FCC Test Report

Product Name ： VDSL2 Security Firewall

Model No. ： Vigor2860ac, Vigor2860Vac, Vigor2862ac, Vigor2862Vac, Vigor2925ac, Vigor2925Vac, Vigor2925Fac, Vigor2925Fvac, Vigor2860Fac, Vigor2860Fvac, VigorIPPBX2860ac, IPOffice3860ac, IPOffice2860ac, Vigor3220ac, Vigor3220Vac, Vigor3220Fac, Vigor3220Fvac, Vigor2132n-plus, Vigor2132Vn-plus, Vigor2132Fn-plus, Vigor2132FVn-plus, Vigor2132ac, Vigor2132Vac, Vigor2132Fac, Vigor2132FVac, VigorBX 2000ac, VigorBX 2000Fac

FCC ID. ： VGYV2860AC

Applicant ： DrayTek Corp.

Address ： No.26 Fu Shing Rd., HuKou County,Hsin-Chu Industrial Park,Hsin-Chu,Taiwan 303 R.O.C

Date of Receipt ： 2014/09/18

Issued Date ： 2014/11/04

Report No. ： 1490454R-RFUSP59V00

Report Version ： V1.0

TAF
Testing Laboratory
3024

Test Report Certification

Issued Date : 2014/11/04
Report No. : 1490454R-RFUSP59V00

Product Name	:	VDSL2 Security Firewall
Applicant	:	DrayTek Corp.
Address	:	No.26 Fu Shing Rd., HuKou County,Hsin-Chu Industrial Park,Hsin-Chu,Taiwan 303 R.O.C
Manufacturer	:	DrayTek Corp.
Model No.	:	Vigor2860ac, Vigor2860Vac, Vigor2862ac, Vigor2862Vac, Vigor2925ac, Vigor2925Vac, Vigor2925Fac, Vigor2925Fvac, Vigor2860Fac, Vigor2860Fvac, VigorIPPBX2860ac, IPOffice3860ac, IPOffice2860ac, Vigor3220ac, Vigor3220Vac, Vigor3220Fac, Vigor3220Fvac, Vigor2132n-plus, Vigor2132Vn-plus, Vigor2132Fn-plus, Vigor2132FVn-plus, Vigor2132ac, Vigor2132Vac, Vigor2132Fac, Vigor2132FVac, VigorBX 2000ac, VigorBX 2000Fac
FCC ID.	:	VGYV2860AC
EUT Voltage	:	AC 100-240V, 50-60Hz
Trade Name	:	DrayTek
Applicable Standard	:	FCC CFR Title 47 Part 15 Subpart E Section 15.407: 2013 ANSI C63.10:2013
Test Result	:	Complied

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.

Documented By : 

(Carol Tsai / Engineering Adm. Assistant)

Reviewed By : 

(Jimmie Liu / Senior Engineer)

Approved By : 

(Roy Wang / Director)

Laboratory Information

We, **QuieTek Corporation**, are an independent RF consultancy that was established the whole facility in our laboratories. The test facility has been accredited/accepted (audited or listed) by the following related bodies in compliance with ISO 17025 specified testing scopes:

Taiwan R.O.C.	**:**	**TAF, Accreditation Number: 3024**
USA	**:**	**FCC, Registration Number: 365520**
Canada	**:**	**IC, Submission No: 150981**

The related certificate for our laboratories about the test site and management system can be downloaded from QuieTek Corporation's Web Site: http://www.quietek.com/chinese/about/certificates.aspx?bval=5
The address and introduction of QuieTek Corporation's laboratories can be founded in our Web site : http://www.quietek.com/
If you have any comments, Please don't hesitate to contact us. Our contact information is as below:

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1. General Information

1.1. EUT Description

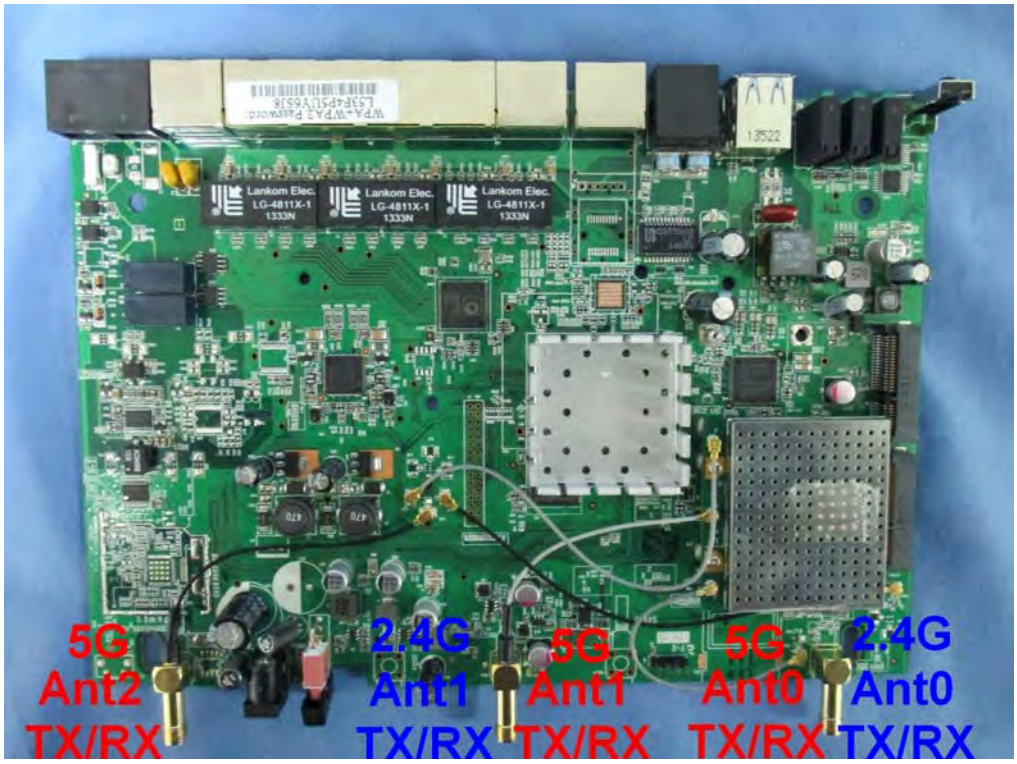
Product Name	VDSL2 Security Firewall	
Product Type	WLAN	
Trade Name	DrayTek	
Model No.	Vigor2860ac, Vigor2860Vac, Vigor2862ac, Vigor2862Vac, Vigor2925ac, Vigor2925Vac, Vigor2925Fac, Vigor2925Fvac, Vigor2860Fac, Vigor2860Fvac, VigorIPPBX2860ac, IPOffice3860ac, IPOffice2860ac, Vigor3220ac, Vigor3220Vac, Vigor3220Fac, Vigor3220Fvac, Vigor2132n-plus, Vigor2132Vn-plus, Vigor2132Fn-plus, Vigor2132FVn-plus, Vigor2132ac, Vigor2132Vac, Vigor2132Fac, Vigor2132FVac, VigorBX 2000ac, VigorBX 2000Fac	
Frequency Range/ Channel Number	IEEE 802.11a/ IEEE 802.11n/ac (20MHz)	5180~5240MHz / 4 Channels 5745~5825MHz / 5 Channels
	IEEE 802.11n/ac (40MHz)	5190~5230MHz / 2 Channels 5755~5795MHz / 2 Channels
	IEEE 802.11ac (80MHz)	5210~5210MHz / 1 Channel 5775~5775MHz / 1 Channel
Type of Modulation	IEEE 802.11a/n/ac	Orthogonal Frequency Division Multiplexing
Data Speed	IEEE 802.11a	6Mbps, 9Mbps, 12Mbps, 18Mbps, 24Mbps, 36Mbps, 48Mbps, 54Mbps
	IEEE 802.11n	Support a subset of the combination of GI, MCS 0~MCS 23 and bandwidth defined in 802.11n
	IEEE 802.11ac	Support a subset of the combination of GI, MCS 0~MCS 9 and bandwidth defined in 802.11ac
Antenna Gain	Ant0: 4.12dBi, Ant1: 4.12dBi, Ant2: 4.12dBi	
Antenna Type	Dipole Antenna	

Component	
Antenna	MAG. LAYERS, EDA-1313-25GR2-A2, 3 Pcs
LAN Cable	Non-Shielded, 3m
DSL Cable (2 to 1)	Non-Shielded, 0.13m
Analog Cable (2 to 1)	Non-Shielded, 0.15m
Power Adatper	HON-KWANG, HK-AX-120A200-US I/P : 100-240V~50/60Hz 0.8A O/P : 12V⎓2.0A Cable Out: Non-Shielded, 1.85m

ANT-TX / RX & Bandwidth

ANT-TX / RX	TX			RX		
Mode/ Channel Bandwidth	20MHz	40MHz	80MHz	20MHz	40MHz	80MHz
IEEE802.11a	✓			✓		
IEEE802.11n	✓	✓		✓	✓	
IEEE802.11ac	✓	✓	✓	✓	✓	✓

2TX / 2RX(2.4G); 3TX / 3RX(5G)



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	
								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	
								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	
								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 802.11ac Data Rate

Spatial Streams (Note1)	MCS Index	Modulation type	Coding rate	Data Rate(Mb/s)							
				20 MHz		40 MHz		80 MHz		160 MHz	
				Guard Interval		Guard Interval		Guard Interval		Guard Interval	
				800ns	400ns	800ns	400ns	800ns	400ns	800ns	400ns
1	0	BPSK	1/2	6.5	7.2	13.5	15	29.3	32.5	58.5	65
	1	QPSK	1/2	13	14.4	27	30	58.5	65	117	130
	2	QPSK	3/4	19.5	21.7	40.5	45	87.8	97.5	175.5	195
	3	16-QAM	1/2	26	28.9	54	60	117	130	234	260
	4	16-QAM	3/4	39	43.3	81	90	175.5	195	351	390
	5	64-QAM	2/3	52	57.8	108	120	234	260	468	520
	6	64-QAM	3/4	58.5	65	121.5	135	263.3	292.5	526.5	585
	7	64-QAM	5/6	65	72.2	135	150	292.5	325	585	650
	8	256-QAM	3/4	78	86.7	162	180	351	390	702	780
	9	256-QAM	5/6	N/A	N/A	180	200	390	433.3	780	866.7
2	0	BPSK	1/2	13	14.4	27	30	58.6	65	117	130
	1	QPSK	1/2	26	28.8	54	60	117	130	234	260
	2	QPSK	3/4	39	43.4	81	90	175.6	195	351	390
	3	16-QAM	1/2	52	57.8	108	120	234	260	468	520
	4	16-QAM	3/4	78	86.6	162	180	351	390	702	780
	5	64-QAM	2/3	104	115.6	216	240	468	520	936	1040
	6	64-QAM	3/4	117	130	243	270	526.6	585	1053	1170
	7	64-QAM	5/6	130	144.4	270	300	585	650	1170	1300
	8	256-QAM	3/4	156	173.4	324	360	702	780	1404	1560
	9	256-QAM	5/6	N/A	N/A	360	400	780	866.6	1560	1733.4
3	0	BPSK	1/2	19.5	21.6	40.5	45	87.9	97.5	175.5	195
	1	QPSK	1/2	39	43.2	81	90	175.5	195	351	390
	2	QPSK	3/4	58.5	65.1	121.5	135	263.4	292.5	526.5	585
	3	16-QAM	1/2	78	86.7	162	180	351	390	702	780
	4	16-QAM	3/4	117	129.9	243	270	526.5	585	1053	1170
	5	64-QAM	2/3	156	173.4	324	360	702	780	1404	1560
	6	64-QAM	3/4	175.5	195	364.5	405	789.9	877.5	1579.5	1755
	7	64-QAM	5/6	195	216.6	405	450	877.5	975	1755	1950
	8	256-QAM	3/4	234	260.1	486	540	1053	1170	2106	2340
	9	256-QAM	5/6	N/A	N/A	540	600	1170	1299.9	2340	2600.1

Table 3 – MCS parameters

IEEE 802.11a & IEEE 802.11n/ac (20MHz)

Working Frequency of Each Channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180MHz	40	5200MHz	44	5220MHz	48	5240MHz
149	5745 MHz	153	5765 MHz	157	5785 MHz	161	5805 MHz
165	5825 MHz						

IEEE 802.11n/ac (40MHz)

Working Frequency of Each Channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
38	5190MHz	46	5230MHz	151	5755MHz	159	5795MHz

IEEE 802.11ac (80MHz)

Working Frequency of Each Channel			
Channel	Frequency	Channel	Frequency
42	5210 MHz	155	5775 MHz

Note:

1. This device is a VDSL2 Security Firewall including 2.4GHz b/g/n(2x2) and 5G Band1,4 a/n/ac (3x3) transmitting and receiving function.
2. The different of the each model is shown as below:

Mode	Model-name	VDSL2 #1 (RJ11)	VDSL2 #2 (RJ11)	FXS (RJ11)	FXO (RJ11)	WLAN -1	WLAN -2	WLAN mode	WAN #1	RJ45 Port #1~6	USB 2.0 x 2
1	Vigor2860ac	V				V (2.4G)	V (5G/11ac)	3	RJ45	LAN#1~6 (RJ45)	V
2	Vigor2860Vac	V		V	V	V (2.4G)	V (5G/11ac)	3	RJ45	LAN#1~6 (RJ45)	V
3	Vigor2862ac	V	V(dual)			V (2.4G)	V (5G/11ac)	3	RJ45	LAN#1~6 (RJ45)	V
4	Vigor2862Vac	V	V(dual)	V	V	V (2.4G)	V (5G/11ac)	3	RJ45	LAN#1~6 (RJ45)	V
5	Vigor2925ac					V (2.4G)	V (5G/11ac)	3	RJ45	WAN#2/ LAN#1~5 (RJ45)	V
6	Vigor2925Vac			V	V	V (2.4G)	V (5G/11ac)	3	RJ45	WAN#2/ LAN#1~5 (RJ45)	V
7	Vigor2925Fac					V (2.4G)	V (5G/11ac)	3	SFP	WAN#2/ LAN#1~5 (RJ45)	V
8	Vigor2925FVac			V	V	V (2.4G)	V (5G/11ac)	3	SFP	WAN#2/ LAN#1~5 (RJ45)	V
9	Vigor2860Fac	V				V (2.4G)	V (5G/11ac)	3	SFP	LAN#1~6 (RJ45)	V
10	Vigor2860FVac	V		V	V	V (2.4G)	V (5G/11ac)	3	SFP	LAN#1~6 (RJ45)	V
11	VigorIPPBX2860 ac	V		V	V	V (2.4G)	V (5G/11ac)	3	RJ45	LAN#1~6 (RJ45)	V
12	IPOffice3860ac	V		V	V	V (2.4G)	V (5G)	2	RJ45	LAN#1~6 (RJ45)	V
13	IPOffice2860ac	V		V	V	V (2.4G)	V (5G)	2	RJ45	LAN#1~6 (RJ45)	V
14	Vigor3220ac					V (2.4G)	V (5G/11ac)	3	RJ45	LAN#2/ WAN#1~5 (RJ45)	V
15	Vigor3220Vac			V	V	V (2.4G)	V (5G/11ac)	3	RJ45	LAN#2/ WAN#1~5 (RJ45)	V
16	Vigor3220Fac					V (2.4G)	V (5G/11ac)	3	SFP	LAN#2/ WAN#1~5 (RJ45)	V
17	Vigor3220FVac			V	V	V (2.4G)	V (5G/11ac)	3	SFP	LAN#2/ WAN#1~5 (RJ45)	V

Mode	Model-name	VDSL2 #1 (RJ11)	VDSL2 #2 (RJ11)	FXS (RJ11)	FXO (RJ11)	WLAN -1	WLAN -2	WLAN mode	WAN #1	RJ45 Port #1~6	USB 2.0 x 2
18	Vigor2132n-plus					V (2.4G)	V (5G)	2	RJ45	WAN#2/ LAN#1~4 (RJ45)	V
19	Vigor2132Vn-plus			V	V	V (2.4G)	V (5G)	2	RJ45	WAN#2/ LAN#1~4 (RJ45)	V
20	Vigor2132Fn-plus					V (2.4G)	V (5G)	2	SFP	WAN#2/ LAN#1~4 (RJ45)	V
21	Vigor2132FVn-plus			V	V	V (2.4G)	V (5G)	2	SFP	WAN#2/ LAN#1~4 (RJ45)	V
22	Vigor2132ac					V (2.4G)	V (5G/11ac)	3	RJ45	LAN#2/ WAN#1~5 (RJ45)	V
23	Vigor2132Vac			V	V	V (2.4G)	V (5G/11ac)	3	RJ45	LAN#2/ WAN#1~5 (RJ45)	V
24	Vigor2132Fac					V (2.4G)	V (5G/11ac)	2	SFP	WAN#2/ LAN#1~4 (RJ45)	V
25	Vigor2132FVac			V	V	V (2.4G)	V (5G/11ac)	2	SFP	WAN#2/LAN#1~4 (RJ45)	V
26	VigorBX 2000ac	V		V	V	V (2.4G)	V(5G/11ac)	3	RJ45	LAN#1~6 (RJ45)	V
27	VigorBX 2000Fac	V		V	V	V (2.4G)	V(5G/11ac)	3	SFP	LAN#1~6 (RJ45)	V

3. These test results on a sample of the device are for the purpose of demonstrating Compliance with Part 15 Subpart E Paragraph 15.407.
4. 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.
5. The function of the 2.4GHz transmitting is measured and makes a test report of the report number: 1490454R-RFUSP27V00.
6. This device has USB and Ethernet ports, which can be connected to computer. The receiving function receiving was tested and its test report number is 1490454R-RFUSP01V00 under Declaration of Conformity.

1.2. 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 (CDD Mode)

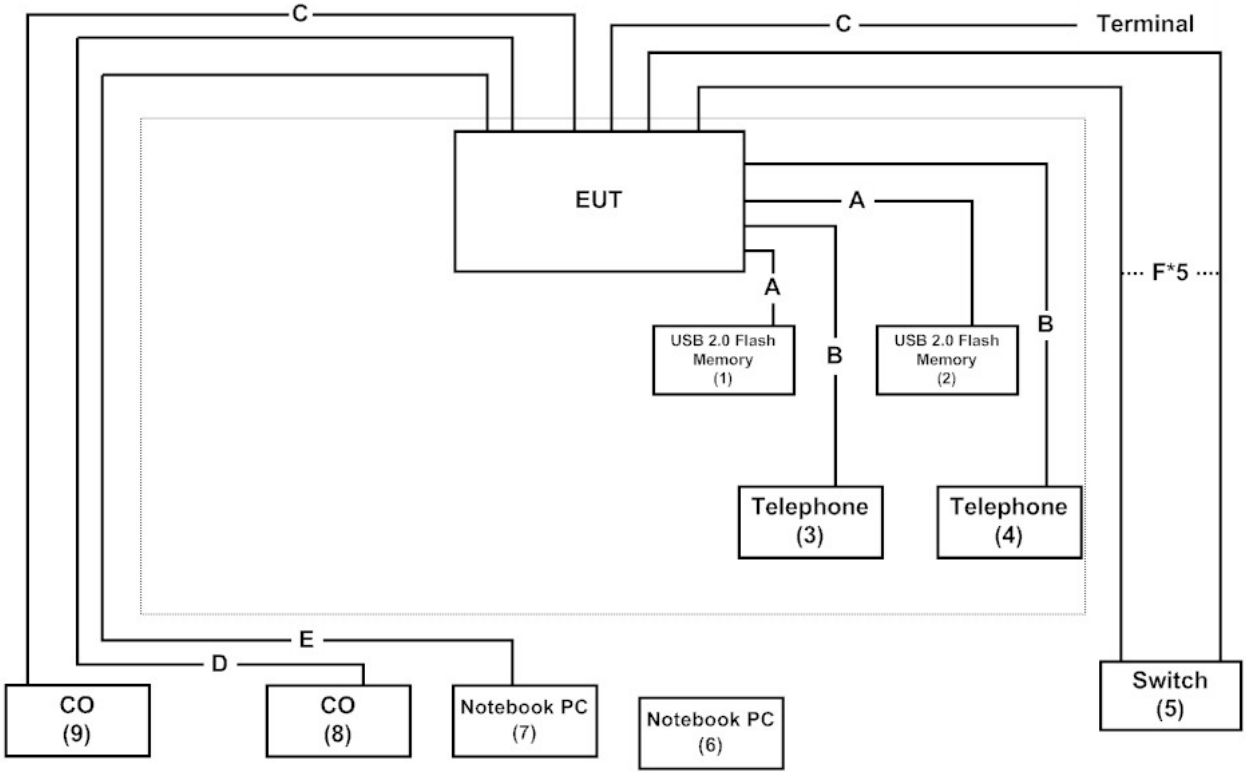
Test Items	Modulation	Channel	Antenna	Result
Conducted Emission	11ac (80MHz)	42/155	0+1+2	Complies
99 % & 26dB Bandwidth	11a	36/44/48/149/157/165	0/1/2	Complies
	11n/ac (20MHz)	36/44/48/149/157/ 165	0/1/2	Complies
	11n/ac (40MHz)	38/46//151/159	0/1/2	Complies
	11ac (80MHz)	42/155	0/1/2	Complies
Peak Transmit Output	11a	36/44/48/149/157/165	0+1+2	Complies
	11n/ac (20MHz)	36/44/48/149/157/ 165	0+1+2	Complies
	11n/ac (40MHz)	38/46/151/159	0+1+2	Complies
	11ac (80MHz)	42/155	0+1+2	Complies
Peak Power Spectrum Density	11a	36/44/48/149/157/165	0+1+2	Complies
	11n/ac (20MHz)	36/44/48/149/157/165	0+1+2	Complies
	11n/ac (40MHz)	38/46/151/159	0+1+2	Complies
	11ac (80MHz)	42/155	0+1+2	Complies
Radiated Emission	11a	36/44/48/149/157/165	0+1+2	Complies
	11n/ac (20MHz)	36/44/48/149/157/165	0+1+2	Complies
	11n/ac (40MHz)	38/46/151/159	0+1+2	Complies
	11ac (80MHz)	42/155	0+1+2	Complies
Band Edge	11a	36/149/165	0+1+2	Complies
	11n/ac (20MHz)	36/149/165	0+1+2	Complies
	11n/ac (40MHz)	38/151/159	0+1+2	Complies
	11ac (80MHz)	42/155	0+1+2	Complies
Frequency Stability	11a	36/44/48/149/165	0/1/2	Complies
	11n/ac (20MHz)	36/44/48/149/165	0/1/2	Complies
	11n/ac (40MHz)	38/46/151/159	0/1/2	Complies
	11ac (80MHz)	42/155	0/1/2	Complies

1.3. 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	Apacer	AH223	N/A	DoC	--
2	USB 2.0 Flash Memory	Apacer	AH223	N/A	DoC	--
3	Telephone	TENTEL	K-302	41230008000356	DoC	--
4	Telephone	TENTEL	K-302	50721005000518	DoC	--
5	Switch	D-Link	DGS1216T	F360298000042	DoC	Non-Shielded, 1.8m
6	Notebook PC	ACER	PAV70	LUSEW0D0371105FE221601	DoC	Non-Shielded, 2.5m one ferrite core bonded
7	Notebook PC	HP	HSTNN-146C	CNU8253S1X	DoC	Non-Shielded, 1.8m
8	CO	DrayTek	Vigor2750	N/A	DoC	--
9	CO	DrayTek	Vigor 3900	N/A	DoC	--

1.4. Configuration of tested System

Connection Diagram


Signal Cable Type		Signal cable Description
A	USB 2.0 Flash Memory Cable	Shielded, 1m, 2 Pcs
B	Telephone Cable	Non-Shielded, 1.5m, 2 Pcs
C	DSL Cable	Non-Shielded, 10m, 2 Pcs
D	LAN Cable	Non-Shielded, 10m
E	LAN Cable	Non-Shielded, 3m
F	LAN Cable	Non-Shielded, 10m, 5 Pcs

1.5. EUT Exercise Software

1	Setup the EUT as shown in Section 1.4.
2	Execute the Telnet command 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.

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Test Item	Required (IEC 68-1)	Actual
Temperature (°C)	FCC PART 15 E 15.407 Conducted Emission	15 - 35	20
Humidity (%RH)		25 - 75	50
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 E 15.407 99 % & 26dB Bandwidth	15 - 35	25
Humidity (%RH)		25 - 75	45
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 E 15.407 Peak Transmit Power	15 - 35	25
Humidity (%RH)		25 - 75	65
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 E 15.407 Peak Power Spectrum Density	15 - 35	25
Humidity (%RH)		25 - 75	45
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 E 15.407 Radiated Emission	15 - 35	25
Humidity (%RH)		25 - 75	48
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 E 15.407 Band Edge	15 - 35	25
Humidity (%RH)		25 - 75	45
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 E 15.407 Frequency Stability	15 - 35	25
Humidity (%RH)		25 - 75	45
Barometric pressure (mbar)		860 - 1060	950-1000

2. Conducted Emission

2.1. Test Equipment

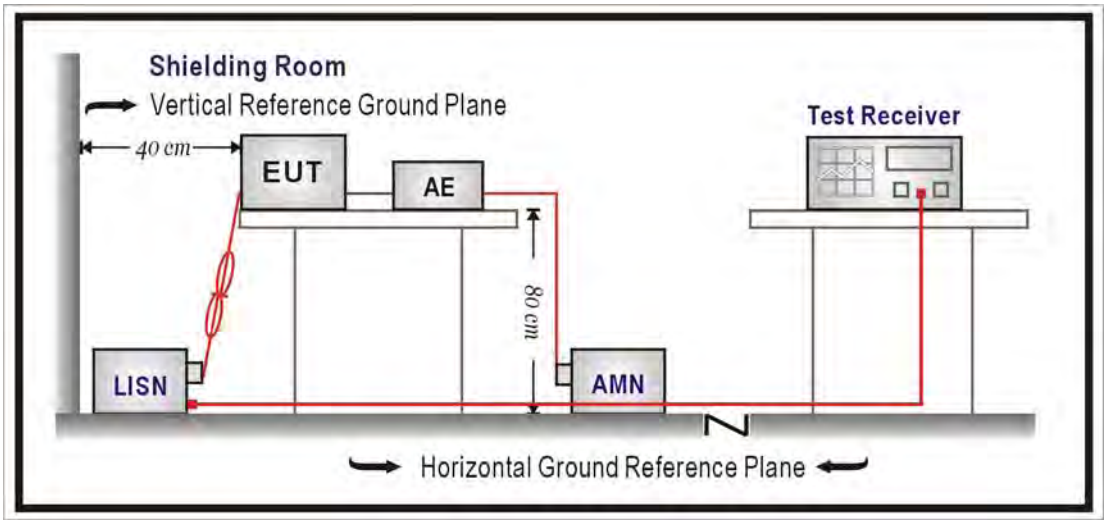
The following test equipments are used during the test:

Conducted Emission / SR2

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Artificial Mains Network	R&S	ENV4200	848411/010	2015/02/09
LISN	R&S	ENV216	100092	2015/08/08
Test Receiver	R&S	ESCS 30	825442/014	2015/07/13

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 C63.10:2013. 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

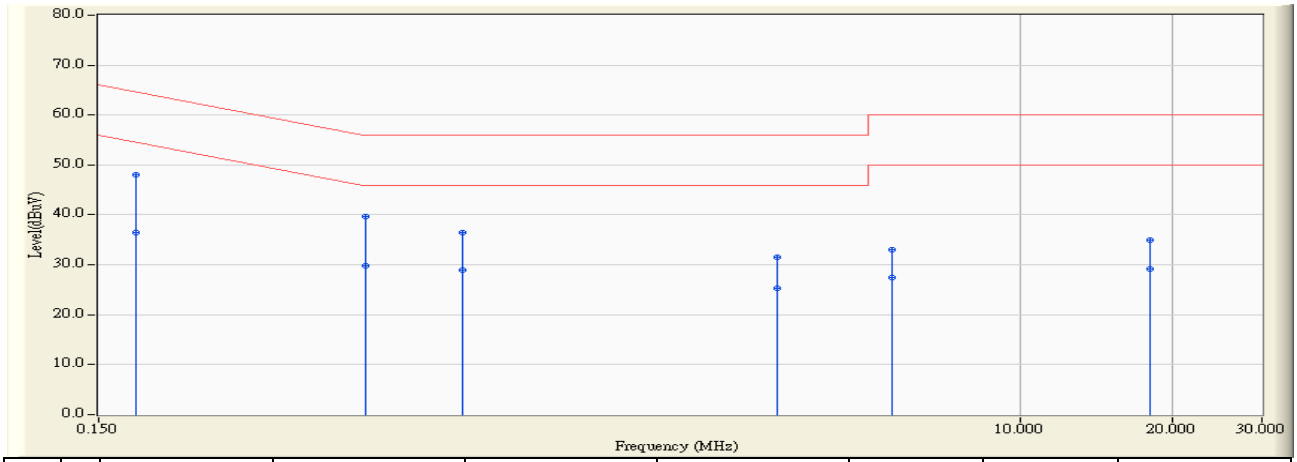
According to FCC Part 15 Subpart C Paragraph 15.207: 2013

2.6. Uncertainty

The measurement uncertainty is defined as ± 2.26 dB.

2.7. Test Result

Site : SR2	**Time : 2014/10/27 - 09:57**
Limit : CISPR_B_00M_QP	**Margin : 10**
Probe : SR2_LISN(16A)-4_0825 - Line1	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : 802.11ac(80M) 5210 MHz**

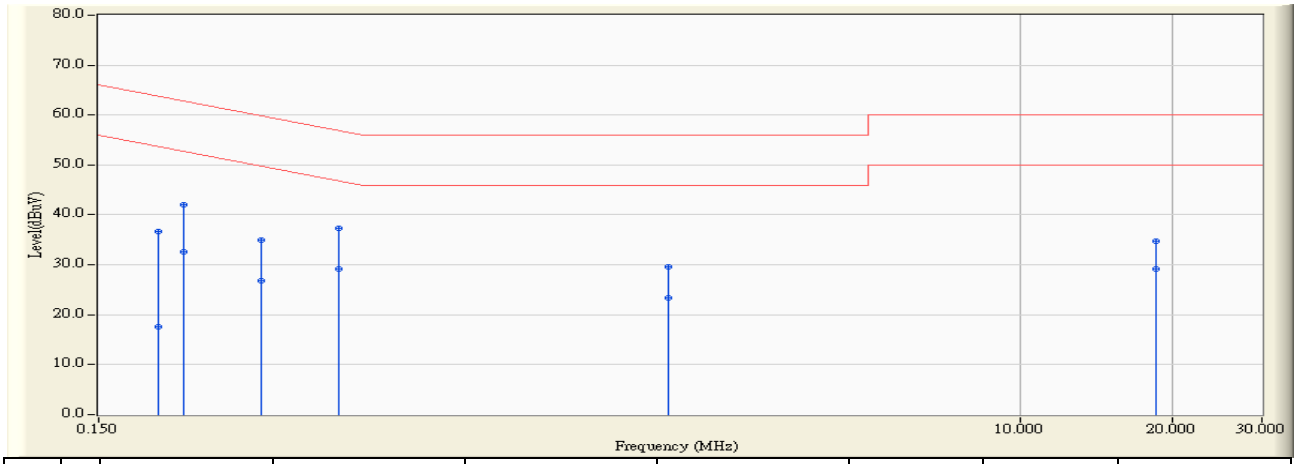


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.177	9.760	38.220	47.980	-16.629	64.609	QUASIPEAK
2		0.177	9.760	26.750	36.510	-18.099	54.609	AVERAGE
3		0.505	9.753	29.930	39.683	-16.317	56.000	QUASIPEAK
4	*	0.505	9.753	20.090	29.843	-16.157	46.000	AVERAGE
5		0.787	9.785	26.770	36.555	-19.445	56.000	QUASIPEAK
6		0.787	9.785	19.200	28.985	-17.015	46.000	AVERAGE
7		3.291	9.882	21.710	31.592	-24.408	56.000	QUASIPEAK
8		3.291	9.882	15.500	25.382	-20.618	46.000	AVERAGE
9		5.552	9.983	22.940	32.923	-27.077	60.000	QUASIPEAK
10		5.552	9.983	17.390	27.373	-22.627	50.000	AVERAGE
11		18.005	10.266	24.590	34.856	-25.144	60.000	QUASIPEAK
12		18.005	10.266	18.910	29.176	-20.824	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 : SR2	**Time : 2014/10/27 - 10:03**
Limit : CISPR_B_00M_QP	**Margin : 10**
Probe : SR2_LISN(16A)-4_0825 - Line2	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : 802.11ac(80M) 5210 MHz**

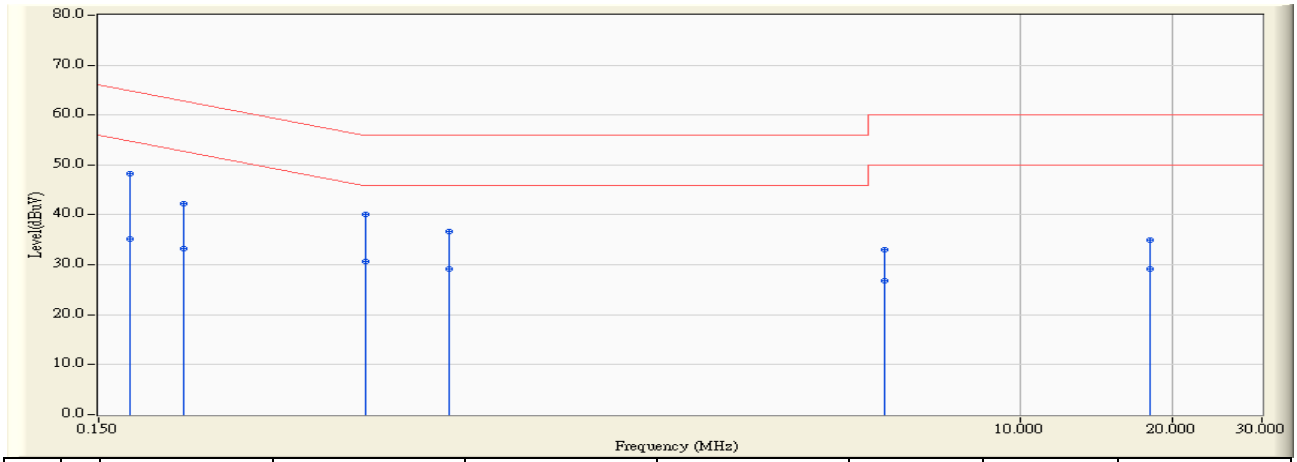


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.197	9.810	26.840	36.650	-27.091	63.741	QUASIPEAK
2		0.197	9.810	7.830	17.640	-36.101	53.741	AVERAGE
3		0.220	9.811	32.130	41.941	-20.866	62.807	QUASIPEAK
4		0.220	9.811	22.790	32.601	-20.206	52.807	AVERAGE
5		0.314	9.816	25.220	35.036	-24.827	59.862	QUASIPEAK
6		0.314	9.816	16.980	26.796	-23.067	49.862	AVERAGE
7		0.447	9.820	27.470	37.290	-19.643	56.933	QUASIPEAK
8	*	0.447	9.820	19.320	29.140	-17.793	46.933	AVERAGE
9		2.013	9.881	19.760	29.641	-26.359	56.000	QUASIPEAK
10		2.013	9.881	13.440	23.321	-22.679	46.000	AVERAGE
11		18.572	10.457	24.380	34.837	-25.163	60.000	QUASIPEAK
12		18.572	10.457	18.640	29.097	-20.903	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 : SR2	**Time : 2014/10/27 - 10:18**
Limit : CISPR_B_00M_QP	**Margin : 10**
Probe : SR2_LISN(16A)-4_0825 - Line1	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : 802.11ac(80M) 5775 MHz**

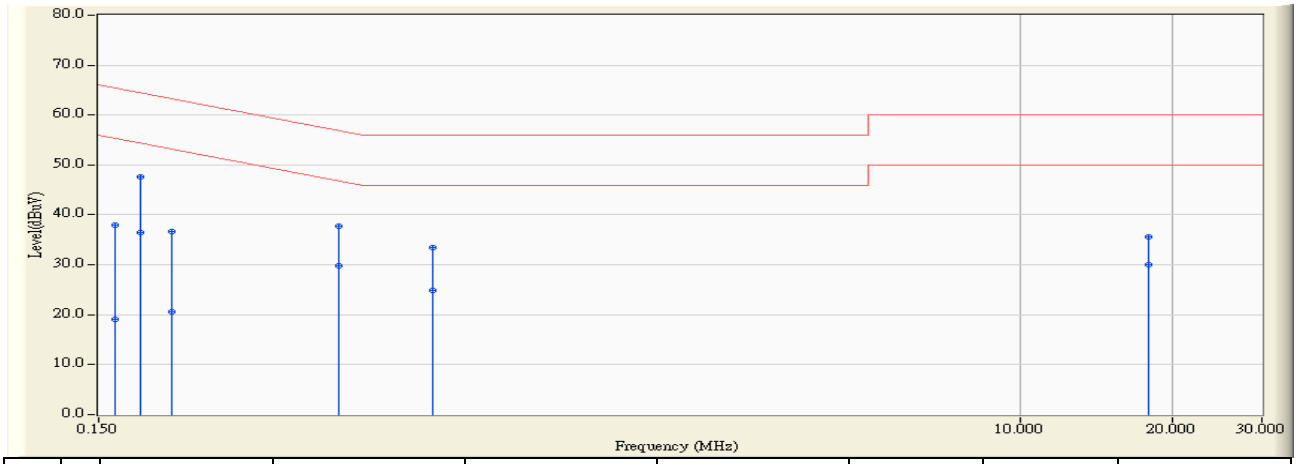


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.173	9.760	38.400	48.160	-16.634	64.794	QUASIPEAK
2		0.173	9.760	25.430	35.190	-19.604	54.794	AVERAGE
3		0.220	9.759	32.400	42.159	-20.648	62.807	QUASIPEAK
4		0.220	9.759	23.590	33.349	-19.458	52.807	AVERAGE
5		0.505	9.753	30.410	40.163	-15.837	56.000	QUASIPEAK
6	*	0.505	9.753	20.870	30.623	-15.377	46.000	AVERAGE
7		0.740	9.780	26.810	36.590	-19.410	56.000	QUASIPEAK
8		0.740	9.780	19.450	29.230	-16.770	46.000	AVERAGE
9		5.388	9.979	23.070	33.049	-26.951	60.000	QUASIPEAK
10		5.388	9.979	16.740	26.719	-23.281	50.000	AVERAGE
11		17.994	10.266	24.610	34.876	-25.124	60.000	QUASIPEAK
12		17.994	10.266	18.910	29.176	-20.824	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 : SR2	**Time : 2014/10/27 - 10:10**
Limit : CISPR_B_00M_QP	**Margin : 10**
Probe : SR2_LISN(16A)-4_0825 - Line2	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : 802.11ac(80M) 5775 MHz**



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.162	9.810	28.060	37.870	-27.505	65.375	QUASIPEAK
2		0.162	9.810	9.330	19.140	-36.235	55.375	AVERAGE
3	*	0.181	9.810	37.880	47.690	-16.738	64.428	QUASIPEAK
4		0.181	9.810	26.750	36.560	-17.868	54.428	AVERAGE
5		0.209	9.811	26.800	36.611	-26.651	63.261	QUASIPEAK
6		0.209	9.811	10.680	20.491	-32.771	53.261	AVERAGE
7		0.447	9.820	27.950	37.770	-19.163	56.933	QUASIPEAK
8		0.447	9.820	20.000	29.820	-17.113	46.933	AVERAGE
9		0.685	9.839	23.640	33.479	-22.521	56.000	QUASIPEAK
10		0.685	9.839	15.120	24.959	-21.041	46.000	AVERAGE
11		17.935	10.433	25.270	35.704	-24.296	60.000	QUASIPEAK
12		17.935	10.433	19.670	30.104	-19.896	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 & DTS Bandwidth

3.1. Test Equipment

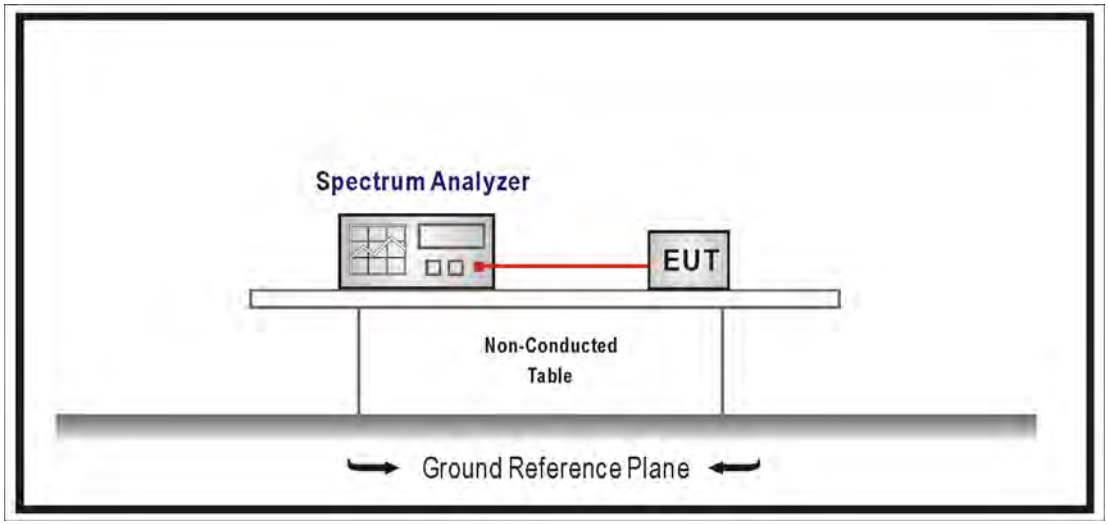
The following test equipments are used during the radiated emission tests:

99% & 26dB & DTS Bandwidth / SR7

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Spectrum Analyzer	Agilent	N9010A-EXA	US47140172	2015/07/14

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

3.2. Test Setup



3.3. Limits

99% & 26dB Bandwidth : No Required
DTS Bandwidth : ≧500KHz

3.4. Test Procedure

99% & 26dB Bandwidth :
The EUT was tested according to U-NII test procedure of KDB 789033.
Set RBW 1% of the emission bandwidth, VBW equal to 3 times the RBW.
DTS Bandwidth :
Set RBW = 100KHz, VBW≧3xRBW, Sweep time=Auto, Set Peak detector.

3.5. Uncertainty

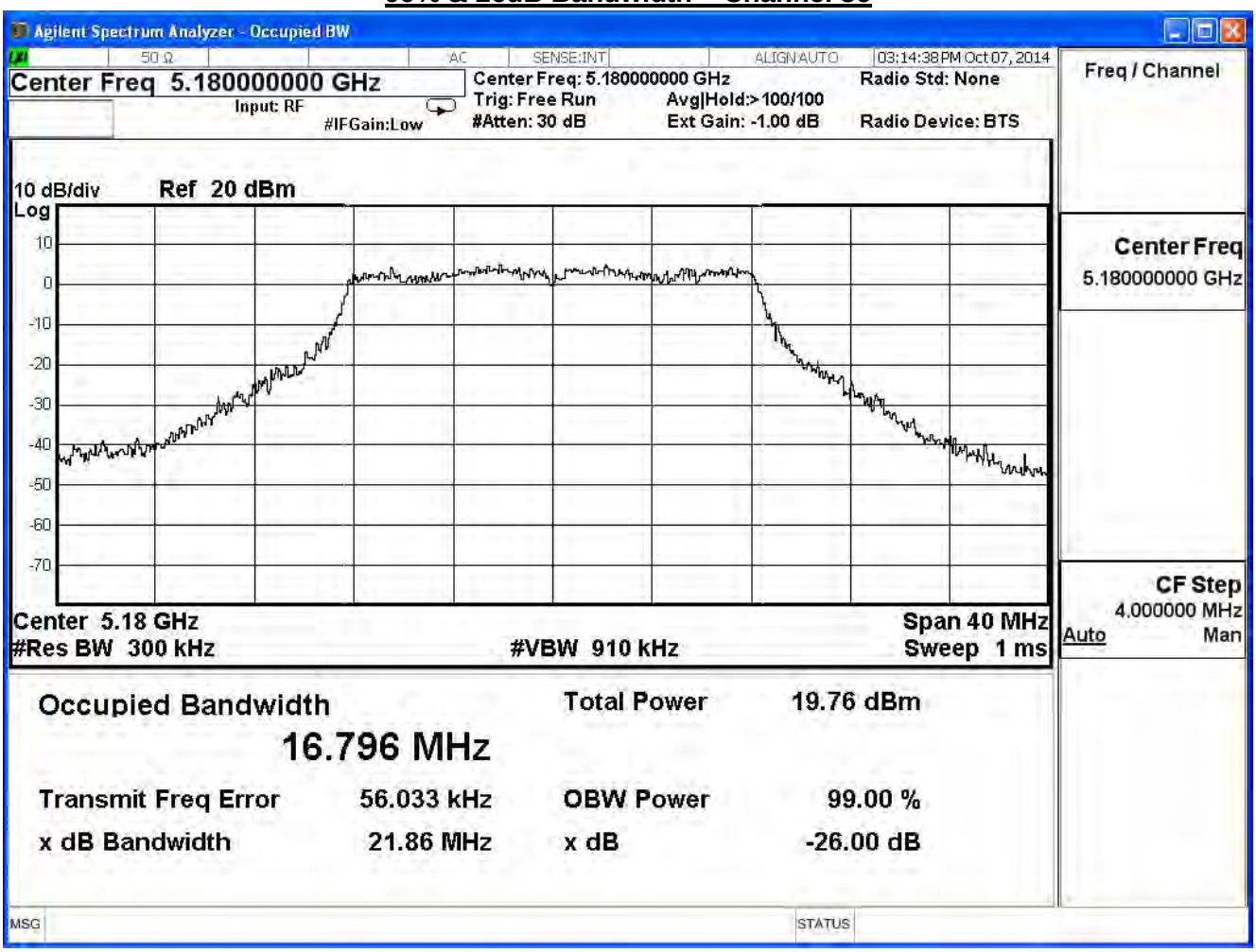
The measurement uncertainty is defined as ±150Hz

3.6. Test Result

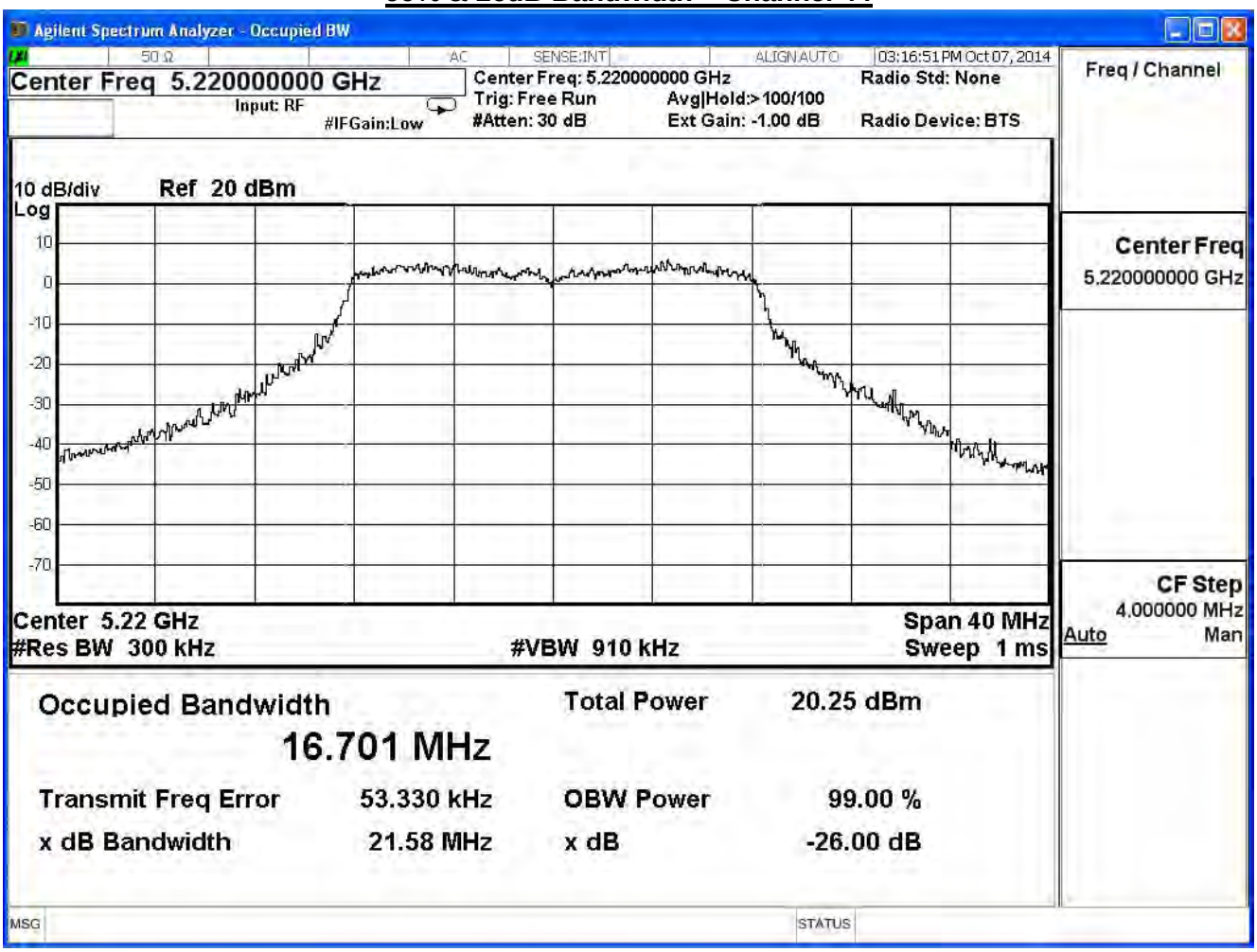
Product	VDSL2 Security Firewall		
Test Item	99% & 26dB Bandwidth		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/07	Test Site	SR7

802.11a (ANT 0)					
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (MHz)	Result
36	5180	21.860	16.796	--	Pass
44	5220	21.580	16.701	--	Pass
48	5240	22.070	16.757	--	Pass

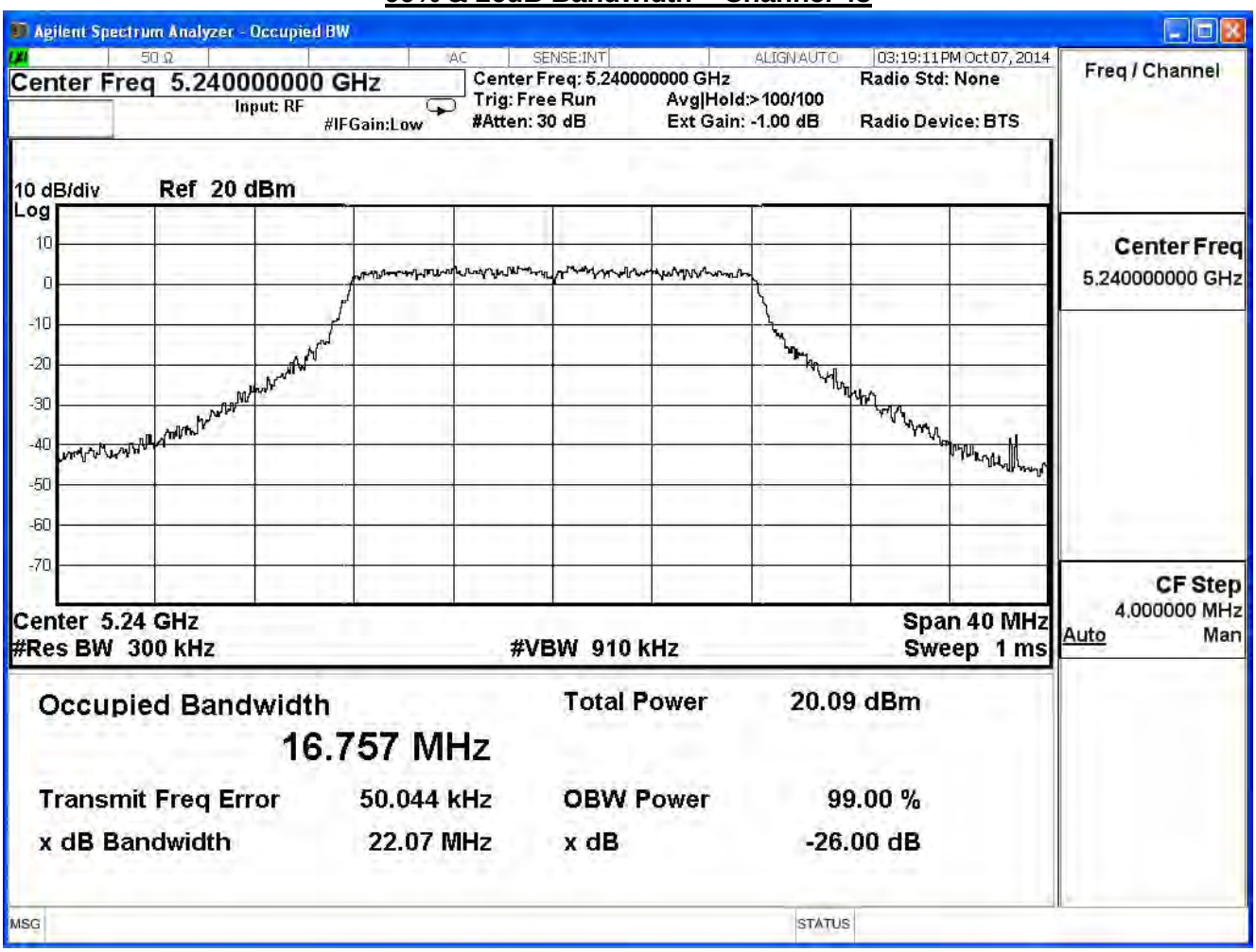
99% & 26dB Bandwidth – Channel 36



99% & 26dB Bandwidth – Channel 44



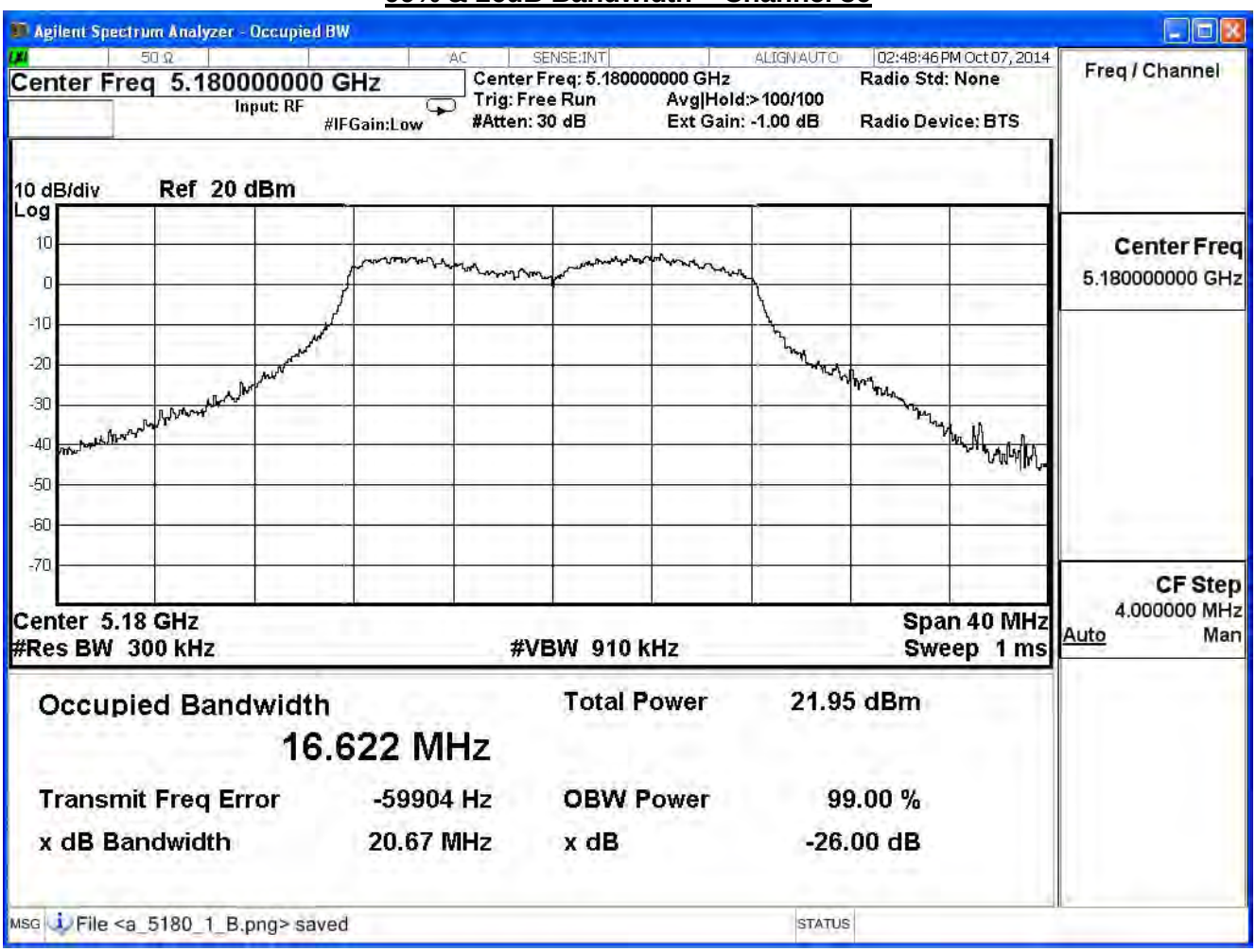
99% & 26dB Bandwidth – Channel 48



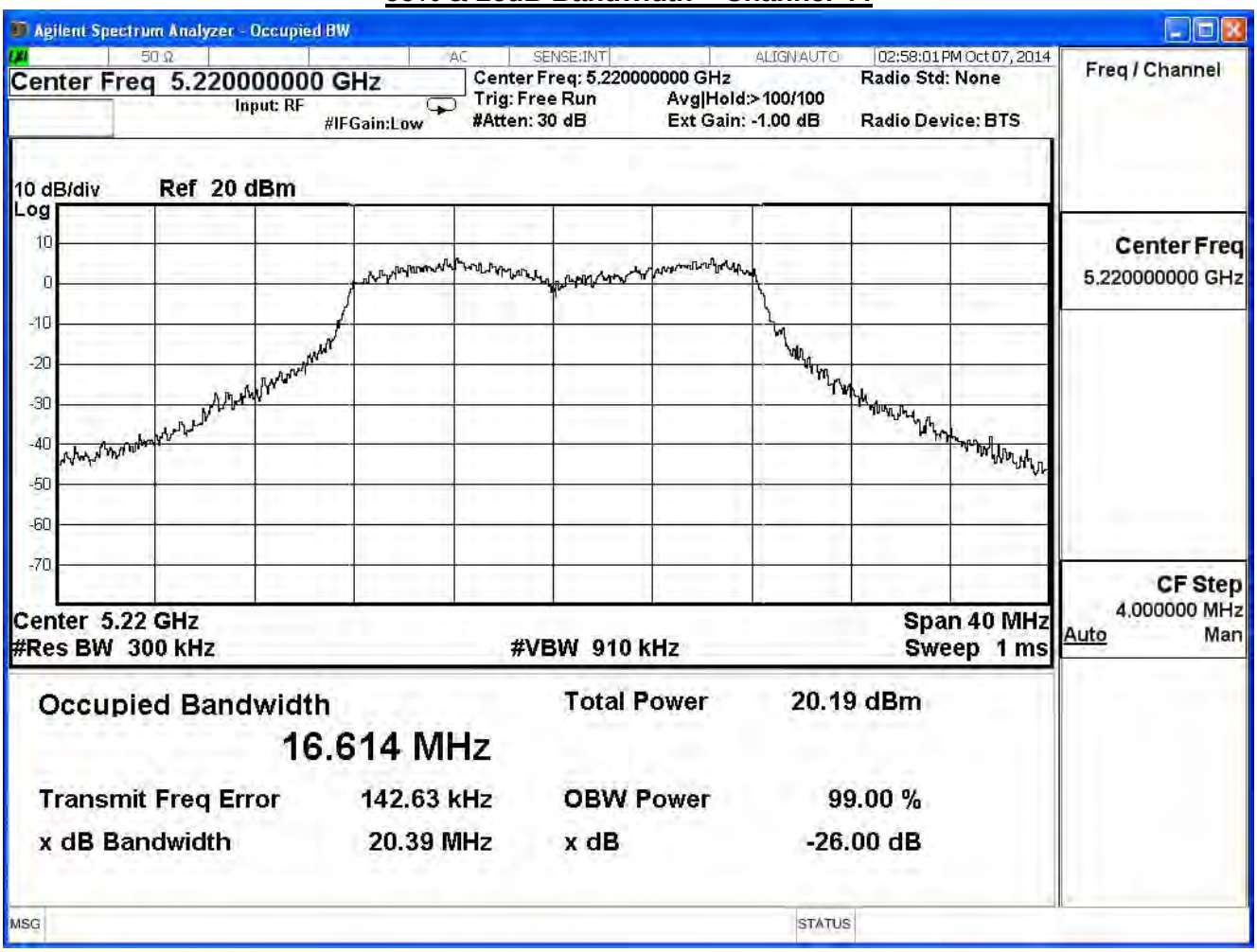
Product	VDSL2 Security Firewall		
Test Item	99% & 26dB Bandwidth		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/07	Test Site	SR7

802.11a (ANT 1)					
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (MHz)	Result
36	5180	20.670	16.622	--	Pass
44	5220	20.390	16.614	--	Pass
48	5240	21.610	16.781	--	Pass

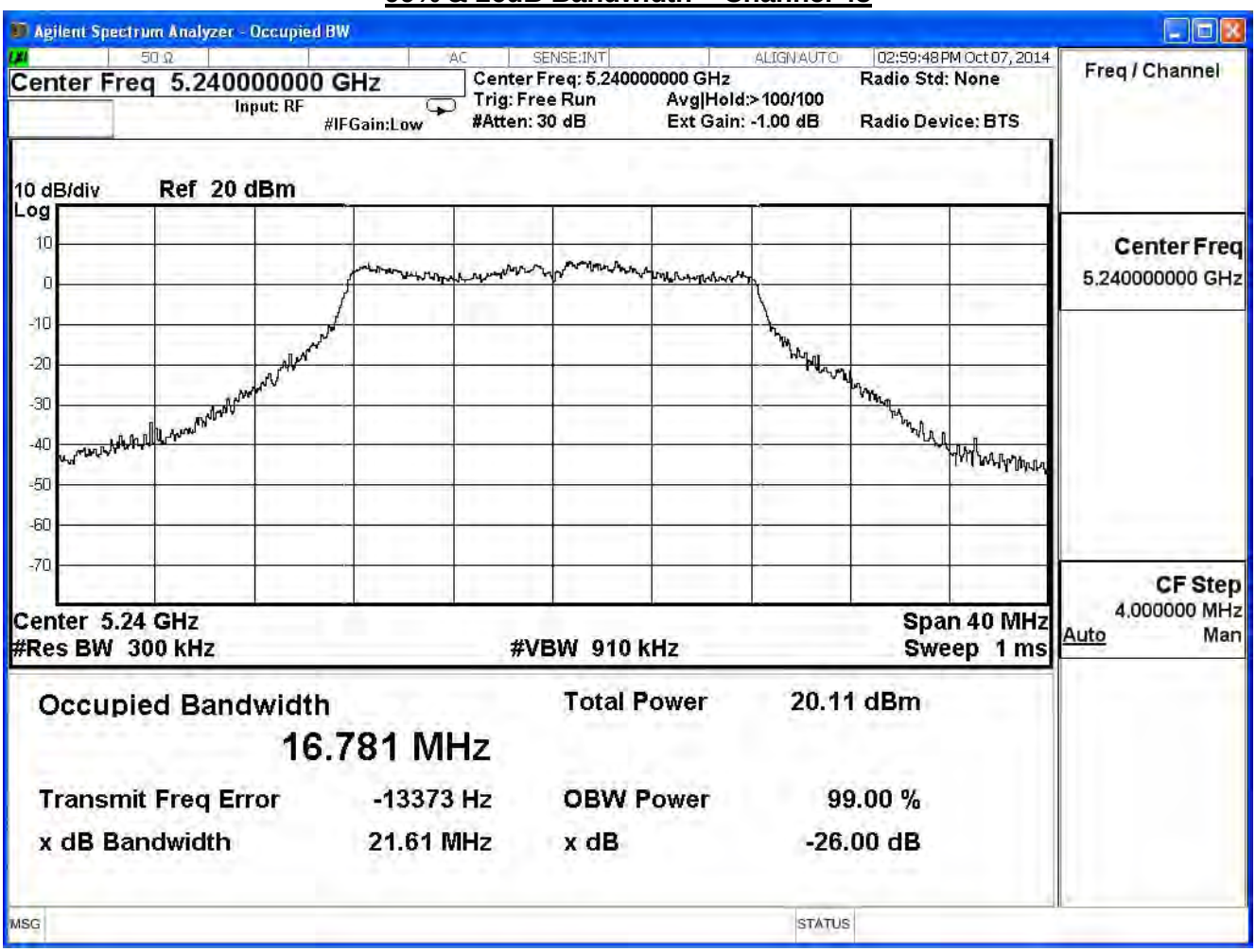
99% & 26dB Bandwidth – Channel 36



99% & 26dB Bandwidth – Channel 44



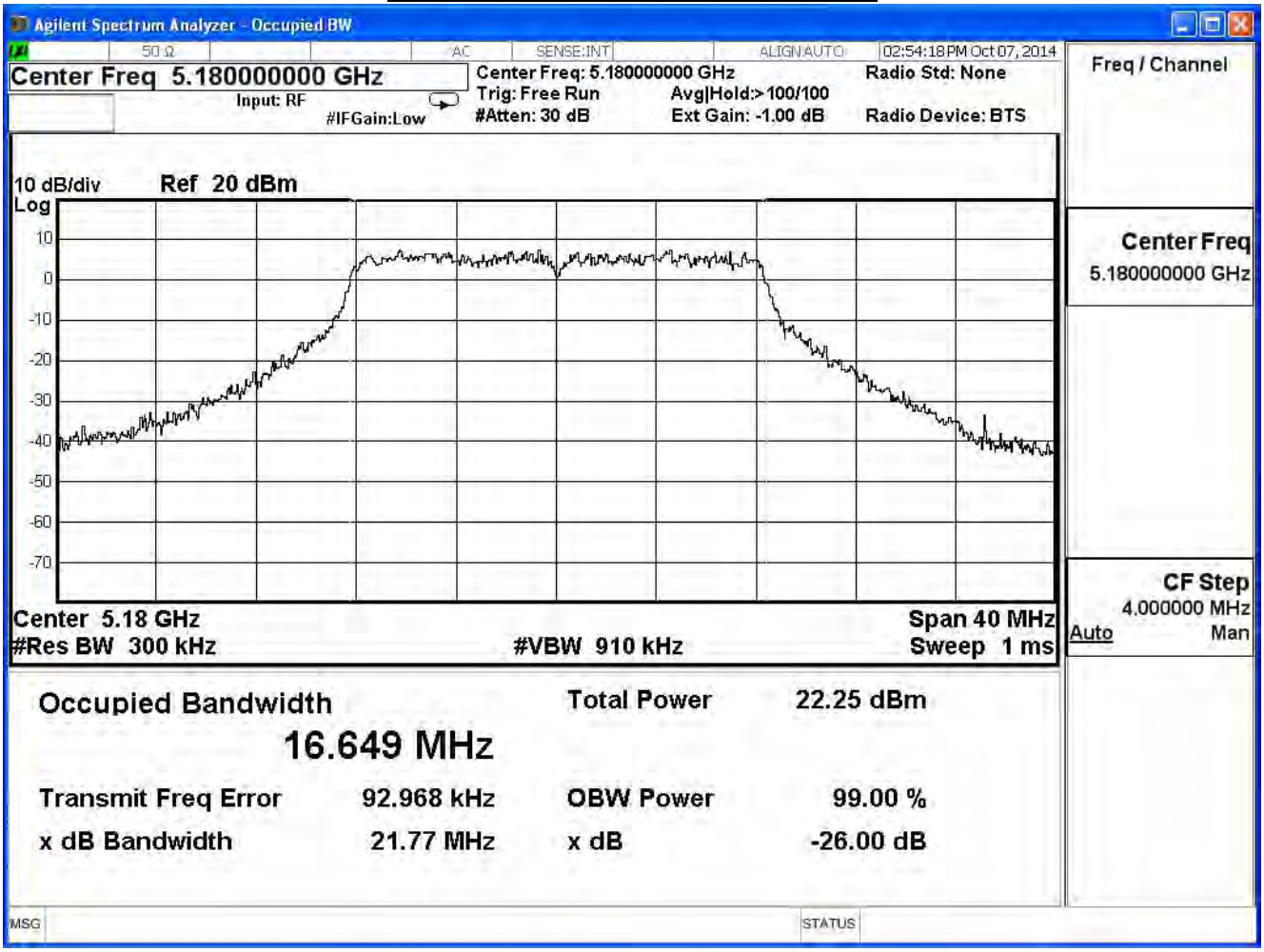
99% & 26dB Bandwidth – Channel 48



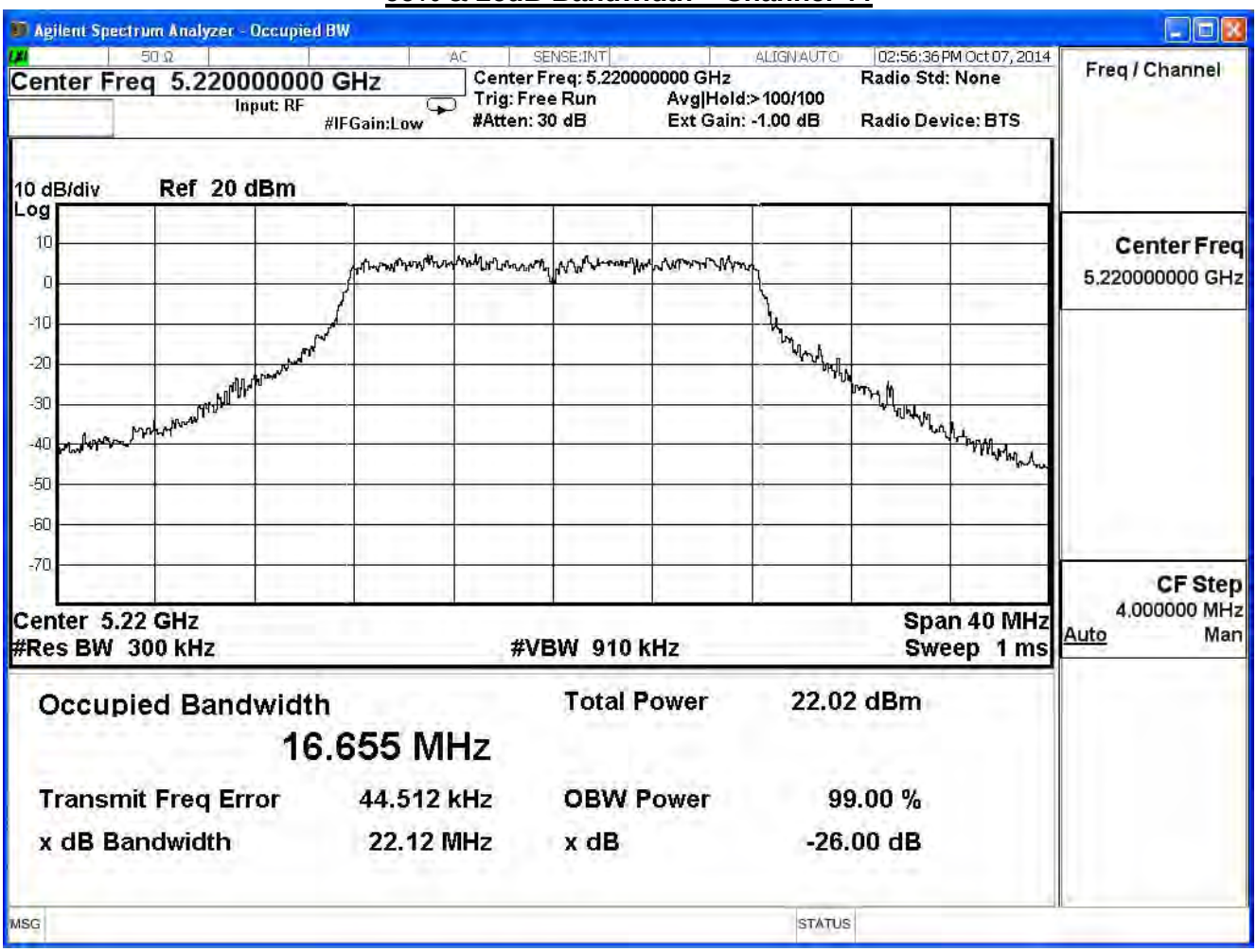
Product	VDSL2 Security Firewall		
Test Item	99% & 26dB Bandwidth		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/07	Test Site	SR7

802.11a (ANT 2)					
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (MHz)	Result
36	5180	21.770	16.649	--	Pass
44	5220	22.120	16.655	--	Pass
48	5240	21.460	16.636	--	Pass

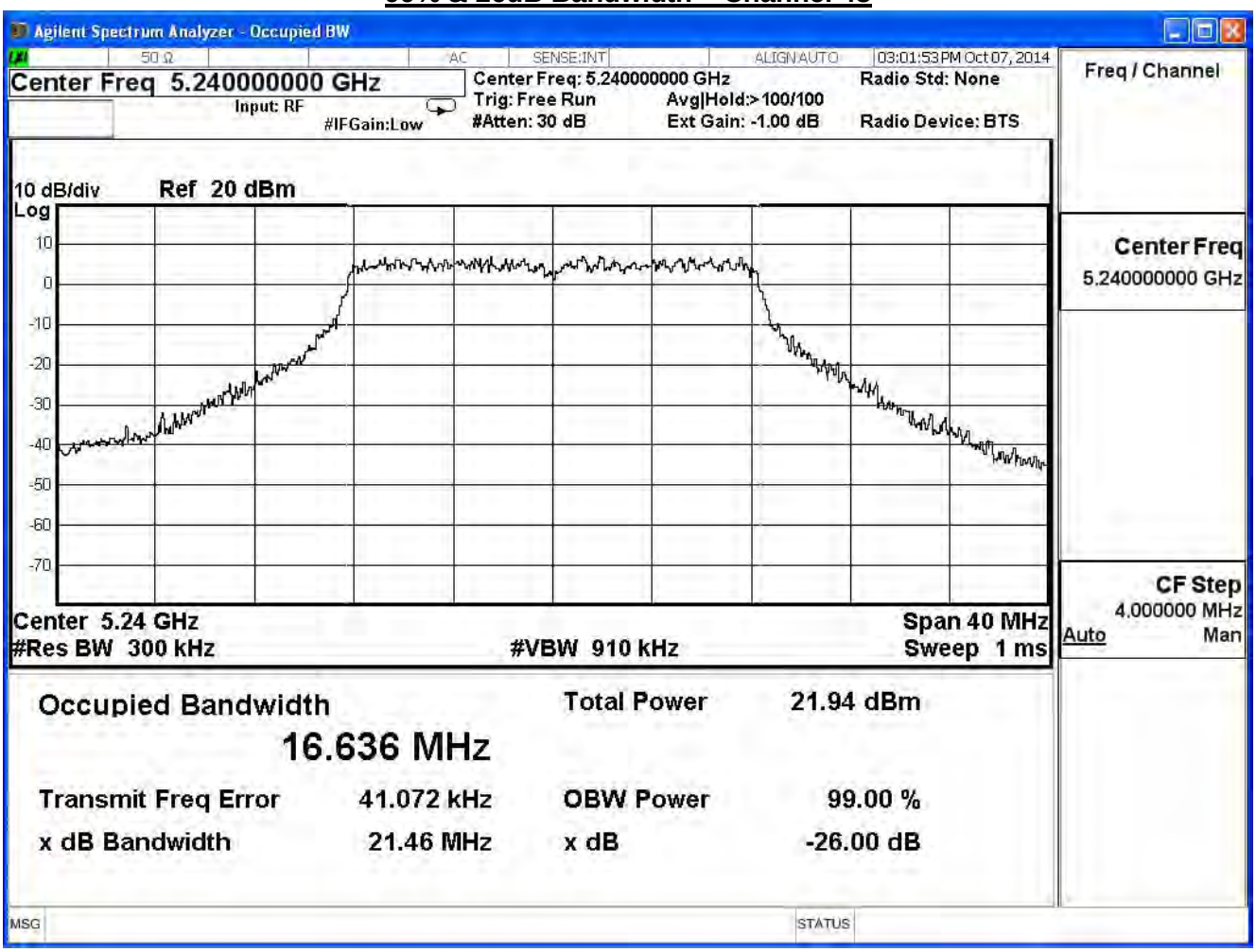
99% & 26dB Bandwidth – Channel 36



99% & 26dB Bandwidth – Channel 44



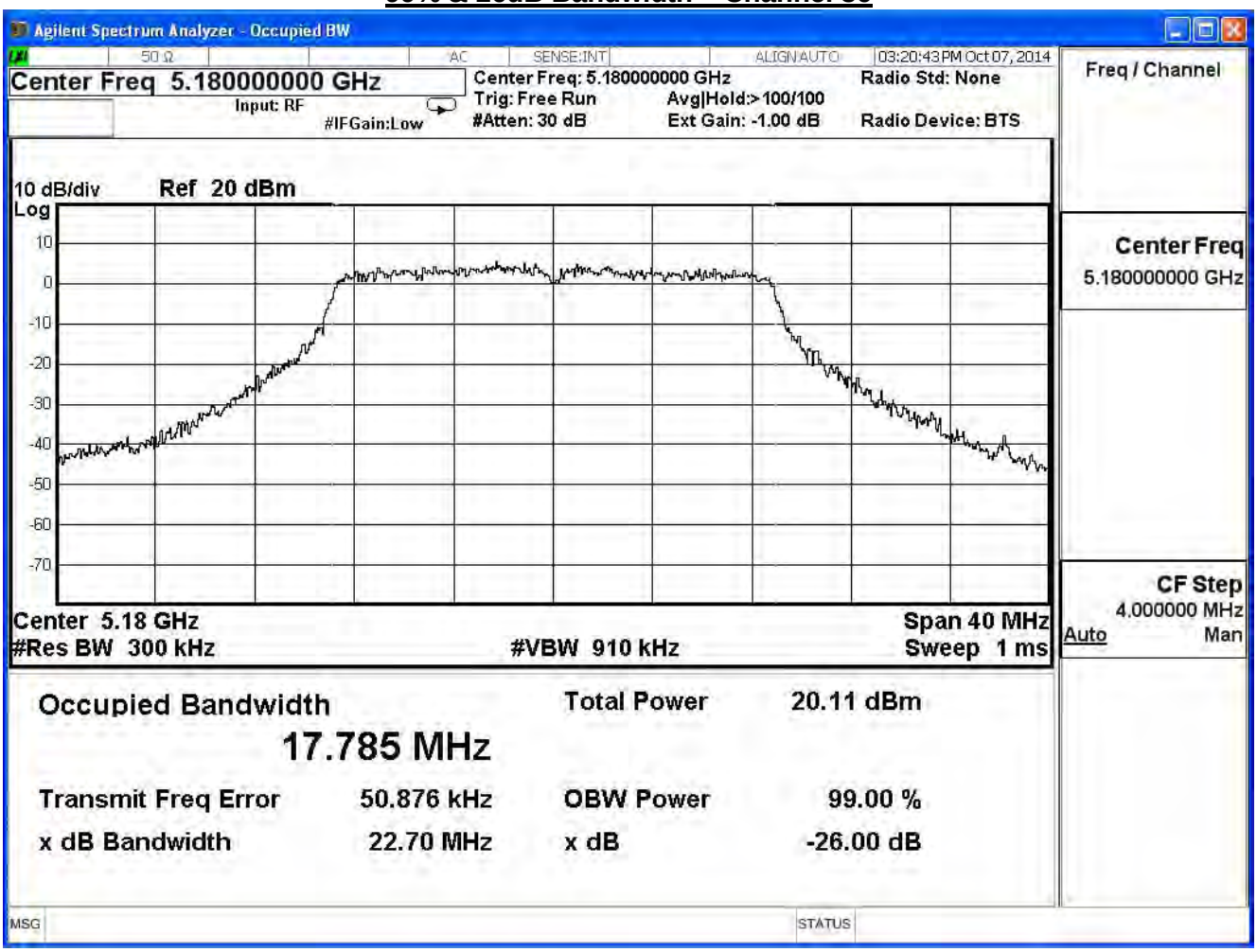
99% & 26dB Bandwidth – Channel 48



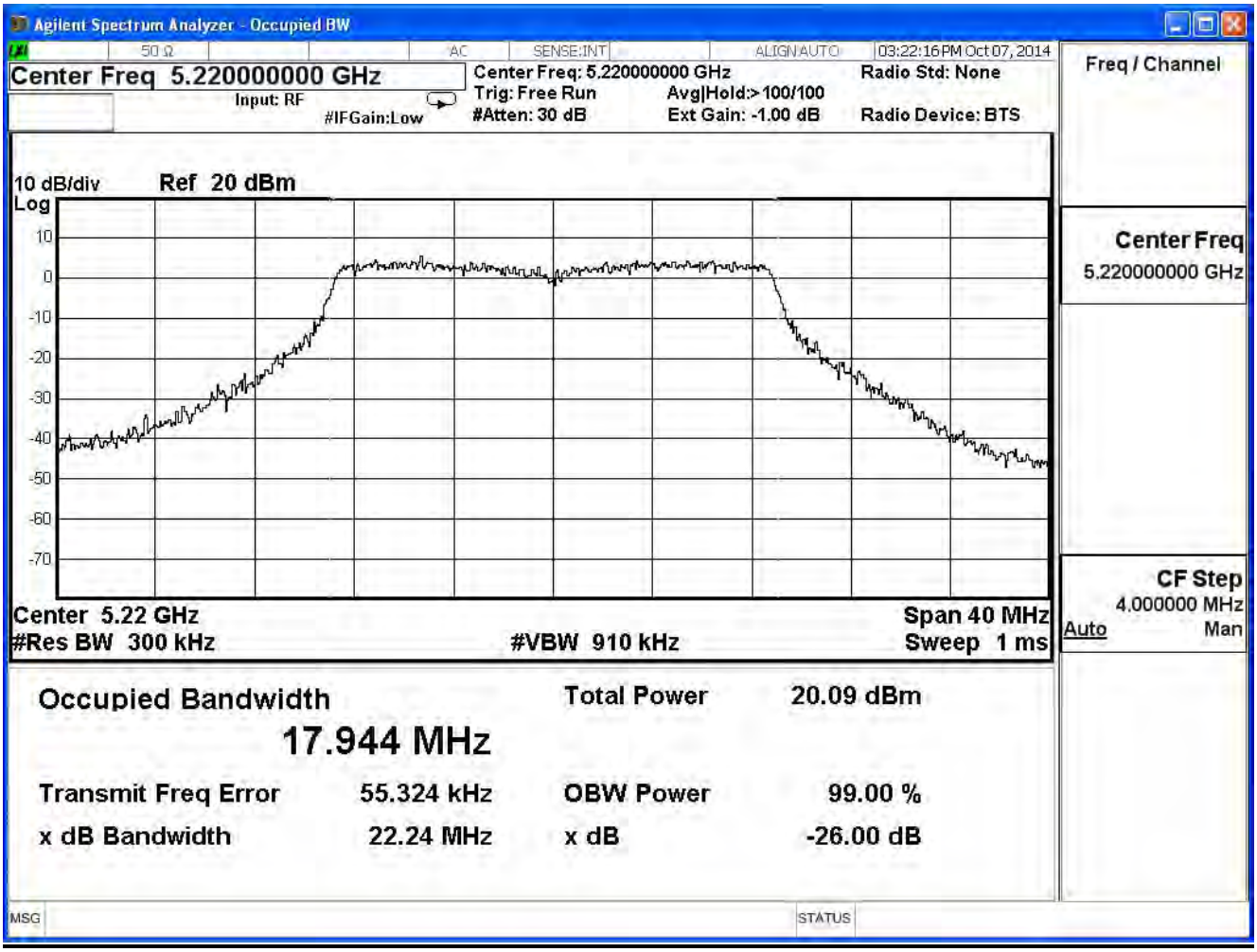
Product	VDSL2 Security Firewall		
Test Item	99% & 26dB Bandwidth		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/07	Test Site	SR7

802.11n_20M(ANT 0)					
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (MHz)	Result
36	5180	22.700	17.785	--	Pass
44	5220	22.240	17.944	--	Pass
48	5240	22.800	17.911	--	Pass

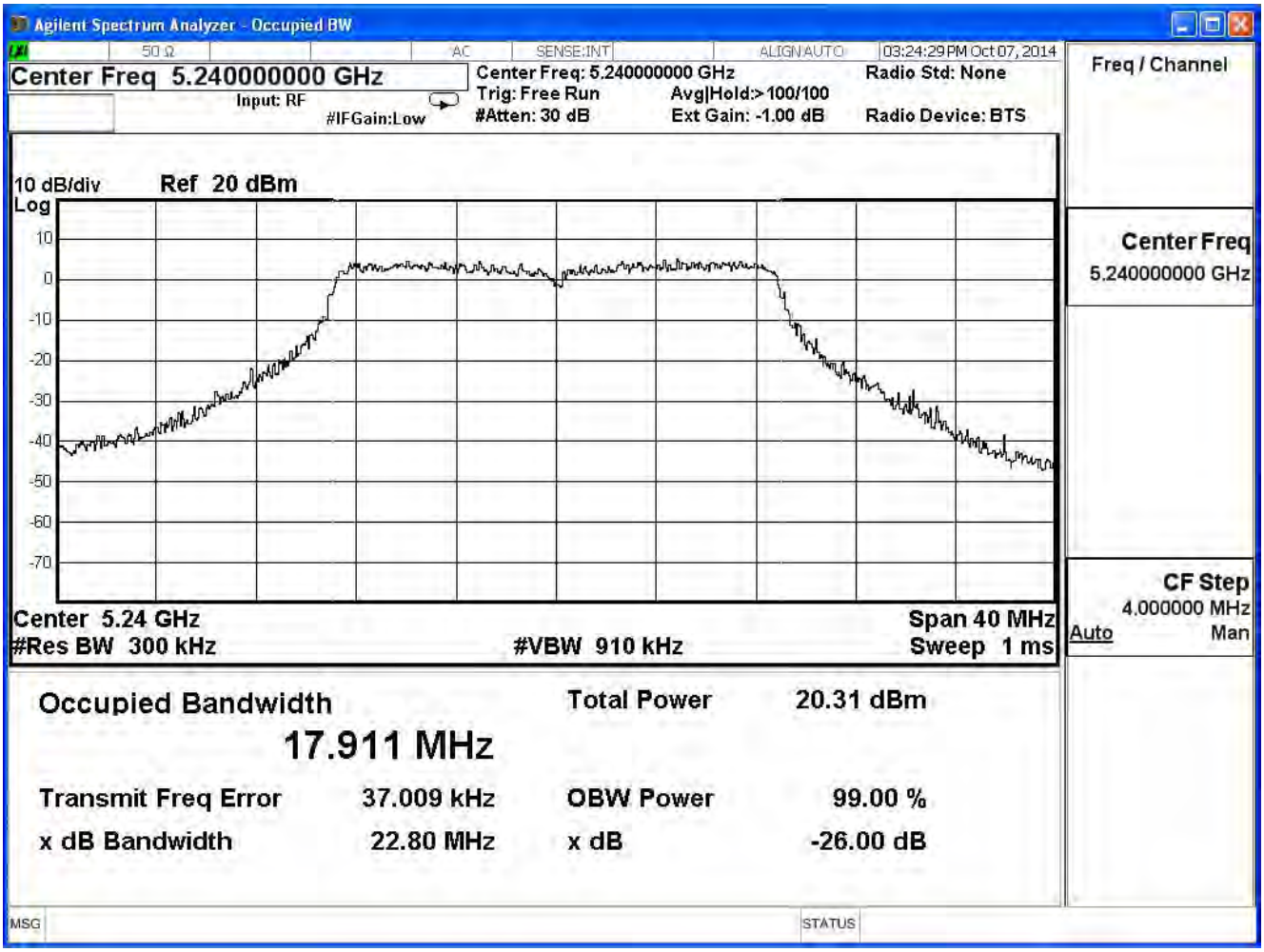
99% & 26dB Bandwidth – Channel 36



99% & 26dB Bandwidth – Channel 44



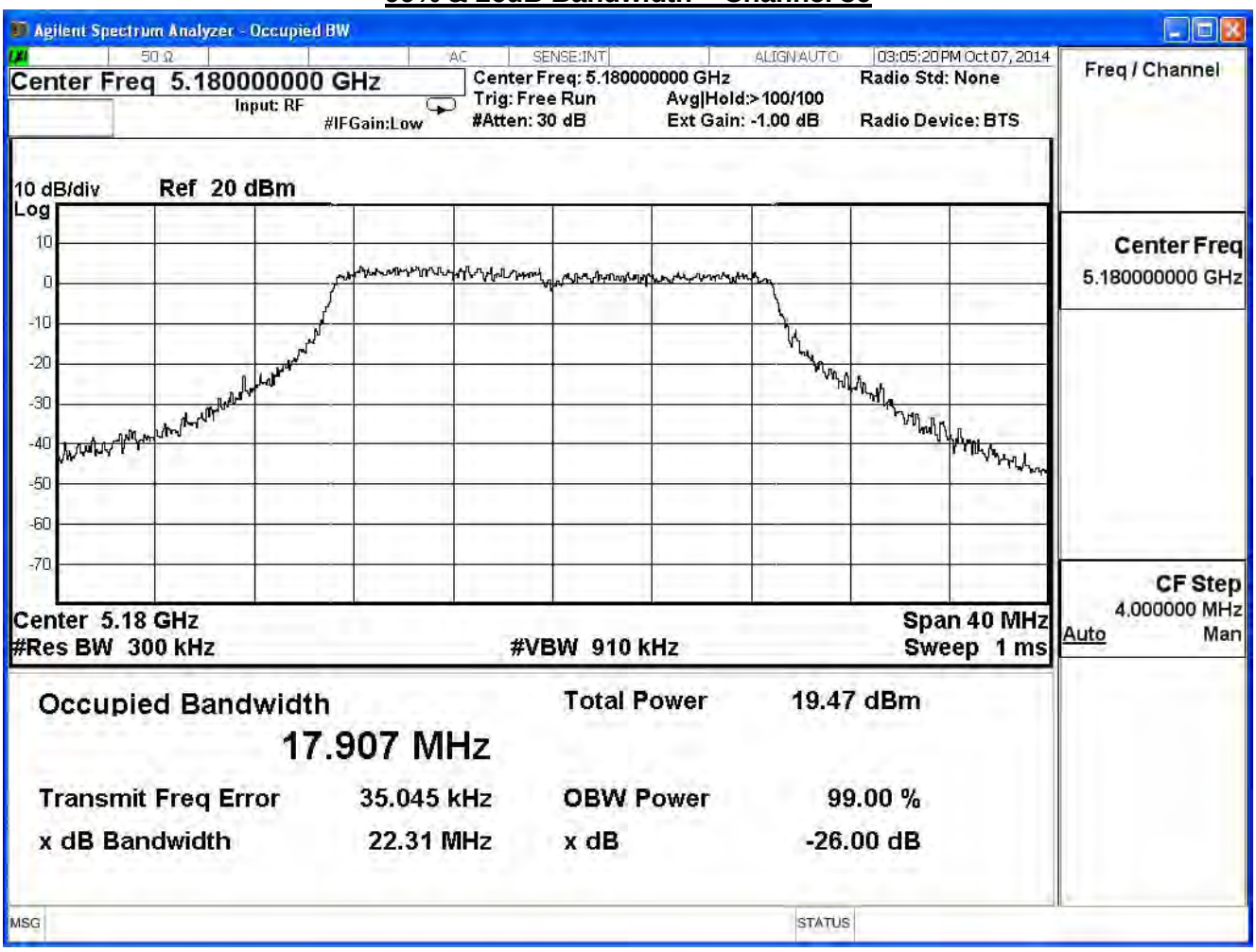
99% & 26dB Bandwidth – Channel 48



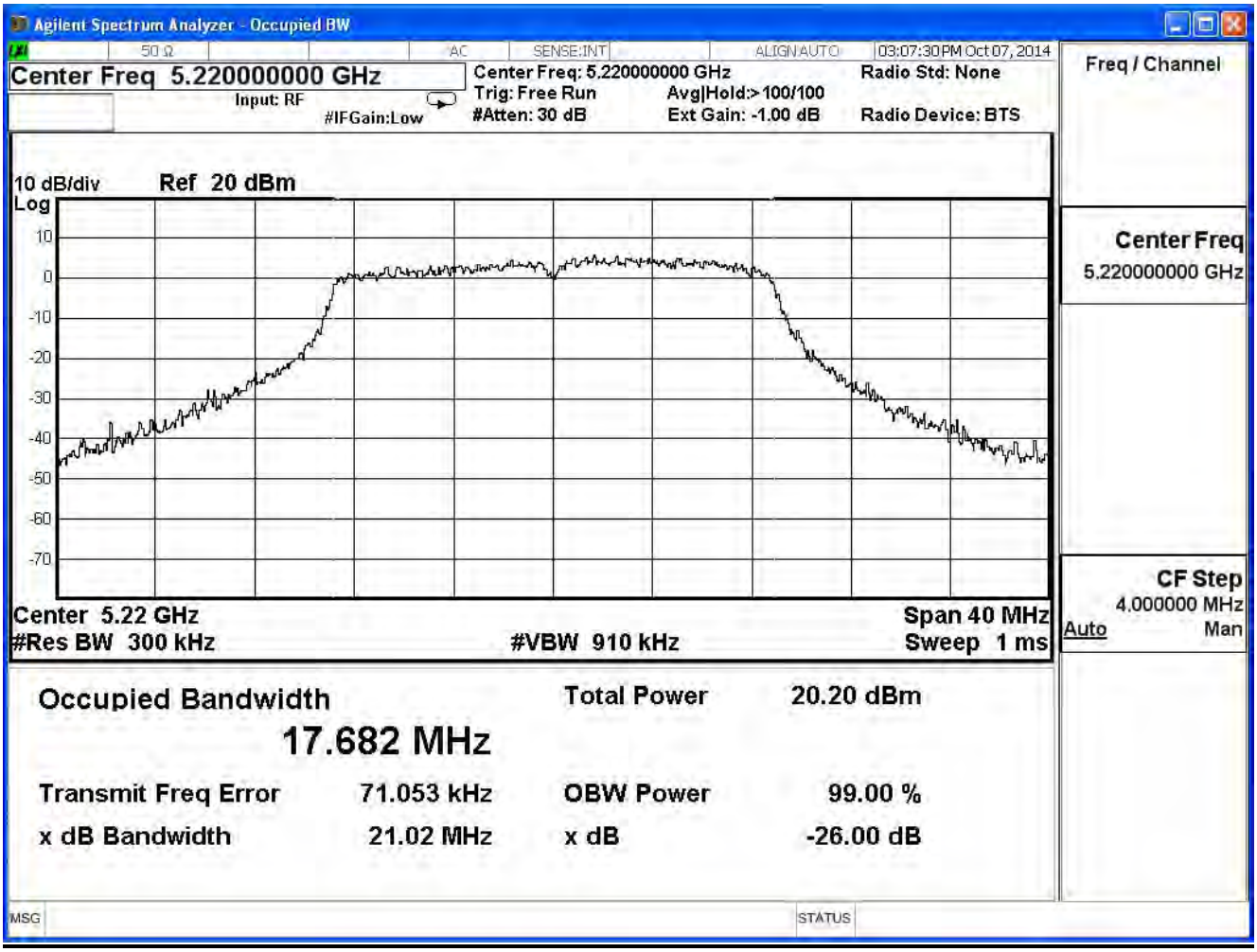
Product	VDSL2 Security Firewall		
Test Item	99% & 26dB Bandwidth		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/07	Test Site	SR7

802.11n_20M(ANT 1)					
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (MHz)	Result
36	5180	22.310	17.907	--	Pass
44	5220	21.020	17.682	--	Pass
48	5240	23.240	17.876	--	Pass

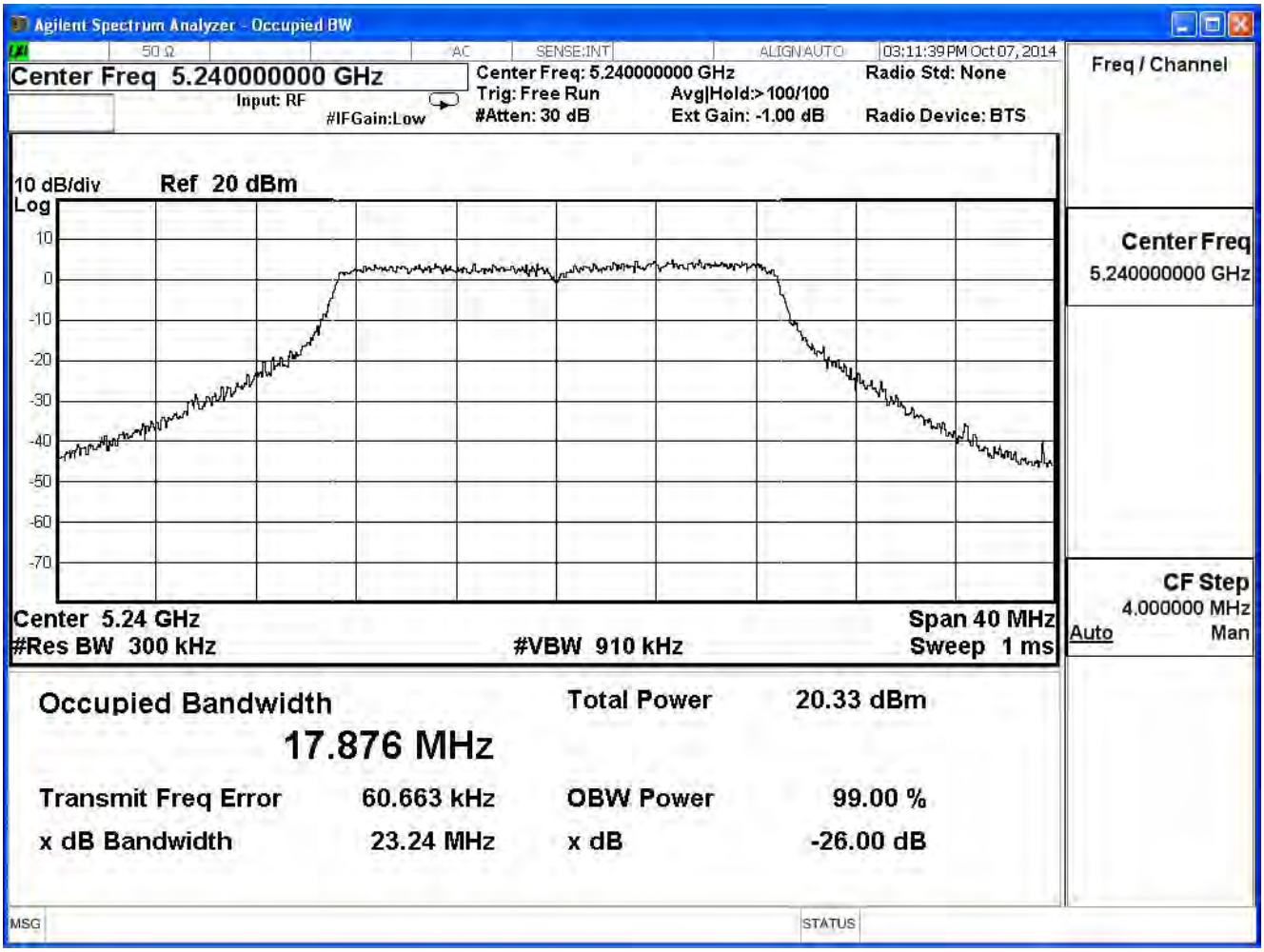
99% & 26dB Bandwidth – Channel 36



99% & 26dB Bandwidth – Channel 44



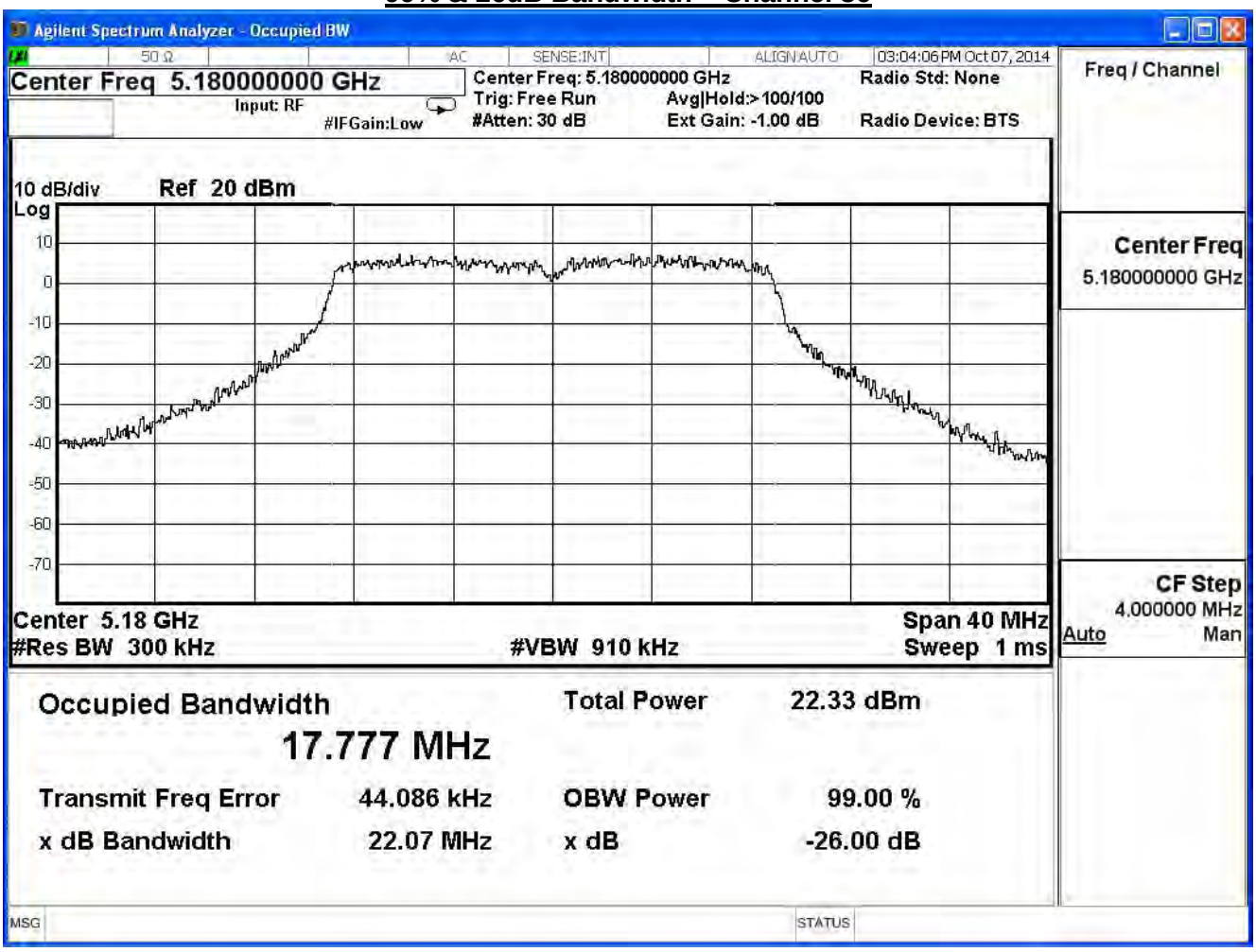
99% & 26dB Bandwidth – Channel 48



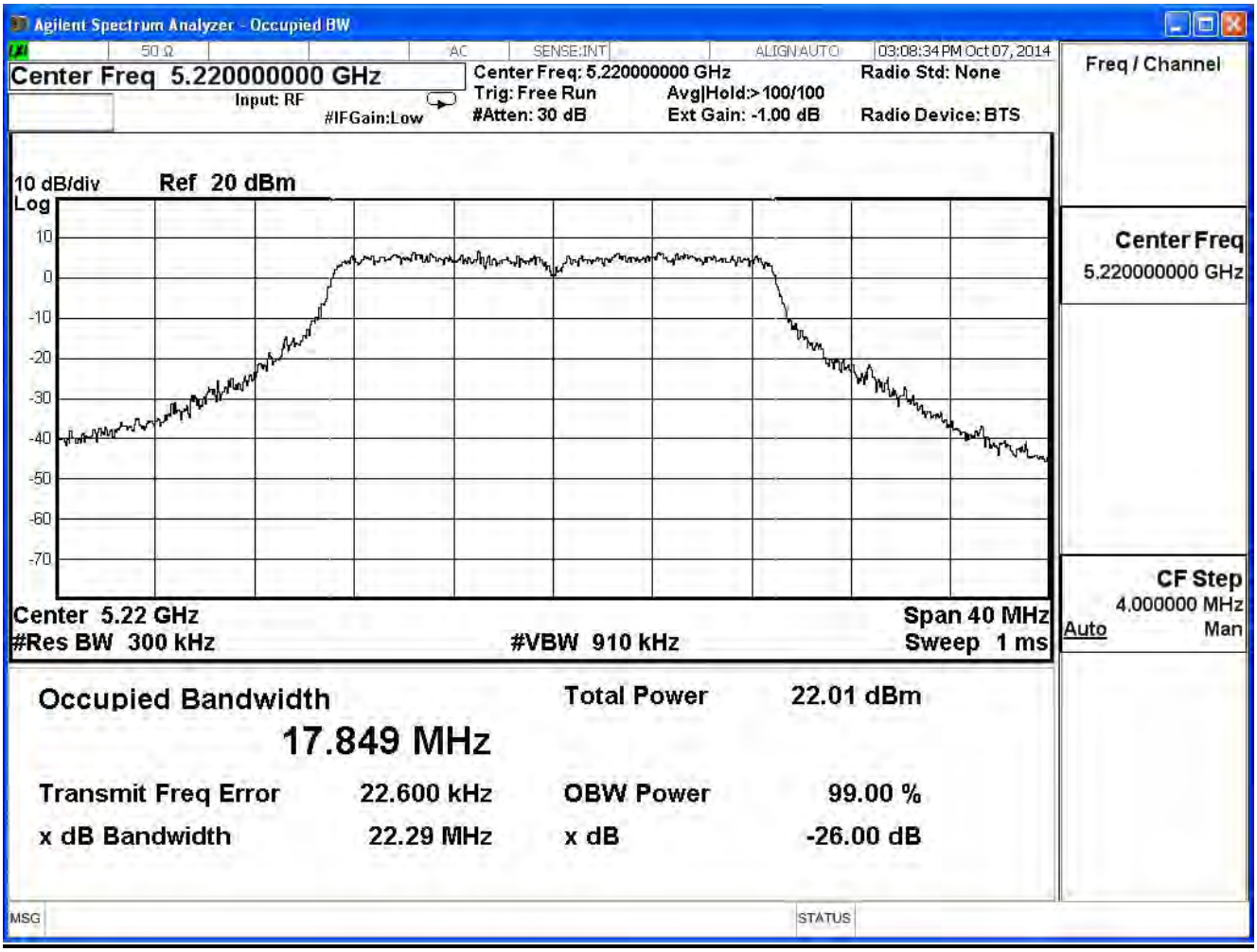
Product	VDSL2 Security Firewall		
Test Item	99% & 26dB Bandwidth		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/07	Test Site	SR7

802.11n_20M(ANT 2)					
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (MHz)	Result
36	5180	22.070	17.777	--	Pass
44	5220	22.290	17.849	--	Pass
48	5240	22.380	17.817	--	Pass

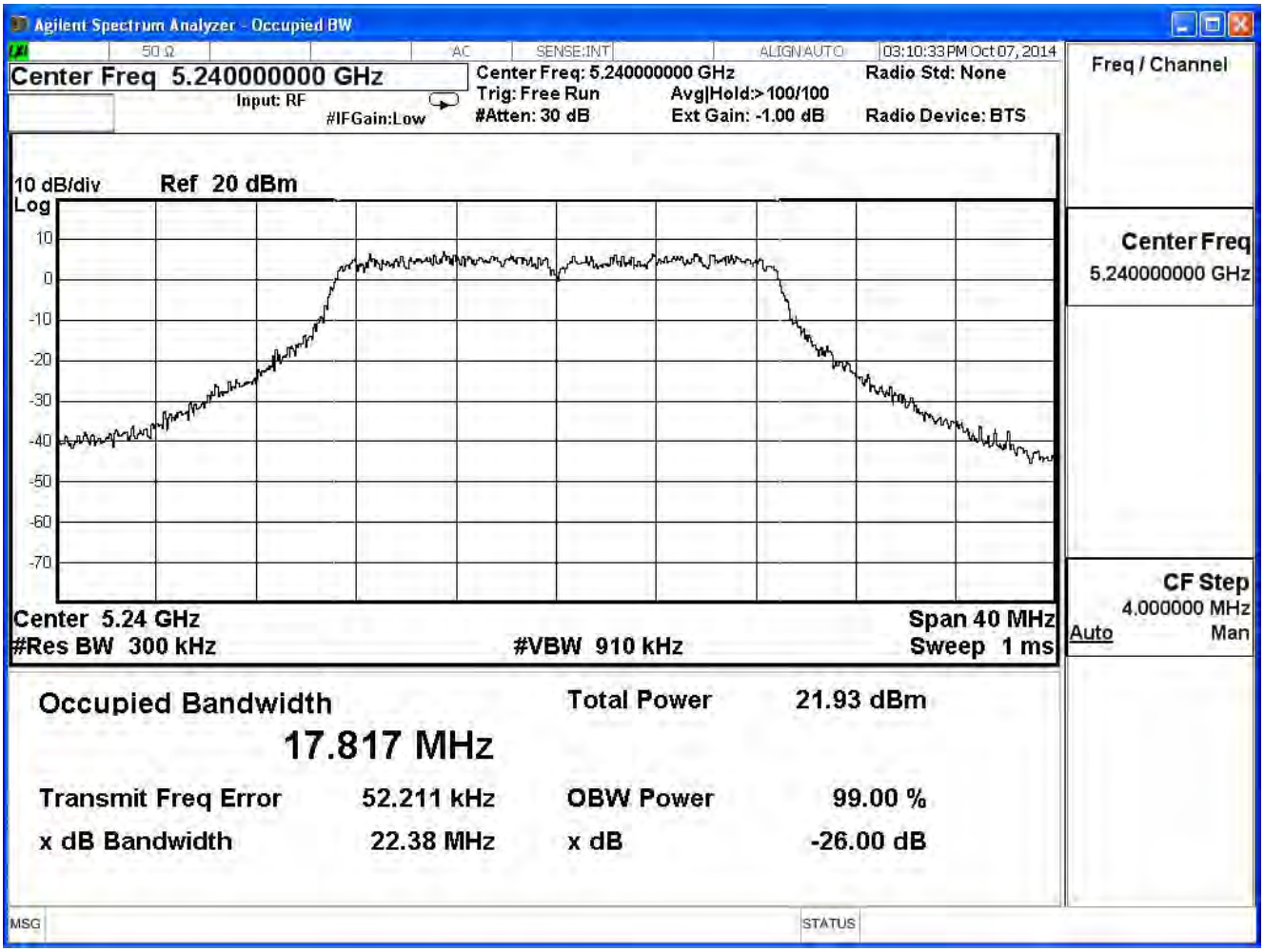
99% & 26dB Bandwidth – Channel 36



99% & 26dB Bandwidth – Channel 44



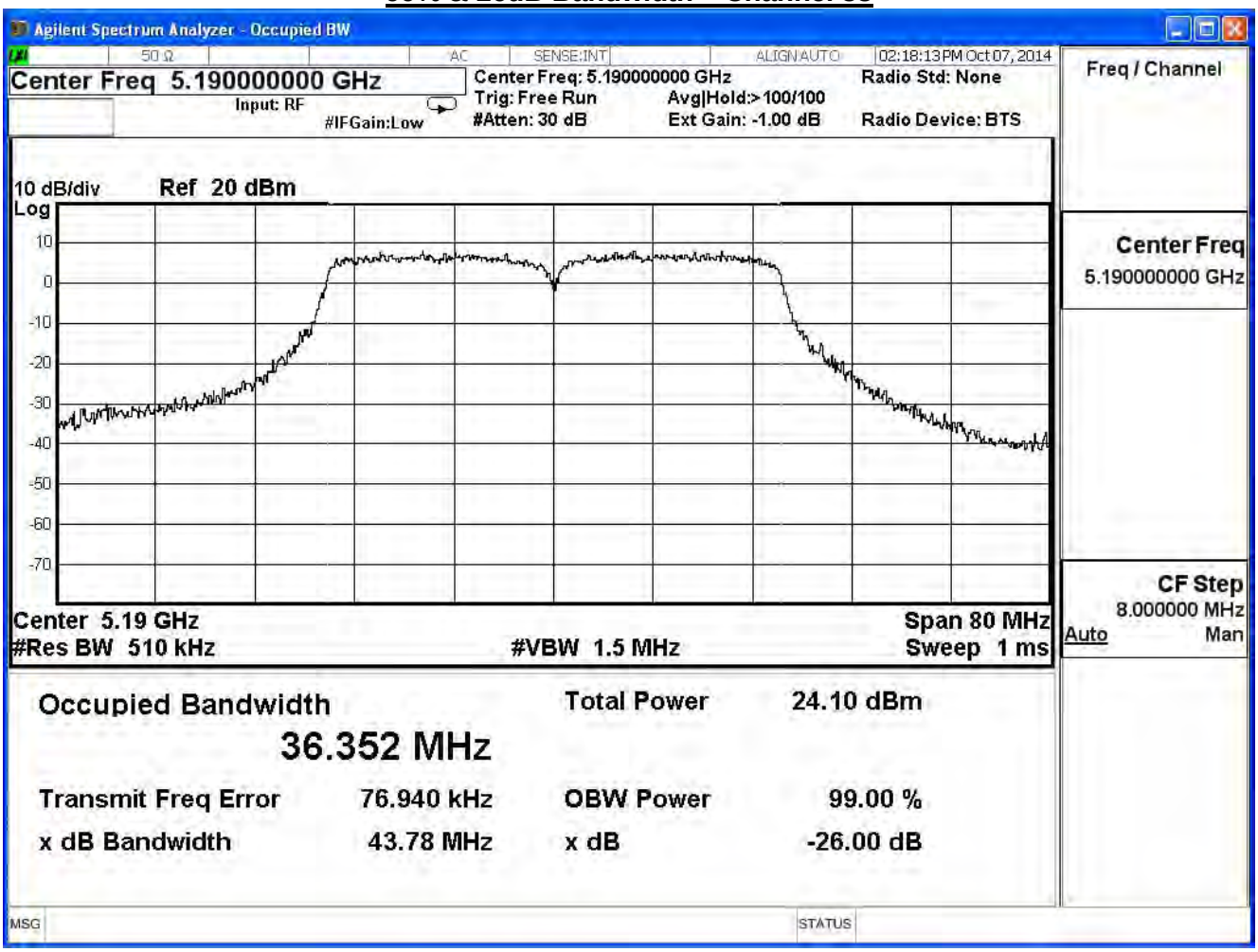
99% & 26dB Bandwidth – Channel 48



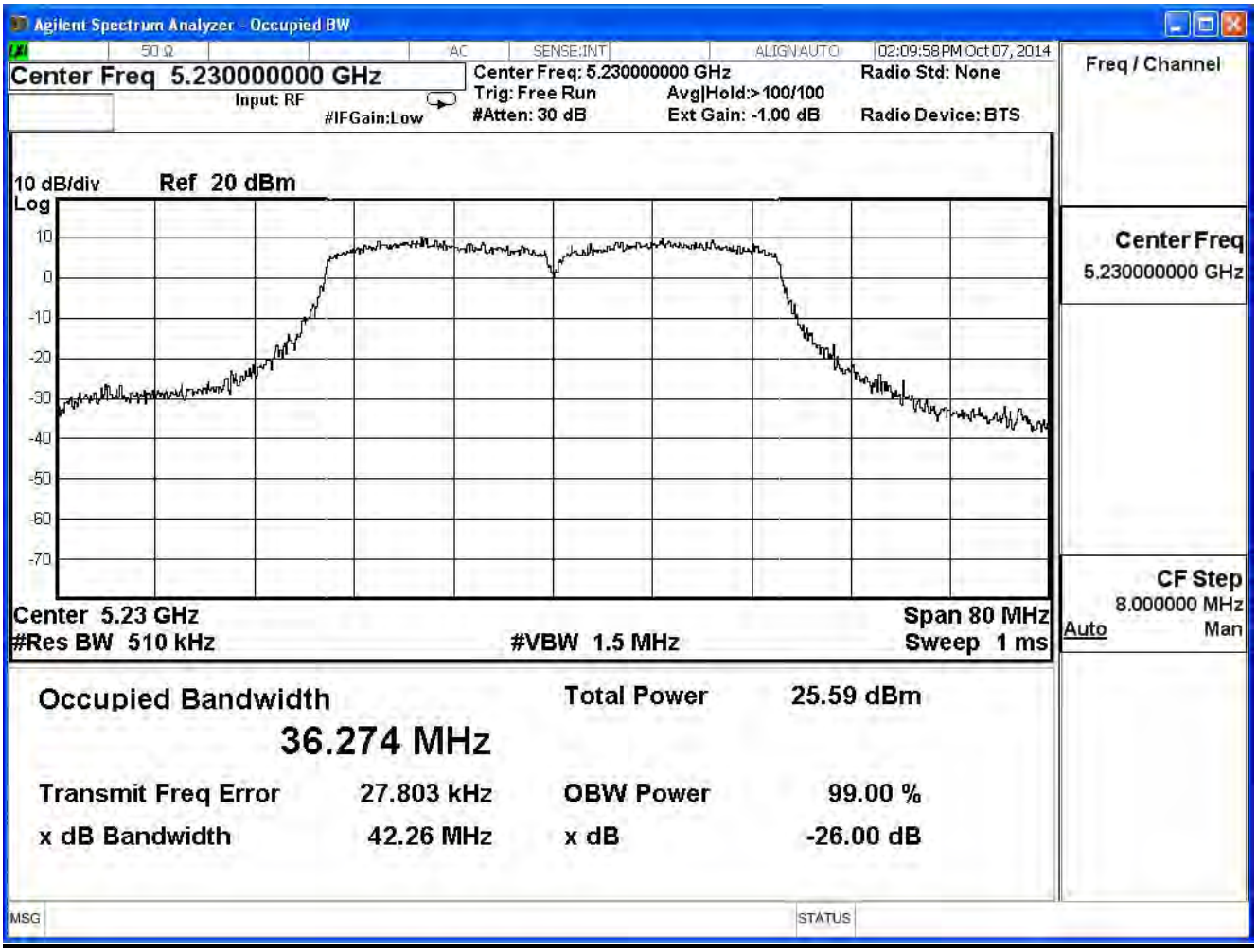
Product	VDSL2 Security Firewall		
Test Item	99% & 26dB Bandwidth		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/07	Test Site	SR7

802.11n_40M(ANT 0)					
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (MHz)	Result
38	5190	43.780	36.352	--	Pass
46	5230	42.260	36.274	--	Pass

99% & 26dB Bandwidth – Channel 38



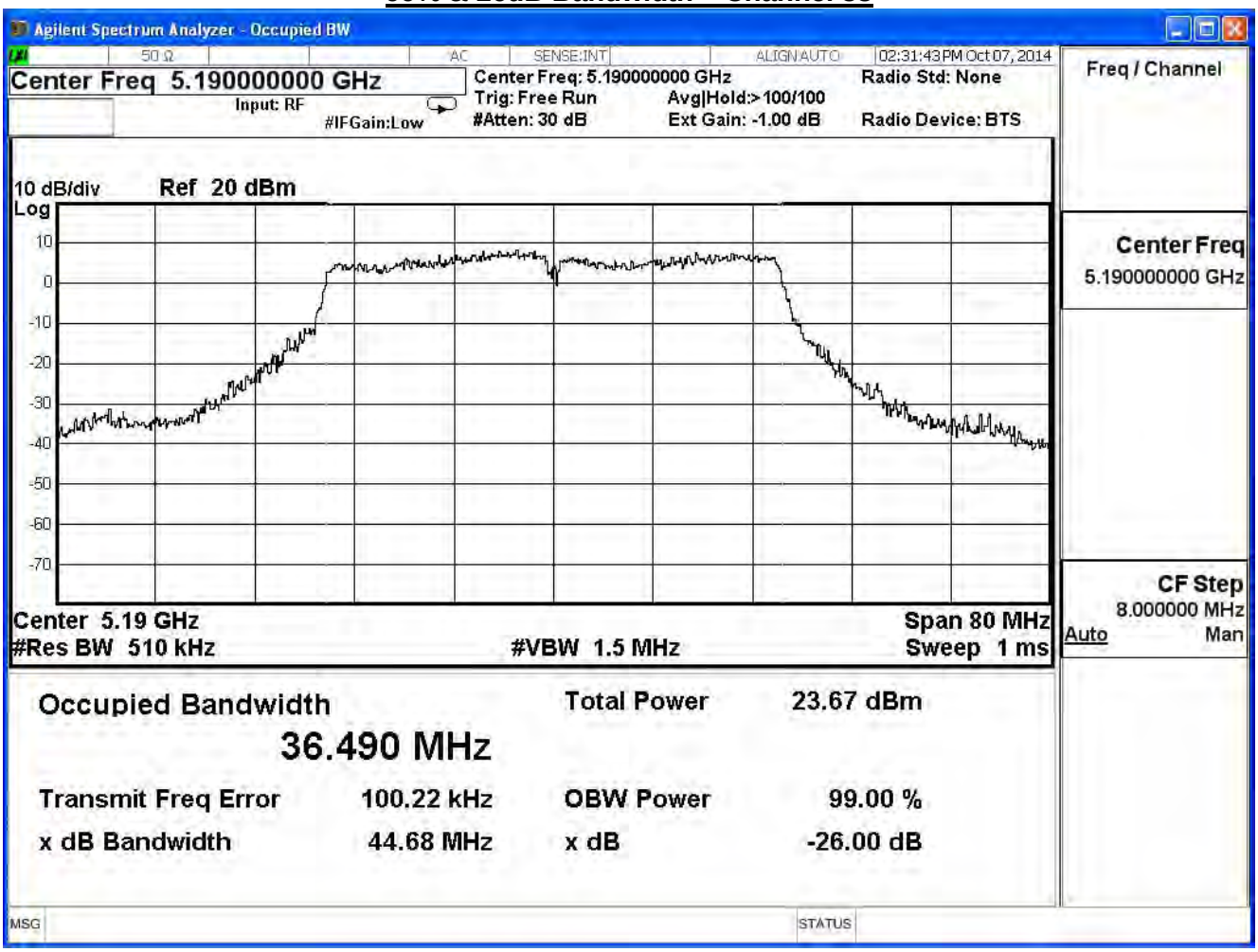
99% & 26dB Bandwidth – Channel 46



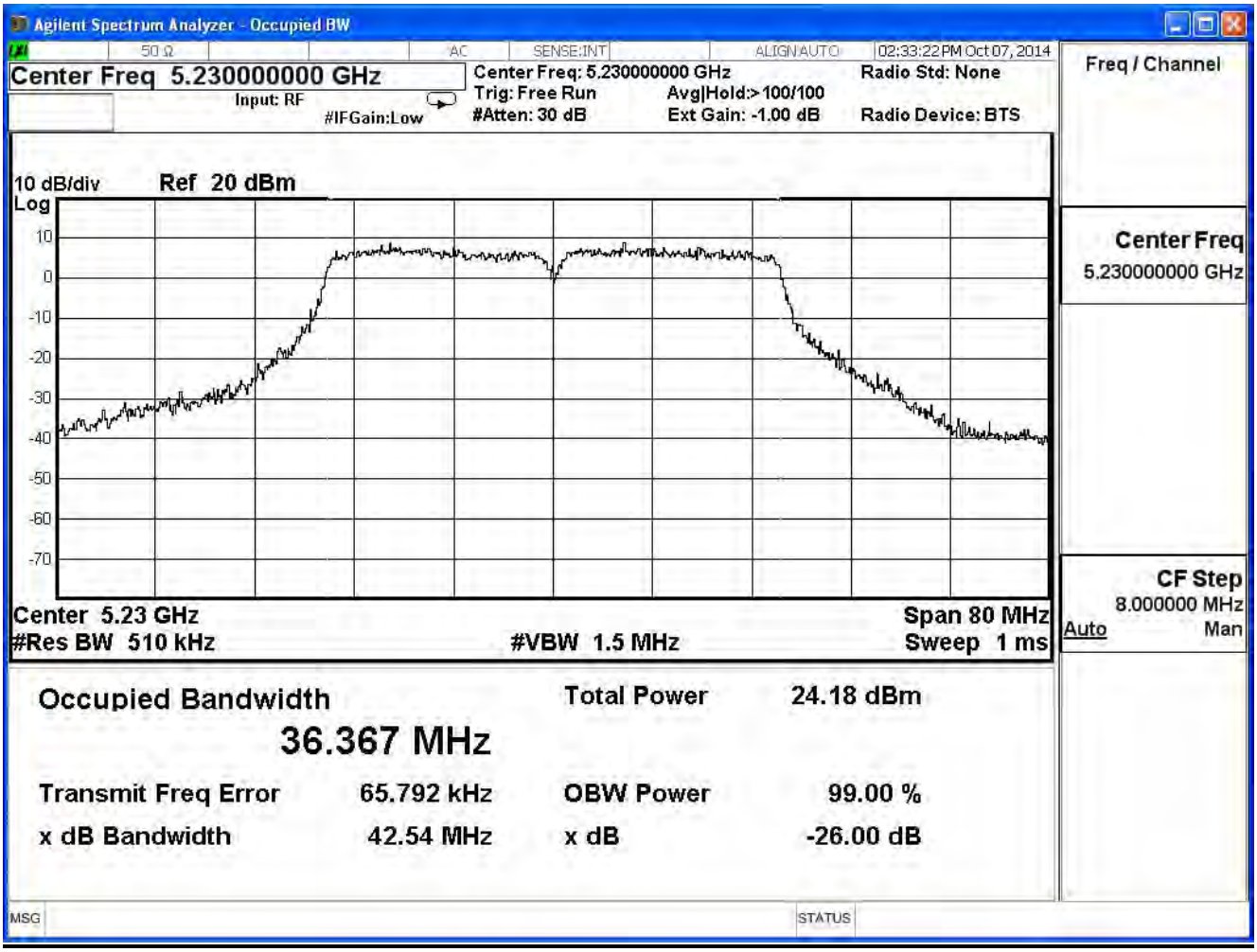
Product	VDSL2 Security Firewall		
Test Item	99% & 26dB Bandwidth		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/07	Test Site	SR7

802.11n_40M(ANT 1)					
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (MHz)	Result
38	5190	44.680	36.490	--	Pass
46	5230	42.540	36.367	--	Pass

99% & 26dB Bandwidth – Channel 38



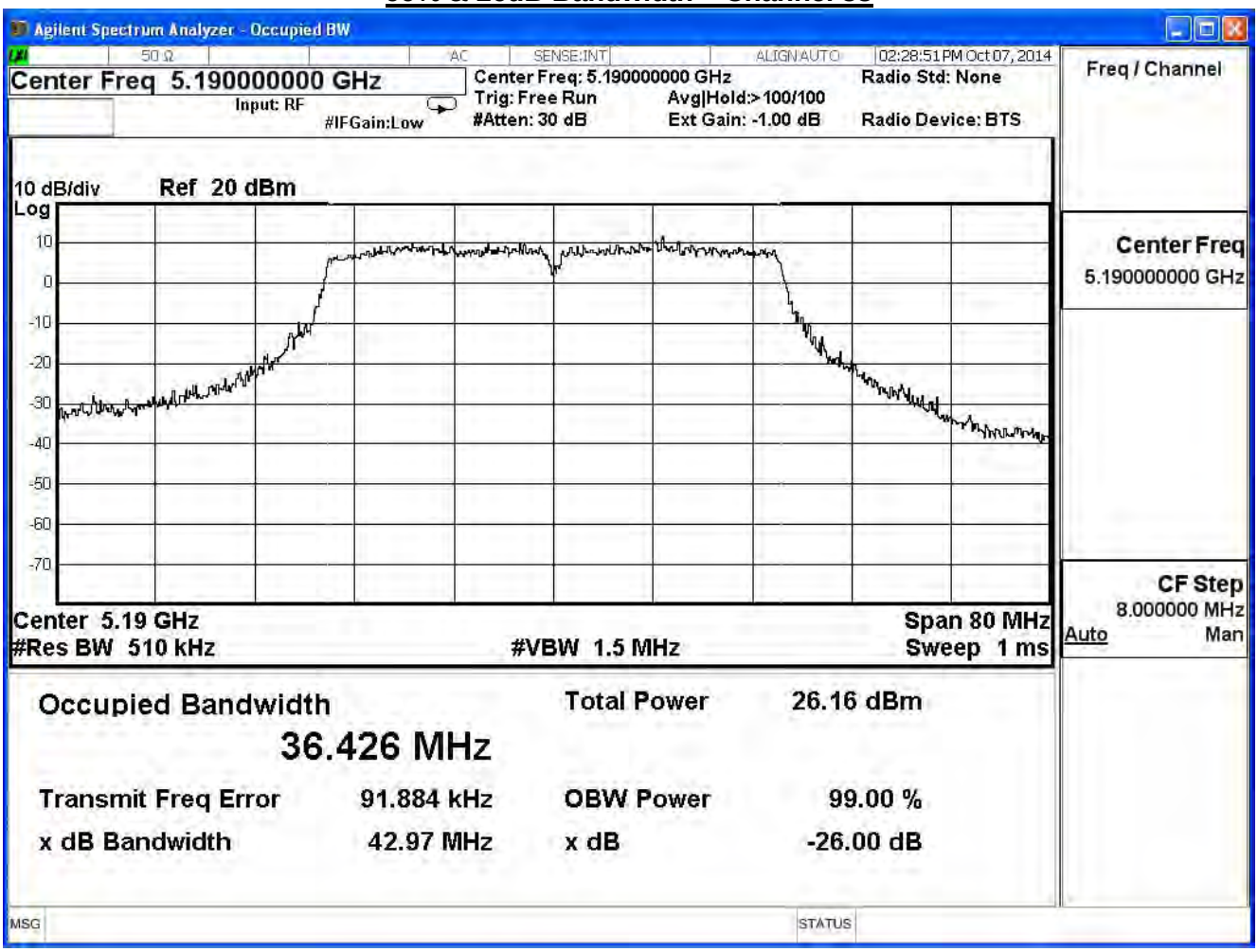
99% & 26dB Bandwidth – Channel 46



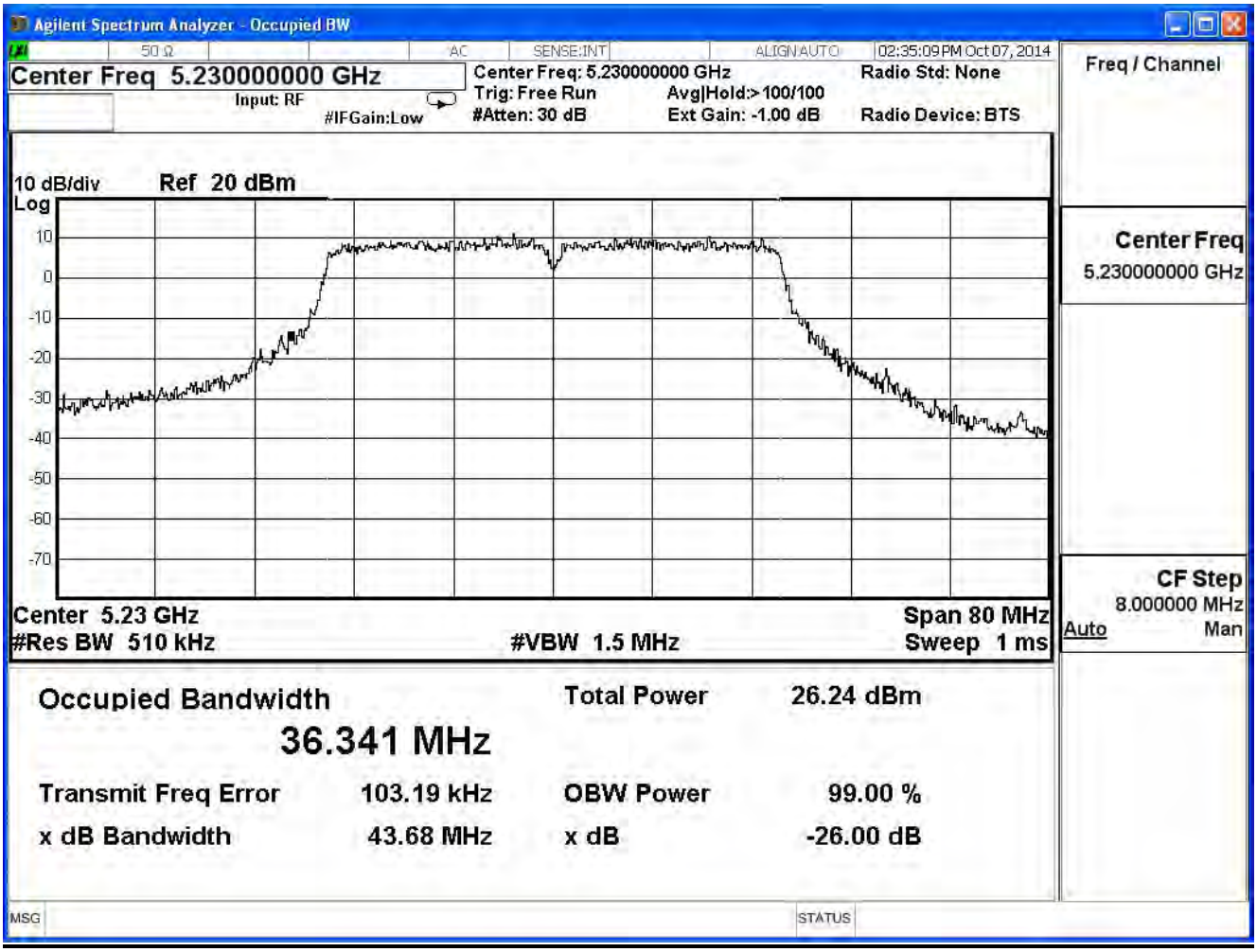
Product	VDSL2 Security Firewall		
Test Item	99% & 26dB Bandwidth		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/07	Test Site	SR7

802.11n_40M(ANT 2)					
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (MHz)	Result
38	5190	42.970	36.426	--	Pass
46	5230	43.680	36.341	--	Pass

99% & 26dB Bandwidth – Channel 38



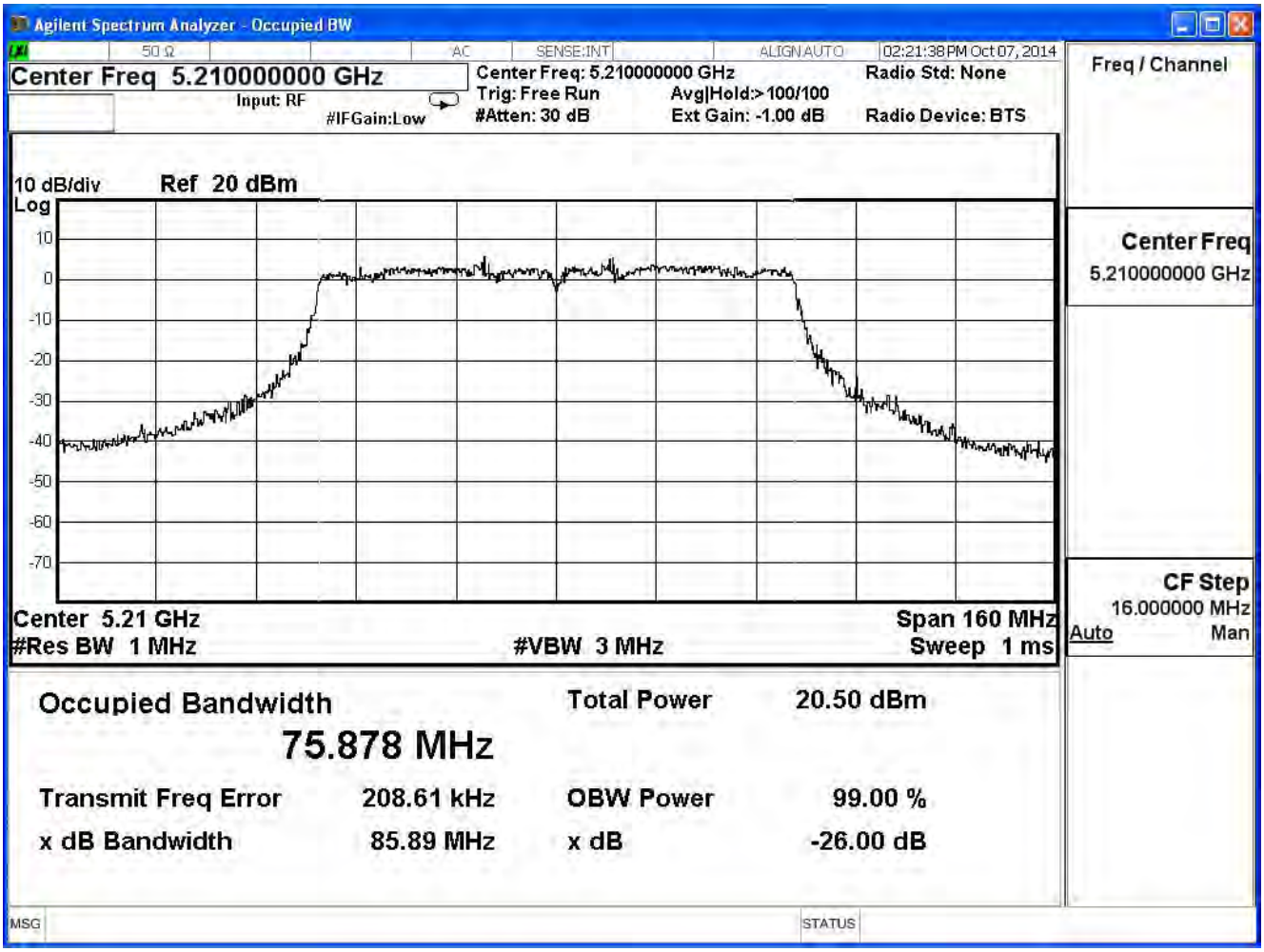
99% & 26dB Bandwidth – Channel 46



Product	VDSL2 Security Firewall		
Test Item	99% & 26dB Bandwidth		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/07	Test Site	SR7

802.11ac(80M) (ANT 0)					
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (MHz)	Result
42	5210	85.890	75.878		Pass

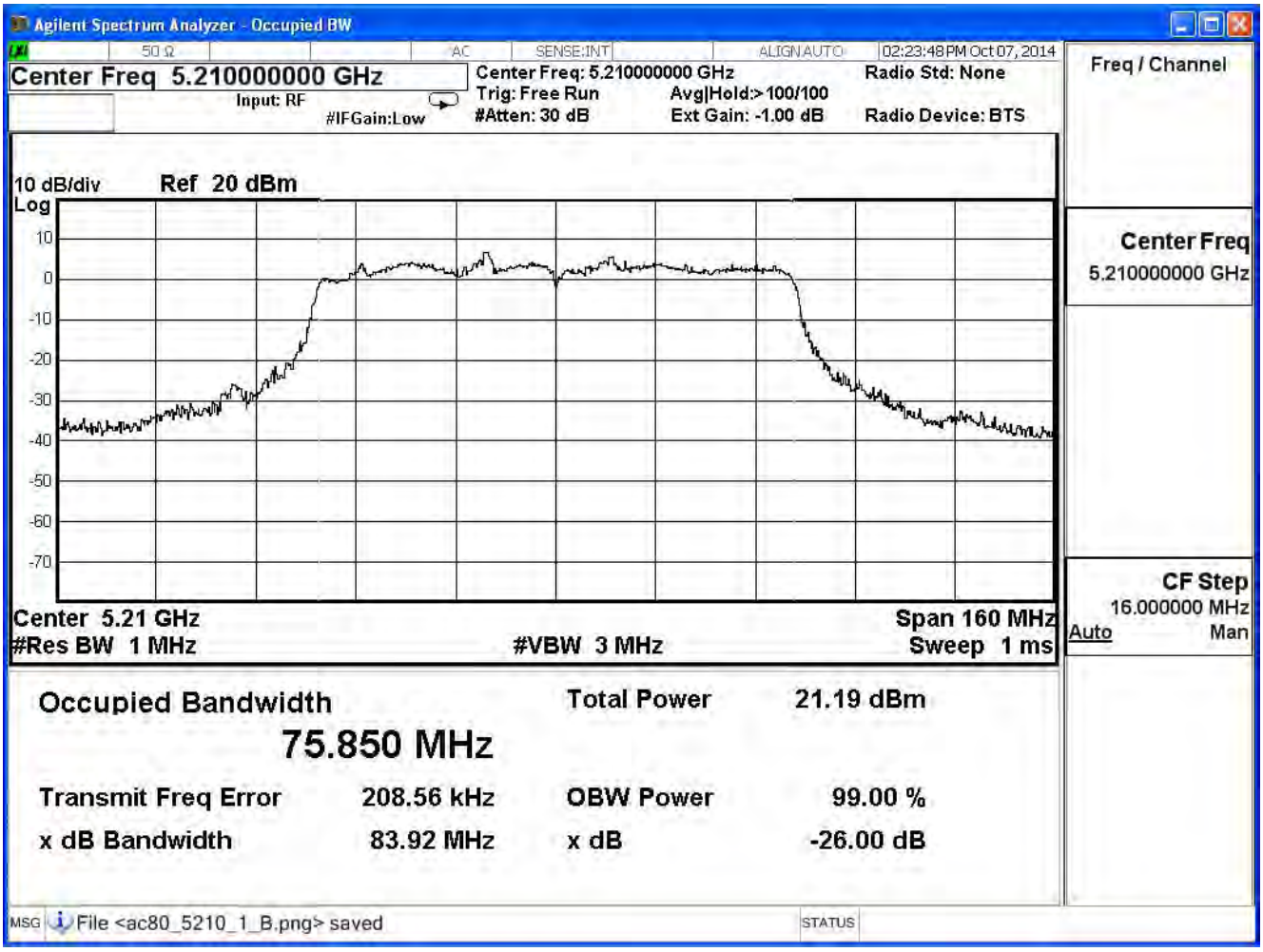
99% & 26dB Bandwidth – Channel 42



Product	VDSL2 Security Firewall		
Test Item	99% & 26dB Bandwidth		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/07	Test Site	SR7

802.11ac(80M) (ANT 1)					
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (MHz)	Result
42	5210	83.920	75.850	--	Pass

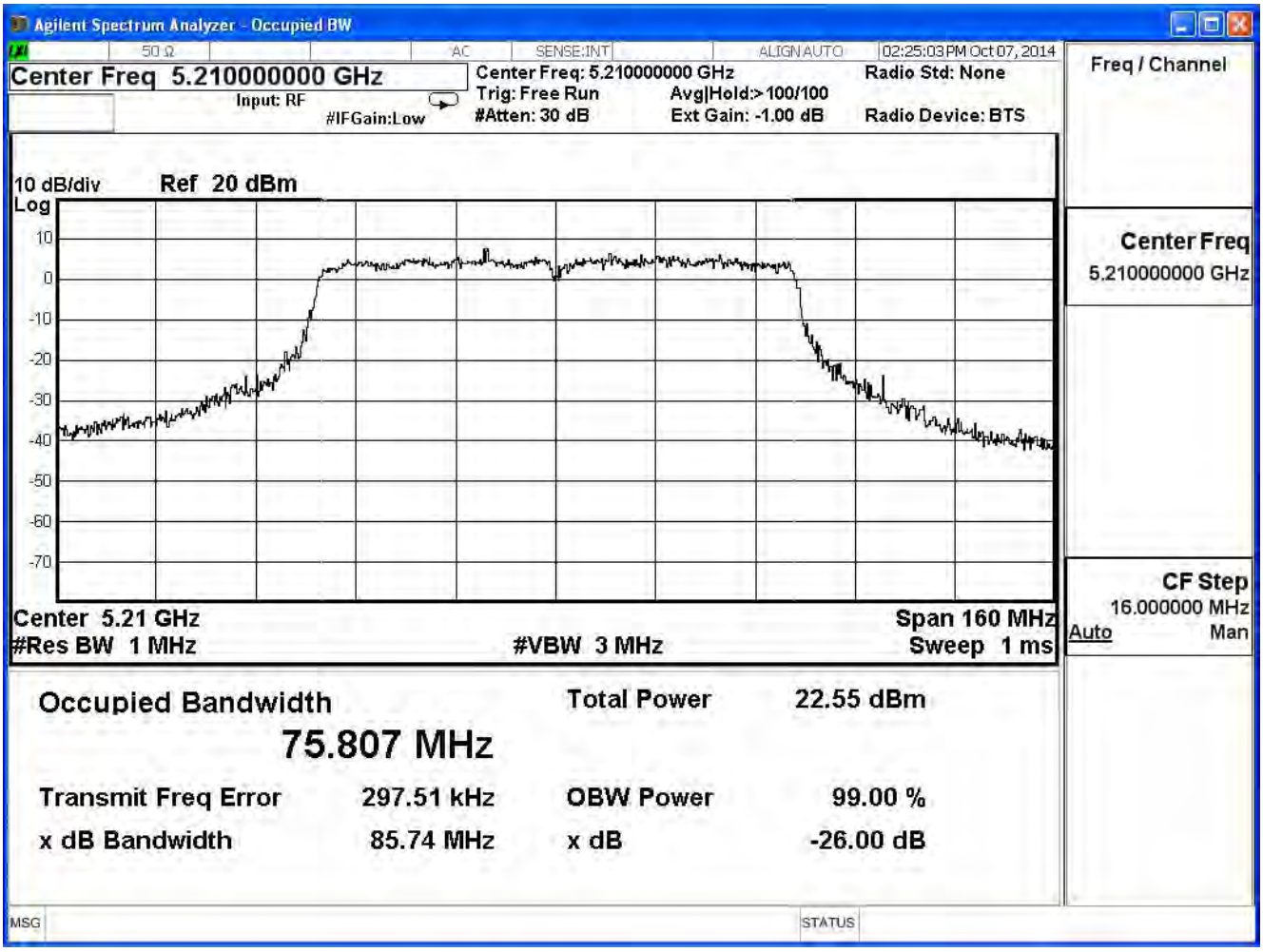
99% & 26dB Bandwidth – Channel 42



Product	VDSL2 Security Firewall		
Test Item	99% & 26dB Bandwidth		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/07	Test Site	SR7

802.11ac(80M) (ANT 2)					
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (MHz)	Result
42	5210	85.740	75.807	--	Pass

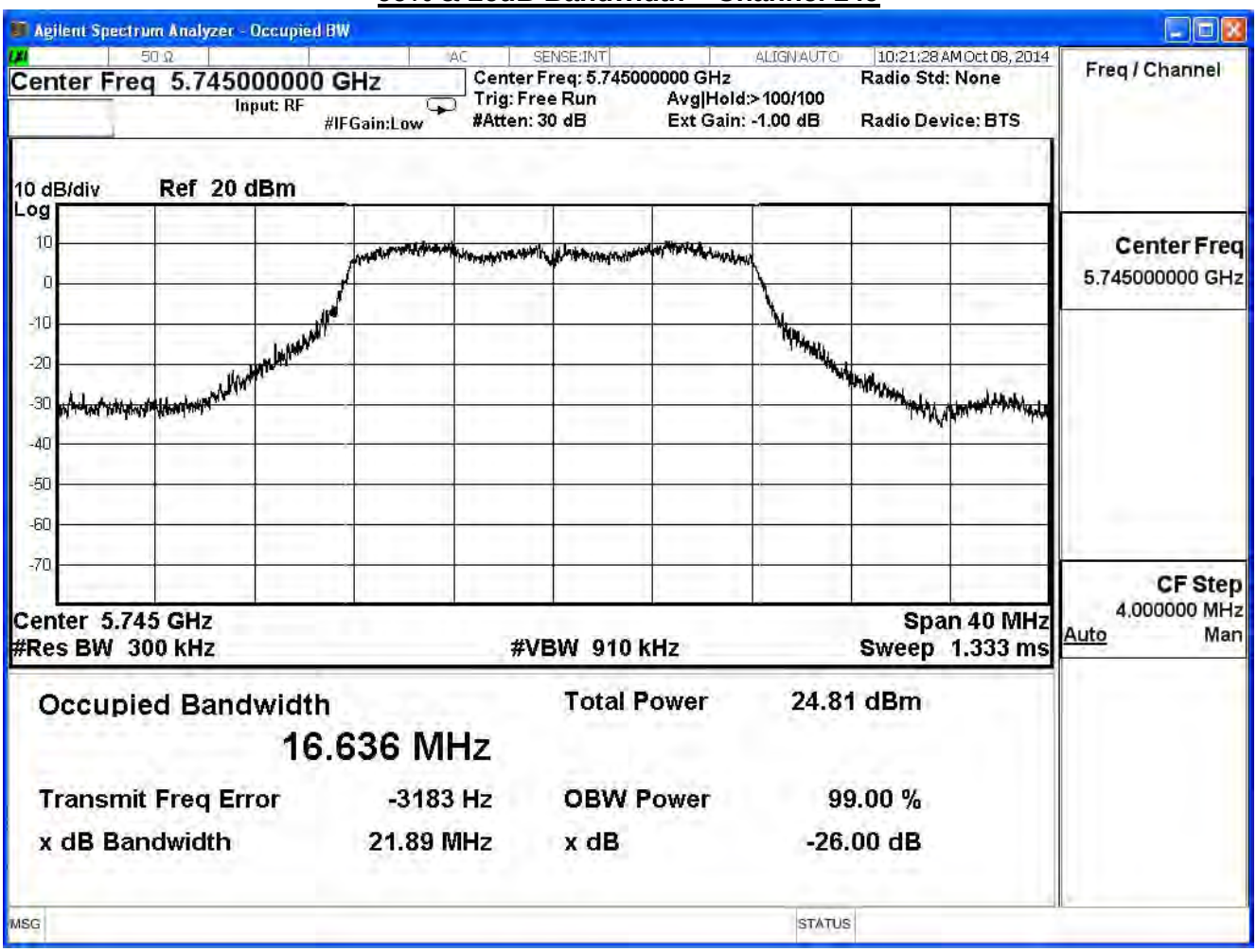
99% & 26dB Bandwidth – Channel 42



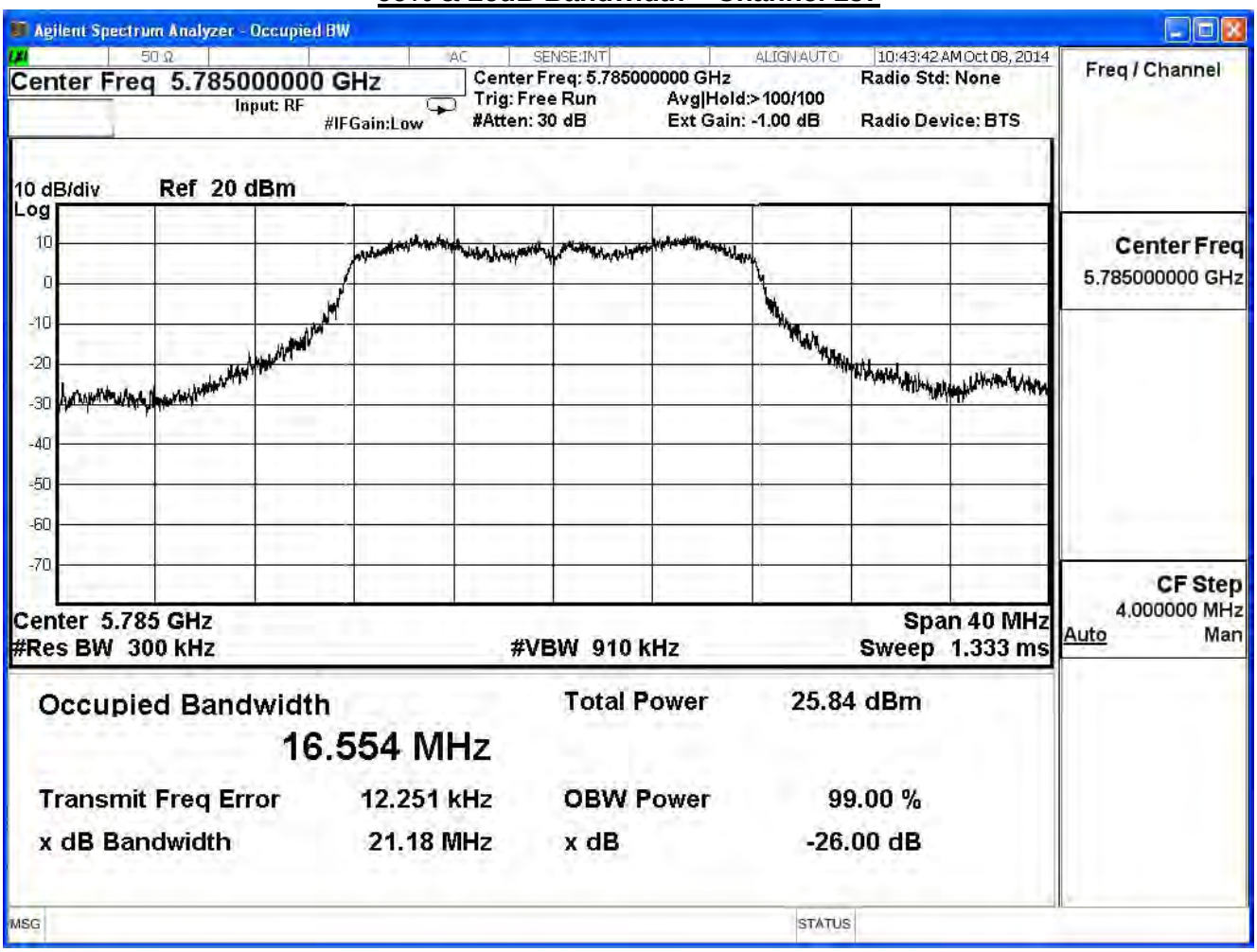
Product	VDSL2 Security Firewall		
Test Item	99% & 26dB Bandwidth		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/07	Test Site	SR7

802.11a (ANT 0)					
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (MHz)	Result
149	5745	21.890	16.636	--	Pass
157	5785	21.180	16.554	--	Pass
165	5825	21.160	16.805	--	Pass

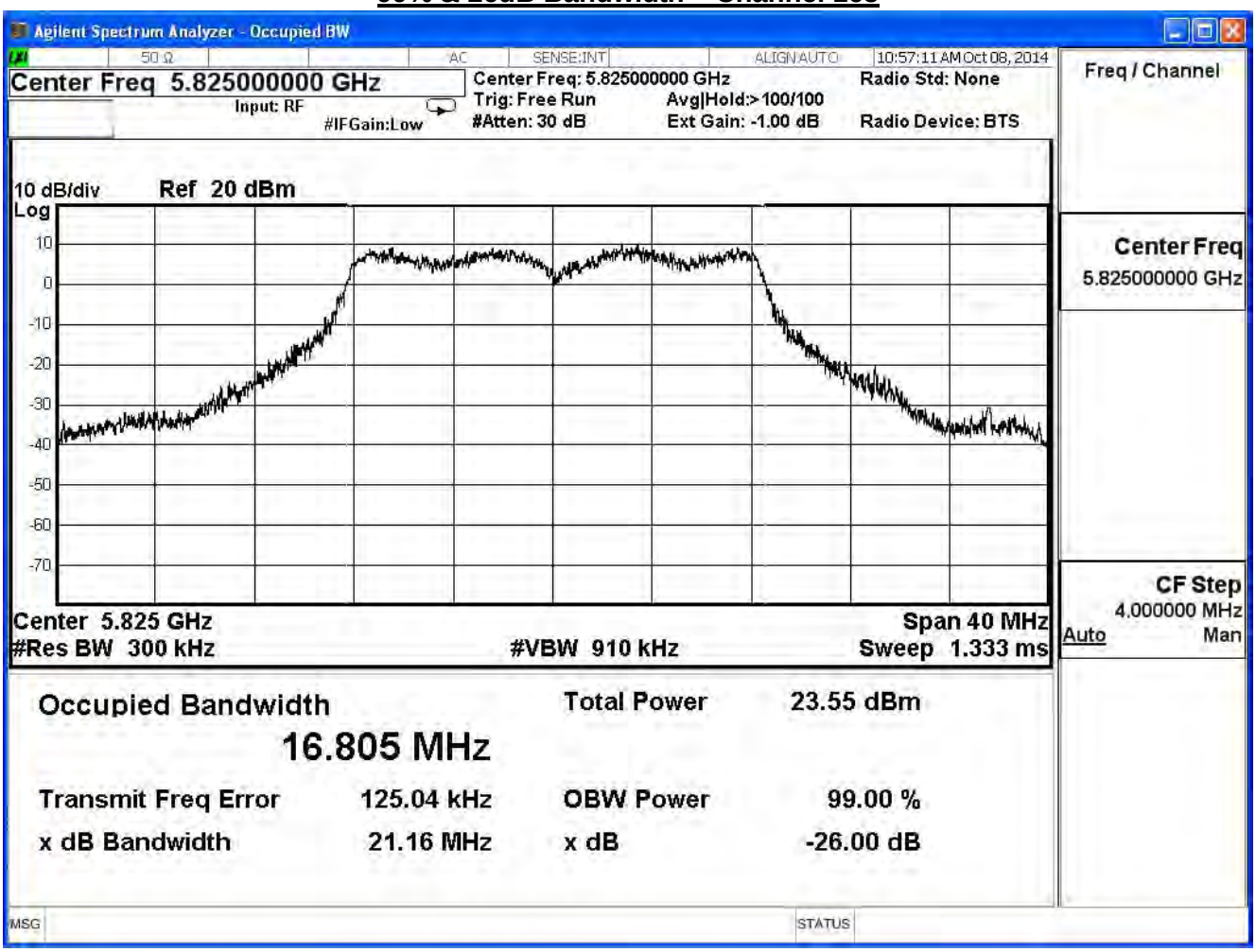
99% & 26dB Bandwidth – Channel 149



99% & 26dB Bandwidth – Channel 157



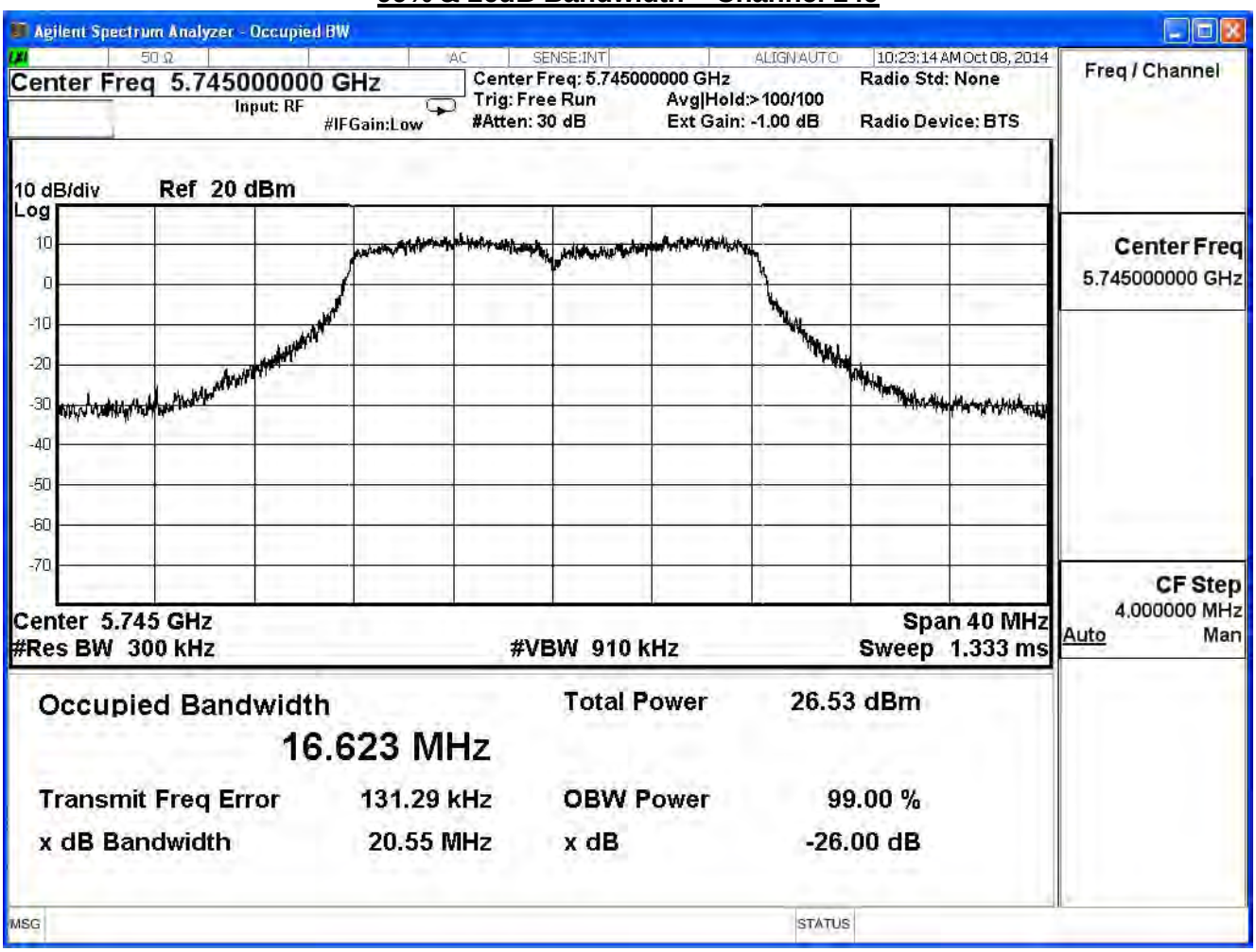
99% & 26dB Bandwidth – Channel 165



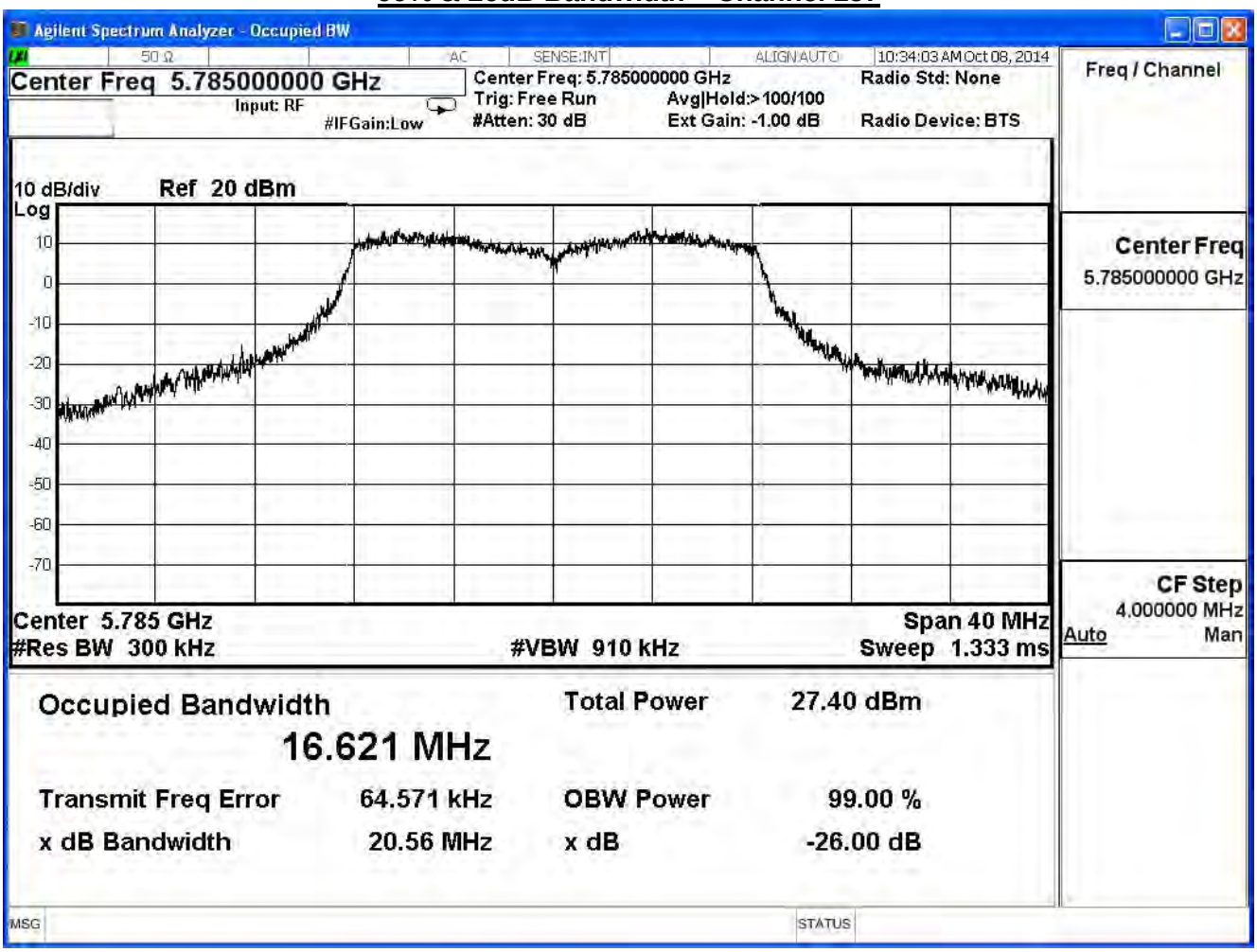
Product	VDSL2 Security Firewall		
Test Item	99% & 26dB Bandwidth		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/07	Test Site	SR7

802.11a (ANT 1)					
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (MHz)	Result
149	5745	20.550	16.623	--	Pass
157	5785	20.560	16.621	--	Pass
165	5825	20.980	16.690	--	Pass

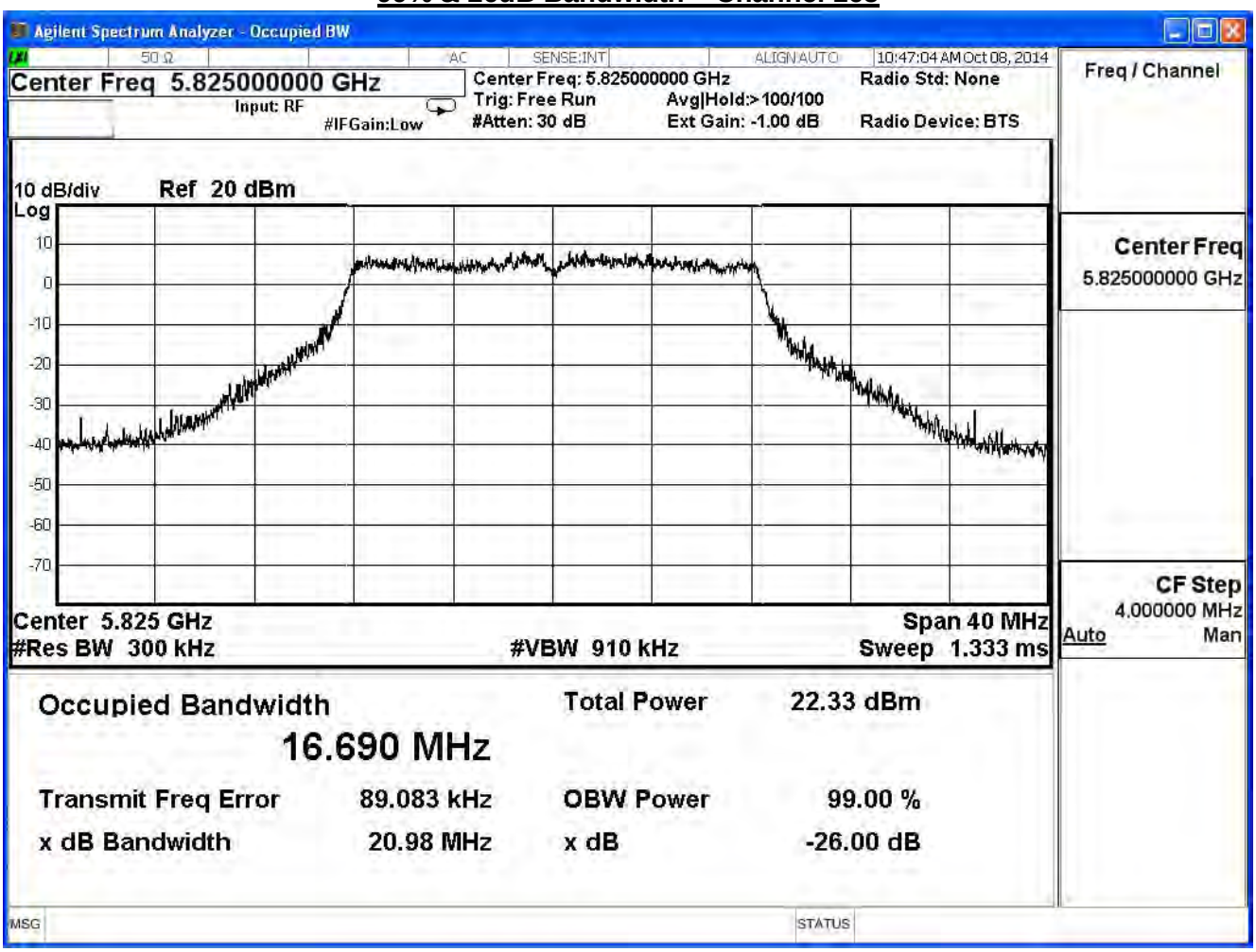
99% & 26dB Bandwidth – Channel 149



99% & 26dB Bandwidth – Channel 157



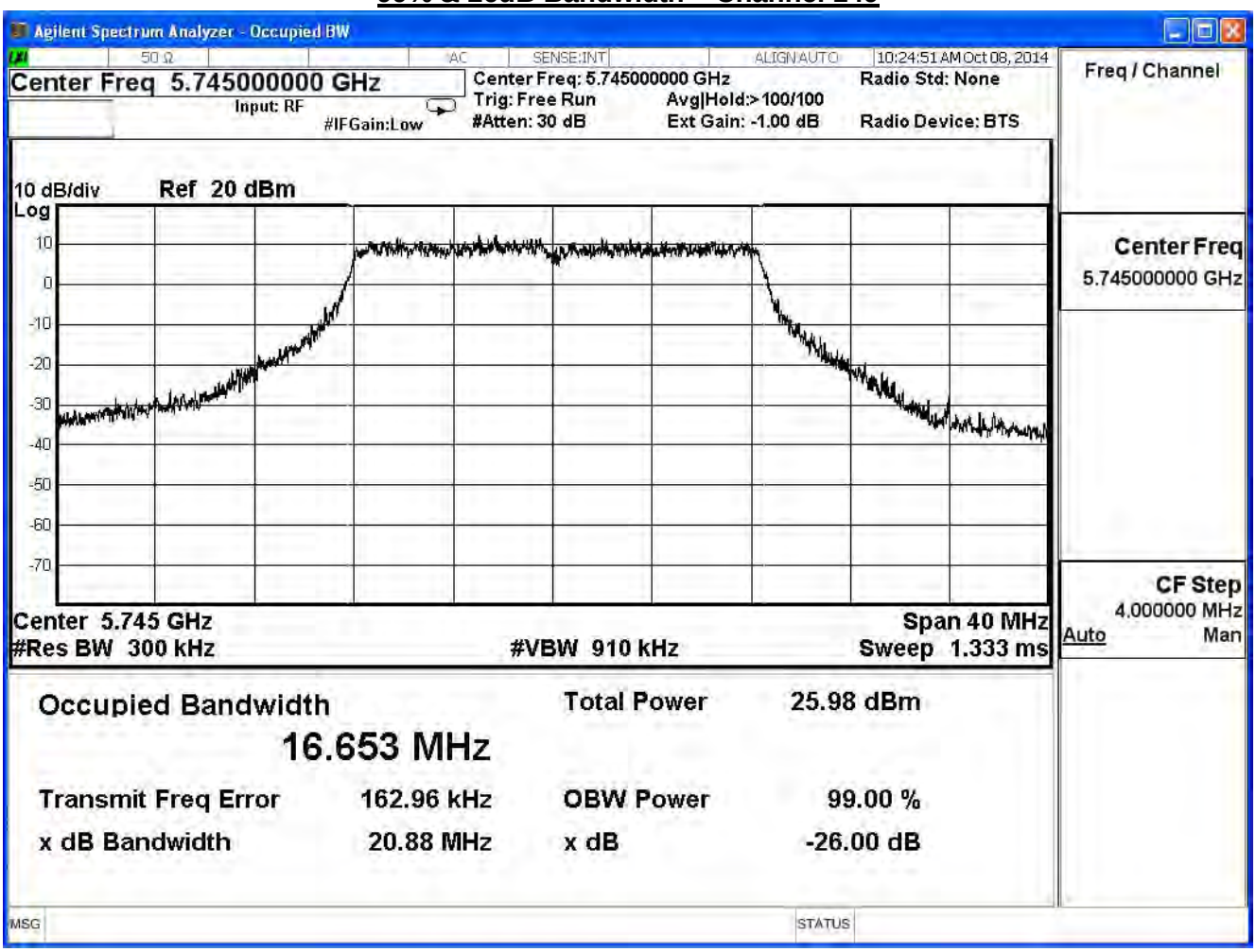
99% & 26dB Bandwidth – Channel 165



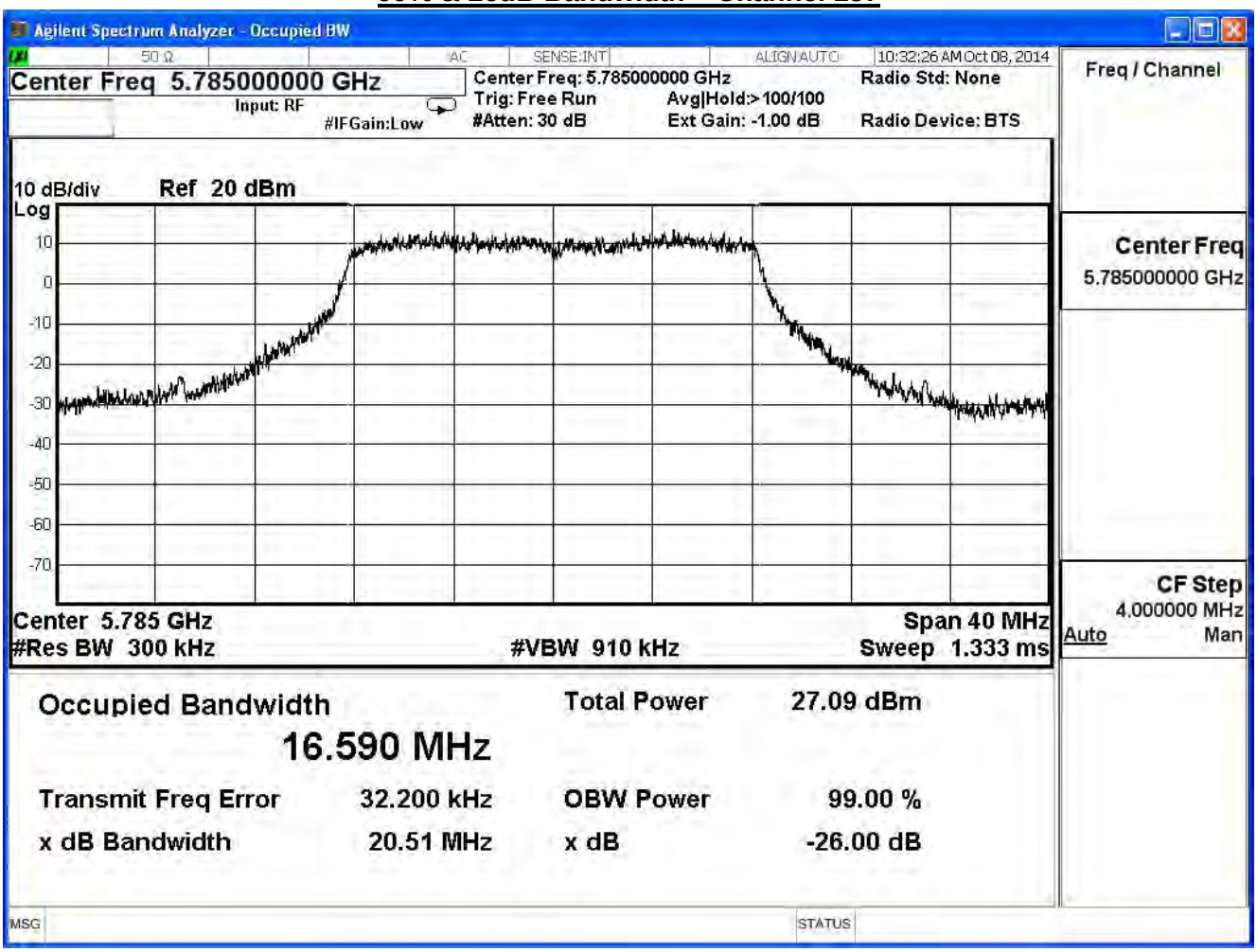
Product	VDSL2 Security Firewall		
Test Item	99% & 26dB Bandwidth		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/07	Test Site	SR7

802.11a (ANT 2)					
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (MHz)	Result
149	5745	20.880	16.653	--	Pass
157	5785	20.510	16.590	--	Pass
165	5825	21.260	16.616	--	Pass

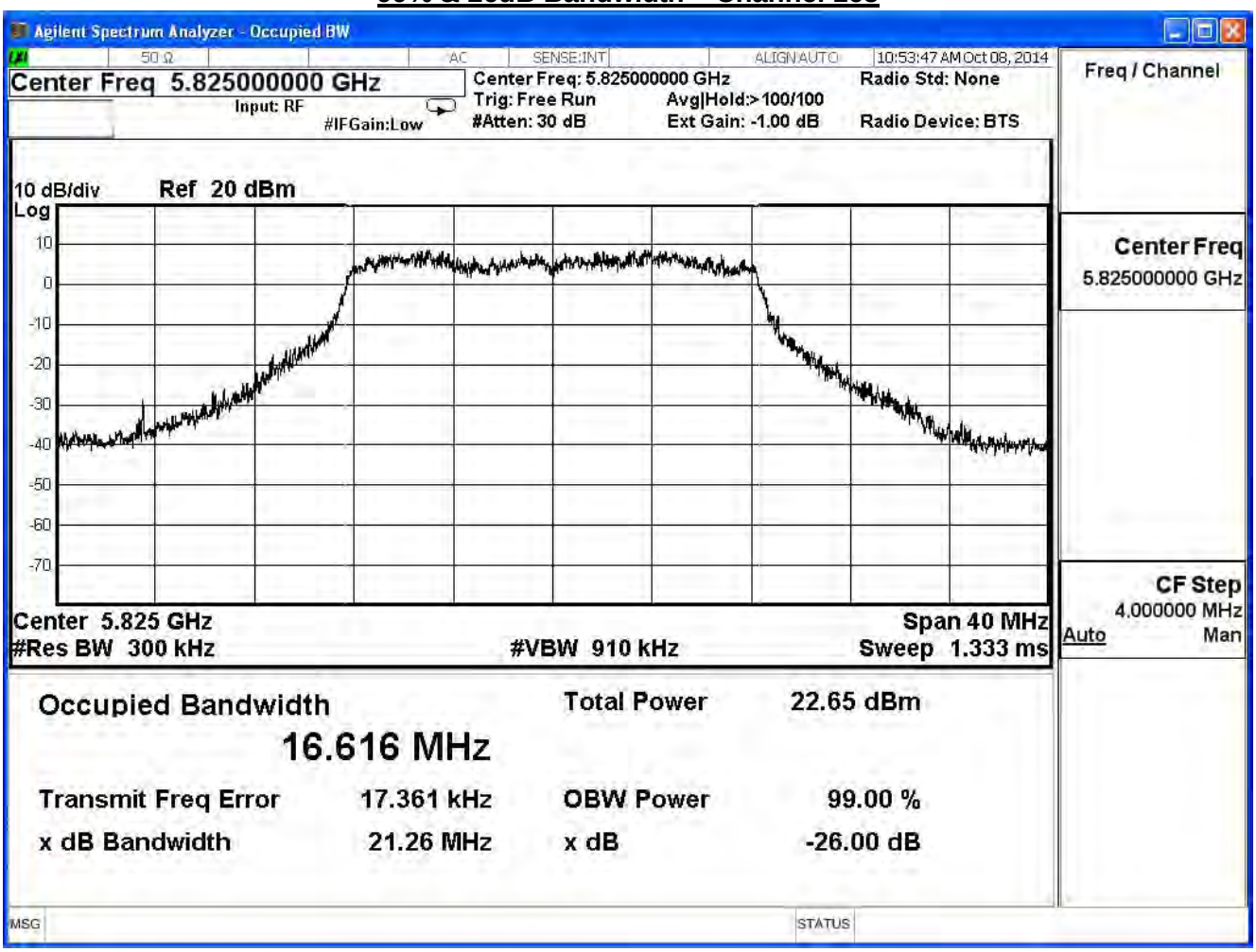
99% & 26dB Bandwidth – Channel 149



99% & 26dB Bandwidth – Channel 157



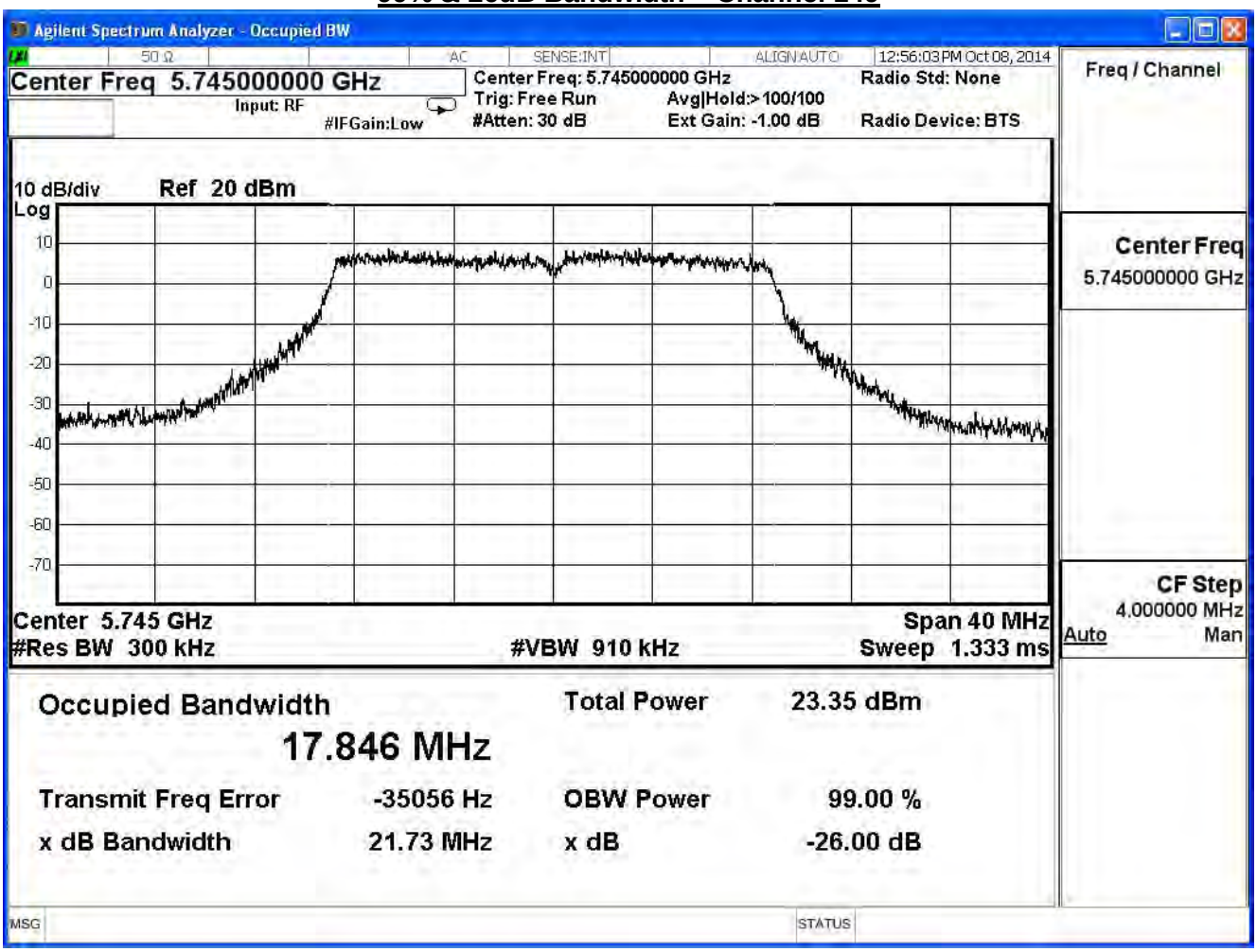
99% & 26dB Bandwidth – Channel 165



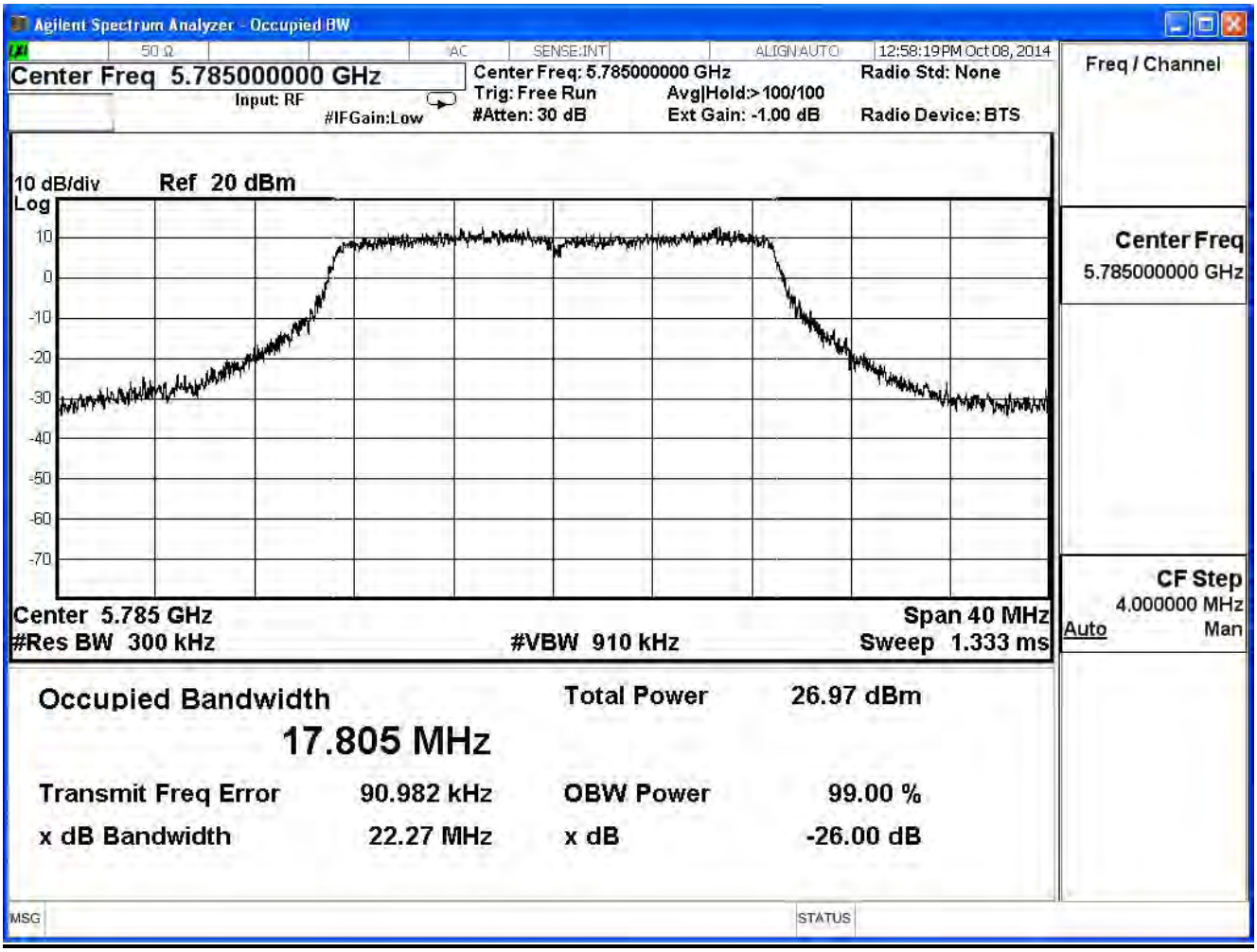
Product	VDSL2 Security Firewall		
Test Item	99% & 26dB Bandwidth		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/07	Test Site	SR7

802.11n_20M(ANT 0)					
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (MHz)	Result
149	5745	21.730	17.846	--	Pass
157	5785	22.270	17.805	--	Pass
165	5825	22.510	17.836	--	Pass

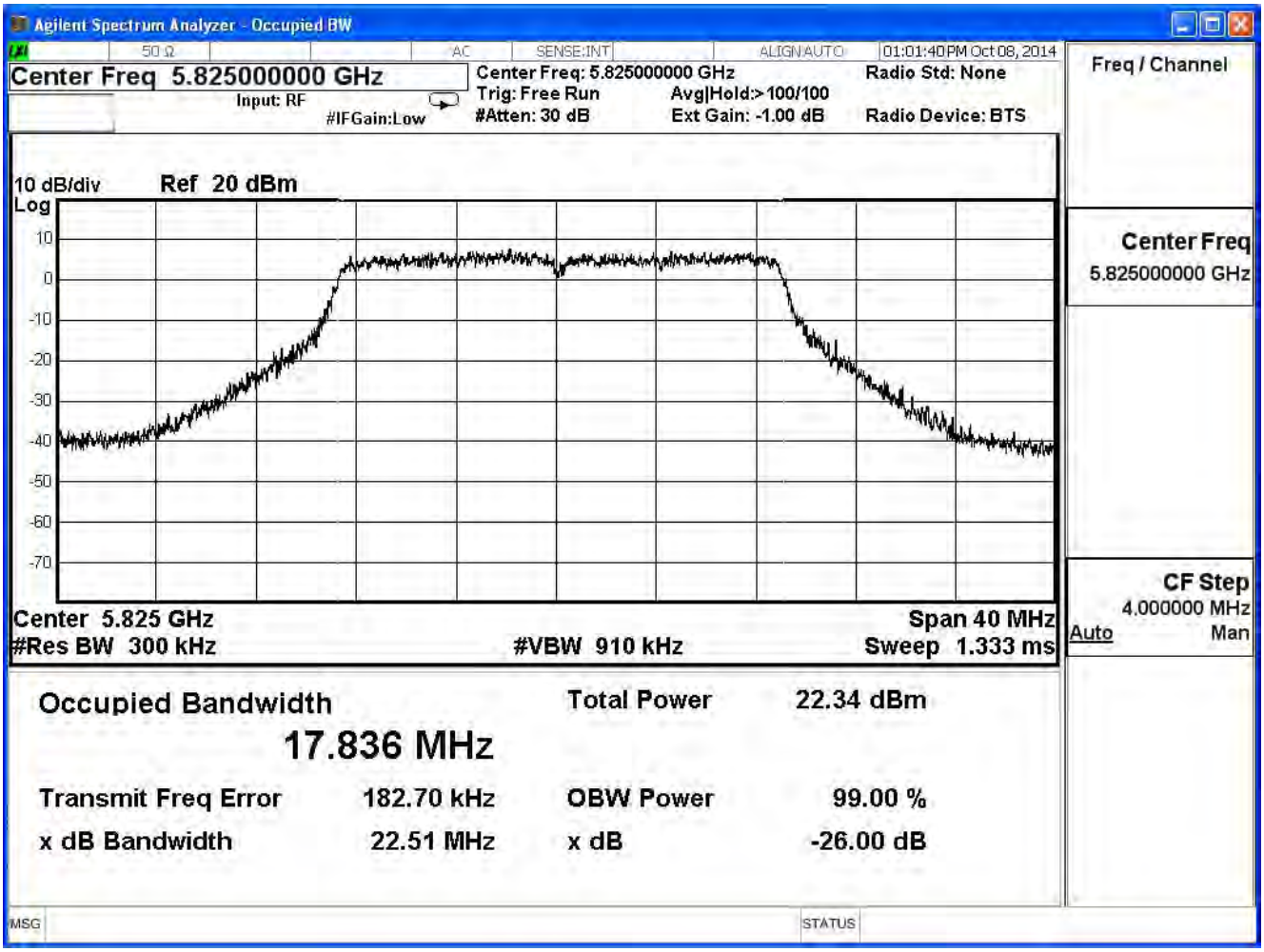
99% & 26dB Bandwidth – Channel 149



99% & 26dB Bandwidth – Channel 157



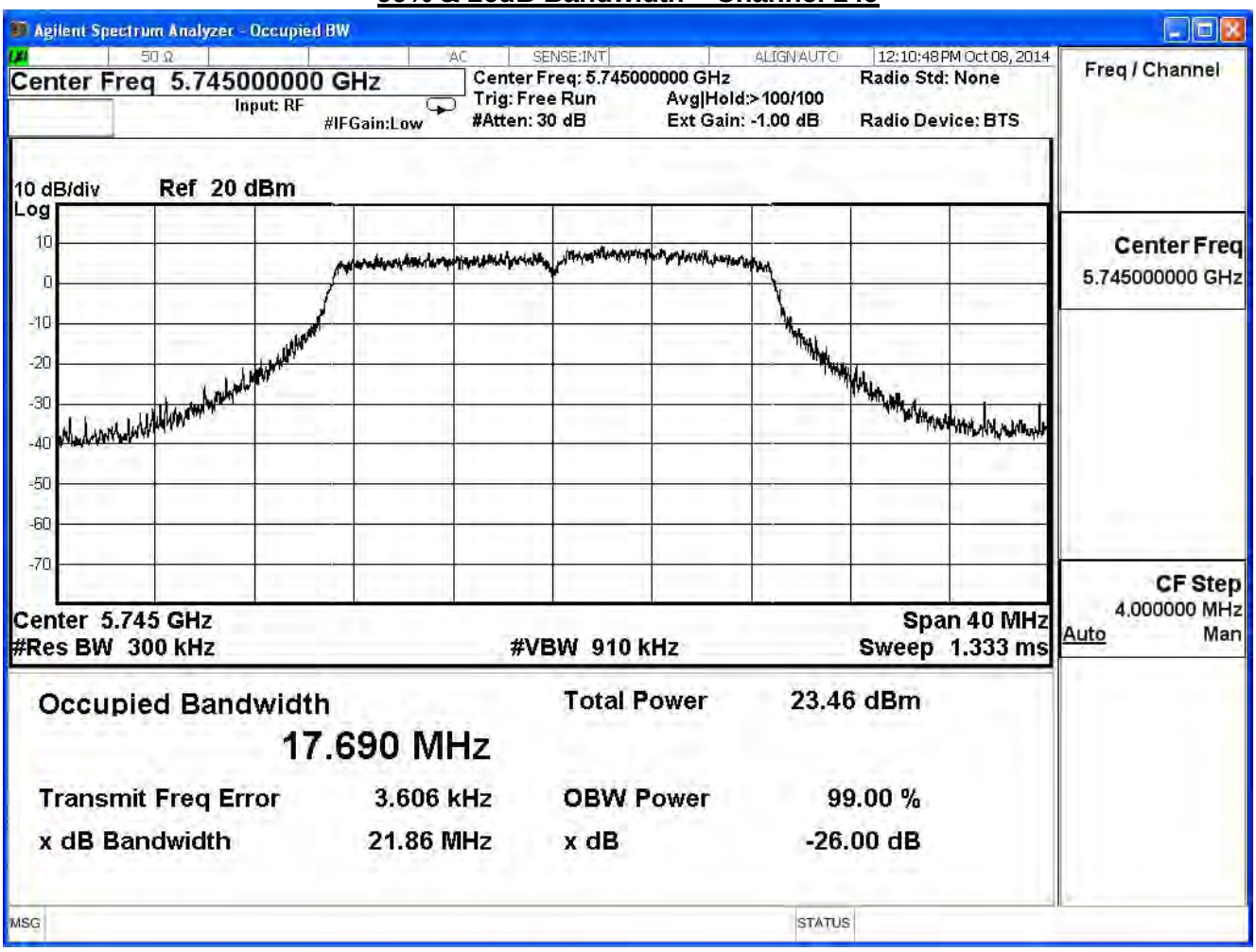
99% & 26dB Bandwidth – Channel 165



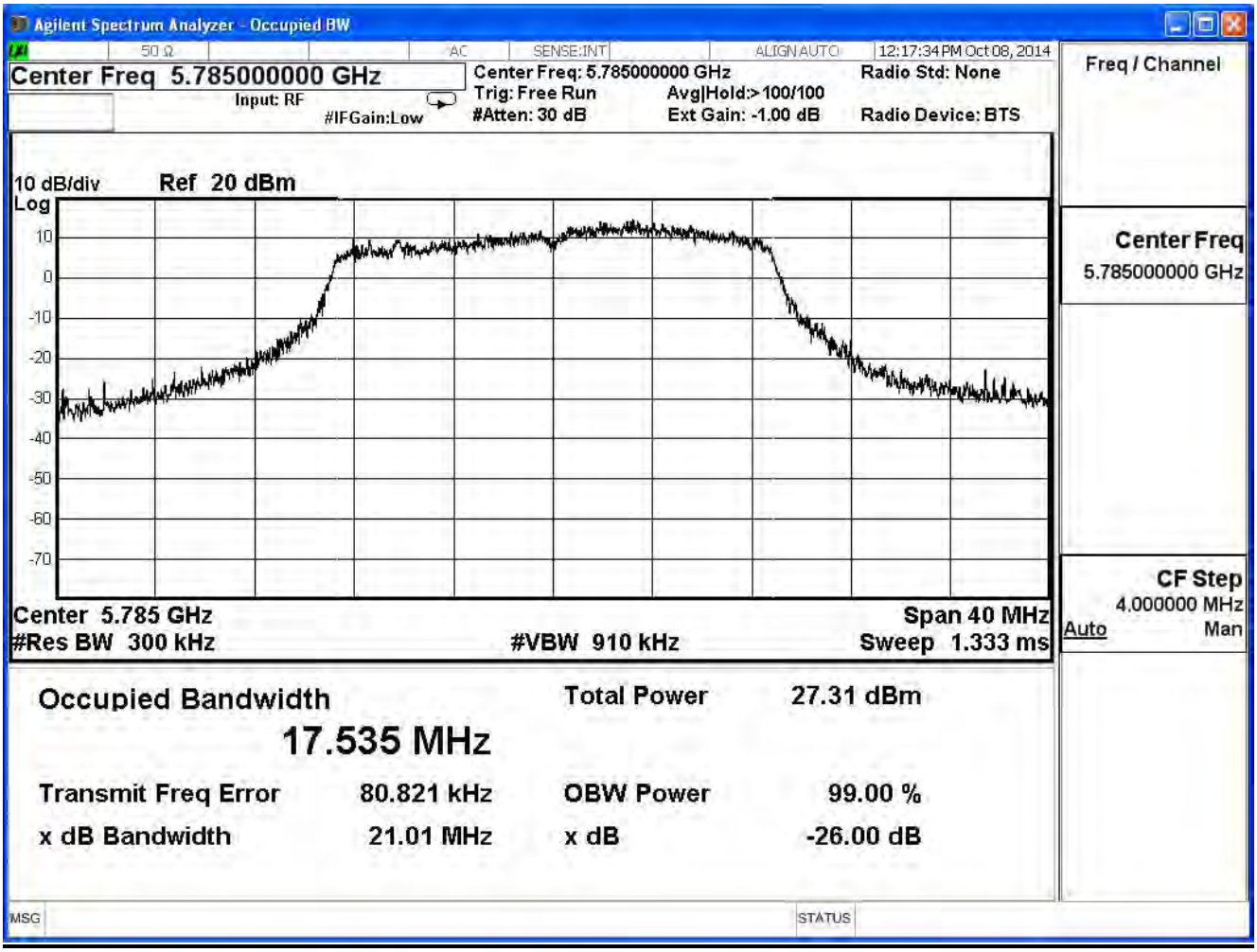
Product	VDSL2 Security Firewall		
Test Item	99% & 26dB Bandwidth		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/07	Test Site	SR7

802.11n_20M(ANT 1)					
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (MHz)	Result
149	5745	21.860	17.690	--	Pass
157	5785	21.010	17.535	--	Pass
165	5825	22.050	18.052	--	Pass

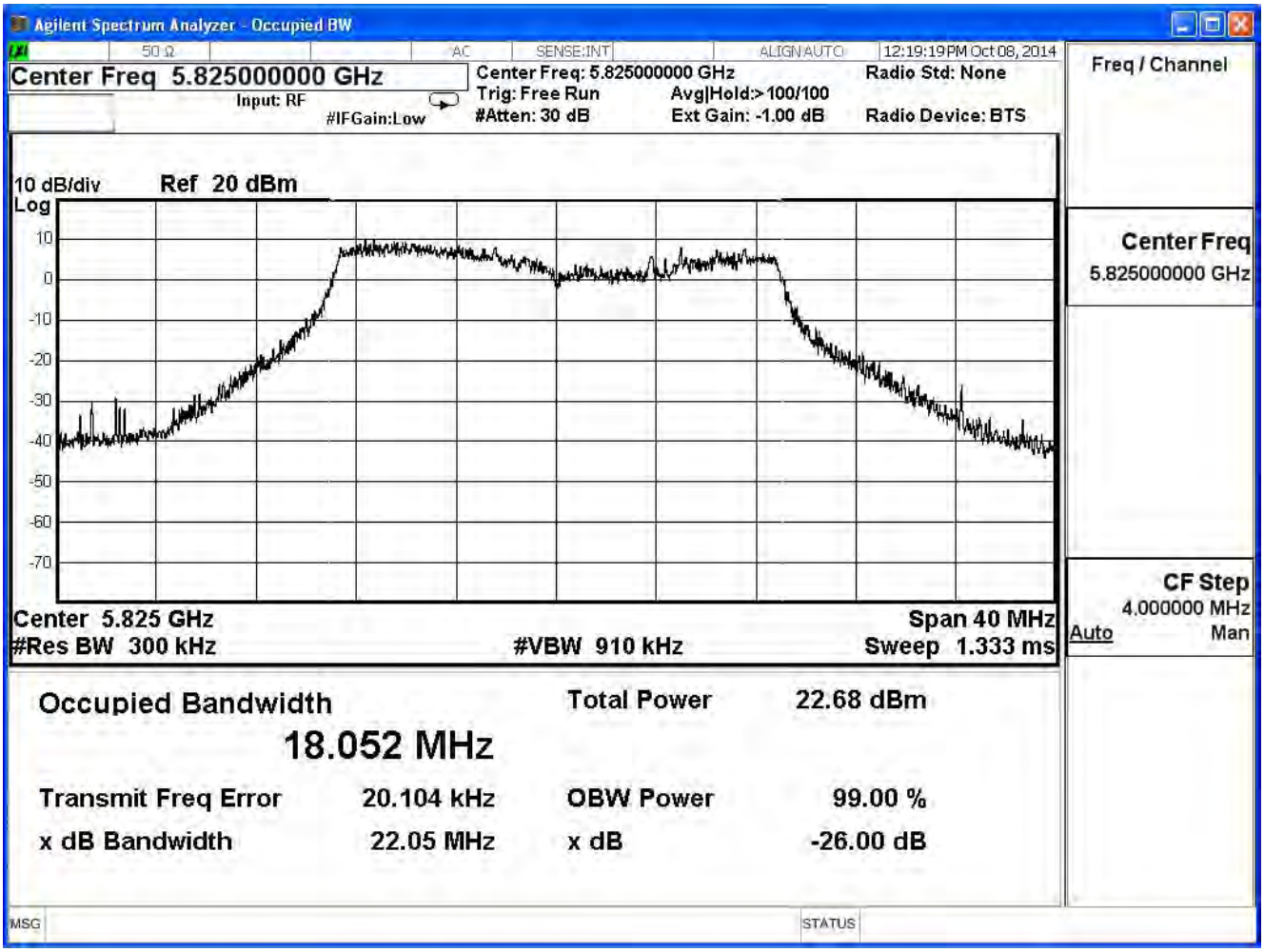
99% & 26dB Bandwidth – Channel 149



99% & 26dB Bandwidth – Channel 157



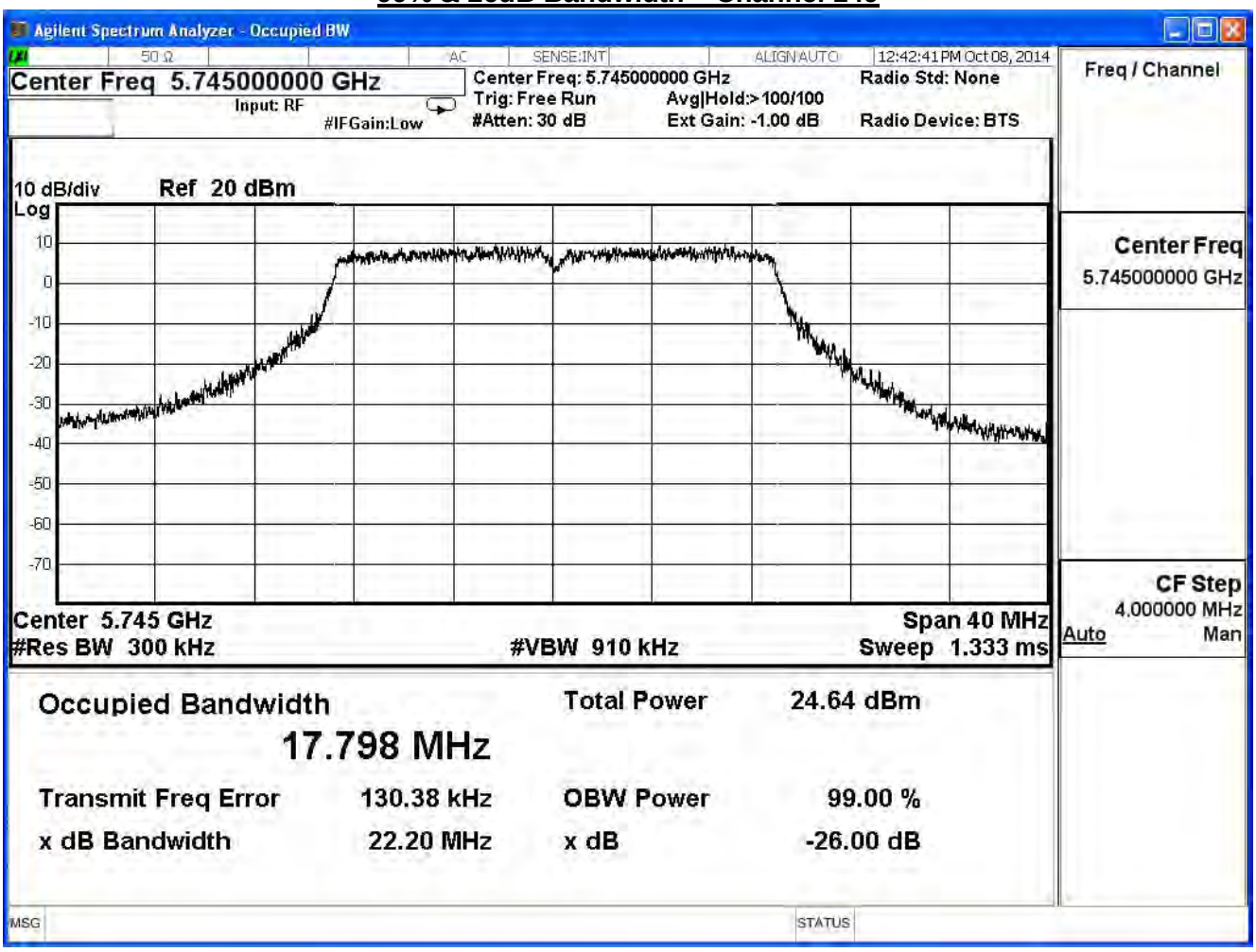
99% & 26dB Bandwidth – Channel 165



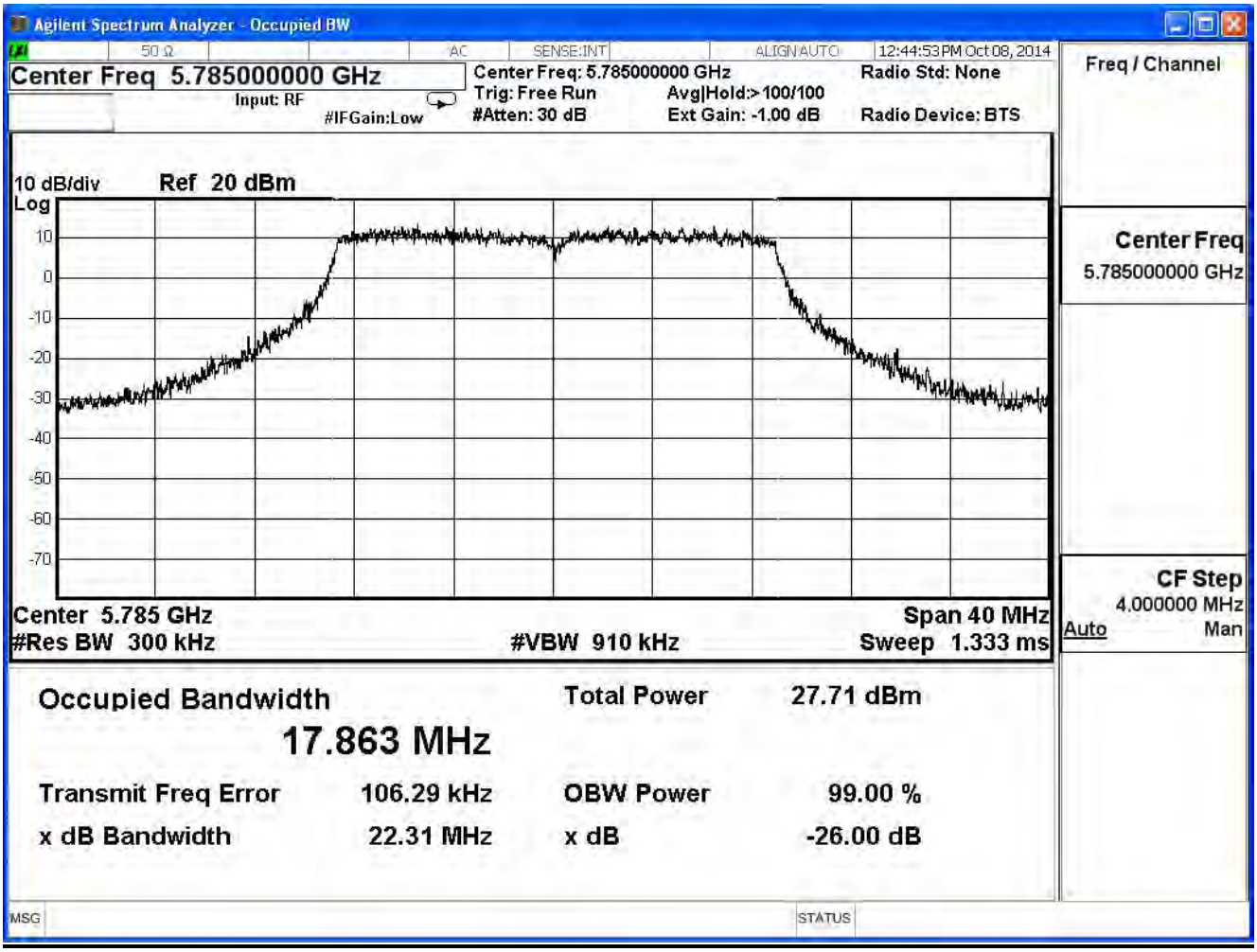
Product	VDSL2 Security Firewall		
Test Item	99% & 26dB Bandwidth		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/07	Test Site	SR7

802.11n_20M(ANT 2)					
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (MHz)	Result
149	5745	22.200	17.798	--	Pass
157	5785	22.310	17.863	--	Pass
165	5825	22.910	17.844	--	Pass

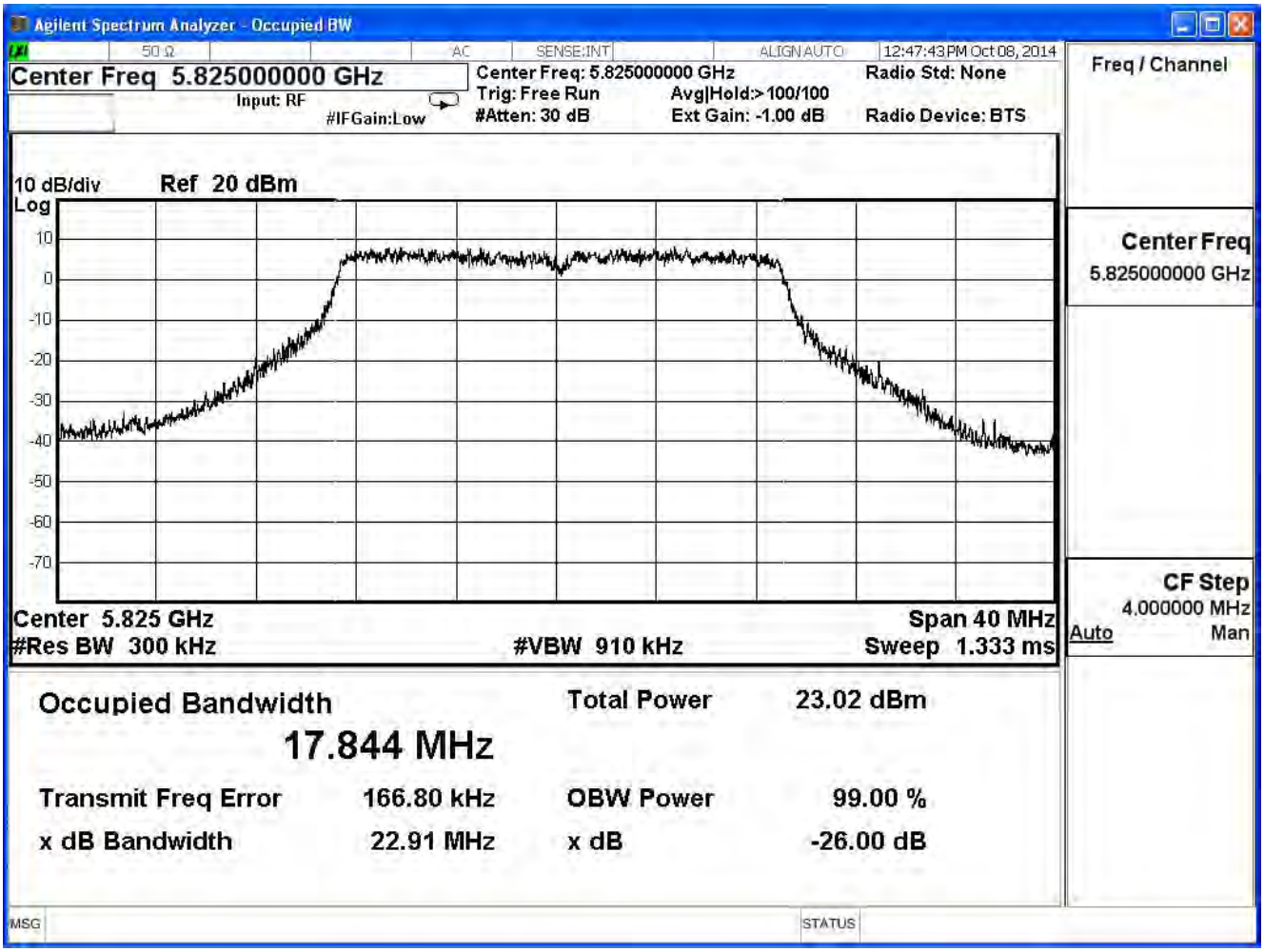
99% & 26dB Bandwidth – Channel 149



99% & 26dB Bandwidth – Channel 157



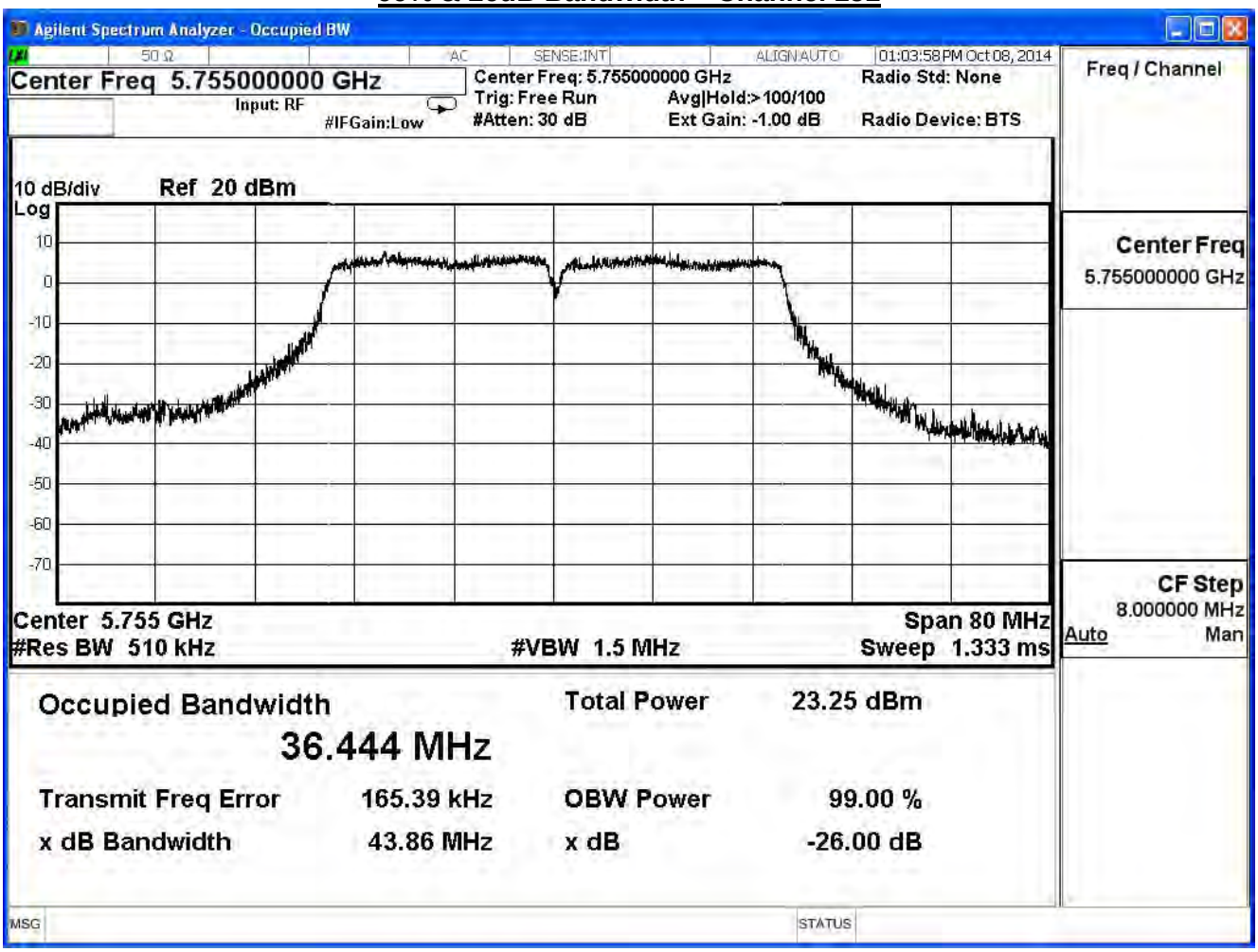
99% & 26dB Bandwidth – Channel 165



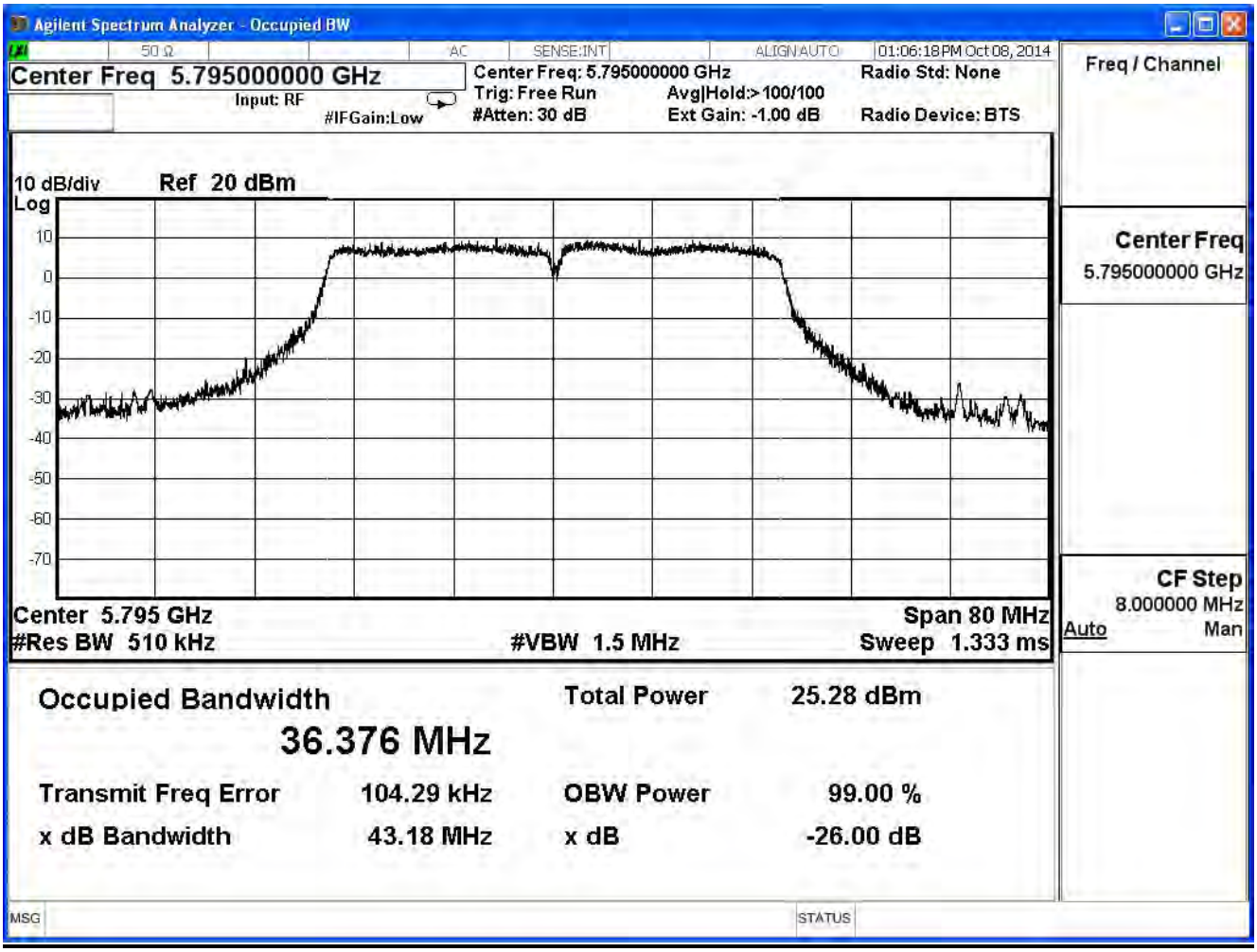
Product	VDSL2 Security Firewall		
Test Item	99% & 26dB Bandwidth		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/07	Test Site	SR7

802.11n_40M(ANT 0)					
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (MHz)	Result
151	5755	43.860	36.444	--	Pass
159	5795	43.180	36.376	--	Pass

99% & 26dB Bandwidth – Channel 151



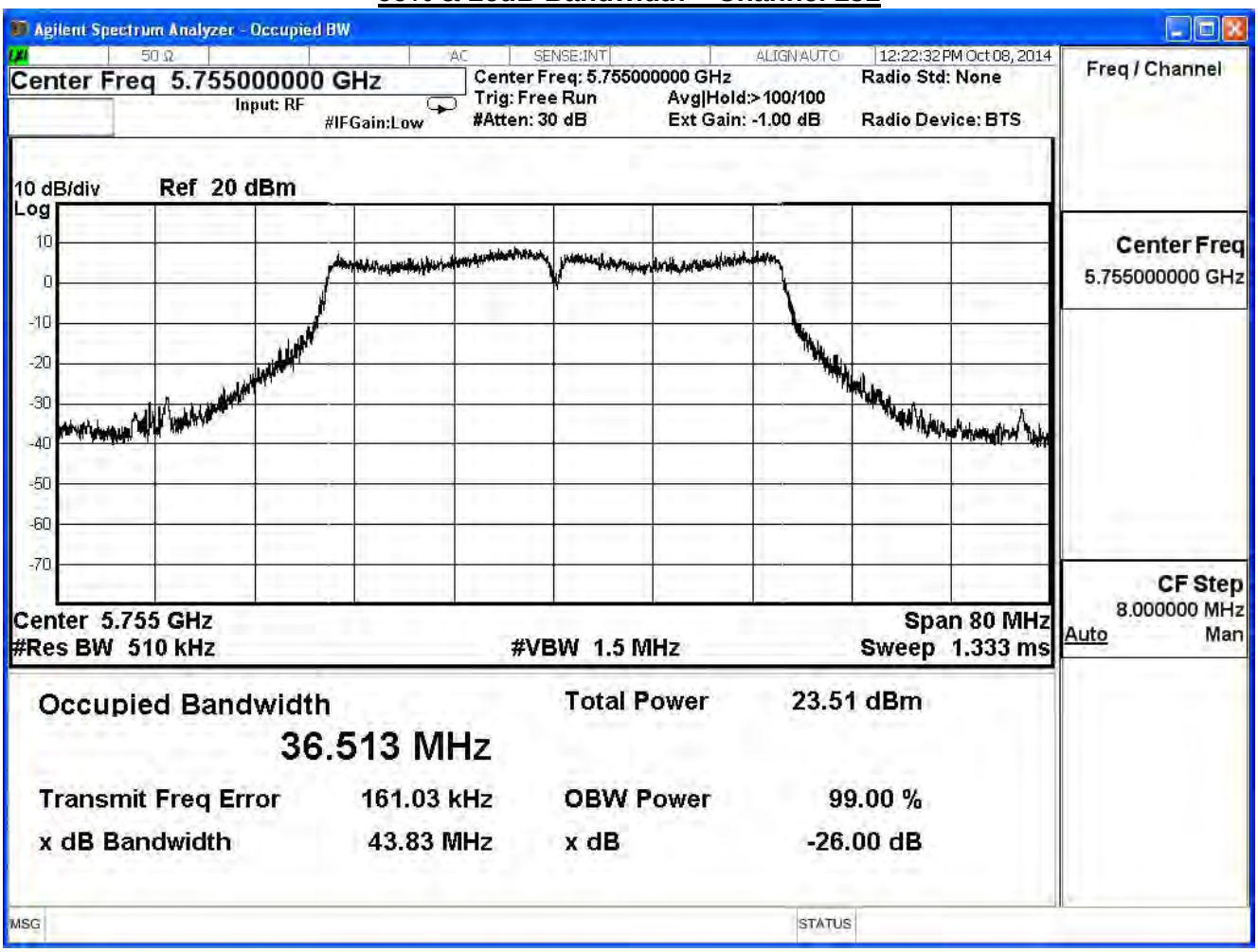
99% & 26dB Bandwidth – Channel 159



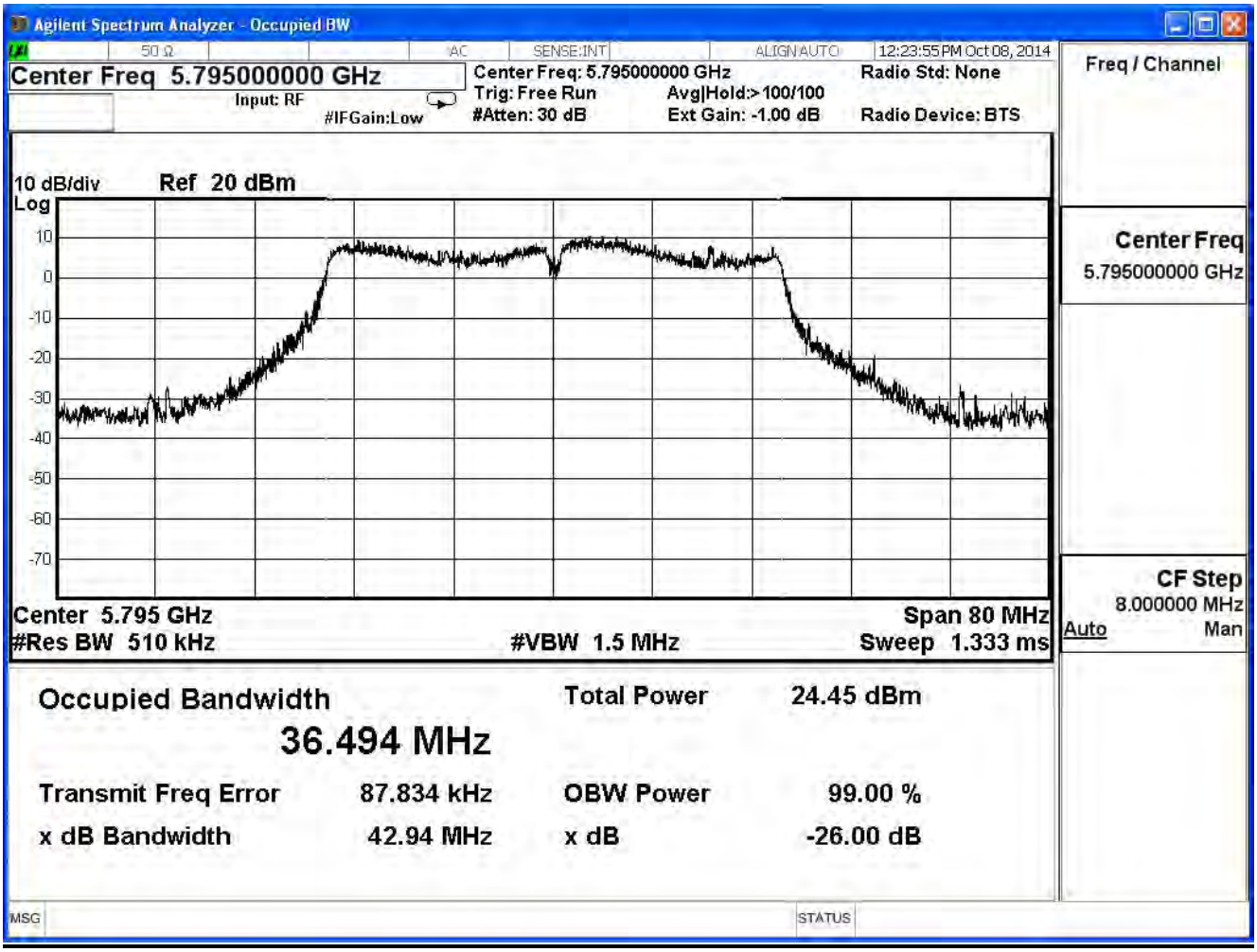
Product	VDSL2 Security Firewall		
Test Item	99% & 26dB Bandwidth		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/07	Test Site	SR7

802.11n_40M(ANT 1)					
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (MHz)	Result
151	5755	43.830	36.513	--	Pass
159	5795	42.940	36.494	--	Pass

99% & 26dB Bandwidth – Channel 151



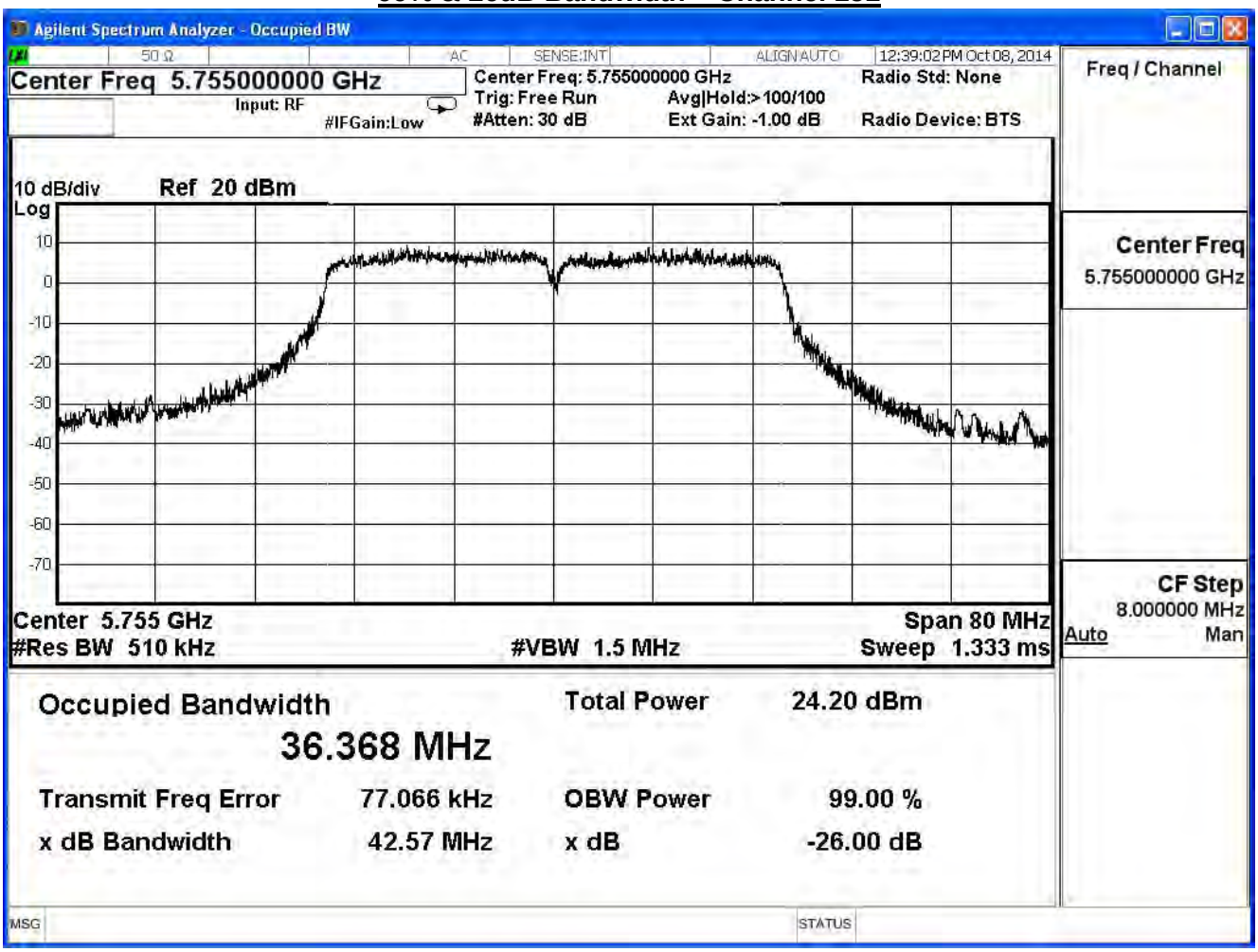
99% & 26dB Bandwidth – Channel 159



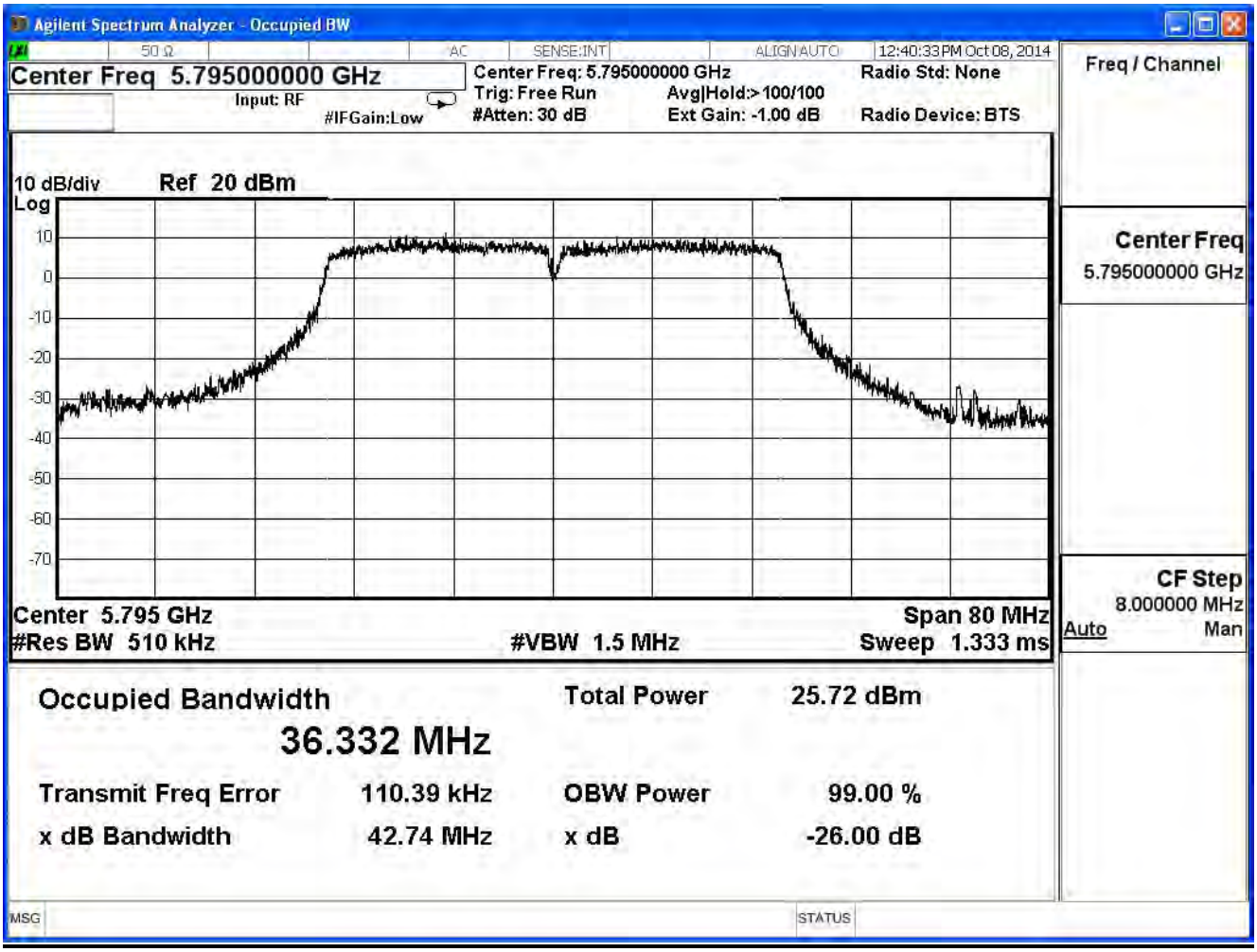
Product	VDSL2 Security Firewall		
Test Item	99% & 26dB Bandwidth		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/07	Test Site	SR7

802.11n_40M(ANT 2)					
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (MHz)	Result
151	5755	42.570	36.368	--	Pass
159	5795	42.740	36.332	--	Pass

99% & 26dB Bandwidth – Channel 151



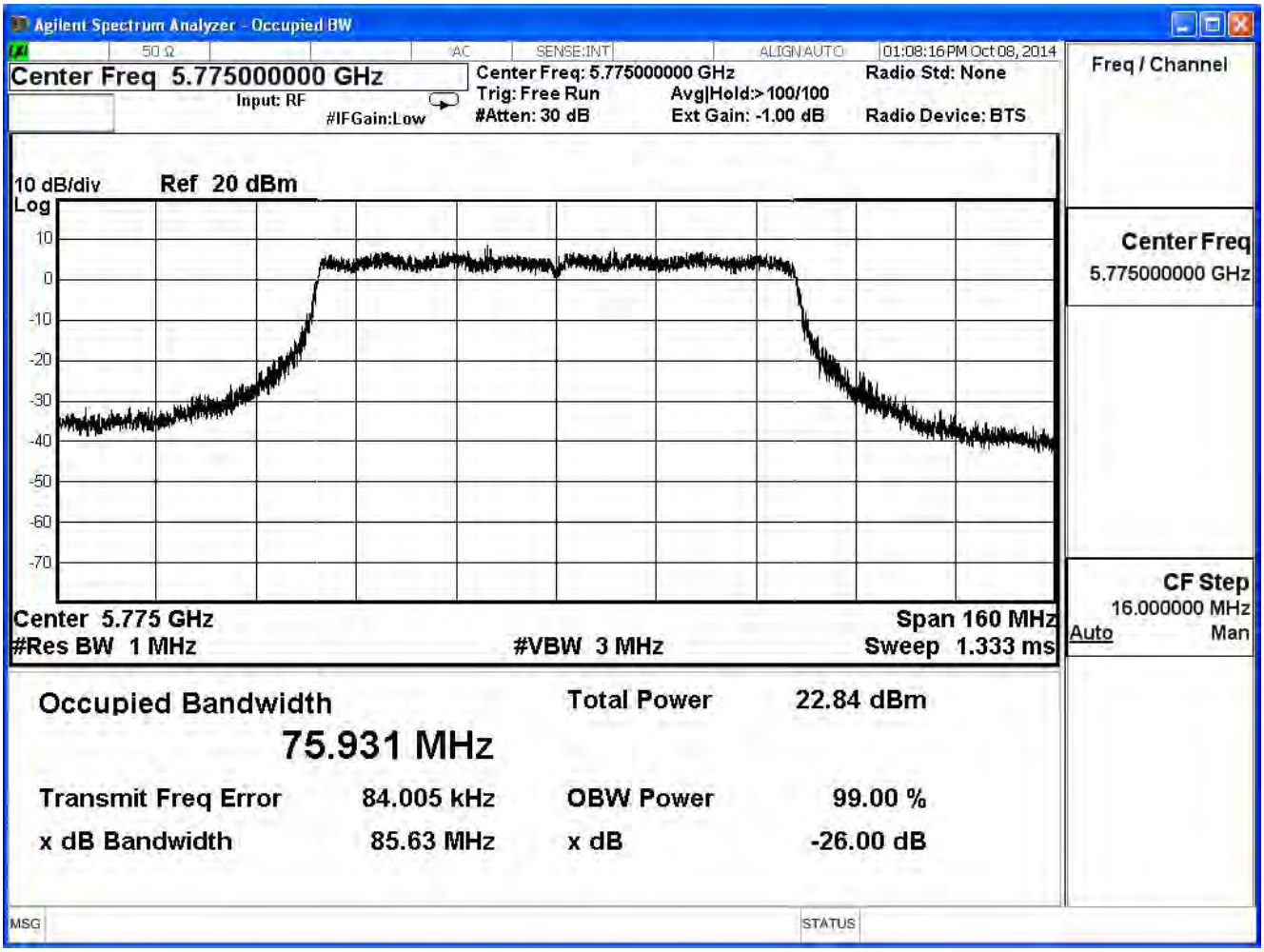
99% & 26dB Bandwidth – Channel 159



Product	VDSL2 Security Firewall		
Test Item	99% & 26dB Bandwidth		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/07	Test Site	SR7

802.11ac(80M) (ANT 0)					
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (MHz)	Result
155	5775	85.630	75.931	--	Pass

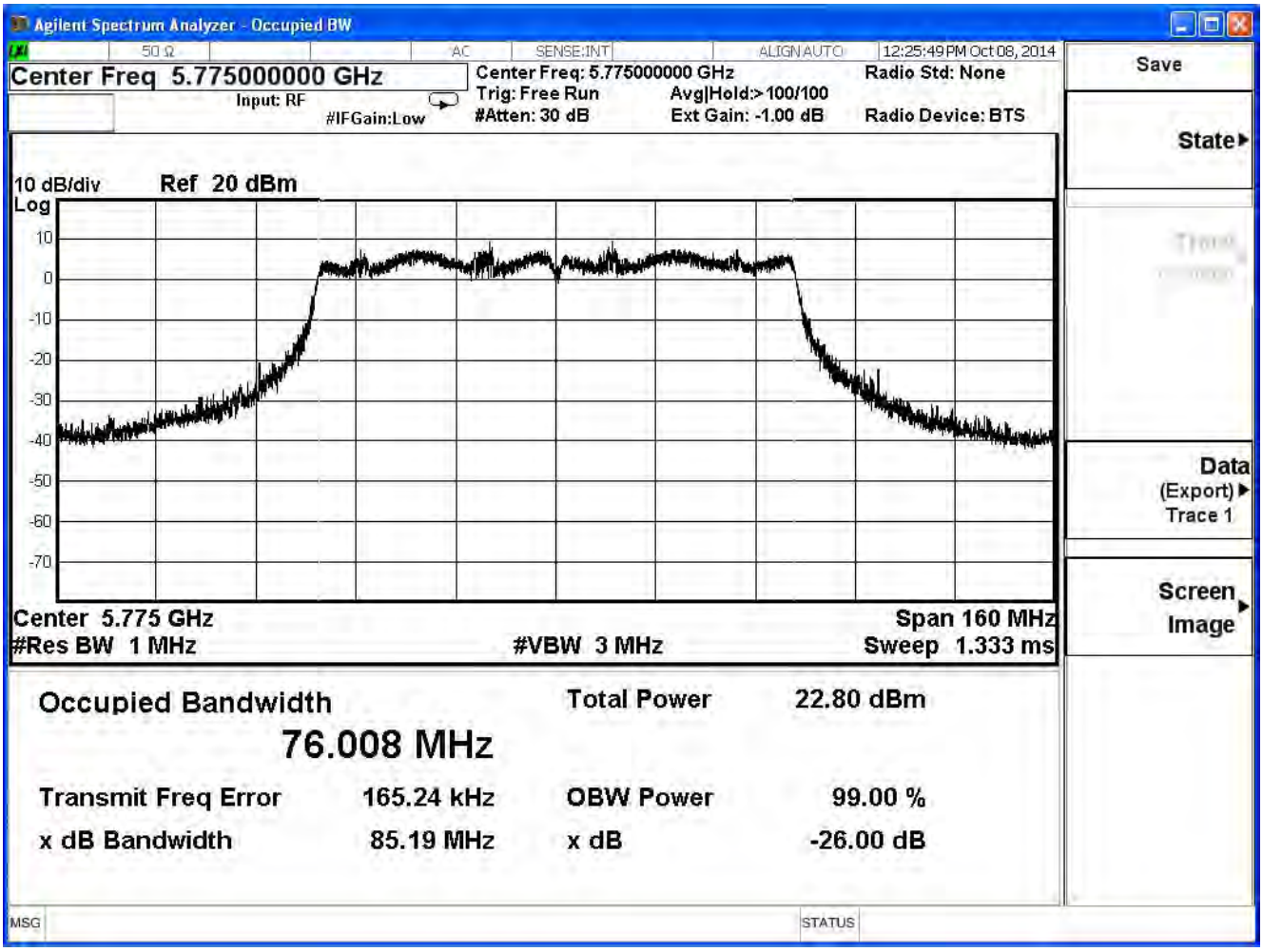
99% & 26dB Bandwidth – Channel 155



Product	VDSL2 Security Firewall		
Test Item	99% & 26dB Bandwidth		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/07	Test Site	SR7

802.11ac(80M) (ANT 1)					
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (MHz)	Result
155	5775	85.190	76.008	--	Pass

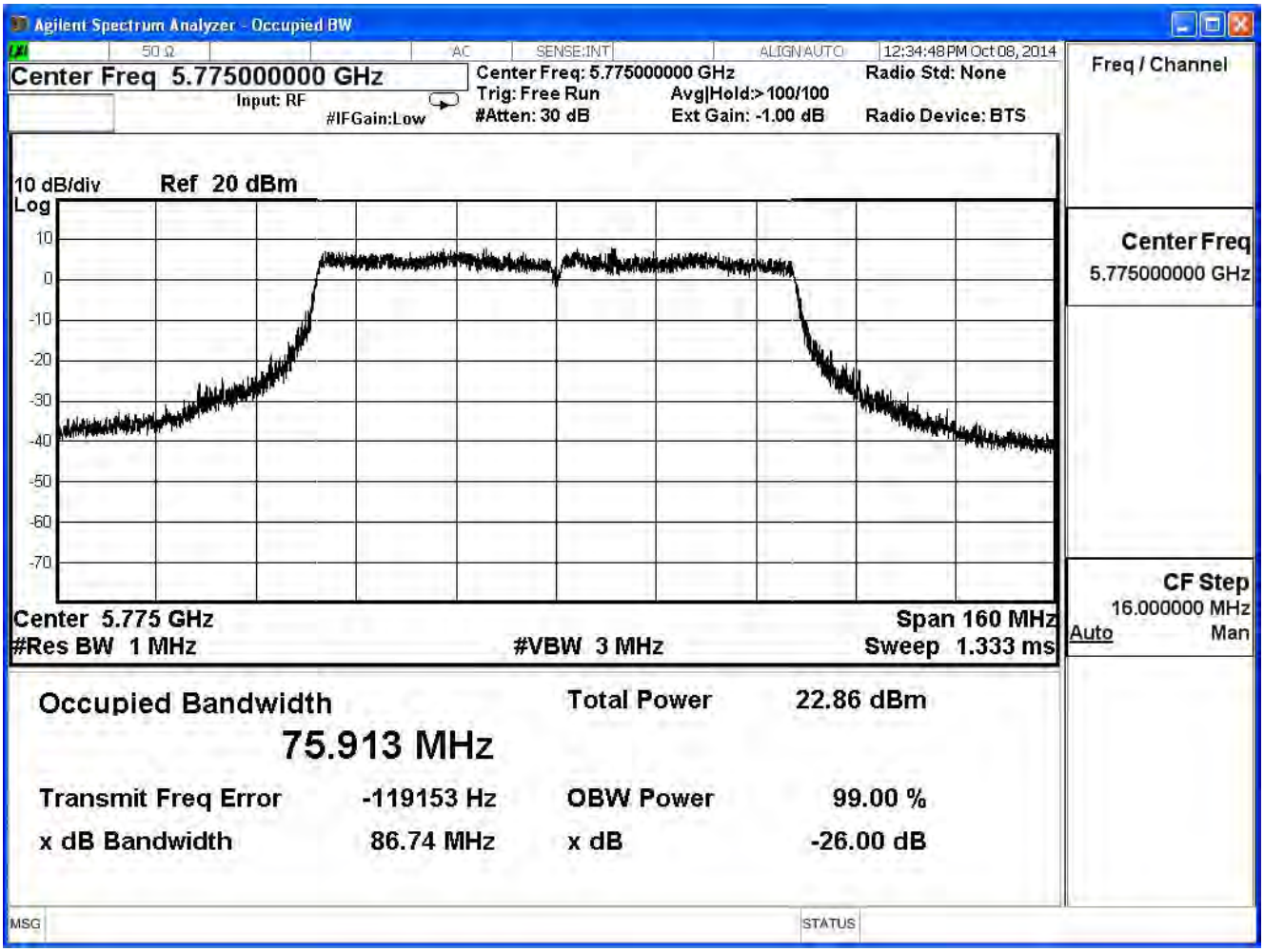
99% & 26dB Bandwidth – Channel 155



Product	VDSL2 Security Firewall		
Test Item	99% & 26dB Bandwidth		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/07	Test Site	SR7

802.11ac(80M) (ANT 2)					
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (MHz)	Result
155	5775	86.740	75.913	--	Pass

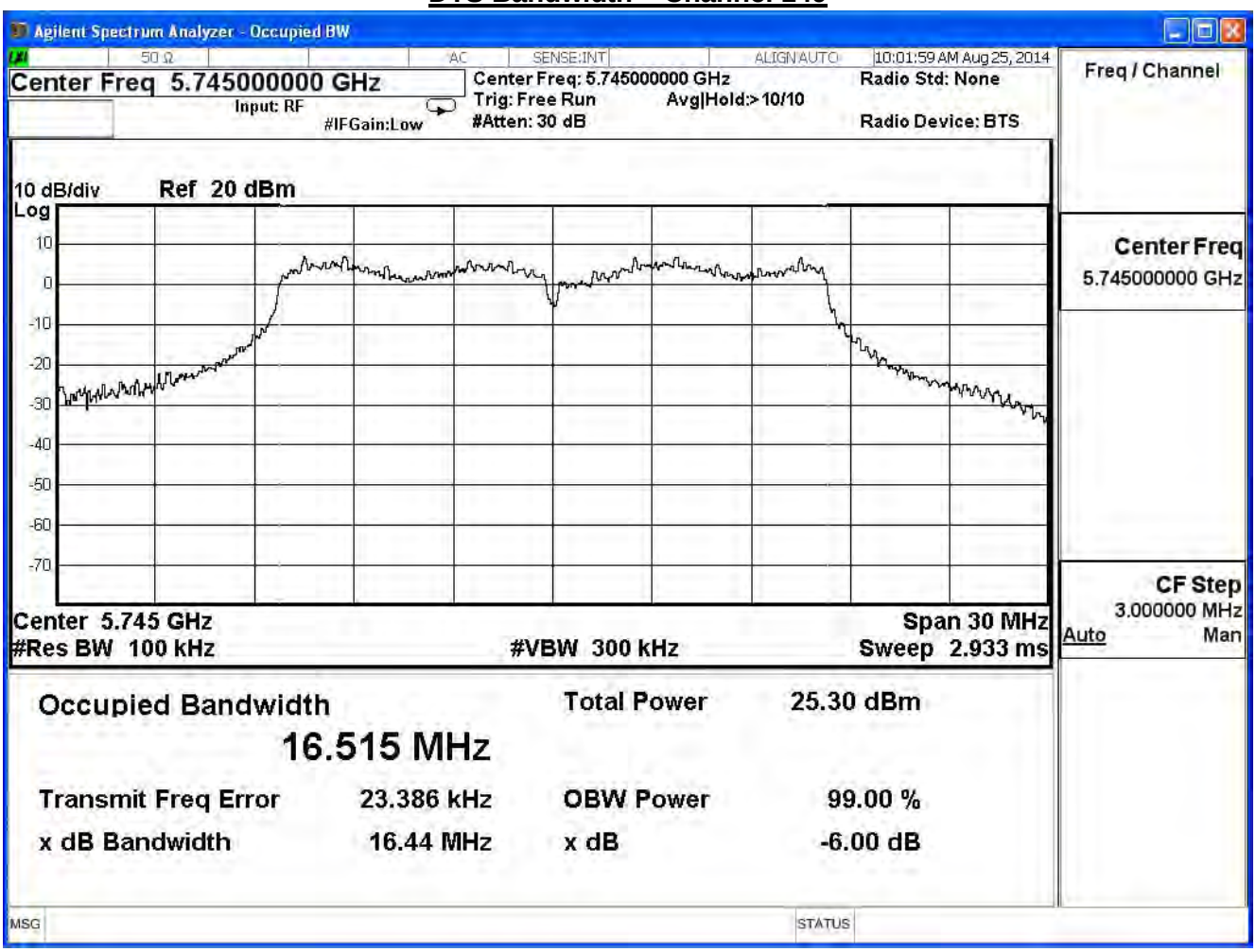
99% & 26dB Bandwidth – Channel 155



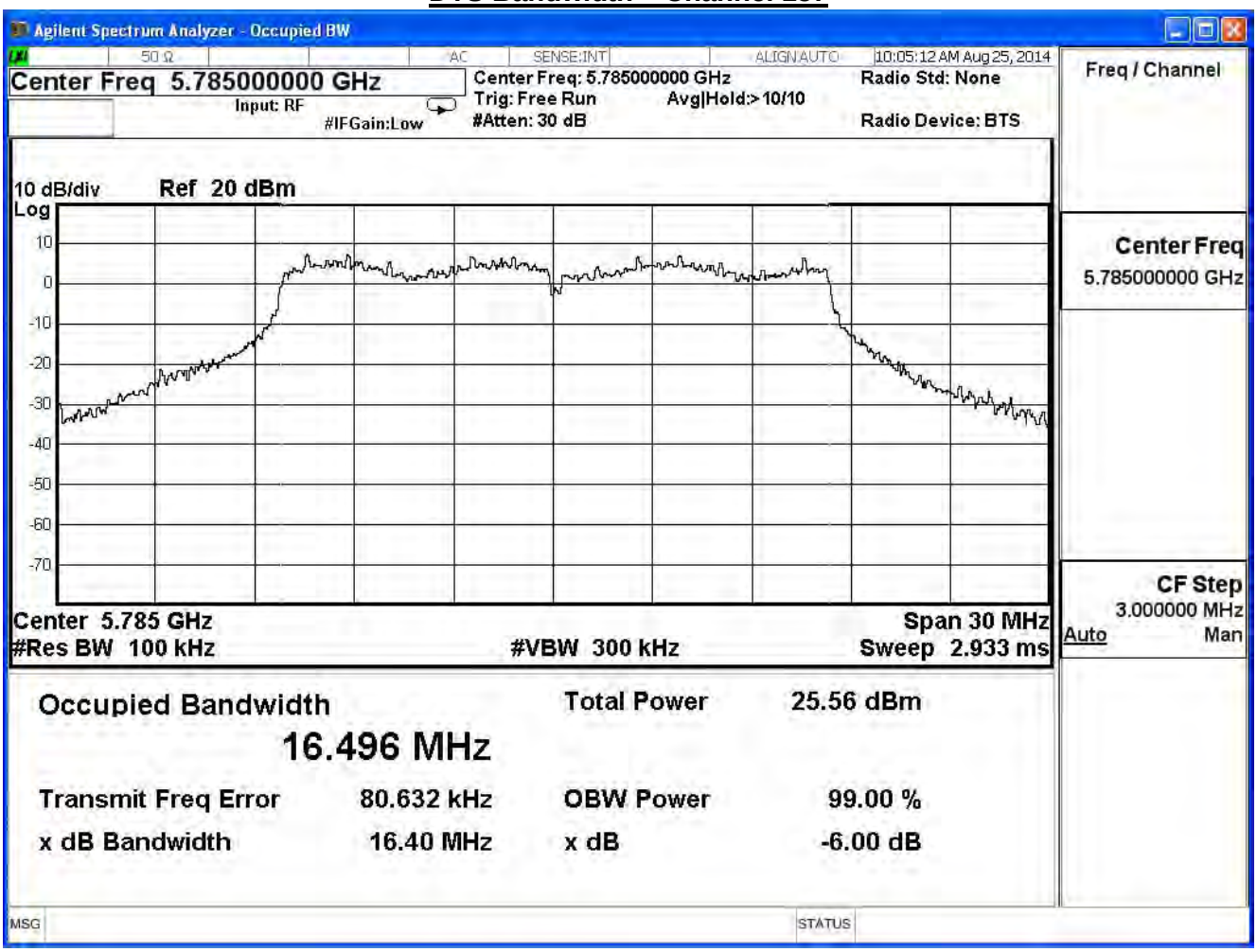
Product	VDSL2 Security Firewall		
Test Item	DTS Bandwidth		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/08/25	Test Site	SR7

802.11a(ANT 0)				
Channel No.	Frequency (MHz)	Measure Level (MHz)	Limit (MHz)	Result
149	5745	16.44	≧0.5	Pass
157	5785	16.40	≧0.5	Pass
165	5825	16.39	≧0.5	Pass

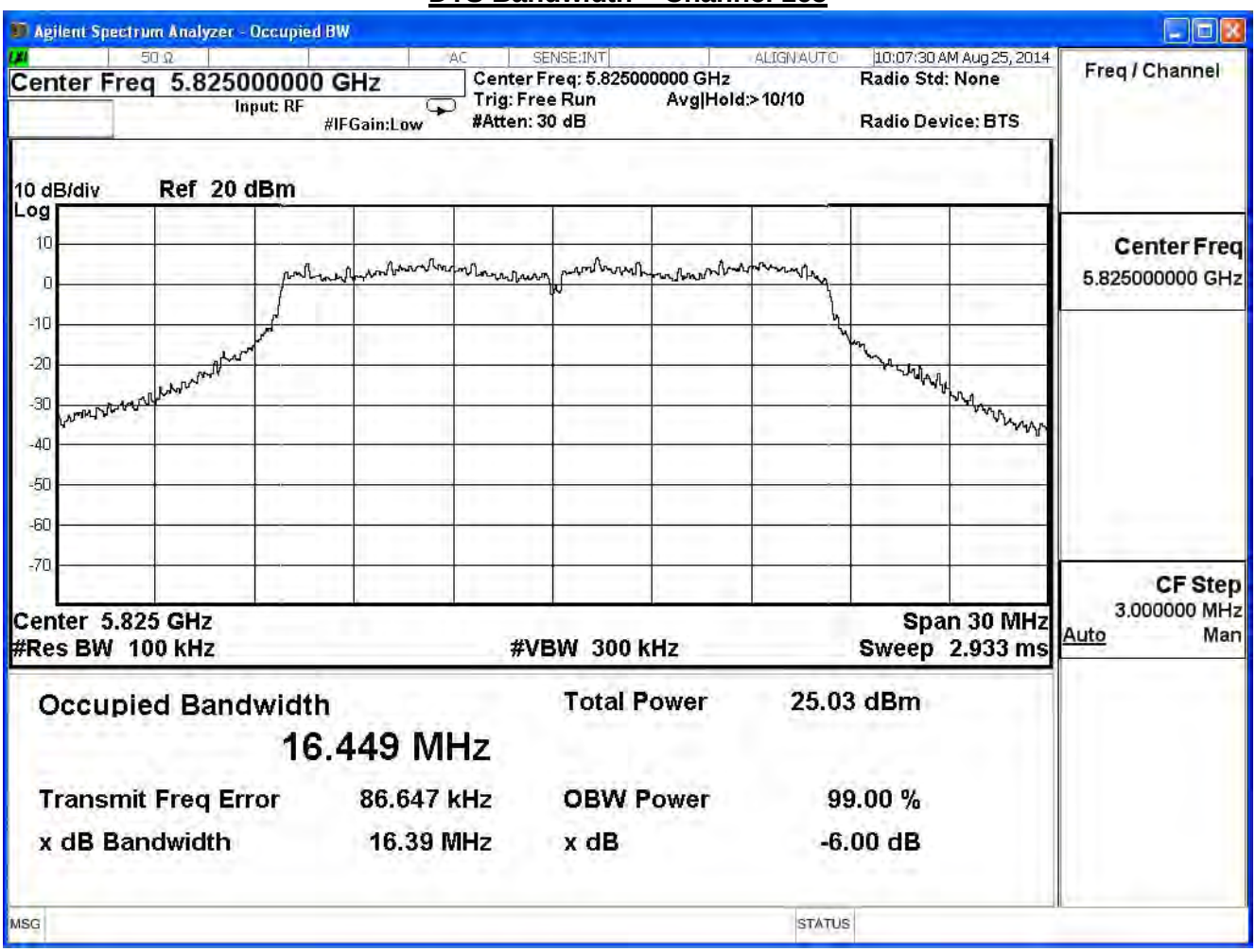
DTS Bandwidth – Channel 149



DTS Bandwidth – Channel 157



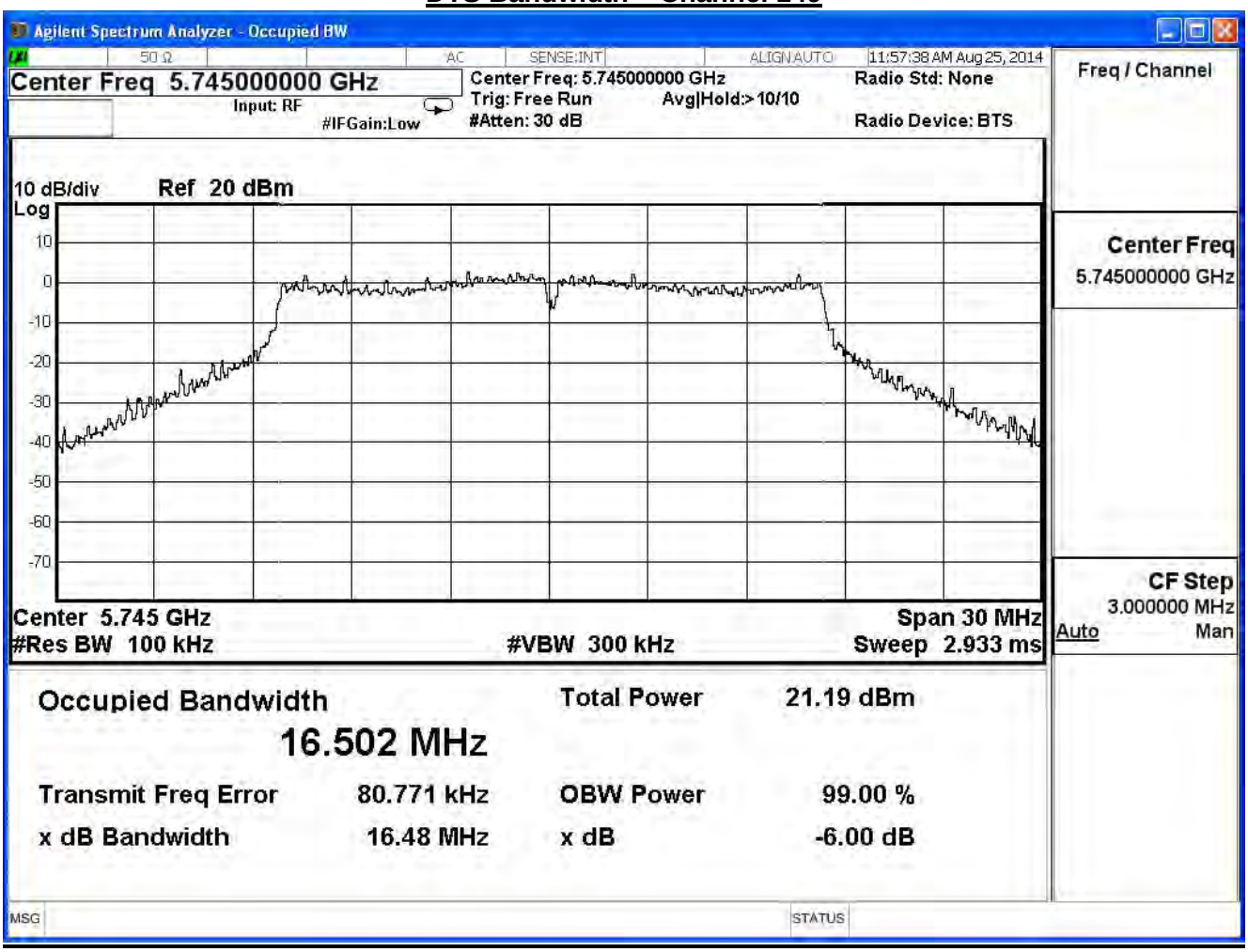
DTS Bandwidth – Channel 165



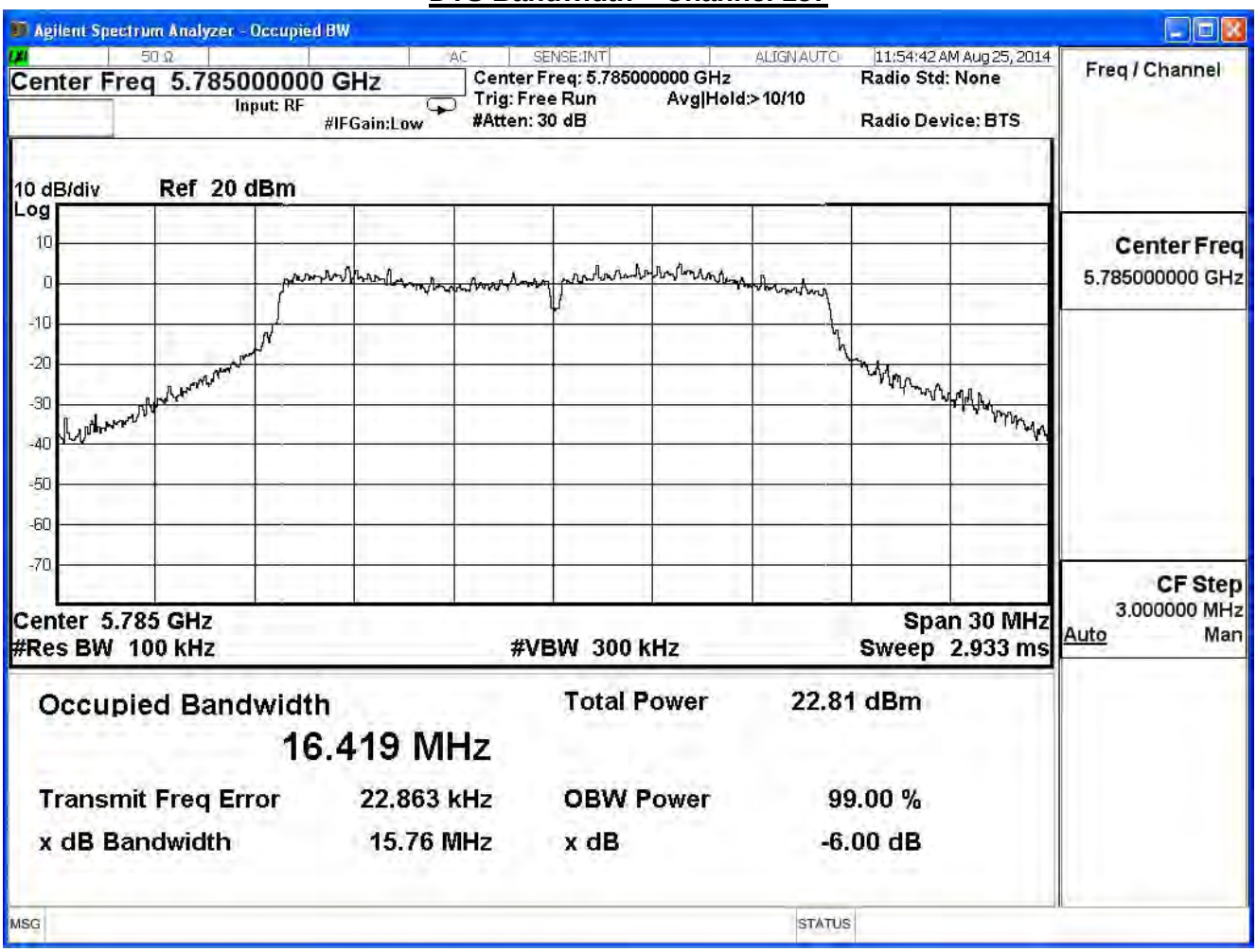
Product	VDSL2 Security Firewall		
Test Item	DTS Bandwidth		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/08/25	Test Site	SR7

802.11a(ANT 1)				
Channel No.	Frequency (MHz)	Measure Level (MHz)	Limit (MHz)	Result
149	5745	16.48	≧0.5	Pass
157	5785	15.76	≧0.5	Pass
165	5825	16.36	≧0.5	Pass

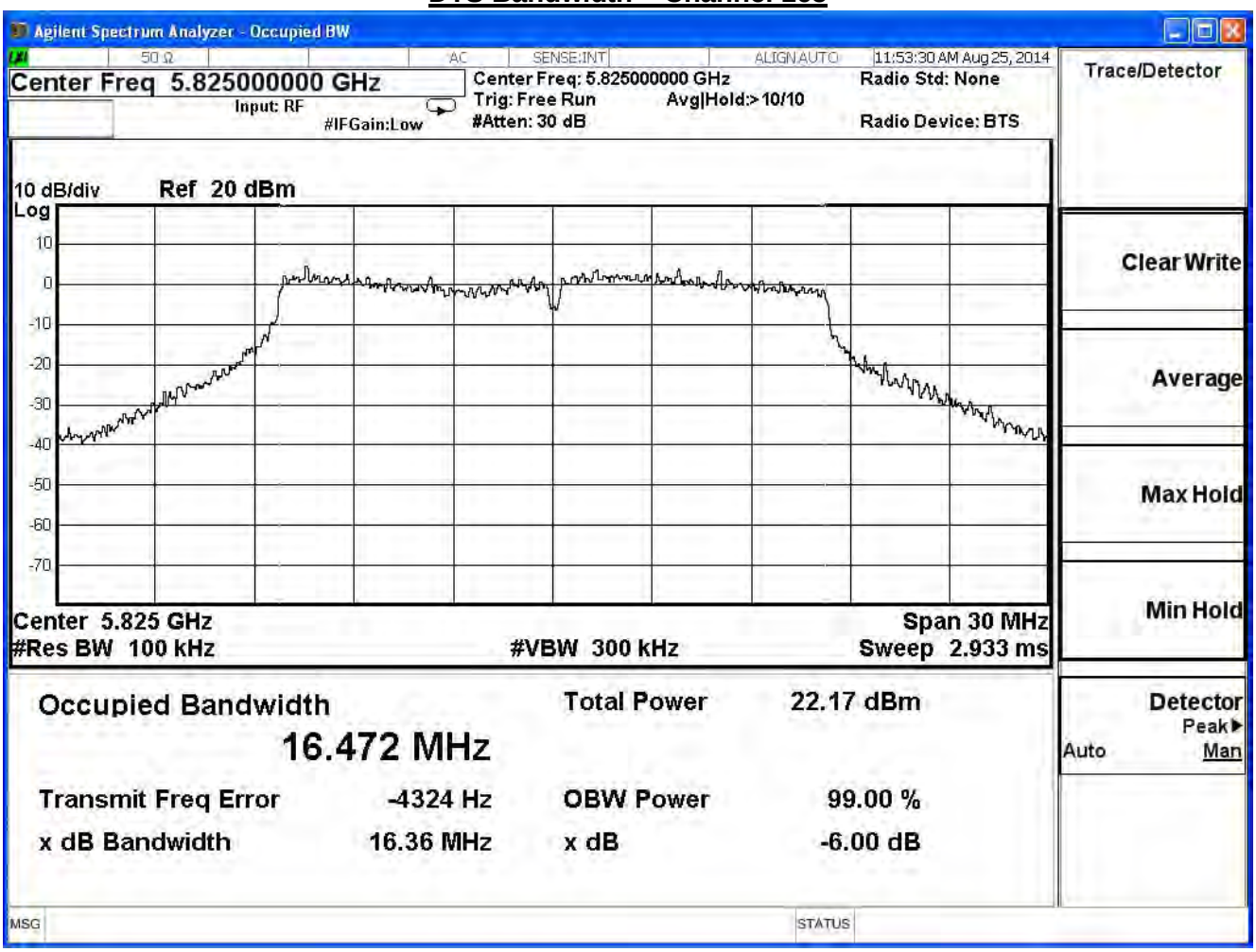
DTS Bandwidth – Channel 149



DTS Bandwidth – Channel 157



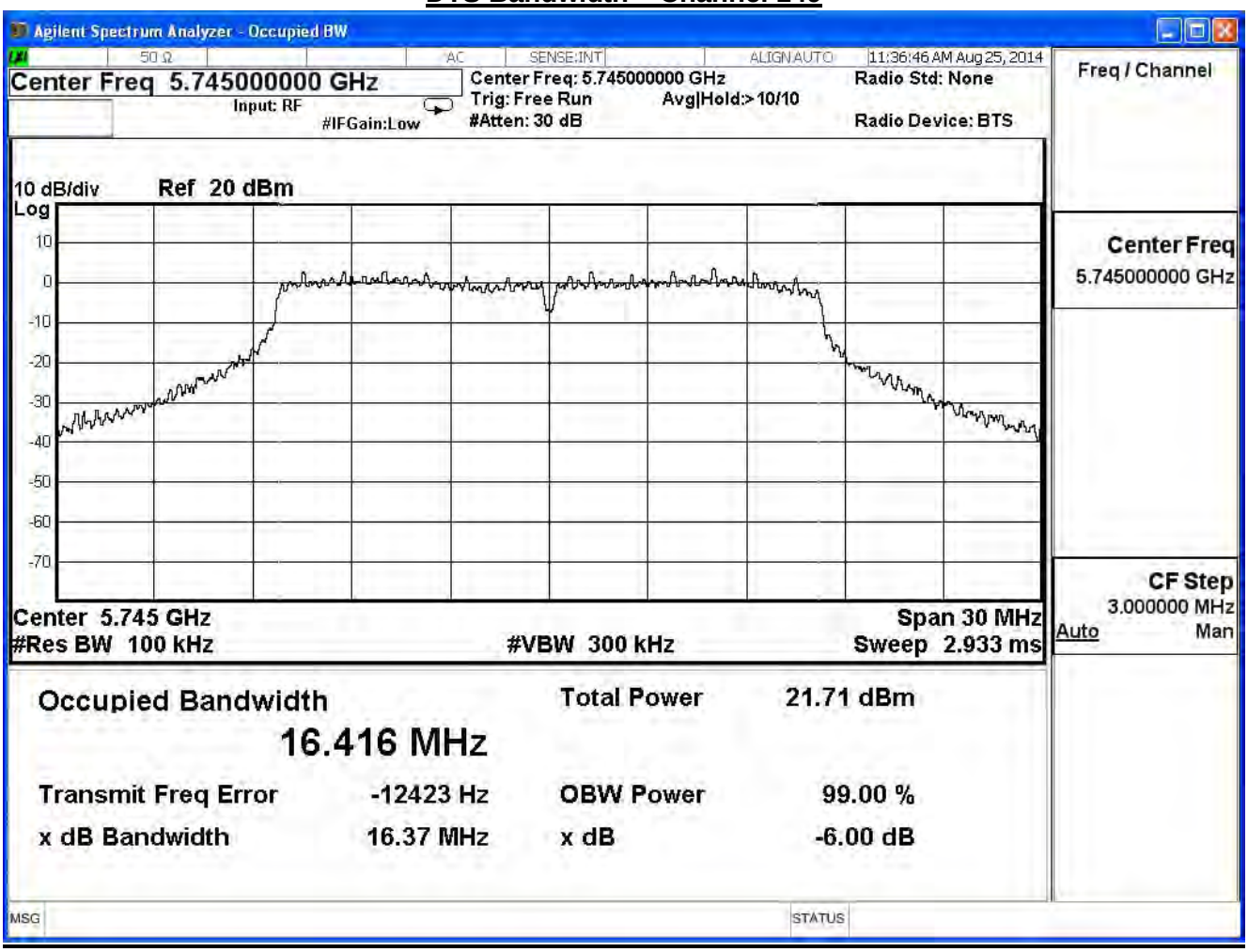
DTS Bandwidth – Channel 165



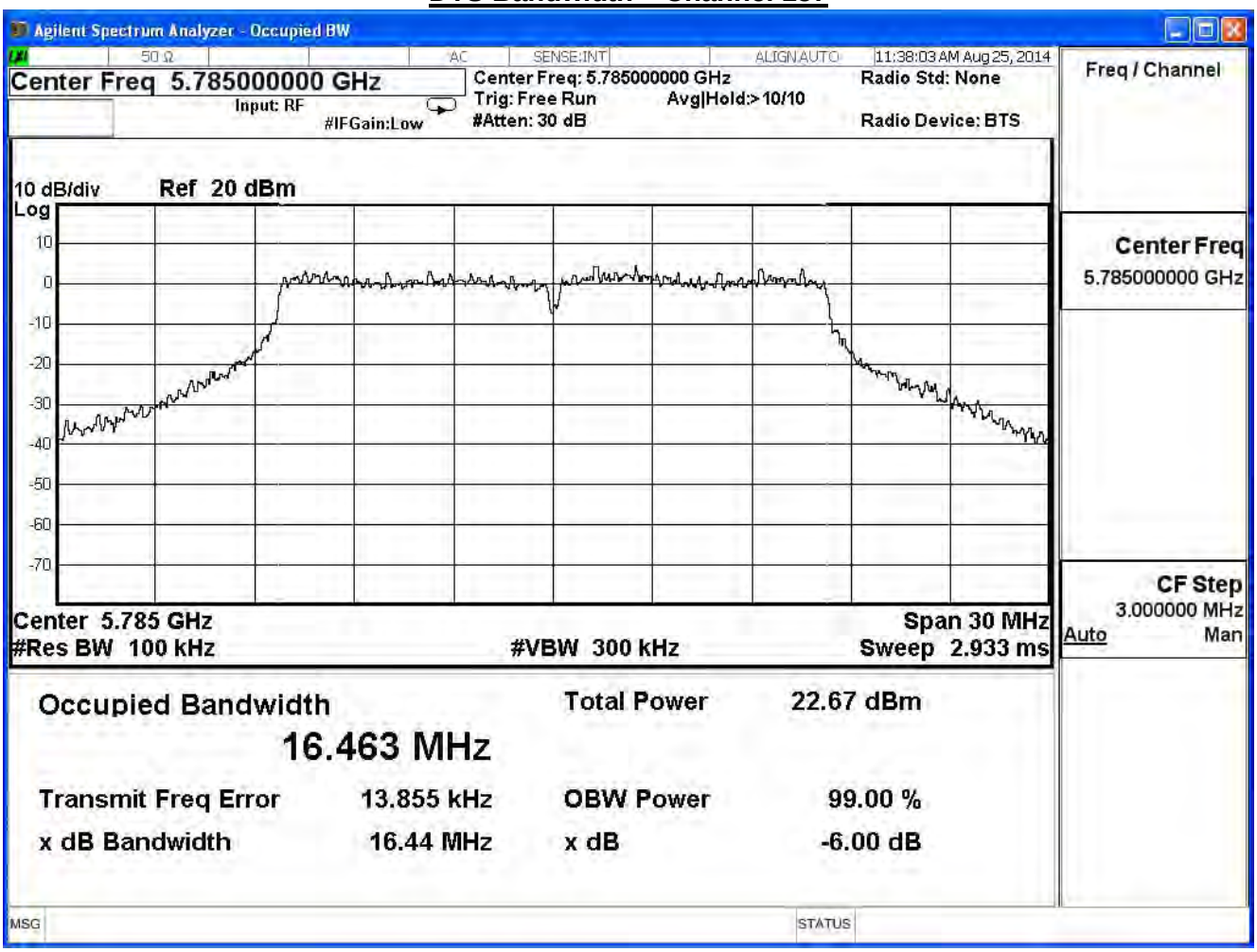
Product	VDSL2 Security Firewall		
Test Item	DTS Bandwidth		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/08/25	Test Site	SR7

802.11a(ANT 2)				
Channel No.	Frequency (MHz)	Measure Level (MHz)	Limit (MHz)	Result
149	5745	16.37	≧0.5	Pass
157	5785	16.44	≧0.5	Pass
165	5825	16.44	≧0.5	Pass

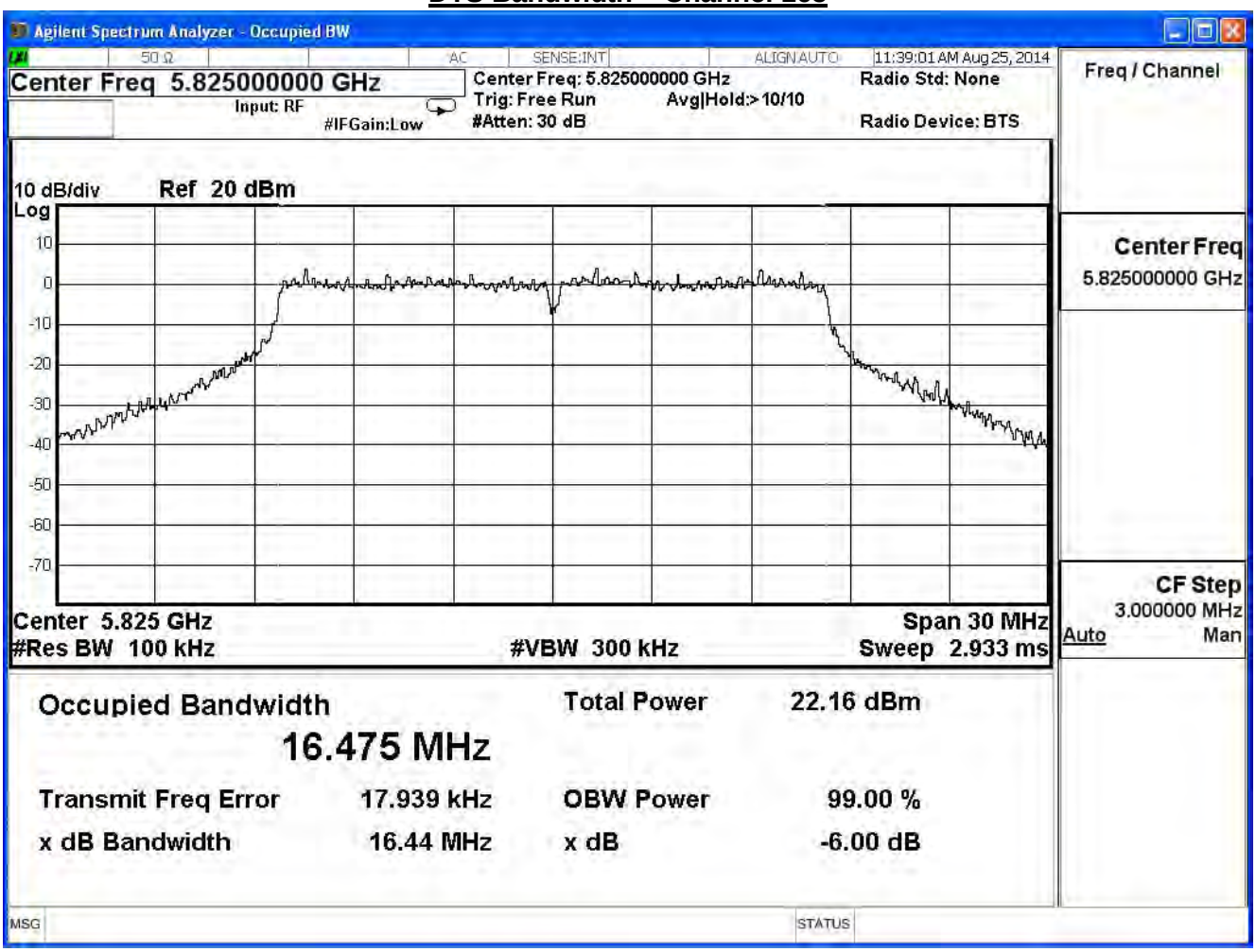
DTS Bandwidth – Channel 149



DTS Bandwidth – Channel 157



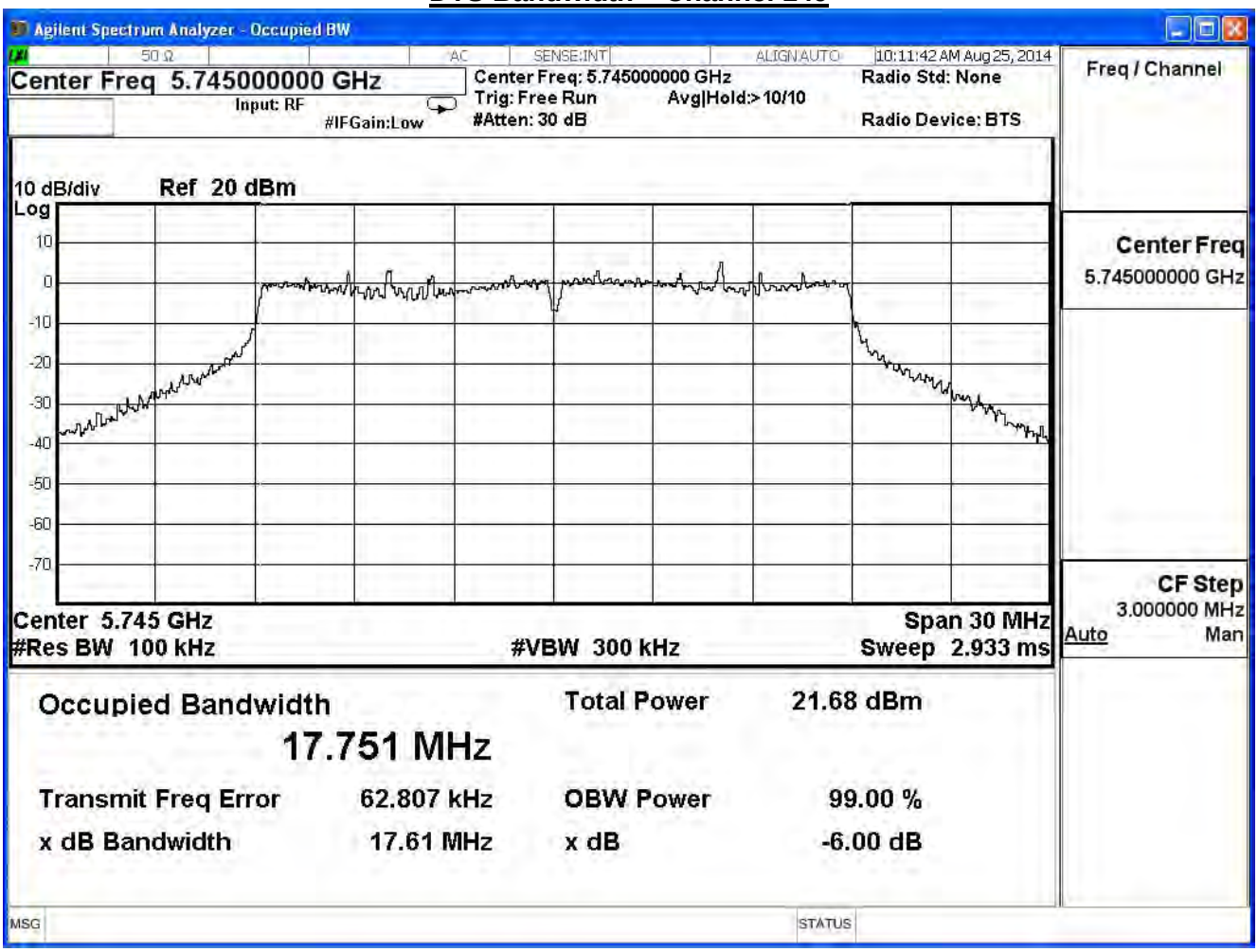
DTS Bandwidth – Channel 165



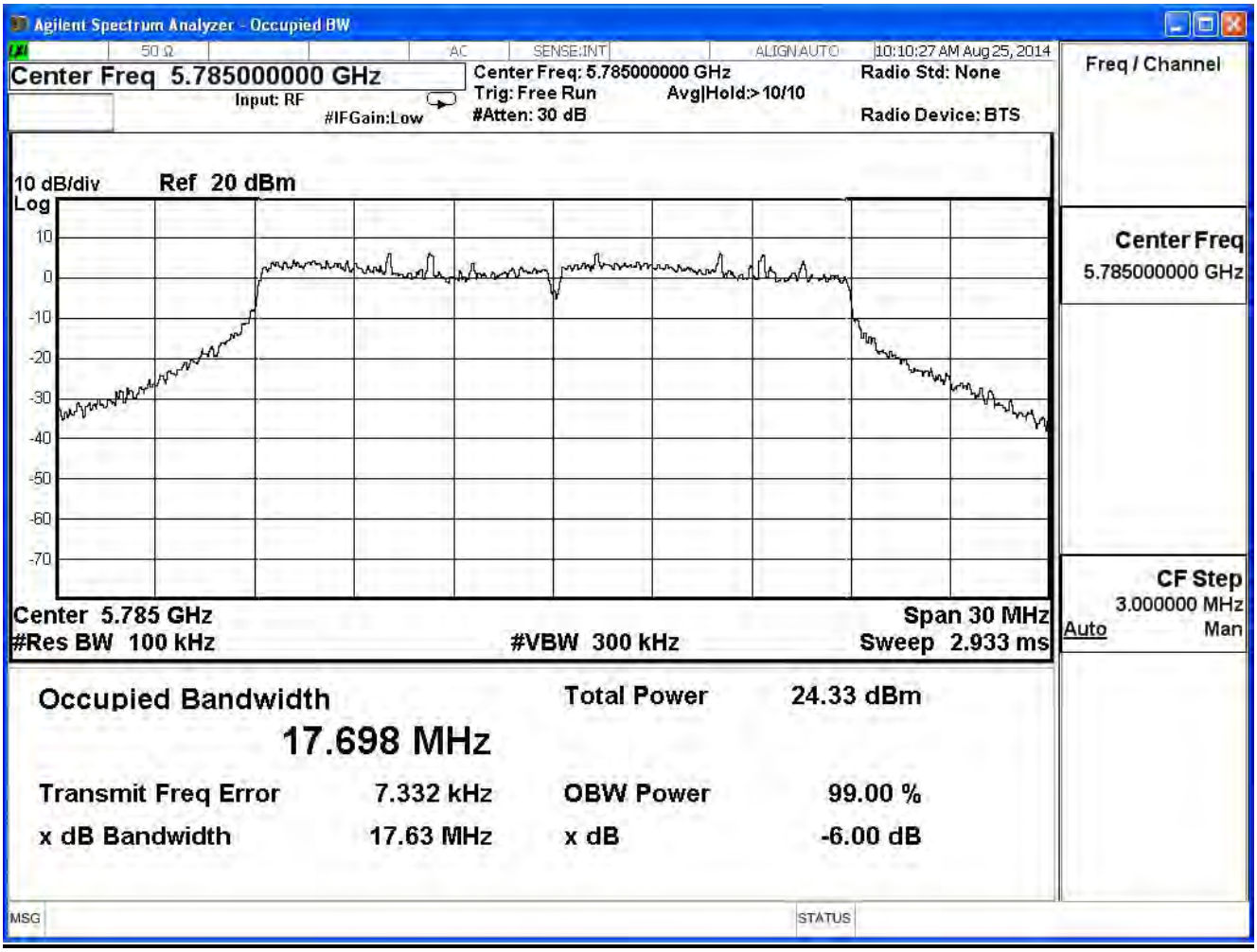
Product	VDSL2 Security Firewall		
Test Item	DTS Bandwidth		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/08/25	Test Site	SR7

802.11n_20M(ANT 0)				
Channel No.	Frequency (MHz)	Measure Level (MHz)	Limit (MHz)	Result
149	5745	17.61	≧0.5	Pass
157	5785	17.63	≧0.5	Pass
165	5825	16.72	≧0.5	Pass

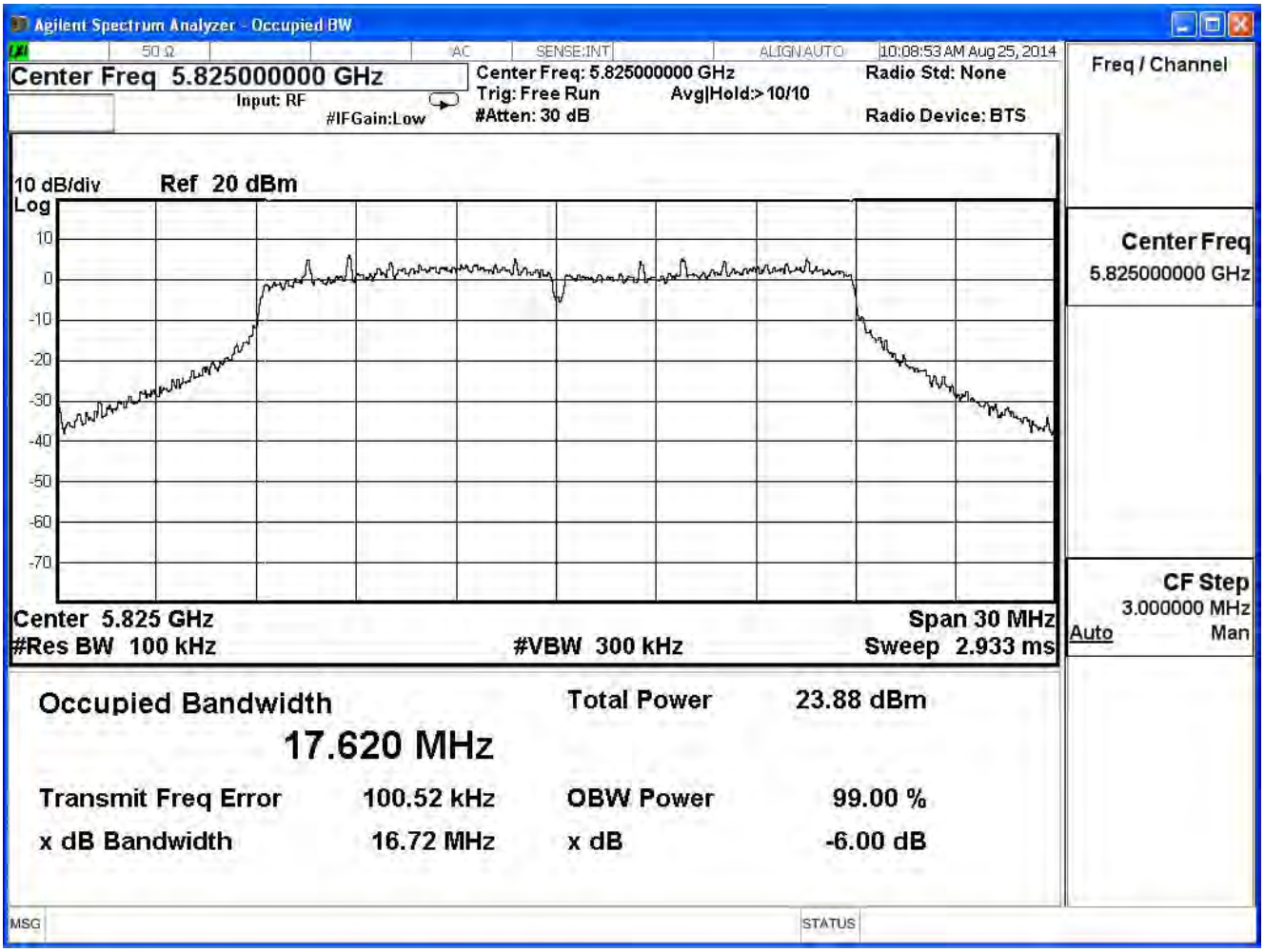
DTS Bandwidth – Channel 149



DTS Bandwidth – Channel 157



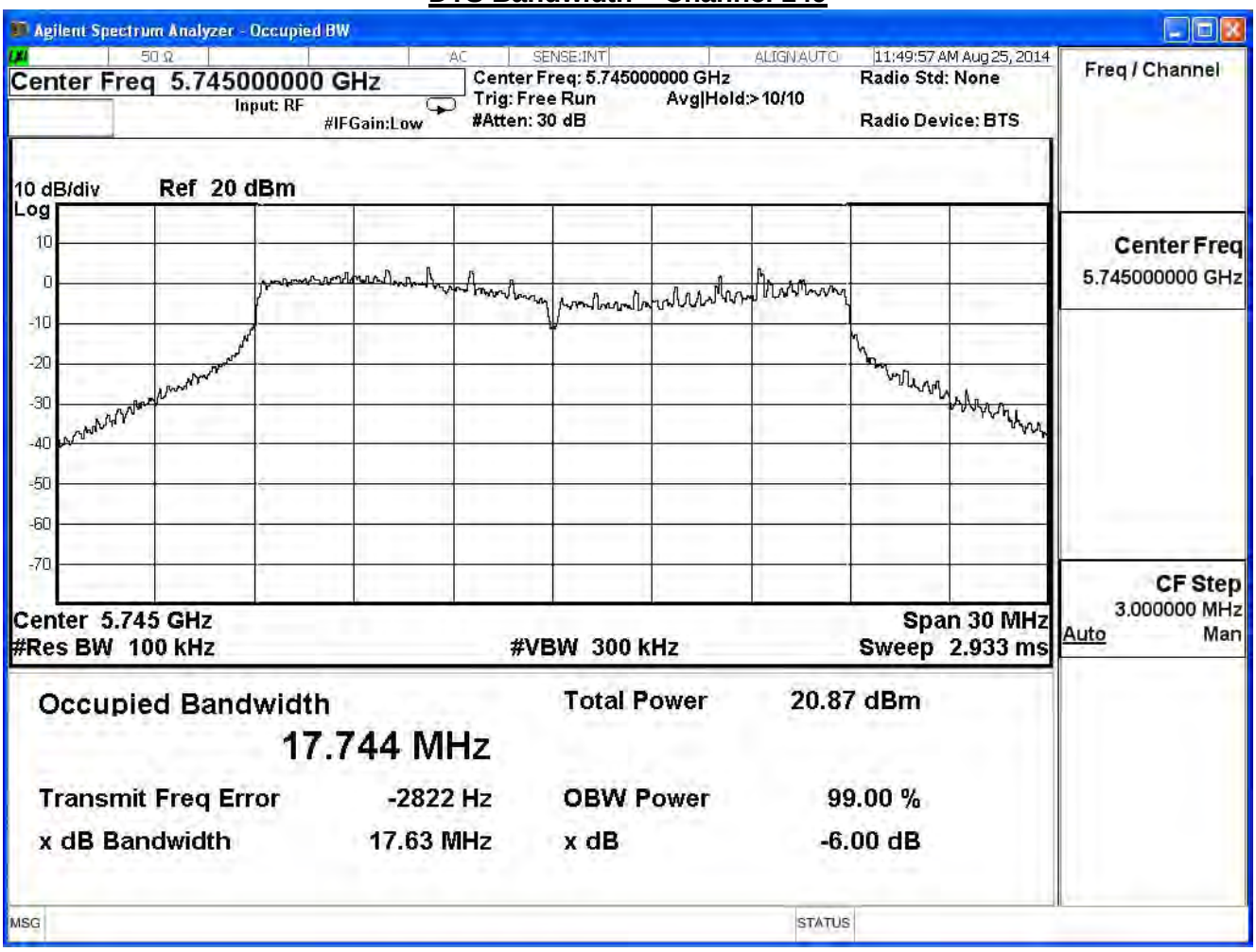
DTS Bandwidth – Channel 165



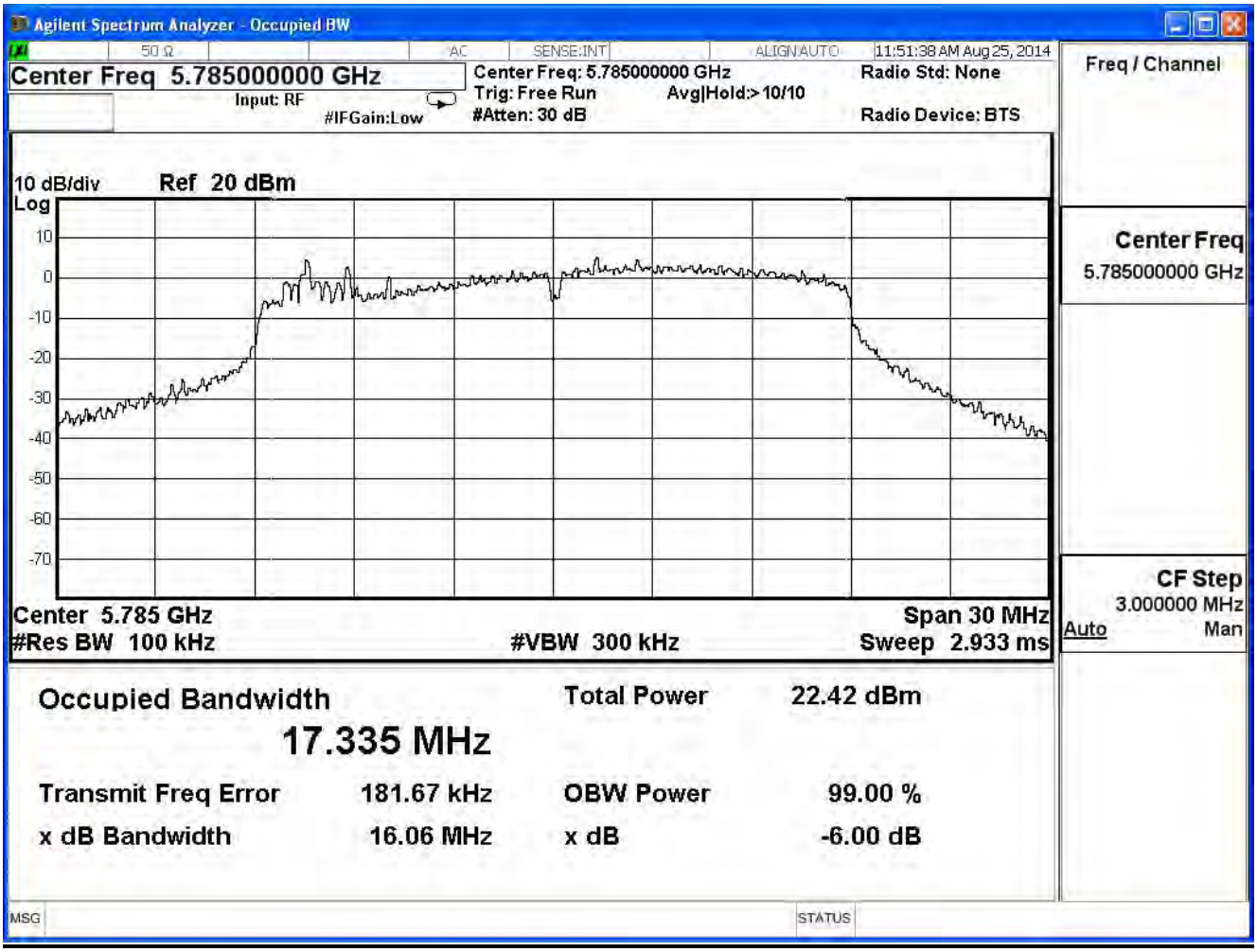
Product	VDSL2 Security Firewall		
Test Item	DTS Bandwidth		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/08/25	Test Site	SR7

802.11n_20M(ANT 1)				
Channel No.	Frequency (MHz)	Measure Level (MHz)	Limit (MHz)	Result
149	5745	17.63	≧0.5	Pass
157	5785	16.06	≧0.5	Pass
165	5825	17.63	≧0.5	Pass

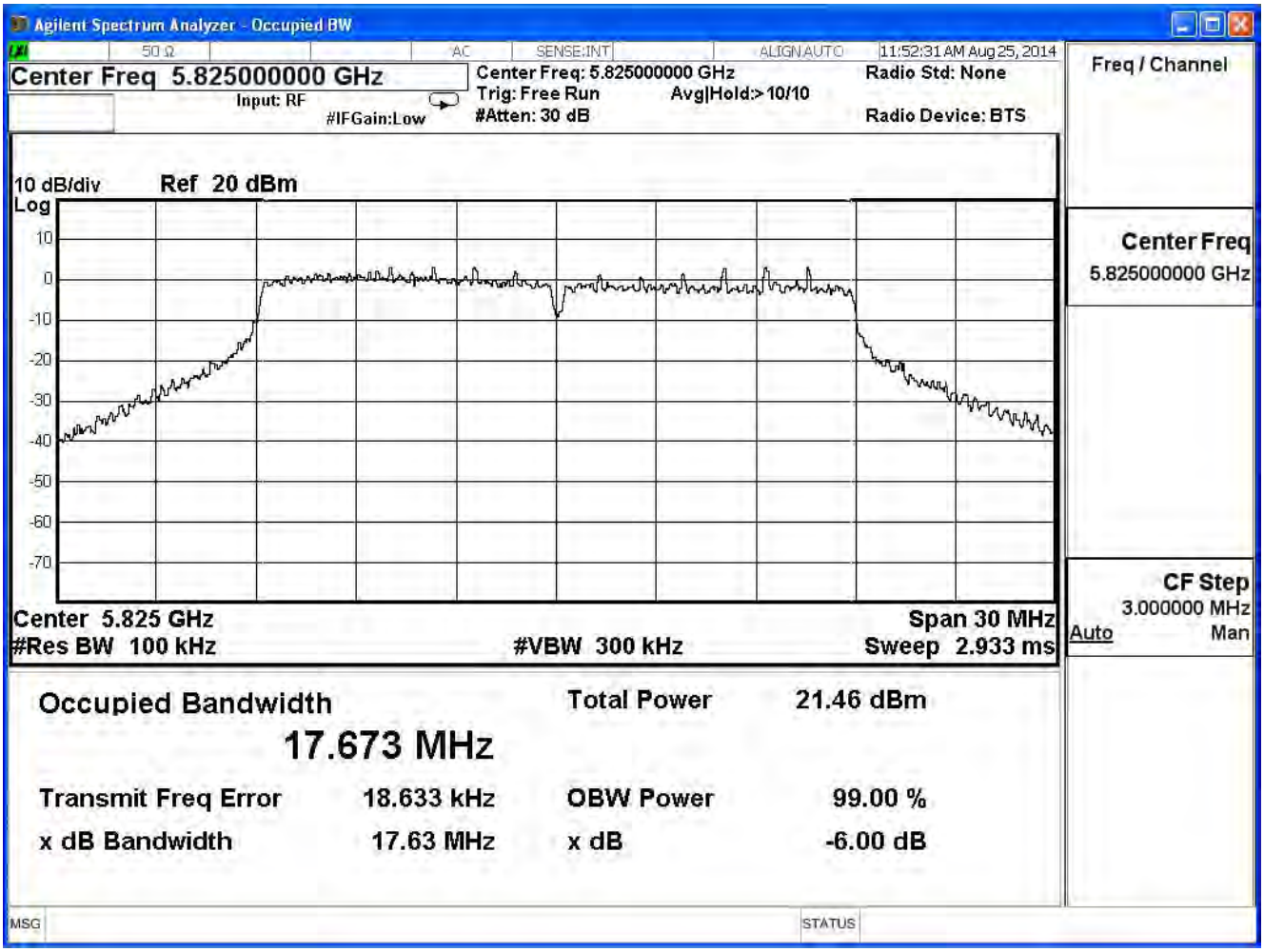
DTS Bandwidth – Channel 149



DTS Bandwidth – Channel 157



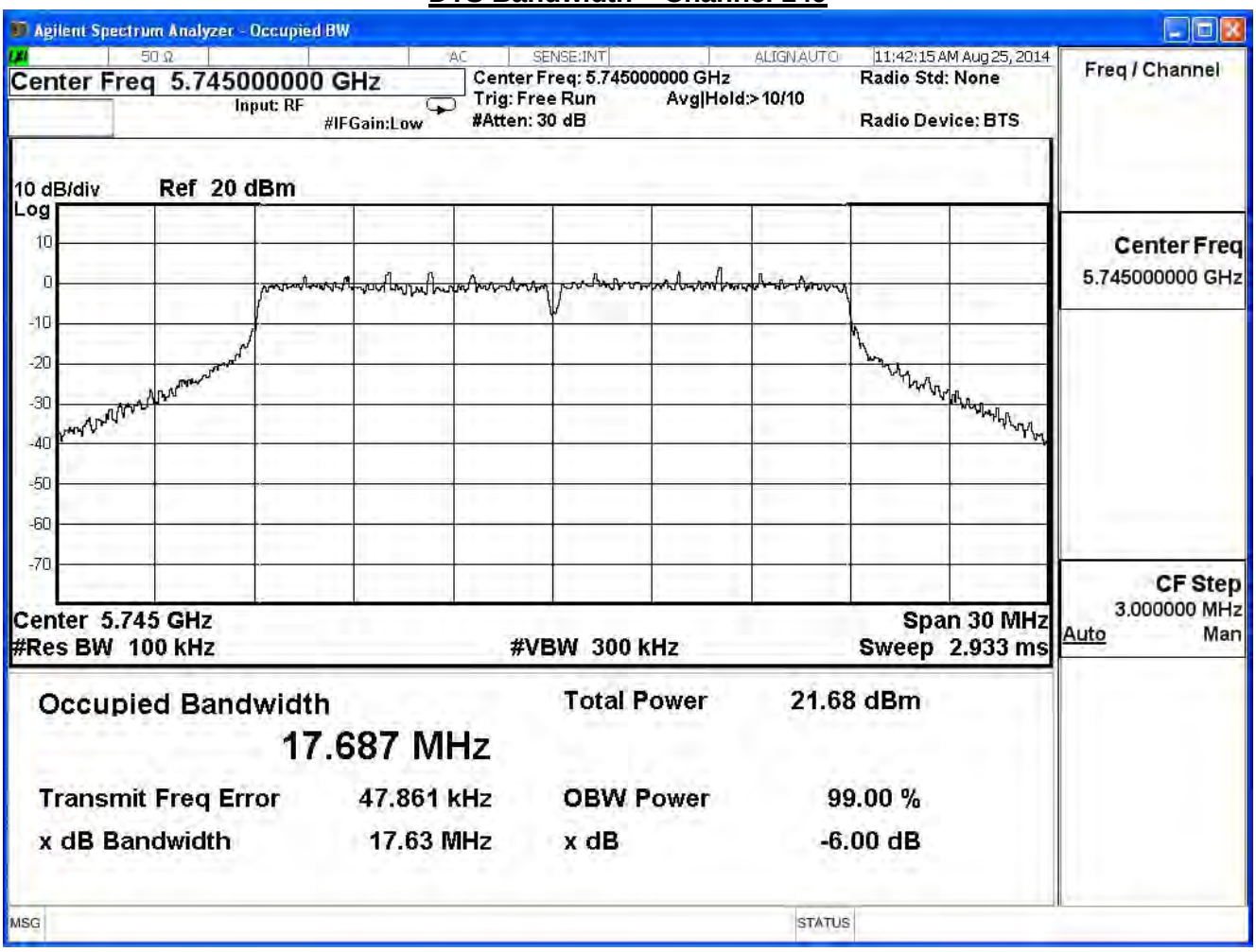
DTS Bandwidth – Channel 165



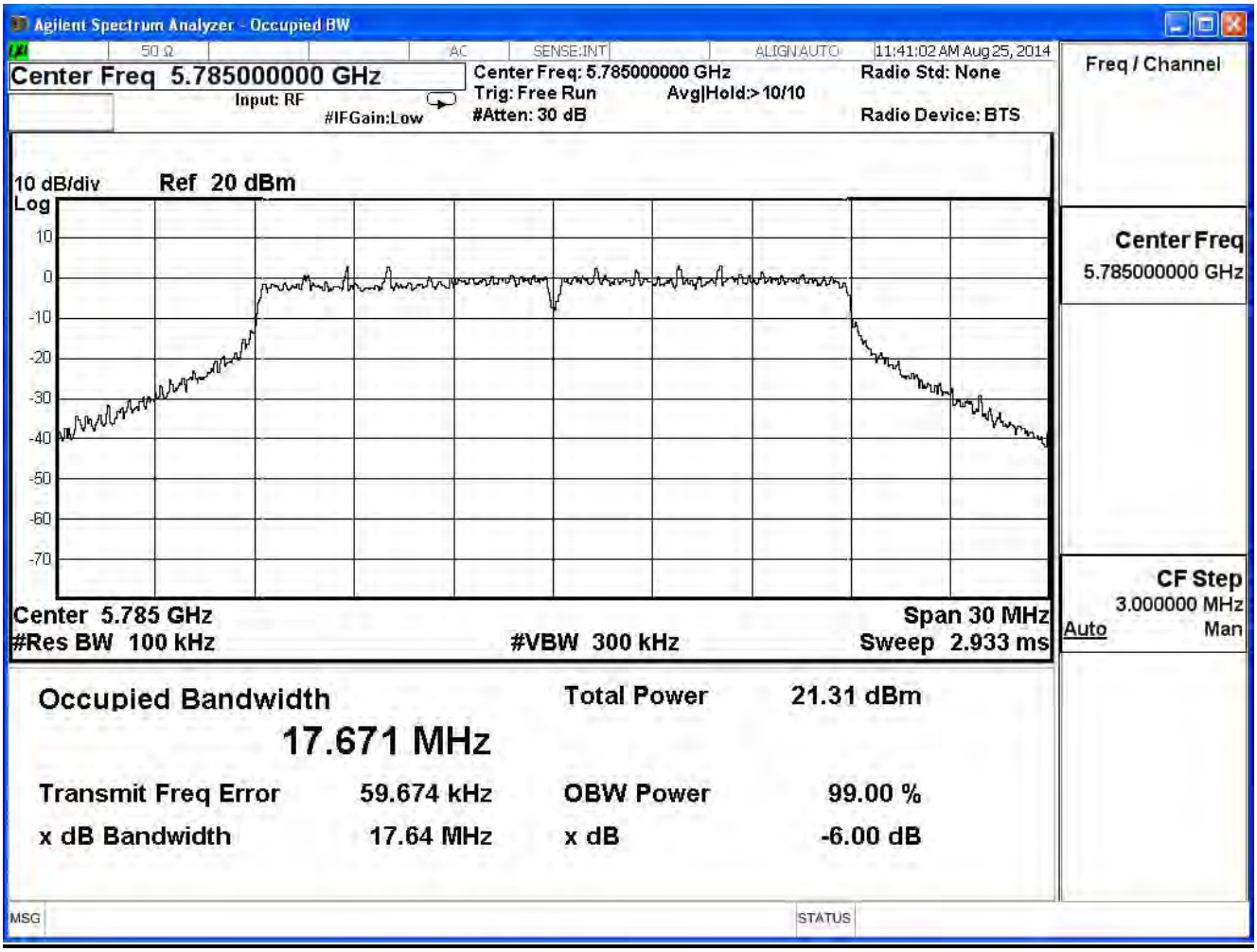
Product	VDSL2 Security Firewall		
Test Item	DTS Bandwidth		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/08/25	Test Site	SR7

802.11n_20M(ANT 2)				
Channel No.	Frequency (MHz)	Measure Level (MHz)	Limit (MHz)	Result
149	5745	17.63	≧0.5	Pass
157	5785	17.64	≧0.5	Pass
165	5825	17.65	≧0.5	Pass

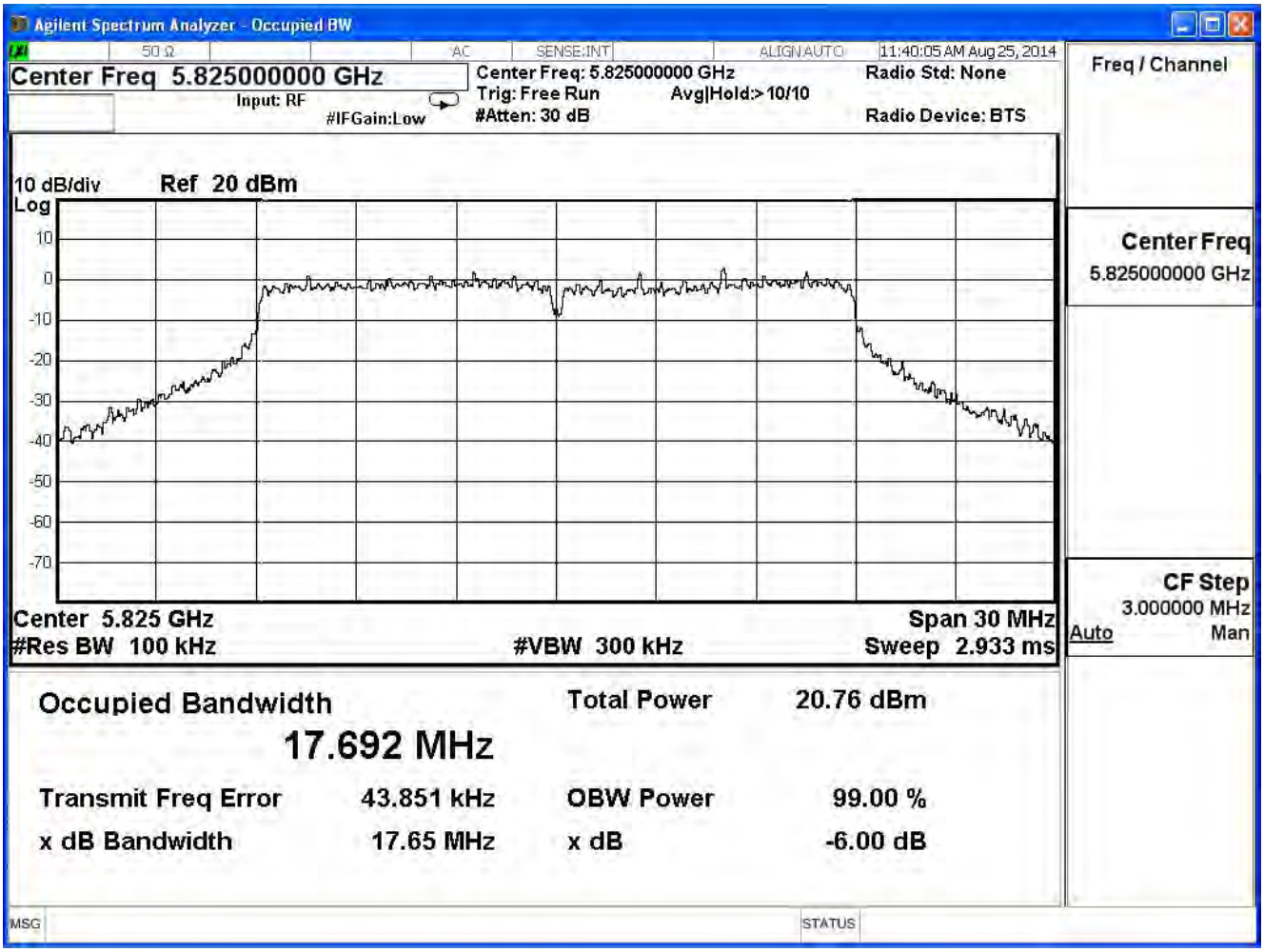
DTS Bandwidth – Channel 149



DTS Bandwidth – Channel 157



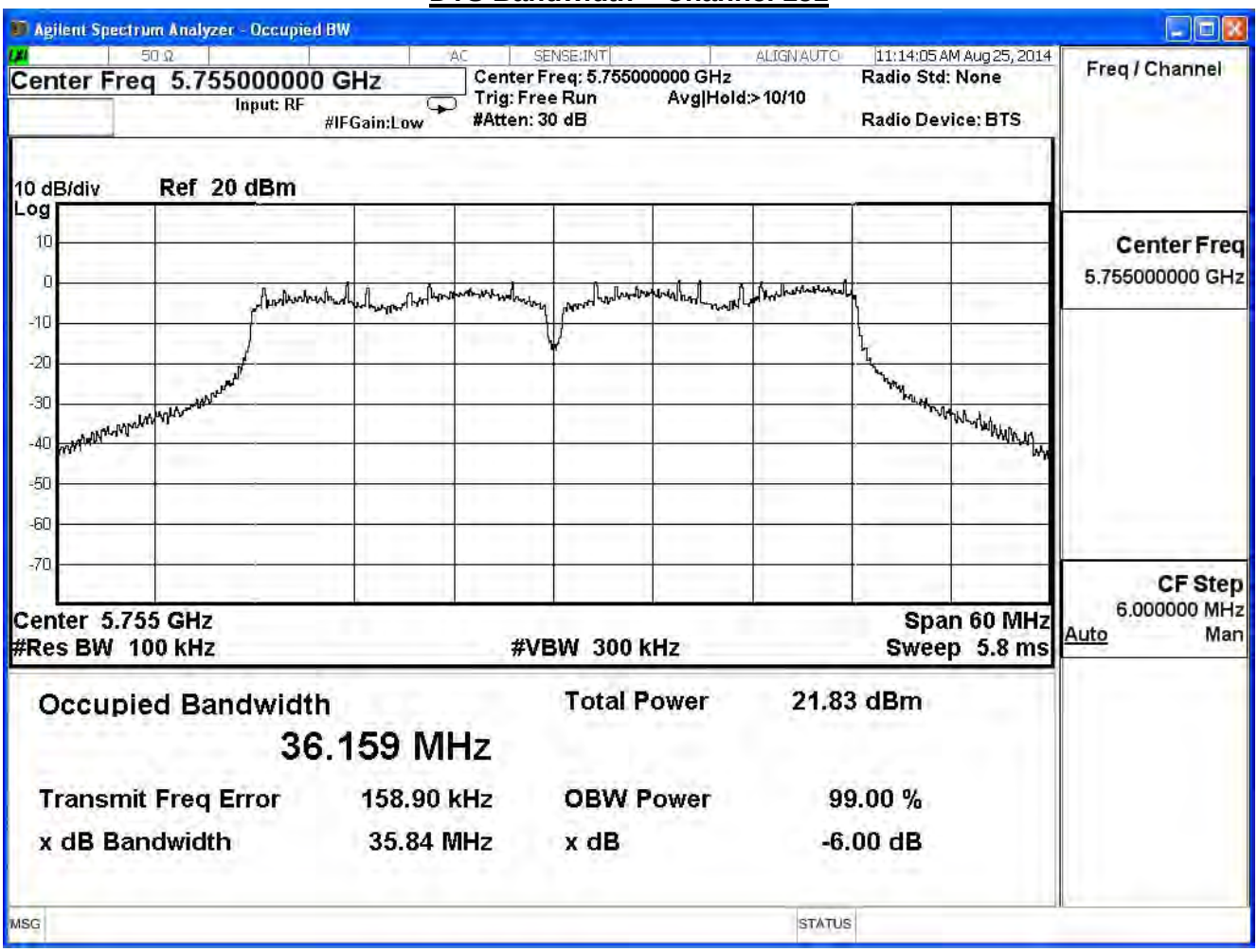
DTS Bandwidth – Channel 165



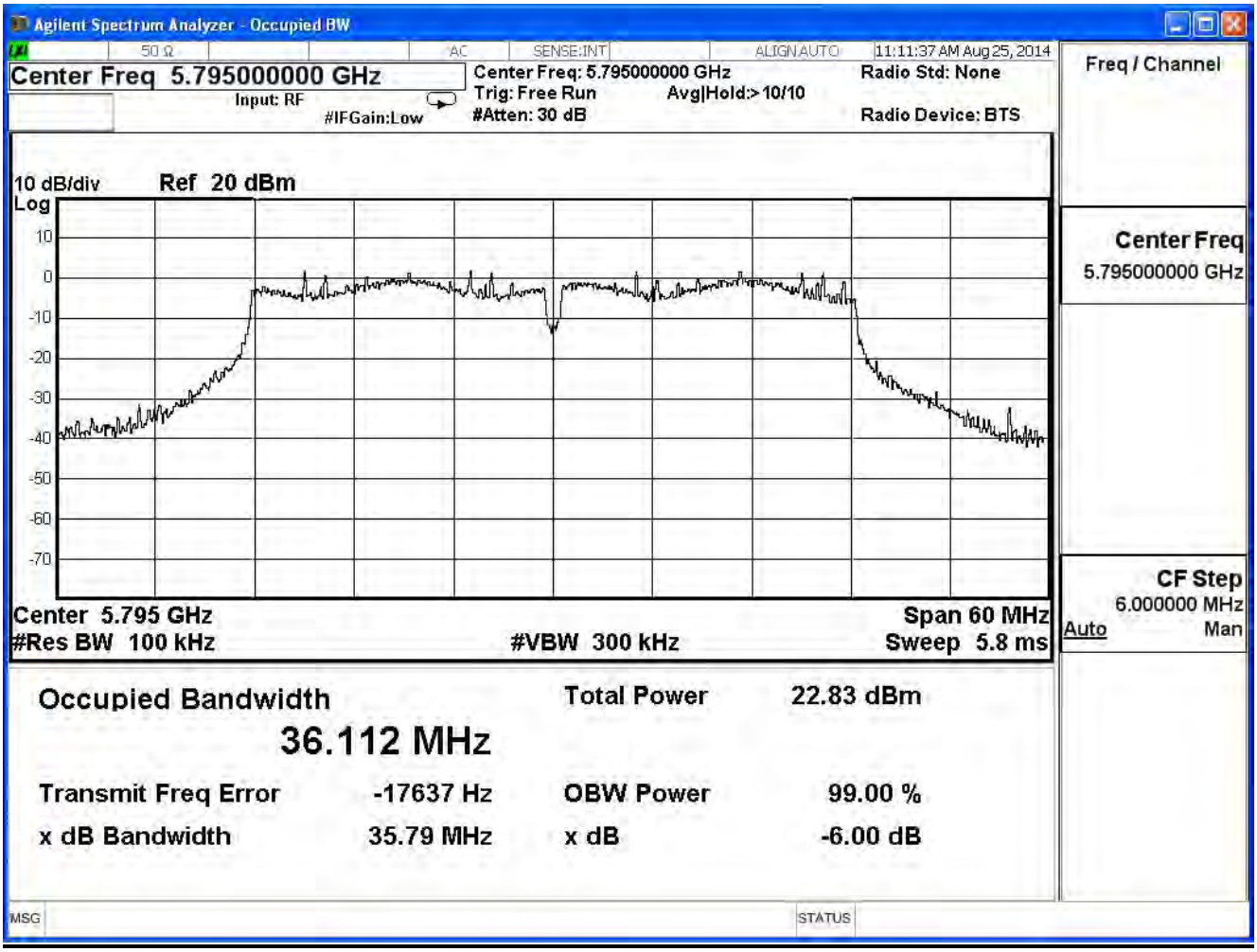
Product	VDSL2 Security Firewall		
Test Item	DTS Bandwidth		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/08/25	Test Site	SR7

802.11n_40M(ANT 0)				
Channel No.	Frequency (MHz)	Measure Level (MHz)	Limit (MHz)	Result
151	5755	35.84	≧0.5	Pass
159	5795	35.79	≧0.5	Pass

DTS Bandwidth – Channel 151



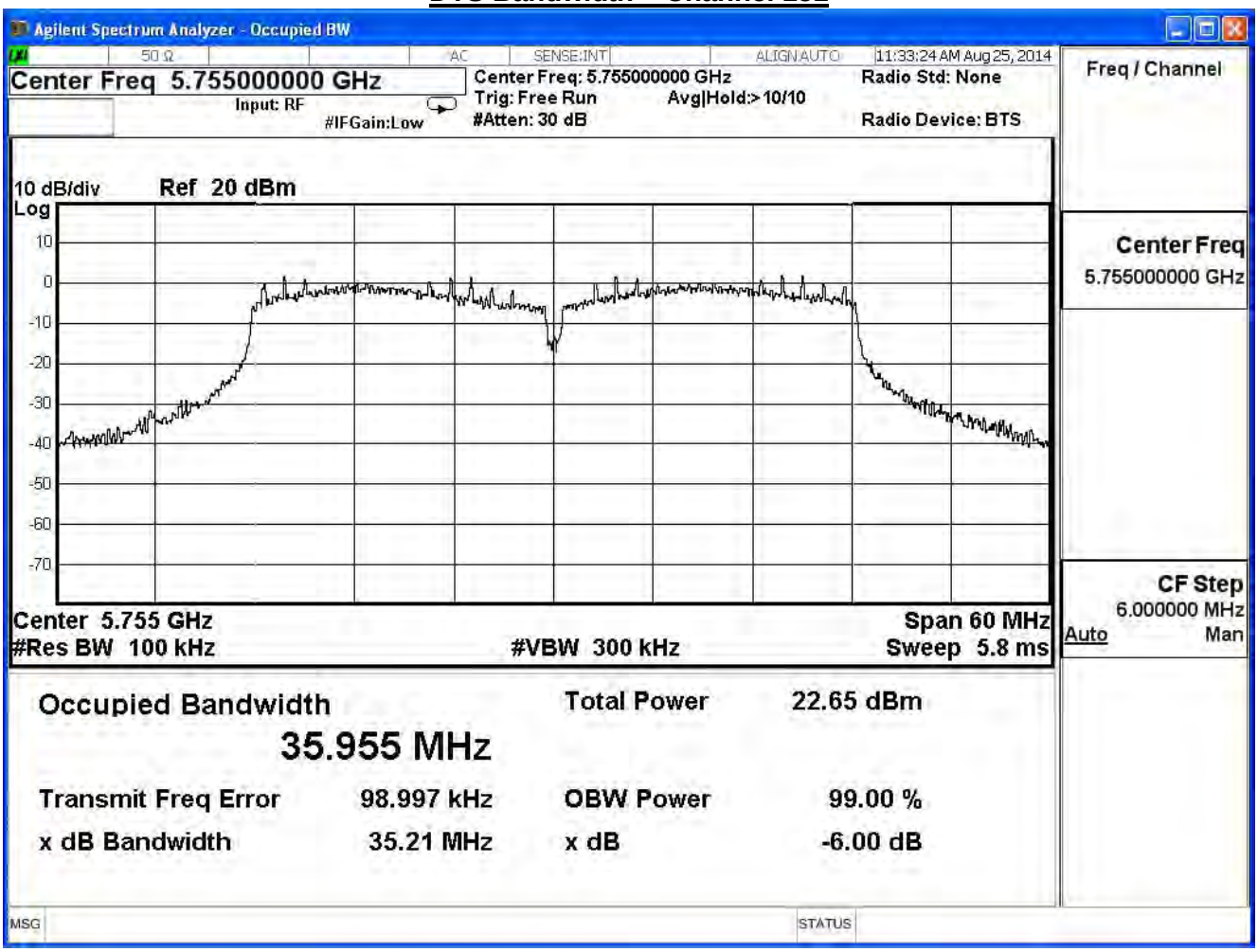
DTS Bandwidth – Channel 159



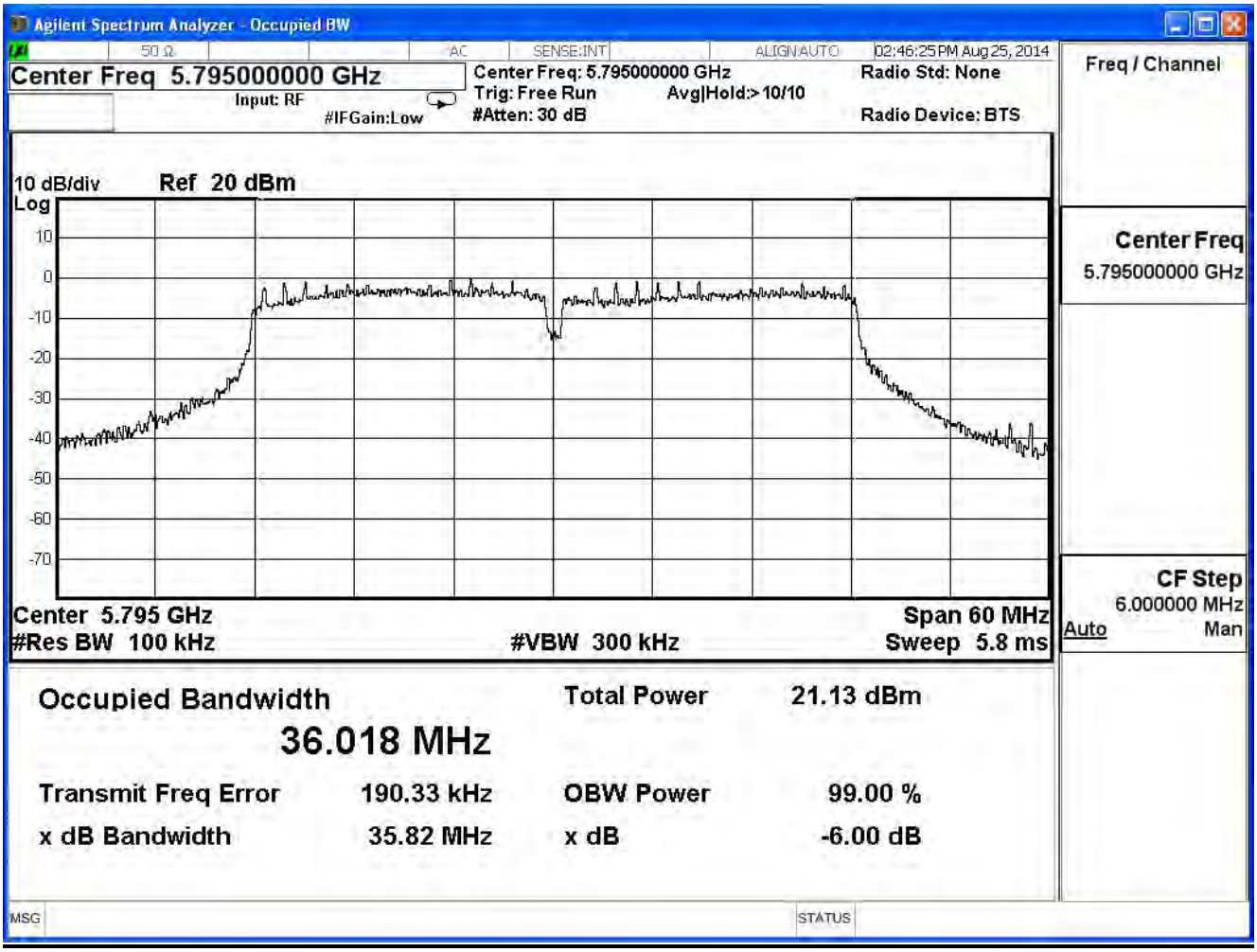
Product	VDSL2 Security Firewall		
Test Item	DTS Bandwidth		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/08/25	Test Site	SR7

802.11n_40M(ANT 1)				
Channel No.	Frequency (MHz)	Measure Level (MHz)	Limit (MHz)	Result
151	5755	35.21	≧0.5	Pass
159	5795	35.82	≧0.5	Pass

DTS Bandwidth – Channel 151



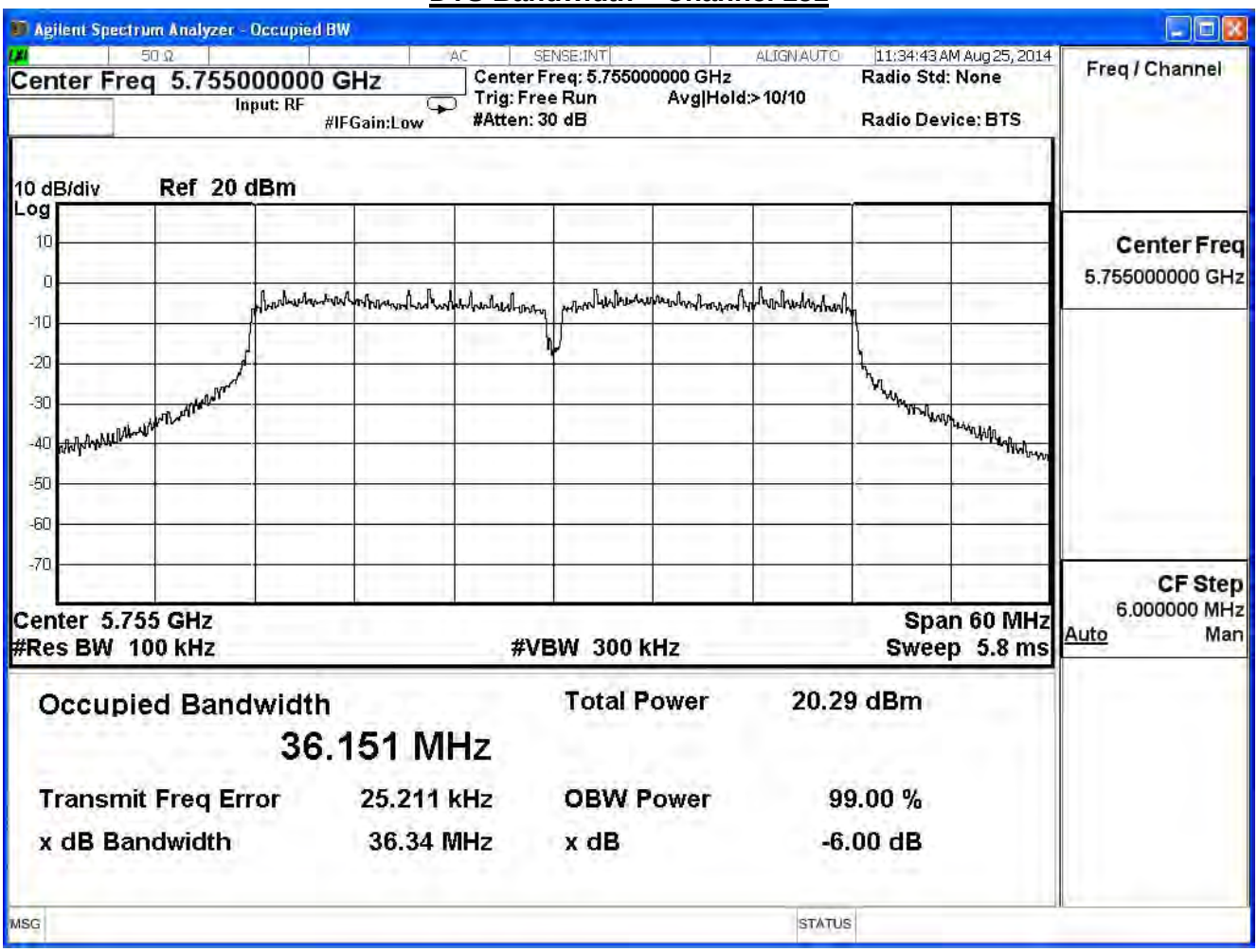
DTS Bandwidth – Channel 159



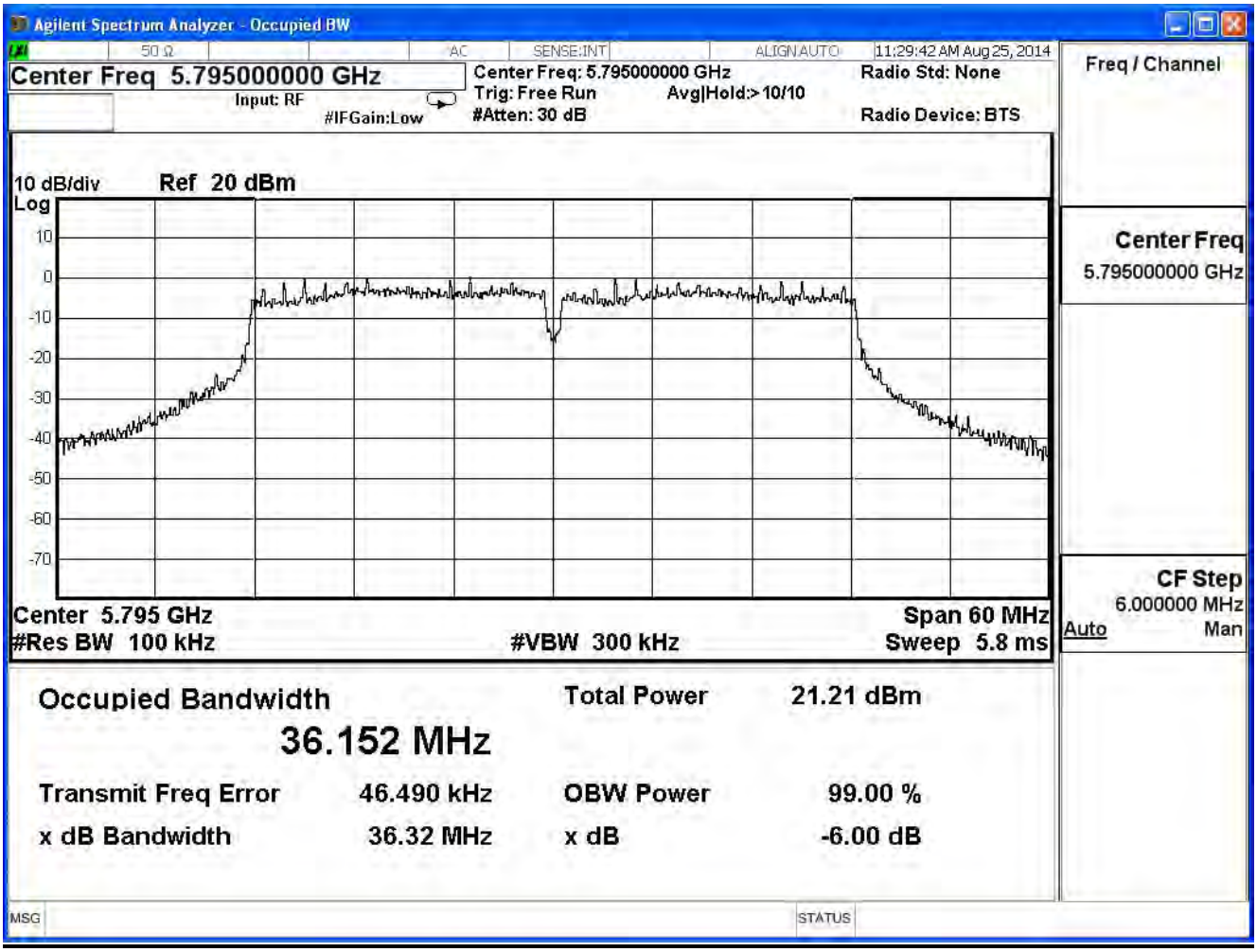
Product	VDSL2 Security Firewall		
Test Item	DTS Bandwidth		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/08/25	Test Site	SR7

802.11n_40M(ANT 2)				
Channel No.	Frequency (MHz)	Measure Level (MHz)	Limit (MHz)	Result
151	5755	36.34	≧0.5	Pass
159	5795	36.32	≧0.5	Pass

DTS Bandwidth – Channel 151



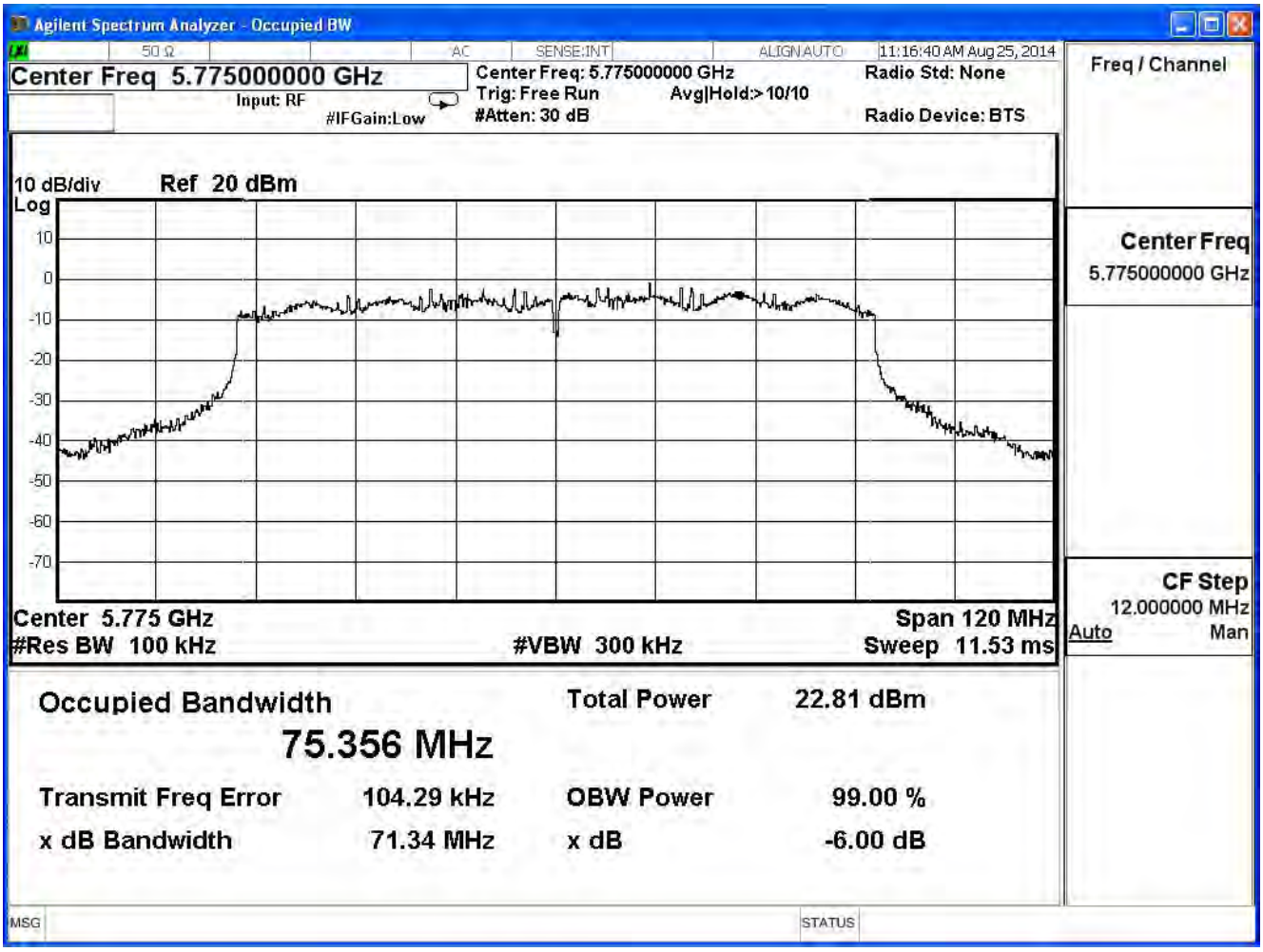
DTS Bandwidth – Channel 159



Product	VDSL2 Security Firewall		
Test Item	DTS Bandwidth		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/08/25	Test Site	SR7

802.11ac(80M) (ANT 0)				
Channel No.	Frequency (MHz)	Measure Level (MHz)	Limit (MHz)	Result
155	5775	71.34	≧0.5	Pass

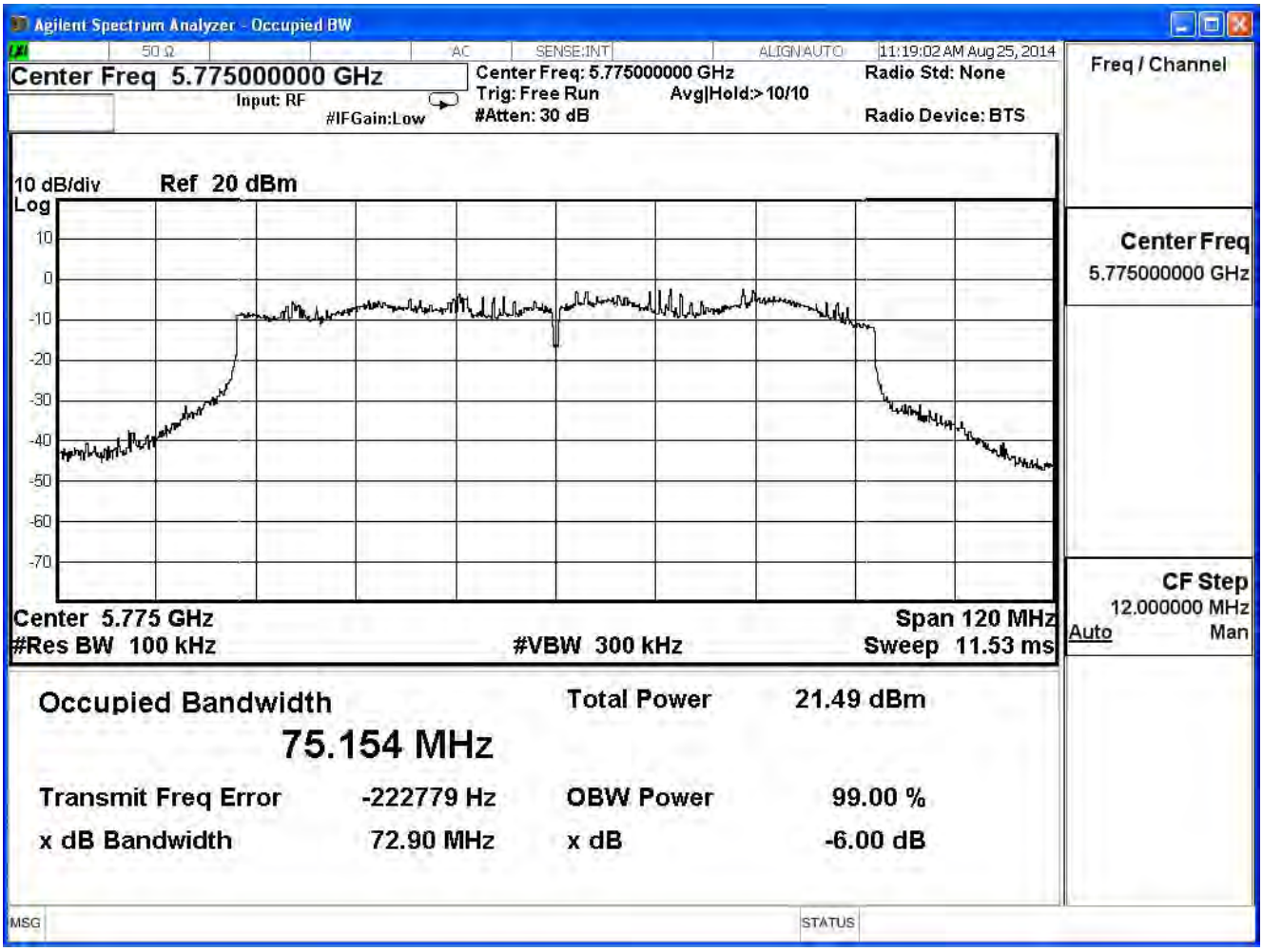
DTS Bandwidth – Channel 155



Product	VDSL2 Security Firewall		
Test Item	DTS Bandwidth		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/08/25	Test Site	SR7

802.11ac(80M) (ANT 1)				
Channel No.	Frequency (MHz)	Measure Level (MHz)	Limit (MHz)	Result
155	5775	72.90	≧0.5	Pass

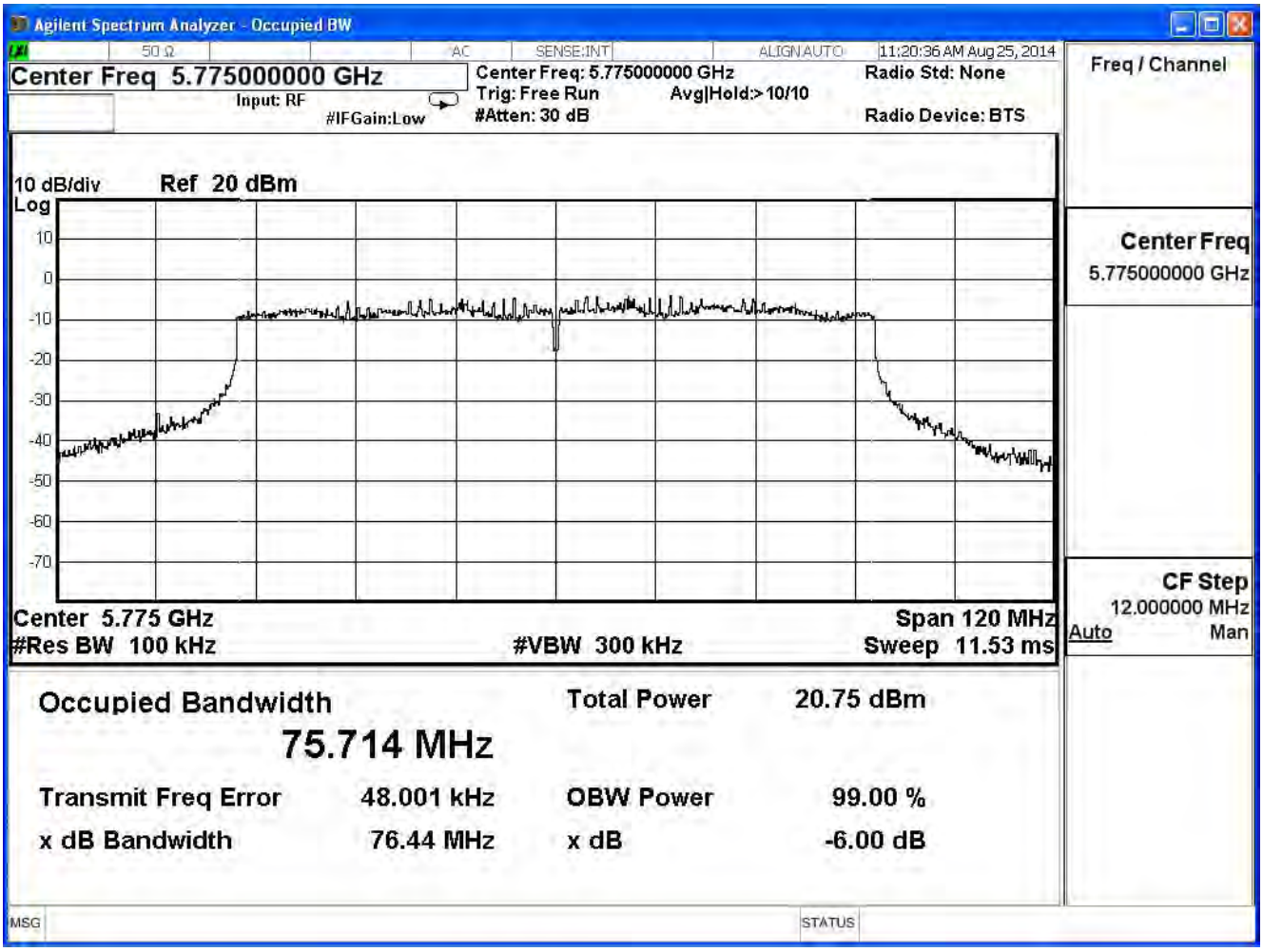
DTS Bandwidth – Channel 155



Product	VDSL2 Security Firewall		
Test Item	DTS Bandwidth		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/08/25	Test Site	SR7

802.11ac(80M) (ANT 2)				
Channel No.	Frequency (MHz)	Measure Level (MHz)	Limit (MHz)	Result
155	5775	76.44	≧0.5	Pass

DTS Bandwidth – Channel 155



4. Peak Transmit Output

4.1. Test Equipment

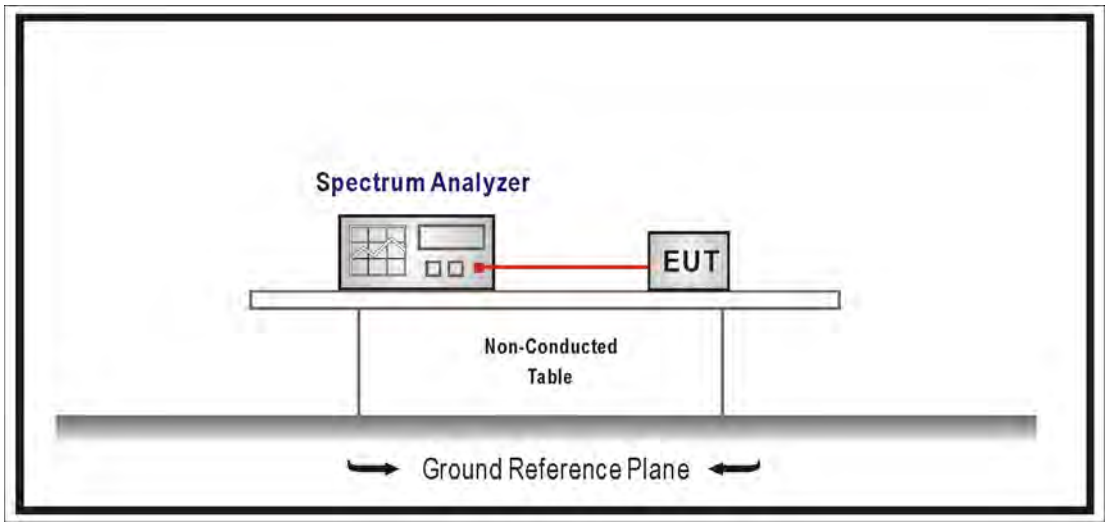
The following test equipments are used during the radiated emission tests:

Peak Transmit Output / SR7

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Spectrum Analyzer	Agilent	N9010A-EXA	US47140172	2015/07/14

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 1W. 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. 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 5.725-5.850 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 1W. 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 C63.10:2013; tested to U-NII test procedure of KDB 789033 for compliance to FCC 47CFR Subpart E requirements. The Method SA-1 of the Maximum conducted output power was used.

Set RBW=1MHz, VBW=3MHz with RMS 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 ± 1.27 dB

4.6. Test Result

Product	VDSL2 Security Firewall		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/07	Test Site	SR7

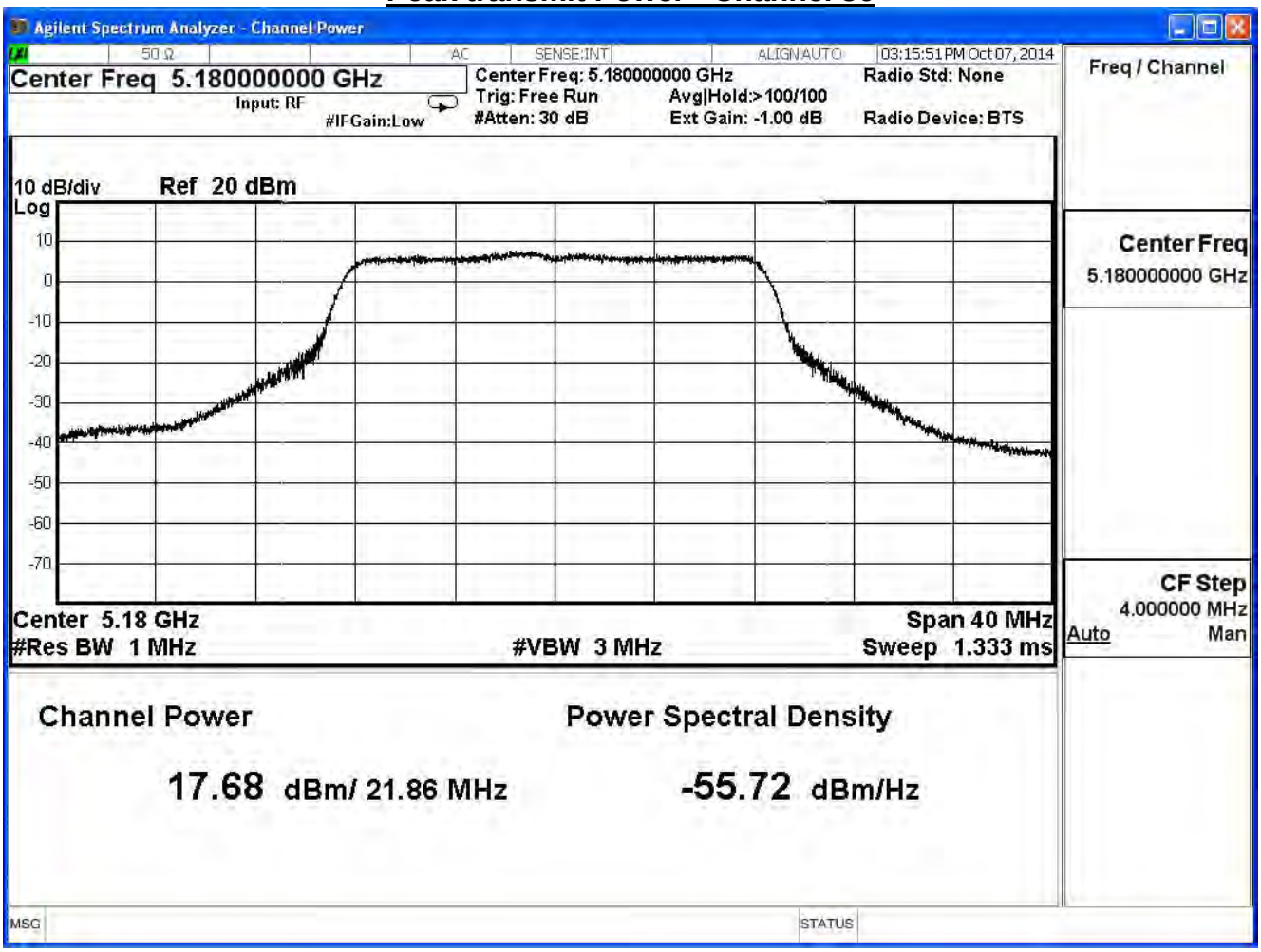
IEEE 802.11a_ANT 0

Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit	Result
36	5180	21.86	17.680	≤30	Pass
44	5220	21.58	18.540	≤30	Pass
48	5240	22.07	18.560	≤30	Pass

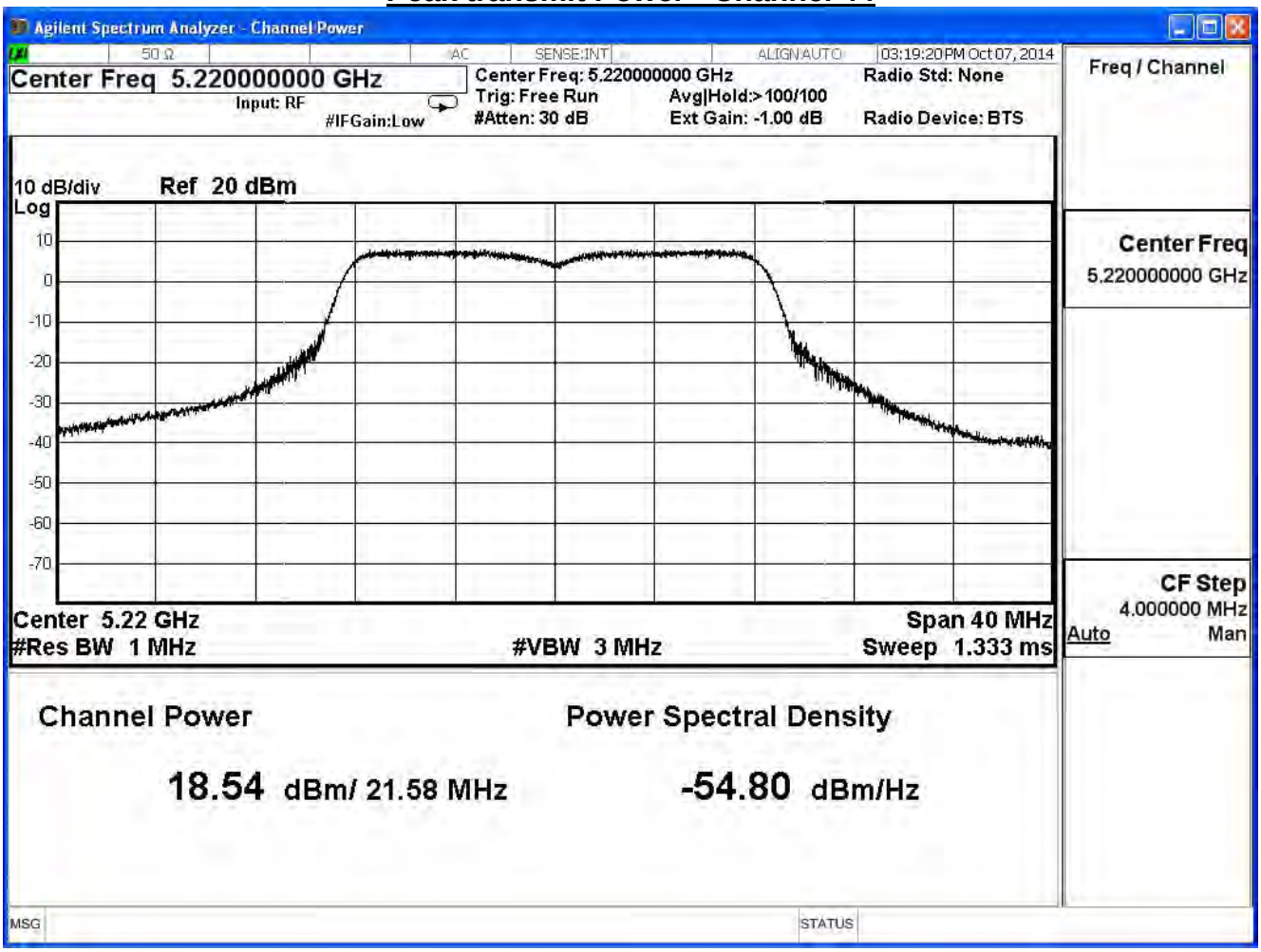
The worst emission of data rate is 6Mbps.

Peak Power Output (dBm)									
Channel No	Frequency (MHz)	Data Rate							Required Limit
		6	12	18	24	36	48	54	
36	5180	17.68	--	--	--	--	--	--	30dBm
44	5220	18.54	18.30	18.10	17.99	17.73	17.49	17.37	
48	5240	18.56	--	--	--	--	--	--	

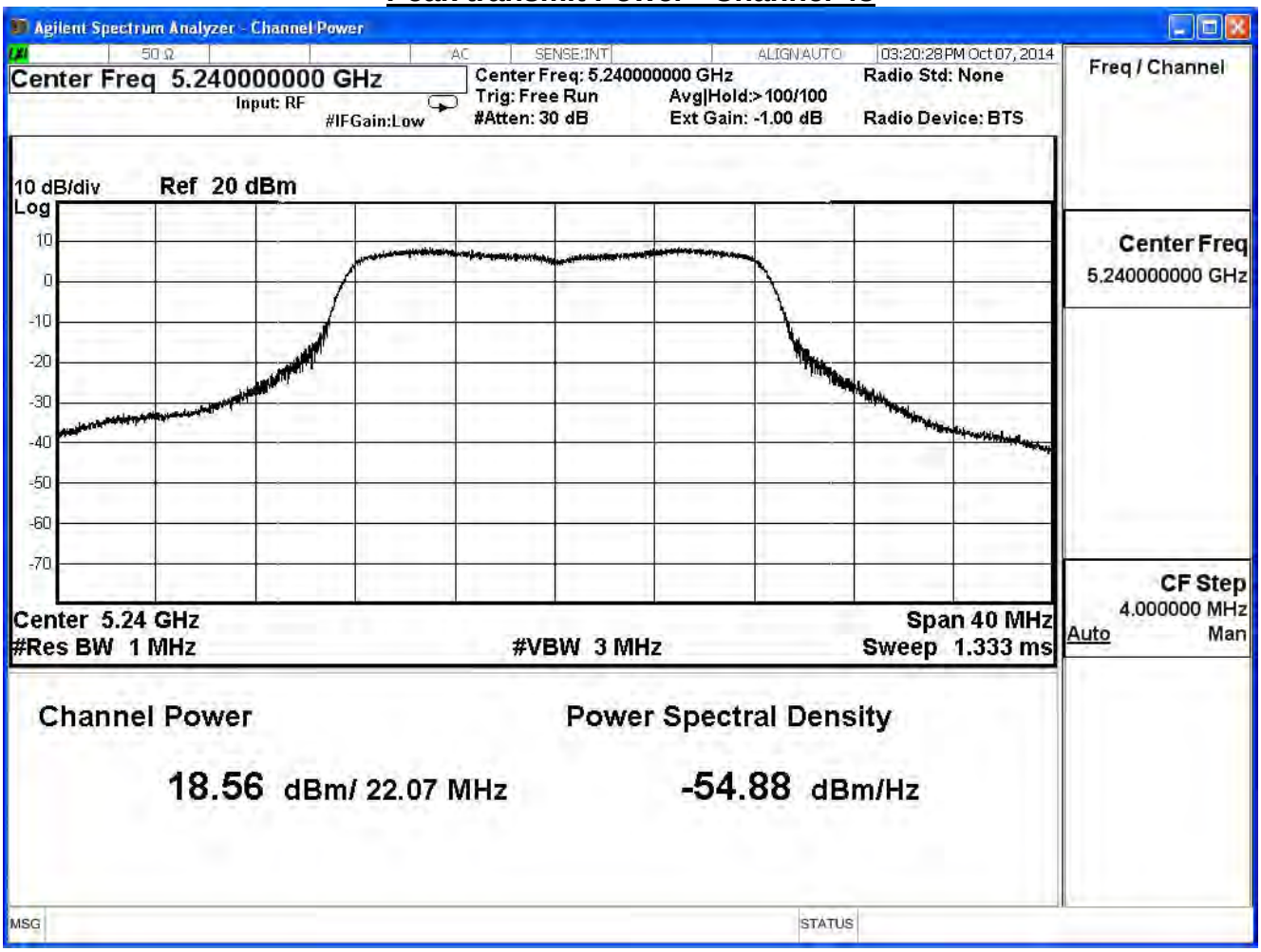
Peak transmit Power - Channel 36



Peak transmit Power - Channel 44



Peak transmit Power - Channel 48



Product	VDSL2 Security Firewall		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/07	Test Site	SR7

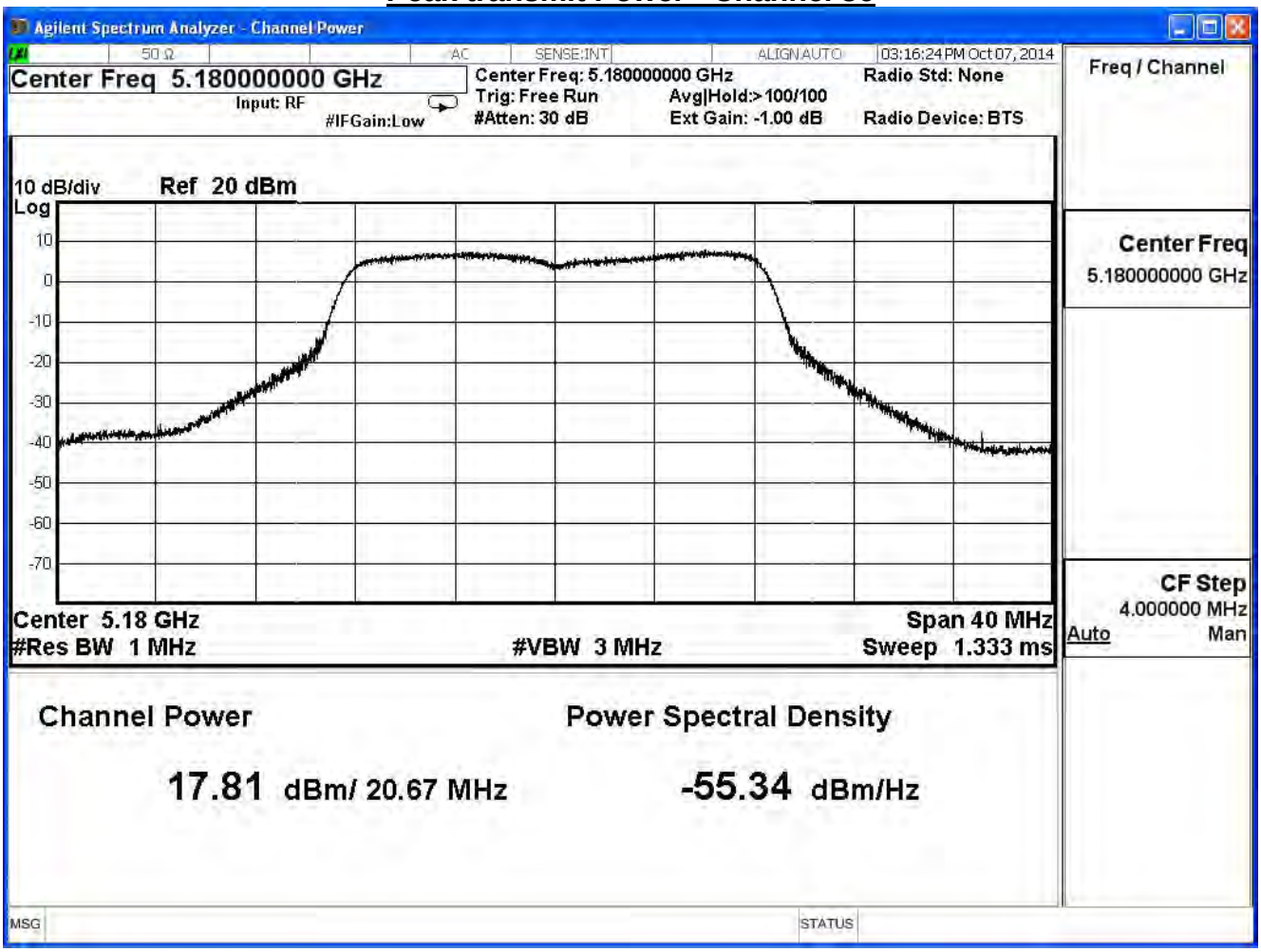
IEEE 802.11a_ANT 1

Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit	Result
36	5180	20.67	17.810	≤30	Pass
44	5220	20.39	17.830	≤30	Pass
48	5240	21.61	17.790	≤30	Pass

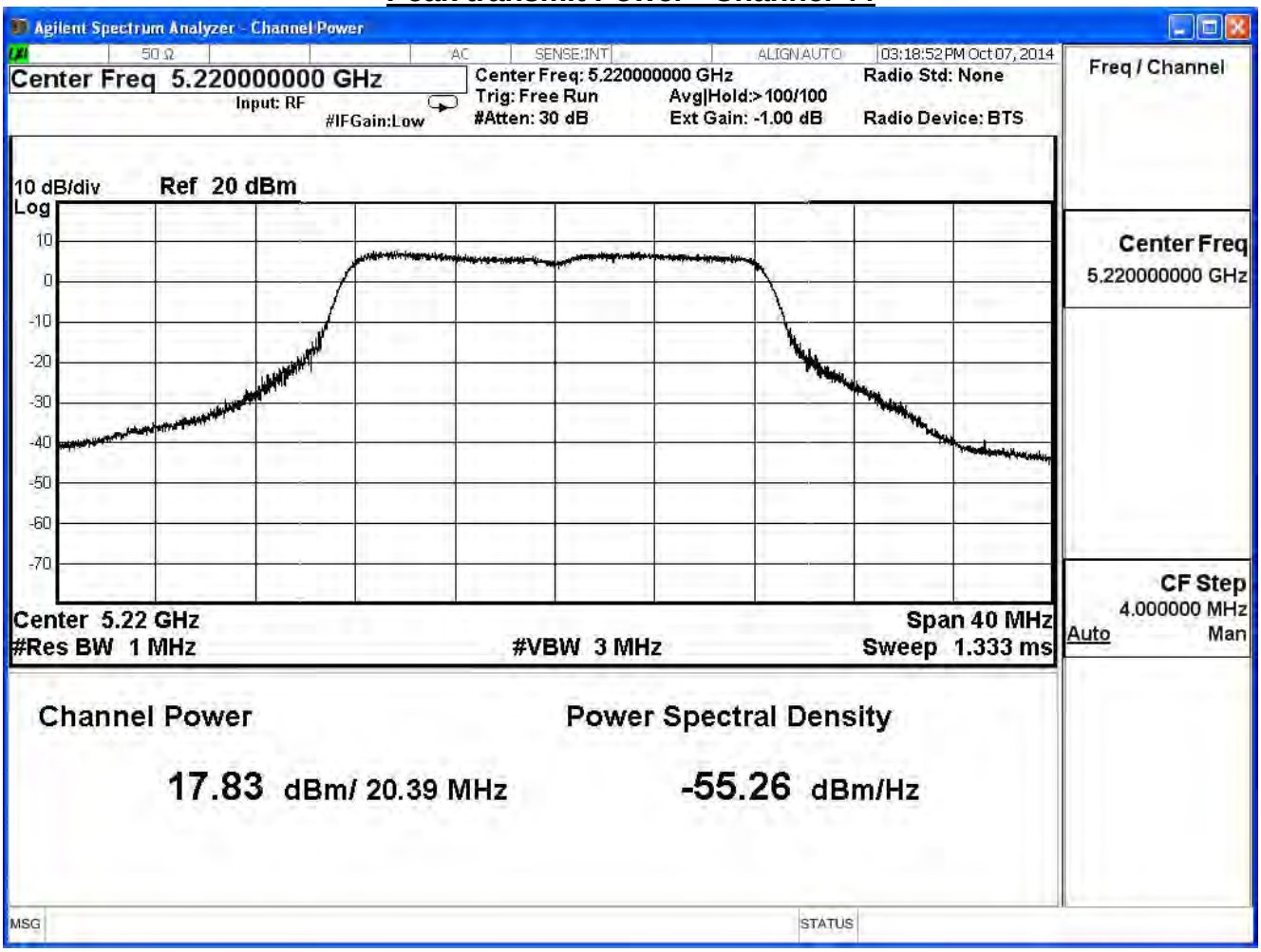
The worst emission of data rate is 6Mbps.

Peak Power Output (dBm)									
Channel No	Frequency (MHz)	Data Rate							Required Limit
		6	12	18	24	36	48	54	
36	5180	17.81	--	--	--	--	--	--	30dBm
44	5220	17.83	17.63	17.39	17.29	17.17	17.05	16.81	
48	5240	17.79	--	--	--	--	--	--	

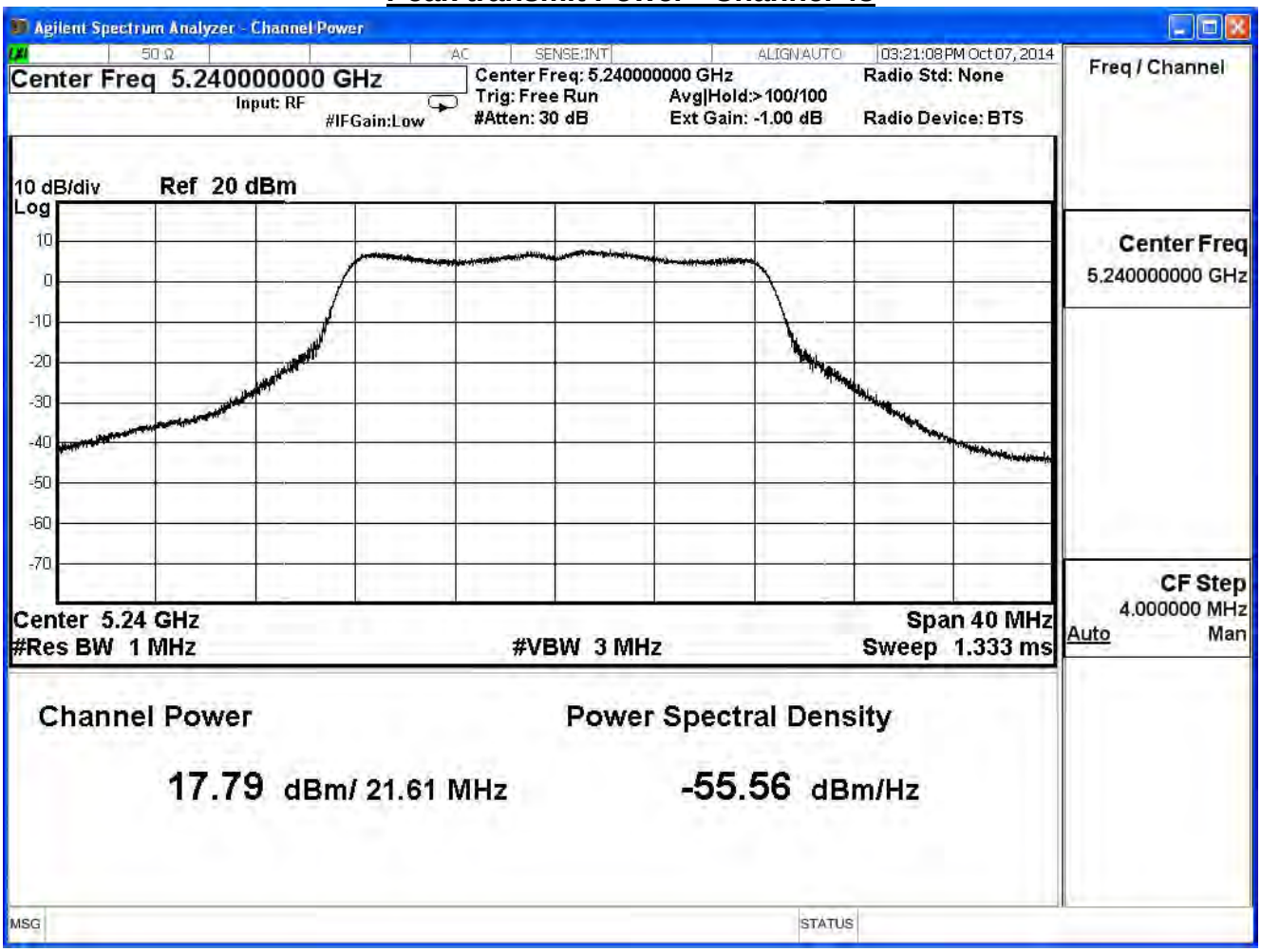
Peak transmit Power - Channel 36



Peak transmit Power - Channel 44



Peak transmit Power - Channel 48



Product	VDSL2 Security Firewall		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/07	Test Site	SR7

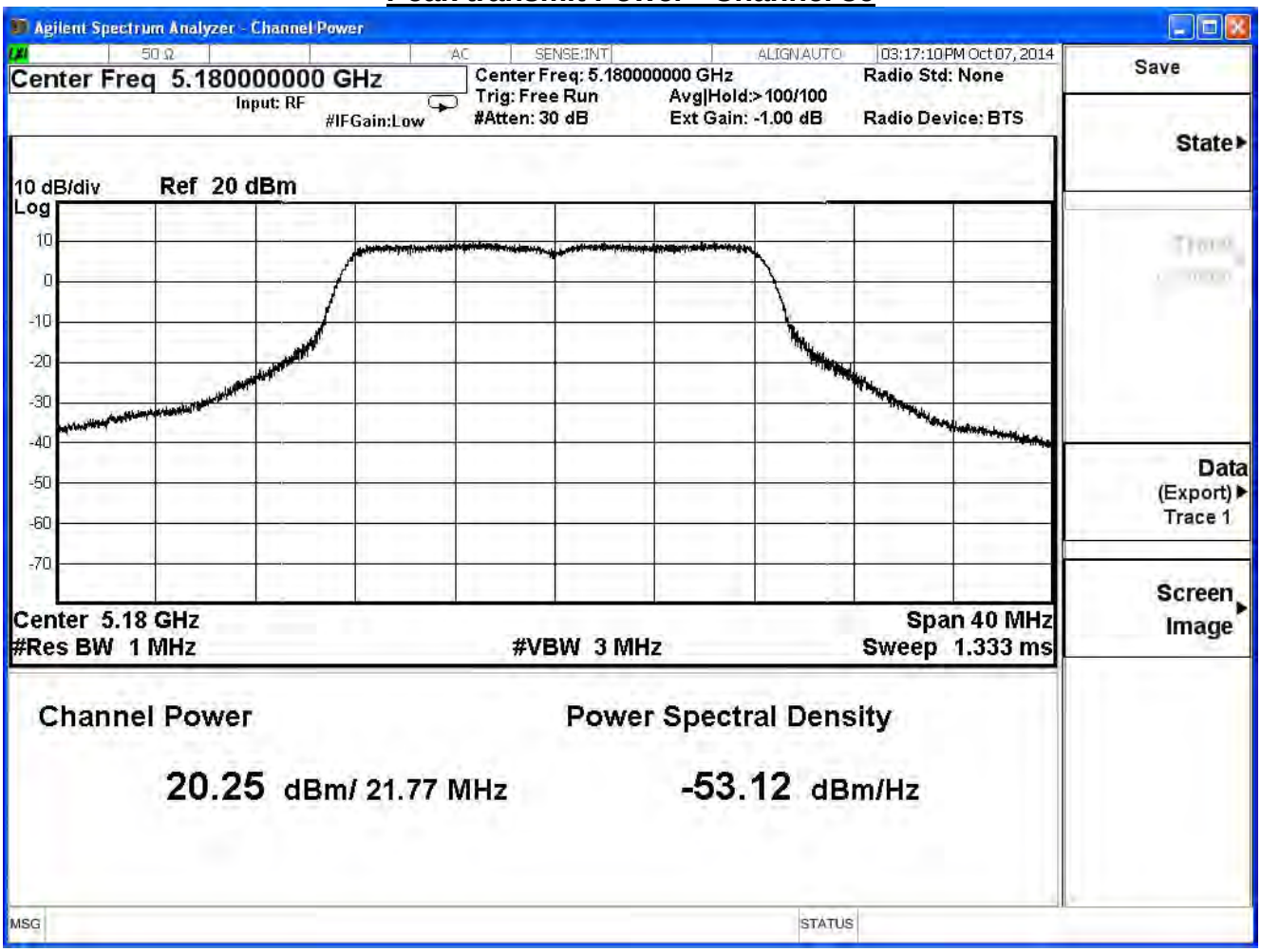
IEEE 802.11a_ANT 2

Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit	Result
36	5180	21.77	20.250	≤30	Pass
44	5220	22.12	19.970	≤30	Pass
48	5240	21.46	19.770	≤30	Pass

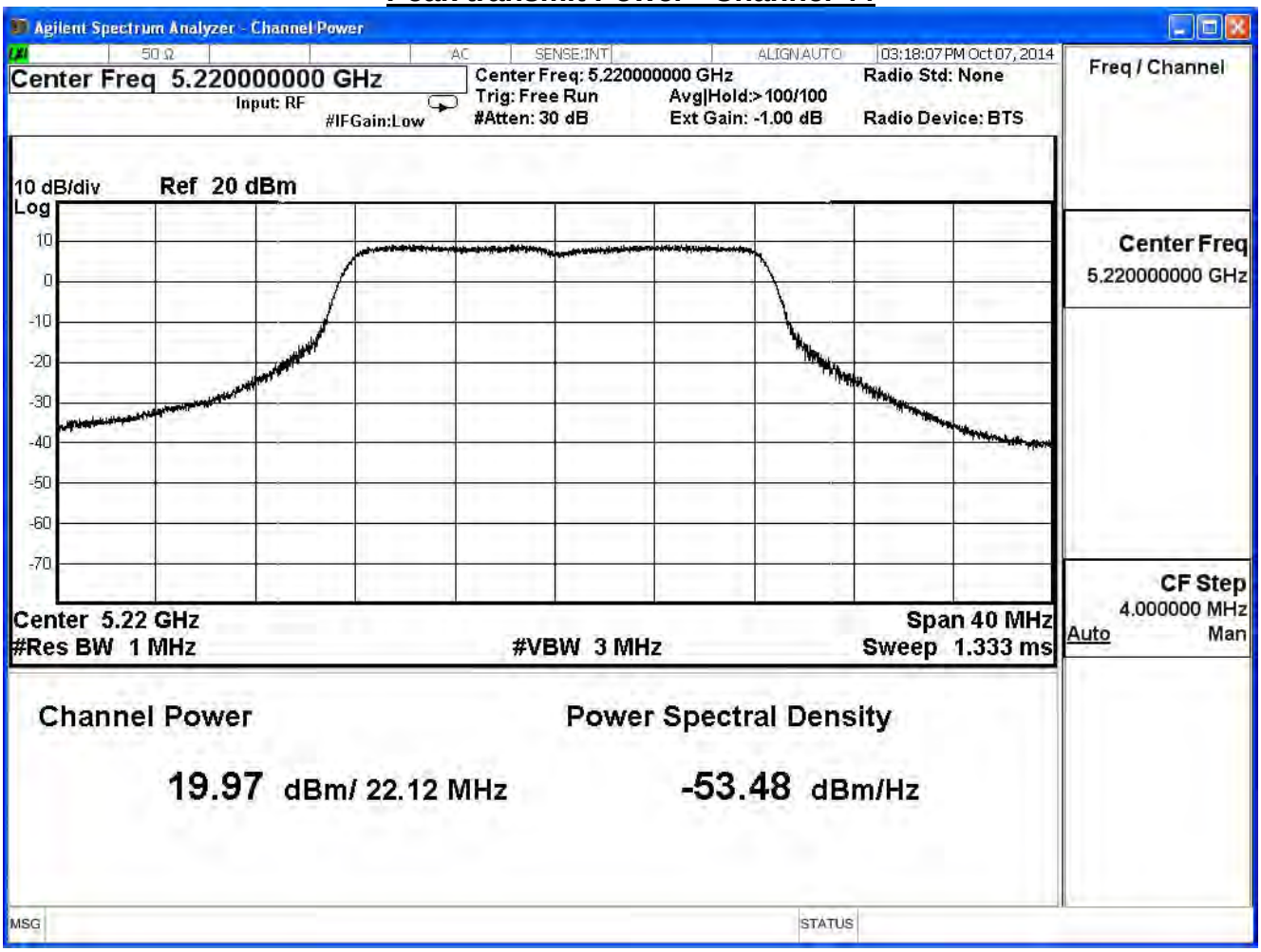
The worst emission of data rate is 6Mbps.

Peak Power Output (dBm)									
Channel No	Frequency (MHz)	Data Rate							Required Limit
		6	12	18	24	36	48	54	
36	5180	20.25	--	--	--	--	--	--	30dBm
44	5220	19.97	19.77	19.64	19.44	19.18	19.06	18.94	
48	5240	19.77	--	--	--	--	--	--	

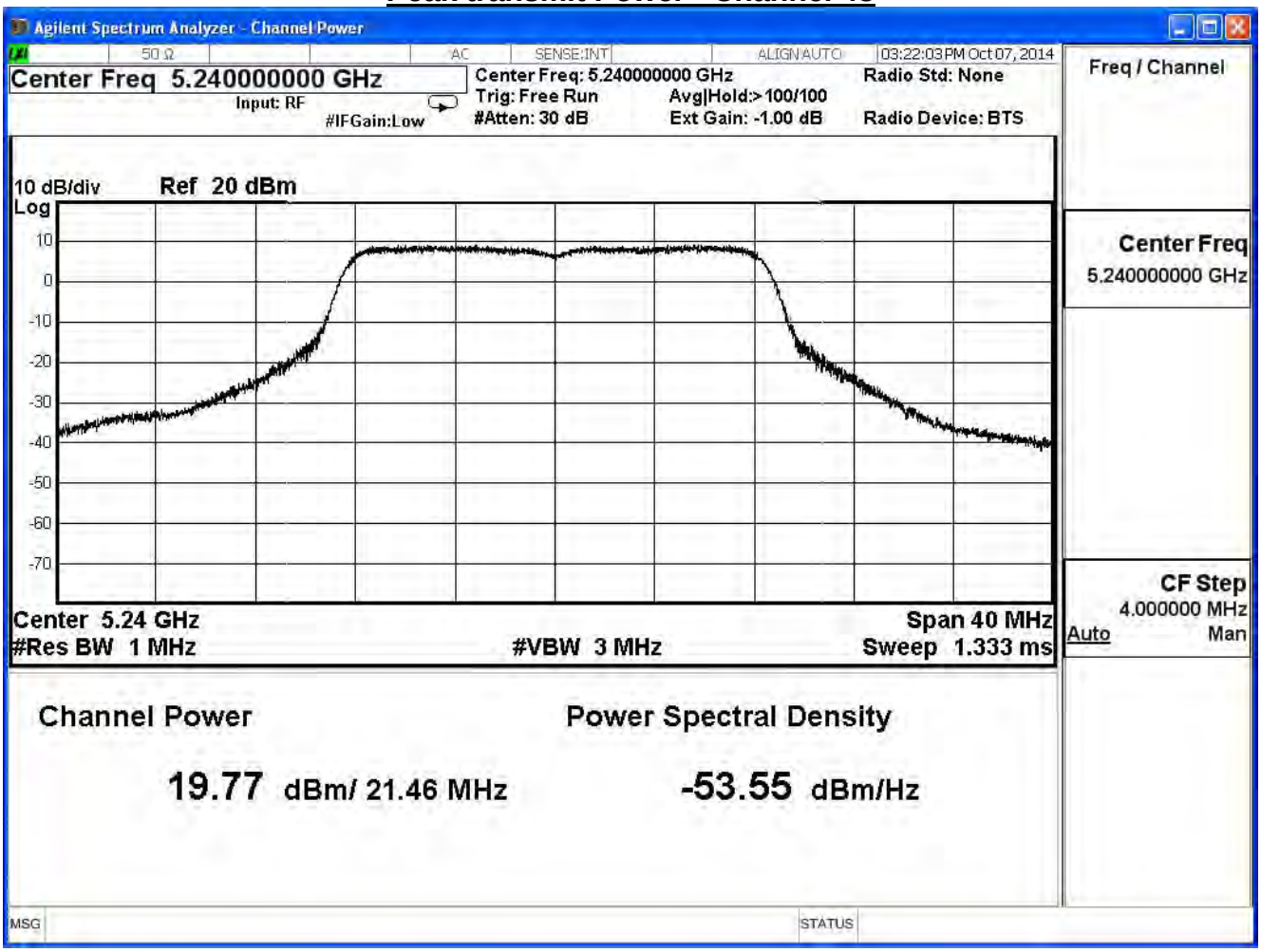
Peak transmit Power - Channel 36



Peak transmit Power - Channel 44



Peak transmit Power - Channel 48



Product	VDSL2 Security Firewall		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/07	Test Site	SR7

IEEE 802.11a_ANT 0+1+2

Channel No.	Frequency (MHz)	Output Power (mW)	Output Power (dBm)	Required Limit	Result
36	5180	224.9573	23.521	≤30	Pass
44	5220	231.4195	23.644	≤30	Pass
48	5240	226.7253	23.555	≤30	Pass

The worst emission of data rate is 6Mbps.

Peak Power Output (dBm)									
Channel No	Frequency (MHz)	Data Rate							Required Limit
		6	12	18	24	36	48	54	
36	5180	23.52	--	--	--	--	--	--	30dBm
44	5220	23.64	23.43	23.25	23.11	22.88	22.73	22.57	
48	5240	23.56	--	--	--	--	--	--	

Product	VDSL2 Security Firewall		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/07	Test Site	SR7

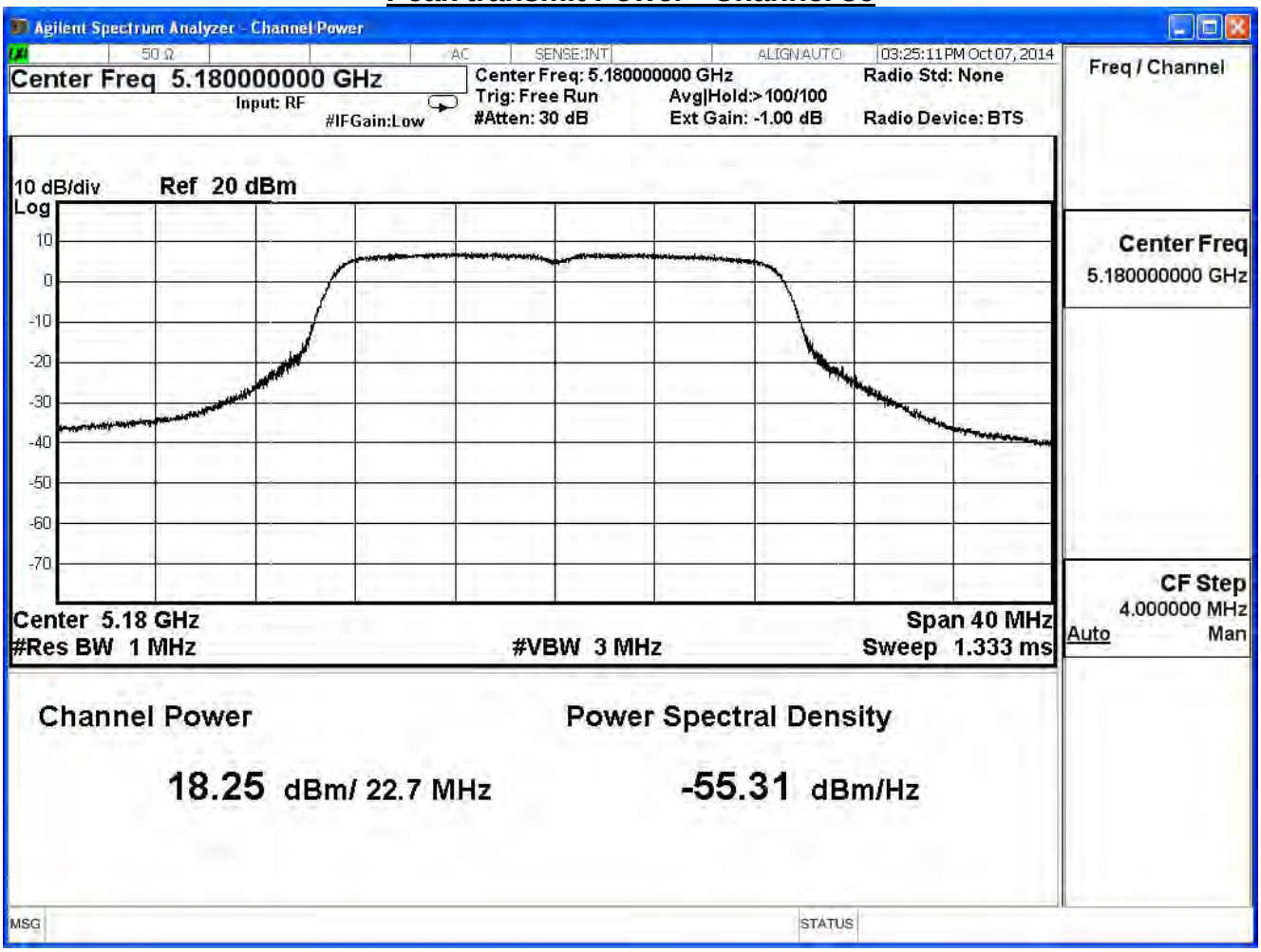
IEEE 802.11n(20MHz)_ANT 0

Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit	Result
36	5180	22.70	18.250	≤30	Pass
44	5220	22.24	18.540	≤30	Pass
48	5240	22.80	17.840	≤30	Pass

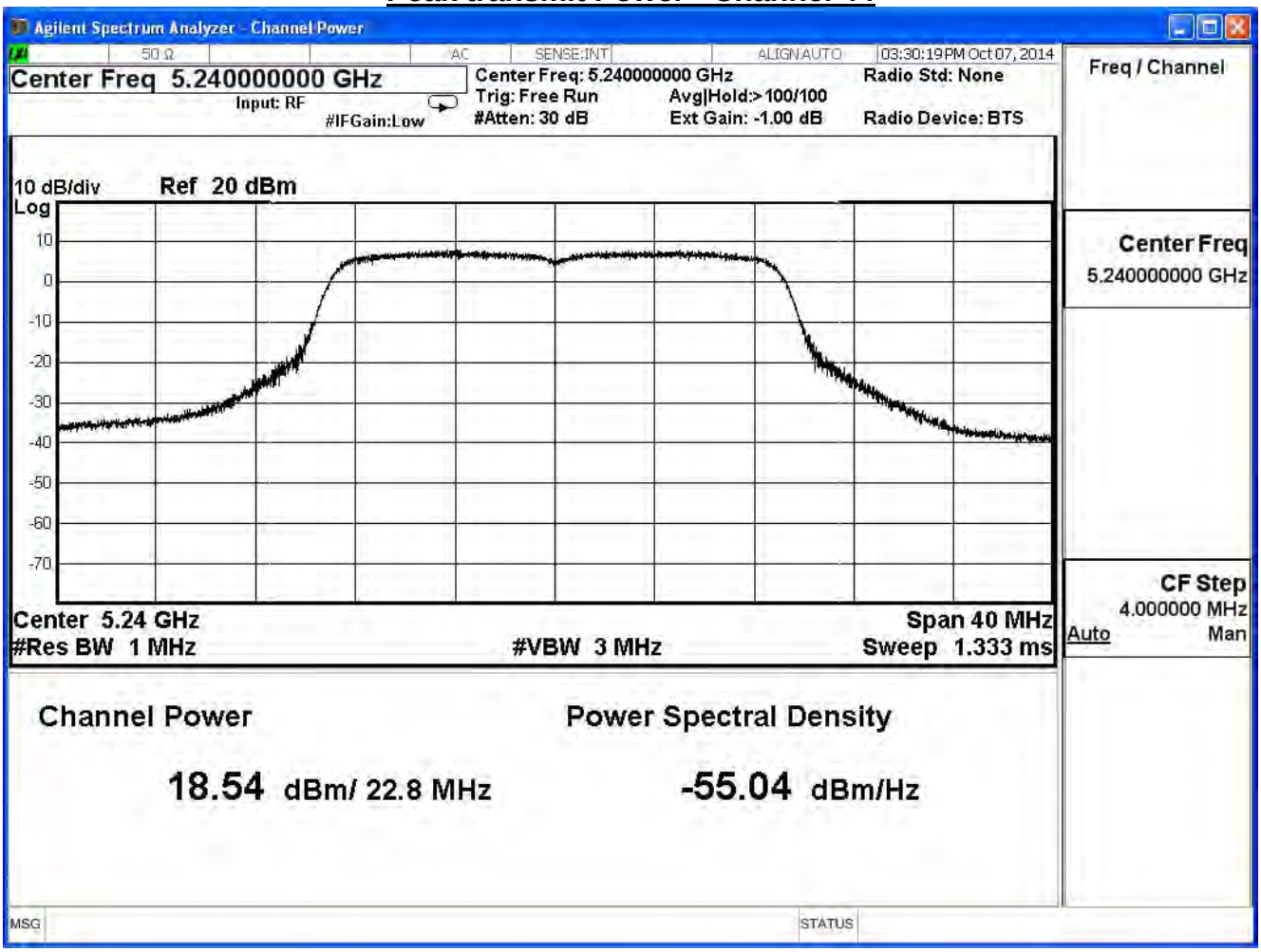
The worst emission of data rate is 6.5 Mbps.

Peak Power Output (dBm)										
MCS Index		0	1	2	3	4	5	6	7	Required Limit
Channel No	Frequency (MHz)	Data Rate								
		6.5	13	19.5	26	39	52	58.5	65	
36	5180	18.25	--	--	--	--	--	--	--	30dBm
44	5220	18.54	18.42	18.32	18.10	17.97	17.73	17.61	17.50	
48	5240	17.84	--	--	--	--	--	--	--	

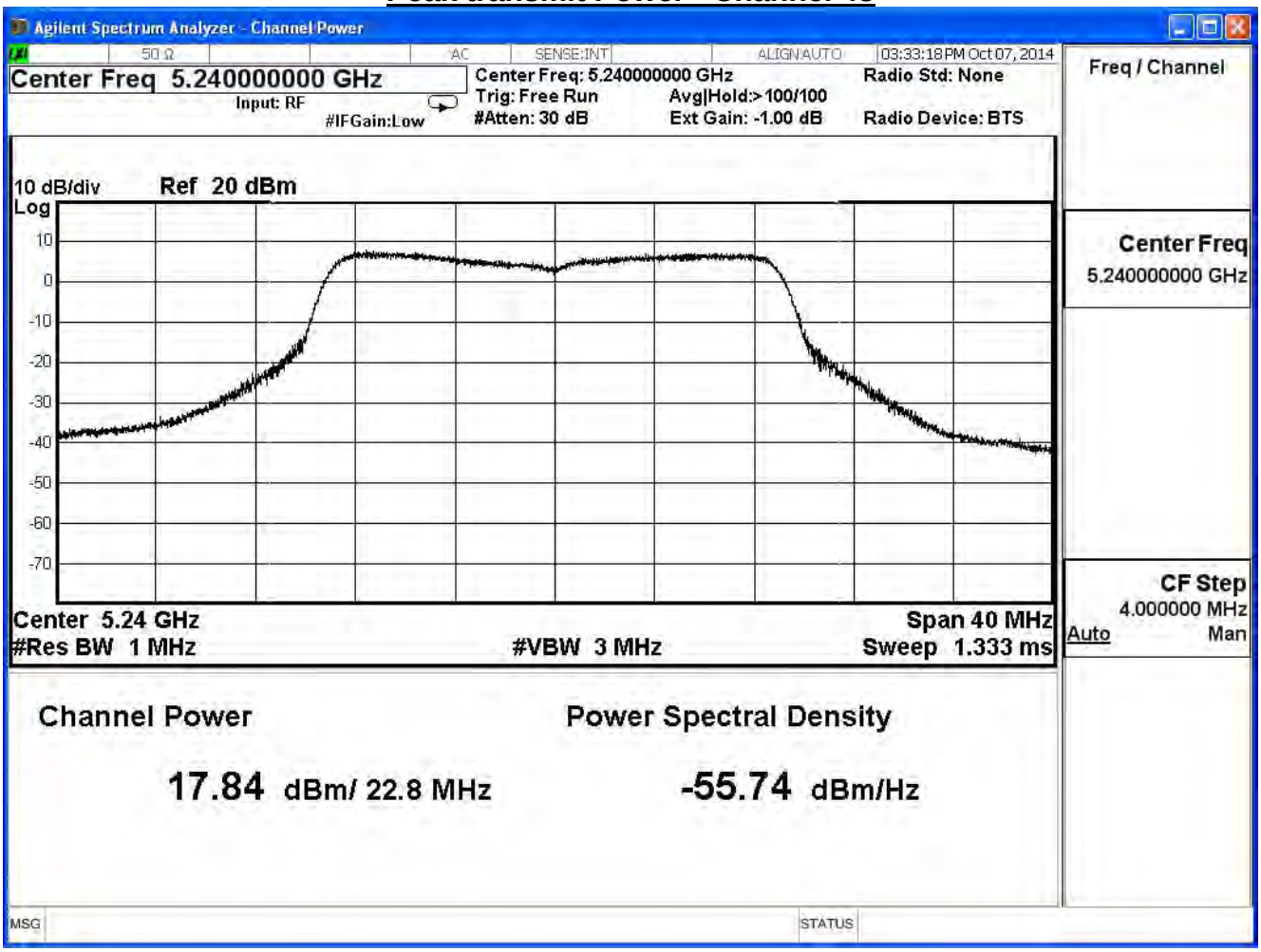
Peak transmit Power - Channel 36



Peak transmit Power - Channel 44



Peak transmit Power - Channel 48



Product	VDSL2 Security Firewall		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/07	Test Site	SR7

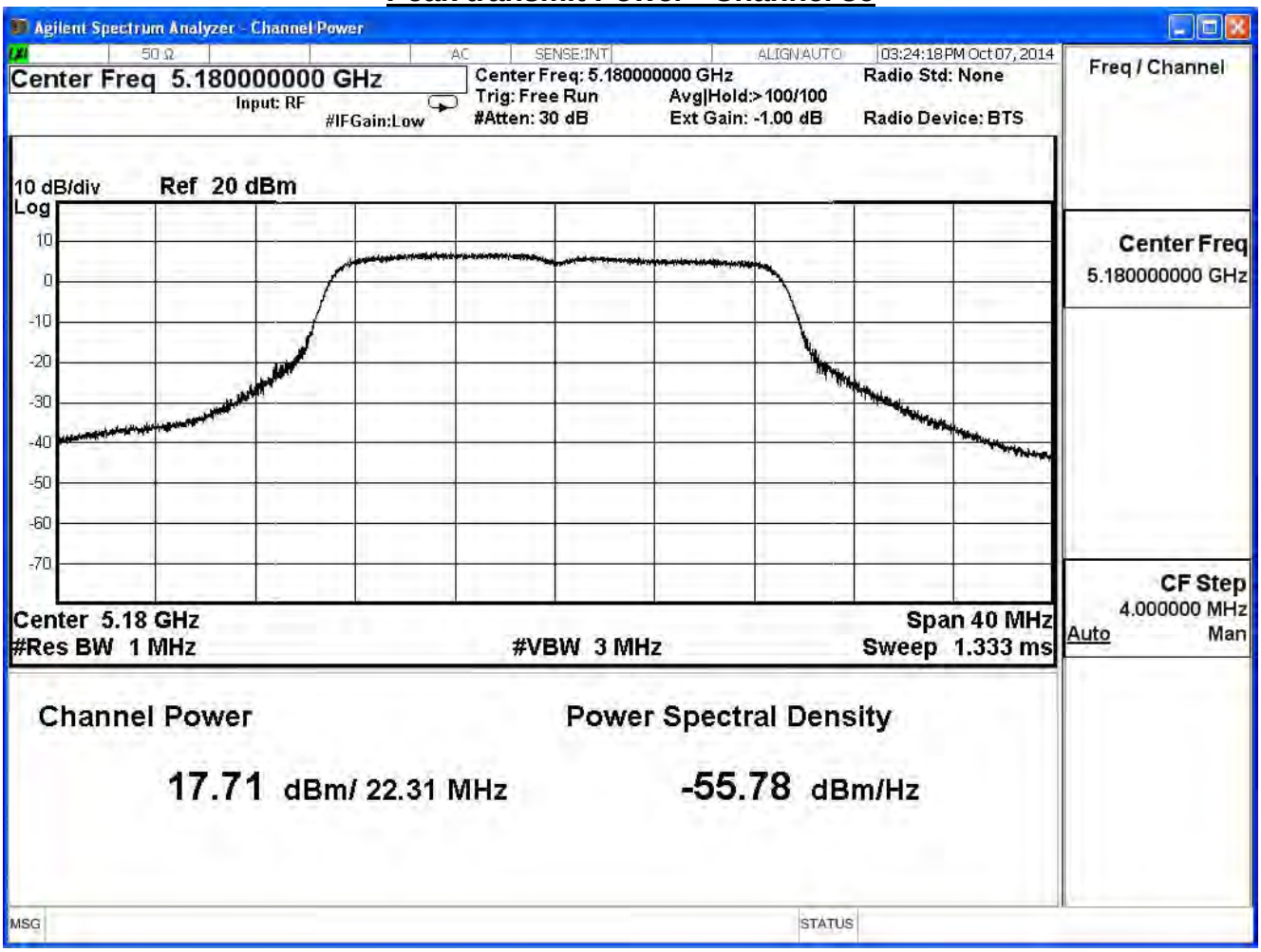
IEEE 802.11n(20MHz)_ANT 1

Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit	Result
36	5180	22.31	17.710	≤30	Pass
44	5220	21.02	18.080	≤30	Pass
48	5240	23.24	18.110	≤30	Pass

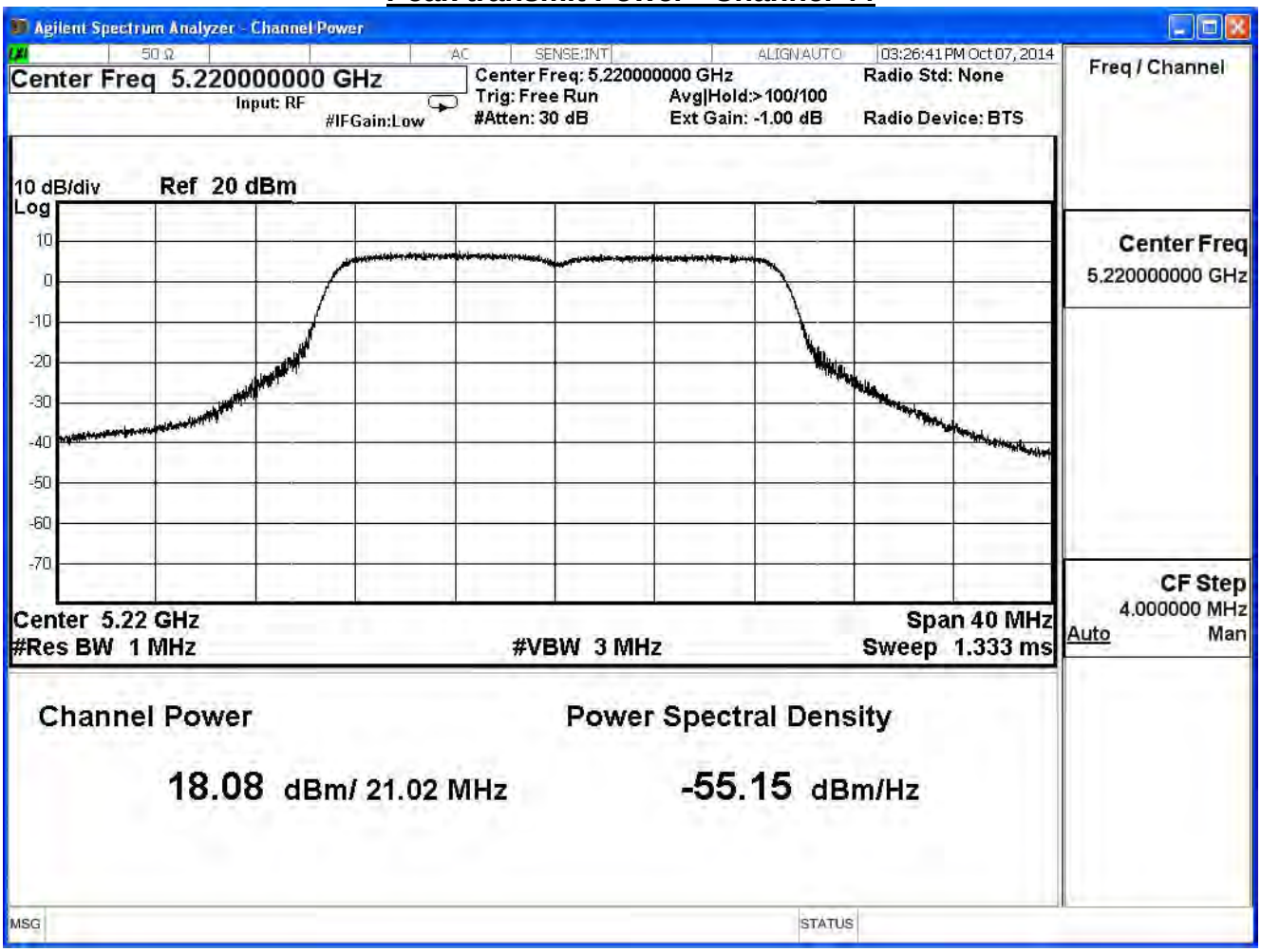
The worst emission of data rate is 6.5 Mbps.

Peak Power Output (dBm)										
MCS Index		0	1	2	3	4	5	6	7	Required Limit
Channel No	Frequency (MHz)	Data Rate								
		6.5	13	19.5	26	39	52	58.5	65	
36	5180	17.71	--	--	--	--	--	--	--	30dBm
44	5220	18.08	17.88	17.76	17.66	17.54	17.42	17.30	17.17	
48	5240	18.11	--	--	--	--	--	--	--	

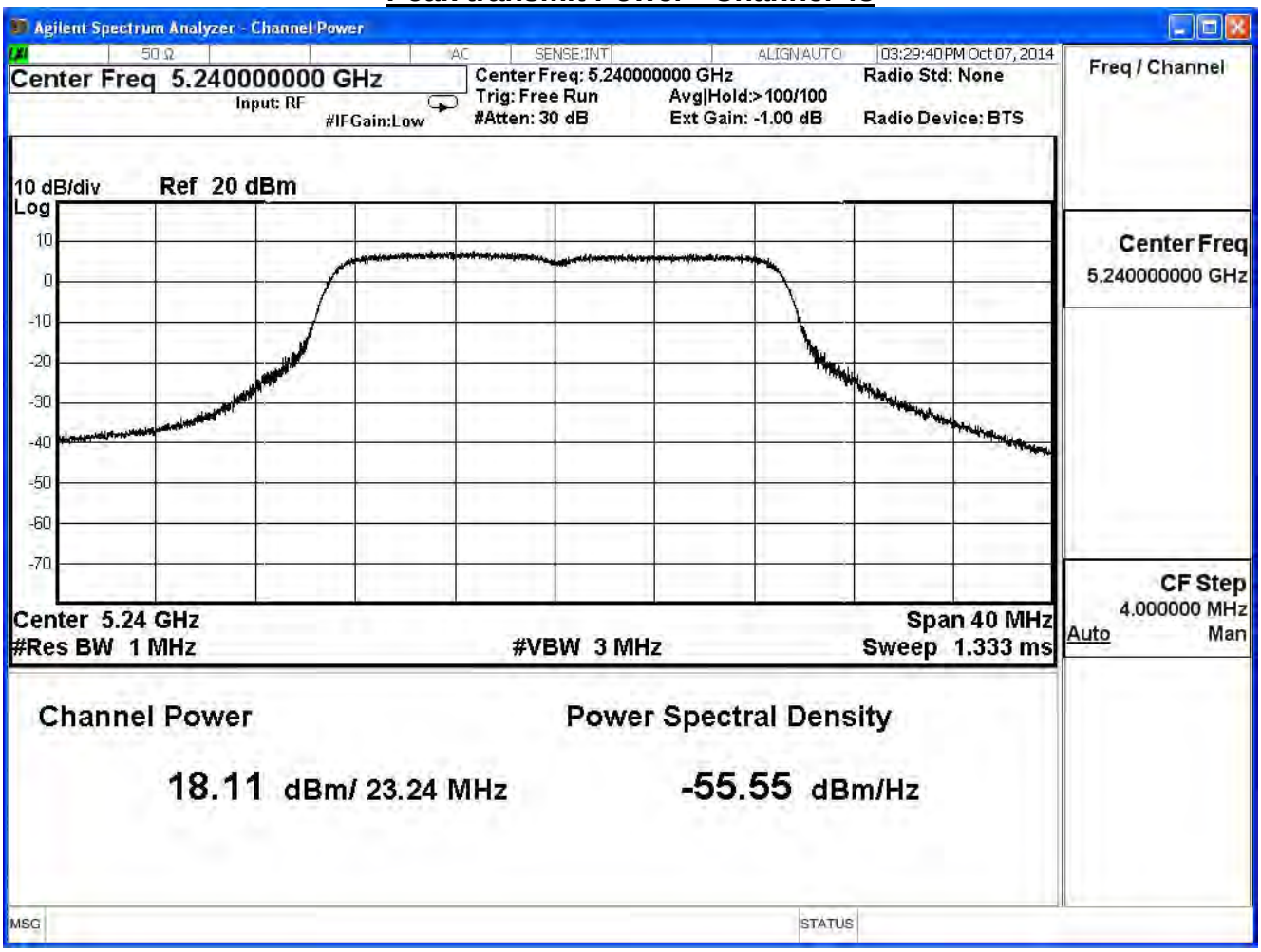
Peak transmit Power - Channel 36



Peak transmit Power - Channel 44



Peak transmit Power - Channel 48



Product	VDSL2 Security Firewall		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/07	Test Site	SR7

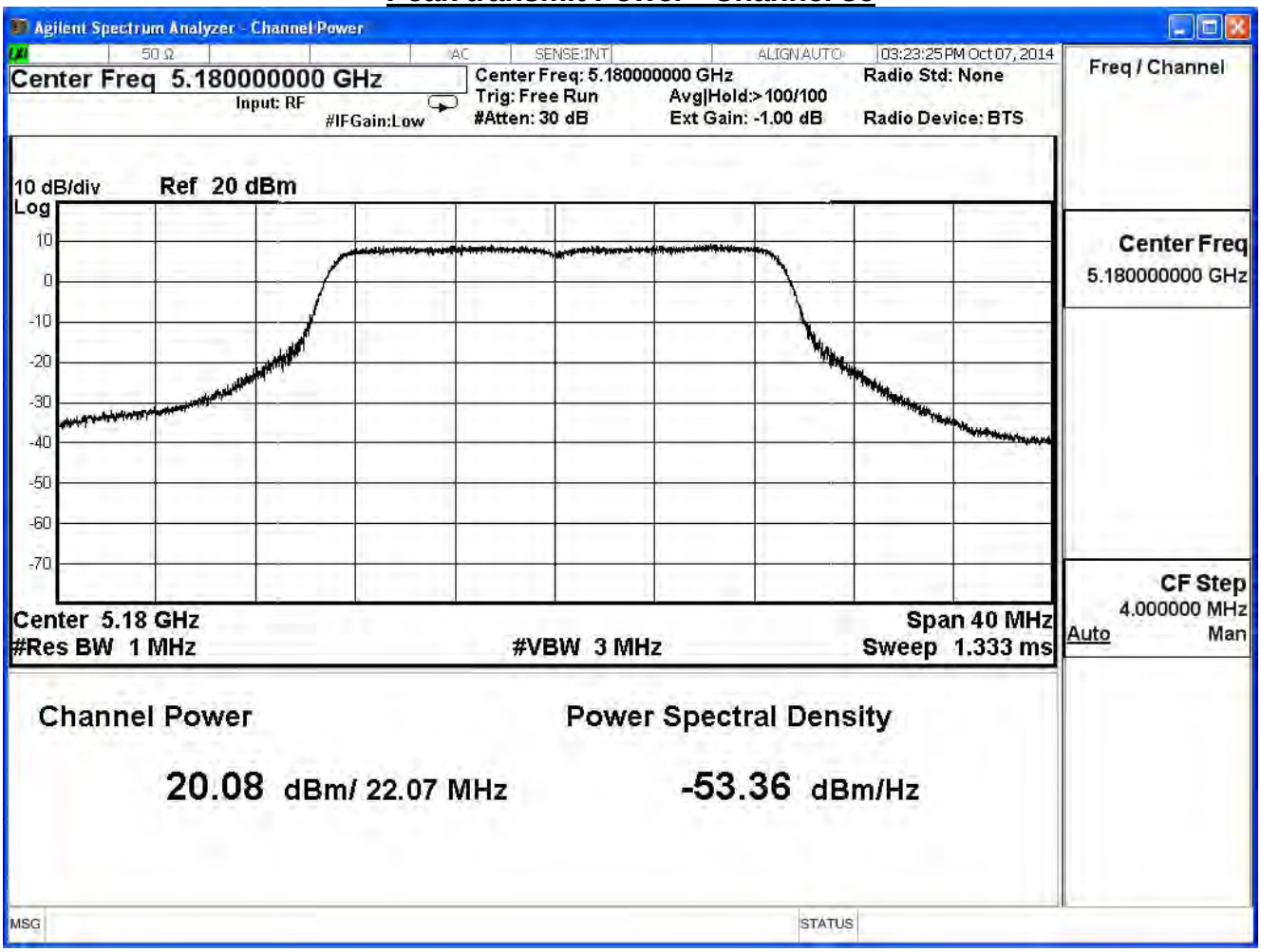
IEEE 802.11n(20MHz)_ANT 2

Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit	Result
36	5180	22.07	20.080	≤30	Pass
44	5220	22.29	19.740	≤30	Pass
48	5240	22.38	19.760	≤30	Pass

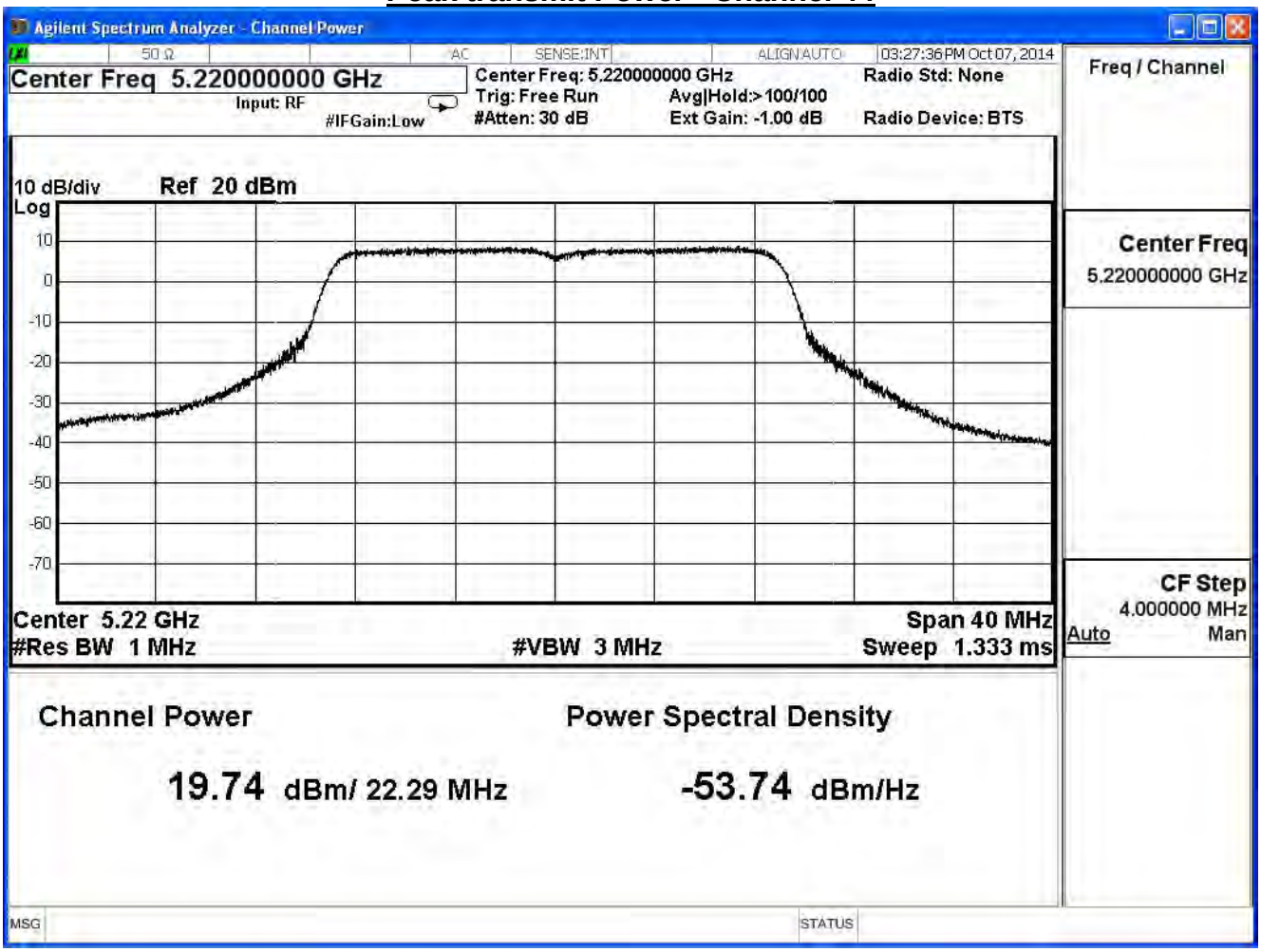
The worst emission of data rate is 6.5 Mbps.

Peak Power Output (dBm)										
MCS Index		0	1	2	3	4	5	6	7	Required Limit
Channel No	Frequency (MHz)	Data Rate								
		6.5	13	19.5	26	39	52	58.5	65	
36	5180	20.08	--	--	--	--	--	--	--	30dBm
44	5220	19.74	19.54	19.41	19.31	19.05	18.93	18.69	18.57	
48	5240	19.76	--	--	--	--	--	--	--	

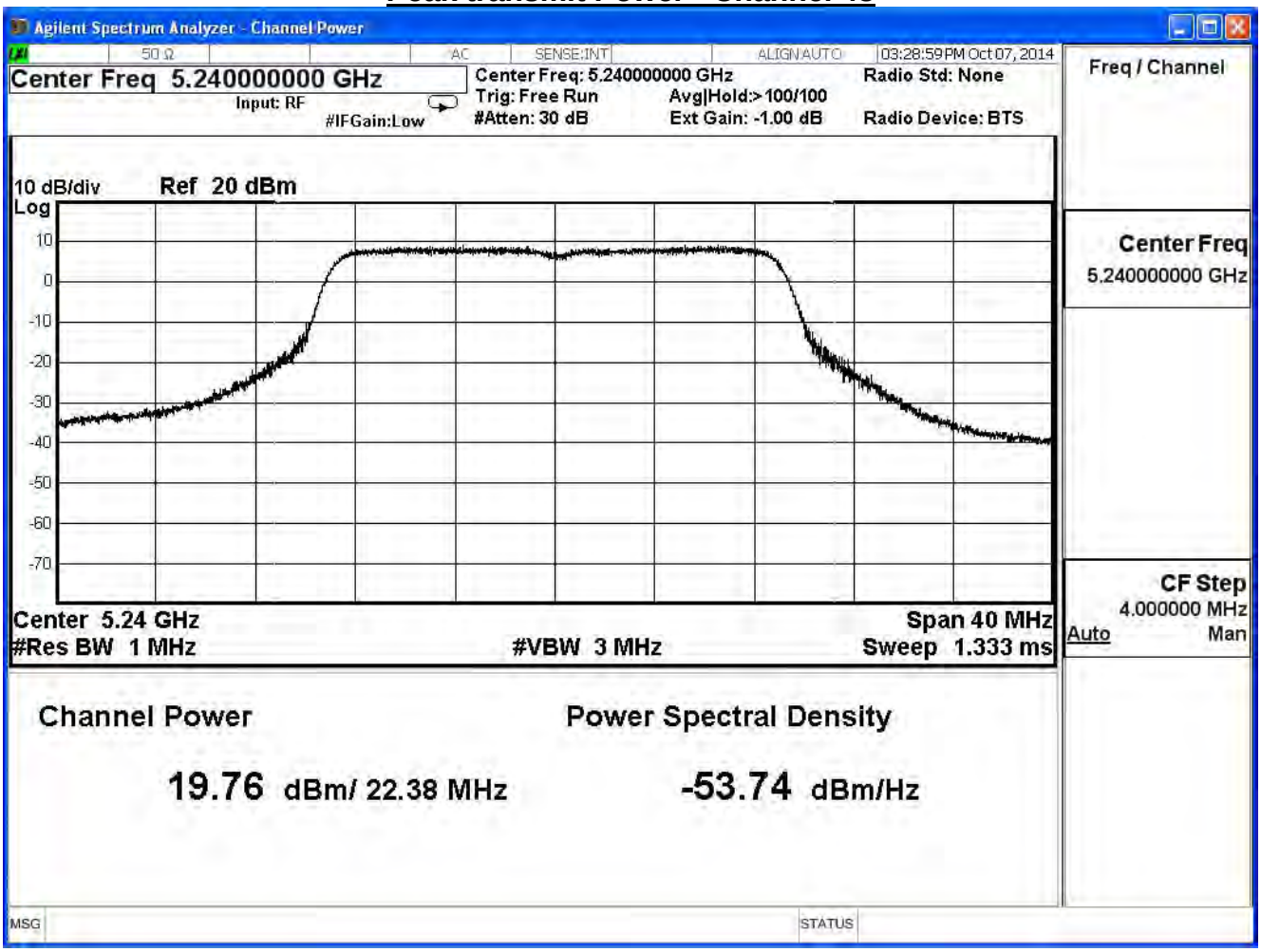
Peak transmit Power - Channel 36



Peak transmit Power - Channel 44



Peak transmit Power - Channel 48



Product	VDSL2 Security Firewall		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/07	Test Site	SR7

IEEE 802.11n(20MHz)_ANT 0+1+2

Channel No.	Frequency (MHz)	Output Power (mW)	Output Power (dBm)	Required Limit	Result
36	5180	227.7194	23.574	≤30	Pass
44	5220	229.9323	23.616	≤30	Pass
48	5240	220.1405	23.427	≤30	Pass

Peak Power Output (dBm)										
MCS Index		0	1	2	3	4	5	6	7	Required Limit
Channel No	Frequency (MHz)	Data Rate								
		6.5	13	19.5	26	39	52	58.5	65	
36	5180	23.57	--	--	--	--	--	--	--	30dBm
44	5220	23.62	23.44	23.32	23.19	23.01	22.85	22.68	22.56	
48	5240	23.43	--	--	--	--	--	--	--	

Product	VDSL2 Security Firewall		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/07	Test Site	SR7

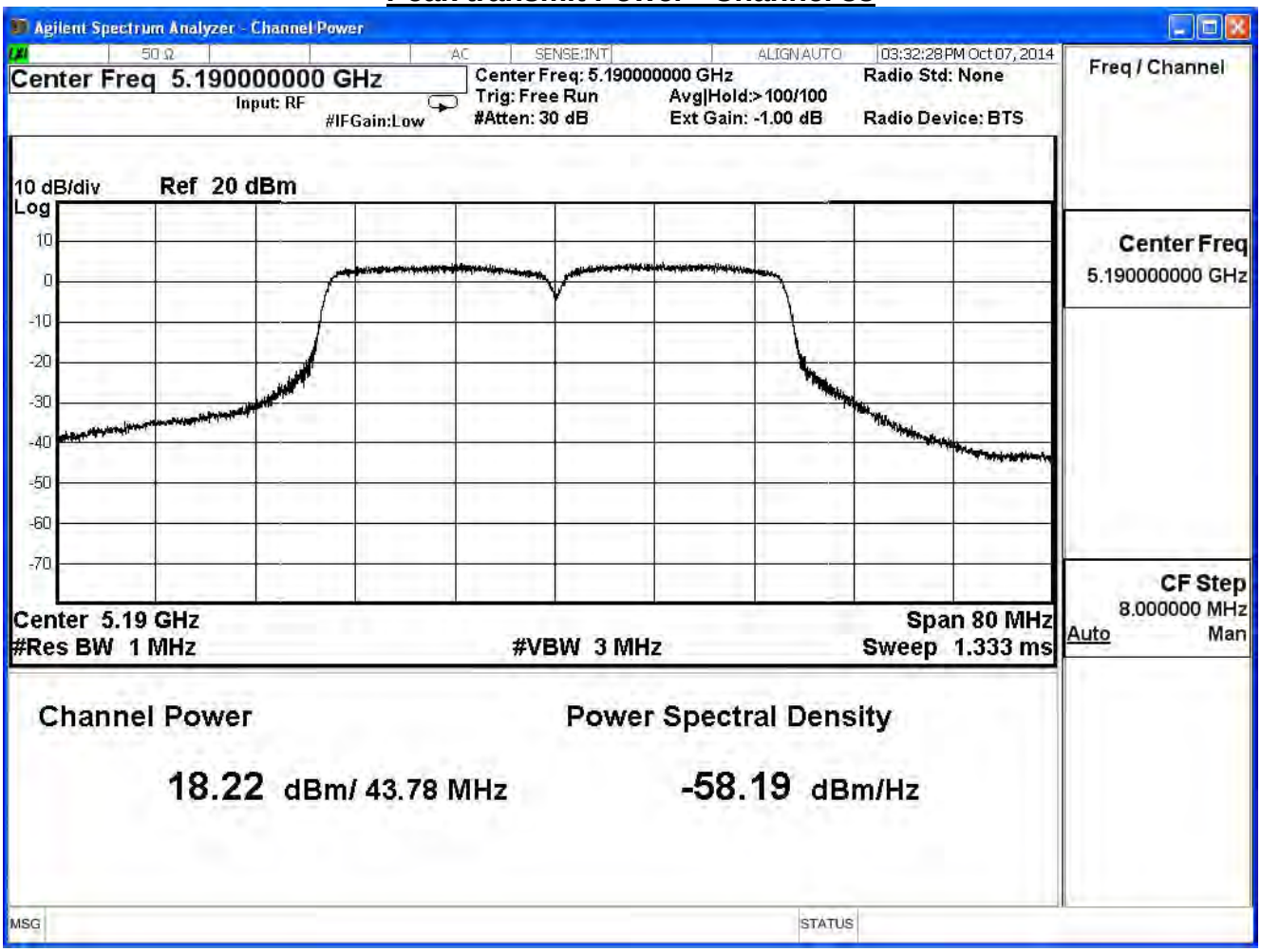
IEEE 802.11n(40MHz)_ANT 0

Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit	Result
38	5190	43.78	18.220	≤30	Pass
46	5230	42.26	18.680	≤30	Pass

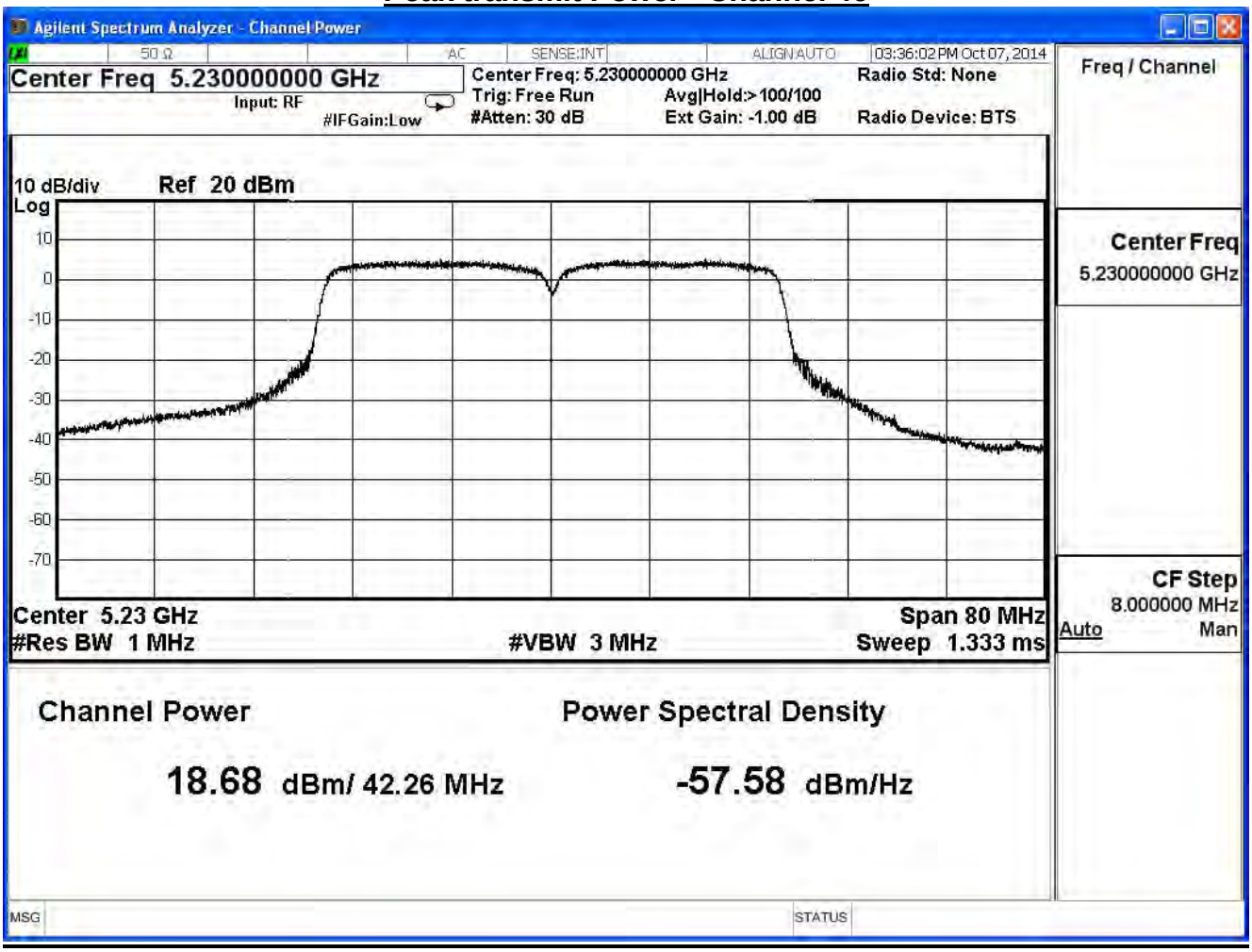
The worst emission of data rate is 13.5 Mbps

Peak Power Output (dBm)										
MCS Index		0	1	2	3	4	5	6	7	Required Limit
Channel No	Frequency (MHz)	Data Rate								
		13.5	27	40.5	54	81	108	121.5	135	
38	5190	18.22	18.12	18.01	17.91	17.81	17.69	17.56	17.44	30dBm
46	5230	18.68	--	--	--	--	--	--	--	

Peak transmit Power - Channel 38



Peak transmit Power - Channel 46



Product	VDSL2 Security Firewall		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/07	Test Site	SR7

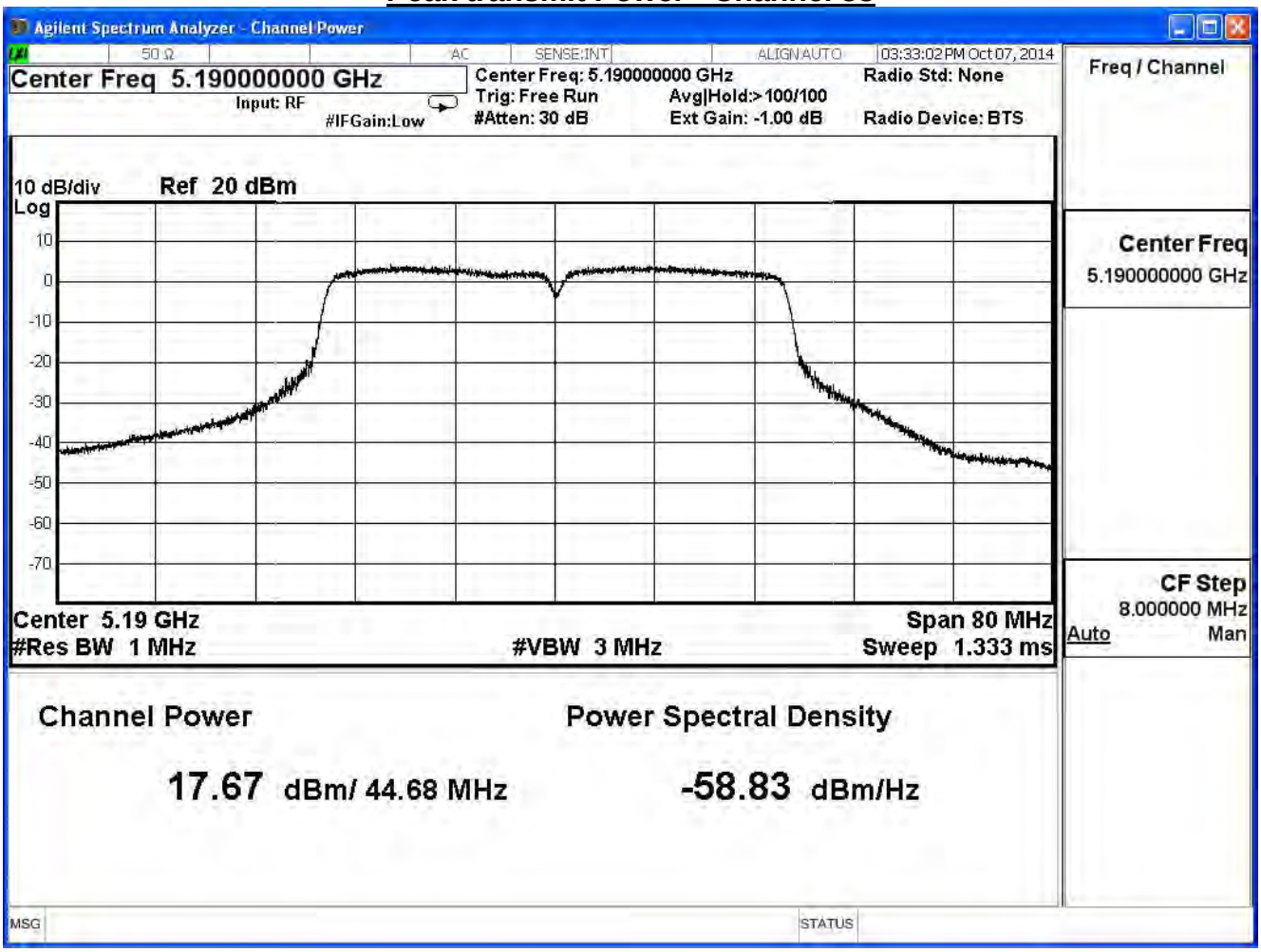
IEEE 802.11n(40MHz)_ANT 1

Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit	Result
38	5190	44.68	17.670	≤30	Pass
46	5230	42.54	18.150	≤30	Pass

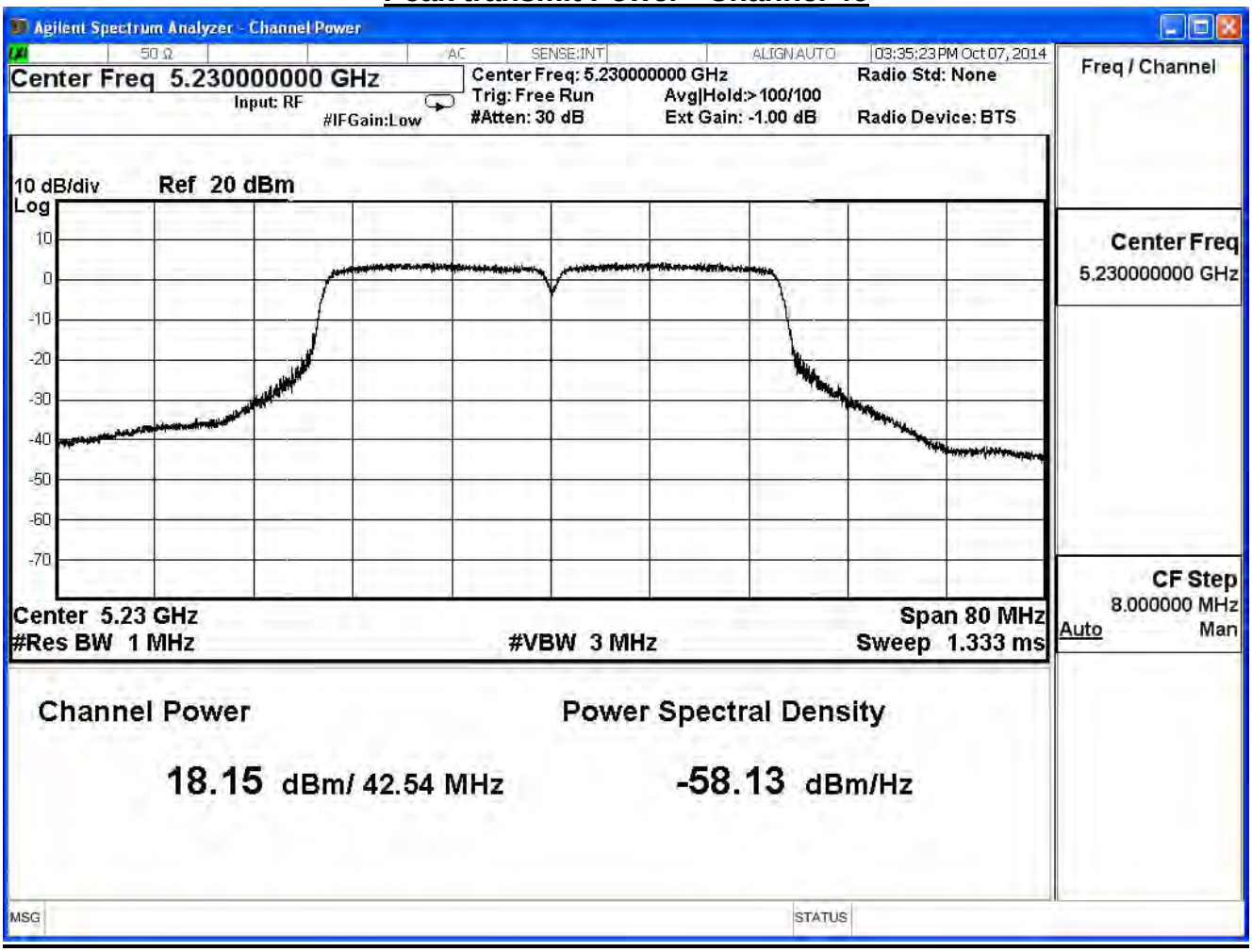
The worst emission of data rate is 13.5 Mbps

Peak Power Output (dBm)										
MCS Index		0	1	2	3	4	5	6	7	Required Limit
Channel No	Frequency (MHz)	Data Rate								
		13.5	27	40.5	54	81	108	121.5	135	
38	5190	17.67	17.47	17.27	17.01	16.81	16.57	16.33	16.09	17dBm or 4dBm+10logB
46	5230	18.15	--	--	--	--	--	--	--	

Peak transmit Power - Channel 38



Peak transmit Power - Channel 46



Product	VDSL2 Security Firewall		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/07	Test Site	SR7

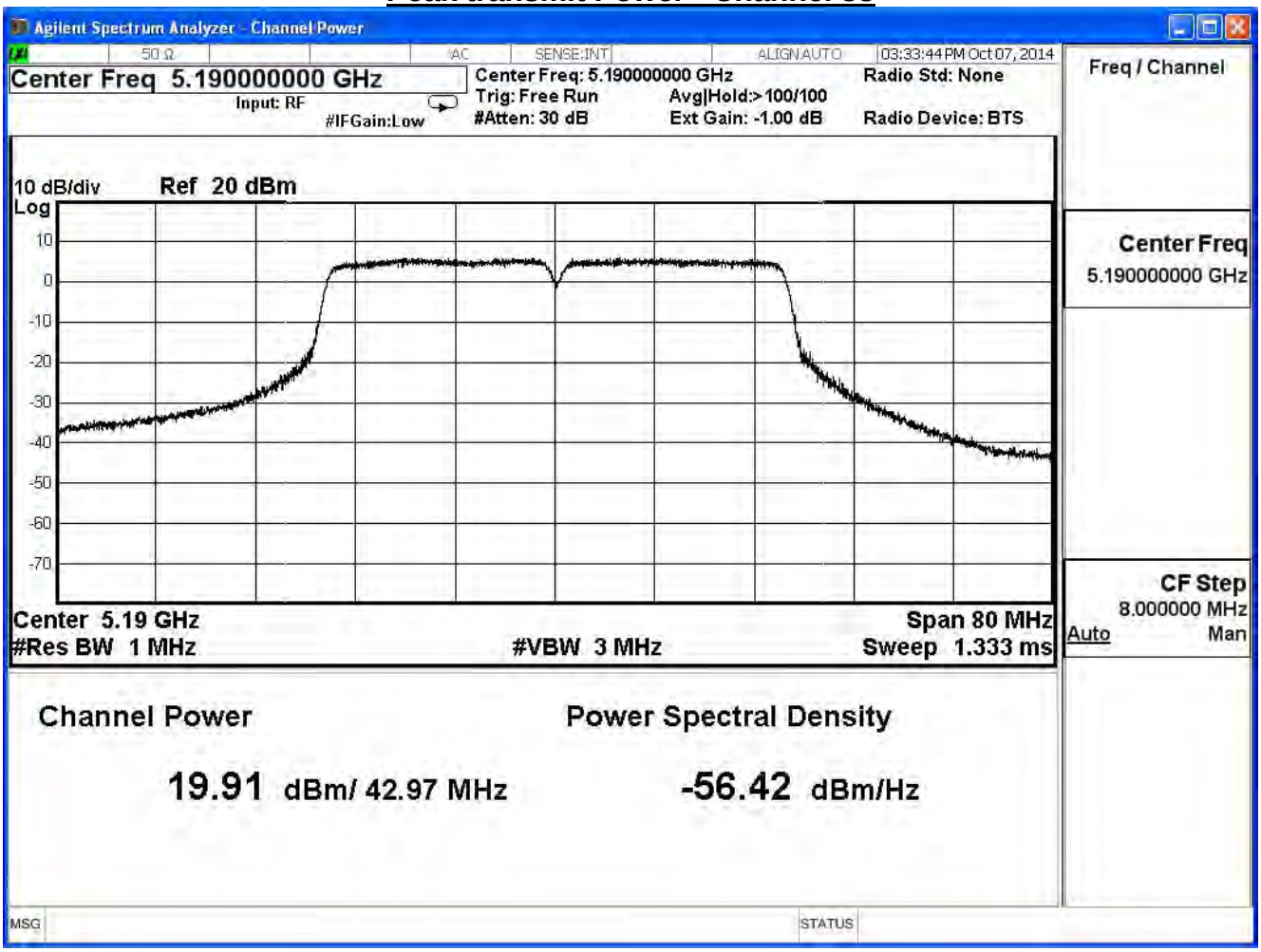
IEEE 802.11n(40MHz)_ANT 2

Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit	Result
38	5190	42.97	19.910	≤30	Pass
46	5230	43.68	20.220	≤30	Pass

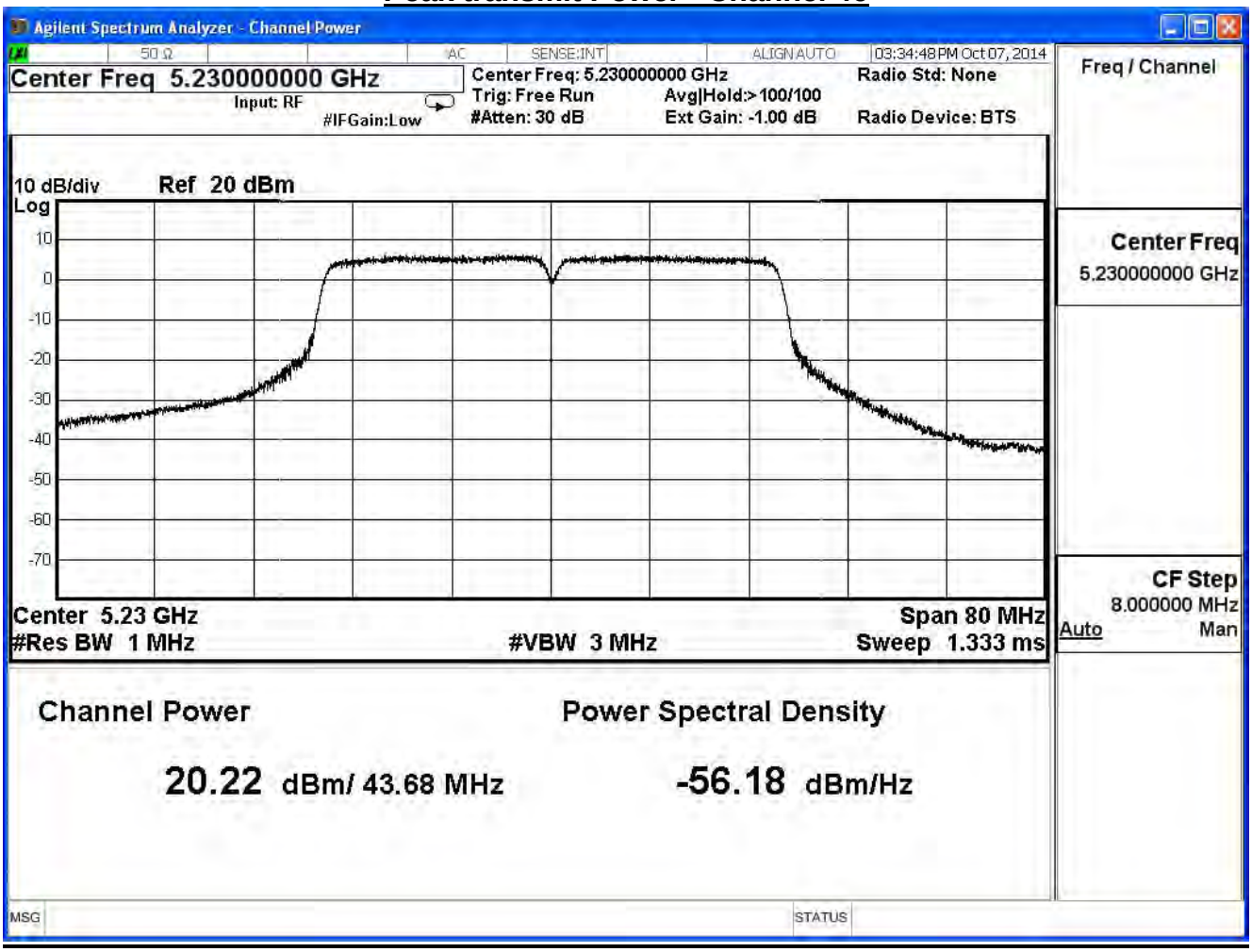
The worst emission of data rate is 13.5 Mbps

Peak Power Output (dBm)										
MCS Index		0	1	2	3	4	5	6	7	Required Limit
Channel No	Frequency (MHz)	Data Rate								
		13.5	27	40.5	54	81	108	121.5	135	
38	5190	19.91	19.81	19.59	19.39	19.15	19.03	18.91	18.67	30dBm
46	5230	20.22	--	--	--	--	--	--	--	

Peak transmit Power - Channel 38



Peak transmit Power - Channel 46



Product	VDSL2 Security Firewall		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/07	Test Site	SR7

IEEE 802.11n(40MHz)_ANT 0+1+2

Channel No.	Frequency (MHz)	Output Power (mW)	Output Power (dBm)	Required Limit	Result
38	5190	222.7922	23.479	≤30	Pass
46	5230	244.2868	23.879	≤30	Pass

Peak Power Output (dBm)										
MCS Index		0	1	2	3	4	5	6	7	Required Limit
Channel No	Frequency (MHz)	Data Rate								
		13.5	27	40.5	54	81	108	121.5	135	
38	5190	23.48	23.35	23.17	22.99	22.80	22.65	22.50	22.30	17dBm or 4dBm+10logB
46	5230	23.88	--	--	--	--	--	--	--	

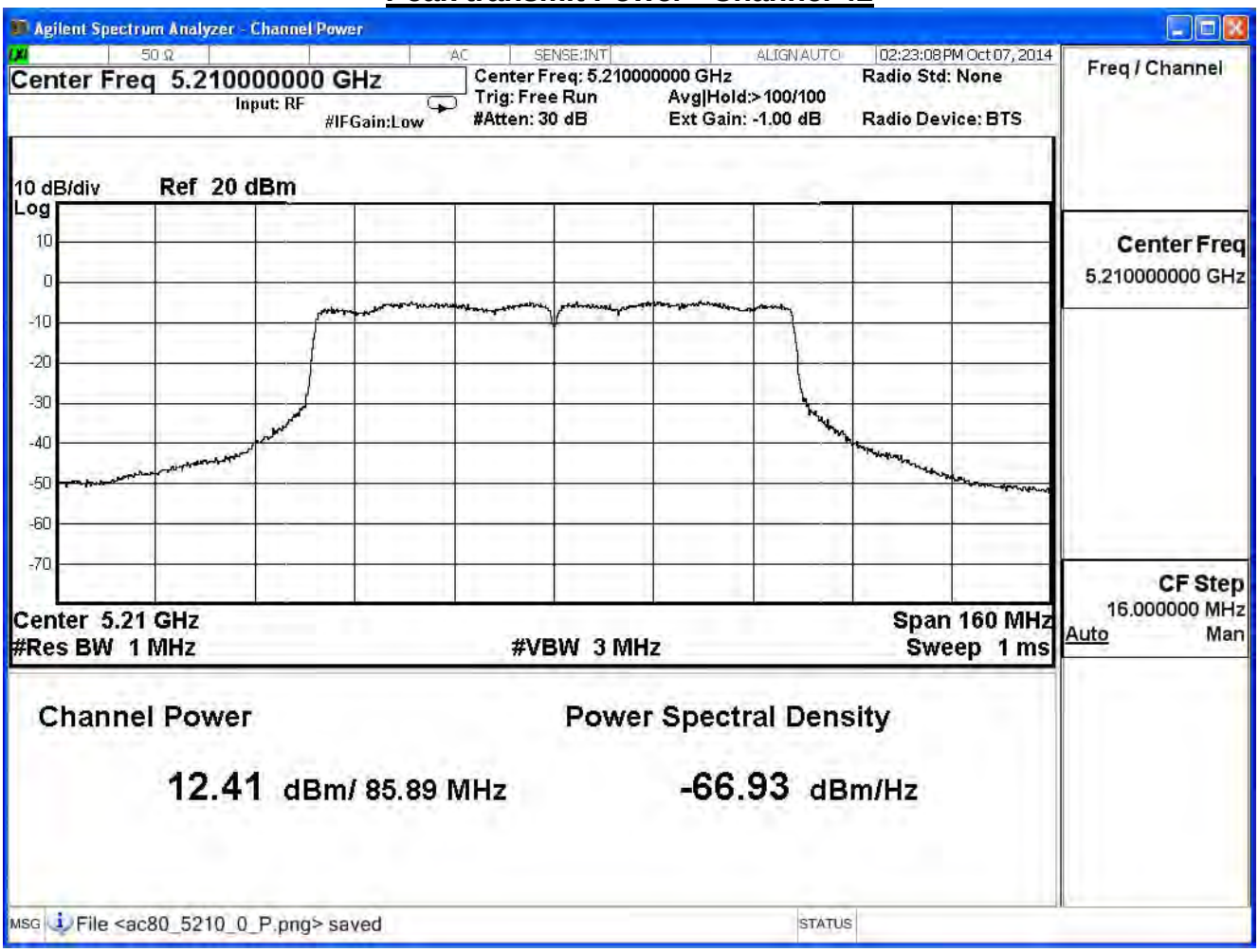
Product	VDSL2 Security Firewall		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/07	Test Site	SR7

IEEE 802.11ac(80MHz)_ANT 0

Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit	Result
42	5210	85.89	12.410	≤30	Pass

Peak Power Output (dBm)												
MCS Index		0	1	2	3	4	5	6	7	8	9	Required Limit
Channel No	Frequency (MHz)	Data Rate										
		29.3	58.5	87.8	117	175.5	234	263.3	292.5	351	390	
42	5210	12.41	12.31	12.09	11.99	11.79	11.67	11.41	11.15	10.89	10.76	30dBm

Peak transmit Power - Channel 42



Product	VDSL2 Security Firewall		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/07	Test Site	SR7

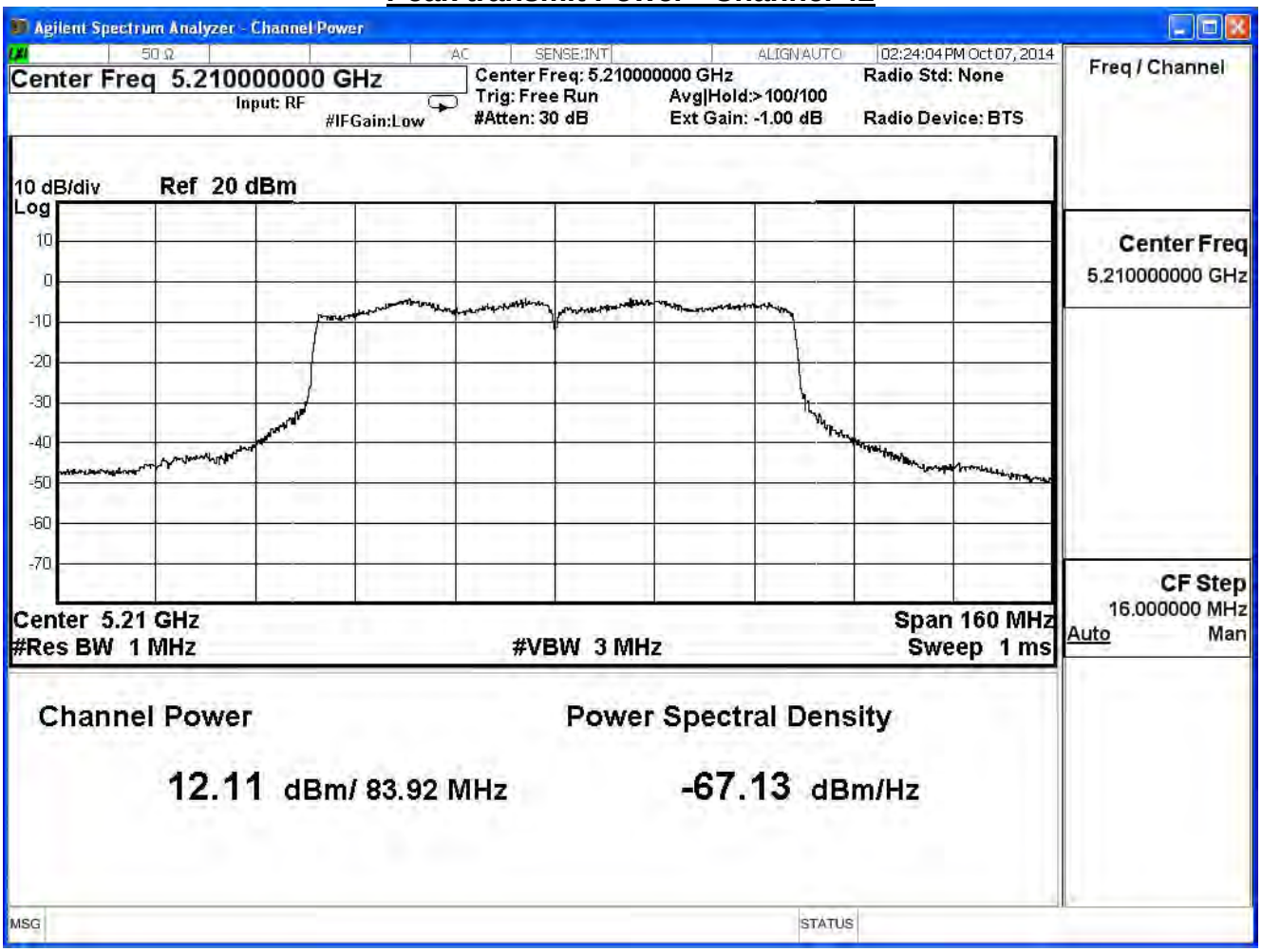
IEEE 802.11ac(80MHz)_ANT 1

Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit	Result
42	5210	83.92	12.110	≤30	Pass

The worst emission of data rate is 29.3 Mbps

Peak Power Output (dBm)												
MCS Index		0	1	2	3	4	5	6	7	8	9	Required Limit
Channel No	Frequency (MHz)	Data Rate										
		29.3	58.5	87.8	117	175.5	234	263.3	292.5	351	390	
42	5210	12.11	12.01	11.91	11.65	11.55	11.43	11.31	11.07	10.83	11.19	30dBm

Peak transmit Power - Channel 42



Product	VDSL2 Security Firewall		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/07	Test Site	SR7

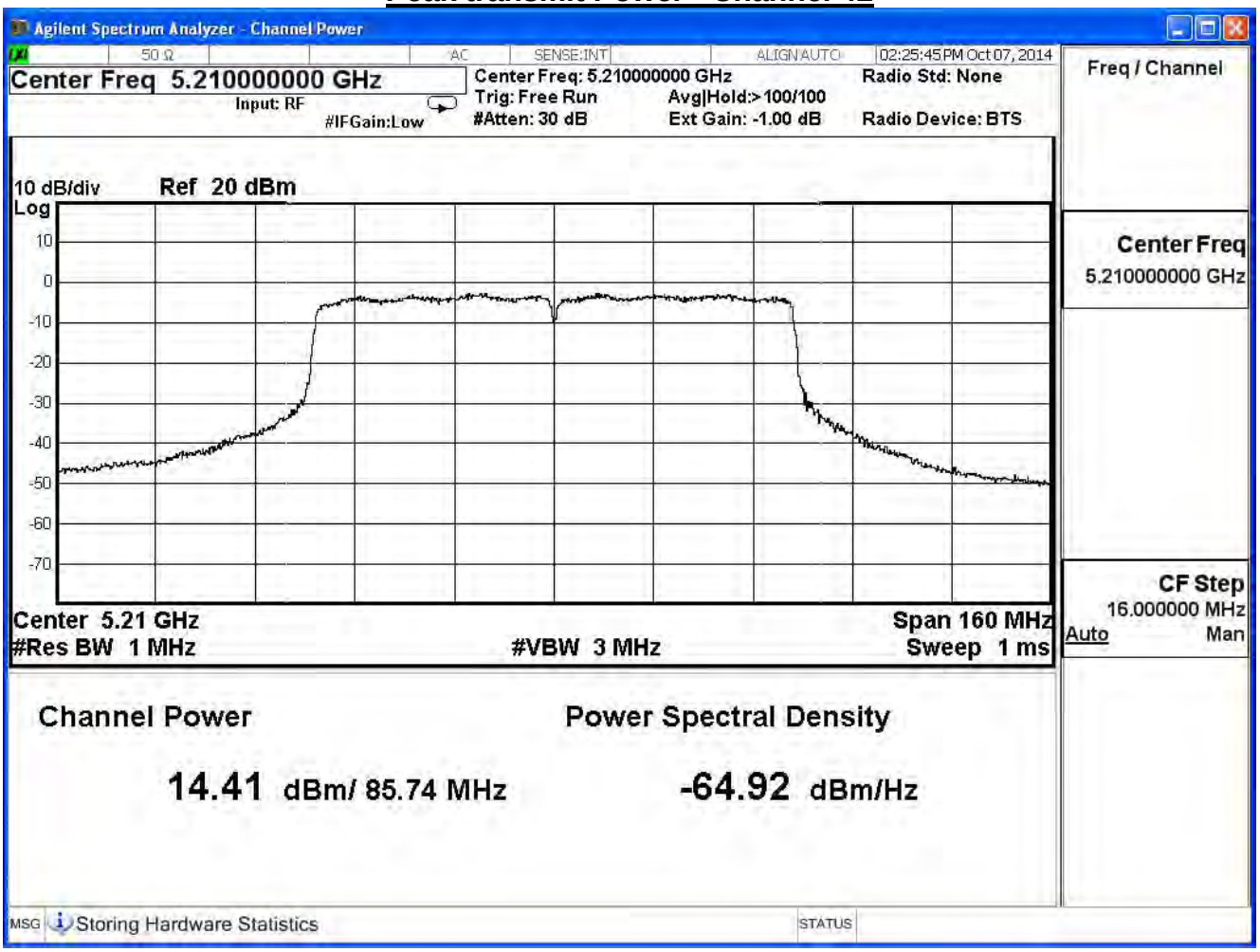
IEEE 802.11ac(80MHz)_ANT 2

Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit	Result
42	5210	85.74	14.410	≤30	Pass

The worst emission of data rate is 29.3 Mbps

Peak Power Output (dBm)												
MCS Index		0	1	2	3	4	5	6	7	8	9	Required Limit
Channel No	Frequency (MHz)	Data Rate										
		29.3	58.5	87.8	117	175.5	234	263.3	292.5	351	390	
42	5210	14.41	14.31	14.09	13.99	13.87	13.63	13.39	13.15	12.91	12.67	30dBm

Peak transmit Power - Channel 42



Product	VDSL2 Security Firewall		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/07	Test Site	SR7

IEEE 802.11ac(80MHz)_ANT 0+1+2

Channel No.	Frequency (MHz)	Output Power (mW)	Output Power (dBm)	Required Limit	Result
42	5210	61.2774	17.873	≤30	Pass

Peak Power Output (dBm)												
MCS Index		0	1	2	3	4	5	6	7	8	9	Required Limit
Channel No	Frequency (MHz)	Data Rate										
		29.3	58.5	87.8	117	175.5	234	263.3	292.5	351	390	
42	5210	17.87	17.77	17.59	17.44	17.31	17.13	16.92	16.67	16.43	16.39	30dBm

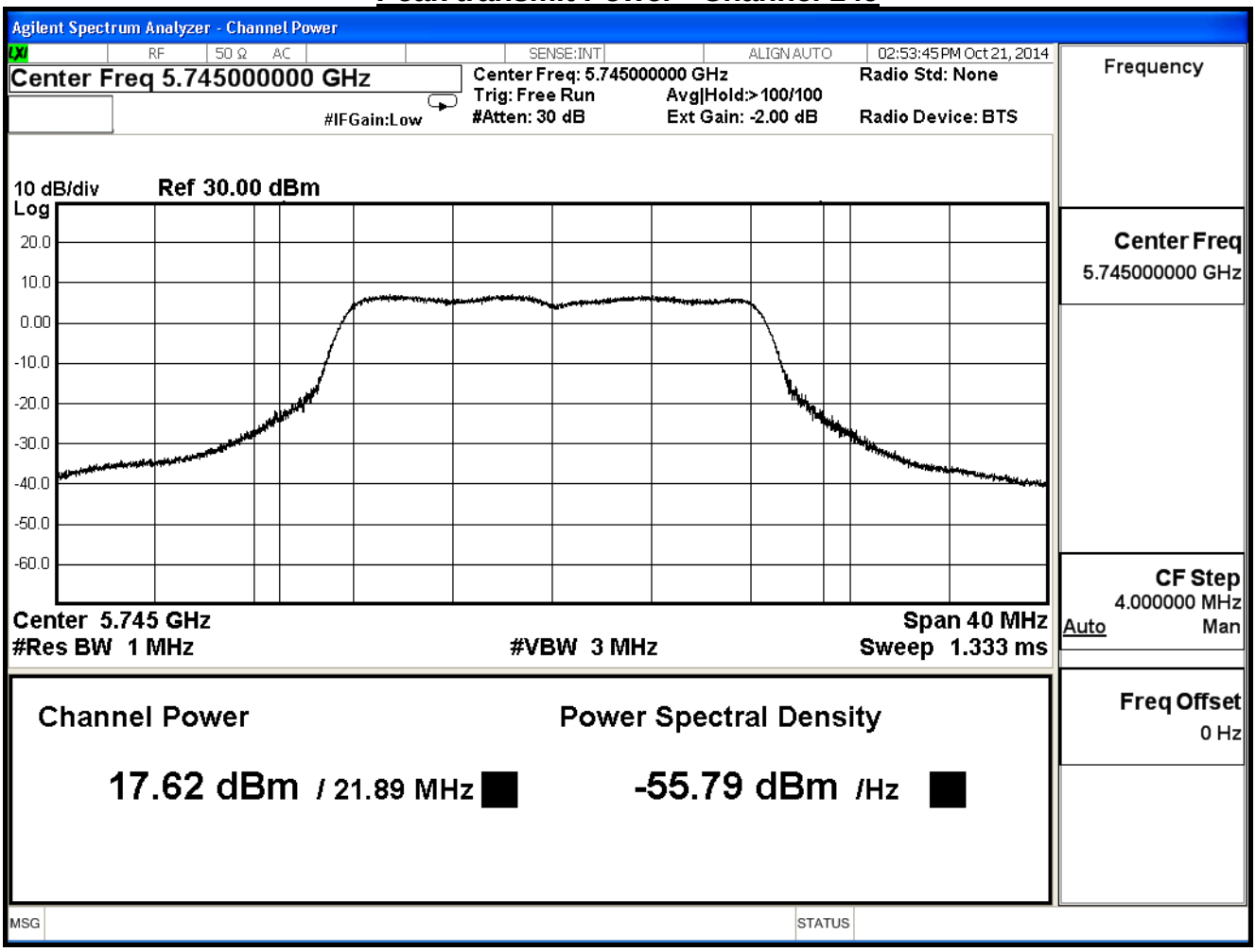
Product	VDSL2 Security Firewall		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/21	Test Site	SR7

802.11a_ANT 0					
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit	Result
149	5745	21.89	17.62	≤30	Pass
157	5785	21.18	18.78	≤30	Pass
165	5825	21.16	16.67	≤30	Pass

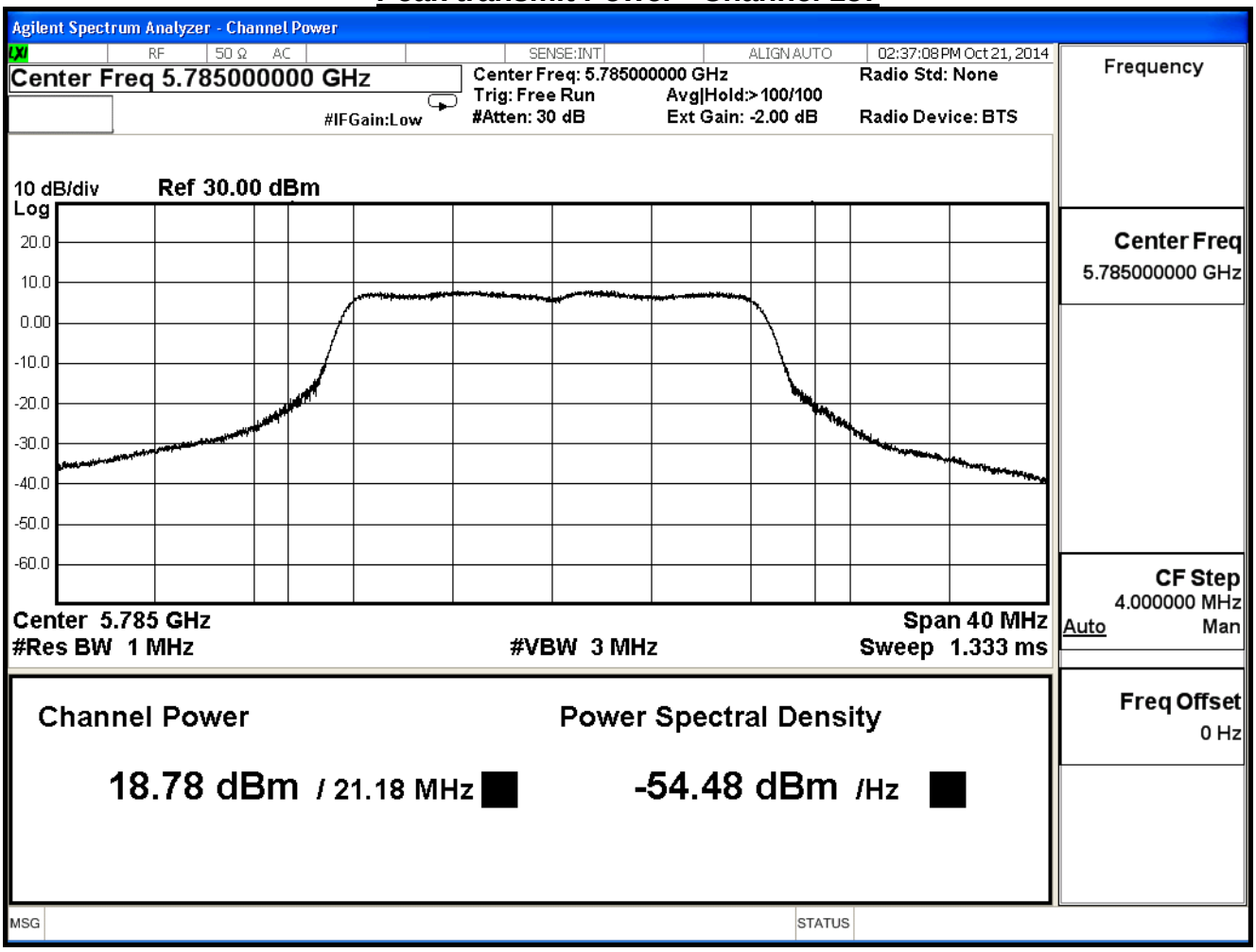
The worst emission of data rate is 6Mbps.

Peak Power Output (dBm)									
Channel No	Frequency (MHz)	Data Rate							Required Limit
		6	12	18	24	36	48	54	
149	5745	17.62	--	--	--	--	--	--	30dBm
157	5785	18.78	18.66	18.46	18.35	18.09	17.97	17.73	30dBm
165	5825	16.67	--	--	--	--	--	--	30dBm

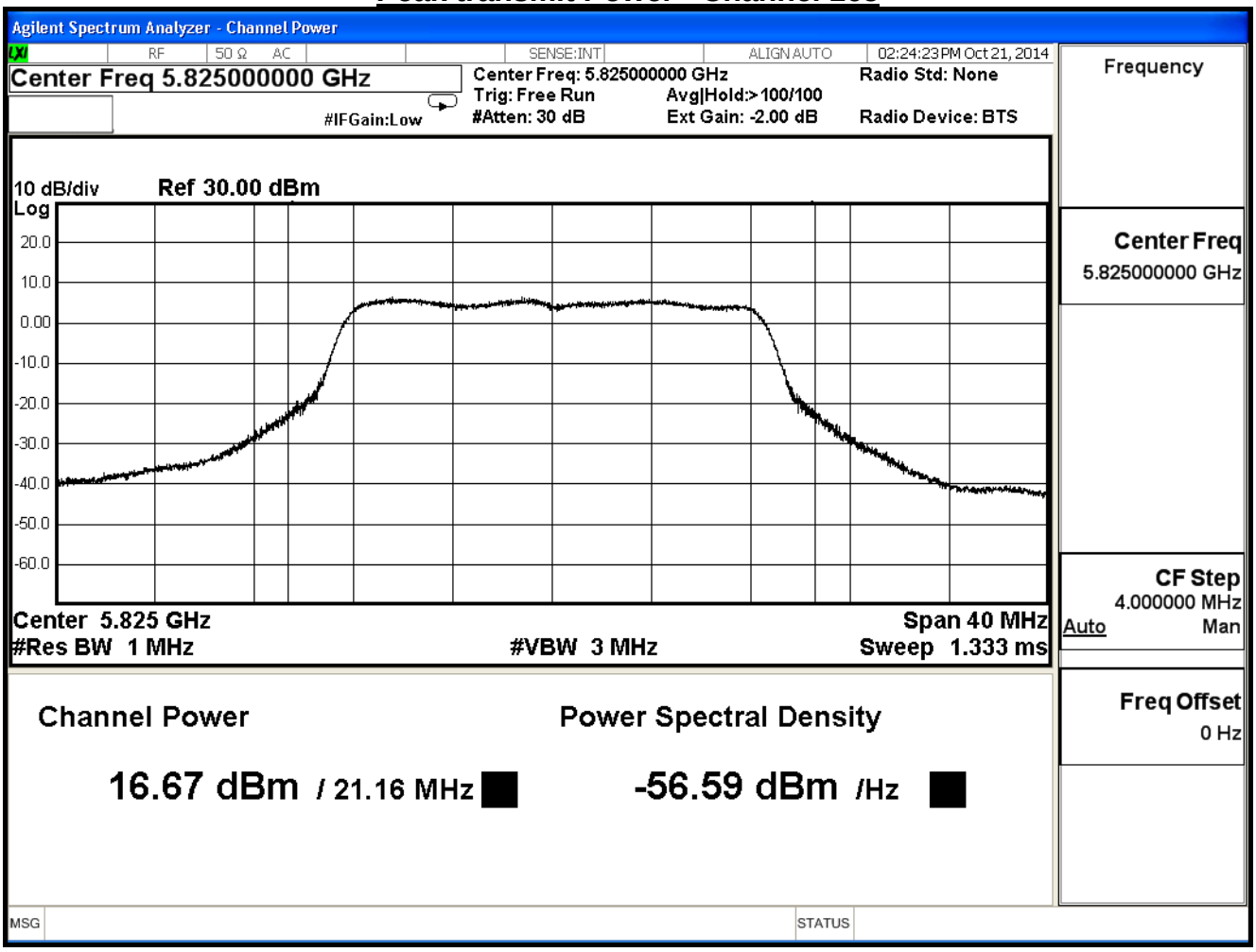
Peak transmit Power - Channel 149



Peak transmit Power - Channel 157



Peak transmit Power - Channel 165



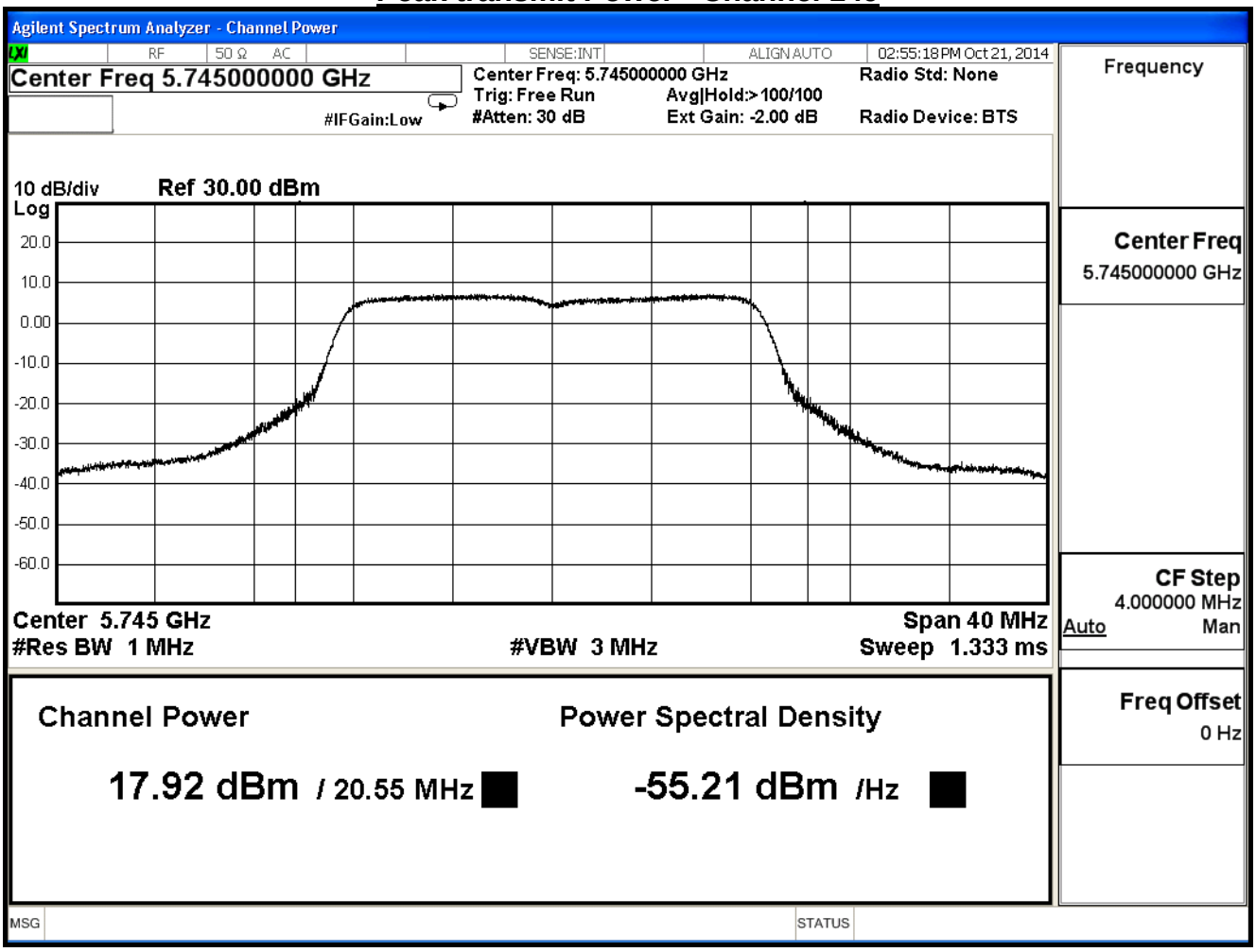
Product	VDSL2 Security Firewall		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/21	Test Site	SR7

802.11a_ANT 1					
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit	Result
149	5745	20.55	17.92	≤30	Pass
157	5785	20.56	18.55	≤30	Pass
165	5825	20.98	16.97	≤30	Pass

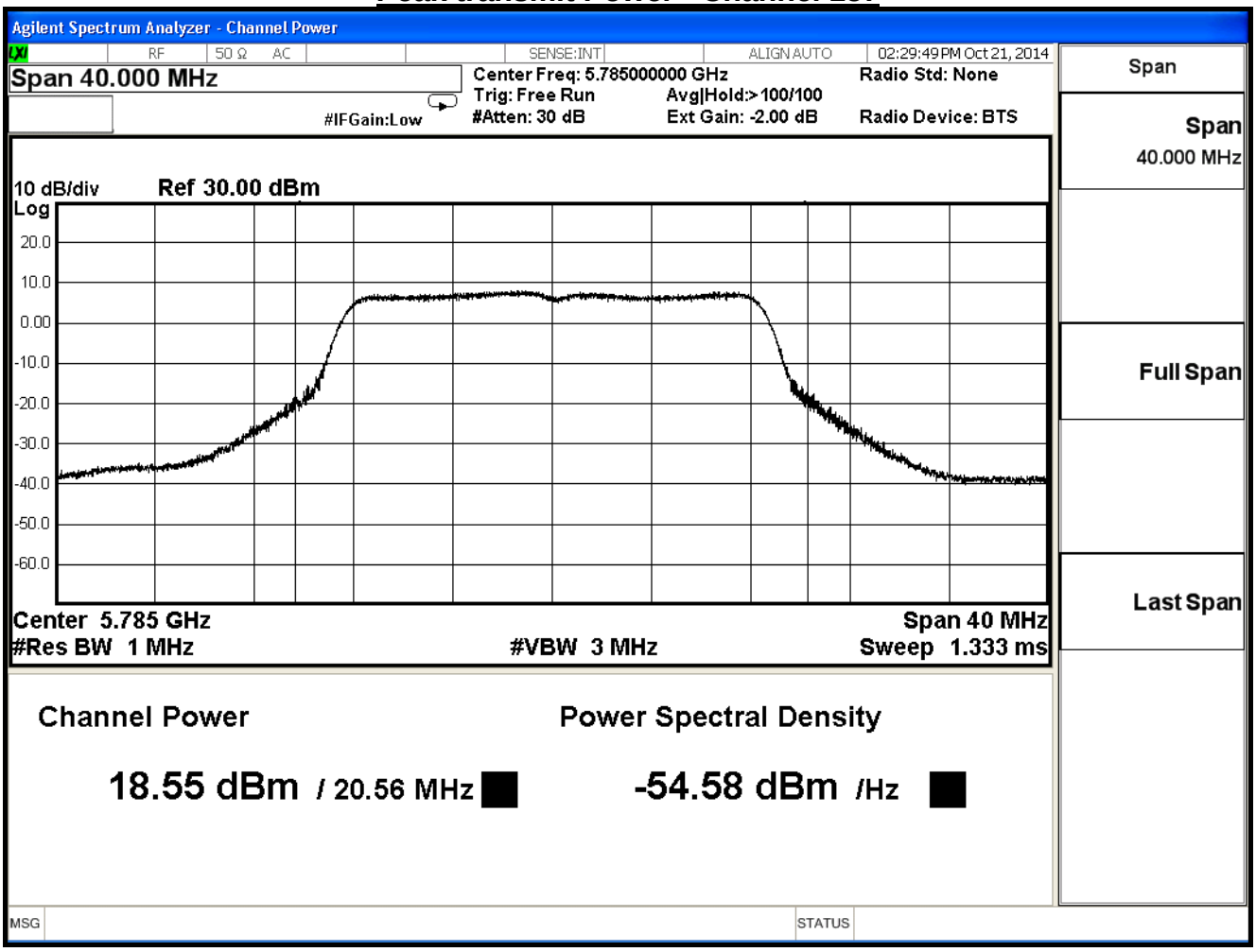
The worst emission of data rate is 6Mbps.

Peak Power Output (dBm)									
Channel No	Frequency (MHz)	Data Rate							Required Limit
		6	12	18	24	36	48	54	
149	5745	17.92	--	--	--	--	--	--	30dBm
157	5785	18.55	18.45	18.21	18.01	17.77	17.53	17.41	30dBm
165	5825	16.97	--	--	--	--	--	--	30dBm

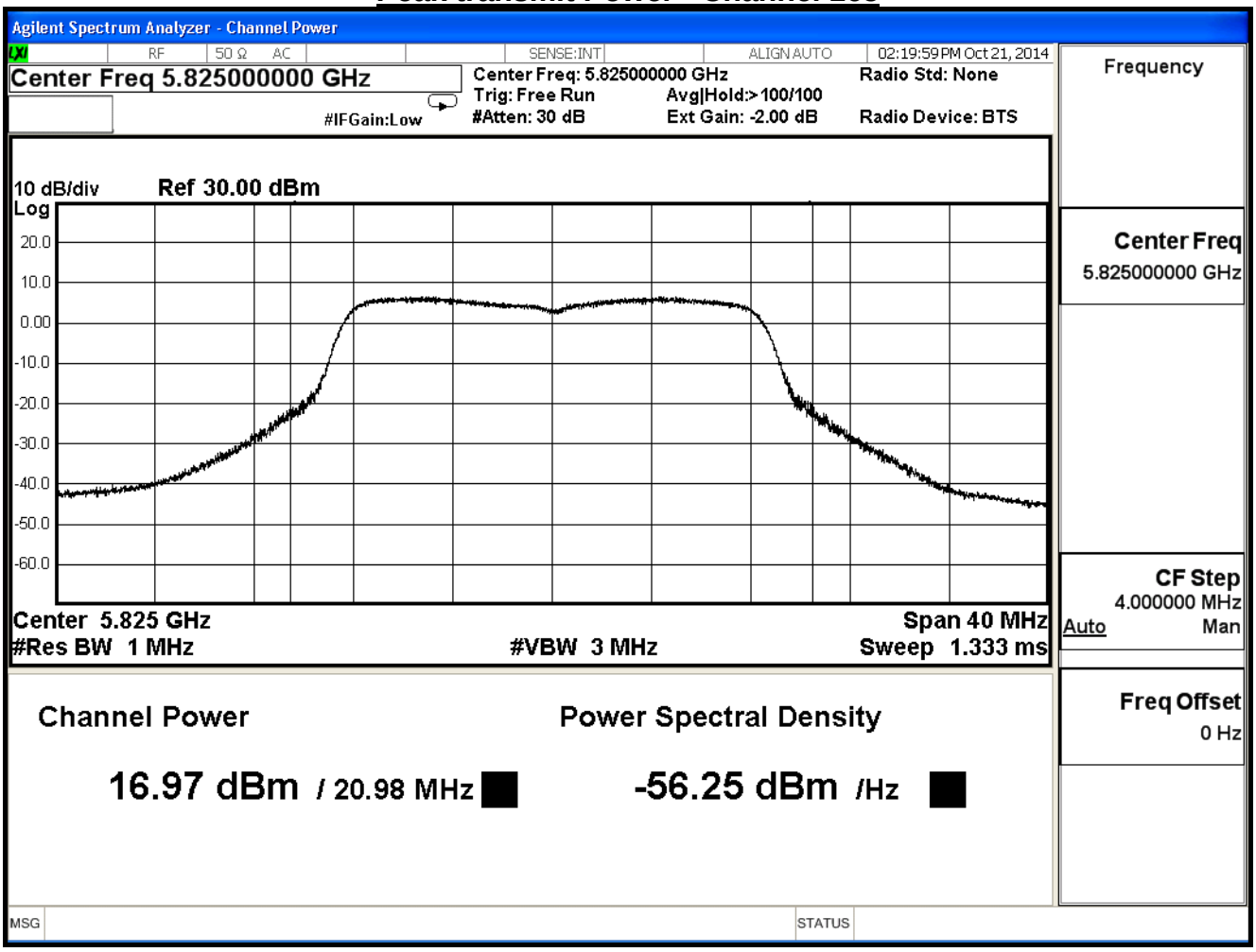
Peak transmit Power - Channel 149



Peak transmit Power - Channel 157



Peak transmit Power - Channel 165



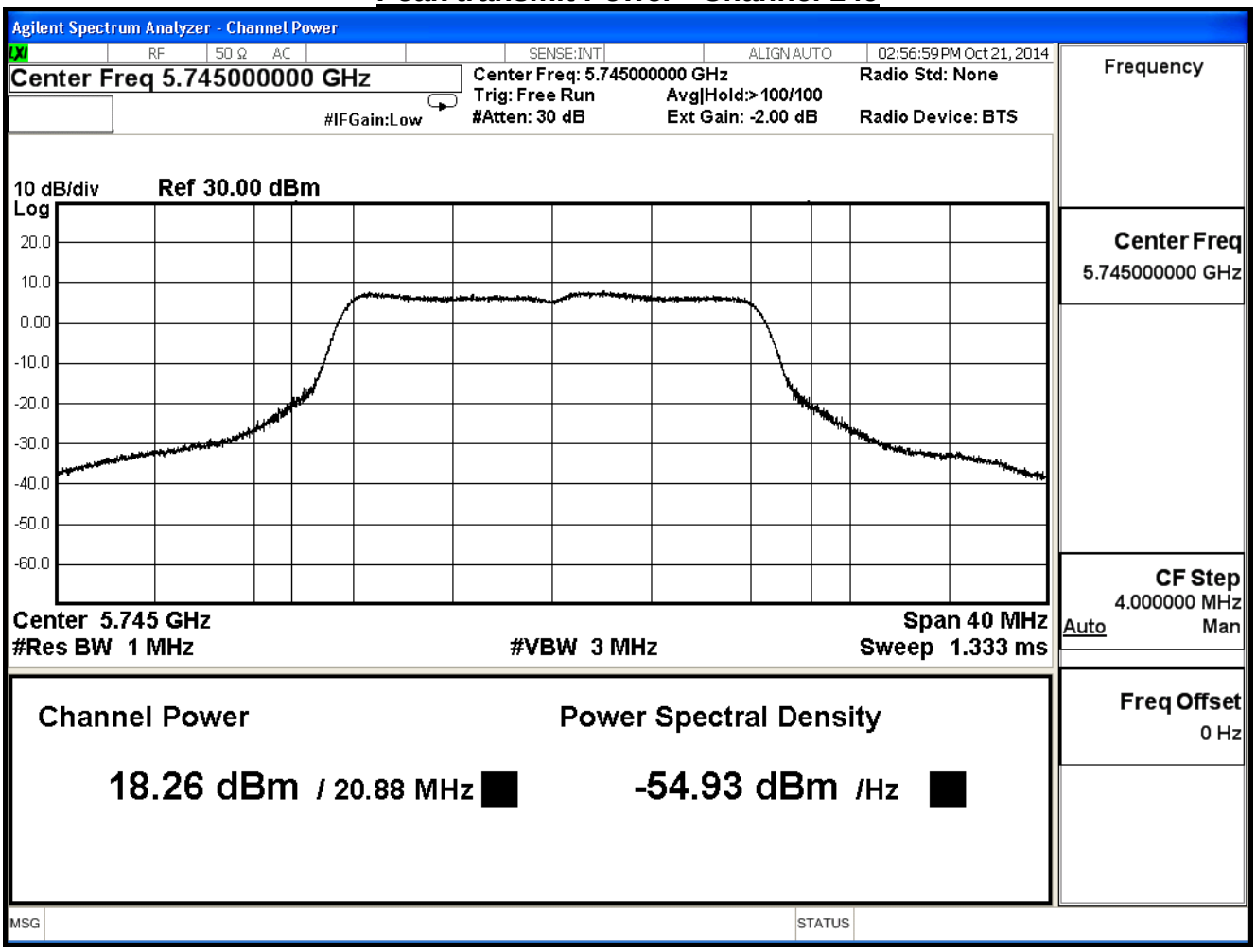
Product	VDSL2 Security Firewall		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/21	Test Site	SR7

802.11a_ANT 2					
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit	Result
149	5745	20.88	18.26	≤30	Pass
157	5785	20.51	19.06	≤30	Pass
165	5825	21.26	16.85	≤30	Pass

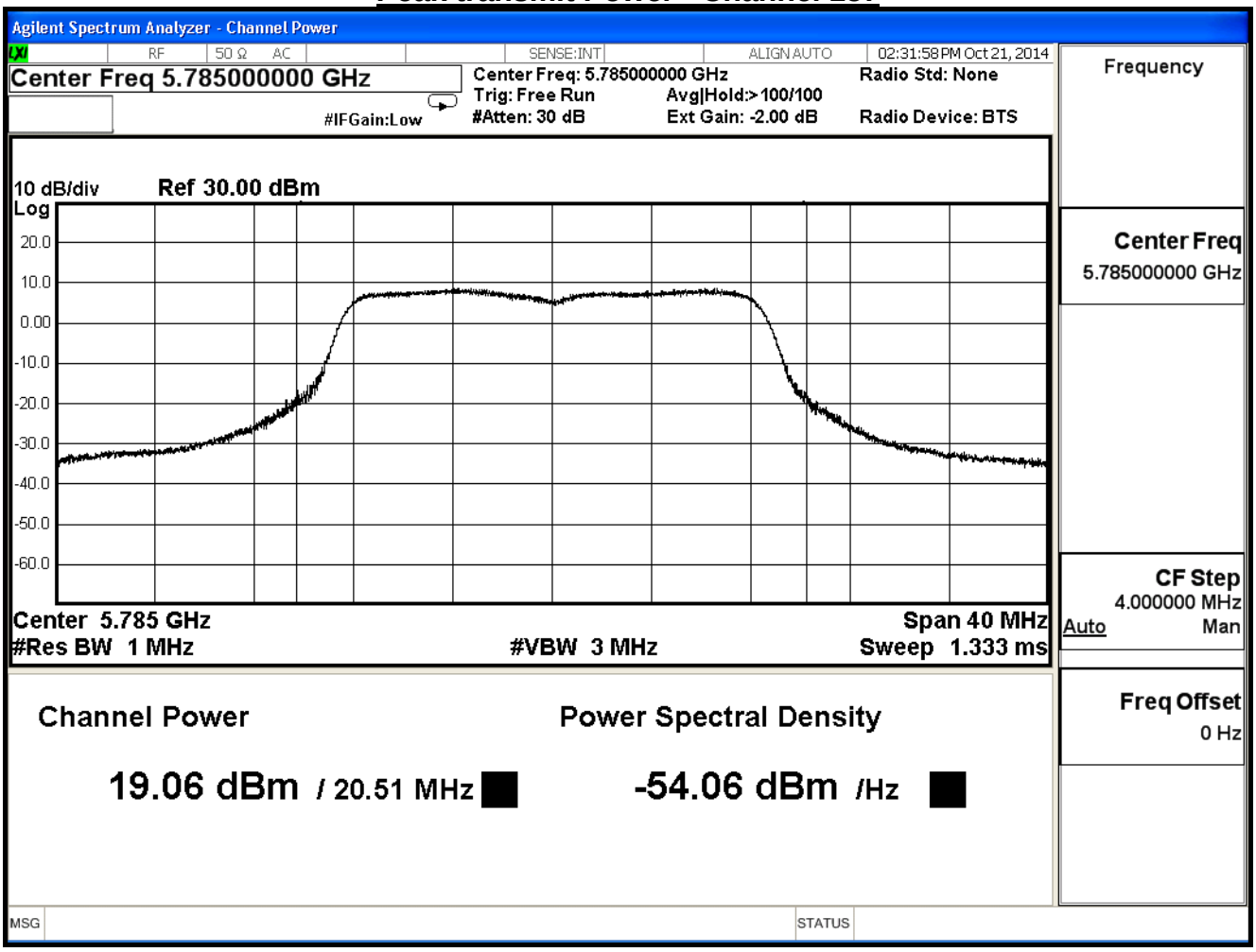
The worst emission of data rate is 6Mbps.

Peak Power Output (dBm)									
Channel No	Frequency (MHz)	Data Rate							Required Limit
		6	12	18	24	36	48	54	
149	5745	18.26	--	--	--	--	--	--	30dBm
157	5785	19.06	18.96	18.70	18.50	18.24	18.12	18.00	30dBm
165	5825	16.85	--	--	--	--	--	--	30dBm

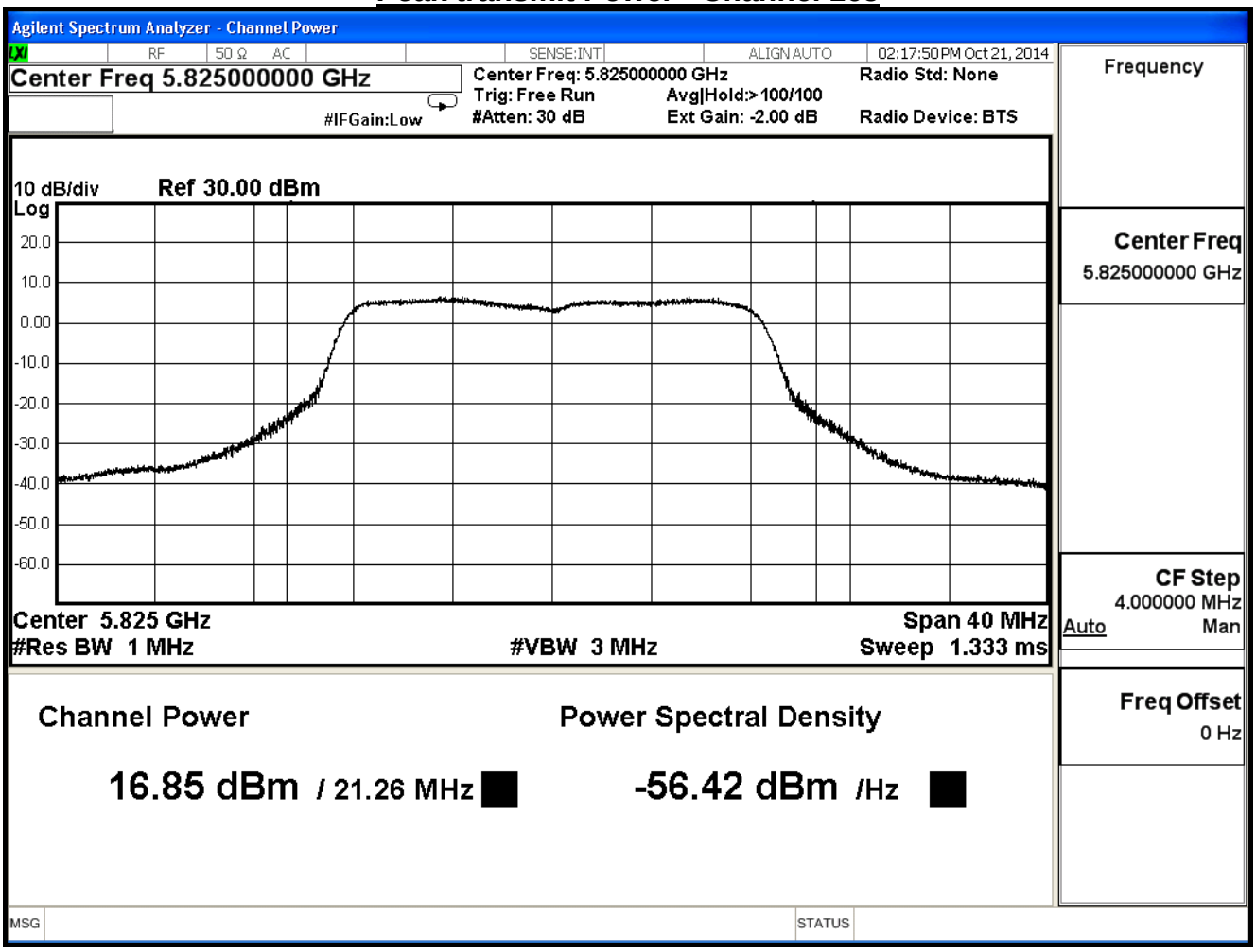
Peak transmit Power - Channel 149



Peak transmit Power - Channel 157



Peak transmit Power - Channel 165



Product	VDSL2 Security Firewall		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/21	Test Site	SR7

802.11a_ANT 0+1+2					
Channel No.	Frequency (MHz)	Output Power (mW)	Output Power (dBm)	Required Limit	Result
149	5745	186.7239	22.712	≤30	Pass
157	5785	227.6670	23.573	≤30	Pass
165	5825	144.6439	21.603	≤30	Pass

The worst emission of data rate is 6Mbps.

Peak Power Output (dBm)									
Channel No	Frequency (MHz)	Data Rate							Required Limit
		6	12	18	24	36	48	54	
149	5745	22.71	--	--	--	--	--	--	30dBm
157	5785	23.57	23.47	23.23	23.06	22.81	22.65	22.49	30dBm
165	5825	21.60	--	--	--	--	--	--	30dBm

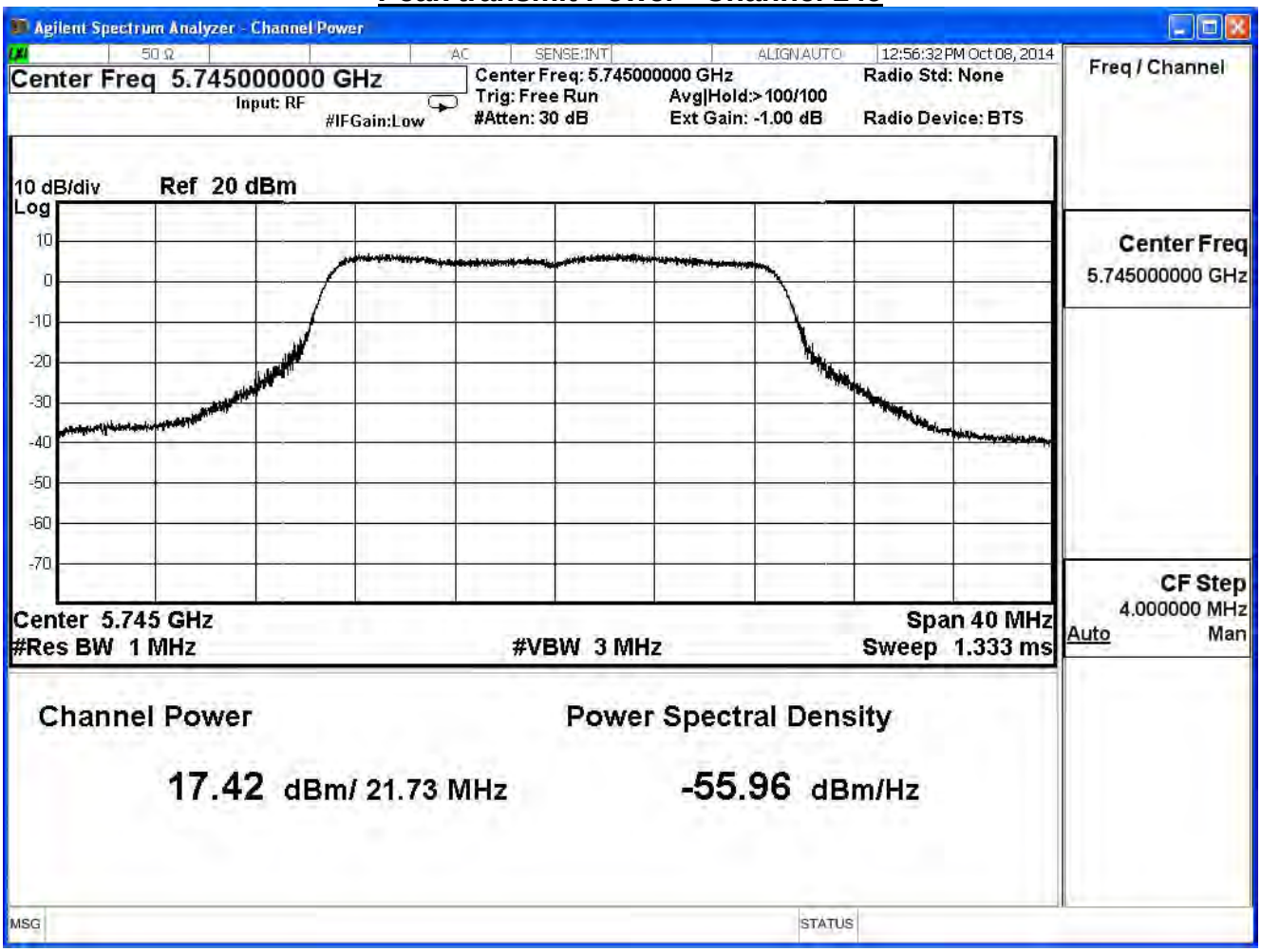
Product	VDSL2 Security Firewall		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/21	Test Site	SR7

IEEE 802.11n(20MHz)_ANT 0					
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit	Result
149	5745	21.73	17.420	≤30	Pass
157	5785	22.27	17.710	≤30	Pass
165	5825	22.51	16.570	≤30	Pass

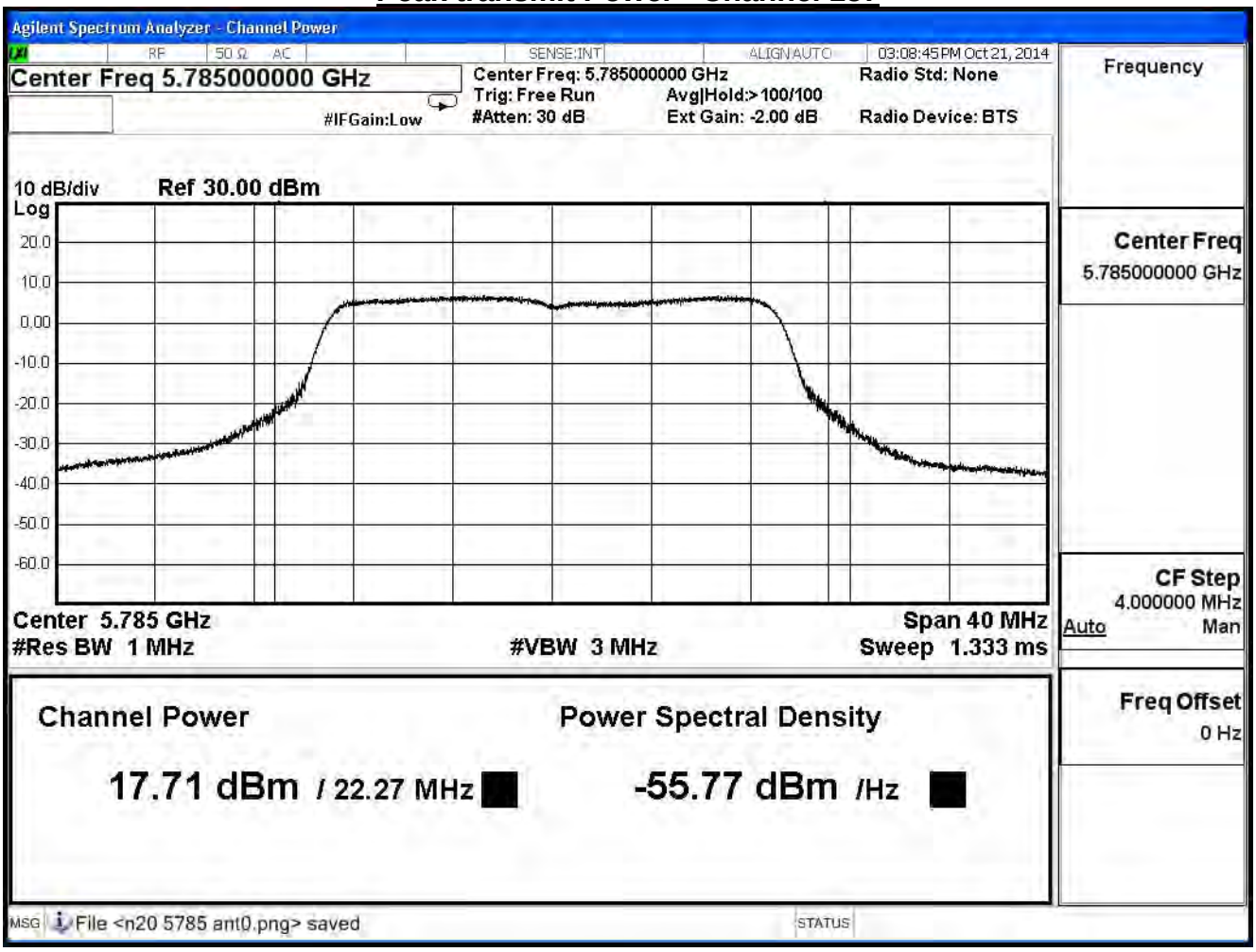
The worst emission of data rate is 6.5 Mbps.

Peak Power Output (dBm)										
MCS Index		0	1	2	3	4	5	6	7	Required Limit
Channel No	Frequency (MHz)	Data Rate								
		6.5	13	19.5	26	39	52	58.5	65	
149	5745	17.42	--	--	--	--	--	--	--	30dBm
157	5785	17.71	17.59	17.49	17.27	17.01	16.89	16.65	16.54	30dBm
165	5825	16.57	--	--	--	--	--	--	--	30dBm

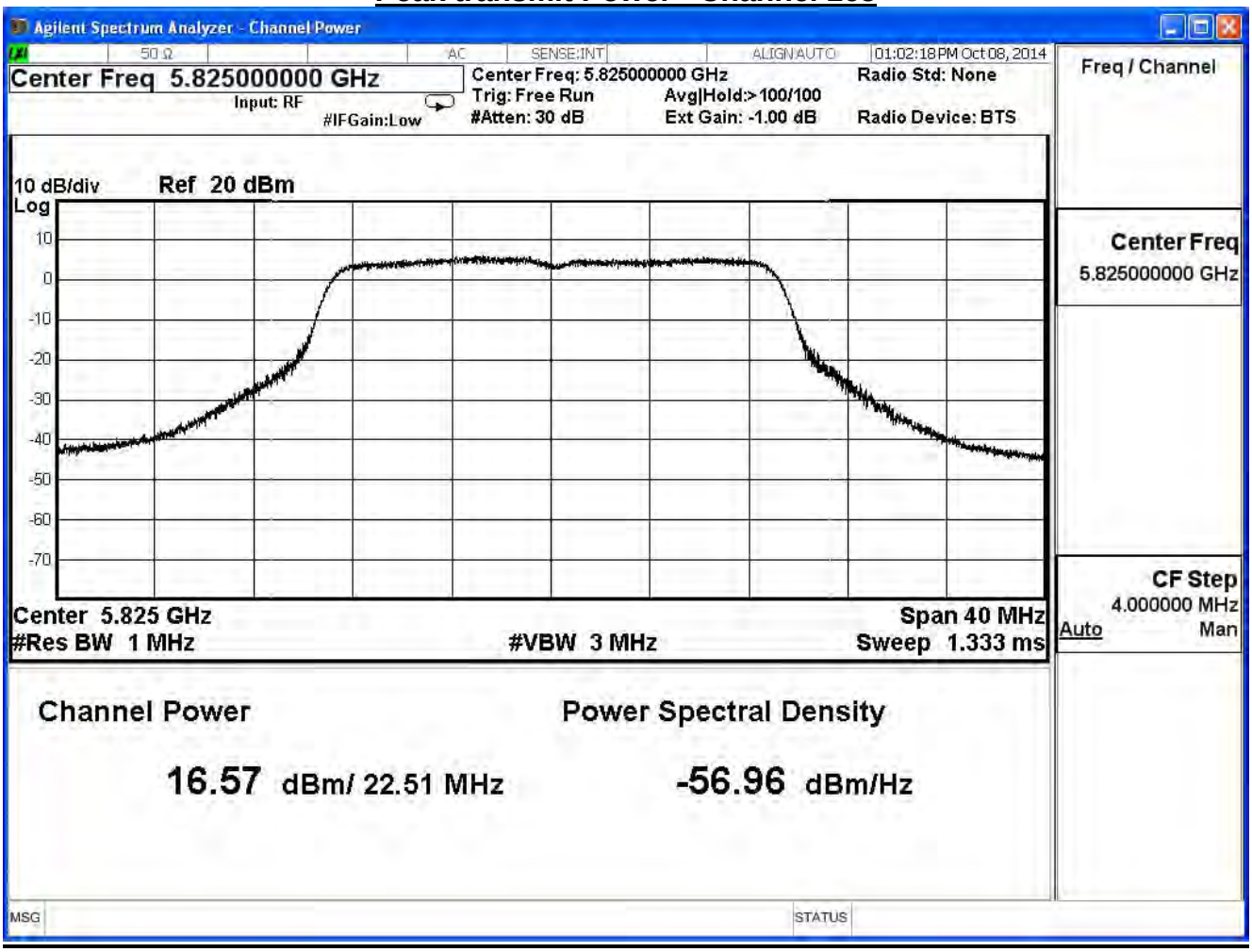
Peak transmit Power - Channel 149



Peak transmit Power - Channel 157



Peak transmit Power - Channel 165



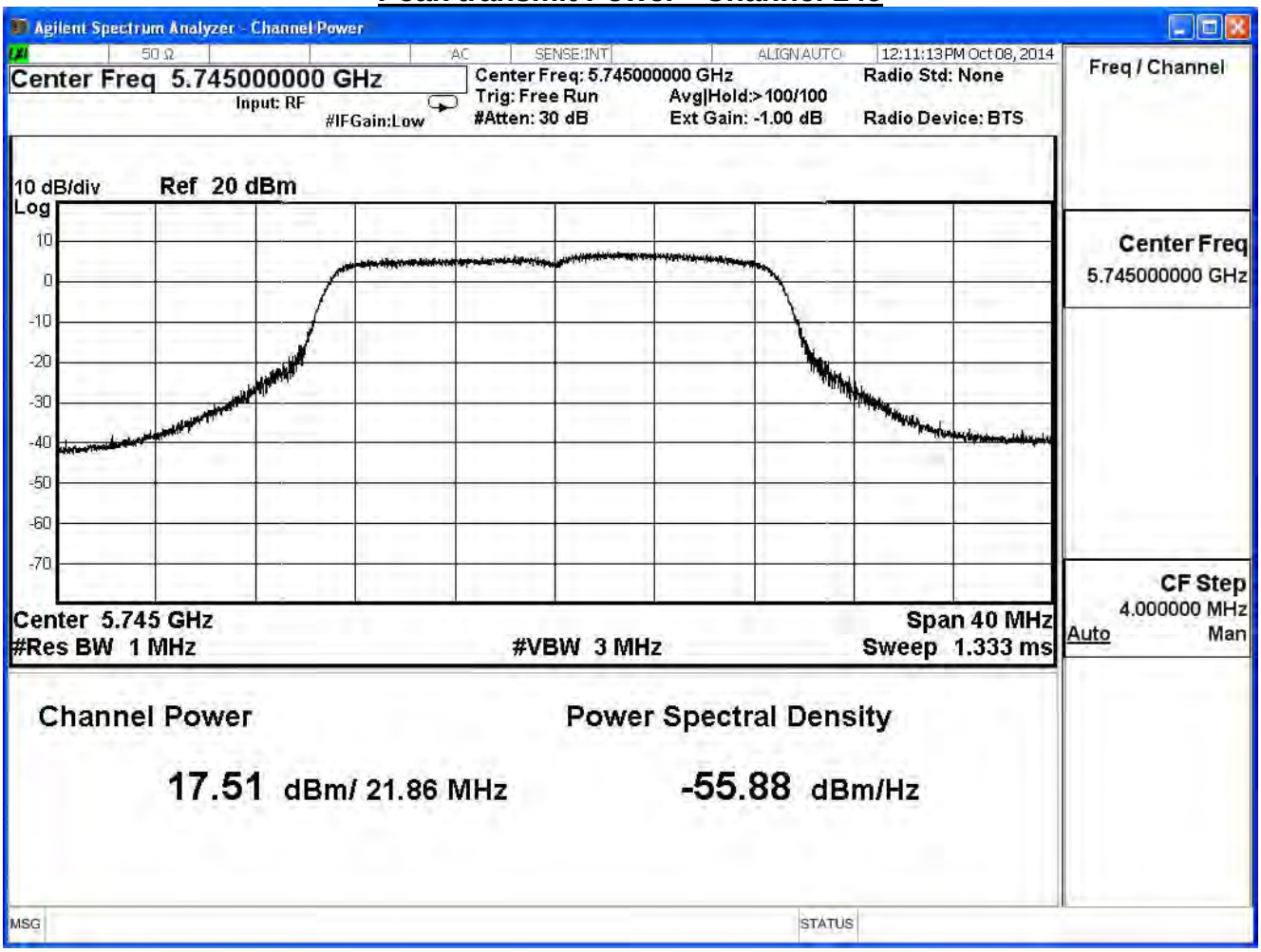
Product	VDSL2 Security Firewall		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/21	Test Site	SR7

IEEE 802.11n(20MHz)_ANT 1					
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit	Result
149	5745	21.86	17.510	≤30	Pass
157	5785	21.01	18.360	≤30	Pass
165	5825	22.15	16.680	≤30	Pass

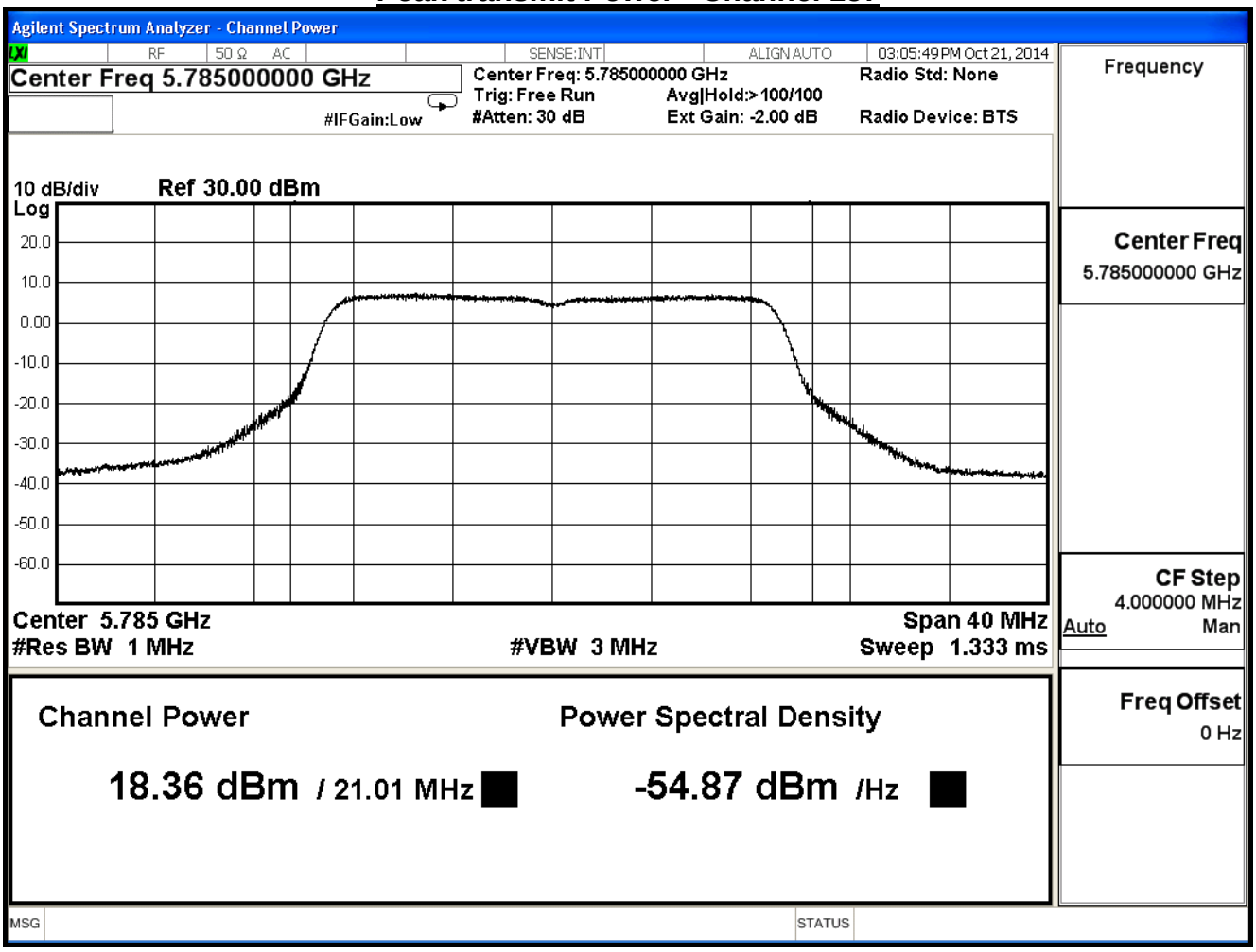
The worst emission of data rate is 6.5 Mbps.

Peak Power Output (dBm)										
MCS Index		0	1	2	3	4	5	6	7	Required Limit
Channel No	Frequency (MHz)	Data Rate								
		6.5	13	19.5	26	39	52	58.5		
149	5745	17.51	--	--	--	--	--	--	--	30dBm
157	5785	18.36	18.16	18.04	17.94	17.82	17.70	17.46	17.33	30dBm
165	5825	16.68	--	--	--	--	--	--	--	30dBm

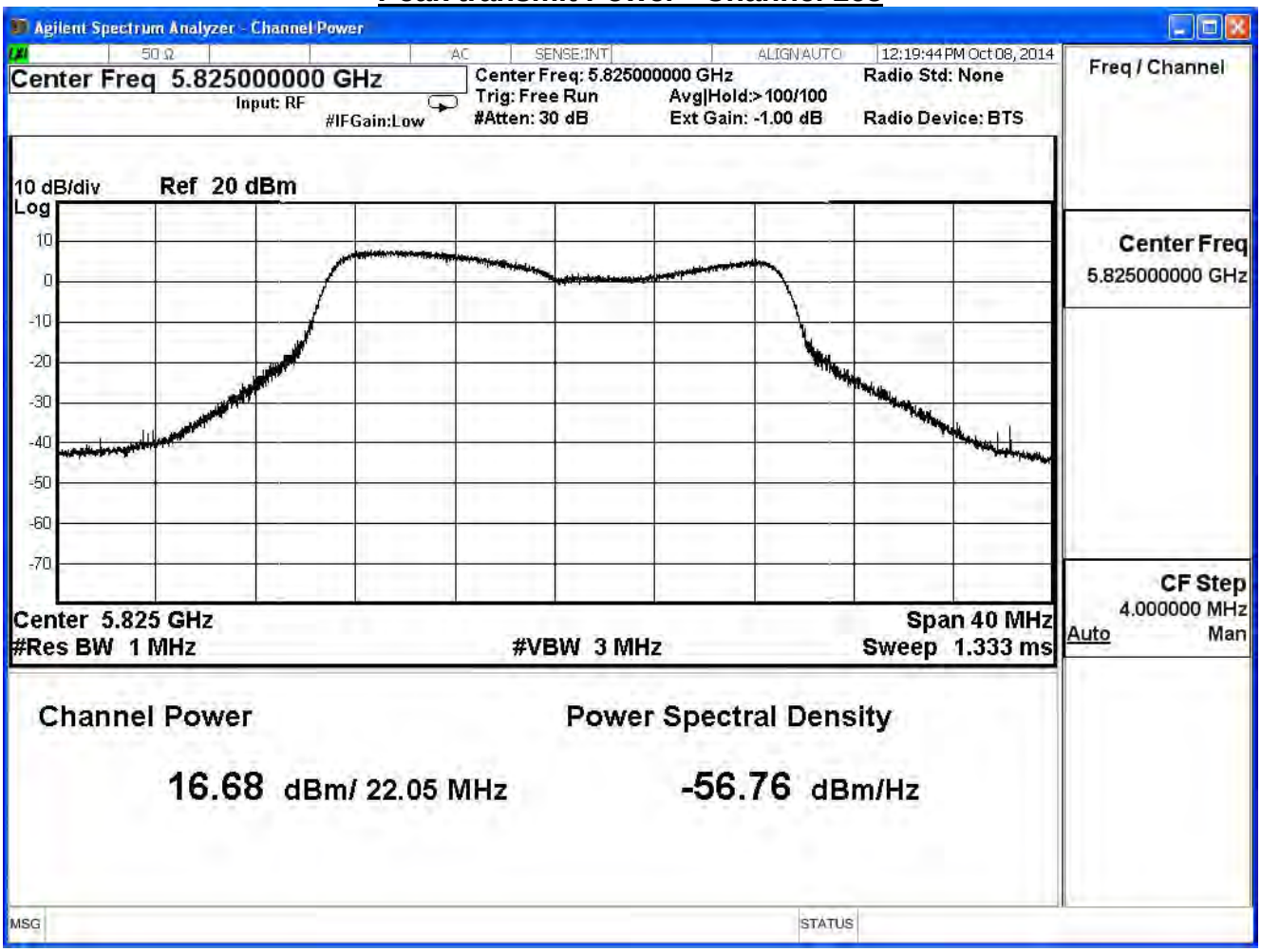
Peak transmit Power - Channel 149



Peak transmit Power - Channel 157



Peak transmit Power - Channel 165



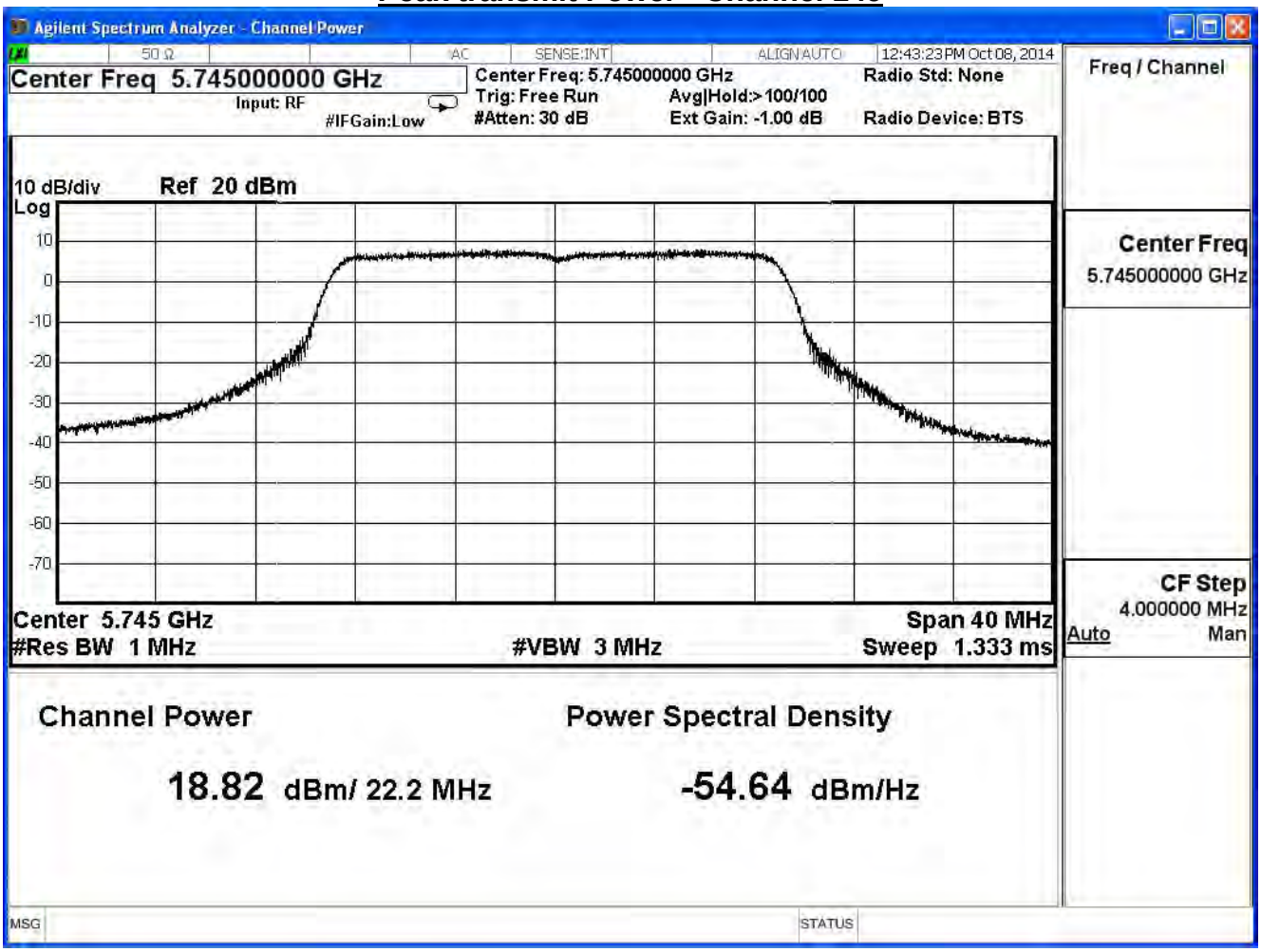
Product	VDSL2 Security Firewall		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/21	Test Site	SR7

IEEE 802.11n(20MHz)_ANT 2					
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit	Result
149	5745	22.20	18.820	≤30	Pass
157	5785	22.31	18.680	≤30	Pass
165	5825	22.91	17.170	≤30	Pass

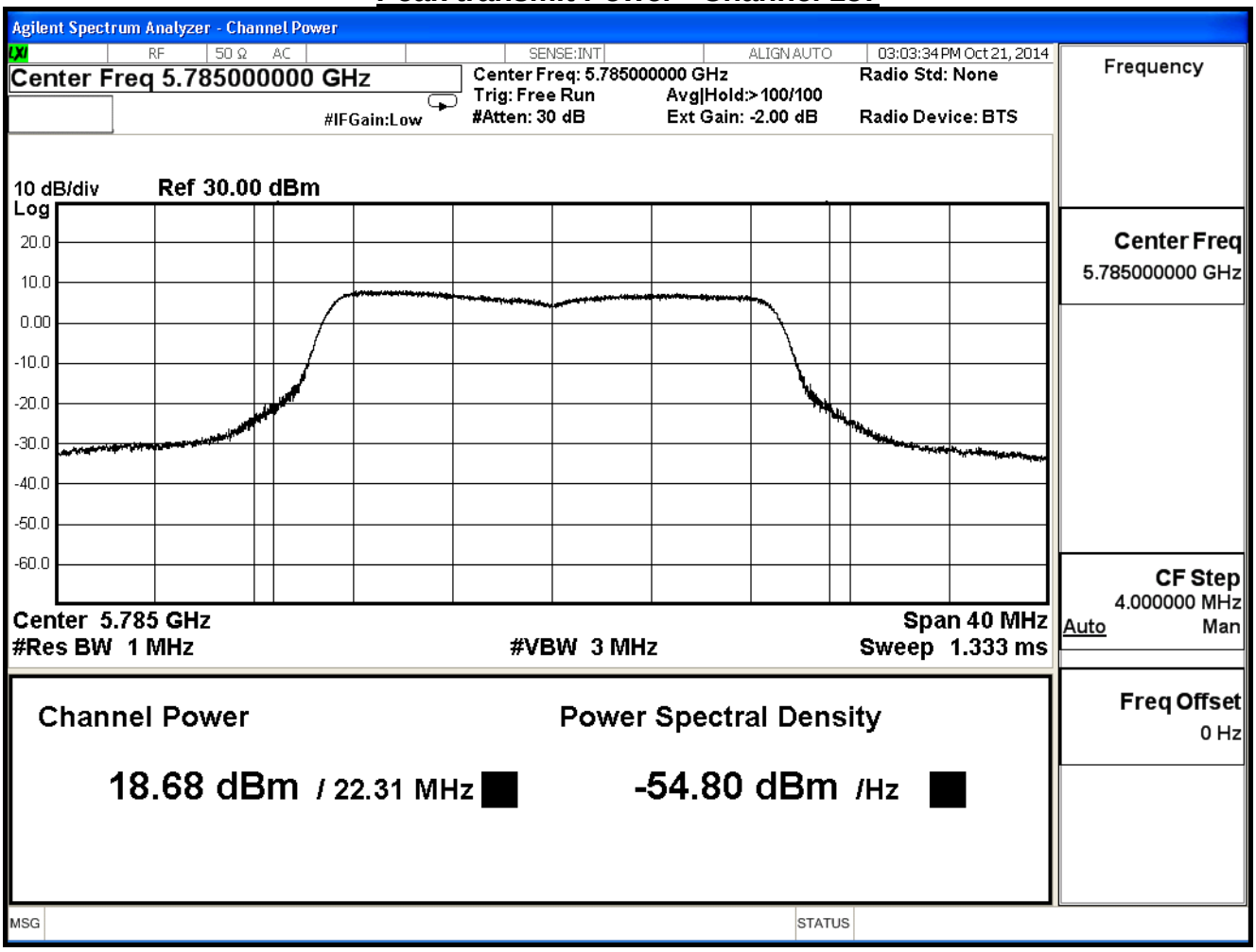
The worst emission of data rate is 6.5 Mbps.

Peak Power Output (dBm)										
MCS Index		0	1	2	3	4	5	6	7	Required Limit
Channel No	Frequency (MHz)	Data Rate								
		6.5	13	19.5	26	39	52	58.5	65	
149	5745	18.82	--	--	--	--	--	--	--	30dBm
157	5785	18.68	18.48	18.35	18.25	17.99	17.87	17.75	17.63	30dBm
165	5825	17.17	--	--	--	--	--	--	--	30dBm

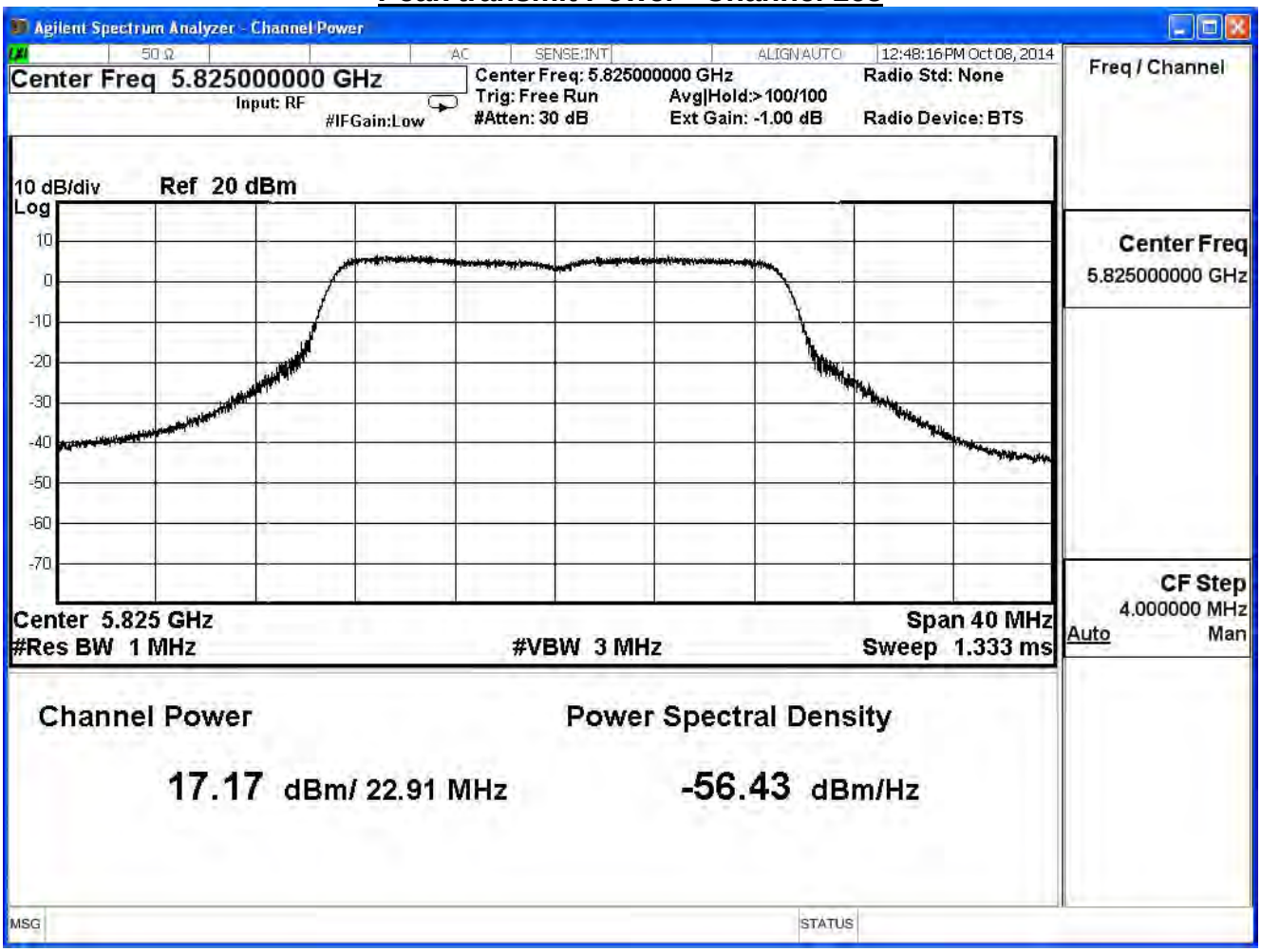
Peak transmit Power - Channel 149



Peak transmit Power - Channel 157



Peak transmit Power - Channel 165



Product	VDSL2 Security Firewall		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/21	Test Site	SR7

IEEE 802.11n(20MHz)_ANT 0+1+2					
Channel No.	Frequency (MHz)	Output Power (mW)	Output Power (dBm)	Required Limit	Result
149	5745	187.7587	22.736	≤30	Pass
157	5785	201.3724	23.040	≤30	Pass
165	5825	144.0788	21.586	≤30	Pass

The worst emission of data rate is 6.5 Mbps.

Peak Power Output (dBm)										
MCS Index		0	1	2	3	4	5	6	7	Required Limit
Channel No	Frequency (MHz)	Data Rate								
		6.5	13	19.5	26	39	52	58.5	65	
149	5745	22.74	--	--	--	--	--	--	--	30dBm
157	5785	23.04	22.86	22.75	22.61	22.40	22.28	22.08	21.96	30dBm
165	5825	21.59	--	--	--	--	--	--	--	30dBm

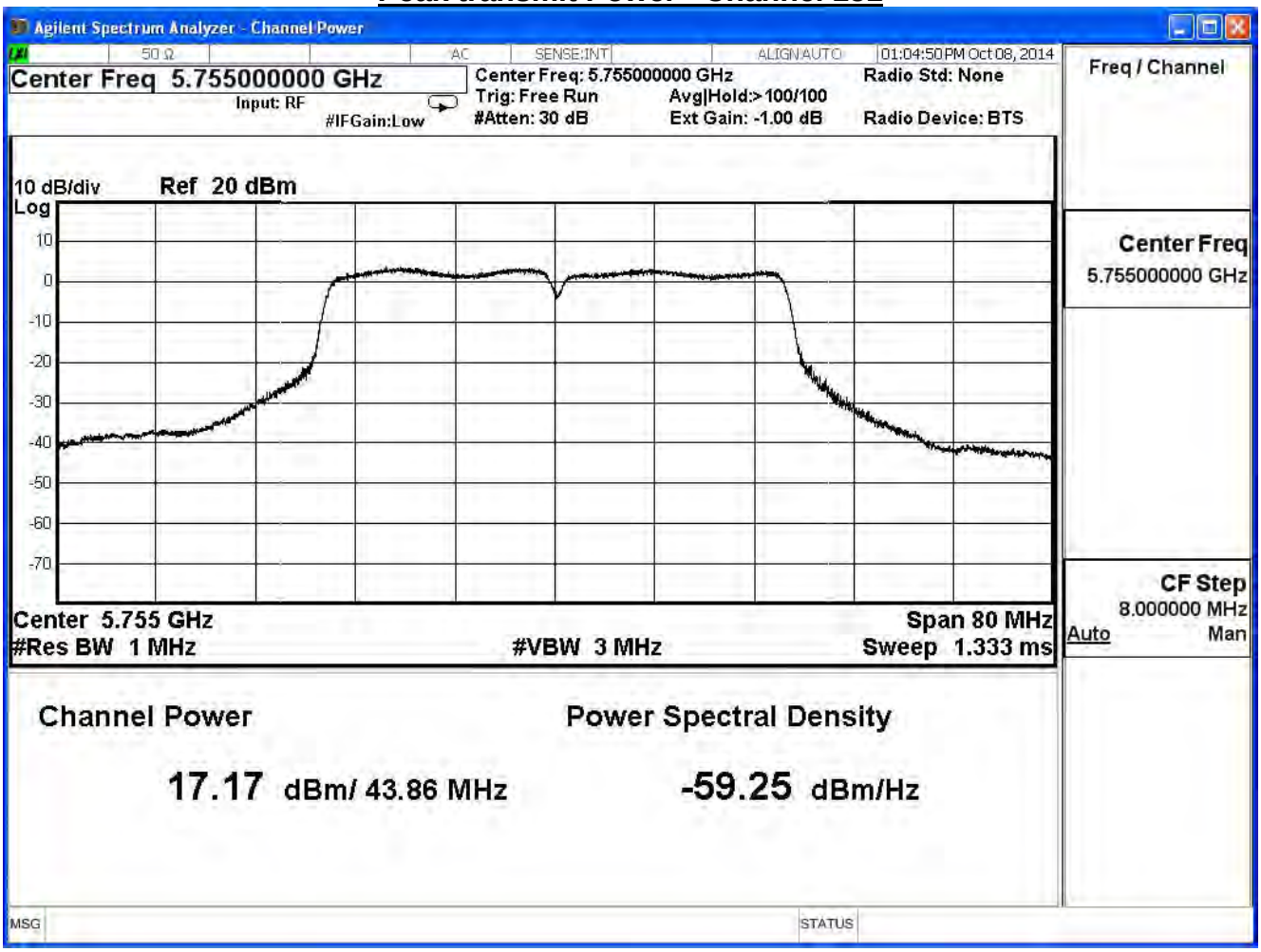
Product	VDSL2 Security Firewall		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/21	Test Site	SR7

IEEE 802.11n(40MHz)_ANT 0					
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit	Result
151	5755	43.86	17.170	≤30	Pass
159	5795	43.18	18.710	≤30	Pass

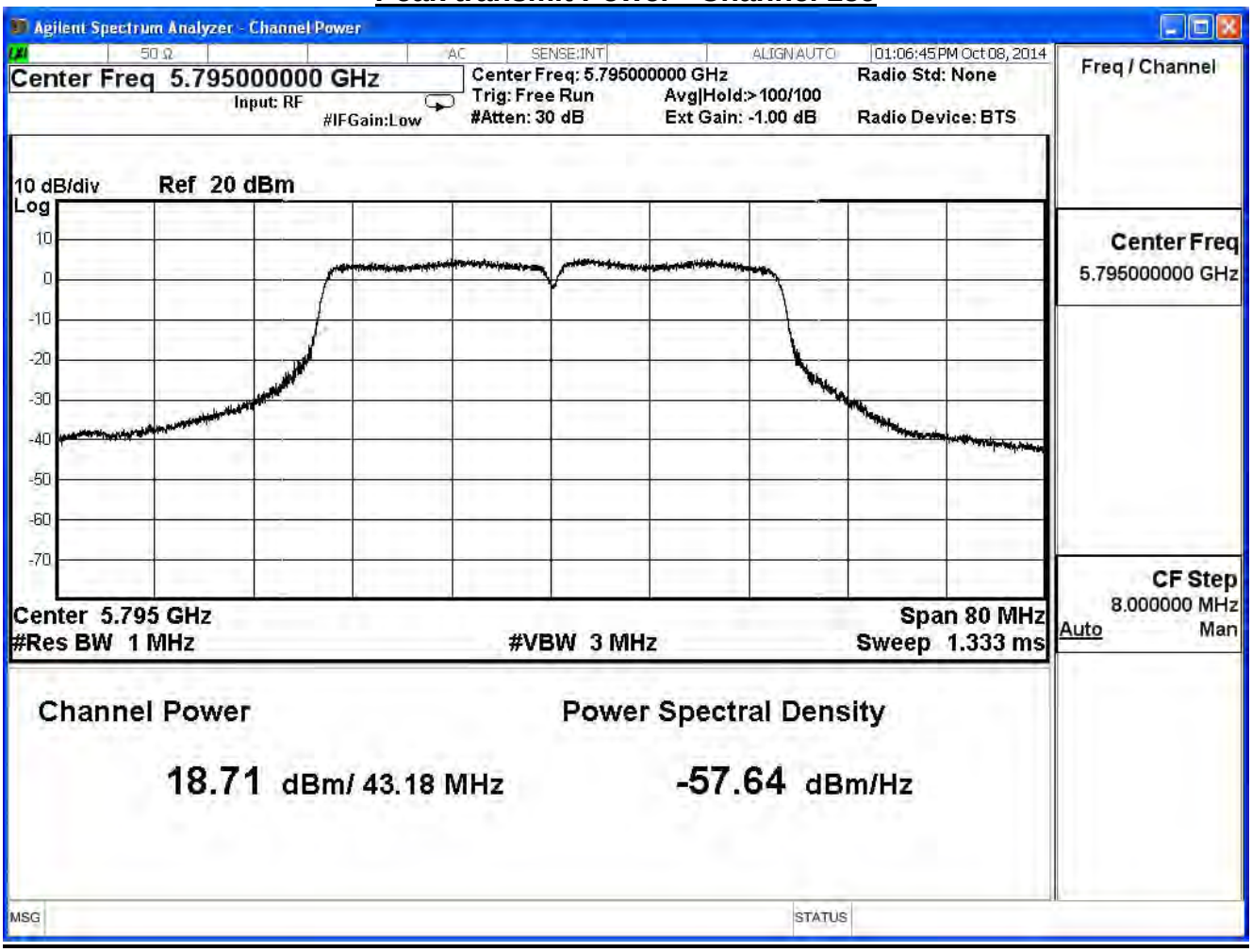
The worst emission of data rate is 13.5 Mbps.

Peak Power Output (dBm)										
MCS Index		0	1	2	3	4	5	6	7	Required Limit
Channel No	Frequency (MHz)	Data Rate								
		13.5	27	40.5	54	81	108	121.5	135	
151	5755	17.17	17.07	16.96	16.76	16.56	16.32	16.19	16.07	30dBm
159	5795	18.71	--	--	--	--	--	--	--	30dBm

Peak transmit Power - Channel 151



Peak transmit Power - Channel 159



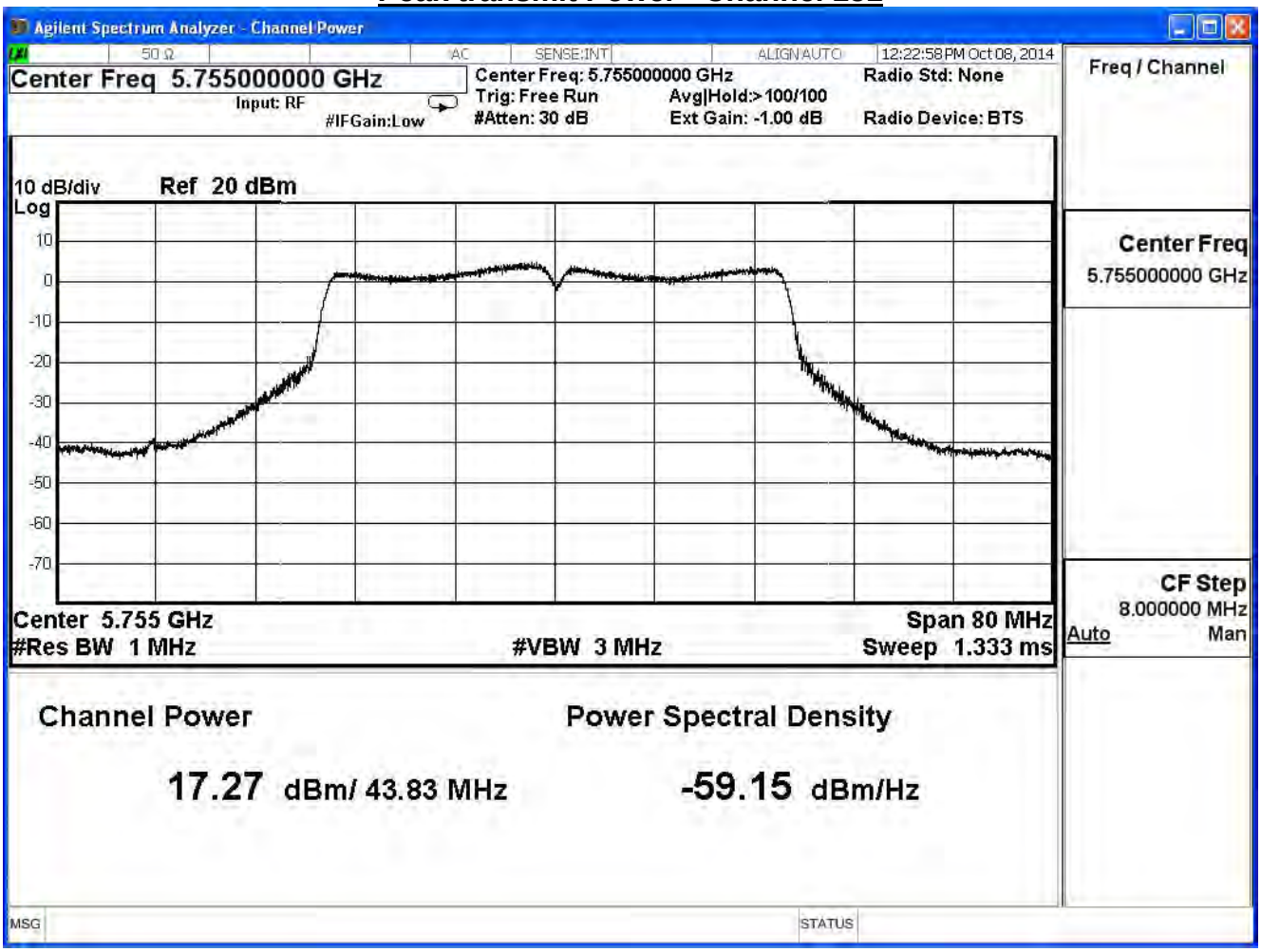
Product	VDSL2 Security Firewall		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/21	Test Site	SR7

IEEE 802.11n(40MHz)_ANT 1					
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit	Result
151	5755	43.83	17.270	≤30	Pass
159	5795	42.94	18.280	≤30	Pass

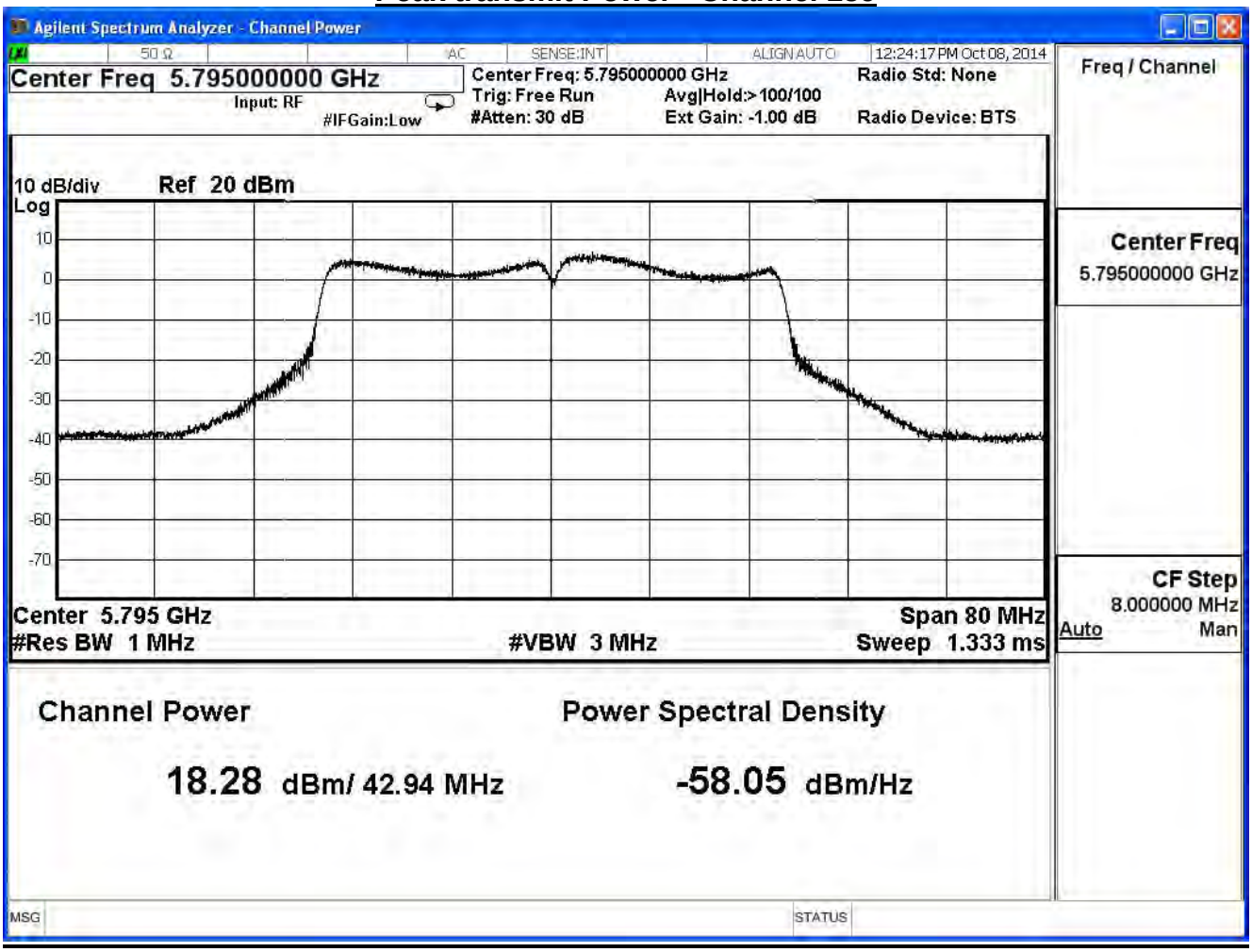
The worst emission of data rate is 13.5 Mbps.

Peak Power Output (dBm)										
MCS Index		0	1	2	3	4	5	6	7	Required Limit
Channel No	Frequency (MHz)	Data Rate								
		13.5	27	40.5	54	81	108	121.5	135	
151	5755	17.27	17.17	17.07	16.94	16.84	16.72	16.48	16.36	30dBm
159	5795	18.28	--	--	--	--	--	--	--	30dBm

Peak transmit Power - Channel 151



Peak transmit Power - Channel 159



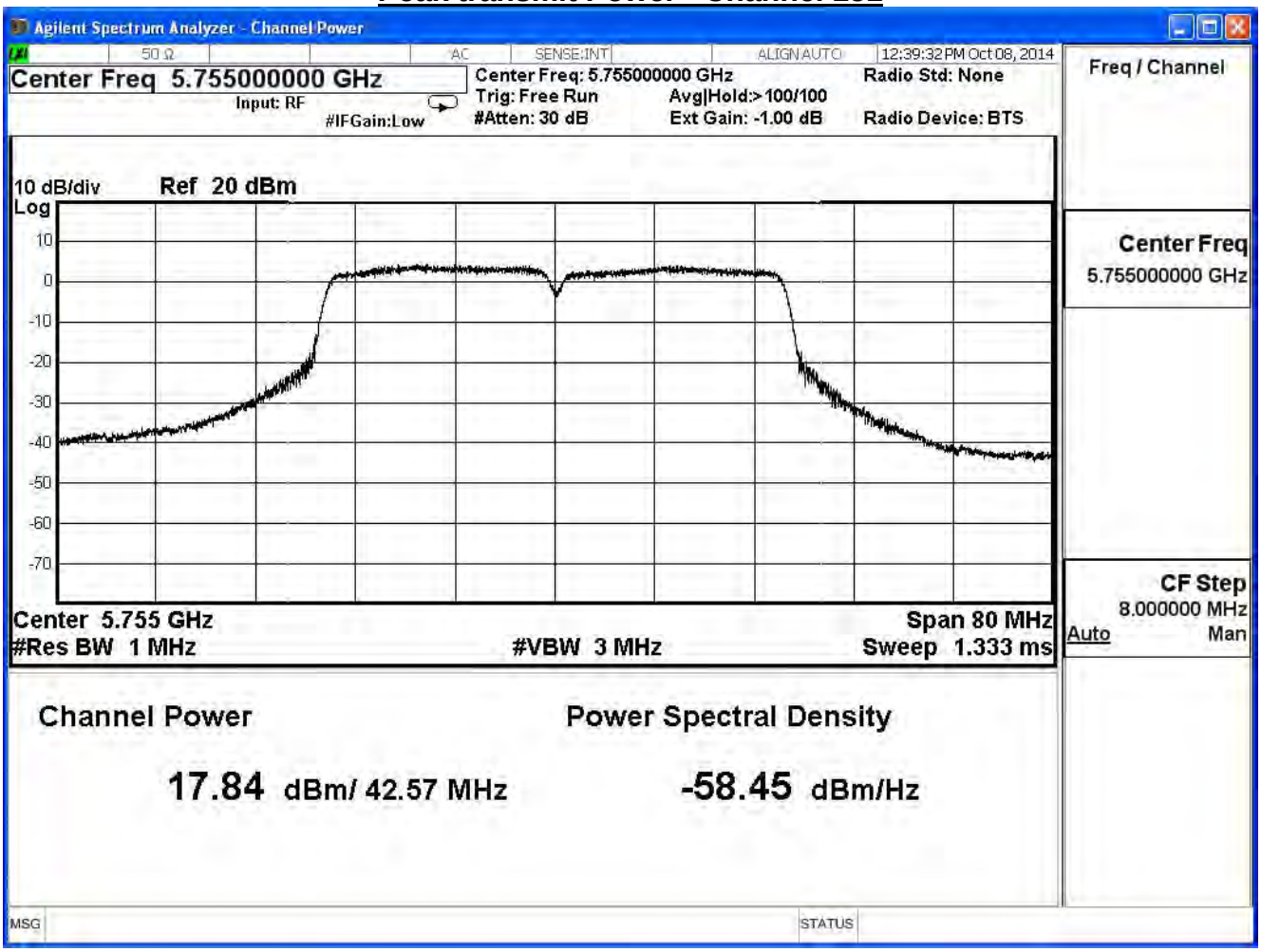
Product	VDSL2 Security Firewall		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/21	Test Site	SR7

IEEE 802.11n(40MHz)_ANT 2					
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit	Result
151	5755	42.57	17.840	≤30	Pass
159	5795	42.74	19.200	≤30	Pass

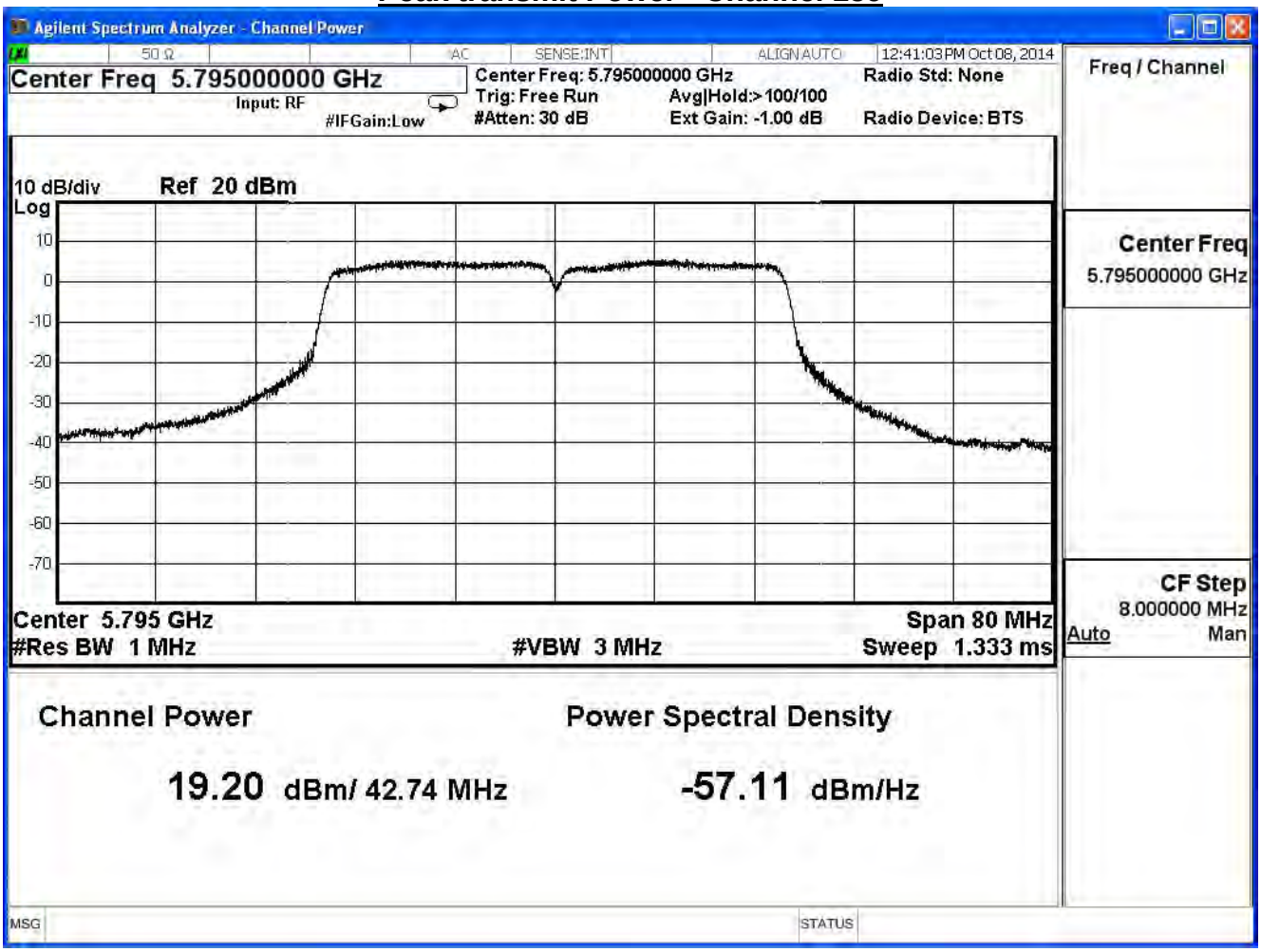
The worst emission of data rate is 13.5 Mbps.

Peak Power Output (dBm)										
MCS Index		0	1	2	3	4	5	6	7	Required Limit
Channel No	Frequency (MHz)	Data Rate								
		13.5	27	40.5	54	81	108	121.5	135	
151	5755	17.84	17.64	17.53	17.43	17.31	17.19	16.95	16.83	30dBm
159	5795	19.20	--	--	--	--	--	--	--	30dBm

Peak transmit Power - Channel 151



Peak transmit Power - Channel 159



Product	VDSL2 Security Firewall		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/21	Test Site	SR7

IEEE 802.11n(40MHz)_ANT 0+1+2					
Channel No.	Frequency (MHz)	Output Power (mW)	Output Power (dBm)	Required Limit	Result
151	5755	166.2647	22.208	≤30	Pass
159	5795	224.7502	23.517	≤30	Pass

The worst emission of data rate is 13.5 Mbps.

Peak Power Output (dBm)										
MCS Index		0	1	2	3	4	5	6	7	Required Limit
Channel No	Frequency (MHz)	Data Rate								
		13.5	27	40.5	54	81	108	121.5	135	
151	5755	22.21	22.07	21.96	21.82	21.69	21.53	21.32	21.20	30dBm
159	5795	23.52	--	--	--	--	--	--	--	30dBm

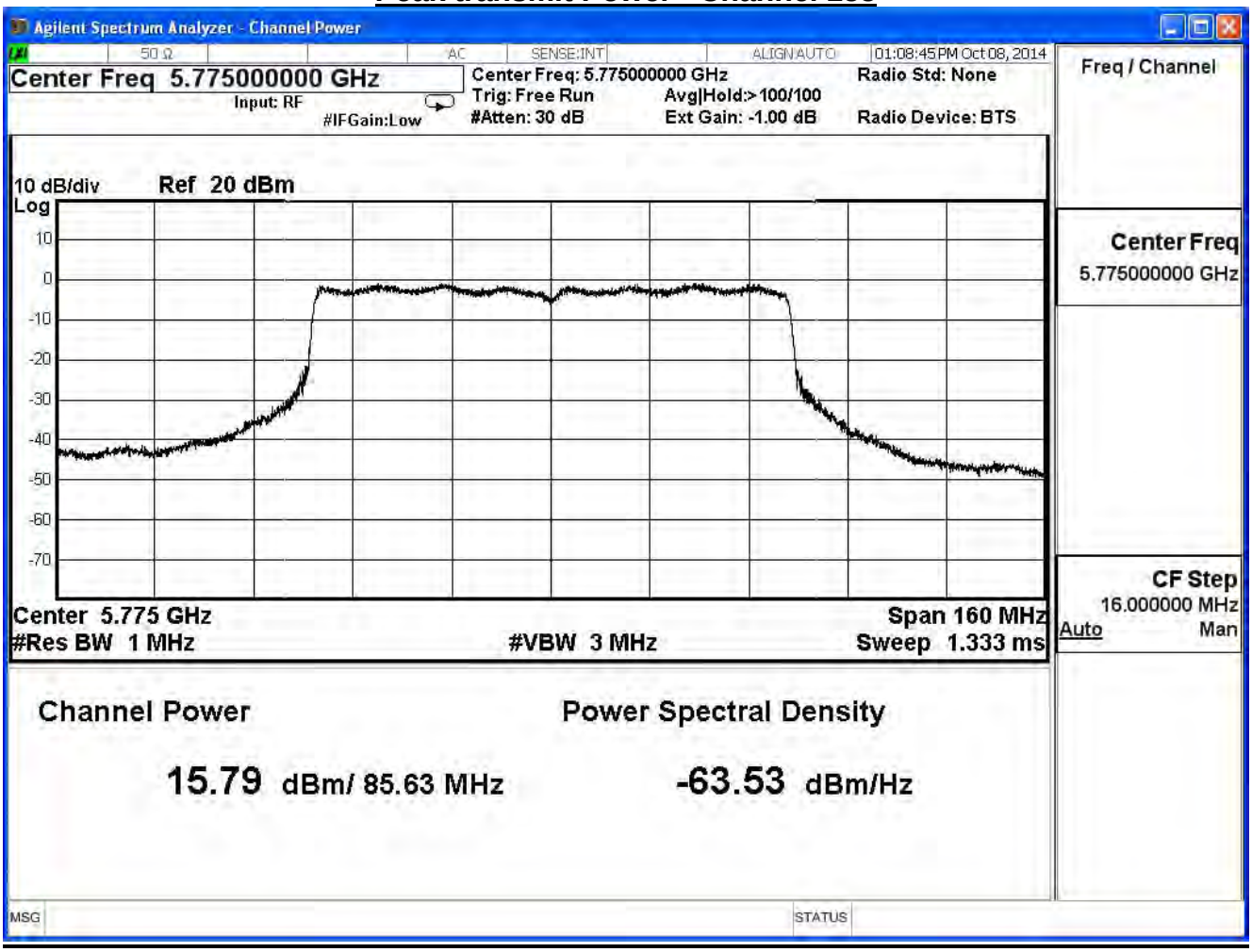
Product	VDSL2 Security Firewall		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/21	Test Site	SR7

IEEE 802.11ac(80MHz)_ANT 0					
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit	Result
155	5775	85.63	15.790	≤30	Pass

The worst emission of data rate is 29.3 Mbps.

Peak Power Output (dBm)												
MCS Index		0	1	2	3	4	5	6	7	8	9	Required Limit
Channel No	Frequency (MHz)	Data Rate										
		29.3	58.5	87.8	117	175.5	234	263.3	292.5	351	390	
155	5775	15.79	15.69	15.58	15.38	15.18	14.94	14.68	14.42	14.16	14.03	30dBm

Peak transmit Power - Channel 155



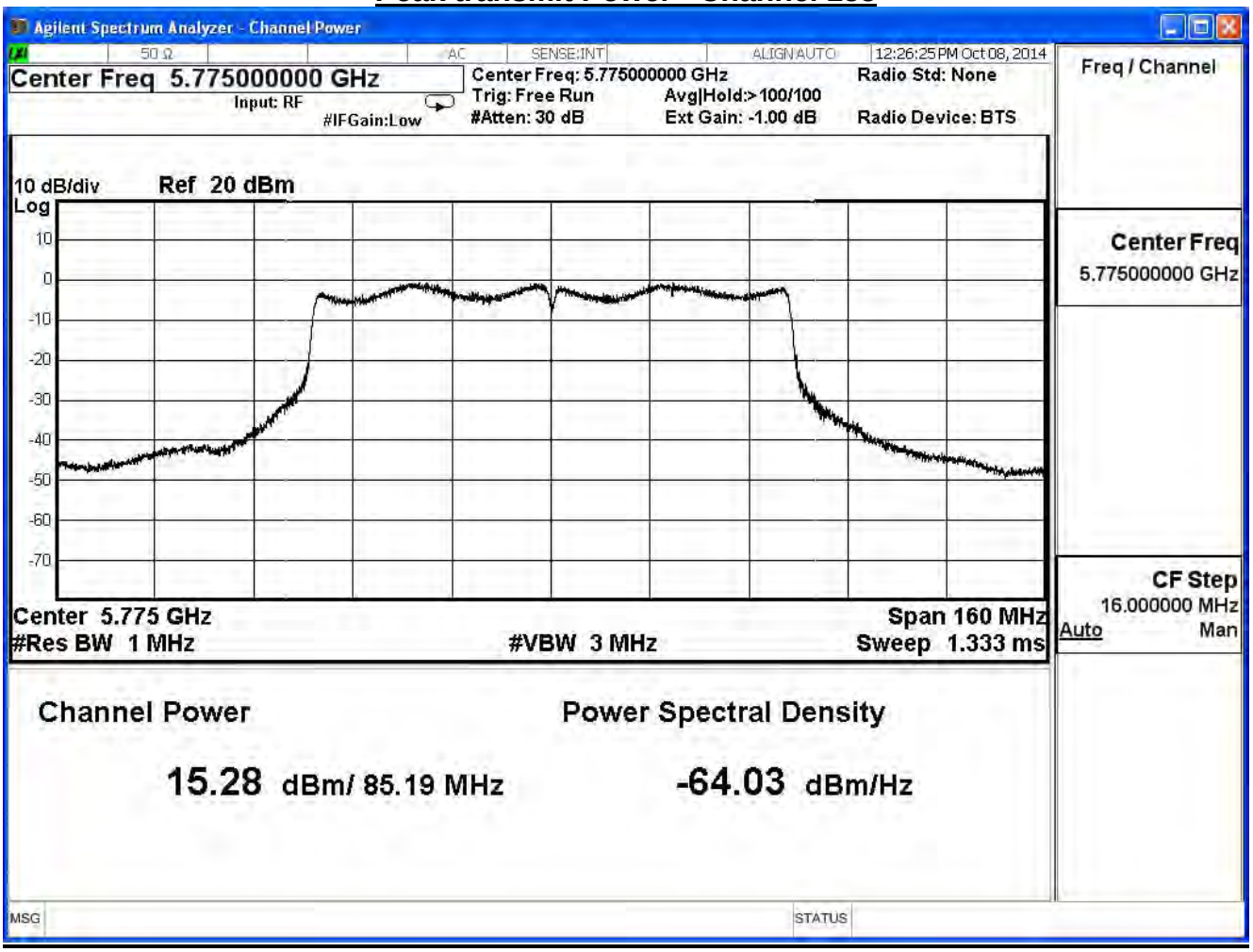
Product	VDSL2 Security Firewall		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/21	Test Site	SR7

IEEE 802.11ac(80MHz)_ANT 1					
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit	Result
155	5775	85.19	15.280	≤30	Pass

The worst emission of data rate is 29.3 Mbps.

Peak Power Output (dBm)												
MCS Index		0	1	2	3	4	5	6	7	8	9	Required Limit
Channel No	Frequency (MHz)	Data Rate										
		29.3	58.5	87.8	117	175.5	234	263.3	292.5	351	390	
155	5775	15.28	15.08	14.88	14.75	14.65	14.41	14.17	14.05	13.81	13.93	30dBm

Peak transmit Power - Channel 155



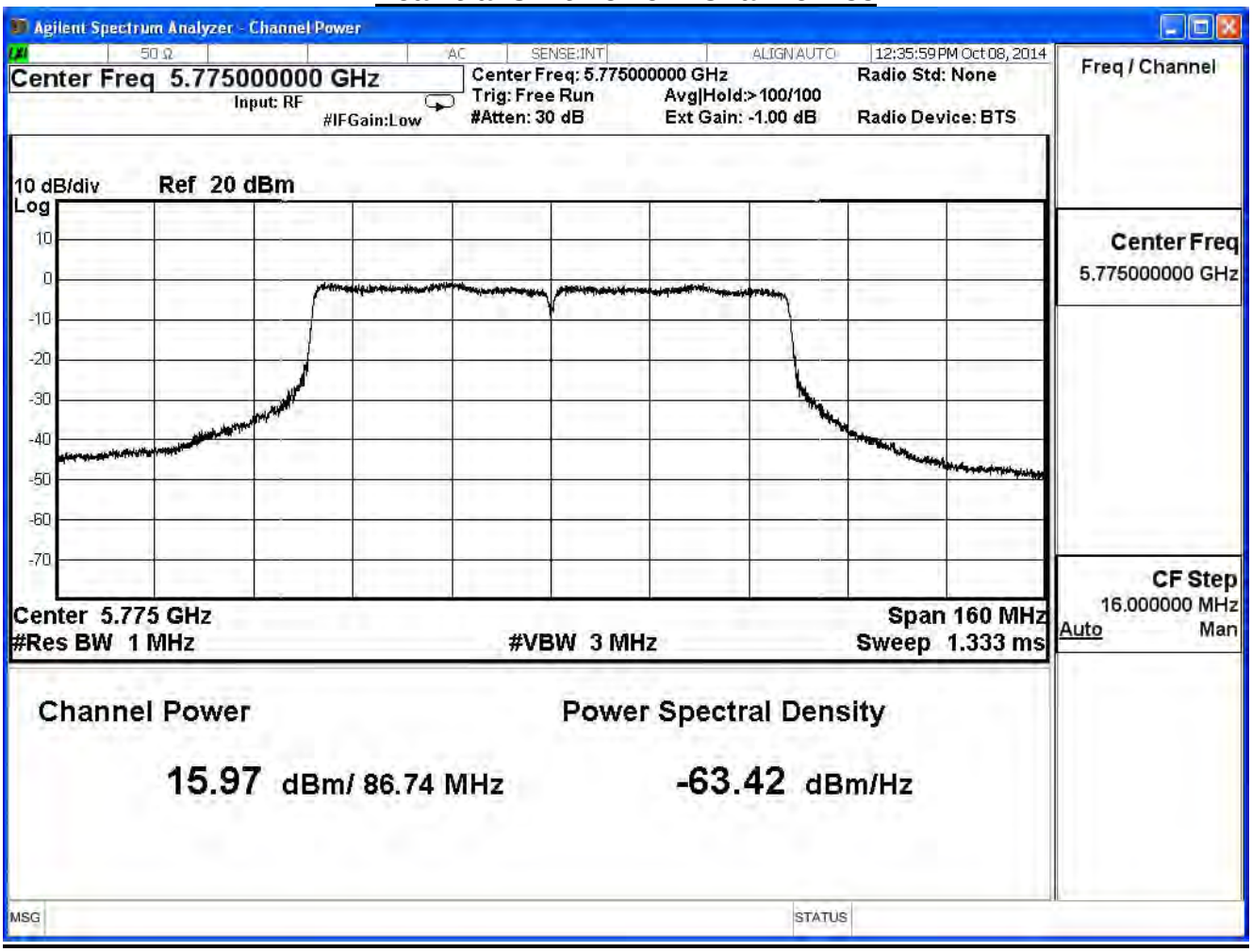
Product	VDSL2 Security Firewall		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/21	Test Site	SR7

IEEE 802.11ac(80MHz)_ANT 2					
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit	Result
155	5775	86.74	15.970	≤30	Pass

The worst emission of data rate is 29.3 Mbps.

Peak Power Output (dBm)												
MCS Index		0	1	2	3	4	5	6	7	8	9	Required Limit
Channel No	Frequency (MHz)	Data Rate										
		29.3	58.5	87.8	117	175.5	234	263.3	292.5	351	390	
155	5775	15.97	15.87	15.76	15.66	15.54	15.42	15.18	15.06	14.94	14.70	30dBm

Peak transmit Power - Channel 155



Product	VDSL2 Security Firewall		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit (CDD Mode)		
Date of Test	2014/10/21	Test Site	SR7

IEEE 802.11ac(80MHz)_ANT 0+1+2					
Channel No.	Frequency (MHz)	Output Power (mW)	Output Power (dBm)	Required Limit	Result
155	5775	111.1988	20.461	≤30	Pass

Peak Power Output (dBm)										
MCS Index		0	1	2	3	4	5	6	7	8	9
Channel No	Frequency (MHz)	Data Rate									
		29.3	58.5	87.8	117	175.5	234	263.3	292.5	351	390
155	5775	13.78	13.63	13.53	13.33	13.18	13.03	12.91	12.67	12.49	12.31

The worst emission of data rate is 29.3 Mbps.

Peak Power Output (dBm)												
MCS Index		0	1	2	3	4	5	6	7	8	9	Required Limit
Channel No	Frequency (MHz)	Data Rate										
		29.3	58.5	87.8	117	175.5	234	263.3	292.5	351	390	
155	5775	20.46	20.33	20.19	20.05	19.91	19.71	19.47	19.30	19.10	19.00	30dBm