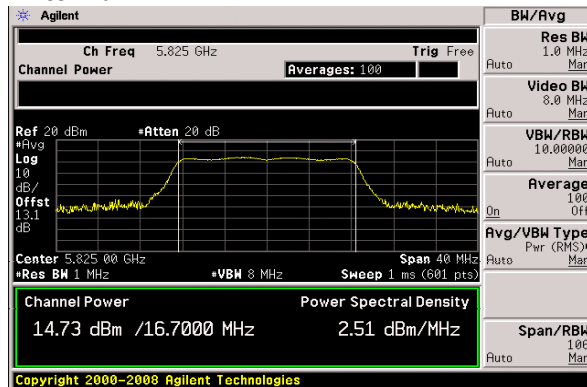
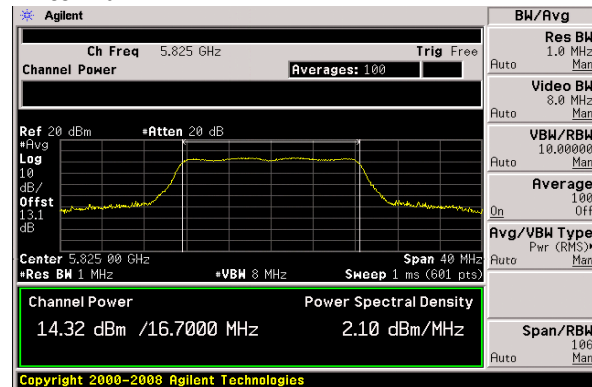
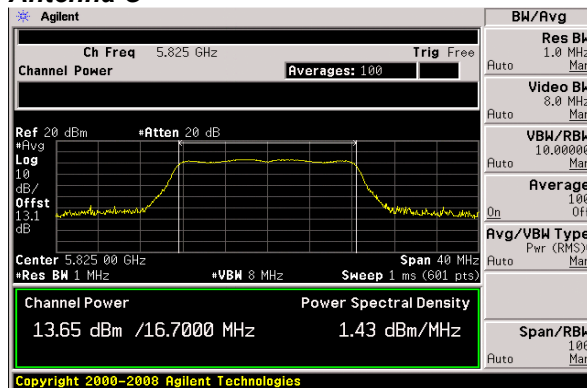
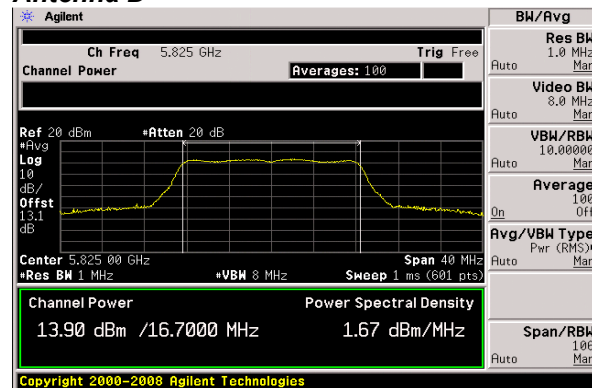


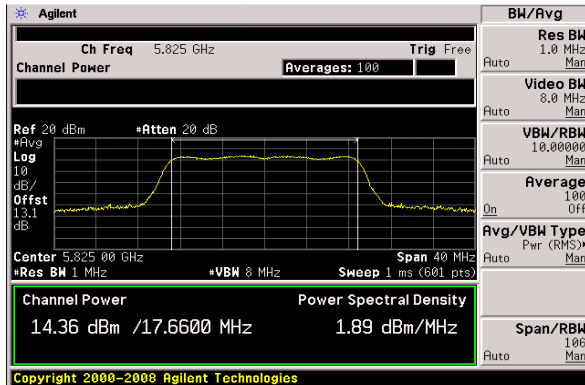
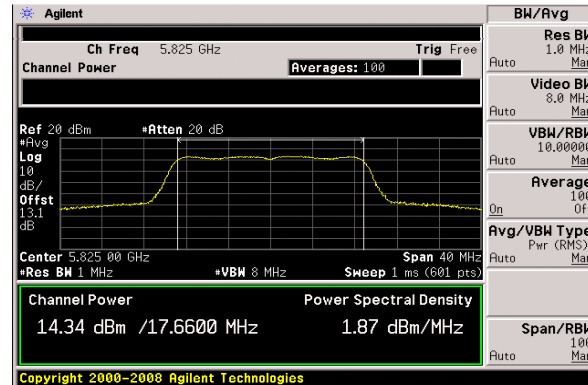
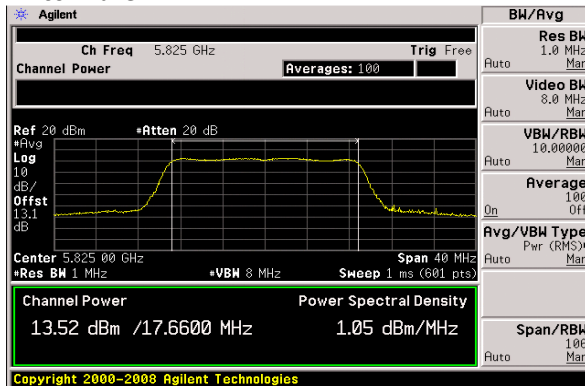


Non HT/VHT20 Beam Forming, 6 to 54 Mbps

Antenna A**Antenna B****Antenna C****Antenna D**

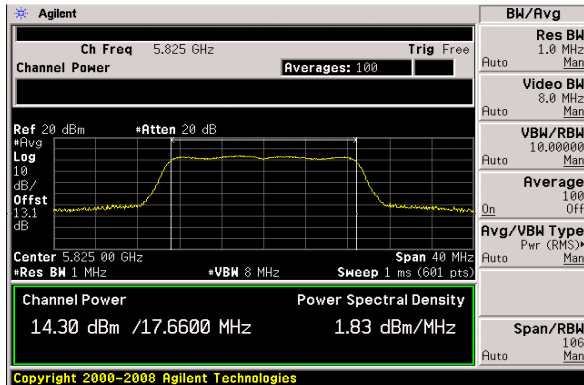
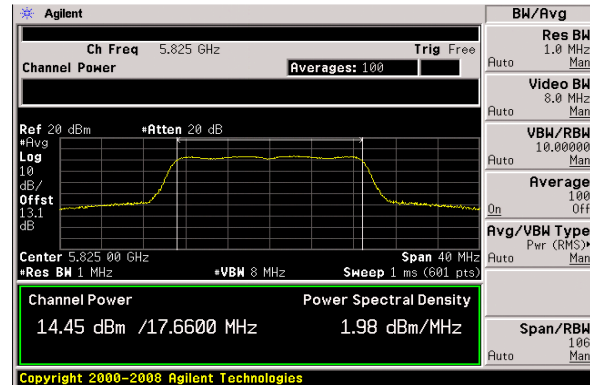
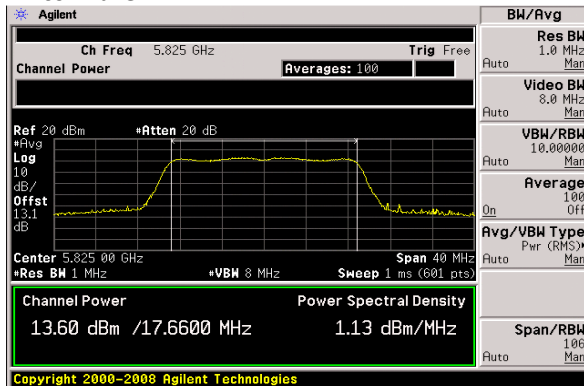
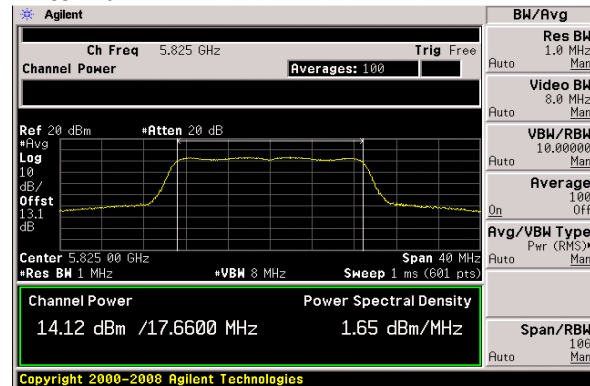


HT/VHT20 Beam Forming, M0 to M7, M0.1 to M9.1

Antenna A**Antenna B****Antenna C**



HT/VHT20 Beam Forming, M0 to M7, M0.1 to M9.1

Antenna A**Antenna B****Antenna C****Antenna D**



Power Spectral Density

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

Connect the antenna port(s) to the spectrum analyzer input. Place the radio in continuous transmit mode. Configure the spectrum analyzer as shown below.

Center Frequency:	Frequency from table below
Span:	1.5 times nominal bandwidth
Ref Level Offset:	Correct for attenuator and cable loss.
Reference Level:	20 dBm
Attenuation:	20 dB
Sweep Time:	3s
Resolution Bandwidth:	3 kHz
Video Bandwidth:	10 kHz
Detector:	Peak
Trace:	Single
Marker:	Peak Search

Record the Marker value.

Data corrected for duty cycle.

The “Measure and add $10 \log(N)$ dB technique”, where N is the number of outputs, is used for measuring in-band Power Spectral Density. With this technique, spectrum measurements are performed at each output of the device, and the quantity $10 \log(4)$ (or 6dB) is added to the worst case spectrum value before comparing to the emission limit.

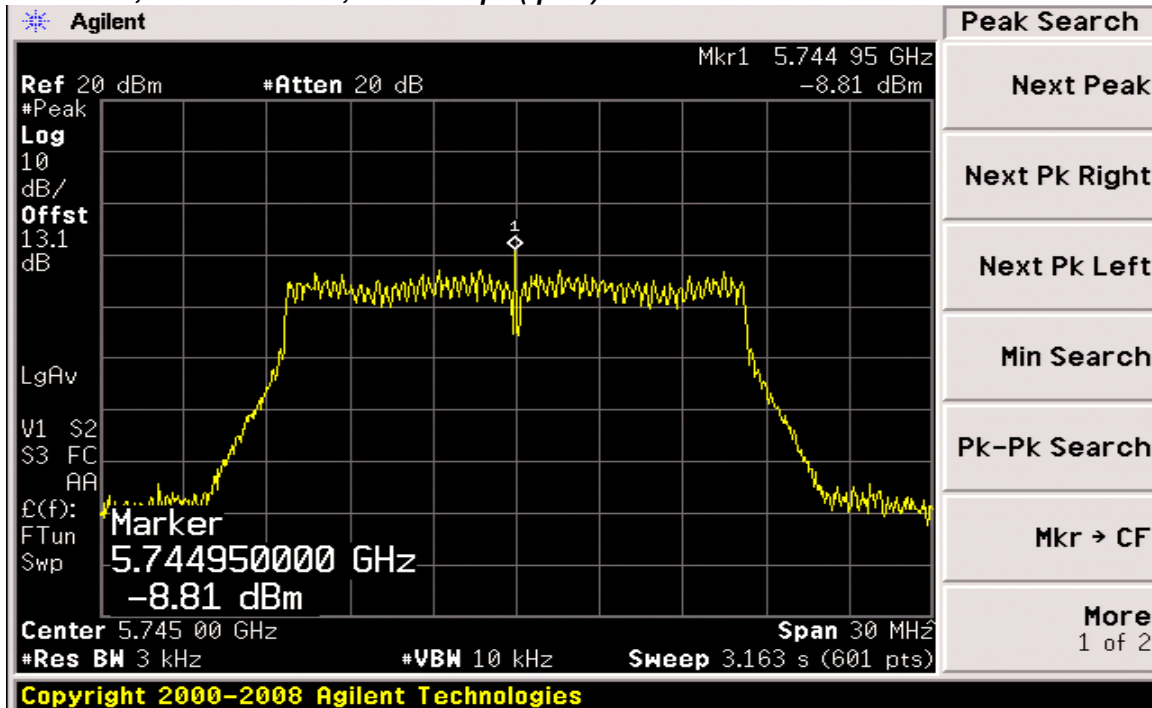
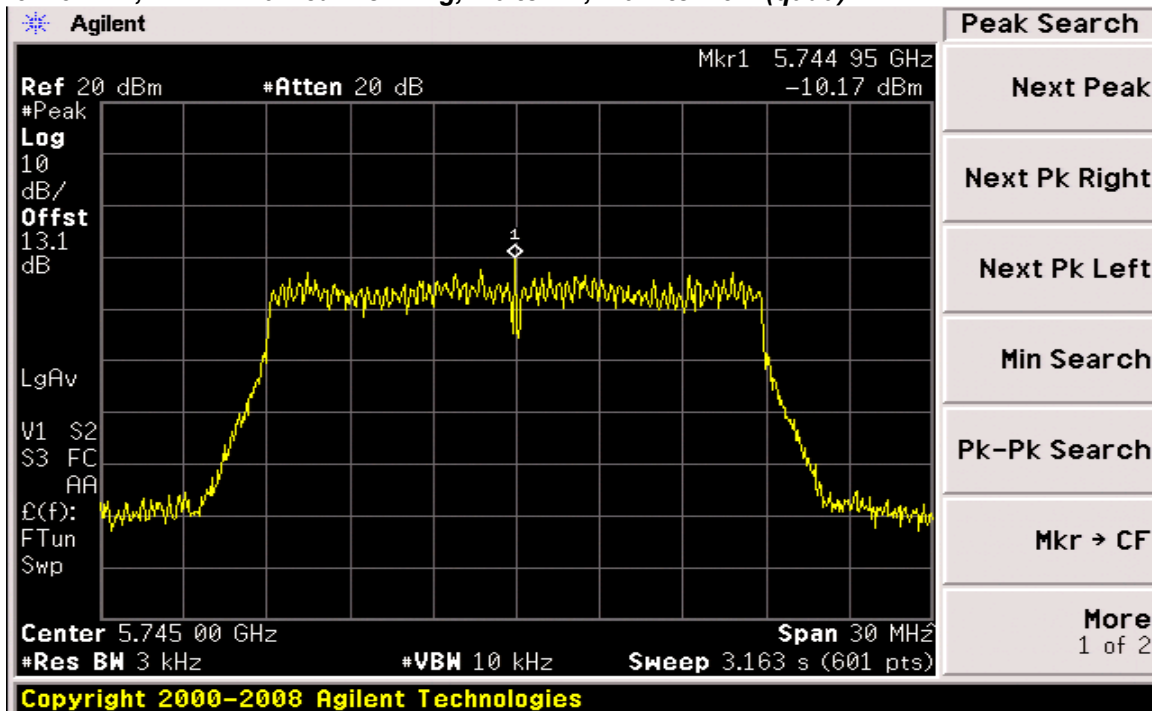
Frequency (MHz)	Mode	Data Rate (Mbps)	Duty Cycle (%)	PSD / Antenna (dBm/3kHz)	Total PSD (dBm/3kHz)	Total PSD corrected for duty cycle (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
5745	Non HT/VHT20, 6 to 54 Mbps	6	99.4	-8.81	-2.81	-2.78	8	10.78
	HT/VHT20, M0 to M23, M0.1 to M9.3	m0	99.3	-10.17	-4.17	-4.14	8	12.14
5745/5765	HT/VHT40, M0 to M23, M0.1 to M9.3	m0	98.5	-10.17	-4.17	-4.10	8	12.10
5745/5765	Non HT/VHT80, 6 to 54 Mbps	6	99.3	-5.3	1.3	1.33	8	6.67
5785/5805	HT/VHT80, M0 to M23, M0.1 to M9.3	m0x1	95.7	-11.22	-5.22	-5.03	8	13.03
5785	Non HT/VHT20, 6 to 54 Mbps	6	99.4	-11.4	-5.4	-5.37	8	13.37



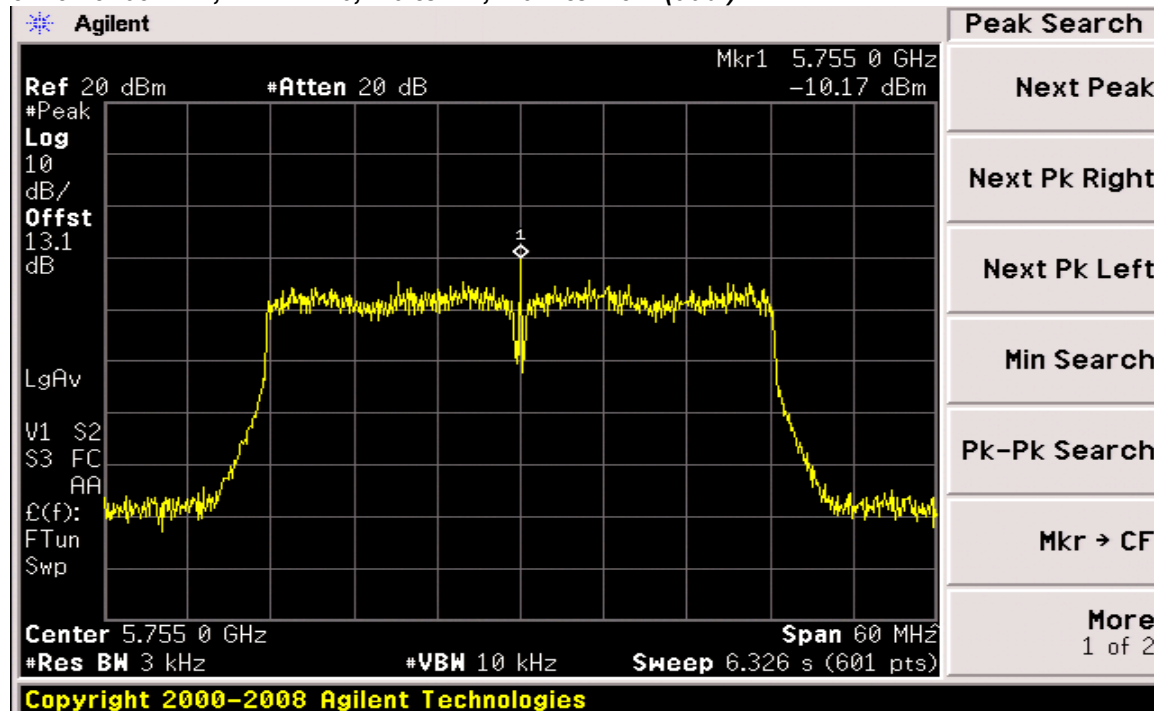
	HT/VHT2 0, M0 to M23, M0.1 to M9.3	m0	99.3	-9.94	-3.94	-3.91	8	11.91
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5785/5805	Non HT/VHT4 0, 6 to 54 Mbps	6	99.3	-10.54	-4.54	-4.51	8	12.51
	HT/VHT4 0, M0 to M23, M0.1 to M9.3	m0	98.5	-10.14	-4.14	-4.07	8	12.07

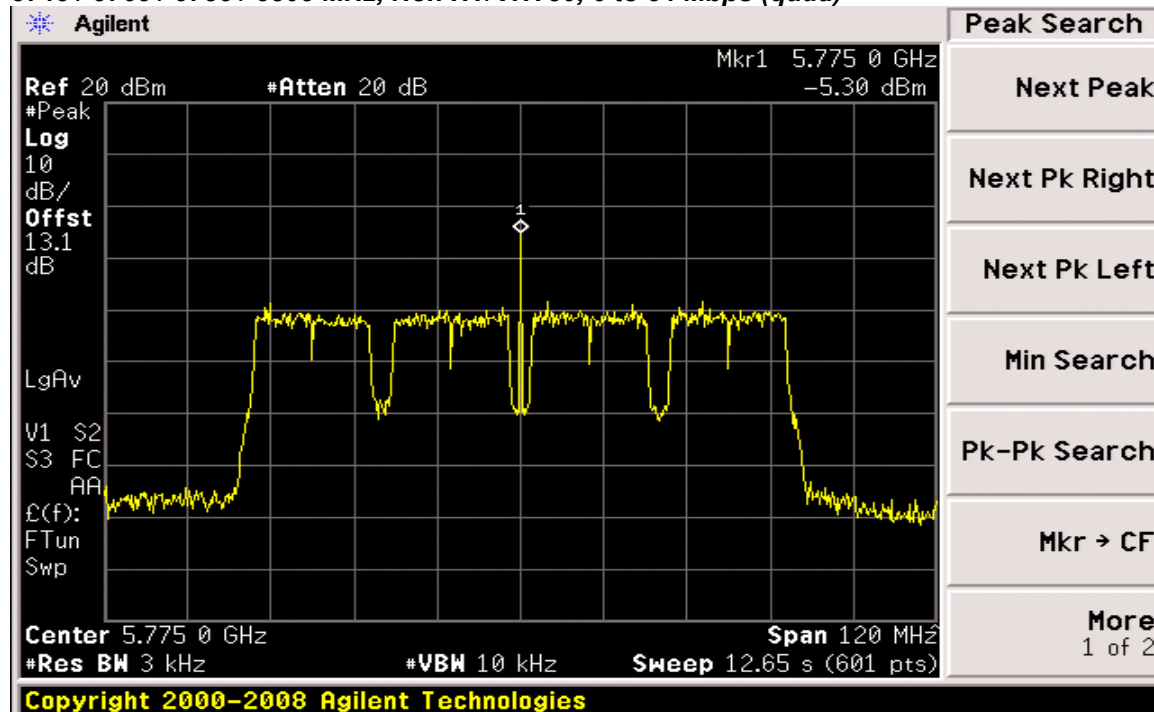
5825	Non HT/VHT2 0, 6 to 54 Mbps	6	99.4	-9.26	-3.26	-3.23	8	11.23
	HT/VHT2 0, M0 to M23, M0.1 to M9.3	m0	99.3	-9.83	-3.83	-3.80	8	11.80

Power Spectral Density Plots**5745 MHz, NON HT/VHT20, 6 to 54Mbps (quad)****5745 MHz, HT/VHT20 Beamforming, M0 to M7, M0.1 to M9.1 (quad)**

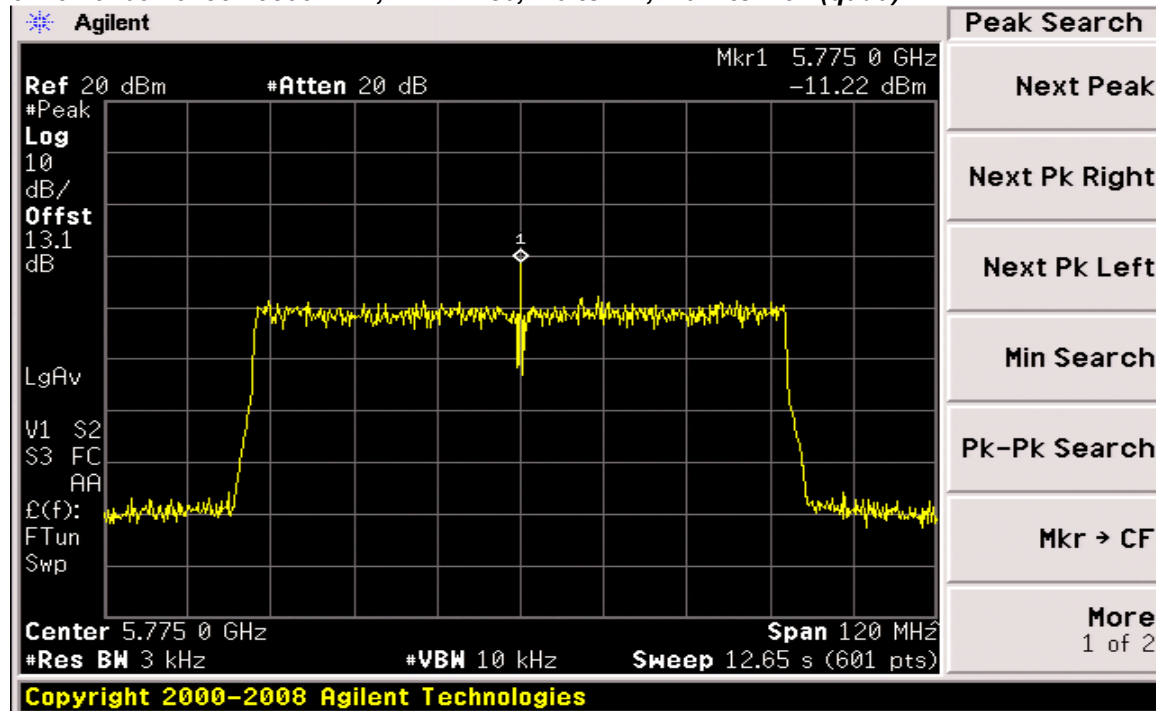
5745 / 5765 MHz, HT/VHT40, M0 to M7, M0.1 to M9.1 (dual)



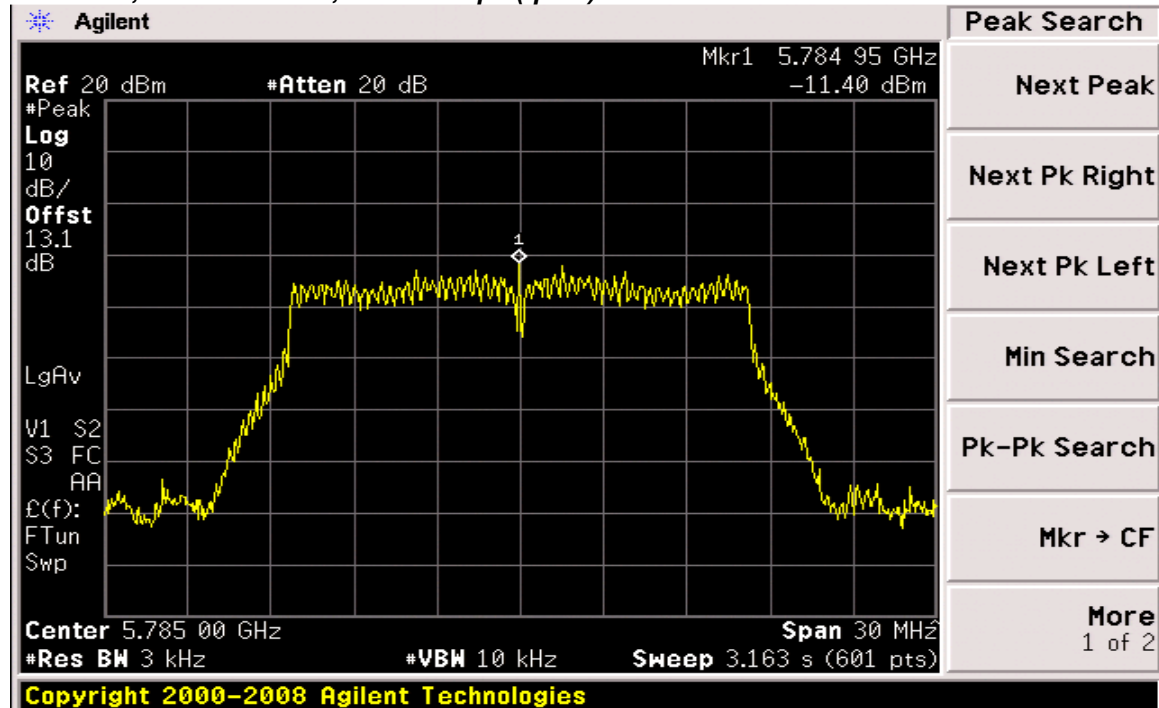
5745 / 5765 / 5785 / 5805 MHz, Non HT/VHT80, 6 to 54 Mbps (quad)

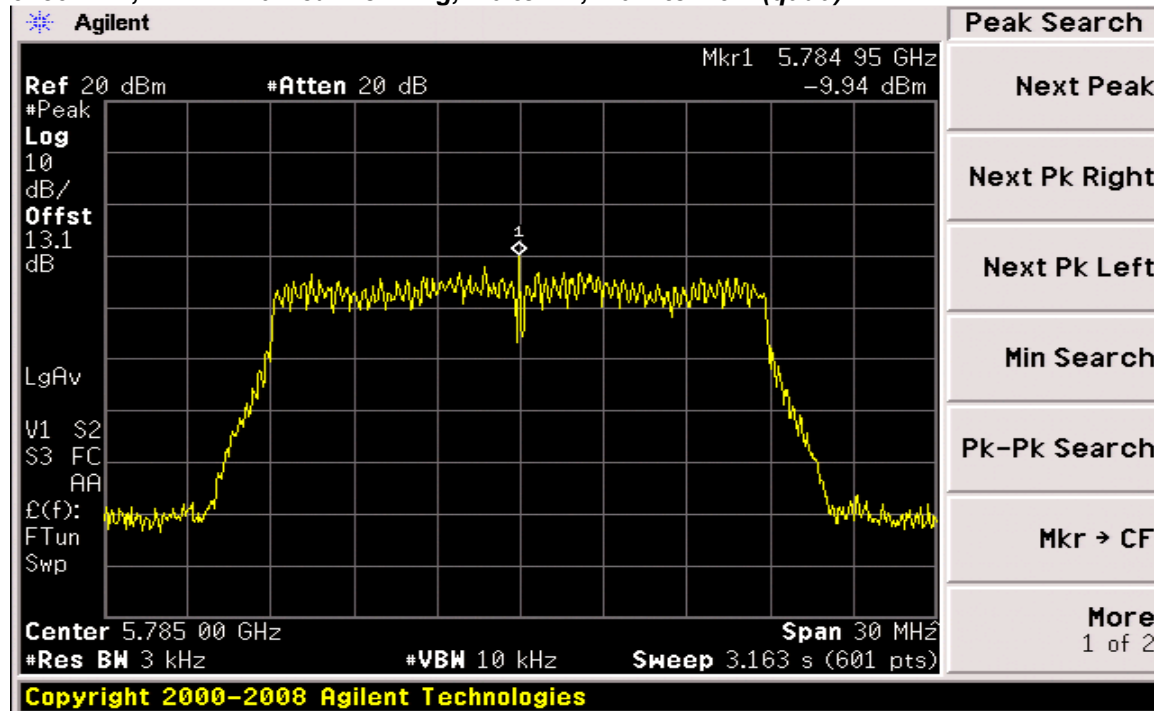
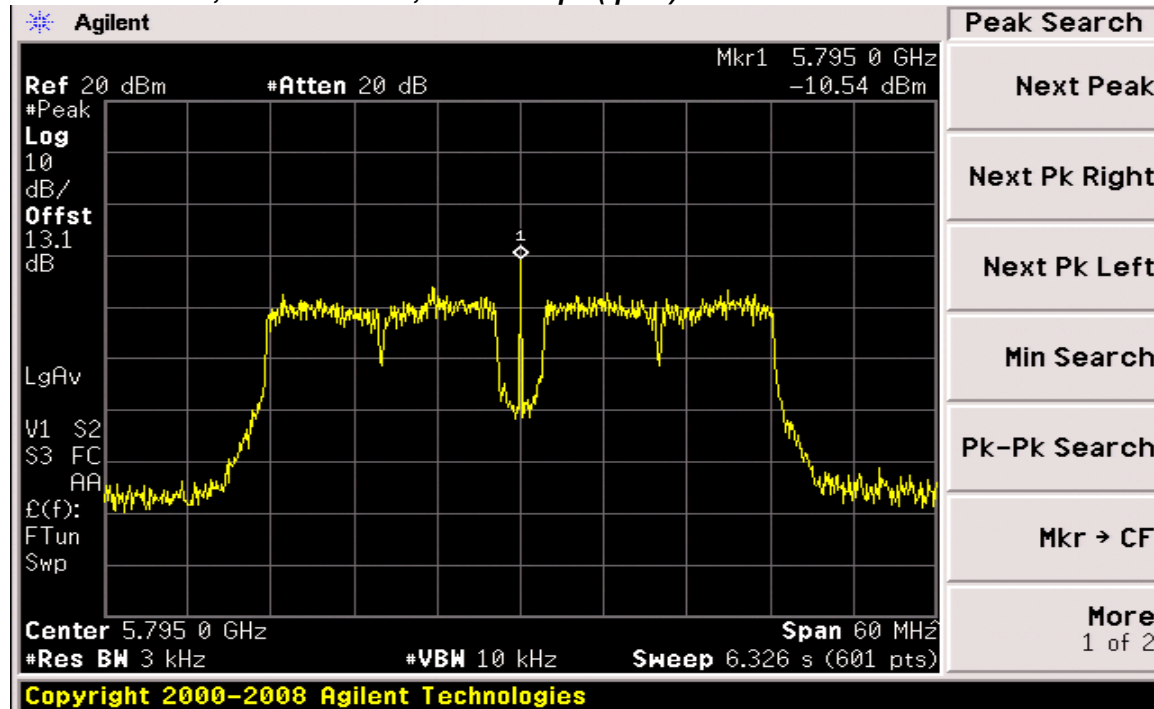


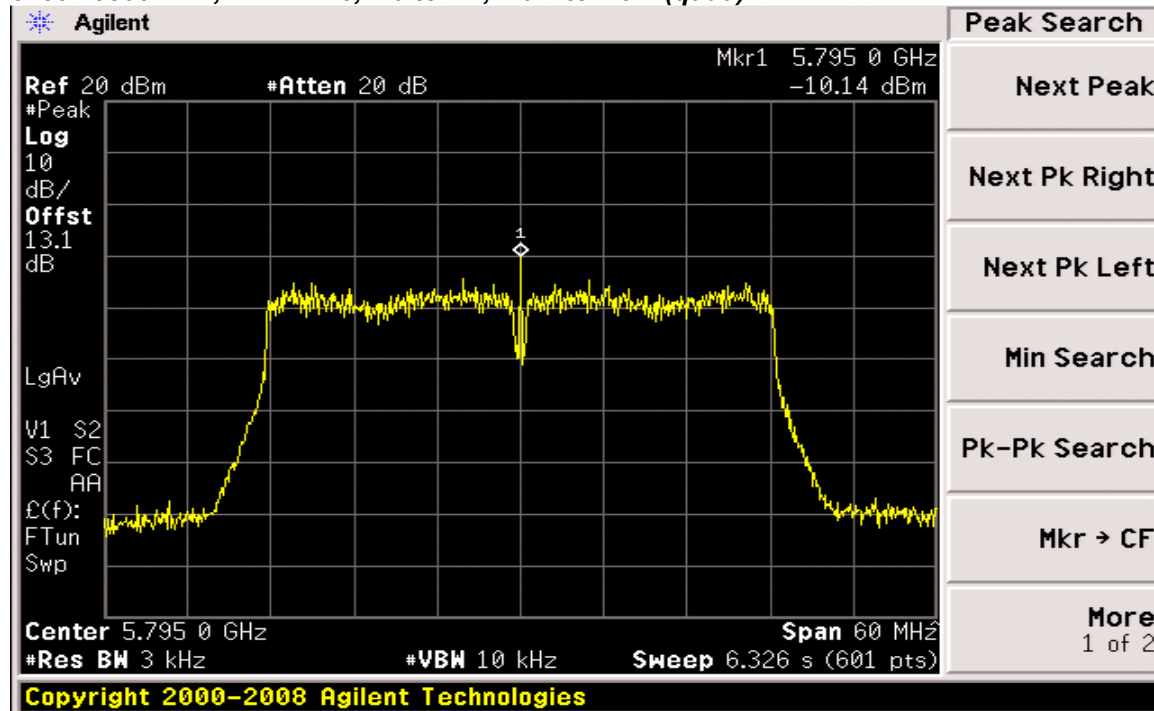
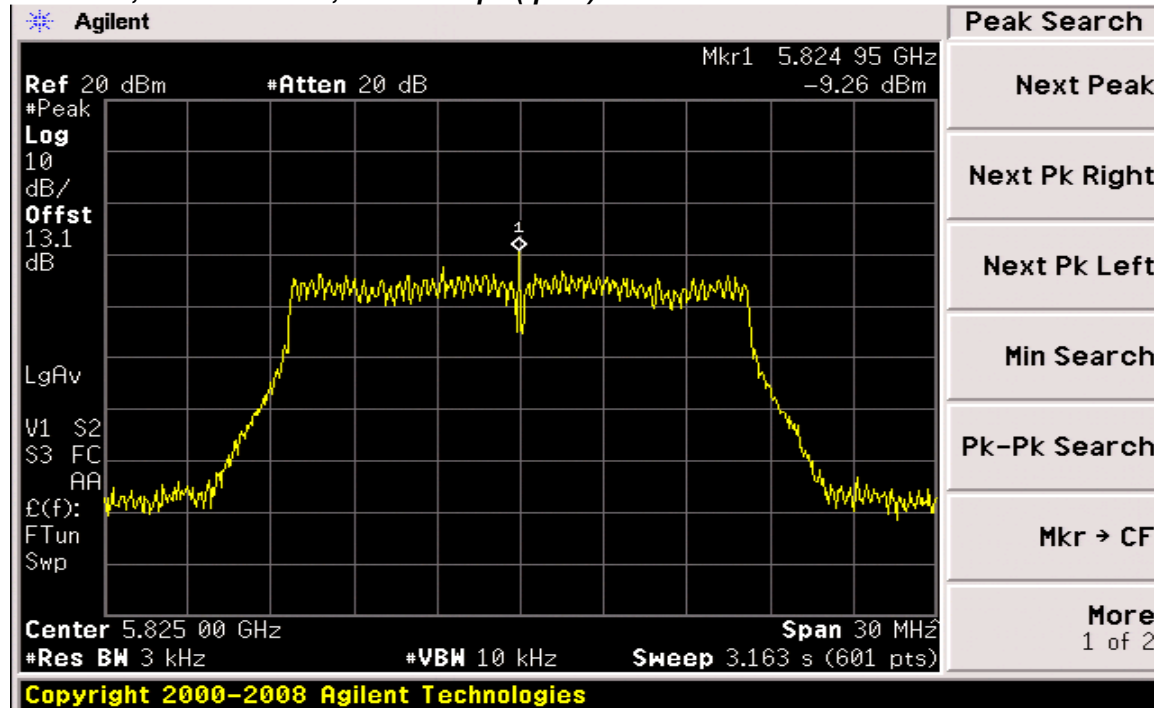
5745 / 5765 / 5785 / 5805 MHz, HT/VHT80, M0 to M7, M0.1 to M9.1(quad)

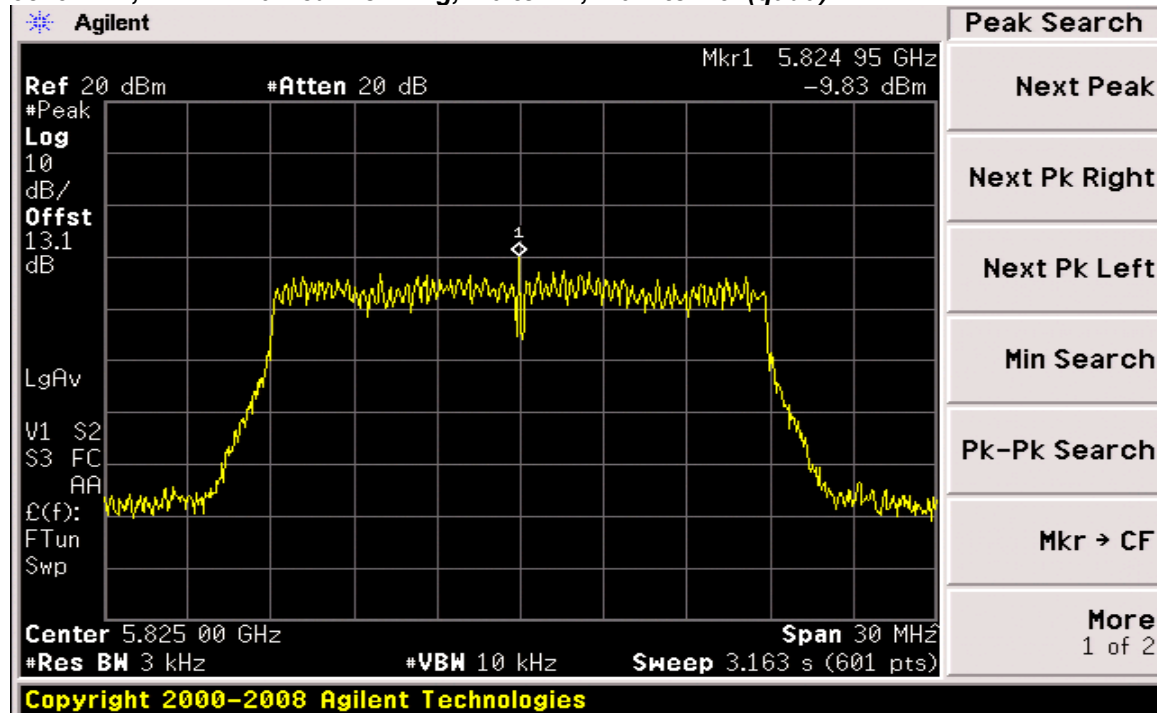


5785 MHz, Non HT/VHT20, 6 to 54 Mbps (quad)



5785 MHz, HT/VHT20 Beamforming, M0 to M7, M0.1 to M9.1 (quad)**5785 / 5805 MHz, Non HT/VHT40, 6 to 54 Mbps (quad)**

5785 / 5805 MHz, HT/VHT40, M0 to M7, M0.1 to M9.1 (quad)**5825 MHz, Non HT/VHT20, 6 to 54 Mbps (quad)**

5825 MHz, HT/VHT20 Beamforming, M0 to M7, M0.1 to M9. (quad)



Conducted Spurious Emission

15.247: In any 100 kHz bandwidth outside the frequency band in which the digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 30 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

Connect the antenna port(s) to the spectrum analyzer input. Place the radio in continuous transmit mode. Configure the spectrum analyzer as shown below (be sure to enter all losses between the transmitter output and the spectrum analyzer).

Span:	30 MHz-40 GHz
Reference Level:	20 dBm
Attenuation:	18 dB
Sweep Time:	5s
Resolution Bandwidth:	100 kHz
Video Bandwidth:	300 kHz
Detector:	Peak
Trace:	Single
Marker:	Peak

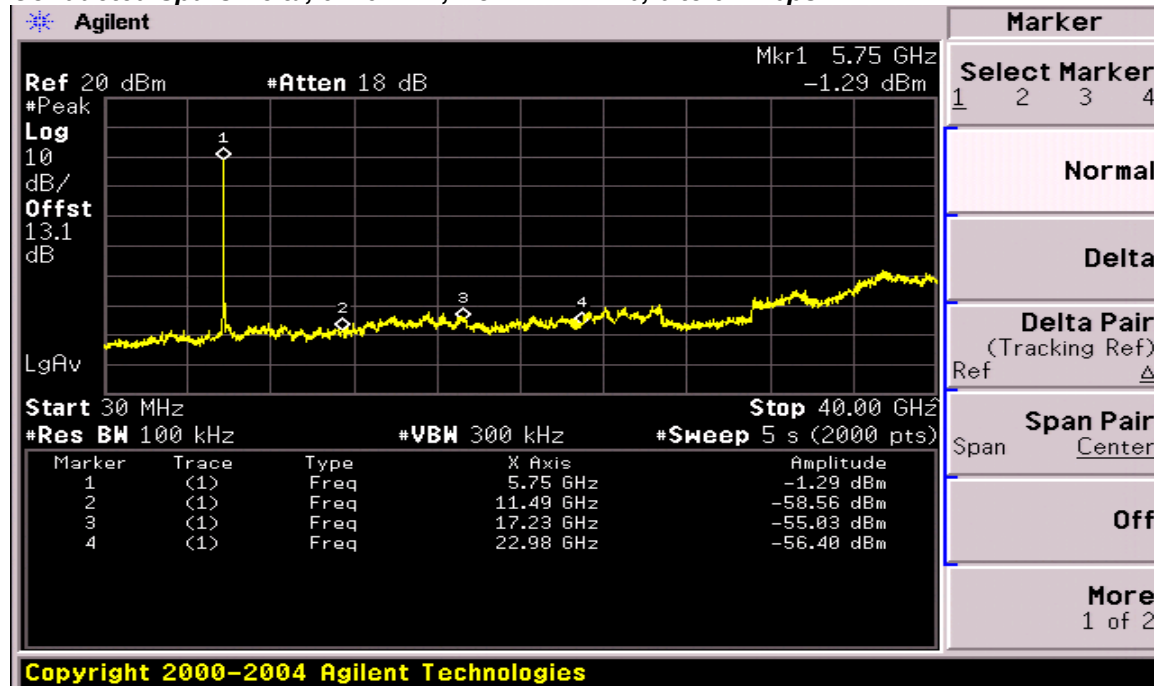
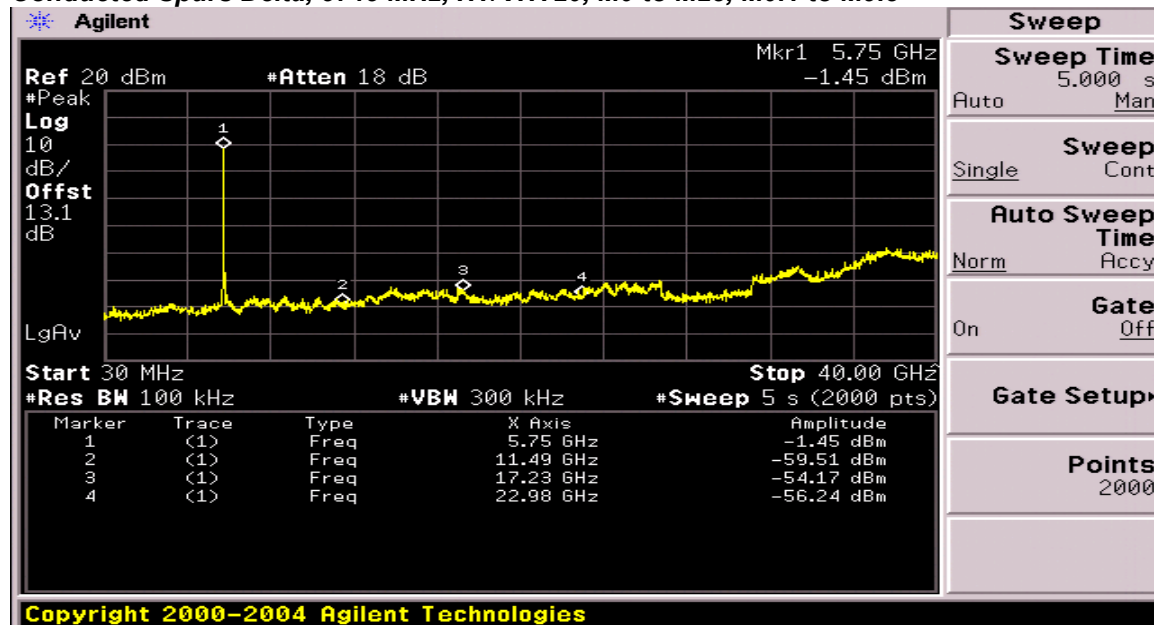
Record the marker waveform peak to spur difference

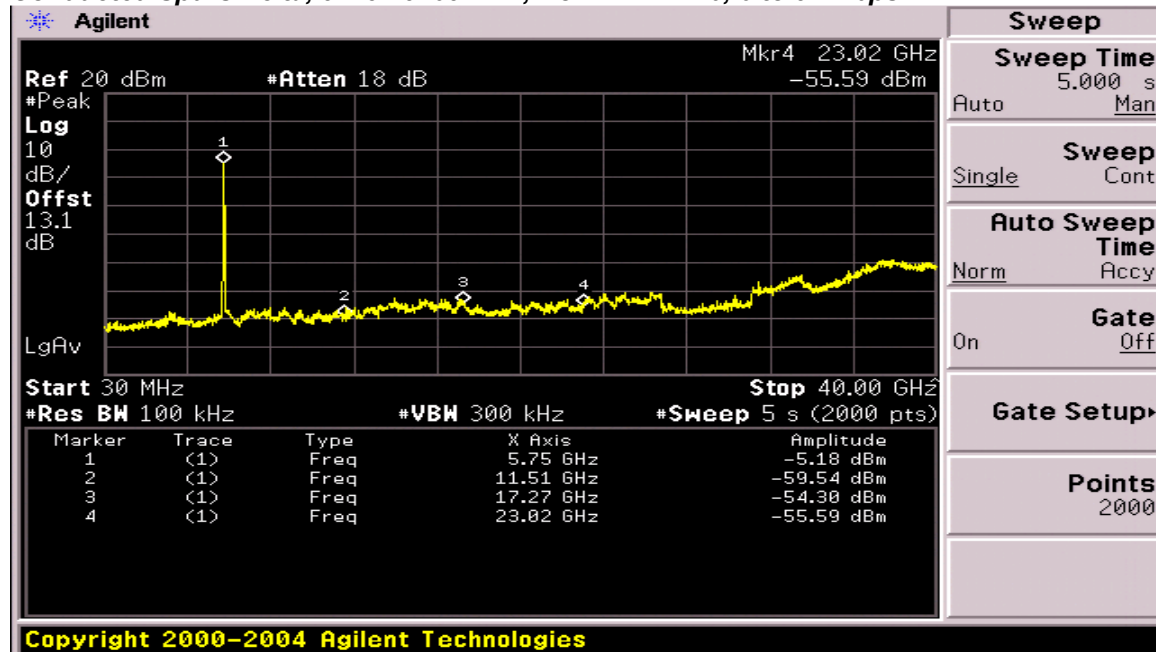
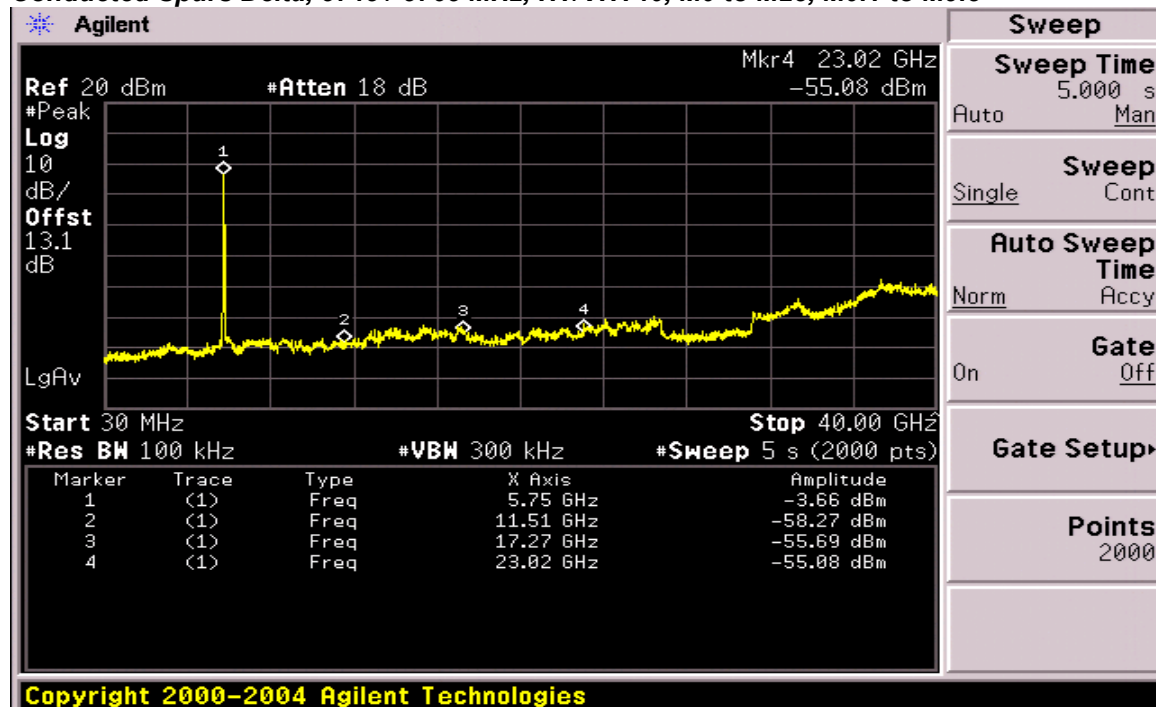
Out-of-band and spurious emissions tests are performed on each output individually without summing or adding $10 \log(N)$ since the measurements are made relative to the in-band emissions on the individual outputs. The worst case output is recorded.

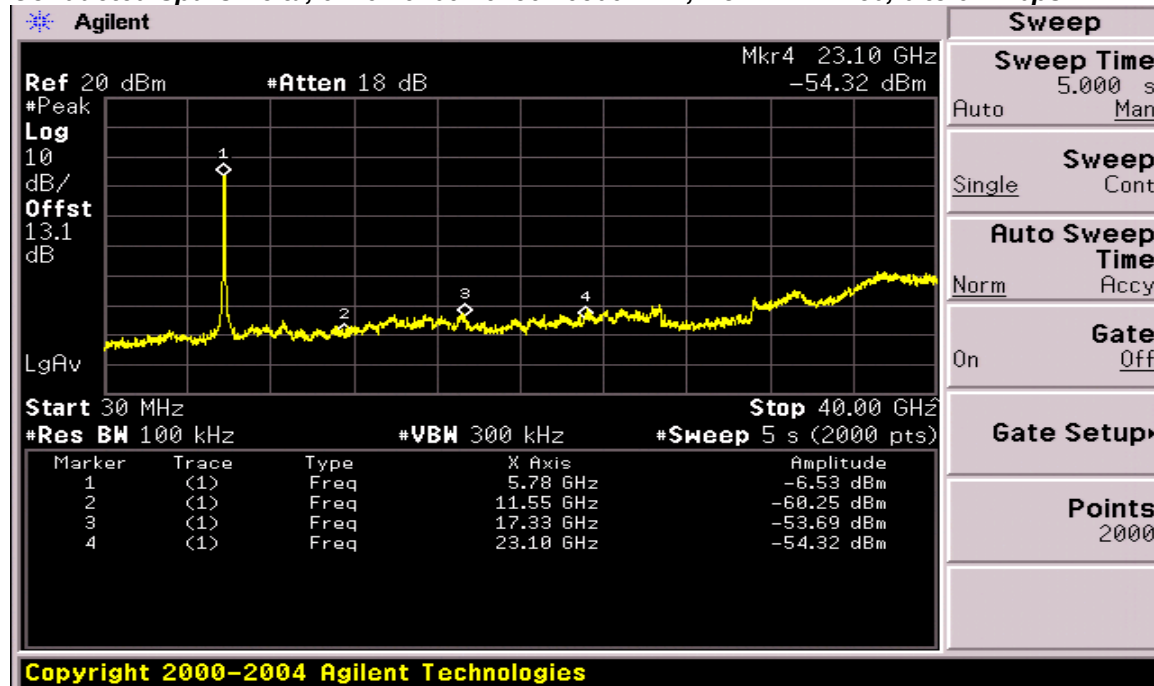
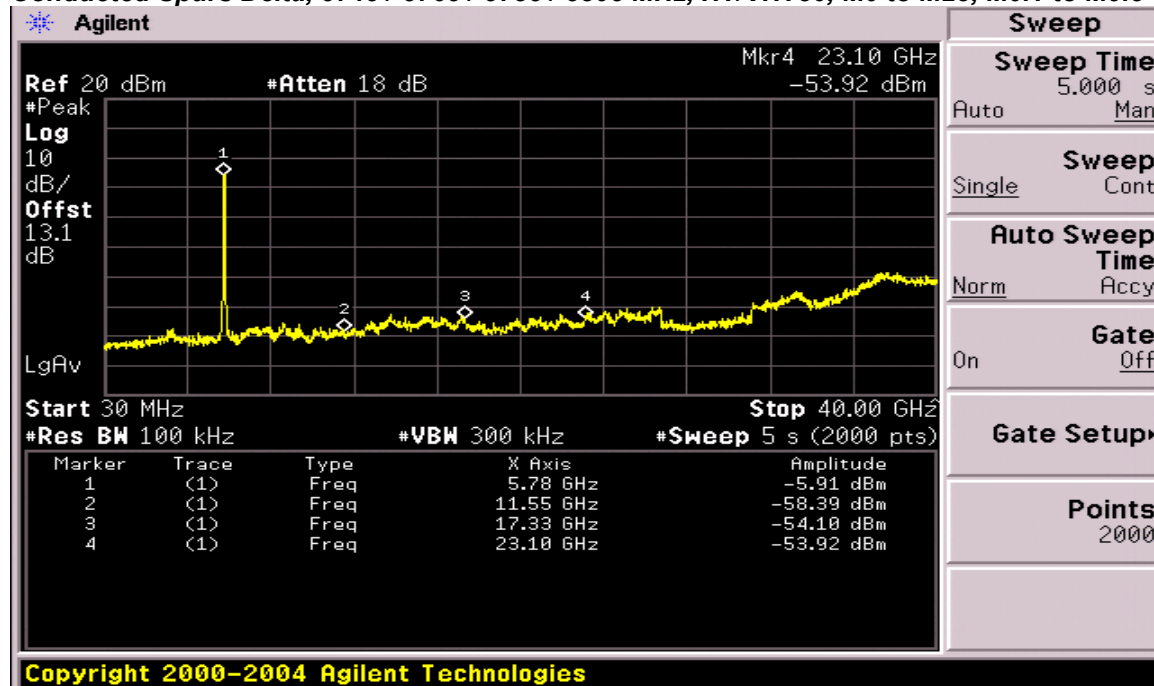
Please note that scans were performed to verify that duty cycle did not have a significant impact on the test results.

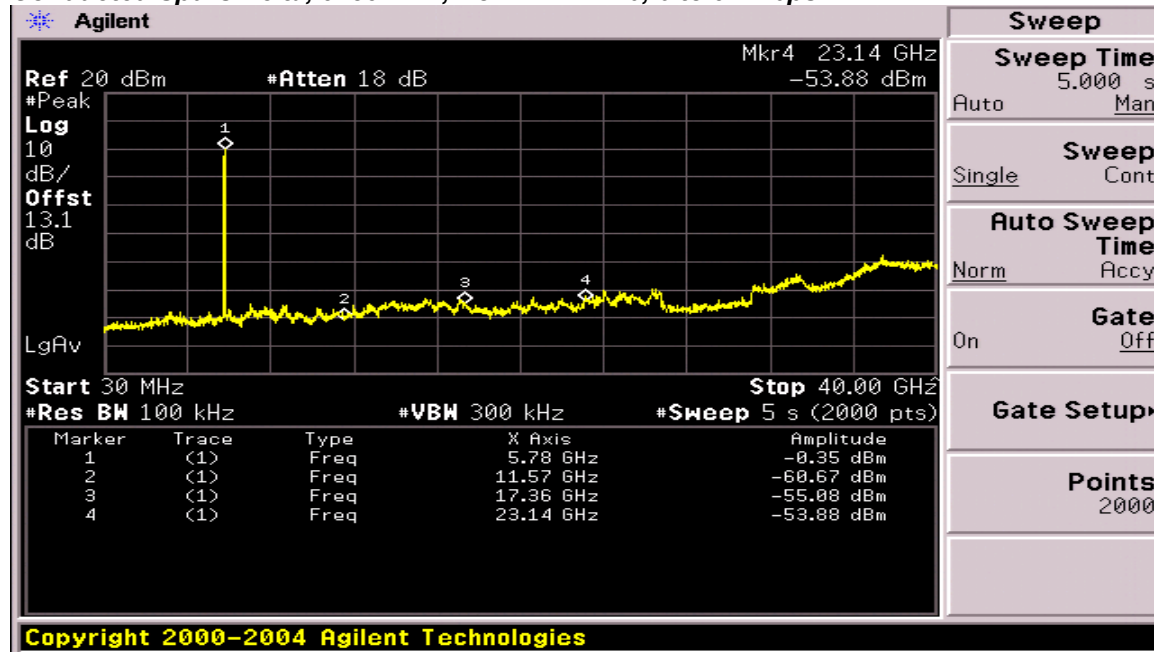
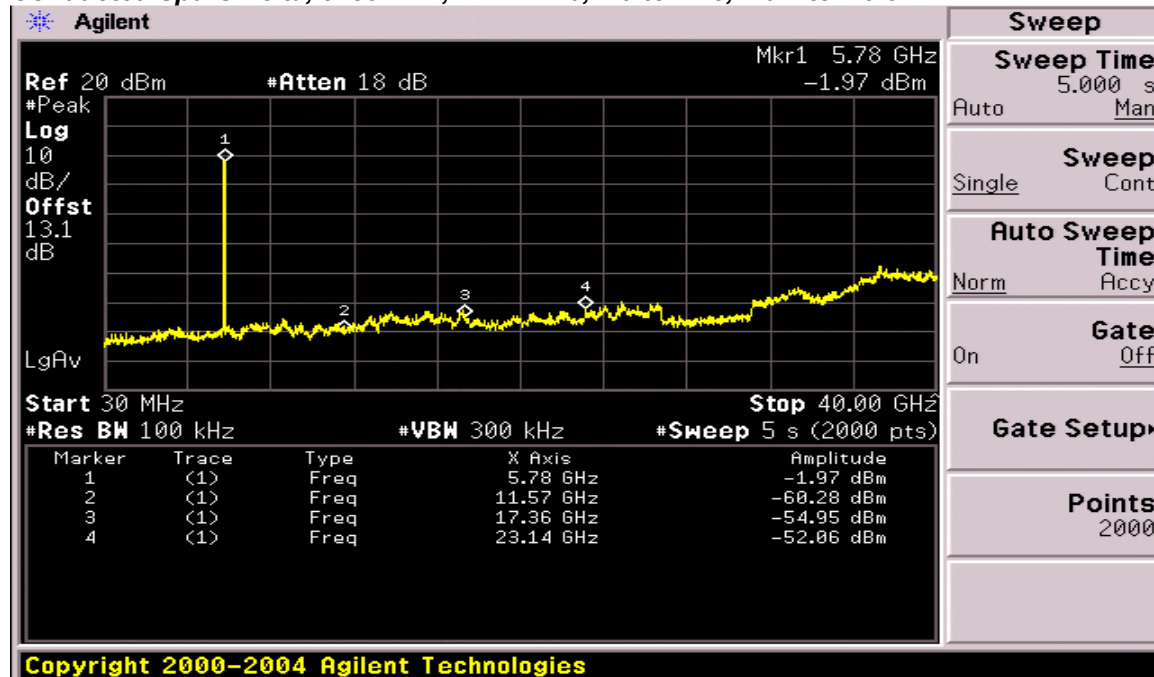


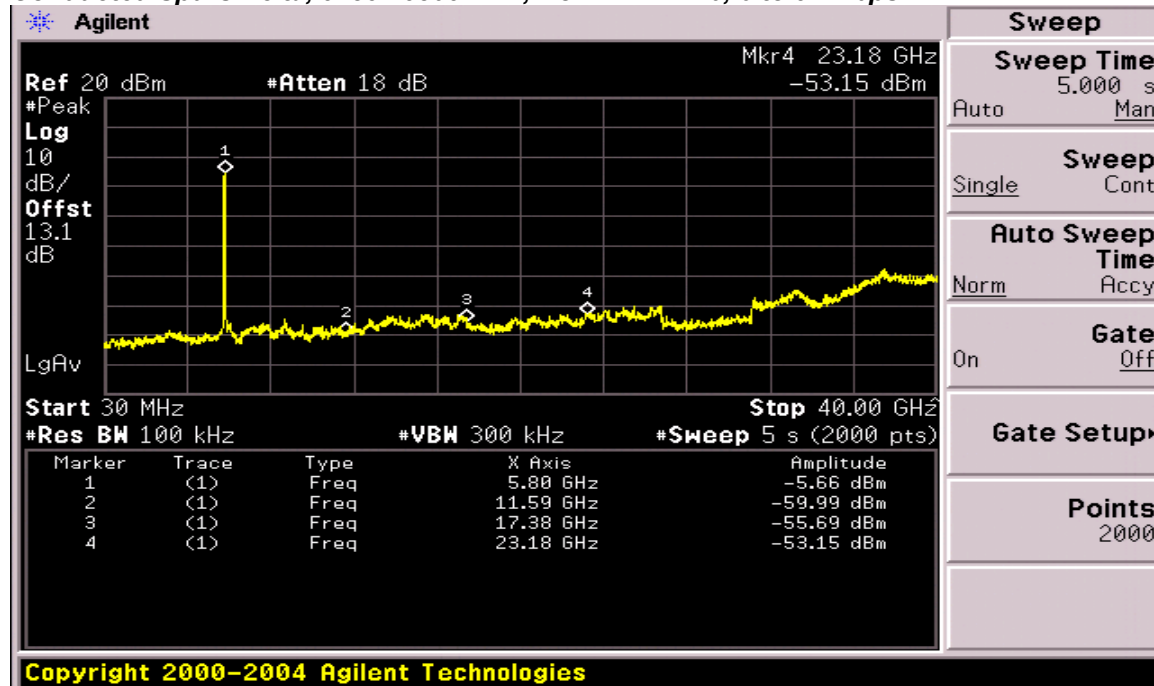
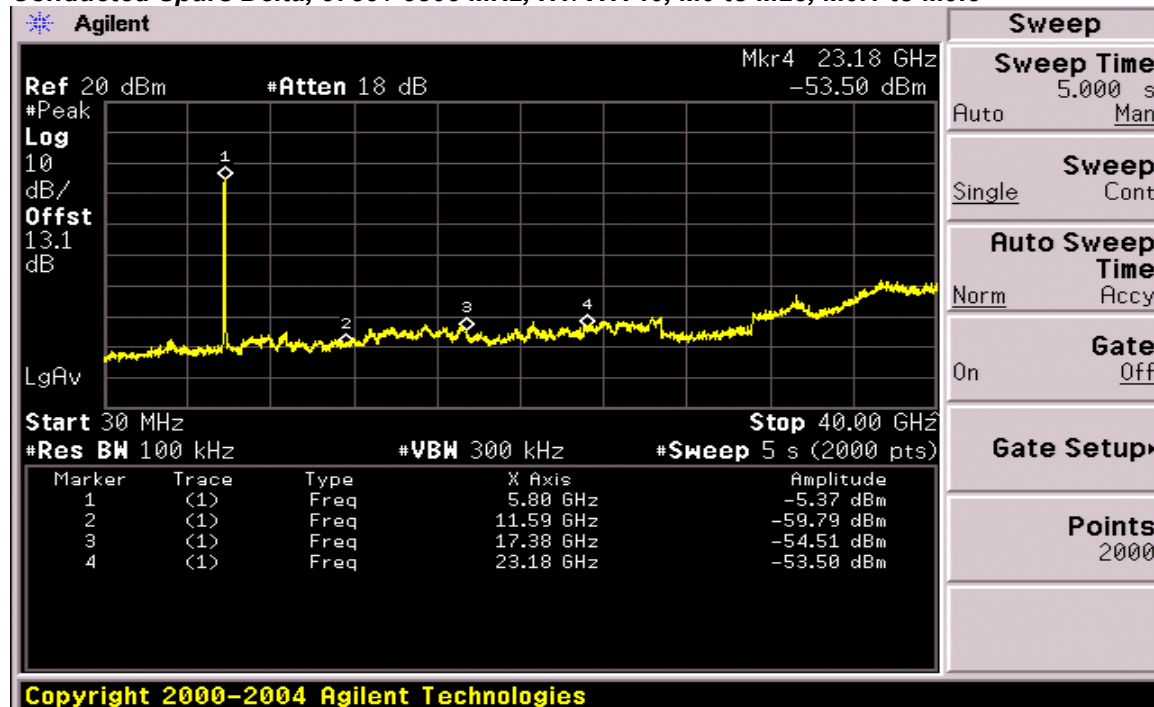
Frequency (MHz)	Mode	Data Rate (Mbps)	Conducted Spur Delta (dB)	Limit (dB c)	Margin (dB)
5745	Non HT/VHT20, 6 to 54 Mbps	6	53.74	30	23.74
	HT/VHT20, M0 to M23, M0.1 to M9.3	m0	52.72	30	22.72
5745/5765	Non HT/VHT40, 6 to 54 Mbps	6	49.12	30	19.12
	HT/VHT40, M0 to M23, M0.1 to M9.3	m0	51.42	30	21.42
5785/5805	Non HT/VHT80, 6 to 54 Mbps	6	47.16	30	17.16
	HT/VHT80, M0 to M23, M0.1 to M9.3	m0x1	48.01	30	18.01
5785	Non HT/VHT20, 6 to 54 Mbps	6	53.53	30	23.30
	HT/VHT20, M0 to M23, M0.1 to M9.3	m0	50.09	30	20.09
5785/5805	Non HT/VHT40, 6 to 54 Mbps	6	47.49	30	17.49
	HT/VHT40, M0 to M23, M0.1 to M9.3	m0	48.13	30	18.13
5825	Non HT/VHT20, 6 to 54 Mbps	6	52.74	30	22.74
	HT/VHT20, M0 to M23, M0.1 to M9.3	m0	52.11	30	22.11

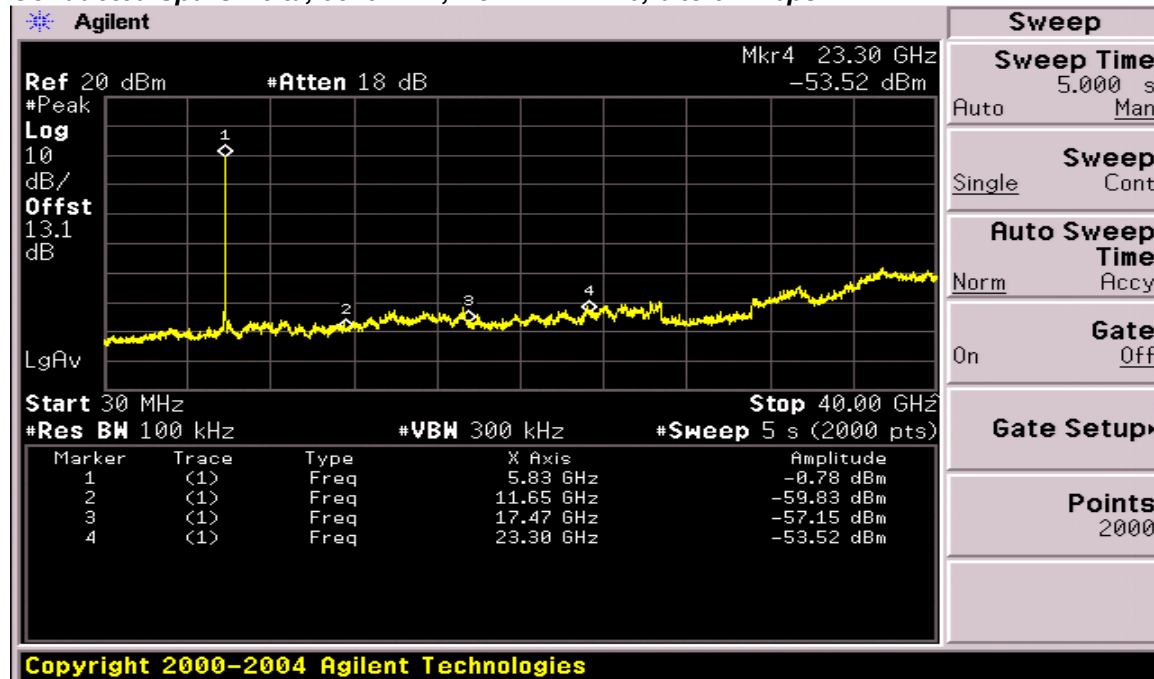
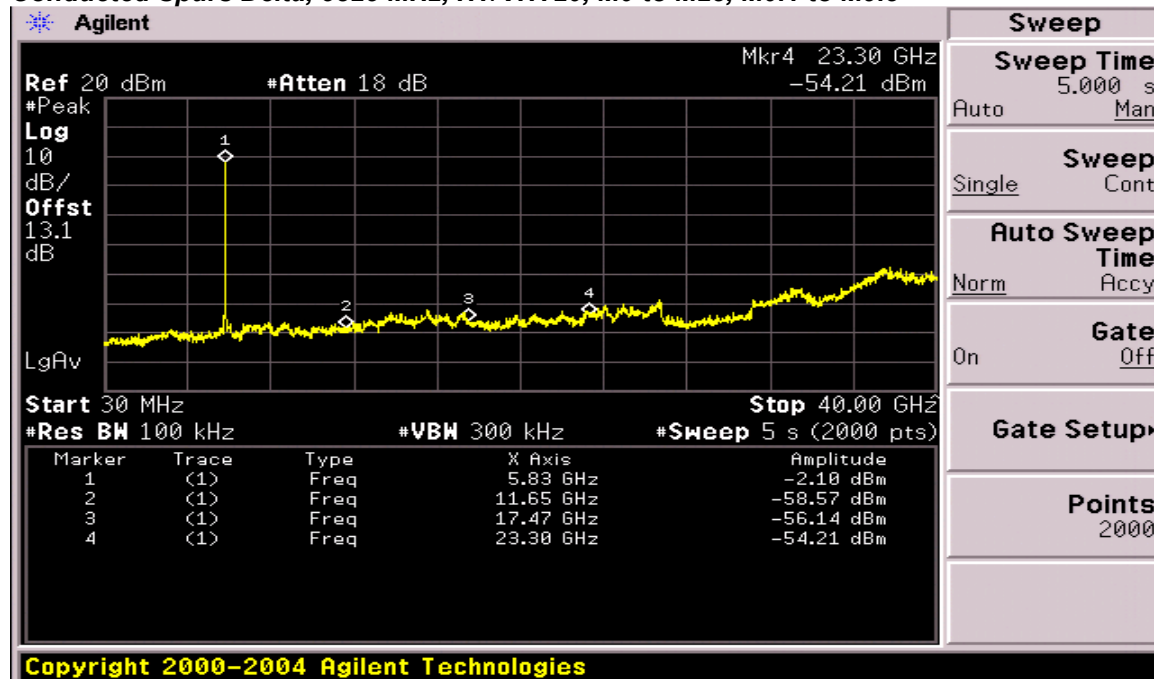
Conducted Spurs Delta, 5745 MHz, Non HT/VHT20, 6 to 54 Mbps**Conducted Spurs Delta, 5745 MHz, HT/VHT20, M0 to M23, M0.1 to M9.3**

Conducted Spurs Delta, 5745 / 5765 MHz, Non HT/VHT40, 6 to 54 Mbps**Conducted Spurs Delta, 5745 / 5765 MHz, HT/VHT40, M0 to M23, M0.1 to M9.3**

Conducted Spurs Delta, 5745 / 5765 / 5785 / 5805 MHz, Non HT/VHT80, 6 to 54 Mbps**Conducted Spurs Delta, 5745 / 5765 / 5785 / 5805 MHz, HT/VHT80, M0 to M23, M0.1 to M9.3**

Conducted Spurs Delta, 5785 MHz, Non HT/VHT20, 6 to 54 Mbps**Conducted Spurs Delta, 5785 MHz, HT/VHT20, M0 to M23, M0.1 to M9.3**

Conducted Spurs Delta, 5785 / 5805 MHz, Non HT/VHT40, 6 to 54 Mbps**Conducted Spurs Delta, 5785 / 5805 MHz, HT/VHT40, M0 to M23, M0.1 to M9.3**

Conducted Spurs Delta, 5825 MHz, Non HT/VHT20, 6 to 54 Mbps**Conducted Spurs Delta, 5825 MHz, HT/VHT20, M0 to M23, M0.1 to M9.3**



Conducted Bandedge

15.247: In any 100 kHz bandwidth outside the frequency band in which the digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 30 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

Connect the antenna port(s) to the spectrum analyzer input. Place the radio in continuous transmit mode. Configure the spectrum analyzer as shown below (be sure to enter all losses between the transmitter output and the spectrum analyzer).

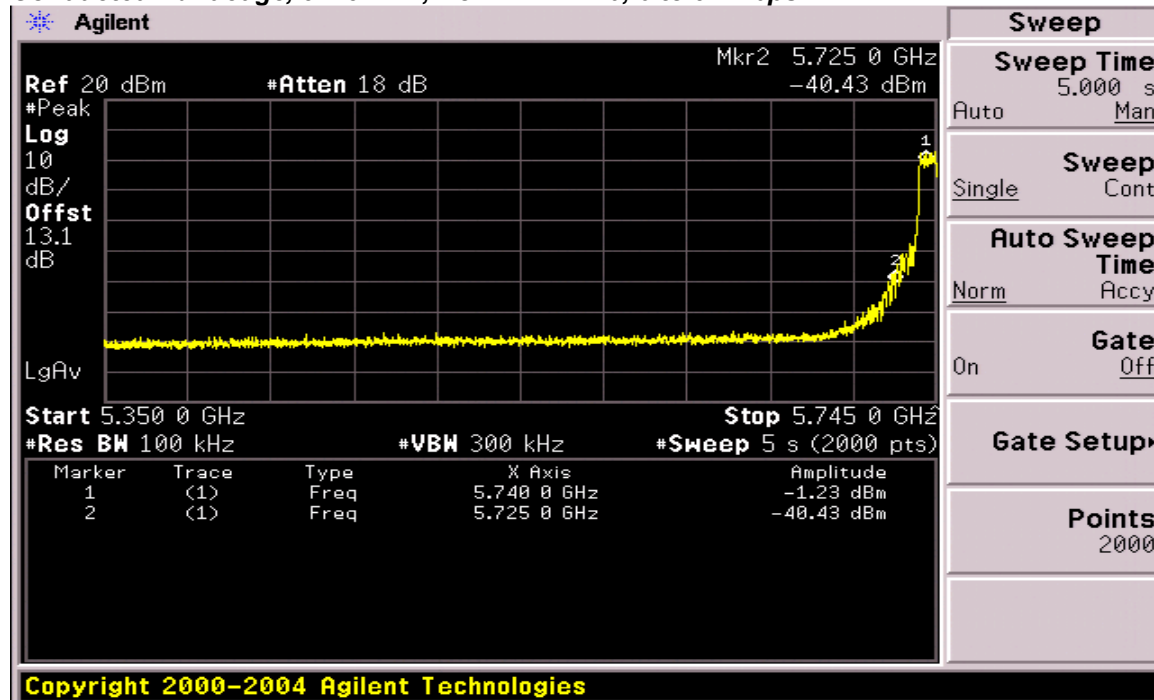
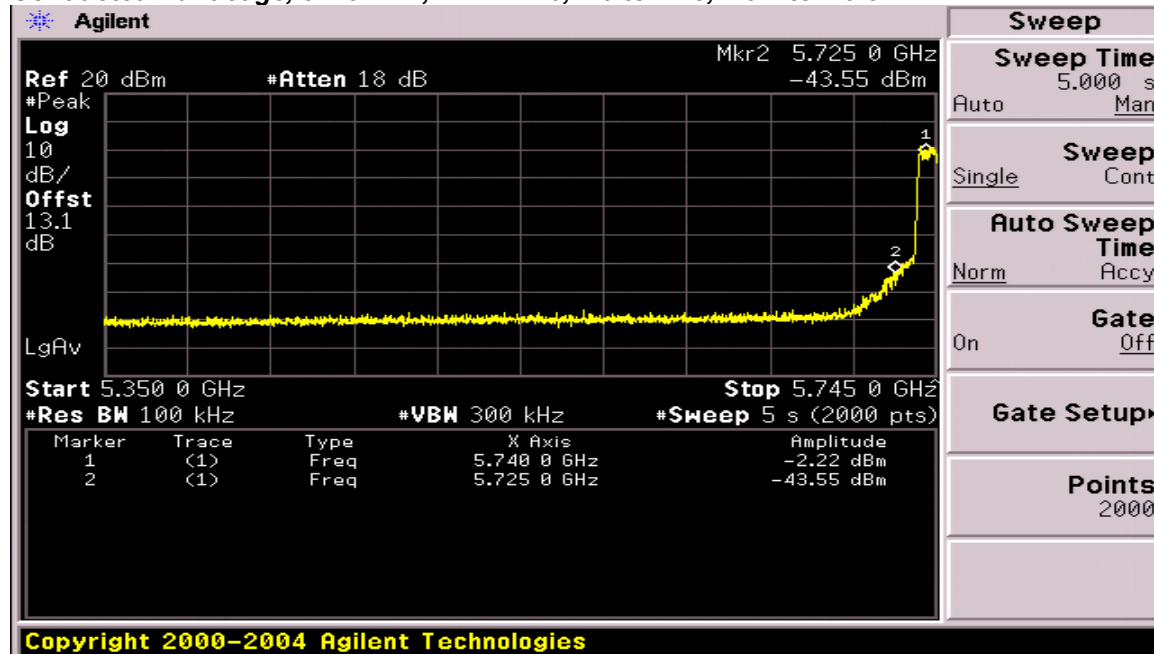
Span:	100MHz – 400MHz
Reference Level:	20 dBm
Attenuation:	18 dB
Sweep Time:	5s
Resolution Bandwidth:	100 kHz
Video Bandwidth:	300 kHz
Detector:	Peak
Trace:	Single
Marker:	Peak

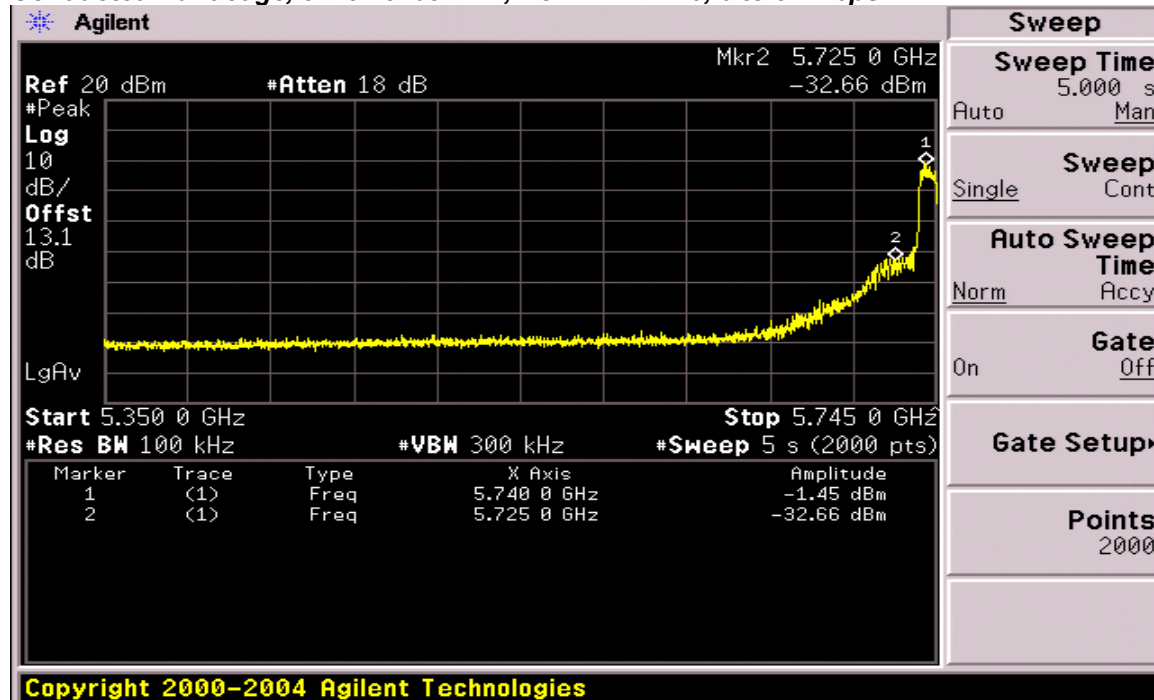
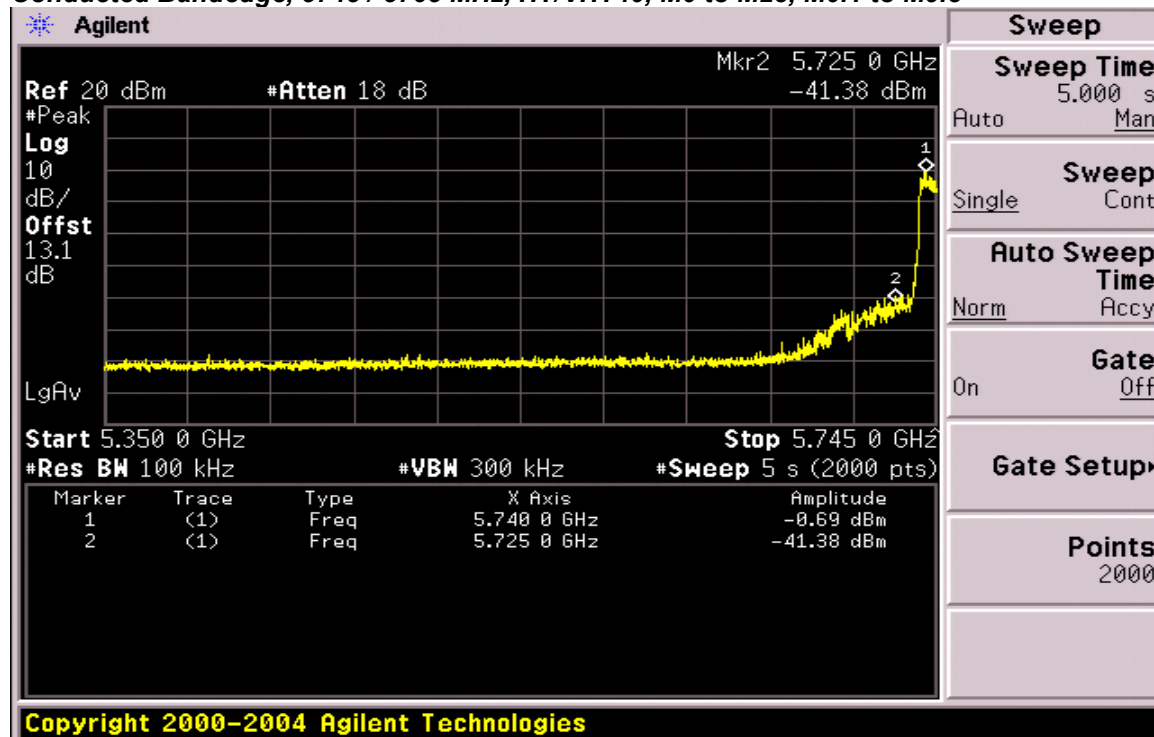
Record the marker waveform peak to spur difference

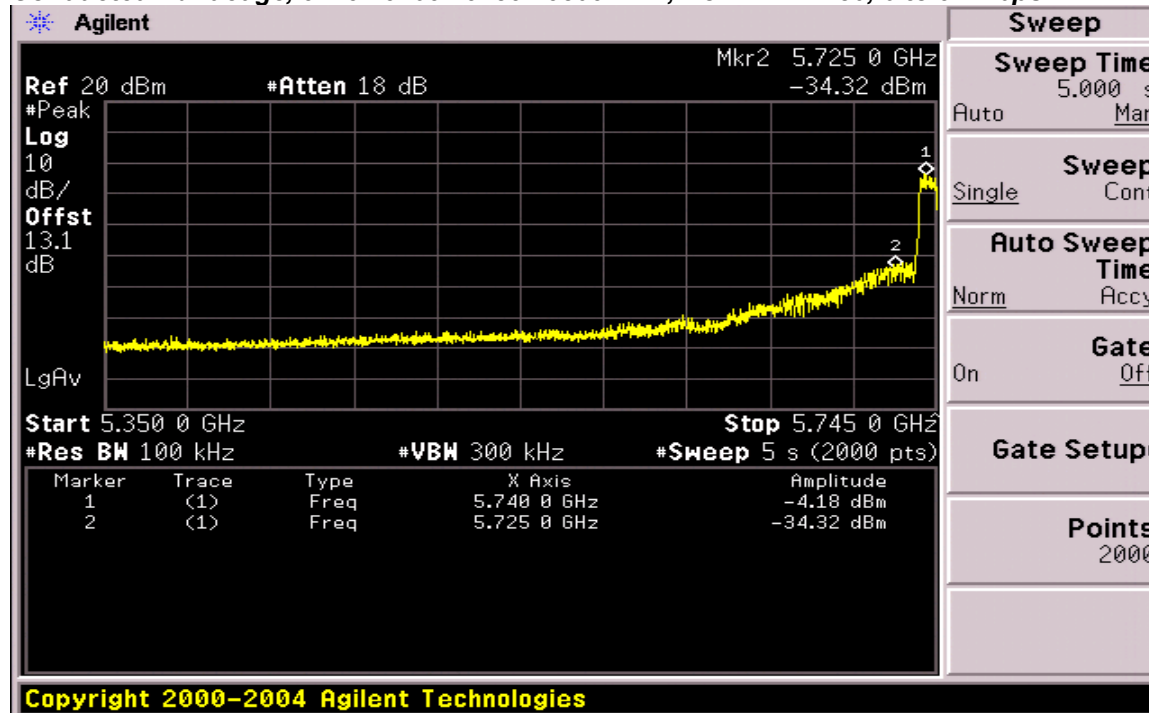
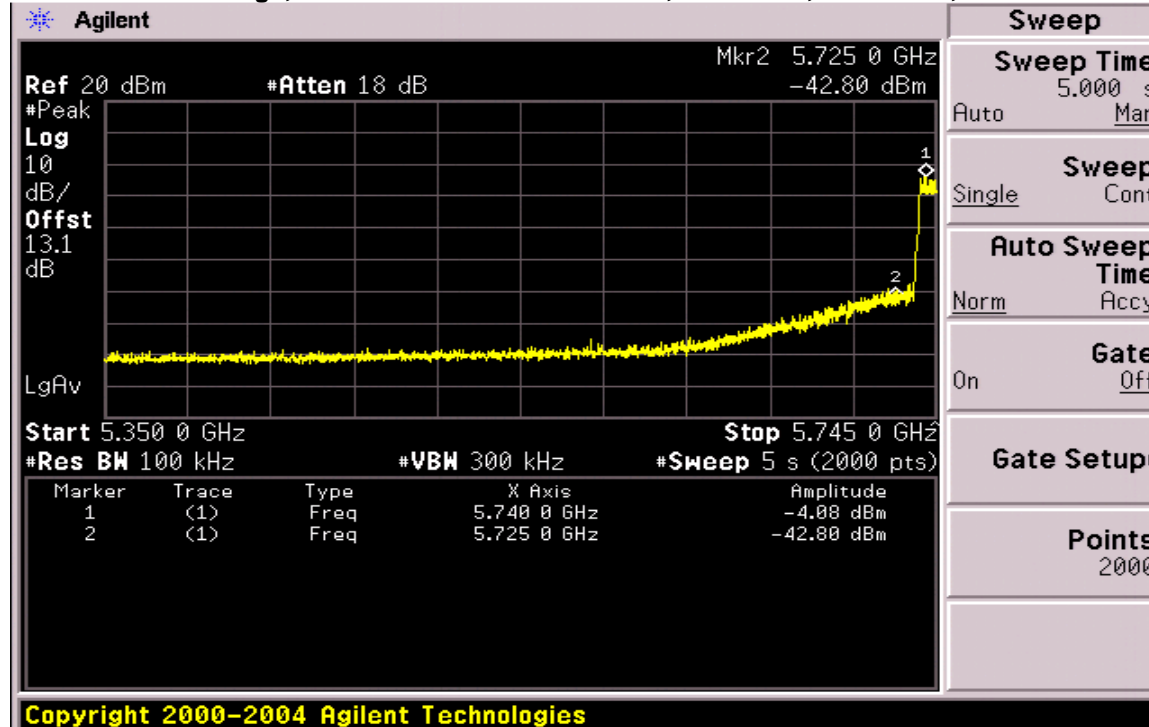
Out-of-band and spurious emissions tests are performed on each output individually without summing or adding $10 \log(N)$ since the measurements are made relative to the in-band emissions on the individual outputs. The worst case output is recorded.

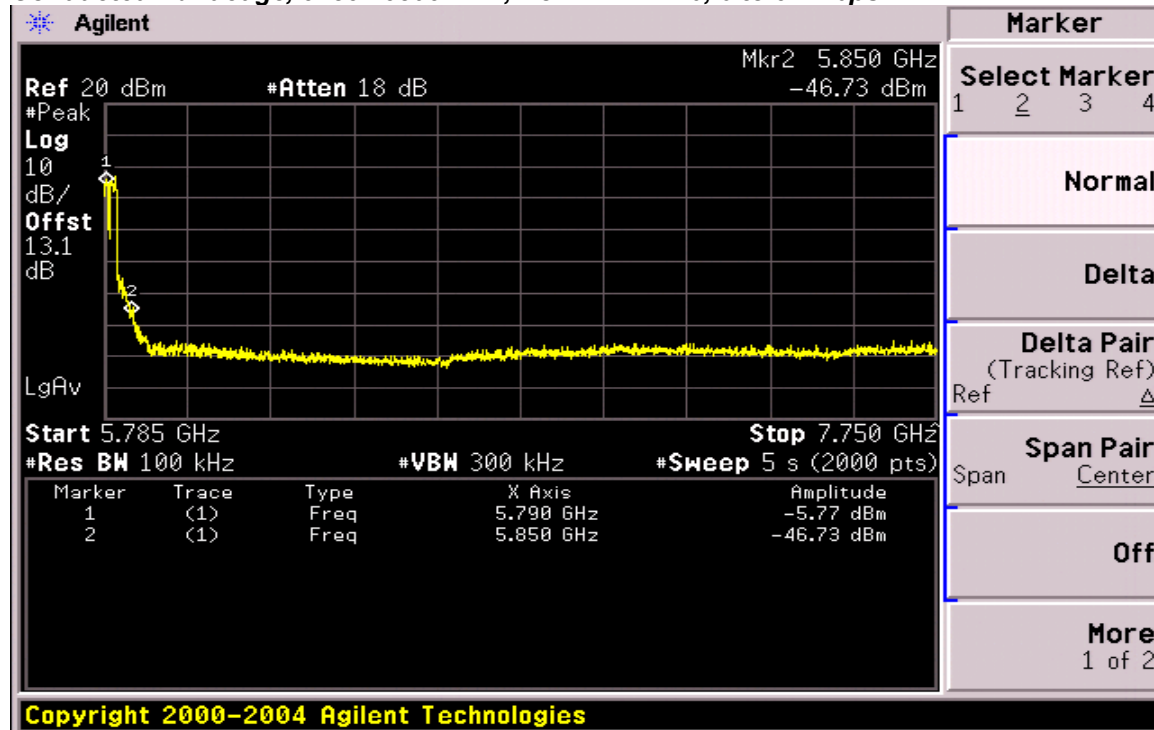
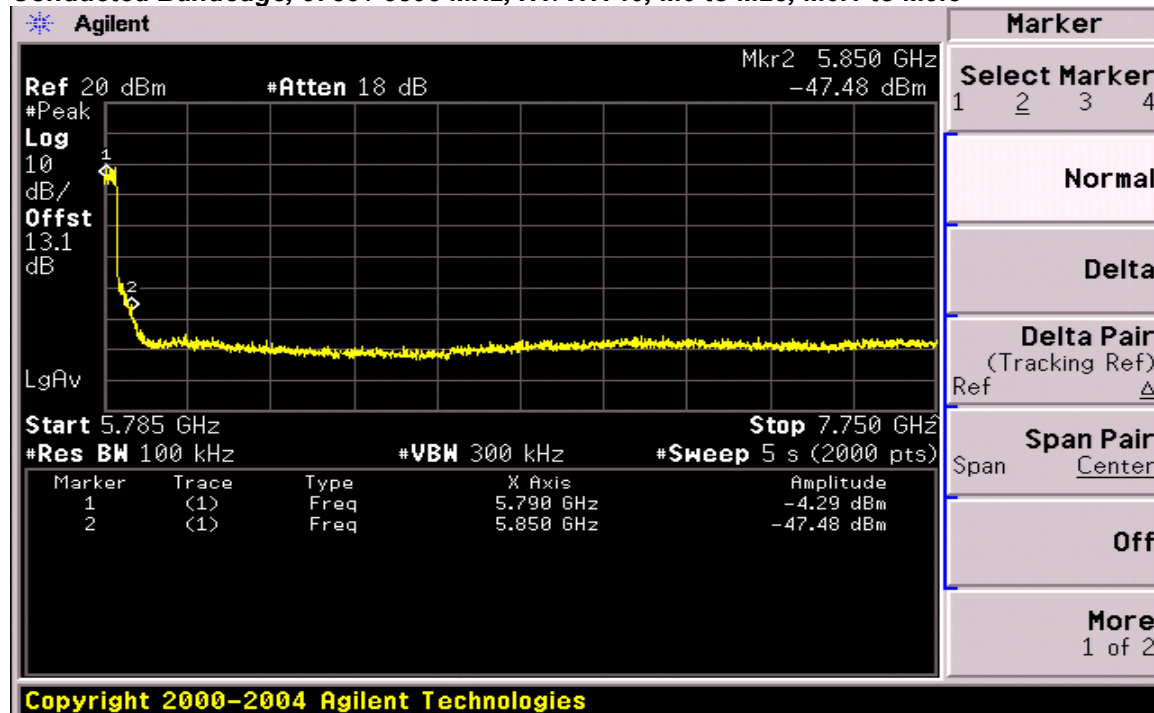


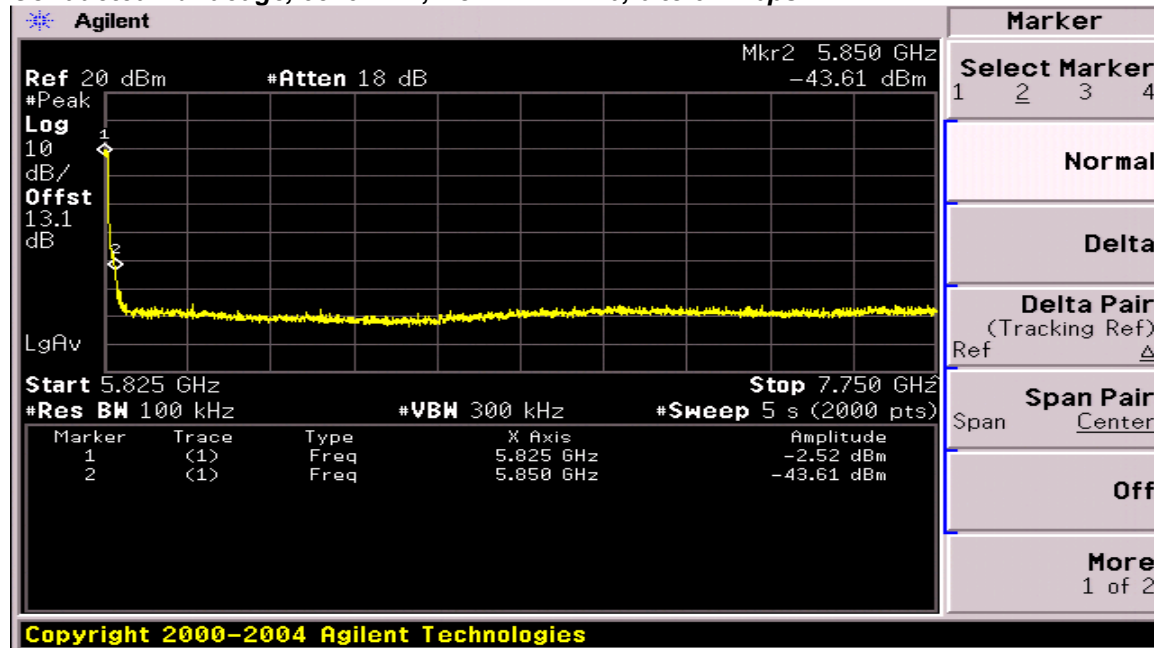
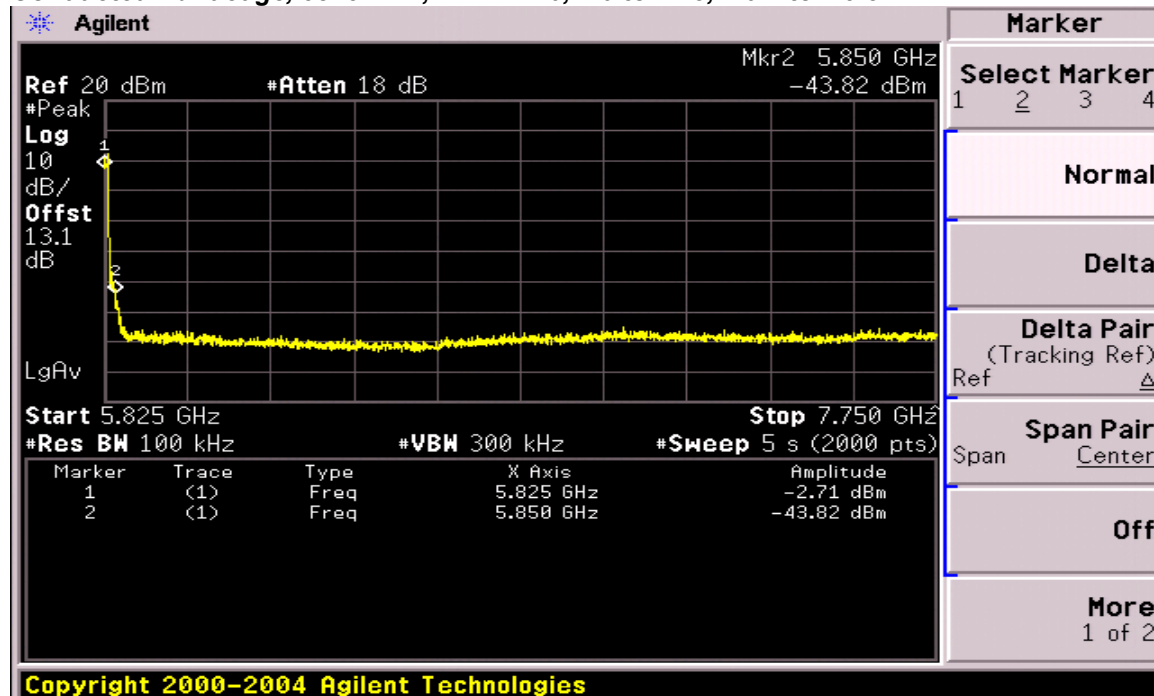
Frequency (MHz)	Mode	Tx Paths	Conducted Bandedge Delta (dB)	Limit (dB c)	Margin (dB)
5745	Non HT/VHT20, 6 to 54 Mbps	2	<u>39.2</u>	>30	9.2
	HT/VHT20, M0 to M23, M0.1 to M9.3	2	41.33	>30	11.33
5745/5765	Non HT/VHT40, 6 to 54 Mbps	1	31.22	>30	1.22
	HT/VHT40, M0 to M23, M0.1 to M9.3	2	40.69	>30	10.69
5745/5765 5785/5805	Non HT/VHT80, 6 to 54 Mbps	1	<u>30.14</u>	>30	0.14
	HT/VHT80, M0 to M23, M0.1 to M9.3	1	38.72	>30	8.72
5785/5805	Non HT/VHT40, 6 to 54 Mbps	3	<u>40.96</u>	>30	10.96
	HT/VHT40, M0 to M23, M0.1 to M9.3	1	<u>43.19</u>	>30	13.19
5825	Non HT/VHT20, 6 to 54 Mbps	2	<u>41.09</u>	>30	11.09
	HT/VHT20, M0 to M23, M0.1 to M9.3	2	<u>41.11</u>	>30	11.11

**Conducted Bandedge, 5745 MHz, Non HT/VHT20, 6 to 54 Mbps****Conducted Bandedge, 5745 MHz, HT/VHT20, M0 to M23, M0.1 to M9.3**

Conducted Bandedge, 5745 / 5765 MHz, Non HT/VHT40, 6 to 54 Mbps**Conducted Bandedge, 5745 / 5765 MHz, HT/VHT40, M0 to M23, M0.1 to M9.3**

**Conducted Bandedge, 5745 / 5765 / 5785 / 5805 MHz, Non HT/VHT80, 6 to 54 Mbps****Conducted Bandedge, 5745 / 5765 / 5785 / 5805 MHz, HT/VHT80, M0 to M23, M0.1 to M9.3**

Conducted Bandedge, 5785 / 5805 MHz, Non HT/VHT40, 6 to 54 Mbps**Conducted Bandedge, 5785 / 5805 MHz, HT/VHT40, M0 to M23, M0.1 to M9.3**

Conducted Bandedge, 5825 MHz, Non HT/VHT20, 6 to 54 Mbps**Conducted Bandedge, 5825 MHz, HT/VHT20, M0 to M23, M0.1 to M9.3**



Emission Test Results

Testing Laboratory: Cisco Systems, Inc., 170 West Tasman Drive, San Jose, CA 95134, USA

Radiated Spurious Emissions

15.205 / RSS-210 2.7: Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

Using Vasona, configure the spectrum analyzer as shown below (be sure to enter all losses between the transmitter output and the spectrum analyzer). Place the radio in continuous transmit mode.

Span:	1GHz – 18 GHz
Reference Level:	87 dBuV
Attenuation:	0 dB
Sweep Time:	Coupled
Resolution Bandwidth:	1MHz
Video Bandwidth:	1 MHz for peak, 1 kHz for average
Detector:	Peak

Terminate the access Point RF ports with 50 ohm loads.

Maximize Turntable (find worst case table angle), Maximize Antenna (find worst case height)

Save 2 plots: 1) Average Plot (Vertical and Horizontal), Limit= 54dBuV/m @3m
 2) Peak plot (Vertical and Horizontal), Limit = 74dBuV/m @3m

Place a marker at the end of the restricted band closest to the transmit frequency to show compliance.
Also measure any emissions in the restricted bands.

This report represents the worst case data for all supported operating modes and antennas.
There are no measurable emissions above 18 GHz.

Please note that scans were performed to verify that duty cycle did not have a significant impact on the test results. Also, scans with reduced RBW and VBW settings were performed to verify that no significant emissions were present under the noise floor.



Frequency (MHz)	Mode	Data Rate (Mbps)	Spurious Emission Level (dBuV/m)	Limit (dBuV/m)
5745	Non HT-20, 6 to 54 Mbps	6	<54	54
	Non HT-20 Beam Forming, 6 to 54 Mbps	6	<54	54
	HT-20, M0 to M23	m0	<54	54
	HT-20 STBC, M0 to M7	m0	<54	54
	HT-20 Beam Forming, M0 to M23	m0	<54	54
5785	Non HT-20, 6 to 54 Mbps	6	<54	54
	Non HT-20 Beam Forming, 6 to 54 Mbps	6	<54	54
	HT-20, M0 to M23	m0	<54	54
	HT-20 STBC, M0 to M7	m0	<54	54
	HT-20 Beam Forming, M0 to M23	m0	<54	54
5825	Non HT-20, 6 to 54 Mbps	6	<54	54
	Non HT-20 Beam Forming, 6 to 54 Mbps	6	<54	54
	HT-20, M0 to M23	m0	<54	54
	HT-20 STBC, M0 to M7	m0	<54	54
	HT-20 Beam Forming, M0 to M23	m0	<54	54

Frequency (MHz)	Mode	Data Rate (Mbps)	Spurious Emission Level (dBuV/m)	Limit (dBuV/m)
5745	Non HT-20, 6 to 54 Mbps	6	<74	74
	Non HT-20 Beam Forming, 6 to 54 Mbps	6	<74	74
	HT-20, M0 to M23	m0	<74	74
	HT-20 STBC, M0 to M7	m0	<74	74
	HT-20 Beam Forming, M0 to M23	m0	<74	74
5785	Non HT-20, 6 to 54 Mbps	6	<74	74
	Non HT-20 Beam Forming, 6 to 54 Mbps	6	<74	74
	HT-20, M0 to M23	m0	<74	74
	HT-20 STBC, M0 to M7	m0	<74	74
	HT-20 Beam Forming, M0 to M23	m0	<74	74
5825	Non HT-20, 6 to 54 Mbps	6	<74	74
	Non HT-20 Beam Forming, 6 to 54 Mbps	6	<74	74
	HT-20, M0 to M23	m0	<74	74
	HT-20 STBC, M0 to M7	m0	<74	74
	HT-20 Beam Forming, M0 to M23	m0	<74	74



Radiated Spurious Emissions 1GHz to 18GHz

Radiated Transmitter Spurs, 5745 MHz, All Rates, All Modes, Average Horizontal Polarization



Radiated Transmitter Spurs, 5745 MHz, All Rates, All Modes, Average Vertical Polarization





Radiated Transmitter Spurs, 5785 MHz, All Rates, All Modes, Average Horizontal Polarization



Radiated Transmitter Spurs, 5785 MHz, All Rates, All Modes, Average Vertical Polarization





Radiated Transmitter Spurs, 5825 MHz, All Rates, All Modes, Average Horizontal Polarization



Radiated Transmitter Spurs, 5825 MHz, All Rates, All Modes, Average Vertical Polarization



**Radiated Transmitter Spurs, 5745 MHz, All Rates, All Modes, Peak Horizontal Polarization****Radiated Transmitter Spurs, 5745 MHz, All Rates, All Modes, Peak Vertical Polarization**



Radiated Transmitter Spurs, 5785 MHz, All Rates, All Modes, Peak Horizontal Polarization



Radiated Transmitter Spurs, 5785 MHz, All Rates, All Modes, Peak Vertical Polarization





Radiated Transmitter Spurs, 5825 MHz, All Rates, All Modes, Peak Horizontal Polarization

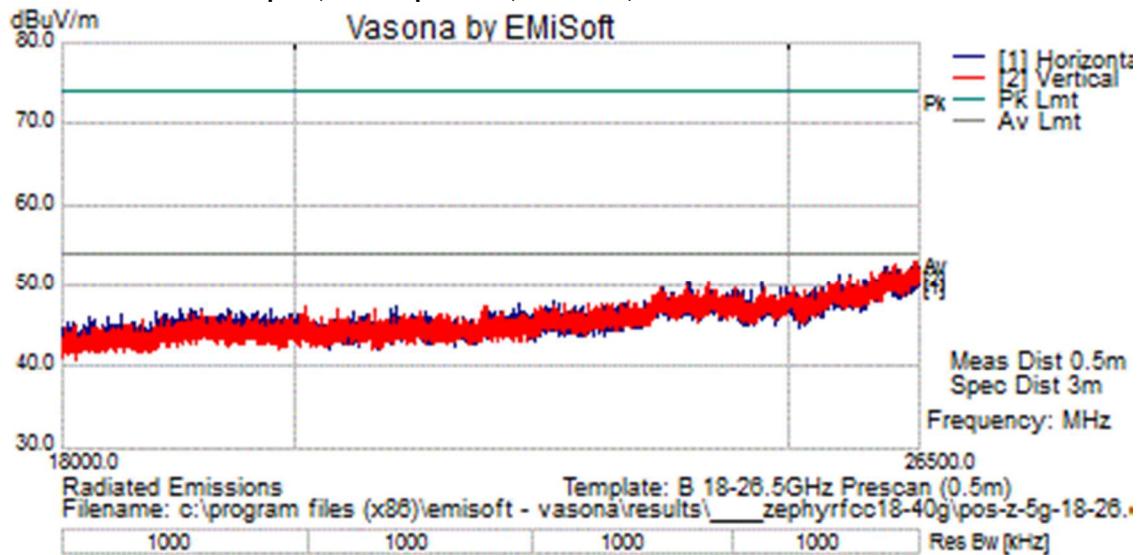


Radiated Transmitter Spurs, 5825 MHz, All Rates, All Modes, Peak Vertical Polarization

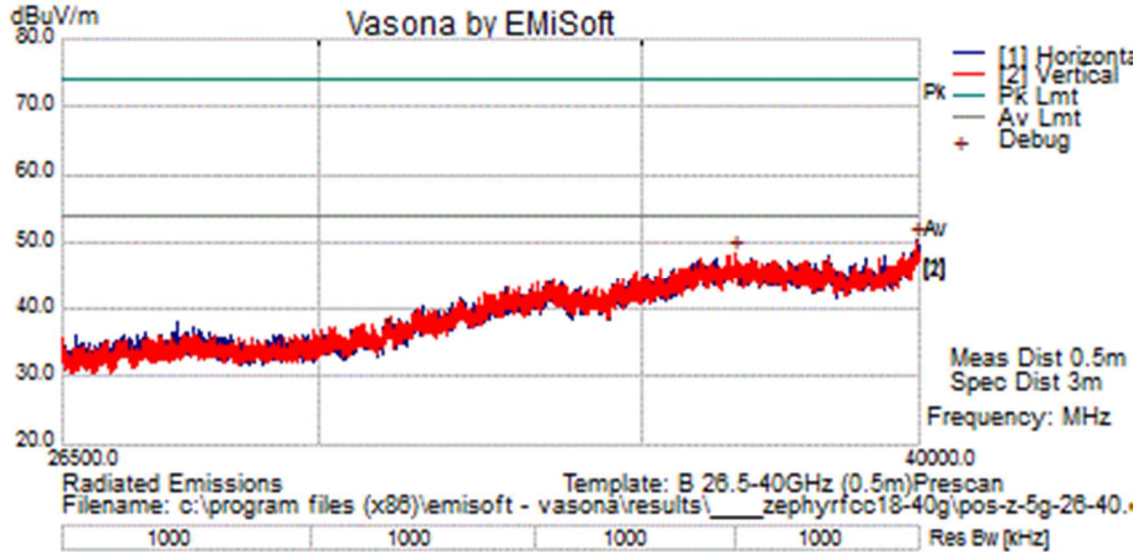


Radiated Spurious Emissions 18GHz to 26.5GHz

Radiated Transmitter Spurs, All Frequencies, All Rates, All Modes.



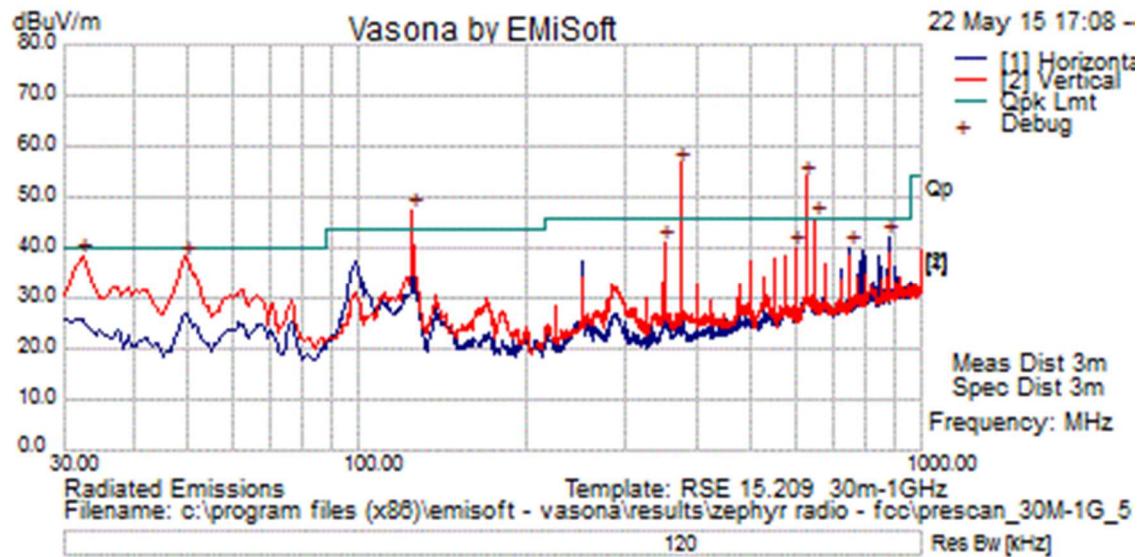
Radiated Spurious Emissions 26.5GHz to 40GHz





Transmitter Radiated Spurious Emissions 30MHz to 1GHz

Note that the high emissions at 375MHz, 125MHz, and 625MHz are digital emissions. These will be covered in the EMC test report. A comparison measurement was made with the radio transmitter turned off (page 66). The emissions were still observed when the radio was off, so it can be concluded that the emissions are not caused by the radio.



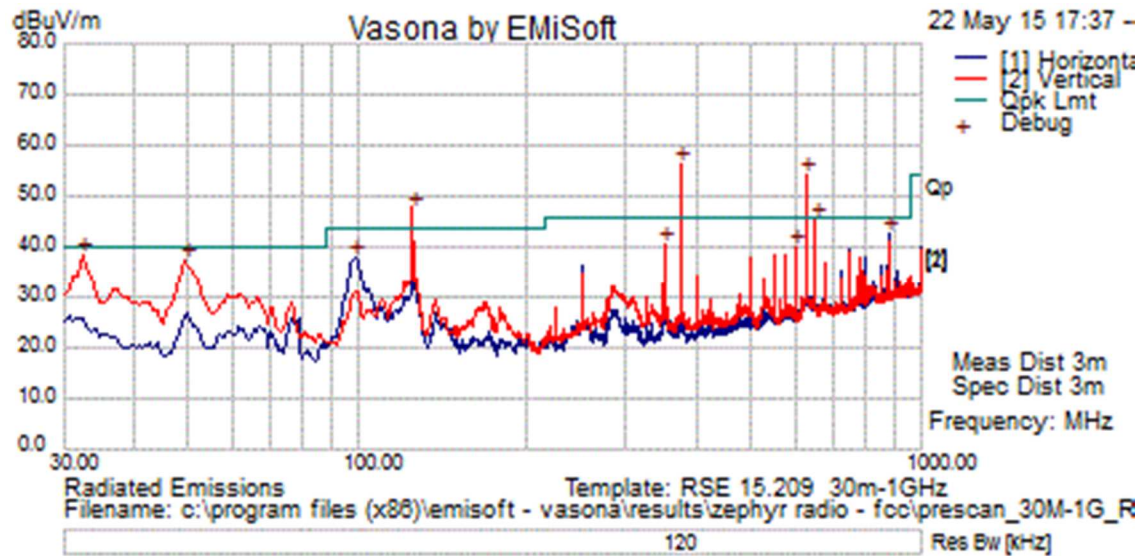
No	Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
1	374.956	39.8	1.8	15.1	56.7	Peak [Scan]	V	100	0	46.0	10.7	Fail	
2	624.731	32.2	2.4	19.4	54.0	Peak [Scan]	H	200	0	46.0	8.0	Fail	
3	125.181	32.4	1.1	14.0	47.5	Peak [Scan]	V	100	0	43.5	4.0	Fail	
4	650.194	23.5	2.4	19.9	45.8	Peak [Scan]	V	100	0	46.0	-.2	Pass	
5	32.425	18.7	.5	19.3	38.4	Peak [Scan]	V	100	0	40.0	-1.6	Pass	
6	49.400	29.4	.6	8.1	38.1	Peak [Scan]	V	100	0	40.0	-1.9	Pass	
7	875.113	17.1	2.8	22.1	42.0	Peak [Scan]	H	100	0	46.0	-4.0	Pass	
8	350.100	25.0	1.8	14.4	41.2	Peak [Scan]	H	100	0	46.0	-4.8	Pass	
9	750.225	16.7	2.6	20.8	40.1	Peak [Scan]	H	100	0	46.0	-5.9	Pass	
10	599.875	19.2	2.3	18.4	39.9	Peak [Scan]	V	100	0	46.0	-6.1	Pass	



Receiver Radiated Spurious Emissions

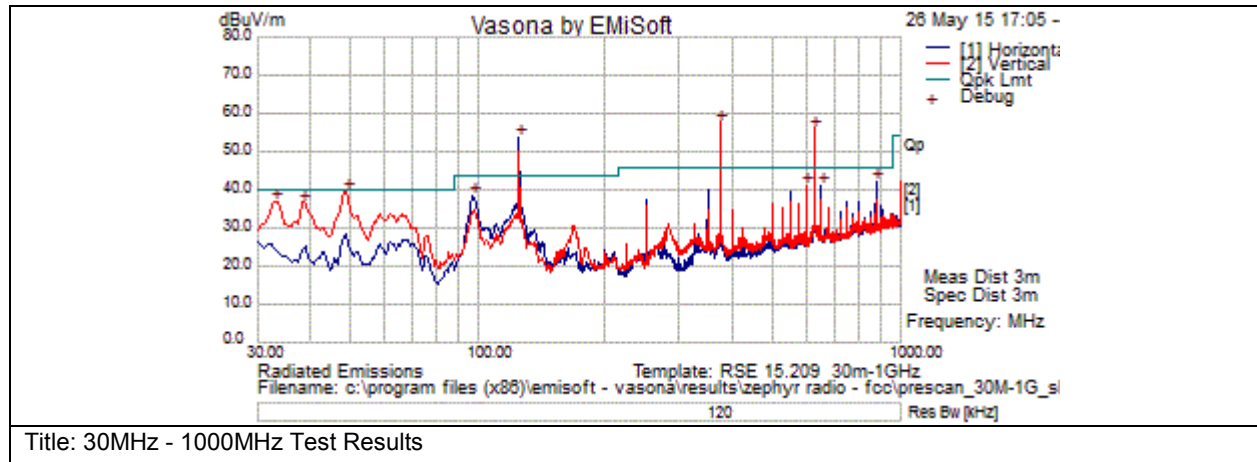
Radiated Receiver Spurs, All Frequencies, All Rates, All Modes, 30MHz to 1GHz

Note that the high emissions at 375MHz, 125MHz, and 625MHz are digital emissions. These will be covered in the EMC test report. A comparison measurement was made with the radio transmitter turned off (page 66). The emissions were still observed when the radio was off, so it can be concluded that the emissions are not caused by the radio.



No	Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
1	374.956	39.6	1.8	15.1	56.5	Peak [Scan]	V	100	0	46.0	10.5	Fail	
2	624.731	32.4	2.4	19.4	54.2	Peak [Scan]	H	200	0	46.0	8.2	Fail	
3	125.181	32.7	1.1	14.0	47.8	Peak [Scan]	V	100	0	43.5	4.3	Fail	
4	650.194	23.3	2.4	19.9	45.6	Peak [Scan]	V	100	0	46.0	-.4	Pass	
5	32.425	18.6	.5	19.3	38.4	Peak [Scan]	V	100	0	40.0	-1.6	Pass	
6	49.400	28.7	.6	8.1	37.3	Peak [Scan]	V	100	0	40.0	-2.7	Pass	
7	875.113	17.7	2.8	22.1	42.6	Peak [Scan]	H	100	0	46.0	-3.4	Pass	
8	350.100	24.3	1.8	14.4	40.5	Peak [Scan]	V	200	0	46.0	-5.5	Pass	
9	99.113	27.0	.9	10.1	38.0	Peak [Scan]	H	200	0	43.5	-5.5	Pass	
10	599.875	19.4	2.3	18.4	40.2	Peak [Scan]	V	100	0	46.0	-5.8	Pass	

Tx turned off:



Test Results Table

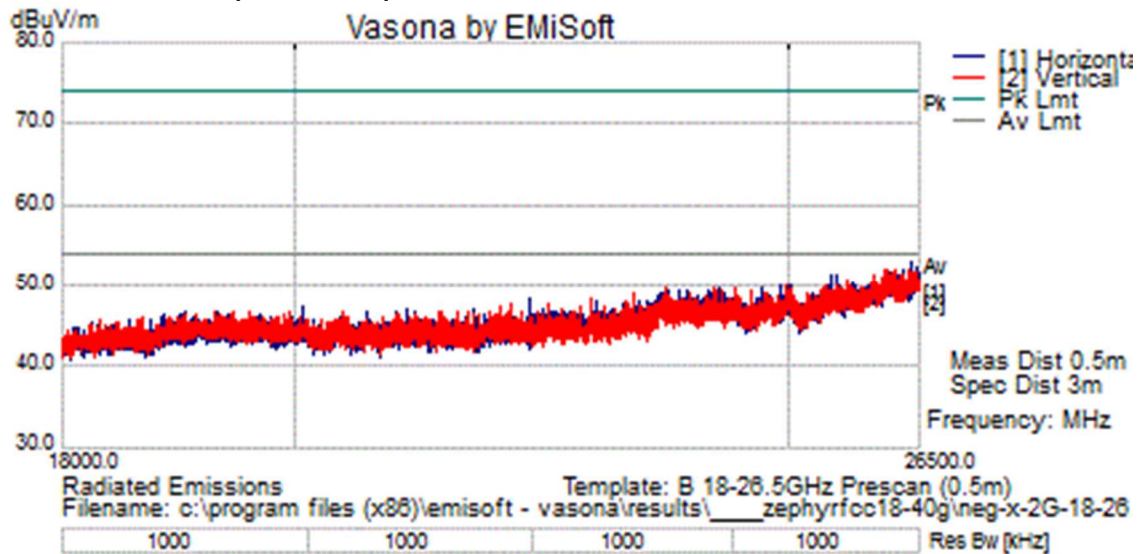
Formal Data

No	Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
1	374.956	40.8	1.8	15.1	57.7	Peak [Scan]	V	100	0	46.0	11.7	Fail	
2	125.181	38.6	1.1	14.0	53.6	Peak [Scan]	H	200	0	43.5	10.1	Fail	
3	624.731	34.4	2.4	19.4	56.1	Peak [Scan]	V	100	0	46.0	10.1	Fail	
4	48.794	30.9	.6	8.4	39.8	Peak [Scan]	V	100	0	40.0	-.2	Pass	
5	33.031	17.4	.5	18.9	36.8	Peak [Scan]	V	100	0	40.0	-3.2	Pass	
6	38.488	21.2	.5	14.8	36.5	Peak [Scan]	V	100	0	40.0	-3.5	Pass	
7	875.113	17.1	2.8	22.1	42.0	Peak [Scan]	H	200	0	46.0	-4.0	Pass	
8	650.194	18.9	2.4	19.9	41.2	Peak [Scan]	H	300	0	46.0	-4.8	Pass	
9	599.875	20.4	2.3	18.4	41.2	Peak [Scan]	V	100	0	46.0	-4.8	Pass	
10	97.294	28.0	.9	9.6	38.5	Peak [Scan]	H	200	0	43.5	-5.0	Pass	

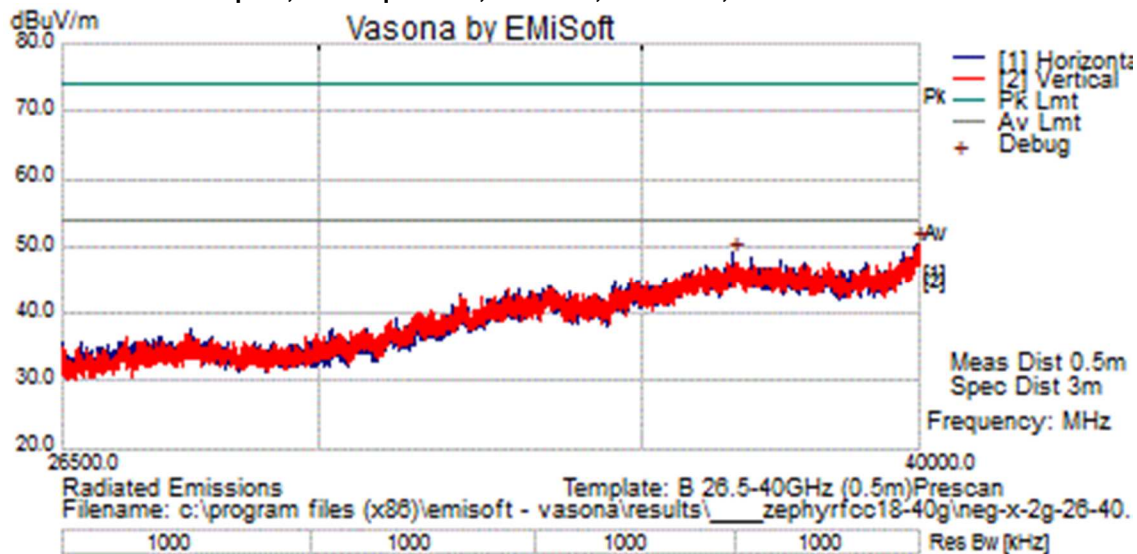
**Radiated Receiver Spurs, All Frequencies, All Rates, All Modes, 1GHz to 18GHz Horizontal Polarization, 1GHz to 18GHz, Average****Radiated Receiver Spurs, All Frequencies, All Rates, All Modes, 1GHz to 18GHz Vertical Polarization, 1GHz to 18GHz, Average**

**Radiated Receiver Spurs, All Frequencies, All Rates, All Modes, 1GHz to 18GHz Horizontal Polarization, 1GHz to 18GHz, Peak****Radiated Receiver Spurs, All Frequencies, All Rates, All Modes, 1GHz to 18GHz Vertical Polarization, 1GHz to 18GHz, Peak**

Radiated Receiver Spurs, All Frequencies, All Rates, All Modes, 18GHz to 26.5GHz



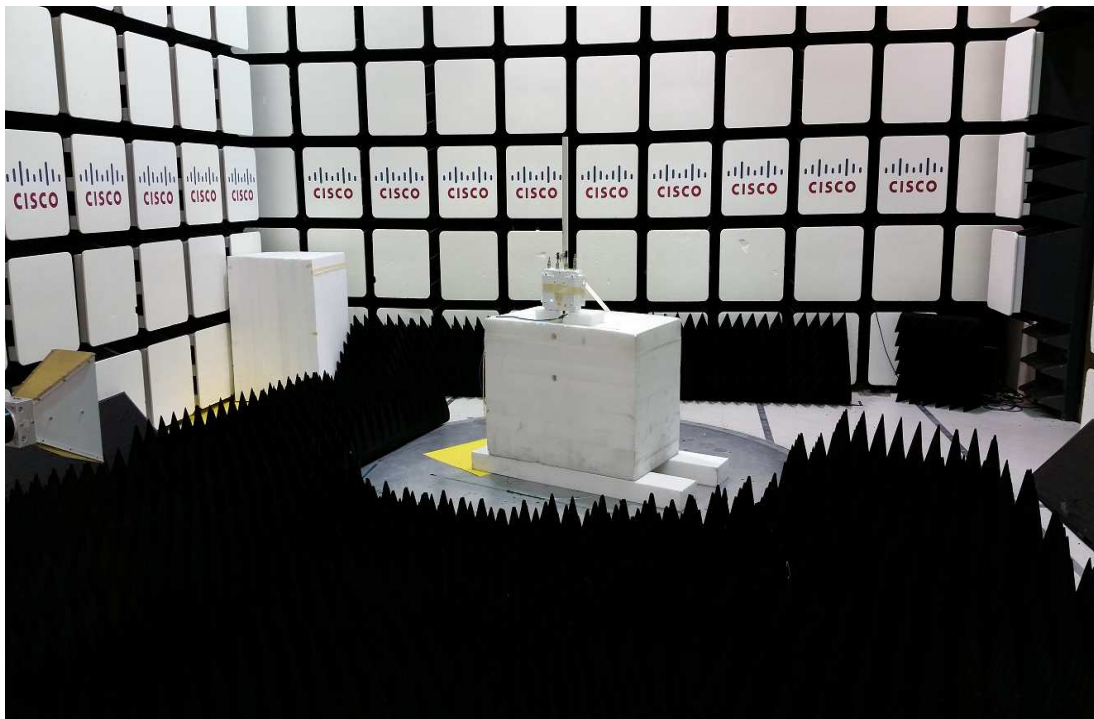
Radiated Receiver Spurs, All Frequencies, All Rates, All Modes, 26.5GHz to 40GHz



Appendix B: Photographs of Test Setups



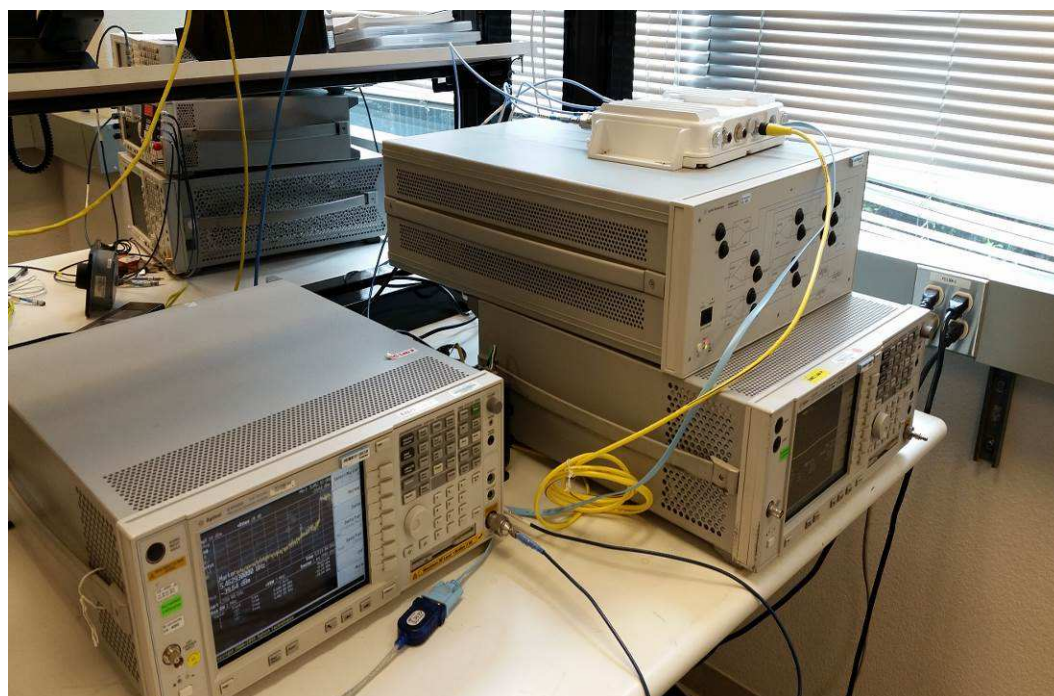
Title: Radiated Spurious Emissions Test Configuration 30M - 1000MHz



Title: Radiated Spurious Emissions Test Configuration 1G - 18GHz



Title: Radiated Spurious Emissions Test Configuration 18 – 40GHz



Title: Conducted Test Setup



Appendix C: Test Equipment Used to Perform Testing

Equip#	Manufacturer/ Model	Description	Last Cal	Next Due
25658	MICRO-COAX/ UFB311A-1-0840-504504	Coaxial Cable, 84.0 in. to 18GHz	13-Feb-15	13-Feb-16
21117	MICRO-COAX/ UFB311A-0-2484-520520	Coaxial Cable-18Ghz	25-Aug-14	25-Aug-15
49563	HUBER + SUHNER/ Sucoflex 106A	Coaxial Cable, 8m	25-Aug-14	25-Aug-15
5691	MITEQ/ NSP1800-25-S1	PREAMPLIFIER	29-Jan-15	29-Jan-16
4882	EMCO/ 3115	HORN ANTENNA	30-Jul-14	24-Jul-15
40597	CISCO/ Above 1GHz Site Cal	1GHz Cspr Site Verification	28-May-14	28-May-15
47300	Keysight (Agilent/HP) / N9038A	EMI Receiver	13-Jan-15	13-Jan-16
47285	HUBER + SUHNER / Sucoflex 102E	40GHz Cable K Connector	06 Jun 2014	06 Jun 2015
4883	EMCO/ 3115	HORN ANTENNA	Cal Not Required	Cal Not Required
34075	SCHAFFNER / RSG 2000	Reference Spectrum Generator, 1-18GHz	Cal Not Required	Cal Not Required
8166	Keysight (Agilent/HP) / 8491B Opt 010	ATTENUATOR	02 Feb 2015	02 Feb 2016
47294	FAIRVIEW MICROWAVE / ST6S-10	SMA Termination 6GHz	12-Aug-14	12-Aug-15
47293	FAIRVIEW MICROWAVE / ST6S-10	SMA Termination 6GHz	12-Aug-14	12-Aug-15
49504	JFW / 50T-039 SMA-F	SMA Female 50 Ohm Termination	27-Mar-15	27-Mar-16
49503	JFW / 50T-039 SMA-F	SMA Female 50 Ohm Termination	27-Mar-15	27-Mar-16
20490	Keysight (Agilent/HP) / 8710-1765	PRESET TORQUE WRENCH 3.5 mm 12 in/lbs	4-Feb-15	4-Feb-16
54230	Newport / iBTHP-5-DB9	5 inch Temp/RH/Press Sensor w/20ft cable	1-Feb-15	1-Feb-16
40503	Keysight (Agilent/HP) / E4440A	Spectrum Analyzer	6-Jun-14	6-Jun-15
54014	HUBER + SUHNER / Sucoflex 102E	40GHz Cable K Connector	27-Mar-15	27-Mar-16



49527	Keysight (Agilent/HP) / N8990K-A38	2x4 Switch Matrix	27-Mar-15	27-Mar-16
54017	HUBER + SUHNER / Sucoflex 102	RF Cable 2.4mm - N Type 18GHz	27-Mar-15	27-Mar-16
54018	HUBER + SUHNER / Sucoflex 102	RF Cable 2.4mm - N Type 18GHz	27-Mar-15	27-Mar-16
54016	HUBER + SUHNER / Sucoflex 102	RF Cable 2.4mm - N Type 18GHz	27-Mar-15	27-Mar-16
54015	HUBER + SUHNER / Sucoflex 102	RF Cable 2.4mm - N Type 18GHz	27-Mar-15	27-Mar-16
33988	Keysight (Agilent/HP) / E4446A	SPECTRUM ANALYZER, 44Ghz	9-Dec-14	9-Dec-15
30654	Sunol Sciences / JB1	Combination Antenna, 30MHz-2GHz	12-Dec-14	12-Dec-15
8448	CISCO/ NSA 5m Chamber	NSA 5m Chamber	7-Oct-14	7-Oct-15
27233	York / CNE V	COMPARISON NOISE EMITTER	Cal Not Required	Cal Not Required
41979	Cisco / 1840	18-40GHz EMI Test Head/Verification Fixture	9-Jul-14	9-Jul-15
38392	Keysight (Agilent/HP) / E8257D	PSG ANALOG SIGNAL GENERATOR	19-Aug-14	19-Aug-15
49516	Keysight (Agilent/HP) / N9030A	PXA Signal Analyzer	12-Nov-14	12-Nov-15
54237	Pasternack / PE5011-1	PRESET TORQUE WRENCH, 8 IN/LBS	04 Feb 2015	04 Feb 2016
37236	JFW / 50CB-015	Control Box, GPIB	Cal Not Required	Cal Not Required

Software Used to Perform Testing:

EMIsoft Vasona, version 6.024



Appendix D: Test Procedures

Measurements were made in accordance with

- KDB Publication No. 558074 - D01 DTS Meas Guidance v03r02
- KDB Publication No. 662911 - MIMO
- Measurement method of spurious emission tolerance to the International Telecommunication Union (ITU) Recommendation SM329.
- ANSI C63.4 2009
- ANSI C63.10 2009

Test procedures are summarized below

FCC Test Procedures 5GHz	EDCS # - 1445048
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Appendix E: Scope of Accreditation (A2LA certificate number 1178-01)

The scope of accreditation of Cisco Systems, Inc. can be found on the A2LA web page at:

<http://www.a2la.org/scopepdf/1178-01.pdf>



Appendix F: Test and Assessment Plan

Compliance Test Plan (Excel) EDCS# 1237091
Target Power Tables EDCS# 1501962

Appendix G: Worst Case Justification

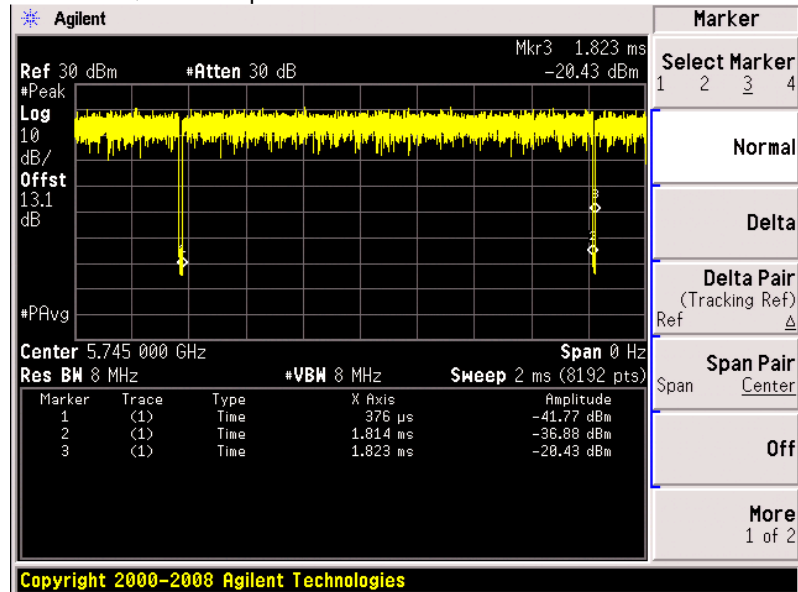
IW3702 is based upon the AIR-CAP3702P-A-K9. Test results for AIR-CAP3702P-A-K9 were reviewed. Worst case modes were selected by lowest margins. A representative sample of modulation types, bit-rates, and bandwidths were selected. The AIR-CAP3702P-A-K9 report can be found here EDCS# 1278297.

Appendix H: Duty Cycle

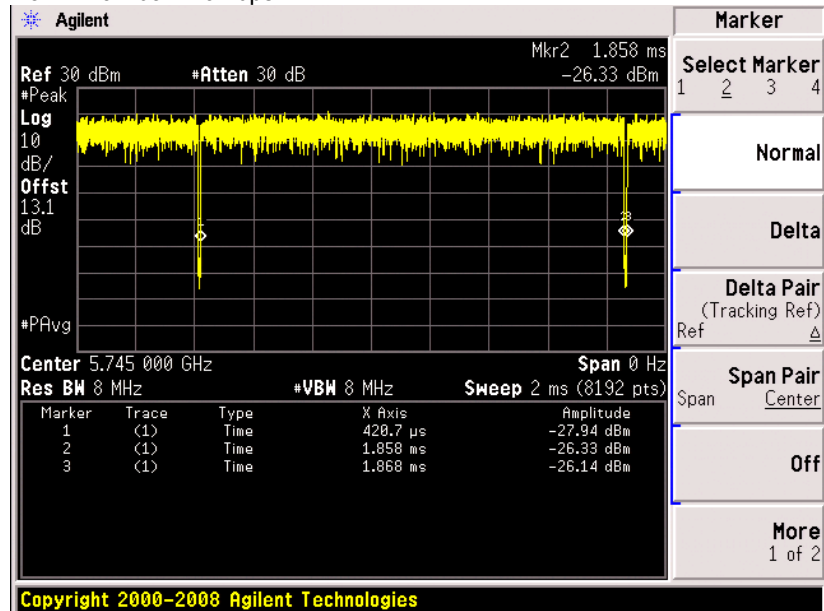
Duty Cycle table and screen captures are shown below for power/psd modes.

Mode	Data Rate	On-time (ms)	Total Time (ms)	Duty Cycle (%)	Correction Factor (dB)
NonHT20 Quad	6Mbps	1.438	1.447	99.4	0.03
NonHT20 Dual	6Mbps	1.438	1.448	99.3	0.03
HT20 BF Triple	M0	1.347	1.356	99.3	0.03
HT20 BF Quad	M0	1.346	1.356	99.3	0.03
HT40 Dual	M0	0.669	0.679	98.5	0.07
HT40 BF Triple	M0	0.67	0.68	98.5	0.07
HT40 BF Quad	M0	0.669	0.679	98.5	0.07
NonHT80 Quad	6Mbps	1.438	1.448	99.3	0.03
VHT80 Quad	M0x1	0.333	0.348	95.7	0.19
VHT80 BF Triple	M0x1	0.333	0.348	95.7	0.19
VHT80 BF Quad	M0x1	0.333	0.349	95.4	0.20
NonHT20 Single	6Mbps	1.438	1.447	99.4	0.03
NonHT20 Quad	6Mbps	1.439	1.449	99.3	0.03
NonHT20 BF Quad	6Mbps	1.346	1.448	99.4	0.03
HT20 Quad	M0	1.346	1.356	99.3	0.03
HT20 Triple	M0	1.345	1.357	99.2	0.03
HT20 BF Quad	M0	1.438	1.355	99.3	0.03
NonHT40 Quad	6Mbps	0.669	1.448	99.3	0.03
HT40 Quad	M0	0.67	0.679	98.5	0.07
HT40 BF Quad	M0	1.438	0.68	98.5	0.07
NonHT20 Quad	6Mbps	1.438	1.447	99.4	0.03
NonHT20 BF Quad	6Mbps	1.438	1.447	99.4	0.03
HT20 BF Triple	M0	1.346	1.356	99.3	0.03
HT20 BF Quad	M0	1.345	1.355	99.3	0.03

NonHT20 Quad 6Mbps

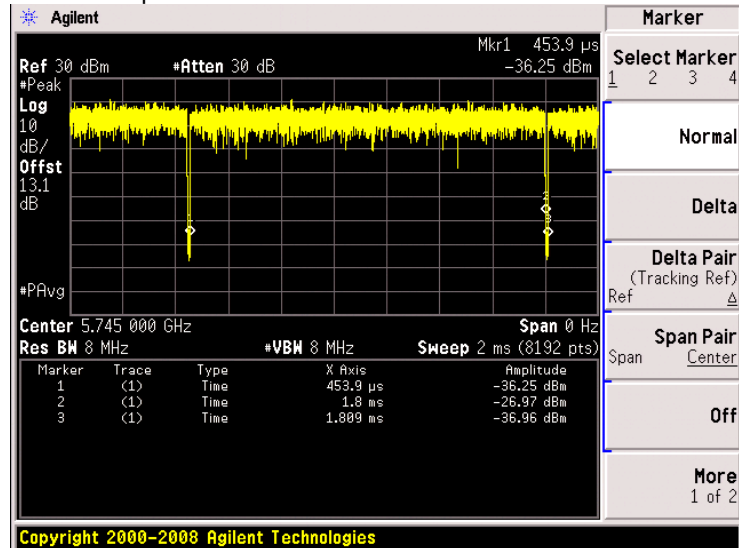


NonHT20 Dual 6Mbps

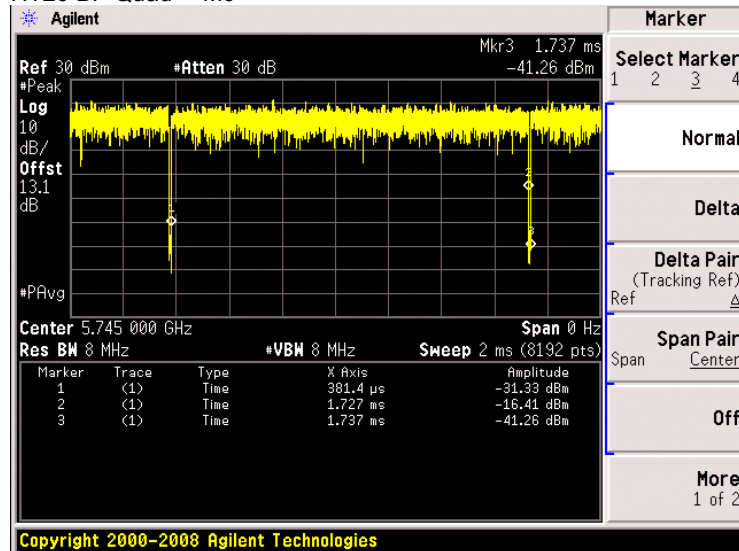




HT20 BF Triple M0

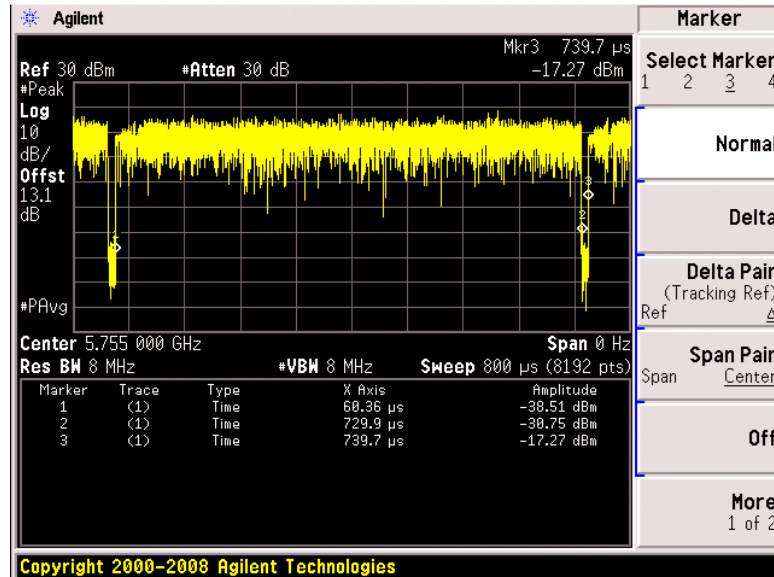


HT20 BF Quad M0

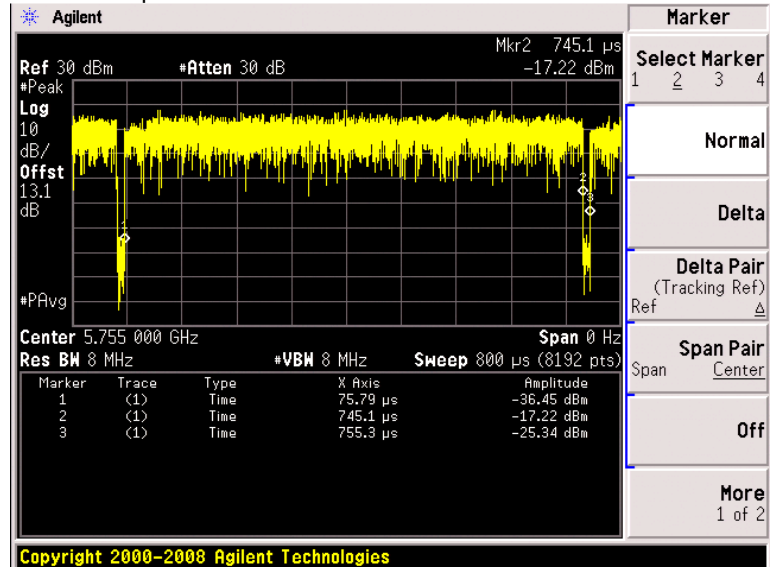




HT40 Dual M0

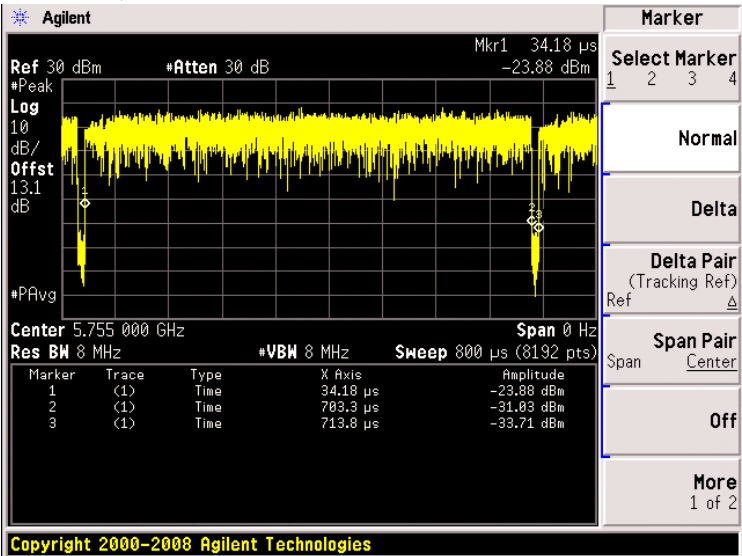


HT40 BF Triple M0

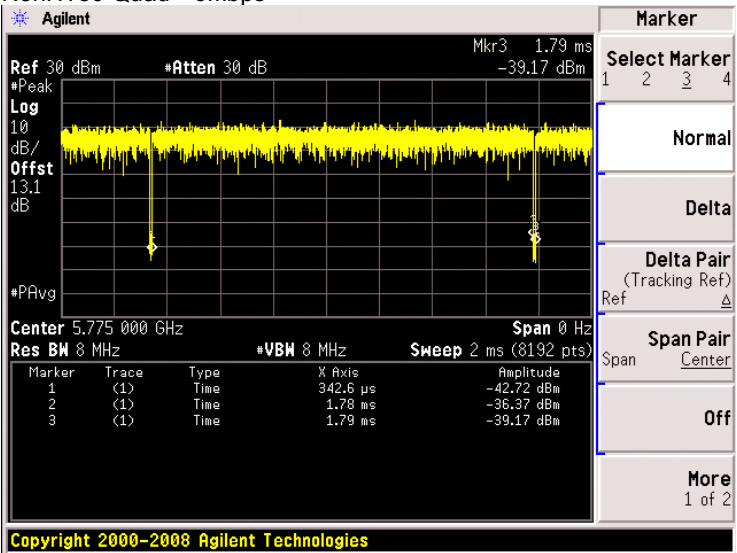




HT40 BF Quad M0

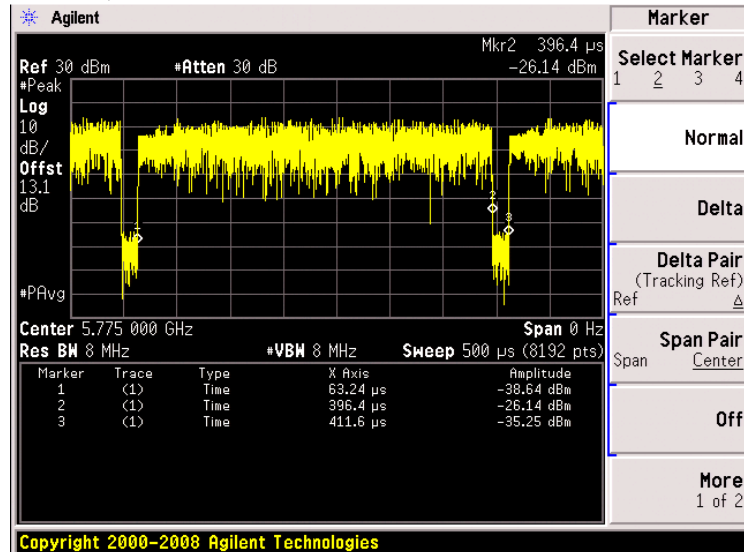


NonHT80 Quad 6Mbps

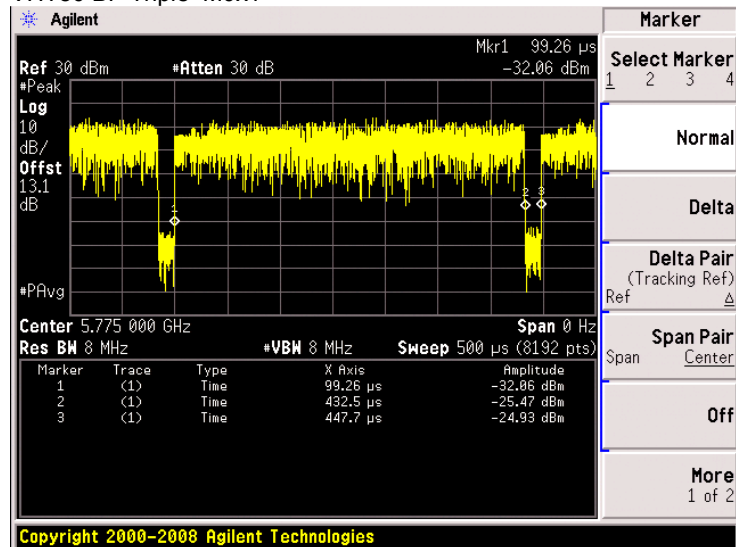




VHT80 Quad M0x1

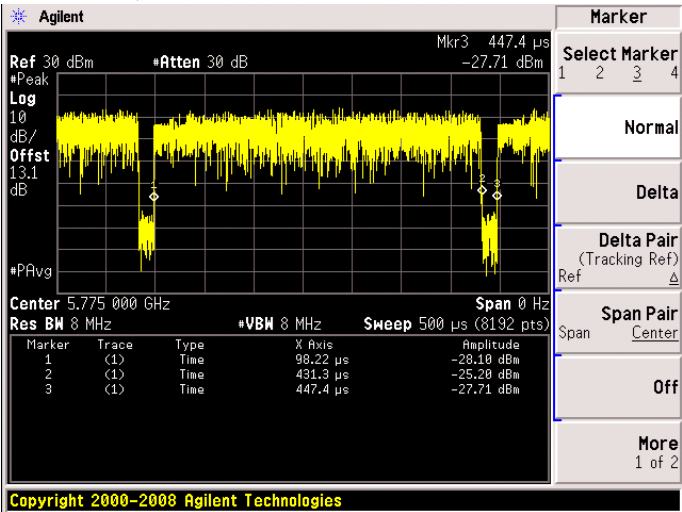


VHT80 BF Triple M0x1

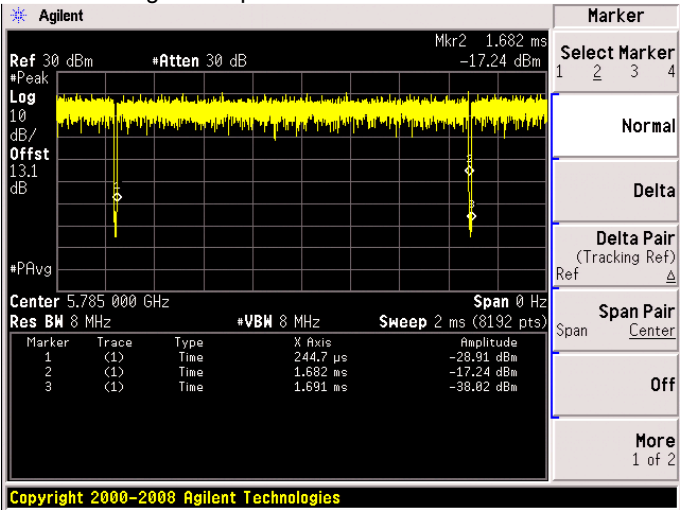




VHT80 BF Quad M0x1

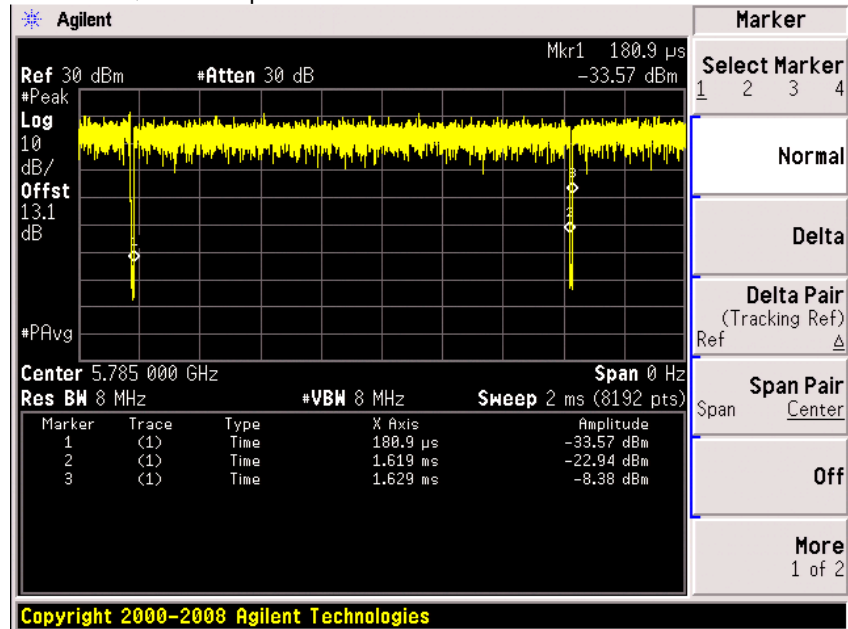


NonHT20 Single 6Mbps

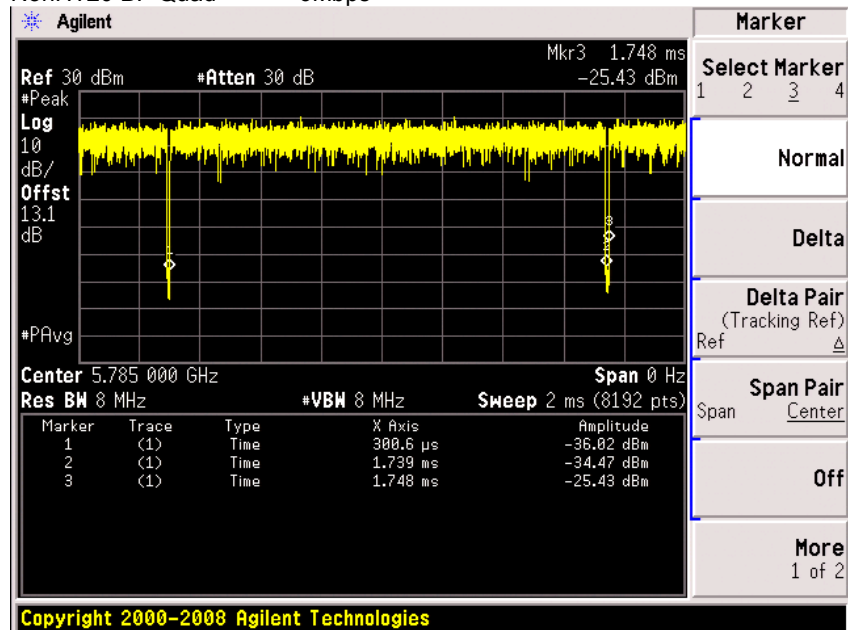


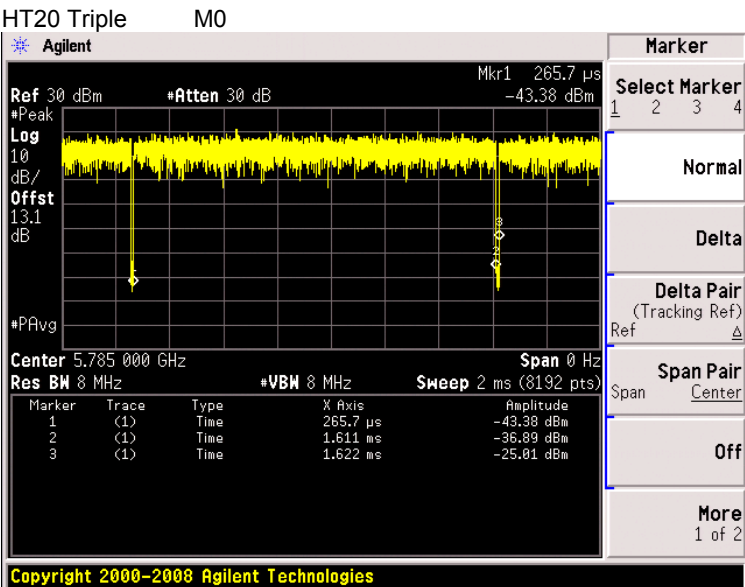
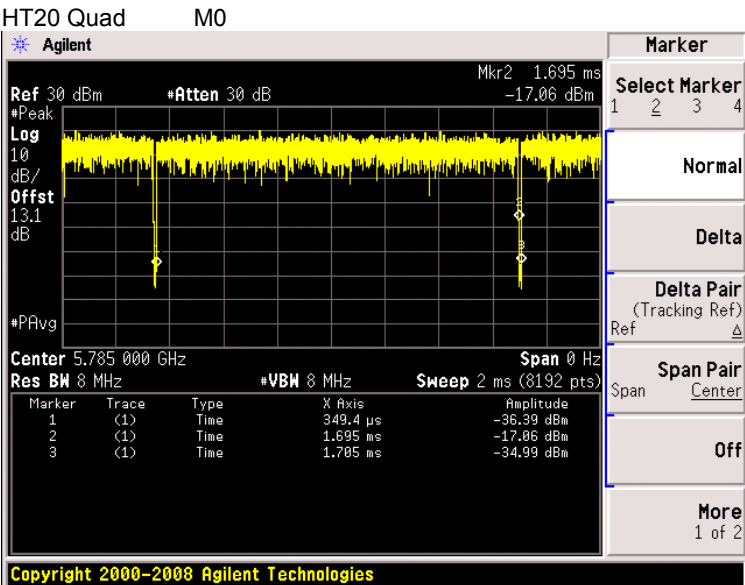


NonHT20 Quad 6Mbps



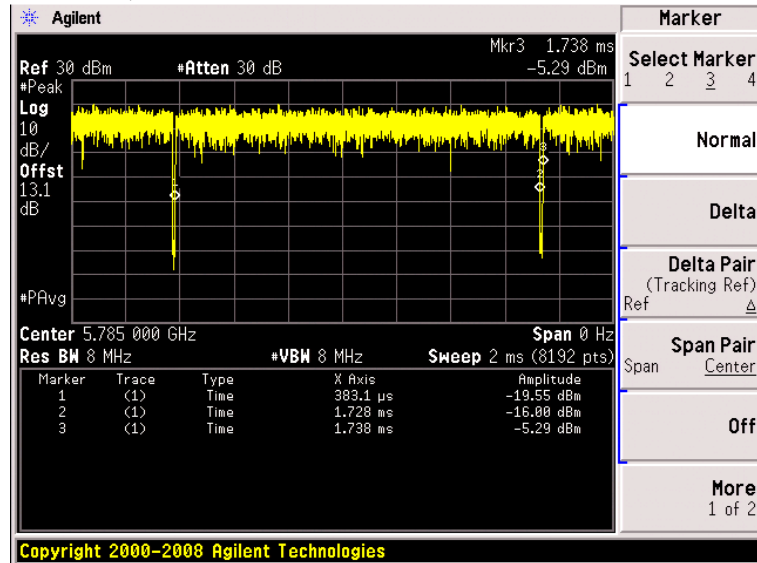
NonHT20 BF Quad 6Mbps



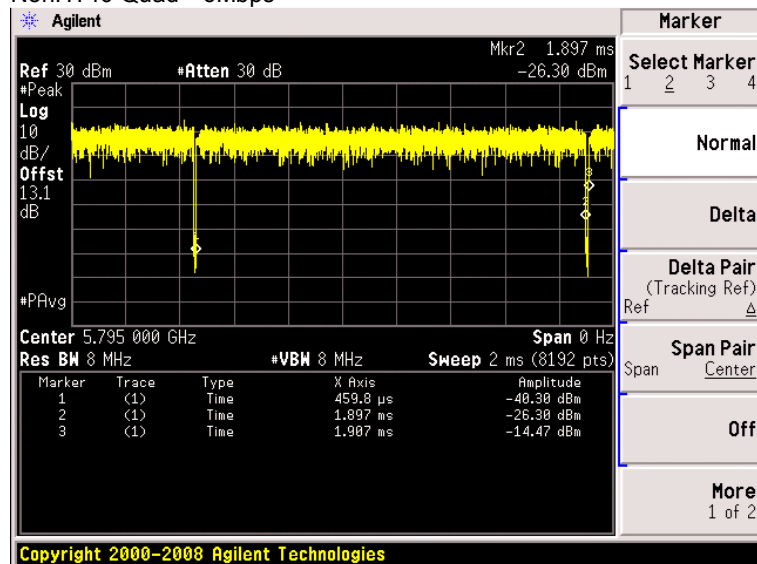




HT20 BF Quad M0

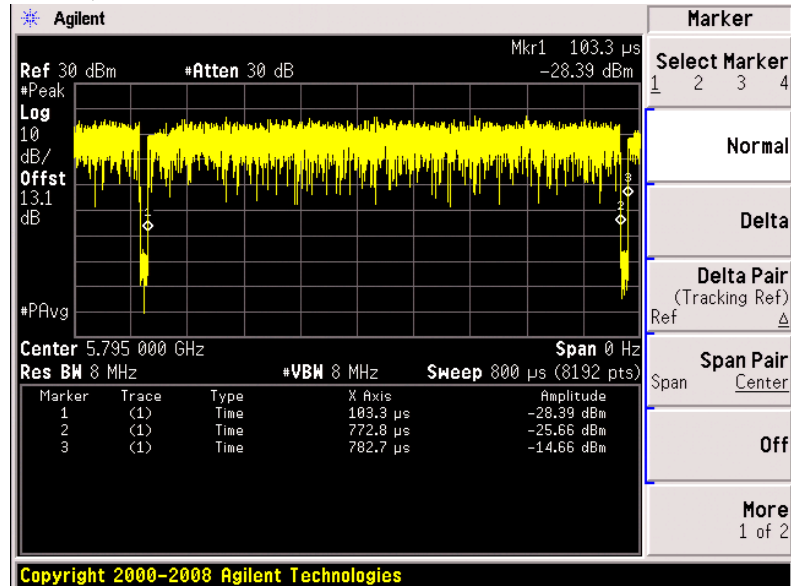


NonHT40 Quad 6Mbps

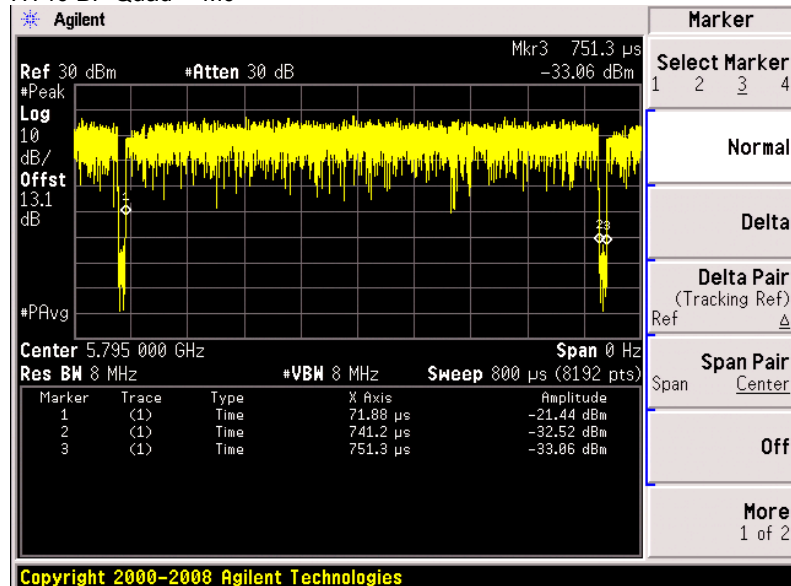




HT40 Quad M0

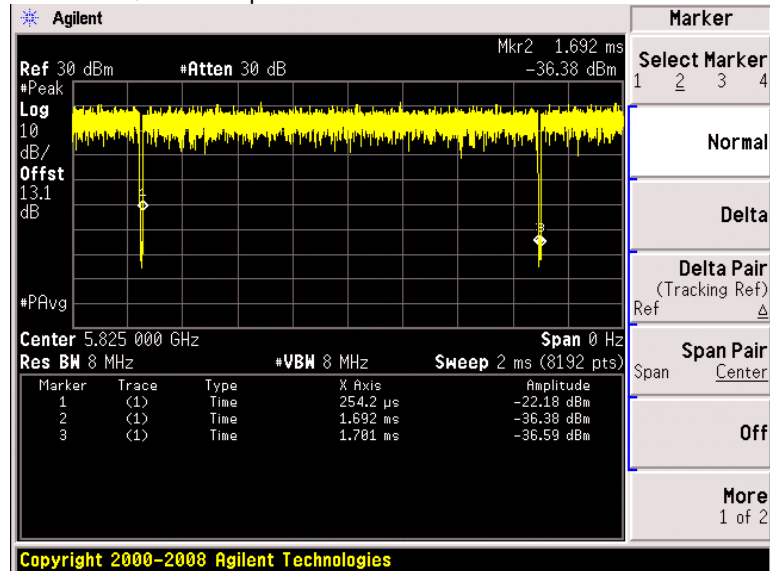


HT40 BF Quad M0

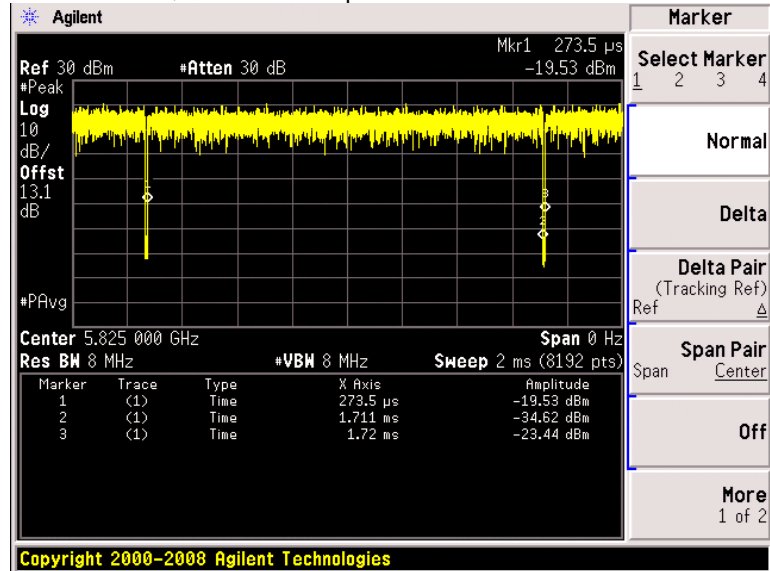




NonHT20 Quad 6Mbps

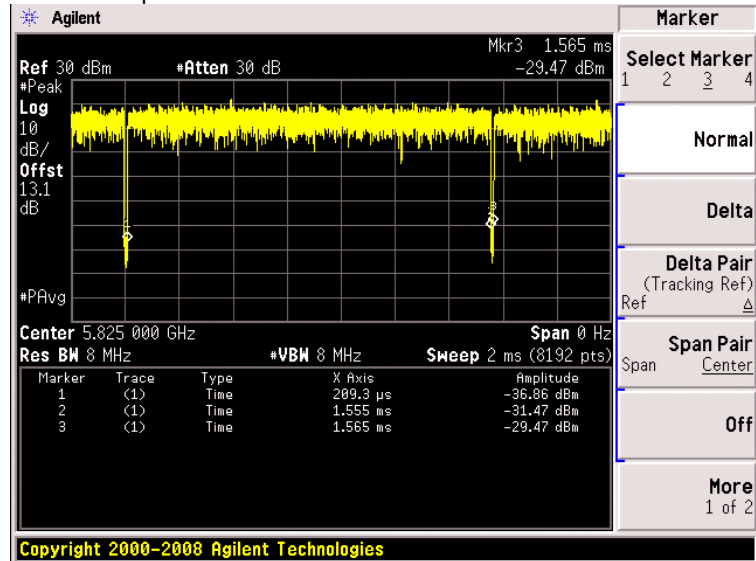


NonHT20 BF Quad 6Mbps





HT20 BF Triple M0



HT20 BF Quad M0

