Test Report

IW3702 - 4E - UXK9

Cisco Industrial Wireless 802.11ac Dual Band Access Point

FCC ID: LDKIW3702
IC: 2461B-IW3702

5725-5850 MHz

Antenna Gain 7 dBi

Against the following Specifications:

CFR47 Part 15.247

Cisco Systems
170 West Tasman Drive
San Jose, CA 95134

ACCREDITED

Author: Allan Beecroft
Approved By: See EDCS
Title: See EDCS

This report replaces any previously entered test report under EDCS – 1497906

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Section 1: Overview

1.1 Test Summary

The samples were assessed against the tests detailed in section 3 under the requirements of the following specifications:

Emission	Immunity
CFR47 Part 15.247	N/A

The specifications listed above represent actual tests performed to demonstrate compliance against the specifications and basic standards listed on the front cover of this report. This list is not a one to one match to the front cover for one or more of the following reasons.

1. Basic standards call up many different test phenomena specifications such as the 61000-4-X series. The basic standards define which elements and levels shall be applied from these specifications and as such it is not appropriate to list the individual specifications on the front cover.
2. A Standard listed on the front cover may be required in a particular country but is not appropriate for the particular technologies included in the equipment under test. E.g. You cannot test a DC product to the mains Harmonics requirements in EN61000-3-2. See section 3.2.
3. Test results against a particular standard or specification may be included in a different test report. See section 3.2 for an EDCS reference of this data.
4. Where appropriate, Cisco may have substituted a later revision of a basic standard to those referenced in the specification on the front sheet of this test report. This decision was based upon improved test methodology and repeatability and/or where the newer revision represented a more stringent test.
5. Where relevant, testing has been carried out to the requirements of both EN and IEC Specifications. This was possible because of the similarities of the test methods involved and the Cisco EMC test procedures.
6. Testing may have been performed to an equivalent test that satisfies the requirements of the standards and specifications listed on the front cover of the report. See section 3.2.
7. Where radiated emissions testing has been performed to EN55022/CISPR22 the additional requirements of VCCI: V- 3/2006.04, EN55022: 1994 +A1/2 and CAN/CSA- CISPR 22-02 have also been evaluated unless otherwise stated.
8. Testing to the requirements of CFR47 Part 15 was performed against the CISPR22 limits. The results are therefore deemed satisfactory evidence of compliance with Industry Canada Interference Causing Equipment Standard ICES-003.
9. Where assessment has been performed to CISPR24, all the applicable test requirements may have not been covered. Refer to the results section for the tests performed.

Notes:

1) Where a specification listed on the front cover of this report has deviations from the basic standards listed above, the additional technical requirements of the specification were also assessed.
2) Where appropriate, Cisco may have substituted a later revision of a basic standard to those referenced in the specification on the front sheet of this test report. This decision was based upon improved test methodology and repeatability and/or where the newer revision represented a more stringent test.
3) Where relevant, testing has been carried out to the requirements of both EN and IEC Specifications. This was possible because of the similarities of the test methods involved and the Cisco EMC test procedures.

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Section 2: Assessment Information

2.1 General

This report contains an assessment of an apparatus against Electromagnetic Compatibility Standards based upon tests carried out on the samples submitted. The testing was performed by and for the use of Cisco systems Inc:

With regard to this assessment, the following points should be noted:

a) The results contained in this report relate only to the items tested and were obtained in the period between the date of the initial assessment and the date of issue of the report. Manufactured products will not necessarily give identical results due to production and measurement tolerances.

b) The apparatus was set up and exercised using the configuration and modes of operation defined in this report only.

c) Where relevant, the apparatus was only assessed using the susceptibility criteria defined in this report and the Test Assessment Plan (TAP).

d) All testing was performed under the following environmental conditions:

Temperature	15°C to 35°C (54°F to 95°F)
Atmospheric Pressure	860mbar to 1060mbar (25.4" to 31.3")
Humidity	10% to 75*%

*[Where applicable] For ESD testing the humidity limits used were 30% to 60% and for EFT/B tests the humidity limits used were 25% to 75%.

e) All AC testing was performed at one or more of the following supply voltages:
110V 60 Hz (+/-20%)

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2.2 Date of testing

4-May-2015 to 29-June-2015

2.3 Report Issue Date

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2.4 Testing facilities

This assessment was performed by:

Testing Laboratory

Cisco Systems, Inc.

170 West Tasman Drive

San Jose, CA 95134

USA

Test Engineers

Chris Blair, Vinay Ganji, Johanna Knudsen

2.5 Equipment Assessed (EUT)

IW3702 - 4E - UXK9 Cisco Industrial Wireless 802.11ac Dual Band Access Point

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2.6 EUT Description

The IW3702 (code name: Zephyr) is an **802.11a/b/g/n/ac** Dual-Band Wi-Fi Access Point based on the **AP3700 Series of AP**s (specifically the ***AIR-CAP3702P-x-K9***), but is ruggedized and certified for onboard Rail and outdoor use-cases. The IW3702 uses the same radio chip set and motherboard as the previously assessed AP3700 series Access Point.

Non HT/VHT-20, One Antenna, 6 to 54 Mbps
Non HT/VHT-20, Two Antennas, 6 to 54 Mbps
Non HT/VHT-20, Three Antennas, 6 to 54 Mbps
Non HT/VHT-20, Four Antennas, 6 to 54 Mbps

Non HT/VHT-20 Beam Forming, Two Antennas, 6 to 54 Mbps
Non HT/VHT-20 Beam Forming, Three Antennas, 6 to 54 Mbps
Non HT/VHT-20 Beam Forming, Four Antennas, 6 to 54 Mbps

HT/VHT-20, One Antenna, M0 to M7, m0.1 to M9.3
HT/VHT-20, Two Antennas, M0 to M15, m0.1 to m9.2
HT/VHT-20, Three Antennas, M0 to M23, m0.1 to m9.3
HT/VHT-20, Four Antennas, M0 to M23, m0.1 to m9.3

HT/VHT-20 STBC, Two Antennas, M0 to M7, m0.1 to M9.3
HT/VHT-20 STBC, Three Antennas, M0 to M7, m0.1 to M9.3
HT/VHT-20 STBC, Four Antennas, M0 to M7, m0.1 to M9.3

HT/VHT-20 Beam Forming, Two Antennas, M0 to M15, m0.1 to m9.2
HT/VHT-20 Beam Forming, Three Antennas, M0 to M23, m0.1 to m9.3
HT/VHT-20 Beam Forming, Four Antennas, M0 to M23, m0.1 to m9.3

Non HT/VHT-40 Duplicate, One Antenna, 6-54 Mbps
Non HT/VHT-40 Duplicate, Two Antennas, 6-54 Mbps
Non HT/VHT-40 Duplicate, Three Antennas, 6-54 Mbps
Non HT/VHT-40 Duplicate, Four Antennas, 6-54 Mbps

HT/VHT-40, One Antenna, M0 to M7, m0.1 to M9.3
HT/VHT-40, Two Antennas, M0 to M15, m0.1 to m9.2
HT/VHT-40, Three Antennas, M0 to M23, m0.1 to m9.3
HT/VHT-40, Four Antennas, M0 to M23, m0.1 to m9.3

HT/VHT-40 STBC, Two Antennas, M0 to M7, m0.1 to M9.3
HT/VHT-40 STBC, Three Antennas, M0 to M7, m0.1 to M9.3
HT/VHT-40 STBC, Four Antennas, M0 to M7, m0.1 to M9.3

HT/VHT-40 Beam Forming, Two Antennas, M0 to M15, m0.1 to m9.2
HT/VHT-40 Beam Forming, Three Antennas, M0 to M23, m0.1 to m9.3
HT/VHT-40 Beam Forming, Four Antennas, M0 to M23, m0.1 to m9.3

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Non VHT-80 Duplicate, One Antenna, 6-54 Mbps
Non VHT-80 Duplicate, Two Antennas, 6-54 Mbps
Non VHT-80 Duplicate, Three Antennas, 6-54 Mbps
Non VHT-80 Duplicate, Four Antennas, 6-54 Mbps

VHT-80, One Antenna, M0 to M7, m0.1 to M9.3
VHT-80, Two Antennas, M0 to M15, m0.1 to m9.2
VHT-80, Three Antennas, M0 to M23, m0.1 to m9.3
VHT-80, Four Antennas, M0 to M23, m0.1 to m9.3

VHT-80 STBC, Two Antennas, M0 to M7, m0.1 to M9.3
VHT-80 STBC, Three Antennas, M0 to M7, m0.1 to M9.3
VHT-80 STBC, Four Antennas, M0 to M7, m0.1 to M9.3

VHT-80 Beam Forming, Two Antennas, M0 to M15, m0.1 to m9.2
VHT-80 Beam Forming, Three Antennas, M0 to M23, m0.1 to m9.3
VHT-80 Beam Forming, Four Antennas, M0 to M23, m0.1 to m9.3

The following antennas are supported by this product series.

The data included in this report represent the antennas in **bold** below.

AIR-ANT2547V-N	**Dual-band 4 dBi (2.4 GHz) 7 dBi (5 GHz) omnidirectional antenna with 1x type N (m) connector (white)**
AIR-ANT2547VG-N	**Dual-band 4 dBi (2.4 GHz) 7 dBi (5 GHz) omnidirectional antenna with 1x type N (m) connector (gray)**
AIR-ANT2513P4M-N	Dual-band 13 dBi (2.4 GHz) 13 dBi (5 GHz) patch antenna with 4x type N (f) connector
AIR-ANT2524V4C-R	Dual-band 2 dBi (2.4 GHz) 4 dBi (5 GHz) omni-directional antenna with 4x RP-TNC (m) connector (indoor only)
AIR-ANT2544V4M-R	Dual-band 4 dBi (2.4 GHz) 4 dBi (5 GHz) omni-directional antenna with 4x RP-TNC (m) connector
AIR-ANT2566P4W-R	Dual-band 6 dBi (2.4 GHz) 6 dBi (5 GHz) patch antenna with 4x RP-TNC (m) connector

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Section 3: Result Summary

Conducted emissions

Basic Standard	Result
6dB Bandwidth	Pass
99% and 26dB Bandwidth	Pass
Maximum Conducted Output Power	Pass
Power Spectral Density	Pass
Conducted Spurious Emissions	Pass
Conducted Band Edge	Pass

Radiated emissions

Basic Standard	Result
Radiated Spurious and Harmonic Emissions	Pass
Radiated Receiver Spurious Emissions	Pass

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Section 4: Sample Details

Note: Each sample was evaluated to ensure that its condition was suitable to be used as a test sample prior to the commencement of testing. Please also refer to the "Justification for worst Case test Configuration" section of this report for further details on the selection of EUT samples.

4.1 Sample Details (Photographs of the test samples, where appropriate can be found in appendix H)

Sample No.	Equipment Details	Part Number	Manufacturer	Hardware Rev.	Serial Number
S01	IW3702 - 4E - UXK9	68-5584-03	Cisco Systems	68-5584-03	FOC18486MLL
S02	PWR-IE3000-AC	341-0304-01	Cisco Systems	NA	DTM170704Z2
S03	IW3702 - 4E - UXK9	68-5584-04	Cisco Systems	68-5584-04	FOC19167ZLE
S04	PWR-IE3000-AC	341-0304-01	Cisco Systems	NA	DTM160801WH

EUT System used for all Conducted testing Image version: flash:/ap3g2-k9w7-mx.newptable_apr30/ap3g2-k9w7-xx.newptable_ap
EUT System used for all Radiated testing Image version: flash:/ap3g2-k9w7-mx.newptable_apr30/ap3g2-k9w7-xx.newptable_ap

4.2 System Details

System #	Description	Samples
1	EUT System used for all Conducted testing	S01, S02
2	EUT System used for all Radiated testing	S03, S04

4.3 Mode of Operation Details

Mode#	Description	Comments
1	Continuous Transmitting	Continuous Transmitting >98% Duty Cycle
2	Receive	EUT powered and operating in receive mode.

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Appendix A: Test Results

Target Maximum Channel Power

The following table details the maximum supported Total Channel Power for all operating modes, and lists the minimum total power across all antenna configurations, i.e. one, two, three or four antennas.

	Maximum Channel Power (dBm)		
	Frequency (MHz)		
Operating Mode	5745	5785	5825
Non HT-20, 6 to 54 Mbps	22	22	22
Non HT-20 Beam Forming, 6 to 54 Mbps	21	21	21
HT-20, M0 to M23, M0.1 to M9.3	22	22	22
HT-20 STBC, M0 to M7, M0.1 to M9.1	22	22	22
HT-20 Beam Forming, M0 to M23, M0.1 to M9.3	22	22	22
	5745/5765		5785/5805
Non HT-40 Duplicate, 6 to 54 Mbps	22		22
HT-40, M0 to M23, M0.1 to M9.3	22		22
HT-40 STBC, M0 to M7, M0.1 to M9.1	22		22
HT-40 Beam Forming, M0 to M23, M0.1 to M9.3	22		22
	5745/5765/5785/5805		
Non HT-80 Duplicate, 6 to 54 Mbps	22		
HT-80, M0 to M23, M0.1 to M9.3	22		
HT-80 STBC, M0 to M7, M0.1 to M9.1	22		
HT-80 Beam Forming, M0 to M23, M0.1 to M9.3	22		

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6dB Bandwidth

15.247: Systems using digital modulation techniques may operate in the 2400-2483.5MHz band. The minimum 6 dB bandwidth shall be at least 500 kHz.

Place the radio in continuous transmit mode. View the transmitter waveform on the spectrum analyzer, and record the pertinent measurements:

Procedure from 558074 D01 DTS Meas Guidance v03r01

8.2 Option 2:

The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described above (*i.e.*, RBW = 100 kHz, VBW ≥ 3 x RBW, peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 dB.

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Frequency (MHz)	Mode	Data Rate (Mbps)	6dB BW (MHz)	Limit (kHz)	Greater than 500kHz?
5745	**Non HT/VHT20, 6 to 54 Mbps**	6Mbps	16.379	>500	PASS
	Non HT/VHT20 Beam Forming, 6 to 54 Mbps	6Mbps	16.388	>500	PASS
	HT/VHT20 Beam Forming, M0 to M7, M0.1 to M9.1	M0	17.599	>500	PASS
	HT/VHT20 Beam Forming, M0 to M7, M0.1 to M9.1	M0	17.599	>500	PASS
5745/ 5765	**HT/VHT40, M0 to M7, M0.1 to M9.1**	M0	35.366	>500	PASS
	HT/VHT40 Beam Forming, M0 to M7, M0.1 to M9.1	M0	35.678	>500	PASS
	HT/VHT40 Beam Forming, M0 to M7, M0.1 to M9.1	M0	35.513	>500	PASS
5745/ 5765/ 5785/ 5805	**Non HT/VHT80, 6 to 54 Mbps**	6Mbps	76.412	>500	PASS
	HT/VHT80, M0 to M7, M0.1 to M9.1	M0x1	76.37	>500	PASS
	HT/VHT80 Beam Forming, M0 to M7, M0.1 to M9.1	M0x1	76.351	>500	PASS
	HT/VHT80 Beam Forming, M0 to M7, M0.1 to M9.1	M0x1	76.364	>500	PASS
5785	**Non HT/VHT20, 6 to 54 Mbps**	6Mbps	16.353	>500	PASS
	Non HT/VHT20, 6 to 54 Mbps	6Mbps	16.377	>500	PASS

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	Non HT/VHT20 Beam Forming, 6 to 54 Mbps	6Mbps	16.381	>500	PASS
	HT/VHT20, M0 to M7, M0.1 to M9.1	M0	17.561	>500	PASS
	HT/VHT20 Beam Forming, M0 to M7, M0.1 to M9.1	M0	17.566	>500	PASS
	HT/VHT20 Beam Forming, M0 to M7, M0.1 to M9.1	M0	17.589	>500	PASS

5785/ 5805	**Non HT/VHT40, 6 to 54 Mbps**	6Mbps	36.325	>500	PASS
	HT/VHT40, M0 to M7, M0.1 to M9.1	M0	35.836	>500	PASS
	HT/VHT40 Beam Forming, M0 to M7, M0.1 to M9.1	M0	35.702	>500	PASS

5825	**Non HT/VHT20, 6 to 54 Mbps**	6Mbps	16.371	>500	PASS
	Non HT/VHT20 Beam Forming, 6 to 54 Mbps	6Mbps	16.345	>500	PASS
	HT/VHT20 Beam Forming, M0 to M7, M0.1 to M9.1	M0	17.603	>500	PASS
	HT/VHT20 Beam Forming, M0 to M7, M0.1 to M9.1	M0	17.567	>500	PASS

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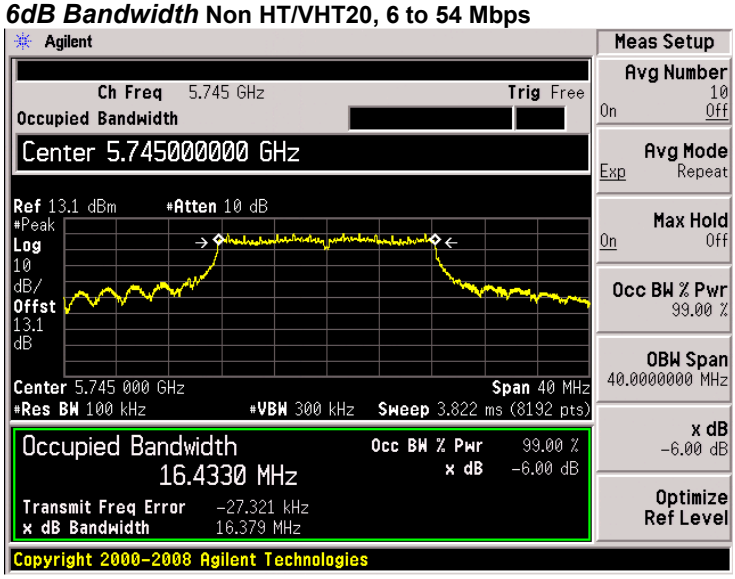
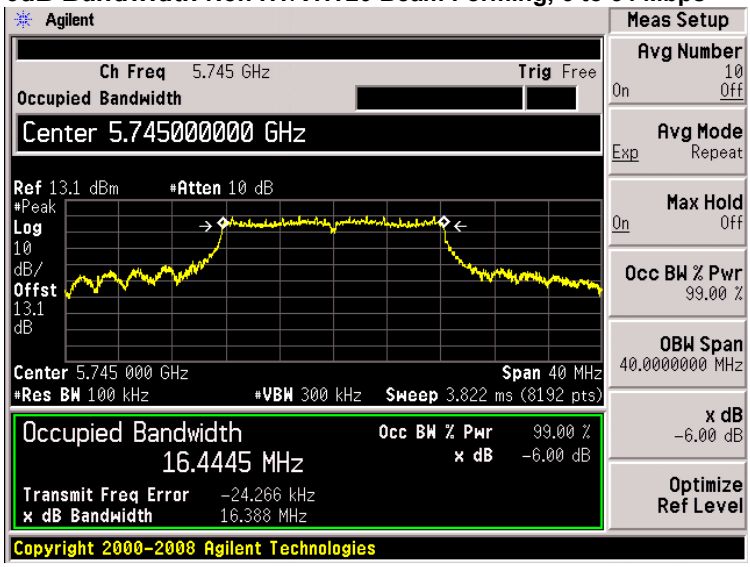
6dB Bandwidth **Non HT/VHT20, 6 to 54 Mbps**



6dB Bandwidth **Non HT/VHT20 Beam Forming, 6 to 54 Mbps**



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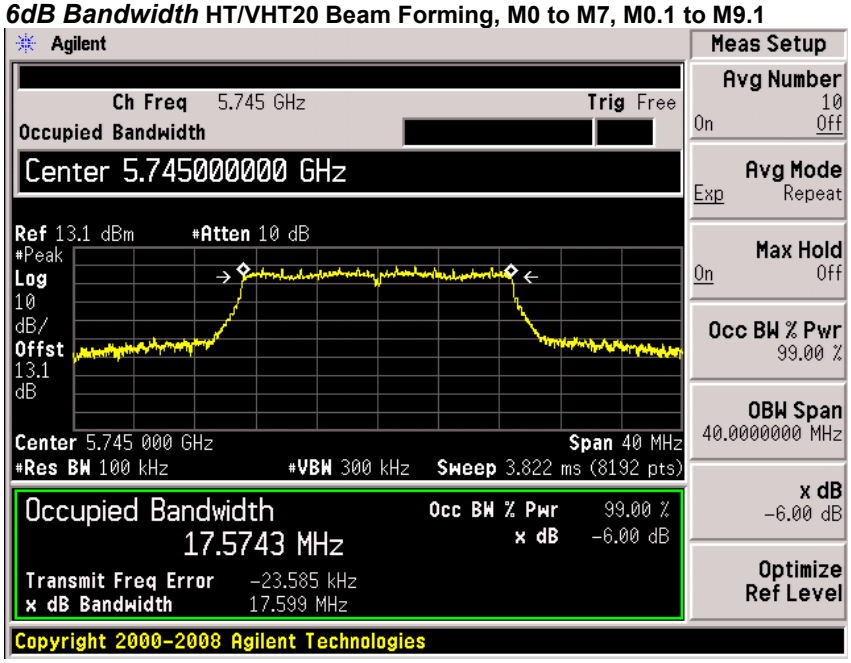
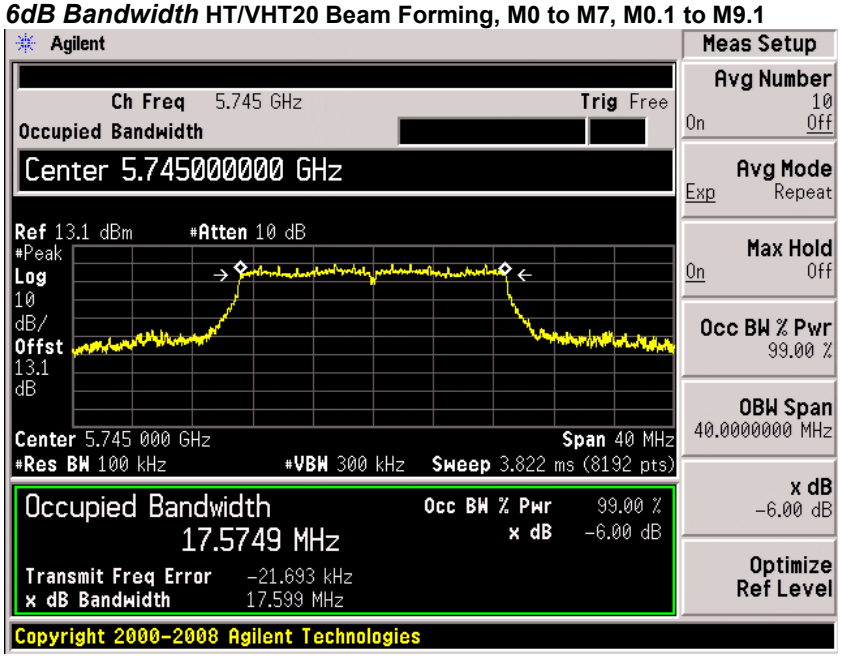
6dB Bandwidth **HT/VHT20 Beam Forming, M0 to M7, M0.1 to M9.1**



6dB Bandwidth **HT/VHT20 Beam Forming, M0 to M7, M0.1 to M9.1**



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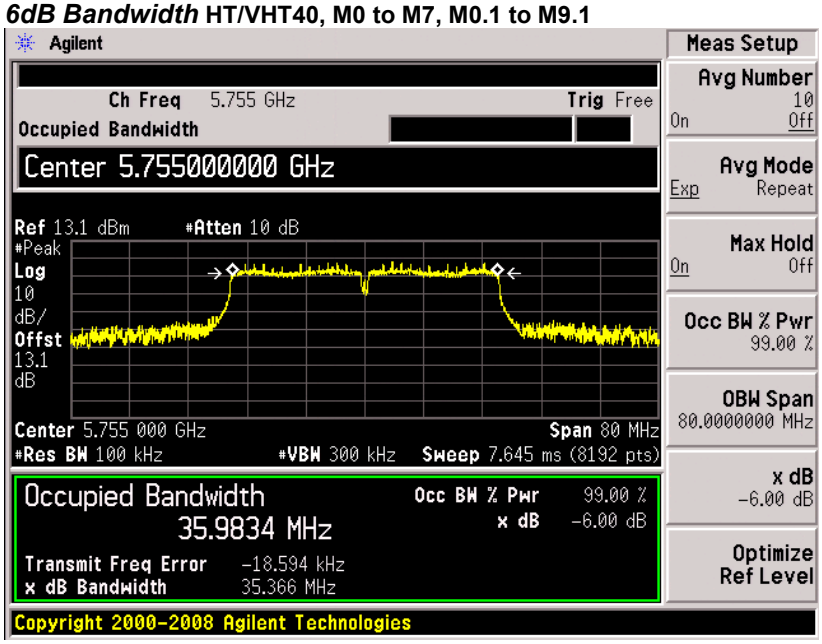
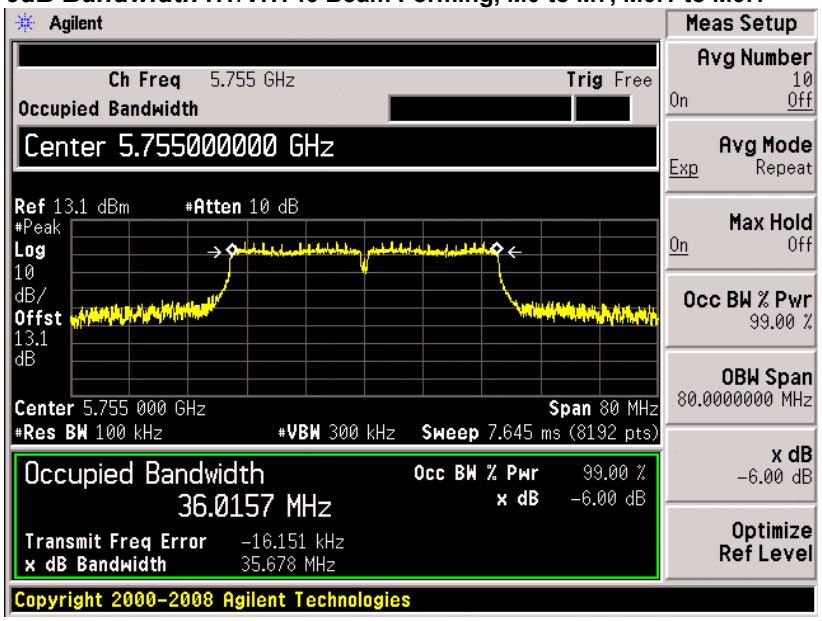
6dB Bandwidth **HT/VHT40, M0 to M7, M0.1 to M9.1**



6dB Bandwidth **HT/VHT40 Beam Forming, M0 to M7, M0.1 to M9.1**



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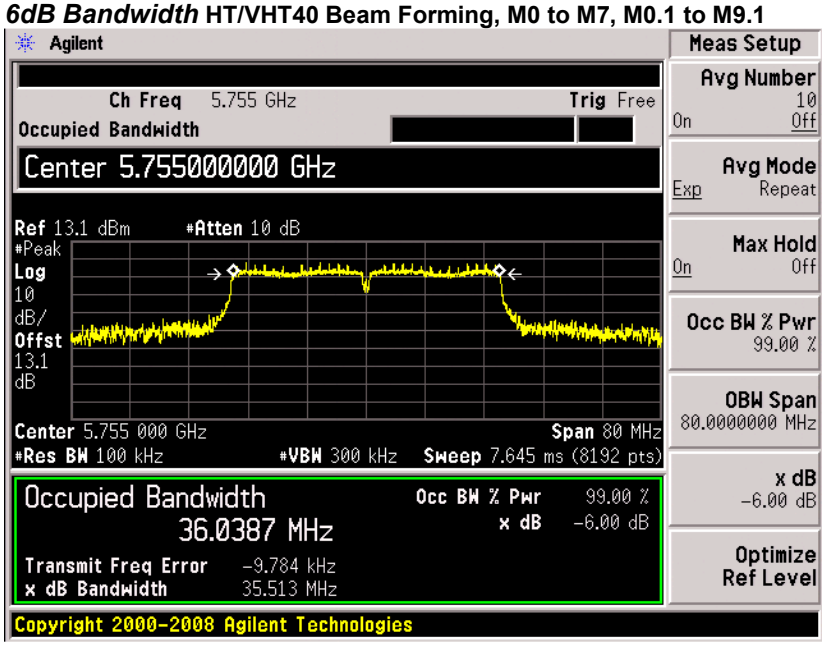
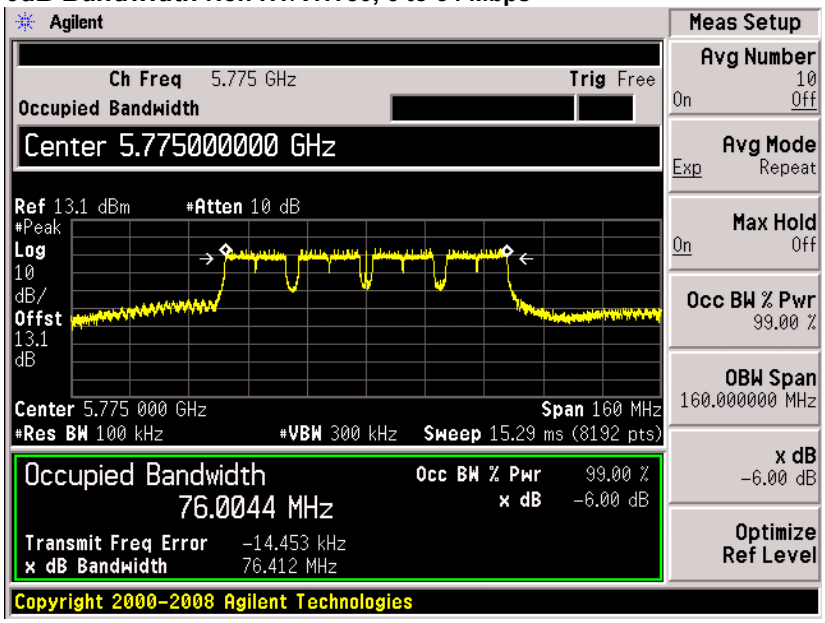
6dB Bandwidth **HT/VHT40 Beam Forming, M0 to M7, M0.1 to M9.1**



6dB Bandwidth **Non HT/VHT80, 6 to 54 Mbps**



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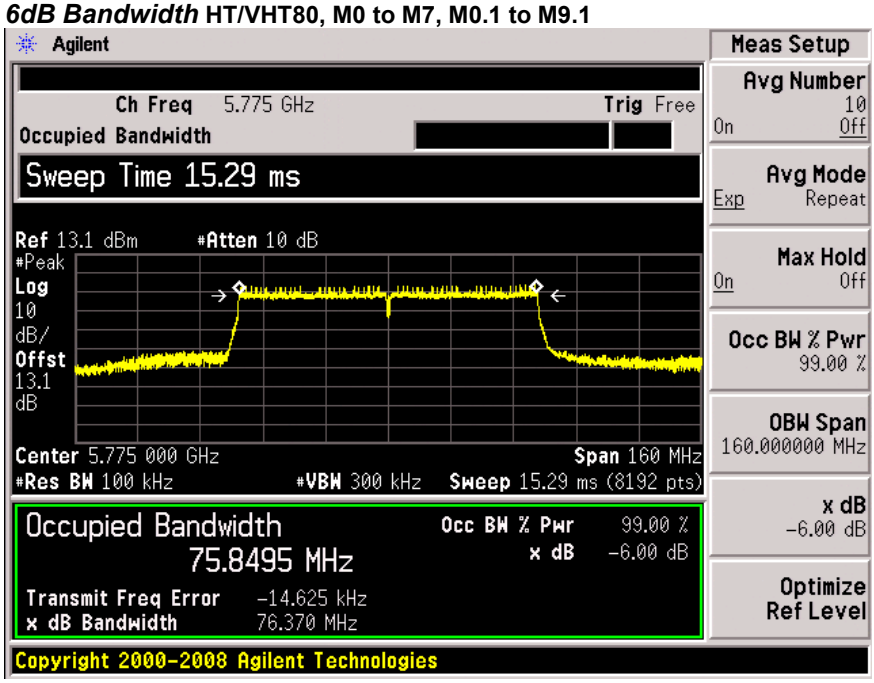
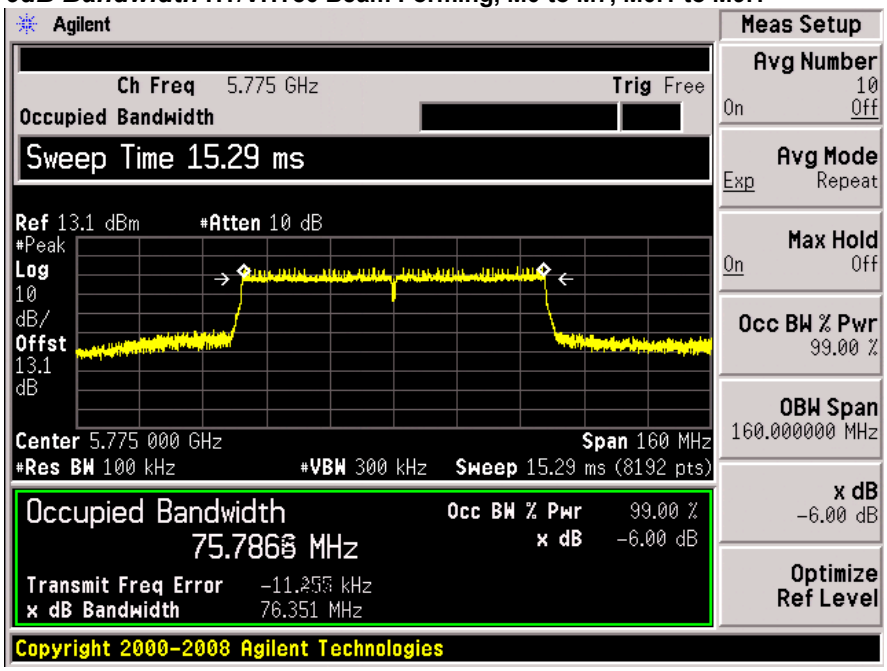
6dB Bandwidth **HT/VHT80, M0 to M7, M0.1 to M9.1**



6dB Bandwidth **HT/VHT80 Beam Forming, M0 to M7, M0.1 to M9.1**



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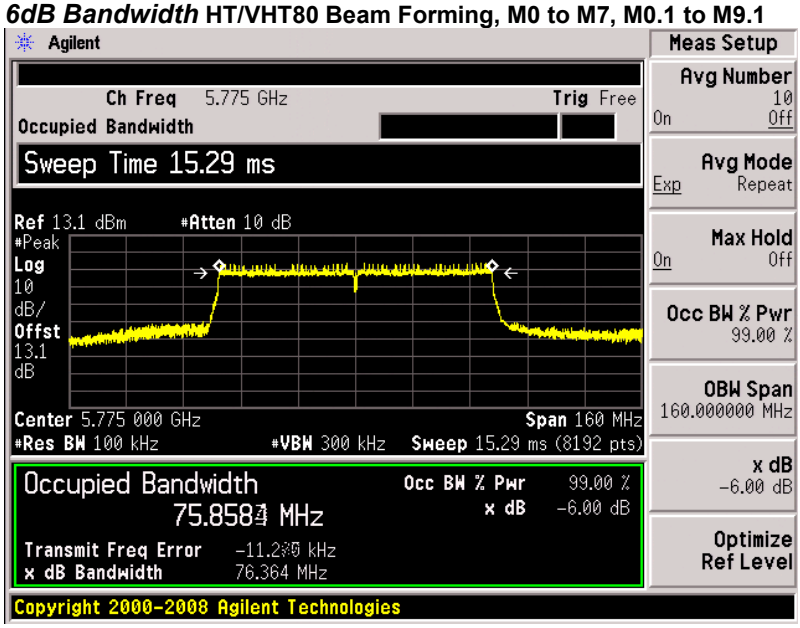
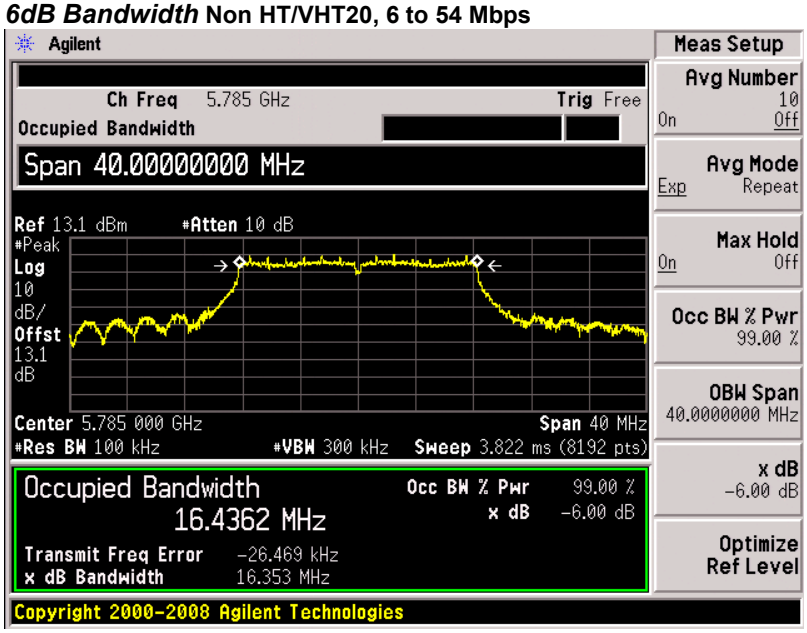
6dB Bandwidth **HT/VHT80 Beam Forming, M0 to M7, M0.1 to M9.1**



6dB Bandwidth **Non HT/VHT20, 6 to 54 Mbps**



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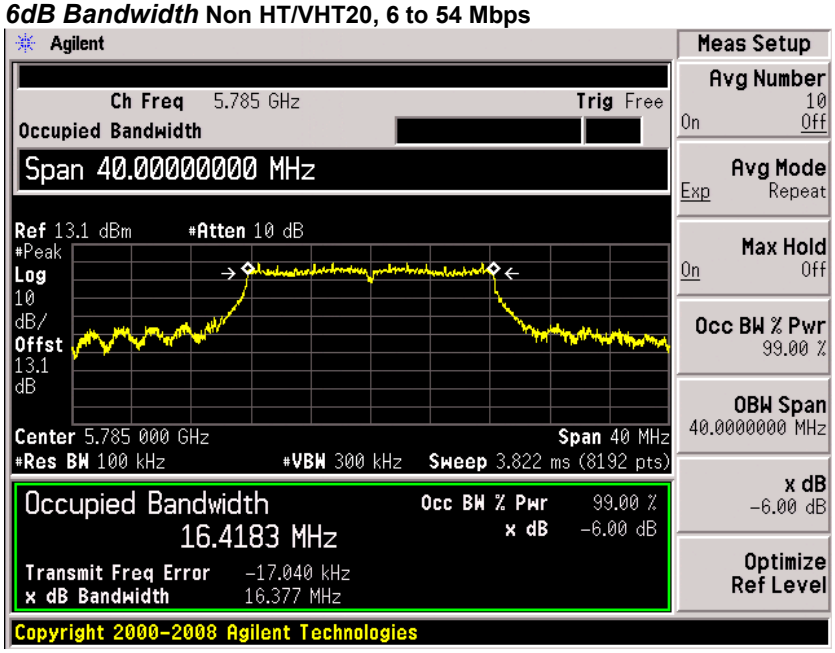
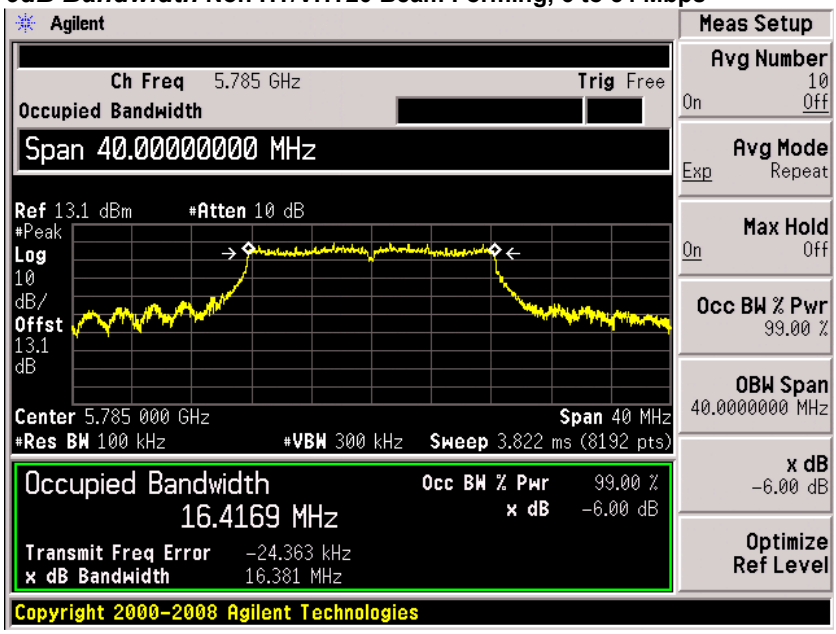
6dB Bandwidth **Non HT/VHT20, 6 to 54 Mbps**



6dB Bandwidth **Non HT/VHT20 Beam Forming, 6 to 54 Mbps**



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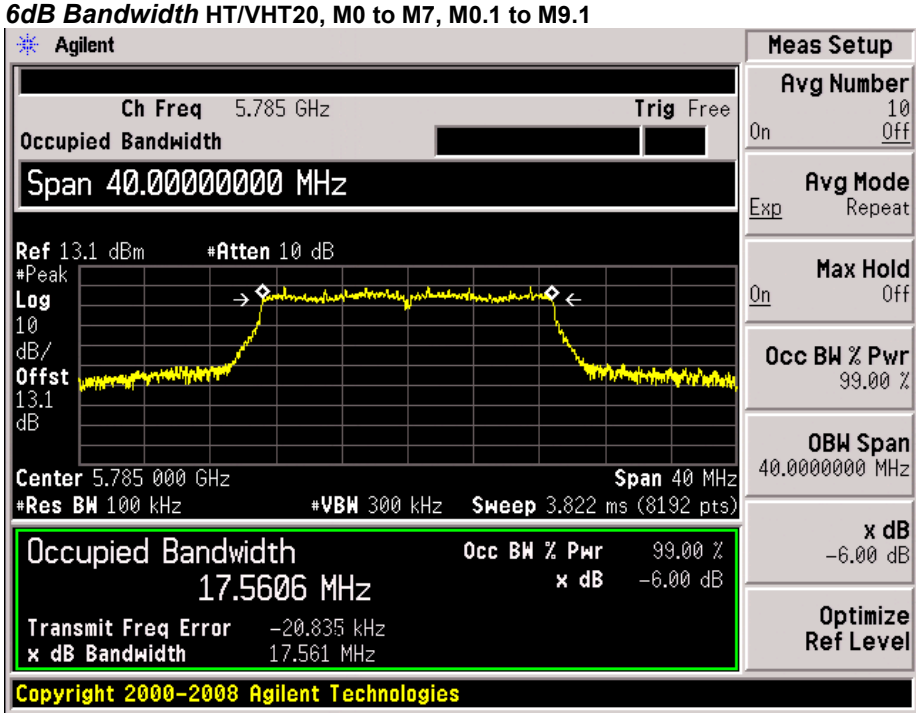
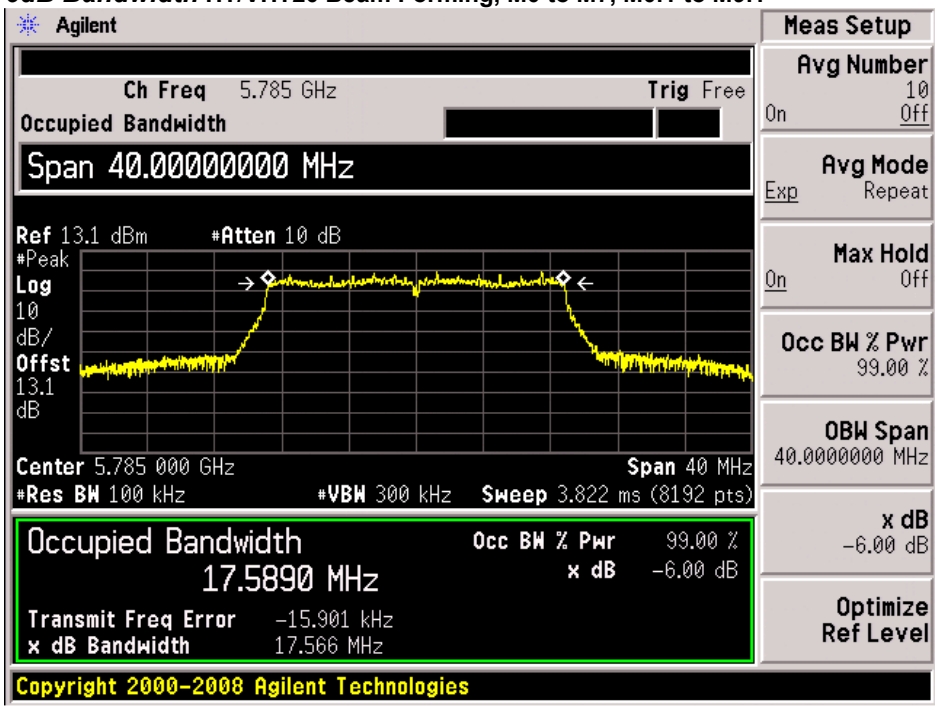
6dB Bandwidth **HT/VHT20, M0 to M7, M0.1 to M9.1**



6dB Bandwidth **HT/VHT20 Beam Forming, M0 to M7, M0.1 to M9.1**



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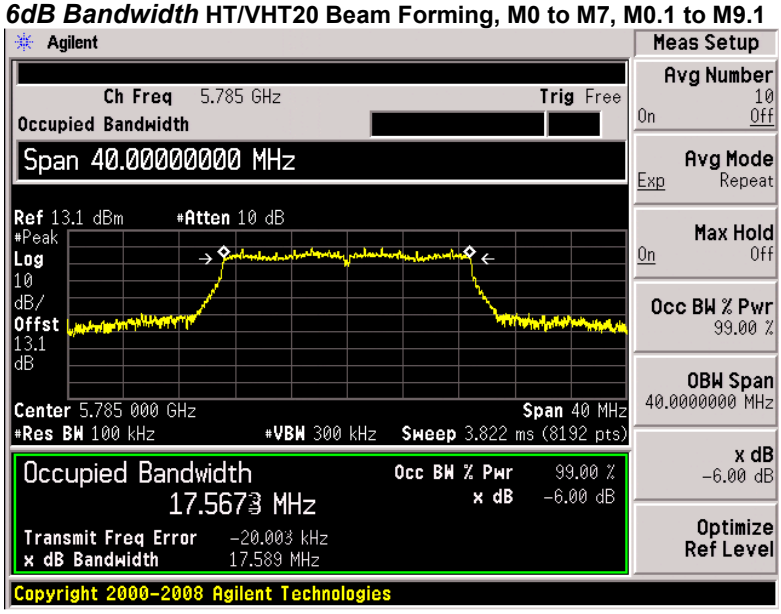
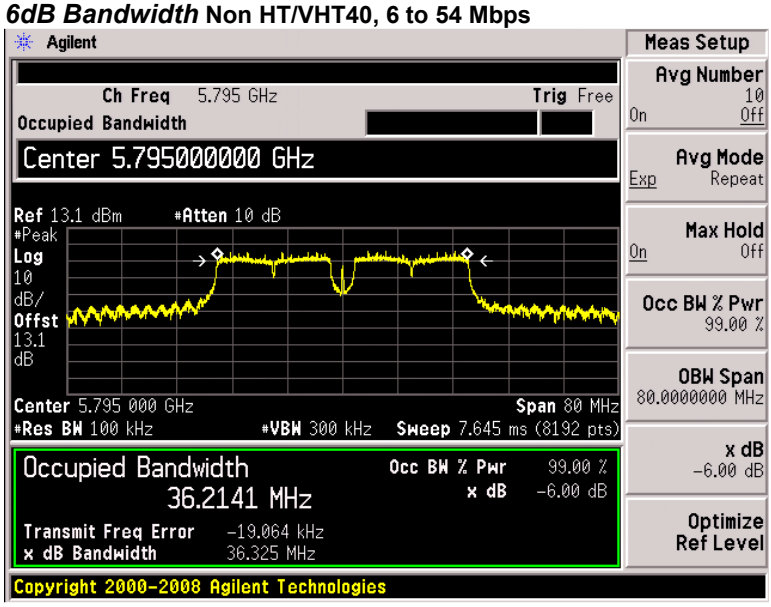
6dB Bandwidth **HT/VHT20 Beam Forming, M0 to M7, M0.1 to M9.1**



6dB Bandwidth **Non HT/VHT40, 6 to 54 Mbps**



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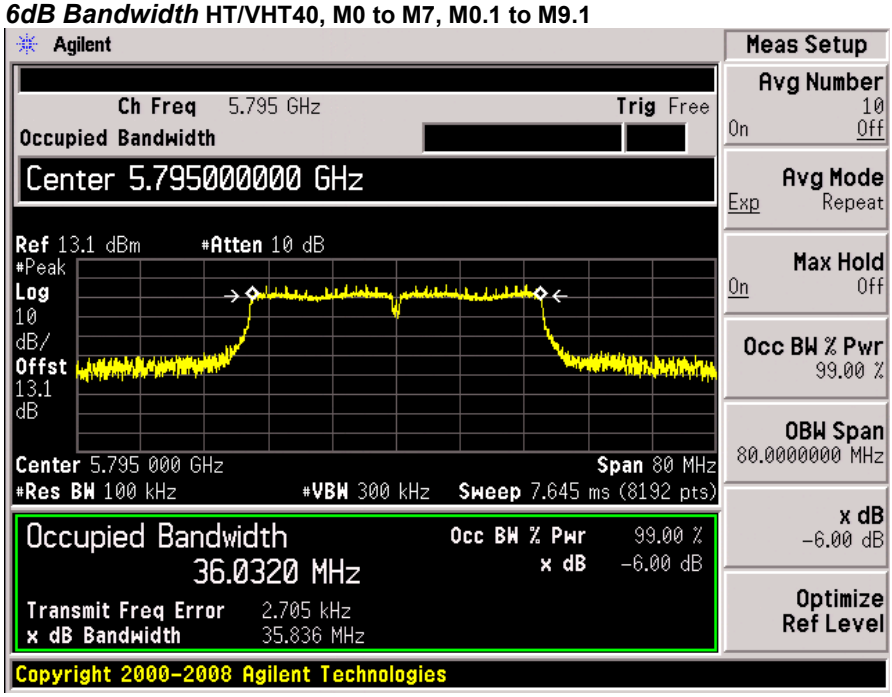
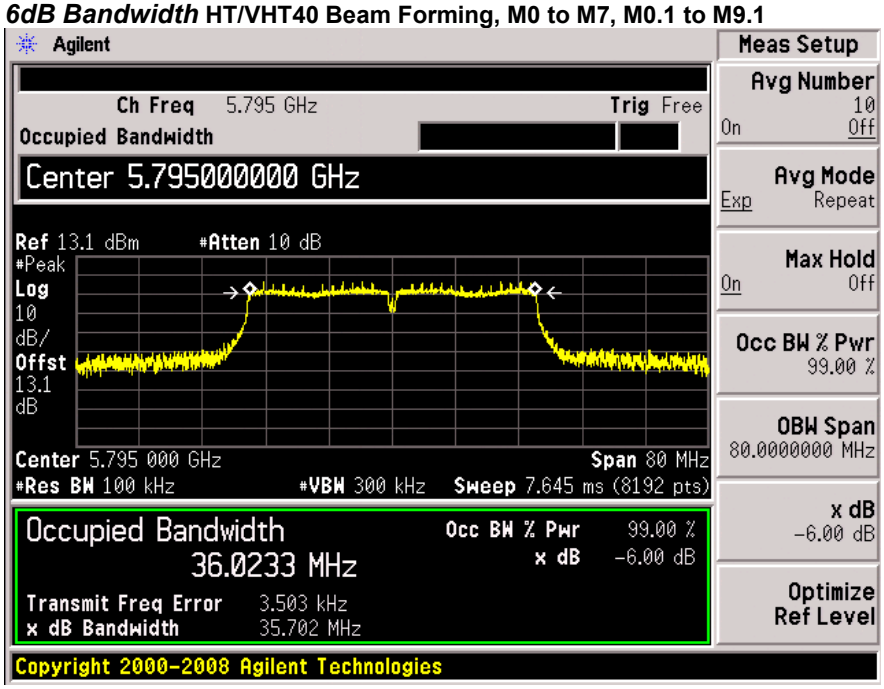
6dB Bandwidth **HT/VHT40, M0 to M7, M0.1 to M9.1**



6dB Bandwidth **HT/VHT40 Beam Forming, M0 to M7, M0.1 to M9.1**



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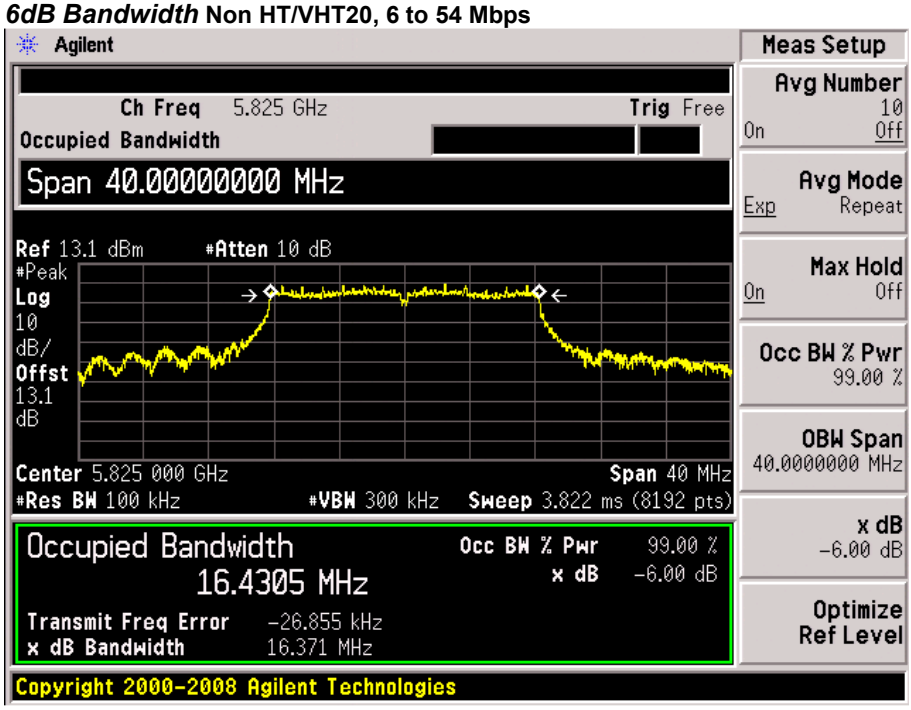
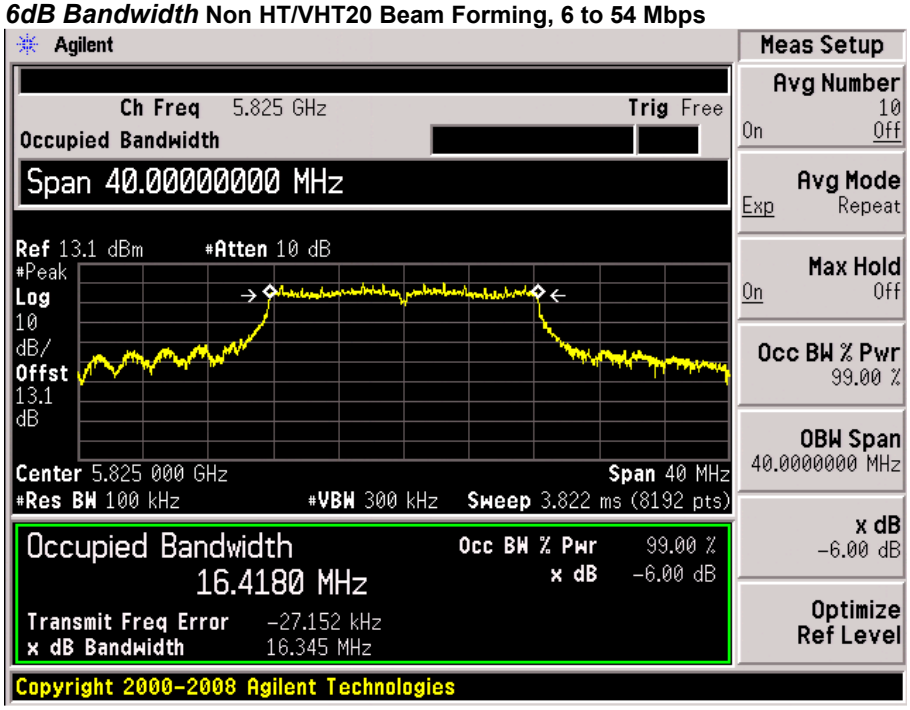
6dB Bandwidth **Non HT/VHT20, 6 to 54 Mbps**



6dB Bandwidth **Non HT/VHT20 Beam Forming, 6 to 54 Mbps**



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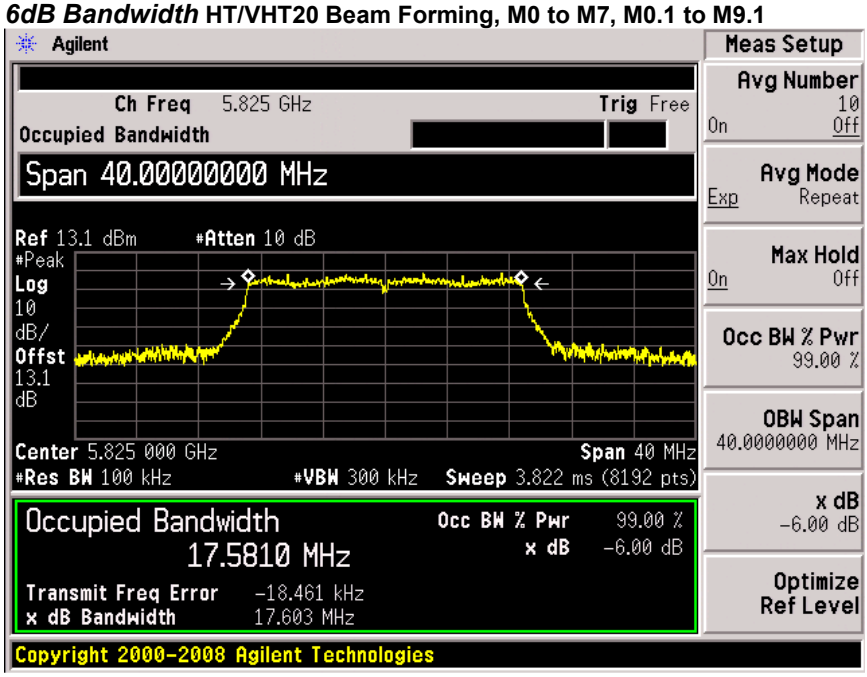
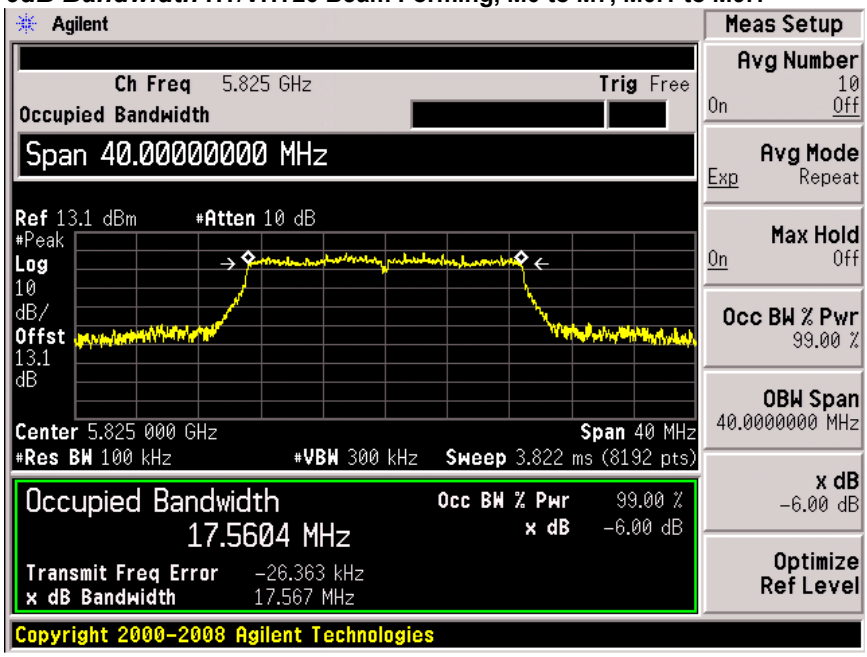
6dB Bandwidth **HT/VHT20 Beam Forming, M0 to M7, M0.1 to M9.1**



6dB Bandwidth **HT/VHT20 Beam Forming, M0 to M7, M0.1 to M9.1**



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99% and 26dB Bandwidth

Connect the antenna port(s) to the spectrum analyzer input. Using the spectrum analyzer Channel Bandwidth mode, configure the spectrum analyzer as shown below (enter all losses between the transmitter output and the spectrum analyzer).

99 Percent Occupied Bandwidth

The 99-percent occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5 % of the total mean power of the given emission. Measurement of the 99-percent occupied bandwidth is *required* only as a condition for using the optional band-edge measurement techniques described in section H)3)d). Measurements of 99-percent occupied bandwidth may also optionally be used in lieu of the 26-dB emission bandwidth to define the minimum frequency range over which the spectrum is integrated when measuring maximum conducted output power as described in section E). However, the 26-dB bandwidth must be measured to determine bandwidth dependent limits on maximum conducted output power in accordance with 15.407(a). The following procedure shall be used for measuring (99 %) power bandwidth.

1) Set center frequency to the nominal EUT channel center frequency.

2) Set span = 1.5 times to 5.0 times the OBW.

3) Set RBW = 1 % to 5 % of the OBW

4) Set VBW $\geq 3 \cdot$ RBW

5) Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.

6) Use the 99 % power bandwidth function of the instrument (if available).

7) If the instrument does not have a 99 % power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

Note: The automatic bandwidth measurement capability of a spectrum analyzer or EMI receiver may be employed if it implements the functionality described above.

Radio was placed in continuous transmit mode. Peak detection with max hold was utilized.

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Frequency (MHz)	Mode	Data Rate (Mbps)	26dB BW (MHz)	99% BW
5745	**Non HT/VHT20, 6 to 54 Mbps**	6Mbps	20.19	16.5739
	Non HT/VHT20 Beam Forming, 6 to 54 Mbps	6Mbps	20.678	16.5744
	HT/VHT20 Beam Forming, M0 to M7, M0.1 to M9.1	M0	19.702	17.6097
	HT/VHT20 Beam Forming, M0 to M7, M0.1 to M9.1	M0	20.02	17.6078
5745/ 5765	**HT/VHT40, M0 to M7, M0.1 to M9.1**	M0	39.833	36.0364
	HT/VHT40 Beam Forming, M0 to M7, M0.1 to M9.1	M0	39.726	36.0688
	HT/VHT40 Beam Forming, M0 to M7, M0.1 to M9.1	M0	40.034	36.0968
5745/ 5765/ 5785/ 5805	**Non HT/VHT80, 6 to 54 Mbps**	6Mbps	105.467	76.482
	HT/VHT80, M0 to M7, M0.1 to M9.1	M0x1	84.732	76.3246
	HT/VHT80 Beam Forming, M0 to M7, M0.1 to M9.1	M0x1	81.41	76.1667
	HT/VHT80 Beam Forming, M0 to M7, M0.1 to M9.1	M0x1	84.784	76.4549
5785	**Non HT/VHT20, 6 to 54 Mbps**	6Mbps	19.448	16.5957
	Non HT/VHT20, 6 to 54 Mbps	6Mbps	20.295	16.5768
	Non HT/VHT20 Beam Forming, 6 to 54 Mbps	6Mbps	19.264	16.5544

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	HT/VHT20, M0 to M7, M0.1 to M9.1	M0	19.889	17.6013
	HT/VHT20 Beam Forming, M0 to M7, M0.1 to M9.1	M0	19.697	17.6093
	HT/VHT20 Beam Forming, M0 to M7, M0.1 to M9.1	M0	19.992	17.6018

5785/ 5805	**Non HT/VHT40, 6 to 54 Mbps**	6Mbps	56.322	36.3863
	HT/VHT40, M0 to M7, M0.1 to M9.1	M0	39.658	36.0798
	HT/VHT40 Beam Forming, M0 to M7, M0.1 to M9.1	M0	39.849	36.0898

5825	**Non HT/VHT20, 6 to 54 Mbps**	6Mbps	19.674	16.5352
	Non HT/VHT20 Beam Forming, 6 to 54 Mbps	6Mbps	22.778	16.5537
	HT/VHT20 Beam Forming, M0 to M7, M0.1 to M9.1	M0	19.64	17.606
	HT/VHT20 Beam Forming, M0 to M7, M0.1 to M9.1	M0	19.964	17.6024

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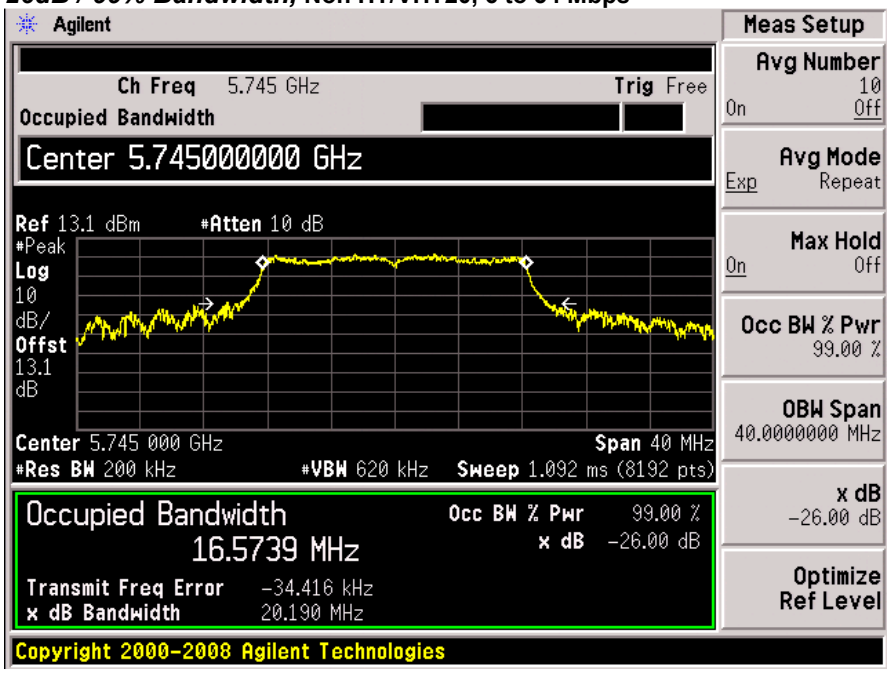
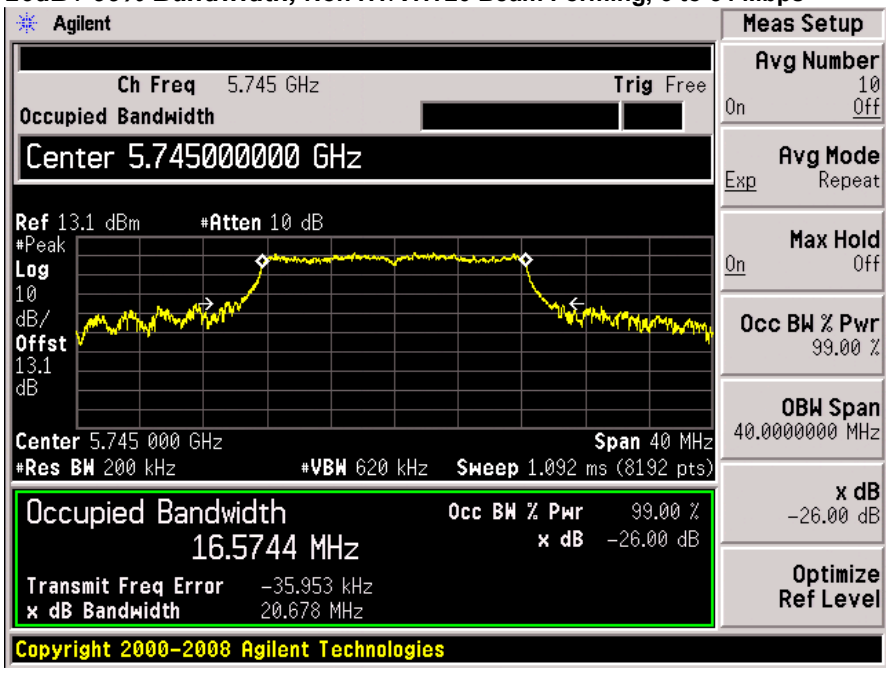
***26dB / 99% Bandwidth,* Non HT/VHT20, 6 to 54 Mbps**



***26dB / 99% Bandwidth,* Non HT/VHT20 Beam Forming, 6 to 54 Mbps**



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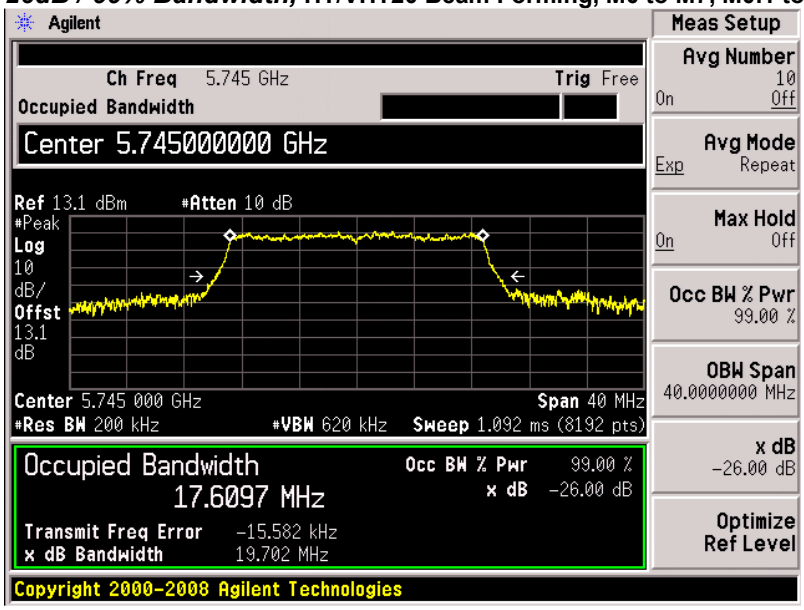
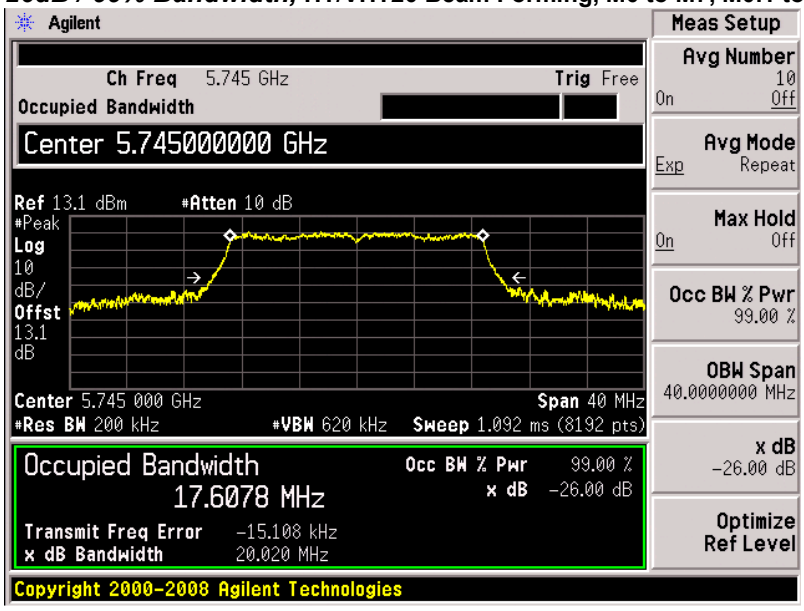
26dB / 99% Bandwidth, **HT/VHT20 Beam Forming, M0 to M7, M0.1 to M9.1**



26dB / 99% Bandwidth, **HT/VHT20 Beam Forming, M0 to M7, M0.1 to M9.1**



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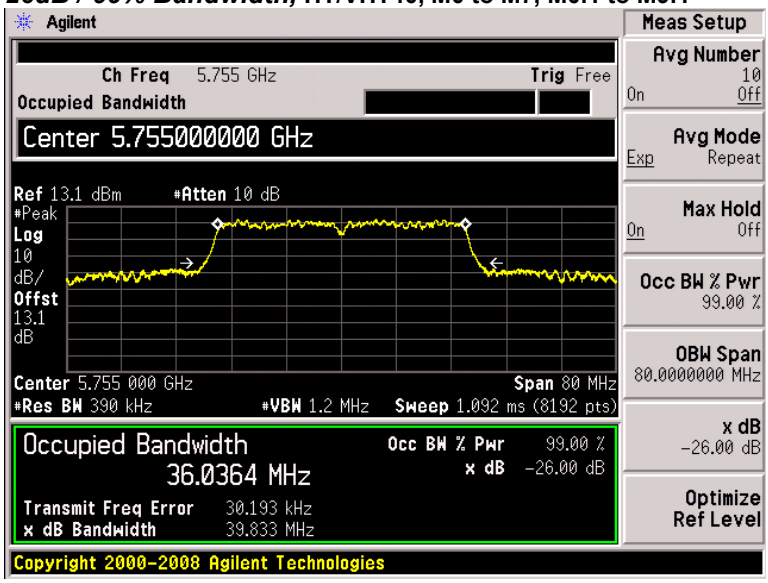
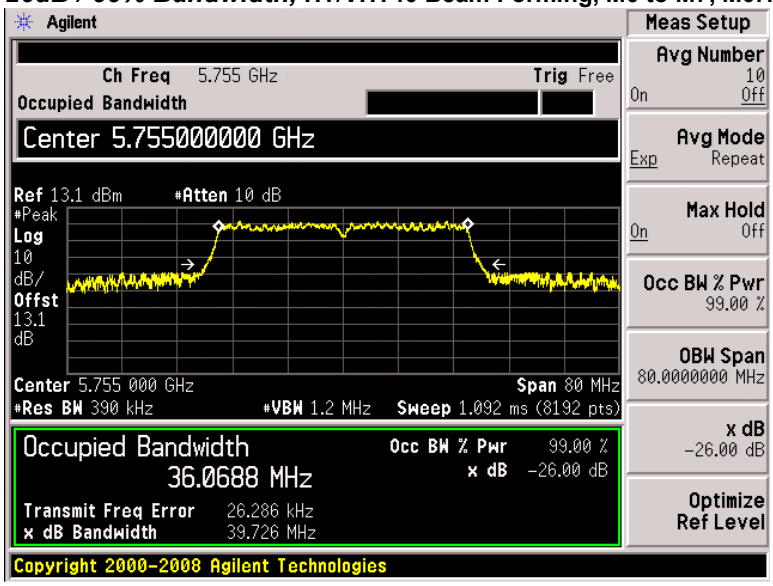
***26dB / 99% Bandwidth,* HT/VHT40, M0 to M7, M0.1 to M9.1**



***26dB / 99% Bandwidth,* HT/VHT40 Beam Forming, M0 to M7, M0.1 to M9.1**



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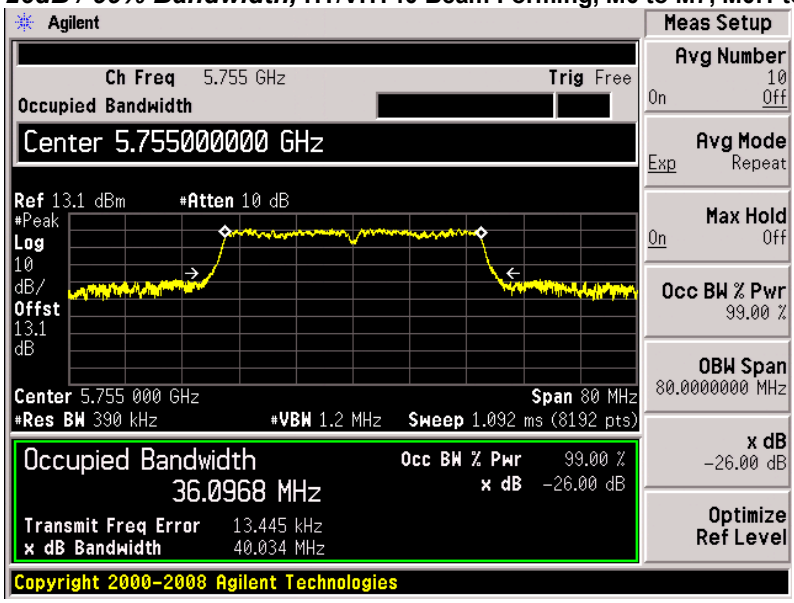
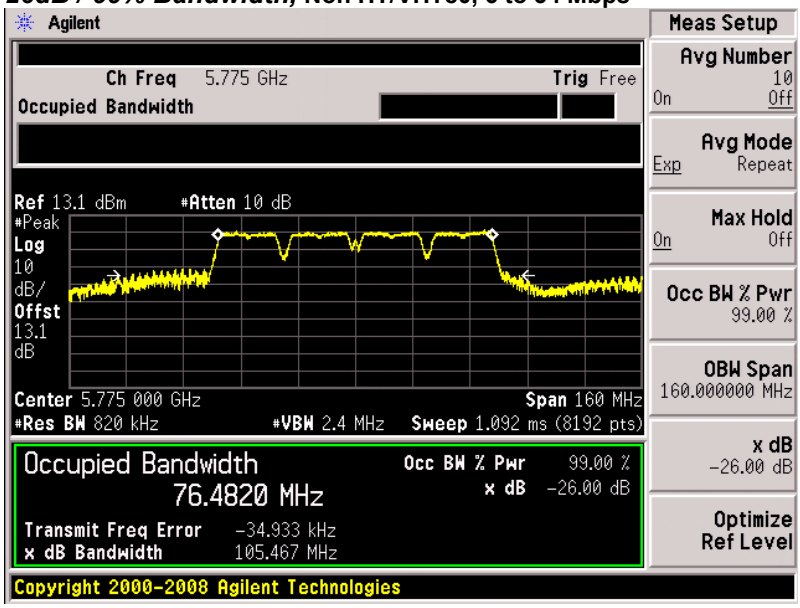
***26dB / 99% Bandwidth,* HT/VHT40 Beam Forming, M0 to M7, M0.1 to M9.1**



***26dB / 99% Bandwidth,* Non HT/VHT80, 6 to 54 Mbps**



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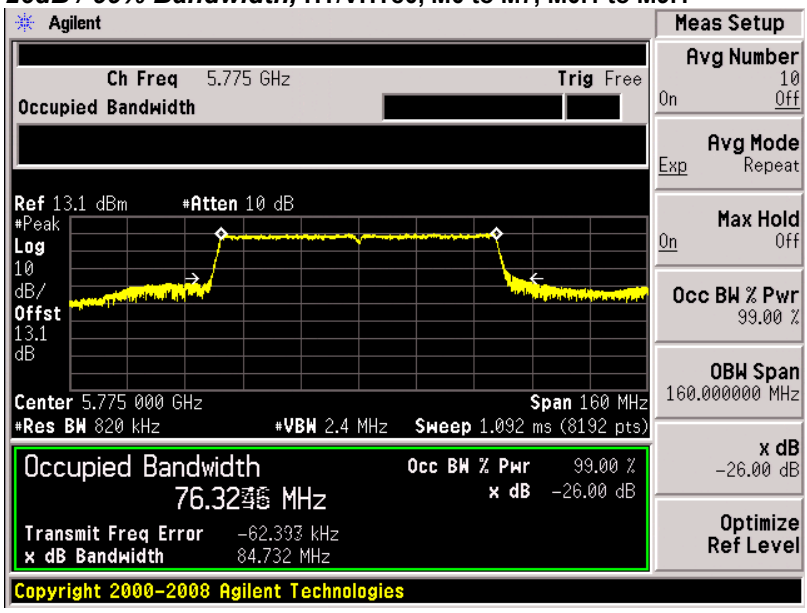
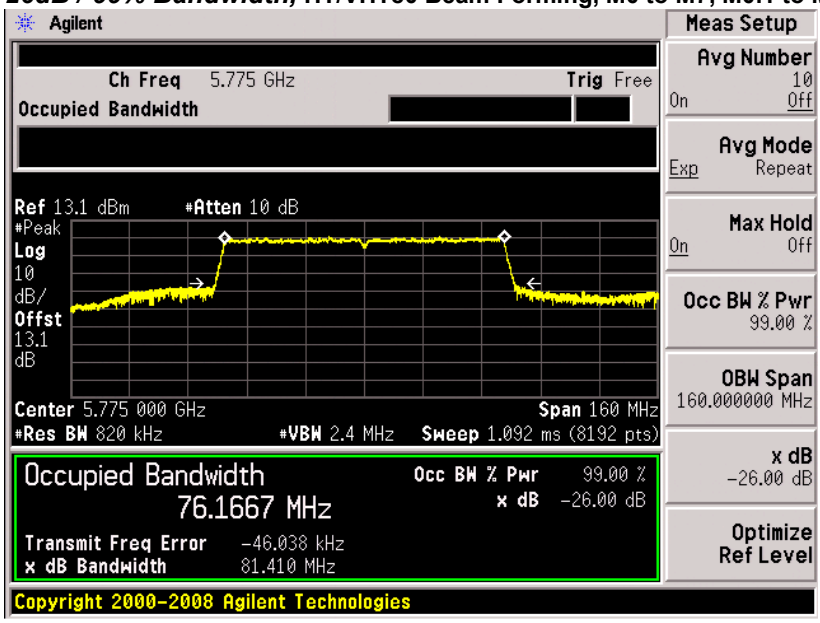
***26dB / 99% Bandwidth,* HT/VHT80, M0 to M7, M0.1 to M9.1**



***26dB / 99% Bandwidth,* HT/VHT80 Beam Forming, M0 to M7, M0.1 to M9.1**



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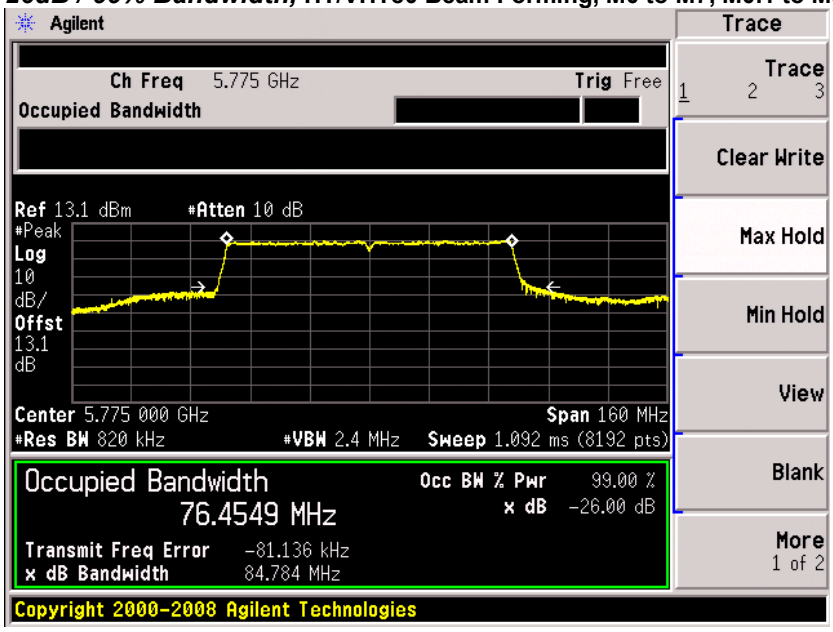
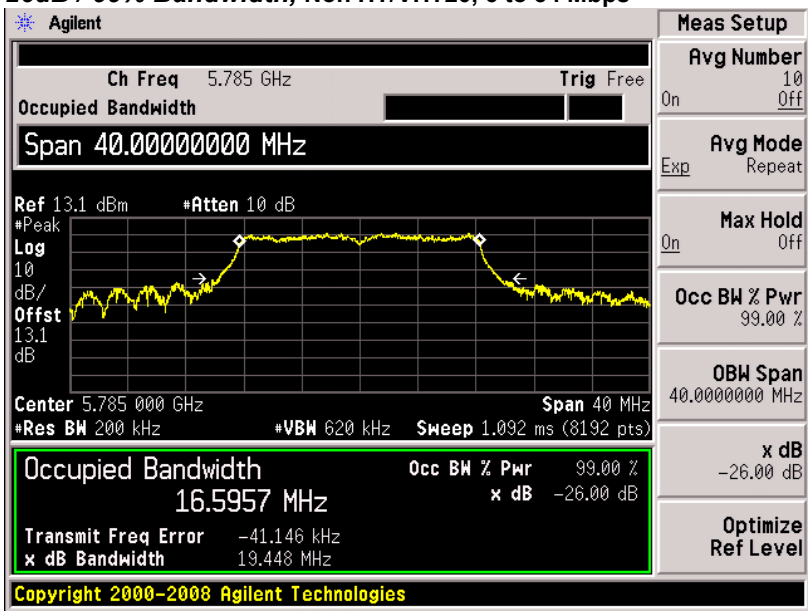
***26dB / 99% Bandwidth,* HT/VHT80 Beam Forming, M0 to M7, M0.1 to M9.1**



***26dB / 99% Bandwidth,* Non HT/VHT20, 6 to 54 Mbps**



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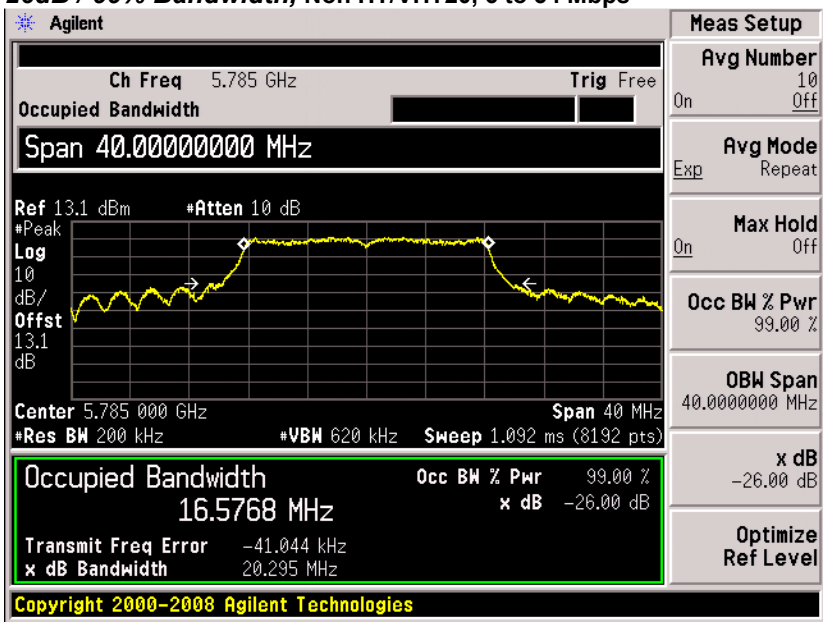
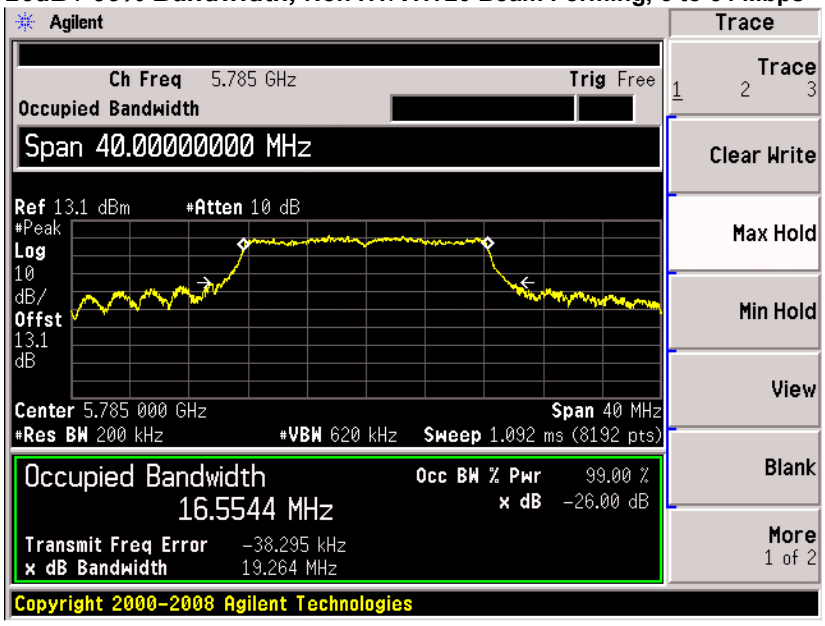
***26dB / 99% Bandwidth,* Non HT/VHT20, 6 to 54 Mbps**



***26dB / 99% Bandwidth,* Non HT/VHT20 Beam Forming, 6 to 54 Mbps**



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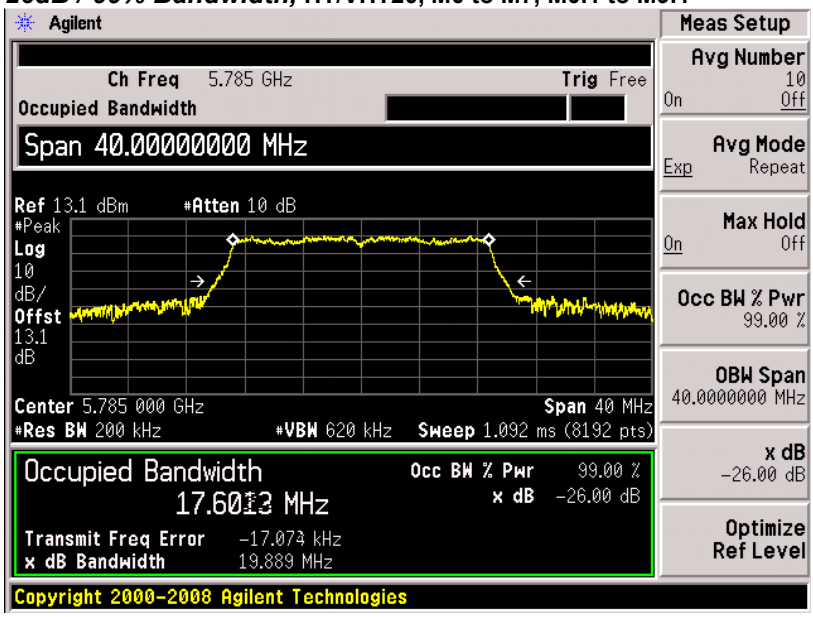
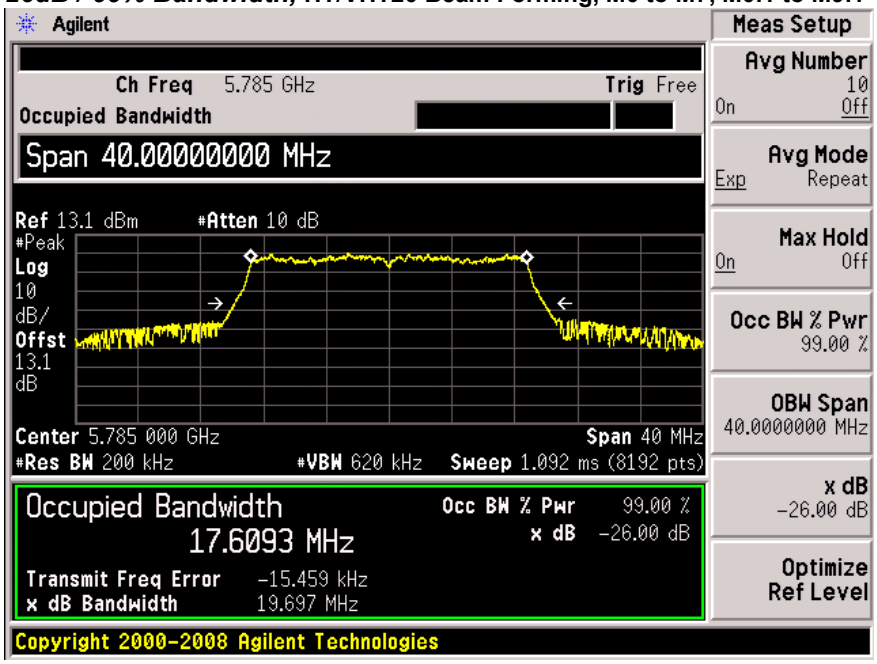
***26dB / 99% Bandwidth,* HT/VHT20, M0 to M7, M0.1 to M9.1**



***26dB / 99% Bandwidth,* HT/VHT20 Beam Forming, M0 to M7, M0.1 to M9.1**



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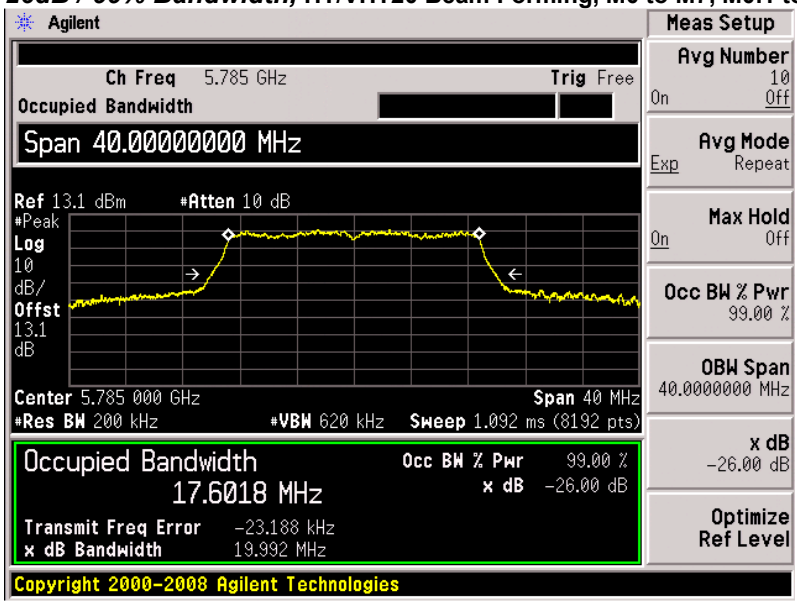
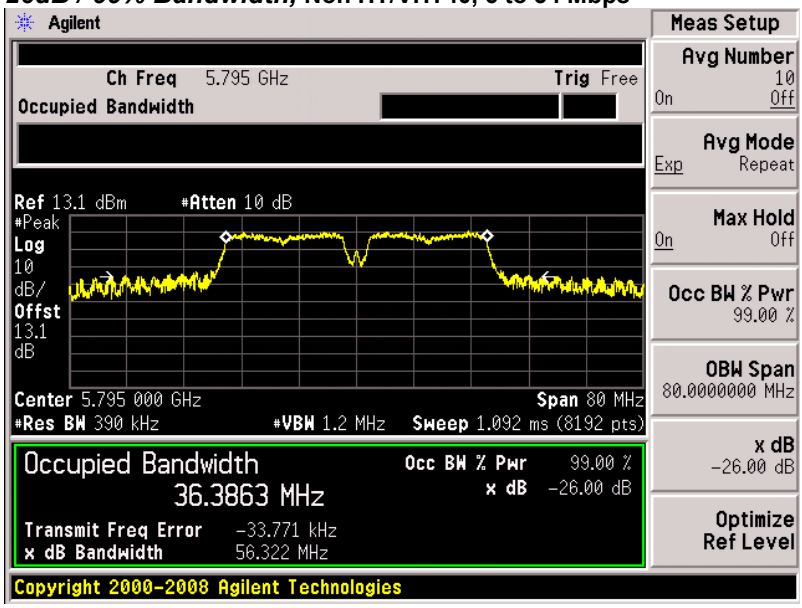
***26dB / 99% Bandwidth,* HT/VHT20 Beam Forming, M0 to M7, M0.1 to M9.1**



***26dB / 99% Bandwidth,* Non HT/VHT40, 6 to 54 Mbps**



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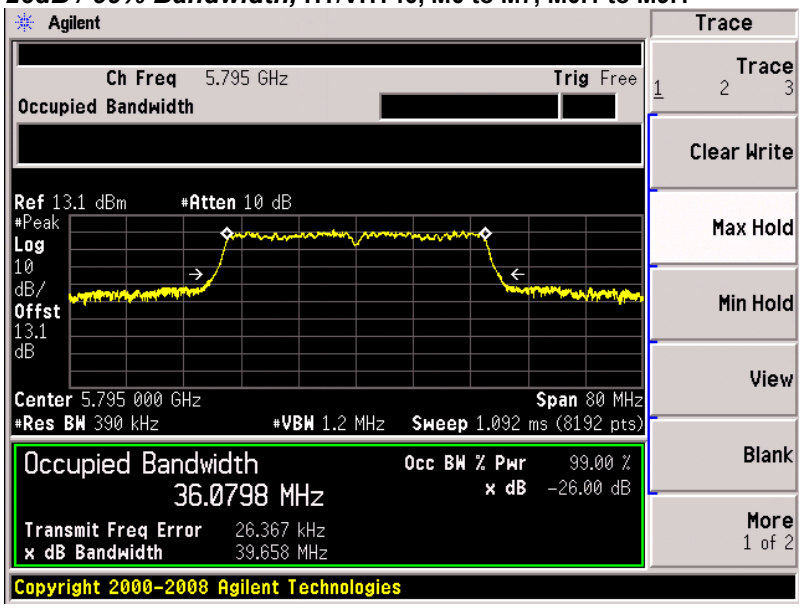
***26dB / 99% Bandwidth,* HT/VHT40, M0 to M7, M0.1 to M9.1**



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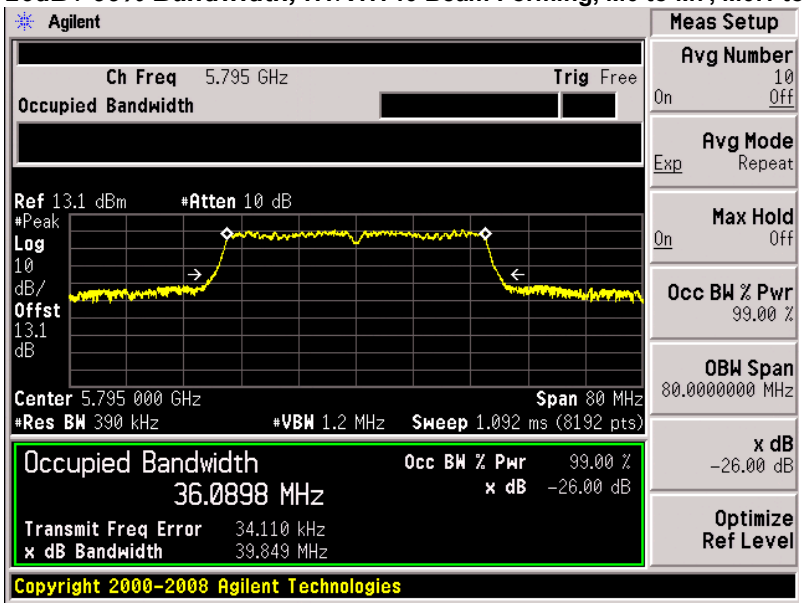

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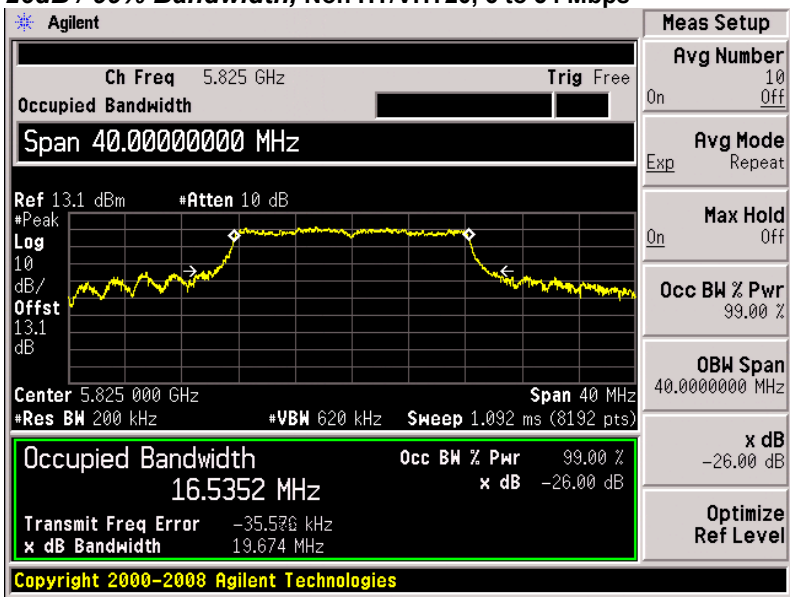
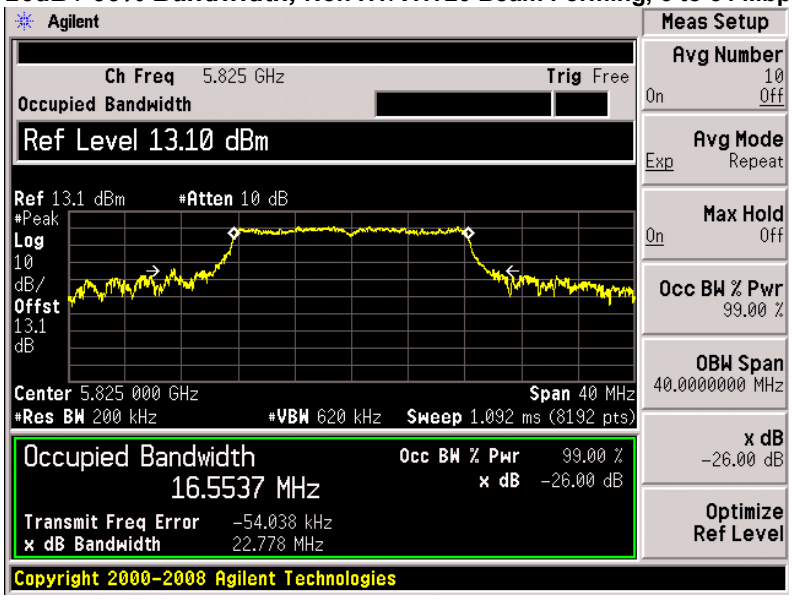
***26dB / 99% Bandwidth,* Non HT/VHT20, 6 to 54 Mbps**



***26dB / 99% Bandwidth,* Non HT/VHT20 Beam Forming, 6 to 54 Mbps**



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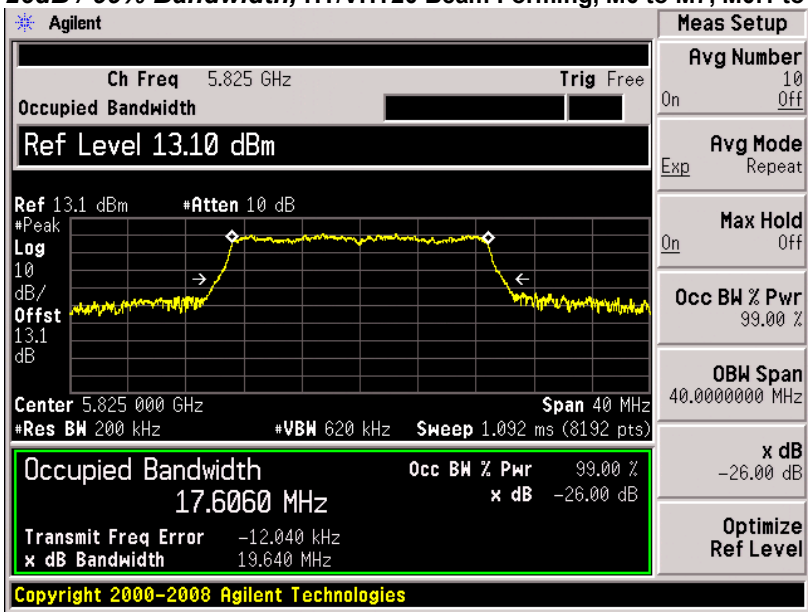
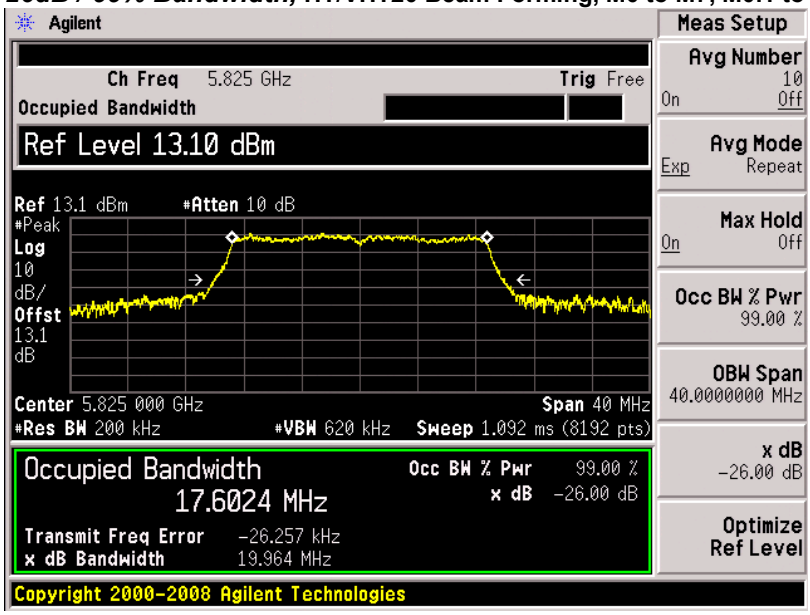
***26dB / 99% Bandwidth,* HT/VHT20 Beam Forming, M0 to M7, M0.1 to M9.1**



***26dB / 99% Bandwidth,* HT/VHT20 Beam Forming, M0 to M7, M0.1 to M9.1**



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Maximum Conducted Output Power

15.247: The maximum conducted output power of the intentional radiator for systems using digital modulation in the 5725-5850 MHz band shall not exceed 1 Watt (30dBm). If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum supported antenna gain is 7dBi. The peak correlated gain for each mode is listed in the table below. See the Theory of Operation for details on the correlated gain for each mode.

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

Enable "Channel Power" function of analyzer	
Center Frequency:	Frequency from table below
Span:	Must be greater than 26dB bandwidth, adjust as necessary
Ref Level Offset:	Correct for attenuator and cable loss.
Reference Level:	20 dBm
Attenuation:	20 dB
Sweep Time:	1ms, Single sweep
Resolution Bandwidth:	1 MHz
Video Bandwidth:	8 MHz
Detector:	Sample
Trace:	Trace Average 100 traces in Power Averaging Mode
Integration BW:	=Occupied Bandwidth from occupied bandwidth Bandwidth Data

After averaging 100 traces of the transmitter waveform on the spectrum analyzer, record the spectrum analyzer Channel Power.

The “measure-and-sum technique” is used for measuring in-band transmit power of a device. In the measure-and-sum approach, the conducted emission level is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically to determine the total emission level from the device. Summing is performed in linear power units.

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Frequency (MHz)	Mode	Tx Paths	Correlated Antenna Gain (dBi)	Duty Cycle (%)	Tx 1 Max Power (dBm)	Tx 2 Max Power (dBm)	Tx 3 Max Power (dBm)	Tx 4 Max Power (dBm)	Total Tx Channel Power (dBm)	Total Tx Channel Power corrected for duty cycle (dBm)	Limit (dBm)	Margin (dB)
5745	Non HT/VHT20, 6 to 54 Mbps	4	7	99.4	14.66	14.32	13.74	13.71	20.2	20.23	29	8.77
	Non HT/VHT20 Beam Forming, 6 to 54 Mbps	2	10	99.3	14.57	14.33			17.5	17.53	26	8.47
	HT/VHT20 Beam Forming, M0 to M7, M0.1 to M9.1	3	11.8	99.3	14.33	14.22	13.85		18.9	18.93	24.2	5.27
	HT/VHT20 Beam Forming, M0 to M7, M0.1 to M9.1	4	13	99.3	14.33	14.17	13.8	13.96	20.1	20.13	23	2.87
5745/ 5765	HT/VHT40, M0 to M7, M0.1 to M9.1	2	7	98.5	14.54	14.52			17.5	17.57	29	11.43
	HT/VHT40 Beam Forming, M0 to M7, M0.1 to M9.1	3	11.8	98.5	14.5	14.49	13.51		19	19.07	24.2	5.13

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	HT/VHT40 Beam Forming, M0 to M7, M0.1 to M9.1	4	13	98.5	14.63	14.35	13.8	13.52	20.1	20.17	23	2.83
5745/ 5765/ 5785/ 5805	Non HT/VHT80, 6 to 54 Mbps	4	7	99.3	14.35	13.98	13.38	13.38	19.8	19.83	29	9.17
	HT/VHT80, M0 to M7, M0.1 to M9.1	4	7	95.7	14.1	13.76	12.81	12.71	19.4	19.59	29	9.41
	HT/VHT80 Beam Forming, M0 to M7, M0.1 to M9.1	3	11.8	95.7	14.33	13.48	12.62		18.5	18.69	24.2	5.51
	HT/VHT80 Beam Forming, M0 to M7, M0.1 to M9.1	4	13	95.4	14.02	13.82	12.87	12.71	19.4	19.60	23	3.40
5785	Non HT/VHT20, 6 to 54 Mbps	1	7	99.4	13.9				13.9	13.93	29	15.07
	Non HT/VHT20, 6 to 54 Mbps	4	7	99.3	13.97	13.55	12.93	12.89	19.4	19.43	29	9.57
	Non HT/VHT20 Beam Forming, 6 to 54 Mbps	4	13	99.4	13.95	13.53	12.93	12.93	19.4	19.43	23	3.57
	HT/VHT20, M0 to M7, M0.1 to M9.1	4	7	99.3	13.87	13.4	12.89	13.23	19.4	19.43	29	9.57

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	HT/VHT20 Beam Forming, M0 to M7, M0.1 to M9.1	3	11.8	99.2	13.58	13.49	12.9		18.1	18.13	24.2	6.07
	HT/VHT20 Beam Forming, M0 to M7, M0.1 to M9.1	4	13	99.3	13.84	13.43	12.83	13.22	19.4	19.43	23	3.57
5785/ 5805	Non HT/VHT40, 6 to 54 Mbps	4	7	99.3	13.25	12.87	12.26	12.2	18.7	18.73	29	10.27
	HT/VHT40, M0 to M7, M0.1 to M9.1	4	7	98.5	14.07	13.66	12.86	12.9	19.4	19.47	29	9.53
	HT/VHT40 Beam Forming, M0 to M7, M0.1 to M9.1	4	13	98.5	14.08	13.6	12.82	12.91	19.4	19.47	23	3.53
5825	Non HT/VHT20, 6 to 54 Mbps	4	7	99.4	14.68	14.35	13.87	13.57	20.2	20.23	29	8.77
	Non HT/VHT20 Beam Forming, 6 to 54 Mbps	4	13	99.4	14.73	14.32	13.65	13.9	20.2	20.23	23	2.77
	HT/VHT20 Beam Forming, M0 to M7, M0.1 to M9.1	3	11.8	99.3	14.36	14.34	13.52		18.9	18.93	24.2	5.27

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	HT/VHT20 Beam Forming, M0 to M7, M0.1 to M9.1	4	13	99.3	14.3	14.45	13.6	14.12	20.2	20.23	23	2.77

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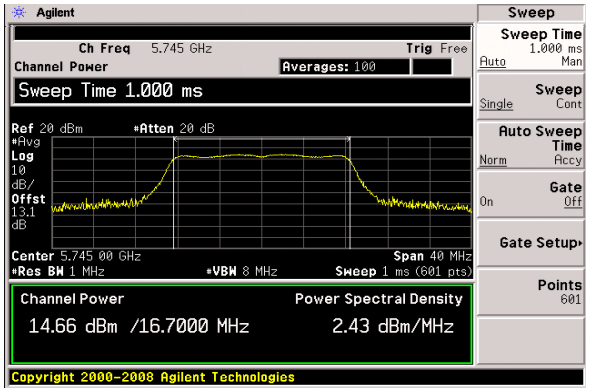
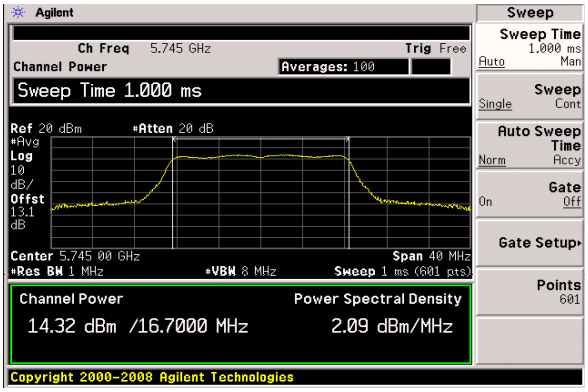
Conducted Output Power, 5745 MHz, Non HT/VHT20, 6 to 54 Mbps

Antenna A



Antenna B



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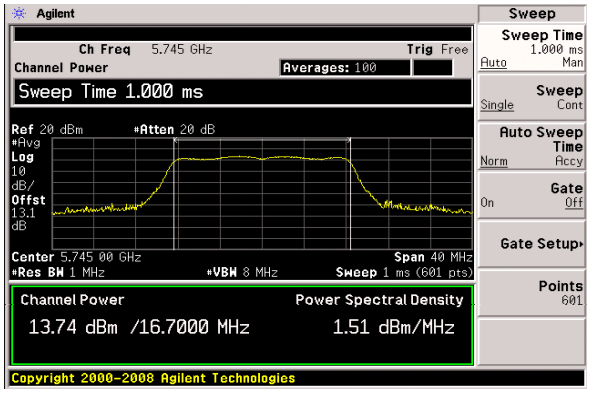
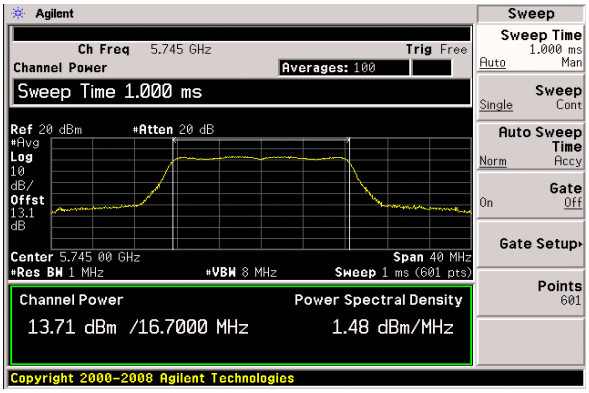
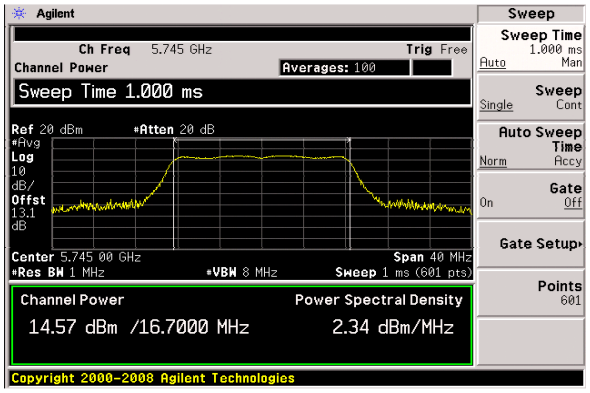


Antenna D



Non HT/VHT20 Beam Forming, 6 to 54 Mbps

Antenna A



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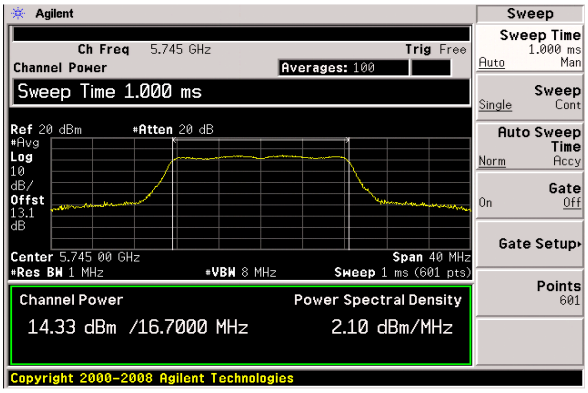

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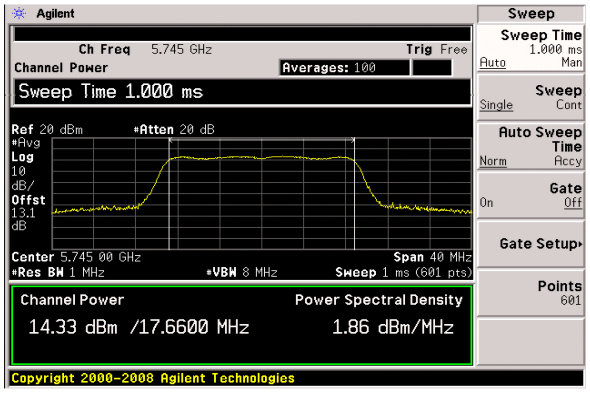
HT/VHT20 Beam Forming, M0 to M7, M0.1 to M9.1

Antenna A



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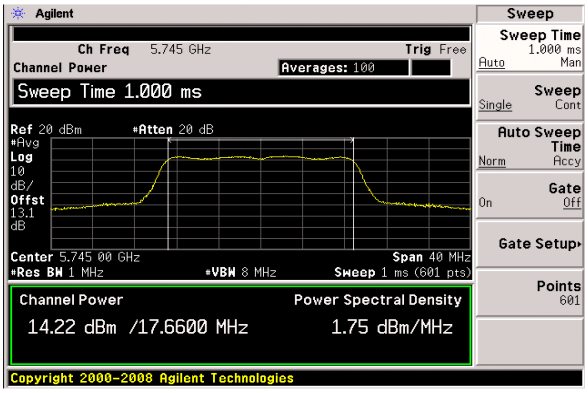

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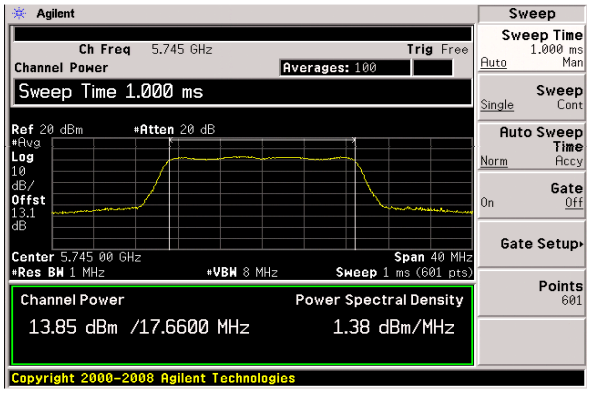

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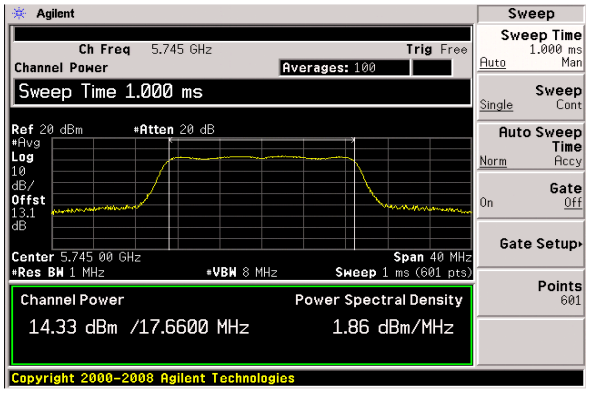
HT/VHT20 Beam Forming, M0 to M7, M0.1 to M9.1

Antenna A



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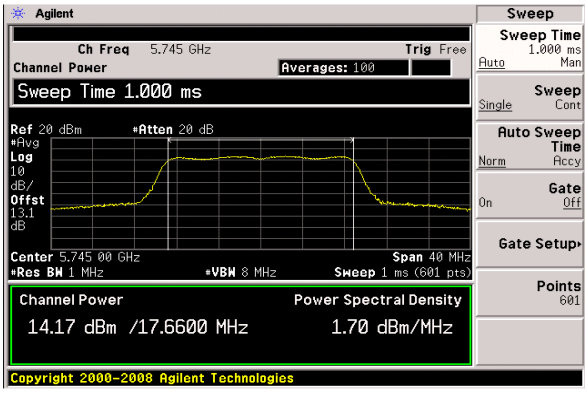

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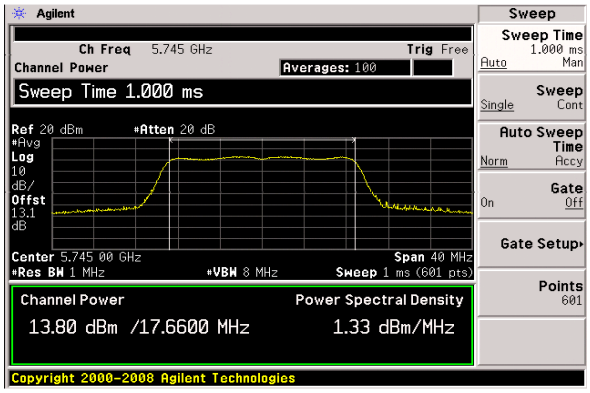

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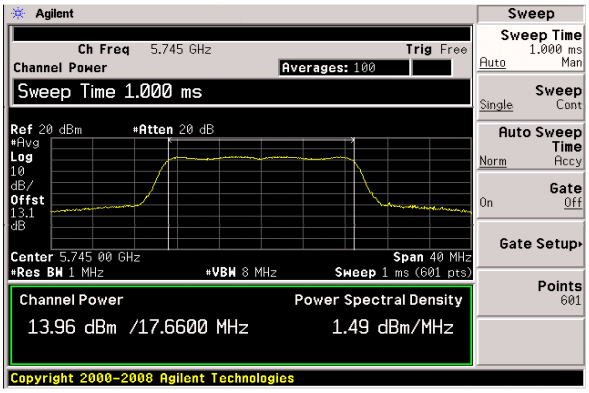
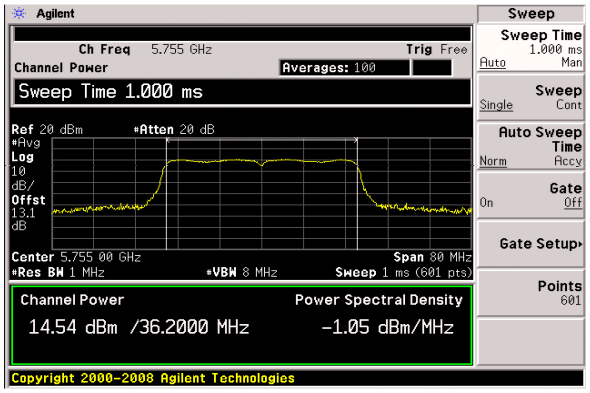


HT/VHT40, M0 to M7, M0.1 to M9.1

Antenna A



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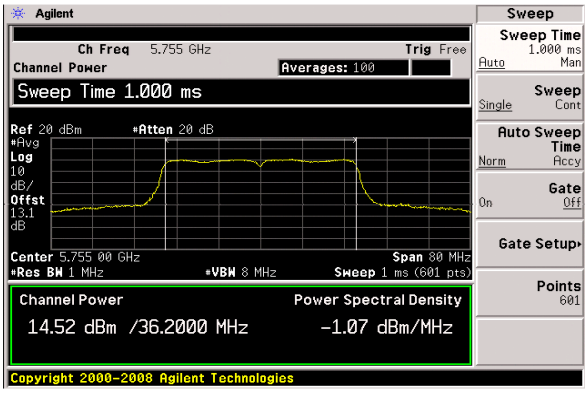

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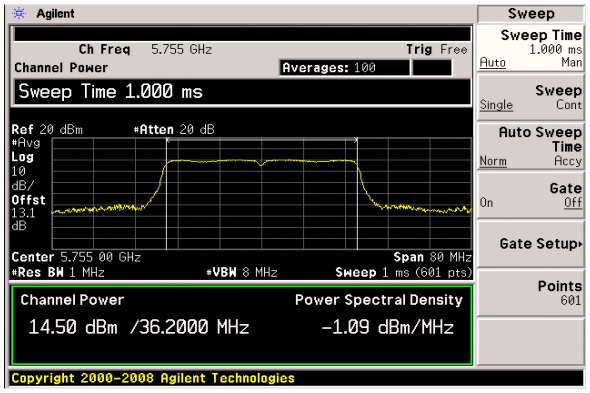
HT/VHT40 Beam Forming, M0 to M7, M0.1 to M9.1

Antenna A



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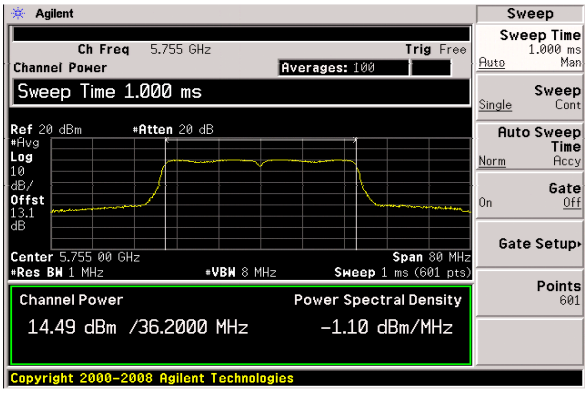

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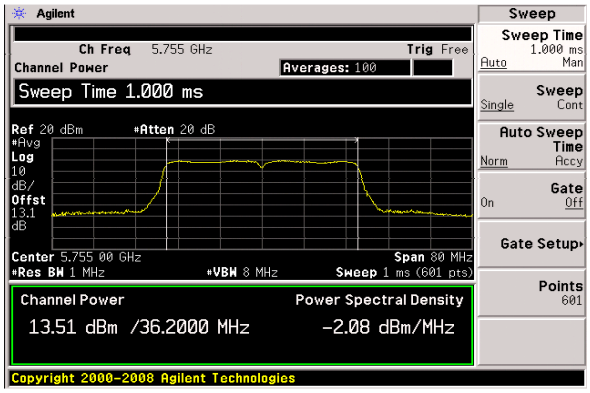

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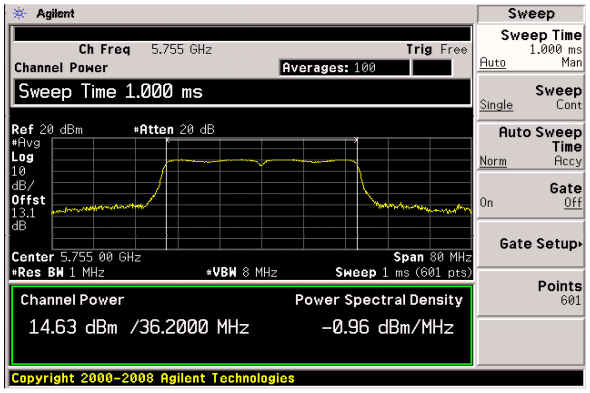
HT/VHT40 Beam Forming, M0 to M7, M0.1 to M9.1

Antenna A



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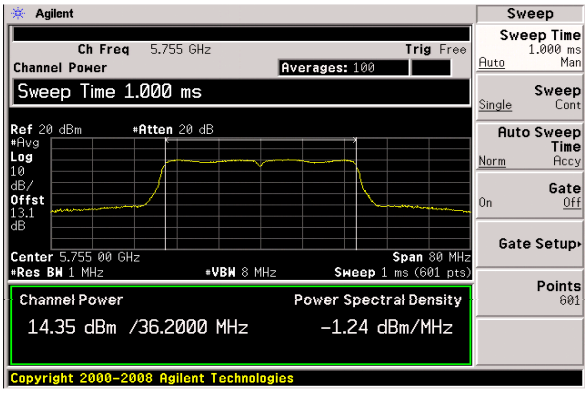

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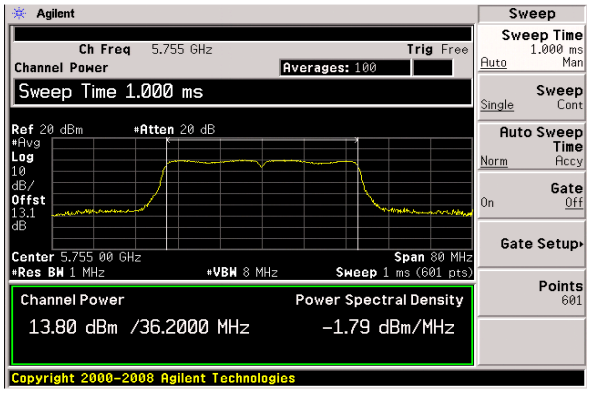

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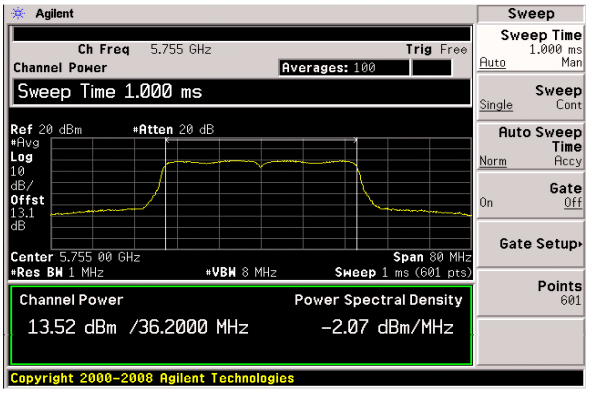

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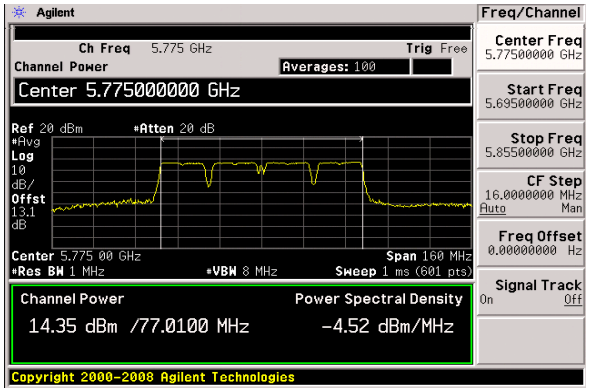
Non HT/VHT80, 6 to 54 Mbps

Antenna A



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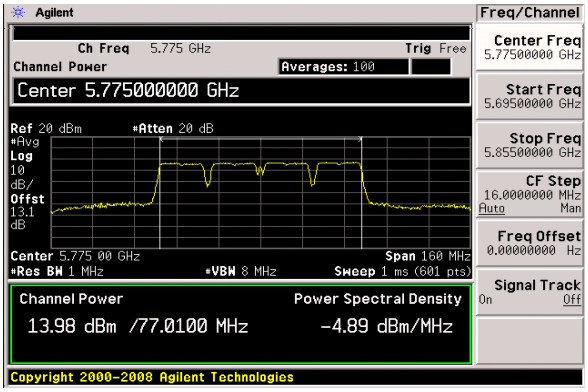

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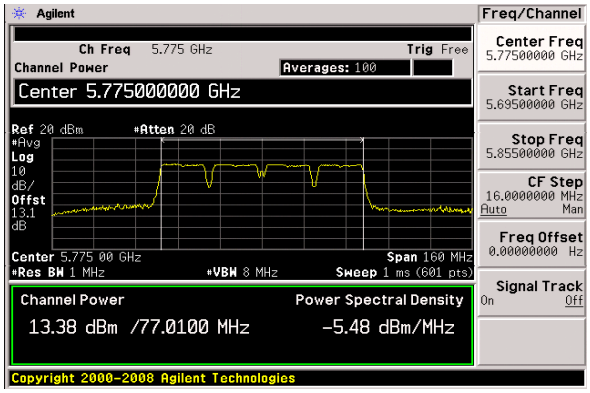

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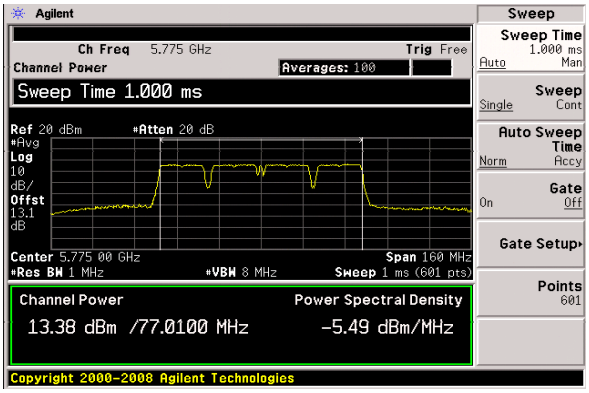

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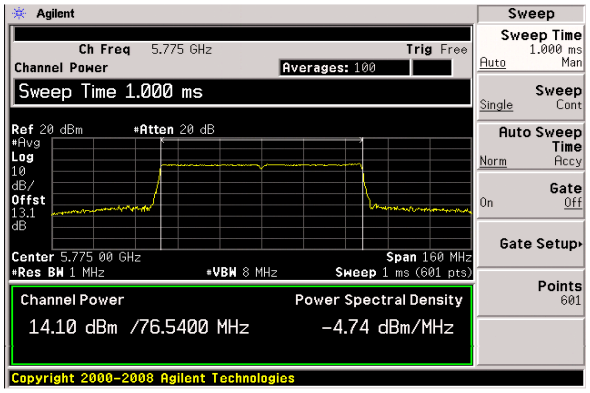
HT/VHT80, M0 to M7, M0.1 to M9.1

Antenna A



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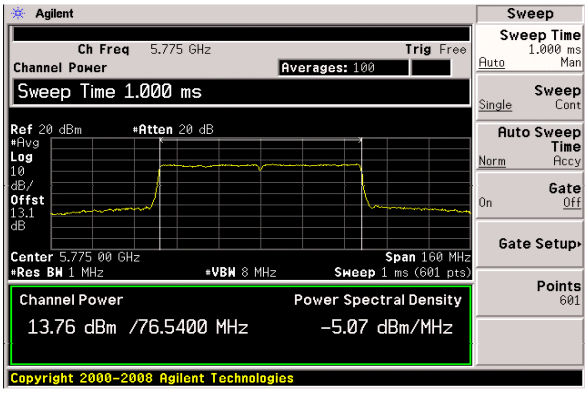

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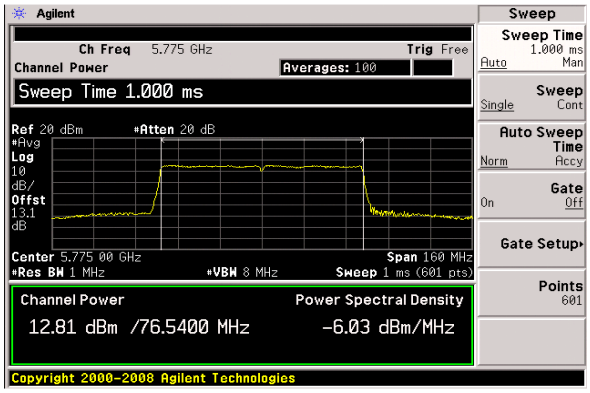

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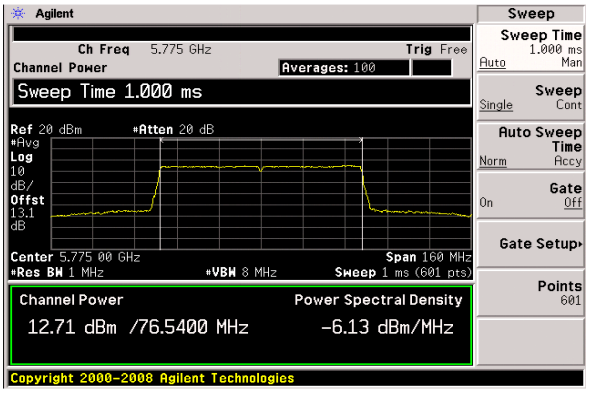

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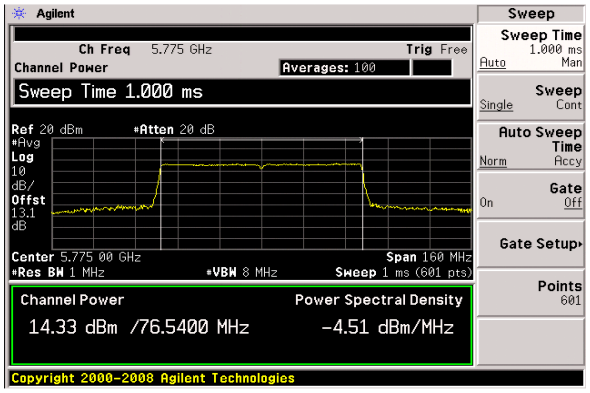
HT/VHT80 Beam Forming, M0 to M7, M0.1 to M9.1

Antenna A



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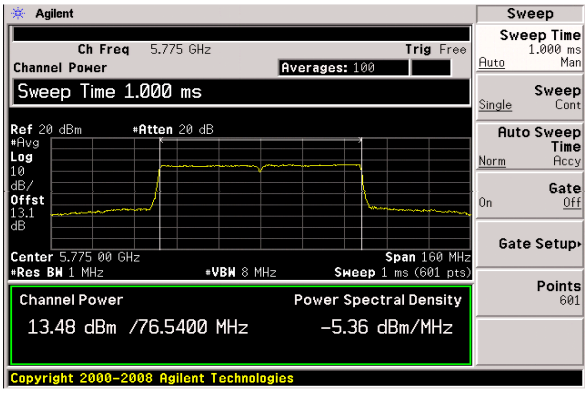
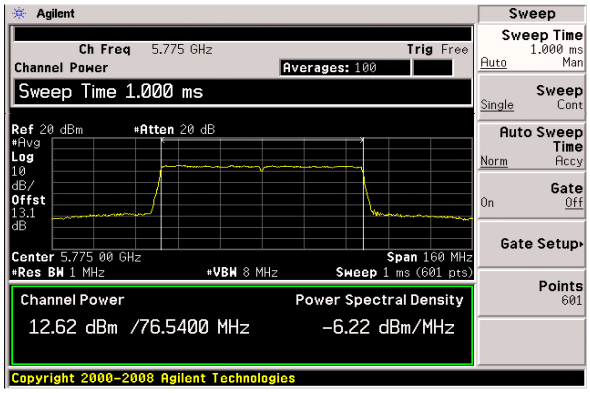


Antenna C



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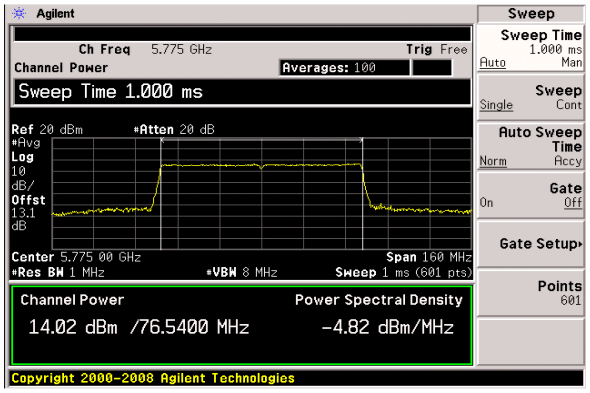
HT/VHT80 Beam Forming, M0 to M7, M0.1 to M9.1

Antenna A



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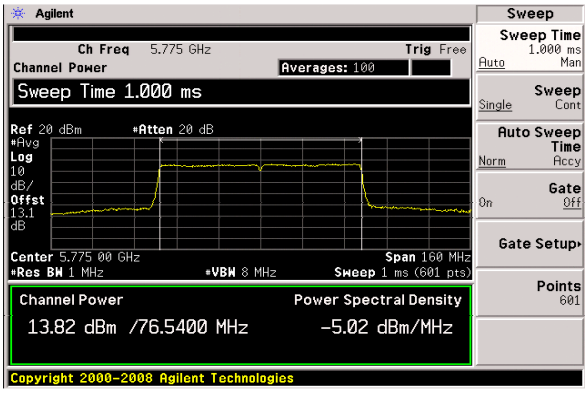

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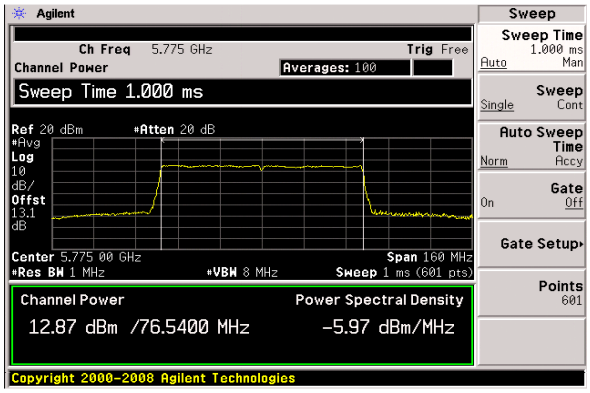

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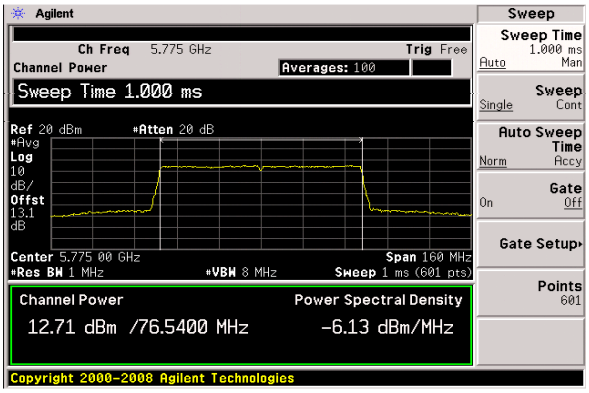

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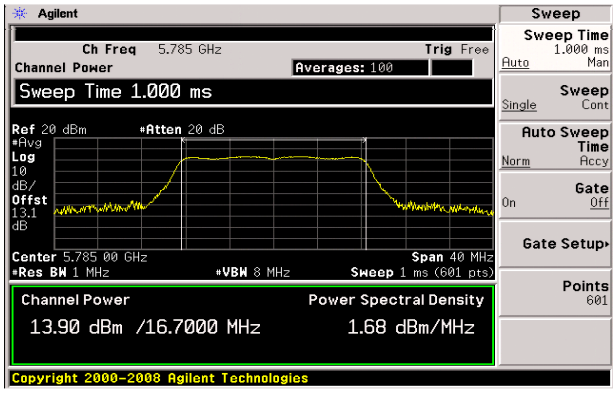
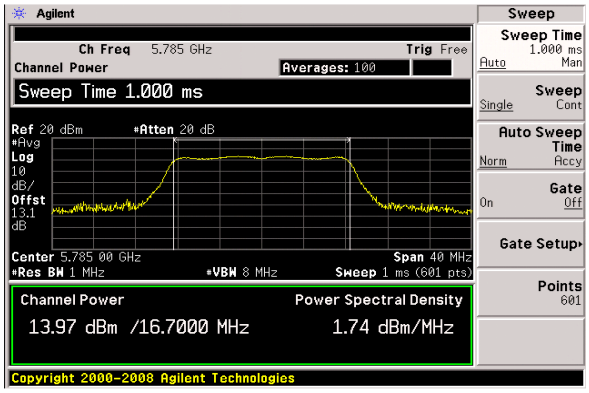
Non HT/VHT20, 6 to 54 Mbps

Antenna A



Non HT/VHT20, 6 to 54 Mbps

Antenna A



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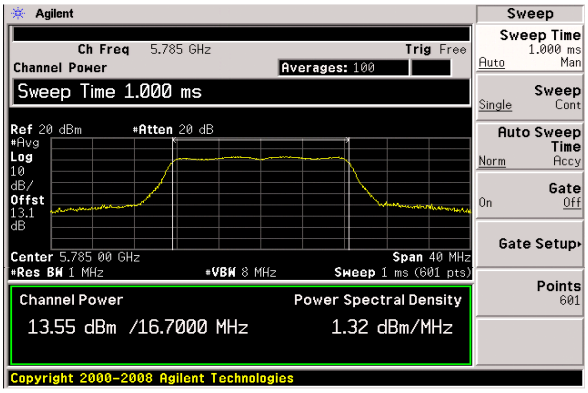

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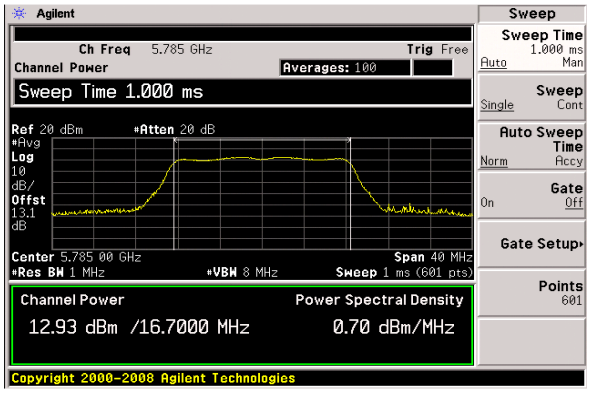

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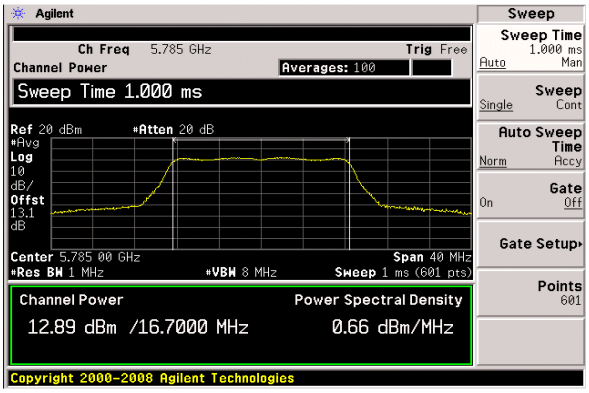

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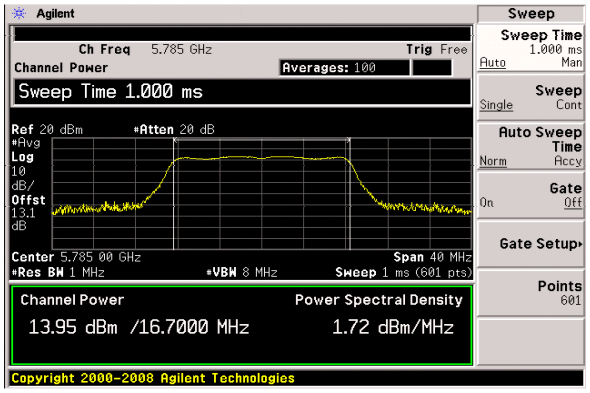
Non HT/VHT20 Beam Forming, 6 to 54 Mbps

Antenna A



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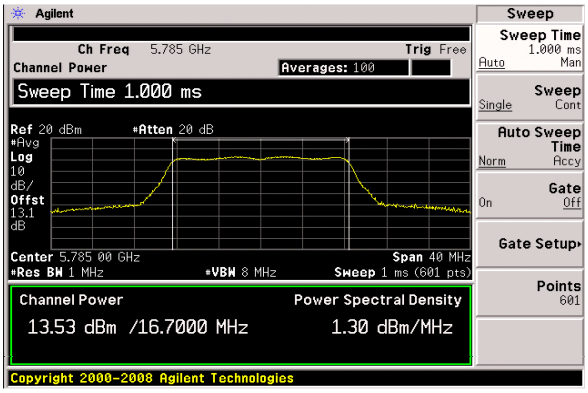

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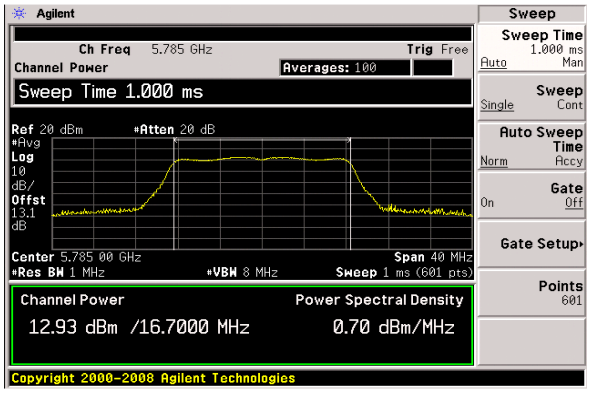

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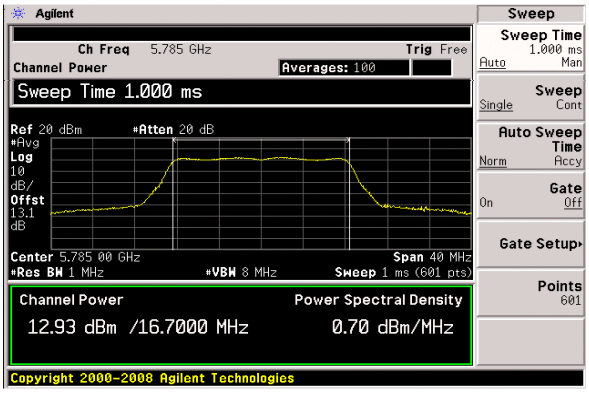

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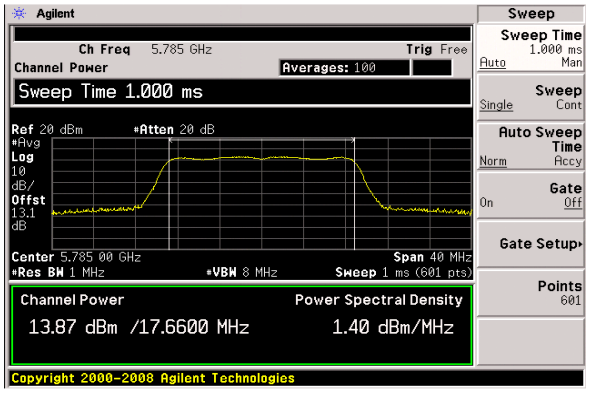
HT/VHT20, M0 to M7, M0.1 to M9.1

Antenna A



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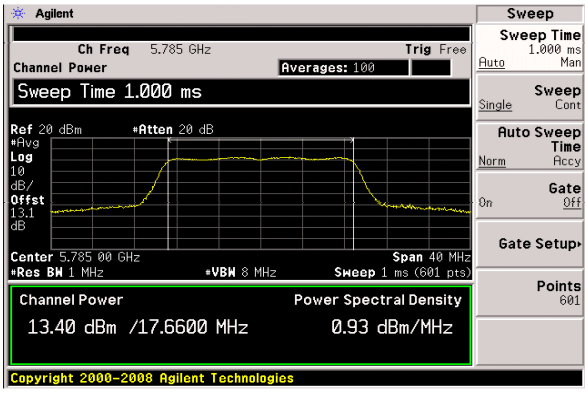

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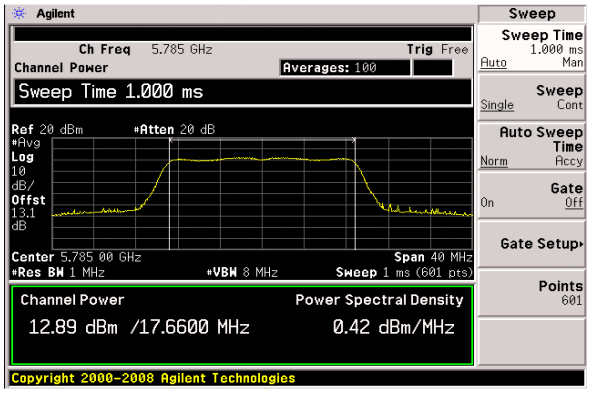

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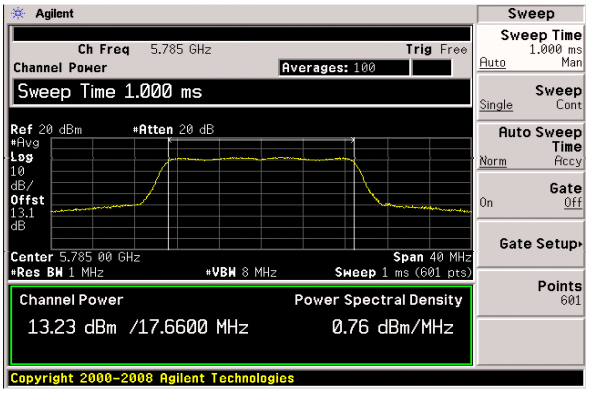

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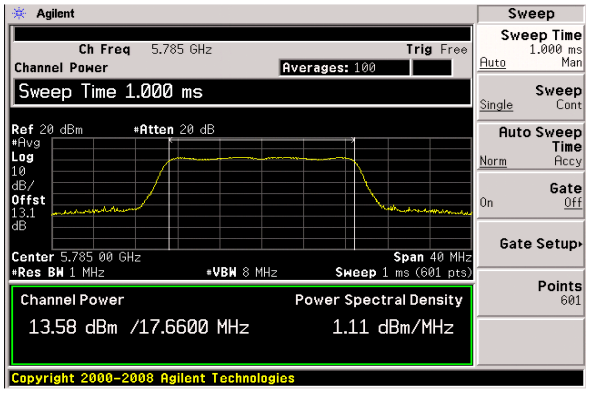
HT/VHT20 Beam Forming, M0 to M7, M0.1 to M9.1

Antenna A



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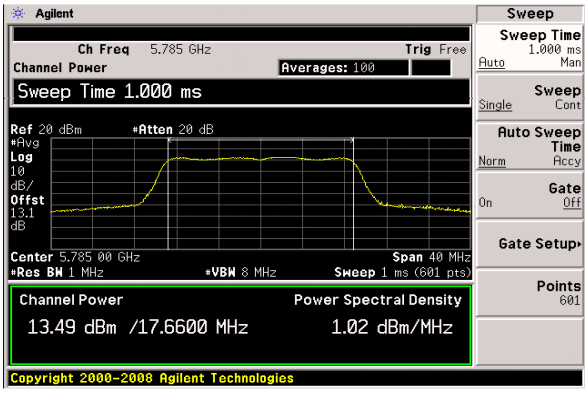

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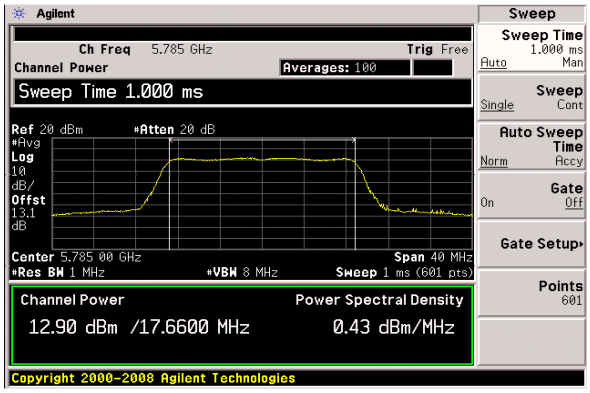

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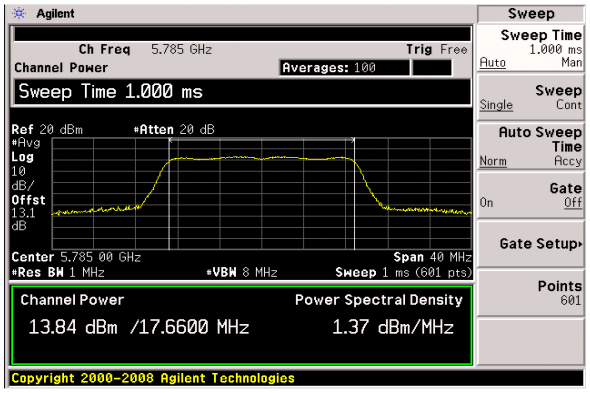
HT/VHT20 Beam Forming, M0 to M7, M0.1 to M9.1

Antenna A



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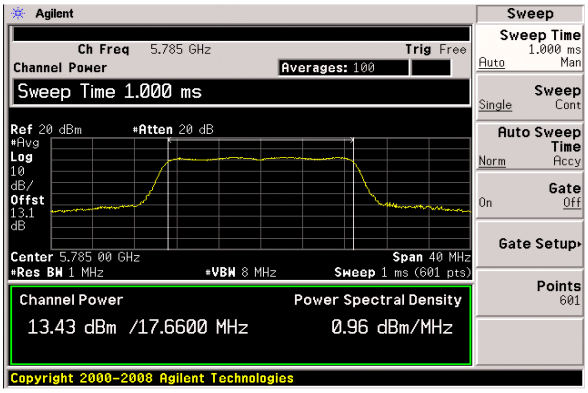

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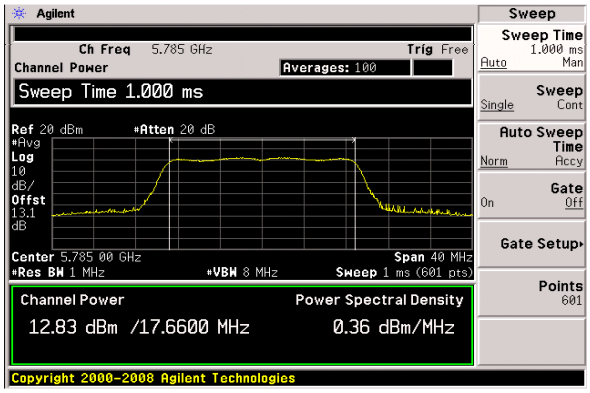

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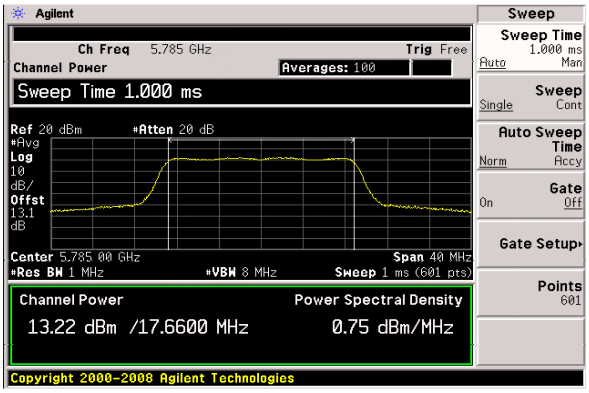

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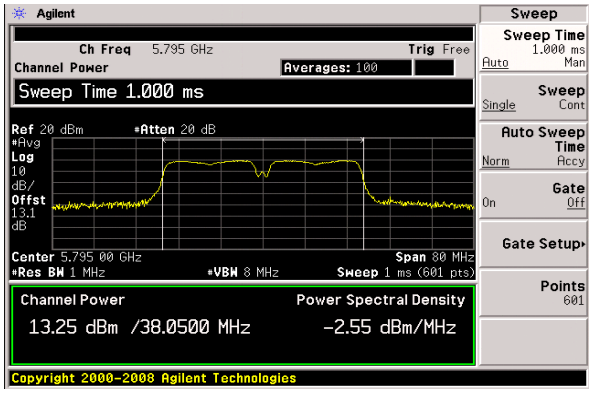
Non HT/VHT40, 6 to 54 Mbps

Antenna A



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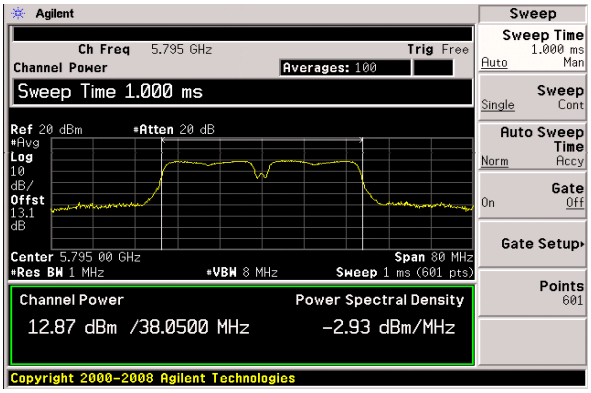

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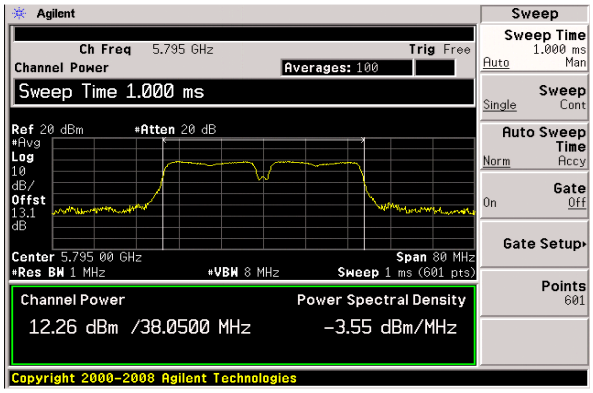

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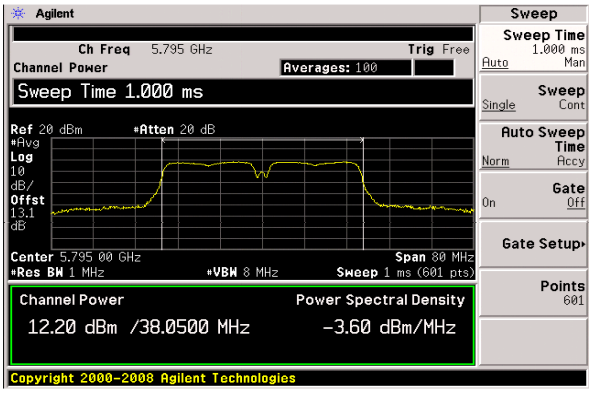

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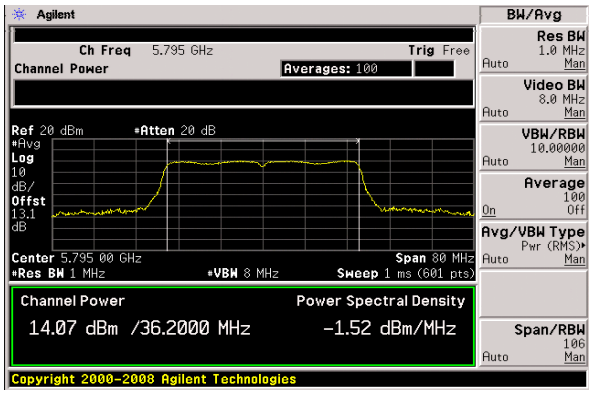
HT/VHT40, M0 to M7, M0.1 to M9.1

Antenna A



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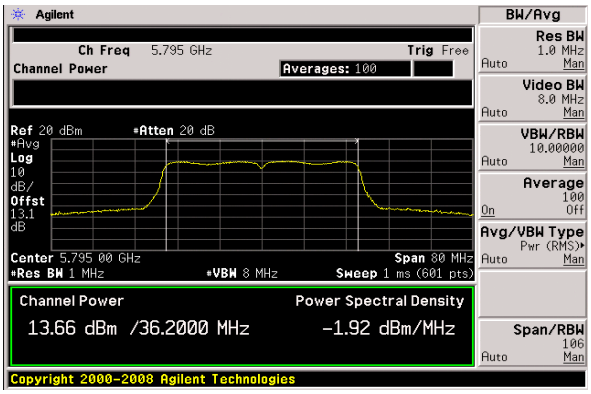

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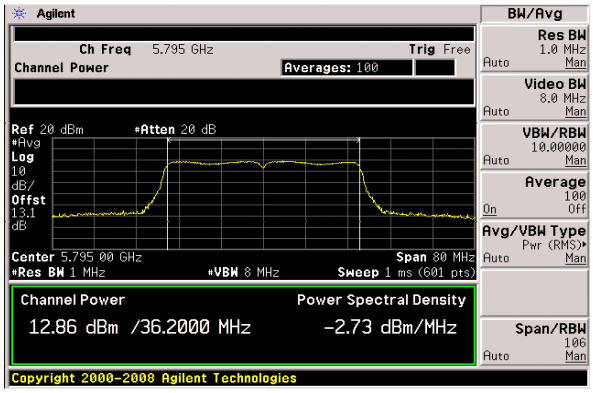

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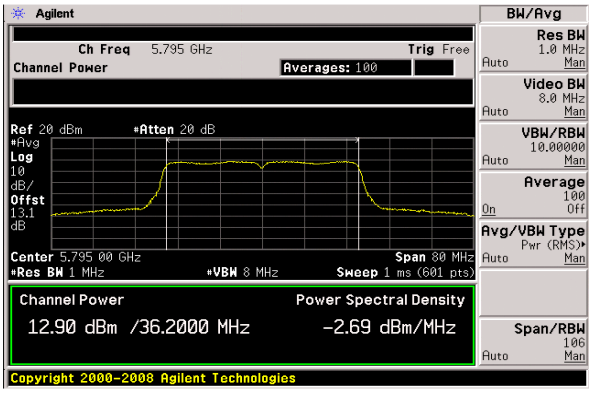

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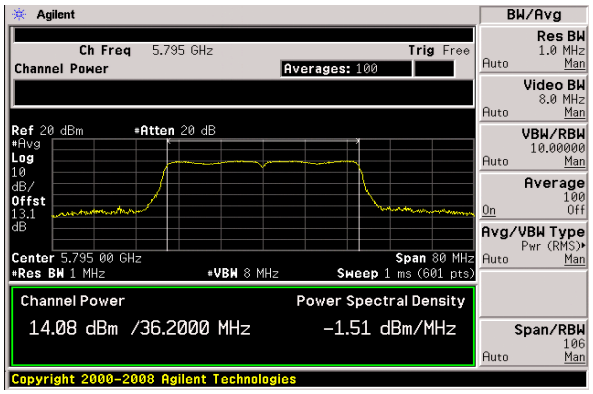
HT/VHT40 Beam Forming, M0 to M7, M0.1 to M9.1

Antenna A



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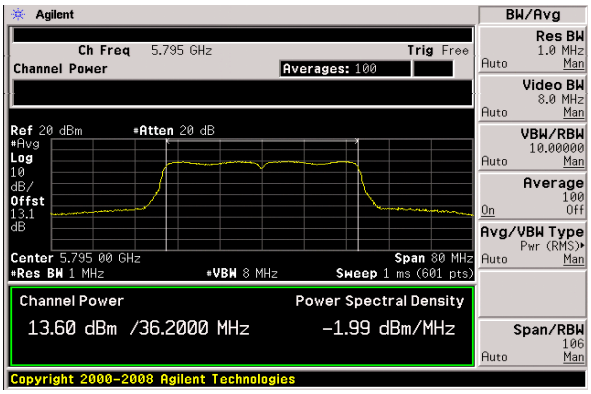

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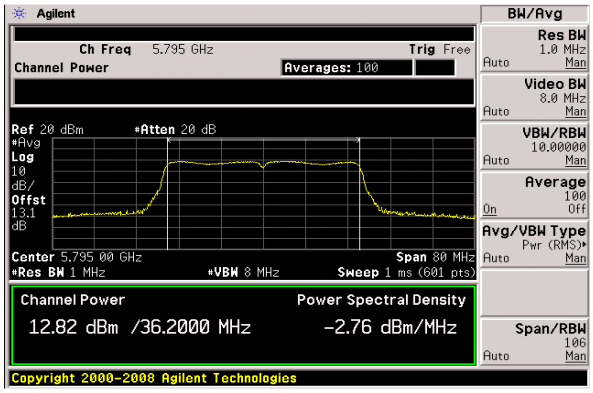

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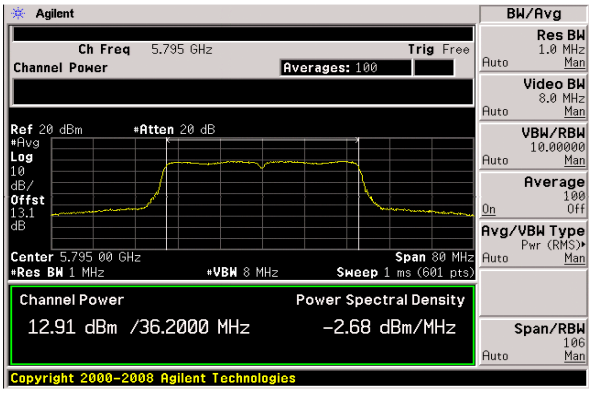

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Non HT/VHT20, 6 to 54 Mbps

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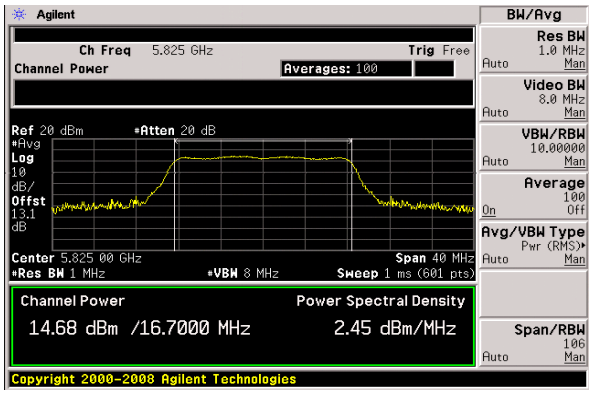

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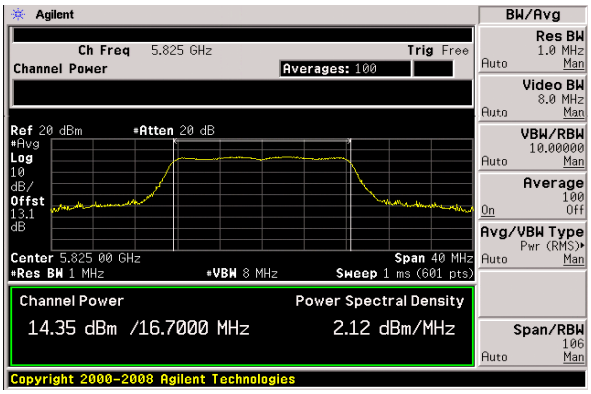

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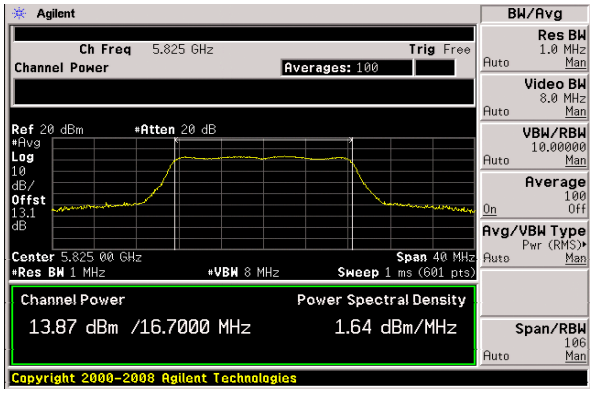

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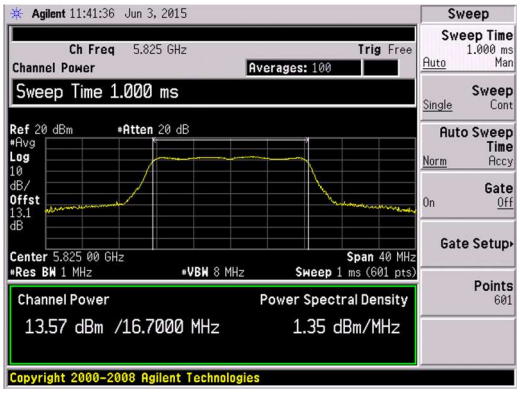

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