



**Plot 33 - Channel 1 (lower ch) @ 16QAM 36Mbps**

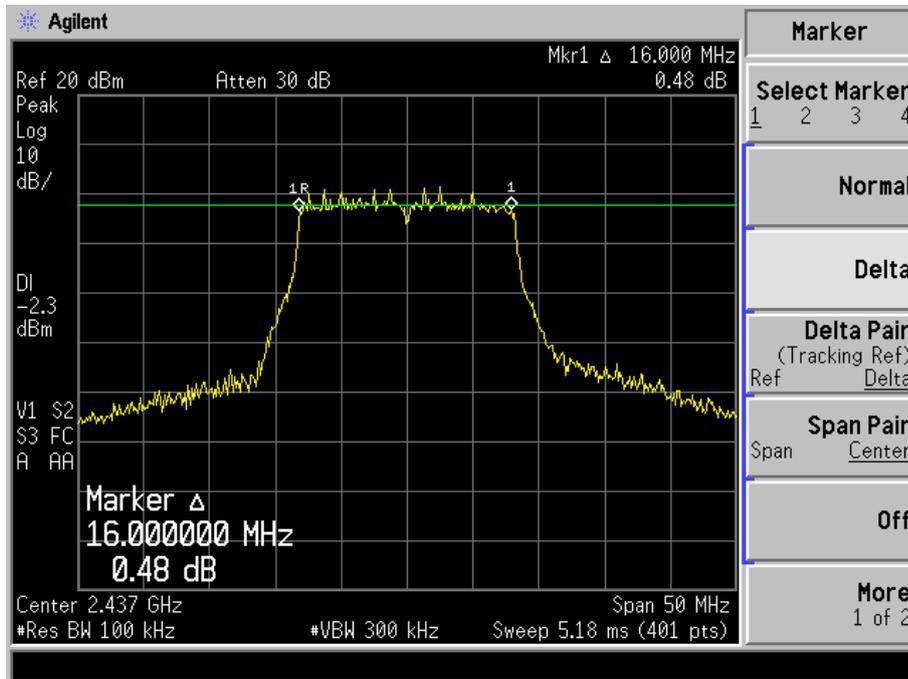


**Plot 34 - Channel 1 (lower ch) @ 64QAM 54Mbps**

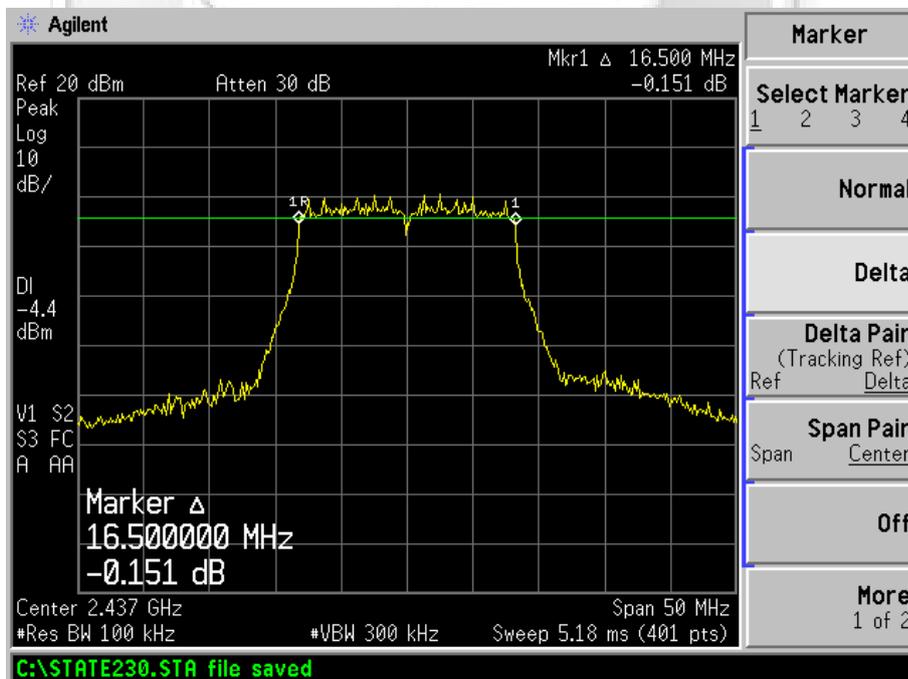


**SPECTRUM BANDWIDTH (6dB BANDWIDTH MEASUREMENT) TEST**

**Spectrum Bandwidth (6dB Bandwidth Measurement) Plots - Antenna 2 (Internal), 802.11g**



Plot 35 - Channel 6 (mid ch) @ BPSK 9Mbps

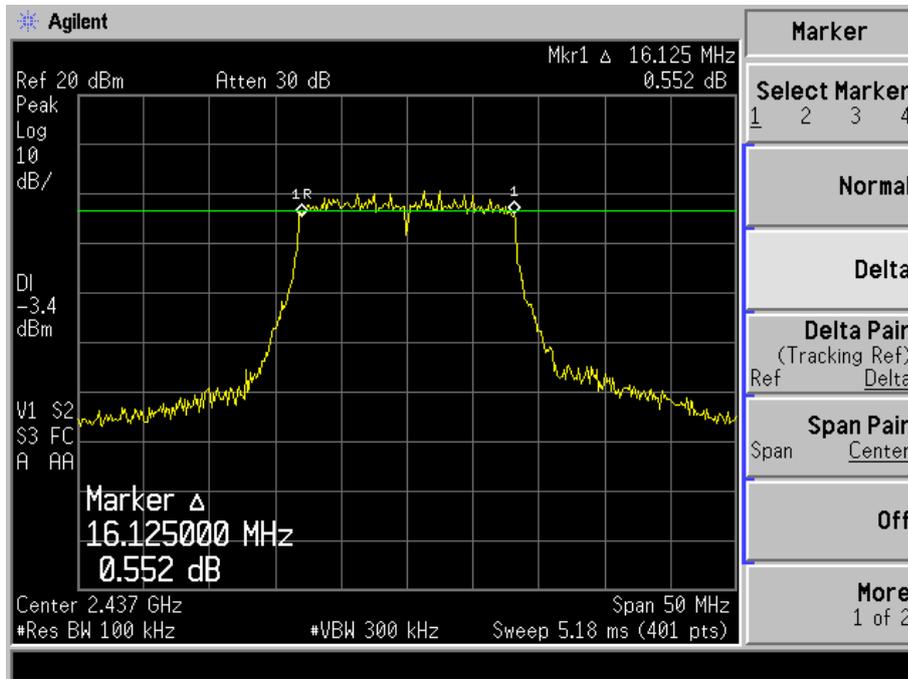


Plot 36 - Channel 6 (mid ch) @ QPSK 18Mbps

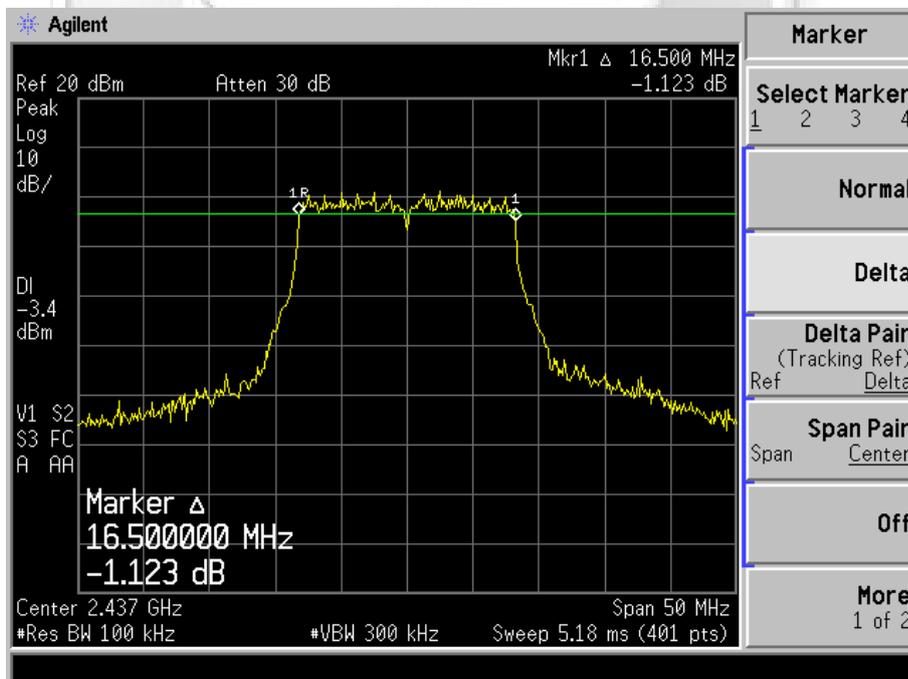


**SPECTRUM BANDWIDTH (6dB BANDWIDTH MEASUREMENT) TEST**

**Spectrum Bandwidth (6dB Bandwidth Measurement) Plots - Antenna 2 (Internal), 802.11g**



**Plot 37 - Channel 6 (mid ch) @ 16QAM 36Mbps**

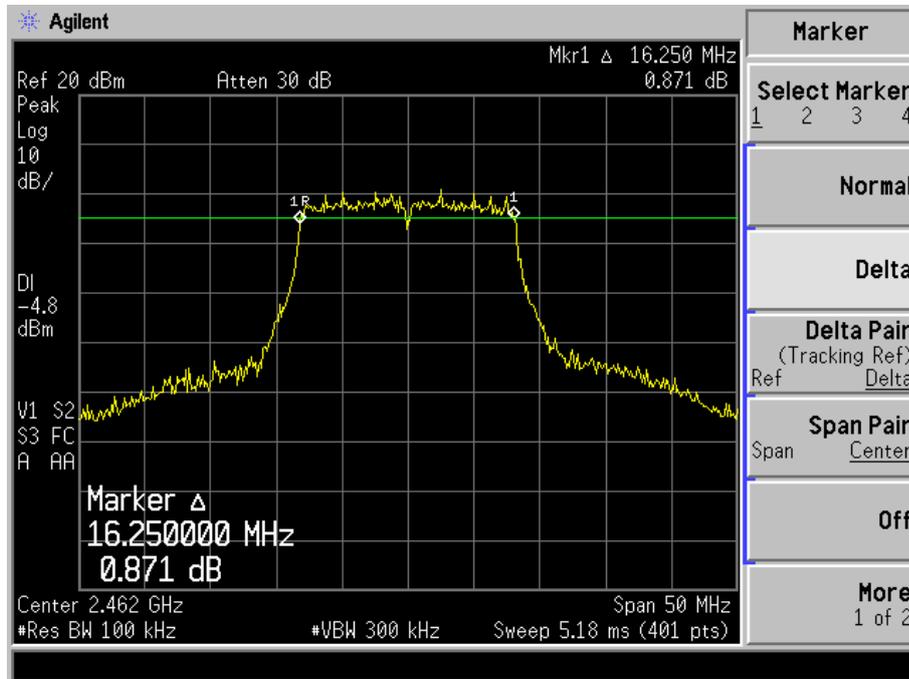


**Plot 38 - Channel 6 (mid ch) @ 64QAM 54Mbps**

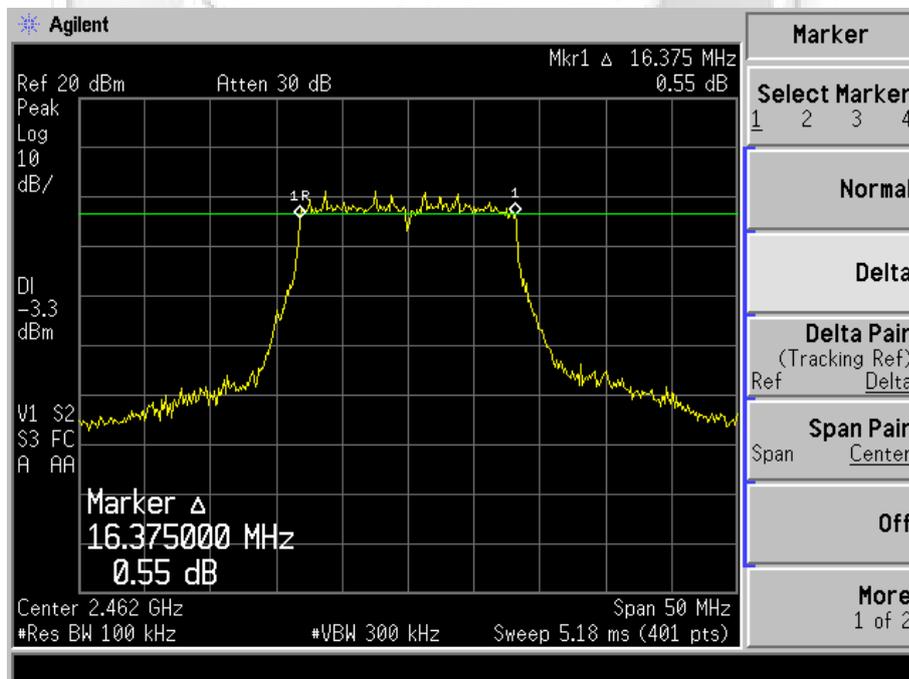


**SPECTRUM BANDWIDTH (6dB BANDWIDTH MEASUREMENT) TEST**

**Spectrum Bandwidth (6dB Bandwidth Measurement) Plots - Antenna 2 (Internal), 802.11g**



**Plot 39 - Channel 11 (upper ch) @ BPSK 9Mbps**

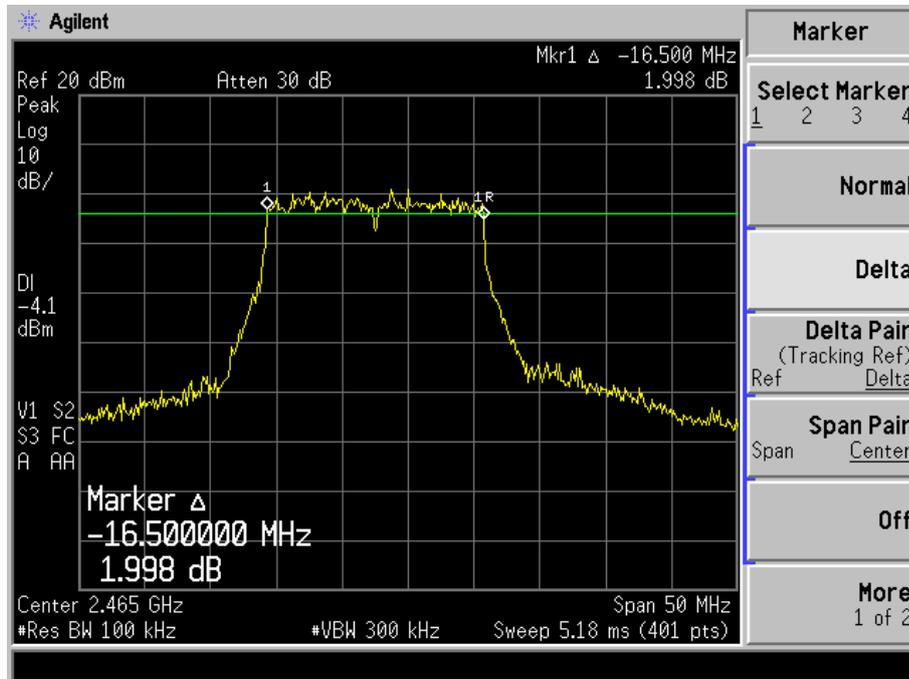


**Plot 40 - Channel 11 (upper ch) @ QPSK 18Mbps**

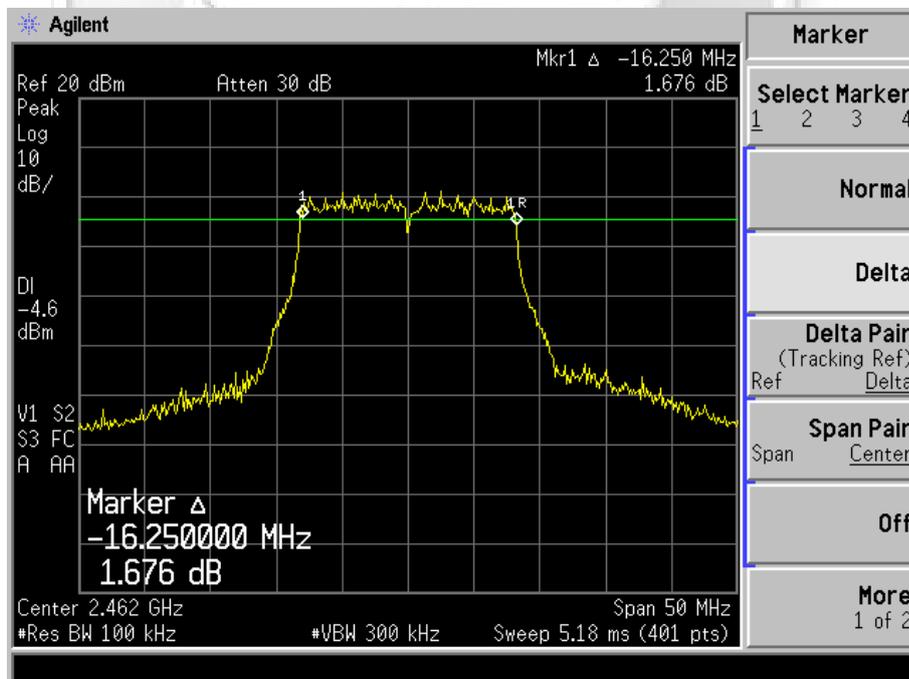


**SPECTRUM BANDWIDTH (6dB BANDWIDTH MEASUREMENT) TEST**

**Spectrum Bandwidth (6dB Bandwidth Measurement) Plots - Antenna 2 (Internal), 802.11g**



**Plot 41 - Channel 11 (upper ch) @ 16QAM 36Mbps**



**Plot 42 - Channel 11 (upper ch) @ 64QAM 54Mbps**



**MAXIMUM PEAK POWER TEST**

**47 CFR FCC Part 15.247(b)(3) Maximum Peak Power Limits**

The EUT shows compliance to the requirements of this section, which states the maximum peak power of the EUT employing digital modulation shall not exceed 1W (30dBm).

**47 CFR FCC Part 15.247(b)(3) Maximum Peak Power Test Instrumentation**

Instrument	Model	S/No	Cal Due Date
Boonton RF Power Meter	4532	72901	14 Apr 2012
Boonton Power Sensor	5618-S/1	1417	14 Apr 2012

**47 CFR FCC Part 15.247(b)(3) Maximum Peak Power Test Setup**

1. The EUT and supporting equipment were set up as shown in the setup photo.
2. The power supply for the EUT was connected to a filtered mains.
3. The RF antenna connector was connected to the power meter via a low-loss coaxial cable.
4. All other supporting equipment were powered separately from another filtered mains.

**47 CFR FCC Part 15.247(b)(3) Maximum Peak Power Test Method**

1. The EUT was switched on and allowed to warm up to its normal operating condition. The EUT was then configured to operate in the test mode at Channel 1 (2.412GHz) (*lower ch*) with specified modulation and data rate.
2. The maximum peak power of the transmitting frequency was detected and recorded.
3. The Equivalent Isotropic Radiated Power (EIRP) of the EUT was computed by adding its antenna gain to the measured maximum peak power.
4. Repeat steps 1 to 3 with all possible modulations and data rates.
5. The steps 2 to 4 were repeated with the transmitting frequency was set to Channel 6 (2.437GHz) (*mid ch*) and Channel 11 (2.462GHz) (*upper ch*) respectively.



**MAXIMUM PEAK POWER TEST**

**47 CFR FCC Part 15.247(b)(3) Maximum Peak Power Results**

Test Input Power	120V 60Hz	Temperature	23°C
Antenna Gain	0.35 dBi	Relative Humidity	55%
Antenna	1 (external)	Atmospheric Pressure	1030mbar
		Tested By	Kyaw Soe Hein

**802.11b**

Channel	Channel Frequency (GHz)	Maximum Peak Power (W)	Maximum EIRP (W)	Limit (W)	Modulation @ Data Rate
1	2.412	0.0089	0.0096	1.0	DBPSK @ 1Mbps
		0.0092	0.0100	1.0	DQPSK @ 2Mbps
		0.0074	0.0080	1.0	CCK @ 11Mbps
6	2.437	0.0102	0.0111	1.0	DBPSK @ 1Mbps
		0.0100	0.0108	1.0	DQPSK @ 2Mbps
		0.0085	0.0092	1.0	CCK @ 11Mbps
11	2.462	0.0113	0.0122	1.0	DBPSK @ 1Mbps
		0.0108	0.0117	1.0	DQPSK @ 2Mbps
		0.0090	0.0098	1.0	CCK @ 11Mbps

**802.11g**

Channel	Channel Frequency (GHz)	Maximum Peak Power (W)	Maximum EIRP (W)	Limit (W)	Modulation @ Data Rate
1	2.412	0.0059	0.0064	1.0	BPSK @ 9Mbps
		0.0056	0.0061	1.0	QPSK @ 18Mbps
		0.0045	0.0049	1.0	16QAM @ 36Mbps
		0.0038	0.0041	1.0	64QAM @ 54Mbps
6	2.437	0.0058	0.0063	1.0	BPSK @ 9Mbps
		0.0057	0.0062	1.0	QPSK @ 18Mbps
		0.0047	0.0051	1.0	16QAM @ 36Mbps
		0.0042	0.0046	1.0	64QAM @ 54Mbps
11	2.462	0.0090	0.0098	1.0	BPSK @ 9Mbps
		0.0066	0.0072	1.0	QPSK @ 18Mbps
		0.0063	0.0068	1.0	16QAM @ 36Mbps
		0.0051	0.0055	1.0	64QAM @ 54Mbps

**Notes**

1. Nil.



**MAXIMUM PEAK POWER TEST**

**47 CFR FCC Part 15.247(b)(3) Maximum Peak Power Results**

Test Input Power	120V 60Hz	Temperature	23°C
Antenna Gain	0.35 dBi	Relative Humidity	55%
Antenna	2 (internal)	Atmospheric Pressure	1030mbar
		Tested By	Kyaw Soe Hein

**802.11b**

Channel	Channel Frequency (GHz)	Maximum Peak Power (W)	Maximum EIRP (W)	Limit (W)	Modulation @ Data Rate
1	2.412	0.0021	0.0023	1.0	DBPSK @ 1Mbps
		0.0020	0.0022	1.0	DQPSK @ 2Mbps
		0.0019	0.0021	1.0	CCK @ 11Mbps
6	2.437	0.0030	0.0033	1.0	DBPSK @ 1Mbps
		0.0030	0.0033	1.0	DQPSK @ 2Mbps
		0.0028	0.0030	1.0	CCK @ 11Mbps
11	2.462	0.0041	0.0044	1.0	DBPSK @ 1Mbps
		0.0040	0.0043	1.0	DQPSK @ 2Mbps
		0.0040	0.0043	1.0	CCK @ 11Mbps

**802.11g**

Channel	Channel Frequency (GHz)	Maximum Peak Power (W)	Maximum EIRP (W)	Limit (W)	Modulation @ Data Rate
1	2.412	0.0022	0.0024	1.0	BPSK @ 9Mbps
		0.0020	0.0022	1.0	QPSK @ 18Mbps
		0.0020	0.0022	1.0	16QAM @ 36Mbps
		0.0022	0.0024	1.0	64QAM @ 54Mbps
6	2.437	0.0063	0.0068	1.0	BPSK @ 9Mbps
		0.0030	0.0033	1.0	QPSK @ 18Mbps
		0.0032	0.0035	1.0	16QAM @ 36Mbps
		0.0032	0.0035	1.0	64QAM @ 54Mbps
11	2.462	0.0040	0.0043	1.0	BPSK @ 9Mbps
		0.0042	0.0046	1.0	QPSK @ 18Mbps
		0.0043	0.0047	1.0	16QAM @ 36Mbps
		0.0041	0.0044	1.0	64QAM @ 54Mbps

**Notes**

1. Nil.



**RF CONDUCTED SPURIOUS EMISSIONS TEST**

**47 CFR FCC Part 15.247(d) RF Conducted Spurious Emissions Limits**

The EUT shows compliance to the requirements of this section, which states in any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator (EUT) is operating, the radio frequency power that is produced by the EUT shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of desired power.

**47 CFR FCC Part 15.247(d) RF Conducted Spurious Test Instrumentation**

Instrument	Model	S/No	Cal Due Date
Agilent EMC Analyzer (9kHz-26.5GHz)	E7405A	US40240195	16 Mar 2012

**47 CFR FCC Part 15.247(d) RF Conducted Spurious Emissions Test Setup**

1. The EUT and supporting equipment were set up as shown in the setup photo.
2. The power supply for the EUT was connected to a filtered mains.
3. The RF antenna connector was connected to the spectrum analyser via a low-loss coaxial cable.
4. The resolution bandwidth (RBW) and the video bandwidth (VBW) of the spectrum analyser were respectively set to 100kHz and 300kHz.
5. All other supporting equipment were powered separately from another filtered mains.

**47 CFR FCC Part 15.247(d) RF Conducted Spurious Emissions Test Method**

1. The EUT was switched on and allowed to warm up to its normal operating condition. The EUT was then configured to operate in the test mode, non-hopping with transmitting frequency at Channel 1 (2.412GHz) (*lower ch*) with specified modulation and data rate.
2. The start and stop frequencies of the spectrum analyser were set to 30MHz and 10GHz.
3. The spectrum analyser was set to max hold to capture any spurious emissions within the span. The signal capturing was continuous until no further spurious emissions were detected.
4. The steps 2 to 3 were repeated with frequency span was set from 10GHz to 25GHz.
5. Repeat steps 1 to 4 with all possible modulations and data rates.
6. The steps 2 to 5 were repeated with the transmitting frequency was set to Channel 6 (2.437GHz) (*mid ch*) and Channel 11 (2.462GHz) (*upper ch*) respectively.



**RF CONDUCTED SPURIOUS EMISSIONS TEST**

**47 CFR FCC Part 15.247(d) RF Conducted Spurious Emissions Results**

Test Input Power	120V 60Hz	Temperature	23°C
Attached Plots	43 - 84	Relative Humidity	55%
Antenna	1 (external)	Atmospheric Pressure	1030mbar
		Tested By	Kyaw Soe Hein

All spurious signals found were below the specified limit. Please refer to the attached plots.

Test Input Power	120V 60Hz	Temperature	23°C
Attached Plots	85 - 126	Relative Humidity	55%
Antenna	2 (internal)	Atmospheric Pressure	1030mbar
		Tested By	Kyaw Soe Hein

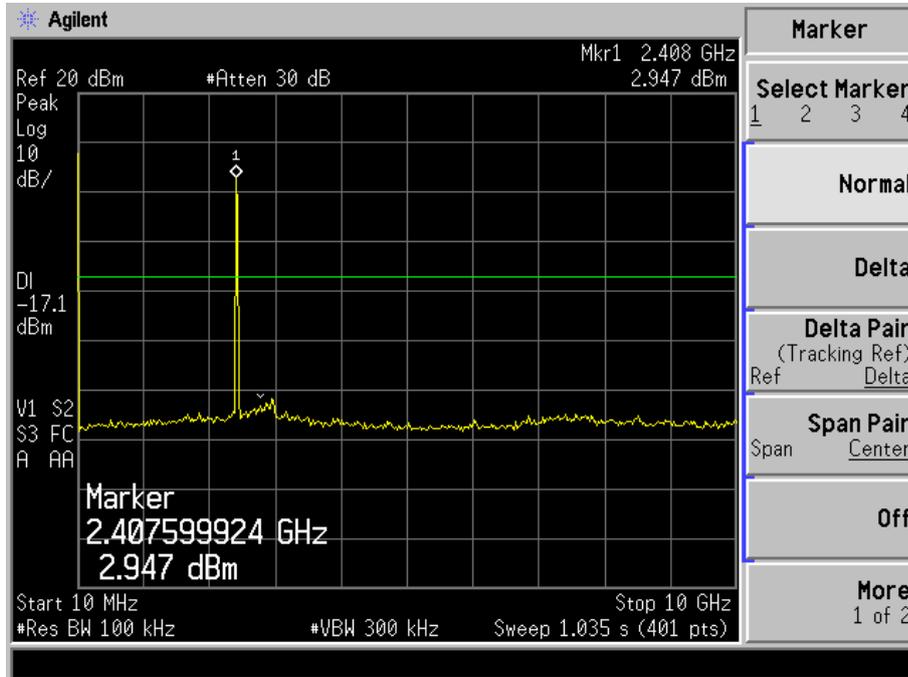
All spurious signals found were below the specified limit. Please refer to the attached plots.



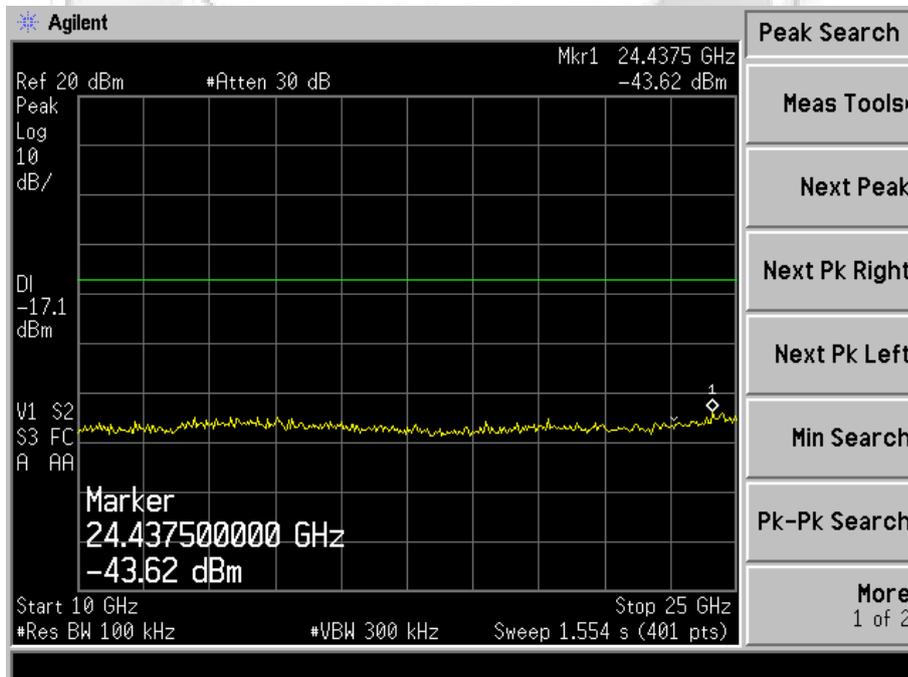


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 1 (External), 802.11b



Plot 43 – Channel 1 (lower ch) @ DBPSK 1Mbps

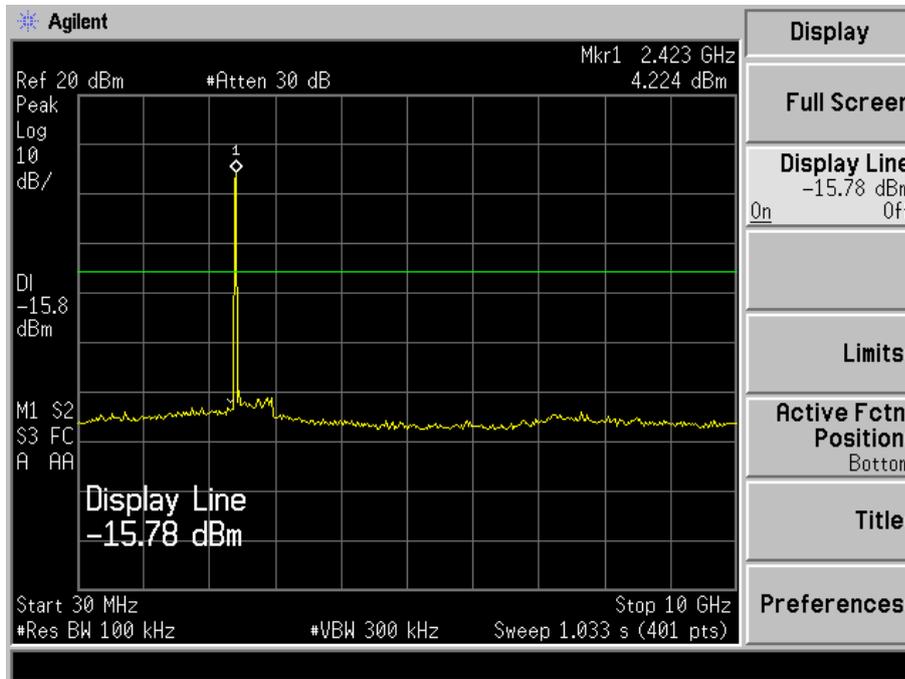


Plot 44 – Channel 1 (lower ch) @ DBPSK 1Mbps

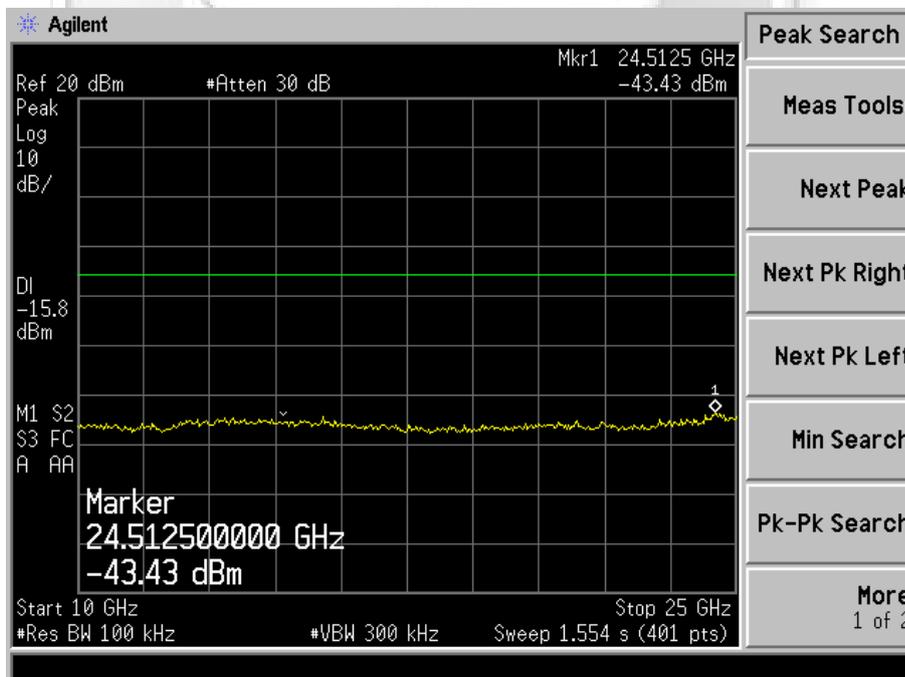


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 1 (External), 802.11b



Plot 45 – Channel 1 (lower ch) @ DQPSK 2Mbps

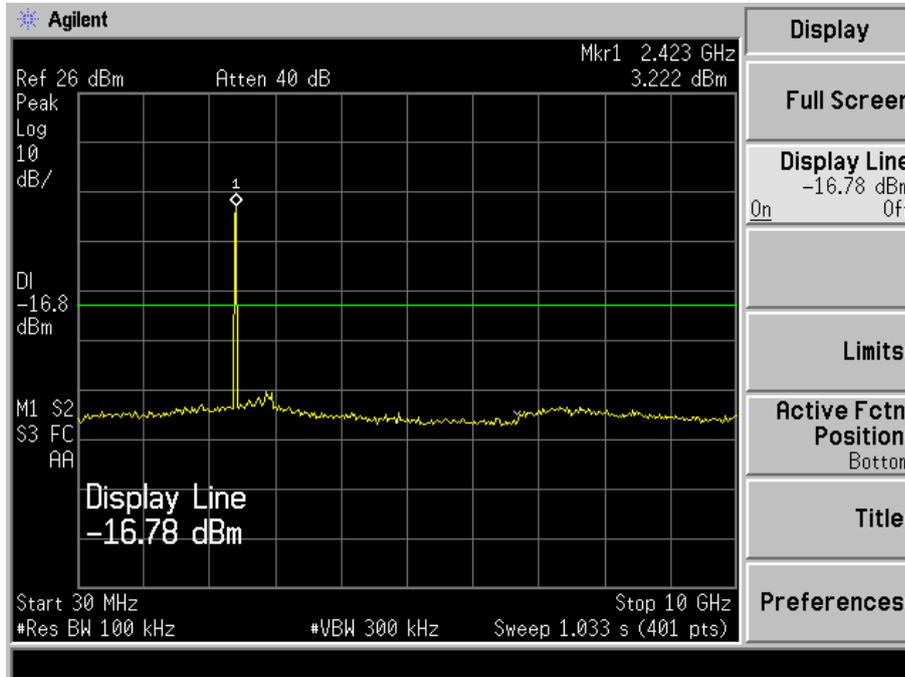


Plot 46 – Channel 1 (lower ch) @ DQPSK 2Mbps

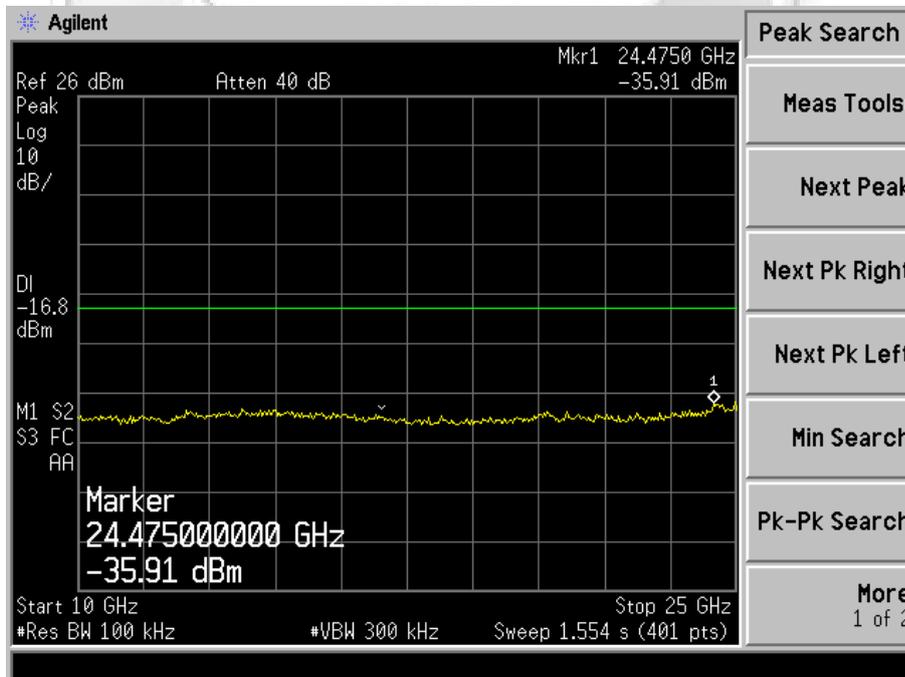


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 1 (External), 802.11b



Plot 47 – Channel 1 (lower ch) @ CCK 11Mbps

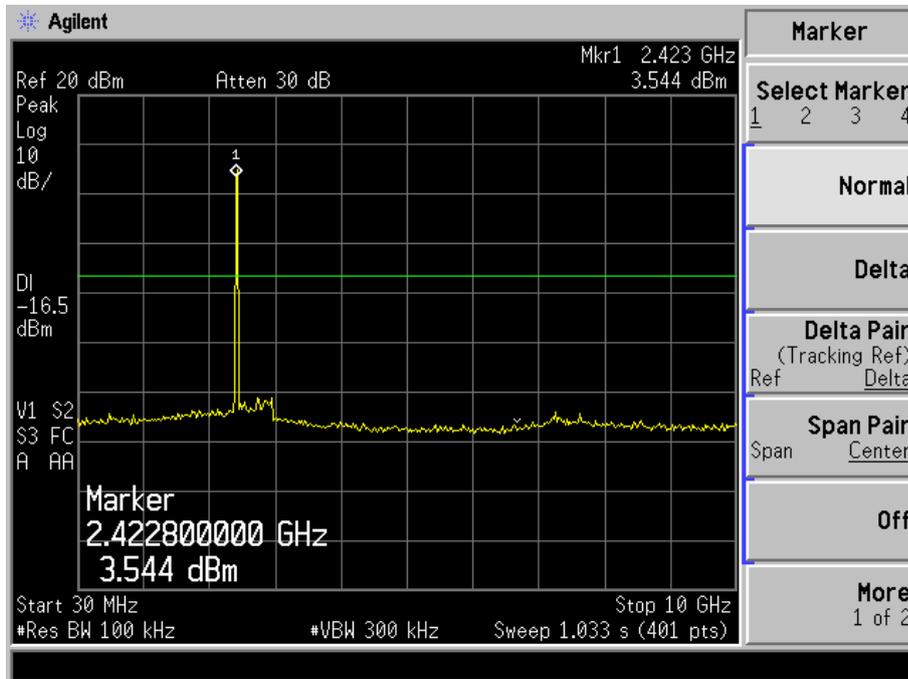


Plot 48 – Channel 1 (lower ch) @ CCK 11Mbps

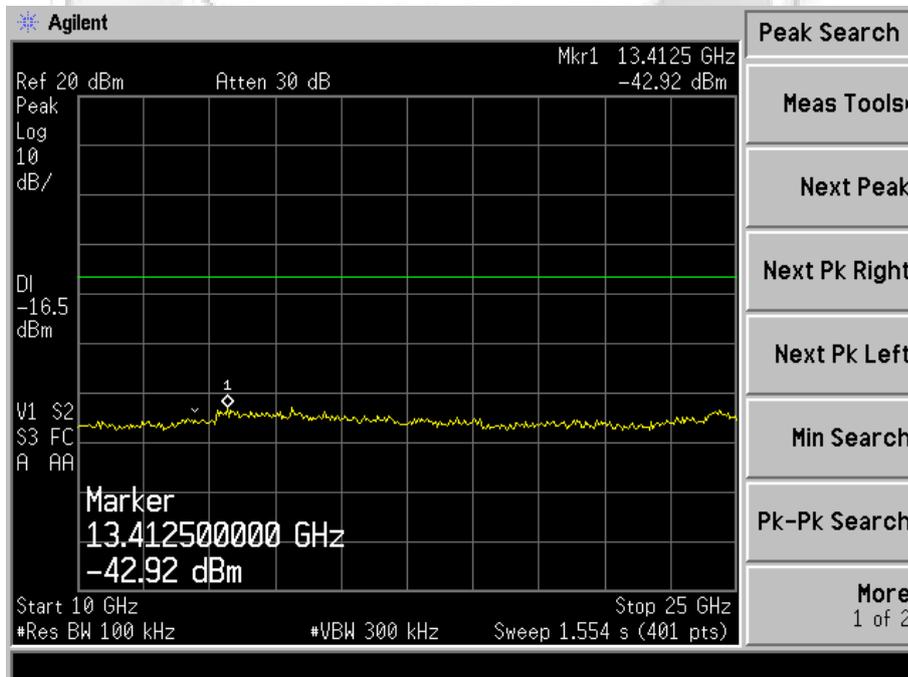


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 1 (External), 802.11b



Plot 49 – Channel 6 (mid ch) @ DBPSK 1Mbps

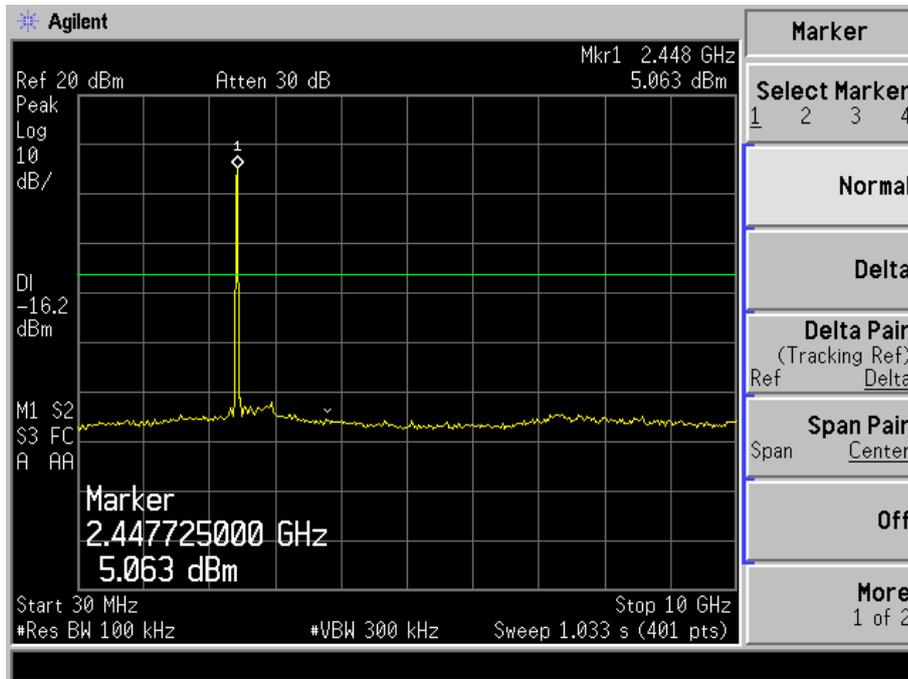


Plot 50 – Channel 6 (mid ch) @ DBPSK 1Mbps

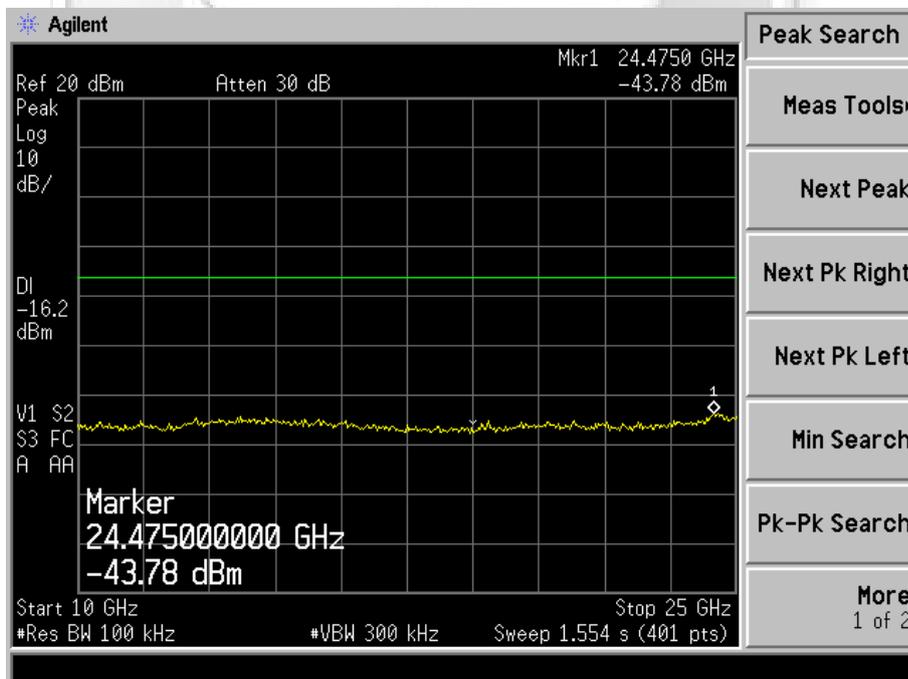


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 1 (External), 802.11b



Plot 51 – Channel 6 (mid ch) @ DQPSK 2Mbps

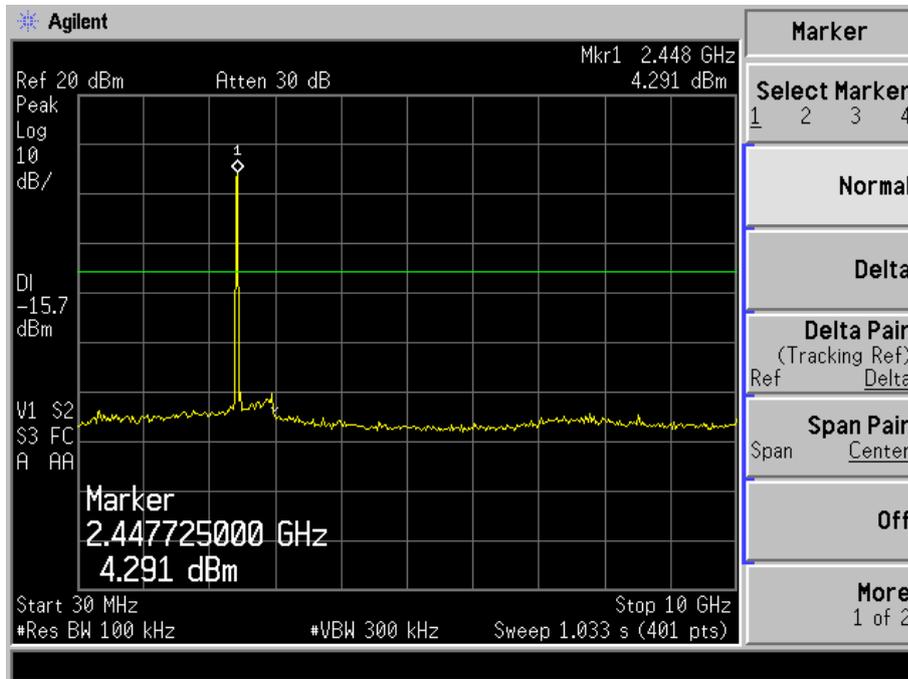


Plot 52 – Channel 6 (mid ch) @ DQPSK 2Mbps

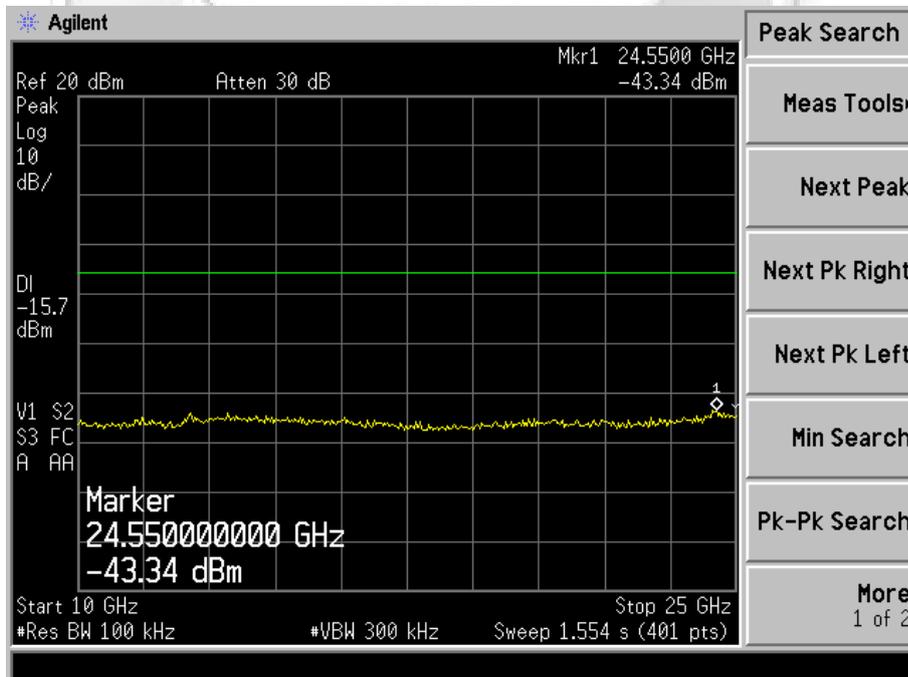


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 1 (External), 802.11b



Plot 53 – Channel 6 (mid ch) @ CCK 11Mbps

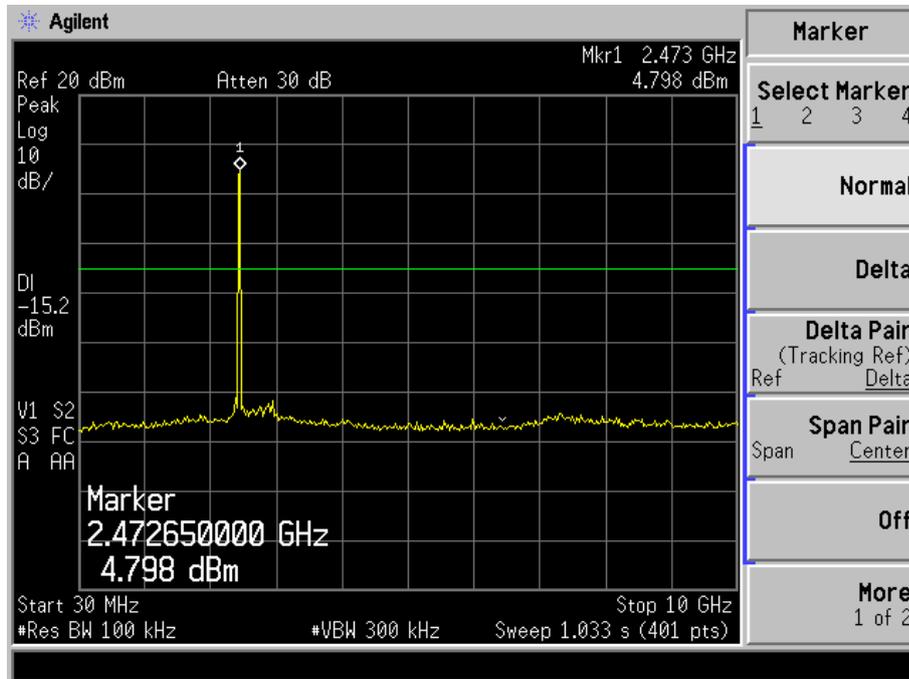


Plot 54 – Channel 6 (mid ch) @ CCK 11Mbps

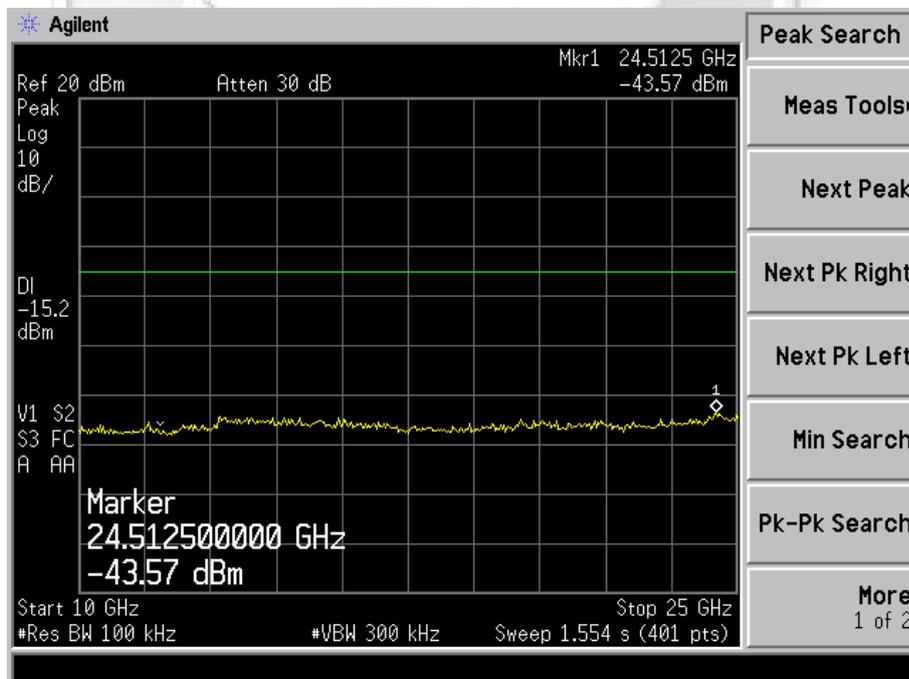


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 1 (External), 802.11b



Plot 55 – Channel 11 (upper ch) @ DBPSK 1Mbps

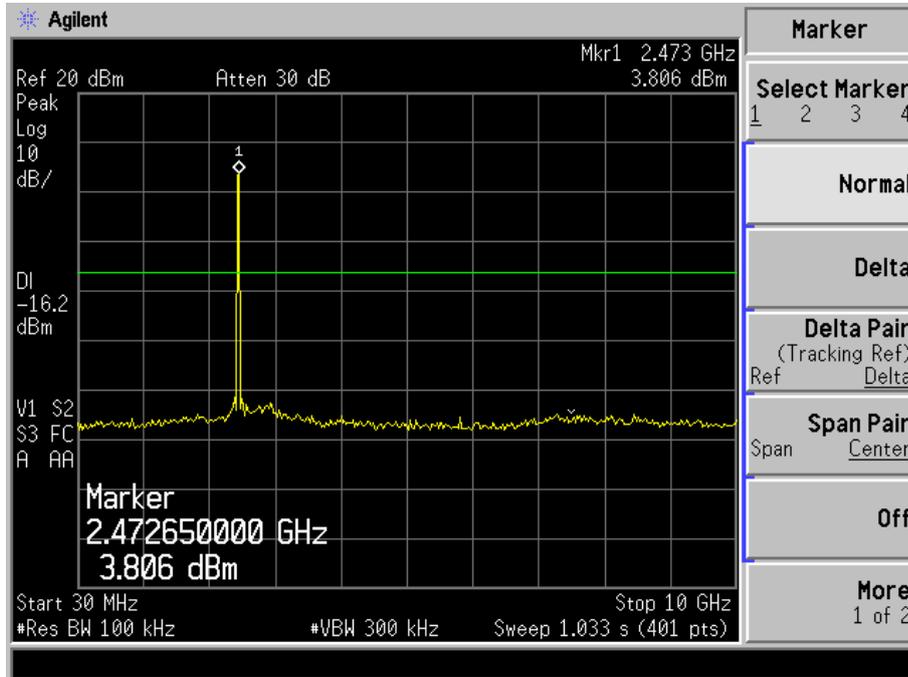


Plot 56 – Channel 11 (upper ch) @ DBPSK 1Mbps

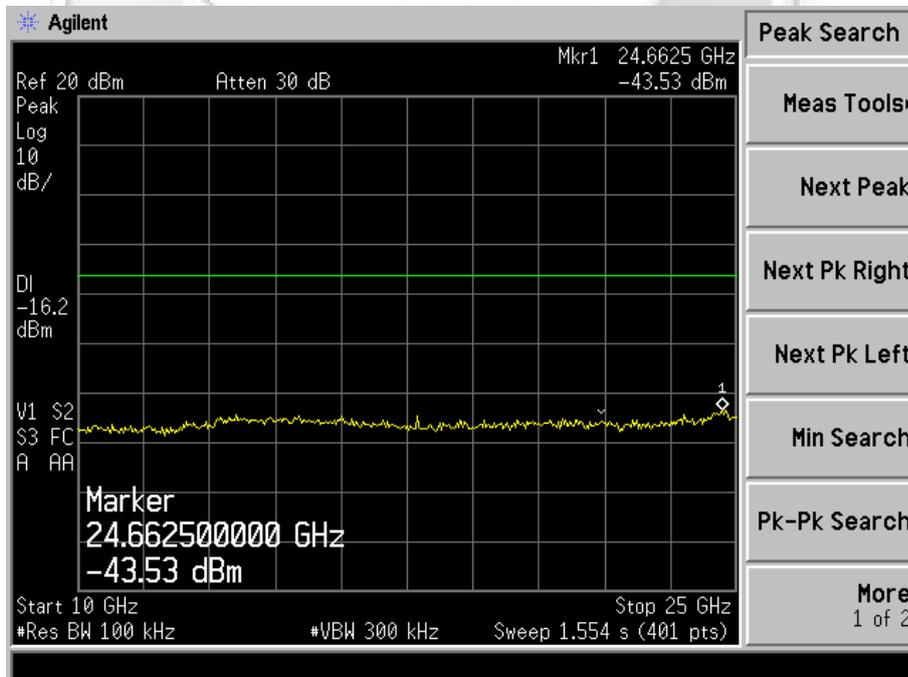


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 1 (External), 802.11b



Plot 57 – Channel 11 (upper ch) @ DQPSK 2Mbps

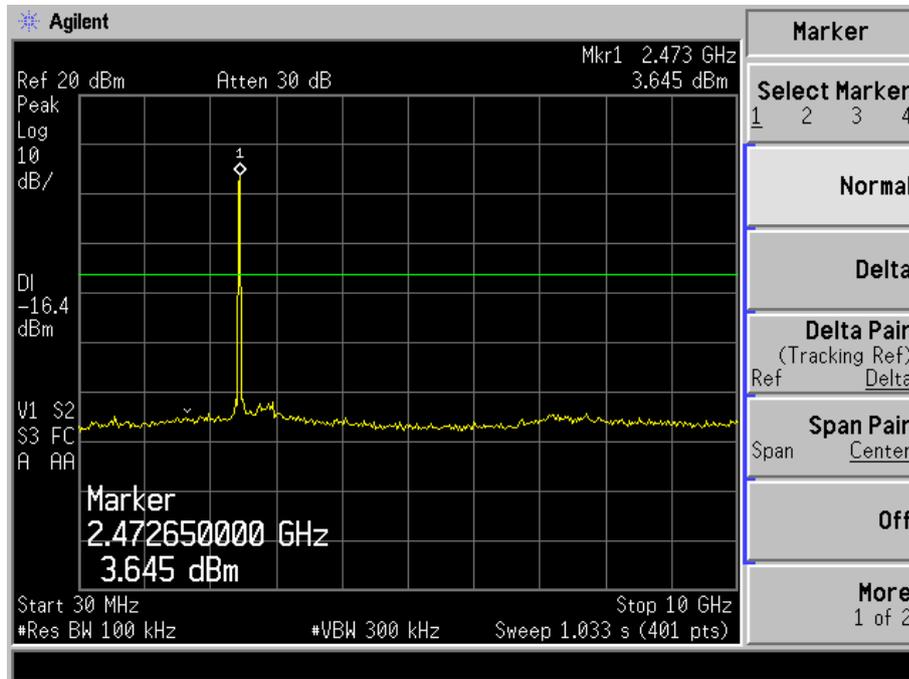


Plot 58 – Channel 11 (upper ch) @ DQPSK 2Mbps

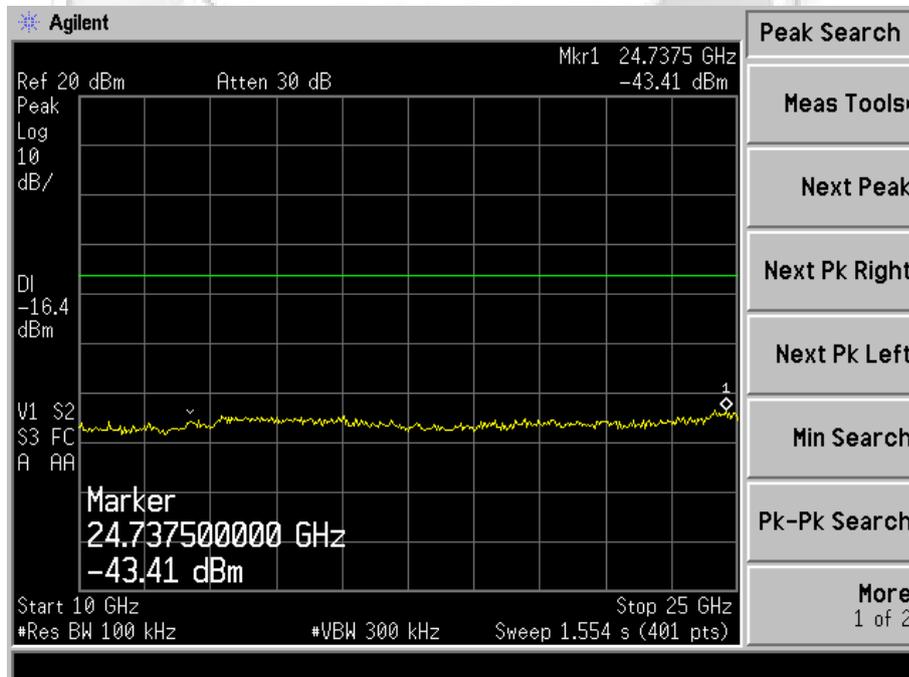


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 1 (External), 802.11b



Plot 59 – Channel 11 (upper ch) @ CCK 11Mbps

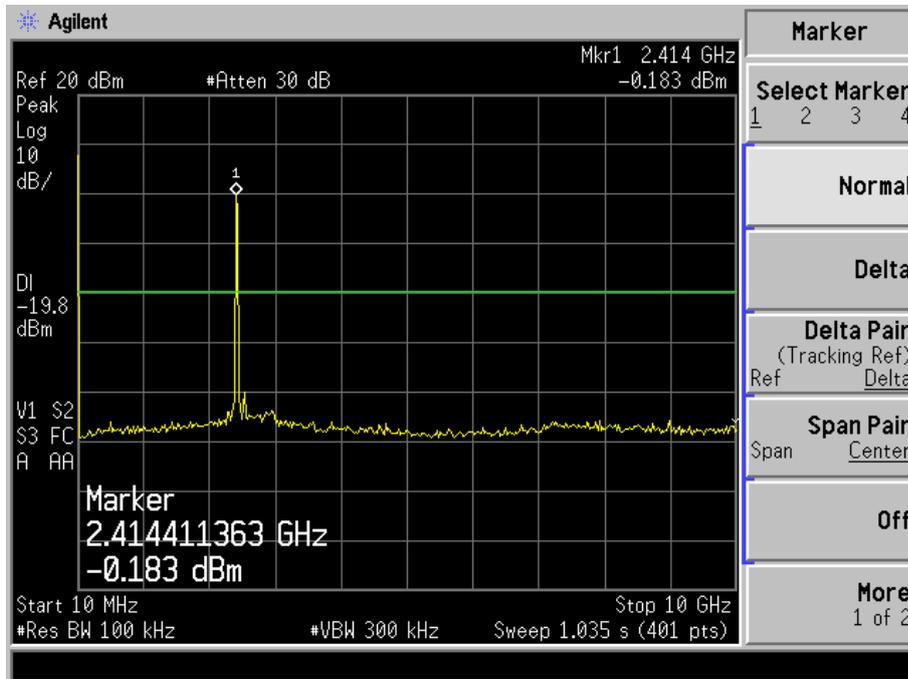


Plot 60 – Channel 11 (upper ch) @ CCK 11Mbps

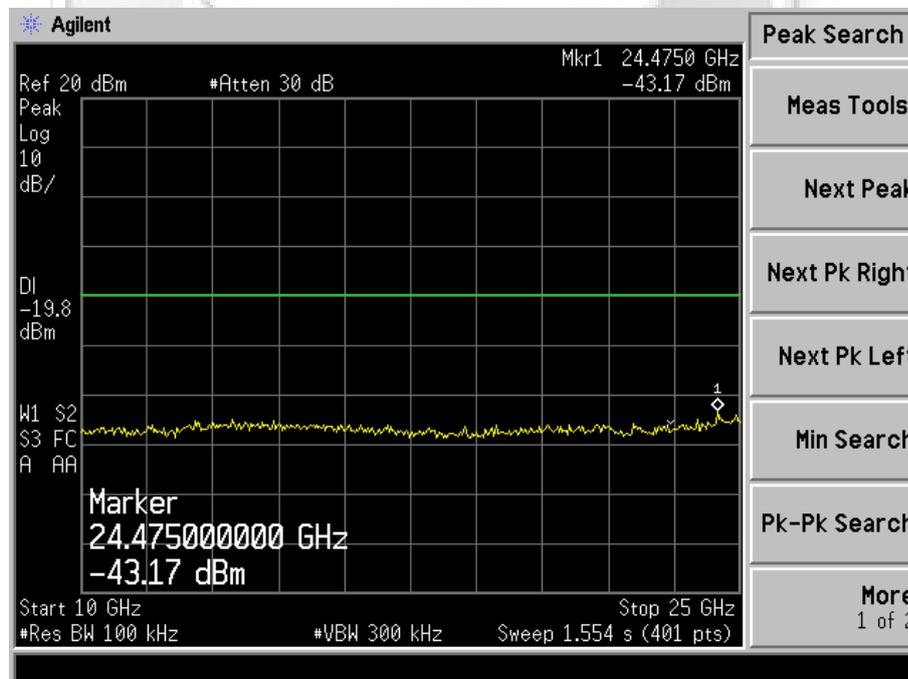


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 1 (External), 802.11g



Plot 61 – Channel 1 (lower ch) @ BPSK 9Mbps

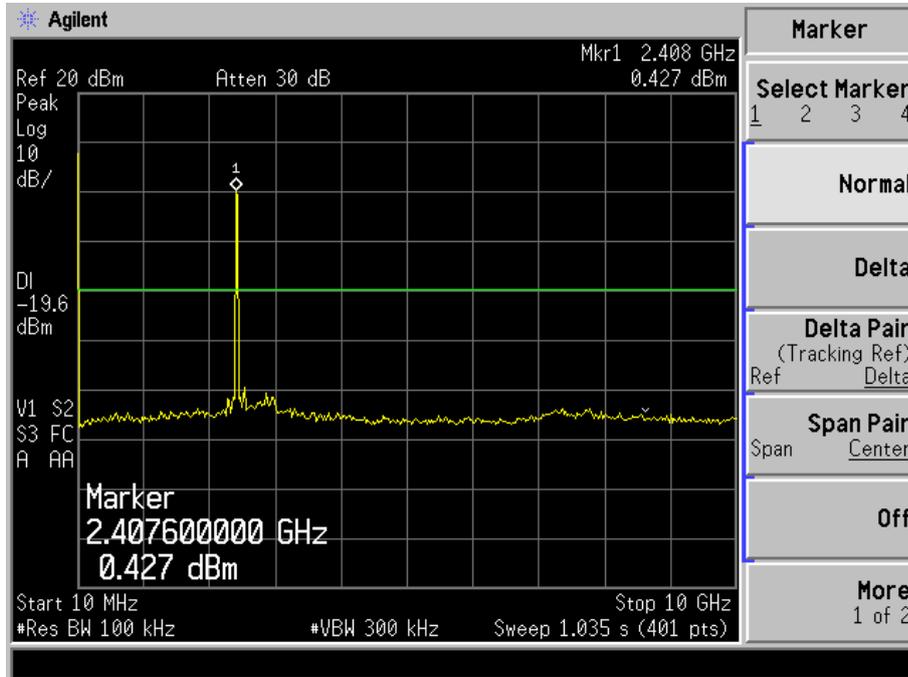


Plot 62 – Channel 1 (lower ch) @ BPSK 9Mbps

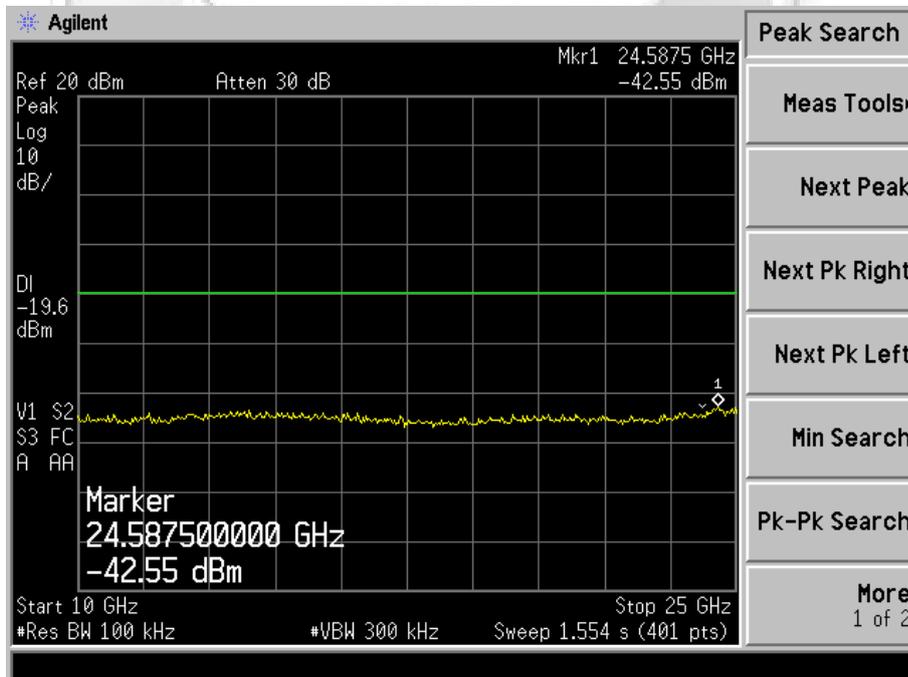


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 1 (External), 802.11g



Plot 63 – Channel 1 (lower ch) @ QPSK 18Mbps

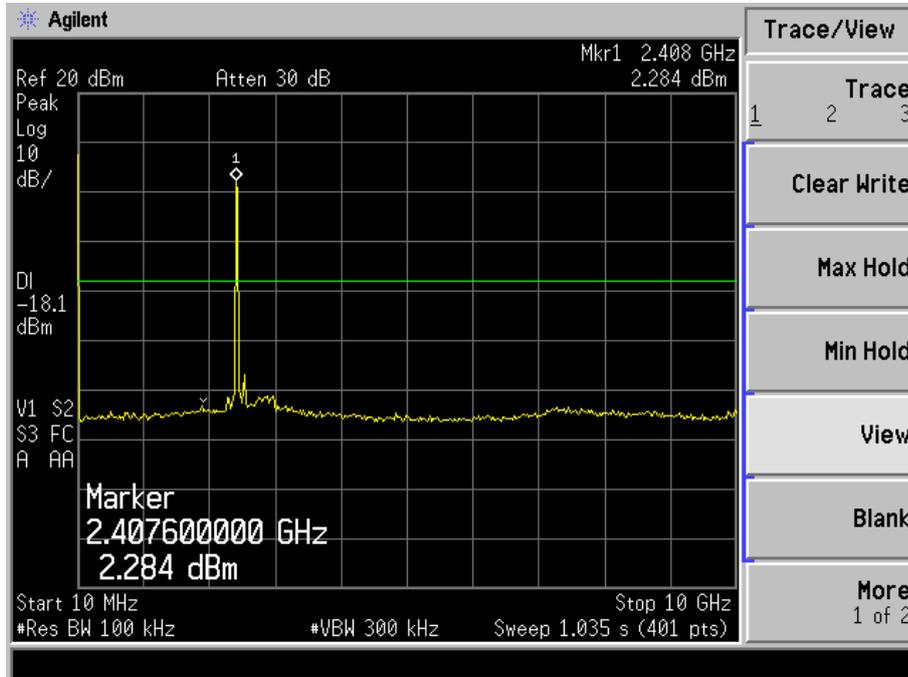


Plot 64 – Channel 1 (lower ch) @ QPSK 18Mbps

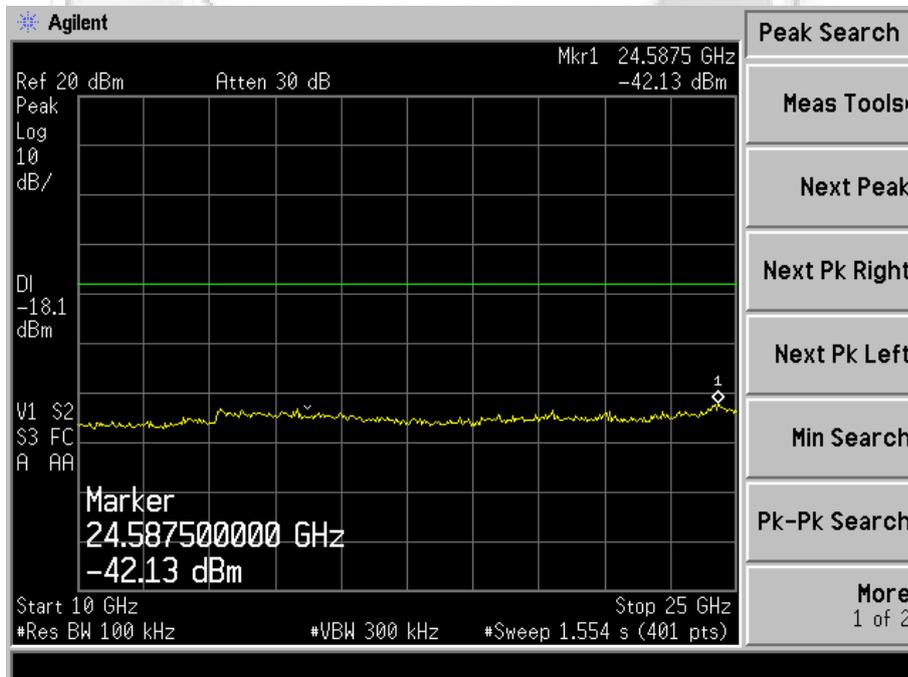


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 1 (External), 802.11g



Plot 65 – Channel 1 (lower ch) @ 16QAM 36Mbps

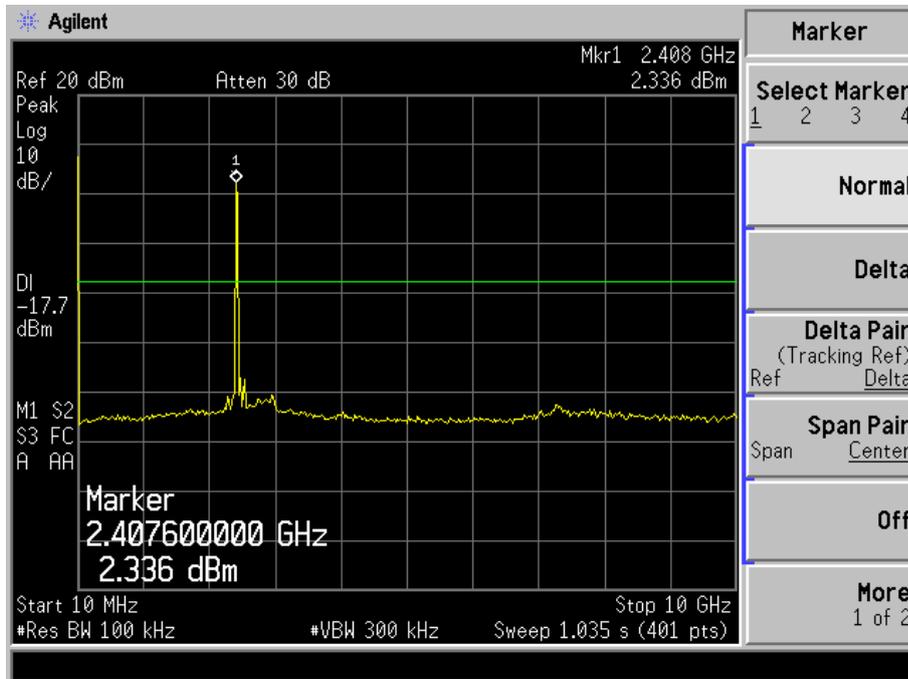


Plot 66 – Channel 1 (lower ch) @ 16QAM 36Mbps

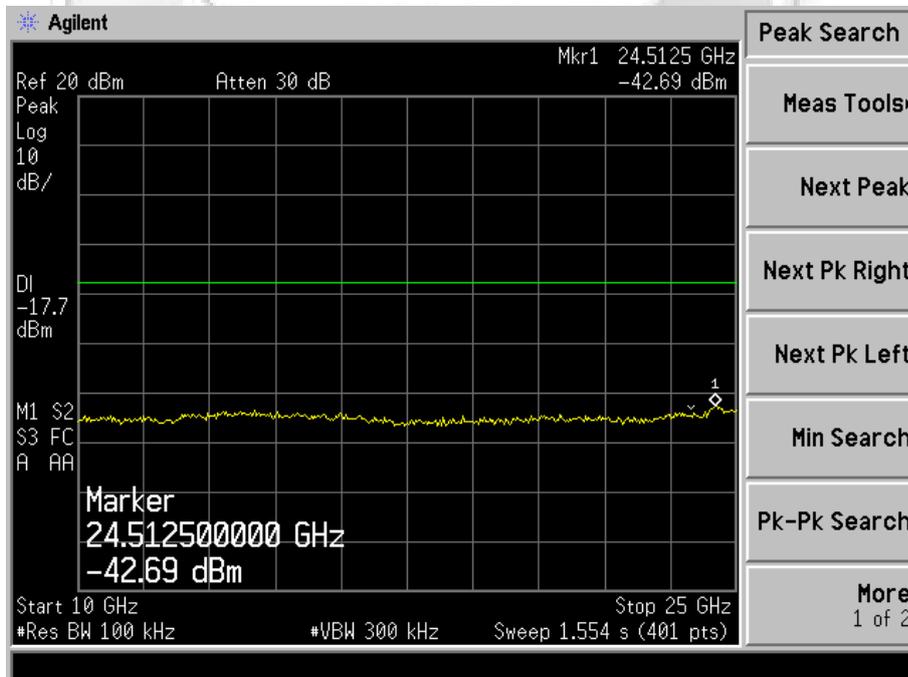


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 1 (External), 802.11g



Plot 67 – Channel 1 (lower ch) @ 64QAM 54Mbps

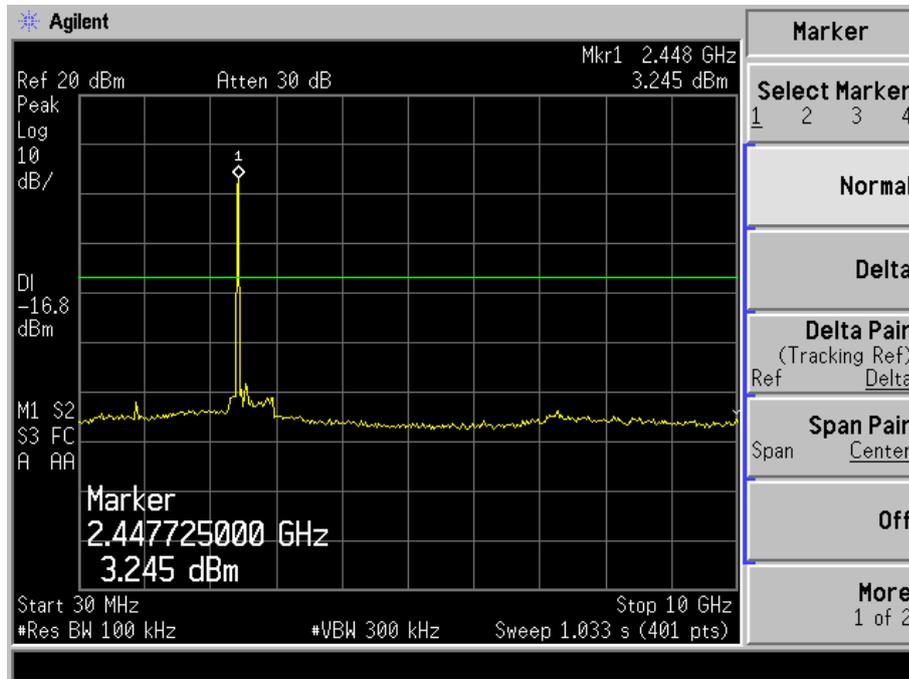


Plot 68 – Channel 1 (lower ch) @ 64QAM 54Mbps

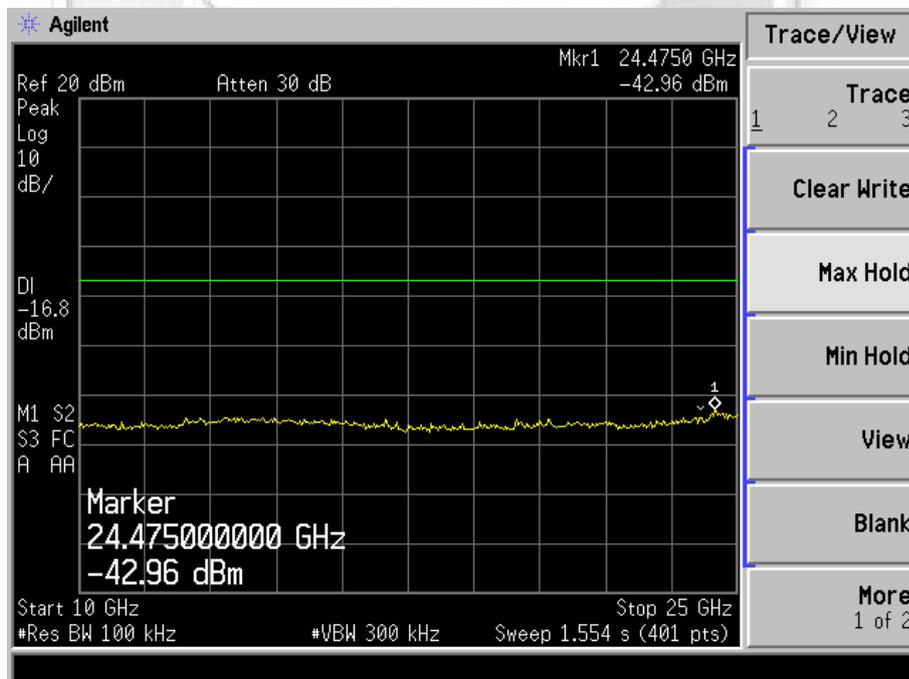


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 1 (External), 802.11g



Plot 69 – Channel 6 (mid ch) @ BPSK 9Mbps

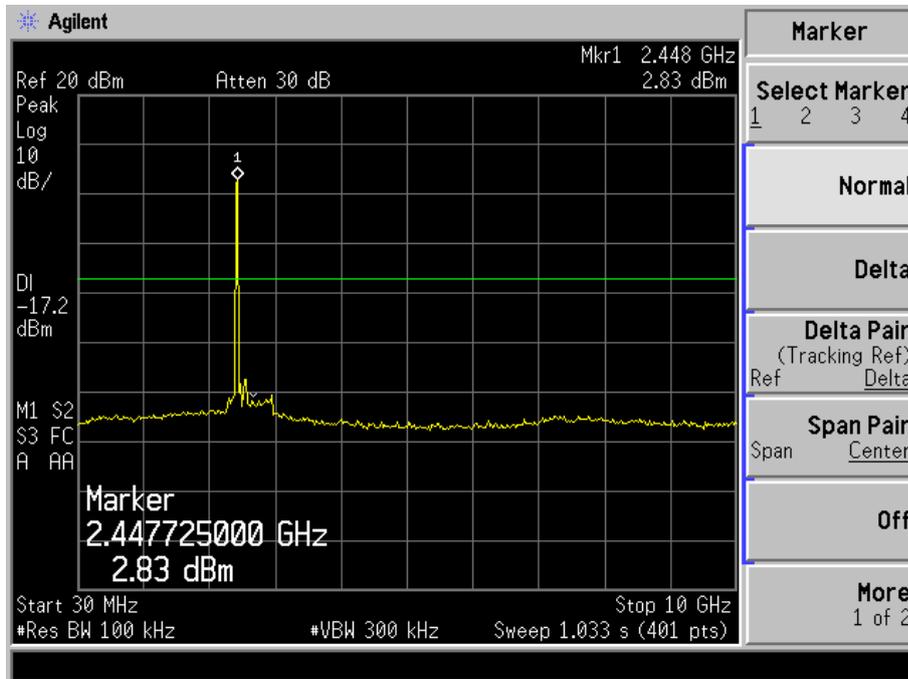


Plot 70 – Channel 6 (mid ch) @ BPSK 9Mbps

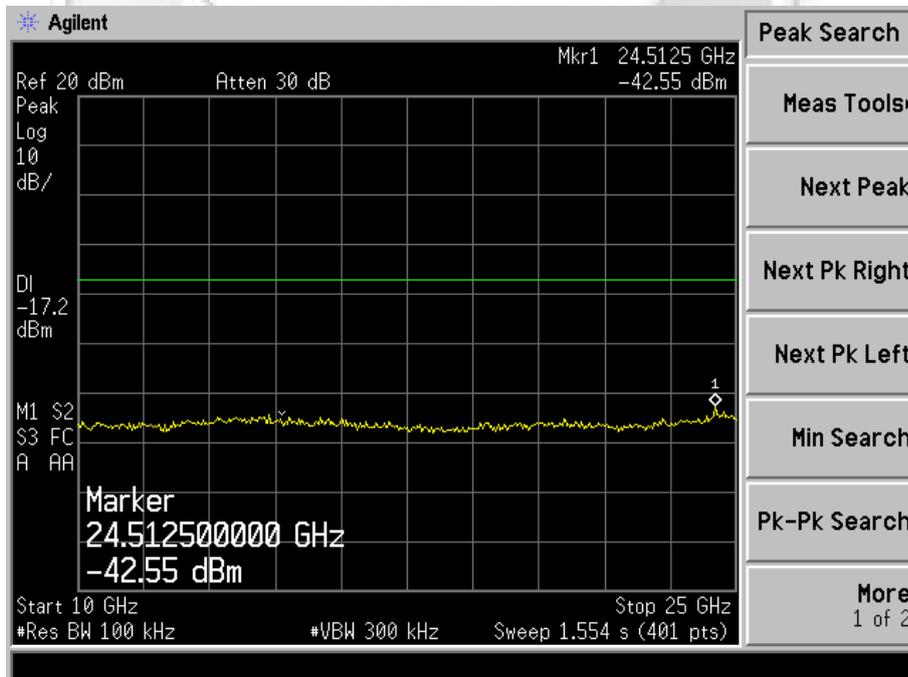


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 1 (External), 802.11g



Plot 71 – Channel 6 (mid ch) @ QPSK 18Mbps

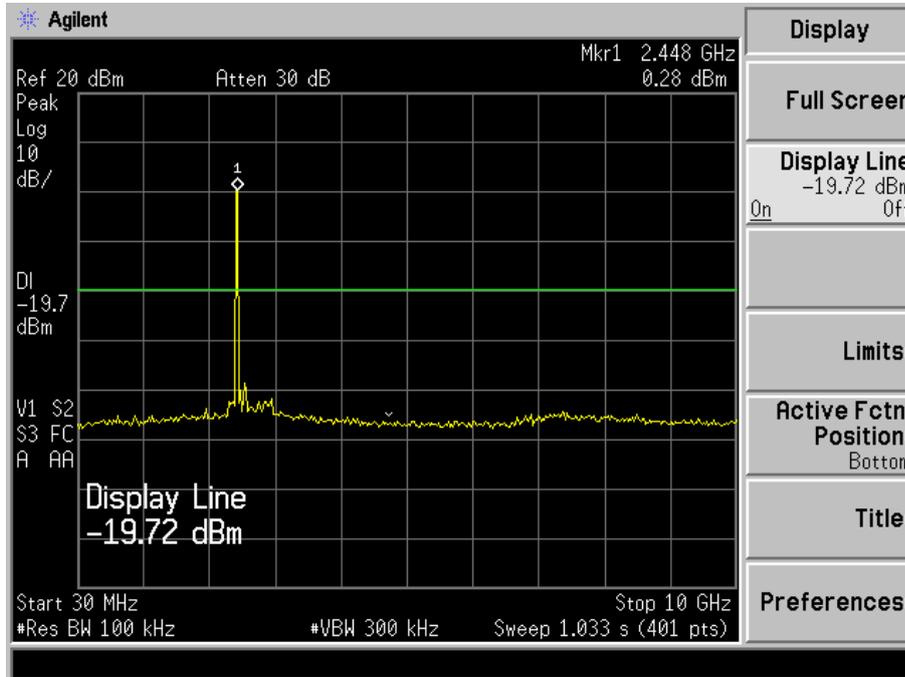


Plot 72 – Channel 6 (mid ch) @ QPSK 18Mbps

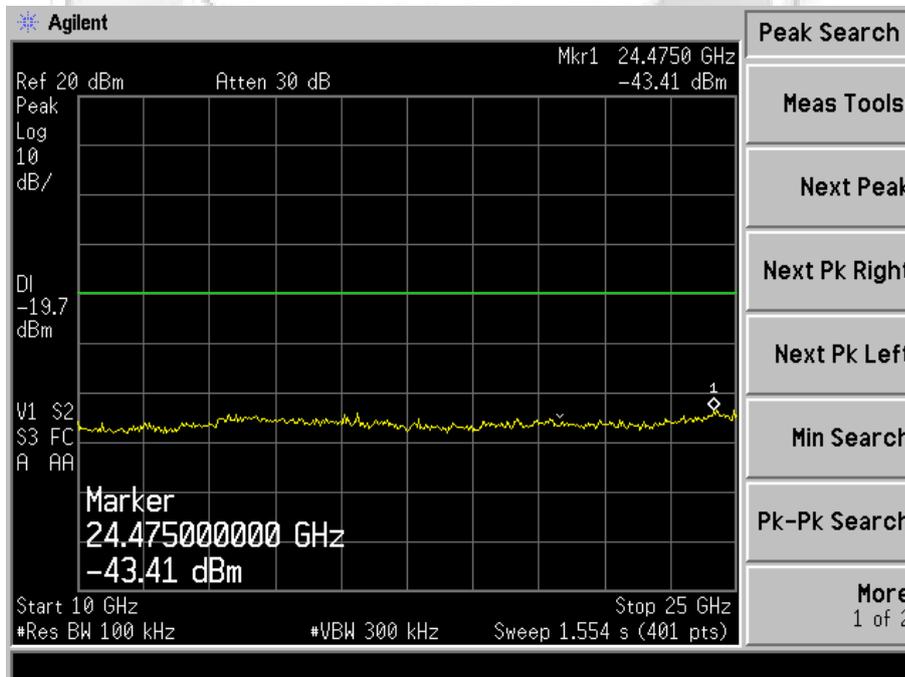


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 1 (External), 802.11g



Plot 73 – Channel 6 (mid ch) @ 16QAM 36Mbps

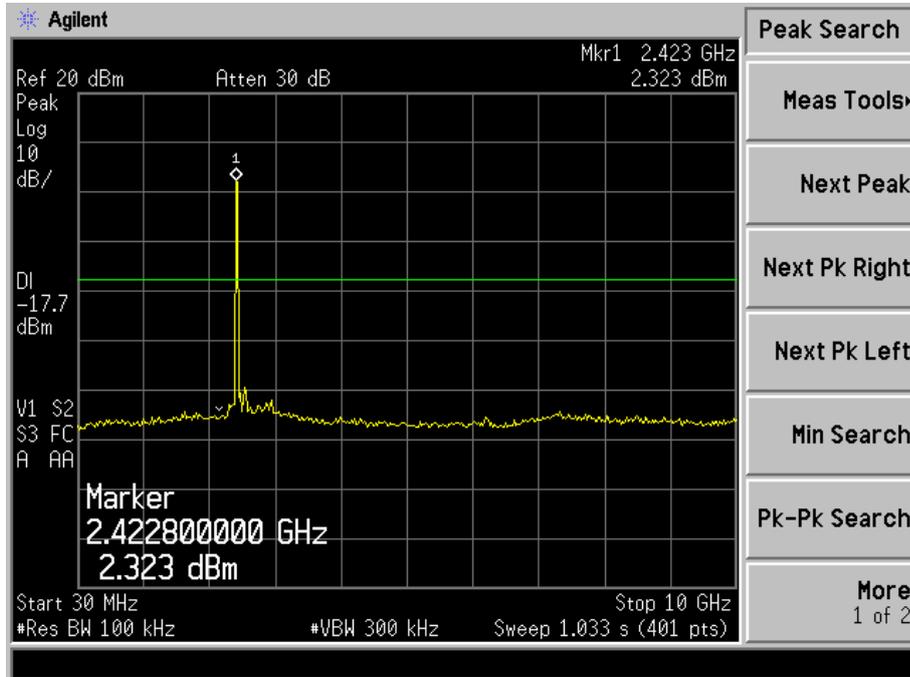


Plot 74 – Channel 6 (mid ch) @ 16QAM 36Mbps

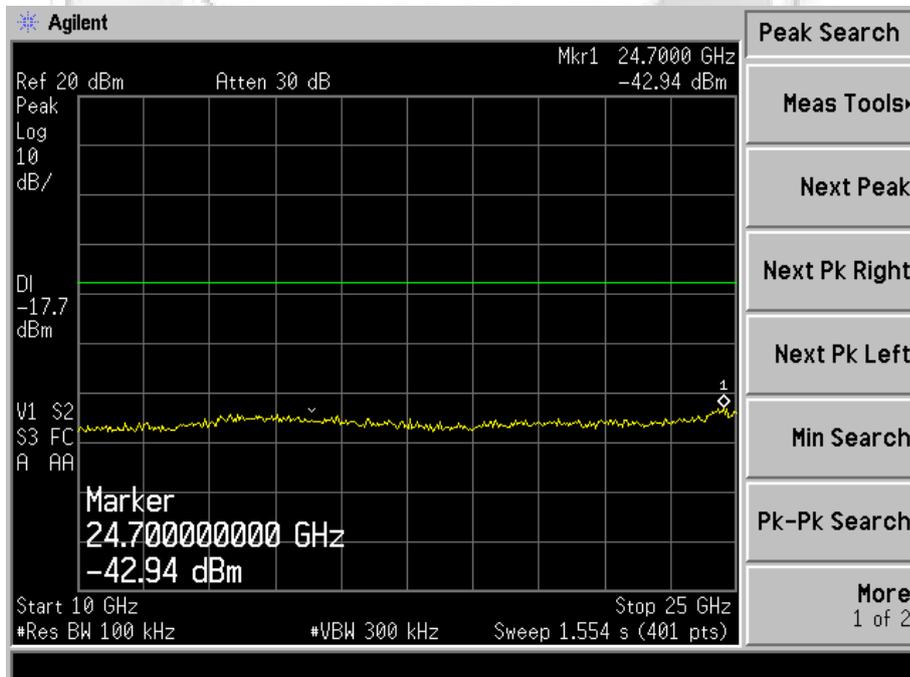


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 1 (External), 802.11g



Plot 75 – Channel 6 (mid ch) @ 64QAM 54Mbps

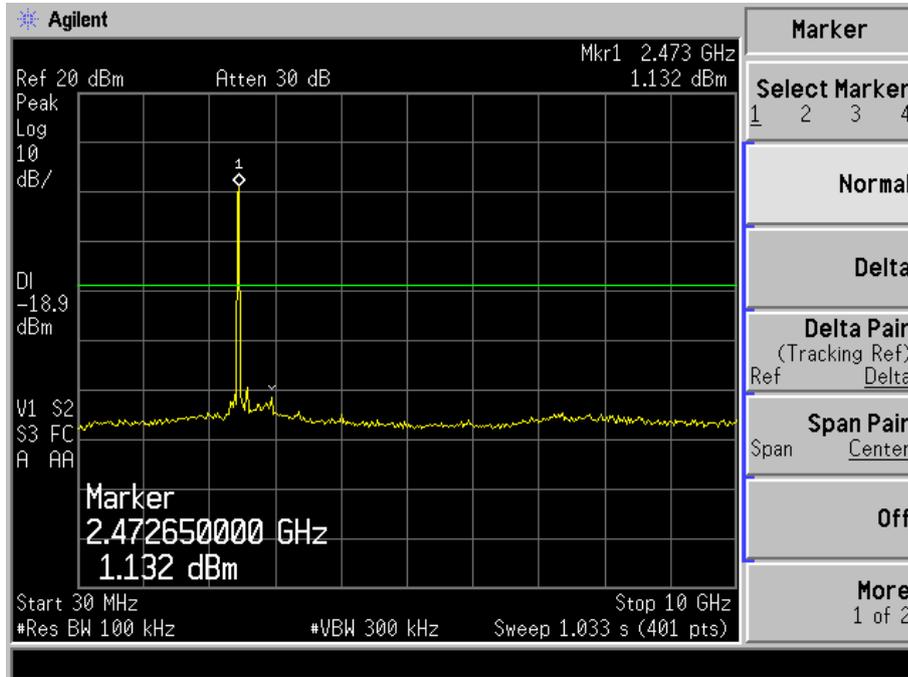


Plot 76 – Channel 6 (mid ch) @ 64QAM 54Mbps

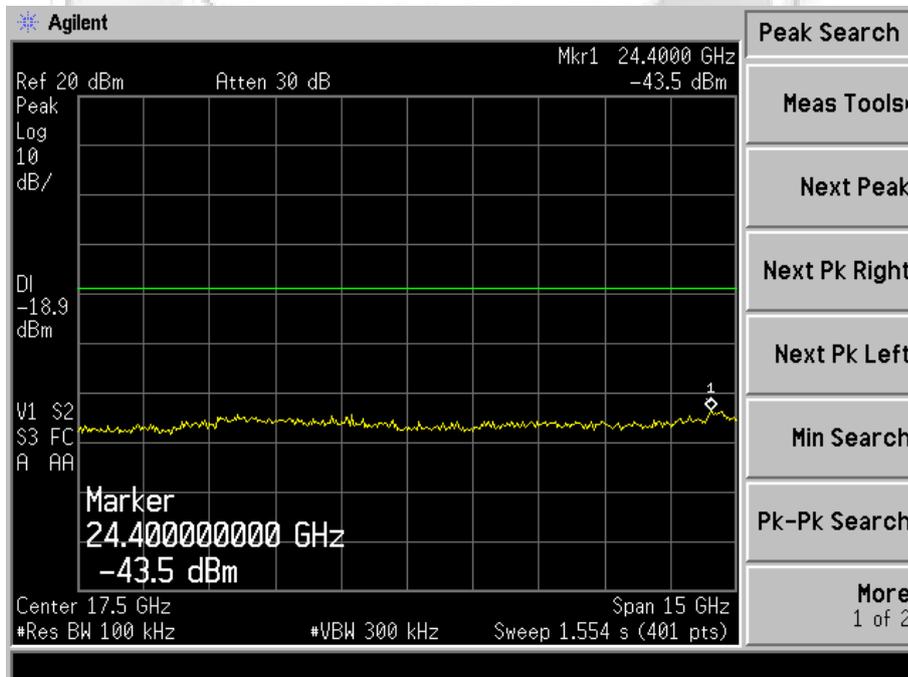


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 1 (External), 802.11g



Plot 77 – Channel 11 (upper ch) @ BPSK 9Mbps

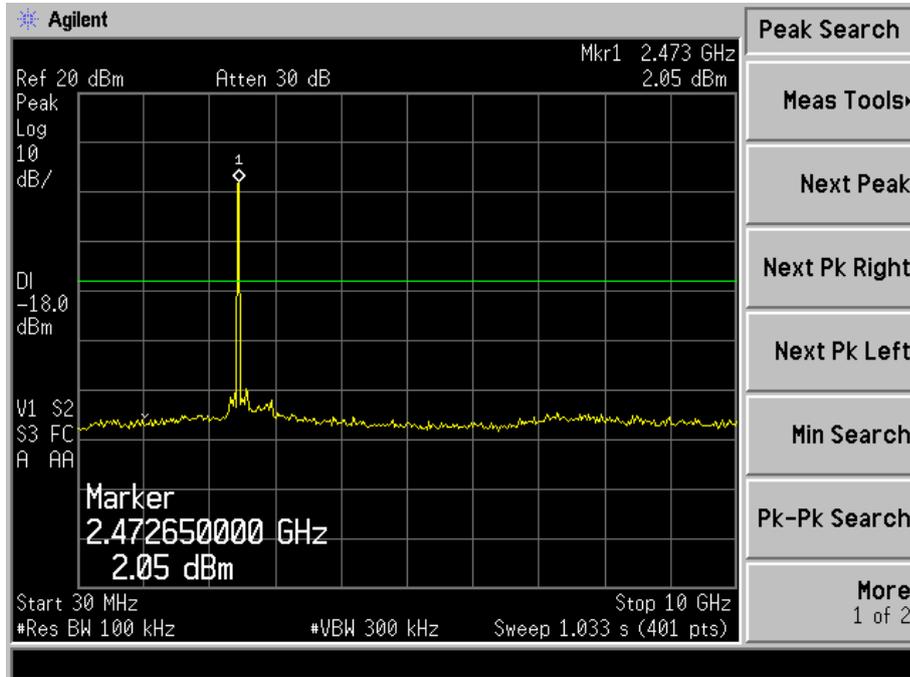


Plot 78 – Channel 11 (upper ch) @ BPSK 9Mbps

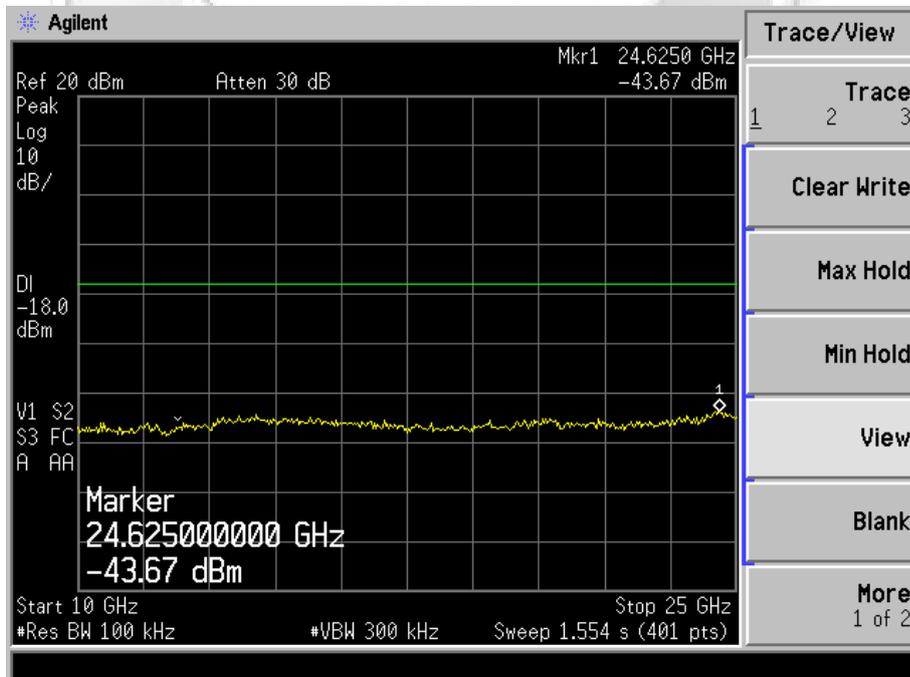


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 1 (External), 802.11g



Plot 79 – Channel 11 (upper ch) @ QPSK 18Mbps

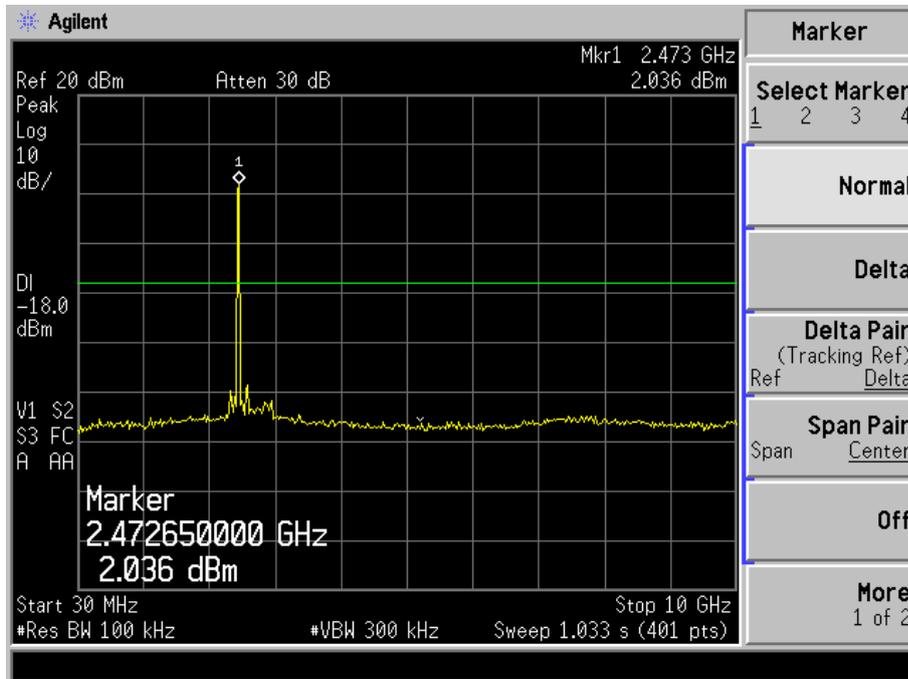


Plot 80 – Channel 11 (upper ch) @ QPSK 18Mbps

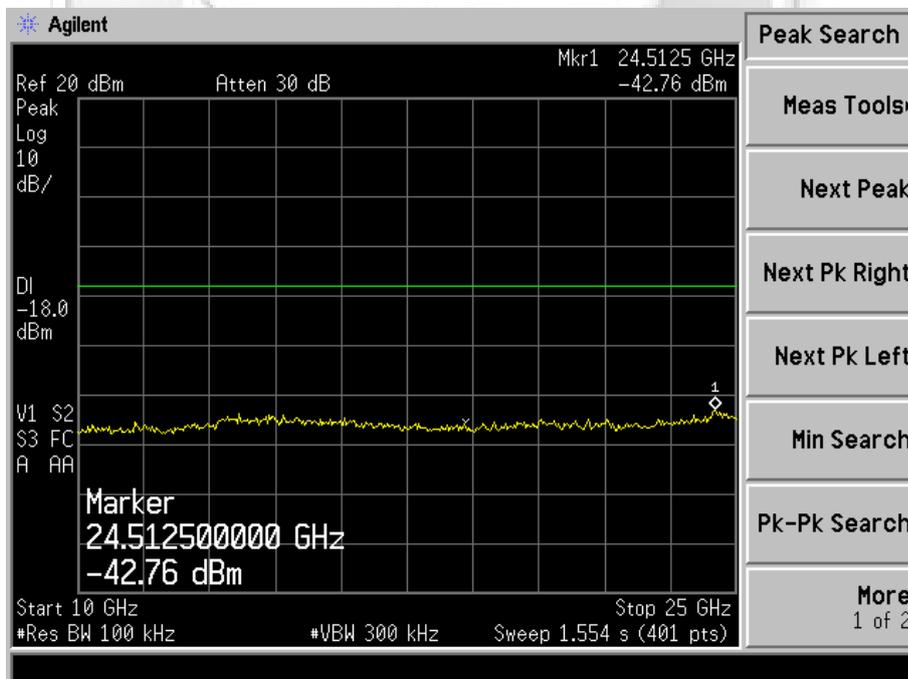


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 1 (External), 802.11g



Plot 81 – Channel 11 (upper ch) @ 16QAM 36Mbps

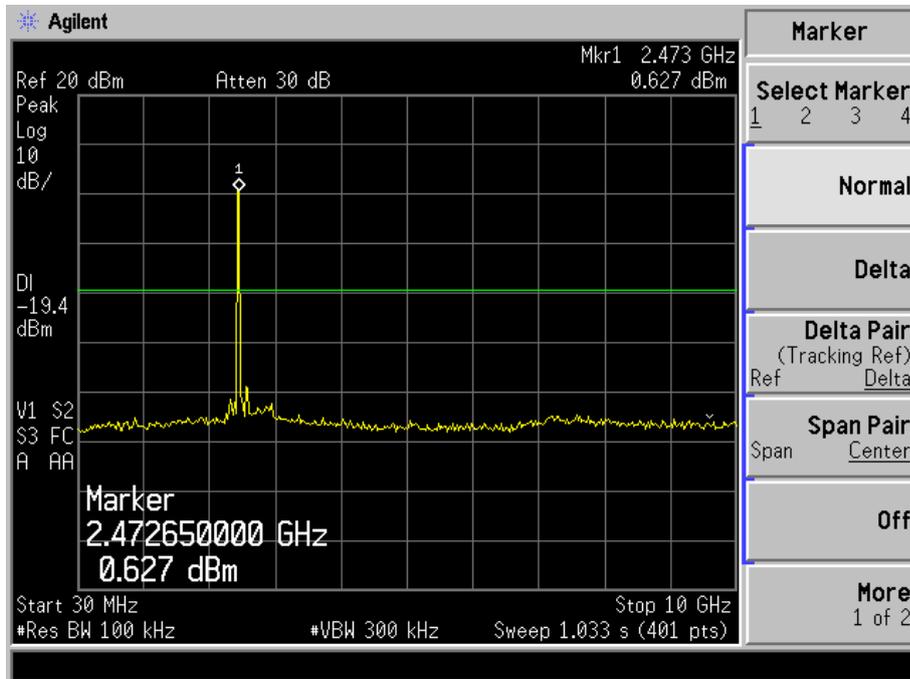


Plot 82 – Channel 11 (upper ch) @ 16QAM 36Mbps

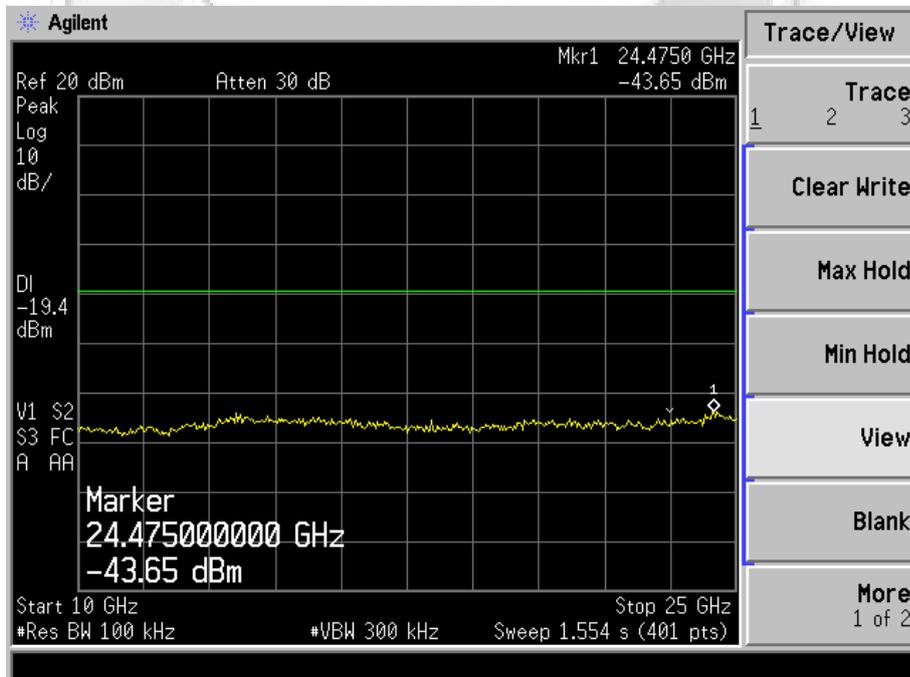


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 1 (External), 802.11g



Plot 83 – Channel 11 (upper ch) @ 64QAM 54Mbps

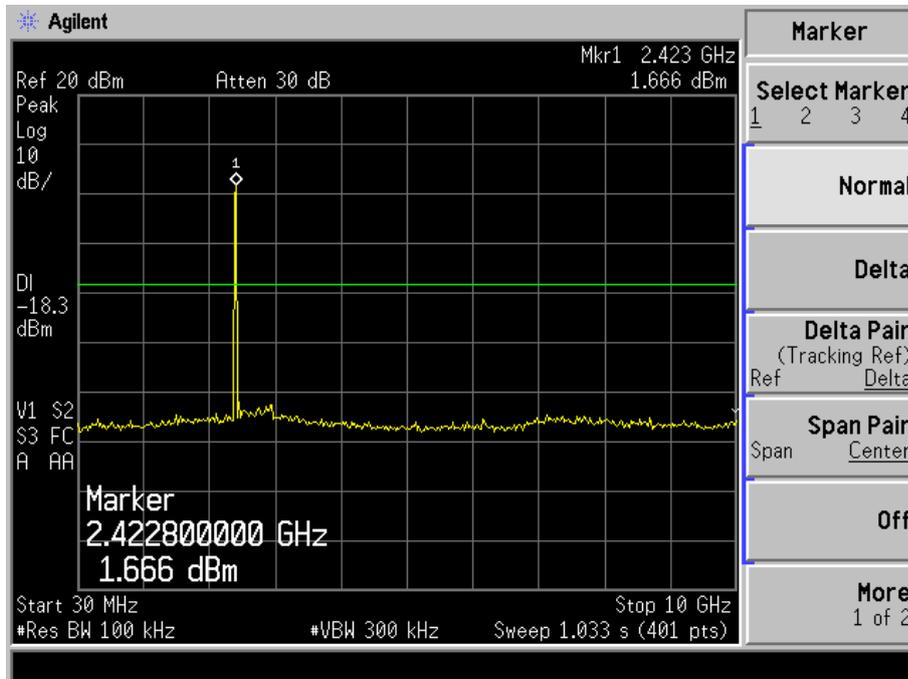


Plot 84 – Channel 11 (upper ch) @ 64QAM 54Mbps

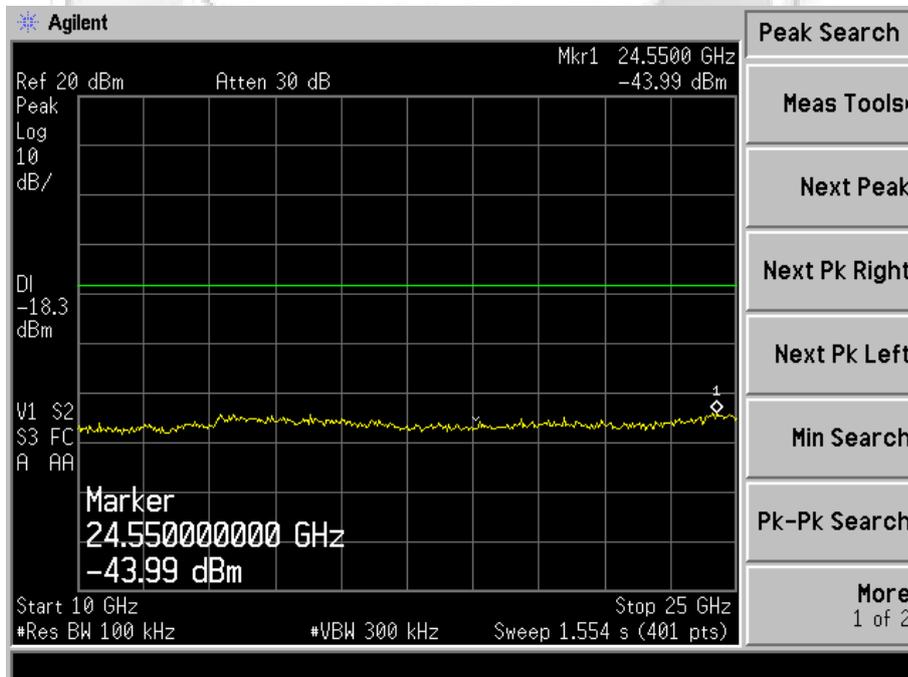


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 2 (Internal), 802.11b



Plot 85 – Channel 1 (lower ch) @ DBPSK 1Mbps

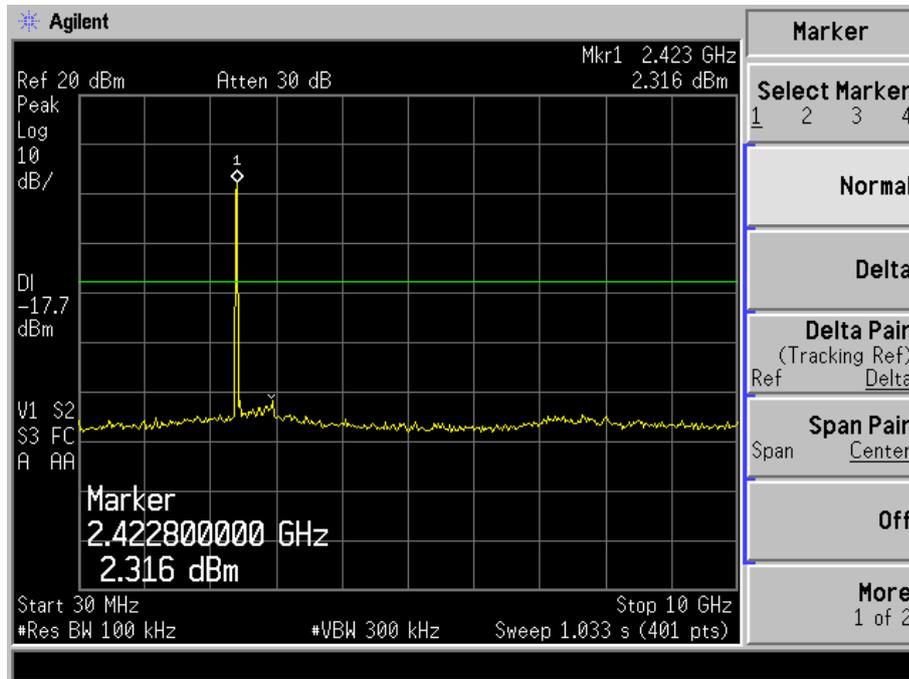


Plot 86 – Channel 1 (lower ch) @ DBPSK 1Mbps

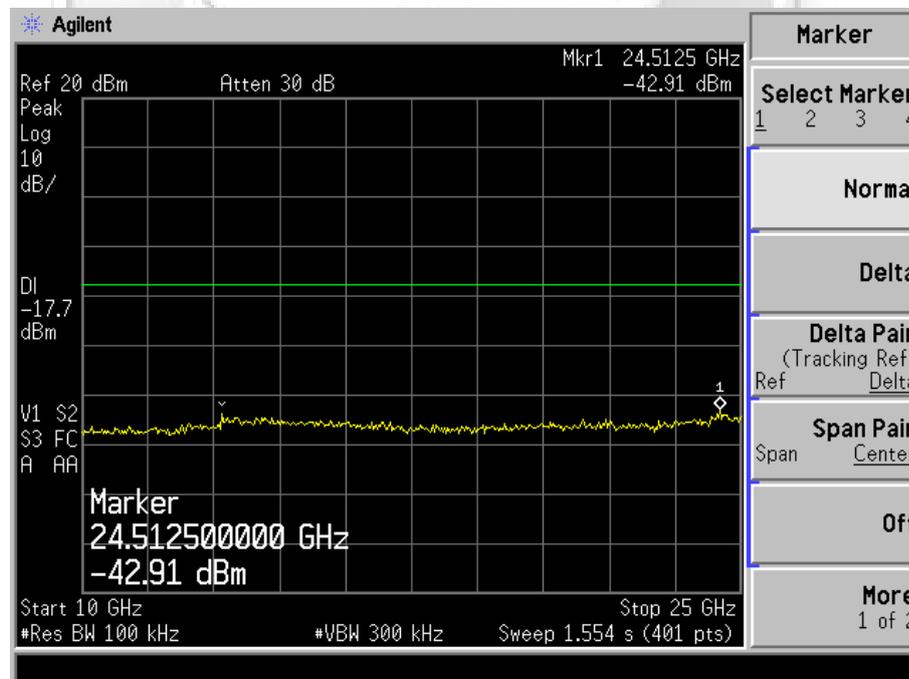


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 2 (Internal), 802.11b



Plot 87 – Channel 1 (lower ch) @ DQPSK 2Mbps

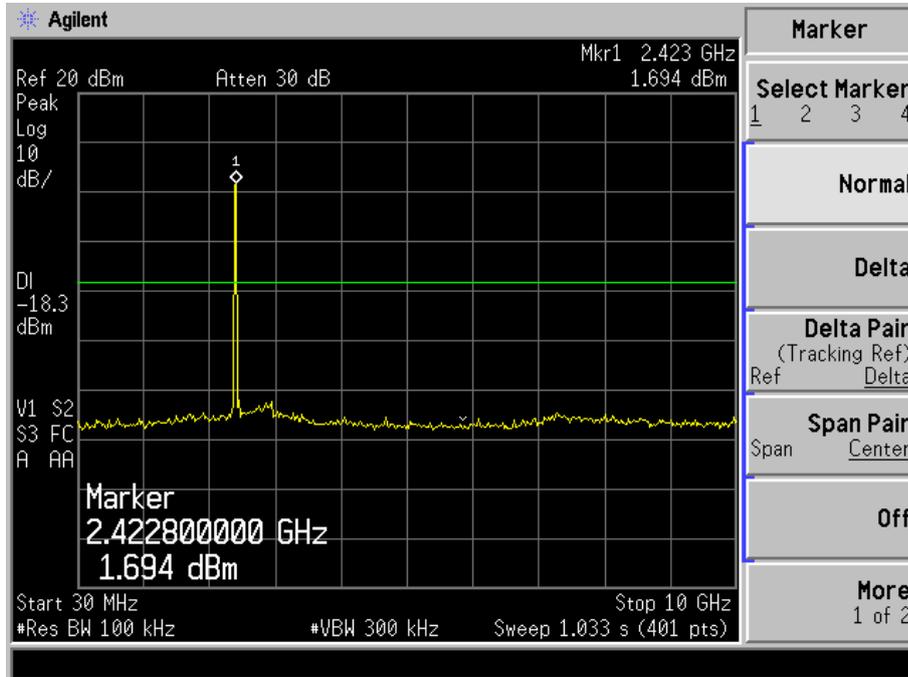


Plot 88 – Channel 1 (lower ch) @ DQPSK 2Mbps

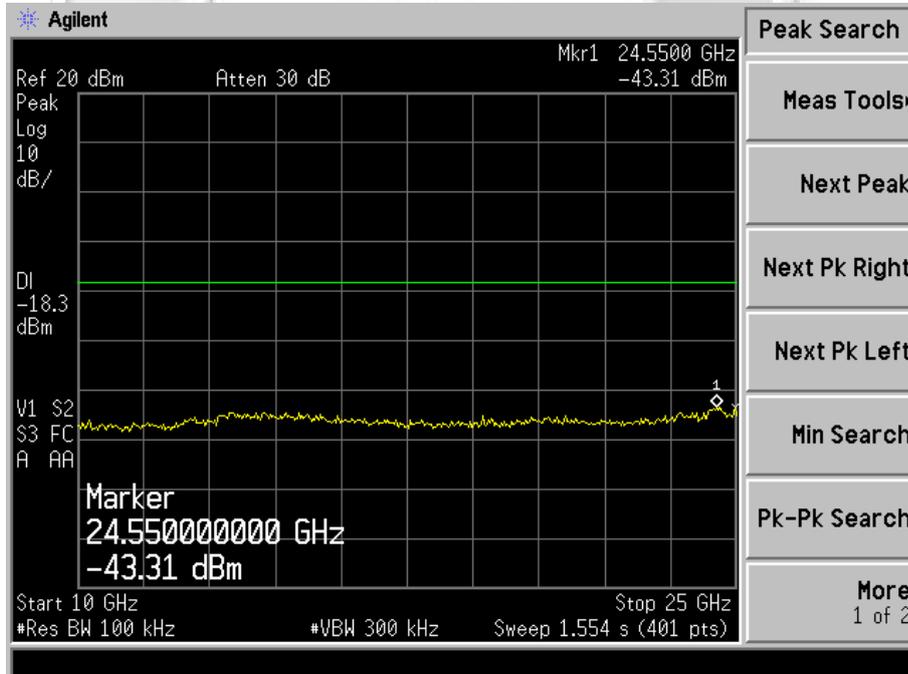


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 2 (Internal), 802.11b



Plot 89 – Channel 1 (lower ch) @ CCK 11Mbps

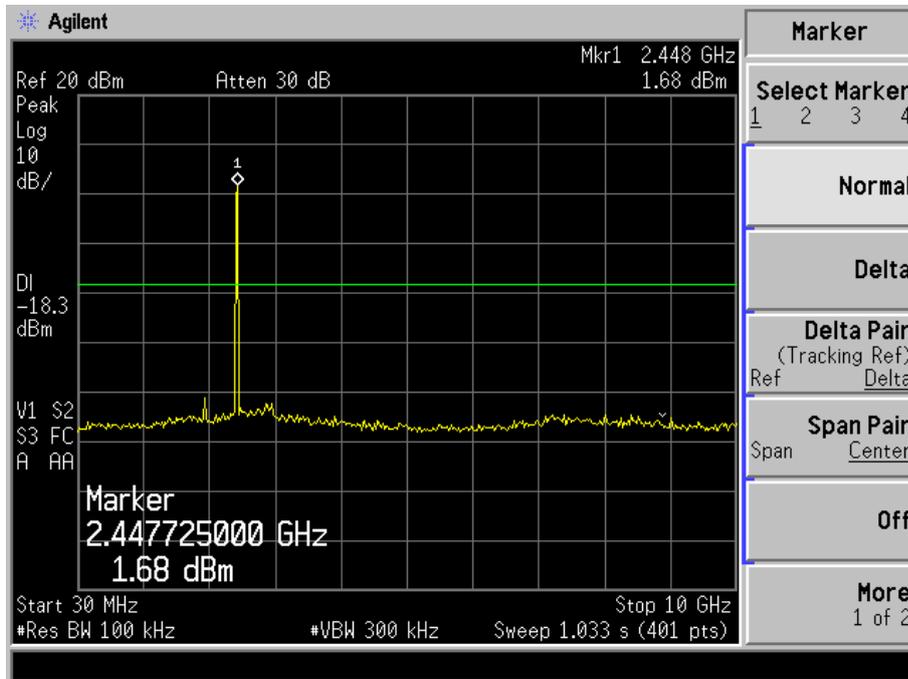


Plot 90 – Channel 1 (lower ch) @ CCK 11Mbps

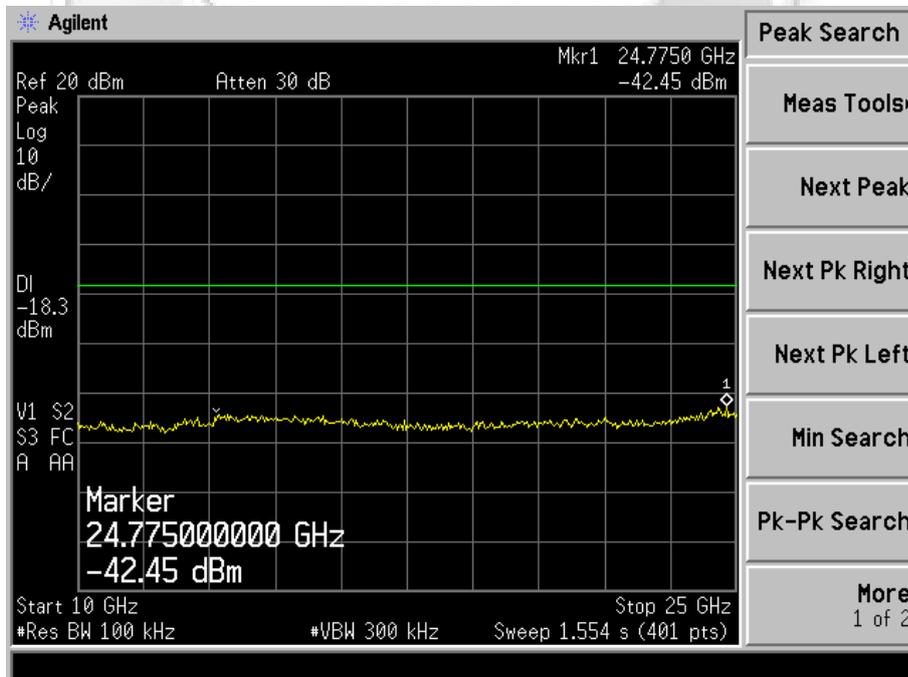


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 2 (Internal), 802.11b



Plot 91 – Channel 6 (mid ch) @ DBPSK 1Mbps

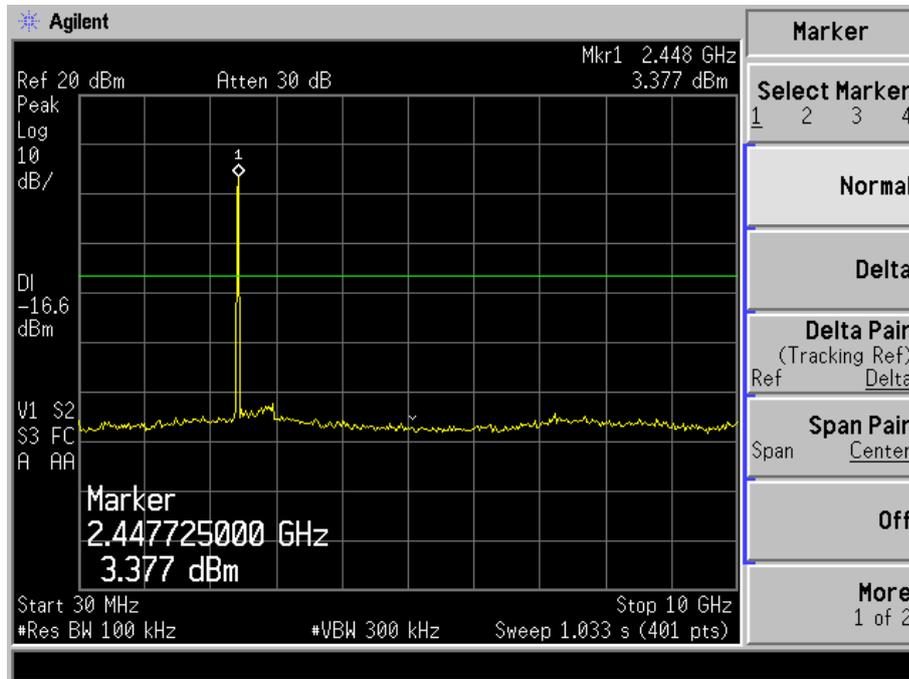


Plot 92 – Channel 6 (mid ch) @ DBPSK 1Mbps

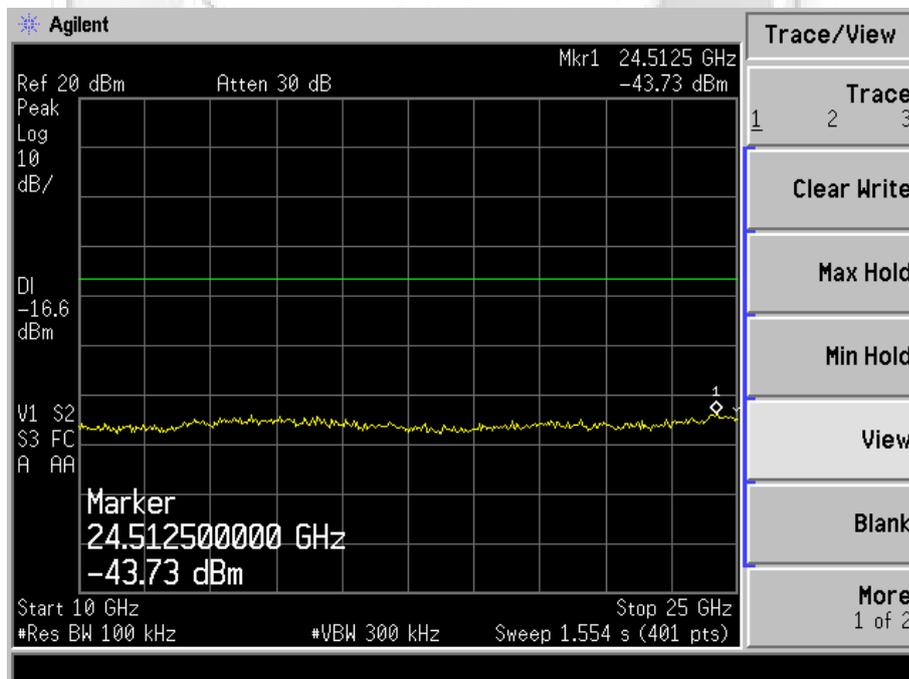


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 2 (Internal), 802.11b



Plot 93 – Channel 6 (mid ch) @ DQPSK 2Mbps

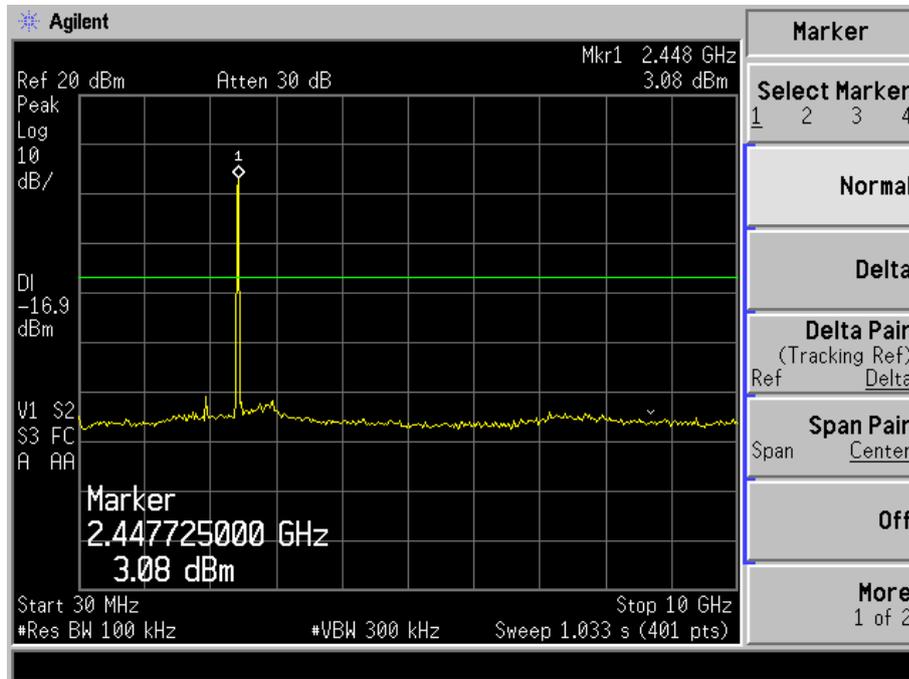


Plot 94 – Channel 6 (mid ch) @ DQPSK 2Mbps

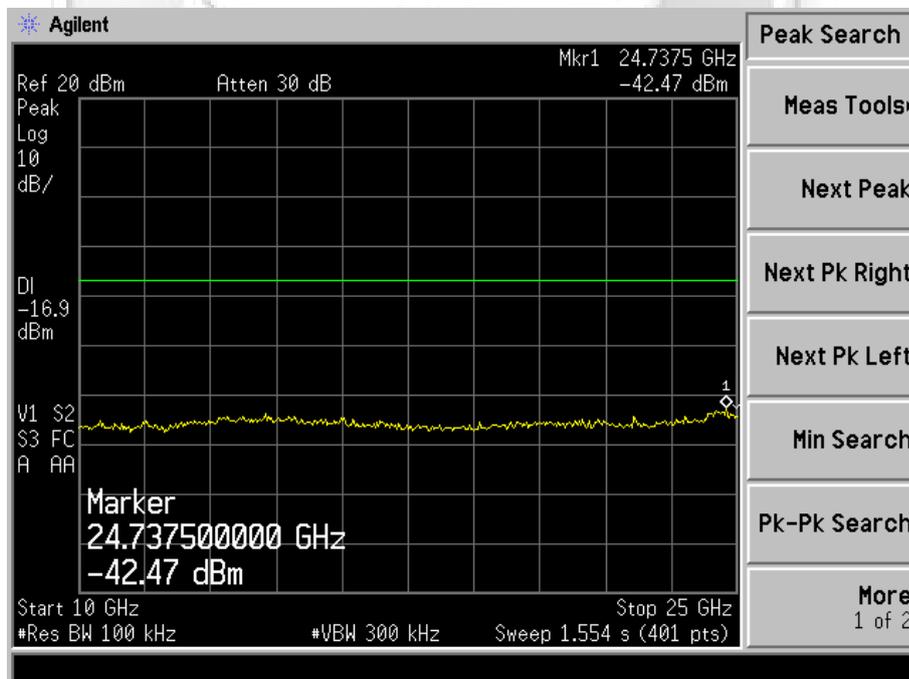


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 2 (Internal), 802.11b



Plot 95 – Channel 6 (mid ch) @ CCK 11Mbps

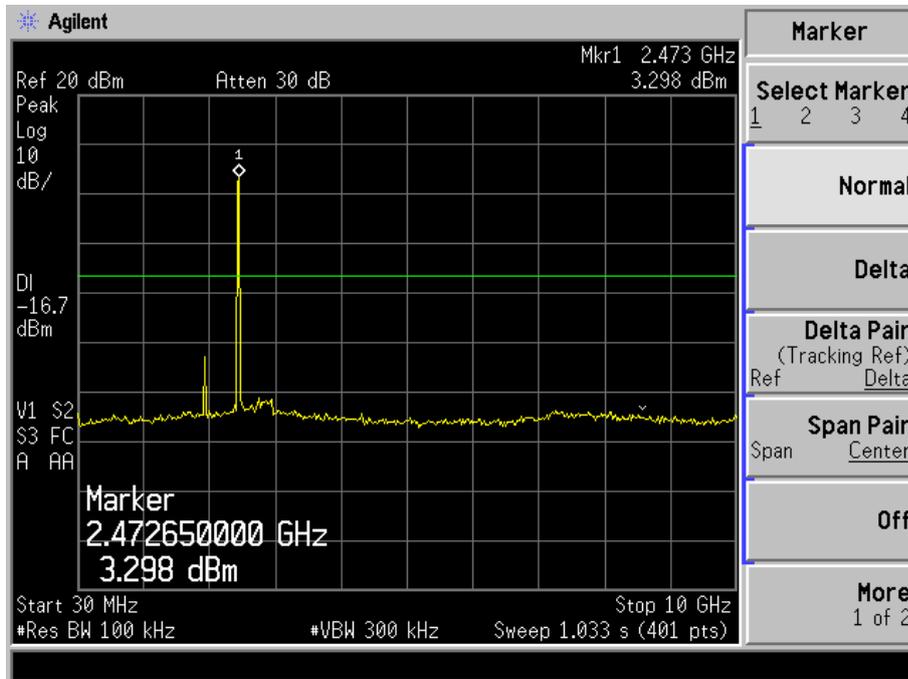


Plot 96 – Channel 6 (mid ch) @ CCK 11Mbps

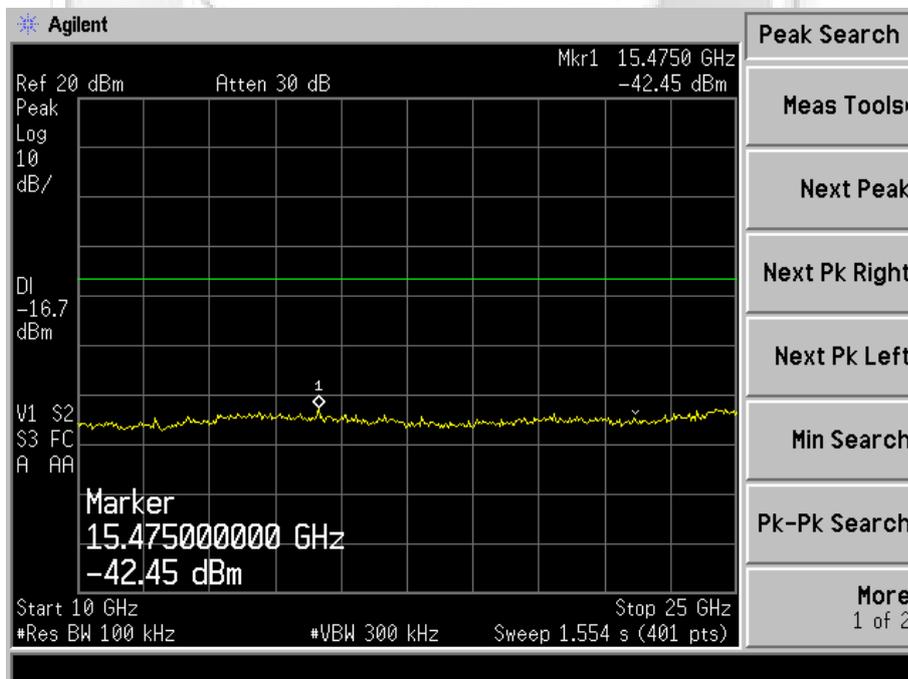


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 2 (Internal), 802.11b



Plot 97 – Channel 11 (upper ch) @ DBPSK 1Mbps

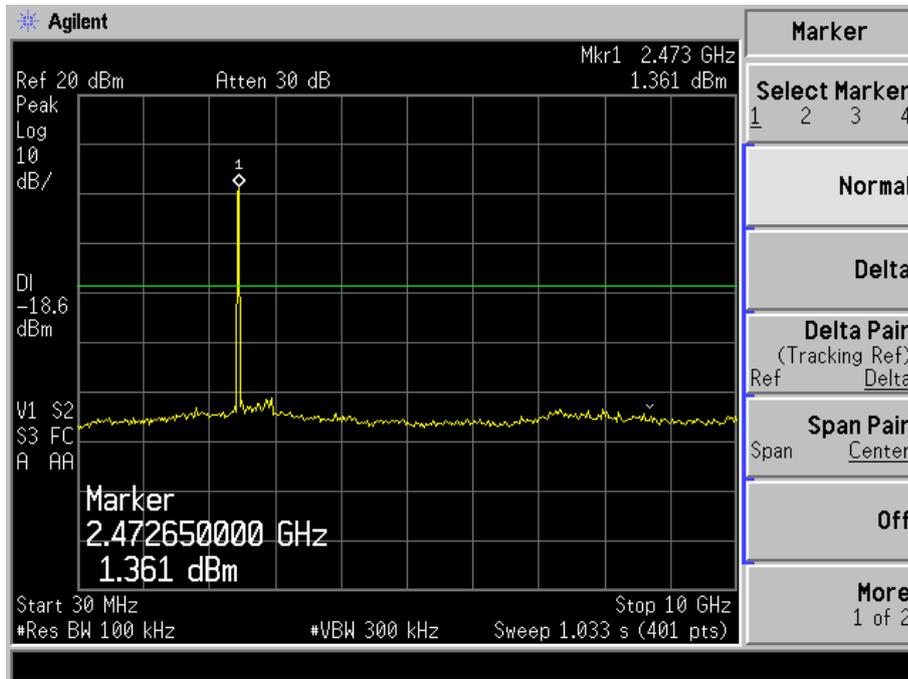


Plot 98 – Channel 11 (upper ch) @ DBPSK 1Mbps

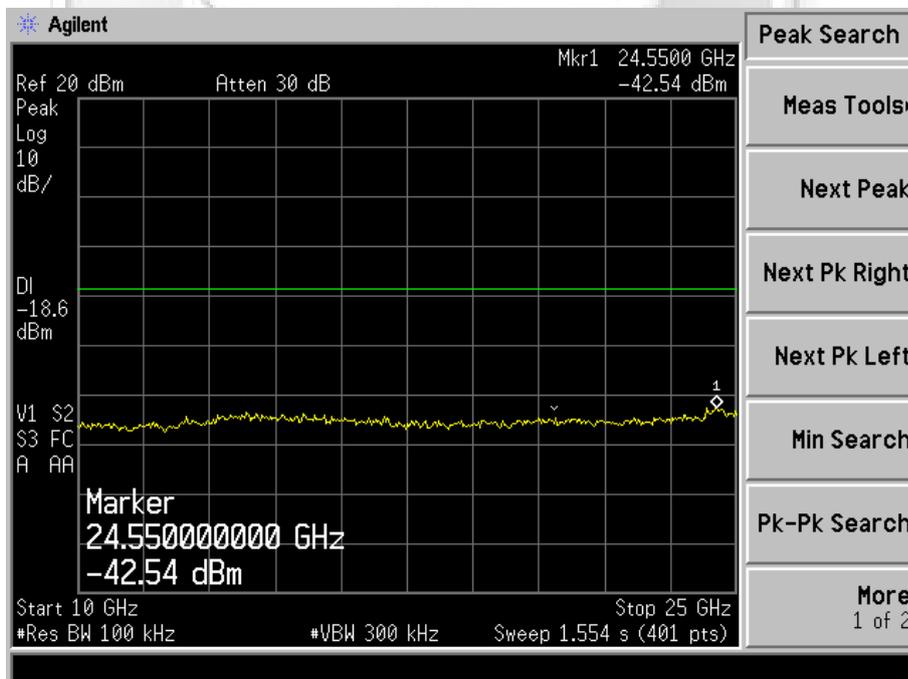


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 2 (Internal), 802.11b



Plot 99 – Channel 11 (upper ch) @ DQPSK 2Mbps

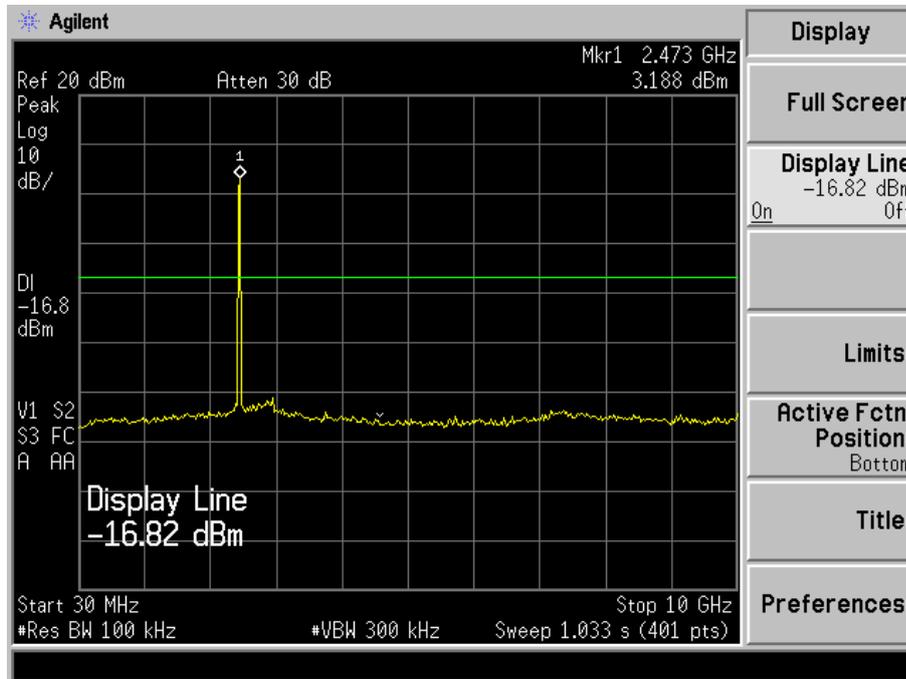


Plot 100 – Channel 11 (upper ch) @ DQPSK 2Mbps

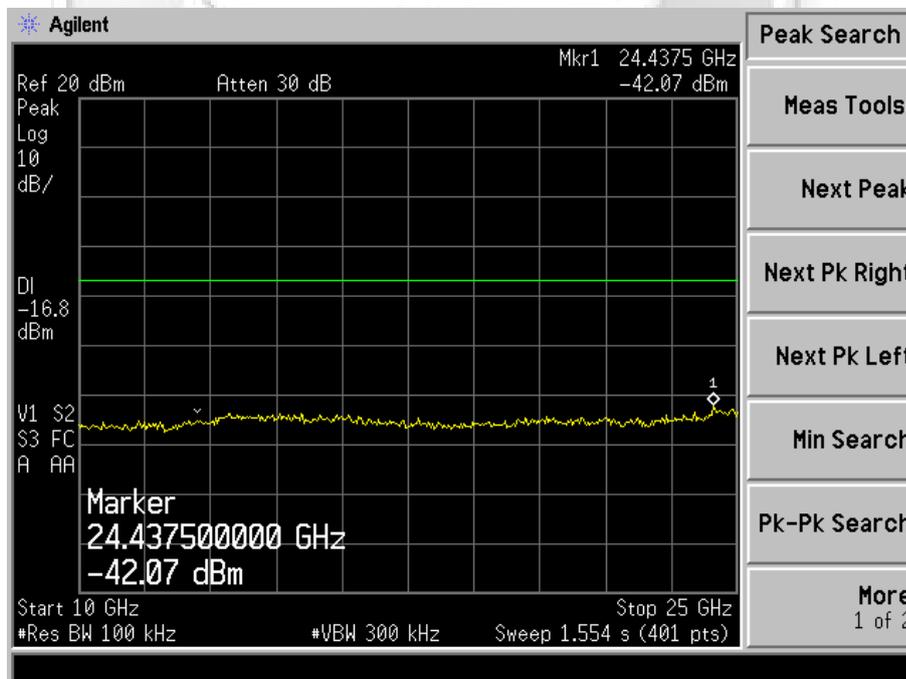


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 2 (Internal), 802.11b



Plot 101 – Channel 11 (upper ch) @ CCK 11Mbps

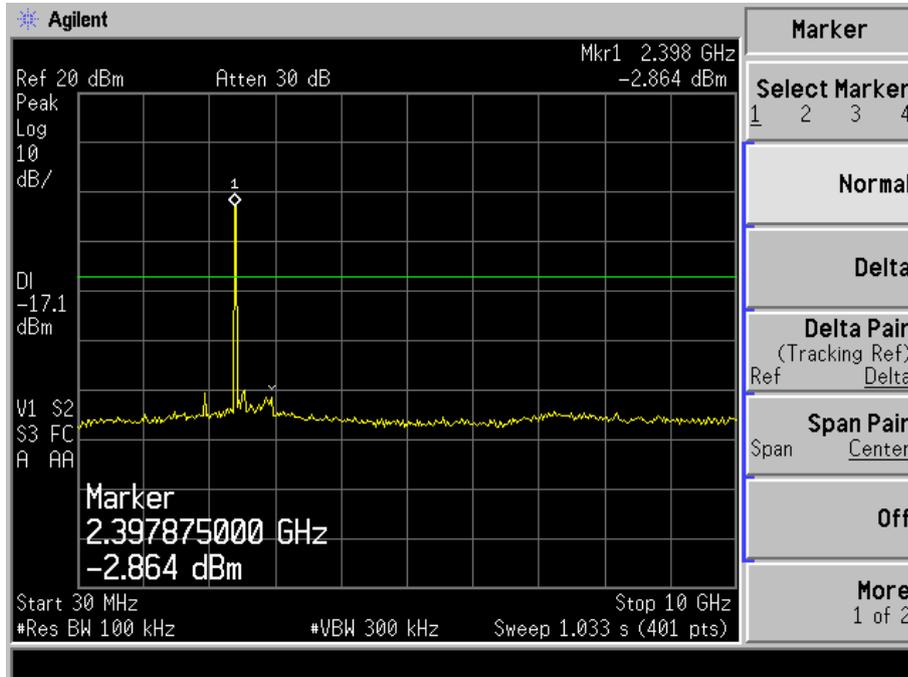


Plot 102 – Channel 11 (upper ch) @ CCK 11Mbps

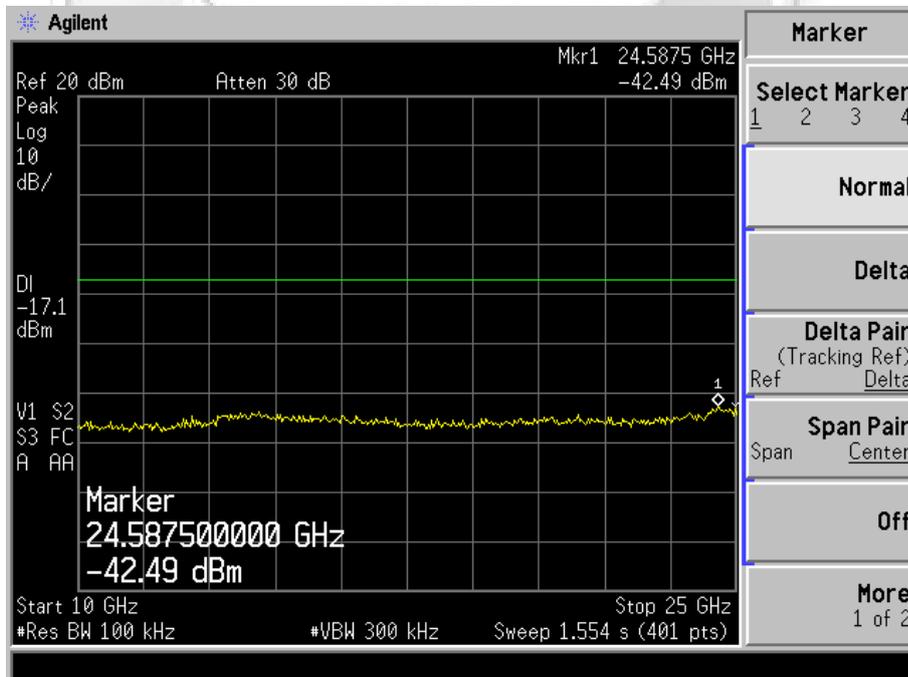


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 2 (Internal), 802.11g



Plot 103 – Channel 1 (lower ch) @ BPSK 9Mbps

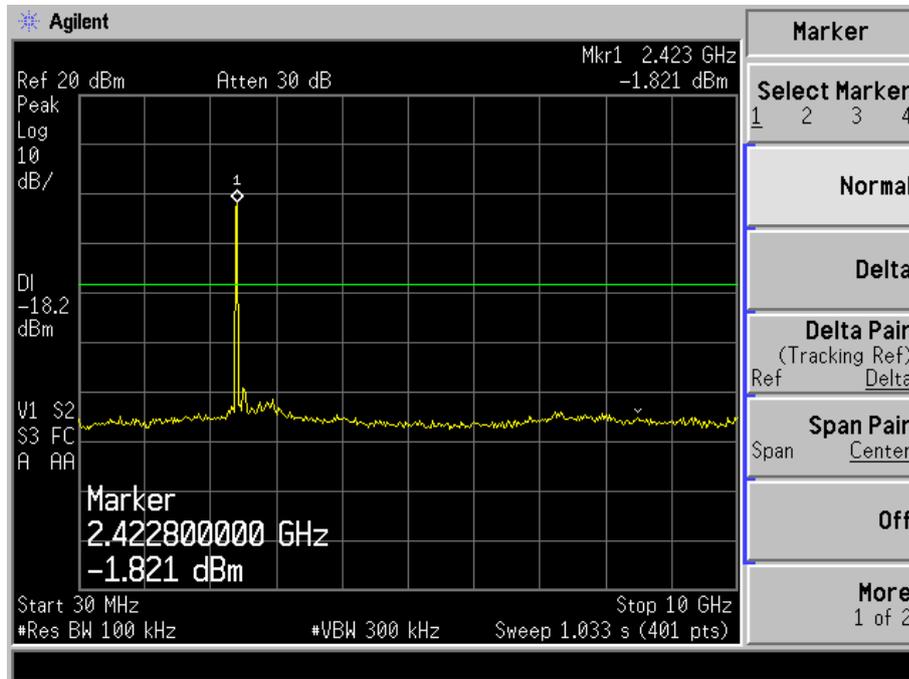


Plot 104 – Channel 1 (lower ch) @ BPSK 9Mbps

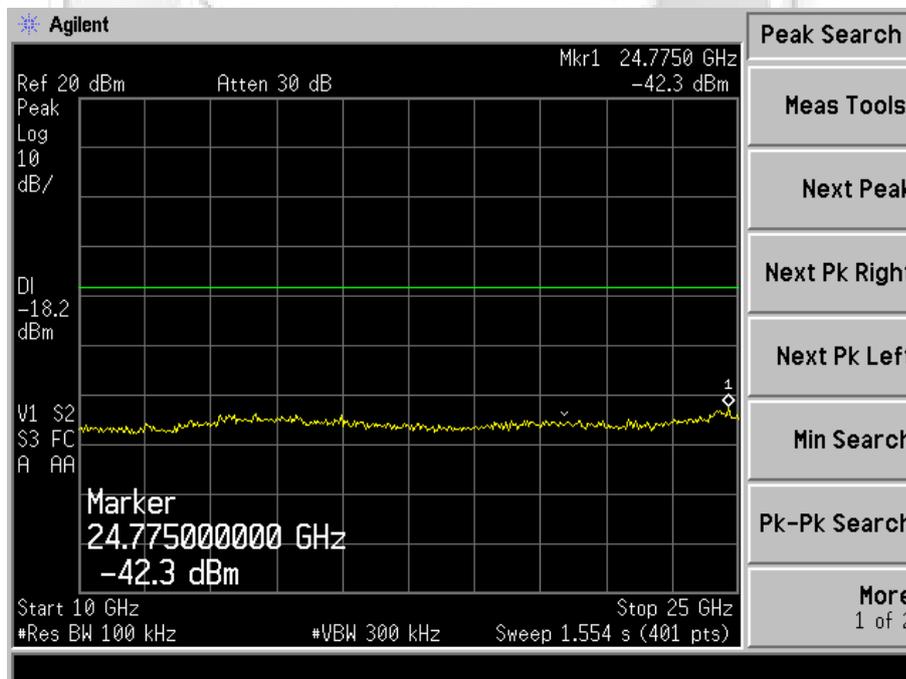


**RF CONDUCTED SPURIOUS EMISSIONS TEST**

**RF Conducted Spurious Emissions Plots – Antenna 2 (Internal), 802.11g**



**Plot 105 – Channel 1 (lower ch) @ QPSK 18Mbps**

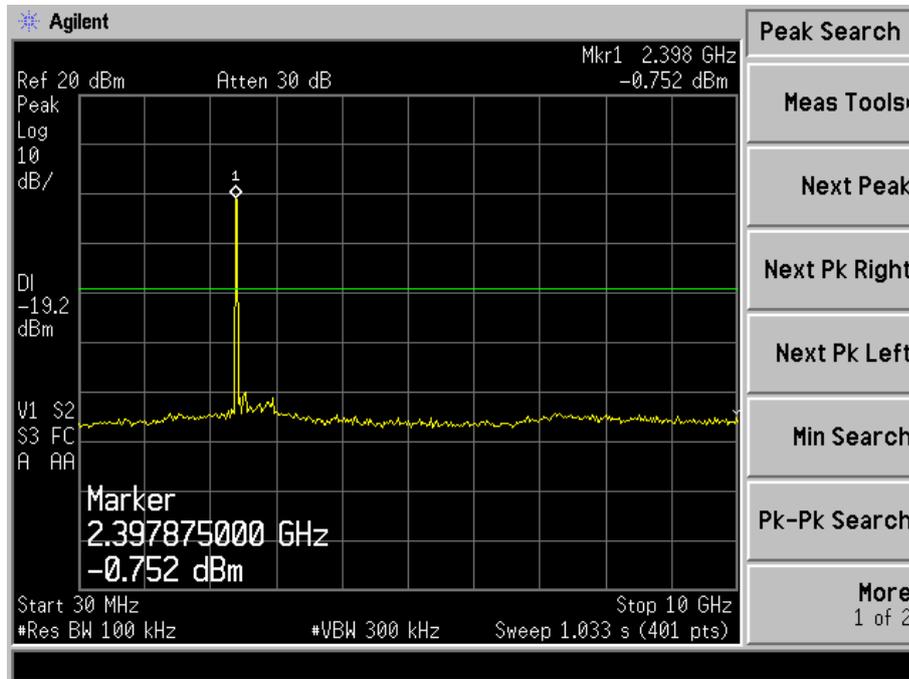


**Plot 106 – Channel 1 (lower ch) @ QPSK 18Mbps**

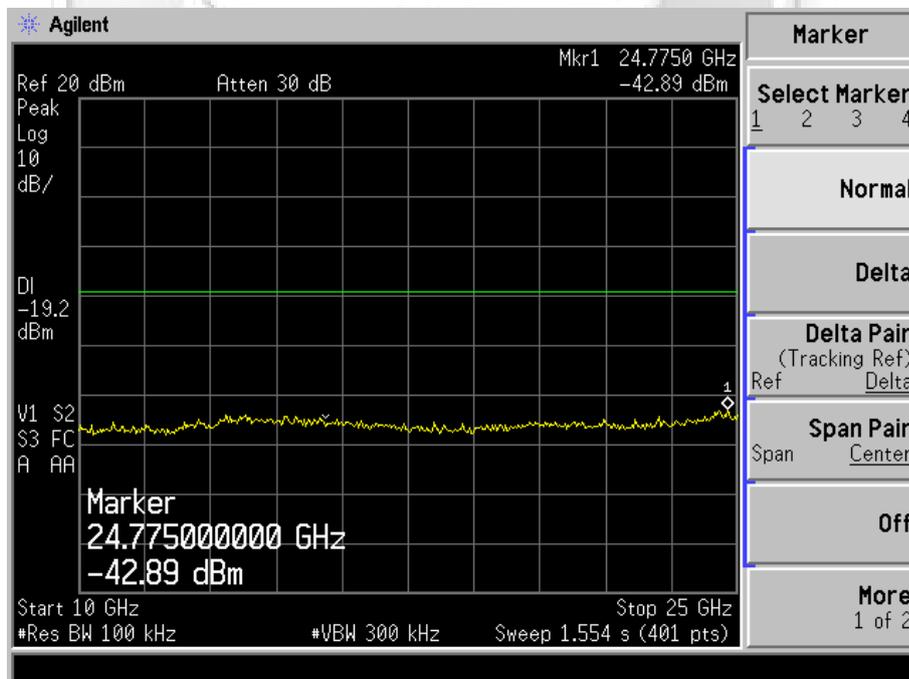


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 2 (Internal), 802.11g



Plot 107 – Channel 1 (lower ch) @ 16QAM 36Mbps

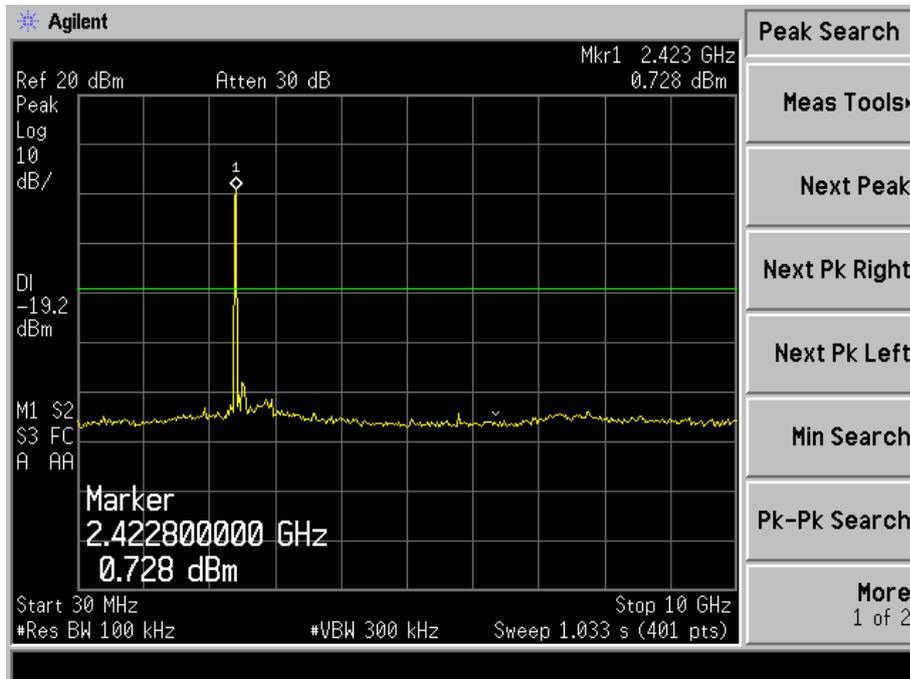


Plot 108 – Channel 1 (lower ch) @ 16QAM 36Mbps

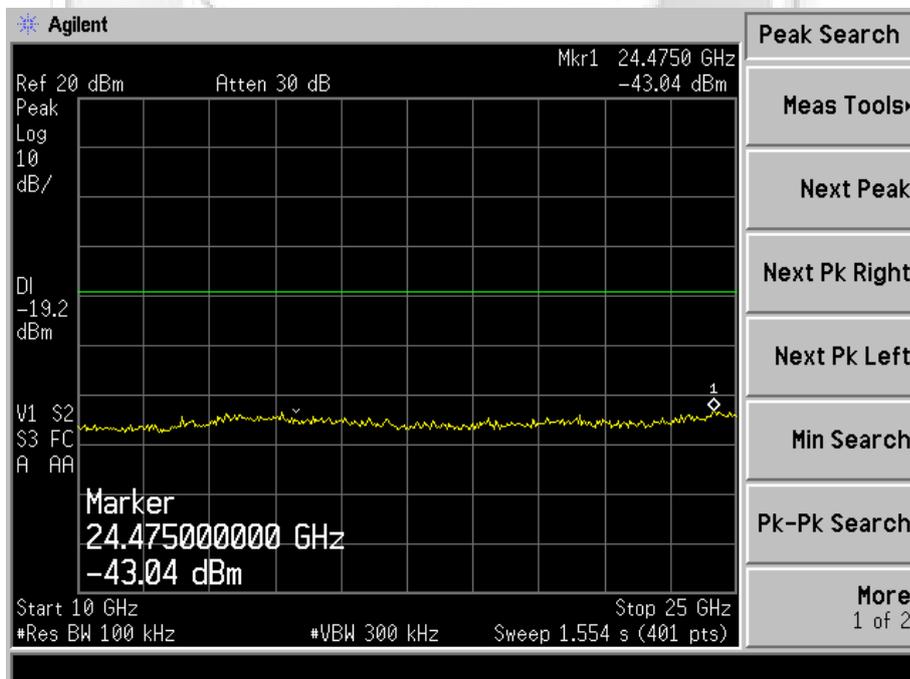


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 2 (Internal), 802.11g



Plot 109 – Channel 1 (lower ch) @ 64QAM 54Mbps

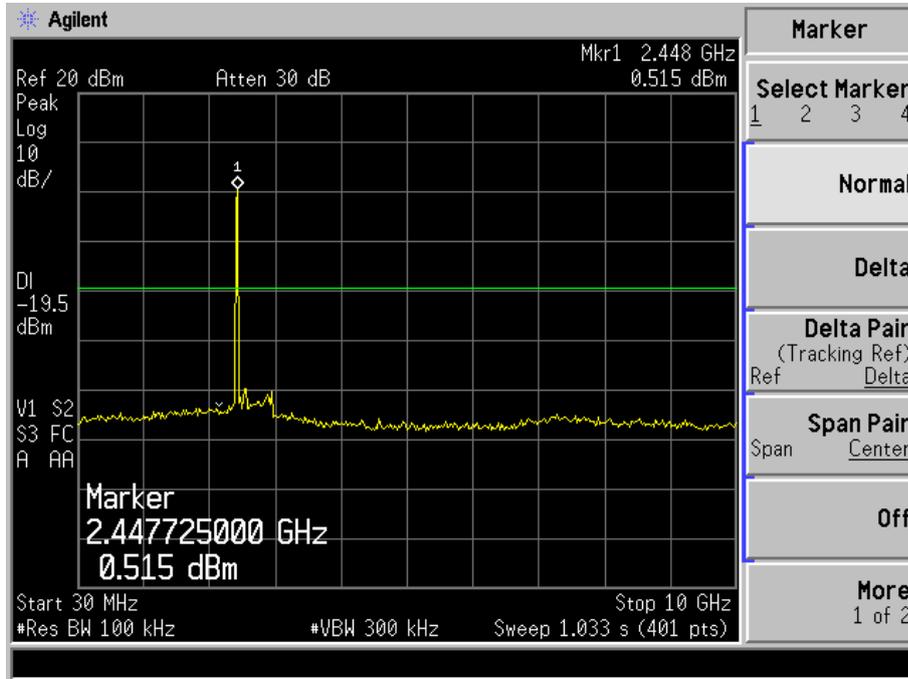


Plot 110 – Channel 1 (lower ch) @ 64QAM 54Mbps

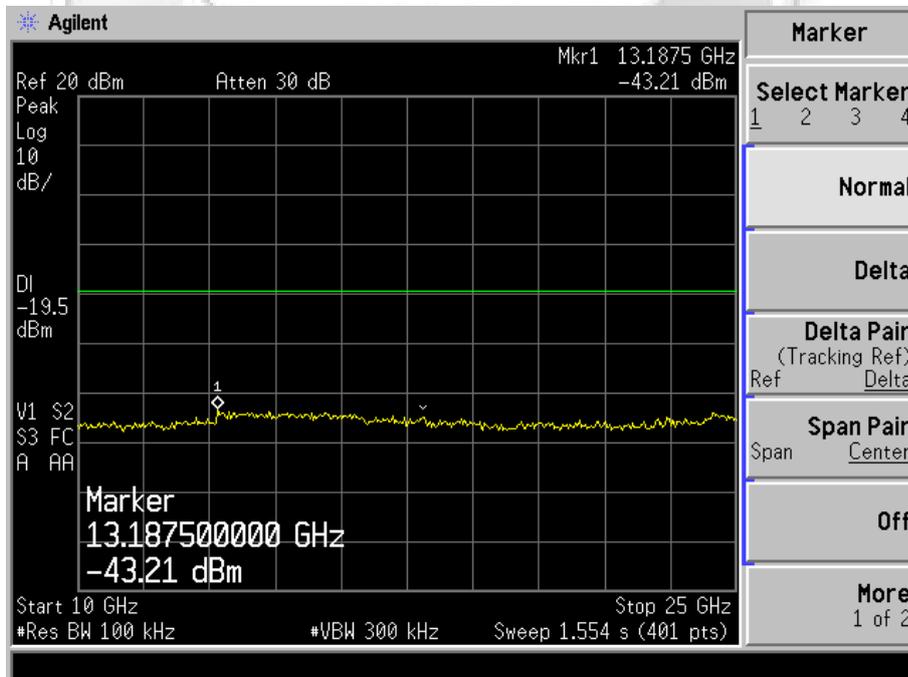


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 2 (Internal), 802.11g



Plot 111 – Channel 6 (mid ch) @ BPSK 9Mbps

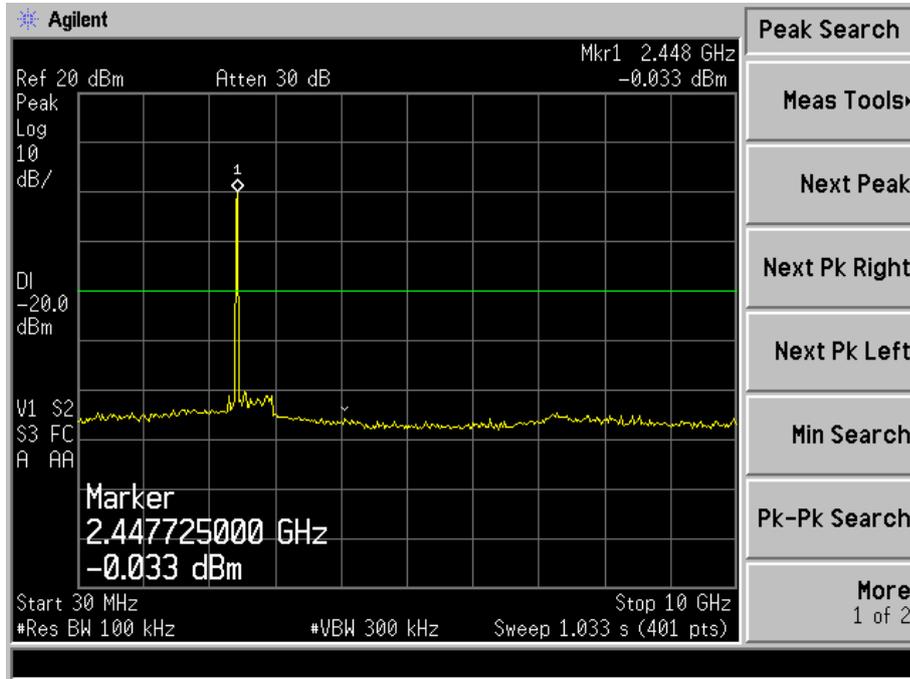


Plot 112 – Channel 6 (mid ch) @ BPSK 9Mbps

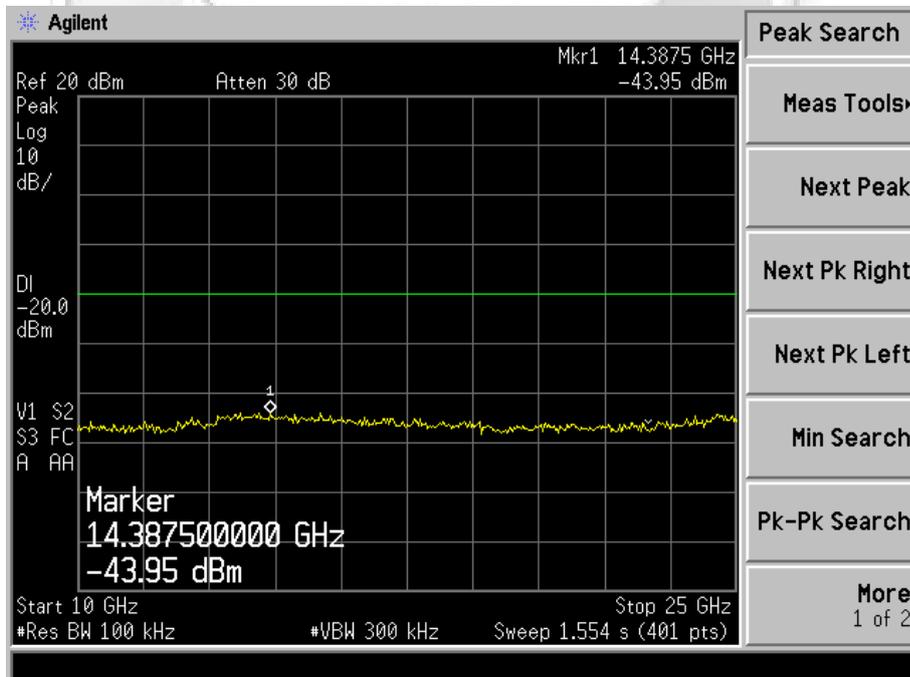


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 2 (Internal), 802.11g



Plot 113 – Channel 6 (mid ch) @ QPSK 18Mbps

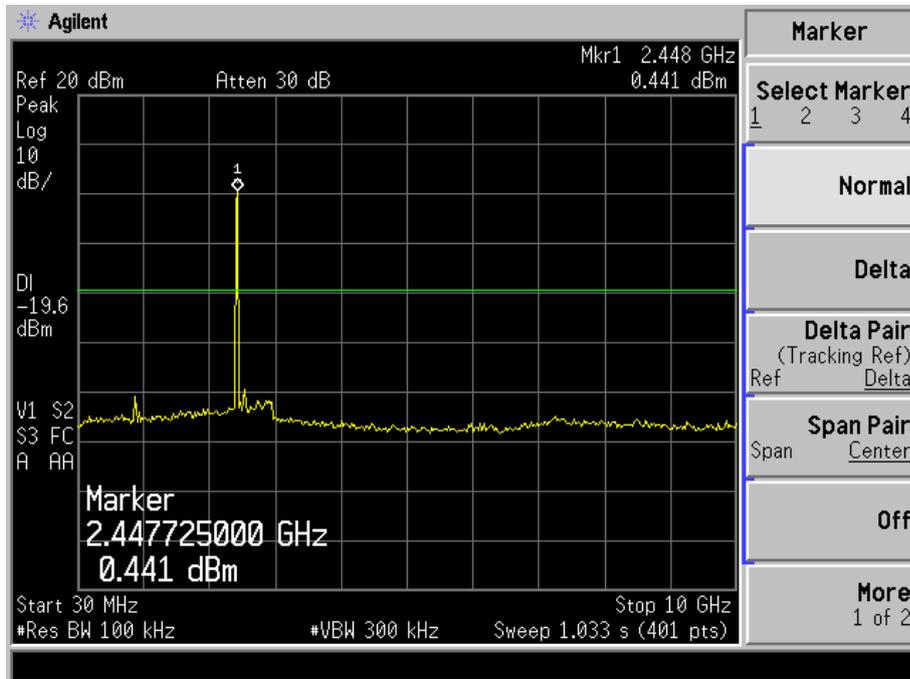


Plot 114 – Channel 6 (mid ch) @ QPSK 18Mbps

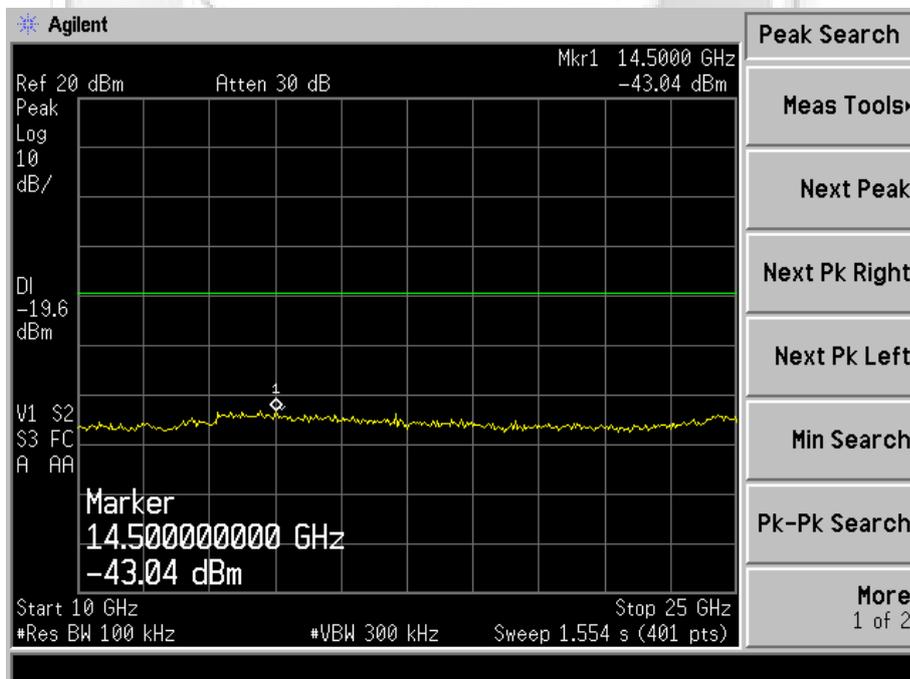


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 2 (Internal), 802.11g



Plot 115 – Channel 6 (mid ch) @ 16QAM 36Mbps

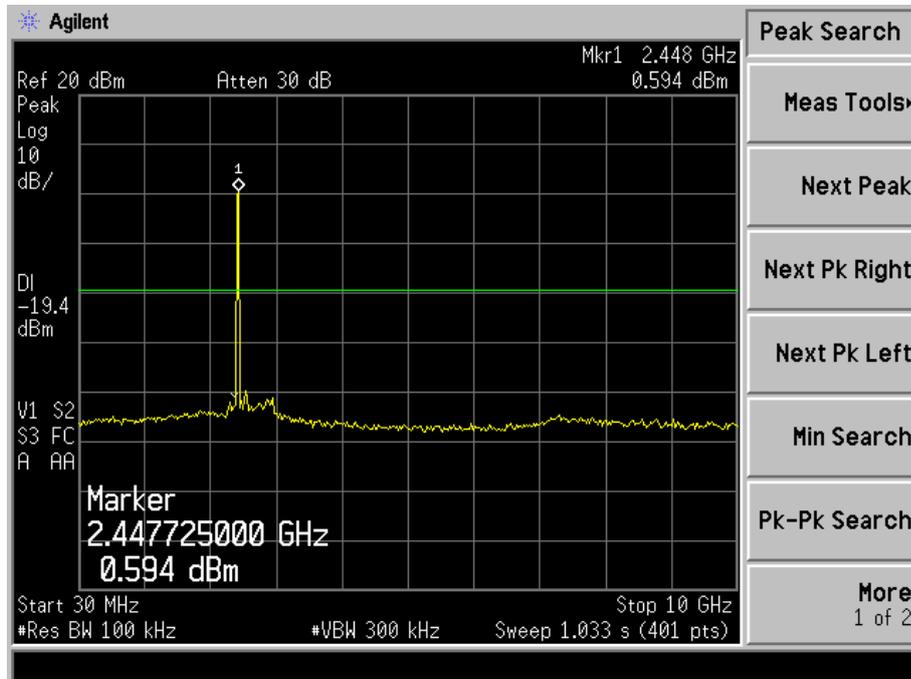


Plot 116 – Channel 6 (mid ch) @ 16QAM 36Mbps

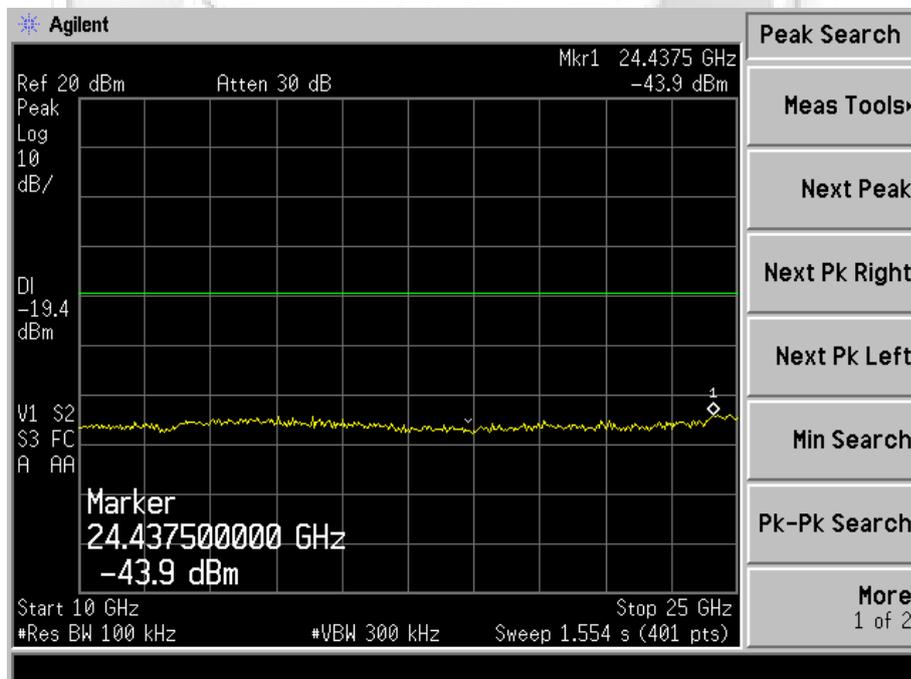


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 2 (Internal), 802.11g



Plot 117 – Channel 6 (mid ch) @ 64QAM 54Mbps

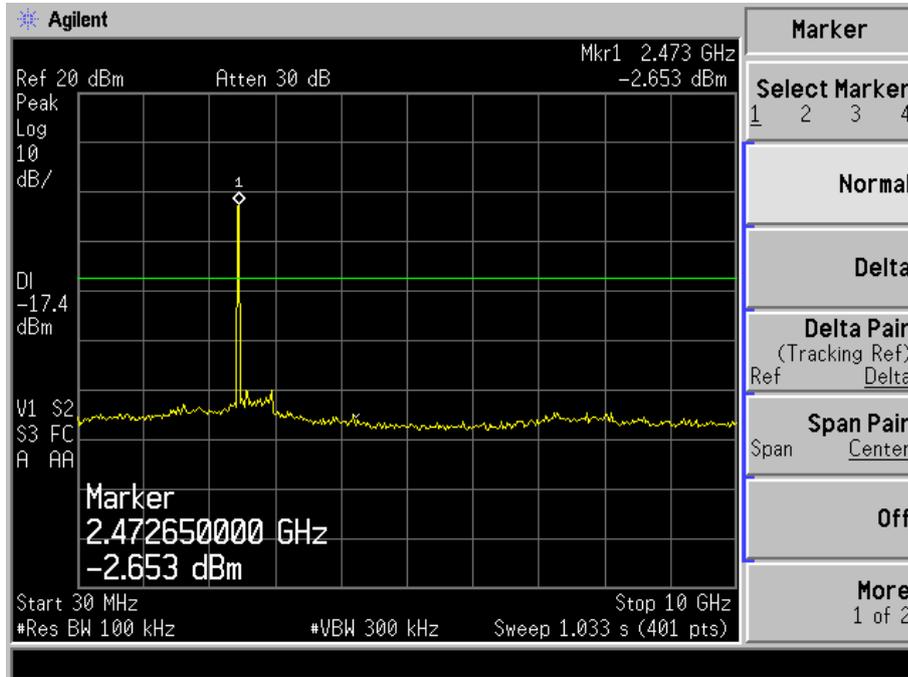


Plot 118 – Channel 6 (mid ch) @ 64QAM 54Mbps

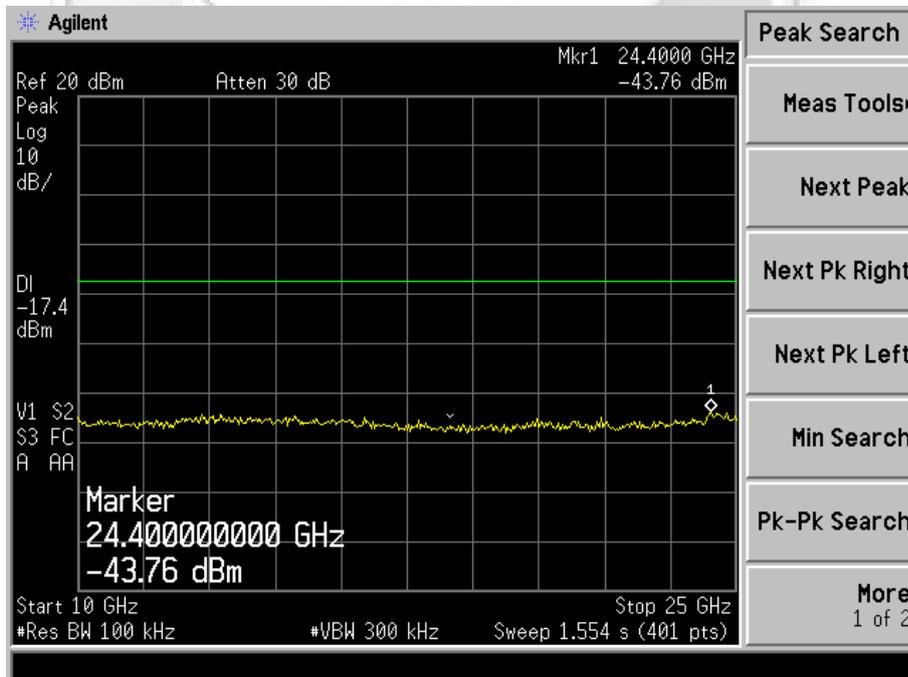


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 2 (Internal), 802.11g



Plot 119 – Channel 11 (upper ch) @ BPSK 9Mbps

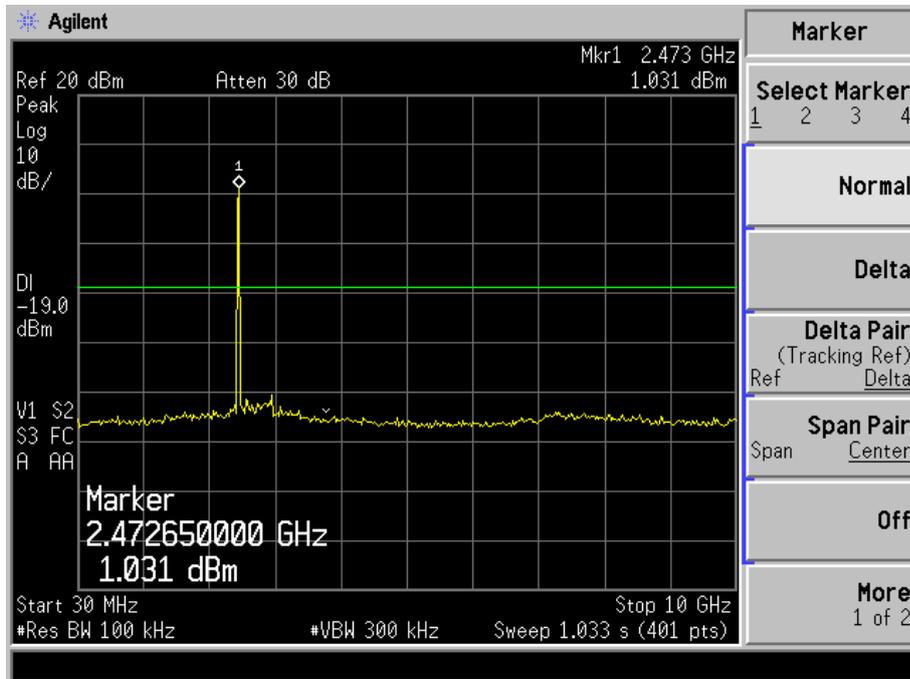


Plot 120 – Channel 11 (upper ch) @ BPSK 9Mbps

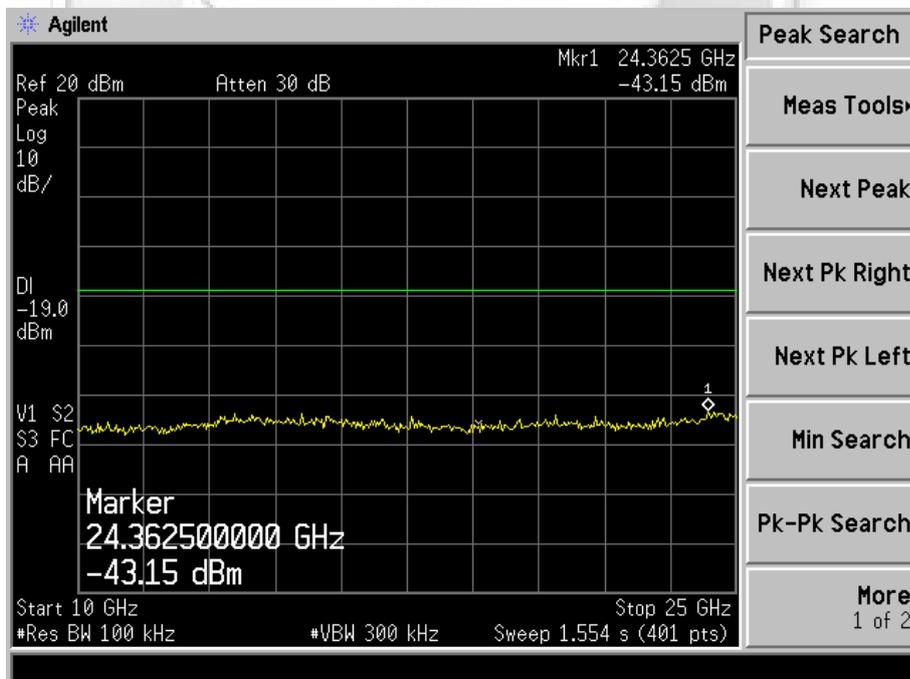


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 2 (Internal), 802.11g



Plot 121 – Channel 11 (upper ch) @ QPSK 18Mbps

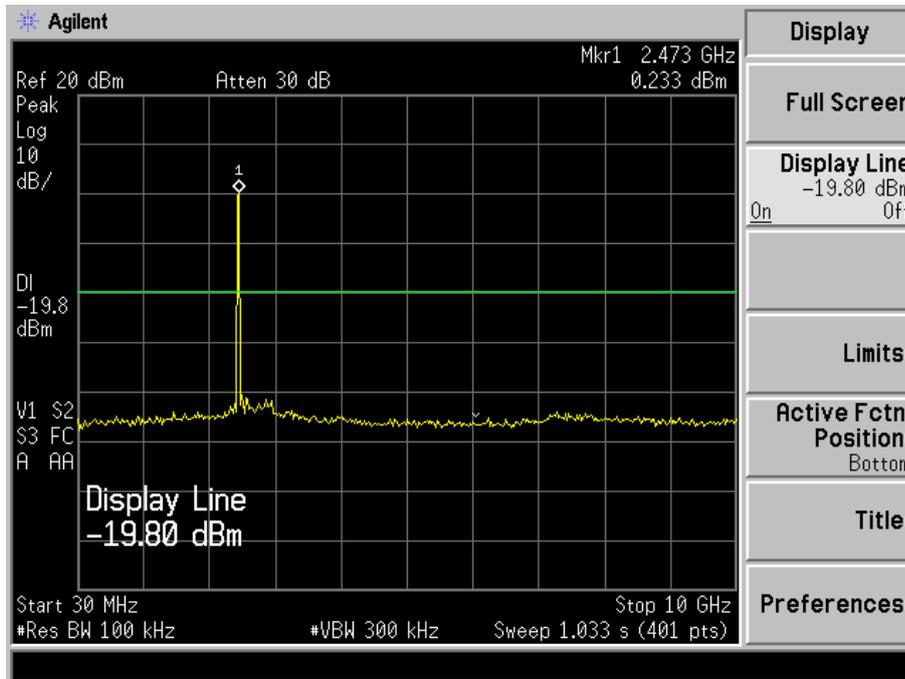


Plot 122 – Channel 11 (upper ch) @ QPSK 18Mbps

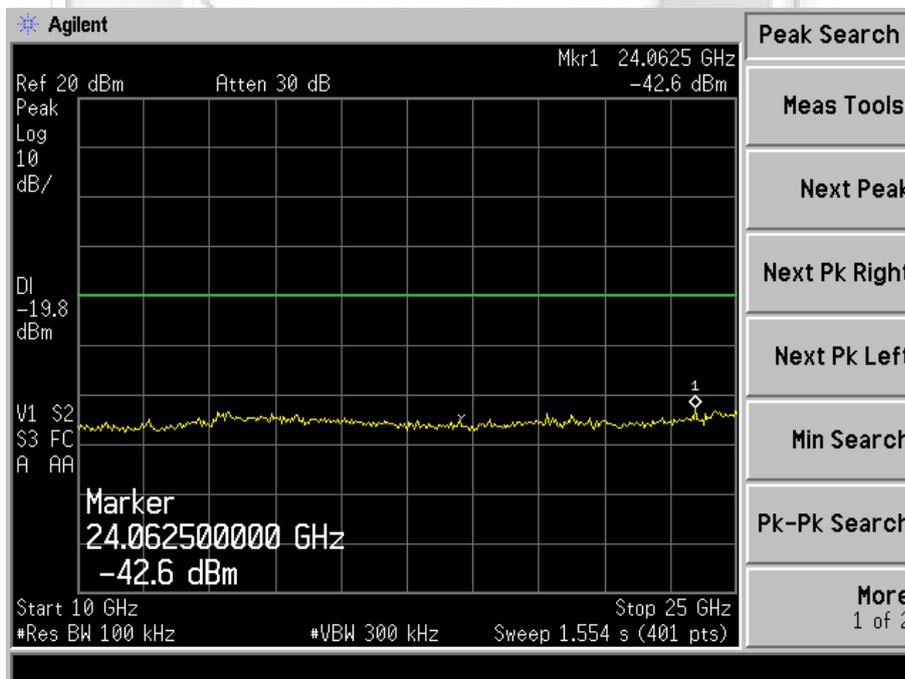


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 2 (Internal), 802.11g



Plot 123 – Channel 11 (upper ch) @ 16QAM 36Mbps

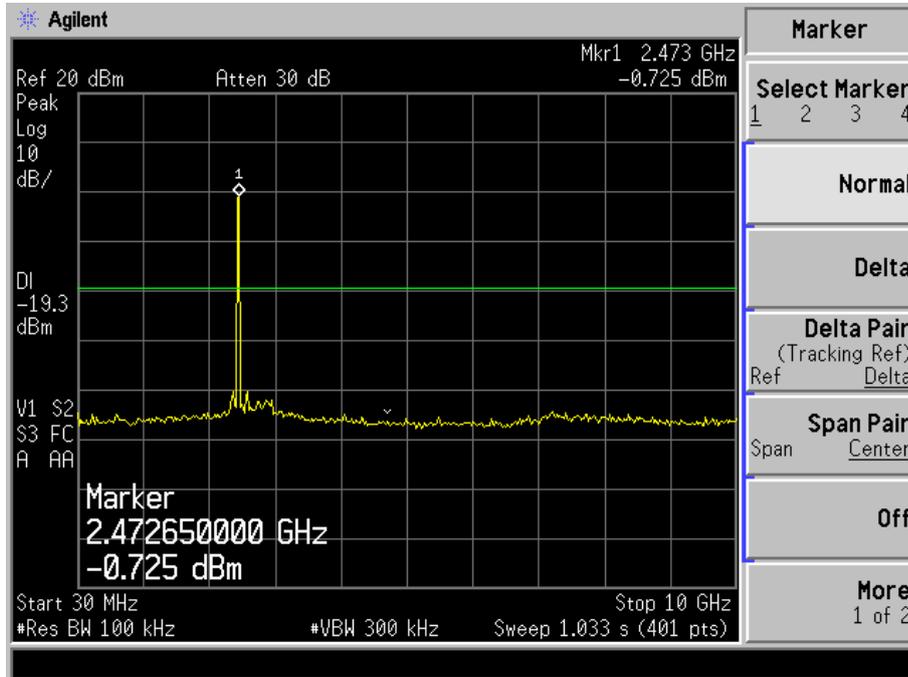


Plot 124 – Channel 11 (upper ch) @ 16QAM 36Mbps

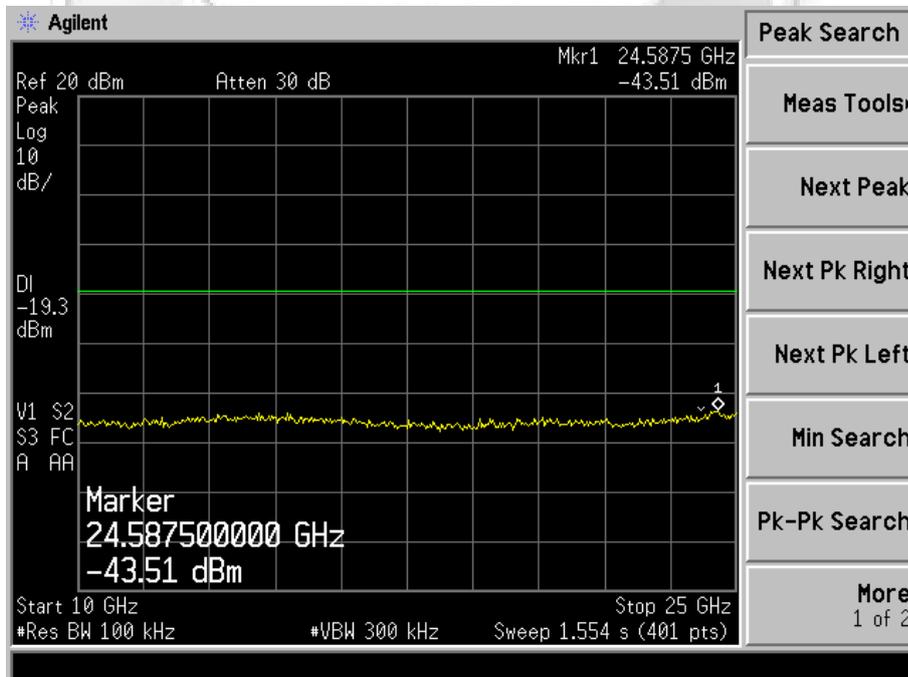


RF CONDUCTED SPURIOUS EMISSIONS TEST

RF Conducted Spurious Emissions Plots – Antenna 2 (Internal), 802.11g



Plot 125 – Channel 11 (upper ch) @ 64QAM 54Mbps



Plot 126 – Channel 11 (upper ch) @ 64QAM 54Mbps



**BAND EDGE COMPLIANCE (CONDUCTED) TEST**

**47 CFR FCC Part 15.247(d) Band Edge Compliance (Conducted) Limits**

The EUT shows compliance to the requirements of this section, which states in any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator (EUT) is operating, the radio frequency power that is produced by the EUT shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of desired power.

**47 CFR FCC Part 15.247(d) Band Edge Compliance (Conducted) Test Instrumentation**

Instrument	Model	S/No	Cal Due Date
Agilent EMC Analyzer (9kHz-26.5GHz)	E7405A	US40240195	16 Mar 2012

**47 CFR FCC Part 15.247(d) Band Edge Compliance (Conducted) Test Setup**

1. The EUT and supporting equipment were set up as shown in the setup photo.
2. The power supply for the EUT was connected to a filtered mains.
3. The RF antenna connector was connected to the spectrum analyser via a low-loss coaxial cable.
4. The resolution bandwidth (RBW) and the video bandwidth (VBW) of the spectrum analyser were respectively set to 100kHz and 300kHz.
5. All other supporting equipment were powered separately from another filtered mains.

**47 CFR FCC Part 15.247(d) Band Edge Compliance (Conducted) Test Method**

1. The EUT was switched on and allowed to warm up to its normal operating condition. The EUT was then configured to operate in the test mode with specified modulation and data rate.
2. The frequency span of the spectrum analyser was set to wide enough to capture the lower band edge of the transmission band, 2.400GHz and any spurious emissions at the band edge.
3. The spectrum analyser was set to max hold to capture any spurious emissions within the span. The signal capturing was continuous until no further spurious emissions were detected.
4. Repeat steps 1 to 3 with all possible modulations and data rates.
5. The steps 2 to 4 were repeated with the frequency span of the spectrum analyser was set to wide enough to capture the upper band edge frequency of the transmission band, 2.4835GHz and the any spurious emissions at the band-edge.



**BAND EDGE COMPLIANCE (CONDUCTED) TEST**

**47 CFR FCC Part 15.247(d) Band Edge Compliance (Conducted) Results**

Test Input Power	120V 60Hz	Temperature	23°C
Attached Plots	127 - 154	Relative Humidity	55%
		Atmospheric Pressure	1030mbar
		Tested By	Kyaw Soe Hein

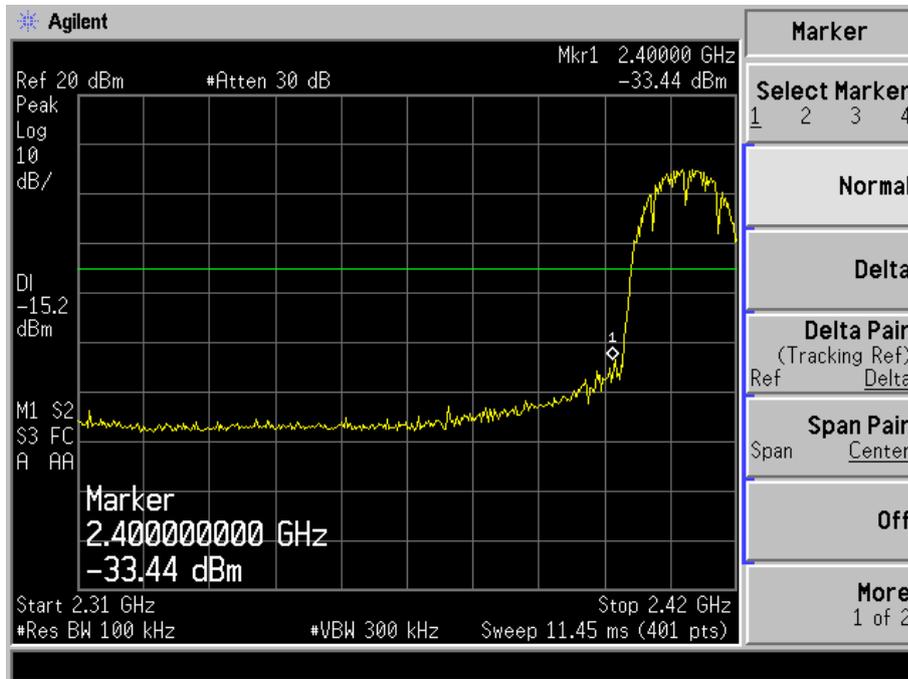
No significant signal was found and they were below the specified limit.



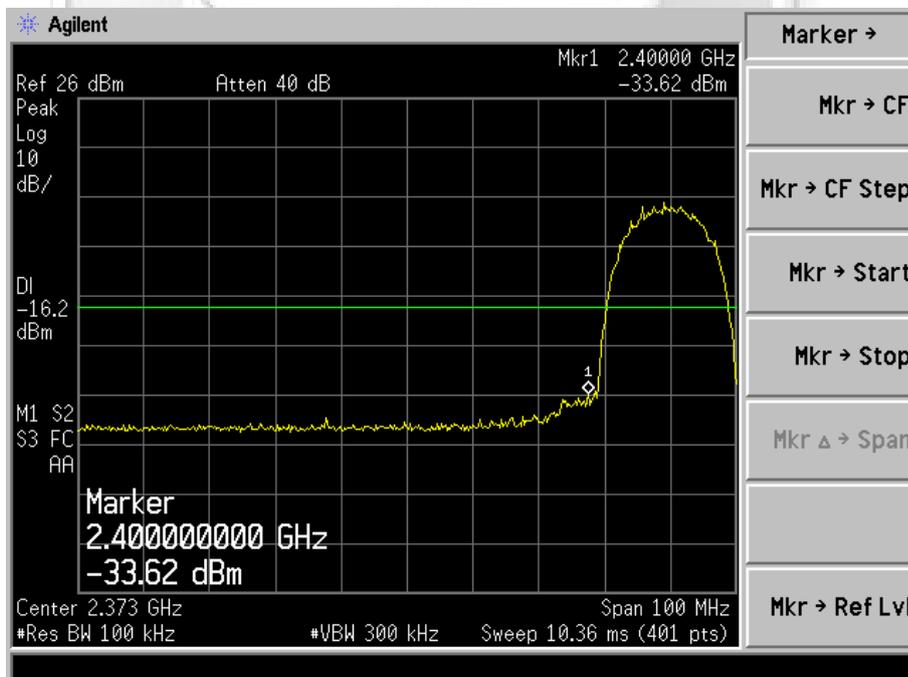


**BAND EDGE COMPLIANCE (CONDUCTED) TEST**

**Band Edge Compliance (Conducted) Plots – Antenna 1 (External), 802.11b**



**Plot 127 – Lower Band Edge at 2.4000GHz @ DBPSK 1Mbps**

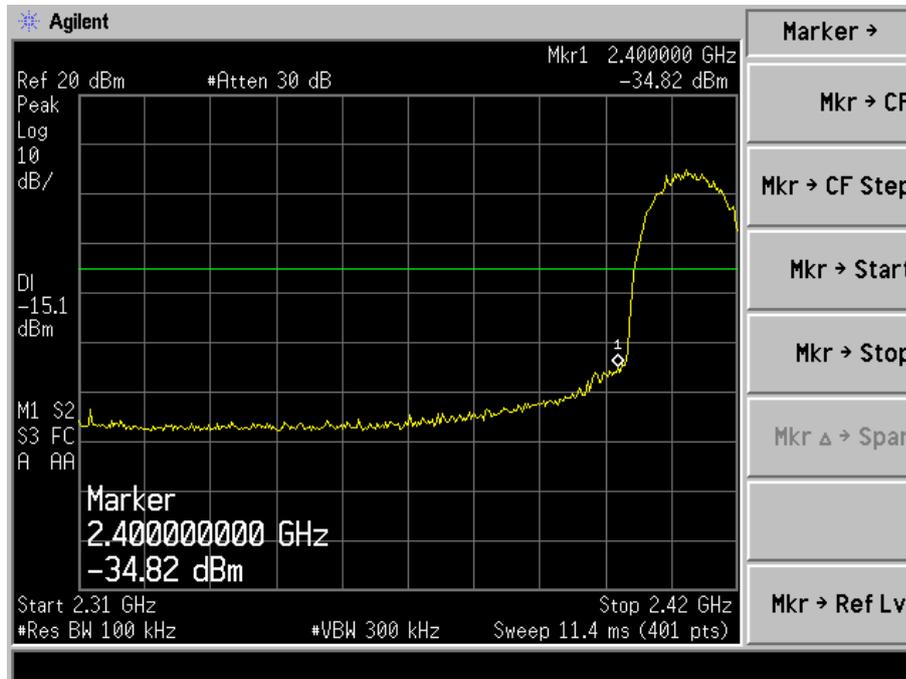


**Plot 128 – Lower Band Edge at 2.4000GHz @ DQPSK 2Mbps**



**BAND EDGE COMPLIANCE (CONDUCTED) TEST**

**Band Edge Compliance (Conducted) Plots – Antenna 1 (External), 802.11b**



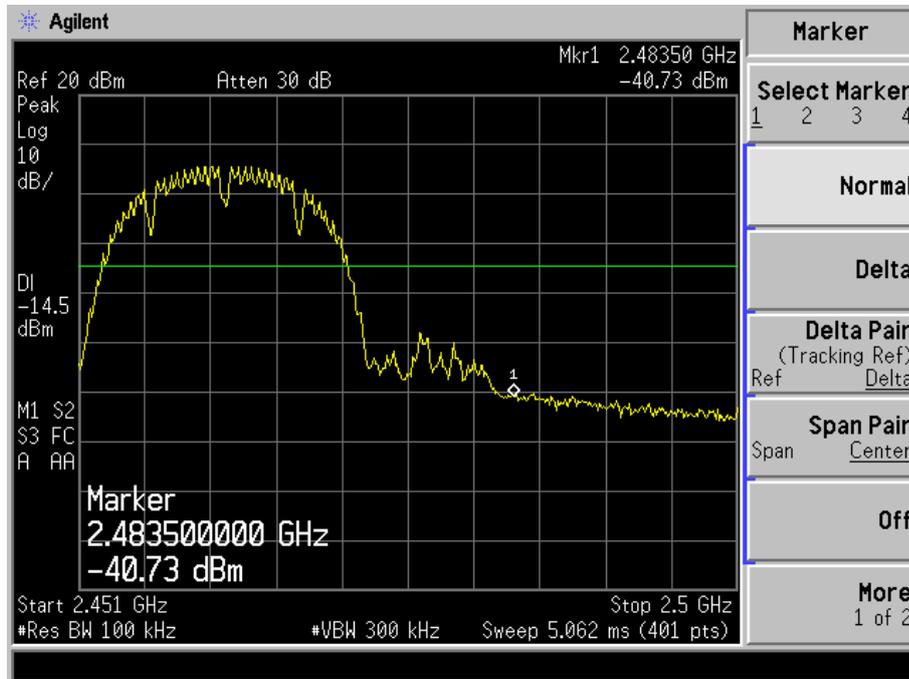
**Plot 129 – Lower Band Edge at 2.400GHz @ CCK 11Mbps**



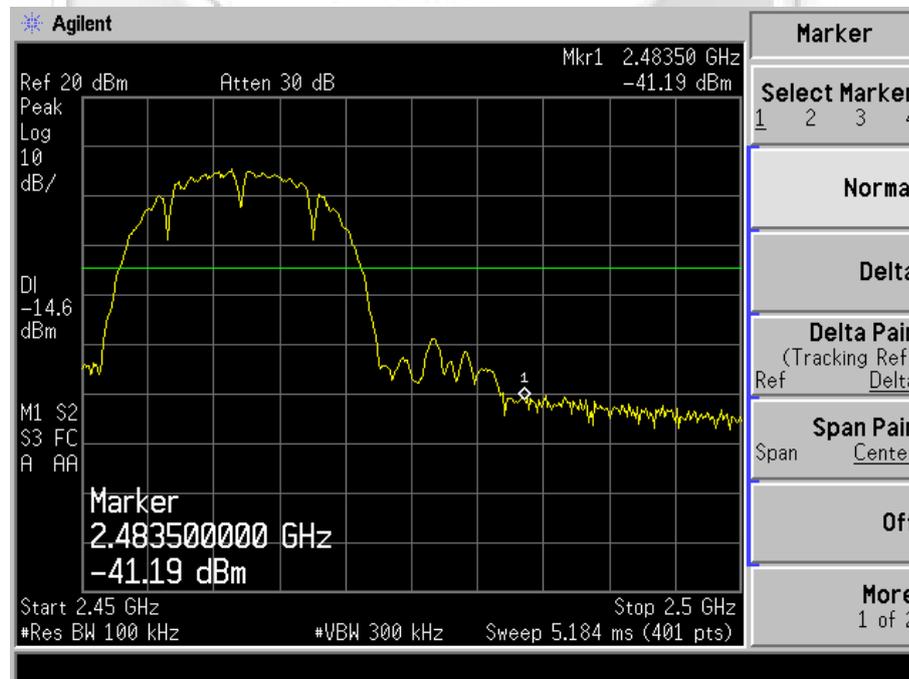


**BAND EDGE COMPLIANCE (CONDUCTED) TEST**

**Band Edge Compliance (Conducted) Plots – Antenna 1 (External), 802.11b**



**Plot 130 – Upper Band Edge at 2.4835GHz @ DBPSK 1Mbps**

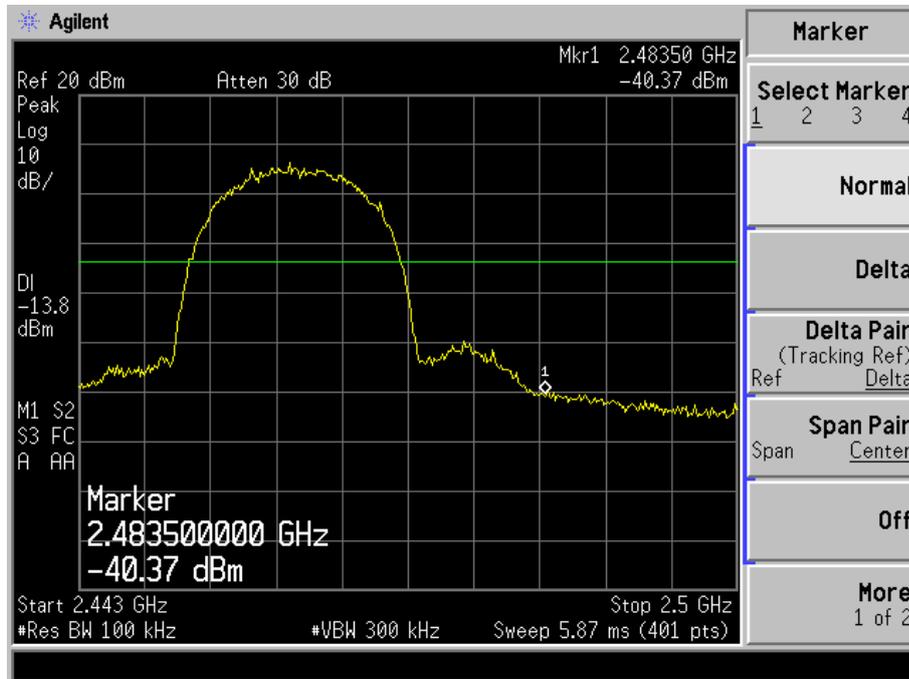


**Plot 131 – Upper Band Edge at 2.4835GHz @ DQPSK 2Mbps**



**BAND EDGE COMPLIANCE (CONDUCTED) TEST**

**Band Edge Compliance (Conducted) Plots – Antenna 1 (External), 802.11b**



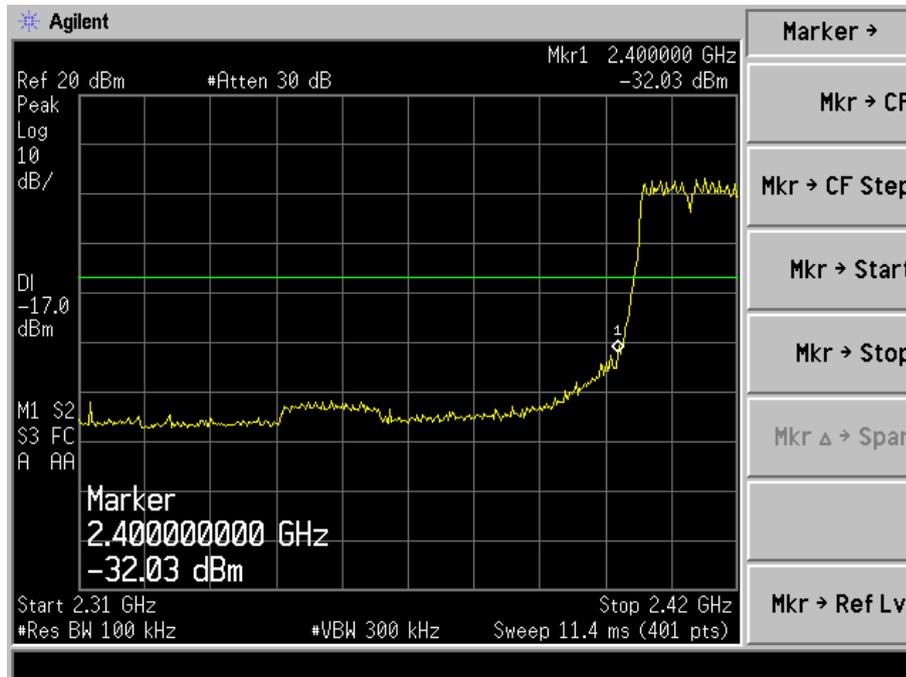
**Plot 132 – Upper Band Edge at 2.4835GHz @ CCK 11Mbps**



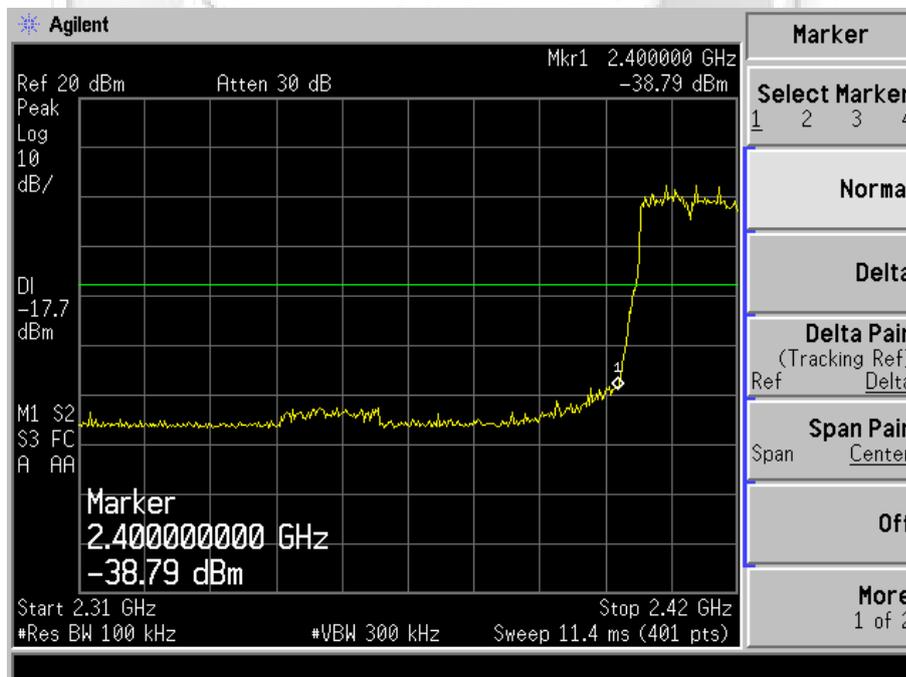


**BAND EDGE COMPLIANCE (CONDUCTED) TEST**

**Band Edge Compliance (Conducted) Plots – Antenna 1 (External), 802.11g**



**Plot 133 – Lower Band Edge at 2.400GHz @ BPSK 9Mbps**

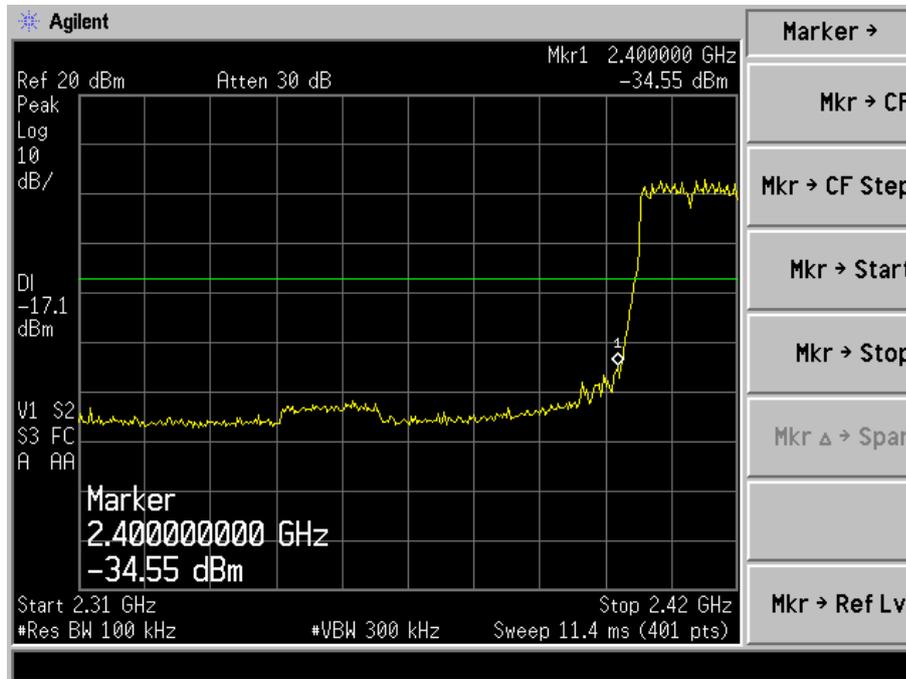


**Plot 134 – Lower Band Edge at 2.400GHz @ QPSK 18Mbps**

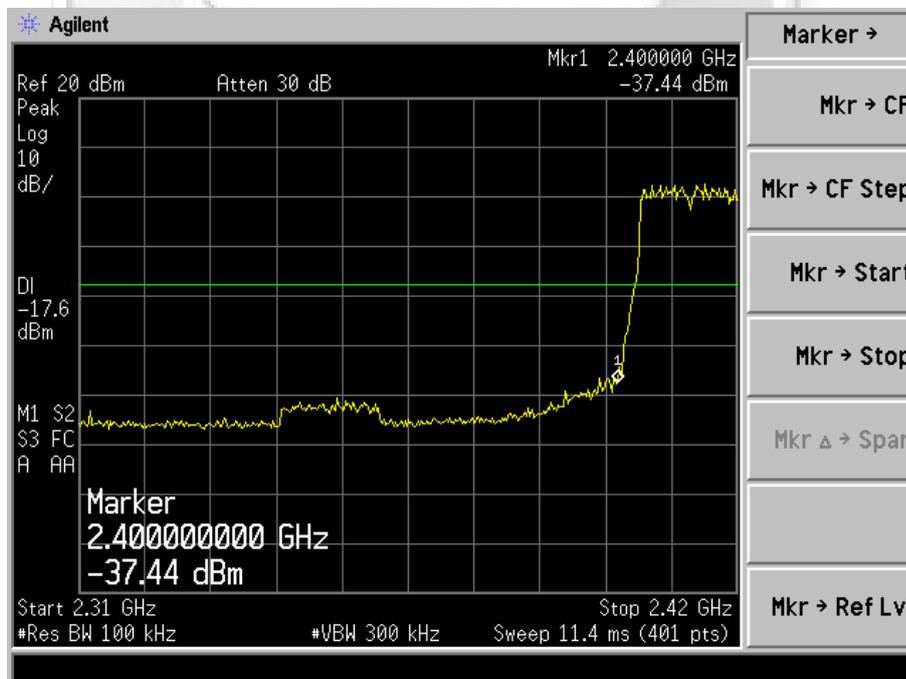


**BAND EDGE COMPLIANCE (CONDUCTED) TEST**

**Band Edge Compliance (Conducted) Plots – Antenna 1 (External), 802.11g**



**Plot 135 – Lower Band Edge at 2.4000GHz @ 16QAM 36Mbps**

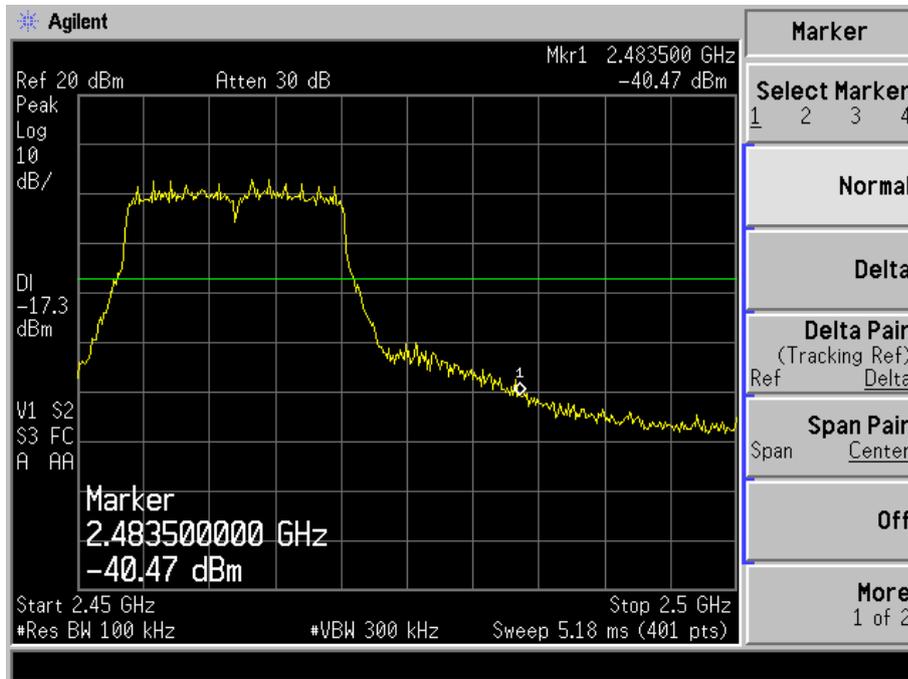


**Plot 136 – Lower Band Edge at 2.4000GHz @ 64QAM 54Mbps**

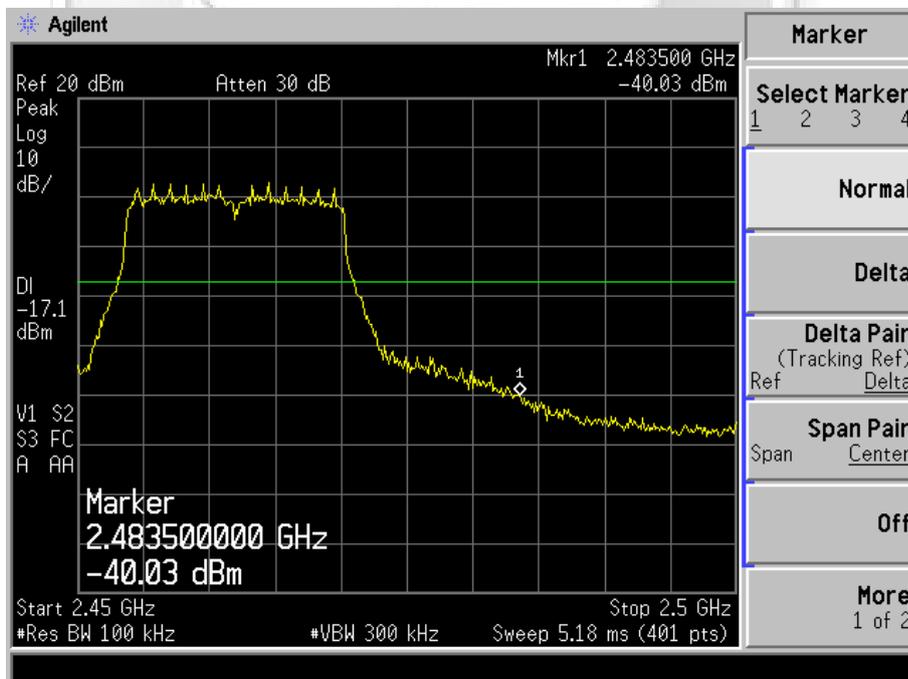


**BAND EDGE COMPLIANCE (CONDUCTED) TEST**

**Band Edge Compliance (Conducted) Plots – Antenna 1 (External), 802.11g**



**Plot 137 – Upper Band Edge at 2.4835GHz @ BPSK 9Mbps**

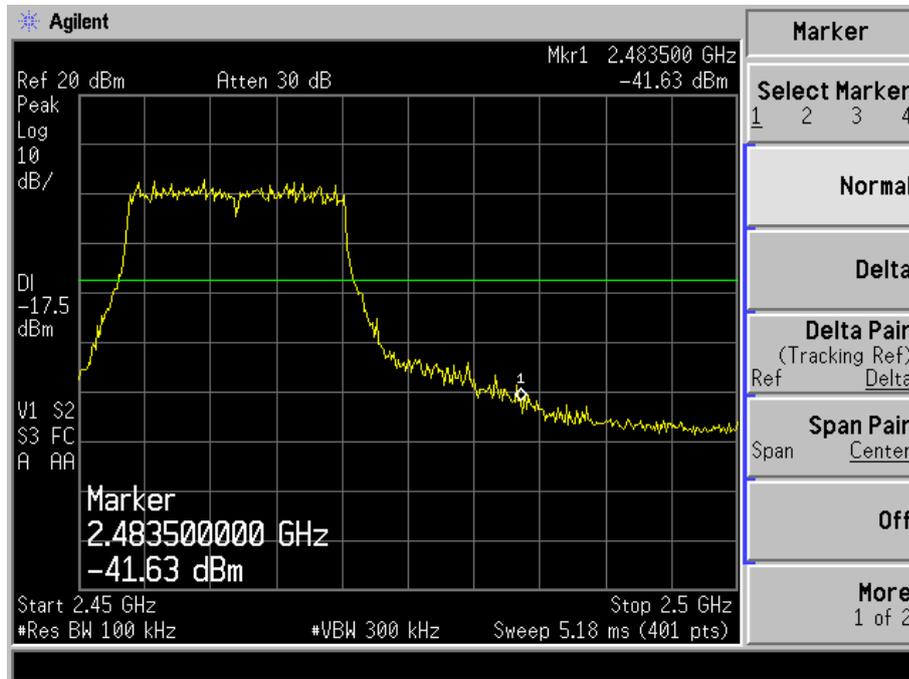


**Plot 138 – Upper Band Edge at 2.4835GHz @ QPSK 18Mbps**

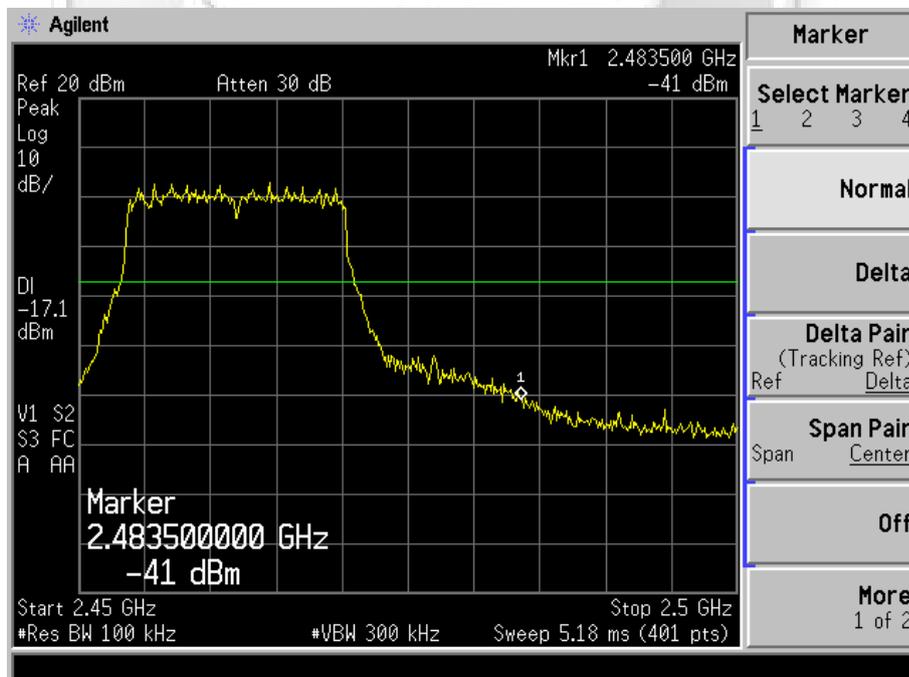


**BAND EDGE COMPLIANCE (CONDUCTED) TEST**

**Band Edge Compliance (Conducted) Plots – Antenna 1 (External), 802.11g**



**Plot 139 – Upper Band Edge at 2.4835GHz @ 16QAM 36Mbps**

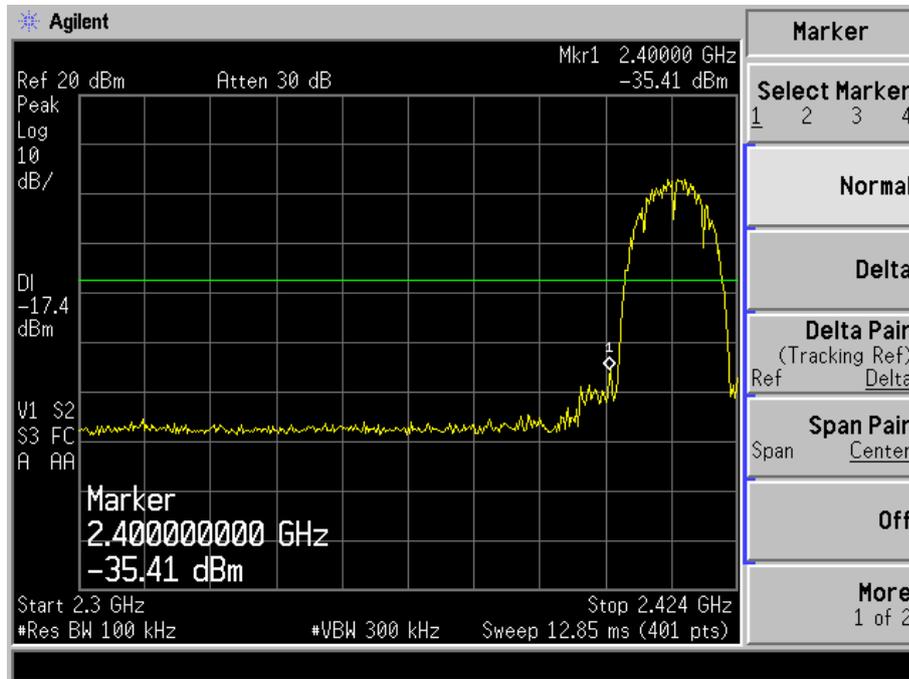


**Plot 140 – Upper Band Edge at 2.4835GHz @ 64QAM 54Mbps**

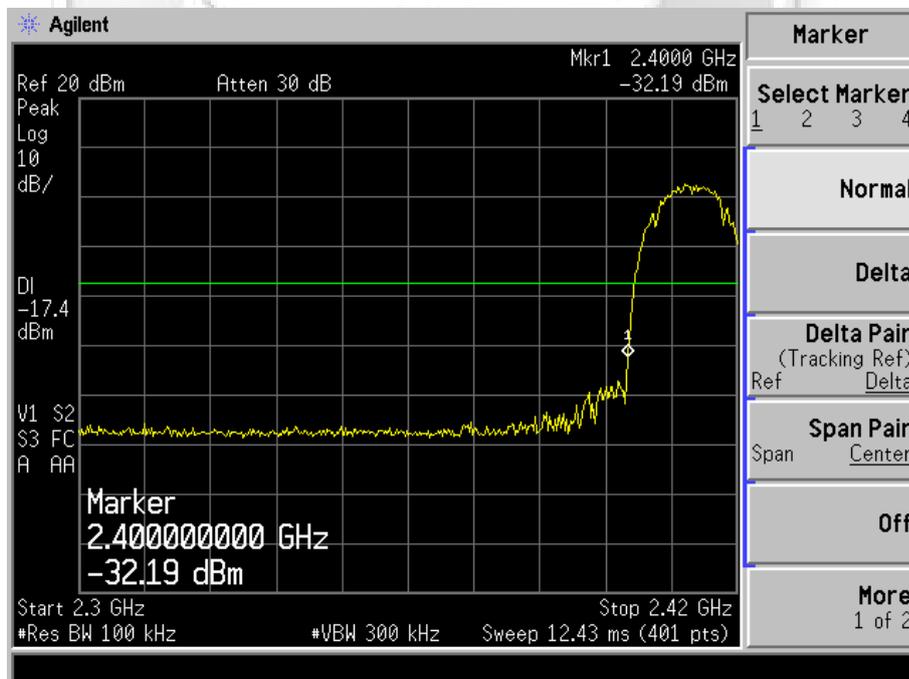


**BAND EDGE COMPLIANCE (CONDUCTED) TEST**

**Band Edge Compliance (Conducted) Plots – Antenna 2 (Internal), 802.11b**



**Plot 141 – Lower Band Edge at 2.400GHz @ DBPSK 1Mbps**

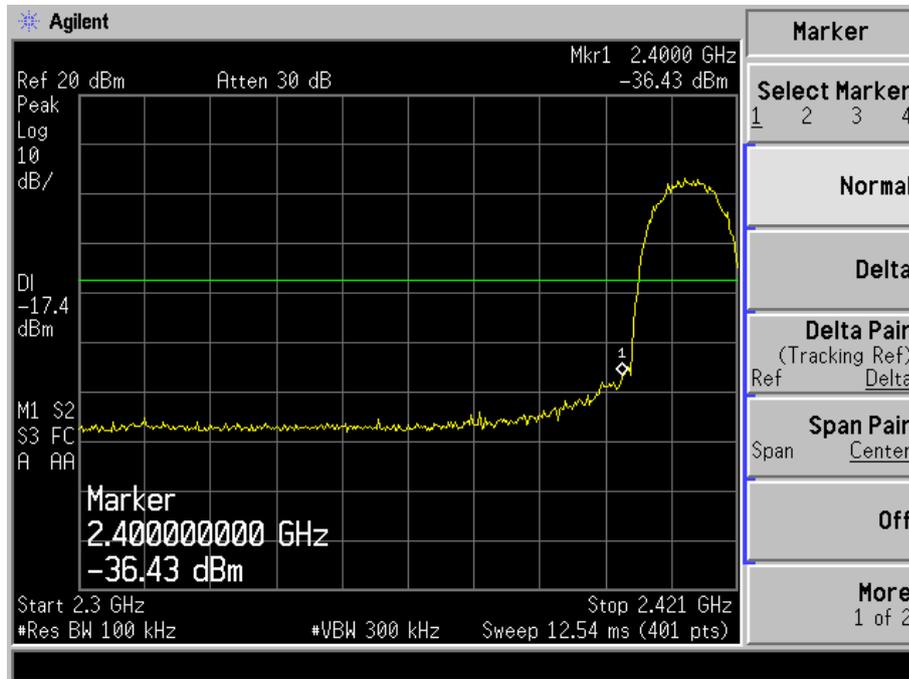


**Plot 142 – Lower Band Edge at 2.400GHz @ DQPSK 2Mbps**



**BAND EDGE COMPLIANCE (CONDUCTED) TEST**

**Band Edge Compliance (Conducted) Plots – Antenna 2 (Internal), 802.11b**



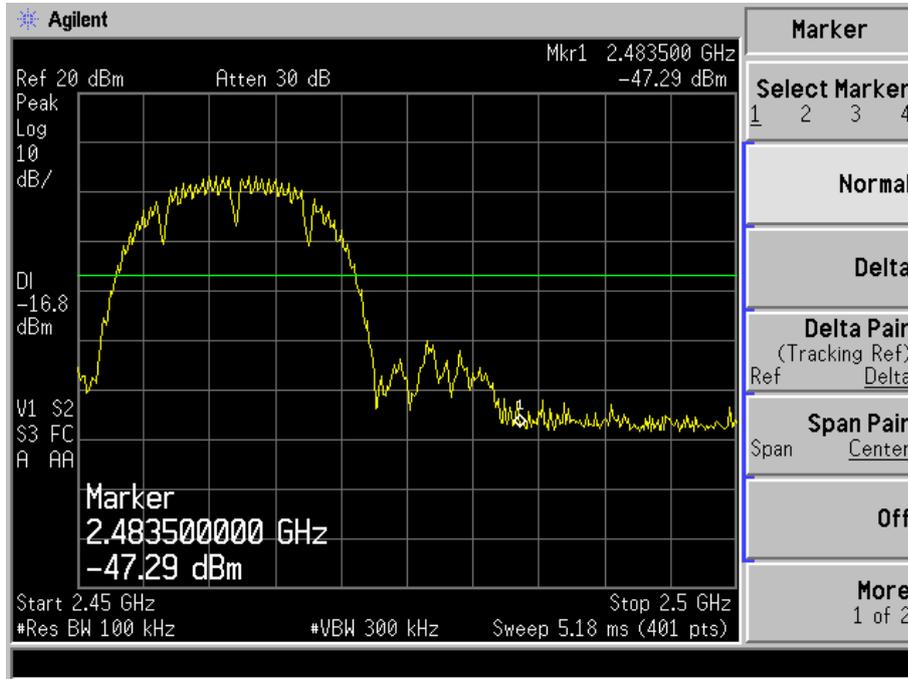
**Plot 143 – Lower Band Edge at 2.4000GHz @ CCK 11Mbps**



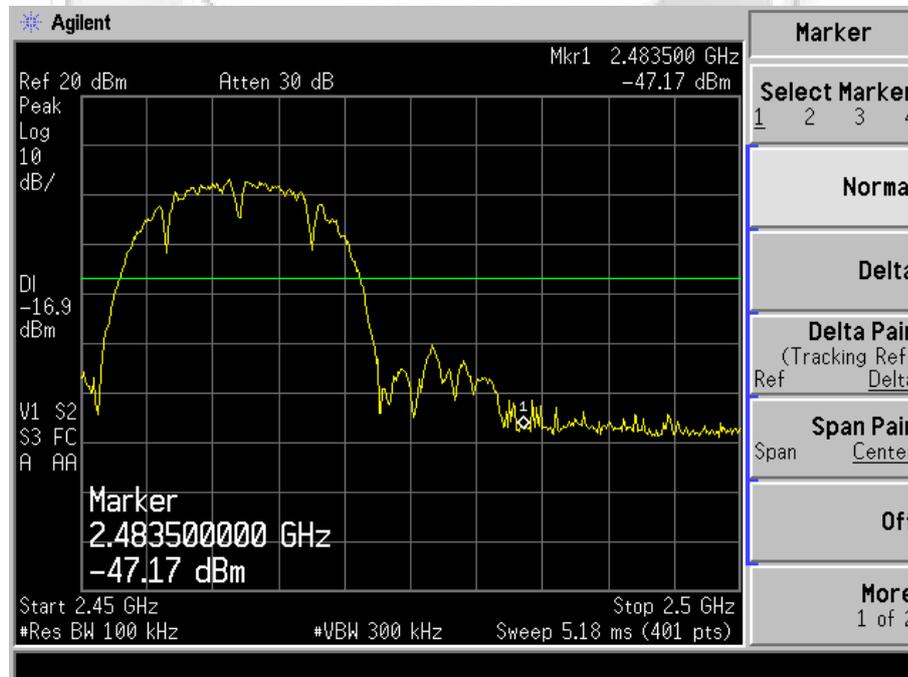


**BAND EDGE COMPLIANCE (CONDUCTED) TEST**

**Band Edge Compliance (Conducted) Plots – Antenna 2 (Internal), 802.11b**



**Plot 144 – Upper Band Edge at 2.4835GHz @ DBPSK 1Mbps**

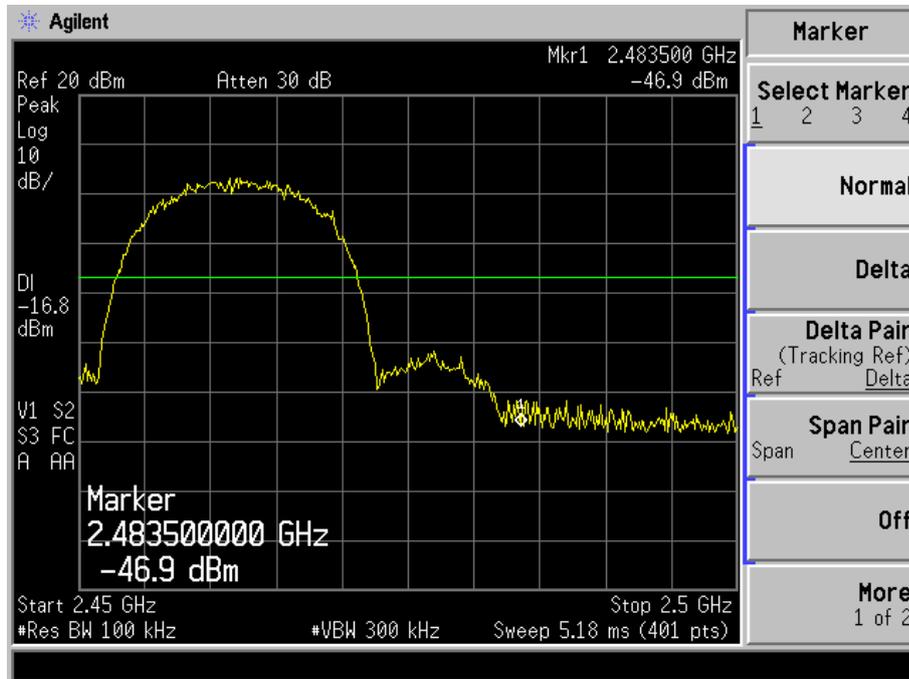


**Plot 145 – Upper Band Edge at 2.4835GHz @ DQPSK 2Mbps**



**BAND EDGE COMPLIANCE (CONDUCTED) TEST**

**Band Edge Compliance (Conducted) Plots – Antenna 2 (Internal), 802.11b**



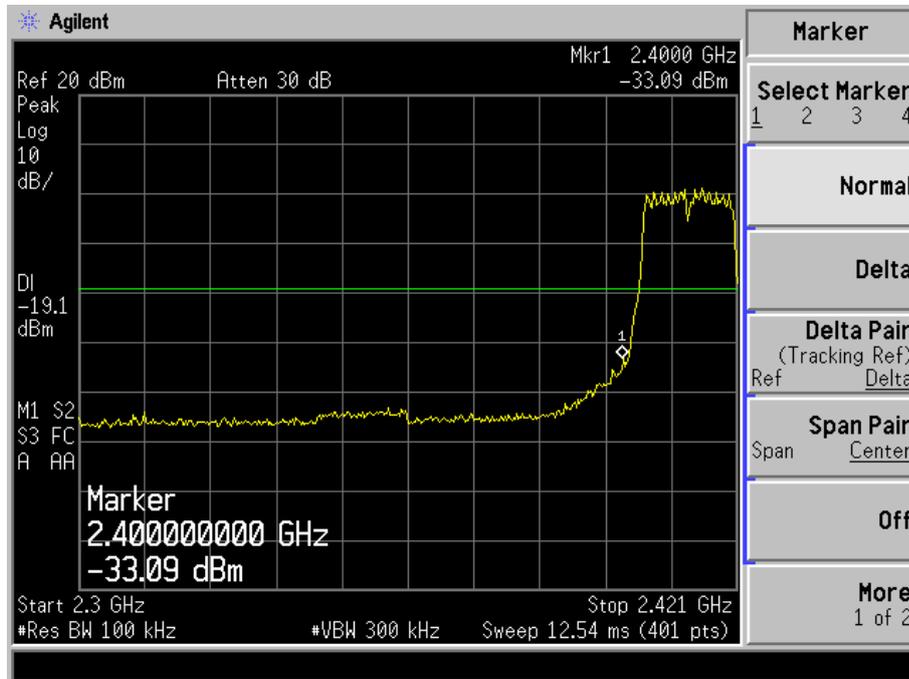
**Plot 146 – Upper Band Edge at 2.4835GHz @ CCK 11Mbps**



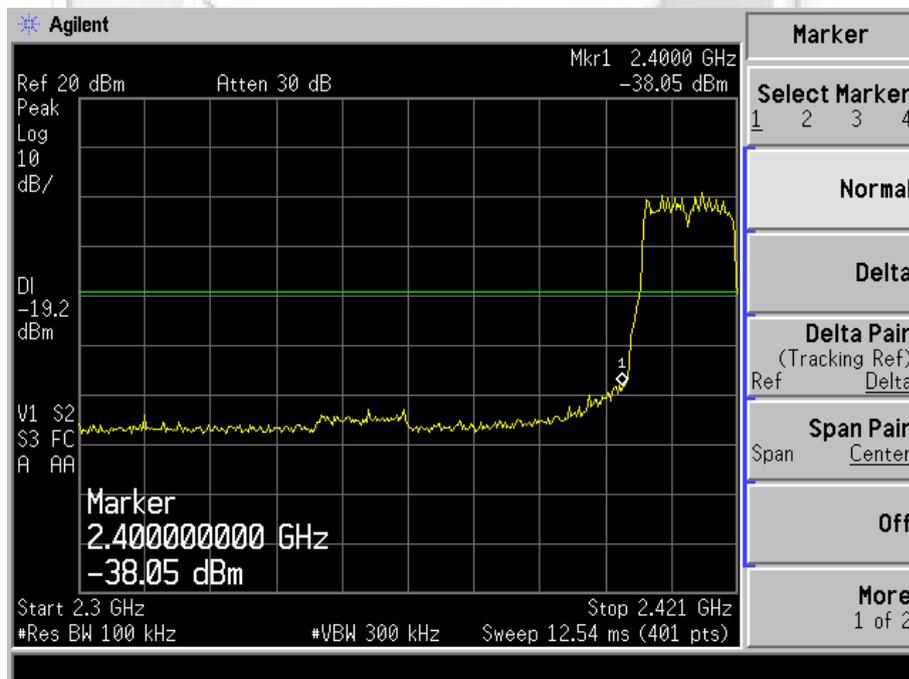


**BAND EDGE COMPLIANCE (CONDUCTED) TEST**

**Band Edge Compliance (Conducted) Plots – Antenna 2 (Internal), 802.11g**



**Plot 147 – Lower Band Edge at 2.4000GHz @ BPSK 9Mbps**

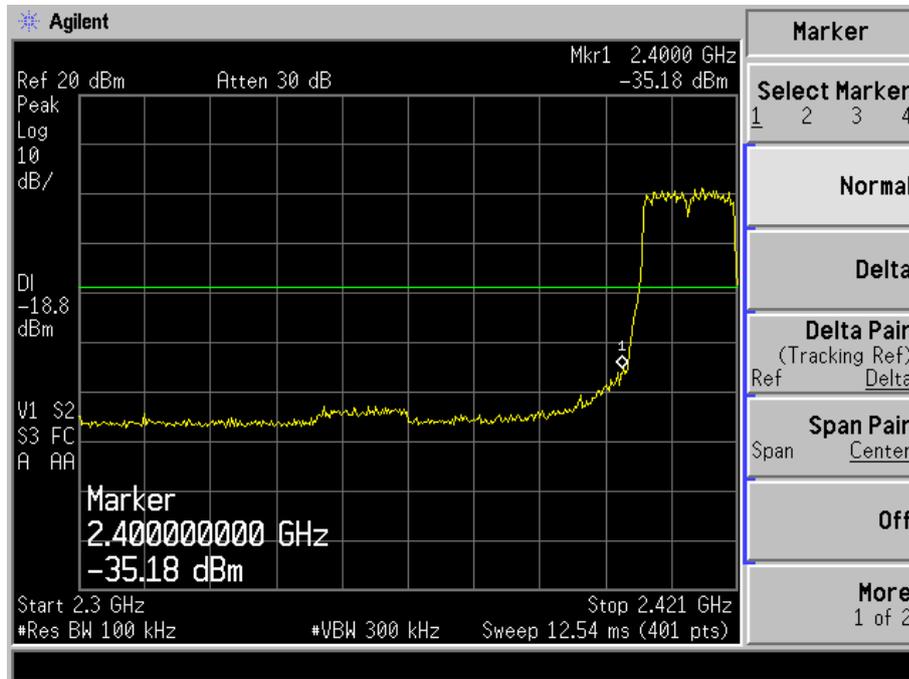


**Plot 148 – Lower Band Edge at 2.4000GHz @ QPSK 18Mbps**

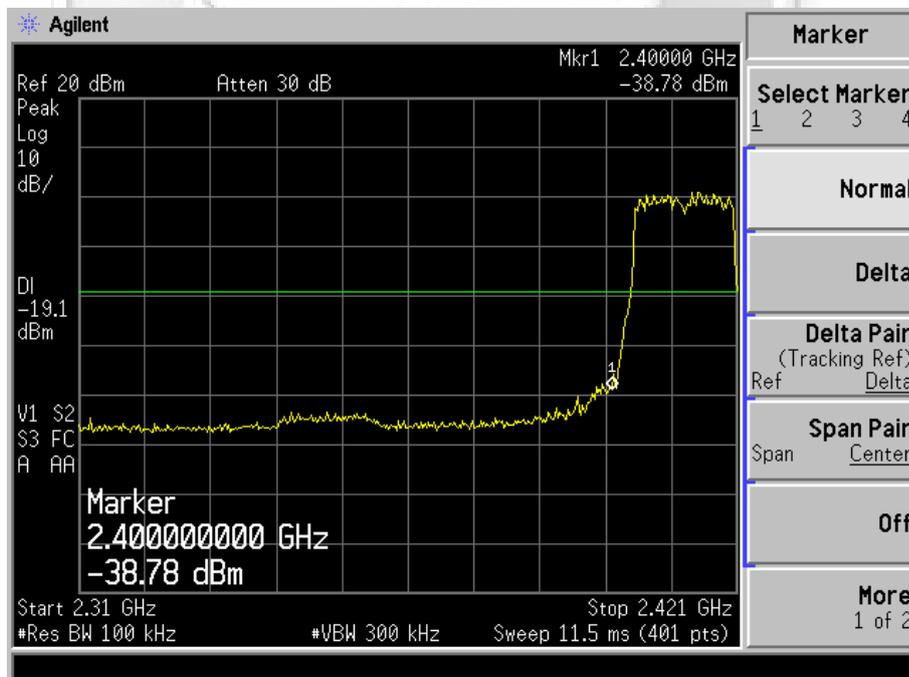


**BAND EDGE COMPLIANCE (CONDUCTED) TEST**

**Band Edge Compliance (Conducted) Plots – Antenna 2 (Internal), 802.11g**



**Plot 149 – Lower Band Edge at 2.4000GHz @ 16QAM 36Mbps**

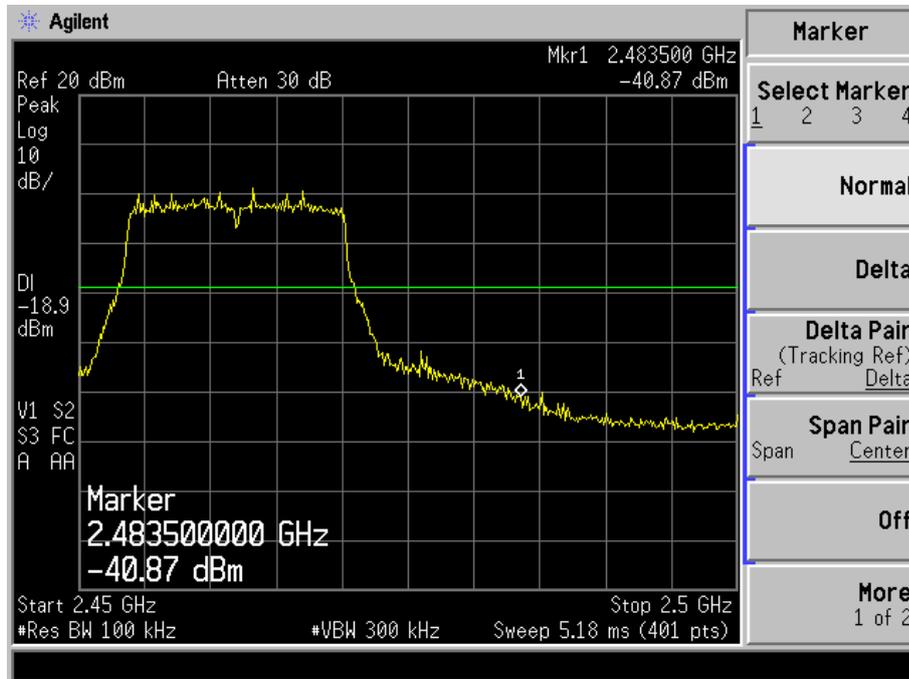


**Plot 150 – Lower Band Edge at 2.4000GHz @ 64QAM 54Mbps**

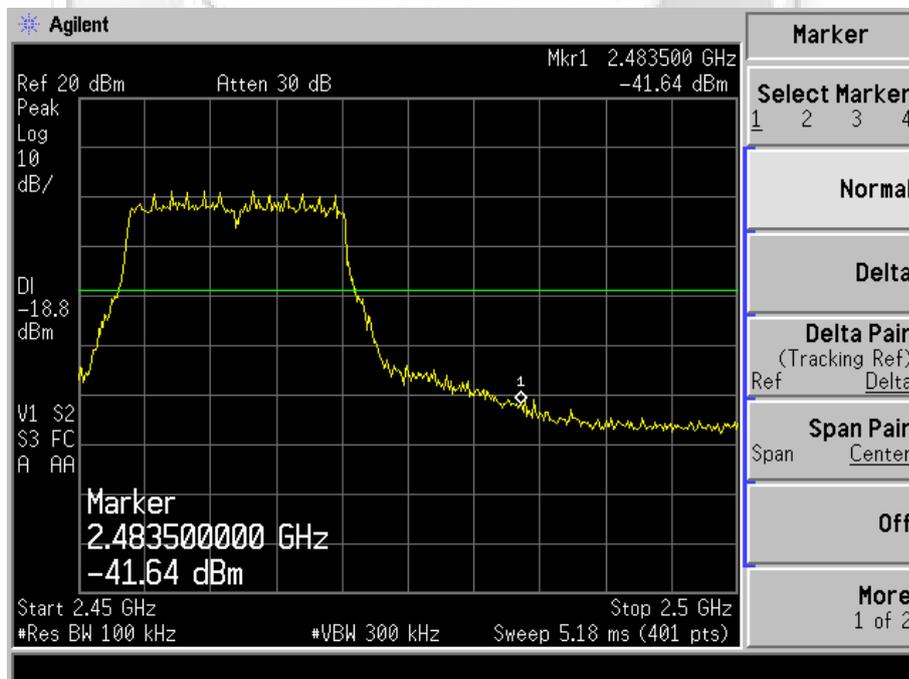


**BAND EDGE COMPLIANCE (CONDUCTED) TEST**

**Band Edge Compliance (Conducted) Plots – Antenna 2 (Internal), 802.11g**



**Plot 151 – Upper Band Edge at 2.4835GHz @ BPSK 9Mbps**

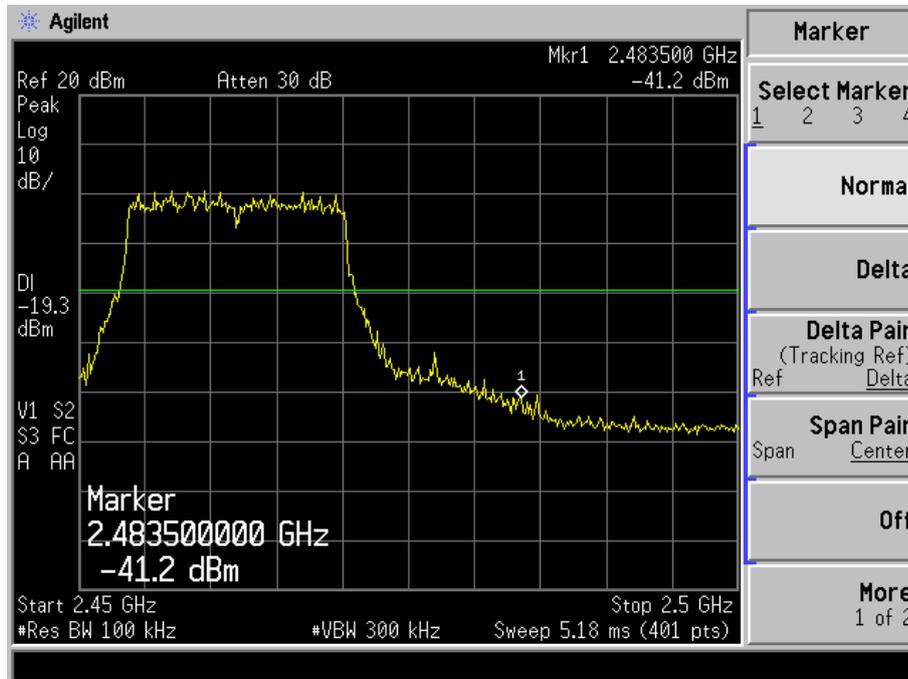


**Plot 152 – Upper Band Edge at 2.4835GHz @ QPSK 18Mbps**

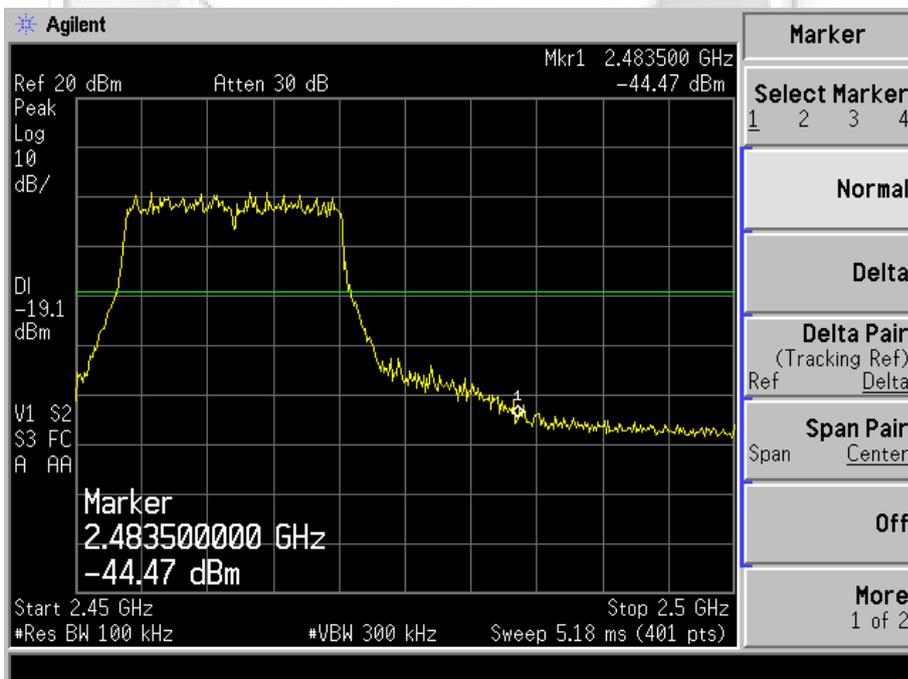


**BAND EDGE COMPLIANCE (CONDUCTED) TEST**

**Band Edge Compliance (Conducted) Plots – Antenna 2 (Internal), 802.11g**



**Plot 153 – Upper Band Edge at 2.4835GHz @ 16QAM 36Mbps**



**Plot 154 – Upper Band Edge at 2.4835GHz @ 64QAM 54Mbps**



## **BAND EDGE COMPLIANCE (RADIATED) TEST**

### **47 CFR FCC Part 15.247(d) Band Edge Compliance (Radiated) Limits**

The EUT shows compliance to the requirements of this section, which states in any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator (EUT) is operating, the radio frequency power that is produced by the EUT shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of desired power. In addition, radiated emissions which fall in the restricted bands shall comply to the radiated emission limits specified in 15.209.

### **47 CFR FCC Part 15.247(d) Band Edge Compliance (Radiated) Test Instrumentation**

<b>Instrument</b>	<b>Model</b>	<b>S/No</b>	<b>Cal Due Date</b>
Rohde & Schwarz EMI Test Receiver (20Hz - 7GHz)	ESI	100015	05 Jul 2012
TDK RF Solution Horn Antenna (1GHz-18GHz)	HRN-0118	130256	15 Mar 2012
Toyo MicroWave Preamplifier (1GHz - 8GHz)	TPA0108-40	0443	09 Oct 2012
Micro-Tronics Notch Filter (Stopband 2.4 - 2.5GHz)	BRM50701-02	007	13 Aug 2012

### **47 CFR FCC Part 15.247(d) Band Edge Compliance (Radiated) Test Setup**

1. The EUT and supporting equipment were set up as shown in the setup photo.
2. The power supply for the EUT was connected to a filtered mains.
3. The resolution bandwidth (RBW) and the video bandwidth (VBW) of the spectrum analyser were respectively set to 100kHz and 300kHz to show compliance of spurious at band edges are at least 20dB below the carriers. For restricted band spurious at band edges, peak and average measurement plots were taken using the following setting:
  - a. Peak Plot:  
RBW = VBW = 1MHz
  - b. Average Plot  
RBW = 1MHz, VBW = 10Hz
4. All other supporting equipment were powered separately from another filtered mains.

### **47 CFR FCC Part 15.247(d) Band Edge Compliance (Radiated) Test Method**

1. The EUT was switched on and allowed to warm up to its normal operating condition. The EUT was then configured to operate in the test mode with specified modulation and data rate.
2. The frequency span of the spectrum analyser was set to wide enough to capture the lower band edge of the transmission band, 2.400GHz and any spurious emissions at the band edge.
3. The spectrum analyser was set to max hold to capture any spurious emissions within the span. The signal capturing was continuous until no further spurious emissions were detected.
4. Repeat steps 1 to 3 with all possible modulations and data rates.
5. The steps 1 to 4 were repeated with the frequency span of the spectrum analyser was set to wide enough to capture the upper band edge frequency of the transmission band, 2.4835GHz and the any spurious emissions at the band-edge.



**BAND EDGE COMPLIANCE (RADIATED) TEST**

**47 CFR FCC Part 15.247(d) Band Edge Compliance (Radiated) Results**

Test Input Power	120V 60Hz	Temperature	21°C
Attached Plots	155 – 158 (20dBc) 159 -164 (Restricted Band)	Relative Humidity	51%
		Atmospheric Pressure	1027mbar
		Tested By	Jason Lai

No significant signal was found and they were below the specified limit.

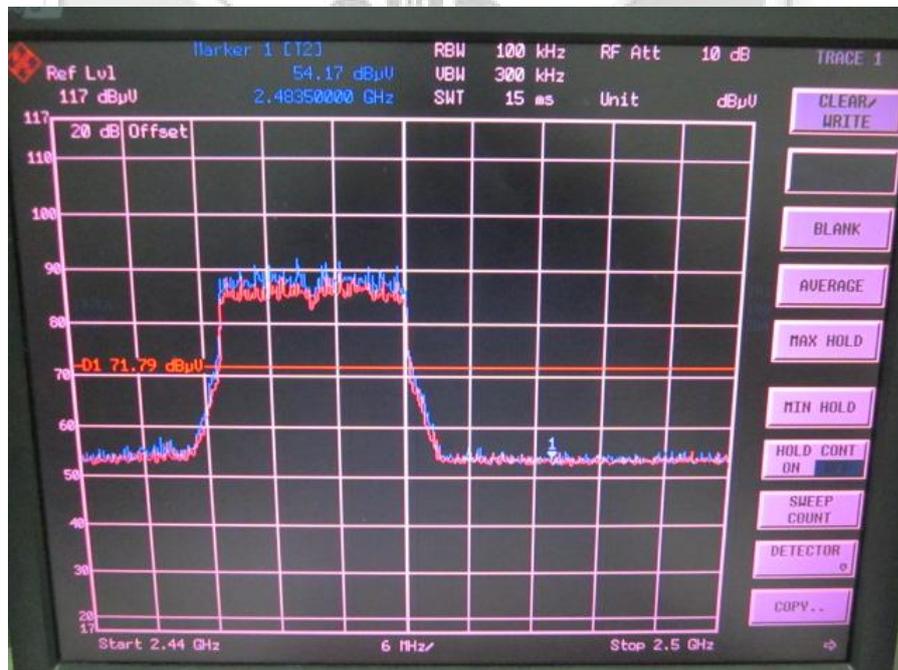


**BAND EDGE COMPLIANCE (RADIATED) TEST**

**Band Edge Compliance (Radiated) Plots (20dB Delta from Carrier at Band Edge) – Antenna 1 (External), Worst Configuration**



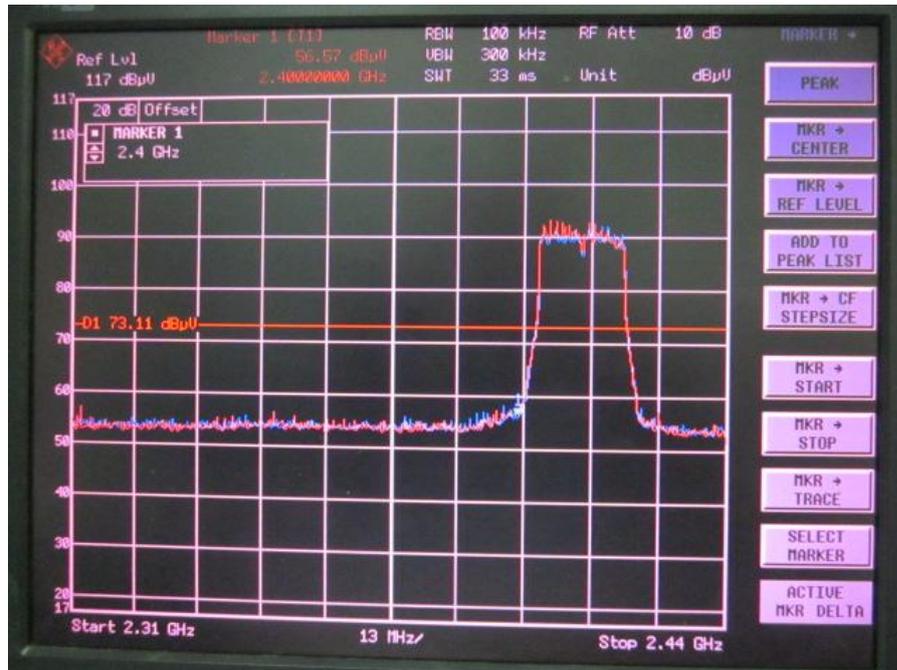
Plot 155 – Lower Band Edge at 2.4000GHz @ 64QAM 54Mbps



Plot 156 – Upper Band Edge at 2.4835GHz @ 64QAM 54Mbps

**BAND EDGE COMPLIANCE (RADIATED) TEST**

**Band Edge Compliance (Radiated) Plots (20dB Delta from Carrier at Band Edge) – Antenna 2 (Internal), Worst Configuration**



**Plot 157 – Lower Band Edge at 2.4000GHz @ 64QAM 54Mbps**



**Plot 158 – Upper Band Edge at 2.4835GHz @ 64QAM 54Mbps**

**BAND EDGE COMPLIANCE (RADIATED) TEST**

**Band Edge Compliance (Radiated) Plots (Restricted Band) – Antenna 1 (External), Worst Configuration**



Plot 159 – Peak Plot at Lower Band Edge at 2.4000GHz @ 64QAM 54Mbps



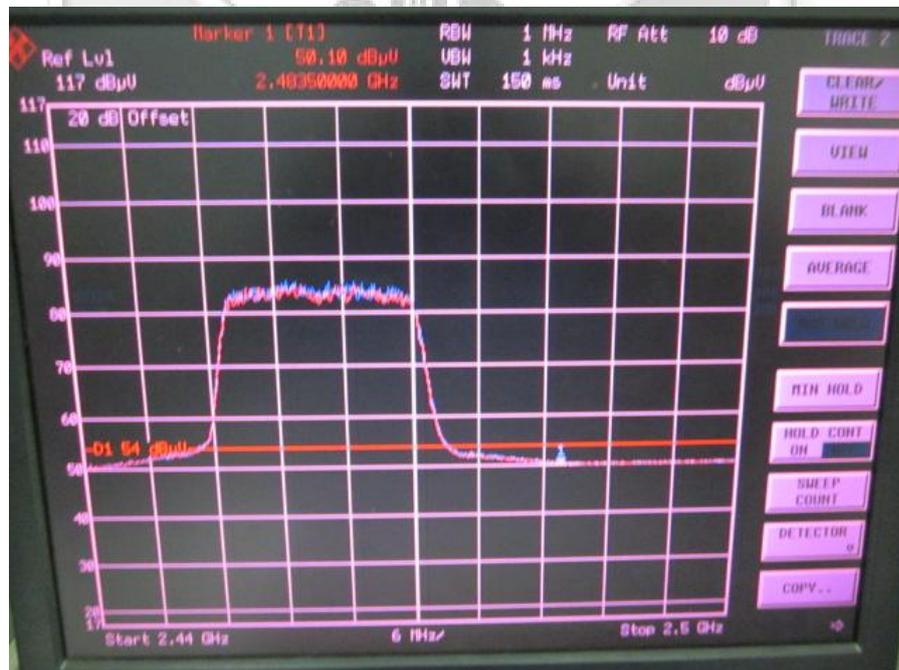
Plot 160 – Average Plot at Lower Band Edge at 2.4000GHz @ 64QAM 54Mbps

**BAND EDGE COMPLIANCE (RADIATED) TEST**

**Band Edge Compliance (Radiated) Plots (Restricted Band) – Antenna 1 (External), Worst Configuration**



**Plot 161 – Peak Plot at Upper Band Edge at 2.4835GHz @ 64QAM 54Mbps**



**Plot 162 – Average Plot at Upper Band Edge at 2.4835GHz @ 64QAM 54Mbps**

**BAND EDGE COMPLIANCE (RADIATED) TEST**

**Band Edge Compliance (Radiated) Plots (Restricted Band) – Antenna 2 (Internal), Worst Configuration**



**Plot 163 – Peak Plot at Upper Band Edge at 2.4835GHz @ 64QAM 54Mbps**



**Plot 164 – Average Plot at Upper Band Edge at 2.4835GHz @ 64QAM 54Mbps**



**PEAK POWER SPECTRAL DENSITY TEST**

**47 CFR FCC Part 15.247(e) Peak Power Spectral Density Limits**

The EUT shows compliance to the requirements of this section, which states the peak power spectral density conducted from the intentional radiator (EUT) to the antenna shall not be greater than 8dBm (6.3mW) in any 3kHz band during any time interval of continuous transmission.

**47 CFR FCC Part 15.247(e) Peak Power Spectral Density Test Instrumentation**

Instrument	Model	S/No	Cal Due Date
Agilent EMC Analyzer (9kHz-26.5GHz)	E7405A	US40240195	16 Mar 2012

**47 CFR FCC Part 15.247(e) Peak Power Spectral Density Test Setup**

1. The EUT and supporting equipment were set up as shown in the setup photo.
2. The power supply for the EUT was connected to a filtered mains.
3. The RF antenna connector was connected to the spectrum via a low-loss coaxial cable.
4. The resolution bandwidth (RBW) and the video bandwidth (VBW) of the spectrum analyser were respectively set to 3kHz and 10kHz.
5. All other supporting equipment were powered separately from another filtered mains.

**47 CFR FCC Part 15.247(e) Peak Power Spectral Density Test Method**

1. The EUT was switched on and allowed to warm up to its normal operating condition. The EUT was then configured to operate in the test mode at Channel 1 (2.412GHz) (*lower ch*) with specified modulation and data rate.
2. The sweep time of the spectrum analyser was set to the value of the ratio of the frequency span divided by the RBW.
3. The peak power density of the transmitting frequency was detected and recorded.
4. Repeat steps 1 to 3 with all possible modulations and data rates.
5. The steps 3 to 4 were repeated with the transmitting frequency was set to Channel 6 (2.437GHz) and Channel 11 (2.462GHz) respectively.



**PEAK POWER SPECTRAL DENSITY TEST**

**47 CFR FCC Part 15.247(e) Peak Power Spectral Density Results**

Test Input Power	120V 60Hz	Temperature	23°C
Attached Plots	165 - 185	Relative Humidity	55%
Antenna	1 (external)	Atmospheric Pressure	1030mbar
		Tested By	Kyaw Soe Hein

**802.11b**

Channel	Channel Frequency (GHz)	Peak Power Spectral Density (mW)	Limit (mW)	Modulation @ Data Rate
1	2.421	0.1112	6.3	DBPSK @ 1Mbps
		0.2661	6.3	DQPSK @ 2Mbps
		0.6883	6.3	CCK @ 11Mbps
6	2.437	0.1777	6.3	DBPSK @ 1Mbps
		0.2771	6.3	DQPSK @ 2Mbps
		1.5610	6.3	CCK @ 11Mbps
11	2.462	0.1706	6.3	DBPSK @ 1Mbps
		0.2680	6.3	DQPSK @ 2Mbps
		1.3213	6.3	CCK @ 11Mbps

**802.11g**

Channel	Channel Frequency (GHz)	Peak Power Spectral Density (mW)	Limit (mW)	Modulation @ Data Rate
1	2.421	0.1375	6.3	BPSK @ 9Mbps
		0.0813	6.3	QPSK @ 18Mbps
		0.1291	6.3	16QAM @ 36Mbps
		0.0685	6.3	64QAM @ 54Mbps
6	2.437	0.1276	6.3	BPSK @ 9Mbps
		0.1080	6.3	QPSK @ 18Mbps
		0.1297	6.3	16QAM @ 36Mbps
		0.1193	6.3	64QAM @ 54Mbps
11	2.462	0.0902	6.3	BPSK @ 9Mbps
		0.0001	6.3	QPSK @ 18Mbps
		0.0001	6.3	16QAM @ 36Mbps
		0.0001	6.3	64QAM @ 54Mbps



**PEAK POWER SPECTRAL DENSITY TEST**

**47 CFR FCC Part 15.247(e) Peak Power Spectral Density Results**

Test Input Power	120V 60Hz	Temperature	23°C
Attached Plots	186 - 206	Relative Humidity	55%
Antenna	2 (internal)	Atmospheric Pressure	1030mbar
		Tested By	Kyaw Soe Hein

**802.11b**

Channel	Channel Frequency (GHz)	Peak Power Spectral Density (mW)	Limit (mW)	Modulation @ Data Rate
1	2.421	0.1346	6.3	DBPSK @ 1Mbps
		0.2373	6.3	DQPSK @ 2Mbps
		0.6128	6.3	CCK @ 11Mbps
6	2.437	0.1781	6.3	DBPSK @ 1Mbps
		0.3551	6.3	DQPSK @ 2Mbps
		1.0153	6.3	CCK @ 11Mbps
11	2.462	0.1169	6.3	DBPSK @ 1Mbps
		0.2412	6.3	DQPSK @ 2Mbps
		0.9449	6.3	CCK @ 11Mbps

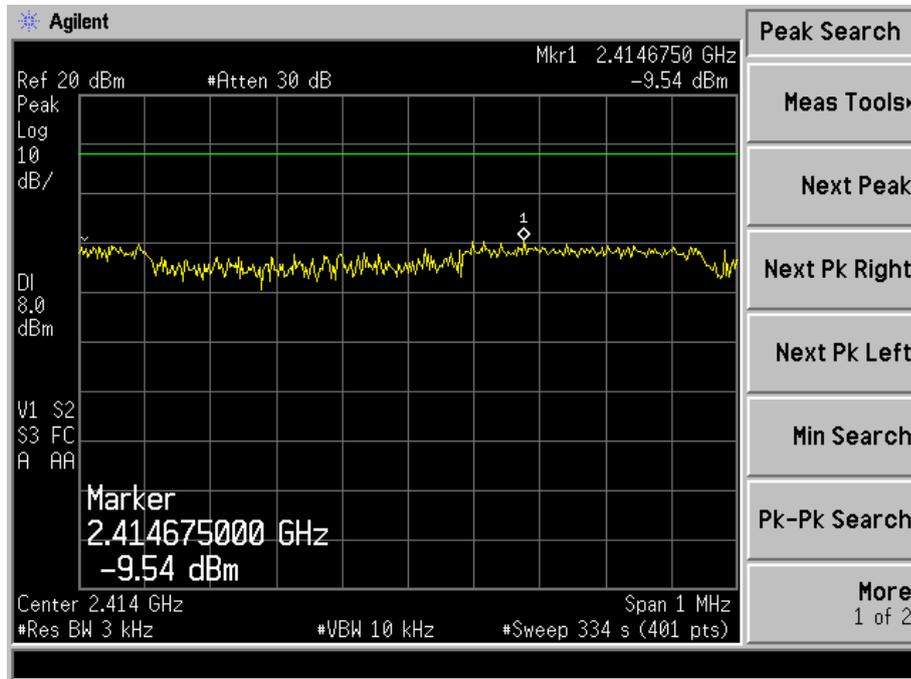
**802.11g**

Channel	Channel Frequency (GHz)	Peak Power Spectral Density (mW)	Limit (mW)	Modulation @ Data Rate
1	2.421	0.0583	6.3	BPSK @ 9Mbps
		0.0474	6.3	QPSK @ 18Mbps
		0.0433	6.3	16QAM @ 36Mbps
		0.0454	6.3	64QAM @ 54Mbps
6	2.437	0.0560	6.3	BPSK @ 9Mbps
		0.0482	6.3	QPSK @ 18Mbps
		0.0456	6.3	16QAM @ 36Mbps
		0.0442	6.3	64QAM @ 54Mbps
11	2.462	0.0548	6.3	BPSK @ 9Mbps
		0.0001	6.3	QPSK @ 18Mbps
		0.0001	6.3	16QAM @ 36Mbps
		0.0001	6.3	64QAM @ 54Mbps

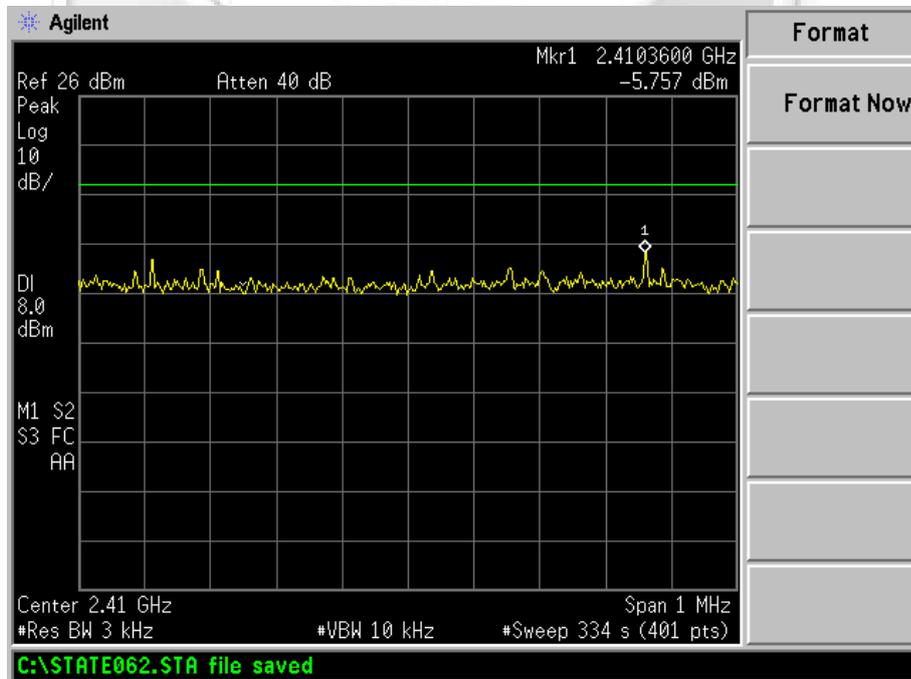


PEAK POWER SPECTRAL DENSITY TEST

Peak Power Spectral Density Plots – Antenna 1 (External), 802.11b



Plot 165 – Channel 1 (lower ch) @ DBPSK 1Mbps

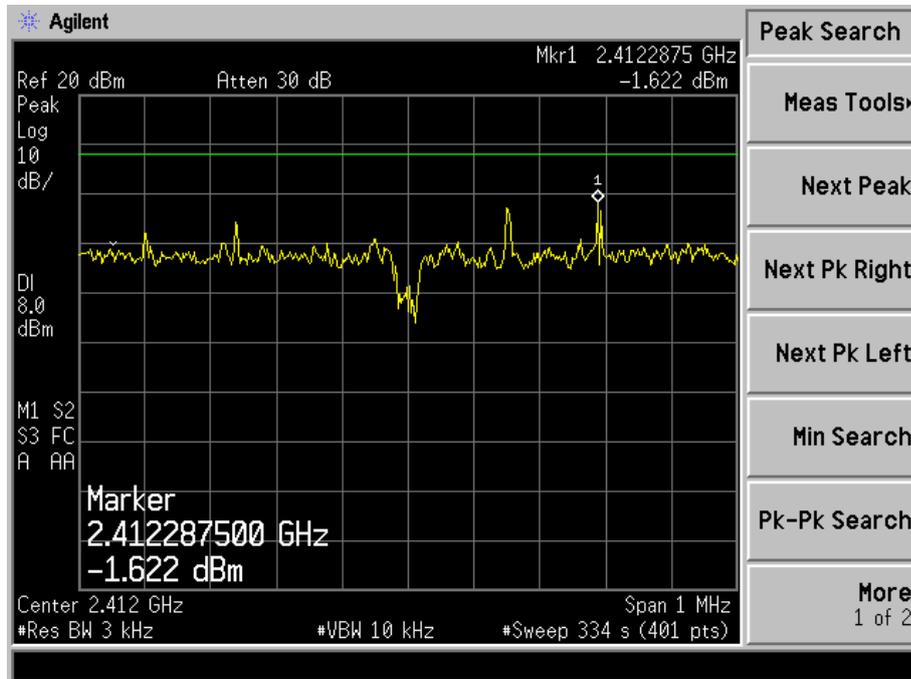


Plot 166 – Channel 1 (lower ch) @ DQPSK 2Mbps



PEAK POWER SPECTRAL DENSITY TEST

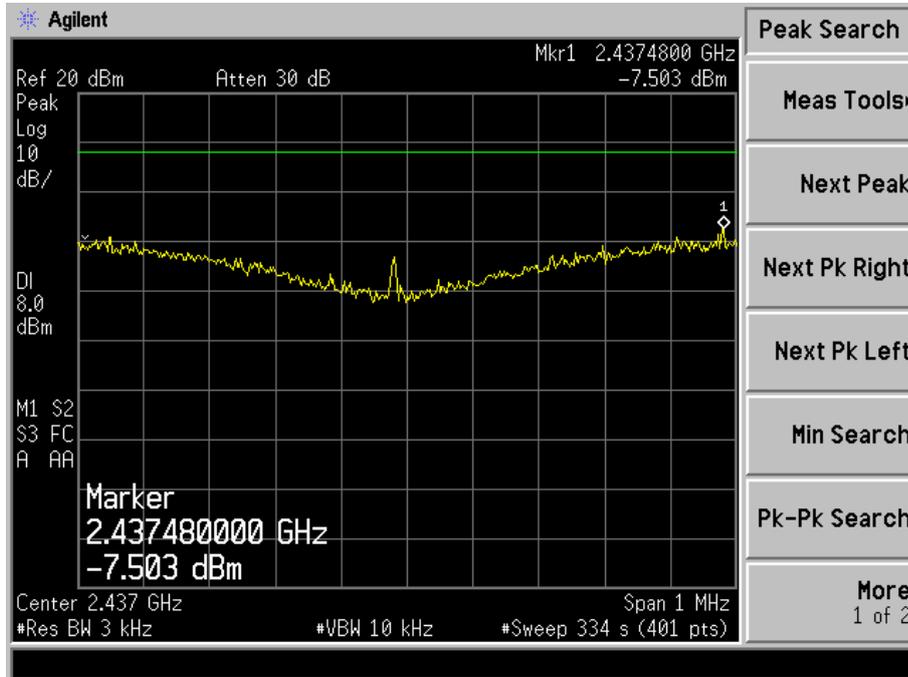
Peak Power Spectral Density Plots – Antenna 1 (External), 802.11b



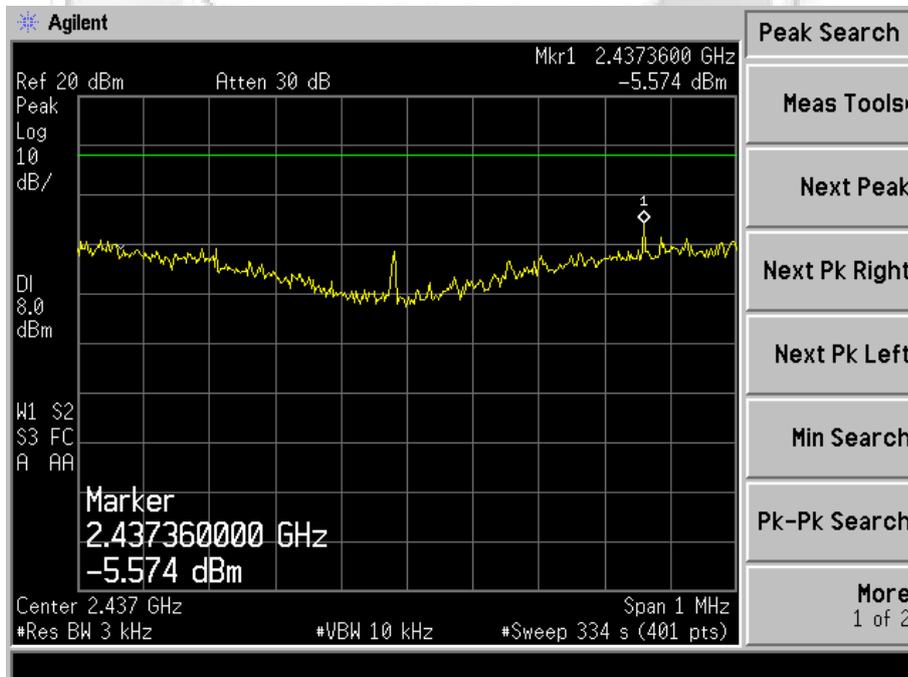


**PEAK POWER SPECTRAL DENSITY TEST**

**Peak Power Spectral Density Plots – Antenna 1 (External), 802.11b**



**Plot 168 – Channel 6 (mid ch) @ DBPSK 1Mbps**

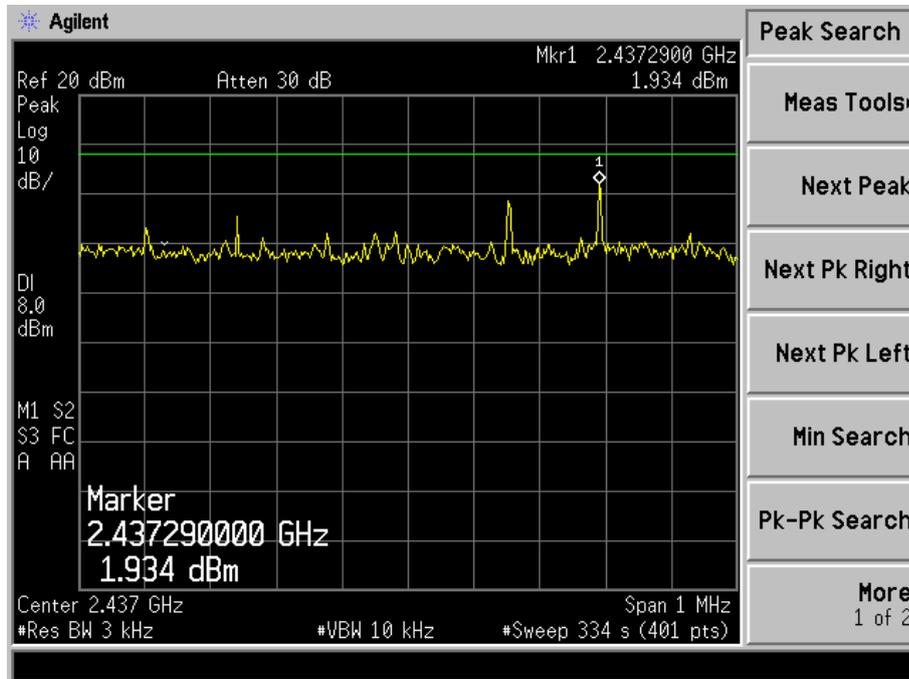


**Plot 169 – Channel 6 (mid ch) @ DQPSK 2Mbps**



**PEAK POWER SPECTRAL DENSITY TEST**

**Peak Power Spectral Density Plots – Antenna 1 (External), 802.11b**



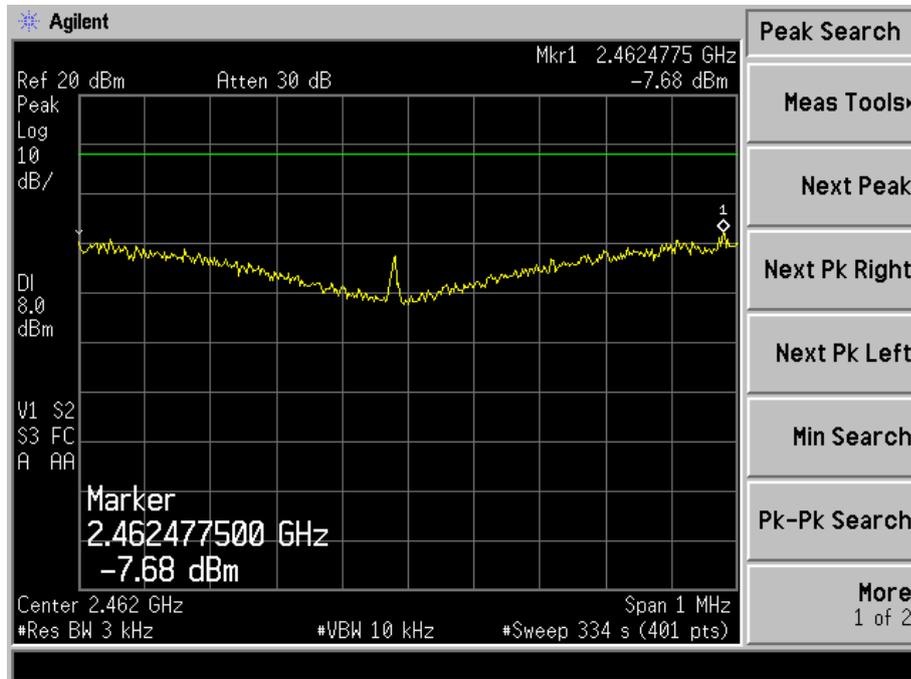
**Plot 170 – Channel 6 (mid ch) @ CCK 11Mbps**



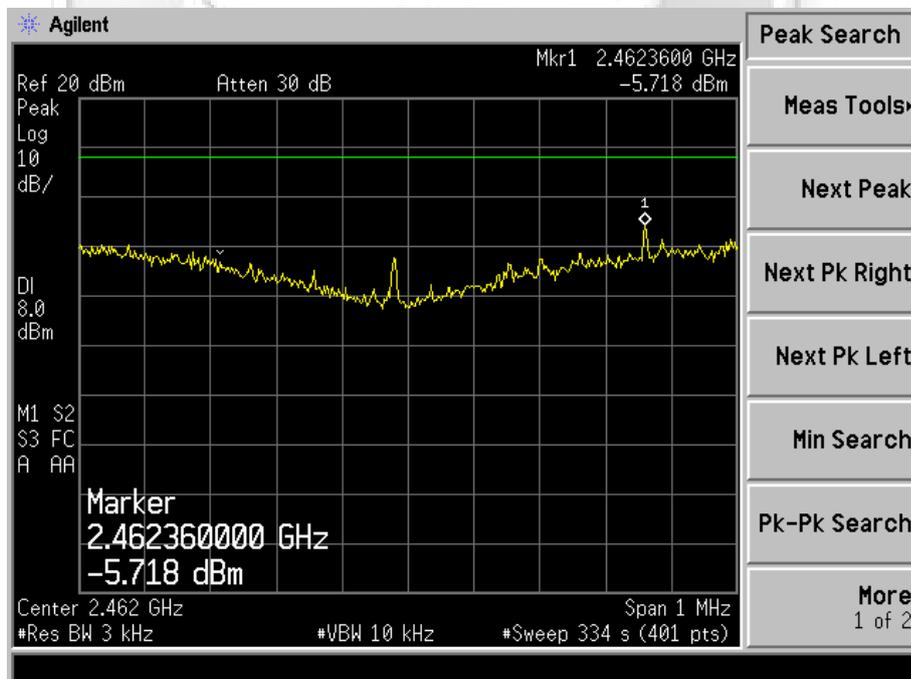


PEAK POWER SPECTRAL DENSITY TEST

Peak Power Spectral Density Plots – Antenna 1 (External), 802.11b



Plot 171 – Channel 11 (upper ch) @ DBPSK 1Mbps

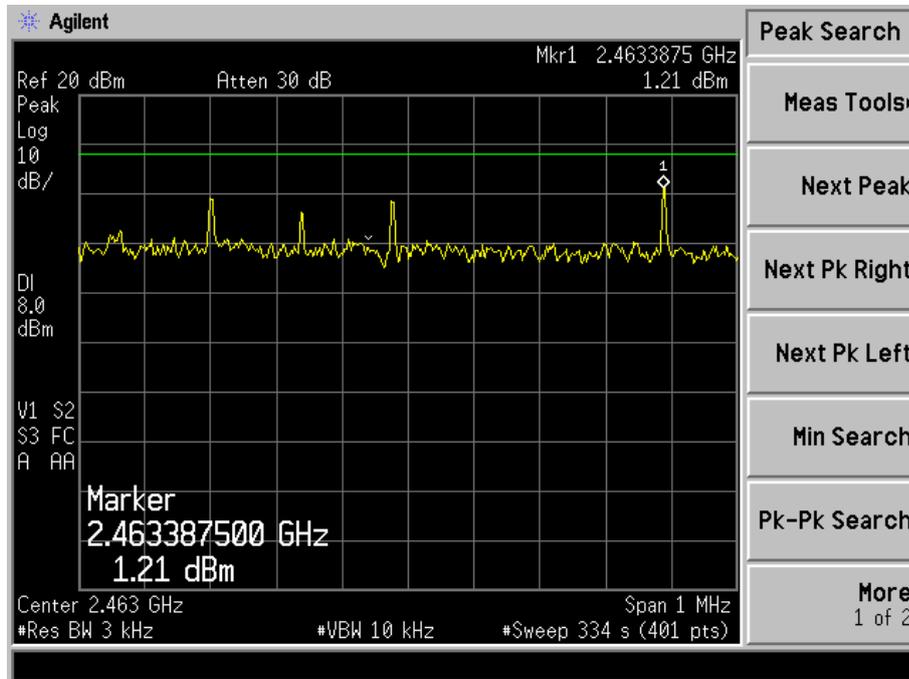


Plot 172 – Channel 11 (upper ch) @ DQPSK 2Mbps

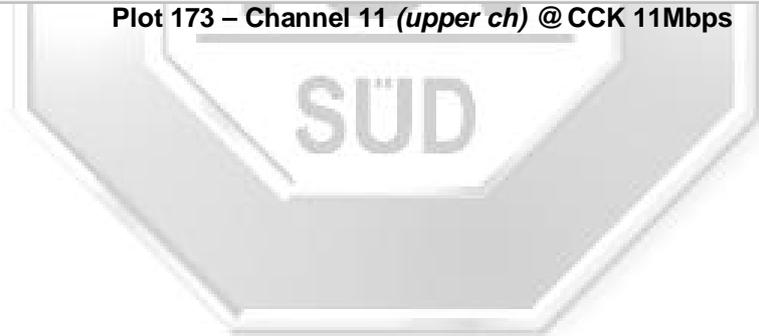


**PEAK POWER SPECTRAL DENSITY TEST**

**Peak Power Spectral Density Plots – Antenna 1 (External), 802.11b**



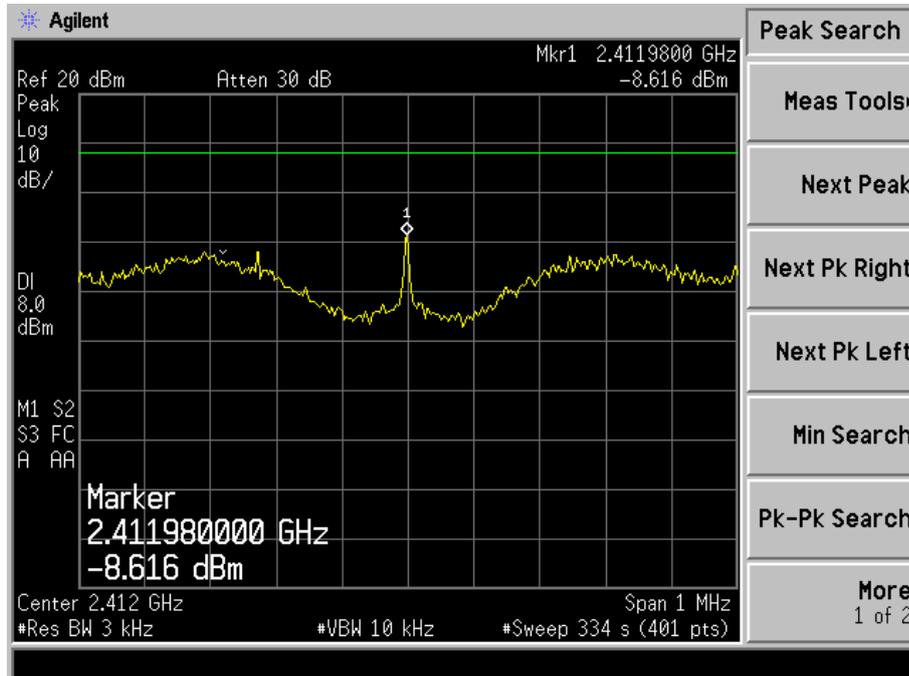
Plot 173 – Channel 11 (upper ch) @ CCK 11Mbps



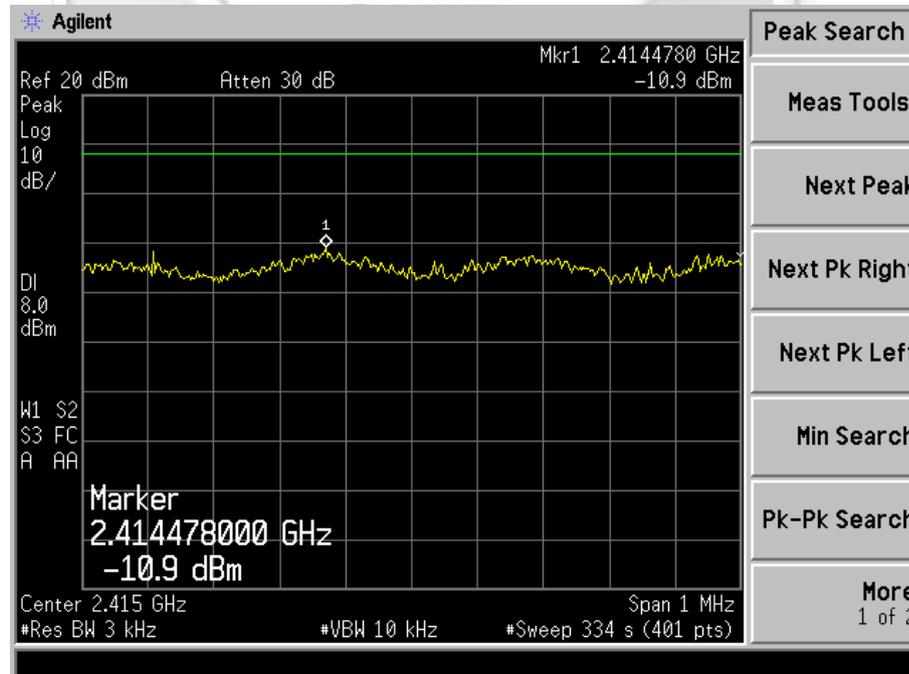


PEAK POWER SPECTRAL DENSITY TEST

Peak Power Spectral Density Plots – Antenna 1 (External), 802.11g



Plot 174 – Channel 1 (lower ch) @ DBPSK 9Mbps

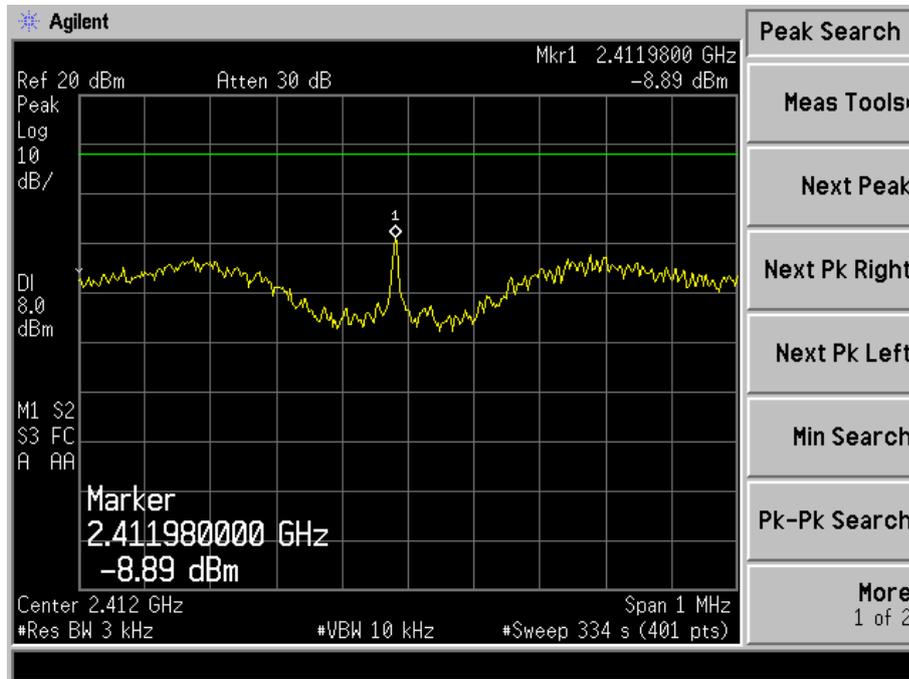


Plot 175 – Channel 1 (lower ch) @ QPSK 18Mbps

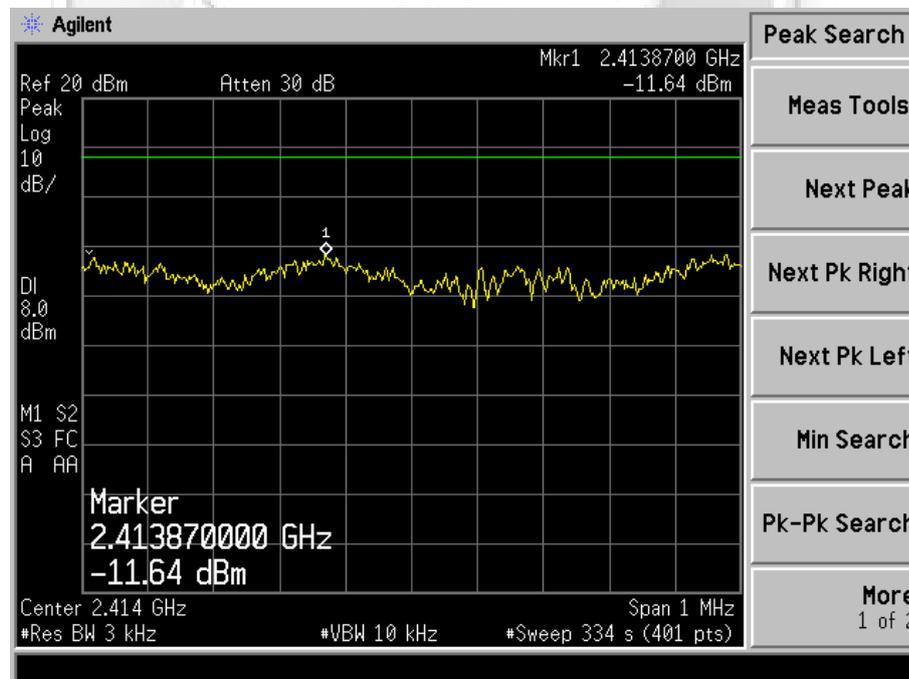


PEAK POWER SPECTRAL DENSITY TEST

Peak Power Spectral Density Plots – Antenna 1 (External), 802.11g



Plot 176 – Channel 1 (lower ch) @ 16QAM 36Mbps

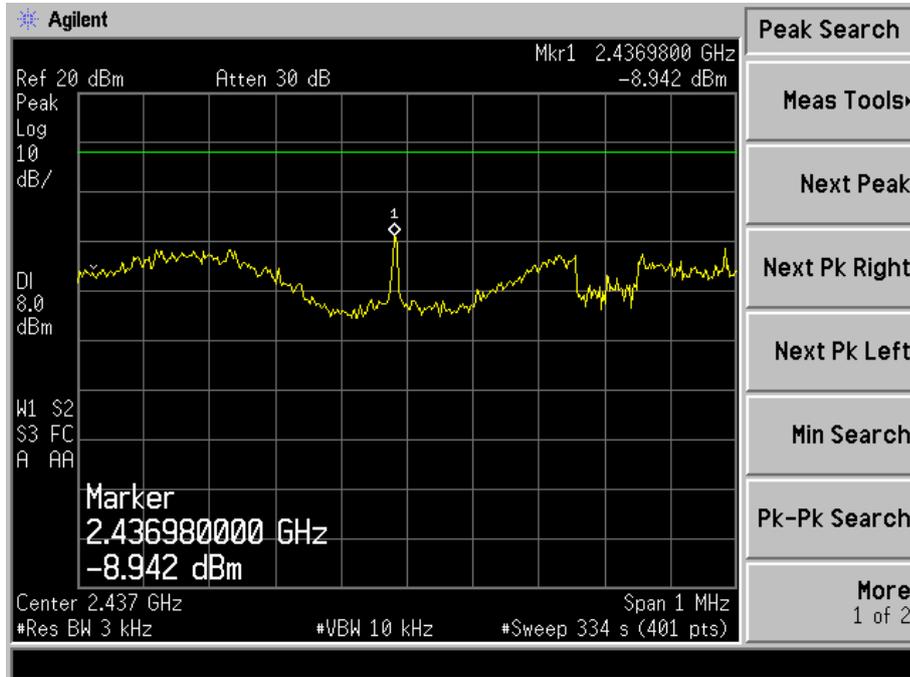


Plot 177 – Channel 1 (lower ch) @ 64QAM 54Mbps

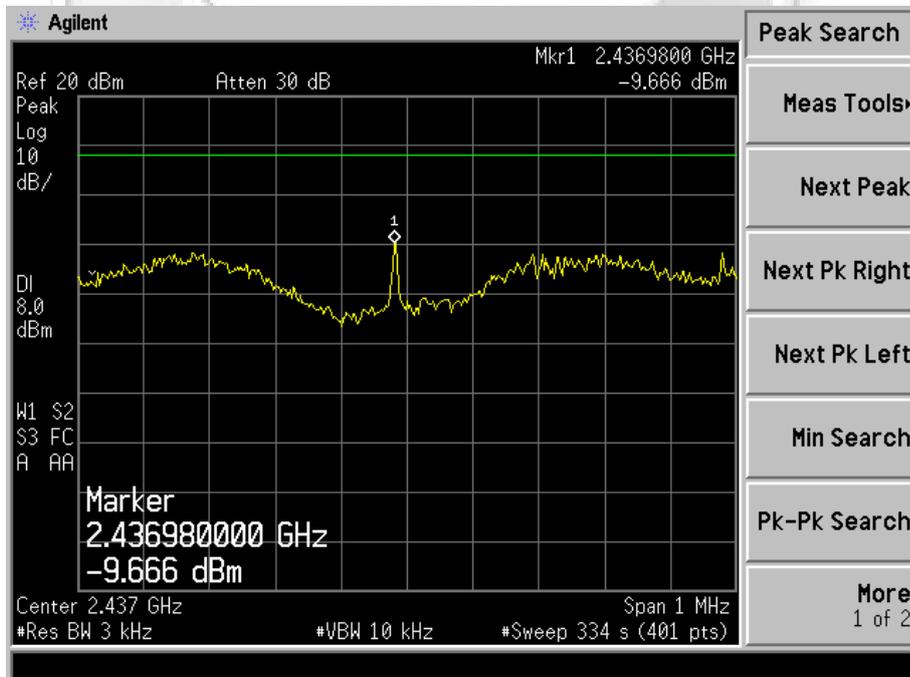


**PEAK POWER SPECTRAL DENSITY TEST**

**Peak Power Spectral Density Plots – Antenna 1 (External), 802.11g**



**Plot 178 – Channel 6 (mid ch) @ BPSK 9Mbps**

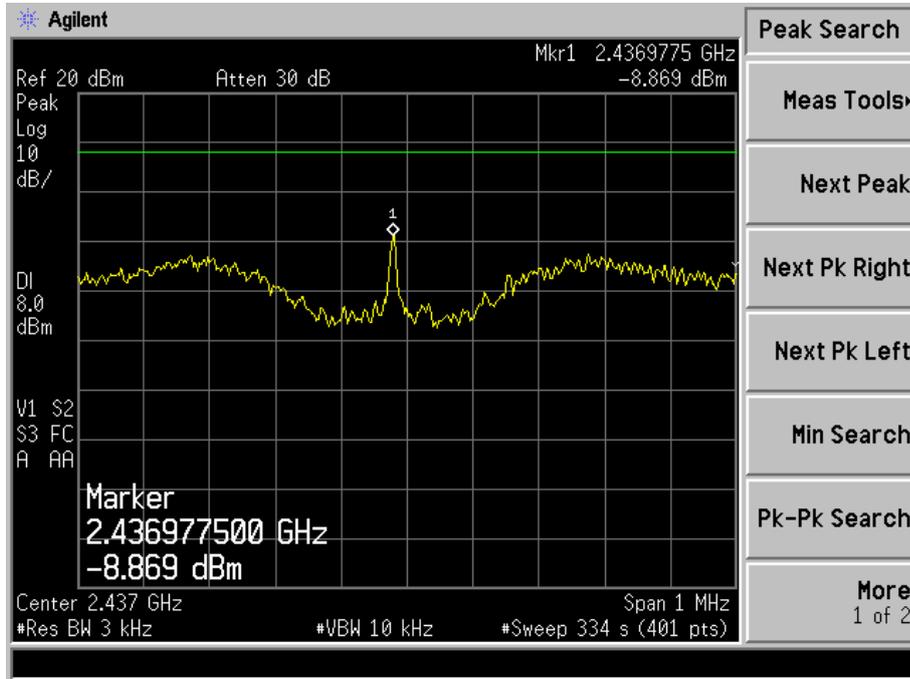


**Plot 179 – Channel 6 (mid ch) @ QPSK 18Mbps**

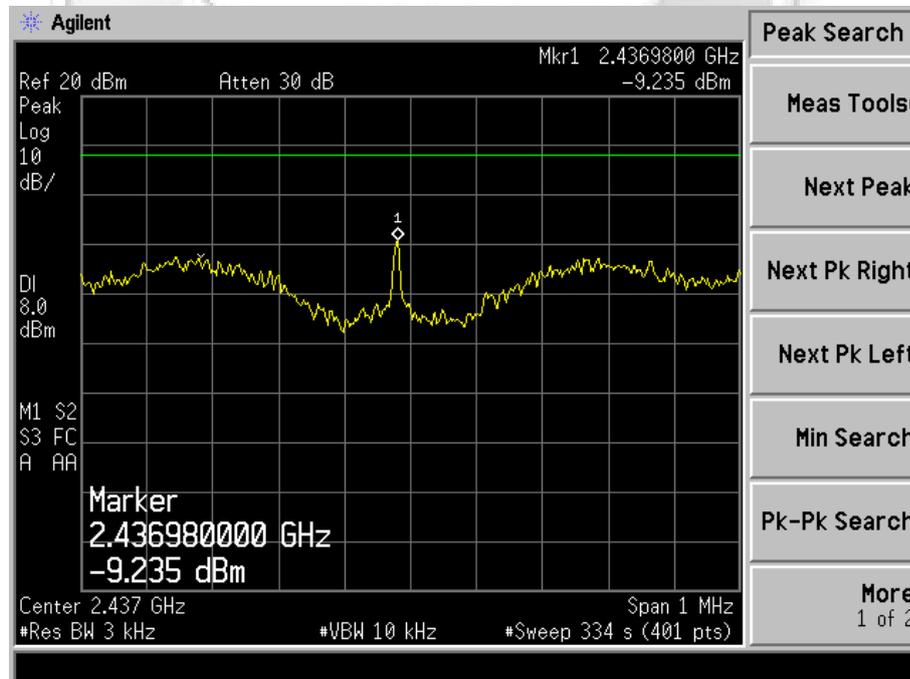


**PEAK POWER SPECTRAL DENSITY TEST**

**Peak Power Spectral Density Plots – Antenna 1 (External), 802.11g**



**Plot 180 – Channel 6 (mid ch) @ 16QAM 36Mbps**

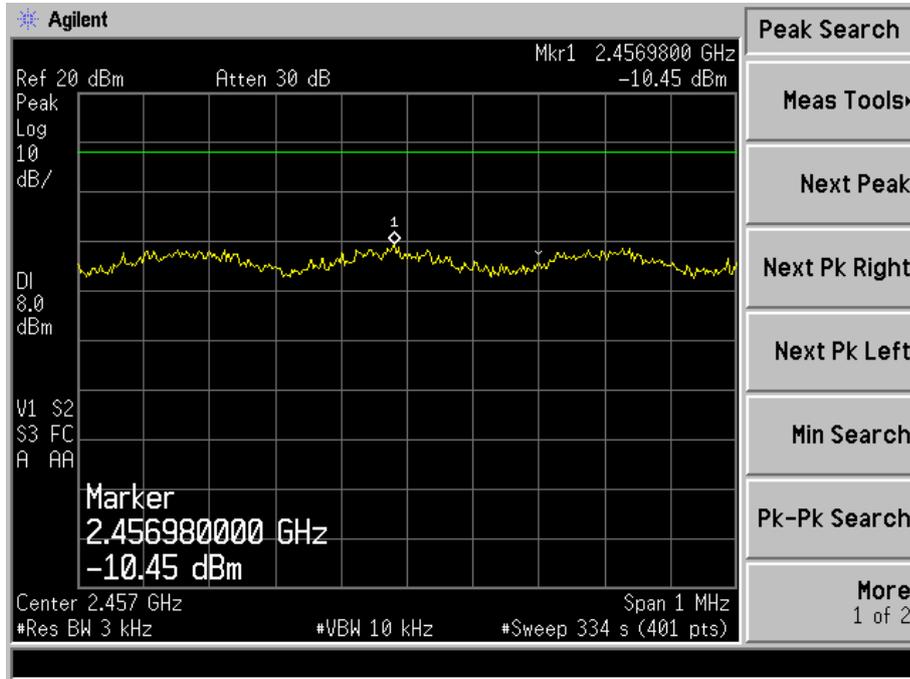


**Plot 181 – Channel 6 (mid ch) @ 64QAM 54Mbps**

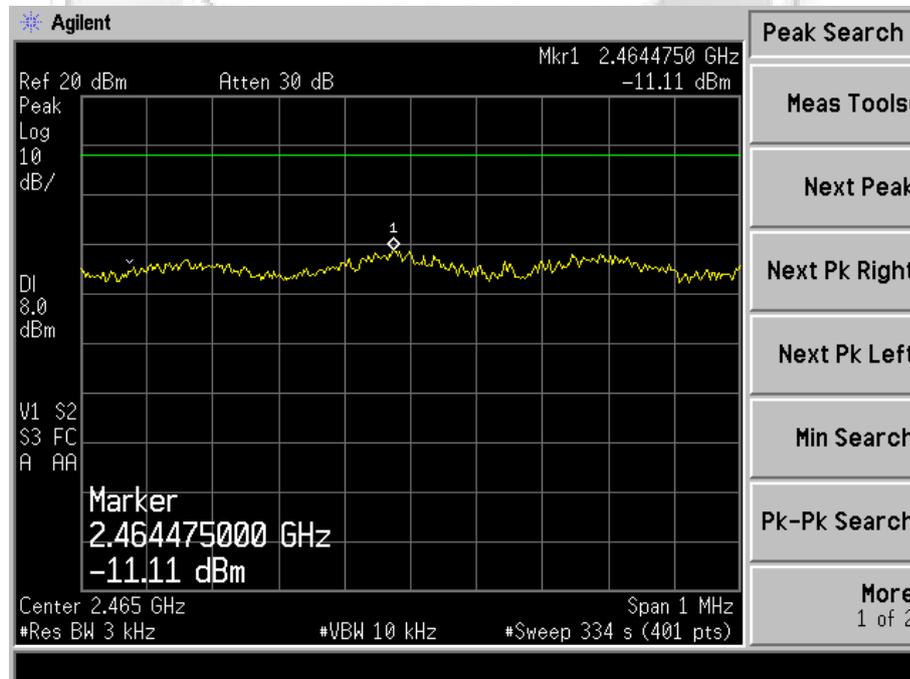


PEAK POWER SPECTRAL DENSITY TEST

Peak Power Spectral Density Plots – Antenna 1 (External), 802.11g



Plot 182 – Channel 11 (upper ch) @ BPSK 9Mbps

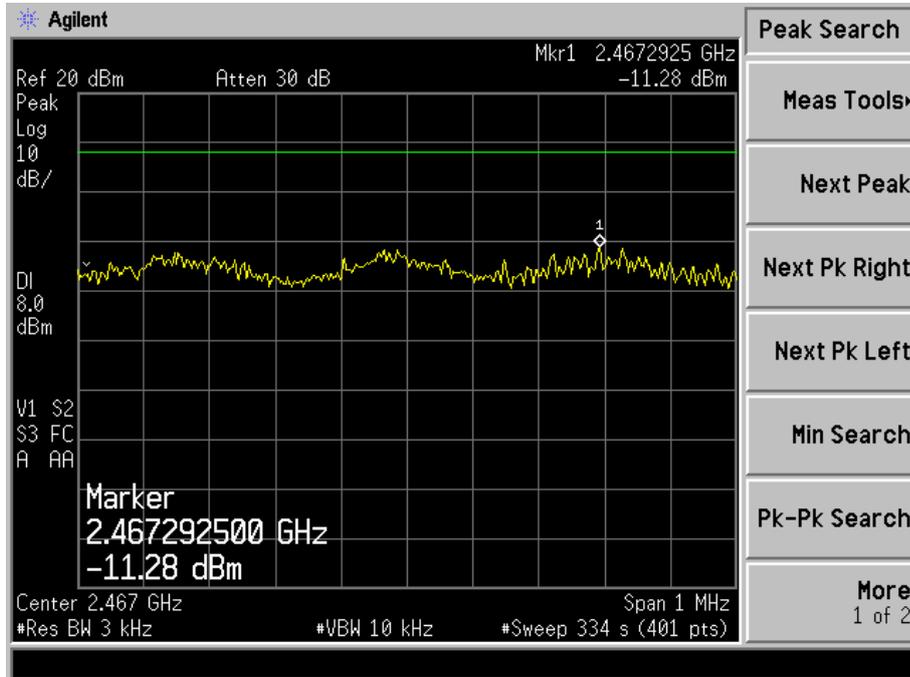


Plot 183 – Channel 11 (upper ch) @ QPSK 18Mbps

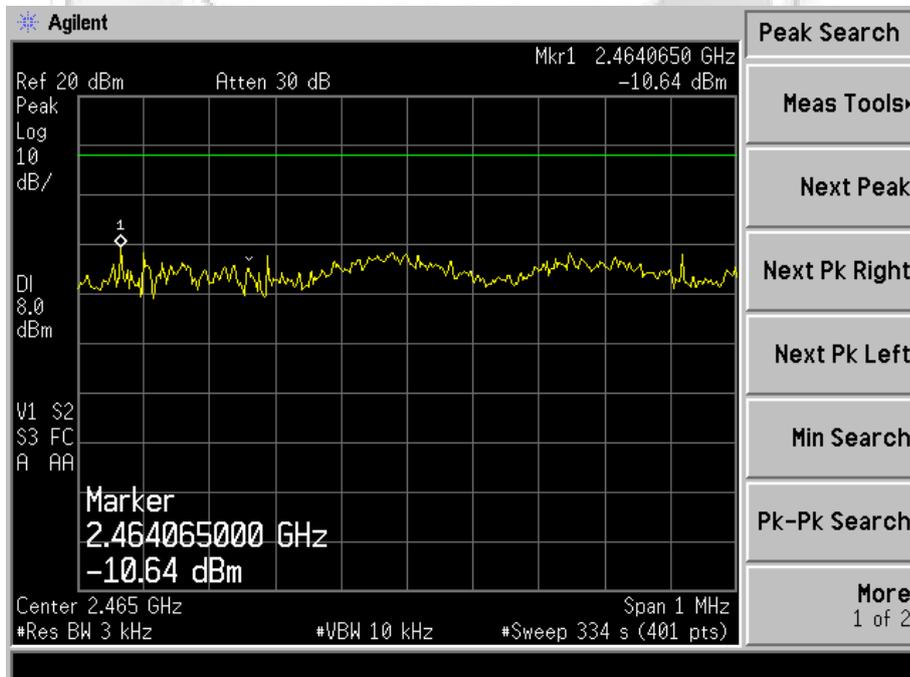


**PEAK POWER SPECTRAL DENSITY TEST**

**Peak Power Spectral Density Plots – Antenna 1 (External), 802.11g**



**Plot 184 – Channel 11 (upper ch) @ 16QAM 36Mbps**

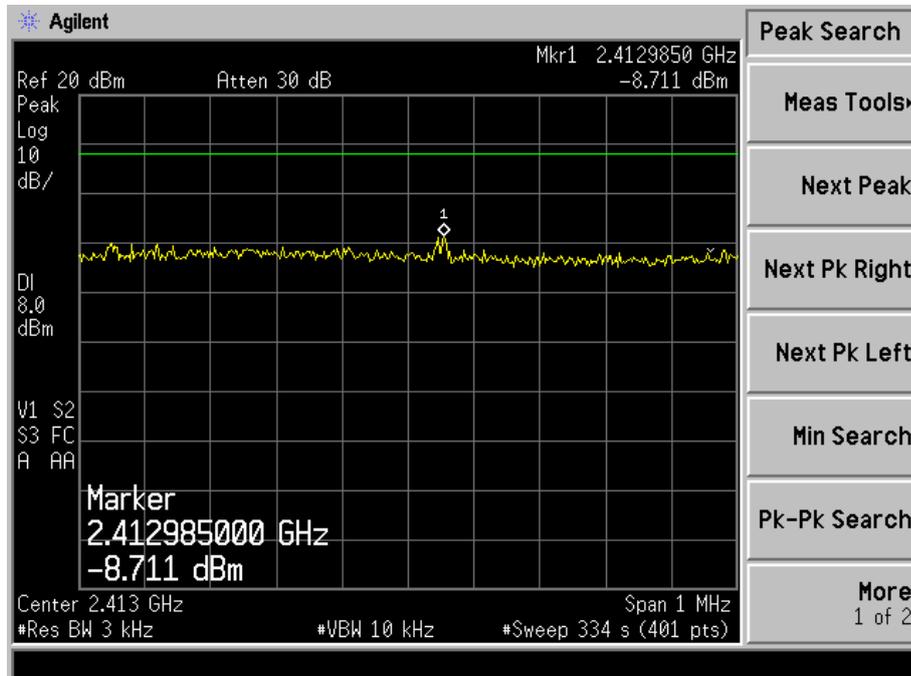


**Plot 185 – Channel 11 (upper ch) @ 64QAM 54Mbps**

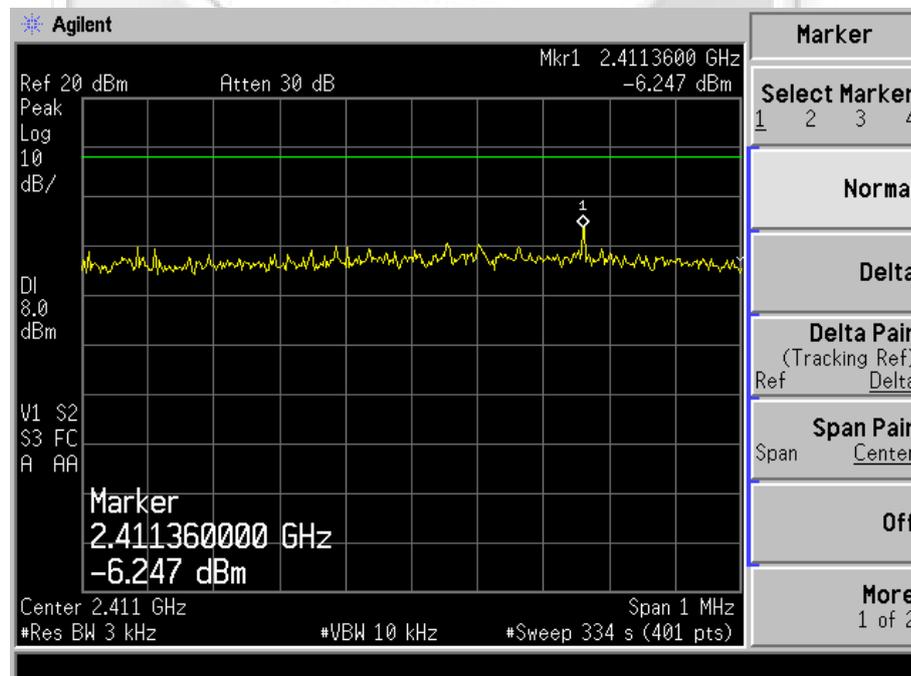


PEAK POWER SPECTRAL DENSITY TEST

Peak Power Spectral Density Plots – Antenna 2 (Internal), 802.11b



Plot 186 – Channel 1 (lower ch) @ DBPSK 1Mbps

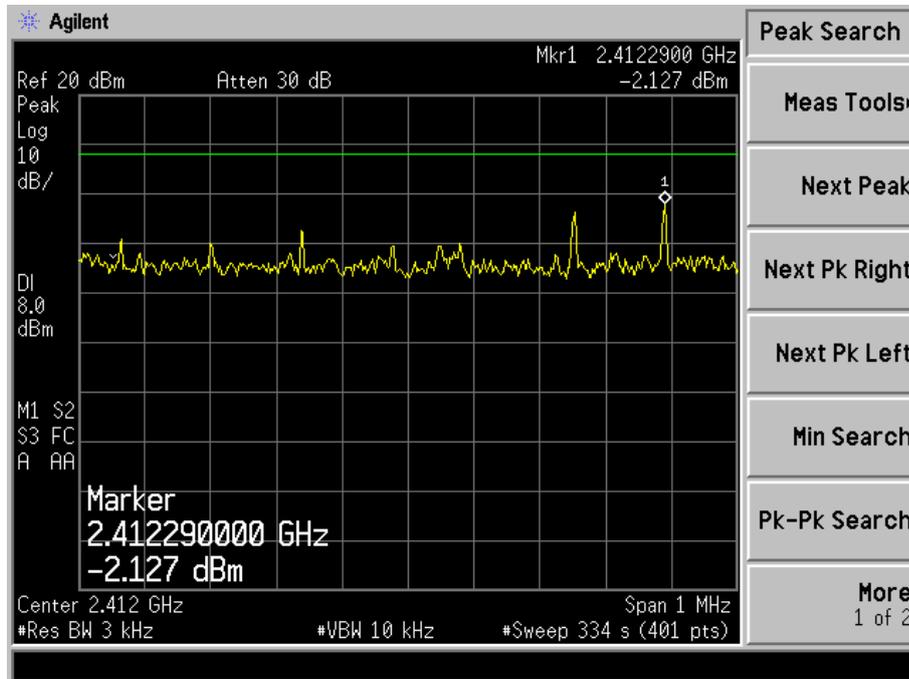


Plot 187 – Channel 1 (lower ch) @ DQPSK 2Mbps

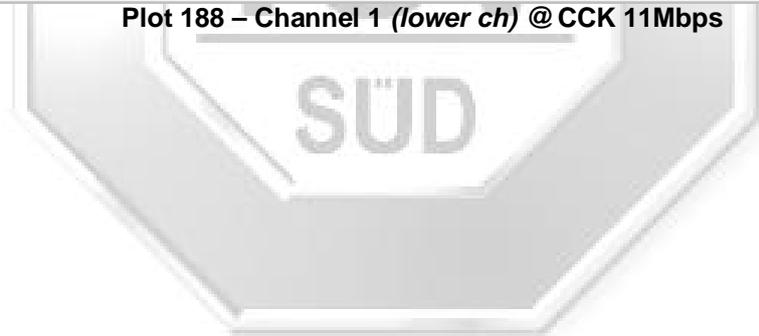


**PEAK POWER SPECTRAL DENSITY TEST**

**Peak Power Spectral Density Plots – Antenna 2 (Internal), 802.11b**



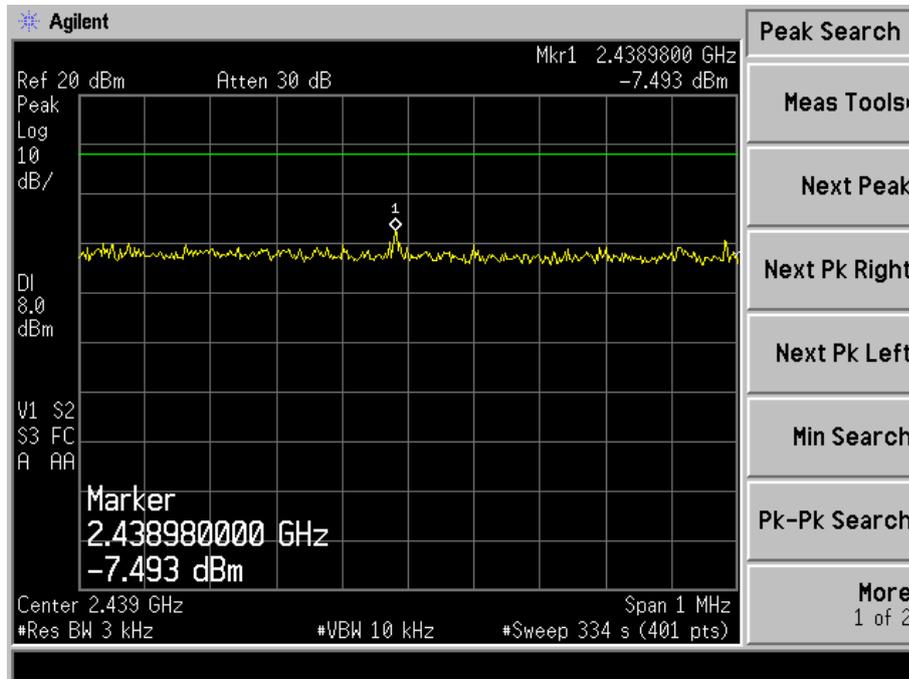
Plot 188 – Channel 1 (lower ch) @ CCK 11Mbps



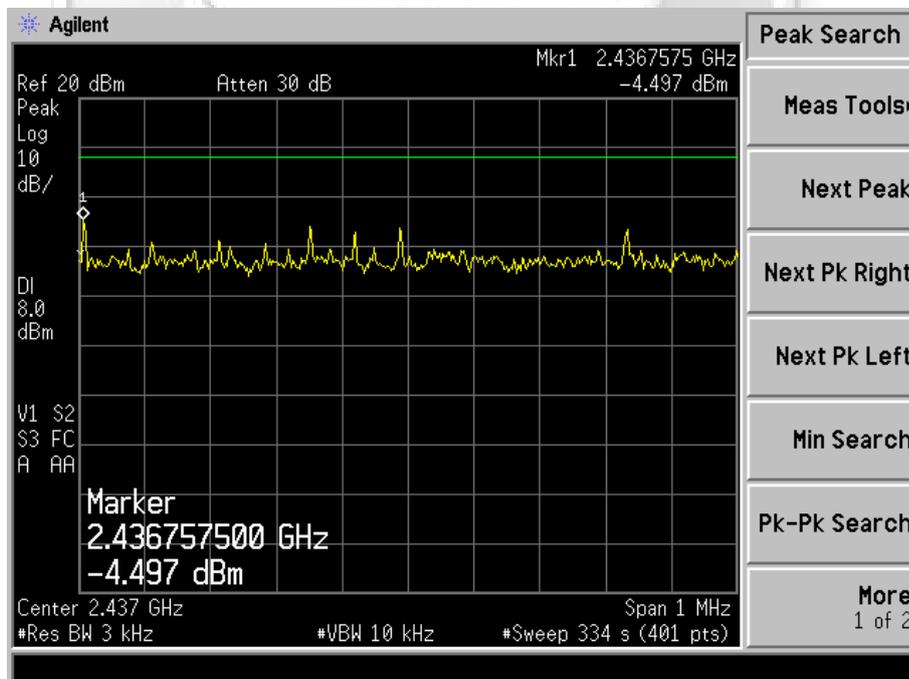


**PEAK POWER SPECTRAL DENSITY TEST**

**Peak Power Spectral Density Plots – Antenna 2 (Internal), 802.11b**



**Plot 189 – Channel 6 (mid ch) @ DBPSK 1Mbps**

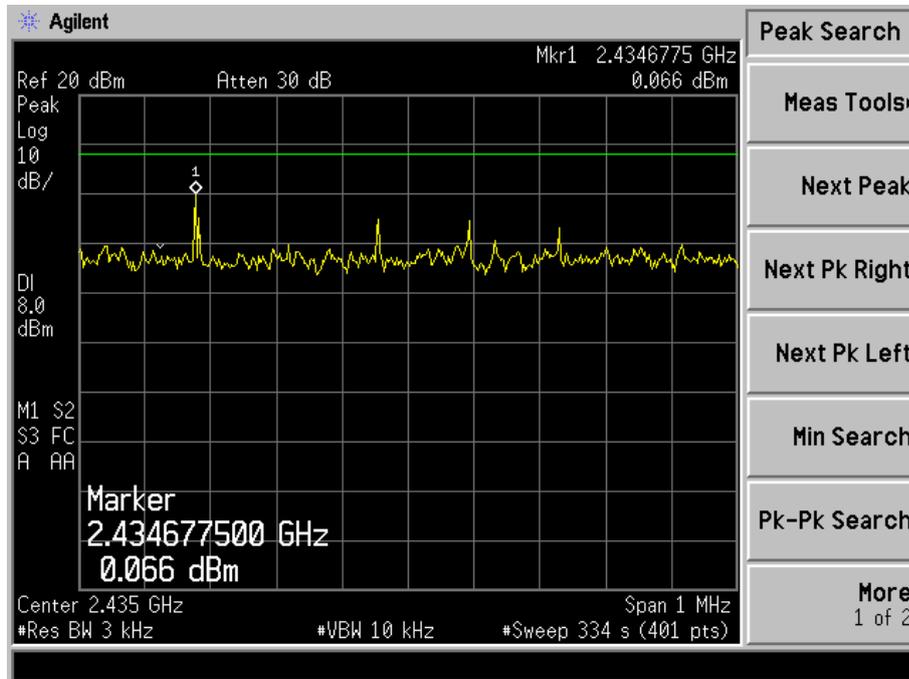


**Plot 190 – Channel 6 (mid ch) @ DQPSK 2Mbps**



PEAK POWER SPECTRAL DENSITY TEST

Peak Power Spectral Density Plots – Antenna 2 (Internal), 802.11b



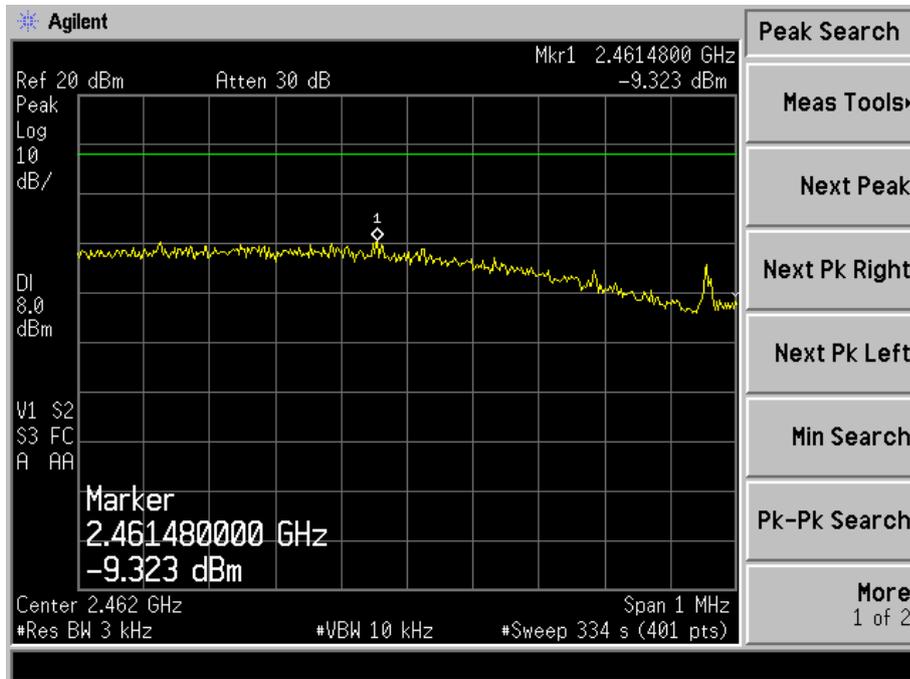
Plot 191 – Channel 6 (mid ch) @ CCK 11Mbps



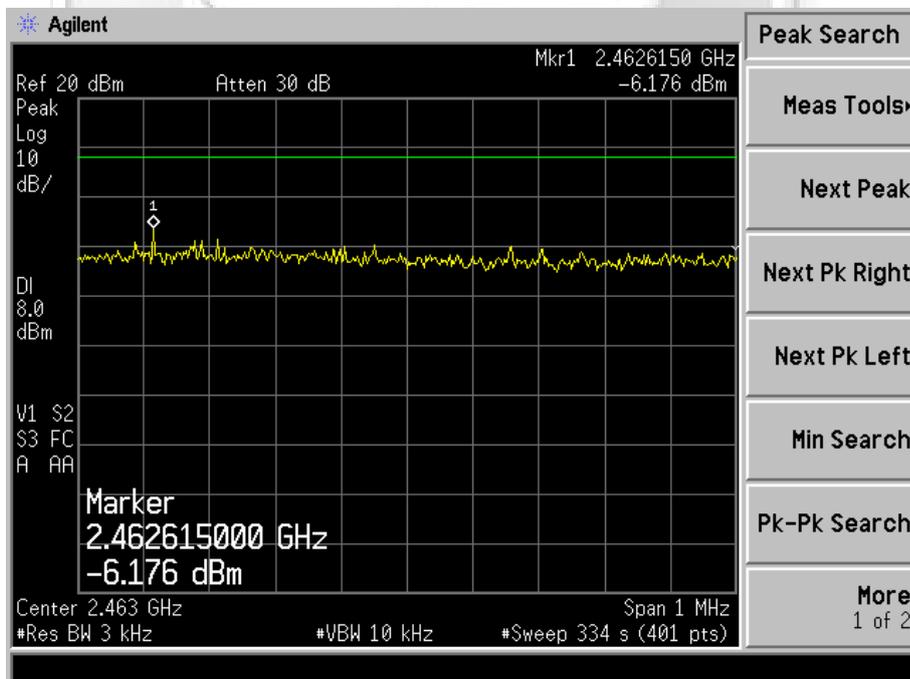


PEAK POWER SPECTRAL DENSITY TEST

Peak Power Spectral Density Plots – Antenna 2 (Internal), 802.11b



Plot 192 – Channel 11 (upper ch) @ DBPSK 1Mbps

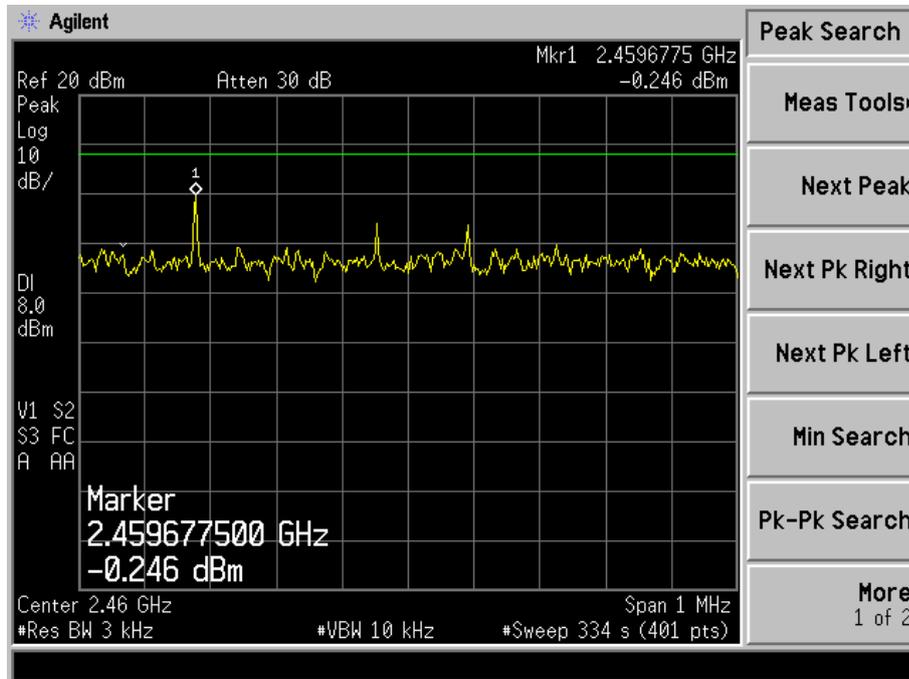


Plot 193 – Channel 11 (upper ch) @ DQPSK 2Mbps



PEAK POWER SPECTRAL DENSITY TEST

Peak Power Spectral Density Plots – Antenna 2 (Internal), 802.11b



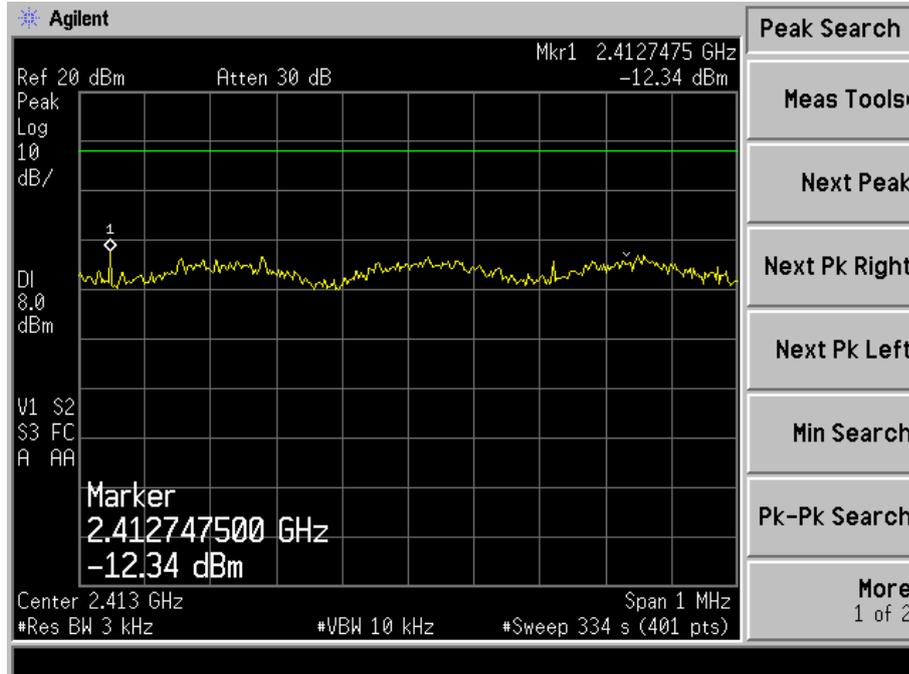
Plot 194 – Channel 11 (upper ch) @ CCK 11Mbps



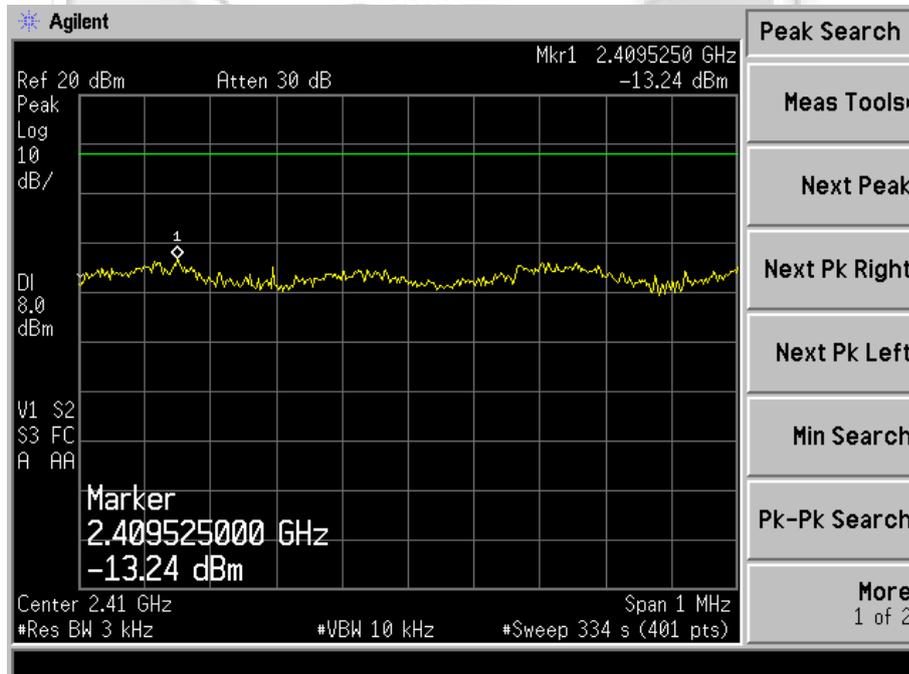


PEAK POWER SPECTRAL DENSITY TEST

Peak Power Spectral Density Plots – Antenna 2 (Internal), 802.11g



Plot 195 – Channel 1 (lower ch) @ DBPSK 9Mbps

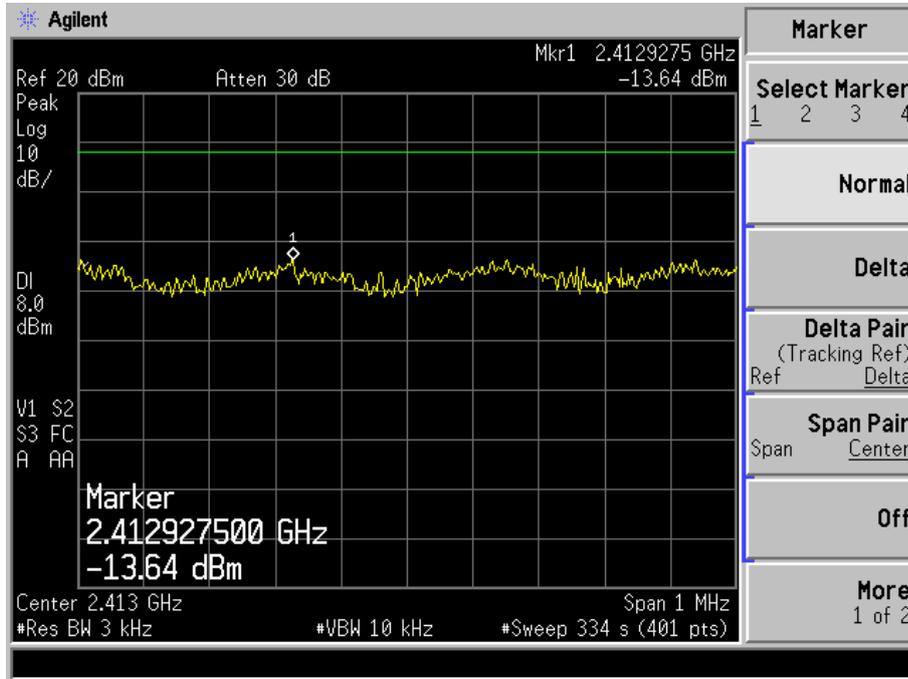


Plot 196 – Channel 1 (lower ch) @ QPSK 18Mbps

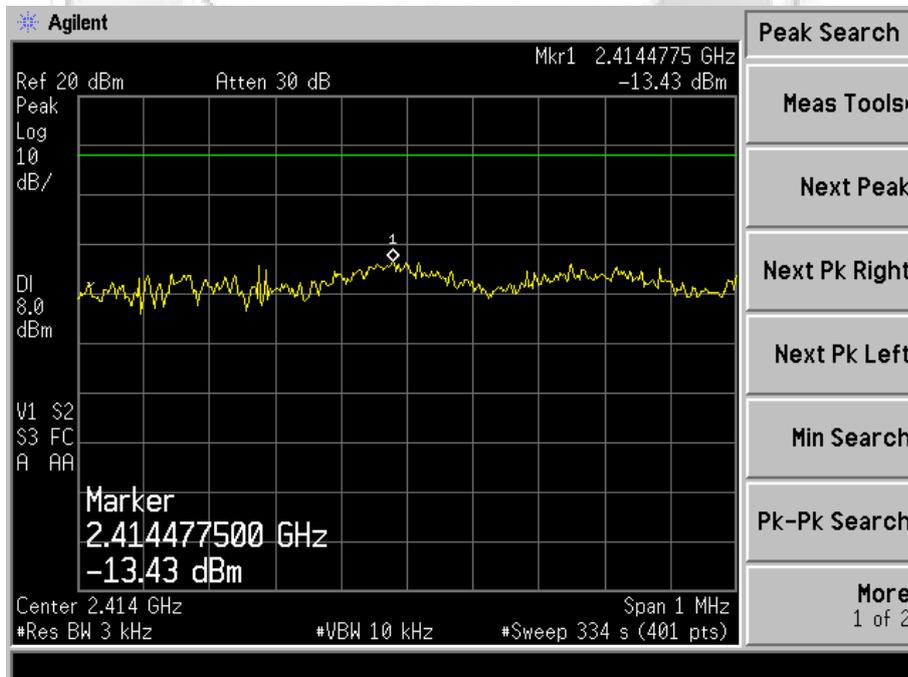


**PEAK POWER SPECTRAL DENSITY TEST**

**Peak Power Spectral Density Plots – Antenna 2 (Internal), 802.11g**



**Plot 197 – Channel 1 (lower ch) @ 16QAM 36Mbps**

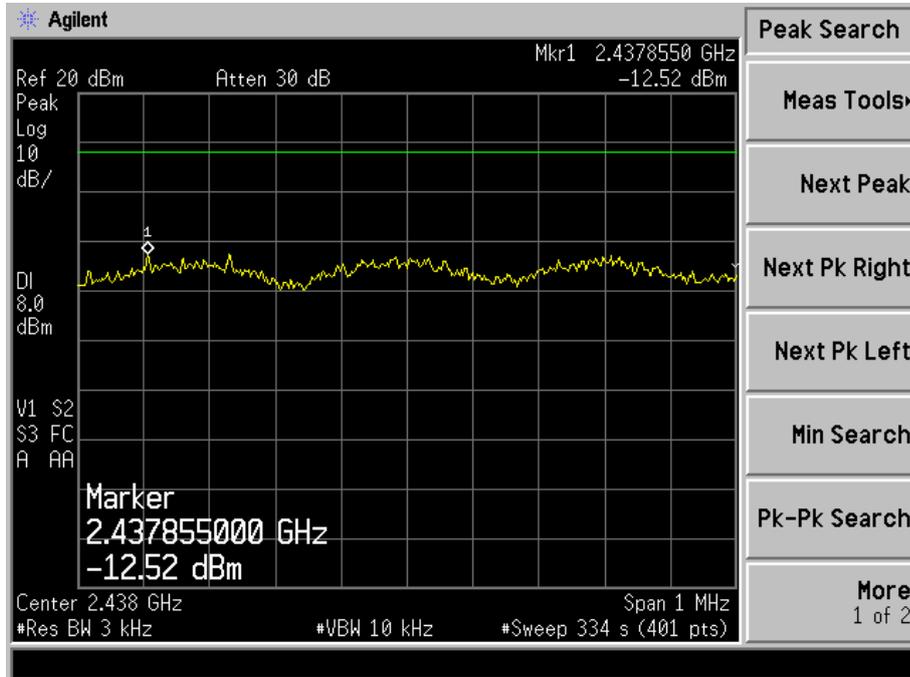


**Plot 198 – Channel 1 (lower ch) @ 64QAM 54Mbps**

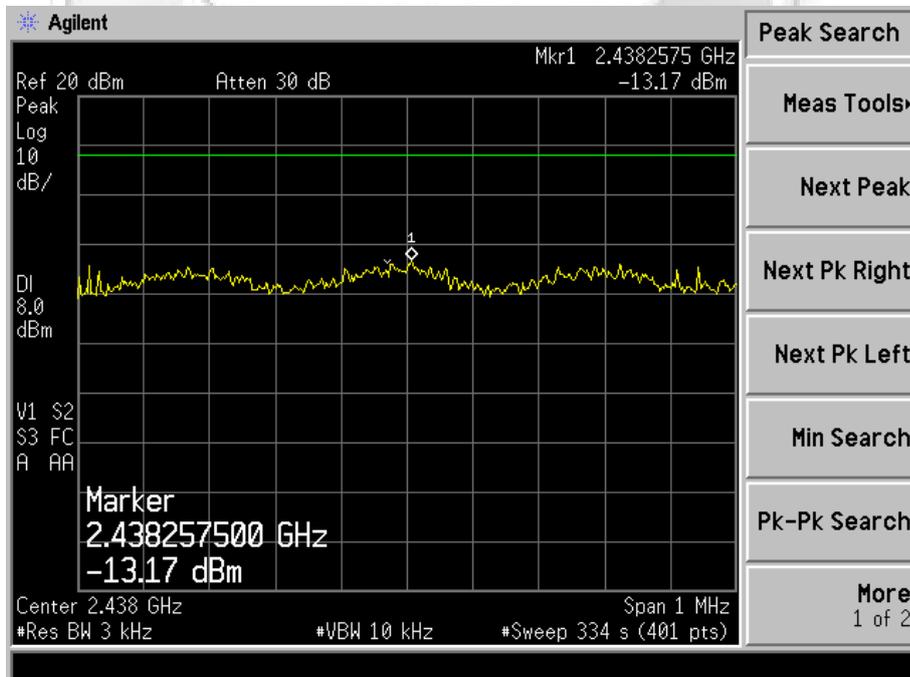


PEAK POWER SPECTRAL DENSITY TEST

Peak Power Spectral Density Plots – Antenna 2 (Internal), 802.11g



Plot 199 – Channel 6 (mid ch) @ BPSK 9Mbps

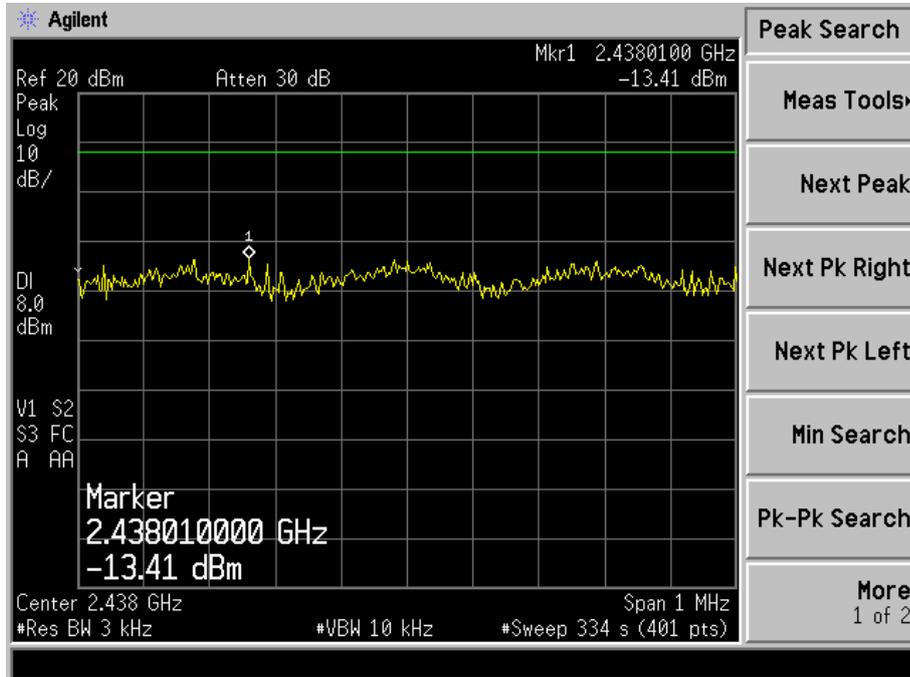


Plot 200 – Channel 6 (mid ch) @ QPSK 18Mbps

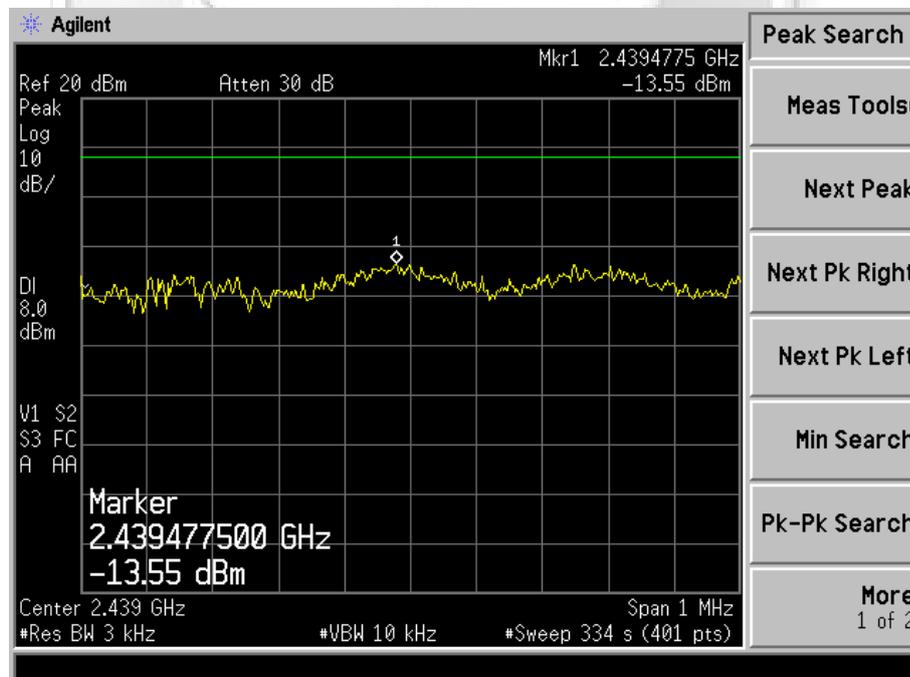


PEAK POWER SPECTRAL DENSITY TEST

Peak Power Spectral Density Plots – Antenna 2 (Internal), 802.11g



Plot 201 – Channel 6 (mid ch) @ 16QAM 36Mbps

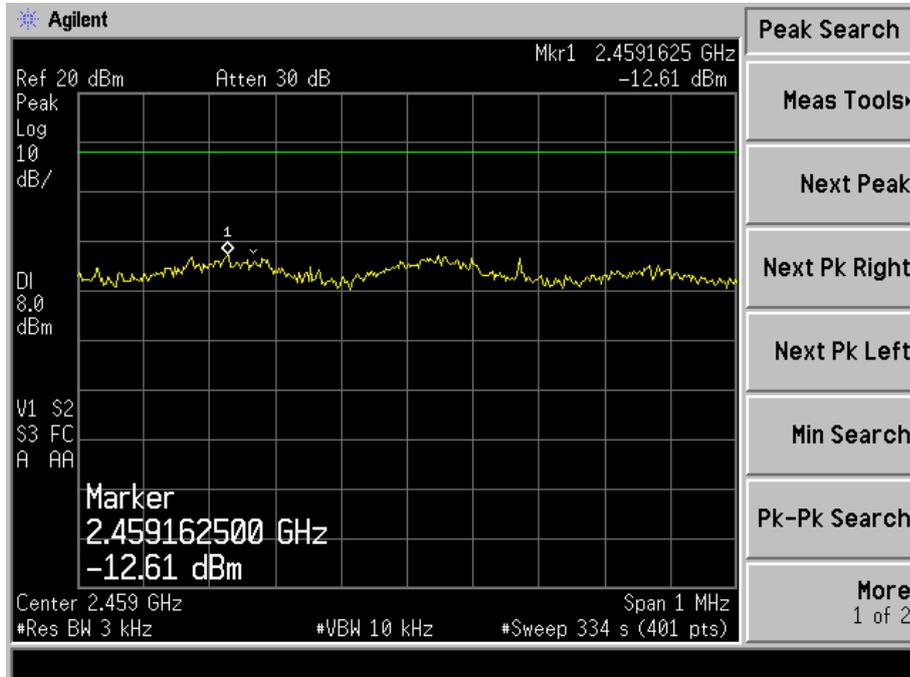


Plot 202 – Channel 6 (mid ch) @ 64QAM 54Mbps

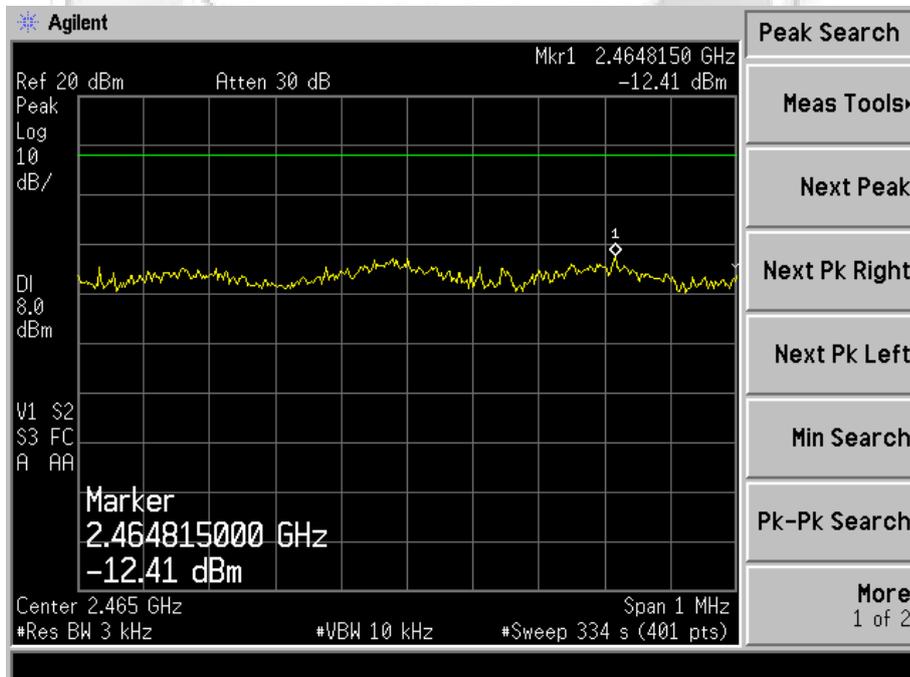


PEAK POWER SPECTRAL DENSITY TEST

Peak Power Spectral Density Plots – Antenna 2 (Internal), 802.11g



Plot 203 – Channel 11 (upper ch) @ BPSK 9Mbps

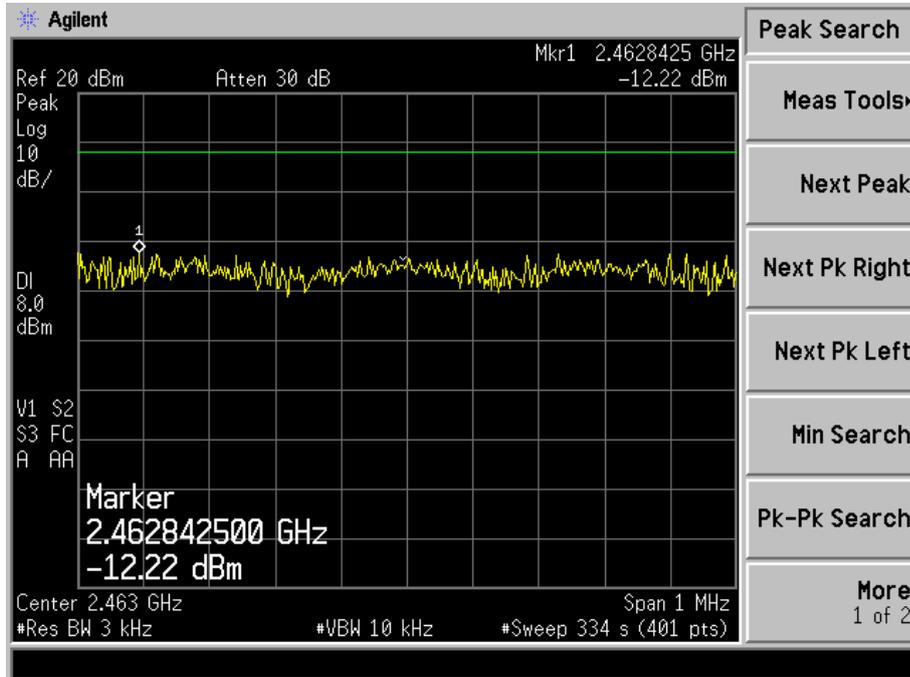


Plot 204 – Channel 11 (upper ch) @ QPSK 18Mbps

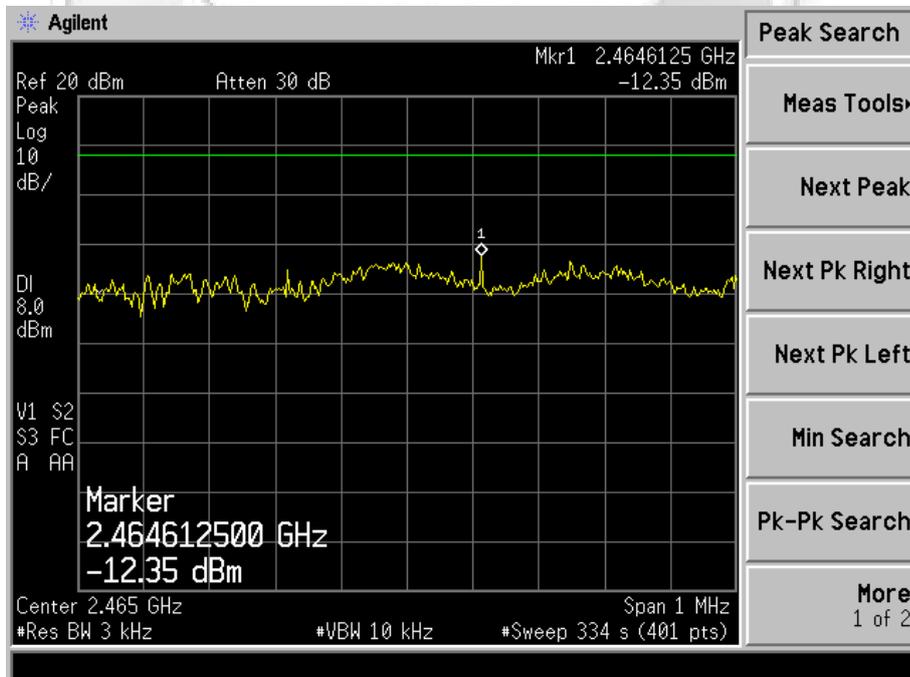


**PEAK POWER SPECTRAL DENSITY TEST**

**Peak Power Spectral Density Plots – Antenna 2 (Internal), 802.11g**



**Plot 205 – Channel X (upper ch) @ 16QAM 36Mbps**



**Plot 206 – Channel 11 (upper ch) @ 64QAM 54Mbps**



**MAXIMUM PERMISSIBLE EXPOSURE (MPE) TEST**

**47 CFR FCC Part 1.1310 Maximum Permissible Exposure (MPE) Limits**

The EUT shows compliance to the requirements of this section, which states the MPE limits for general population / uncontrolled exposure are as shown below:

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Average Time (min)
0.3 - 1.34	614	1.63	100 <sup>Note 2</sup>	30
1.34 - 30	824 / f	2.19 / f	180 / f <sup>2</sup> <sup>Note 2</sup>	30
30 - 300	27.5	0.073	0.2	30
300 - 1500	-	-	f / 1500	30
1500 - 100000	-	-	1.0	30
Notes				
1. f = frequency in MHz				
2. Plane wave equivalent power density				

**47 CFR FCC Part 1.1310 Maximum Permissible Exposure Computation**

Antenna 1 (external)

The power density at 20cm distance was computed from the following formula:

$$S = (30GP) / (377d^2)$$

where

- S = Power density in W/m<sup>2</sup>
- P = 0.0113W
- d = Test distance at 0.2m
- G = Numerical isotropic gain, 1.08 (0.35dBi)

Substituting the relevant parameters into the formula:

$$S = [(30GP) / 377d^2]$$

$$= 0.0243W/m^2$$

$$= 0.00243mW/cm^2$$

∴ The power density of the EUT at 20cm distance is 0.00243mW/cm<sup>2</sup> based on the above computation and found to be lower than the power density limit of 1.0mW/cm<sup>2</sup>.

Antenna 2 (internal)

The power density at 20cm distance was computed from the following formula:

$$S = (30GP) / (377d^2)$$

where

- S = Power density in W/m<sup>2</sup>
- P = 0.0063W
- d = Test distance at 0.2m
- G = Numerical isotropic gain, 1.08 (0.35dBi)

Substituting the relevant parameters into the formula:

$$S = [(30GP) / 377d^2]$$

$$= 0.0135W/m^2$$

$$= 0.00135mW/cm^2$$

∴ The power density of the EUT at 20cm distance is 0.00135mW/cm<sup>2</sup> based on the above computation and found to be lower than the power density limit of 1.0mW/cm<sup>2</sup>.

**Test Report No. 7191024569-EEC12/01**  
**dated 01 Feb 2012**

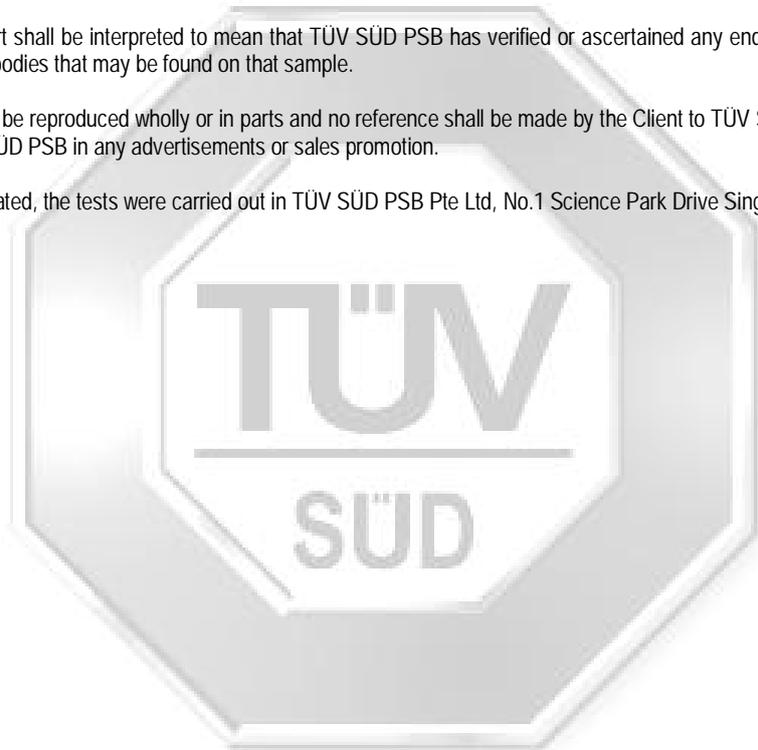


PSB Singapore

Please note that this Report is issued under the following terms :

1. This report applies to the sample of the specific product/equipment given at the time of its testing/calibration. The results are not used to indicate or imply that they are applicable to other similar items. In addition, such results must not be used to indicate or imply that TÜV SÜD PSB approves, recommends or endorses the manufacturer, supplier or user of such product/equipment, or that TÜV SÜD PSB in any way "guarantees" the later performance of the product/equipment. Unless otherwise stated in this report, no tests were conducted to determine long term effects of using the specific product/equipment.
2. The sample/s mentioned in this report is/are submitted/supplied/manufactured by the Client. TÜV SÜD PSB therefore assumes no responsibility for the accuracy of information on the brand name, model number, origin of manufacture, consignment or any information supplied.
3. Nothing in this report shall be interpreted to mean that TÜV SÜD PSB has verified or ascertained any endorsement or marks from any other testing authority or bodies that may be found on that sample.
4. This report shall not be reproduced wholly or in parts and no reference shall be made by the Client to TÜV SÜD PSB or to the report or results furnished by TÜV SÜD PSB in any advertisements or sales promotion.
5. Unless otherwise stated, the tests were carried out in TÜV SÜD PSB Pte Ltd, No.1 Science Park Drive Singapore 118221.

July 2011





---

**ANNEX A EUT PHOTOGRAPHS / DIAGRAMS**





---

**ANNEX B USER MANUAL TECHNICAL DESCRIPTION BLOCK & CIRCUIT DIAGRAMS**





---

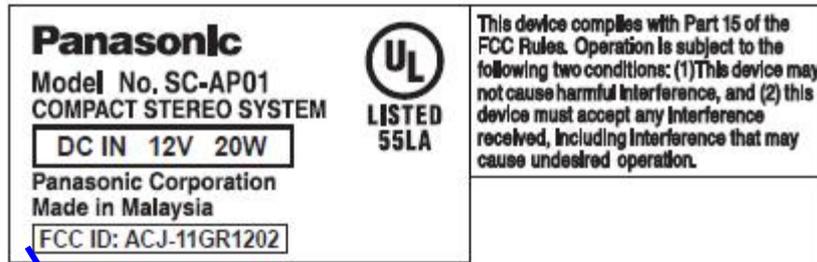
**ANNEX C FCC LABEL & POSITION**



**ANNEX C FCC LABEL & POSITION**

Labeling requirements per Section 2.925 & 15.19

The label shown will be permanently affixed at a conspicuous location on the device and be readily visible to the user at the time of purchase.



Sample Label



Physical Location of FCC Label on EUT