



HCT CO., LTD.

CERTIFICATE OF COMPLIANCE FCC Certification

Applicant Name: LG Electronics Inc.	Date of Issue: October 26, 2011
Address: 19-1, Cheongho-ri, Jinwi-myeon, Pyeongtaek-Si, Gyeonggi-do, Korea(451-713)	Test Site/Location: HCT CO., LTD., 105-1, Jangam-ri, Majang-Myeon, Icheon-si, Kyunggi-Do, Korea
	Report No.: HCTR1110FR02-3
	HCT FRN: 0005866421
	IC Recognition No.: 5944A-3

FCC ID:	BEJTWFM003D
IC:	2703H-TWFM003D
APPLICANT:	LG Electronics Inc.

FCC Model(s):	TWFM-B003D
IC Model(s):	TWFM-B003D
EUT Type:	WI-FI Module
Max. RF Output Power:	Ant.0: Wi-Fi 802.11a (5180~5240) (13.39 dBm)/ Wi-Fi 802.11n (5180~5240) (13.36 dBm) Wi-Fi 802.11n_40 MHz (5180~5240) (6.48 dBm) Ant.1: Wi-Fi 802.11a (5180~5240) (13.05 dBm)/ Wi-Fi 802.11n (5180~5240) (12.88 dBm) Wi-Fi 802.11n_40 MHz (5180~5240) (5.63 dBm)
Frequency Range:	5180 – 5240 MHz (UNII Band 1)
Modulation type	DSSS/OFDM
FCC Classification:	Unlicensed National Information Infrastructure (UNII)
FCC Rule Part(s):	Part 15.407
IC Rule :	RSS-210 , RSS-GEN
IC Registration No. :	5944A-3

Engineering Statement:

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.

HCT CO., LTD. Certifies that no party to this application has subject to a denial of Federal benefits that includes FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998, 21 U.S. C. 853(a)

Report prepared by
: Jong Seok Lee
Test engineer of RF Team

Approved by
: Sang Jun Lee
Manager of RF Team

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FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: WI-FI Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCTR1110FR02	October 18, 2011	- First Approval Report
HCTR1110FR02-1	October 24, 2011	- Add Directional Antenna Gain
HCTR1110FR02-2	October 25, 2011	- Add Conducted Emissions
HCTR1110FR02-3	October 26, 2011	- Insert OBW test result

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1. GENERAL INFORMATION

Applicant: LG Electronics Inc.
Address: 19-1, Cheongho-ri, Jinwi-myeon, Pyeongtaek-Si, Gyeonggi-do, Korea(451-713)
FCC ID: JYCTWFM-B003D
EUT Type: WI-FI Module
FCC Model Name: TWFM-B003D
IC Model Name: TWFM-B003D
Date(s) of Tests: September 09, 2011 ~ October 15, 2011
Contact person: Name: Min Seok Kim
 Phone #: +82-31-610-5844
Place of Tests: HCT Co., Ltd.
 105-1, Jangam-ri, Majang-Myeon, Icheon-si, Kyunggi-Do, 467-811, KOREA.
 (IC Recognition No. : 5944A-3)

2. EUT DESCRIPTION

EUT Type	WI-FI Module	
FCC Model Name	TWFM-B003D	
IC Model Name	TWFM-B003D	
Power Supply	DC 5.0 V	
Frequency Range	TX: 5180 MHz ~ 5240 MHz RX: 5180 MHz ~ 5240 MHz	
Max. RF Output Power:	Ant.0:	Wi-Fi 802.11a (5180~5240) (13.39 dBm)/ Wi-Fi 802.11n_20 MHz (5180~5240) (13.36 dBm)/ Wi-Fi 802.11n_40 MHz (5180~5240) (6.48 dBm)
	Ant.1:	Wi-Fi 802.11a (5180~5240) (13.05 dBm)/ Wi-Fi 802.11n_20 MHz (5180~5240) (12.88 dBm)/ Wi-Fi 802.11n_40 MHz (5180~5240) (5.63 dBm)
Modulation Type	OFDM(802.11a, 802.11n)	
Antenna Specification	Ant.0:	Manufacturer: LGINNOTEK Antenna type: PIFA Antenna Peak Gain : 1.90 dBi (5.2 GHz)
	Ant.1:	Manufacturer: LGINNOTEK Antenna type: PIFA Antenna Peak Gain : 1.86 dBi (5.2 GHz)
	Directional Antenna Gain	4.89 dBi (802.11a_5.2 GHz), 1.88 dBi (802.11n_5.2 GHz)

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3. TEST METHODOLOGY

The measurement procedure described in the American National Standard for Methods of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz(ANSI C63.4-2003)

3.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

3.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4. (Version :2003) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 13.1.4.1 of ANSI C63.4. (Version: 2003)

3.4 DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Channel low, mid and high with highest data rate (worst case) is chosen for full testing.

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4. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipments, which is traceable to recognized national standards.

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 105-1, Jangam-ri, Majang-Myeon, Icheon-si, Kyunggi-Do, 467-811, Korea. The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2003) and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated March 02, 2011 (Registration Number: 90661)

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements. Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

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6. ANTENNA REQUIREMENTS

According to FCC 47 CFR §15.203:

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.”

* The antennas of this E.U.T are permanently attached.

*The E.U.T Complies with the requirement of §15.203

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7. SUMMARY OF TEST RESULTS

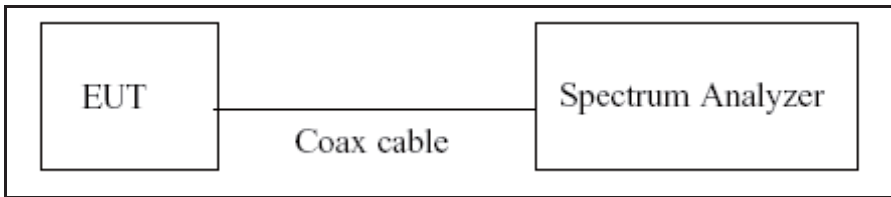
Test Description	IC Part Section(s)	FCC Part Section(s)	Test Limit	Test Condition	Test Result
TRANSMITTER MODE(TX)					
26dB Bandwidth [FCC]	RSS-210, [A9.2]	NA	NA	CONDUCTED	PASS
Occupied Bandwidth [IC]	RSS-210, [A9.2]	NA	NA		PASS
Maximum Conducted Output Power	RSS-210, [A9.2]	§15.407(a)(1)	< 4+10 log ₁₀ (BW) dBm (5150-5250 MHz)[FCC] <10+10 log ₁₀ (BW) dBm (5150-5250 MHz)[IC]		PASS
Peak Power Spectral Density	RSS-210, [A9.2]	§15.407(a)(1), (5)	<4 dBm/ MHz (5150-5250) [FCC] <10 dBm/ MHz (5150-5250) [IC]		PASS
Peak Excursion	NA	§15.407(a)(6)	<13 dB/ MHz maximum difference		PASS
Frequency Stability	NA	§15.407(g)	NA		PASS
Undesirable Emissions	RSS-210, [A9.2]	§15.407(b)(1), (2), (3)	<-27 dBm/ MHz EIRP (5150-5350 MHz)	RADIATED	PASS
General Field Strength Limits(Restricted Bands and Radiated Emission Limits)	RSS-Gen [7.2.3.2]	15.205, 5.407(b)(1), (5), (6)	Emissions in restricted bands must meet the radiated limits detailed in 15.209 (RSS-210 Table 3 Limits)		PASS
AC Conducted Emissions 150 kHz-30 MHz	RSS-Gen [7.2.2]	15.207	<FCC 15.207 limits or <RSS-Gen table 2 limits	LINE CONDUCTED	PASS
RECEIVER MODE (RX)/ DIGITAL EMISSIONS					
General Field Strength Limits(Restricted Bands and Radiated Emission Limits)	RSS-Gen [7.2.3.2]	§15.109	<FCC 15.109 limits or <RSS-210 table 3 limits	RADIATED (30 MHz-1 GHz)(1-25 GHz)	PASS

7. TEST RESULT

7.1 26dB BANDWIDTH MEASUREMENT

The bandwidth at 26 dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating in transmission mode at the appropriate frequencies. The 26 dB bandwidth is used to determine the conducted power limits.

■ TEST CONFIGURATION



■ TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to

RBW: 100 kHz

VBW: 100 kHz

SPAN: 40 MHz / 80 MHz (802.11n_40 MHz BW)

■ TEST RESULTS_Ant.0

Conducted 26dB Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5180	36	18.80	N/A	Pass
5200	40	18.68	N/A	Pass
5240	48	18.61	N/A	Pass

Conducted 26dB Bandwidth Measurements for 802.11n_20 MHz BW

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5180	36	19.02	N/A	Pass
5200	40	18.87	N/A	Pass
5240	48	18.92	N/A	Pass

Conducted 26dB Bandwidth Measurements for 802.11n_40 MHz BW

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5190	38	38.19	N/A	Pass
5230	46	38.08	N/A	Pass

■ TEST RESULTS_Ant.1

Conducted 26dB Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5180	36	19.07	N/A	Pass
5200	40	18.39	N/A	Pass
5240	48	18.87	N/A	Pass

Conducted 26dB Bandwidth Measurements for 802.11n_20 MHz BW

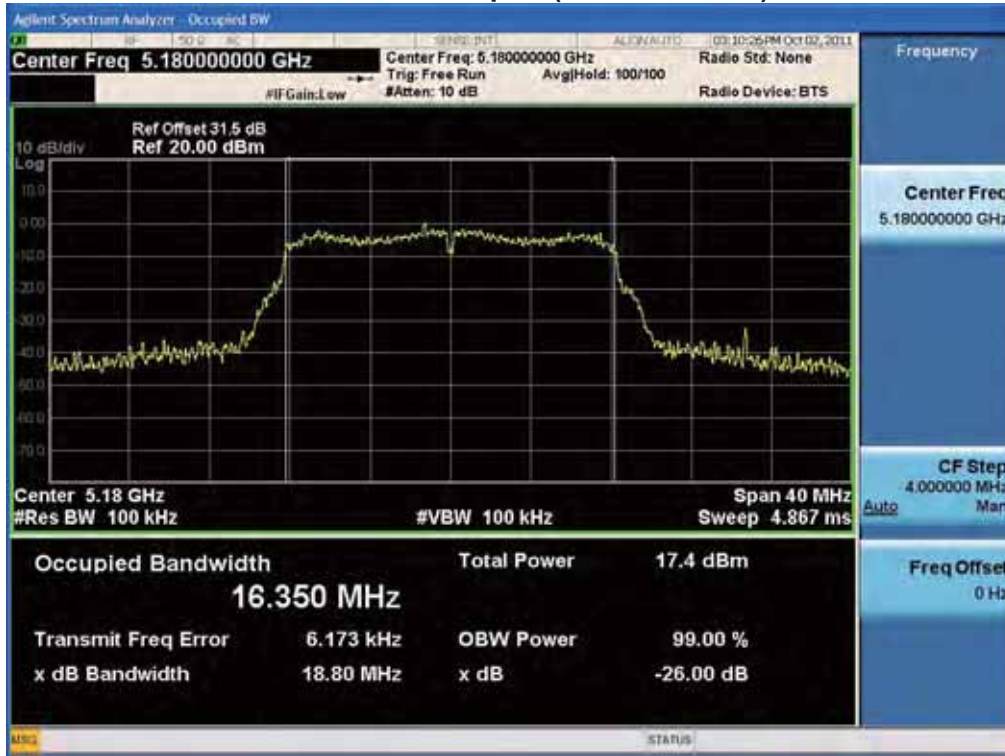
802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5180	36	18.94	N/A	Pass
5200	40	18.95	N/A	Pass
5240	48	18.94	N/A	Pass

Conducted 26dB Bandwidth Measurements for 802.11n_40 MHz BW

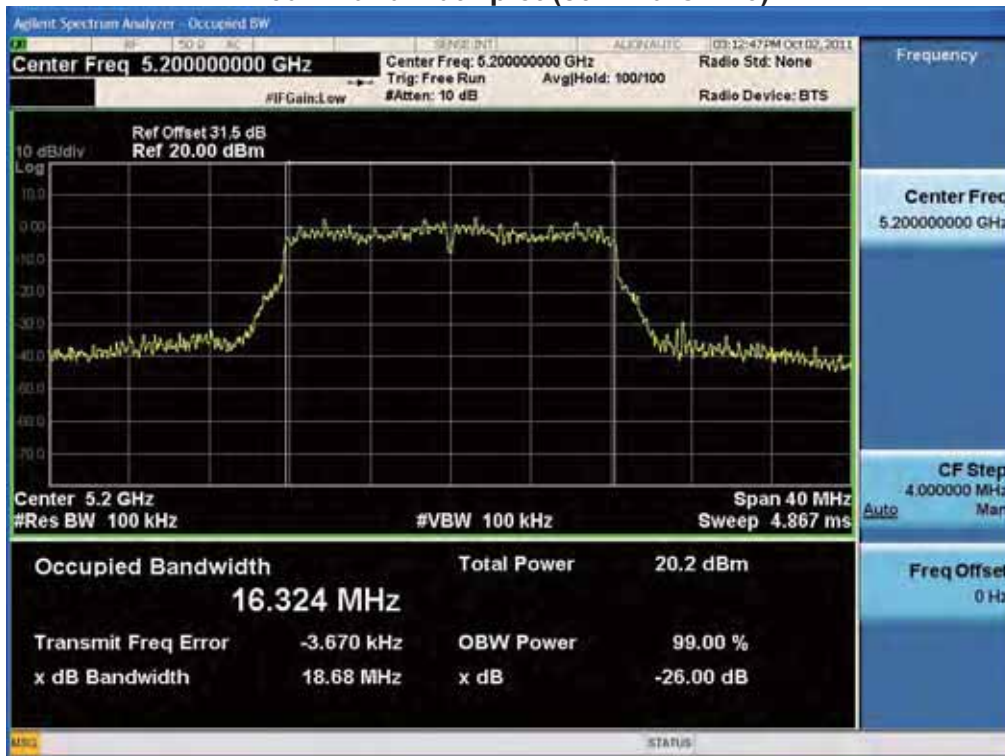
802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5190	38	38.18	N/A	Pass
5230	46	38.16	N/A	Pass

RESULT PLOTS_Ant.0

26dB Bandwidth plot (802.11a-CH 36)

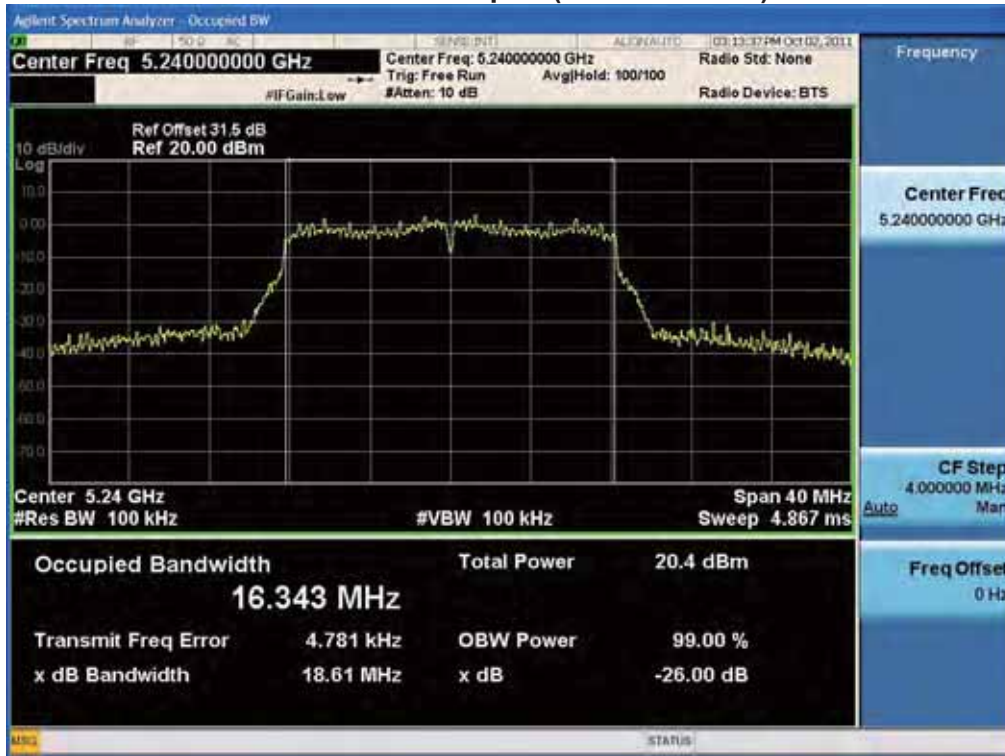


26dB Bandwidth plot (802.11a-CH 40)

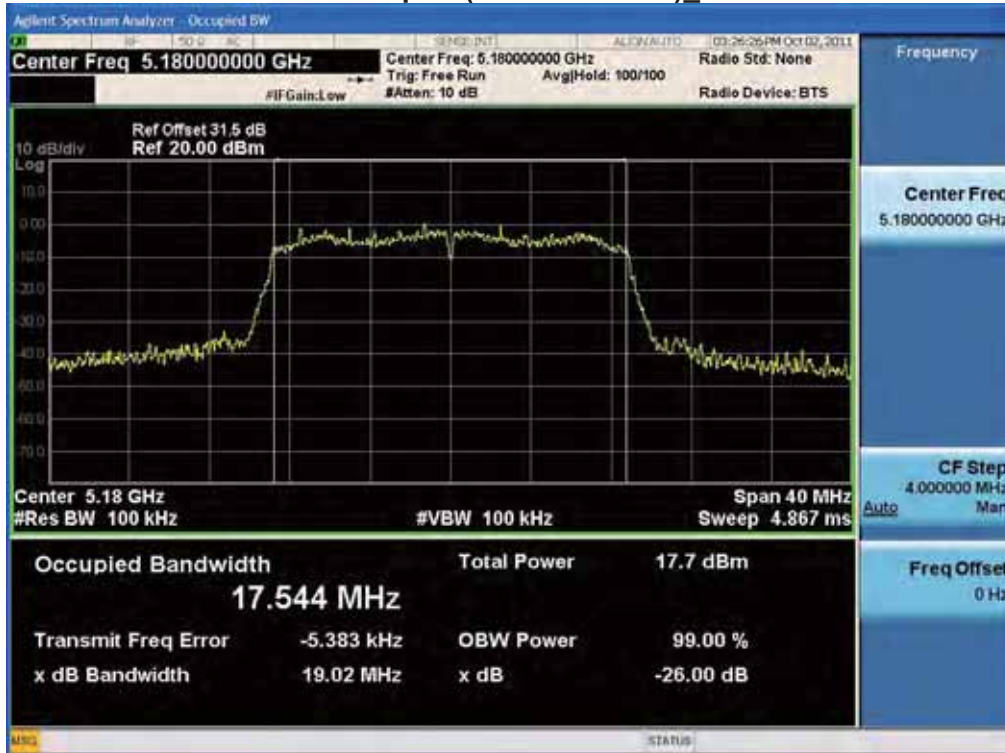


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26dB Bandwidth plot (802.11a-CH 48)

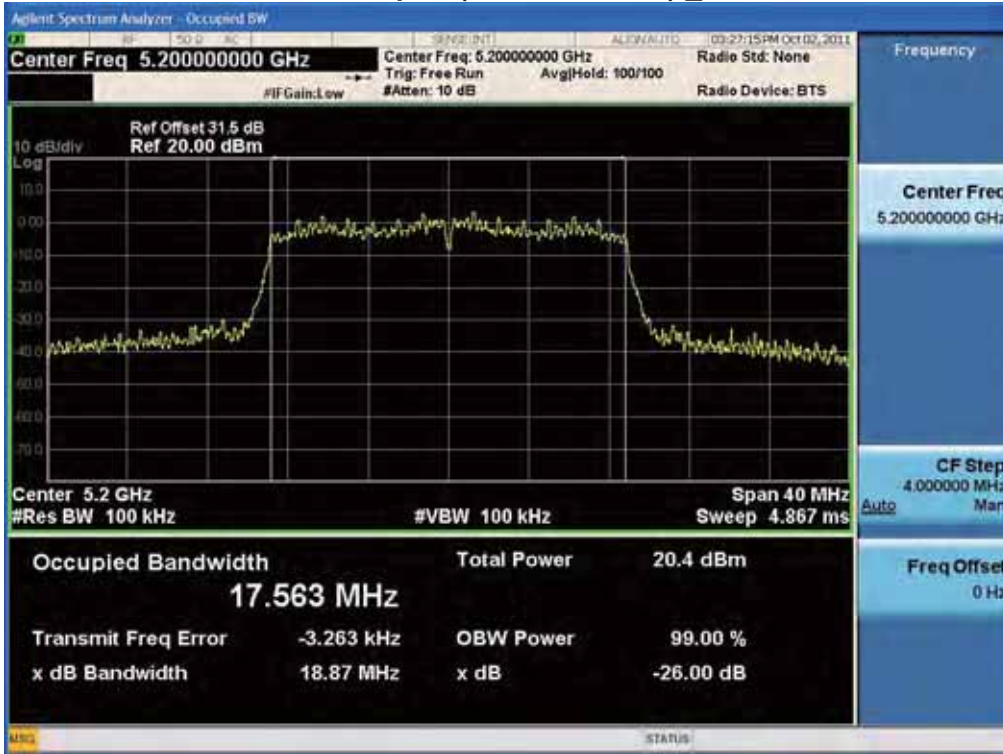


26dB Bandwidth plot (802.11n-CH 36) 20 MHz BW

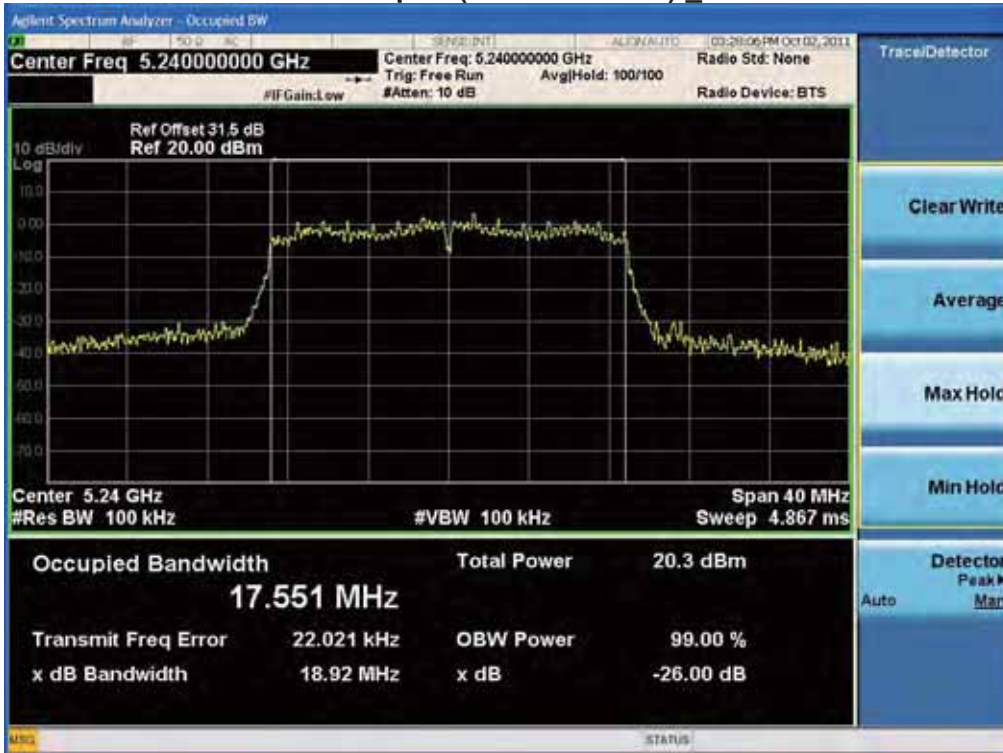


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26dB Bandwidth plot (802.11n-CH 40) _20 MHz BW

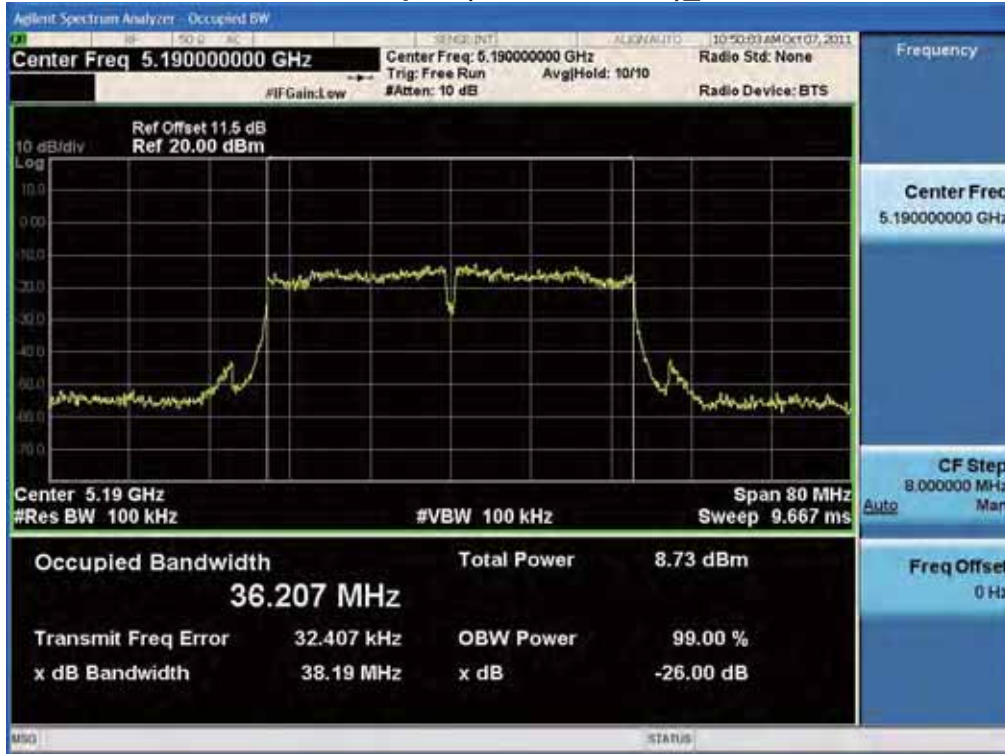


26dB Bandwidth plot (802.11n-CH 48) _20 MHz BW

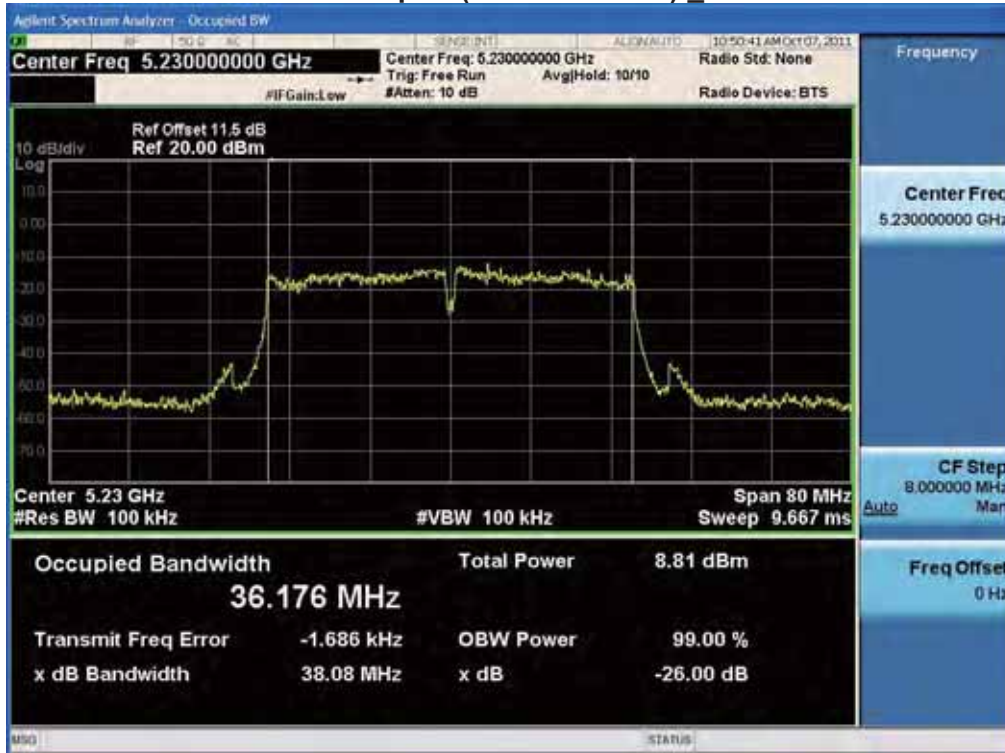


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26dB Bandwidth plot (802.11n-CH 38)_40 MHz BW



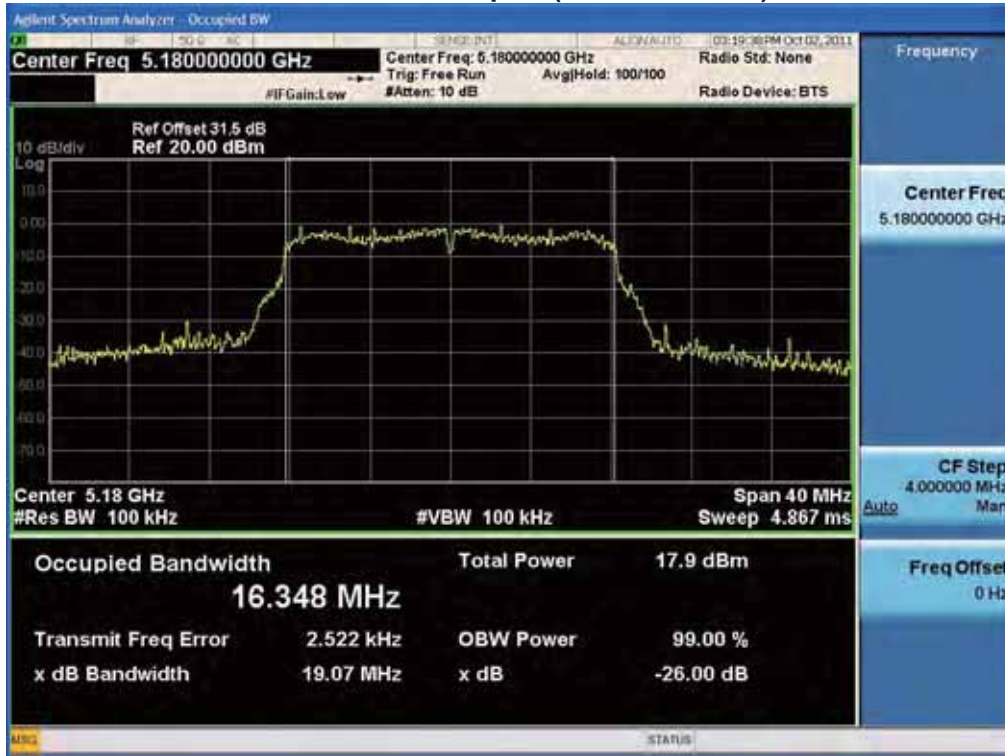
26dB Bandwidth plot (802.11n-CH 46)_40 MHz BW



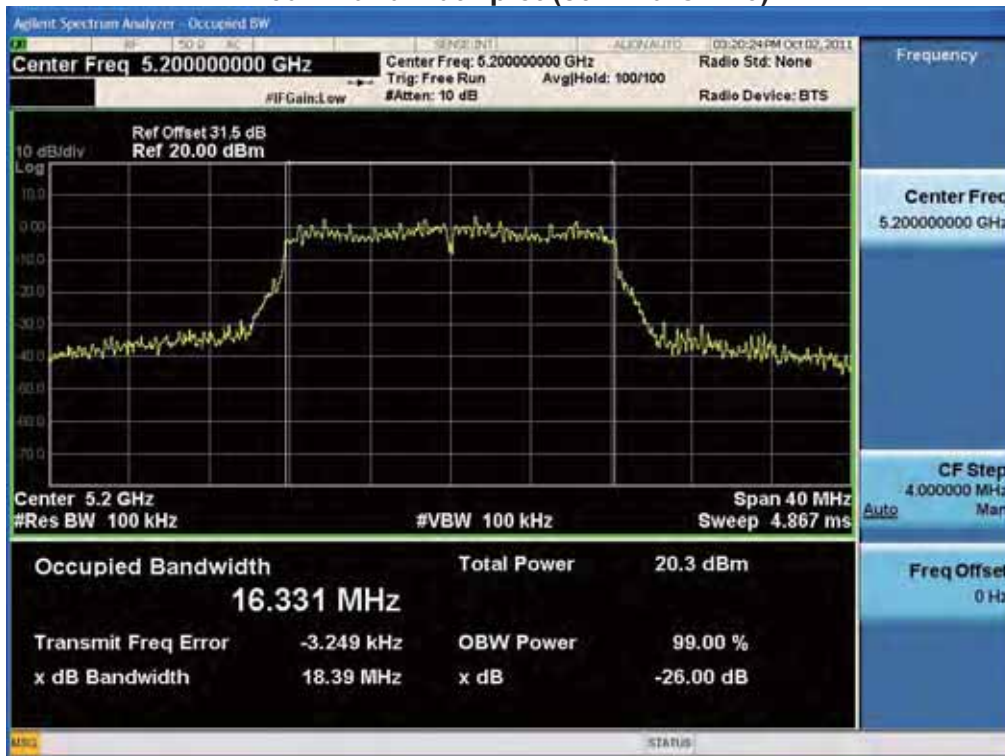
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RESULT PLOTS_Ant.1

26dB Bandwidth plot (802.11a-CH 36)

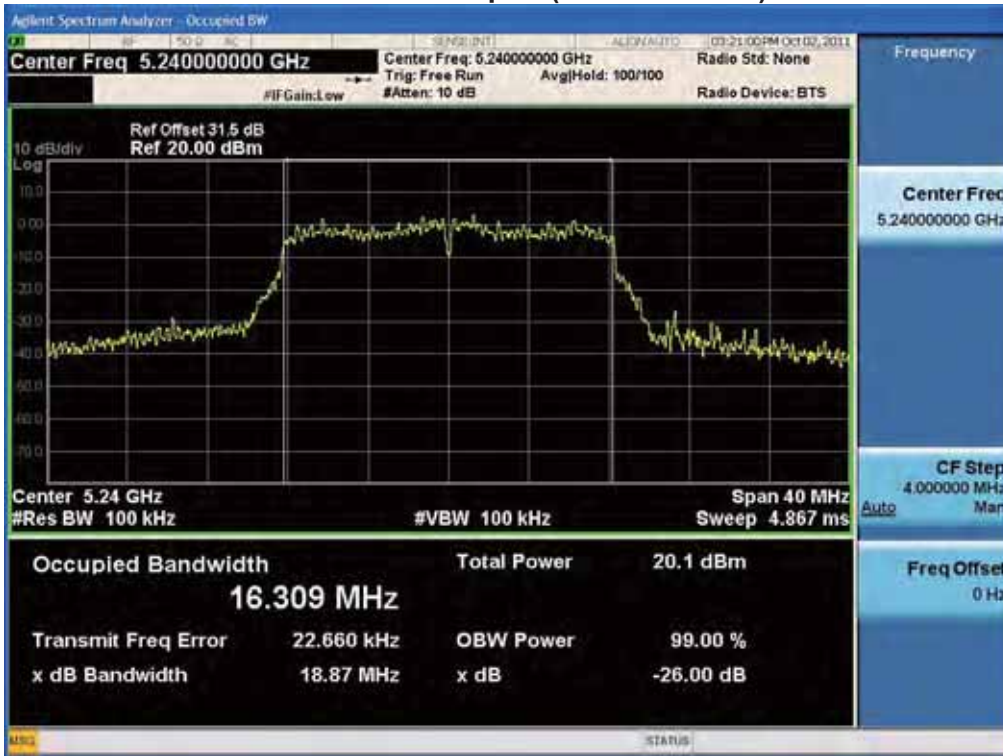


26dB Bandwidth plot (802.11a-CH 40)

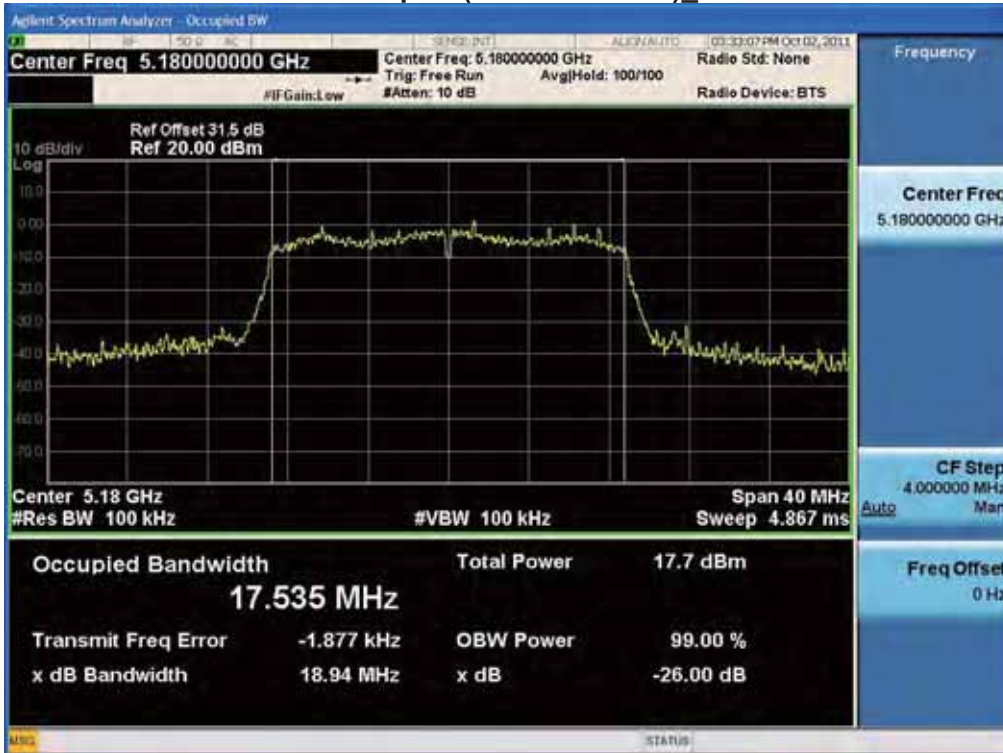


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26dB Bandwidth plot (802.11a-CH 48)



26dB Bandwidth plot (802.11n-CH 36) 20 MHz BW

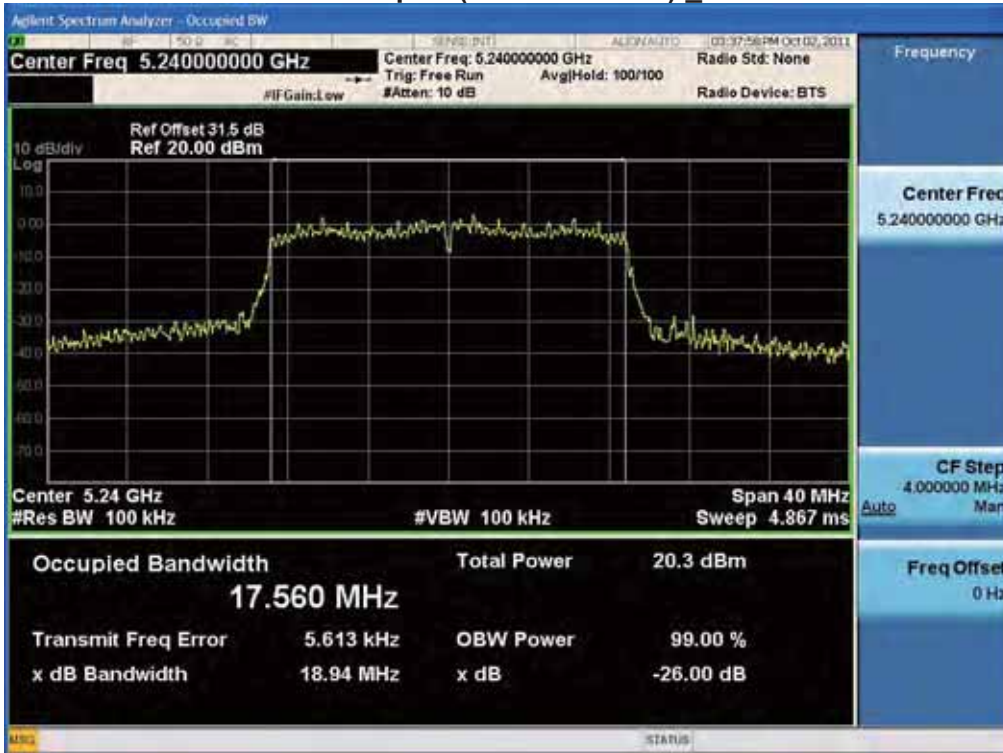


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26dB Bandwidth plot (802.11n-CH 40) _20 MHz BW

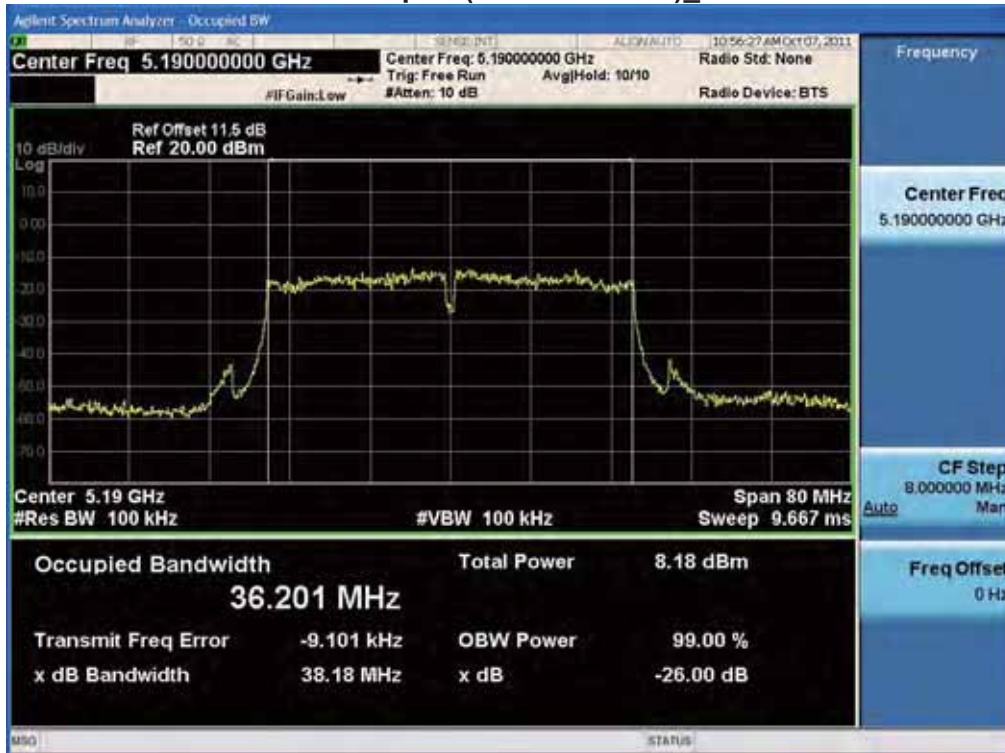


26dB Bandwidth plot (802.11n-CH 48) _20 MHz BW

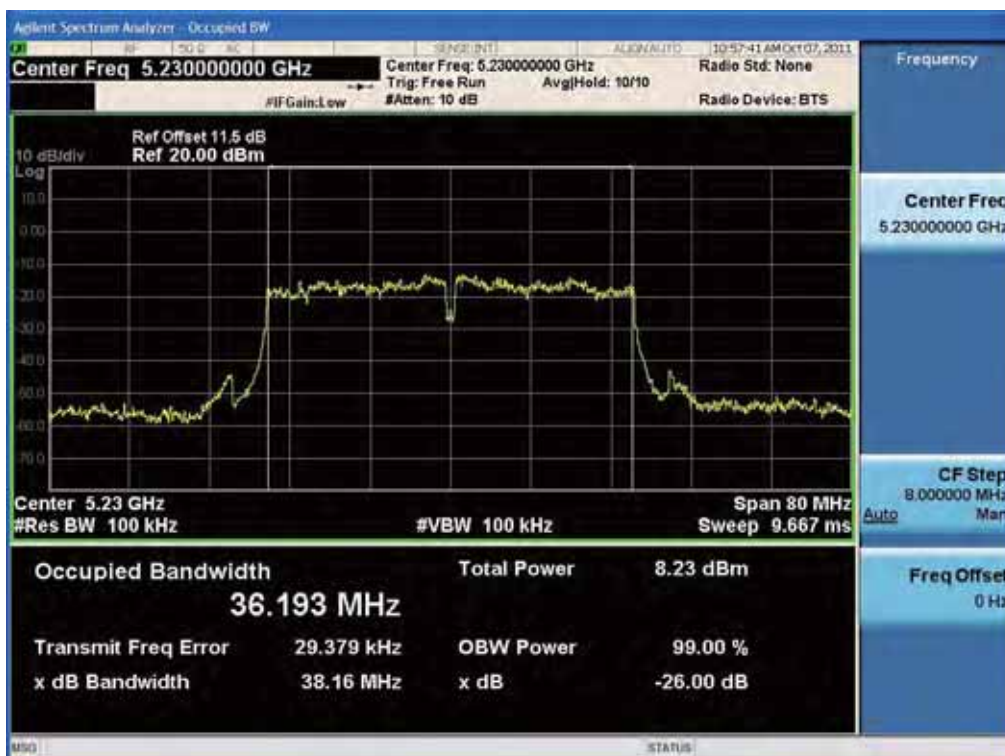


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26dB Bandwidth plot (802.11n-CH 38)_40 MHz BW



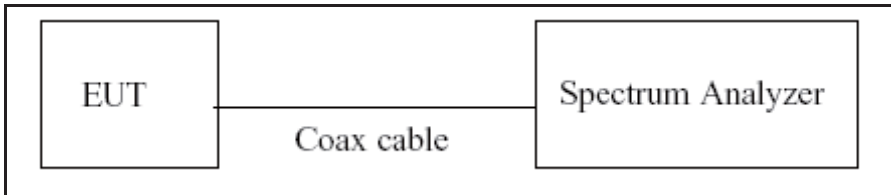
26dB Bandwidth plot (802.11n-CH 46)_40 MHz BW



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7.2 OBW (99 % BW) BANDWIDTH MEASUREMENT

■ TEST CONFIGURATION



■ TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to

RBW: RSS GEN required the RBW used for measuring 99 % must be at least 1 % of the SPAN.

VBW: 3 times of RBW

SPAN: 40 MHz

■ TEST RESULTS_Ant.0

Conducted OBW Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
5180	36	16.68
5200	40	16.54
5240	48	16.52

Conducted OBW Measurements for 802.11n_20 MHz BW

802.11n Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
5180	36	17.60
5200	40	17.58
5240	48	17.57

Conducted OBW Measurements for 802.11n_40 MHz BW

802.11n Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
5190	38	36.29
5230	46	36.33

■ TEST RESULTS_Ant.1

Conducted OBW Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
5180	36	16.51
5200	40	16.56
5240	48	16.54

Conducted OBW Measurements for 802.11n_20 MHz BW

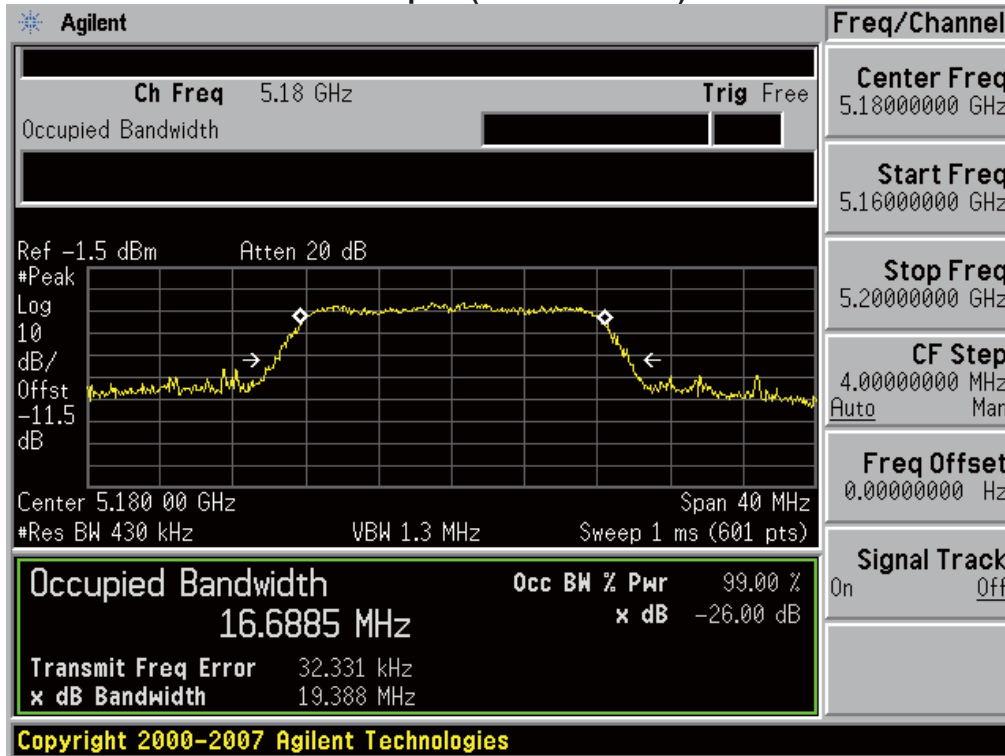
802.11n Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
5180	36	17.56
5200	40	17.65
5240	48	17.68

Conducted OBW Measurements for 802.11n_40 MHz BW

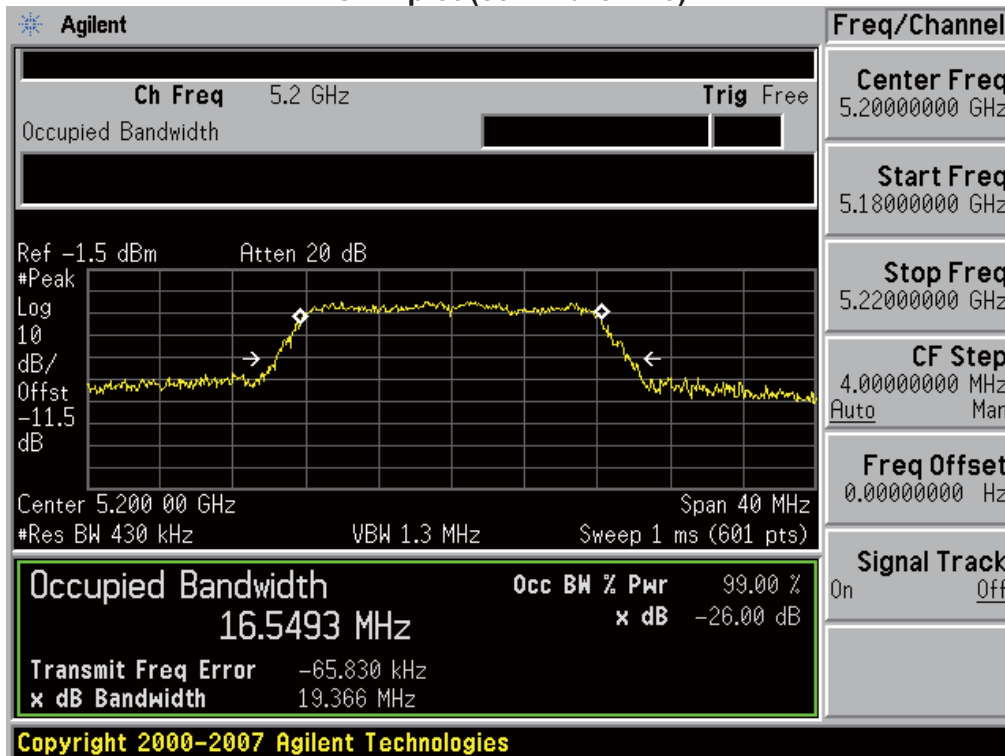
802.11n Mode		Measured Bandwidth [MHz]
Frequency [MHz]	Channel No.	
5190	38	36.30
5230	46	36.21

RESULT PLOTS_Ant.0

OBW plot (802.11a-CH 36)

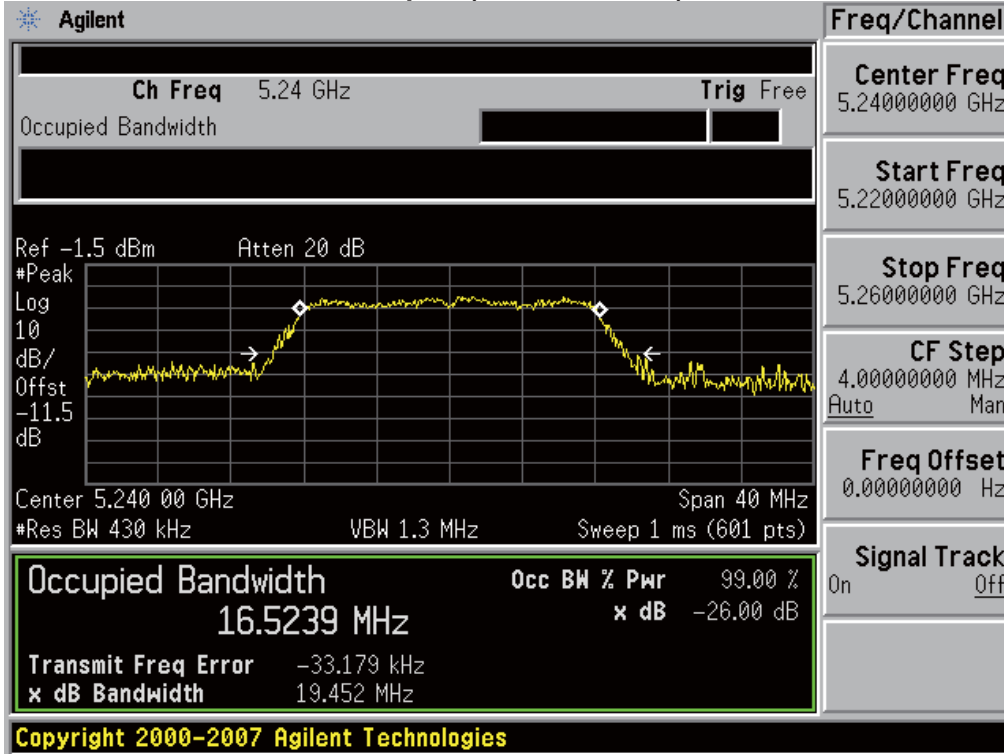


OBW plot (802.11a-CH 40)

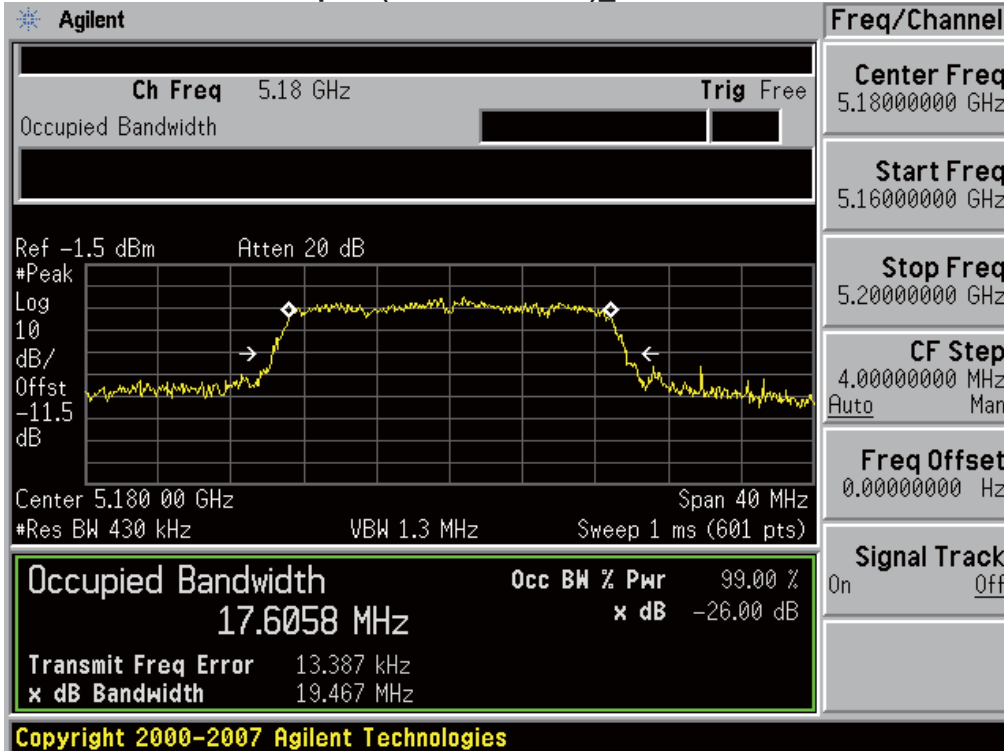


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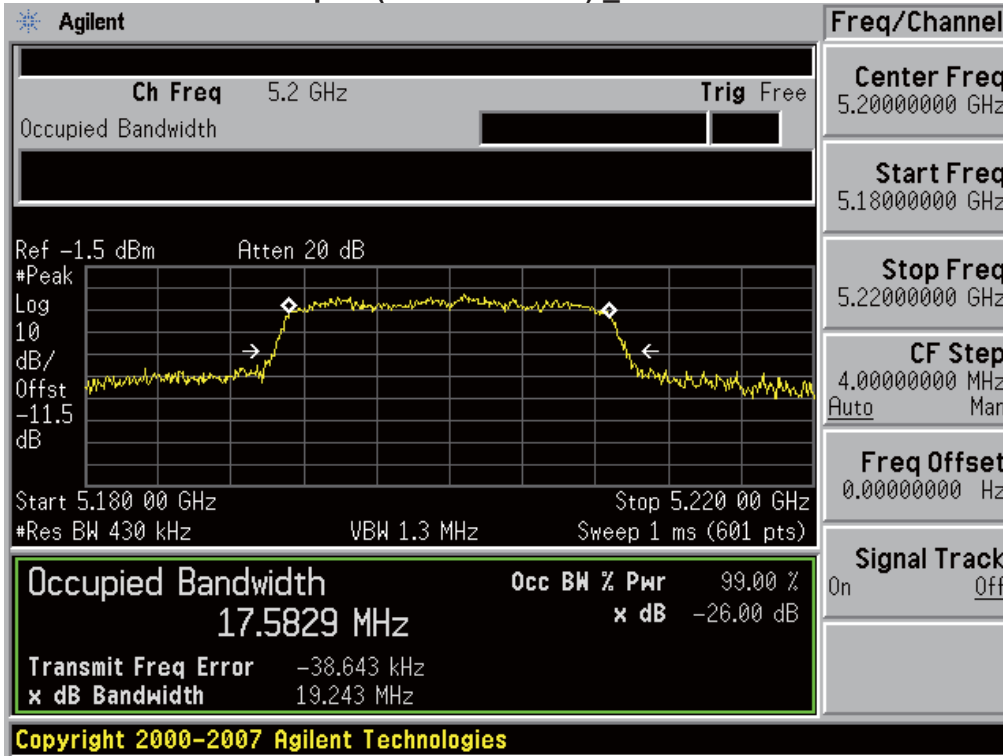
OBW plot (802.11a-CH 48)



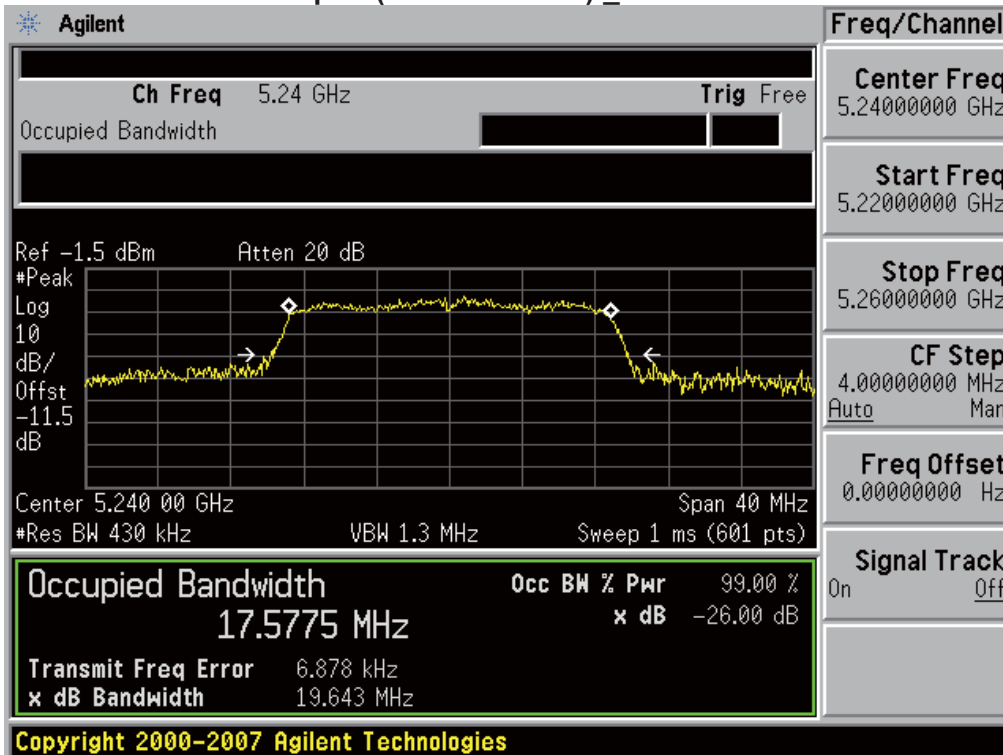
OBW plot (802.11n-CH 36)_20 MHz BW



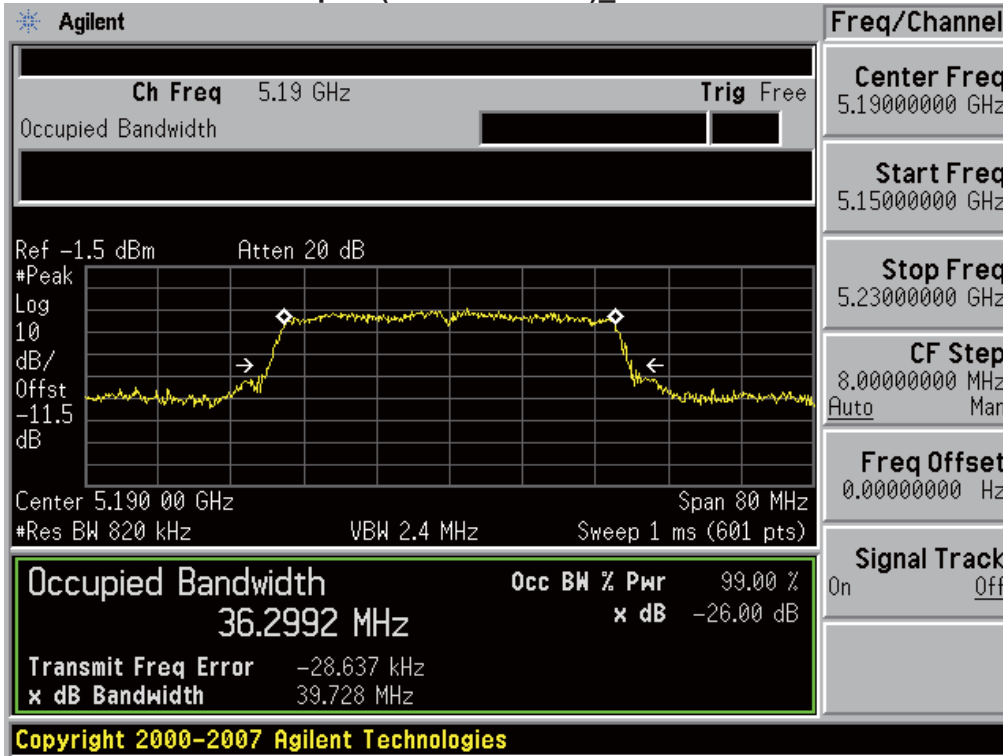
OBW plot (802.11n-CH 40) _20 MHz BW



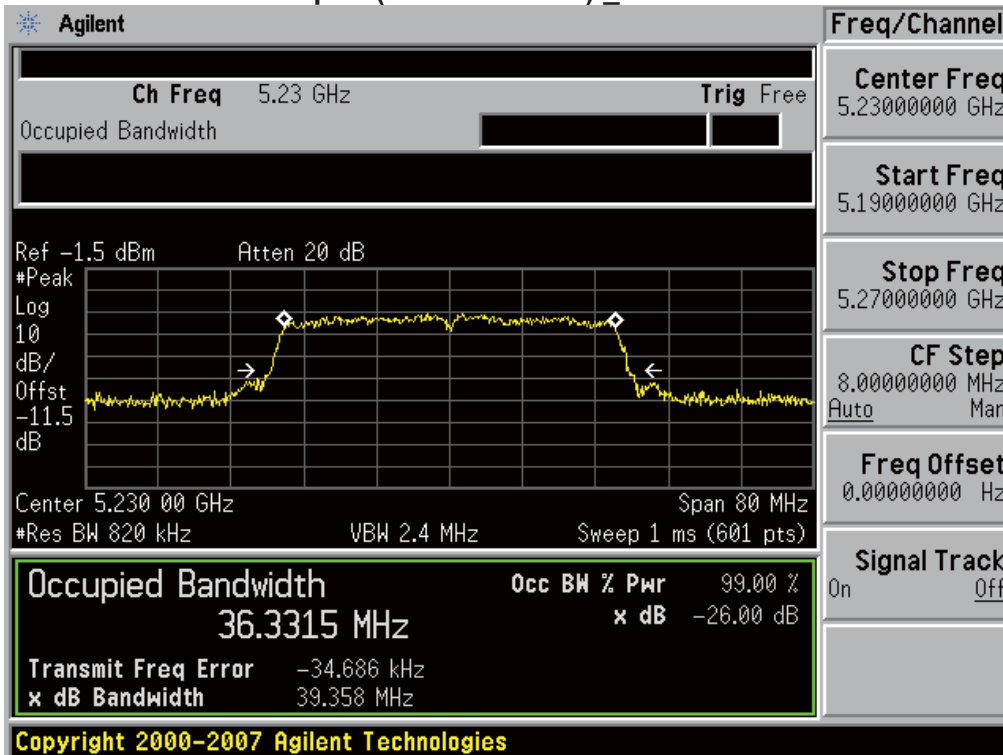
OBW plot (802.11n-CH 48) _20 MHz BW



OBW plot (802.11n-CH 38)_40 MHz BW

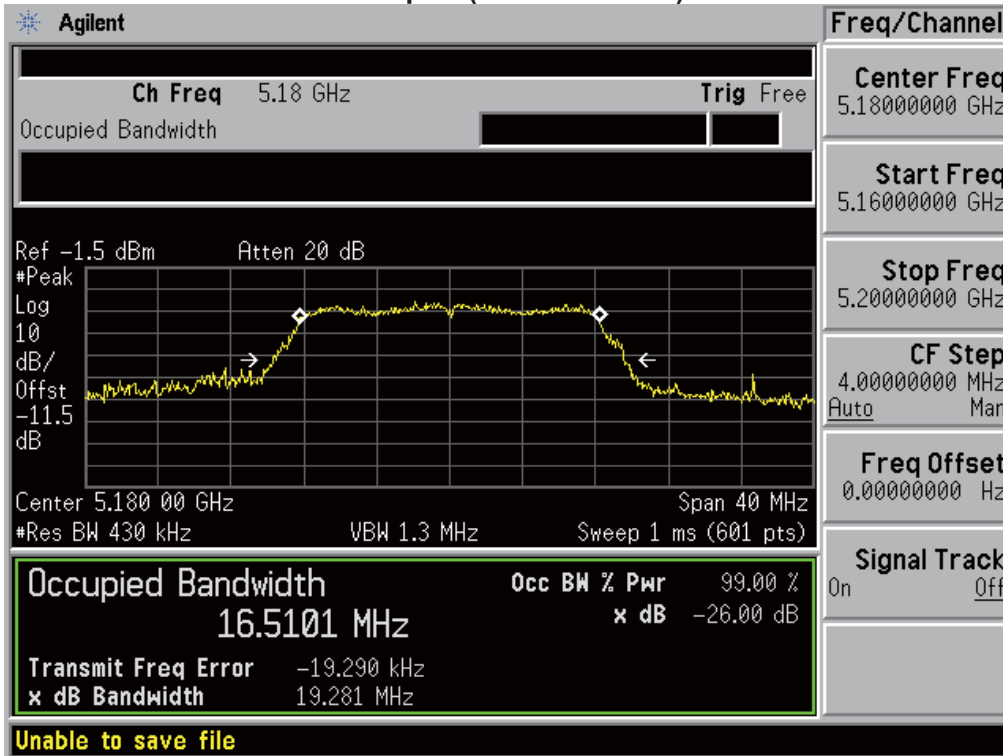


OBW plot (802.11n-CH 46)_40 MHz BW

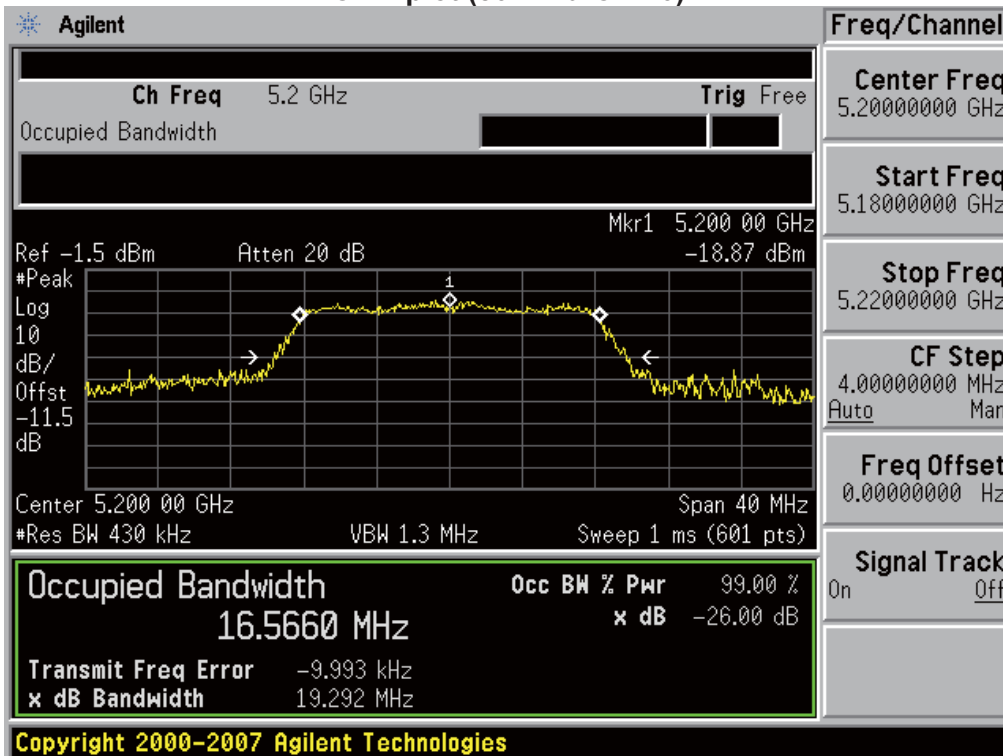


RESULT PLOTS_Ant.1

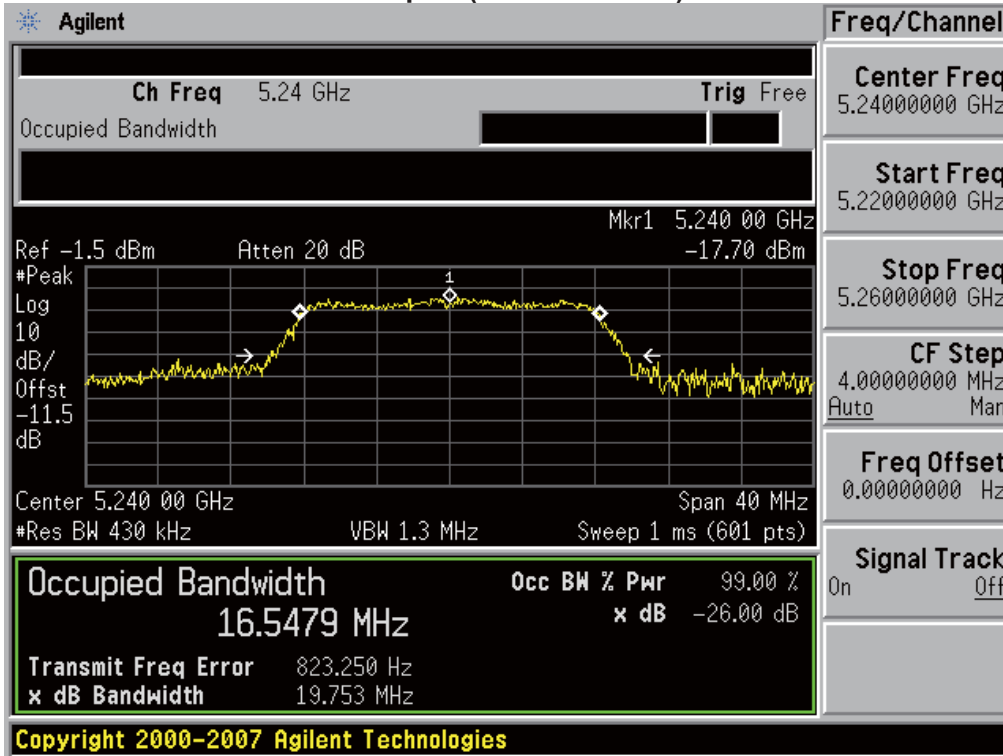
OBW plot (802.11a-CH 36)



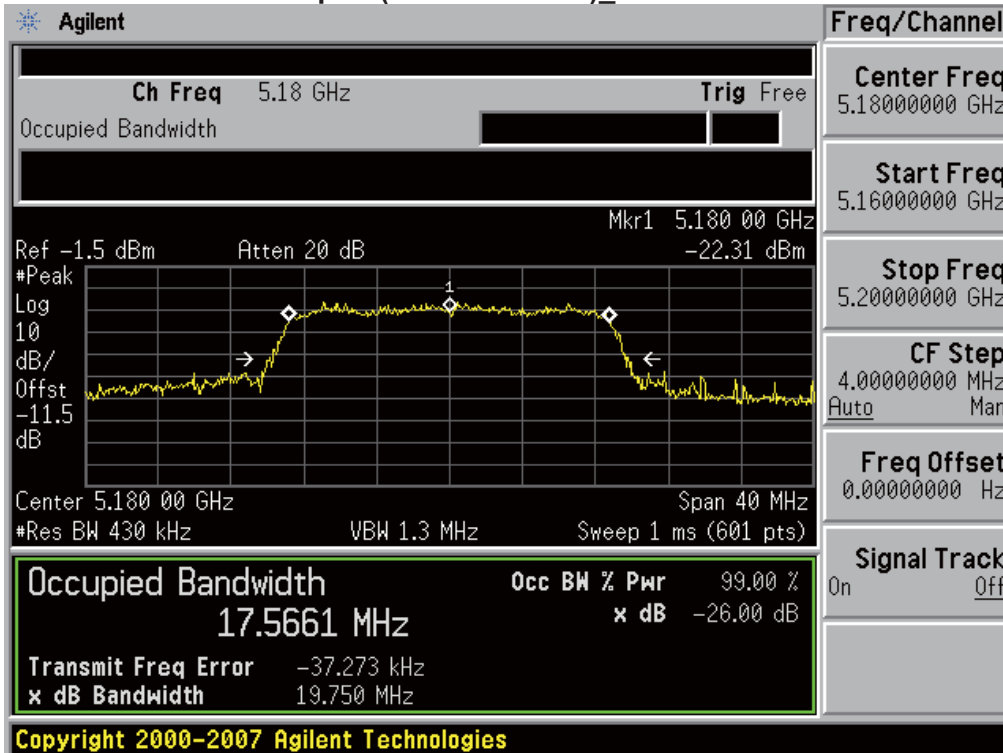
OBW plot (802.11a-CH 40)



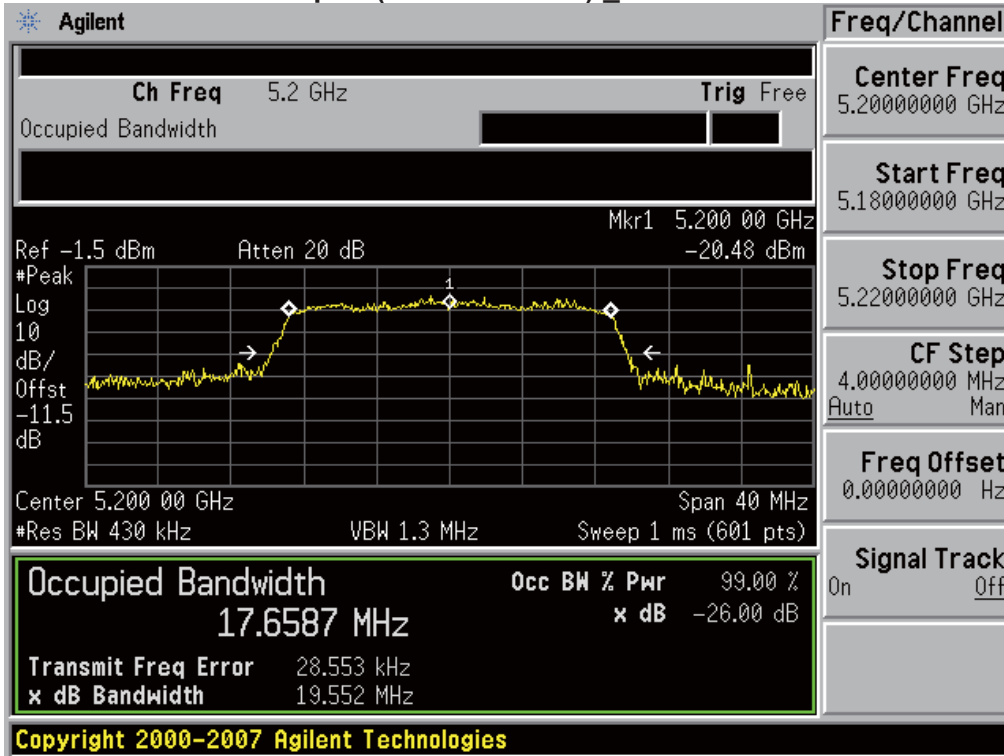
OBW plot (802.11a-CH 48)



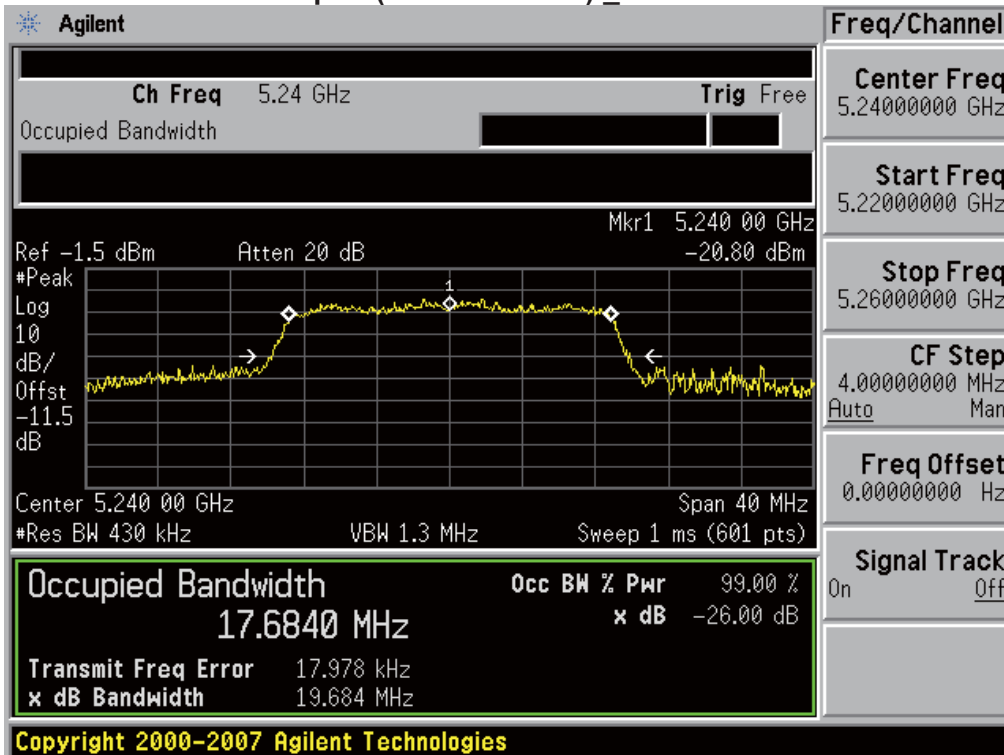
OBW plot (802.11n-CH 36)_20 MHz BW



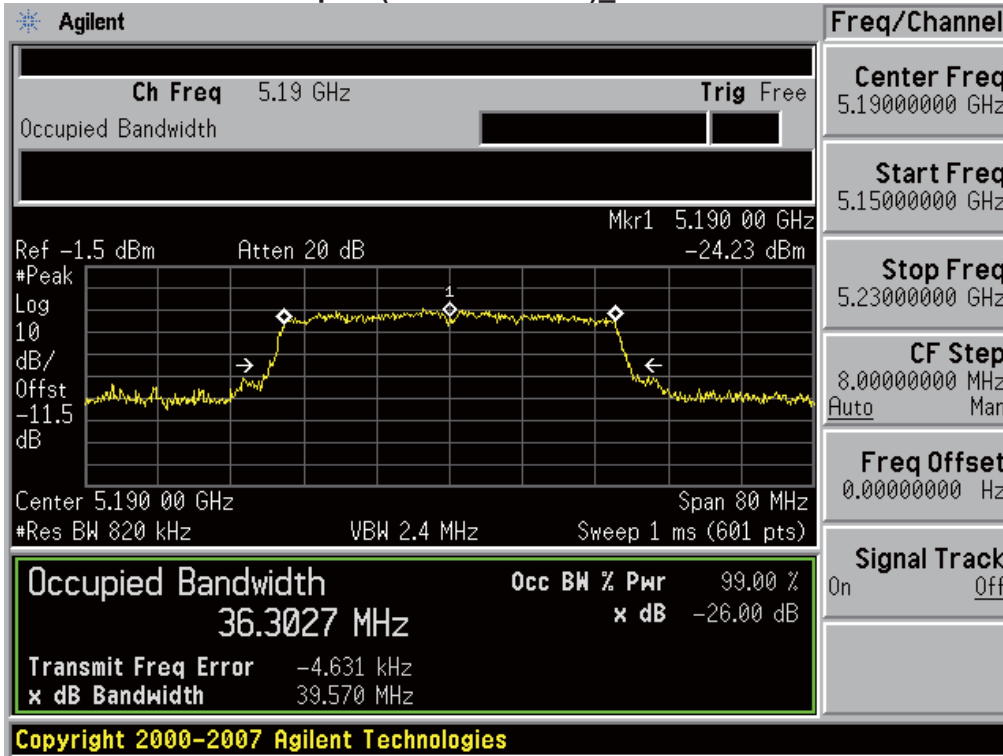
OBW plot (802.11n-CH 40) _20 MHz BW



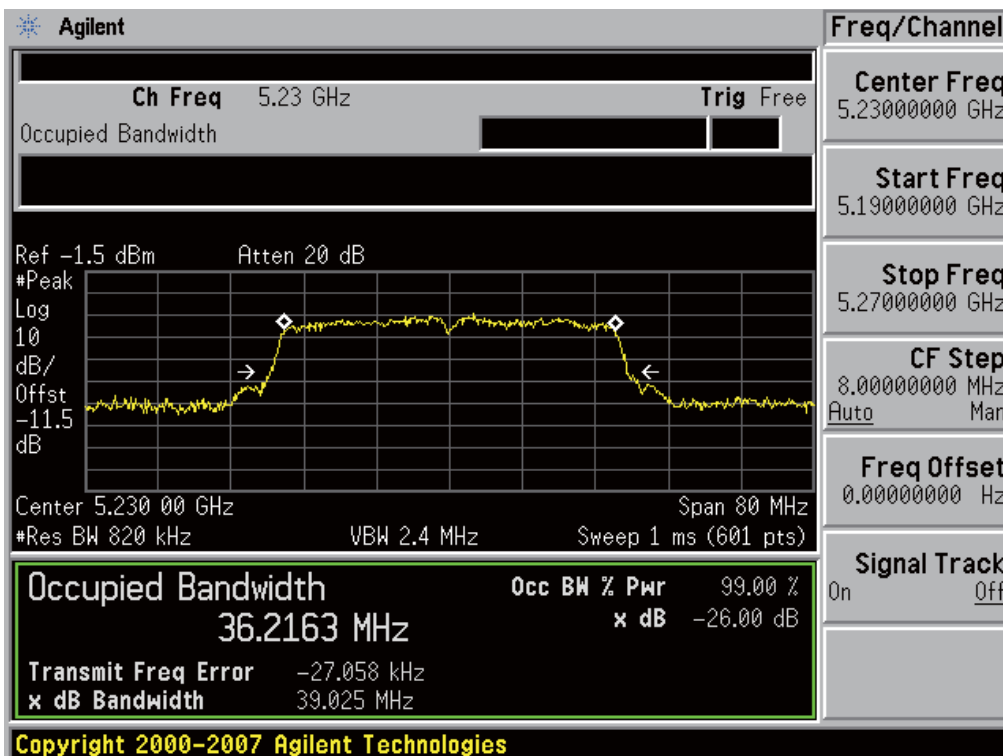
OBW plot (802.11n-CH 48) _20 MHz BW



OBW plot (802.11n-CH 38)_40 MHz BW



OBW plot (802.11n-CH 46)_40 MHz BW



7.3 OUTPUT POWER MEASUREMENT

Test Requirements and limit, §15.247(b)(3)

A transmitter antenna terminal of EUT is connected to the input of a Spectrum Analyzer. Measurement is made while the EUT is operating in transmission mode at the appropriate frequencies. In the 5.15 – 5.25 GHz band, the maximum permissible conducted output power is the lesser of 50 mW (16.99 dBm) and $4 \text{ dBm} + 10 \log_{10}(26 \text{ dB BW})$

Limit : 802.11a_Ant.0 = 16.74 dBm

802.11n_20 MHz BW_Ant.0 = 16.79 dBm

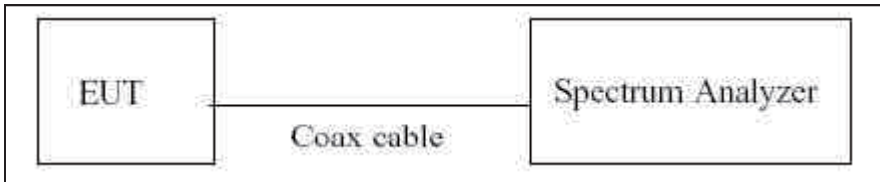
802.11n_40 MHz BW_Ant.0 = 16.99 dBm

802.11a_Ant.1 = 16.80 dBm

802.11n_20 MHz BW_Ant.1 = 16.78 dBm

802.11n_40 MHz BW_Ant.1 = 16.99 dBm

■ TEST CONFIGURATION



■ TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to

RBW: 1 MHz

VBW: 1 MHz

SPAN: 40 MHz / 80 MHz (802.11n_40 MHz BW)

Detector Mode = Peak

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■ TEST RESULTS_Ant.0

Conducted Output Power Measurements (802.11a Mode: 5180~5240)

802.11a Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
5180	36	6 Mbps	11.33	30
		9 Mbps	11.01	30
		12 Mbps	10.85	30
		18 Mbps	10.59	30
		24 Mbps	10.39	30
		36 Mbps	10.08	30
		48 Mbps	9.84	30
		54 Mbps	9.76	30
5200	40	6 Mbps	13.23	30
		9 Mbps	13.18	30
		12 Mbps	12.95	30
		18 Mbps	12.78	30
		24 Mbps	12.60	30
		36 Mbps	12.25	30
		48 Mbps	11.92	30
		54 Mbps	11.73	30
5240	48	6 Mbps	13.39	30
		9 Mbps	13.17	30
		12 Mbps	13.04	30
		18 Mbps	12.80	30
		24 Mbps	12.55	30
		36 Mbps	12.19	30
		48 Mbps	11.89	30
		54 Mbps	11.59	30

■ TEST RESULTS_Ant.1

Conducted Output Power Measurements (802.11a Mode:5180~5240)

802.11a Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
5180	36	6 Mbps	11.55	30
		9 Mbps	11.39	30
		12 Mbps	11.26	30
		18 Mbps	11.10	30
		24 Mbps	10.76	30
		36 Mbps	10.05	30
		48 Mbps	9.75	30
		54 Mbps	9.67	30
5200	40	6 Mbps	13.05	30
		9 Mbps	12.96	30
		12 Mbps	12.82	30
		18 Mbps	12.61	30
		24 Mbps	12.38	30
		36 Mbps	11.97	30
		48 Mbps	11.54	30
		54 Mbps	11.38	30
5240	48	6 Mbps	13.02	30
		9 Mbps	12.95	30
		12 Mbps	12.74	30
		18 Mbps	12.49	30
		24 Mbps	12.34	30
		36 Mbps	11.87	30
		48 Mbps	11.51	30
		54 Mbps	11.30	30

■ Measure and sum data

Conducted Output Power Measurements (802.11a Mode: 5180~5240)

802.11a Mode		Rate (Mbps)	Measured Power(W)	Limit (dBm)
Frequency[MHz]	Channel No.			
5180	36	6 Mbps	14.47	30
		9 Mbps	14.15	30
		12 Mbps	14.15	30
		18 Mbps	13.80	30
		24 Mbps	13.62	30
		36 Mbps	13.01	30
		48 Mbps	12.79	30
		54 Mbps	12.79	30
5200	40	6 Mbps	16.13	30
		9 Mbps	16.13	30
		12 Mbps	15.91	30
		18 Mbps	15.68	30
		24 Mbps	15.44	30
		36 Mbps	15.19	30
		48 Mbps	14.77	30
		54 Mbps	14.62	30
5240	48	6 Mbps	16.23	30
		9 Mbps	16.02	30
		12 Mbps	15.91	30
		18 Mbps	15.68	30
		24 Mbps	15.44	30
		36 Mbps	15.05	30
		48 Mbps	14.77	30
		54 Mbps	14.47	30

■ TEST RESULTS_Ant.0

Conducted Output Power Measurements (802.11n_20 MHz BW Mode: 5180~5240)

802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
5180	36	6.5 Mbps	11.36	30
		13 Mbps	11.08	30
		19.5 Mbps	10.72	30
		26 Mbps	10.49	30
		39 Mbps	10.10	30
		52 Mbps	9.42	30
		58.5 Mbps	9.67	30
		65 Mbps	9.51	30
5200	40	6.5 Mbps	13.17	30
		13 Mbps	12.99	30
		19.5 Mbps	12.62	30
		26 Mbps	12.42	30
		39 Mbps	12.06	30
		52 Mbps	11.71	30
		58.5 Mbps	11.65	30
		65 Mbps	11.41	30
5240	48	6.5 Mbps	13.36	30
		13 Mbps	13.07	30
		19.5 Mbps	12.79	30
		26 Mbps	12.54	30
		39 Mbps	12.14	30
		52 Mbps	11.80	30
		58.5 Mbps	11.63	30
		65 Mbps	11.47	30

■ TEST RESULTS_Ant.1

Conducted Output Power Measurements (802.11n _20 MHz BW Mode: 5180~5240)

802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
5180	36	6.5 Mbps	11.41	30
		13 Mbps	11.16	30
		19.5 Mbps	10.84	30
		26 Mbps	10.61	30
		39 Mbps	10.22	30
		52 Mbps	9.90	30
		58.5 Mbps	9.77	30
		65 Mbps	9.61	30
5200	40	6.5 Mbps	12.88	30
		13 Mbps	12.69	30
		19.5 Mbps	12.44	30
		26 Mbps	12.18	30
		39 Mbps	11.73	30
		52 Mbps	11.42	30
		58.5 Mbps	11.34	30
		65 Mbps	11.18	30
5240	48	6.5 Mbps	12.84	30
		13 Mbps	12.67	30
		19.5 Mbps	12.48	30
		26 Mbps	12.22	30
		39 Mbps	11.80	30
		52 Mbps	11.30	30
		58.5 Mbps	11.20	30
		65 Mbps	11.15	30

■ Measure and sum data

Conducted Output Power Measurements (802.11n _20 MHz BW Mode: 5180~5240)

802.11n Mode		Rate (Mbps)	Measured Power(W)	Limit (dBm)
Frequency[MHz]	Channel No.			
5180	36	6.5 Mbps	14.47	30
		13 Mbps	14.15	30
		19.5 Mbps	13.80	30
		26 Mbps	13.62	30
		39 Mbps	13.22	30
		52 Mbps	12.79	30
		58.5 Mbps	12.79	30
		65 Mbps	12.55	30
5200	40	6.5 Mbps	16.02	30
		13 Mbps	15.80	30
		19.5 Mbps	15.56	30
		26 Mbps	15.31	30
		39 Mbps	14.91	30
		52 Mbps	14.62	30
		58.5 Mbps	14.47	30
		65 Mbps	14.31	30
5240	48	6.5 Mbps	16.13	30
		13 Mbps	15.91	30
		19.5 Mbps	15.68	30
		26 Mbps	15.44	30
		39 Mbps	15.05	30
		52 Mbps	14.62	30
		58.5 Mbps	14.47	30
		65 Mbps	14.31	30

■ TEST RESULTS_Ant.0

Conducted Output Power Measurements (802.11n_40 MHz BW Mode: 5180~5240)

802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
5190	38	13.5 Mbps	6.48	30
		27 Mbps	6.00	30
		40.5 Mbps	5.59	30
		54 Mbps	5.16	30
		81 Mbps	4.59	30
		108 Mbps	4.13	30
		121.5 Mbps	3.98	30
		135 Mbps	3.80	30
5230	46	13.5 Mbps	6.33	30
		27 Mbps	5.82	30
		40.5 Mbps	5.43	30
		54 Mbps	5.10	30
		81 Mbps	4.53	30
		108 Mbps	4.12	30
		121.5 Mbps	3.97	30
		135 Mbps	3.72	30

■ TEST RESULTS_Ant.1

Conducted Output Power Measurements (802.11n_40 MHz BW Mode:5180~5240)

802.11n Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
5190	38	13.5 Mbps	5.49	30
		27 Mbps	4.74	30
		40.5 Mbps	4.19	30
		54 Mbps	3.71	30
		81 Mbps	3.16	30
		108 Mbps	2.69	30
		121.5 Mbps	2.55	30
		135 Mbps	2.34	30
5230	46	13.5 Mbps	5.63	30
		27 Mbps	4.91	30
		40.5 Mbps	4.22	30
		54 Mbps	3.74	30
		81 Mbps	3.16	30
		108 Mbps	2.60	30
		121.5 Mbps	2.37	30
		135 Mbps	2.21	30

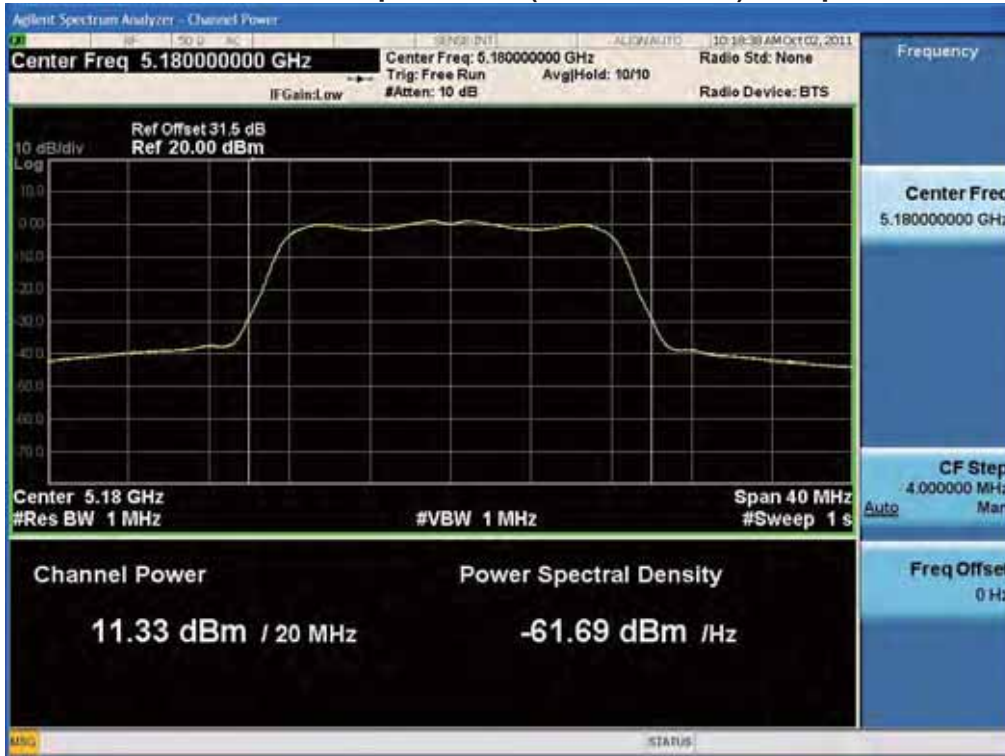
■ Measure and sum data

Conducted Output Power Measurements (802.11n_40 MHz BW Mode:5180~5240)

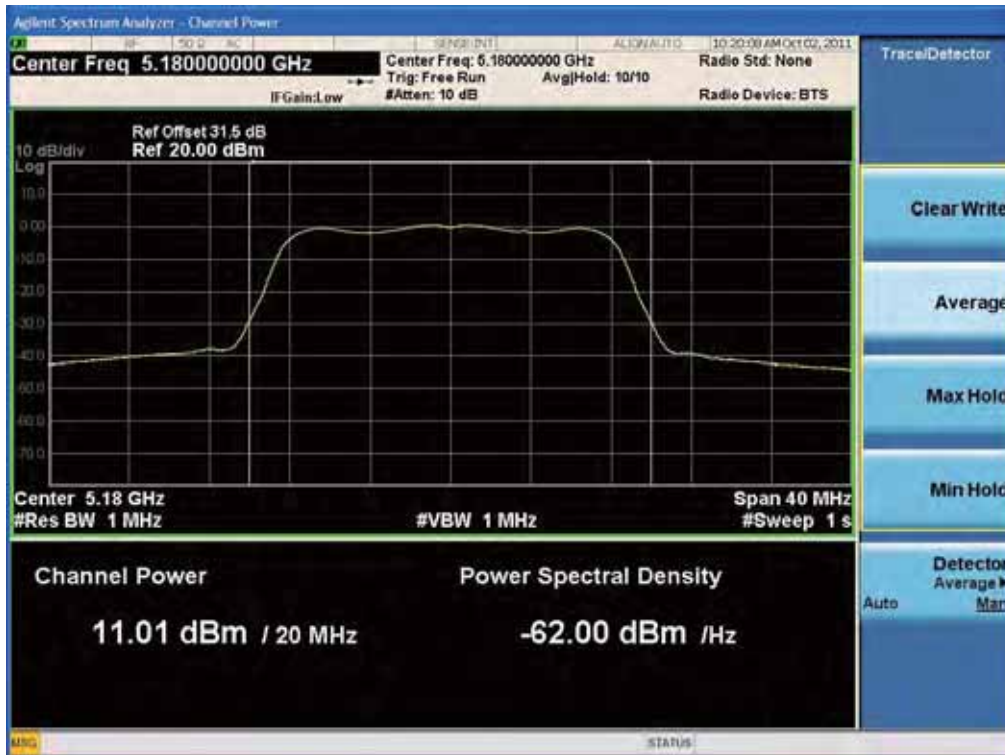
802.11n Mode		Rate (Mbps)	Measured Power(W)	Limit (dBm)
Frequency[MHz]	Channel No.			
5190	38	13.5 Mbps	9.03	30
		27 Mbps	8.45	30
		40.5 Mbps	7.92	30
		54 Mbps	7.48	30
		81 Mbps	6.90	30
		108 Mbps	6.43	30
		121.5 Mbps	6.33	30
		135 Mbps	6.13	30
5230	46	13.5 Mbps	9.03	30
		27 Mbps	8.39	30
		40.5 Mbps	7.85	30
		54 Mbps	7.48	30
		81 Mbps	6.90	30
		108 Mbps	6.43	30
		121.5 Mbps	6.23	30
		135 Mbps	6.02	30

RESULT PLOTS_Ant.0 (5180 MHz ~5240 MHz)

Conducted Output Power (802.11a-CH 36) 6 Mbps

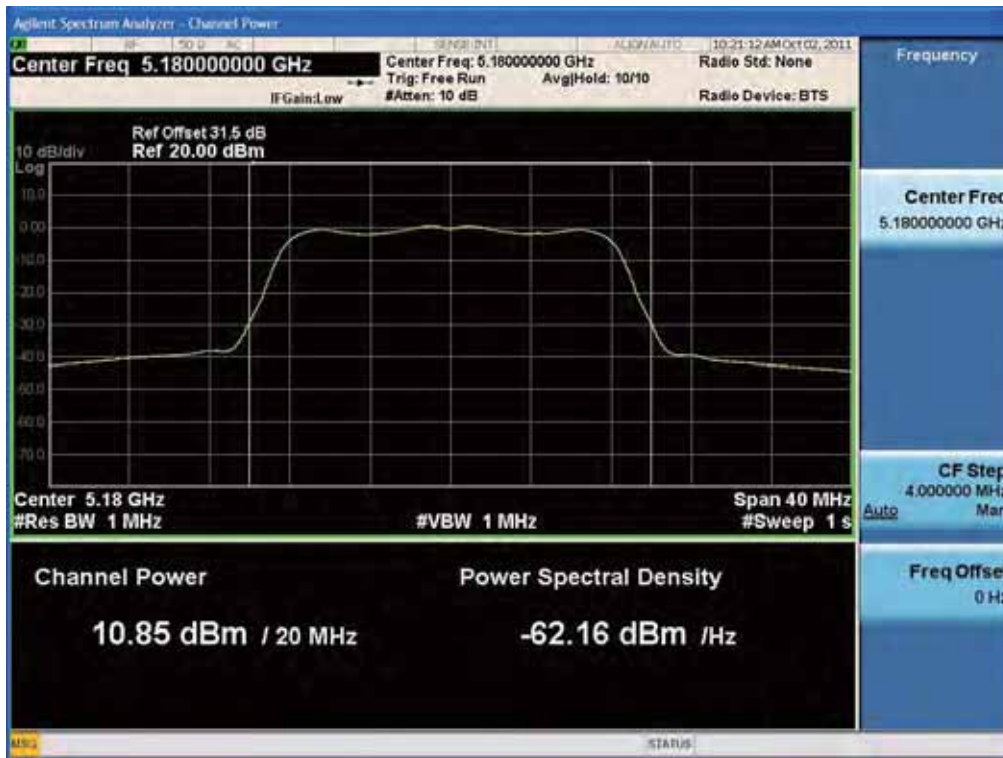


Conducted Output Power (802.11a-CH 36) 9 Mbps

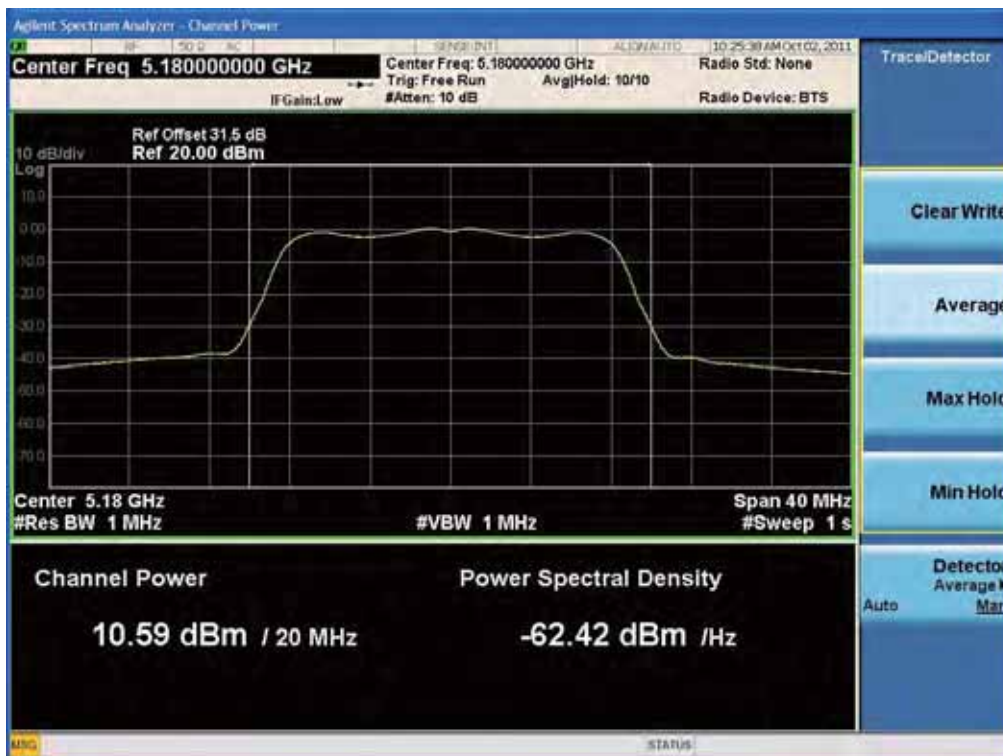


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Conducted Output Power (802.11a-CH 36) 12 Mbps

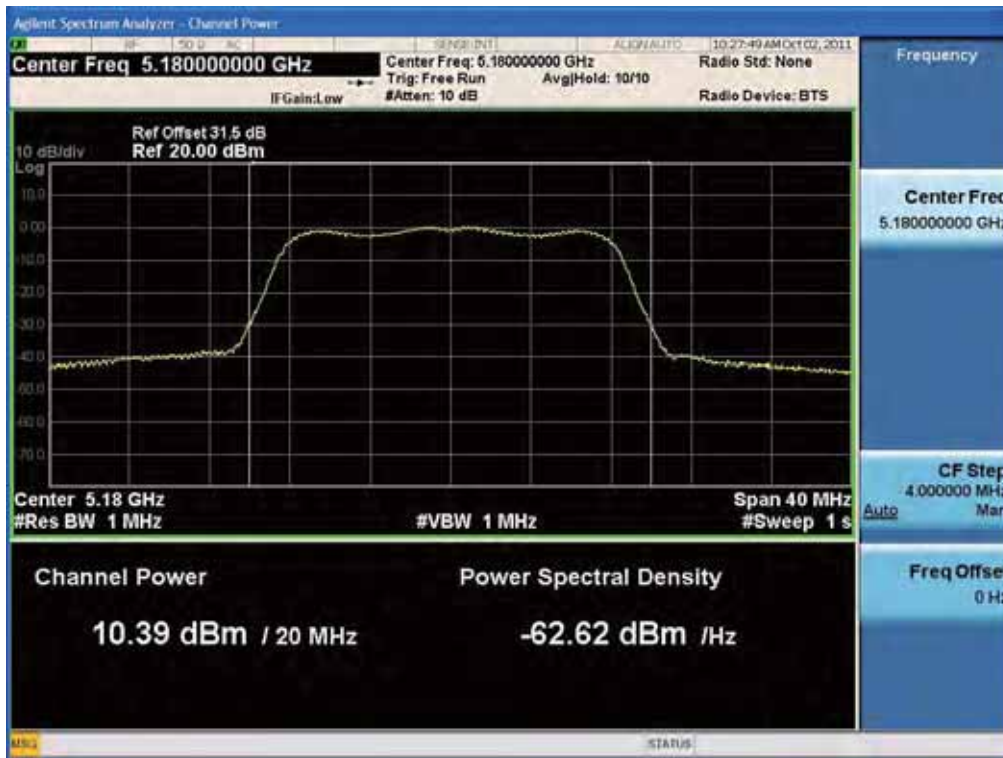


Conducted Output Power (802.11a-CH 36) 18 Mbps

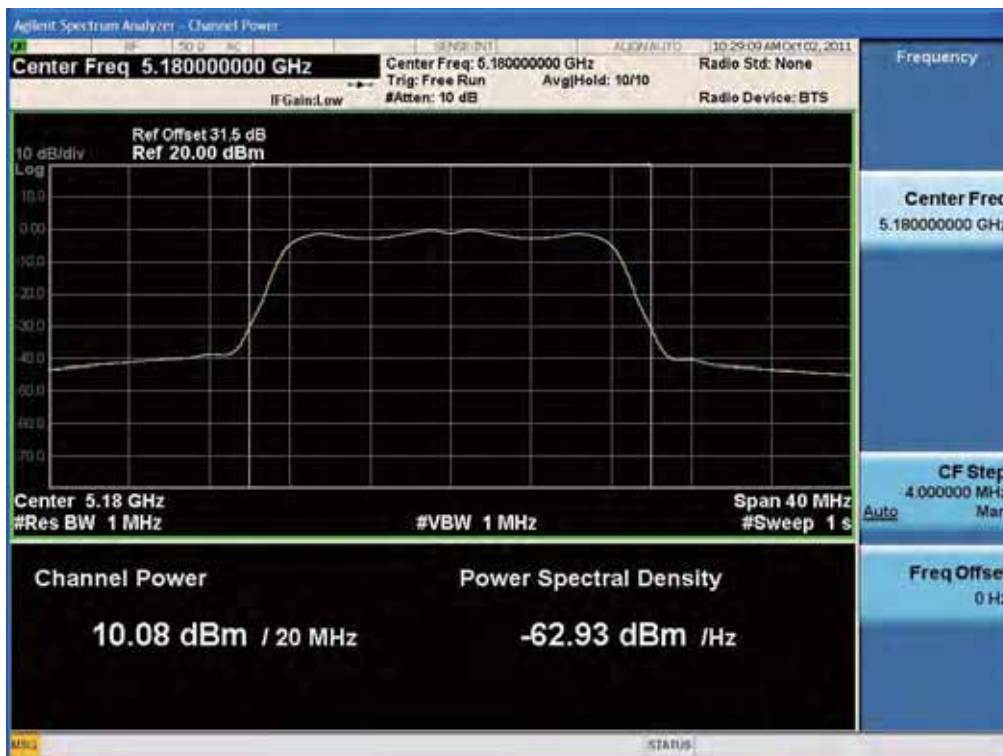


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Conducted Output Power (802.11a-CH 36) 24 Mbps

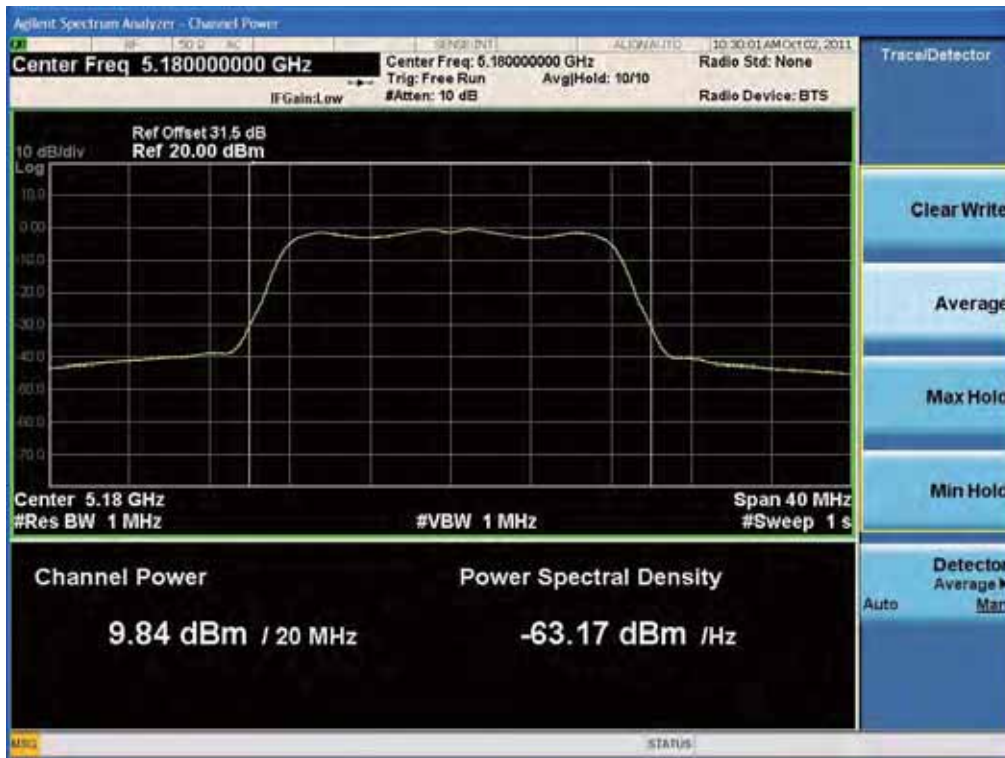


Conducted Output Power (802.11a-CH 36) 36 Mbps

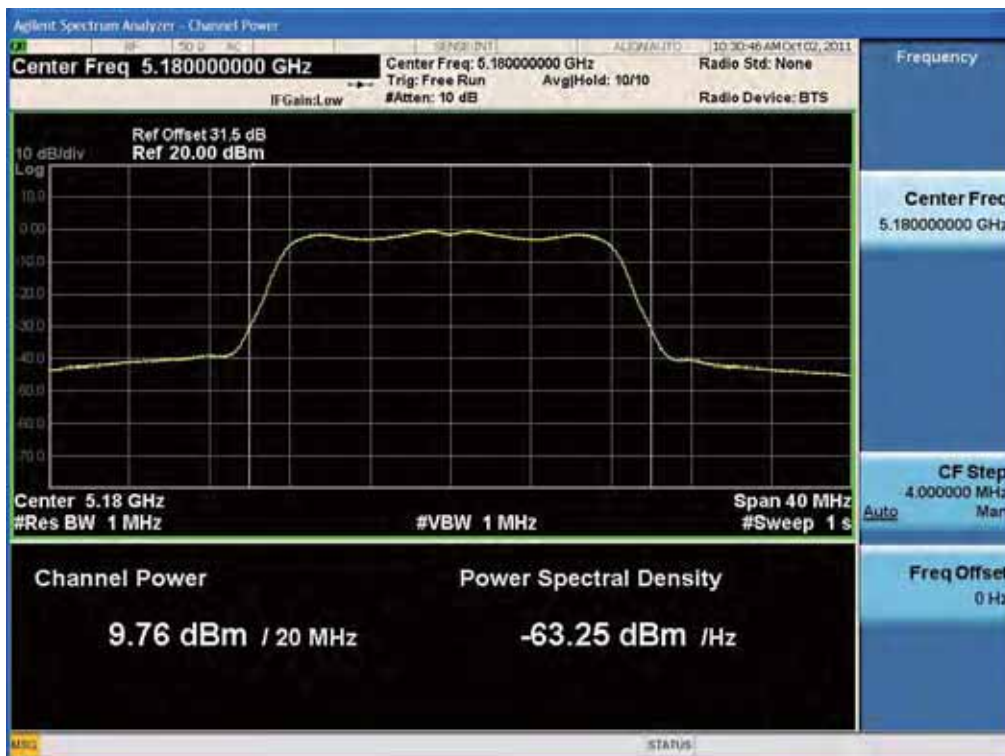


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Conducted Output Power (802.11a-CH 36) 48 Mbps

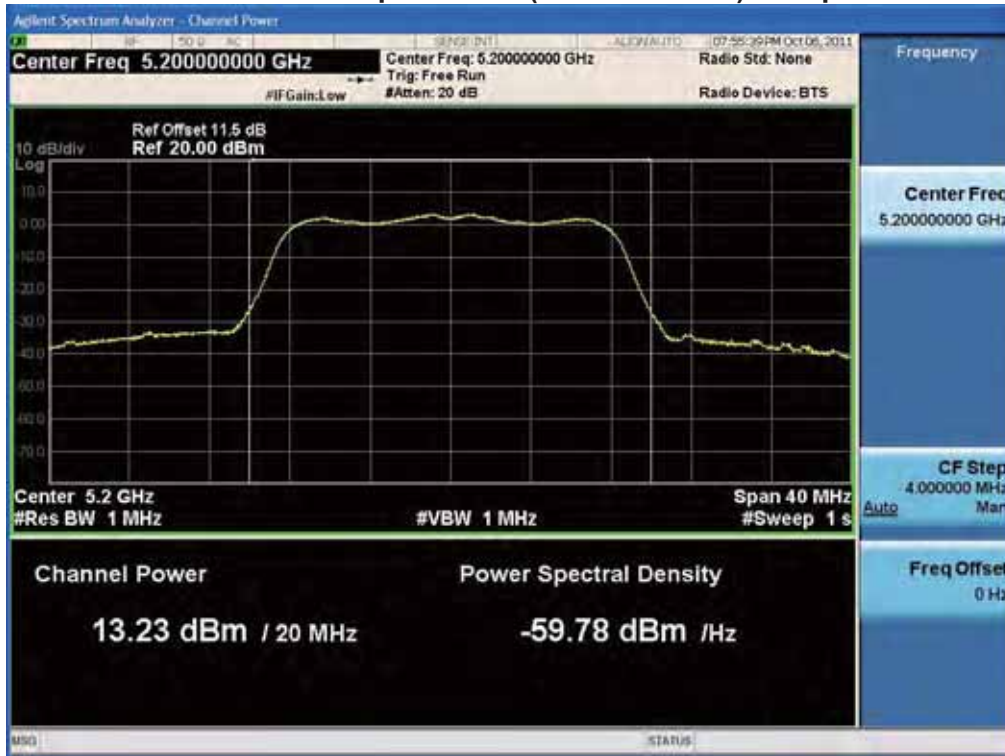


Conducted Output Power (802.11a-CH 36) 54 Mbps



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Conducted Output Power (802.11a-CH 40) 6 Mbps

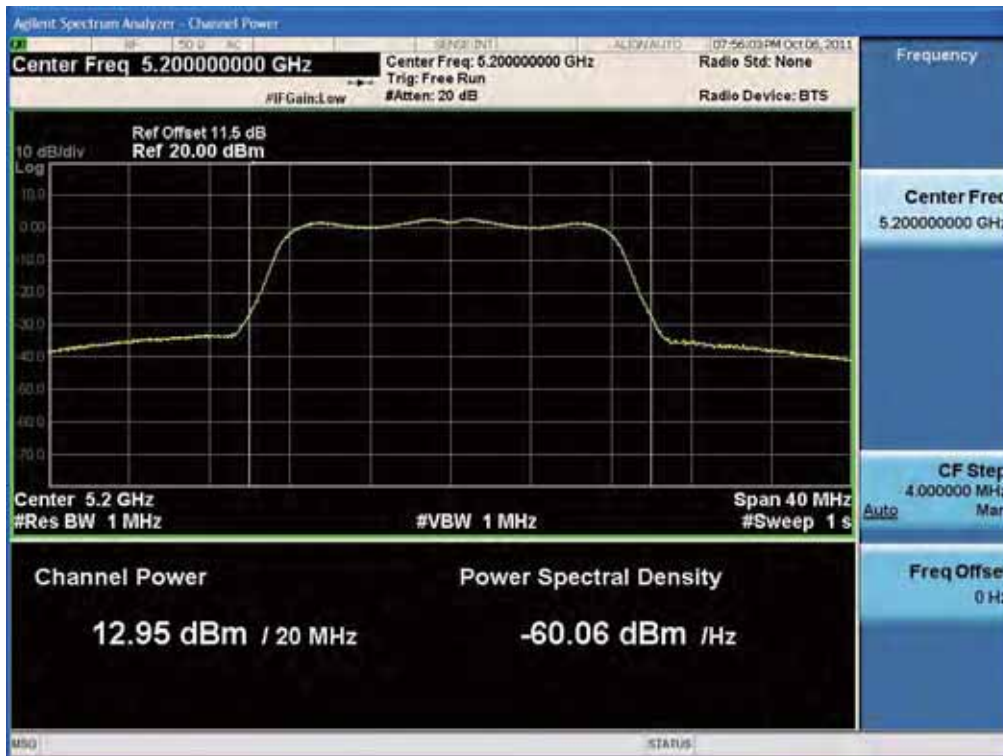


Conducted Output Power (802.11a-CH 40) 9 Mbps

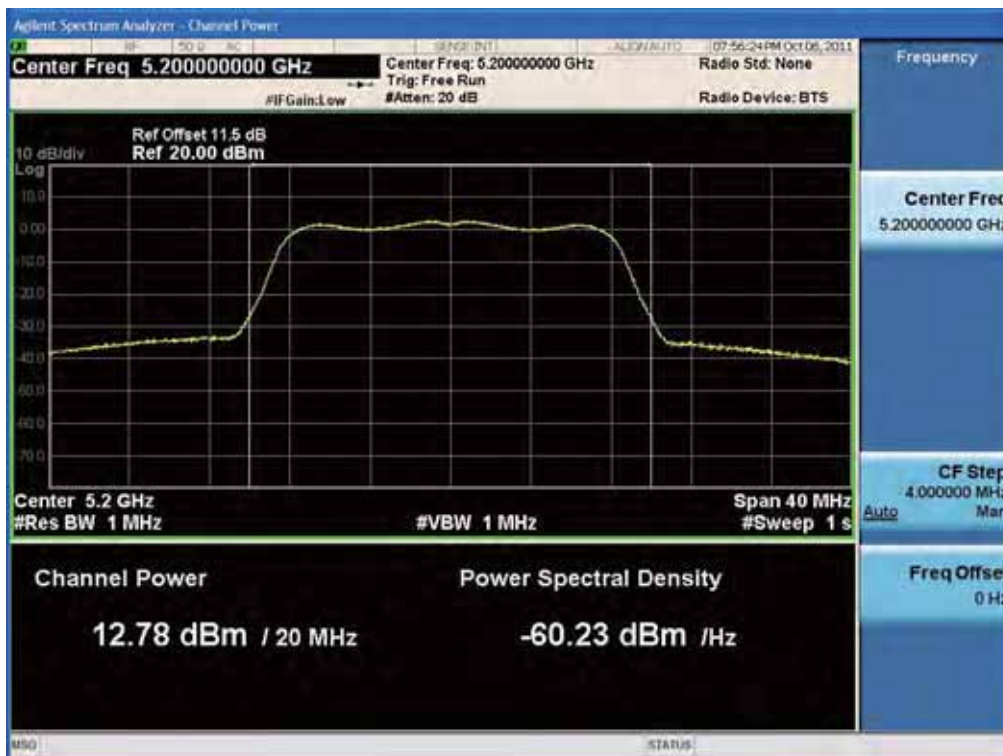


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Conducted Output Power (802.11a-CH 40) 12 Mbps

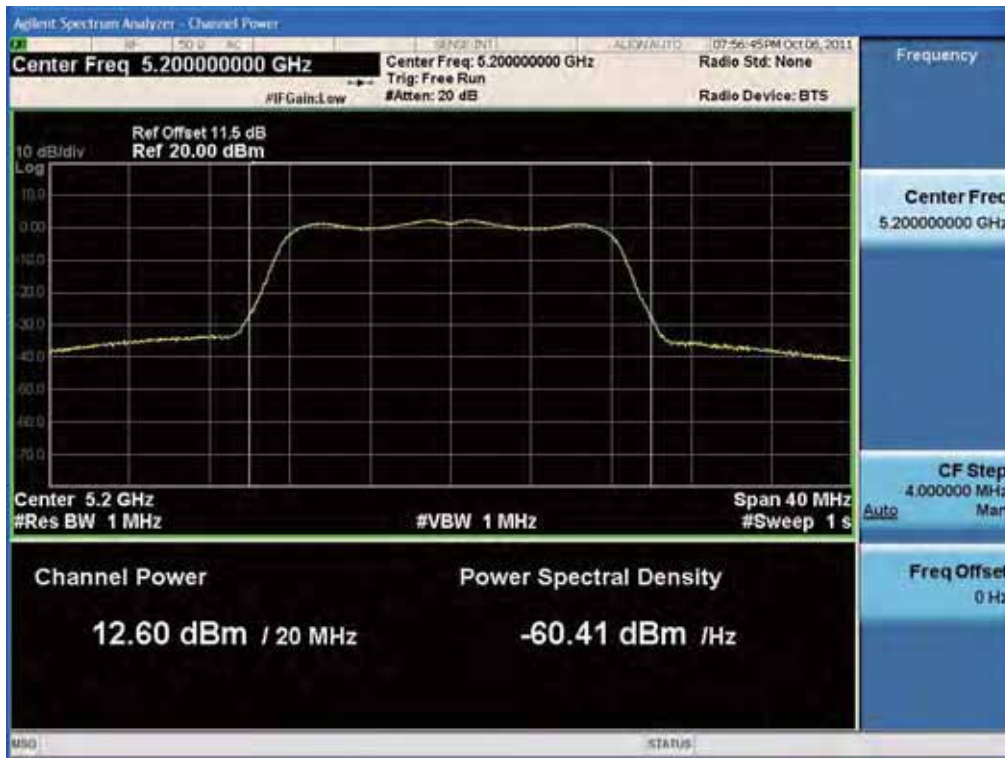


Conducted Output Power (802.11a-CH 40) 18 Mbps

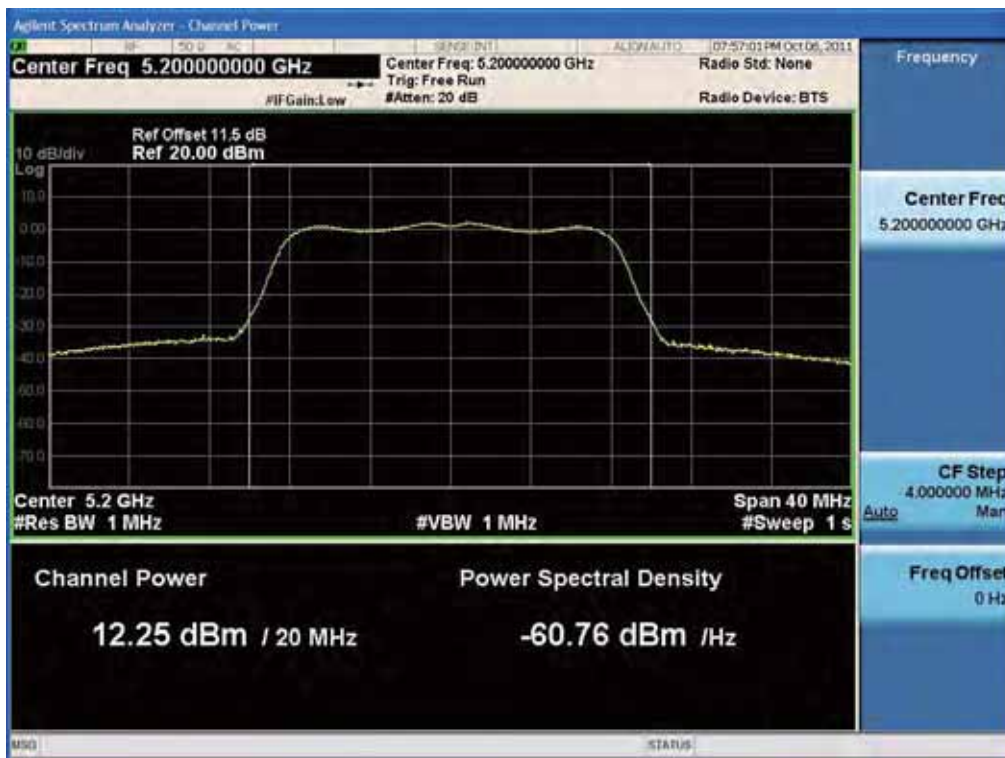


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Conducted Output Power (802.11a-CH 40) 24 Mbps



Conducted Output Power (802.11a-CH 40) 36 Mbps

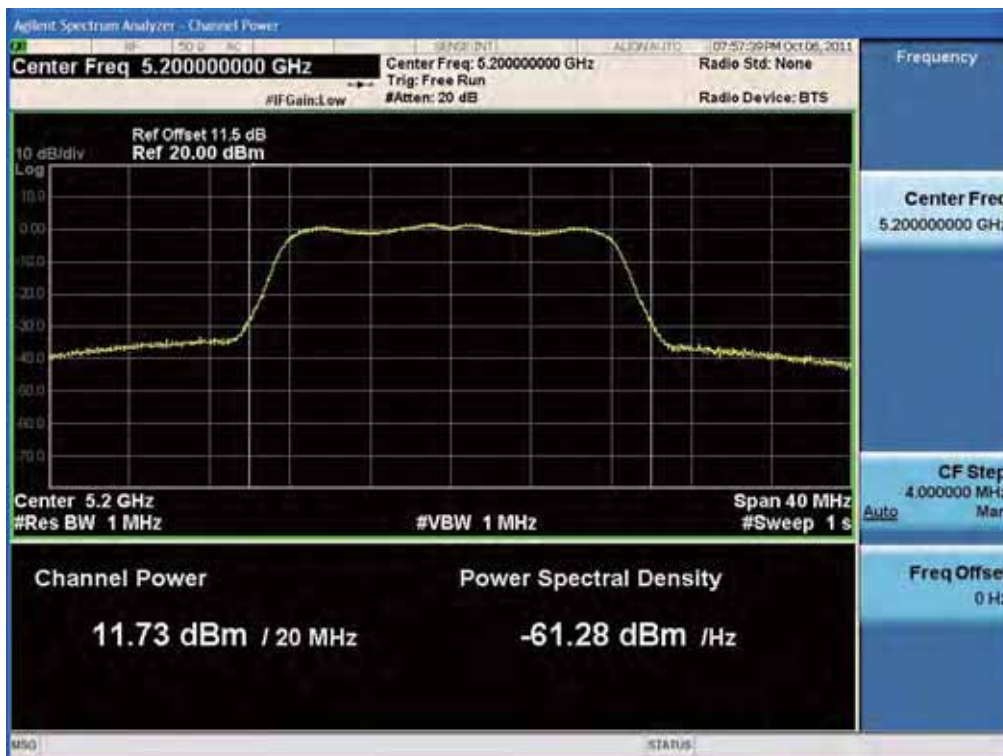


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Conducted Output Power (802.11a-CH 40) 48 Mbps

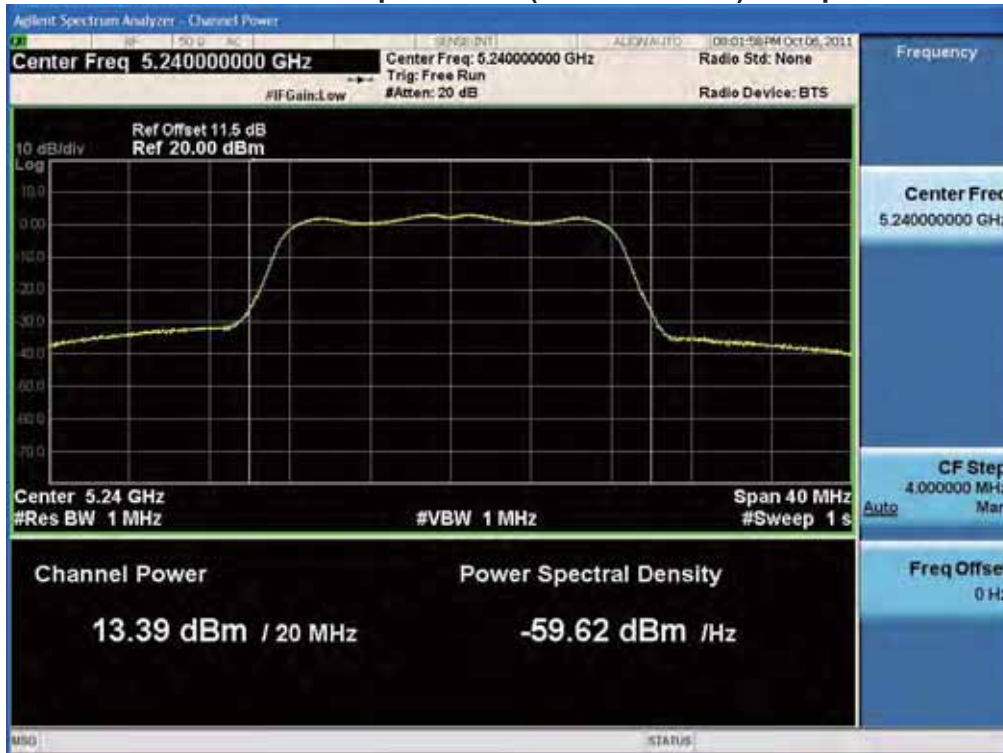


Conducted Output Power (802.11a-CH 40) 54 Mbps



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Conducted Output Power (802.11a-CH 48) 6 Mbps

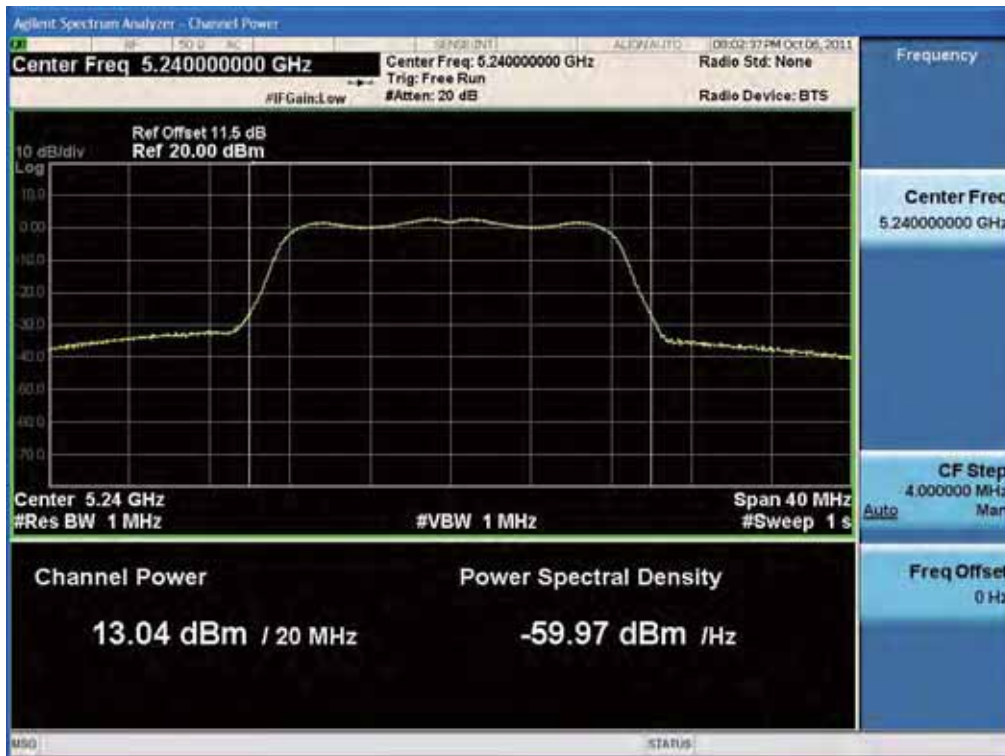


Conducted Output Power (802.11a-CH 48) 9 Mbps

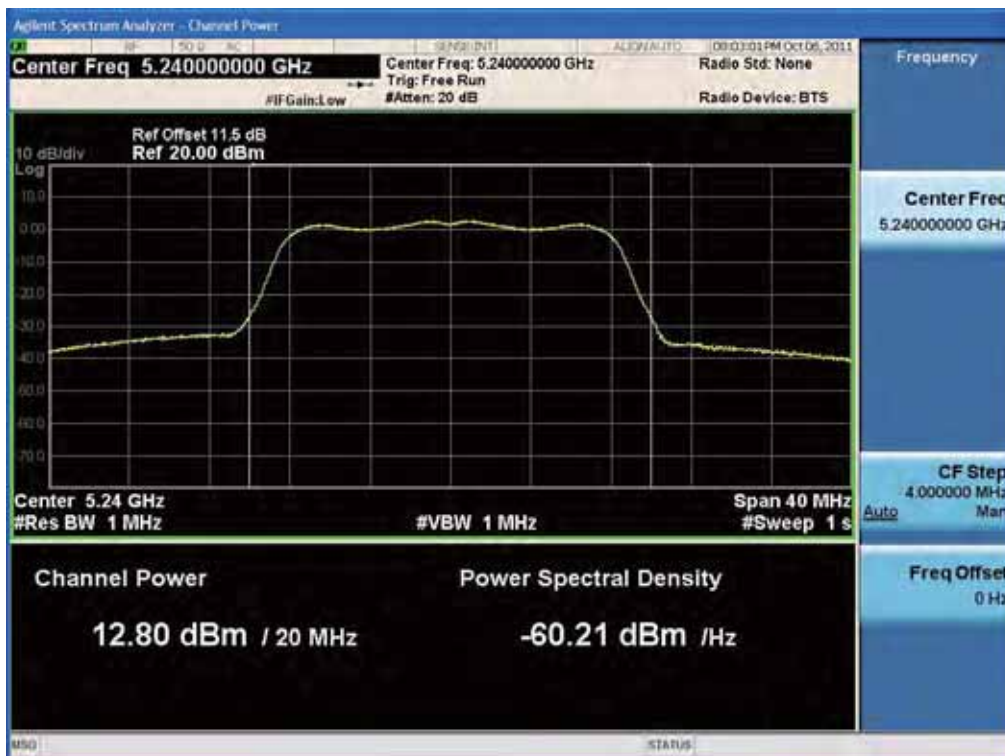


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Conducted Output Power (802.11a-CH 48) 12 Mbps

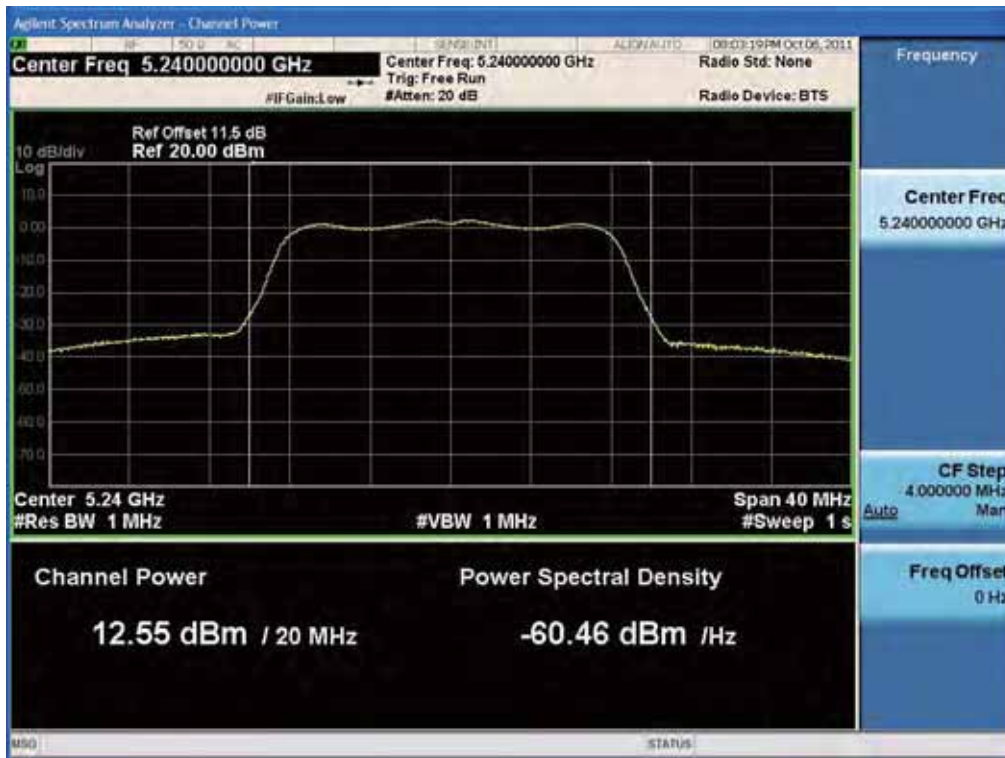


Conducted Output Power (802.11a-CH 48) 18 Mbps

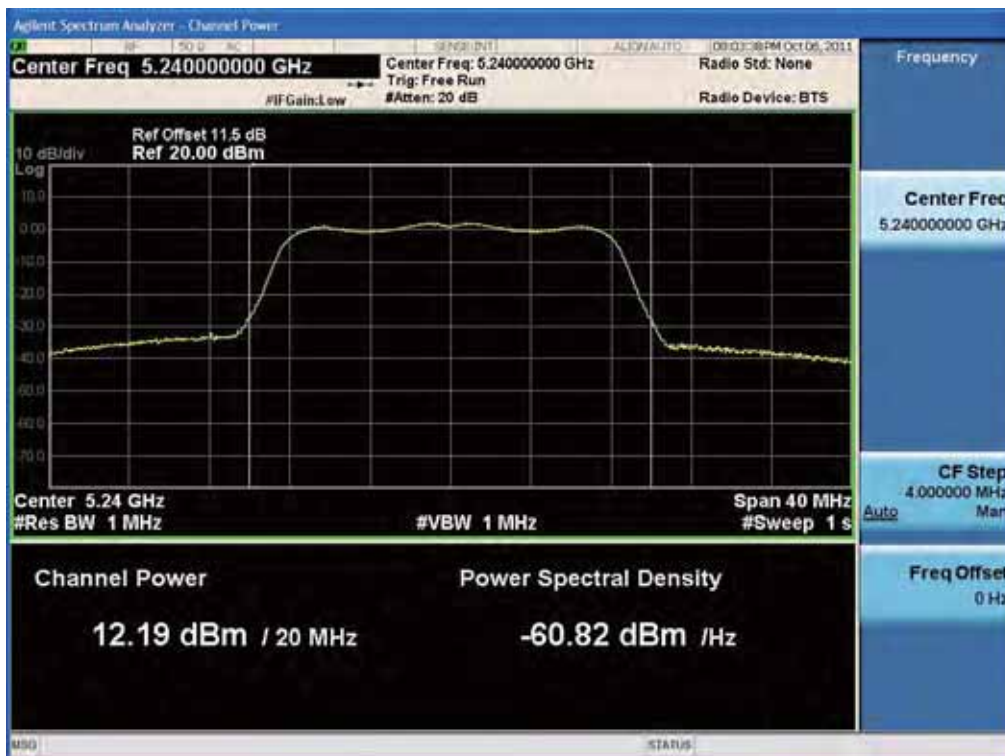


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Conducted Output Power (802.11a-CH 48) 24 Mbps



Conducted Output Power (802.11a-CH 48) 36 Mbps

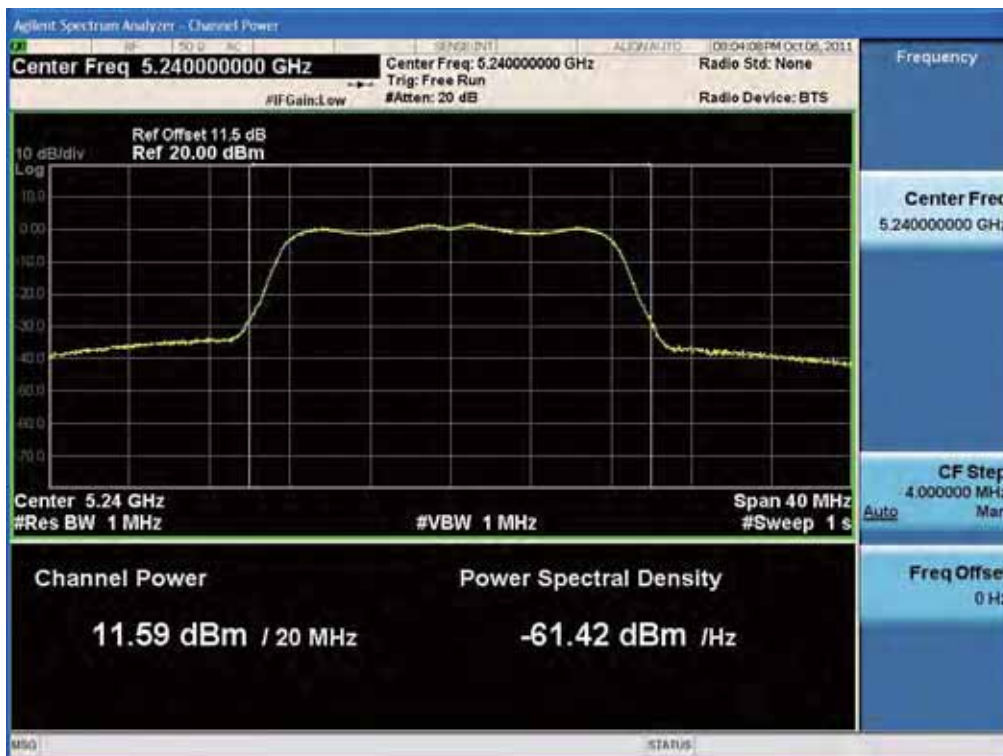


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: WI-FI Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Conducted Output Power (802.11a-CH 48) 48 Mbps



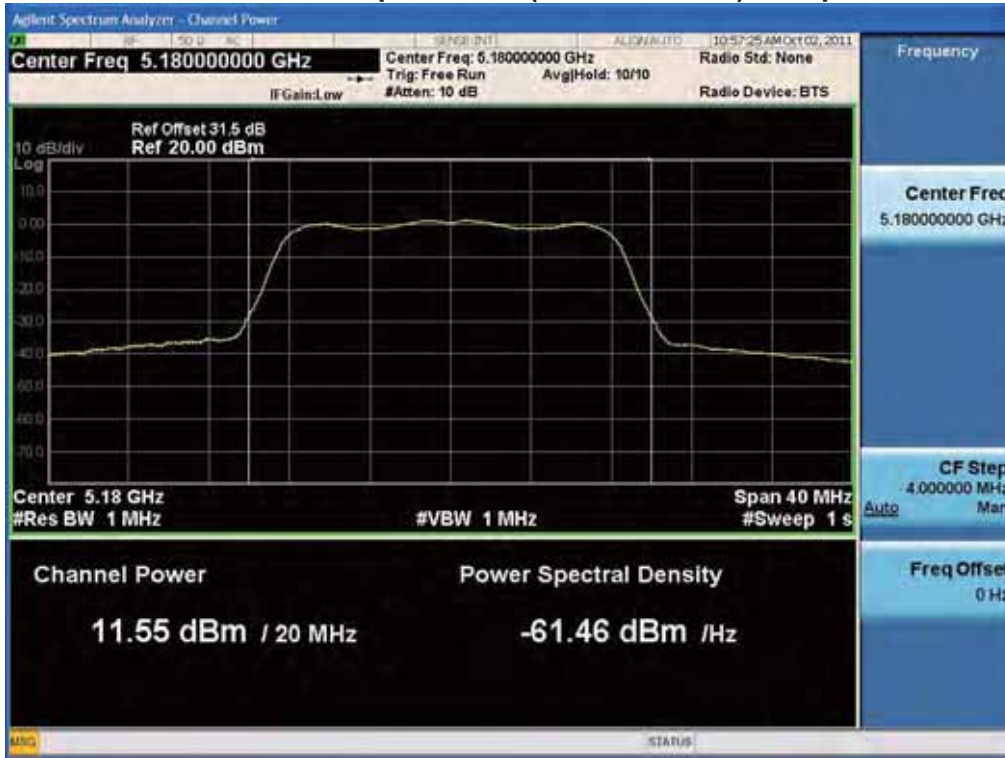
Conducted Output Power (802.11a-CH 48) 54 Mbps



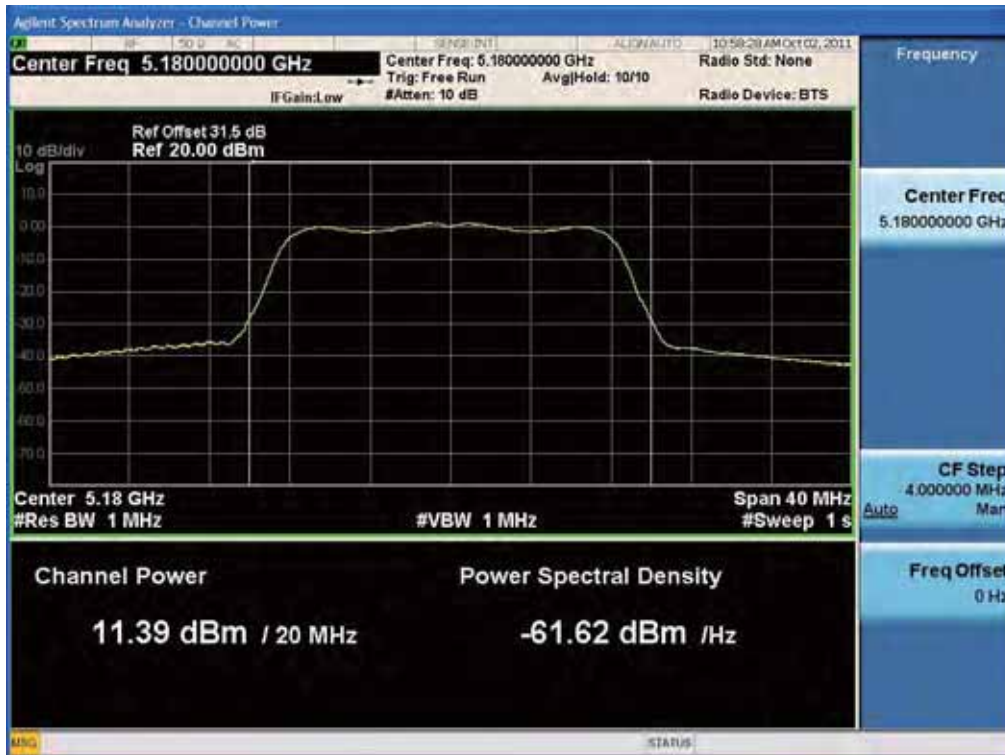
FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: WI-FI Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

RESULT PLOTS_Ant.1 (5180 MHz ~5240 MHz)

Conducted Output Power (802.11a-CH 36) 6 Mbps

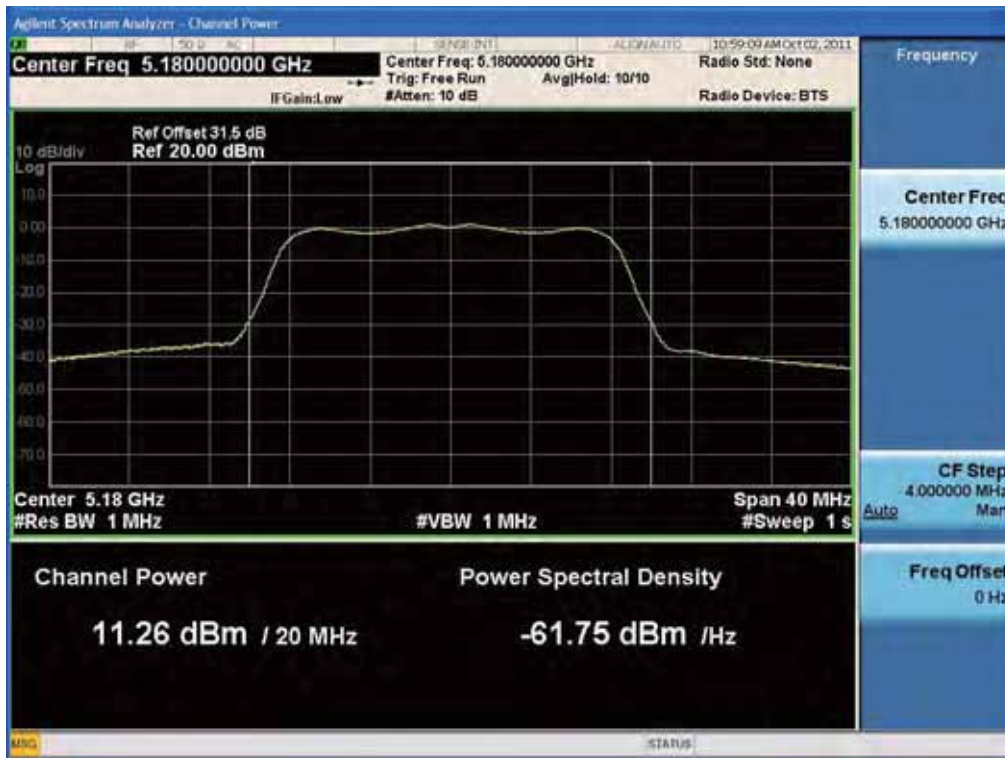


Conducted Output Power (802.11a-CH 36) 9 Mbps

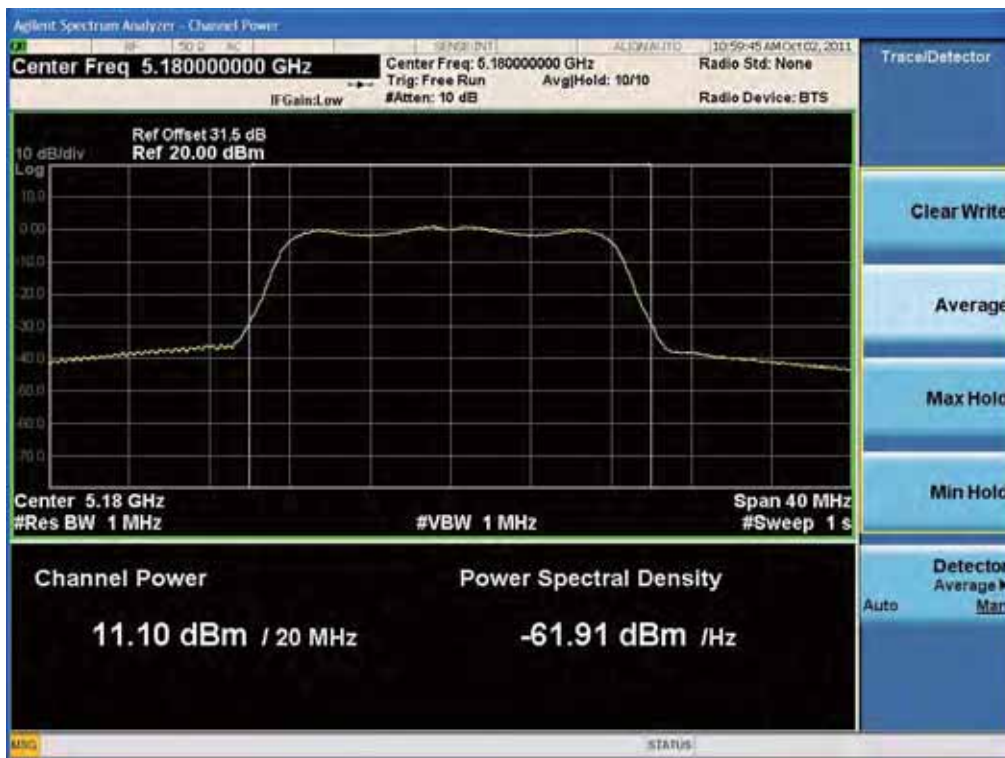


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: WI-FI Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Conducted Output Power (802.11a-CH 36) 12 Mbps

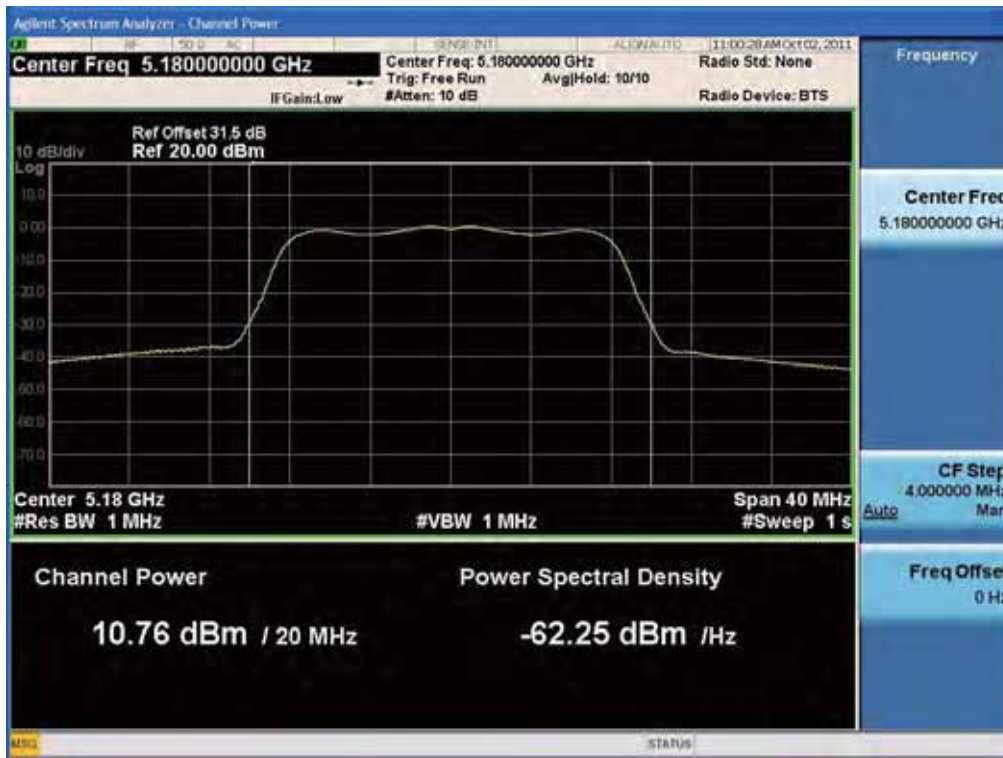


Conducted Output Power (802.11a-CH 36) 18 Mbps

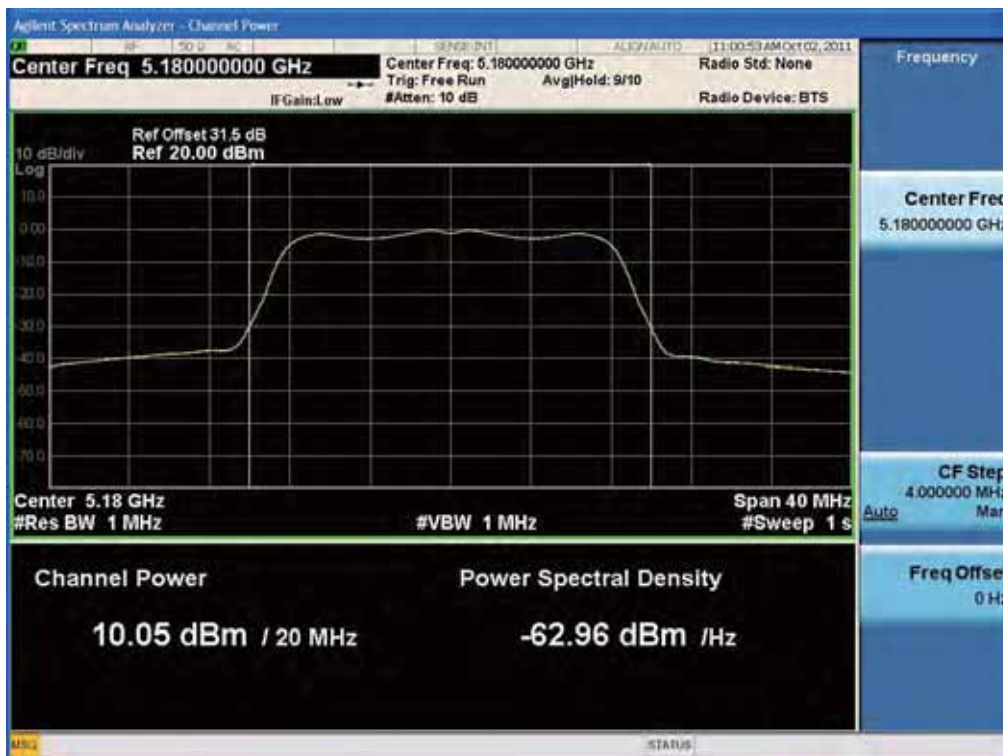


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Conducted Output Power (802.11a-CH 36) 24 Mbps

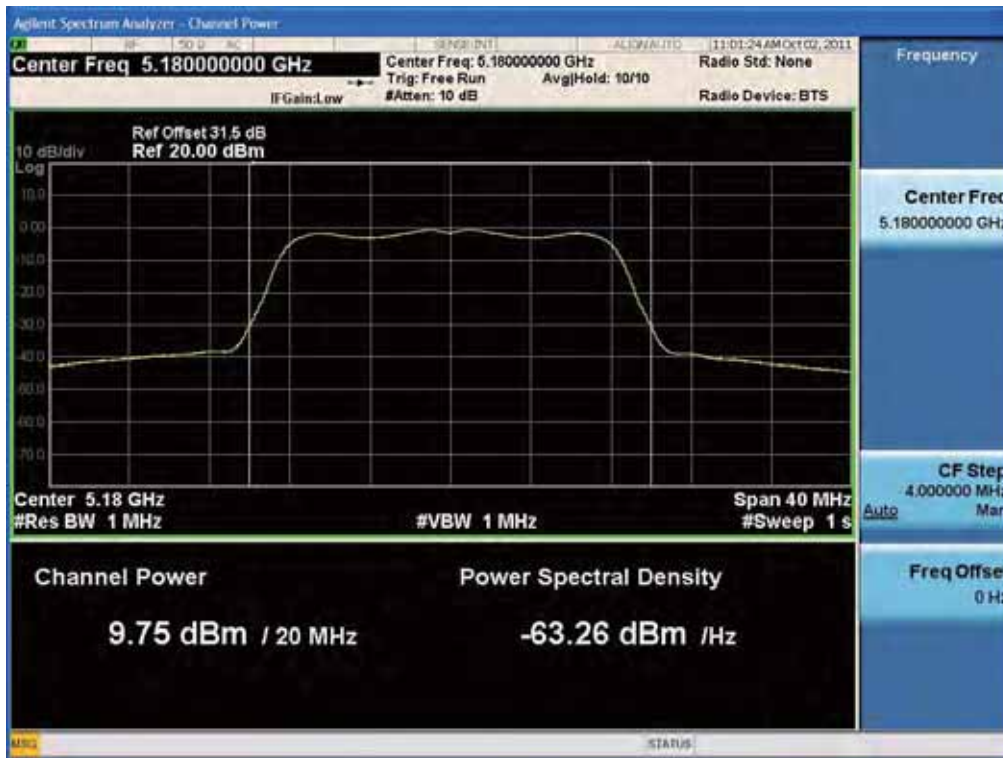


Conducted Output Power (802.11a-CH 36) 36 Mbps

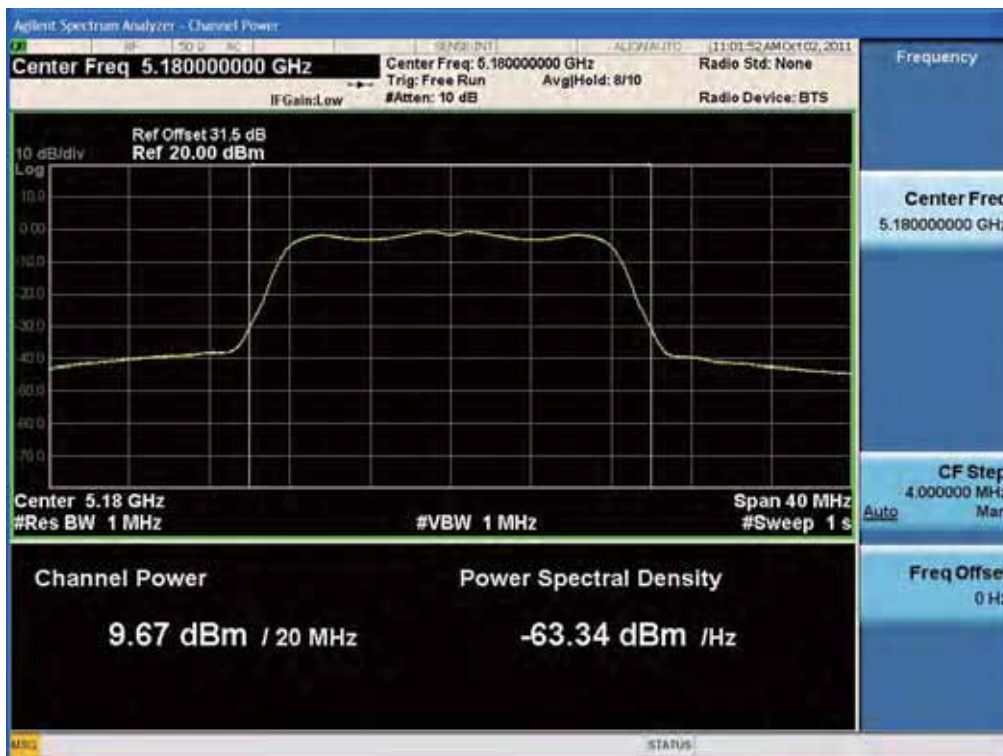


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Conducted Output Power (802.11a-CH 36) 48 Mbps

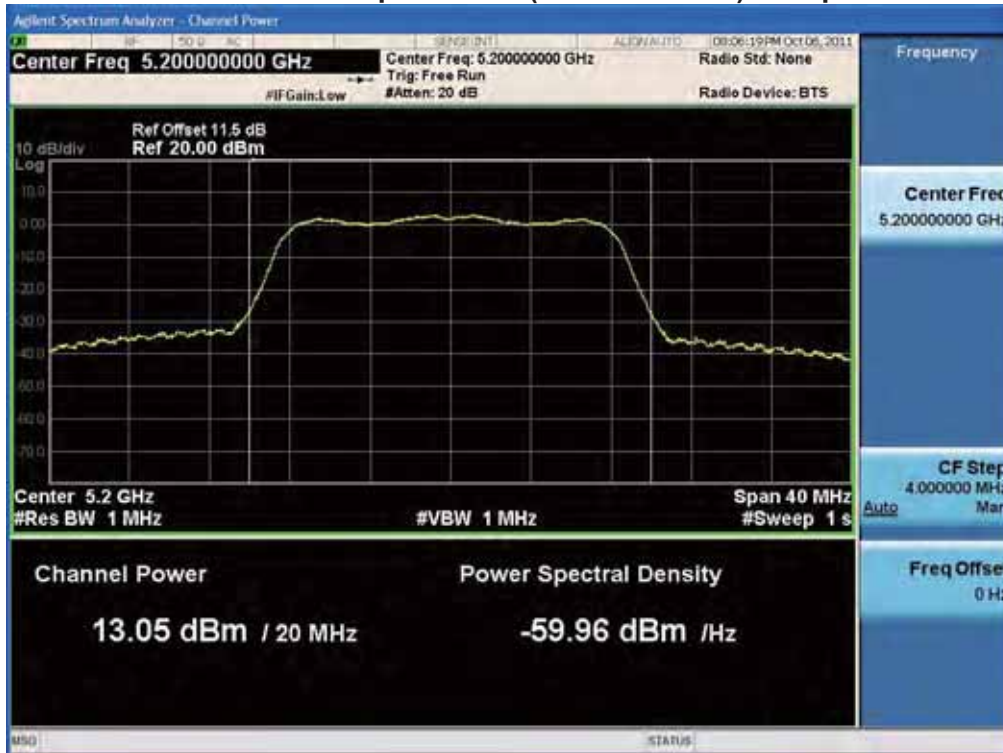


Conducted Output Power (802.11a-CH 36) 54 Mbps



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Conducted Output Power (802.11a-CH 40) 6 Mbps

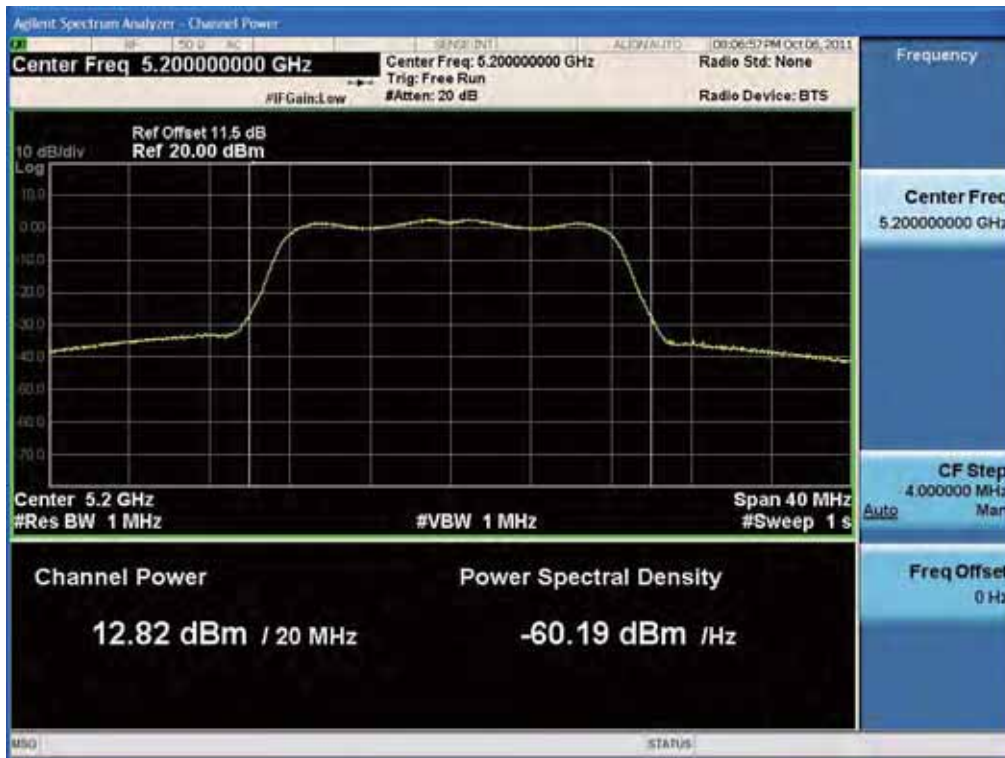


Conducted Output Power (802.11a-CH 40) 9 Mbps



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Conducted Output Power (802.11a-CH 40) 12 Mbps

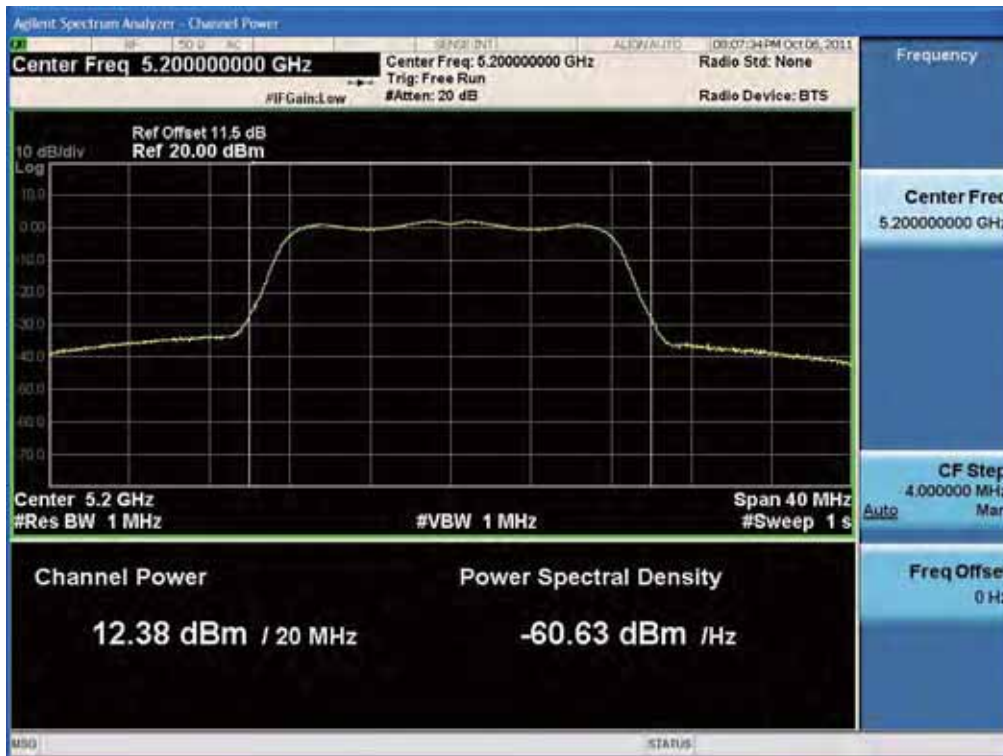


Conducted Output Power (802.11a-CH 40) 18 Mbps

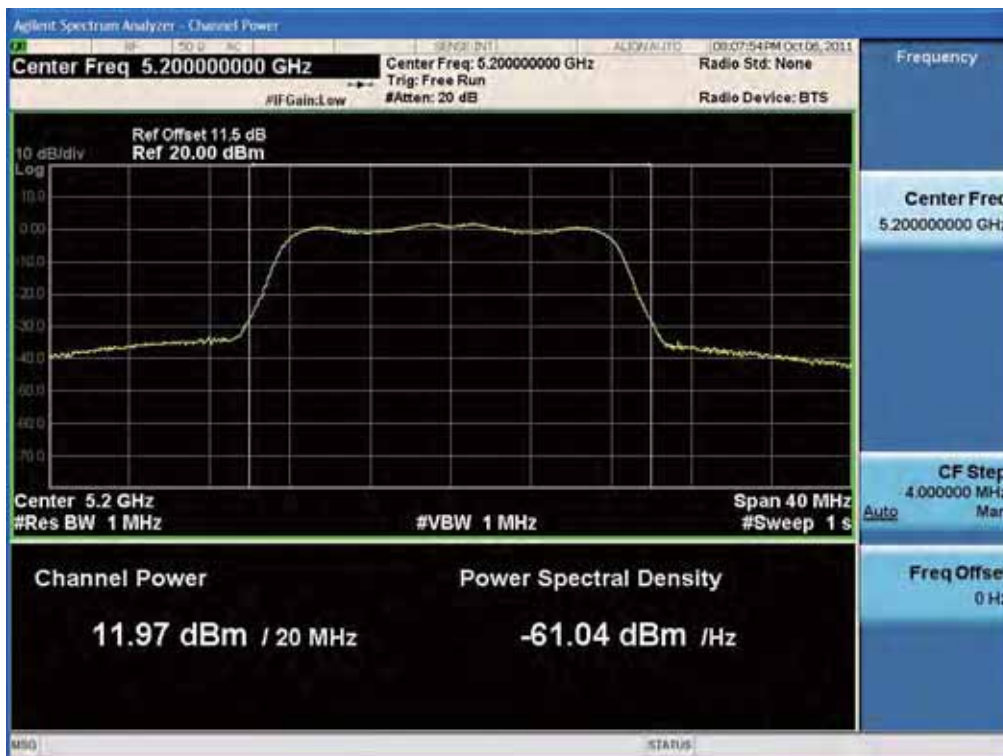


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Conducted Output Power (802.11a-CH 40) 24 Mbps

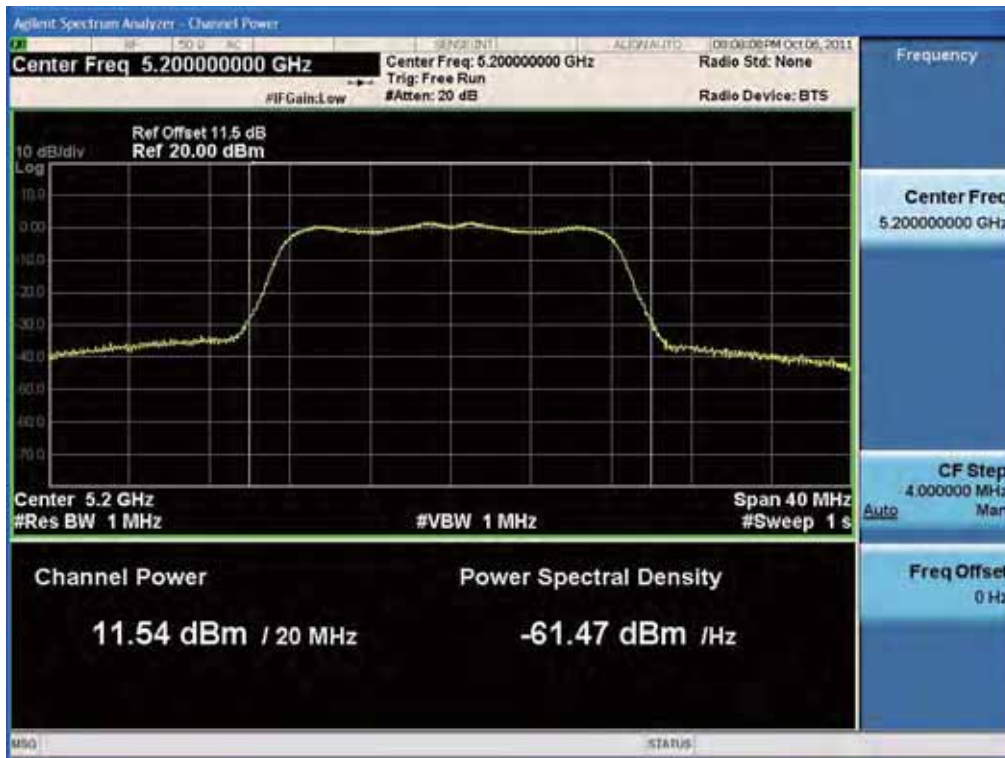


Conducted Output Power (802.11a-CH 40) 36 Mbps

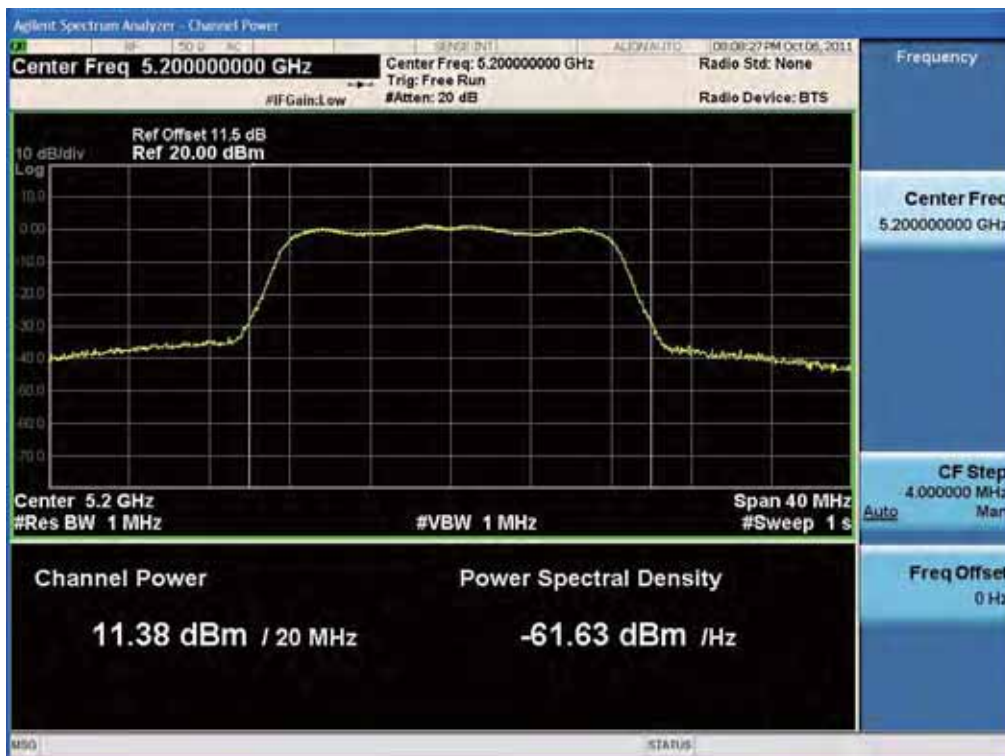


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: WI-FI Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Conducted Output Power (802.11a-CH 40) 48 Mbps



Conducted Output Power (802.11a-CH 40) 54 Mbps

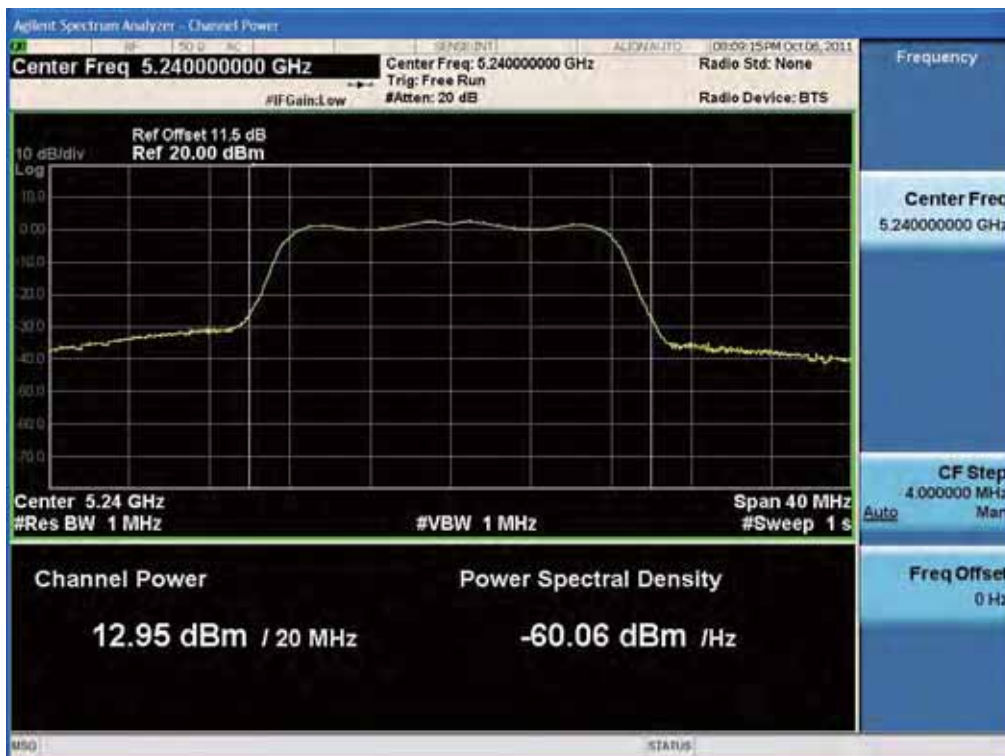


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Conducted Output Power (802.11a-CH 48) 6 Mbps

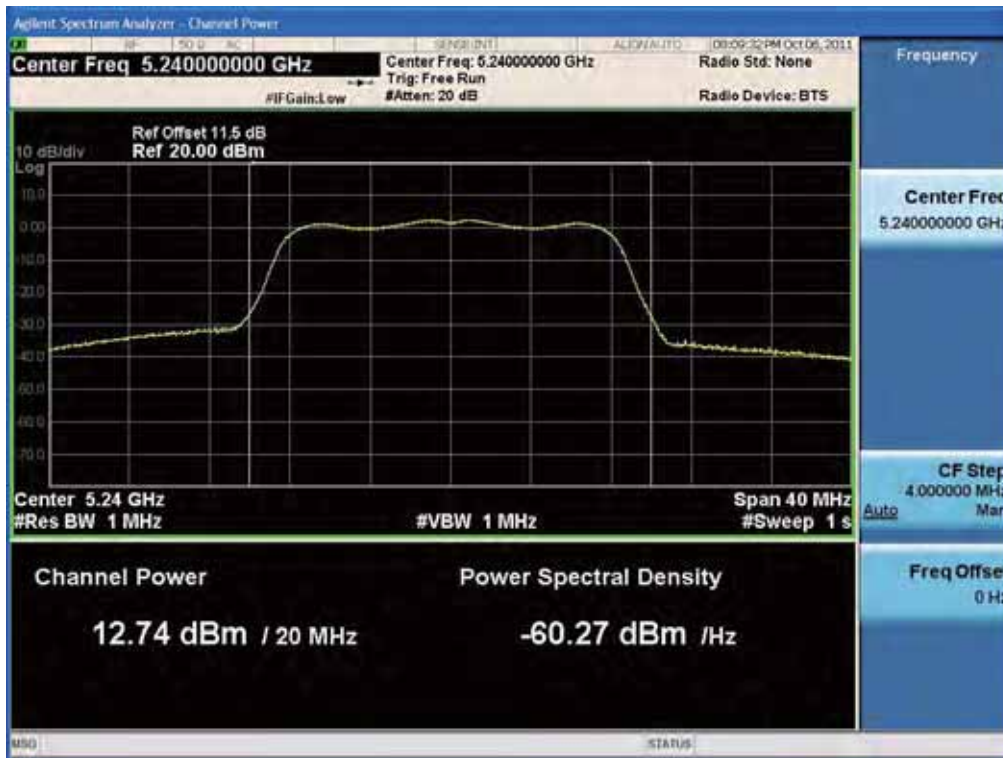


Conducted Output Power (802.11a-CH 48) 9 Mbps

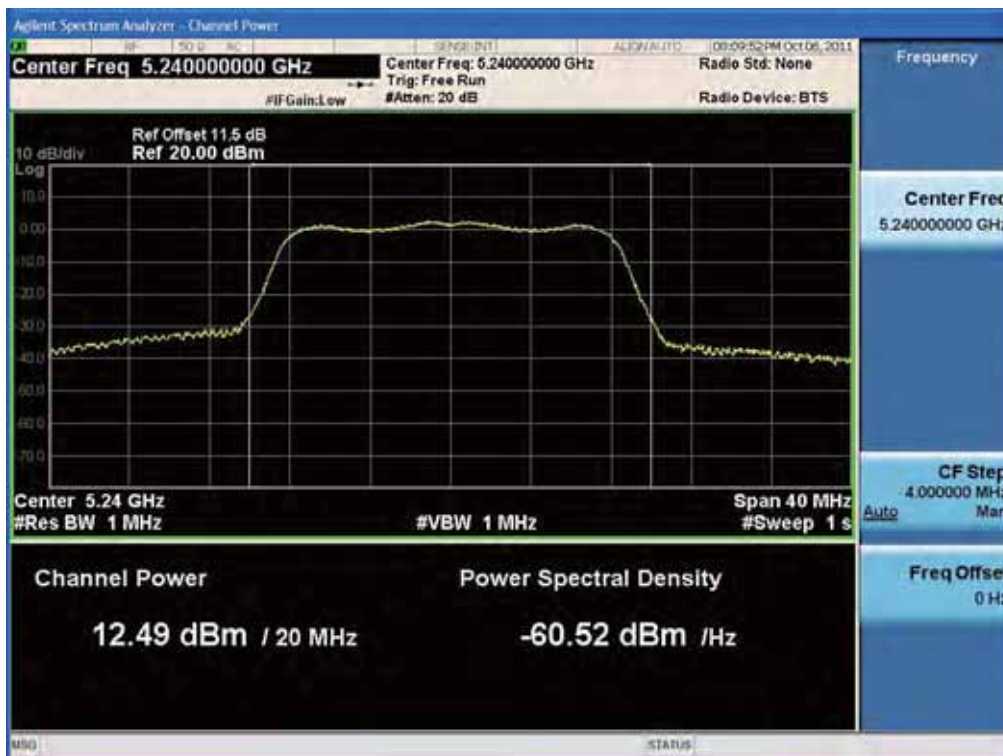


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFMB003D

Conducted Output Power (802.11a-CH 48) 12 Mbps

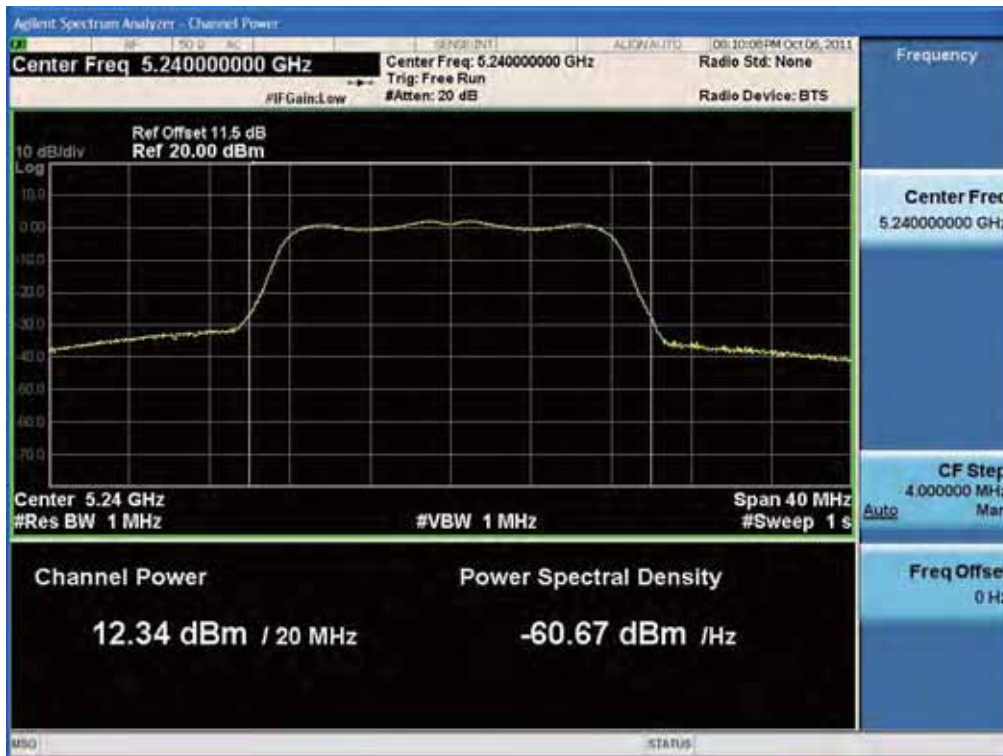


Conducted Output Power (802.11a-CH 48) 18 Mbps

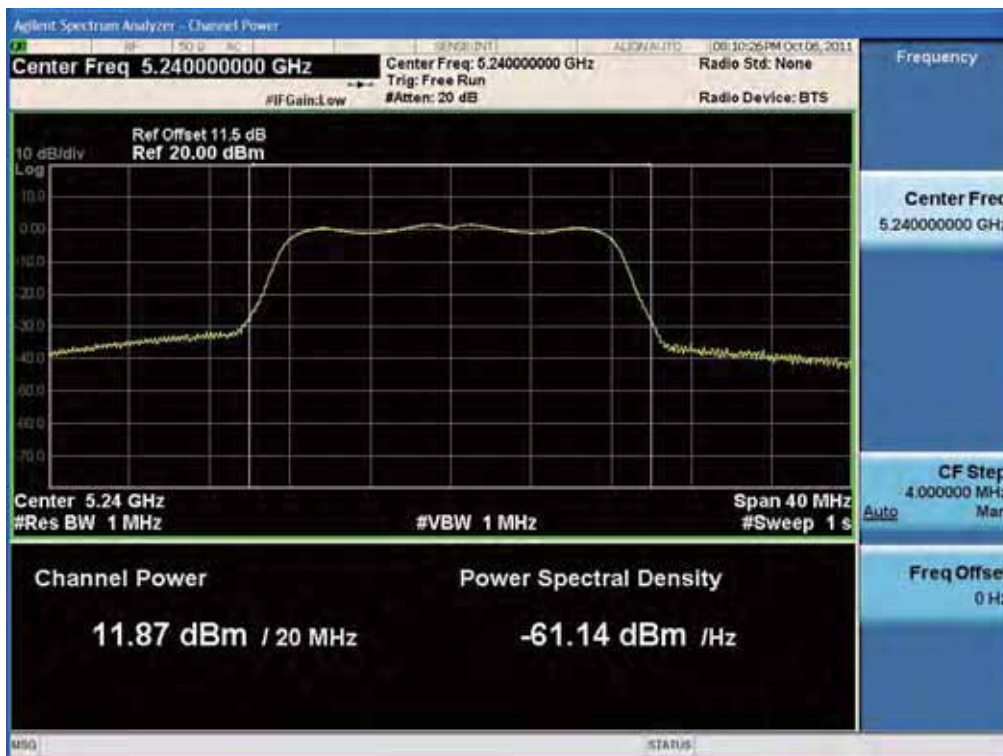


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Conducted Output Power (802.11a-CH 48) 24 Mbps



Conducted Output Power (802.11a-CH 48) 36 Mbps

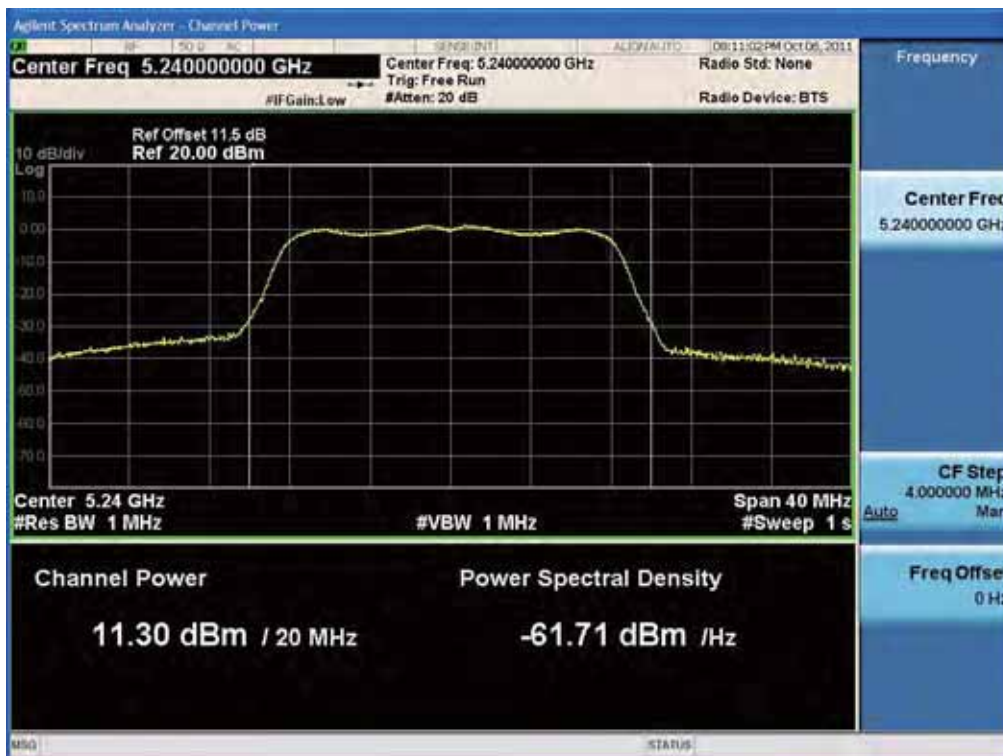


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: WI-FI Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Conducted Output Power (802.11a-CH 48) 48 Mbps

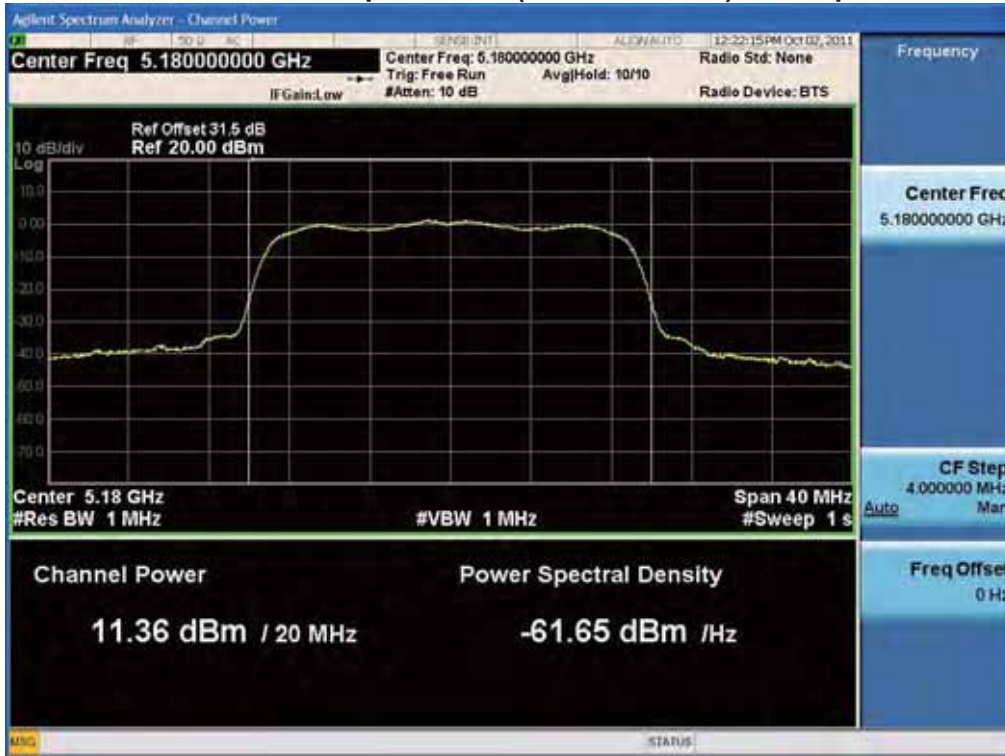


Conducted Output Power (802.11a-CH 48) 54 Mbps



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

RESULT PLOTS_Ant.0 (5180 MHz ~5240 MHz)_20 MHz BW
 Conducted Output Power (802.11n-CH 36) 6.5 Mbps

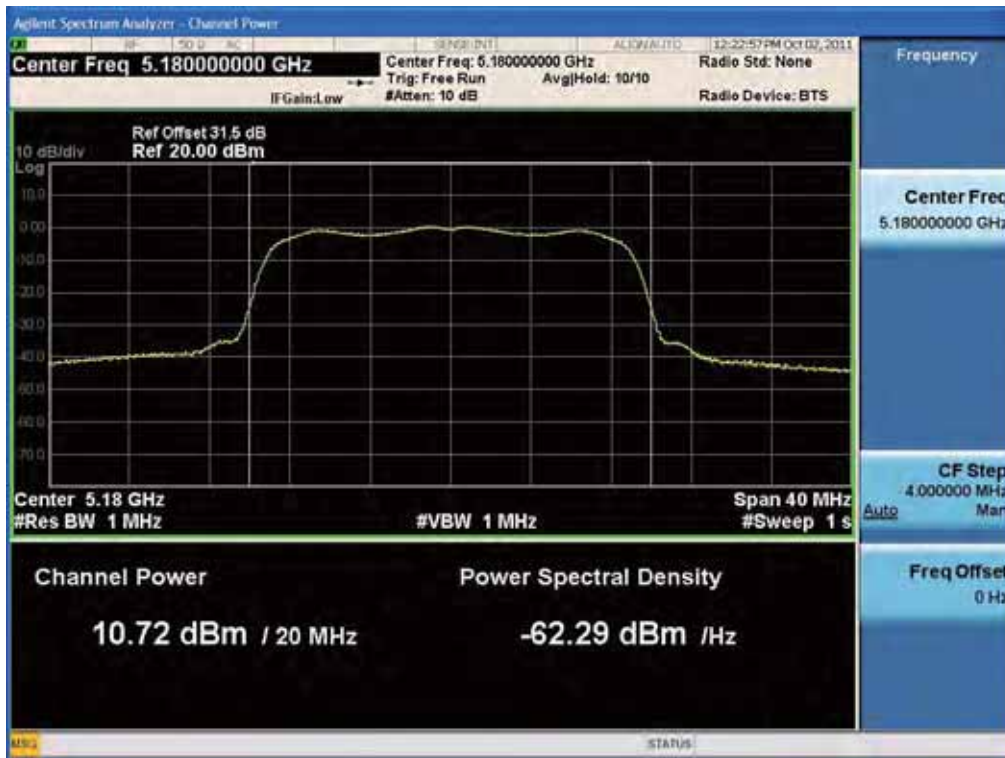


Conducted Output Power (802.11n-CH 36) 13 Mbps

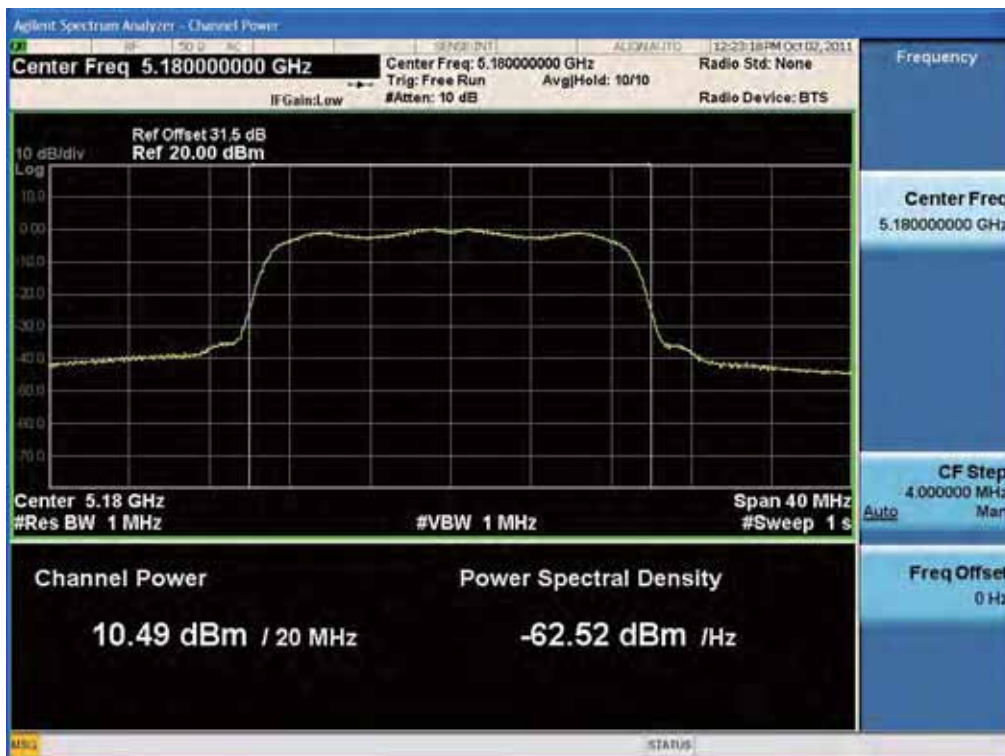


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: WI-FI Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Conducted Output Power (802.11n-CH 36) 19.5 Mbps

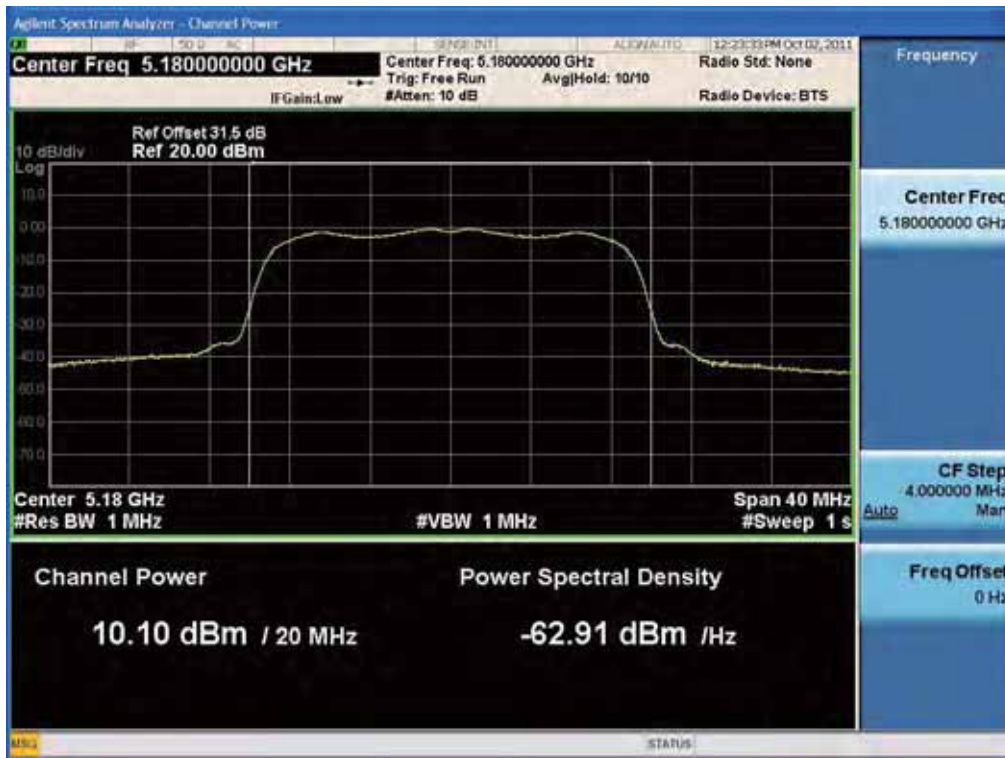


Conducted Output Power (802.11n-CH 36) 26 Mbps

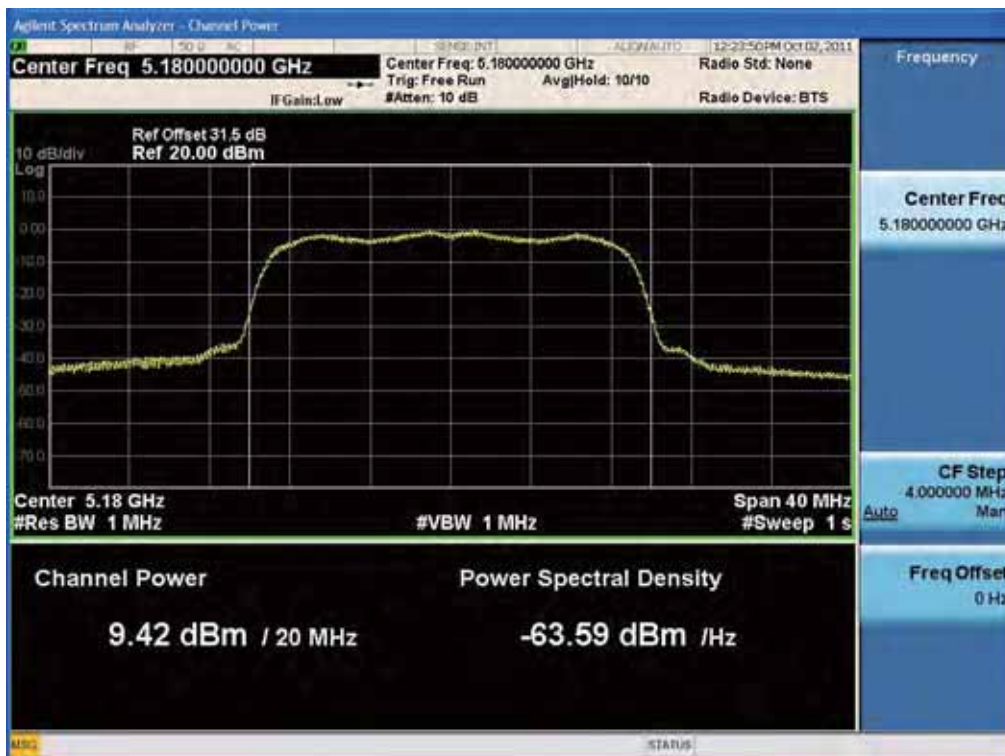


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Conducted Output Power (802.11n-CH 36) 39 Mbps

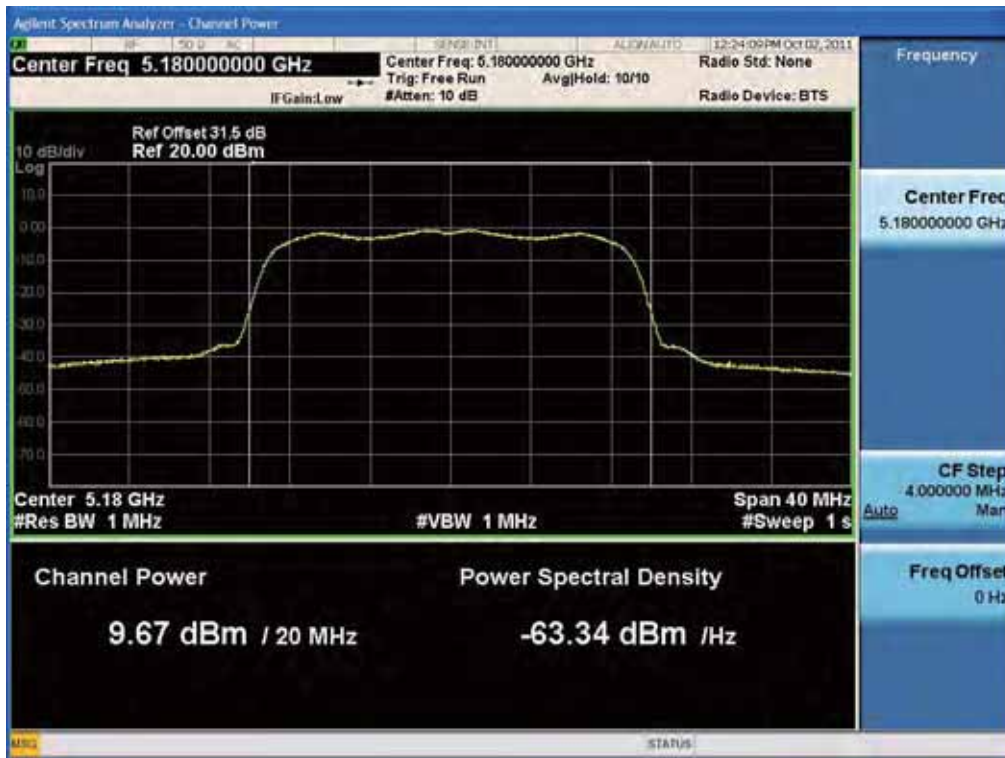


Conducted Output Power (802.11n-CH 36) 52 Mbps

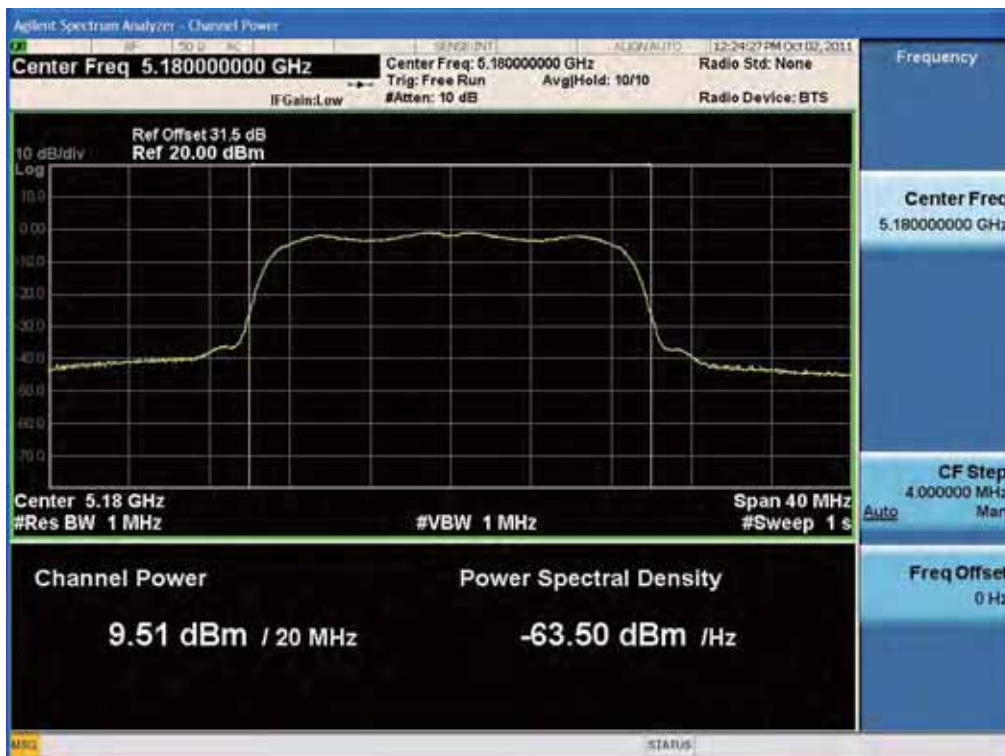


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFMB003D

Conducted Output Power (802.11n-CH 36) 58.5 Mbps

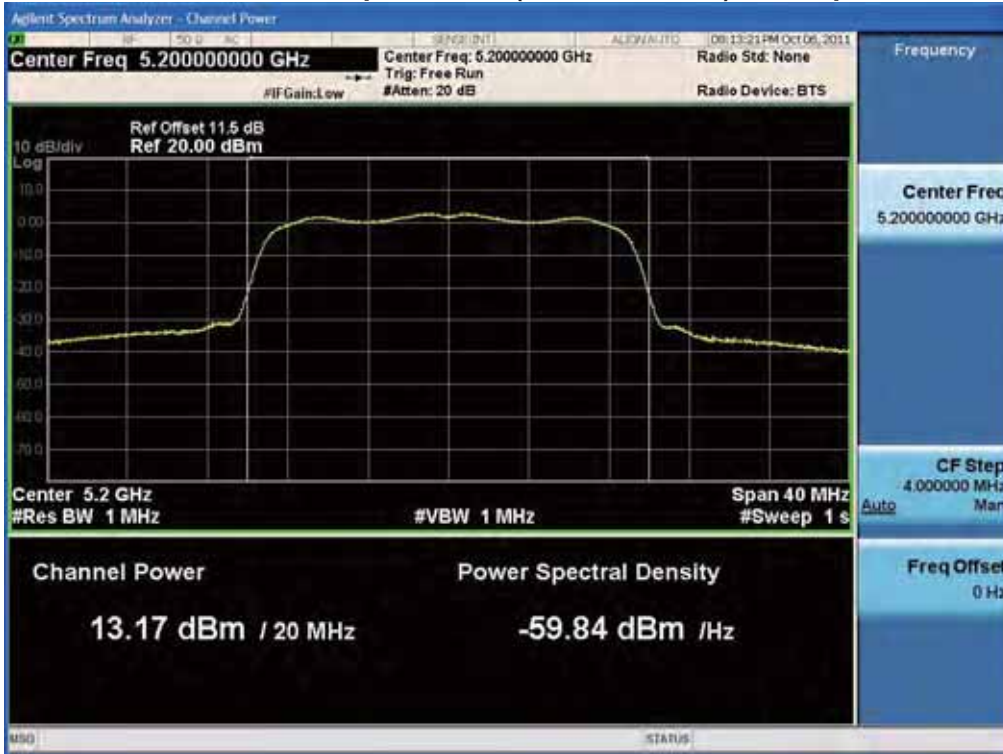


Conducted Output Power (802.11n-CH 36) 65 Mbps

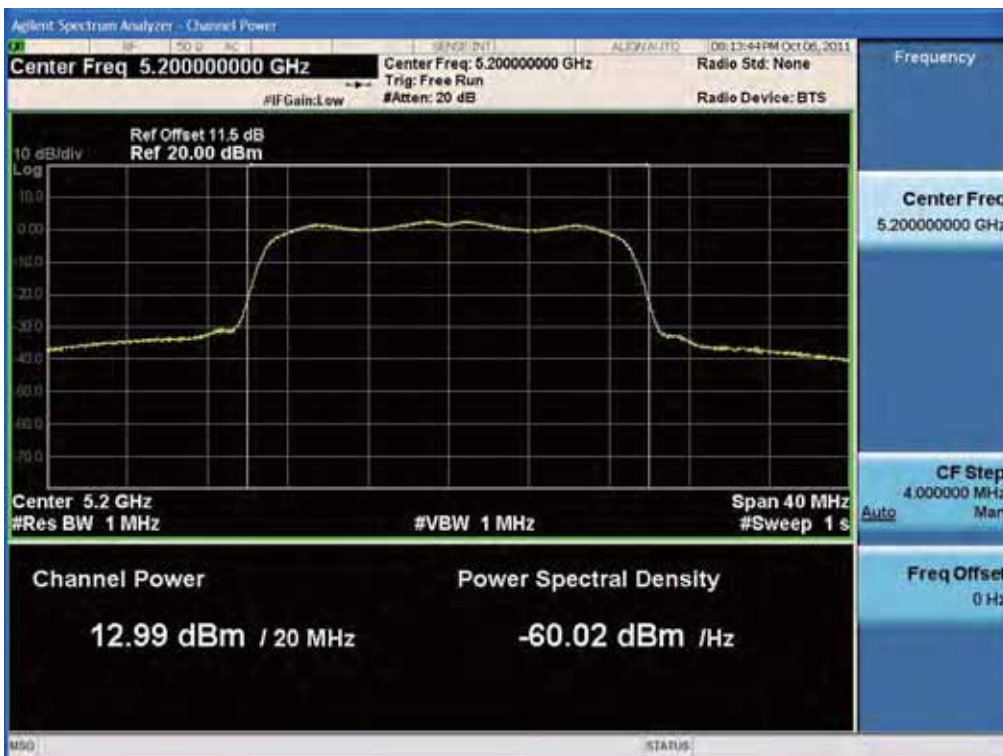


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFMB003D

Conducted Output Power (802.11n-CH 40) 6.5 Mbps



Conducted Output Power (802.11n-CH 40) 13 Mbps



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Conducted Output Power (802.11n-CH 40) 19.5 Mbps

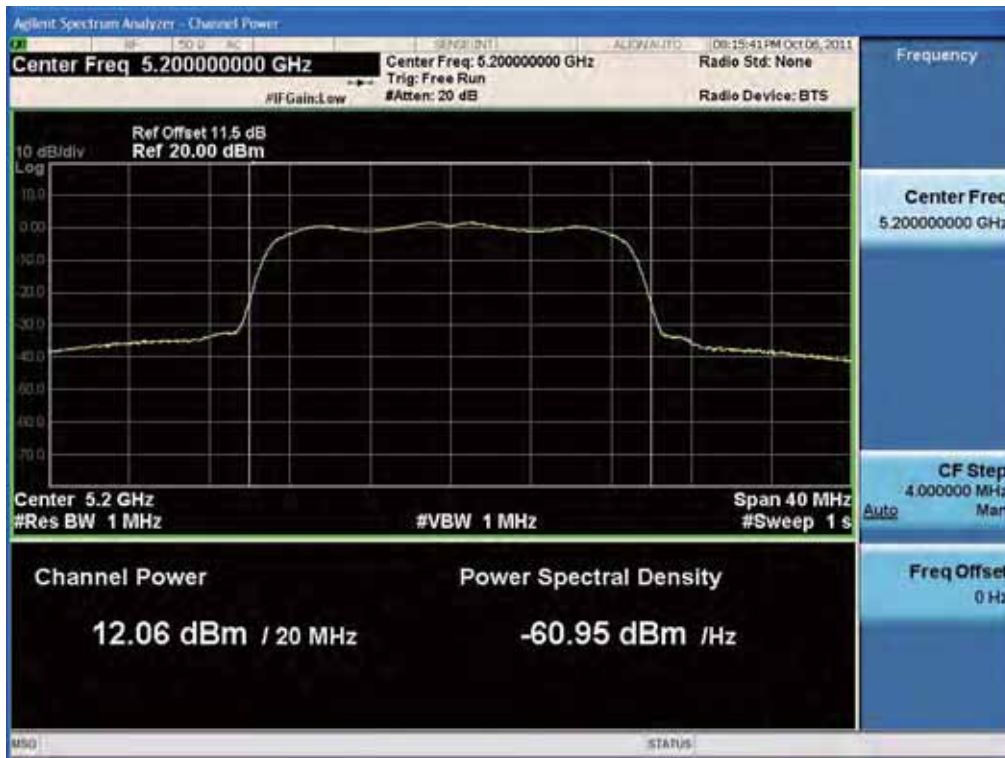


Conducted Output Power (802.11n-CH 40) 26 Mbps

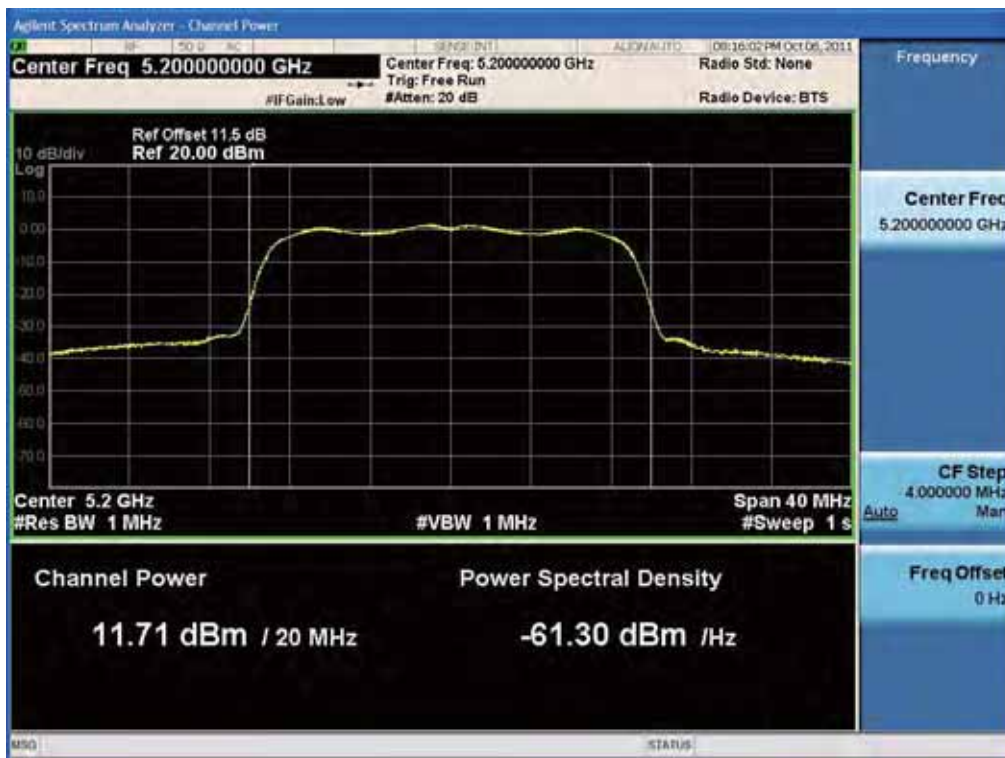


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Conducted Output Power (802.11n-CH 40) 39 Mbps

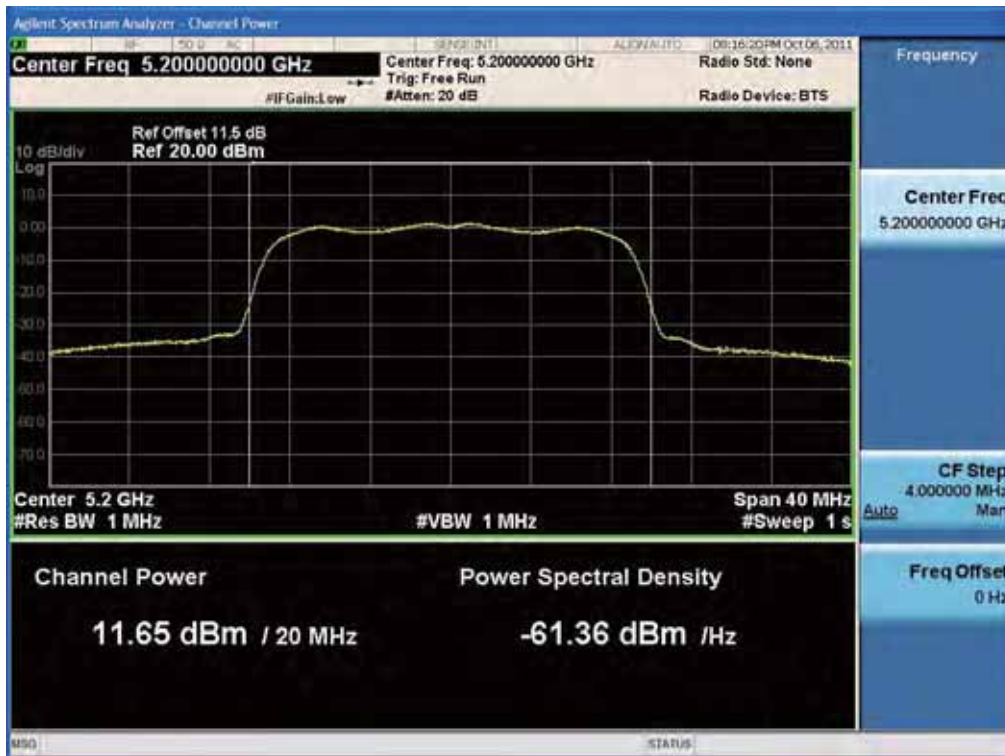


Conducted Output Power (802.11n-CH 40) 52 Mbps

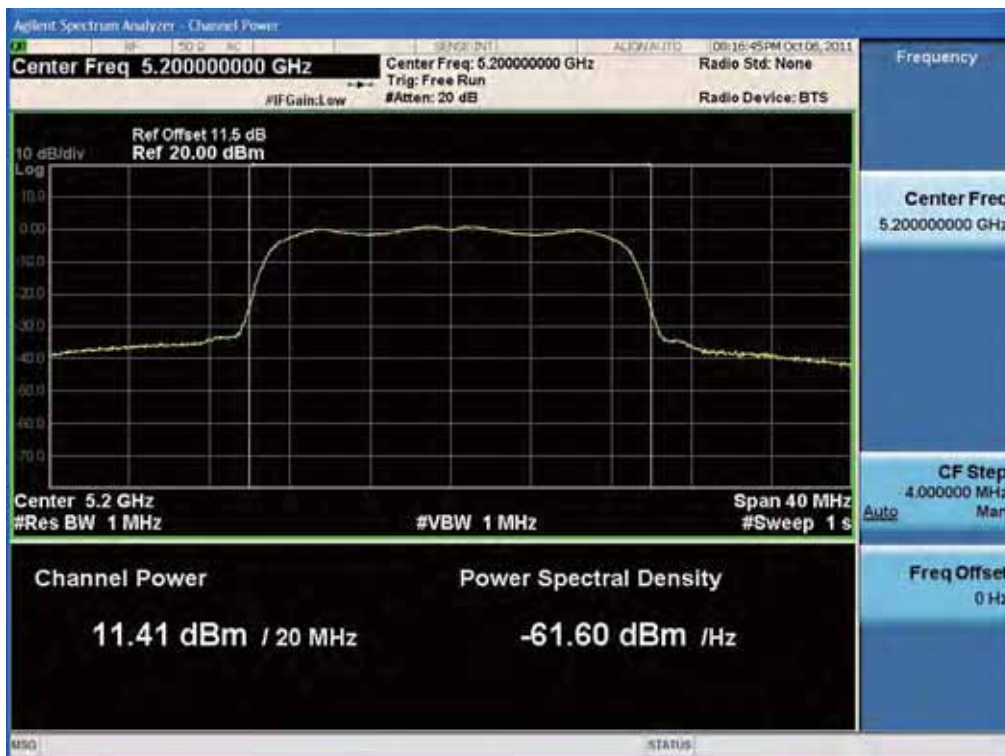


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: WI-FI Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Conducted Output Power (802.11n-CH 40) 58.5 Mbps



Conducted Output Power (802.11n-CH 40) 65 Mbps

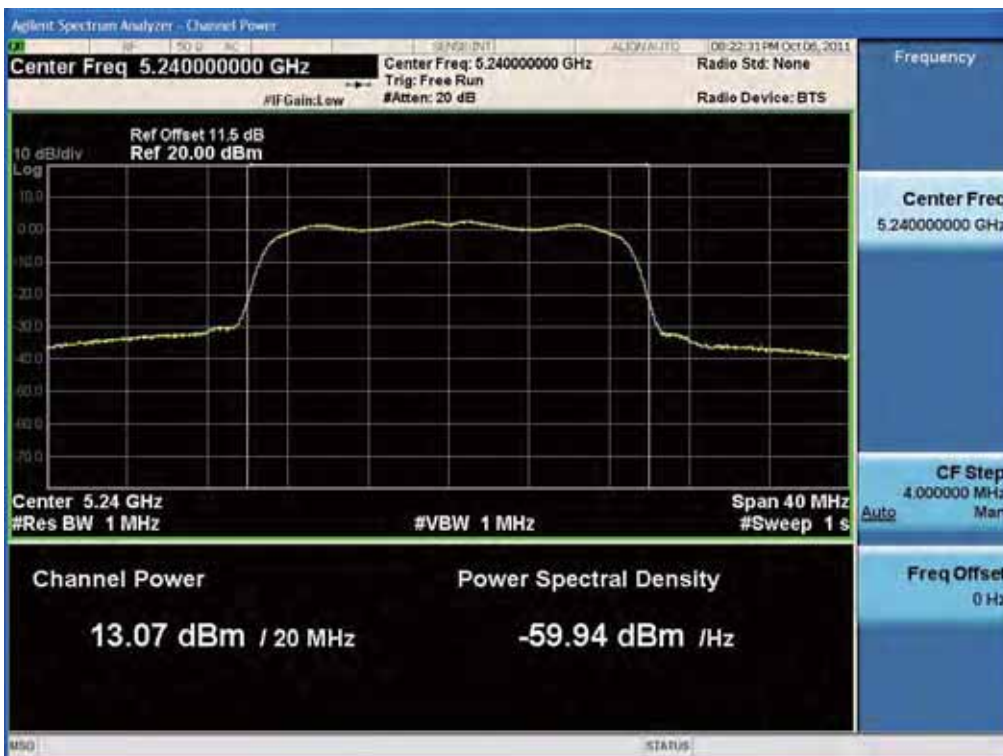


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Conducted Output Power (802.11n-CH 48) 6.5 Mbps

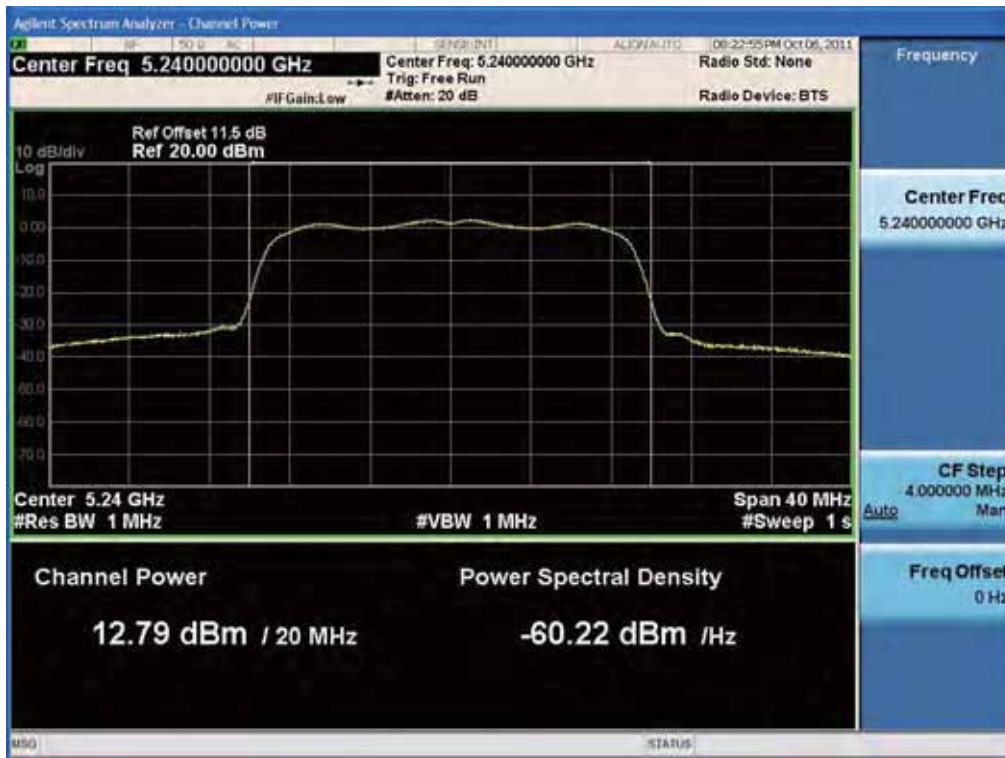


Conducted Output Power (802.11n-CH 48) 13 Mbps

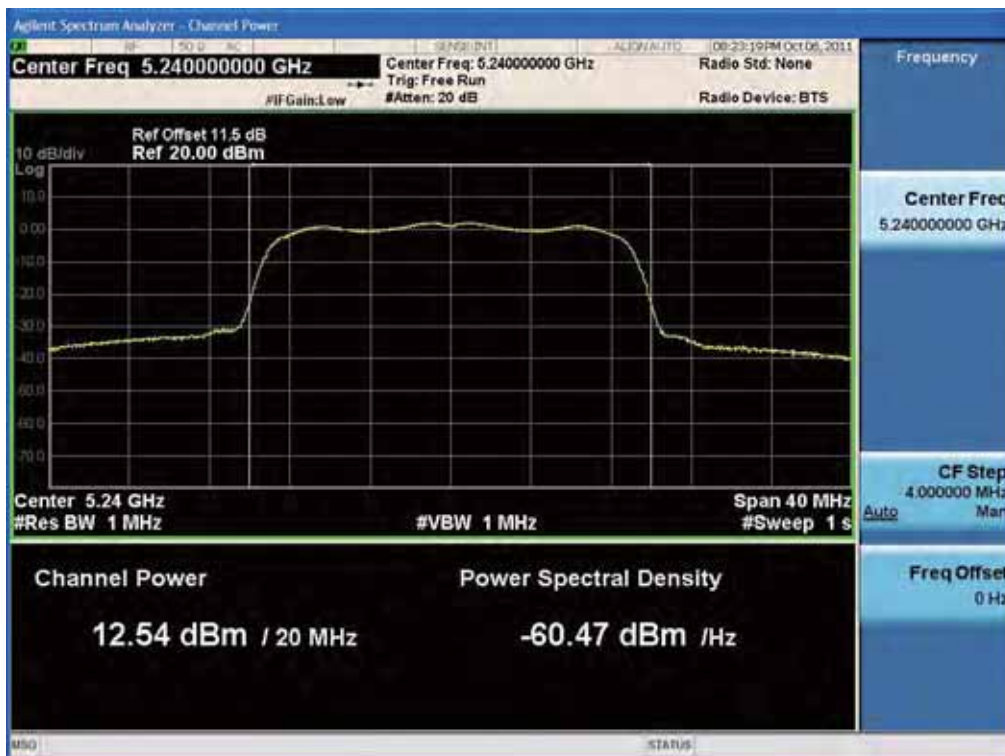


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Conducted Output Power (802.11n-CH 48) 19.5 Mbps



Conducted Output Power (802.11n-CH 48) 26 Mbps

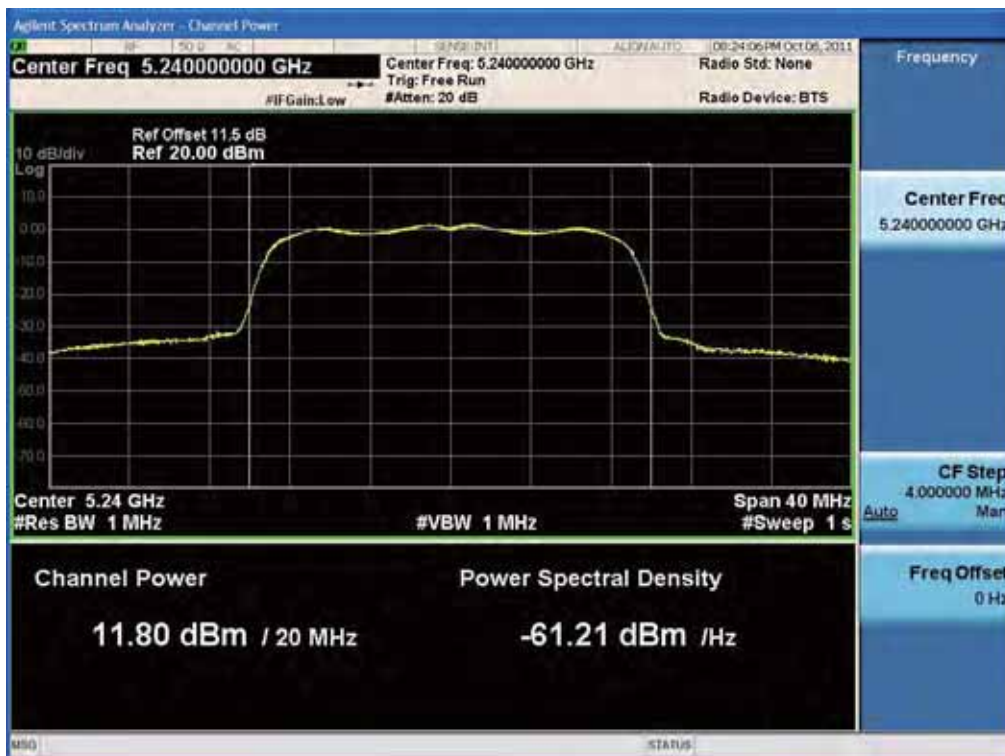


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: WI-FI Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Conducted Output Power (802.11n-CH 48) 39 Mbps

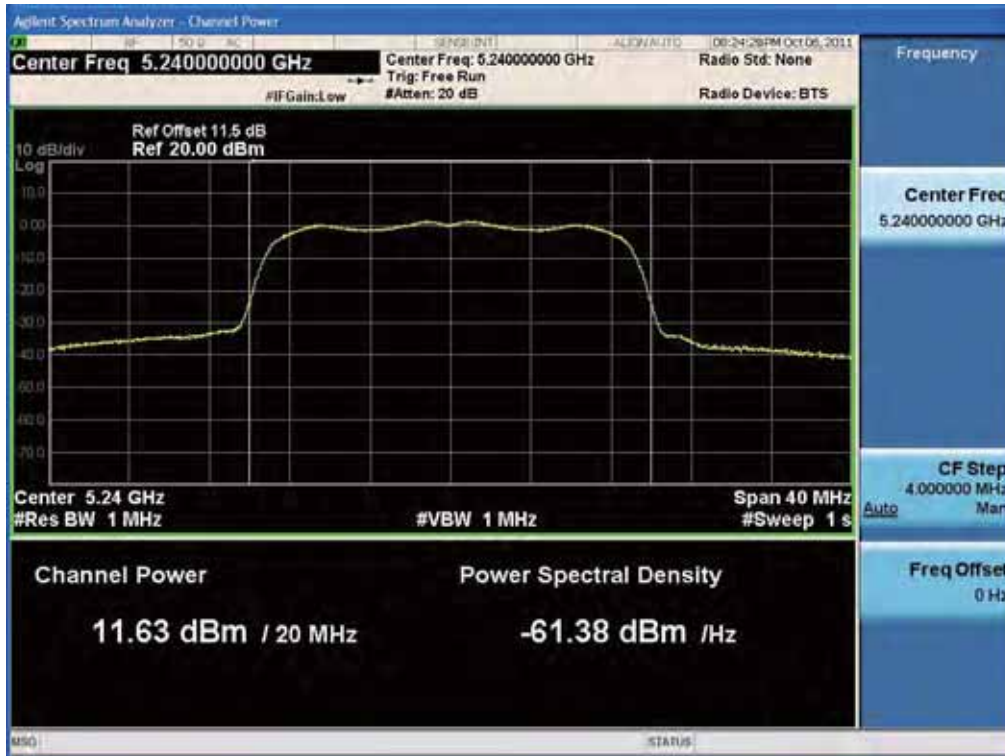


Conducted Output Power (802.11n-CH 48) 52 Mbps

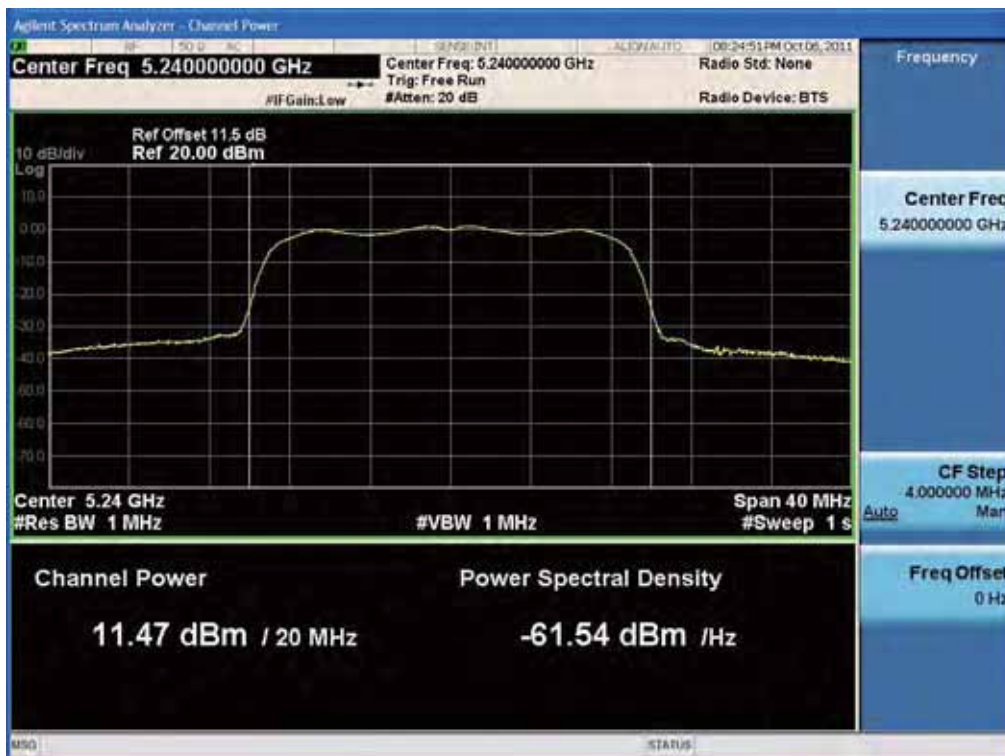


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: WI-FI Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Conducted Output Power (802.11n-CH 48) 58.5 Mbps

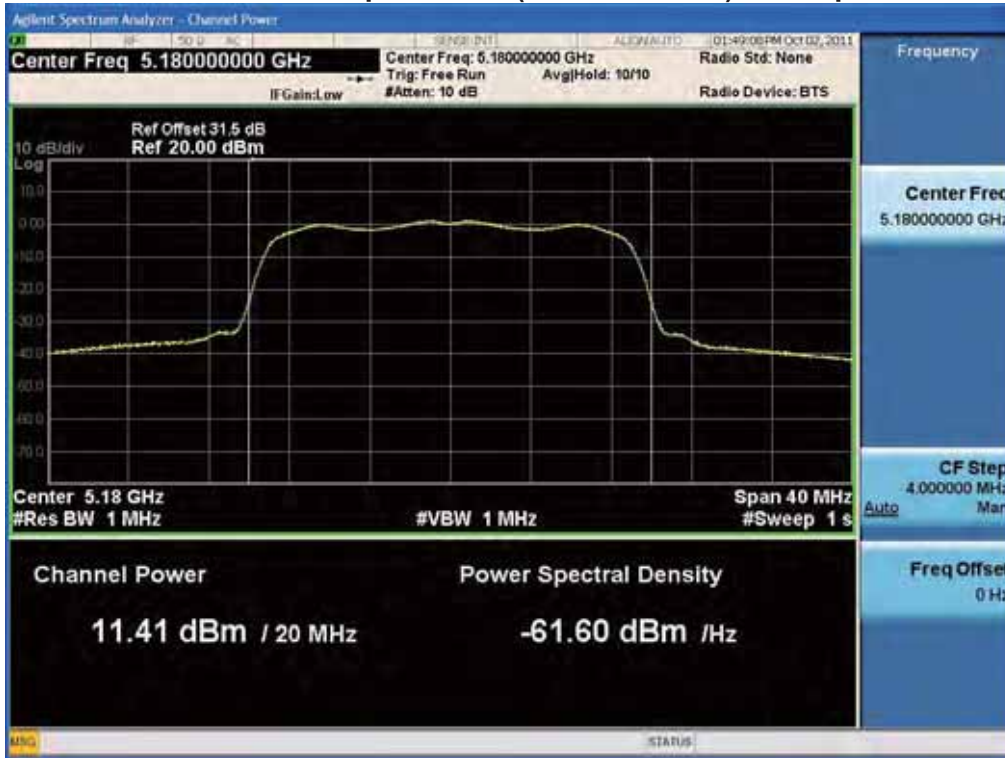


Conducted Output Power (802.11n-CH 48) 65 Mbps

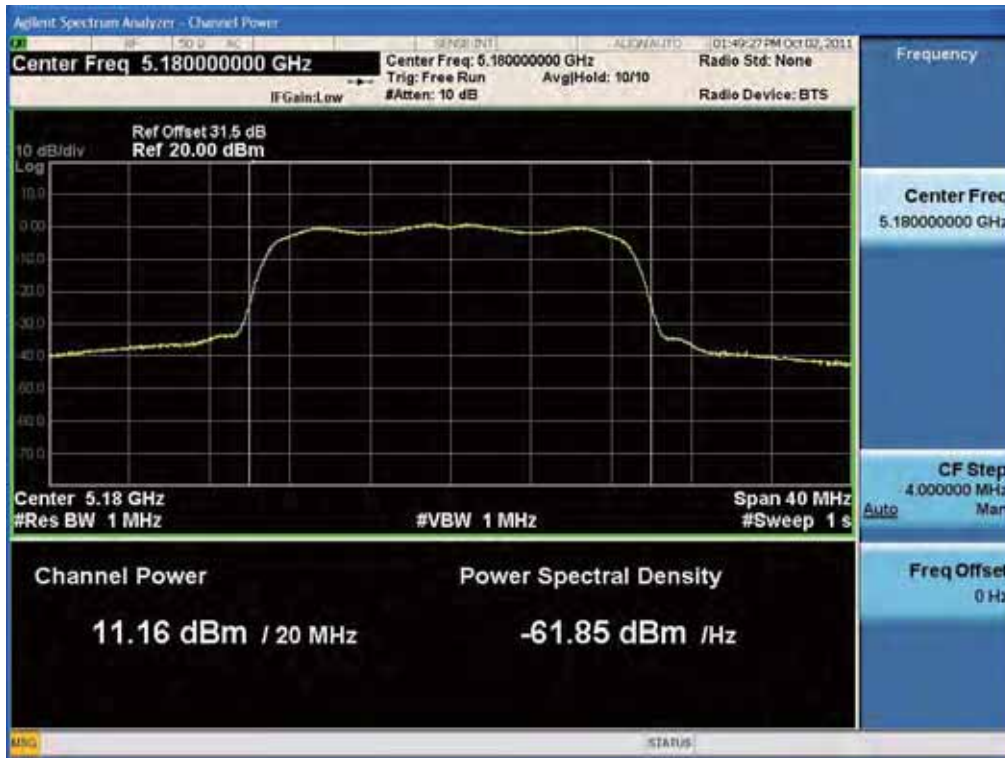


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

RESULT PLOTS_Ant.1 (5180 MHz ~5240 MHz) _20 MHz BW
 Conducted Output Power (802.11n-CH 36) 6.5 Mbps

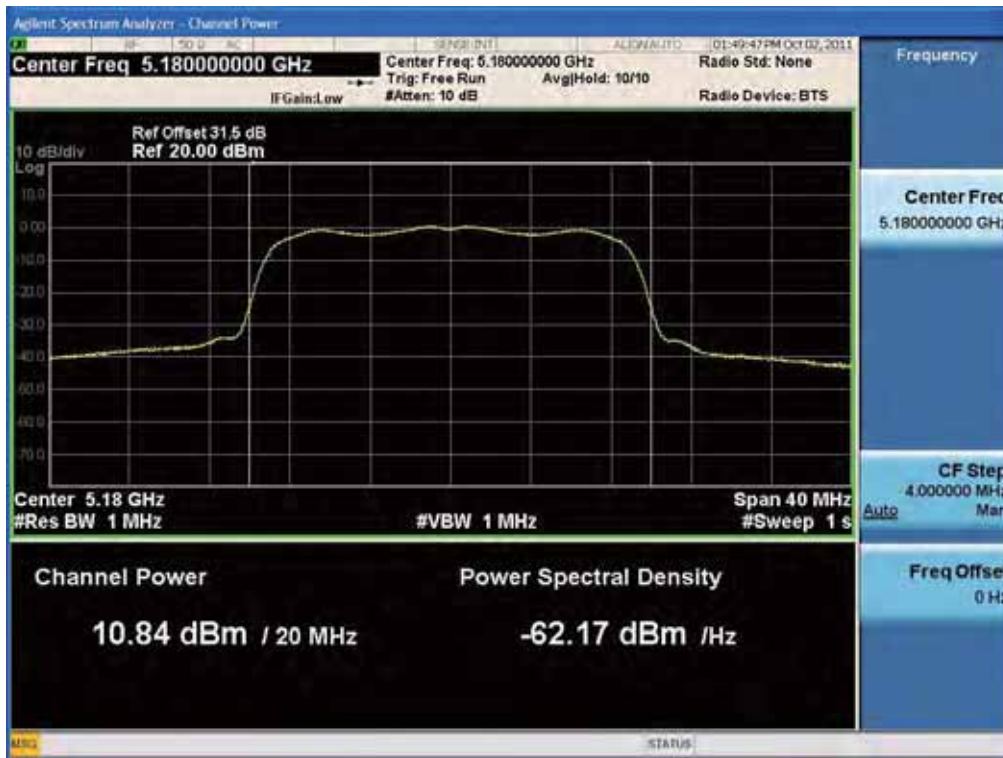


Conducted Output Power (802.11n-CH 36) 13 Mbps

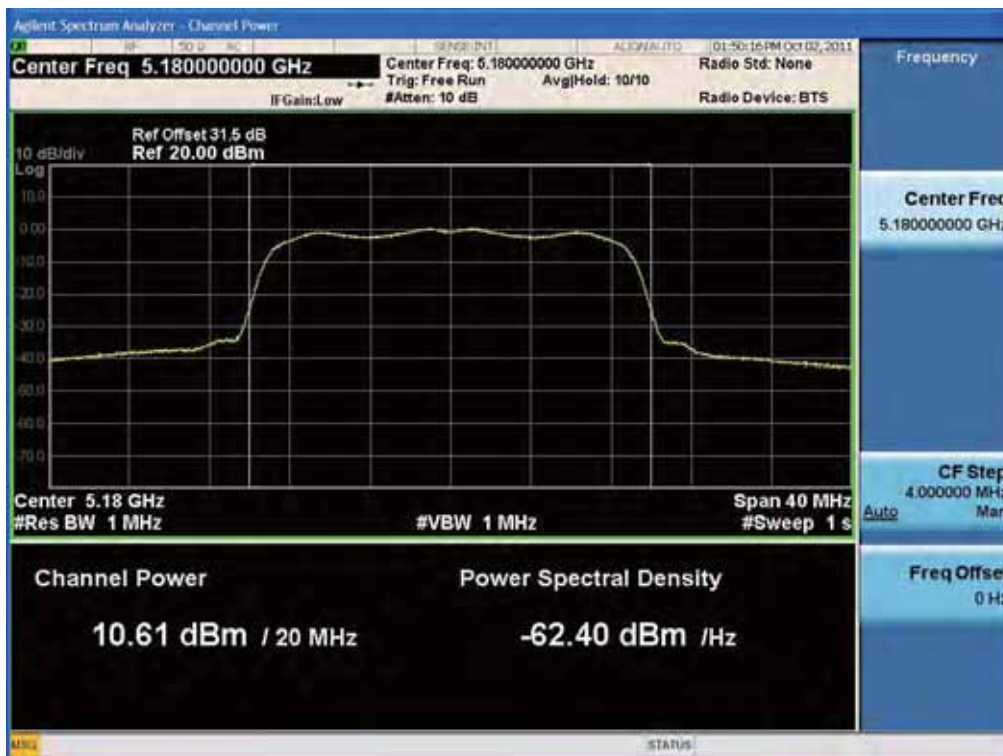


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Conducted Output Power (802.11n-CH 36) 19.5 Mbps

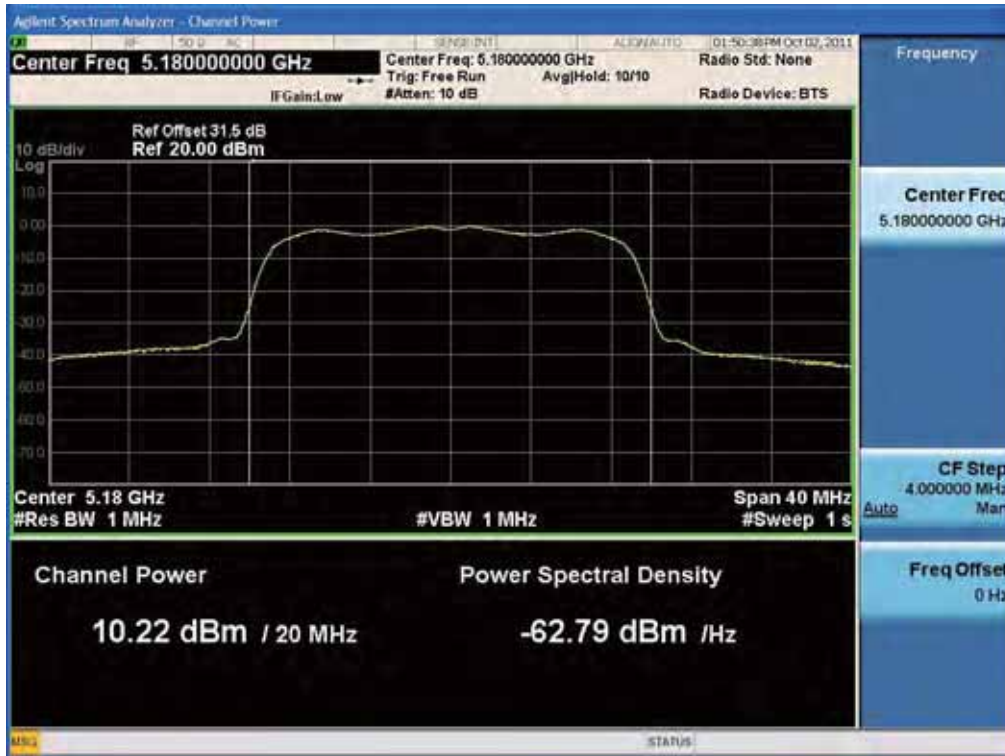


Conducted Output Power (802.11n-CH 36) 26 Mbps

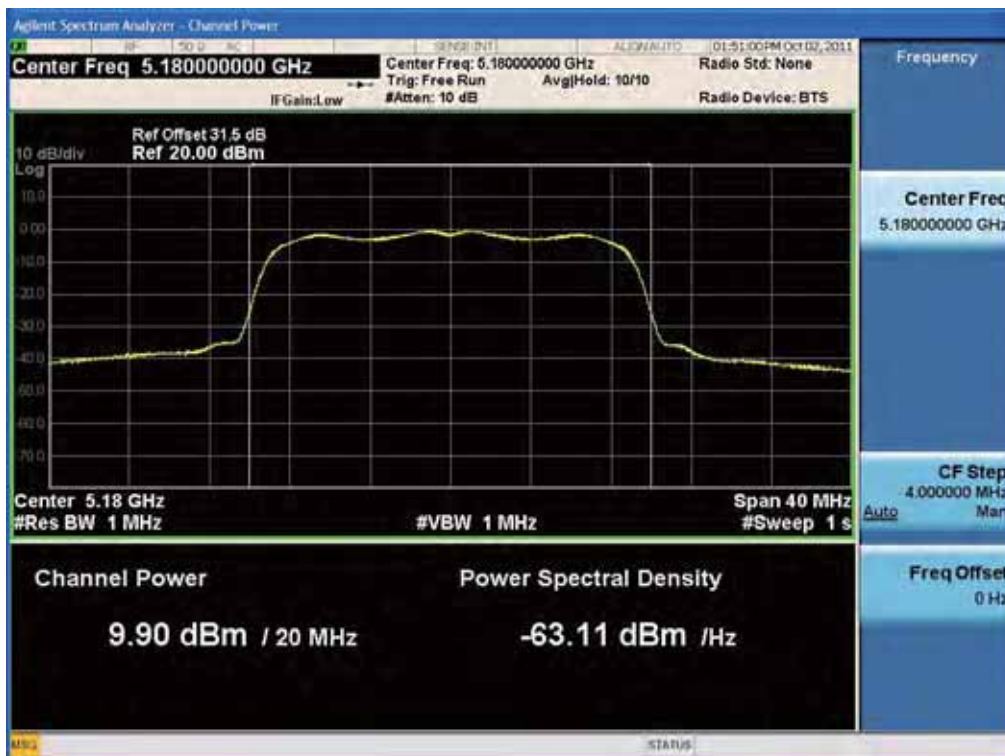


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: WI-FI Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFMB003D

Conducted Output Power (802.11n-CH 36) 39 Mbps

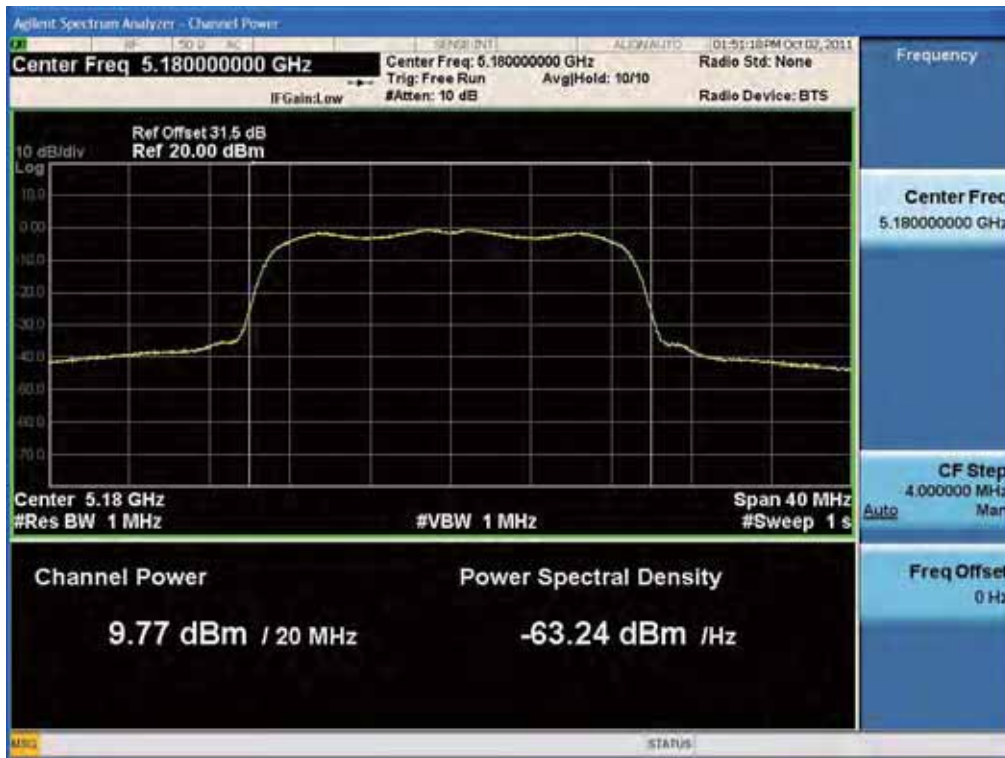


Conducted Output Power (802.11n-CH 36) 52 Mbps

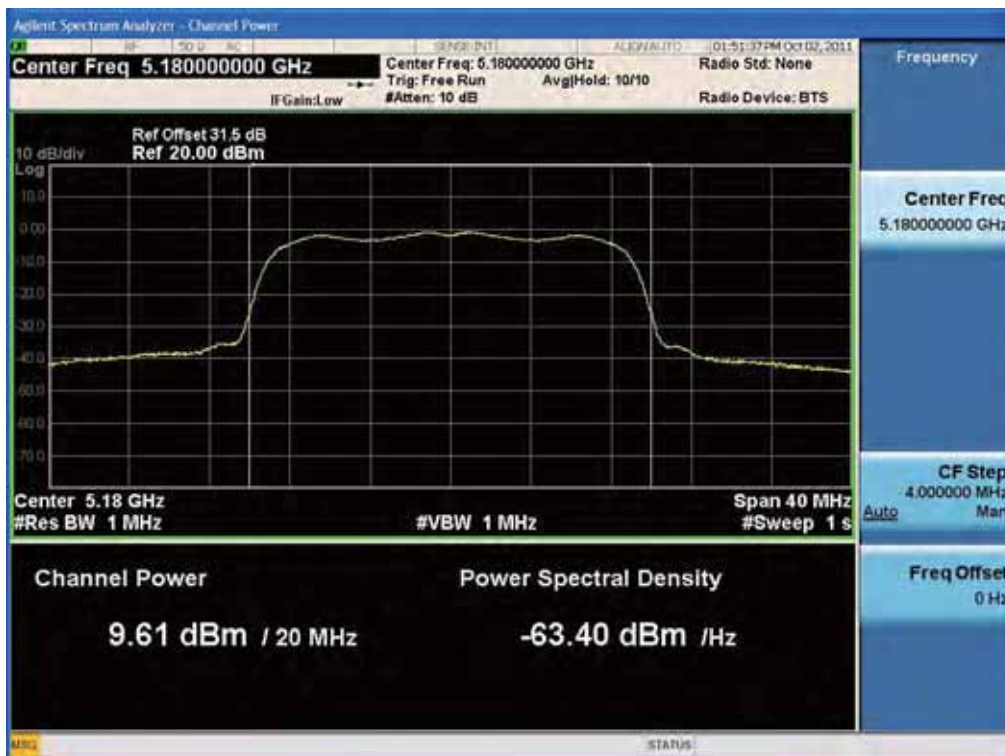


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Conducted Output Power (802.11n-CH 36) 58.5 Mbps



Conducted Output Power (802.11n-CH 36) 65 Mbps



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: WI-FI Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Conducted Output Power (802.11n-CH 40) 6.5 Mbps

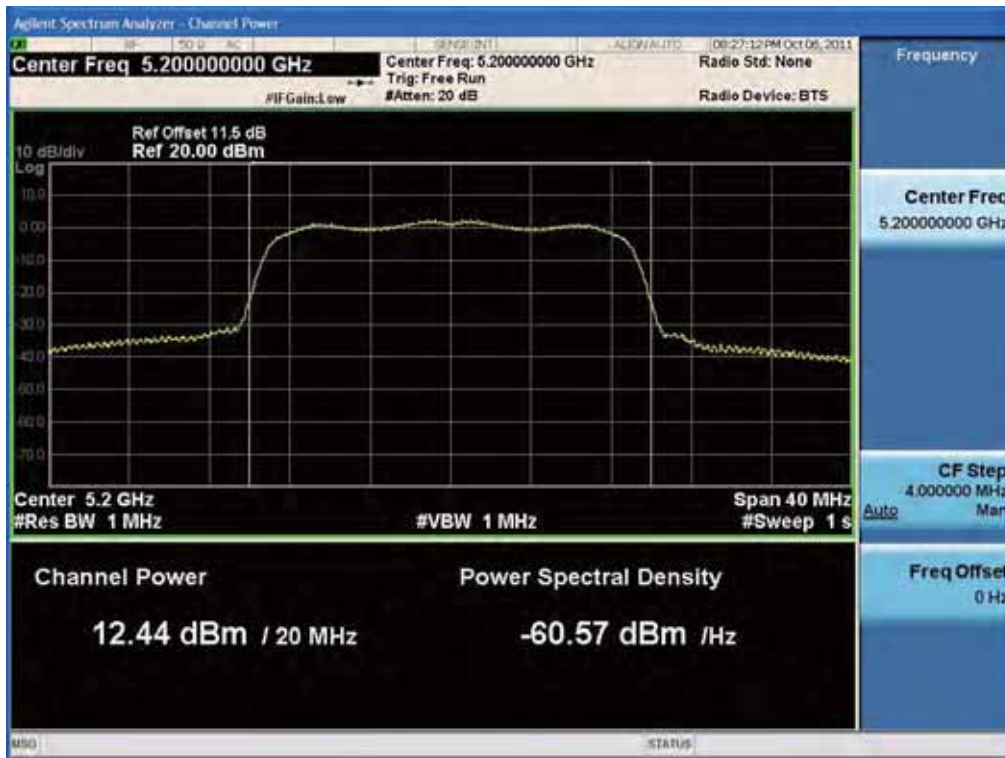


Conducted Output Power (802.11n-CH 40) 13 Mbps

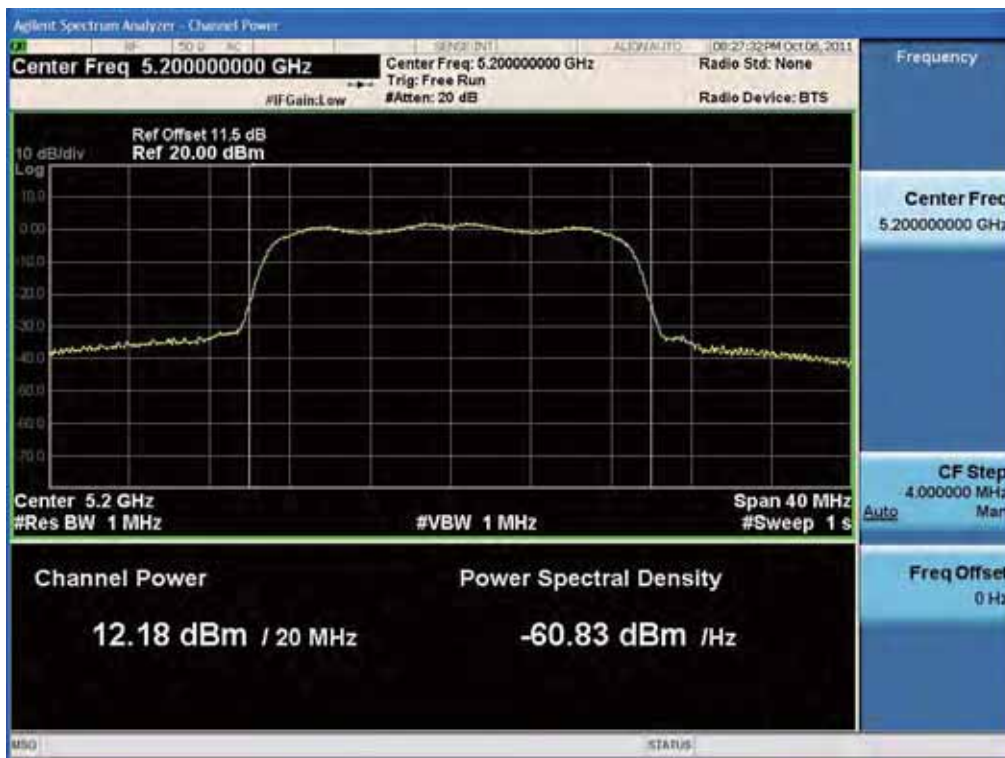


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Conducted Output Power (802.11n-CH 40) 19.5 Mbps

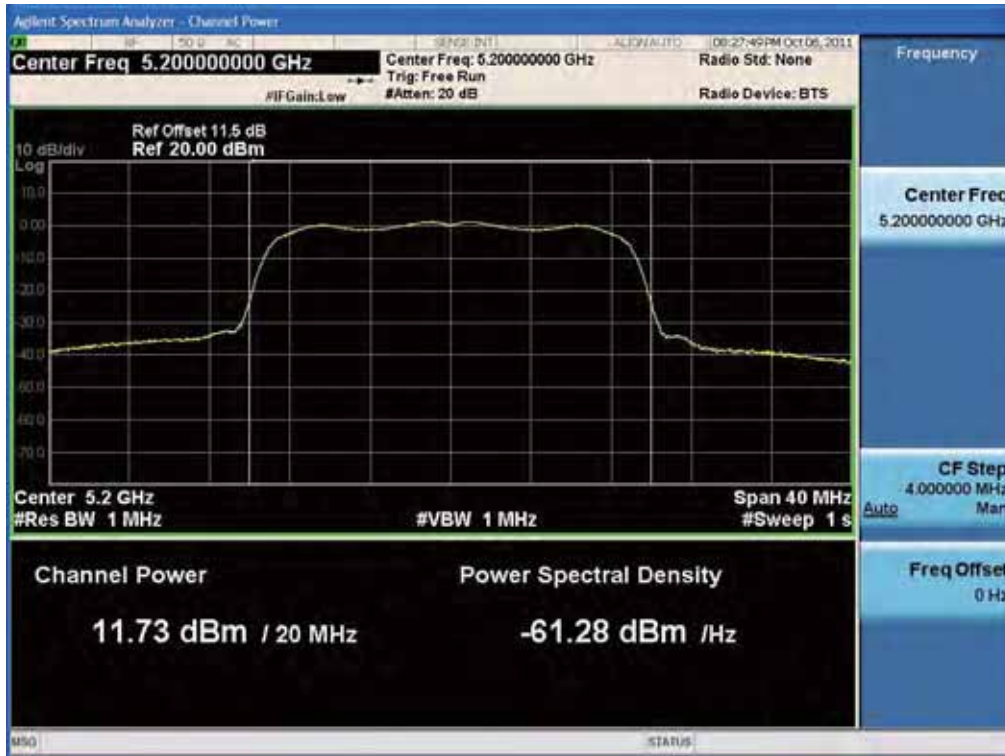


Conducted Output Power (802.11n-CH 40) 26 Mbps

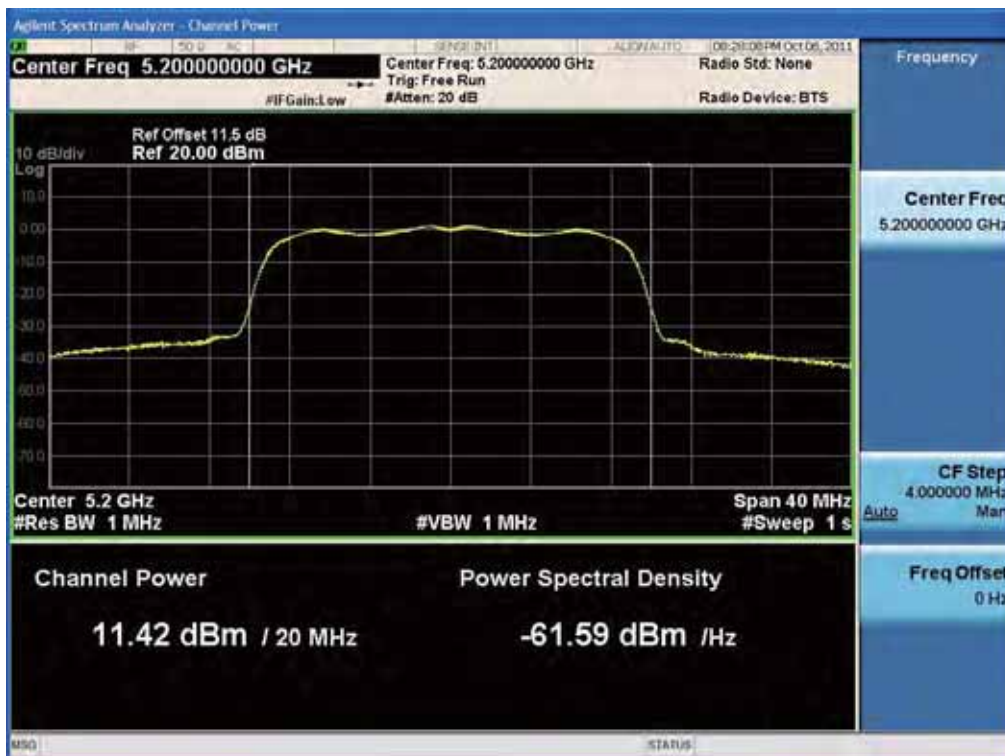


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Conducted Output Power (802.11n-CH 40) 39 Mbps

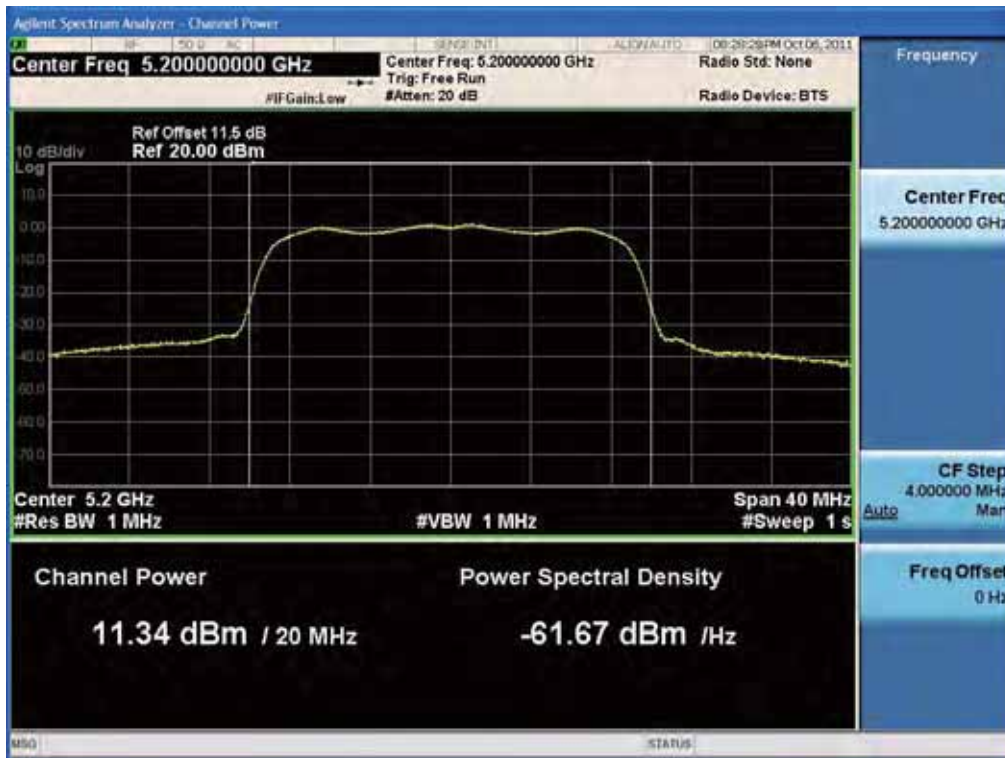


Conducted Output Power (802.11n-CH 40) 52 Mbps

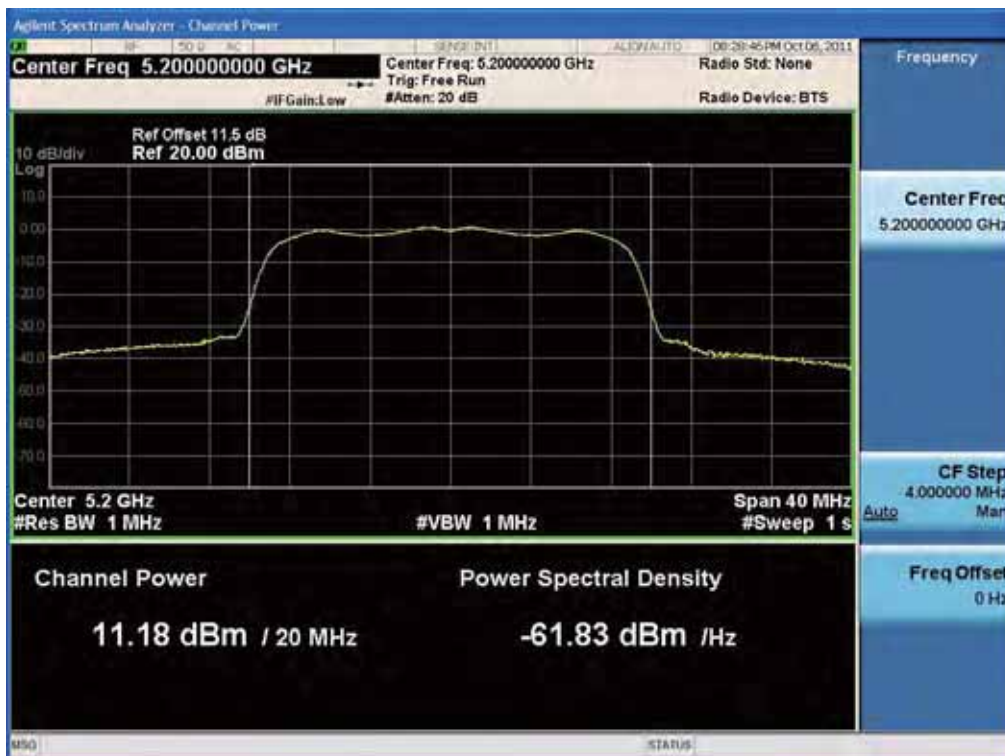


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Conducted Output Power (802.11n-CH 40) 58.5 Mbps

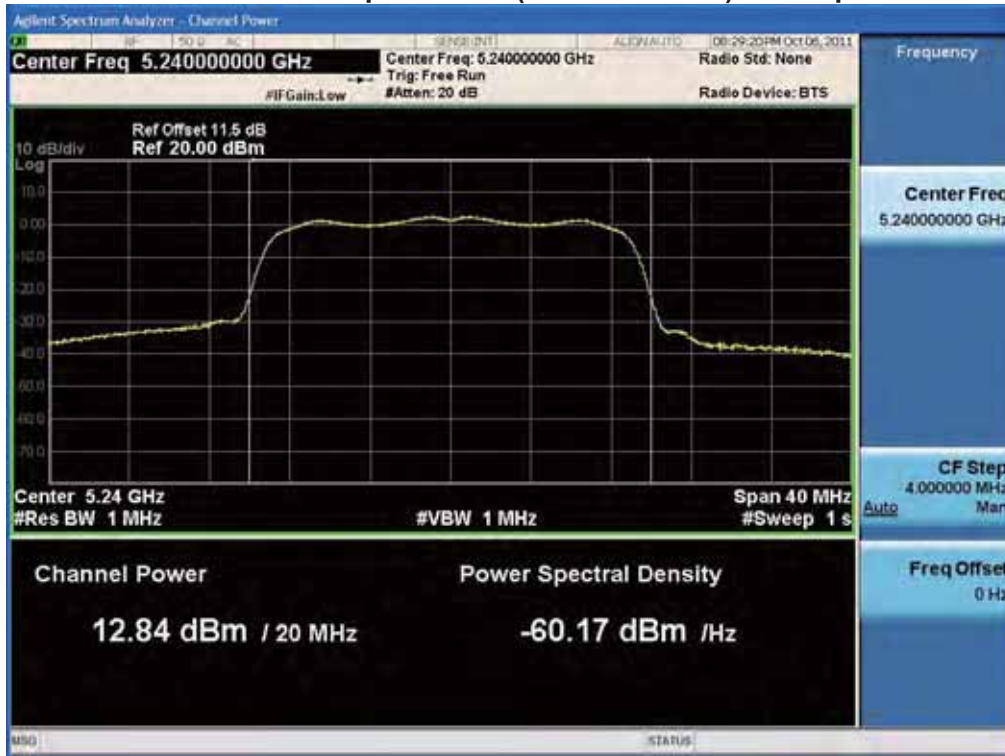


Conducted Output Power (802.11n-CH 40) 65 Mbps



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Conducted Output Power (802.11n-CH 48) 6.5 Mbps



Conducted Output Power (802.11n-CH 48) 13 Mbps



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Conducted Output Power (802.11n-CH 48) 19.5 Mbps



Conducted Output Power (802.11n-CH 48) 26 Mbps

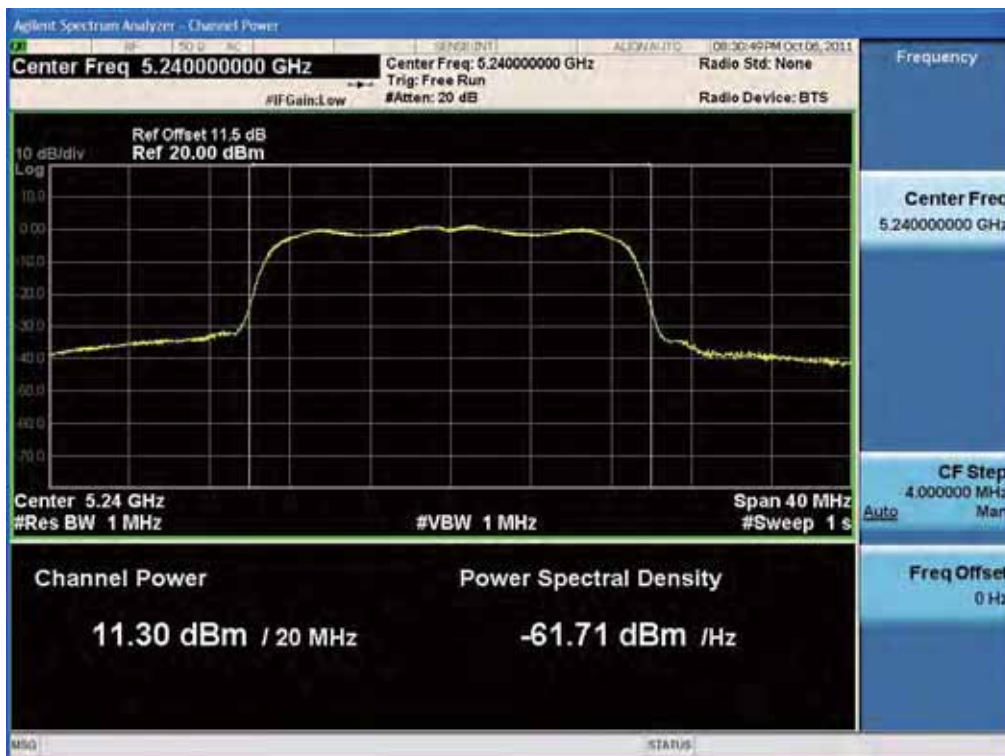


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Conducted Output Power (802.11n-CH 48) 39 Mbps

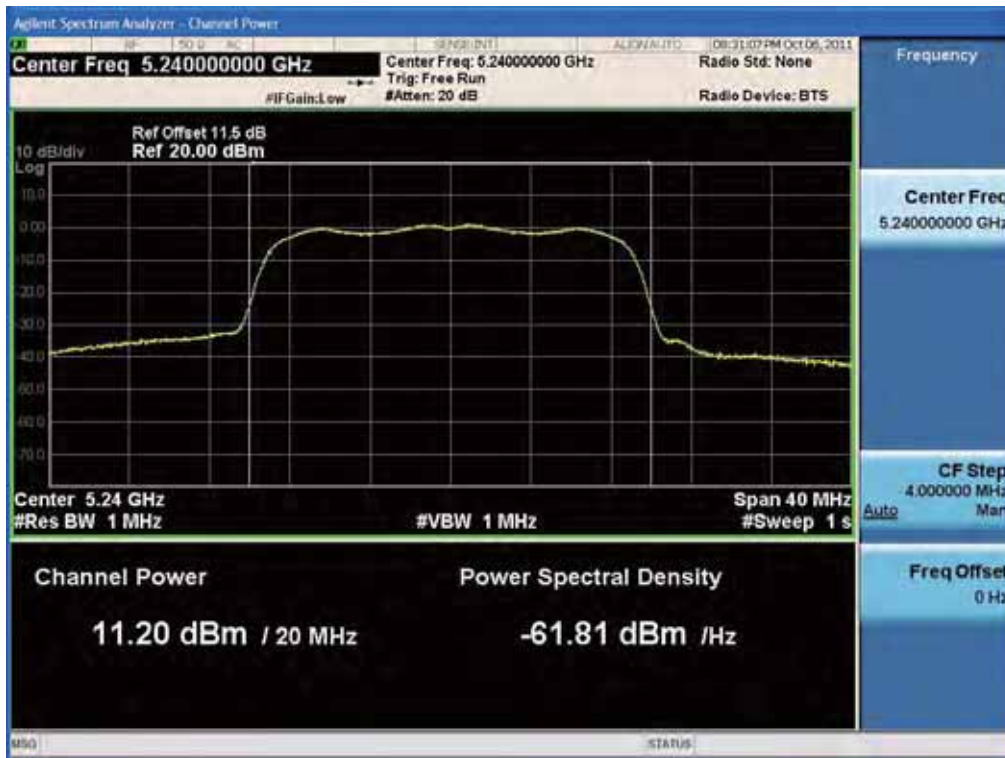


Conducted Output Power (802.11n-CH 48) 52 Mbps

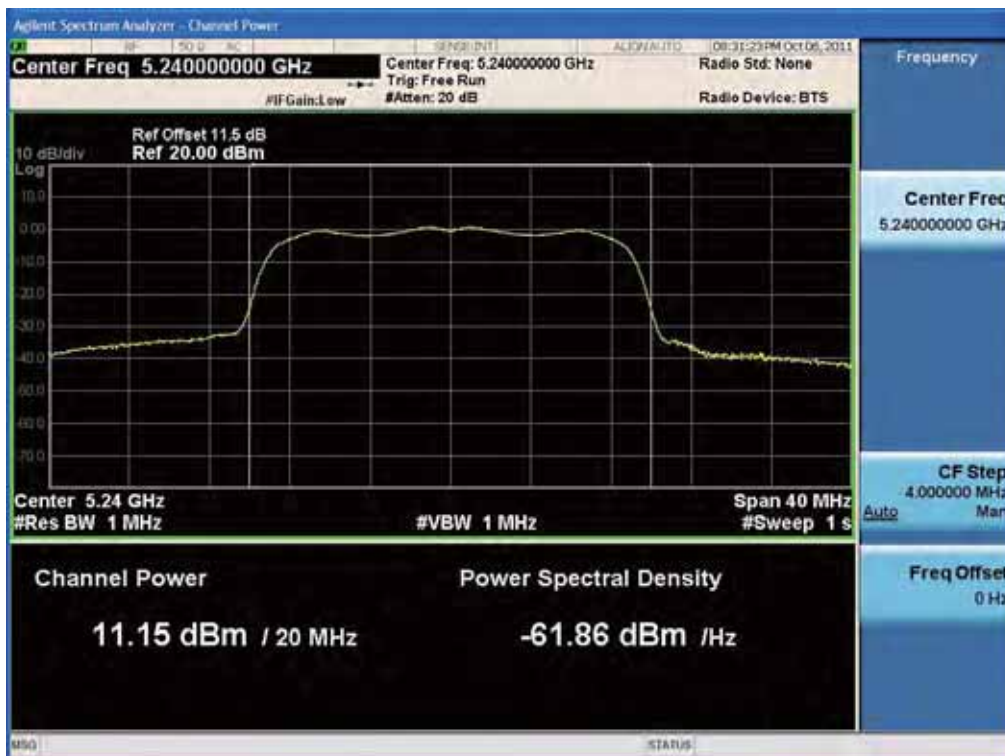


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Conducted Output Power (802.11n-CH 48) 58.5 Mbps

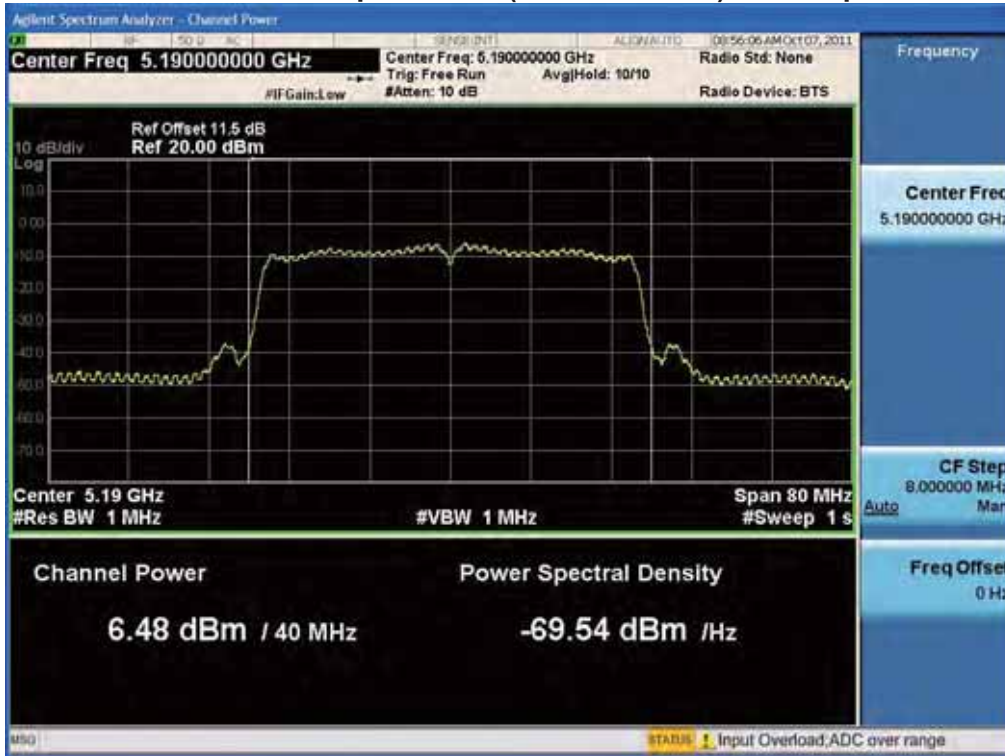


Conducted Output Power (802.11n-CH 48) 65 Mbps

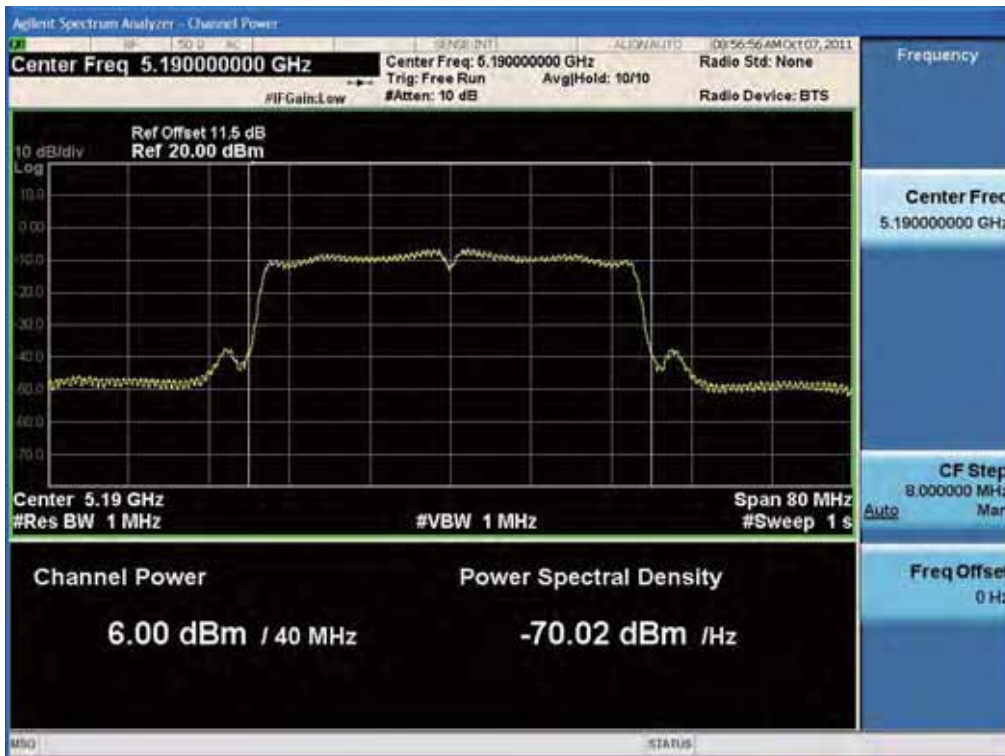


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

RESULT PLOTS_Ant.0 (5180 MHz~5240 MHz) _40 MHz BW
 Conducted Output Power (802.11n-CH 38) 13.5 Mbps

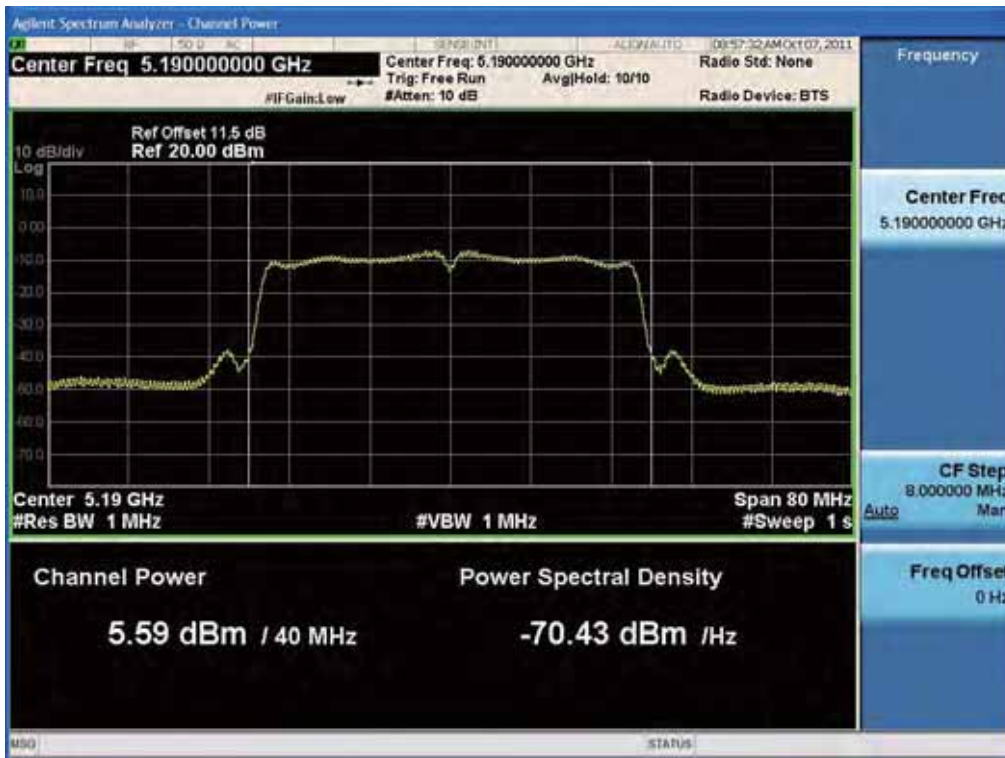


Conducted Output Power (802.11n-CH 38) 27 Mbps

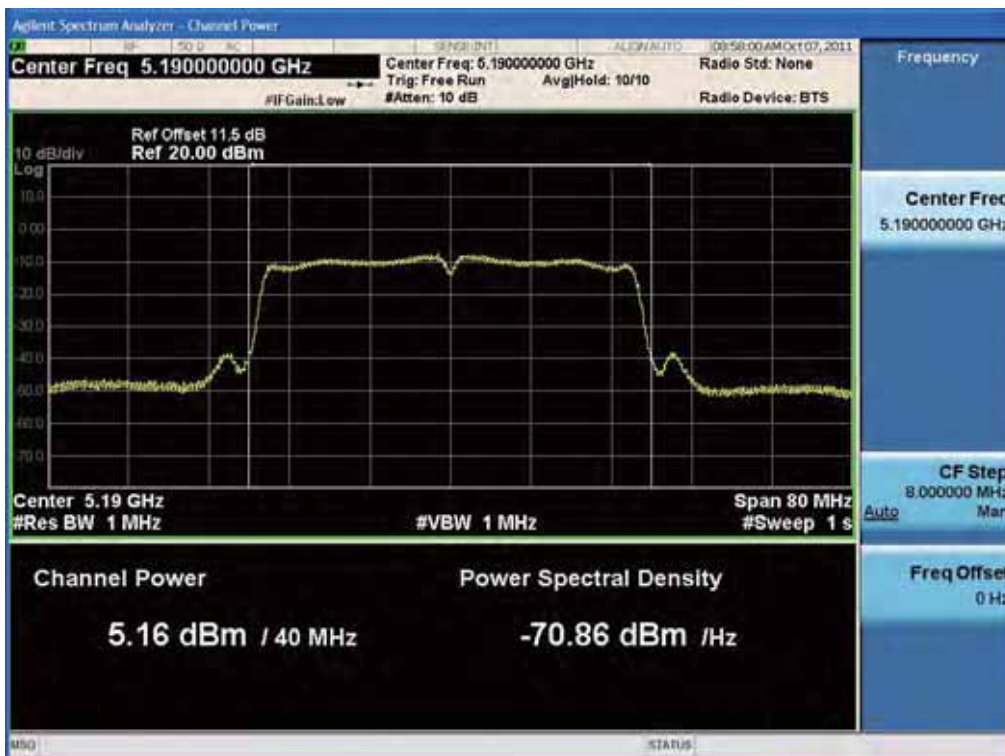


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM-B003D

Conducted Output Power (802.11n-CH 38) 40.5 Mbps



Conducted Output Power (802.11n-CH 38) 54 Mbps

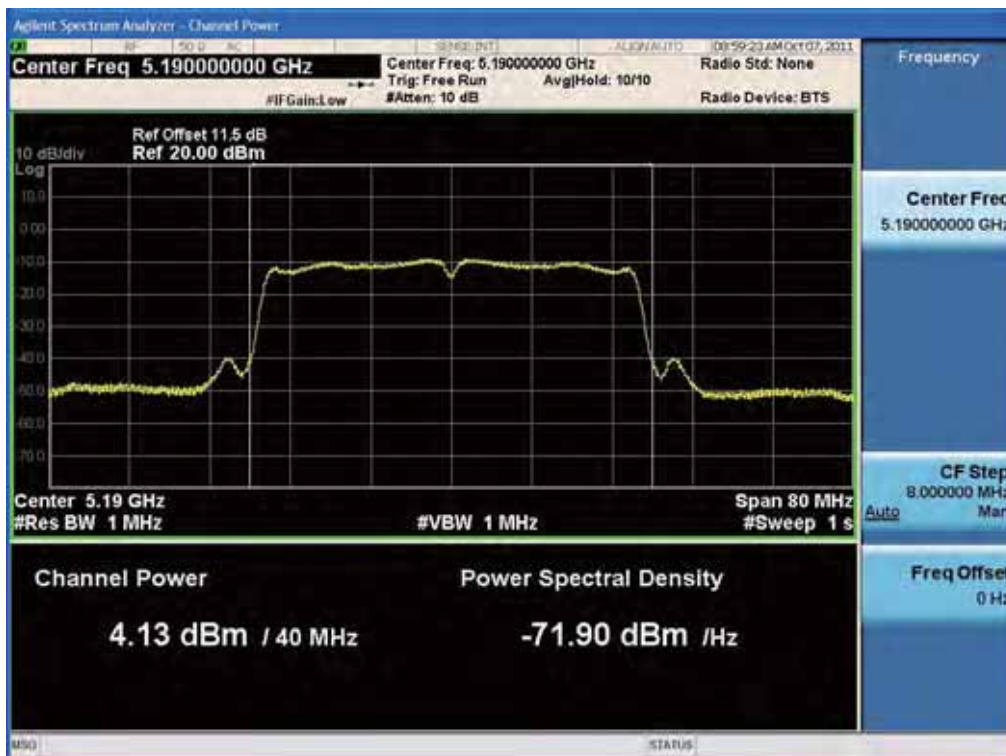


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Conducted Output Power (802.11n-CH 38) 81 Mbps

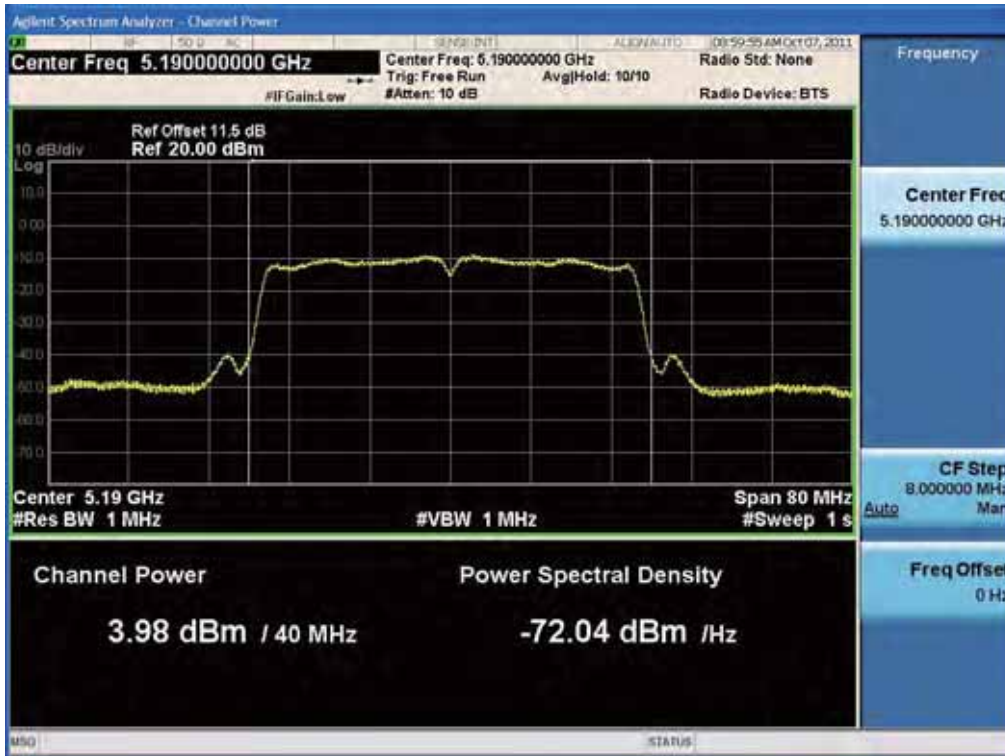


Conducted Output Power (802.11n-CH 38) 108 Mbps

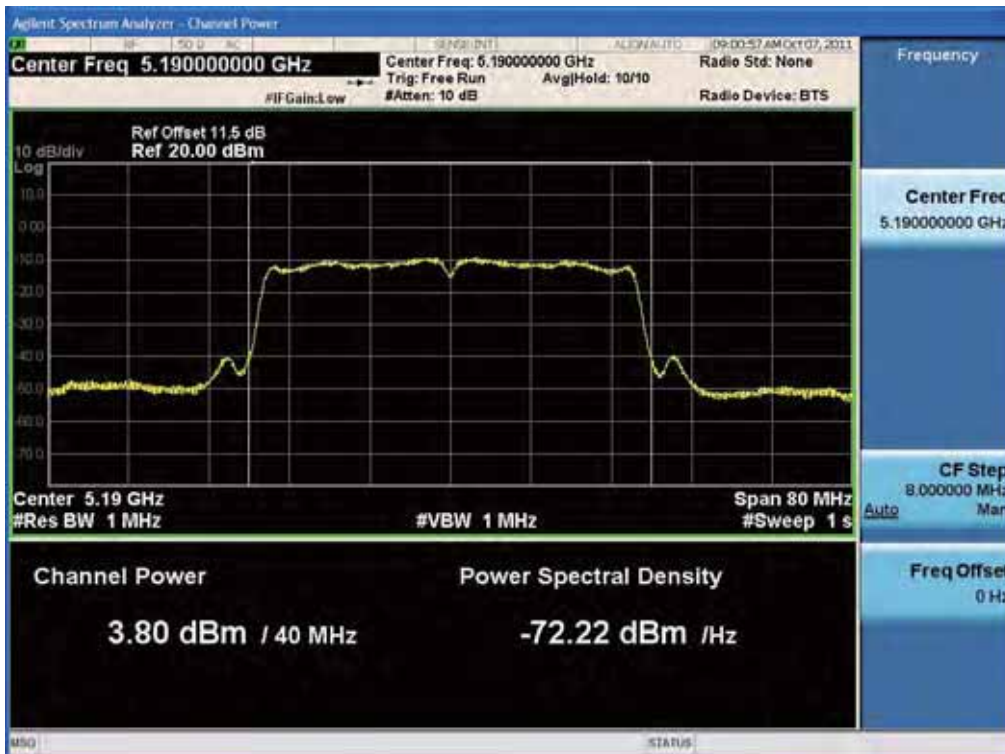


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Conducted Output Power (802.11n-CH 38) 121.5 Mbps

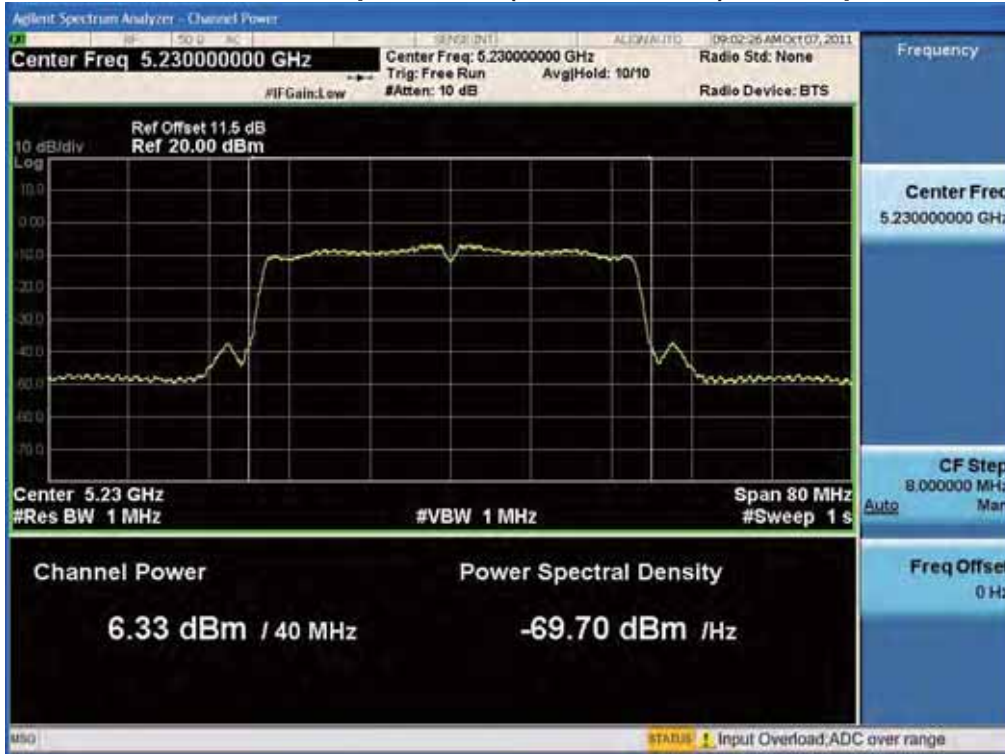


Conducted Output Power (802.11n-CH 38) 135 Mbps

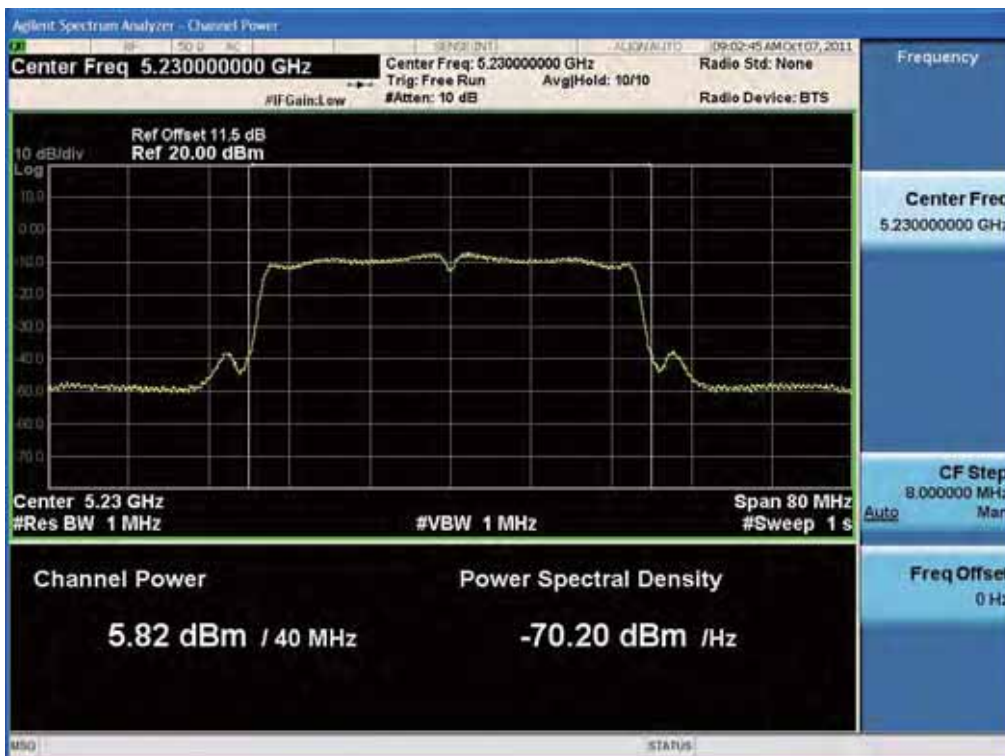


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Conducted Output Power (802.11n-CH 46) 13.5 Mbps

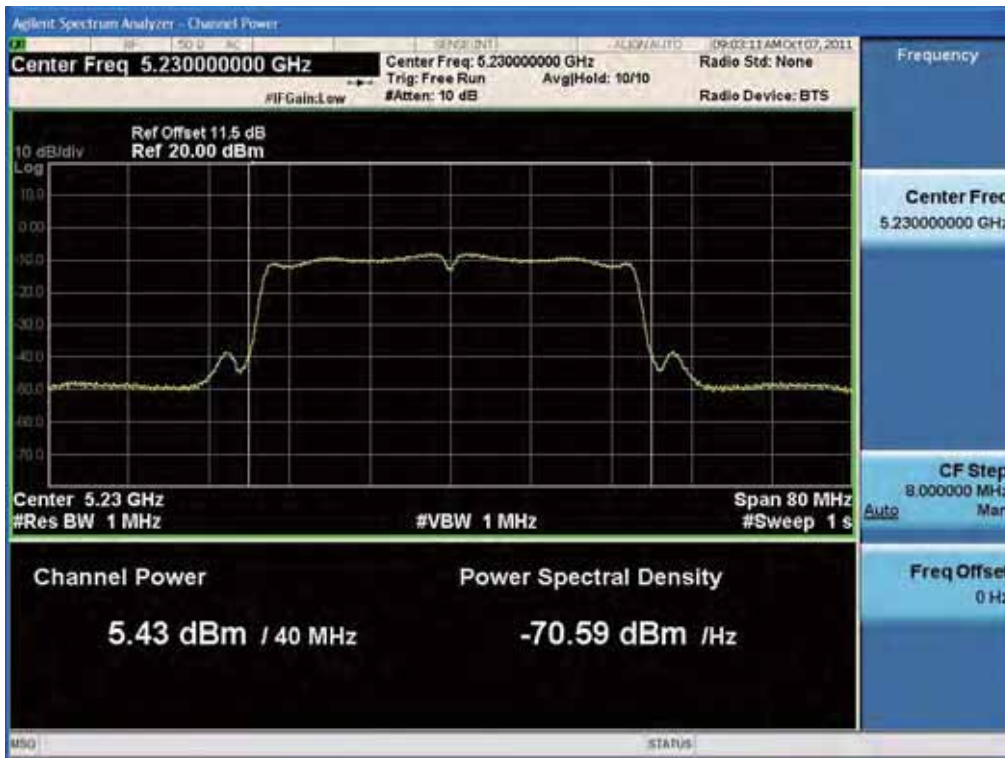


Conducted Output Power (802.11n-CH 46) 27 Mbps

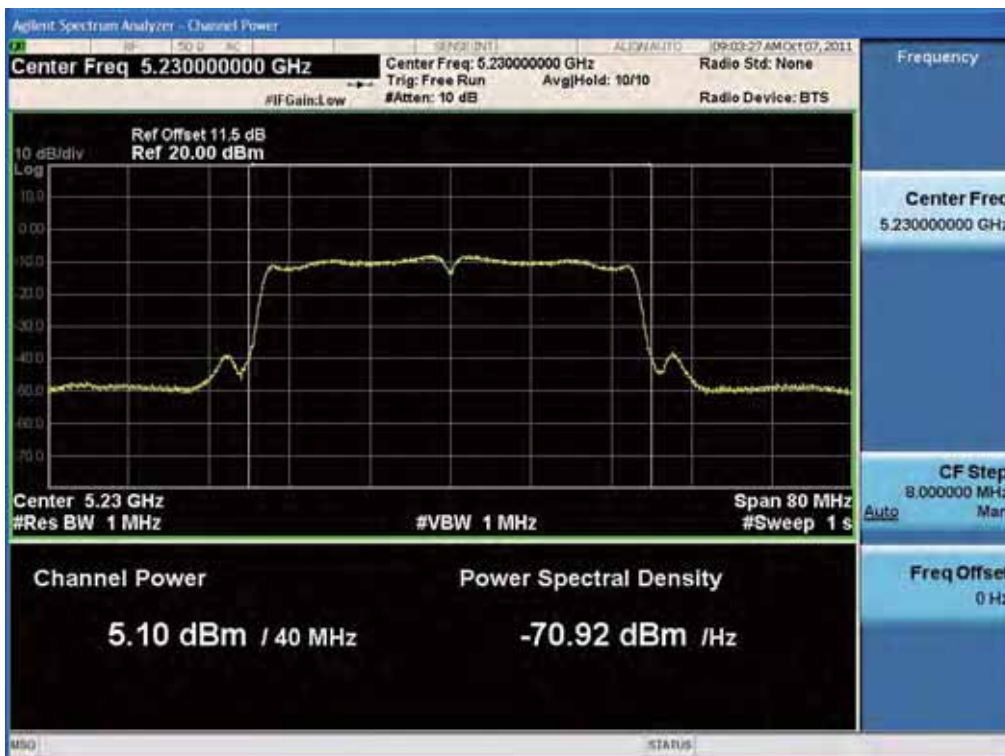


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Conducted Output Power (802.11n-CH 46) 40.5 Mbps



Conducted Output Power (802.11n-CH 46) 54 Mbps

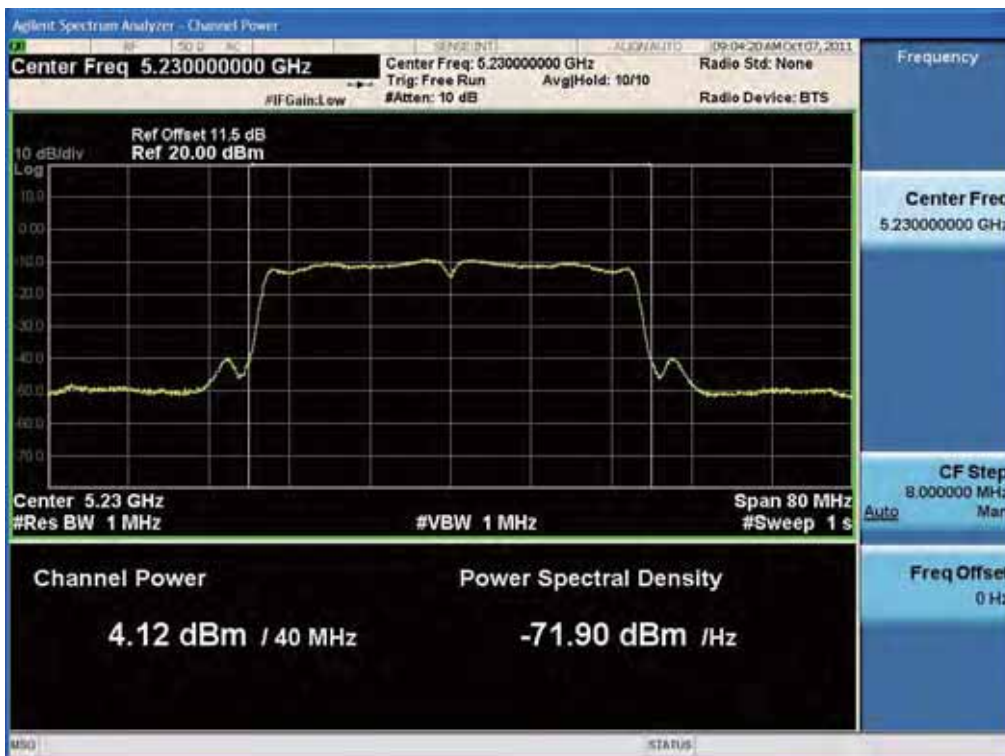


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Conducted Output Power (802.11n-CH 46) 81 Mbps

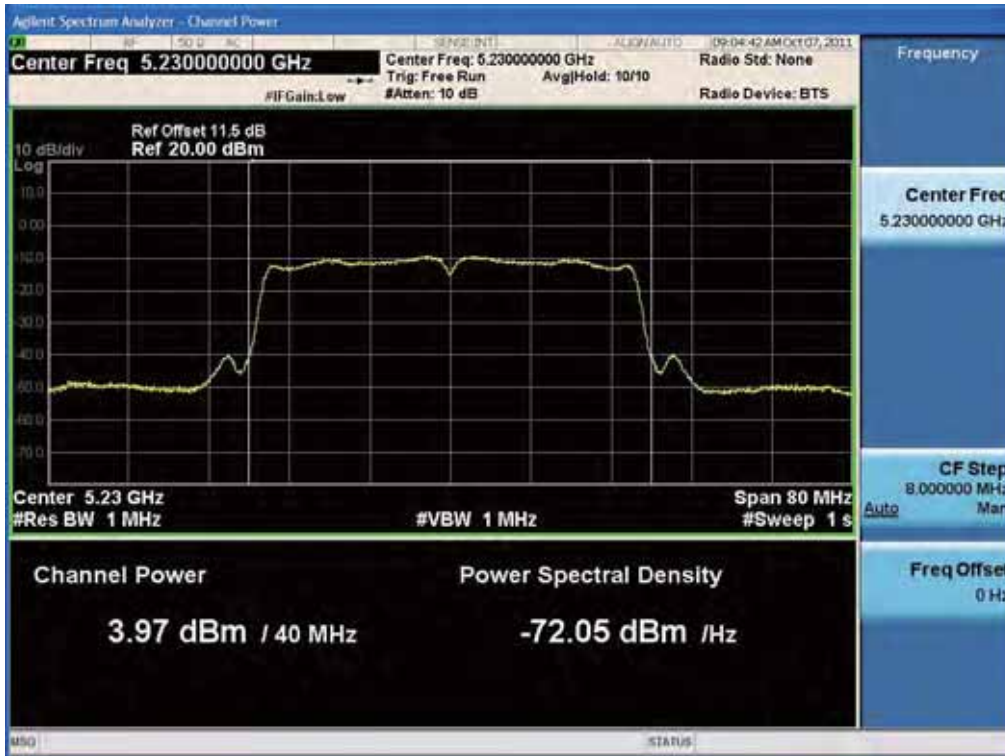


Conducted Output Power (802.11n-CH 46) 108 Mbps



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Conducted Output Power (802.11n-CH 46) 121.5 Mbps

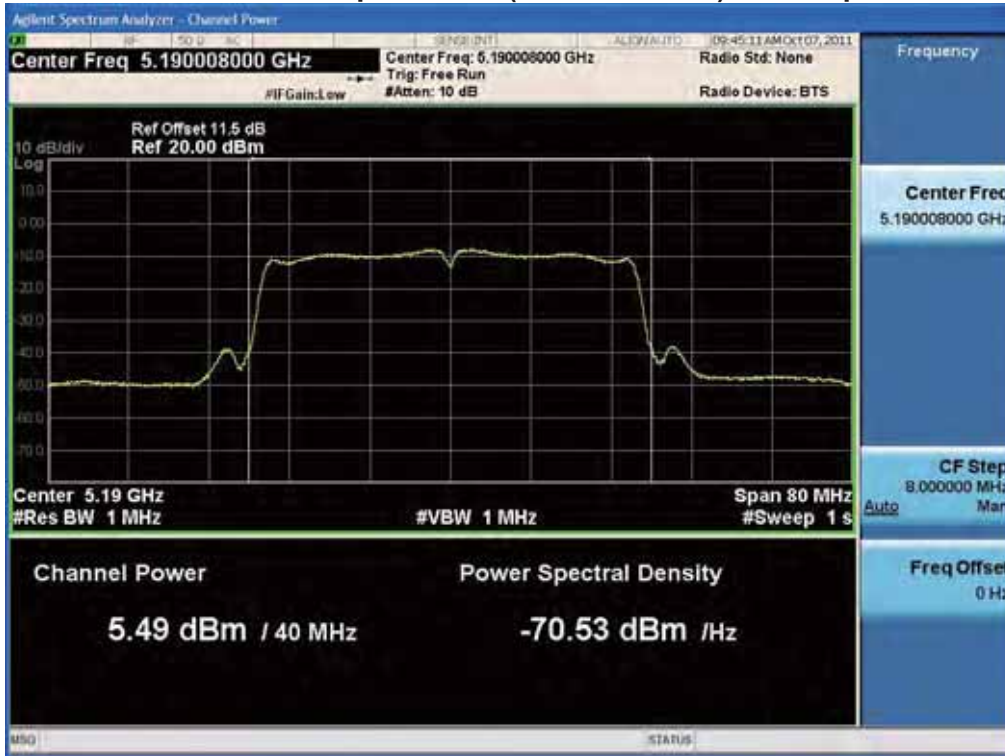


Conducted Output Power (802.11n-CH 46) 135 Mbps

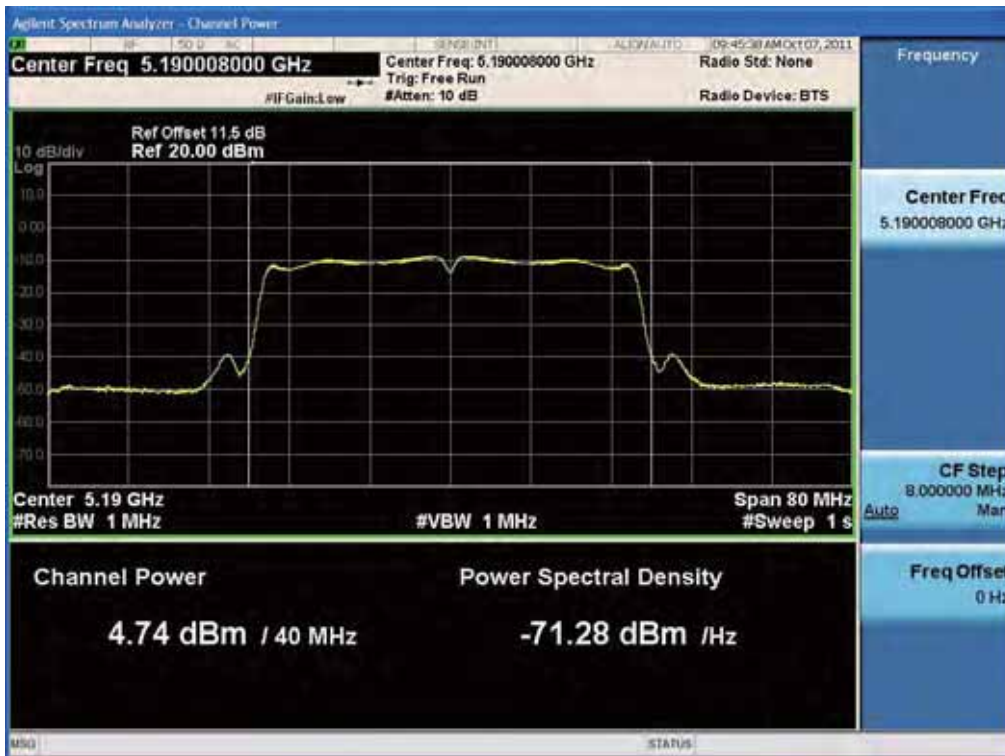


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: WI-FI Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

RESULT PLOTS_Ant.1 (5180 MHz~5240 MHz) _40 MHz BW
 Conducted Output Power (802.11n-CH 38) 13.5 Mbps

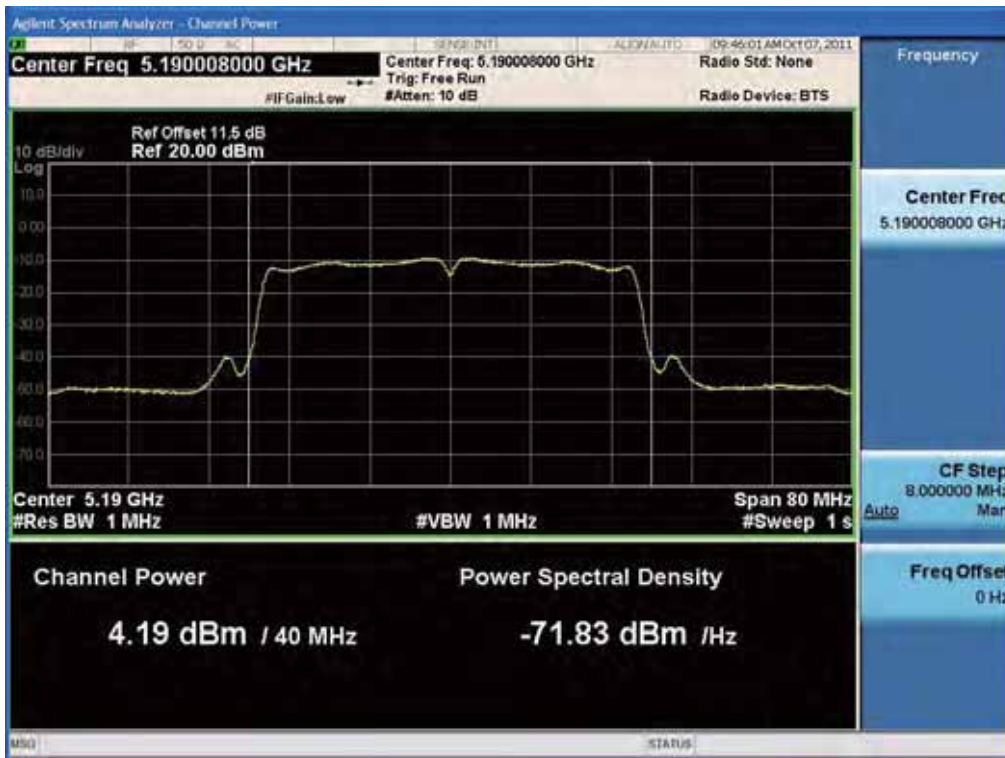


Conducted Output Power (802.11n-CH 38) 27 Mbps

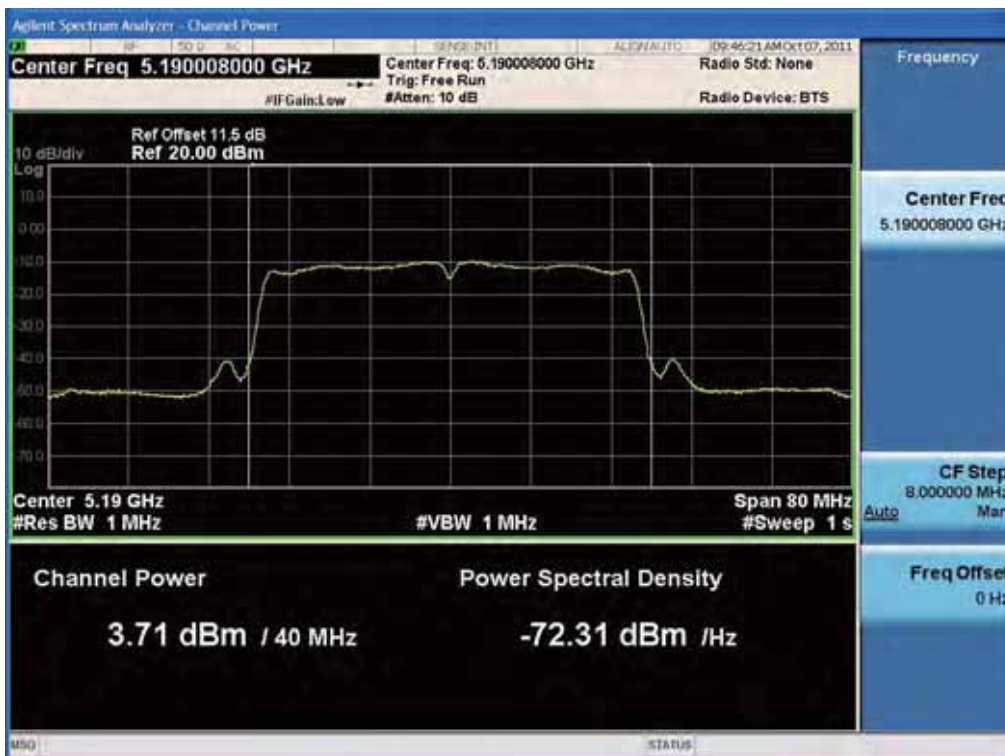


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM-B003D

Conducted Output Power (802.11n-CH 38) 40.5 Mbps



Conducted Output Power (802.11n-CH 38) 54 Mbps

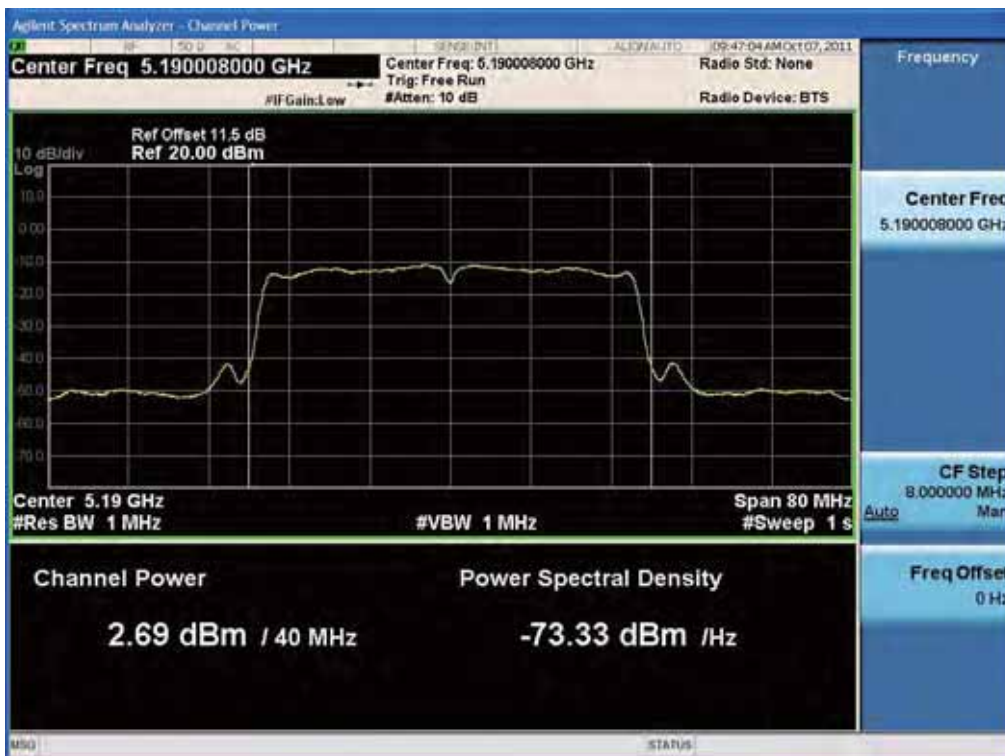


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Conducted Output Power (802.11n-CH 38) 81 Mbps

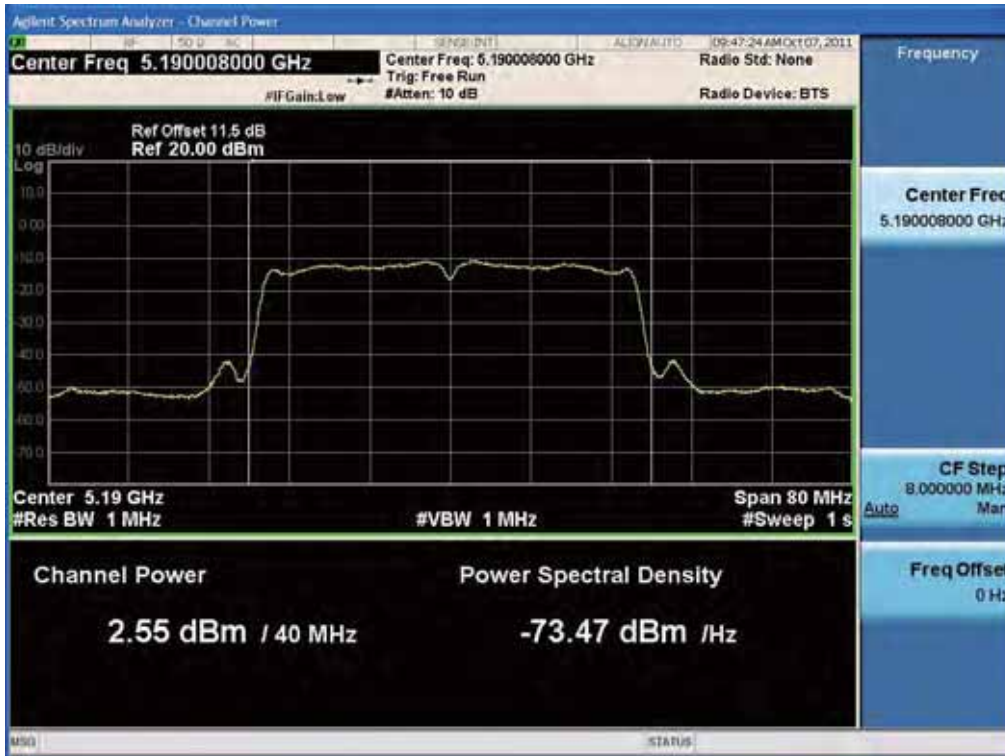


Conducted Output Power (802.11n-CH 38) 108 Mbps

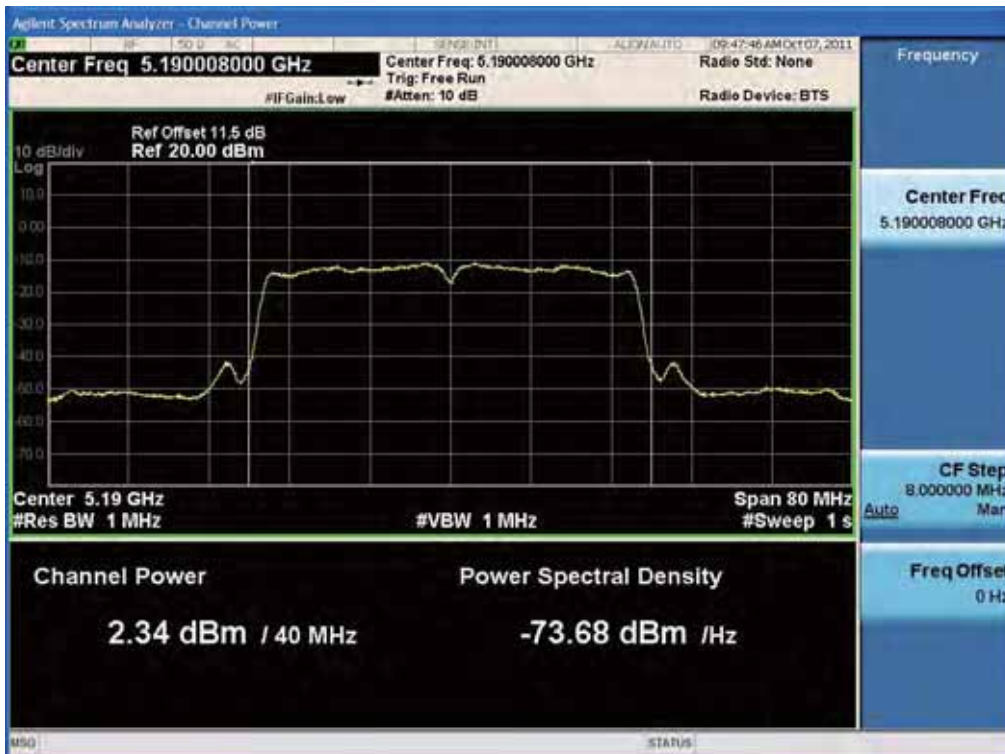


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Conducted Output Power (802.11n-CH 38) 121.5 Mbps

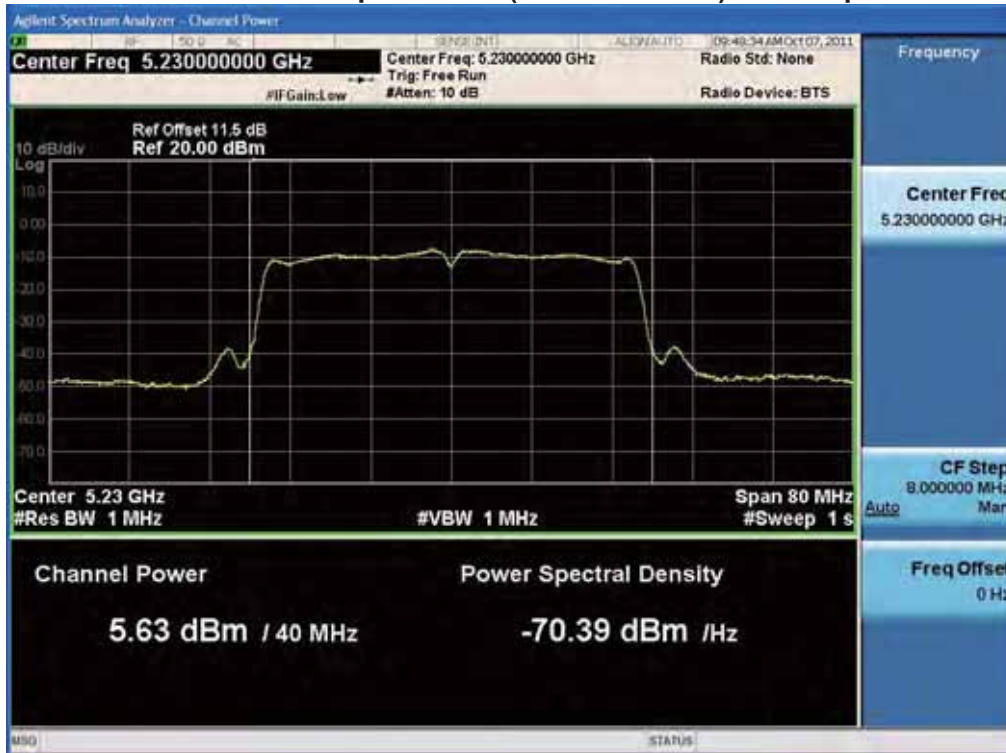


Conducted Output Power (802.11n-CH 38) 135 Mbps



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Conducted Output Power (802.11n-CH 46) 13.5 Mbps



Conducted Output Power (802.11n-CH 46) 27 Mbps

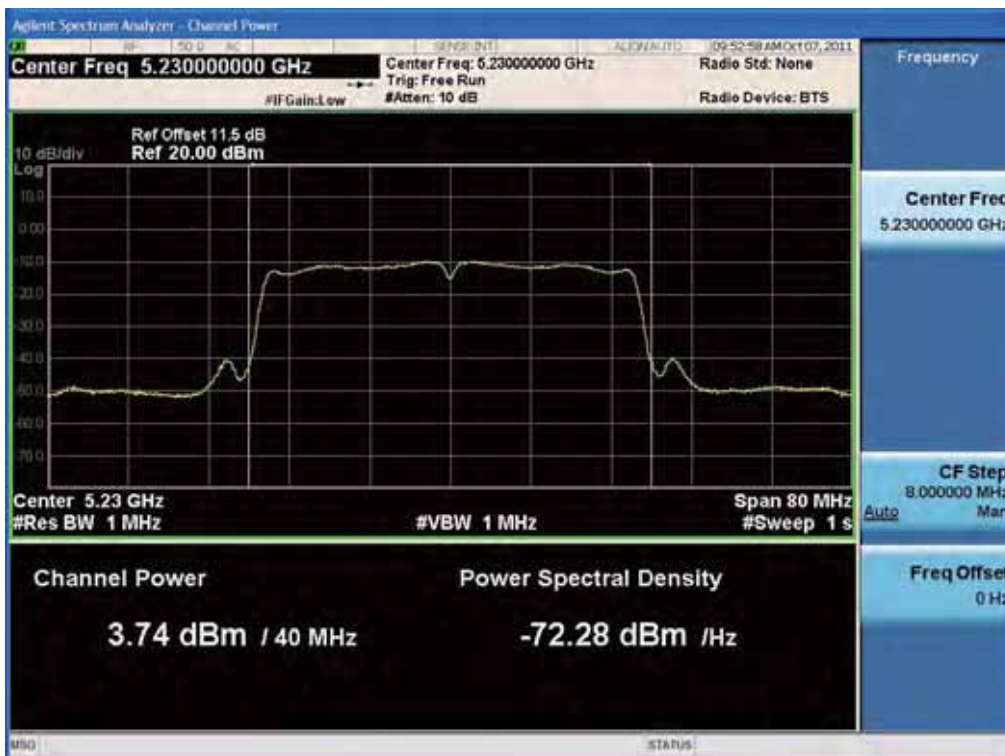


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Conducted Output Power (802.11n-CH 46) 40.5 Mbps



Conducted Output Power (802.11n-CH 46) 54 Mbps

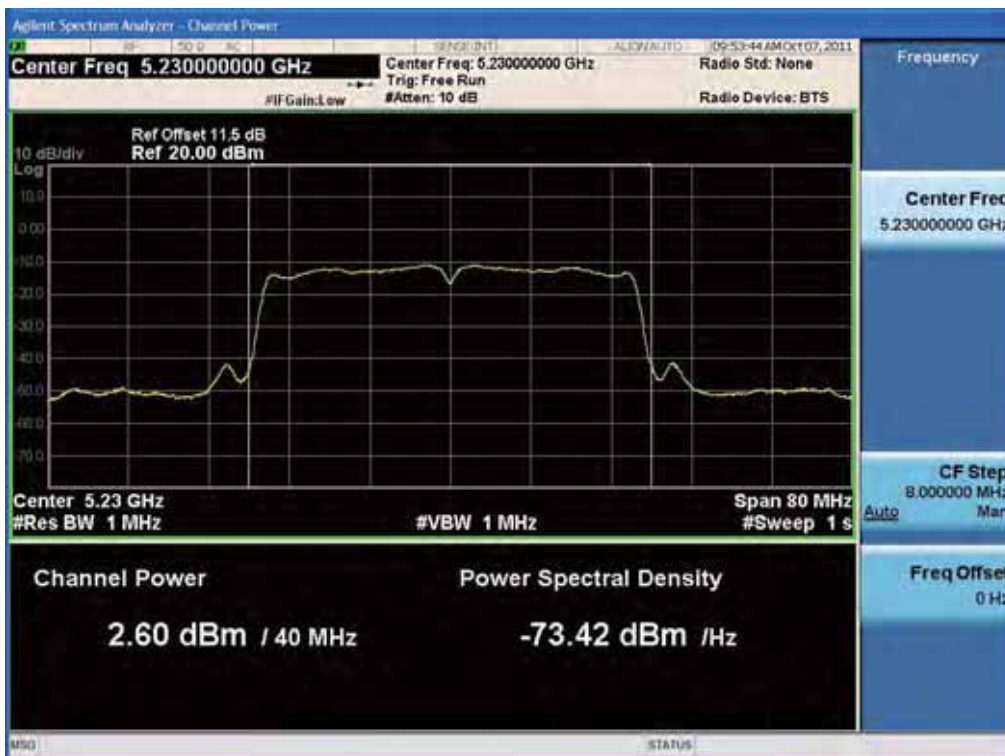


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

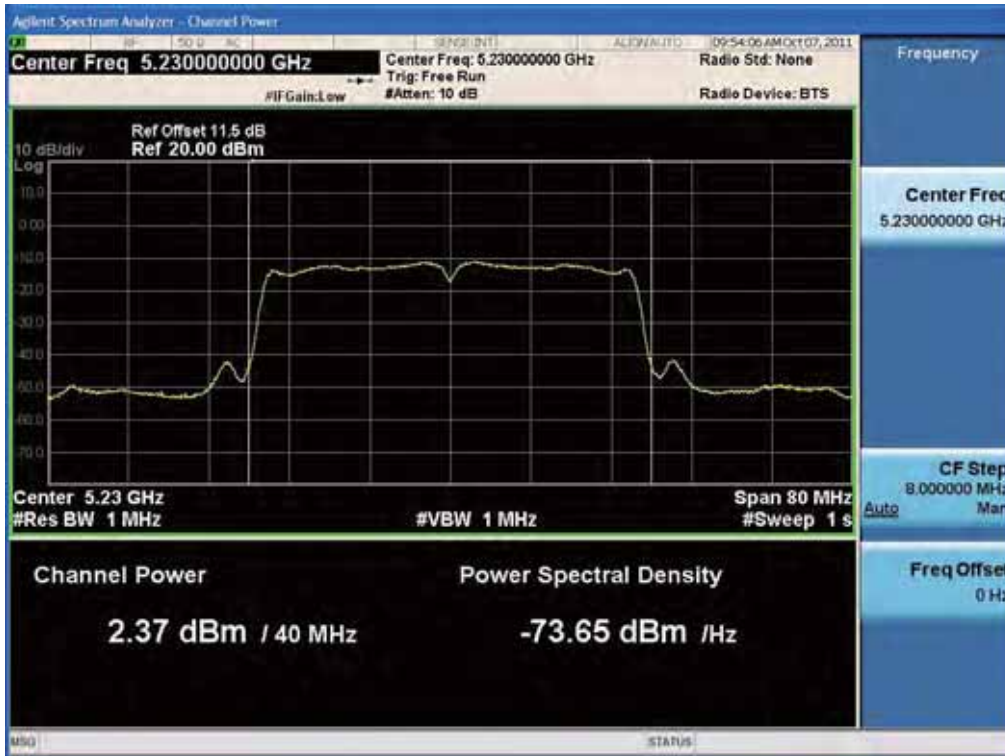
Conducted Output Power (802.11n-CH 46) 81 Mbps



Conducted Output Power (802.11n-CH 46) 108 Mbps



Conducted Output Power (802.11n-CH 46) 121.5 Mbps



Conducted Output Power (802.11n-CH 46) 135 Mbps

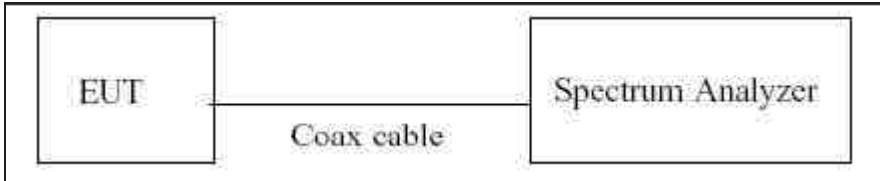


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

7.4 POWER SPECTRAL DENSITY

The peak power density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating in transmission mode at the appropriate frequencies. The maximum permissible peak power spectral density is 4 dBm/ MHz in the 5.15 GHz – 5.25 GHz band and 11 dBm/ MHz in the 5.25 GHz – 5.35 GHz and 5.47 GHz – 5.725 GHz bands

■ TEST CONFIGURATION



■ TEST PROCEDURE

The spectrum analyzer is set to :

1. Span = 20 MHz / 40 MHz(802.11n_40 MHz BW)
2. RBW = 1 MHz
3. VBW = 3 MHz
4. Sweep = Auto

■ TEST RESULTS_Ant.0

Conducted Power Density Measurements

Frequency (MHz)	Channel No.	Mode	Test Result	
			Power Density (dBm)	Pass/Fail
5180	36	802.11a	-3.23	Pass
5200	40		-1.60	Pass
5240	48		-1.31	Pass
5180	36	802.11n (20 MHz)	-2.80	Pass
5200	40		-1.23	Pass
5240	48		-1.49	Pass
5190	38	802.11n (40 MHz)	-12.97	Pass
5230	46		-10.36	Pass

■ TEST RESULTS_Ant.1

Conducted Power Density Measurements

Frequency (MHz)	Channel No.	Mode	Test Result	
			Power Density (dBm)	Pass/Fail
5180	36	802.11a	-3.91	Pass
5200	40		-1.51	Pass
5240	48		-1.00	Pass
5180	36	802.11n (20 MHz BW)	-3.62	Pass
5200	40		-0.42	Pass
5240	48		-1.31	Pass
5190	38	802.11n (40 MHz BW)	-12.72	Pass
5230	46		-14.03	Pass

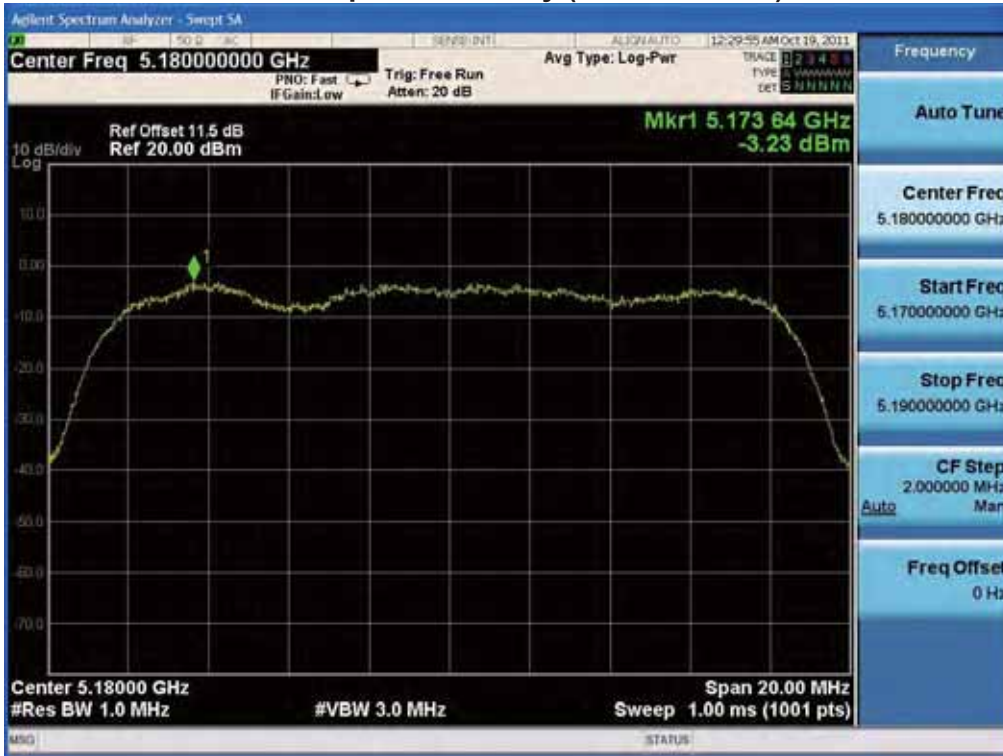
■ Measure and sum data

Conducted Power Density Measurements

Frequency (MHz)	Channel No.	Mode	Test Result	
			Power Density (dBm)	Pass/Fail
5180	36	802.11a	-0.55	Pass
5200	40		1.46	Pass
5240	48		1.86	Pass
5180	36	802.11n (20 MHz BW)	-0.18	Pass
5200	40		2.20	Pass
5240	48		1.61	Pass
5190	38	802.11n (40 MHz BW)	-9.83	Pass
5230	46		-8.81	Pass

RESULT PLOTS_Ant.0

Power Spectral Density (802.11a-CH 36)



Power Spectral Density (802.11a-CH 40)



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: WI-FI Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Power Spectral Density (802.11a-CH 48)



Power Spectral Density (802.11n-CH 36)_20 MHz BW

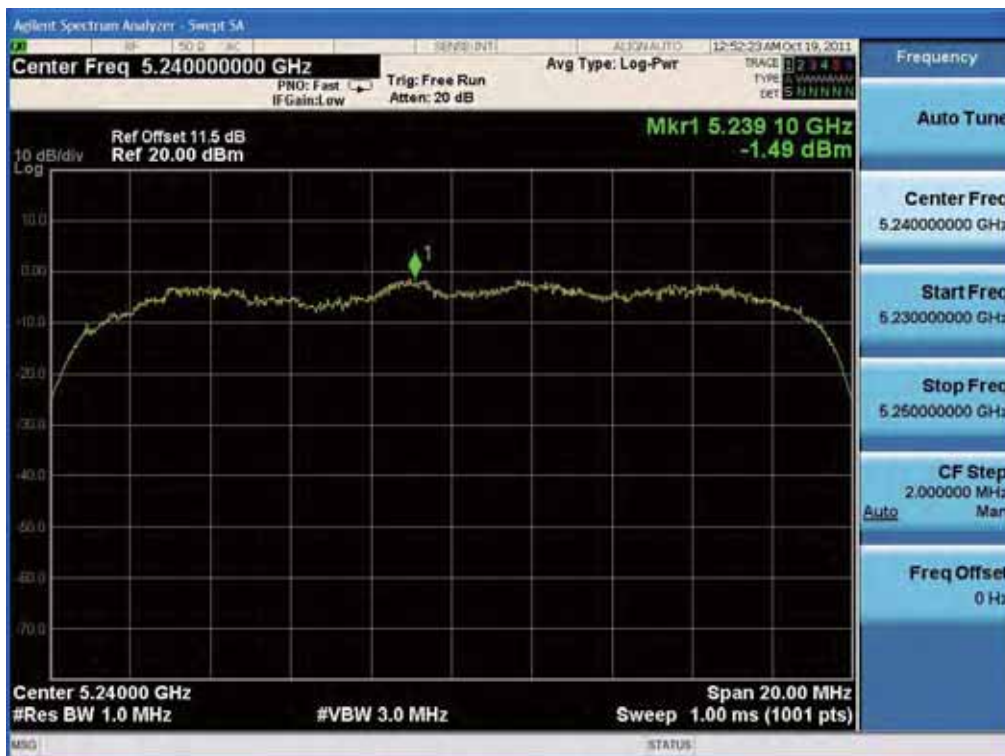


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFMB003D

Power Spectral Density (802.11n-CH 40) _20 MHz BW



Power Spectral Density (802.11n-CH48) _20 MHz BW

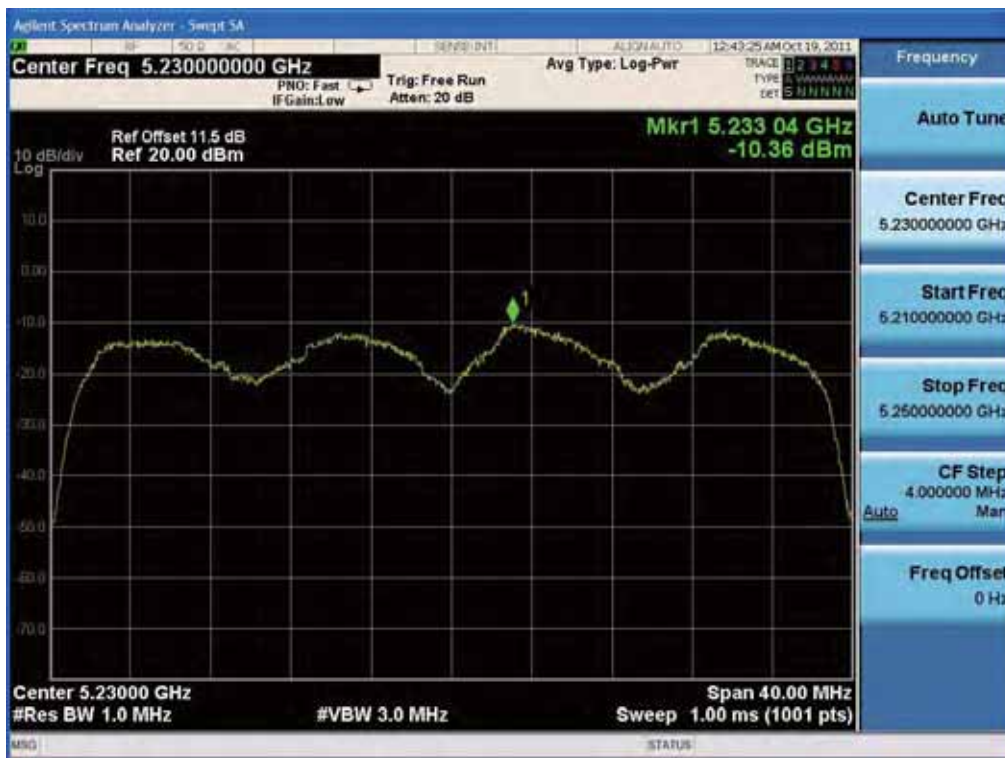


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: WI-FI Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Power Spectral Density (802.11n-CH 38)_40 MHz BW



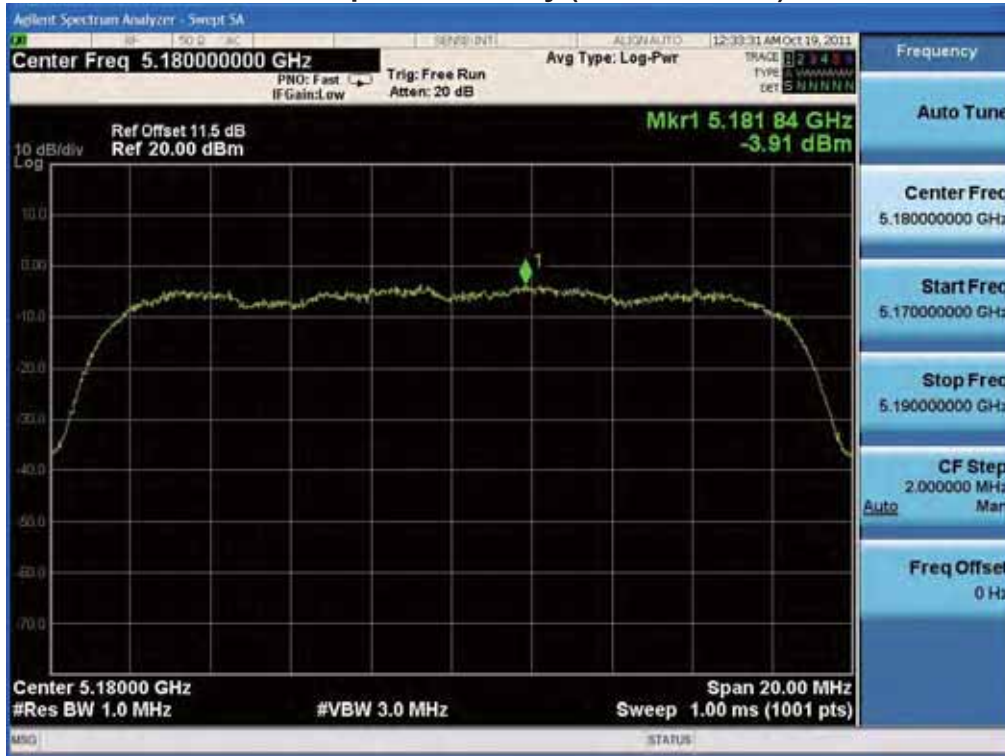
Power Spectral Density (802.11n-CH 46)_40 MHz BW



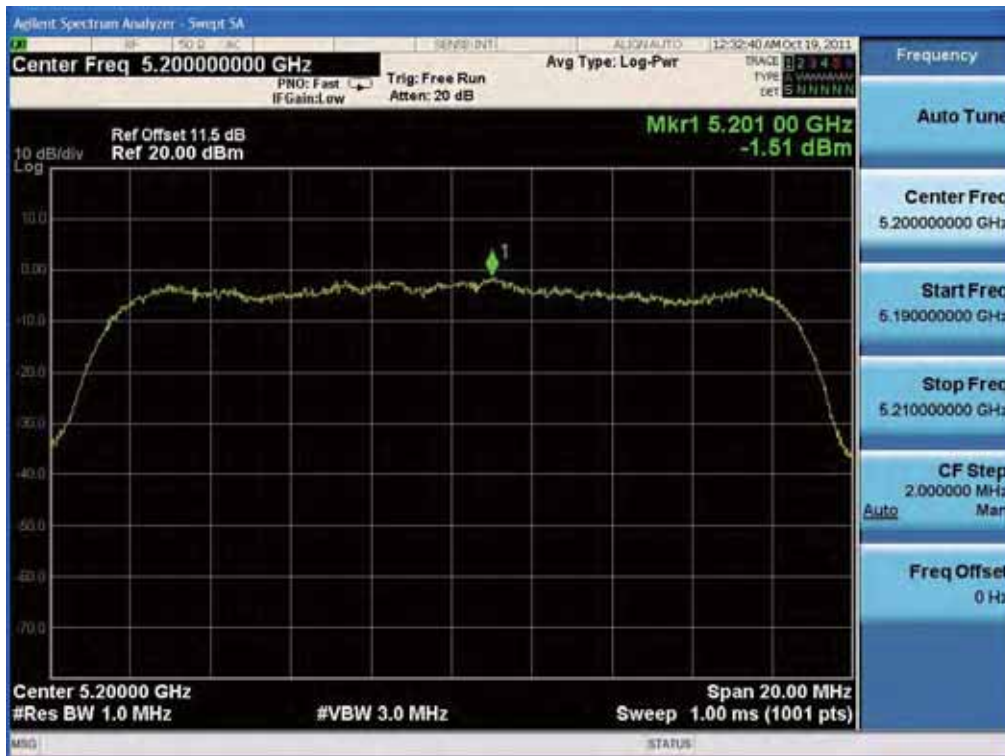
FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

RESULT PLOTS_Ant.1

Power Spectral Density (802.11a-CH 36)

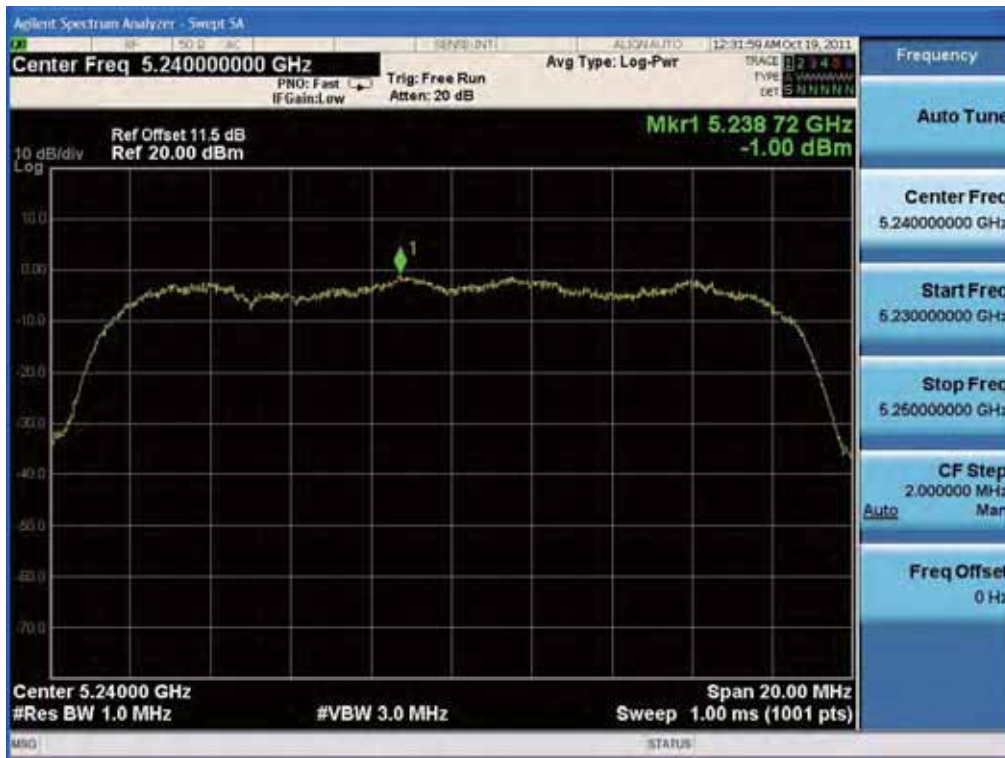


Power Spectral Density (802.11a-CH 40)



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Power Spectral Density (802.11a-CH 48)



Power Spectral Density (802.11n-CH 36)_20 MHz BW



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Power Spectral Density (802.11n-CH 40) _20 MHz BW



Power Spectral Density (802.11n-CH48) _20 MHz BW

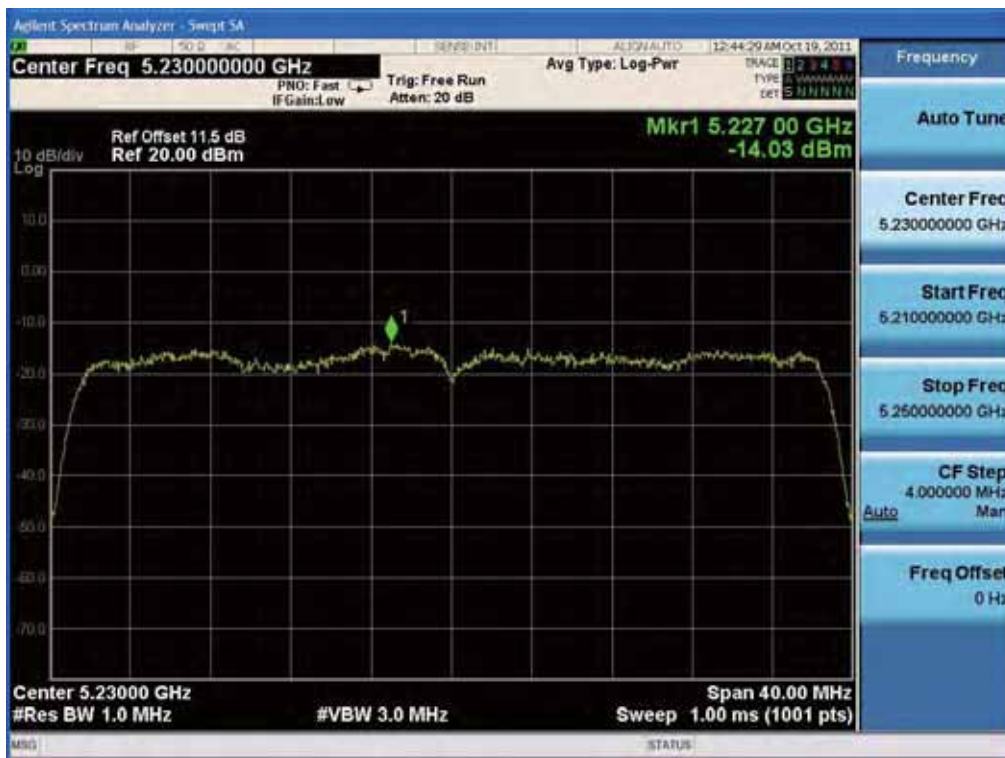


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Power Spectral Density (802.11n-CH 38)_40 MHz BW



Power Spectral Density (802.11n-CH 46)_40 MHz BW

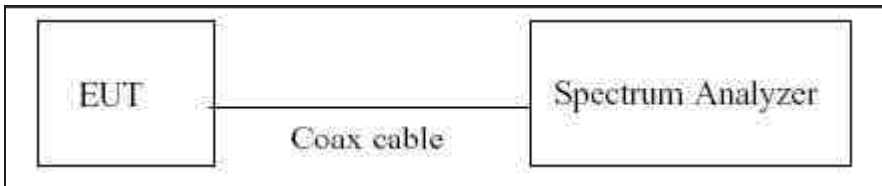


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM-B003D

7.5 PEAK EXCURSION RATIO

The spectrum analyzer was connected to the antenna terminal while the EUT was operating in the continuous transmission mode at the appropriate center frequencies. The largest permissible difference between the modulation envelope(measured using a peak hold function) and the maximum conducted output power 13 dBm/MHz.

■ TEST CONFIGURATION



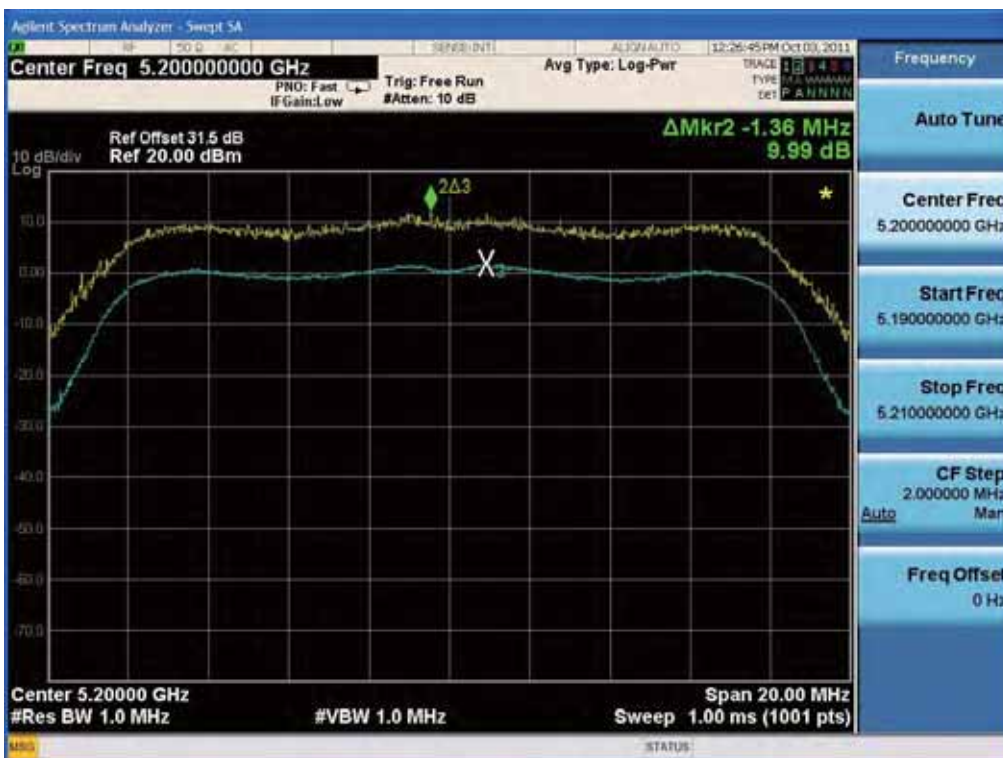
FCC PT.15.247 TEST REPORT		FCC & IC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

RESULT PLOTS_Ant.0

Peak Excursion Ratio (802.11a-CH36)

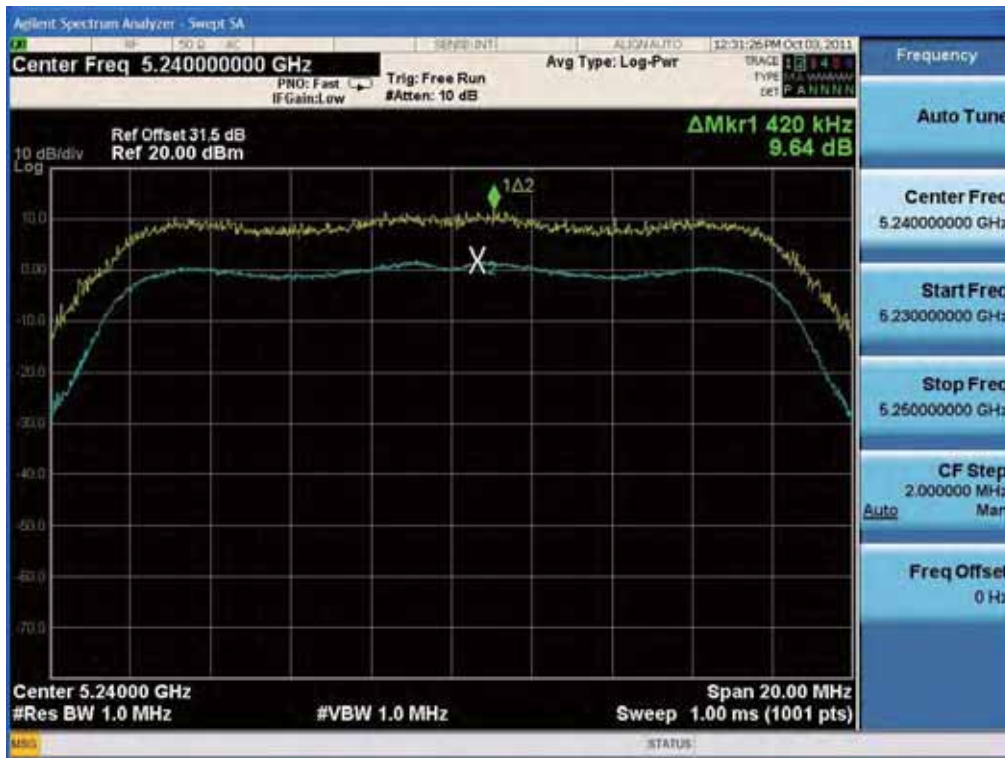


Peak Excursion Ratio (802.11a-CH40)

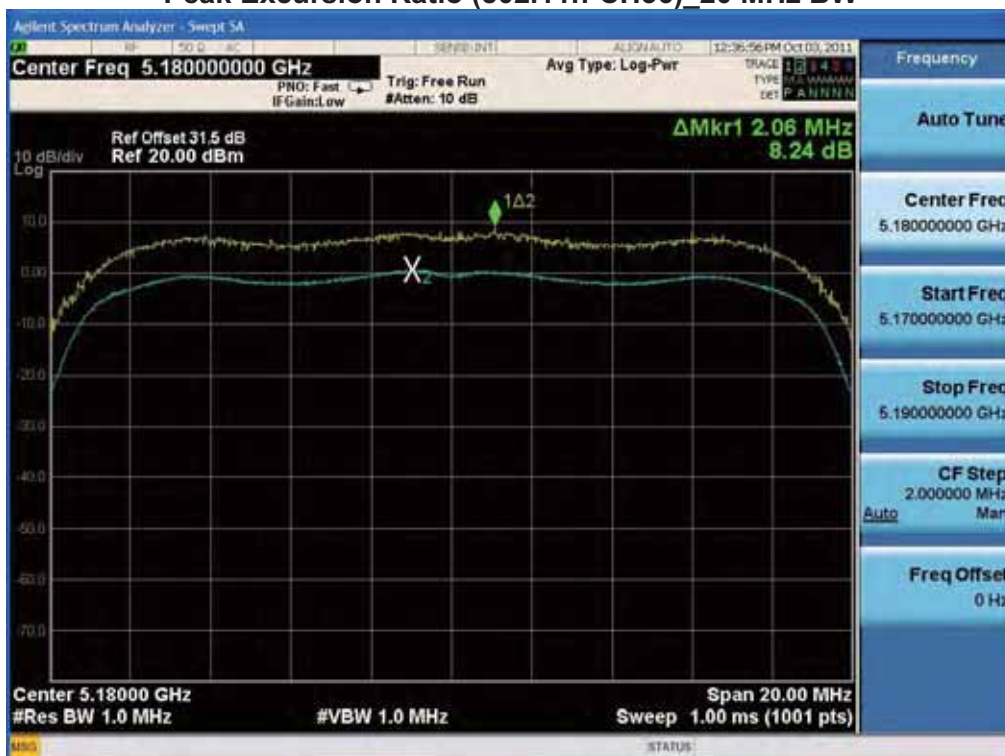


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: WI-FI Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM-B003D

Peak Excursion Ratio (802.11a-CH48)

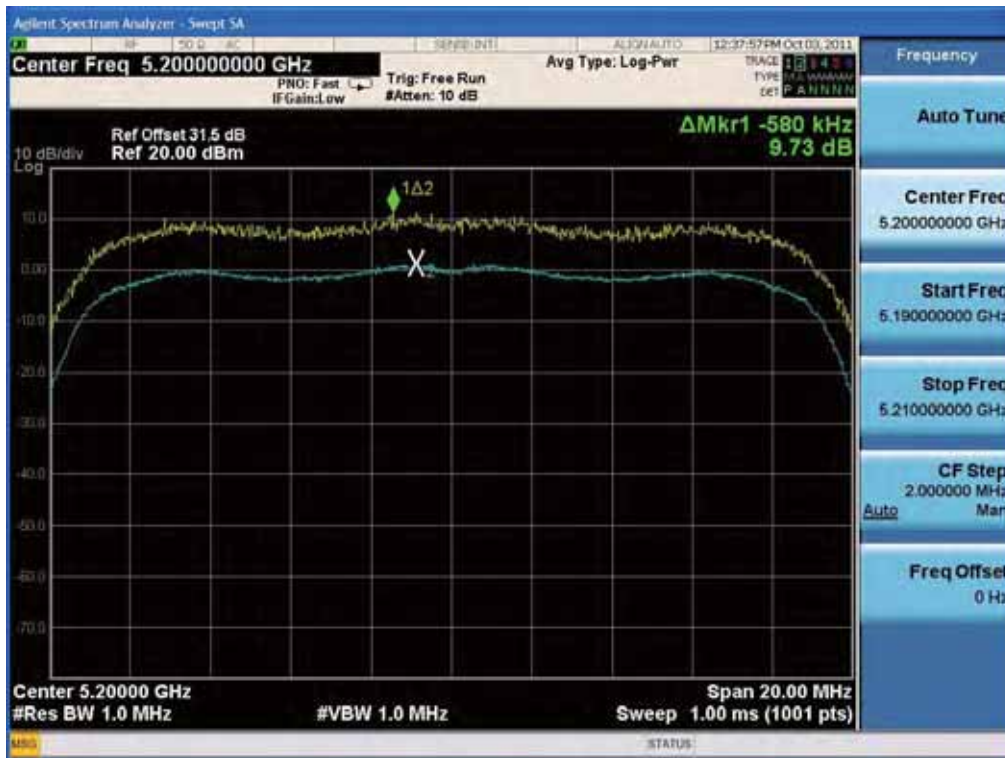


Peak Excursion Ratio (802.11n-CH36)_20 MHz BW

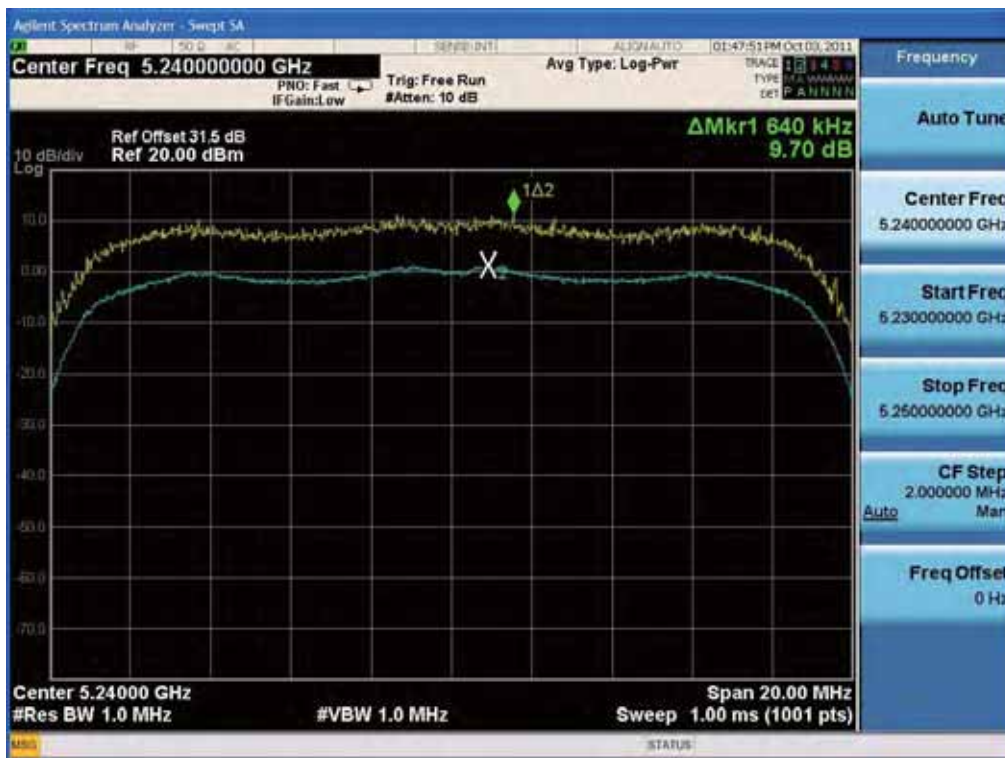


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Peak Excursion Ratio (802.11n-CH40) _20 MHz BW



Peak Excursion Ratio (802.11n-CH48) _20 MHz BW



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Peak Excursion Ratio (802.11n-CH38) _40 MHz BW



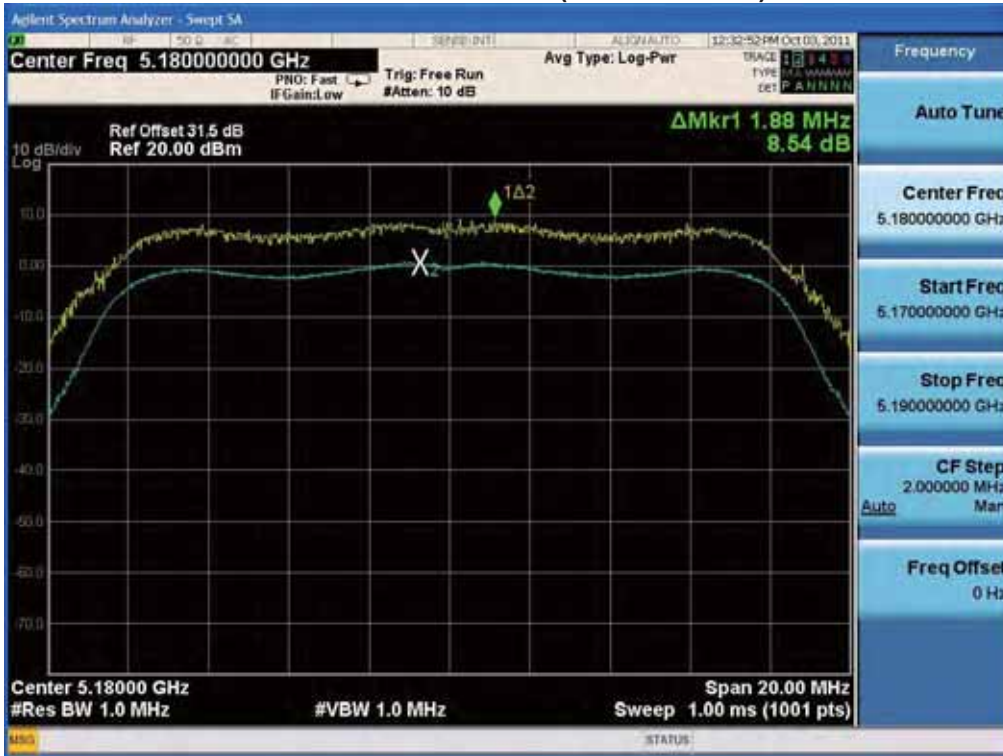
Peak Excursion Ratio (802.11n-CH46) _40 MHz BW



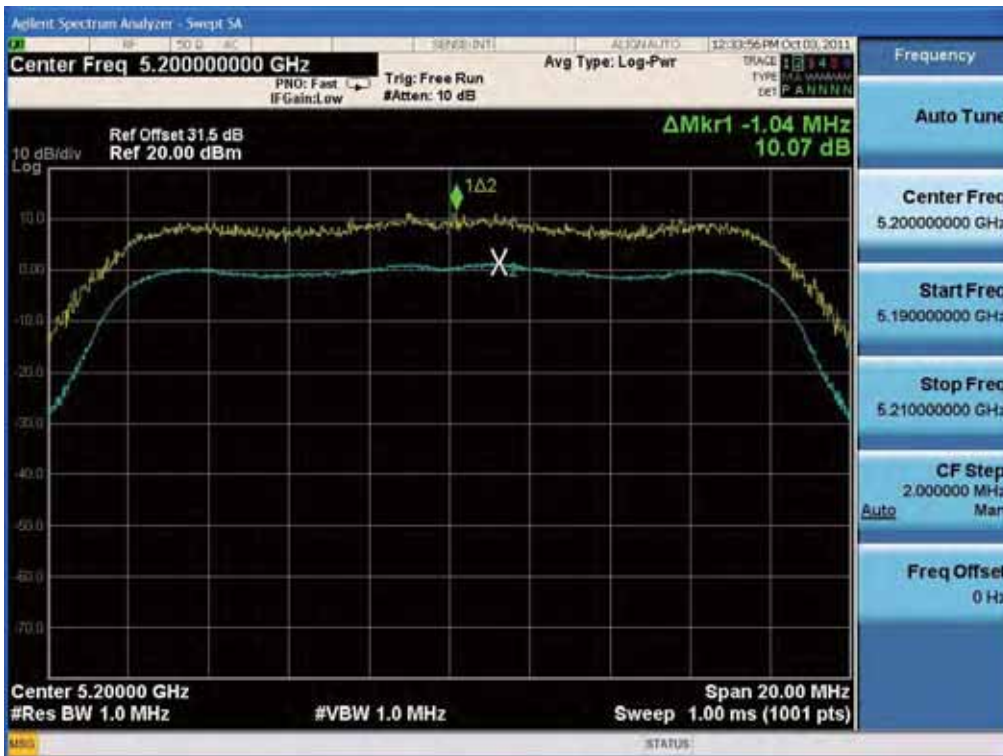
FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

RESULT PLOTS_Ant.1

Peak Excursion Ratio (802.11a-CH36)

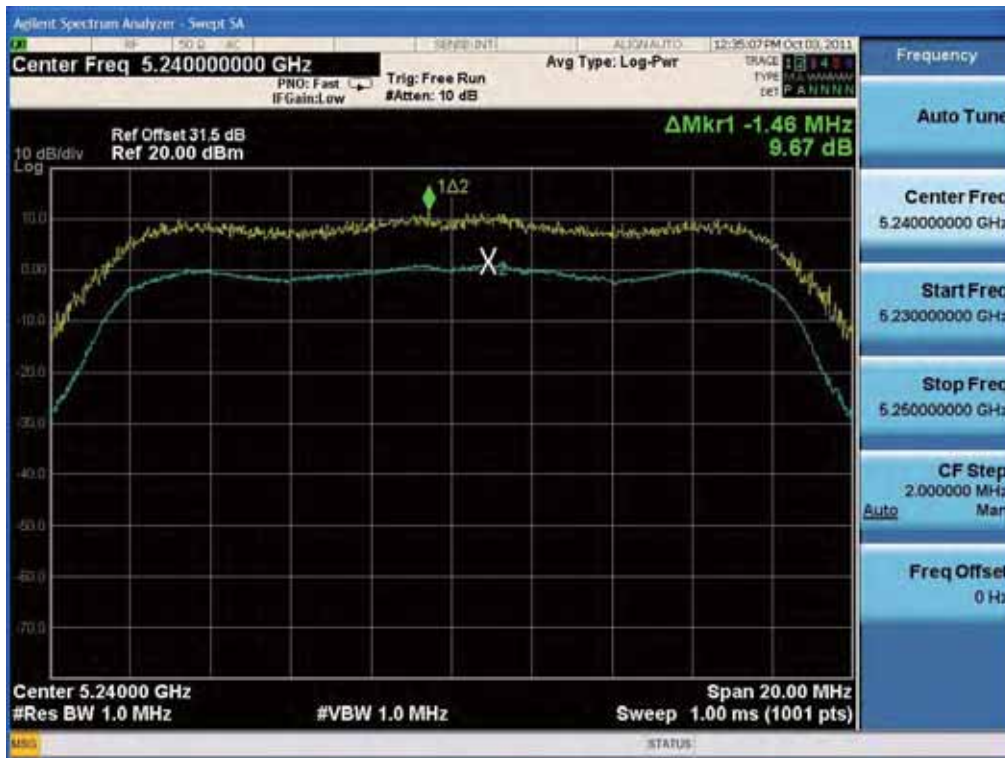


Peak Excursion Ratio (802.11a-CH40)

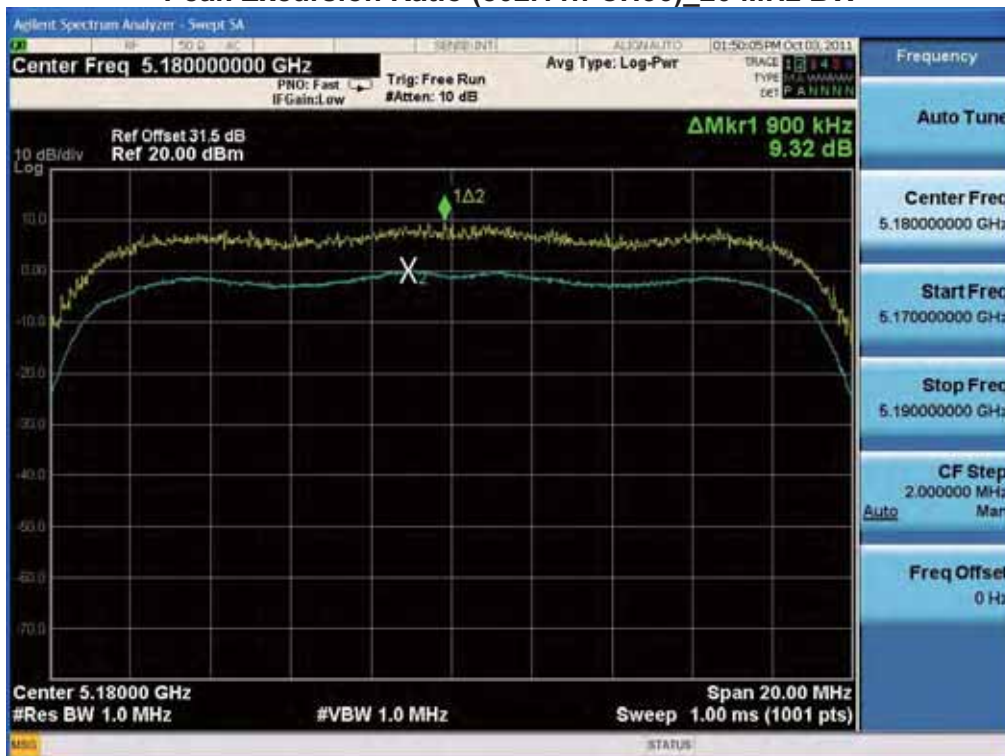


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM-B003D

Peak Excursion Ratio (802.11a-CH48)



Peak Excursion Ratio (802.11n-CH36)_20 MHz BW



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Peak Excursion Ratio (802.11n-CH40) _20 MHz BW

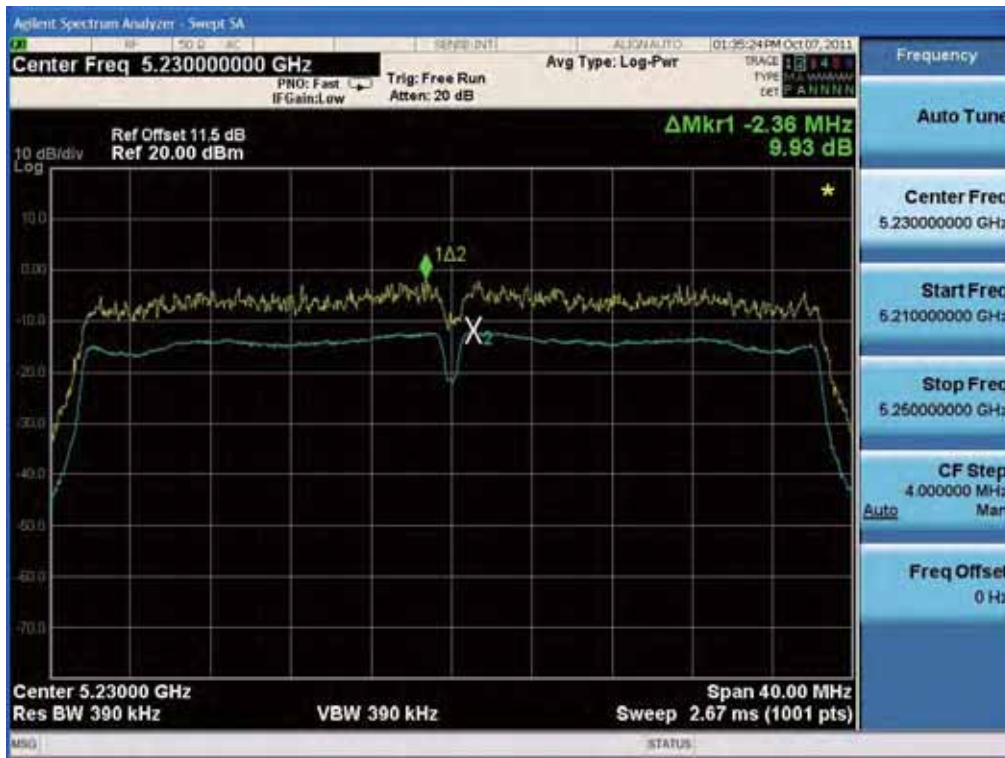


Peak Excursion Ratio (802.11n-CH48) _20 MHz BW

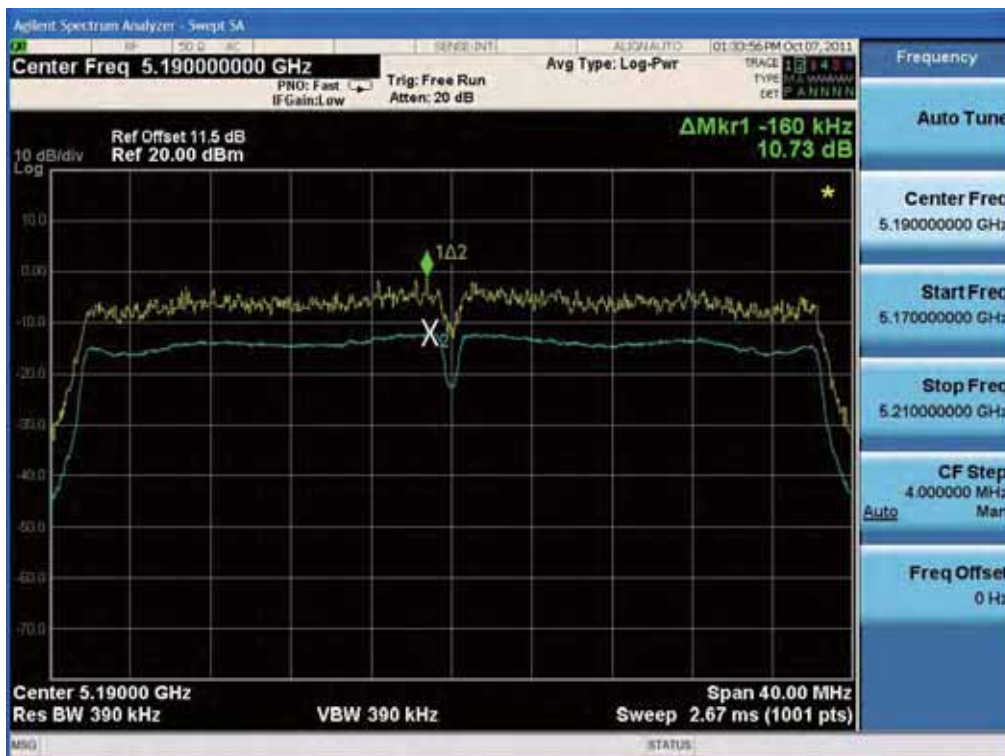


FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM-B003D

Peak Excursion Ratio (802.11n-CH38) _40 MHz BW



Peak Excursion Ratio (802.11n-CH46) _40 MHz BW



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

7.6 FREQUENCY STABILITY.

The EUT was placed inside an environmental chamber as the temperature in the chamber was varied between 0 °C and 65 °C. The temperature was incremented by 10 °C intervals and the unit was allowed to stabilize at each temperature before each measurement. The center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channel's center frequency was recorded.

OPERATING FREQUENCY: 5,200,000,000 Hz
 CHANNEL: 36
 REFERENCE VOLTAGE: 5.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	ppm
100%	5.0	+20(Ref)	-2.79
100%		0	1.69
100%		10	1.11
100%		30	-2.03
100%		40	-2.33
100%		50	-0.98
100%		65	-0.06
115%	5.75	+20	-2.68
Batt. Endpoint	4.5	+20	-2.55

7.7 RADIATED MEASUREMENT.

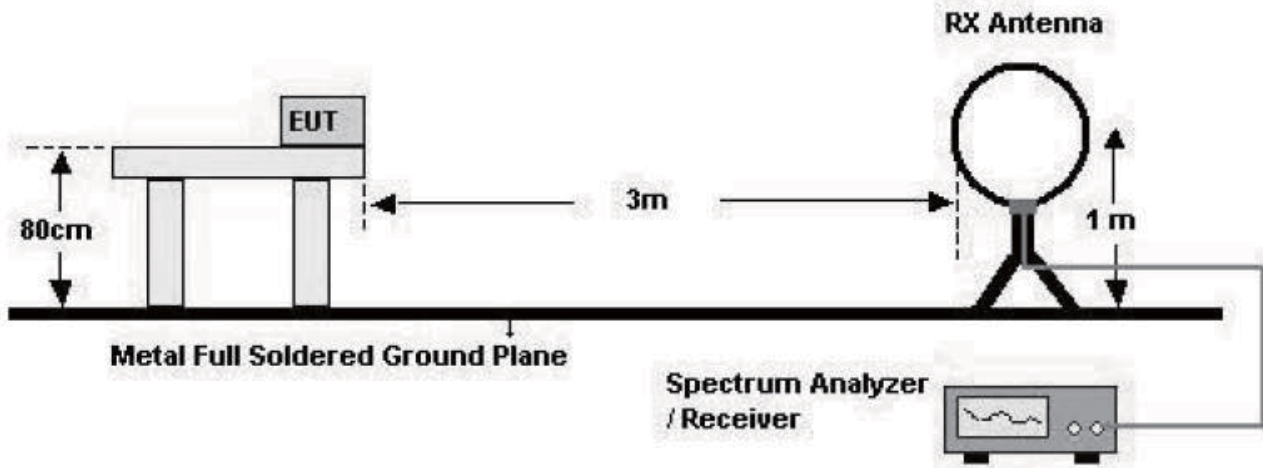
7.7.1 RADIATED SPURIOUS EMISSIONS.

Test Requirements and limit, §15.205, §15.209

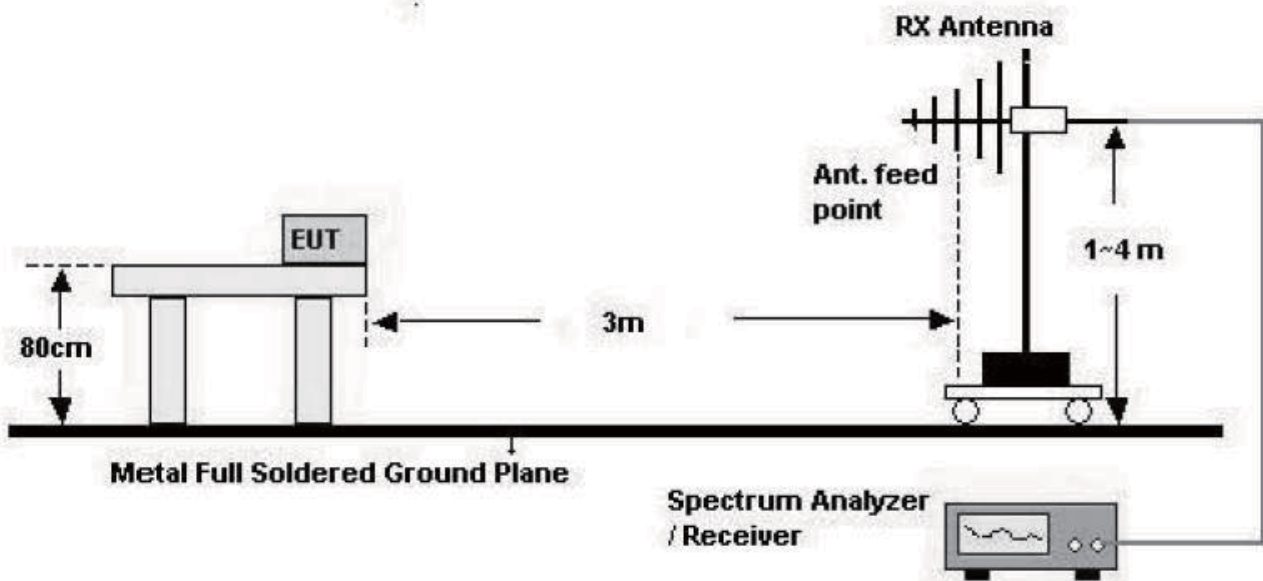
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

Below 30 MHz

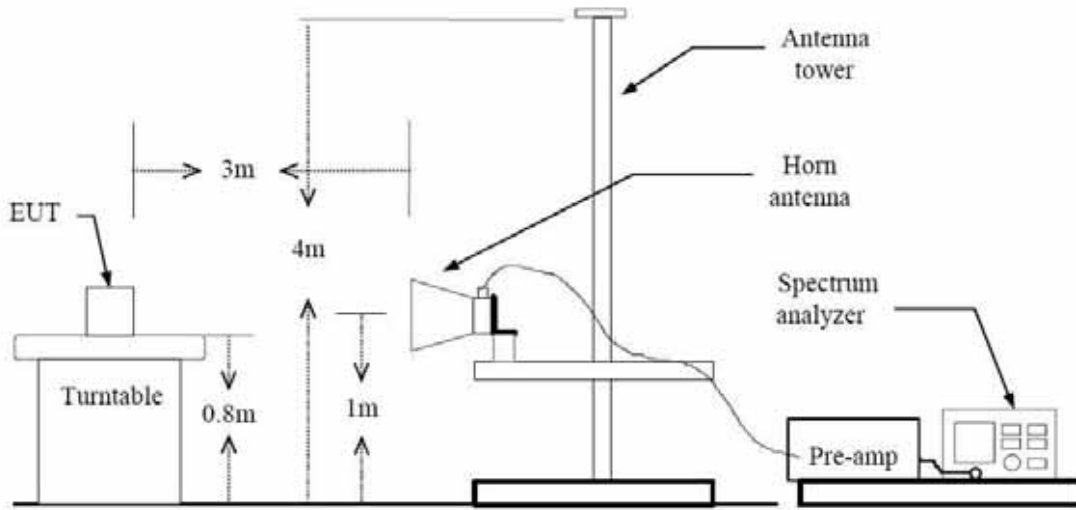


30 MHz - 1 GHz



FCC PT.15.247 TEST REPORT	FCC & IC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFM003D

Above 1 GHz



TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8 m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.

FCC PT.15.247 TEST REPORT		FCC & IC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1110FR02-3	Date of Issue: October 26, 2011	EUT Type: Wi-Fi Module	FCC ID: JYCTWFM-B003D	IC: 2703H-TWFB003D

TEST RESULTS

9 kHz – 30MHz

Operation Mode: Normal Mode

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dB μ V	dB /m	dB	(H/V)	dB μ V/m	dB μ V/m	dB
No Critical peaks found							

Notes:

1. Measuring frequencies from 9 kHz to the 30MHz.
2. The reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.
3. Distance extrapolation factor = 40 log (specific distance / test distance) (dB)
4. Limit line = specific Limits (dBuV) + Distance extrapolation factor

TEST RESULTS

Below 1 GHz

Operation Mode: 802.11a Mode (Channel : 48 , Data rate : 6 Mbps)

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dB μ V	dB /m	dB	(H/V)	dB μ V/m	dB μ V/m	dB
81.05	21.31	9.33	0.86	H	31.49	40.0	8.51
98.72	24.97	8.52	0.99	V	34.48	43.5	9.02
131.65	20.24	11.90	1.17	V	33.31	43.5	10.19
165.88	20.19	13.00	1.33	V	34.52	43.5	8.98
347.20	17.79	14.40	2.03	H	34.22	46.0	11.78

Notes:

1. Measuring frequencies from 30 MHz to the 1 GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Quasi peak detector mode.
3. We have done 802.11a, 802.11n_20 MHz BW, 802.11n_40 MHz BW (5.2 GHz) test. Worst case of EUT is 6 Mbps in 802.11a.

Above 1 GHz

Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5180
Channel No.	36 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
1036	39.98	9.33	V	49.31	74	24.69	PK
1036	27.50	9.33	V	36.83	54	17.17	AV
1036	39.56	9.33	H	48.89	74	25.11	PK
1036	27.11	9.33	H	36.44	54	17.56	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
 - a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
 - b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 10 Hz.
5. We have done 802.11a, 802.11n (20 MHz) and 802.11n (40 MHz) test. Worst case of EUT is 6 Mbps in 802.11a.

Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5200
Channel No.	40 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
1040	42.75	9.26	V	52.01	74	21.99	PK
1040	28.18	9.26	V	37.44	54	16.56	AV
1040	45.15	9.26	H	54.41	74	19.59	PK
1040	31.72	9.26	H	40.98	54	13.02	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
 - a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
 - b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 10 Hz.
5. We have done 802.11a, 802.11n (20 MHz) and 802.11n (40 MHz) test. Worst case of EUT is 6 Mbps in 802.11a.

Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5240
Channel No.	48 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
1048	43.56	9.35	V	52.91	74	21.09	PK
1048	28.71	9.35	V	38.06	54	15.94	AV
1048	45.00	9.35	H	54.35	74	19.65	PK
1048	30.97	9.35	H	40.32	54	13.68	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
 - a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MH.
 - b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 10 Hz.
5. We have done 802.11a, 802.11n (20 MHz) and 802.11n (40 MHz) test. Worst case of EUT is 6 Mbps in 802.11a.

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7.7.2 RECEIVER SPURIOUS EMISSIONS

FCC Rule(s)	§15.109 (see Table Below)
Test Requirements:	Emission Level shall not exceed §15.109 limits
Operating conditions:	Under normal test conditions
Method of testing:	Radiated

S/A. Settings:	F < 1 GHz: RBW: 120 kHz, VBW: 300 kHz (Quasi Peak)
	F > 1 GHz: RBW: 1 MHz, VBW: 1 MHz (Peak)
Mode of operation:	Receive

Frequency (MHz)	Field Strength (mV/m)	Measurement Distance (m)
30 – 88	100 (40 dBuV)	3
88 - 216	150 (43.5 dBuV)	3
216 – 960	200 (46 dBuV)	3
Above 960	500 (54 dBuV)	3

Operation Mode: Receive:

30 MHz ~ 1 GHz

Frequency MHz	Reading dBuV	Ant. Factor dB/m	Cable Loss dB	ANT POL (H/V)	Total dBuV/m	Limit dBuV/m	Margin dB
82.11	20.60	9.16	0.86	H	30.62	40.0	9.38
99.02	24.37	8.61	1.00	V	33.98	43.5	9.52
132.72	20.42	11.94	1.17	V	33.53	43.5	9.97
164.20	19.67	13.08	1.33	V	34.08	43.5	9.42
347.15	18.50	14.40	2.03	H	34.93	46.0	11.07

Above 1 GHz

Frequency MHz	Reading dBuV	Ant. Factor dB/m	Cable Loss dB	ANT POL (H/V)	Total dBuV/m	Limit dBuV/m	Margin dB
No Critical peaks found							

7.7.3 RADIATED RESTRICTED BAND EDGE MEASUREMENTS

Test Requirements and limit, §15.247(d) §15.205, §15.209

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in section 15.209(a) (See section 15.205(c)).

Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5180 MHz
Channel No.	36 Ch

Frequency [MHz]	Reading dBuV	AN.+CL [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
5150	69.40	-0.09	H	69.31	74	4.69	PK
5150	46.79	-0.09	H	46.70	54	7.30	AV
5150	67.66	-0.09	V	67.57	74	6.43	PK
5150	47.18	-0.09	V	47.09	54	6.91	AV



Operation Mode: 802.11 n_20 MHz BW
 Transfer Rate: 6 Mbps
 Operating Frequency: 5180 MHz
 Channel No.: 36 Ch

Frequency [MHz]	Reading dBuV	AN.+CL [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
5150	67.12	-0.09	H	67.03	74	6.97	PK
5150	45.66	-0.09	H	45.57	54	8.43	AV
5150	66.95	-0.09	V	66.86	74	7.14	PK
5150	47.05	-0.09	V	46.96	54	7.04	AV



Operation Mode: 802.11 n_40 MHz BW
 Transfer Rate: 6 Mbps
 Operating Frequency: 5190 MHz
 Channel No. 38 Ch

Frequency [MHz]	Reading dBuV	AN.+CL [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
5150	64.20	-0.09	H	64.11	74	9.89	PK
5150	42.51	-0.09	H	42.42	54	11.58	AV
5150	66.93	-0.09	V	66.84	74	7.16	PK
5150	44.23	-0.09	V	44.14	54	9.86	AV

Notes:

1. Spectrum setting:
 - a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
 - b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 10 Hz.
2. We have done 802.11a, 802.11n_20 MHz BW and 802.11n_40 MHz BW test.

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7.8 POWERLINE CONDUCTED EMISSIONS

Test Requirements and limit, §15.207

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency Range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

Test Configuration

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

TEST PROCEDURE

1. The EUT is placed on a wooden table 80 cm above the reference groundplane.
2. The EUT is connected via LISN to a test power supply.
3. The measurement results are obtained as described below:
4. Detectors – Quasi Peak and Average Detector.

■ RESULT PLOTS

Conducted Emissions (Line 1)

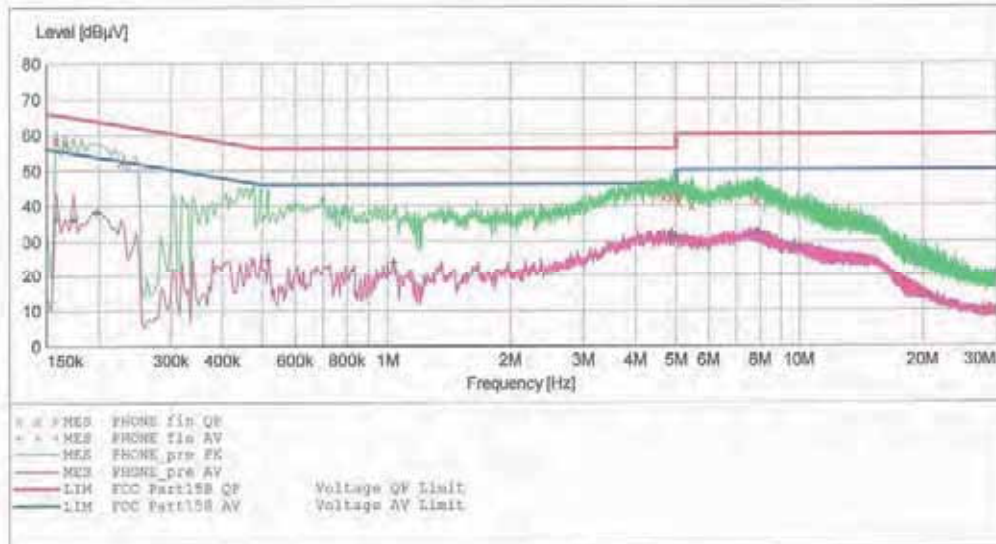
HCT

EMC

EUT: TWFM-B003D
 Manufacturer: LGINNOTEK
 Operating Condition: WLAN MODE
 Test Site: SHIELD ROOM
 Operator: JS LEE
 Test Specification: FCC PART15 CLASS B
 Comment: N

SCAN TABLE: "FCC PART 15 B(N)"

Short Description:		FCC PART 15 CLASS B					Transducer
Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.		
150.0 kHz	500.0 kHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None	
			Average				
500.0 kHz	5.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None	
			Average				
5.0 MHz	30.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None	
			Average				



MEASUREMENT RESULT: "PHONE_fin_QP"

10/25/2011 10:31AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.158010	58.40	10.3	66	7.2	---	---
0.166010	57.60	10.3	65	7.6	---	---
0.226010	52.50	10.3	63	10.1	---	---
4.672000	42.50	10.7	56	13.5	---	---
4.868000	42.50	10.7	56	13.5	---	---
5.000000	42.40	10.7	56	13.6	---	---
5.064000	41.00	10.7	60	19.0	---	---
5.468000	40.10	10.8	60	19.9	---	---
7.828000	41.30	11.0	60	18.7	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

10/25/2011 10:31AM

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Line	PE
0.158010	36.30	10.3	56	19.2	---	---
0.174010	35.90	10.3	55	18.8	---	---
0.198010	38.10	10.3	54	15.6	---	---
0.516000	24.50	10.3	46	21.5	---	---
1.036000	24.00	10.4	46	22.0	---	---
4.892000	31.50	10.7	46	14.5	---	---
5.000000	31.40	10.7	46	14.6	---	---
7.912000	32.10	11.0	50	17.9	---	---
9.792000	28.30	11.0	50	21.7	---	---

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Conducted Emissions (Line 2)

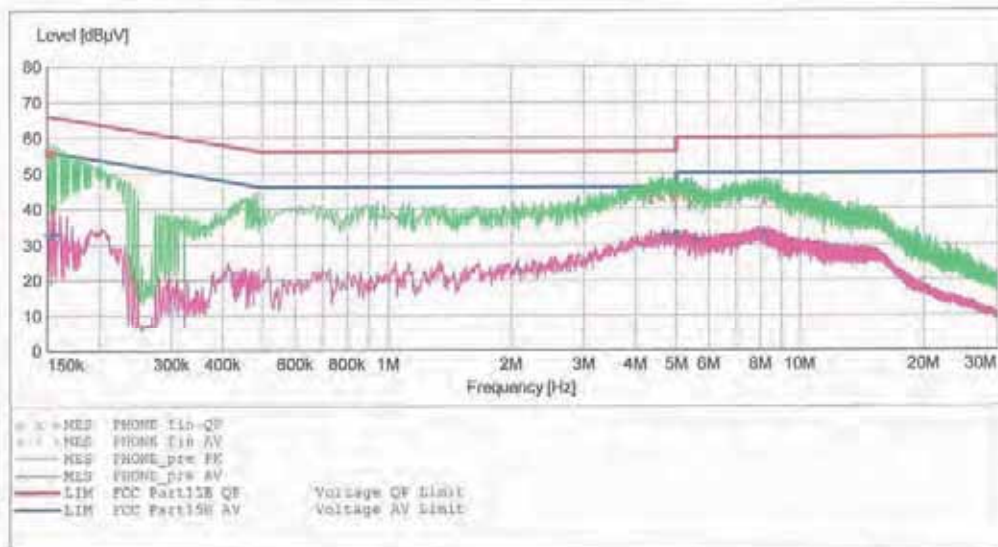
HCT

EMC

EUT: TWFM-B003D
 Manufacturer: LGINNOTEK
 Operating Condition: WLAN MODE
 Test Site: SHIELD ROOM
 Operator: JS LEE
 Test Specification: FCC PART15 CLASS C
 Comment: H

SCAN TABLE: "FCC PART 15 B(H)"

Short Description:			FCC PART 15 CLASS B			
Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	500.0 kHz	1.0 kHz	MaxPeak	10.0 ms	9 kHz	None
500.0 kHz	5.0 MHz	4.0 kHz	Average	10.0 ms	9 kHz	None
5.0 MHz	30.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average	10.0 ms	9 kHz	None



MEASUREMENT RESULT: "PHONE_fin QP"

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Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Line	PK
0.150010	56.20	10.1	66	9.8	---	---
0.152010	56.00	10.1	66	9.9	---	---
0.154010	55.60	10.1	66	10.2	---	---
4.360000	42.70	10.4	56	13.3	---	---
4.652000	43.20	10.5	56	12.8	---	---
4.956000	42.80	10.5	56	13.2	---	---
5.000000	43.60	10.5	56	12.4	---	---
5.460000	41.80	10.6	60	18.2	---	---
8.200000	42.20	10.8	60	17.8	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

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Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Line	PE
0.150010	32.50	10.1	56	23.5	---	---
0.154010	32.60	10.1	56	23.2	---	---
0.156010	32.90	10.1	56	22.7	---	---
2.076000	23.20	10.2	46	22.8	---	---
4.668000	32.90	10.5	46	13.1	---	---
4.984000	32.90	10.5	46	13.1	---	---
5.000000	32.10	10.5	46	13.9	---	---
5.592000	31.10	10.6	50	18.9	---	---
8.212000	32.50	10.8	50	17.5	---	---

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8. LIST OF TEST EQUIPMENT

Manufacturer	Model / Equipment	Calibration Interval	Calibration Due	Serial No.
Rohde & Schwarz	ESH2-Z5/ LISN	Annual	02/01/2012	861741/013
Schwarzbeck	VULB 9168/ TRILOG Antenna	Biennial	02/09/2013	200
Rohde & Schwarz	ESI 40 / EMI TEST RECEIVER	Annual	05/26/2012	831564103
Agilent	E4440A/ Spectrum Analyzer	Annual	05/02/2012	US45303008
Agilent	N9020A/ SIGNAL ANALYZER	Annual	09/23/2012	MY51110020
HD	MA240/ Antenna Position Tower	N/A	N/A	556
EMCO	1050/ Turn Table	N/A	N/A	114
HD GmbH	HD 100/ Controller	N/A	N/A	13
HD GmbH	KMS 560/ SlideBar	N/A	N/A	12
Rohde & Schwarz	ESH3-Z2/ PULSE LIMITER	Annual	08/01/2011	375.8810.352
Rohde & Schwarz	SCU-18/ Signal Conditioning Unit	Annual	09/19/2012	10094
MITEQ	AFS44-00102650-42-10P-44-PS/ POWER AMP	Annual	09/23/2012	1532439
Schwarzbeck	BBHA 9120D/ Horn Antenna	Biennial	04/13/2012	147
Rohde & Schwarz	FSP / Spectrum Analyzer	Annual	03/23/2012	839117/011
Agilent	E4440A / Spectrum Analyzer	Annual	05/02/2012	US45303008
Agilent	E4416A /Power Meter	Annual	01/04/2012	GB41291412
Agilent	E9327A /POWER SENSOR	Annual	05/02/2012	MY4442009
Wainwright Instrument	WHF3.3/18G-10EF / High Pass Filter	Annual	05/02/2012	1
Wainwright Instrument	WRCJ2400/2483.5-2370/2520-60/14SS / Band Reject Filter	Annual	05/02/2012	1
Hewlett Packard	11636B/Power Divider	Annual	12/29/2011	11377
Hewlett Packard	11667B / Power Splitter	Annual	11/08/2011	10126
DIGITAL	EP-3010 /DC POWER SUPPLY	Annual	01/04/2012	3110117
ITECH	IT6720 / DC POWER SUPPLY	Annual	12/01/2011	010002156287001199
TESCOM	TC-3000C / BLUETOOTH TESTER	Annual	04/01/2012	3000C000276
Rohde & Schwarz	CBT / BLUETOOTH TESTER	Annual	05/02/2012	100422
EMCO	6502.LOOP ANTENNA	Biennial	01/13/2012	9009-2536

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