

# FCC MEASUREMENT REPORT

## CERTIFICATION OF COMPLIANCE

PRODUCT : WiMAX RF Repeater  
MODEL/TYPE NO : JR-30W2.5G  
FCC ID : WLCJR30W25G  
TRADE NAME : **HUTECH**<sub>21</sub>  
Hutech21. Co., Ltd.  
APPLICANT : #201, Daerungtechnotown III, 448, Gasan-Dong, Geumcheon-Gu, Seoul, Korea  
Seung-Han, Lee / Team Manager  
CLASSIFICATION : TNB Licensed Non-Broadcast Station Transmitter  
RULE PART(S) : FCC Part 27  
FCC PROCEDURE : Certification  
DATES OF TEST : July 22 to August 19, 2008  
DATES OF ISSUE : August 19, 2008  
TEST REPORT No. : BWS-08-RF-0012  
TEST LAB. : BWS TECH Inc. (Registration No. : 553281)

This WiMAX RF Repeater JR-30W2.5G 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.

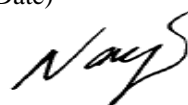
I attest to the accuracy of data. All measurement herein was performed by me or were made under my supervision. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them. The results of testing in this report apply to the product/system,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

August 19, 2008  
(Date)



Tested by **CY, Choi**

August 19, 2008  
(Date)



Reviewed by **TaeHyun, Nam**

**BWS TECH Inc.**

[www.bws.co.kr](http://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** Hutech21. Co., Ltd.  
**Company Address** #201, DaerungtechnotownIII, 448, Gasan-Dong, Geumcheon-Gu, Seoul, Korea  
**Phone/Fax** Phone : 82-2-2107-3945 Fax :82-2-2107-3940

### Manufacturer

**Company Name** Hutech21. Co., Ltd.  
**Company Address** #201, DaerungtechnotownIII, 448, Gasan-Dong, Geumcheon-Gu, Seoul, Korea  
**Phone/Fax** Phone : 82-2-2107-3945 Fax :82-2-2107-3940

- **EUT Type** WiMAX RF Repeater
- **Model Number** JR-30W2.5G
- **FCC Identifier** WLCJR30W25G
- **S/N** Prototype
- **FCC Rule Part(s)** FCC Part 27
- **FCC Classification** TNB / Licensed Non-Broadcast Station Transmitter
- **Service Block**
  - A-B : 2503.5 MHz ~ 2533.5 MHz
  - C-D : 2536.5 MHz ~ 2566.5 MHz
  - E-F : 2625.5 MHz ~ 2655.5 MHz
  - H-G : 2658.5 MHz ~ 2688.5 MHz
- **Modulation Method** OFDMA (QPSK, 16QAM, 64QAM)
- **Emission Designator** 10M0W7D
- **RF Power Output** 30 dBm / 1 W
- **Test Procedure** ANSI C63.4-2003 and ANSI/TIA-603-C-2004
- **Dates of Tests** July 22 to August 19, 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-0013

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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 Hutech21. Co., Ltd. WiMAX RF Repeater Model : **JR-30W2.5G**.

### 3. Product Information

#### 3.1 General Specification

Item		Specifications	Note
Frequency		2496MHz ~ 2690MHz	BW 194MHz
Service Block		2503.5MHz ~ 2533.5MHz	BW30MHz
		2536.5MHz ~ 2566.5MHz	BW30MHz
		2625.5MHz ~ 2655.5MHz	BW30MHz
		2658.5MHz ~ 2688.5MHz	BW30MHz
Output Power	Down Link	+30dBm/Total	3FA
	Up Link	+30dBm/Total	3FA
System Gain	Down Link	80dB	Max
	Up Link	80dB	Max
Input range	Down Link	-20dBm ~ -50dBm/Total	3FA
	Up Link	-20dBm ~ -50dBm/Total	3FA
System delay		5.0usec	
Frequency stability		±0.02ppm	
Passband Ripple		Less then ± 1.5 dB	
Gain Control Step Size		0.5dB	
Gain Control accuracy		Less then 0.7dB	
Input VSWR		Less then 1.5	
EVM		5%	at Source
Antenna Gain		19dBi (PA-2500-18-19HFB)	Max
Noise Figure		5dB	Max
		12dB	Min
OOBE		edge±1.5 ~ 2.5MHz	-37dBm/100kHz
		edge±2.5 ~ 4.5MHz	-37dBm/1MHz
		More then edge±4.5MHz	-37dBm/1MHz
ALC		30dB	
Occupied Bandwidth		30MHz	3FA
Spurious Emission		30MHz~1GHz	Less Then -13dBm
		1GHz~12GHz	Less Then -13dBm
Operating Temperature		-10°C~50°C	

## 3.2 EUT operating conditions & test configuration

### 3.2.1 Client Condition

Temperature : -10 °C ~ +50 °C

Humidity : 95 %

### 3.2.2 EUT Operating Condition

Using external signal source

QPSK

16QAM

64QAM

### 3.2.3 Test Frequency

A-B Block (2503.5 MHz ~ 2533.5 MHz)

C-D Block (2536.5 MHz ~ 2566.5 MHz)

E-F Block (2625.5 MHz ~ 2655.5 MHz)

H-G Block (2658.5 MHz ~ 2688.5 MHz)

Block	Channel	Down Link	Up Link	Modulation Method
A-B Block	Low FA	2508.5 MHz	2508.5 MHz	QPSK, 16QAM, 64QAM
	Middle FA	2518.5 MHz	2518.5 MHz	QPSK, 16QAM, 64QAM
	High FA	2528.5 MHz	2528.5 MHz	QPSK, 16QAM, 64QAM
	Full FA	2518.5 MHz	2518.5 MHz	16QAM
C-D Block	Low FA	2541.5 MHz	2541.5 MHz	QPSK, 16QAM, 64QAM
	Middle FA	2551.5 MHz	2551.5 MHz	QPSK, 16QAM, 64QAM
	High FA	2561.5 MHz	2561.5 MHz	QPSK, 16QAM, 64QAM
	Full FA	2551.5 MHz	2551.5 MHz	16QAM
E-F Block	Low FA	2630.5 MHz	2630.5 MHz	QPSK, 16QAM, 64QAM
	Middle FA	2640.5 MHz	2640.5 MHz	QPSK, 16QAM, 64QAM
	High FA	2650.5 MHz	2650.5 MHz	QPSK, 16QAM, 64QAM
	Full FA	2640.5 MHz	2640.5 MHz	16QAM
H-G Block	Low FA	2663.5 MHz	2663.5 MHz	QPSK, 16QAM, 64QAM
	Middle FA	2673.5 MHz	2673.5 MHz	QPSK, 16QAM, 64QAM
	High FA	2683.5 MHz	2683.5 MHz	QPSK, 16QAM, 64QAM
	Full FA	2673.5 MHz	2673.5 MHz	16QAM

## 4. Summary of Test Results

The measurement results were obtained with the EUT tested in the conditions described in this report. Detailed measurement data and plots showing the maximum emission of the EUT are reported.

<b>APPLIED STANDARD : 47 CFR Part 27</b>		
<b>FCC Rule</b>	<b>Description of Test</b>	<b>Test Result</b>
15.207	Power Line Conducted Emission	Pass
2.1046 27.50(h)	RF Power Output	Pass
2.1049	Occupied Bandwidth	Pass
2.1051 27.53(l)	Spurious Emissions at Antenna Terminals	Pass
2.1051 27.53(l)	Band Edge Compliance with InterModulation	Pass
2.1051 27.53(l)	Field Strength of Spurious Radiation	Pass
2.1055 27.54	Frequency Stability/ Temperature Variation	Pass

## 5. TEST DATA

### 5.1 Power Line Conducted Emission

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 kHz on the 230V 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.

#### 5.1.1 Test Condition

Frequency Range of Test : 150 kHz to 30 MHz

Test Standard : FCC Part 15.207

Test Date : August 8, 2008

Temperature/Humidity : 26 °C/ 42 %

#### 5.1.2 Test Standard

Frequency Range (MHz)	Limit (dBuV)	
	Quasi-Peak	Average
0.15 ~ 0.5	66 – 56	56 – 46
0.5 ~ 5	56	46
5 ~ 30	60	50

#### 5.1.3 Test Equipment List

Equipment Type	Model	Manufacture	Serial No	Cal Due Date
TEST RECEIVER	ESPI	ROHDE & SCHWARZ	100063	11. 19. 2008
Conducted Cable	N/A	N/A	N/A	N/A
LISN	FCC-LISN-50-50-2-02	FCC	03074	11. 02. 2008



#### 5.1.4 Test Result of Power Line Conducted Emission

**EUT** : JR-30W2.5G  
**Input Source** : N5182A  
**Output Monitoring** : N9020A  
**Input Voltage** : 230V, 50Hz

##### 5.1.4.1 Down link

Freq [MHz]	Correction		Phase [H/N]	Quasi-Peak Mode				Average Mode			
	AMN	C.L		Limit	Reading	Emission Level	Margin	Limit	Reading	Emission Level	Margin
				[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]
0.150	0.06	0.03	H	66.00	50.22	50.31	15.69	59.00			
0.422	0.08	0.26	H	58.30	44.49	44.83	13.47	49.01			
0.470	0.07	0.28	H	56.90	42.46	42.81	14.09	47.16			
3.510	0.03	0.68	N	56.00	43.21	43.92	12.08	46.00			
3.698	0.03	0.71	N		42.26	43.00	13.00				
3.886	0.03	0.74	N		42.01	42.78	13.22				
10.930	0.05	1.07	N	60.00	47.06	49.01	6.99	50.00	43.47	44.59	5.41
16.346	0.07	1.23	N		47.70	48.87	11.13		36.64	37.94	12.06
29.334	0.26	1.64	N		47.00	44.74	15.26		43.40	45.30	4.70

##### 5.1.4.2 Up link

Freq [MHz]	Correction		Phase [H/N]	Quasi-Peak Mode				Average Mode			
	AMN	C.L		Limit	Reading	Emission Level	Margin	Limit	Reading	Em ission Level	Margin
				[dBuV]	[d BuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]
0.234	0.07	0.10	N	63.70	40.88	41.05	22.65	56.04			
0.414	0.08	0.26	H	58.60	42.01	42.35	16.25	49.38			
0.466	0.07	0.28	H	57.00	43.19	43.54	13.46	47.34			
0.498	0.07	0.28	N	56.10	40.58	40.93	15.17	46.23			
0.502	0.07	0.30	N	56.00	42.11	42.48	13.52	46.00			
2.002	0.03	0.55	H		41.69	42.27	13.73				
3.306	0.03	0.65	H		42.64	43.32	12.68				
3.398	0.03	0.66	H		41.98	42.67	13.33				
3.522	0.03	0.68	N		39.66	40.37	15.63				
3.710	0.03	0.72	N		39.77	40.52	15.48				
10.766	0.06	1.06	H	60.00	47.06	48.18	7.82	50.00	42.40	43.52	6.48
11.042	0.05	1.07	N		47.70	48.82	11.18		41.15	42.27	-42.27
14.570	0.06	1.22	H		46.67	47.95	12.05		43.34	44.62	-44.62
15.130	0.06	1.22	N		46.88	48.16	11.84		43.13	44.41	-44.41
16.358	0.07	1.23	H		47.81	49.11	10.89		42.74	44.04	-44.04
16.366	0.07	1.23	N		47.03	48.33	11.67		43.09	44.39	-44.39
26.794	0.18	1.54	H		46.00	47.72	12.28		41.99	43.71	-43.71
27.350	0.20	1.57	N		46.03	47.80	12.20		41.81	43.58	-43.58

#### 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 RF Power Output

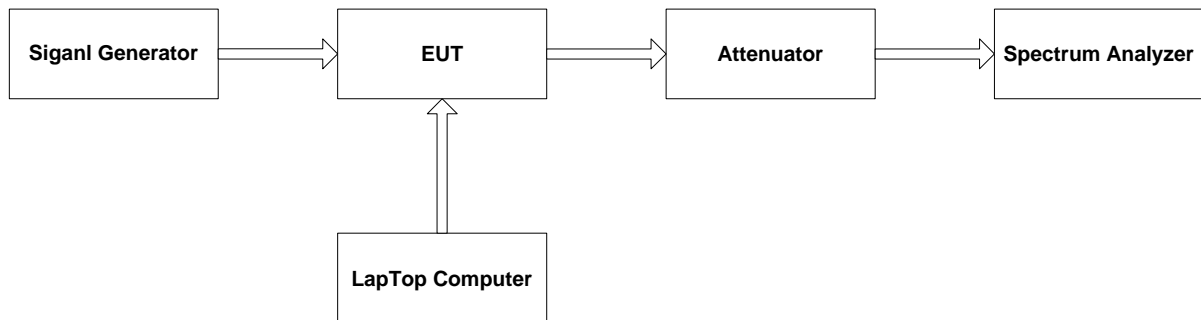
### 5.2.1 Specification

FCC Rules Part 2, Section 2.1046  
FCC Rules Part 27, Section 27.50(h)

### 5.2.2 Method of Measurement

ANSI/TIA-603-C-2004 Section 2.2.1

### 5.2.3 Measurement Set-Up



### 5.2.4 Test Equipment List

Equipment	Model Name	Manufacturer
EUT	JR-30W2.5G	Hutech21
LapTop Computer	PP01L	Dell
Attenuator	30 dB Attenuator	Agilent
Signal Generator	N5182	Agilent
Spectrum Analyzer	N9020A	Agilent

### 5.2.5 Test Procedure

- 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.

### 5.2.6 Limit

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

### 5.3.7 Test Result

Center Frequency (MHz)	Measured maximum channel power (dBm)					
	Down Link			Up Link		
	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
A-B Block						
2508.5	30.10	29.94	30.00	29.99	29.76	29.88
2518.5	30.32	30.17	30.23	30.23	29.96	30.12
2528.5	30.09	29.93	30.00	30.06	29.90	29.96
Full FA	30.24			30.10		
C-D Block						
2541.5	29.84	29.69	29.76	29.82	29.65	29.72
2551.5	29.94	29.80	29.87	29.97	29.70	29.87
2561.5	29.93	29.80	29.87	29.99	29.68	29.91
Full FA	29.65			29.83		
E-F Block						
2630.5	30.43	30.23	30.28	30.38	30.20	30.28
2640.5	29.36	29.18	29.23	29.41	29.17	29.32
2650.5	29.66	29.50	29.53	29.68	29.40	29.61
Full FA	29.75			29.53		
H-G Block						
2663.5	29.77	29.63	29.66	29.62	29.36	29.50
2673.5	29.02	28.89	28.92	29.22	29.00	29.10
2683.5	29.89	29.84	29.85	30.24	29.89	30.08
Full FA	29.72			29.60		

**Note : The detail plot data is refer to 6.2.**

## 5.3 Occupied Bandwidth

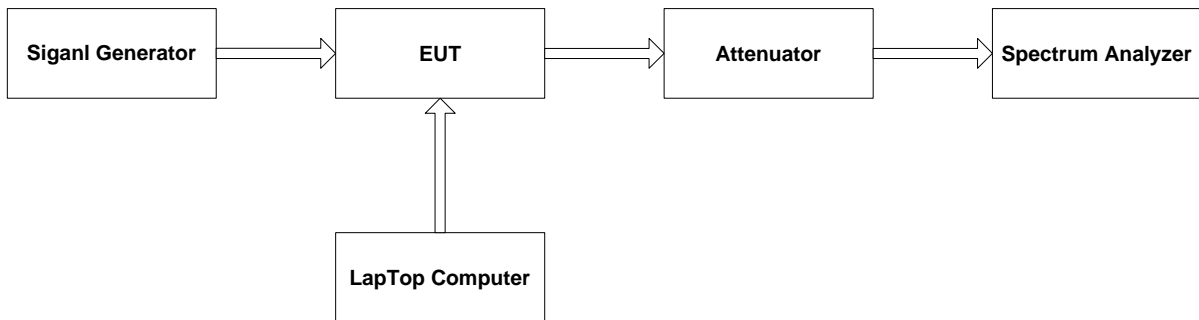
### 5.3.1 Specification

FCC Rules Part 2, Section 2.1049

### 5.3.2 Method of Measurement

ANSI/TIA-603-C-2004 Section 2.2.11

### 5.3.3 Measurement Set-Up



### 5.3.4 Test Equipment List

Equipment	Model Name	Manufacturer
EUT	JR-30W2.5G	Hutech21
LapTop Computer	PP01L	Dell
Attenuator	30 dB Attenuator	Agilent
Signal Generator	N5182	Agilent
Spectrum Analyzer	N9020A	Agilent

### 5.3.5 Test Procedure

- 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.

### 5.3.6 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.

### 5.3.7 Data

Center Frequency (MHz)		Measured bandwidth (MHz)					
		Down Link			Up Link		
		QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
A-B Block							
2508.5	99%	9.14	9.15	9.15	9.15	9.15	9.15
	26 dB	9.43	9.50	9.50	9.43	9.50	9.50
2518.5	99%	9.14	9.14	9.14	9.14	9.14	9.14
	26 dB	9.43	9.49	9.49	9.43	9.49	9.49
2528.5	99%	9.14	9.14	9.14	9.14	9.14	9.14
	26 dB	9.43	9.50	9.50	9.43	9.50	9.50
C-D Block							
2541.5	99%	9.15	9.15	9.15	9.15	9.15	9.15
	26 dB	9.43	9.50	9.49	9.42	9.49	9.49
2551.5	99%	9.14	9.15	9.15	9.14	9.14	9.15
	26 dB	9.43	9.49	9.49	9.43	9.49	9.49
2561.5	99%	9.14	9.14	9.14	9.14	9.14	9.14
	26 dB	9.43	9.49	9.49	9.42	9.50	9.49
E-F Block							
2630.5	99%	9.14	9.14	9.14	9.14	9.14	9.14
	26 dB	9.42	9.48	9.48	9.42	9.48	9.48
2640.5	99%	9.14	9.15	9.15	9.14	9.14	9.14
	26 dB	9.43	9.50	9.49	9.43	9.50	9.50
2650.5	99%	9.14	9.14	9.14	9.14	9.14	9.15
	26 dB	9.43	9.49	9.49	9.43	9.50	9.50
H-G Block							
2663.5	99%	9.14	9.15	9.15	9.15	9.15	9.15
	26 dB	9.42	9.48	9.48	9.42	9.49	9.49
2673.5	99%	9.15	9.15	9.15	9.15	9.15	9.15
	26 dB	9.43	9.50	9.50	9.43	9.49	9.49
2683.5	99%	9.14	9.14	9.14	9.14	9.15	9.14
	26 dB	9.43	9.50	9.49	9.43	9.49	9.50

**Note : The detail plot data is refer to 6.3.**

## 5.4 Spurious Emissions at Antenna Terminals

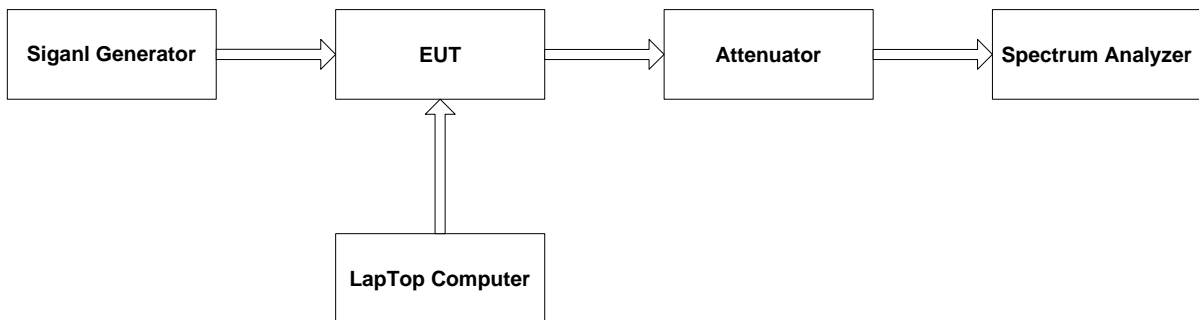
### 5.4.1 Specification

FCC Rules Part 2, Section 2.1051  
FCC Rules Part 27, Section 27.53(l)

### 5.4.2 Method of Measurement

ANSI/TIA-603-C-2004 Section 2.2.13

### 5.4.3 Measurement Set-Up



### 5.4.4 Test Equipment List

Equipment	Model Name	Manufacturer
EUT	JR-30W2.5G	Hutech21
LapTop Computer	PP01L	Dell
Attenuator	30 dB Attenuator	Agilent
Signal Generator	N5182	Agilent
Spectrum Analyzer	N9020A	Agilent

### 5.4.5 Measurement Procedure

- 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.

### 5.4.6 Limit

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

#### 5.4.6 Data

Frequency (MHz)	Transmitter Spurious Emissions		
	Level (dBm)	Limit (dBm)	Margin (dB)
A-B Block			
※ All emissions below noise floor.			
C-D Block			
※ All emissions below noise floor.			
E-F Block			
※ All emissions below noise floor.			
H-G Block			
※ All emissions below noise floor.			

**Note :** The detail plot data is refer to 6.4.

## 5.5 Band Edge Compliance with intermodulation

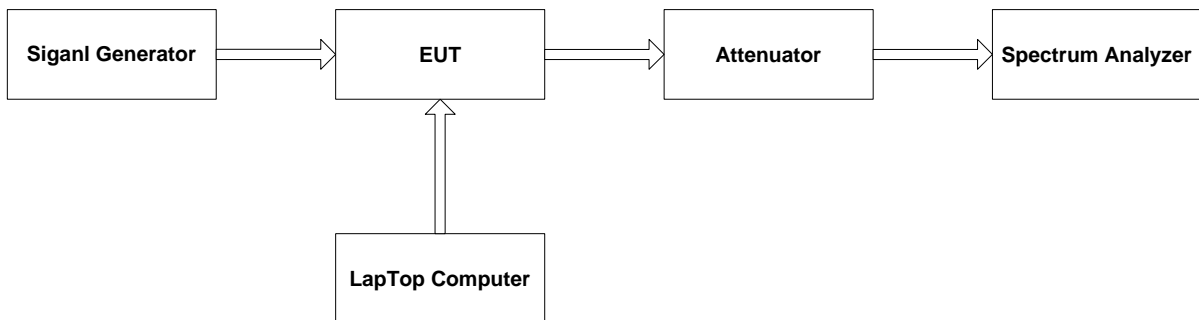
### 5.5.1 Specification

FCC Rules Part 2, Section 2.1051  
FCC Rules Part 27, Section 27.53(l)

### 5.5.2 Method of Measurement

ANSI/TIA-603-C-2004 Section 2.2.13

### 5.5.3 Measurement Set-Up



### 5.5.4 Test Equipment List

Equipment	Model Name	Manufacturer
EUT	JR-30W2.5G	Hutech21
LapTop Computer	PP01L	Dell
Attenuator	30 dB Attenuator	Agilent
Signal Generator	N5182	Agilent
Spectrum Analyzer	N9020A	Agilent

### 5.5.5 Measurement Procedure

- 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.

### 5.5.6 Limit

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



### 5.5.6 Data

Frequency (MHz)	Transmitter Spurious Emissions		
	Level (dBm)	Limit (dBm)	Margin (dB)
A-B Block			
※ All emissions meet the out of band limits.			
C-D Block			
※ All emissions meet the out of band limits.			
E-F Block			
※ All emissions meet the out of band limits.			
H-G Block			
※ All emissions meet the out of band limits.			

**Note :** The detail plot data is refer to 6.5.

## 5.6 Field Strength of Spurious Radiation

### 5.6.1 Specification

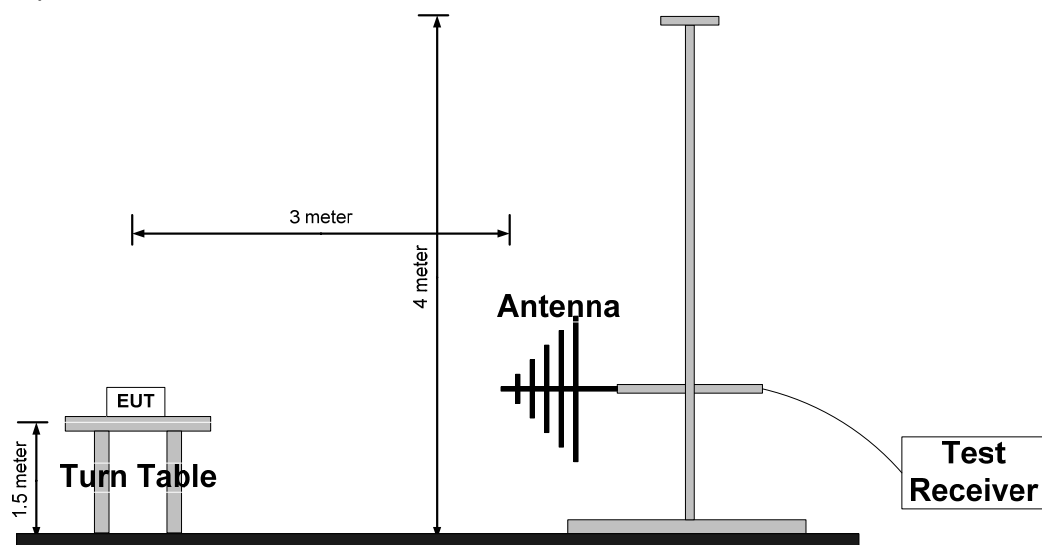
FCC Rules Part 2, Section 2.1051  
FCC Rules Part 27, Section 27.53(l)

### 5.6.2 Method of Measurement

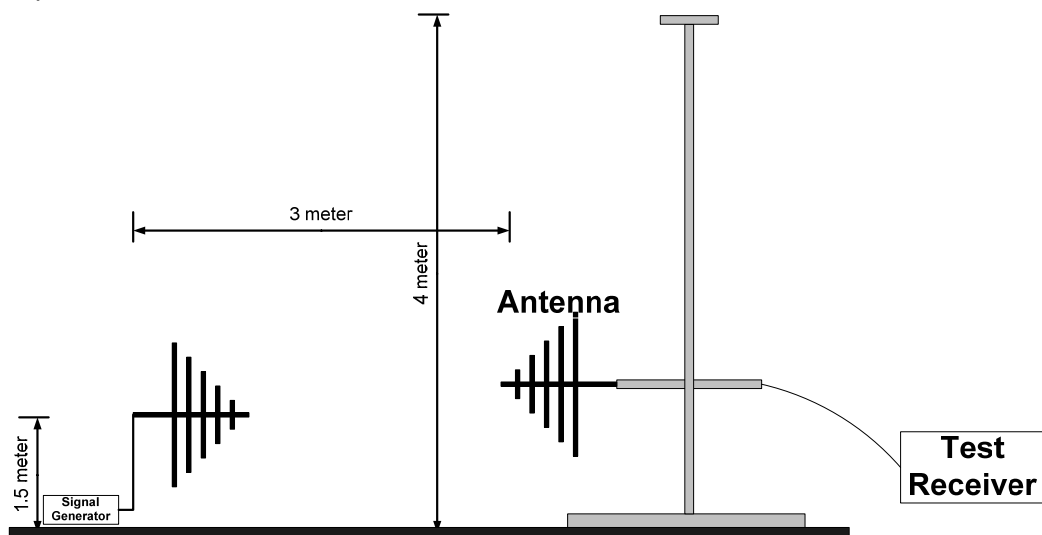
ANSI/TIA-603-C-2004 Section 2.2.12

### 5.6.3 Measurement Set-Up

Step 1.



Step 2.



#### 5.6.4 Test Equipment List

Equipment	Model Name	Manufacturer
EUT	JR-30W2.5G	Hutech21
LapTop Computer	PP01L	Dell
Attenuator	30 dB Attenuator	Agilent
Signal Generator	N5182	Agilent
Spectrum Analyzer	N9020A	Agilent
Test Receiver	E7403A	Agilent
Signal Generator	E4432B	Agilent
Bilog Antenna	VULB9160	Swalzbeck
Bilog Antenna	VULB9160	Swalzbeck
Horn Antenna	BBHA 9120 D	Swalzbeck
Horn Antenna	BBHA 9120 D	Swalzbeck

#### 5.6.5 Measurement Procedure

-. Refer to EIRP.

#### 5.6.6 Limit

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

#### 5.6.7 Data

Frequency [MHz]	Reading [dBm]	Polarization [*H/**V]	Ant Factor [dB]	Cable Loss [dB]	Limit [dBm]	Emission Level [dBm]	Margin [dB]

**Note :** The Emission level is below to the Noise Flow.

**Note :** The detail plot data is refer to 6.6.

## 5.8 Frequency Stability / Temperature Variation

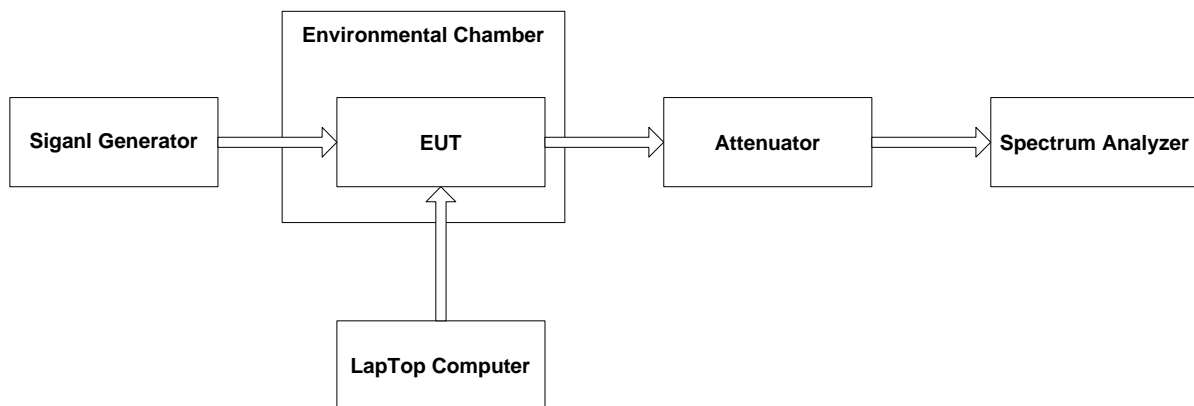
### 5.8.1 Specification

FCC Rules Part 2, Section 2.1055  
FCC Rules Part 27, Section 27.54

### 5.8.2 Method of Measurement

ANSI/TIA-603-C-2004 Section 2.2.2

### 5.8.3 Measurement Set-Up



### 5.8.4 Test Equipment List

Equipment	Model Name	Manufacturer
EUT	JR-30W2.5G	Hutech21
LapTop Computer	PP01L	Dell
Attenuator	30 dB Attenuator	Agilent
Signal Generator	N5182	Agilent
Spectrum Analyzer	N9020A	Agilent
Chamber	SJ1013-TH	SeoJin

### 5.8.5 Test Procedure

- The unit was turn-up in accordance with the alignment procedure stated in the FIG. 8 , and was loaded into a 50 ohm resistive termination.
- With all power removed, the temperature was decreased to -30°C and permitted to stabilize for three hours. Power was applied and the maximum change in frequency was noted within one minute.
- With power OFF, the temperature was raised in 10°C steps. 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.
- The temperature tests were performed for the worst case.

### 5.8.6 Limit

- The limit is 2.5 ppm.

### 5.8.7 Test Result 1 (Down Link / A-B Block)

FCC Rules : Part 2 §2.1055 & §90.231  
Path : Down Link  
Operating Frequency : 2518.5 MHz  
Modulation : Non-Modulation  
Reference Voltage : 220.0 Vac

Voltage (%)	Power Supply (Vac)	Temperature (°C)	Frequency (MHz)	Deviation (ppm)	Limit (ppm)
100 %	220.0	-10	2518.500000	0	2.5
100 %	220.0	0	2518.500000	0	2.5
100 %	220.0	+10	2518.500000	0	2.5
100 %	220.0	+20 (ref)	2518.500000	0	2.5
100 %	220.0	+30	2518.500000	0	2.5
100 %	220.0	+40	2518.500000	0	2.5
100 %	220.0	+50	2518.500000	0	2.5
85 %	187.0	+20	2518.500000	0	2.5
115 %	253.0	+20	2518.500000	0	2.5

**Note : The detail plot data is refer to 6.7.1**

### 5.8.8 Test Result 2 (Down Link / C-D Block)

FCC Rules : Part 2 §2.1055 & §90.231  
Path : Down Link  
Operating Frequency : 2551.5 MHz  
Modulation : Non-Modulation  
Reference Voltage : 220.0 Vac

Voltage (%)	Power Supply (Vac)	Temperature (°C)	Frequency (MHz)	Deviation (ppm)	Limit (ppm)
100 %	220.0	-10	2551.500000	0	2.5
100 %	220.0	0	2551.500000	0	2.5
100 %	220.0	+10	2551.500000	0	2.5
100 %	220.0	+20 (ref)	2551.500000	0	2.5
100 %	220.0	+30	2551.500000	0	2.5
100 %	220.0	+40	2551.500000	0	2.5
100 %	220.0	+50	2551.500000	0	2.5
85 %	187.0	+20	2551.500000	0	2.5
115 %	253.0	+20	2551.500000	0	2.5

**Note : The detail plot data is refer to 6.7.2**

### 5.8.9 Test Result 3 (Down Link / E-F Block)

FCC Rules : Part 2 §2.1055 & §90.231  
Path : Down Link  
Operating Frequency : 2640.5 MHz  
Modulation : Non-Modulation  
Reference Voltage : 220.0 Vac

Voltage (%)	Power Supply (Vac)	Temperature (°C)	Frequency (MHz)	Deviation (ppm)	Limit (ppm)
100 %	220.0	-10	2640.500000	0	2.5
100 %	220.0	0	2640.500000	0	2.5
100 %	220.0	+10	2640.500000	0	2.5
100 %	220.0	+20 (ref)	2640.500000	0	2.5
100 %	220.0	+30	2640.500000	0	2.5
100 %	220.0	+40	2640.500000	0	2.5
100 %	220.0	+50	2640.500000	0	2.5
85 %	187.0	+20	2640.500000	0	2.5
115 %	253.0	+20	2640.500000	0	2.5

**Note : The detail plot data is refer to 6.7.3**

### 5.8.10 Test Result 4 (Down Link / G-H Block)

FCC Rules : Part 2 §2.1055 & §90.231  
Path : Down Link  
Operating Frequency : 2673.5 MHz  
Modulation : Non-Modulation  
Reference Voltage : 220.0 Vac

Voltage (%)	Power Supply (Vac)	Temperature (°C)	Frequency (MHz)	Deviation (ppm)	Limit (ppm)
100 %	220.0	-10	2673.500000	0	2.5
100 %	220.0	0	2673.500000	0	2.5
100 %	220.0	+10	2673.500000	0	2.5
100 %	220.0	+20 (ref)	2673.500000	0	2.5
100 %	220.0	+30	2673.500000	0	2.5
100 %	220.0	+40	2673.500000	0	2.5
100 %	220.0	+50	2673.500000	0	2.5
85 %	187.0	+20	2673.500000	0	2.5
115 %	253.0	+20	2673.500000	0	2.5

**Note : The detail plot data is refer to 6.7.4**

### 5.8.11 Test Result 5 (Up Link / A-B Block)

FCC Rules : Part 2 §2.1055 & §90.231  
Path : Up Link  
Operating Frequency : 2518.5 MHz  
Modulation : Non-Modulation  
Reference Voltage : 220.0 Vac

Voltage (%)	Power Supply (Vac)	Temperature (°C)	Frequency (MHz)	Deviation (ppm)	Limit (ppm)
100 %	220.0	-10	2518.500000	0	2.5
100 %	220.0	0	2518.500000	0	2.5
100 %	220.0	+10	2518.500000	0	2.5
100 %	220.0	+20 (ref)	2518.500000	0	2.5
100 %	220.0	+30	2518.500000	0	2.5
100 %	220.0	+40	2518.500000	0	2.5
100 %	220.0	+50	2518.500000	0	2.5
85 %	187.0	+20	2518.500000	0	2.5
115 %	253.0	+20	2518.500000	0	2.5

**Note : The detail plot data is refer to 6.7.5**

### 5.8.12 Test Result 6 (Up Link / C-D Block)

FCC Rules : Part 2 §2.1055 & §90.231  
Path : Up Link  
Operating Frequency : 2551.5 MHz  
Modulation : Non-Modulation  
Reference Voltage : 220.0 Vac

Voltage (%)	Power Supply (Vac)	Temperature (°C)	Frequency (MHz)	Deviation (ppm)	Limit (ppm)
100 %	220.0	-10	2551.500000	0	2.5
100 %	220.0	0	2551.500000	0	2.5
100 %	220.0	+10	2551.500000	0	2.5
100 %	220.0	+20 (ref)	2551.500000	0	2.5
100 %	220.0	+30	2551.500000	0	2.5
100 %	220.0	+40	2551.500000	0	2.5
100 %	220.0	+50	2551.500000	0	2.5
85 %	187.0	+20	2551.500000	0	2.5
115 %	253.0	+20	2551.500000	0	2.5

**Note : The detail plot data is refer to 6.7.6**

### 5.8.13 Test Result 7 (Up Link / E-F Block)

FCC Rules : Part 2 §2.1055 & §90.231  
Path : Up Link  
Operating Frequency : 2640.5 MHz  
Modulation : Non-Modulation  
Reference Voltage : 220.0 Vac

Voltage (%)	Power Supply (Vac)	Temperature (°C)	Frequency (MHz)	Deviation (ppm)	Limit (ppm)
100 %	220.0	-10	2640.500000	0	2.5
100 %	220.0	0	2640.500000	0	2.5
100 %	220.0	+10	2640.500000	0	2.5
100 %	220.0	+20 (ref)	2640.500000	0	2.5
100 %	220.0	+30	2640.500000	0	2.5
100 %	220.0	+40	2640.500000	0	2.5
100 %	220.0	+50	2640.500000	0	2.5
85 %	187.0	+20	2640.500000	0	2.5
115 %	253.0	+20	2640.500000	0	2.5

**Note : The detail plot data is refer to 6.7.7**

### 5.8.14 Test Result 8 (Up Link / G-H Block)

FCC Rules : Part 2 §2.1055 & §90.231  
Path : Up Link  
Operating Frequency : 2673.5 MHz  
Modulation : Non-Modulation  
Reference Voltage : 220.0 Vac

Voltage (%)	Power Supply (Vac)	Temperature (°C)	Frequency (MHz)	Deviation (ppm)	Limit (ppm)
100 %	220.0	-10	2673.500000	0	2.5
100 %	220.0	0	2673.500000	0	2.5
100 %	220.0	+10	2673.500000	0	2.5
100 %	220.0	+20 (ref)	2673.500000	0	2.5
100 %	220.0	+30	2673.500000	0	2.5
100 %	220.0	+40	2673.500000	0	2.5
100 %	220.0	+50	2673.500000	0	2.5
85 %	187.0	+20	2673.500000	0	2.5
115 %	253.0	+20	2673.500000	0	2.5

**Note : The detail plot data is refer to 6.7.8**



## 6. TEST PLOT

### 6.1 Power Line Conducted Emission

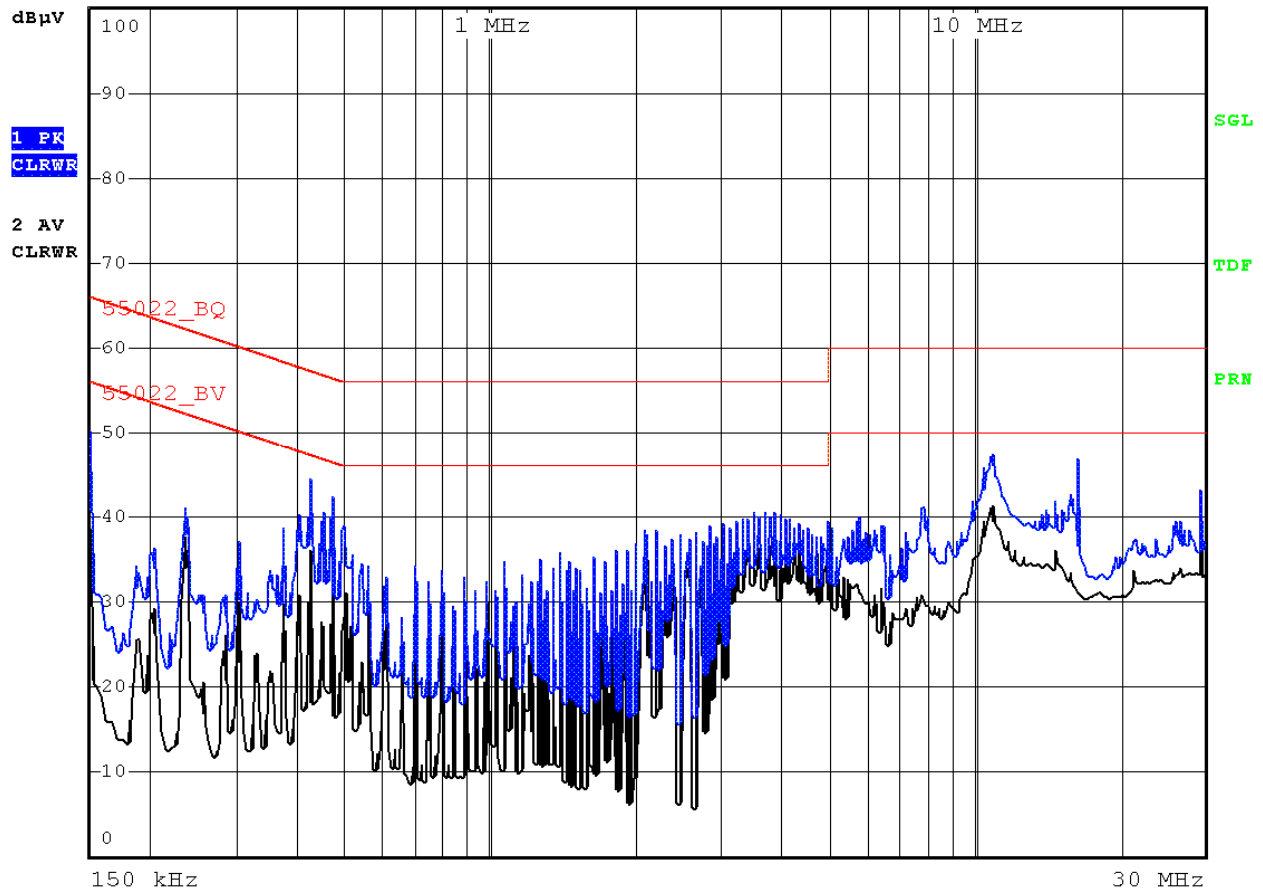
#### 6.1.1 Down Link / HOT

FCC Rules :	Part 15 §15.207
Operating Path :	Down Link
Test Mode :	HOT
Input Level :	-50 dBm
System Gain :	80 dB
Bandwidth :	30 MHz
Number of FA :	3 FA



RBW 9 kHz  
MT 20 ms

Att 0 dB AUTO PREAMP OFF



Date: 8.AUG.2008 09:38:28

## 6.1.2 Down Link / Neutral

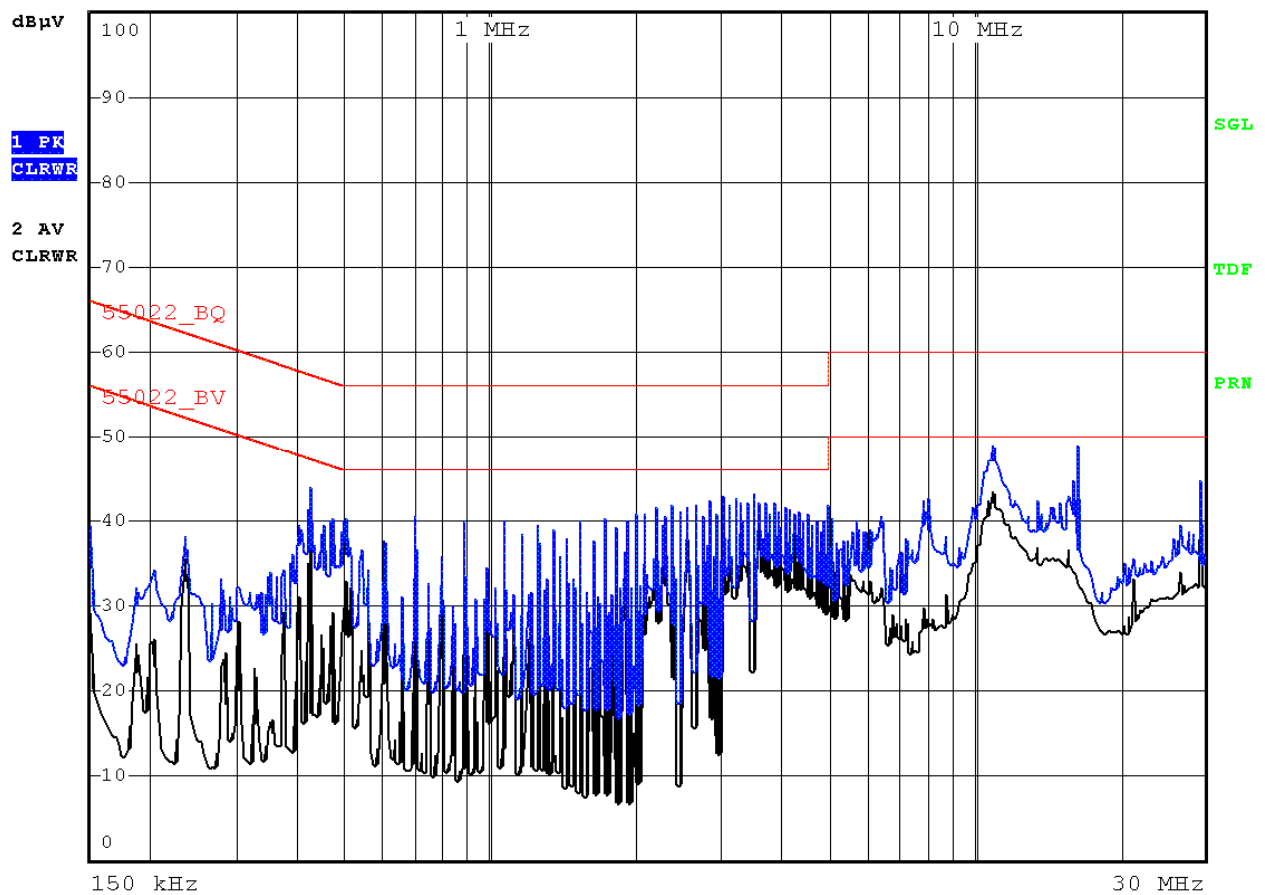
FCC Rules :	Part 15 §15.207
Operating Path :	Down Link
Test Mode :	Neutral
Input Level :	-50 dBm
System Gain :	80 dB
Bandwidth :	30 MHz
Number of FA :	3 FA



RBW 9 kHz

MT 20 ms

Att 0 dB AUTO PREAMP OFF



Date: 8.AUG.2008 09:45:07

### 6.1.3 Up Link / HOT

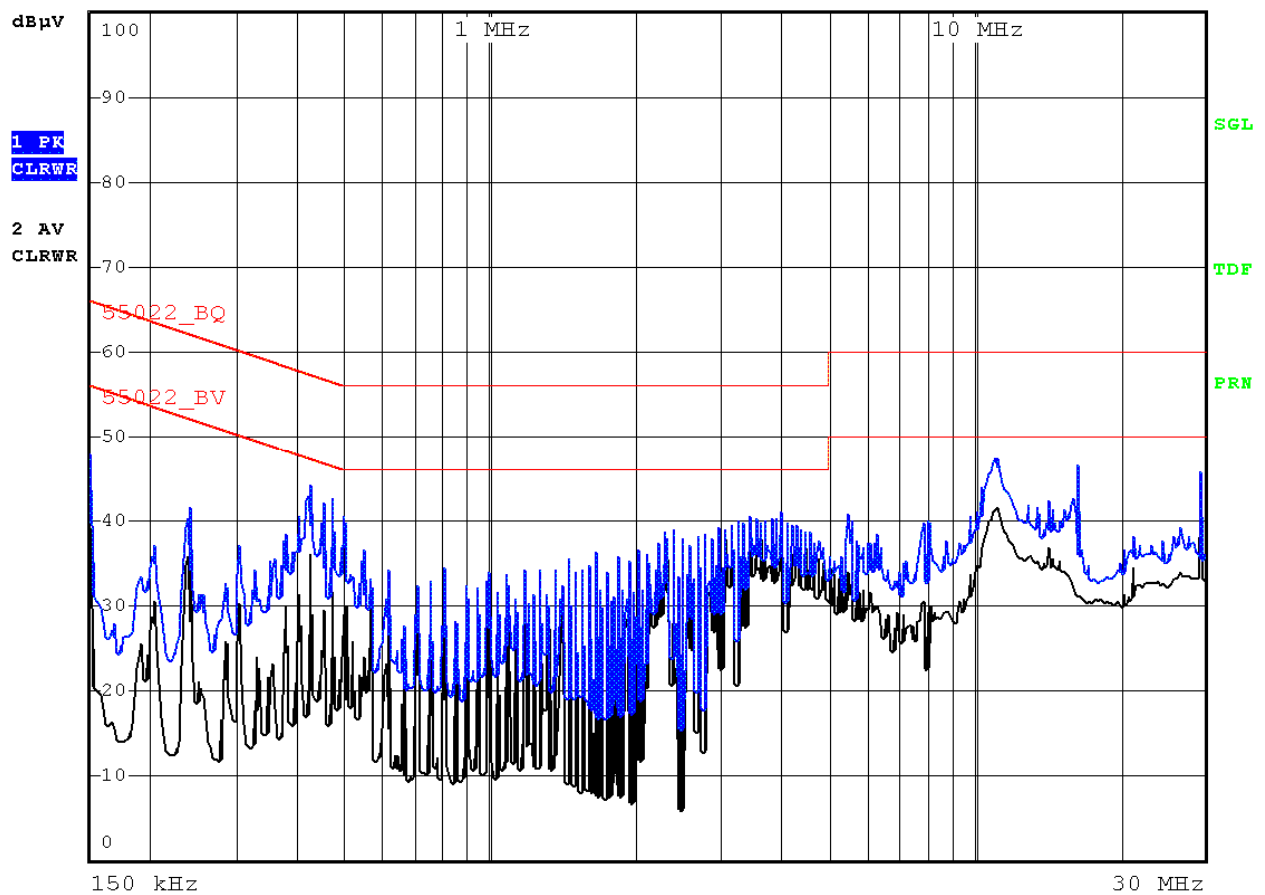
FCC Rules :	Part 15 §15.207
Operating Path :	Up Link
Test Mode :	HOT
Input Level :	-50 dBm
System Gain :	80 dB
Bandwidth :	30 MHz
Number of FA :	3 FA



RBW 9 kHz

MT 20 ms

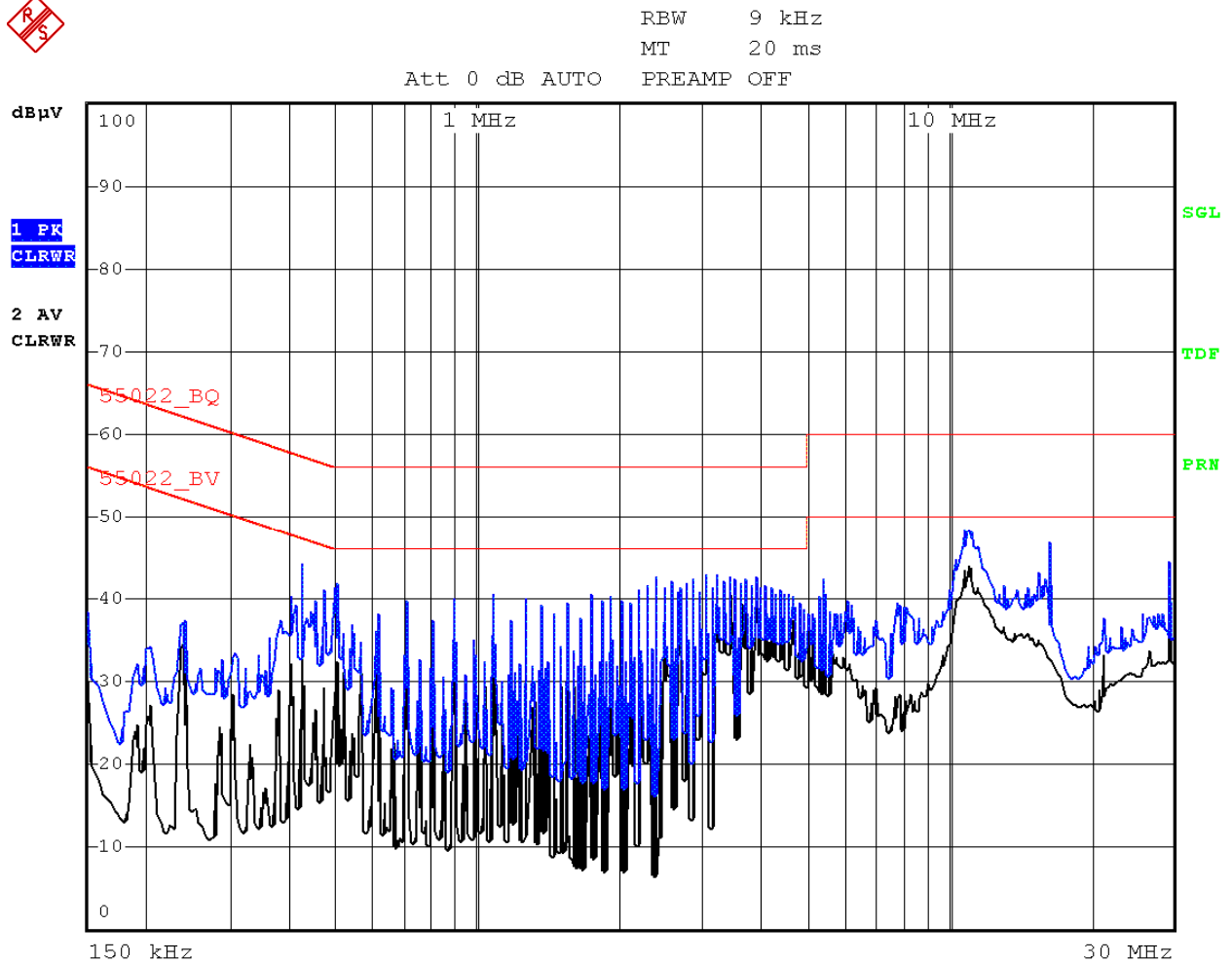
Att 0 dB AUTO PREAMP OFF



Date: 8.AUG.2008 09:55:05

## 6.1.4 Up Link / Neutral

FCC Rules :	Part 15 §15.207
Operating Path :	Up Link
Test Mode :	Neutral
Input Level :	-50 dBm
System Gain :	80 dB
Bandwidth :	30 MHz
Number of FA :	3 FA



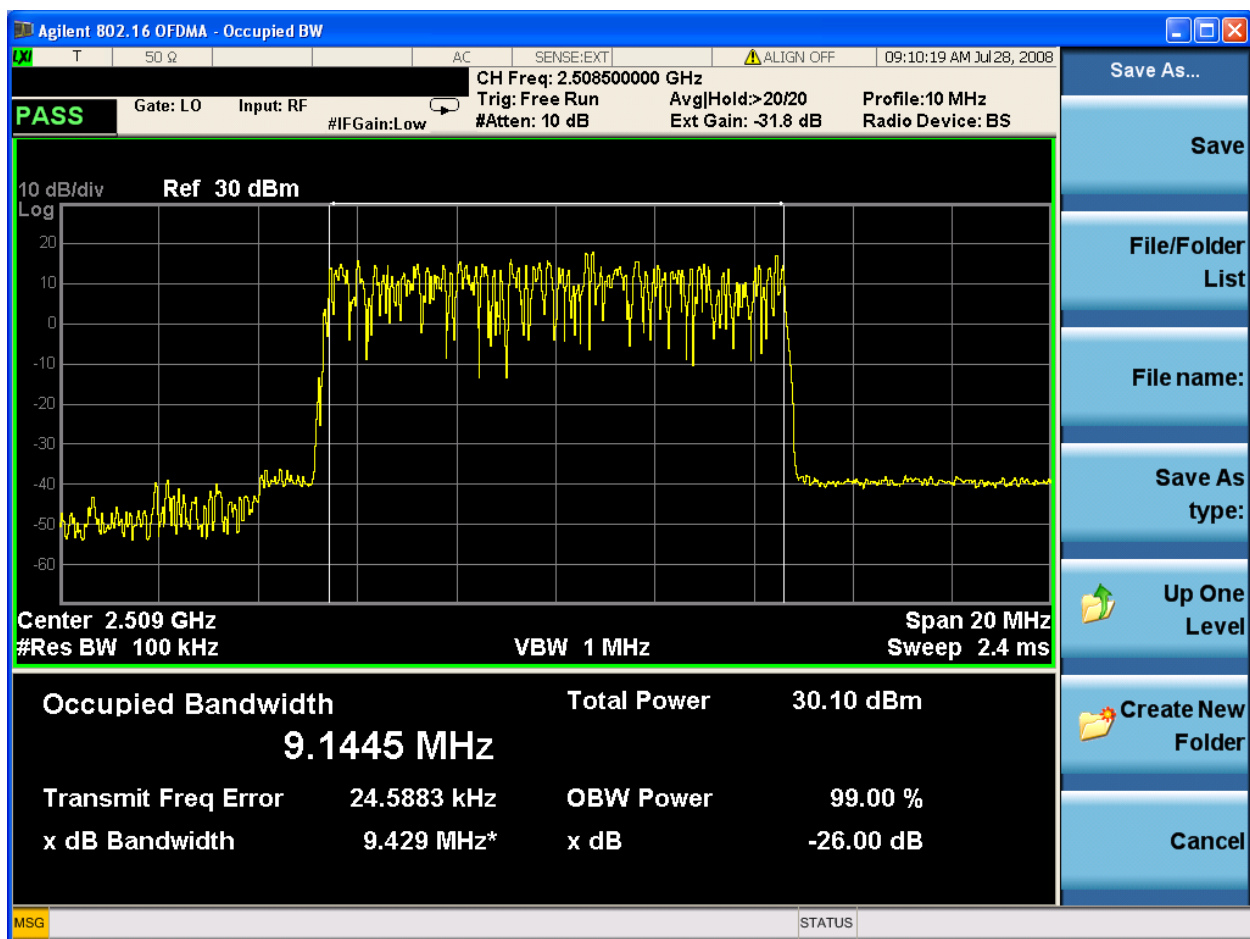
Date: 8.AUG.2008 09:50:30

## 6.2 Down Link

### 6.2.1 A-B Block

#### 6.2.1.1 2508.5 MHz / QPSK

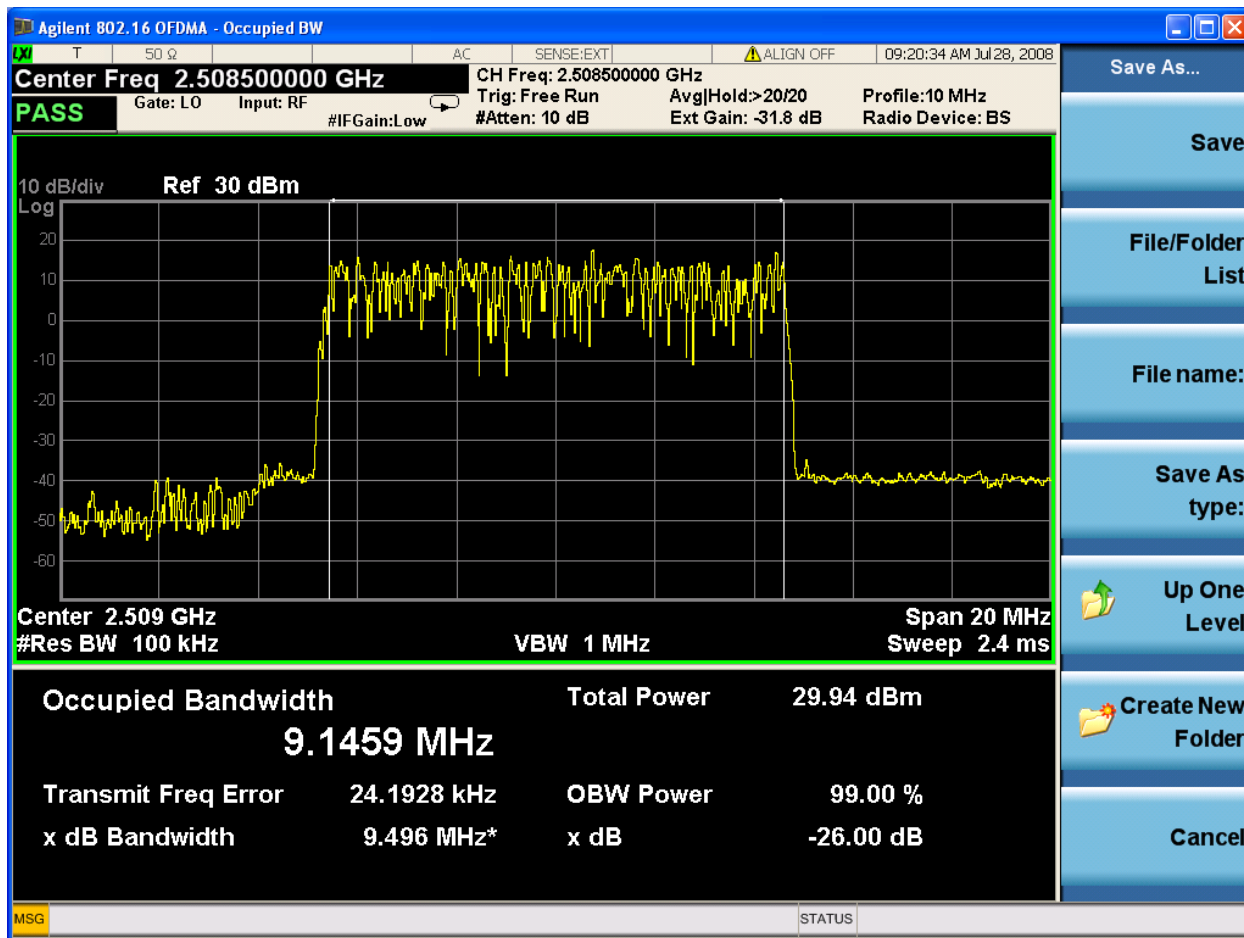
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Down Link
Operating Frequency :	1 <sup>st</sup> FA (2508.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	QPSK
Bandwidth :	10 MHz



Channel Power :	30.10 dBm
99% Bandwidth :	9.1445 MHz
26 dB Bandwidth :	9.429 MHz

## 6.2.1.2 2508.5 MHz / 16QAM

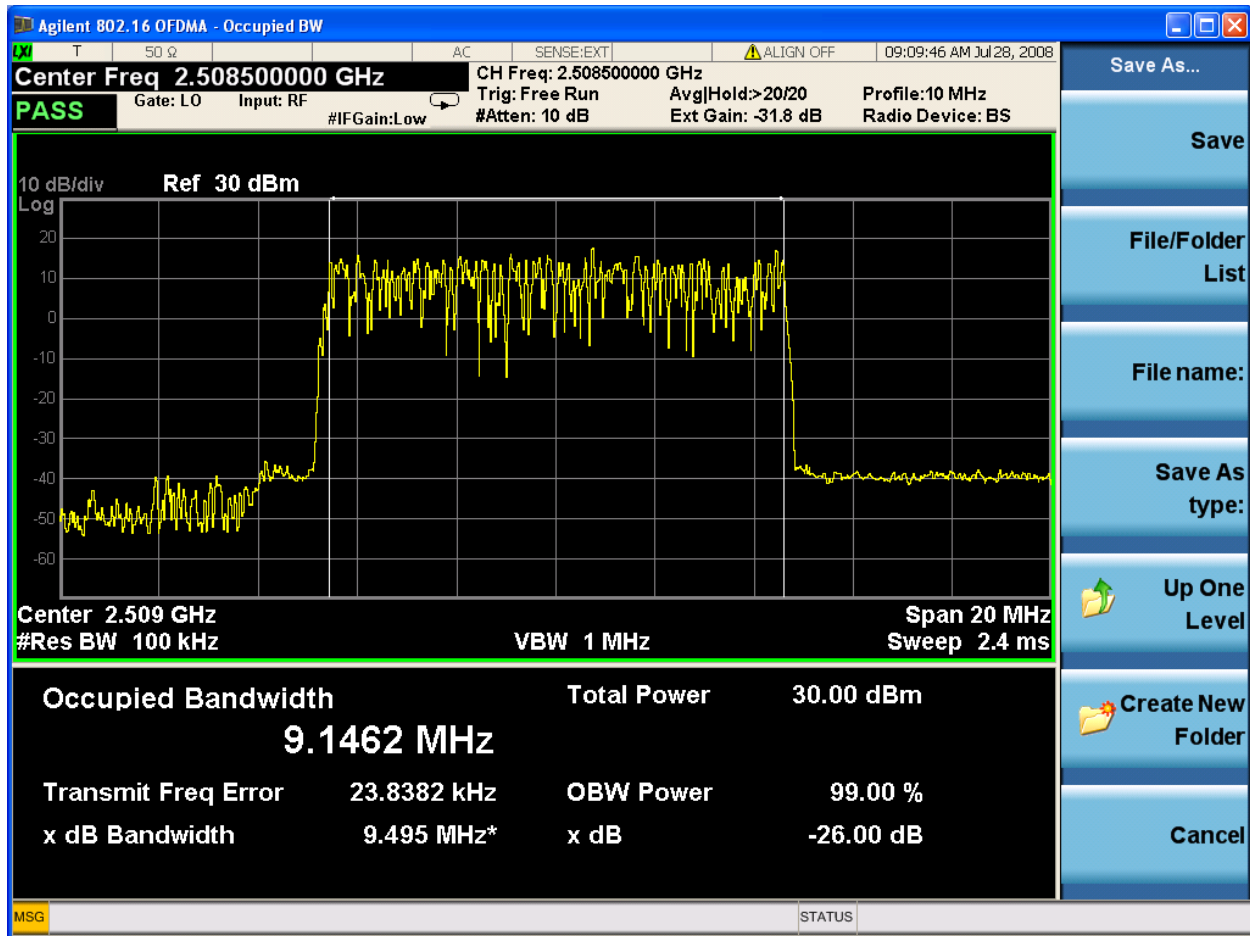
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Down Link
Operating Frequency :	1 <sup>st</sup> FA (2508.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	16QAM
Bandwidth :	10 MHz



Channel Power :	29.94 dBm
99% Bandwidth :	9.1459 MHz
26 dB Bandwidth :	9.496 MHz

### 6.2.1.3 2508.5 MHz / 64QAM

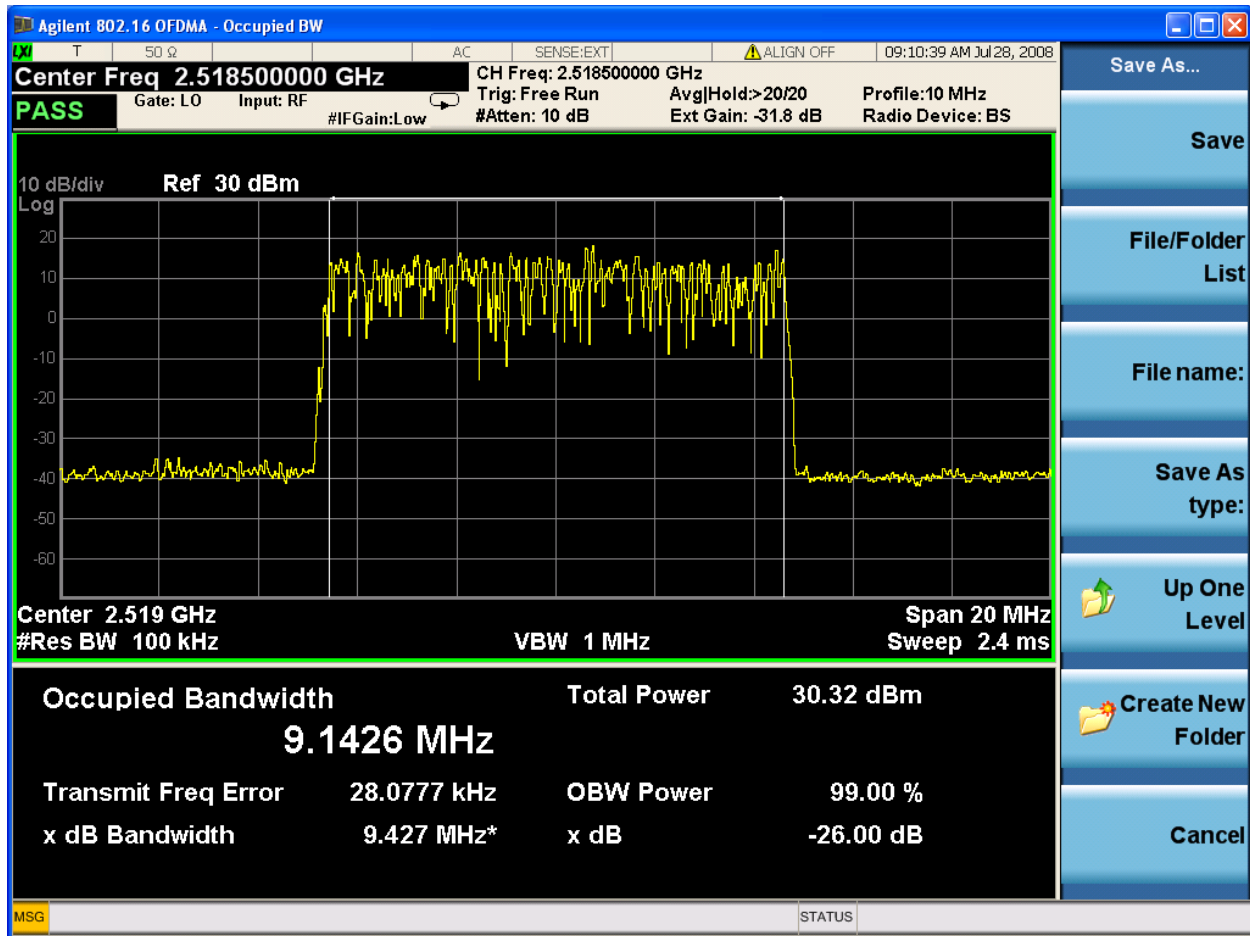
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Down Link
Operating Frequency :	1 <sup>st</sup> FA (2508.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	64QAM
Bandwidth :	10 MHz



Channel Power :	30.00 dBm
99% Bandwidth :	9.1462 MHz
26 dB Bandwidth :	9.495 MHz

#### 6.2.1.4 2518.5 MHz / QPSK

FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Down Link
Operating Frequency :	2 <sup>nd</sup> FA (2518.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	QPSK
Bandwidth :	10 MHz

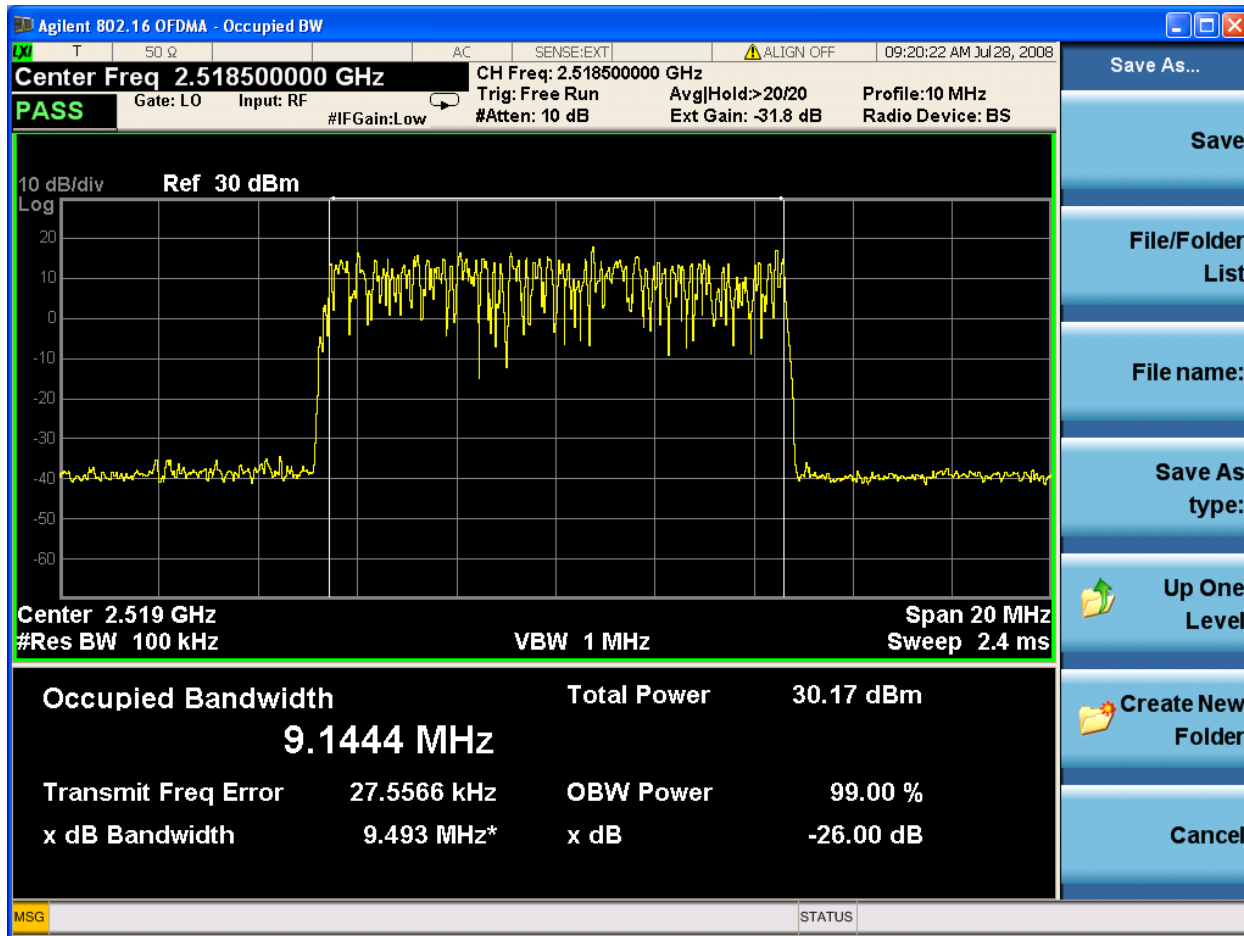


Channel Power :	30.32 dBm
99% Bandwidth :	9.1426 MHz
26 dB Bandwidth :	9.427 MHz



### 6.2.1.5 2518.5 MHz / 16QAM

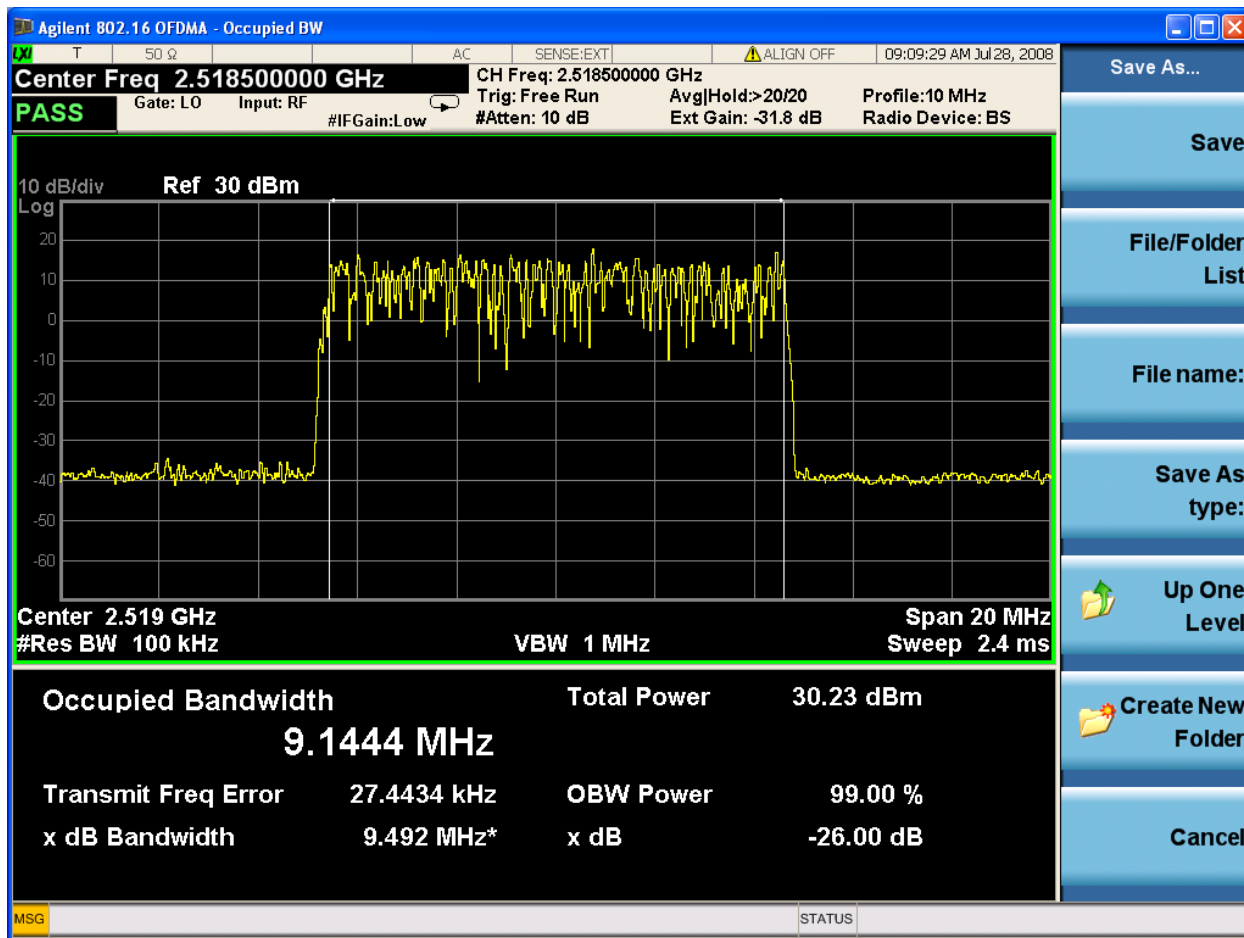
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Down Link
Operating Frequency :	2 <sup>nd</sup> FA (2518.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	16QAM
Bandwidth :	10 MHz



Channel Power :	30.17 dBm
99% Bandwidth :	9.1444 MHz
26 dB Bandwidth :	9.493 MHz

## 6.2.1.6 2518.5 MHz / 64QAM

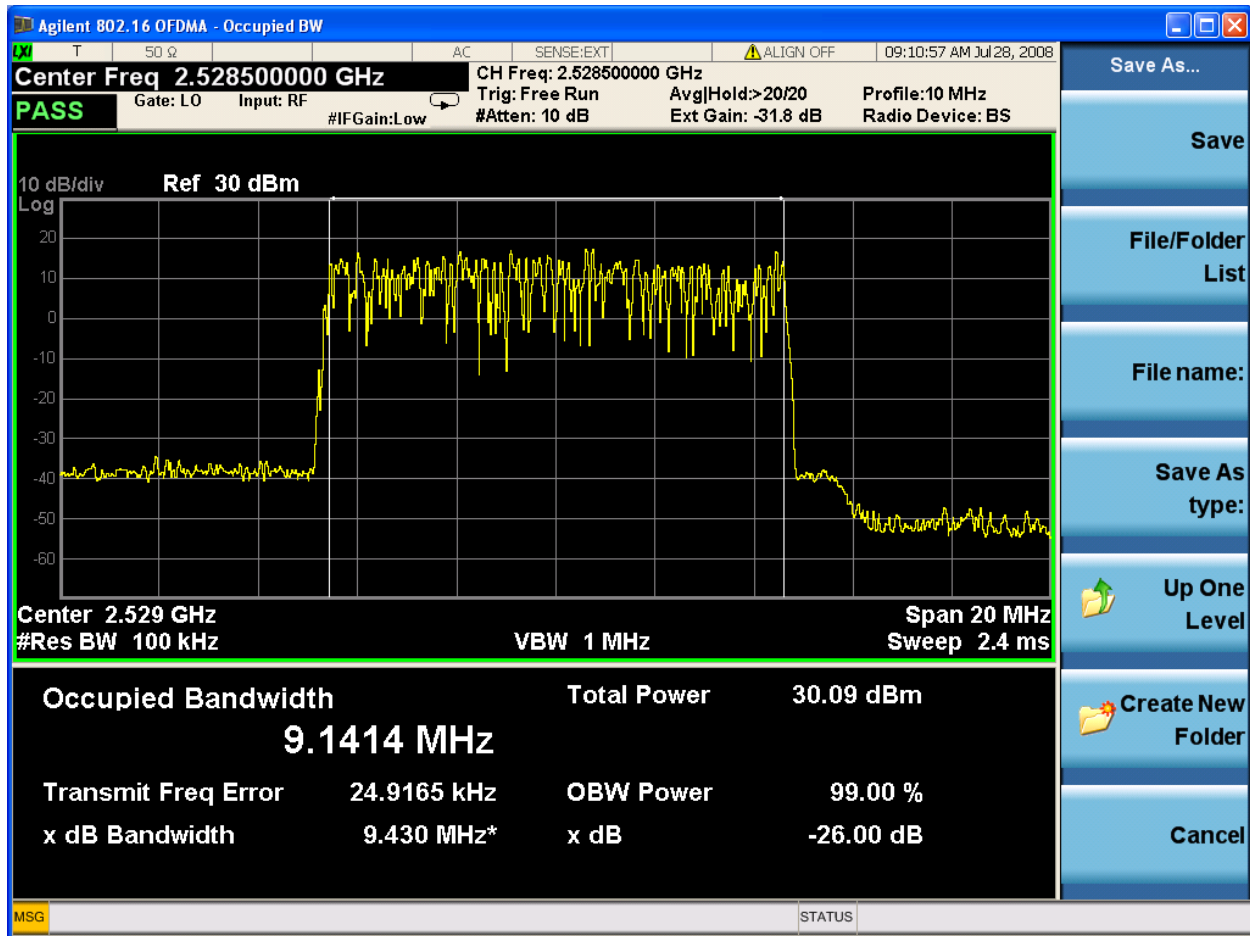
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Down Link
Operating Frequency :	2 <sup>nd</sup> FA (2518.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	64QAM
Bandwidth :	10 MHz



Channel Power :	30.23 dBm
99% Bandwidth :	9.1444 MHz
26 dB Bandwidth :	9.492 MHz

### 6.2.1.7 2528.5 MHz / QPSK

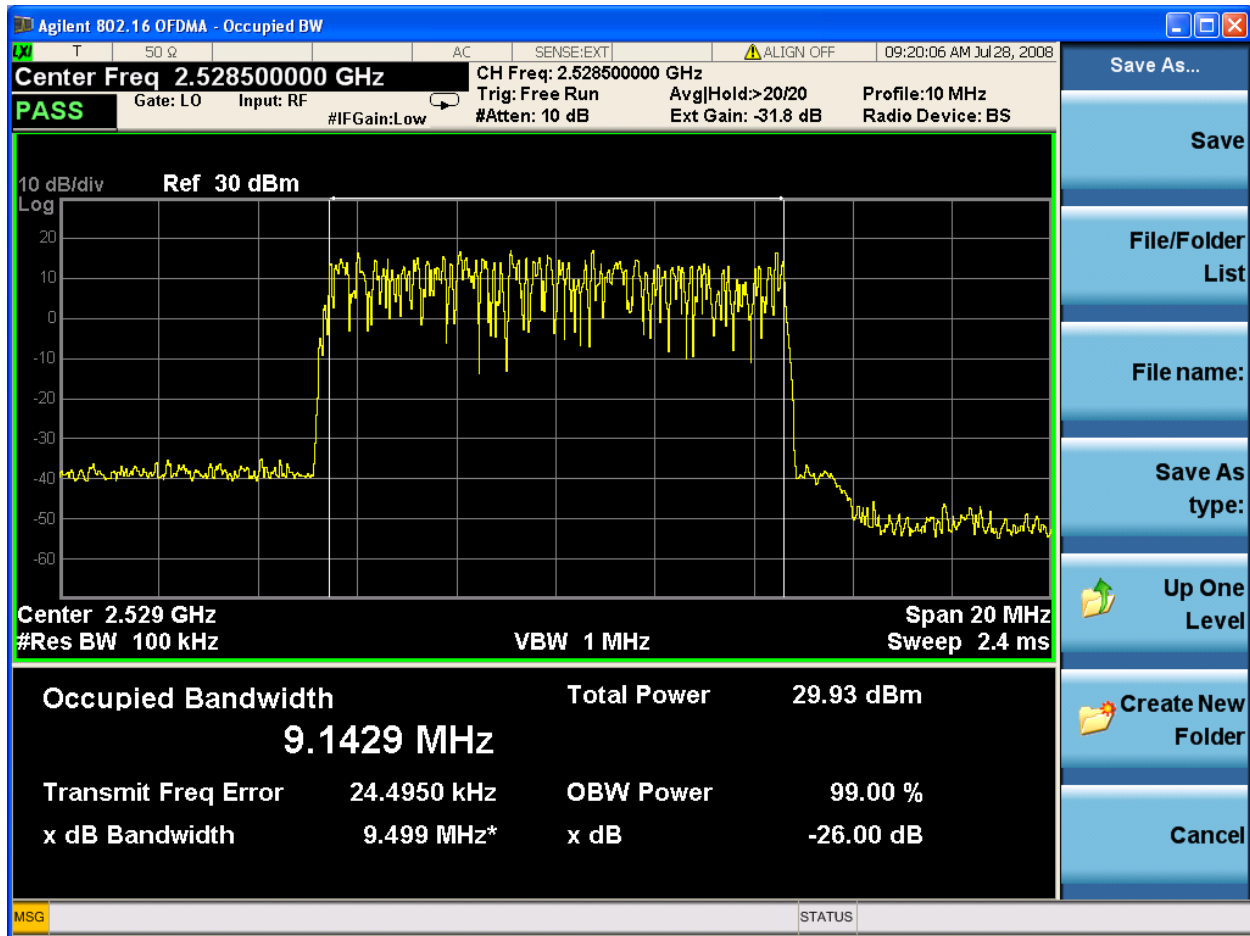
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Down Link
Operating Frequency :	3 <sup>rd</sup> FA (2528.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	QPSK
Bandwidth :	10 MHz



Channel Power :	30.09 dBm
99% Bandwidth :	9.1414 MHz
26 dB Bandwidth :	9.430 MHz

## 6.2.1.8 2528.5 MHz / 16QAM

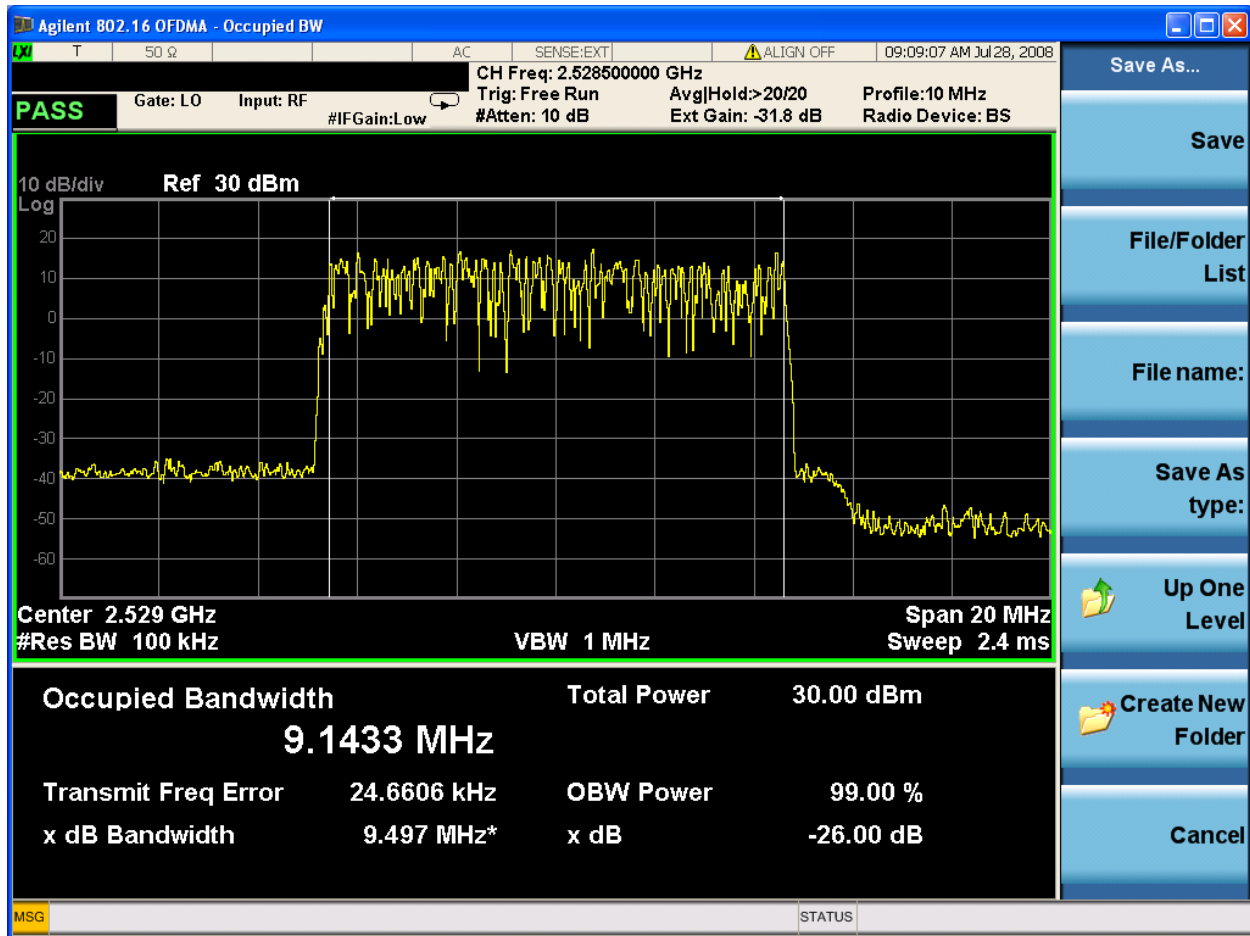
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Down Link
Operating Frequency :	3 <sup>rd</sup> FA (2528.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	16QAM
Bandwidth :	10 MHz



Channel Power :	29.93 dBm
99% Bandwidth :	9.1429 MHz
26 dB Bandwidth :	9.499 MHz

## 6.2.1.9 2528.5 MHz / 64QAM

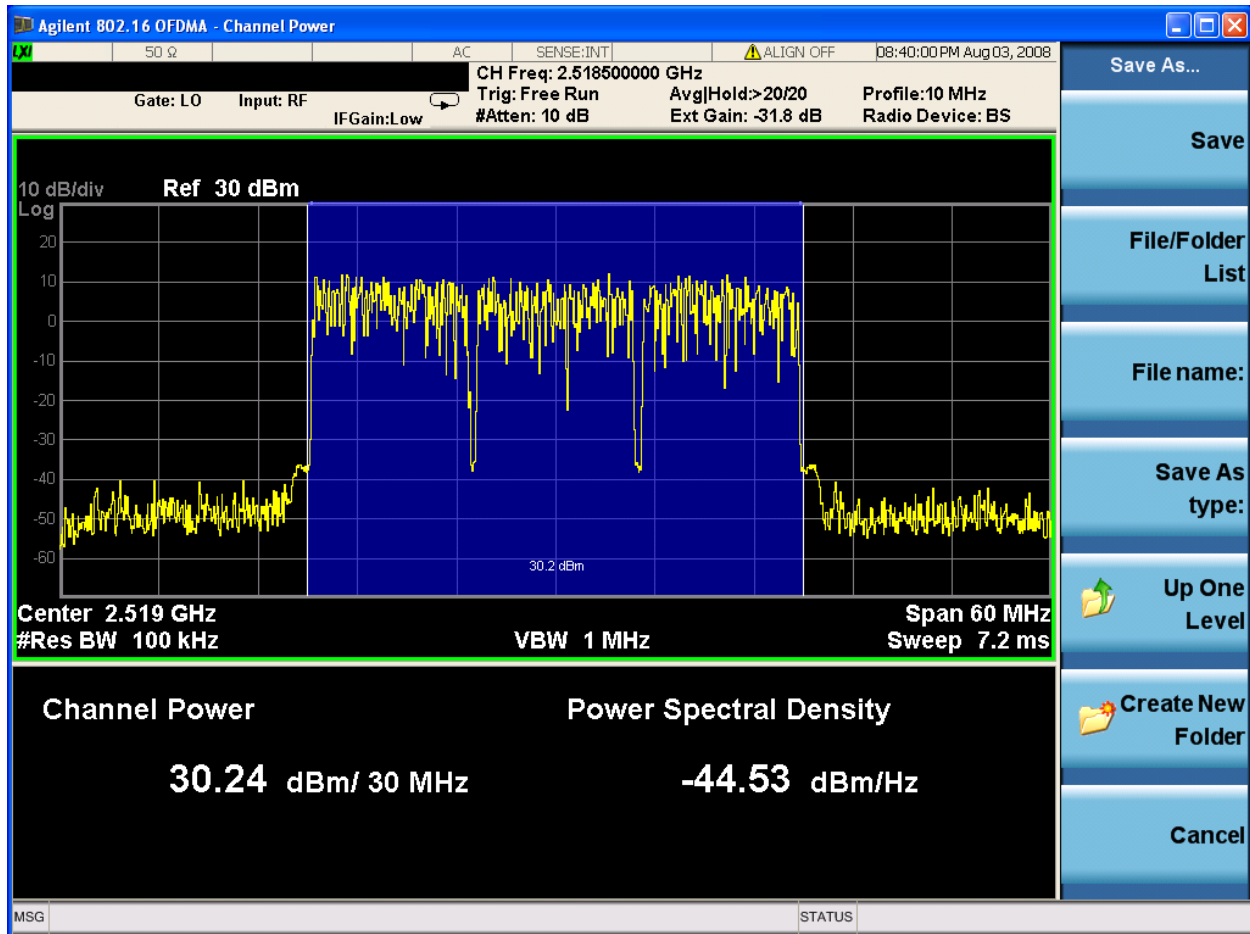
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Down Link
Operating Frequency :	3 <sup>rd</sup> FA (2528.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	64QAM
Bandwidth :	10 MHz



Channel Power :	30.00 dBm
99% Bandwidth :	9.1433 MHz
26 dB Bandwidth :	9.497 MHz

### 6.2.1.10 Full FA

FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Down Link
Operating Frequency :	Full FA
Input Level :	-50 dBm
System Gain :	80 dB
Bandwidth :	30 MHz

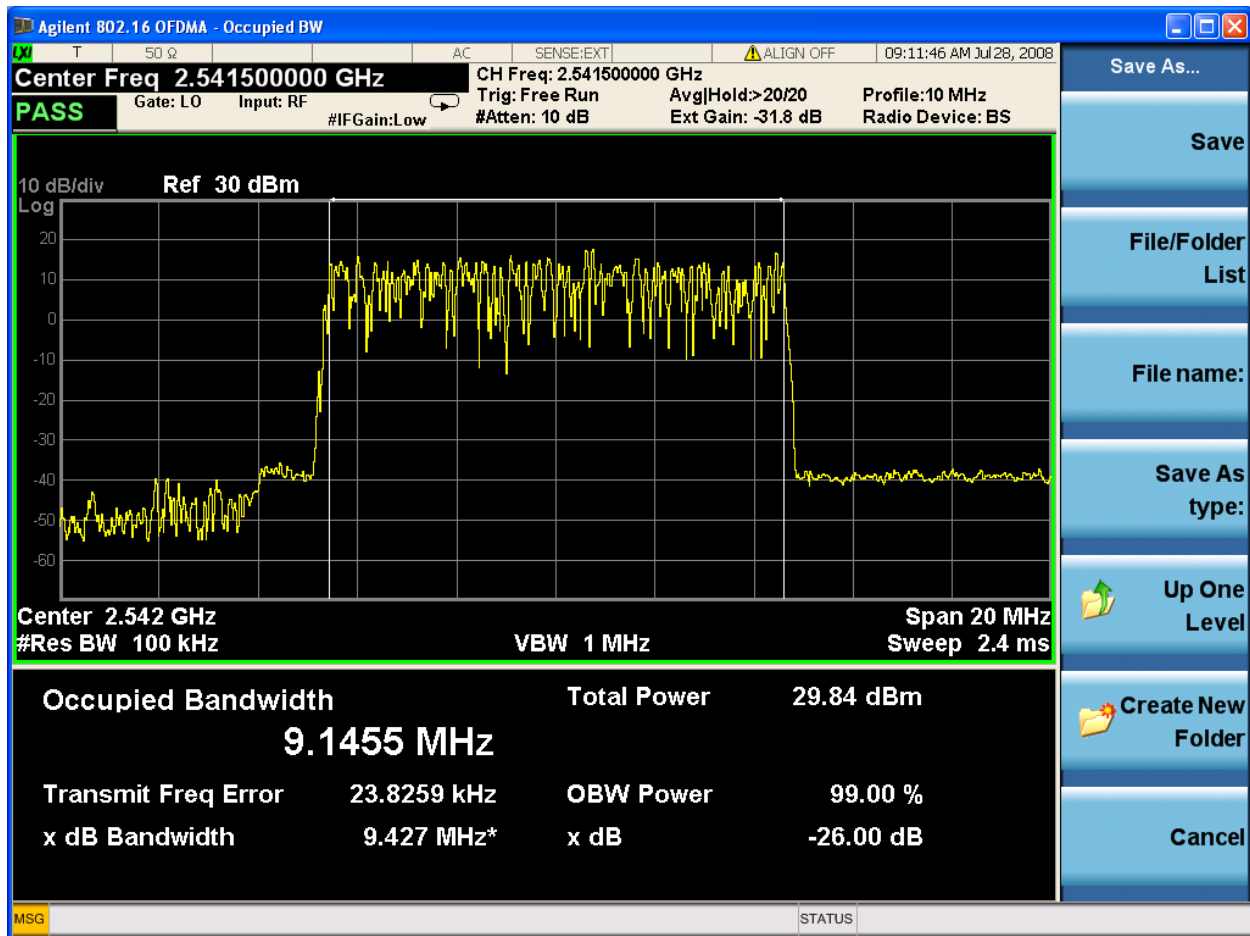


Channel Power : 30.24 dBm

## 6.2.2 C-D Block

### 6.2.2.1 2541.5 MHz / QPSK

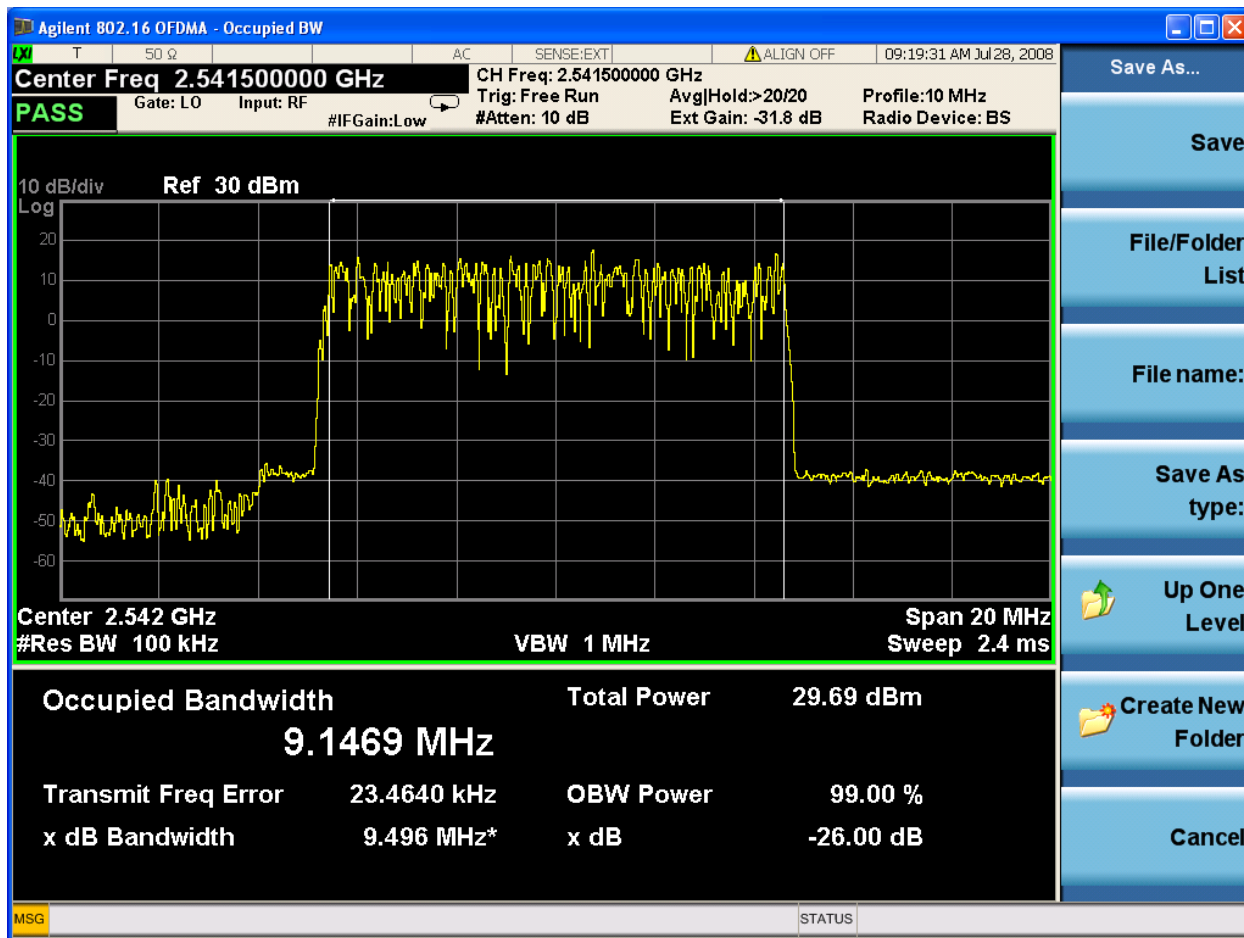
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Down Link
Operating Frequency :	1 <sup>st</sup> FA (2541.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	QPSK
Bandwidth :	10 MHz



Channel Power :	29.84 dBm
99% Bandwidth :	9.1455 MHz
26 dB Bandwidth :	9.427 MHz

## 6.2.2.2 2541.5 MHz / 16QAM

FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Down Link
Operating Frequency :	1 <sup>st</sup> FA (2541.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	16QAM
Bandwidth :	10 MHz

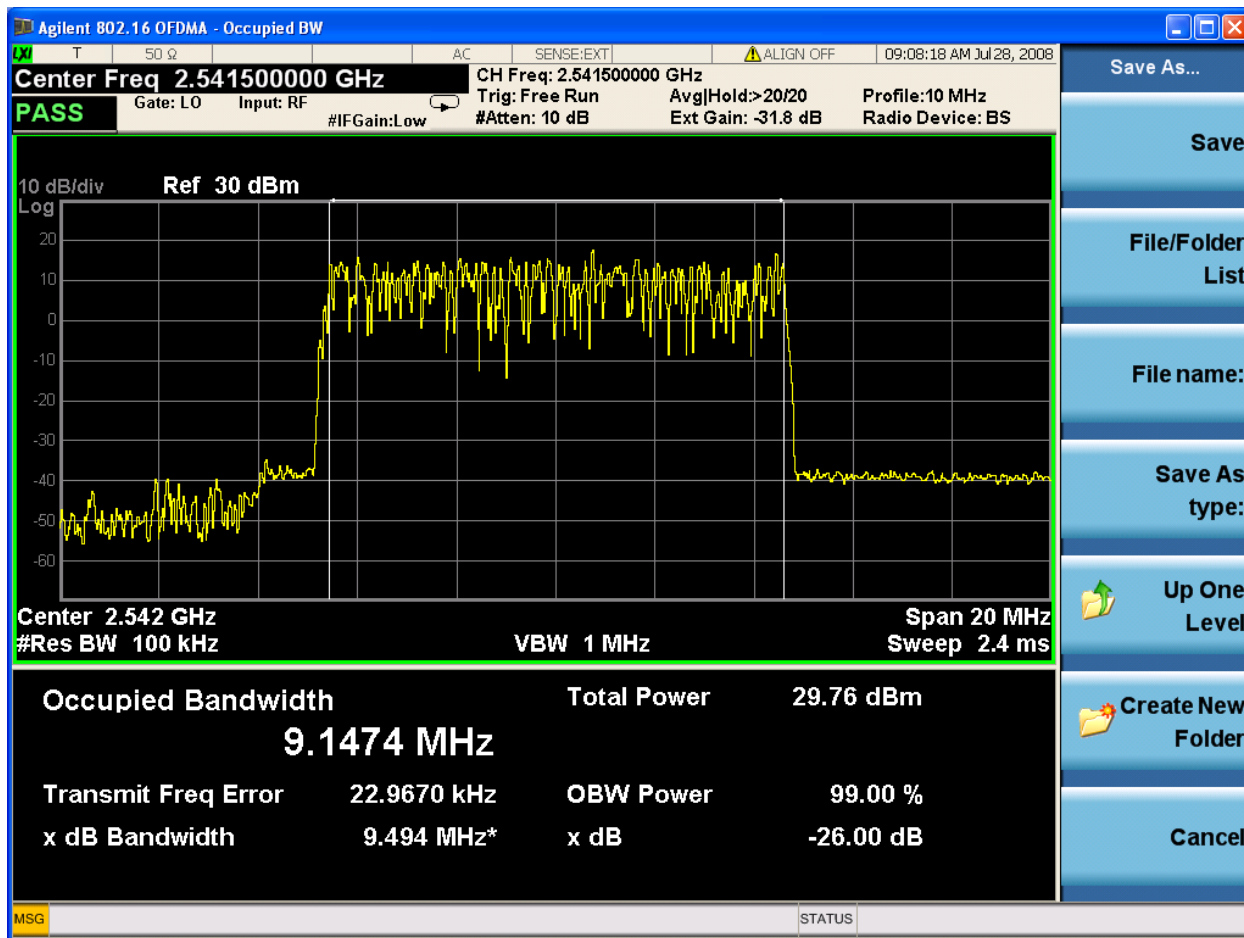


Channel Power :	29.69 dBm
99% Bandwidth :	9.1469 MHz
26 dB Bandwidth :	9.496 MHz



### 6.2.2.3 2541.5 MHz / 64QAM

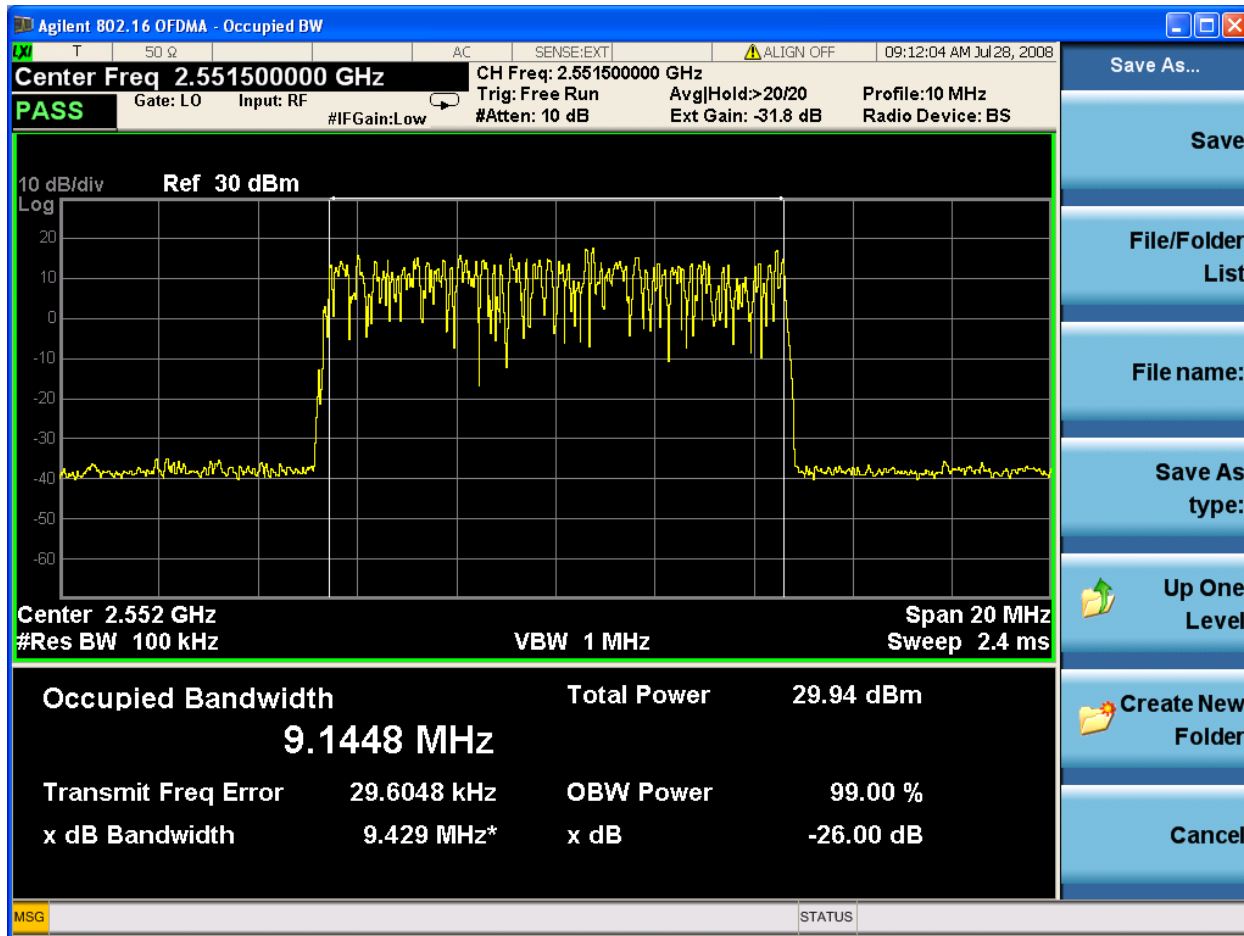
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Down Link
Operating Frequency :	1 <sup>st</sup> FA (2541.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	64QAM
Bandwidth :	10 MHz



Channel Power :	29.76 dBm
99% Bandwidth :	9.1474 MHz
26 dB Bandwidth :	9.494 MHz

#### 6.2.2.4 2551.5 MHz / QPSK

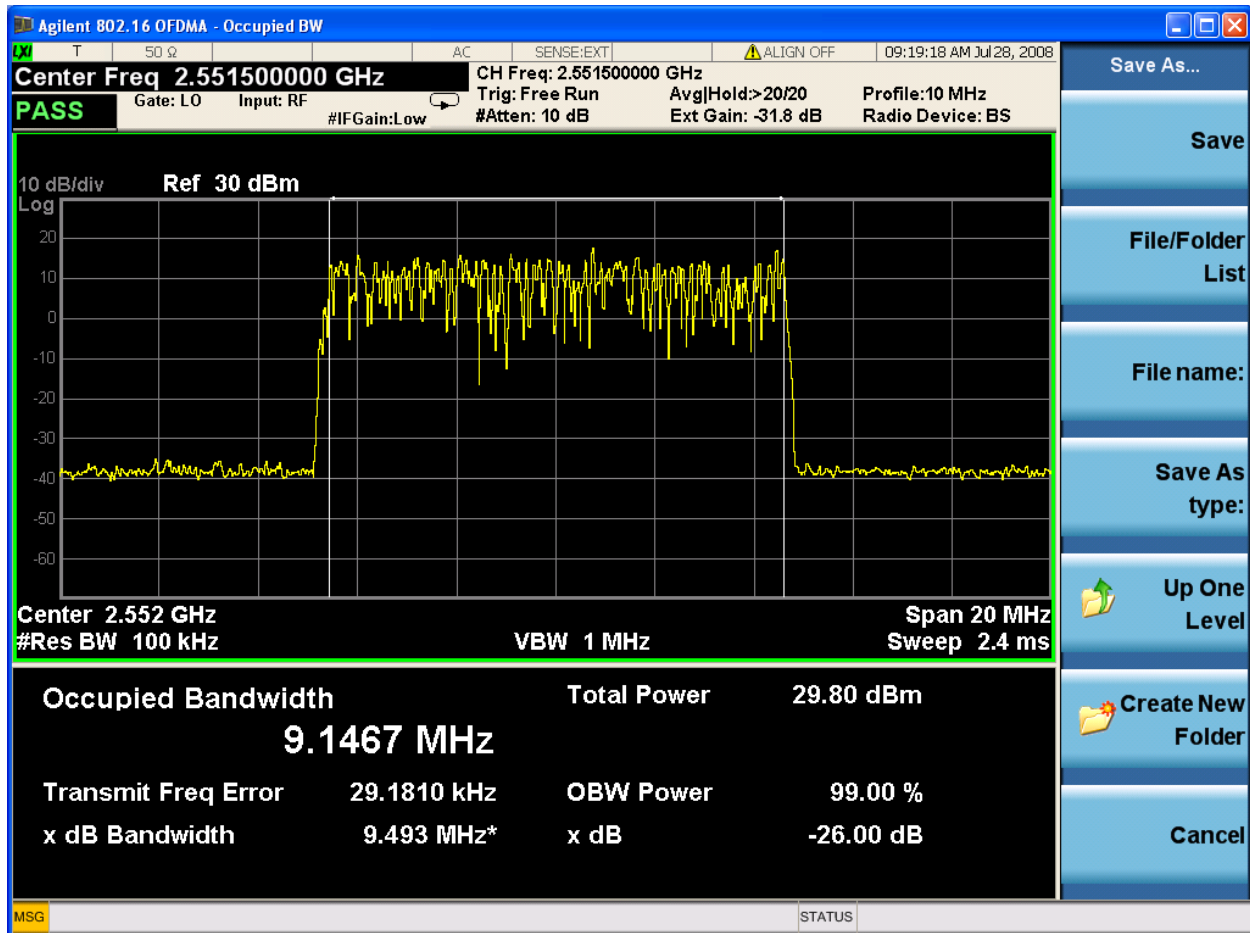
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Down Link
Operating Frequency :	2 <sup>nd</sup> FA (2551.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	QPSK
Bandwidth :	10 MHz



Channel Power :	29.94 dBm
99% Bandwidth :	9.1448 MHz
26 dB Bandwidth :	9.429 MHz

## 6.2.2.5 2551.5 MHz / 16QAM

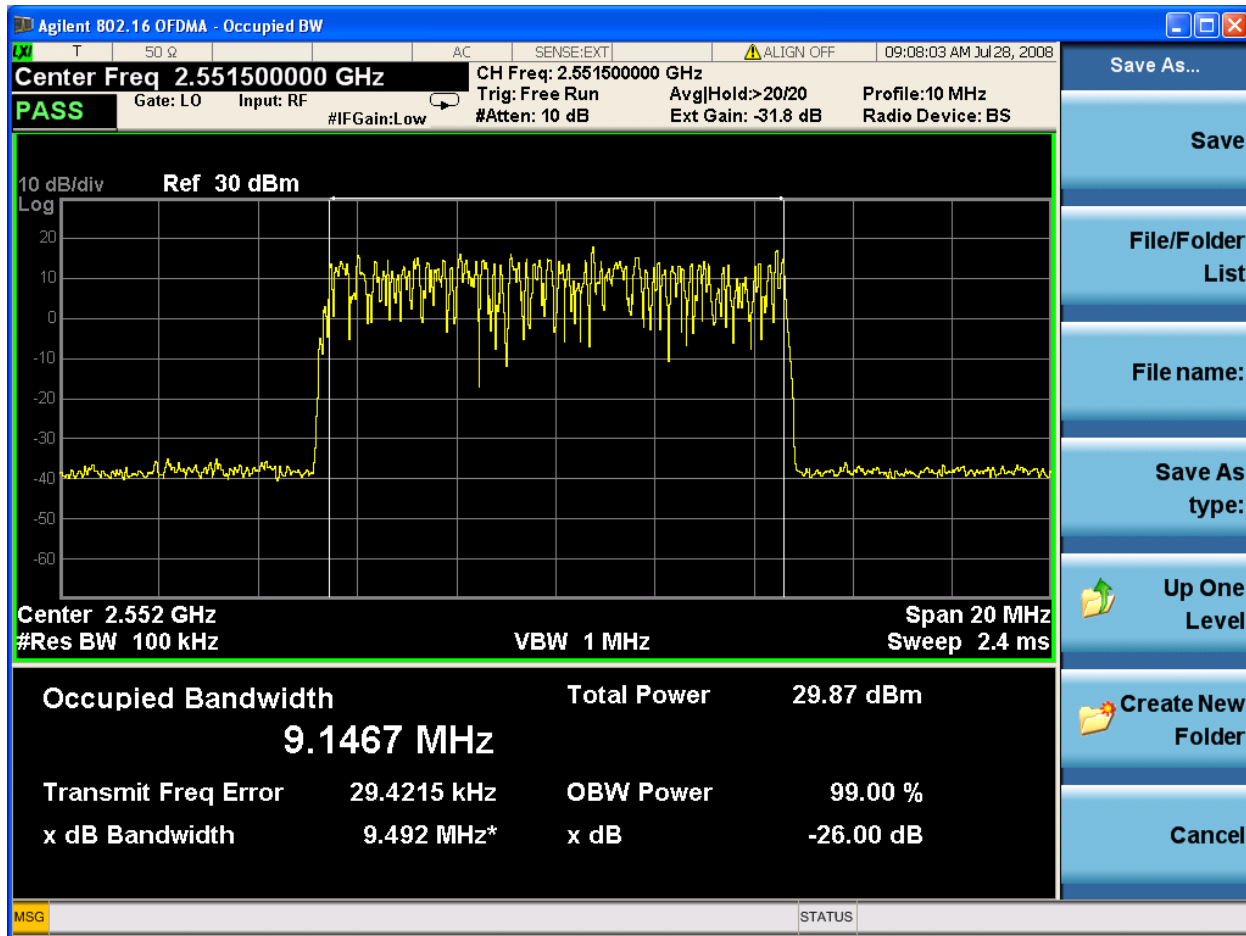
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Down Link
Operating Frequency :	2 <sup>nd</sup> FA (2551.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	16QAM
Bandwidth :	10 MHz



Channel Power :	29.80 dBm
99% Bandwidth :	9.1467 MHz
26 dB Bandwidth :	9.493 MHz

## 6.2.2.6 2551.5 MHz / 64QAM

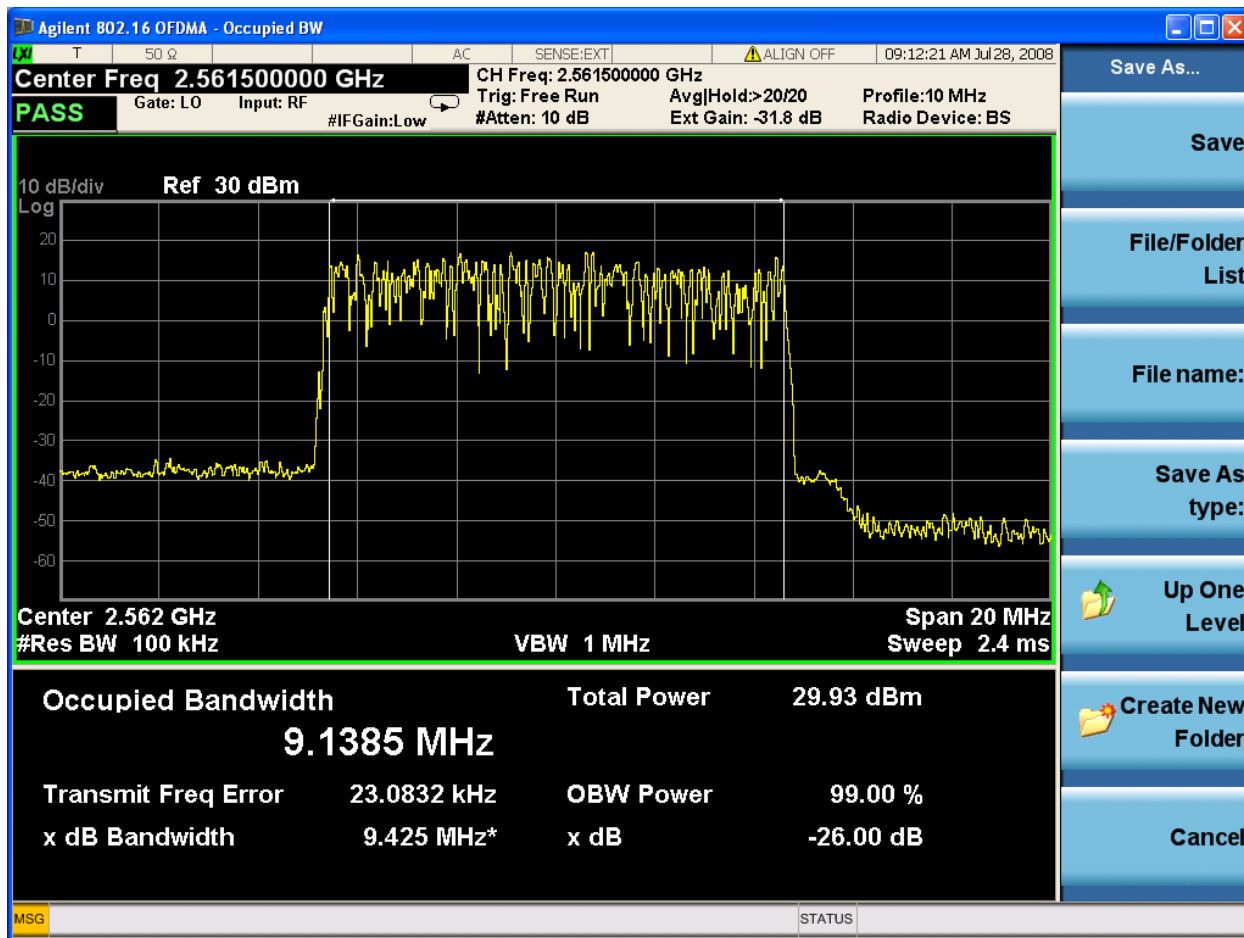
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Down Link
Operating Frequency :	2 <sup>nd</sup> FA (2551.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	64QAM
Bandwidth :	10 MHz



Channel Power :	29.87 dBm
99% Bandwidth :	9.1467 MHz
26 dB Bandwidth :	9.492 MHz

## 6.2.2.7 2561.5 MHz / QPSK

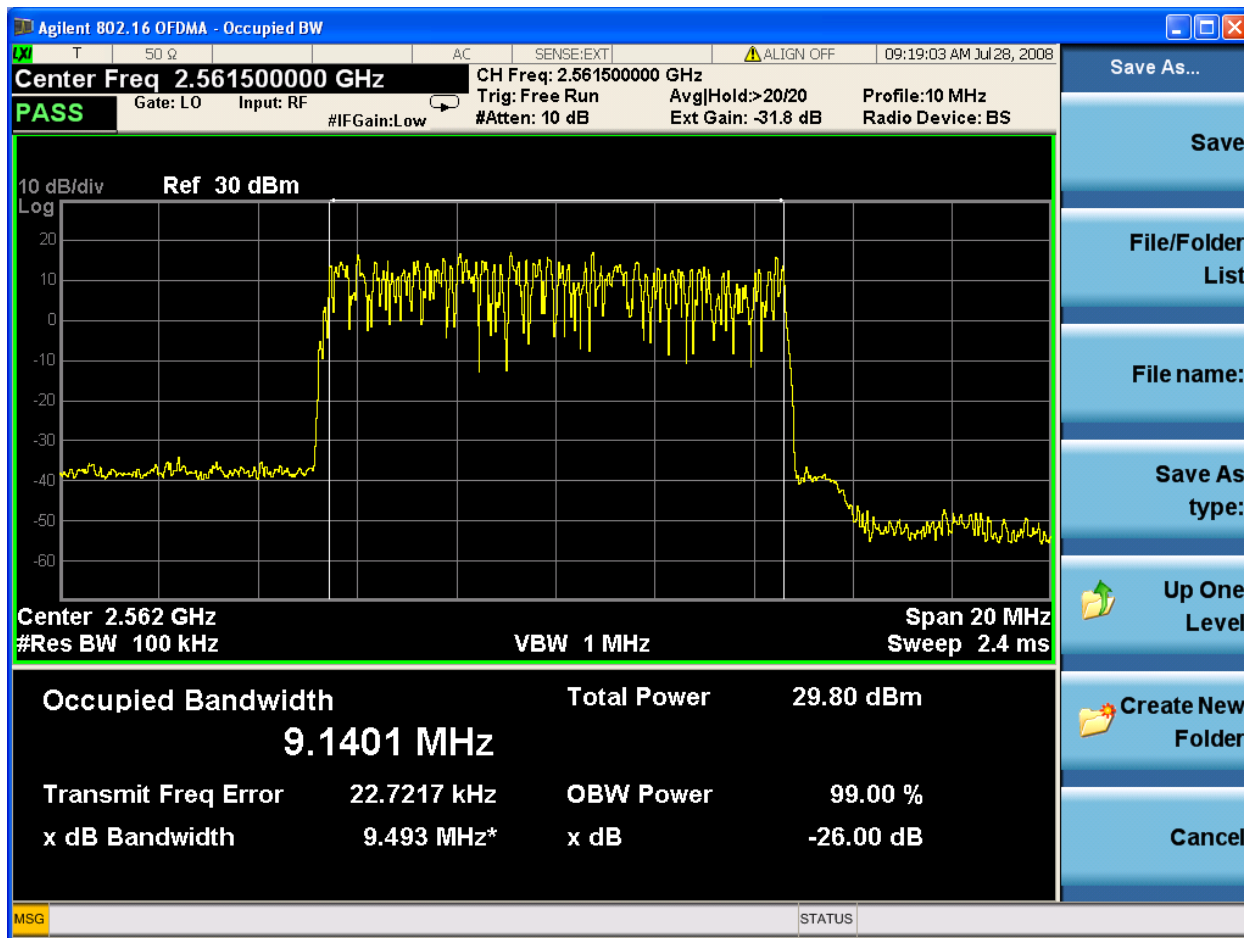
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Down Link
Operating Frequency :	3 <sup>rd</sup> FA (2561.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	QPSK
Bandwidth :	10 MHz



Channel Power :	29.93 dBm
99% Bandwidth :	9.1385 MHz
26 dB Bandwidth :	9.425 MHz

## 6.2.2.8 2561.5 MHz / 16QAM

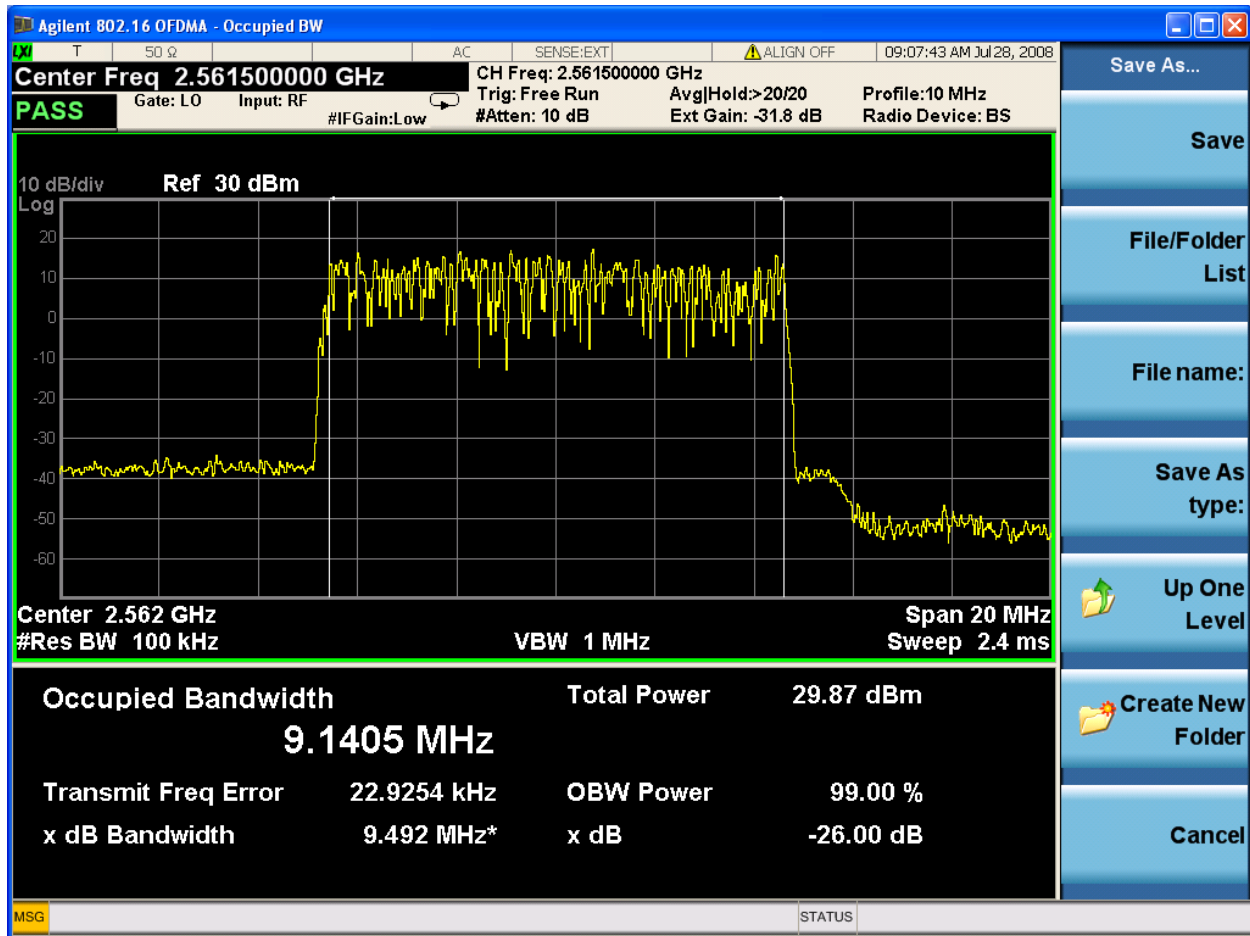
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Down Link
Operating Frequency :	3 <sup>rd</sup> FA (2561.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	16QAM
Bandwidth :	10 MHz



Channel Power :	29.80 dBm
99% Bandwidth :	9.1401 MHz
26 dB Bandwidth :	9.493 MHz

## 6.2.2.9 2561.5 MHz / 64QAM

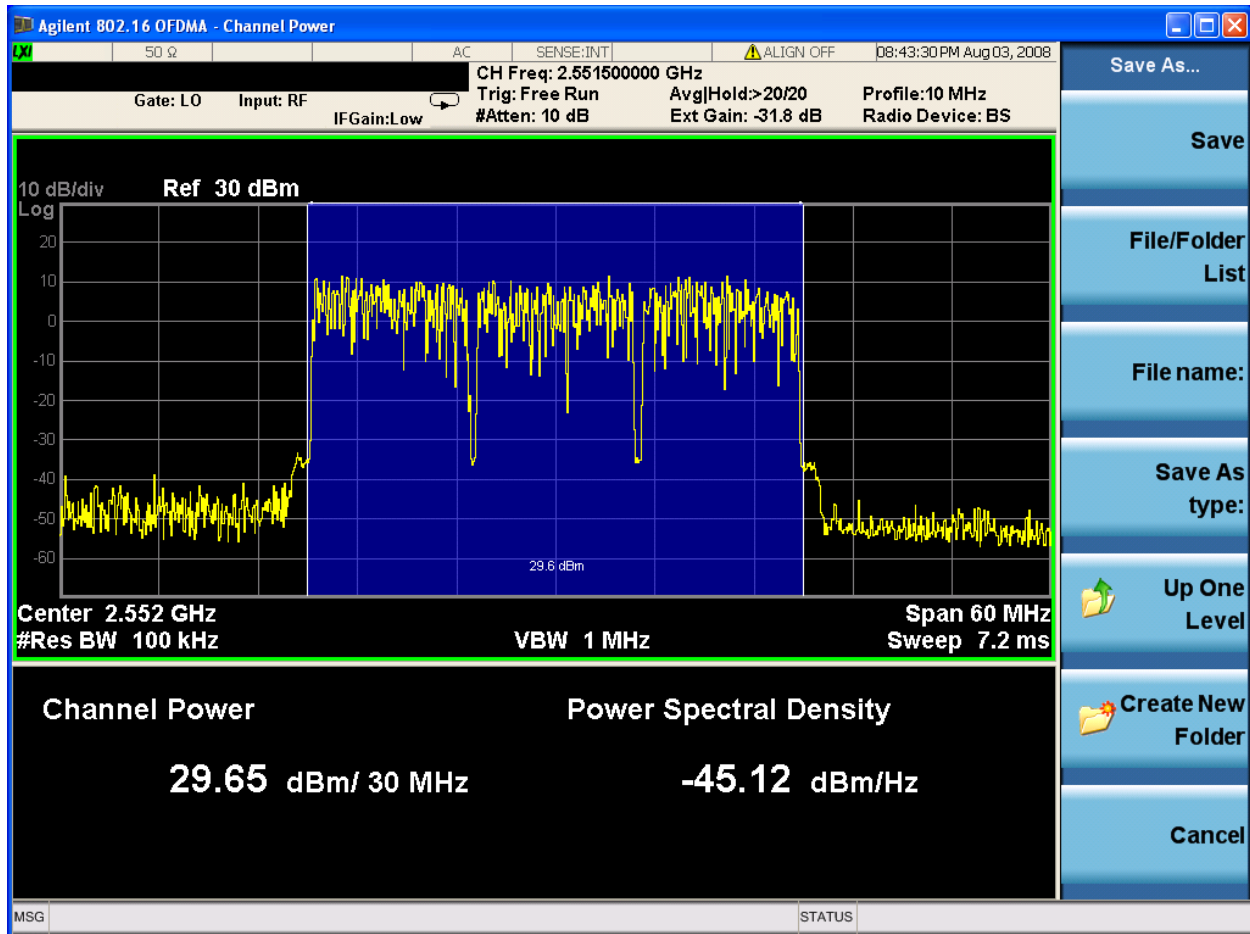
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Down Link
Operating Frequency :	3 <sup>rd</sup> FA (2561.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	64QAM
Bandwidth :	10 MHz



Channel Power :	29.87 dBm
99% Bandwidth :	9.1405 MHz
26 dB Bandwidth :	9.492 MHz

### 6.2.2.10 Full FA

FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Down Link
Operating Frequency :	Full FA
Input Level :	-50 dBm
System Gain :	80 dB
Bandwidth :	30 MHz



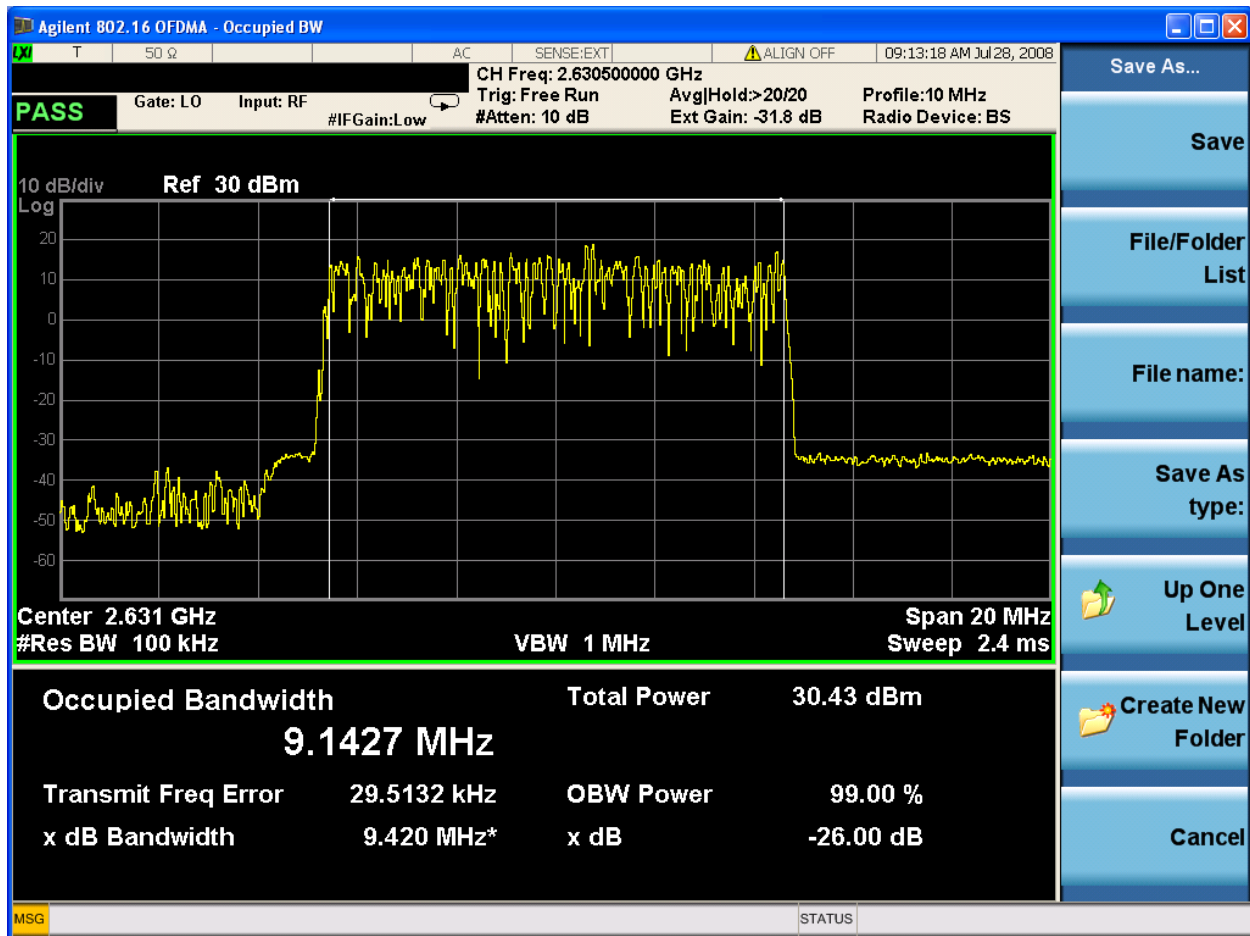
Channel Power : 29.65 dBm



## 6.2.3 E-F Block

### 6.2.3.1 2630.5 MHz / QPSK

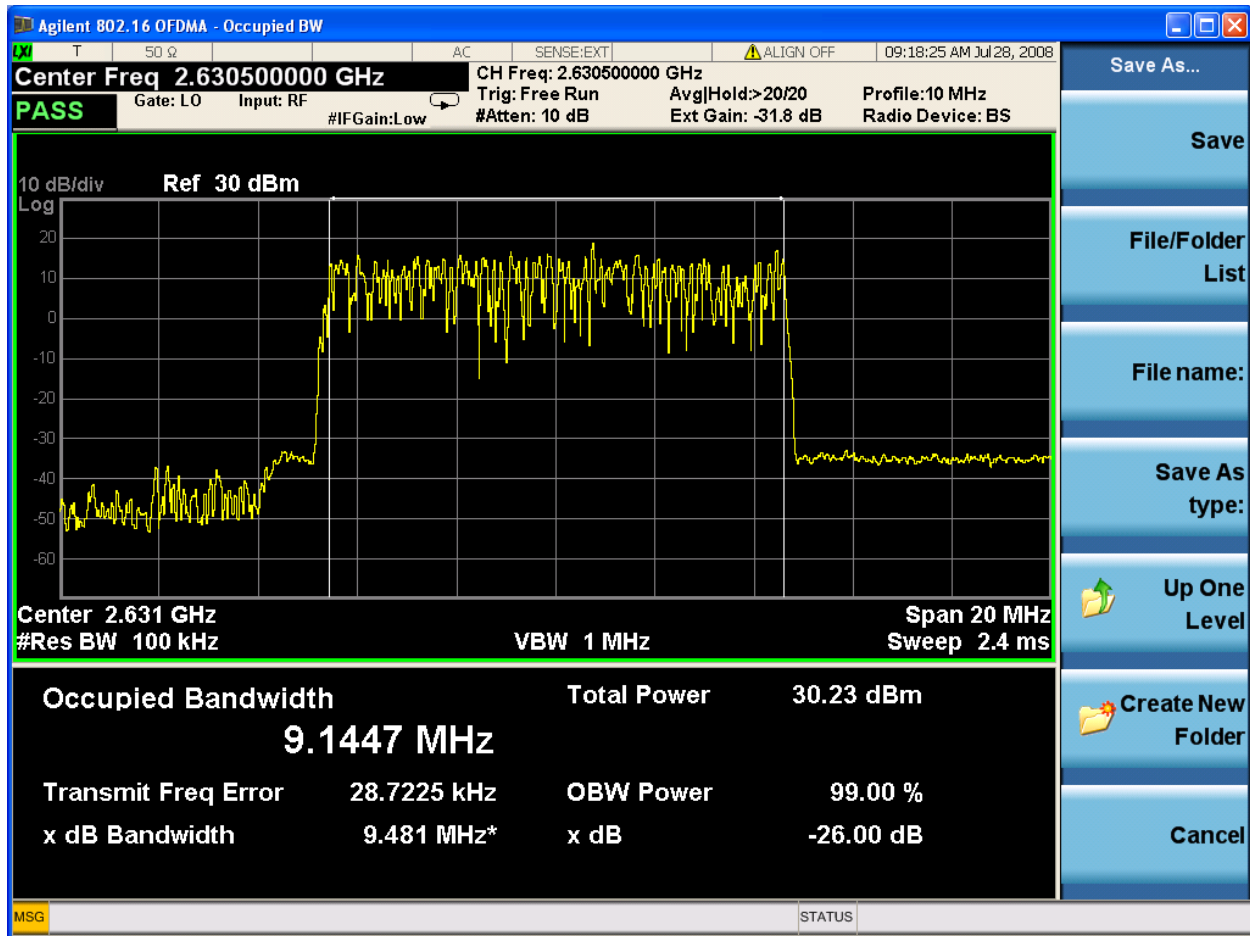
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Down Link
Operating Frequency :	1 <sup>st</sup> FA (2630.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	QPSK
Bandwidth :	10 MHz



Channel Power :	30.43 dBm
99% Bandwidth :	9.1427 MHz
26 dB Bandwidth :	9.420 MHz

### 6.2.3.2 2630.5 MHz / 16QAM

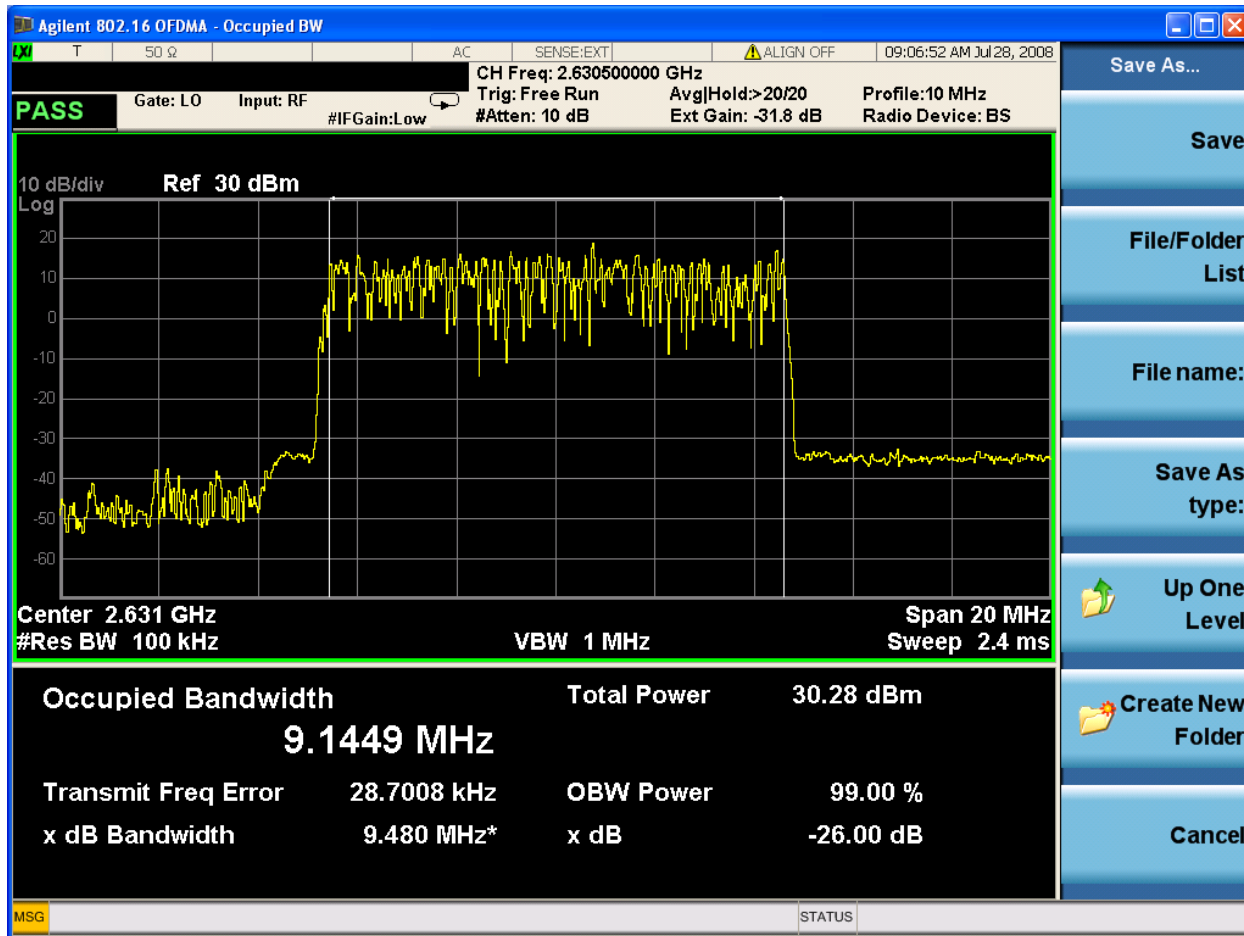
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Down Link
Operating Frequency :	1 <sup>st</sup> FA (2630.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	16QAM
Bandwidth :	10 MHz



Channel Power :	30.23 dBm
99% Bandwidth :	9.1447 MHz
26 dB Bandwidth :	9.481 MHz

### 6.2.3.3 2630.5 MHz / 64QAM

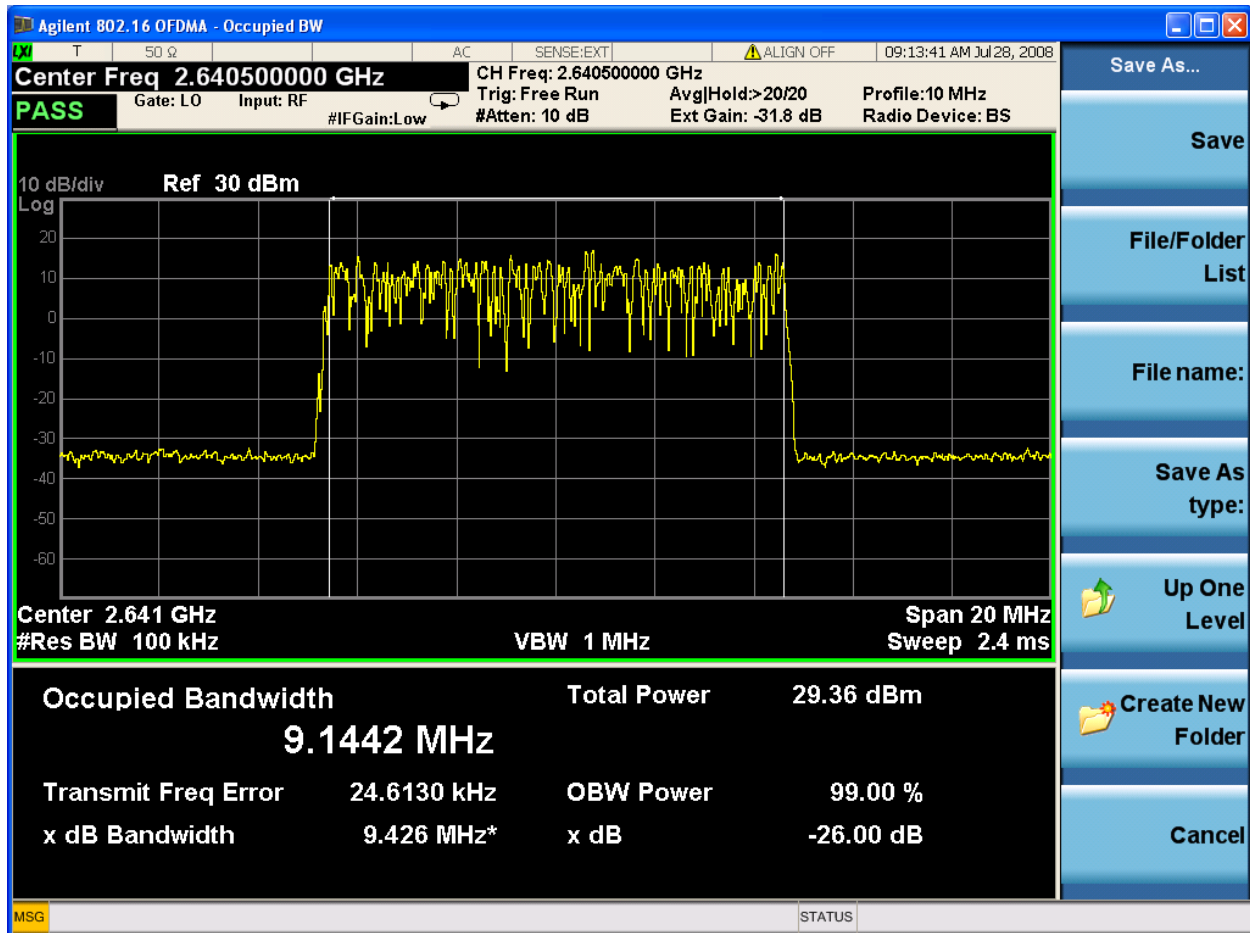
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Down Link
Operating Frequency :	1 <sup>st</sup> FA (2630.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	64QAM
Bandwidth :	10 MHz



Channel Power :	30.28 dBm
99% Bandwidth :	9.1449 MHz
26 dB Bandwidth :	9.480 MHz

### 6.2.3.4 2640.5 MHz / QPSK

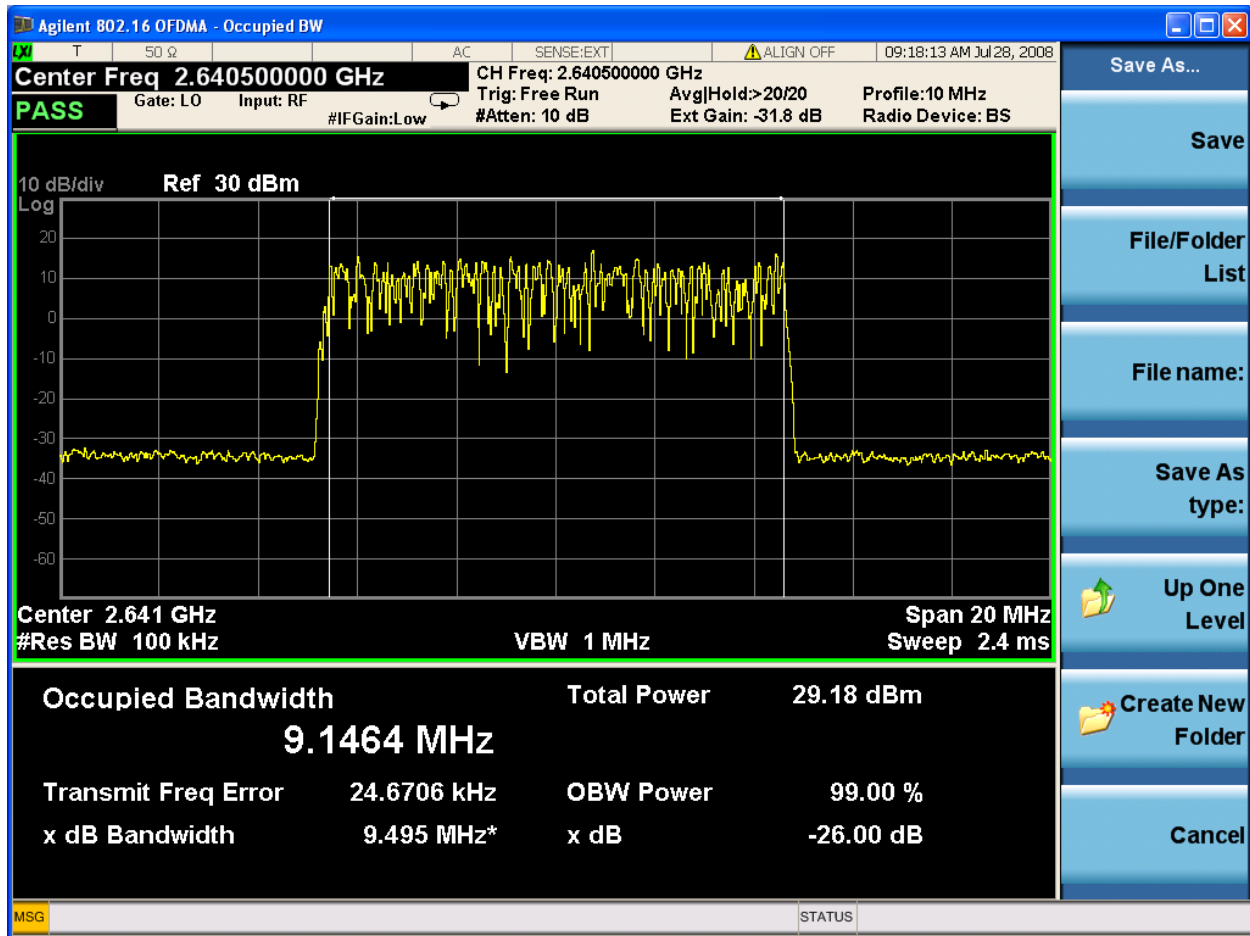
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Down Link
Operating Frequency :	2 <sup>nd</sup> FA (2640.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	QPSK
Bandwidth :	10 MHz



Channel Power :	29.36 dBm
99% Bandwidth :	9.1442 MHz
26 dB Bandwidth :	9.426 MHz

### 6.2.3.5 2640.5 MHz / 16QAM

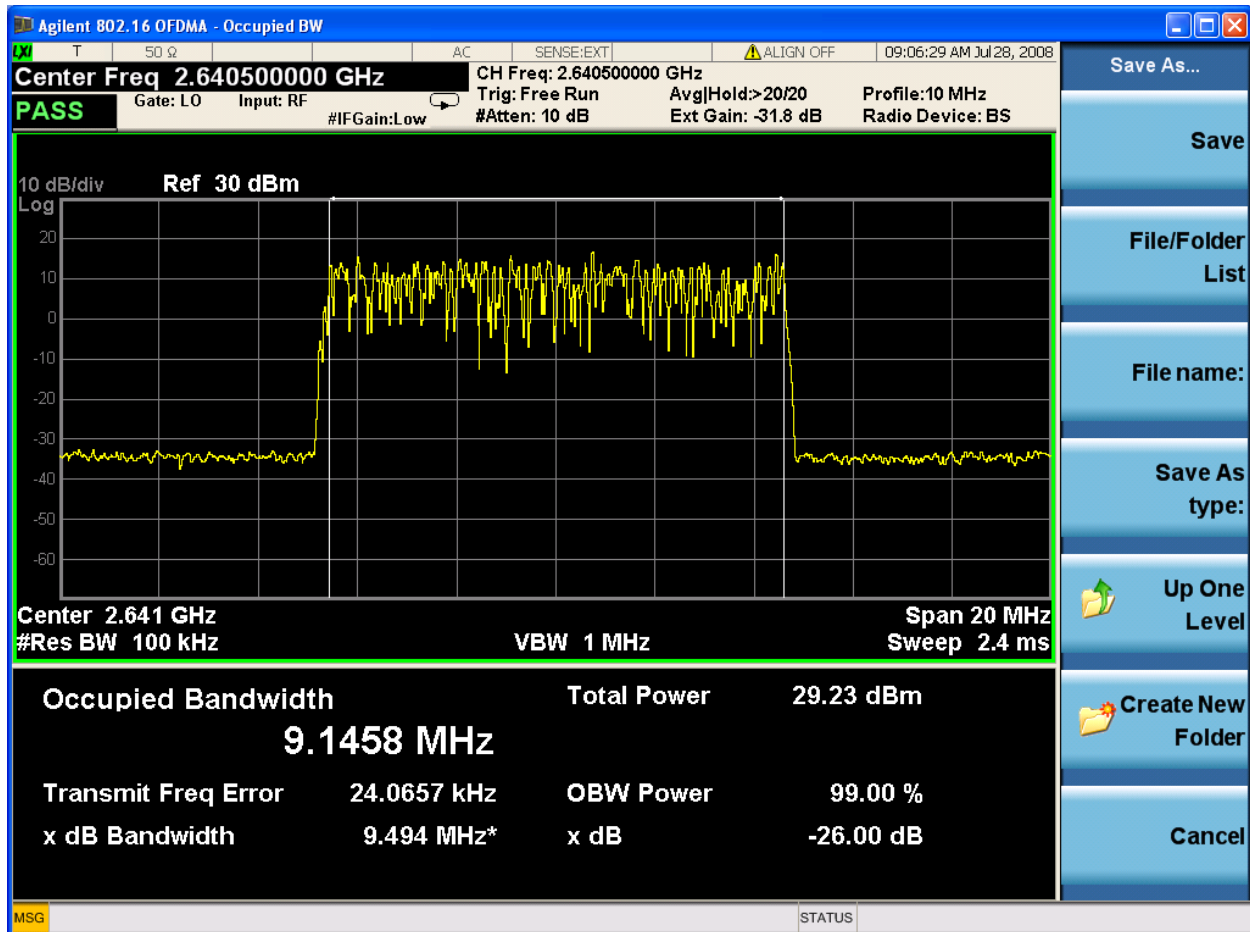
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Down Link
Operating Frequency :	2 <sup>nd</sup> FA (2640.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	16QAM
Bandwidth :	10 MHz



Channel Power :	29.18 dBm
99% Bandwidth :	9.1464 MHz
26 dB Bandwidth :	9.495 MHz

### 6.2.3.6 2640.5 MHz / 64QAM

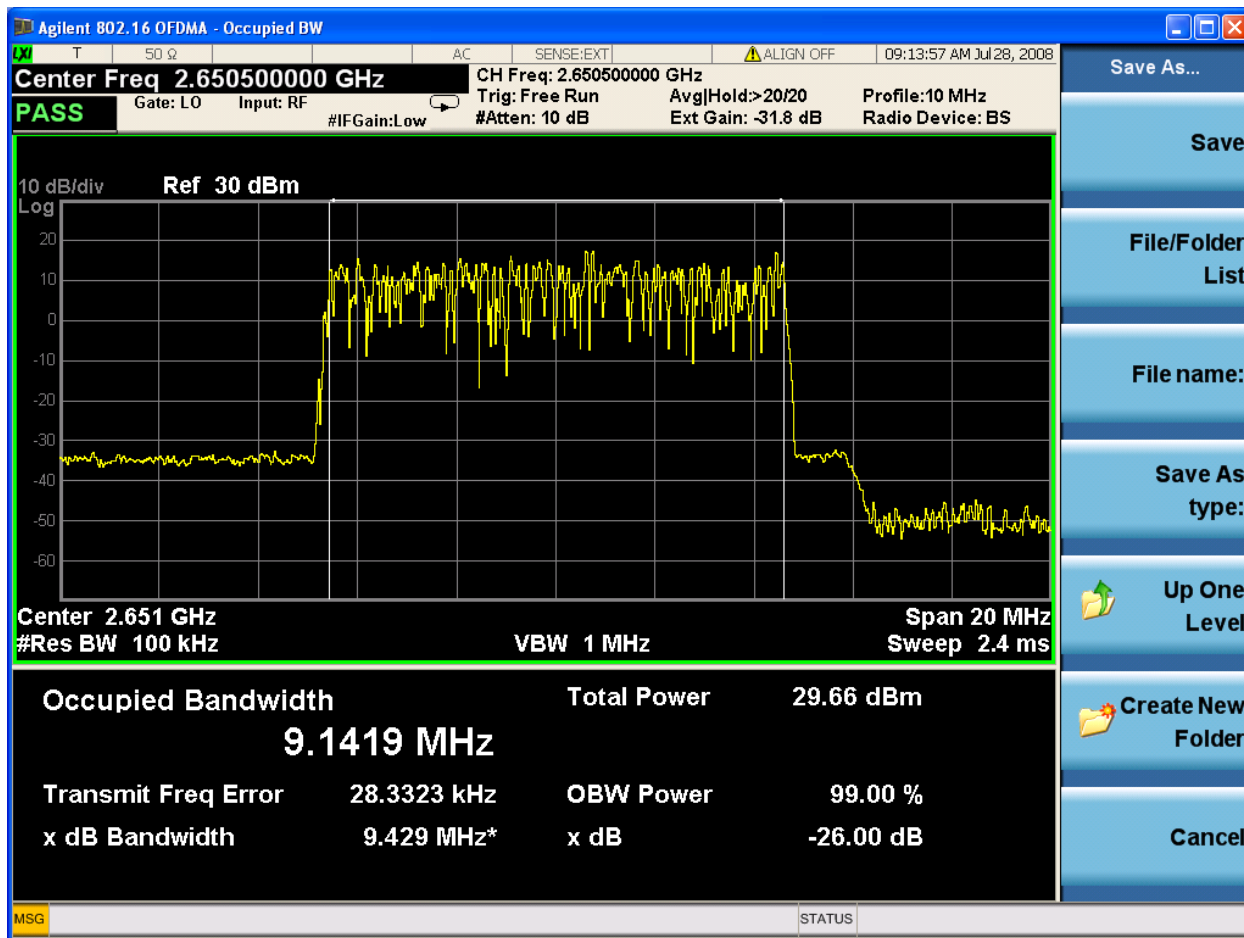
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Down Link
Operating Frequency :	2 <sup>nd</sup> FA (2640.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	64QAM
Bandwidth :	10 MHz



Channel Power :	29.23 dBm
99% Bandwidth :	9.1458 MHz
26 dB Bandwidth :	9.494 MHz

### 6.2.3.7 2650.5 MHz / QPSK

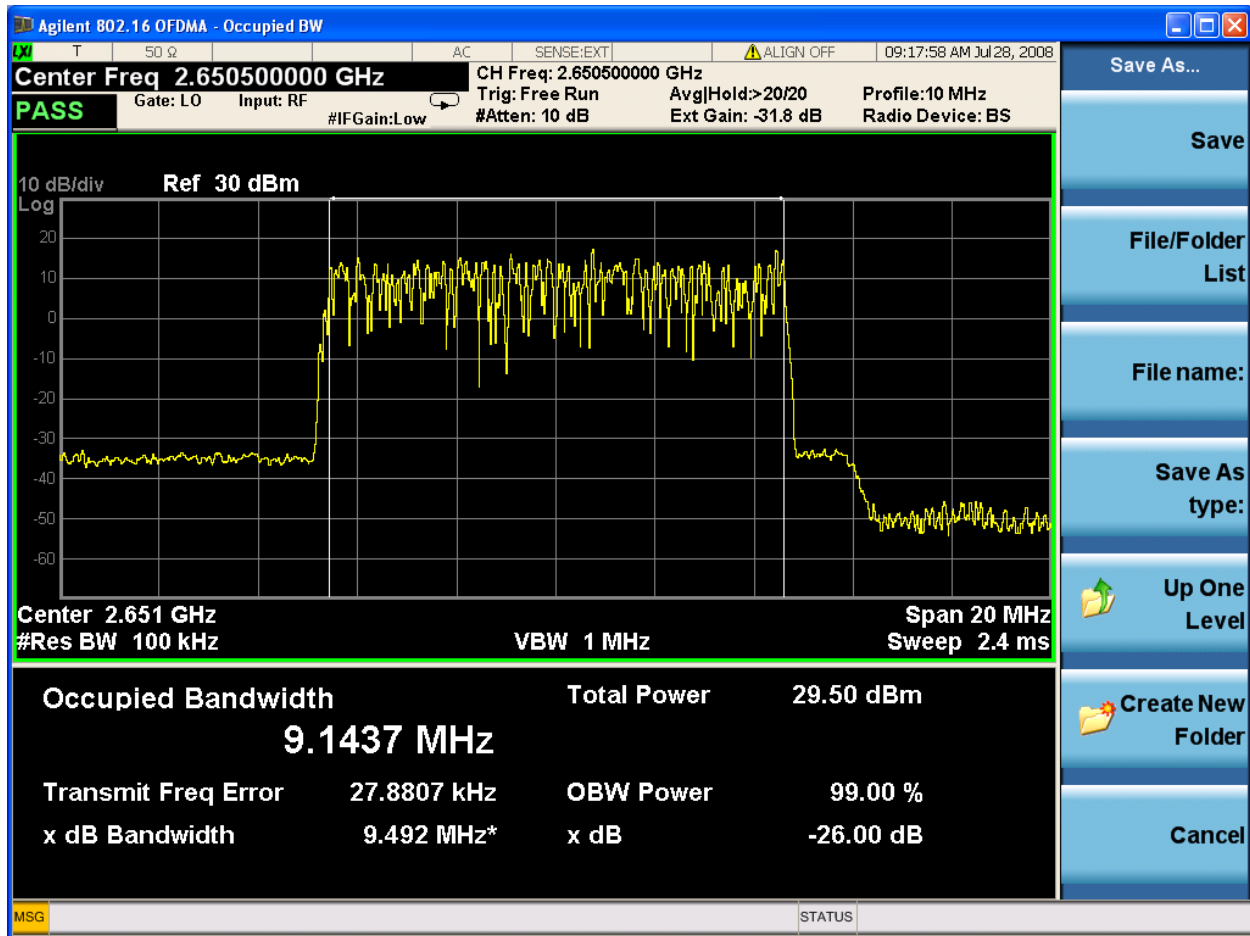
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Down Link
Operating Frequency :	3 <sup>rd</sup> FA (2650.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	QPSK
Bandwidth :	10 MHz



Channel Power :	29.66 dBm
99% Bandwidth :	9.1419 MHz
26 dB Bandwidth :	9.429 MHz

### 6.2.3.8 2650.5 MHz / 16QAM

FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Down Link
Operating Frequency :	3 <sup>rd</sup> FA (2650.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	16QAM
Bandwidth :	10 MHz

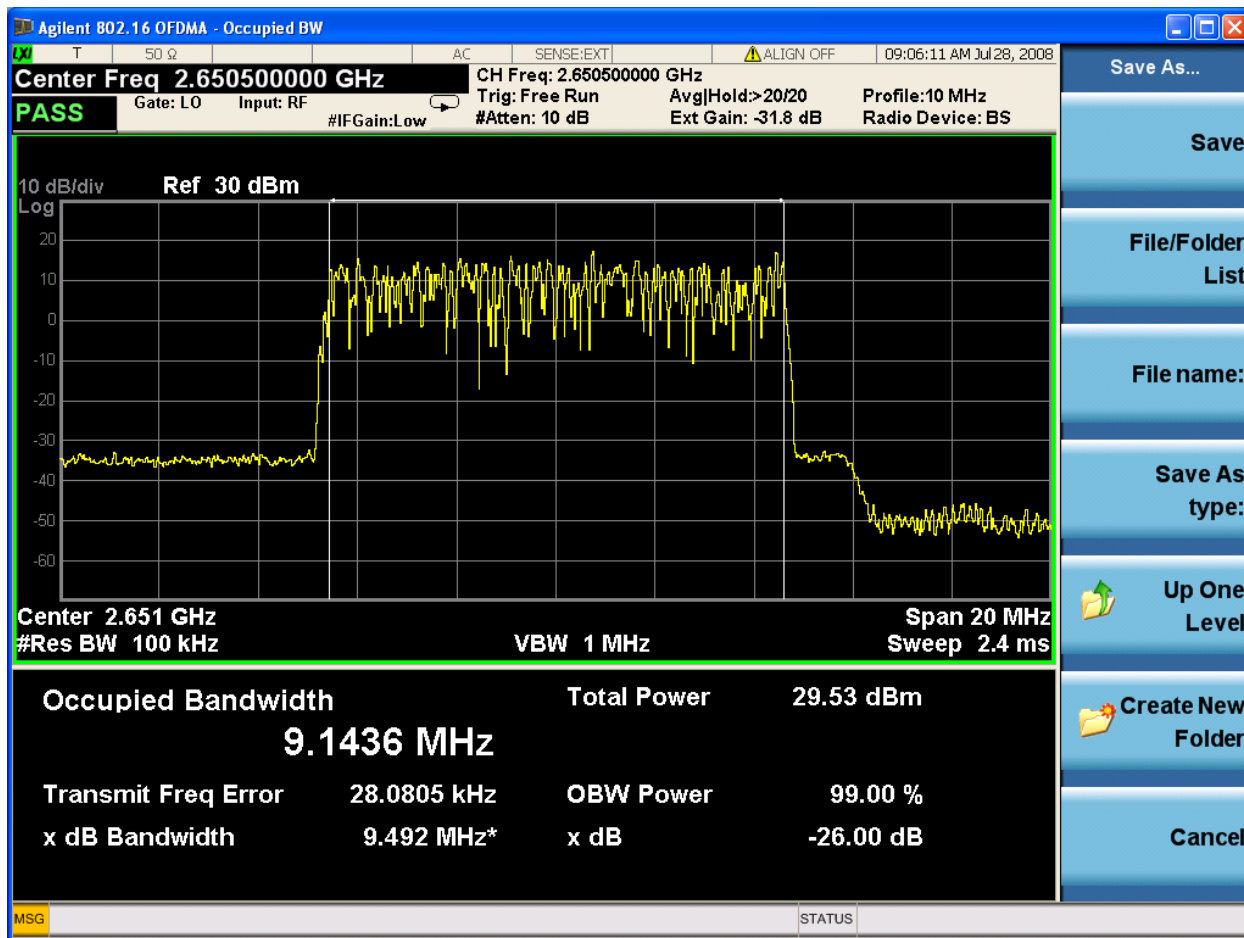


Channel Power :	29.50 dBm
99% Bandwidth :	9.1437 MHz
26 dB Bandwidth :	9.492 MHz



### 6.2.3.9 2650.5 MHz / 64QAM

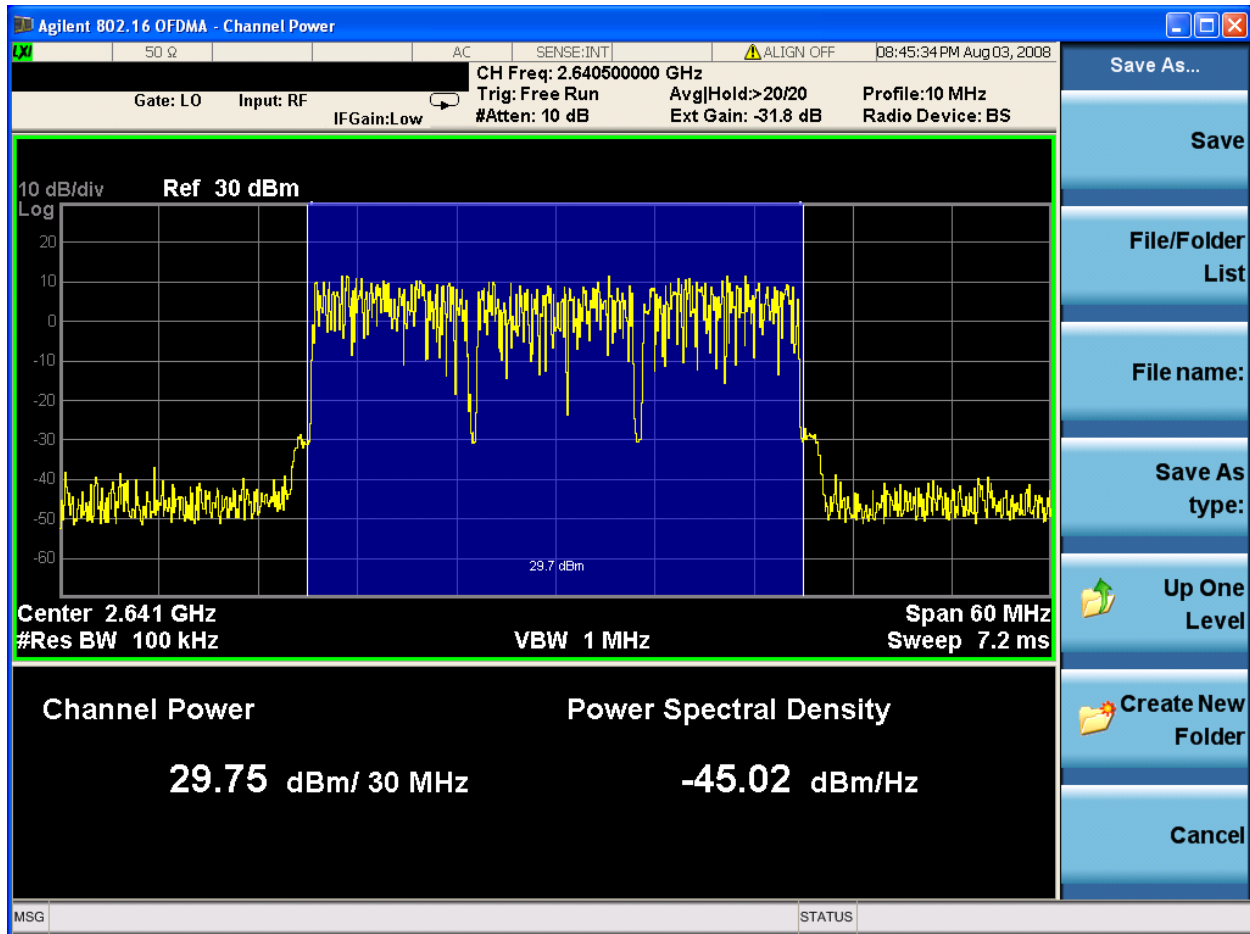
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Down Link
Operating Frequency :	3 <sup>rd</sup> FA (2650.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	64QAM
Bandwidth :	10 MHz



Channel Power :	29.53 dBm
99% Bandwidth :	9.1436 MHz
26 dB Bandwidth :	9.492 MHz

### 6.2.3.10 Full FA

FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Down Link
Operating Frequency :	Full FA
Input Level :	-50 dBm
System Gain :	80 dB
Bandwidth :	30 MHz

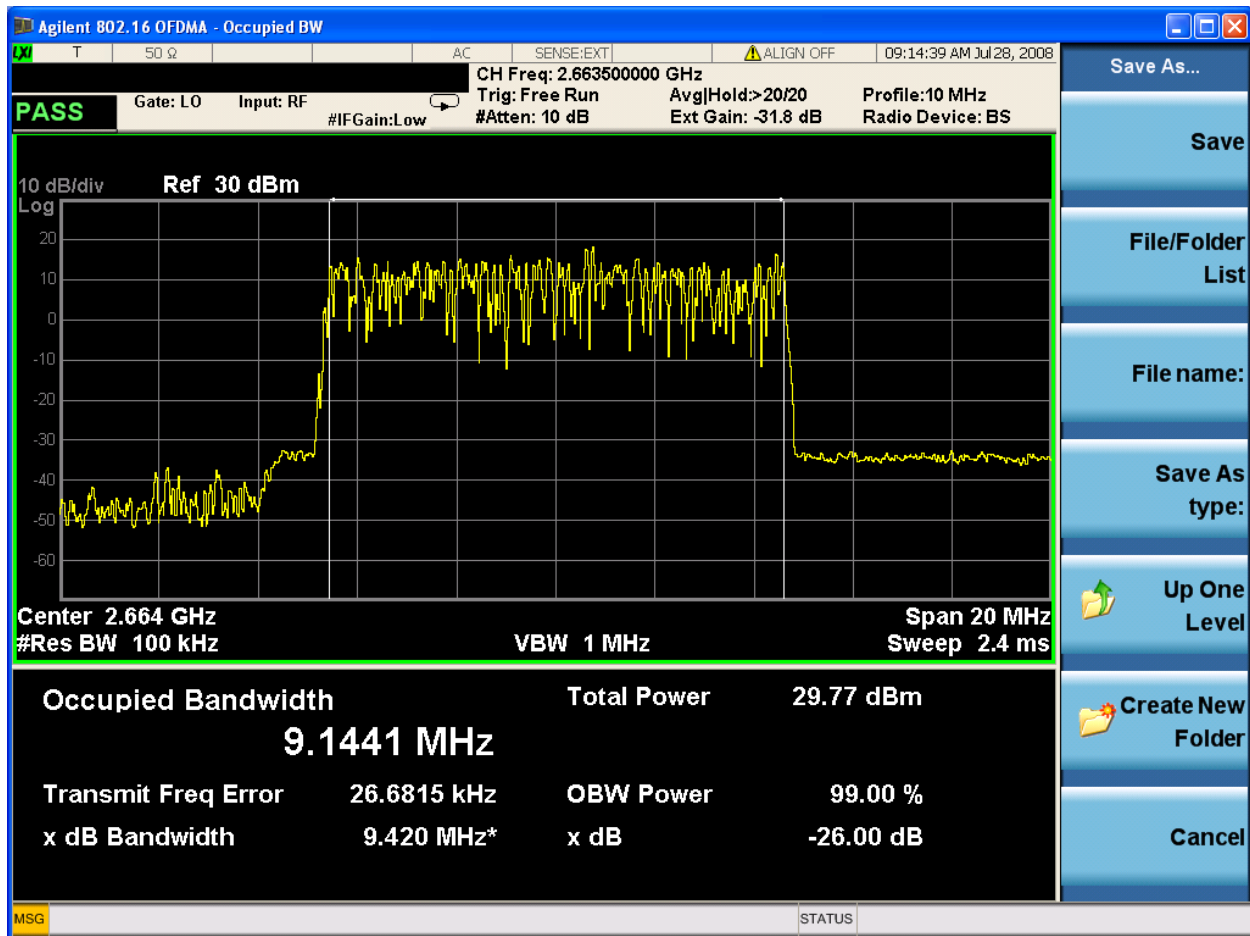


Channel Power : 29.75 dBm

## 6.2.4 H-G Block

### 6.2.4.1 2663.5 MHz / QPSK

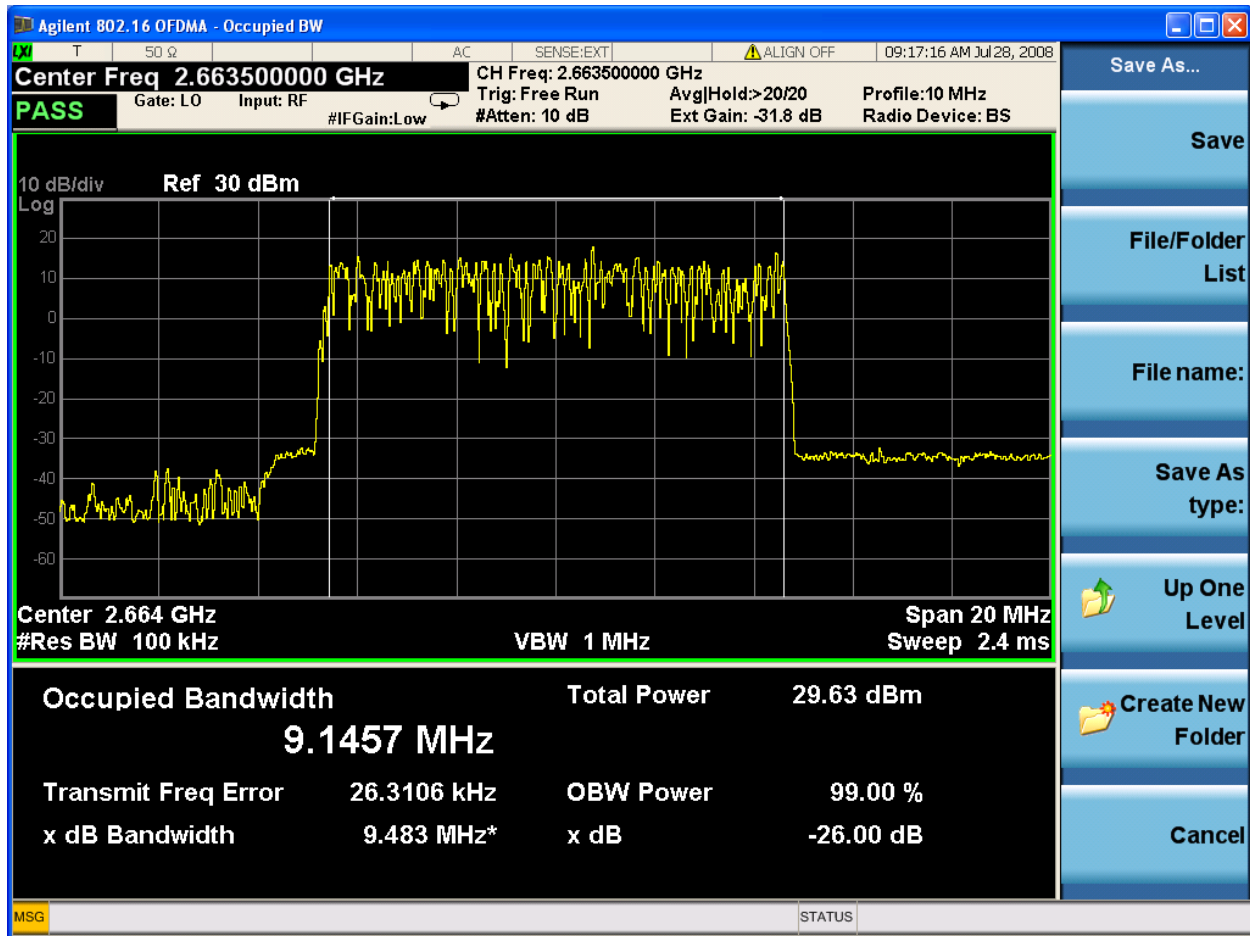
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Down Link
Operating Frequency :	1 <sup>st</sup> FA (2663.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	QPSK
Bandwidth :	10 MHz



Channel Power :	29.77 dBm
99% Bandwidth :	9.1441 MHz
26 dB Bandwidth :	9.420 MHz

## 6.2.4.2 2663.5 MHz / 16QAM

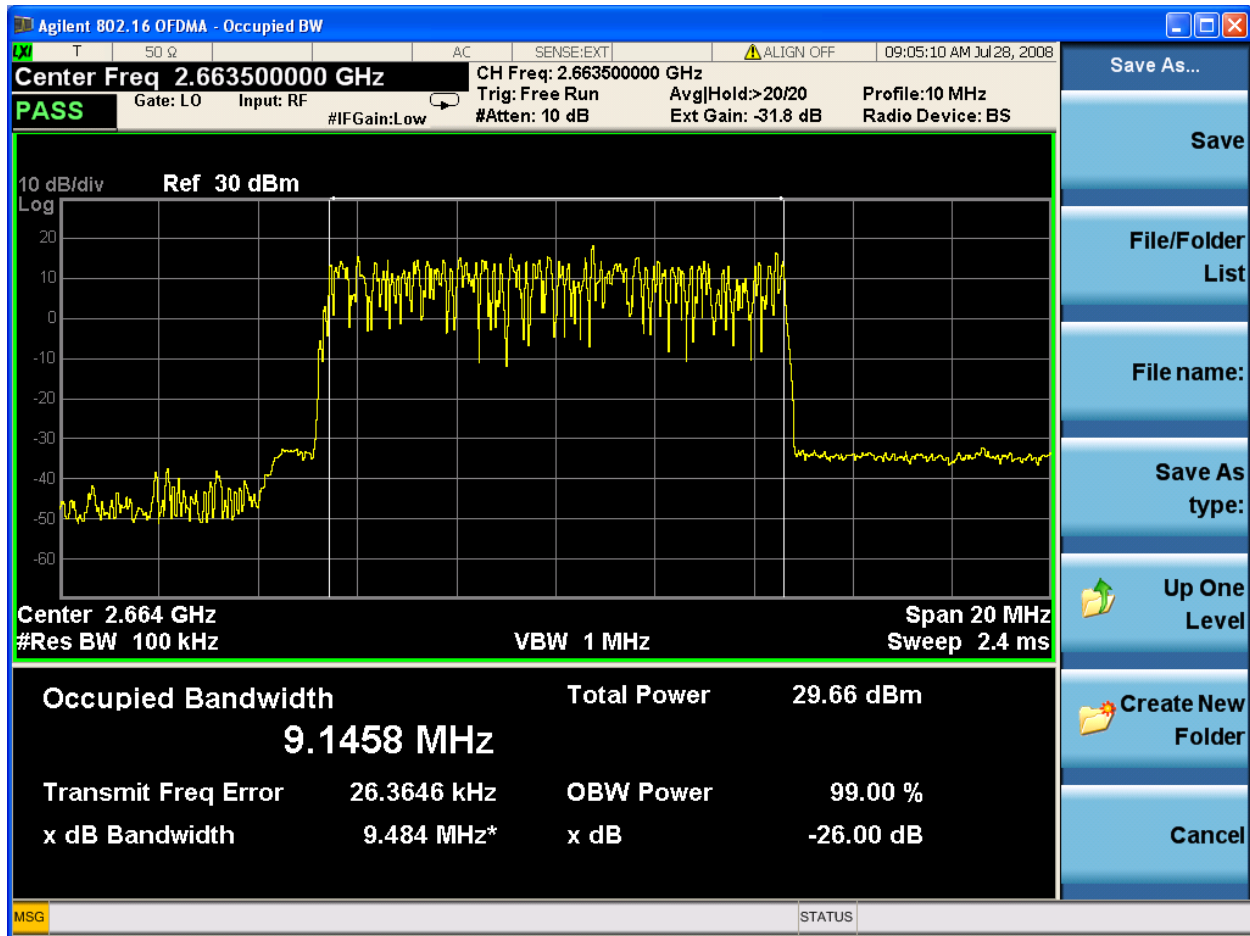
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Down Link
Operating Frequency :	1 <sup>st</sup> FA (2663.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	16QAM
Bandwidth :	10 MHz



Channel Power :	29.63 dBm
99% Bandwidth :	9.1457 MHz
26 dB Bandwidth :	9.483 MHz

### 6.2.4.3 2663.5 MHz / 64QAM

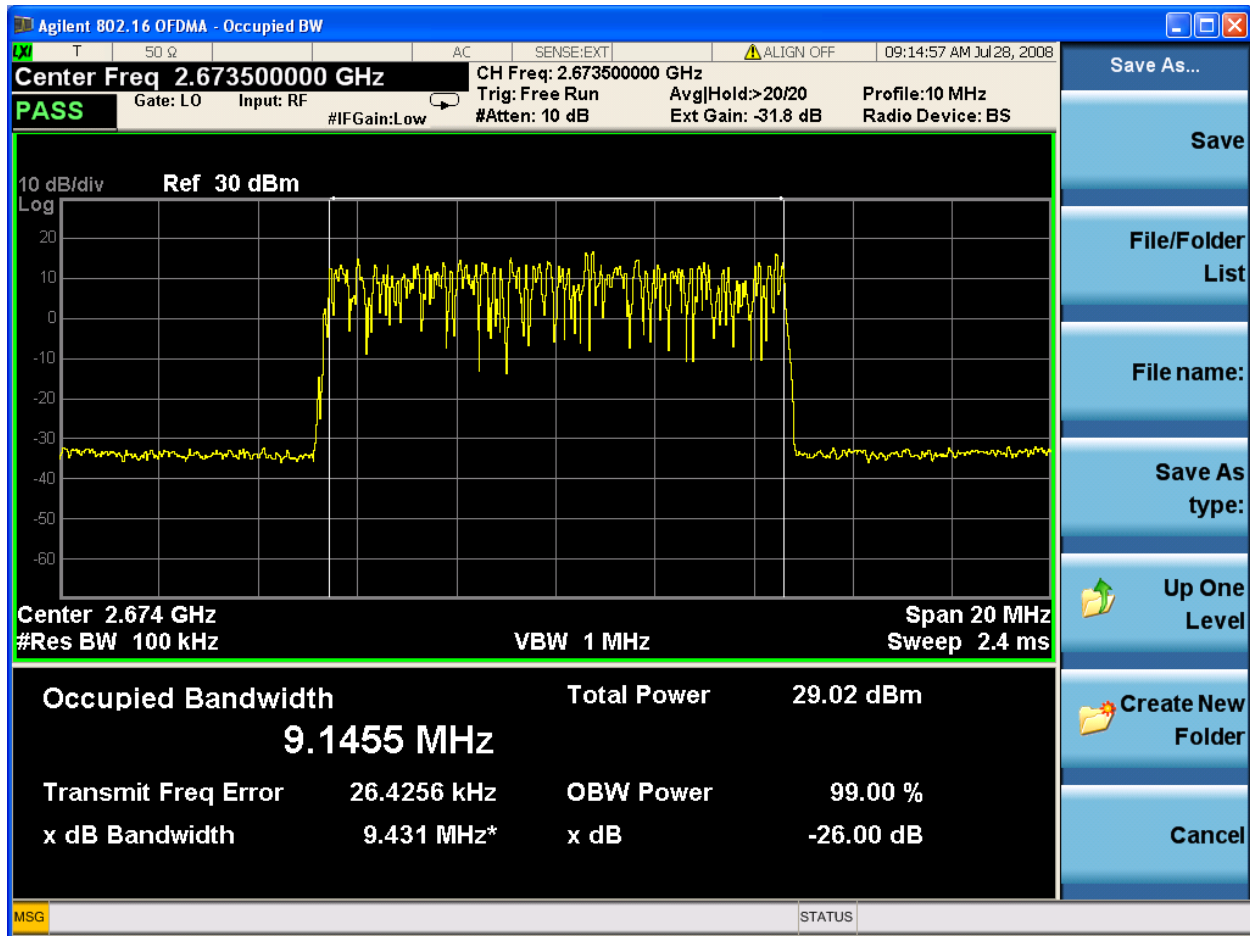
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Down Link
Operating Frequency :	1 <sup>st</sup> FA (2663.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	64QAM
Bandwidth :	10 MHz



Channel Power :	29.66 dBm
99% Bandwidth :	9.1458 MHz
26 dB Bandwidth :	9.484 MHz

#### 6.2.4.4 2673.5 MHz / QPSK

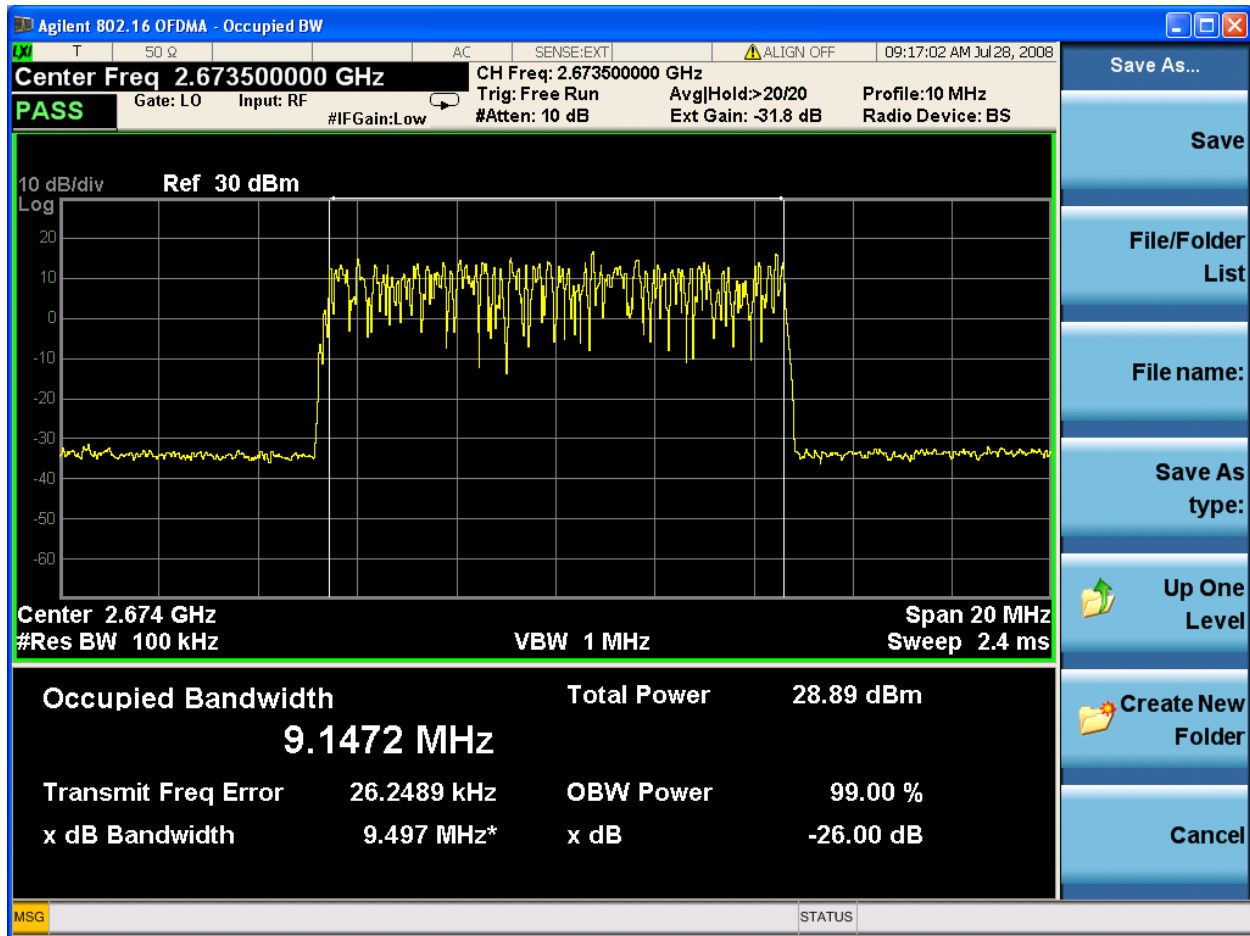
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Down Link
Operating Frequency :	2 <sup>nd</sup> FA (2673.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	QPSK
Bandwidth :	10 MHz



Channel Power :	29.02 dBm
99% Bandwidth :	9.1455 MHz
26 dB Bandwidth :	9.431 MHz

#### 6.2.4.5 2673.5 MHz / 16QAM

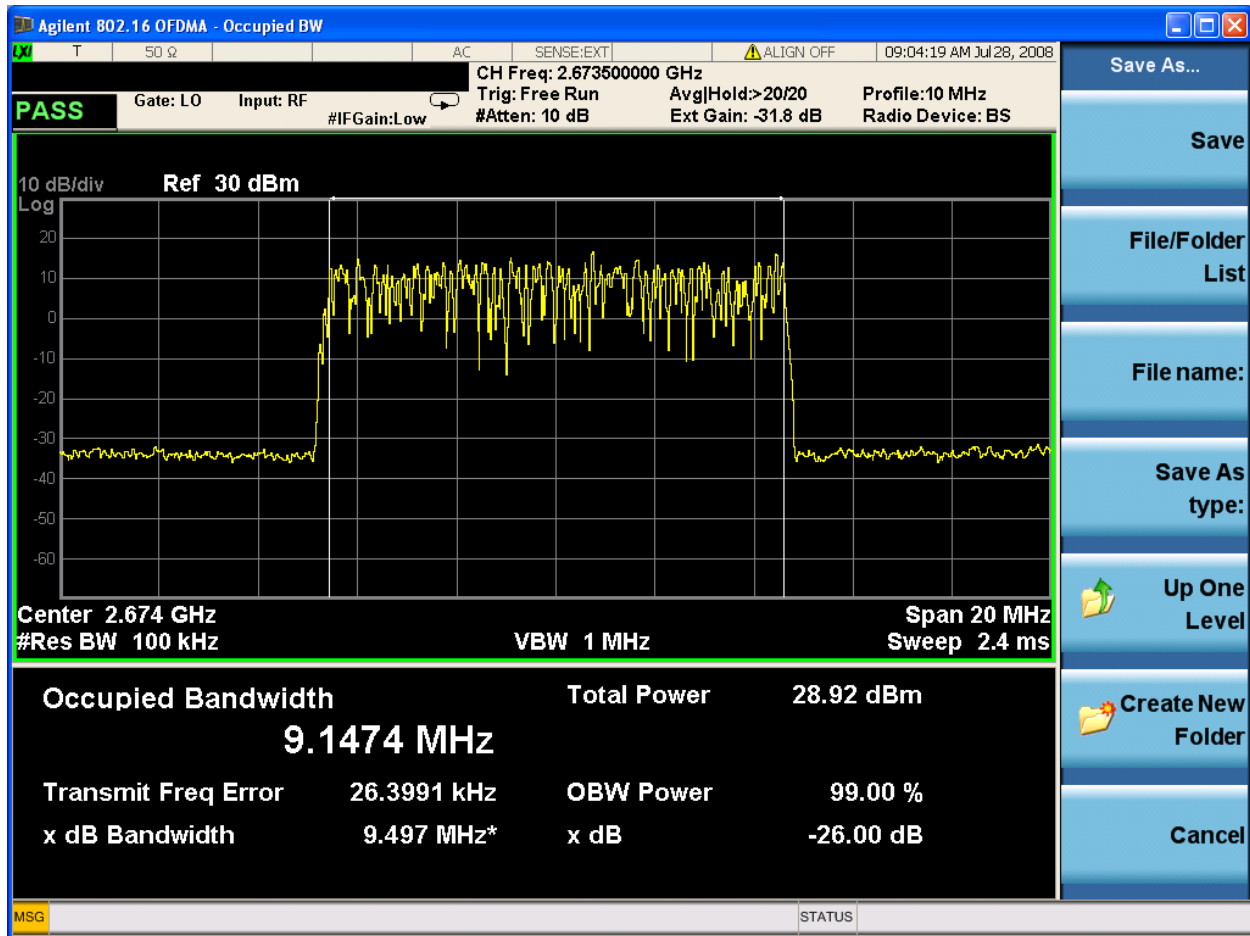
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Down Link
Operating Frequency :	2 <sup>nd</sup> FA (2673.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	16QAM
Bandwidth :	10 MHz



Channel Power :	28.89 dBm
99% Bandwidth :	9.1472 MHz
26 dB Bandwidth :	9.497 MHz

## 6.2.4.6 2673.5 MHz / 64QAM

FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Down Link
Operating Frequency :	2 <sup>nd</sup> FA (2673.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	64QAM
Bandwidth :	10 MHz

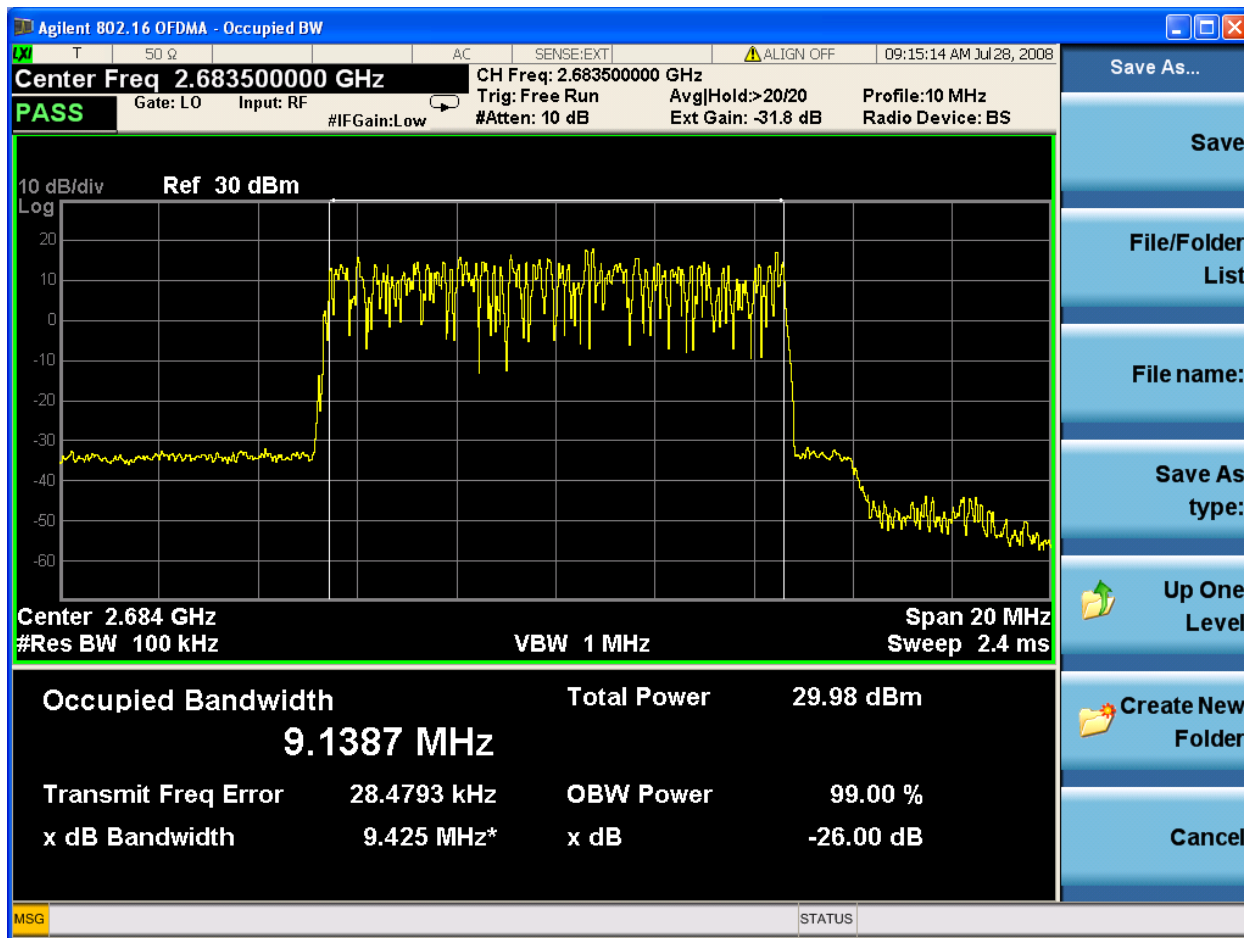


Channel Power :	28.92 dBm
99% Bandwidth :	9.1474 MHz
26 dB Bandwidth :	9.497 MHz



## 6.2.4.7 2683.5 MHz / QPSK

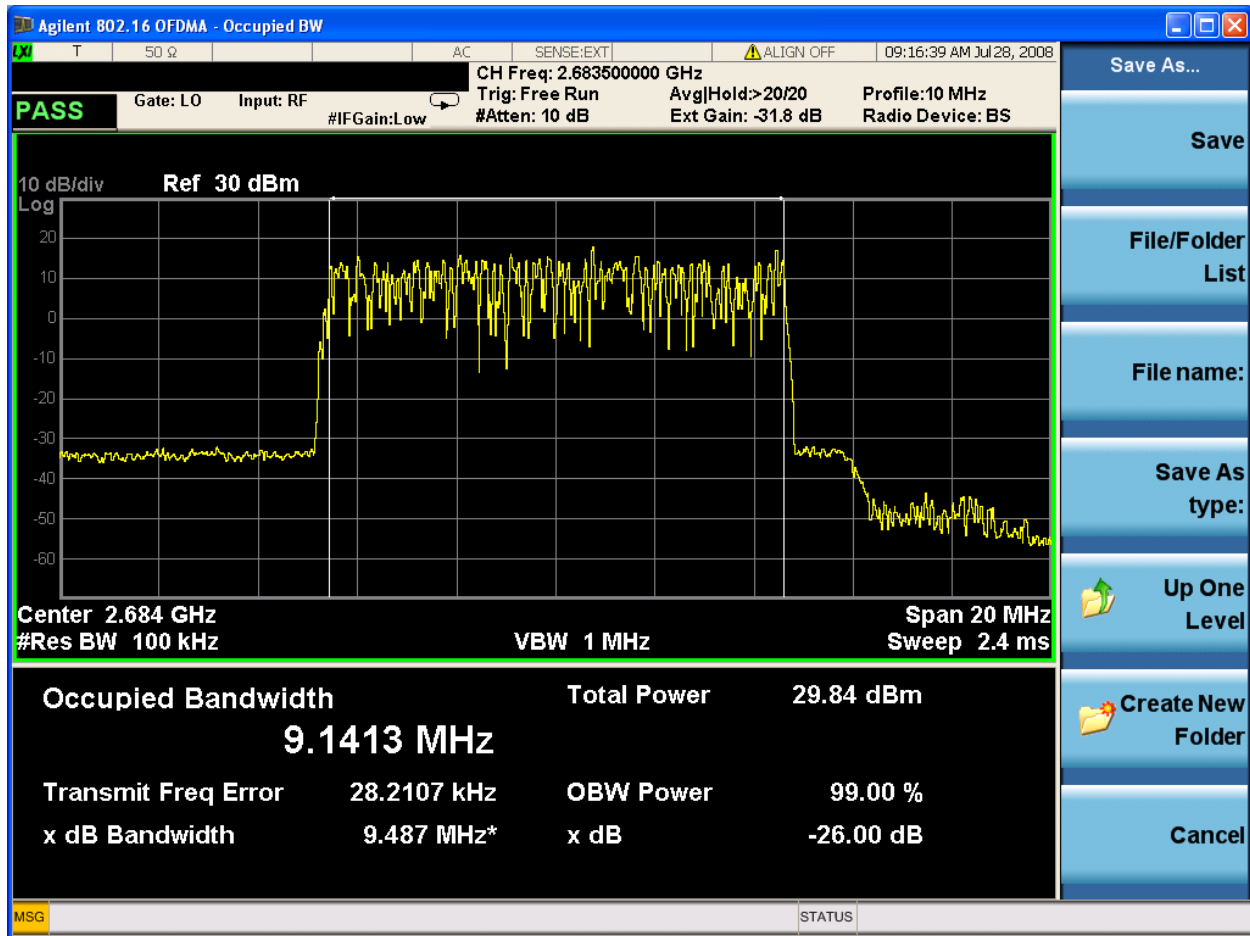
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Down Link
Operating Frequency :	3 <sup>rd</sup> FA (2683.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	QPSK
Bandwidth :	10 MHz



Channel Power :	29.98 dBm
99% Bandwidth :	9.1387 MHz
26 dB Bandwidth :	9.425 MHz

## 6.2.4.8 2683.5 MHz / 16QAM

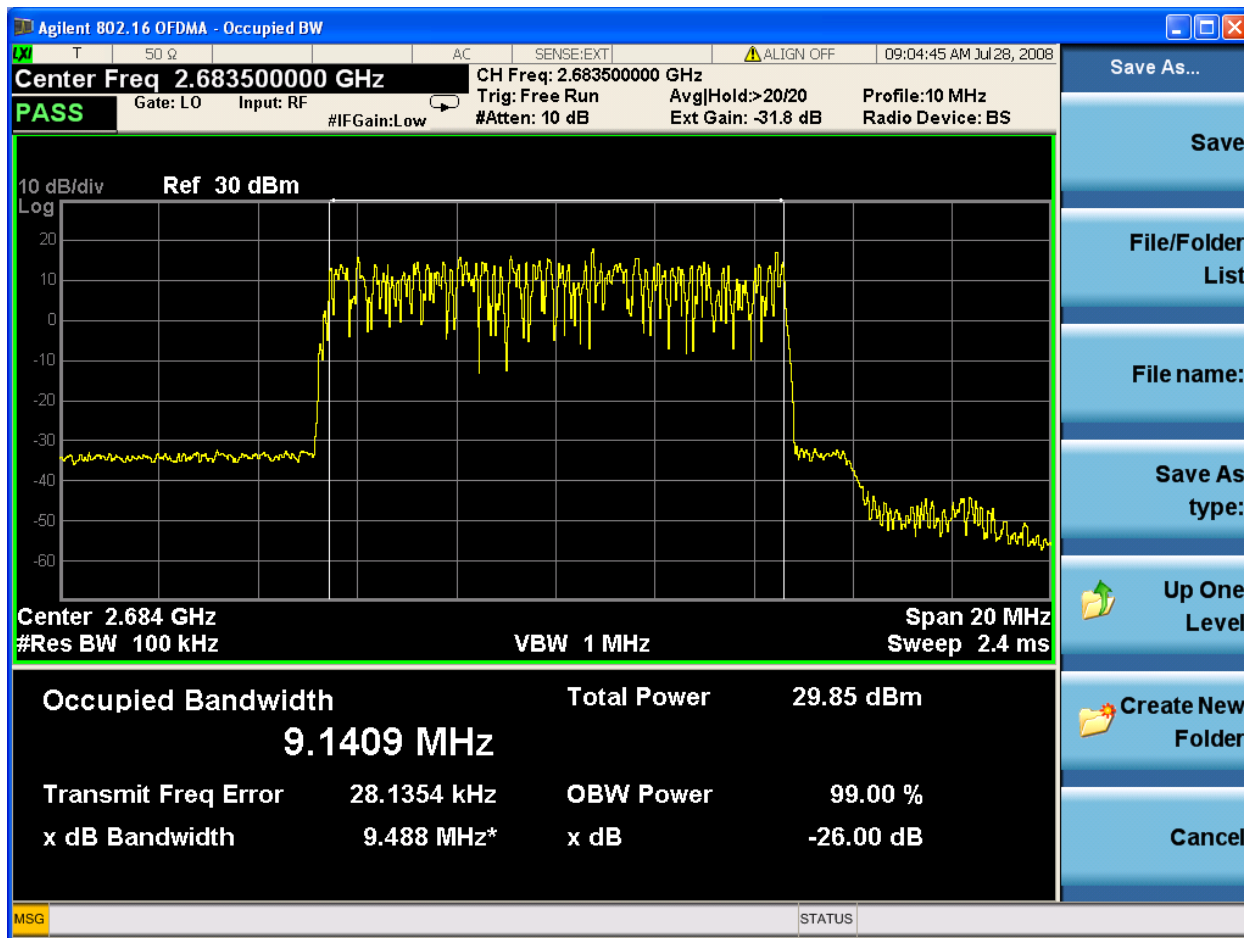
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Down Link
Operating Frequency :	3 <sup>rd</sup> FA (2683.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	16QAM
Bandwidth :	10 MHz



Channel Power :	29.84 dBm
99% Bandwidth :	9.1413 MHz
26 dB Bandwidth :	9.487 MHz

## 6.2.4.9 2683.5 MHz / 64QAM

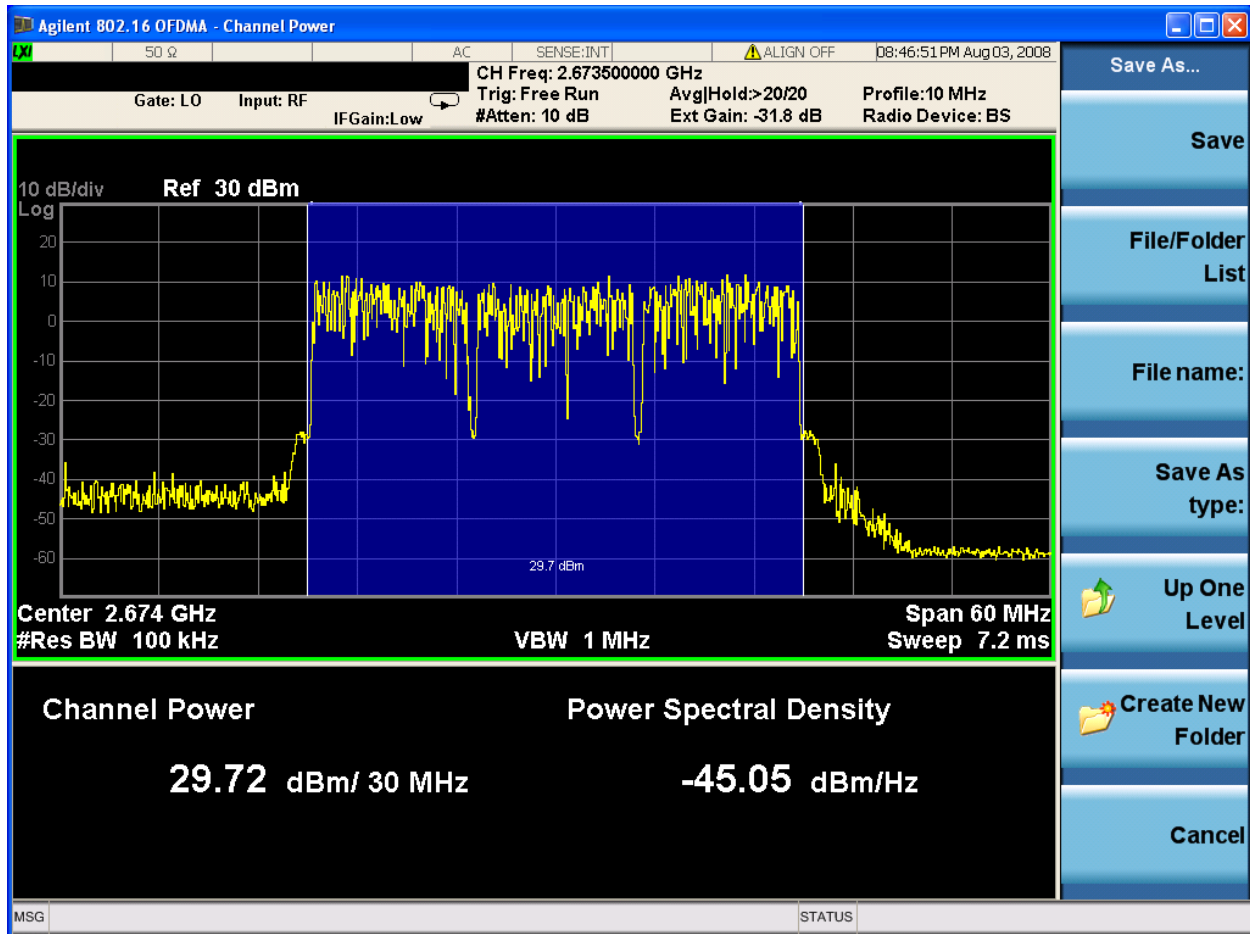
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Down Link
Operating Frequency :	3 <sup>rd</sup> FA (2683.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	64QAM
Bandwidth :	10 MHz



Channel Power :	29.85 dBm
99% Bandwidth :	9.1409 MHz
26 dB Bandwidth :	9.488 MHz

#### 6.2.4.10 Full FA

FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Down Link
Operating Frequency :	Full FA
Input Level :	-50 dBm
System Gain :	80 dB
Bandwidth :	30 MHz



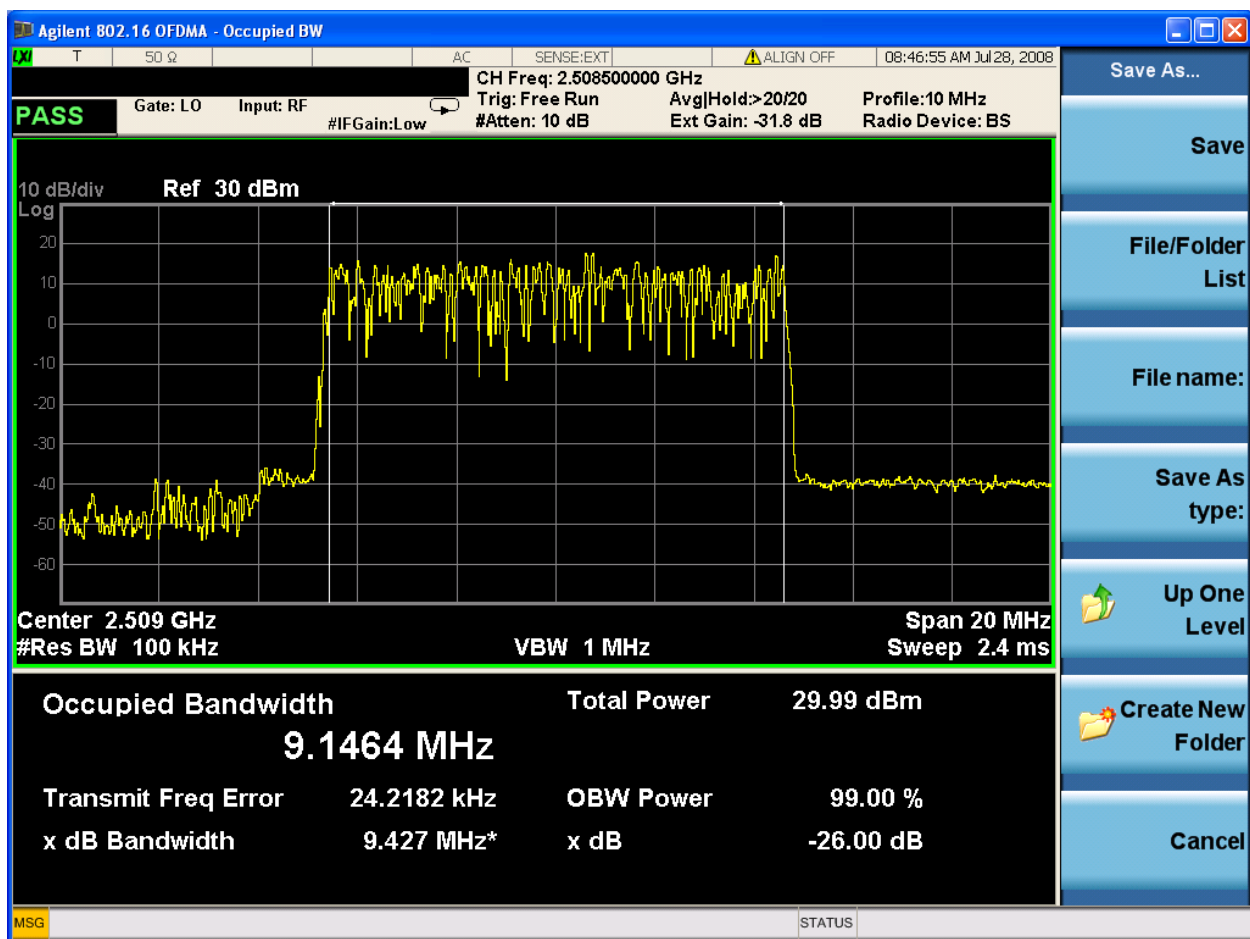
Channel Power : 29.72 dBm

## 6.3 Up Link

### 6.3.1 A-B Block

#### 6.3.1.1 2508.5 MHz / QPSK

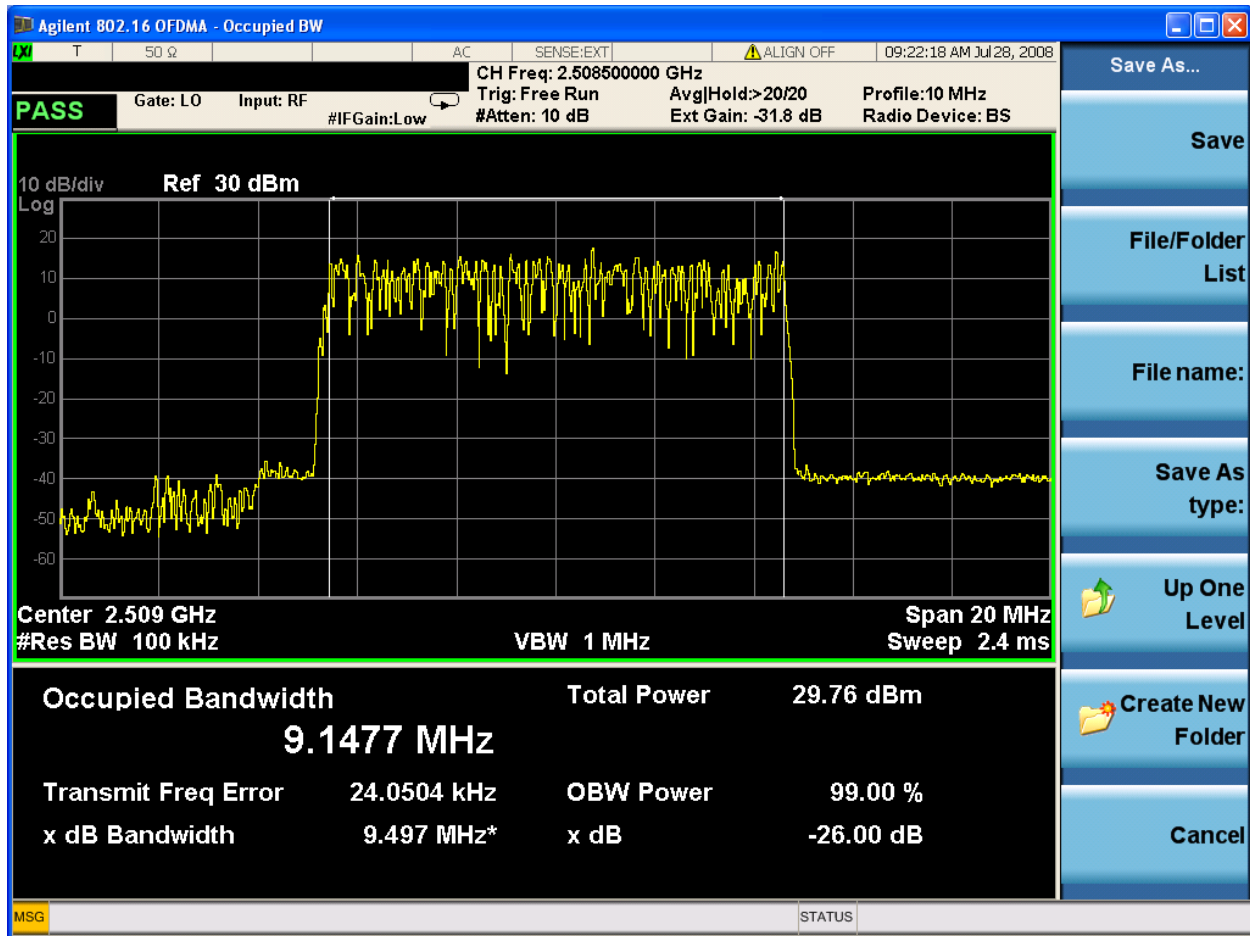
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Up Link
Operating Frequency :	1 <sup>st</sup> FA (2508.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	QPSK
Bandwidth :	10 MHz



Channel Power :	29.99 dBm
99% Bandwidth :	9.1464 MHz
26 dB Bandwidth :	9.427 MHz

### 6.3.1.2 2508.5 MHz / 16QAM

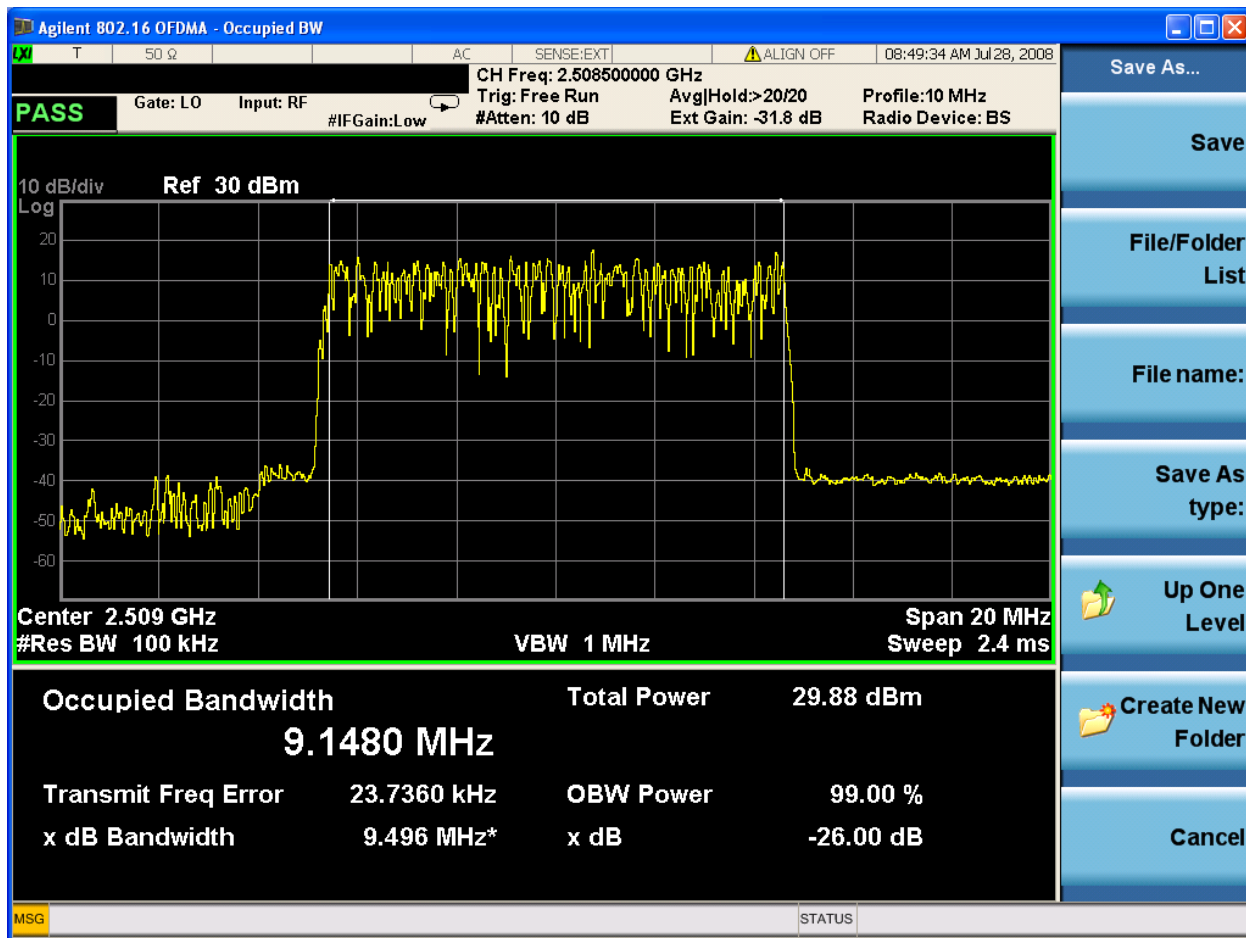
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Up Link
Operating Frequency :	1 <sup>st</sup> FA (2508.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	16QAM
Bandwidth :	10 MHz



Channel Power :	29.76 dBm
99% Bandwidth :	9.1477 MHz
26 dB Bandwidth :	9.497 MHz

### 6.3.1.3 2508.5 MHz / 64QAM

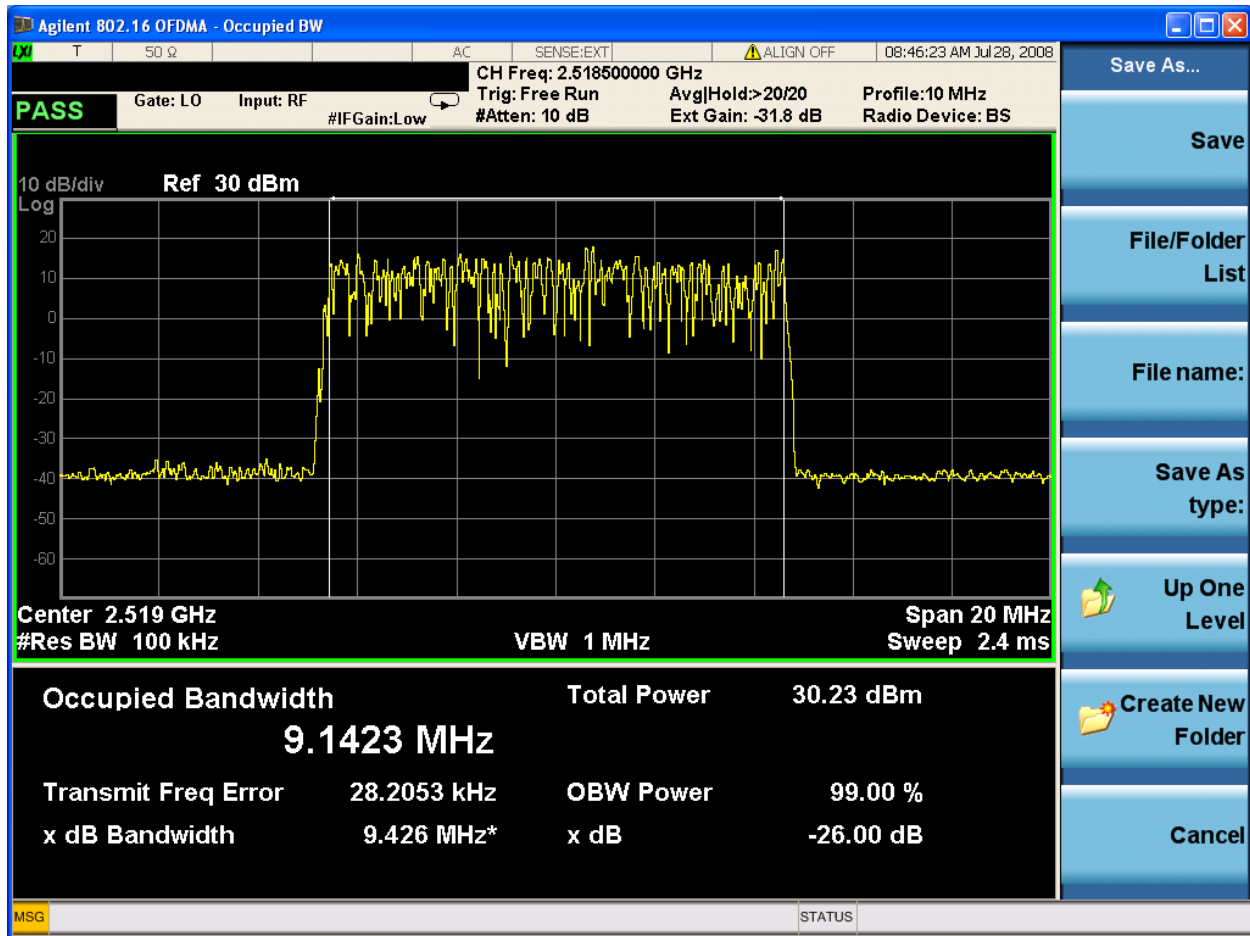
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Up Link
Operating Frequency :	1 <sup>st</sup> FA (2508.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	64QAM
Bandwidth :	10 MHz



Channel Power :	29.88 dBm
99% Bandwidth :	9.1480 MHz
26 dB Bandwidth :	9.496 MHz

### 6.3.1.4 2518.5 MHz / QPSK

FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Up Link
Operating Frequency :	2 <sup>nd</sup> FA (2518.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	QPSK
Bandwidth :	10 MHz

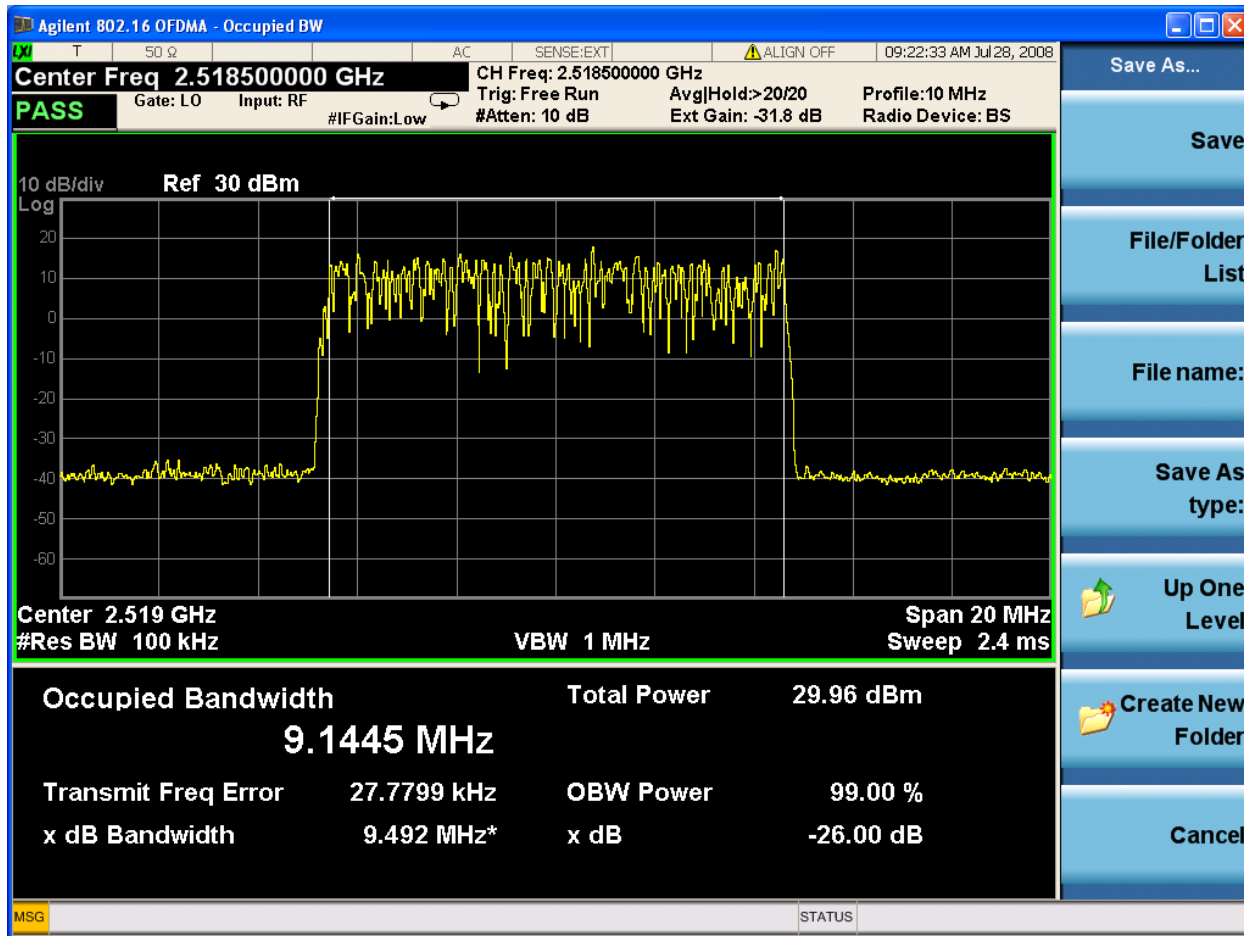


Channel Power :	30.23 dBm
99% Bandwidth :	9.1423 MHz
26 dB Bandwidth :	9.426 MHz



### 6.3.1.5 2518.5 MHz / 16QAM

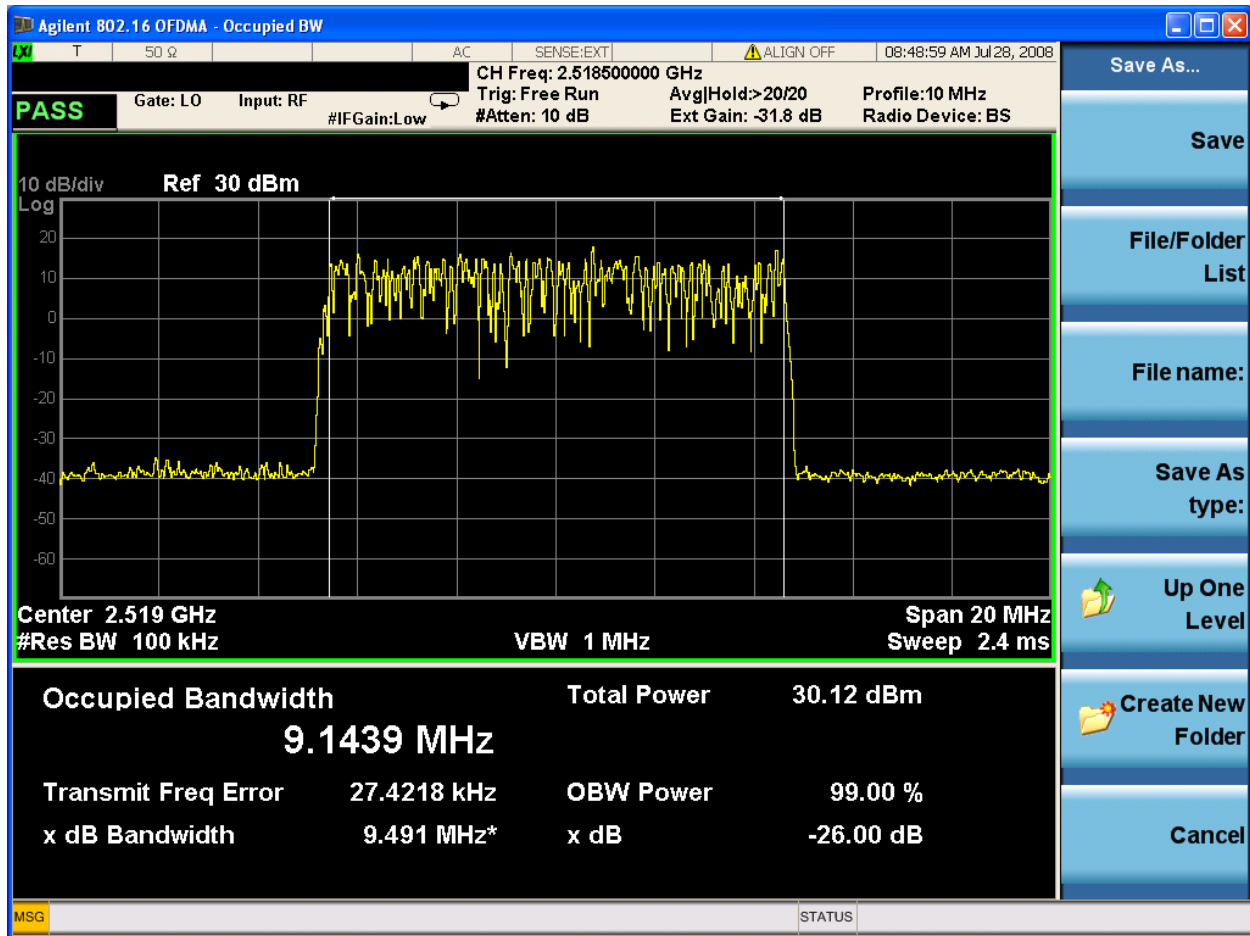
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Up Link
Operating Frequency :	2 <sup>nd</sup> FA (2518.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	16QAM
Bandwidth :	10 MHz



Channel Power :	29.96 dBm
99% Bandwidth :	9.1445 MHz
26 dB Bandwidth :	9.492 MHz

### 6.3.1.6 2518.5 MHz / 64QAM

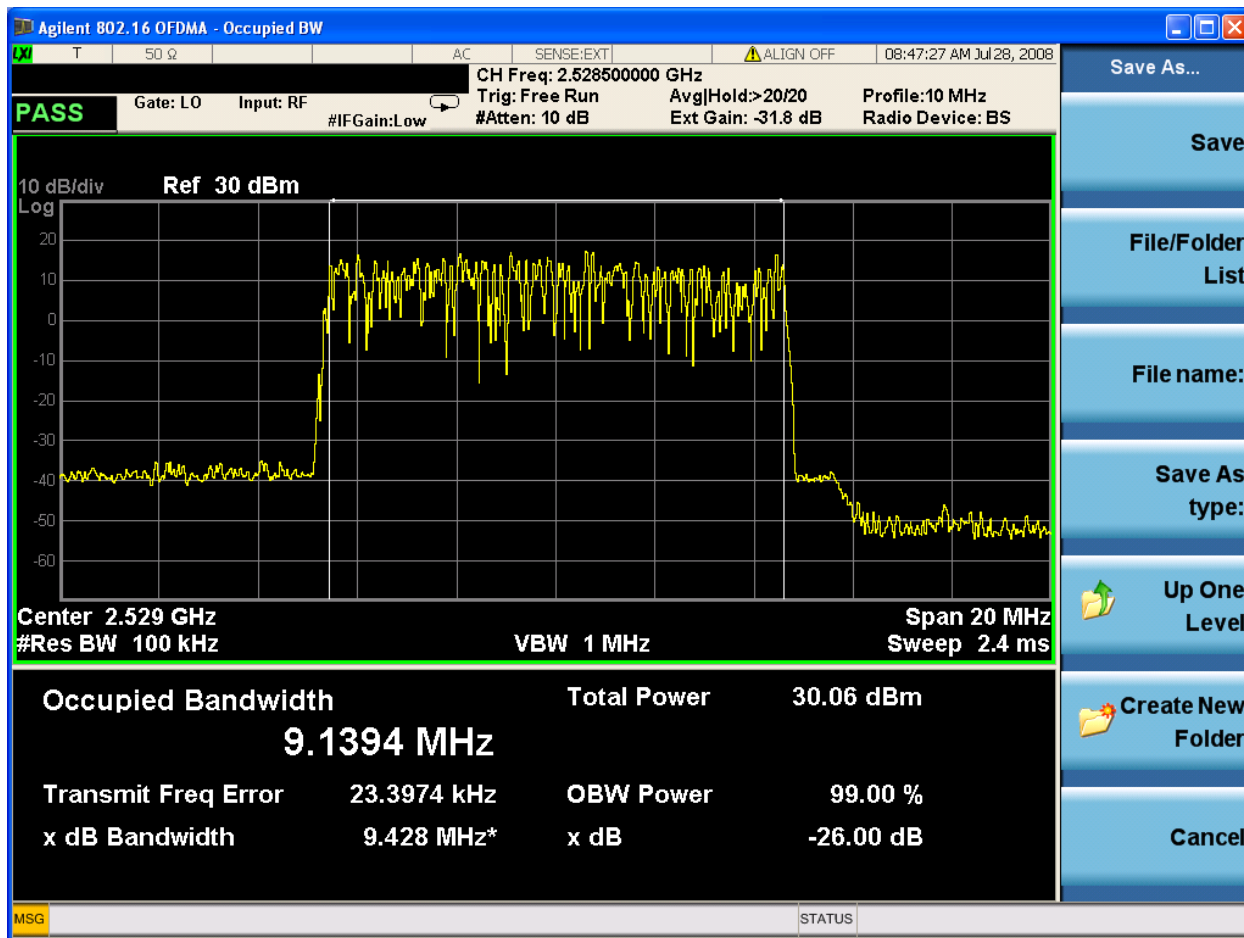
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Up Link
Operating Frequency :	2 <sup>nd</sup> FA (2518.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	64QAM
Bandwidth :	10 MHz



Channel Power :	30.12 dBm
99% Bandwidth :	9.1439 MHz
26 dB Bandwidth :	9.491 MHz

### 6.3.1.7 2528.5 MHz / QPSK

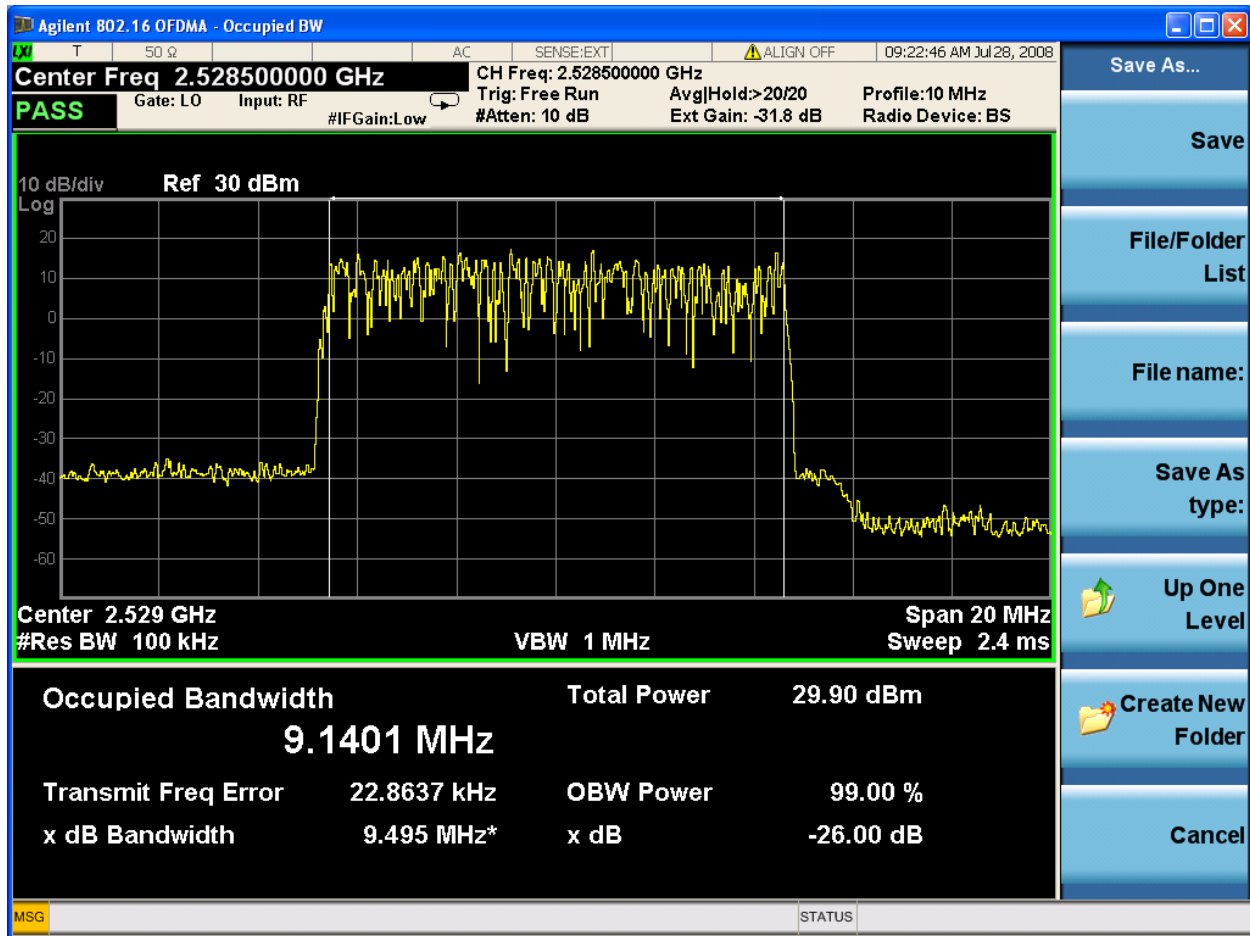
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Up Link
Operating Frequency :	3 <sup>rd</sup> FA (2528.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	QPSK
Bandwidth :	10 MHz



Channel Power :	30.06 dBm
99% Bandwidth :	9.1394 MHz
26 dB Bandwidth :	9.428 MHz

### 6.3.1.8 2528.5 MHz / 16QAM

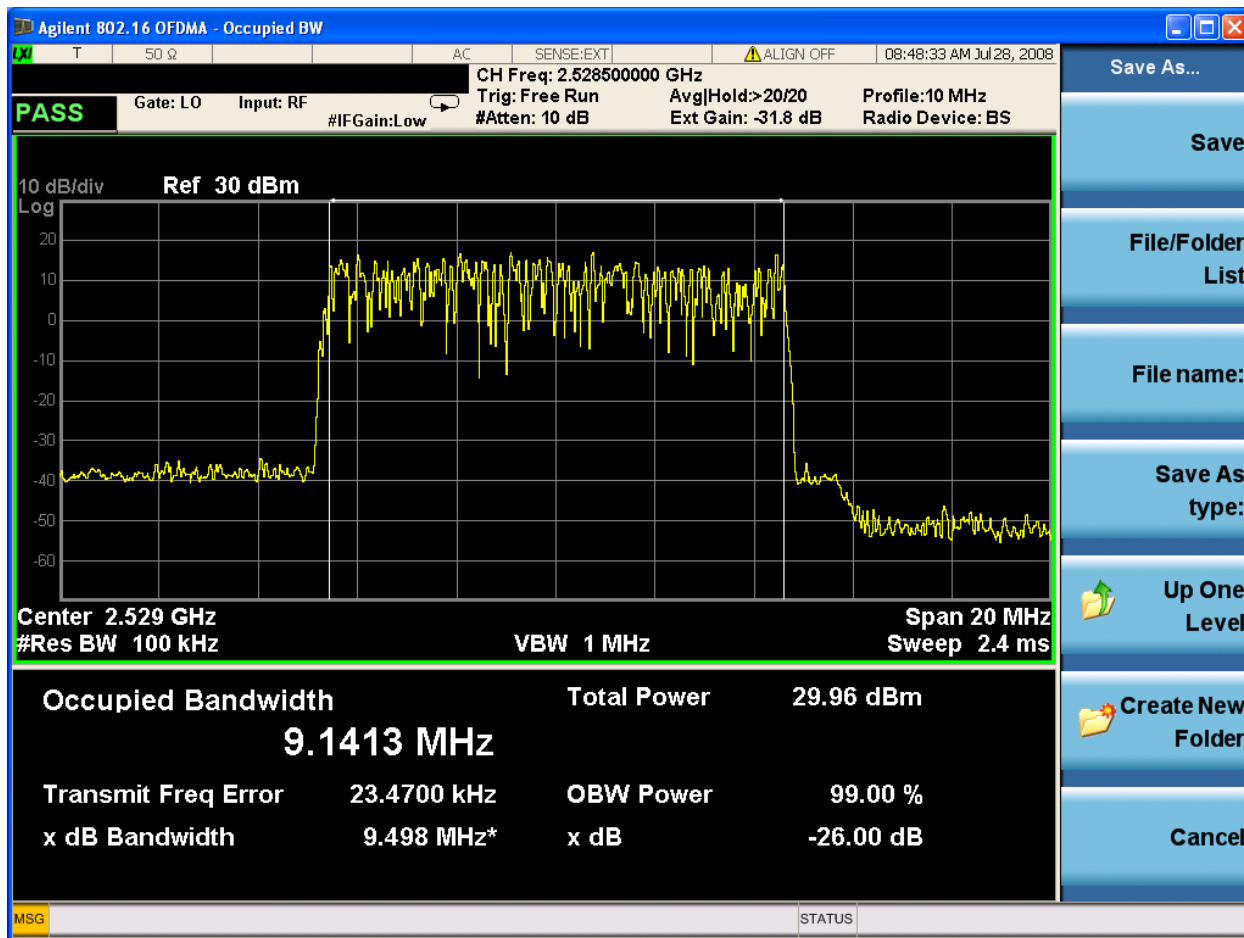
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Up Link
Operating Frequency :	3 <sup>rd</sup> FA (2528.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	16QAM
Bandwidth :	10 MHz



Channel Power :	29.90 dBm
99% Bandwidth :	9.1401 MHz
26 dB Bandwidth :	9.495 MHz

### 6.3.1.9 2528.5 MHz / 64QAM

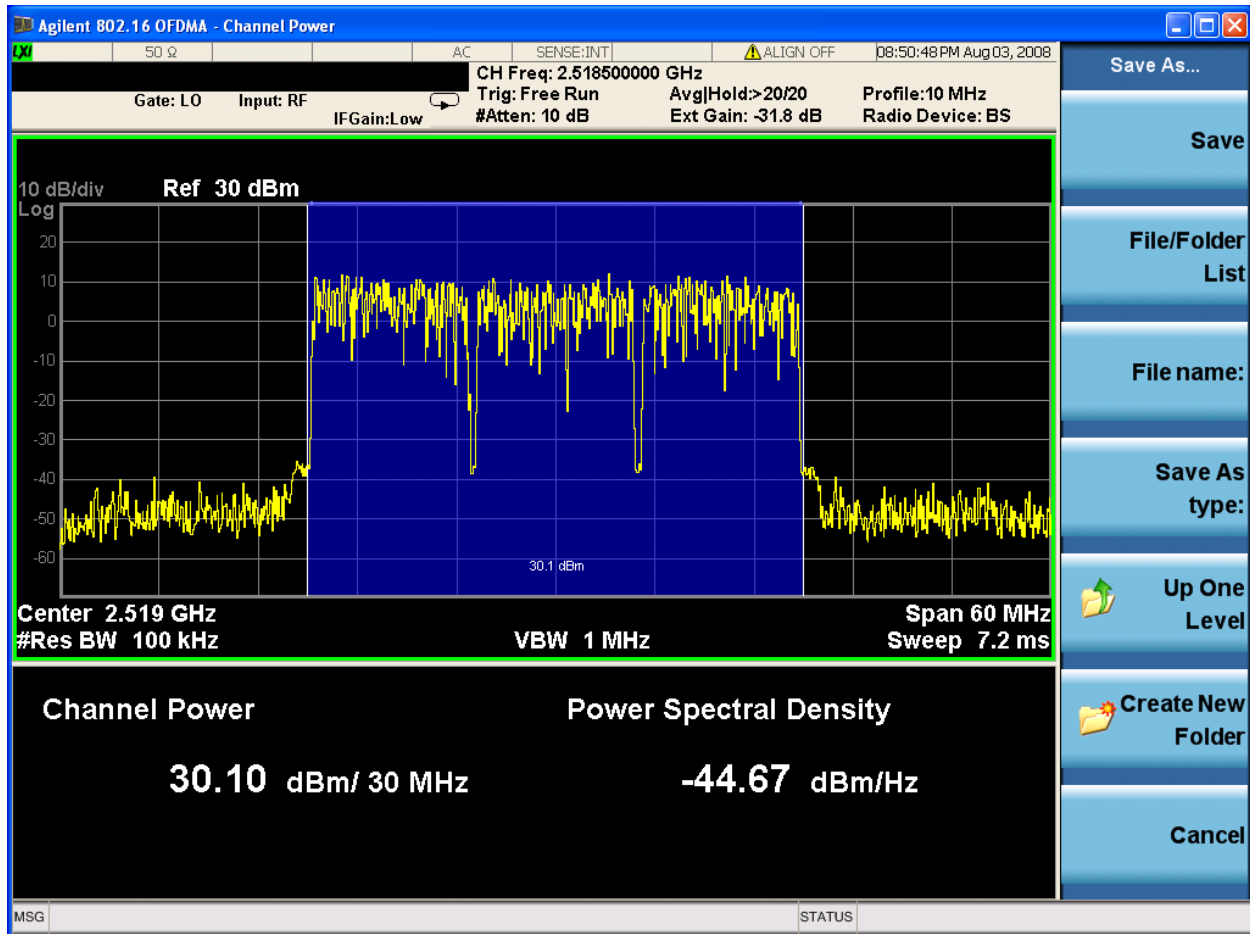
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Up Link
Operating Frequency :	3 <sup>rd</sup> FA (2528.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	64QAM
Bandwidth :	10 MHz



Channel Power :	29.96 dBm
99% Bandwidth :	9.1413 MHz
26 dB Bandwidth :	9.498 MHz

### 6.3.1.10 Full FA

FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Up Link
Operating Frequency :	Full FA
Input Level :	-50 dBm
System Gain :	80 dB
Bandwidth :	30 MHz

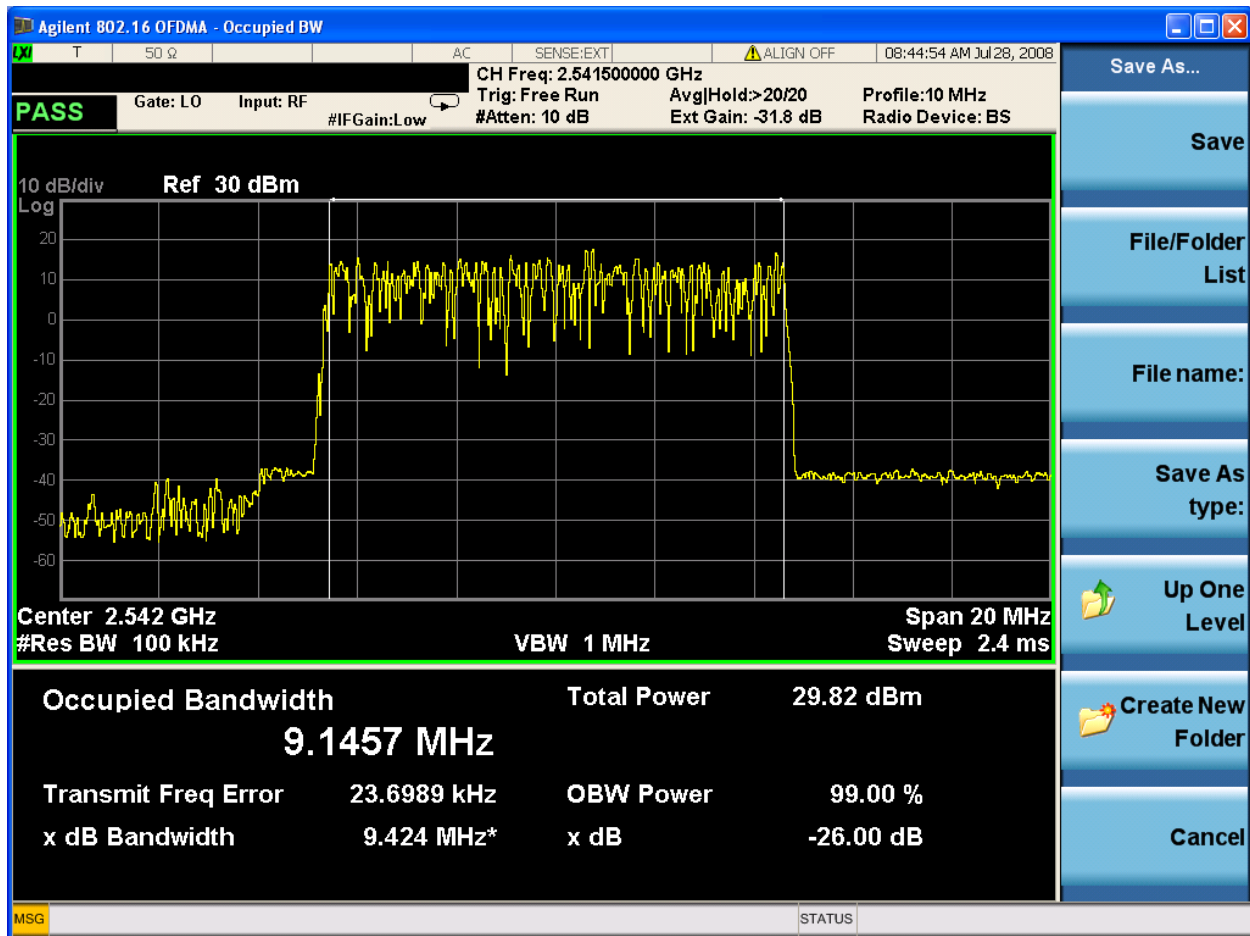


Channel Power : 30.10 dBm

## 6.3.2 C-D Block

### 6.3.2.1 2541.5 MHz / QPSK

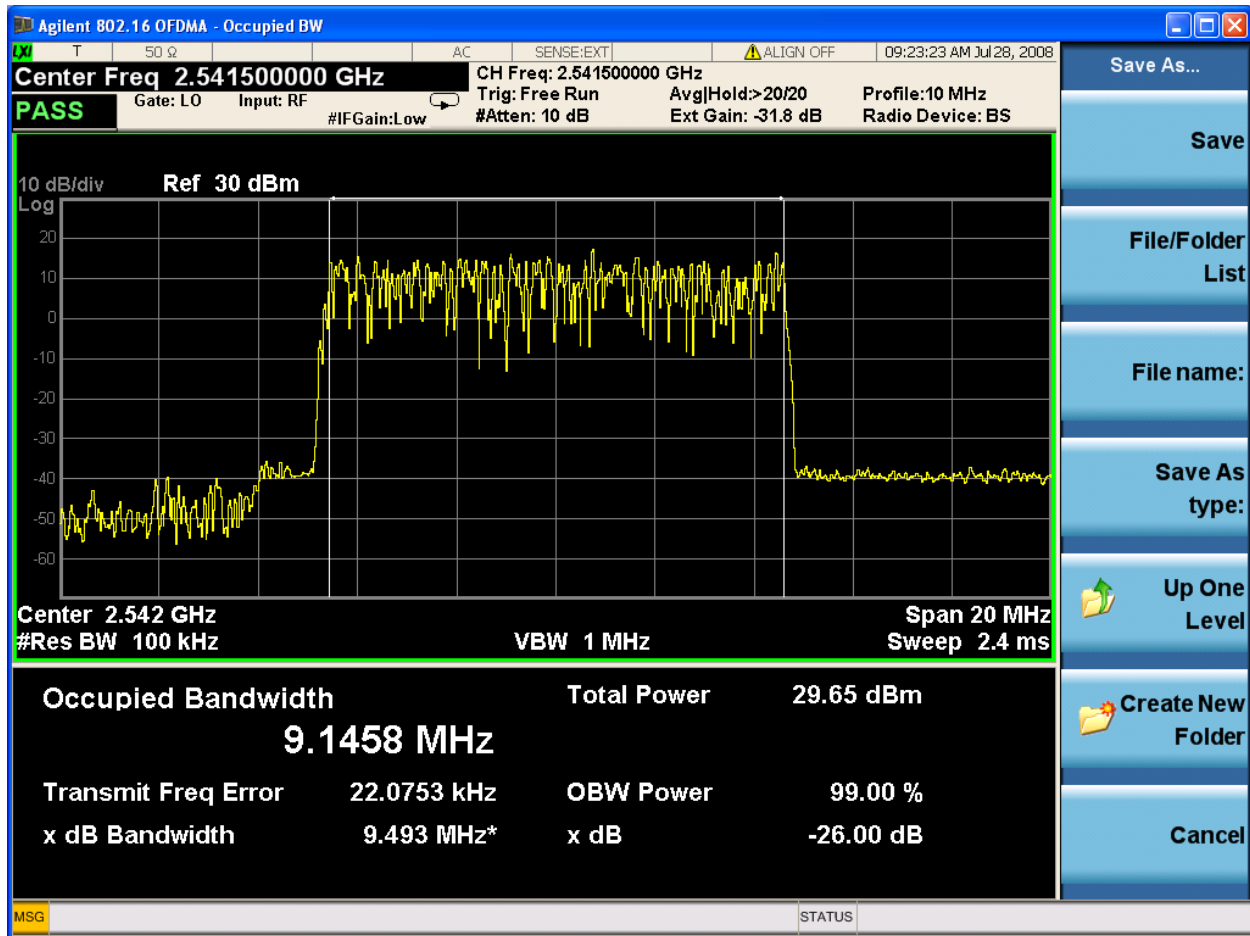
FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Up Link
Operating Frequency :	1 <sup>st</sup> FA (2541.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	QPSK
Bandwidth :	10 MHz



Channel Power :	29.82 dBm
99% Bandwidth :	9.1457 MHz
26 dB Bandwidth :	9.424 MHz

### 6.3.2.2 2541.5 MHz / 16QAM

FCC Rules :	Part 2 §2.1046 & §27.50(h)
Path :	Up Link
Operating Frequency :	1 <sup>st</sup> FA (2541.5 MHz)
Input Level :	-50 dBm
System Gain :	80 dB
Modulation :	16QAM
Bandwidth :	10 MHz



Channel Power :	29.65 dBm
99% Bandwidth :	9.1458 MHz
26 dB Bandwidth :	9.493 MHz