FCC Test Report

Product Name	：	VDSL2 Security Firewall
Model No.	：	Vigor2860, Other models please refer to the report attachment 1
FCC ID.	：	VGYV2860VNPLUS

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	：	2013/03/27
Issued Date	：	2013/11/29
Report No.	：	134094R-RFUSP46V01
Report Version	：	V1.0

Testing Laboratory
1313

Test Report Certification

Issued Date : 2013/11/29
Report No. : 134094R-RFUSP46V01

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.	:	Vigor2860, Other models please refer to the report attachment 1
FCC ID.	:	VGYV2860VNPLUS
EUT Voltage	:	AC 100-240V, 50-60Hz
Trade Name	:	DrayTek
Applicable Standard	:	FCC CFR Title 47 Part 15 Subpart E Section 15.407:2012 ANSI C63.4: 2009
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 / Adm. Specialist)

Tested By : (JuBo Shen / 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: 1313**
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/tw/ctg/cts/accreditations.htm
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:

HsinChu Testing Laboratory:
No.75-2, 3rd Lin, Wangye Keng, Yonghxing Tsuen, Qionglin Shiang, Hsinchu County 307, Taiwan, R.O.C.
TEL:+886-3-592-8858 / FAX:+886-3-592-8859 E-Mail : service@quietek.com

LinKou Testing Laboratory:
No.5-22, Ruishukeng, Linkou Dist., New Taipei City 24451, Taiwan, R.O.C.
TEL : 886-2-8601-3788 / FAX : 886-2-8601-3789 E-Mail : service@quietek.com

TABLE OF CONTENTS

1. General Information

1.1. EUT Description

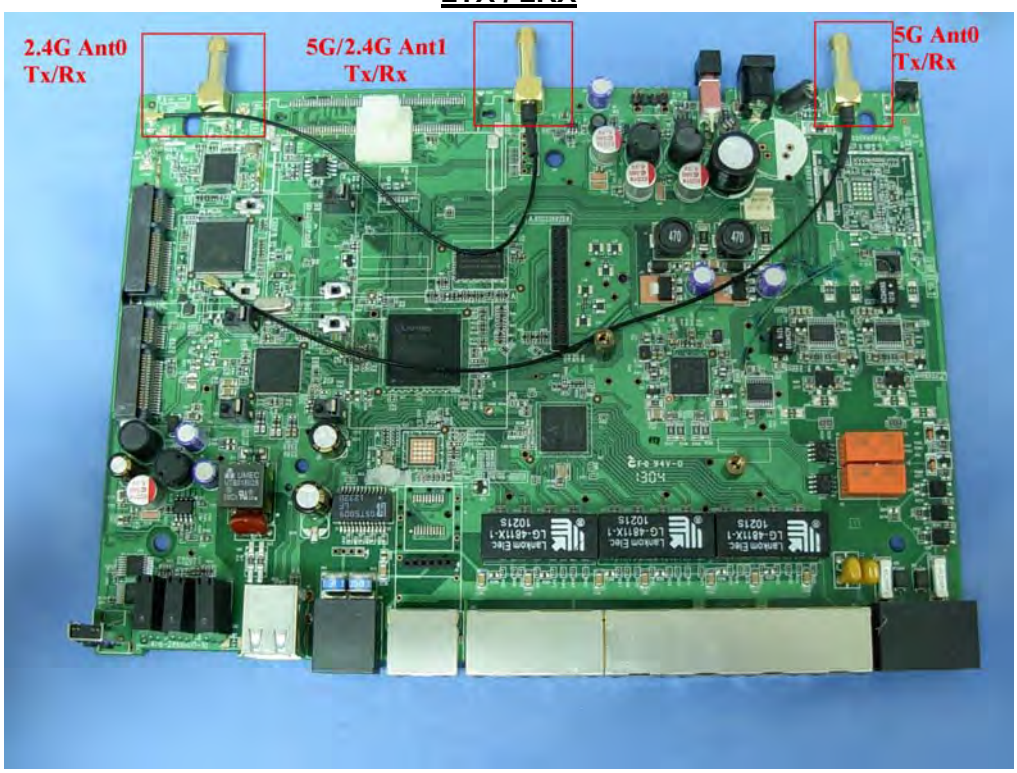
Product Name	VDSL2 Security Firewall	
Product Type	WLAN (2TX, 2RX)	
Trade Name	DrayTek	
Model No.	Vigor2860, Other models please refer to the report attachment 1	
Frequency Range/ Channel Number	IEEE 802.11a/ IEEE 802.11n (20MHz)	5180~5240MHz / 4 Channels
	IEEE 802.11n (40MHz)	5190~5230MHz / 2 Channels
Type of Modulation	IEEE 802.11a/n	Orthogonal Frequency Division Multiplexing (OFDM)
Data Speed	IEEE 802.11a	6, 9, 18, 24, 36, 48, 54Mbps
	IEEE 802.11n	Support a subset of the combination of GI, MCS 0~MCS 15 and bandwidth defined in 802.11n
Antenna Gain	Ant0: 4.12dBi, Ant1: 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	Powertron Electronics, PA1030-2I I/P : 100-240V~50/60Hz 0.8A O/P : 12V⎓2.5A, 30W Max Cable Out: Non-Shielded, 1.5m
Power Adatper	HON-KW ANG, 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	20MHz	40MHz
IEEE802.11a	✓		✓	
IEEE802.11n	✓	✓	✓	✓

2TX / 2RX



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

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

IEEE 802.11a & IEEE 802.11n (20MHz)

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

IEEE 802.11n (40MHz)

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

Note:

1. This device is a VDSL2 Security Firewall including 2.4GHz b/g/n and 5GHz a/n (2x2) transmitting and receiving function.
2. The variation of model number is for shown as attached 1.
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 & 5.8GHz transmitting is measured and makes a test report of the report number: 134094R-RFUSP42V01.
6. This device is a composite device in accordance with Part 15 regulations. The receiving function receiving was tested and its test report number is 134094R-RFUSP37V02 under Declaration of Conformity.

1.3. Test Mode

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

TX	Mode 1: Transmit(Adapter:PA1030-2I) Mode 2: Transmit(Adapter: HK-AX-120A200-US)

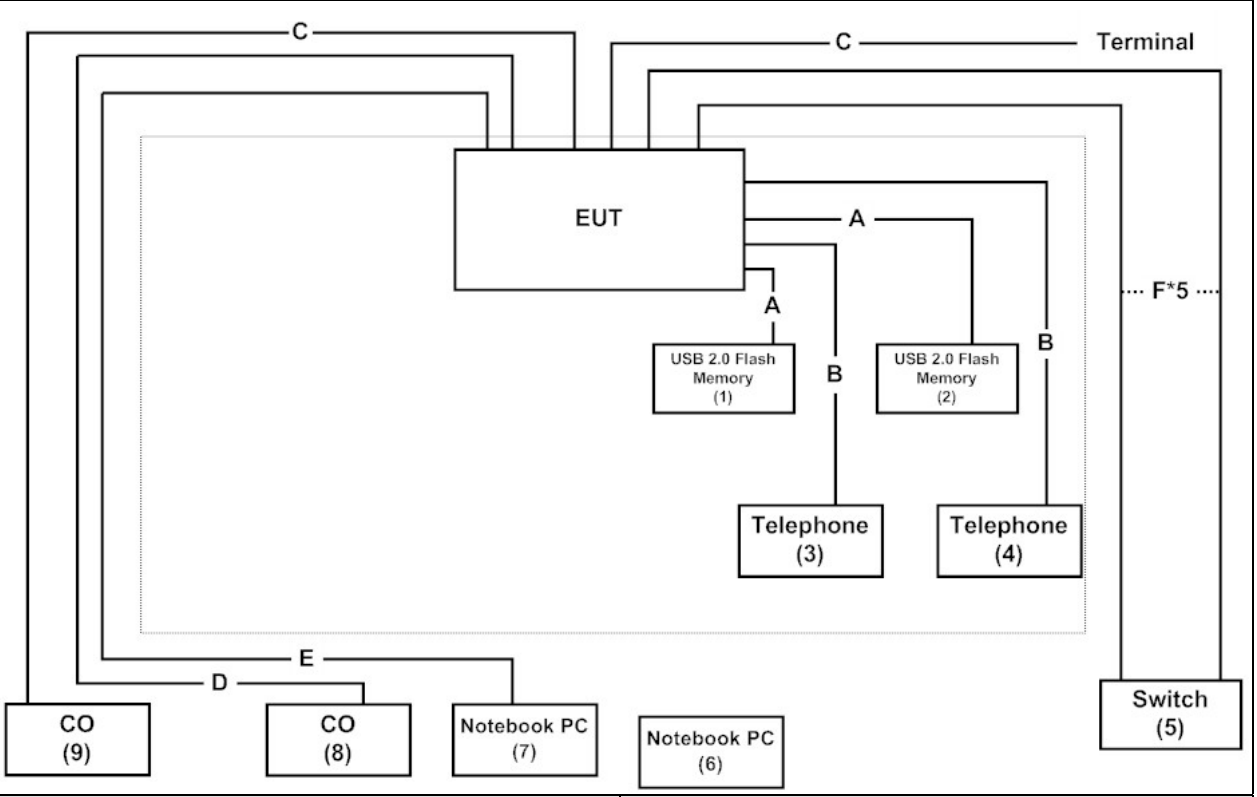
Test Items	Mode	Modulation	Channel	Antenna	Result
Conducted Emission	1	11ac (80MHz)	46	0+1	Complies
99 % & 26dB Bandwidth	1	a	36/44/48	0	Complies
	1	11n (20MHz)	36/44/48	0/1	Complies
	1	11n (40MHz)	38/46	0/1	Complies
Peak Transmit Output	1	a	36/44/48	0	Complies
	1	11n (20MHz)	36/44/48	0+1	Complies
	1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

1.4. Tested System Details

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

Product		Manufacturer	Model No.	Serial No.	FCC ID	Power Cord
1	USB 2.0 Flash Memory	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	--

1.5. 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

1.6. EUT Exercise Software

1	Setup the EUT as shown in Section 1.5.
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.

1.7. Test Facility

Ambient conditions in the laboratory:

Items	Test Item	Required (IEC 68-1)	Actual
Temperature (°C)	FCC PART 15 C 15.407 Conducted Emission	15 - 35	20
Humidity (%RH)		25 - 75	50
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.407 99 % & 26dB Bandwidth	15 - 35	25
Humidity (%RH)		25 - 75	45
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.407 Peal Transmit Power	15 - 35	25
Humidity (%RH)		25 - 75	45
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 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 C 15.407 Power Excursion	15 - 35	25
Humidity (%RH)		25 - 75	45
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.407 Radiated Emission	15 - 35	25
Humidity (%RH)		25 - 75	65
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.407 Band Edge	15 - 35	25
Humidity (%RH)		25 - 75	58
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 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

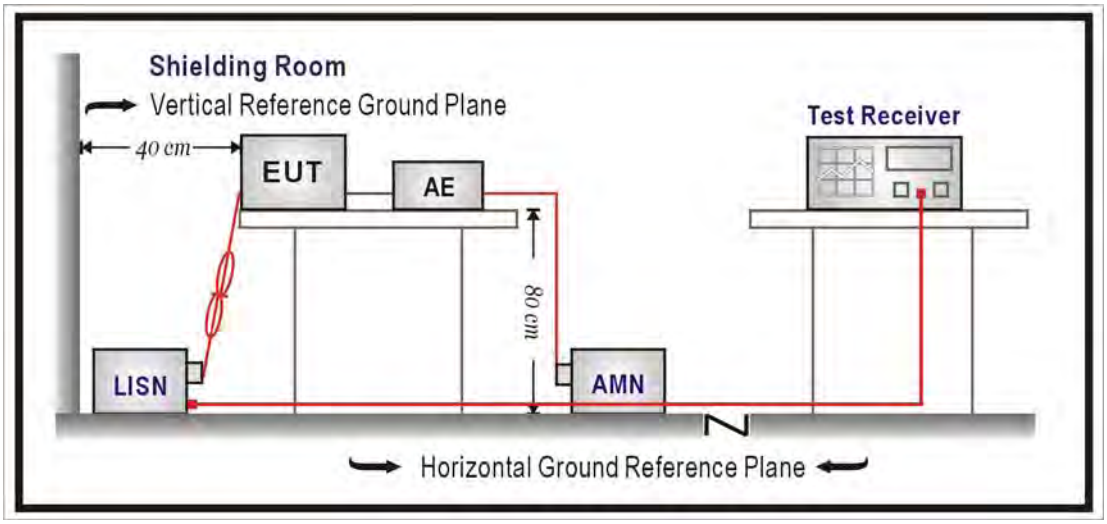
The following test equipments are used during the test:

Conducted Emission / SR2

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Artificial Mains Network	R&S	ENV4200	848411/010	2014/01/24
LISN	R&S	ENV216	100092	2013/08/21
Test Receiver	R&S	ESCS 30	825442/014	2013/08/07

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

2.2. Test Setup



2.3. Limits

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

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

2.4. Test Procedure

The EUT was setup according to ANSI C63.4: 2009. 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

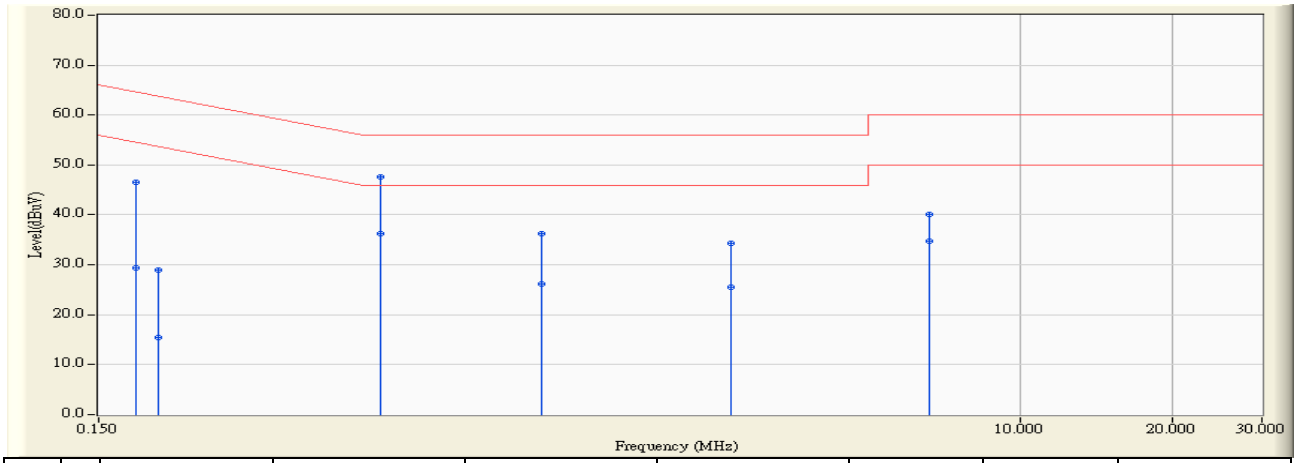
According to FCC Part 15 Subpart C Paragraph 15.207:2012

2.6. Uncertainty

The measurement uncertainty is defined as ± 2.26 dB.

2.7. Test Result

Site : SR2	**Time : 2013/11/19 - 15:46**
Limit : CISPR_B_00M_QP	**Margin : 10**
Probe : SR2_LISN(16A)-3_0822 - Line1	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : Mode 1: Transmit(Adapter:PA1030-2I) 802.11n 40MHz_5230MHz**

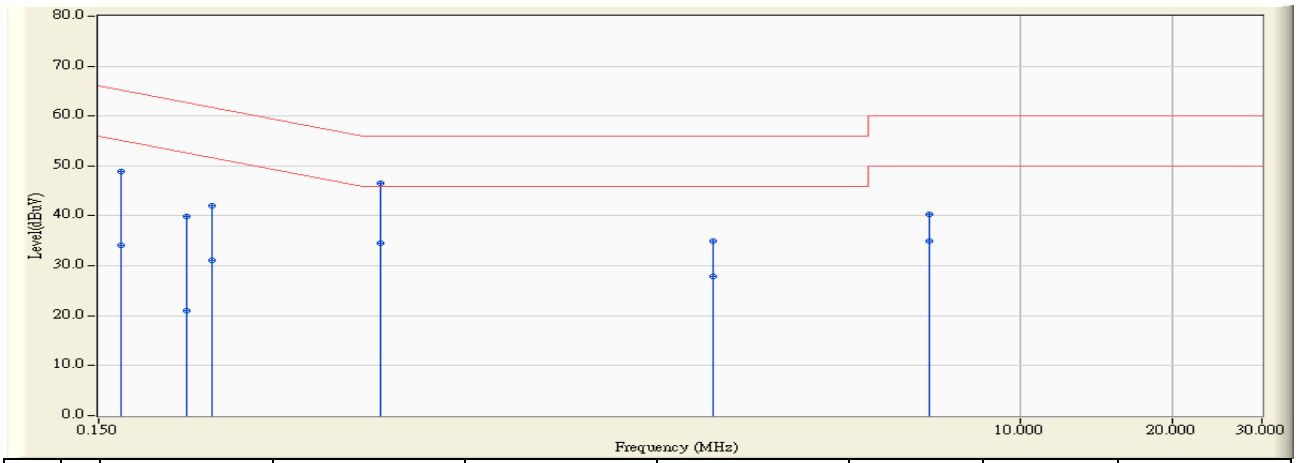


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.177	9.640	36.820	46.460	-18.149	64.609	QUASIPEAK
2		0.177	9.640	19.770	29.410	-25.199	54.609	AVERAGE
3		0.197	9.644	19.360	29.004	-34.737	63.741	QUASIPEAK
4		0.197	9.644	5.730	15.374	-38.367	53.741	AVERAGE
5	*	0.541	9.732	37.860	47.592	-8.408	56.000	QUASIPEAK
6		0.541	9.732	26.560	36.292	-9.708	46.000	AVERAGE
7		1.127	9.754	26.520	36.274	-19.726	56.000	QUASIPEAK
8		1.127	9.754	16.430	26.184	-19.816	46.000	AVERAGE
9		2.673	9.875	24.380	34.256	-21.744	56.000	QUASIPEAK
10		2.673	9.875	15.590	25.466	-20.534	46.000	AVERAGE
11		6.615	10.014	30.180	40.194	-19.806	60.000	QUASIPEAK
12		6.615	10.014	24.790	34.804	-15.196	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 : 2013/11/19 - 16:05**
Limit : CISPR_B_00M_QP	**Margin : 10**
Probe : SR2_LISN(16A)-3_0822 - Line2	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : Mode 1: Transmit(Adapter:PA1030-2I) 802.11n 40MHz_5230MHz**

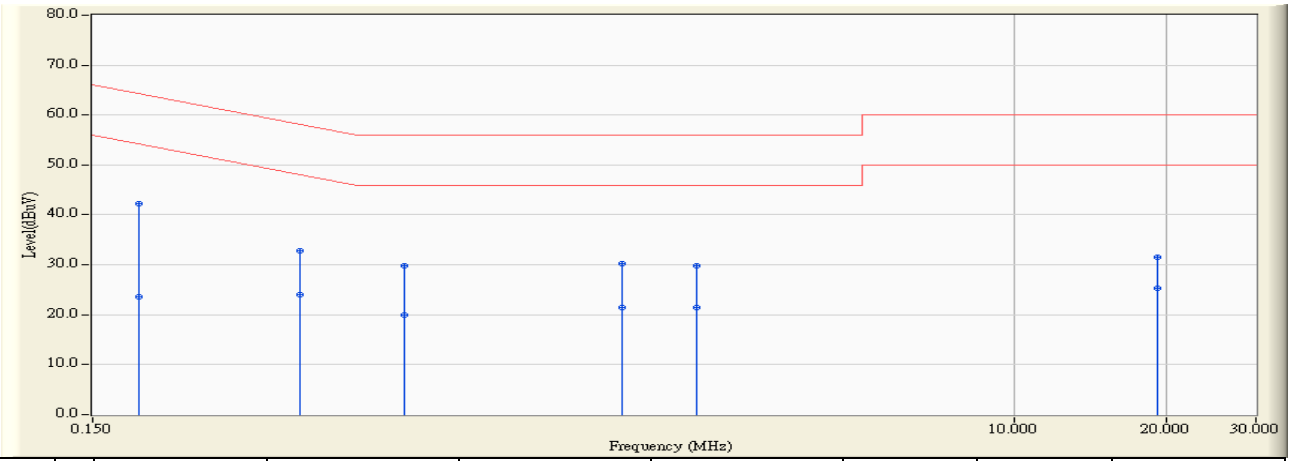


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.166	9.624	39.300	48.924	-16.253	65.177	QUASIPEAK
2		0.166	9.624	24.540	34.164	-21.013	55.177	AVERAGE
3		0.224	9.640	30.300	39.940	-22.721	62.661	QUASIPEAK
4		0.224	9.640	11.370	21.010	-31.651	52.661	AVERAGE
5		0.252	9.647	32.420	42.066	-19.639	61.705	QUASIPEAK
6		0.252	9.647	21.370	31.016	-20.689	51.705	AVERAGE
7	*	0.541	9.712	36.820	46.532	-9.468	56.000	QUASIPEAK
8		0.541	9.712	24.870	34.582	-11.418	46.000	AVERAGE
9		2.462	9.850	25.120	34.970	-21.030	56.000	QUASIPEAK
10		2.462	9.850	18.000	27.850	-18.150	46.000	AVERAGE
11		6.599	10.017	30.240	40.257	-19.743	60.000	QUASIPEAK
12		6.599	10.017	24.870	34.887	-15.113	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 : 2013/11/19 - 16:13**
Limit : CISPR_B_00M_QP	**Margin : 10**
Probe : SR2_LISN(16A)-3_0822 - Line1	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : Mode 2: Transmit(Adapter: HK-AX-120A200-US) 802.11n 40MHz_5230MHz**

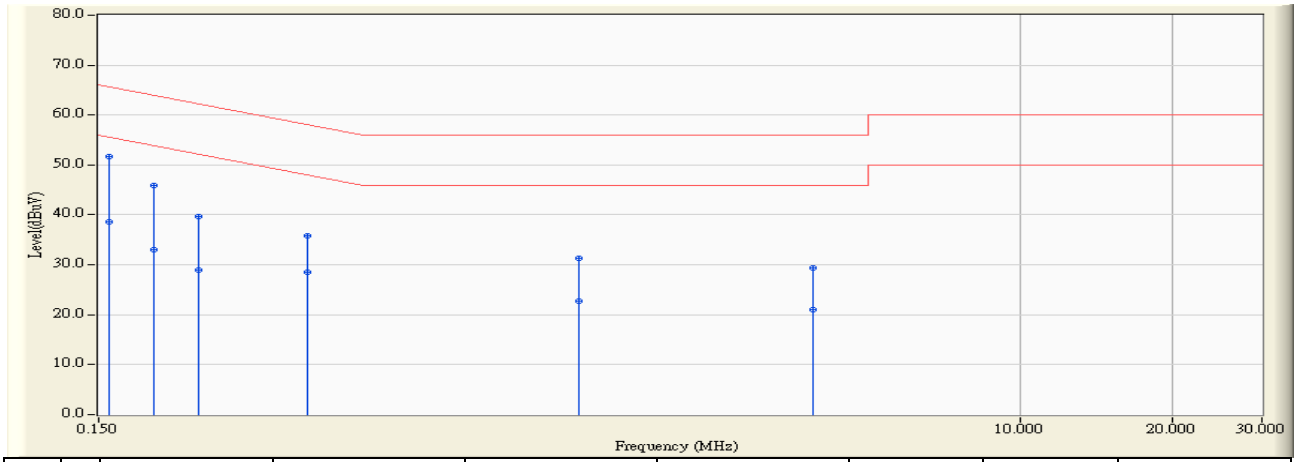


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	*	0.185	9.642	32.620	42.261	-21.990	64.251	QUASIPEAK
2		0.185	9.642	14.040	23.681	-30.570	54.251	AVERAGE
3		0.384	9.697	23.120	32.817	-25.368	58.184	QUASIPEAK
4		0.384	9.697	14.320	24.017	-24.168	48.184	AVERAGE
5		0.619	9.734	20.040	29.774	-26.226	56.000	QUASIPEAK
6		0.619	9.734	10.140	19.874	-26.126	46.000	AVERAGE
7		1.673	9.814	20.400	30.214	-25.786	56.000	QUASIPEAK
8		1.673	9.814	11.560	21.374	-24.626	46.000	AVERAGE
9		2.345	9.863	19.880	29.743	-26.257	56.000	QUASIPEAK
10		2.345	9.863	11.560	21.423	-24.577	46.000	AVERAGE
11		19.197	10.072	21.420	31.492	-28.508	60.000	QUASIPEAK
12		19.197	10.072	15.220	25.292	-24.708	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 : 2013/11/19 - 15:52**
Limit : CISPR_B_00M_QP	**Margin : 10**
Probe : SR2_LISN(16A)-3_0822 - Line2	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : Mode 2: Transmit(Adapter: HK-AX-120A200-US) 802.11n 40MHz_5230MHz**



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	*	0.158	9.622	42.100	51.722	-13.856	65.578	QUASIPEAK
2		0.158	9.622	29.090	38.712	-16.866	55.578	AVERAGE
3		0.193	9.632	36.180	45.812	-18.096	63.908	QUASIPEAK
4		0.193	9.632	23.320	32.952	-20.956	53.908	AVERAGE
5		0.236	9.642	29.940	39.583	-22.655	62.238	QUASIPEAK
6		0.236	9.642	19.240	28.883	-23.355	52.238	AVERAGE
7		0.388	9.679	26.100	35.778	-22.322	58.100	QUASIPEAK
8		0.388	9.679	18.930	28.608	-19.492	48.100	AVERAGE
9		1.334	9.756	21.640	31.397	-24.603	56.000	QUASIPEAK
10		1.334	9.756	12.990	22.747	-23.253	46.000	AVERAGE
11		3.877	9.912	19.420	29.331	-26.669	56.000	QUASIPEAK
12		3.877	9.912	11.180	21.091	-24.909	46.000	AVERAGE

Note:

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

3. 99% & 26dB Bandwidth

3.1. Test Equipment

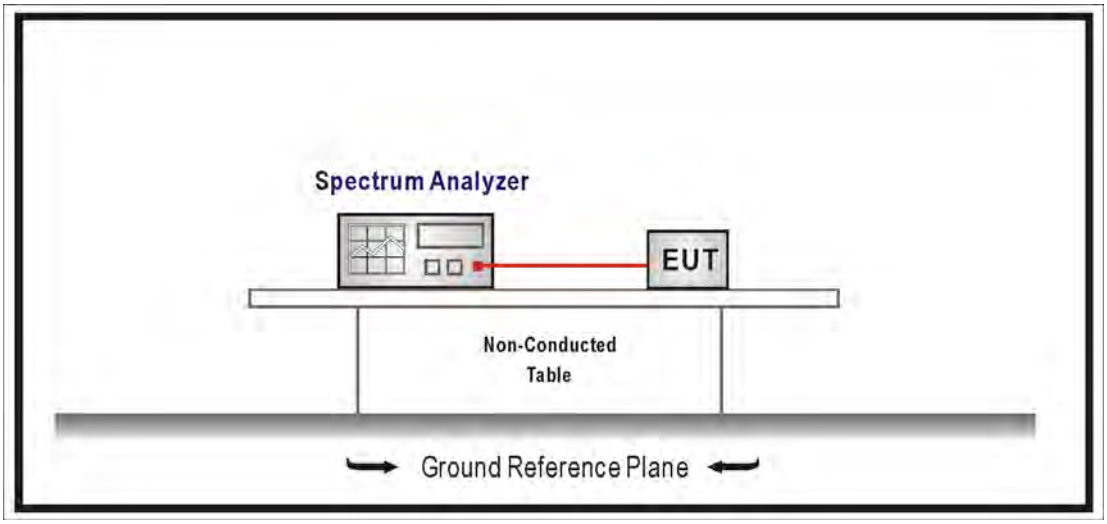
The following test equipments are used during the radiated emission tests:

99% & 26dB Bandwidth / SR7

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Spectrum Analyzer	Agilent	N9010A-EXA	US47140172	2013/07/31

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

3.2. Test Setup



3.3. Limits

No Required

3.4. Test Procedure

The EUT was tested according to U-NII test procedure of KDB 789033.
Set RBW 1% of the emission bandwidth, VBW equal to 3 times the RBW.

3.5. Uncertainty

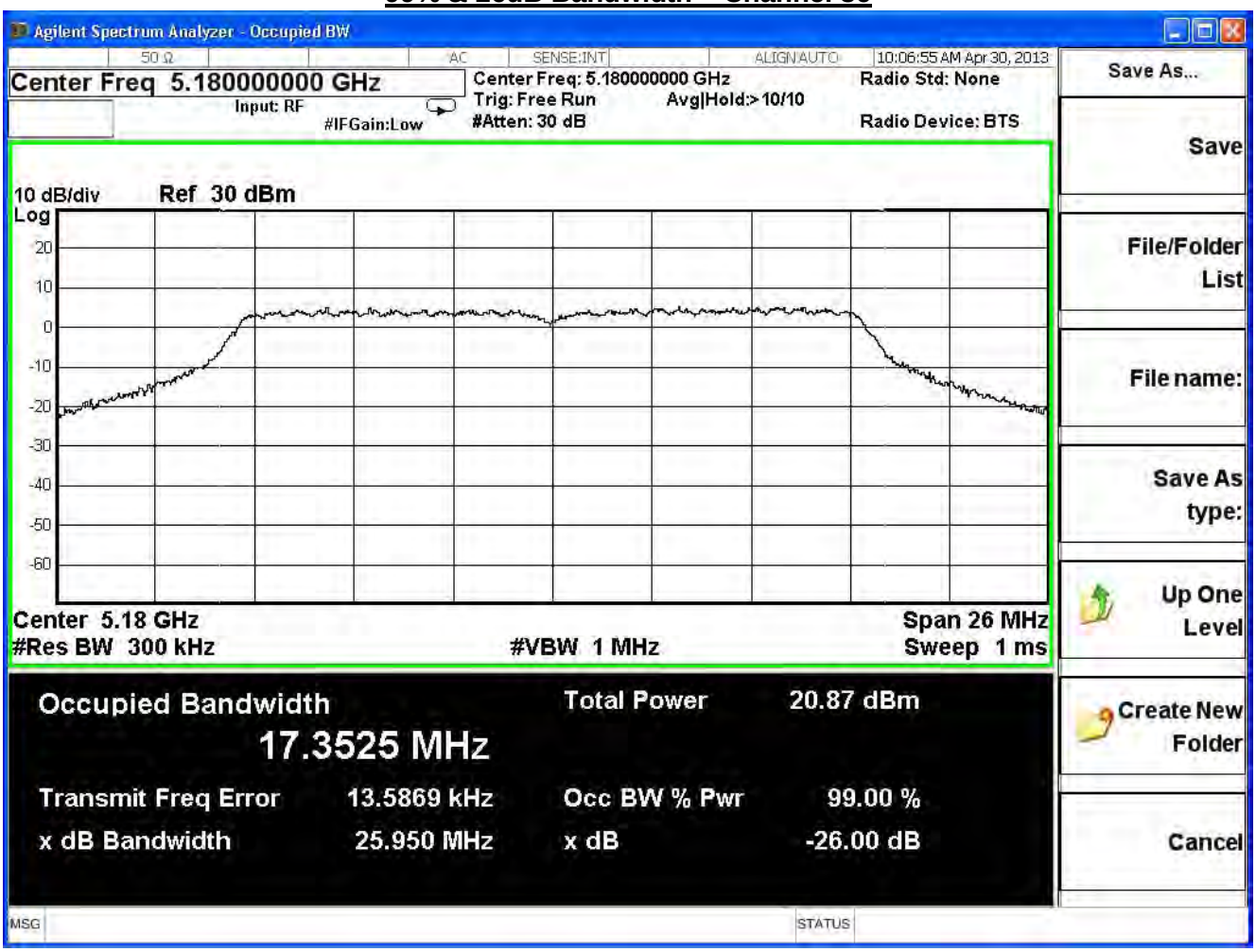
The measurement uncertainty is defined as ±150Hz

3.6. Test Result

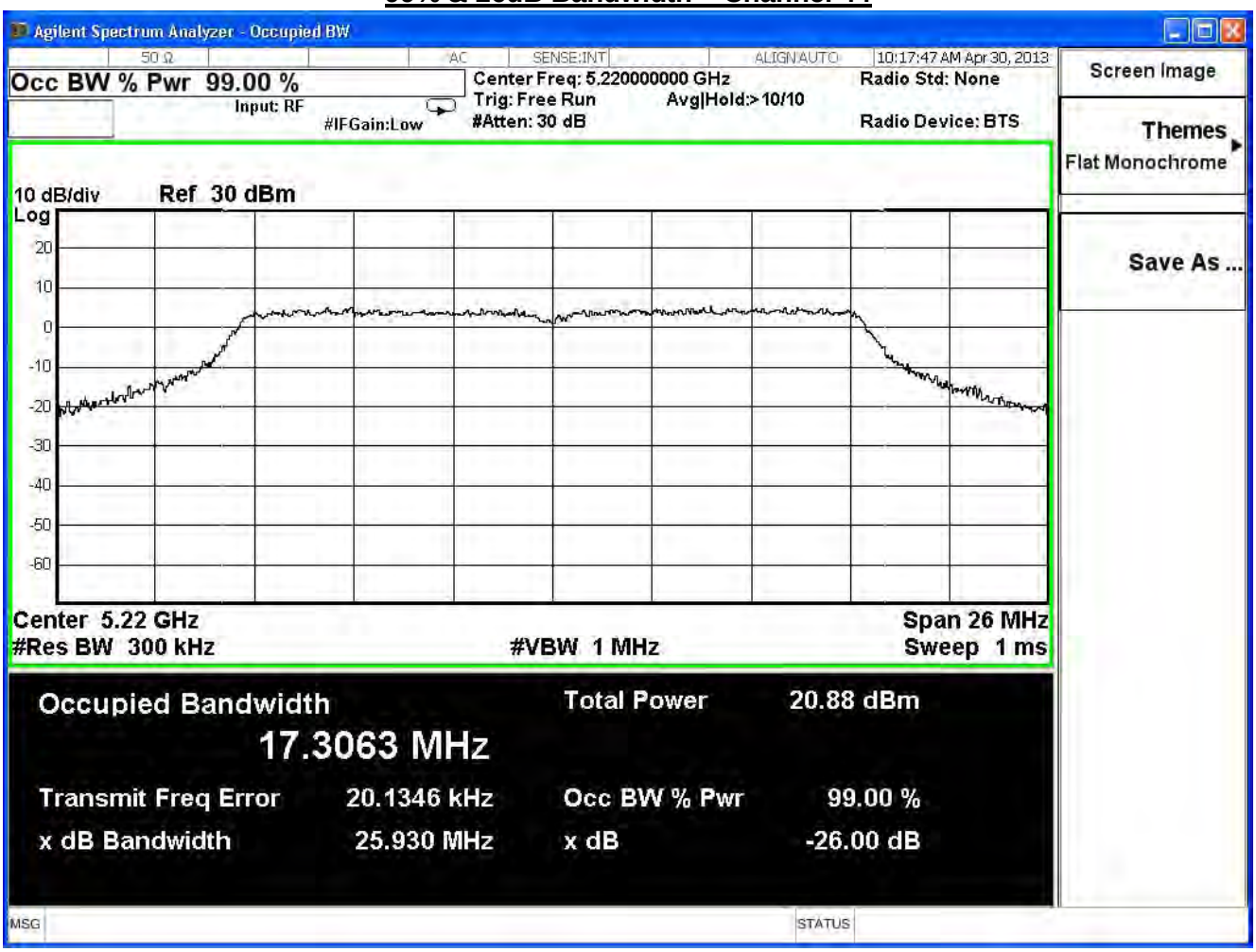
Product	VDSL2 Security Firewall		
Test Item	99% & 26dB Bandwidth		
Test Mode	Transmit		
Date of Test	2013/04/30	Test Site	SR7

802.11a					
Channel No.	Frequency (MHz)	26dB BW (MHz)	99 % OBW (MHz)	Required Limit (MHz)	Result
36	5180	25.950	17.353	--	PASS
44	5220	25.930	17.306	--	PASS
48	5240	24.870	17.204	--	PASS

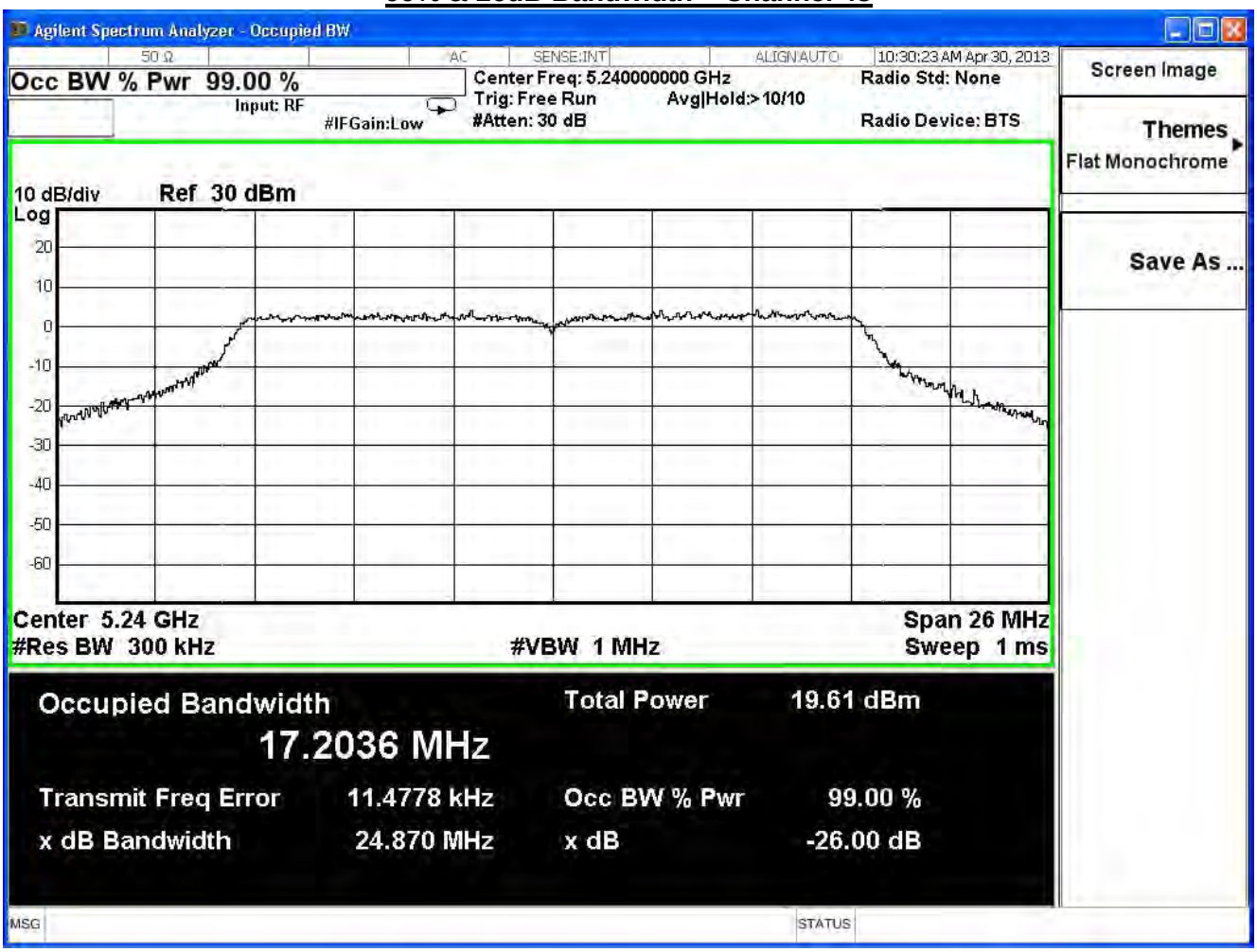
99% & 26dB Bandwidth – Channel 36



99% & 26dB Bandwidth – Channel 44



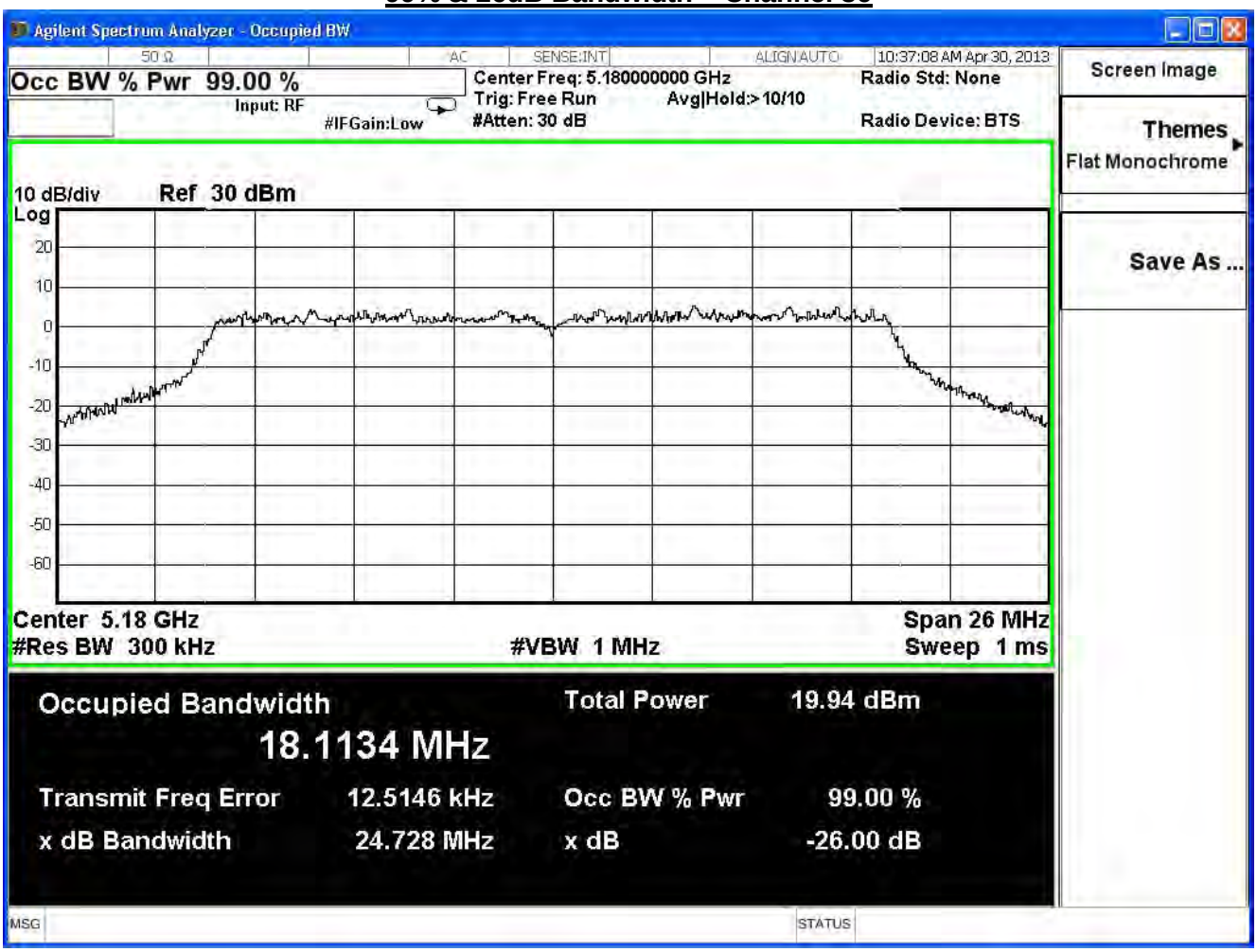
99% & 26dB Bandwidth – Channel 48



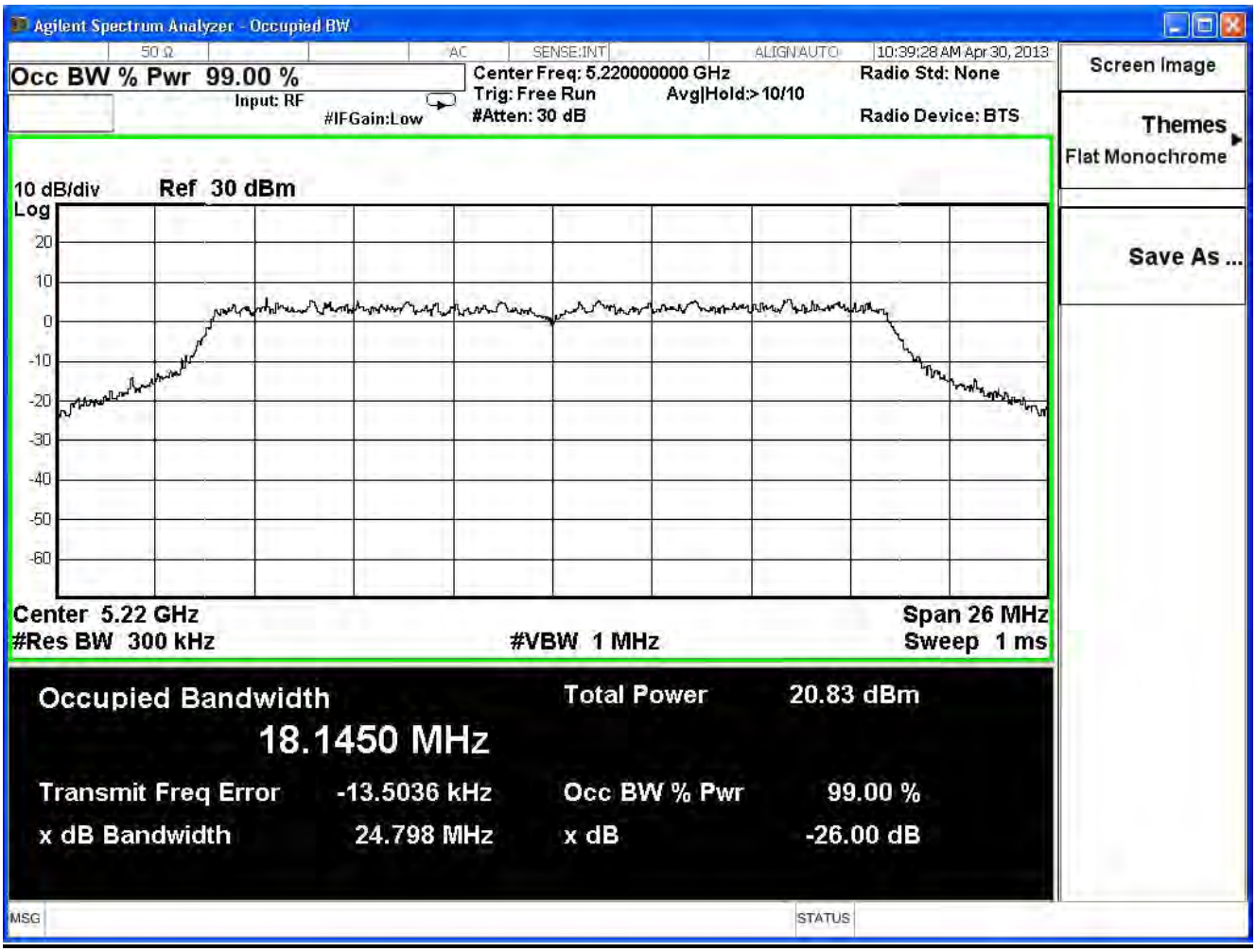
Product	VDSL2 Security Firewall		
Test Item	99% & 26dB Bandwidth		
Test Mode	Transmit		
Date of Test	2013/04/30	Test Site	SR7

802.11n_20M(ANT 0)					
Channel No.	Frequency (MHz)	26dB BW (MHz)	99 % OBW (MHz)	Required Limit (MHz)	Result
36	5180	24.728	18.113	--	PASS
44	5220	24.798	18.145	--	PASS
48	5240	25.485	18.190	--	PASS

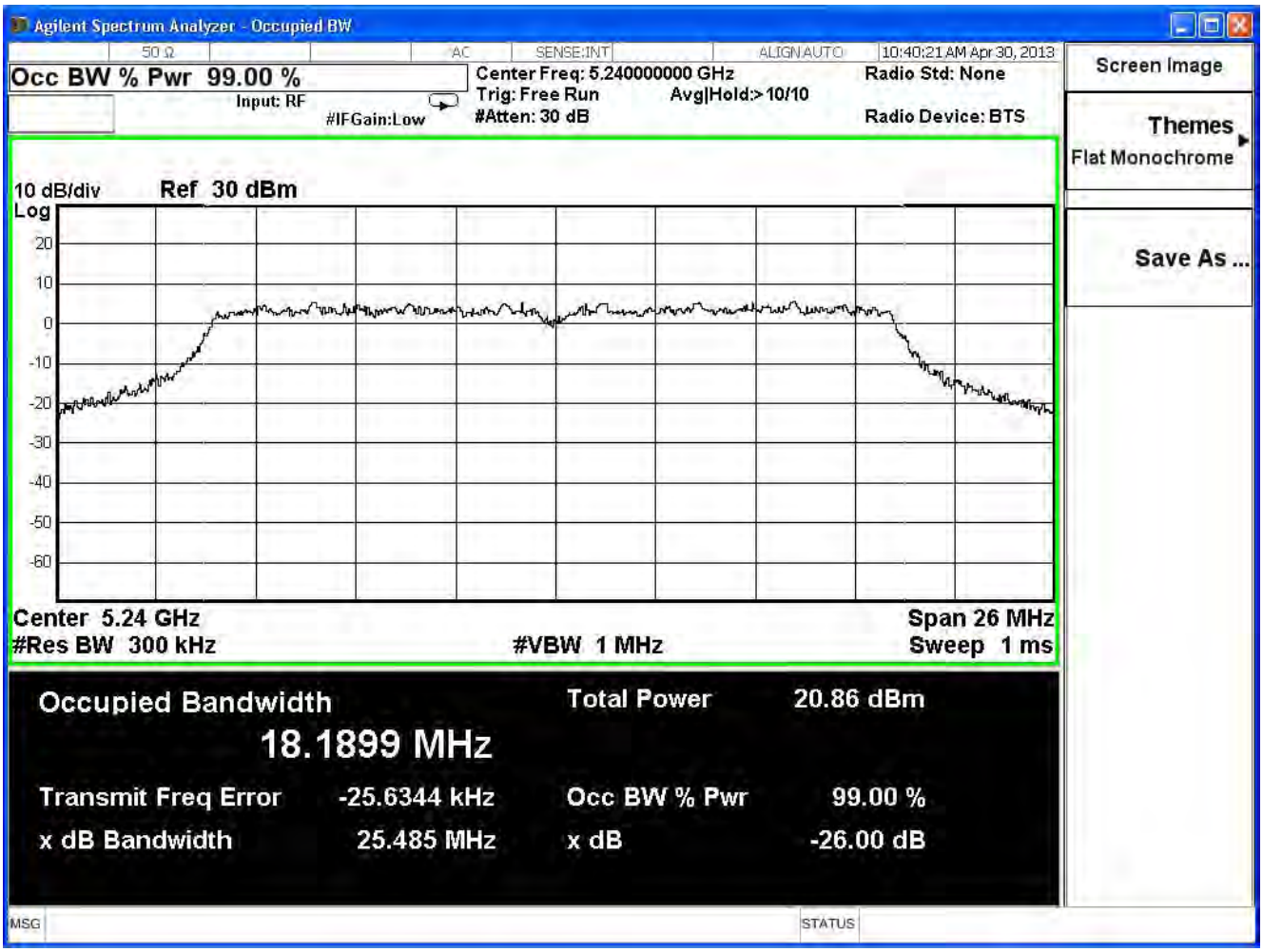
99% & 26dB Bandwidth – Channel 36



99% & 26dB Bandwidth – Channel 44



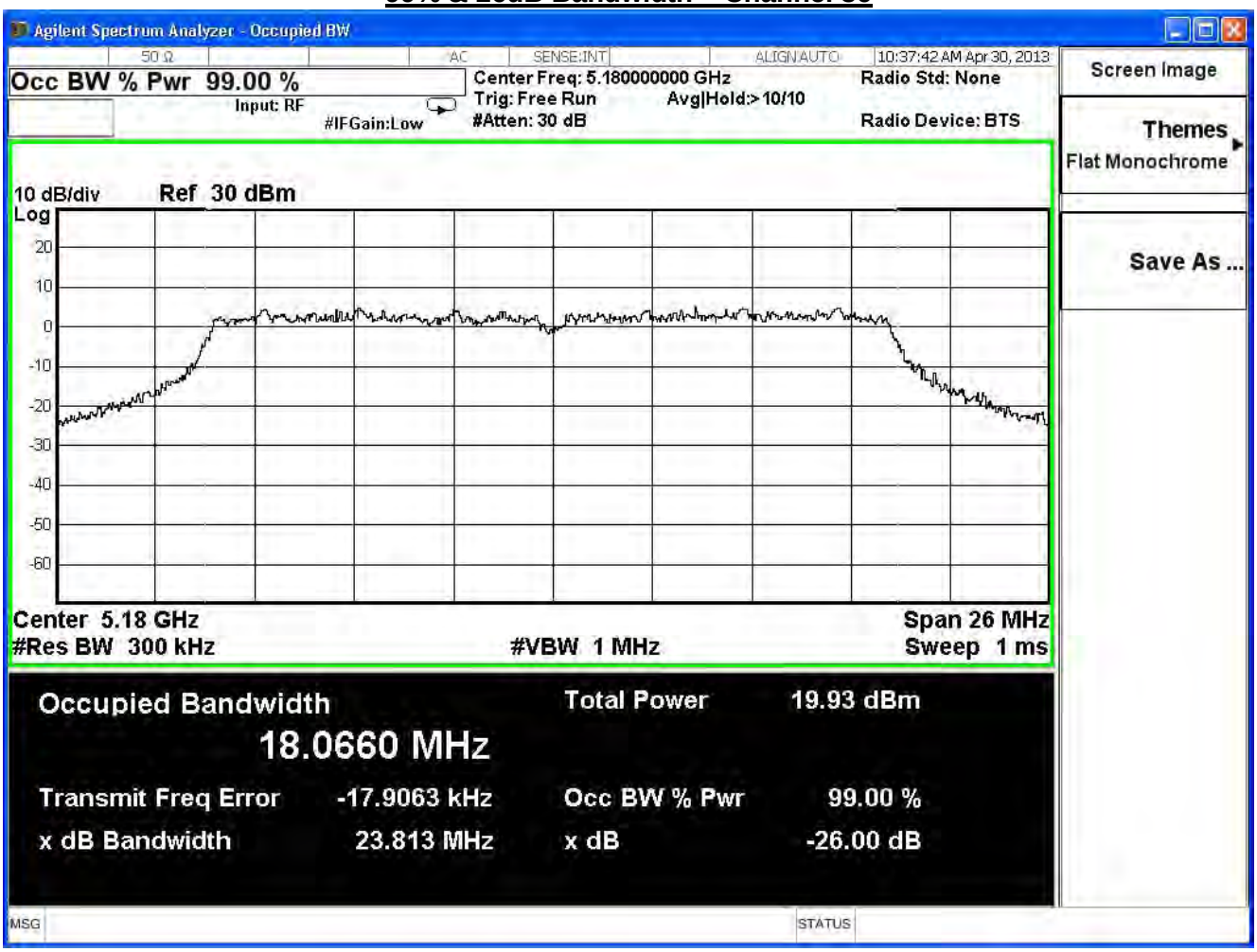
99% & 26dB Bandwidth – Channel 48



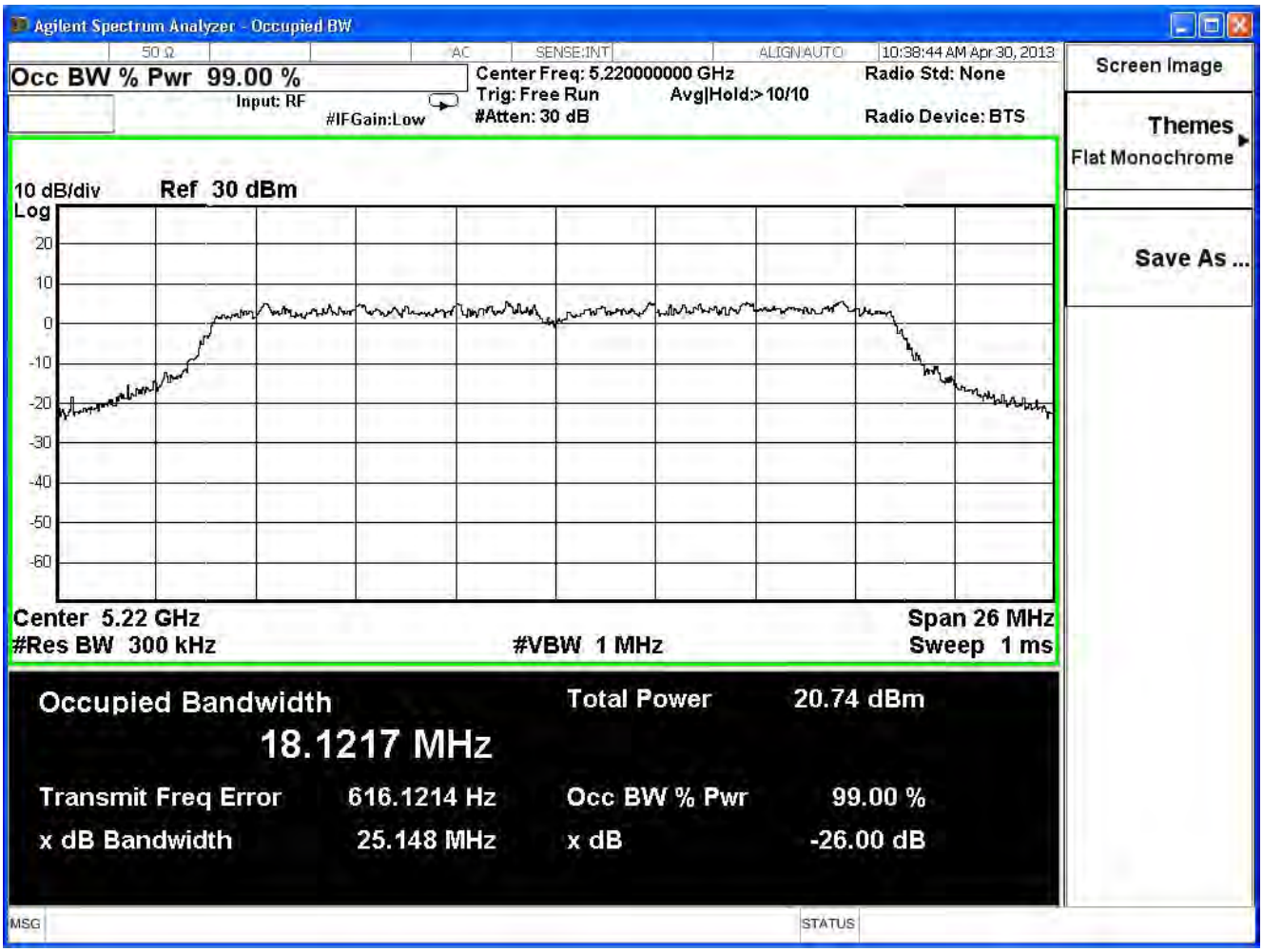
Product	VDSL2 Security Firewall		
Test Item	99% & 26dB Bandwidth		
Test Mode	Transmit		
Date of Test	2013/04/30	Test Site	SR7

802.11n_20M(ANT 1)					
Channel No.	Frequency (MHz)	26dB BW (MHz)	99 % OBW (MHz)	Required Limit (MHz)	Result
36	5180	23.813	18.066	--	PASS
44	5220	25.148	18.122	--	PASS
48	5240	24.814	18.085	--	PASS

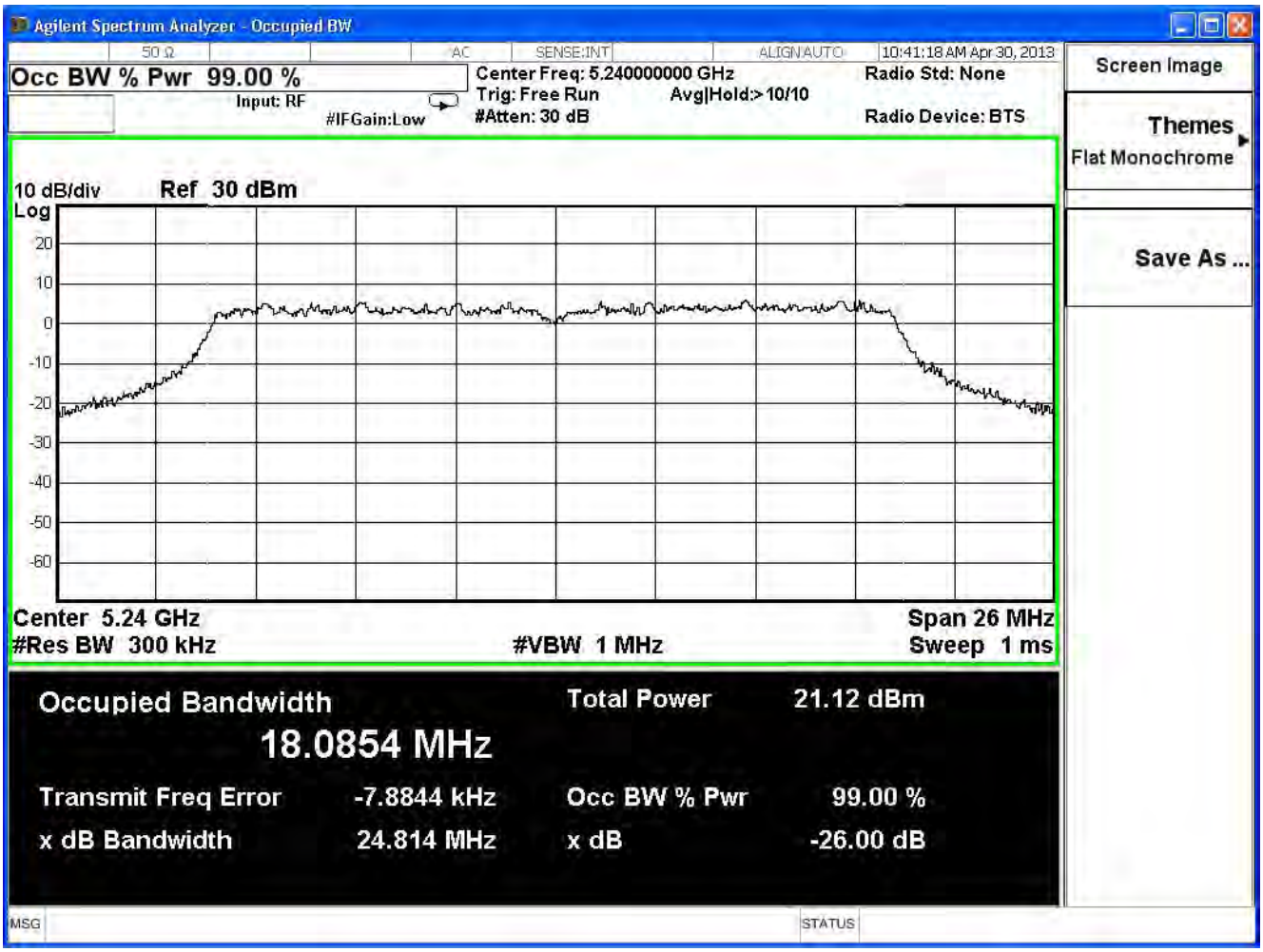
99% & 26dB Bandwidth – Channel 36



99% & 26dB Bandwidth – Channel 44



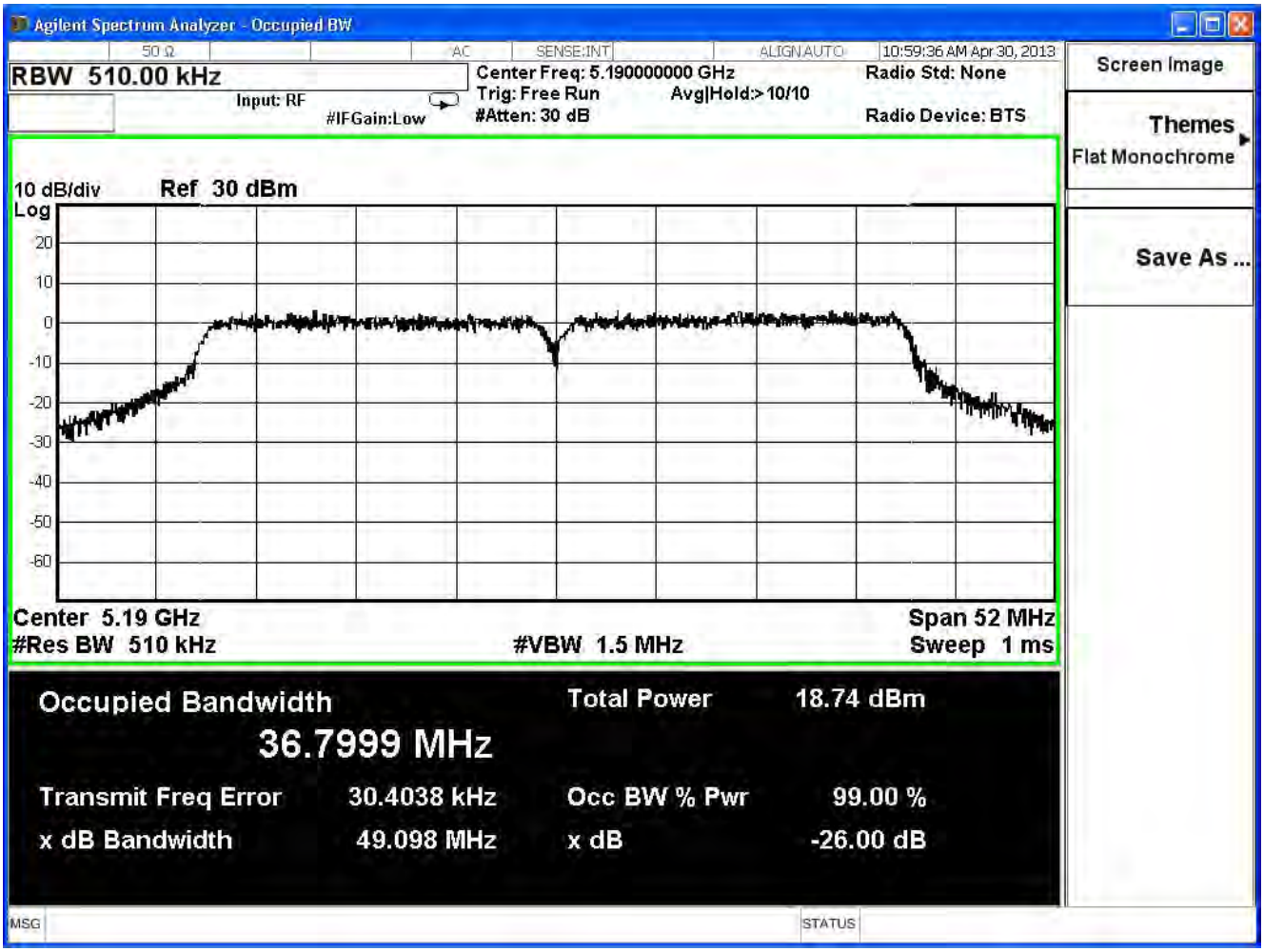
99% & 26dB Bandwidth – Channel 48



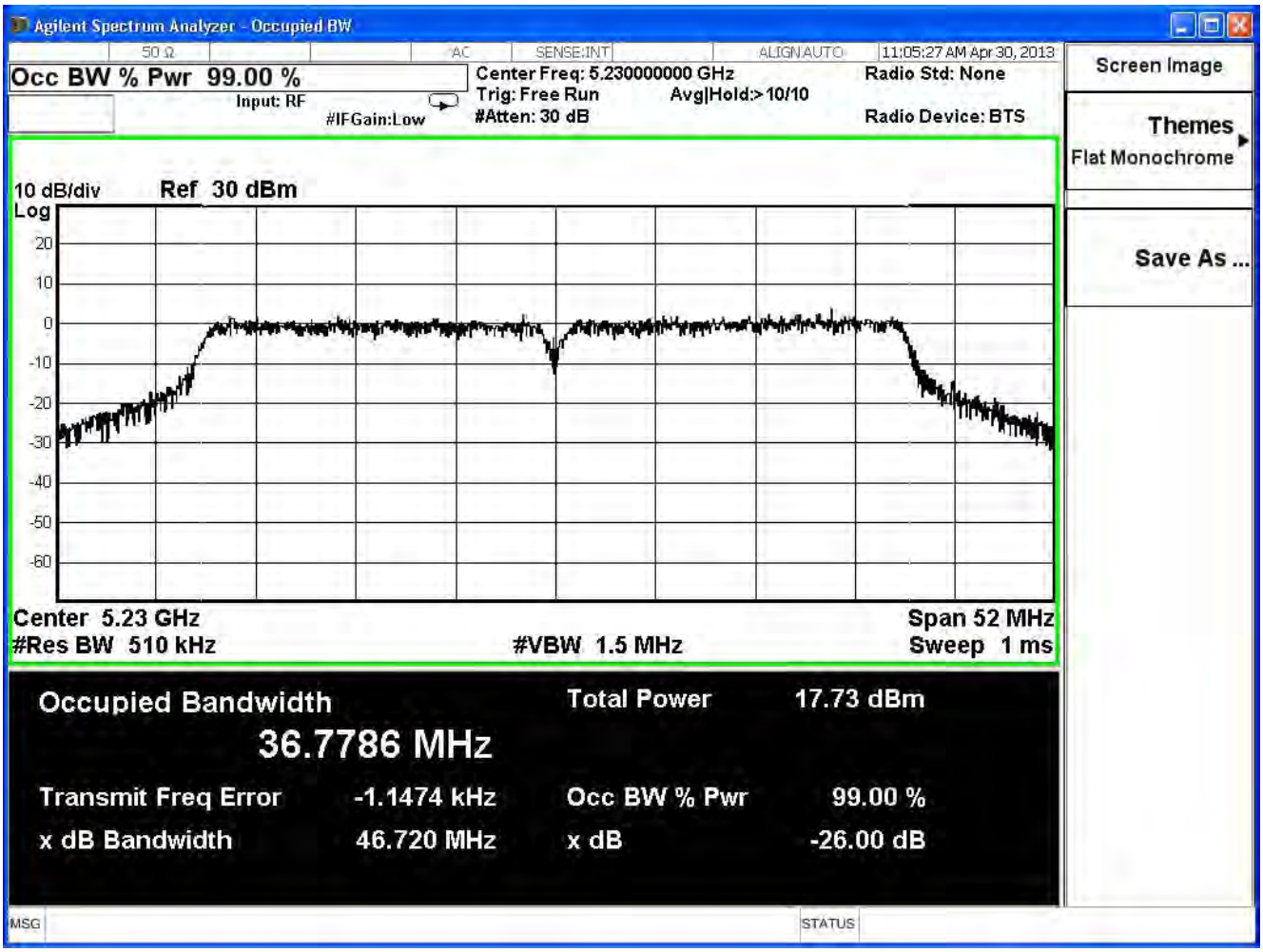
Product	VDSL2 Security Firewall		
Test Item	99% & 26dB Bandwidth		
Test Mode	Transmit		
Date of Test	2013/04/30	Test Site	SR7

802.11n_40M(ANT 0)					
Channel No.	Frequency (MHz)	26dB BW (MHz)	99 % OBW (MHz)	Required Limit (MHz)	Result
38	5190	49.098	36.800	--	PASS
46	5230	46.720	36.779	--	PASS

99% & 26dB Bandwidth – Channel 38



99% & 26dB Bandwidth – Channel 46

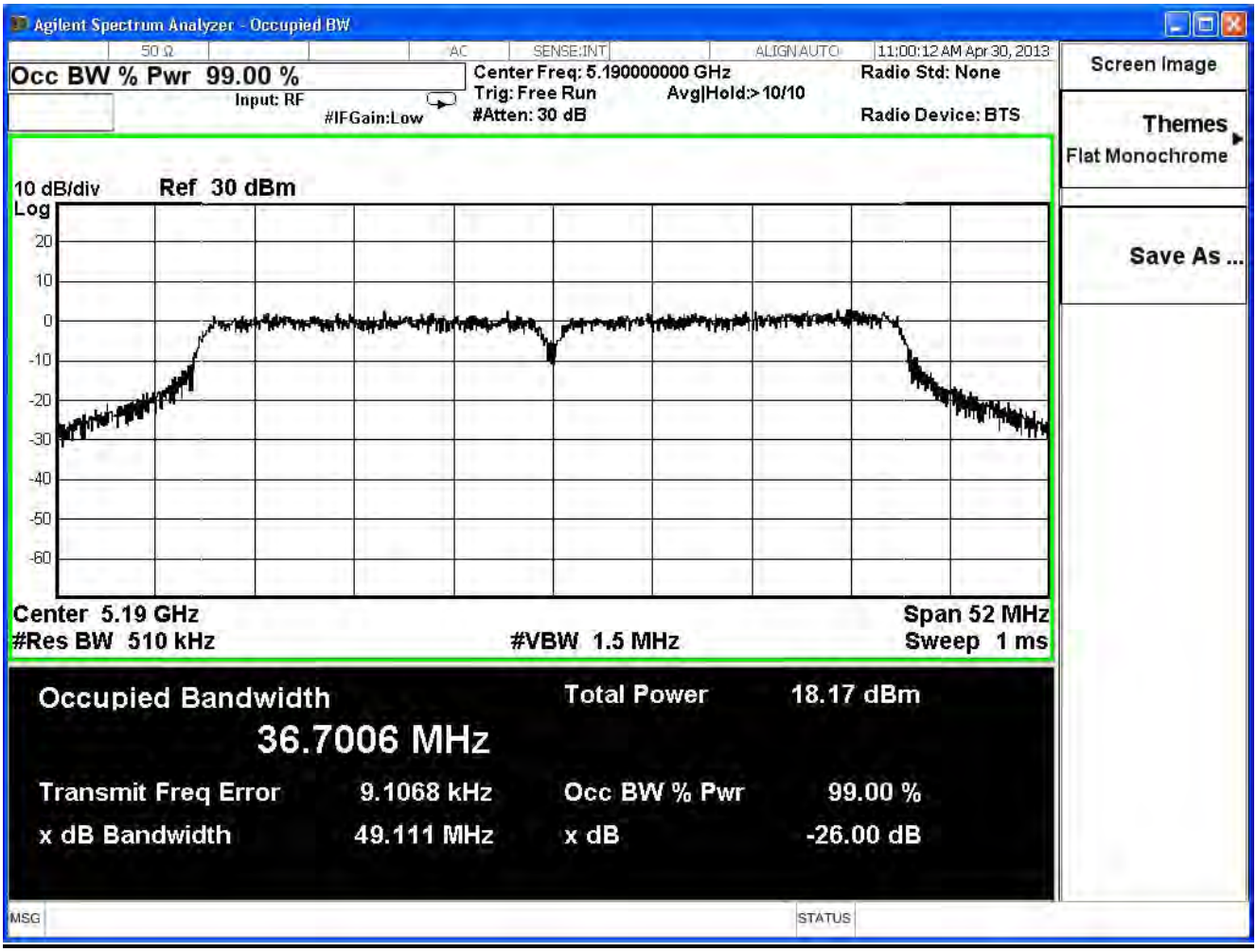


Product	VDSL2 Security Firewall		
Test Item	99% & 26dB Bandwidth		
Test Mode	Transmit		
Date of Test	2013/04/30	Test Site	SR7

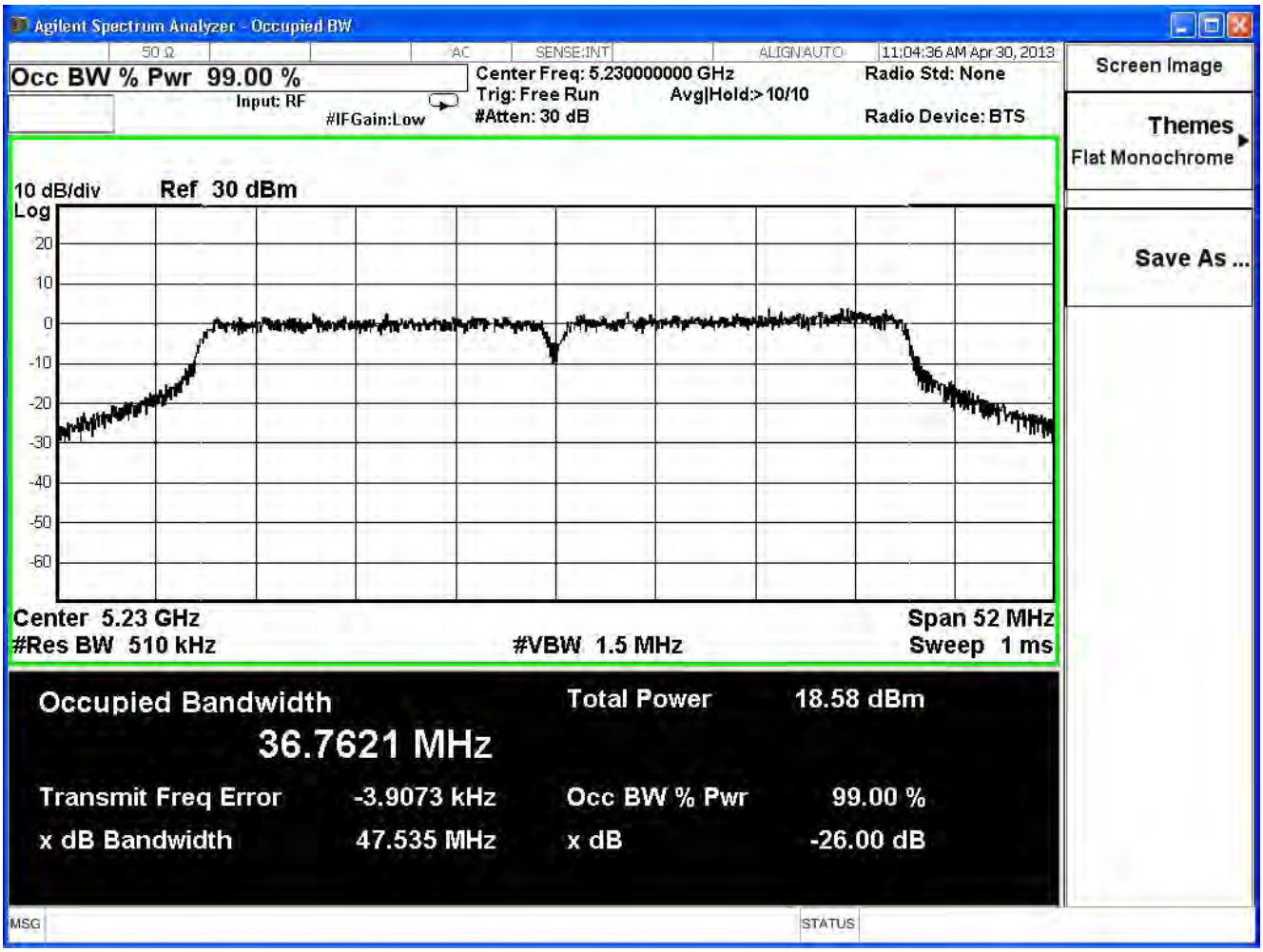
802.11n_40M(ANT 1)

Channel No.	Frequency (MHz)	26dB BW (MHz)	99 % OBW (MHz)	Required Limit (MHz)	Result
38	5190	49.111	36.700	--	PASS
46	5230	47.535	36.762	--	PASS

99% & 26dB Bandwidth – Channel 38



99% & 26dB Bandwidth – Channel 46



4. Peak Transmit Output

4.1. Test Equipment

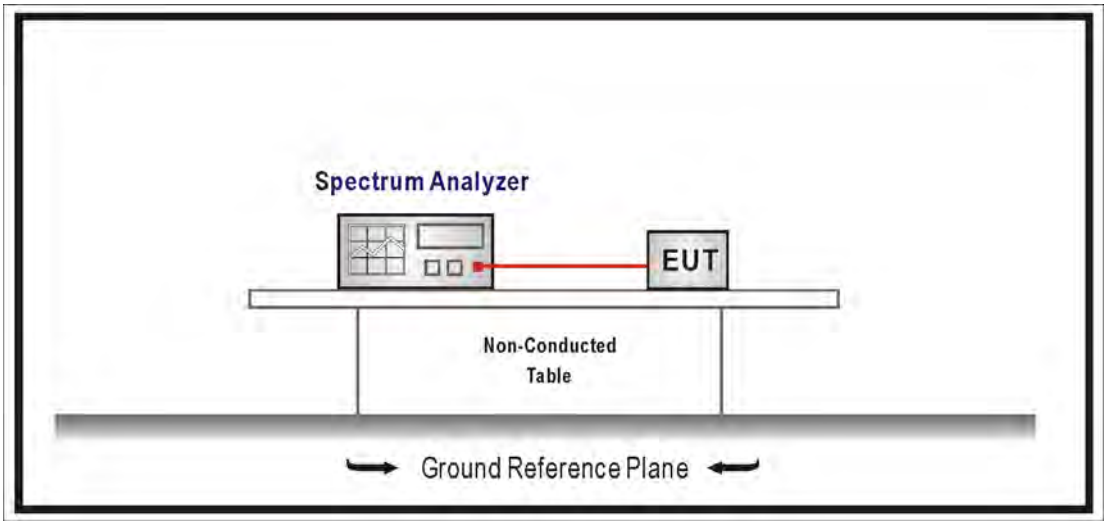
The following test equipments are used during the radiated emission tests:

Peak Transmit Output / SR7

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Spectrum Analyzer	Agilent	N9010A-EXA	US47140172	2013/07/31

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

4.2. Test Setup



4.3. Limits

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

4.4. Test Procedure

The EUT was setup to ANSI C63.4, 2009; tested to 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	Transmit		
Date of Test	2013/05/02	Test Site	SR7

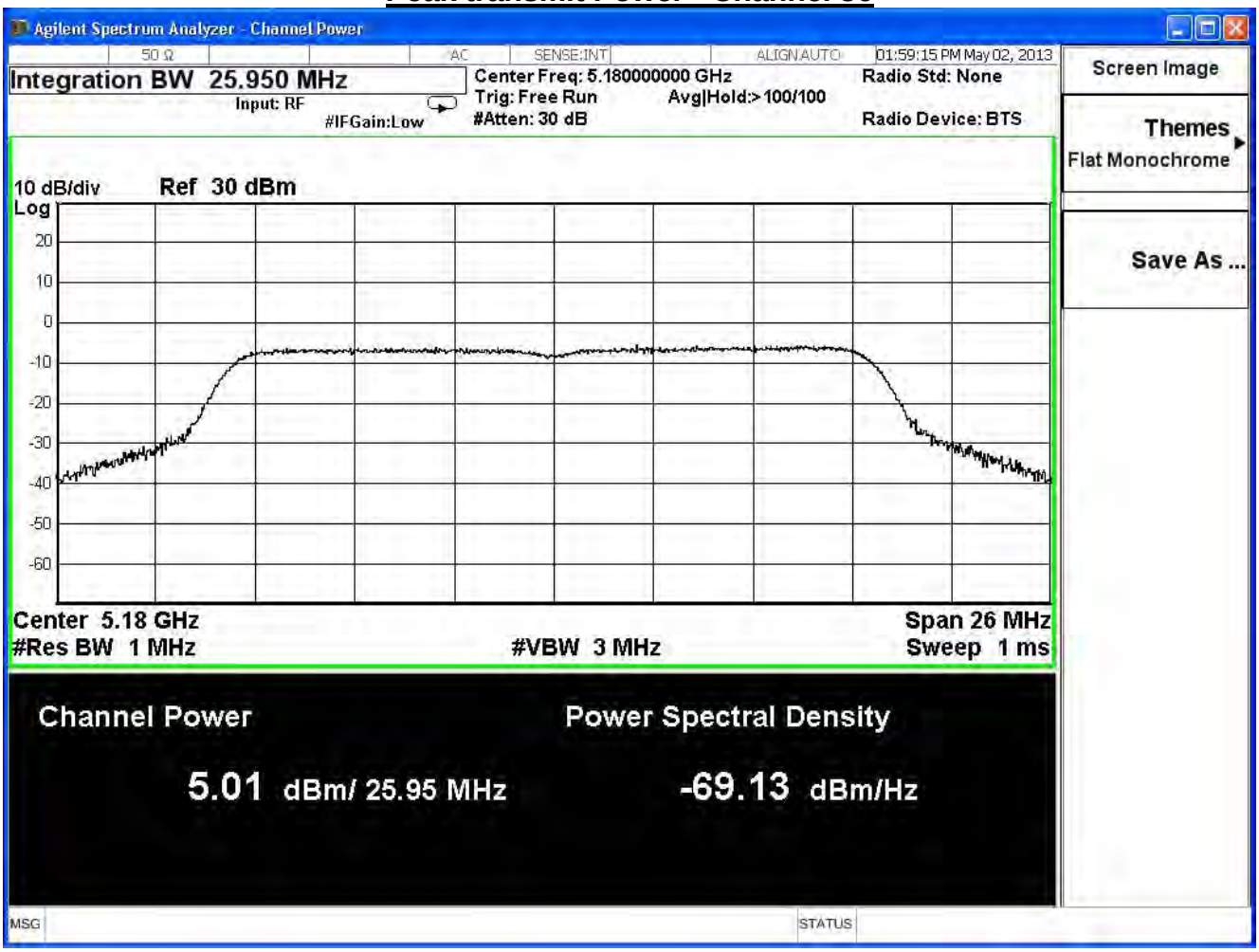
802.11a

Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit		Result
				Fixed Limit (dBm)	4+10logB Limit (dBm)	
36	5180	25.950	5.01	17	18.14	Pass
44	5220	25.930	5.07	17	18.14	Pass
48	5240	24.870	5.13	17	17.96	Pass

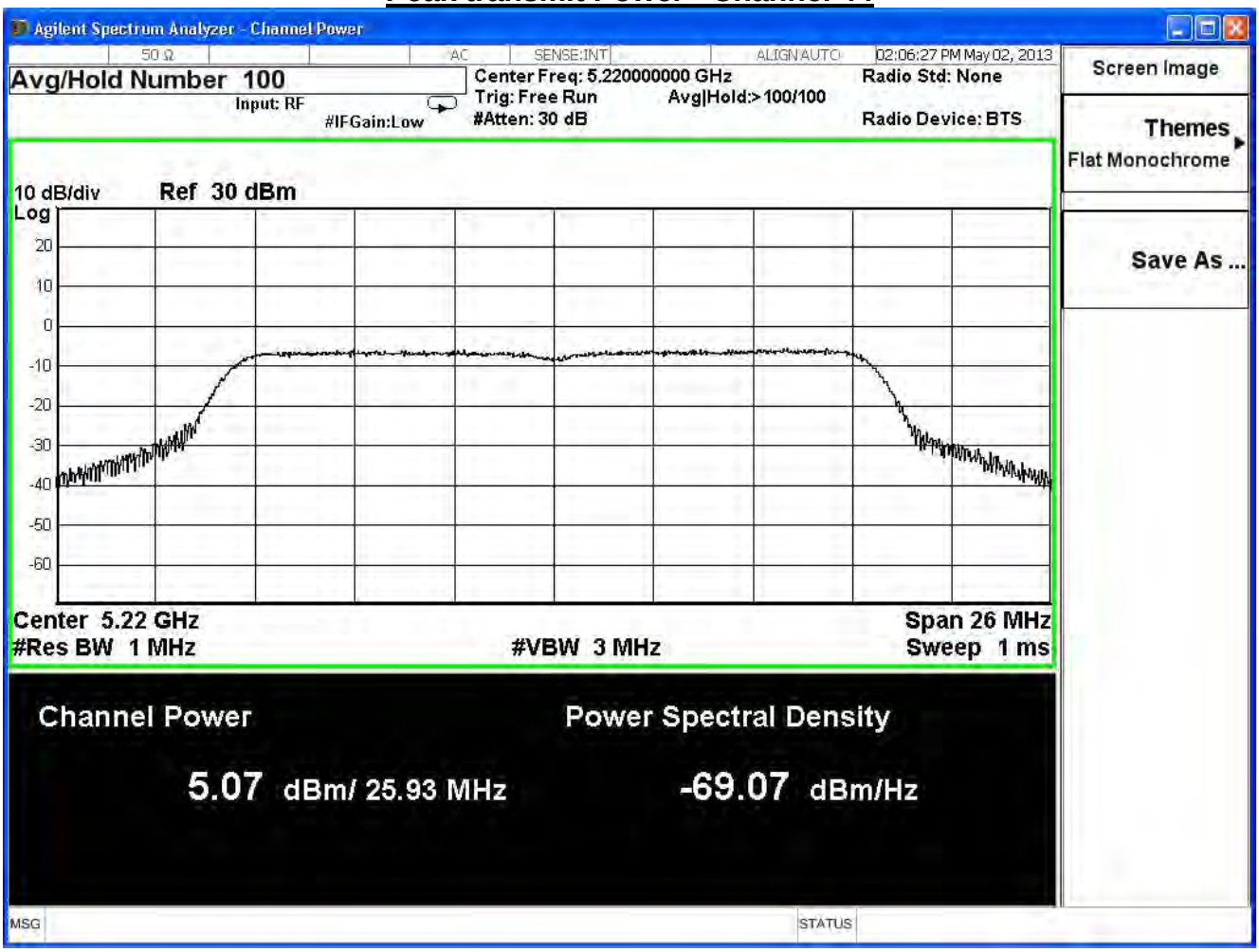
The worst emission of data rate is 6 Mbps.

Peak Power Output (dBm)									
Channel No	Frequency (MHz)	Data Rate							Required Limit
		6	12	18	24	36	48	54	
36	5180	5.01	--	--	--	--	--	--	17dBm or 4dBm+10log B
44	5220	5.07	5.06	5.04	5.02	5.01	4.99	4.97	
48	5240	5.13	--	--	--	--	--	--	

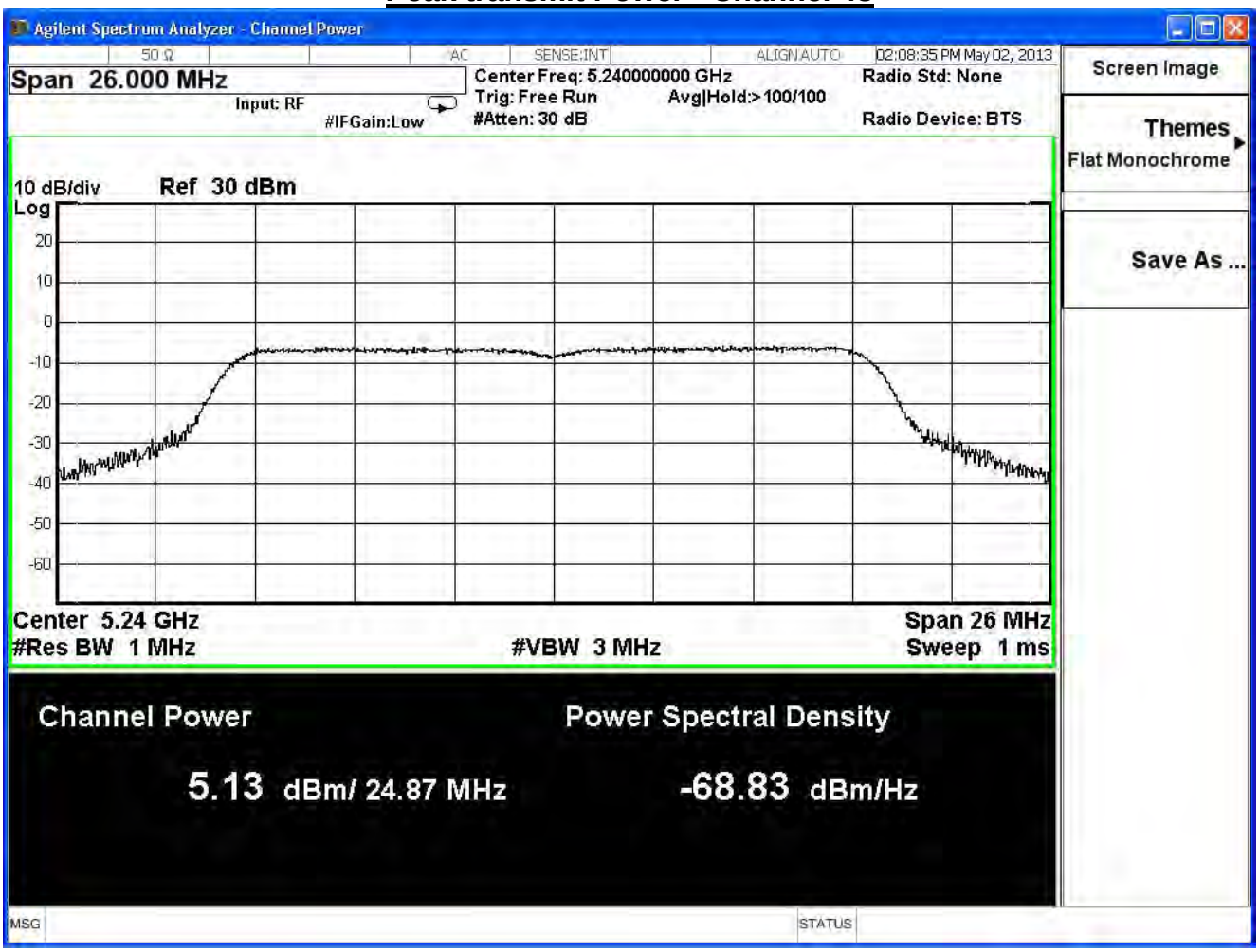
Peak transmit Power - Channel 36



Peak transmit Power - Channel 44



Peak transmit Power - Channel 48



Product	VDSL2 Security Firewall		
Test Item	Peak Transmit Output		
Test Mode	Transmit		
Date of Test	2013/05/02	Test Site	SR7

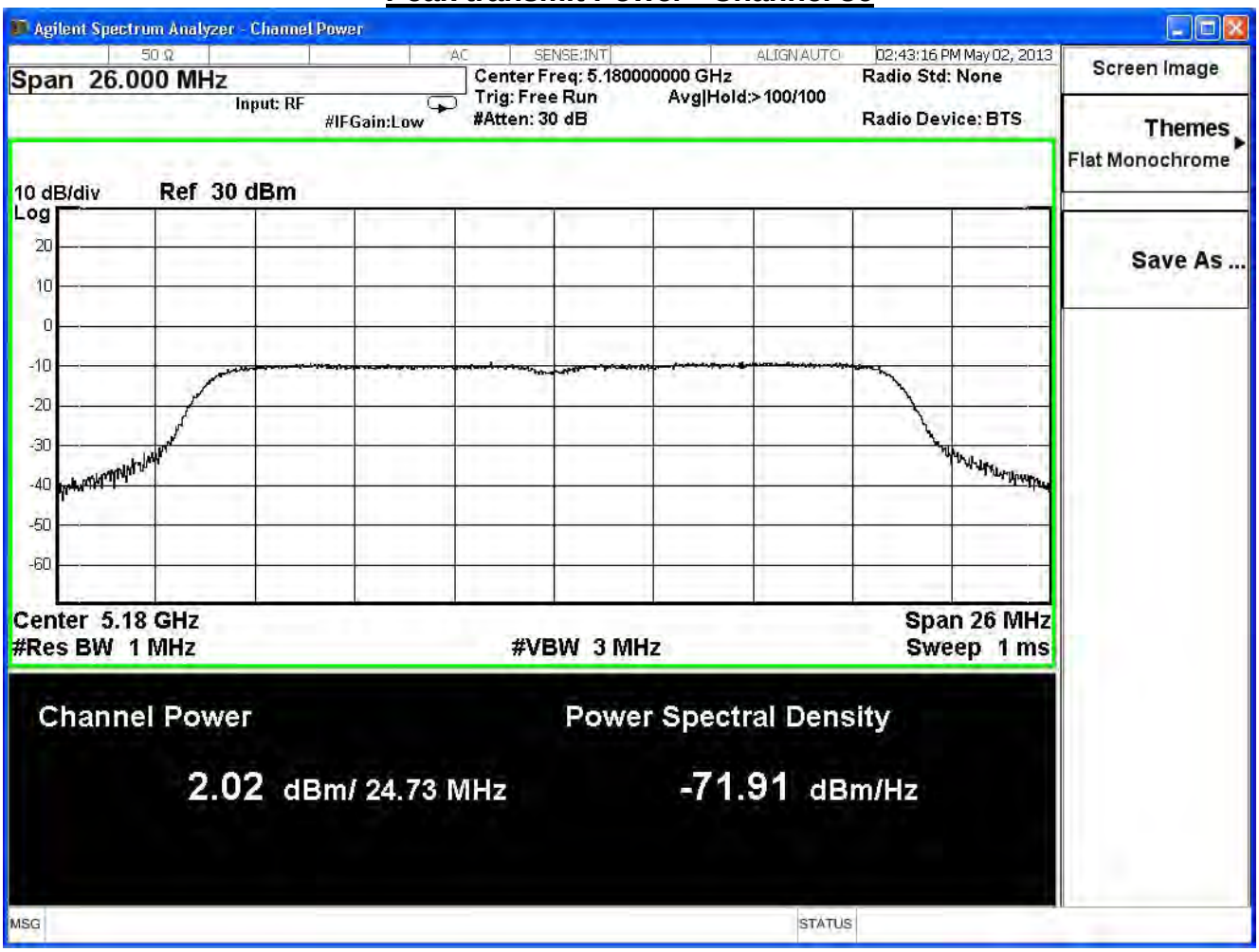
IEEE 802.11n(20MHz)_ANT 0

Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit		Result
				Fixed Limit (dBm)	4+10logB Limit (dBm)	
36	5180	24.728	2.02	17	17.93	Pass
44	5220	24.798	1.63	17	17.94	Pass
48	5240	25.485	1.87	17	18.06	Pass

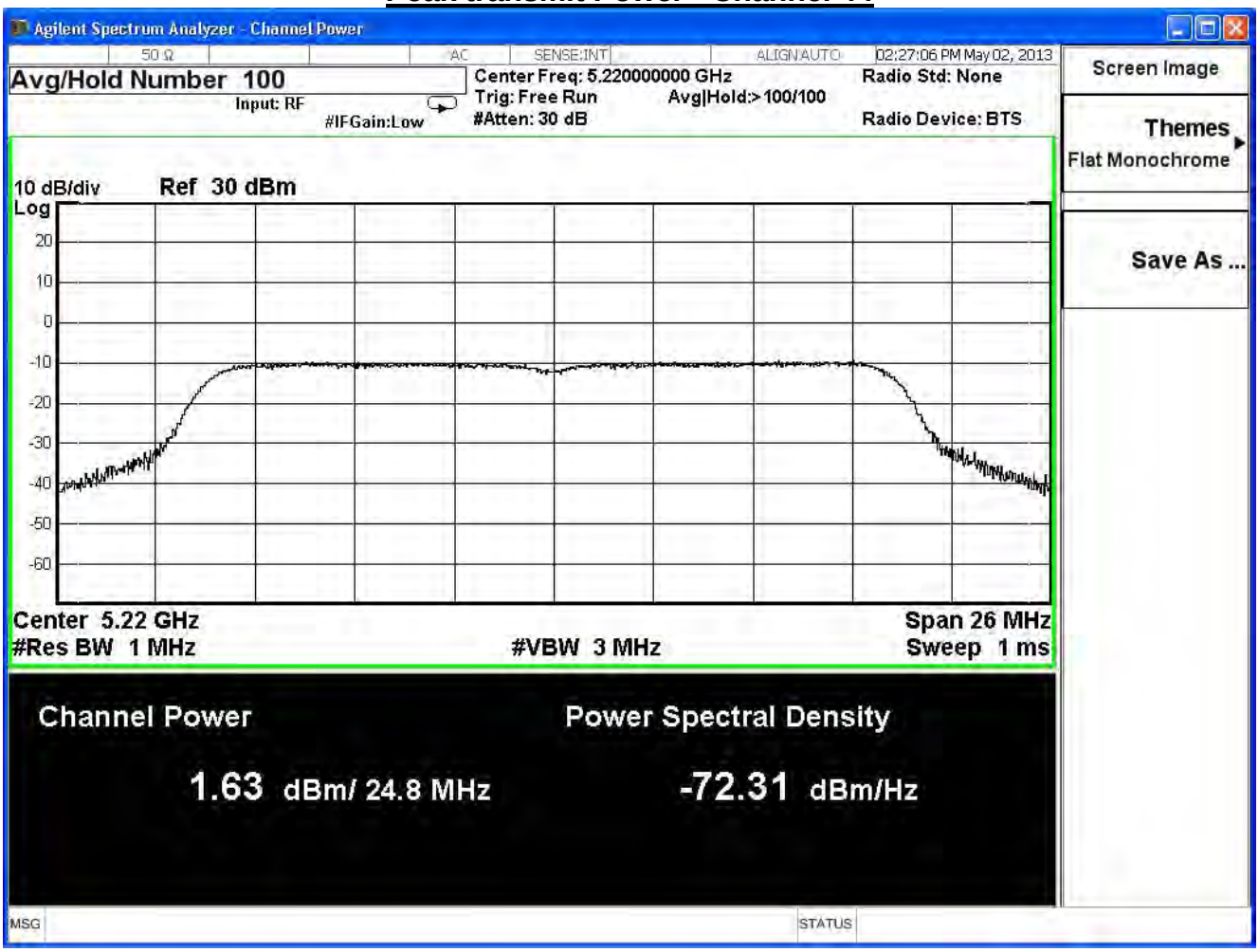
The worst emission of data rate is 19.5Mbps.

Peak Power Output (dBm)										
MCS Index		16	17	18	19	20	21	22	23	Required Limit
Channel No	Frequency (MHz)	Data Rate								
		19.5	39	58.5	78	117	156	175.5	195	
36	5180	2.02	--	--	--	--	--	--	--	17dBm or 4dBm+10logB
44	5220	1.63	1.62	1.60	1.58	1.57	1.55	1.53	1.52	
48	5240	1.87	--	--	--	--	--	--	--	

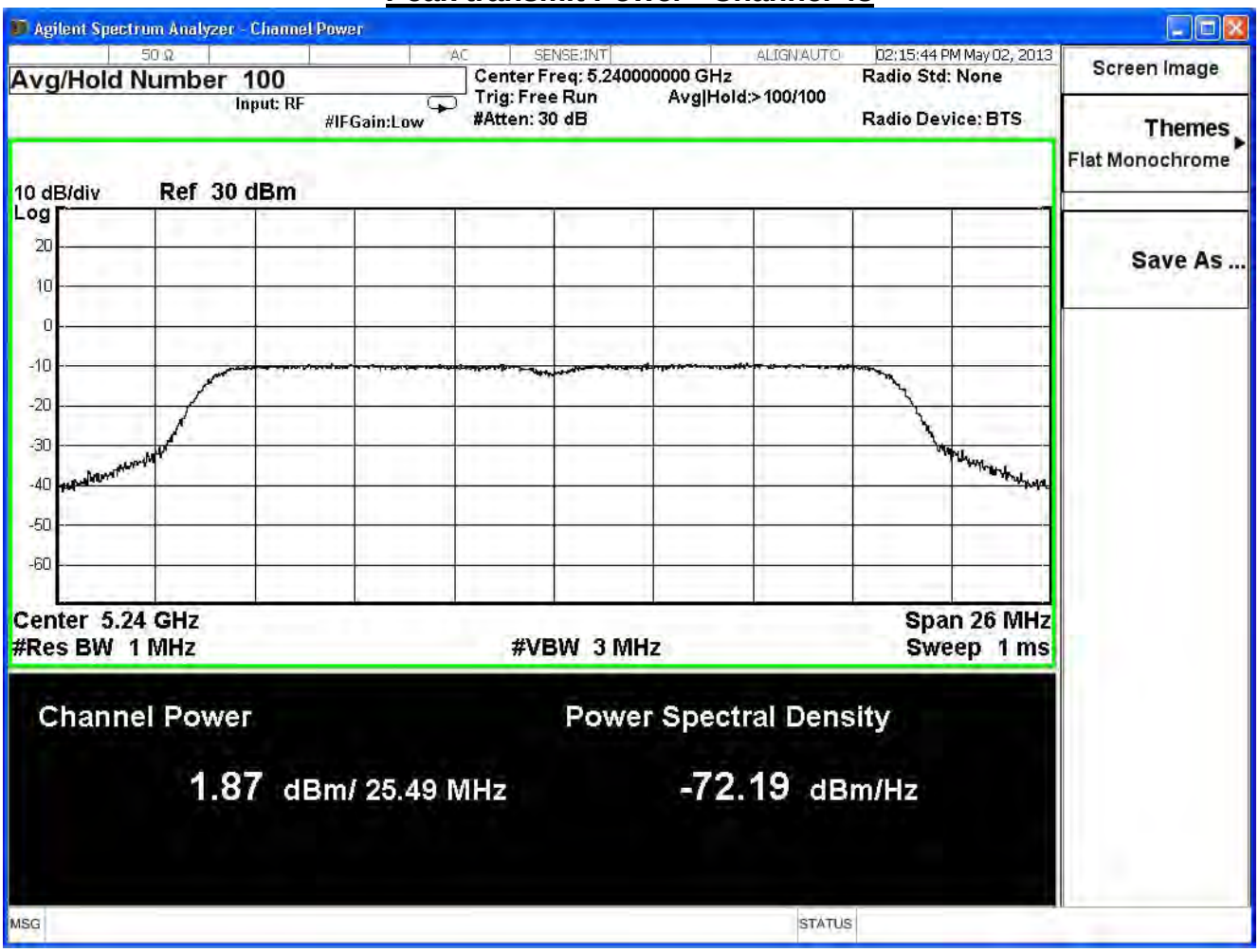
Peak transmit Power - Channel 36



Peak transmit Power - Channel 44



Peak transmit Power - Channel 48



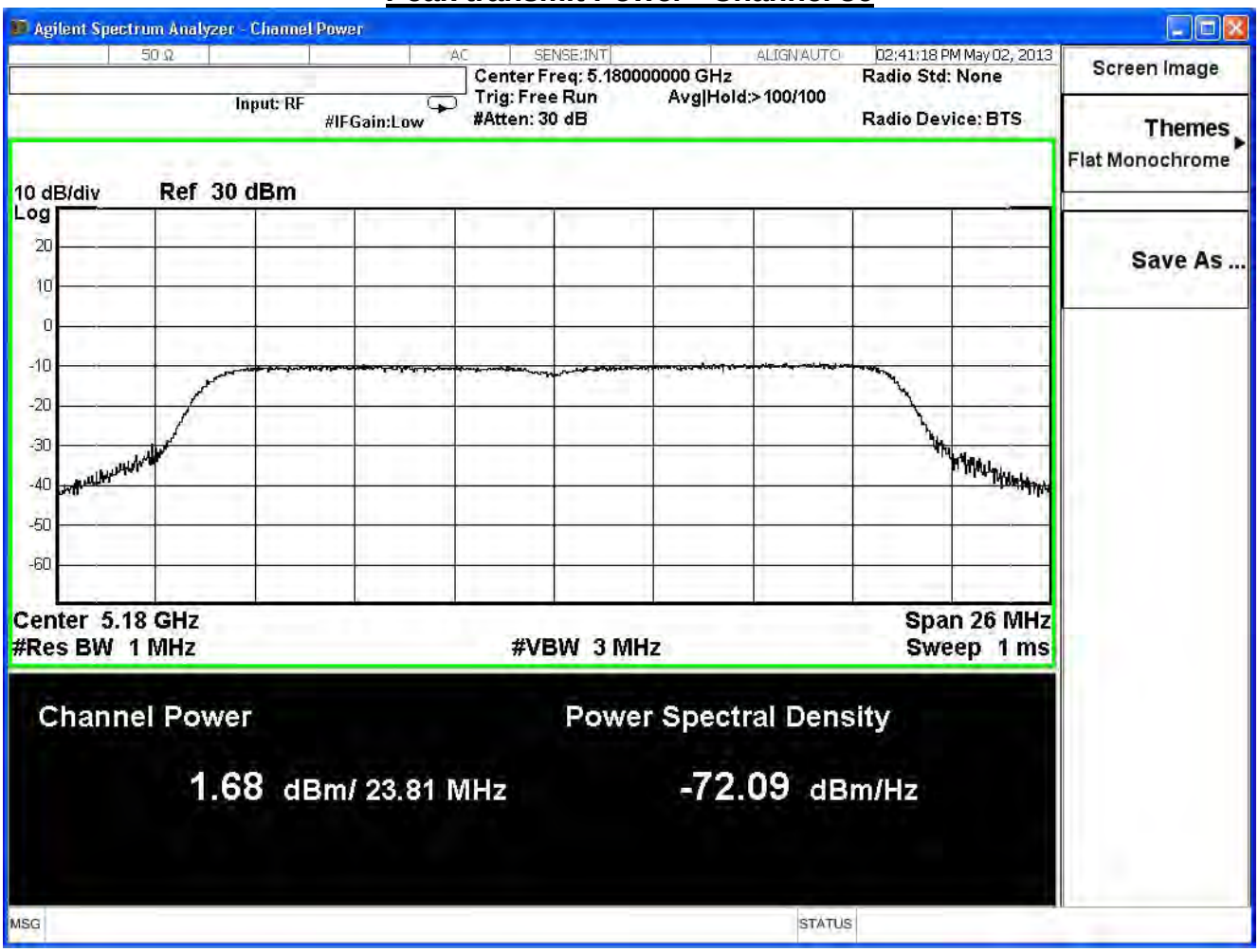
Product	VDSL2 Security Firewall		
Test Item	Peak Transmit Output		
Test Mode	Transmit		
Date of Test	2013/05/02	Test Site	SR7

IEEE 802.11n(20MHz)_ANT 1						
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit		Result
				Fixed Limit (dBm)	4+10logB Limit (dBm)	
36	5180	23.813	1.68	17	17.77	Pass
44	5220	25.148	1.59	17	18.01	Pass
48	5240	24.814	1.66	17	17.947	Pass

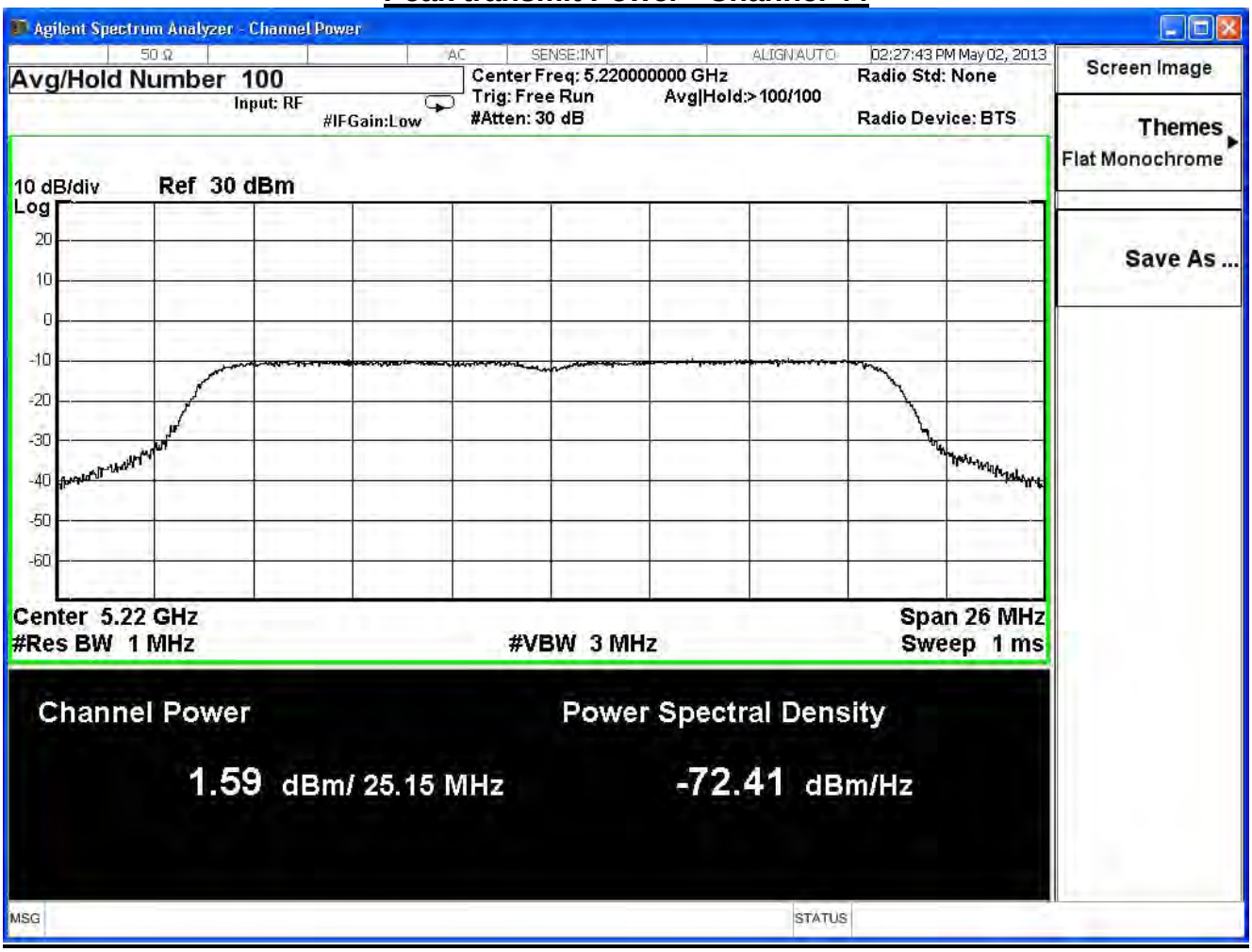
The worst emission of data rate is 19.5Mbps.

Peak Power Output (dBm)										
MCS Index		16	17	18	19	20	21	22	23	Required Limit
Channel No	Frequency (MHz)	Data Rate								
		19.5	39	58.5	78	117	156	175.5	195	
36	5180	1.68	--	--	--	--	--	--	--	17dBm or 4dBm+10logB
44	5220	1.59	1.55	1.53	1.52	1.51	1.50	1.49	1.48	
48	5240	1.66	--	--	--	--	--	--	--	

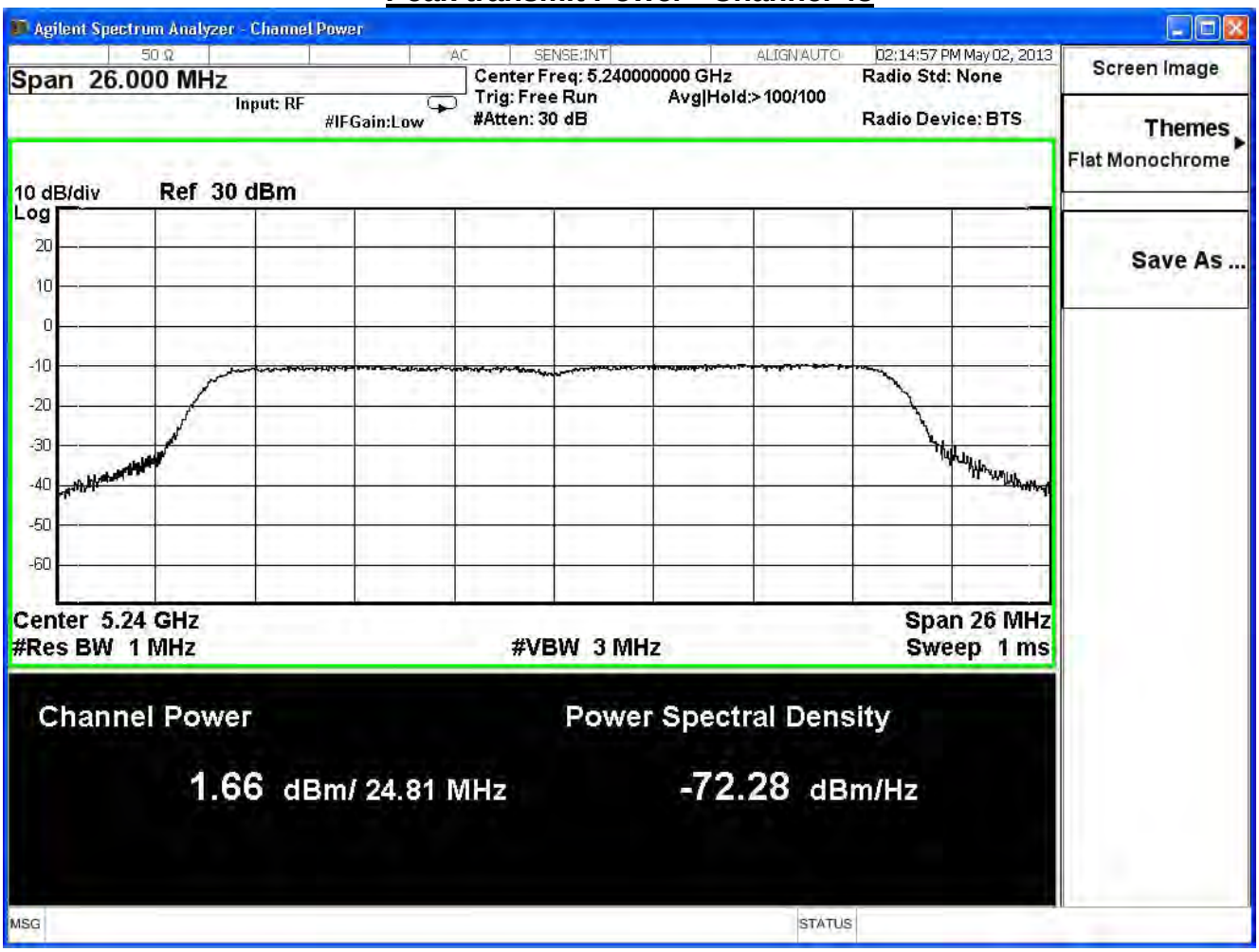
Peak transmit Power - Channel 36



Peak transmit Power - Channel 44



Peak transmit Power - Channel 48



Product	VDSL2 Security Firewall		
Test Item	Peak Transmit Output		
Test Mode	Transmit		
Date of Test	2013/05/02	Test Site	SR7

IEEE 802.11n(20MHz)_ANT 0+1					
Channel No.	Frequency (MHz)	Total Output Power		Required Limit (dBm)	Result
		(mW)	(dBm)		
36	5180	3.06	4.86	17	Pass
44	5220	2.90	4.62	17	Pass
48	5240	3.01	4.78	17	Pass

Product	VDSL2 Security Firewall		
Test Item	Peak Transmit Output		
Test Mode	Transmit		
Date of Test	2013/05/02	Test Site	SR7

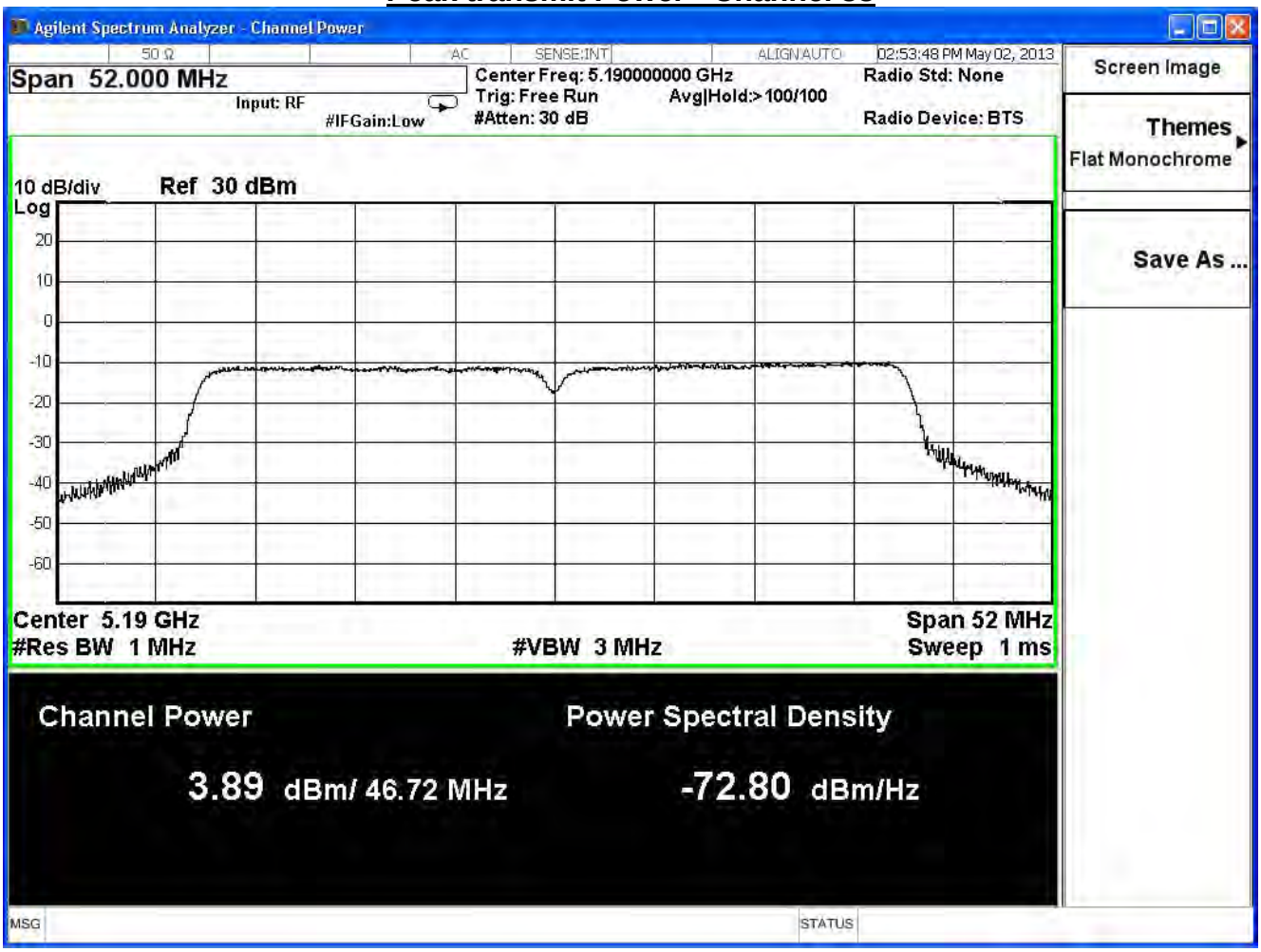
IEEE 802.11n(40MHz)_ANT 0

Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit		Result
				Fixed Limit (dBm)	4+10logB Limit (dBm)	
38	5190	49.098	3.89	17	20.91	Pass
46	5230	46.720	4.02	17	20.70	Pass

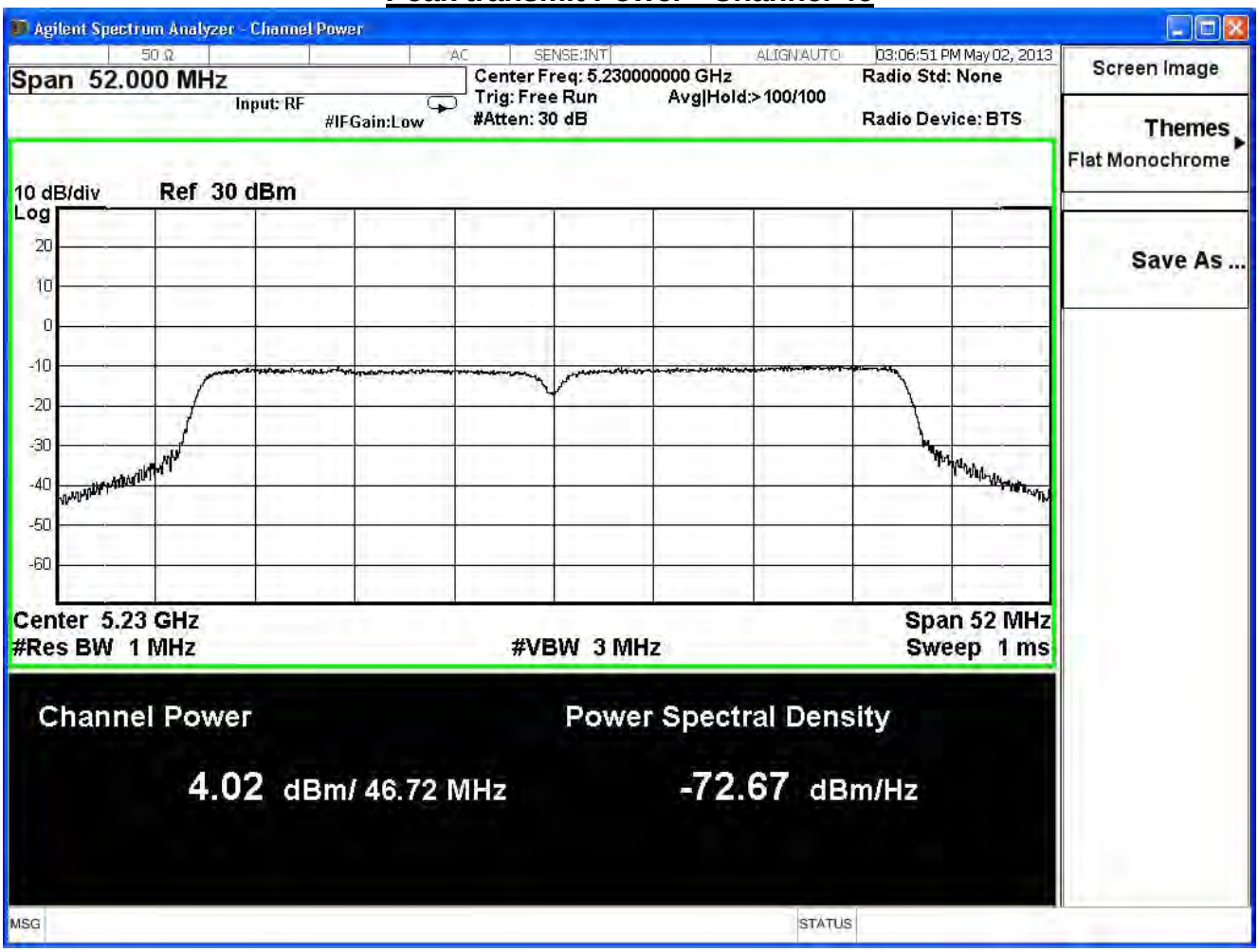
The worst emission of data rate is 40.5 Mbps

Peak Power Output (dBm)										
MCS Index		16	17	18	19	20	21	22	23	Required Limit
Channel No	Frequency (MHz)	Data Rate								
		40.5	81.0	121.5	162.0	243.0	324.0	364.5	405.0	
38	5190	3.89	3.88	3.87	3.86	3.85	3.84	3.83	3.82	17dBm or 4dBm+10logB
46	5230	4.02	--	--	--	--	--	--	--	

Peak transmit Power - Channel 38



Peak transmit Power - Channel 46



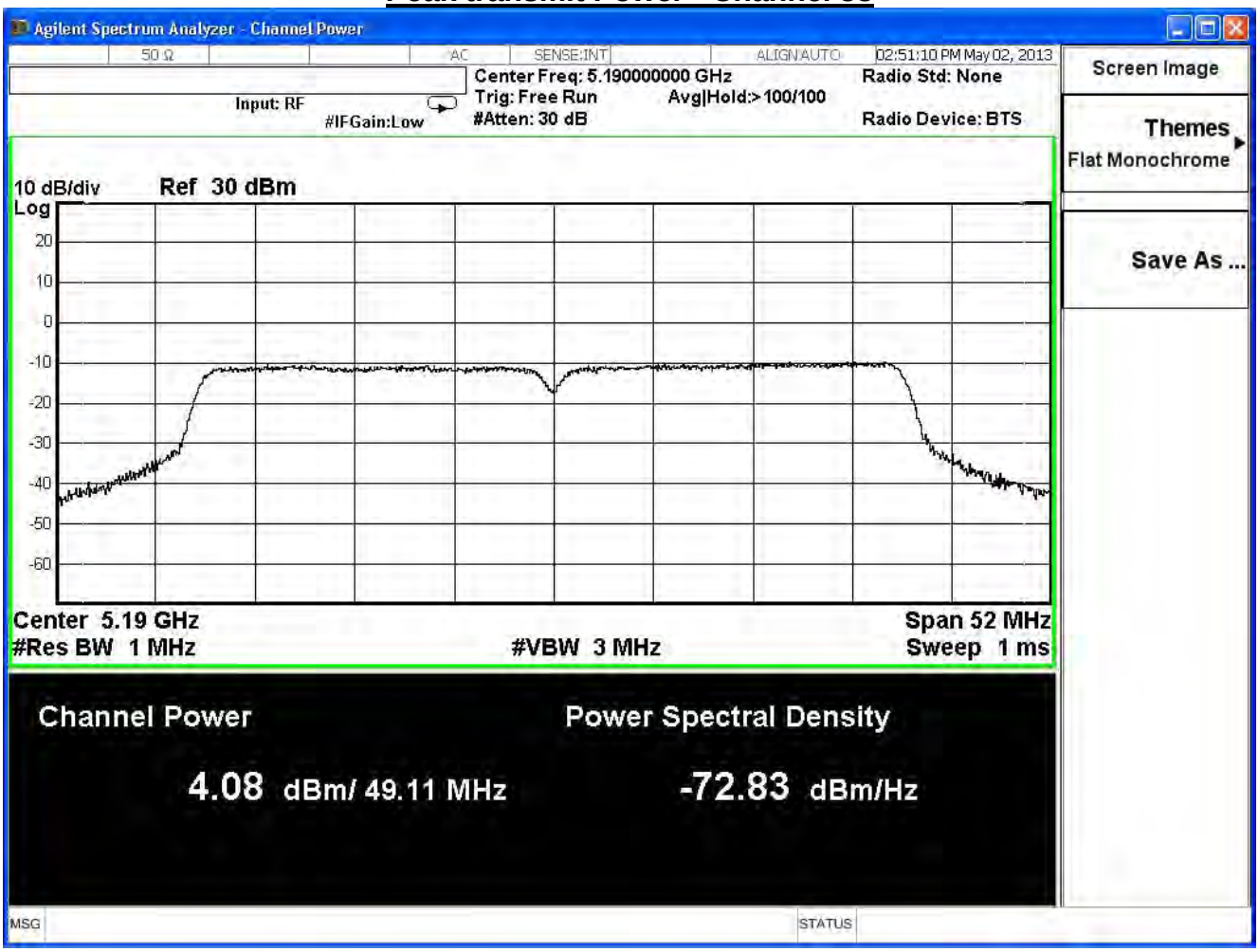
Product	VDSL2 Security Firewall		
Test Item	Peak Transmit Output		
Test Mode	Transmit		
Date of Test	2013/05/02	Test Site	SR7

IEEE 802.11n(40MHz)_ANT 1						
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit		Result
				Fixed Limit (dBm)	4+10logB Limit (dBm)	
38	5190	49.111	4.08	17	20.91	Pass
46	5230	47.535	3.95	17	20.77	Pass

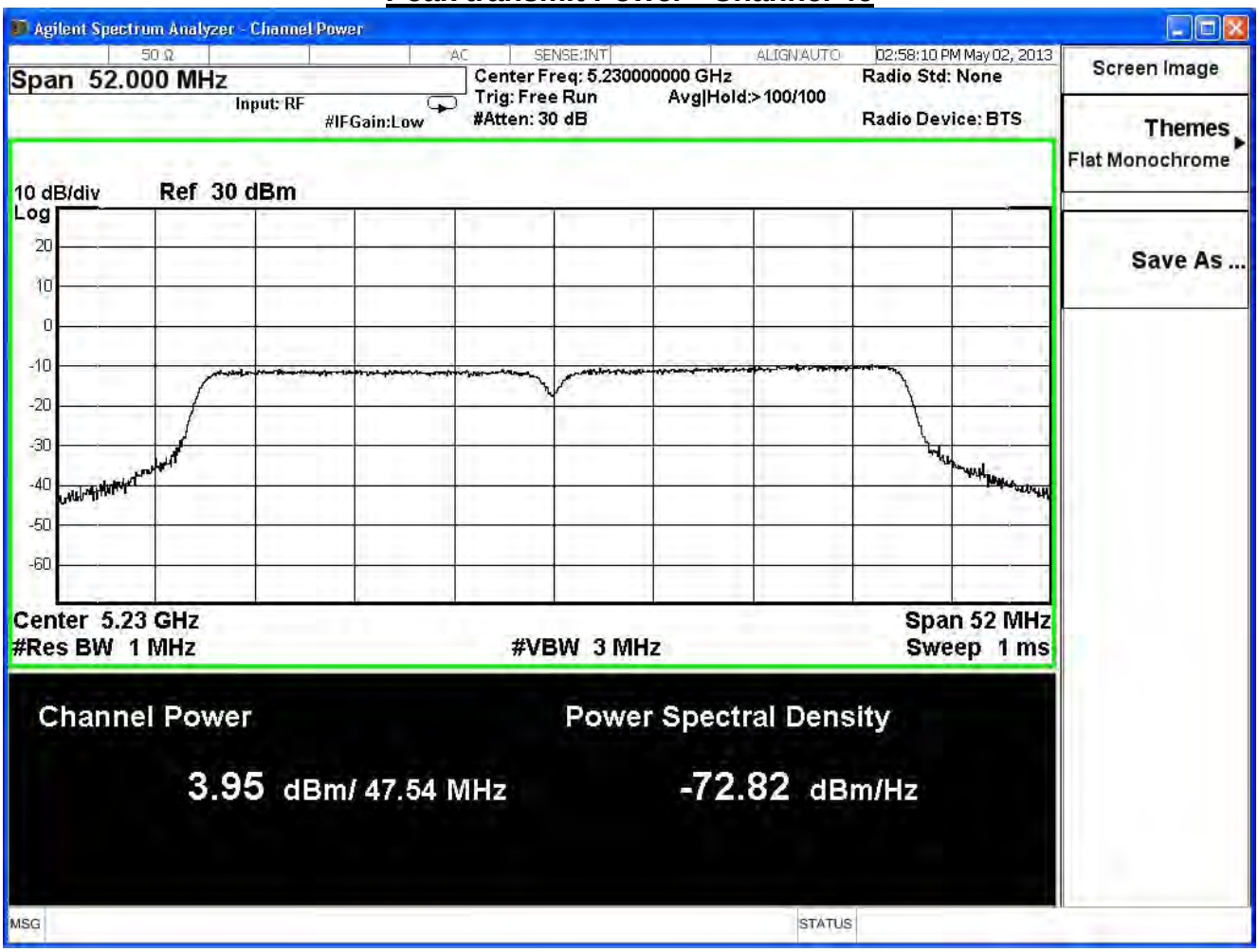
The worst emission of data rate is 40.5 Mbps

Peak Power Output (dBm)										
MCS Index		16	17	18	19	20	21	22	23	Required Limit
Channel No	Frequency (MHz)	Data Rate								
		40.5	81.0	121.5	162.0	243.0	324.0	364.5	405.0	
38	5190	4.08	4.07	4.06	4.05	4.03	4.02	4.01	4.00	17dBm or 4dBm+10logB
46	5230	3.95	--	--	--	--	--	--	--	

Peak transmit Power - Channel 38



Peak transmit Power - Channel 46



Product	VDSL2 Security Firewall		
Test Item	Peak Transmit Output		
Test Mode	Transmit		
Date of Test	2013/05/02	Test Site	SR7

IEEE 802.11n(40MHz)_ANT 0+1					
Channel No.	Frequency (MHz)	Total Output Power		Required Limit (dBm)	Result
		(mW)	(dBm)		
38	5190	5.01	7.00	17	Pass
46	5230	5.01	7.00	17	Pass

5. Peak Power Spectrum Density

5.1. Test Equipment

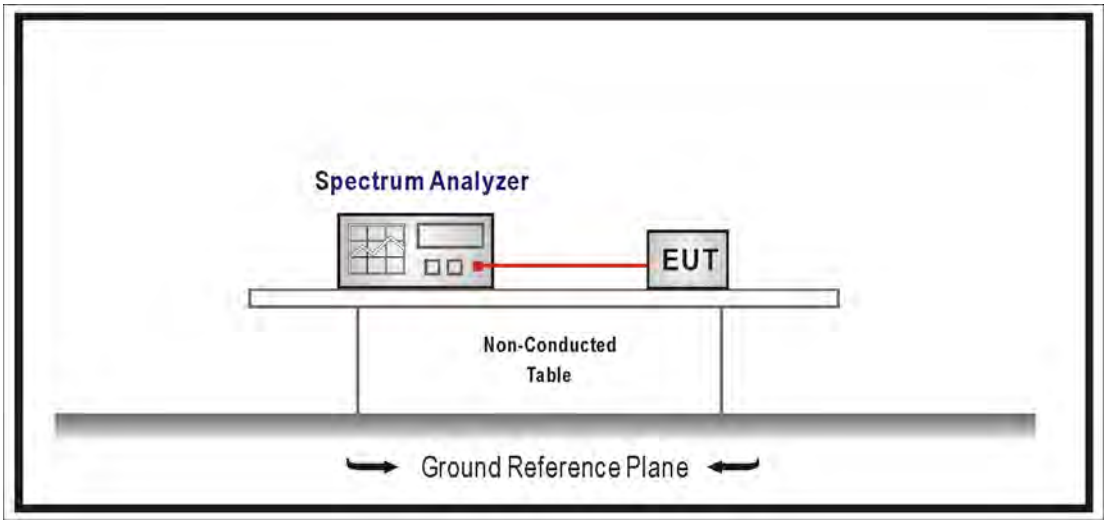
The following test equipments are used during the radiated emission tests:

Peak Power Spectrum Density / SR7

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Spectrum Analyzer	Agilent	N9010A-EXA	US47140172	2013/07/31

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

5.2. Test Setup



5.3. Limits

1. For the band 5.15-5.25 GHz, the peak power spectral density shall not exceed 4 dBm in any 1-MHz band. If transmitting antenna of directional gain greater than 6 dBi are used, the peak power spectral density 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 power spectral density shall not exceed 11 dBm in any 1-MHz band. If transmitting antenna of directional gain greater than 6 dBi are used, the peak power spectral density shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.
3. For the band 5.725-5.825 GHz, the peak power spectral density shall not exceed 17 dBm in any 1-MHz band. If transmitting antenna of directional gain greater than 6 dBi are used, the peak power spectral density shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.

5.4. Test Procedure

The EUT was setup to ANSI C63.4, 2009; tested to U-NII test procedure of KDB 789033 for compliance to FCC 47CFR Subpart E requirements.

Set RBW=1MHz, VBW=3MHz with RMS detector. The PPSD is the highest level found across the emission in any 1-MHz band after 100 sweeps of averaging.

5.5. Uncertainty

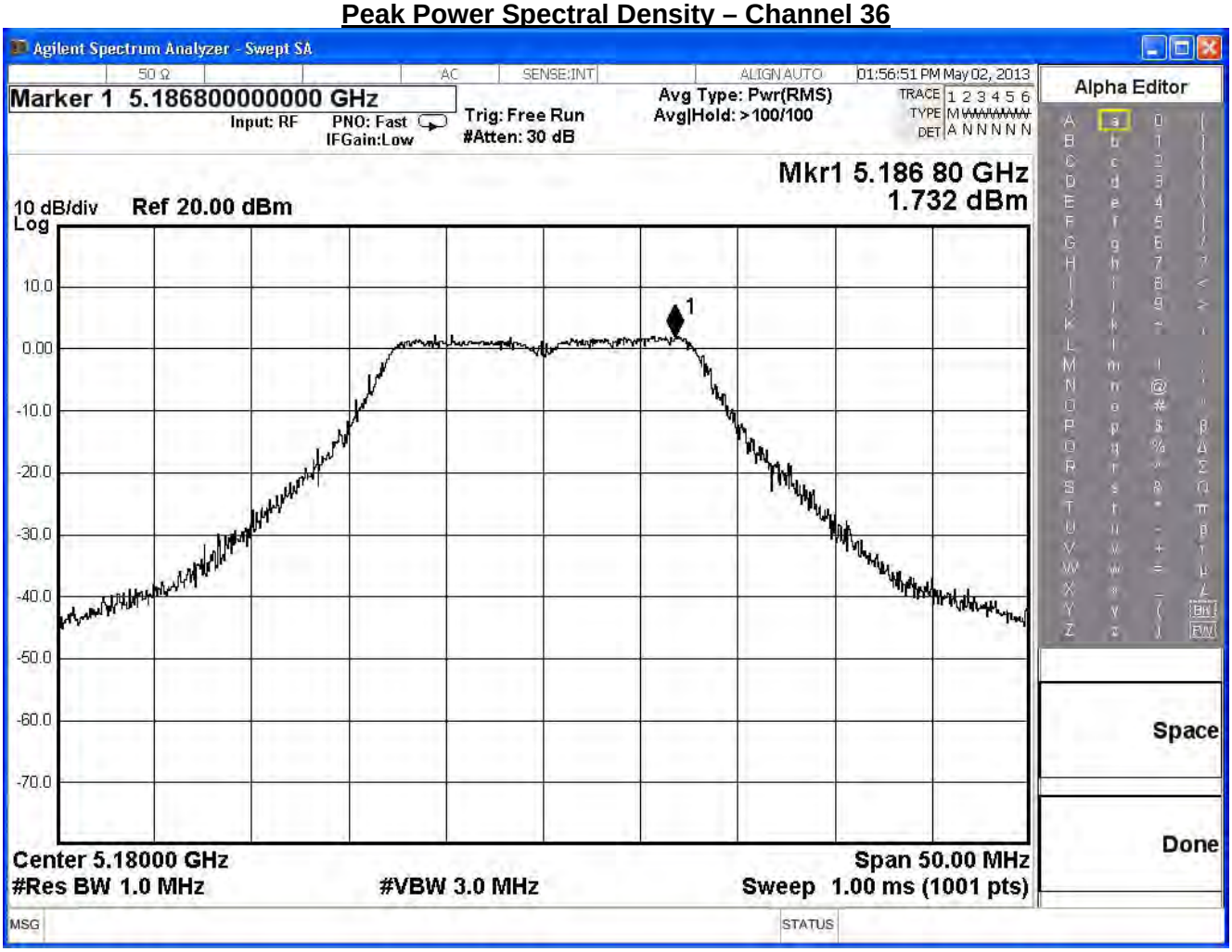
The measurement uncertainty is defined as ± 1.27 dB

5.6. Test Result

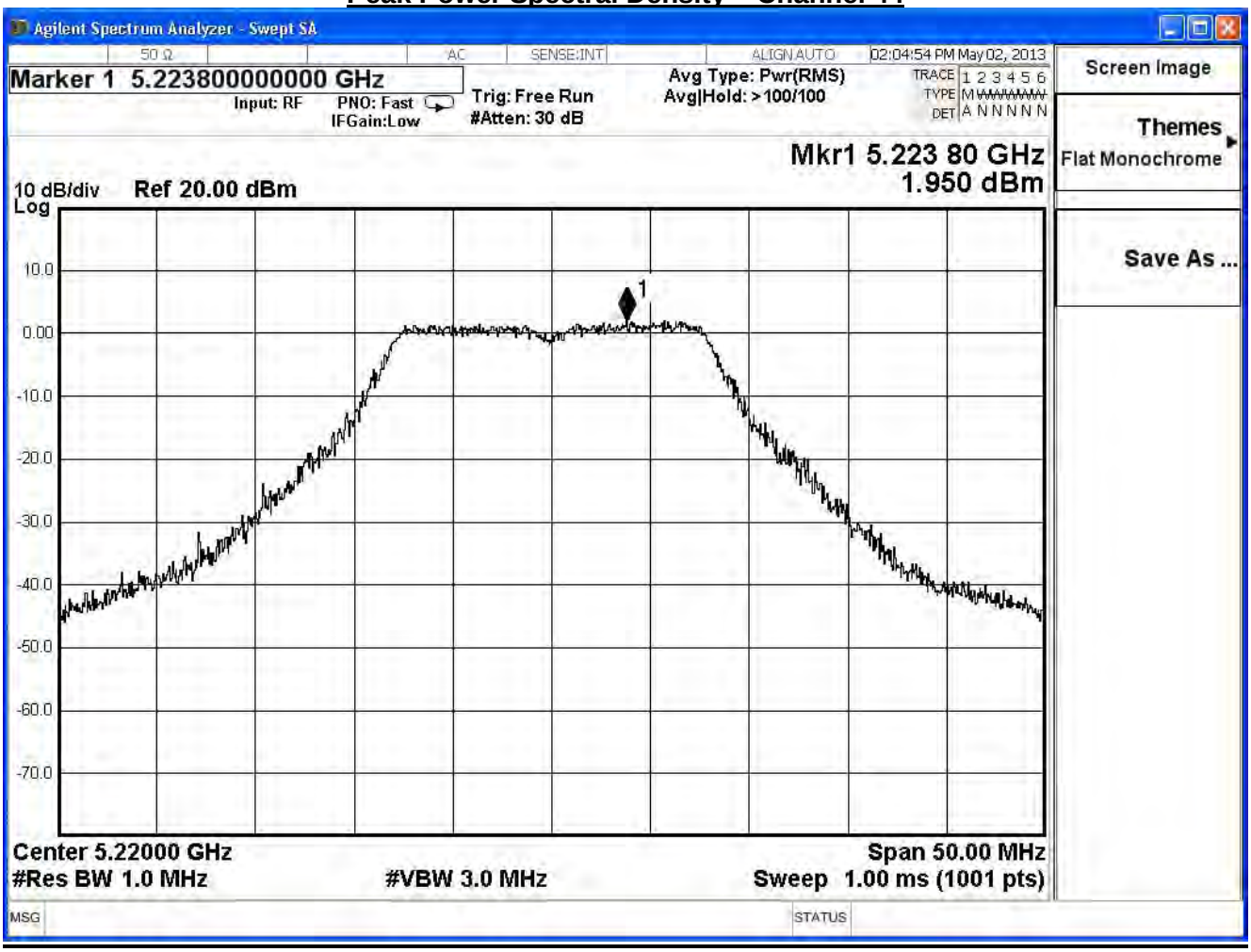
Product	VDSL2 Security Firewall		
Test Item	Peak Power Spectral Density		
Test Mode	Transmit		
Date of Test	2013/05/02	Test Site	SR7

IEEE 802.11a				
Channel No.	Frequency (MHz)	Measure Level (dBm)	Required Limit (dBm)	Result
36	5180	1.732	≦4	Pass
44	5220	1.950	≦4	Pass
48	5240	1.907	≦4	Pass

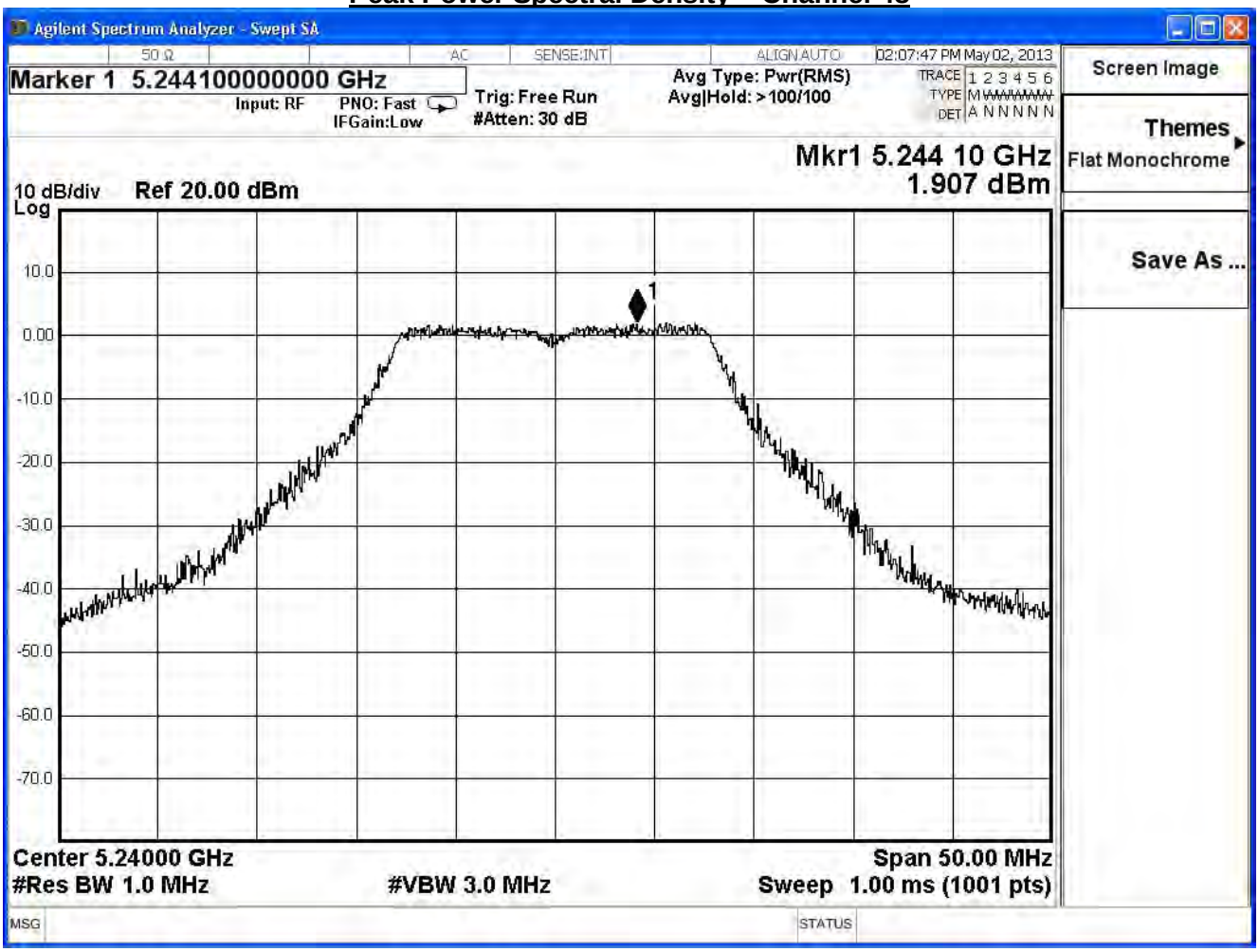
Peak Power Spectral Density – Channel 36



Peak Power Spectral Density – Channel 44



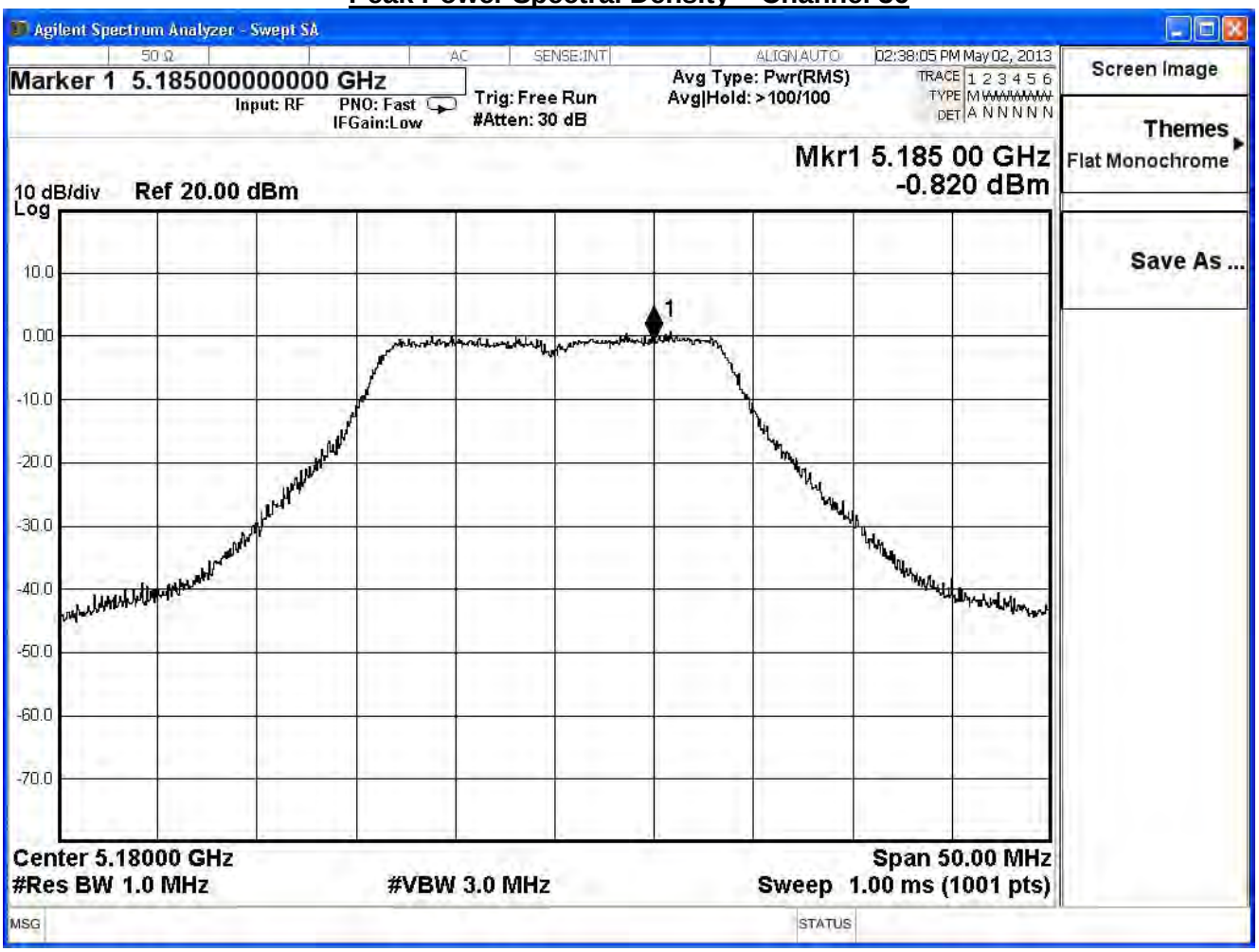
Peak Power Spectral Density – Channel 48



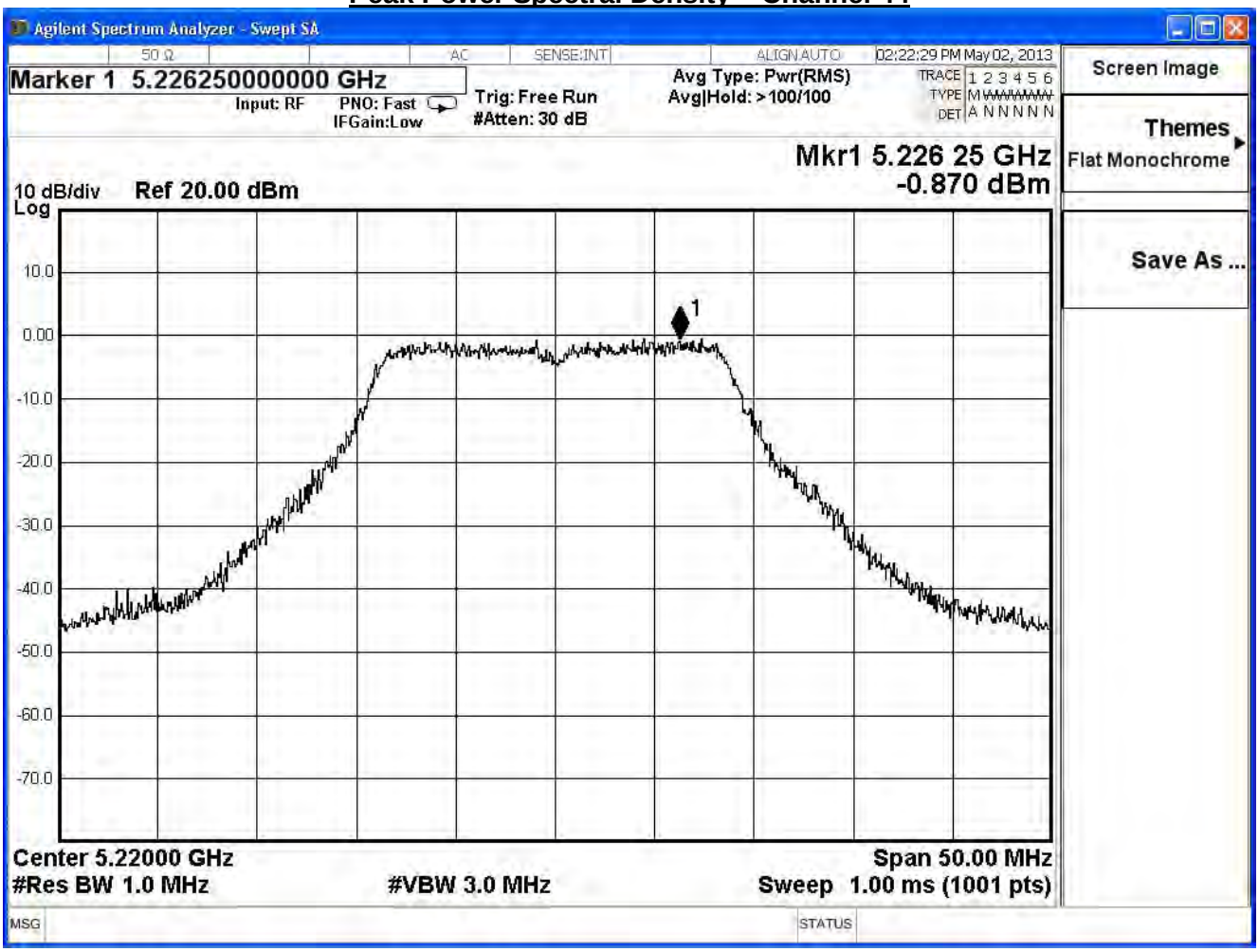
Product	VDSL2 Security Firewall		
Test Item	Peak Power Spectral Density		
Test Mode	Transmit		
Date of Test	2013/05/02	Test Site	SR7

IEEE 802.11n_20M(ANT 0)				
Channel No.	Frequency (MHz)	Measure Level (dBm)	Required Limit (dBm)	Result
36	5180	-0.820	≦4	Pass
44	5220	-0.870	≦4	Pass
48	5240	-1.205	≦4	Pass

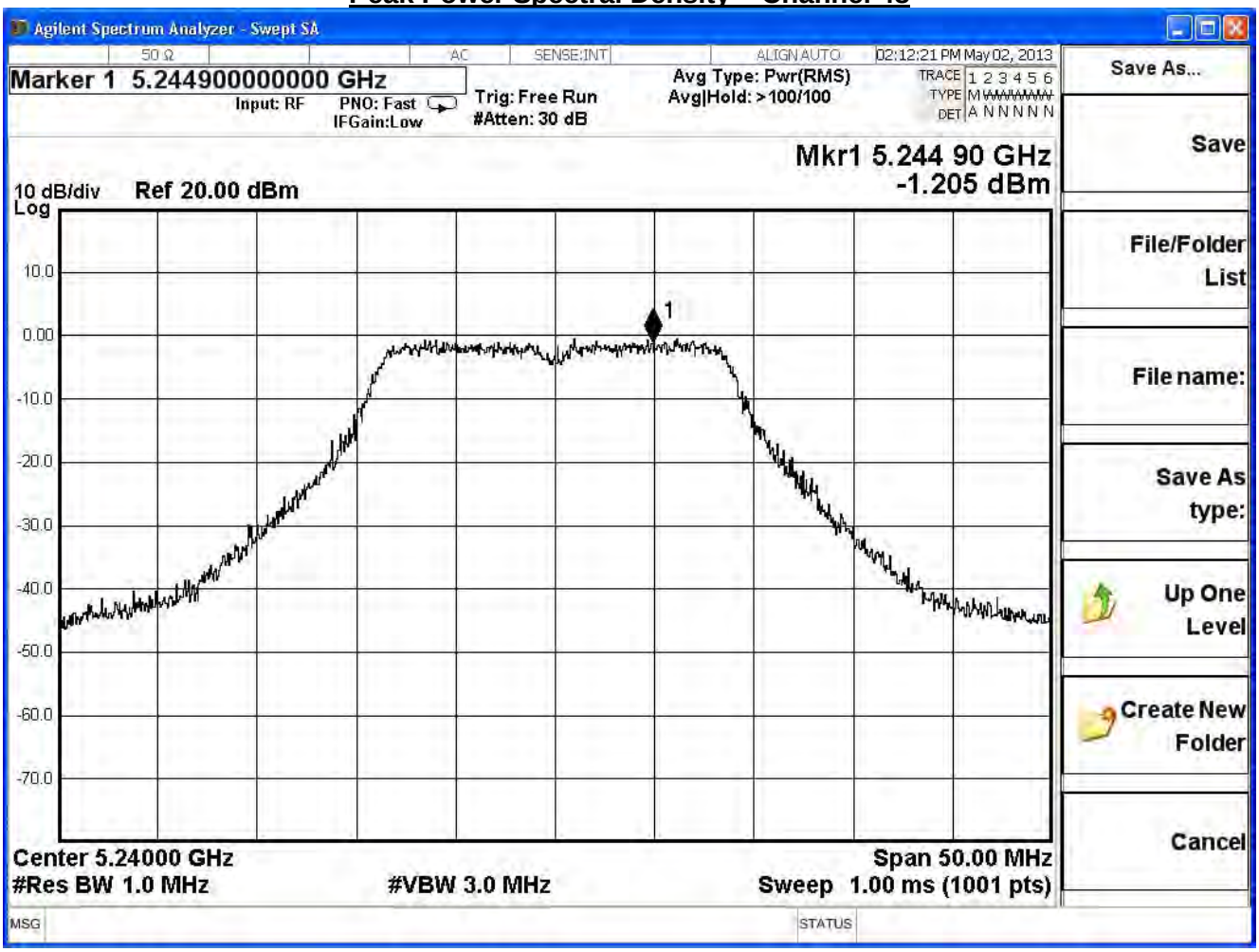
Peak Power Spectral Density – Channel 36



Peak Power Spectral Density – Channel 44



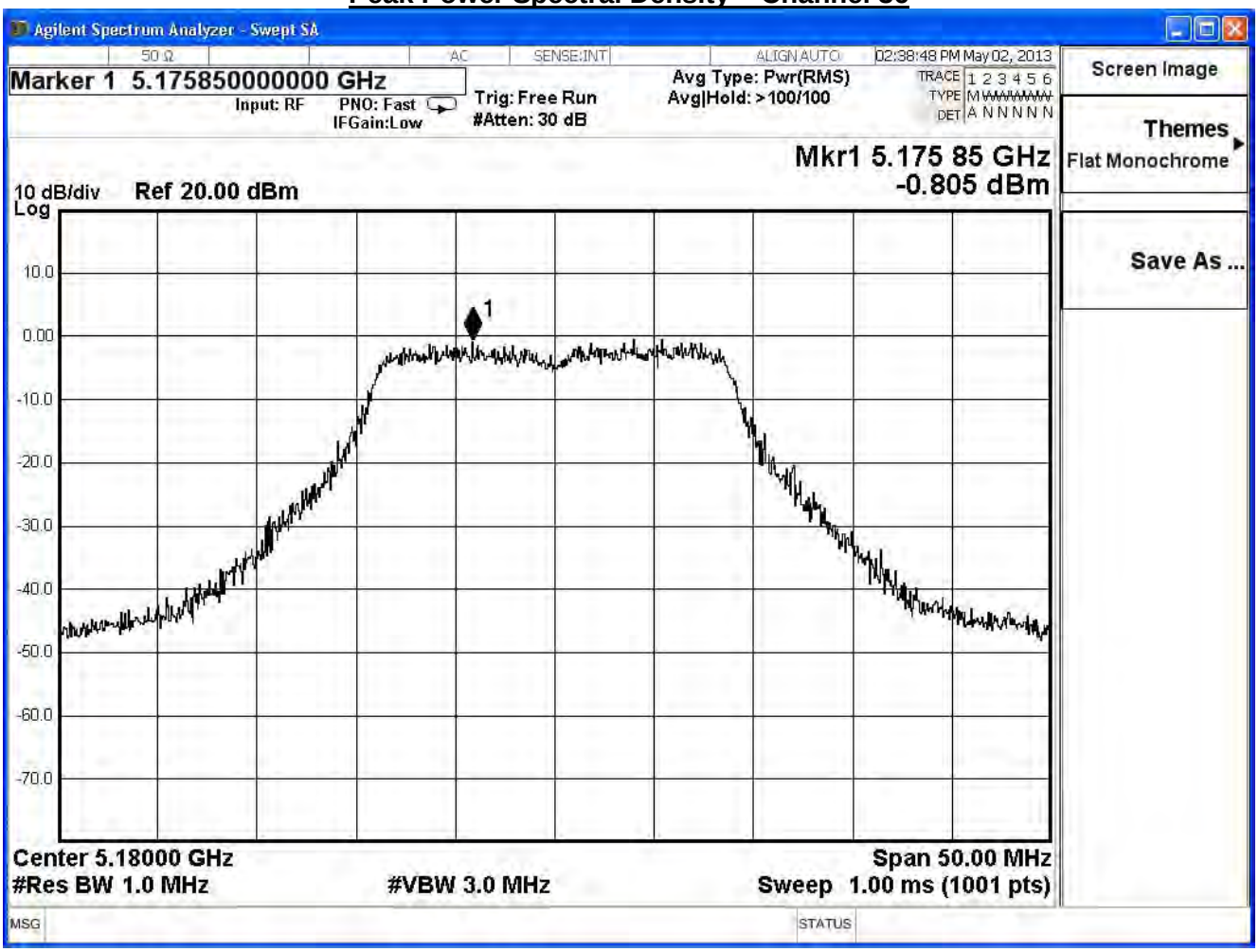
Peak Power Spectral Density – Channel 48



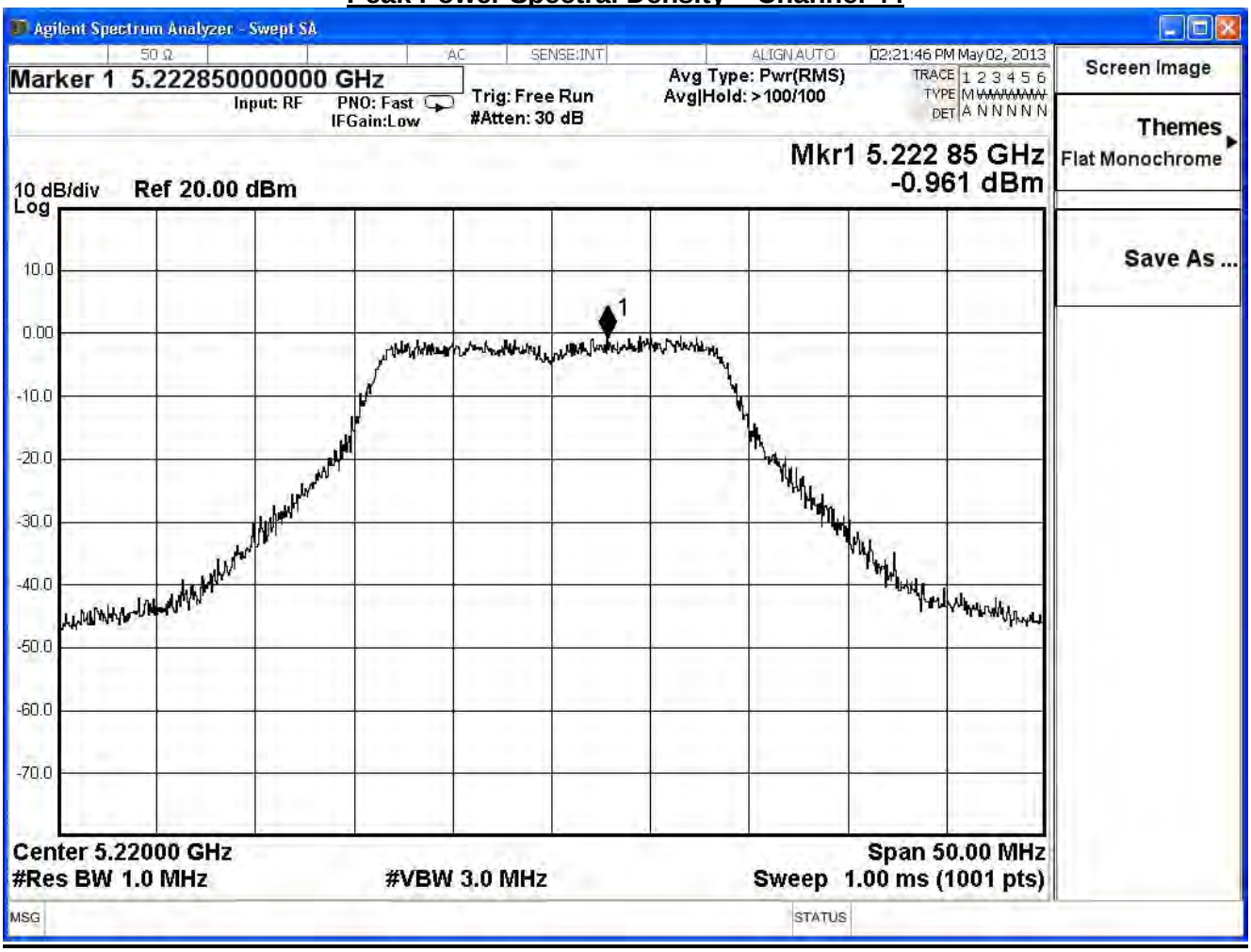
Product	VDSL2 Security Firewall		
Test Item	Peak Power Spectral Density		
Test Mode	Transmit		
Date of Test	2013/05/02	Test Site	SR7

IEEE 802.11n_20M(ANT 1)				
Channel No.	Frequency (MHz)	Measure Level (dBm)	Required Limit (dBm)	Result
36	5180	-0.805	≦4	Pass
44	5220	-0.961	≦4	Pass
48	5240	-1.171	≦4	Pass

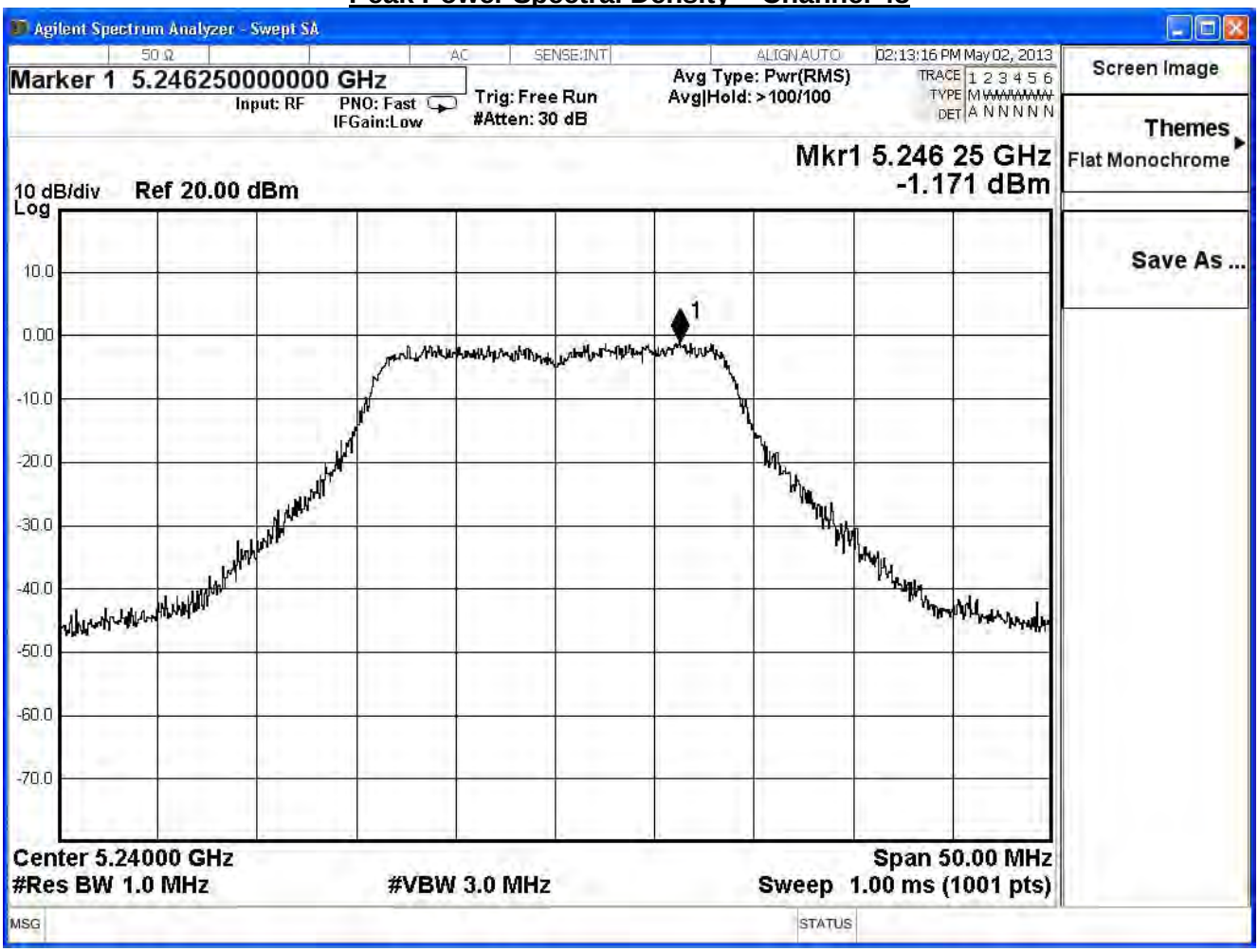
Peak Power Spectral Density – Channel 36



Peak Power Spectral Density – Channel 44



Peak Power Spectral Density – Channel 48



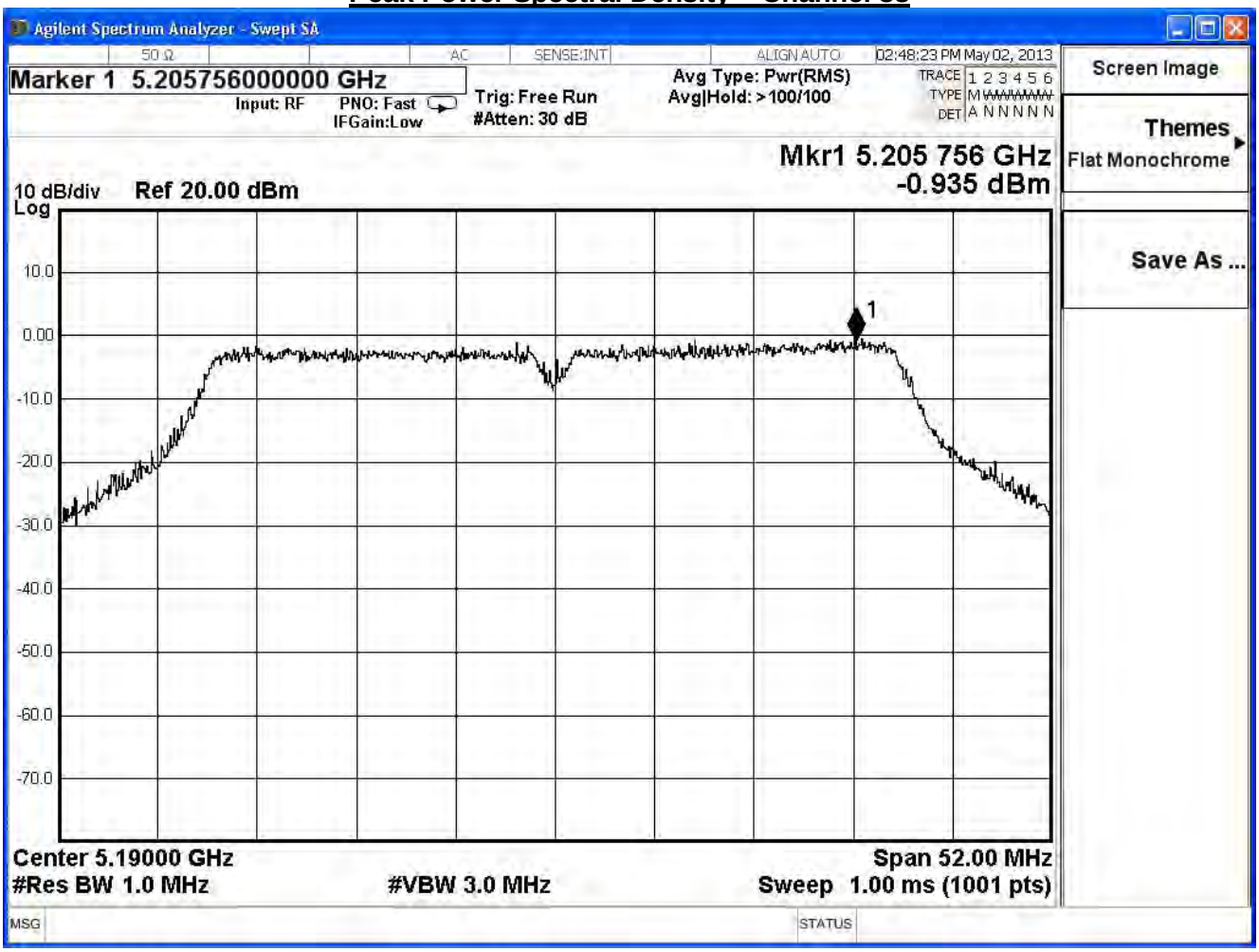
Product	VDSL2 Security Firewall		
Test Item	Peak Power Spectral Density		
Test Mode	Transmit		
Date of Test	2013/05/02	Test Site	SR7

IEEE 802.11n_20M(ANT 0+1)				
Channel No.	Frequency (MHz)	Measure Level (dBm)	Required Limit (dBm)	Result
36	5180	2.198	≦4	Pass
44	5220	2.095	≦4	Pass
48	5240	1.822	≦4	Pass

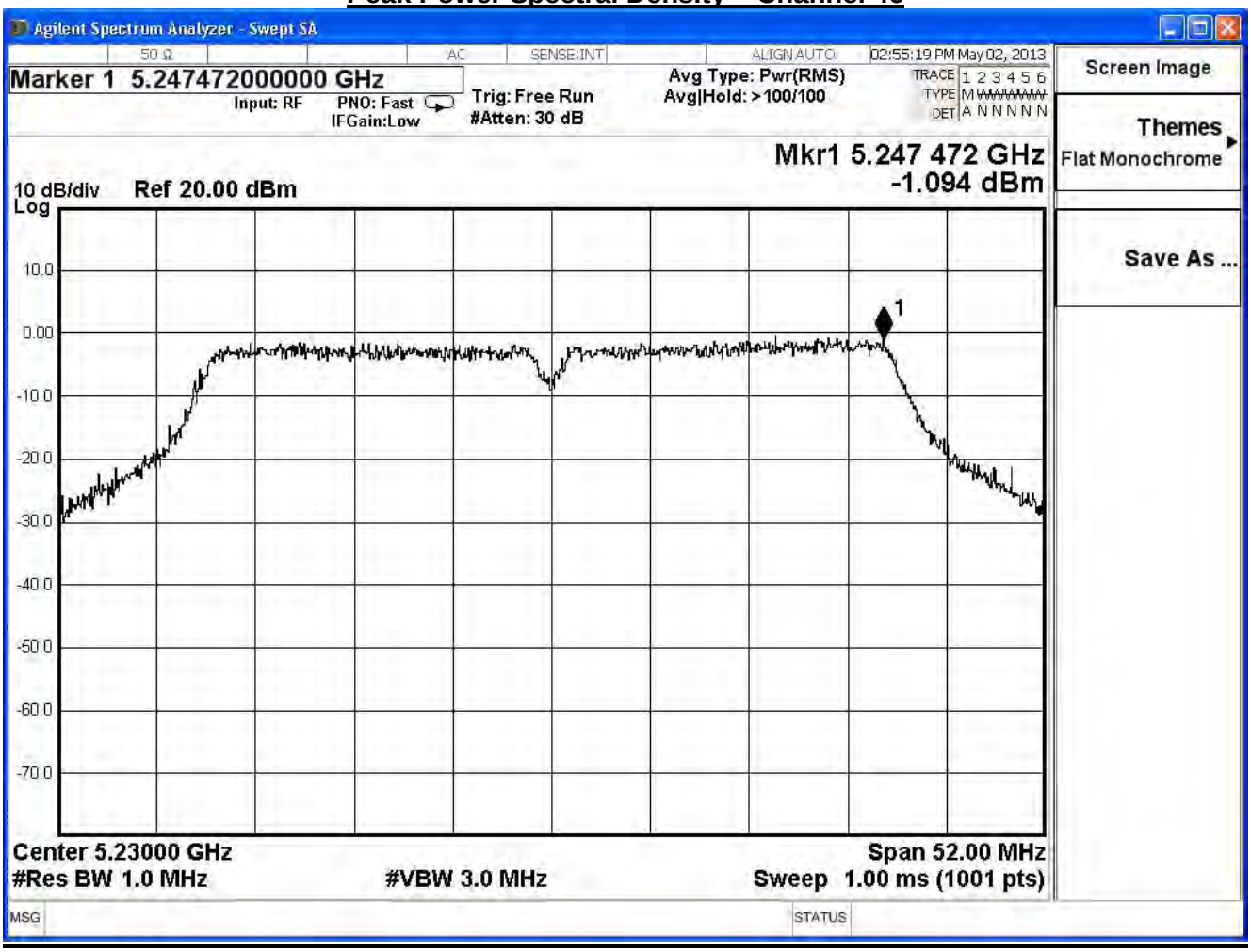
Product	VDSL2 Security Firewall		
Test Item	Peak Power Spectral Density		
Test Mode	Transmit		
Date of Test	2013/05/02	Test Site	SR7

IEEE 802.11n_40M(ANT 0)				
Channel No.	Frequency (MHz)	Measure Level (dBm)	Required Limit (dBm)	Result
38	5190	-0.935	≦4	Pass
46	5230	-1.094	≦4	Pass

Peak Power Spectral Density – Channel 38



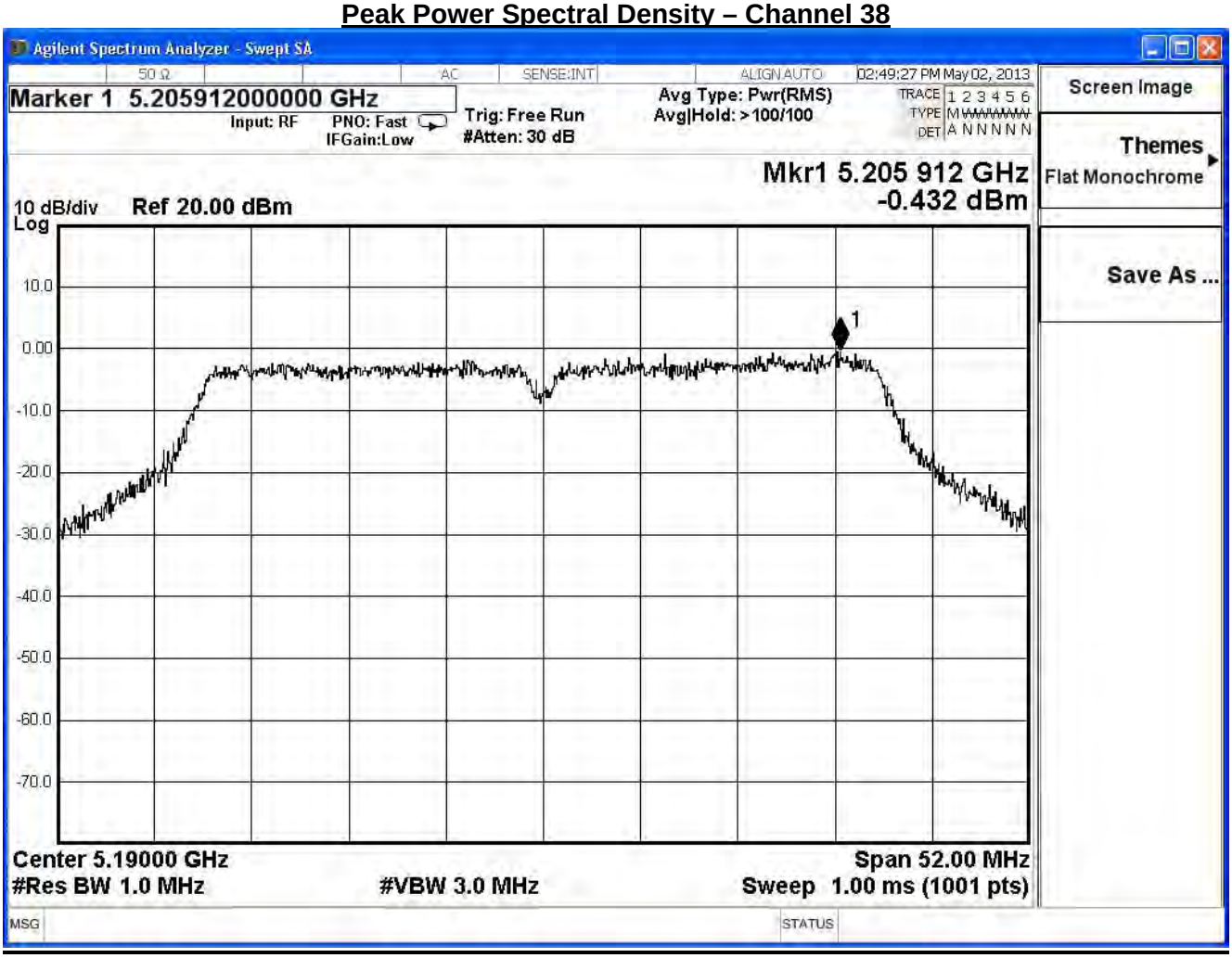
Peak Power Spectral Density – Channel 46



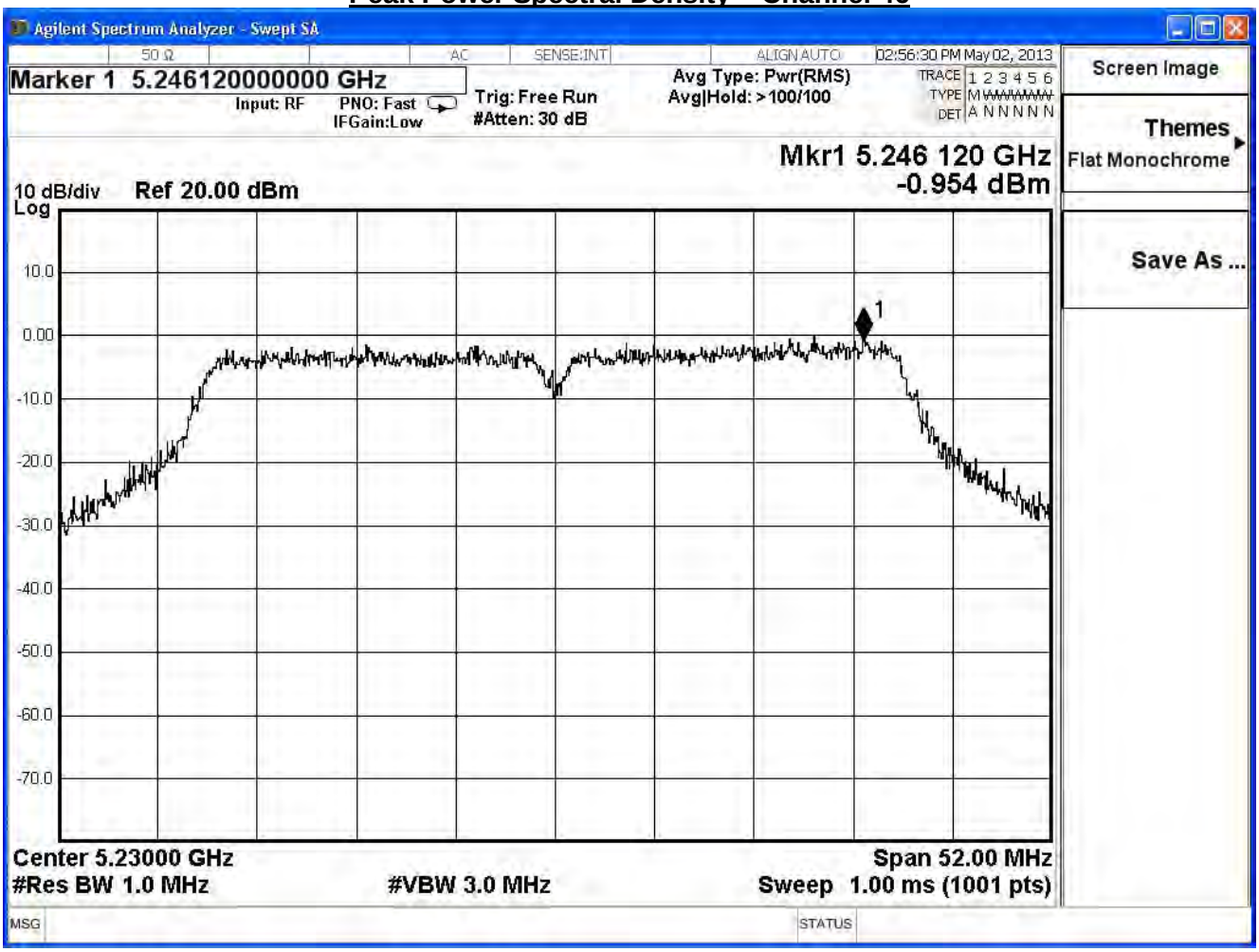
Product	VDSL2 Security Firewall		
Test Item	Peak Power Spectral Density		
Test Mode	Transmit		
Date of Test	2013/05/02	Test Site	SR7

IEEE 802.11n_40M(ANT 1)				
Channel No.	Frequency (MHz)	Measure Level (dBm)	Required Limit (dBm)	Result
38	5190	-0.432	≦4	Pass
46	5230	-0.954	≦4	Pass

Peak Power Spectral Density – Channel 38



Peak Power Spectral Density – Channel 46



Product	VDSL2 Security Firewall		
Test Item	Peak Power Spectral Density		
Test Mode	Transmit		
Date of Test	2013/05/02	Test Site	SR7

IEEE 802.11n_40M(ANT 0+1)				
Channel No.	Frequency (MHz)	Measure Level (dBm)	Required Limit (dBm)	Result
38	5190	2.334	≦4	Pass
46	5230	1.987	≦4	Pass

6. Peak Excursion

6.1. Test Equipment

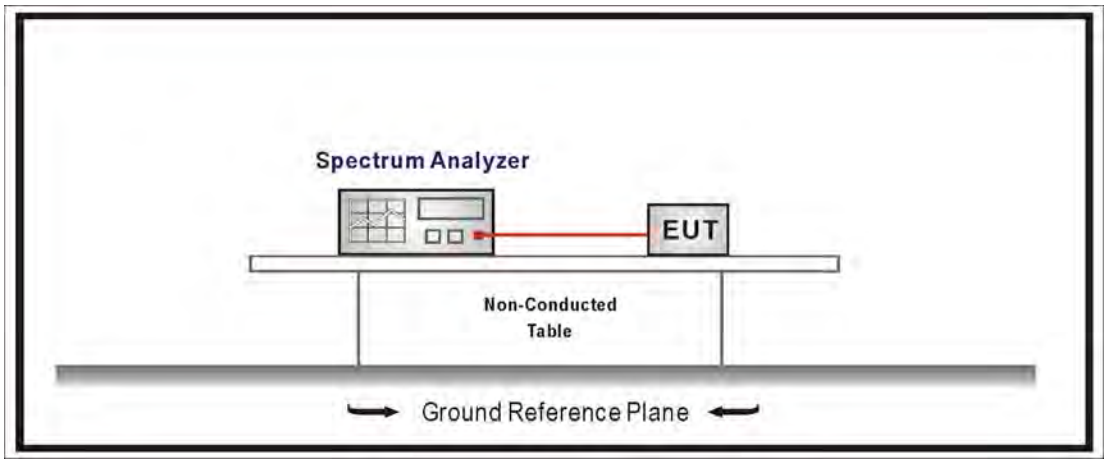
The following test equipments are used during the radiated emission tests:

Peak Excursion / SR7

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Spectrum Analyzer	Agilent	N9010A-EXA	US47140172	2013/07/31

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

6.2. Test Setup



6.3. Limits

The ratio of the peak excursion of the modulation envelope (measured suing a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

6.4. Test Procedure

The EUT was setup to ANSI C63.4, 2009; tested to U-NII test procedure of KDB 789033 for compliance to FCC 47CFR Subpart E requirements.

1st Trace:

Set RBW = 1MHz, VBW = 3MHz with peak detector and max-hold settings.

2nd Trace:

Set RBW = 1MHz, VBW = 3MHz with RMS detector and trace average 100 traces in power averaging mode.

6.5. Uncertainty

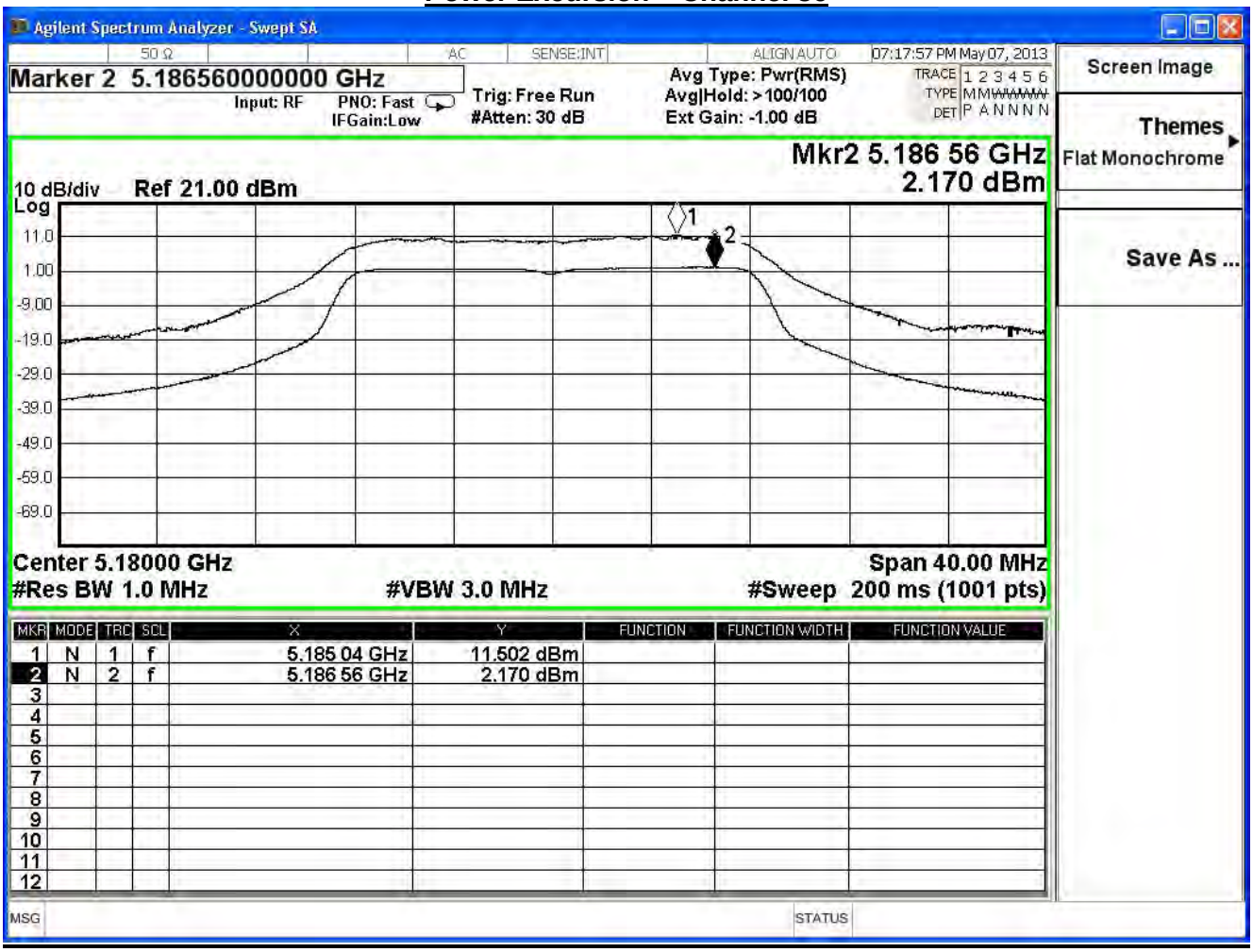
The measurement uncertainty is defined as ± 1.27 dB

6.6. Test Result

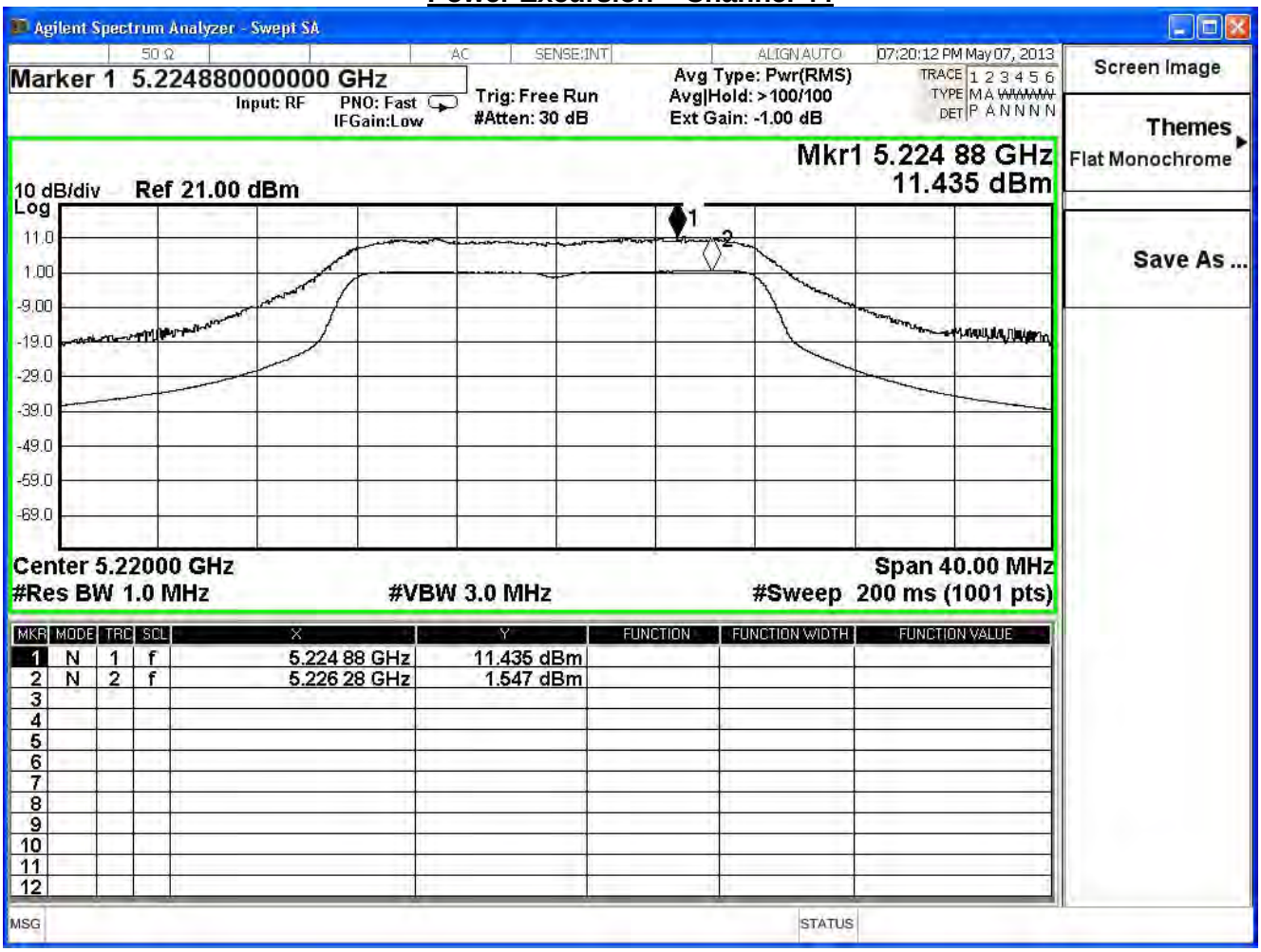
Product	VDSL2 Security Firewall		
Test Item	Peak Excursion		
Test Mode	Transmit		
Date of Test	2013/05/07	Test Site	SR7

IEEE 802.11a				
Channel No.	Frequency (MHz)	Measure Level (dB)	Required Limit (dB)	Result
36	5180	9.332	≦13	Pass
44	5220	9.888	≦13	Pass
48	5240	9.583	≦13	Pass

Power Excursion – Channel 36

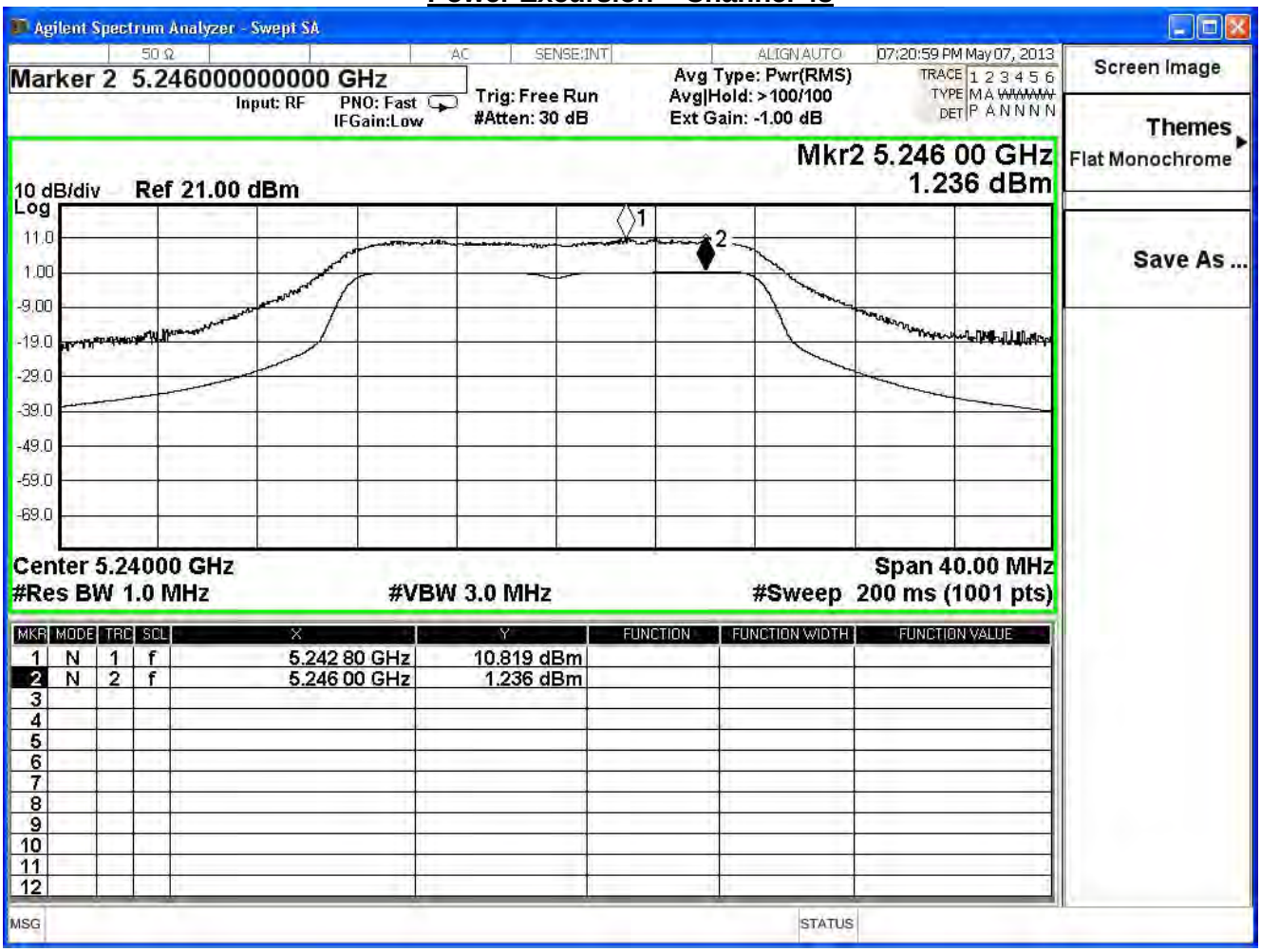


Power Excursion – Channel 44



MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	5.224 88 GHz	11.435 dBm			
2	N	2	f	5.226 28 GHz	1.547 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								

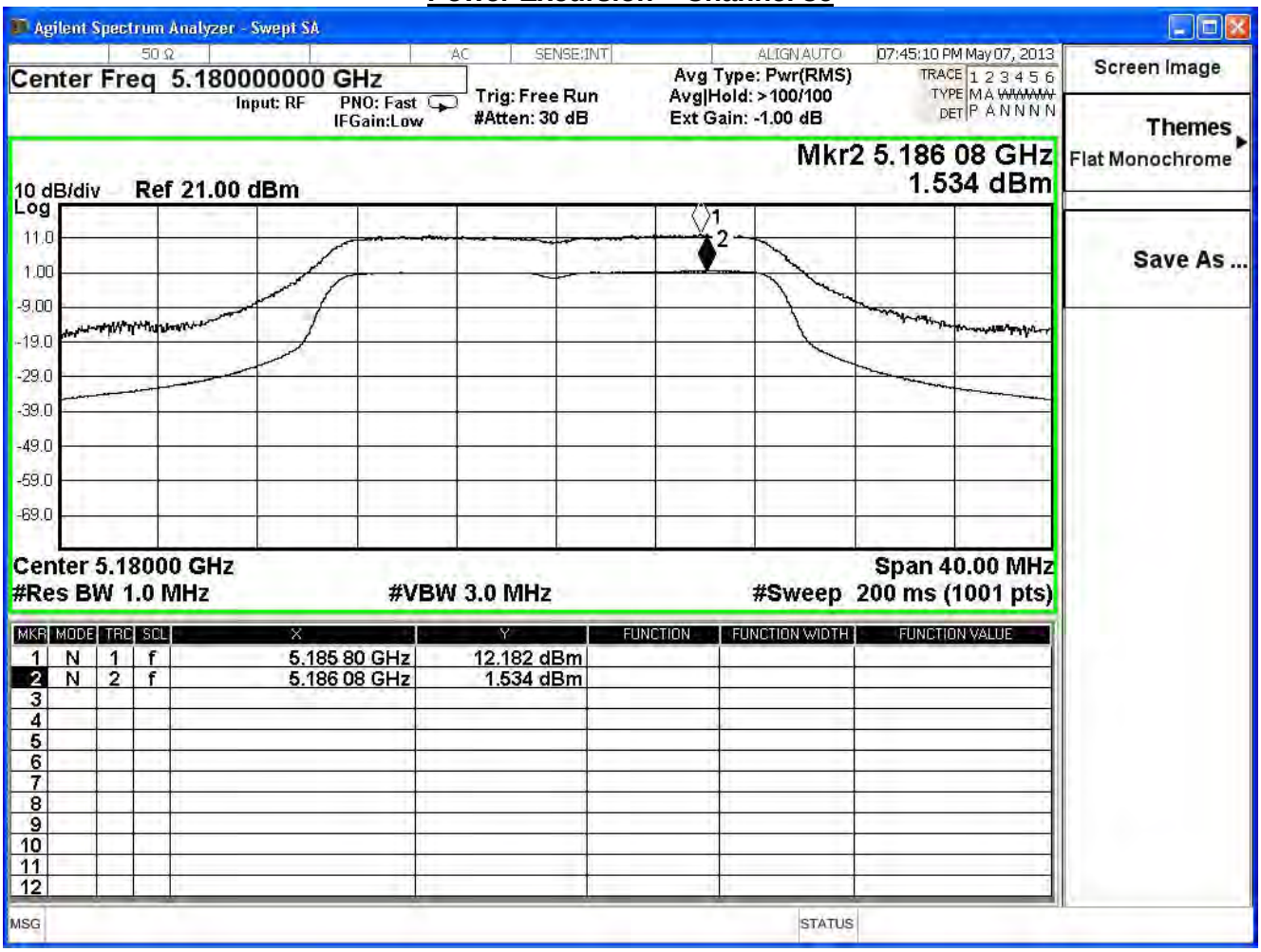
Power Excursion – Channel 48



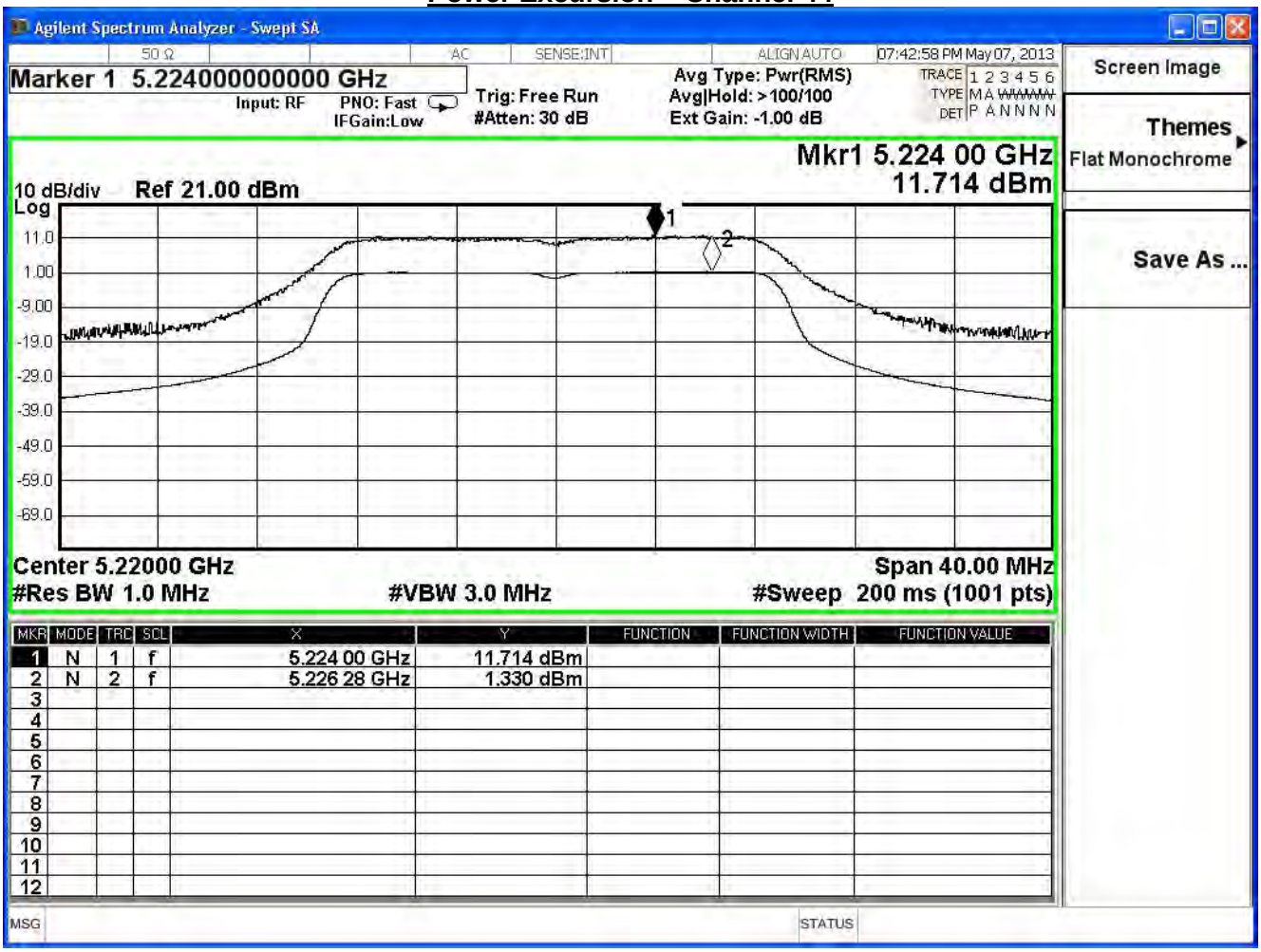
Product	VDSL2 Security Firewall		
Test Item	Peak Excursion		
Test Mode	Transmit		
Date of Test	2013/05/07	Test Site	SR7

IEEE 802.11n_20M(ANT 0)				
Channel No.	Frequency (MHz)	Measure Level (dB)	Required Limit (dB)	Result
36	5180	10.648	≦13	Pass
44	5220	10.384	≦13	Pass
48	5240	9.171	≦13	Pass

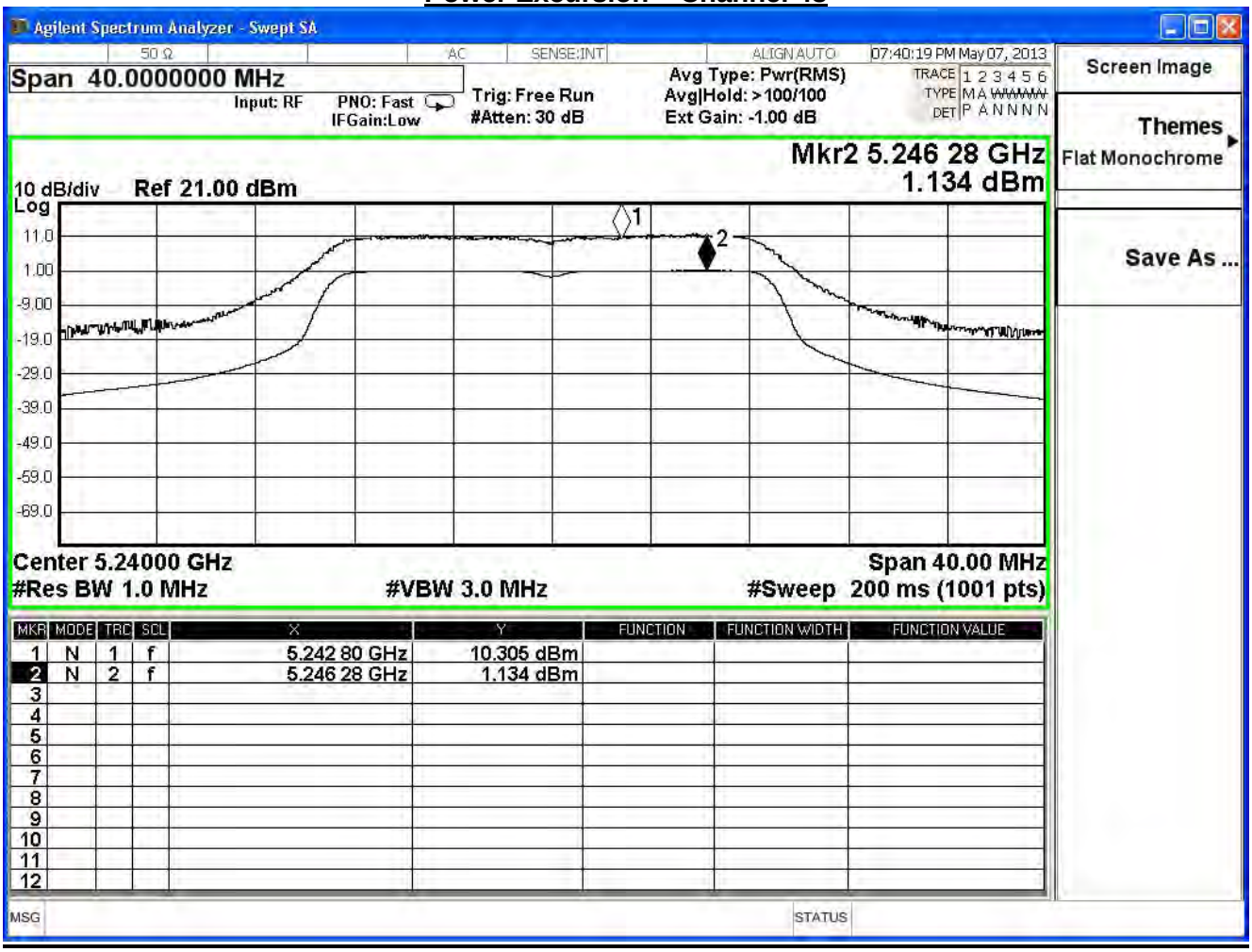
Power Excursion – Channel 36



Power Excursion – Channel 44



Power Excursion – Channel 48

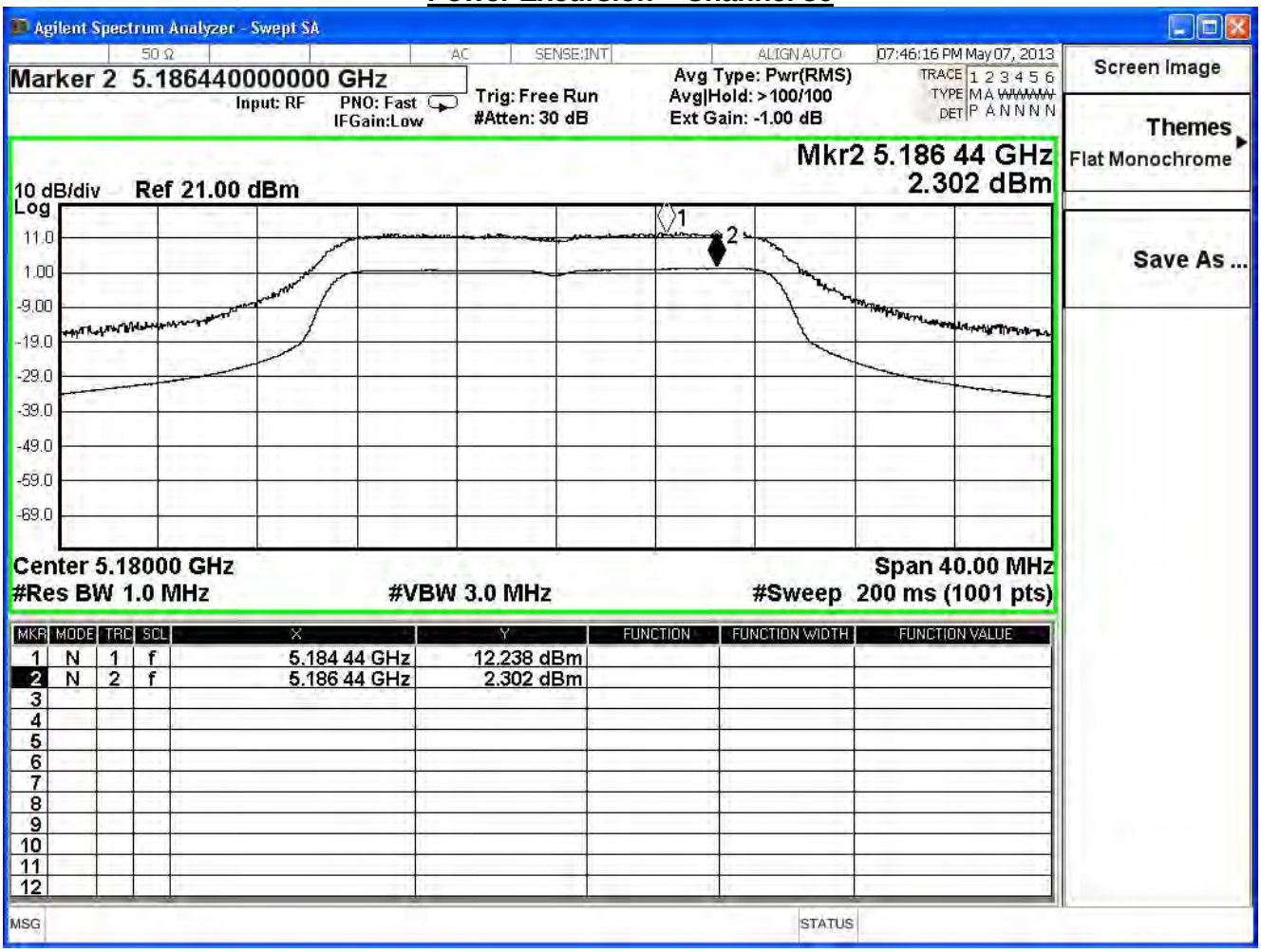


MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	5.242 80 GHz	10.305 dBm			
2	N	2	f	5.246 28 GHz	1.134 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								

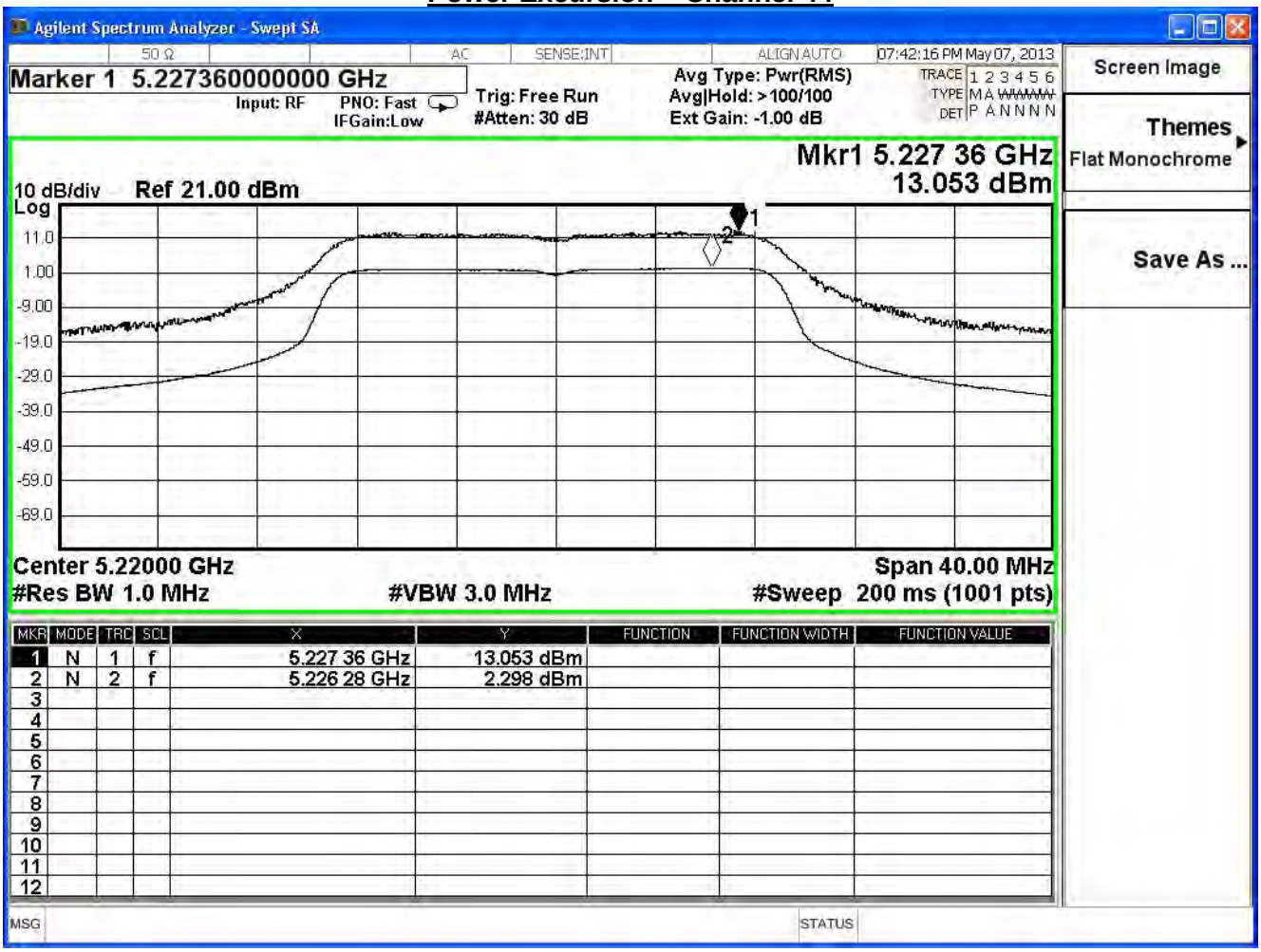
Product	VDSL2 Security Firewall		
Test Item	Peak Excursion		
Test Mode	Transmit		
Date of Test	2013/05/07	Test Site	SR7

IEEE 802.11n_20M(ANT 1)				
Channel No.	Frequency (MHz)	Measure Level (dB)	Required Limit (dB)	Result
36	5180	9.936	≦13	Pass
44	5220	10.755	≦13	Pass
48	5240	9.900	≦13	Pass

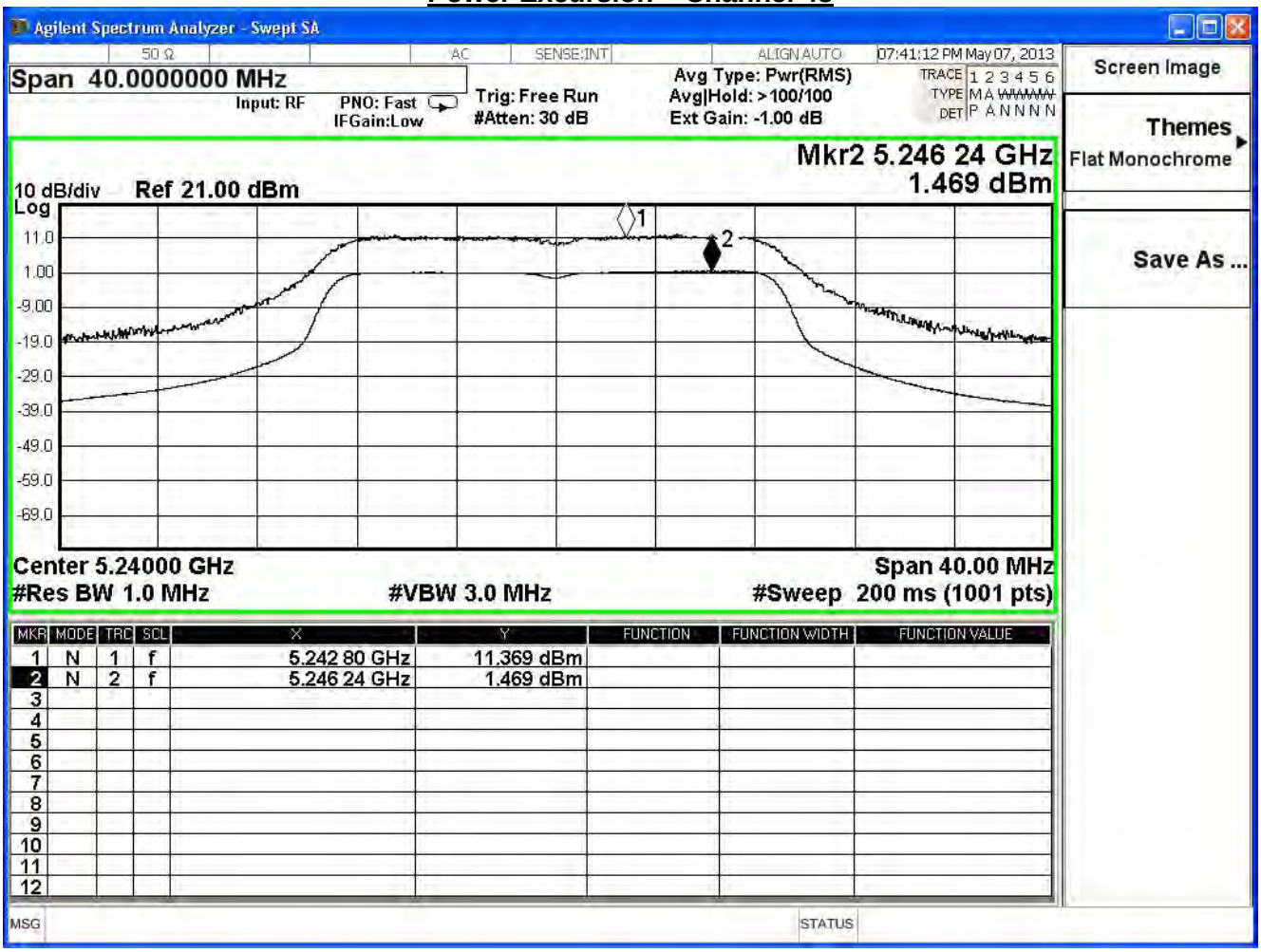
Power Excursion – Channel 36



Power Excursion – Channel 44



Power Excursion – Channel 48

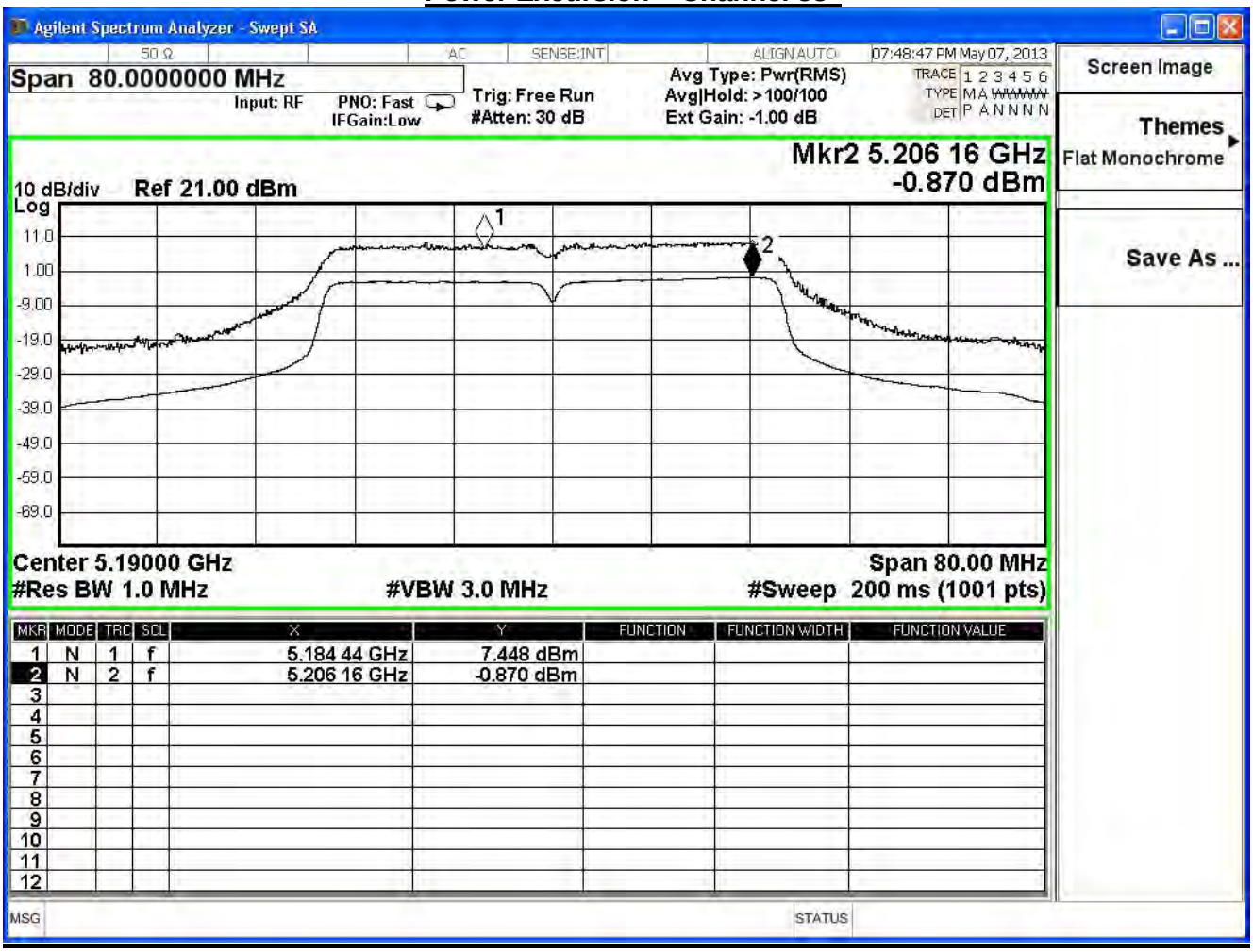


MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	5.242 80 GHz	11.369 dBm			
2	N	2	f	5.246 24 GHz	1.469 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								

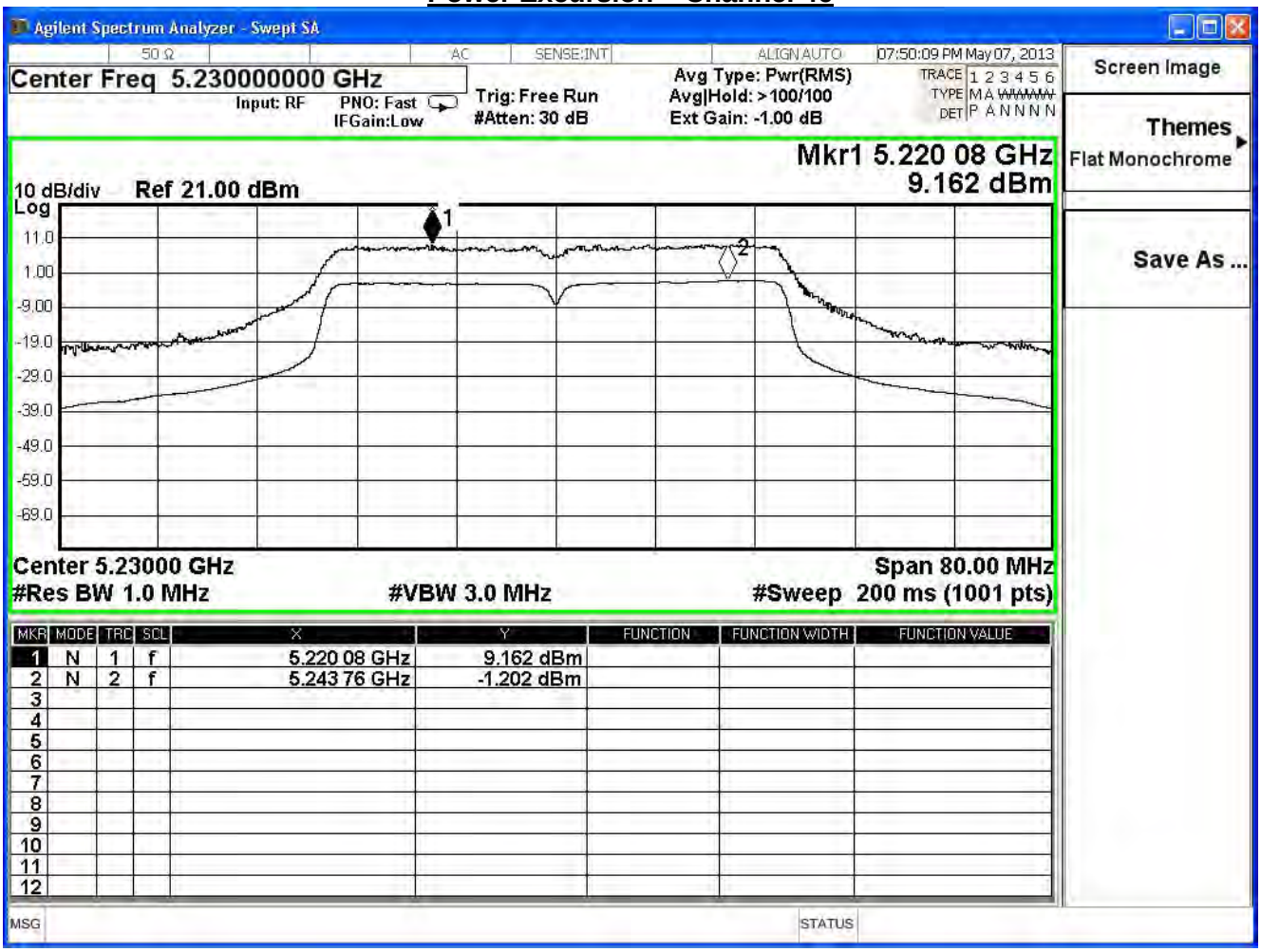
Product	VDSL2 Security Firewall		
Test Item	Peak Excursion		
Test Mode	Transmit		
Date of Test	2013/05/07	Test Site	SR7

IEEE 802.11n_40M(ANT 0)				
Channel No.	Frequency (MHz)	Measure Level (dB)	Required Limit (dB)	Result
38	5190	8.318	≦13	Pass
46	5230	10.364	≦13	Pass

Power Excursion – Channel 38



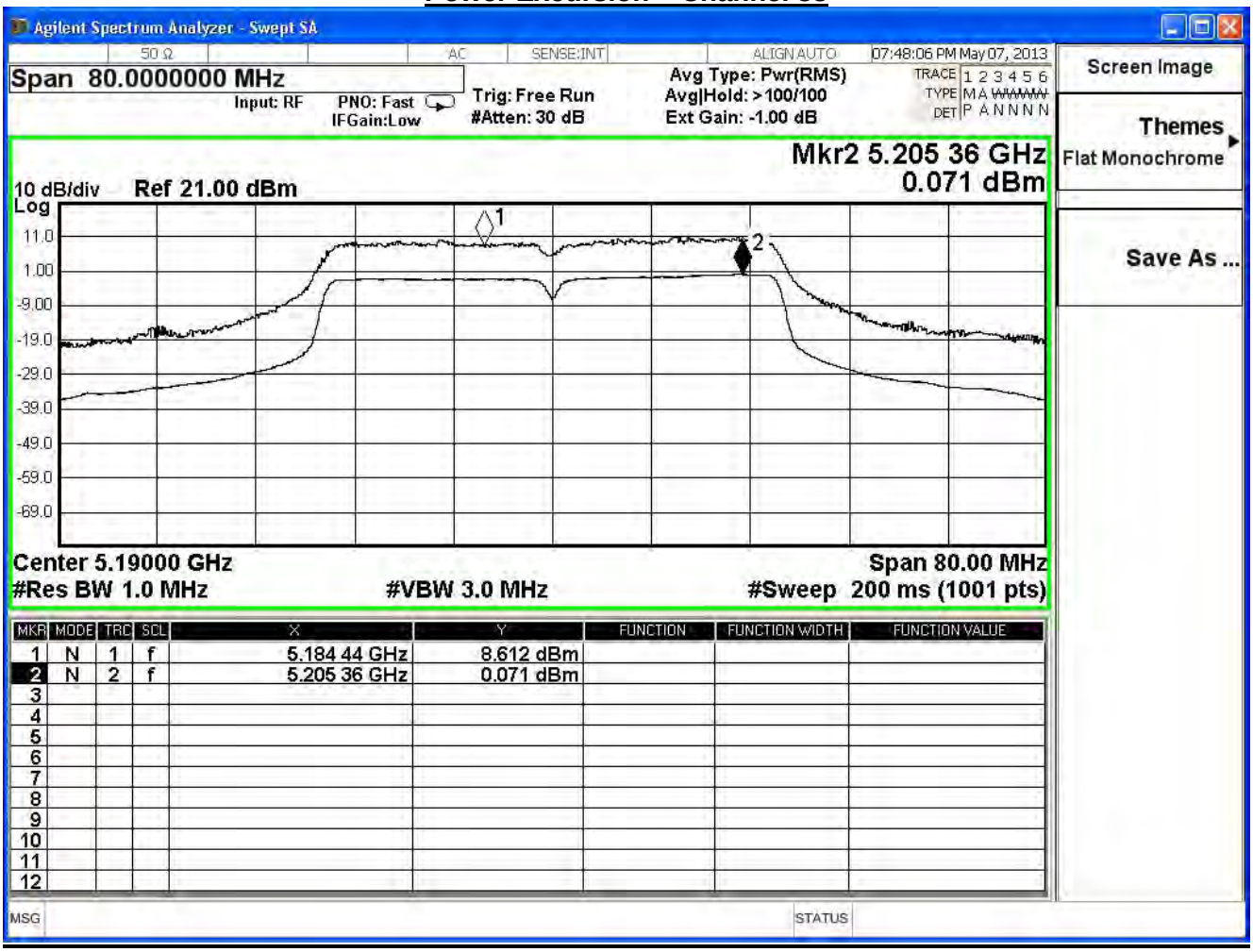
Power Excursion – Channel 46



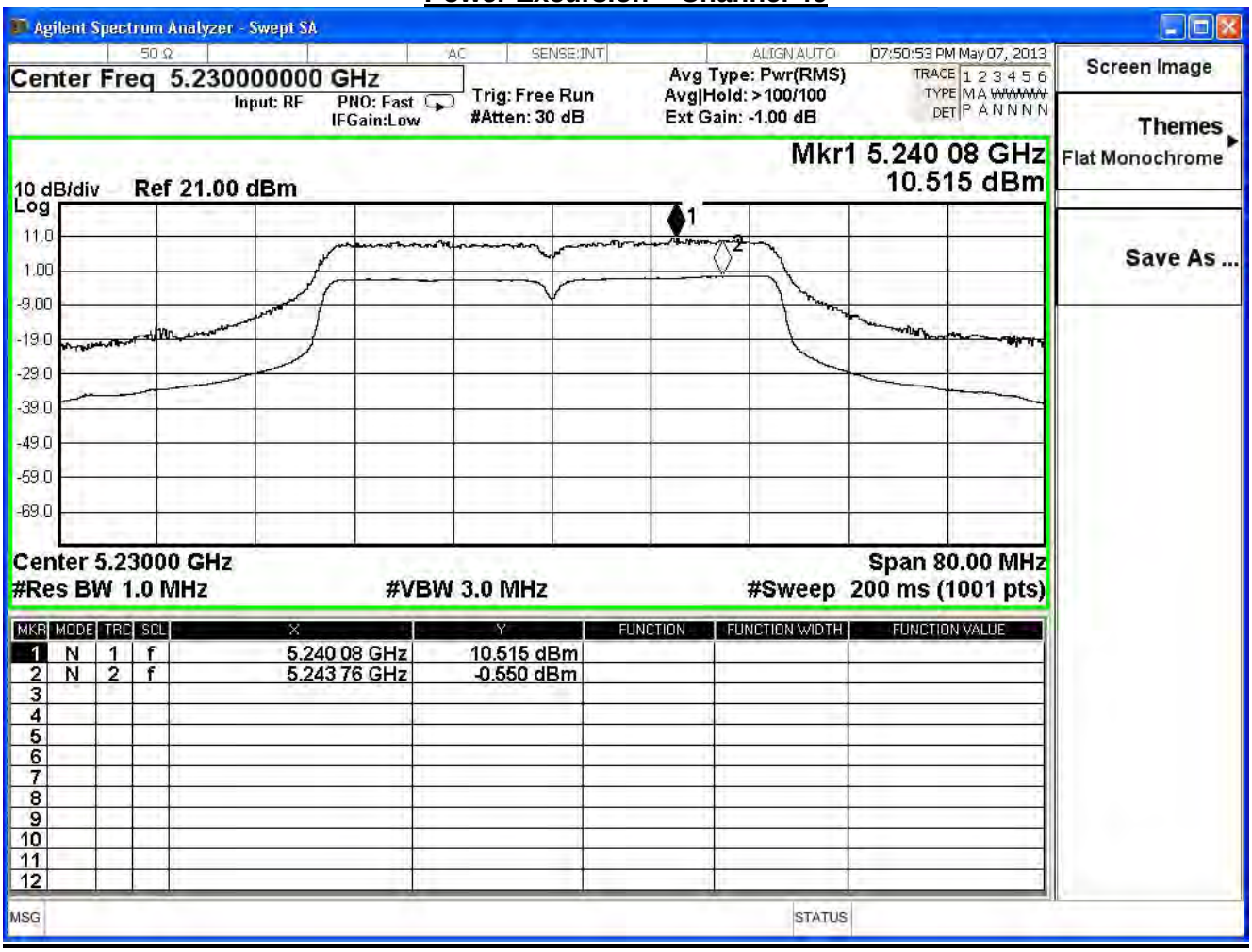
Product	VDSL2 Security Firewall		
Test Item	Peak Excursion		
Test Mode	Transmit		
Date of Test	2013/05/07	Test Site	SR7

IEEE 802.11n_40M(ANT 1)				
Channel No.	Frequency (MHz)	Measure Level (dB)	Required Limit (dB)	Result
38	5190	8.541	≦13	Pass
46	5230	11.065	≦13	Pass

Power Excursion – Channel 38



Power Excursion – Channel 46



7. Radiated Emission

7.1. Test Equipment

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

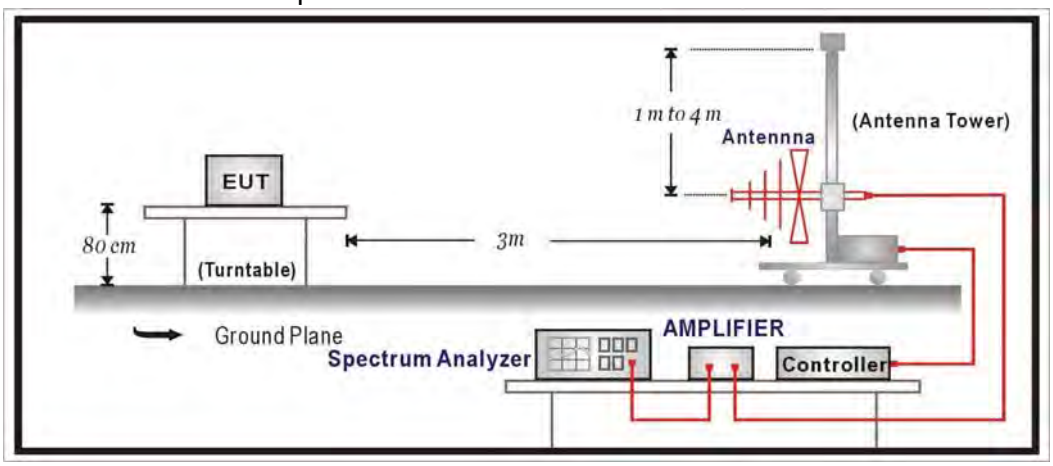
Radiated Emission / CB1

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Bilog Antenna	SCHAFFNER	CBL6112B	2895	2013/08/14
Double Ridged Guide Horn Antenna	Schwarzback	BBHA 9120	D743	2014/02/17
Pre-Amplifier	MITEQ	AMF-4D-005180-24-10P	888003	2013/12/02
Pre-Amplifier	QuieTek	AP-025C	CHM-0706049	2014/02/19
Spectrum Analyzer	Agilent	E4440A	MY46187335	2014/01/27
k Type Cable	Huber Suhner	Sucoflex 102	25623/2	2014/02/21

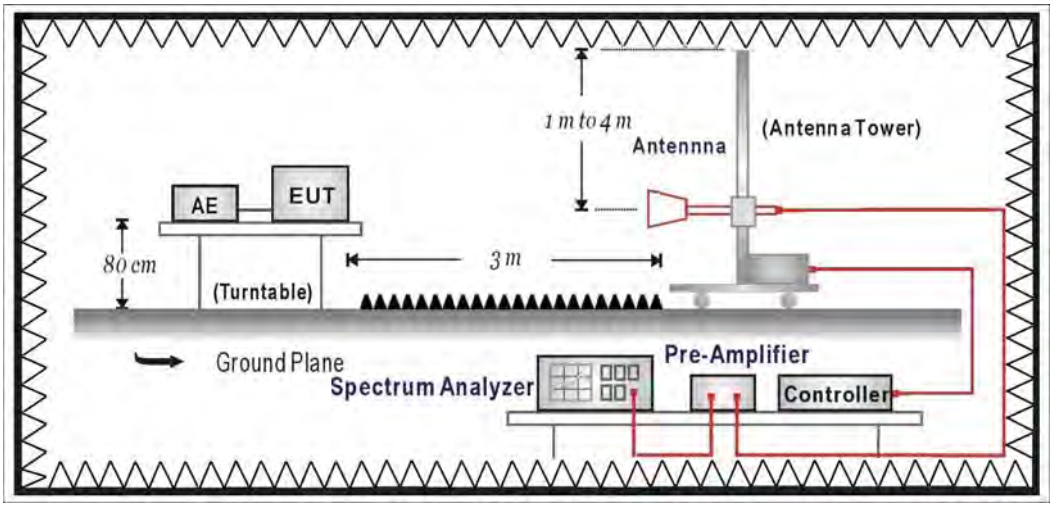
Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

7.2. Test Setup

Under 1GHz Test Setup:



Above 1GHz Test Setup:



7.3. Limits

➢ **General Radiated Emission Limits**

The provisions of Section 15.205 of this part apply to intentional radiators operating under this section. Radiated emissions which fall in the restricted bands, as defined in Section 15.205, must also comply with the radiated emission limits specified in Section 15.209:

FCC Part 15 Subpart C Paragraph 15.209 Limits		
Frequency MHz	uV/m @3m	dBuV/m@3m
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Remark:

1. RF Voltage (dBuV) = 20 log RF Voltage (uV)
2. In the Above Table, the tighter limit applies at the band edges.
3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

➢ **Unwanted Emission out of the restricted bands Limits**

FCC Part 15 Subpart E Paragraph 15.407(b) Limits		
Frequency (MHz)	EIRP Limit (dBm)	Equivalent Field Strength (dBuV/m@3m)
5150~5250	-27	68.3
5250~5350	-27	68.3
5470~5725	-27	68.3
5725~5825	-27 (Note1)	68.3
	-17 (Note2)	78.3

Remark:

1. For frequencies more than 10 MHz above or below the band edges.
2. For frequency range from the band edges to 10 MHz above or below the band edges.
3. uV/m = $\frac{1000000\sqrt{30 \times EIRP}}{3}$, RF Voltage (dBuV/m) = 20 log RF Voltage (uV/m)

7.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.
Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4: 2009 on radiated measurement.
The additional latch filter below 1GHz was used to measure the level of harmonics radiated emission during field dtrength of harmonics measurement.
The bandwidth below 1GHz setting on the field strength meter is 120 KHz, above 1GHz are 1 MHz.
The frequency range from 30MHz to 10th harminics is checked.

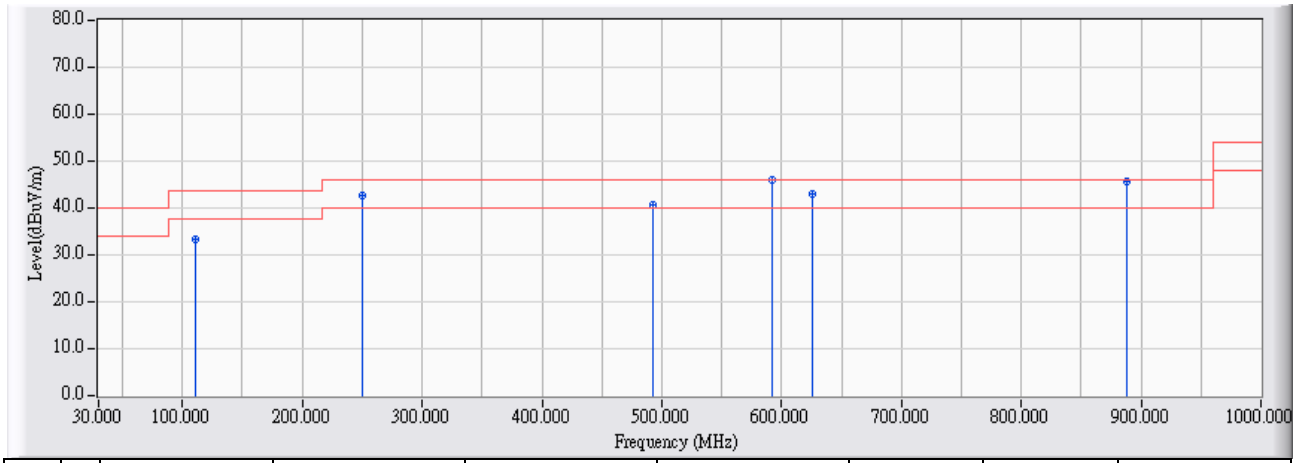
7.5. Uncertainty

The measurement uncertainty
30MHz～1GHz as ±3.43dB
1GHz～26.5Ghz as ±3.65dB

7.6. Test Result

30MHz-1GHz Spurious

Site : CB1	**Time : 2013/11/20 - 16:20**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Probe : CB1_FCC_EFS_30-1G-2_1011 - HORIZONTAL	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : Mode 1: Transmit(Adapter:PA1030-2I) 802.11n 20MHz_5180MHz**

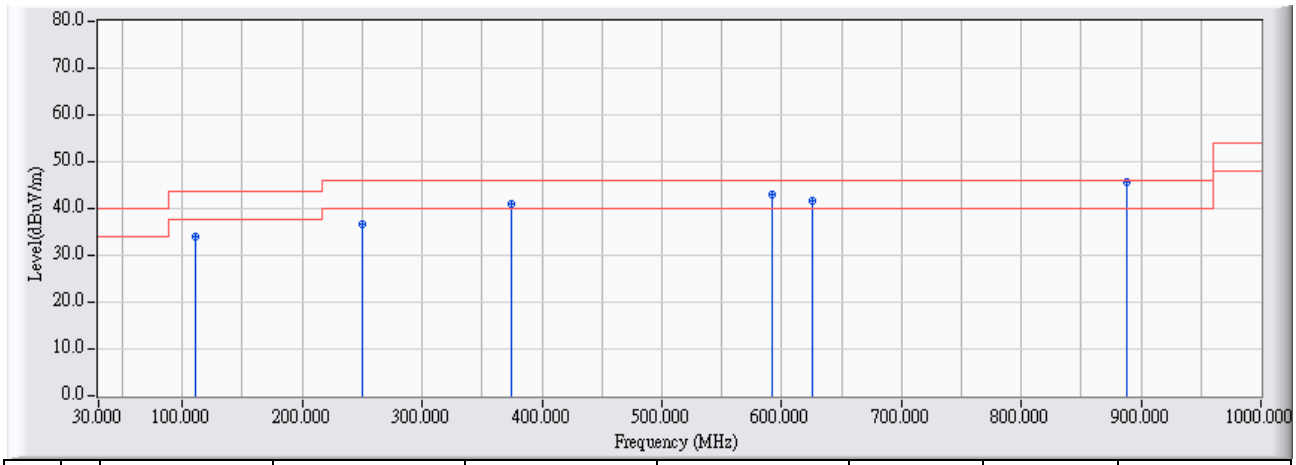


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		110.995	-22.629	56.089	33.460	-10.040	43.500	QUASIPEAK
2		250.190	-20.538	63.265	42.727	-3.273	46.000	QUASIPEAK
3		493.175	-15.595	56.242	40.646	-5.354	46.000	QUASIPEAK
4	*	591.630	-15.331	61.213	45.882	-0.118	46.000	QUASIPEAK
5		625.095	-15.158	58.319	43.161	-2.839	46.000	QUASIPEAK
6		887.480	-13.028	58.792	45.764	-0.236	46.000	QUASIPEAK

Note:

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

Site : CB1	**Time : 2013/11/20 - 16:24**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Probe : CB1_FCC_EFS_30-1G-2_1011 - VERTICAL	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : Mode 1: Transmit(Adapter:PA1030-2I) 802.11n 20MHz_5180MHz**

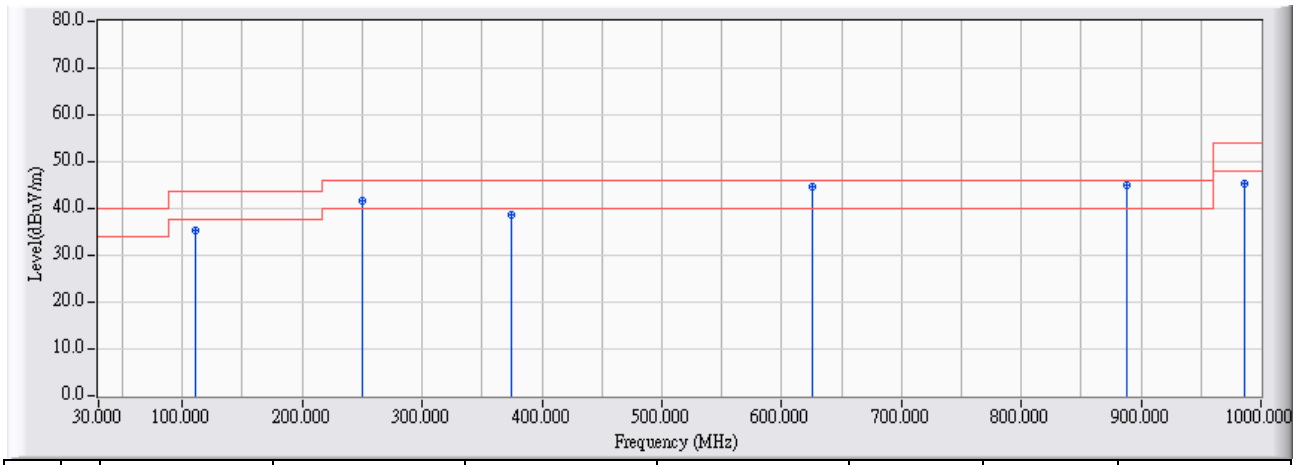


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		110.995	-22.629	56.725	34.096	-9.404	43.500	QUASIPEAK
2		250.190	-20.538	57.225	36.687	-9.313	46.000	QUASIPEAK
3		374.835	-18.049	58.997	40.947	-5.053	46.000	QUASIPEAK
4		591.630	-15.331	58.496	43.165	-2.835	46.000	QUASIPEAK
5		625.095	-15.158	56.810	41.652	-4.348	46.000	QUASIPEAK
6	*	887.480	-13.028	58.733	45.705	-0.295	46.000	QUASIPEAK

Note:

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

Site : CB1	**Time : 2013/11/20 - 16:28**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Probe : CB1_FCC_EFS_30-1G-2_1011 - HORIZONTAL	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : Mode 1: Transmit(Adapter:PA1030-2I) 802.11n 40MHz_5190MHz**

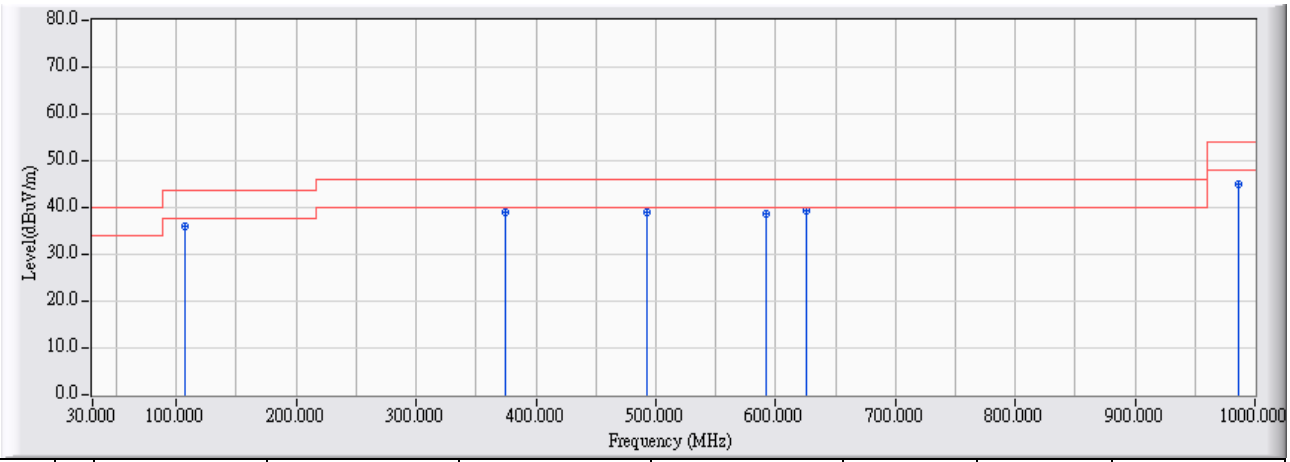


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		110.995	-22.629	58.017	35.388	-8.112	43.500	QUASIPEAK
2		250.190	-20.538	62.178	41.640	-4.360	46.000	QUASIPEAK
3		374.835	-18.049	56.864	38.814	-7.186	46.000	QUASIPEAK
4		625.095	-15.158	59.792	44.634	-1.366	46.000	QUASIPEAK
5	*	887.480	-13.028	58.185	45.157	-0.843	46.000	QUASIPEAK
6		985.935	-12.268	57.549	45.281	-8.719	54.000	QUASIPEAK

Note:

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

Site : CB1	**Time : 2013/11/20 - 16:33**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Probe : CB1_FCC_EFS_30-1G-2_1011 - VERTICAL	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : Mode 1: Transmit(Adapter:PA1030-2I) 802.11n 40MHz_5190MHz**

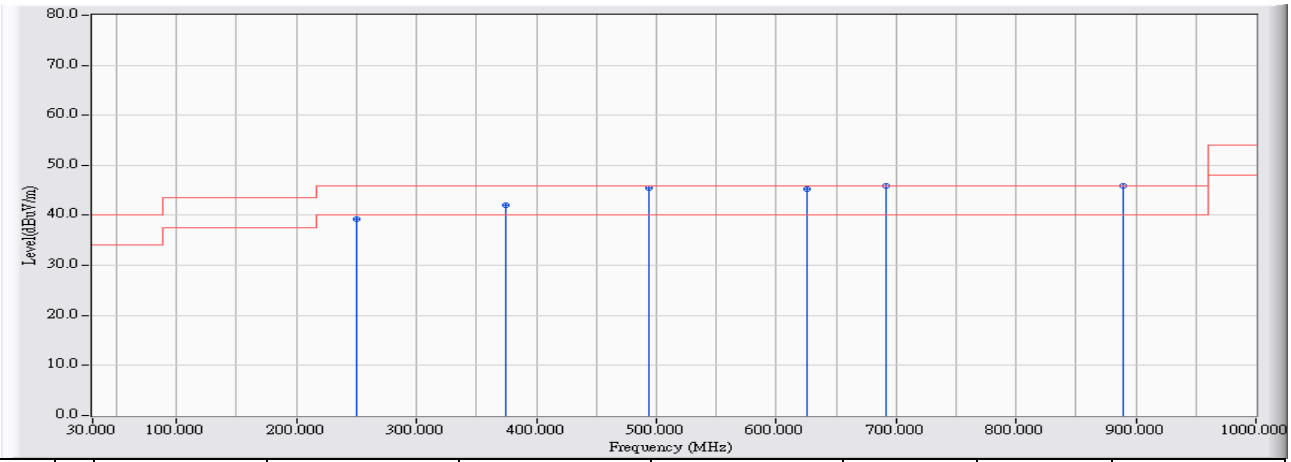


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		106.630	-22.846	58.886	36.040	-7.460	43.500	QUASIPEAK
2		374.835	-18.049	57.116	39.066	-6.934	46.000	QUASIPEAK
3		492.690	-15.606	54.647	39.042	-6.958	46.000	QUASIPEAK
4		591.630	-15.331	54.043	38.712	-7.288	46.000	QUASIPEAK
5	*	625.095	-15.158	54.579	39.421	-6.579	46.000	QUASIPEAK
6		985.935	-12.268	57.302	45.034	-8.966	54.000	QUASIPEAK

Note:

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

Site : CB1	**Time : 2013/11/20 - 19:23**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Probe : CB1_FCC_EFS_30-1G-2_1011 - HORIZONTAL	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : Mode 2: Transmit(Adapter: HK-AX-120A200-US) 802.11n 20MHz_5180MHz**

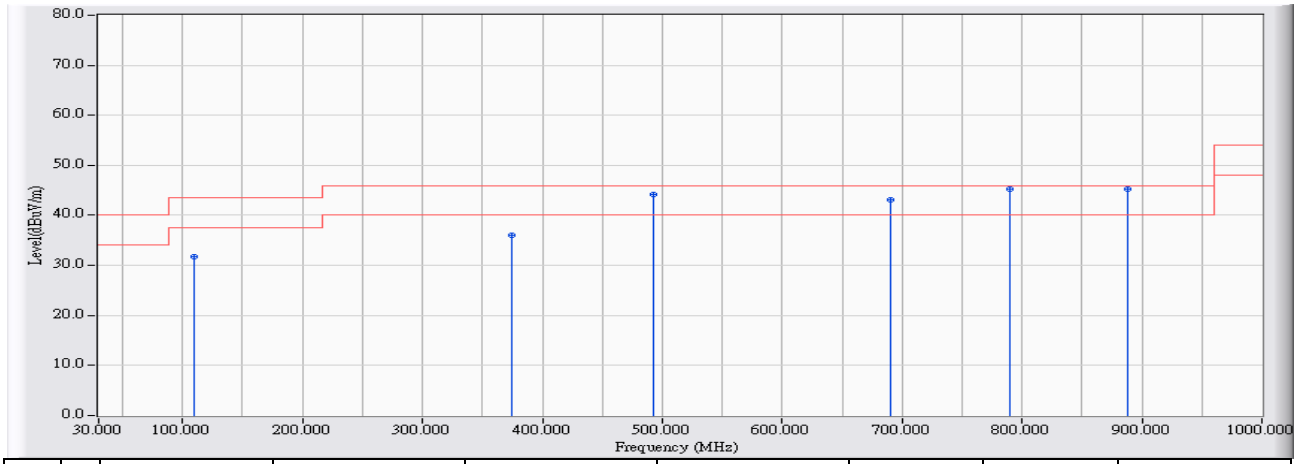


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		250.190	-21.013	60.294	39.281	-6.719	46.000	QUASIPEAK
2		374.835	-18.175	60.236	42.061	-3.939	46.000	QUASIPEAK
3		493.660	-15.740	61.235	45.495	-0.505	46.000	QUASIPEAK
4		625.095	-15.389	60.672	45.283	-0.717	46.000	QUASIPEAK
5	*	691.055	-15.053	60.911	45.858	-0.142	46.000	QUASIPEAK
6		888.935	-13.357	59.201	45.845	-0.155	46.000	QUASIPEAK

Note:

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

Site : CB1	**Time : 2013/11/20 - 19:29**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Probe : CB1_FCC_EFS_30-1G-2_1011 - VERTICAL	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : Mode 2: Transmit(Adapter: HK-AX-120A200-US) 802.11n 20MHz_5180MHz**

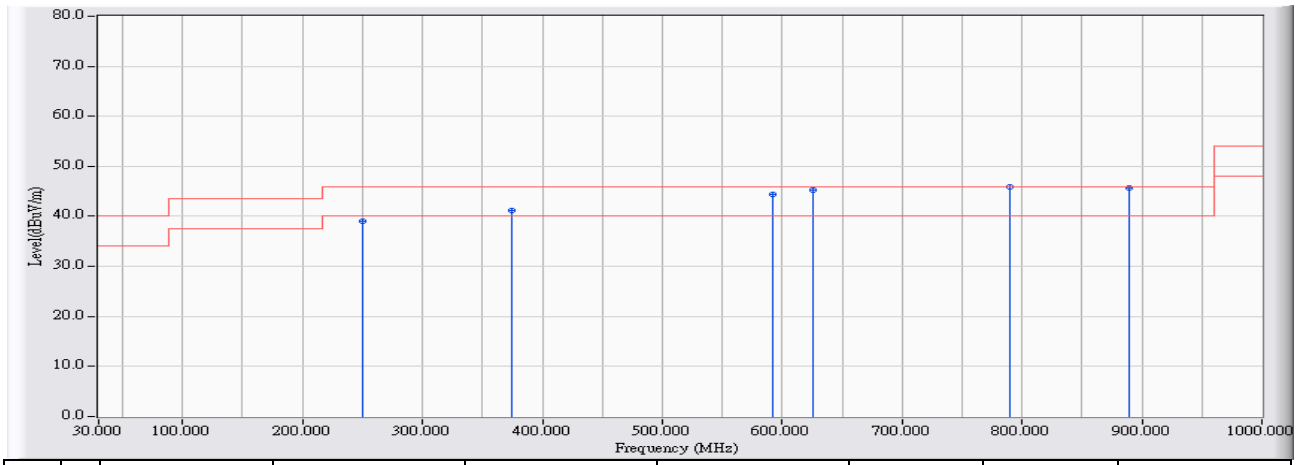


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		110.025	-22.669	54.399	31.731	-11.769	43.500	QUASIPEAK
2		374.835	-18.175	54.245	36.070	-9.930	46.000	QUASIPEAK
3		493.175	-15.748	59.973	44.224	-1.776	46.000	QUASIPEAK
4		690.570	-15.056	58.126	43.070	-2.930	46.000	QUASIPEAK
5		789.510	-13.735	58.898	45.163	-0.837	46.000	QUASIPEAK
6	*	887.965	-13.358	58.539	45.180	-0.820	46.000	QUASIPEAK

Note:

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

Site : CB1	**Time : 2013/11/20 - 19:34**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Probe : CB1_FCC_EFS_30-1G-2_1011 - HORIZONTAL	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : Mode 2: Transmit(Adapter: HK-AX-120A200-US) 802.11n 40MHz_5190MHz**

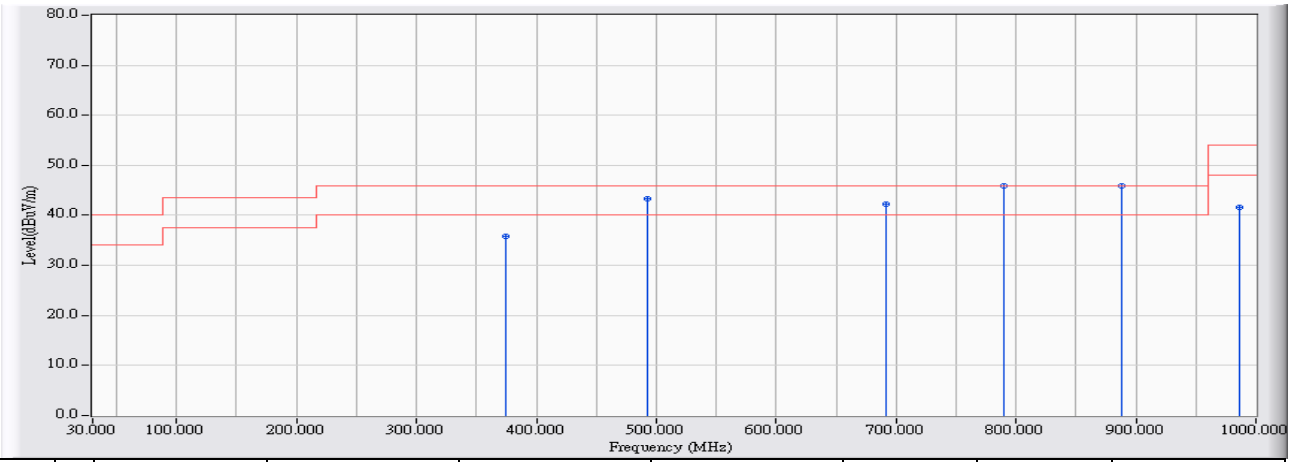


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		250.190	-21.013	60.134	39.121	-6.879	46.000	QUASIPEAK
2		374.835	-18.175	59.325	41.150	-4.850	46.000	QUASIPEAK
3		592.600	-15.524	59.900	44.376	-1.624	46.000	QUASIPEAK
4		625.095	-15.389	60.586	45.197	-0.803	46.000	QUASIPEAK
5	*	789.995	-13.728	59.631	45.903	-0.097	46.000	QUASIPEAK
6		888.935	-13.357	59.095	45.739	-0.261	46.000	QUASIPEAK

Note:

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

Site : CB1	**Time : 2013/11/20 - 19:38**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Probe : CB1_FCC_EFS_30-1G-2_1011 - VERTICAL	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : Mode 2: Transmit(Adapter: HK-AX-120A200-US) 802.11n 40MHz_5190MHz**



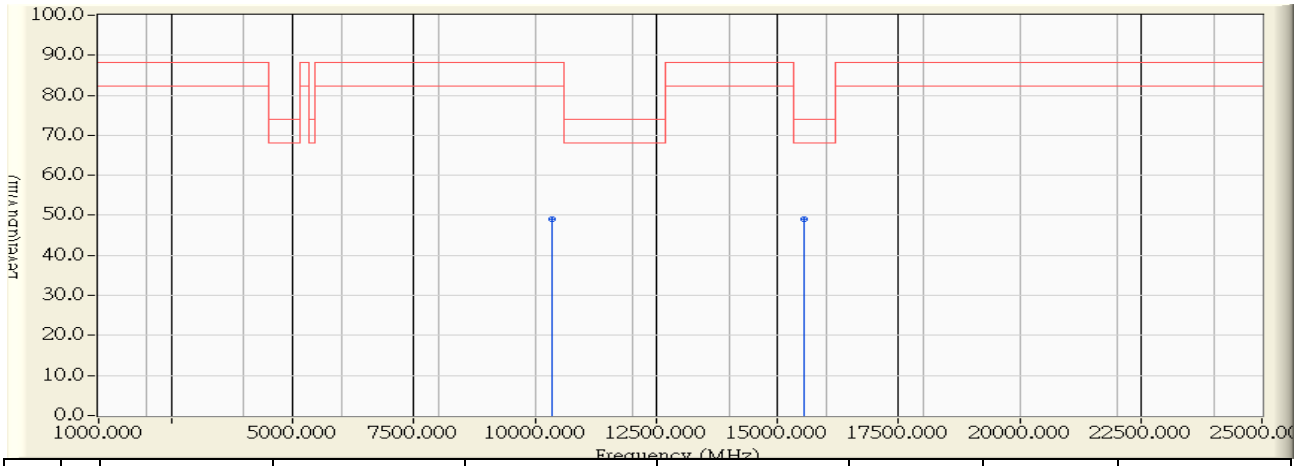
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		374.835	-18.175	53.904	35.729	-10.271	46.000	QUASIPEAK
2		493.175	-15.748	59.001	43.252	-2.748	46.000	QUASIPEAK
3		691.055	-15.053	57.410	42.357	-3.643	46.000	QUASIPEAK
4		789.510	-13.735	59.592	45.857	-0.143	46.000	QUASIPEAK
5	*	887.965	-13.358	59.222	45.863	-0.137	46.000	QUASIPEAK
6		986.905	-12.704	54.347	41.642	-12.358	54.000	QUASIPEAK

Note:

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

Harmonic & Spurious:

Site : CB1	**Time : 2013/05/15 - 19:17**
Limit : FCC_SpartE_15.407_H_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : 802.11a_5180MHz**

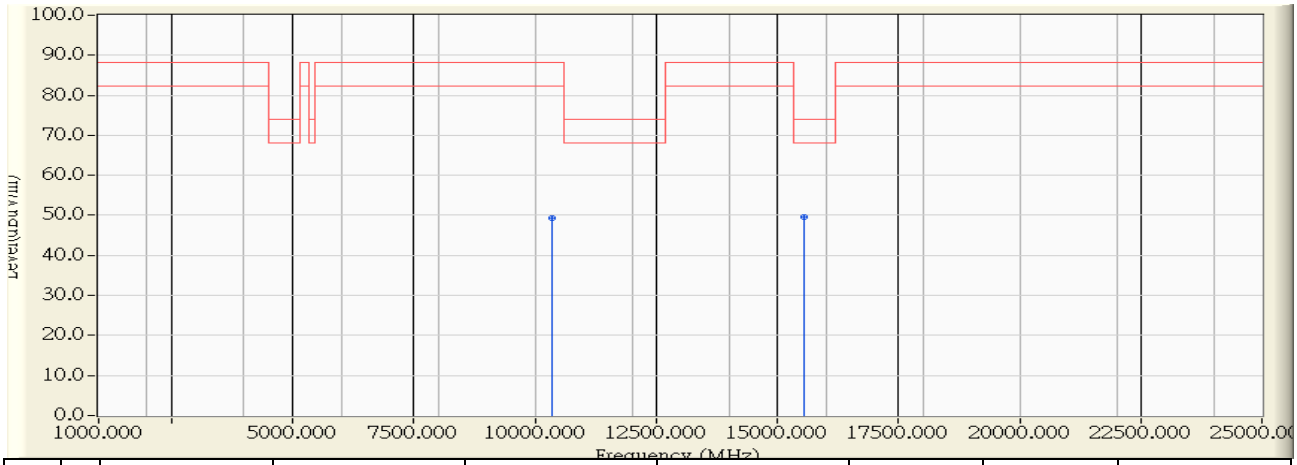


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		10361.760	10.789	38.396	49.185	-39.115	88.300	PEAK
2	*	15542.380	11.402	37.784	49.186	-24.814	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. " # ", means the frequency is out of the restricted band.
6. Measurement Level = Reading Level + Correct Factor.
7. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	**Time : 2013/05/15 - 19:17**
Limit : FCC_SpartE_15.407_H_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : 802.11a_5180MHz**

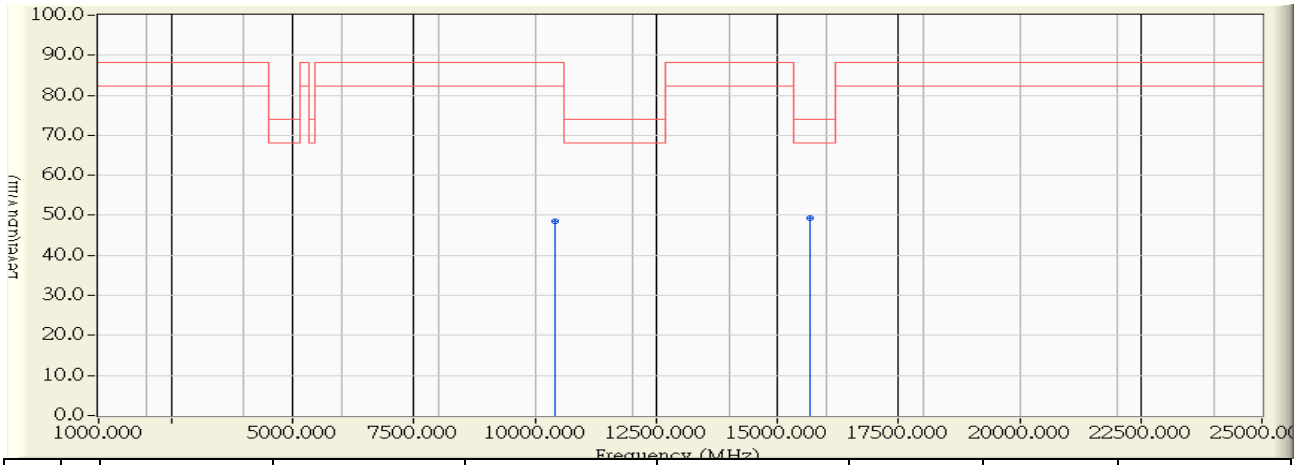


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		10359.760	10.795	38.561	49.356	-38.944	88.300	PEAK
2	*	15544.720	11.401	38.072	49.473	-24.527	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. " # ", means the frequency is out of the restricted band.
6. Measurement Level = Reading Level + Correct Factor.
7. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	**Time : 2013/05/15 - 19:29**
Limit : FCC_SpartE_15.407_H_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : 802.11a_5220MHz**

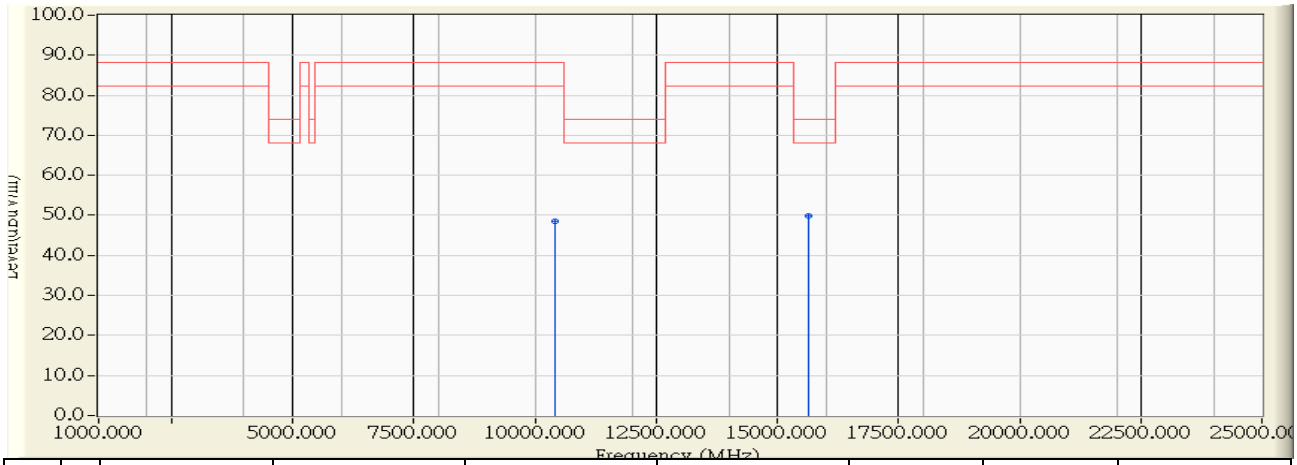


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		10420.100	10.628	37.989	48.617	-39.683	88.300	PEAK
2	*	15674.800	11.311	38.097	49.409	-24.591	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. " # ", means the frequency is out of the restricted band.
6. Measurement Level = Reading Level + Correct Factor.
7. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	**Time : 2013/05/15 - 19:31**
Limit : FCC_SpartE_15.407_H_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : 802.11a_5220MHz**

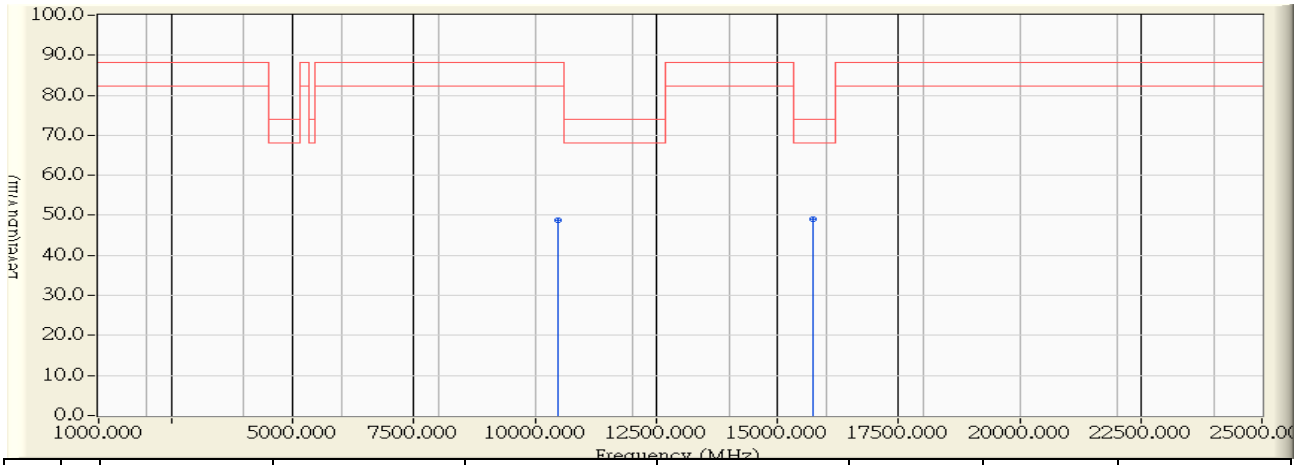


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		10415.600	10.640	37.996	48.636	-39.664	88.300	PEAK
2	*	15637.700	11.337	38.432	49.769	-24.231	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. " # ", means the frequency is out of the restricted band.
6. Measurement Level = Reading Level + Correct Factor.
7. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	**Time : 2013/05/15 - 19:36**
Limit : FCC_SpartE_15.407_H_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : 802.11a_5240MHz**

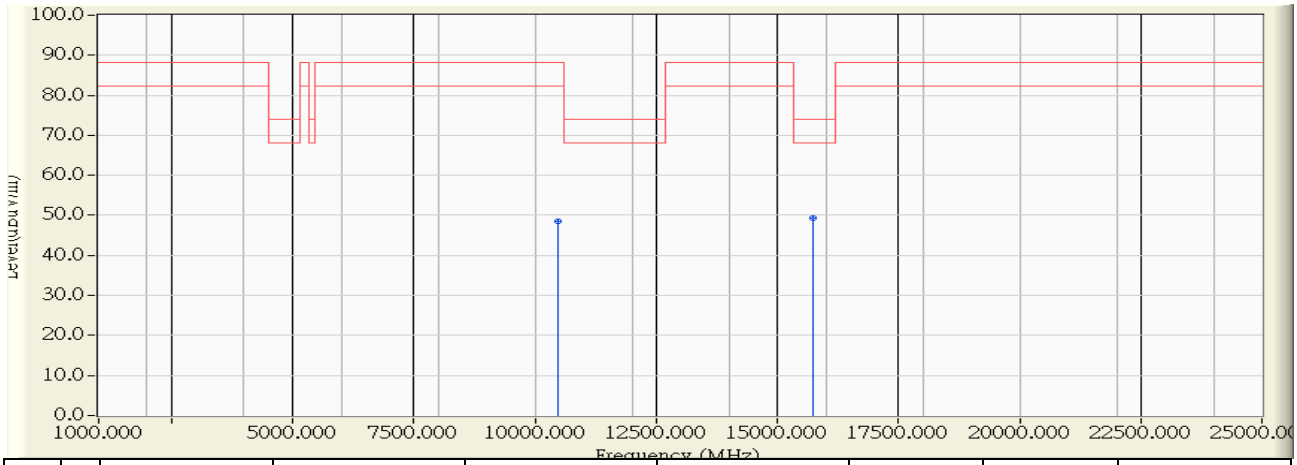


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		10479.150	10.464	38.339	48.804	-39.496	88.300	PEAK
2	*	15728.150	11.275	37.801	49.076	-24.924	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. " # ", means the frequency is out of the restricted band.
6. Measurement Level = Reading Level + Correct Factor.
7. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	**Time : 2013/05/15 - 19:38**
Limit : FCC_SpartE_15.407_H_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : 802.11a_5240MHz**

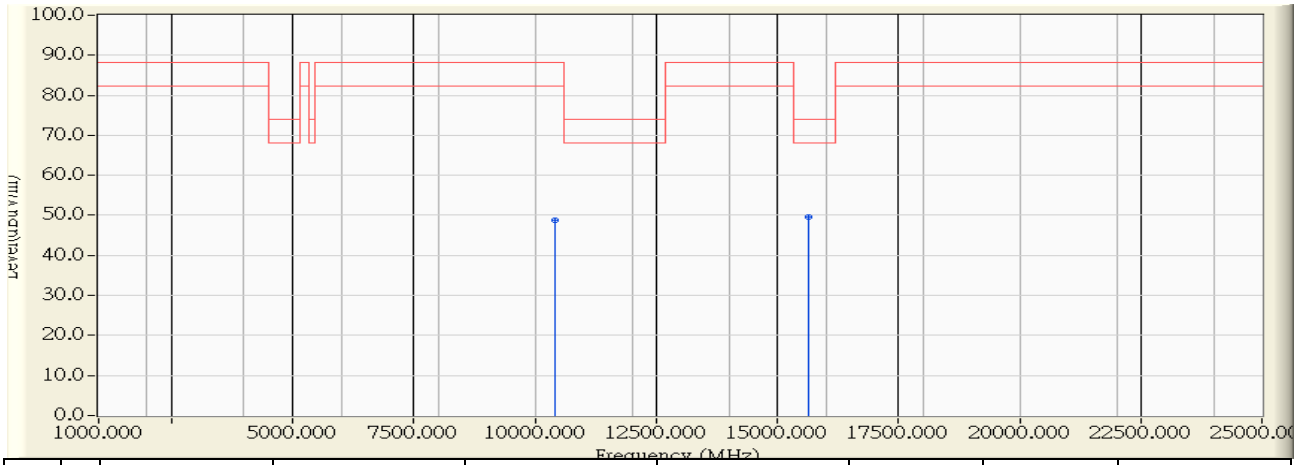


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		10467.750	10.497	37.948	48.444	-39.856	88.300	PEAK
2	*	15728.600	11.274	37.964	49.239	-24.761	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. " # ", means the frequency is out of the restricted band.
6. Measurement Level = Reading Level + Correct Factor.
7. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	**Time : 2013/05/15 - 19:42**
Limit : FCC_SpartE_15.407_H_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : 802.11n 20MHz_5180MHz**

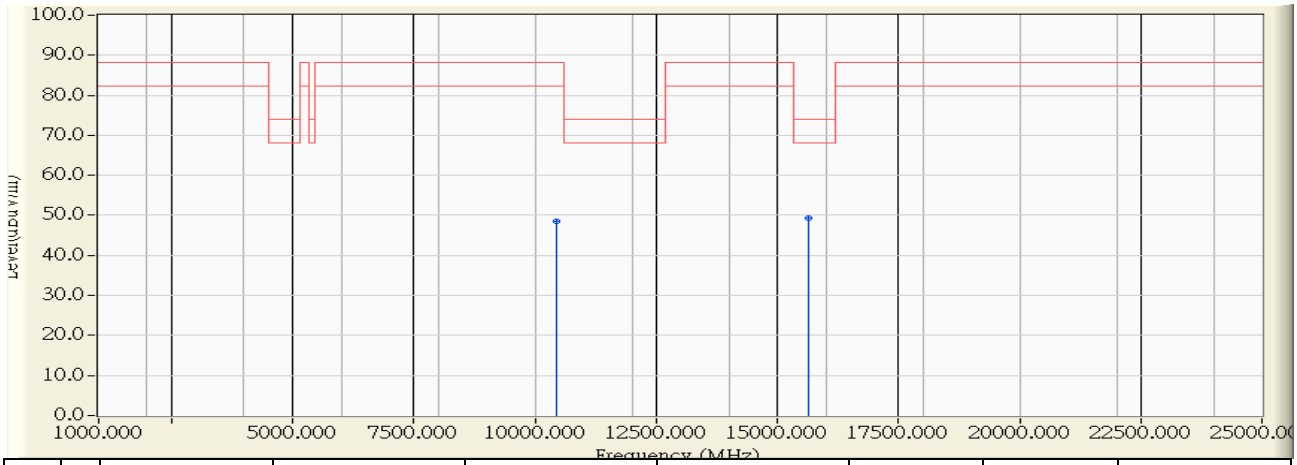


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		10419.150	10.630	38.134	48.765	-39.535	88.300	PEAK
2	*	15659.650	11.322	38.189	49.511	-24.489	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. " # ", means the frequency is out of the restricted band.
6. Measurement Level = Reading Level + Correct Factor.
7. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	**Time : 2013/05/15 - 19:44**
Limit : FCC_SpartE_15.407_H_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : 802.11n 20MHz_5180MHz**

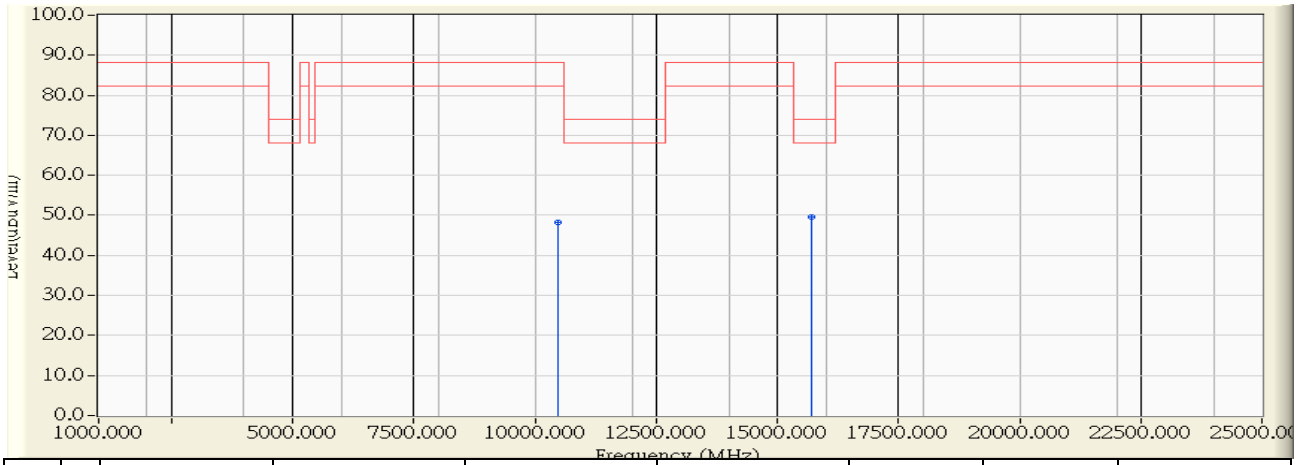


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		10439.600	10.574	38.075	48.649	-39.651	88.300	PEAK
2	*	15641.250	11.334	38.015	49.349	-24.651	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. " # ", means the frequency is out of the restricted band.
6. Measurement Level = Reading Level + Correct Factor.
7. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	**Time : 2013/05/15 - 19:47**
Limit : FCC_SpartE_15.407_H_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : 802.11n 20MHz_5220MHz**

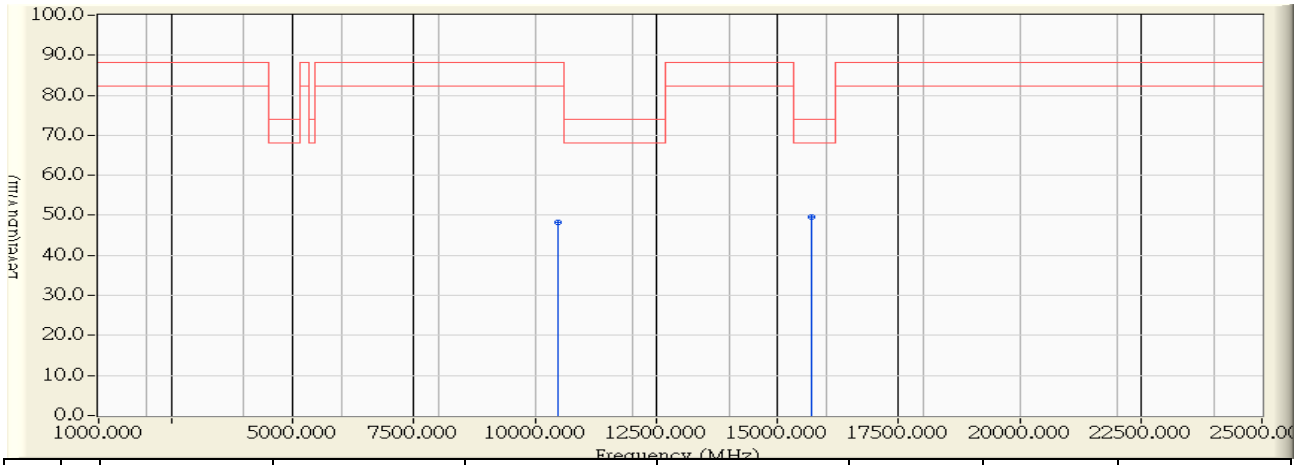


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		10484.850	10.450	37.687	48.136	-40.164	88.300	PEAK
2	*	15709.950	11.287	38.202	49.489	-24.511	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. " # ", means the frequency is out of the restricted band.
6. Measurement Level = Reading Level + Correct Factor.
7. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	**Time : 2013/05/15 - 19:49**
Limit : FCC_SpartE_15.407_H_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : 802.11n 20MHz_5220MHz**

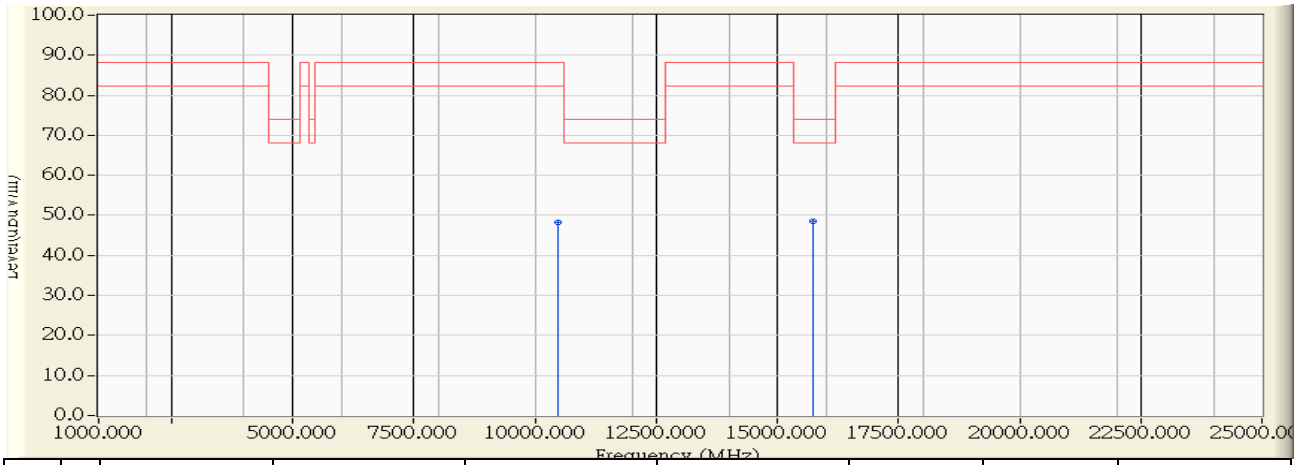


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		10474.100	10.478	37.853	48.332	-39.968	88.300	PEAK
2	*	15721.750	11.279	38.426	49.705	-24.295	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. " # ", means the frequency is out of the restricted band.
6. Measurement Level = Reading Level + Correct Factor.
7. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	**Time : 2013/05/15 - 19:52**
Limit : FCC_SpartE_15.407_H_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : 802.11n 20MHz_5240MHz**

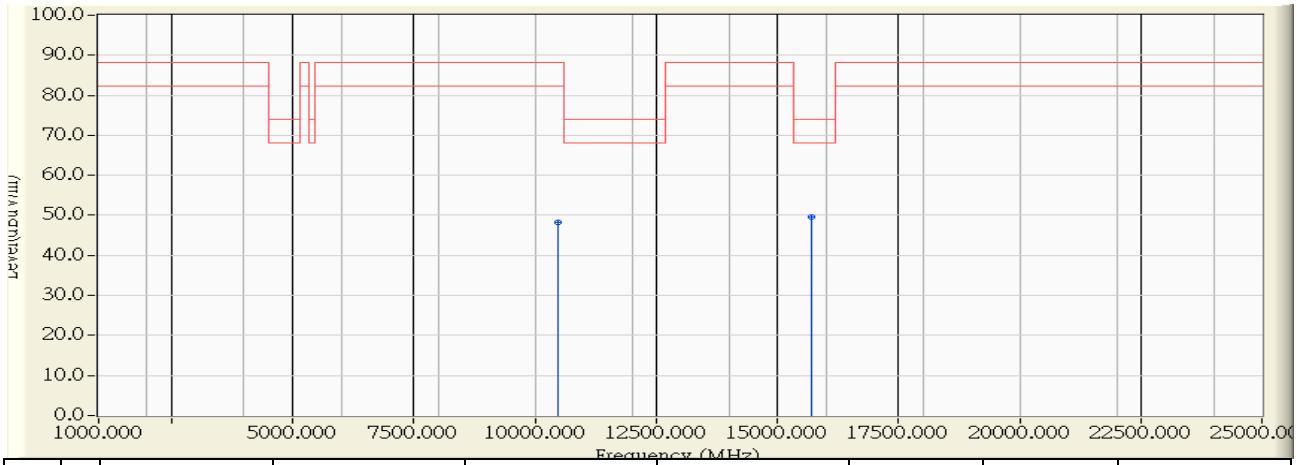


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		10468.750	10.493	37.729	48.223	-40.077	88.300	PEAK
2	*	15729.900	11.274	37.271	48.545	-25.455	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. " # ", means the frequency is out of the restricted band.
6. Measurement Level = Reading Level + Correct Factor.
7. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	**Time : 2013/05/15 - 19:57**
Limit : FCC_SpartE_15.407_H_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : 802.11n 20MHz_5240MHz**

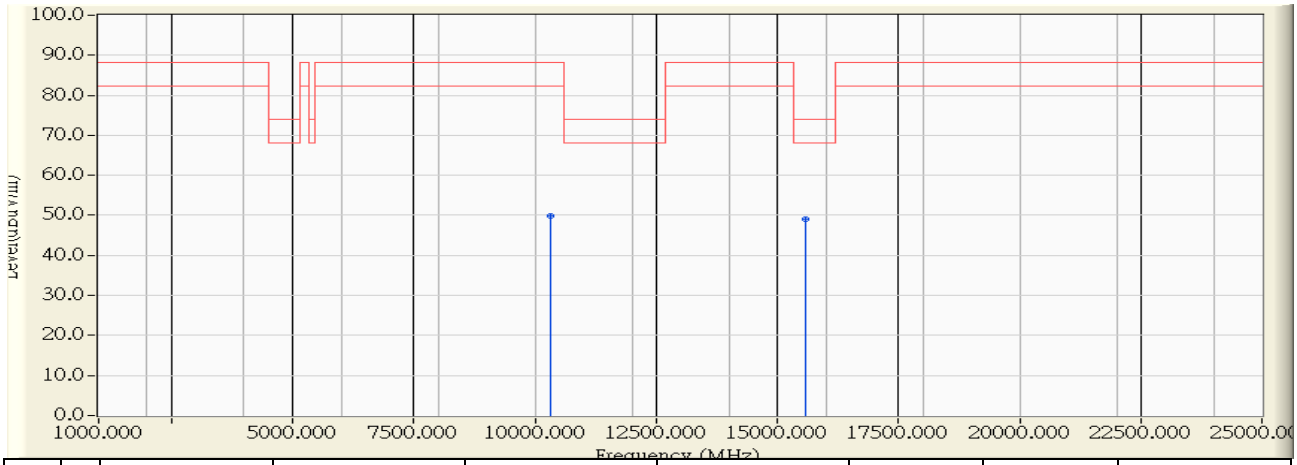


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		10480.050	10.463	37.814	48.276	-40.024	88.300	PEAK
2	*	15705.250	11.290	38.410	49.701	-24.299	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. " # ", means the frequency is out of the restricted band.
6. Measurement Level = Reading Level + Correct Factor.
7. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	**Time : 2013/05/15 - 20:01**
Limit : FCC_SpartE_15.407_H_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : 802.11n 40MHz_5190MHz**

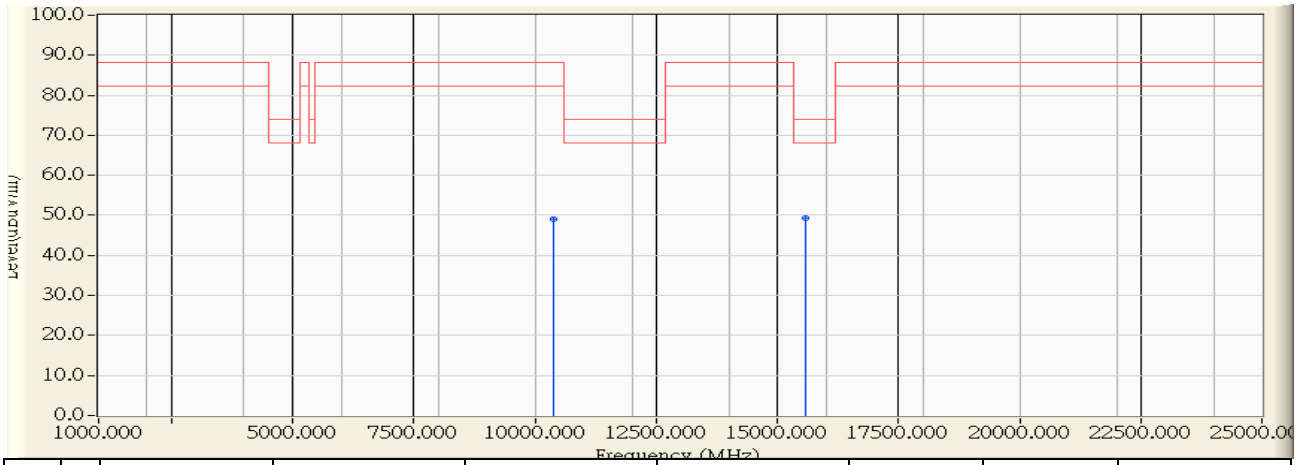


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		10335.600	10.861	38.932	49.793	-38.507	88.300	PEAK
2	*	15572.000	11.381	37.797	49.179	-24.821	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. " # ", means the frequency is out of the restricted band.
6. Measurement Level = Reading Level + Correct Factor.
7. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	**Time : 2013/05/15 - 20:03**
Limit : FCC_SpartE_15.407_H_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : 802.11n 40MHz_5190MHz**

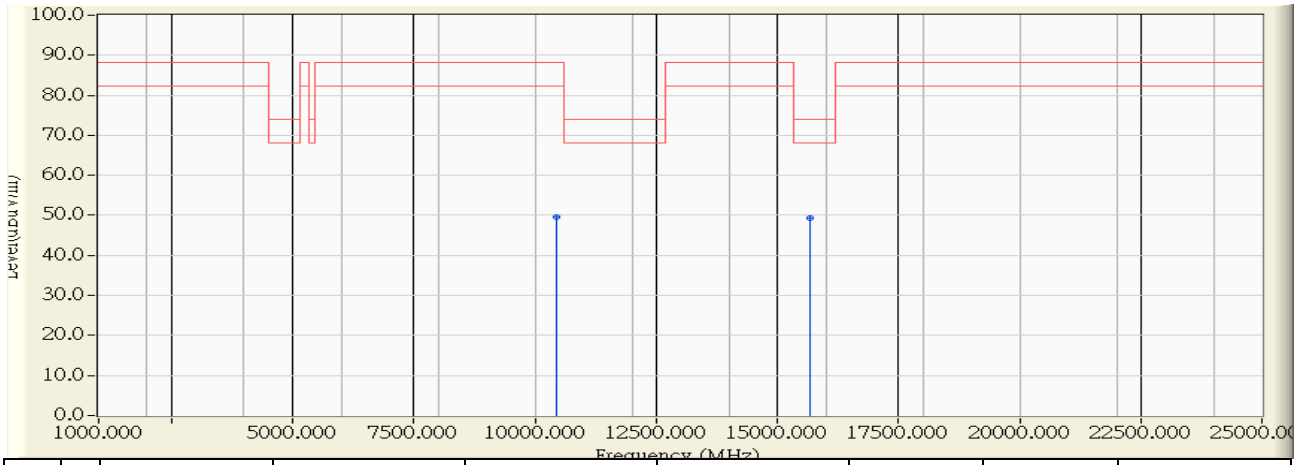


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		10397.000	10.692	38.271	48.963	-39.337	88.300	PEAK
2	*	15575.200	11.380	38.030	49.410	-24.590	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. " # ", means the frequency is out of the restricted band.
6. Measurement Level = Reading Level + Correct Factor.
7. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	**Time : 2013/05/15 - 20:07**
Limit : FCC_SpartE_15.407_H_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note :802.11n 40MHz_5230MHz**

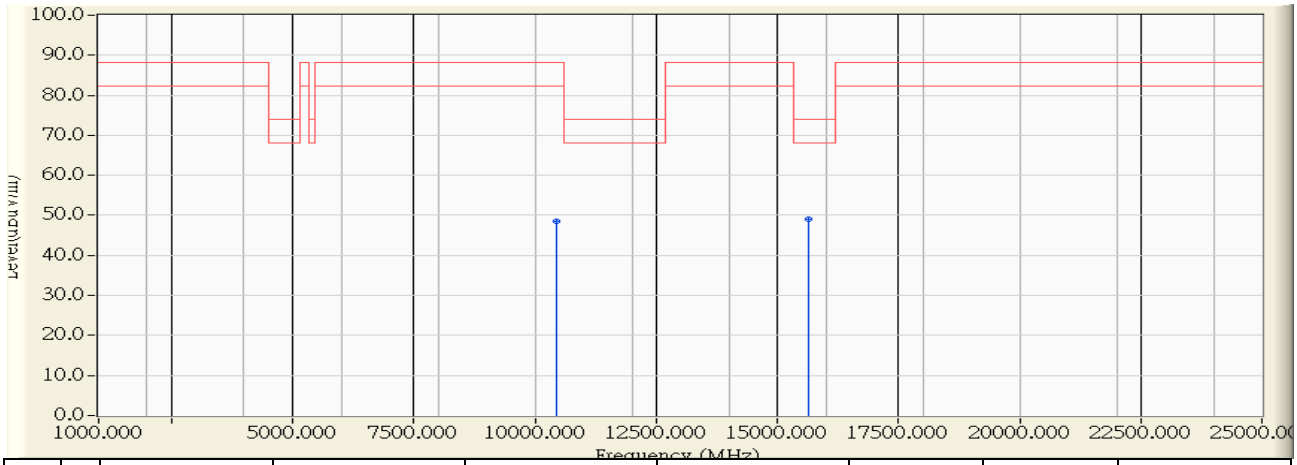


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		10433.900	10.590	38.975	49.565	-38.735	88.300	PEAK
2	*	15668.400	11.316	37.963	49.279	-24.721	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. " # ", means the frequency is out of the restricted band.
6. Measurement Level = Reading Level + Correct Factor.
7. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	**Time : 2013/05/15 - 20:09**
Limit : FCC_SpartE_15.407_H_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note :802.11n 40MHz_5230MHz**

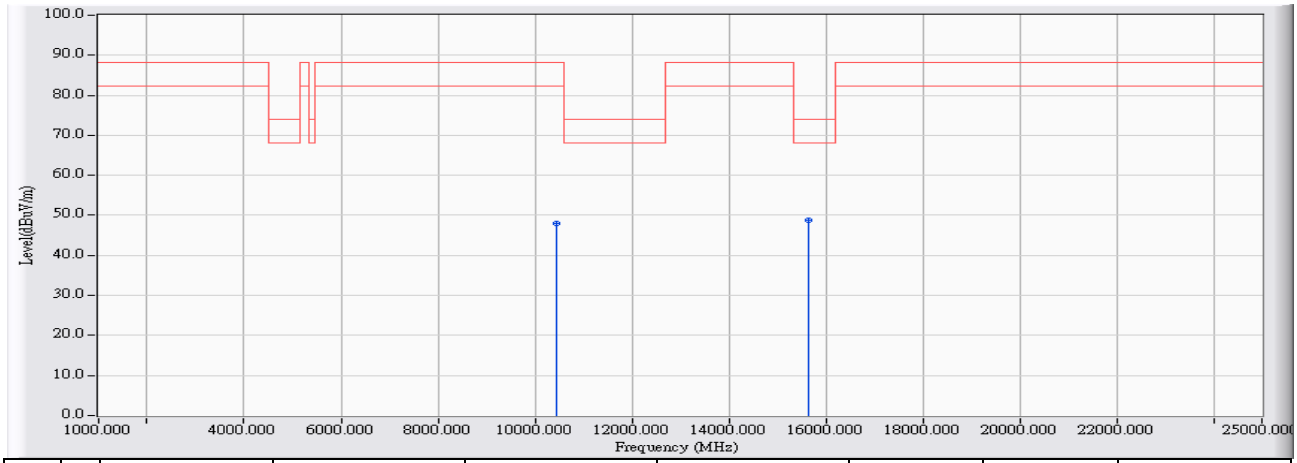


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		10440.700	10.570	37.908	48.479	-39.821	88.300	PEAK
2	*	15651.000	11.328	37.850	49.178	-24.822	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. " # ", means the frequency is out of the restricted band.
6. Measurement Level = Reading Level + Correct Factor.
7. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	**Time : 2013/08/26 - 10:18**
Limit : FCC_SpartE_15.407_H_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : 802.11n 40MHz_5220MHz_Co-location**

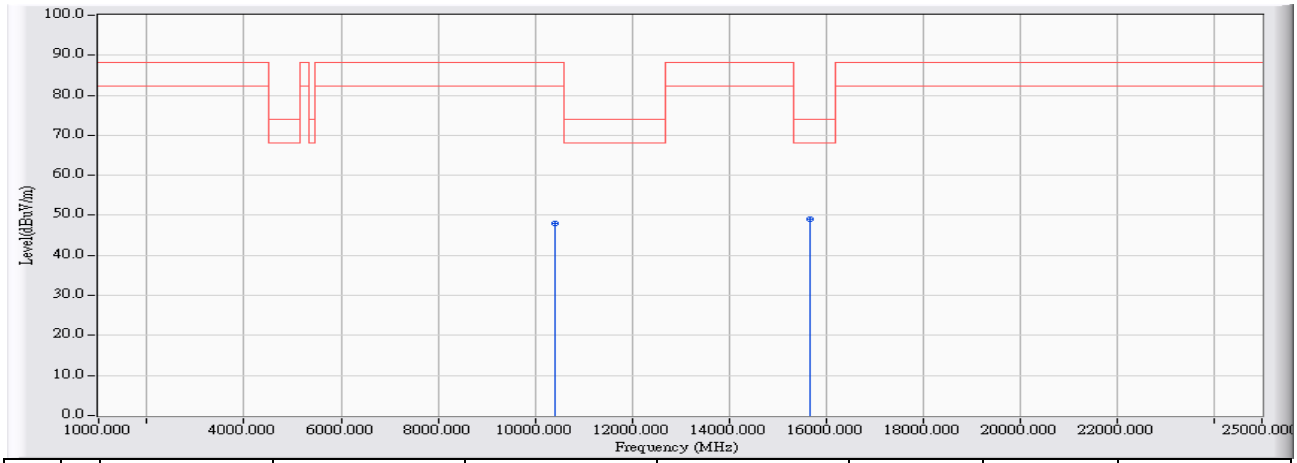


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		10448.600	12.614	35.342	47.957	-40.343	88.300	PEAK
2	*	15638.250	12.975	35.804	48.779	-25.221	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. " # ", means the frequency is out of the restricted band.
6. Measurement Level = Reading Level + Correct Factor.
7. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	**Time : 2013/08/26 - 10:23**
Limit : FCC_SpartE_15.407_H_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : 802.11n 40MHz_5220MHz_Co-location**



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		10421.750	12.598	35.522	48.120	-40.180	88.300	PEAK
2	*	15663.250	12.979	35.987	48.967	-25.033	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. " # ", means the frequency is out of the restricted band.
6. Measurement Level = Reading Level + Correct Factor.
7. The average measurement was not performed when the peak measured data under the limit of average detection.

8. Band Edge

8.1. Test Equipment

The following test equipments are used during the band edge tests:

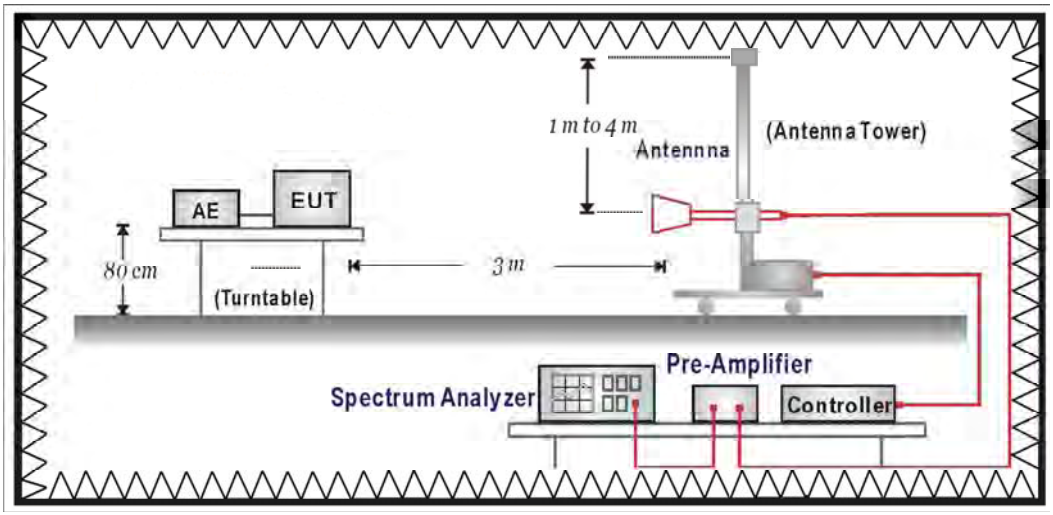
Band Edge / CB1

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Double Ridged Guide Horn Antenna	Schwarzback	BBHA 9120	D743	2014/02/17
Spectrum Analyzer	Agilent	E4440A	MY46187335	2014/01/27
k Type Cable	Huber Suhner	Sucoflex 102	25623/2	2014/02/21

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

8.2. Test Setup

RF Radiated Measurement:



8.3. Limits

➢ General Radiated Emission Limits

The provisions of Section 15.205 of this part apply to intentional radiators operating under this section. Radiated emissions which fall in the restricted bands, as defined in Section 15.205, must also comply with the radiated emission limits specified in Section 15.209:

FCC Part 15 Subpart C Paragraph 15.209 Limits		
Frequency MHz	uV/m @3m	dBuV/m@3m
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Remark:

4. RF Voltage (dBuV) = 20 log RF Voltage (uV)
5. In the Above Table, the tighter limit applies at the band edges.
6. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

➢ Unwanted Emission out of the restricted bands Limits

FCC Part 15 Subpart C Paragraph 15.407(b) Limits		
Frequency (MHz)	EIRP Limit (dBm)	Equivalent Field Strength (dBuV/m@3m)
5150~5250	-27	68.3
5250~5350	-27	68.3
5470~5725	-27	68.3
5725~5825	-27 (Note1)	68.3
	-17 (Note2)	78.3

Remark:

4. For frequencies more than 10 MHz above or below the band edges.
5. For frequency range from the band edges to 10 MHz above or below the band edges.
6. uV/m = $\frac{1000000\sqrt{30 \times EIRP}}{3}$, RF Voltage (dBuV/m) = 20 log RF Voltage (uV/m)

8.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4: 2009on radiated measurement.

The bandwidth below 1GHz setting on the field strength meter is 120 KHz, above 1GHz are 1 MHz.

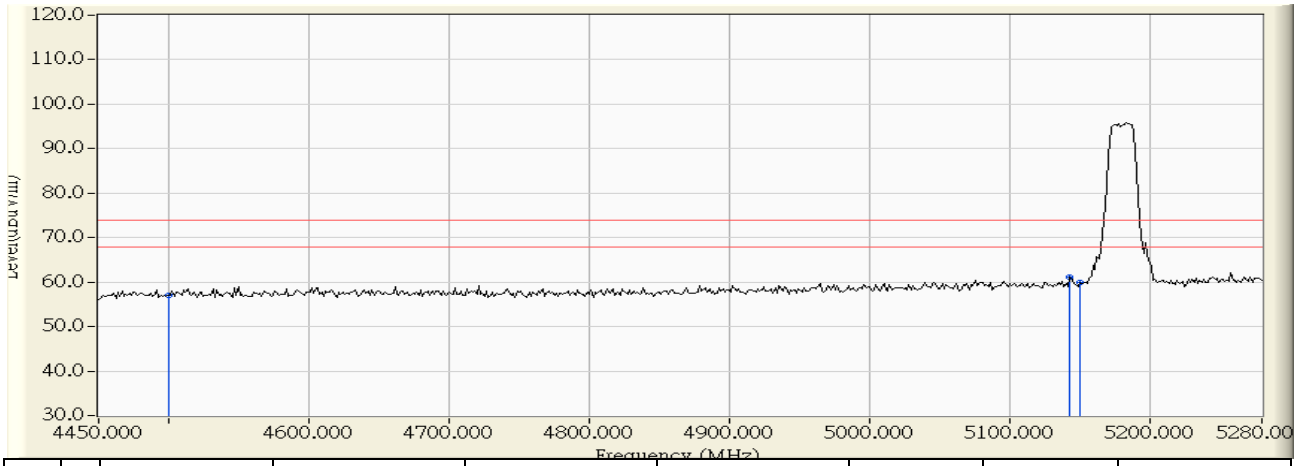
8.5. Uncertainty

The measurement uncertainty is defined as ± 3.65dB

8.6. Test Result

Radiated is defined as

Site : CB1	**Time : 2013/04/27 - 14:54**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : 802.11a_5180MHz**

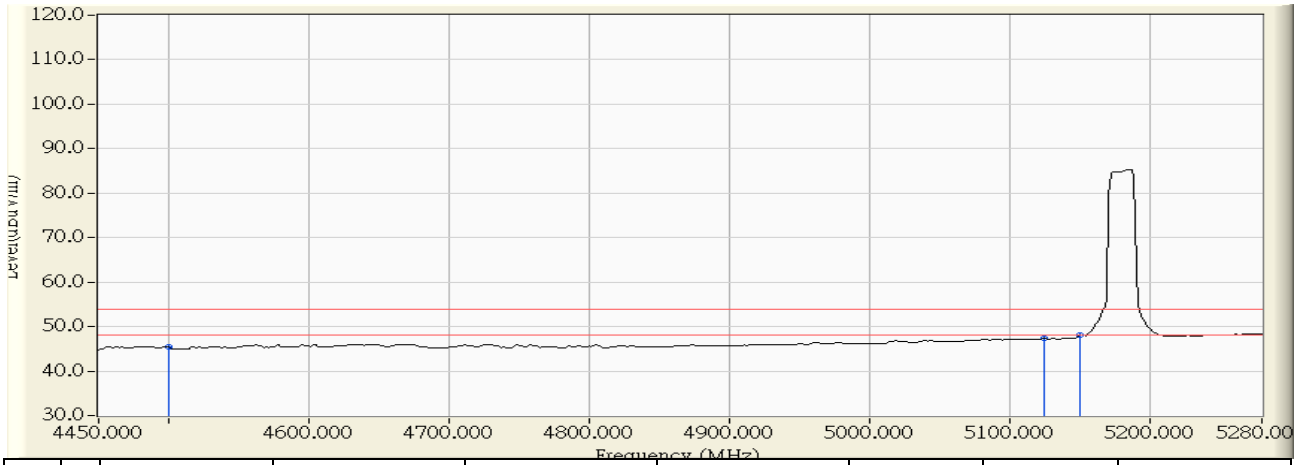


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4500.000	32.947	24.071	57.018	-16.982	74.000	PEAK
2	*	5143.050	35.305	25.833	61.138	-12.862	74.000	PEAK
3		5150.000	35.361	24.572	59.933	-14.067	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	**Time : 2013/04/27 - 14:58**
Limit : FCC_SpartC_15.209_03M_AV	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : 802.11a_5180MHz**

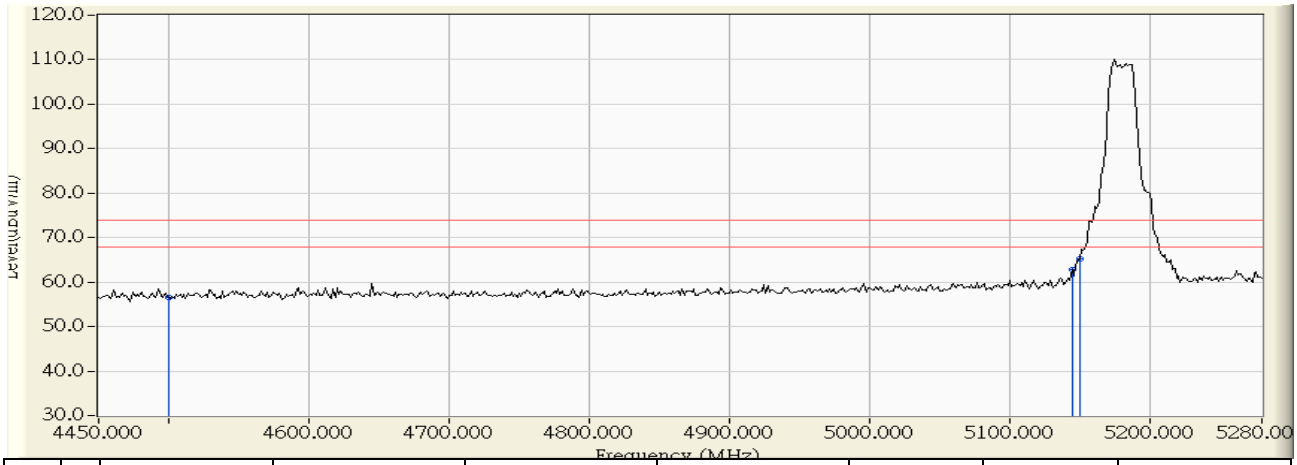


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4500.000	32.947	12.515	45.462	-8.538	54.000	AVERAGE
2		5125.067	35.160	12.154	47.315	-6.685	54.000	AVERAGE
3	*	5150.000	35.361	12.676	48.037	-5.963	54.000	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	**Time : 2013/04/27 - 15:07**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : 802.11a_5180MHz**

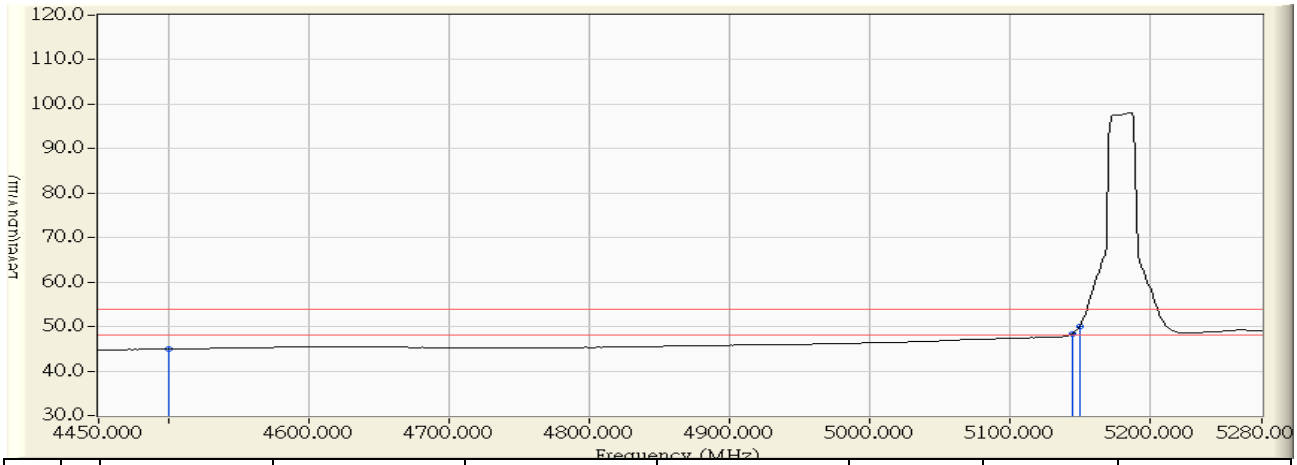


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4500.000	32.947	23.530	56.477	-17.523	74.000	PEAK
2		5144.433	35.316	27.578	62.894	-11.106	74.000	PEAK
3	*	5150.000	35.361	29.962	65.323	-8.677	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	**Time : 2013/04/27 - 15:12**
Limit : FCC_SpartC_15.209_03M_AV	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : 802.11a_5180MHz**

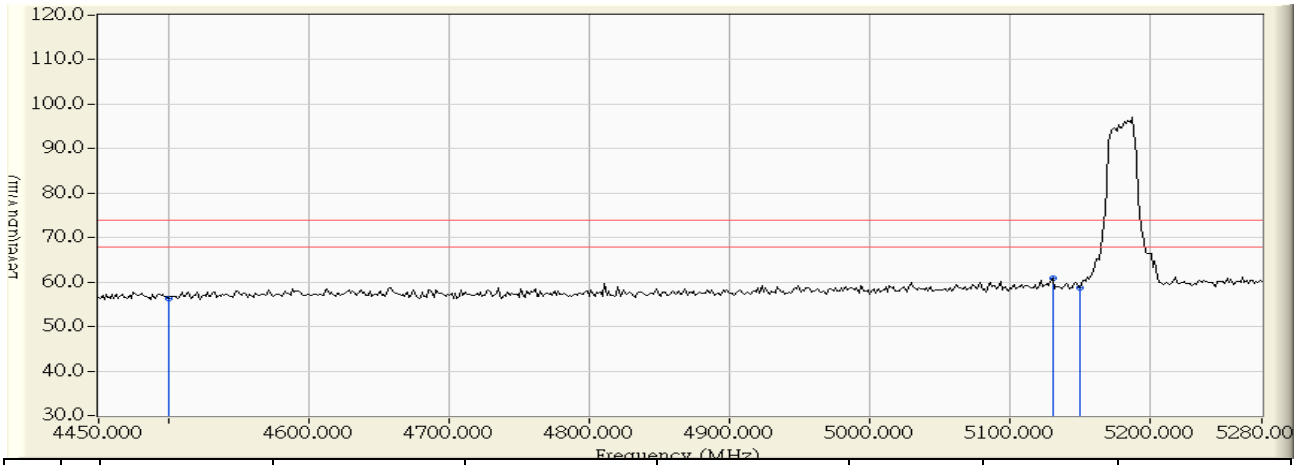


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4500.000	32.947	11.981	44.928	-9.072	54.000	AVERAGE
2		5144.433	35.316	12.988	48.304	-5.696	54.000	AVERAGE
3	*	5150.000	35.361	14.785	50.146	-3.854	54.000	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	**Time : 2013/04/27 - 15:21**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : 8802.11n 20MHz_5180MHz**

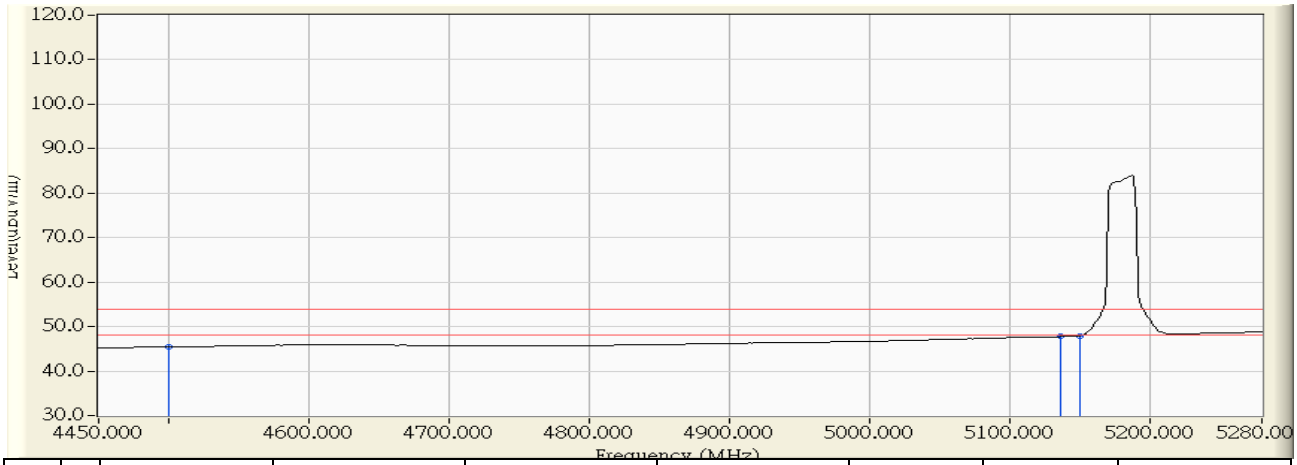


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4500.000	32.947	23.415	56.362	-17.638	74.000	PEAK
2	*	5130.600	35.205	25.644	60.849	-13.151	74.000	PEAK
3		5150.000	35.361	23.259	58.620	-15.380	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	**Time : 2013/04/27 - 15:23**
Limit : FCC_SpartC_15.209_03M_AV	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : 8802.11n 20MHz_5180MHz**

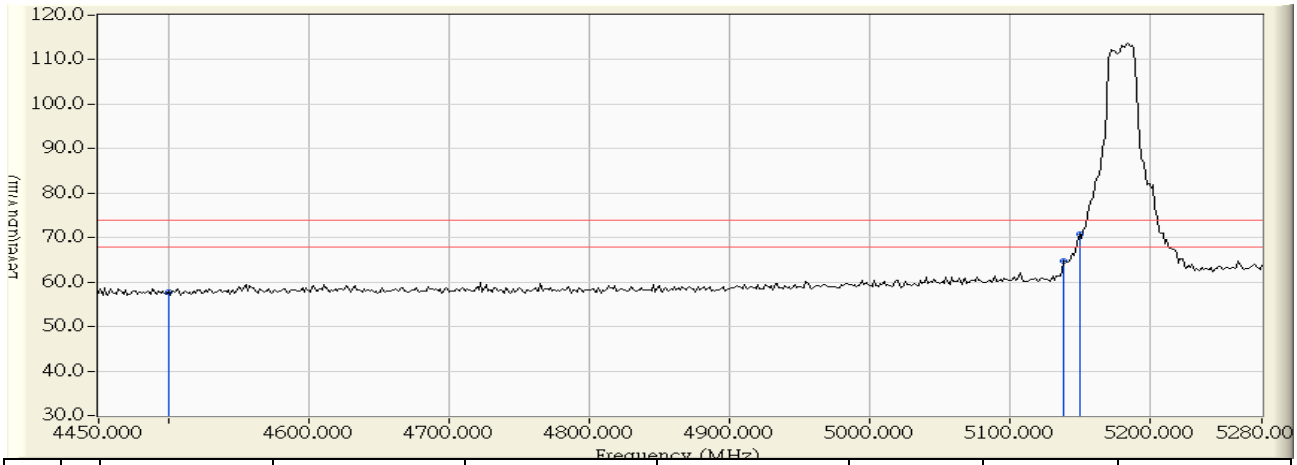


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4500.000	32.947	12.436	45.383	-8.617	54.000	AVERAGE
2		5136.133	35.249	12.490	47.740	-6.260	54.000	AVERAGE
3	*	5150.000	35.361	12.609	47.970	-6.030	54.000	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	**Time : 2013/04/27 - 16:00**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : 8802.11n 20MHz_5180MHz**

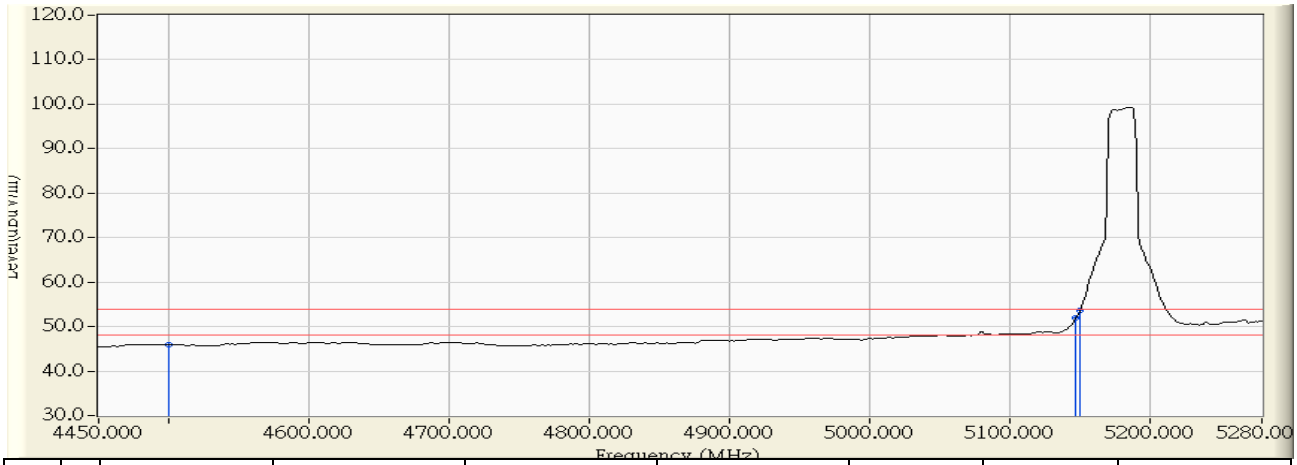


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4500.000	32.947	24.847	57.794	-16.206	74.000	PEAK
2		5138.900	35.272	29.498	64.770	-9.230	74.000	PEAK
3	*	5150.000	35.361	35.440	70.801	-3.199	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	**Time : 2013/04/27 - 16:02**
Limit : FCC_SpartC_15.209_03M_AV	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : 8802.11n 20MHz_5180MHz**

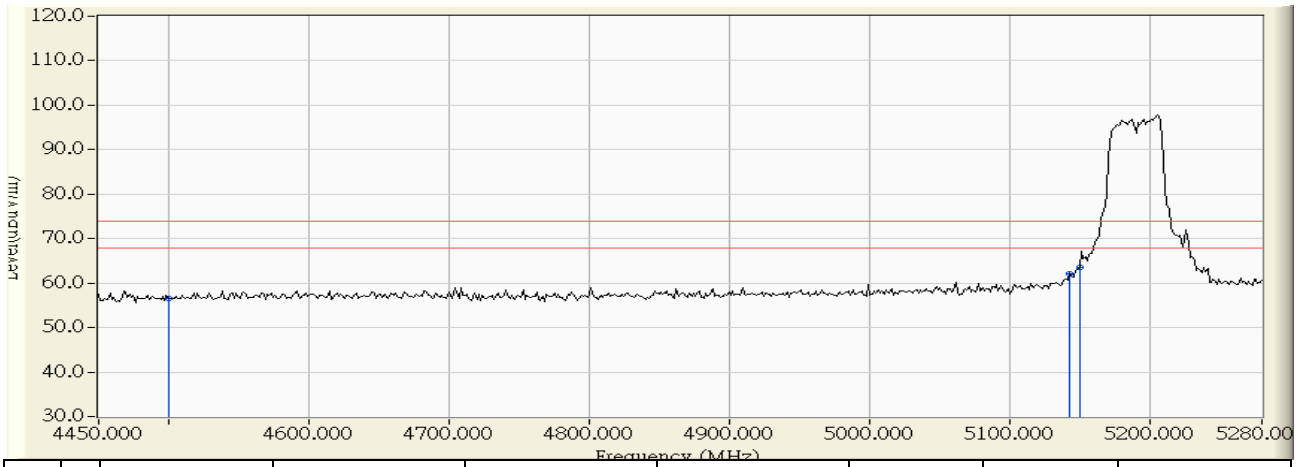


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4500.000	32.947	12.975	45.922	-8.078	54.000	AVERAGE
2		5147.200	35.338	16.535	51.873	-2.127	54.000	AVERAGE
3	*	5150.000	35.361	18.185	53.546	-0.454	54.000	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	**Time : 2013/04/27 - 16:11**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : 802.11n 40MHz_5190MHz**

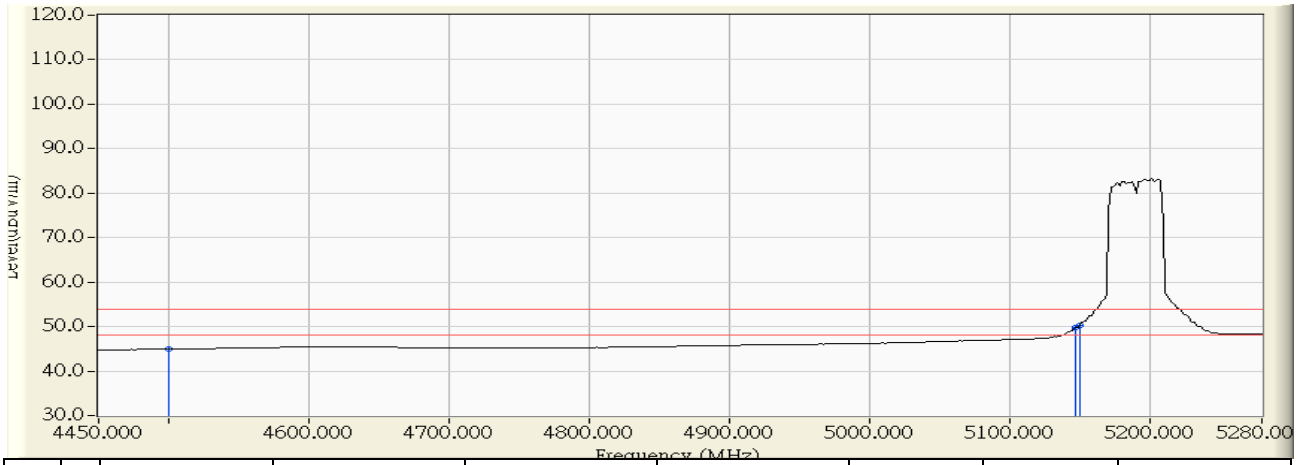


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4500.000	32.947	23.611	56.558	-17.442	74.000	PEAK
2		5143.050	35.305	26.748	62.053	-11.947	74.000	PEAK
3	*	5150.000	35.361	28.195	63.556	-10.444	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	**Time : 2013/04/27 - 16:16**
Limit : FCC_SpartC_15.209_03M_AV	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : 802.11n 40MHz_5190MHz**

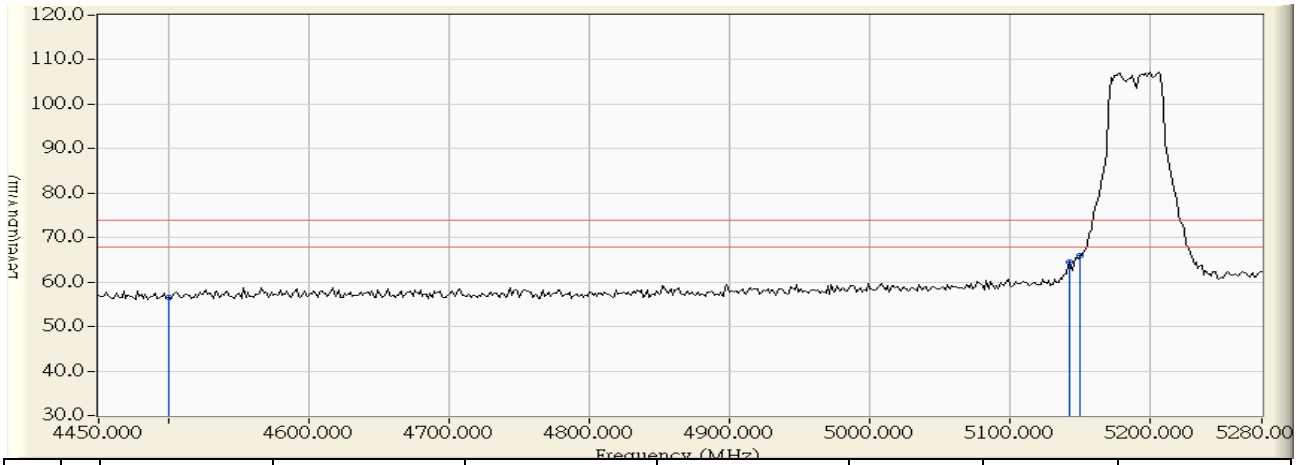


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4500.000	32.947	11.962	44.909	-9.091	54.000	AVERAGE
2		5147.200	35.338	14.393	49.731	-4.269	54.000	AVERAGE
3	*	5150.000	35.361	14.962	50.323	-3.677	54.000	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	**Time : 2013/04/27 - 16:53**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : 802.11n 40MHz_5190MHz**

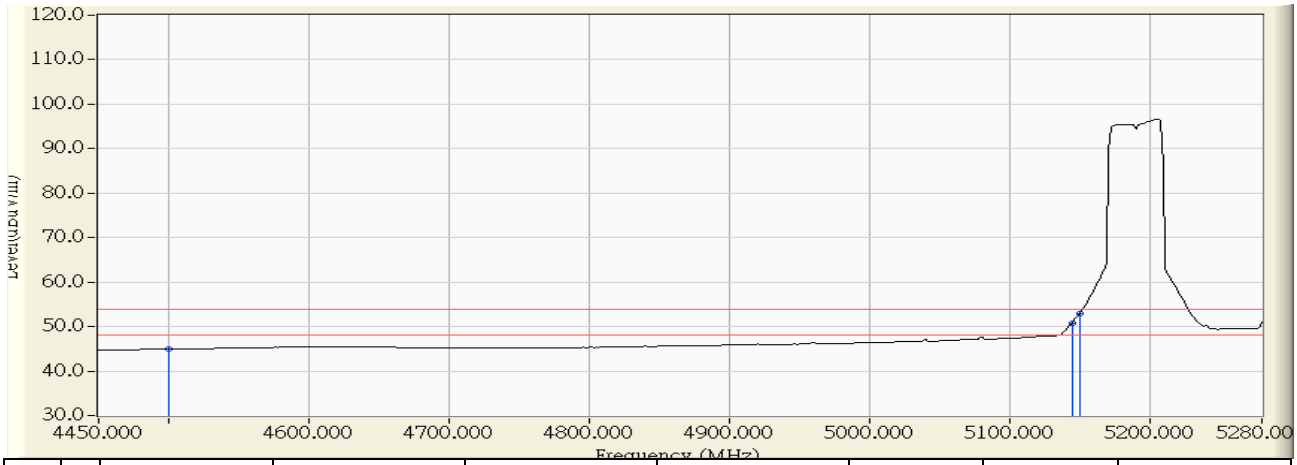


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4500.000	32.947	23.496	56.443	-17.557	74.000	PEAK
2		5143.050	35.305	29.220	64.525	-9.475	74.000	PEAK
3	*	5150.000	35.361	30.641	66.002	-7.998	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	**Time : 2013/04/27 - 16:58**
Limit : FCC_SpartC_15.209_03M_AV	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	**Power : AC 120V/60Hz**
EUT : VDSL2 Security Firewall	**Note : 802.11n 40MHz_5190MHz**



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4500.000	32.947	11.972	44.919	-9.081	54.000	AVERAGE
2		5144.433	35.316	15.546	50.862	-3.138	54.000	AVERAGE
3	*	5150.000	35.361	17.613	52.974	-1.026	54.000	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 1MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

9. Frequency Stability

9.1. Test Equipment

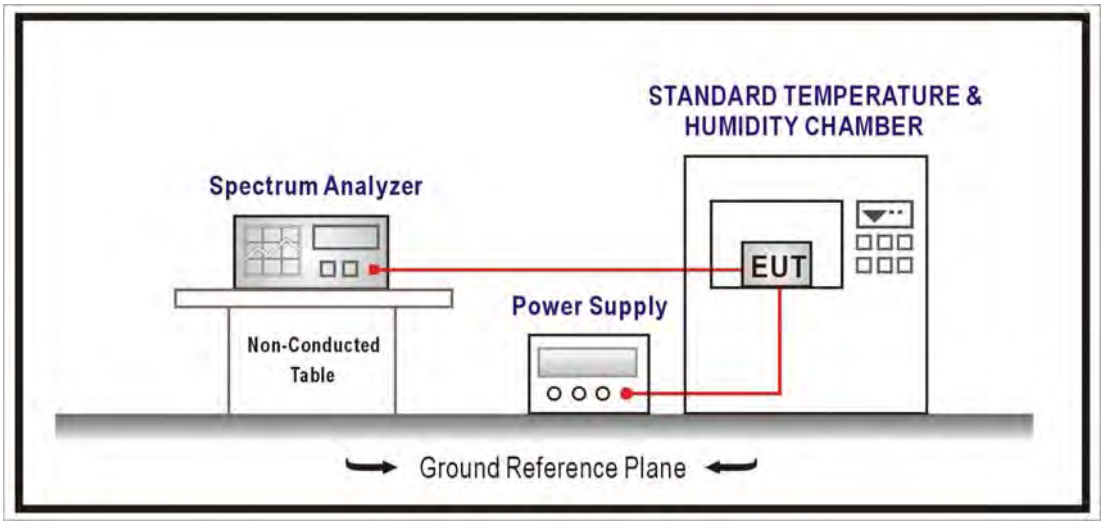
The following test equipments are used during the radiated emission tests:

Frequency Stability / SR7

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Spectrum Analyzer	R&S	FSP	100561	2014/02/03
Standard Temperature & Humidity Chamber	WIT	TH-1S-B	1082101	2014/01/27

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

9.2. Test Setup



9.3. Limits

Manufactures of all devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified

9.4. Test Procedure

The EUT was setup to ANSI C63.4, 2009; tested to DTS test procedure of Aug 2002 DA 02-2138 for compliance to FCC 47CFR Subpart E requirements.

9.5. Uncertainty

The measurement uncertainty is defined as ± 150 Hz

9.6. Test Result

Product	VDSL2 Security Firewall		
Test Item	Frequency Stability		
Test Mode	Transmit - 802.11a - 5180MHz(ANT 0)		
Date of Test	2013/05/15	Test Site	SR7

Temperature Interval (°C)	AC Voltage (V)	Frequency (MHz)	Deviation (ppm)	Result
-20	120	5180.2153	41.5596	PASS
-10		5180.3890	75.0908	PASS
0		5180.1299	25.0788	PASS
10		5180.1005	19.3967	PASS
20		5180.0040	0.7768	PASS
30		5180.0608	11.7291	PASS
40		5180.3981	76.8608	PASS
50		5180.1595	30.7866	PASS

Temperature Interval (°C)	AC Voltage (V)	Frequency (MHz)	Deviation (ppm)	Result
25	102	5180.1033	19.9400	PASS
	120	5180.2689	51.9159	PASS
	138	5180.2681	51.7562	PASS

Product	VDSL2 Security Firewall		
Test Item	Frequency Stability		
Test Mode	Transmit - 802.11a - 5240MHz(ANT 0)		
Date of Test	2013/05/15	Test Site	SR7

Temperature Interval (°C)	AC Voltage (V)	Frequency (MHz)	Deviation (ppm)	Result
-20	120	5240.1255	23.9495	PASS
-10		5240.2796	53.3646	PASS
0		5240.0767	14.6333	PASS
10		5240.1090	20.7943	PASS
20		5240.0044	0.8344	PASS
30		5240.1625	31.0027	PASS
40		5240.2212	42.2176	PASS
50		5240.4756	90.7597	PASS

Temperature Interval (°C)	AC Voltage (V)	Frequency (MHz)	Deviation (ppm)	Result
25	102	5240.3143	59.9801	PASS
	120	5240.1562	29.8139	PASS
	138	5240.1479	28.2248	PASS

Product	VDSL2 Security Firewall		
Test Item	Frequency Stability		
Test Mode	Transmit - 802.11n_20M - 5180MHz(ANT 0)		
Date of Test	2013/05/15	Test Site	SR7

Temperature Interval (°C)	AC Voltage (V)	Frequency (MHz)	Deviation (ppm)	Result
-20	120	5180.3472	67.0270	PASS
-10		5180.3364	64.9457	PASS
0		5180.4713	90.9810	PASS
10		5180.2435	47.0143	PASS
20		5180.3464	66.8815	PASS
30		5180.3642	70.3106	PASS
40		5180.1037	20.0229	PASS
50		5180.0787	15.1917	PASS

Temperature Interval (°C)	AC Voltage (V)	Frequency (MHz)	Deviation (ppm)	Result
25	102	5180.4545	87.7439	PASS
	120	5180.4762	91.9228	PASS
	138	5180.3430	66.2178	PASS

Product	VDSL2 Security Firewall		
Test Item	Frequency Stability		
Test Mode	Transmit - 802.11n_20M - 5240MHz(ANT 0)		
Date of Test	2013/05/15	Test Site	SR7

Temperature Interval (°C)	AC Voltage (V)	Frequency (MHz)	Deviation (ppm)	Result
-20	120	5240.4011	76.5403	PASS
-10		5240.4295	81.9660	PASS
0		5240.3197	61.0127	PASS
10		5240.3617	69.0289	PASS
20		5240.4065	77.5693	PASS
30		5240.3842	73.3148	PASS
40		5240.3021	57.6579	PASS
50		5240.4639	88.5333	PASS

Temperature Interval (°C)	AC Voltage (V)	Frequency (MHz)	Deviation (ppm)	Result
25	102	5240.3446	65.7576	PASS
	120	5240.3848	73.4269	PASS
	138	5240.0540	10.3046	PASS

Product	VDSL2 Security Firewall		
Test Item	Frequency Stability		
Test Mode	Transmit - 802.11n_20M - 5180MHz(ANT 1)		
Date of Test	2013/05/15	Test Site	SR7

Temperature Interval (°C)	AC Voltage (V)	Frequency (MHz)	Deviation (ppm)	Result
-20	120	5180.4501	86.8922	PASS
-10		5180.2239	43.2267	PASS
0		5180.1820	35.1436	PASS
10		5180.1190	22.9781	PASS
20		5180.4316	83.3280	PASS
30		5180.2674	51.6308	PASS
40		5180.0453	8.7469	PASS
50		5180.4499	86.8476	PASS

Temperature Interval (°C)	AC Voltage (V)	Frequency (MHz)	Deviation (ppm)	Result
25	102	5180.4672	90.2004	PASS
	120	5180.4854	93.6977	PASS
	138	5180.0196	3.7774	PASS

Product	VDSL2 Security Firewall		
Test Item	Frequency Stability		
Test Mode	Transmit - 802.11n_20M - 5240MHz(ANT 1)		
Date of Test	2013/05/15	Test Site	SR7

Temperature Interval (°C)	AC Voltage (V)	Frequency (MHz)	Deviation (ppm)	Result
-20	120	5240.4554	86.9027	PASS
-10		5240.2872	54.8034	PASS
0		5240.1844	35.1874	PASS
10		5240.4445	84.8215	PASS
20		5240.1441	27.4922	PASS
30		5240.3812	72.7450	PASS
40		5240.1186	22.6276	PASS
50		5240.1667	31.8115	PASS

Temperature Interval (°C)	AC Voltage (V)	Frequency (MHz)	Deviation (ppm)	Result
25	102	5240.2816	53.7379	PASS
	120	5240.2614	49.8798	PASS
	138	5240.0475	9.0661	PASS

Product	VDSL2 Security Firewall		
Test Item	Frequency Stability		
Test Mode	Transmit - 802.11n_40M - 5190MHz(ANT 0)		
Date of Test	2013/05/15	Test Site	SR7

Temperature Interval (°C)	AC Voltage (V)	Frequency (MHz)	Deviation (ppm)	Result
-20	120	5190.4477	86.2665	PASS
-10		5190.4324	83.3147	PASS
0		5190.0255	4.9147	PASS
10		5190.2598	50.0616	PASS
20		5190.4787	92.2387	PASS
30		5190.0502	9.6786	PASS
40		5190.1088	20.9690	PASS
50		5190.0887	17.0885	PASS

Temperature Interval (°C)	AC Voltage (V)	Frequency (MHz)	Deviation (ppm)	Result
25	102	5190.0084	1.6210	PASS
	120	5190.2241	43.1773	PASS
	138	5190.1571	30.2608	PASS

Product	VDSL2 Security Firewall		
Test Item	Frequency Stability		
Test Mode	Transmit - 802.11n_40M - 5230MHz(ANT 0)		
Date of Test	2013/05/15	Test Site	SR7

Temperature Interval (°C)	AC Voltage (V)	Frequency (MHz)	Deviation (ppm)	Result
-20	120	5230.4961	94.8653	PASS
-10		5230.1494	28.5641	PASS
0		5230.0618	11.8085	PASS
10		5230.2578	49.2950	PASS
20		5230.1747	33.4127	PASS
30		5230.4735	90.5298	PASS
40		5230.0635	12.1477	PASS
50		5230.4002	76.5160	PASS

Temperature Interval (°C)	AC Voltage (V)	Frequency (MHz)	Deviation (ppm)	Result
25	102	5230.1359	25.9790	PASS
	120	5230.2948	56.3686	PASS
	138	5230.2126	40.6542	PASS

Product	VDSL2 Security Firewall		
Test Item	Frequency Stability		
Test Mode	Transmit - 802.11n_40M - 5190MHz(ANT 1)		
Date of Test	2013/05/15	Test Site	SR7

Temperature Interval (°C)	AC Voltage (V)	Frequency (MHz)	Deviation (ppm)	Result
-20	120	5190.4477	86.2665	PASS
-10		5190.4324	83.3147	PASS
0		5190.0255	4.9147	PASS
10		5190.2598	50.0616	PASS
20		5190.4787	92.2387	PASS
30		5190.0502	9.6786	PASS
40		5190.1088	20.9690	PASS
50		5190.0887	17.0885	PASS

Temperature Interval (°C)	AC Voltage (V)	Frequency (MHz)	Deviation (ppm)	Result
25	102	5190.0084	1.6210	PASS
	120	5190.2241	43.1773	PASS
	138	5190.1571	30.2608	PASS

Product	VDSL2 Security Firewall		
Test Item	Frequency Stability		
Test Mode	Transmit - 802.11n_40M - 5230MHz(ANT 1)		
Date of Test	2013/05/15	Test Site	SR7

Temperature Interval (°C)	AC Voltage (V)	Frequency (MHz)	Deviation (ppm)	Result
-20	120	5230.4961	94.8653	PASS
-10		5230.1494	28.5641	PASS
0		5230.0618	11.8085	PASS
10		5230.2578	49.2950	PASS
20		5230.1747	33.4127	PASS
30		5230.4735	90.5298	PASS
40		5230.0635	12.1477	PASS
50		5230.4002	76.5160	PASS

Temperature Interval (°C)	AC Voltage (V)	Frequency (MHz)	Deviation (ppm)	Result
25	102	5230.1359	25.9790	PASS
	120	5230.2948	56.3686	PASS
	138	5230.2126	40.6542	PASS

10. Attachment 1

➢ **Attachment: EUT Detailed Model Number and Detailed Difference**

Mode	Model-name	VDSL2#1 (RJ11)	VDSL2#2 (RJ11)	FXS (RJ11)	FXO (RJ11)	WLAN-1
1	Vigor2860n-plus	V				V (2.4G by RT5392)
2	Vigor2860Vn-plus	V		V	V	V (2.4G by RT5392)
3	Vigor2862n-plus	V	V(dual)			V (2.4G by RT5392)
4	Vigor2862Vn-plus	V	V(dual)	V	V	V (2.4G by RT5392)
5	Vigor2925n-plus					V (2.4G by RT5392)
6	Vigor2925Vn-plus			V	V	V (2.4G by RT5392)
7	Vigor2925Fn-plus					V (2.4G by RT5392)
8	Vigor2925FVn-plus			V	V	V (2.4G by RT5392)
9	Vigor2860Fn-plus	V				V (2.4G by RT5392)
10	Vigor2860FVn-plus	V		V	V	V (2.4G by RT5392)
11	VigorIPPBX2860n-plus	V		V	V	V (2.4G by RT5392)
12	Vigor3220n-plus					V (2.4G by RT5392)
13	Vigor3220Vn-plus			V	V	V (2.4G by RT5392)
14	Vigor3220Fn-plus					V (2.4G by RT5392)
15	Vigor3220FVn-plus			V	V	V (2.4G by RT5392)

Mode	Model-name	WLAN-2	WAN#1	RJ45 Port#1~6	USB 2.0 x 2
1	Vigor2860n-plus	V (5G by WMC-ND07)	RJ45	LAN#1~6(RJ45)	V
2	Vigor2860Vn-plus	V (5G by WMC-ND07)	RJ45	LAN#1~6(RJ45)	V
3	Vigor2862n-plus	V (5G by WMC-ND07)	RJ45	LAN#1~6(RJ45)	V
4	Vigor2862Vn-plus	V (5G by WMC-ND07)	RJ45	LAN#1~6(RJ45)	V
5	Vigor2925n-plus	V (5G by WMC-ND07)	RJ45	WAN#2/LAN#1~5(RJ45)	V
6	Vigor2925Vn-plus	V (5G by WMC-ND07)	RJ45	WAN#2/LAN#1~5(RJ45)	V
7	Vigor2925Fn-plus	V (5G by WMC-ND07)	SFP	WAN#2/LAN#1~5(RJ45)	V
8	Vigor2925FVn-plus	V (5G by WMC-ND07)	SFP	WAN#2/LAN#1~5(RJ45)	V
9	Vigor2860Fn-plus	V (5G by WMC-ND07)	SFP	LAN#1~6(RJ45)	V
10	Vigor2860FVn-plus	V (5G by WMC-ND07)	SFP	LAN#1~6(RJ45)	V
11	VigorIPPBX2860n-plus	V (5G by WMC-ND07)	RJ45	LAN#1~6(RJ45)	V
12	Vigor3220n-plus	V (5G by WMC-ND07)	RJ45	LAN#2/WAN#1~5(RJ45)	V
13	Vigor3220Vn-plus	V (5G by WMC-ND07)	RJ45	LAN#2/WAN#1~5(RJ45)	V
14	Vigor3220Fn-plus	V (5G by WMC-ND07)	SFP	LAN#2/WAN#1~5(RJ45)	V
15	Vigor3220FVn-plus	V (5G by WMC-ND07)	SFP	LAN#2/WAN#1~5(RJ45)	V