

FCC MEASUREMENT REPORT

CERTIFICATION OF COMPLIANCE

PRODUCT : WiMAX RF Repeater
MODEL/TYPE NO : JR-24W2.5G
FCC ID : WLCJR24W25G
TRADE NAME : **HUTECH**₂₁
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-24W2.5G 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.

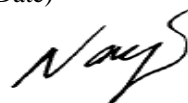
I attest to the accuracy of data. All measurement herein was performed by me or were made under my supervision. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them. The results of testing in this report apply to the product/system, 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.

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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-24W2.5G
- **FCC Identifier** WLCJR24W25G
- **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** 24 dBm / 250 mW
- **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-0012

2. Description of Test Facility

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-24W2.5G**.

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 | +24dBm/Total | 3FA |
| | Up Link | +24dBm/Total | 3FA |
| System Gain | Down Link | 80dB | Max |
| | Up Link | 80dB | Max |
| Input range | Down Link | -26dBm ~ -56dBm/Total | 3FA |
| | Up Link | -26dBm ~ -56dBm/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 | 100KHz |
| | 1GHz~12GHz | Less Then -13dBm | 1MHz |
| 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.

| APPLIED STANDARD : 47 CFR Part 27 | | |
|--|--|--------------------|
| FCC Rule | Description of Test | Test Result |
| 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-24W2.5G
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] | [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 | H | 56.10 | 40.58 | 40.93 | 15.17 | 46.23 | | | |
| 0.502 | 0.07 | 0.30 | H | 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 | | | | |
| 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 | 7.73 |
| 16.358 | 0.07 | 1.23 | H | | 47.81 | 49.11 | 10.89 | | 42.74 | 44.04 | 5.96 |
| 26.794 | 0.18 | 1.54 | H | | 47.00 | 48.72 | 11.28 | | 41.99 | 43.71 | 6.29 |

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 | Emission Level | Margin |
| | | | | [dBuV] | [d BuV] | [dBuV] | [dBuV] | [dBuV] | [dBuV] | [dBuV] | [dBuV] |
| 0.238 | 0.07 | 0.10 | N | 63.60 | 40.30 | 40.47 | 23.13 | 55.86 | | | |
| 0.450 | 0.07 | 0.28 | H | 57.40 | 40.87 | 41.22 | 16.18 | 47.90 | | | |
| 0.474 | 0.07 | 0.28 | H | 56.90 | 42.44 | 42.79 | 14.11 | 47.16 | | | |
| 0.498 | 0.07 | 0.28 | H | 56.10 | 40.70 | 41.05 | 15.05 | 46.23 | | | |
| 0.502 | 0.07 | 0.30 | N | 56.00 | 42.38 | 42.75 | 13.25 | 46.00 | | | |
| 3.438 | 0.03 | 0.67 | N | | 39.83 | 40.53 | 15.47 | | | | |
| 3.822 | 0.03 | 0.74 | H | | 42.28 | 43.05 | 12.95 | | | | |
| 3.918 | 0.03 | 0.75 | H | | 42.67 | 43.45 | 12.55 | | | | |
| 10.998 | 0.05 | 1.07 | H | 60.00 | 49.67 | 50.79 | 5.21 | 50.00 | 44.39 | 45.51 | 4.49 |
| 14.570 | 0.06 | 1.22 | H | | 46.60 | 47.88 | 12.12 | | 43.01 | 44.29 | -44.29 |
| 15.126 | 0.06 | 1.22 | N | | 47.81 | 49.09 | 10.91 | | 42.56 | 43.84 | -43.84 |
| 16.350 | 0.07 | 1.23 | H | | 47.93 | 49.23 | 10.77 | | 43.26 | 44.56 | -44.56 |

Notes:

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

5.2 RF Power Output

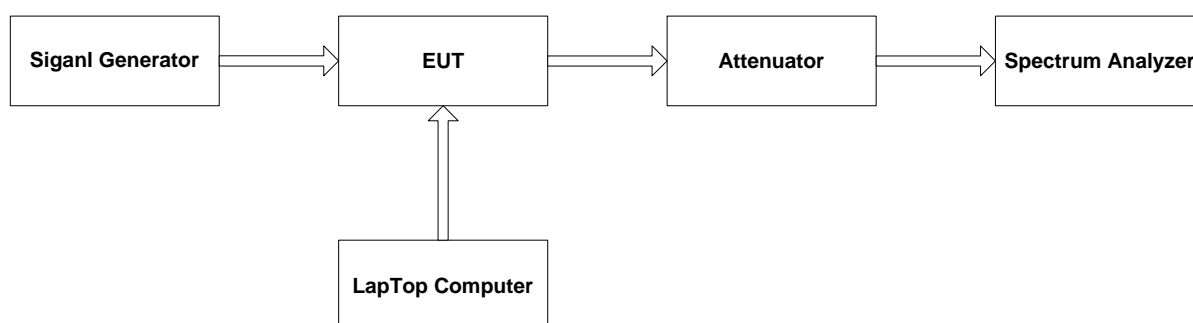
5.2.1 Specification

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-24W2.5G | 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 | 23.18 | 23.07 | 22.98 | 22.98 | 23.00 | 22.92 |
| 2518.5 | 24.06 | 23.96 | 23.87 | 23.98 | 24.02 | 23.92 |
| 2528.5 | 23.41 | 23.29 | 23.24 | 23.36 | 23.44 | 23.32 |
| Full FA | 23.85 | | | 23.84 | | |
| C-D Block | | | | | | |
| 2541.5 | 23.96 | 23.87 | 23.84 | 23.90 | 23.88 | 23.77 |
| 2551.5 | 22.79 | 22.70 | 22.68 | 22.67 | 22.68 | 22.55 |
| 2561.5 | 21.35 | 21.26 | 21.25 | 21.21 | 21.24 | 21.09 |
| Full FA | 23.62 | | | 23.98 | | |
| E-F Block | | | | | | |
| 2630.5 | 23.82 | 23.69 | 23.70 | 23.52 | 23.58 | 23.37 |
| 2640.5 | 23.57 | 23.45 | 23.47 | 23.35 | 23.43 | 23.22 |
| 2650.5 | 23.08 | 22.98 | 23.01 | 23.07 | 23.16 | 22.96 |
| Full FA | 23.75 | | | 23.66 | | |
| H-G Block | | | | | | |
| 2663.5 | 23.45 | 23.28 | 23.34 | 23.14 | 23.30 | 23.01 |
| 2673.5 | 23.31 | 23.18 | 23.22 | 23.35 | 23.50 | 23.24 |
| 2683.5 | 23.99 | 23.84 | 23.88 | 24.12 | 24.23 | 23.99 |
| Full FA | 23.62 | | | 23.79 | | |

Note : The detail plot data is refer to 6.2.

5.3 Occupied Bandwidth

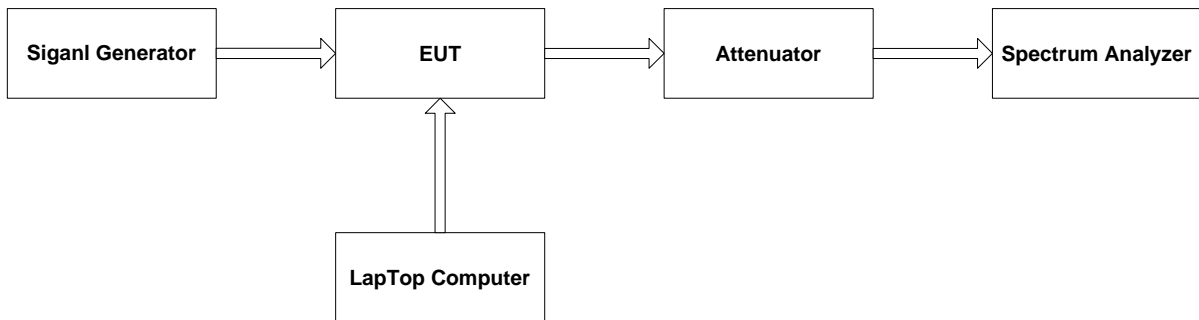
5.3.1 Specification

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-24W2.5G | 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% | 9.15 | 9.15 | 9.15 | 9.14 | 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 | 9.50 | 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% | 9.14 | 9.15 | 9.15 | 9.14 | 9.15 | 9.15 |
| | 26 dB | 9.43 | 9.50 | 9.50 | 9.43 | 9.50 | 9.50 |
| 2551.5 | 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 |
| 2561.5 | 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 |
| E-F Block | | | | | | | |
| 2630.5 | 99% | 9.14 | 9.14 | 9.14 | 9.14 | 9.14 | 9.14 |
| | 26 dB | 9.43 | 9.48 | 9.48 | 9.43 | 9.48 | 9.48 |
| 2640.5 | 99% | 9.14 | 9.15 | 9.15 | 9.14 | 9.15 | 9.15 |
| | 26 dB | 9.43 | 9.50 | 9.49 | 9.43 | 9.50 | 9.50 |
| 2650.5 | 99% | 9.15 | 9.15 | 9.15 | 9.14 | 9.15 | 9.15 |
| | 26 dB | 9.43 | 9.50 | 9.50 | 9.43 | 9.50 | 9.50 |
| H-G Block | | | | | | | |
| 2663.5 | 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 |
| 2673.5 | 99% | 9.14 | 9.14 | 9.14 | 9.14 | 9.15 | 9.15 |
| | 26 dB | 9.43 | 9.50 | 9.50 | 9.43 | 9.50 | 9.50 |
| 2683.5 | 99% | 9.14 | 9.14 | 9.14 | 9.14 | 9.15 | 9.15 |
| | 26 dB | 9.43 | 9.50 | 9.50 | 9.43 | 9.50 | 9.50 |

Note : The detail plot data is refer to 6.3.

5.4 Spurious Emissions at Antenna Terminals

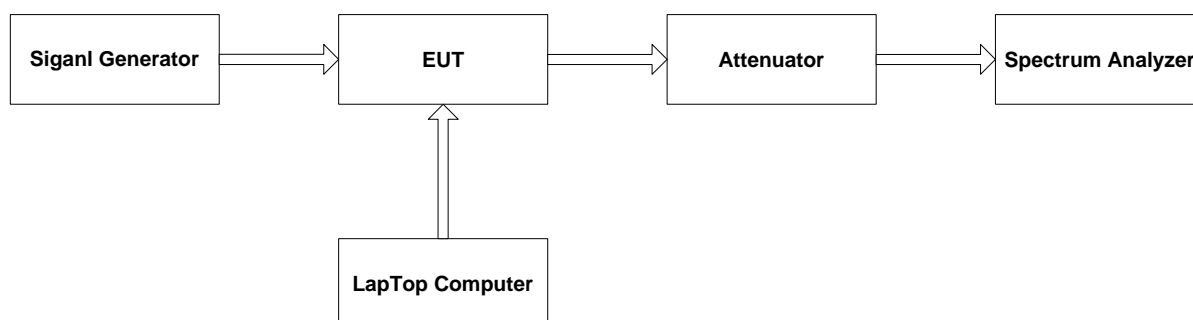
5.4.1 Specification

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-24W2.5G | 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

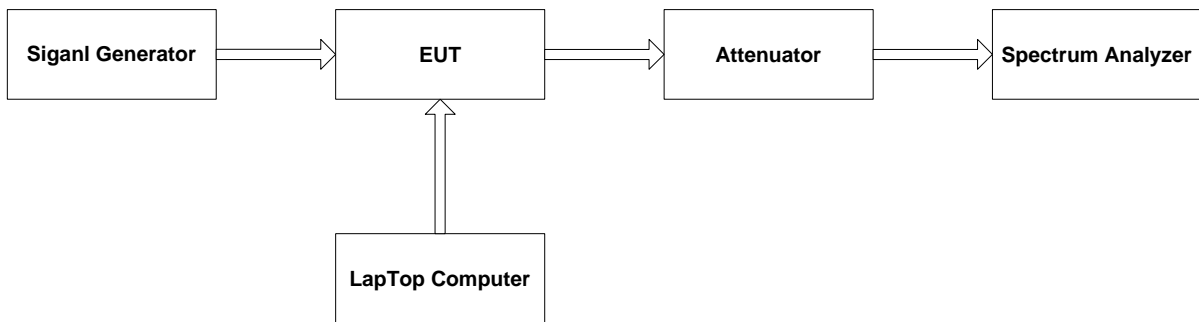
5.5.1 Specification

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-24W2.5G | 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

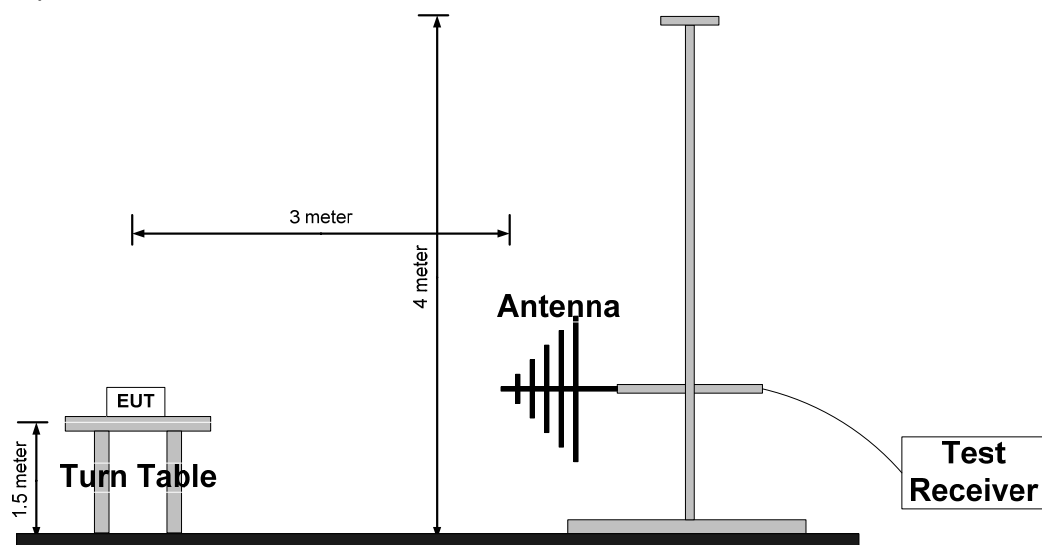
FCC Rules Part 2, Section 2.1051
FCC Rules Part 27, Section 27.53(l)

5.6.2 Method of Measurement

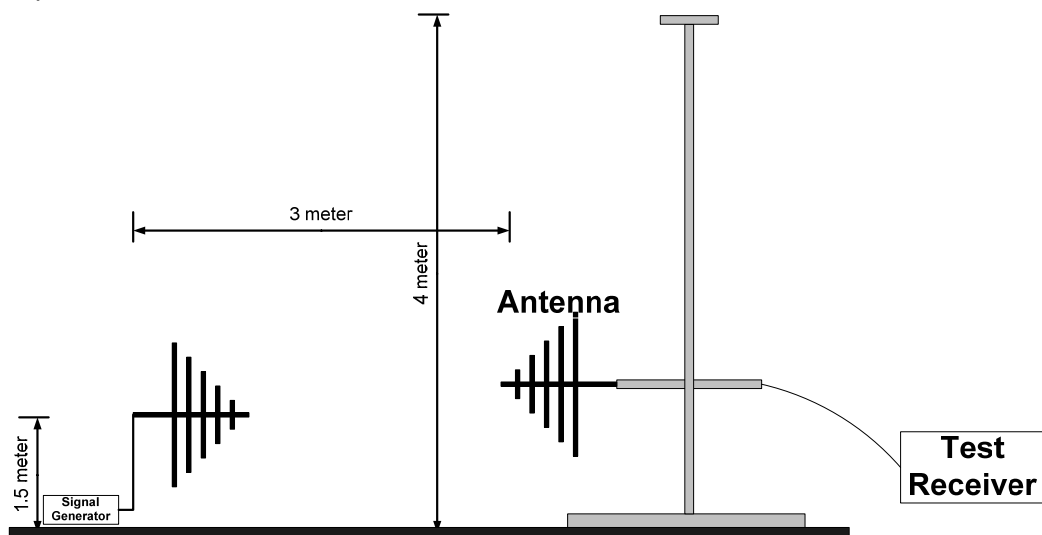
ANSI/TIA-603-C-2004 Section 2.2.12

5.6.3 Measurement Set-Up

Step 1.



Step 2.



5.6.4 Test Equipment List

| Equipment | Model Name | Manufacturer |
|-------------------|------------------|--------------|
| EUT | JR-24W2.5G | 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.

5.7 Frequency Stability / Temperature Variation

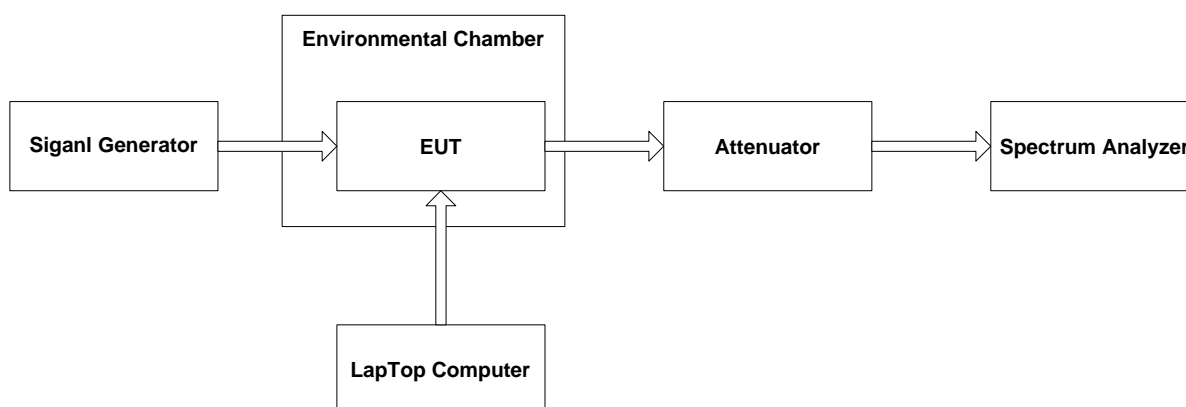
5.7.1 Specification

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

5.7.2 Method of Measurement

ANSI/TIA-603-C-2004 Section 2.2.2

5.7.3 Measurement Set-Up



5.7.4 Test Equipment List

| Equipment | Model Name | Manufacturer |
|-------------------|------------------|--------------|
| EUT | JR-24W2.5G | Hutech21 |
| LapTop Computer | PP01L | Dell |
| Attenuator | 30 dB Attenuator | Agilent |
| Signal Generator | N5182 | Agilent |
| Spectrum Analyzer | N9020A | Agilent |
| Chamber | SJ1013-TH | SeoJin |

5.7.5 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.

5.7.6 Limit

- The limit is 2.5 ppm.

5.7.7 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 |

5.7.8 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 |

5.7.9 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 |

5.7.10 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 |

5.7.11 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 |

5.7.12 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 |

5.7.13 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 |

5.7.14 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

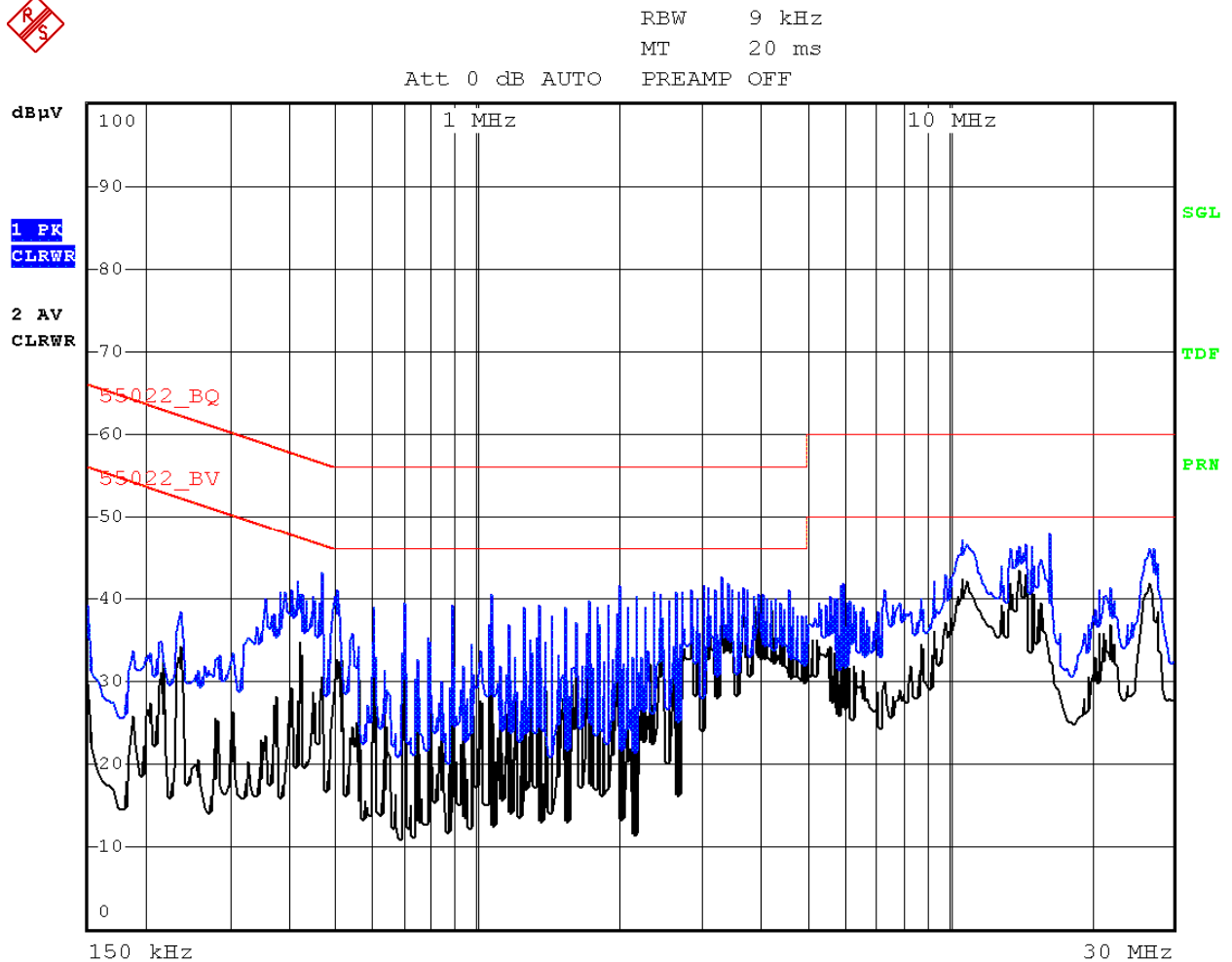
| Voltage (%) | Power Supply (Vac) | Temperature (°C) | Frequency (MHz) | Deviation (ppm) | Limit (ppm) |
|-------------|--------------------|------------------|-----------------|-----------------|-------------|
| 100 % | 220.0 | -10 | 2673.500000 | 0 | 2.5 |
| 100 % | 220.0 | 0 | 2673.500000 | 0 | 2.5 |
| 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 |

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 : | -56 dBm |
| System Gain : | 80 dB |
| Bandwidth : | 30 MHz |
| Number of FA : | 3 FA |



6.1.2 Down Link / Neutral

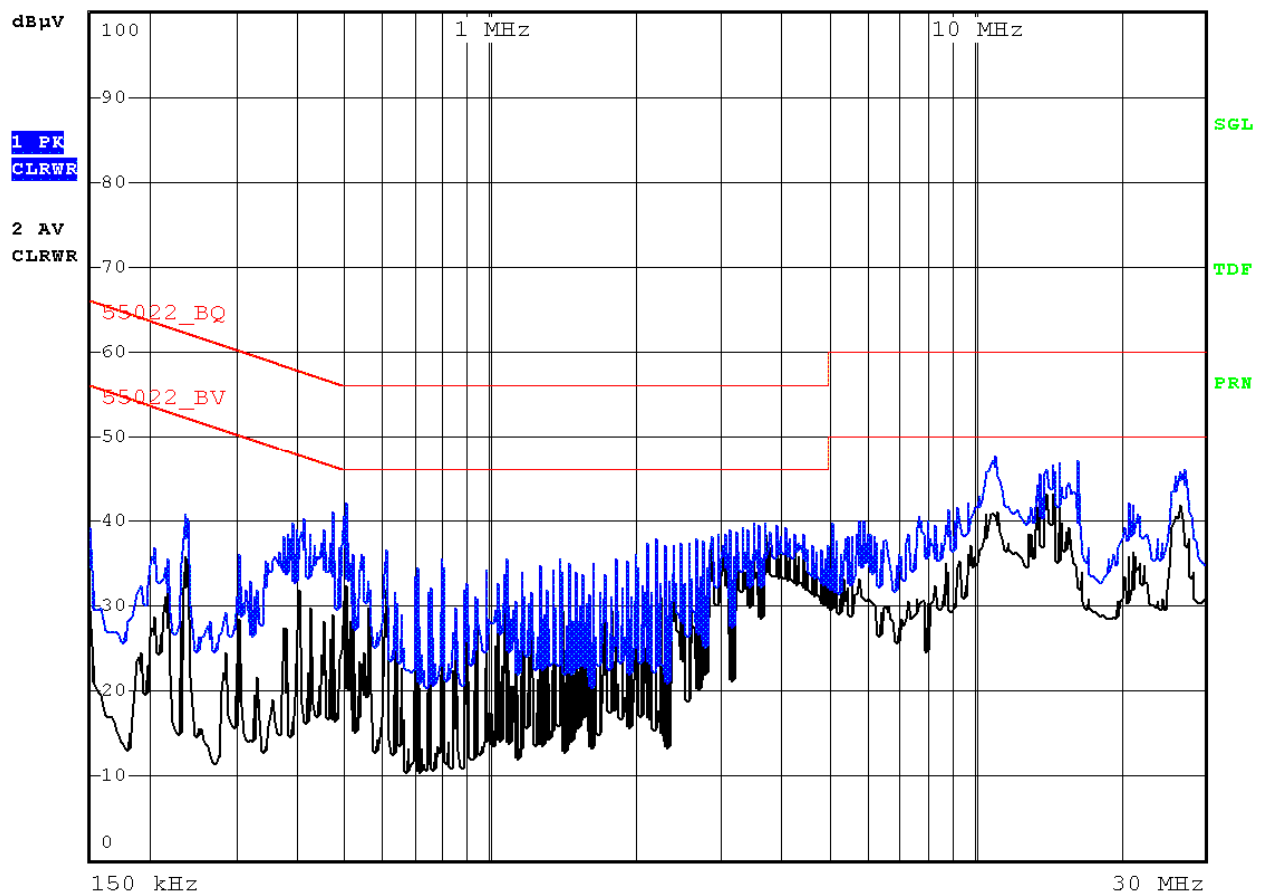
| | |
|------------------|-----------------|
| FCC Rules : | Part 15 §15.207 |
| Operating Path : | Down Link |
| Test Mode : | Neutral |
| Input Level : | -56 dBm |
| System Gain : | 80 dB |
| Bandwidth : | 30 MHz |
| Number of FA : | 3 FA |



RBW 9 kHz

MT 20 ms

Att 0 dB AUTO PREAMP OFF



6.1.3 Up Link / HOT

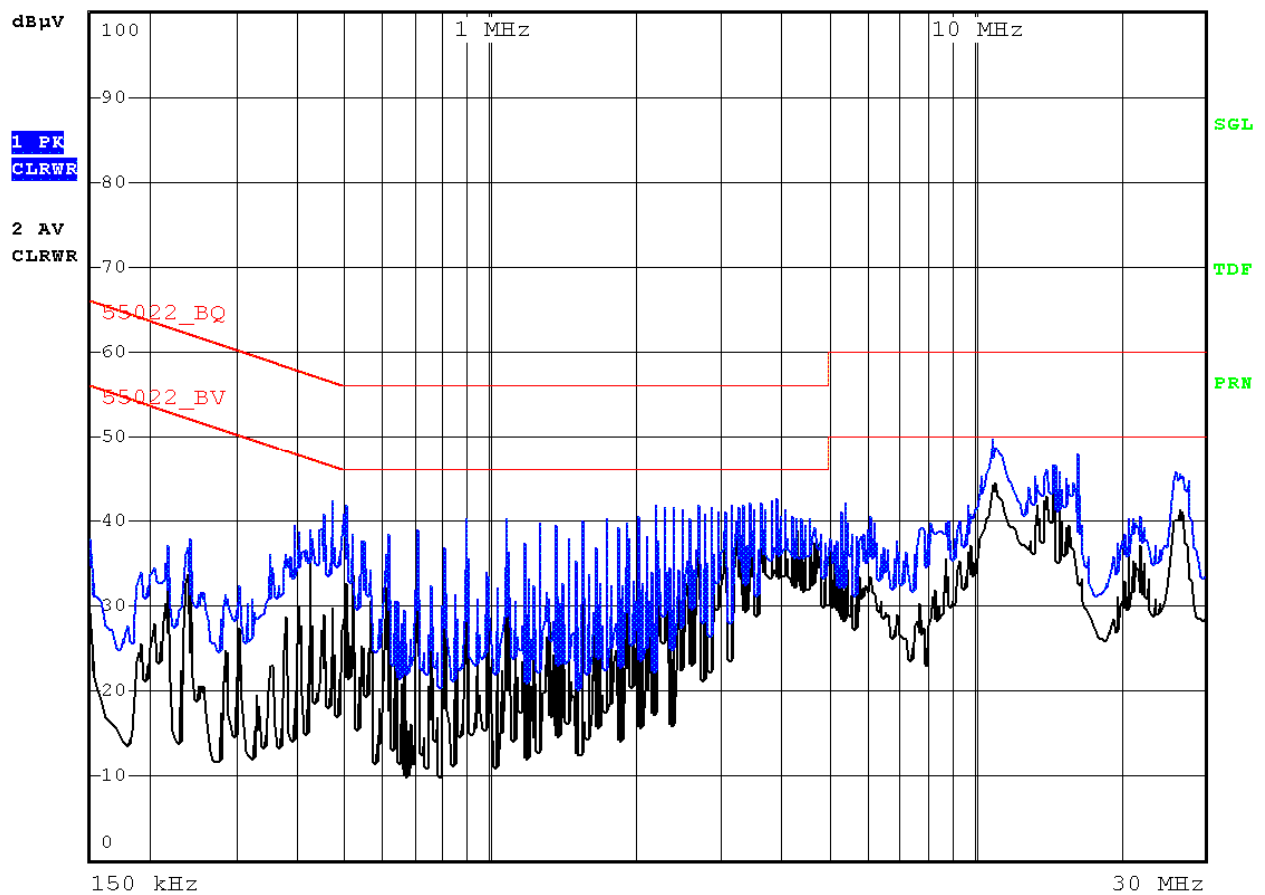
| | |
|------------------|-----------------|
| FCC Rules : | Part 15 §15.207 |
| Operating Path : | Up Link |
| Test Mode : | HOT |
| Input Level : | -56 dBm |
| System Gain : | 80 dB |
| Bandwidth : | 30 MHz |
| Number of FA : | 3 FA |



RBW 9 kHz

MT 20 ms

Att 0 dB AUTO PREAMP OFF



6.1.4 Up Link / Neutral

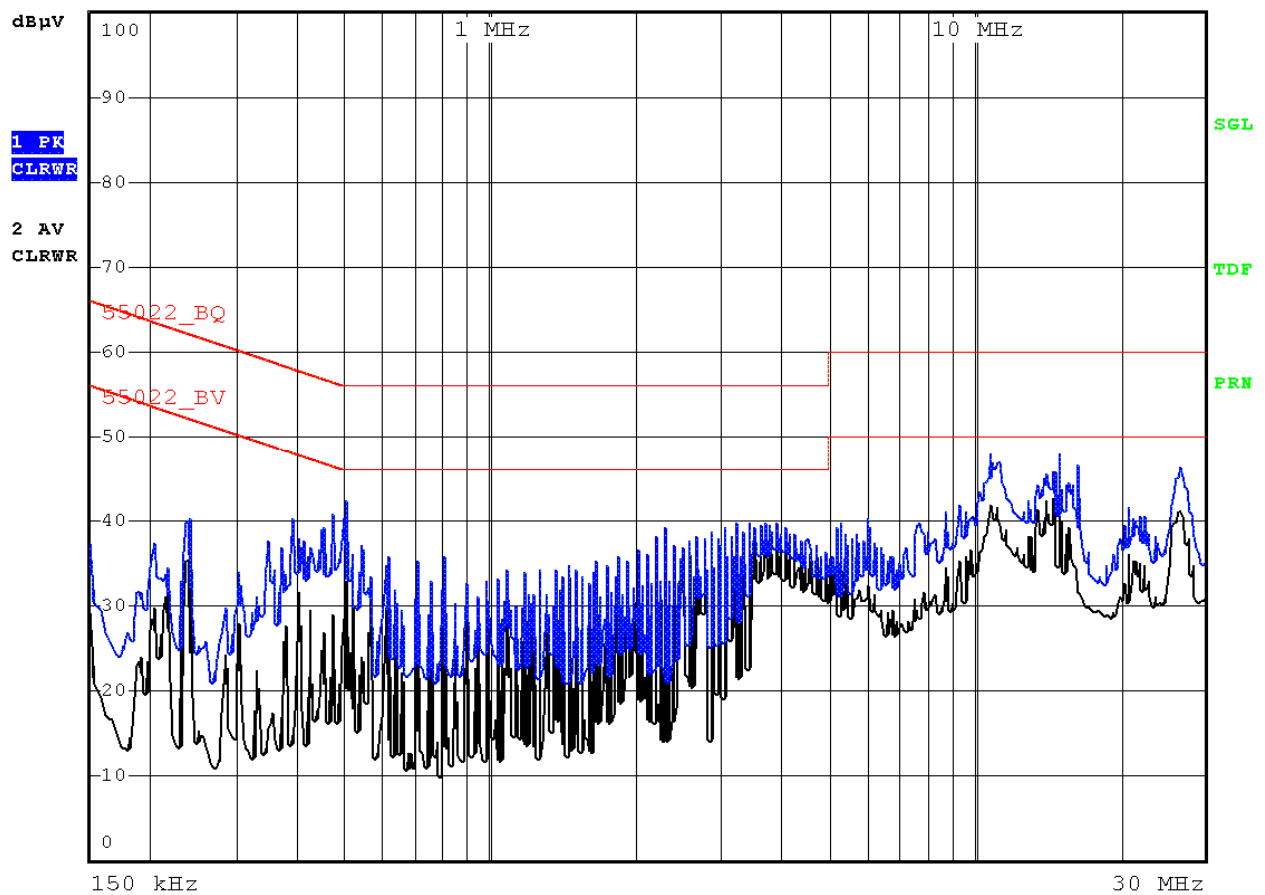
| | |
|------------------|-----------------|
| FCC Rules : | Part 15 §15.207 |
| Operating Path : | Up Link |
| Test Mode : | Neutral |
| Input Level : | -56 dBm |
| System Gain : | 80 dB |
| Bandwidth : | 30 MHz |
| Number of FA : | 3 FA |



RBW 9 kHz

MT 20 ms

Att 0 dB AUTO PREAMP OFF

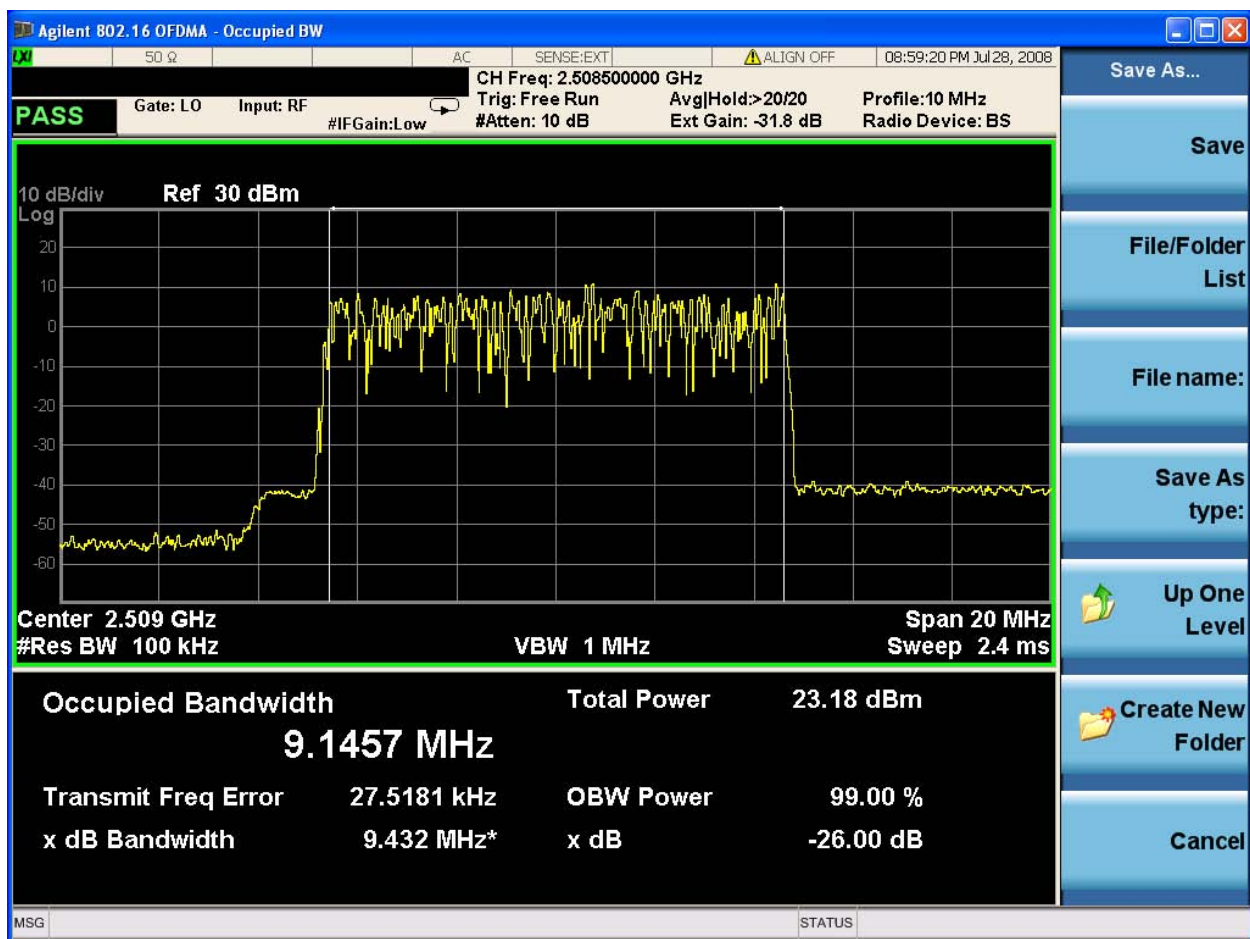


6.2 Down Link

6.2.1 A-B Block

6.2.1.1 2508.5 MHz / QPSK

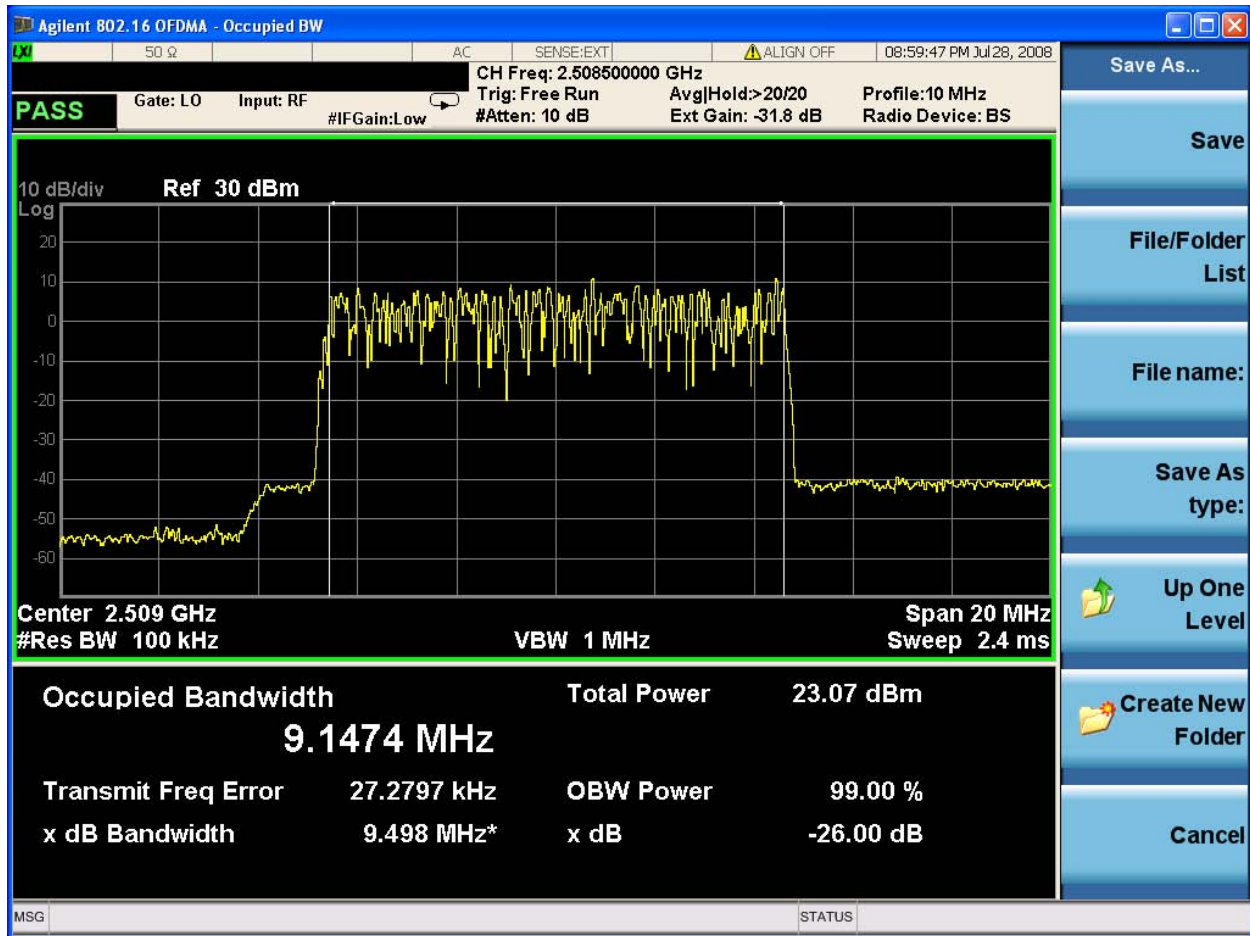
| | |
|-----------------------|---------------------------------|
| FCC Rules : | Part 2 §2.1046 & §27.50(h) |
| Path : | Down Link |
| Operating Frequency : | 1 st FA (2508.5 MHz) |
| Input Level : | -56 dBm |
| System Gain : | 80 dB |
| Modulation : | QPSK |
| Bandwidth : | 10 MHz |



| | |
|-------------------|------------|
| Channel Power : | 23.18 dBm |
| 99% Bandwidth : | 9.1457 MHz |
| 26 dB Bandwidth : | 9.432 MHz |

6.2.1.2 2508.5 MHz / 16QAM

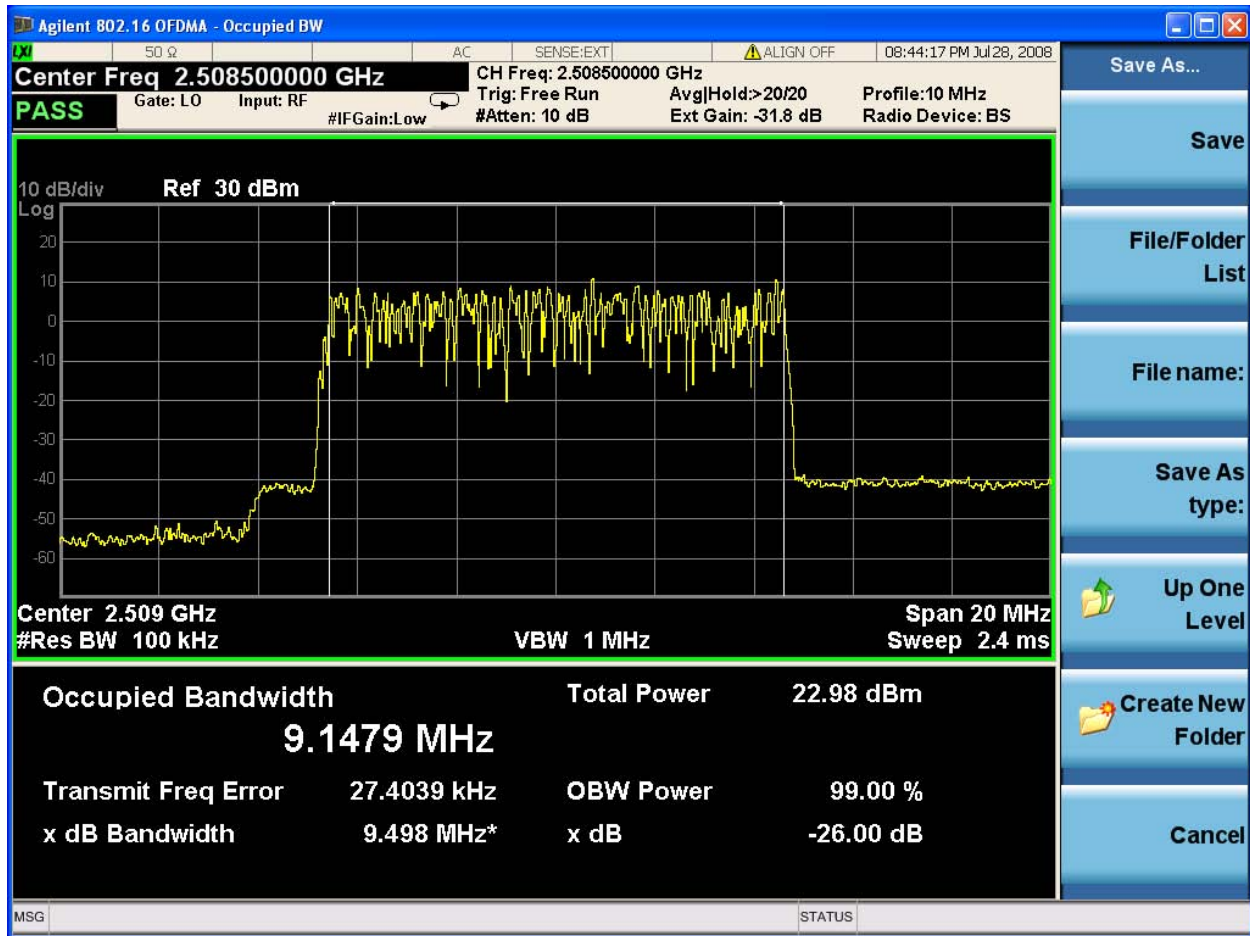
| | |
|-----------------------|---------------------------------|
| FCC Rules : | Part 2 §2.1046 & §27.50(h) |
| Path : | Down Link |
| Operating Frequency : | 1 st FA (2508.5 MHz) |
| Input Level : | -56 dBm |
| System Gain : | 80 dB |
| Modulation : | 16QAM |
| Bandwidth : | 10 MHz |



| | |
|-------------------|------------|
| Channel Power : | 23.07 dBm |
| 99% Bandwidth : | 9.1474 MHz |
| 26 dB Bandwidth : | 9.498 MHz |

6.2.1.3 2508.5 MHz / 64QAM

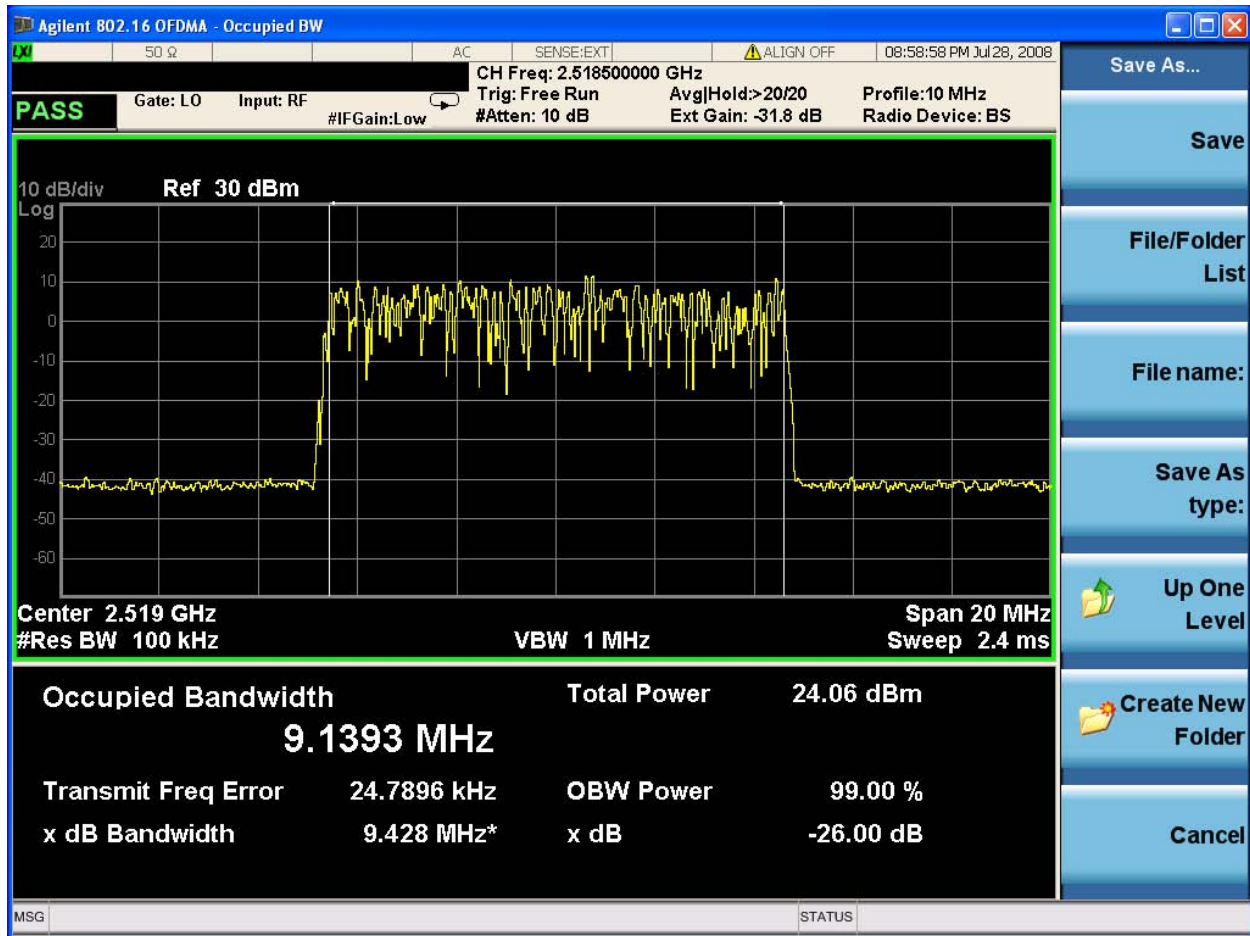
| | |
|-----------------------|---------------------------------|
| FCC Rules : | Part 2 §2.1046 & §27.50(h) |
| Path : | Down Link |
| Operating Frequency : | 1 st FA (2508.5 MHz) |
| Input Level : | -56 dBm |
| System Gain : | 80 dB |
| Modulation : | 64QAM |
| Bandwidth : | 10 MHz |



| | |
|-------------------|------------|
| Channel Power : | 22.98 dBm |
| 99% Bandwidth : | 9.1479 MHz |
| 26 dB Bandwidth : | 9.498 MHz |

6.2.1.4 2518.5 MHz / QPSK

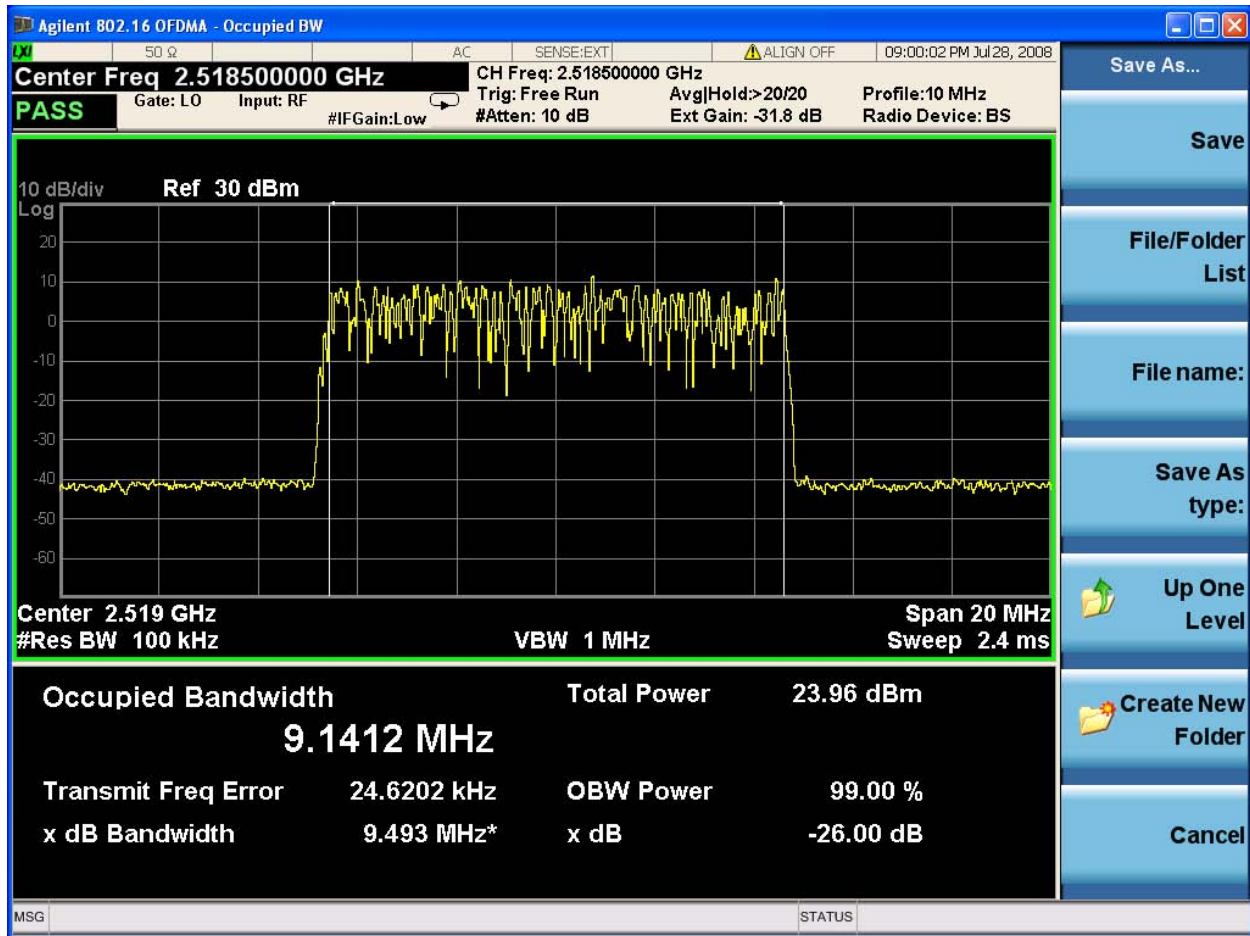
| | |
|-----------------------|---------------------------------|
| FCC Rules : | Part 2 §2.1046 & §27.50(h) |
| Path : | Down Link |
| Operating Frequency : | 2 nd FA (2518.5 MHz) |
| Input Level : | -56 dBm |
| System Gain : | 80 dB |
| Modulation : | QPSK |
| Bandwidth : | 10 MHz |



| | |
|-------------------|------------|
| Channel Power : | 24.06 dBm |
| 99% Bandwidth : | 9.1393 MHz |
| 26 dB Bandwidth : | 9.428 MHz |

6.2.1.5 2518.5 MHz / 16QAM

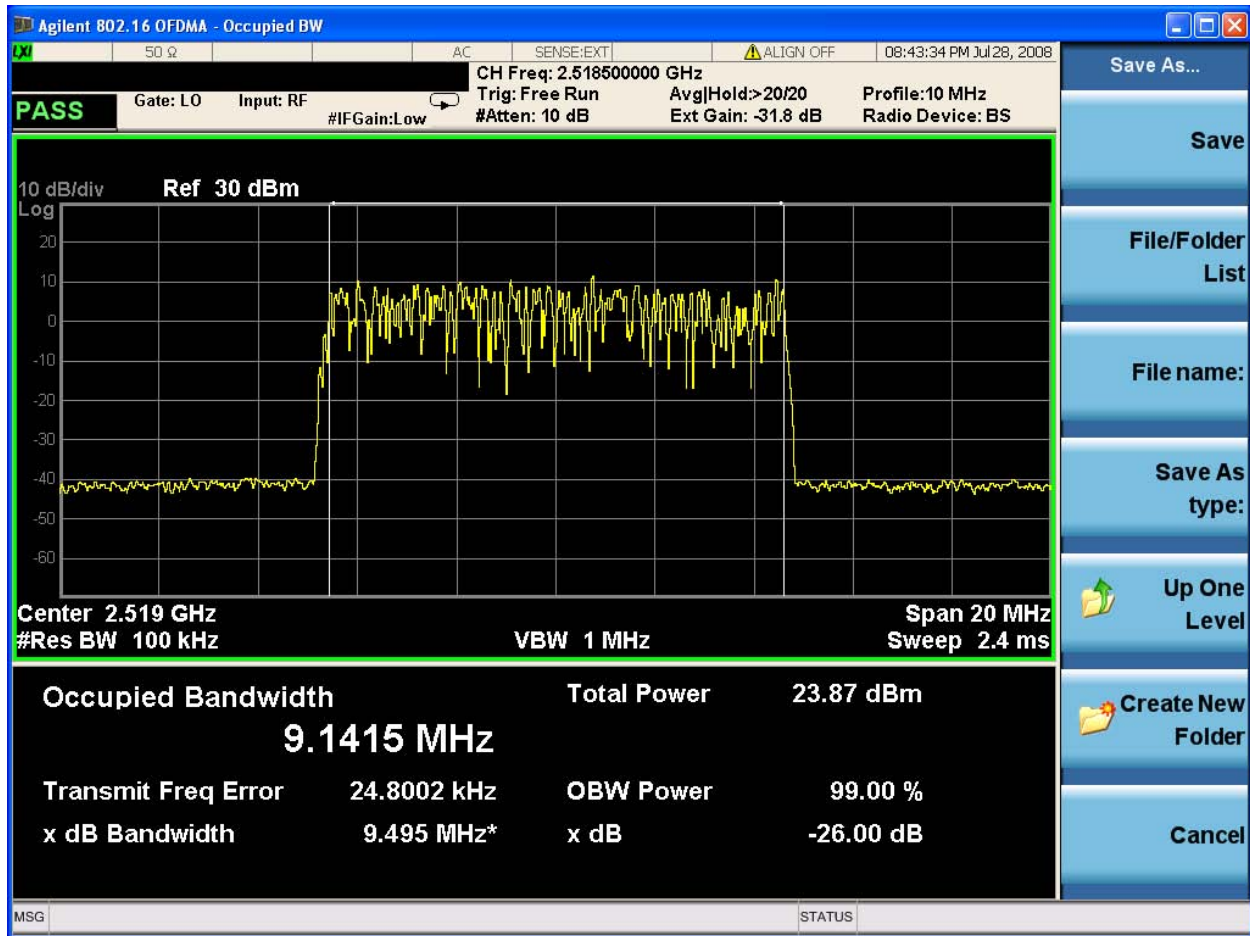
| | |
|-----------------------|---------------------------------|
| FCC Rules : | Part 2 §2.1046 & §27.50(h) |
| Path : | Down Link |
| Operating Frequency : | 2 nd FA (2518.5 MHz) |
| Input Level : | -56 dBm |
| System Gain : | 80 dB |
| Modulation : | 16QAM |
| Bandwidth : | 10 MHz |



| | |
|-------------------|------------|
| Channel Power : | 23.96 dBm |
| 99% Bandwidth : | 9.1412 MHz |
| 26 dB Bandwidth : | 9.493 MHz |

6.2.1.6 2518.5 MHz / 64QAM

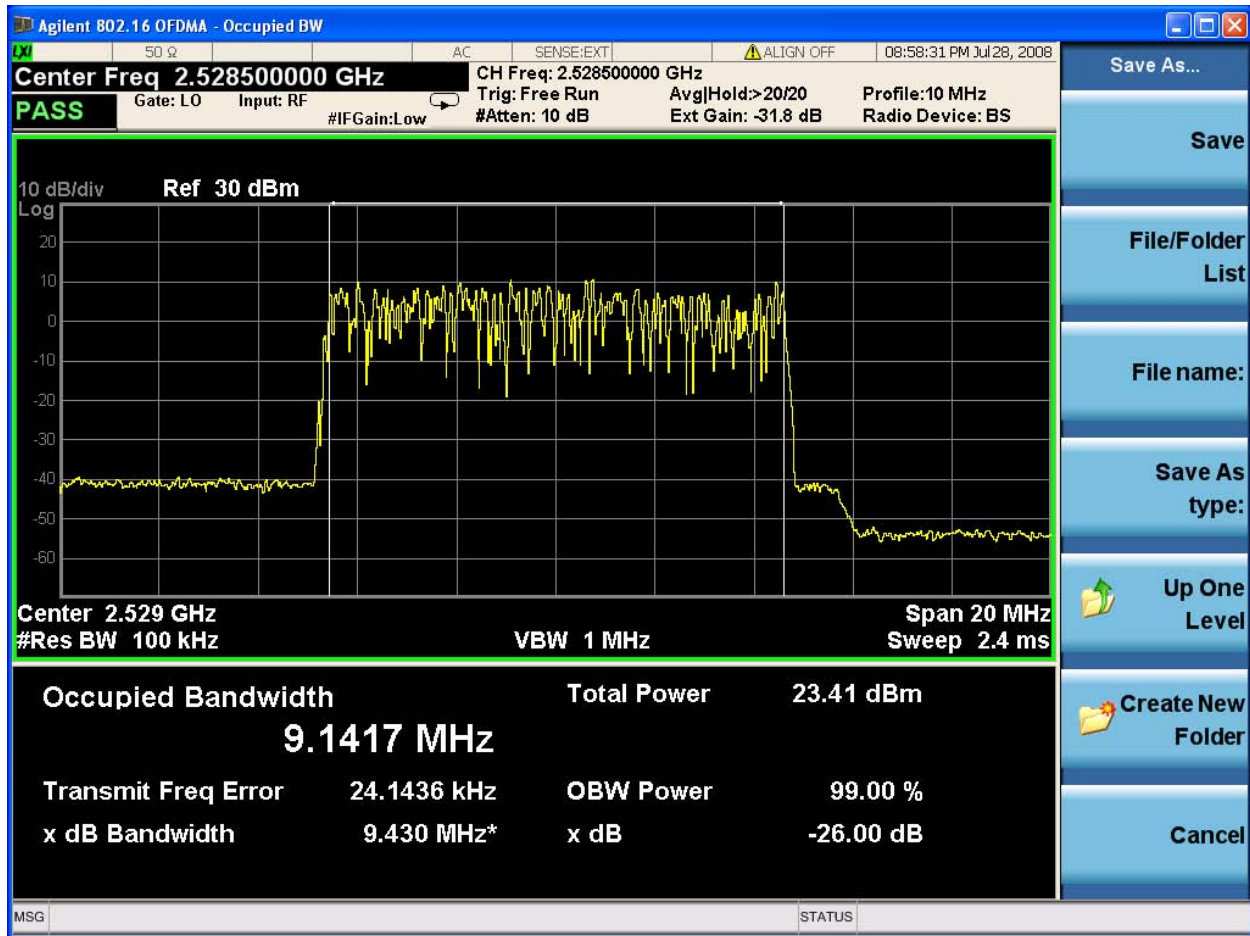
| | |
|-----------------------|---------------------------------|
| FCC Rules : | Part 2 §2.1046 & §27.50(h) |
| Path : | Down Link |
| Operating Frequency : | 2 nd FA (2518.5 MHz) |
| Input Level : | -56 dBm |
| System Gain : | 80 dB |
| Modulation : | 64QAM |
| Bandwidth : | 10 MHz |



| | |
|-------------------|------------|
| Channel Power : | 23.87 dBm |
| 99% Bandwidth : | 9.1415 MHz |
| 26 dB Bandwidth : | 9.495 MHz |

6.2.1.7 2528.5 MHz / QPSK

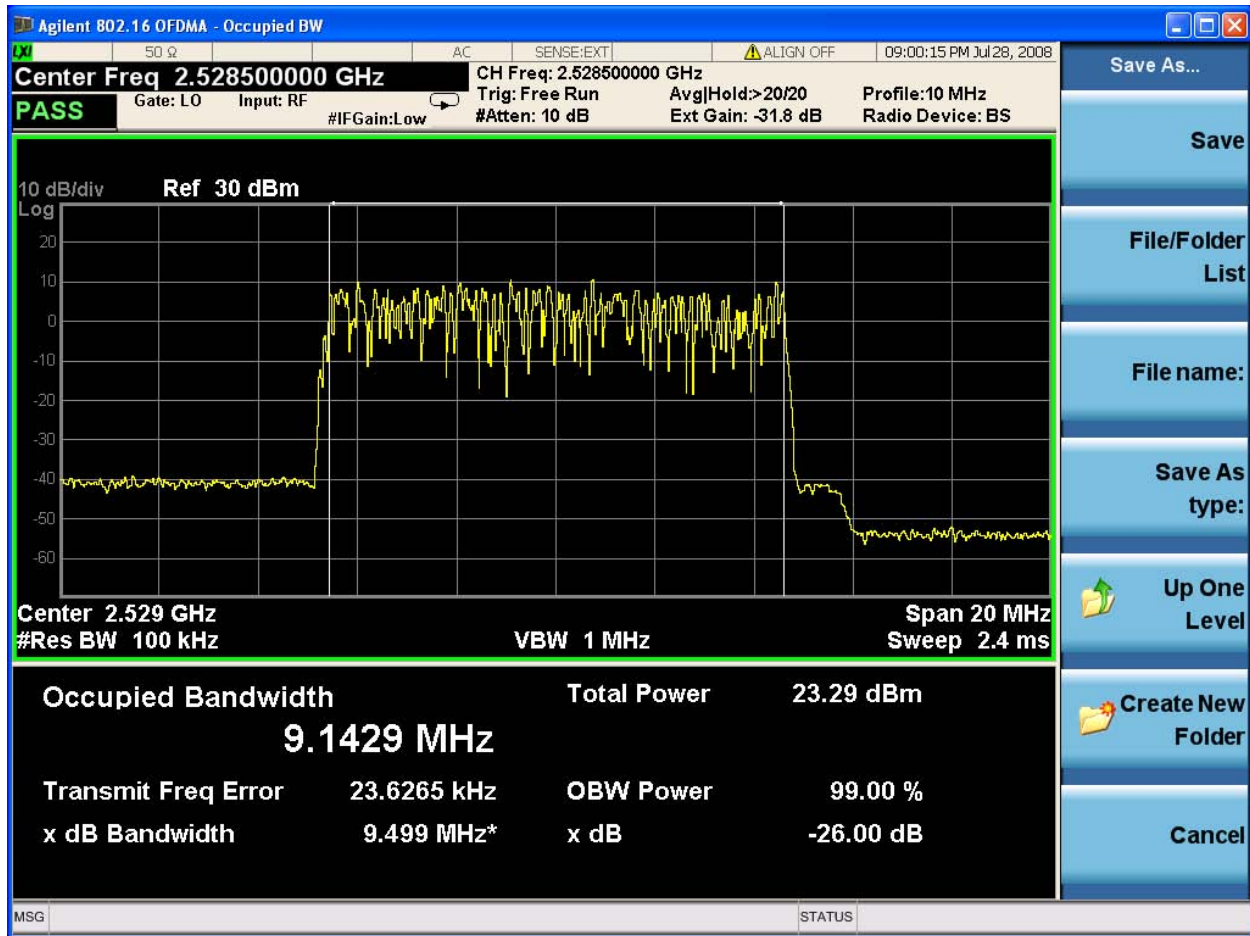
| | |
|-----------------------|---------------------------------|
| FCC Rules : | Part 2 §2.1046 & §27.50(h) |
| Path : | Down Link |
| Operating Frequency : | 3 rd FA (2528.5 MHz) |
| Input Level : | -56 dBm |
| System Gain : | 80 dB |
| Modulation : | QPSK |
| Bandwidth : | 10 MHz |



| | |
|-------------------|------------|
| Channel Power : | 23.41 dBm |
| 99% Bandwidth : | 9.1417 MHz |
| 26 dB Bandwidth : | 9.430 MHz |

6.2.1.8 2528.5 MHz / 16QAM

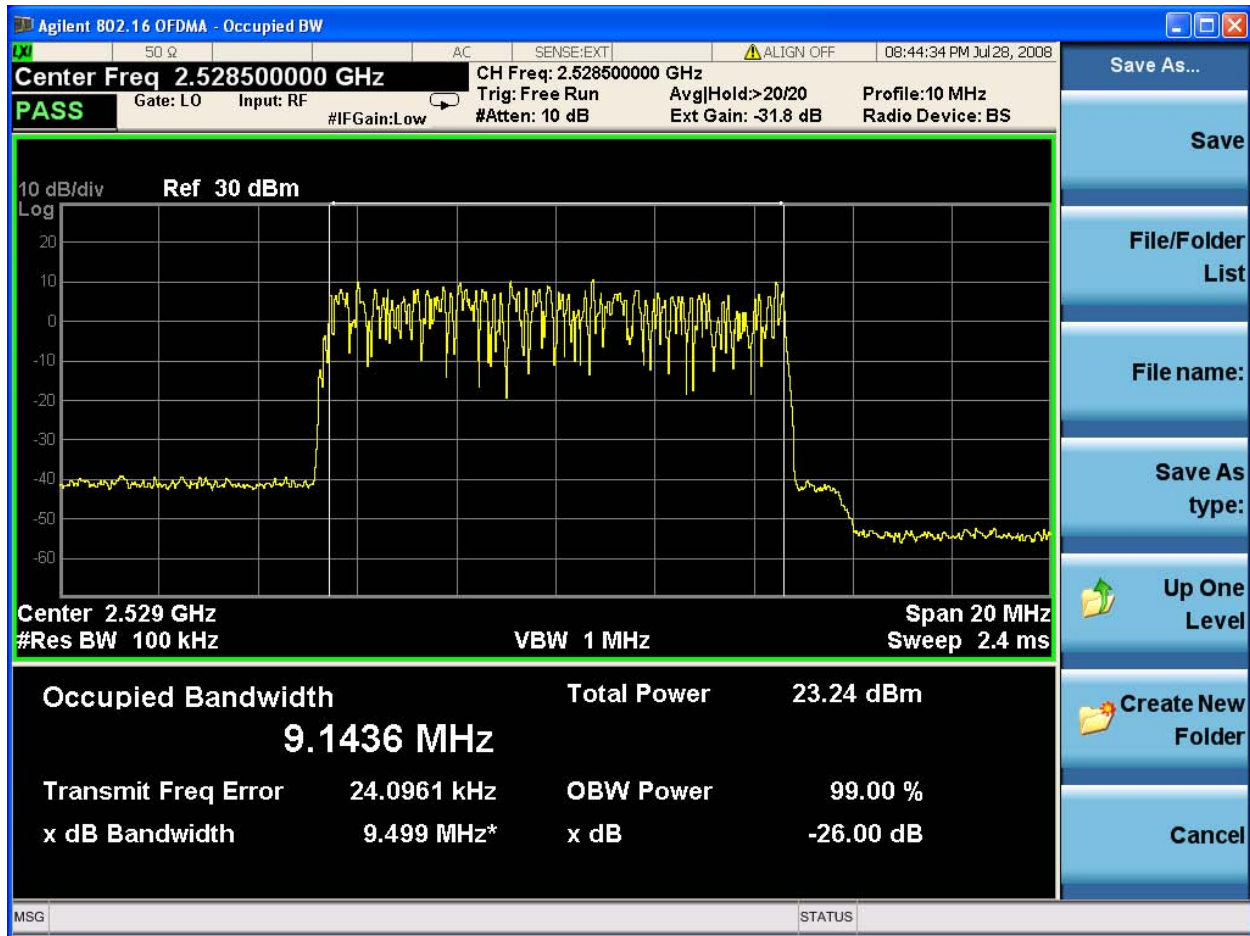
| | |
|-----------------------|---------------------------------|
| FCC Rules : | Part 2 §2.1046 & §27.50(h) |
| Path : | Down Link |
| Operating Frequency : | 3 rd FA (2528.5 MHz) |
| Input Level : | -56 dBm |
| System Gain : | 80 dB |
| Modulation : | 16QAM |
| Bandwidth : | 10 MHz |



| | |
|-------------------|------------|
| Channel Power : | 23.29 dBm |
| 99% Bandwidth : | 9.1429 MHz |
| 26 dB Bandwidth : | 9.499 MHz |

6.2.1.9 2528.5 MHz / 64QAM

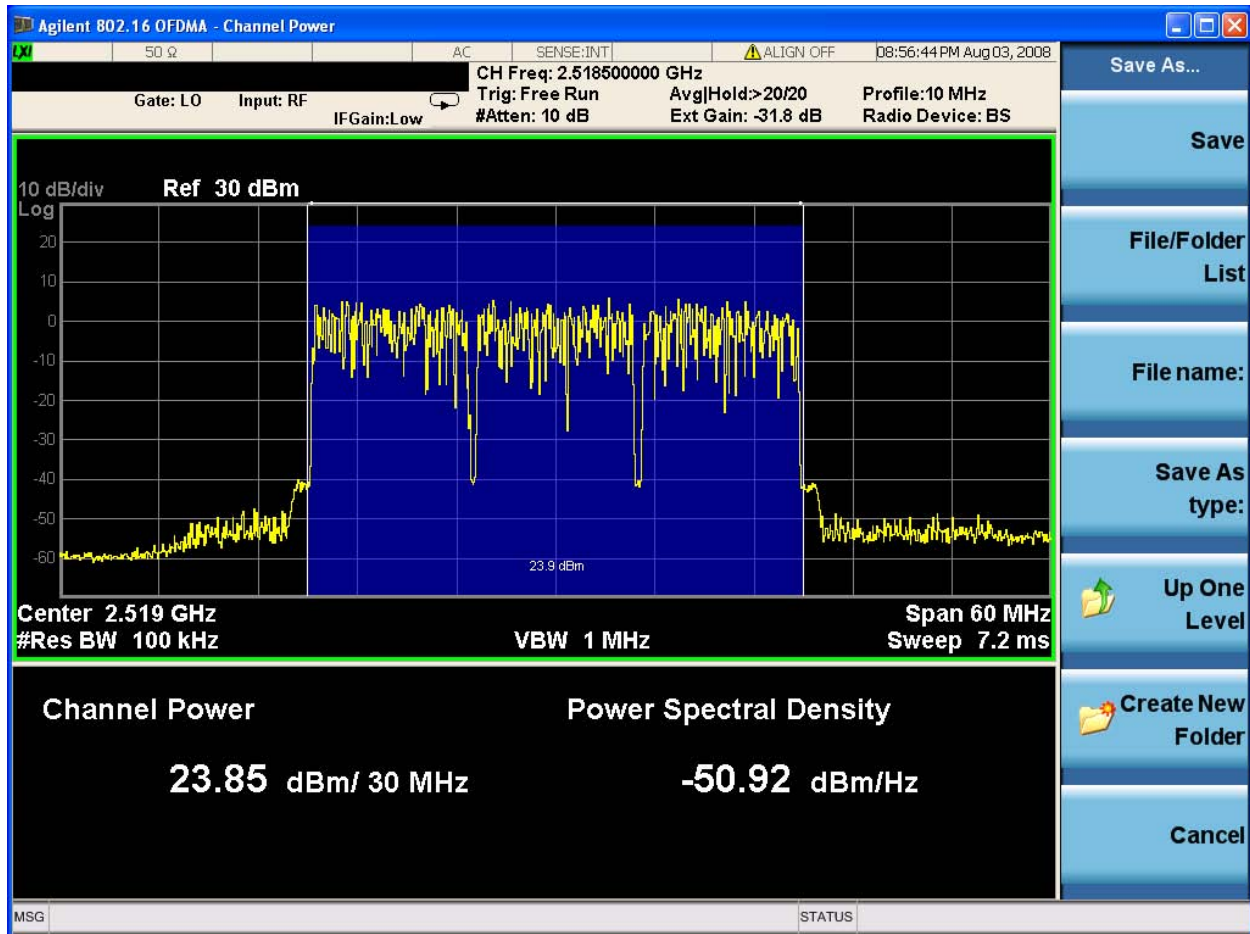
| | |
|-----------------------|---------------------------------|
| FCC Rules : | Part 2 §2.1046 & §27.50(h) |
| Path : | Down Link |
| Operating Frequency : | 3 rd FA (2528.5 MHz) |
| Input Level : | -56 dBm |
| System Gain : | 80 dB |
| Modulation : | 64QAM |
| Bandwidth : | 10 MHz |



| | |
|-------------------|------------|
| Channel Power : | 23.24 dBm |
| 99% Bandwidth : | 9.1436 MHz |
| 26 dB Bandwidth : | 9.499 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 : | -56 dBm |
| System Gain : | 80 dB |
| Bandwidth : | 30 MHz |

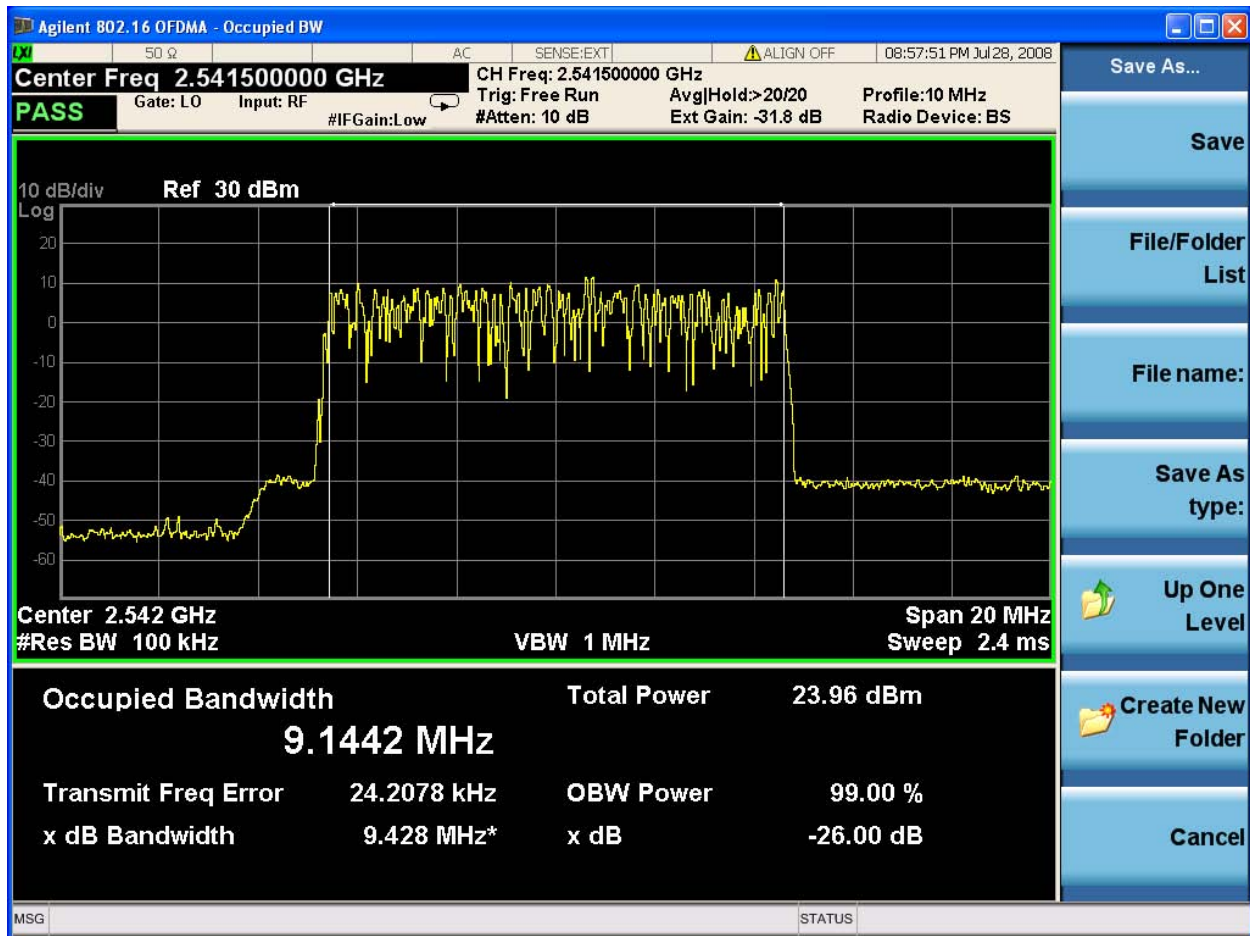


Channel Power : 23.85 dBm

6.2.2 C-D Block

6.2.2.1 2541.5 MHz / QPSK

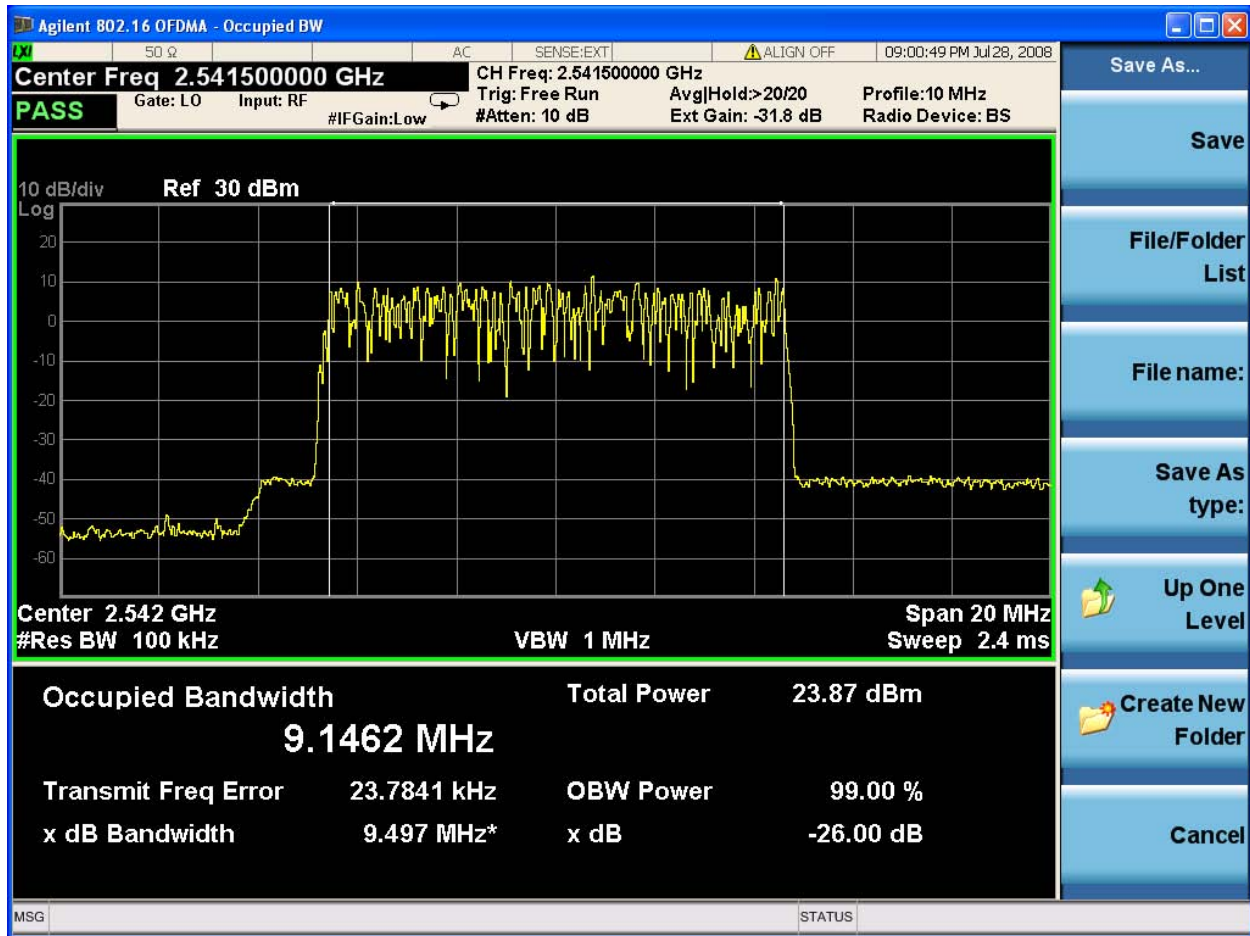
| | |
|-----------------------|---------------------------------|
| FCC Rules : | Part 2 §2.1046 & §27.50(h) |
| Path : | Down Link |
| Operating Frequency : | 1 st FA (2541.5 MHz) |
| Input Level : | -56 dBm |
| System Gain : | 80 dB |
| Modulation : | QPSK |
| Bandwidth : | 10 MHz |



| | |
|-------------------|------------|
| Channel Power : | 23.96 dBm |
| 99% Bandwidth : | 9.1442 MHz |
| 26 dB Bandwidth : | 9.428 MHz |

6.2.2.2 2541.5 MHz / 16QAM

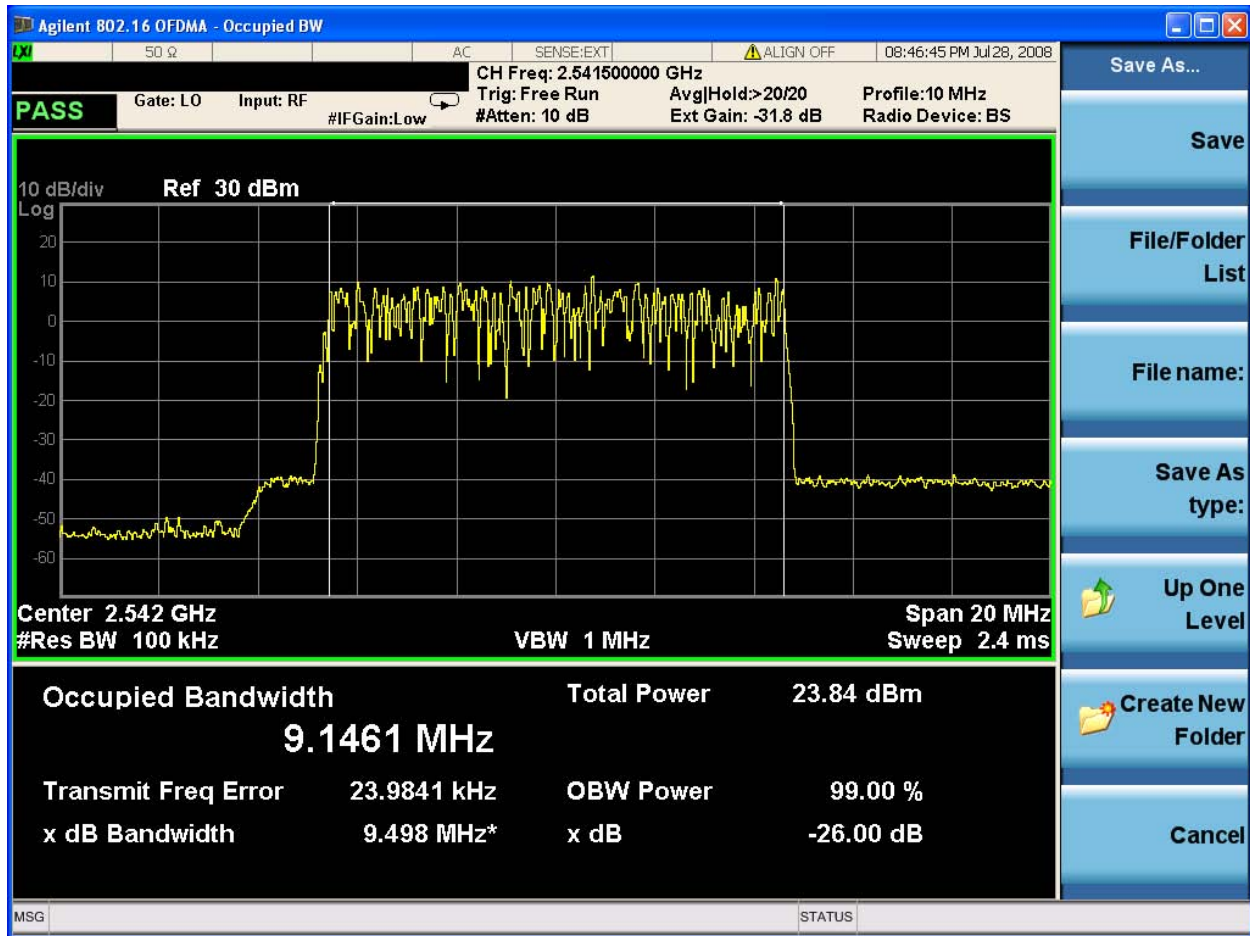
| | |
|-----------------------|---------------------------------|
| FCC Rules : | Part 2 §2.1046 & §27.50(h) |
| Path : | Down Link |
| Operating Frequency : | 1 st FA (2541.5 MHz) |
| Input Level : | -56 dBm |
| System Gain : | 80 dB |
| Modulation : | 16QAM |
| Bandwidth : | 10 MHz |



| | |
|-------------------|------------|
| Channel Power : | 23.87 dBm |
| 99% Bandwidth : | 9.1462 MHz |
| 26 dB Bandwidth : | 9.497 MHz |

6.2.2.3 2541.5 MHz / 64QAM

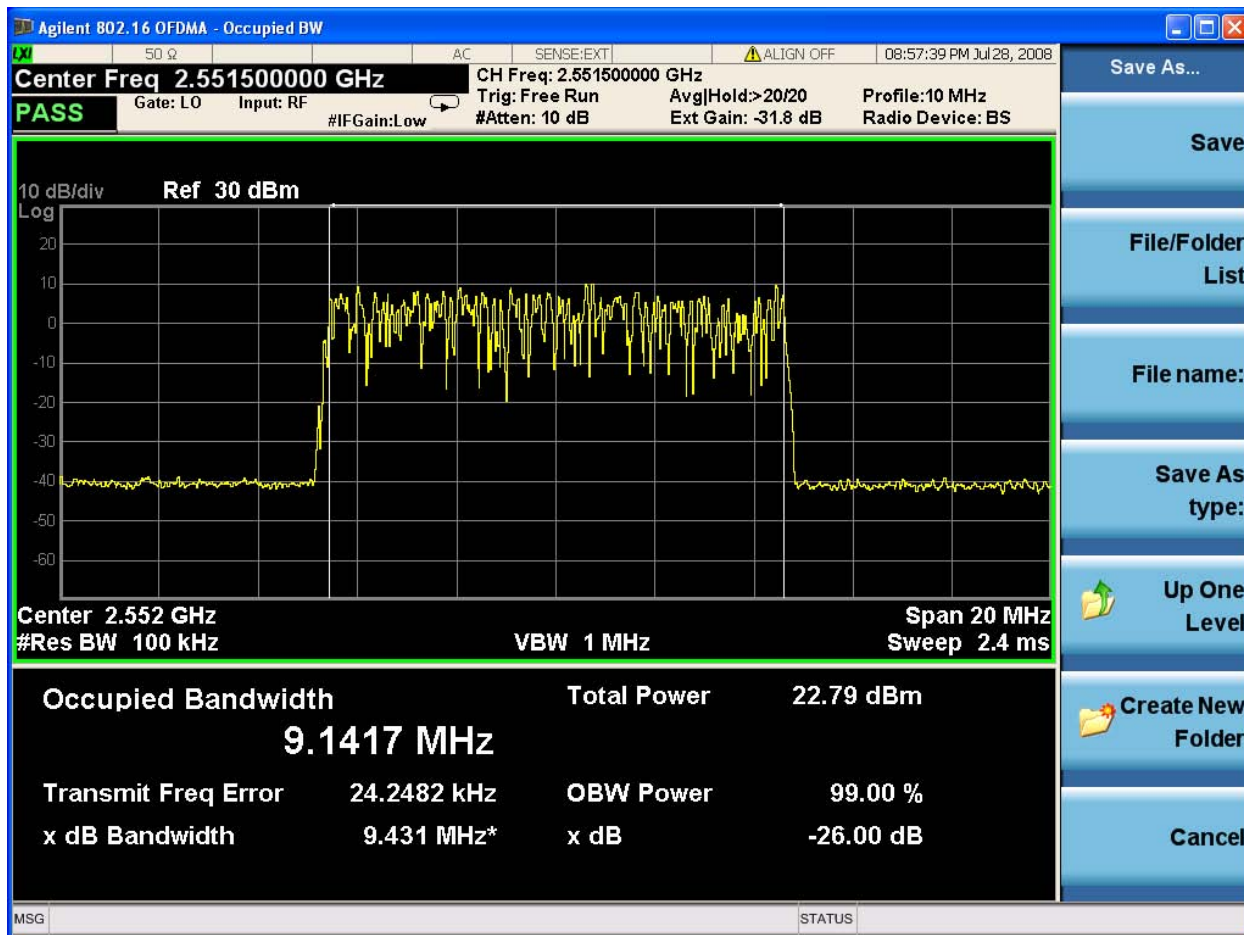
| | |
|-----------------------|---------------------------------|
| FCC Rules : | Part 2 §2.1046 & §27.50(h) |
| Path : | Down Link |
| Operating Frequency : | 1 st FA (2541.5 MHz) |
| Input Level : | -56 dBm |
| System Gain : | 80 dB |
| Modulation : | 64QAM |
| Bandwidth : | 10 MHz |



| | |
|-------------------|------------|
| Channel Power : | 23.84 dBm |
| 99% Bandwidth : | 9.1461 MHz |
| 26 dB Bandwidth : | 9.498 MHz |

6.2.2.4 2551.5 MHz / QPSK

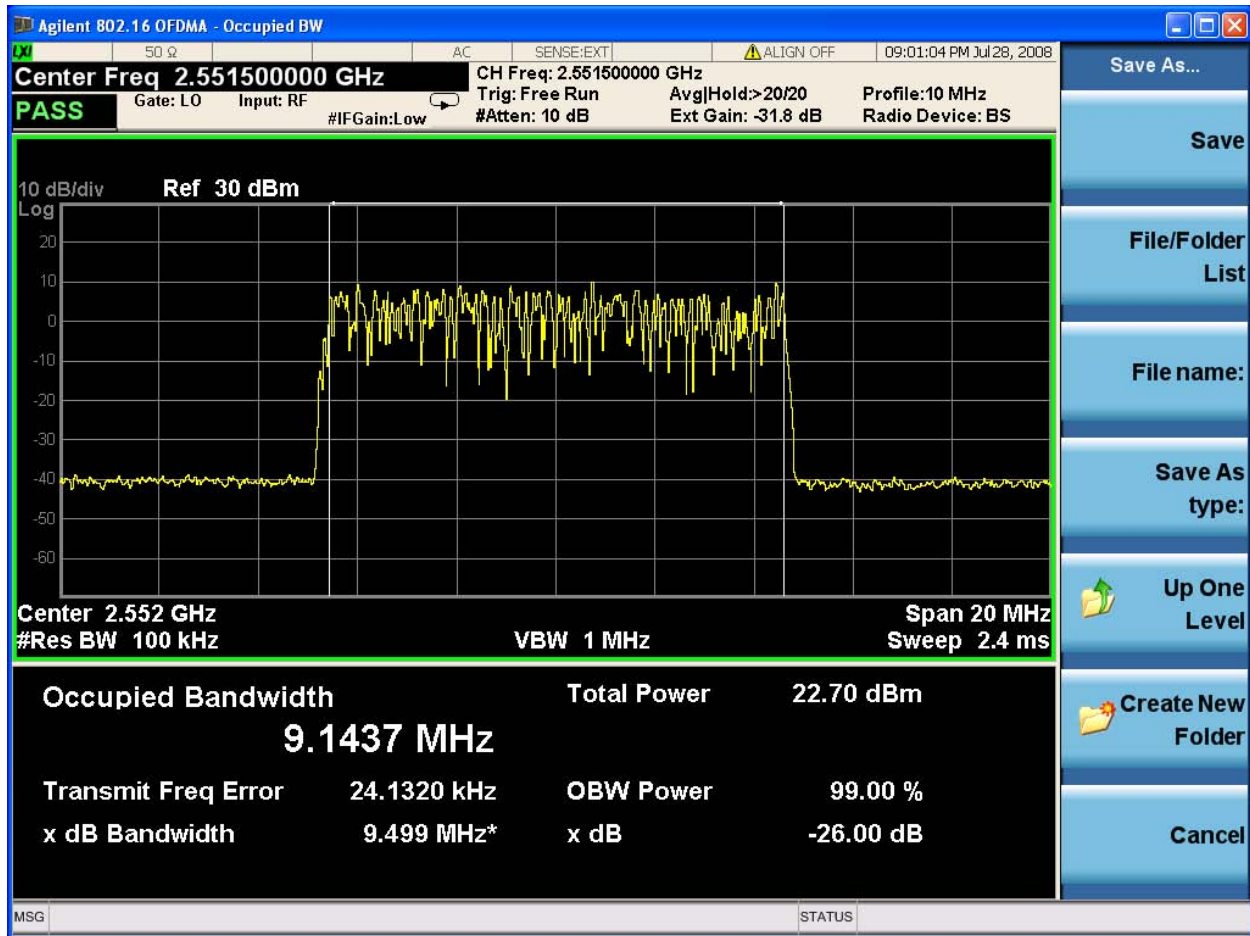
| | |
|-----------------------|---------------------------------|
| FCC Rules : | Part 2 §2.1046 & §27.50(h) |
| Path : | Down Link |
| Operating Frequency : | 2 nd FA (2551.5 MHz) |
| Input Level : | -56 dBm |
| System Gain : | 80 dB |
| Modulation : | QPSK |
| Bandwidth : | 10 MHz |



| | |
|-------------------|------------|
| Channel Power : | 22.79 dBm |
| 99% Bandwidth : | 9.1417 MHz |
| 26 dB Bandwidth : | 9.431 MHz |

6.2.2.5 2551.5 MHz / 16QAM

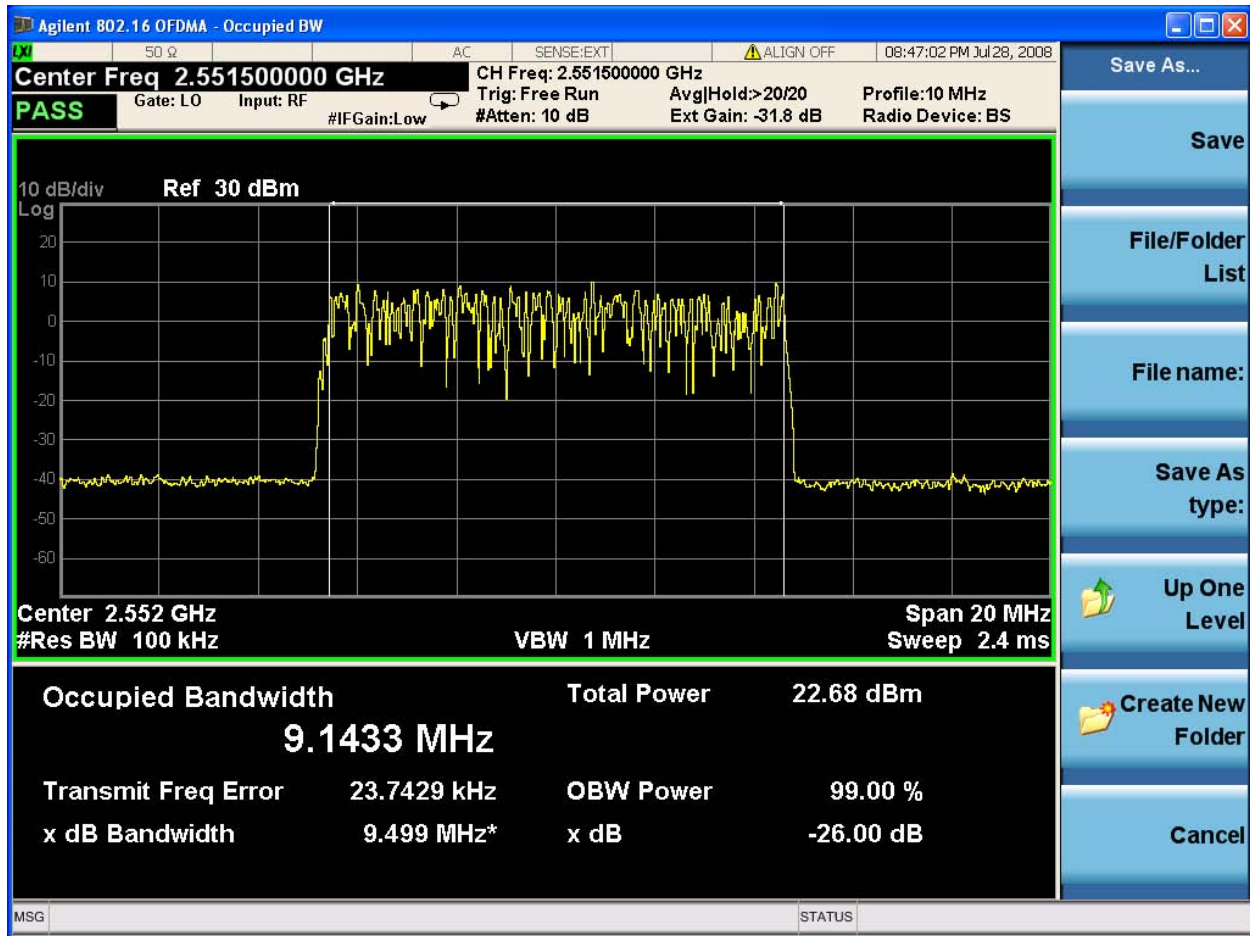
| | |
|-----------------------|---------------------------------|
| FCC Rules : | Part 2 §2.1046 & §27.50(h) |
| Path : | Down Link |
| Operating Frequency : | 2 nd FA (2551.5 MHz) |
| Input Level : | -56 dBm |
| System Gain : | 80 dB |
| Modulation : | 16QAM |
| Bandwidth : | 10 MHz |



| | |
|-------------------|------------|
| Channel Power : | 22.70 dBm |
| 99% Bandwidth : | 9.1437 MHz |
| 26 dB Bandwidth : | 9.499 MHz |

6.2.2.6 2551.5 MHz / 64QAM

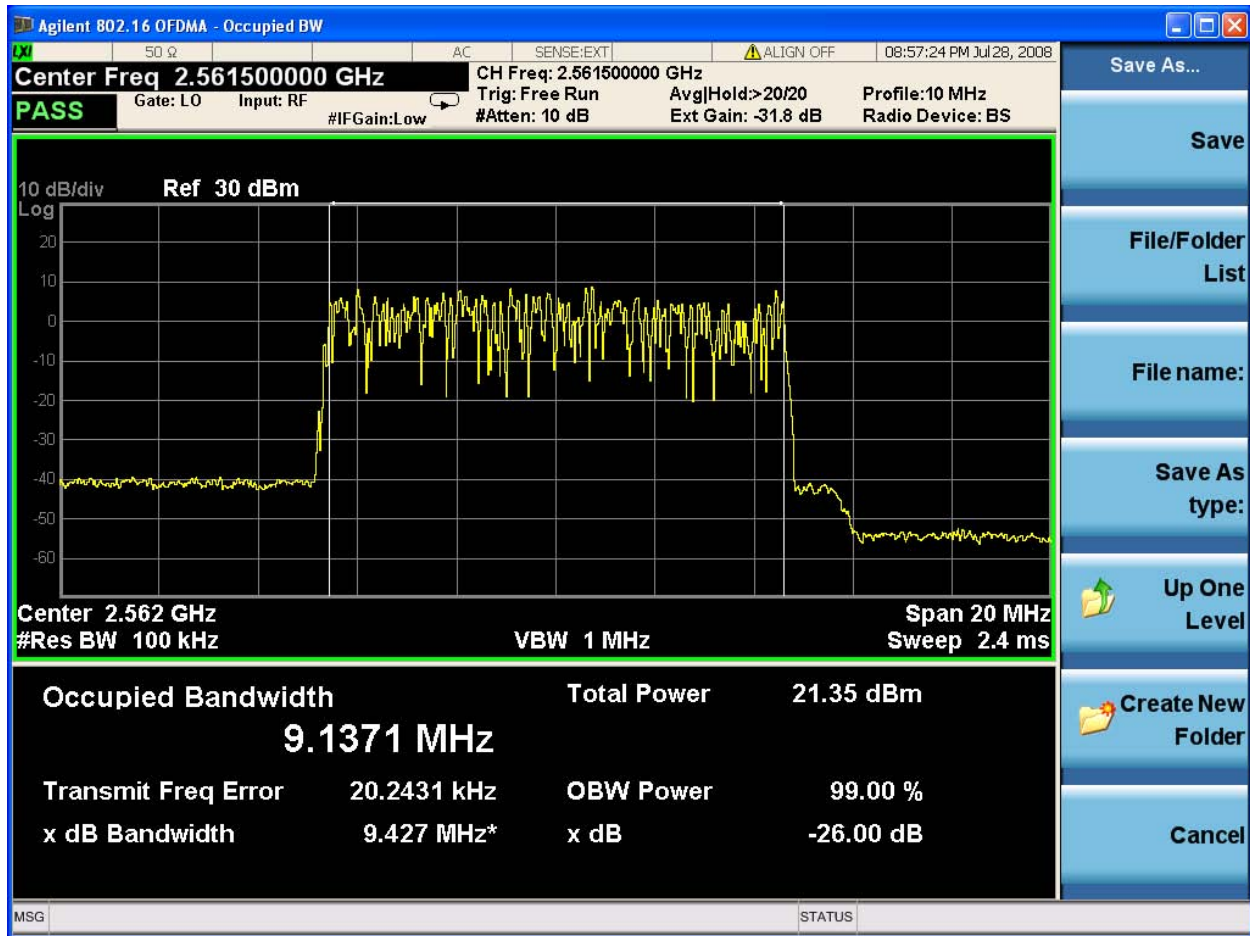
| | |
|-----------------------|---------------------------------|
| FCC Rules : | Part 2 §2.1046 & §27.50(h) |
| Path : | Down Link |
| Operating Frequency : | 2 nd FA (2551.5 MHz) |
| Input Level : | -56 dBm |
| System Gain : | 80 dB |
| Modulation : | 64QAM |
| Bandwidth : | 10 MHz |



| | |
|-------------------|------------|
| Channel Power : | 22.68 dBm |
| 99% Bandwidth : | 9.1433 MHz |
| 26 dB Bandwidth : | 9.499 MHz |

6.2.2.7 2561.5 MHz / QPSK

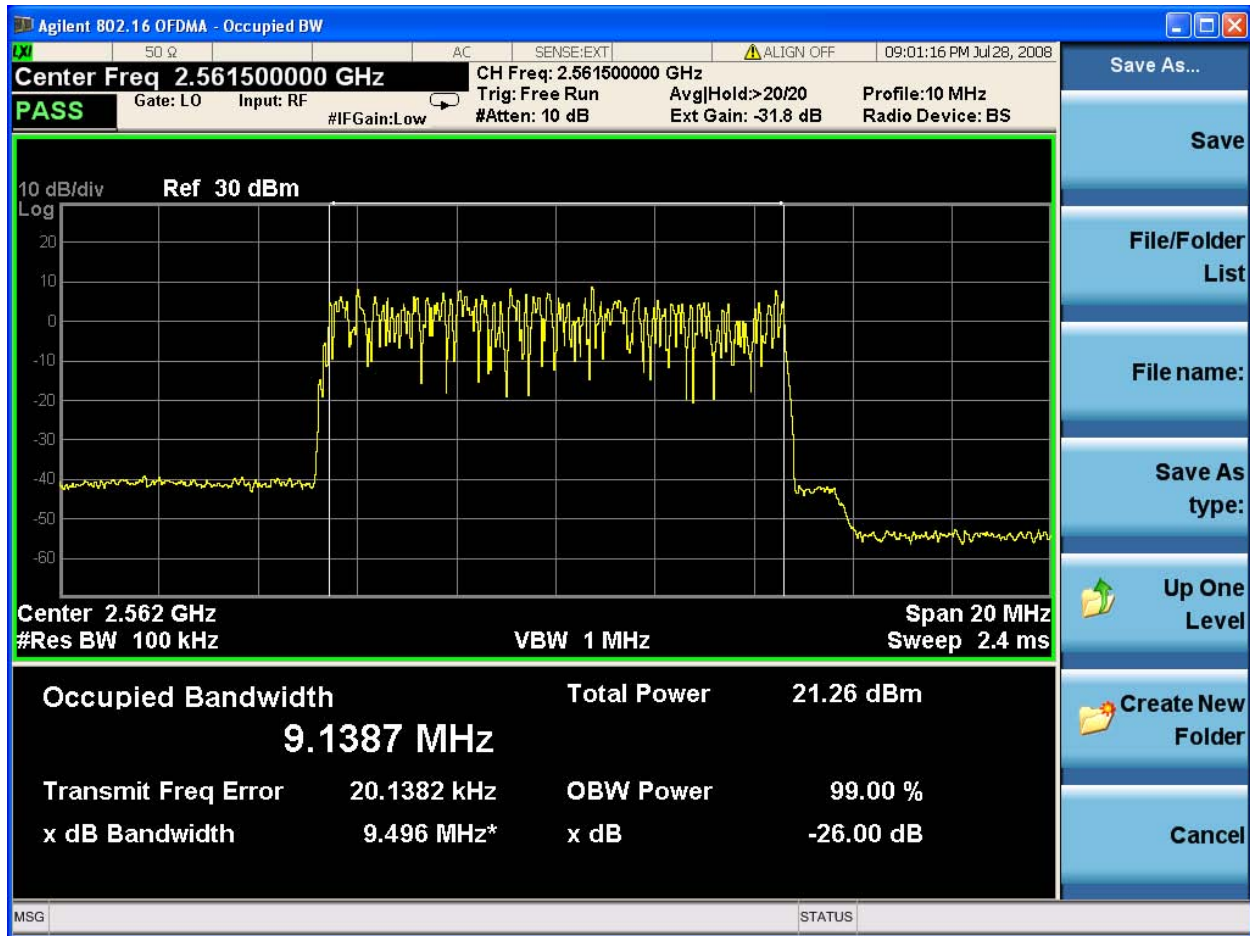
| | |
|-----------------------|---------------------------------|
| FCC Rules : | Part 2 §2.1046 & §27.50(h) |
| Path : | Down Link |
| Operating Frequency : | 3 rd FA (2561.5 MHz) |
| Input Level : | -56 dBm |
| System Gain : | 80 dB |
| Modulation : | QPSK |
| Bandwidth : | 10 MHz |



| | |
|-------------------|------------|
| Channel Power : | 21.35 dBm |
| 99% Bandwidth : | 9.1371 MHz |
| 26 dB Bandwidth : | 9.427 MHz |

6.2.2.8 2561.5 MHz / 16QAM

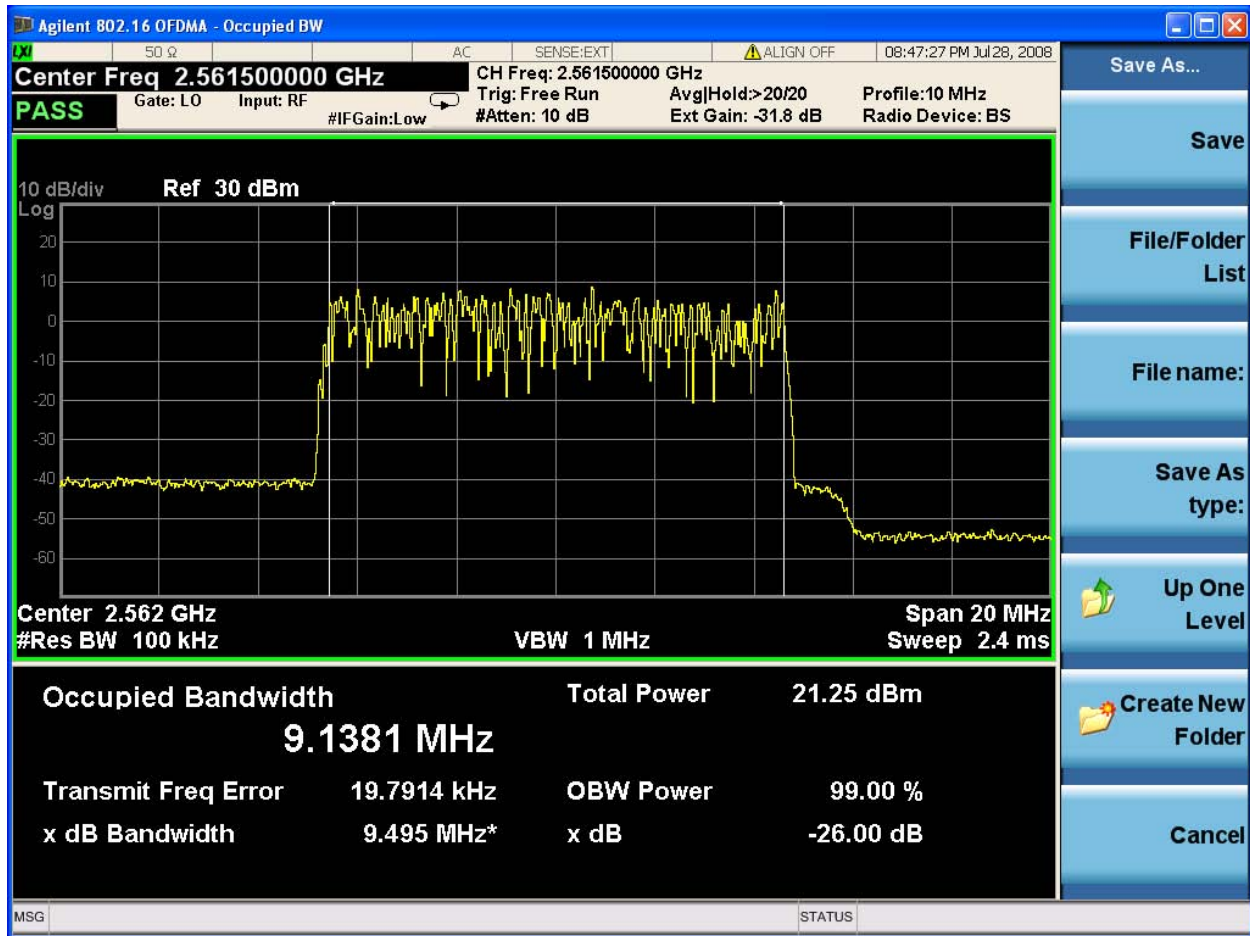
| | |
|-----------------------|---------------------------------|
| FCC Rules : | Part 2 §2.1046 & §27.50(h) |
| Path : | Down Link |
| Operating Frequency : | 3 rd FA (2561.5 MHz) |
| Input Level : | -56 dBm |
| System Gain : | 80 dB |
| Modulation : | 16QAM |
| Bandwidth : | 10 MHz |



| | |
|-------------------|------------|
| Channel Power : | 21.26 dBm |
| 99% Bandwidth : | 9.1387 MHz |
| 26 dB Bandwidth : | 9.496 MHz |

6.2.2.9 2561.5 MHz / 64QAM

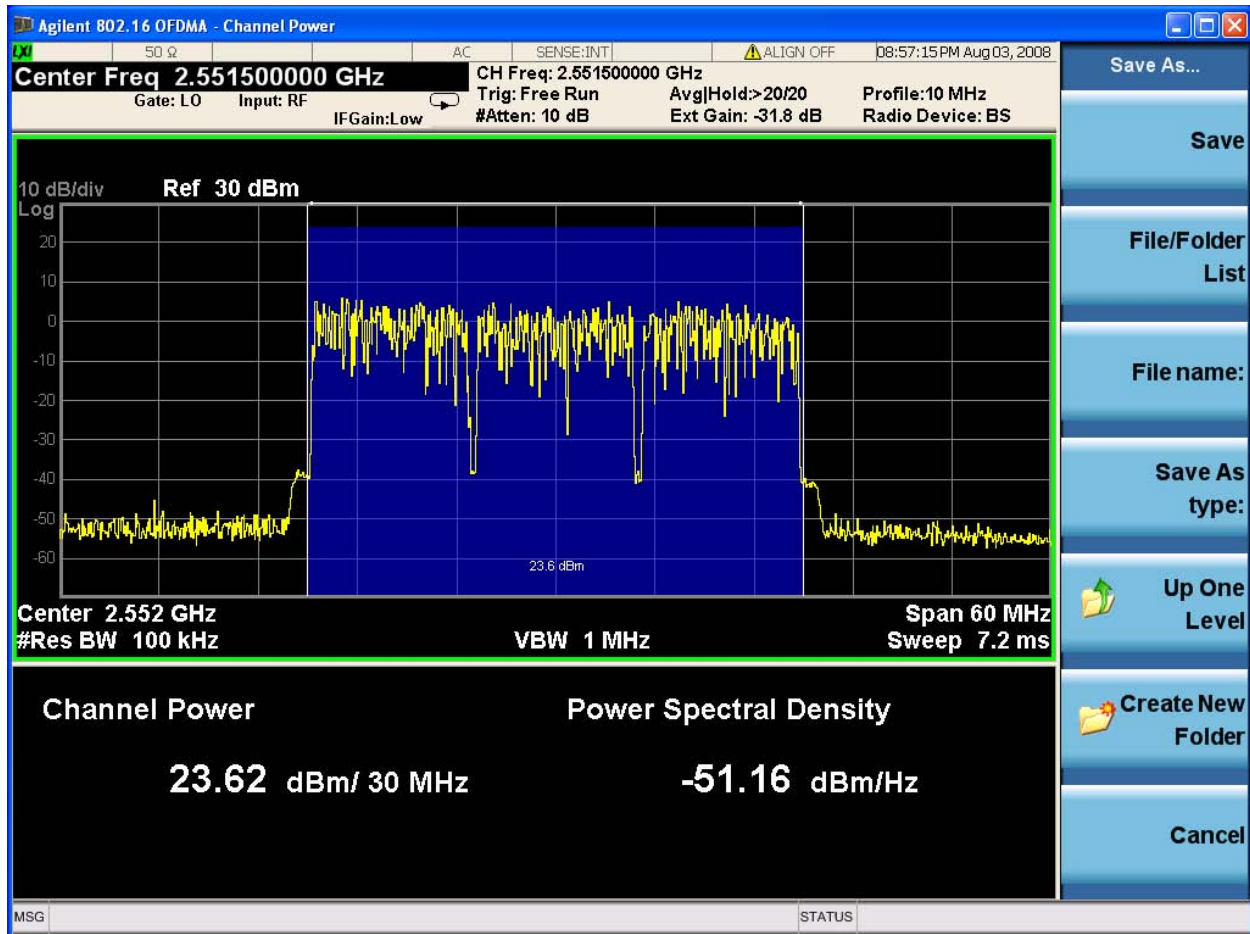
| | |
|-----------------------|---------------------------------|
| FCC Rules : | Part 2 §2.1046 & §27.50(h) |
| Path : | Down Link |
| Operating Frequency : | 3 rd FA (2561.5 MHz) |
| Input Level : | -56 dBm |
| System Gain : | 80 dB |
| Modulation : | 64QAM |
| Bandwidth : | 10 MHz |



| | |
|-------------------|------------|
| Channel Power : | 21.25 dBm |
| 99% Bandwidth : | 9.1381 MHz |
| 26 dB Bandwidth : | 9.495 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 : | -56 dBm |
| System Gain : | 80 dB |
| Bandwidth : | 30 MHz |

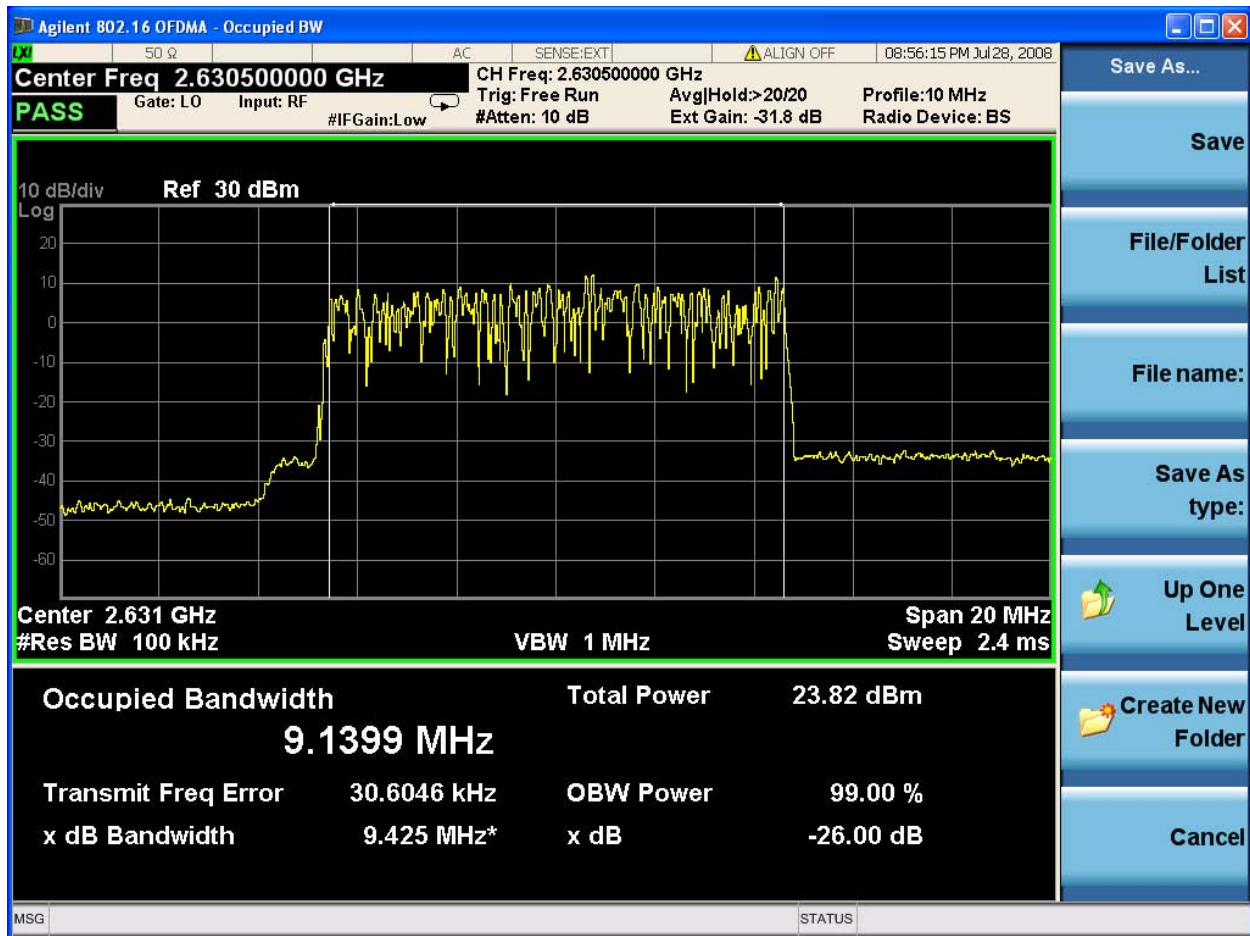


Channel Power : 23.62 dBm

6.2.3 E-F Block

6.2.3.1 2630.5 MHz / QPSK

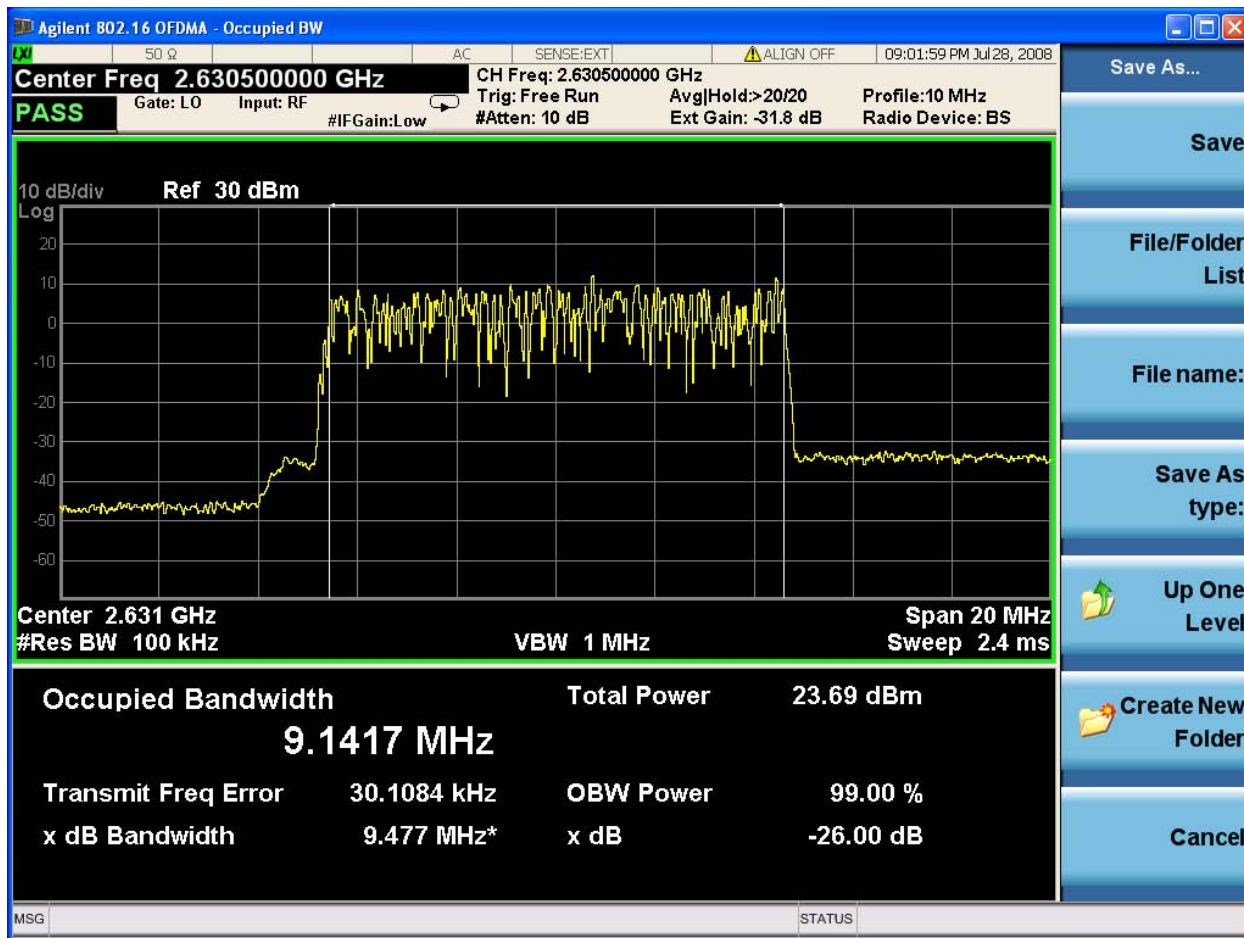
| | |
|-----------------------|---------------------------------|
| FCC Rules : | Part 2 §2.1046 & §27.50(h) |
| Path : | Down Link |
| Operating Frequency : | 1 st FA (2630.5 MHz) |
| Input Level : | -56 dBm |
| System Gain : | 80 dB |
| Modulation : | QPSK |
| Bandwidth : | 10 MHz |



| | |
|-------------------|------------|
| Channel Power : | 23.82 dBm |
| 99% Bandwidth : | 9.1399 MHz |
| 26 dB Bandwidth : | 9.425 MHz |

6.2.3.2 2630.5 MHz / 16QAM

| | |
|-----------------------|---------------------------------|
| FCC Rules : | Part 2 §2.1046 & §27.50(h) |
| Path : | Down Link |
| Operating Frequency : | 1 st FA (2630.5 MHz) |
| Input Level : | -56 dBm |
| System Gain : | 80 dB |
| Modulation : | 16QAM |
| Bandwidth : | 10 MHz |



| | |
|-------------------|------------|
| Channel Power : | 23.69 dBm |
| 99% Bandwidth : | 9.1417 MHz |
| 26 dB Bandwidth : | 9.477 MHz |