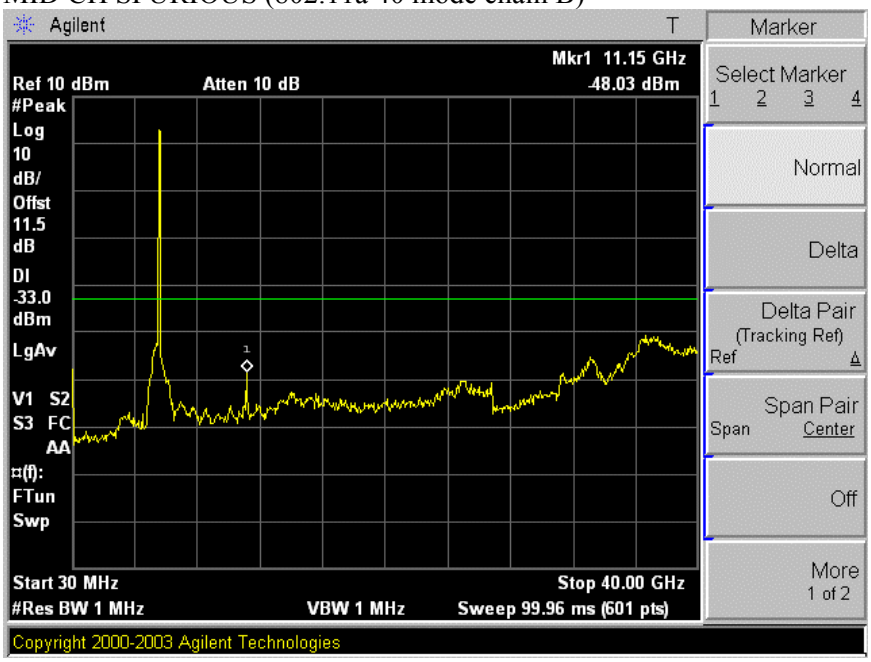
MID CH SPURIOUS (802.11a 40 mode chain B)



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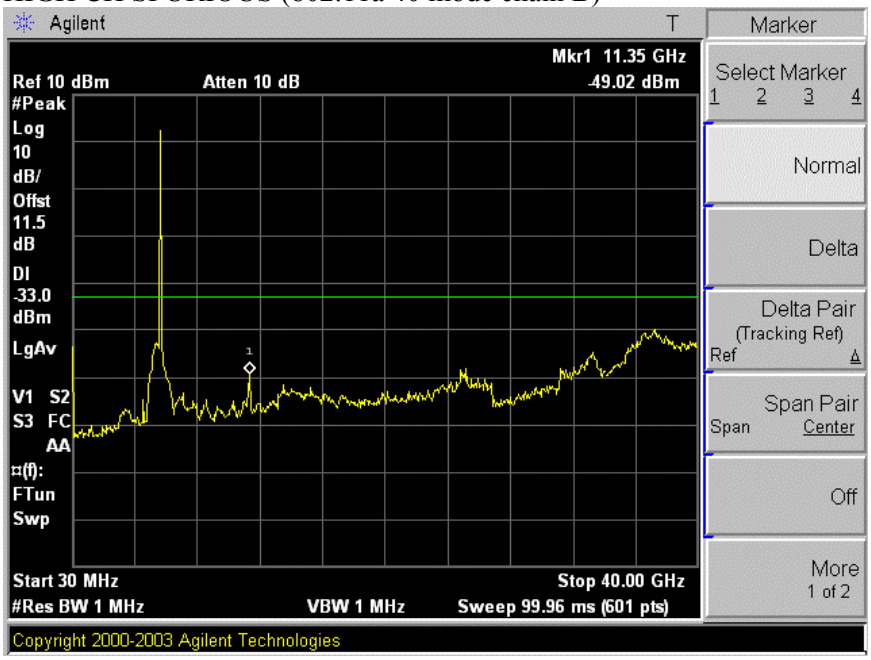
HIGH CH SPURIOUS (802.11a 40 mode chain B)



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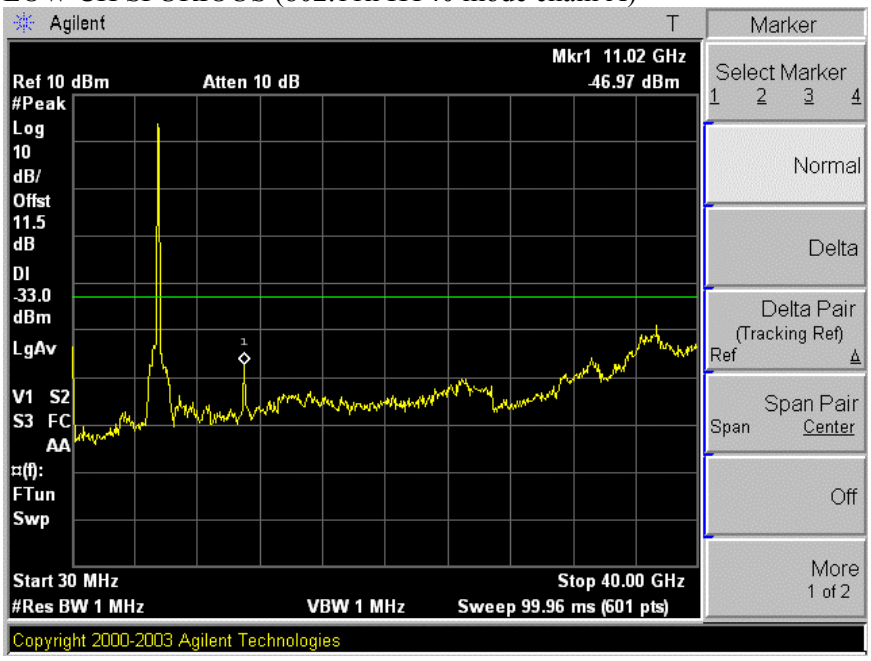
SPURIOUS EMISSIONS (802.11 HT40 MODE CHAIN A)

LOW CH SPURIOUS (802.11n HT40 mode chain A)



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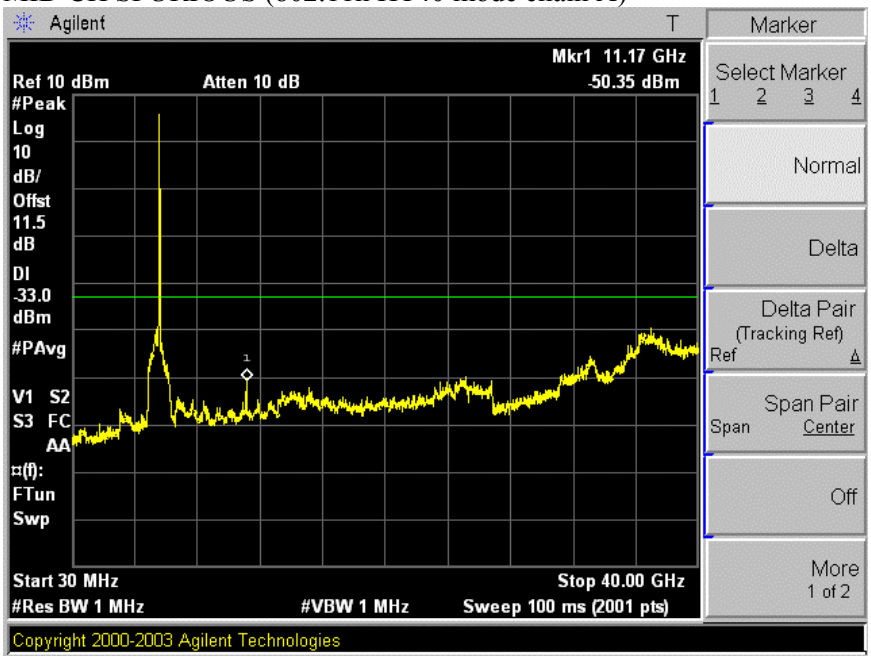
MID CH SPURIOUS (802.11n HT40 mode chain A)



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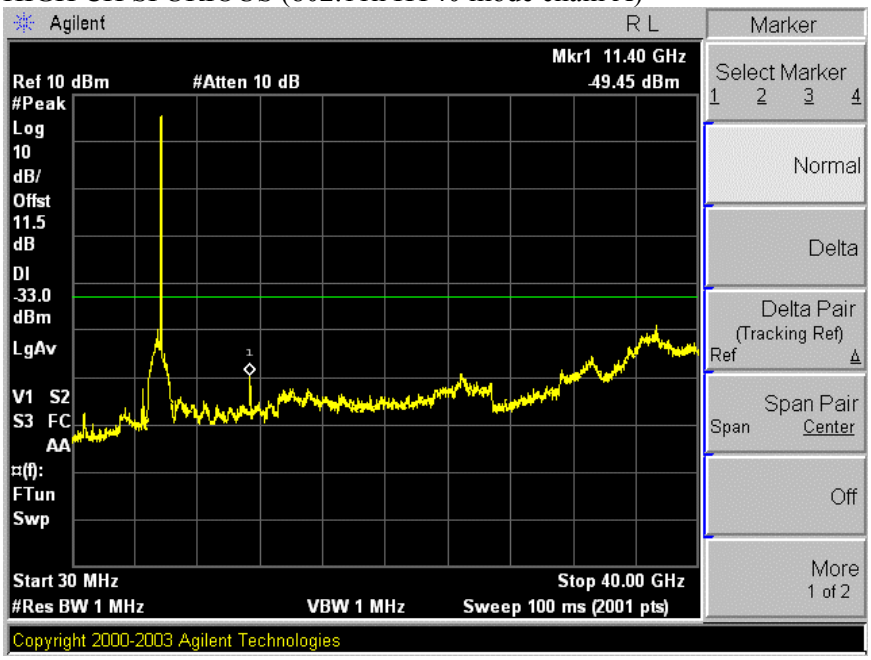
HIGH CH SPURIOUS (802.11n HT40 mode chain A)



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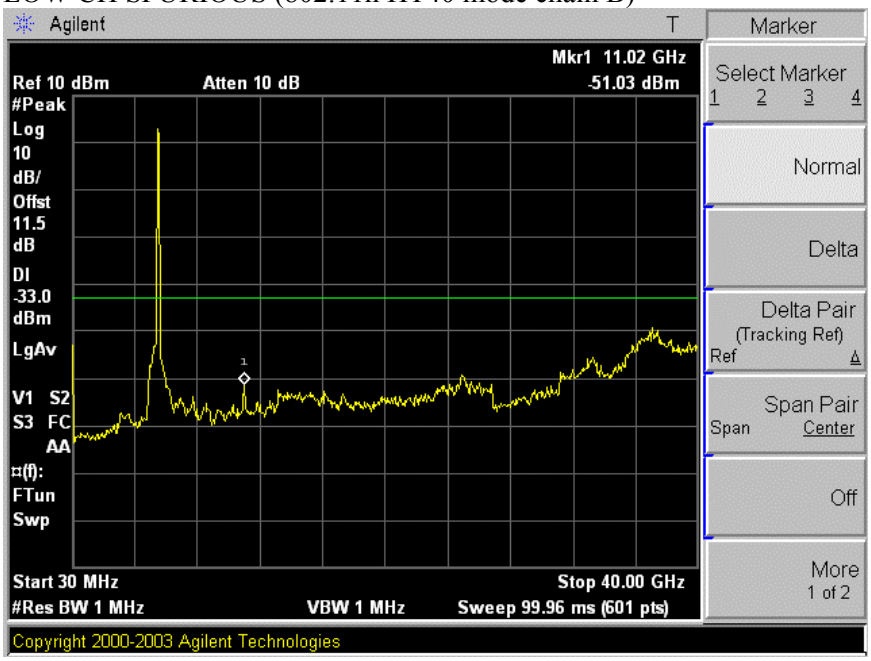
SPURIOUS EMISSIONS (802.11 HT40 MODE CHAIN B)

LOW CH SPURIOUS (802.11n HT40 mode chain B)



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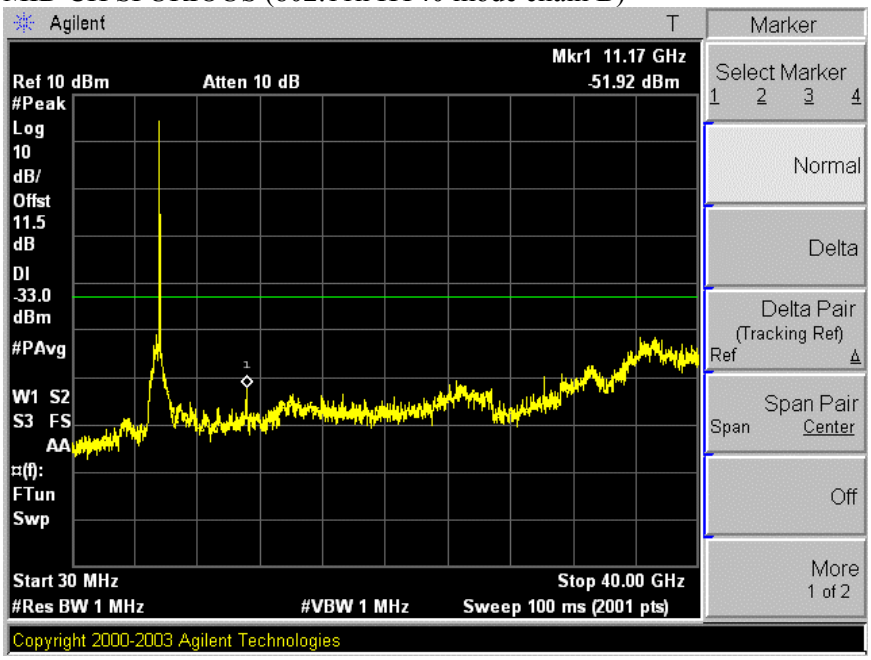
MID CH SPURIOUS (802.11n HT40 mode chain B)



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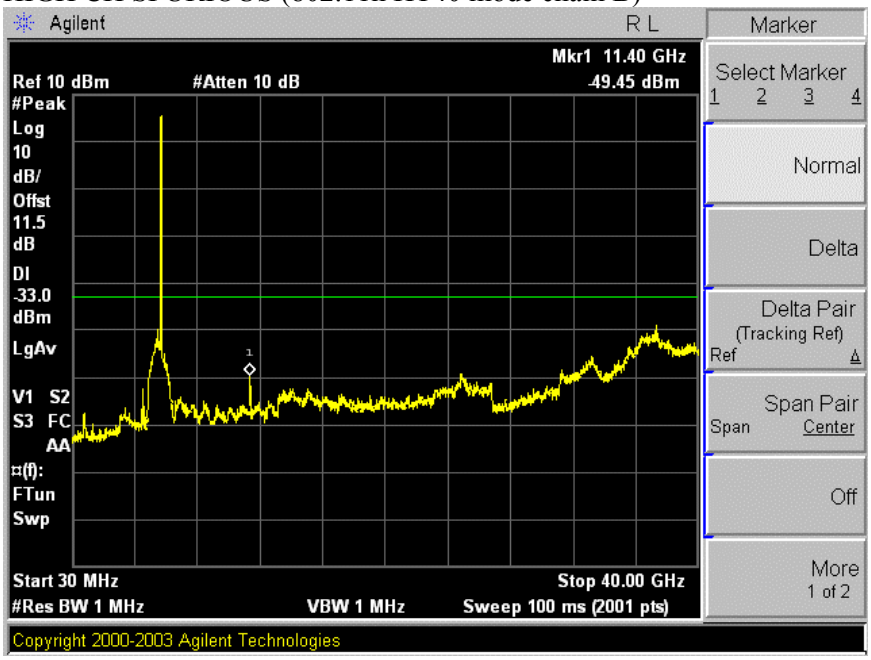
HIGH CH SPURIOUS (802.11n HT40 mode chain B)



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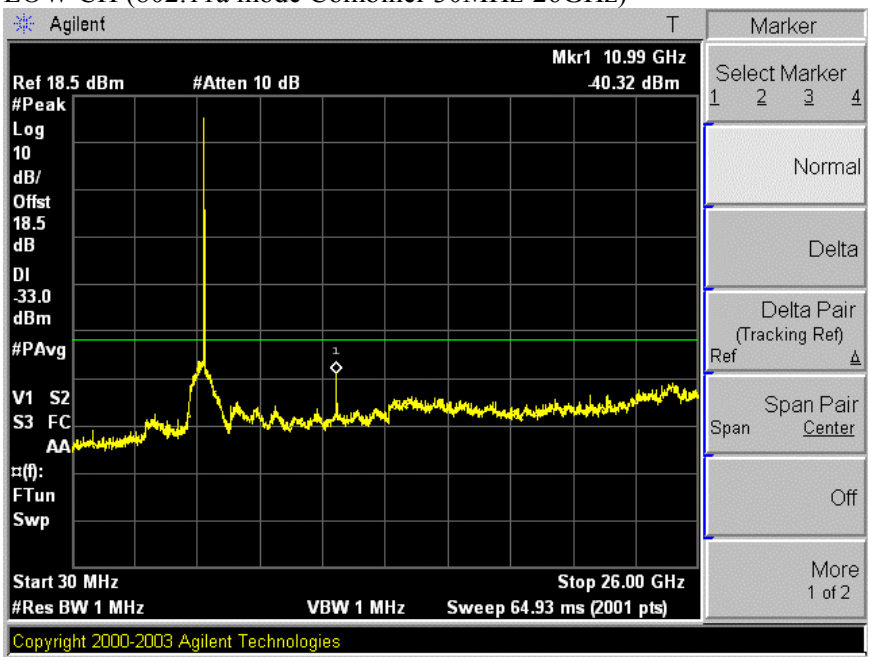
(802.11a MODE COMBINER)

LOW CH (802.11a mode Combiner 30MHz-26GHz)



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LOW CH (802.11a mode Combiner 26-40GHz)

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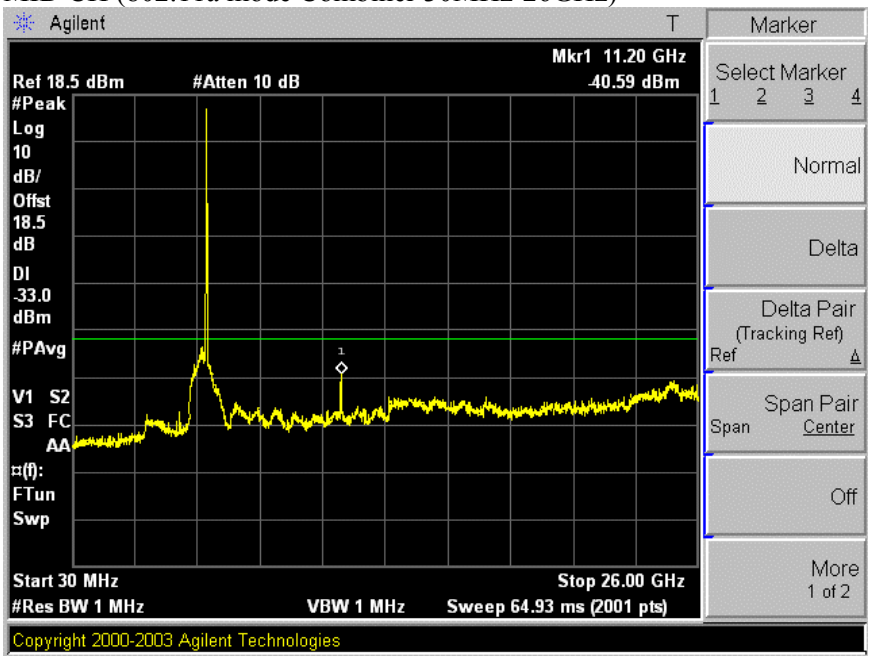
MID CH (802.11a mode Combiner 30MHz-26GHz)



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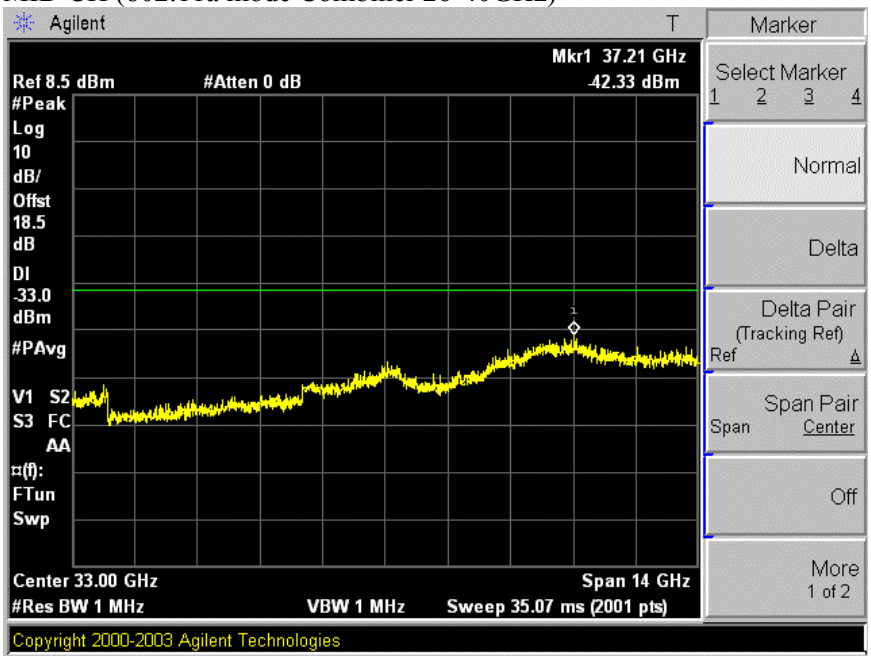
MID CH (802.11a mode Combiner 26-40GHz)



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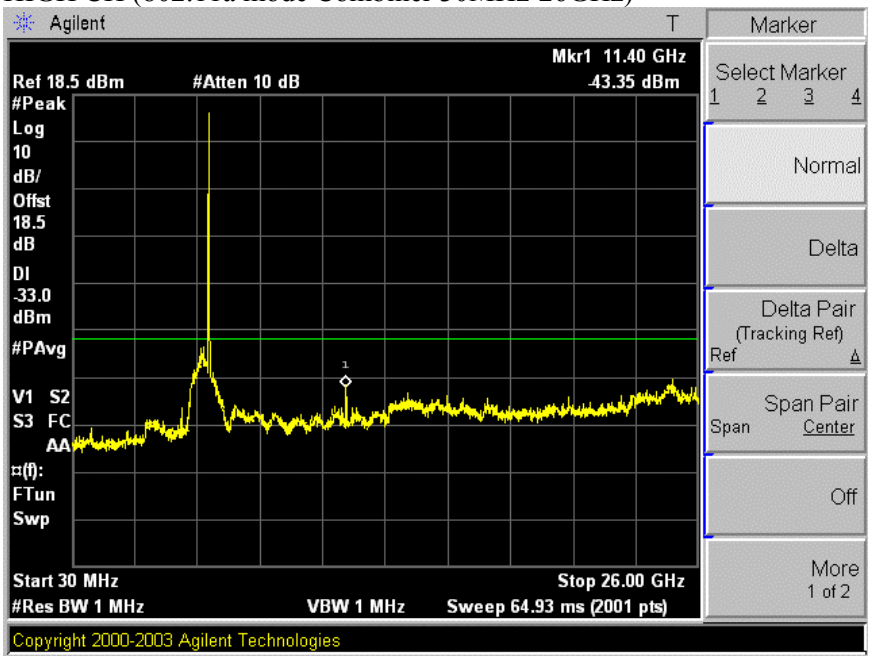
HIGH CH (802.11a mode Combiner 30MHz-26GHz)



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HIGH CH (802.11a mode Combiner 26-40GHz)

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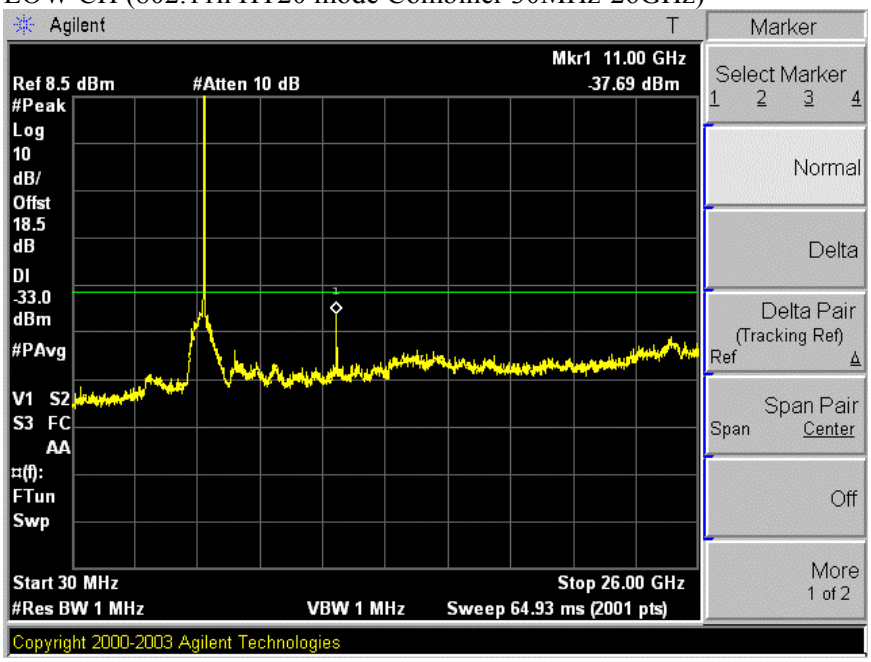
SPURIOUS EMISSIONS (802.11 n HT20 MODE COMBINER)

LOW CH (802.11n HT20 mode Combiner 30MHz-26GHz)



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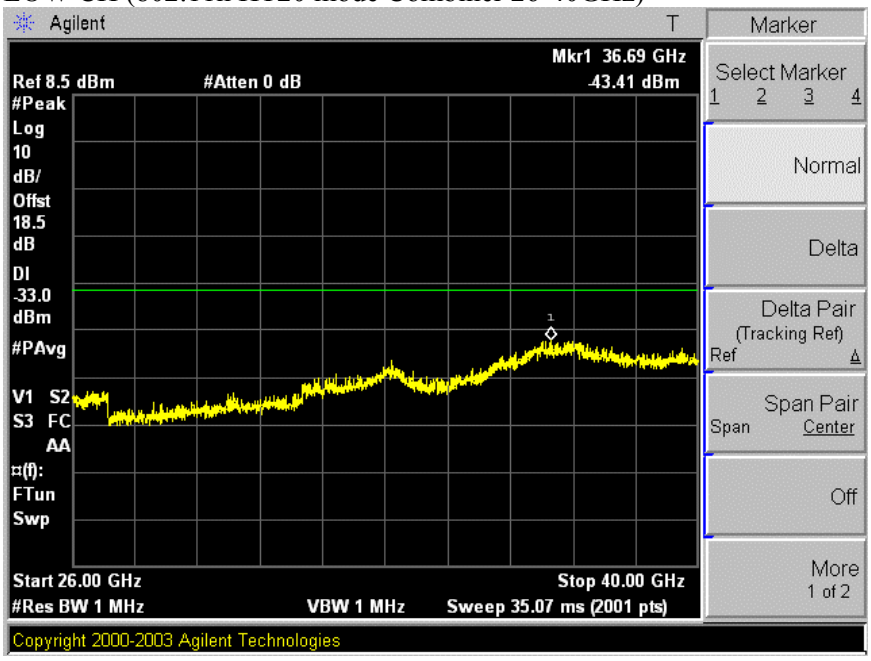
LOW CH (802.11n HT20 mode Combiner 26-40GHz)



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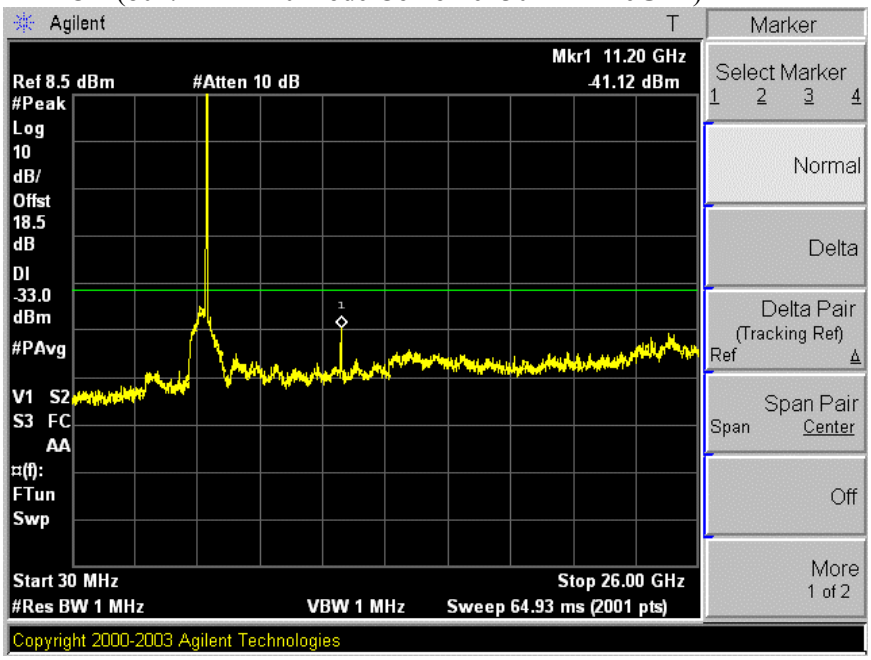
MID CH (802.11n HT20 mode Combiner 30MHz- 26GHz)



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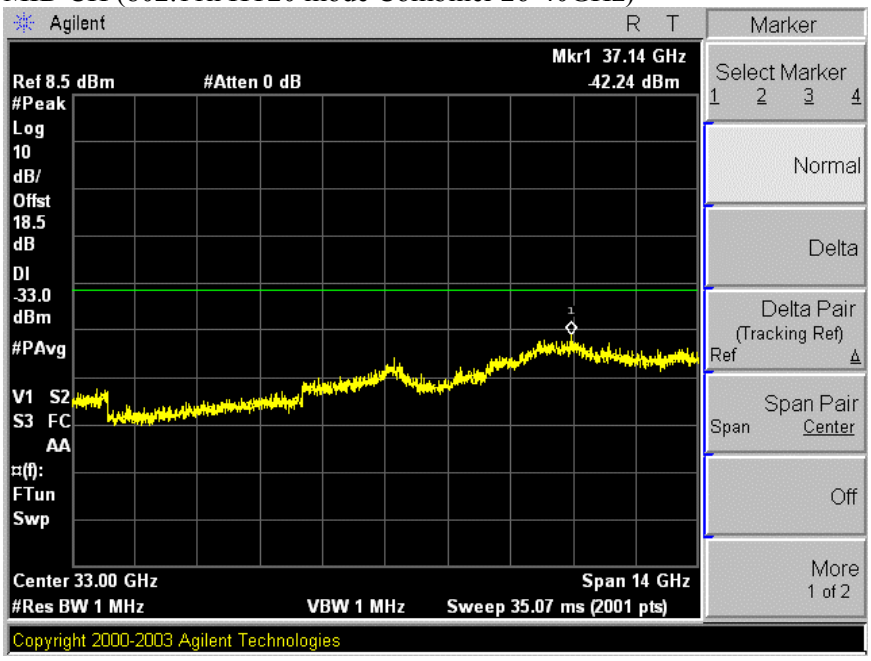
MID CH (802.11n HT20 mode Combiner 26-40GHz)



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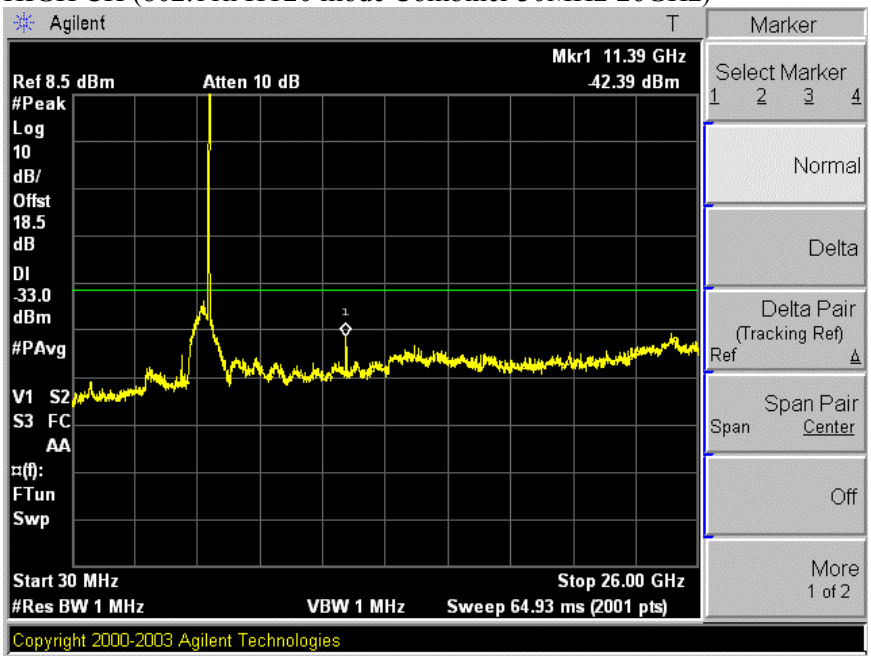
HIGH CH (802.11n HT20 mode Combiner 30MHz-26GHz)



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HIGH CH (802. 11n HT20 mode Combiner 26-40GHz)

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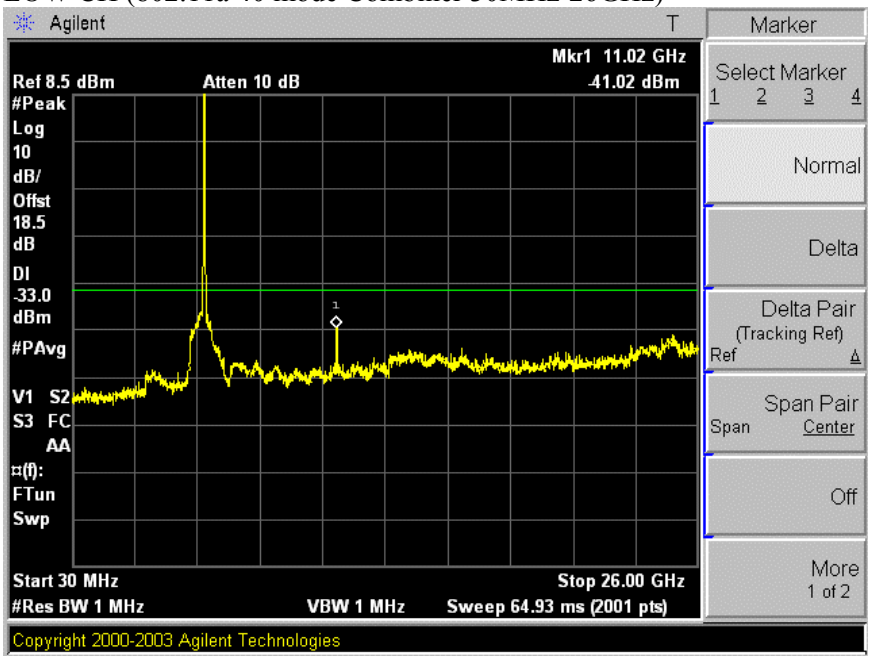
SPURIOUS EMISSIONS (802.11 a 40 MODE COMBINER)

LOW CH (802.11a 40 mode Combiner 30MHz-26GHz)



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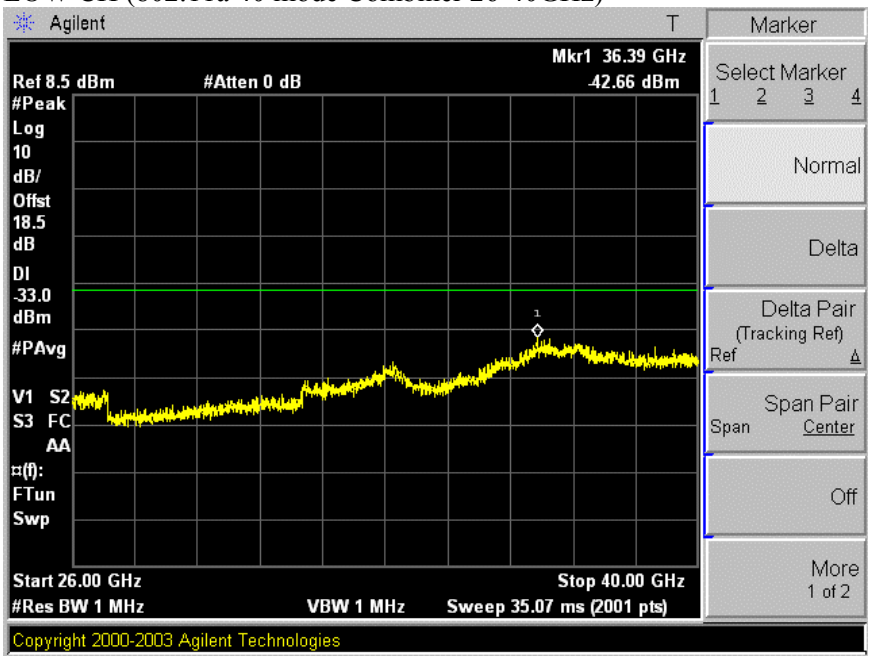
LOW CH (802.11a 40 mode Combiner 26-40GHz)



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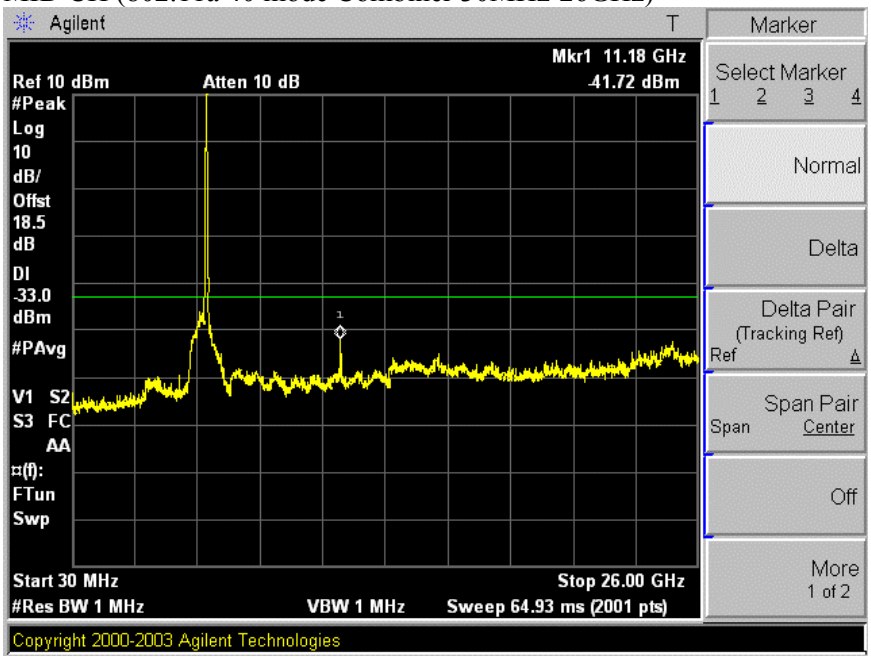
MID CH (802.11a 40 mode Combiner 30MHz-26GHz)



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MID CH (802.11a 40 mode Combiner 26-40GHz)

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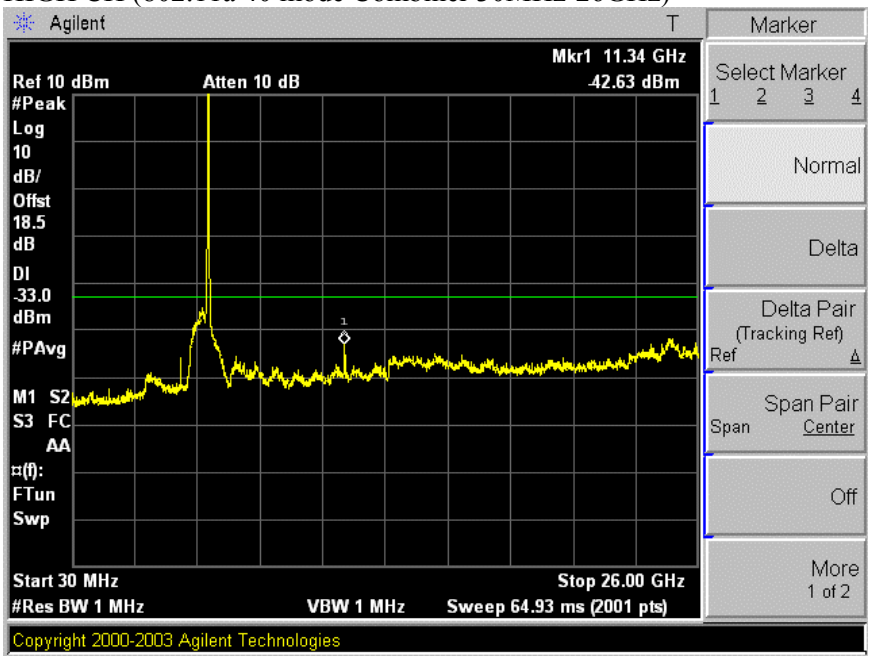
HIGH CH (802.11a 40 mode Combiner 30MHz-26GHz)



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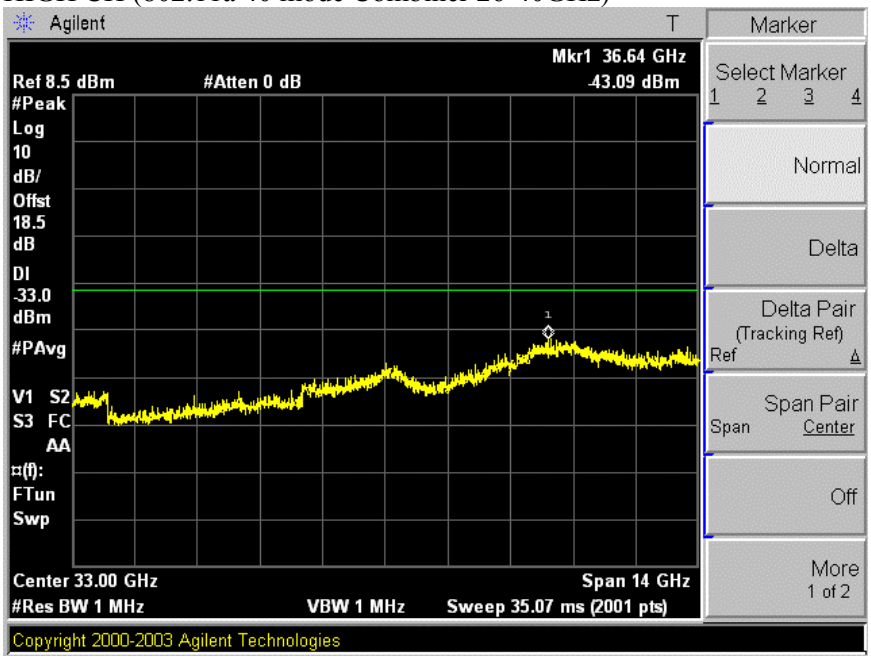
HIGH CH (802.11a 40 mode Combiner 26-40GHz)



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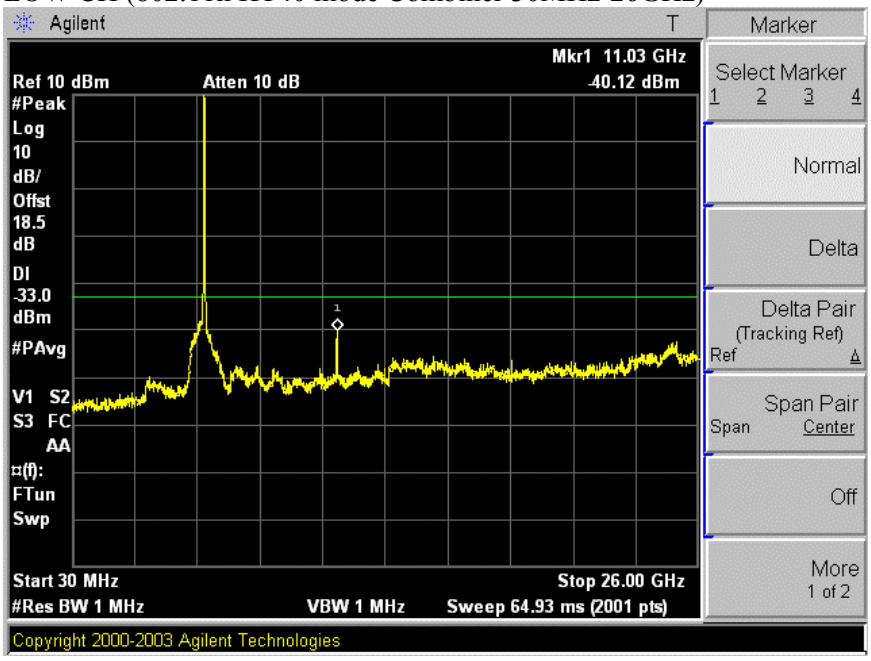
SPURIOUS EMISSIONS (802.11 n HT40 MODE COMBINER)

LOW CH (802.11n HT40 mode Combiner 30MHz-26GHz)



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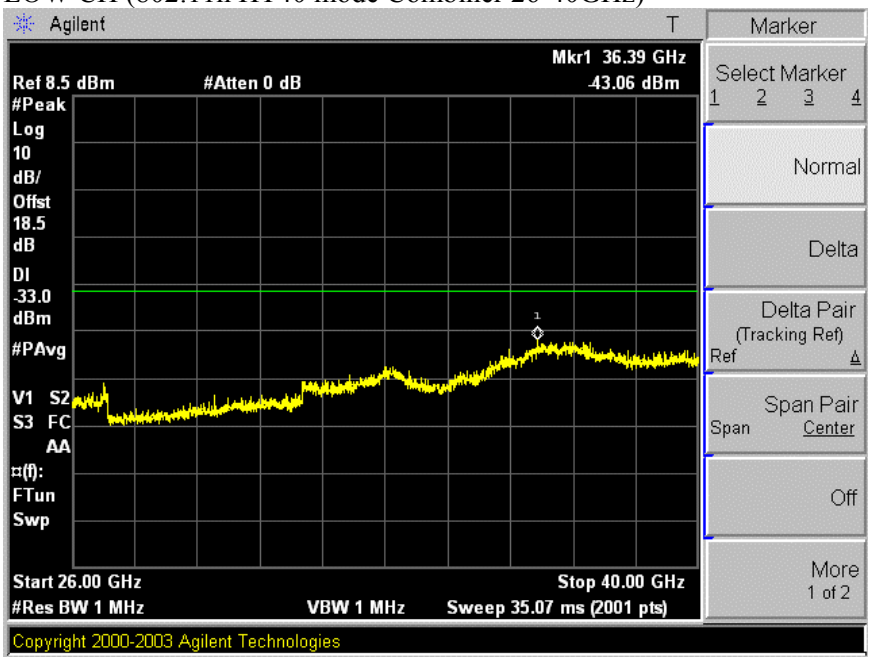
LOW CH (802.11n HT40 mode Combiner 26-40GHz)



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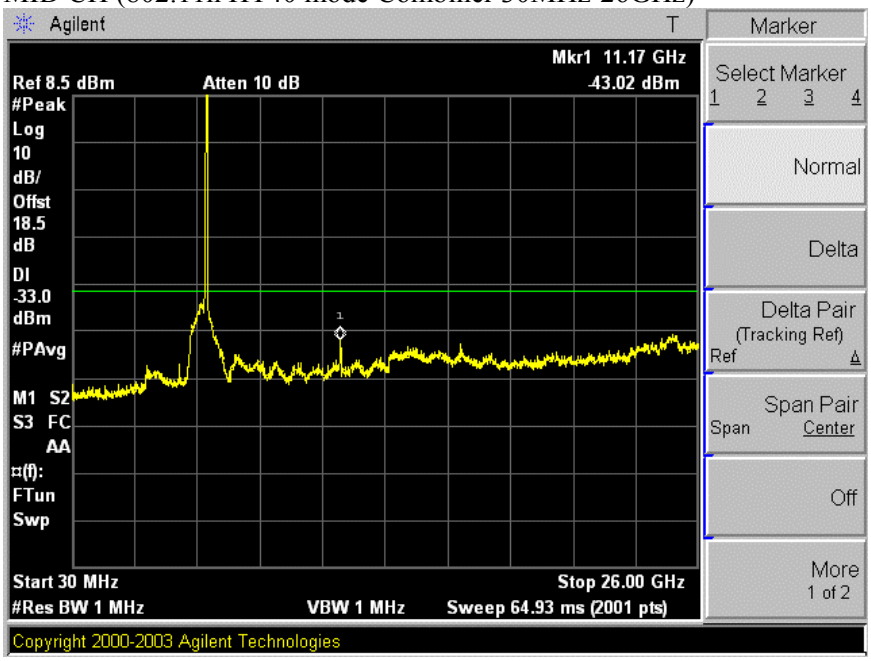
MID CH (802.11n HT40 mode Combiner 30MHz-26GHz)



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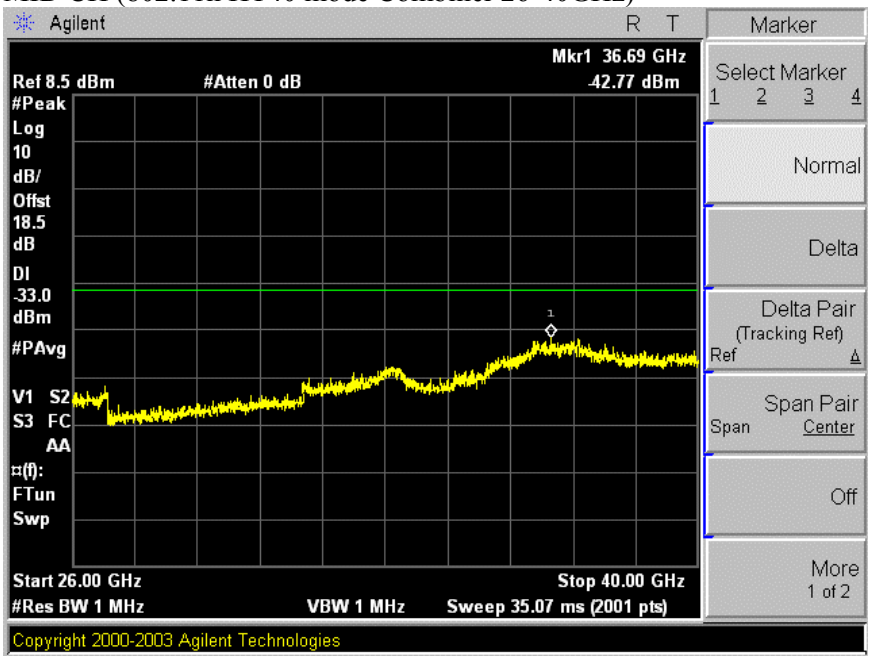
MID CH (802.11n HT40 mode Combiner 26-40GHz)



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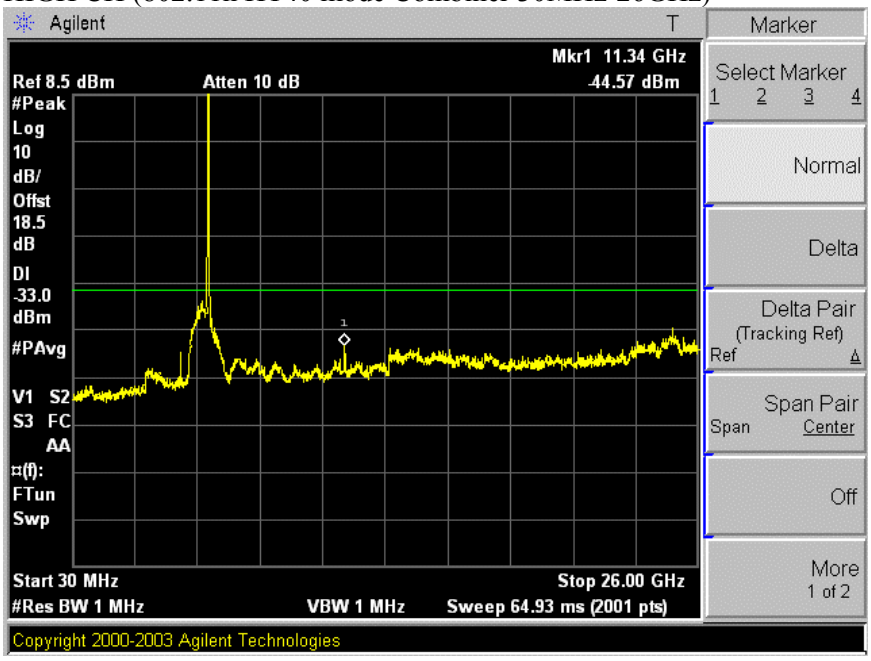
HIGH CH (802.11n HT40 mode Combiner 30MHz-26GHz)



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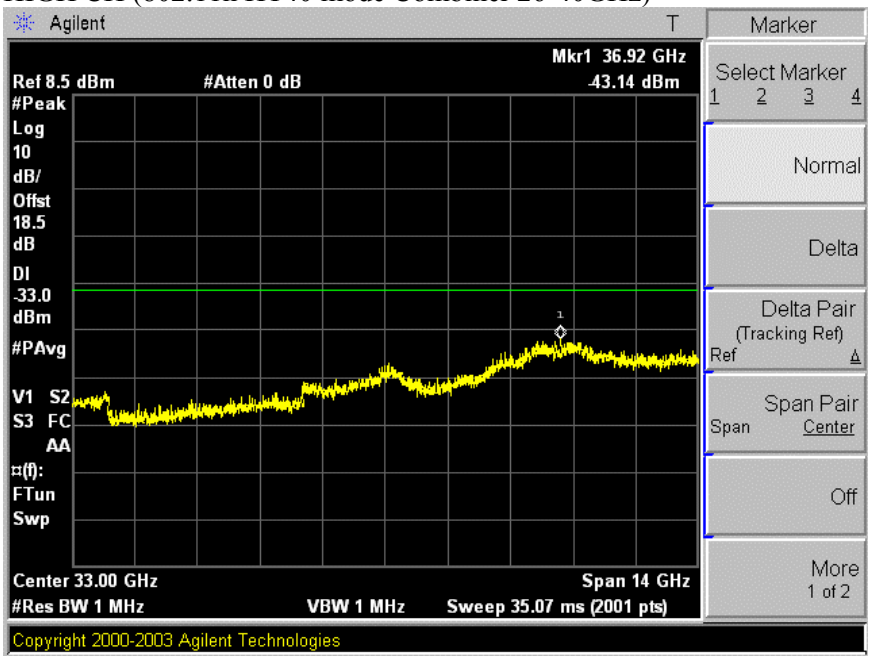
HIGH CH (802.11n HT40 mode Combiner 26-40GHz)



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7.2. RADIATED EMISSIONS

7.2.1. TRANSMITTER RADIATED SPURIOUS EMISSIONS

LIMITS

§15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]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	2655 - 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	([2])
13.36 - 13.41			

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
[2] Above 38.6

§15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

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§15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

§15.209 (b) In the emission table above, the tighter limit applies at the band edges.

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TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each band.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

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7.2.2. WORST-CASE RADIATED EMISSIONS BELOW 1 GHz

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

HORIZONTAL DATA

COMPLIANCE Engineering Services, Inc.
561F Monterey Road
Morgan Hill, CA 95037
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 13 File#: 699EMI.EMI Date: 11-16-2006 Time: 15:48:20
Audix ATC

Condition: FCC CLASS-B HORIZONTAL
Test Operator:: Thanh Nguyen
Company: : Marvell Semiconductor,Inc.
Project #: : 06U10699
Configuration:: Laptop ,extended card, EUT
Mode of Oper.:: Transmit worst case
Target: : FCC Class B

Page: 1

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	116.330	21.84	14.71	36.55	43.50	-6.95	Peak
2	201.690	24.69	14.32	39.01	43.50	-4.49	Peak
3	269.590	23.81	14.61	38.42	46.00	-7.58	Peak
4	499.480	15.57	20.22	35.79	46.00	-10.21	Peak
5	720.640	15.98	23.49	39.47	46.00	-6.53	Peak
6	983.510	14.43	26.76	41.18	54.00	-12.82	Peak

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SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)

VERTICAL DATA

561F Monterey Road
Morgan Hill, CA 95037
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 12 File#: 699EMI.EMI Date: 11-16-2006 Time: 15:46:08
Audix ATC

Condition: FCC CLASS-B VERTICAL
Test Operator:: Thanh Nguyen
Company: : Marvell Semiconductor,Inc.
Project #: : 06U10699
Configuration:: Laptop ,extended card, EUT
Mode of Oper.:: Transmit worst case
Target: : FCC Class B

Page: 1

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	39.700	14.27	15.51	29.79	40.00	-10.21	Peak
2	124.090	21.37	15.23	36.60	43.50	-6.90	Peak
3	201.690	19.82	14.32	34.14	43.50	-9.36	Peak
4	400.540	18.94	18.04	36.98	46.00	-9.02	Peak
5	502.390	18.68	20.24	38.92	46.00	-7.08	Peak
6	799.210	14.52	24.56	39.07	46.00	-6.93	Peak
7	998.060	16.20	26.89	43.09	54.00	-10.91	Peak

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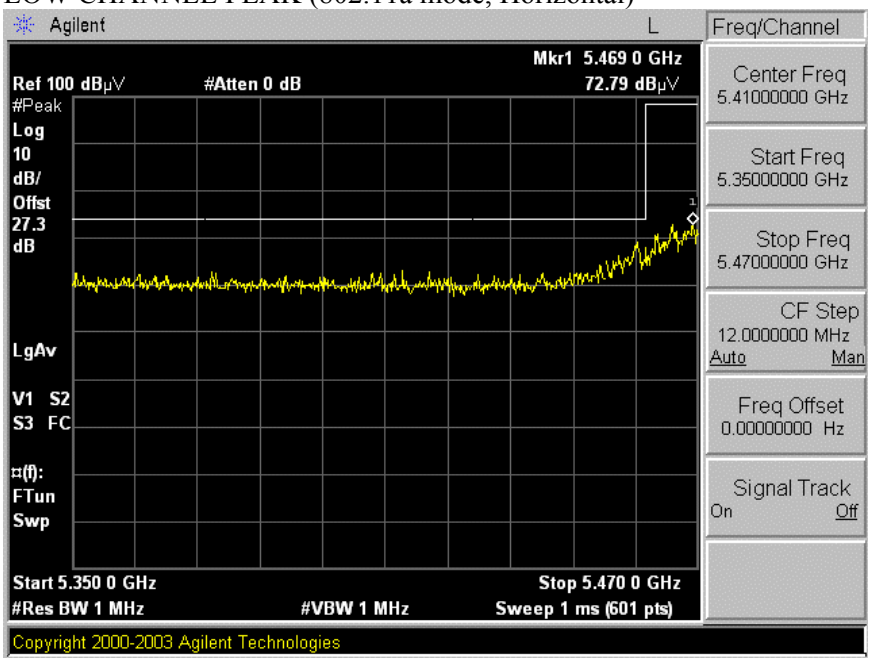
7.2.3. TRANSMITTER ABOVE 1 GHz FOR 5470 TO 5725 MHz BAND

Mega Chip Dipole Antenna

RESTRICTED BANDEDGE (802.11a MODE, LOW CHANNEL)

LOW CHANNEL PEAK (802.11a mode, Horizontal)



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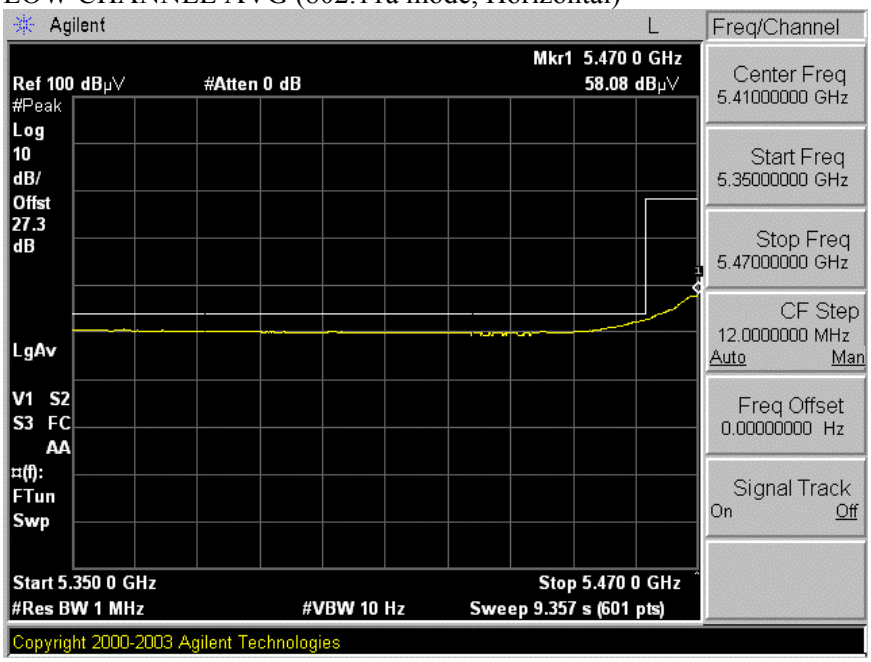
LOW CHANNEL AVG (802.11a mode, Horizontal)



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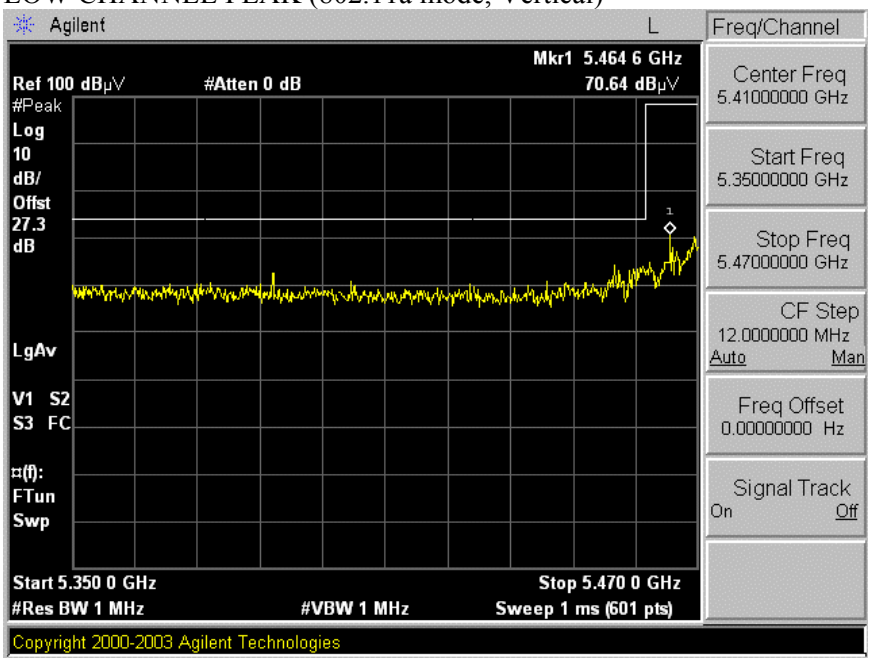
LOW CHANNEL PEAK (802.11a mode, Vertical)



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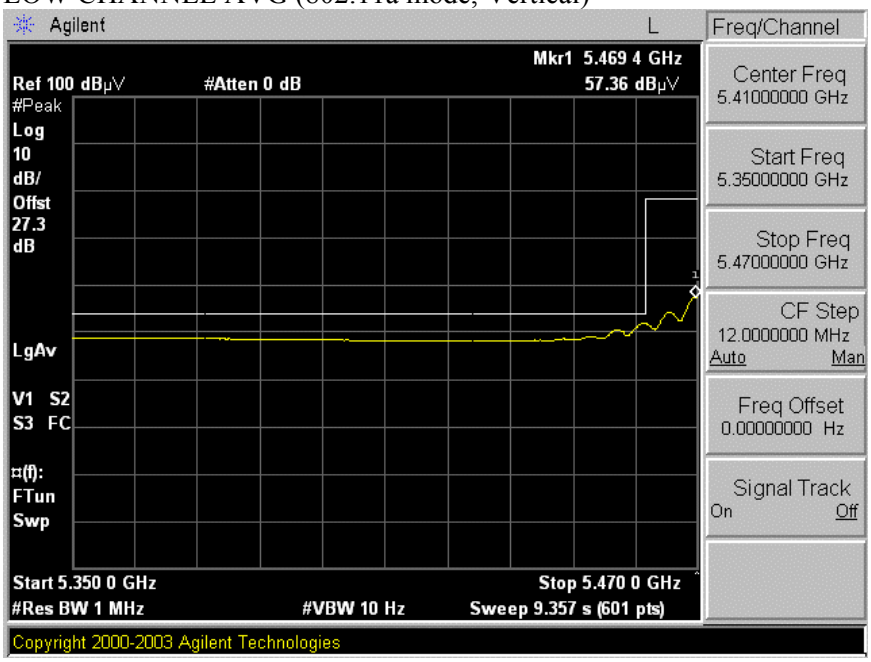
LOW CHANNEL AVG (802.11a mode, Vertical)



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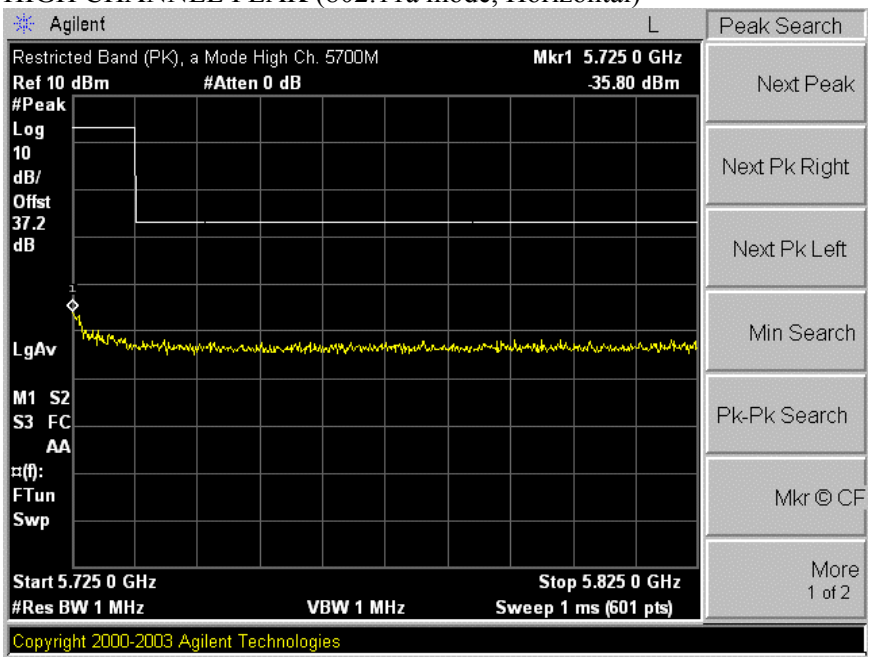
RESTRICTED BANDEDGE (802.11a MODE, HIGH CHANNEL)

HIGH CHANNEL PEAK (802.11a mode, Horizontal)



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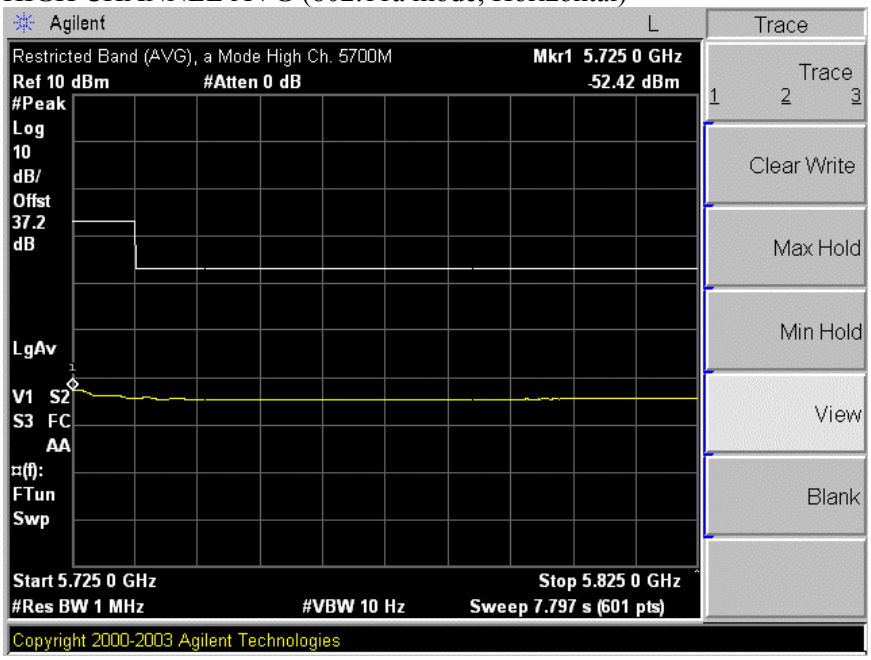
HIGH CHANNEL AVG (802.11a mode, Horizontal)



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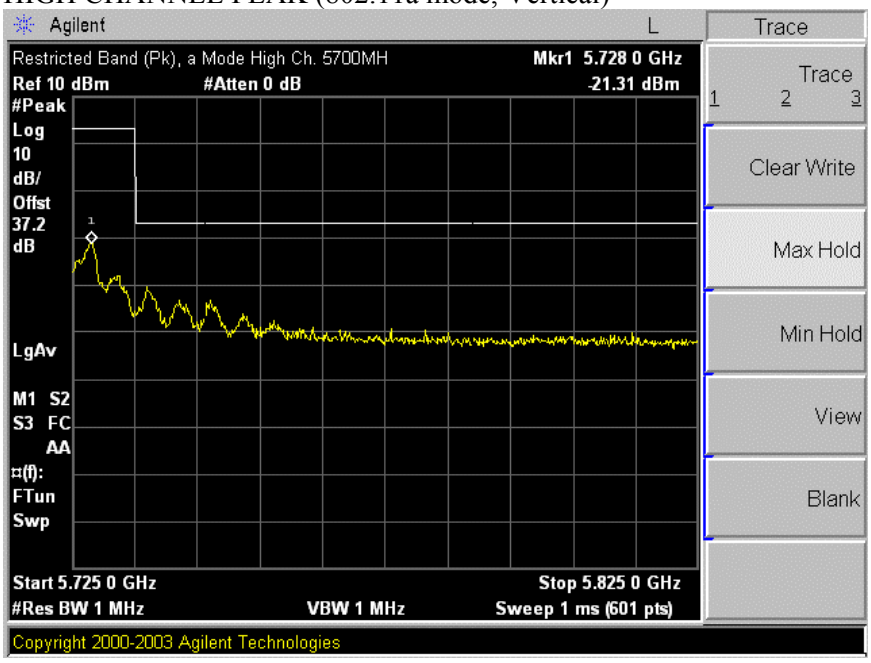
HIGH CHANNEL PEAK (802.11a mode, Vertical)



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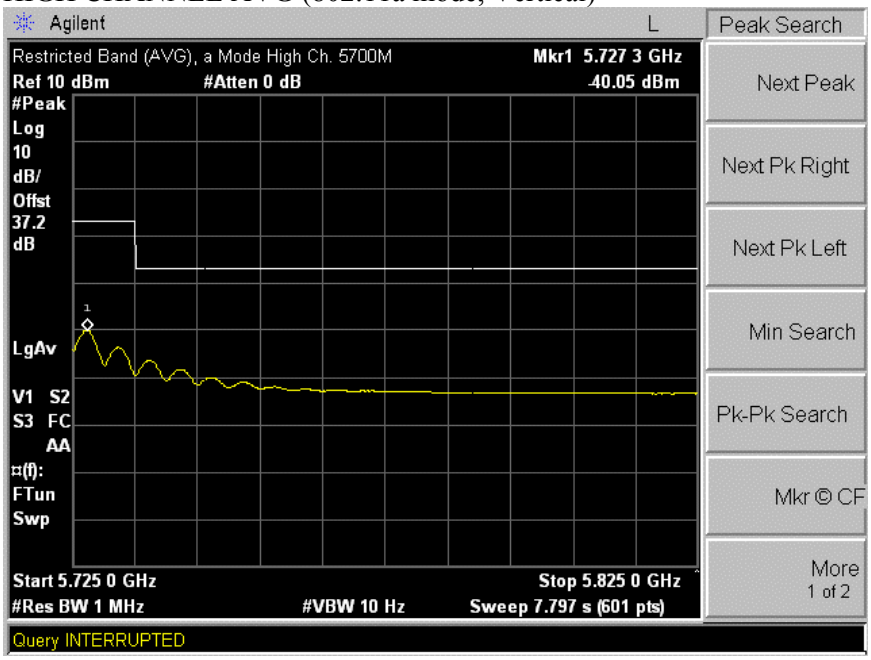
HIGH CHANNEL AVG (802.11a mode, Vertical)



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HARMONICS AND SPURIOUS EMISSIONS (802.11a MODE)

High Frequency Measurement
Compliance Certification Services, Morgan Hill Open Field Site

Company: MARVELL Semiconductor, Inc.
Project #: 06U10699-1
Date:11-06-2006
Test Engineer: Thanh Nguyen
Configuration: EUT, Laptop and Extender Card with Mega Chip Antenna
Mode: Transmit 5.5GHz Band a mode

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T120; S/N: 29310 @3m	T145 Agilent 3008A005(			FCC 15.209

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
Thanh 177079008		Thanh 208946003	HPF_7.6GHz	

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Ch 5500MHz															
11.000	3.0	50.3	40.3	37.5	4.1	-33.8	0.0	0.7	58.9	48.8	74	54	-15.1	-5.2	V
16.500	3.0	43.4	30.8	39.7	5.0	-32.1	0.0	0.7	56.6	44.1	74	54	-17.4	-9.9	V
22.000	3.0	44.5	31.0	32.3	6.0	-32.3	0.0	0.0	50.5	37.0	74	54	-23.5	-17.0	Noise floor
11.000	3.0	48.6	36.5	37.5	4.1	-33.8	0.0	0.7	57.1	45.0	74	54	-16.9	-9.0	H
16.500	3.0	42.4	30.8	39.7	5.0	-32.1	0.0	0.7	55.6	44.0	74	54	-18.4	-10.0	H
22.000	3.0	43.2	30.8	32.3	6.0	-32.3	0.0	0.0	49.2	36.8	74	54	-24.8	-17.2	Noise floor
CH 5600MHz															
11.200	3.0	52.3	37.6	37.6	4.1	-33.5	0.0	0.7	61.2	46.5	74	54	-12.8	-7.5	V
16.800	3.0	43.0	31.2	39.9	5.1	-32.0	0.0	0.7	56.6	44.8	74	54	-17.4	-9.2	V
22.400	3.0	44.0	30.8	32.5	6.1	-32.3	0.0	0.0	50.2	37.0	74	54	-23.8	-17.0	Noise floor
11.200	3.0	49.8	36.5	37.6	4.1	-33.5	0.0	0.7	58.7	45.4	74	54	-15.3	-8.6	H
16.800	3.0	42.6	30.2	39.9	5.1	-32.0	0.0	0.7	56.2	43.8	74	54	-17.8	-10.2	H
22.400	3.0	43.4	30.8	32.5	6.1	-32.3	0.0	0.0	49.6	37.0	74	54	-24.4	-17.0	Noise floor
CH 5700MHz															
11.400	3.0	53.6	41.2	37.6	4.2	-33.2	0.0	0.7	62.8	50.5	74	54	-11.2	-3.5	V
17.100	3.0	41.6	30.8	40.1	5.2	-32.0	0.0	0.7	55.6	44.7	74	54	-18.4	-9.3	V
22.800	3.0	42.9	30.9	32.7	6.2	-32.4	0.0	0.0	49.4	37.4	74	54	-24.6	-16.6	Noise floor
11.400	3.0	50.5	37.6	37.6	4.2	-33.2	0.0	0.7	59.7	46.8	74	54	-14.3	-7.2	H
17.100	3.0	41.7	30.3	40.1	5.2	-32.0	0.0	0.7	55.6	44.3	74	54	-18.4	-9.7	H
22.800	3.0	44.2	31.2	32.7	6.2	-32.4	0.0	0.0	50.7	37.7	74	54	-23.3	-16.3	Noise floor
No other spurious emissions were detected above system noise floor.															

Rev. 5.1.6

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

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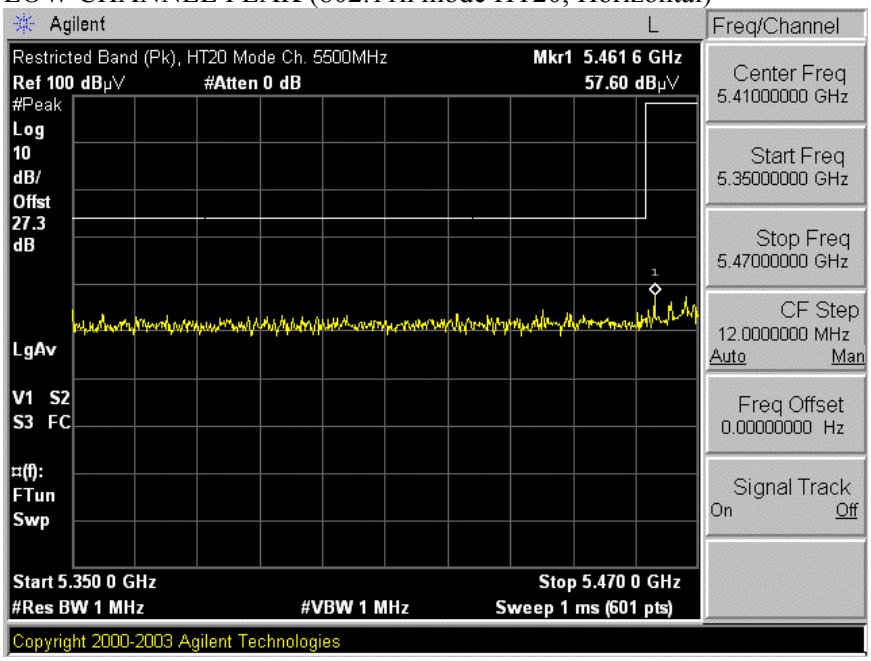
ESTRICTED BANDEDGE (802.11n MODE HT20, LOW CHANNEL)

LOW CHANNEL PEAK (802.11n mode HT20, Horizontal)



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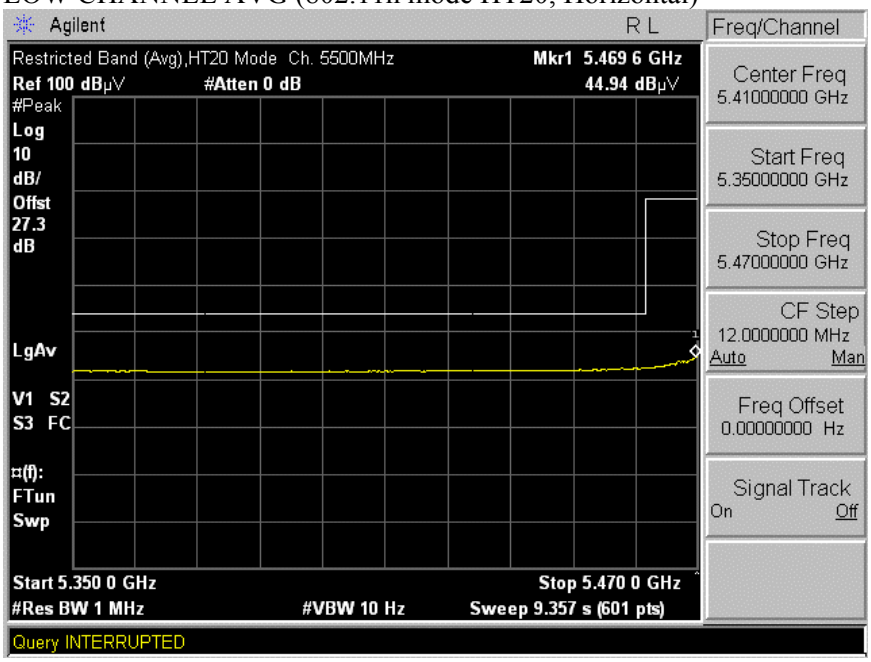
LOW CHANNEL AVG (802.11n mode HT20, Horizontal)



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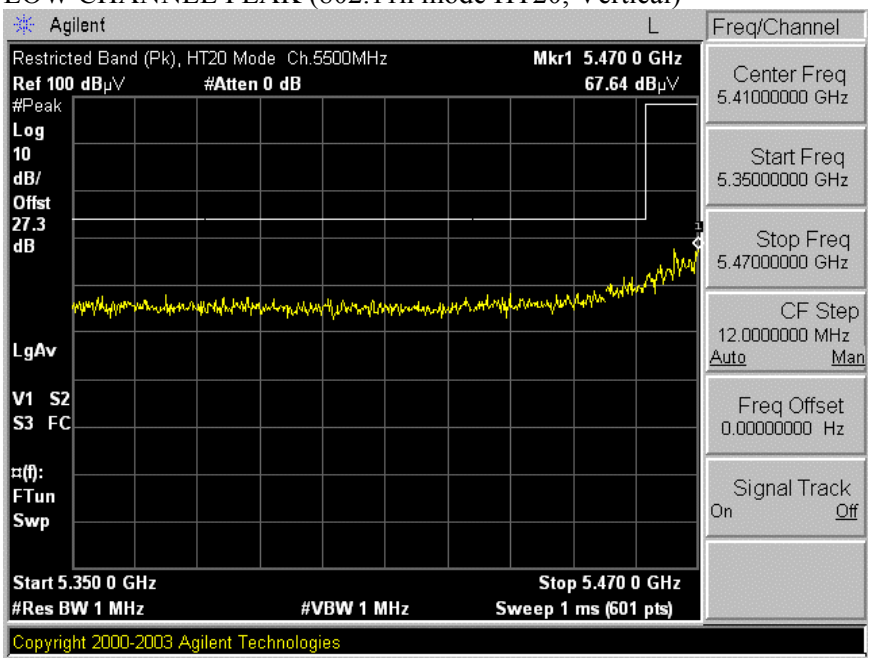
LOW CHANNEL PEAK (802.11n mode HT20, Vertical)



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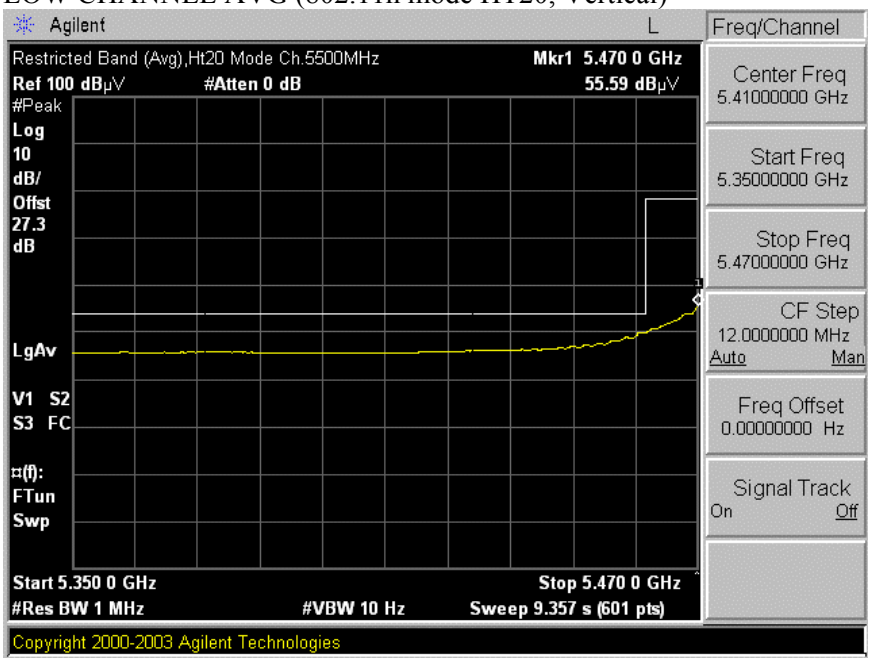
LOW CHANNEL AVG (802.11n mode HT20, Vertical)



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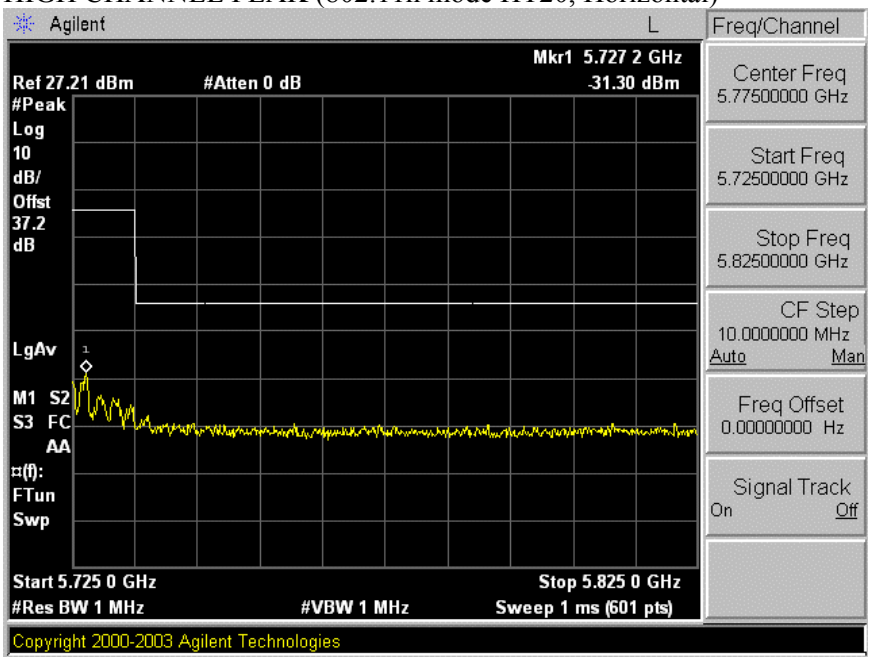
RESTRICTED BANDEDGE (802.11n MODE HT20, HIGH CHANNEL)

HIGH CHANNEL PEAK (802.11n mode HT20, Horizontal)



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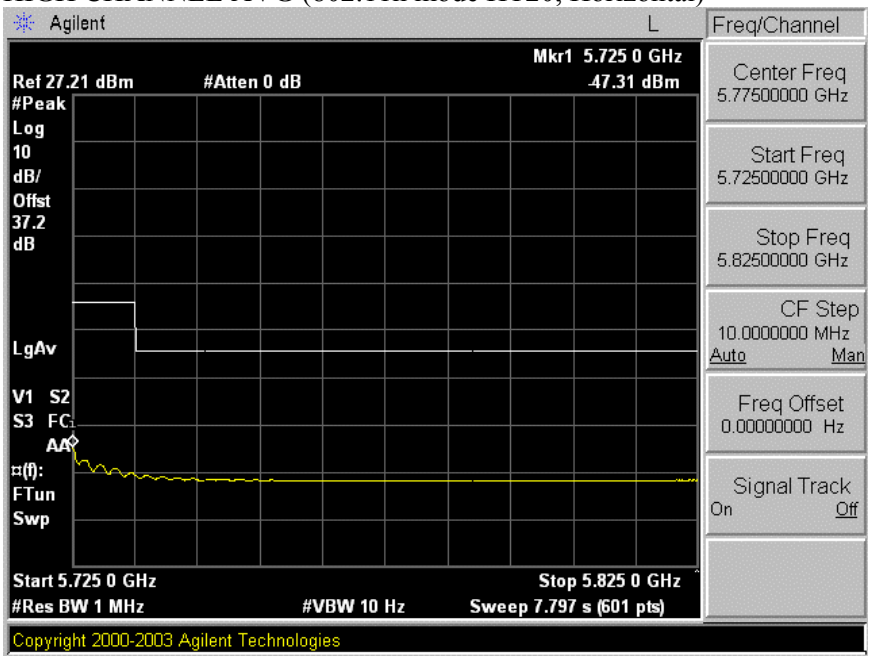
HIGH CHANNEL AVG (802.11n mode HT20, Horizontal)



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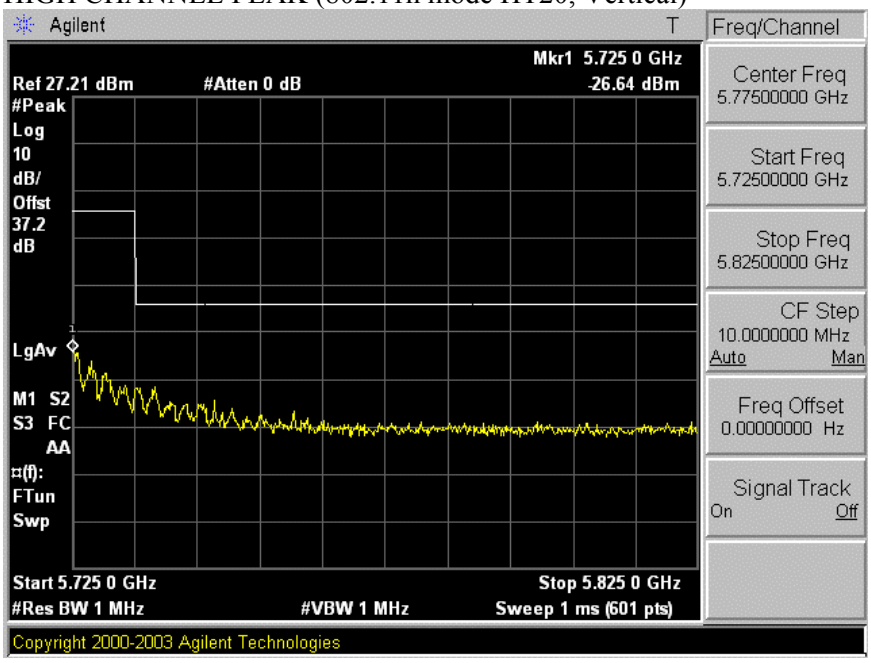
HIGH CHANNEL PEAK (802.11n mode HT20, Vertical)



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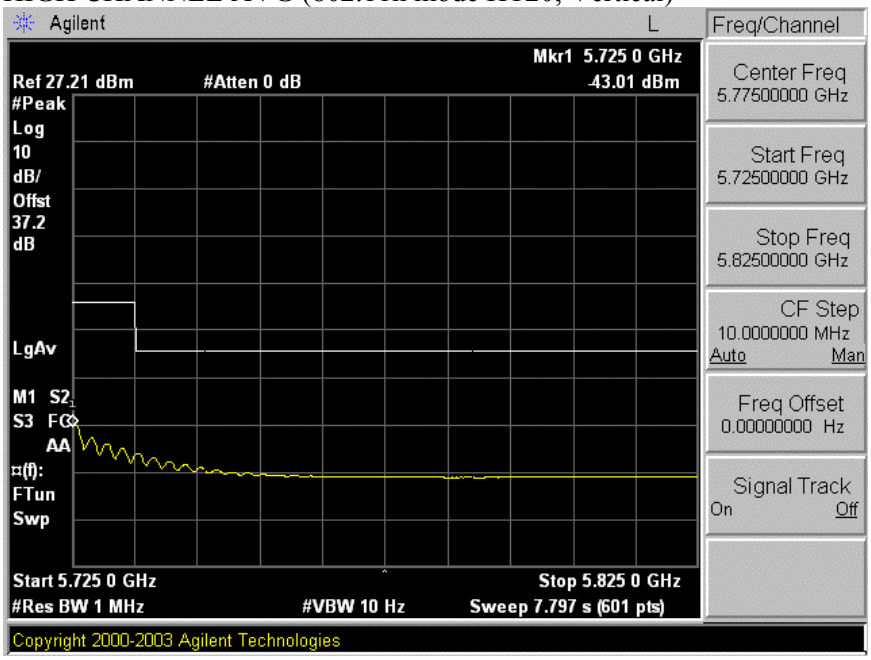
HIGH CHANNEL AVG (802.11n mode HT20, Vertical)



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HARMONICS AND SPURIOUS EMISSIONS (802.11n MODE HT20)

High Frequency Measurement
Compliance Certification Services, Morgan Hill Open Field Site

Company: MARVELL Semiconductor, Inc.
Project #: 06U10699-1
Date:11-06-2006
Test Engineer: Thanh Nguyen
Configuration: EUT, Laptop and Extender Card with Mega Chip Antenna
Mode: Transmit 5.5GHz Band HT20 mode

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T120; S/N: 29310 @3m	T145 Agilent 3008A005(			FCC 15.209

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
Thanh 177079008		Thanh 208946003	HPF_7.6GHz	

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Ch 5500MHz															
11.000	3.0	53.3	41.6	37.5	4.1	-33.8	0.0	0.7	61.8	50.1	74	54	-12.2	-3.9	V
16.500	3.0	43.2	30.9	39.7	5.0	-32.1	0.0	0.7	56.5	44.1	74	54	-17.5	-9.9	V
22.000	3.0	43.1	31.0	32.3	6.0	-32.3	0.0	0.0	49.1	37.0	74	54	-24.9	-17.0	Noise floor
11.000	3.0	52.5	39.6	37.5	4.1	-33.8	0.0	0.7	61.0	48.2	74	54	-13.0	-5.8	H
16.500	3.0	42.1	30.7	39.7	5.0	-32.1	0.0	0.7	55.3	43.9	74	54	-18.7	-10.1	H
22.000	3.0	43.3	30.7	32.3	6.0	-32.3	0.0	0.0	49.3	36.7	74	54	-24.7	-17.3	Noise floor
CH 5600MHz															
11.200	3.0	54.7	42.6	37.6	4.1	-33.5	0.0	0.7	63.6	51.5	74	54	-10.4	-2.5	V
16.800	3.0	42.2	32.2	39.9	5.1	-32.0	0.0	0.7	55.8	45.8	74	54	-18.2	-8.2	V
22.400	3.0	44.4	31.2	32.5	6.1	-32.3	0.0	0.0	50.6	37.4	74	54	-23.4	-16.6	Noise floor
11.200	3.0	54.2	41.5	37.6	4.1	-33.5	0.0	0.7	63.1	50.4	74	54	-10.9	-3.6	H
16.800	3.0	42.3	30.1	39.9	5.1	-32.0	0.0	0.7	55.8	43.7	74	54	-18.2	-10.3	H
22.400	3.0	43.3	30.8	32.5	6.1	-32.3	0.0	0.0	49.5	37.0	74	54	-24.5	-17.0	Noise floor
CH 5700MHz															
11.400	3.0	53.6	41.8	37.6	4.2	-33.2	0.0	0.7	62.8	51.0	74	54	-11.2	-3.0	V
17.100	3.0	43.0	31.4	40.1	5.2	-32.0	0.0	0.7	56.9	45.3	74	54	-17.1	-8.7	V
22.800	3.0	43.0	31.3	32.7	6.2	-32.4	0.0	0.0	49.5	37.8	74	54	-24.5	-16.2	Noise floor
11.400	3.0	50.3	39.2	37.6	4.2	-33.2	0.0	0.7	59.6	48.4	74	54	-14.4	-5.6	H
17.100	3.0	42.1	31.7	40.1	5.2	-32.0	0.0	0.7	56.0	45.6	74	54	-18.0	-8.4	H
22.800	3.0	43.3	31.3	32.7	6.2	-32.4	0.0	0.0	49.8	37.8	74	54	-24.2	-16.2	Noise floor
No other spurious emissions were detected above system noise floor.															

Rev. 5.1.6

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

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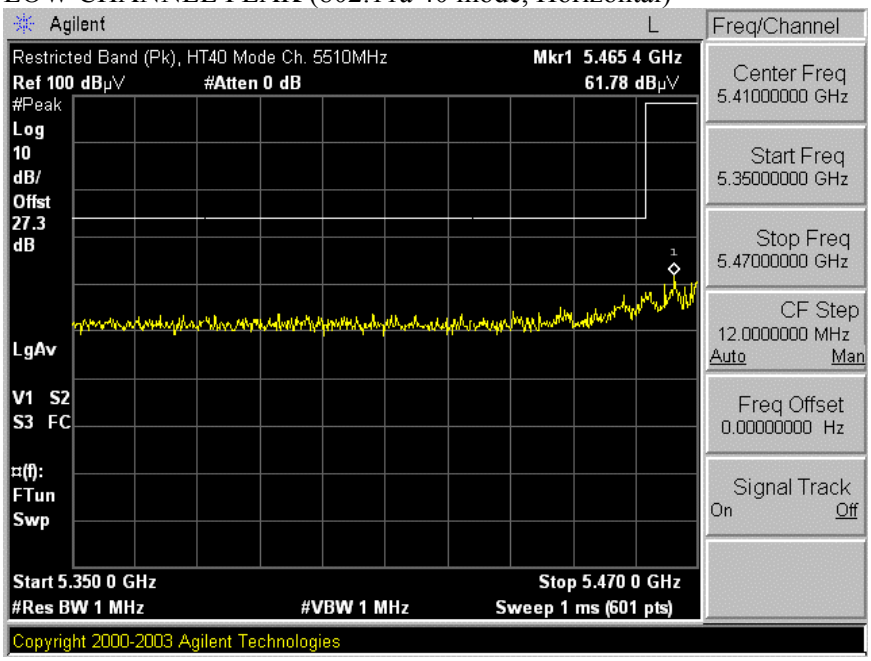
RESTRICTED BANDEDGE (802.11a 40 MODE, LOW CHANNEL)

LOW CHANNEL PEAK (802.11a 40 mode, Horizontal)



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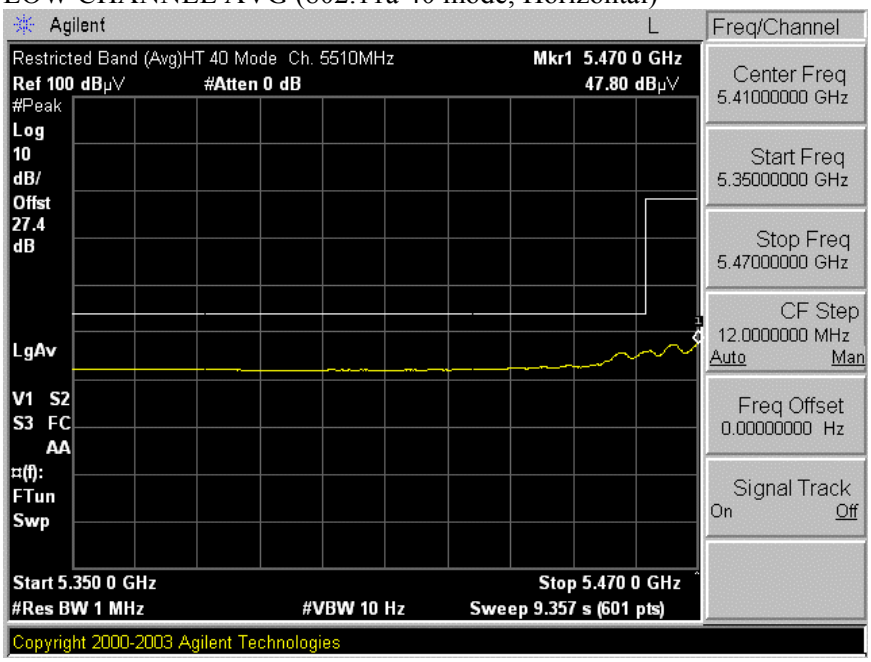
LOW CHANNEL AVG (802.11a 40 mode, Horizontal)



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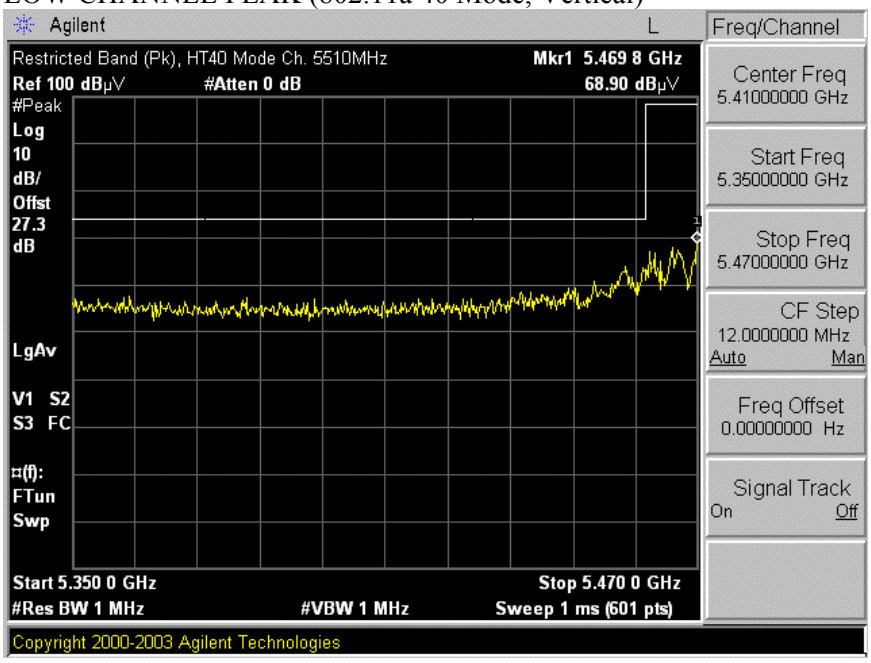
LOW CHANNEL PEAK (802.11a 40 Mode, Vertical)



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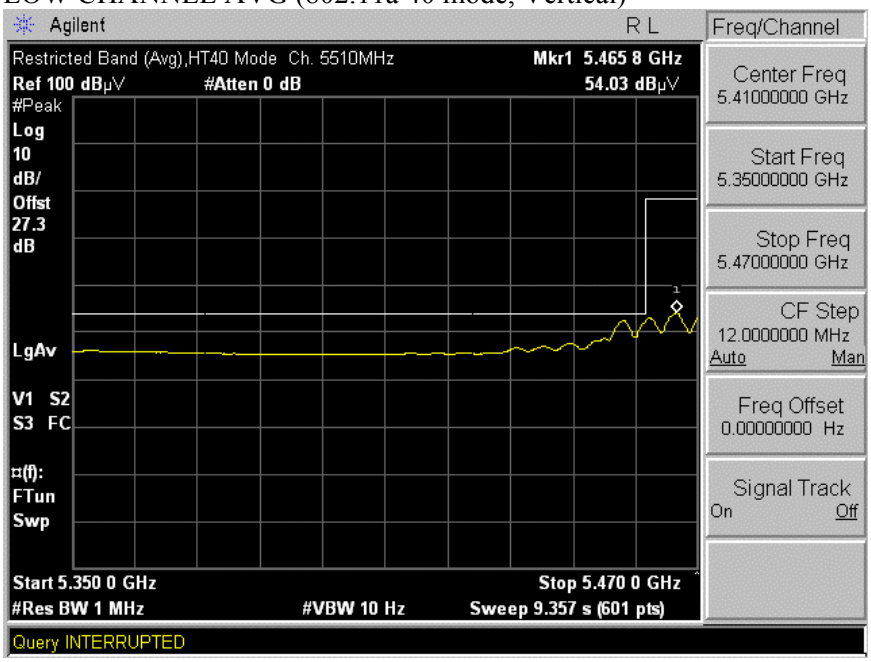
LOW CHANNEL AVG (802.11a 40 mode, Vertical)



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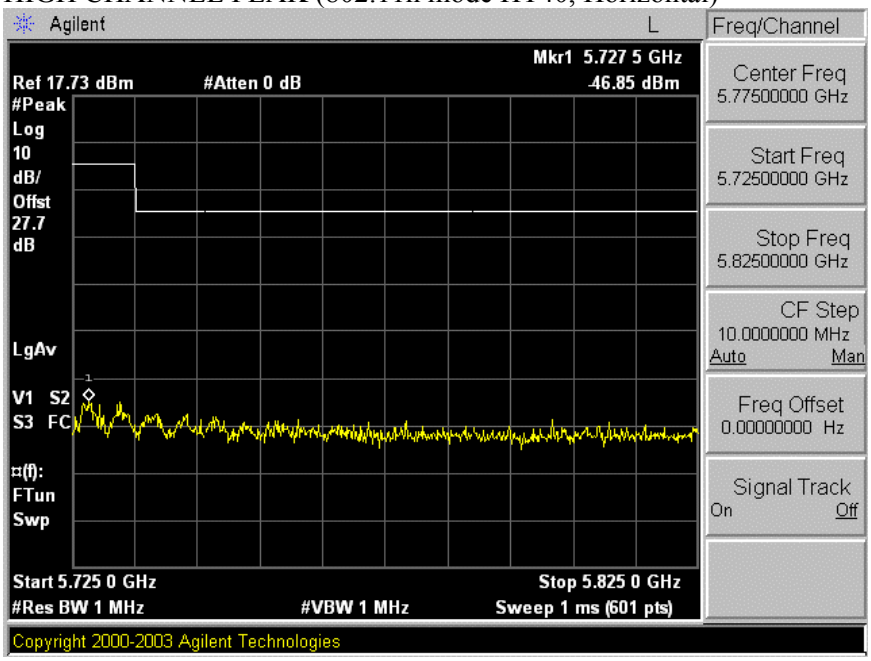
RESTRICTED BANDEDGE (802.11a 40MHZ MODE , HIGH CHANNEL)

HIGH CHANNEL PEAK (802.11n mode HT40, Horizontal)



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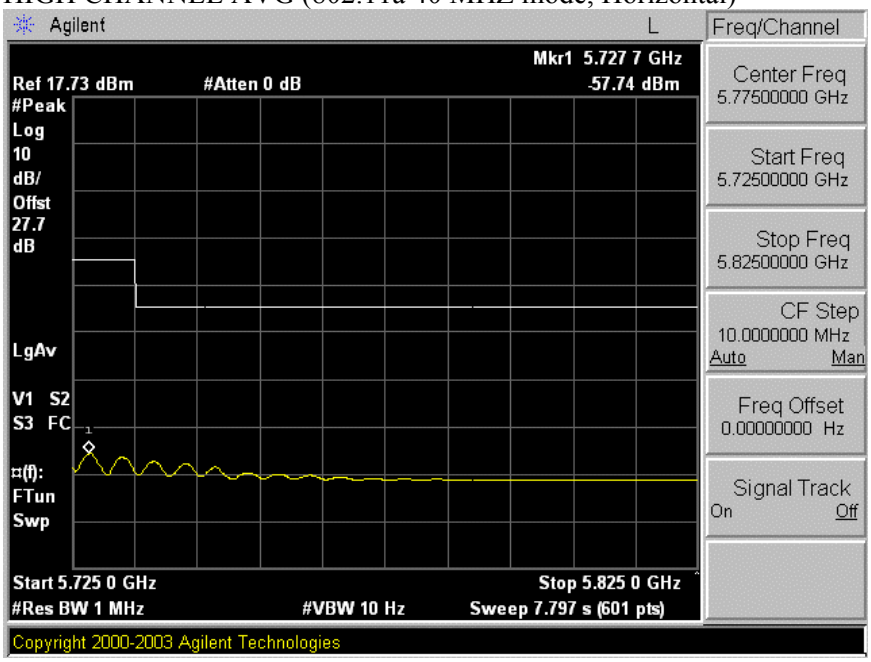
HIGH CHANNEL AVG (802.11a 40 MHZ mode, Horizontal)



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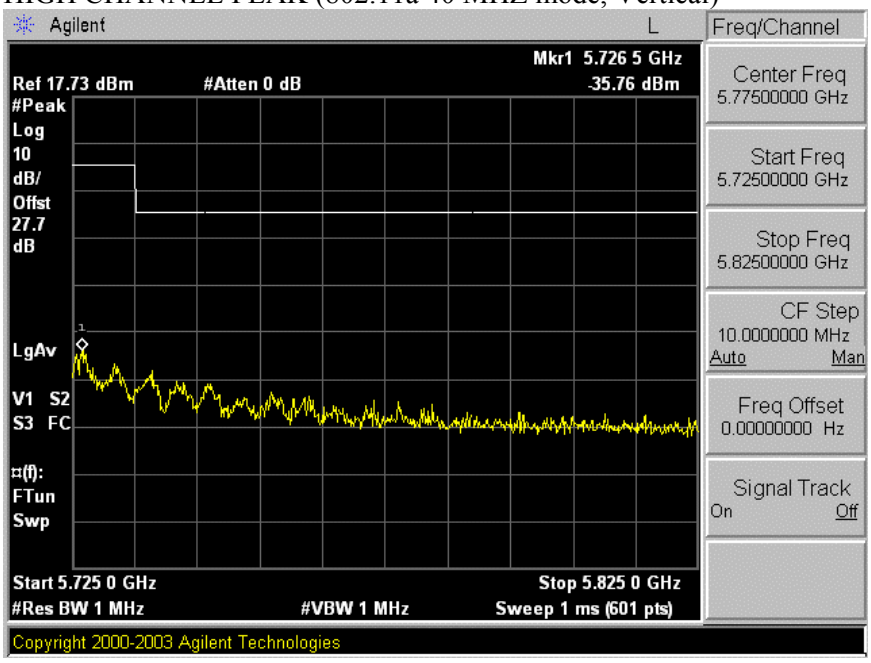
HIGH CHANNEL PEAK (802.11a 40 MHZ mode, Vertical)



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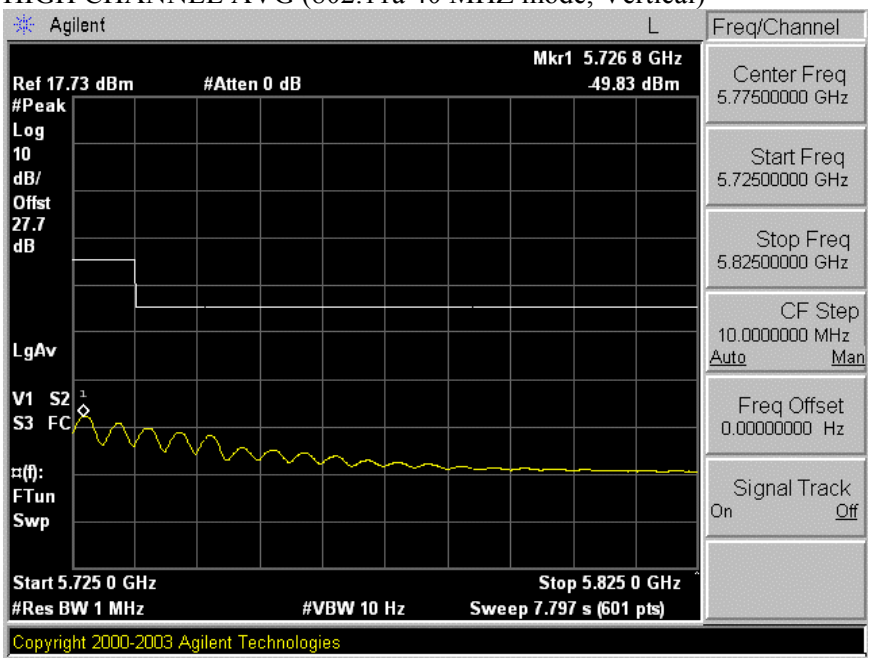
HIGH CHANNEL AVG (802.11a 40 MHZ mode, Vertical)



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HARMONICS AND SPURIOUS EMISSIONS (802.11a 40 MHZ MODE)

High Frequency Measurement
Compliance Certification Services, Morgan Hill Open Field Site

Company: MARVELL Semiconductor, Inc.
Project #: 06U10699-1
Date: 11-06-2006
Test Engineer: Thanh Nguyen
Configuration: EUT, Laptop and Extender Card with Mega Chip Antenna
Mode: Transmit 5.5GHz Band 11a40 mode

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T120; S/N: 29310 @3m	T145 Agilent 3008A005(			FCC 15.209

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
Thanh 177079008		Thanh 208946003	HPF_7.6GHz	

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Ch 5510MHz															
11.020	3.0	53.9	41.2	37.5	4.1	-33.7	0.0	0.7	62.5	49.8	74	54	-11.5	-4.2	V
16.500	3.0	42.8	30.7	39.7	5.0	-32.1	0.0	0.7	56.1	43.9	74	54	-17.9	-10.1	V
22.000	3.0	42.7	30.8	32.3	6.0	-32.3	0.0	0.0	48.7	36.9	74	54	-25.3	-17.1	Noise floor
11.020	3.0	52.5	39.7	37.5	4.1	-33.7	0.0	0.7	61.0	48.3	74	54	-13.0	-5.7	H
16.500	3.0	42.3	30.6	39.7	5.0	-32.1	0.0	0.7	55.5	43.9	74	54	-18.5	-10.1	H
22.000	3.0	42.9	30.6	32.3	6.0	-32.3	0.0	0.0	48.9	36.6	74	54	-25.1	-17.4	Noise floor
CH 5590MHz															
11.180	3.0	53.6	42.7	37.6	4.1	-33.5	0.0	0.7	62.4	51.5	74	54	-11.6	-2.5	V
16.800	3.0	42.7	31.1	39.9	5.1	-32.0	0.0	0.7	56.2	44.7	74	54	-17.8	-9.3	V
22.400	3.0	42.7	31.2	32.5	6.1	-32.3	0.0	0.0	48.9	37.4	74	54	-25.1	-16.6	Noise floor
11.180	3.0	53.1	39.5	37.6	4.1	-33.5	0.0	0.7	61.9	48.4	74	54	-12.1	-5.6	H
16.800	3.0	42.5	30.5	39.9	5.1	-32.0	0.0	0.7	56.0	44.1	74	54	-18.0	-9.9	H
22.400	3.0	42.8	30.8	32.5	6.1	-32.3	0.0	0.0	49.1	37.0	74	54	-24.9	-17.0	Noise floor
CH 5670MHz															
11.340	3.0	54.7	42.3	37.6	4.2	-33.3	0.0	0.7	63.8	51.5	74	54	-10.2	-2.5	V
17.010	3.0	43.7	31.9	40.0	5.1	-32.0	0.0	0.7	57.5	45.7	74	54	-16.5	-8.3	V
22.680	3.0	43.2	31.3	32.7	6.1	-32.3	0.0	0.0	49.6	37.7	74	54	-24.4	-16.3	Noise floor
11.340	3.0	52.5	40.3	37.6	4.2	-33.3	0.0	0.7	61.7	49.5	74	54	-12.3	-4.5	H
17.010	3.0	42.1	30.3	40.0	5.1	-32.0	0.0	0.7	55.9	44.1	74	54	-18.1	-9.9	H
22.680	3.0	43.4	31.2	32.7	6.1	-32.3	0.0	0.0	49.9	37.7	74	54	-24.1	-16.3	Noise floor
No other spurious emissions were detected above system noise floor.															

Rev. 5.1.6

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

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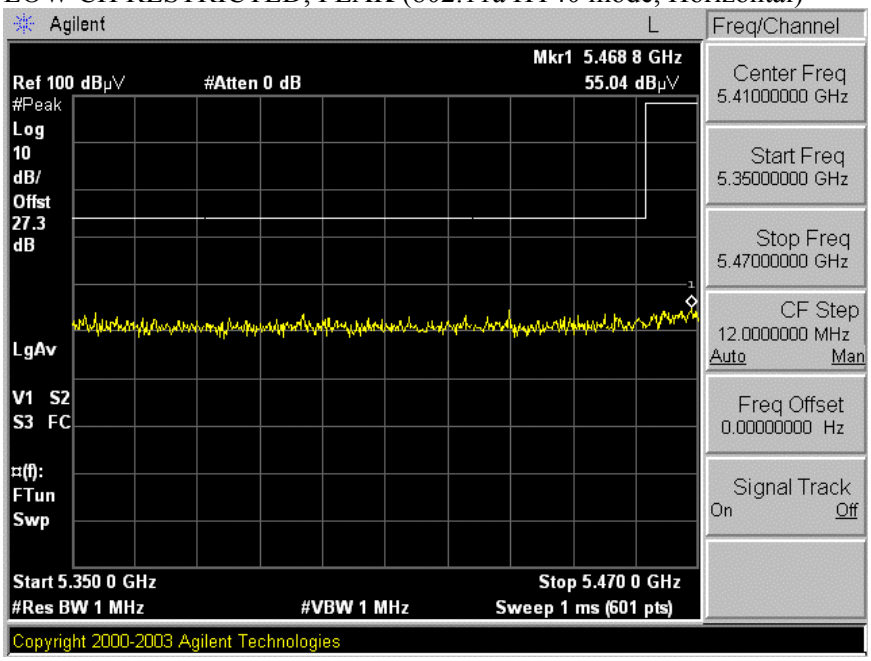
RESTRICTED BANDEDGE (802.11a HT40 MODE, LOW CHANNEL, HORIZONTAL)

LOW CH RESTRICTED, PEAK (802.11a HT40 mode, Horizontal)



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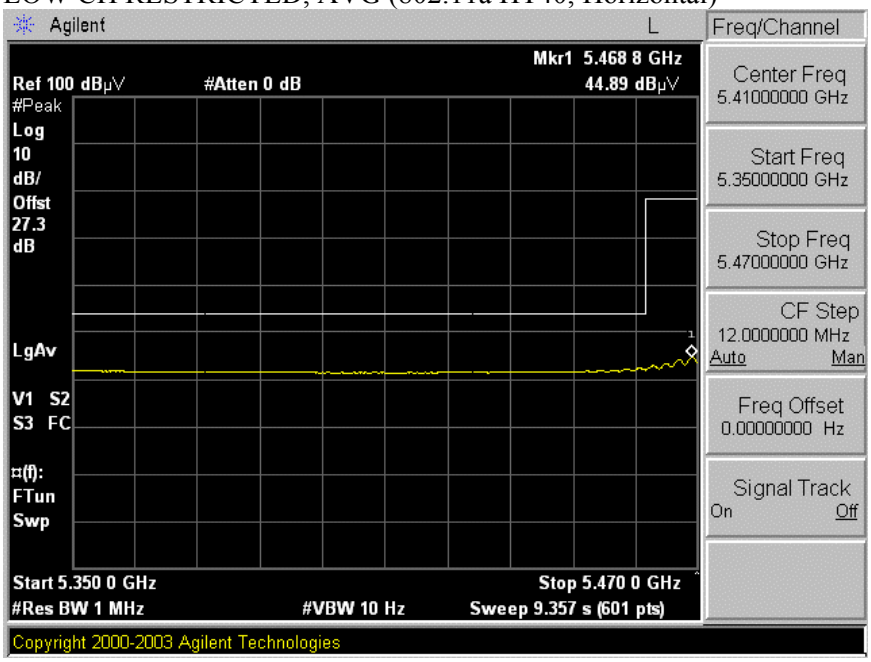
LOW CH RESTRICTED, AVG (802.11a HT40, Horizontal)



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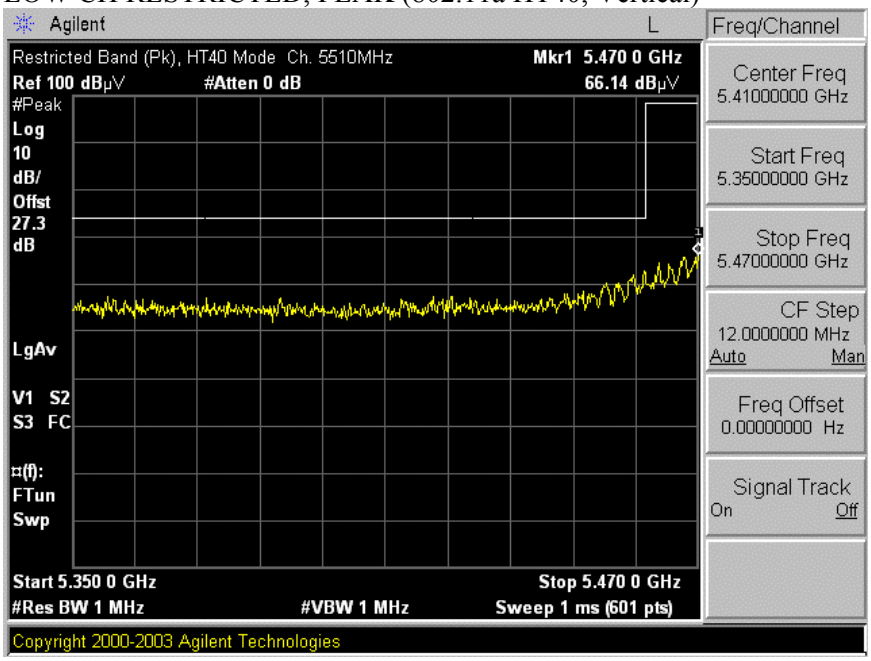
RESTRICTED BANDEDGE (802.11a HT40 MODE, LOW CHANNEL, VERTICAL)

LOW CH RESTRICTED, PEAK (802.11a HT40, Vertical)



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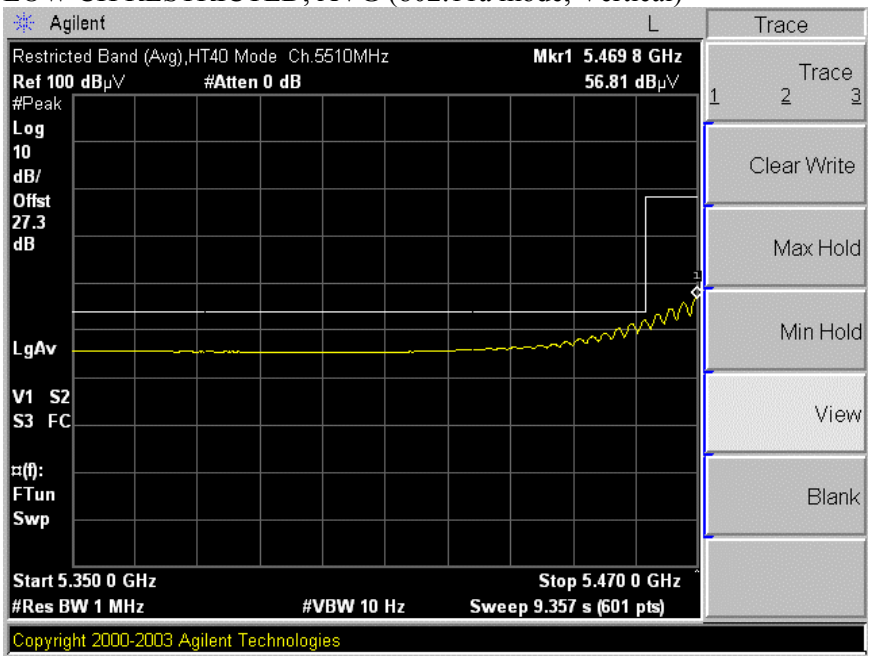
LOW CH RESTRICTED, AVG (802.11a mode, Vertical)



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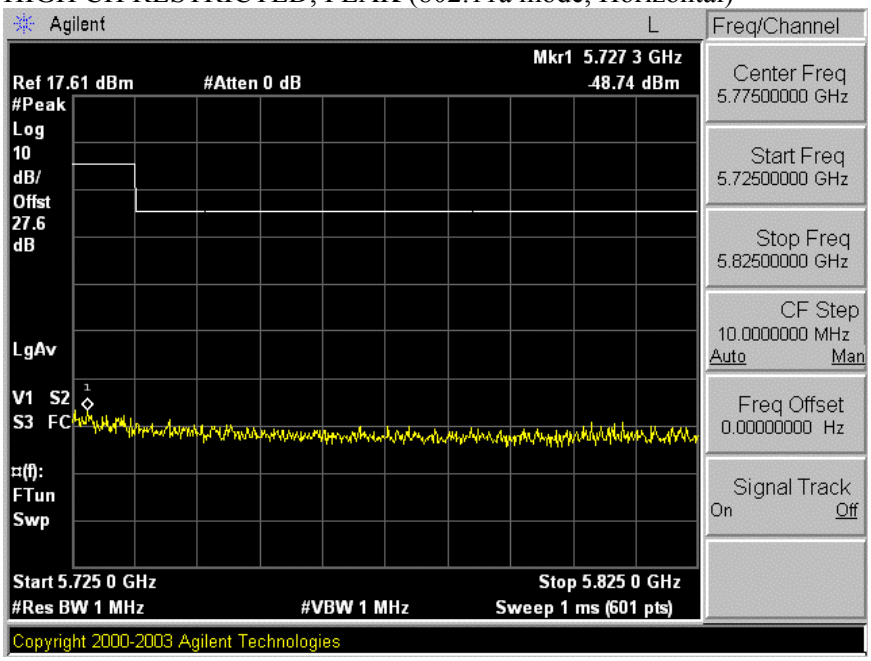
RESTRICTED BANDEDGE (802.11a MODE, HIGH CHANNEL, HORIZONTAL)

HIGH CH RESTRICTED, PEAK (802.11a mode, Horizontal)



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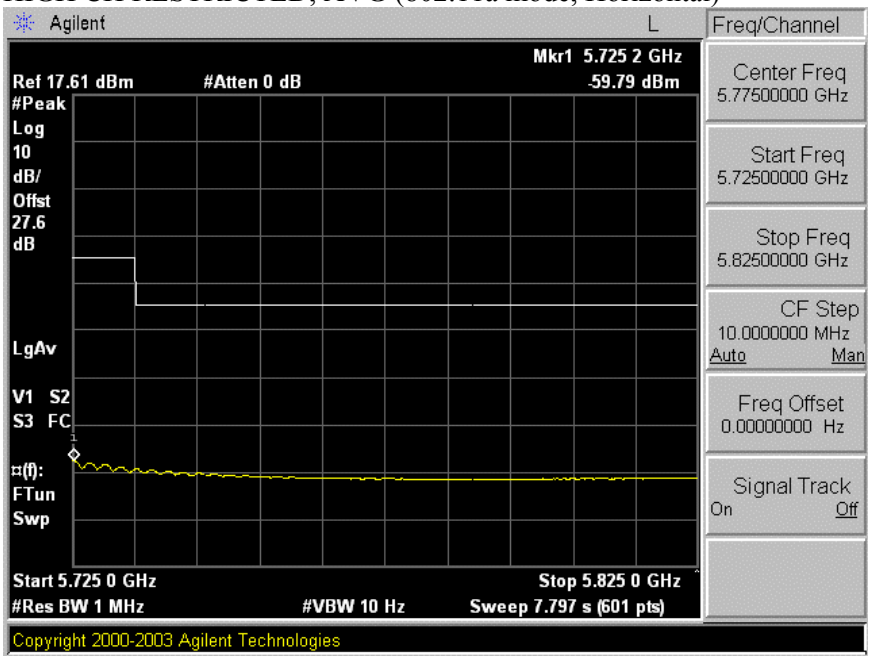
HIGH CH RESTRICTED, AVG (802.11a mode, Horizontal)



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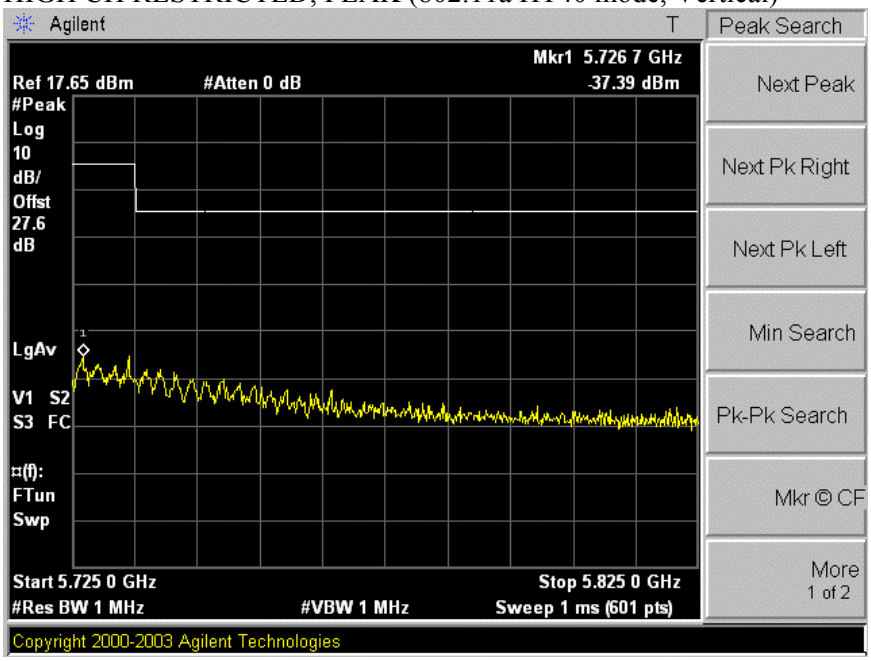
RESTRICTED BANDEDGE (802.11a HT40 MODE, HIGH CHANNEL, VERTICAL)

HIGH CH RESTRICTED, PEAK (802.11a HT40 mode, Vertical)



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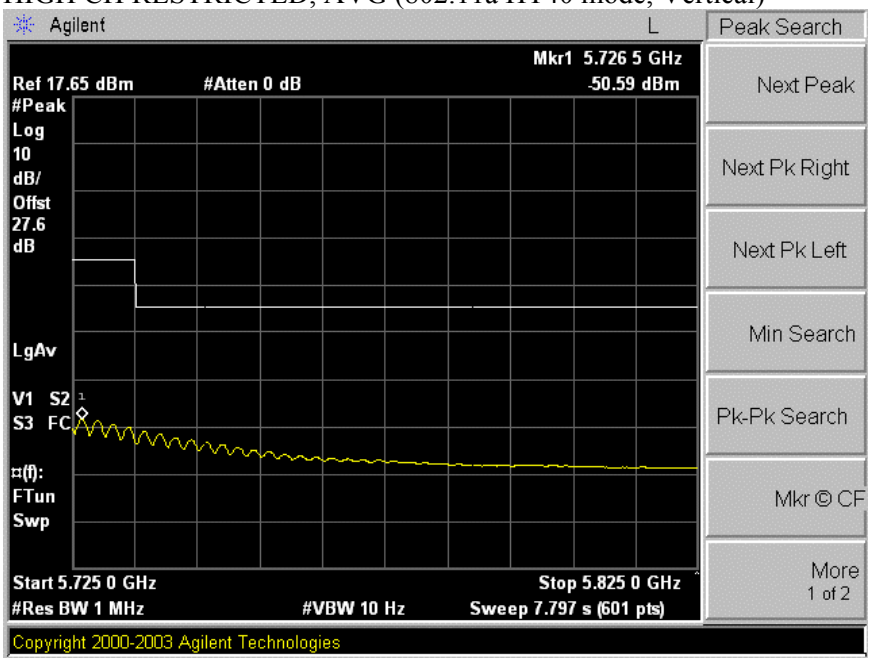
HIGH CH RESTRICTED, AVG (802.11a HT40 mode, Vertical)



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HARMONICS AND SPURIOUS EMISSIONS (802.11a HT40 MODE)

High Frequency Measurement
Compliance Certification Services, Morgan Hill Open Field Site

Company: MARVELL Semiconductor, Inc.
Project #: 06U10699-1
Date:11-06-2006
Test Engineer: Thanh Nguyen
Configuration: EUT, Laptop and Extender Card with Mega Chip Antenna
Mode: Transmit 5.5GHz Band HT40 mode

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T120; S/N: 29310 @3m	T145 Agilent 3008A005(			FCC 15.209

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
Thanh 177079008		Thanh 208946003	HPF_7.6GHz	

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Ch 5510MHz															
11.020	3.0	53.7	42.2	37.5	4.1	-33.7	0.0	0.7	62.3	50.8	74	54	-11.7	-3.2	V
16.500	3.0	42.6	31.3	39.7	5.0	-32.1	0.0	0.7	55.8	44.5	74	54	-18.2	-9.5	V
22.000	3.0	42.9	31.3	32.3	6.0	-32.3	0.0	0.0	48.9	37.4	74	54	-25.1	-16.6	Noise floor
11.020	3.0	52.8	41.2	37.5	4.1	-33.7	0.0	0.7	61.4	49.8	74	54	-12.6	-4.2	H
16.500	3.0	42.3	31.2	39.7	5.0	-32.1	0.0	0.7	55.5	44.5	74	54	-18.5	-9.5	H
22.000	3.0	42.6	30.5	32.3	6.0	-32.3	0.0	0.0	48.6	36.5	74	54	-25.4	-17.5	Noise floor
CH 5590MHz															
11.180	3.0	50.7	39.3	37.6	4.1	-33.5	0.0	0.7	59.5	48.2	74	54	-14.5	-5.8	V
16.800	3.0	42.6	31.3	39.9	5.1	-32.0	0.0	0.7	56.1	44.8	74	54	-17.9	-9.2	V
22.400	3.0	42.5	30.9	32.5	6.1	-32.3	0.0	0.0	48.7	37.1	74	54	-25.3	-16.9	Noise floor
11.180	3.0	50.9	38.8	37.6	4.1	-33.5	0.0	0.7	59.7	47.7	74	54	-14.3	-6.3	V
16.800	3.0	42.4	30.4	39.9	5.1	-32.0	0.0	0.7	56.0	44.0	74	54	-18.0	-10.0	V
22.400	3.0	42.0	31.2	32.5	6.1	-32.3	0.0	0.0	48.2	37.4	74	54	-25.8	-16.6	Noise floor
CH 5670MHz															
11.340	3.0	52.0	41.0	37.6	4.2	-33.3	0.0	0.7	61.2	50.1	74	54	-12.8	-3.9	V
17.010	3.0	43.6	31.8	40.0	5.1	-32.0	0.0	0.7	57.4	45.6	74	54	-16.6	-8.4	V
22.680	3.0	42.9	31.4	32.7	6.1	-32.3	0.0	0.0	49.4	37.9	74	54	-24.6	-16.1	Noise floor
11.340	3.0	47.1	37.0	37.6	4.2	-33.3	0.0	0.7	56.2	46.2	74	54	-17.8	-7.8	H
17.010	3.0	42.4	30.2	40.0	5.1	-32.0	0.0	0.7	56.2	44.1	74	54	-17.8	-9.9	H
22.680	3.0	42.8	31.0	32.7	6.1	-32.3	0.0	0.0	49.3	37.5	74	54	-24.7	-16.5	Noise floor
No other spurious emissions were detected above system noise floor.															

Rev. 5.1.6

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

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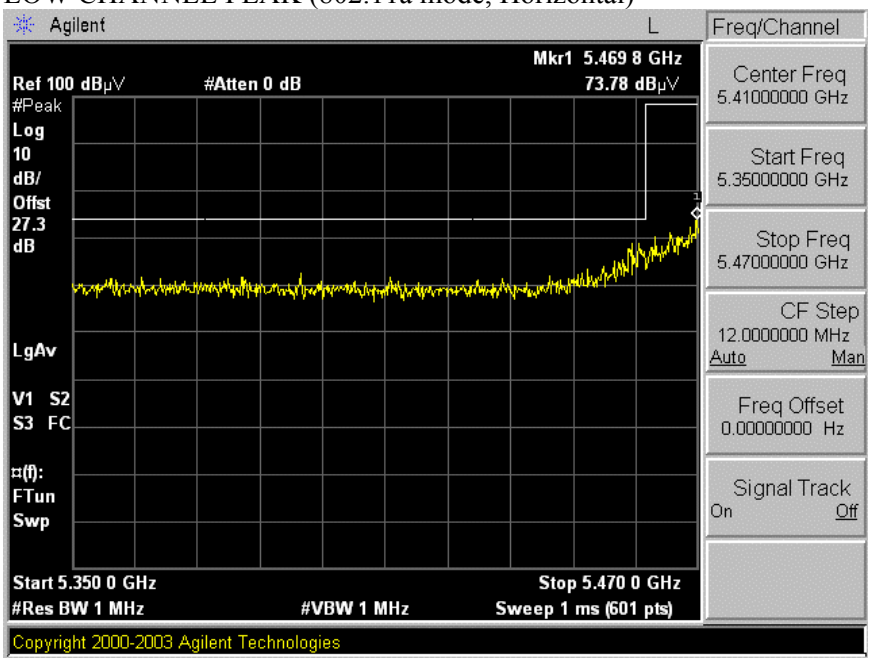
7.2.4. TRANSMITTER ABOVE 1 GHz FOR 5470 TO 5725 MHz BAND

FOXCONN Antenna

RESTRICTED BANDEDGE (802.11a 20MHz MODE, LOW CHANNEL)

LOW CHANNEL PEAK (802.11a mode, Horizontal)



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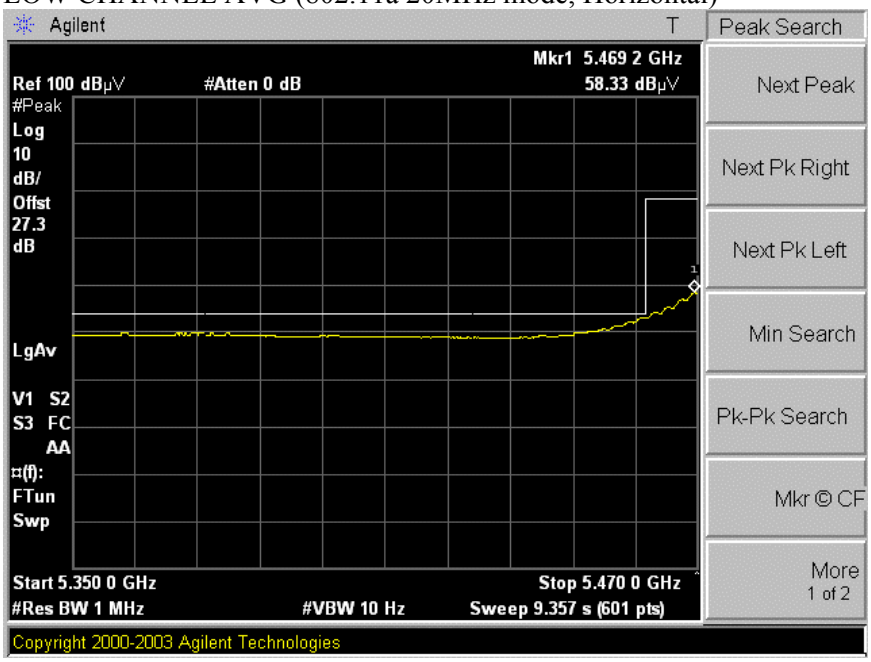
LOW CHANNEL AVG (802.11a 20MHz mode, Horizontal)



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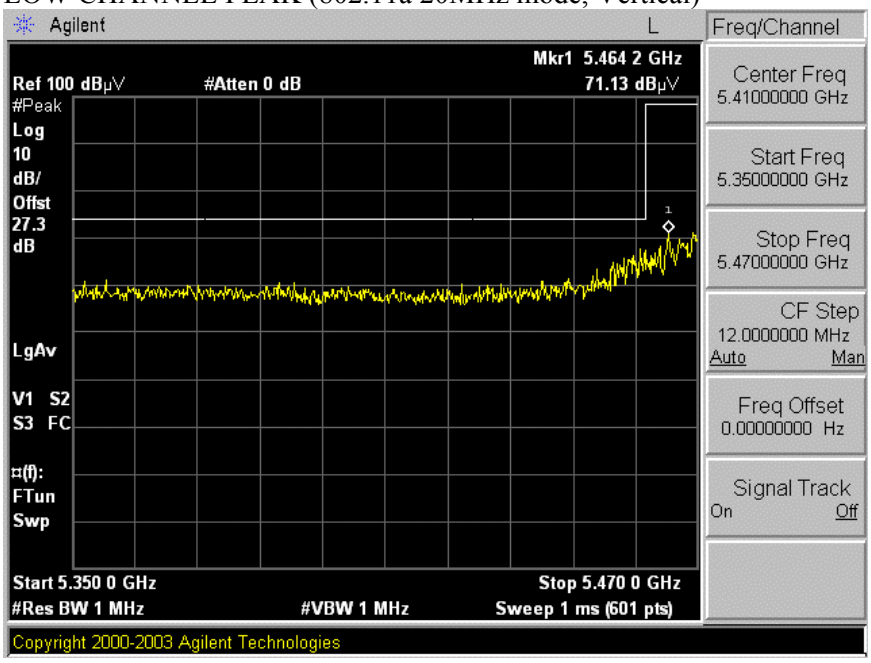
LOW CHANNEL PEAK (802.11a 20MHz mode, Vertical)



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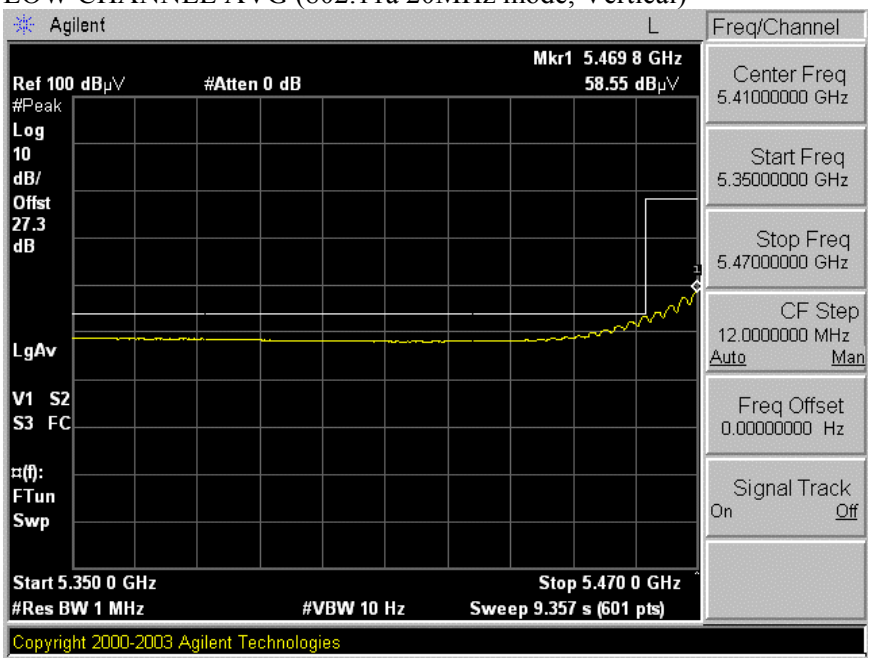
LOW CHANNEL AVG (802.11a 20MHz mode, Vertical)



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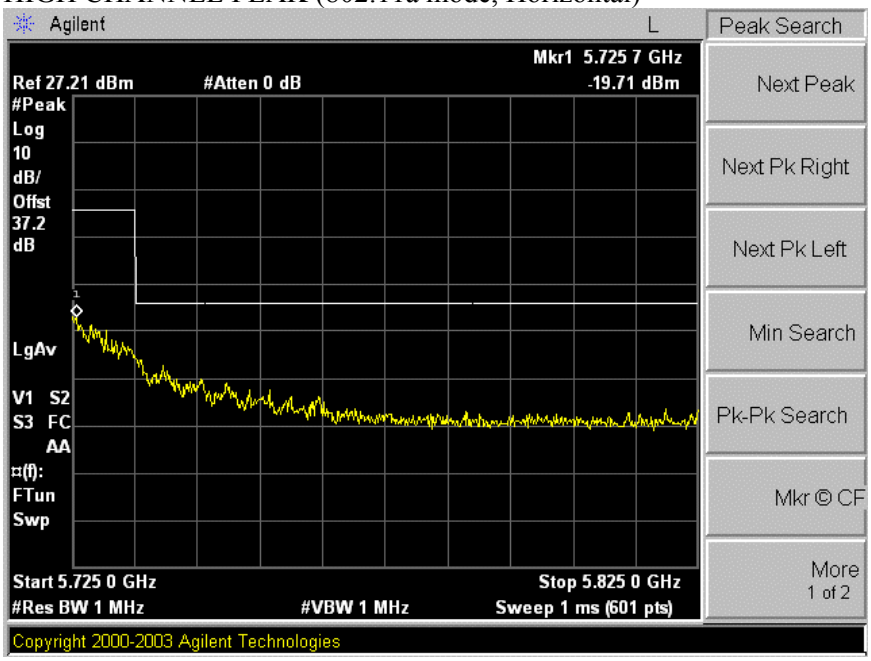
RESTRICTED BANDEDGE (802.11a 20MHz MODE, HIGH CHANNEL)

HIGH CHANNEL PEAK (802.11a mode, Horizontal)



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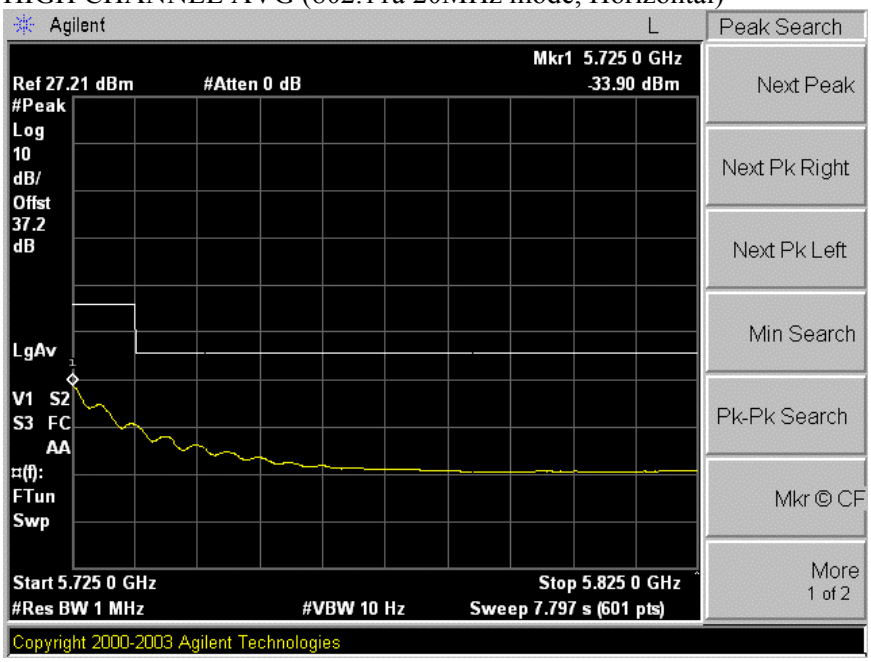
HIGH CHANNEL AVG (802.11a 20MHz mode, Horizontal)



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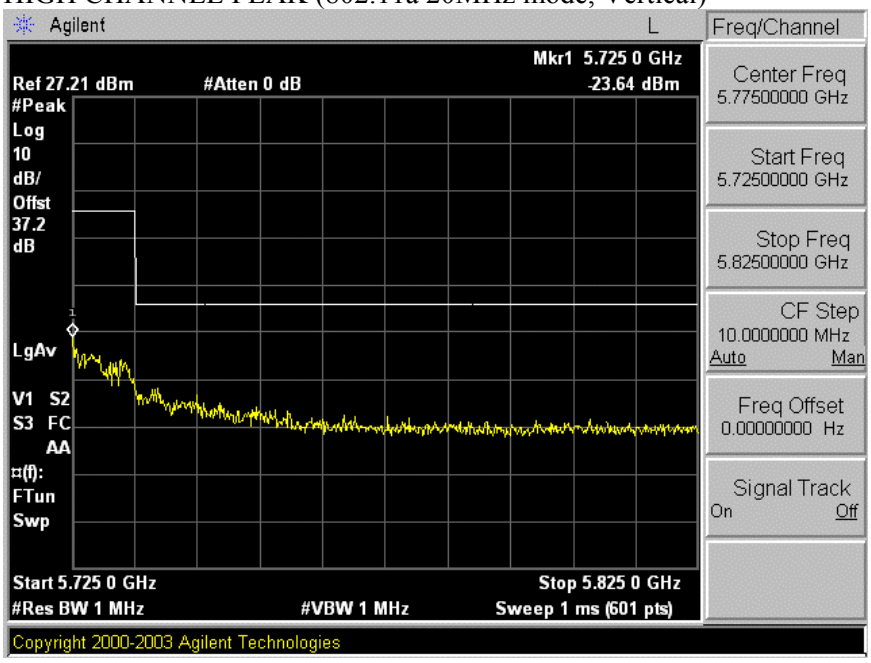
HIGH CHANNEL PEAK (802.11a 20MHz mode, Vertical)



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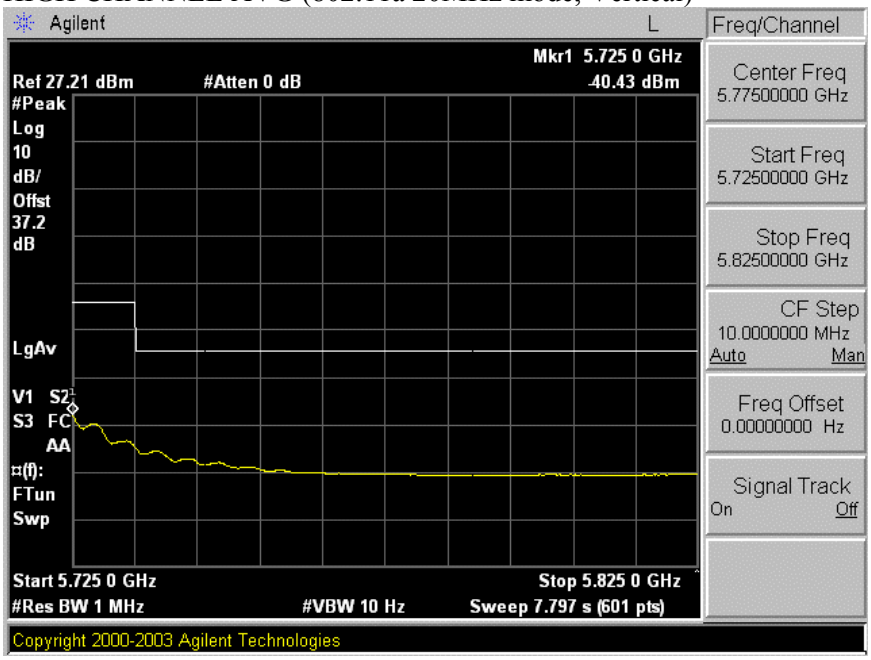
HIGH CHANNEL AVG (802.11a 20MHz mode, Vertical)



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HARMONICS AND SPURIOUS EMISSIONS (802.11a MODE)

High Frequency Measurement
Compliance Certification Services, Morgan Hill Open Field Site

Company: MARVELL Semiconductor, Inc.
Project #: 06U10699-1
Date:11-06-2006
Test Engineer: Thanh Nguyen
Configuration: EUT, Laptop and Extender Card with PCB Dipole (FOXCONN)Antenna
Mode: Transmit 5.5GHz Band 11a mode

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T120; S/N: 29310 @3m	T145 Agilent 3008A005(			FCC 15.209

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
Thanh 177079008		Thanh 208946003	HPF_7.6GHz	

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Ch 5500MHz															
11.000	3.0	50.4	39.6	37.5	4.1	-33.8	0.0	0.7	58.9	48.1	74	54	-15.1	-5.9	V
16.500	3.0	42.6	31.4	39.7	5.0	-32.1	0.0	0.7	55.8	44.7	74	54	-18.2	-9.3	V
22.000	3.0	42.6	30.8	32.3	6.0	-32.3	0.0	0.0	48.6	36.8	74	54	-25.4	-17.2	Noise floor
11.000	3.0	54.6	40.4	37.5	4.1	-33.8	0.0	0.7	63.2	48.9	74	54	-10.8	-5.1	H
16.500	3.0	43.8	32.1	39.7	5.0	-32.1	0.0	0.7	57.0	45.3	74	54	-17.0	-8.7	H
22.000	3.0	42.8	31.3	32.3	6.0	-32.3	0.0	0.0	48.8	37.3	74	54	-25.2	-16.7	Noise floor
CH 5600MHz															
11.200	3.0	51.3	42.1	37.6	4.1	-33.5	0.0	0.7	60.2	51.0	74	54	-13.8	-3.0	V
16.800	3.0	42.6	30.8	39.9	5.1	-32.0	0.0	0.7	56.2	44.4	74	54	-17.8	-9.6	V
22.400	3.0	43.1	31.0	32.5	6.1	-32.3	0.0	0.0	49.3	37.2	74	54	-24.7	-16.8	Noise floor
11.200	3.0	42.2	41.5	37.6	4.1	-33.5	0.0	0.7	51.1	50.4	74	54	-22.9	-3.6	H
16.800	3.0	42.1	30.6	39.9	5.1	-32.0	0.0	0.7	55.7	44.1	74	54	-18.3	-9.9	H
22.400	3.0	42.6	31.3	32.5	6.1	-32.3	0.0	0.0	48.8	37.5	74	54	-25.2	-16.5	Noise floor
CH 5700MHz															
11.400	3.0	52.0	41.0	37.6	4.2	-33.2	0.0	0.7	61.2	50.2	74	54	-12.8	-3.8	V
17.100	3.0	42.0	30.6	40.1	5.2	-32.0	0.0	0.7	55.9	44.5	74	54	-18.1	-9.5	V
22.800	3.0	43.1	31.0	32.7	6.2	-32.4	0.0	0.0	49.6	37.5	74	54	-24.4	-16.5	Noise floor
11.400	3.0	52.7	40.3	37.6	4.2	-33.2	0.0	0.7	61.9	49.5	74	54	-12.1	-4.5	H
17.100	3.0	42.4	31.8	40.1	5.2	-32.0	0.0	0.7	56.3	45.7	74	54	-17.7	-8.3	H
22.800	3.0	42.9	32.2	32.7	6.2	-32.4	0.0	0.0	49.4	38.7	74	54	-24.6	-15.3	Noise floor
No other spurious emissions were detected above system noise floor.															

Rev. 5.1.6

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

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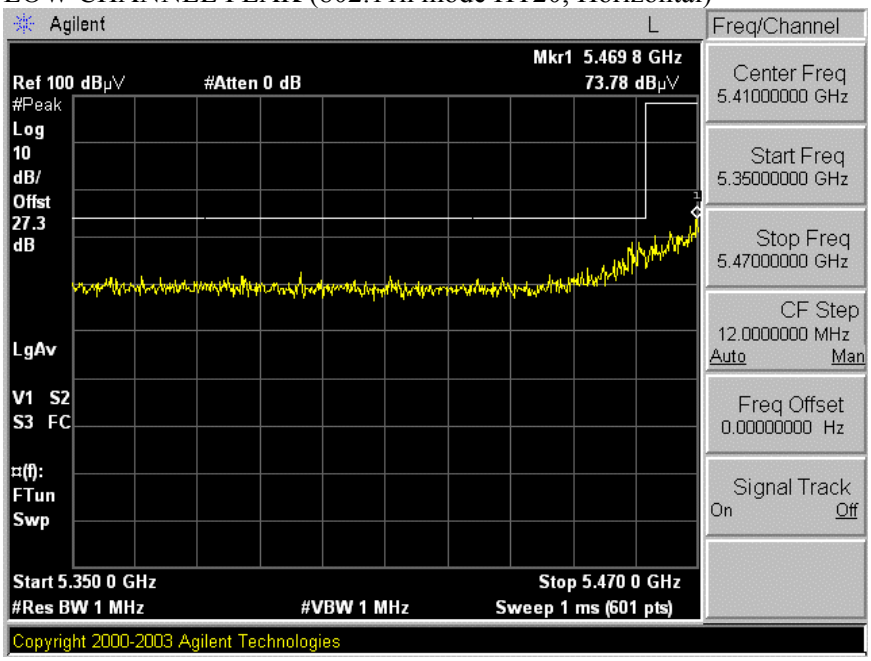
ESTRICTED BANDEDGE (802.11n MODE HT20, LOW CHANNEL)

LOW CHANNEL PEAK (802.11n mode HT20, Horizontal)



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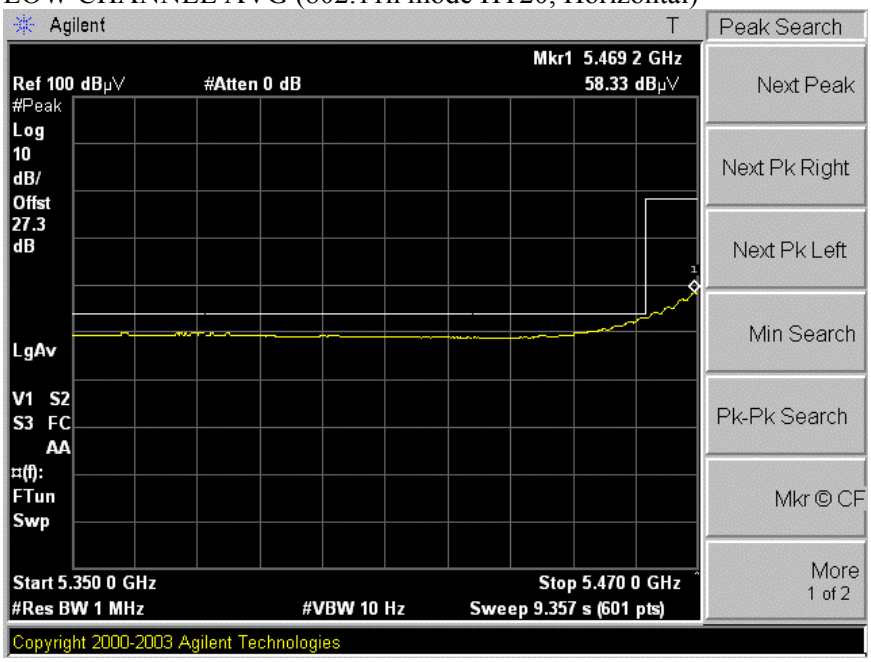
LOW CHANNEL AVG (802.11n mode HT20, Horizontal)



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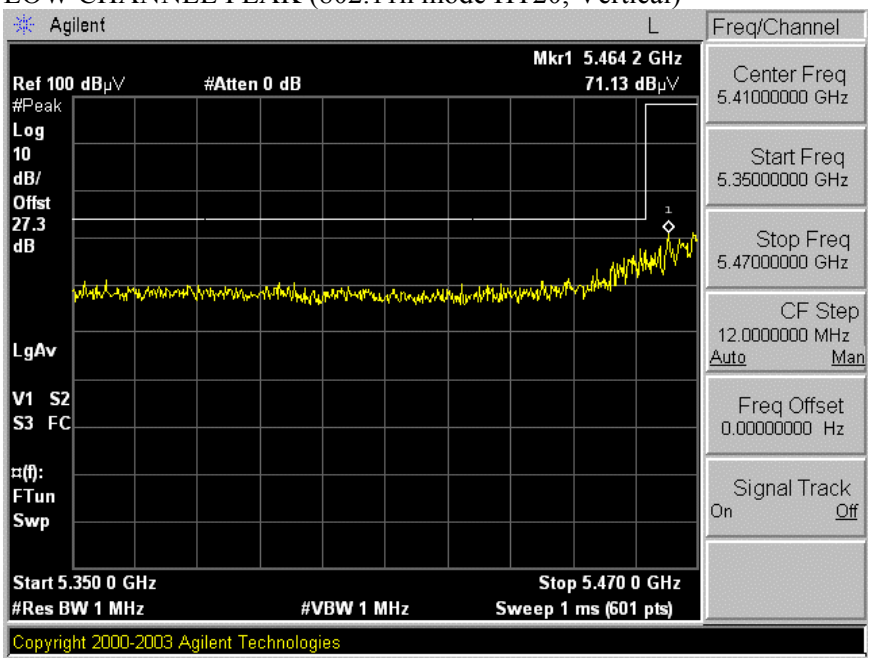
LOW CHANNEL PEAK (802.11n mode HT20, Vertical)



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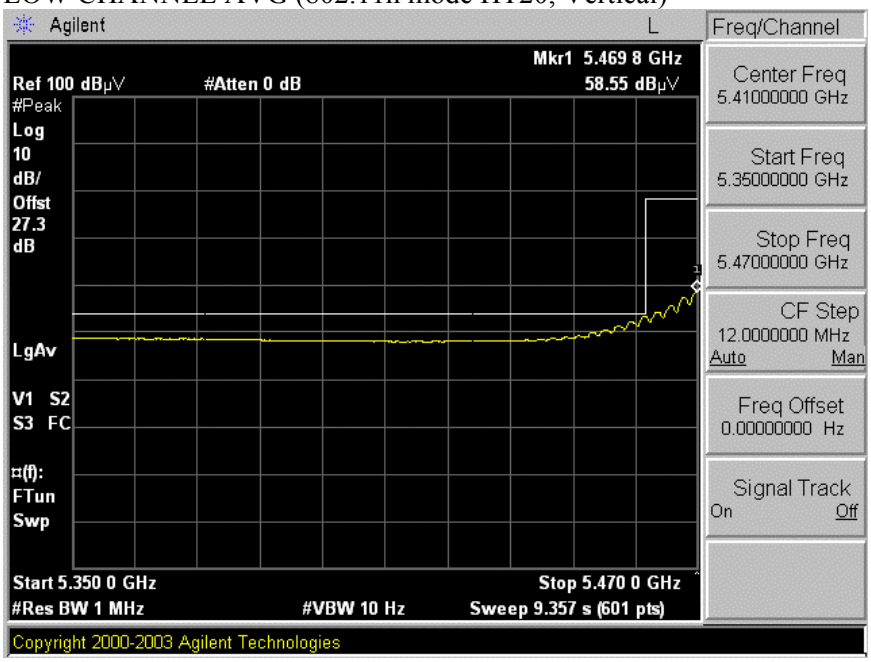
LOW CHANNEL AVG (802.11n mode HT20, Vertical)



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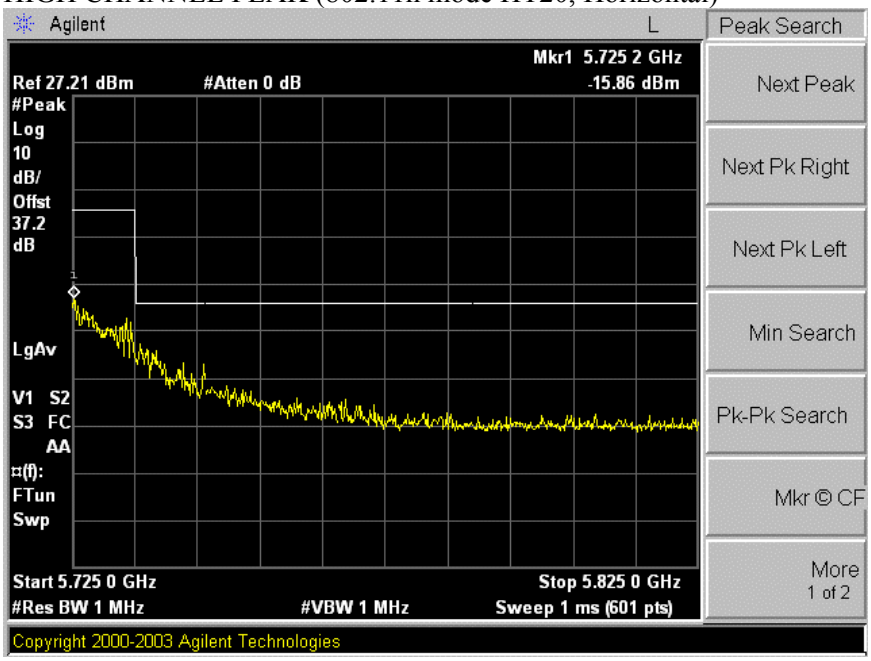
RESTRICTED BANDEDGE (802.11n MODE HT20, HIGH CHANNEL)

HIGH CHANNEL PEAK (802.11n mode HT20, Horizontal)



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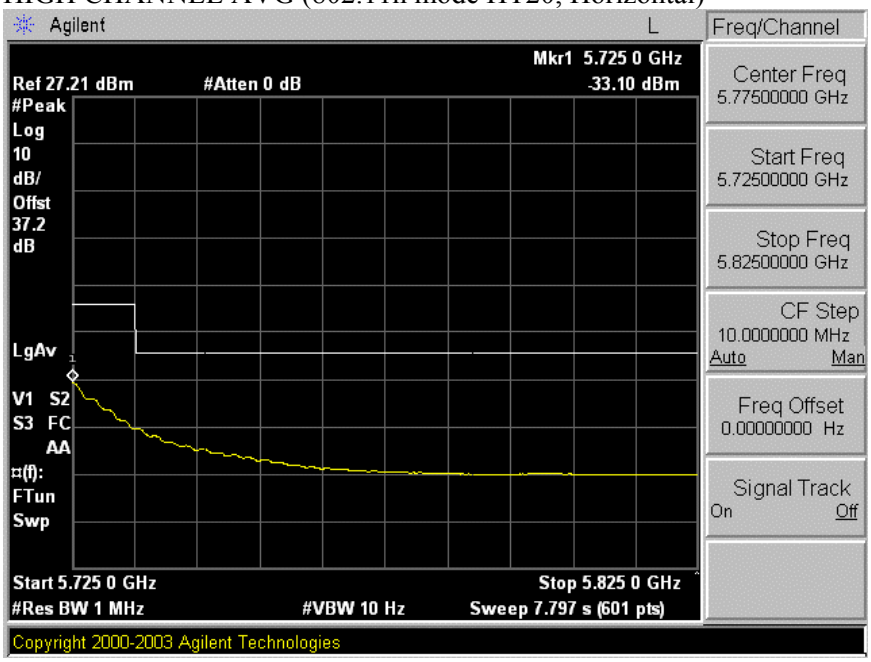
HIGH CHANNEL AVG (802.11n mode HT20, Horizontal)



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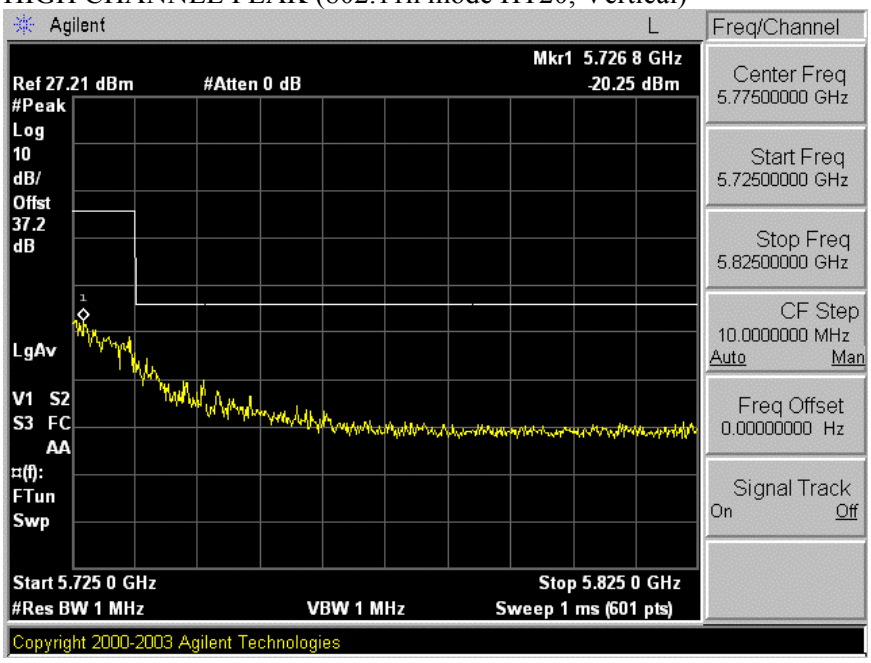
HIGH CHANNEL PEAK (802.11n mode HT20, Vertical)



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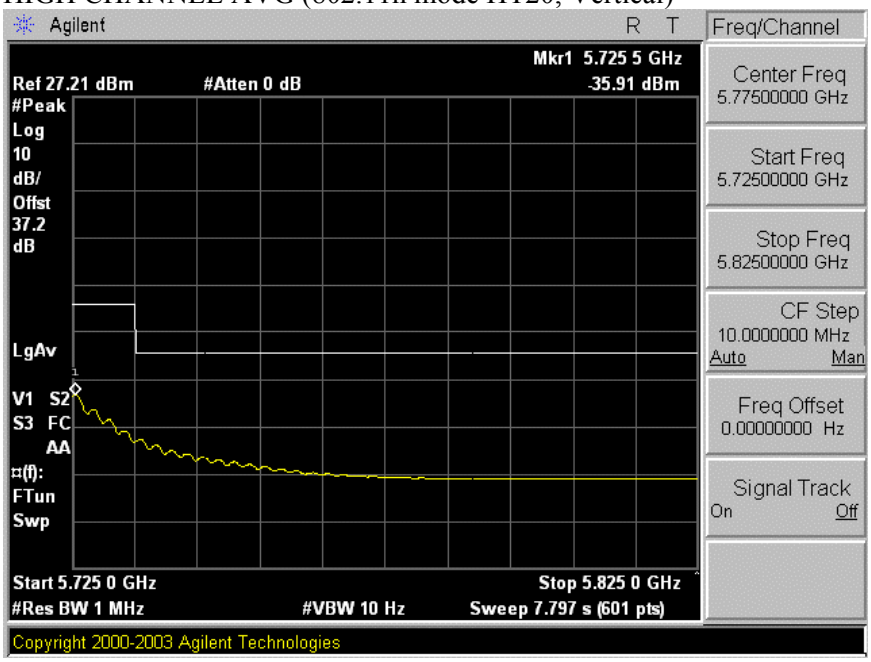
HIGH CHANNEL AVG (802.11n mode HT20, Vertical)



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HARMONICS AND SPURIOUS EMISSIONS (802.11n MODE HT20)

High Frequency Measurement
Compliance Certification Services, Morgan Hill Open Field Site

Company: MARVELL Semiconductor, Inc.
Project #: 06U10699-1
Date:11-06-2006
Test Engineer: Thanh Nguyen
Configuration: EUT, Laptop and Extender Card with PCB Dipole (FOXCONN) Antenna
Mode: Transmit 5.5GHz Band HT20 mode

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T120; S/N: 29310 @3m	T145 Agilent 3008A005(			FCC 15.209

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
Thanh 177079008		Thanh 208946003	HPF_7.6GHz	

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Ch 5500MHz															
11.000	3.0	55.5	41.6	37.5	4.1	-33.8	0.0	0.7	64.0	50.1	74	54	-10.0	-3.9	V
16.500	3.0	43.1	31.1	39.7	5.0	-32.1	0.0	0.7	56.4	44.3	74	54	-17.6	-9.7	V
22.000	3.0	42.6	30.8	32.3	6.0	-32.3	0.0	0.0	48.6	36.8	74	54	-25.4	-17.2	Noise floor
11.000	3.0	54.2	42.1	37.5	4.1	-33.8	0.0	0.7	62.8	50.7	74	54	-11.2	-3.3	H
16.500	3.0	43.4	31.8	39.7	5.0	-32.1	0.0	0.7	56.6	45.0	74	54	-17.4	-9.0	H
22.000	3.0	43.3	31.3	32.3	6.0	-32.3	0.0	0.0	49.3	37.4	74	54	-24.7	-16.6	Noise floor
CH 5600MHz															
11.200	3.0	54.4	41.3	37.6	4.1	-33.5	0.0	0.7	63.3	50.2	74	54	-10.7	-3.8	V
16.800	3.0	42.4	31.2	39.9	5.1	-32.0	0.0	0.7	56.0	44.8	74	54	-18.0	-9.2	V
22.400	3.0	43.5	32.3	32.5	6.1	-32.3	0.0	0.0	49.7	38.5	74	54	-24.3	-15.5	Noise floor
11.200	3.0	55.2	41.9	37.6	4.1	-33.5	0.0	0.7	64.1	50.8	74	54	-9.9	-3.2	H
16.800	3.0	42.1	30.9	39.9	5.1	-32.0	0.0	0.7	55.7	44.5	74	54	-18.3	-9.5	H
22.400	3.0	42.6	31.2	32.5	6.1	-32.3	0.0	0.0	48.8	37.5	74	54	-25.2	-16.5	Noise floor
CH 5700MHz															
11.400	3.0	52.1	41.1	37.6	4.2	-33.2	0.0	0.7	61.4	50.3	74	54	-12.6	-3.7	V
17.100	3.0	42.0	30.6	40.1	5.2	-32.0	0.0	0.7	55.9	44.6	74	54	-18.1	-9.4	V
22.800	3.0	43.1	31.6	32.7	6.2	-32.4	0.0	0.0	49.6	38.1	74	54	-24.4	-15.9	Noise floor
11.400	3.0	54.2	41.6	37.6	4.2	-33.2	0.0	0.7	63.5	50.9	74	54	-10.5	-3.1	H
17.100	3.0	42.8	30.8	40.1	5.2	-32.0	0.0	0.7	56.7	44.7	74	54	-17.3	-9.3	H
22.800	3.0	44.2	31.3	32.7	6.2	-32.4	0.0	0.0	50.7	37.8	74	54	-23.3	-16.2	Noise floor
No other spurious emissions were detected above system noise floor.															

Rev. 5.1.6

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

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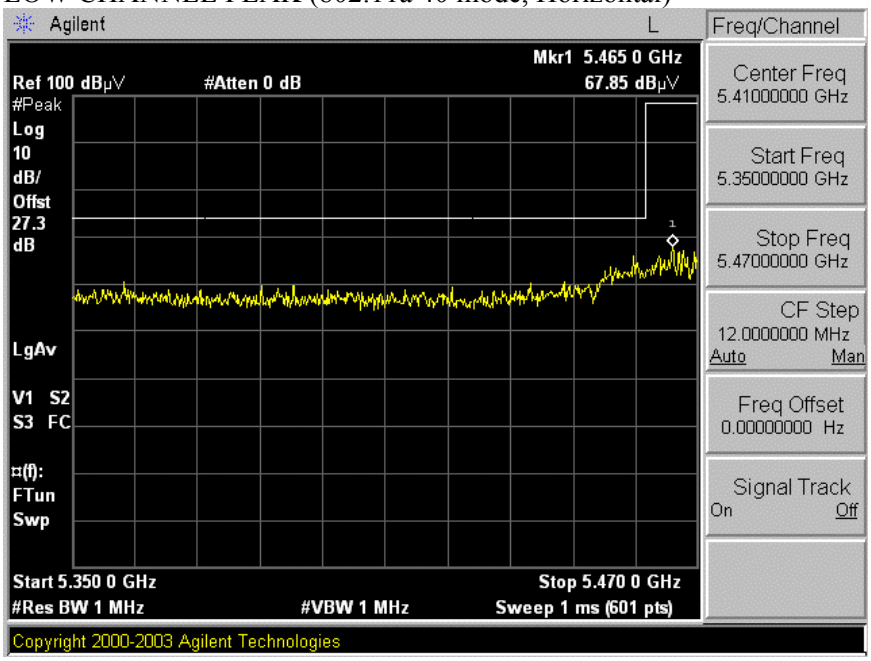
RESTRICTED BANDEDGE (802.11a 40 MODE, LOW CHANNEL)

LOW CHANNEL PEAK (802.11a 40 mode, Horizontal)



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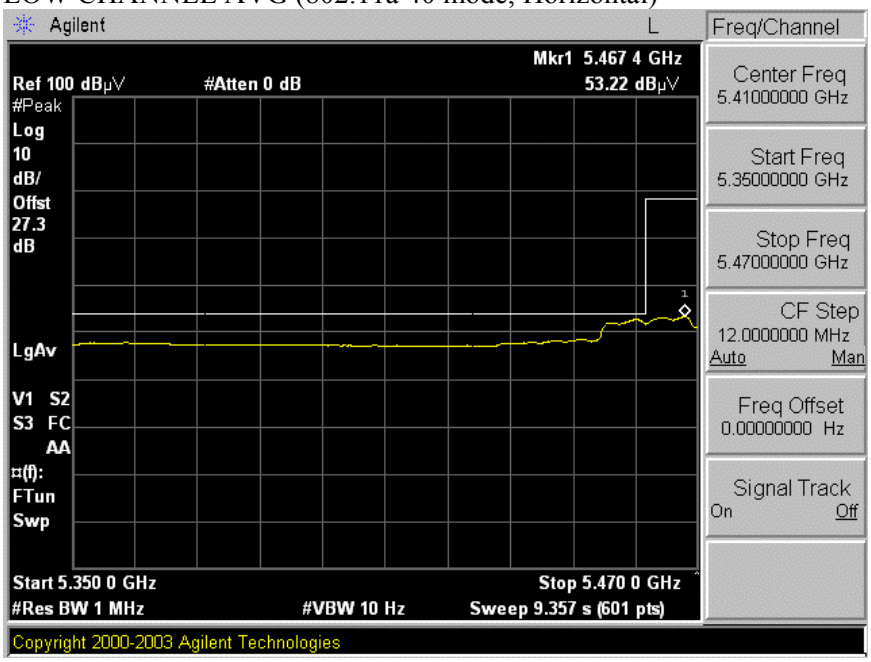
LOW CHANNEL AVG (802.11a 40 mode, Horizontal)



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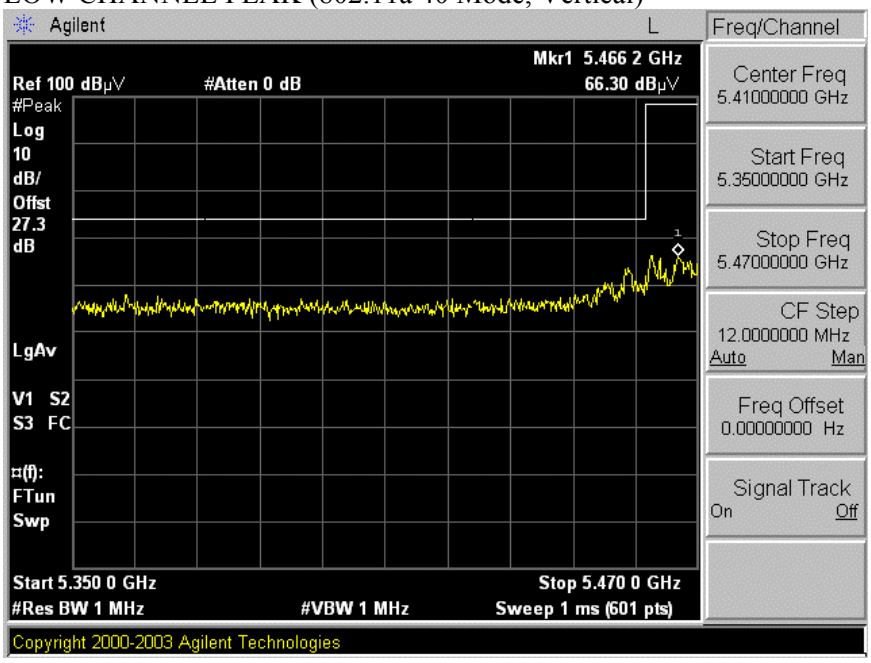
LOW CHANNEL PEAK (802.11a 40 Mode, Vertical)



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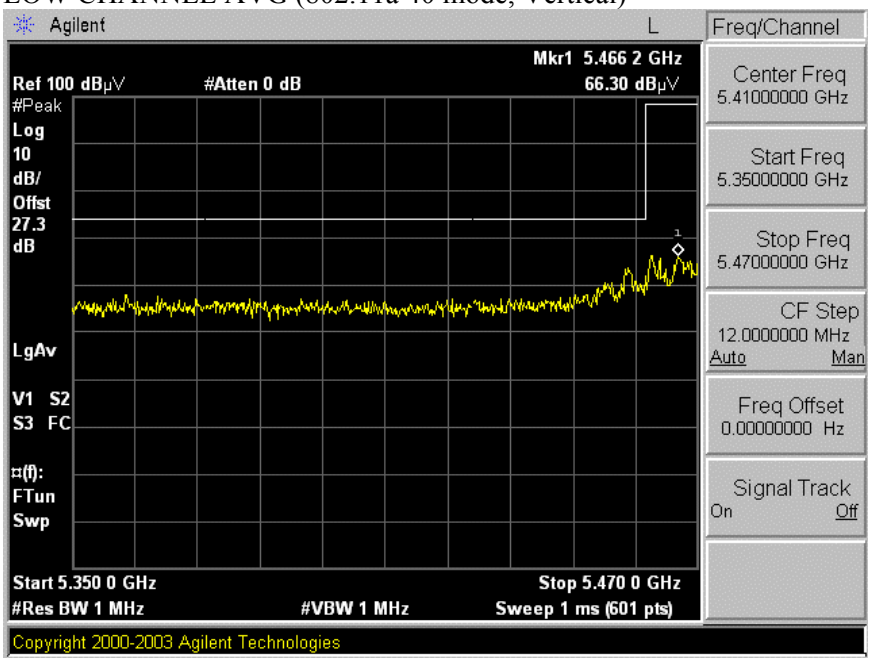
LOW CHANNEL AVG (802.11a 40 mode, Vertical)



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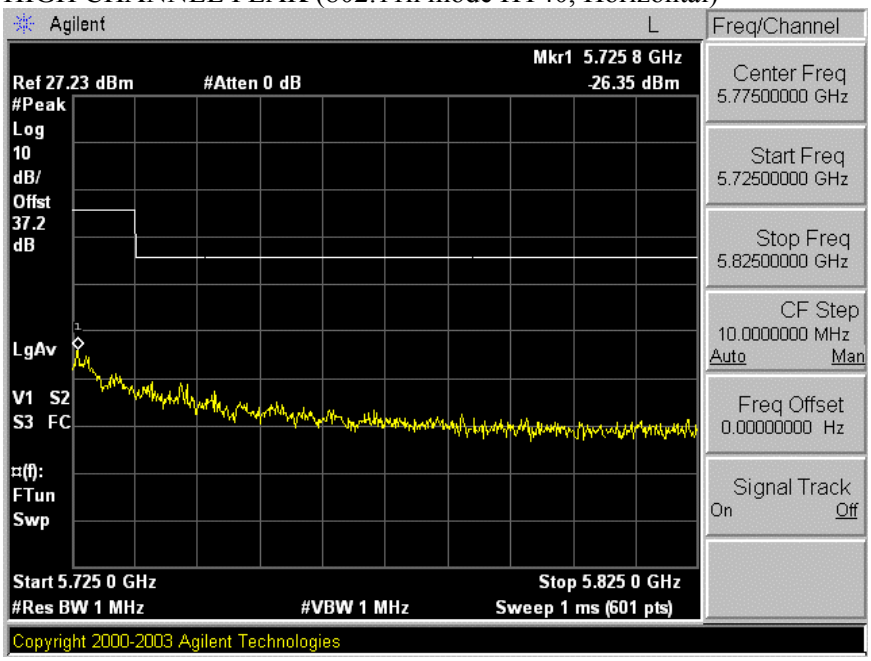
RESTRICTED BANDEDGE (802.11a 40MHz MODE , HIGH CHANNEL)

HIGH CHANNEL PEAK (802.11n mode HT40, Horizontal)



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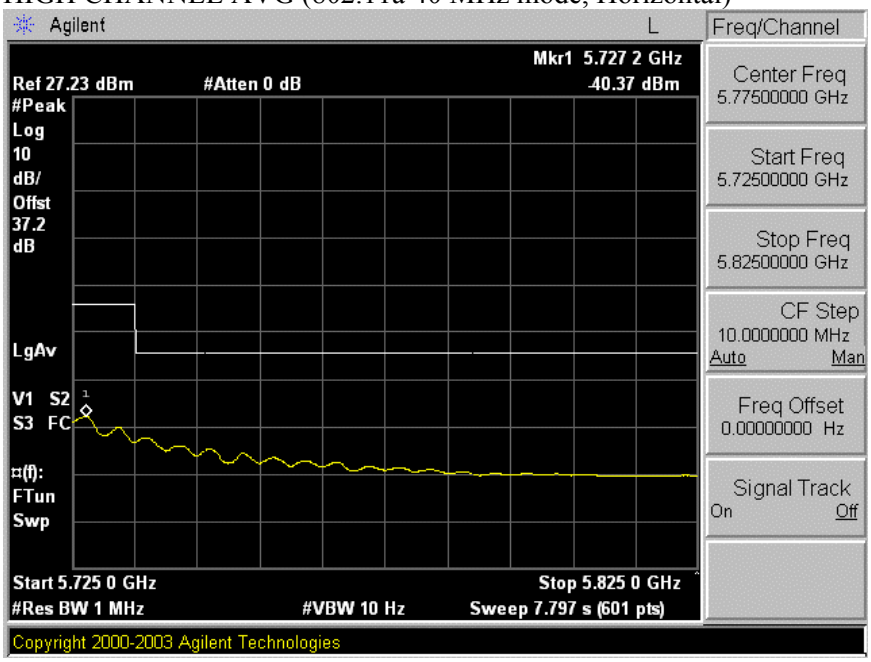
HIGH CHANNEL AVG (802.11a 40 MHz mode, Horizontal)



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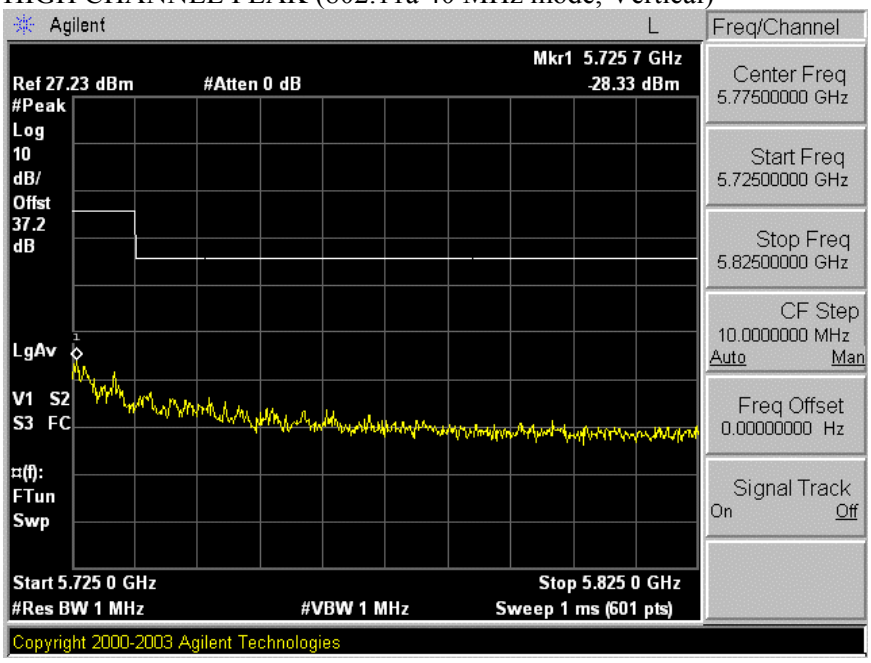
HIGH CHANNEL PEAK (802.11a 40 MHz mode, Vertical)



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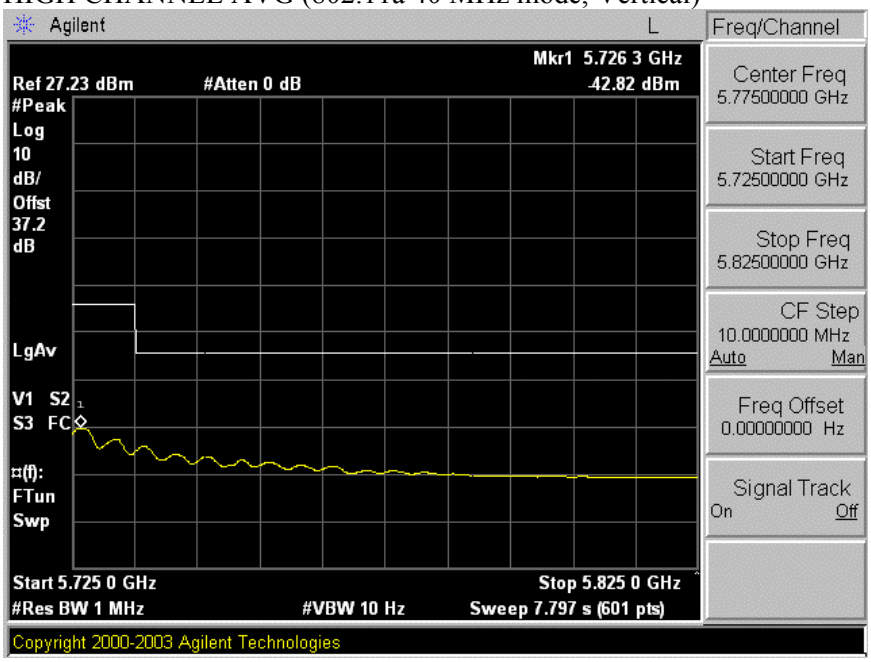
HIGH CHANNEL AVG (802.11a 40 MHz mode, Vertical)



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HARMONICS AND SPURIOUS EMISSIONS (802.11a 40 MHz MODE)

High Frequency Measurement
Compliance Certification Services, Morgan Hill Open Field Site

Company: MARVELL Semiconductor, Inc.
Project #: 06U10699-1
Date:11-06-2006
Test Engineer: Thanh Nguyen
Configuration: EUT, Laptop and Extender Card with PCB Dipole (FOXCONN) Antenna
Mode: Transmit 5.5GHz Band 11a40 mode

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T120; S/N: 29310 @3m	T145 Agilent 3008A005(			FCC 15.209

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
Thanh 177079008		Thanh 208946003	HPF_7.6GHz	

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Ch 5510MHz															
11.020	3.0	50.1	37.4	37.5	4.1	-33.7	0.0	0.7	58.7	46.0	74	54	-15.3	-8.0	V
16.500	3.0	43.1	31.6	39.7	5.0	-32.1	0.0	0.7	56.3	44.8	74	54	-17.7	-9.2	V
22.000	3.0	42.3	30.7	32.3	6.0	-32.3	0.0	0.0	48.3	36.7	74	54	-25.7	-17.3	Noise floor
11.020	3.0	51.6	40.0	37.5	4.1	-33.7	0.0	0.7	60.2	48.6	74	54	-13.8	-5.4	H
16.500	3.0	42.8	31.6	39.7	5.0	-32.1	0.0	0.7	56.0	44.8	74	54	-18.0	-9.2	H
22.000	3.0	42.9	30.6	32.3	6.0	-32.3	0.0	0.0	48.9	36.6	74	54	-25.1	-17.4	Noise floor
CH 5590MHz															
11.180	3.0	50.3	38.9	37.6	4.1	-33.5	0.0	0.7	59.1	47.8	74	54	-14.9	-6.2	V
16.800	3.0	42.7	31.1	39.9	5.1	-32.0	0.0	0.7	56.2	44.7	74	54	-17.8	-9.3	V
22.400	3.0	42.7	31.2	32.5	6.1	-32.3	0.0	0.0	48.9	37.4	74	54	-25.1	-16.6	Noise floor
11.180	3.0	52.2	40.4	37.6	4.1	-33.5	0.0	0.7	61.1	49.2	74	54	-12.9	-4.8	H
16.800	3.0	42.0	31.3	39.9	5.1	-32.0	0.0	0.7	55.6	44.8	74	54	-18.4	-9.2	H
22.400	3.0	42.8	31.4	32.5	6.1	-32.3	0.0	0.0	49.1	37.6	74	54	-24.9	-16.4	Noise floor
CH 5670MHz															
11.340	3.0	51.5	40.4	37.6	4.2	-33.3	0.0	0.7	60.6	49.6	74	54	-13.4	-4.4	V
17.010	3.0	43.3	31.5	40.0	5.1	-32.0	0.0	0.7	57.2	45.4	74	54	-16.8	-8.6	V
22.680	3.0	43.5	32.3	32.7	6.1	-32.3	0.0	0.0	50.0	38.8	74	54	-24.0	-15.2	Noise floor
11.340	3.0	52.2	39.6	37.6	4.2	-33.3	0.0	0.7	61.3	48.7	74	54	-12.7	-5.3	H
17.010	3.0	42.0	30.5	40.0	5.1	-32.0	0.0	0.7	55.8	44.3	74	54	-18.2	-9.7	H
22.680	3.0	43.1	31.2	32.7	6.1	-32.3	0.0	0.0	49.6	37.7	74	54	-24.4	-16.3	Noise floor
No other spurious emissions were detected above system noise floor.															

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f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

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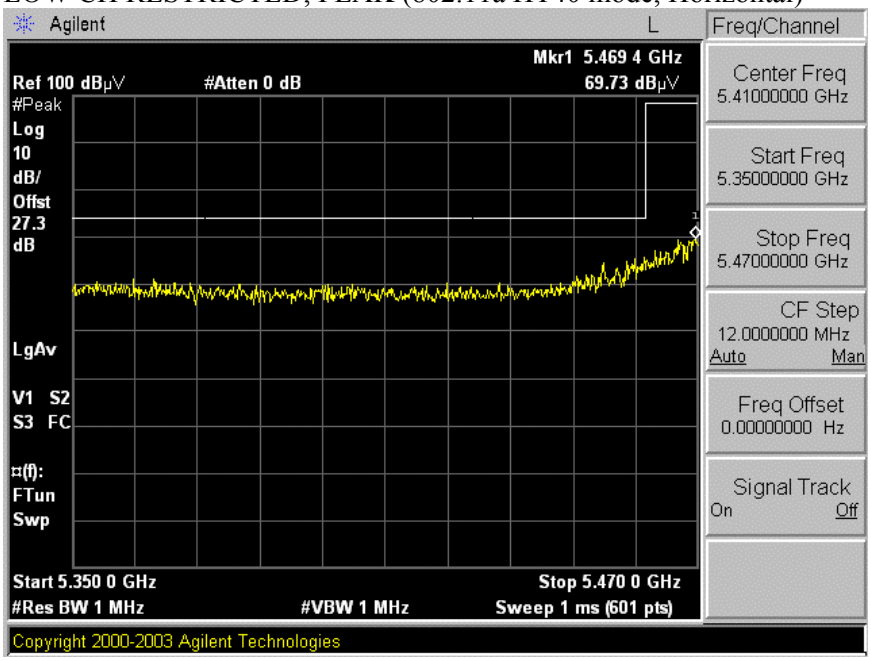
RESTRICTED BANDEDGE (802.11a HT40 MODE, LOW CHANNEL, HORIZONTAL)

LOW CH RESTRICTED, PEAK (802.11a HT40 mode, Horizontal)



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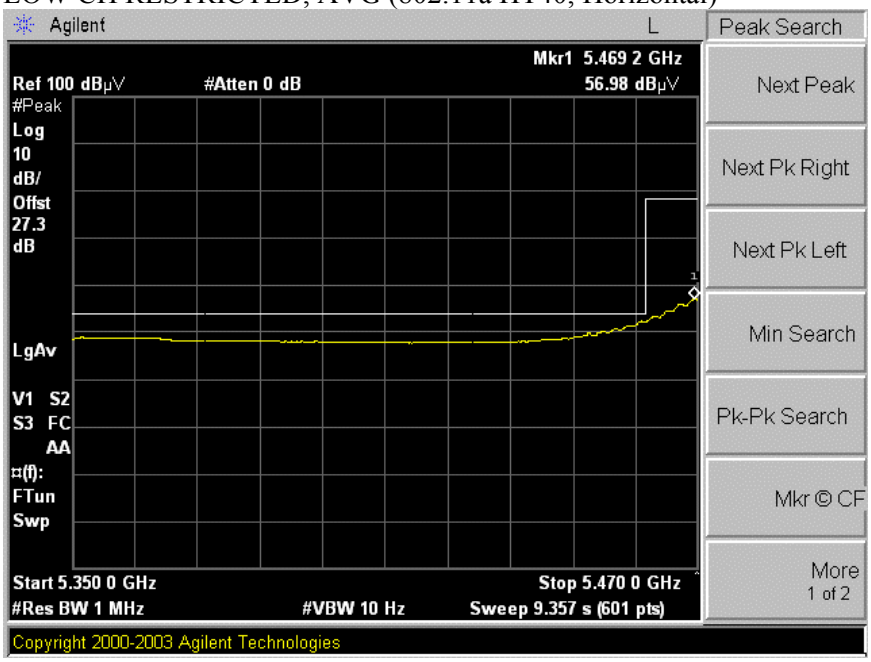
LOW CH RESTRICTED, AVG (802.11a HT40, Horizontal)



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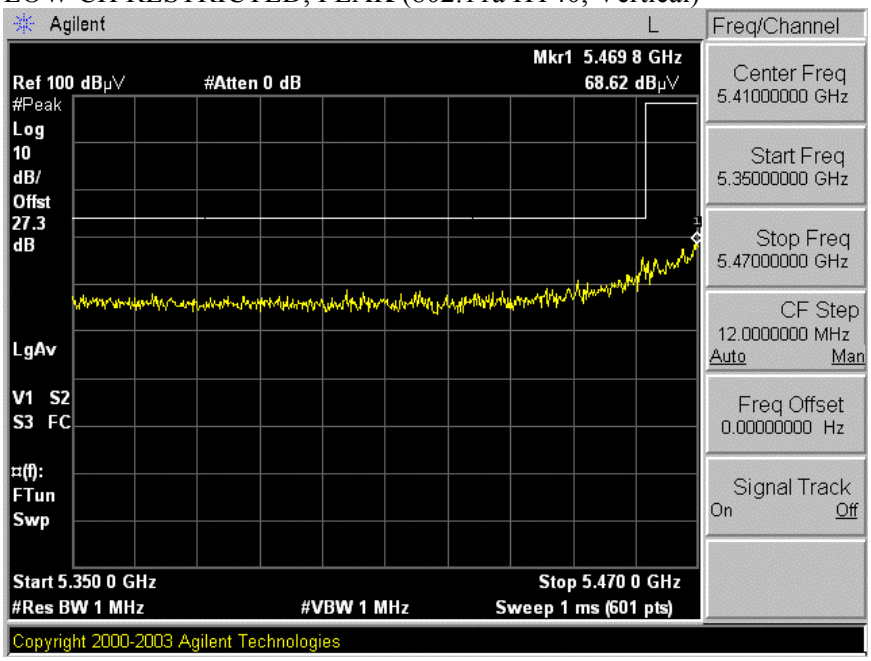
RESTRICTED BANDEDGE (802.11a HT40 MODE, LOW CHANNEL, VERTICAL)

LOW CH RESTRICTED, PEAK (802.11a HT40, Vertical)



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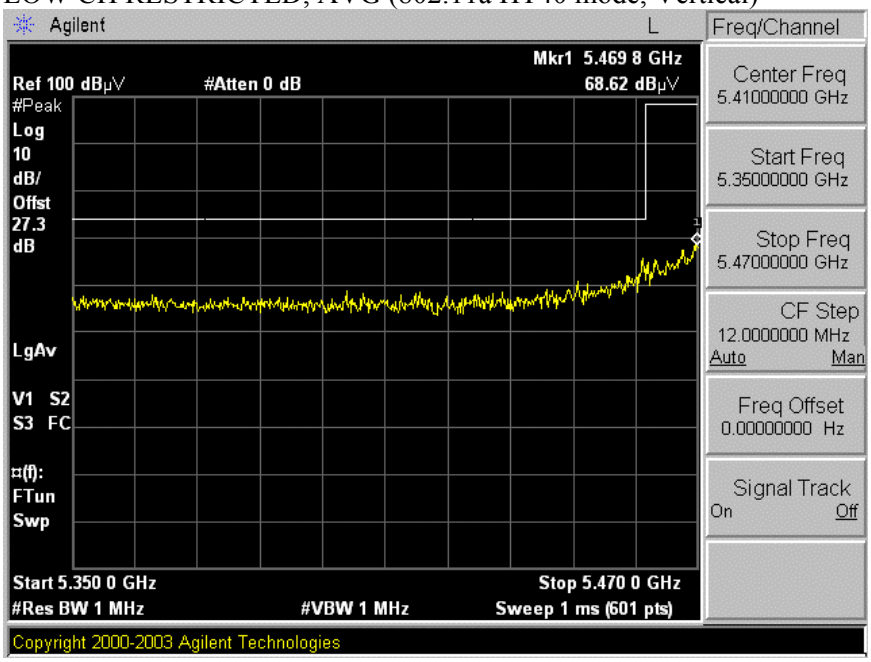
LOW CH RESTRICTED, AVG (802.11a HT40 mode, Vertical)



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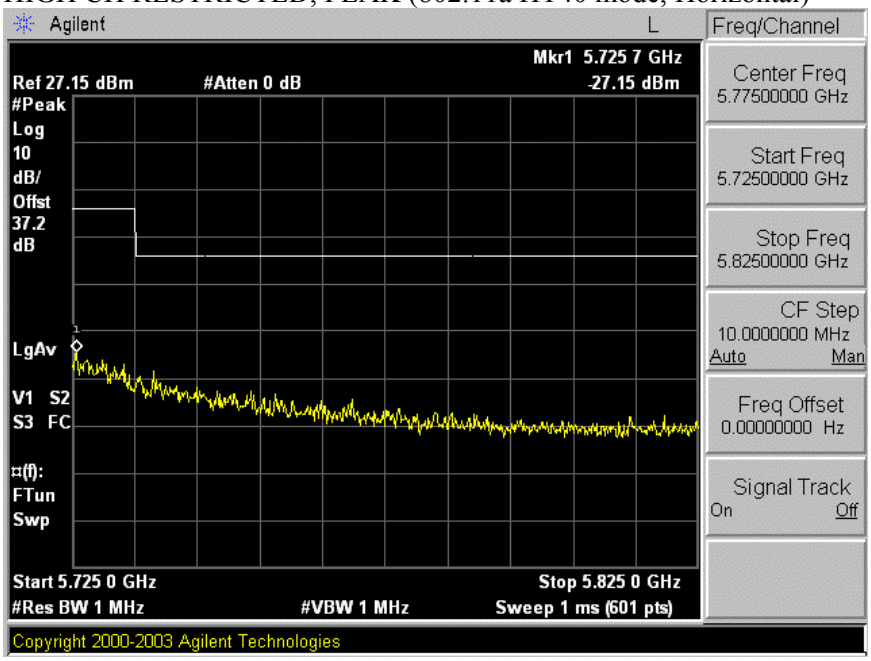
RESTRICTED BANDEDGE (802.11a MODE, HIGH CHANNEL, HORIZONTAL)

HIGH CH RESTRICTED, PEAK (802.11a HT40 mode, Horizontal)



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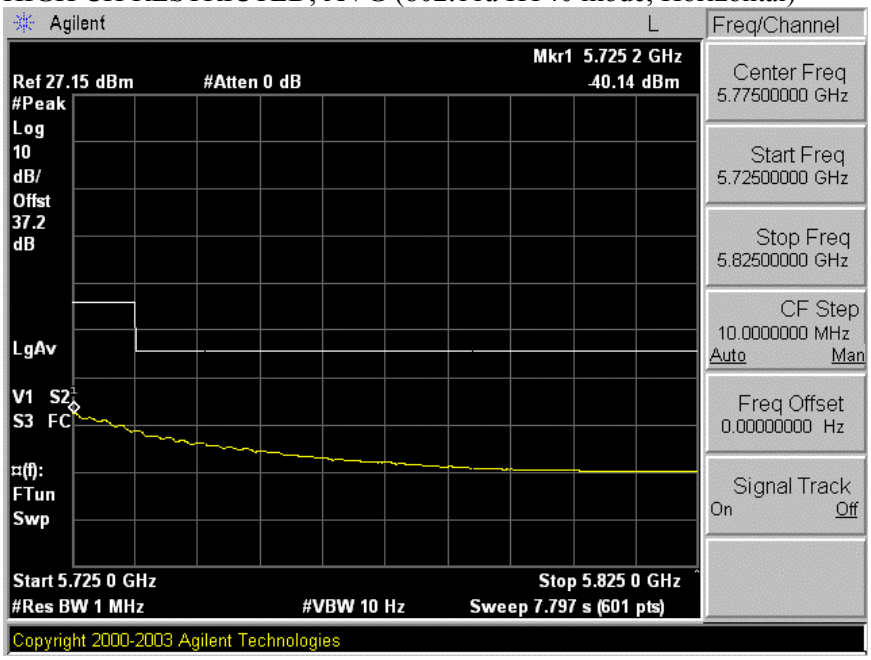
HIGH CH RESTRICTED, AVG (802.11a HT40 mode, Horizontal)



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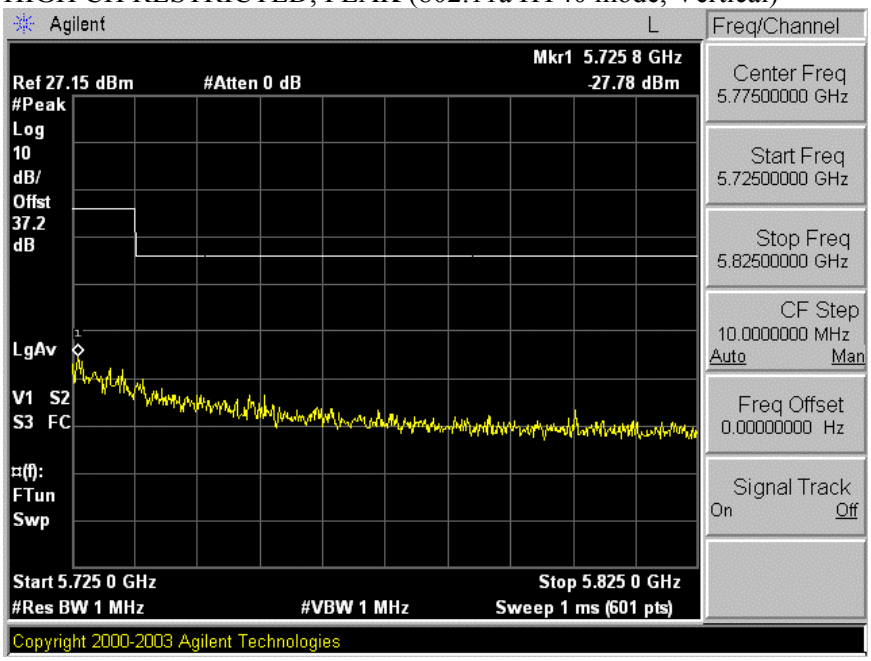
RESTRICTED BANDEDGE (802.11a HT40 MODE, HIGH CHANNEL, VERTICAL)

HIGH CH RESTRICTED, PEAK (802.11a HT40 mode, Vertical)



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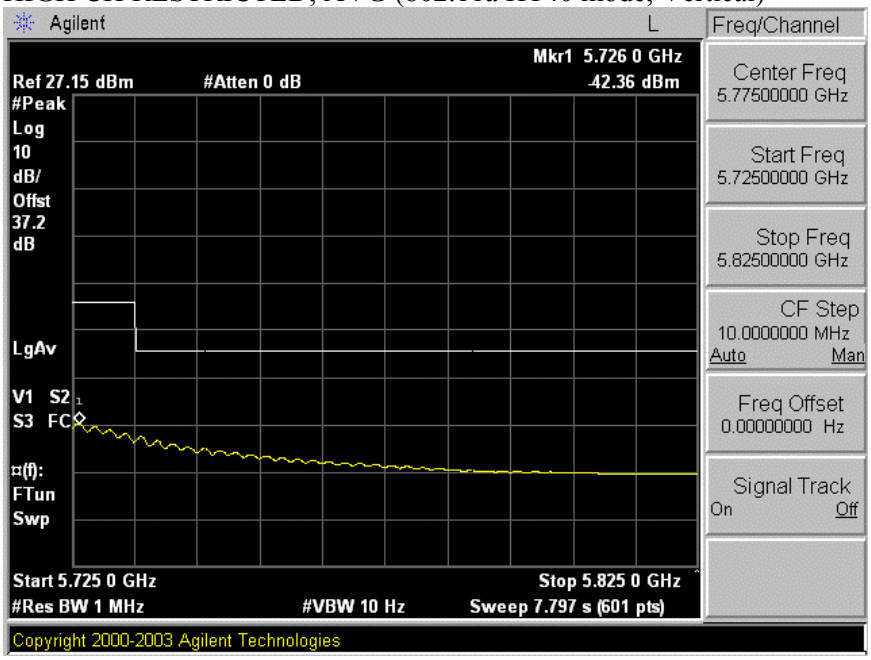
HIGH CH RESTRICTED, AVG (802.11a HT40 mode, Vertical)



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HARMONICS AND SPURIOUS EMISSIONS (802.11a HT40 MODE)

High Frequency Measurement
Compliance Certification Services, Morgan Hill Open Field Site

Company: MARVELL Semiconductor, Inc.
Project #: 06U10699-1
Date:11-06-2006
Test Engineer: Thanh Nguyen
Configuration: EUT, Laptop and Extender Card with PCB Dipole (FOXCONN) Antenna
Mode: Transmit 5.5GHz Band HT40 mode

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T120; S/N: 29310 @3m	T145 Agilent 3008A005(			FCC 15.209

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
Thanh 177079008		Thanh 208946003	HPF_7.6GHz	

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Ch 5510MHz															
11.020	3.0	53.6	42.3	37.5	4.1	-33.7	0.0	0.7	62.2	50.9	74	54	-11.8	-3.1	V
16.500	3.0	42.2	30.9	39.7	5.0	-32.1	0.0	0.7	55.4	44.1	74	54	-18.6	-9.9	V
22.000	3.0	42.8	31.2	32.3	6.0	-32.3	0.0	0.0	48.9	37.3	74	54	-25.1	-16.7	Noise floor
11.020	3.0	52.4	41.6	37.5	4.1	-33.7	0.0	0.7	61.0	50.2	74	54	-13.0	-3.8	H
16.500	3.0	42.1	30.8	39.7	5.0	-32.1	0.0	0.7	55.3	44.1	74	54	-18.7	-9.9	H
22.000	3.0	41.6	31.2	32.3	6.0	-32.3	0.0	0.0	47.7	37.2	74	54	-26.3	-16.8	Noise floor
CH 5590MHz															
11.180	3.0	53.5	42.7	37.6	4.1	-33.5	0.0	0.7	62.3	51.5	74	54	-11.7	-2.5	V
16.800	3.0	42.6	31.0	39.9	5.1	-32.0	0.0	0.7	56.2	44.6	74	54	-17.8	-9.4	V
22.400	3.0	43.2	31.5	32.5	6.1	-32.3	0.0	0.0	49.4	37.7	74	54	-24.6	-16.3	Noise floor
11.180	3.0	52.4	42.3	37.6	4.1	-33.5	0.0	0.7	61.2	51.1	74	54	-12.8	-2.9	H
16.800	3.0	41.5	31.2	39.9	5.1	-32.0	0.0	0.7	55.1	44.8	74	54	-18.9	-9.2	H
22.400	3.0	42.4	31.6	32.5	6.1	-32.3	0.0	0.0	48.6	37.8	74	54	-25.4	-16.2	Noise floor
CH 5670MHz															
11.340	3.0	53.5	42.4	37.6	4.2	-33.3	0.0	0.7	62.7	51.5	74	54	-11.3	-2.5	V
17.010	3.0	43.0	31.2	40.0	5.1	-32.0	0.0	0.7	56.9	45.0	74	54	-17.1	-9.0	V
22.680	3.0	43.1	31.9	32.7	6.1	-32.3	0.0	0.0	49.6	38.3	74	54	-24.4	-15.7	Noise floor
11.340	3.0	51.0	39.8	37.6	4.2	-33.3	0.0	0.7	60.1	49.0	74	54	-13.9	-5.0	H
17.010	3.0	40.8	30.9	40.0	5.1	-32.0	0.0	0.7	54.6	44.7	74	54	-19.4	-9.3	H
22.680	3.0	42.4	31.2	32.7	6.1	-32.3	0.0	0.0	48.9	37.7	74	54	-25.1	-16.3	Noise floor
No other spurious emissions were detected above system noise floor.															

Rev. 5.1.6

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

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7.3. DYNAMIC FREQUENCY SELECTION

7.3.1. LIMITS

§15.407 (h) and FCC 06-96 APPENDIX "COMPLIANCE MEASUREMENT PROCEDURES FOR UNLICENSED-NATIONAL INFORMATION INFRASTRUCTURE DEVCIES OPERATING IN THE 5250-5350 MHz AND 5470-5725 MHz BANDS INCORPORATING DYNAMIC FREQUENCY SELECTION".

Table 1: Applicability of DFS requirements prior to use of a channel

Requirement	**Operational Mode**		
	Master	**Client (without radar detection)**	**Client (with radar detection)**
Non-Occupancy Period	Yes	Not required	Yes
DFS Detection Threshold	Yes	Not required	Yes
Channel Availability Check Time	Yes	Not required	Not required
Uniform Spreading	Yes	Not required	Not required

Table 2: Applicability of DFS requirements during normal operation

Requirement	**Operational Mode**		
	Master	**Client** (without DFS)	**Client** (with DFS)
DFS Detection Threshold	Yes	Not required	Yes
Channel Closing Transmission Time	Yes	Yes	Yes
Channel Move Time	Yes	Yes	Yes

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Table 3: Interference Threshold values, Master or Client incorporating In-Service Monitoring

Maximum Transmit Power	**Value (see note)**
≥ 200 milliwatt	-64 dBm
< 200 milliwatt	-62 dBm
Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna Note 2: Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response.	

Table 4: DFS Response requirement values

Parameter	**Value**
Non-occupancy period	30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds
Channel Closing Transmission Time	200 milliseconds + approx. 60 milliseconds over remaining 10 second period
The instant that the *Channel Move Time* and the *Channel Closing Transmission Time* begins is as follows: • For the Short pulse radar Test Signals this instant is the end of the *Burst*. • For the Frequency Hopping radar Test Signal, this instant is the end of the last radar burst generated. • For the Long Pulse radar Test Signal this instant is the end of the 12 second period defining the radar transmission. The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required to facilitate channel changes (an aggregate of approximately 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.	

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Table 5 – Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (Microseconds)	PRI (Microseconds)	Pulses	Minimum Percentage of Successful Detection	Minimum Trials
1	1	1428	18	60%	30
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120

Table 6 – Long Pulse Radar Test Signal

Radar Waveform	Bursts	Pulses per Burst	Pulse Width (µsec)	Chirp Width (MHz)	PRI (µsec)	Minimum Percentage of Successful Detection	Minimum Trials
5	8-20	1-3	50-100	5-20	1000-2000	80%	30

Table 7 – Frequency Hopping Radar Test Signal

Radar Waveform	Pulse Width (µsec)	PRI (µsec)	Burst Length (ms)	Pulses per Hop	Hopping Rate (kHz)	Minimum Percentage of Successful Detection	Minimum Trials
6	1	333	300	9	.333	70%	30

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7.3.2. TEST AND MEASUREMENT SYSTEM

SYSTEM OVERVIEW

The measurement system is based on a conducted test method.

The short pulse and long pulse signal generating system utilizes the NTIA software. The Vector Signal Generator has been validated by the NTIA. The hopping signal generating system utilizes the CCS simulated hopping method and system, which has been validated by the DoD, FCC and NTIA. The software selects waveform parameters from within the bounds of the signal type on a random basis using uniform distribution.

The short pulse types 2, 3 and 4, and the long pulse type 5 parameters are randomized at run-time.

The hopping type 6 pulse parameters are fixed while the hopping sequence is based on the August 2005 NTIA Hopping Frequency List. The initial starting point randomized at run-time and each subsequent starting point is incremented by 475. Each frequency in the 100-length segment is compared to the boundaries of the EUT Detection Bandwidth and the software creates a hopping burst pattern in accordance with Section 7.4.1.3 Method #2 Simulated Freqeuncy Hopping Radar Waveform Generating Subsystem of FCC 06-96 APPENDIX. The frequency of the signal generator is incremented in 1 MHz steps from F_L to F_H for each successive trial. This incremental sequence is repeated as required to generate a minimum of 30 total trials and to maintain a uniform frequency distribution over the entire Detection Bandwidth.

The signal monitoring equipment consists of a spectrum analyzer set to display 8001 bins on the horizontal axis. The time-domain resolution is 2 msec / bin with a 16 second sweep time, meeting the 10 second short pulse reporting criteria. The aggregate ON time is calculated by multiplying the number of bins above a threshold during a particular observation period by the dwell time per bin, with the analyzer set to peak detection and max hold. The time-domain resolution is 3 msec / bin with a 24 second sweep time, meeting the 22 second long pulse reporting criteria and allowing a minimum of 10 seconds after the end of the long pulse waveform.

Should multiple RF ports be utilized for the Master and/or Slave devices (for example, for diversity or MIMO implementations), additional combiner/dividers are inserted between the Master Combiner/Divider and the 10 dB pad connected to the Master Device (and/or between the Slave Combiner/Divider and the 10 dB pad connected to the Slave Device). Additional 10 dB pads are connected as needed, such that there is one pad at each RF port on each EUT.

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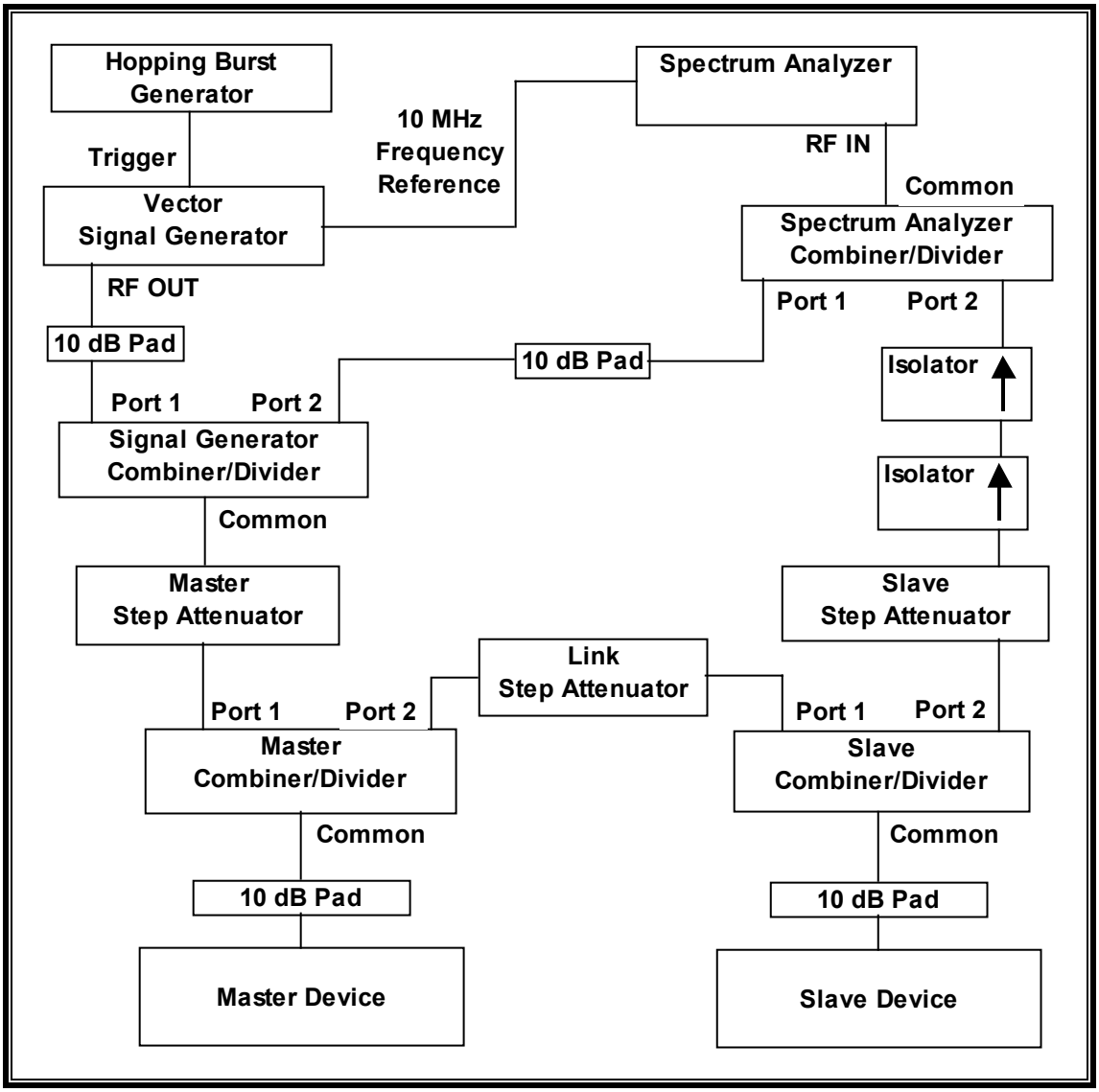
CONDUCTED METHOD SYSTEM BLOCK DIAGRAM



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SYSTEM CALIBRATION

Connect the spectrum analyzer to the test system in place of the master device. Set the signal generator to CW mode. Adjust the amplitude of the signal generator to yield a measured level of –64 dBm on the spectrum analyzer.

Without changing any of the instrument settings, reconnect the spectrum analyer to the Common port of the Spectrum Analyzer Combiner/Divider and connect a 50 ohm load to the Master Device port of the test system.

Measure the amplitude and calculate the difference from –64 dBm. Adjust the Reference Level Offset of the spectrum analyzer to this difference. Confirm that the signal is displayed at –64 dBm. Readjust the RBW and VBW to 3 MHz, set the span to 10 MHz, and confirm that the signal is still displayed at –64 dBm.

The spectrum analyzer displays the level of the signal generator as received at the antenna ports of the Master Device. The interference detection threshold may be varied from the calibrated value of –64 dBm and the spectrum analyzer will still indicate the level as received by the Master Device.

Set the signal generator to produce a radar waveform, trigger a burst manually and measure the level on the spectrum analyzer. Readjust the amplitude of the signal generator as required so that the peak level of the waveform is at a displayed level equal to the required or desired interference detection threshold. Separate signal generator amplitude settings are determined as required for each radar type.

ADJUSTMENT OF DISPLAYED TRAFFIC LEVEL

Establish a link between the Master and Slave, adjusting the Link Step Attenuator as needed to provide a suitable received level at the Master and Slave devices. Stream the video test file to generate WLAN traffic. Confirm that the WLAN traffic level, as displayed on the spectrum analyzer, is at lower amplitude than the radar detection threshold. Confirm that the displayed traffic is from the Master Device. Confirm that the displayed traffic does not include Slave Device traffic.

If a different setting of the Master Step Attenuator is required to meet the above conditions, perform a new System Calibration for the new Master Step Attenuator setting.

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7.3.3. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**Cal Due**
Spectrum Analyzer 3 Hz ~ 44 GHz	Agilent / HP	E4446A	US42070220	7/26/2007
Vector Signal Generator 250kHz-20GHz	Agilent / HP	E8267C	US43320336	11/2/2007
High Speed Digital I/O Card	National Instruments	PCI-6534	HA1612845	1/16/2008

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7.3.4. DESCRIPTION OF EUT

The EUT operates over the 5250-5350 MHz and 5470-5725 MHz ranges.

The EUT can operate as a Master Device or as a Slave Device. As a Master Device, the EUT can initiate operation in an ad-hoc mode. As a Slave device the EUT does not have radar detection capability.

The highest power level within these bands is 25.95 dBm EIRP in the 5250-5350 MHz band and 22.19 dBm EIRP in the 5470-5725 MHz band.

Only one set of antenna assemblies is utilized with the EUT. Each set consists of two different antenna assemblies, one on each of the two transmitter chains, to meet the MIMO operational requirements.

One transmitter chain utilizes an antenna with a gain of 6.2 dBi in the 5250-5350 MHz band and 6.0 dBi in the 5470-5725 MHz band. The other transmitter chain utilizes an antenna with a gain of 5.46 dBi in the 5250-5350 MHz band and 5.3 dBi in the 5470-5725 MHz band.

The rated output power of the Master unit is > 23dBm (EIRP). Therefore the required interference threshold level is –64 dBm. After correction for the lowest antenna gain and procedural adjustments, the required conducted threshold at the antenna port is –64 + 5.3 + 1 = -57.7 dBm.

The calibrated conducted DFS Detection Threshold level is set to –64 dBm. The tested level is lower than the required level hence it provides margin to the limit.

The EUT uses two transmitters, each connected to a 50-ohm coaxial antenna. Both antenna ports are connected to the test system via a power divider to perform conducted tests.

Two samples of this EUT, one configured as a Master and the other configured as a Slave, are utilized for these tests.

WLAN traffic is generated by streaming the video file TestFile.mp2 “6 ½ Magic Hours” from the Master to the Slave in full motion video mode using the media player with the V2.61 Codec package.

TPC is not required since the maximum EIRP is less than 500 mW (27 dBm).

The EUT utilizes the 802.11a/n architecture. Two nominal channel bandwidths are implemented: 20 MHz and 40 MHz.

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The software installed in the EUT is:

System Firmware	revision 4.1.3.9
NDIS Driver	revision 7.0.8.0 / 2.1.4.0
GUI	revision 5.0.1.4

Test results show that the EUT requires 18.66 seconds to complete its initial power-up cycle in 20 MHz bandwidth and 13.59 seconds in 40 MHz bandwidth.

MANUFACTURER'S STATEMENT REGARDING UNIFORM CHANNEL SPREADING

This statement is in a separate document.

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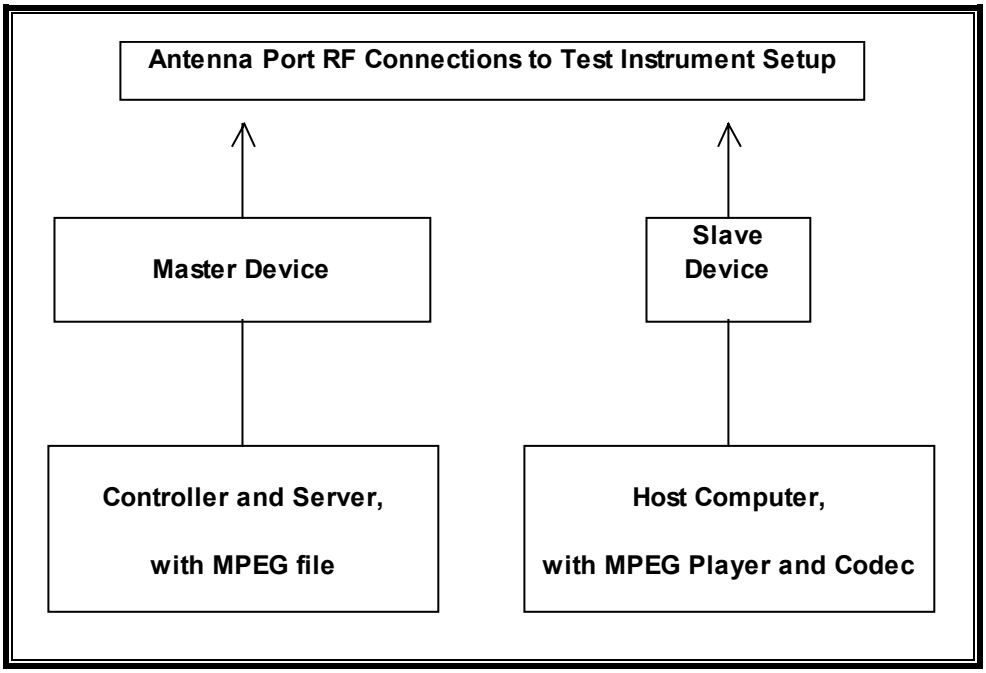
7.3.5. SETUP OF EUT

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
AC Adapter	IBM	THINKPAD	11S92P1113Z1ZACW59T131	DoC
Laptop	IBM	Thinkpad T60	L3-MO4O9	DoC
AC Adapter	LENOVO	LENOVO	11S92P1109Z1ZBTZ63G122	DoC
Laptop	IBM	Thinkpad T60	L3-M5085	DoC

The EUT can be either a master and slave device; one sample of each configuaration is utilized for the test setup.

TEST SETUP



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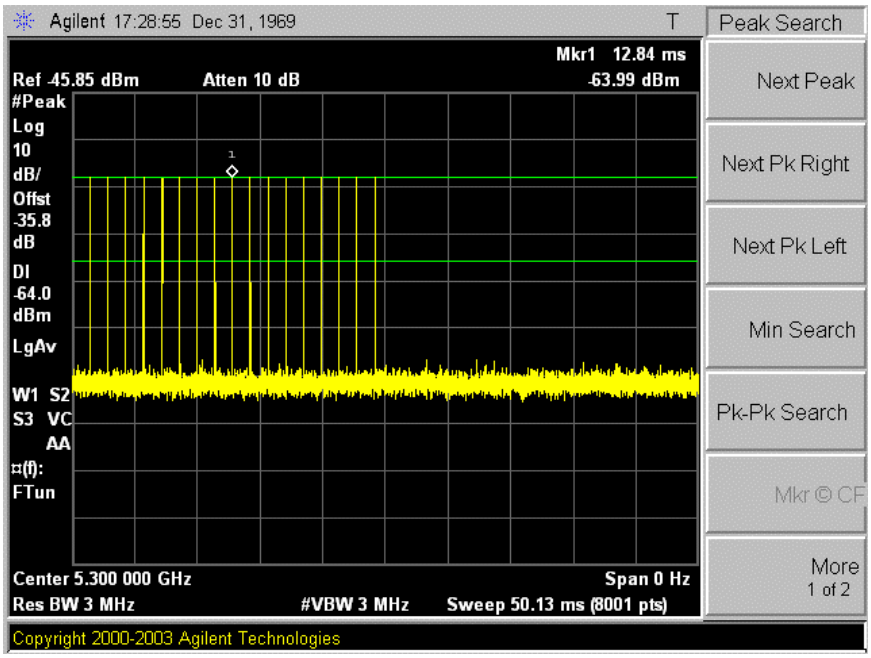
7.4. DFS RESULTS FOR 20 MHz BANDWIDTH

7.4.1. PLOTS OF RADAR WAVEFORM, AND WLAN TRAFFIC

PLOTS OF RADAR WAVEFORMS

SHORT PULSE RADAR TYPE 1



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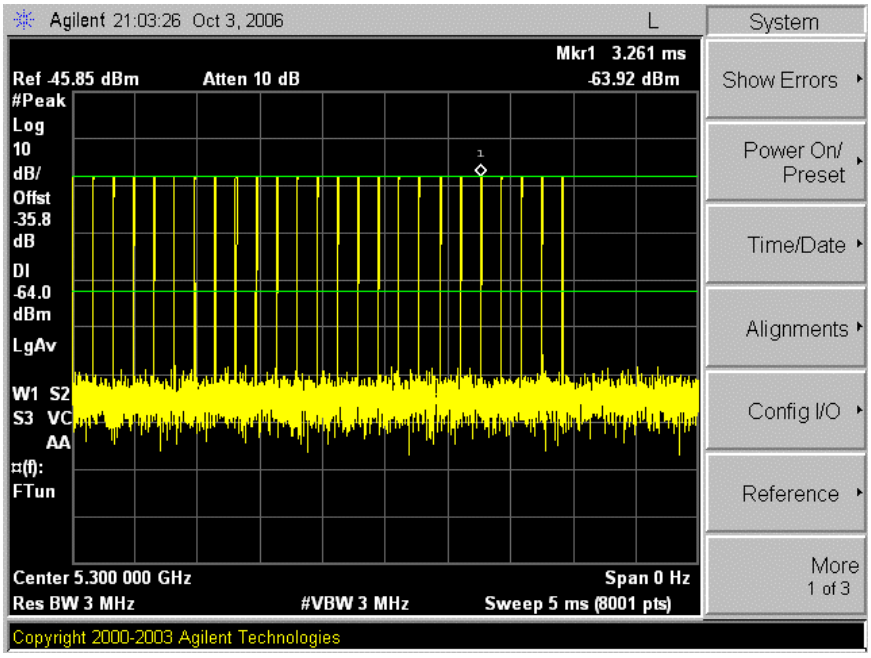
SAMPLE OF SHORT PULSE RADAR TYPE 2



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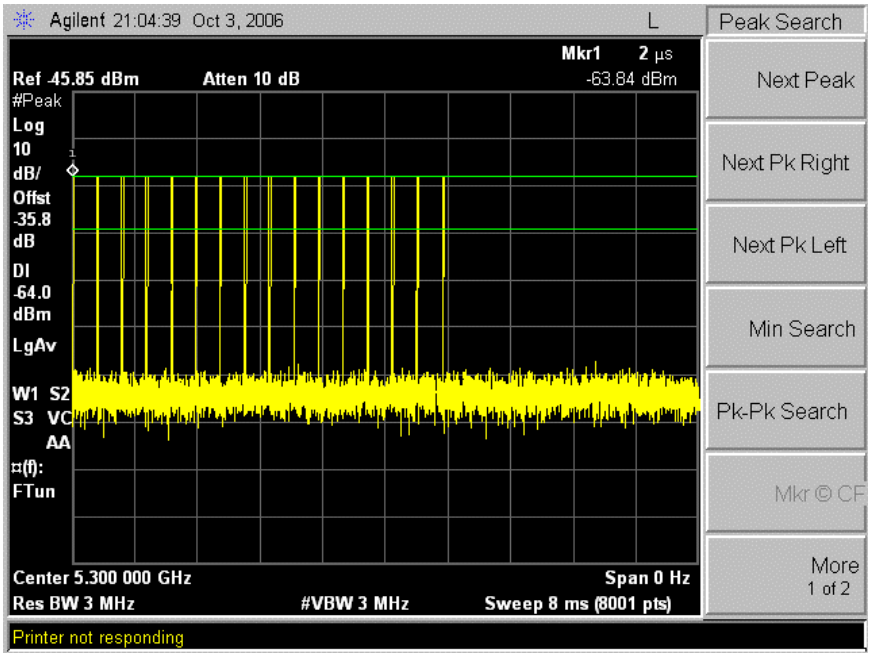
SAMPLE OF SHORT PULSE RADAR TYPE 3



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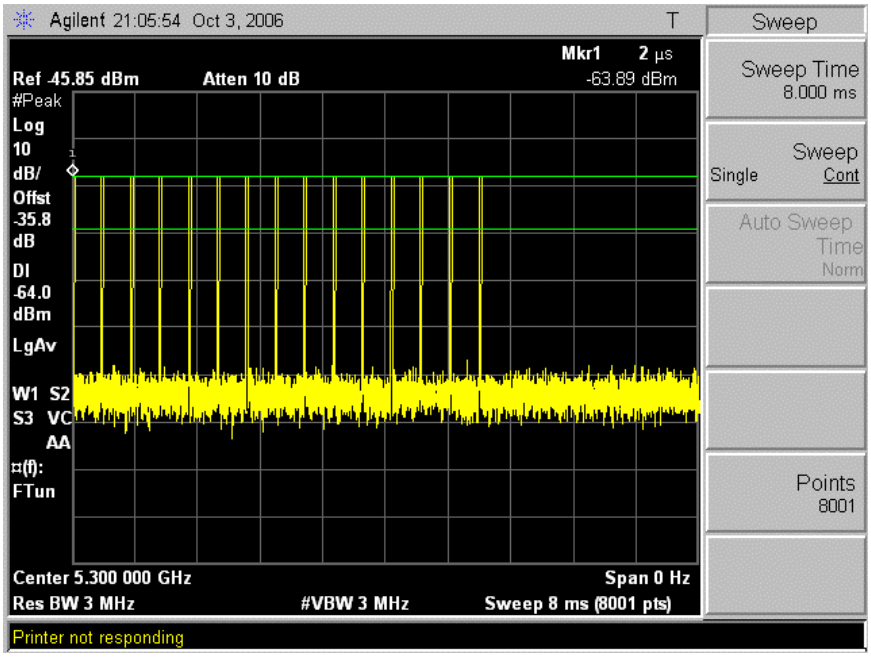
SAMPLE OF SHORT PULSE RADAR TYPE 4



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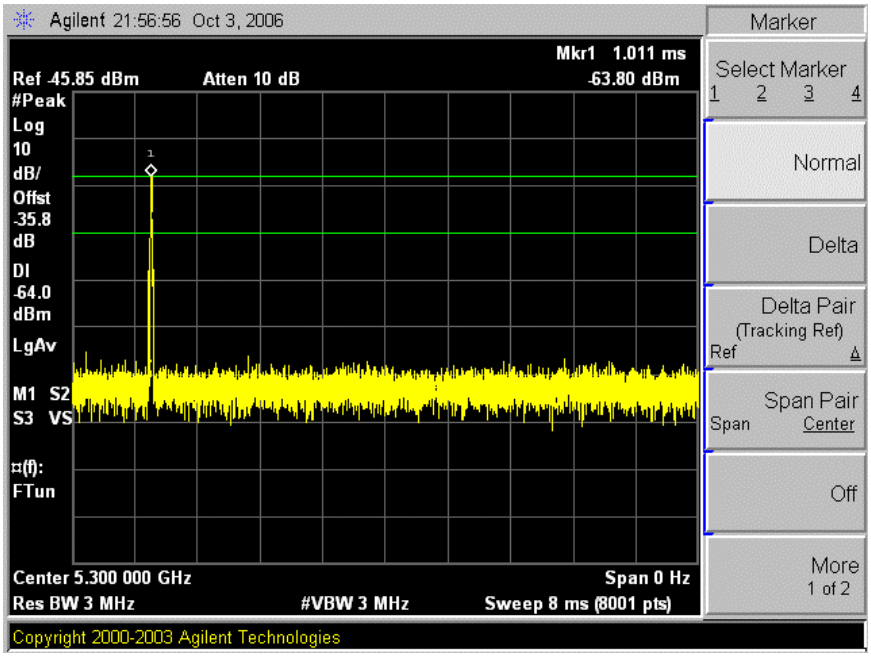
SAMPLE OF SINGLE BURST OF RADAR TYPE 5



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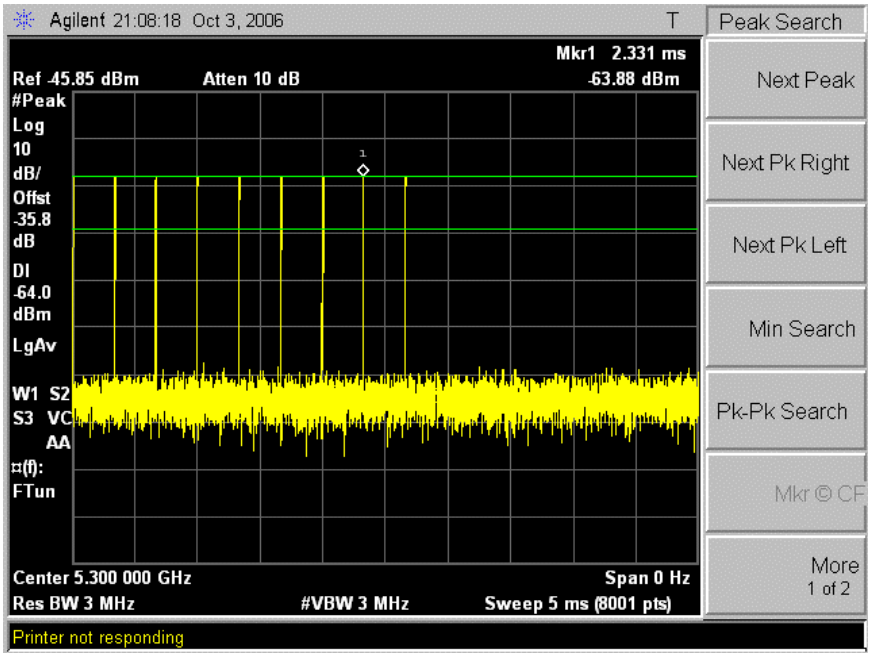
SINGLE BURST OF RADAR TYPE 6



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