



Test Report

Product Name : Dark Knight Double 450Mbps Dual N Band Router
Model No. : RT-N66U
FCC ID. : MSQ-RTN66U

Applicant : ASUSTeK COMPUTER INC.

Address : No. 15, Li-Te Rd., Peitou, Taipei 112, Taiwan R.O.C.

Date of Receipt : 2011/06/17

Issued Date : 2011/11/22

Report No. : 116286R-RFUSP46V01

Report Version : V1.0

The test results relate only to the samples tested.

The test report shall not be reproduced except in full without the written approval of Quietek Corporation.

Test Report Certification

Issued Date : 2011/11/22

Report No. : 116286R-RFUSP46V01



Product Name : Dark Knight Double 450Mbps Dual N Band Router
 Applicant : ASUSTeK COMPUTER INC.
 Address : No. 15, Li-Te Rd., Peitou, Taipei 112, Taiwan R.O.C.
 Manufacturer : Askey Technology (Jiangsu) LTD.
 Model No. : RT-N66U
 FCC ID. : MSQ-RTN66U
 EUT Voltage : AC 100-240V, 50-60Hz
 Trade Name : ASUS
 Applicable Standard : FCC CFR Title 47 Part 15 Subpart C Section 15.407:2010
 ANSI C63.4: 2009
 Test Result : Complied

The test results relate only to the samples tested.

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TABLE OF CONTENTS


Description	Page
1. General Information.....	5
1.1. EUT DESCRIPTION.....	5
1.2. OPERATIONAL DESCRIPTION.....	10
1.3. TEST MODE.....	11
1.4. TESTED SYSTEM DETAILS.....	12
1.5. CONFIGURATION OF TESTED SYSTEM.....	13
1.6. EUT EXERCISE SOFTWARE.....	13
1.7. TEST FACILITY.....	14
2. Conducted Emission.....	16
2.1. TEST EQUIPMENT.....	16
2.2. TEST SETUP.....	16
2.3. LIMITS.....	17
2.4. TEST PROCEDURE.....	17
2.5. TEST SPECIFICATION.....	17
2.6. UNCERTAINTY.....	17
2.7. TEST RESULT.....	18
2.8. TEST PHOTO.....	20
3. 99% & 26dB Bandwidth.....	21
3.1. TEST EQUIPMENT.....	21
3.2. TEST SETUP.....	21
3.3. LIMITS.....	21
3.4. TEST PROCEDURE.....	21
3.5. UNCERTAINTY.....	21
3.6. TEST RESULT.....	22
4. Peak Transmit Output.....	36
4.1. TEST EQUIPMENT.....	36
4.2. TEST SETUP.....	36
4.3. LIMITS.....	37
4.4. TEST PROCEDURE.....	37
4.5. UNCERTAINTY.....	37
4.6. TEST RESULT.....	38
5. Peak Power Spectrum Density.....	54
5.1. TEST EQUIPMENT.....	54
5.2. TEST SETUP.....	54

5.3.	LIMITS	54
5.4.	TEST PROCEDURE	55
5.5.	UNCERTAINTY	55
5.6.	TEST RESULT.....	56
6.	Peak Excursion	72
6.1.	TEST EQUIPMENT.....	72
6.2.	TEST SETUP	72
6.3.	LIMITS	72
6.4.	TEST PROCEDURE	72
6.5.	UNCERTAINTY	72
6.6.	TEST RESULT.....	73
7.	Radiated Emission.....	87
7.1.	TEST EQUIPMENT.....	87
7.2.	TEST SETUP	87
7.3.	LIMITS	88
7.4.	TEST PROCEDURE	89
7.5.	UNCERTAINTY	89
7.6.	TEST RESULT.....	90
7.7.	TEST PHOTO.....	112
8.	Band Edge	114
8.1.	TEST EQUIPMENT.....	114
8.2.	TEST SETUP	114
8.3.	LIMITS	115
8.4.	TEST PROCEDURE	116
8.5.	UNCERTAINTY	116
8.6.	TEST RESULT.....	117
9.	Frequency Stability.....	141
9.1.	TEST EQUIPMENT.....	141
9.2.	TEST SETUP	141
9.3.	LIMITS	141
9.4.	TEST PROCEDURE	141
9.5.	UNCERTAINTY	141
9.6.	TEST RESULT.....	142
	ATTACHEMENT	156
	EUT PHOTOGRAPH.....	156

1. General Information

1.1. EUT Description

Product Name	Dark Knight Double 450Mbps Dual N Band Router
Product Type	WLAN (3TX, 3RX)
Trade Name	ASUS
Model No.	RT-N66U
Frequency Range -IEEE 802.11a & IEEE 802.11n (20MHz)	5180~5240MHz
Frequency Range- IEEE 802.11n (40MHz)	5190~5230MHz
Channel Number - IEEE 802.11a & IEEE 802.11n (20MHz))	4
Channel Number- IEEE 802.11n (40MHz)	2
Type of Modulation (IEEE 802.11a/n)	Orthogonal Frequency Division Multiplexing (OFDM)
Data Speed (IEEE 802.11a)	6Mbps,9Mbps,12Mbps,18Mbps,24Mbps,36Mbps,48Mbps,54Mbps
Data Speed (IEEE 802.11n)	Support a subset of the combination of GI, MCS 0~MCS 23 and bandwidth defined in 802.11n
Antenna Gain	2dBi
Channel Control	Manual
Antenna Type	Dipole

Component	
LAN Cable	Non-Shielded, 1.5m
Power Adatper	ASUS, EXA1004UH I/P : AC 100-240V, 50-60Hz 1A O/P : +19V  1.58A Cable Out: Non-shielded, 2.5m, one ferrite core bonded.

IEEE 802.11n

MCS Index	Modulation	R	N _{BPSCS}	N _{CBPS}		N _{DBPS}		Data Rate(Mb/s)			
				20MHz	40MHz	20MHz	40MHz	800ns GI		400ns GI (Note1)	
								20MHz	40MHz	20MHz	40MHz
0	BPSK	1/2	1	52	108	26	54	6.5	13.5	7.2	15.0
1	QPSK	1/2	2	104	216	52	108	13.0	27.0	14.4	30.0
2	QPSK	3/4	2	104	216	78	162	19.5	40.5	21.7	45.0
3	16-QAM	1/2	4	208	432	104	216	26.0	54.0	28.9	60.0
4	16-QAM	3/4	4	208	432	156	324	39.0	81.0	43.3	90.0
5	64-QAM	2/3	6	312	648	208	432	52.0	108.0	57.8	120.0
6	64-QAM	3/4	6	312	648	234	486	58.5	121.5	65.0	135.0
7	64-QAM	5/6	6	312	648	260	540	65.0	135.0	72.2	150.0

Note 1: Support of 400ns GI is optional on transmit and receive.

Table 1 – MCS parameters for TX Antenna number = 1

MCS Index	Modulation	R	N _{BPSCS}	N _{CBPS}		N _{DBPS}		Data Rate(Mb/s)			
				20MHz	40MHz	20MHz	40MHz	800ns GI		400ns GI (Note1)	
								20MHz	40MHz	20MHz	40MHz
8	BPSK	1/2	1	104	216	52	108	13.0	27.0	14.4	30.0
9	QPSK	1/2	2	208	432	104	216	26.0	54.0	28.9	60.0
10	QPSK	3/4	2	208	432	156	324	39.0	81.0	43.3	90.0
11	16-QAM	1/2	4	416	864	208	432	52.0	108.0	57.8	120.0
12	16-QAM	3/4	4	416	864	312	648	78.0	162.0	86.7	180.0
13	64-QAM	2/3	6	624	1296	416	864	104.0	216.0	115.6	240.0
14	64-QAM	3/4	6	624	1296	468	972	117.0	243.0	130.0	270.0
15	64-QAM	5/6	6	624	1296	520	1080	130.0	270.0	144.4	300.0

Note 1: Support of 400ns GI is optional on transmit and receive.

Table 2 – MCS parameters for TX Antenna number = 2

MCS Index	Modulation	R	N _{BPSCS}	N _{CBPS}		N _{DBPS}		Data Rate(Mb/s)			
				20MHz	40MHz	20MHz	40MHz	800ns GI		400ns GI (Note1)	
								20MHz	40MHz	20MHz	40MHz
16	BPSK	1/2	1	156	324	78	162	19.5	40.5	21.7	45.0
17	QPSK	1/2	2	312	648	156	324	39.0	81.0	43.3	90.0
18	QPSK	3/4	2	312	648	234	486	58.5	121.5	65.0	135.0
19	16-QAM	1/2	4	624	1296	312	648	78.0	162.0	86.7	180.0
20	16-QAM	3/4	4	624	1296	468	972	117.0	243.0	130.0	270.0
21	64-QAM	2/3	6	936	1944	624	1296	156.0	324.0	173.3	360.0
22	64-QAM	3/4	6	936	1944	702	1458	175.5	364.5	195.0	405.0
23	64-QAM	5/6	6	936	1944	780	1620	195.0	405.0	216.7	450.0

Note 1: Support of 400ns GI is optional on transmit and receive.

Table 3 – MCS parameters for TX Antenna number = 3

Symbol	Explanation
R	Code rate
N _{BPSC}	Number of coded bits per single carrier
N _{CBPS}	Number of coded bits per symbol
N _{DBPS}	Number of data bits per symbol
GI	guard interval

IEEE 802.11a & IEEE 802.11n (20MHz)

Working Frequency of Each Channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180MHz	40	5200MHz	44	5220MHz	48	5240MHz

IEEE 802.11n (40MHz)

Working Frequency of Each Channel			
Channel	Frequency	Channel	Frequency
38	5190MHz	46	5230MHz

Note:

1. This device is a Dark Knight Double 450Mbps Dual N Band Router including 2.4GHz b/g/n and 5GHz a/n (3x3) transmitting and receiving function.
2. These test results on a sample of the device are for the purpose of demonstrating Compliance with Part 15 Subpart C Paragraph 15.407.
3. Regards to the frequency band operation; the lowest , middle and highest frequency of channel were selected to perform the test, and then shown on this report.
4. The function of the 5.2GHz transmitting is measured and makes a test report of the report number: 116286R-RFUSP42V01.
5. This device is a composite device in accordance with Part 15 regulations. The receiving function receiving was tested and its test report number is 116286R-RFUSP37V02 under Declaration of Conformity.

1.3. Test Mode

Quietek has verified the construction and function in typical operation. The preliminary tests were performed in different data rate, and to find the worst condition, which was shown in this test report. The following table is the final test mode.

TX	Mode 1: Transmit
----	------------------

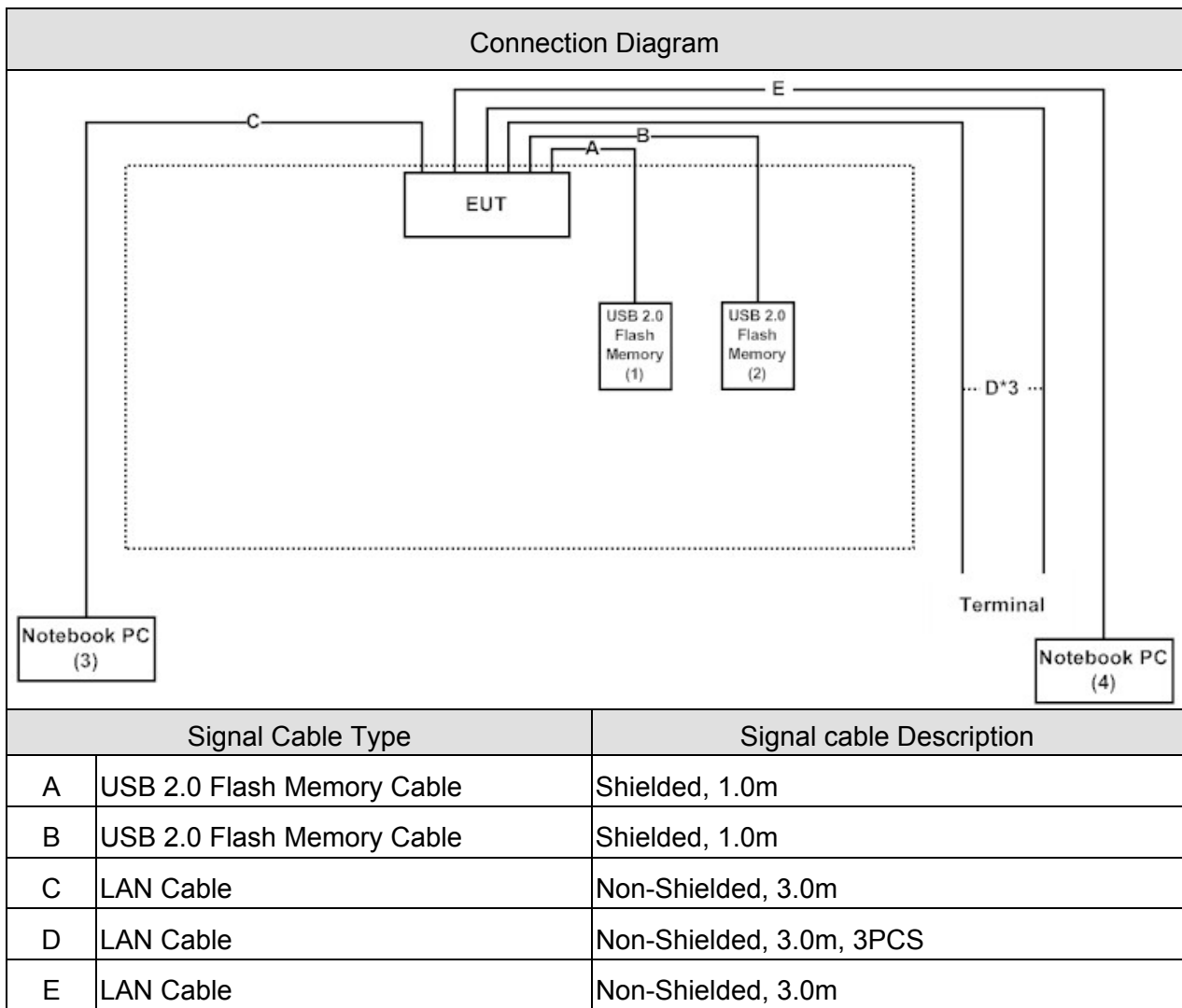
Test Items	Mode	Channel	Antenna	Result
Conducted Emission	11n(40MHz)	38	0+1+2	Complies
99 % & 26dB Bandwidth	a	36/44/48	1	Complies
	11n(20MHz)	36/44/48	0/1/2	Complies
	11n(40MHz)	38/46	0/1/2	Complies
Peak Transmit Output	a	36/44/48	1	Complies
	11n(20MHz)	36/44/48	0+1+2	Complies
	11n(40MHz)	38/46	0+1+2	Complies
Peak Power Spectrum Density	a	36/44/48	1	Complies
	11n(20MHz)	36/44/48	0+1+2	Complies
	11n(40MHz)	38/46	0+1+2	Complies
Power Excursion	a	36/44/48	1	Complies
	11n(20MHz)	36/44/48	0/1/2	Complies
	11n(40MHz)	38/46	0/1/2	Complies
Radiated Emission	a	36/44/48	1	Complies
	11n(20MHz)	36/44/48	0+1+2	Complies
	11n(40MHz)	38/46	0+1+2	Complies
Band Edge	a	36	1	Complies
	11n(20MHz)	36	0+1+2	Complies
	11n(40MHz)	38	0+1+2	Complies
Frequency Stability	a	36/48	1	Complies
	11n(20MHz)	36/48	0/1/2	Complies
	11n(40MHz)	38/46	0/1/2	Complies

1.4. Tested System Details

The types for all equipments, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product	Manufacturer	Model No.	Serial No.	FCC ID	Power Cord
1 USB 2.0 Flash Memory	Sony	USM2GJX	N/A	DoC	--
2 USB 2.0 Flash Memory	Sony	USM2GJX	N/A	DoC	--
3 Notebook PC	DELL	PP37L	CD8BNG1	DoC	Non-Shielded, 1.8m
4 Notebook PC	HP Compaq	NX6320FF	CNU7020BXT	DoC	Non-Shielded, 1.8m

1.5. Configuration of tested System



1.6. EUT Exercise Software

1	Setup the EUT as shown in Section 1.5.
2	Execute the MFG Control Panel Ver 1.4.0.0 on the EUT.
3	Configure the test mode, the test channel, and the data rate.
4	Press "Start TX" to start the continuous transmitting.
5	Verify that the EUT works properly.

1.7. Test Facility

Ambient conditions in the laboratory:

Items	Test Item	Required (IEC 68-1)	Actual
Temperature (°C)	FCC PART 15 C 15.407 Conducted Emission	15 - 35	20
Humidity (%RH)		25 - 75	50
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.407 99 % & 26dB Bandwidth	15 - 35	25
Humidity (%RH)		25 - 75	48
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.407 Peal Transmit Power	15 - 35	25
Humidity (%RH)		25 - 75	65
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.407 Peak Power Spectrum	15 - 35	24
Humidity (%RH)		25 - 75	49
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.407 Power Excursion	15 - 35	25
Humidity (%RH)		25 - 75	48
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.407 Radiated Emission	15 - 35	25
Humidity (%RH)		25 - 75	48
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.407 Band Edge	15 - 35	25
Humidity (%RH)		25 - 75	48
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.407 Frequency Stability	15 - 35	25
Humidity (%RH)		25 - 75	48
Barometric pressure (mbar)		860 - 1060	950-1000

Site Description: September 27, 2010 File on
Federal Communications Commission
Laboratory Division
7435 Oakland Mills Road
Columbia, MD 21046
Registration Number: 365520
Accredited by TAF
Accreditation Number: 1313
Effective through: December 27, 2013



Accredited by NVLAP
NVLAP Lab Code: 200347-0
Effective through: September 30, 2012



Site Name: Quietek Corporation

Site Address: No.75-2, 3rd Lin, Wang Ye keng, Yonghxing Tsuen,
Qionglin Shiang, Hsinchu County 307, Taiwan
TEL : 886-3-592-8858 / FAX : 886-3-592-8859
E-Mail : service@quietek.com

2. Conducted Emission

2.1. Test Equipment

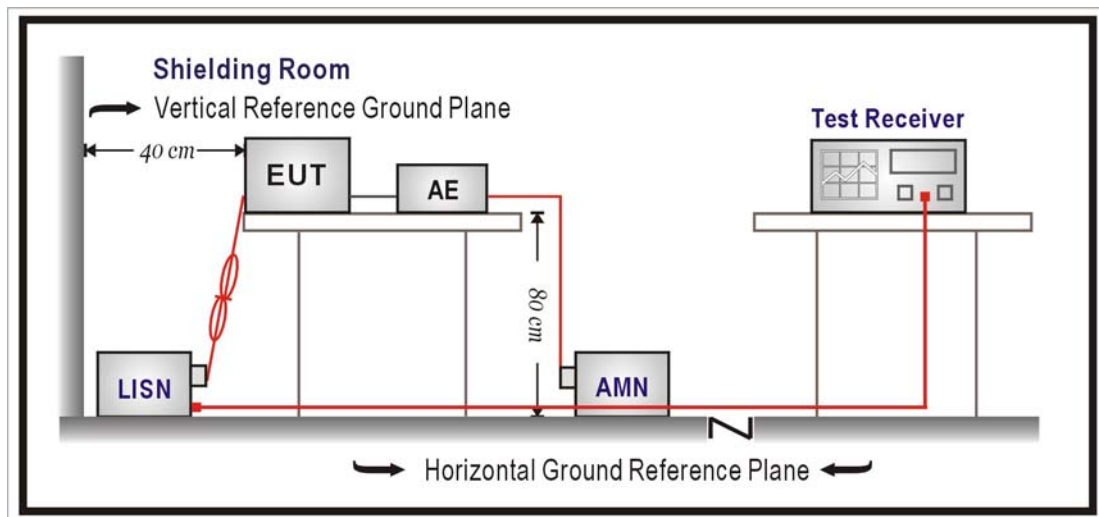
The following test equipments are used during the test:

Conducted Emission / SR3

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
LISN	R&S	ENV216	100096	2012/09/20
LISN	R&S	ESH3-Z5	836679/022	2012/02/10
Test Receiver	R&S	ESCS 30	825442/017	2012/01/16

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

2.2. Test Setup



2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 Limits (dBuV)		
Frequency MHz	QP	AV
0.15 - 0.50	66-56	56-46
0.50 - 5.0	56	46
5.0 - 30	60	50

Remarks: In the above table, the tighter limit applies at the band edges.

2.4. Test Procedure

The EUT was setup according to ANSI C63.4: 2009 and tested according to DTS test procedure of Oct 2002 KDB558074 for compliance to FCC 47CFR 15.247 requirements. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs.) Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length. Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.

2.5. Test Specification

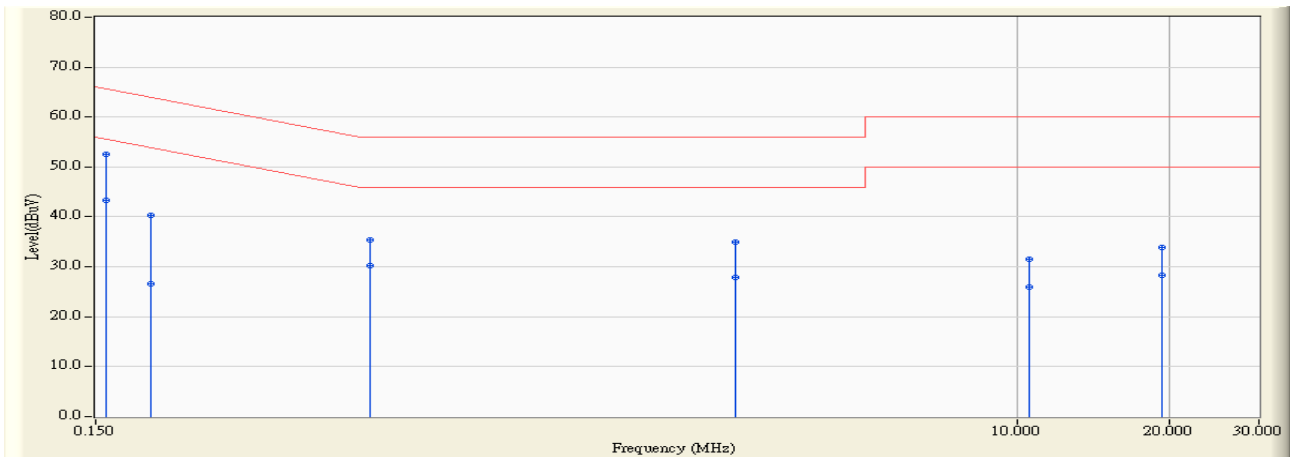
According to FCC Part 15 Subpart C Paragraph 15.207:2010

2.6. Uncertainty

The measurement uncertainty is defined as ± 2.26 dB.

2.7. Test Result

Site : SR3	Time : 2011/11/12 - 13:23
Limit : CISPR_B_00M_QP	Margin : 10
Probe : SR3_LISN(16A)-1_0907 - Line1	Power : AC 120V/60Hz
EUT : Dark Knight Double 450Mbps Dual N Band Router	Note : TX-5190MHz,802.11n(40MHz)

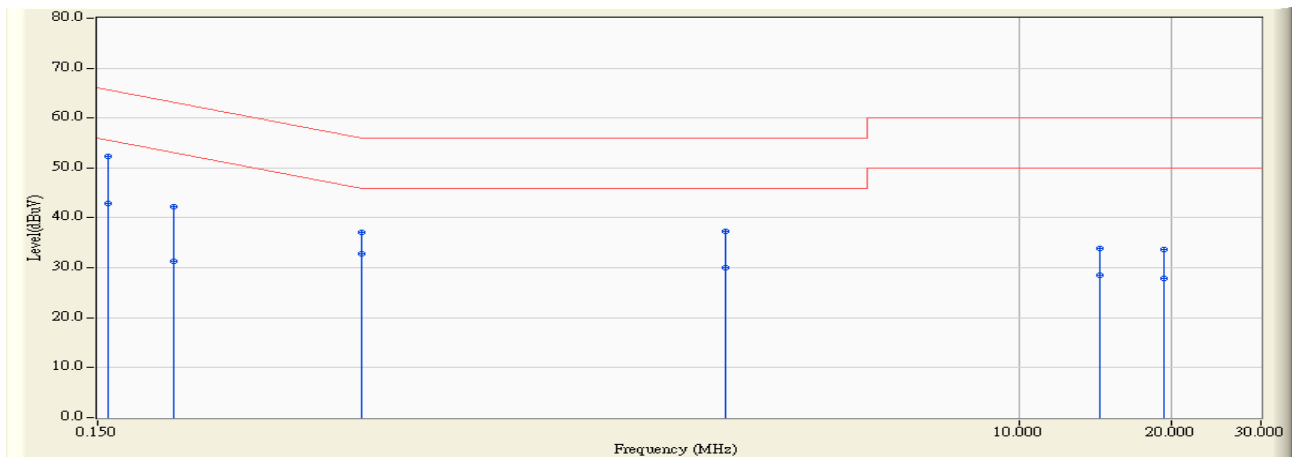


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	0.158	9.655	42.800	52.455	-13.123	65.578	QUASPEAK
2	* 0.158	9.655	33.710	43.365	-12.213	55.578	AVERAGE
3	0.193	9.657	30.640	40.297	-23.611	63.908	QUASPEAK
4	0.193	9.657	17.000	26.657	-27.251	53.908	AVERAGE
5	0.525	9.705	25.720	35.425	-20.575	56.000	QUASPEAK
6	0.525	9.705	20.630	30.335	-15.665	46.000	AVERAGE
7	2.759	9.962	24.970	34.932	-21.068	56.000	QUASPEAK
8	2.759	9.962	17.950	27.912	-18.088	46.000	AVERAGE
9	10.548	10.144	21.280	31.424	-28.576	60.000	QUASPEAK
10	10.548	10.144	15.900	26.044	-23.956	50.000	AVERAGE
11	19.306	10.294	23.620	33.914	-26.086	60.000	QUASPEAK
12	19.306	10.294	18.120	28.414	-21.586	50.000	AVERAGE

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Site : SR3	Time : 2011/11/12 - 13:25
Limit : CISPR_B_00M_QP	Margin : 10
Probe : SR3_LISN(16A)-1_0907 - Line2	Power : AC 120V/60Hz
EUT : Dark Knight Double 450Mbps Dual N Band Router	Note : TX-5190MHz,802.11n(40MHz)



	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	0.158	9.665	42.720	52.385	-13.193	65.578	QUASIPeAK
2	* 0.158	9.665	33.180	42.845	-12.733	55.578	AVERAGE
3	0.212	9.669	32.500	42.169	-20.938	63.107	QUASIPeAK
4	0.212	9.669	21.560	31.229	-21.878	53.107	AVERAGE
5	0.498	9.709	27.450	37.159	-18.880	56.039	QUASIPeAK
6	0.498	9.709	23.030	32.739	-13.300	46.039	AVERAGE
7	2.619	9.962	27.430	37.392	-18.608	56.000	QUASIPeAK
8	2.619	9.962	20.120	30.082	-15.918	46.000	AVERAGE
9	14.365	10.347	23.630	33.977	-26.023	60.000	QUASIPeAK
10	14.365	10.347	18.200	28.547	-21.453	50.000	AVERAGE
11	19.295	10.490	23.230	33.720	-26.280	60.000	QUASIPeAK
12	19.295	10.490	17.440	27.930	-22.070	50.000	AVERAGE

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

3. 99% & 26dB Bandwidth

3.1. Test Equipment

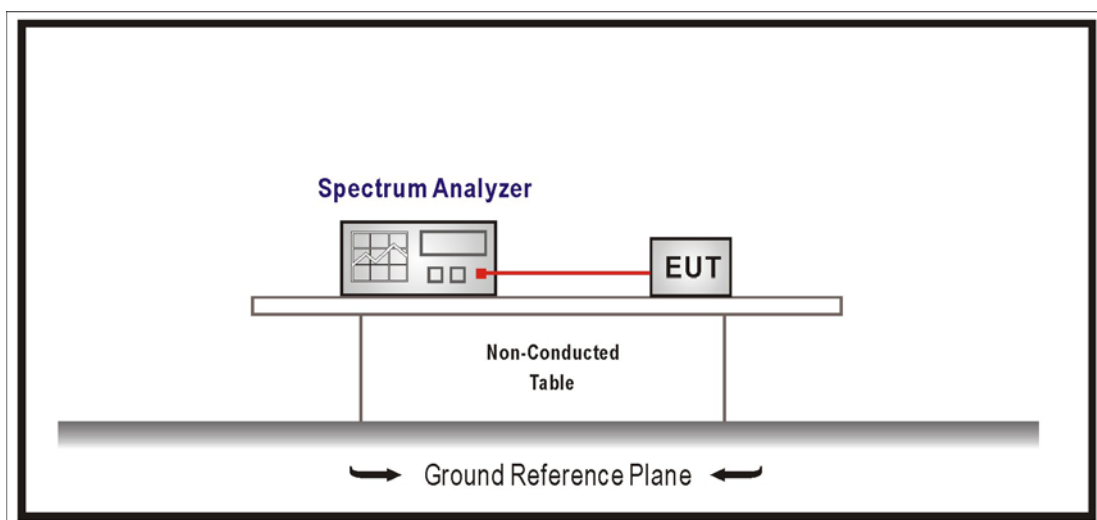
The following test equipments are used during the radiated emission tests:

99% & 26dB Bandwidth / SR7

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Spectrum Analyzer	R&S	FSP	100561	2012/01/16

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

3.2. Test Setup



3.3. Limits

No Required

3.4. Test Procedure

The EUT was tested according to FCC Public Notice DA 02-2138, AUGUST 2002. Set RBW 1% of the emission bandwidth, VBW equal to 3 times the RBW.

3.5. Uncertainty

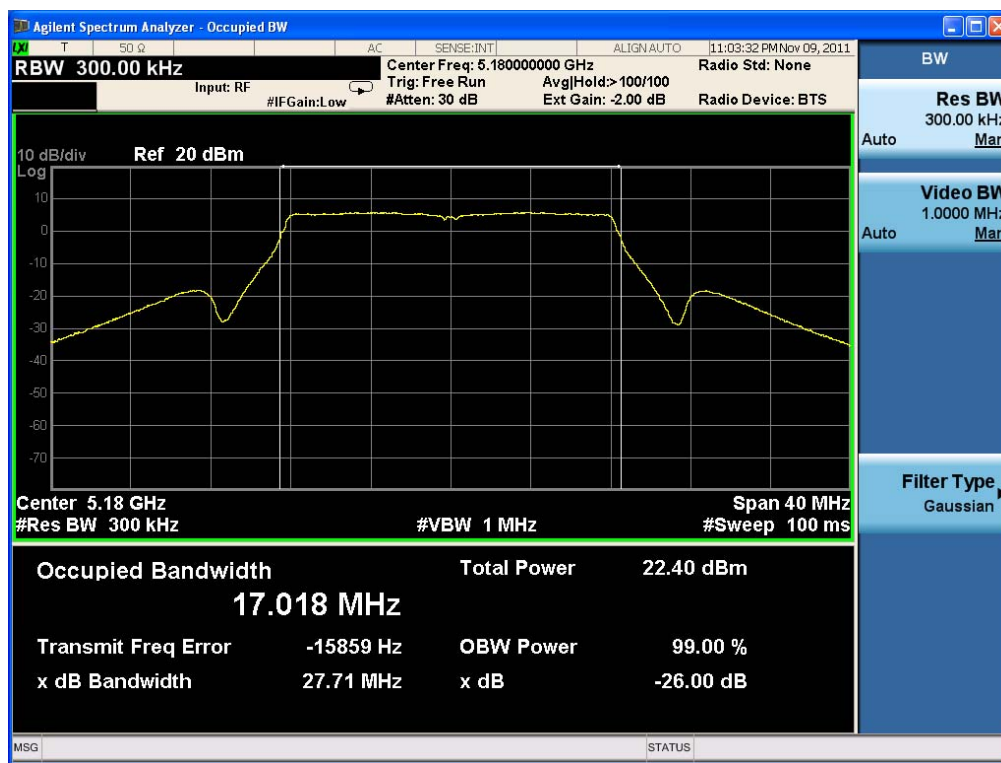
The measurement uncertainty is defined as $\pm 150\text{Hz}$

3.6. Test Result

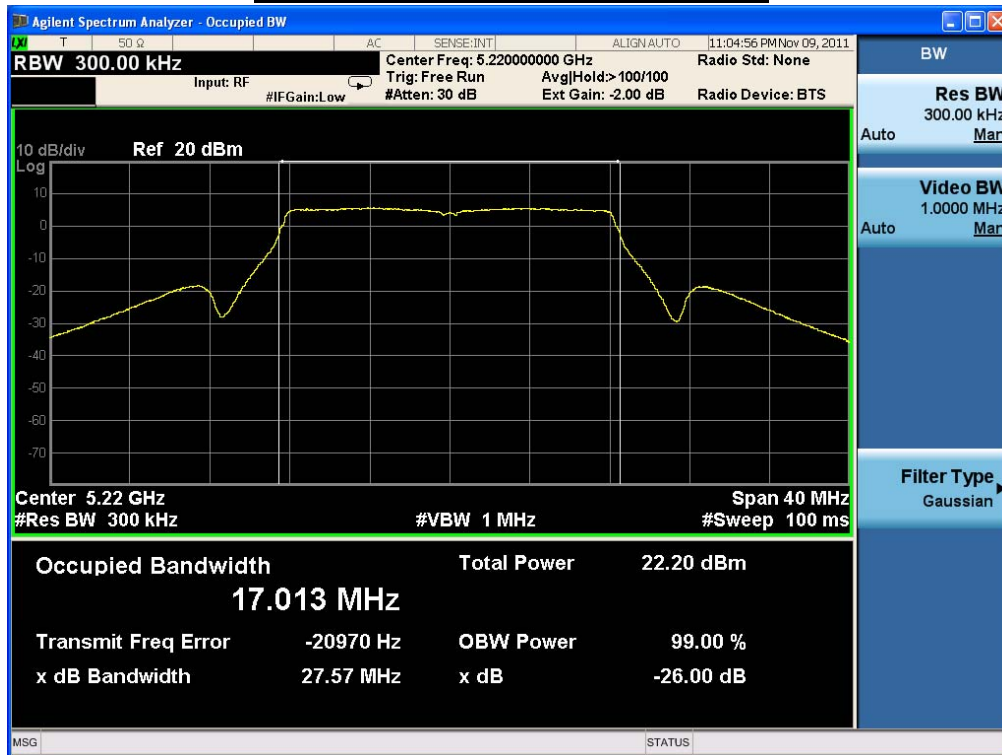
Product	Dark Knight Double 450Mbps Dual N Band Router		
Test Item	99% & 26dB Bandwidth		
Test Mode	Mode 1: Transmit		
Date of Test	2011/11/09	Test Site	SR7

802.11a					
Channel No.	Frequency (MHz)	26dB BW (MHz)	99 % OBW (MHz)	Required Limit (MHz)	Result
36	5180	27.71	17.01	--	NA
44	5220	27.57	17.01	--	NA
48	5240	27.73	17.01	--	NA

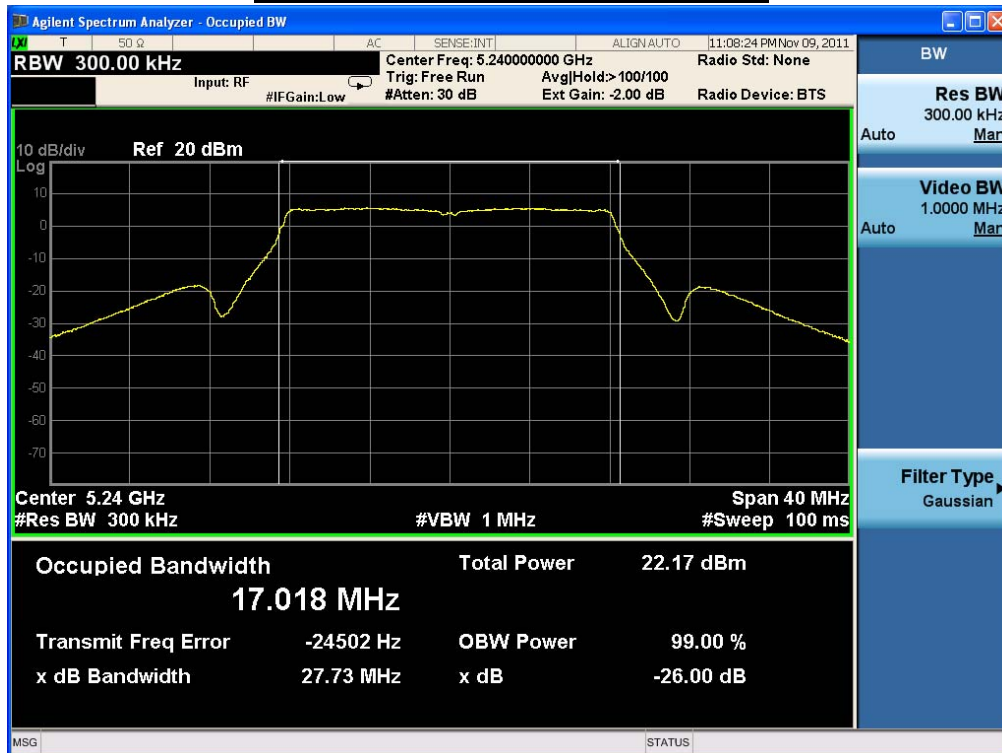
99% & 26dB Bandwidth – Channel 36



99% & 26dB Bandwidth – Channel 44



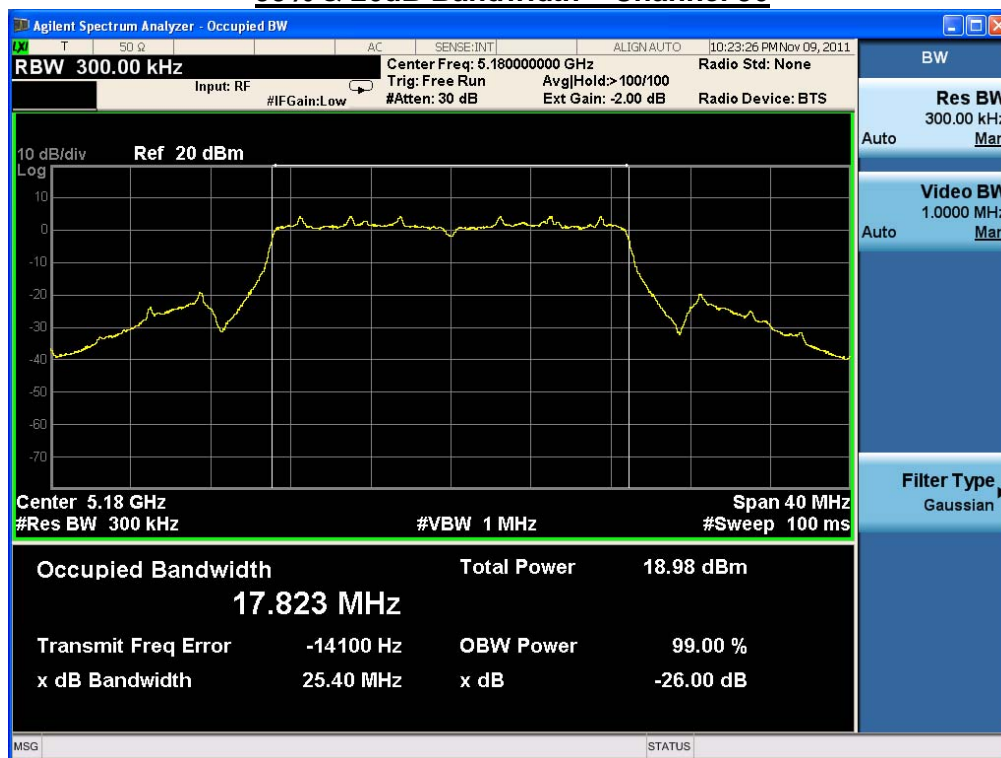
99% & 26dB Bandwidth – Channel 48



Product	Dark Knight Double 450Mbps Dual N Band Router		
Test Item	99% & 26dB Bandwidth		
Test Mode	Mode 1: Transmit		
Date of Test	2011/11/09	Test Site	SR7

802.11n_20M(ANT 0)					
Channel No.	Frequency (MHz)	26dB BW (MHz)	99 % OBW (MHz)	Required Limit (MHz)	Result
36	5180	25.40	17.82	--	NA
44	5220	26.74	17.96	--	NA
48	5240	25.41	17.81	--	NA

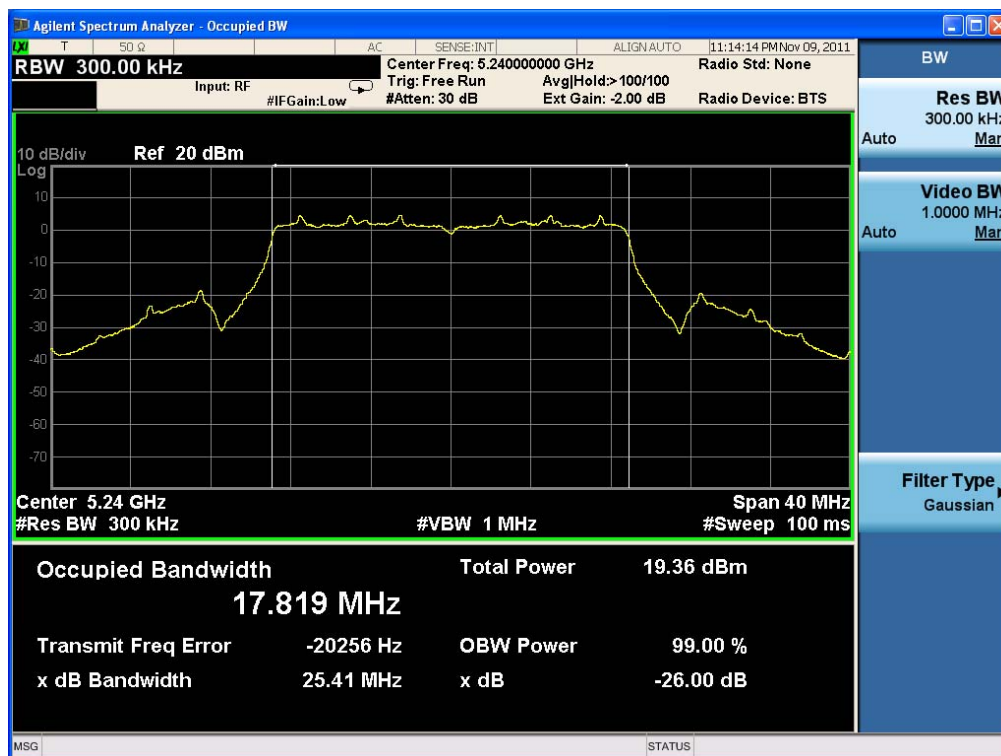
99% & 26dB Bandwidth – Channel 36



99% & 26dB Bandwidth – Channel 44



99% & 26dB Bandwidth – Channel 48

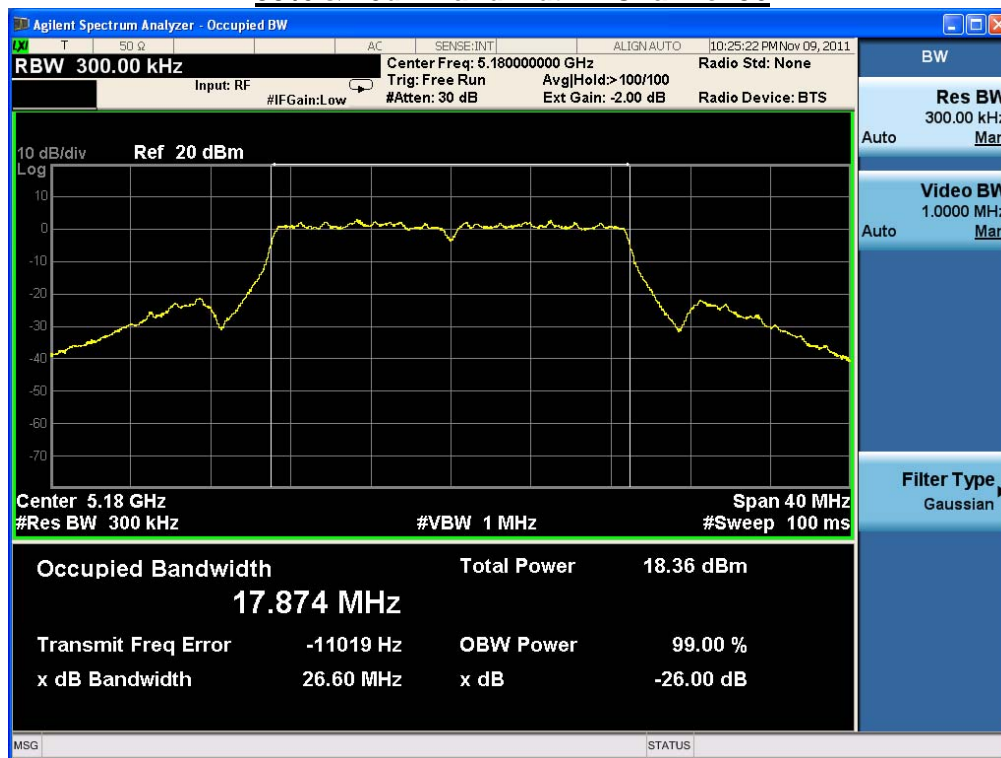


Product	Dark Knight Double 450Mbps Dual N Band Router		
Test Item	99% & 26dB Bandwidth		
Test Mode	Mode 1: Transmit		
Date of Test	2011/11/09	Test Site	SR7

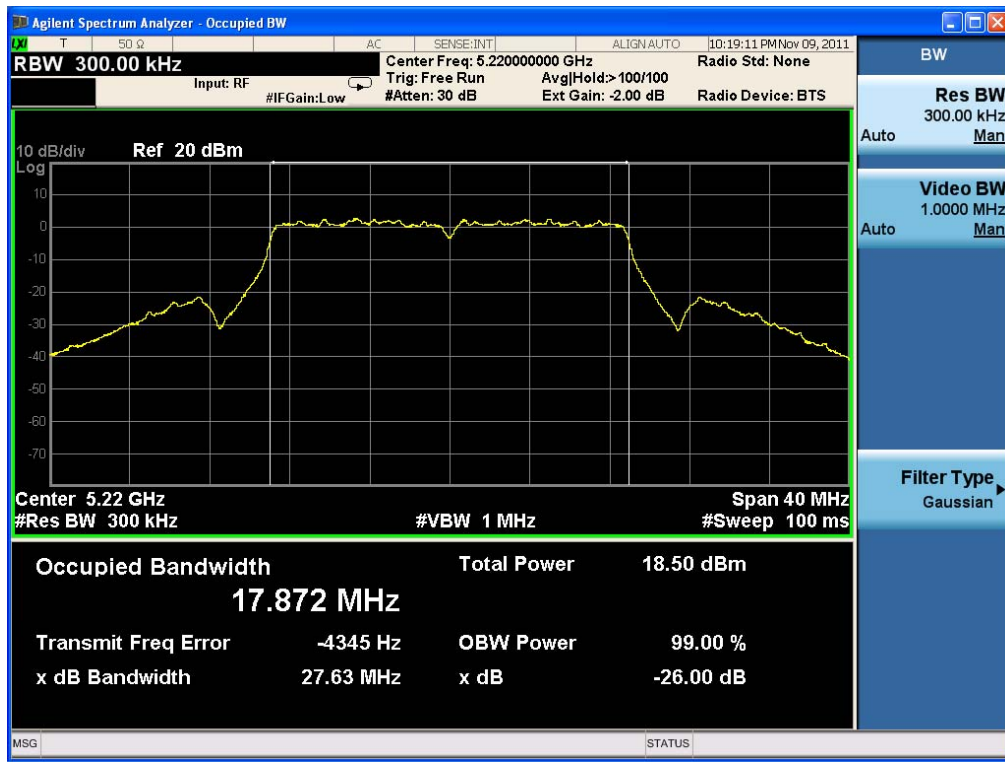
802.11n_20M(ANT 1)

Channel No.	Frequency (MHz)	26dB BW (MHz)	99 % OBW (MHz)	Required Limit (MHz)	Result
36	5180	26.60	17.87	--	NA
44	5220	27.63	17.87	--	NA
48	5240	26.58	17.87	--	NA

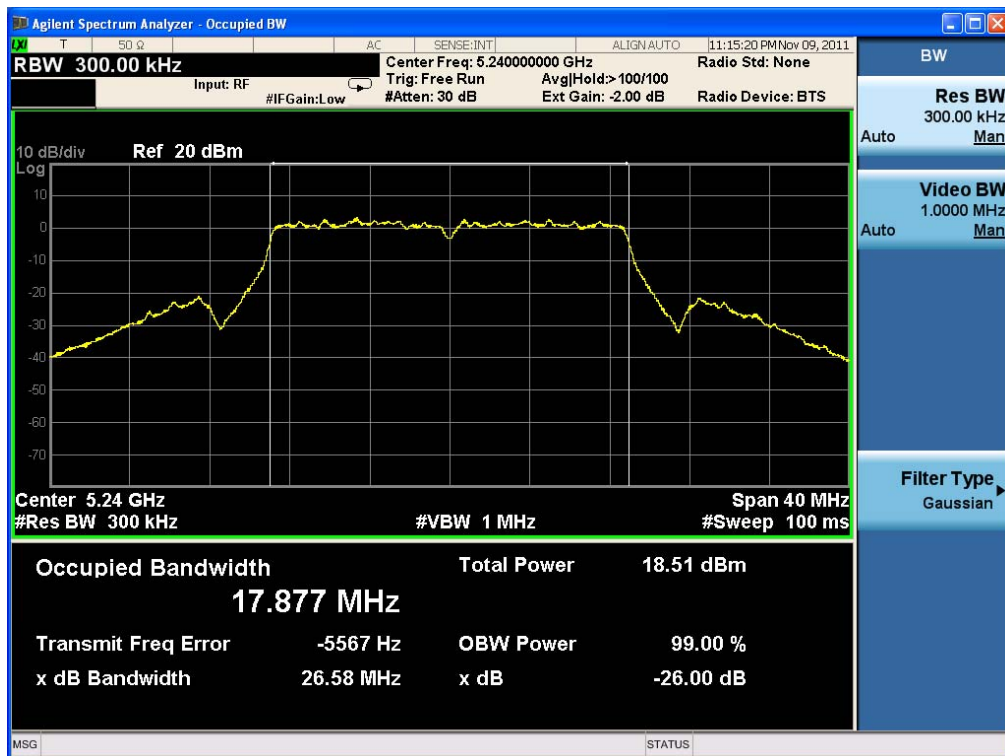
99% & 26dB Bandwidth – Channel 36



99% & 26dB Bandwidth – Channel 44



99% & 26dB Bandwidth – Channel 48

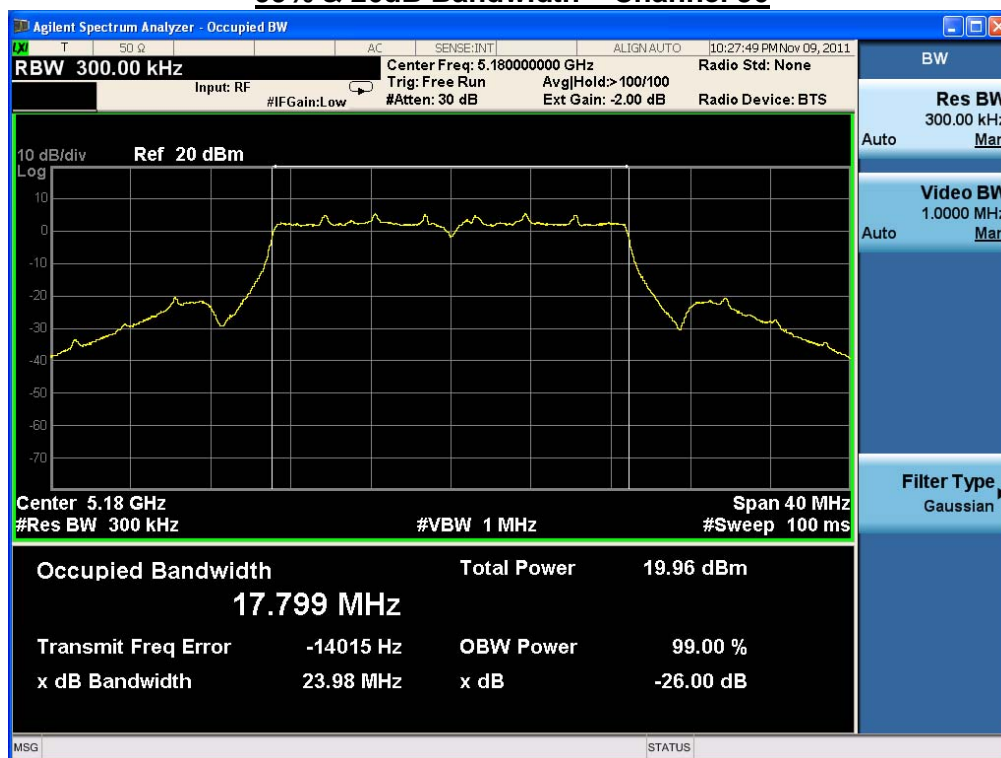


Product	Dark Knight Double 450Mbps Dual N Band Router		
Test Item	99% & 26dB Bandwidth		
Test Mode	Mode 1: Transmit		
Date of Test	2011/11/09	Test Site	SR7

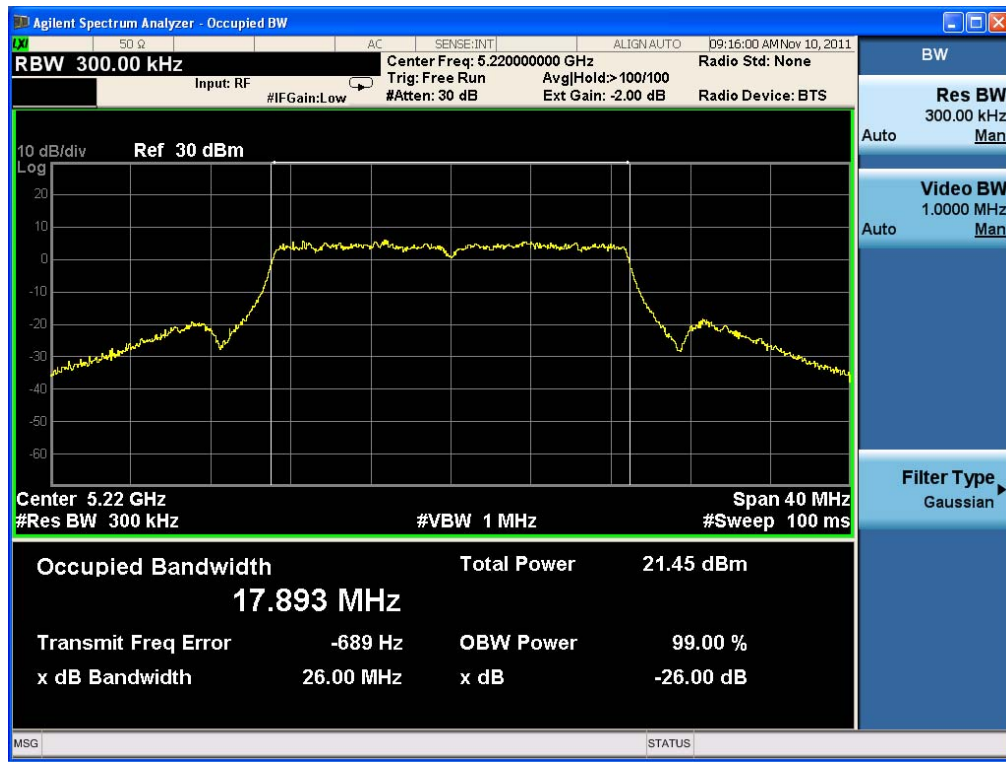
802.11n_20M(ANT 2)

Channel No.	Frequency (MHz)	26dB BW (MHz)	99 % OBW (MHz)	Required Limit (MHz)	Result
36	5180	23.98	17.79	--	NA
44	5220	26.00	17.89	--	NA
48	5240	27.46	17.80	--	NA

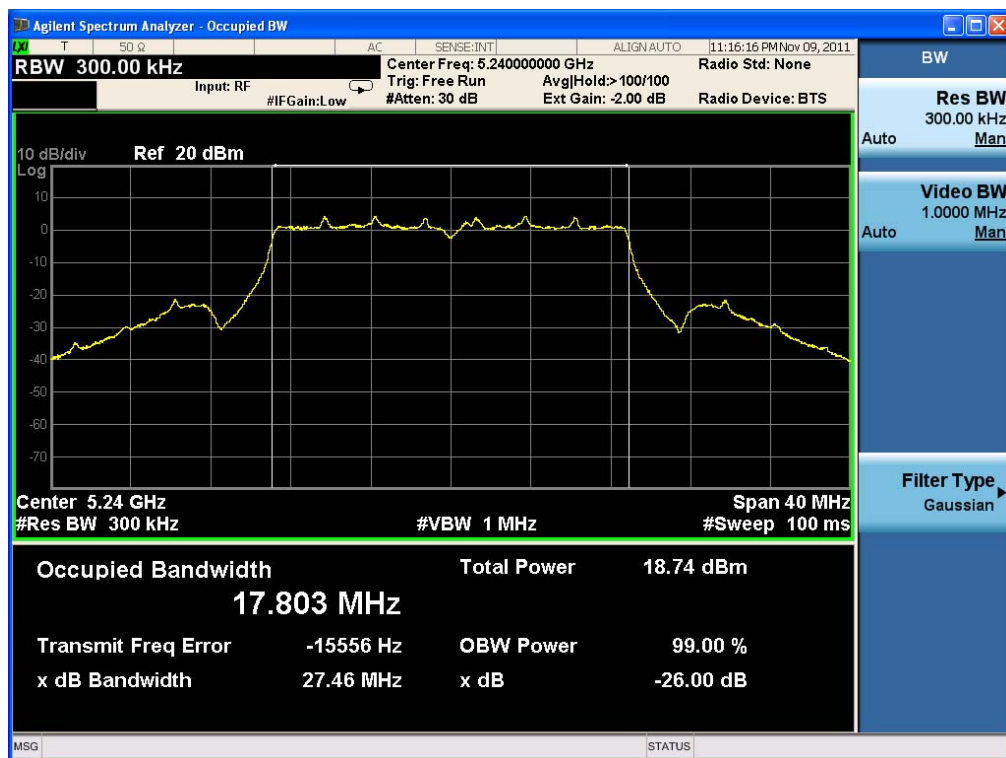
99% & 26dB Bandwidth – Channel 36



99% & 26dB Bandwidth – Channel 44



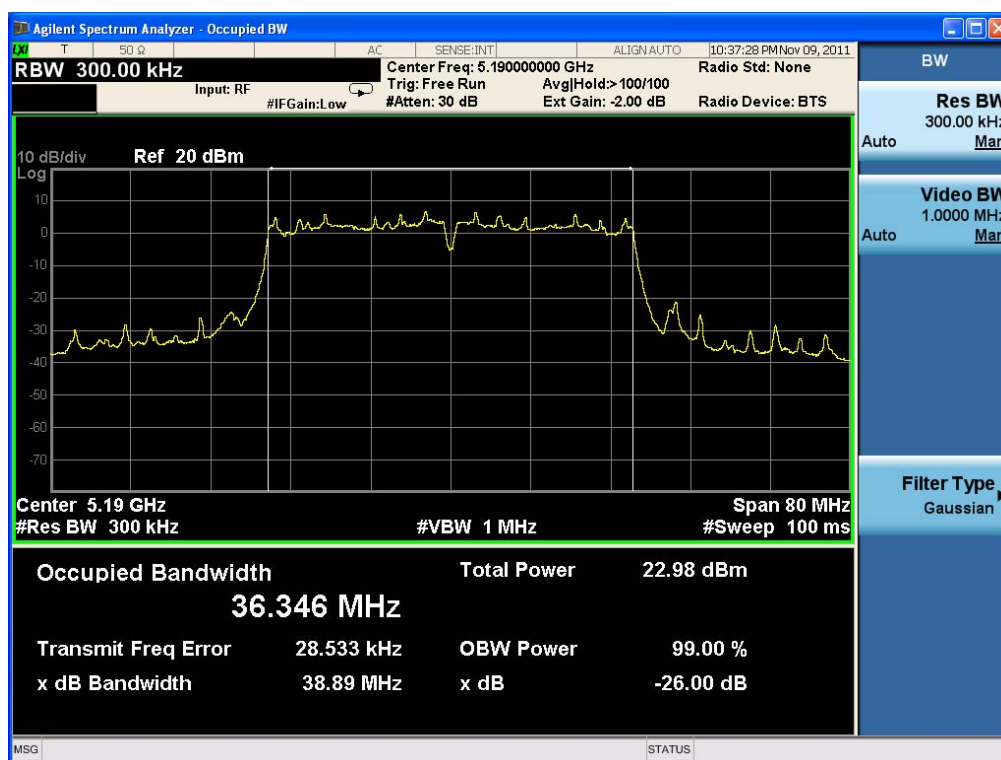
99% & 26dB Bandwidth – Channel 48



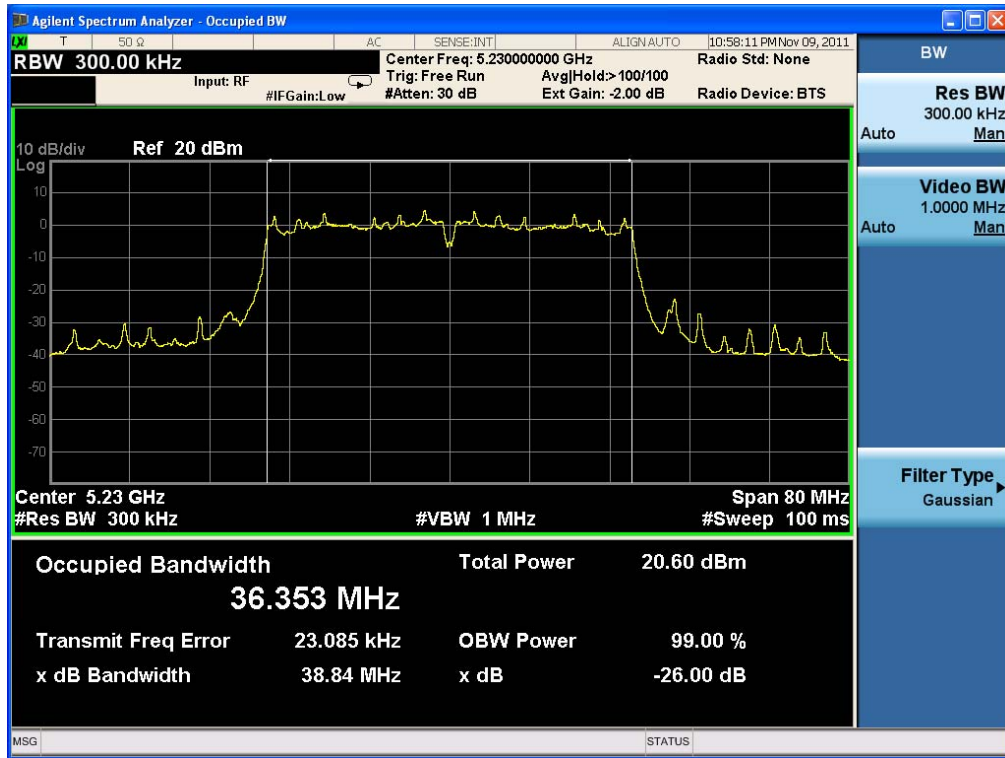
Product	Dark Knight Double 450Mbps Dual N Band Router		
Test Item	99% & 26dB Bandwidth		
Test Mode	Mode 1: Transmit		
Date of Test	2011/11/09	Test Site	SR7

802.11n_40M(ANT 0)					
Channel No.	Frequency (MHz)	26dB BW (MHz)	99 % OBW (MHz)	Required Limit (MHz)	Result
38	5190	38.89	36.34	--	NA
46	5230	38.84	36.35	--	NA

99% & 26dB Bandwidth – Channel 38



99% & 26dB Bandwidth – Channel 46



Product	Dark Knight Double 450Mbps Dual N Band Router		
Test Item	99% & 26dB Bandwidth		
Test Mode	Mode 1: Transmit		
Date of Test	2011/11/09	Test Site	SR7

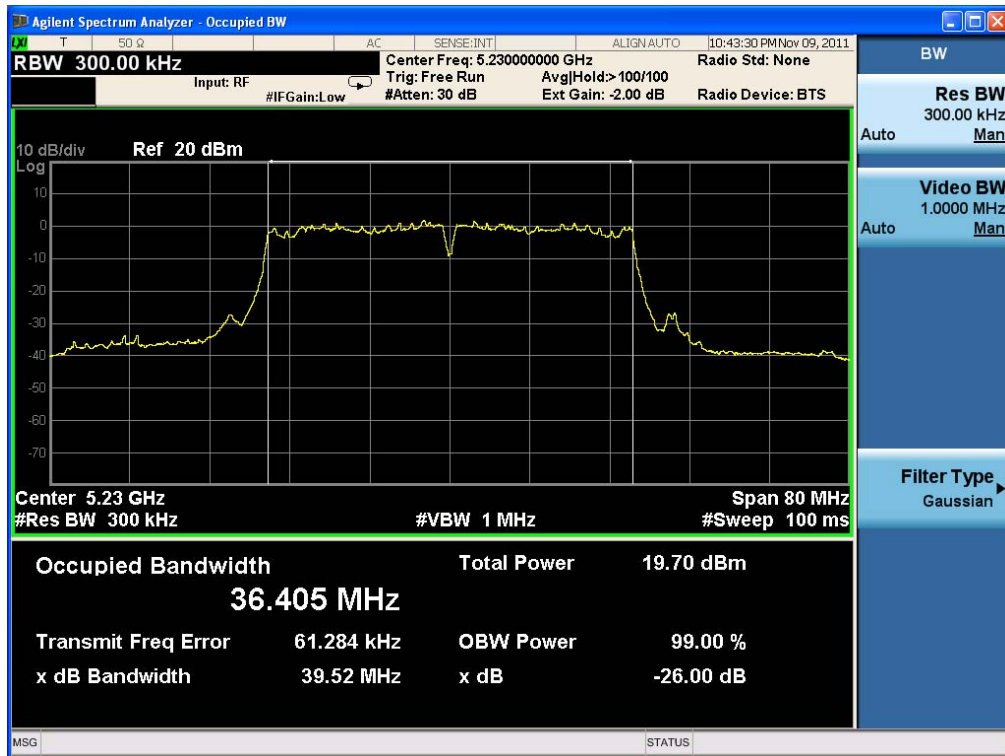
802.11n_40M(ANT 1)

Channel No.	Frequency (MHz)	26dB BW (MHz)	99 % OBW (MHz)	Required Limit (MHz)	Result
38	5190	39.52	36.40	--	NA
46	5230	39.52	36.40	--	NA

99% & 26dB Bandwidth – Channel 38



99% & 26dB Bandwidth – Channel 46

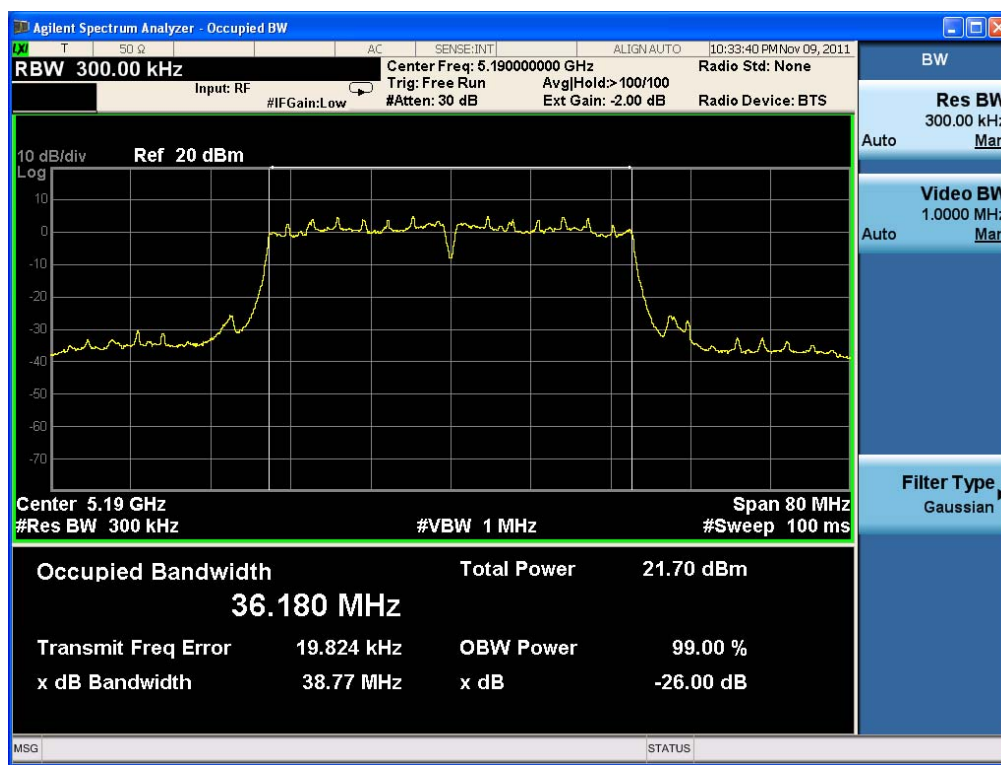


Product	Dark Knight Double 450Mbps Dual N Band Router		
Test Item	99% & 26dB Bandwidth		
Test Mode	Mode 1: Transmit		
Date of Test	2011/11/09	Test Site	SR7

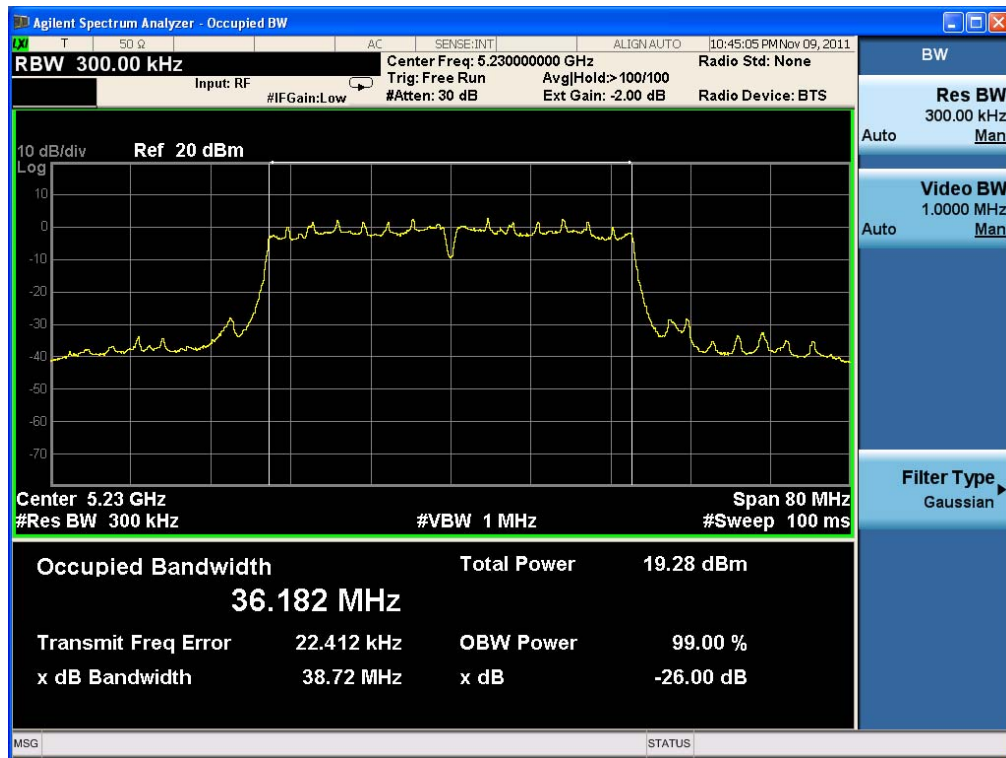
802.11n_40M(ANT 2)

Channel No.	Frequency (MHz)	26dB BW (MHz)	99 % OBW (MHz)	Required Limit (MHz)	Result
38	5190	38.77	36.18	--	NA
46	5230	38.72	36.18	--	NA

99% & 26dB Bandwidth – Channel 38



99% & 26dB Bandwidth – Channel 46



4. Peak Transmit Output

4.1. Test Equipment

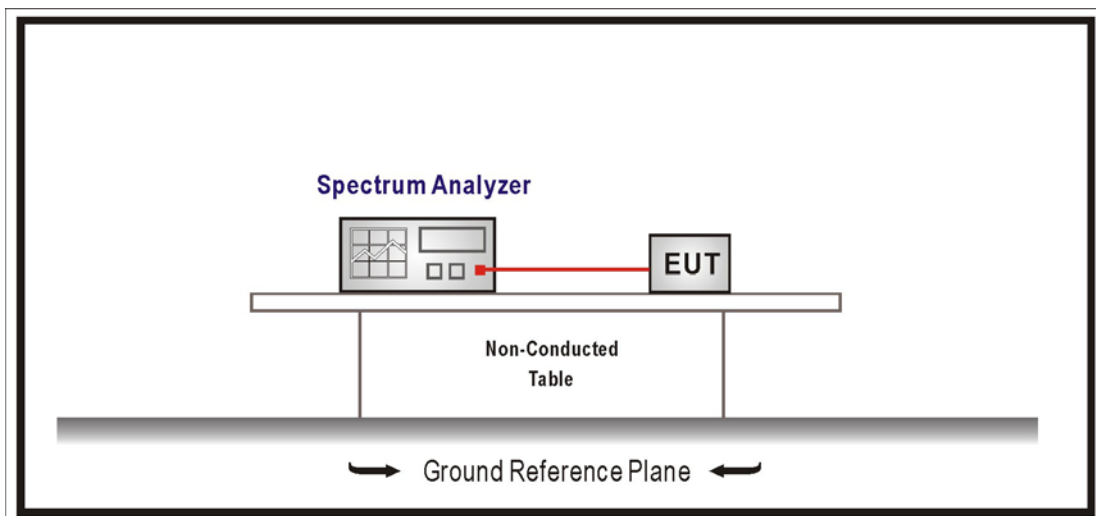
The following test equipments are used during the radiated emission tests:

Peak Transmit Output / SR7

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Spectrum Analyzer	R&S	FSP	100561	2012/01/16

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

4.2. Test Setup



4.3. Limits

1. For the band 5.15-5.25 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 50 mW or $4 \text{ dBm} + 10\log B$, where B is the 26dB emission bandwidth in MHz. If transmitting antenna of directional gain greater than 6 dBi are used, the peak transmit power shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.
2. For the band 5.25-5.35 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10\log B$, where B is the 26dB emission bandwidth in MHz. If transmitting antenna of directional gain greater than 6 dBi are used, the peak transmit power shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.
3. For the band 5.725-5.825 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 1W or $17 \text{ dBm} + 10\log B$, where B is the 26dB emission bandwidth in MHz. If transmitting antenna of directional gain greater than 6 dBi are used, the peak transmit power shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.

4.4. Test Procedure

The EUT was setup to ANSI C63.4, 2009; tested to DTS test procedure of Aug 2002 DA 02-2138 for compliance to FCC 47CFR Subpart E requirements. The Method #1 of the Peak conducted transmit output power was used.

Set RBW=1MHz, VBW=3MHz with sample detector and trace average 100 traces in power averaging mode. Set span to encompass the entire emission bandwidth (EBW) of the signal. Compute power by integrating the spectrum across the 26 dB EBW of the signal.

4.5. Uncertainty

The measurement uncertainty is defined as $\pm 1.27 \text{ dB}$

4.6. Test Result

Product	Dark Knight Double 450Mbps Dual N Band Router		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit		
Date of Test	2011/11/09	Test Site	SR7

802.11a						
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit		Result
				Fixed Limit (dBm)	4+10logB Limit (dBm)	
36	5180	27.71	16.61	≤17	≤18.42	Pass
44	5220	27.57	16.58	≤ 17	≤18.40	Pass
48	5240	27.73	16.32	≤ 17	≤18.42	Pass

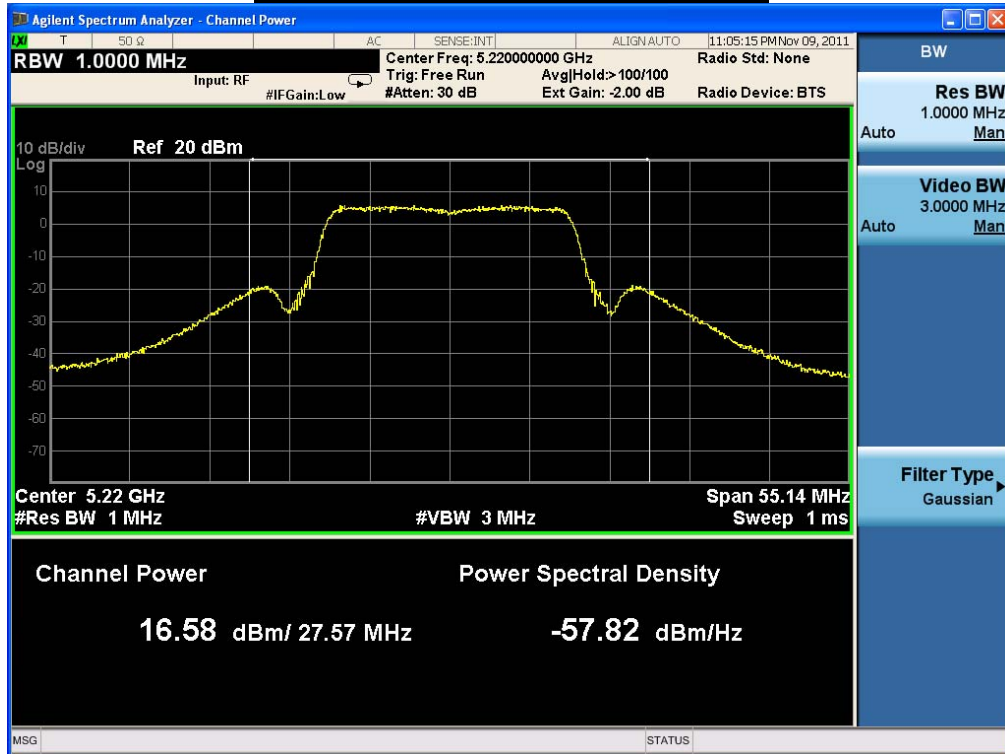
The worst emission of data rate is 6 Mbps.

Peak Power Output (dBm)									
Channel No	Frequency (MHz)	Data Rate							Required Limit
		6	12	18	24	36	48	54	
36	5180	16.61	--	--	--	--	--	--	17dBm or 4dBm+10logB
44	5220	16.58	16.54	16.51	16.48	16.42	16.37	16.35	
48	5240	16.32	--	--	--	--	--	--	

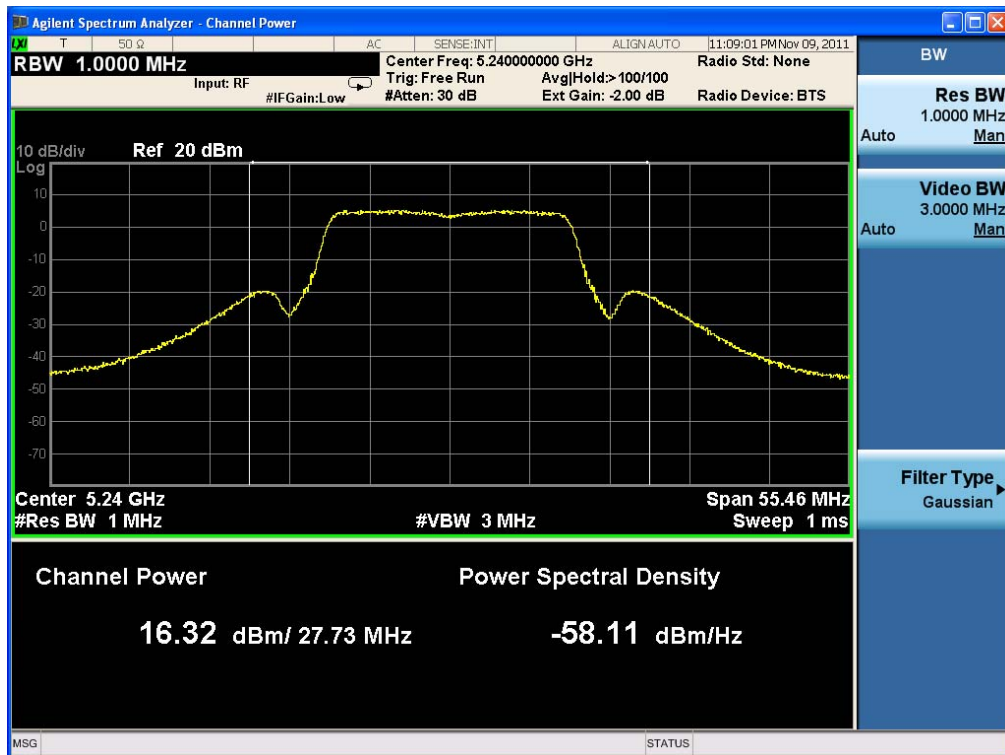
Peak transmit Power - Channel 36



Peak transmit Power - Channel 44



Peak transmit Power - Channel 48



Product	Dark Knight Double 450Mbps Dual N Band Router		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit		
Date of Test	2011/11/09	Test Site	SR7

IEEE 802.11n(20MHz)_ANT 0						
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit		Result
				Fixed Limit (dBm)	4+10logB Limit (dBm)	
36	5180	25.40	10.17	≤17	≤18.04	Pass
44	5220	26.74	10.91	≤ 17	≤18.27	Pass
48	5240	25.41	10.35	≤ 17	≤18.05	Pass

The worst emission of data rate is 19.5Mbps.

Peak Power Output (dBm)										
MCS Index		16	17	18	19	20	21	22	23	Required Limit
Channel No	Frequency (MHz)	Data Rate								
		19.5	39	58.5	78	117	156	175.5	195	
36	5180	10.17	--	--	--	--	--	--	--	17dBm or 4dBm+10logB
44	5220	10.91	10.87	10.84	10.80	10.78	10.75	10.71	10.68	
48	5240	10.35	--	--	--	--	--	--	--	

Peak transmit Power - Channel 36



Peak transmit Power - Channel 44



Peak transmit Power - Channel 48



Product	Dark Knight Double 450Mbps Dual N Band Router		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit		
Date of Test	2011/11/09	Test Site	SR7

IEEE 802.11n(20MHz)_ANT 1						
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit		Result
				Fixed Limit (dBm)	4+10logB Limit (dBm)	
36	5180	26.60	10.15	≤17	≤18.24	Pass
44	5220	27.63	10.40	≤ 17	≤18.41	Pass
48	5240	26.58	10.18	≤ 17	≤18.24	Pass

The worst emission of data rate is 19.5Mbps.

Peak Power Output (dBm)										
MCS Index		16	17	18	19	20	21	22	23	Required Limit
Channel No	Frequency (MHz)	Data Rate								
		19.5	39	58.5	78	117	156	175.5	195	
36	5180	10.15	--	--	--	--	--	--	--	17dBm or 4dBm+10logB
44	5220	10.40	10.34	10.29	10.25	10.24	10.18	10.14	10.11	
48	5240	10.18	--	--	--	--	--	--	--	

Peak transmit Power - Channel 36



Peak transmit Power - Channel 44



Peak transmit Power - Channel 48



Product	Dark Knight Double 450Mbps Dual N Band Router		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit		
Date of Test	2011/11/09	Test Site	SR7

IEEE 802.11n(20MHz)_ANT 2						
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit		Result
				Fixed Limit (dBm)	4+10logB Limit (dBm)	
36	5180	23.98	11.19	≤17	≤17.79	Pass
44	5220	26.00	10.00	≤ 17	≤18.14	Pass
48	5240	27.46	10.04	≤ 17	≤18.38	Pass

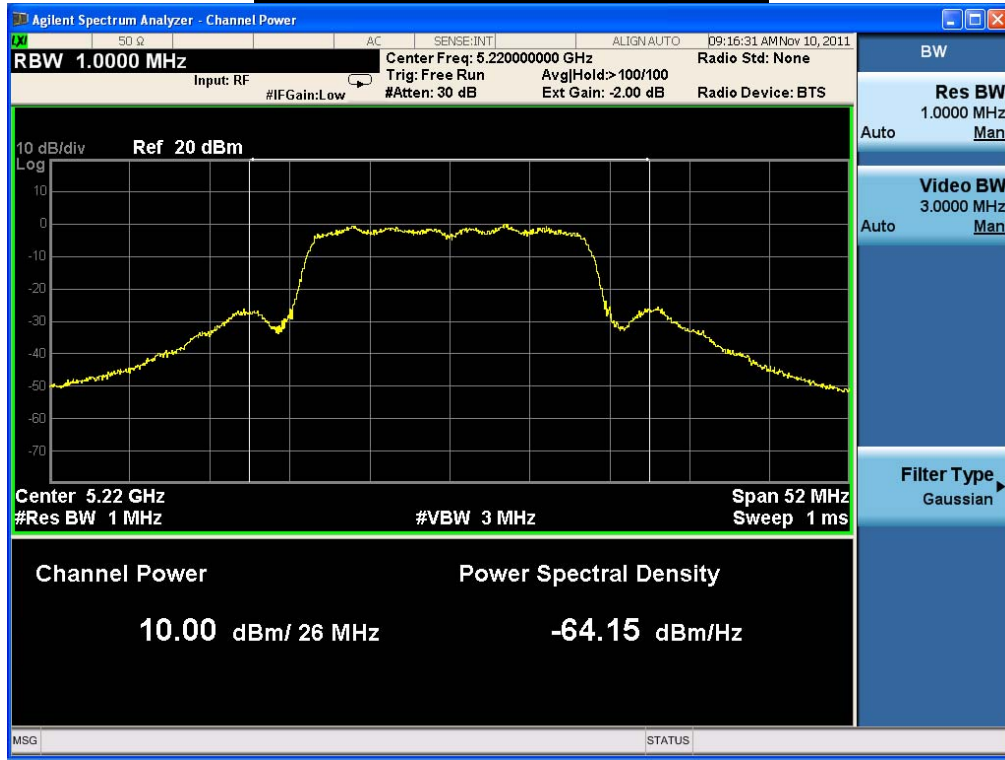
The worst emission of data rate is 19.5Mbps.

Peak Power Output (dBm)										
MCS Index		16	17	18	19	20	21	22	23	Required Limit
Channel No	Frequency (MHz)	Data Rate								
		19.5	39	58.5	78	117	156	175.5	195	
36	5180	11.19	--	--	--	--	--	--	--	17dBm or 4dBm+10logB
44	5220	10.00	9.98	9.94	9.87	9.82	9.78	9.74	9.68	
48	5240	10.04	--	--	--	--	--	--	---	

Peak transmit Power - Channel 36



Peak transmit Power - Channel 44



Peak transmit Power - Channel 48



Product	Dark Knight Double 450Mbps Dual N Band Router		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit		
Date of Test	2011/11/09	Test Site	SR7

IEEE 802.11n(20MHz)_ANT 0+1+2					
Channel No.	Frequency (MHz)	Total Output Power		Required Limit (dBm)	Result
		(mW)	(dBm)		
36	5180	33.88	15.30	≤17	Pass
44	5220	33.26	15.22	≤ 17	Pass
48	5240	31.33	14.96	≤ 17	Pass

Product	Dark Knight Double 450Mbps Dual N Band Router		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit		
Date of Test	2011/11/09	Test Site	SR7

IEEE 802.11n(40MHz)_ANT 0						
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit		Result
				Fixed Limit (dBm)	4+10logB Limit (dBm)	
38	5190	38.89	11.02	≤17	≤19.89	Pass
46	5230	38.84	10.87	≤ 17	≤19.89	Pass

The worst emission of data rate is 40.5 Mbps

Peak Power Output (dBm)										
MCS Index		8	9	10	11	12	13	14	15	Required Limit
Channel No	Frequency (MHz)	Data Rate								
		40.5	81.0	121.5	162.0	243.0	324.0	364.5	405.0	
38	5190	11.02	10.98	10.92	10.95	10.86	10.81	10.73	10.71	17dBm or
46	5230	10.87	--	--	--	--	--	--	--	4dBm+10logB

Peak transmit Power - Channel 38



Peak transmit Power - Channel 46



Product	Dark Knight Double 450Mbps Dual N Band Router		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit		
Date of Test	2011/11/09	Test Site	SR7

IEEE 802.11n(40MHz)_ANT 1						
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit		Result
				Fixed Limit (dBm)	4+10logB Limit (dBm)	
38	5190	39.52	10.19	≤17	≤19.96	Pass
46	5230	39.52	10.54	≤ 17	≤19.96	Pass

The worst emission of data rate is 40.5 Mbps

Peak Power Output (dBm)										
MCS Index		16	17	18	19	20	21	22	23	Required Limit
Channel No	Frequency (MHz)	Data Rate								
		40.5	81.0	121.5	162.0	243.0	324.0	364.5	405.0	
38	5190	10.19	10.02	9.89	9.91	9.73	9.72	9.67	9.62	17dBm or 4dBm+10logB
46	5230	10.54	--	--	--	--	--	--	--	

Peak transmit Power - Channel 38



Peak transmit Power - Channel 46



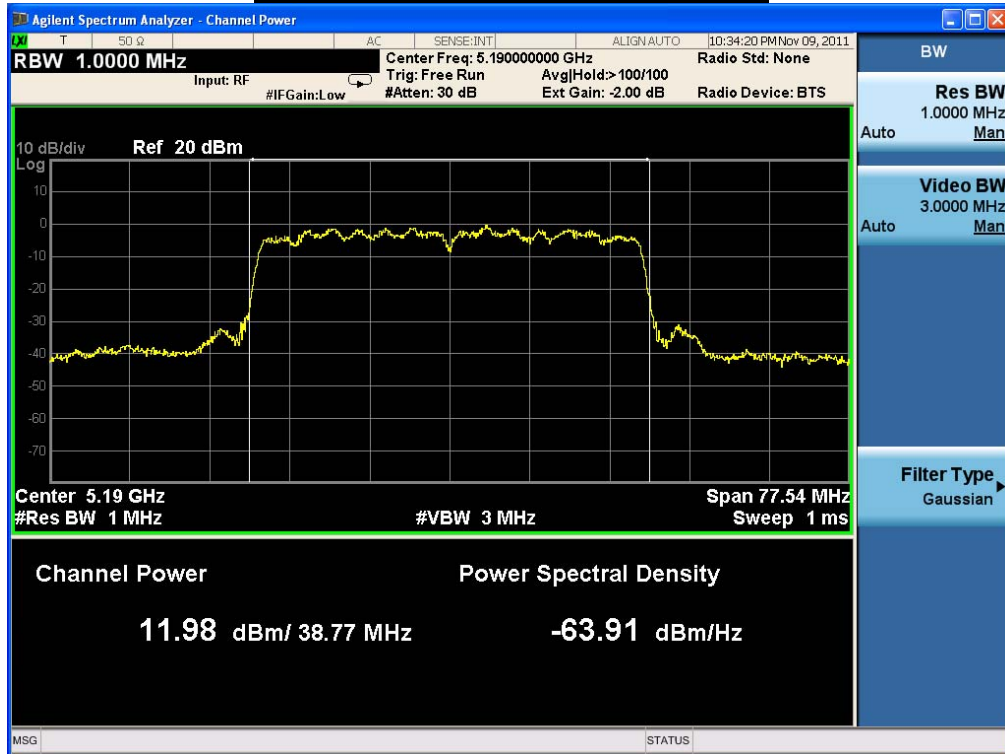
Product	Dark Knight Double 450Mbps Dual N Band Router		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit		
Date of Test	2011/11/09	Test Site	SR7

IEEE 802.11n(40MHz)_ANT 2						
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit		Result
				Fixed Limit (dBm)	4+10logB Limit (dBm)	
38	5190	38.77	11.98	≤17	≤19.88	Pass
46	5230	38.72	9.58	≤ 17	≤19.87	Pass

The worst emission of data rate is 40.5 Mbps

Peak Power Output (dBm)										
MCS Index		16	17	18	19	20	21	22	23	Required Limit
Channel No	Frequency (MHz)	Data Rate								
		40.5	81.0	121.5	162.0	243.0	324.0	364.5	405.0	
38	5190	11.98	11.94	11.87	11.82	11.76	11.74	11.69	11.66	17dBm or 4dBm+10logB
46	5230	9.58	--	--	--	--	--	--	--	

Peak transmit Power - Channel 38



Peak transmit Power - Channel 46

