


# FCC MEASUREMENT REPORT

## CERTIFICATION OF COMPLIANCE

PRODUCT : WiMAX RF Repeater  
MODEL/TYPE NO : JI-43W2.5G-U  
FCC ID : WYFJI43W25GUN  
TRADE NAME :   
Airpoint Co., Ltd.  
APPLICANT : 946 Dunsan-dong, Seo-gu, Daejeon, 302-120, Korea.  
Yoon-Sun, Lee / Research Engineer  
CLASSIFICATION : TNB Licensed Non-Broadcast Station Transmitter  
RULE PART(S) : FCC Part 27  
FCC PROCEDURE : Certification  
DATES OF TEST : December 1 to 10, 2008  
DATES OF ISSUE : December 22, 2008  
TEST REPORT No. : BWS-08-RF-0018  
TEST LAB. : BWS TECH Inc. (Registration No. : 553281)

This WiMAX RF Repeater JI-43W2.5G-U has been tested in accordance with the measurement procedures specified in ANSI C63.4-2003 and ANSI/TIA-603-C-2004 at the BWS TECH/EMC Test Laboratory and has been shown to be complied with the electromagnetic radiated emission limits specified in FCC Rule Part 27.

I attest to the accuracy of data. All measurement herein was performed by me or were made under my supervision. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them. The results of testing in this report apply to the product/system, which was tested only. Other similar equipment may not necessarily produce the same results due to production tolerance and measurement uncertainties.

December 22, 2008

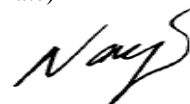
(Date)



Reviewed by **HyunSup, Jin**

December 22, 2008

(Date)



Reviewed by **TaeHyun, Nam**

**BWS TECH Inc.**

**www.bws.co.kr**

#611-1 Maesan-Ri, Mohyeon-Myeon, Yongin-Si, Gyeonggi-Do, 449-853 Korea

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# FCC TEST REPORT

*Scope - Measurement and determination of electromagnetic emission(EME) of radio frequency devices including intentional radiators and/or unintentional radiators for compliance with the technical rules and regulations of the U.S Federal Communications Commission(FCC)*

## 1. General Information

### Applicant

**Company Name** Airpoint Co., Ltd.  
**Company Address** 946 Dunsan-dong, Seo-gu, Daejeon, 302-120, Korea.  
**Phone/Fax** Phone : 82-42-484-5460(ex. 131) Fax :82-42-485-5460

### Manufacturer

**Company Name** Airpoint Co., Ltd.  
**Company Address** 946 Dunsan-dong, Seo-gu, Daejeon, 302-120, Korea.  
**Phone/Fax** Phone : 82-42-484-5460(ex. 131) Fax :82-42-485-5460

- **EUT Type** WiMAX RF Repeater
- **Model Number** JI-43W2.5G-U
- **FCC Identifier** WYFJI43W25GUN
- **S/N** Prototype
- **FCC Rule Part(s)** FCC Part 27
- **FCC Classification** TNB / Licensed Non-Broadcast Station Transmitter
- **Service Block** E-H : 2624 MHz ~ 2690 MHz
- **Modulation Method** OFDMA (QPSK, 16QAM, 64QAM)
- **Emission Designator** 10M0W7D
- **RF Power Output** Down Link : 43 dBm / 20 W , Up Link : 33 dBm / 2W
- **Test Procedure** ANSI C63.4-2003 and ANSI/TIA-603-C-2004
- **Dates of Tests** December 1 to 10, 2008
- **Place of Tests** BWS TECH Inc.(FCC Registration Number : 553281)  
#611-1 Maesan-Ri, Mohyeon-Myeon, Yongin-Si, Gyeonggi-Do, 449-853 Korea  
TEL: +82 31 333 5997 FAX: +82 31 333 0017
- **Test Report No.** BWS-08-RF-0018

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## 2. Description of Test Facility

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The measurement for radiated and conducted emission test were conducted at the open area test site of BWS TECH Inc. facility located at #611-1 Maesan-Ri, Mohyeon-Myeon, Yongin-Si, Gyeonggi-Do, 449-853 Korea. The site is constructed in conformance with the requirements of the ANSI C63.4-2003 and CISPR Publication 16. The BWS TECH measurement facility has been filed to the Commission with the FCC for 3 and 10-meter site configurations. Detailed description of test facility was found to be in compliance with the requirements of Section 2.948 FCC Rules according to the ANSI C63.4-2003 and registered to the Federal Communications Commission (Registration Number : 553281 ).

The measurement procedure described in American National Standard for Method of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz (ANSI C.63.4-2003) was used in determining radiated and conducted emissions from the Airpoint Co., Ltd. WiMAX RF Repeater Model : **JI-43W2.5G-U**.

## 3. Product Information

### 3.1 General Specification

Description	Unit	JI-43W2.5G-U	JI-43W2.5G-U
<b>RF Specifications</b>			
Frequency Band		2502MHz ~ 2568MHz	2624MHz ~ 2690MHz
Bandwidth	Total BW	66MHz	66MHz
	Signal Processing BW	10MHz	10MHz
DL Power Out (Per Band)	dBm	43(20W)	43(20W)
UL Power Out (Per Band)	dBm	33dBm (2W)	33dBm (2W)
Gain	dB	DL = 100dB / UL = 95dB	DL = 100dB / UL = 95dB
Gain Range	dB	40	40
Gain Ripple	+/- dB	1.5	1.5
AGC Range	dB	35	30
Noise Figure	dB	5 / 12	5 / 12
Total System Delay	us	5	5
VSWR		1.5 : 1	1.5 : 1
Antenna Port Impedance	Ohms	50	50
DL Input Range	dBm	-75~ -27	-75~ -27
UL Input Range	dBm	-90 ~ -32	-90 ~ -32
Number of FA		1FA	1FA
<b>WiMAX Emissions</b>			
<b>(from band edge)</b>		11 MHz @ 1 MHz BW (< -13 dBm)	11 MHz @ 1 MHz BW (< -13 dBm)
		8.5 MHz @ 1MHz BW (<-13 dBm)	8.5 MHz @ 1MHz BW (<-13 dBm)
		6.5 MHz @ 1MHz BW (<-13 dBm)	6.5 MHz @ 1MHz BW (<-13 dBm)
		5.05 MHz @ 100 kHz BW (< -13 dBm)	5.05 MHz @ 100 kHz BW (< -13 dBm)
		<2495MHz -37dBm/MHz	<2495MHz -37dBm/MHz
<b>Physical</b>			
Size		W X L X H (mm) = 430 X 625 X 330	W X L X H (mm) = 430 X 625 X 330
sound level max @ 1 meter		< 55dBA	< 55dBA
Cabinet IP		IP-55	IP-55
Operating temperature		-30 ~ -50°C	-30 ~ -50°C
Humidity		5 ~ 95%	5 ~ 95%
Voltage		115VAC ~ 240VAC +/- 10%	115VAC ~ 240VAC +/- 10%
Power (W)		< 400W	< 400W
RF Ports		7/16 DIN-Female	7/16 DIN-Female
CDMA Modem antenna port		Type N Female	Type N Female

## 3.2 EUT operating conditions & test configuration

### 3.2.1 Client Condition

Temperature : -40 °C ~ +50 °C

Humidity : 95 %

### 3.2.2 EUT Operating Condition

Using external signal source

QPSK

16QAM

64QAM

### 3.2.3 Test Frequency

Block	Channel	Down Link	Up Link	Modulation Method
E-H Block	Low FA	2629 MHz	2629 MHz	QPSK, 16QAM, 64QAM
	Middle FA	2657 MHz	2657 MHz	QPSK, 16QAM, 64QAM
	High FA	2685 MHz	2685 MHz	QPSK, 16QAM, 64QAM

## 4. Applied Standards

### 4.1. FCC Rules and Regulations

- 47 CFR Part 2(10-1-05 Edition)  
Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
- 47 CFT Part 27(10-1-06 Edition)  
Miscellaneous Wireless Communications Services

### 4.2. Supporting Standards

- EIA/TIA-603-C:2004  
Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
- ITU-R Recommendation SM.329-10(2003)
- ANSI C63.4:2003  
Methods of Measurement of Radio-Noise Emissions from Low Voltage Electrical and Electronic Equipment in Range of 9 kHz to 40 GHz

### 4.3. Test Items

The following requirements and test specifications within Table 1 are relevant to the conformity to FCC rules and regulations.

Table 1 Summary of test items

FCC Measurement Specification	FCC Limit	Description	Test Result
§ 15.107	§ 15.107	Power Line Conducted Emission Class A	Pass
§2.1046	§27.50(h)(1)	Maximum Channel Power	Pass
§2.1049	-	Occupied Bandwidth	Pass
§2.1051 §27.53(1)(6)	§27.53(h)(2)	Spurious Emissions at Antenna Terminals	Pass
§2.1051 §27.53(1)(6)	§27.53(h)(2)	Band Edge Compliance *	Pass
§2.1053 §27.53(1)(6)	§27.53(h)(2)	Radiated Spurious Emission	Pass
§2.1055	§27.54	Frequency Stability	Pass

\* The EUT is only use to 1FA. So, we are waived to intermodulation test.

## 5. TEST DATA

### 5.1 Power Line Conducted Emission

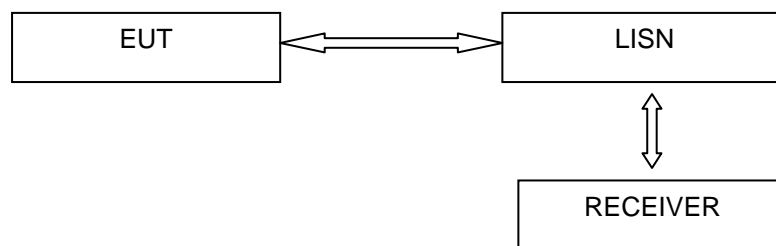
#### 5.1.1 Specification

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 kHz on the 100 AC power and return leads of the EUT according to the methods defined in FCC Part 15.207. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane as shown in section 3.1.5. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position producing maximum conducted emissions.

#### 5.1.2 Method of Measurement

The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane as shown in section 3.1.5. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position producing maximum conducted emissions

#### 5.1.3 Measurement Set-Up



#### 5.1.4 Limit

Frequency Range (MHz)	Limit (dBuV)	
	Quasi-Peak	Average
0.15 ~ 0.5	79	66
0.5 ~ 30	73	60

#### 5.1.6 Test Result

Frequency Range of Test : 150 kHz to 30 MHz  
 Test Standard : FCC Part 15.107  
 Test Date : December 4, 2008  
 Temperature/Humidity : 21 °C/ 50 %



### 5.1.6.1 Down link

Freq [MHz]	Correction		Phase [H/N]	Quasi-Peak Mode				Average Mode			
	AMN	C.L		Lim it	Reading	Emission Level	Margin	Lim it	Reading	Emissio n Level	Margin
				[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]
0.266	0.07	0.16	N	79	51.90	52.13	26.87	66			
0.398	0.08	0.24	N	79	49.68	50.00	29.00	66			
1.450	0.03	0.47	N	73	57.66	58.16	14.84	60	45.05	45.55	14.45
5.634	0.06	0.89	N	73	70.78	71.73	1.27	60	51.85	52.80	7.20
8.294	0.06	1.00	N	73	58.01	59.07	13.93	60	37.43	38.49	21.51
29.238	0.26	1.64	H	73	55.24	49.01	23.99	60	36.39	38.29	21.71

### 5.1.6.2 Up link

Freq [MHz]	Correction		Phase [H/N]	Quasi-Peak Mode				Average Mode			
	AMN	C.L		Lim it	Reading	Emission Level	Margin	Lim it	Reading	Emissio n Level	Margin
				[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]
0.262	0.07	0.16	N	79	57.39	57.62	21.38	66			
0.398	0.08	0.24	H	79	52.31	52.63	26.37	66			
1.434	0.03	0.46	H	73	59.40	59.89	13.11	60	46.50	46.99	13.01
5.694	0.06	0.89	N	73	70.66	71.61	1.39	60	52.02	52.97	7.03
14.102	0.07	1.22	N	73	56.96	58.25	14.75	60	41.67	42.96	17.04
29.462	0.26	1.65	H	73	57.85	59.76	13.24	60	40.35	42.26	17.74

#### Notes:

1. All modes of operation were investigated and the worst-case emissions are reported.  
See the plots in next 2 pages.
2. Line N = (Neutral), Line H = (Hot)
3. Measurement uncertainty estimated at  $\pm 1.38$  dB.  
The measurement uncertainty is given with a confidence of 95.45 % with the coverage factor,  $k=2$
4. The detail plot data is refer to 6.1.

## 5.2 Maximum Channel Power

### 5.2.1 Specification

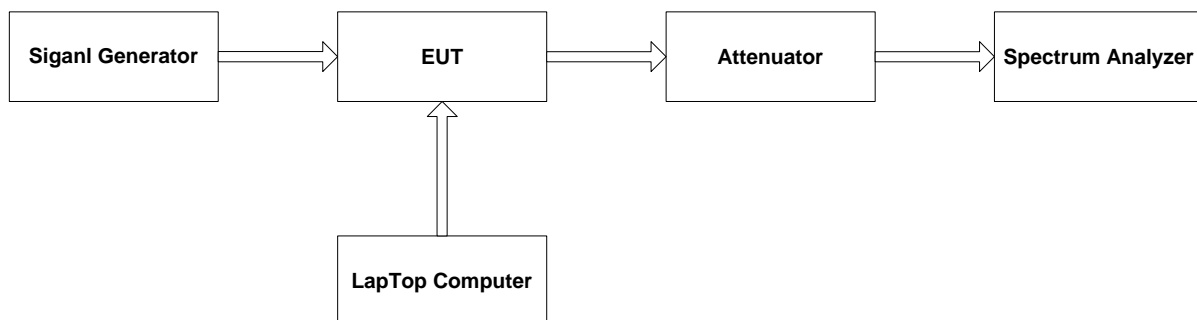
According to 47 CFR Part 2 section § 2.1046 and Part 27 section § 27.50(h)(1), the maximum EIRP of a base station shall not exceed  $33 \text{ dBW} + 10 \lg (X/Y) \text{ dBW}$ , where X is the actual channel width in MHz and Y is either 6 MHz if prior to transition or the station is in the MBS following transition or 5.5 MHz if the station is in the LBS and UBS following transition.

### 5.2.2 Method of Measurement

ANSI/TIA-603-C-2004 Section 2.2.1

- The EUT was connected to a Signal Analyzer via the main RF connector, and through an appropriate Attenuator.
- Diversity RF connectors were connected to 50 Ohm match load.
- The EUT was controlled to power amplifier of each block by a LapTop Computer.
- Measure and record the maximum channel power of the EUT by the Spectrum Analyzer.
- The transmitter was tested while in a continuous transmit mode.
- The EUT was tuned to a low, middle, and high channel in both the downlink and uplink directions.

### 5.2.3 Measurement Set-Up



### 5.2.4 Limit

As to the limit, the X is 10 MHz and Y is 6 MHz for the EUT, so the limit is calculated to be  $33 \text{ dBW} + 10 \log (10 \text{ MHz}/6 \text{ MHz}) = 65 \text{ dBm}$ .

## 5.2.5 Test Result

### [Down Link]

TX output Power – E-H Block

Test mode	Measured Maximum Channel Power (dBm)			Limit (dBm)
	Low Channel 2629MHz	Middle Channel 2657MHz	High Channel 2685MHz	
QPSK	43.56	43.26	43.13	< 65
16QAM	43.61	43.42	43.07	< 65
64QAM	43.74	43.45	43.27	< 65

### [Up Link]

TX output Power – E-H Block

Test mode	Measured Maximum Channel Power (dBm)			Limit (dBm)
	Low Channel 2629MHz	Middle Channel 2657MHz	High Channel 2685MHz	
QPSK	33.73	33.11	32.85	< 65
16QAM	33.72	33.12	32.84	< 65
64QAM	33.75	33.12	32.83	< 65

## 5.2.6 Conclusion

The equipment **passed** the requirement of this clause. Also refer to 6.2 of the present test report for detailed.

## 5.3 Occupied Bandwidth

### 5.3.1 Specification

According to 47 CFR Part 2 Section § 2.1049 and Part 27, no specific modulation characteristics requirement limits is applicable.

The occupied bandwidth is defined in section § 2.1049: the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured. The occupied bandwidth is normally called 99% bandwidth.

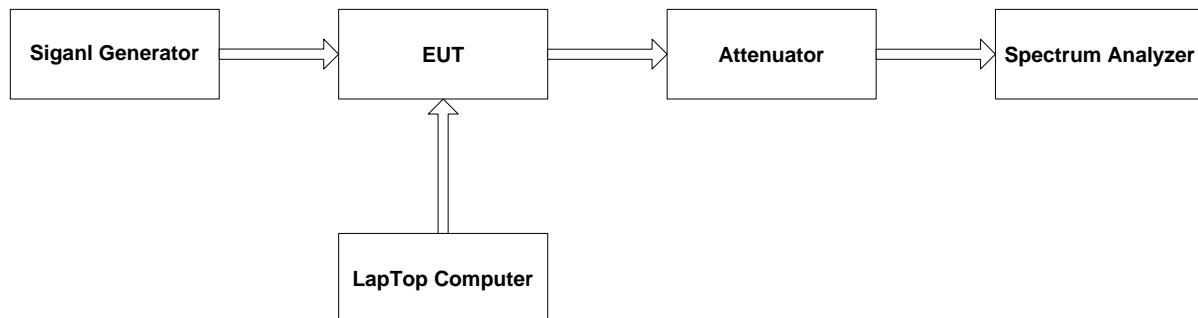
According to section §27.53(i)(6), the emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power. The emission bandwidth is normally called 26dB bandwidth.

### 5.3.2 Method of Measurement

ANSI/TIA-603-C-2004 Section 2.2.11

- The EUT was connected to a Signal Analyzer via the main RF connector, and through an appropriate Attenuator.
- Diversity RF connectors were connected to 50 Ohm match load.
- The EUT was controlled to power amplifier of each block by a Laptop Computer.
- Measure and record the occupied bandwidth of the EUT by the Spectrum Analyzer.
- The transmitter was tested while in a continuous transmit mode.
- The EUT was tuned to a low, middle, and high channel in both the downlink and uplink directions.
- The main settings of the Signal Analyzer were as below:  
Measurement bandwidth (RBW) : 100kHz

### 5.3.3 Measurement Set-Up



### 5.3.4 Limit

- According to 47 CFR Part 2 section § 2.1049 and Part 27, no specific modulation characteristics requirement limits is applicable.
- This EUT used 10 MHz bandwidth.

### 5.3.5 Test Result [Down Link]

TX occupied bandwidth – E-H Block

Test mode	Measured occupied bandwidth (MHz)					
	Low Channel 2629MHz		Middle Channel 2657MHz		High Channel 2685MHz	
	99%	26dB	99%	26dB	99%	26dB
QPSK	9.070	9.411	9.100	9.422	9.037	9.316
16QAM	9.077	9.415	9.028	9.357	9.016	9.391
64QAM	9.035	9.406	9.049	9.408	9.029	9.391

### [Up Link]

Table 10 Test : TX occupied bandwidth – E-H Block

Test mode	Measured occupied bandwidth (MHz)					
	Low Channel 2629MHz		Middle Channel 2657MHz		High Channel 2685MHz	
	99%	26dB	99%	26dB	99%	26dB
QPSK	9.043	9.327	9.063	9.331	9.068	9.326
16QAM	9.044	9.328	9.064	9.332	9.068	9.325
64QAM	9.043	9.328	9.064	9.331	9.068	9.325

### 5.3.6 Conclusion

The equipment **passed** the requirement of this clause. Also refer to 6.2 of the present test report for detailed.

## 5.4 Spurious Emissions at Antenna Terminals

### 5.4.1 Specification

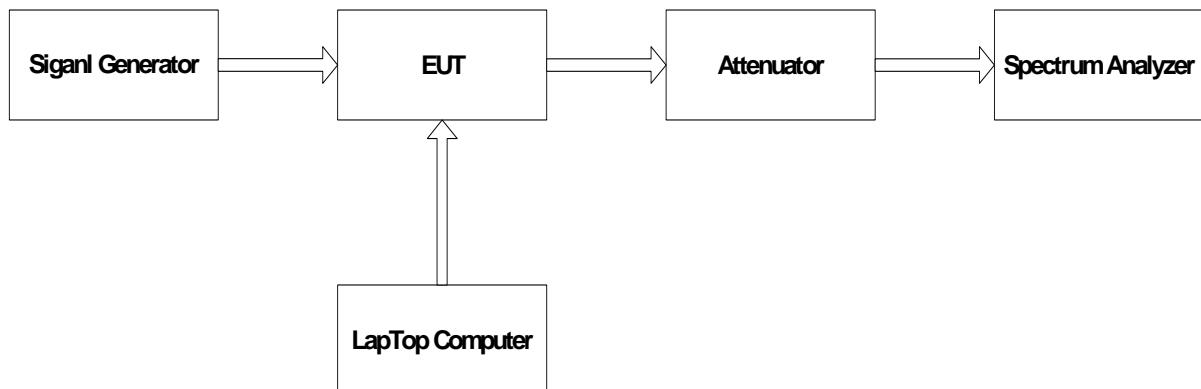
According to 47 CFR Part 2 section § 2.1051 and Part 27 section § 27.53(l)(2) and § 27.53(l)(6), the power of any emissions outside the licensee's frequency bands of operation must be attenuated below the transmitter power (P in watts) by at least  $43 + 10 \lg(P)$  dB. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater.

### 5.4.2 Method of Measurement

ANSI/TIA-603-C-2004 Section 2.2.13

- The EUT was connected to a Signal Analyzer via the main RF connector, and through an appropriate Attenuator.
- Diversity RF connectors were connected to 50 Ohm match load.
- The EUT was controlled to power amplifier of each block by a LapTop Computer.
- Measure and record the spurious emissions bandwidth of the EUT by the Spectrum Analyzer.
- The transmitter was tested while in a continuous transmit mode.
- The EUT was tuned to a low, middle, and high channel in both the downlink and uplink directions.

### 5.4.3 Measurement Set-Up



### 5.4.5 Limit

- 
- The limit is calculated to be  $P(W) - \{43 \text{ dB} + 10 \log [P(W)]\} = -13 \text{ dBm}$ .

#### 5.4.6 Data

TX Spurious emission at antenna terminal – E-H Block

Test mode	Measured Maximum Spurious emission (dBm)		Limit (dBm)
	Down Link	Up Link	
	Center Frequency 2657MHz	Center Frequency 2657MHz	
1FA_QPSK	-25.94	-20.82	< -13

#### 5.4.7 Conclusion

The equipment **passed** the requirement of this clause. Also refer to 6.3 of the present test report for detailed.

## 5.5 Band Edge Compliance

### 5.5.1 Specification

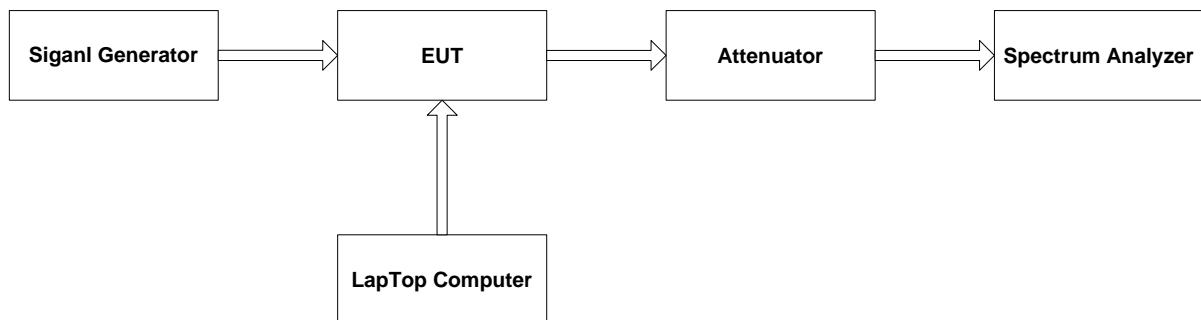
According to 47 CFR Part 2 section § 2.1051 and Part 27 section § 27.53(l)(2) and § 27.53(l)(6), the power of any emissions outside the licensee's frequency bands of operation must be attenuated below the transmitter power (P in watts) by at least  $43 + 10 \lg(P)$  dB. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater

### 5.5.2 Method of Measurement

ANSI/TIA-603-C-2004 Section 2.2.13

- The EUT was connected to a Signal Analyzer via the main RF connector, and through an appropriate Attenuator.
- Diversity RF connectors were connected to 50 Ohm match load.
- The EUT was controlled to power amplifier of each block by a LapTop Computer.
- Measure and record the spurious emissions bandwidth of the EUT by the Spectrum Analyzer.
- The transmitter was tested while in a continuous transmit mode.
- The EUT was tuned to a low, high channel in both the downlink and uplink directions.

### 5.5.3 Measurement Set-Up



### 5.5.4 Limit

- The limit is calculated to be  $P(W) - \{43 \text{ dB} + 10 \log [P(W)]\} = -13 \text{ dBm}$ .



### 5.5.5 Data

#### TX Band Edge Compliance – E-H Block

Test mode	Measured Maximum band edge emission (dBm)				Limit (dBm)
	Down Link		Up Link		
	Low Channel 2629MHz	High Channel 2685MHz	Low Channel 2629MHz	High Channel 2685MHz	
QPSK	-17.01	-16.55	-20.09	-21.21	< -13
16QAM	-16.68	-16.21	-22.09	-21.59	< -13
64QAM	-16.97	-16.38	-20.08	-20.57	< -13

### 5.5.6 Conclusion

The equipment **passed** the requirement of this clause. Also refer to 6.4 of the present test report for detailed.

## 5.6 Field Strength of Spurious Radiation

### 5.6.1 Specification

According to 47 CFR Part 2 section § 2.1051 and Part 27 section § 27.53(l)(2) and § 27.53(l)(6), the power of any emissions outside the licensee's frequency bands of operation must be attenuated below the transmitter power (P in watts) by at least  $43 + 10 \log (P)$  dB. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater

### 5.6.2 Method of Measurement

ANSI/TIA-603-C-2004 Section 2.2.12

The EUT, equipped with non-integral antenna, was connected to 50 Ohm match load. The EUT was controlled to transmit maximum power by a Console computer.

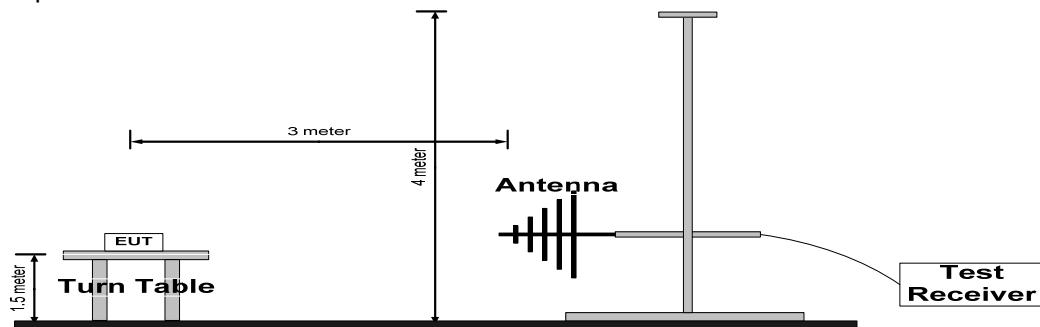
For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, the values of current and voltage on the circuit elements specified in section § 2.1033(c)(8). The EUT was connected to ancillary in order to simulate normal operating conditions with reference to the guidance given in the standard for this type equipment.

Step (a): Measure the radiated maximum output power by the Test Receiver received from the Test Antenna.

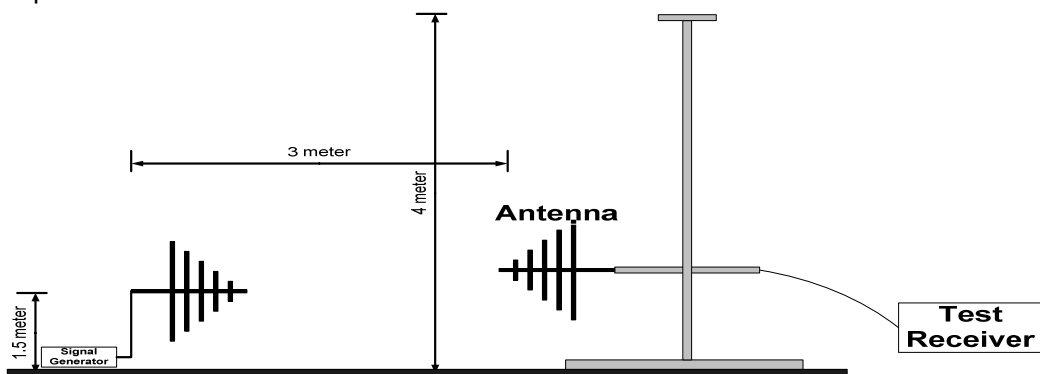
Step (b): Use substitution method to verify the maximum output power. The EUT was substituted by a dipole antenna. The dipole is connected to a Signal Generator. And then adjust the output level Of the Signal Generator to get the same received power recorded in step (b) on Test Receiver, and record the power level of Signal Generator. The cable loss at the test frequency should be compensated.

### 5.6.3 Measurement Set-Up

Step 1.



Step 2.



#### 5.6.4 Limit

∴  
-The limit is calculated to be  $P(W) - \{43 \text{ dB} + 10 \log [P(W)]\} = -13 \text{ dBm}$ .

#### 5.6.5 Data

##### Down Link

Test frequency range	Measured maximum spurious emission levels (dBm)	Limit (dBm)
30 MHz to 10 <sup>th</sup> harmonic included	-58.97	<-13

##### Up Link

Test frequency range	Measured maximum spurious emission levels (dBm)	Limit (dBm)
30 MHz to 10 <sup>th</sup> harmonic included	-58.17	<-13

#### 5.6.6 Conclusion

The equipment **passed** the requirement of this clause. Also refer to 6.5 of the present test report for detailed.

## 5.7 Frequency Stability

### 5.7.1 Specification

According to 47 CFR Part 2 section §2.1055 and Part 27 section §27.54, the frequency stability shall be sufficient to ensure that the fundamental emission stay within the authorized bands of operation.

### 5.7.2 Method of Measurement

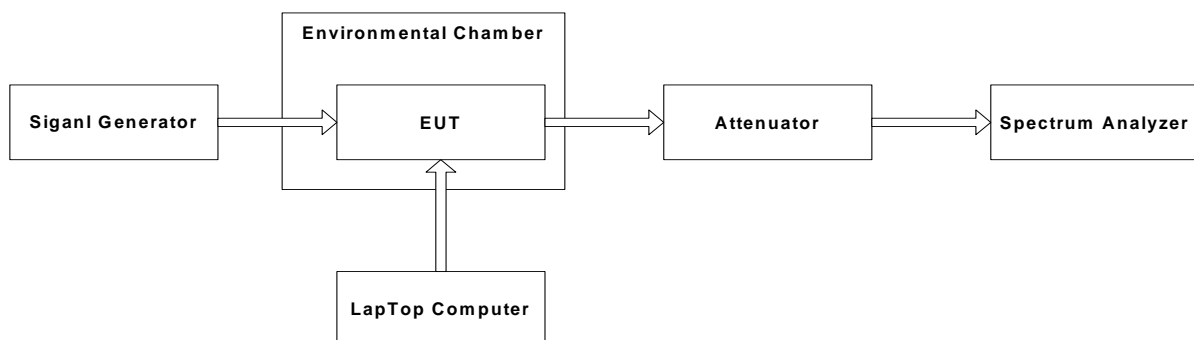
ANSI/TIA-603-C-2004 Section 2.2.2

The frequency stability shall be measured with variation of ambient temperature from  $-40^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$ . Frequency measurements shall be made at the extremes of the specified temperature range and at intervals of not more than  $10^{\circ}\text{C}$  through the range. A period of time sufficient to stabilize all of the components of the oscillator circuit at each temperature level shall be allowed prior to frequency measurement.

The frequency stability shall be measured with variation of primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

The sample was permitted to stabilize at each step for at least one-half hour. Power was applied and the maximum frequency change was noted within one minute.

### 5.7.3 Measurement Set-Up



### 5.7.5 Limit

The frequency tolerance is limited to  $\pm 2\text{ppm}$ .

## 5.7.6 Data

TX frequency stability – E-H Block

Test environment		Measured maximum frequency error				Limit(ppm)
		Down Link 2657MHz		Up Link 2657MHz		
Voltage (V)	Temperature (℃)	Hz	ppm	Hz	ppm	
100	-40	2,657,000,000.001	0.001	2,657,000,000.002	0.002	<±2
	-30	2,657,000,000.000	0.000	2,657,000,000.002	0.002	<±2
	-20	2,656,999,999.998	-0.002	2,657,000,000.003	0.003	<±2
	-10	2,656,999,999.999	-0.001	2,656,999,999.999	-0.001	<±2
	0	2,657,000,000.000	0.000	2,657,000,000.001	0.001	<±2
	10	2,656,999,999.999	-0.001	2,657,000,000.001	0.001	<±2
	20	2,657,000,000.001	0.001	2,656,999,999.999	-0.001	<±2
	30	2,657,000,000.001	0.001	2,657,000,000.002	0.002	<±2
	40	2,657,000,000.000	0.000	2,657,000,000.001	0.001	<±2
	50	2,657,000,000.003	0.003	2,657,000,000.000	0.000	<±2
85	20	2,657,000,000.000	0.000	2,657,000,000.000	0.000	<±2
115	20	2,657,000,000.001	0.001	2,657,000,000.002	0.002	<±2

## 5.5.6 Conclusion

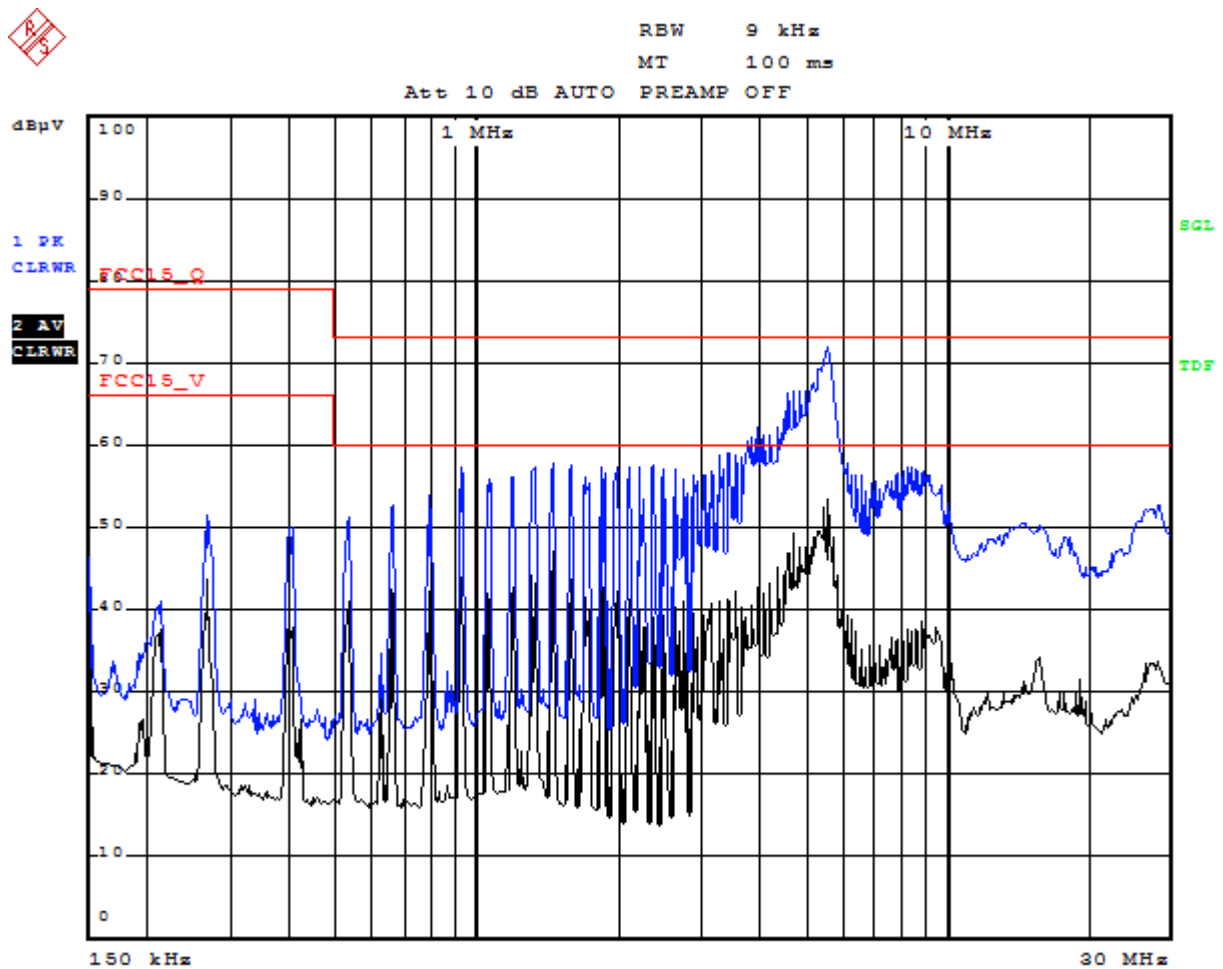
The equipment **passed** the requirement of this clause. Also refer to 6.6 of the present test report for detailed.

## 6. TEST PLOT

### 6.1 Power Line Conducted Emission

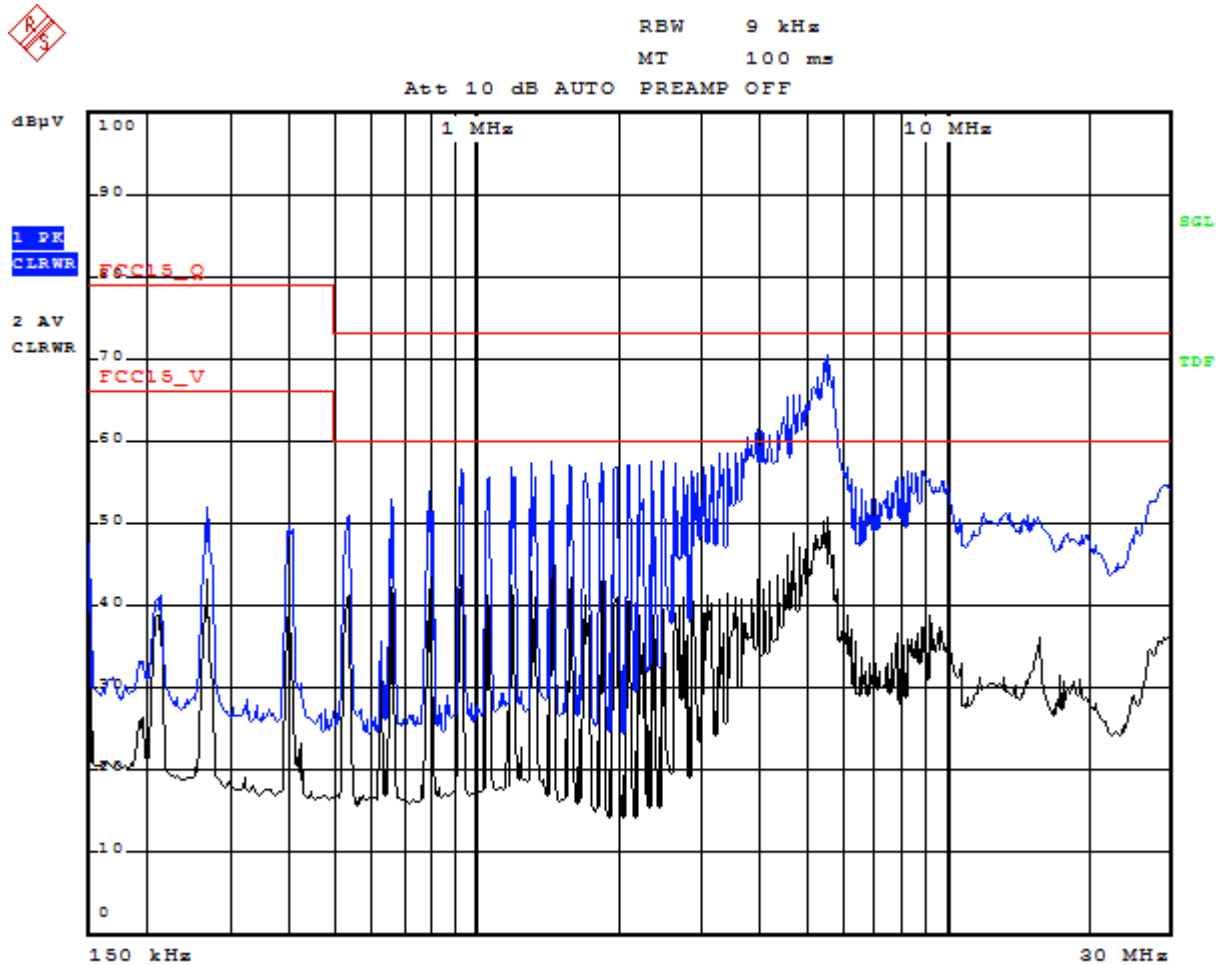
#### 6.1.1 Down Link / HOT

FCC Rules :	Part 15 §15.107
Operating Path :	Down Link
Test Mode :	HOT
Input Level :	-57 dBm
System Gain :	80 dB
Bandwidth :	10 MHz
Number of FA :	1 FA



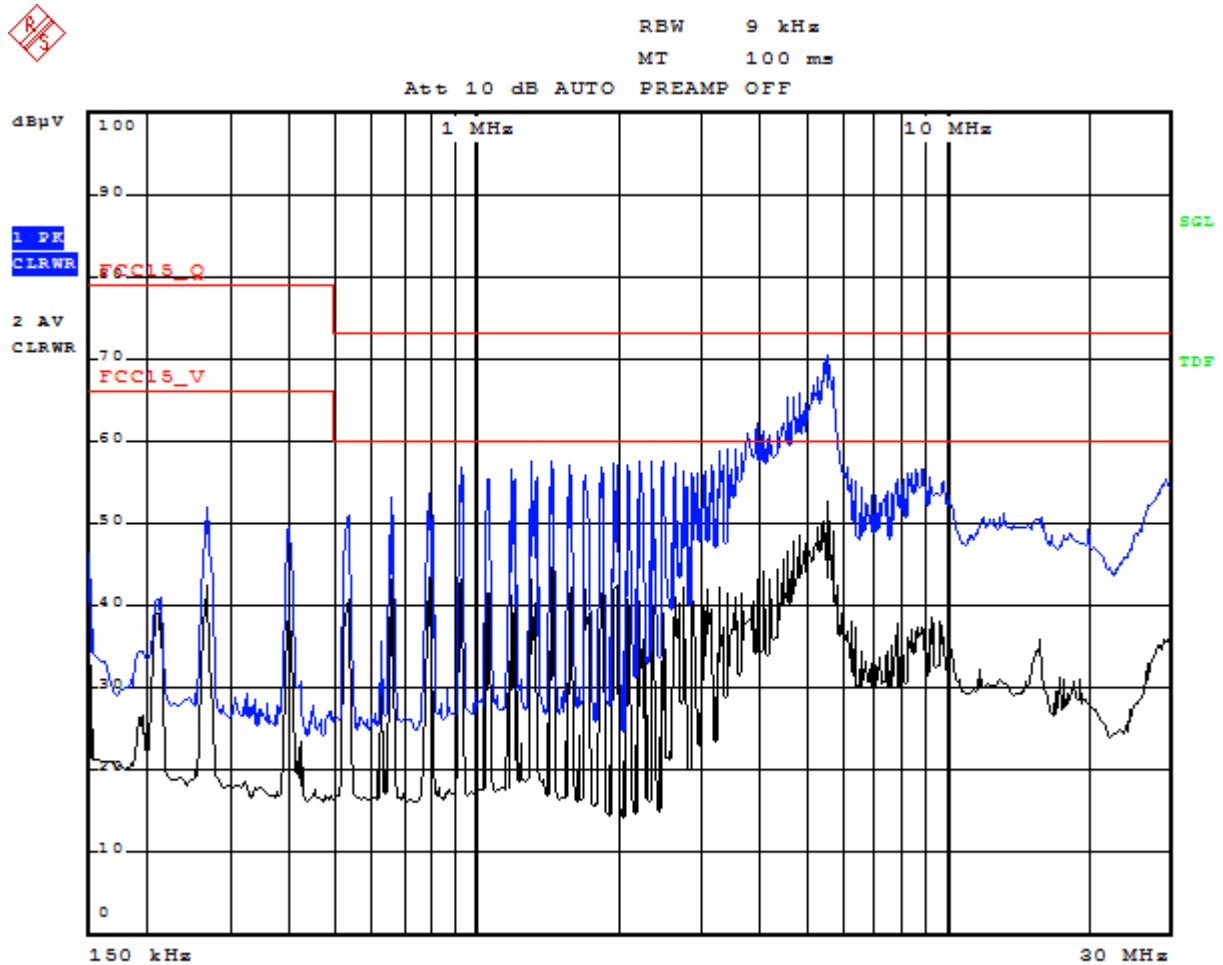
## 6.1.2 Down Link / Neutral

FCC Rules :	Part 15 §15.107
Operating Path :	Down Link
Test Mode :	Neutral
Input Level :	-57 dBm
System Gain :	80 dB
Bandwidth :	10 MHz
Number of FA :	1 FA



### 6.1.3 Up Link / HOT

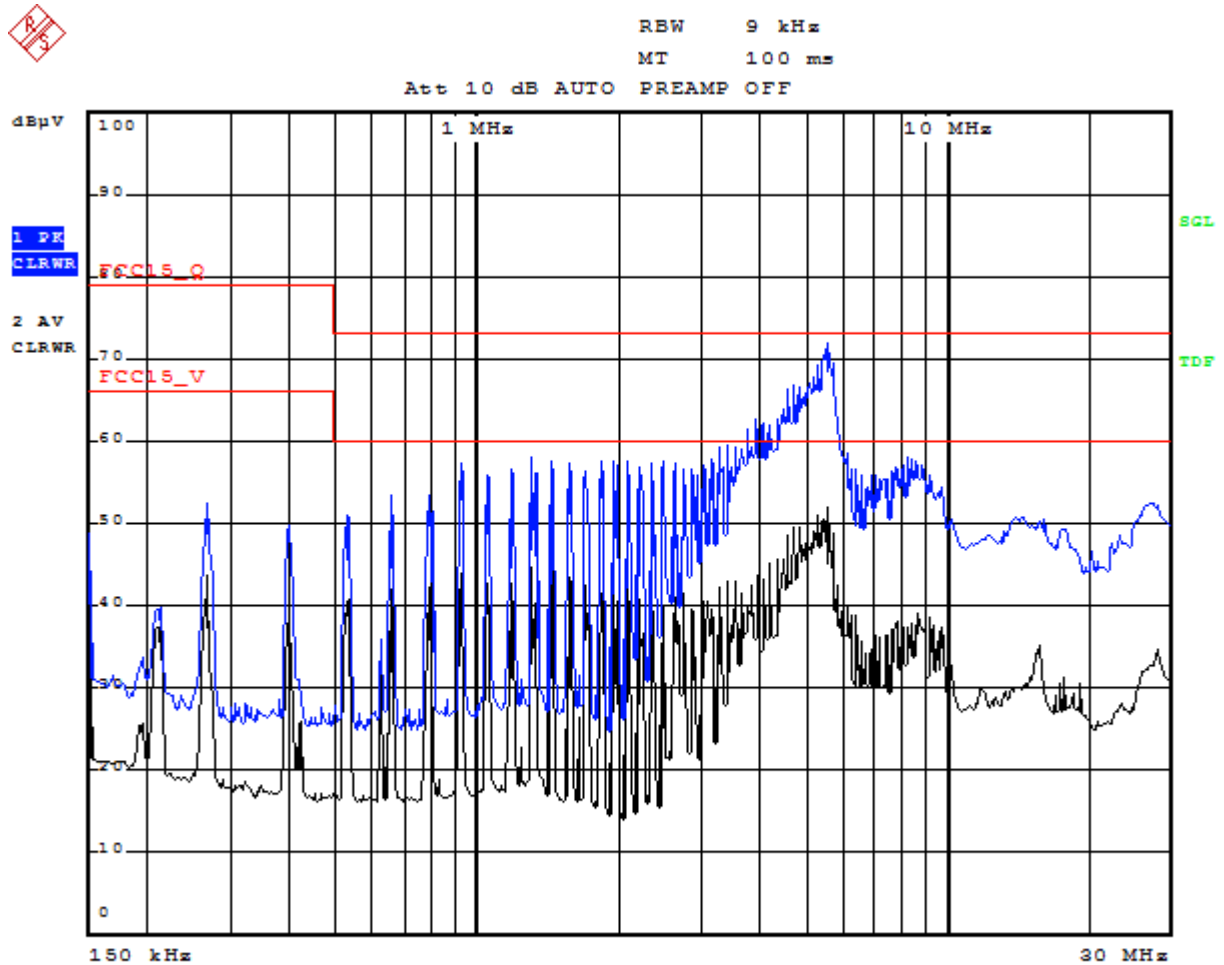
FCC Rules :	Part 15 §15.107
Operating Path :	Up Link
Test Mode :	HOT
Input Level :	-57 dBm
System Gain :	80 dB
Bandwidth :	10 MHz
Number of FA :	1 FA





## 6.1.4 Up Link / Neutral

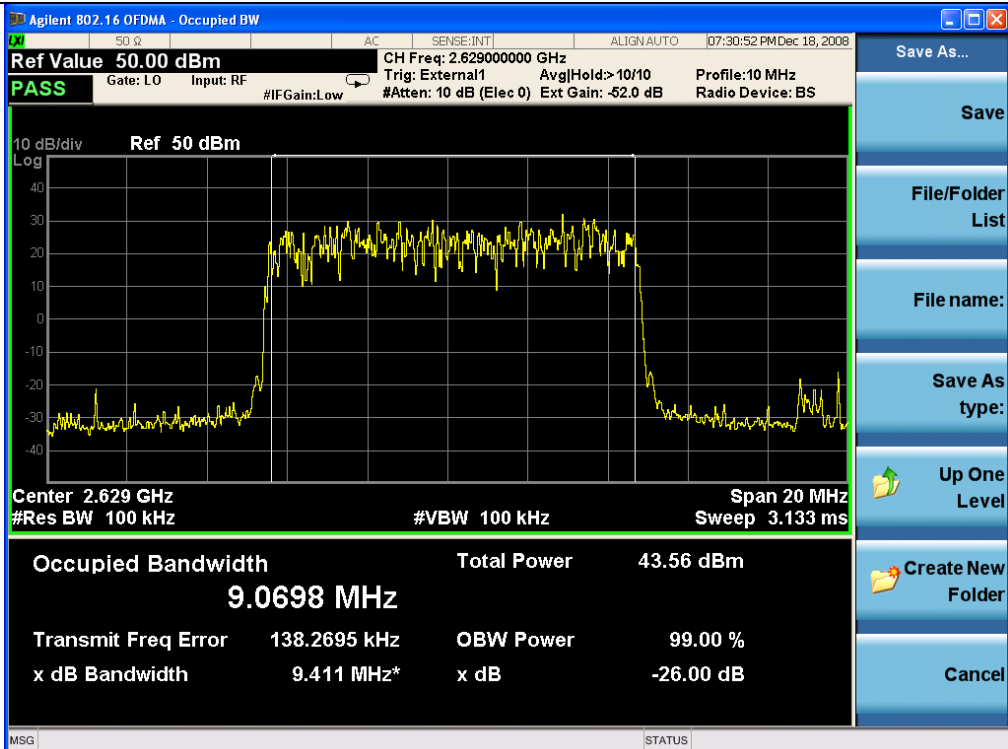
FCC Rules :	Part 15 §15.107
Operating Path :	Up Link
Test Mode :	Neutral
Input Level :	-57 dBm
System Gain :	80 dB
Bandwidth :	10 MHz
Number of FA :	1 FA



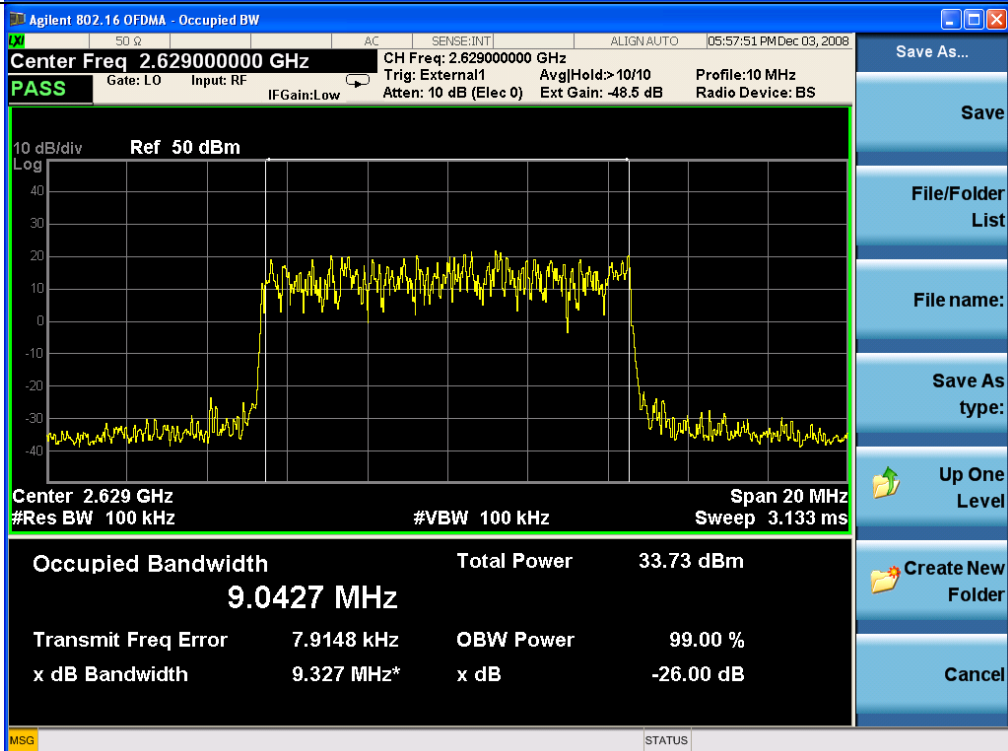
## 6.2 Maximum Channel Power / Occupied Bandwidth

### 6.2.1 E-H Block [2629MHz - QPSK]

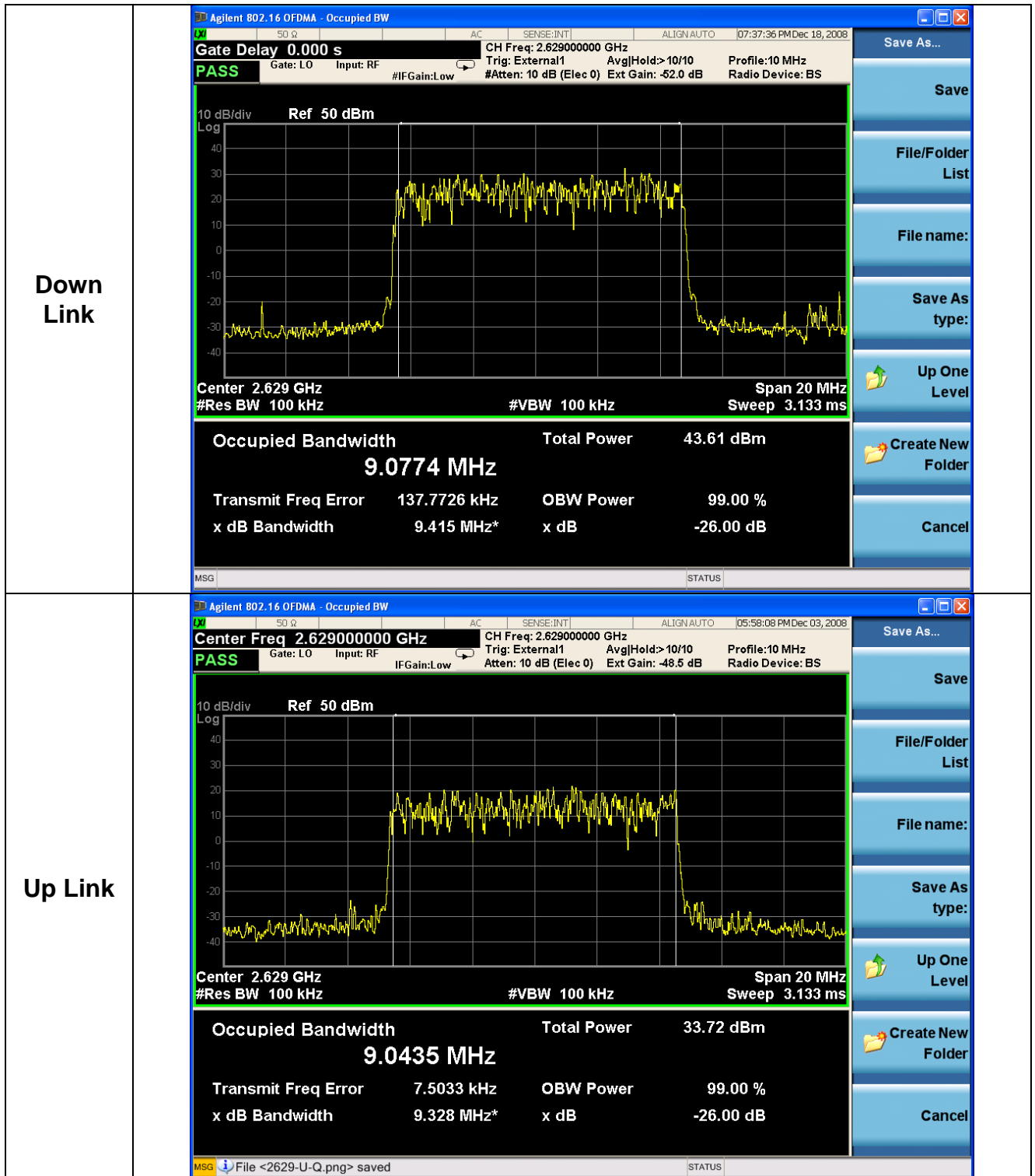
Down Link



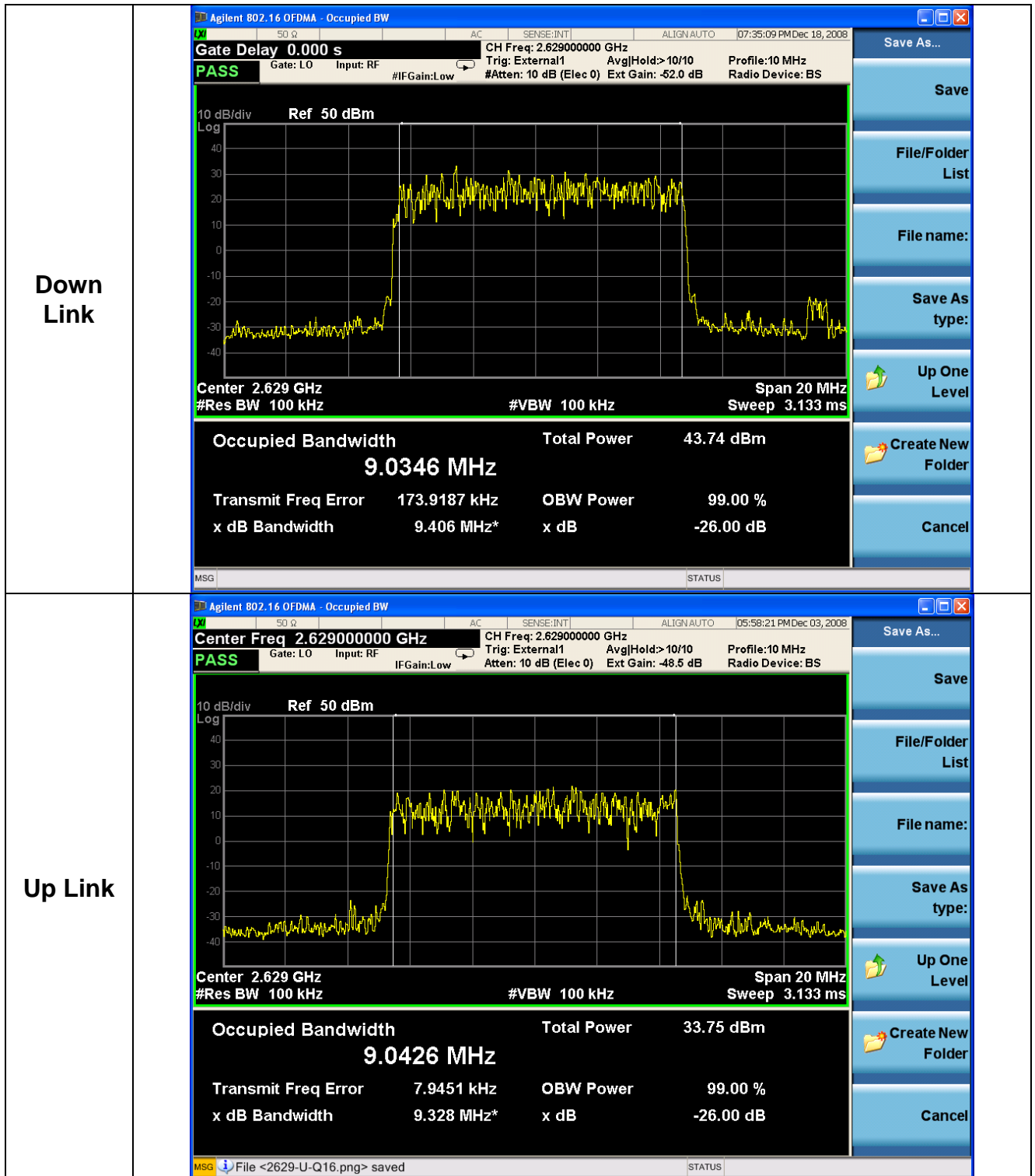
Up Link



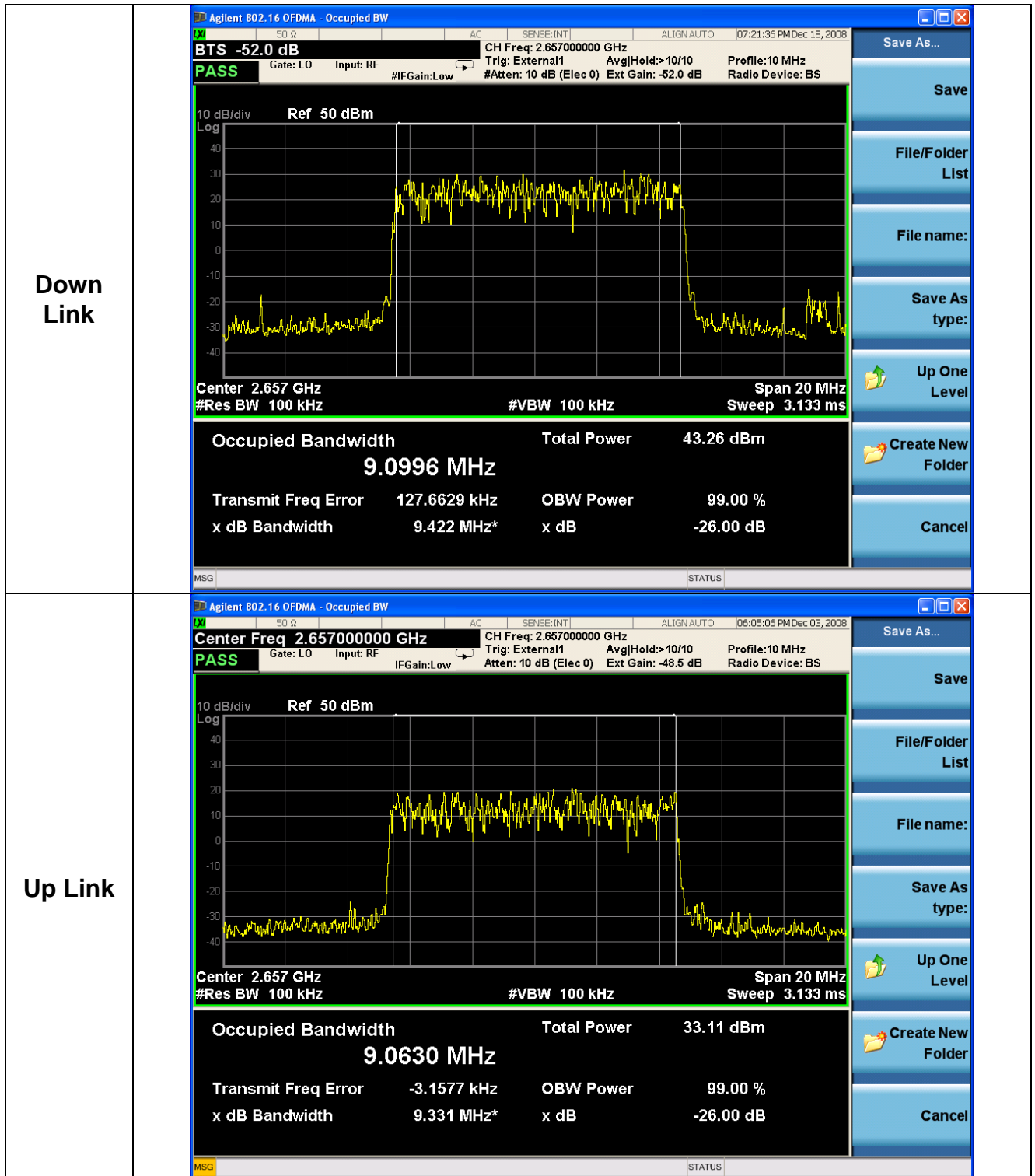
## 6.2.2 E-H Block [2629MHz – 16QAM]



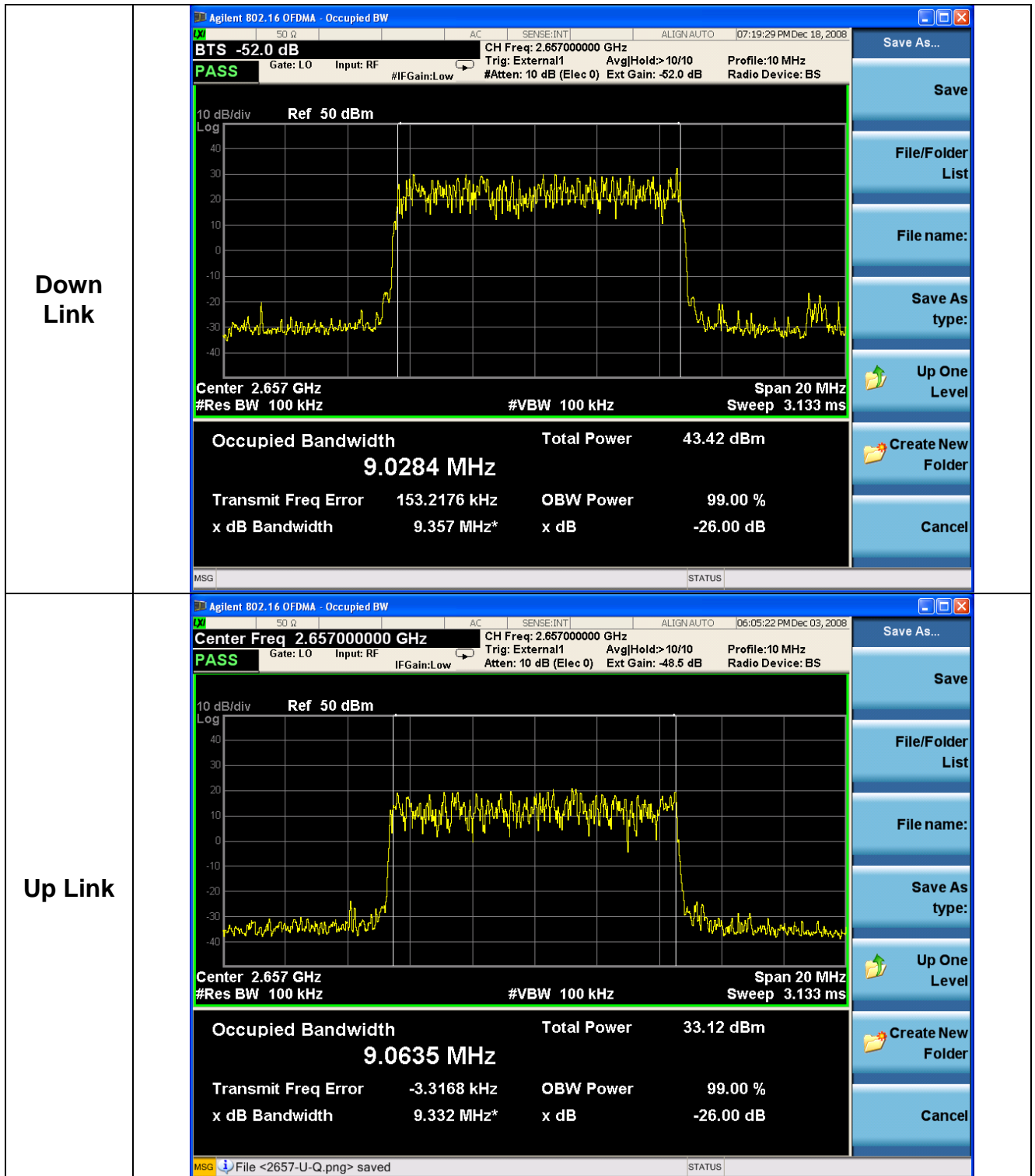
## 6.2.3 E-H Block [2629MHz – 64QAM]



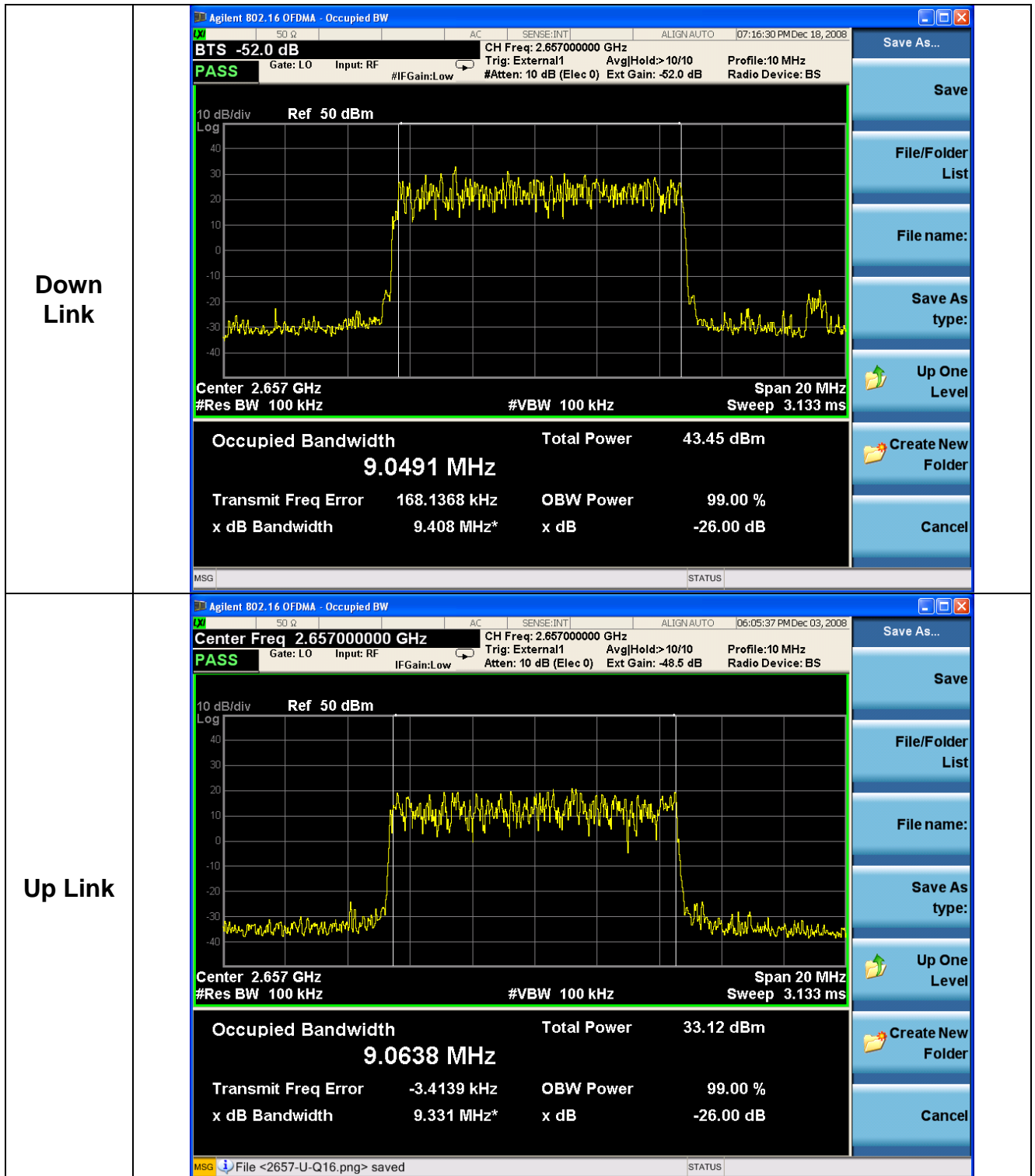
## 6.2.4 E-H Block [2657MHz – QPSK]



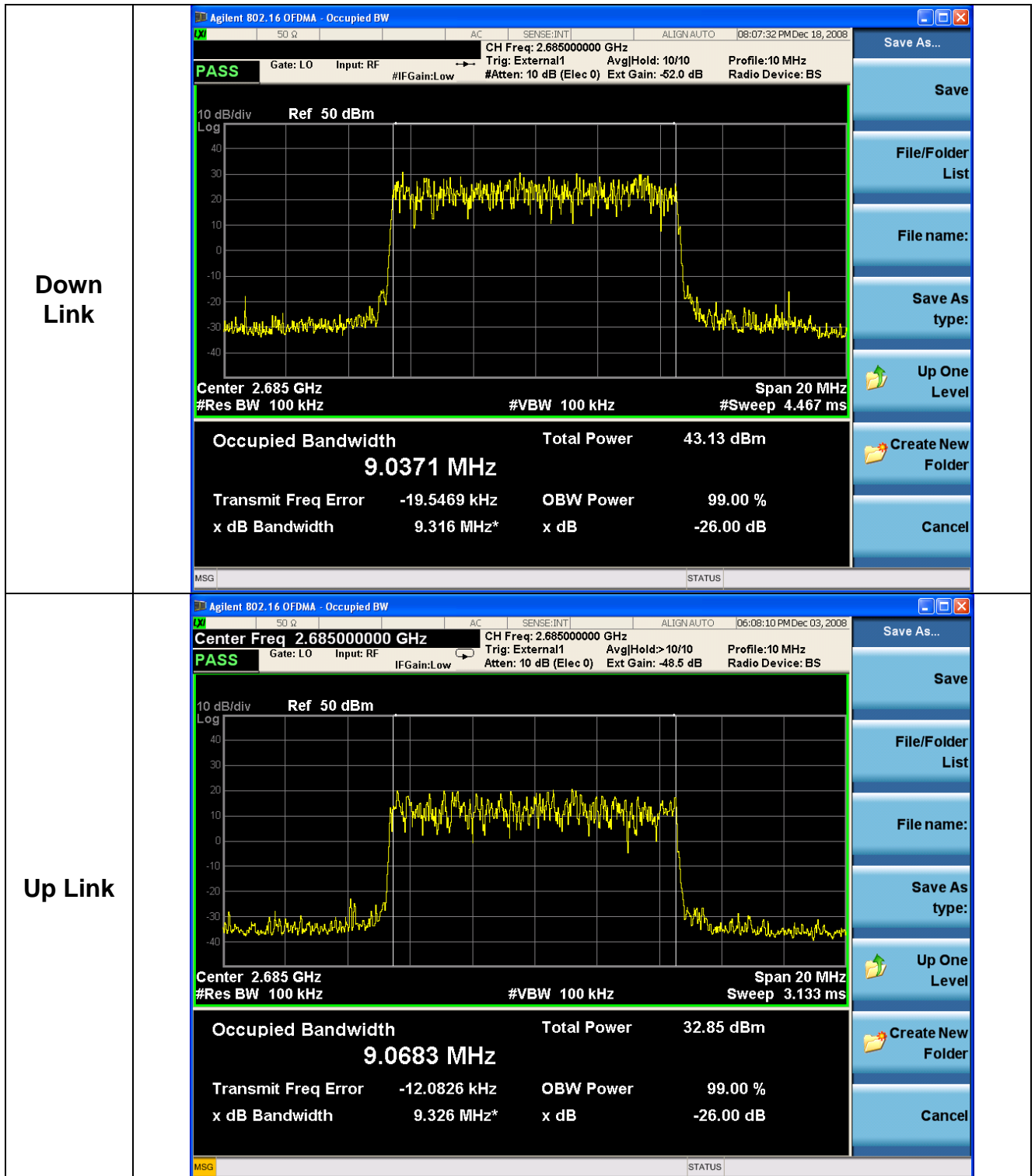
## 6.2.5 A- D Block [2657MHz – 16QAM]



## 6.2.6 A- D Block [2657MHz – 64QAM]

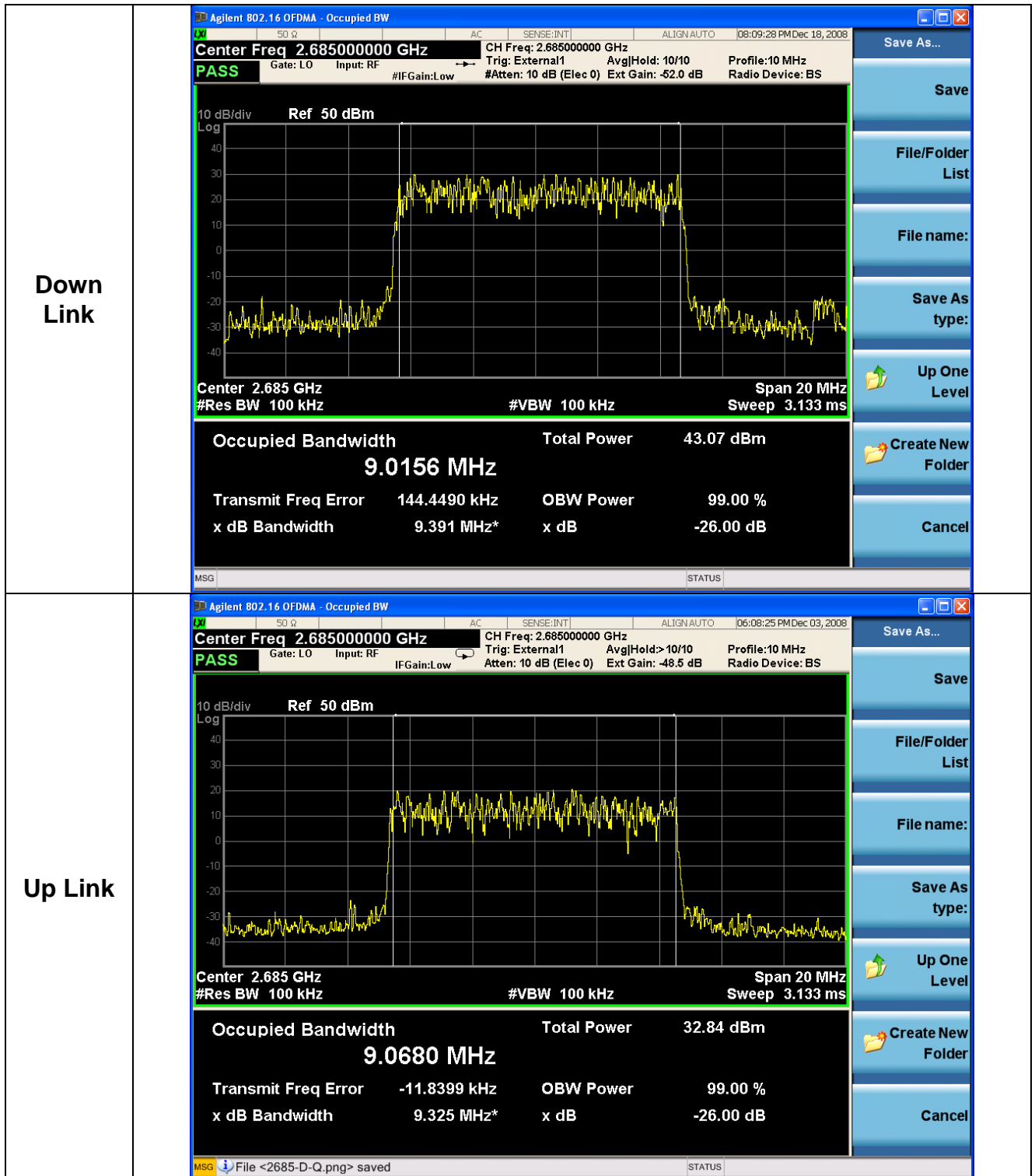


## 6.2.7 A- D Block [2685MHz – QPSK]



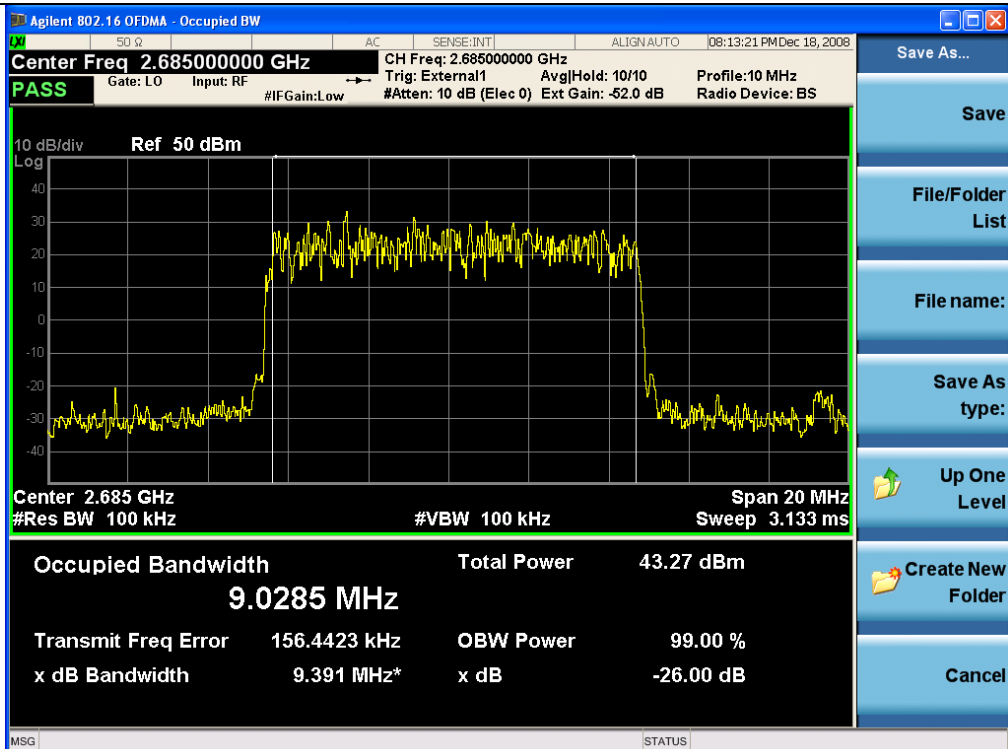


## 6.2.8 A- D Block [2685MHz – 16QAM]

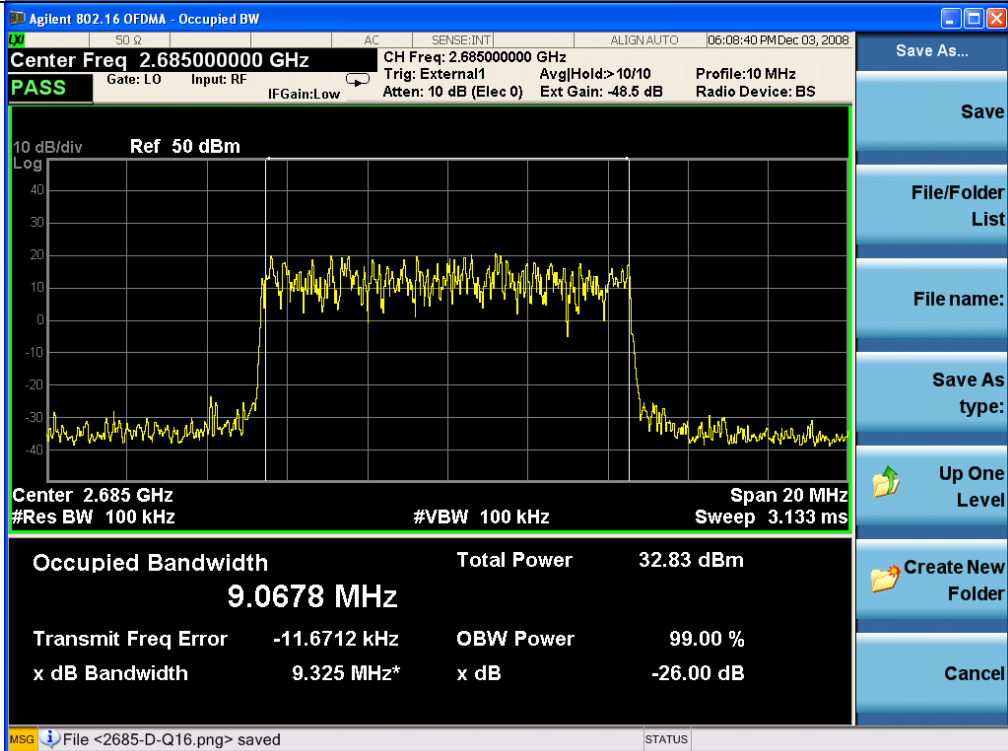


## 6.2.9 A- D Block [2685MHz – 64QAM]

Down Link

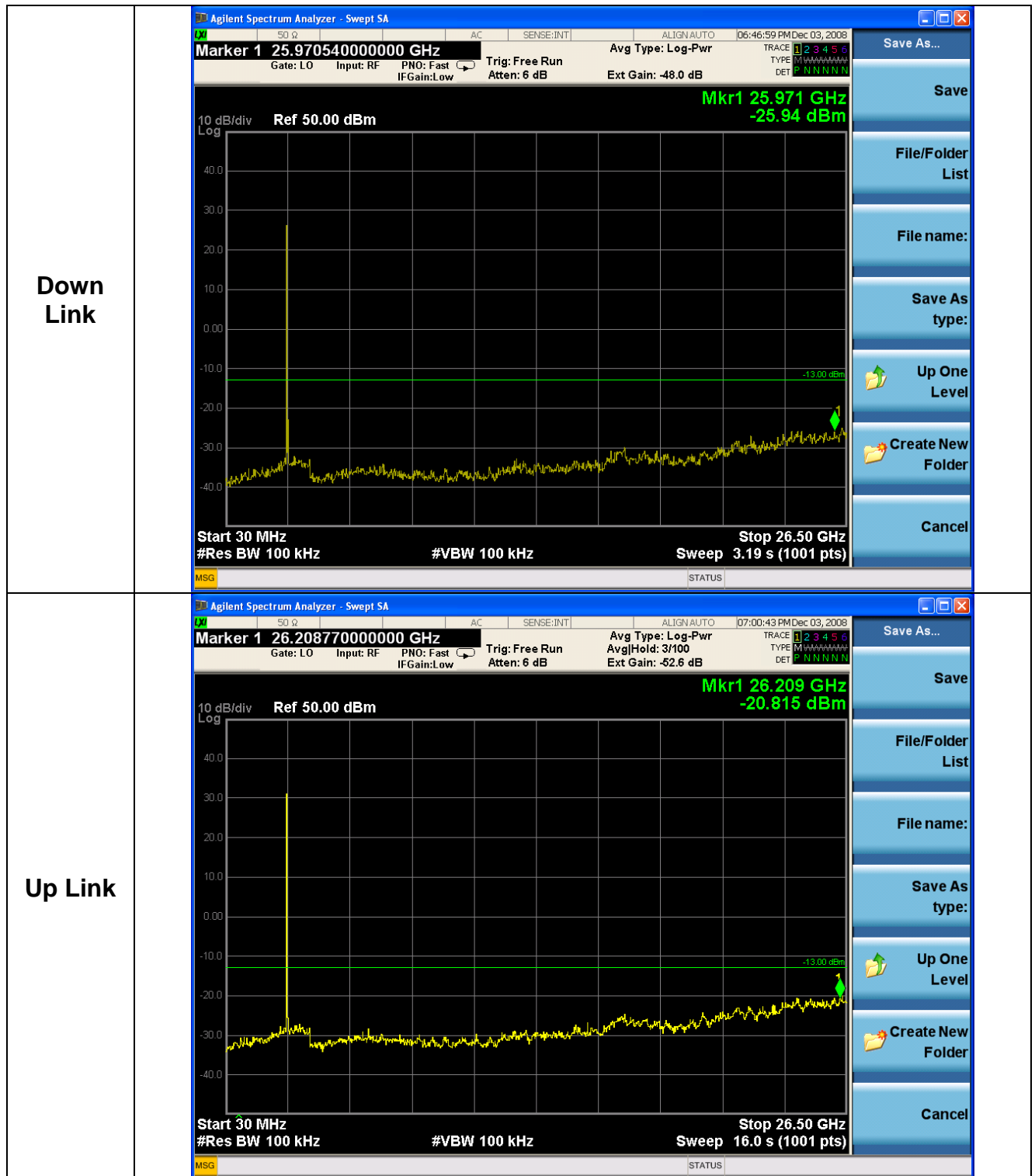


Up Link



## 6.3 Spurious Emissions at Antenna Terminals

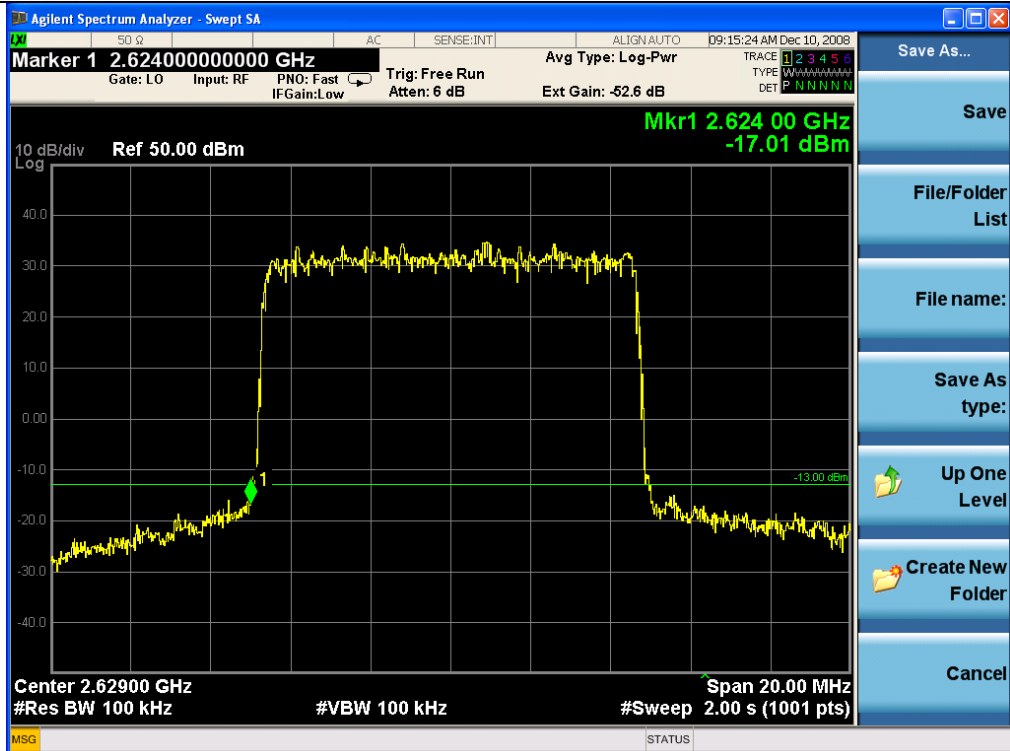
### 6.3.1 E-H Block [2657MHz – 1FA\_QPSK]



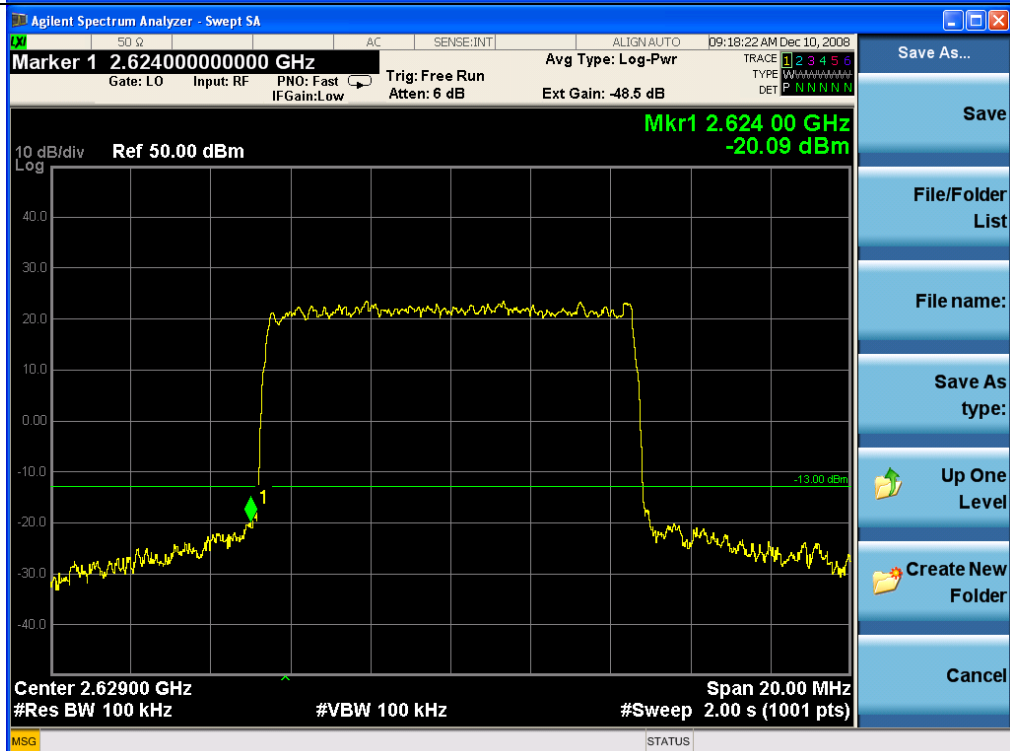
## 6.4 Band Edge Compliance

### 6.4.1 E-H Block [2629MHz – QPSK]

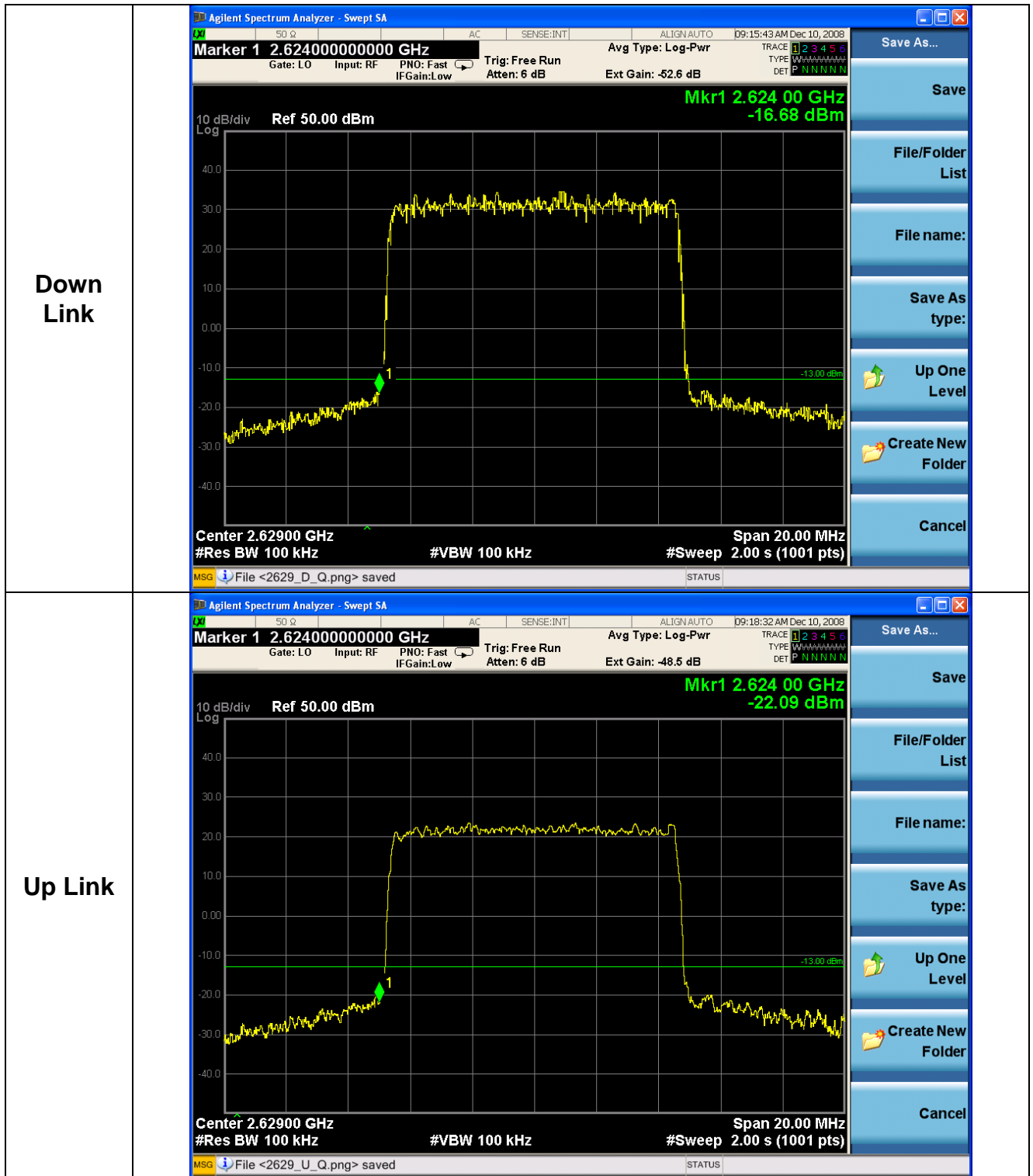
Down Link



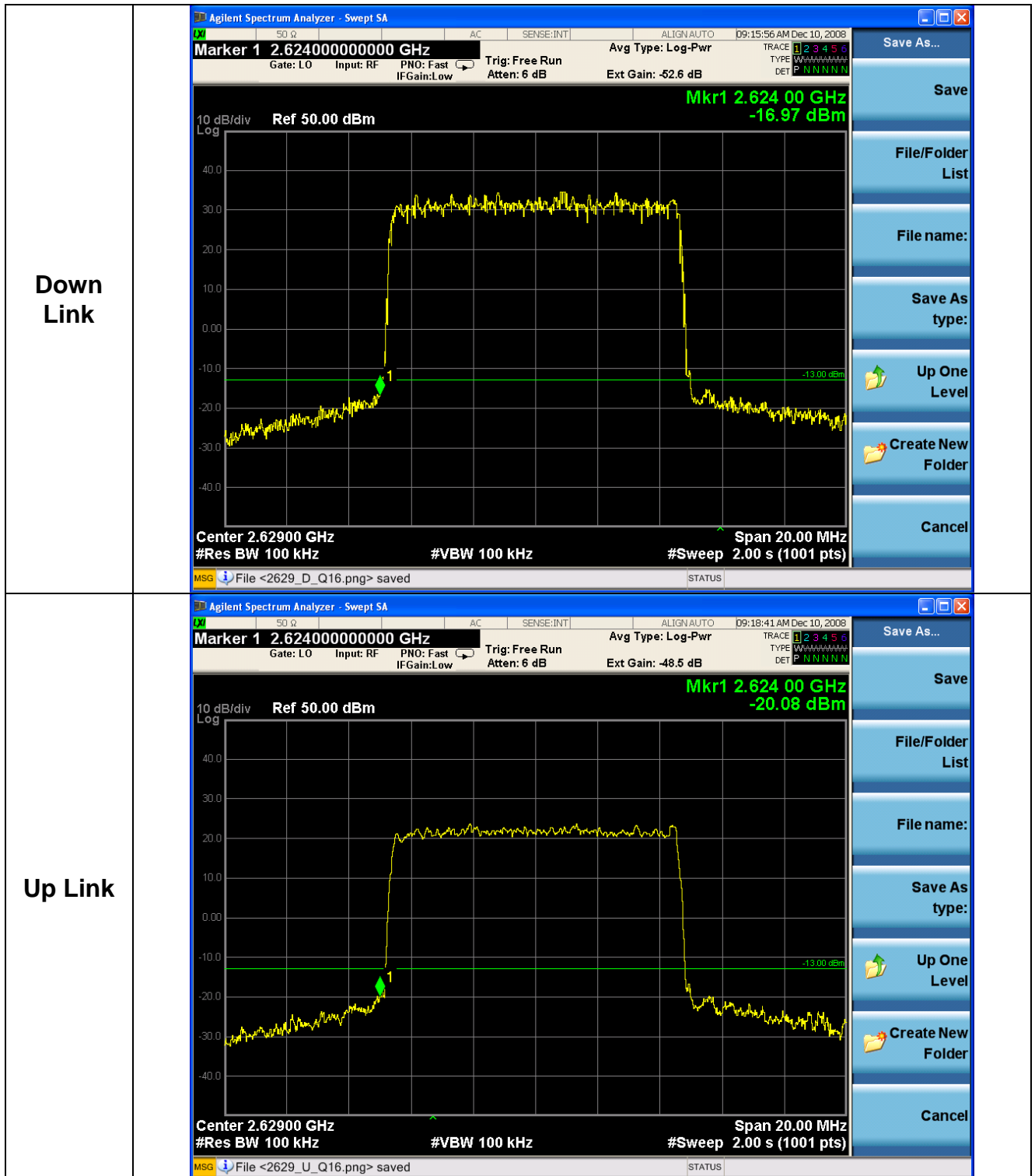
Up Link



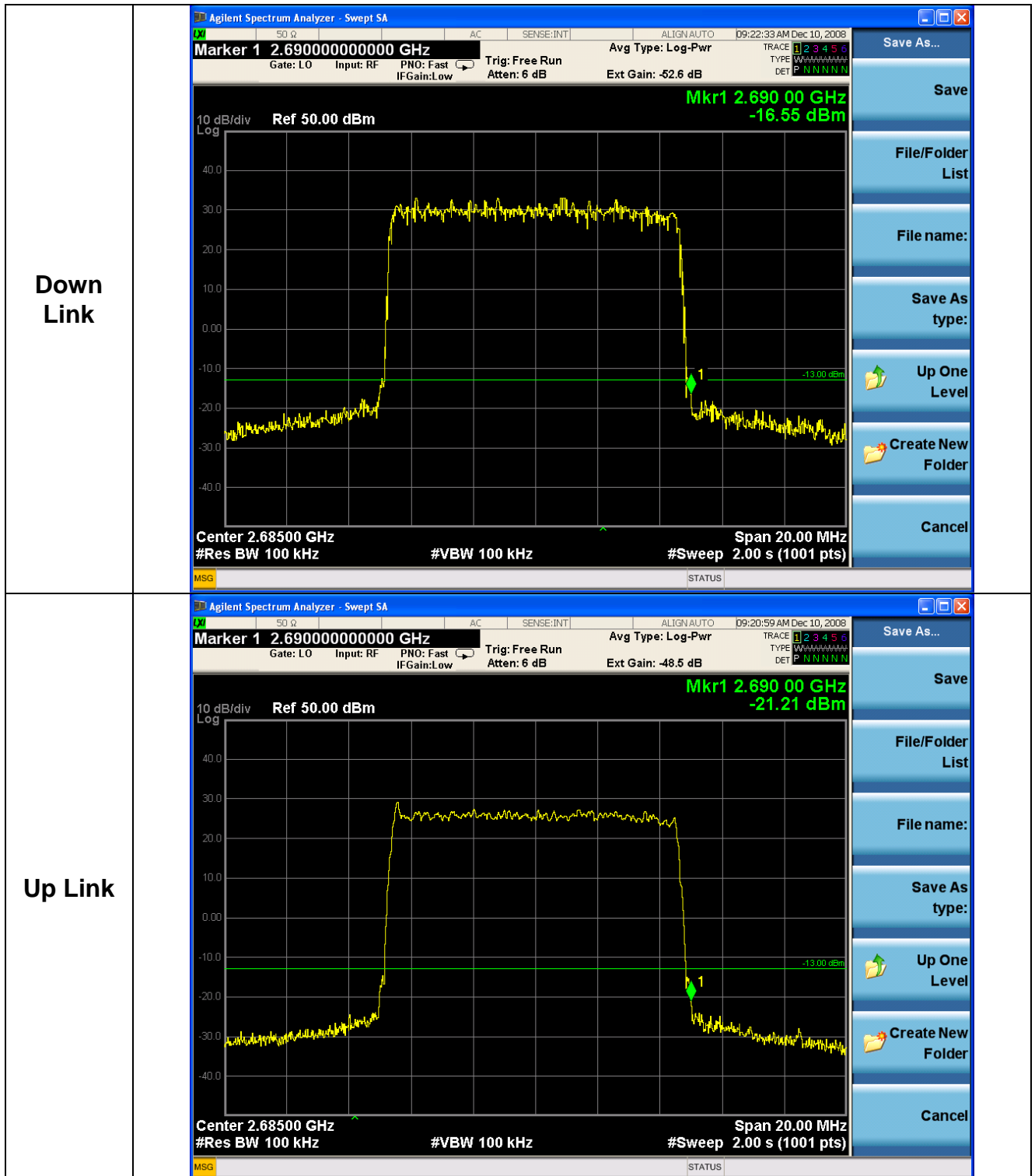
## 6.4.2 E-H Block [2629MHz – 16QAM]



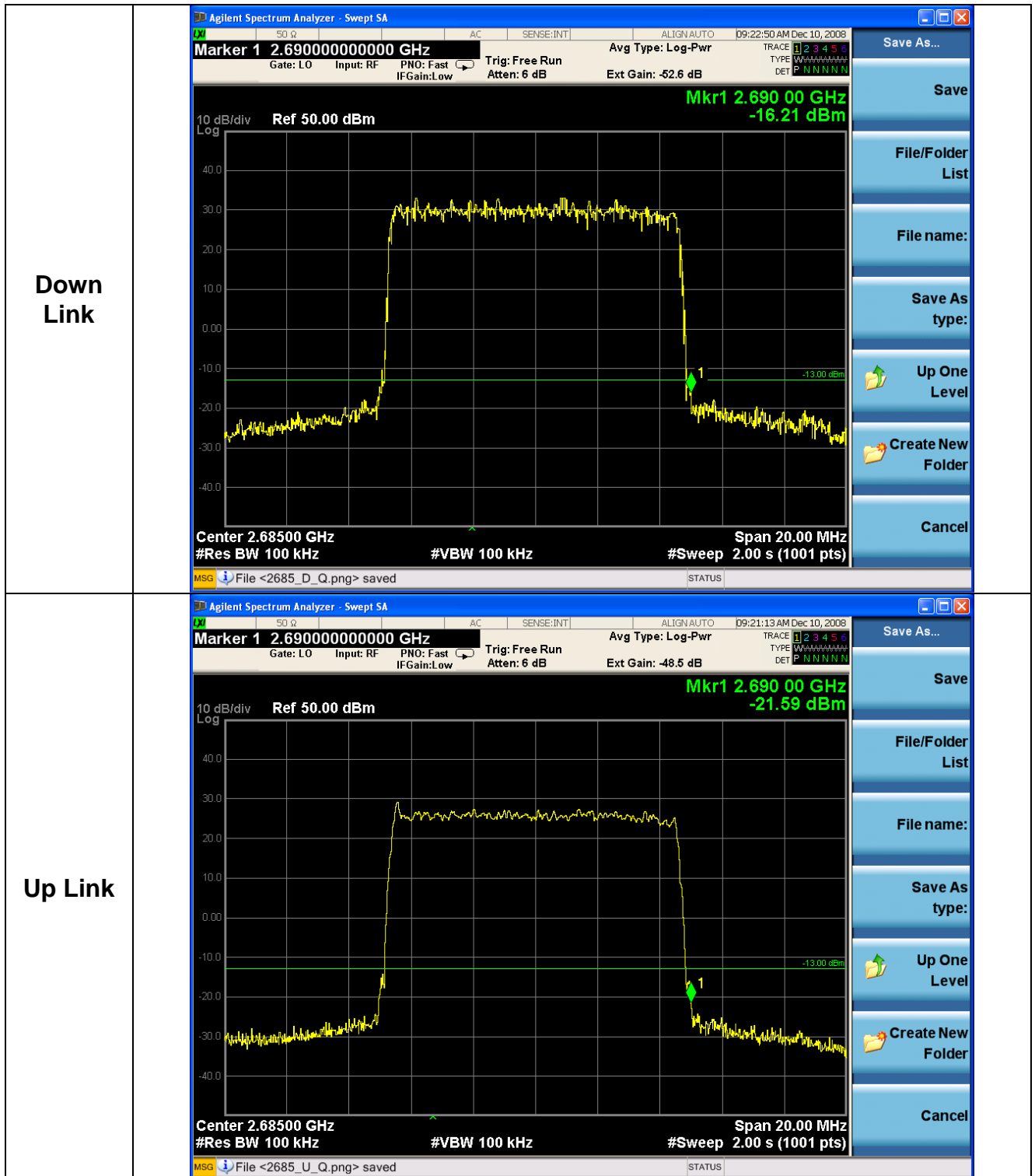
### 6.4.3 E-H Block [2629MHz – 64QAM]



## 6.4.4 E-H Block [2685MHz – QPSK]

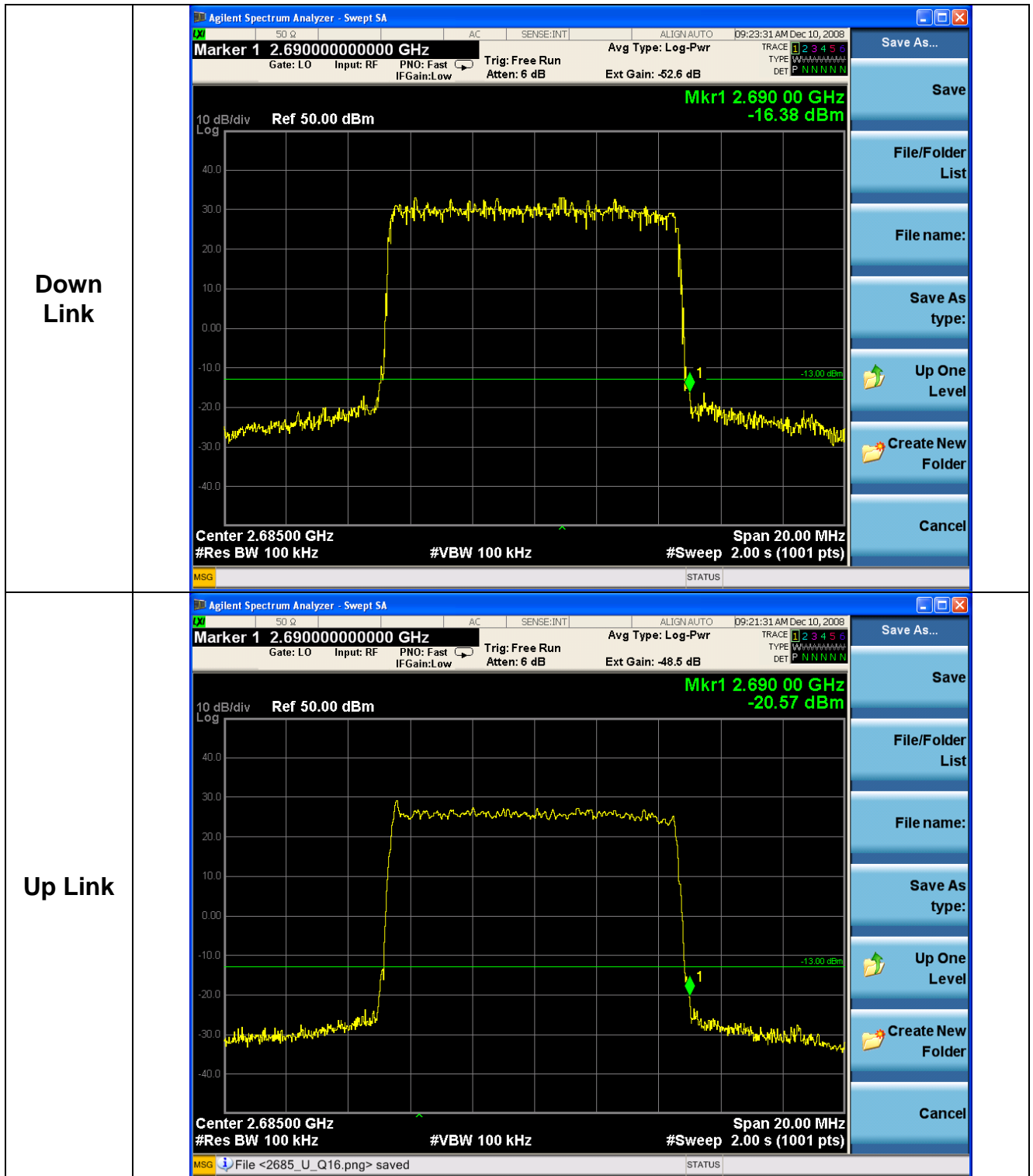


## 6.4.5 E-H Block [2685MHz – 16QAM]



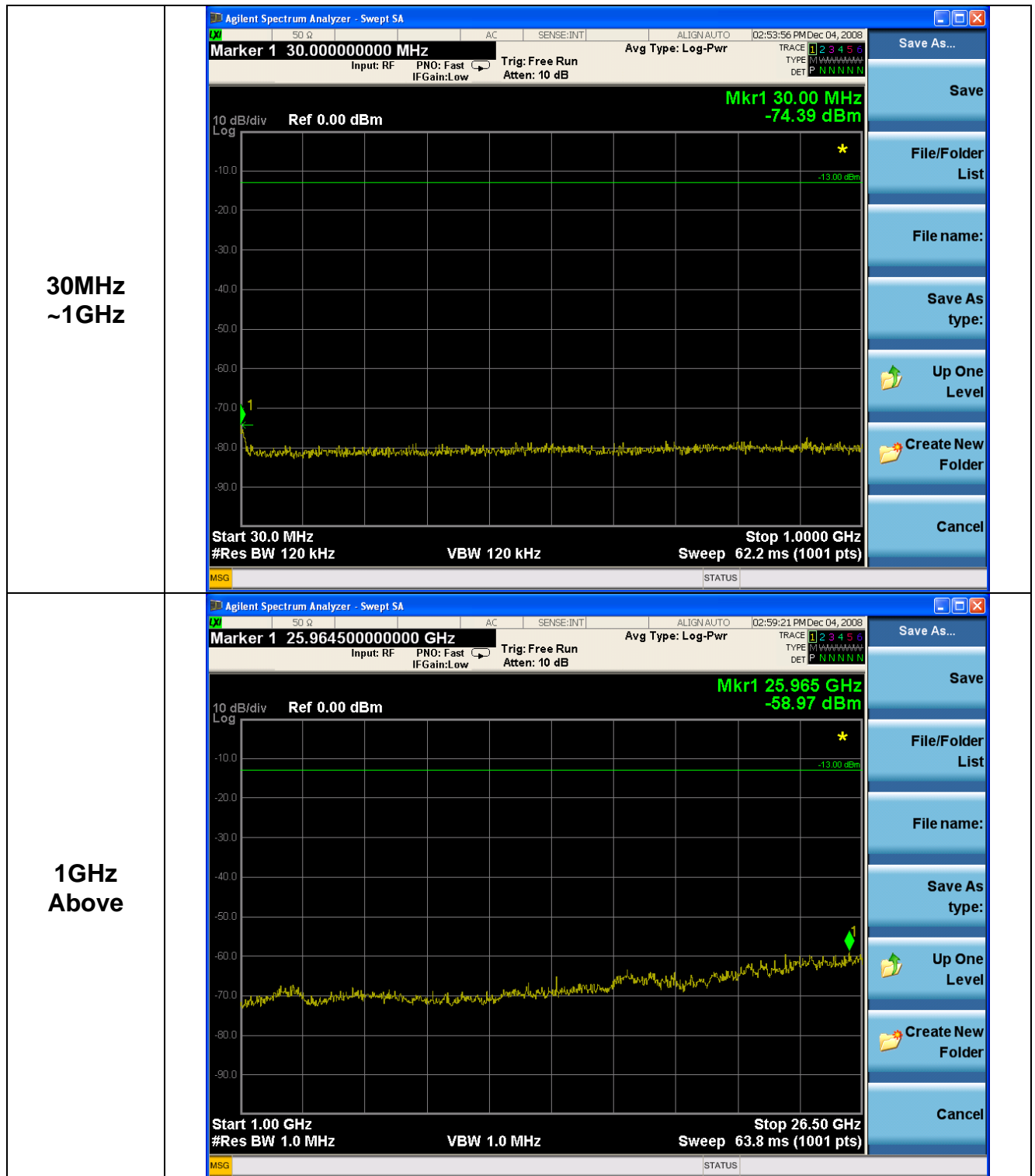


## 6.4.6 E-H Block [2685MHz – 64QAM]

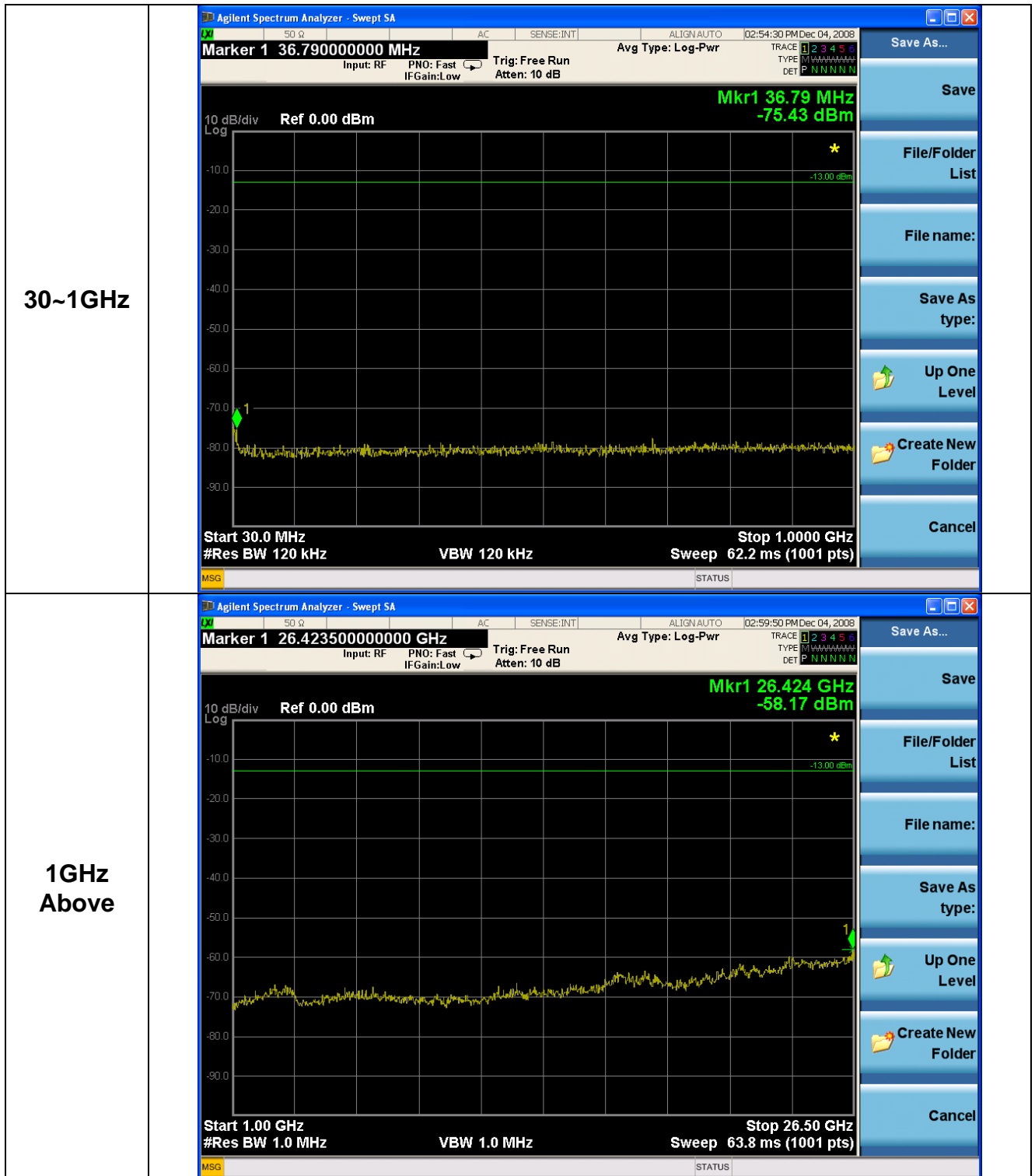


## 6.5 Field Strength of Spurious Radiation

### 6.5.1 [2657MHz \_QPSK] Down Link

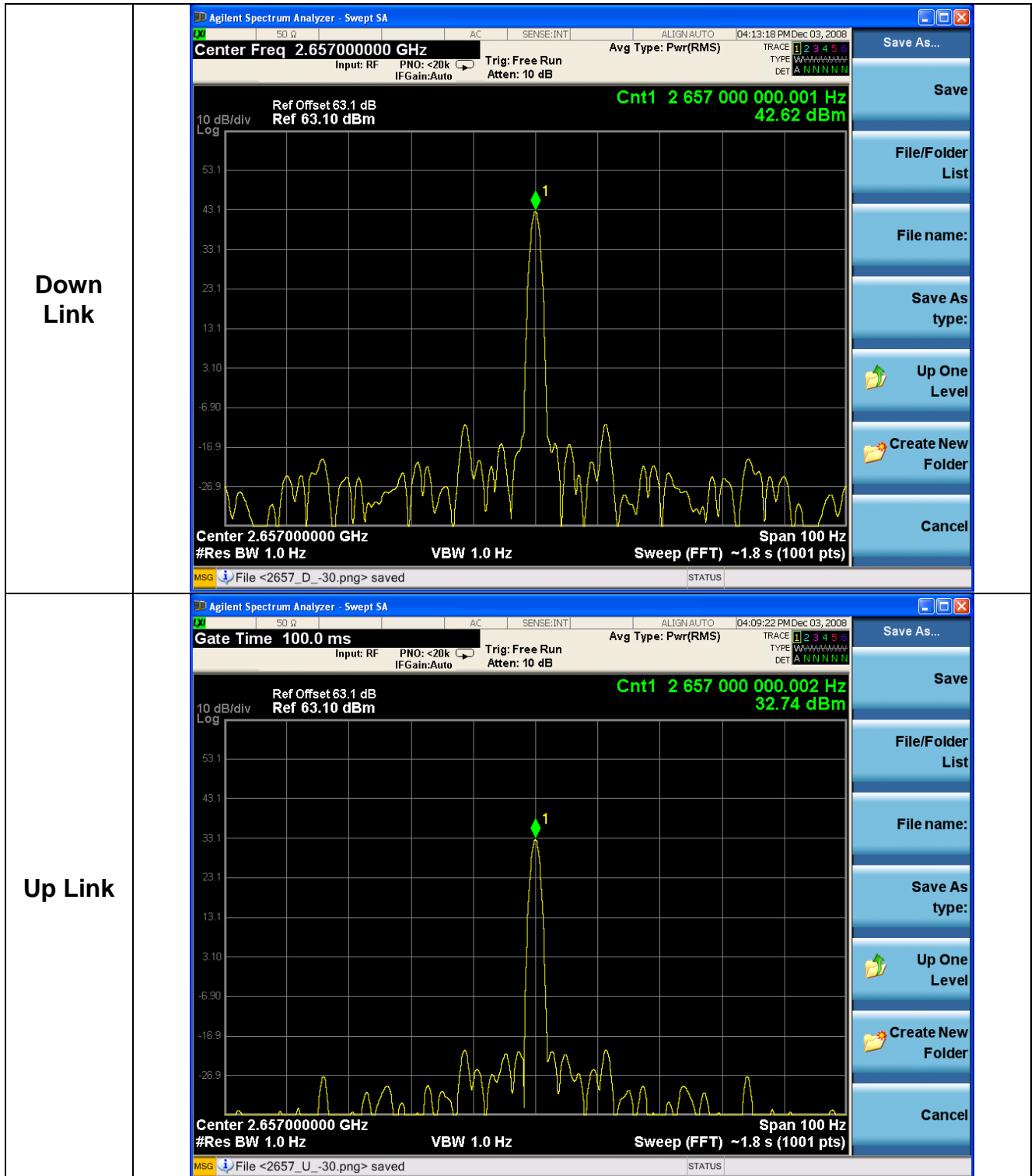


## 6.5.2 [2657MHz \_1FA\_QPSK] Up Link

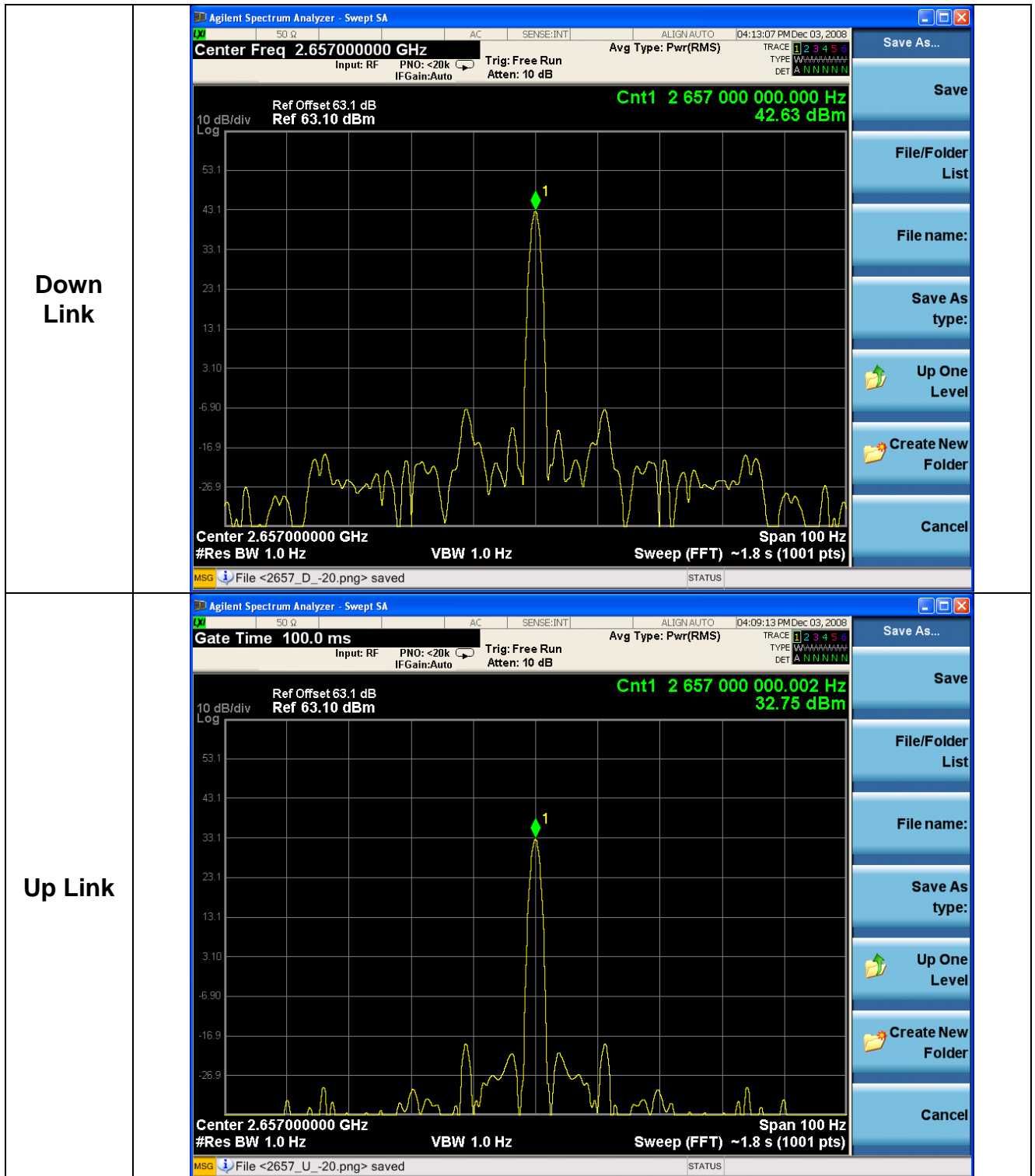


## 6.6 Frequency Stability

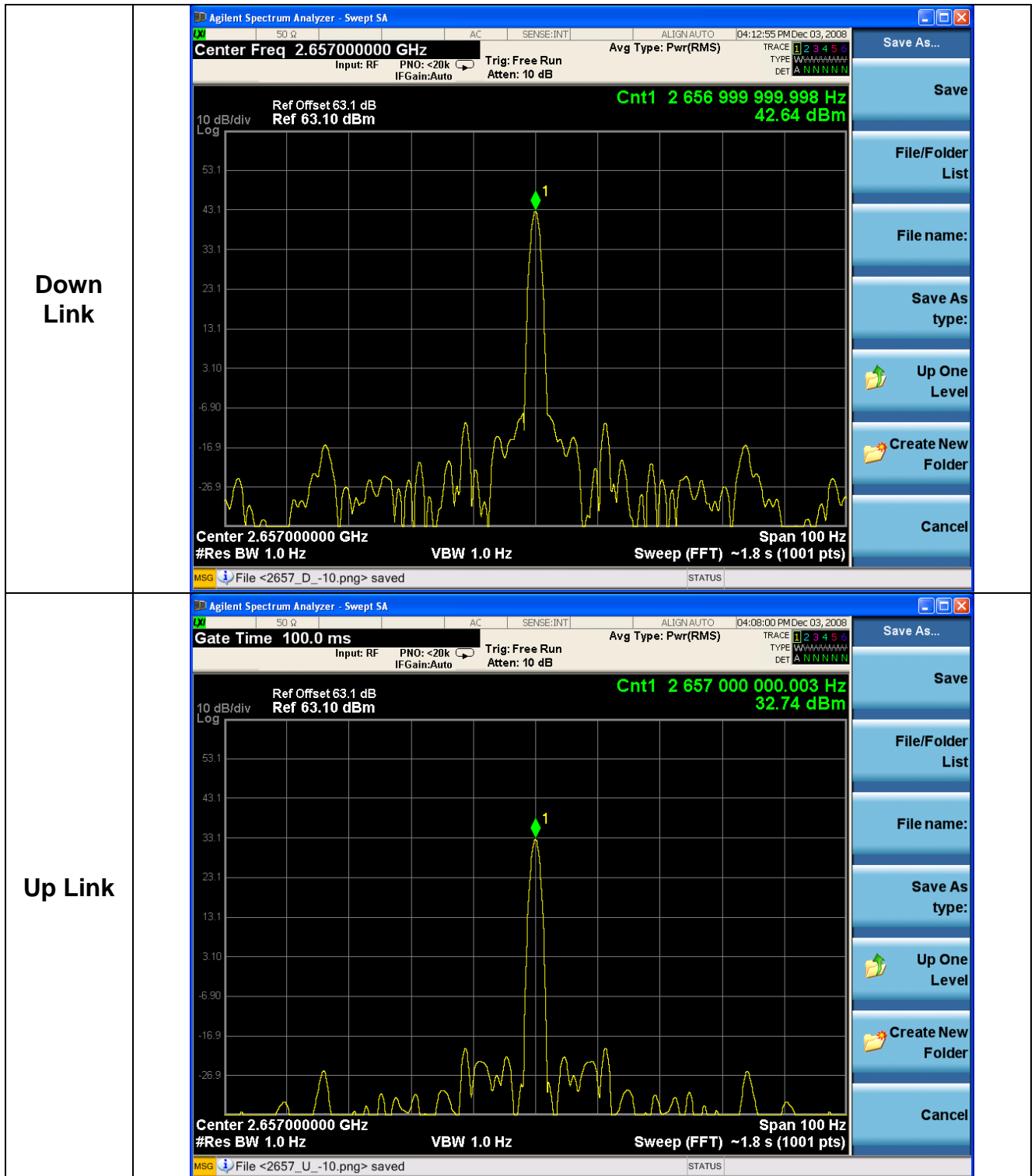
### 6.6.1 E-H Block [2657MHz ,Temperature: -40℃ ]



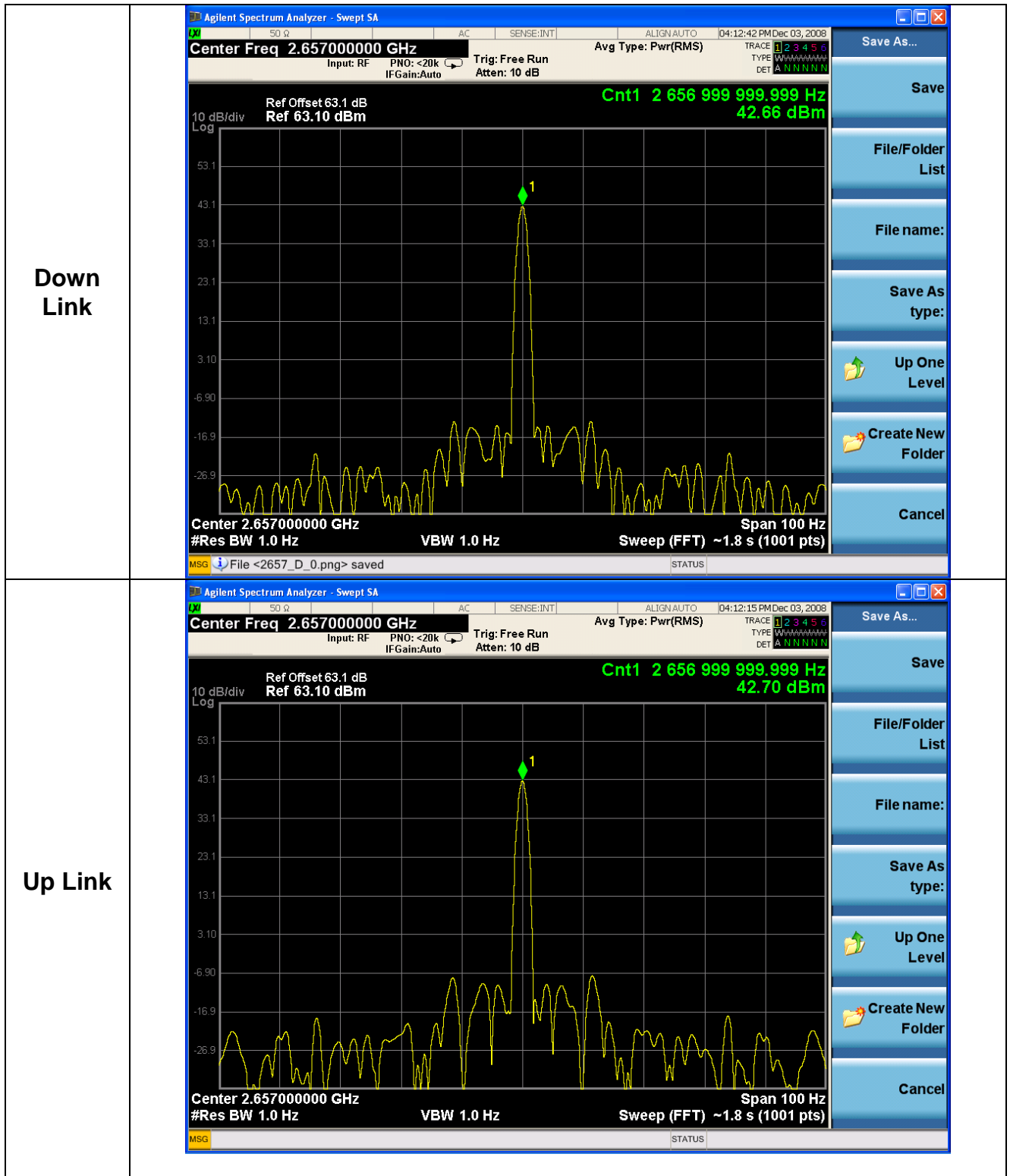
## 6.6.2 E-H Block [2657MHz, Temperature: -30℃]



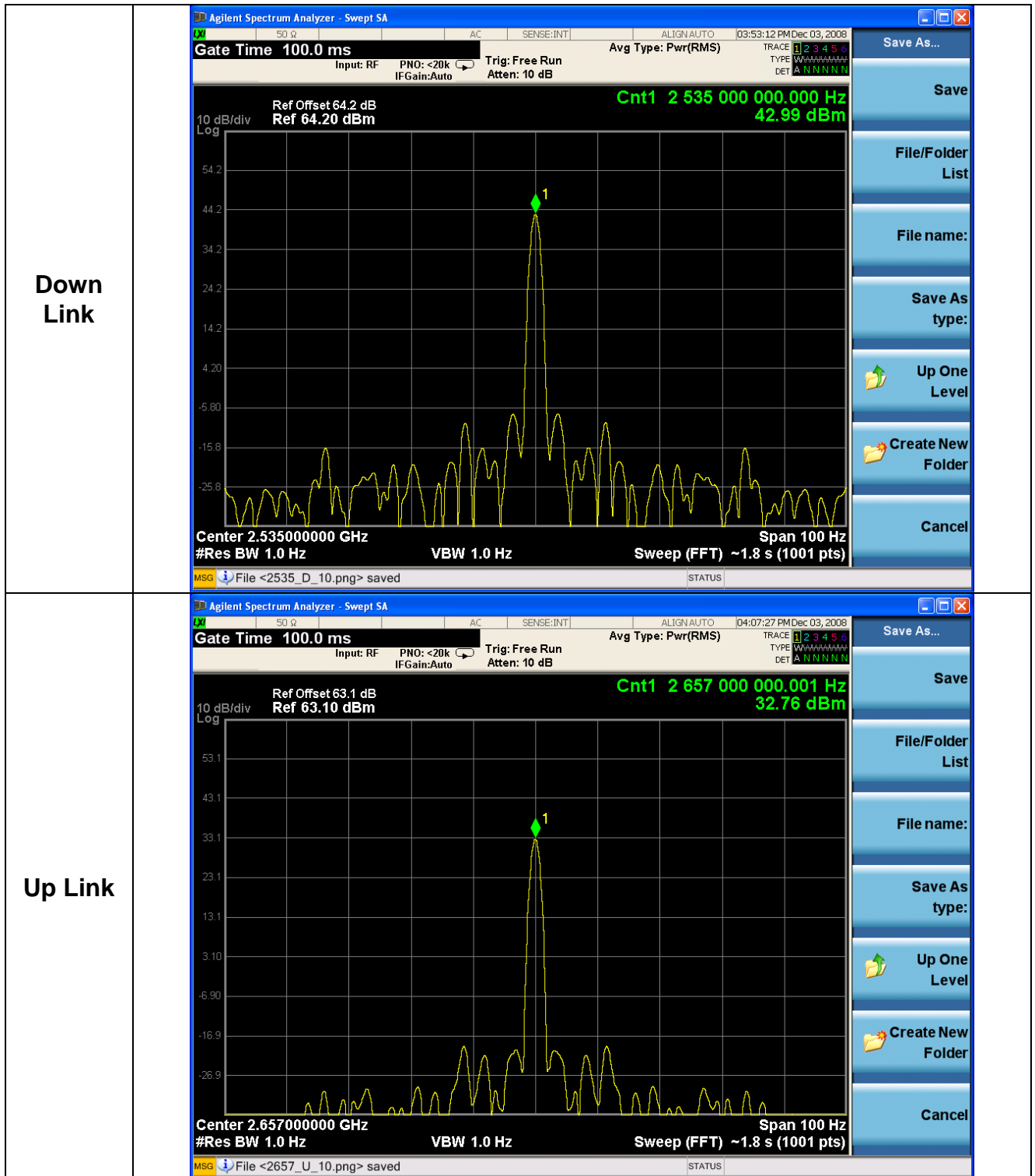
### 6.6.3 E-H Block [2657MHz, Temperature: -20℃]



## 6.6.4 E-H Block [2657MHz, Temperature: -10°C]

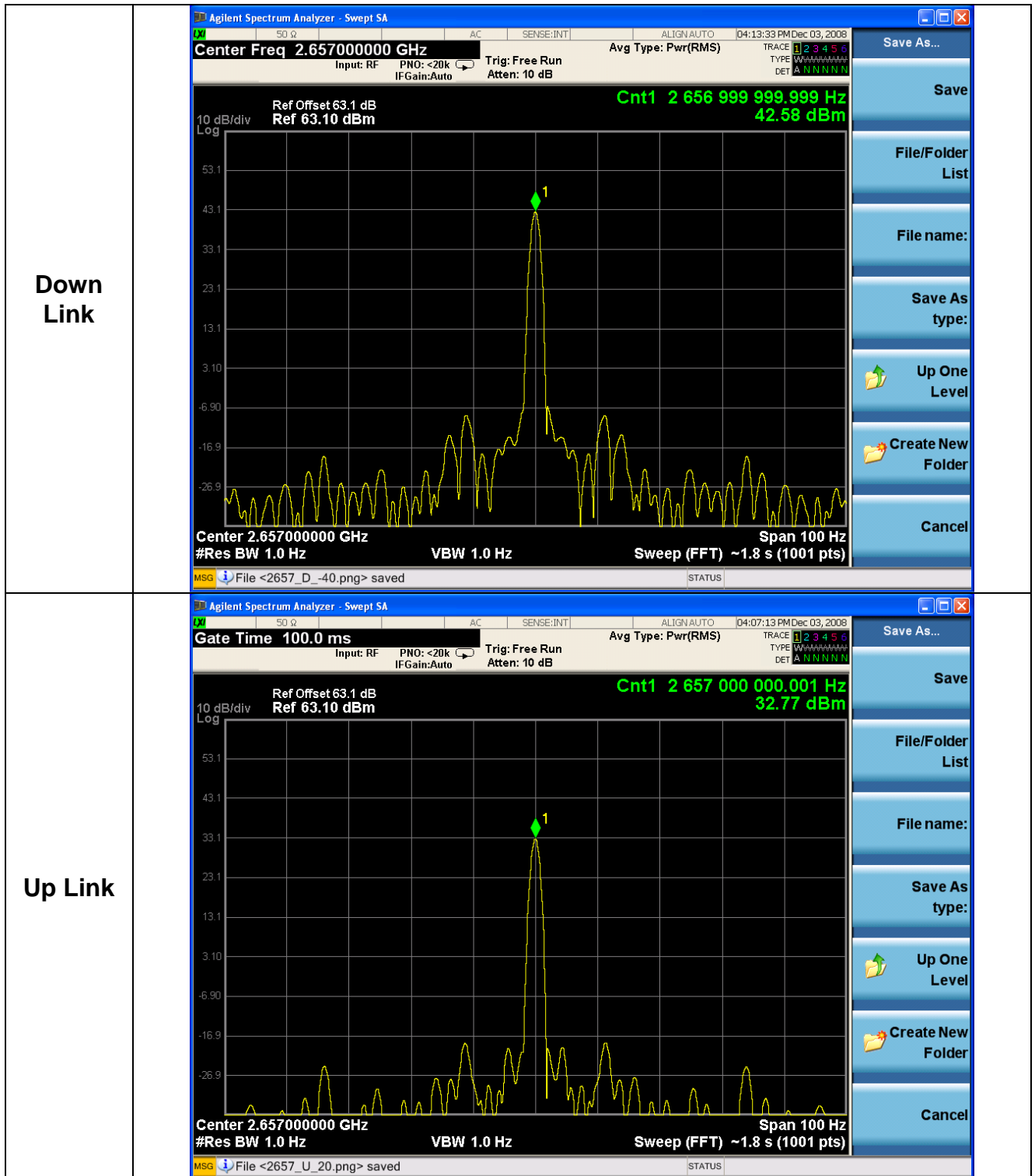


## 6.6.5 E-H Block [2657MHz, Temperature: 0℃]

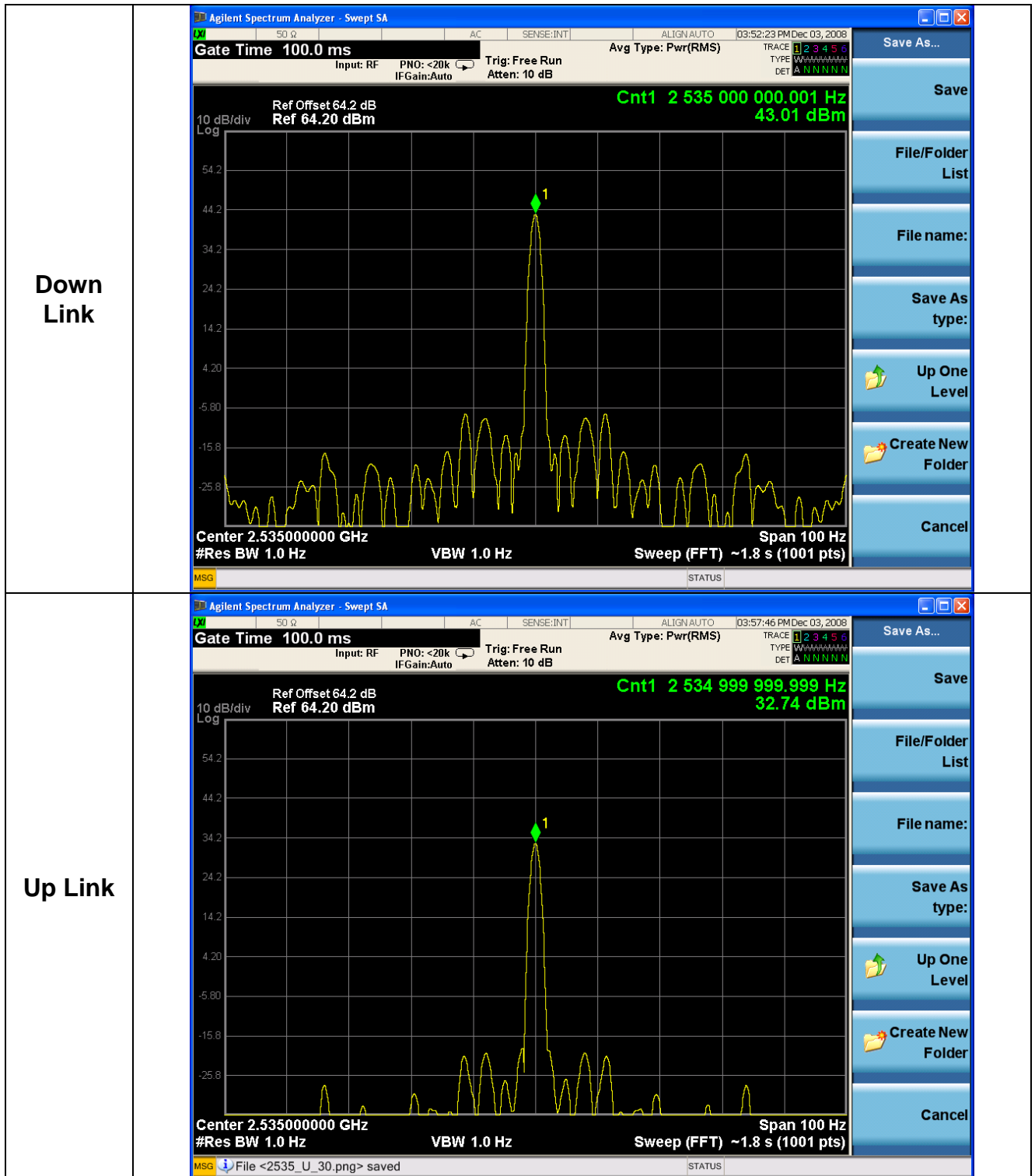




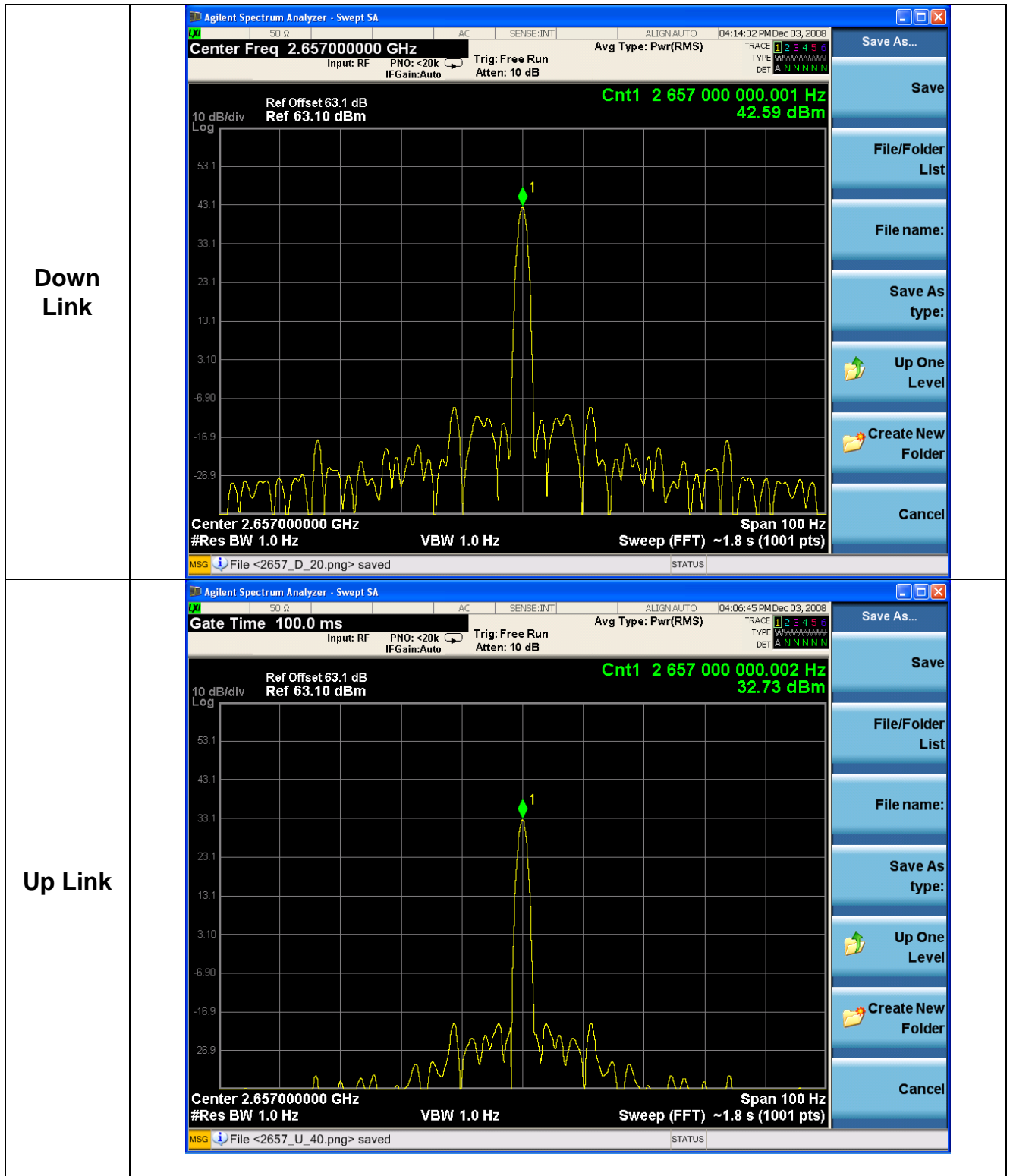
## 6.6.6 E-H Block [2657MHz, Temperature: +10°C]



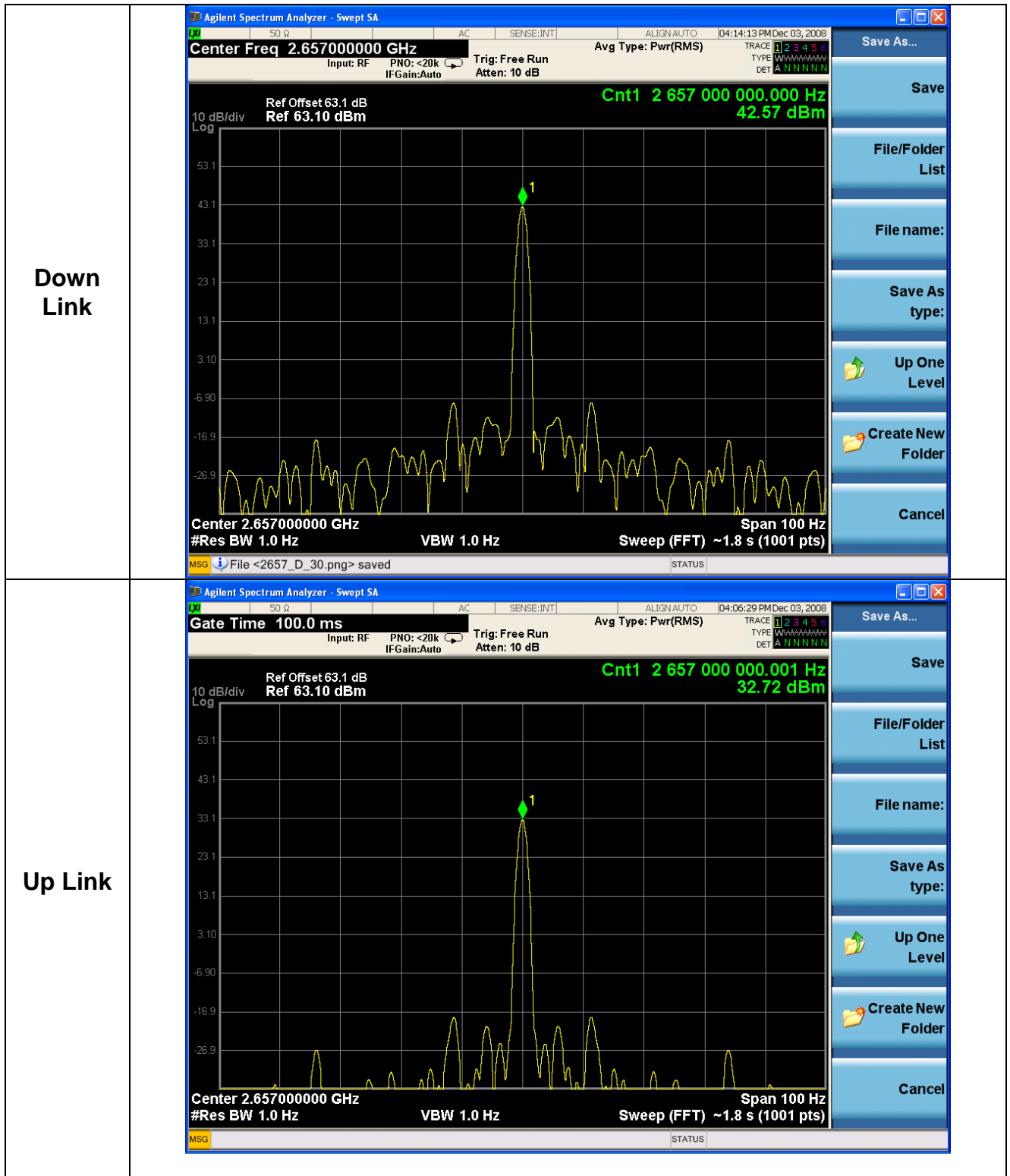
## 6.6.7 E-H Block [2657MHz, Temperature: +20°C]



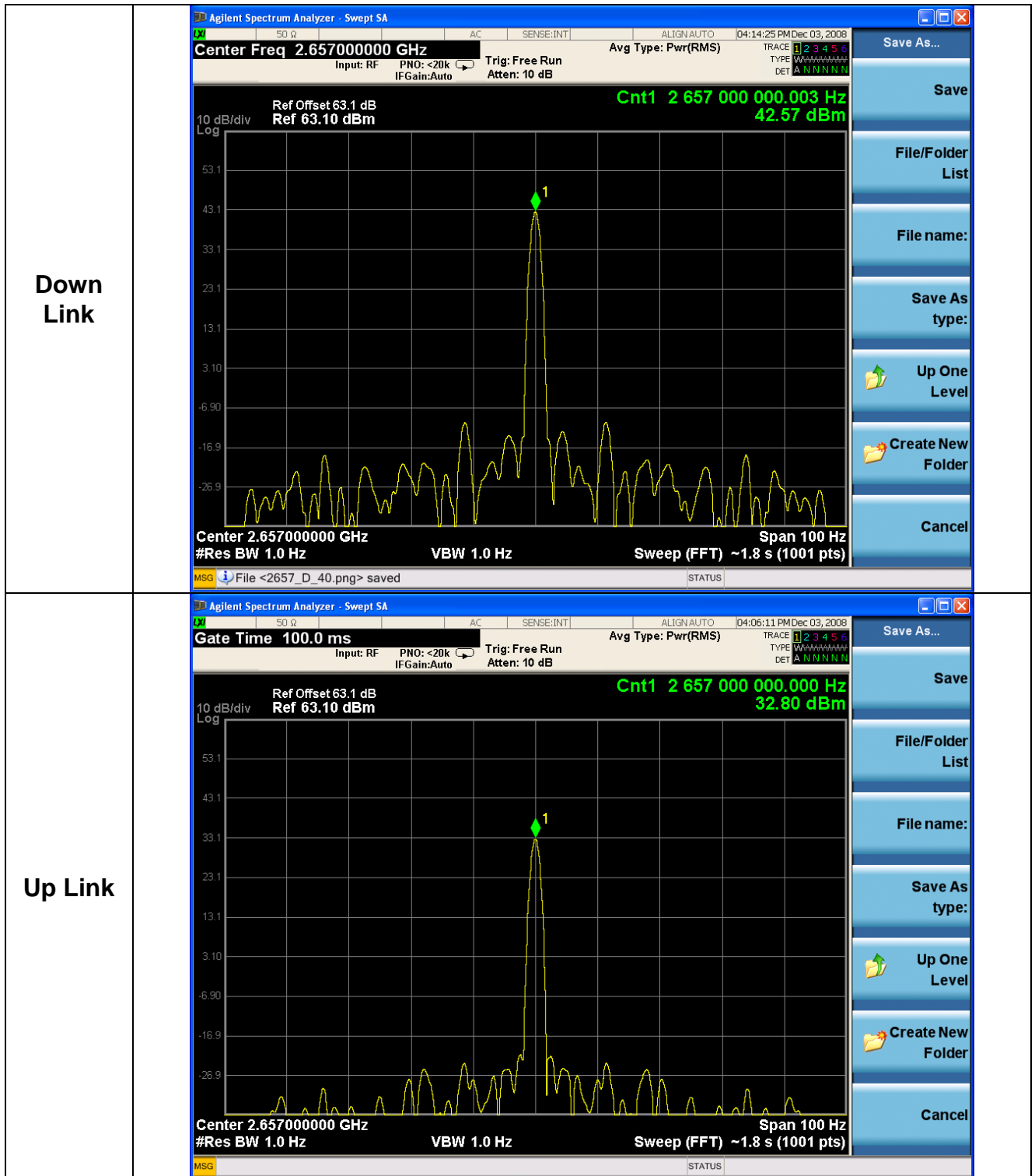
## 6.6.8 E-H Block [2657MHz, Temperature: +30℃]



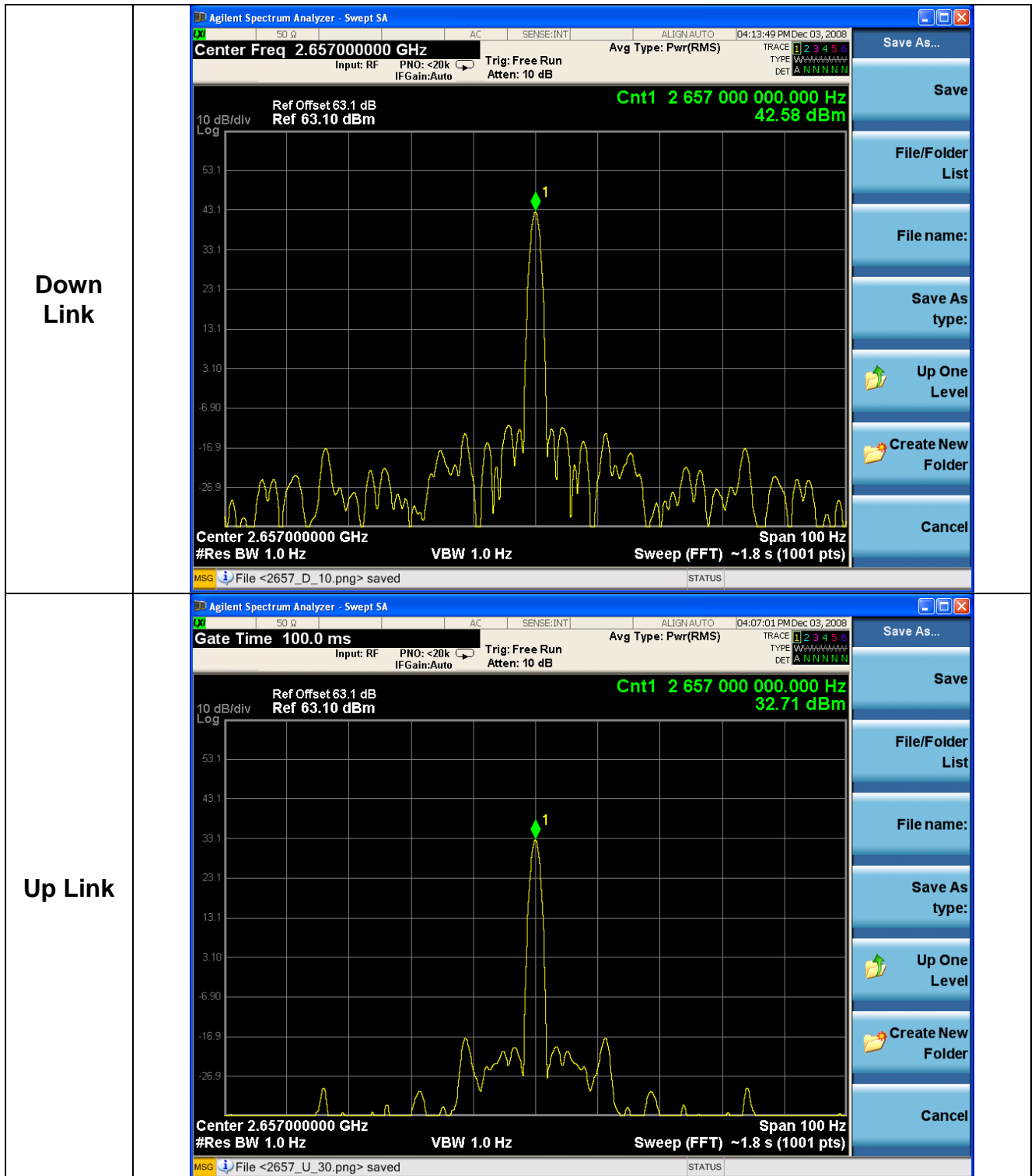
## 6.6.9 E-H Block [2657MHz, Temperature: +40°C]



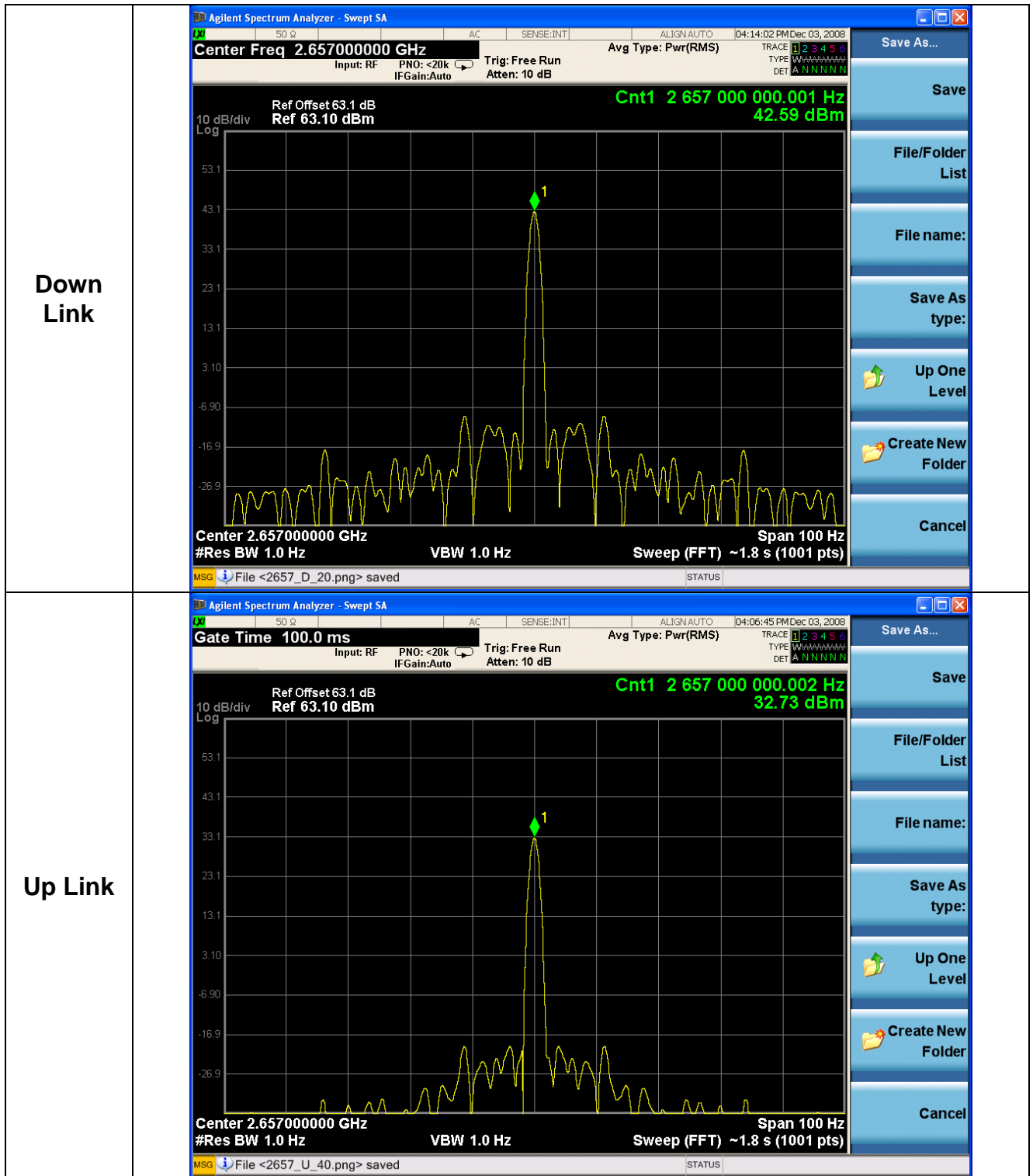
## 6.6.10 E-H Block [2657MHz, Temperature: +50°C]



## 6.6.11 E-H Block [2657MHz, Voltage : 85V]



## 6.6.12 E-H Block [2657MHz, Voltage : 115V]



## 7. TEST EQUIPMENTS LIST

	EQUIPMENT	MODEL	MANUFACTURE	SERIAL NUMBER	Calibration Due date
1	Receiver	ESVN 30	Rohde & Schwarz	832854/010	07/25/09
2	MXA Signal Analyzer	N9020A	Agilent	US46220101	10/07/09
3	Spectrum analyzer	FSP7	Rohde & Schwarz	100001	02/22/09
4	Signal Generator	E4432B	Agilent	US40053157	07/08/09
5	MXG Vector Signal Generator	N5182A	Agilent	MY46240037	10/07/09
6	Signal Generator	GT9000	Gigatronics	9604010	02/22/09
7	Modulation Analyzer	8901B	Agilent	3028A03124	02/22/09
8	Audio Analyzer	8903B	Agilent	3011A09344	02/22/09
9	Digital Oscilloscope	TDS3032	Tektronix	B019436	11/20/09
10	Frequency Counter	R5372	Advantest	41855204	02/22/09
11	Shield Room (7m x 4m x 3m)	N/A	SJEMC	0004	N/A
12	Turn Table	OSC-30	N/A	BWS-01	N/A
13	Antenna Mast	JAC-3	Dail EMC	N/A	N/A
14	Temperature & Humidity chanber	EN-GLMP-54	Enex	N/A	03/21/09
15	Bilog Antenna	VULB9160	Schwarzbeck	VULB9160-3122	01/24/10
16	Bilog Antenna	VULB9161	Schwarzbeck	VULB9161-4067	11/19/09
17	Bilog Antenna	VULB9161	Schwarzbeck	VULB9161-4068	12/11/09
18	Horn Antenna	3115	ETS•Lindgren	00055005	02/07/10
19	Horn Antenna	BBHA 9120 D	Schwarzbeck	BBHA 9120 D 234	03/16/09
20	Horn Antenna	BBHA 9170	Schwarzbeck	BBHA9170157	12/07/10
21	Power Meter	E4418A	Agilent	GB38272621	02/22/09
22	Power Sensor	E9301B	Agilent	US40010238	02/22/09
23	Power supply	IPS-30B03DD	Interact	42052	03/20/09
24	Directional Coupler	778D	Agilent	1144A08477	11/07/09
25	Power Divider/Combiner	11636A	Agilent	05774	06/25/09
26	Power Divider/Combiner	11636A	Agilent	05870	06/25/09