

Test Report for FCC & IC

Report Number		ESTRGC2311-002		
Applicant	Company name	FCC : LG Electronics USA, Inc.		
		ISED : LG Electronics Inc.		
	Address	FCC : 111 Sylvan Avenue North Building Englewood New Jersey United States 07632		
		ISED : 222, LG-ro, Jinwi-myeon Pyeongtaek-si, Gyeonggi-do 451-713 Korea (Republic Of)		
Telephone	+82-10-6605-9491			
Product	Product name	Car Telematics Device		
	Model No.	TFHOBINN0D2	Manufacturer	LG Electronics Inc.
	Serial No.	NONE	Country of origin	KOREA
Test date	18-Sep-23 ~ 22-Nov-23		Date of issue	23-Nov-23
Testing location	140-16, Eongmalli-ro, Majang-myeon, Icheon-si, Gyeonggi-do, Rep. of Korea			
FCC ID	BEJTFHOBINN0D			
ISED ID	2703H-TFHOBINN0D			
FCC Rule Part(s)	FCC PART 15 Subpart C (15.247), ANSI C 63.10(2013)			
ISED Rule Part(s)	RSS-247 (2017)			
Test result				Complied
Measurement facility registration number		FCC:659627		
Measurement facility registration number		ISE:4475A		
Tested by	Engineer S.H. Yoon			(Signature)
Reviewed by	Engineering Manager I.K. Hong			(Signature)
Abbreviation	OK, Pass = Complied, Fail = Failed, N/A = not applicable			
* Note - This test report is not permitted to copy partly without our permission - This test result is dependent on only equipment to be used - This test report is not related to KOLAS accreditation - This product is tested in a single channel at the request of the company. - This is the reissue report due to the change of the applicant				

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1. Laboratory Information

1.1 General

This EUT (Equipment Under Test) has been shown to be capable of compliance with the applicable technical standards and is tested in accordance with the measurement procedures as indicated in this report. ESTECH Lab attests to accuracy of test data. All measurement reported herein were performed by ESTECH Co., Ltd.

ESTECH Lab assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

1.2 Test Lab.

Corporation Name : ESTECH Co., Ltd

Head Office : Suite 1015 World Meridian II, 123 Gasan Digital 2-ro, Geumcheon-gu,
Seoul 153-759, R. O. Korea

EMC/Telecom/Safety Test Lab : 140-16, Eongmalli-ro, Majang-myeon, Icheon-si, Gyeonggi-do, Rep. of Korea

1.3 Official Qualification(s)

MSIP : Granted Accreditation from Ministry of Information & Communication for EMC, Safety and Telecommunication

KOLAS : Accredited Lab By Korea Laboratory Accreditation Schema base on CENELEC

FCC : Filed Laboratory at Federal Communications Commission

VCCI : Granted Accreditation from Voluntary Control Council for Interference from ITE

ISED : Accredited Lab By Canada Laboratory Accreditation

2. Description of EUT

2.1 Summary of Equipment Under Test

Product : Car Telematics Device

Model Number : TFHOBINN0D2

Additional Model Number : TFHOBINN0D1

Serial Number : NONE

Manufacturer : LG Electronics Inc.

Transfer Rate : 802.11b/g/n20,n40, ac20, ac40

Channel Spacing : 20 MHz, 40 MHz

Max Output Power : 802.11b(9.97 dBm), EIRP (12.82 dBm)

Power Supply Rating : DC 12.0 V

Receipt Date : 2023-Sep-19

Hardware Version Id Number (HVIN): TFHOBINN0D2, TFHOBINN0D1

Firmware Version Id Number (FVIN): N/A

Product Marketing Name (PMN): TFHOBINN0D2, TFHOBINN0D1

3. Test Standards

Test Standard : FCC PART 15 Subpart C (15.247)

This Standard sets out the regulations under which an intentional, unintentional, or incidental radiator may be operated without an individual license. It also contains the technical specifications, administrative requirements and other conditions relating to the marketing of Part 15 devices.

Test Standard : RSS-247

RSS-Gen must be used in conjunction with other RSSs, as applicable to the specific type of radio apparatus, for assessing its compliance with ISED requirements.

Test Method : ANSI C 63.10 (2013)

This standard sets forth uniform methods of measurement of radio-frequency (RF) signals and noise emitted from both unintentional and intentional emitters of RF energy in the frequency range 9 kHz to 40 GHz. Methods for the measurement of radiated and AC power-line conducted radio noise are covered and may be applied to any such equipment unless otherwise specified by individual equipment

requirements. These methods cover measurement of certain devices that deliberately radiate energy, such as intentional emitters, but does not cover licensed transmitters. This standard is not intended for certification/approval of avionic equipment or for industrial, scientific, and medical (ISM) equipment. These methods apply to the measurement of individual units or systems comprised of multiple units.

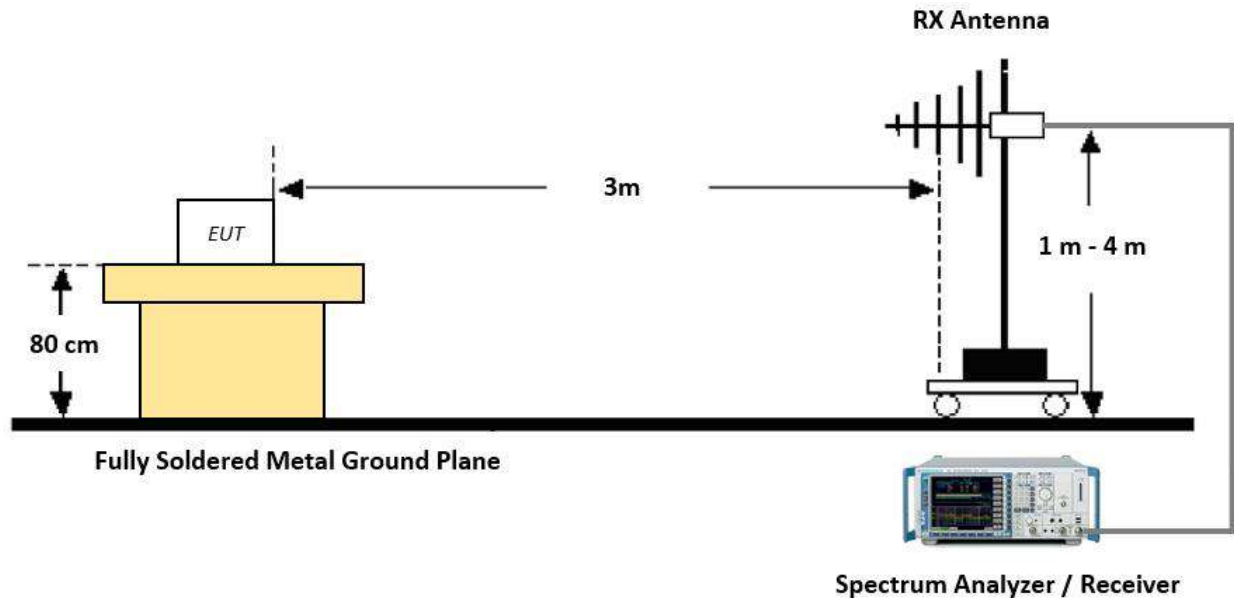
Data Rate / Enhanced Data Rate

Test Description	FCC Part Section(s)	ISED Part Section(s)	Test Result
Maximum conducted output power	15.247 (b)(3)	RSS 247 Issue 2, Section 5.4 (d)	Pass
Maximum Power Spectral Density	15.247(e)	RSS 247 Issue 2, Section 5.2 (b)	Pass
DTS Bandwidth	15.247(a)(2)	RSS 247 Issue 2, Section 5.2 (a)	Pass
Emissions in non-restricted frequency bands	15.247(d)	RSS 247 Issue 2, Section 5.5	Pass
Conducted Spurious Emission on AC Power lines	15.207	RSS-Gen Issue 5, Section 8.9 /8.10	N/A

Notes:

- 1). No tests were applied because the fundamental level did not exceed the spurious limit per part 15.209.

30 MHz - 1 GHz



Test Procedure of Radiated spurious emissions (Below 1GHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The EUT is placed on a turntable, which is 0.8m above ground plane.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
4. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.

5. Spectrum Setting

(1) Measurement Type (Peak):

- Measured Frequency Range: 30 MHz – 1 GHz
- Detector = Peak
- Trace = Max hold
- RBW = 100 kHz
- VBW $\geq 3 \times$ RBW

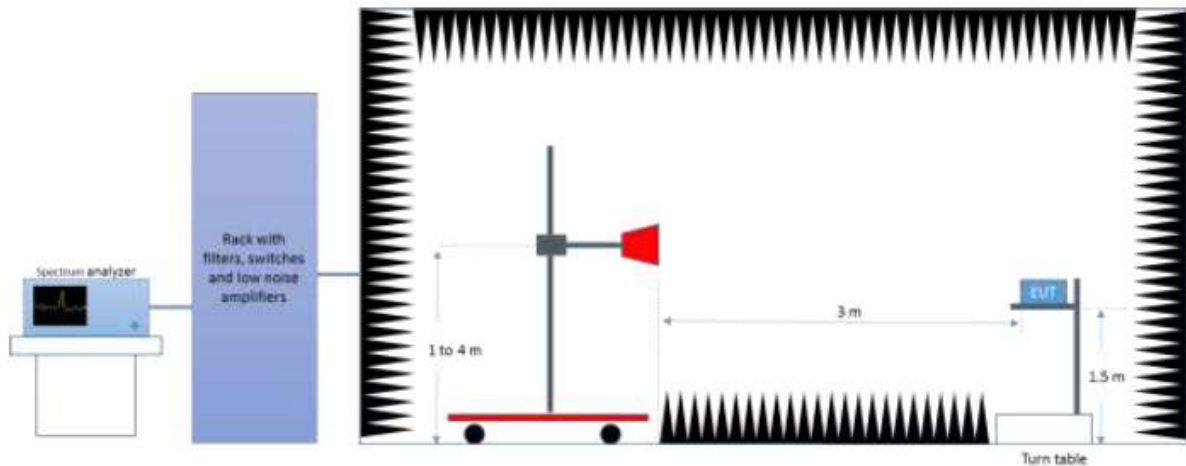
(2) Measurement Type(Quasi-peak):

- Measured Frequency Range: 30 MHz – 1 GHz
- Detector = Quasi-Peak
- RBW = 120 kHz

In general, the method (1) is mainly used

6. Total = Reading Value + Antenna Factor (A.F) + Cable Loss (C.L)

1 GHz – 26.5 GHz



Test Procedure of Radiated spurious emissions (Above 1GHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The EUT is placed on a turntable, which is 0.8m above ground plane.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
4. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.

5. Spectrum Setting

(1) Measurement Type (Peak):

- Measured Frequency Range: 1 GHz – 26.5 GHz
- Detector = Peak
- Trace = Max hold
- RBW = 1 MHz
- VBW $\geq 3 \times$ RBW

(2) Measurement Type(Average):

- Measured Frequency Range: 1 GHz – 26.5 GHz
- Detector = average or rms
- RBW = 1 MHz

In general, the method (1) is mainly used

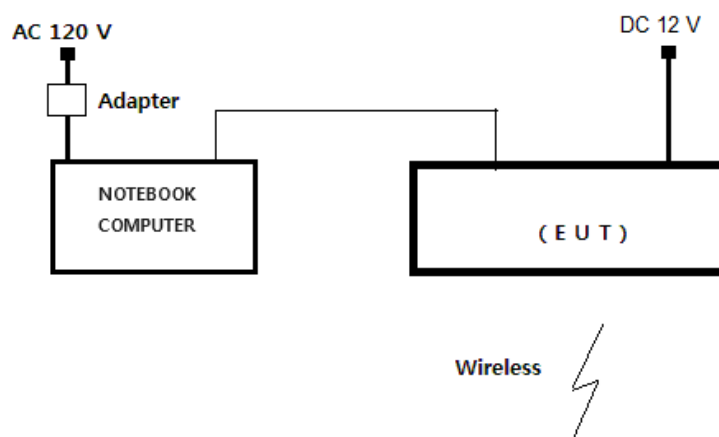
6. Total = Reading Value + Antenna Factor (A.F) + Cable Loss (C.L)

4. Measurement Condition

4.1 EUT Operation.

- * The EUT was in the following operation mode during all testing
- * The operational conditions of the EUT was determined by the manufacturer according to emission
- * Execute a RF test program to enable EUT under transmission/receiving condition continuously at specific channel frequency.
- * Transmit mode was each test. Each channel (low, middle, high), also set the test after
- * The EUT was measured up to tenth harmonic or 40 GHz of the highest operating frequencies.

4.2 Configuration and Peripherals



4.3 EUT and Support equipment

Equipment Name	Model Name	S/N	Manufacturer	Remark
Car Telematics Device	TFHOBINN0D2, TFHOBINN0D1	NONE	LG Electronics Inc.	EUT
Notebook	80XL	NONE	LCFC(HeFei) Electronics Technology Co.,Ltd.	
Adapter	ADL45WCE	NONE	CHICONY POWER TECHNOLOGY(SUZHOU)CO LT	

4.4 List of frequencies

Frequency Band (MHz)	Channel No.	Channel Frequency (MHz)
2412 – 2462	1	2412
	2	2417
	3	2422
	4	2427
	5	2432
	6	2437
	7	2442
	8	2447
	9	2452
	10	2457
	11	2462

List of Wi-Fi center Frequencies

4.5 Antenna mode

Antenna (2T2R)	Ant0	2.88 dBi
	Ant1	2.82 dBi

4.6 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
TEST Receiver	ESCI7	ROHDE & SCHWARZ	100916	12-Jun-24
Logbicon Antenna	VULB 9168	SCHWARZBECK	237	21-Mar-24
Turn Table	DT3000-2t	Innco System GmbH	N/A	-
Antenna Mast	MA4000-EP	Innco System GmbH	N/A	-
PREAMPLIFIER	8449B	HP	3008A00581	28-Jun-24
Horn Antenna	LB-42-15-C-SF	A-INFOMF	J2020079000055	1-Nov-24
Horn Antenna	BBHA9120D	SCHWARZBECK	469	26-Oct-24
TEST Receiver	ESU	ROHDE & SCHWARZ	100529	28-Jun-24
Turn Table	DT1500-S	Innco System GmbH	N/A	-
Antenna Mast	MA4000-EP	Innco System GmbH	N/A	-
Antenna Master & Turn table controller	CO2000-P	Innco System GmbH	CO2000/642 /28051111/L	-
Spectrum Analyzer	E4440A	AGILENT	US40420430	28-Nov-23
Spectrum Analyzer	FSV40	ROHDE&SCHWARZ	100939	28-Nov-23
Power Sensor	A1921A	Agilent	MY45240427	28-Nov-23
Power Meter	N1912A	Agilent	MY45100570	28-Nov-23
DC Power Supply	K-3010	VUPOWER	03110920	28-Nov-23
DC Power Supply	HMP2020	ROHDE&SCHWARZ	120956	28-Nov-23
Signal Generator	SMB 100A	ROHDE&SCHWARZ	177653	29-Nov-23

4.7 Duty Cycle of Test Signal

If duty cycle is $\geq 98\%$, duty factor is not required.

If duty cycle is $< 98\%$, duty factor shall be considered.

All the duty factor of other test mode have been considered.

TestMode	Frequency [MHz]	Transmission Duration [ms]	Transmissi on Period [ms]	Duty Cycle [%]	Duty Cycle Correction Factor(dB)
802.11b	2437	12.42	12.54	99.04	0.04
802.11g	2437	2.05	2.18	94.03	0.26
802.11n(HT20)	2437	1.91	2.10	90.95	0.41
802.11n(HT40)	2437	0.92	1.08	85.18	0.69
802.11ac(VHT20)	2437	1.93	2.05	94.14	0.26
802.11ac(VHT40)	2437	0.91	1.12	81.25	0.90

Note: The Duty Cycle of different channels in the same mode is the same, and the above test channels are represented in the report.

5. TEST METHODOLOGY

5.1 Radiated Emission Test

The radiated emission measurement was performed according to the procedures in ANSI C63.10-2013. The equipment under test (EUT) was placed at the middle of the 80 cm high turntable for below 1 GHz & 1.5 m height for above 1 GHz measurement, and the EUT is 3 meters far from the measuring antenna. The turntable was rotated 360° for obtaining the maximum emission. The height of the measuring antennas was scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained. The measurement above 1000 MHz was performed by horn antenna, The measurement below 30 MHz was performed by loop antenna, Measurement from 30 MHz to 200 MHz was performed by Baloon and Biconical Antenna, and mesurement from 200 MHz to 1 GHz was performed by Log-Periodic Antenna.

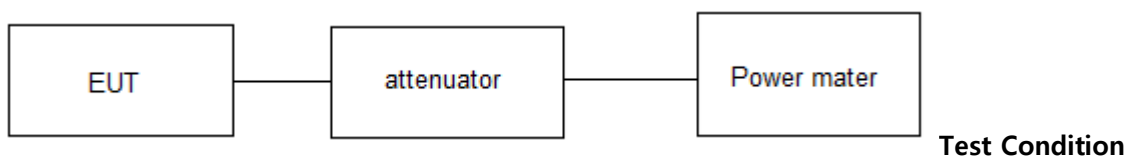
The EUT was rotated around the X-, Y-, and Z-Axis and the results from worst case axis are recorded

6. TEST RESULTS FOR Wi-Fi

6.1 Maximum average Conducted Output Power

Result	Pass
Test Specification	FCC part 15 Subpart C 15.247 (b)(3) / RSS 247 Issue 2, Section 5.4 (d)
Test Method	Subclause 11.9.2.2.6 of ANSI C63.10
Detector	Average
Port of testing	Antenna port
Requirement	Power $\leq$ 1 W (30 dBm) & e.i.r.p $\leq$ 4 W (36 dBm)

Test Method



Normal Test Condition:

Temperature (Norm) = + 22.3 °C	Voltage = DC 12.0 V	Relative humidity: 58%
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KDB Guidelines applied:

Measurements were made as per section 8.3.2.2 in KDB 558074 D01 15.247 Measurement Guidance v05r02.

Test results:**Note:**

1. All the losses are included during measurement and final values are mentioned in the test report.
2. Max Output power (dBm) = Measured Average power (dBm) + Attenuator factor
+ Cable loss
3. This product do not support additional beamforming gain / directional gain, it uses signal antenna and hence directional gain of the 2T2R antenna is ANT0:2.88 dBi, ANT1:2.82 dBi
4. All modes of operation were investigated, and the worst-case configuration results are reported in this section

Antenna Mode:ANT0

Modulation: 802.11b

Data rate	Channel Frequency (MHz)	Measured Average Power (dBm)	Final Average power (e.i.r.p) (dBm)	Power Limit (dBm)	e.i.r.p Limit (dBm)
1Mbps	2412	6.28	9.16	30	36
	2437	6.79	9.67	30	36
	2462	6.83	9.71	30	36

Modulation: 802.11g

Data rate	Channel Frequency (MHz)	Measured Average Power (dBm)	Final Average power (e.i.r.p) (dBm)	Power Limit (dBm)	e.i.r.p Limit (dBm)
6Mbps	2412	2.47	5.35	30	36
	2437	3.03	5.91	30	36
	2462	2.82	5.70	30	36

Modulation: 802.11n HT20

Data rate	Channel Frequency (MHz)	Measured Average Power (dBm)	Final Average power (e.i.r.p) (dBm)	Power Limit (dBm)	e.i.r.p Limit (dBm)
MCS0	2412	2.03	4.91	30	36
	2437	2.48	5.36	30	36
	2462	2.33	5.21	30	36

Modulation: 802.11n HT40

Data rate	Channel Frequency (MHz)	Measured Average Power (dBm)	Final Average power (e.i.r.p) (dBm)	Power Limit (dBm)	e.i.r.p Limit (dBm)
MCS0	2422	1.26	4.14	30	36
	2437	0.72	3.60	30	36
	2452	-0.53	2.35	30	36

Modulation: 802.11ac VHT20

Data rate	Channel Frequency (MHz)	Measured Average Power (dBm)	Final Average power (e.i.r.p) (dBm)	Power Limit (dBm)	e.i.r.p Limit (dBm)
MCS0	2412	2.04	4.92	30	36
	2437	2.40	5.28	30	36
	2462	2.33	5.21	30	36

Modulation: 802.11ac VHT40

Data rate	Channel Frequency (MHz)	Measured Average Power (dBm)	Final Average power (e.i.r.p) (dBm)	Power Limit (dBm)	e.i.r.p Limit (dBm)
MCS0	2422	1.25	4.13	30	36
	2437	0.83	3.71	30	36
	2452	-0.38	2.50	30	36

Antenna Mode:ANT1

Modulation: 802.11b

Data rate	Channel Frequency (MHz)	Measured Average Power (dBm)	Final Average power (e.i.r.p) (dBm)	Power Limit (dBm)	e.i.r.p Limit (dBm)
1Mbps	2412	6.33	9.15	30	36
	2437	6.83	9.65	30	36
	2462	7.03	9.85	30	36

Modulation: 802.11g

Data rate	Channel Frequency (MHz)	Measured Average Power (dBm)	Final Average power (e.i.r.p) (dBm)	Power Limit (dBm)	e.i.r.p Limit (dBm)
6Mbps	2412	2.67	5.49	30	36
	2437	2.67	5.49	30	36
	2462	3.26	6.08	30	36

Modulation: 802.11n HT20

Data rate	Channel Frequency (MHz)	Measured Average Power (dBm)	Final Average power (e.i.r.p) (dBm)	Power Limit (dBm)	e.i.r.p Limit (dBm)
MCS0	2412	2.27	5.09	30	36
	2437	2.22	5.04	30	36
	2462	2.92	5.74	30	36

Modulation: 802.11n HT40

Data rate	Channel Frequency (MHz)	Measured Average Power (dBm)	Final Average power (e.i.r.p) (dBm)	Power Limit (dBm)	e.i.r.p Limit (dBm)
MCS0	2422	1.37	4.19	30	36
	2437	0.52	3.34	30	36
	2452	-0.38	2.44	30	36

Modulation: 802.11ac VHT20

Data rate	Channel Frequency (MHz)	Measured Average Power (dBm)	Final Average power (e.i.r.p) (dBm)	Power Limit (dBm)	e.i.r.p Limit (dBm)
MCS0	2412	2.33	5.15	30	36
	2437	2.18	5.00	30	36
	2462	2.94	5.76	30	36

Modulation: 802.11ac VHT40

Data rate	Channel Frequency (MHz)	Measured Average Power (dBm)	Final Average power (e.i.r.p) (dBm)	Power Limit (dBm)	e.i.r.p Limit (dBm)
MCS0	2422	1.15	3.97	30	36
	2437	0.49	3.31	30	36
	2452	-0.46	2.36	30	36

Antenna Mode: MIMO ANT0
Modulation: 802.11b

Data rate	Channel Frequency (MHz)	Measured Average Power (dBm)	Final Average power (e.i.r.p) (dBm)	Power Limit (dBm)	e.i.r.p Limit (dBm)
1Mbps	2412	6.45	9.33	30	36
	2437	6.84	9.72	30	36
	2462	6.68	9.56	30	36

Modulation: 802.11g

Data rate	Channel Frequency (MHz)	Measured Average Power (dBm)	Final Average power (e.i.r.p) (dBm)	Power Limit (dBm)	e.i.r.p Limit (dBm)
6Mbps	2412	2.52	5.40	30	36
	2437	3.05	5.93	30	36
	2462	2.75	5.63	30	36

Modulation: 802.11n HT20

Data rate	Channel Frequency (MHz)	Measured Average Power (dBm)	Final Average power (e.i.r.p) (dBm)	Power Limit (dBm)	e.i.r.p Limit (dBm)
MCS8	2412	1.91	4.79	30	36
	2437	2.54	5.42	30	36
	2462	2.09	4.97	30	36

Modulation: 802.11n HT40

Data rate	Channel Frequency (MHz)	Measured Average Power (dBm)	Final Average power (e.i.r.p) (dBm)	Power Limit (dBm)	e.i.r.p Limit (dBm)
MCS8	2422	1.13	4.01	30	36
	2437	0.79	3.67	30	36
	2452	-0.49	2.39	30	36

Modulation: 802.11ac VHT20

Data rate	Channel Frequency (MHz)	Measured Average Power (dBm)	Final Average power (e.i.r.p) (dBm)	Power Limit (dBm)	e.i.r.p Limit (dBm)
MCS0	2412	2.01	4.89	30	36
	2437	2.35	5.23	30	36
	2462	2.23	5.11	30	36

Modulation: 802.11ac VHT40

Data rate	Channel Frequency (MHz)	Measured Average Power (dBm)	Final Average power (e.i.r.p) (dBm)	Power Limit (dBm)	e.i.r.p Limit (dBm)
MCS0	2422	1.04	3.92	30	36
	2437	0.64	3.52	30	36
	2452	-0.69	2.19	30	36

Antenna Mode: MIMO ANT1
Modulation: 802.11b

Data rate	Channel Frequency (MHz)	Measured Average Power (dBm)	Final Average power (e.i.r.p) (dBm)	Power Limit (dBm)	e.i.r.p Limit (dBm)
1Mbps	2412	6.39	9.21	30	36
	2437	7.08	9.90	30	36
	2462	6.95	9.77	30	36

Modulation: 802.11g

Data rate	Channel Frequency (MHz)	Measured Average Power (dBm)	Final Average power (e.i.r.p) (dBm)	Power Limit (dBm)	e.i.r.p Limit (dBm)
6Mbps	2412	2.34	5.16	30	36
	2437	2.88	5.70	30	36
	2462	3.12	5.94	30	36

Modulation: 802.11n HT20

Data rate	Channel Frequency (MHz)	Measured Average Power (dBm)	Final Average power (e.i.r.p) (dBm)	Power Limit (dBm)	e.i.r.p Limit (dBm)
MCS8	2412	1.83	4.65	30	36
	2437	2.29	5.11	30	36
	2462	2.61	5.43	30	36

Modulation: 802.11n HT40

Data rate	Channel Frequency (MHz)	Measured Average Power (dBm)	Final Average power (e.i.r.p) (dBm)	Power Limit (dBm)	e.i.r.p Limit (dBm)
MCS8	2422	1.04	3.86	30	36
	2437	0.35	3.17	30	36
	2452	-0.43	2.39	30	36

Modulation: 802.11ac VHT20

Data rate	Channel Frequency (MHz)	Measured Average Power (dBm)	Final Average power (e.i.r.p) (dBm)	Power Limit (dBm)	e.i.r.p Limit (dBm)
MCS0	2412	2.06	4.88	30	36
	2437	2.45	5.27	30	36
	2462	2.82	5.64	30	36

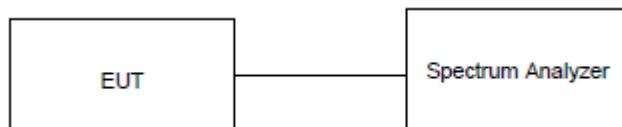
Modulation: 802.11ac VHT40

Data rate	Channel Frequency (MHz)	Measured Average Power (dBm)	Final Average power (e.i.r.p) (dBm)	Power Limit (dBm)	e.i.r.p Limit (dBm)
MCS0	2422	0.97	3.79	30	36
	2437	0.35	3.17	30	36
	2452	-0.63	2.19	30	36

6.2 Maximum Power Spectral Density

Result**Pass**

Test Specification	FCC part 15 Subpart C 15.247 (e) / RSS 247 Issue 2, Section 5.2 (b)
Test Method	Subclause 11.10.7 of ANSI C63.10
Measurement Bandwidth	10 kHz
Detector	Average sample detector mode
Port of testing	Antenna port
Requirement	For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm

Test Method:**Test Condition****Normal Test Condition:**

Temperature (Norm) = + 22.3 °C	Voltage = DC 12.0 V	Relative humidity: 58%
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KDB Guidelines applied:

Measurements were made as per section 8.4 in KDB 558074 D01 15.247 Measurement Guidance v05r02.

Test results:**Note:**

1. All the losses are included during measurement and final values are mentioned in the test report.

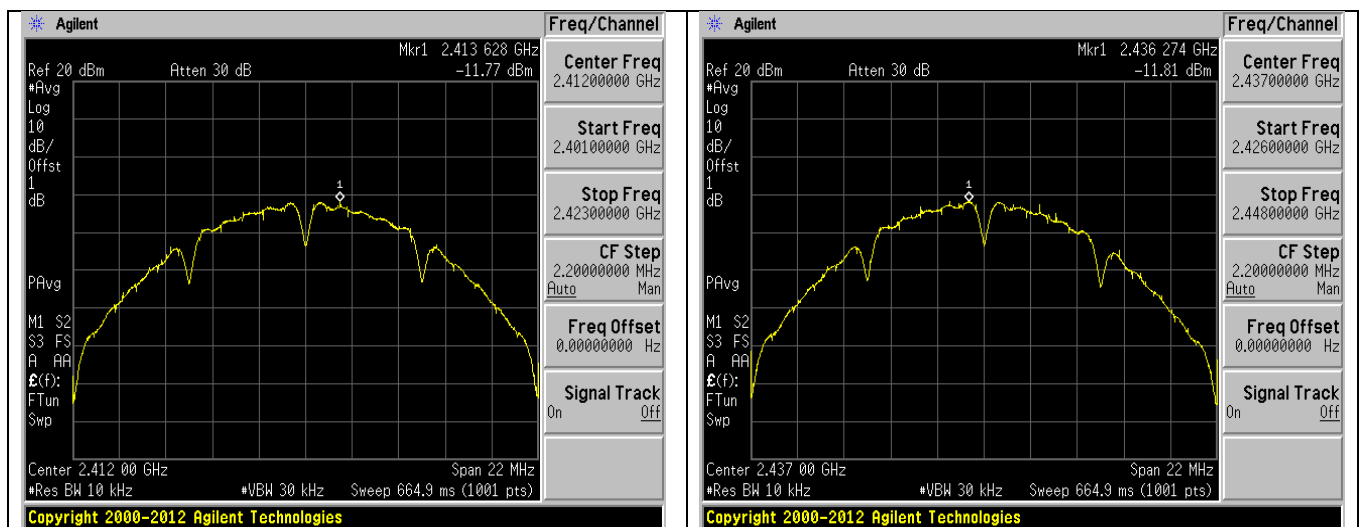
2. Peak Output power (dBm) = Measured peak power (dBm) + Cable loss
3. This product do not support additional beamforming gain / directional gain, it uses signal antenna and hence directional gain of the 2T2R antenna is ANT0:2.88 dBi, ANT1:2.82 dBi
4. All modes of operation were investigated, and the worst-case configuration results are reported in this section

Antenna Mode:ANT0

Modulation: 802.11b

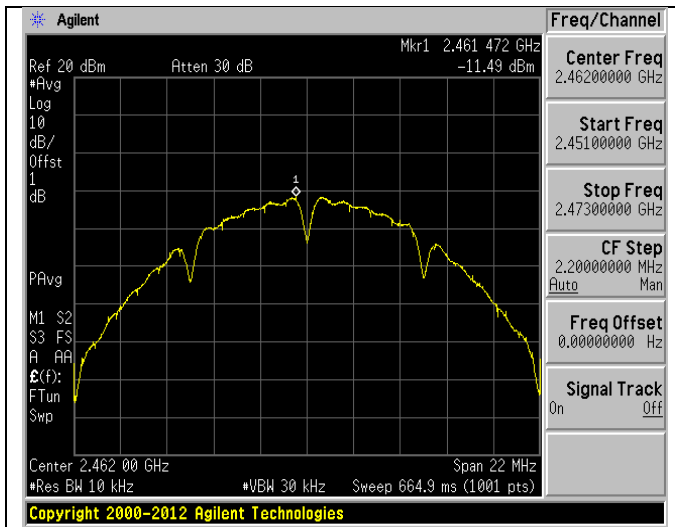
Data rate	Channel Frequency (MHz)	Measured Average PSD (dBm/10 kHz)	PSD Limit (dBm/10 kHz)
1Mbps	2412	-11.77	8
	2437	-11.81	8
	2462	-11.49	8

Data Rate : 1 Mbps



Channel Frequency: 2412MHz

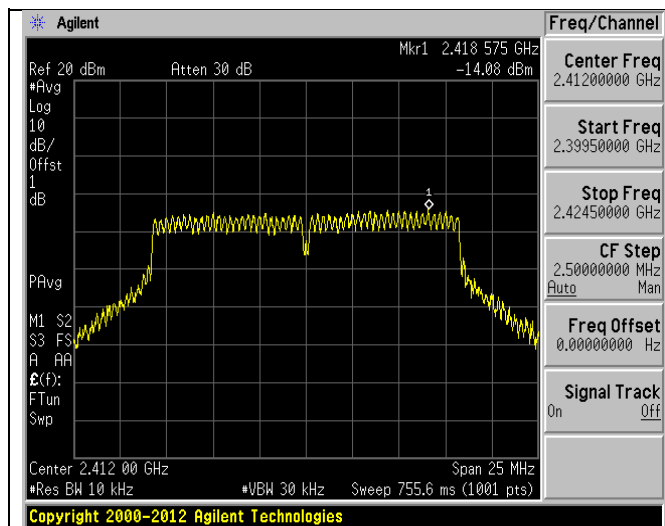
Channel Frequency: 2437MHz



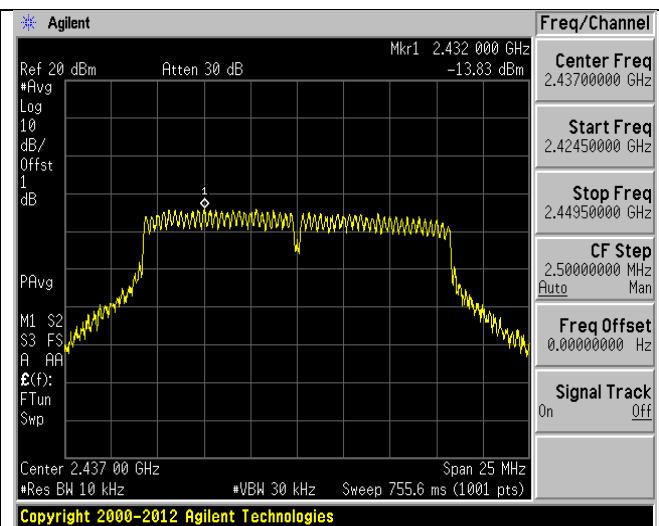
Channel Frequency: 2462MHz

Modulation: 802.11g

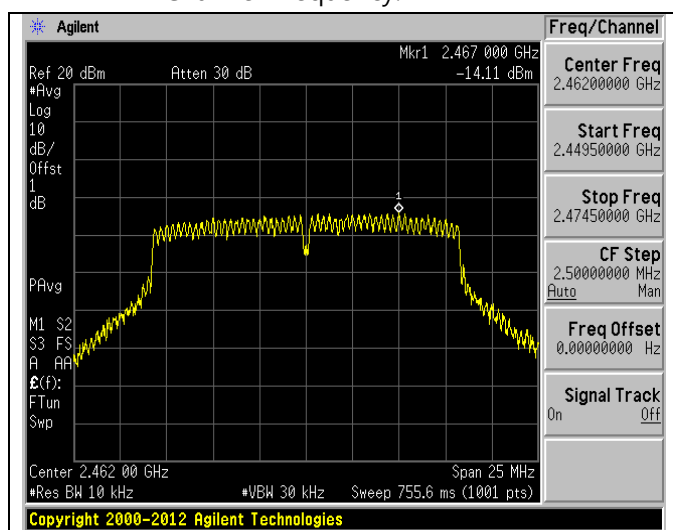
Data rate	Channel Frequency (MHz)	Measured Average PSD (dBm/10 kHz)	PSD Limit (dBm/10 kHz)
6Mbps	2412	-14.08	8
	2437	-13.83	8
	2462	-14.11	8

Data Rate : 6 Mbps


Channel Frequency: 2412MHz



Channel Frequency: 2437MHz

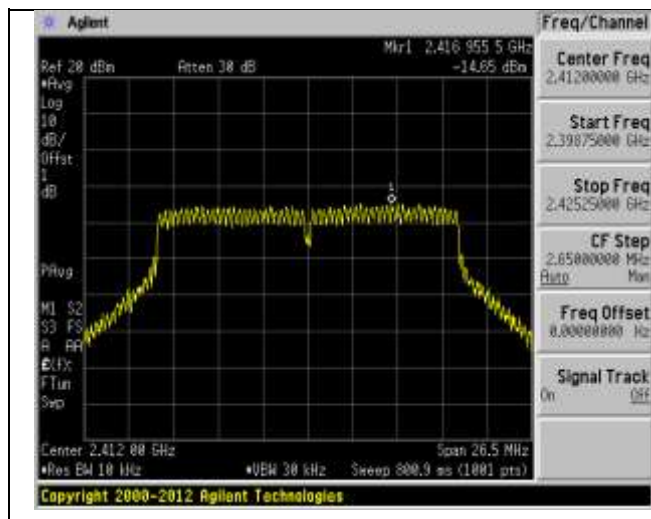


Channel Frequency: 2462MHz

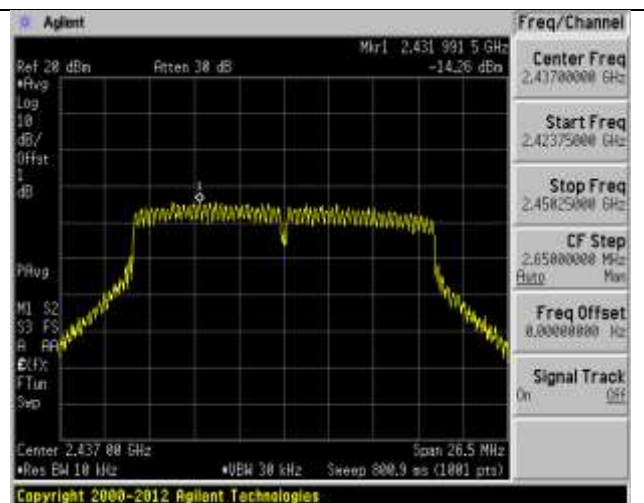
Modulation: 802.11n HT20

Data rate	Channel Frequency (MHz)	Measured Average PSD (dBm/10 kHz)	PSD Limit (dBm/10 kHz)
MCS0	2412	-14.65	8
	2437	-14.26	8
	2462	-13.96	8

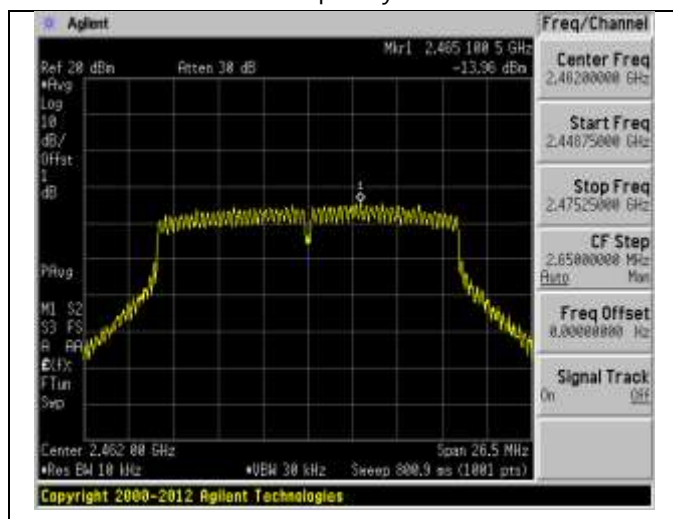
Data Rate : MCS0



Channel Frequency: 2412MHz



Channel Frequency: 2437MHz

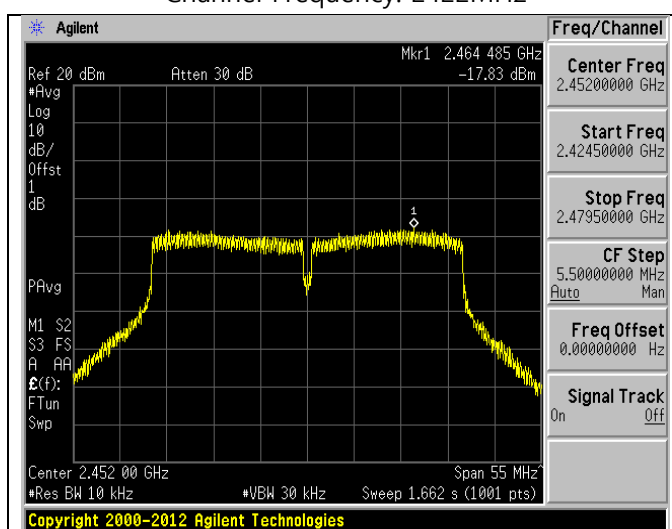
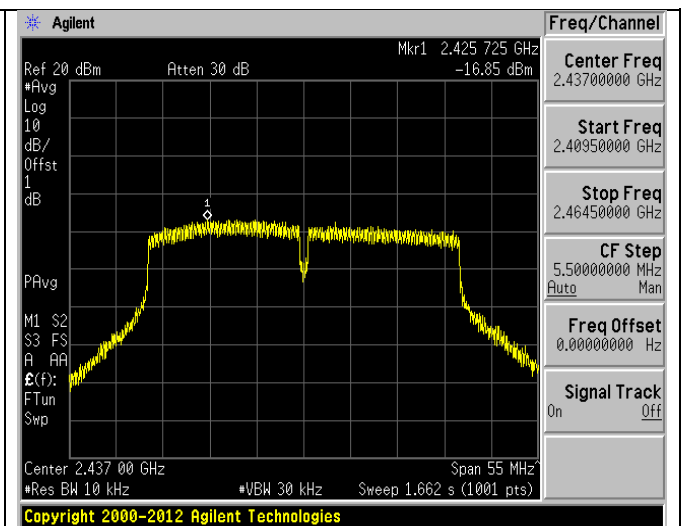
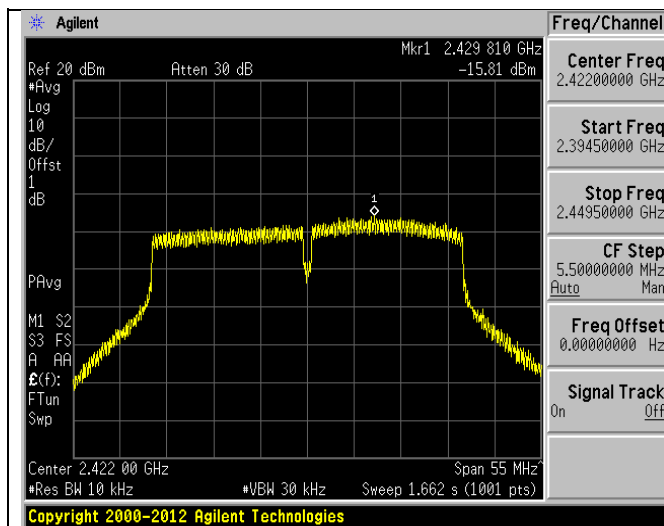


Channel Frequency: 2462MHz

Modulation: 802.11n HT40

Data rate	Channel Frequency (MHz)	Measured Average PSD (dBm/10 kHz)	PSD Limit (dBm/10 kHz)
MCS0	2422	-15.81	8
	2437	-16.85	8
	2452	-17.83	8

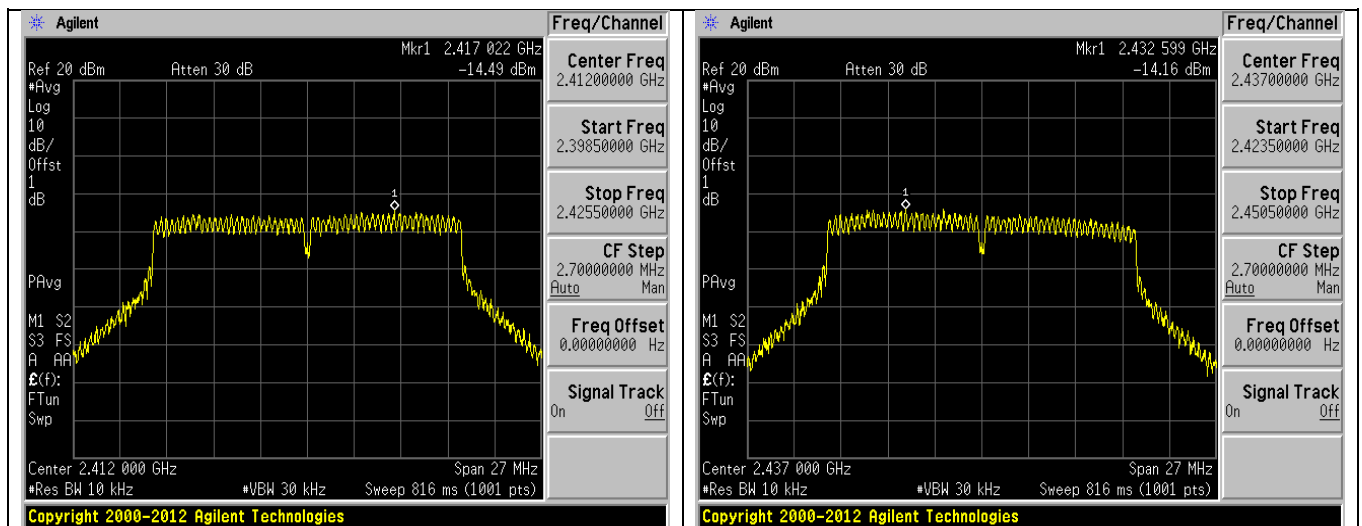
Data Rate : MCS0



Modulation: 802.11ac VHT20

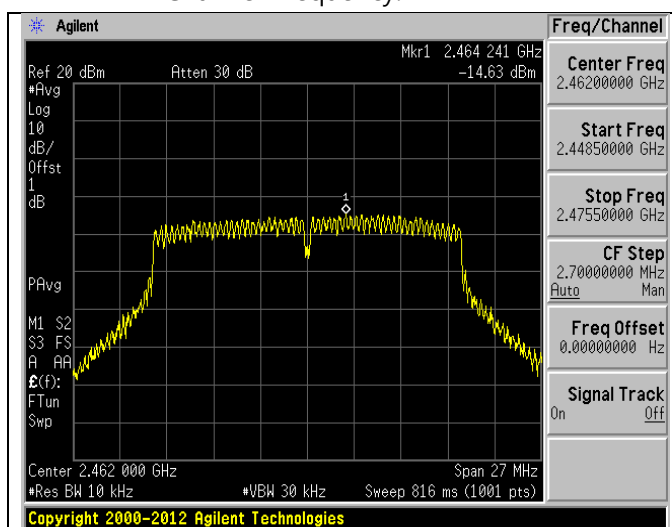
Data rate	Channel Frequency (MHz)	Measured Average PSD (dBm/10 kHz)	PSD Limit (dBm/10 kHz)
MCS0	2412	-14.49	8
	2437	-14.16	8
	2462	-14.63	8

Data Rate : MCS0



Channel Frequency: 2412MHz

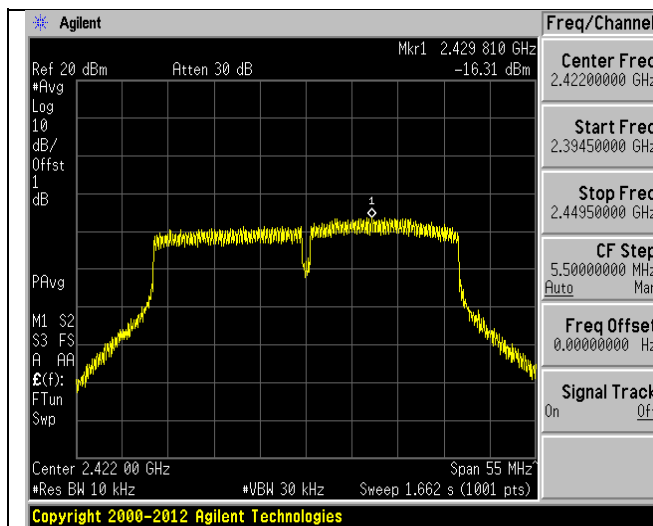
Channel Frequency: 2437MHz



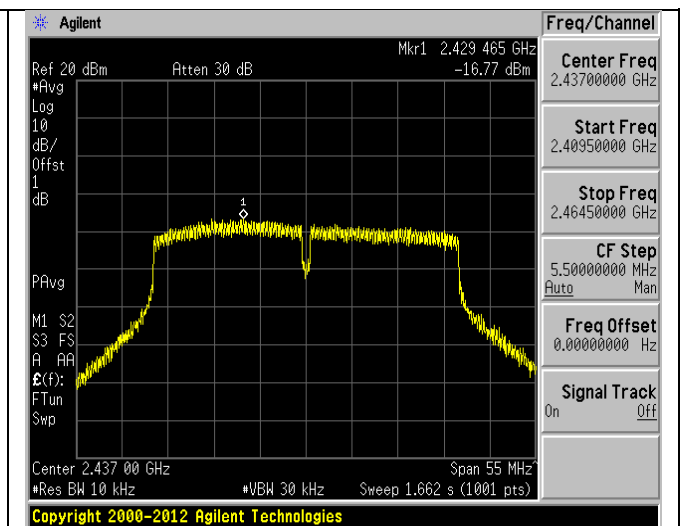
Channel Frequency: 2462MHz

Modulation: 802.11ac VHT40

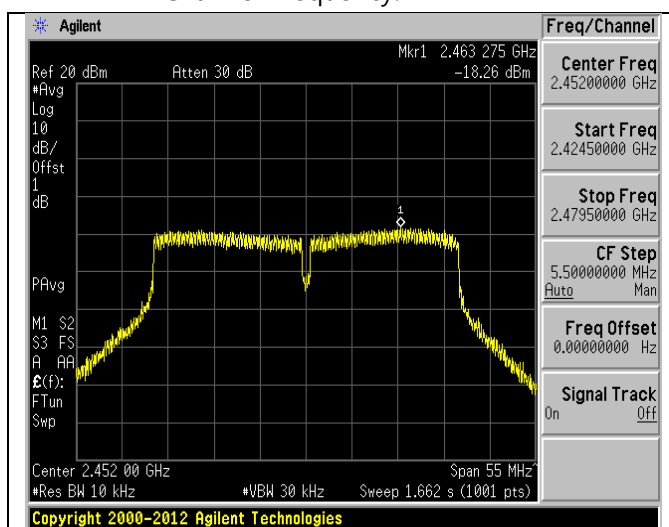
Data rate	Channel Frequency (MHz)	Measured Average PSD (dBm/10 kHz)	PSD Limit (dBm/10 kHz)
MCS0	2422	-16.31	8
	2437	-16.77	8
	2452	-18.26	8

Data Rate : MCS0


Channel Frequency: 2422MHz



Channel Frequency: 2437MHz



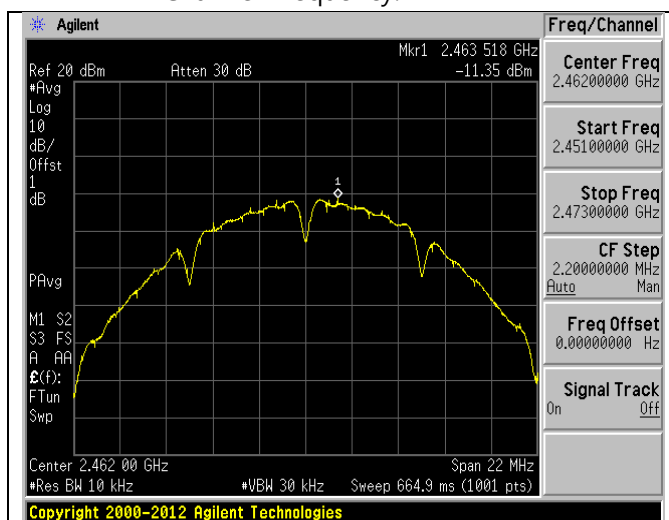
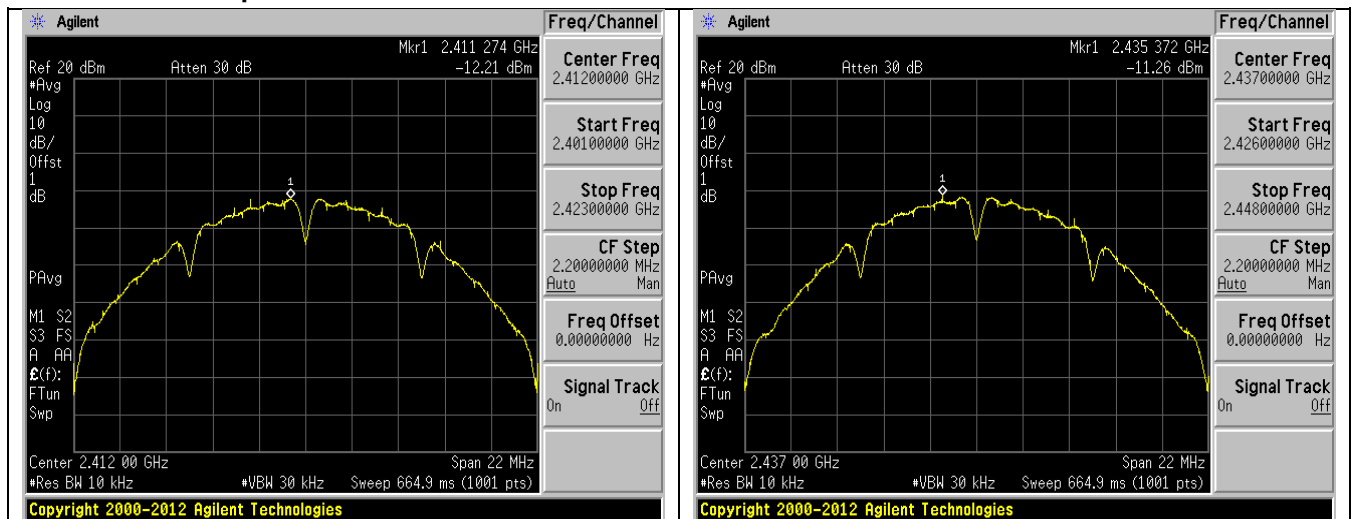
Channel Frequency: 2452MHz

Antenna Mode:ANT1

Modulation: 802.11b

Data rate	Channel Frequency (MHz)	Measured Average PSD (dBm/10 kHz)	PSD Limit (dBm/10 kHz)
1Mbps	2412	-12.21	8
	2437	-11.26	8
	2462	-11.35	8

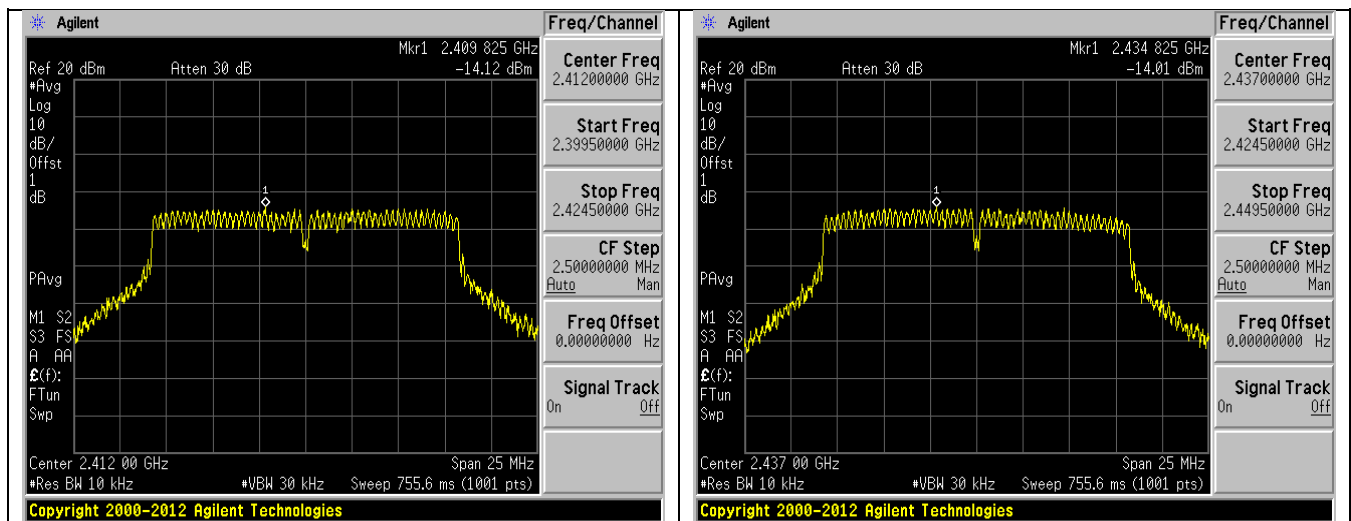
Data Rate : 1 Mbps



Modulation: 802.11g

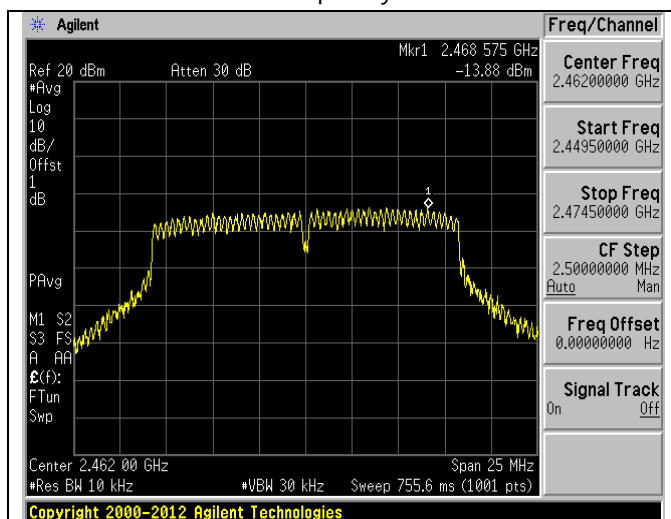
Data rate	Channel Frequency (MHz)	Measured Average PSD (dBm/10 kHz)	PSD Limit (dBm/10 kHz)
6Mbps	2412	-14.12	8
	2437	-14.01	8
	2462	-13.88	8

Data Rate : 6 Mbps



Channel Frequency: 2412MHz

Channel Frequency: 2437MHz

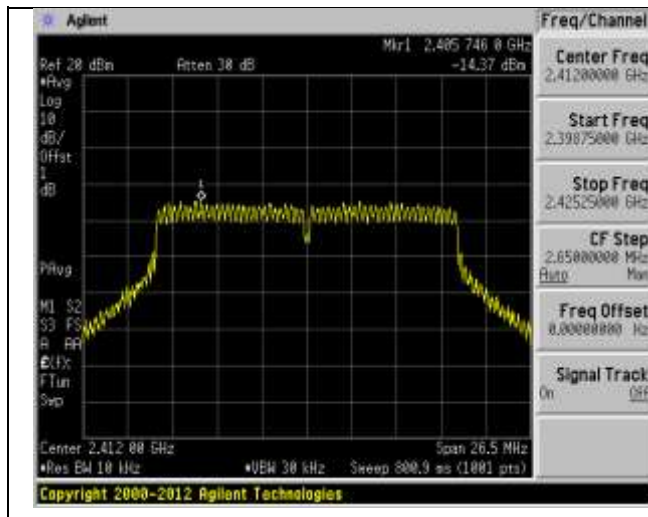


Channel Frequency: 2462MHz

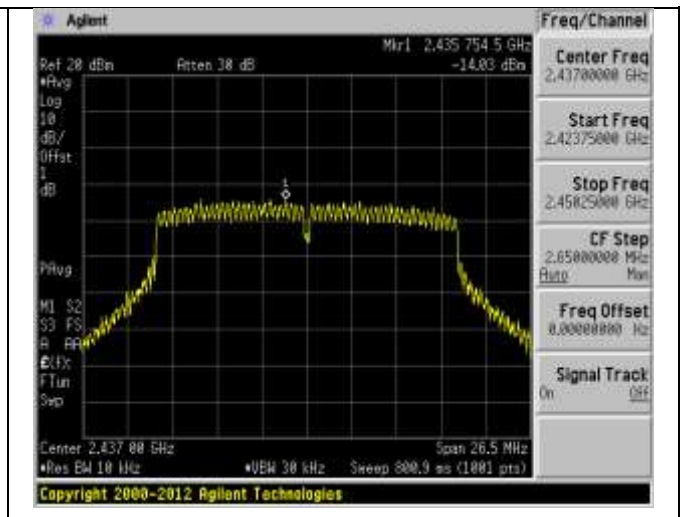
Modulation: 802.11n HT20

Data rate	Channel Frequency (MHz)	Measured Average PSD (dBm/10 kHz)	PSD Limit (dBm/10 kHz)
MCS0	2412	-14.37	8
	2437	-14.03	8
	2462	-14.10	8

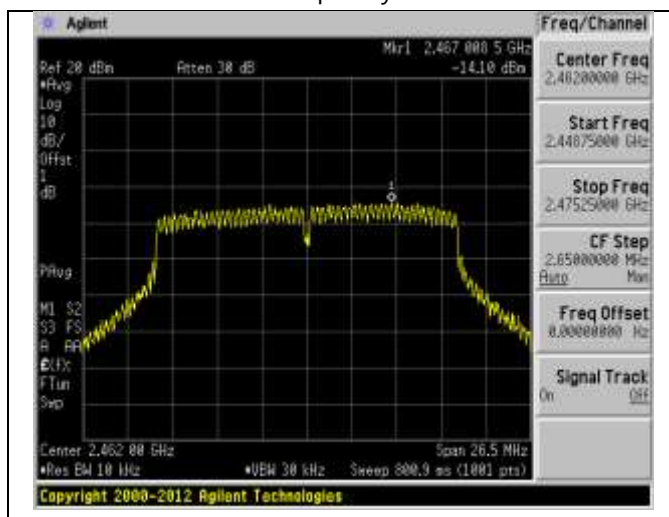
Data Rate : MCS0



Channel Frequency: 2412MHz



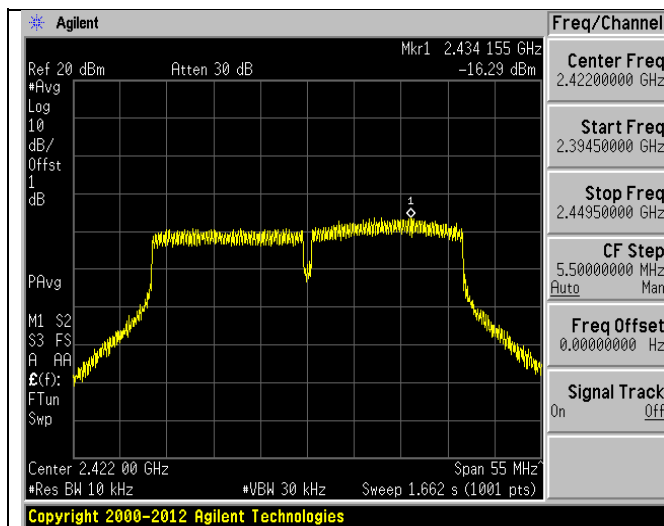
Channel Frequency: 2437MHz



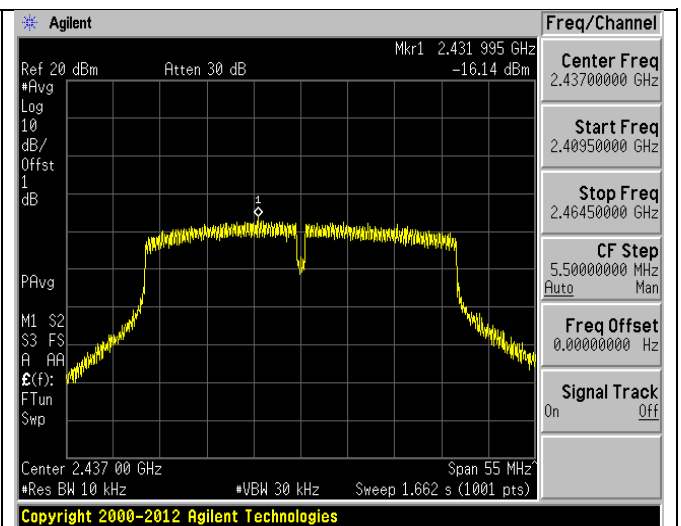
Channel Frequency: 2462MHz

Modulation: 802.11n HT40

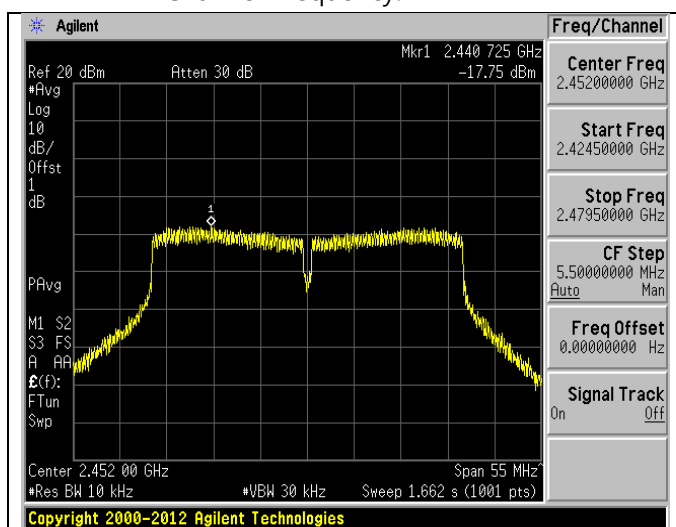
Data rate	Channel Frequency (MHz)	Measured Average PSD (dBm/10 kHz)	PSD Limit (dBm/10 kHz)
MCS0	2422	-16.29	8
	2437	-16.14	8
	2452	-17.75	8

Data Rate : MCS0


Channel Frequency: 2422MHz



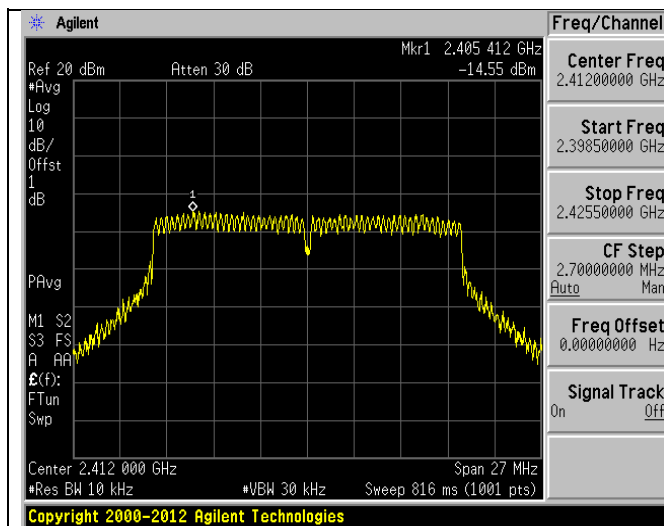
Channel Frequency: 2437MHz



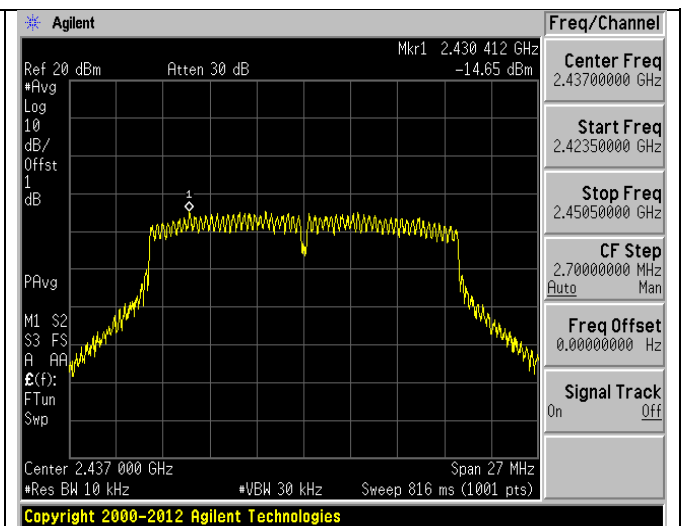
Channel Frequency: 2452MHz

Modulation: 802.11ac VHT20

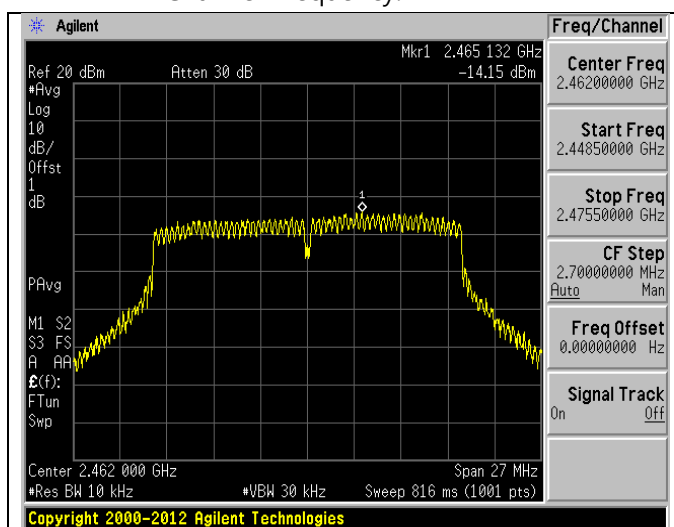
Data rate	Channel Frequency (MHz)	Measured Average PSD (dBm/10 kHz)	PSD Limit (dBm/10 kHz)
MCS0	2412	-14.55	8
	2437	-14.65	8
	2462	-14.15	8

Data Rate : MCS0


Channel Frequency: 2412MHz



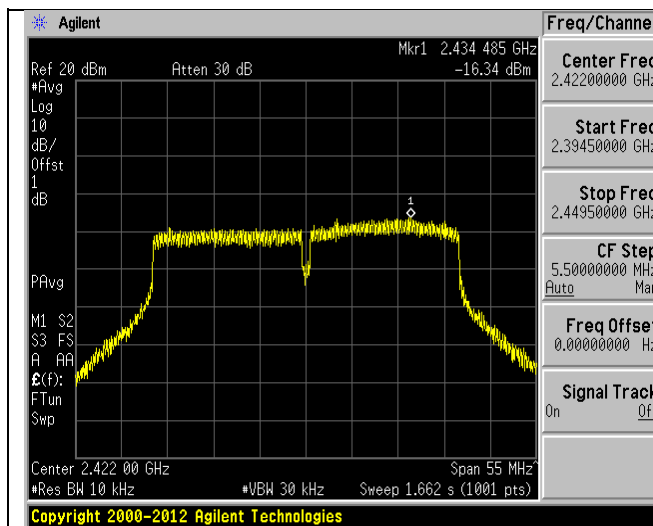
Channel Frequency: 2437MHz



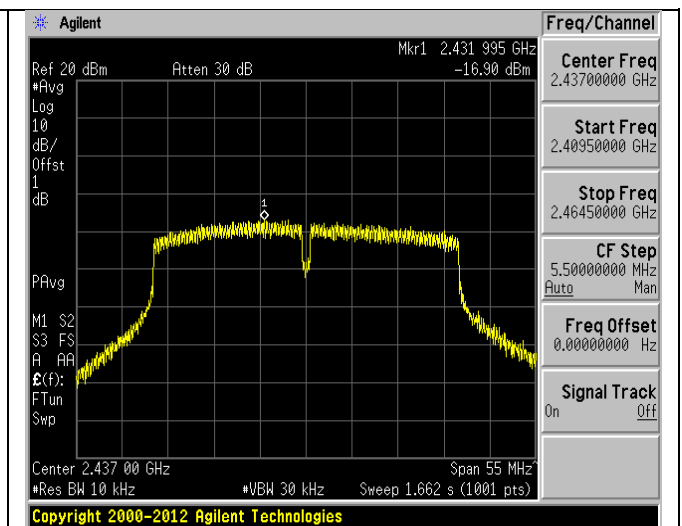
Channel Frequency: 2462MHz

Modulation: 802.11ac VHT40

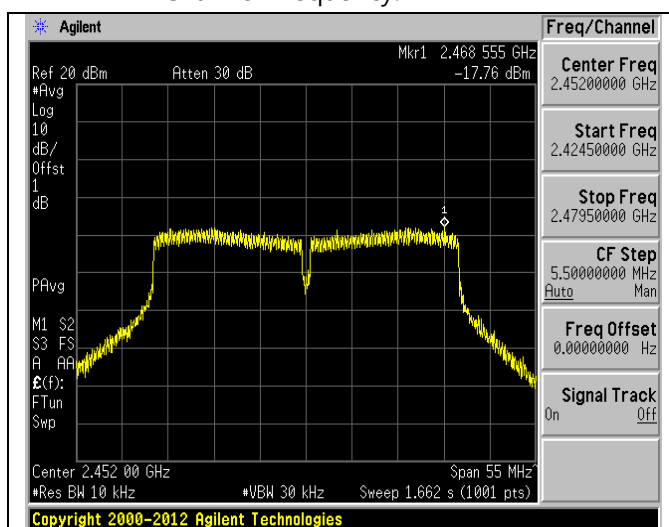
Data rate	Channel Frequency (MHz)	Measured Average PSD (dBm/10 kHz)	PSD Limit (dBm/10 kHz)
MCS0	2422	-16.34	8
	2437	-16.90	8
	2452	-17.76	8

Data Rate : MCS0


Channel Frequency: 2422MHz



Channel Frequency: 2437MHz



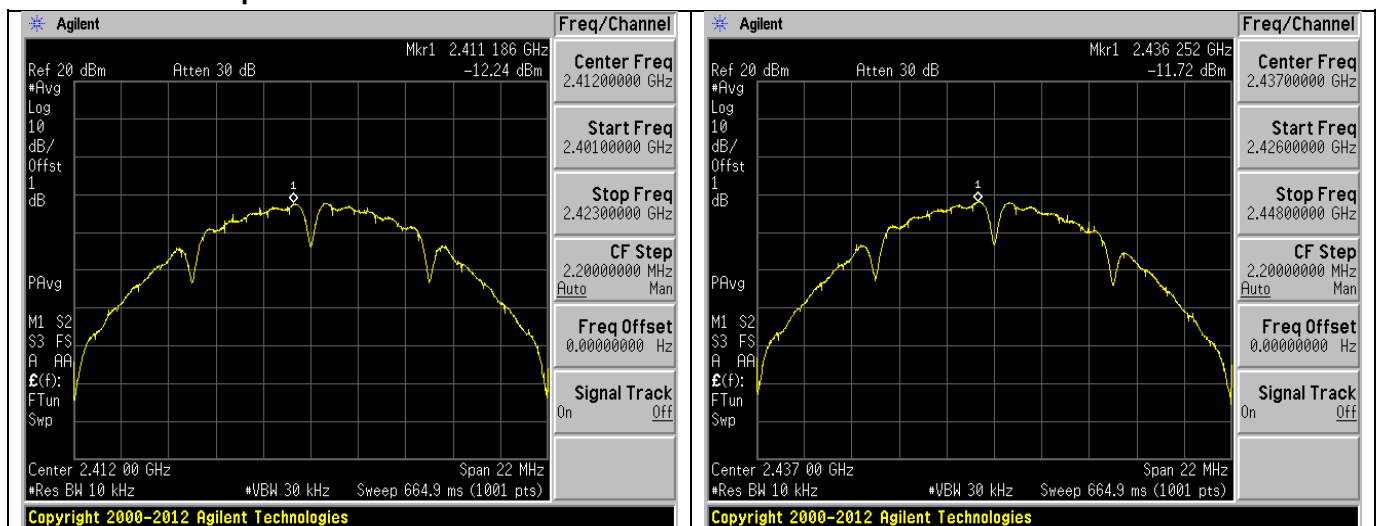
Channel Frequency: 2452MHz

Antenna Mode:MIMO ANT0

Modulation: 802.11b

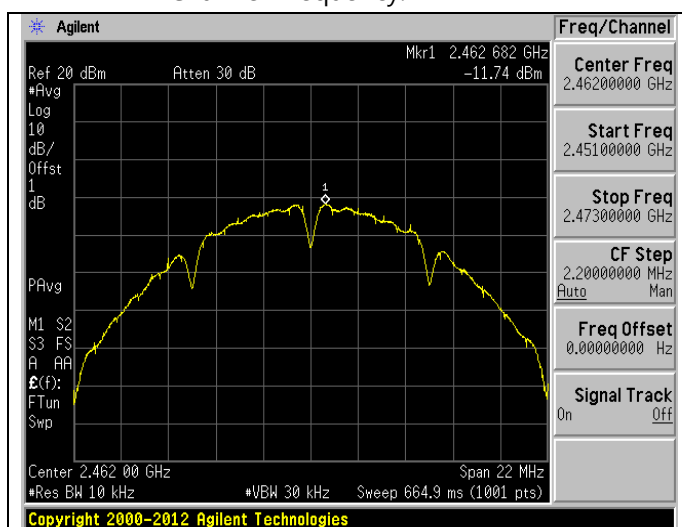
Data rate	Channel Frequency (MHz)	Measured Average PSD (dBm/10 kHz)	PSD Limit (dBm/10 kHz)
1Mbps	2412	-12.24	8
	2437	-11.72	8
	2462	-11.74	8

Data Rate : 1 Mbps



Channel Frequency: 2412MHz

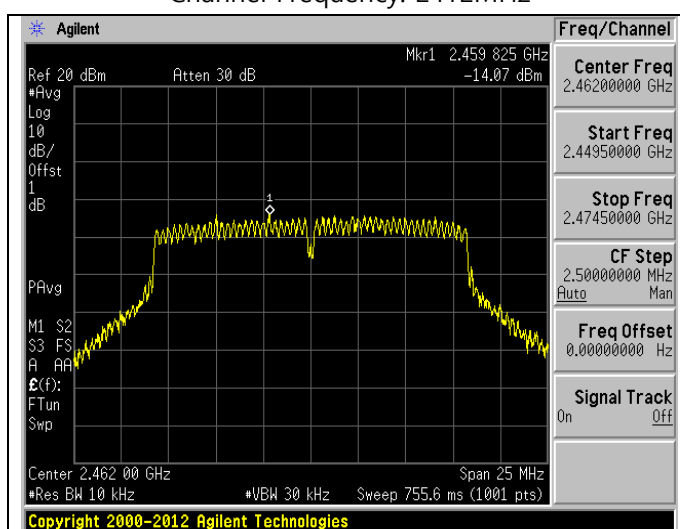
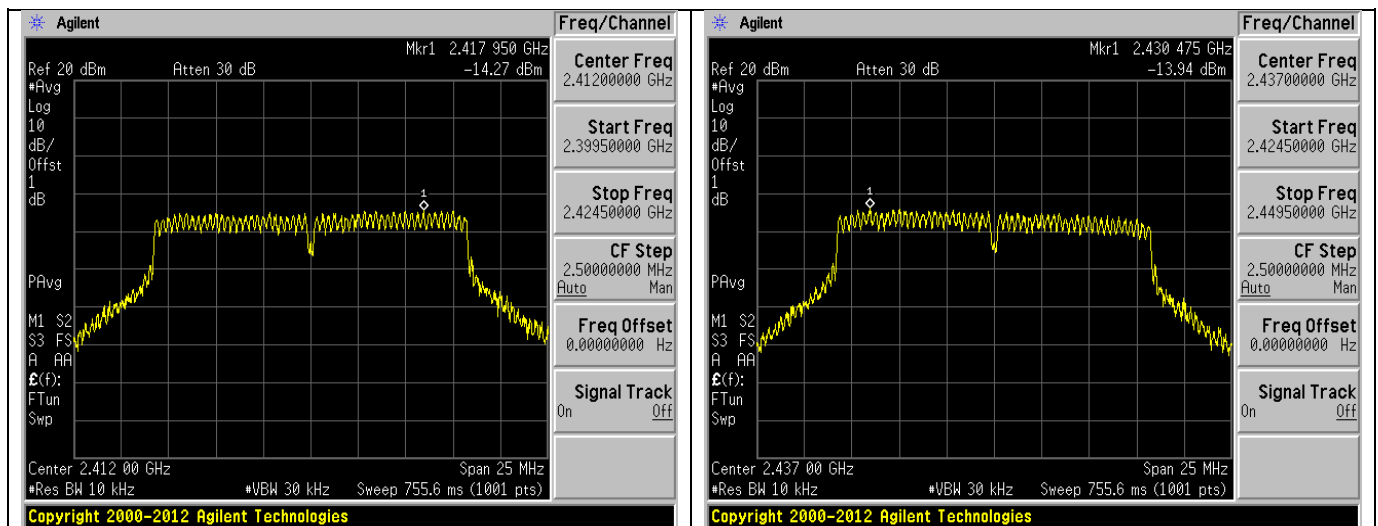
Channel Frequency: 2437MHz



Channel Frequency: 2462MHz

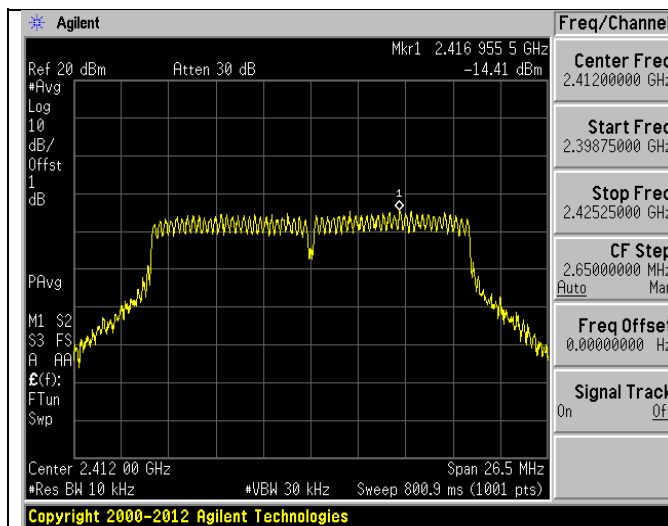
Modulation: 802.11g

Data rate	Channel Frequency (MHz)	Measured Average PSD (dBm/10 kHz)	PSD Limit (dBm/10 kHz)
6Mbps	2412	-14.27	8
	2437	-13.94	8
	2462	-14.07	8

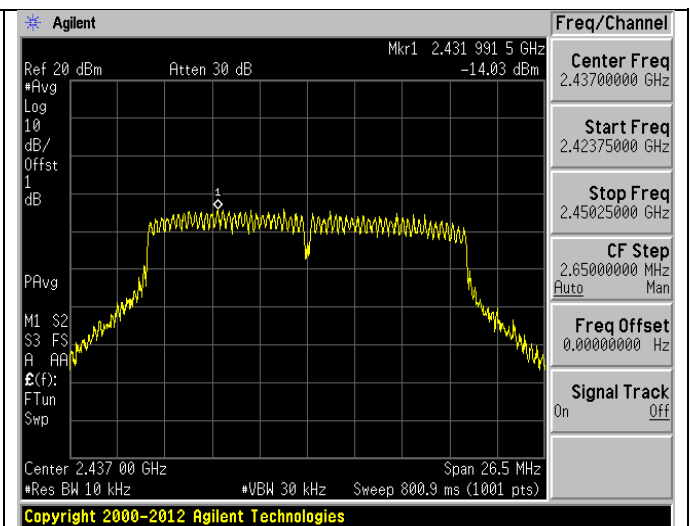
Data Rate : 6 Mbps


Modulation: 802.11n HT20

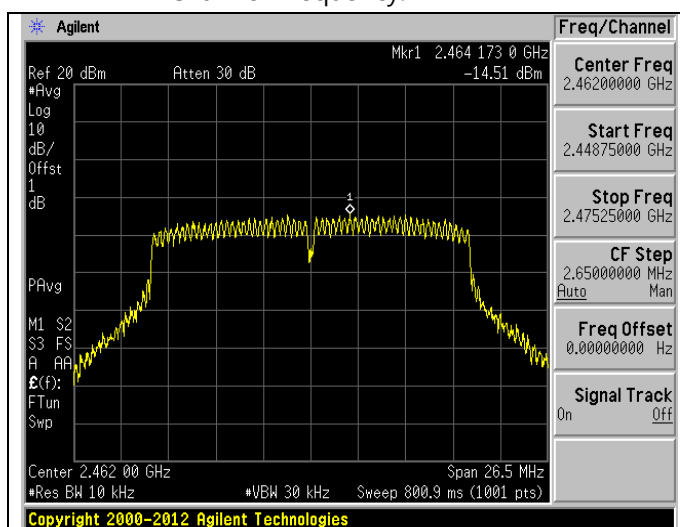
Data rate	Channel Frequency (MHz)	Measured Average PSD (dBm/10 kHz)	PSD Limit (dBm/10 kHz)
MCS8	2412	-14.41	8
	2437	-14.03	8
	2462	-14.51	8

Data Rate : MCS8


Channel Frequency: 2412MHz



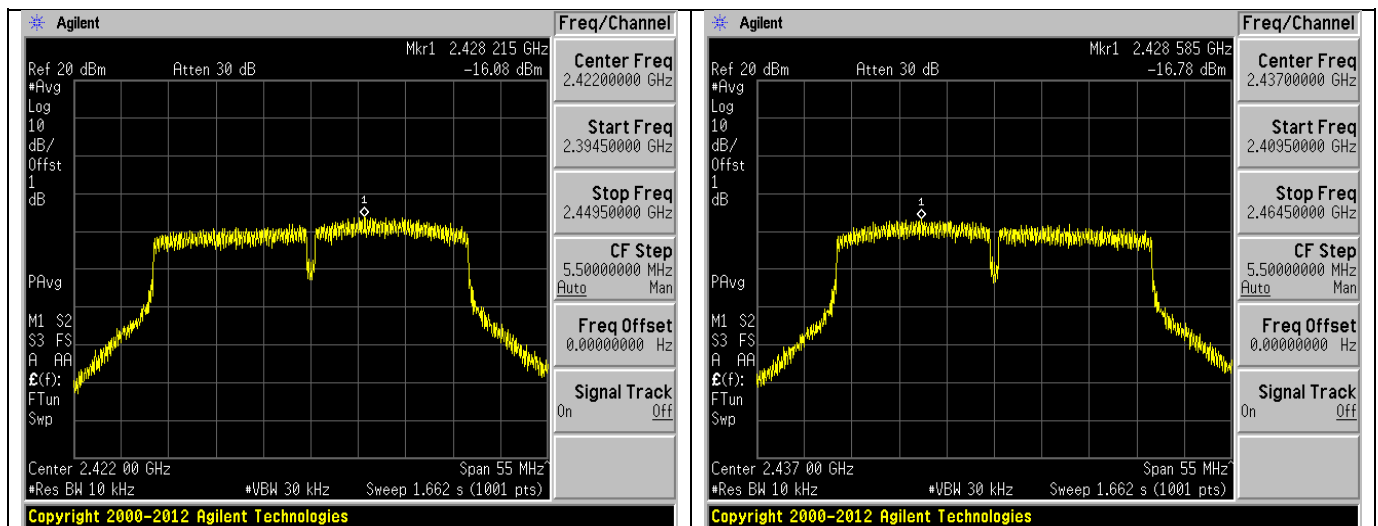
Channel Frequency: 2437MHz



Channel Frequency: 2462MHz

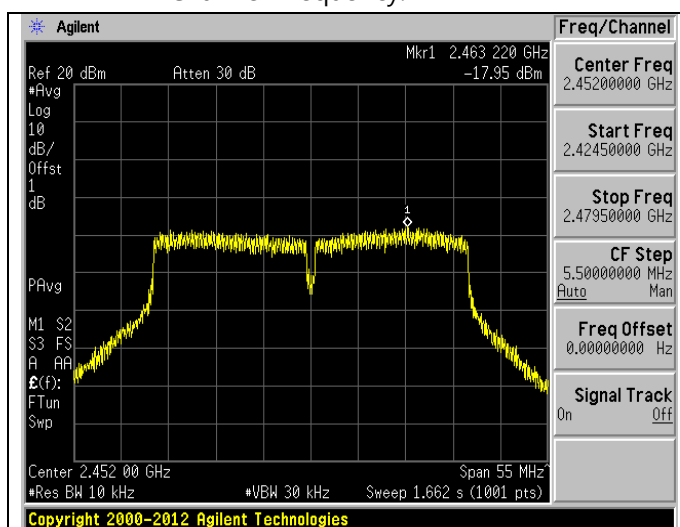
Modulation: 802.11n HT40

Data rate	Channel Frequency (MHz)	Measured Average PSD (dBm/10 kHz)	PSD Limit (dBm/10 kHz)
MCS8	2422	-16.08	8
	2437	-16.78	8
	2452	-17.95	8

Data Rate : MCS8


Channel Frequency: 2422MHz

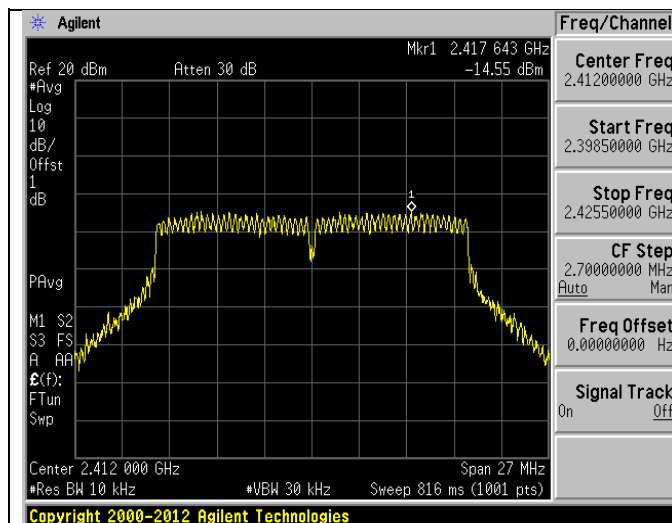
Channel Frequency: 2437MHz



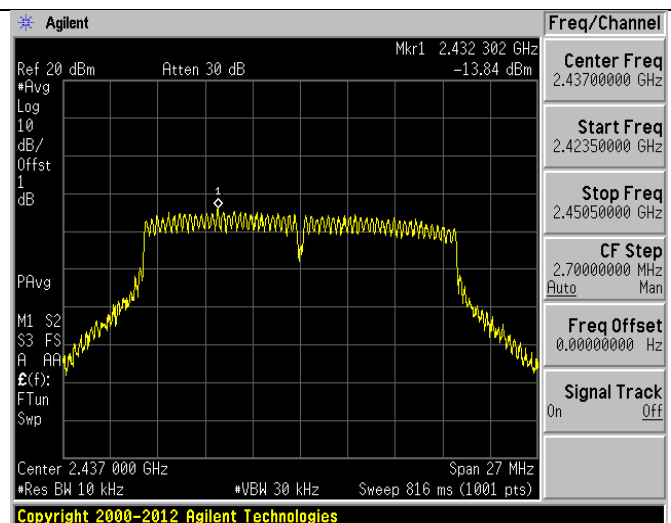
Channel Frequency: 2452MHz

Modulation: 802.11ac VHT20

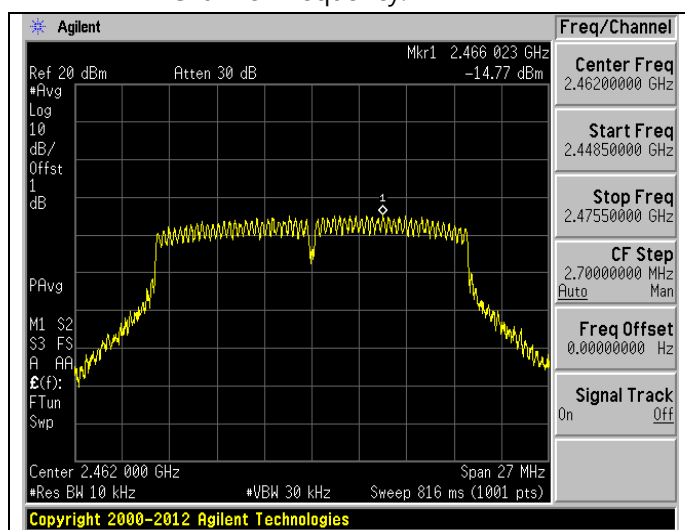
Data rate	Channel Frequency (MHz)	Measured Average PSD (dBm/10 kHz)	PSD Limit (dBm/10 kHz)
MCS0	2412	-14.55	8
	2437	-13.84	8
	2462	-14.77	8

Data Rate : MCS0


Channel Frequency: 2412MHz



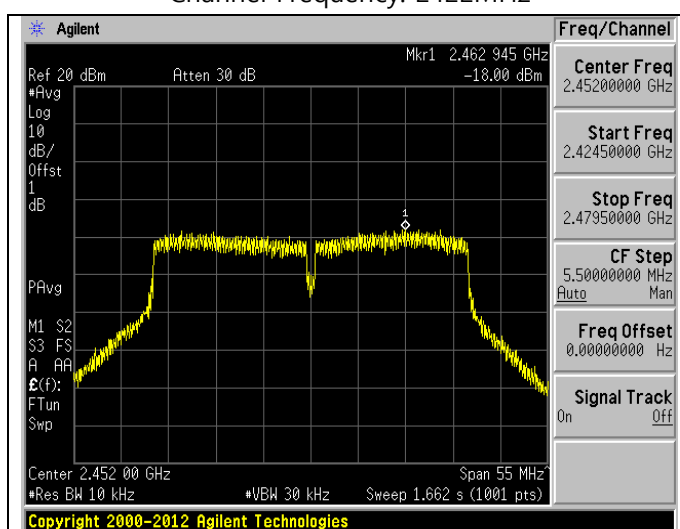
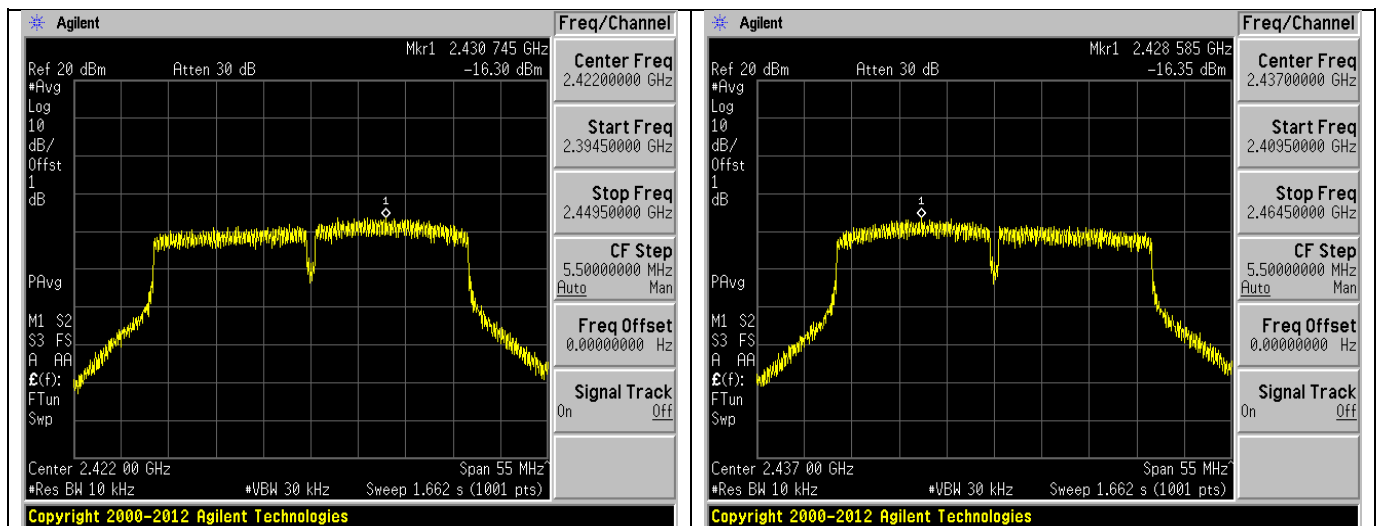
Channel Frequency: 2437MHz



Channel Frequency: 2462MHz

Modulation: 802.11ac VHT40

Data rate	Channel Frequency (MHz)	Measured Average PSD (dBm/10 kHz)	PSD Limit (dBm/10 kHz)
MCS0	2422	-16.30	8
	2437	-16.35	8
	2452	-18.00	8

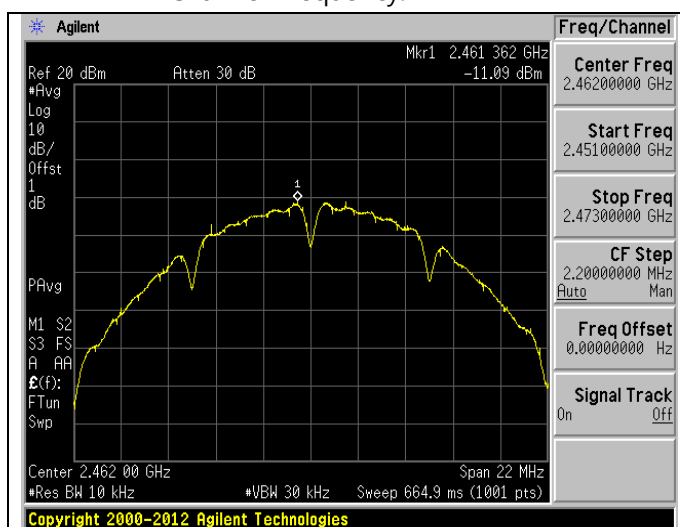
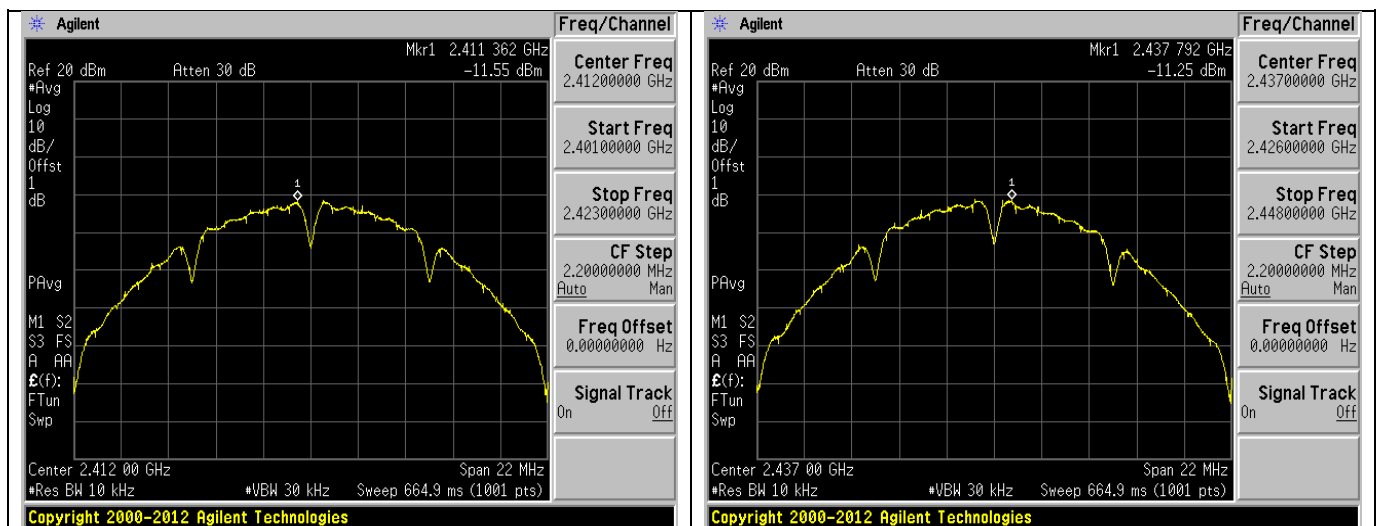
Data Rate : MCS0


Antenna Mode:MIMO ANT1

Modulation: 802.11b

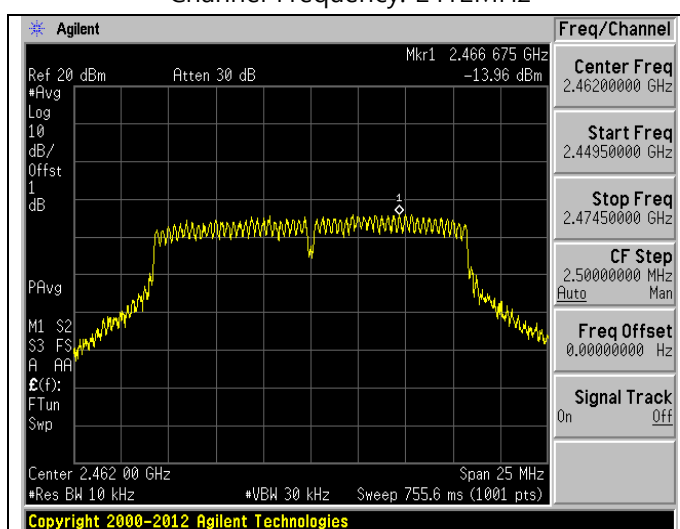
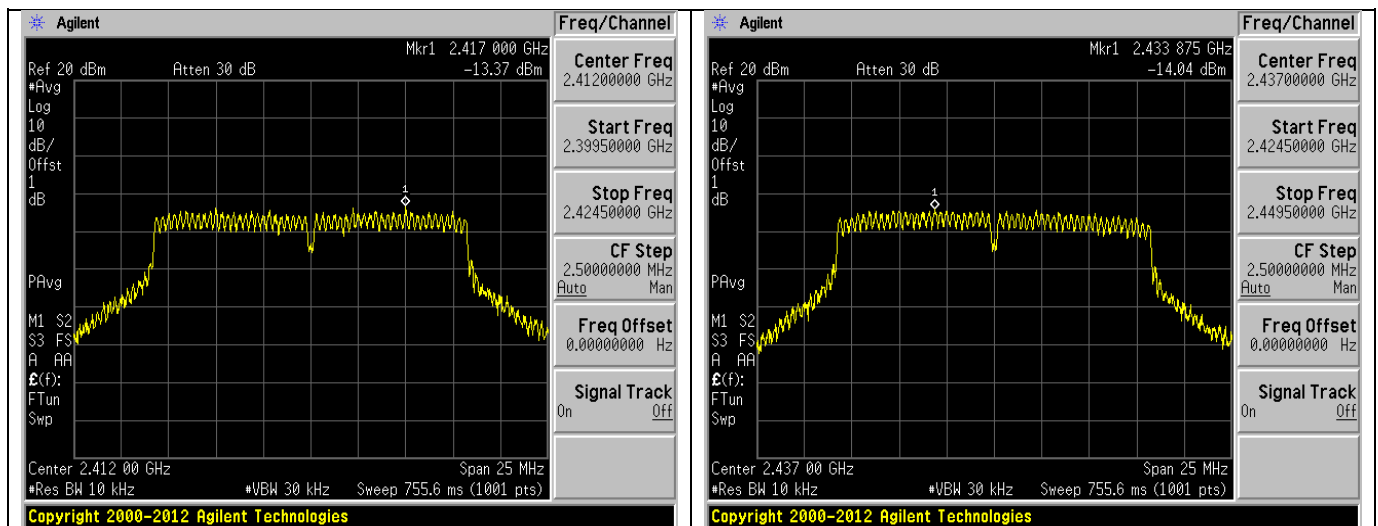
Data rate	Channel Frequency (MHz)	Measured Average PSD (dBm/10 kHz)	PSD Limit (dBm/10 kHz)
1Mbps	2412	-11.55	8
	2437	-11.25	8
	2462	-11.09	8

Data Rate : 1 Mbps



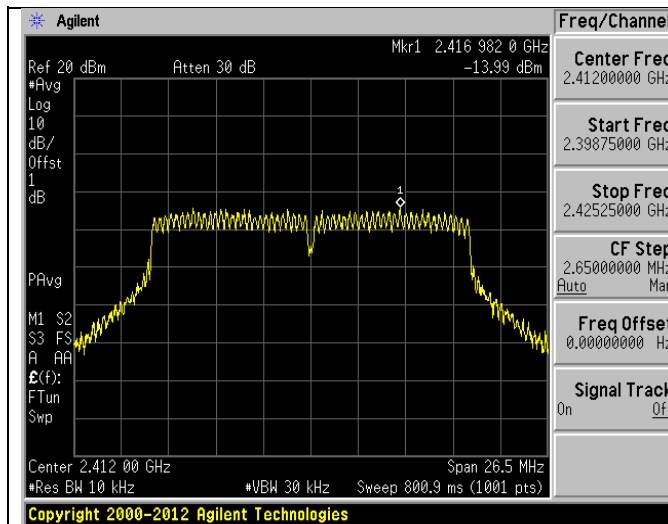
Modulation: 802.11g

Data rate	Channel Frequency (MHz)	Measured Average PSD (dBm/10 kHz)	PSD Limit (dBm/10 kHz)
6Mbps	2412	-13.37	8
	2437	-14.04	8
	2462	-13.96	8

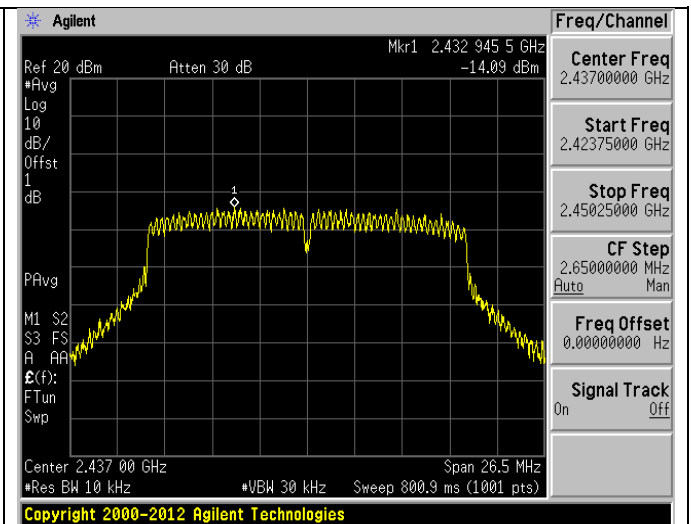
Data Rate : 6 Mbps


Modulation: 802.11n HT20

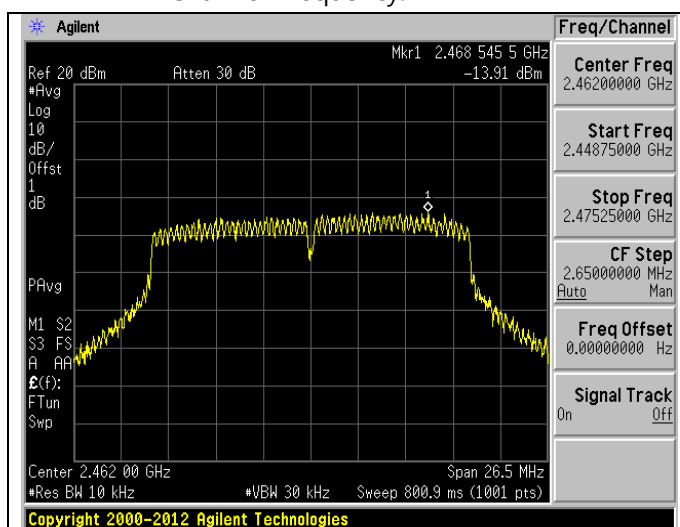
Data rate	Channel Frequency (MHz)	Measured Average PSD (dBm/10 kHz)	PSD Limit (dBm/10 kHz)
MCS8	2412	-13.99	8
	2437	-14.09	8
	2462	-13.91	8

Data Rate : MCS8


Channel Frequency: 2412MHz



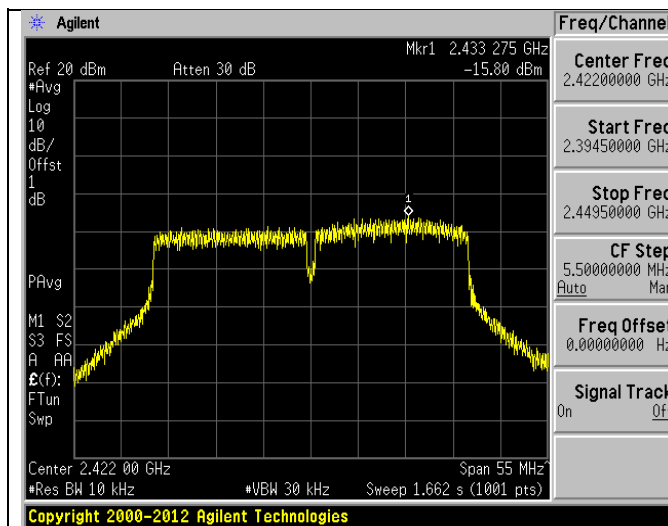
Channel Frequency: 2437MHz



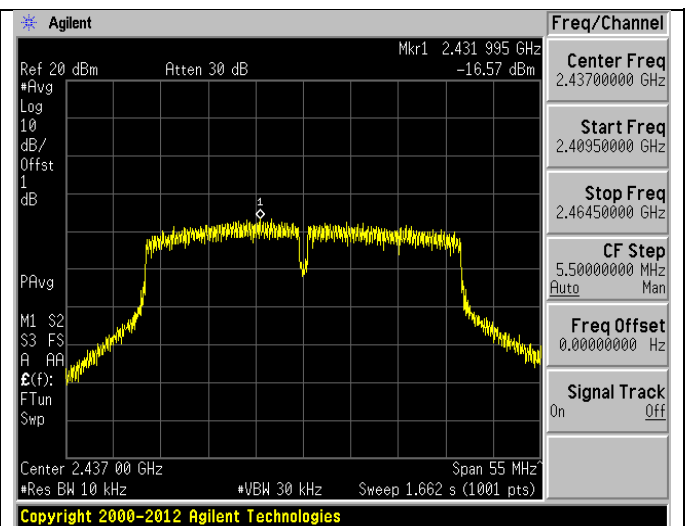
Channel Frequency: 2462MHz

Modulation: 802.11n HT40

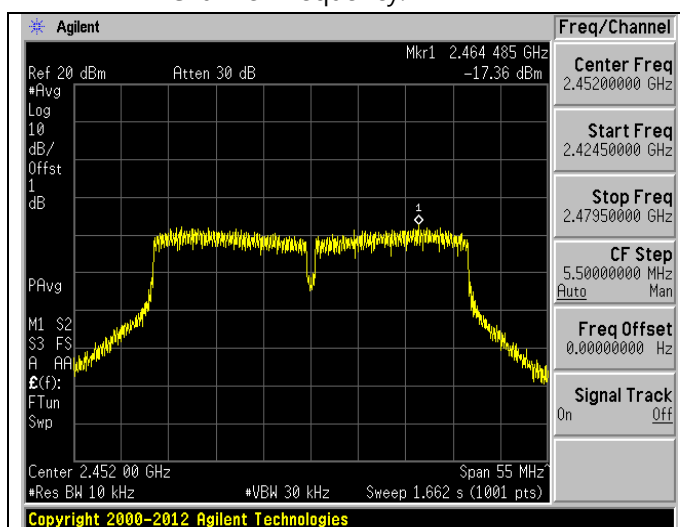
Data rate	Channel Frequency (MHz)	Measured Average PSD (dBm/10 kHz)	PSD Limit (dBm/10 kHz)
MCS8	2422	-15.80	8
	2437	-16.57	8
	2452	-17.36	8

Data Rate : MCS8


Channel Frequency: 2422MHz



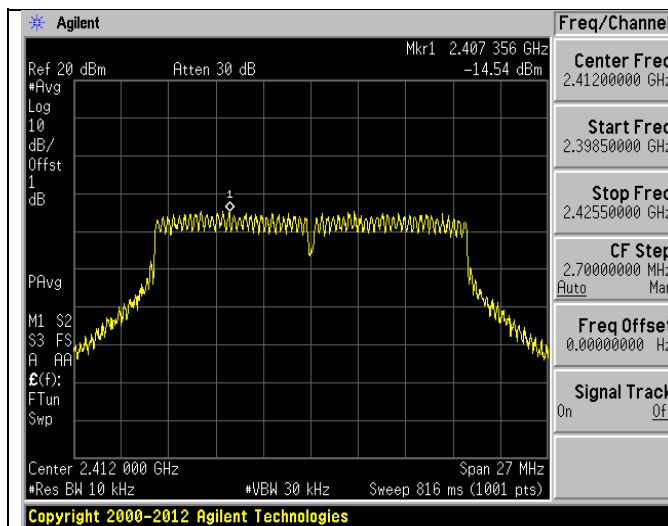
Channel Frequency: 2437MHz



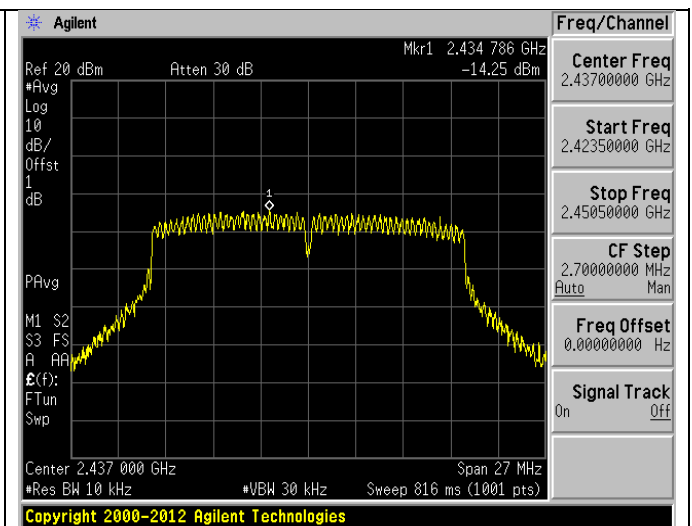
Channel Frequency: 2452MHz

Modulation: 802.11ac VHT20

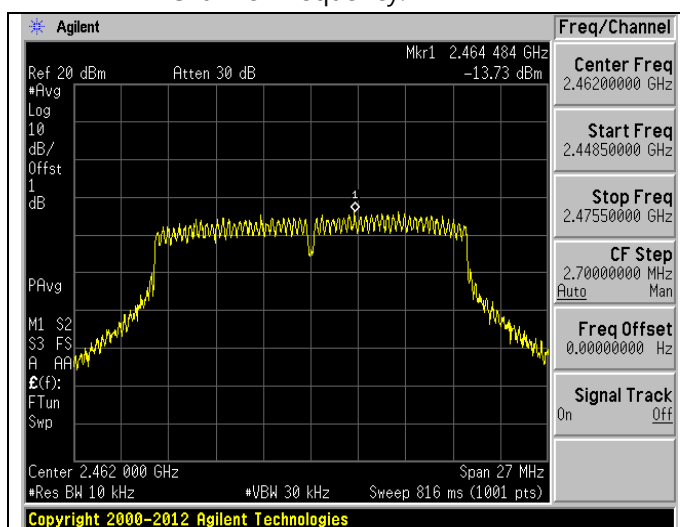
Data rate	Channel Frequency (MHz)	Measured Average PSD (dBm/10 kHz)	PSD Limit (dBm/10 kHz)
MCS0	2412	-14.54	8
	2437	-14.25	8
	2462	-13.73	8

Data Rate : MCS0


Channel Frequency: 2412MHz



Channel Frequency: 2437MHz

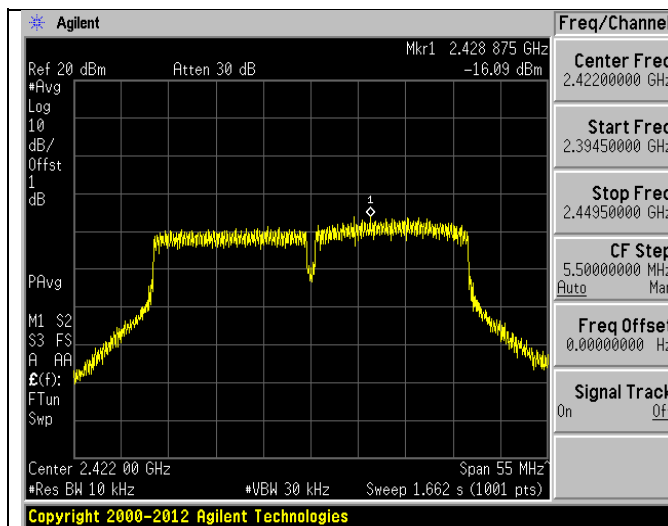


Channel Frequency: 2462MHz

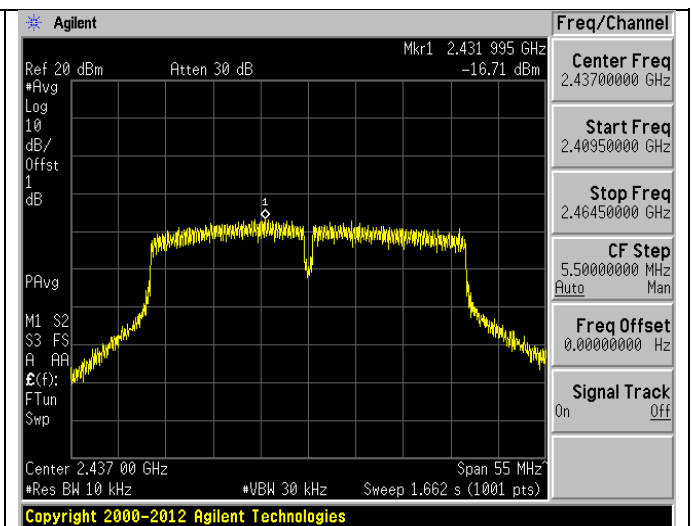
Modulation: 802.11ac VHT40

Data rate	Channel Frequency (MHz)	Measured Average PSD (dBm/10 kHz)	PSD Limit (dBm/10 kHz)
MCS0	2422	-16.09	8
	2437	-16.71	8
	2452	-17.92	8

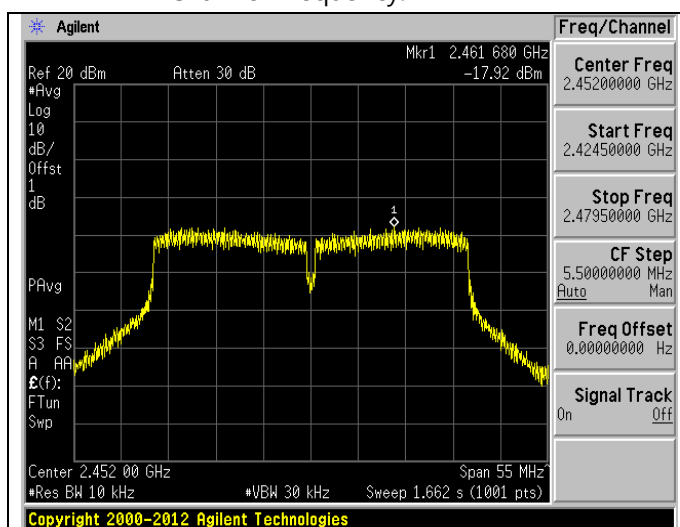
Data Rate : MCS0



Channel Frequency: 2422MHz



Channel Frequency: 2437MHz



Channel Frequency: 2452MHz

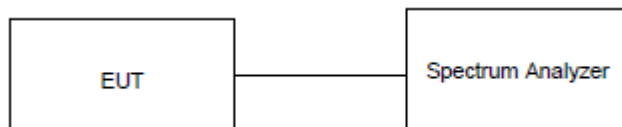
7.3 DTS Bandwidth & 99% Bandwidth

Result

Pass

Test Specification	FCC part 15 Subpart C 15.247 (a) (2) / RSS 247 Issue 2, Section 5.2 (a)
Test Method	Subclause 11.8.1 of ANSI C63.10
Measurement Bandwidth	100 kHz for x dB bandwidth 1 to 5% of OCB for 99% bandwidth
Detector	Peak
Port of testing	Antenna port
Requirement	The minimum 6 dB bandwidth shall be at least 500 kHz

Test Method:



Test Condition

Normal Test Condition:

Temperature (Norm) = + 22.3 °C	Voltage = DC 12.0 V	Relative humidity: 58%
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KDB Guidelines applied:

Measurements were made as per section 8.2 in KDB 558074 D01 15.247 Measurement Guidance v05r02.

Test results:

Note:

1. All the losses are included during measurement and final values are mentioned in the test report.
2. Peak Output power (dBm) = Measured Peak power (dBm) + Cable loss

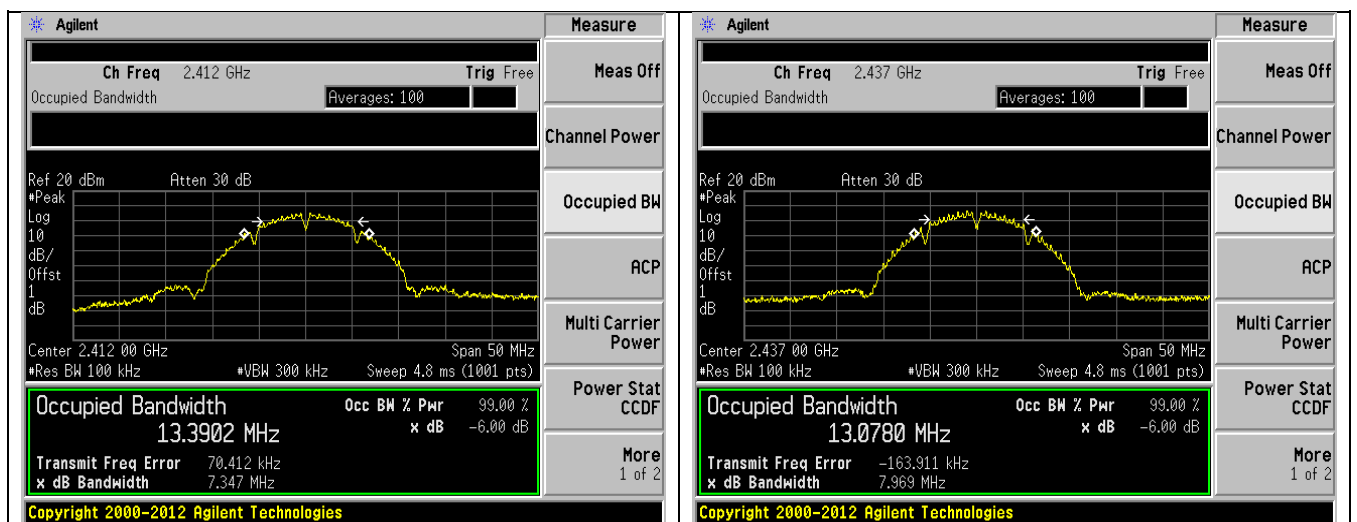
3. This product do not support additional beamforming gain / directional gain, it uses signal antenna and hence directional gain of the 2T2R antenna is ANT0:2.88 dBi, ANT1:2.82 dBi
4. All modes of operation were investigated, and the worst-case configuration results are reported in this section

ANT 0

Modulation: 802.11b

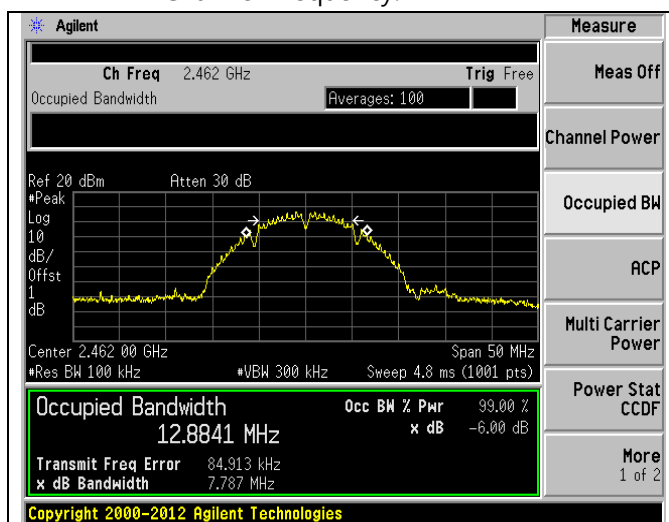
Data rate	Channel Frequency (MHz)	6 dB Bandwidth (MHz)	99% OBW (MHz)	Minimum Limit (MHz)
1Mbps	2412	7.34	13.46	0.5
	2437	7.96	13.06	0.5
	2462	7.78	12.89	0.5

Data Rate : 1Mbps-6 dB Bandwidth



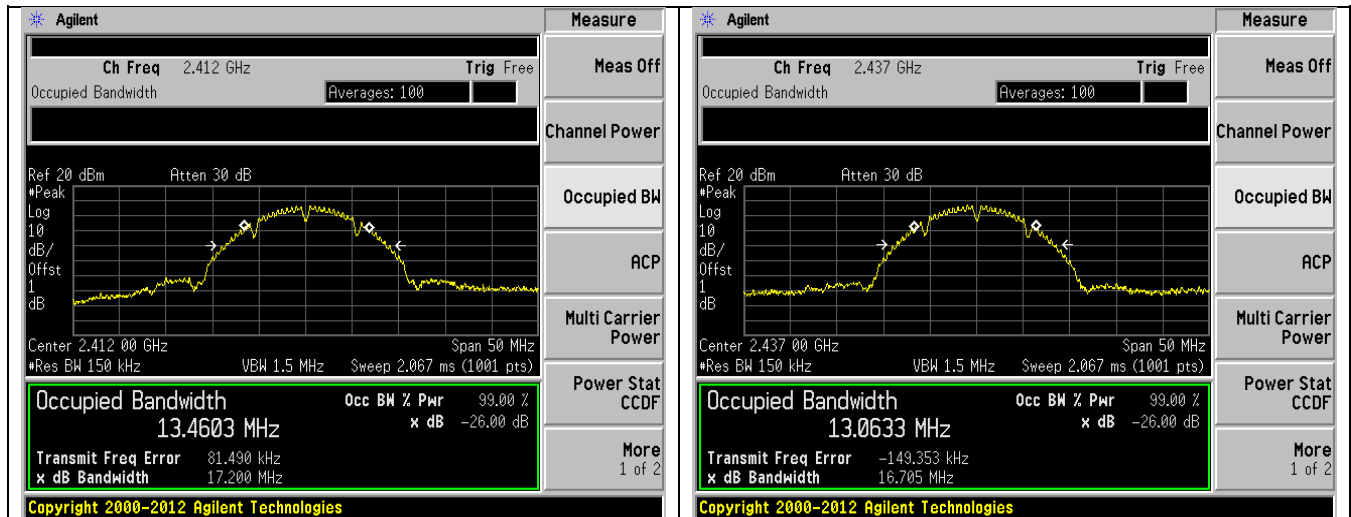
Channel Frequency: 2412MHz

Channel Frequency: 2437MHz



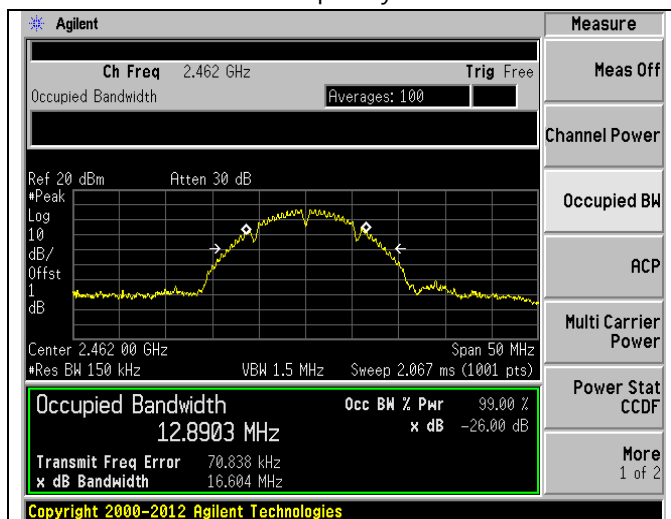
Channel Frequency: 2462MHz

Data Rate : 1 Mbps-99 % Bandwidth



Channel Frequency: 2412MHz

Channel Frequency: 2437MHz

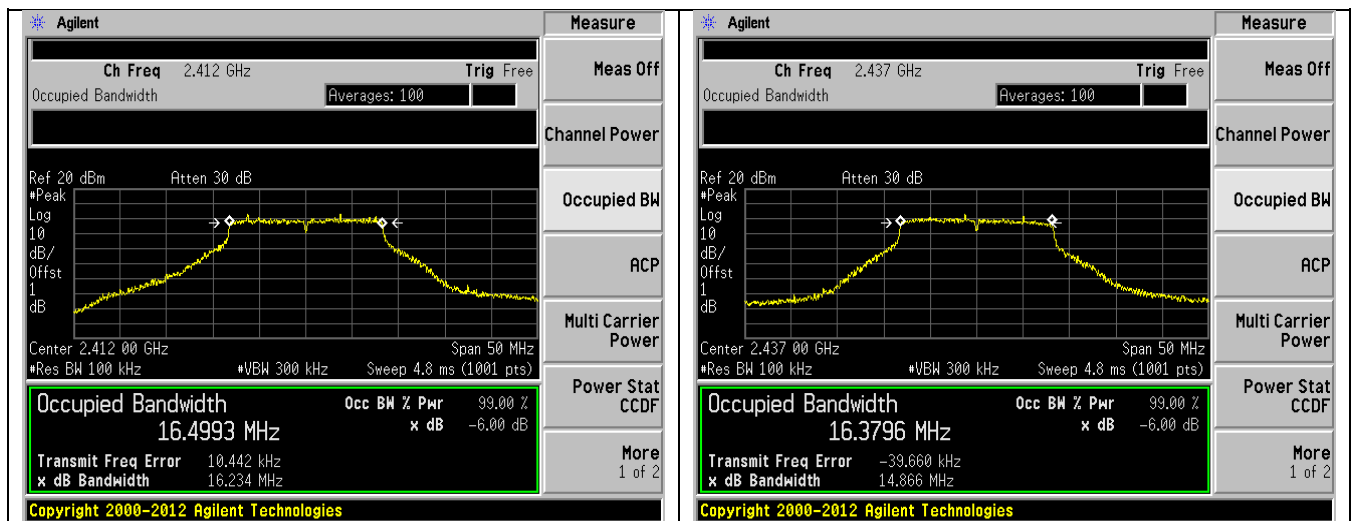


Channel Frequency: 2462MHz

Modulation: 802.11g

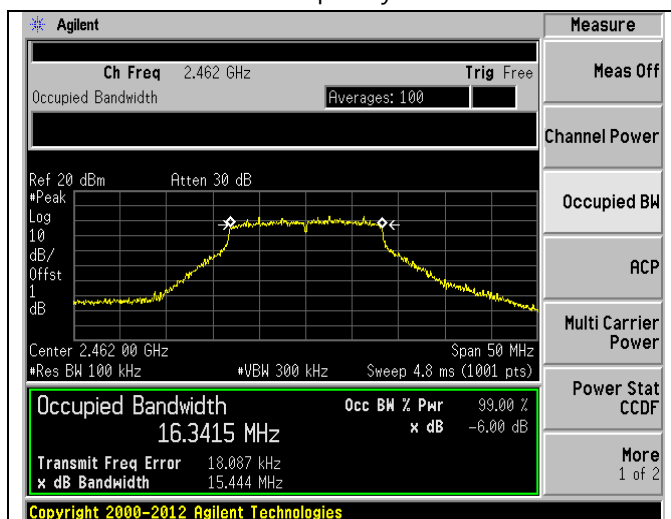
Data rate	Channel Frequency (MHz)	6 dB Bandwidth (MHz)	99% OBW (MHz)	Minimum Limit (MHz)
6Mbps	2412	16.23	16.58	0.5
	2437	14.86	16.42	0.5
	2462	15.44	16.37	0.5

Data Rate : 6 Mbps-6 dB Bandwidth



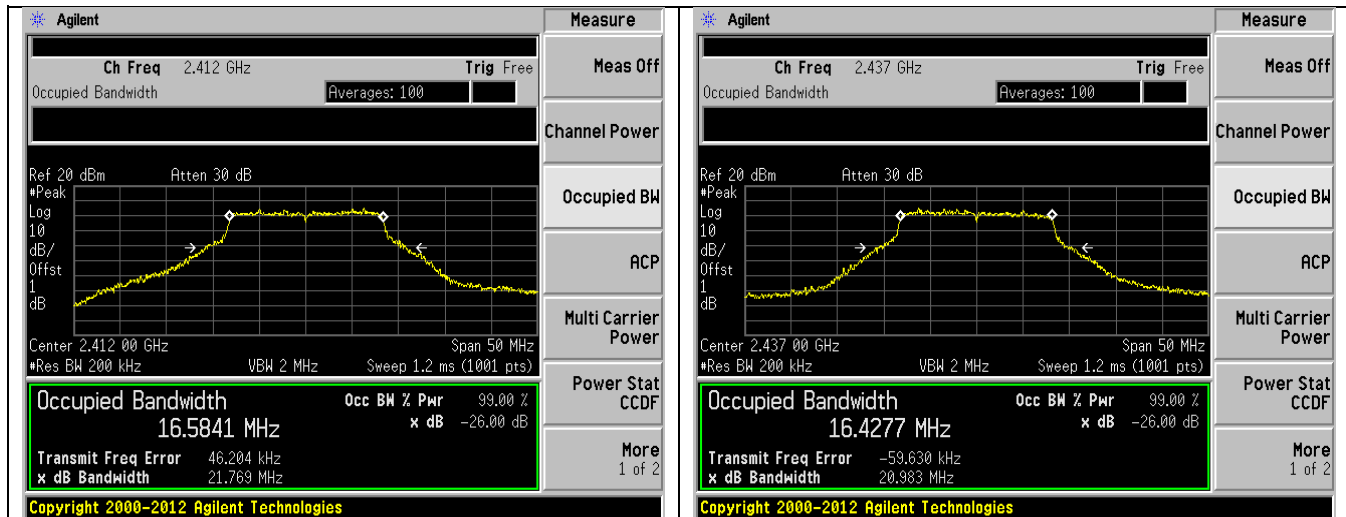
Channel Frequency: 2412MHz

Channel Frequency: 2437MHz



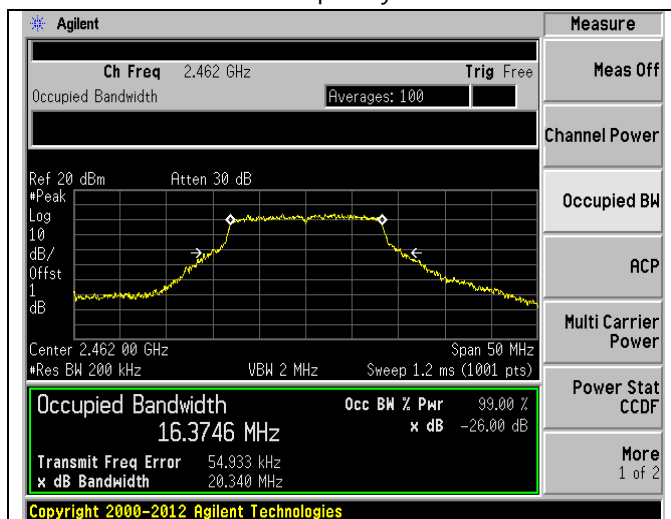
Channel Frequency: 2462MHz

Data Rate : 6 Mbps-99% Bandwidth



Channel Frequency: 2412MHz

Channel Frequency: 2437MHz

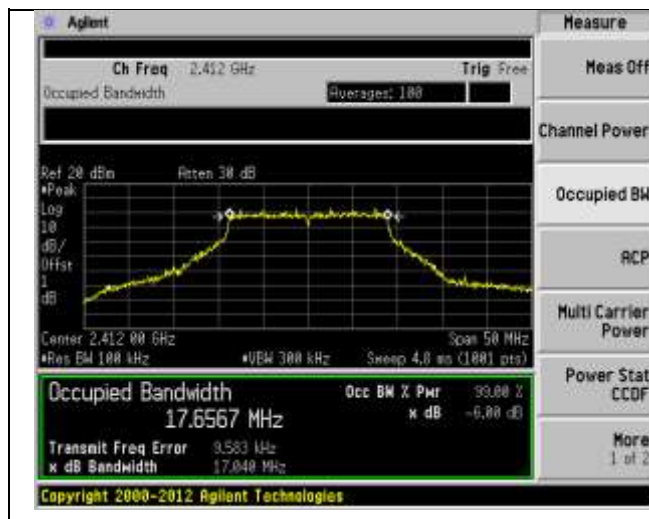


Channel Frequency: 2462MHz

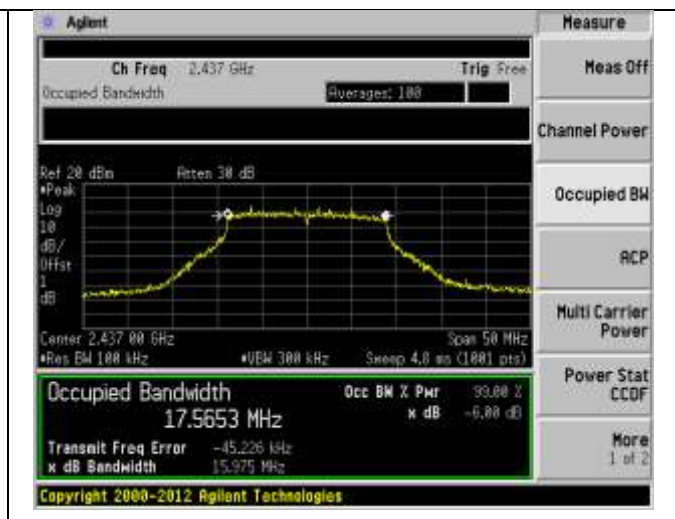
Modulation: 802.11n HT20

Data rate	Channel Frequency (MHz)	6 dB Bandwidth (MHz)	99% OBW (MHz)	Minimum Limit (MHz)
MCS0	2412	17.04	17.67	0.5
	2437	15.97	17.55	0.5
	2462	14.67	17.54	0.5

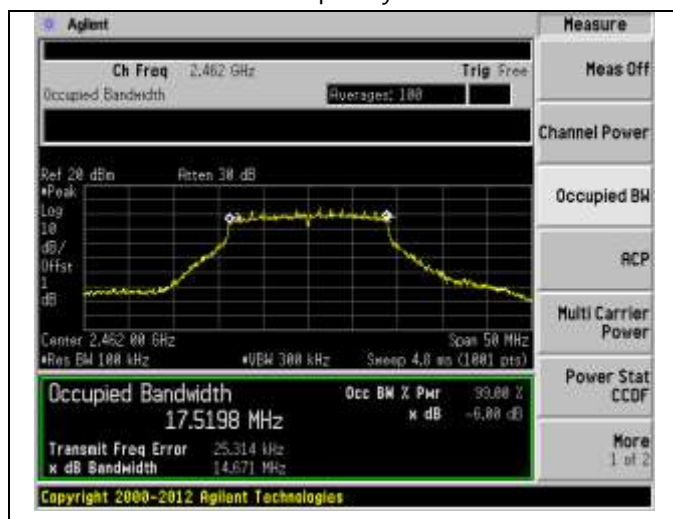
Data Rate : MCS0-6 dB Bandwidth



Channel Frequency: 2412MHz

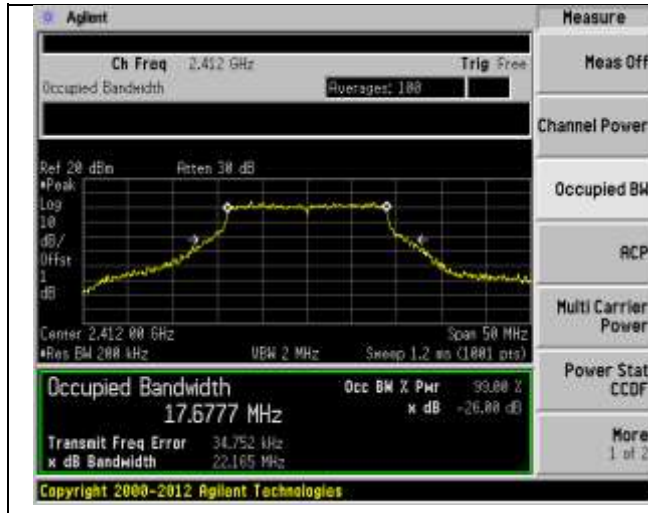


Channel Frequency: 2437MHz

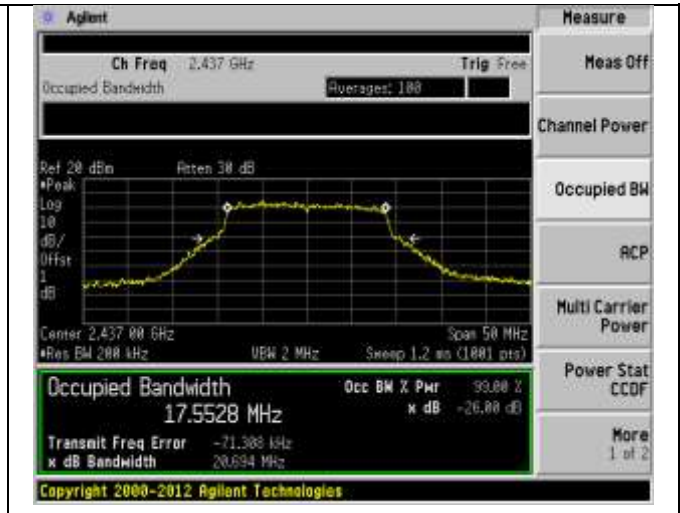


Channel Frequency: 2462MHz

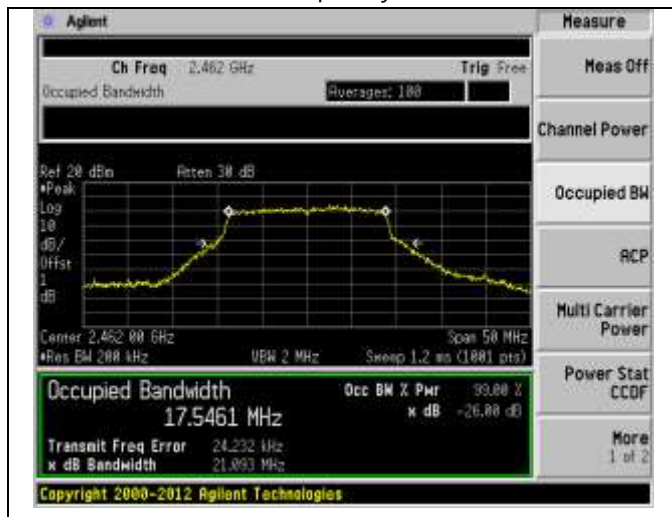
Data Rate : MCS0-99 % Bandwidth



Channel Frequency: 2412MHz



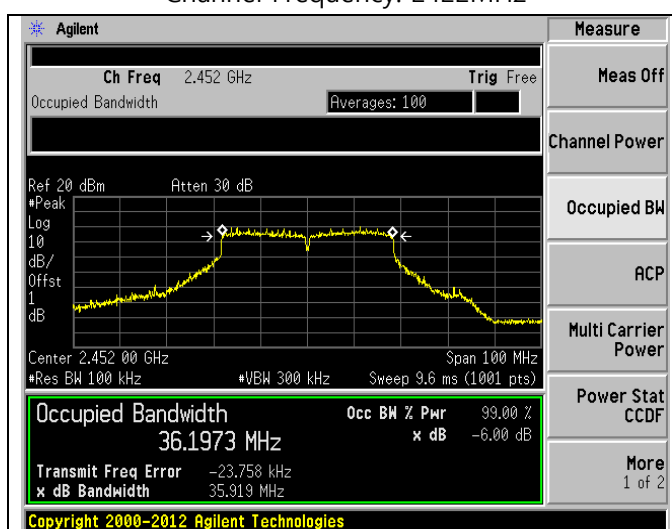
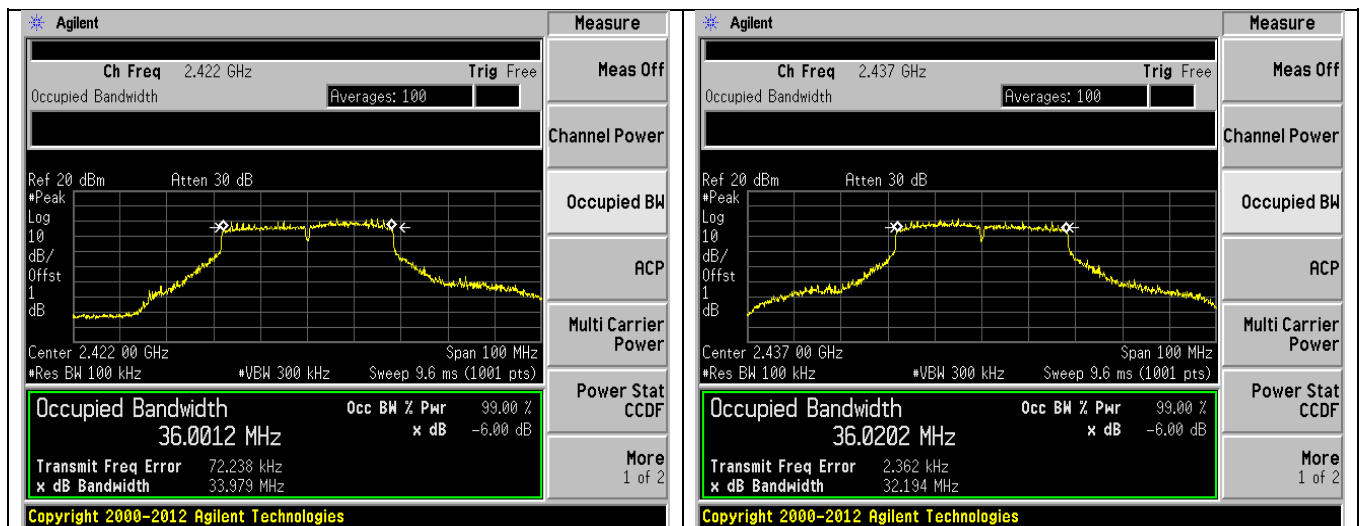
Channel Frequency: 2437MHz



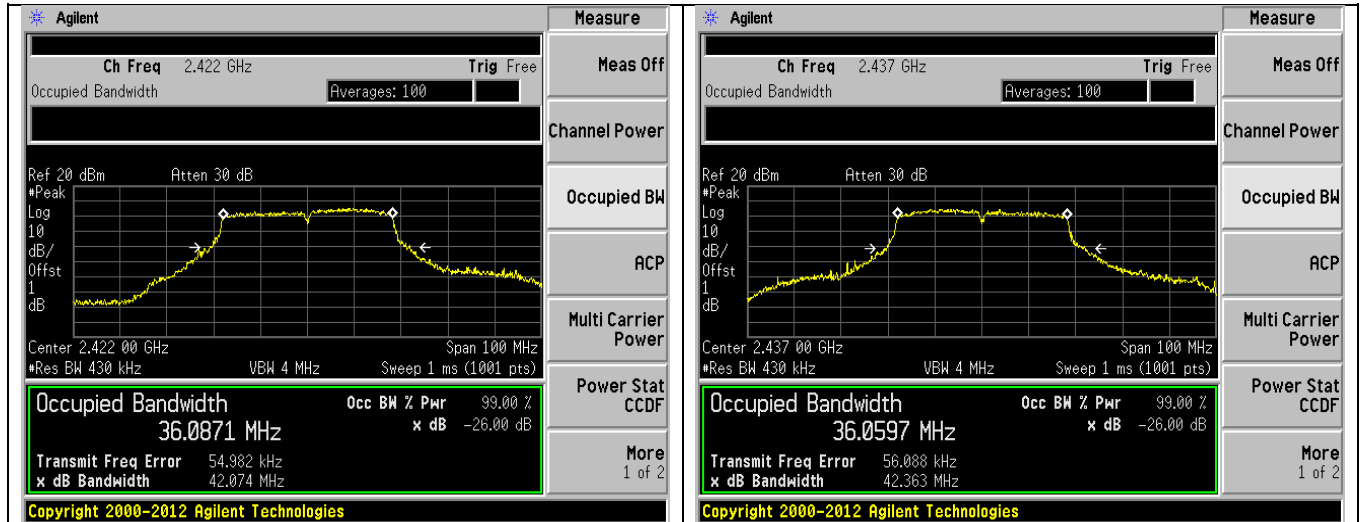
Channel Frequency: 2462MHz

Modulation: 802.11n HT40

Data rate	Channel Frequency (MHz)	6 dB Bandwidth (MHz)	99% OBW (MHz)	Minimum Limit (MHz)
MCS0	2422	33.97	36.08	0.5
	2437	32.19	36.05	0.5
	2452	35.91	36.25	0.5

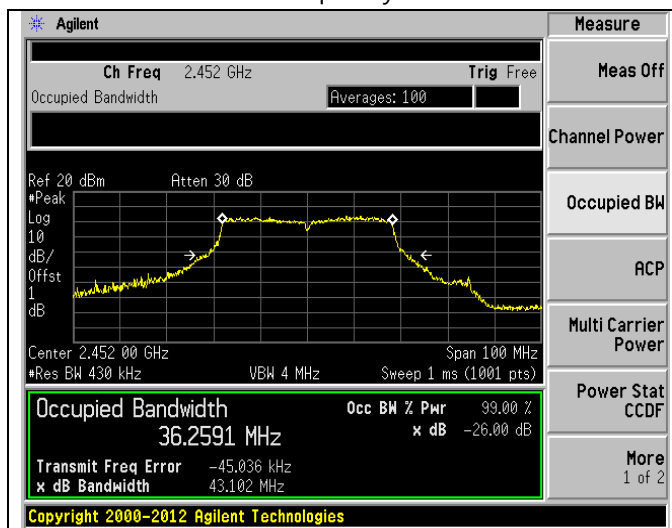
Data Rate : MCS0-6 dB Bandwidth


Data Rate : MCS0-99 % Bandwidth



Channel Frequency: 2422MHz

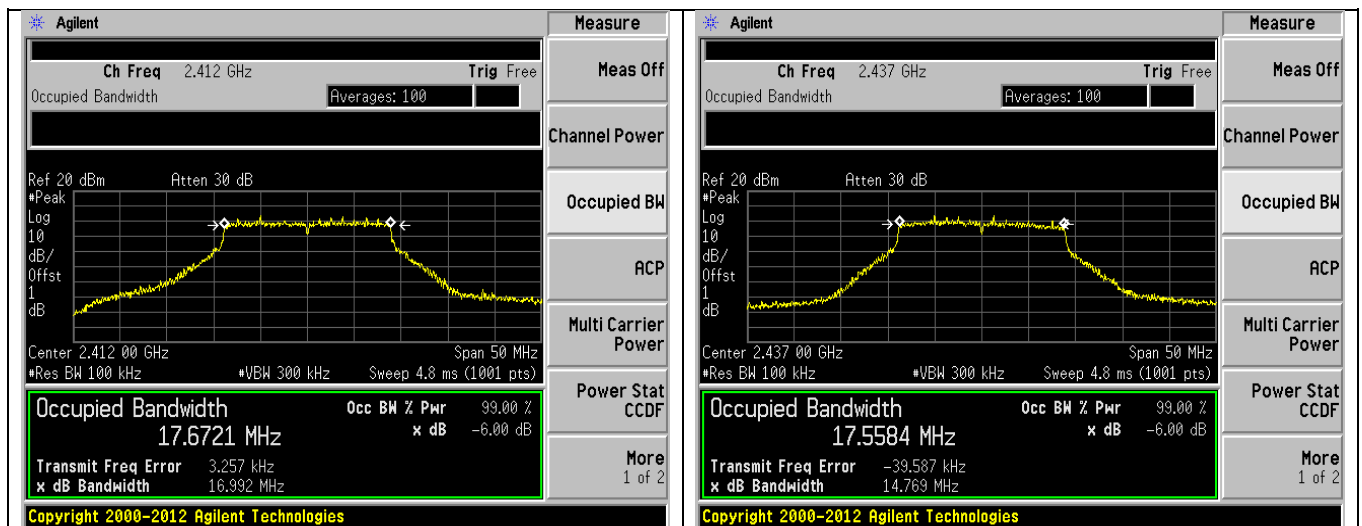
Channel Frequency: 2437MHz



Channel Frequency: 2452MHz

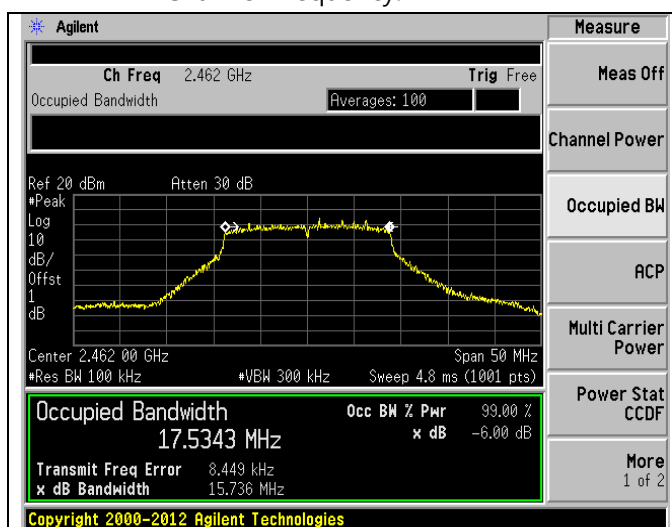
Modulation: 802.11ac VHT20

Data rate	Channel Frequency (MHz)	6 dB Bandwidth (MHz)	99% OBW (MHz)	Minimum Limit (MHz)
MCS0	2412	16.99	17.70	0.5
	2437	14.76	17.59	0.5
	2462	15.73	17.57	0.5

Data Rate : MCS0-6 dB Bandwidth


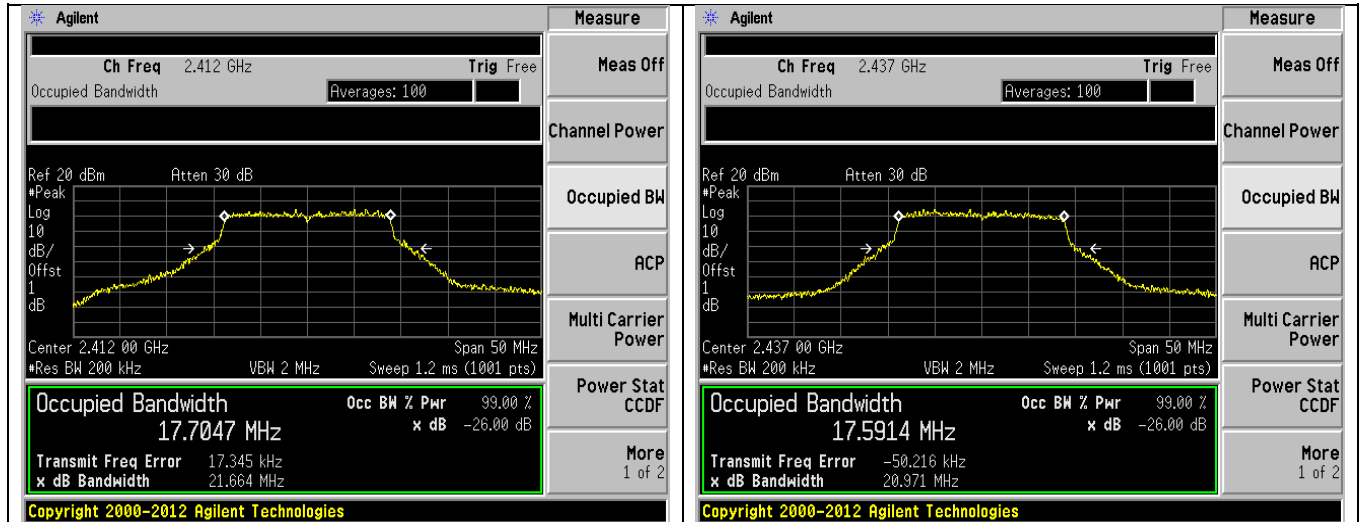
Channel Frequency: 2412MHz

Channel Frequency: 2437MHz



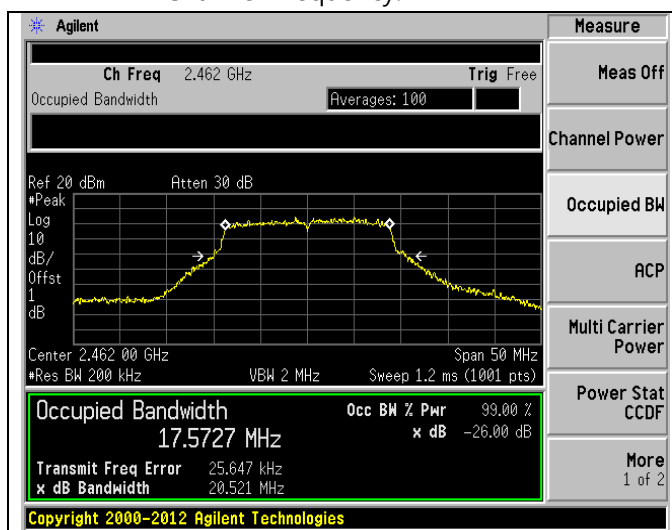
Channel Frequency: 2462MHz

Data Rate : MCS0-99 % Bandwidth



Channel Frequency: 2412MHz

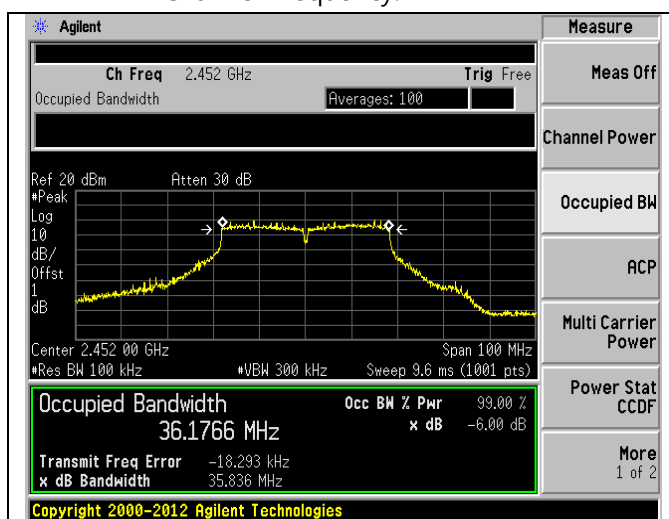
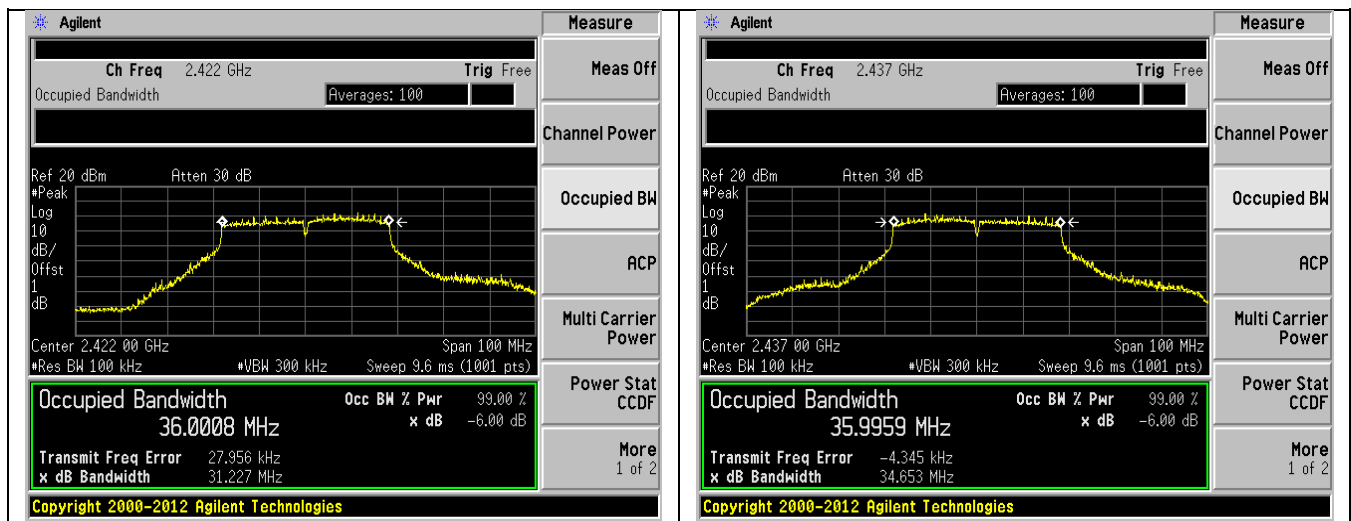
Channel Frequency: 2437MHz



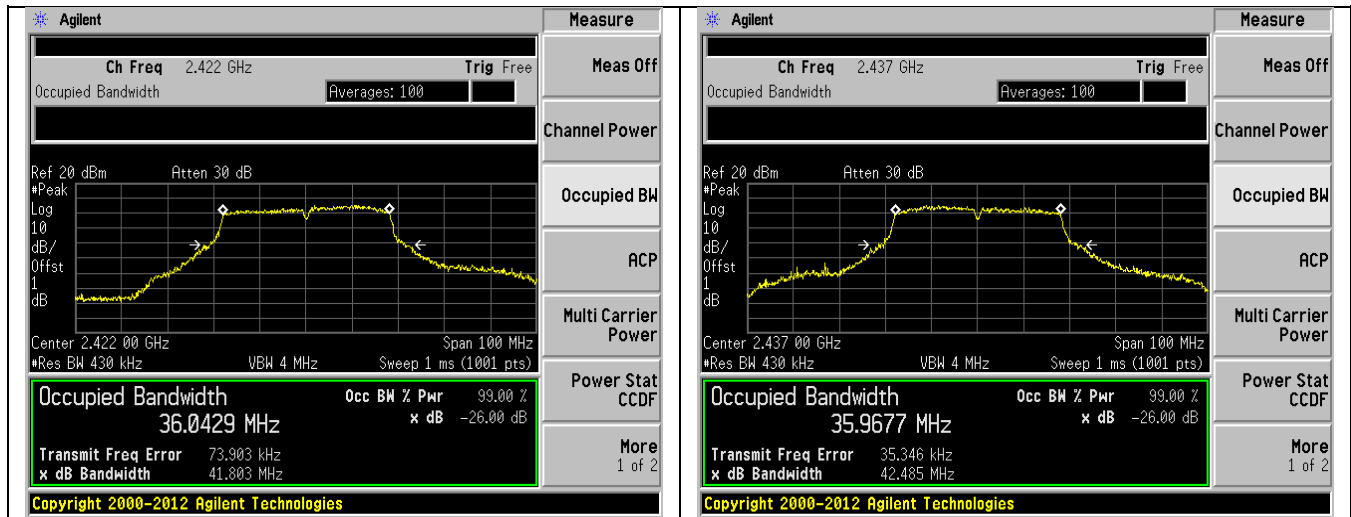
Channel Frequency: 2462MHz

Modulation: 802.11ac VHT40

Data rate	Channel Frequency (MHz)	6 dB Bandwidth (MHz)	99% OBW (MHz)	Minimum Limit (MHz)
MCS0	2422	31.22	36.04	0.5
	2437	34.65	35.96	0.5
	2452	35.83	36.26	0.5

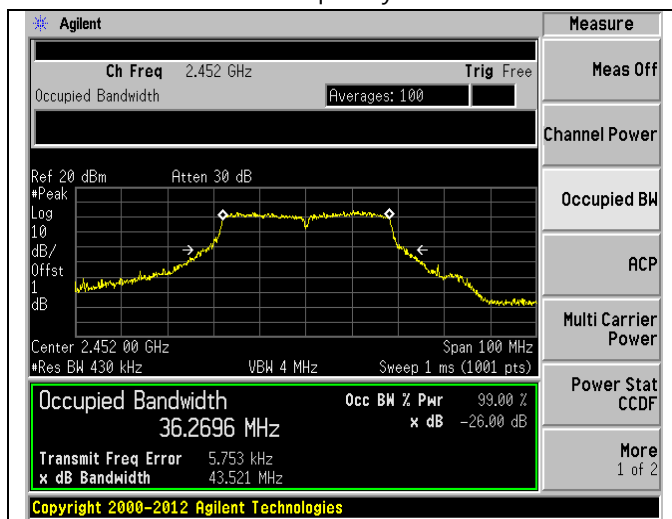
Data Rate : MCS0-6 dB Bandwidth


Data Rate : MCS0-99 % Bandwidth



Channel Frequency: 2422MHz

Channel Frequency: 2437MHz



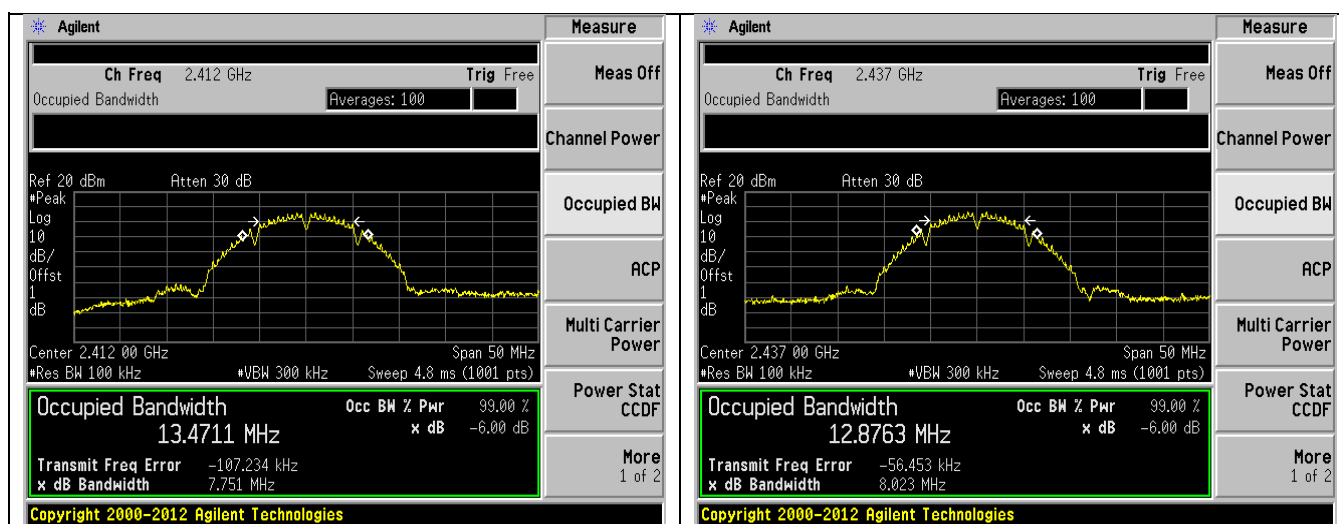
Channel Frequency: 2452MHz

ANT 1

Modulation: 802.11b

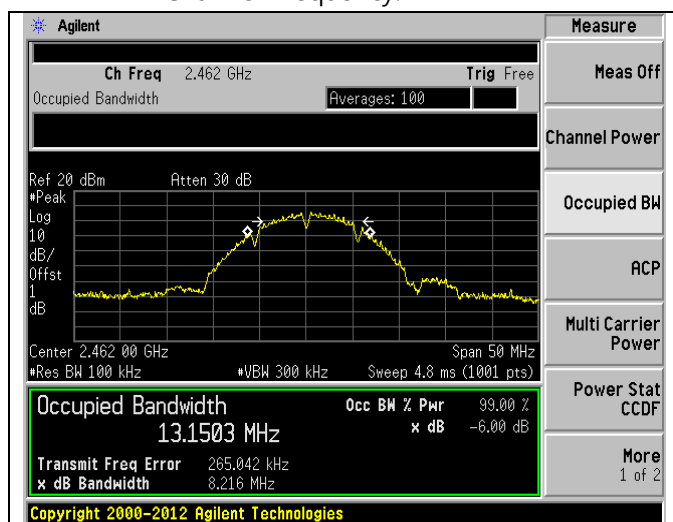
Data rate	Channel Frequency (MHz)	6 dB Bandwidth (MHz)	99% OBW (MHz)	Minimum Limit (MHz)
1Mbps	2412	7.75	13.44	0.5
	2437	8.02	12.91	0.5
	2462	8.21	13.05	0.5

Data Rate : 1Mbps-6 dB Bandwidth



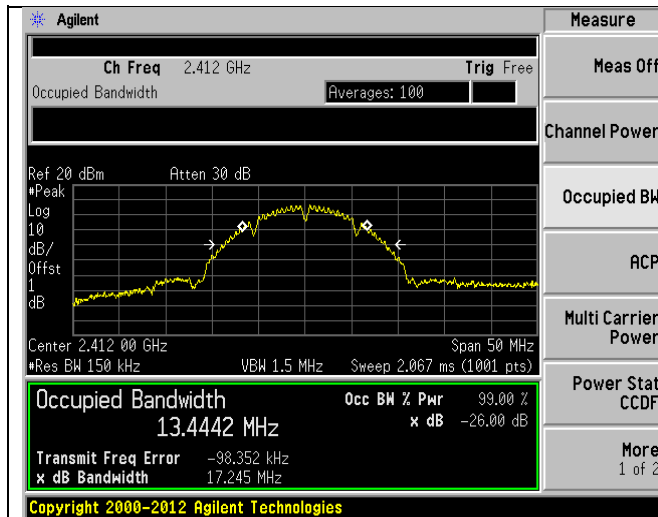
Channel Frequency: 2412MHz

Channel Frequency: 2437MHz

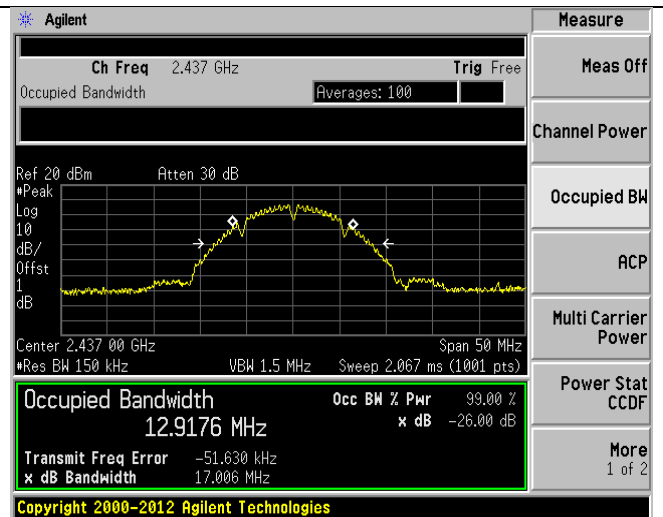


Channel Frequency: 2462MHz

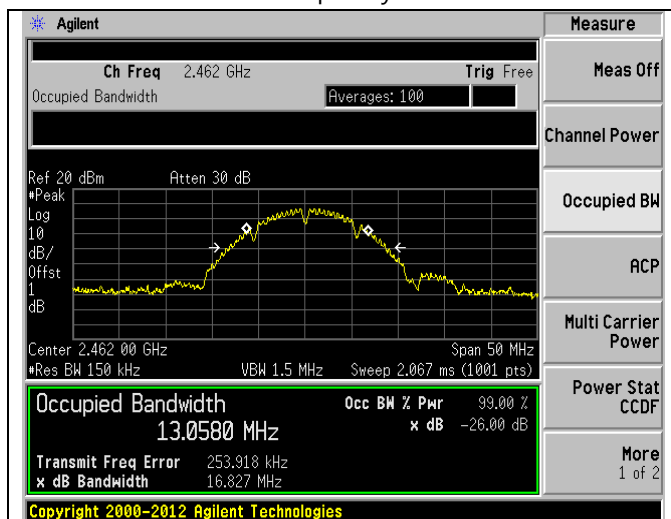
Data Rate : 1 Mbps-99 % Bandwidth



Channel Frequency: 2412MHz



Channel Frequency: 2437MHz

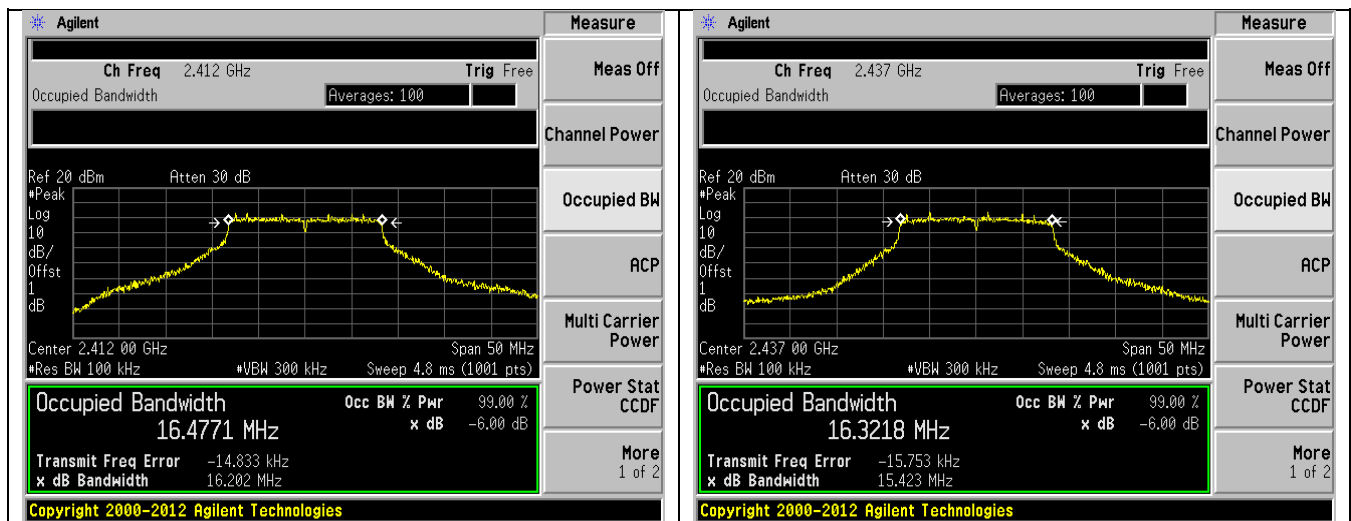


Channel Frequency: 2462MHz

Modulation: 802.11g

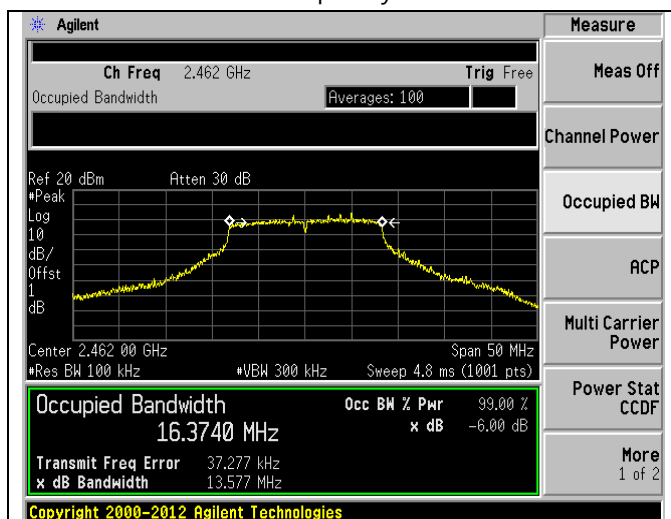
Data rate	Channel Frequency (MHz)	6 dB Bandwidth (MHz)	99% OBW (MHz)	Minimum Limit (MHz)
6Mbps	2412	16.20	16.51	0.5
	2437	15.42	16.39	0.5
	2462	13.57	16.46	0.5

Data Rate : 6 Mbps-6 dB Bandwidth



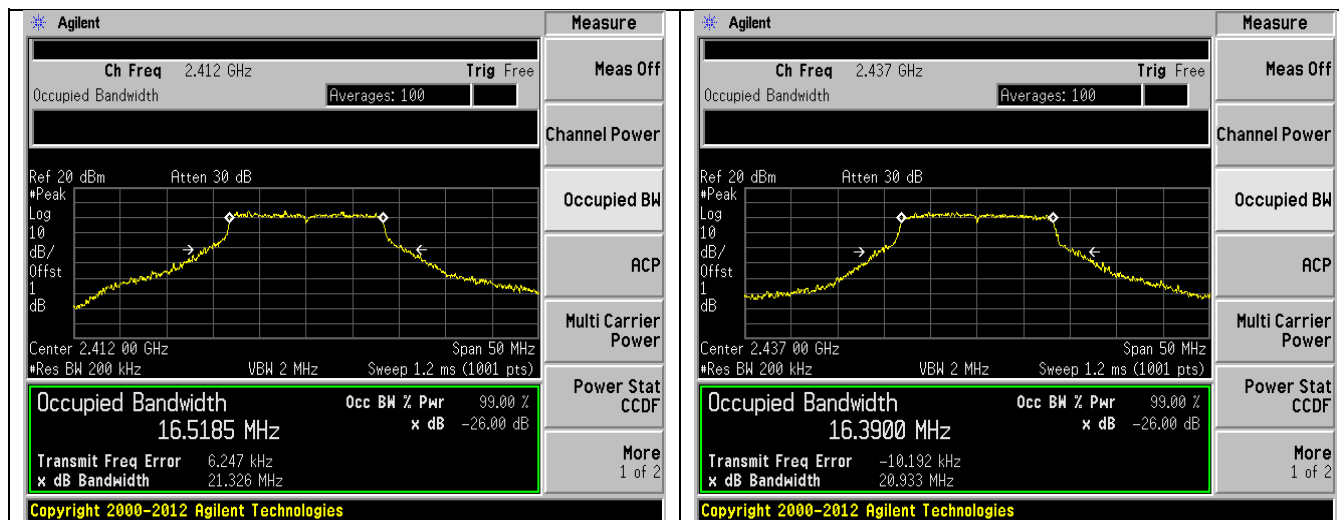
Channel Frequency: 2412MHz

Channel Frequency: 2437MHz



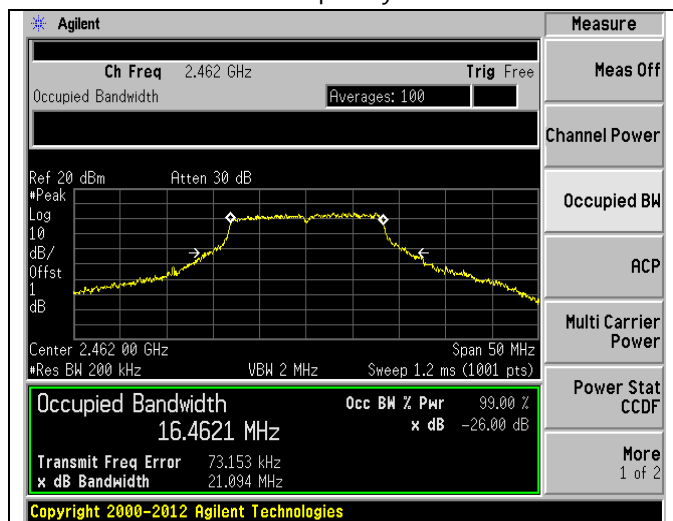
Channel Frequency: 2462MHz

Data Rate : 6 Mbps-99% Bandwidth



Channel Frequency: 2412MHz

Channel Frequency: 2437MHz

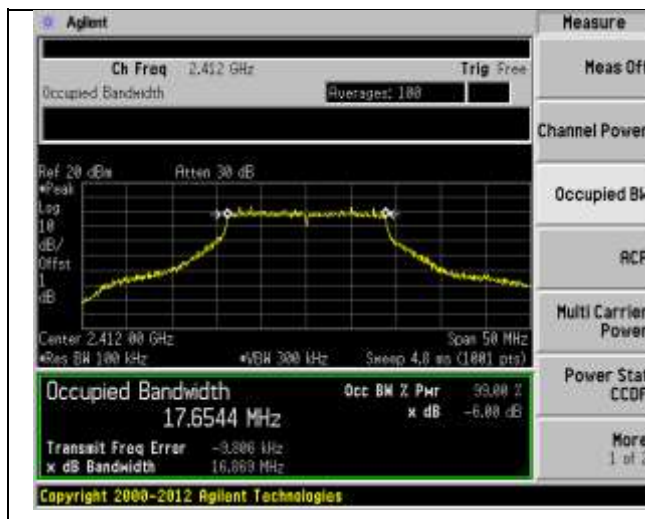


Channel Frequency: 2462MHz

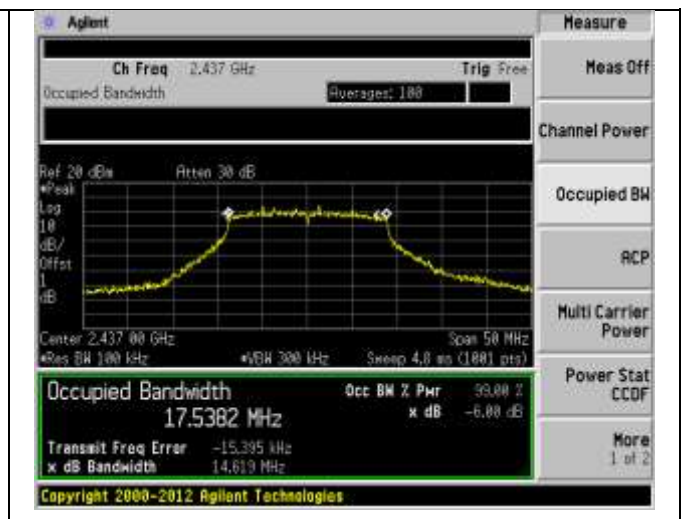
Modulation: 802.11n HT20

Data rate	Channel Frequency (MHz)	6 dB Bandwidth (MHz)	99% OBW (MHz)	Minimum Limit (MHz)
MCS0	2412	16.86	17.74	0.5
	2437	14.61	17.54	0.5
	2462	16.82	17.57	0.5

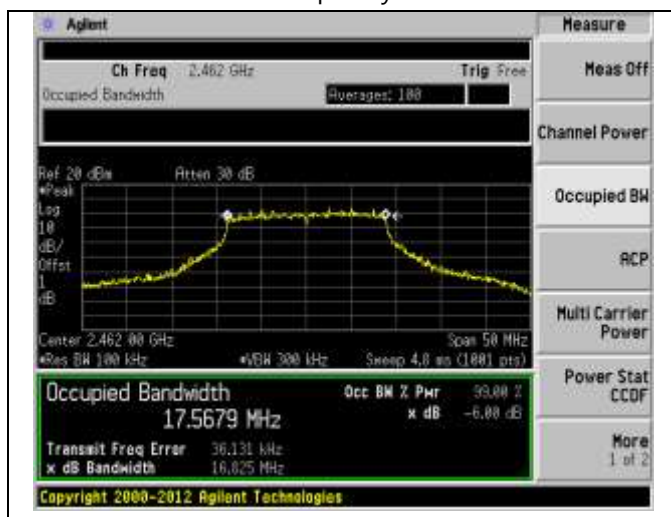
Data Rate : MCS0-6 dB Bandwidth



Channel Frequency: 2412MHz

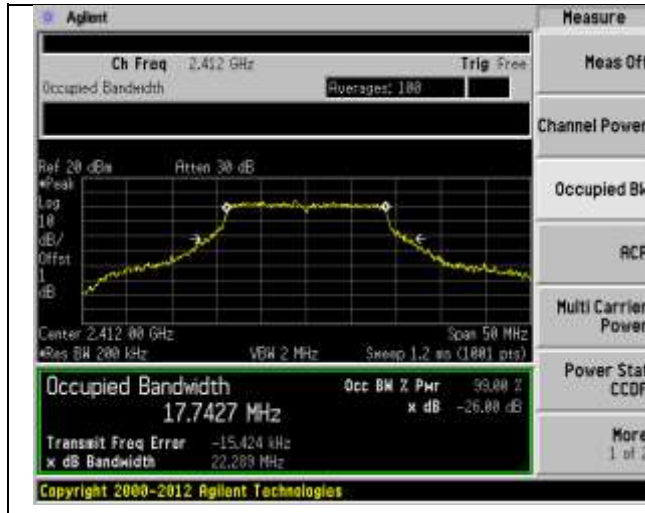


Channel Frequency: 2437MHz

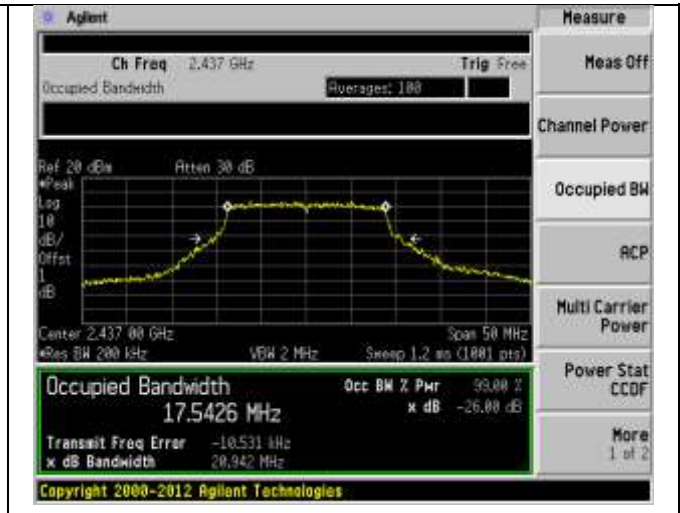


Channel Frequency: 2462MHz

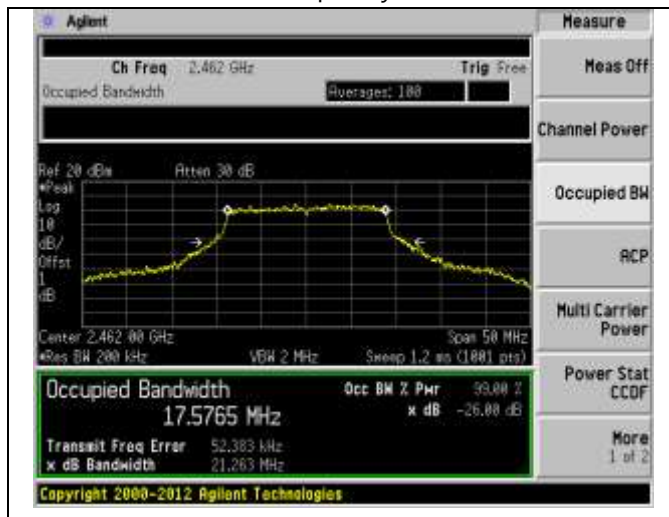
Data Rate : MCS0-99 % Bandwidth



Channel Frequency: 2412MHz



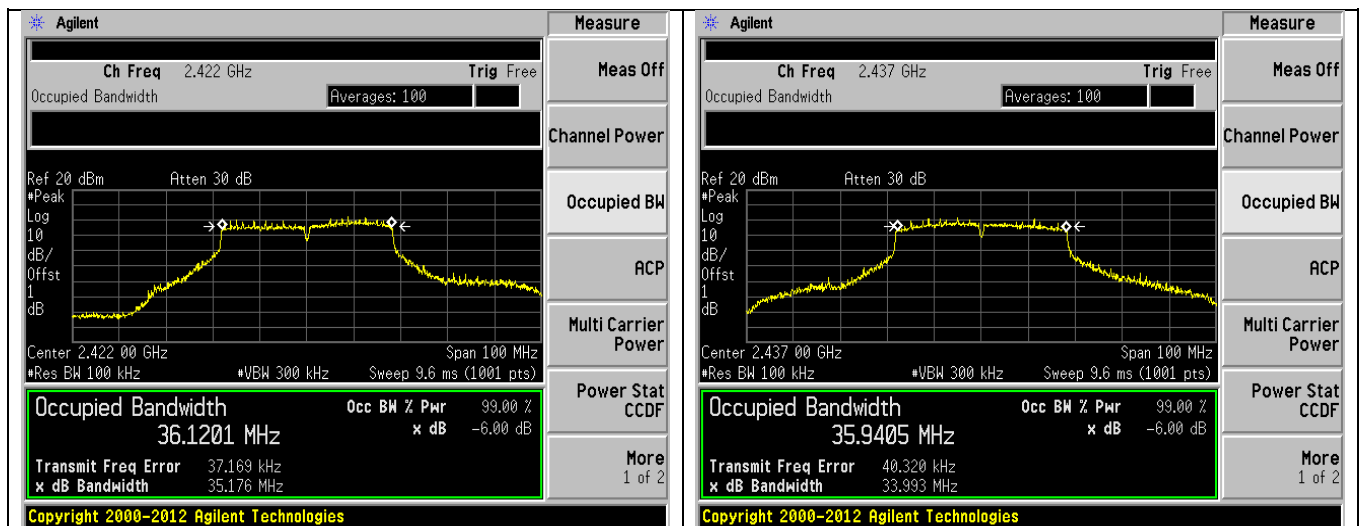
Channel Frequency: 2437MHz



Channel Frequency: 2462MHz

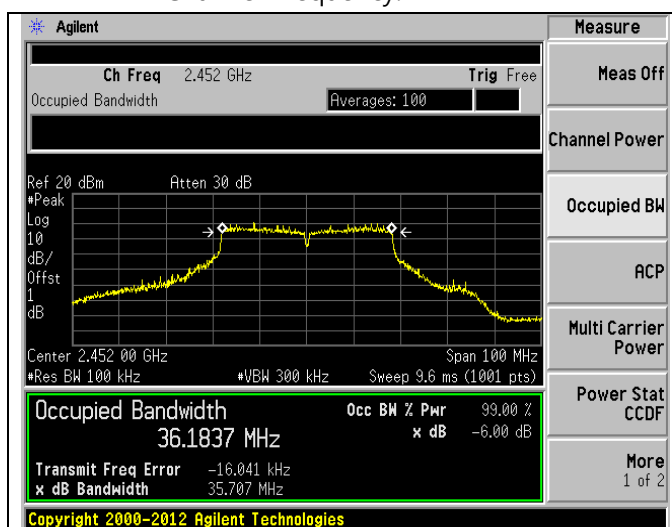
Modulation: 802.11n HT40

Data rate	Channel Frequency (MHz)	6 dB Bandwidth (MHz)	99% OBW (MHz)	Minimum Limit (MHz)
MCS0	2422	35.17	36.17	0.5
	2437	33.99	35.94	0.5
	2452	35.70	36.28	0.5

Data Rate : MCS0-6 dB Bandwidth


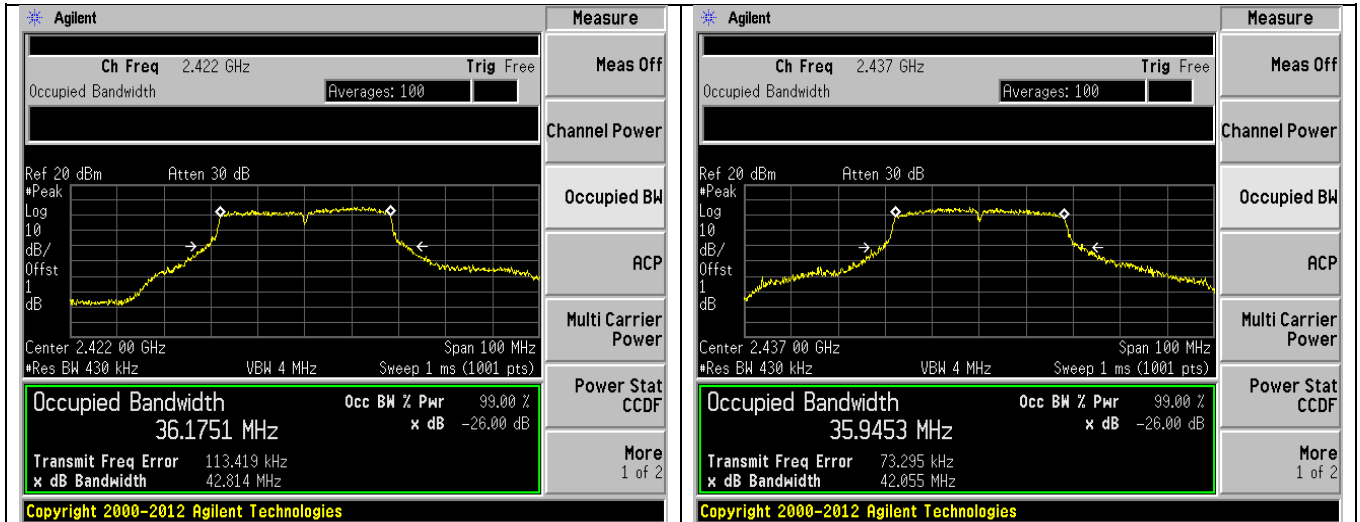
Channel Frequency: 2422MHz

Channel Frequency: 2437MHz



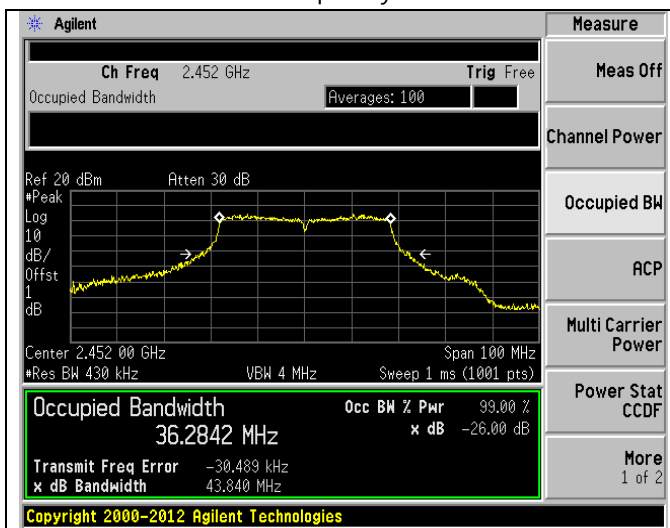
Channel Frequency: 2452MHz

Data Rate : MCS0-99 % Bandwidth



Channel Frequency: 2422MHz

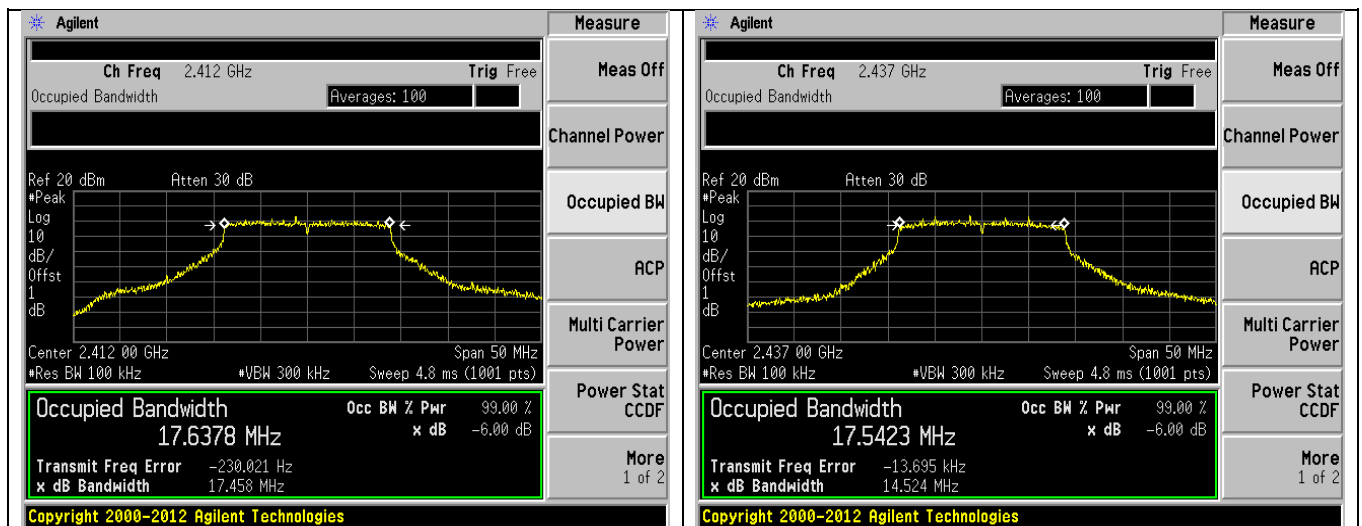
Channel Frequency: 2437MHz



Channel Frequency: 2452MHz

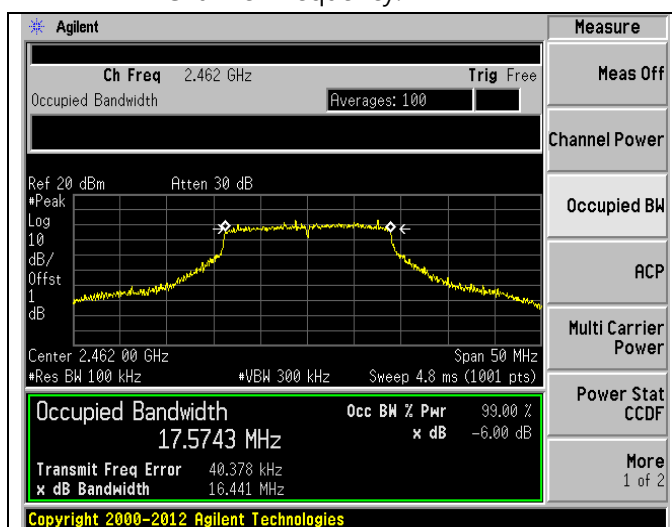
Modulation: 802.11ac VHT20

Data rate	Channel Frequency (MHz)	6 dB Bandwidth (MHz)	99% OBW (MHz)	Minimum Limit (MHz)
MCS0	2412	17.45	17.69	0.5
	2437	14.52	17.52	0.5
	2462	16.44	17.61	0.5

Data Rate : MCS0-6 dB Bandwidth


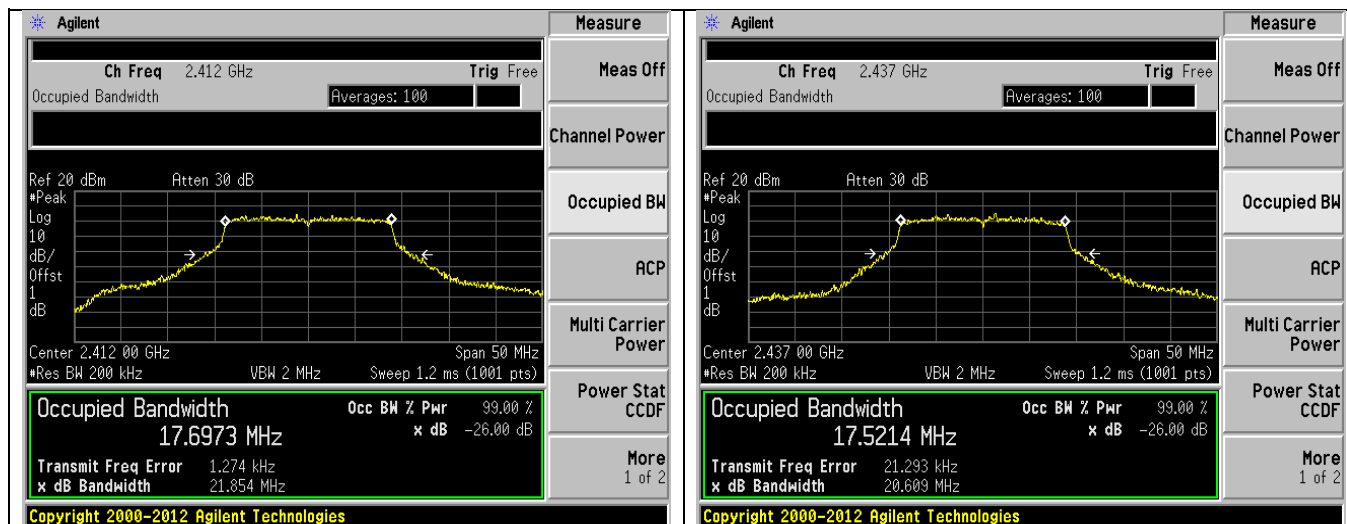
Channel Frequency: 2412MHz

Channel Frequency: 2437MHz



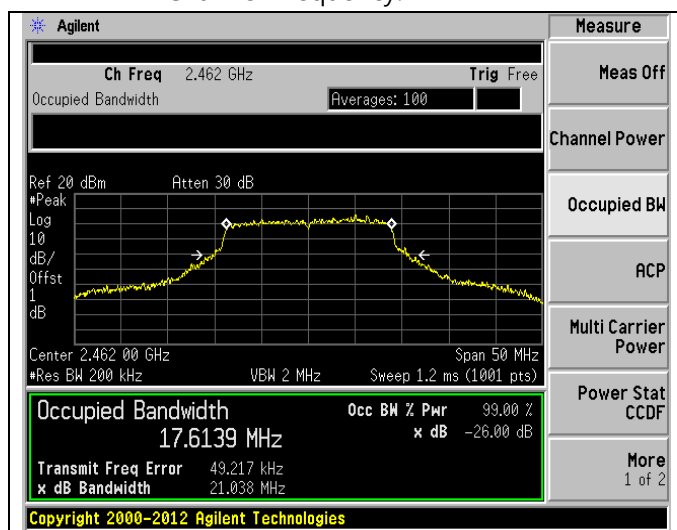
Channel Frequency: 2462MHz

Data Rate : MCS0-99 % Bandwidth



Channel Frequency: 2412MHz

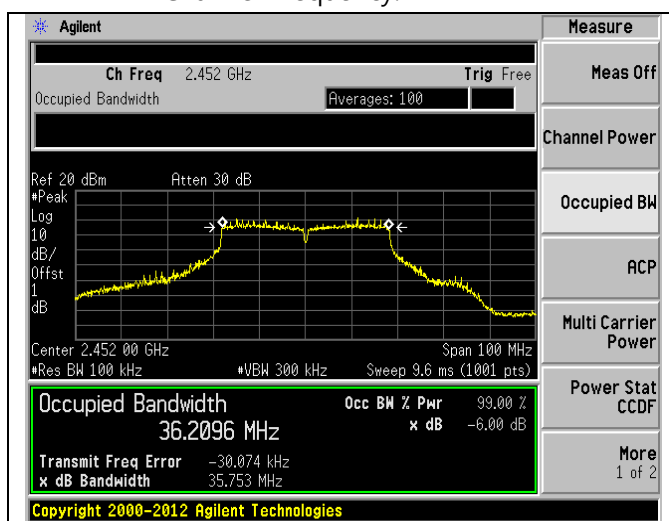
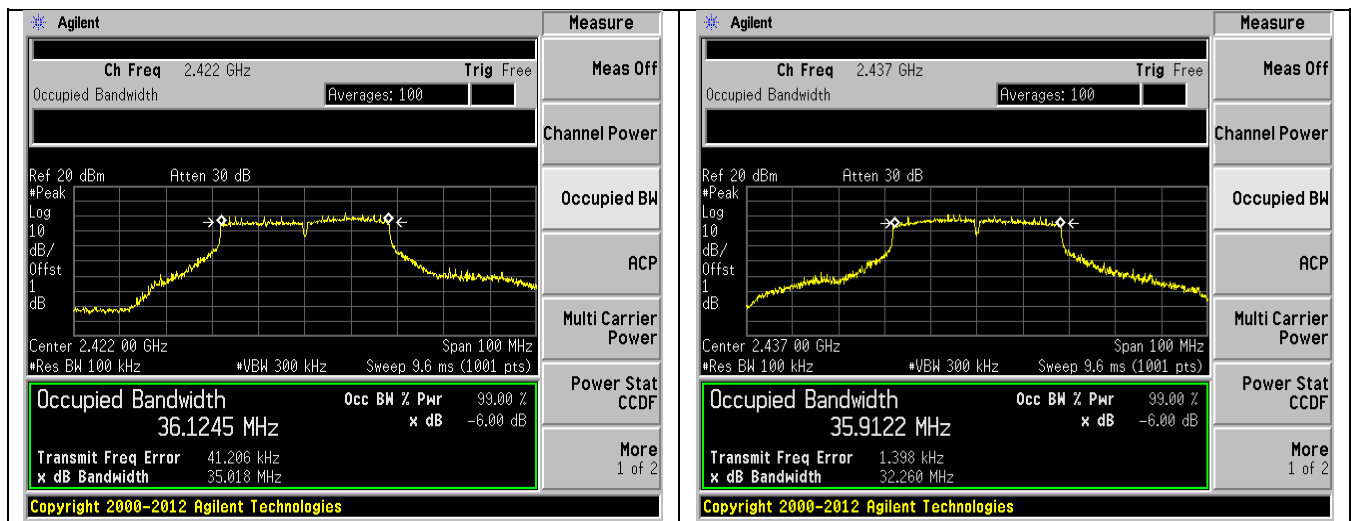
Channel Frequency: 2437MHz



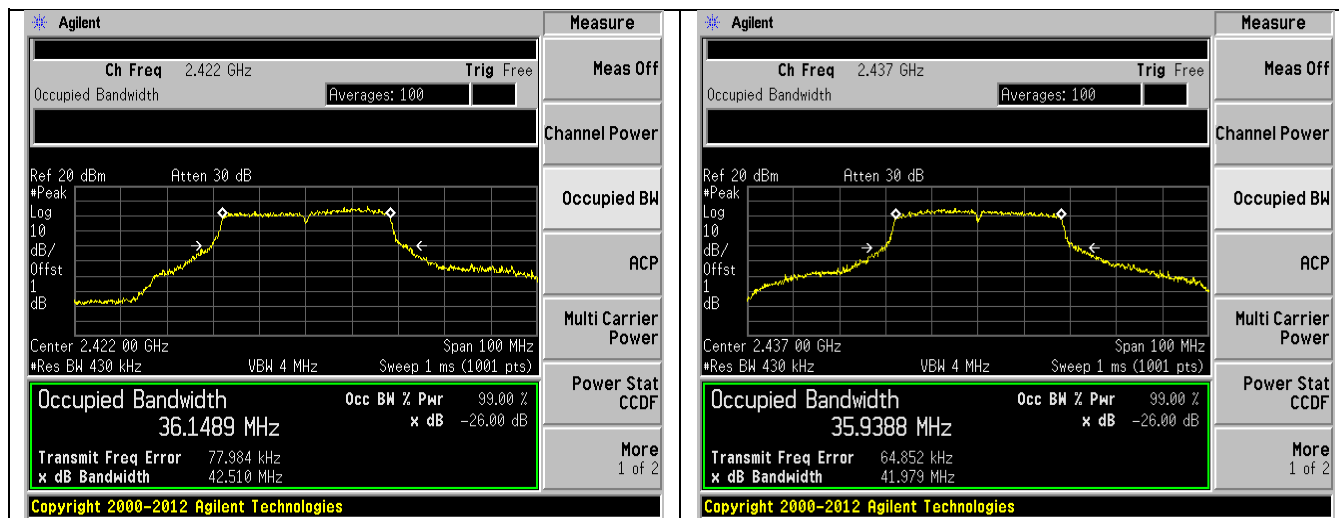
Channel Frequency: 2462MHz

Modulation: 802.11ac VHT40

Data rate	Channel Frequency (MHz)	6 dB Bandwidth (MHz)	99% OBW (MHz)	Minimum Limit (MHz)
MCS0	2422	35.01	36.14	0.5
	2437	32.26	35.93	0.5
	2452	35.75	36.29	0.5

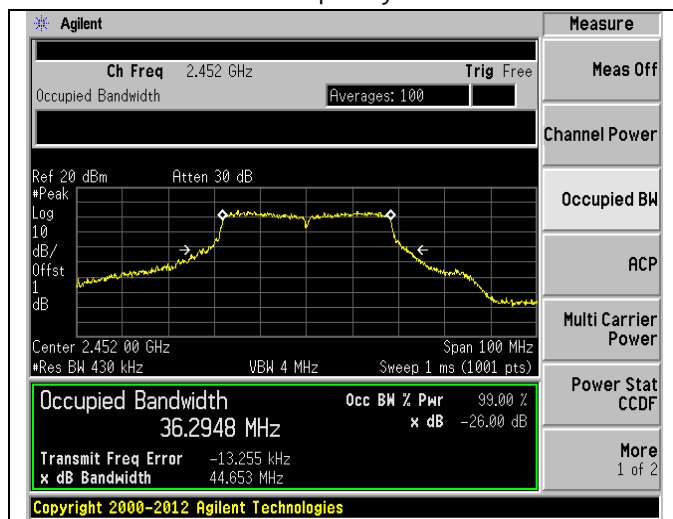
Data Rate : MCS0-6 dB Bandwidth


Data Rate : MCS0-99 % Bandwidth



Channel Frequency: 2422MHz

Channel Frequency: 2437MHz



Channel Frequency: 2452MHz

7.4 Emissions in non-restricted frequency bands and Conducted Spurious Emission

Result

Pass

Test Specification

FCC part 15 Subpart C 15.247 (d) / RSS 247 Issue 2, Section 5.5

Test Method

Subclause 11.11 of ANSI C63.10

Measurement Bandwidth

100 kHz

Detector

Peak

Port of testing

Antenna port

Requirement

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 30dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30dB instead of 20 dB.

Test Method:



Test Condition

Normal Test Condition:

Temperature (Norm) = + 22.3 °C	Voltage = DC 12.0 V	Relative humidity: 58%
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KDB Guidelines applied:

Measurements were made as per section 8.5 in KDB 558074 D01 15.247 Measurement Guidance v05r02.

Test results:**Note:**

1. All the losses are included during measurement and final values are mentioned in the test report.
2. Peak Output power (dBm) = Measured peak power (dBm) + Cable loss (1.0 dB)
3. This product do not support additional beamforming gain / directional gain, it uses signal antenna and hence directional gain of the 2T2R antenna is ANT0:2.88 dBi, ANT1:2.82 dBi
4. All modes of operation were investigated, and the worst-case configuration results are reported in this section

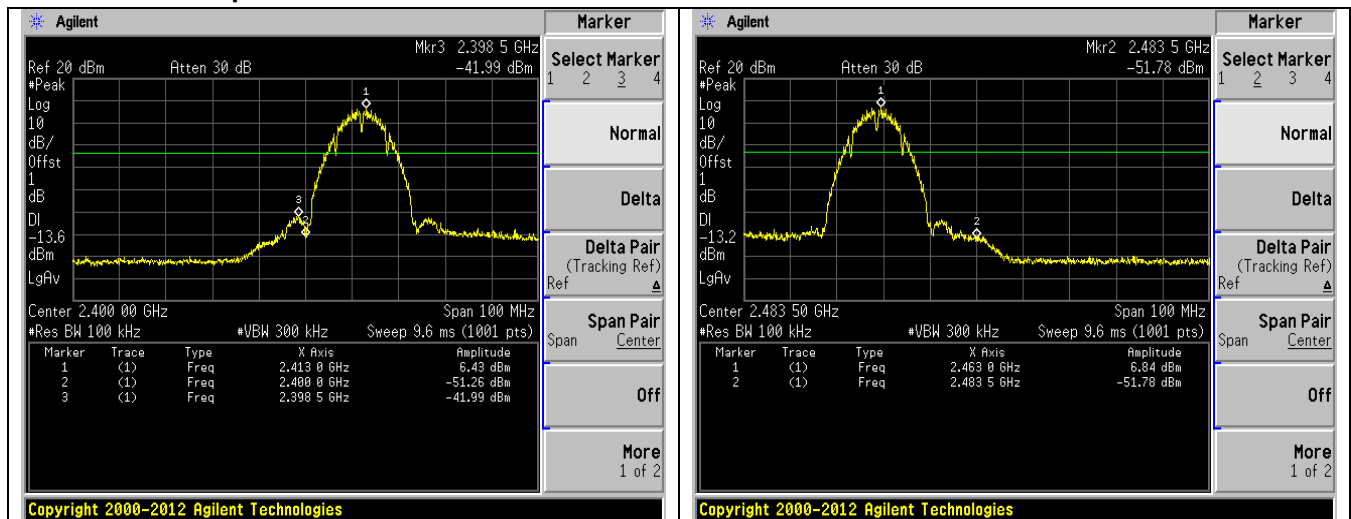
7.4.1 Band edge and reference plots

ANT0

Modulation: 802.11b

Data rate	Channel Frequency (MHz)	Reference Value (B) (dBm)	Band edge Frequency (MHz)	Value at Band edge (A) (dBm)	A-B (dBc)	Minimum Limit (dBc)
1Mbps	2412	6.43	2398.5	-41.99	48.42	30
	2462	6.84	2483.5	-51.78	58.62	30

Data Rate : 1Mbps

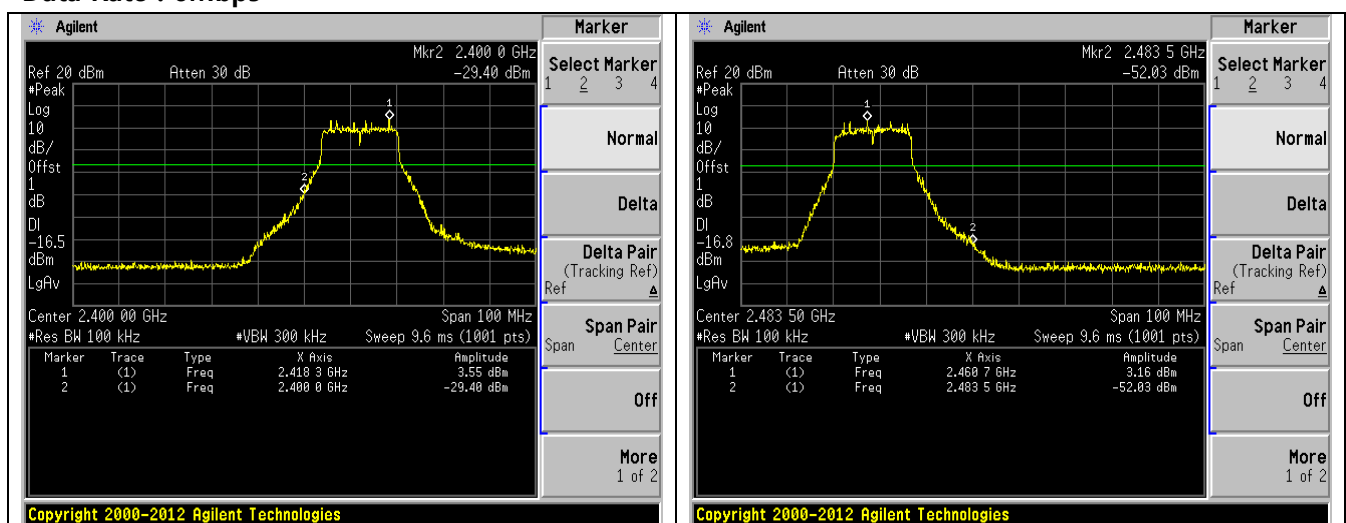


Channel Frequency: 2412 MHz

Channel Frequency: 2462 MHz

Modulation: 802.11g

Data rate	Channel Frequency (MHz)	Reference Value (B) (dBm)	Band edge Frequency (MHz)	Value at Band edge (A) (dBm)	A-B (dBc)	Minimum Limit (dBc)
6Mbps	2412	3.55	2400.0	-29.4	32.95	30
	2462	3.16	2483.5	-52.03	55.19	30

Data Rate : 6Mbps


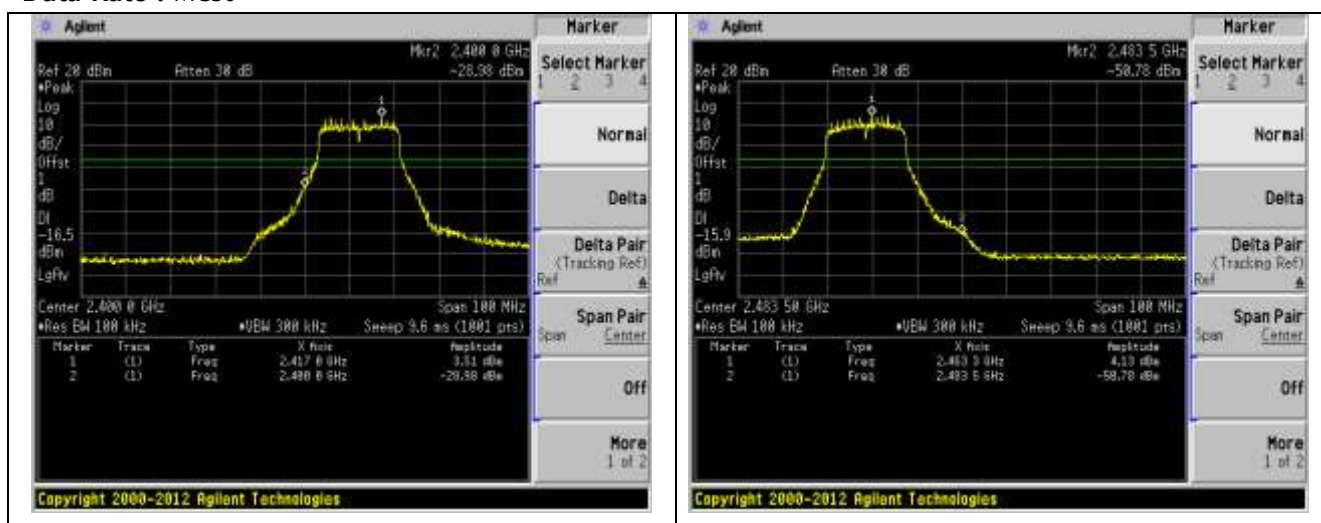
Channel Frequency: 2412 MHz

Channel Frequency: 2462 MHz

Modulation: 802.11n HT20

Data rate	Channel Frequency (MHz)	Reference Value (B) (dBm)	Band edge Frequency (MHz)	Value at Band edge (A) (dBm)	A-B (dBc)	Minimum Limit (dBc)
MCS0	2412	3.51	2400.0	-28.98	32.49	30
	2462	4.13	2483.5	-50.78	54.91	30

Data Rate : MCS0

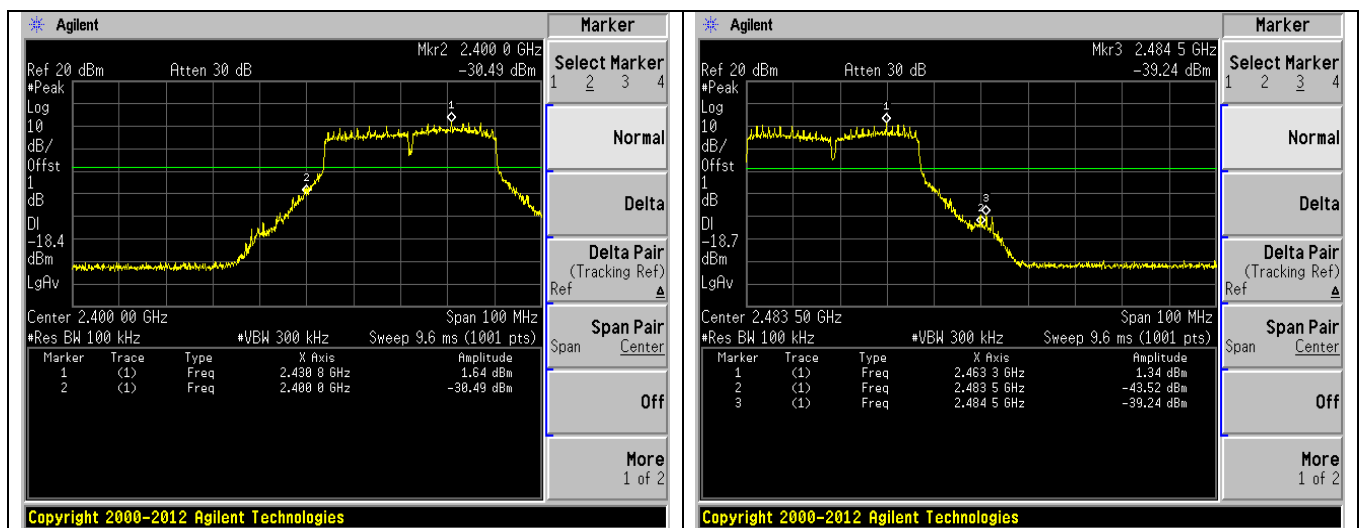


Channel Frequency: 2412 MHz

Channel Frequency: 2462 MHz

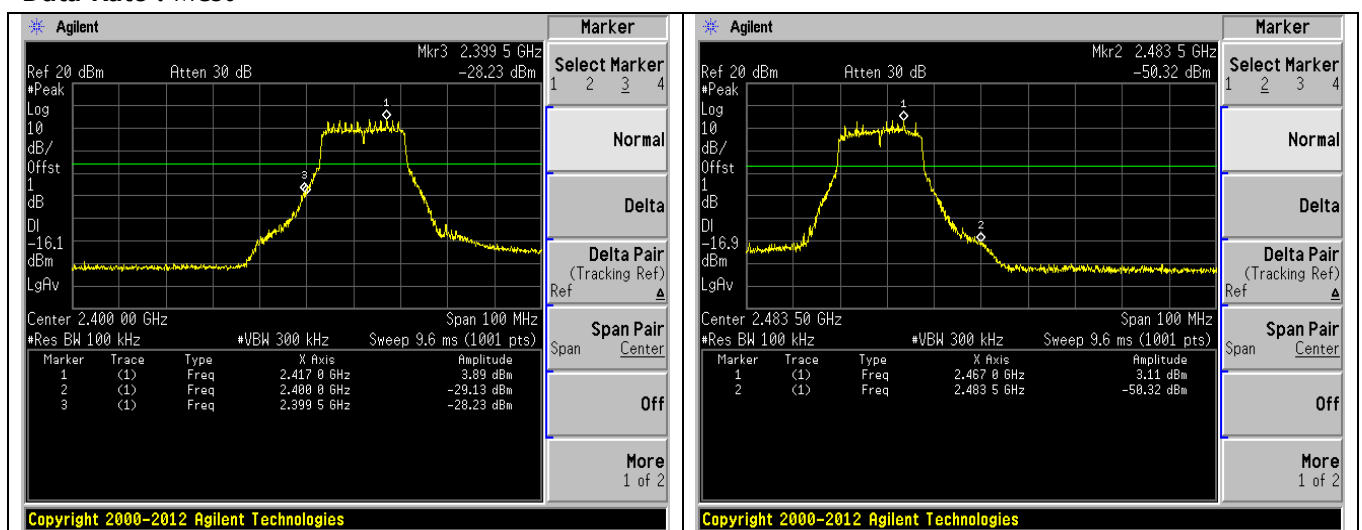
Modulation: 802.11n HT40

Data rate	Channel Frequency (MHz)	Reference Value (B) (dBm)	Band edge Frequency (MHz)	Value at Band edge (A) (dBm)	A-B (dBc)	Minimum Limit (dBc)
MCS0	2422	1.64	2400.0	-30.49	32.13	30
	2452	1.34	2484.5	-39.24	40.58	30

Data Rate : MCS0


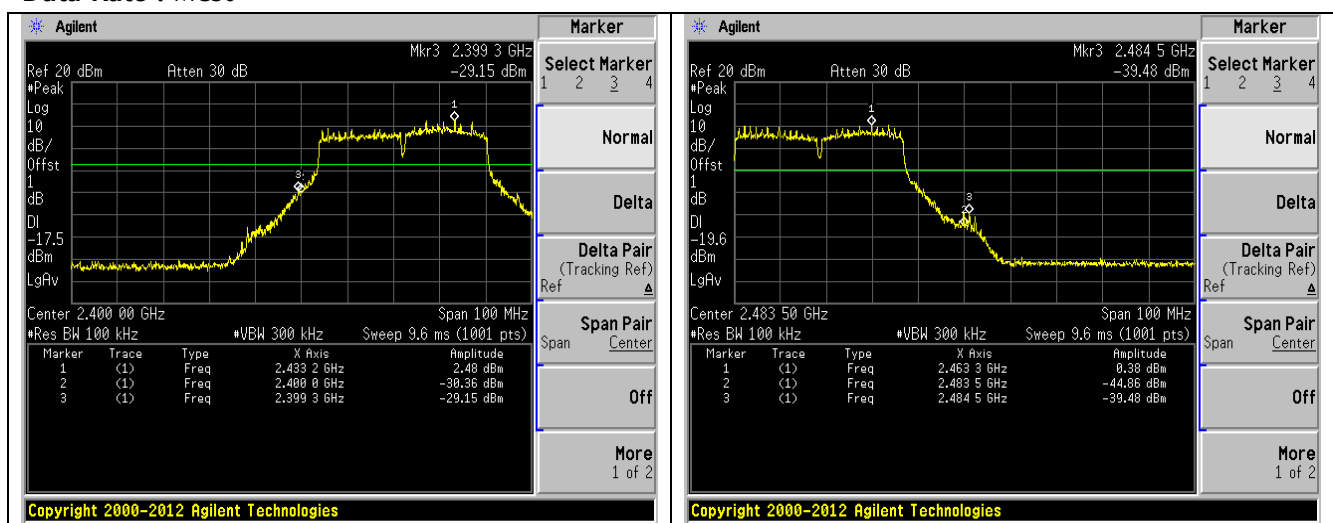
Modulation: 802.11ac VHT20

Data rate	Channel Frequency (MHz)	Reference Value (B) (dBm)	Band edge Frequency (MHz)	Value at Band edge (A) (dBm)	A-B (dBc)	Minimum Limit (dBc)
MCS0	2412	3.89	2399.5	-28.23	32.12	30
	2462	3.11	2483.5	-50.32	53.43	30

Data Rate : MCS0


Modulation: 802.11ac VHT40

Data rate	Channel Frequency (MHz)	Reference Value (B) (dBm)	Band edge Frequency (MHz)	Value at Band edge (A) (dBm)	A-B (dBc)	Minimum Limit (dBc)
MCS0	2422	2.48	2399.3	-29.15	31.63	30
	2452	0.38	2484.5	-39.48	39.86	30

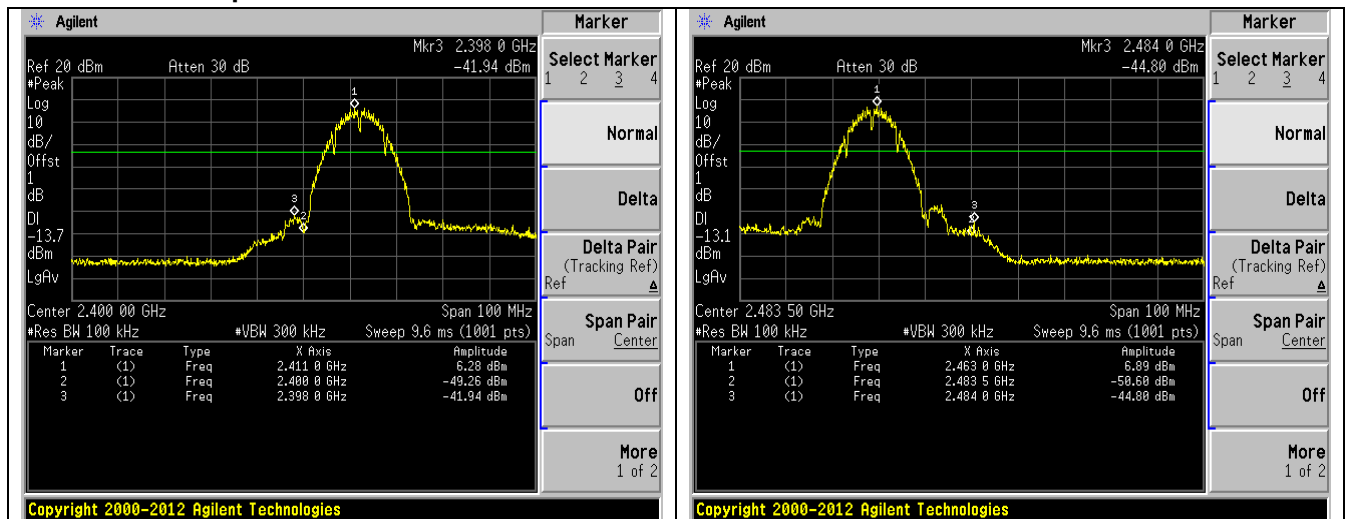
Data Rate : MCS0


ANT1

Modulation: 802.11b

Data rate	Channel Frequency (MHz)	Reference Value (B) (dBm)	Band edge Frequency (MHz)	Value at Band edge (A) (dBm)	A-B (dBc)	Minimum Limit (dBc)
1Mbps	2412	6.28	2398.0	-41.94	48.22	30
	2462	6.89	2484.0	-44.80	51.69	30

Data Rate : 1Mbps

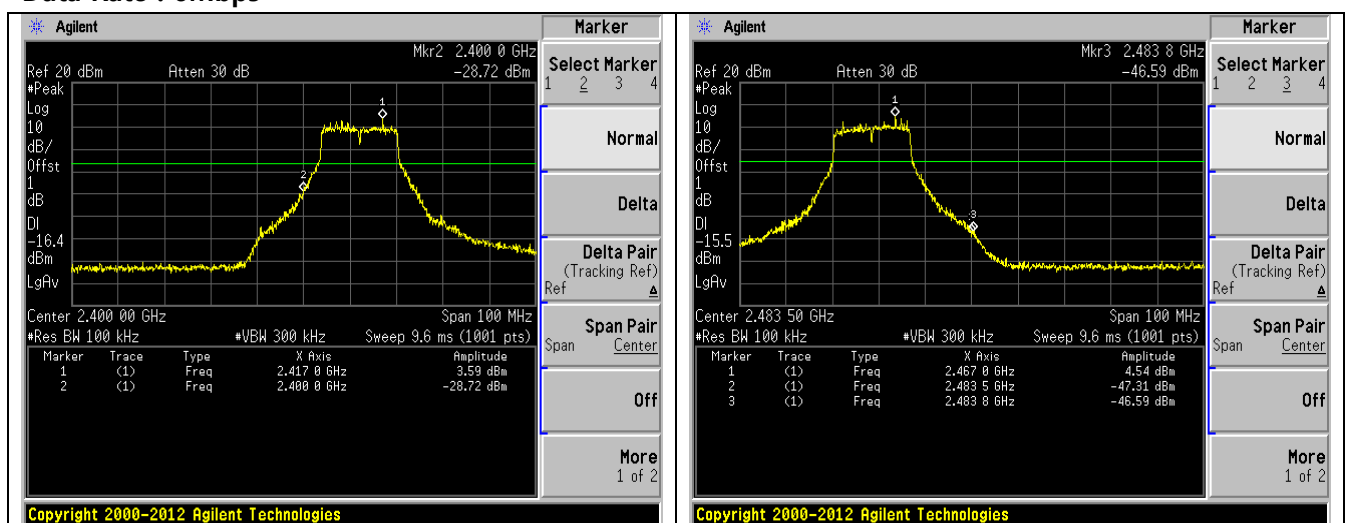


Channel Frequency: 2412 MHz

Channel Frequency: 2462 MHz

Modulation: 802.11g

Data rate	Channel Frequency (MHz)	Reference Value (B) (dBm)	Band edge Frequency (MHz)	Value at Band edge (A) (dBm)	A-B (dBc)	Minimum Limit (dBc)
6Mbps	2412	3.59	2400.0	-28.72	32.31	30
	2462	4.54	2483.8	-46.59	51.13	30

Data Rate : 6Mbps


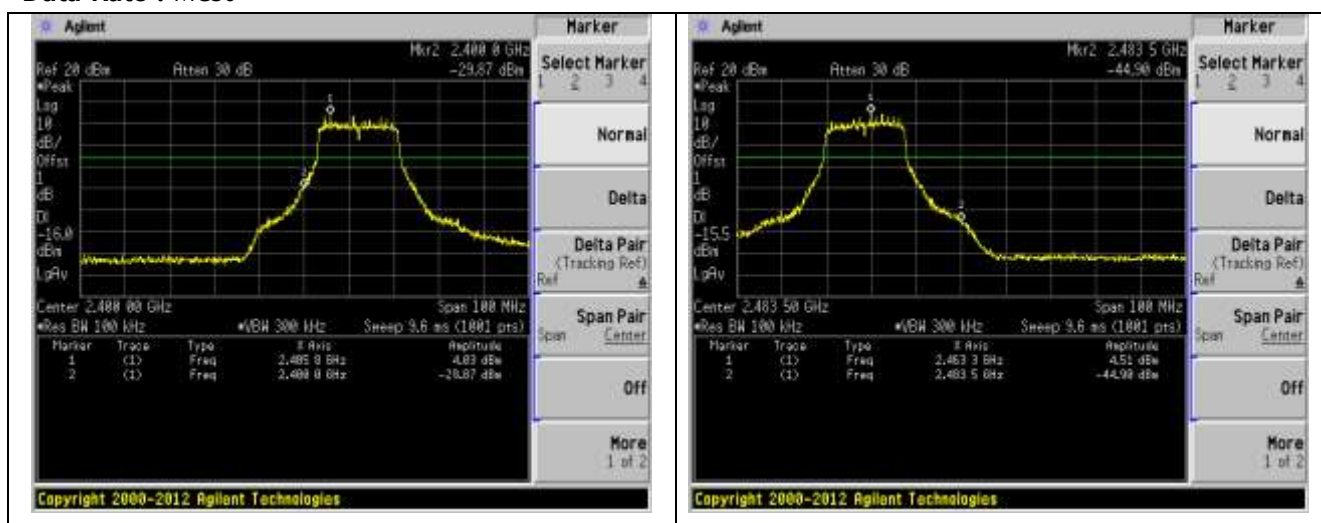
Channel Frequency: 2412 MHz

Channel Frequency: 2462 MHz

Modulation: 802.11n HT20

Data rate	Channel Frequency (MHz)	Reference Value (B) (dBm)	Band edge Frequency (MHz)	Value at Band edge (A) (dBm)	A-B (dBc)	Minimum Limit (dBc)
MCS0	2412	4.03	2400.0	-29.87	33.90	30
	2462	4.51	2483.5	-44.90	49.41	30

Data Rate : MCS0

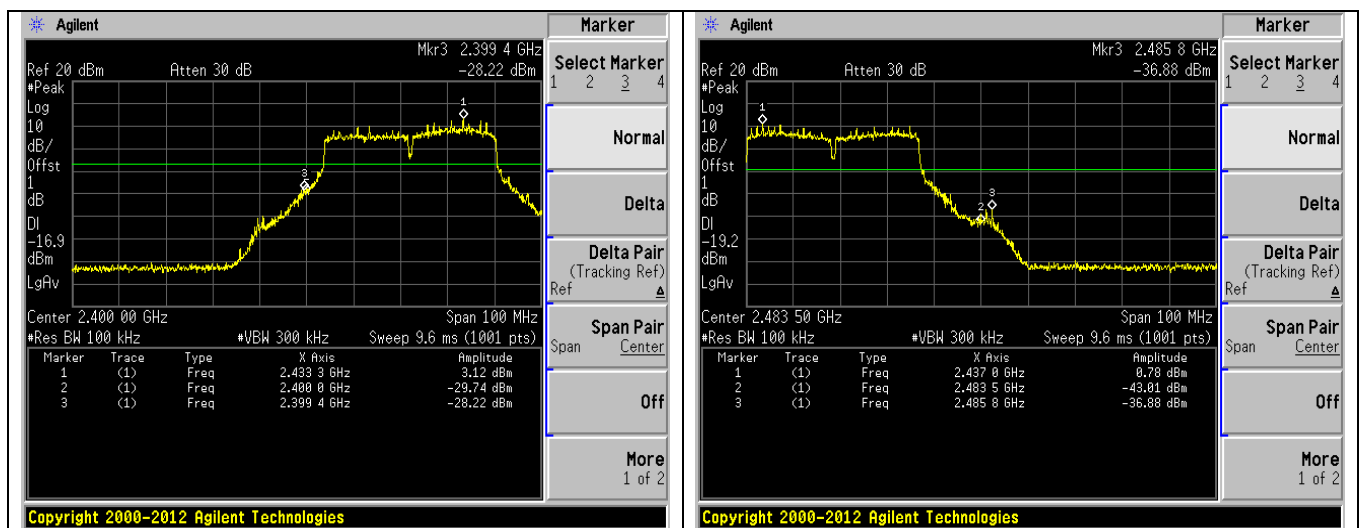


Channel Frequency: 2412 MHz

Channel Frequency: 2462 MHz

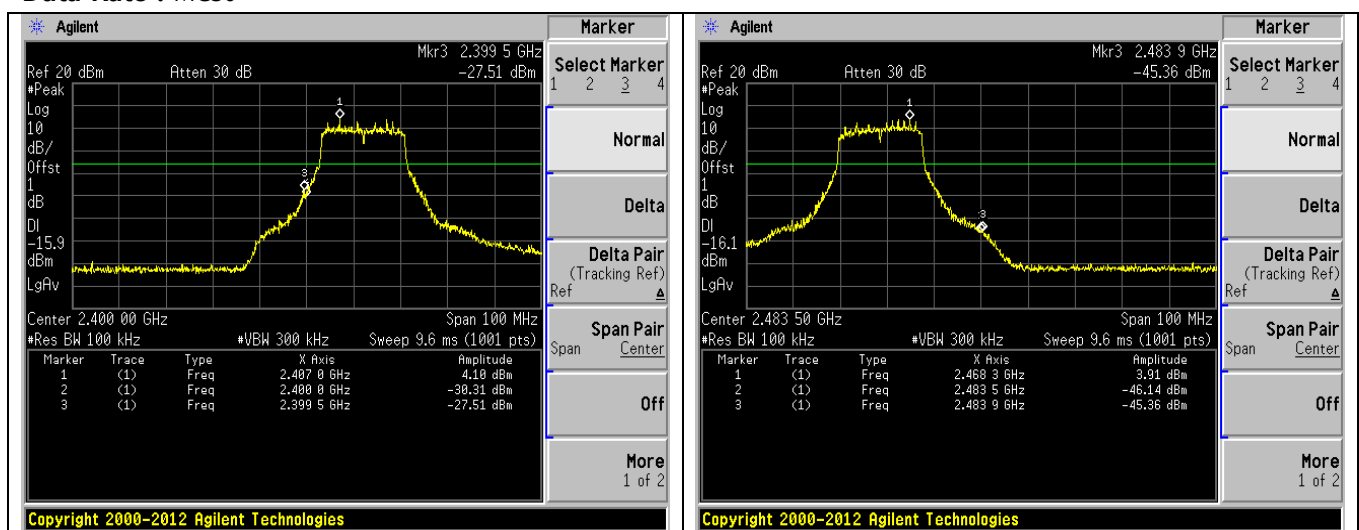
Modulation: 802.11n HT40

Data rate	Channel Frequency (MHz)	Reference Value (B) (dBm)	Band edge Frequency (MHz)	Value at Band edge (A) (dBm)	A-B (dBc)	Minimum Limit (dBc)
MCS0	2422	3.12	2399.4	-28.22	31.34	30
	2452	0.78	2485.8	-36.88	37.66	30

Data Rate : MCS0


Modulation: 802.11ac VHT20

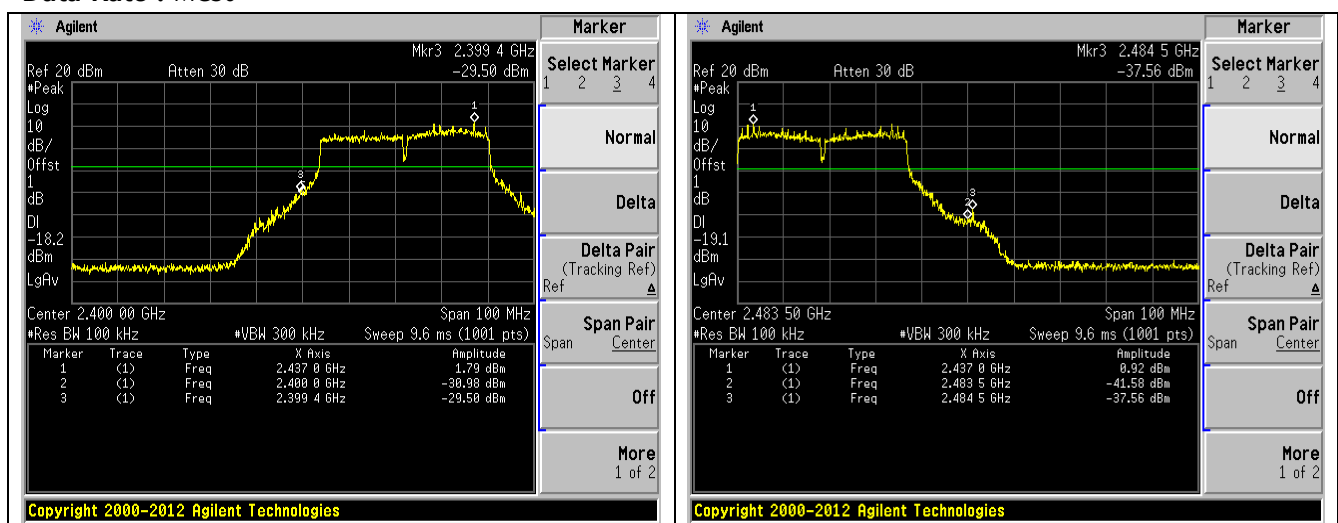
Data rate	Channel Frequency (MHz)	Reference Value (B) (dBm)	Band edge Frequency (MHz)	Value at Band edge (A) (dBm)	A-B (dBc)	Minimum Limit (dBc)
MCS0	2412	4.10	2399.5	-27.51	31.61	30
	2462	3.91	2483.9	-45.36	49.27	30

Data Rate : MCS0


Modulation: 802.11ac VHT40

Data rate	Channel Frequency (MHz)	Reference Value (B) (dBm)	Band edge Frequency (MHz)	Value at Band edge (A) (dBm)	A-B (dBc)	Minimum Limit (dBc)
MCS0	2422	1.79	2399.4	-29.50	31.29	30
	2452	0.92	2484.5	-37.56	38.48	30

Data Rate : MCS0



Channel Frequency: 2422 MHz

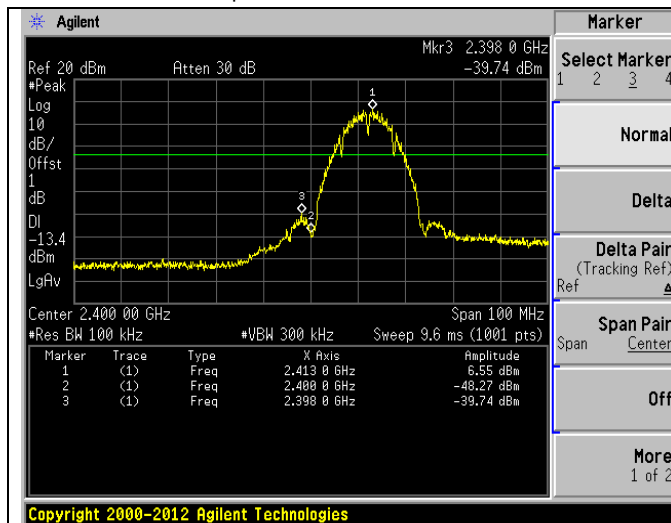
Channel Frequency: 2452 MHz

MIMO ANTO

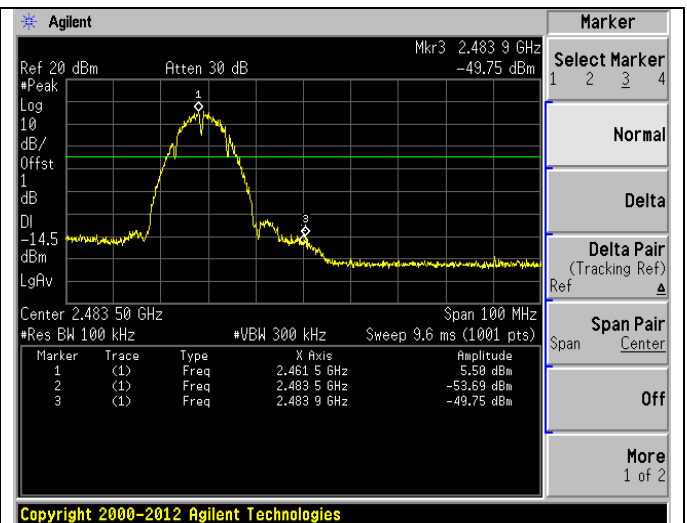
Modulation: 802.11b

Data rate	Channel Frequency (MHz)	Reference Value (B) (dBm)	Band edge Frequency (MHz)	Value at Band edge (A) (dBm)	A-B (dBc)	Minimum Limit (dBc)
1Mbps	2412	6.55	2398.0	-39.74	46.29	30
	2462	5.50	2483.9	-49.75	55.25	30

Data Rate : 1 Mbps



Channel Frequency: 2412 MHz

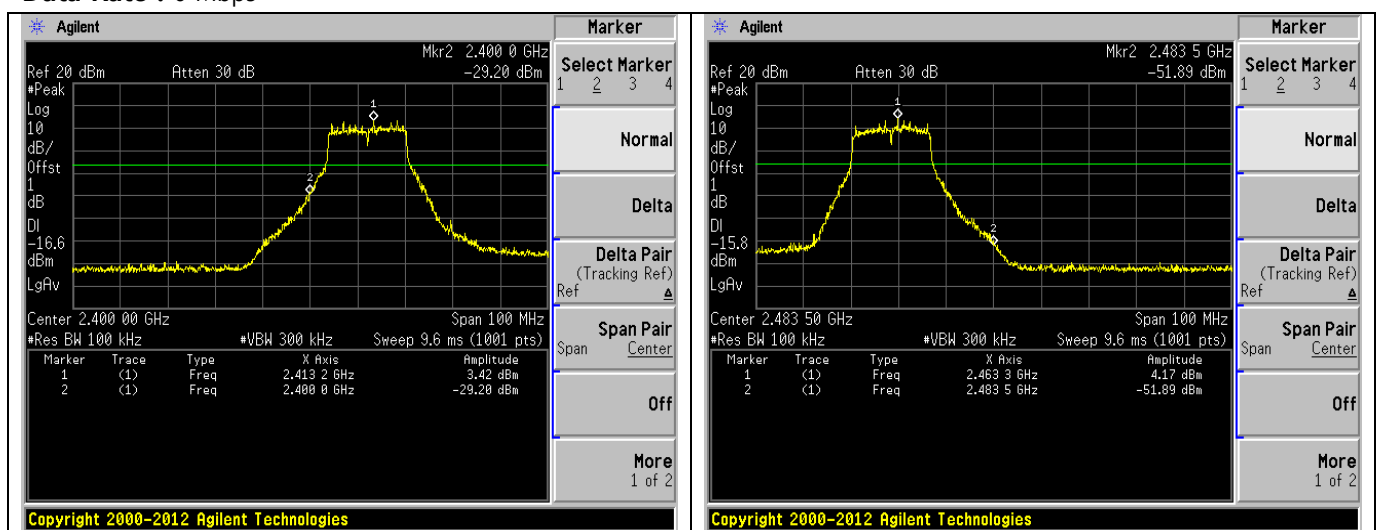


Channel Frequency: 2462 MHz

Modulation: 802.11g

Data rate	Channel Frequency (MHz)	Reference Value (B) (dBm)	Band edge Frequency (MHz)	Value at Band edge (A) (dBm)	A-B (dBc)	Minimum Limit (dBc)
6Mbps	2412	3.42	2400.0	-29.20	32.62	30
	2462	4.17	2483.5	-51.89	56.06	30

Data Rate : 6 Mbps



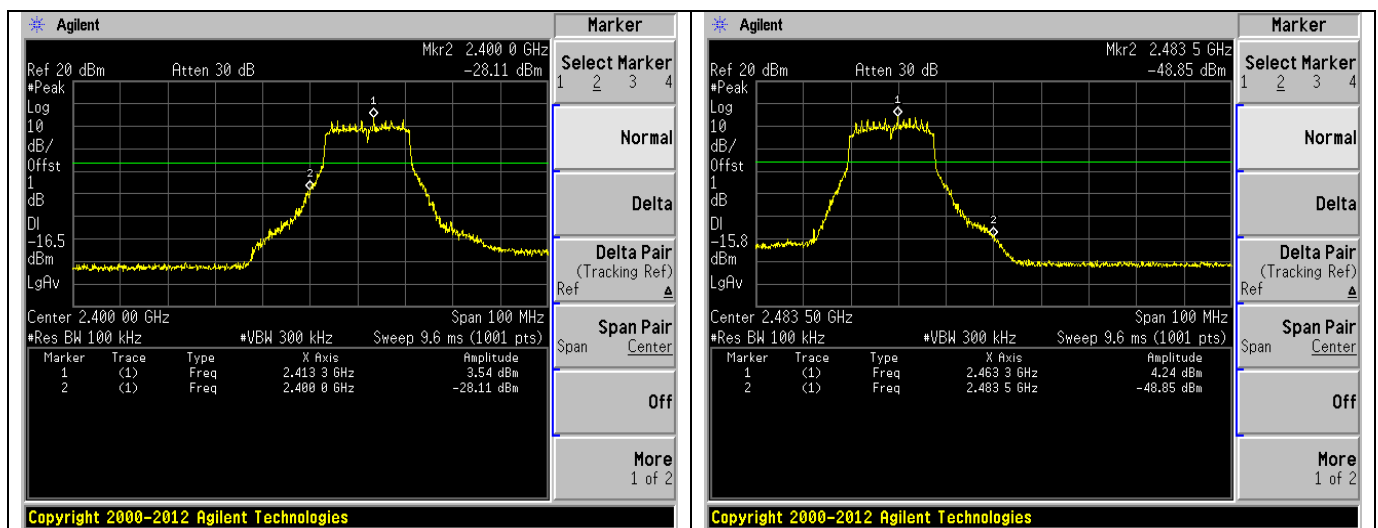
Channel Frequency: 2412 MHz

Channel Frequency: 2462 MHz

Modulation: 802.11n HT20

Data rate	Channel Frequency (MHz)	Reference Value (B) (dBm)	Band edge Frequency (MHz)	Value at Band edge (A) (dBm)	A-B (dBc)	Minimum Limit (dBc)
MCS8	2412	3.54	2400.0	-28.11	31.65	30
	2462	4.24	2483.5	-48.85	53.09	30

Data Rate : MCS8

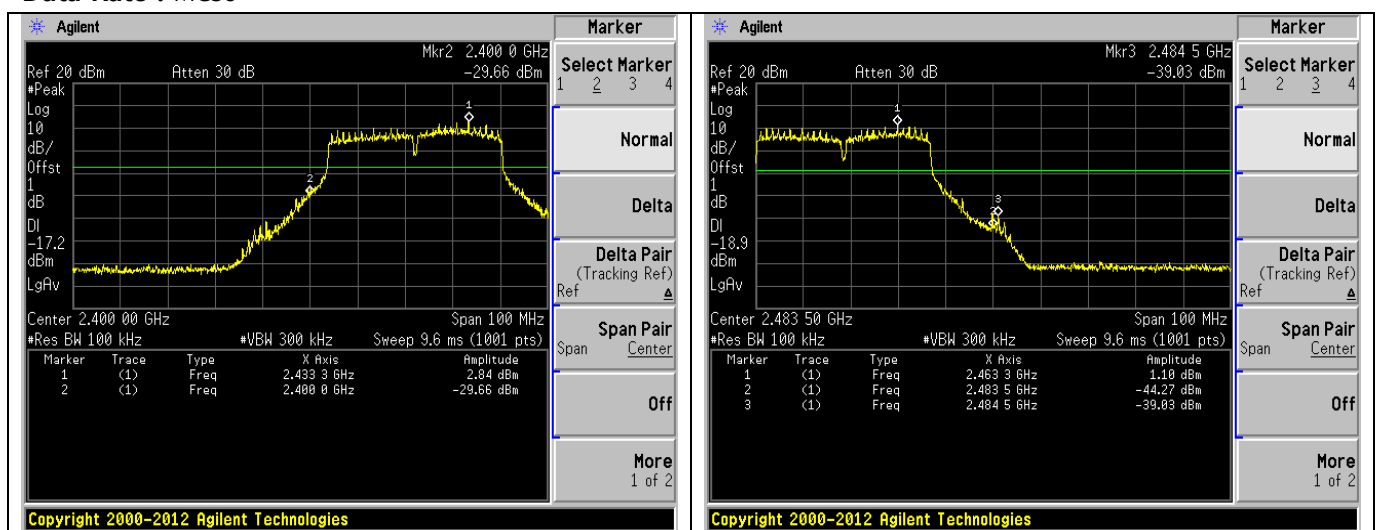


Channel Frequency: 2412 MHz

Channel Frequency: 2462 MHz

Modulation: 802.11n HT40

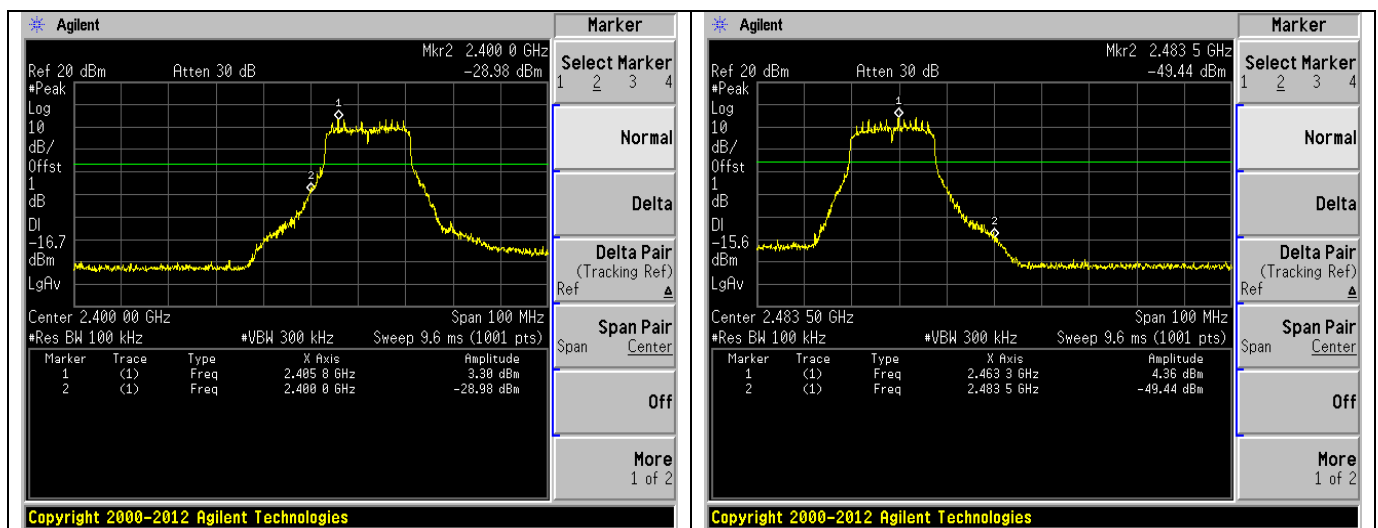
Data rate	Channel Frequency (MHz)	Reference Value (B) (dBm)	Band edge Frequency (MHz)	Value at Band edge (A) (dBm)	A-B (dBc)	Minimum Limit (dBc)
MCS8	2422	2.84	2400.0	-29.66	32.50	30
	2452	1.10	2484.5	-39.03	40.13	30

Data Rate : MCS8


Modulation: 802.11ac VHT20

Data rate	Channel Frequency (MHz)	Reference Value (B) (dBm)	Band edge Frequency (MHz)	Value at Band edge (A) (dBm)	A-B (dBc)	Minimum Limit (dBc)
MCS0	2412	3.30	2400.0	-28.98	32.28	30
	2462	4.36	2483.5	-49.44	53.80	30

Data Rate : MCS0

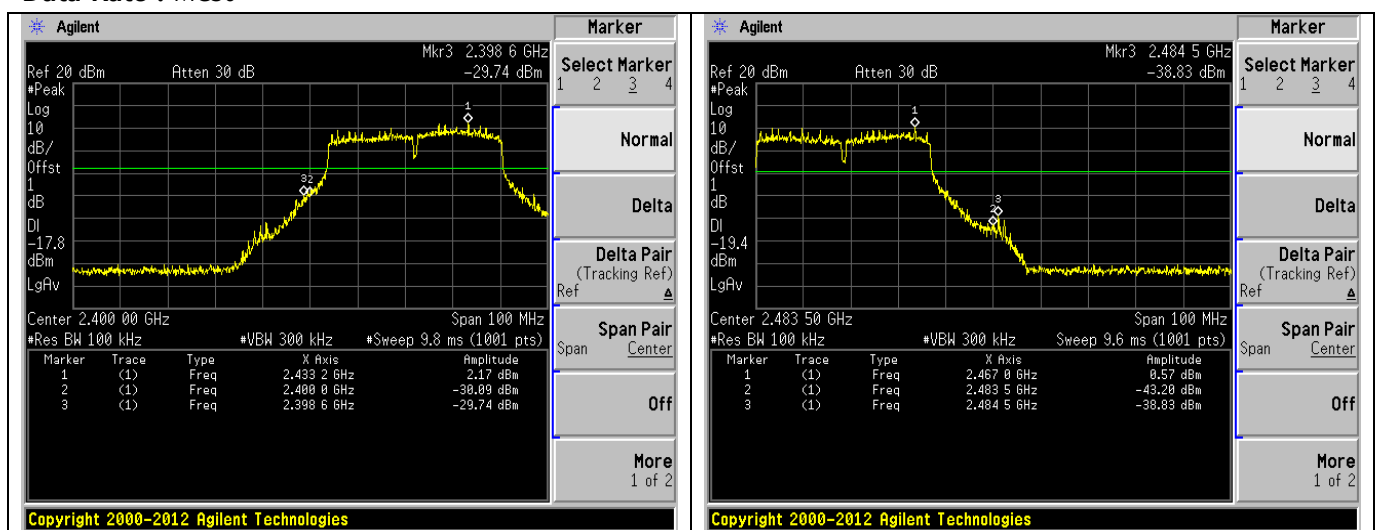


Channel Frequency: 2412 MHz

Channel Frequency: 2462 MHz

Modulation: 802.11ac VHT40

Data rate	Channel Frequency (MHz)	Reference Value (B) (dBm)	Band edge Frequency (MHz)	Value at Band edge (A) (dBm)	A-B (dBc)	Minimum Limit (dBc)
MCS0	2422	2.17	2398.6	-29.74	31.91	30
	2452	0.57	2484.5	-38.83	39.40	30

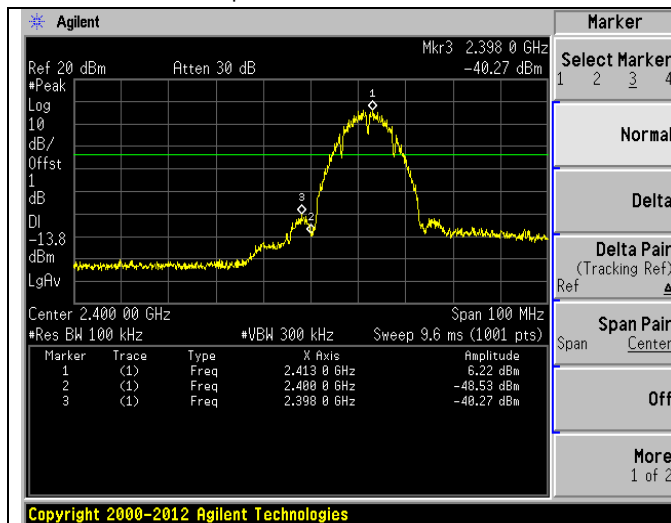
Data Rate : MCS0


MIMO ANT1

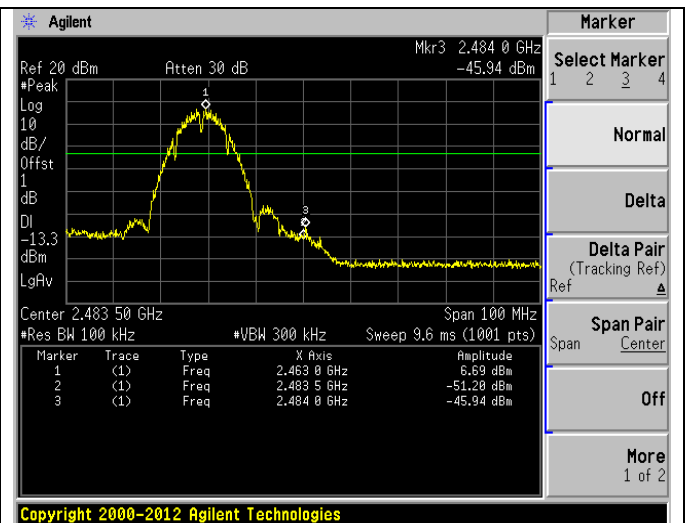
Modulation: 802.11b

Data rate	Channel Frequency (MHz)	Reference Value (B) (dBm)	Band edge Frequency (MHz)	Value at Band edge (A) (dBm)	A-B (dBc)	Minimum Limit (dBc)
1Mbps	2412	6.22	2398.0	-40.27	46.49	30
	2462	6.69	2484.0	-45.94	52.63	30

Data Rate : 1 Mbps



Channel Frequency: 2412 MHz

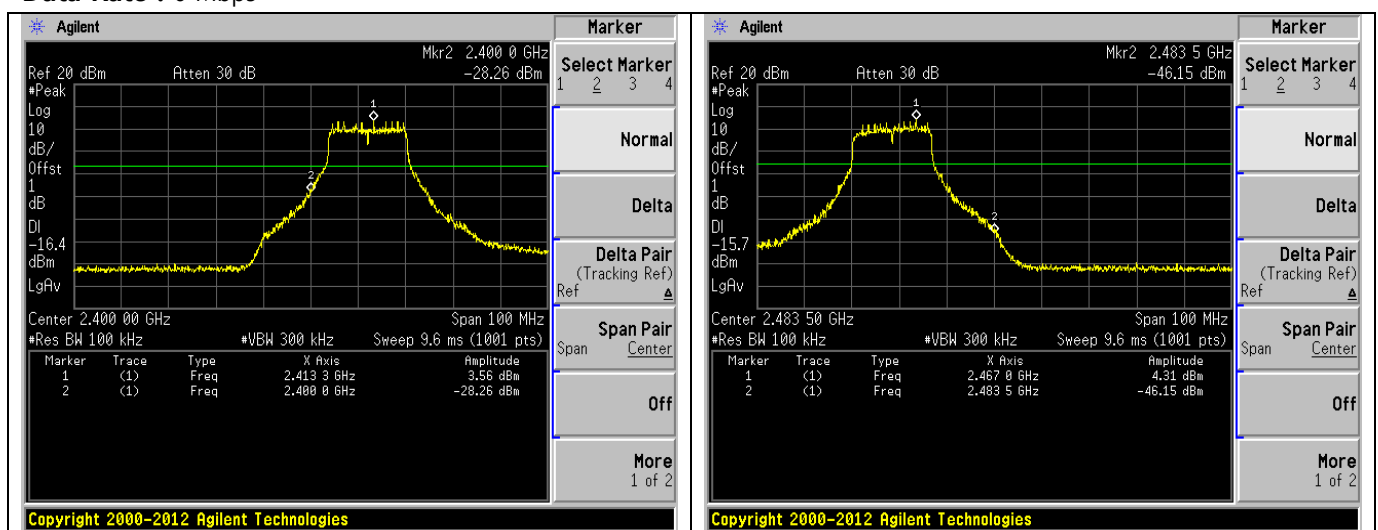


Channel Frequency: 2462 MHz

Modulation: 802.11g

Data rate	Channel Frequency (MHz)	Reference Value (B) (dBm)	Band edge Frequency (MHz)	Value at Band edge (A) (dBm)	A-B (dBc)	Minimum Limit (dBc)
6Mbps	2412	3.56	2400.0	-28.26	31.82	30
	2462	4.31	2483.5	-46.15	50.46	30

Data Rate : 6 Mbps

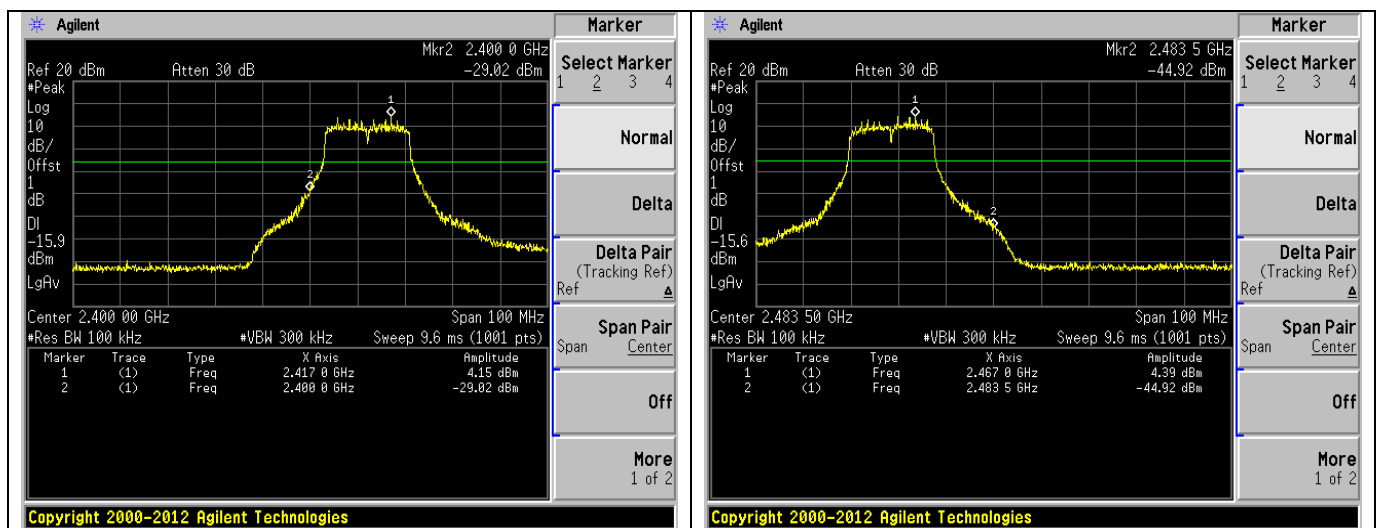


Channel Frequency: 2412 MHz

Channel Frequency: 2462 MHz

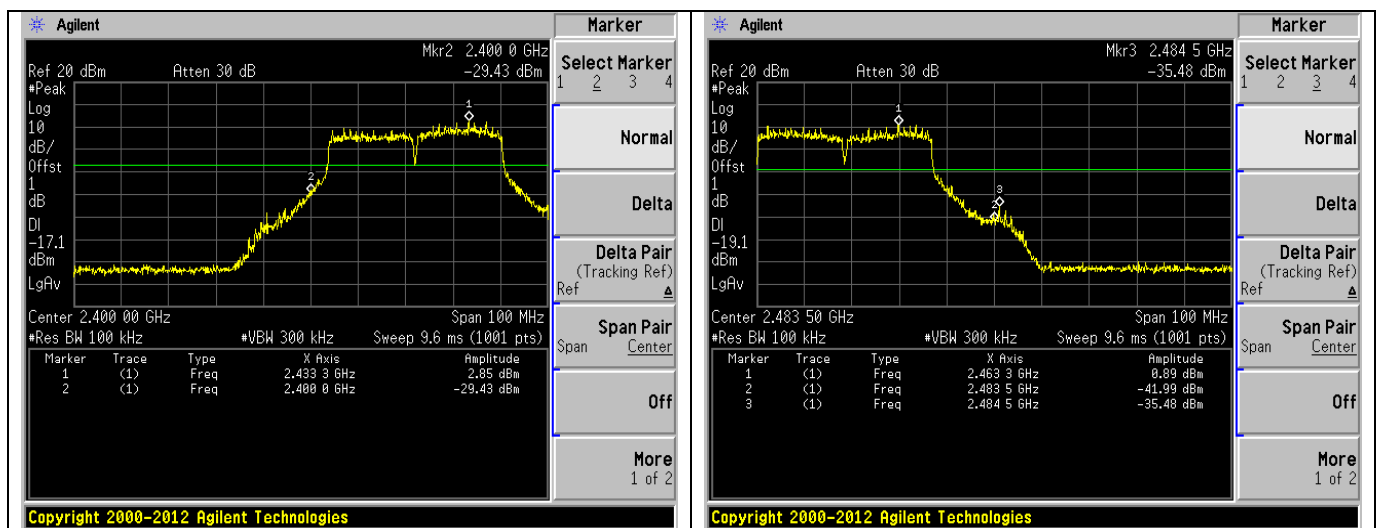
Modulation: 802.11n HT20

Data rate	Channel Frequency (MHz)	Reference Value (B) (dBm)	Band edge Frequency (MHz)	Value at Band edge (A) (dBm)	A-B (dBc)	Minimum Limit (dBc)
MCS8	2412	4.15	2400.0	-29.02	33.17	30
	2462	4.39	2483.5	-44.92	49.31	30

Data Rate : MCS8


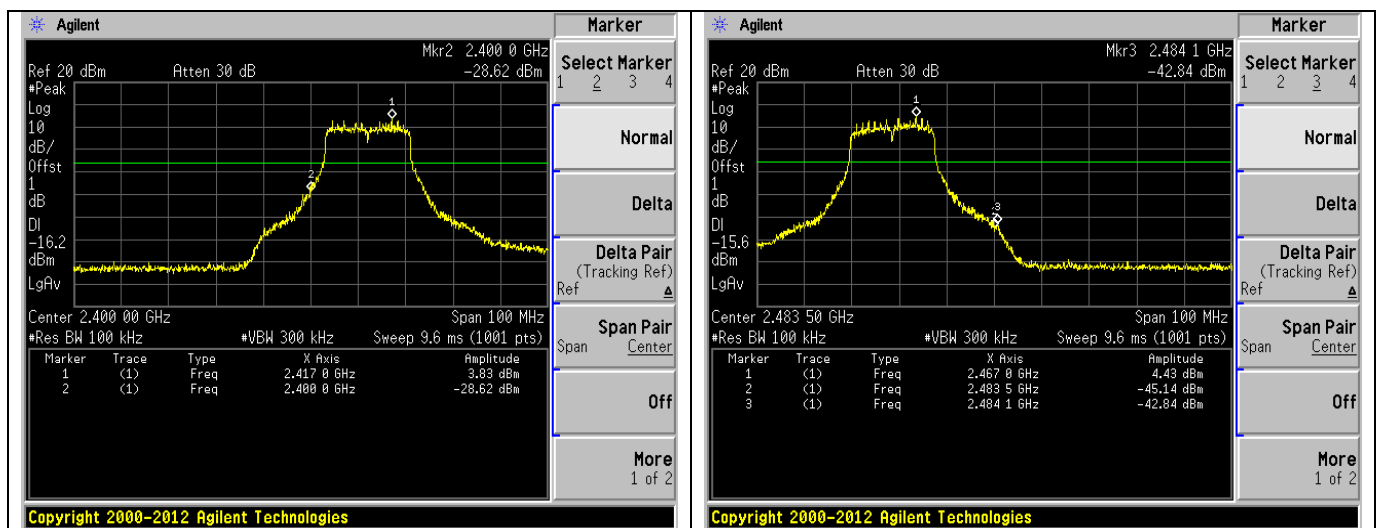
Modulation: 802.11n HT40

Data rate	Channel Frequency (MHz)	Reference Value (B) (dBm)	Band edge Frequency (MHz)	Value at Band edge (A) (dBm)	A-B (dBc)	Minimum Limit (dBc)
MCS8	2422	2.85	2400.0	-29.43	32.28	30
	2452	0.89	2484.5	-35.48	36.37	30

Data Rate : MCS8


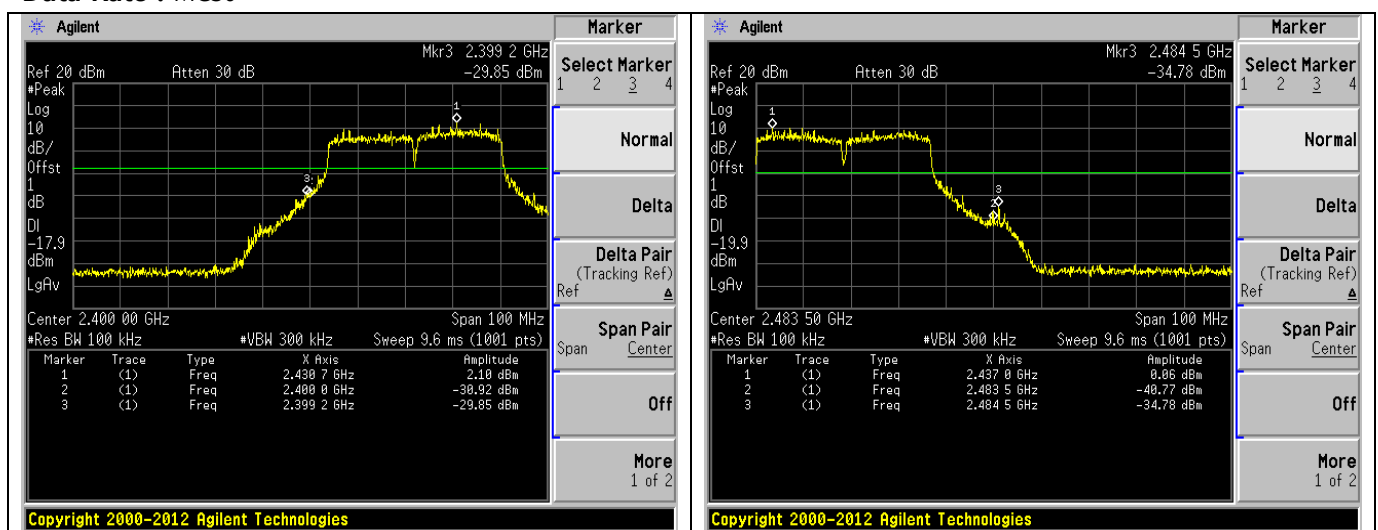
Modulation: 802.11ac VHT20

Data rate	Channel Frequency (MHz)	Reference Value (B) (dBm)	Band edge Frequency (MHz)	Value at Band edge (A) (dBm)	A-B (dBc)	Minimum Limit (dBc)
MCS0	2412	3.83	2400.0	-28.62	32.45	30
	2462	4.43	2484.1	-42.84	47.27	30

Data Rate : MCS0


Modulation: 802.11ac VHT40

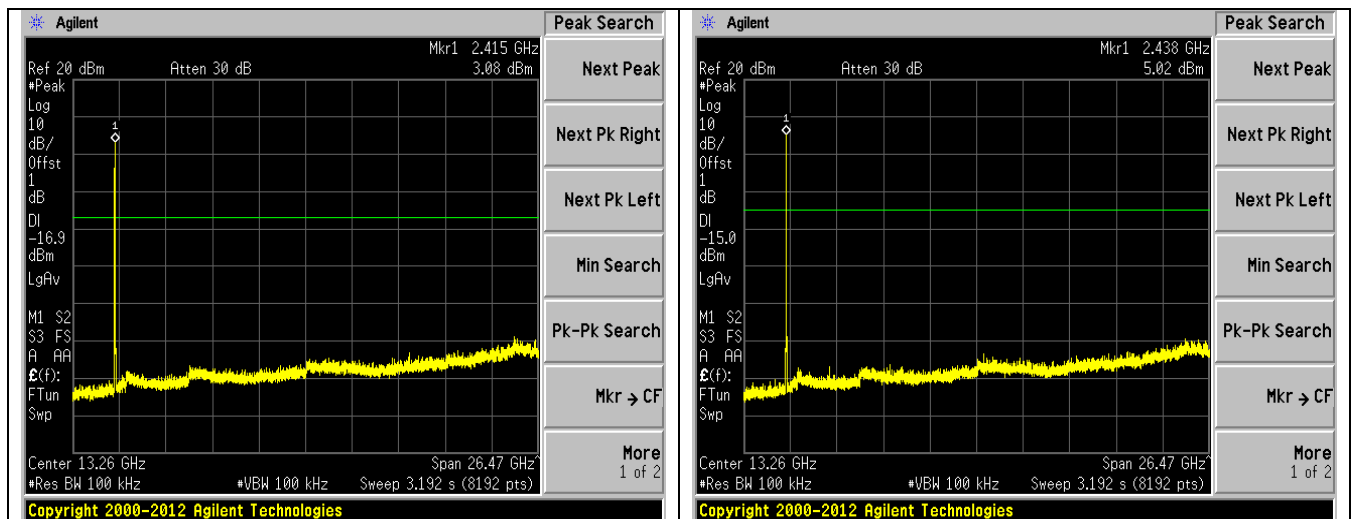
Data rate	Channel Frequency (MHz)	Reference Value (B) (dBm)	Band edge Frequency (MHz)	Value at Band edge (A) (dBm)	A-B (dBc)	Minimum Limit (dBc)
MCS0	2422	2.10	2399.2	-29.85	31.95	30
	2452	0.06	2484.5	-34.78	34.84	30

Data Rate : MCS0


ANT0

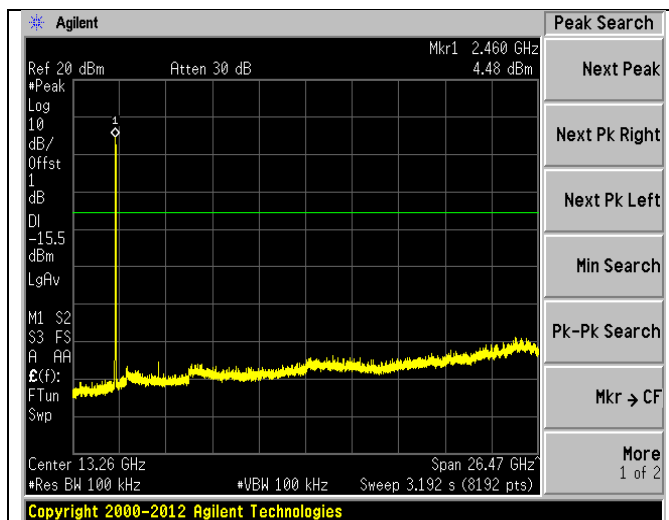
Modulation: 802.11b

Data rate 1 Mbps



Channel Frequency 2412 MHz

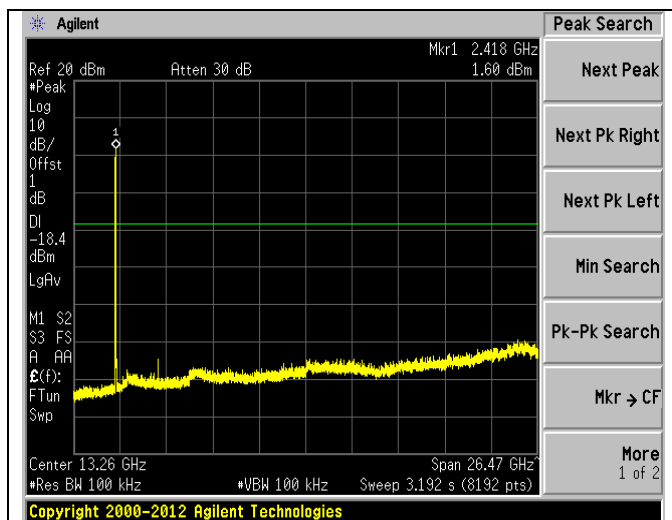
Channel Frequency 2437 MHz



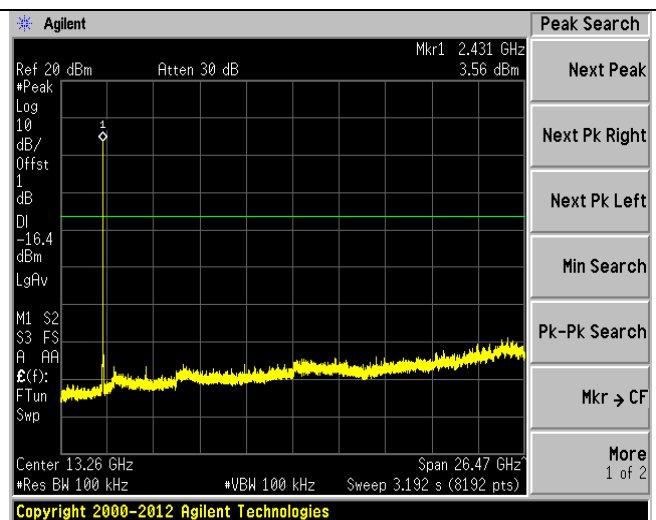
Channel Frequency 2462 MHz

Modulation: 802.11g

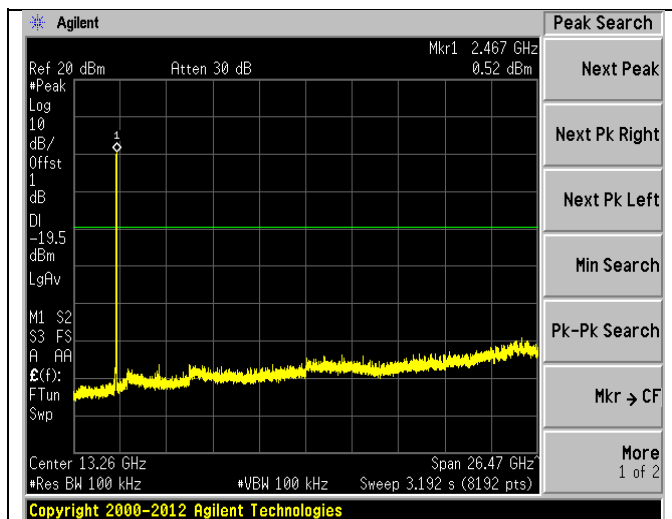
Data rate 6 Mbps



Channel Frequency 2412 MHz



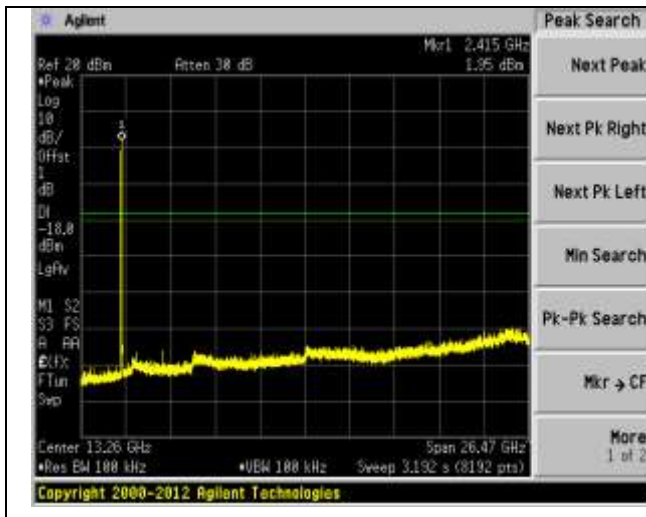
Channel Frequency 2437 MHz



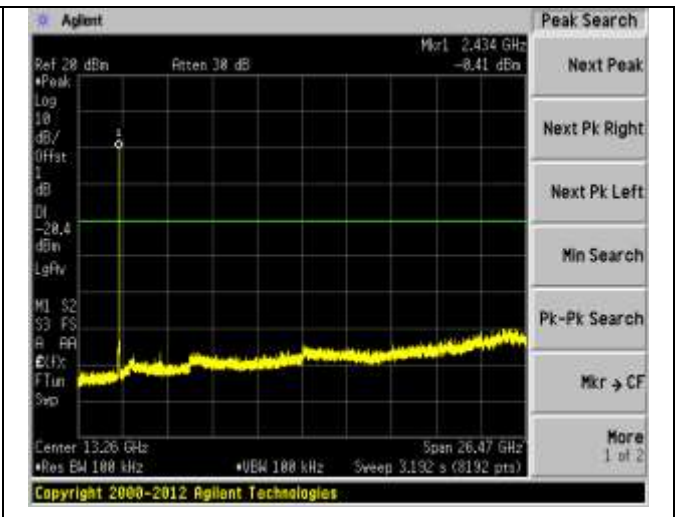
Channel Frequency 2462 MHz

Modulation: 802.11n20

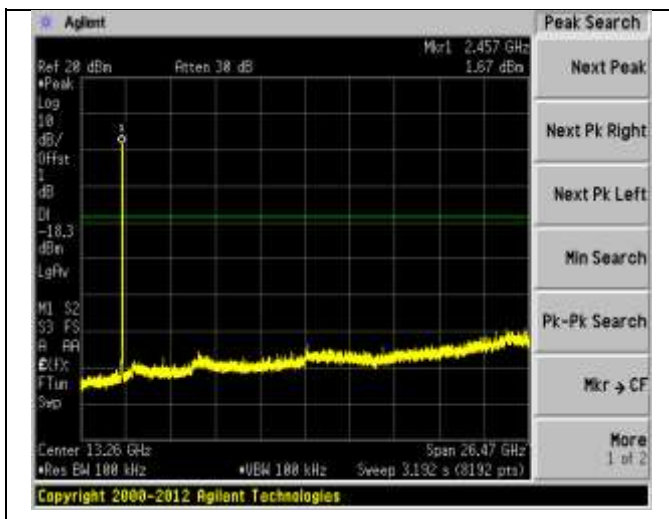
Data rate Mcs 0



Channel Frequency 2412 MHz



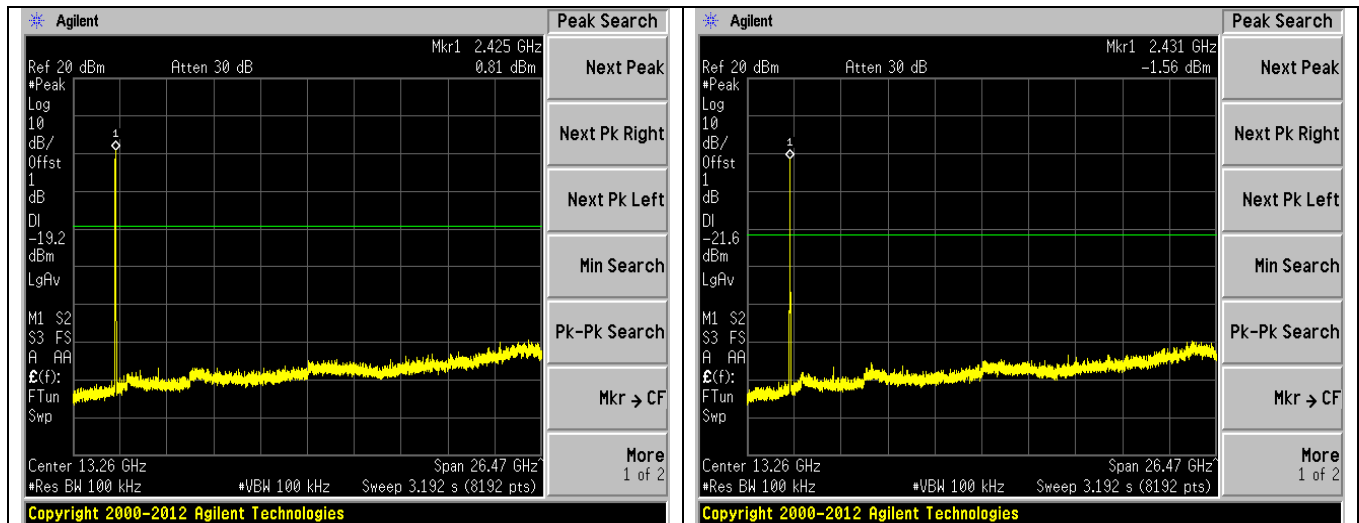
Channel Frequency 2437 MHz



Channel Frequency 2462 MHz

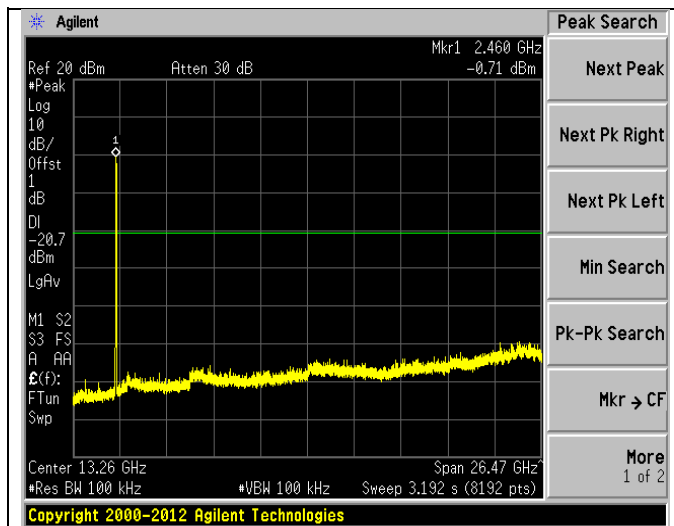
Modulation: 802.11n40

Data rate Mcs 0



Channel Frequency 2422 MHz

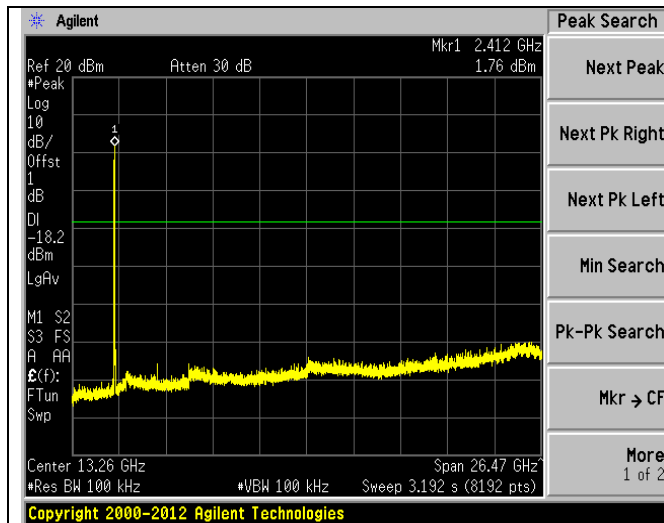
Channel Frequency 2437 MHz



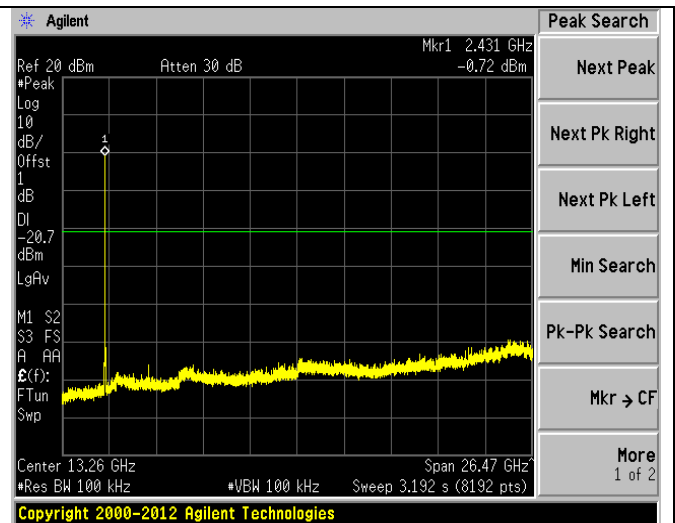
Channel Frequency 2452 MHz

Modulation: 802.11ac20

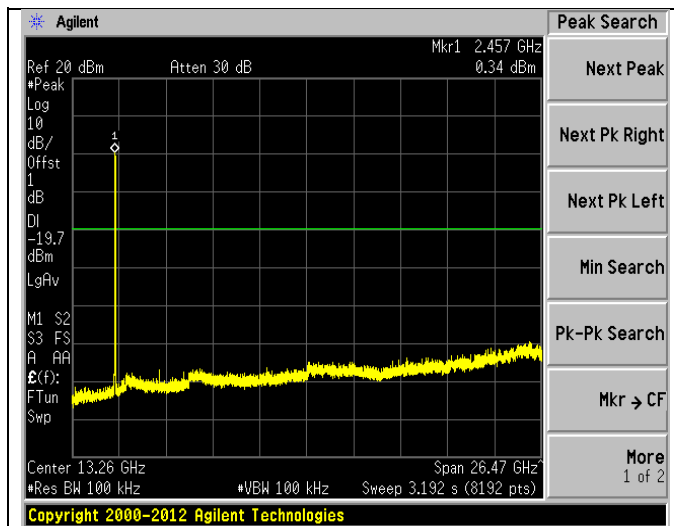
Data rate Mcs 0



Channel Frequency 2412 MHz



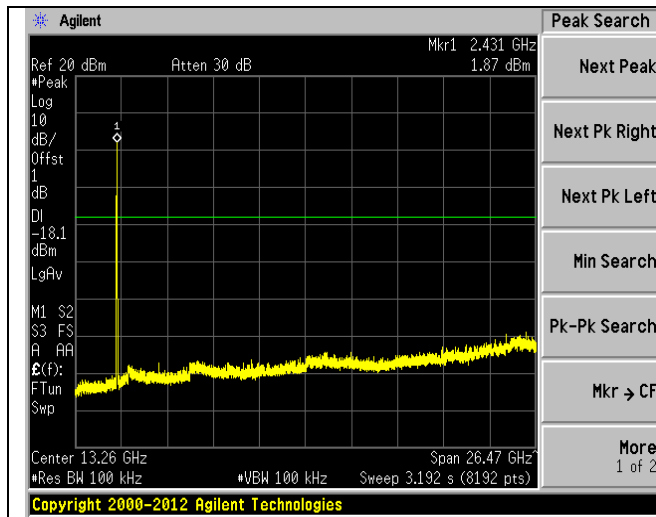
Channel Frequency 2437 MHz



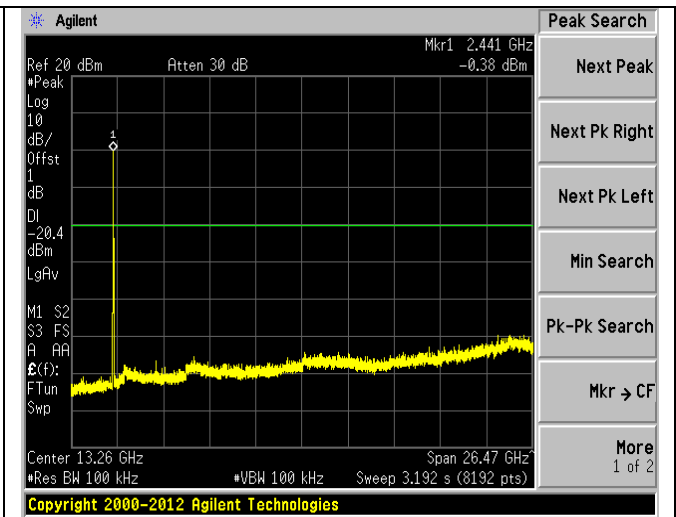
Channel Frequency 2462 MHz

Modulation: 802.11ac40

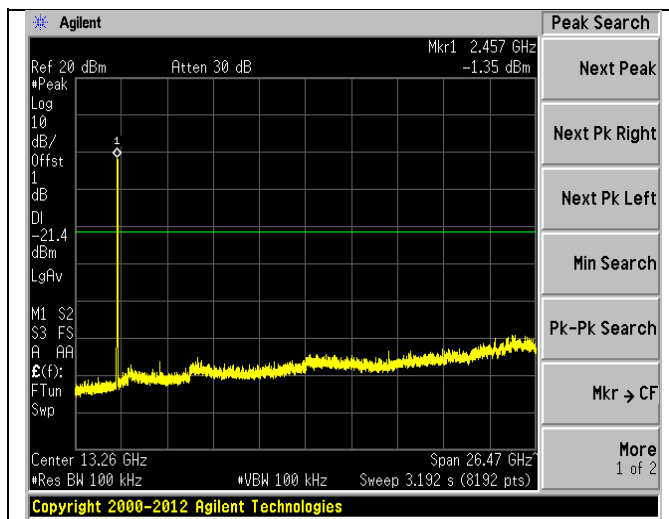
Data rate Mcs 0



Channel Frequency 2422 MHz



Channel Frequency 2437 MHz

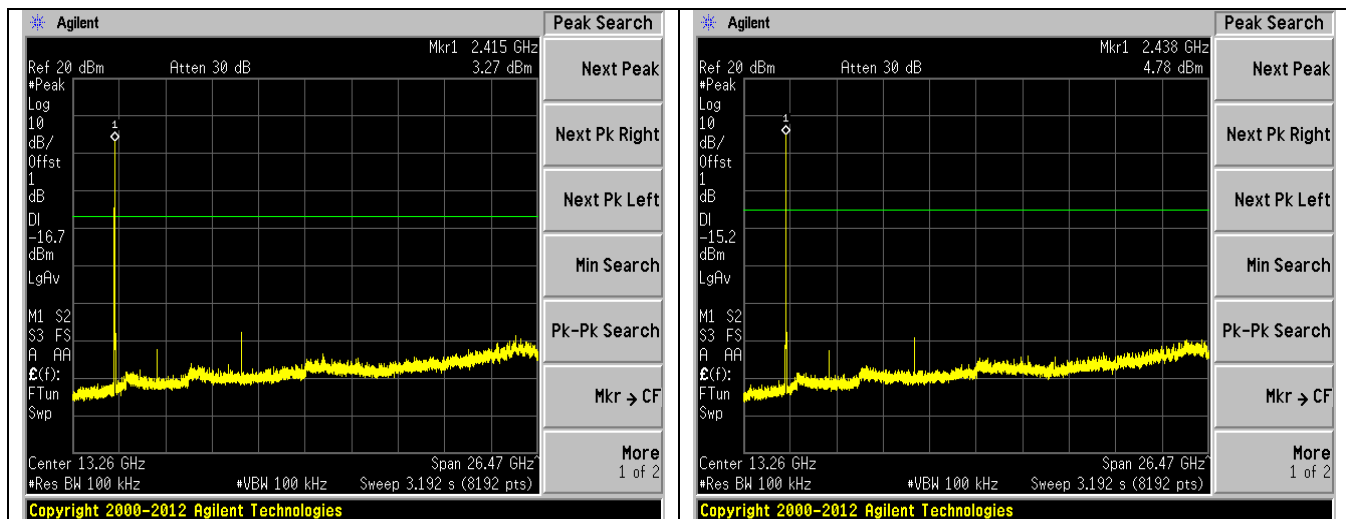


Channel Frequency 2452 MHz

ANT1

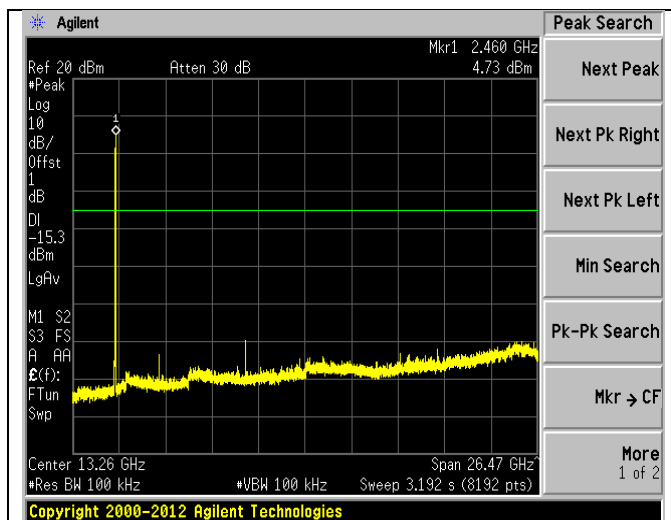
Modulation: 802.11b

Data rate 1 Mbps



Channel Frequency 2412 MHz

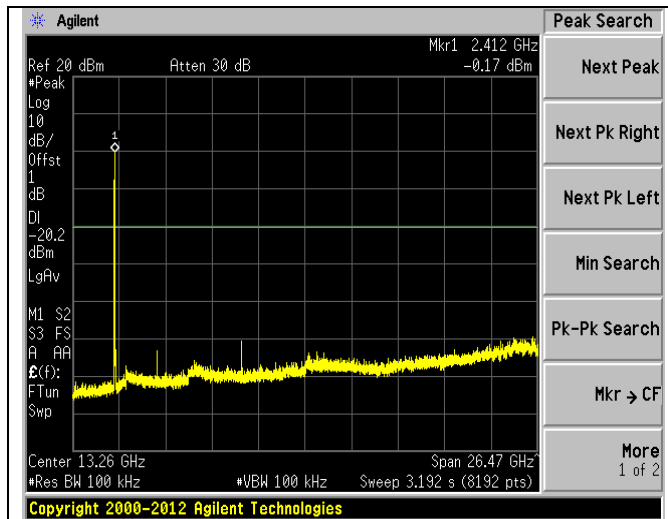
Channel Frequency 2437 MHz



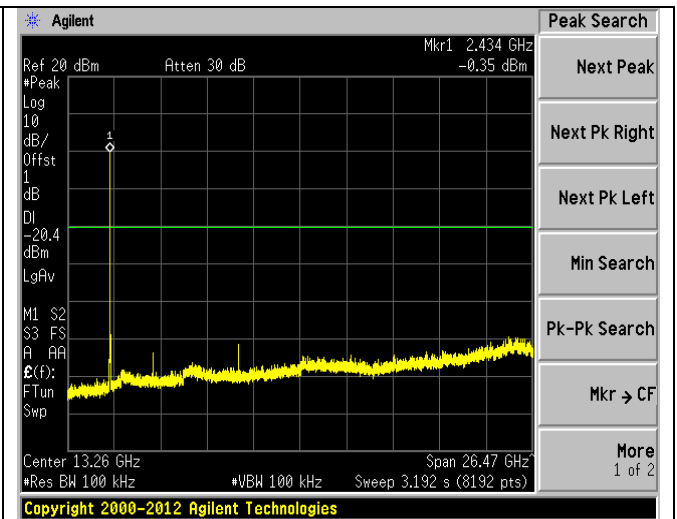
Channel Frequency 2462 MHz

Modulation: 802.11g

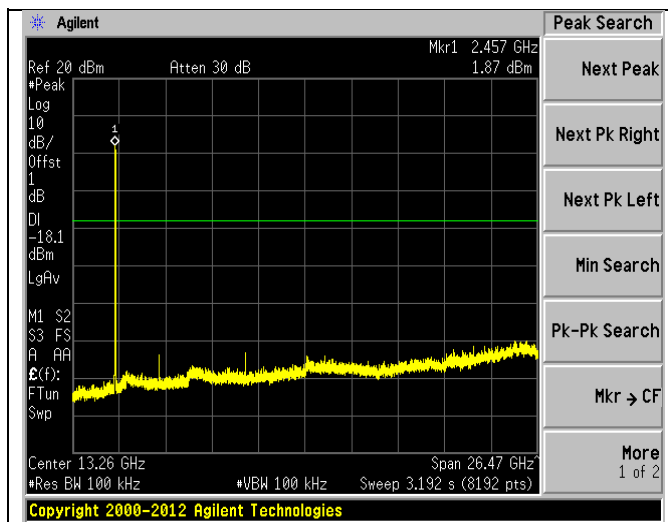
Data rate 6 Mbps



Channel Frequency 2412 MHz



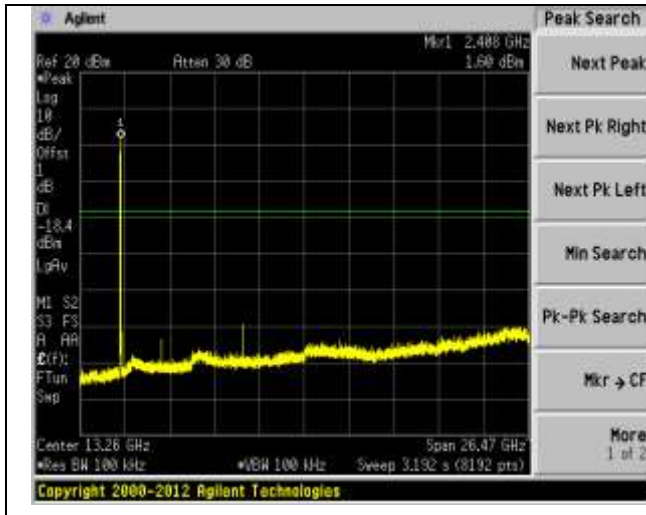
Channel Frequency 2437 MHz



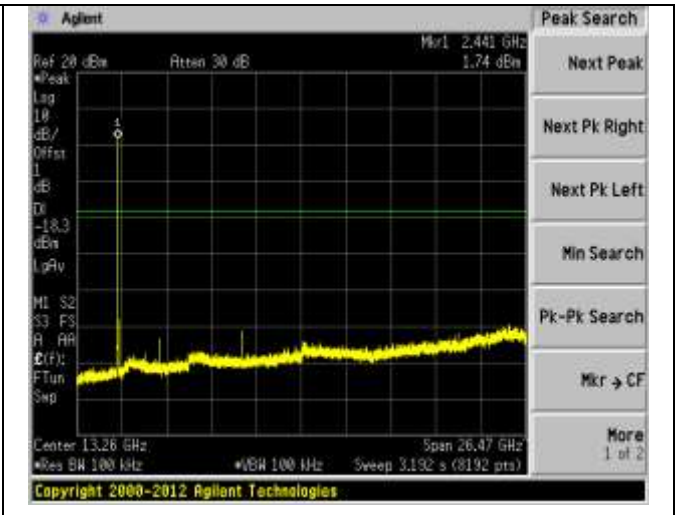
Channel Frequency 2462 MHz

Modulation: 802.11n20

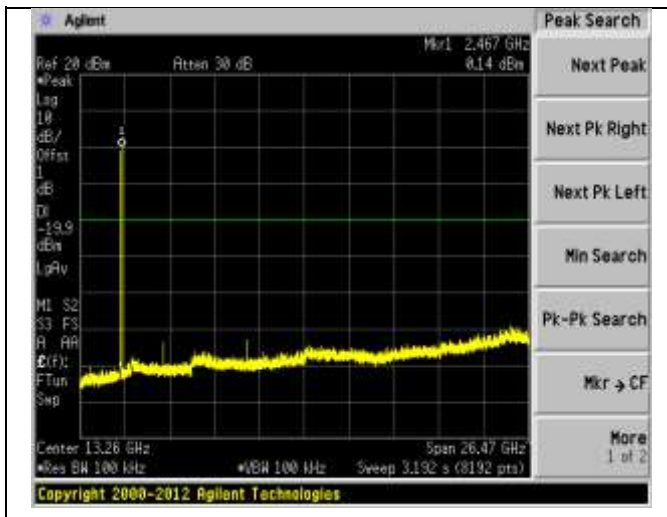
Data rate Mcs 0



Channel Frequency 2412 MHz



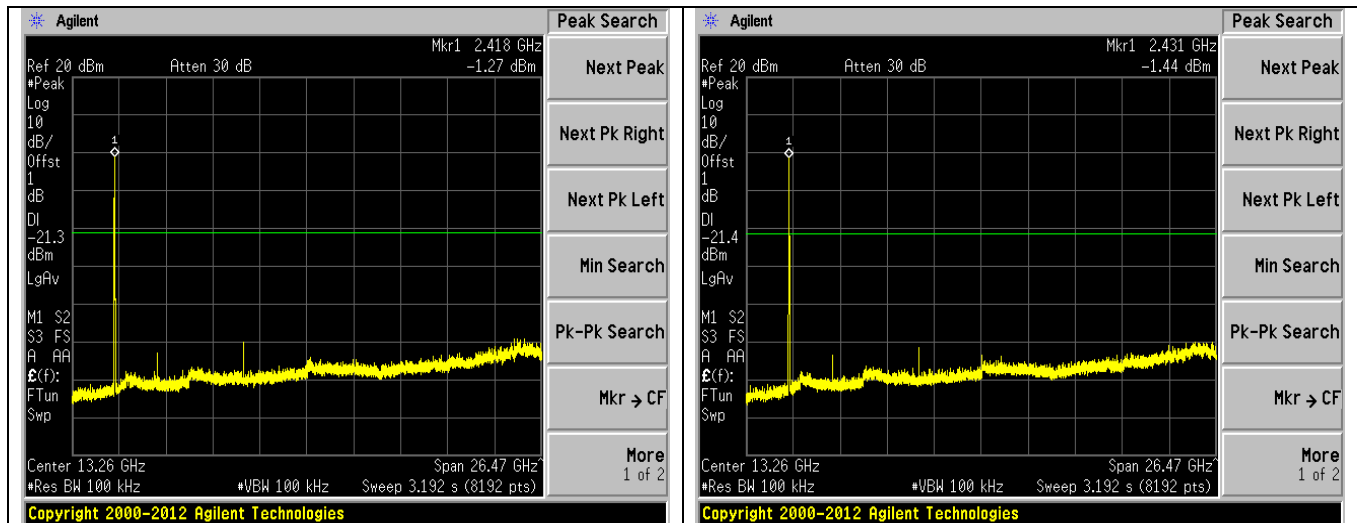
Channel Frequency 2437 MHz



Channel Frequency 2462 MHz

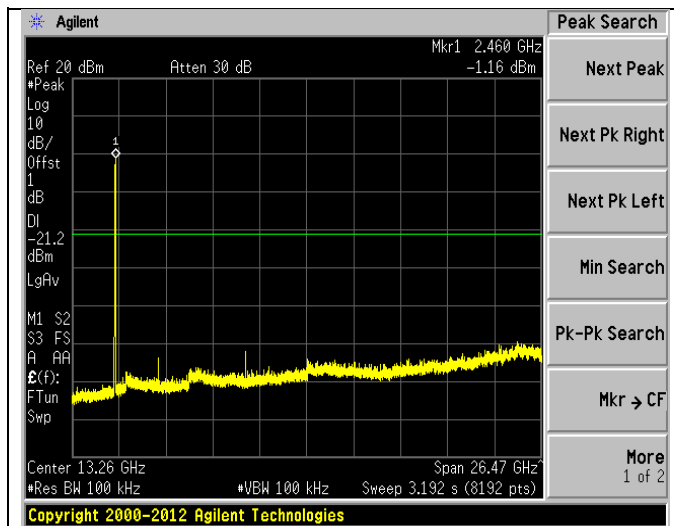
Modulation: 802.11n40

Data rate Mcs 0



Channel Frequency 2422 MHz

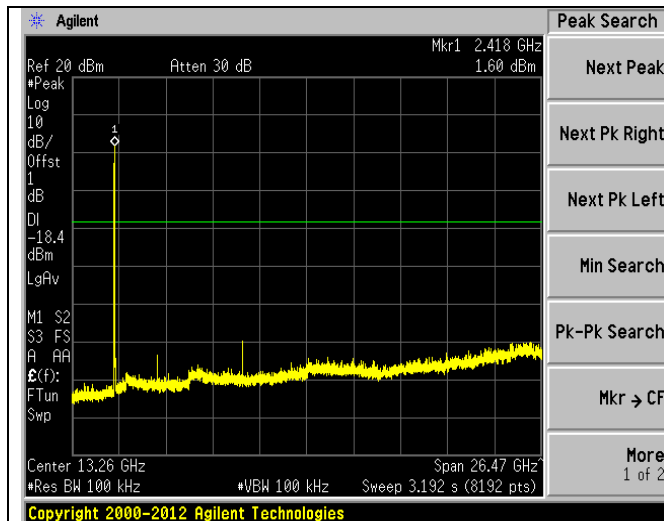
Channel Frequency 2437 MHz



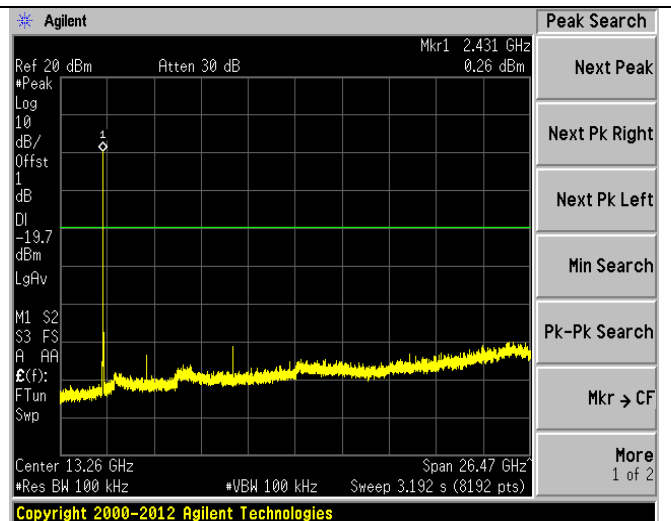
Channel Frequency 2452 MHz

Modulation: 802.11ac20

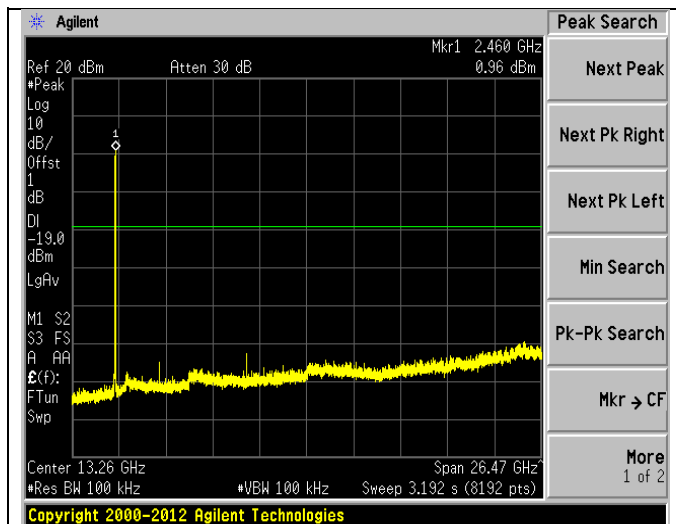
Data rate Mcs 0



Channel Frequency 2412 MHz



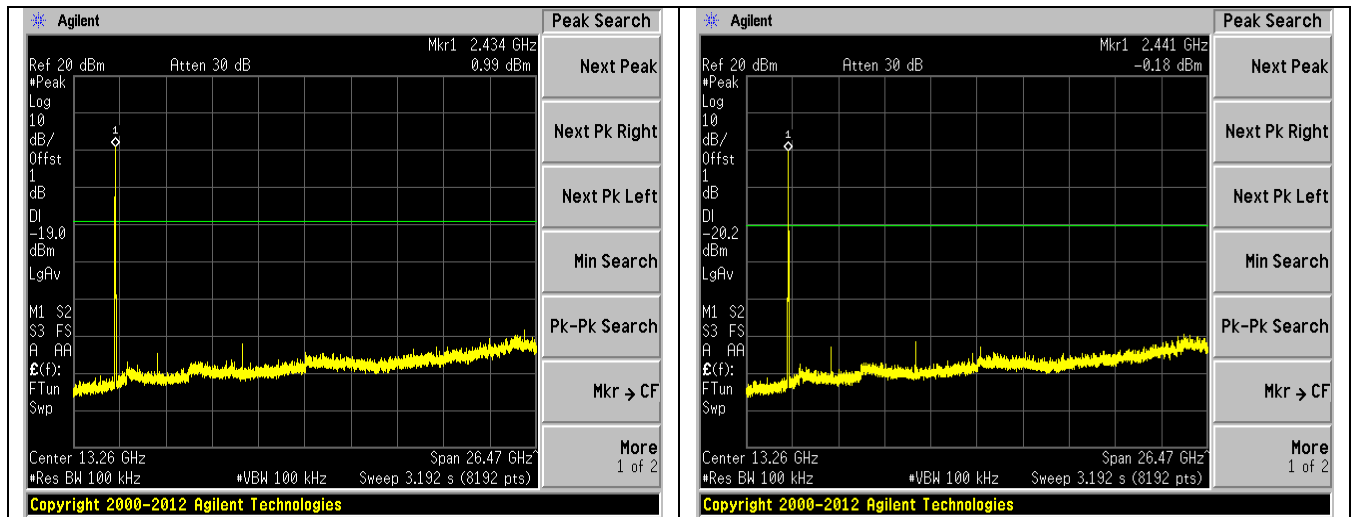
Channel Frequency 2437 MHz



Channel Frequency 2462 MHz

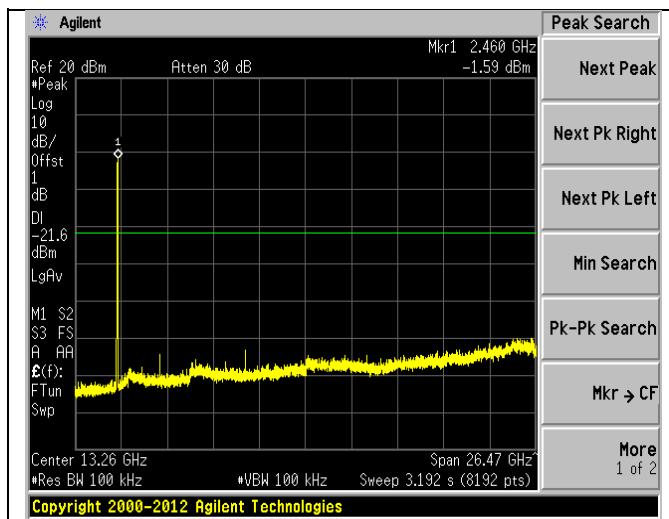
Modulation: 802.11ac40

Data rate Mcs 0



Channel Frequency 2422 MHz

Channel Frequency 2437 MHz

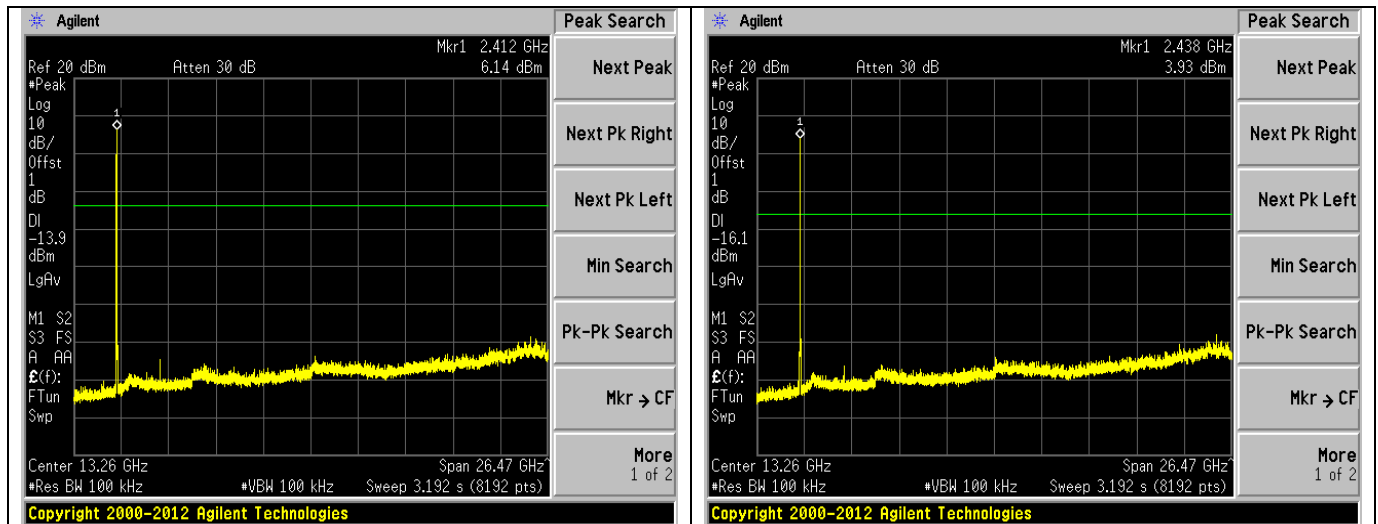


Channel Frequency 2452 MHz

MIMO ANTO

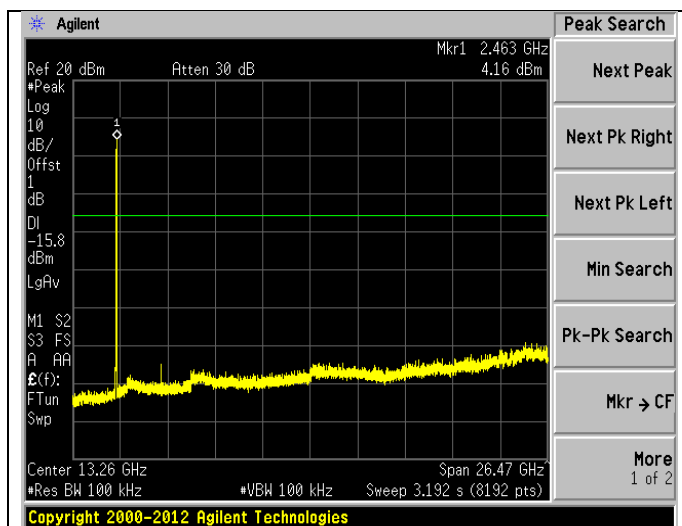
Modulation: 802.11b

Data rate 1 Mbps



Channel Frequency 2412 MHz

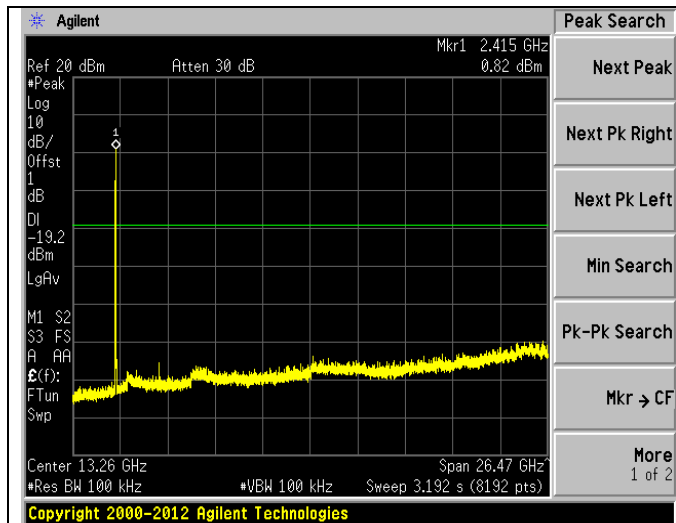
Channel Frequency 2437 MHz



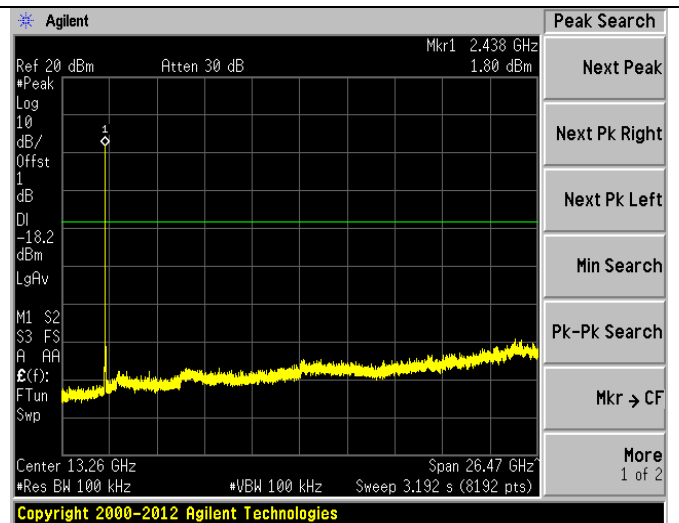
Channel Frequency 2462 MHz

Modulation: 802.11g

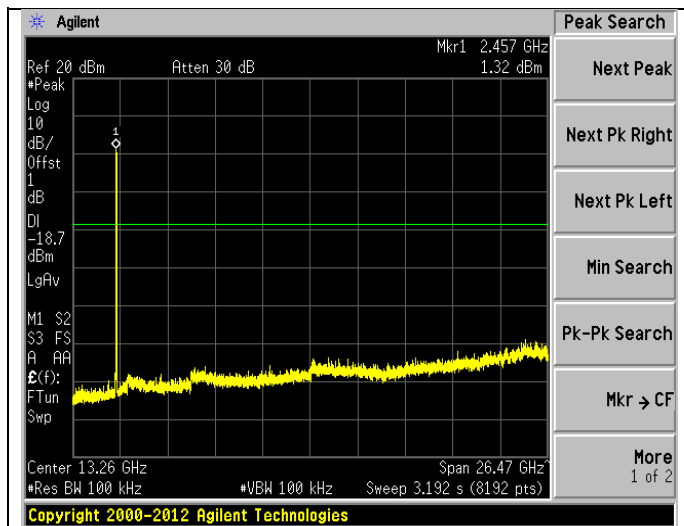
Data rate 6 Mbps



Channel Frequency 2412 MHz



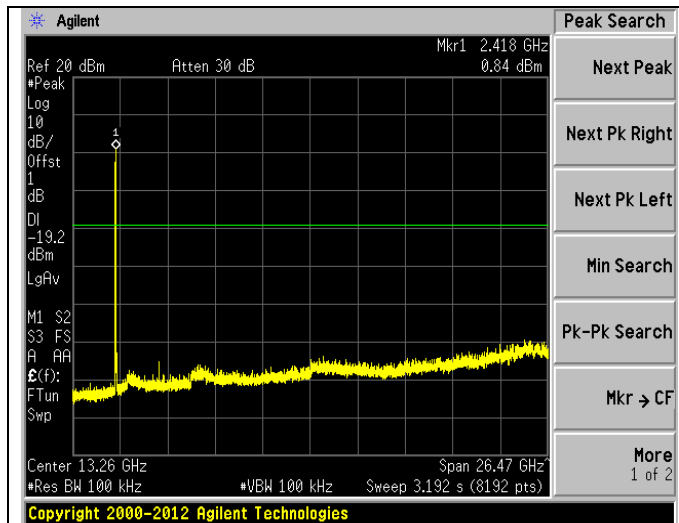
Channel Frequency 2437 MHz



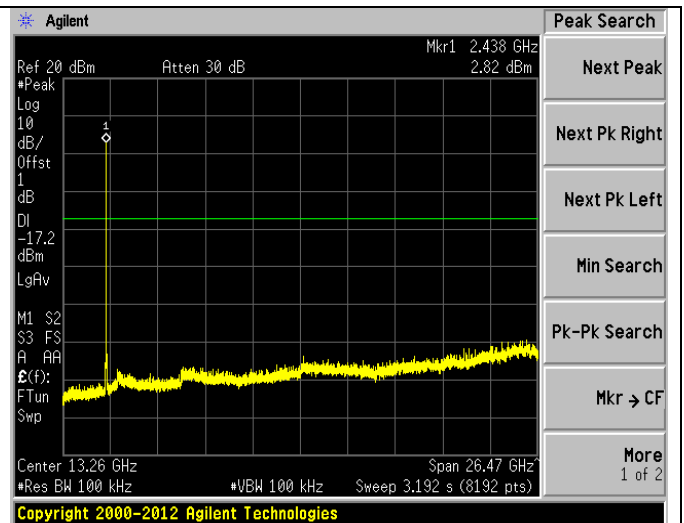
Channel Frequency 2462 MHz

Modulation: 802.11n20

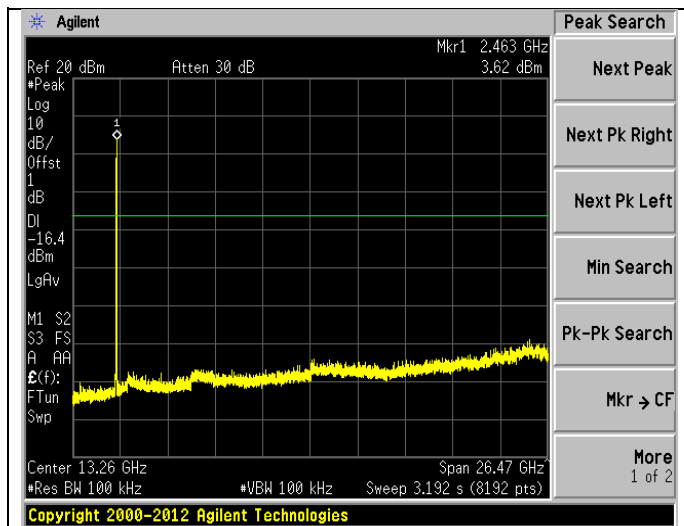
Data rate Mcs 8



Channel Frequency 2412 MHz



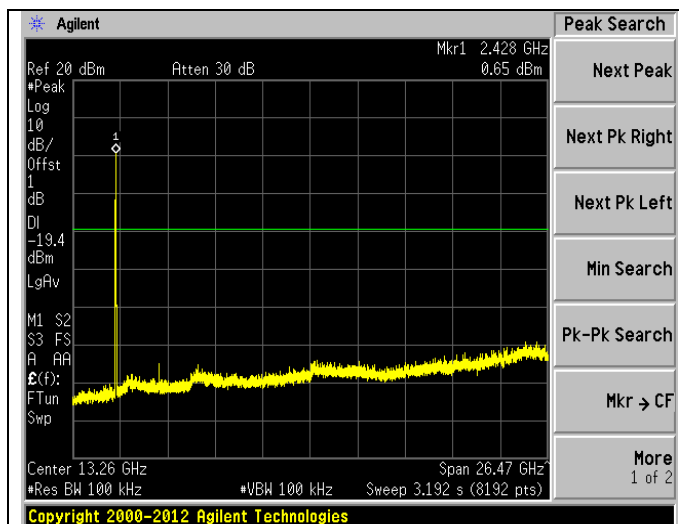
Channel Frequency 2437 MHz



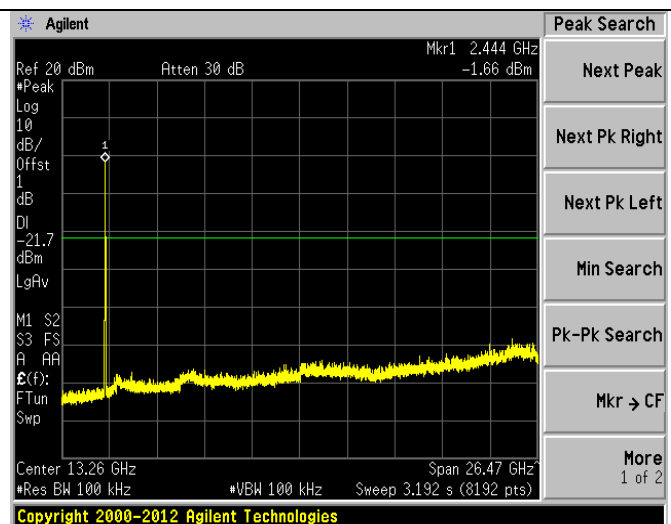
Channel Frequency 2462 MHz

Modulation: 802.11n40

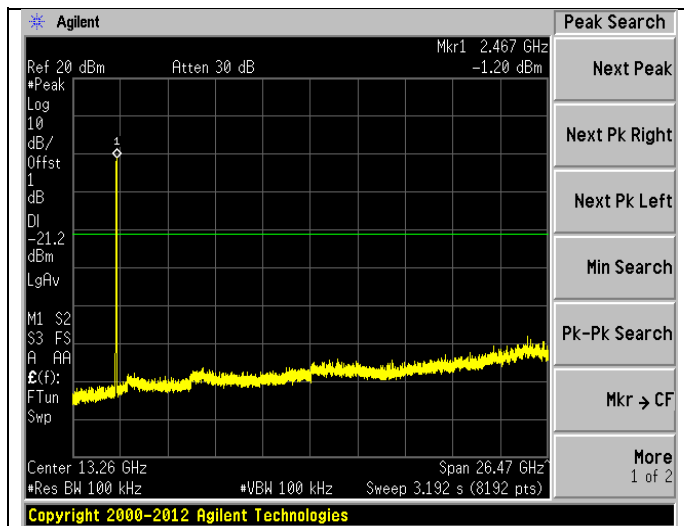
Data rate Mcs 8



Channel Frequency 2422 MHz



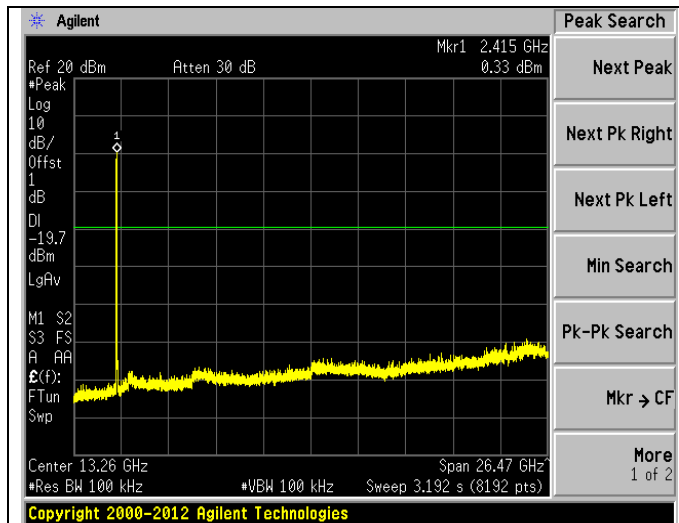
Channel Frequency 2437 MHz



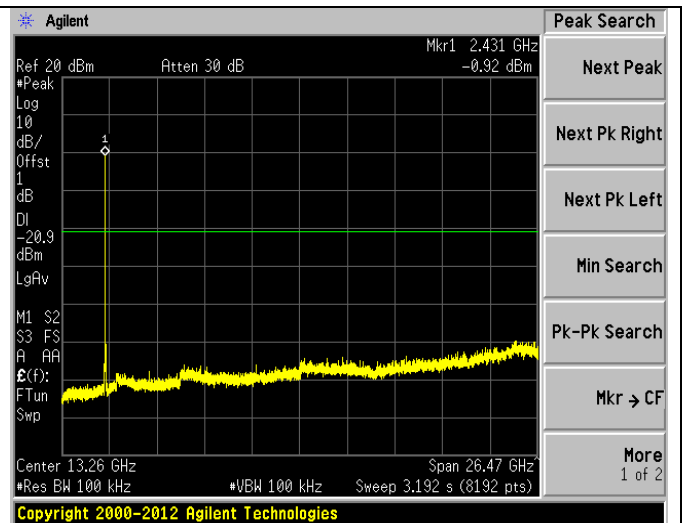
Channel Frequency 2452 MHz

Modulation: 802.11ac20

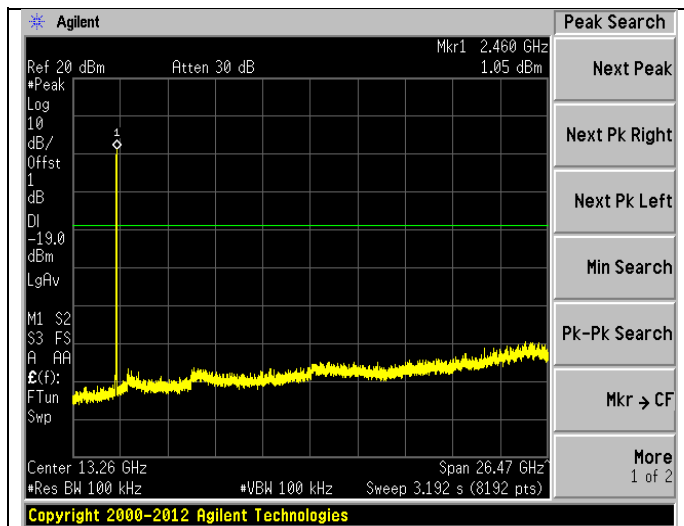
Data rate Mcs 0



Channel Frequency 2412 MHz



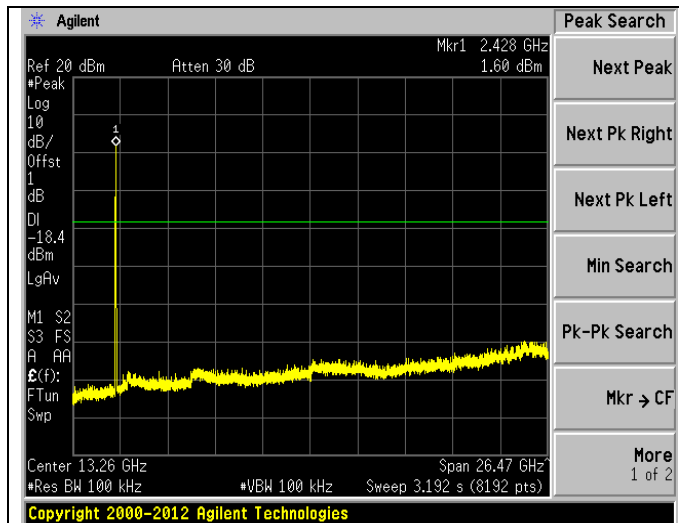
Channel Frequency 2437 MHz



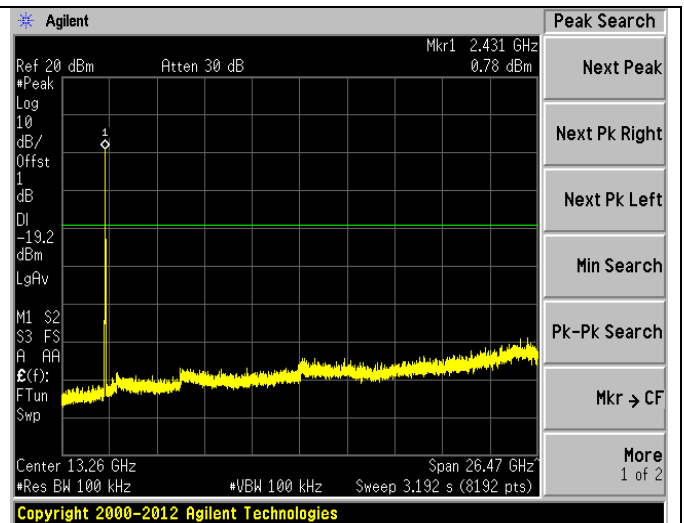
Channel Frequency 2462 MHz

Modulation: 802.11ac40

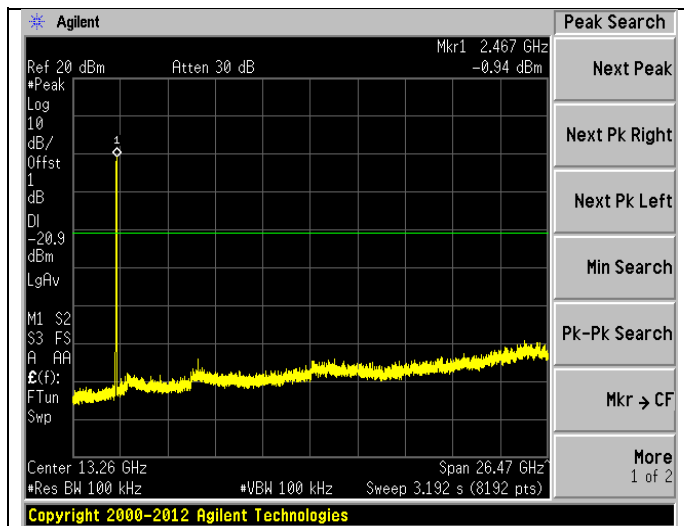
Data rate Mcs 0



Channel Frequency 2422 MHz



Channel Frequency 2437 MHz

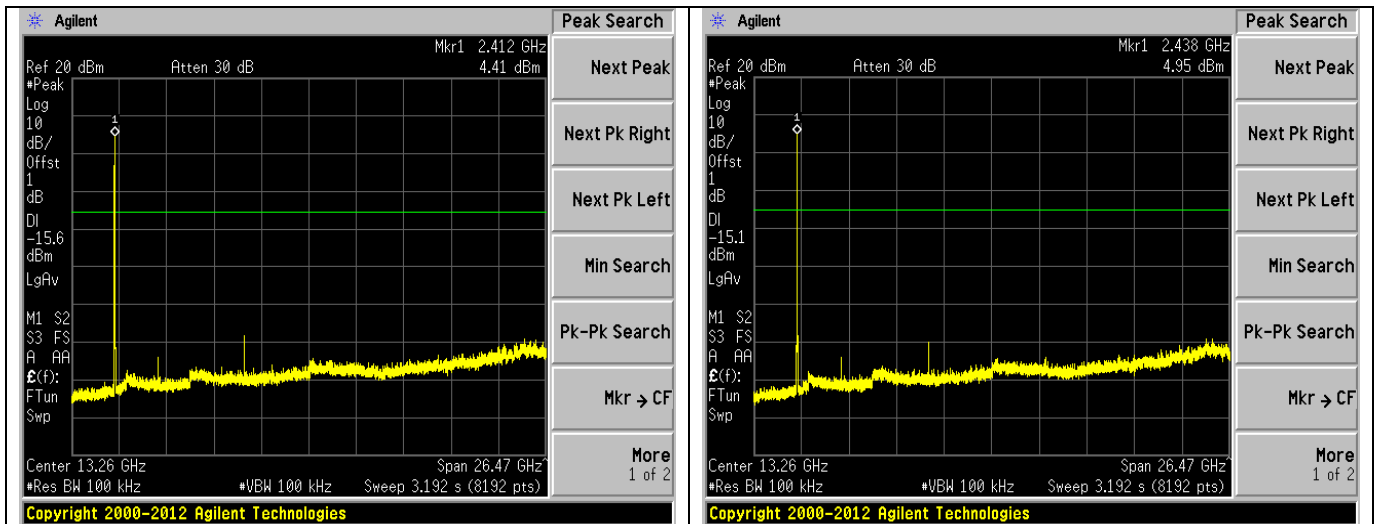


Channel Frequency 2452 MHz

MIMO ANT1

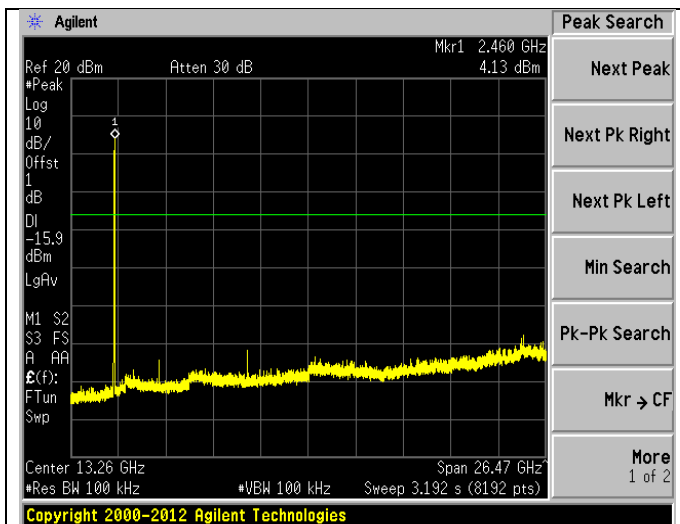
Modulation: 802.11b

Data rate 1 Mbps



Channel Frequency 2412 MHz

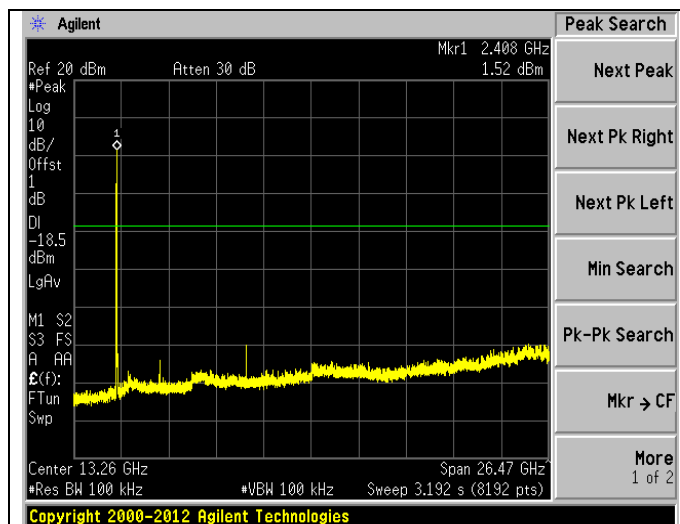
Channel Frequency 2437 MHz



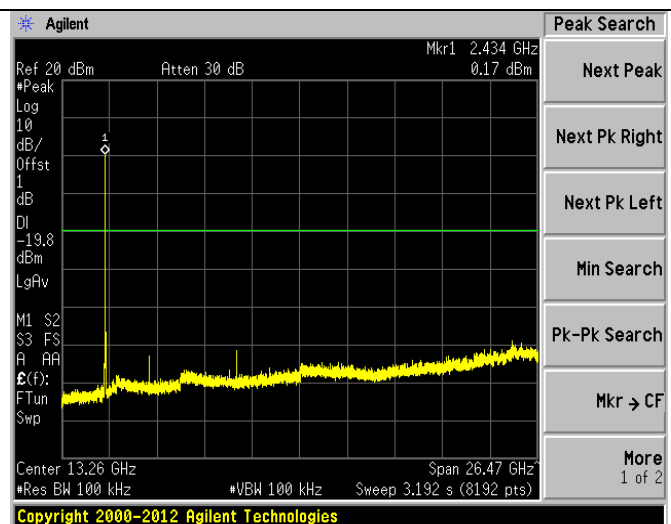
Channel Frequency 2462 MHz

Modulation: 802.11g

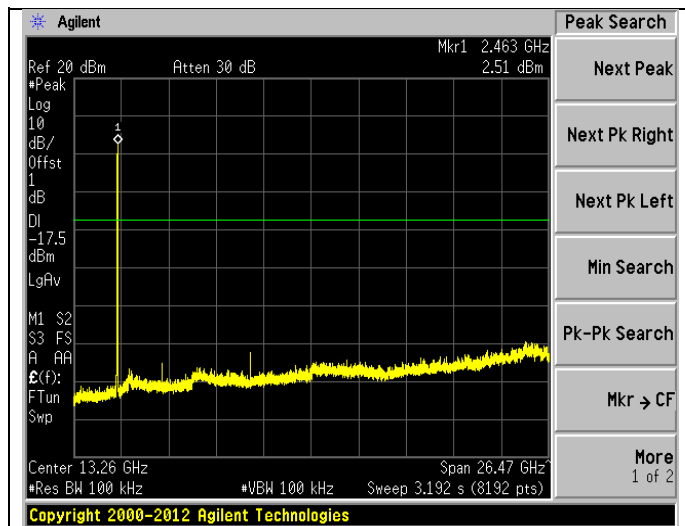
Data rate 6 Mbps



Channel Frequency 2412 MHz



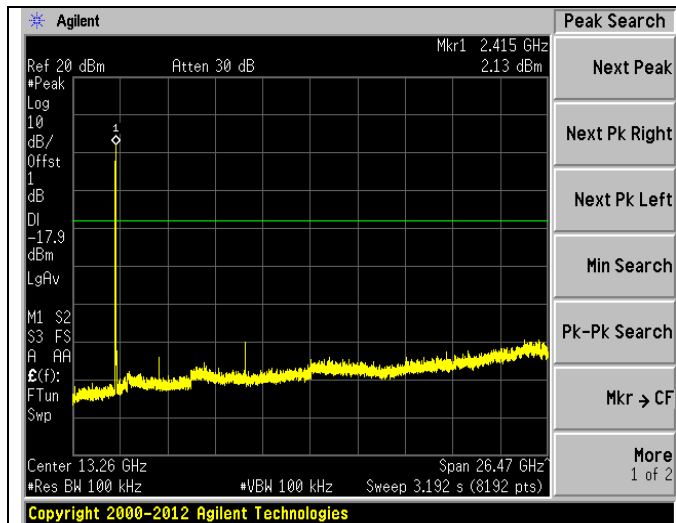
Channel Frequency 2437 MHz



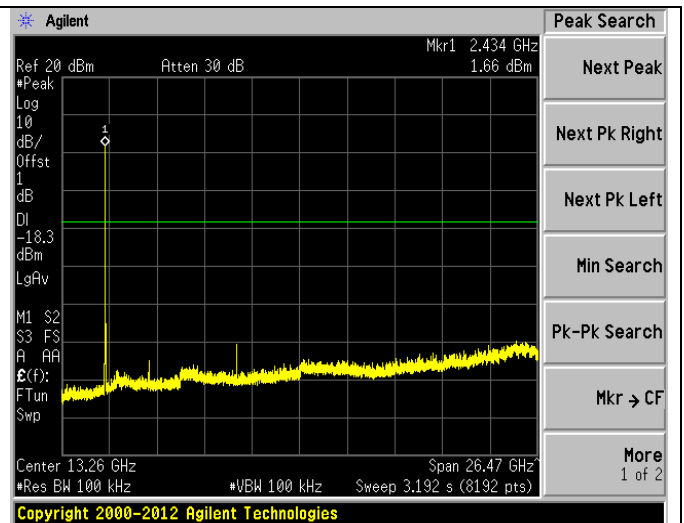
Channel Frequency 2462 MHz

Modulation: 802.11n20

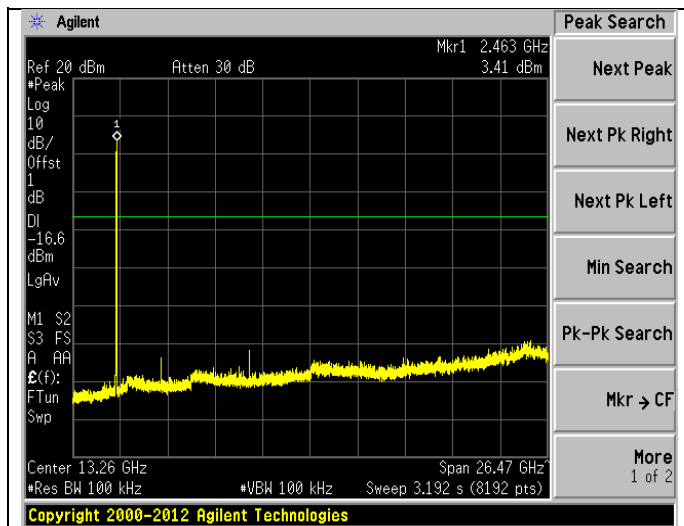
Data rate Mcs 8



Channel Frequency 2412 MHz



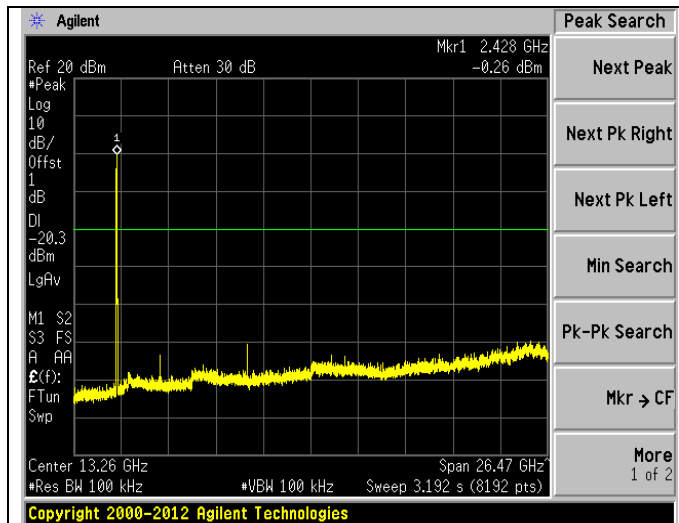
Channel Frequency 2437 MHz



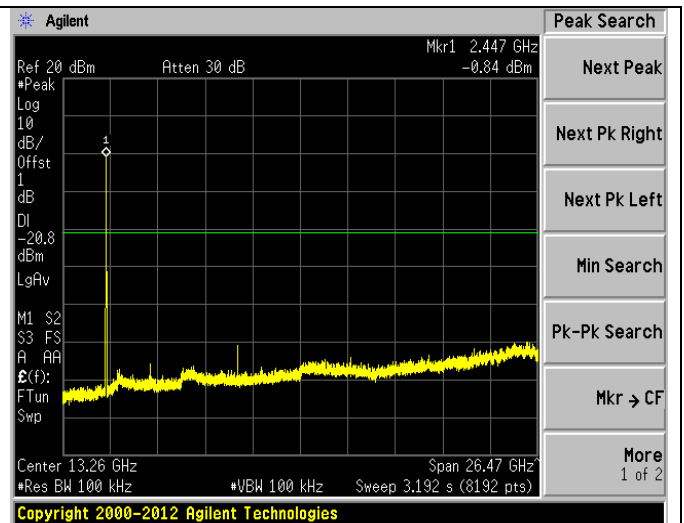
Channel Frequency 2462 MHz

Modulation: 802.11n40

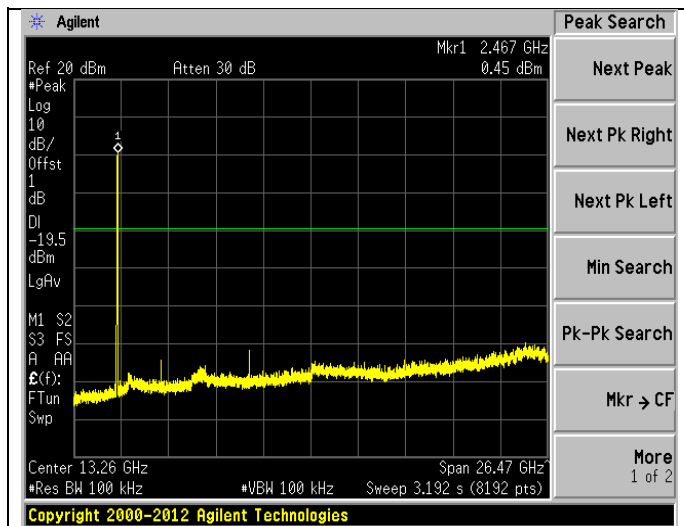
Data rate Mcs 8



Channel Frequency 2422 MHz



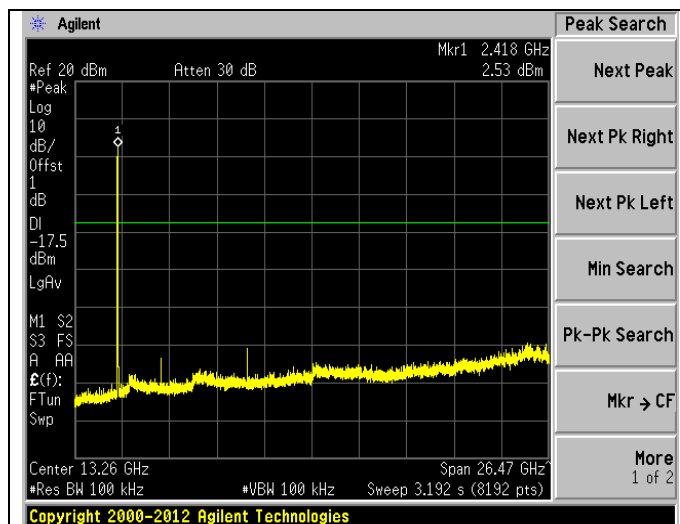
Channel Frequency 2437 MHz



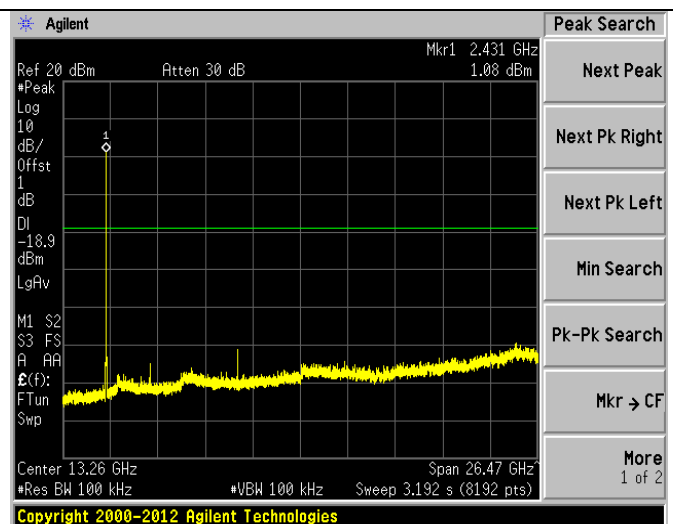
Channel Frequency 2452 MHz

Modulation: 802.11ac20

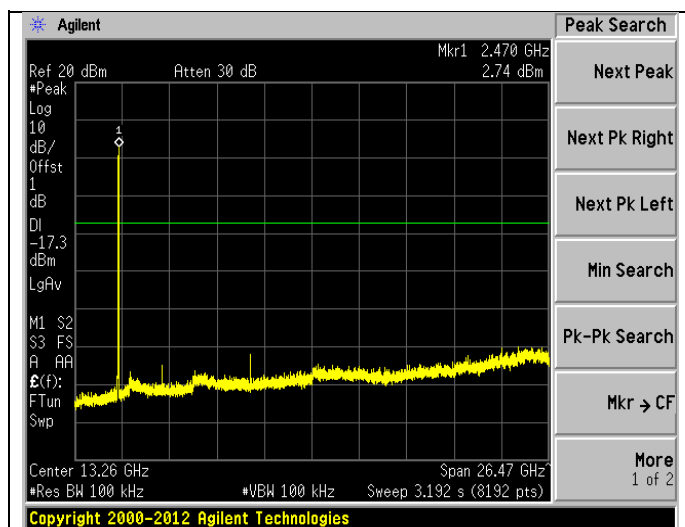
Data rate Mcs 0



Channel Frequency 2412 MHz



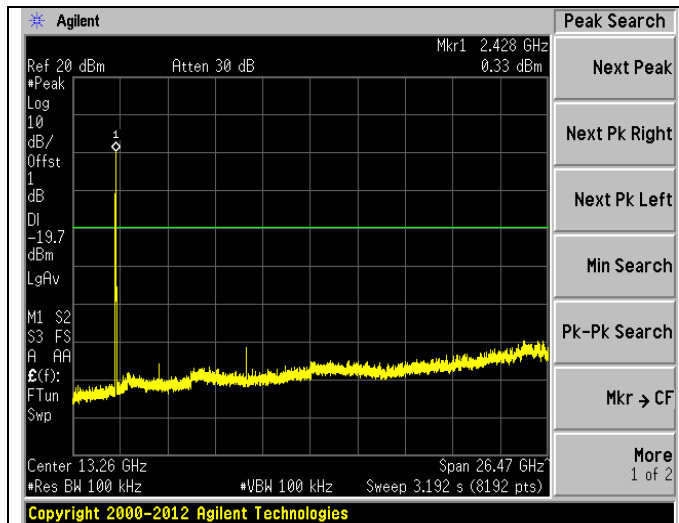
Channel Frequency 2437 MHz



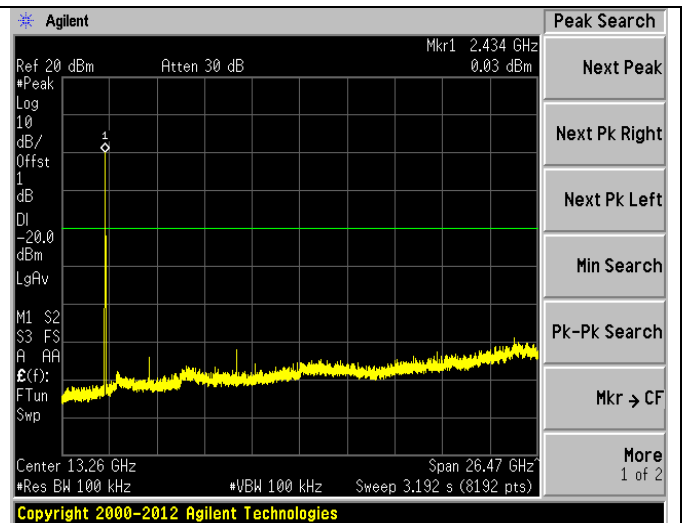
Channel Frequency 2462 MHz

Modulation: 802.11ac40

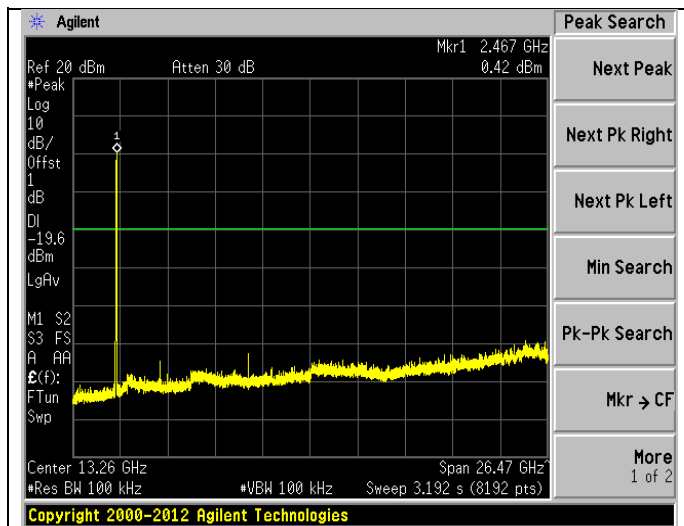
Data rate Mcs 0



Channel Frequency 2422 MHz



Channel Frequency 2437 MHz



Channel Frequency 2452 MHz

7.5 Spurious Radiated Emissions & Restricted Bands of Operation

Result

Pass

Test Specification	FCC part 15 Subpart C 15.247 (d) / (15.209 & 15.205) RSS-Gen Issue 5, Section 8.9 /8.10
Test Method	ANSI C63.10
Measurement Location	Semi Anechoic Chamber 30MHz - 1 GHz Fully Anechoic Chamber 1 GHz – 26.5 GHz
Measurement Bandwidth	100 kHz for frequency range < 1GHz 1 MHz for Frequency range >1GHz
Detector	Refer remarks below
Measuring Distance	3 m
Requirement	As per the limits mentioned in the below table

Frequency (MHz)	FCC Field strength ($\mu\text{V}/\text{m}$)	ISED Field strength ($\mu\text{V}/\text{m}$)	Distance of Measurement (m)
0.009 – 0.490	2400/F(kHz)	6.37/F(F in kHz)	300*
0.490 – 1.705	24000/F(kHz)	63.7/F(F in kHz)	30*
1.705 -30	30	0.08	30*
30-88	100	100	3
88-216	150	150	3
216-960	200	200	3
Above 960	500	500	3

Remark: * The limit shows in the table above of frequency range 0.009 – 0.490, 0.490 – 1.705 MHz and
1.705-30MHz is at 300 meter, 30 meter and 30 meter range respectively, which corresponds to 128.51 – 93.80, 73.80 – 62.96 and 69.54.00 dB $\mu\text{V}/\text{m}$ at 3m range by extrapolation

calculation and the measurement of loop antenna. The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz Radiated emission limits in these three bands are based on measurements employing an average detector.

Normal Test Condition:

Temperature (Norm) = + 22.3 °C	Voltage = DC 12.0 V	Relative humidity: 58 %
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Test procedures

Radiated emissions from the EUT were measured according to the dictates in section 11.11 & 11.12 of ANSI

C63.10-2013 and only the radiated emissions of the configuration that produced the worst case emissions

are reported in this section.

Test Procedures for emission above 30 MHz

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site below 1 GHz and 1.5 meters above the ground at a 3 meter anechoic chamber test site above 1 GHz. The table was rotated 360 degrees to determine the position of the highest radiation.

2. During performing radiated emission below 1 GHz, the EUT was set 3 meters away from the interference

receiving antenna, which was mounted on the top of a variable-height antenna tower. During performing

radiated emission above 1 GHz, the EUT was set 3 meter away from the interference-receiving antenna.

3. The antenna is a bi-log antenna, a horn antenna and its height is varied from one meter to four meters

above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to

heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.

5. For measurements below 1 GHz resolution bandwidth is set to 100 kHz for peak detection measurements or

120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

6. For measurements Above 1 GHz resolution bandwidth is set to 1 MHz, the video bandwidth is set to 3 MHz for

peak measurements and as applicable for average measurements..

Test results for frequency range 9kHz – 30MHz

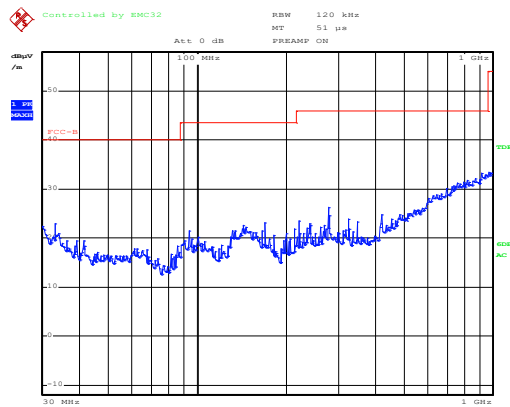
No emissions found in frequency range 9 kHz to 30 MHz, and measured levels are below 20dB from the limit line, hence not reported

Test results for frequency range 30MHz – 1GHz

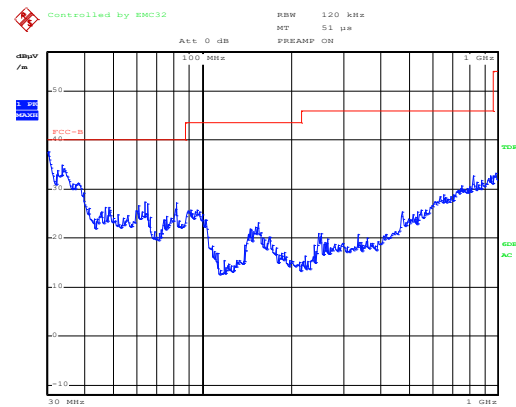
TEST MODE : 802.11ac40 (CH : 6 - 2 437 MHz)								
Frequency (MHz)	Reading (dBμV)	Position (V/H)	Height (m)	Correction Factor		Result Value(Quasi-peak)		
				Ant Factor (dB)	Cable (dB)	Limit (dBμV/m)	Result (dBμV/m)	Margin (dB)
33.00	9.95	H	1.5	12.22	0.86	40.00	23.03	16.97
94.20	12.44	H	1.5	7.76	1.29	43.50	21.49	22.01
169.40	8.76	H	1.5	12.63	1.80	43.50	23.19	20.31
221.80	11.46	H	1.5	9.96	2.19	46.00	23.61	22.39
278.10	10.73	H	1.0	13.02	2.51	46.00	26.26	19.74
421.10	6.51	H	1.0	16.14	2.22	46.00	24.87	21.13
30.10	21.88	V	1.5	12.10	0.83	40.00	34.81	5.19
33.20	21.42	V	1.5	12.22	0.86	40.00	34.50	5.50
65.00	13.39	V	1.5	12.80	1.06	40.00	27.25	12.75
143.00	9.27	V	1.0	12.76	1.59	43.50	23.62	19.88
177.50	12.58	V	1.0	11.95	1.90	43.50	26.43	17.07
631.30	5.02	V	1.0	20.41	3.97	46.00	29.40	16.60
Remark	H : Horizontal, V : Vertical *Checked in all 3 axis and the maximum measured data were reported.(Worst data is X axis of position) *CL = Cable Loss(In case of below 1 000 MHz) *Result Value = Reading + Ant Factor + Cable loss *The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection at frequency below 1 GHz. *All modes of operation were investigated, and the worst-case configuration results are reported in this section							

Modulation: 802.11ac40

Data rate: MCS0



Polarity:Horizontal

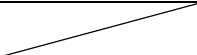
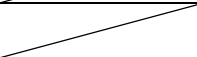
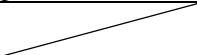
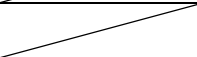


Polarity:Vertical

Test results for the frequencies in the range 1 GHz to 26.5 GHz
Test Data(Low)

802.11b ANT0

Measurement Distance : 3 m

Frequency (MHz)	Reading (dB μ V)	Position (V/H)	Height (m)	Correction Factor		Duty Cycle Correction(dB)	Result Value		
				Ant Factor (dB)	AMP & Cable (dB)		Limit (dB μ V/m)	Result (dB μ V/m)	Margin (dB)
PEAK(RBW: 1 MHz VBW: 3 MHz)									
2390.00	48.60	H	1.5	27.73	-28.01		74.00	48.32	25.68
2390.00	49.65	V	1.5	27.73	-28.01		74.00	49.37	24.63
4824.00	46.65	H	1.5	31.44	-25.25		74.00	52.84	21.16
4824.00	45.01	V	1.5	31.44	-25.25		74.00	51.20	22.80
AV(RBW: 1 MHz VBW: 3 MHz)									
2390.00	37.51	H	1.5	27.73	-28.01	0.04	54.00	37.27	16.73
2390.00	37.19	V	1.5	27.73	-28.01	0.04	54.00	36.95	17.05
4824.00	39.78	H	1.5	31.44	-25.25	0.04	54.00	46.01	7.99
4824.00	36.15	V	1.5	31.44	-25.25	0.04	54.00	42.38	11.62
Remark	H : Horizontal, V : Vertical TEST MODE : CH : 1 - 2 412 MHz (x postion)								
	*The TX signal wasn't detected from 5th harmonics.								
	*Checked in all 3 axis and the maximum measured data were reported.(Worst data is X axis of position)								
	*Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Duty Cycle Correction								