



# FCC TEST REPORT (PART 27)

**REPORT NO.:** RF981104H02

**MODEL NO.:** RG211-2.5, RG211-2.5-1D1V,  
RG211-2.5-1D

**RECEIVED:** Nov. 04, 2009

**TESTED:** Nov. 13 to 25, 2009

**ISSUED:** Dec. 17, 2009

**APPLICANT:** Accton Wireless Broadband Corp.

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**ISSUED BY :** Bureau Veritas Consumer Products Services (H.K.)  
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# 1 CERTIFICATION

**PRODUCT:** WiMAX 802.16e Indoor CPE

**BRAND NAME:** AWB

**MODEL NO.:** RG211-2.5, RG211-2.5-1D1V, RG211-2.5-1D

**APPLICANT:** Accton Wireless Broadband Corp.

**TESTED:** Nov. 13 to 25, 2009

**TEST SAMPLE:** R&D SAMPLE

**TEST STANDARDS:** FCC 47 CFR Part 2

FCC 47 CFR Part 27, Subpart C & M

ANSI/TIA/EIA-603-C-2004

The above equipment (Model No.: RG211-2.5) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

**PREPARED BY** : Sunny Wen , **DATE:** Dec 17, 2009  
( Sunny Wen, Specialist )

**TECHNICAL ACCEPTANCE** : Hank Chung , **DATE:** Dec 17, 2009  
( Hank Chung, Deputy Manager )

**APPROVED BY** : May Chen , **DATE:** Dec 17, 2009  
( May Chen, Deputy Manager )

## 2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 27 & Part 2			
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT	REMARK
2.1046 27.50(h)(2)	Maximum Peak Output Power Limit: max. 2 watts conducted peak power	PASS	Meet the requirement of limit.
2.1055 27.54	Frequency Stability Stay with the authorized bands of operation	PASS	Meet the requirement of limit.
2.1049 27.53(m)(6)	Emission Bandwidth	PASS	Meet the requirement of limit.
2.1051 27.53(m)(4)(6)	Band Edge Measurements	PASS	Meet the requirement of limit.
2.1051 27.53(m)(4)(6)	Conducted Spurious Emissions	PASS	Meet the requirement of limit.
2.1053 27.53(m)(4)(6)	Radiated Spurious Emissions	PASS	Meet the requirement of limit.



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## 2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$ .

Measurement	Value
Radiated emissions (30MHz-1GHz)	3.94 dB
Radiated emissions (1GHz -18GHz)	2.49 dB
Radiated emissions (18GHz -40GHz)	2.70 dB

### 3 GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT</b>	WiMAX 802.16e Indoor CPE
<b>MODEL NO.</b>	RG211-2.5, RG211-2.5-1D1V, RG211-2.5-1D
<b>FCC ID</b>	V8YFW181RG25020W
<b>POWER SUPPLY</b>	DC 12V from power adapter
<b>MODULATION TECHNOLOGY</b>	OFDMA
<b>MODULATION</b>	QPSK-1/2, -3/4, 16QAM-1/2, 3/4, 64QAM-1/2, -2/3, -3/4, -5/6 (64QAM for Rx only)
<b>OPERATING FREQUENCY</b>	5MHz: 2502.5MHz ~ 2687.5MHz 10MHz: 2505MHz ~ 2685MHz
<b>CHANNEL BANDWIDTH</b>	5MHz & 10MHz
<b>MAX. CONDUCTED POWER</b>	5MHz: 25.5dBm 10MHz: 25.3dBm
<b>ANTENNA TYPE</b>	Please see note 1
<b>DATA CABLE</b>	NA
<b>I/O PORTS</b>	See note 1
<b>ASSOCIATED DEVICES</b>	Adapter x 2

**NOTE:**

- The EUT has three model names, which are identical to each other in all aspects except for the following:

Brand	Model No.	Difference
AWB	RG211-2.5	I/O ports: LAN port x 1, Phone port x 1
	RG211-2.5-1D1V	
	RG211-2.5-1D	I/O port: LAN port x 1

From the above models, the worst case was found in model: **RG211-2.5** for the test and its data were recorded in this report.

- There are two antennas provided to this EUT, please refer to the following table:

Chain	Antenna Type	Antenna Connector	Net Gain (dBi)	Cable Length (mm)	Cable loss (dB)	Frequency range (MHz)
0	External Omni-dipole	RPSMA	4.7	195	0.3	2500~2700
1				90		

3. The EUT could be supplied with the a power adapter as below table:

Adapter 1	
Brand:	Powertron
Model No.:	PA1015-2HU
Input power :	100-240V, 50-60Hz, 0.4A
Output power :	12V, 1.5A DC output cable (1.55m, Unshielded)
Adapter 2	
Brand:	APD
Model No.:	WA-18G12U
Input power :	100-240V, 50-60Hz, 0.5A
Output power :	12V, 1.5A DC output cable (1.8m, Unshielded)

From the above adapters, the worst case was found in **Adapter 1**. Therefore only the test data of the modes were recorded in this report.

4. For the EUT Modulation type and coding rate. After pre-testing items of output power and spurious emissions, QPSK-3/4 was found to be 5MHz worst case, 16QAM-1/2 was found to be 10MHz worst case, and was selected for the final test configuration.

Up Link		Down Link	
Modulation	Coding rate	Modulation	Coding rate
QPSK	1/2	QPSK	1/2
	3/4		3/4
16QAM	1/2	16QAM	1/2
	3/4		3/4
/		64QAM	1/2
			2/3
			3/4
			5/6

5. The EUT is 2 \* 2 spatial MIMO without beam forming function. The antenna configuration is two transmitter antennas and two receiver antennas, as there are two dipole antennas. Spatial multiplexing modes for simultaneous transmission using 2 antennas, and for simultaneous receiver using 2 antennas.

6. The EUT embedded a firmware for testing that needs to control from Notebook computer to let EUT with different DL/UL ration.





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7. The device has different DL/UL ration in normal operation. It was tested with 38% (DL:UL= 29:18) and 38% (DL:UL=29:18) duty cycle mode for 5MHz and 10MHz, which is the worse mode, and controlled by software. (The detail duty cycle refer to appendix A).
8. The above EUT information was declared by manufacturer and for more detailed feature descriptions, please refers to the manufacturer's specifications or User's Manual.

### 3.2 DESCRIPTION OF TEST MODES

Three channels have been tested and presented.

#### **CHANNEL BANDWIDTH: 5MHz**

**Low channel (L):** 2502.5MHz.

**Middle channel (M):** 2600MHz.

**High channel (H):** 2687.5MHz.

#### **CHANNEL BANDWIDTH: 10MHz**

**Low channel (L):** 2505MHz.

**Middle channel (M):** 2600MHz.

**High channel (H):** 2685MHz.



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### 3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO							DESCRIPTION
	OP	FS	EB	CE	CSE	RE<1G	RE <sup>3</sup> 1G	
MODE 1	√	√	√	√	√	√	√	Channel Bandwidth: 5MHz
MODE 2	√	√	√	√	√	√	√	Channel Bandwidth: 10MHz

Where **OP**: Output power **FS**: Frequency stability  
**EB**: Emission bandwidth **CE**: Channel edge  
**CSE**: Conducted spurious emissions **RE<1G**: Radiated emission below 1GHz  
**RE<sup>3</sup>1G**: Radiated emission above 1GHz

#### COMBINATION MODE:

COMBINATION MODE	OPERATION MODE	TX CHAIN (0)	TX CHAIN (1)
A	UL:QPSK-1/2, DL:QPSK-1/2	√	√
B	UL:QPSK-3/4, DL:QPSK-1/2	√	√
C	UL:16QAM-1/2, DL:QPSK-1/2	√	√
D	UL:16QAM-3/4, DL:QPSK-1/2	√	√

#### Note:

1. The above information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.
2. Antenna 1 and Antenna 2 are Dipole.
3. Mode B the worst mode for 5MHz, Mode C the worst mode for 10MHz, were selected as representative mode for the report.

**OUTPUT POWER MEASUREMENT:**

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

TESTED MODE	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
MODE 1	L, M, H	OFDMA	QPSK
MODE 2	L, M, H	OFDMA	16QAM

**FREQUENCY STABILITY MEASUREMENT:**

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
M	OFDMA	Unmodulation

**EMISSION BANDWIDTH MEASUREMENT:**

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

TESTED MODE	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
MODE 1	L, M, H	OFDMA	QPSK
MODE 2	L, M, H	OFDMA	16QAM

**CHANNEL EDGE MEASUREMENT:**

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

TESTED MODE	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
MODE 1	L, M, H	OFDMA	QPSK
MODE 2	L, M, H	OFDMA	16QAM

**CONDUCTED SPURIOUS EMISSIONS MEASUREMENT:**

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

TESTED MODE	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
MODE 1	L, M, H	OFDMA	QPSK
MODE 2	L, M, H	OFDMA	16QAM

**RADIATED EMISSION MEASUREMENT (BELOW 1 GHz):**

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

TESTED MODE	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
MODE 1	M	OFDMA	QPSK
MODE 2	H	OFDMA	16QAM

**RADIATED EMISSION MEASUREMENT (ABOVE 1 GHz):**

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

TESTED MODE	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
MODE 1	L, M, H	OFDMA	QPSK
MODE 2	L, M, H	OFDMA	16QAM



### **3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS**

The EUT is a RF product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC 47 CFR Part 2**

**FCC 47 CFR Part 27, Subpart C & M**

**ANSI/TIA/EIA-603-C-2004**

All test items have been performed and recorded as per the above standards.

**NOTE:** The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.



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### 3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

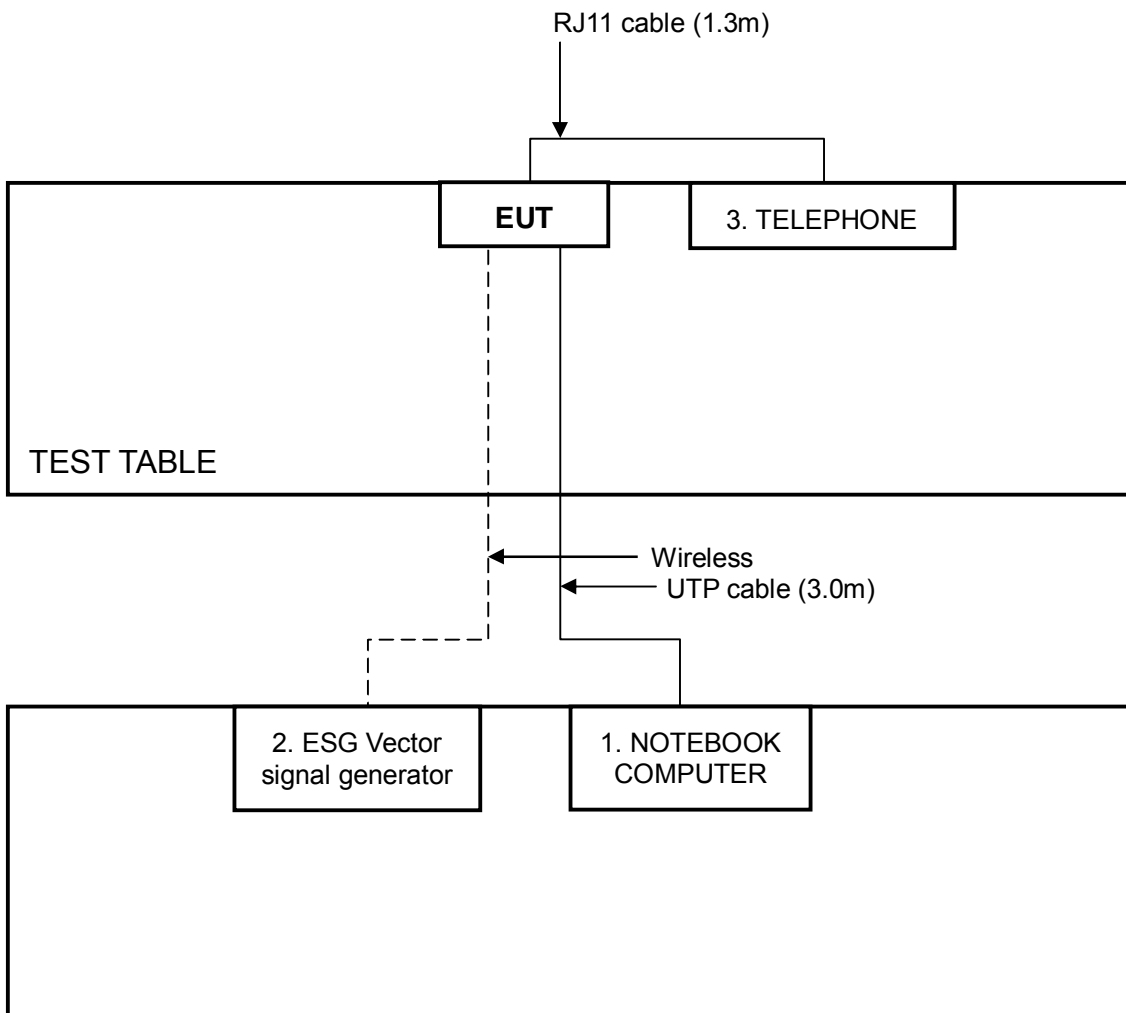
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	ASUS	M2400N	4ANP088103	FCC DoC
2	ESG Vector signal generator	Agilent	E4438C	MY45094468/005 506 602 UK6 UNJ	NA
3	TELEPHONE	WONDER	WD-303	6C17BA04787	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	3.0 m UTP cable.
2	NA
3	1.3 m non shielded cable, RJ11 connector, w/o core.

**NOTE:** All power cords of the above support units are non shielded (1.8m).



### 3.4.1 CONFIGURATION OF SYSTEM UNDER TEST



## 4 TEST TYPES AND RESULTS

### 4.1 OUTPUT POWER MEASUREMENT

#### 4.1.1 LIMITS OF OUTPUT POWER MEASUREMENT

The radiated peak output power shall be according to the specific rule Part 27.50(h)(2) that “Other User stations are limited to 2 watts and 27.50(i) specific that “Peak transmit power must be measure over any interval of continuous transmission using instrumentation calibration in terms of rms-equivalent voltage.”

#### 4.1.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
Anritsu Power meter	ML2495A	0824006	April 24, 2010
JFW 10dB attenuation	50HF-010-SMA	N/A	NA

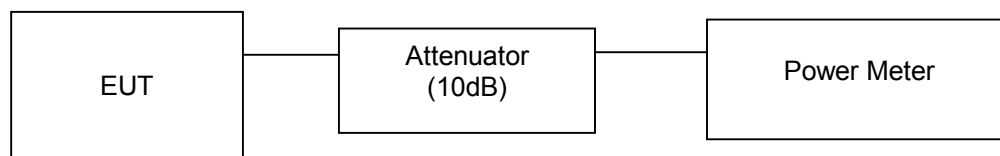
**NOTE:**

The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

#### 4.1.3 TEST PROCEDURES

The transmitter output was connected to power meter through an attenuator. The test result was measured and recorded.

#### 4.1.4 TEST SETUP



#### 4.1.5 EUT OPERATING CONDITIONS

1. Prepared other computer system (support unit 1) to act as communication partners and placed them outside of testing area.
2. The communication partners run test program “Tera Term Web3.1.exe + wftpd32.exe” to enable EUT under transmission/receiving condition continuously at specific channel frequency.



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#### 4.1.6 TEST RESULTS

##### CHANNEL BANDWIDTH: 5MHz

<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>DETECTOR FUNCTION</b>	RMS
<b>ENVIRONMENTAL CONDITIONS</b>	20deg°C, 60%RH 1023hPa	<b>TESTED BY</b>	Phoenix Huang

CONDUCTED POWER					
CHANNEL	FREQUENCY (MHz)	Chain 0 POWER OUTPUT (dBm)	Chain 1 POWER OUTPUT (dBm)	TOTAL POWER OUTPUT (mW)	TOTAL POWER OUTPUT (dBm)
Low	2502.5	22.5	22.3	347.7	25.4
Middle	2600	22.4	22.6	355.8	25.5
High	2687.5	22.0	22.2	324.4	25.1



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### CHANNEL BANDWIDTH: 10MHz

<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>DETECTOR FUNCTION</b>	RMS
<b>ENVIRONMENTAL CONDITIONS</b>	20deg°C, 60%RH 1023hPa	<b>TESTED BY</b>	Phoenix Huang

CONDUCTED POWER					
CHANNEL	FREQUENCY (MHz)	Chain 0 POWER OUTPUT (dBm)	Chain 1 POWER OUTPUT (dBm)	TOTAL POWER OUTPUT (mW)	TOTAL POWER OUTPUT (dBm)
Low	2505	22.2	22.4	339.7	25.3
Middle	2600	22.3	22.0	328.3	25.2
High	2685	22.3	22.0	328.3	25.2



## 4.2 FREQUENCY STABILITY MEASUREMENT

### 4.2.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

According to the FCC part 2.1055 shall be tested the frequency stability. The rule is defined that "The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block." The test extreme voltage is according to the 2.1055(d)(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment and the extreme temperature rule is comply with specification of EUT  $-30^{\circ}\text{C} \sim 50^{\circ}\text{C}$ .

### 4.2.2 TEST INSTRUMENTS

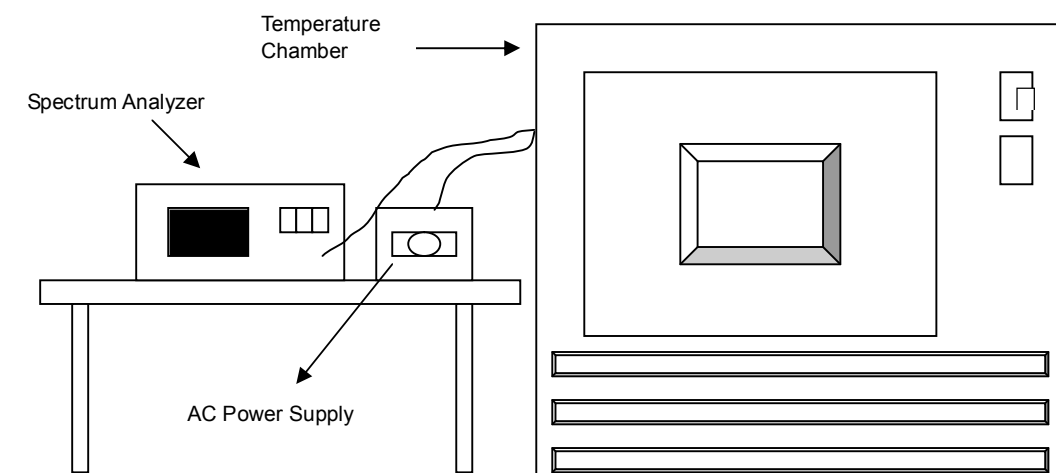
DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 03, 2009	Aug. 02, 2010
OVEN	MHU-225AU	911033	Dec. 18, 2008	Dec. 17, 2009
HUBER+SUHNER	SUCOFLEX104	222684/4	Aug. 15, 2009	Aug. 14, 2010
AC POWER SOURCE	6205	1140503	NA	NA

**NOTE:** 1. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

#### 4.2.3 TEST PROCEDURE

- a. Power must be removed when changing from one temperature to another or one voltage to another voltage. Power warm up is at least 15 min and power applied should perform before recording frequency error.
- b. EUT is connected the external power supply to control the AC input power. The various Volts from the minimum 102 Volts to 138 Volts. Each step shall be record the frequency error rate.
- c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the  $\pm 0.5^{\circ}\text{C}$  during the measurement testing.
- d. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

#### 4.2.4 TEST SETUP





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#### 4.2.5 TEST RESULTS

<b>MODE</b>	Middle channel (2600MHz)	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz
<b>ENVIRONMENTAL CONDITIONS</b>	20deg°C, 60%RH 1023hPa	<b>TESTED BY</b>	Phoenix Huang

AFC FREQUENCY ERROR VS. VOLTAGE						
VOLTAGE (Volts)	2Minutes		5Minutes		10Minutes	
	FREQUENCY (MHz)	PPM (%)	FREQUENCY (MHz)	PPM (%)	FREQUENCY (MHz)	PPM (%)
138	2599.9986	0.000054	2599.9984	0.000062	2599.9983	0.000065
120	2599.9987	0.000050	2599.9989	0.000042	2599.9991	0.000035
102	2599.9988	0.000046	2599.9990	0.000038	2599.9985	0.000058

AFC FREQUENCY ERROR VS. TEMP						
TEMP (°C)	2Minutes		5Minutes		10Minutes	
	FREQUENCY (MHz)	PPM (%)	FREQUENCY (MHz)	PPM (%)	FREQUENCY (MHz)	PPM (%)
50	2599.9985	0.000058	2599.9986	0.000054	2599.9984	0.000062
40	2599.9986	0.000054	2599.9988	0.000046	2599.9989	0.000042
30	2599.9987	0.000050	2599.9989	0.000042	2599.9990	0.000038
20	2599.9987	0.000050	2599.9989	0.000042	2599.9991	0.000035
10	2599.9989	0.000042	2599.9988	0.000046	2599.9984	0.000062
0	2599.9991	0.000035	2599.9992	0.000031	2599.9994	0.000023
-10	2599.999	0.000038	2599.9992	0.000031	2599.9994	0.000023
-20	2599.9991	0.000035	2599.9992	0.000031	2599.9995	0.000019
-30	2599.9992	0.000031	2599.9994	0.000023	2599.9991	0.000035





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### 4.3 EMISSION BANDWIDTH MEASUREMENT

#### 4.3.1 LIMITS OF EMISSION BANDWIDTH MEASUREMENT

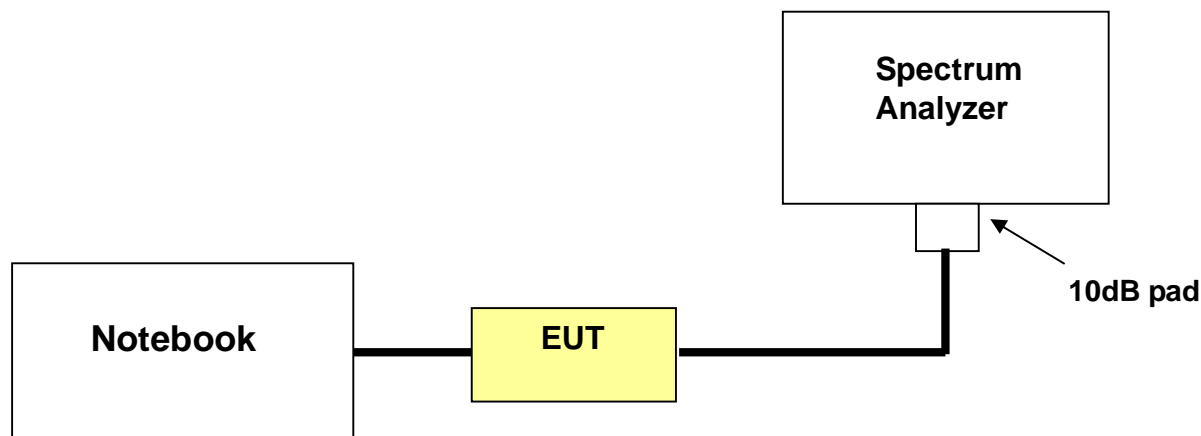
According to FCC 27.53(m)(6) specified that emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power.

#### 4.3.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	CALIBRATED DATE	CALIBRATED UNTIL
Agilent Spectrum Analyzer	E4446A	MY46180622	Apr. 24 , 2009	Apr. 23 , 2010
HUBER+SUHNER	SUCOFLEX104	222684/4	Aug. 15, 2009	Aug. 14, 2010
JFW 10dB attenuation	50HF-010-SMA	N/A	N/A	N/A

**NOTE:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

#### 4.3.3 TEST SETUP



#### 4.3.4 TEST PROCEDURES

- a. The Notebook controlled EUT to export rated output power under transmission mode and specific channel frequency. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100kHz RBW and 300kHz VBW. The 26dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 26dB.



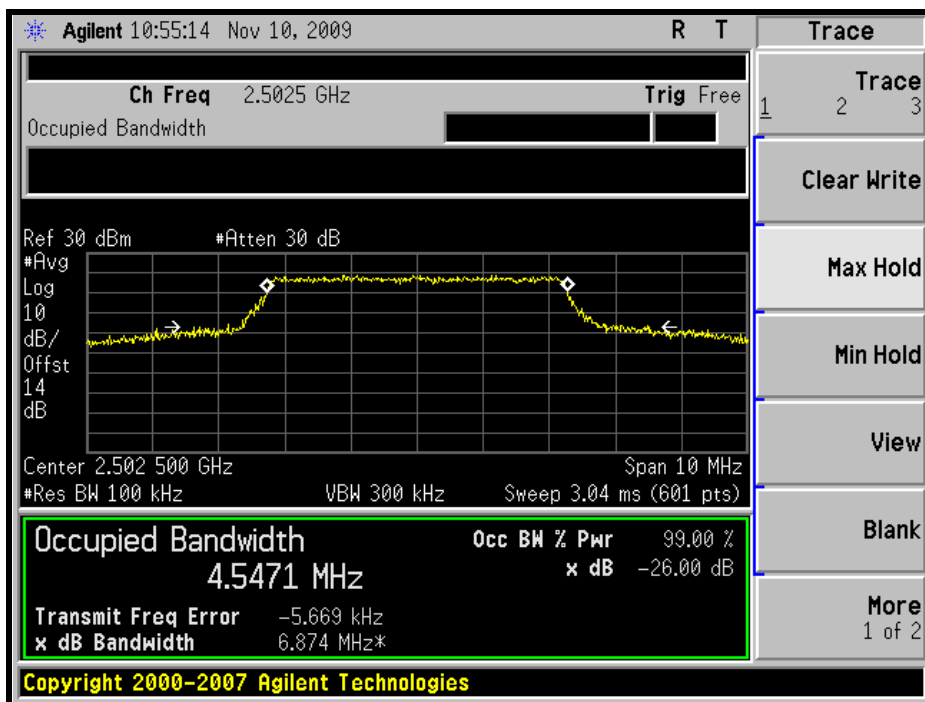
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### 4.3.5 TEST RESULTS

#### CHANNEL BANDWIDTH: 5MHz

FREQUENCY (MHz)	-26 dBc BANDWIDTH (MHz)
2502.5	6.874
2600	7.103
2687.5	7.585

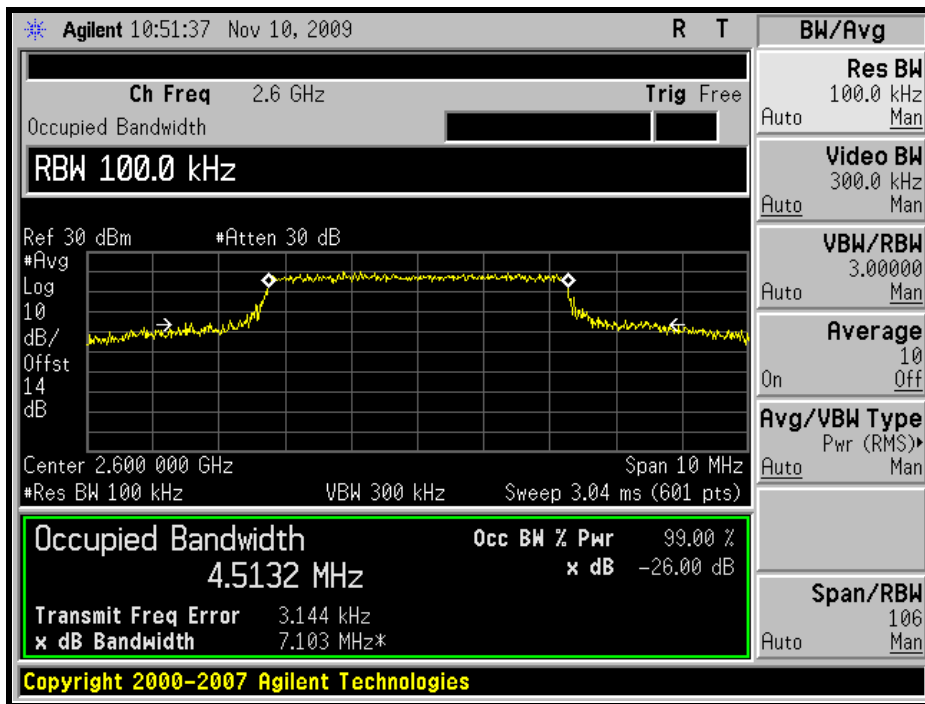
#### LOW CHANNEL



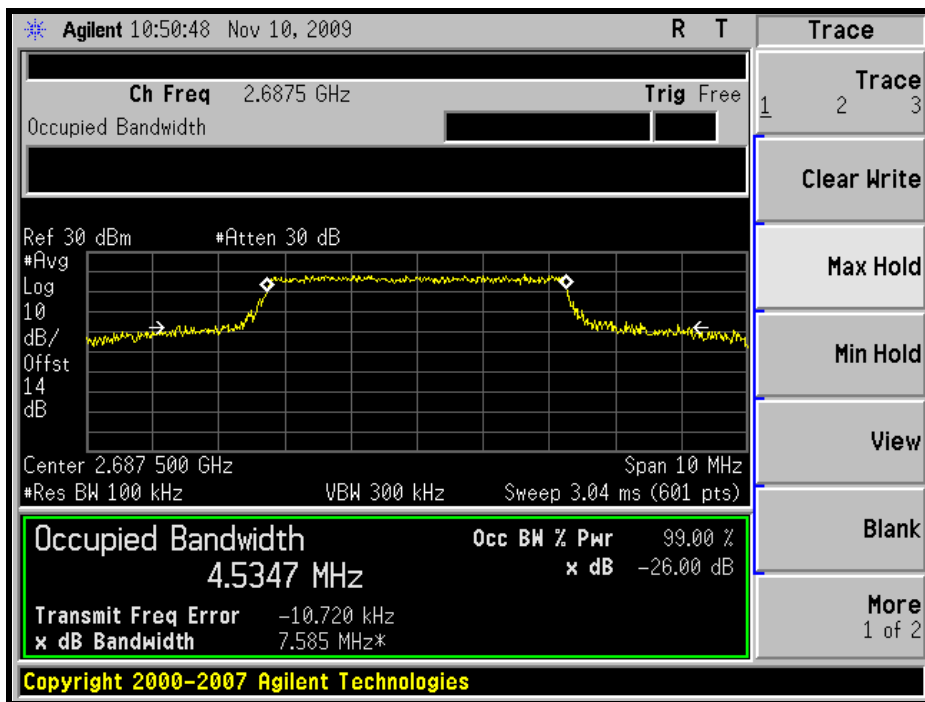


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### MIDDLE CHANNEL



### HIGH CHANNEL



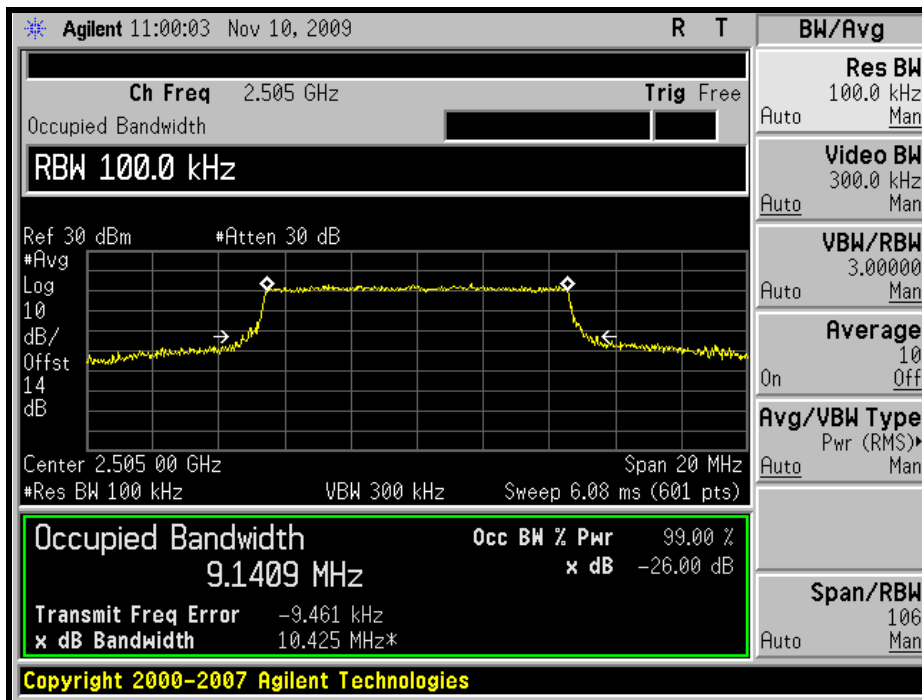


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### CHANNEL BANDWIDTH: 10MHz

FREQUENCY (MHz)	-26 dBc BANDWIDTH (MHz)
2505	10.425
2600	10.649
2685	10.598

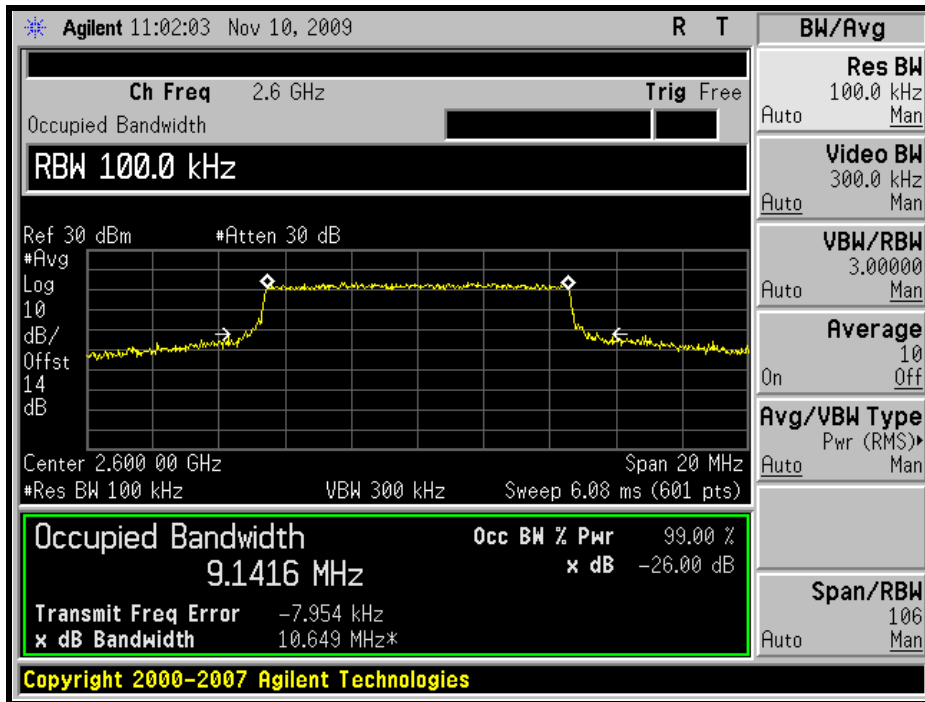
### LOW CHANNEL



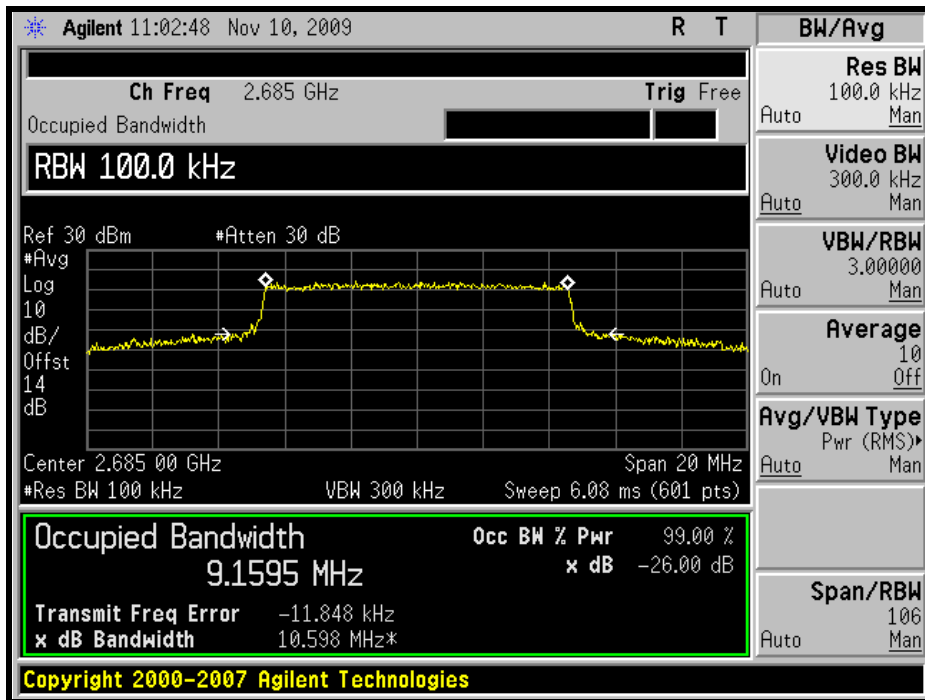


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### MIDDLE CHANNEL



### HIGH CHANNEL



## 4.4 CHANNEL EDGE MEASUREMENT

### 4.4.1 LIMITS OF CHANNEL EDGE MEASUREMENT

According to FCC 27.53(m)(2) specified that power of any emission outside of the channel edge must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$ dB. In the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

### 4.4.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	CALIBRATED DATE	CALIBRATED UNTIL
Agilent Spectrum Analyzer	E4446A	MY46180622	Apr. 24 , 2009	Apr. 23 , 2010
HUBER+SUHNER	SUCOFLEX104	222684/4	Aug. 15, 2009	Aug. 14, 2010
JFW 10dB attenuation	50HF-010-SMA	NA	NA	NA

**NOTE:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

### 4.4.3 TEST SETUP

Same as Item 4.3.3

#### 4.4.4 TEST PROCEDURES

- a. The EUT was set up for the rated peak power. The power was measured with Spectrum Analyzer. All measurements were done at 3 channels: low, middle and high operational frequency range.
- b. For Channel bandwidth: 5 MHz:  
The center frequency of spectrum is the band edge frequency and span is 20MHz. RB of the spectrum is 82kHz and VB of the spectrum is 270kHz.
- c. For Channel bandwidth: 10 MHz:  
The center frequency of spectrum is the band edge frequency and span is 30MHz. RB of the spectrum is 110kHz and VB of the spectrum is 330kHz.
- d. Record the max trace plot into the test report.

#### 4.4.5 EUT OPERATING CONDITION

Same as item 4.1.5





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#### 4.4.6 TEST RESULTS

### CHANNEL BANDWIDTH: 5MHz

#### LOW CHANNEL-LEFT

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)		TOTAL POWER DENSITY (mW)	TOTAL POWER DENSITY (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)				
2502.5	2499.974	-28.18	-26.75	0.0036	-24.40	-13	PASS
	2498.5	-20.75	-21.34	0.0158	-18.02	-13	PASS
	2497.5	-25.25	-23.07	0.0079	-21.01	-13	PASS
	2496.5	-30.06	-28.08	0.0026	-25.93	-13	PASS
	2495.5	-34.66	-34.65	0.0007	-31.67	-13	PASS
	2495	-35.77	-36.07	0.0005	-32.92	-13	PASS
	2494	-38.41	-40.30	0.0002	-36.38	-25	PASS
	2493	-40.51	-39.78	0.0002	-36.99	-25	PASS

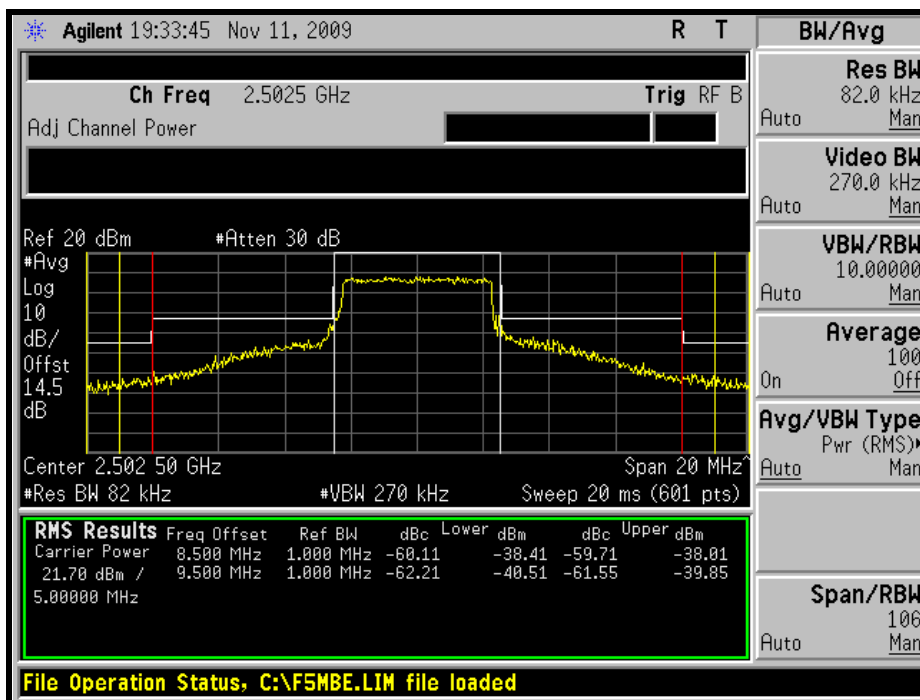
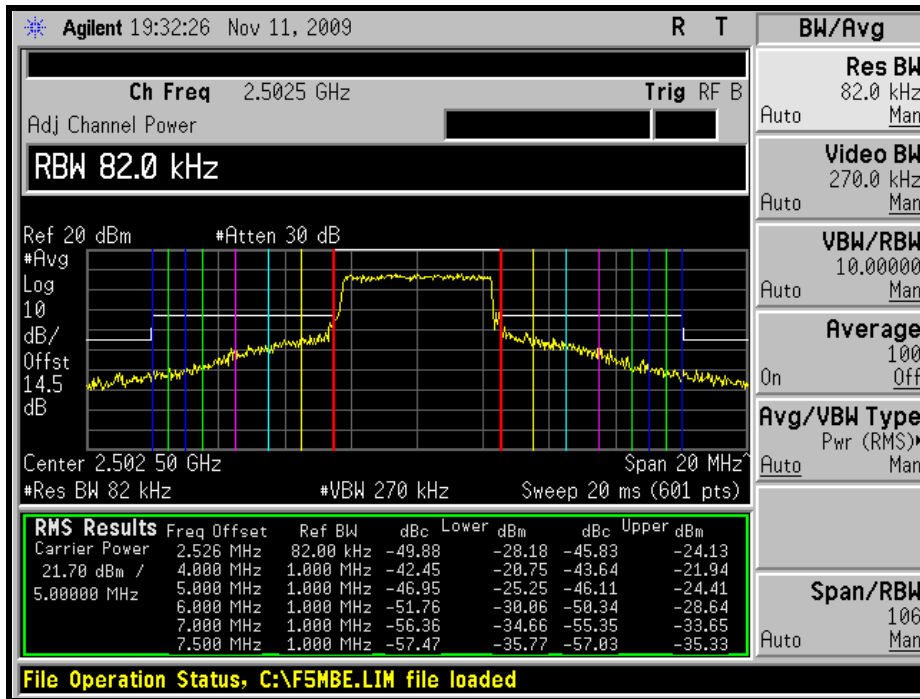
#### LOW CHANNEL-RIGHT

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)		TOTAL POWER DENSITY (mW)	TOTAL POWER DENSITY (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)				
2502.5	2505.026	-24.13	-26.46	0.0061	-22.13	-13	PASS
	2506.5	-21.94	-20.73	0.0149	-18.28	-13	PASS
	2507.5	-24.41	-23.47	0.0081	-20.90	-13	PASS
	2508.5	-28.64	-29.24	0.0026	-25.92	-13	PASS
	2509.5	-33.65	-32.97	0.0009	-30.32	-13	PASS
	2510	-35.33	-34.24	0.0007	-31.74	-13	PASS
	2511	-38.01	-36.73	0.0004	-34.32	-25	PASS
	2512	-39.85	-38.74	0.0002	-36.38	-25	PASS



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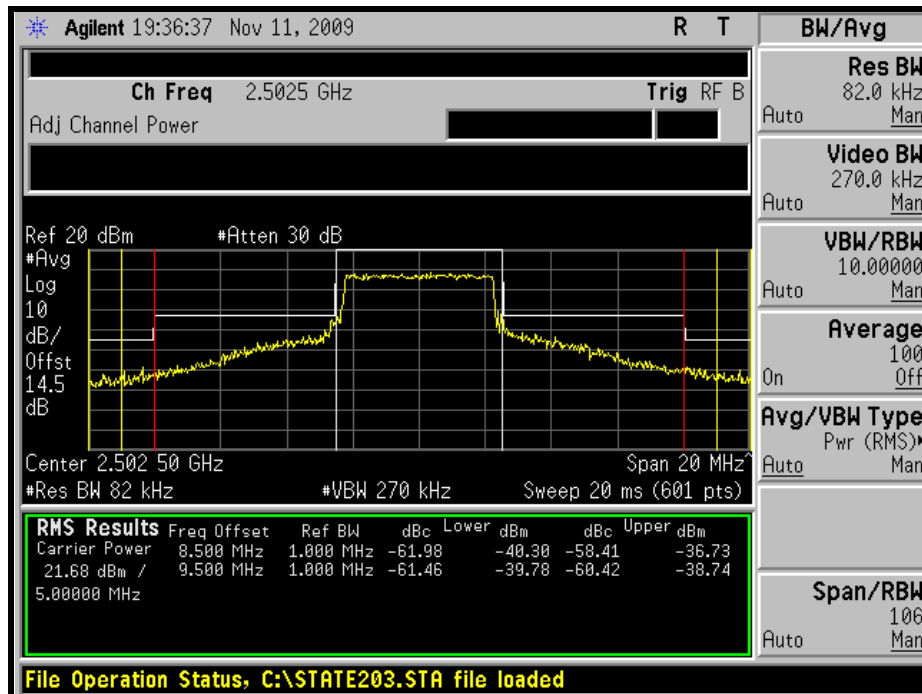
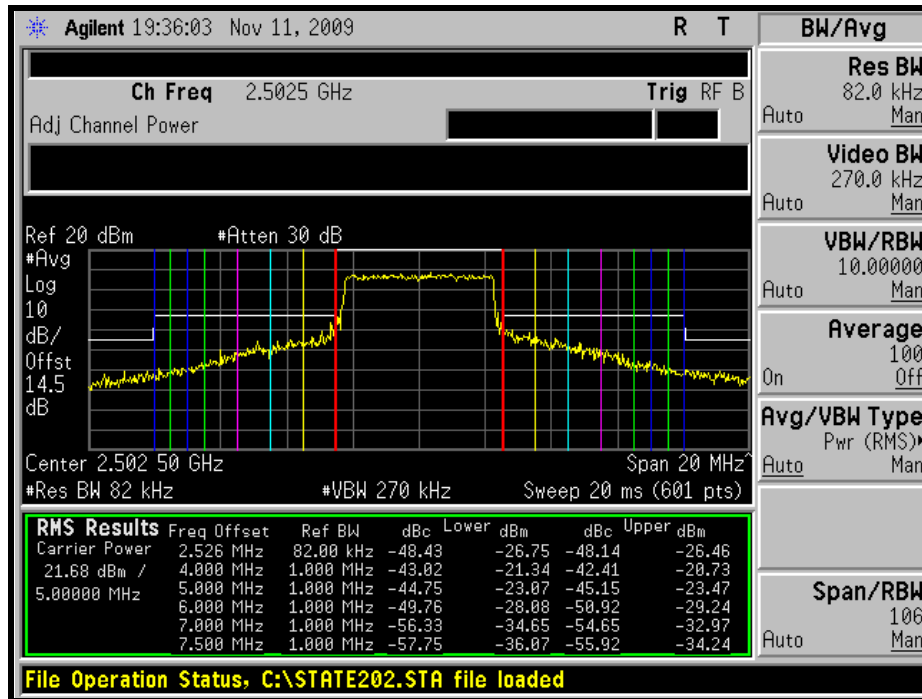
**CHAIN 0**  
**LOW CHANNEL**





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**CHAIN 1**  
**LOW CHANNEL**





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### MIDDLE CHANNEL-LEFT

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)		TOTAL POWER DENSITY (mW)	TOTAL POWER DENSITY (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)				
2600	2597.474	-24.02	-22.51	0.0096	-20.19	-13	PASS
	2596	-19.48	-17.38	0.0296	-15.29	-13	PASS
	2595	-21.22	-21.74	0.0143	-18.46	-13	PASS
	2594	-29.08	-28.04	0.0028	-25.51	-13	PASS
	2593	-35.93	-33.60	0.0007	-31.55	-13	PASS
	2592.5	-40.34	-35.22	0.0004	-34.09	-13	PASS
	2591.5	-38.41	-39.42	0.0003	-36.02	-25	PASS
	2590.5	-41.12	-40.42	0.0002	-37.70	-25	PASS

### MIDDLE CHANNEL-RIGHT

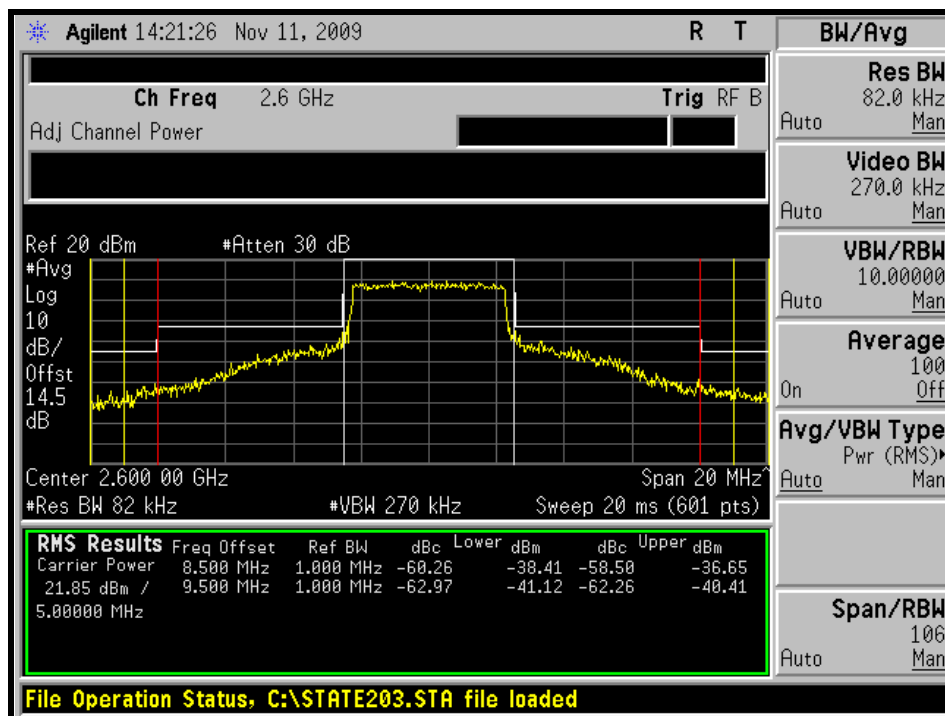
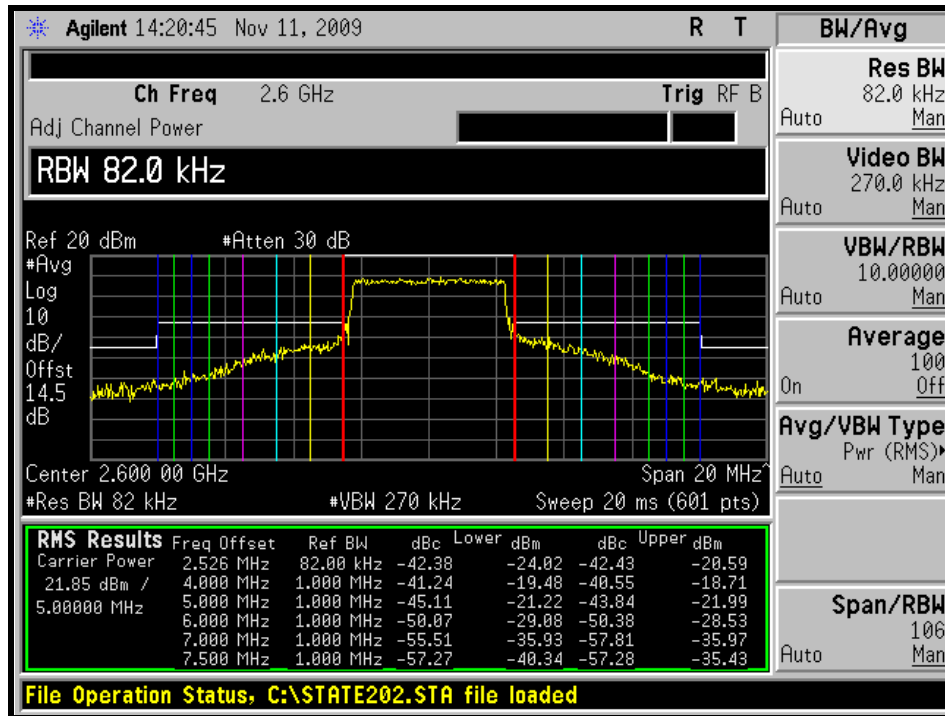
CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)		TOTAL POWER DENSITY (mW)	TOTAL POWER DENSITY (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)				
2600	2602.526	-20.59	-27.20	0.0106	-19.73	-13	PASS
	2604	-18.71	-16.79	0.0344	-14.63	-13	PASS
	2605	-21.99	-20.45	0.0153	-18.14	-13	PASS
	2606	-28.53	-25.51	0.0042	-23.76	-13	PASS
	2607	-35.97	-32.49	0.0008	-30.92	-13	PASS
	2607.5	-35.43	-33.40	0.0008	-31.25	-13	PASS
	2608.5	-36.65	-38.05	0.0004	-34.20	-25	PASS
	2609.5	-40.41	-39.81	0.0002	-37.21	-25	PASS



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CHAIN 0

MIDDLE CHANNEL

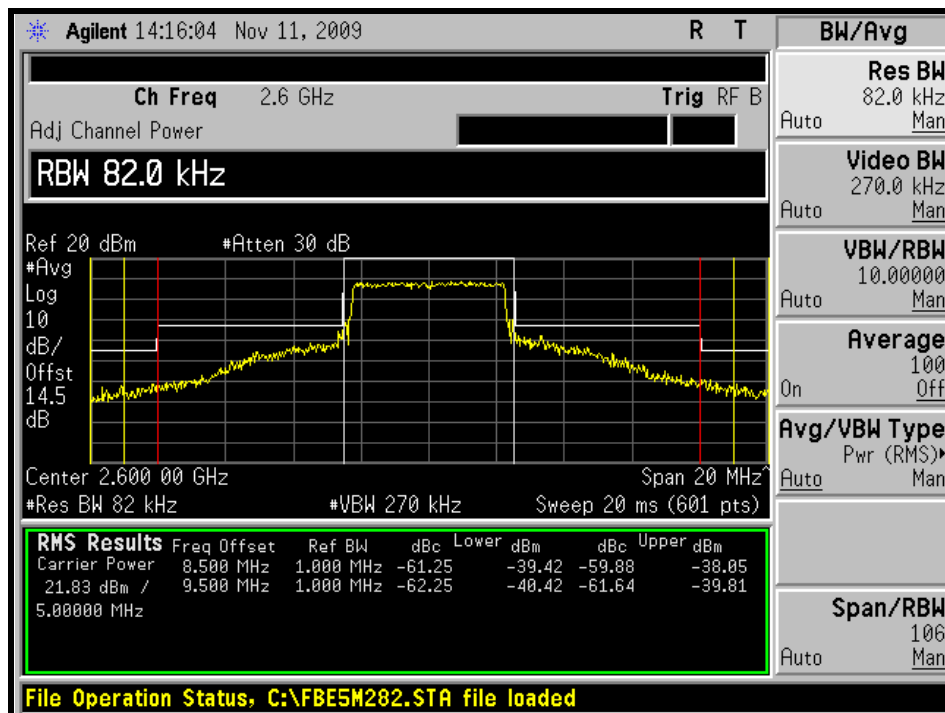
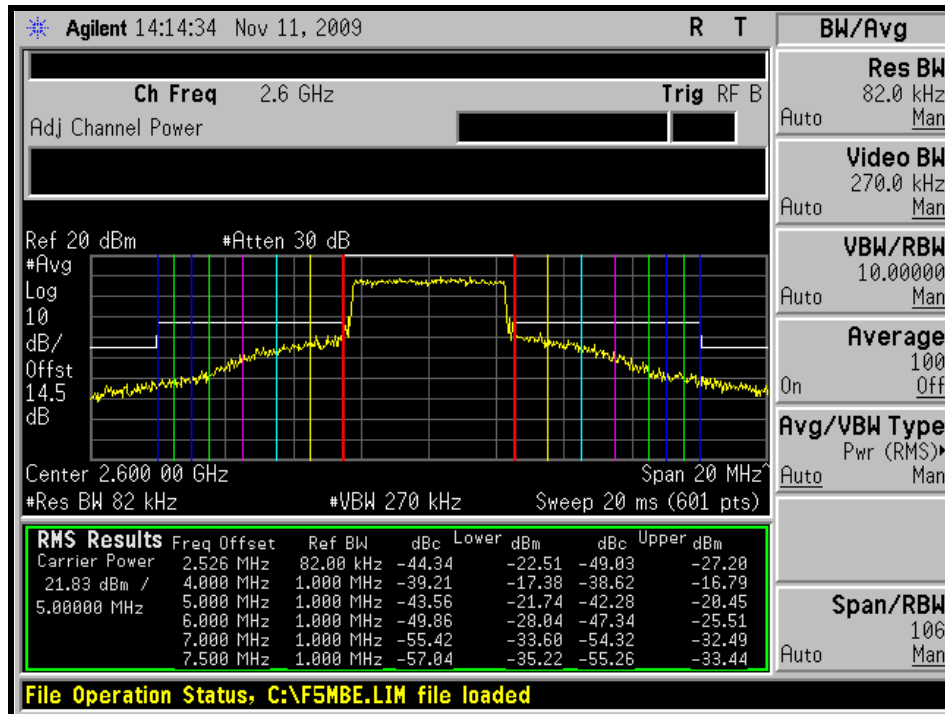




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CHAIN 1

MIDDLE CHANNEL





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### HIGH CHANNEL-LEFT

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)		TOTAL POWER DENSITY (mW)	TOTAL POWER DENSITY (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)				
2687.5	2684.974	-23.37	-23.06	0.0095	-20.20	-13	PASS
	2683.5	-18.00	-16.80	0.0367	-14.35	-13	PASS
	2682.5	-22.12	-21.88	0.0126	-18.99	-13	PASS
	2681.5	-27.26	-27.69	0.0036	-24.46	-13	PASS
	2680.5	-34.17	-34.10	0.0008	-31.14	-13	PASS
	2680	-35.73	-35.57	0.0006	-32.60	-13	PASS
	2679	-38.20	-38.21	0.0003	-35.23	-25	PASS
	2678	-40.90	-41.69	0.0002	-38.24	-25	PASS

### HIGH CHANNEL-RIGHT

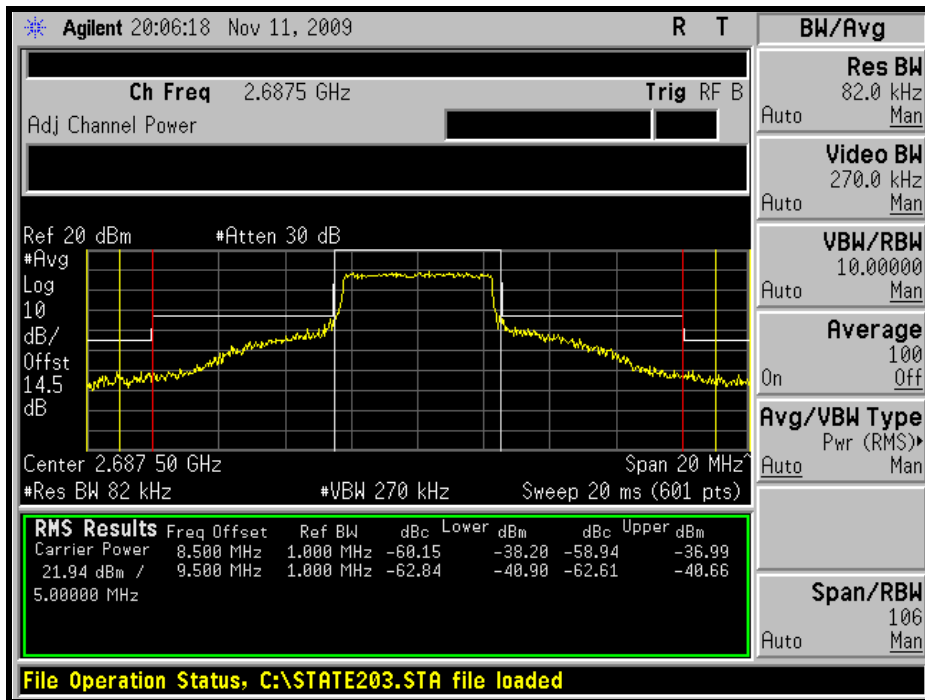
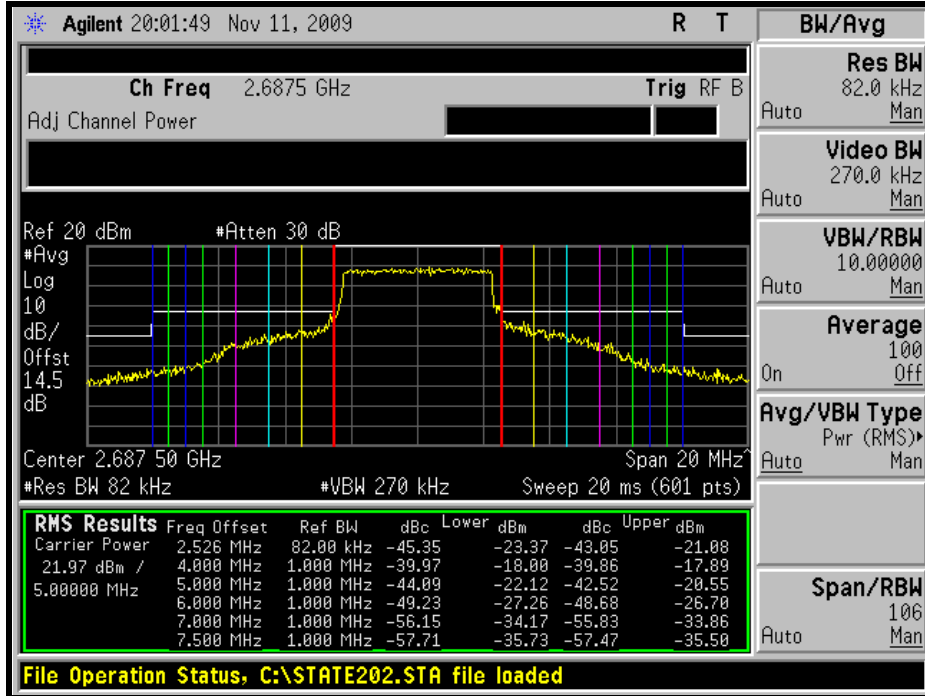
CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)		TOTAL POWER DENSITY (mW)	TOTAL POWER DENSITY (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)				
2687.5	2690.026	-21.08	-24.71	0.0112	-19.52	-13	PASS
	2691.5	-17.89	-16.17	0.0404	-13.94	-13	PASS
	2692.5	-20.55	-20.67	0.0174	-17.60	-13	PASS
	2693.5	-26.70	-25.63	0.0049	-23.12	-13	PASS
	2694.5	-33.86	-33.69	0.0008	-30.76	-13	PASS
	2695	-35.50	-35.48	0.0006	-32.52	-13	PASS
	2696	-36.99	-38.71	0.0003	-34.81	-25	PASS
	2697	-40.66	-40.95	0.0002	-37.70	-25	PASS



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CHAIN 0

HIGH CHANNEL



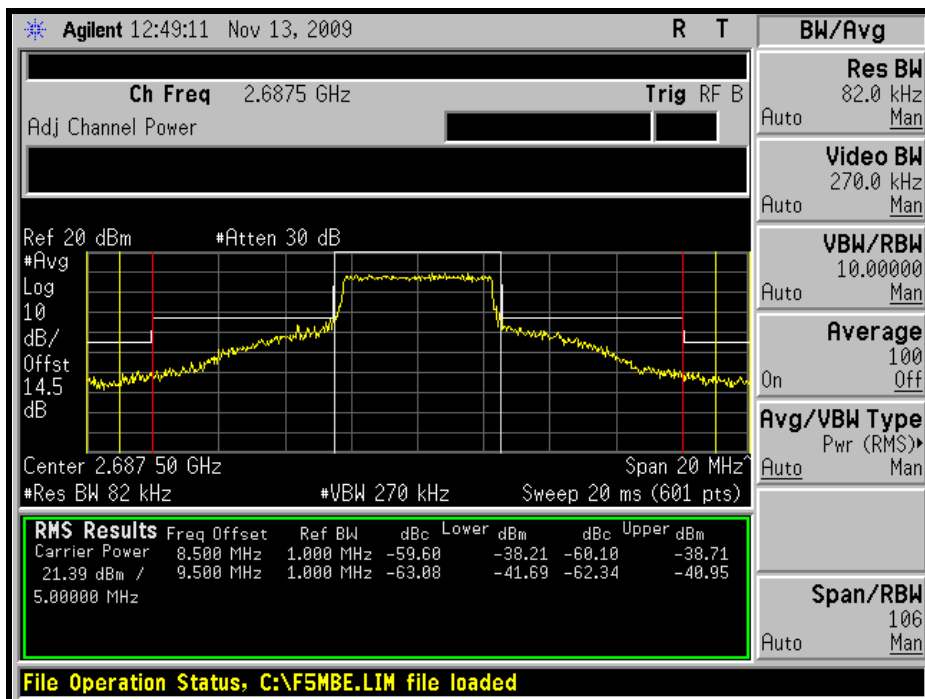
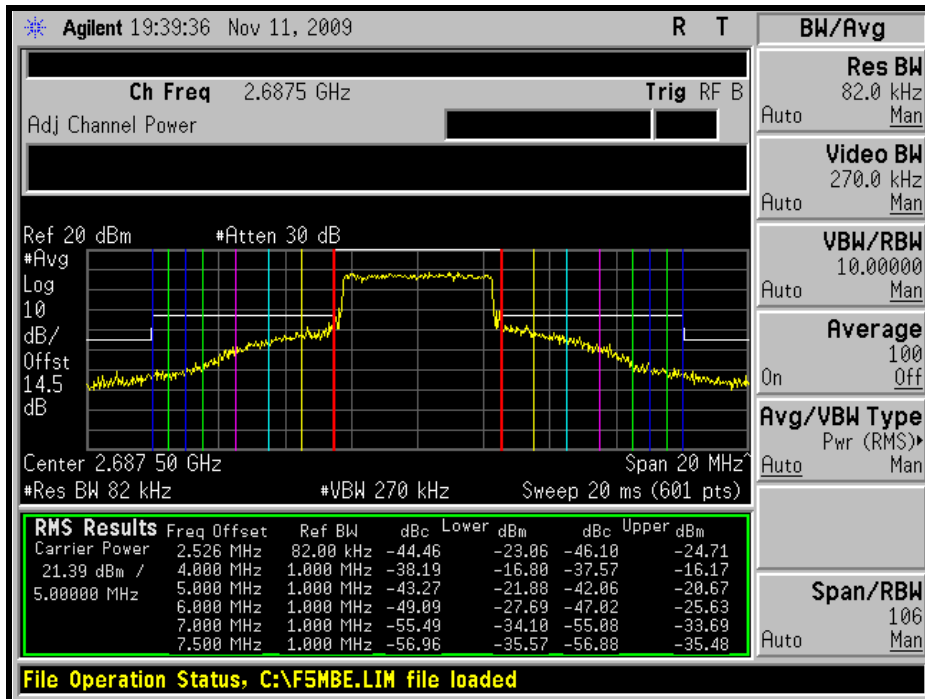




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CHAIN 1

HIGH CHANNEL





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**CHANNEL BANDWIDTH: 10MHz****LOW CHANNEL-LEFT**

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)		TOTAL POWER DENSITY (mW)	TOTAL POWER DENSITY (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)				
2505	2499.95	-30.14	-29.49	0.0021	-26.80	-13	PASS
	2498.5	-24.34	-22.38	0.0095	-20.24	-13	PASS
	2497.5	-24.79	-22.83	0.0085	-20.69	-13	PASS
	2496.5	-24.53	-23.11	0.0084	-20.75	-13	PASS
	2495.5	-28.02	-26.26	0.0040	-24.03	-13	PASS
	2495	-28.76	-26.57	0.0035	-24.52	-13	PASS
	2494	-33.13	-28.10	0.0020	-26.90	-13	PASS
	2493	-33.50	-31.38	0.0012	-29.28	-13	PASS
	2492	-36.69	-33.72	0.0006	-32.01	-13	PASS
	2491	-38.55	-36.56	0.0004	-34.44	-13	PASS

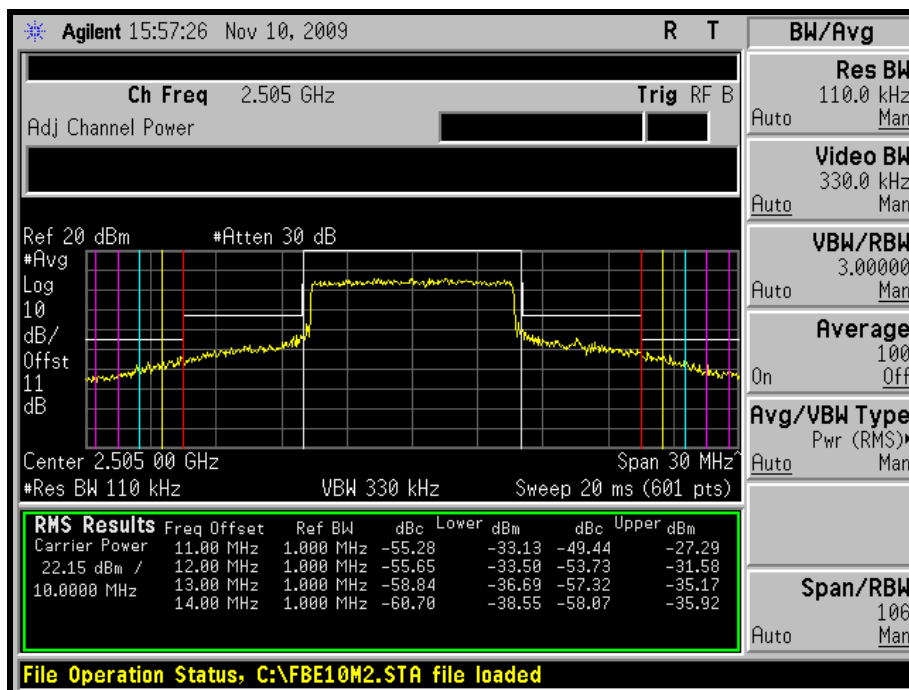
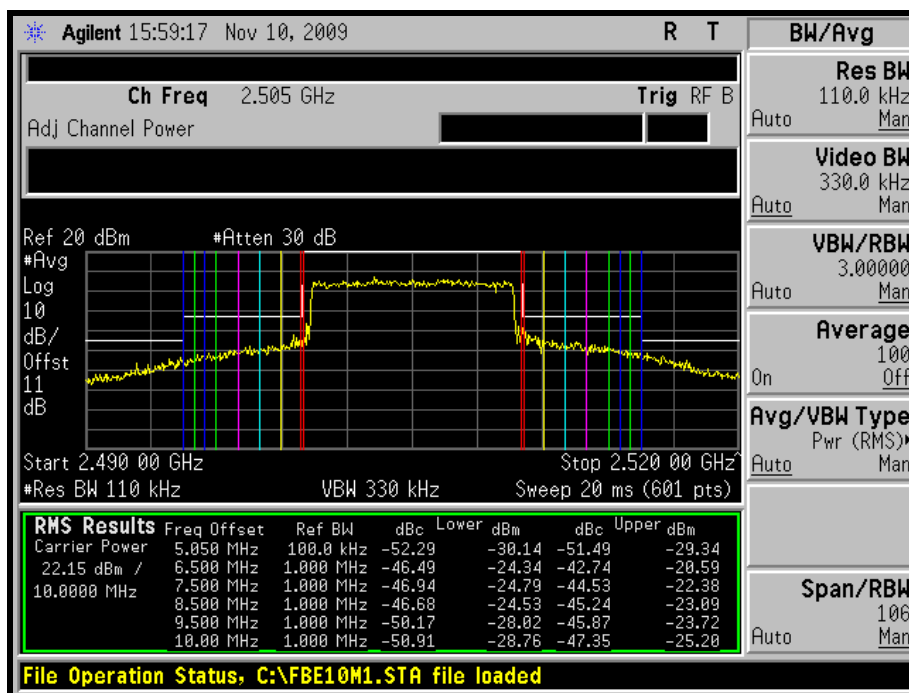
**LOW CHANNEL-RIGHT**

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)		TOTAL POWER DENSITY (mW)	TOTAL POWER DENSITY (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)				
2505	2510.05	-29.34	-28.22	0.0027	-25.73	-13	PASS
	2511.5	-20.59	-19.13	0.0210	-16.79	-13	PASS
	2512.5	-22.38	-20.30	0.0151	-18.21	-13	PASS
	2513.5	-23.09	-21.19	0.0125	-19.03	-13	PASS
	2514.5	-23.72	-21.74	0.0110	-19.61	-13	PASS
	2515	-25.20	-23.21	0.0078	-21.08	-13	PASS
	2516	-27.29	-25.65	0.0046	-23.38	-13	PASS
	2517	-31.58	-29.03	0.0020	-27.10	-13	PASS
	2518	-35.17	-32.02	0.0009	-30.32	-13	PASS
	2519	-35.92	-33.87	0.0007	-31.74	-13	PASS



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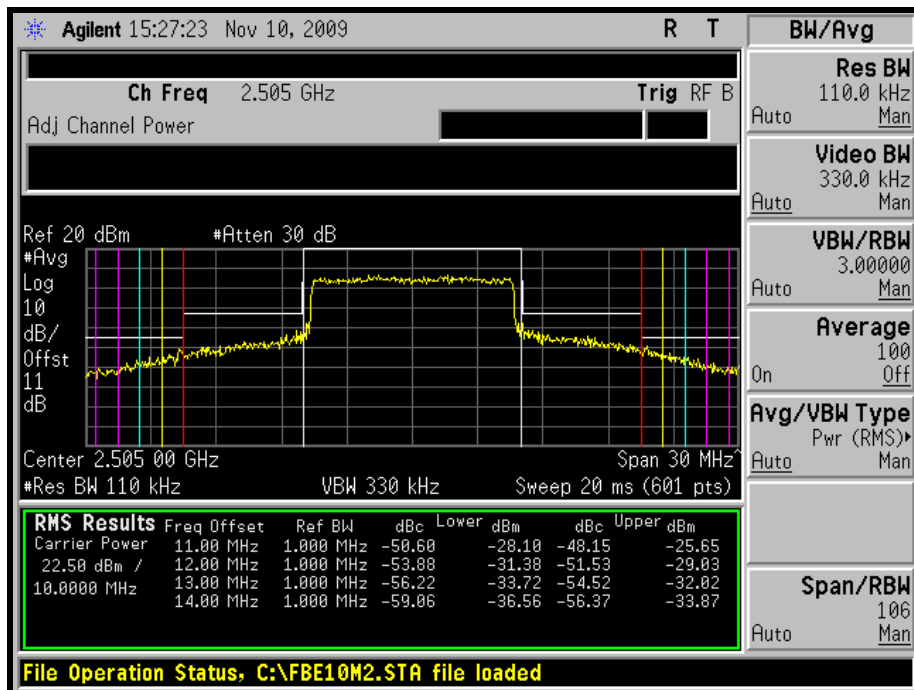
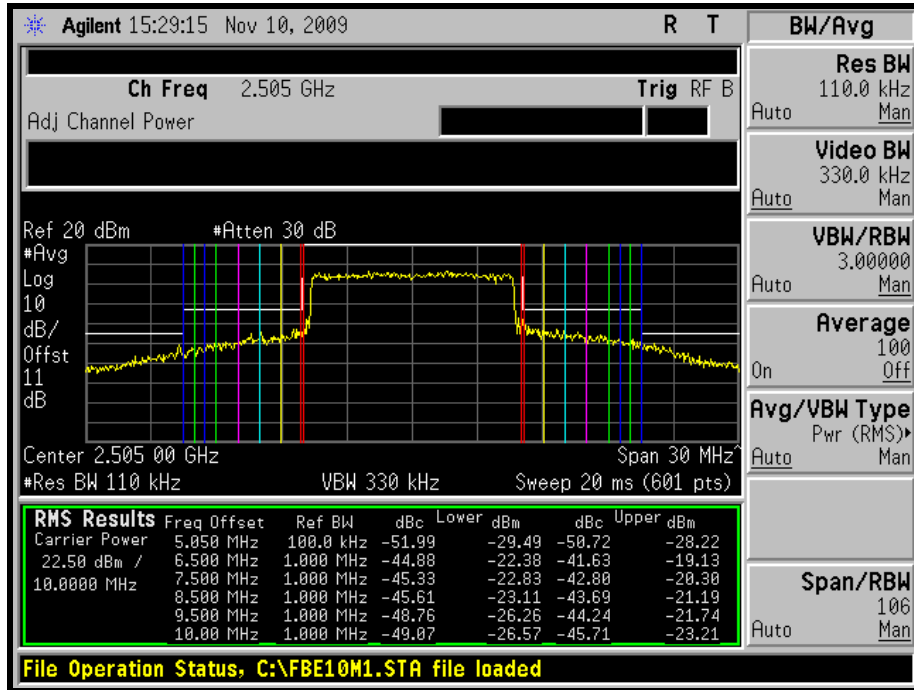
**CHAIN 0**  
**LOW CHANNEL**





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**CHAIN 1**  
**LOW CHANNEL**





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**MIDDLE CHANNEL-LEFT**

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)		TOTAL POWER DENSITY (mW)	TOTAL POWER DENSITY (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)				
2600	2594.95	-30.90	-25.96	0.0034	-24.75	-13	PASS
	2593.5	-21.07	-21.32	0.0152	-18.18	-13	PASS
	2592.5	-24.41	-22.37	0.0094	-20.26	-13	PASS
	2591.5	-24.91	-23.97	0.0072	-21.40	-13	PASS
	2590.5	-26.29	-25.67	0.0051	-22.96	-13	PASS
	2590	-27.26	-26.87	0.0039	-24.05	-13	PASS
	2589	-31.25	-28.88	0.0020	-26.90	-13	PASS
	2588	-32.45	-32.09	0.0012	-29.24	-13	PASS
	2587	-36.23	-34.84	0.0006	-32.44	-13	PASS
	2586	-39.09	-37.45	0.0003	-35.23	-13	PASS

**MIDDLE CHANNEL-RIGHT**

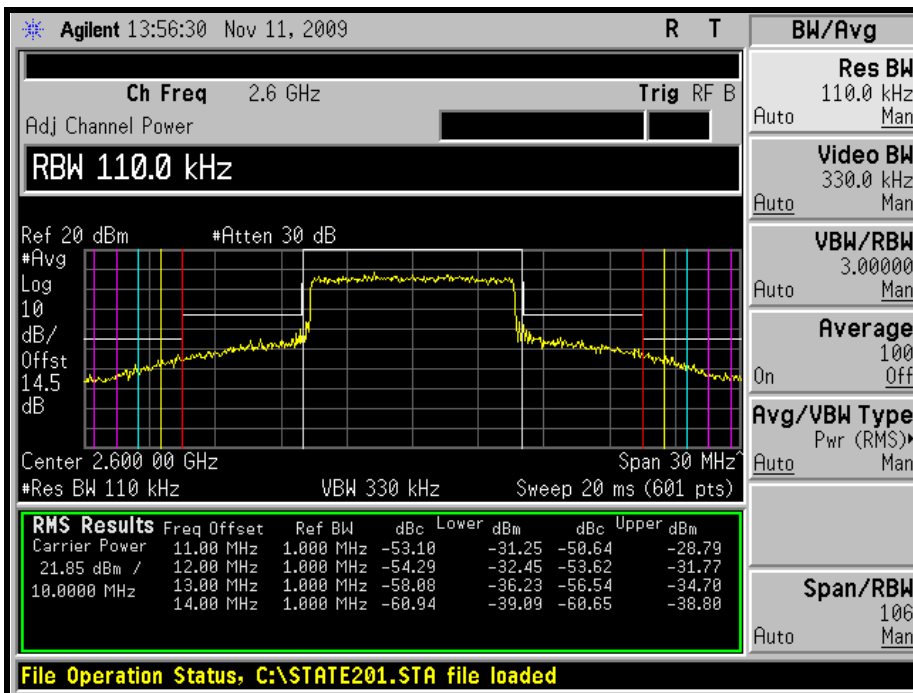
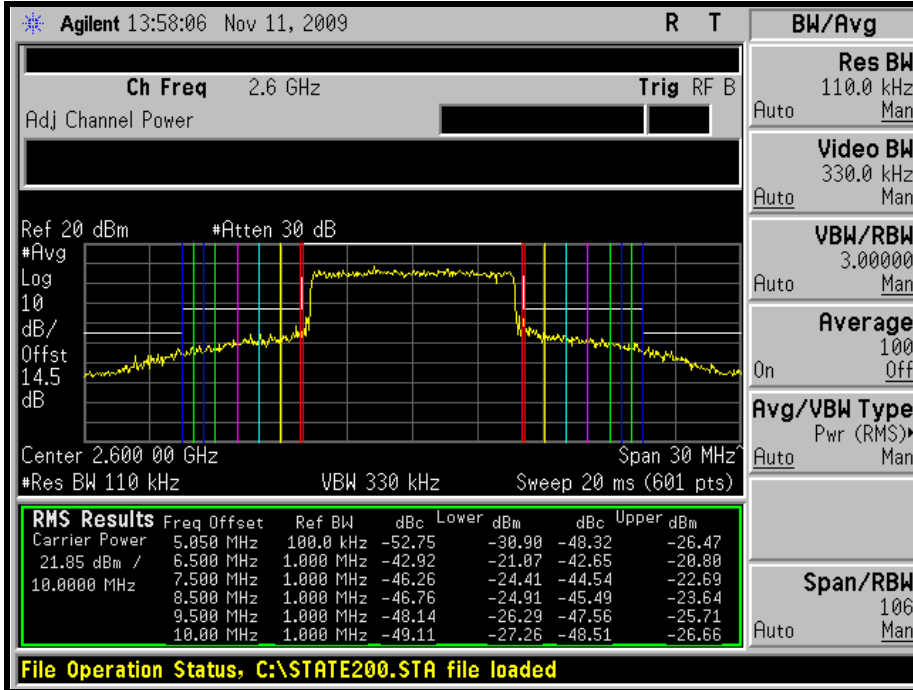
CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)		TOTAL POWER DENSITY (mW)	TOTAL POWER DENSITY (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)				
2600	2605.05	-26.47	-21.00	0.0102	-19.92	-13	PASS
	2606.5	-20.80	-19.68	0.0191	-17.19	-13	PASS
	2607.5	-22.69	-20.80	0.0137	-18.63	-13	PASS
	2608.5	-23.64	-22.98	0.0094	-20.28	-13	PASS
	2609.5	-25.71	-24.14	0.0065	-21.84	-13	PASS
	2610	-26.66	-24.56	0.0057	-22.47	-13	PASS
	2611	-28.79	-26.22	0.0037	-24.31	-13	PASS
	2612	-31.77	-28.66	0.0020	-26.93	-13	PASS
	2613	-34.70	-33.56	0.0008	-31.08	-13	PASS
	2614	-38.80	-36.30	0.0004	-34.44	-13	PASS



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CHAIN 0

MIDDLE CHANNEL

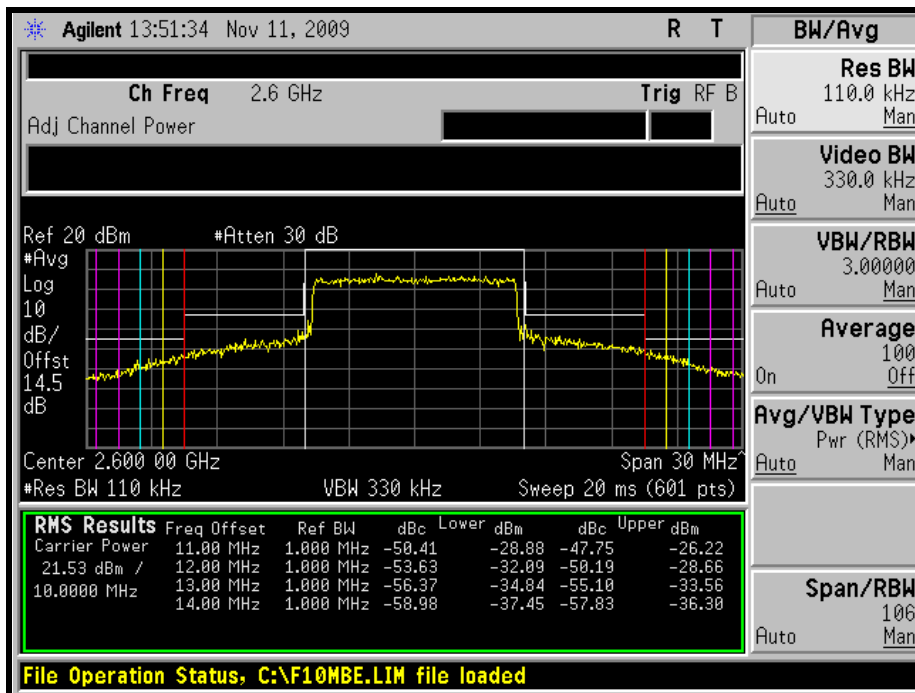
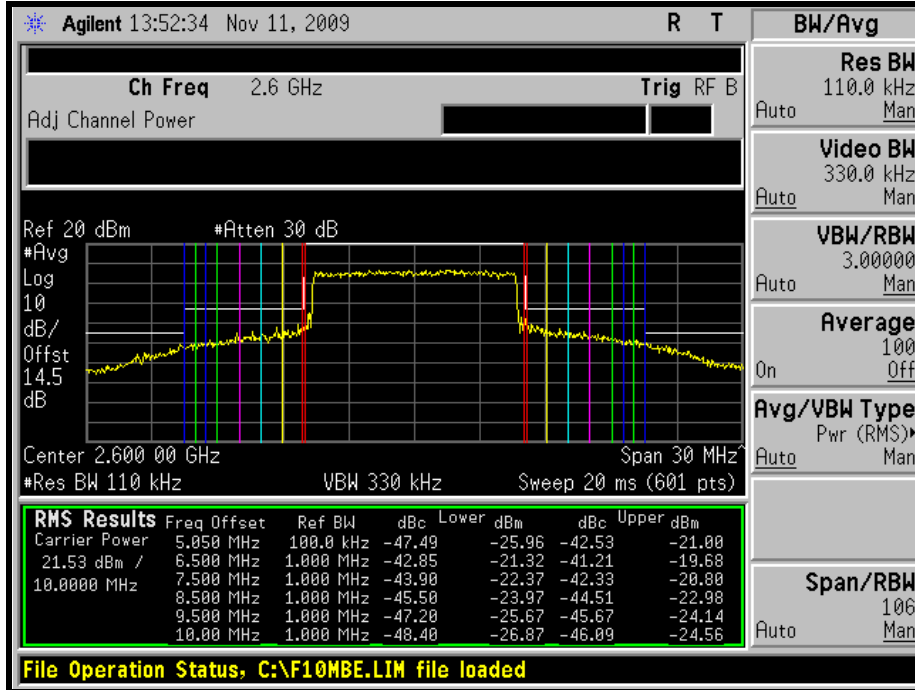




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CHAIN 1

MIDDLE CHANNEL



**HIGH CHANNEL-LEFT**

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)		TOTAL POWER DENSITY (mW)	TOTAL POWER DENSITY (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)				
2685	2679.95	-25.68	-25.18	0.0060	-22.22	-13	PASS
	2678.5	-19.45	-17.01	0.0310	-15.09	-13	PASS
	2677.5	-21.52	-17.11	0.0260	-15.85	-13	PASS
	2676.5	-22.69	-19.30	0.0170	-17.70	-13	PASS
	2675.5	-24.09	-21.48	0.0110	-19.59	-13	PASS
	2675	-24.89	-22.49	0.0090	-20.46	-13	PASS
	2674	-27.80	-25.46	0.0050	-23.01	-13	PASS
	2673	-30.72	-28.23	0.0030	-25.23	-13	PASS
	2672	-35.23	-32.01	0.0009	-30.46	-13	PASS
	2671	-37.90	-35.55	0.0005	-33.01	-13	PASS

**HIGH CHANNEL-RIGHT**

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)		TOTAL POWER DENSITY (mW)	TOTAL POWER DENSITY (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)				
2685	2690.05	-26.79	-21.76	0.0088	-20.57	-13	PASS
	2691.5	-18.79	-25.55	0.0160	-17.96	-13	PASS
	2692.5	-20.24	-16.83	0.0302	-15.20	-13	PASS
	2693.5	-22.17	-18.89	0.0190	-17.22	-13	PASS
	2694.5	-23.73	-20.33	0.0135	-18.69	-13	PASS
	2695	-25.02	-21.26	0.0106	-19.73	-13	PASS
	2696	-26.54	-23.95	0.0063	-22.04	-13	PASS
	2697	-30.84	-26.67	0.0030	-25.27	-13	PASS
	2698	-33.77	-31.92	0.0011	-29.75	-13	PASS
	2699	-37.23	-36.19	0.0004	-33.67	-13	PASS

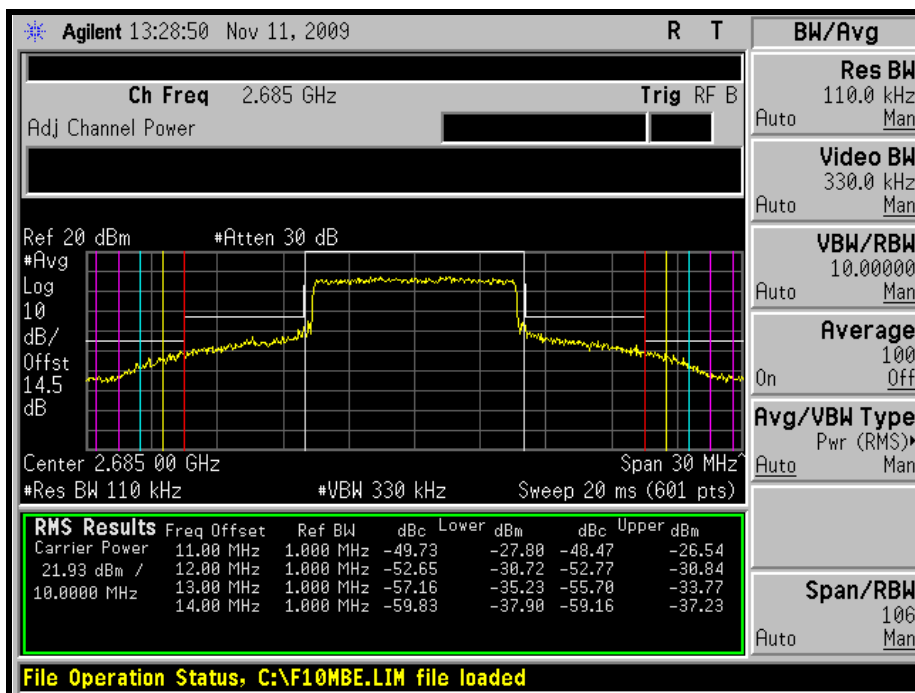
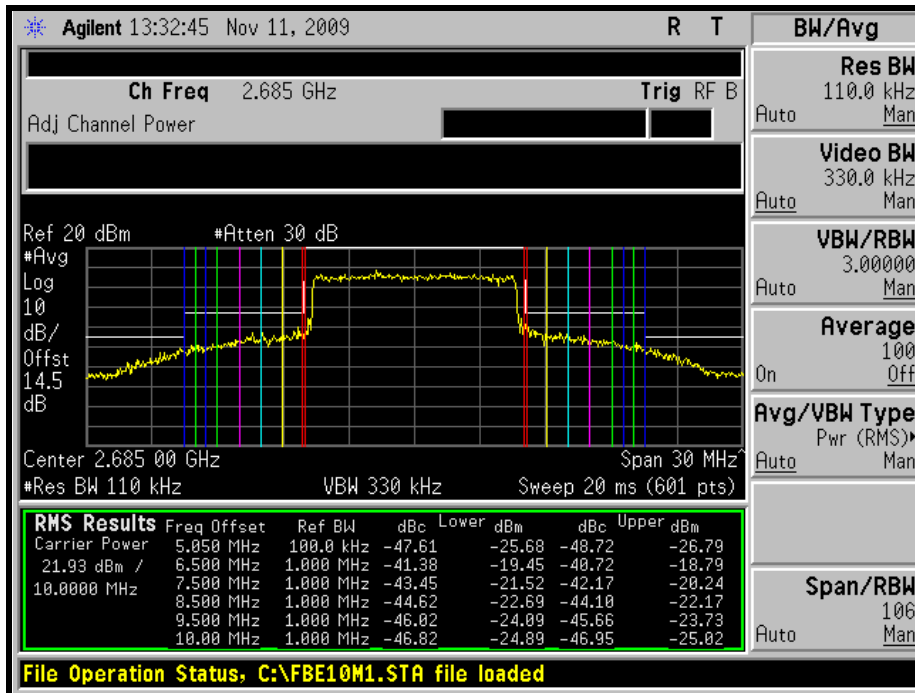




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CHAIN 0

HIGH CHANNEL

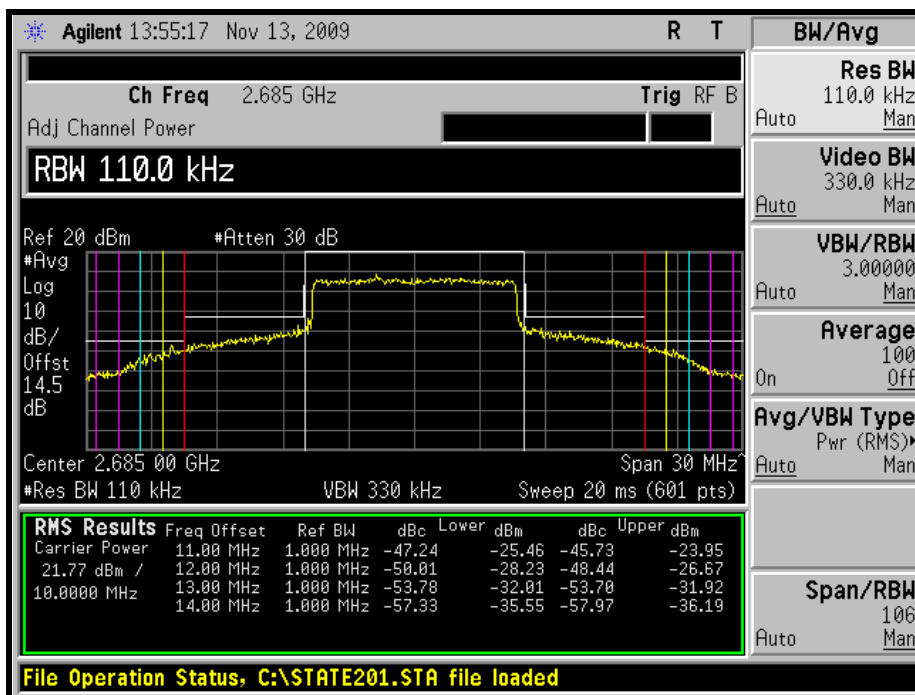
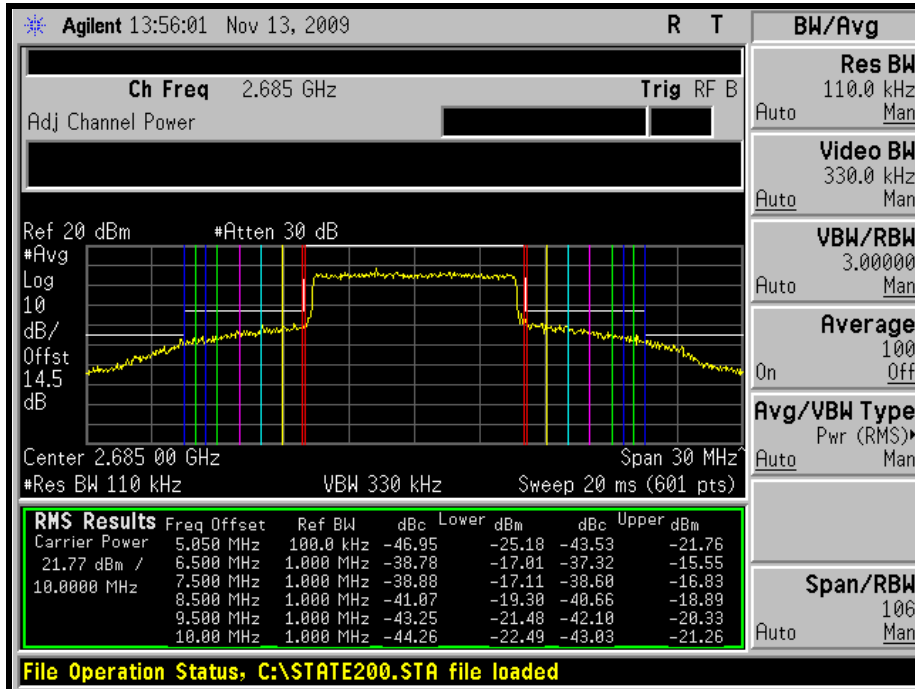




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CHAIN 1

HIGH CHANNEL





## 4.5 CONDUCTED SPURIOUS EMISSIONS

### 4.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

In the FCC 27.53(m)(2), On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log (P)$ dB from the channel edges.

### 4.5.2 TEST INSTRUMENTS

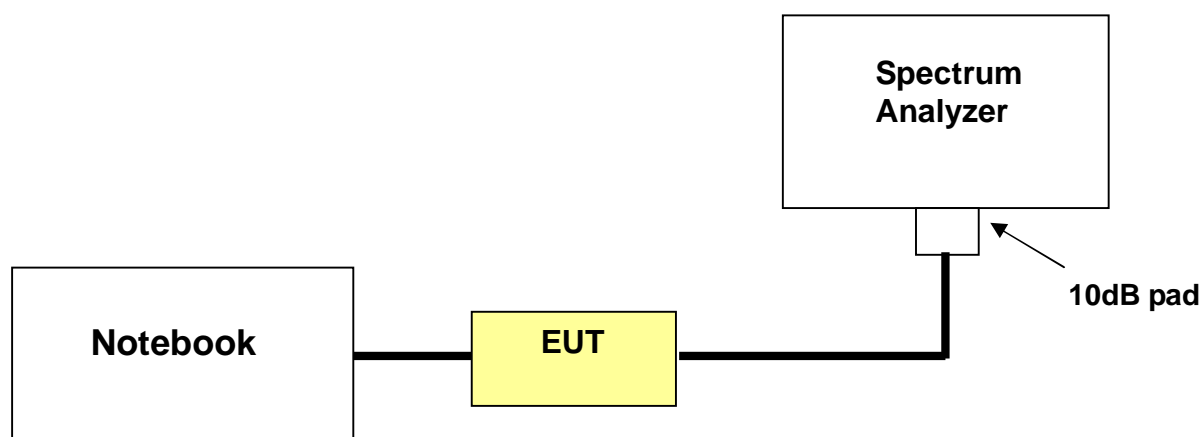
Description & Manufacturer	Model No.	Serial No.	CALIBRATED DATE	CALIBRATED UNTIL
Agilent Spectrum Analyzer	E4446A	MY46180622	Apr. 24 , 2009	Apr. 23, 2010
HUBER+SUHNER	SUCOFLEX104	22238114	July 31, 2009	July 30, 2010
JFW 10dB attenuation	50HF-010-SMA	N/A	N/A	N/A
Wainwright Instruments High Pass Filter	WHK3.1/18G-1 0SS	ZZ-010091	N/A	N/A

**NOTE:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

#### 4.5.3 TEST PROCEDURE

- a. The EUT was set up for the rated peak power. The power was measured with Spectrum Analyzer. All measurements were done at 3 channels: low, middle and high operational frequency range.
- b. When the spectrum scanned from 30MHz to 3GHz, it shall be connected to the 10dB pad attenuated the carried frequency. The spectrum set RB = 1MHz, VB = 3MHz.
- c. When the spectrum scanned from 3GHz to 26.5GHz, it shall be connected to the high pass filter attenuated the carried frequency. The spectrum set RB = 1MHz, VB = 3MHz.

#### 4.5.4 TEST SETUP



#### 4.5.5 EUT OPERATING CONDITIONS

Same as item 4.1.5



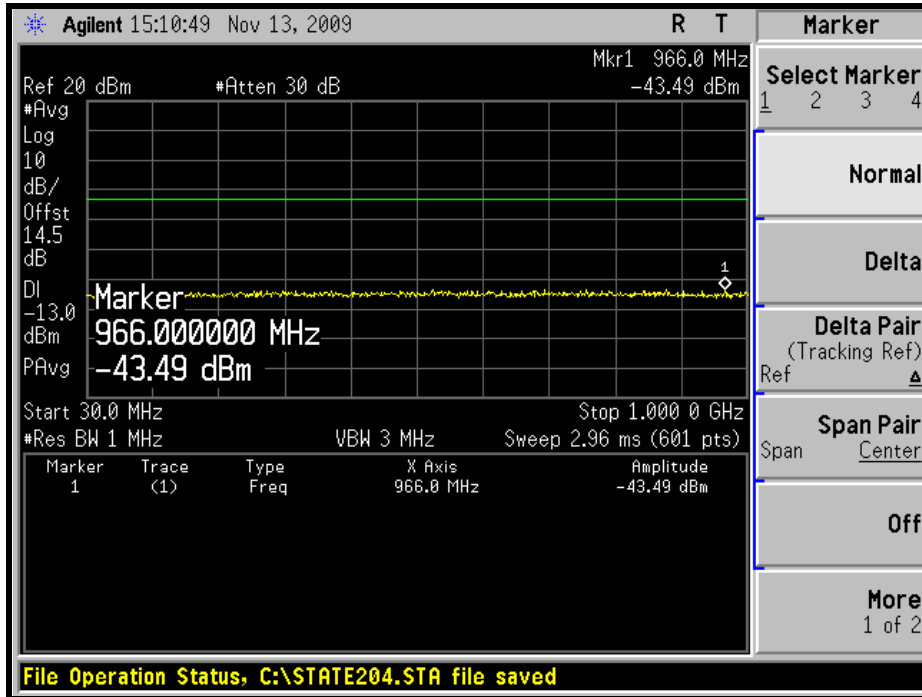
A D T

#### 4.5.6 TEST RESULTS

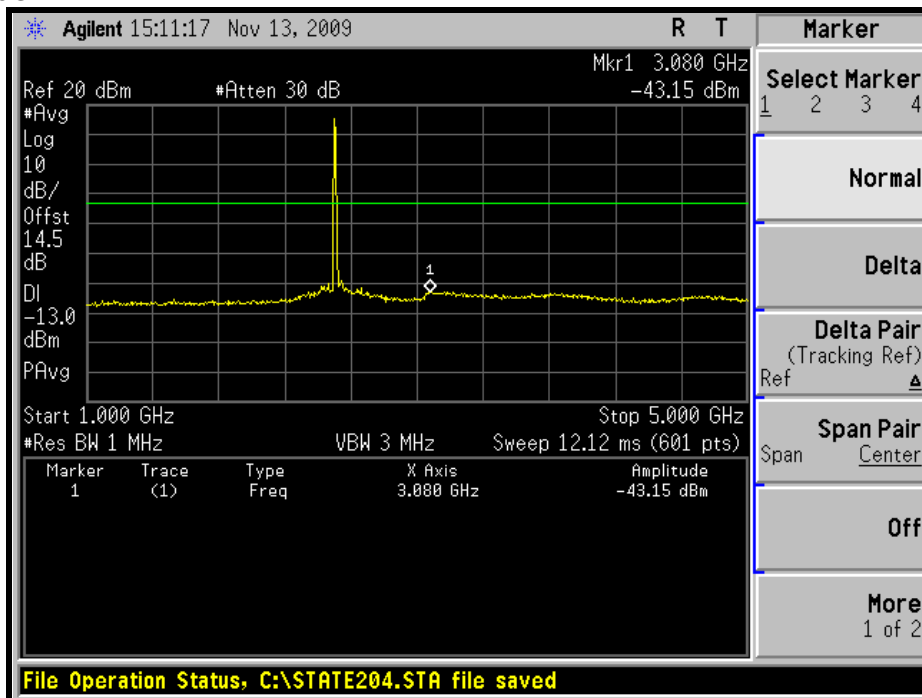
### CHANNEL BANDWIDTH: 5MHz

CHINO

LOW CHANNEL: 30MHz ~ 1GHz:



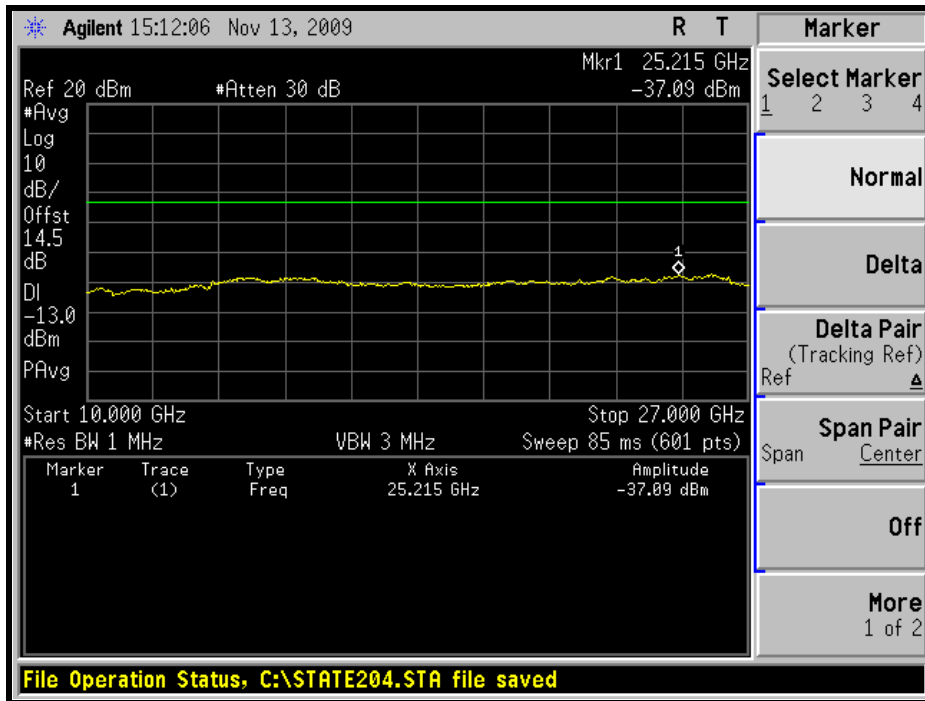
1GHz ~ 5GHz:





A D T

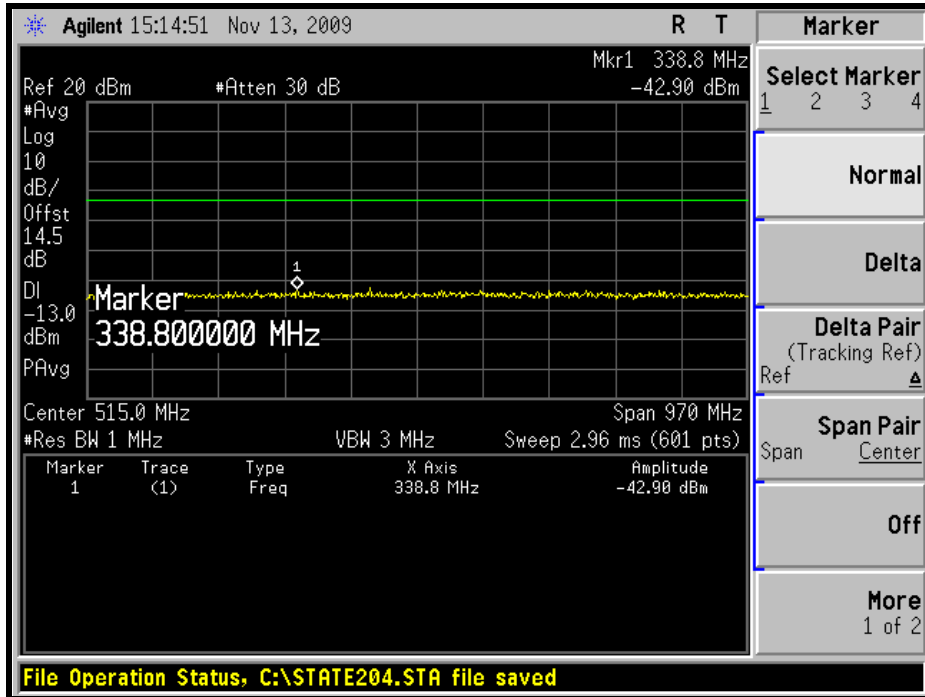
10GHz ~ 27GHz:



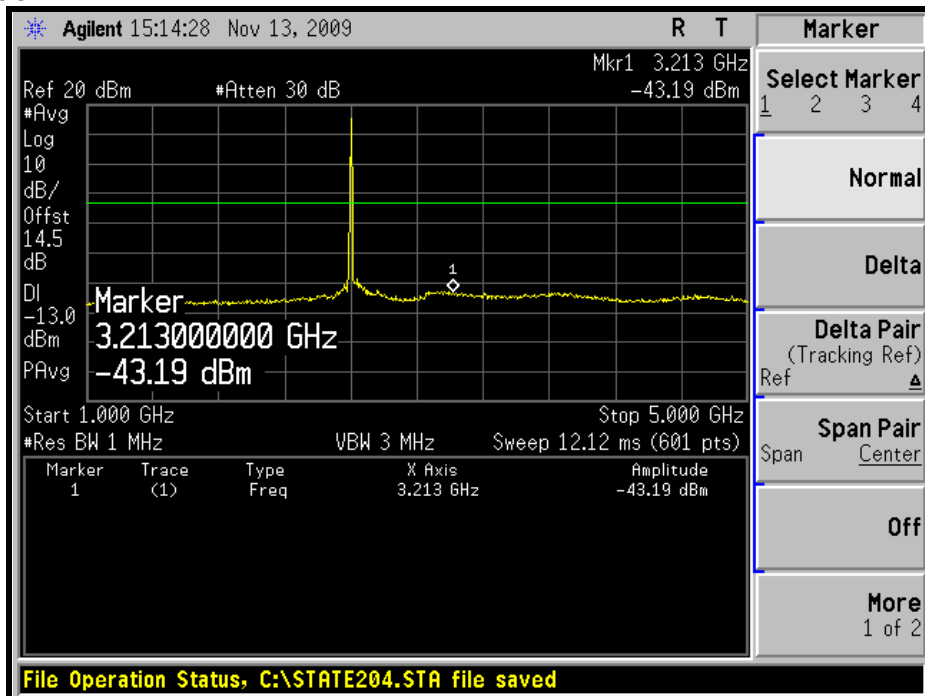


A D T

MIDDLE CHANNEL: 30MHz ~ 1GHz:



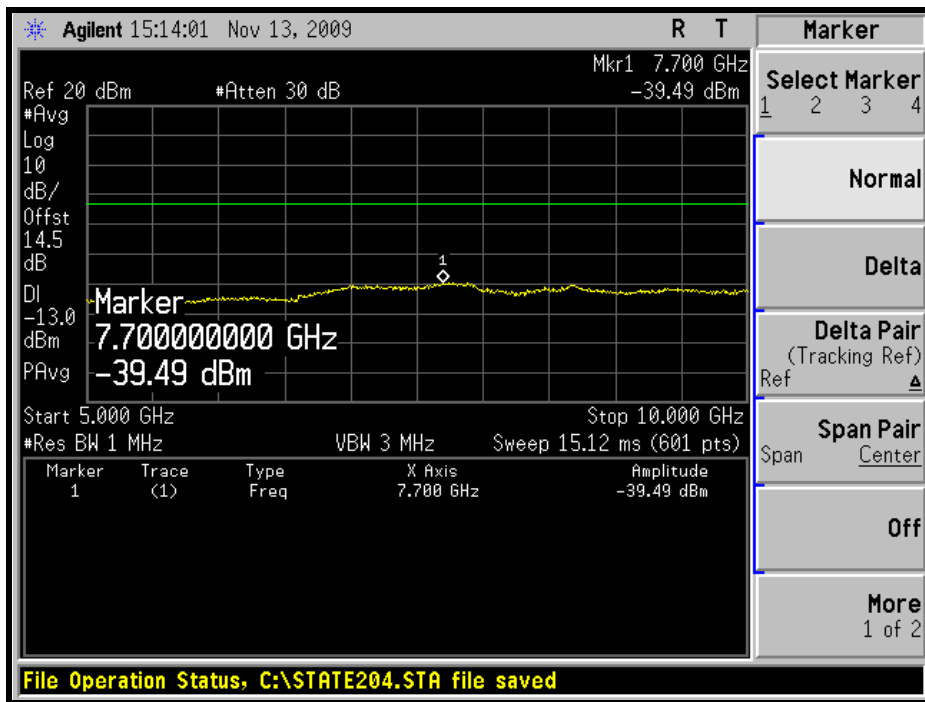
1GHz ~ 5GHz:



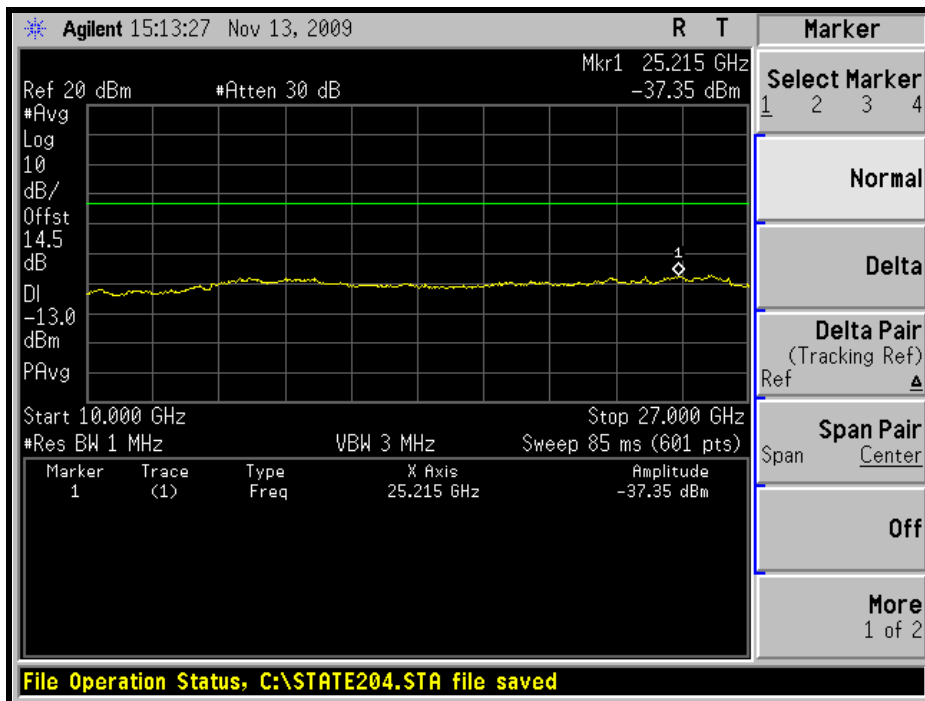


A D T

5GHz ~ 10GHz:



10GHz ~ 27GHz:

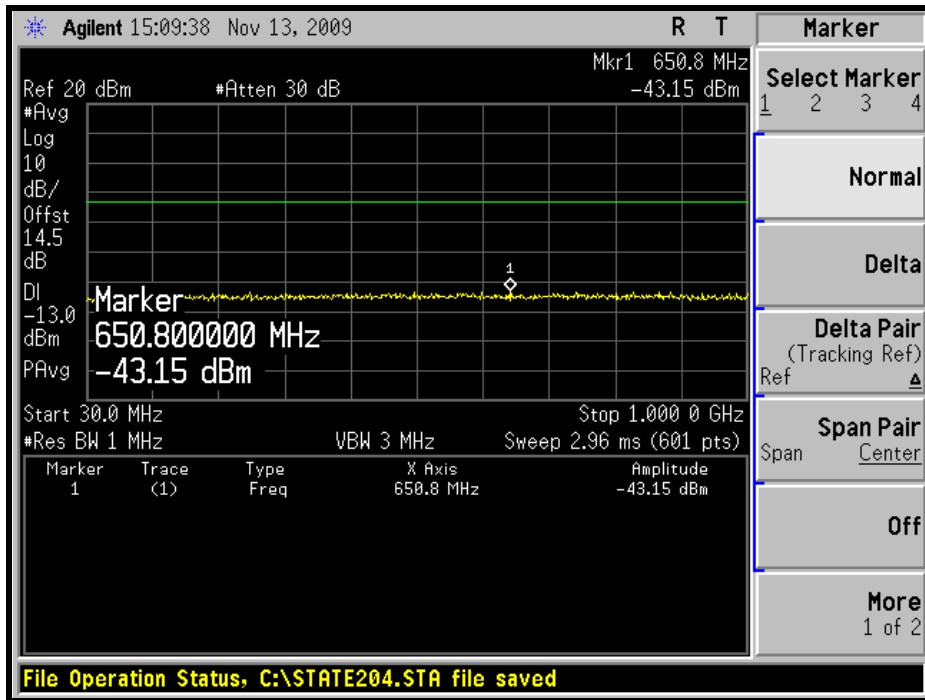




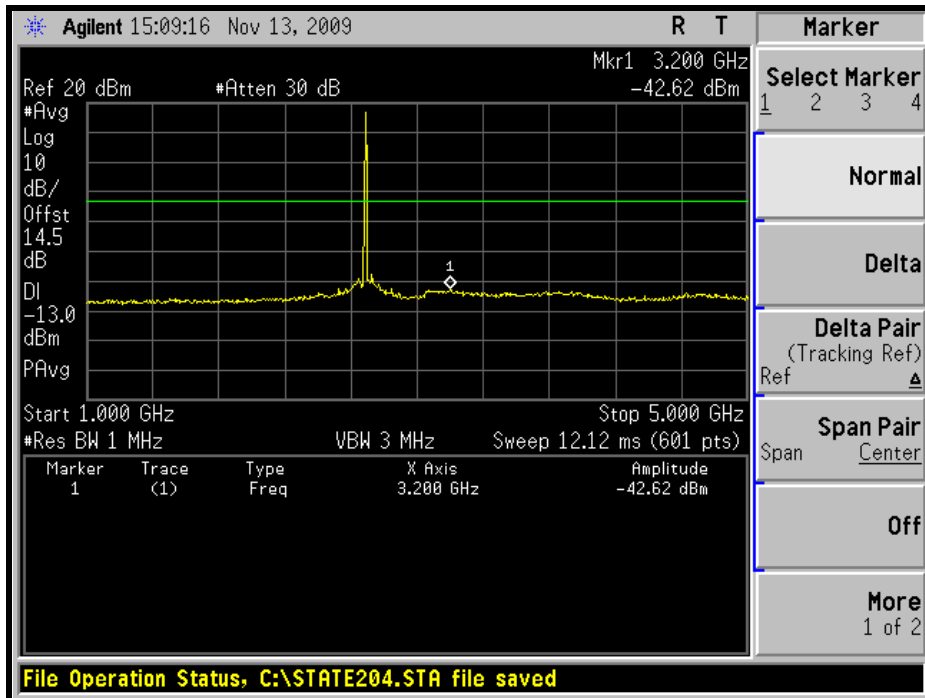


A D T

### HIGH CHANNEL: 30MHz ~ 1GHz:



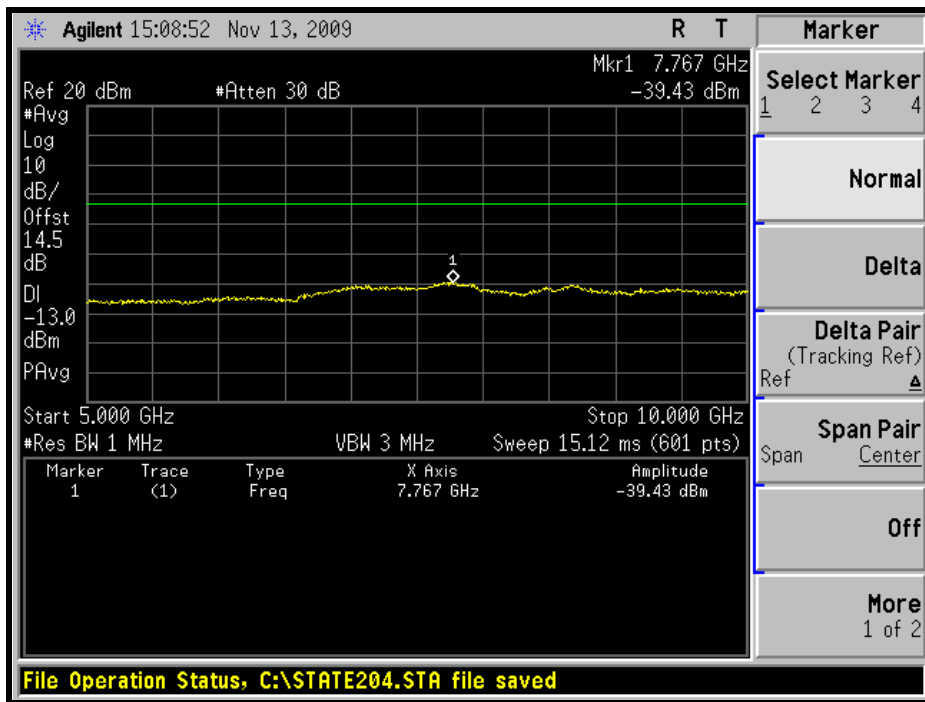
### 1GHz ~ 5GHz:



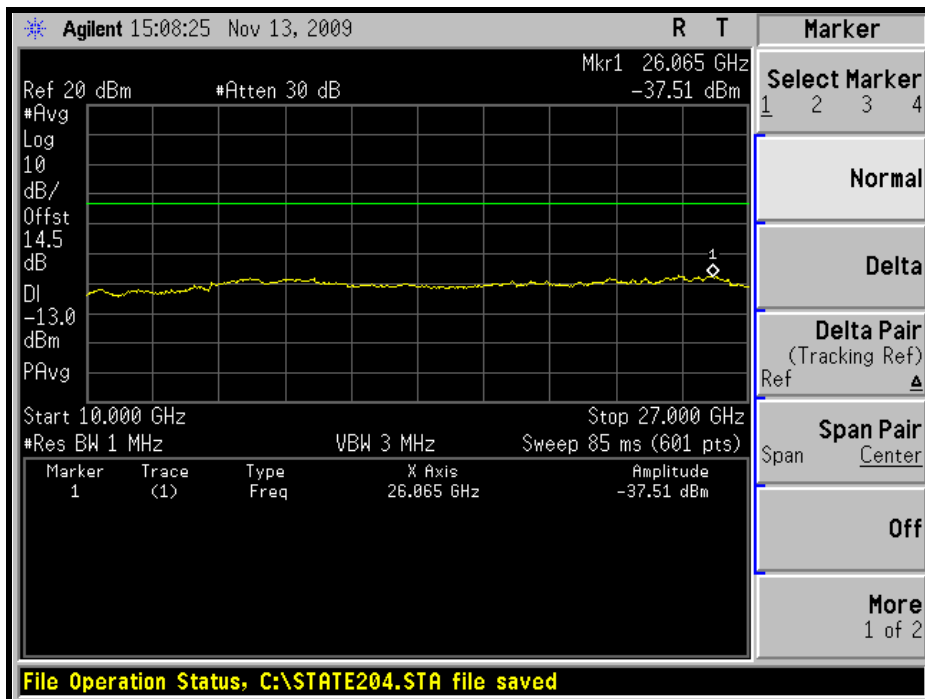


A D T

5GHz ~ 10GHz:



10GHz ~ 27GHz:

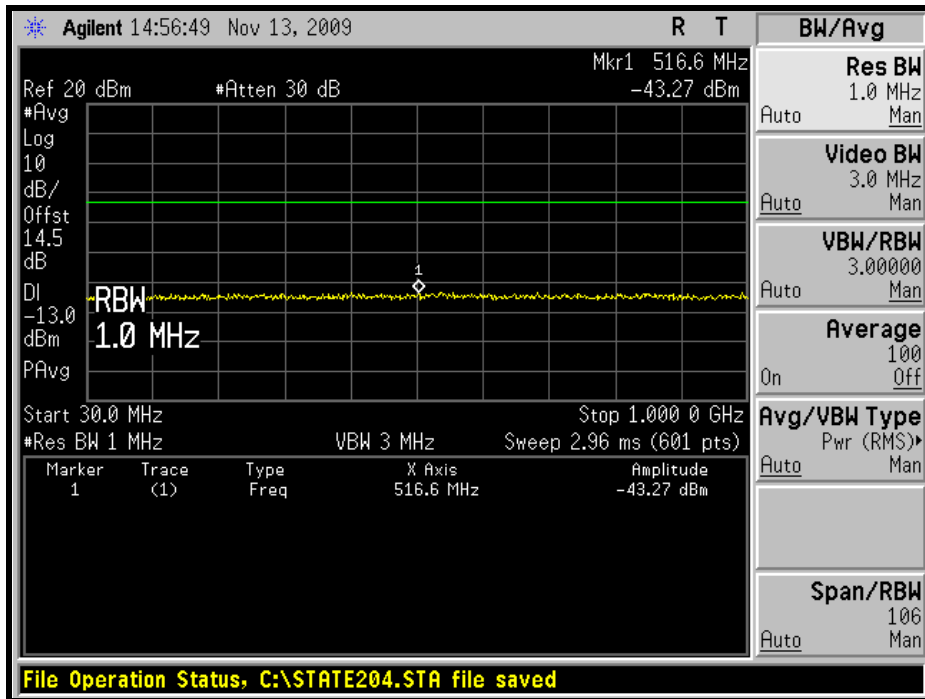




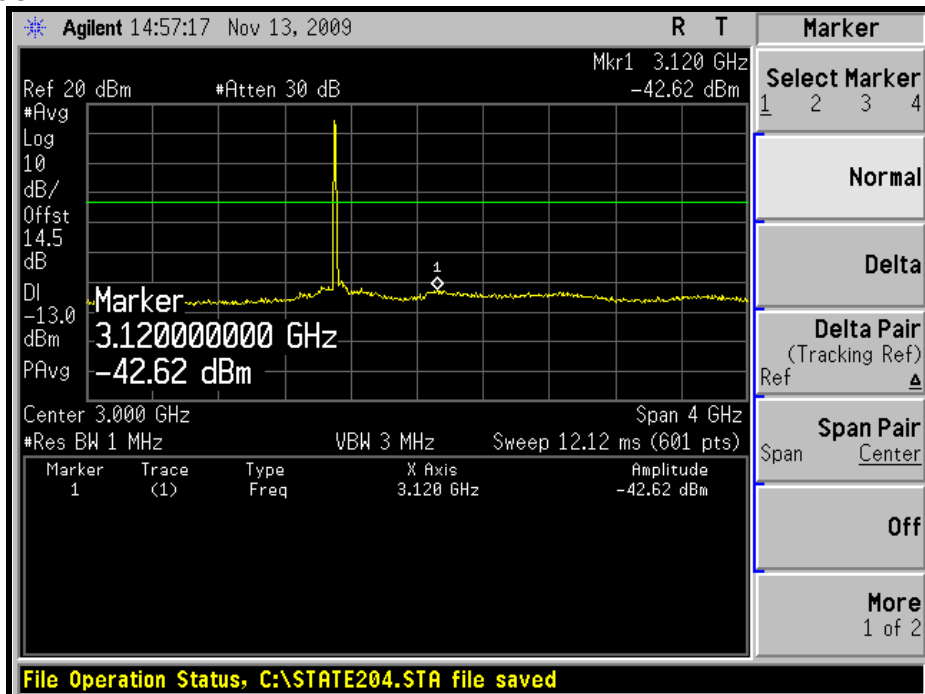
A D T

### CHIN1

LOW CHANNEL: 30MHz ~ 1GHz:



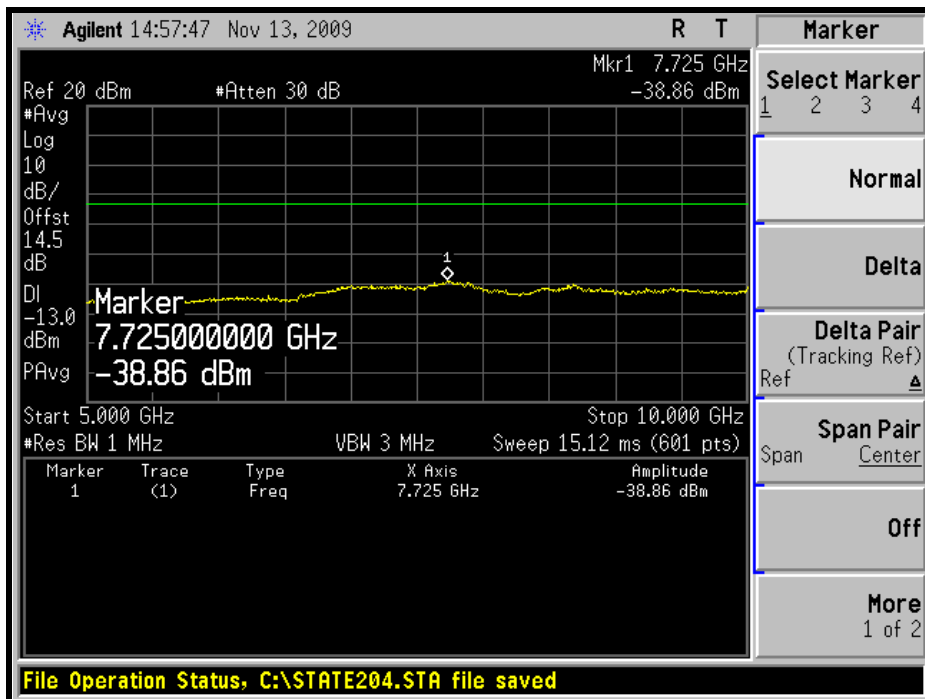
1GHz ~ 5GHz:



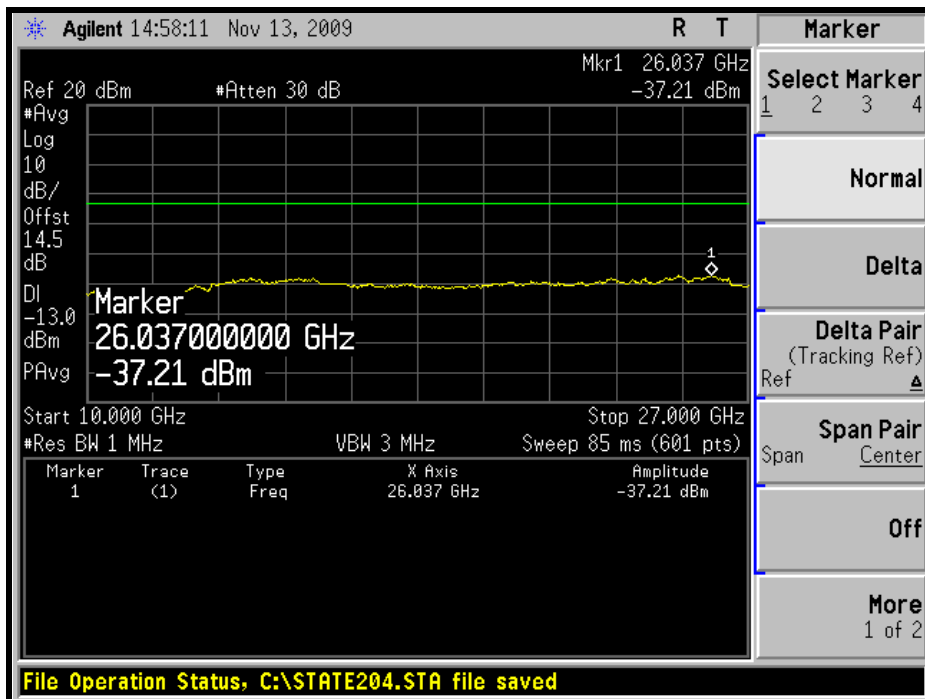


A D T

5GHz ~ 10GHz:



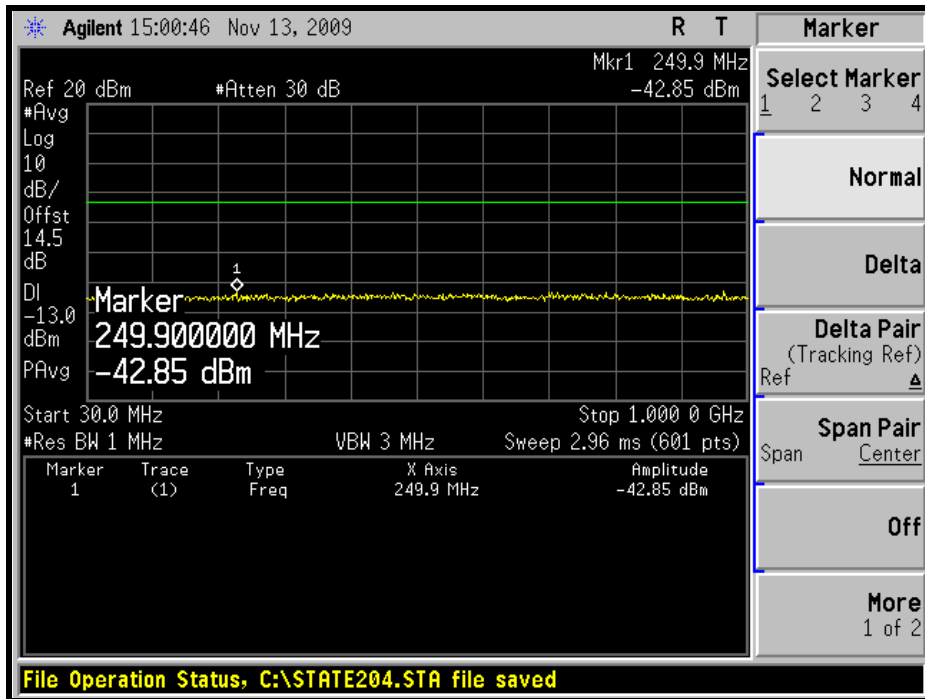
10GHz ~ 27GHz:



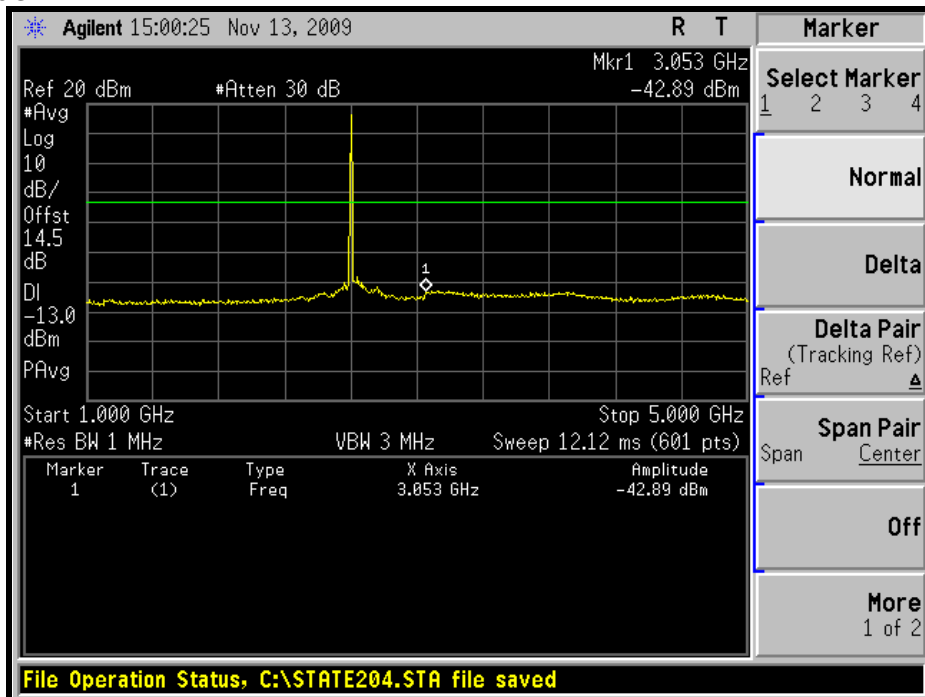


A D T

MIDDLE CHANNEL: 30MHz ~ 1GHz:



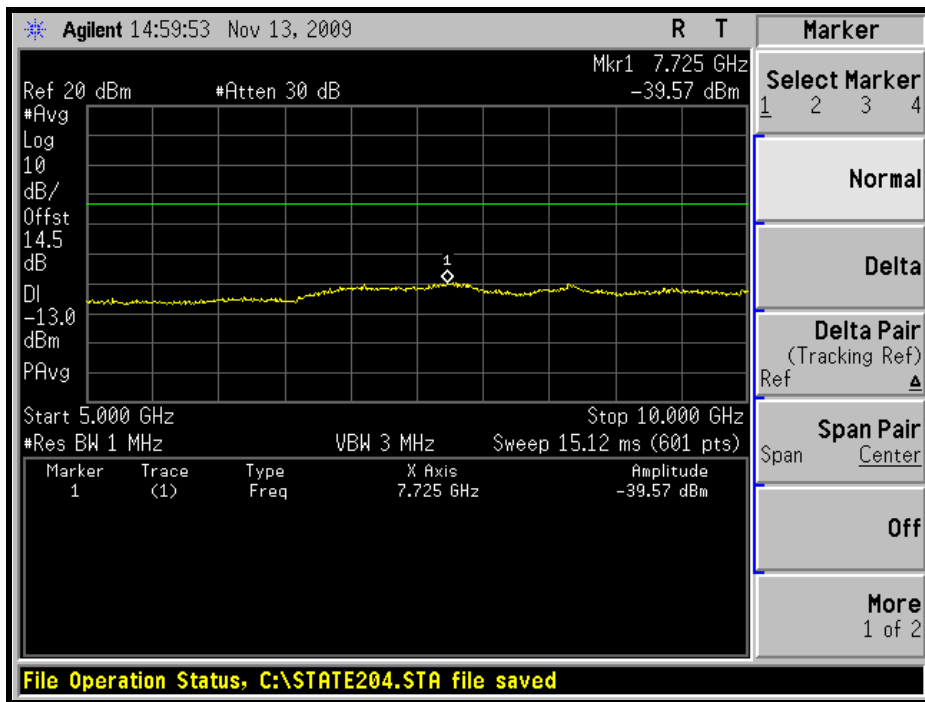
1GHz ~ 5GHz:



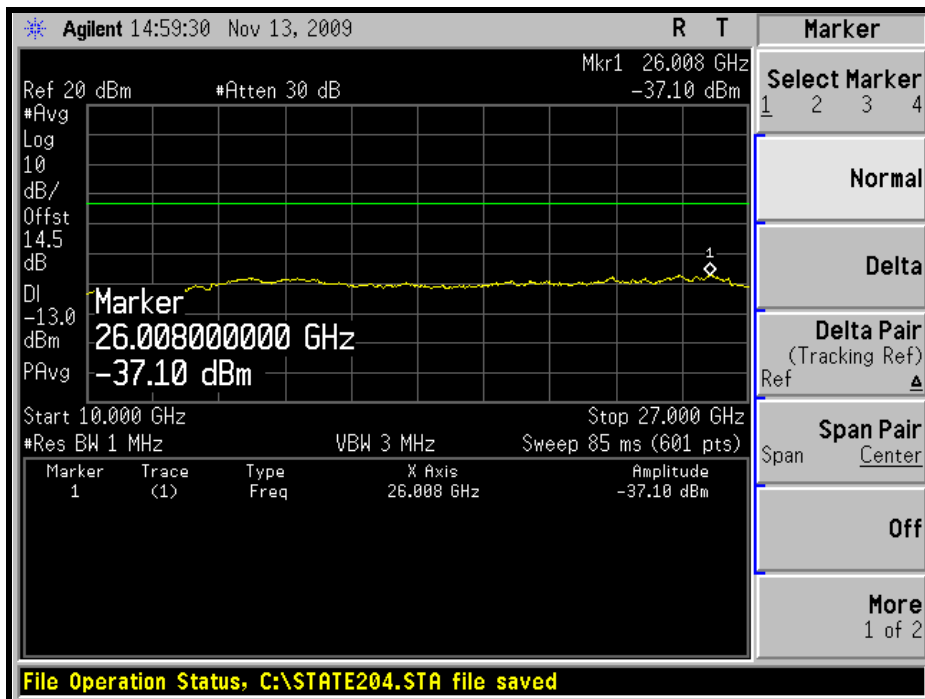


A D T

5GHz ~ 10GHz:



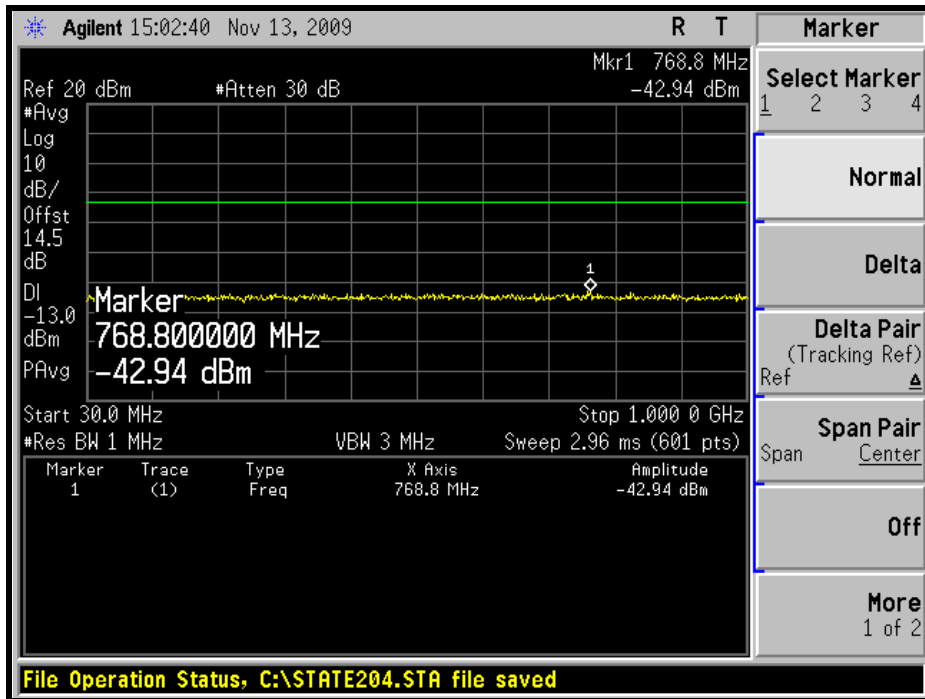
10GHz ~ 27GHz:



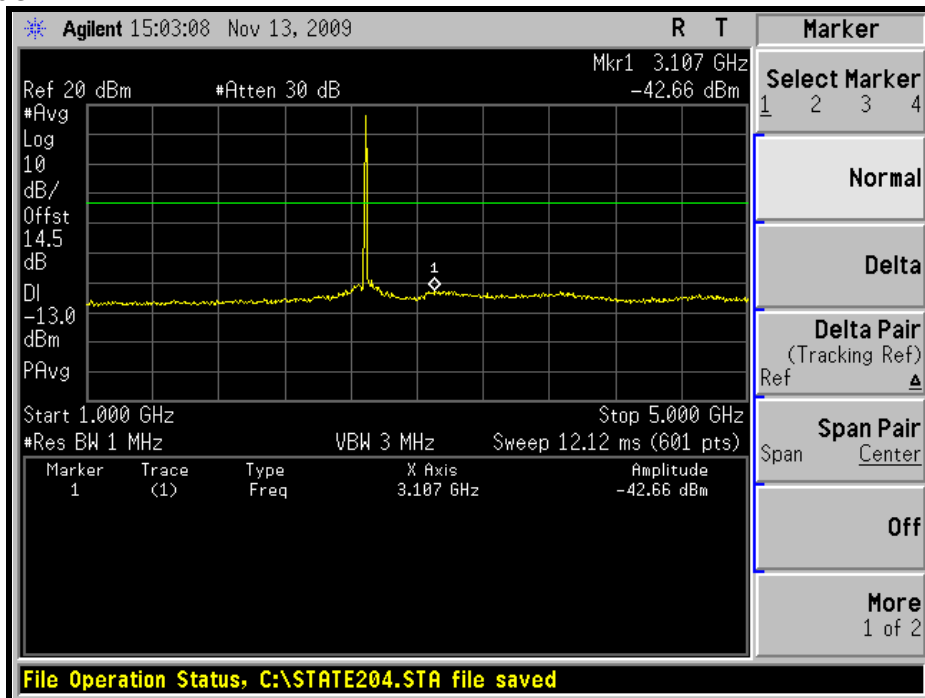


A D T

**HIGH CHANNEL: 30MHz ~ 1GHz:**



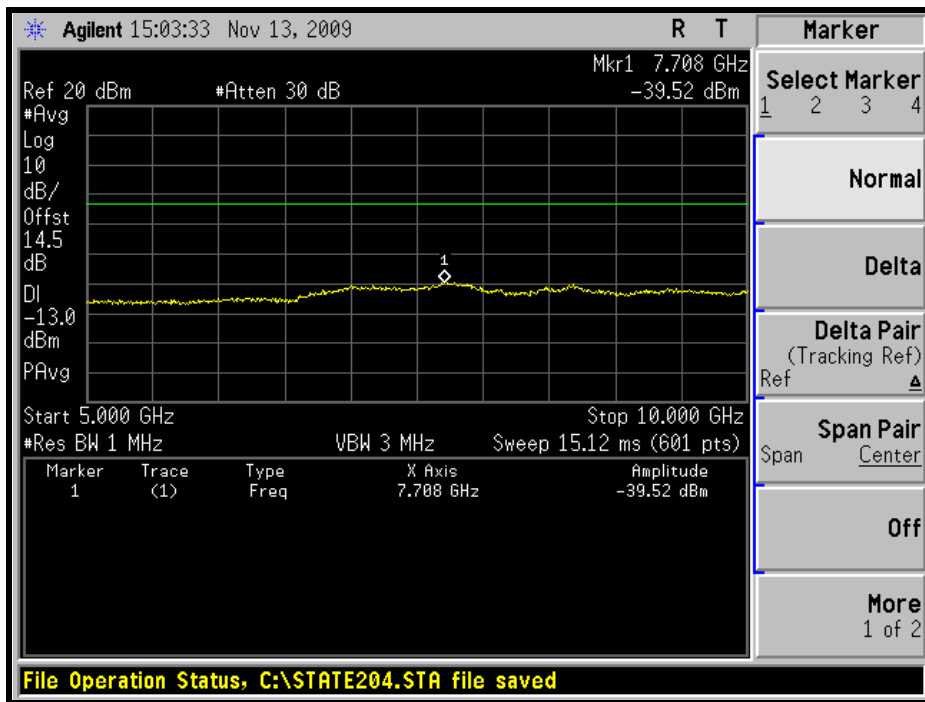
**1GHz ~ 5GHz:**



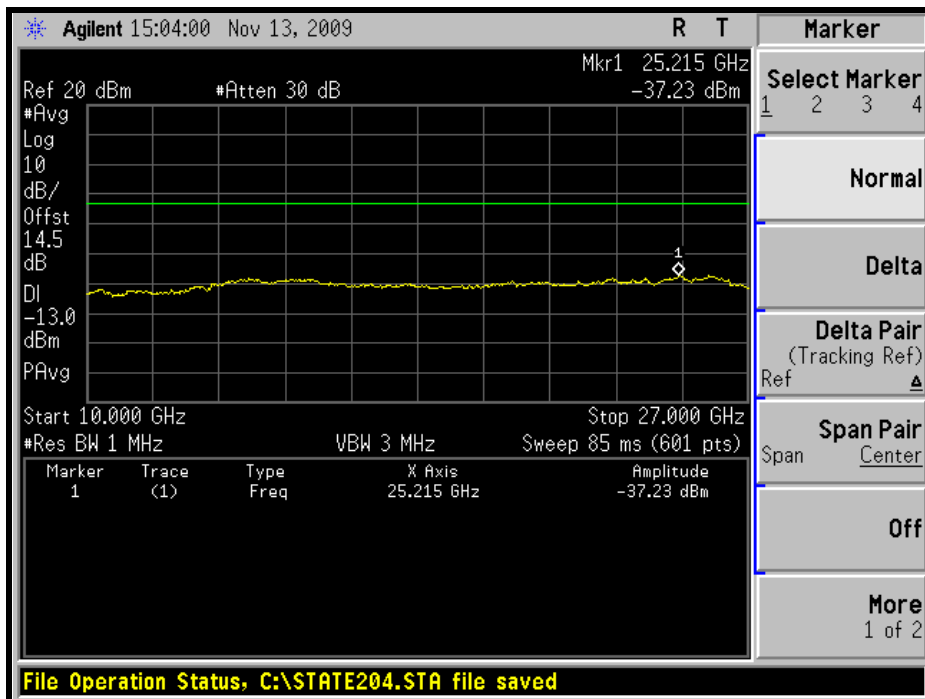


A D T

5GHz ~ 10GHz:



10GHz ~ 27GHz:





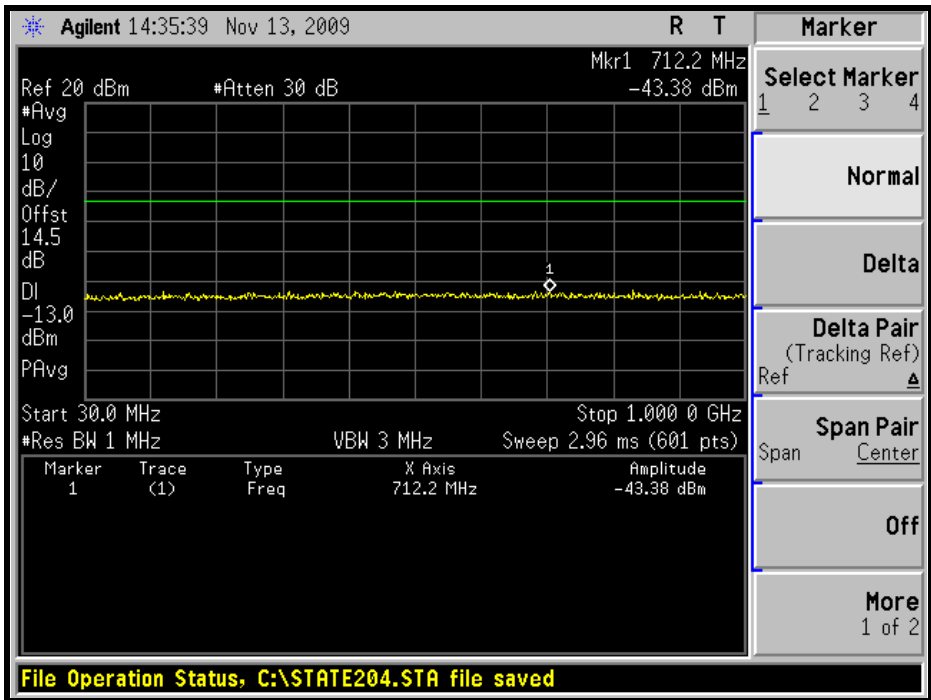


A D T

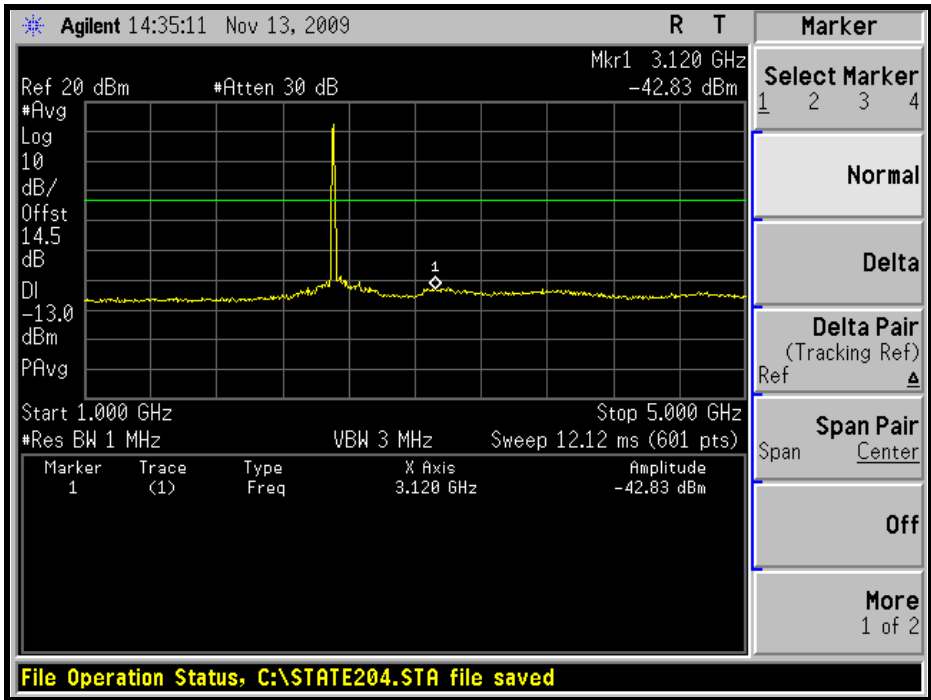
### CHANNEL BANDWIDTH: 10MHz

CHINO

LOW CHANNEL: 30MHz ~ 1GHz:



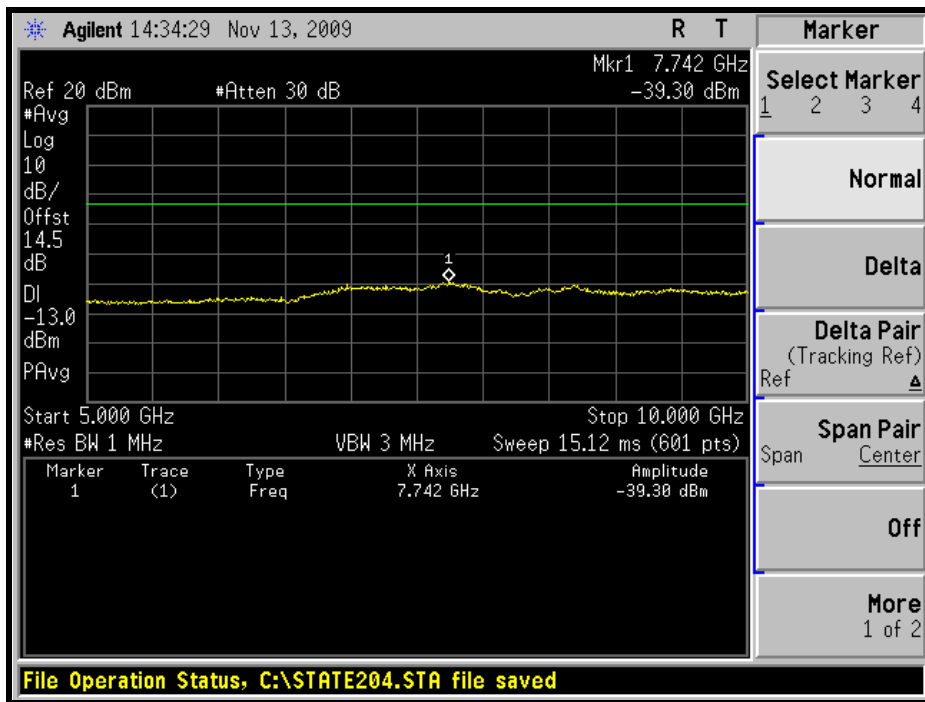
1GHz ~ 5GHz:



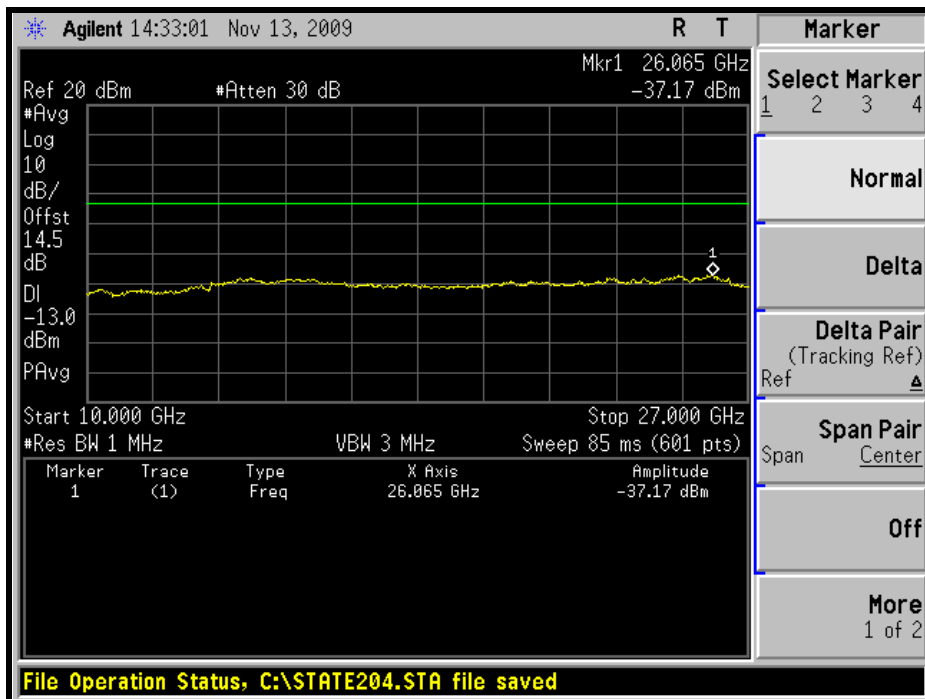


A D T

5GHz ~ 10GHz:



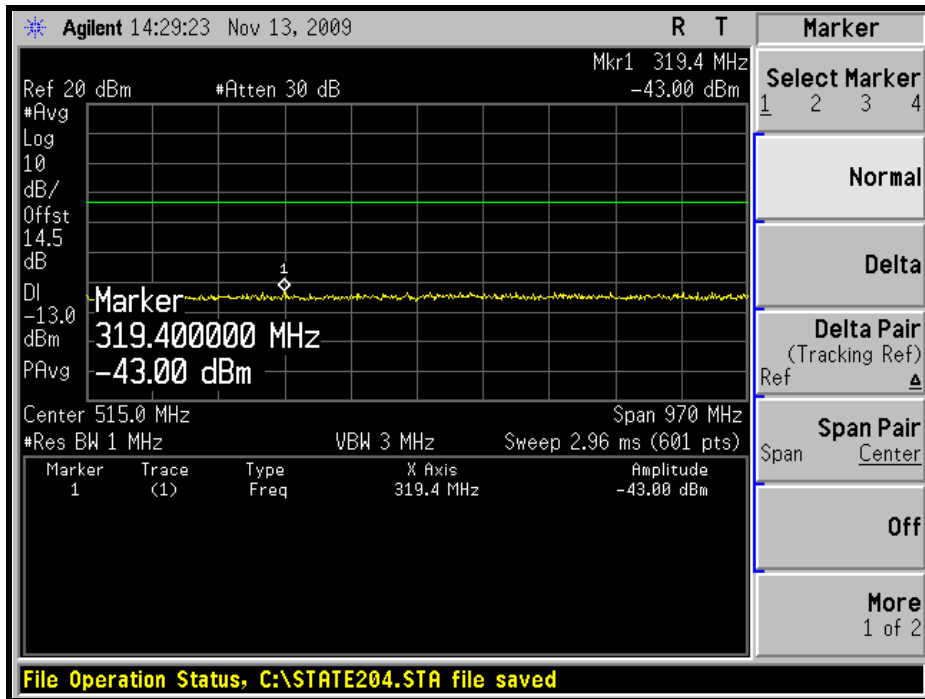
10GHz ~ 27GHz:



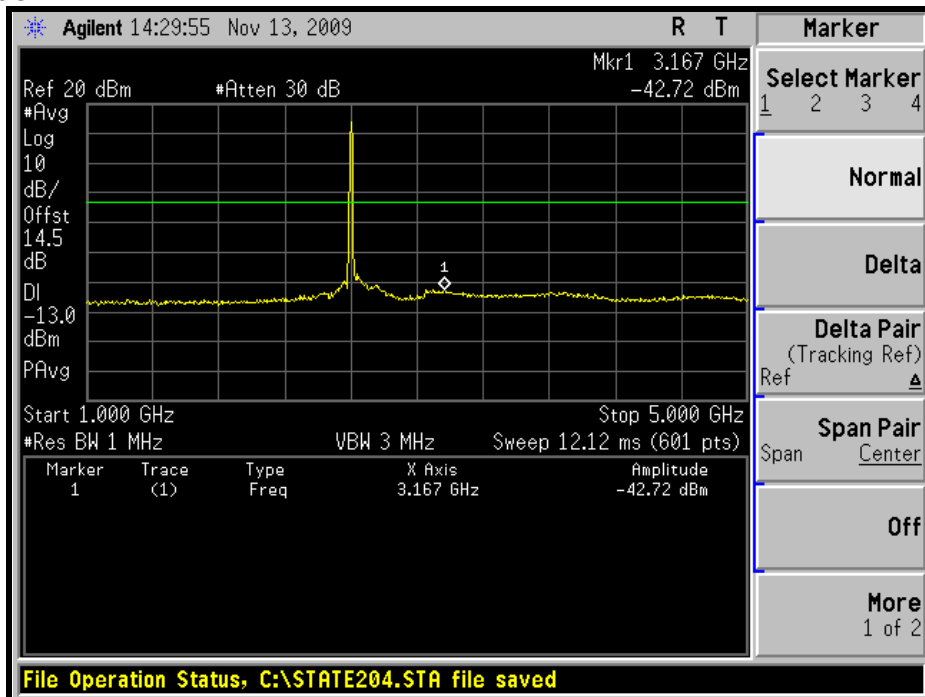


A D T

MIDDLE CHANNEL: 30MHz ~ 1GHz:



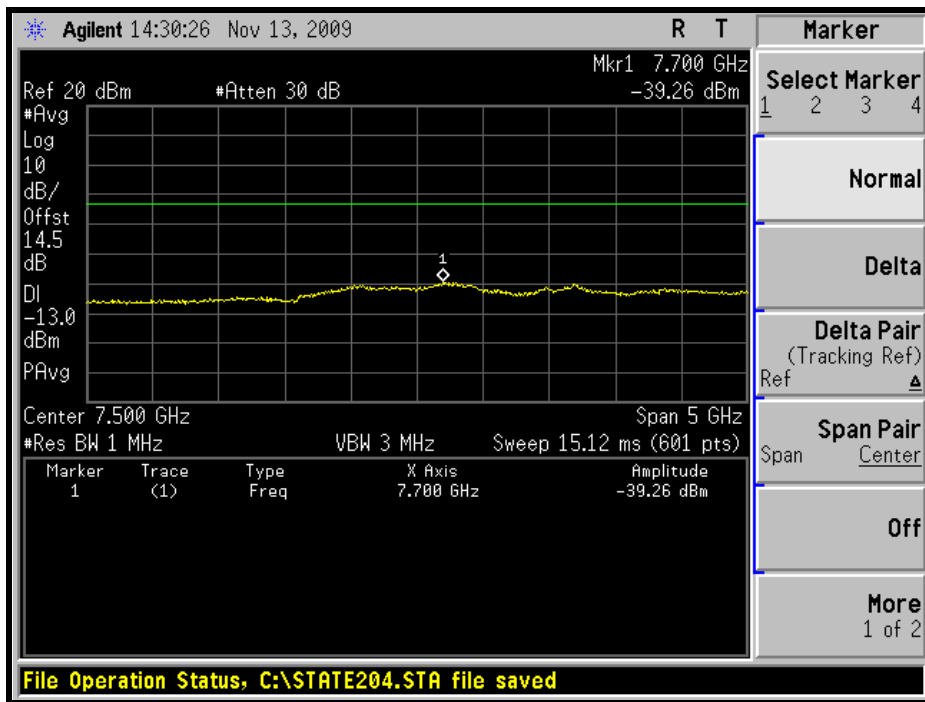
1GHz ~ 5GHz:



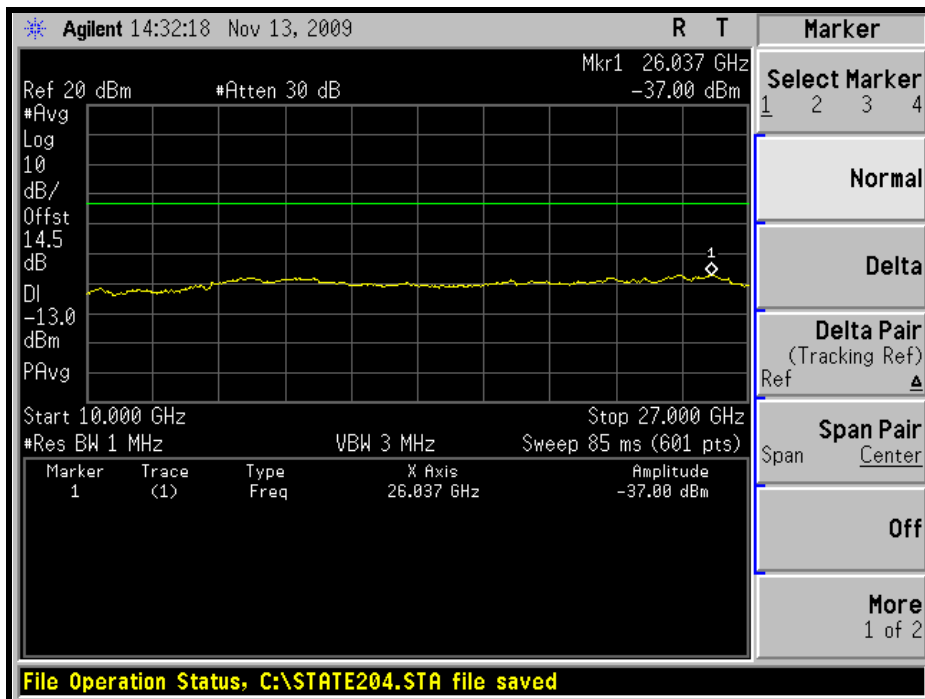


A D T

5GHz ~ 10GHz:



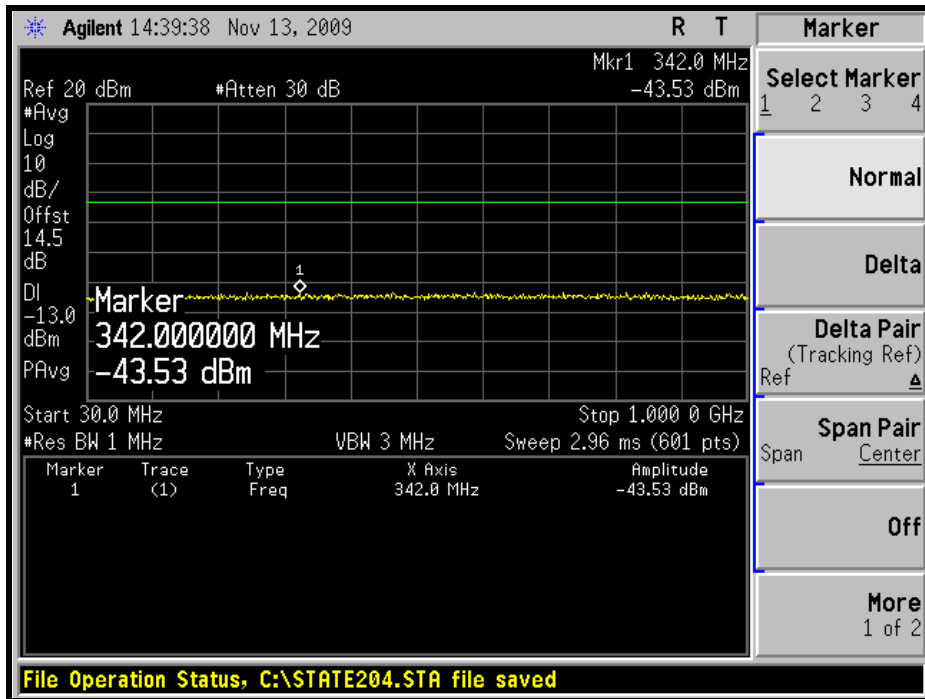
10GHz ~ 27GHz:



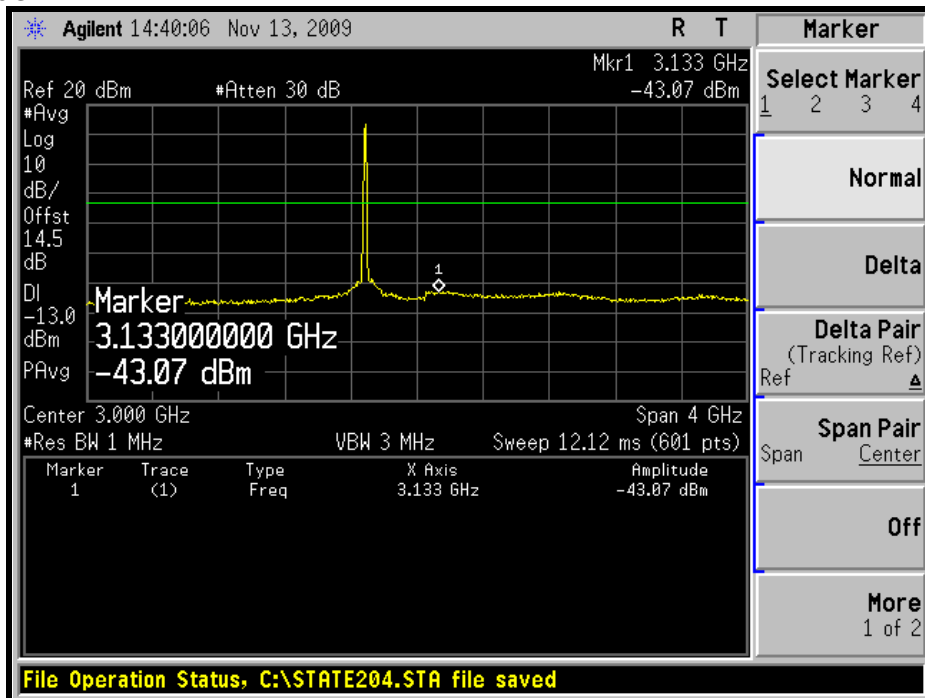


A D T

**HIGH CHANNEL: 30MHz ~ 1GHz:**



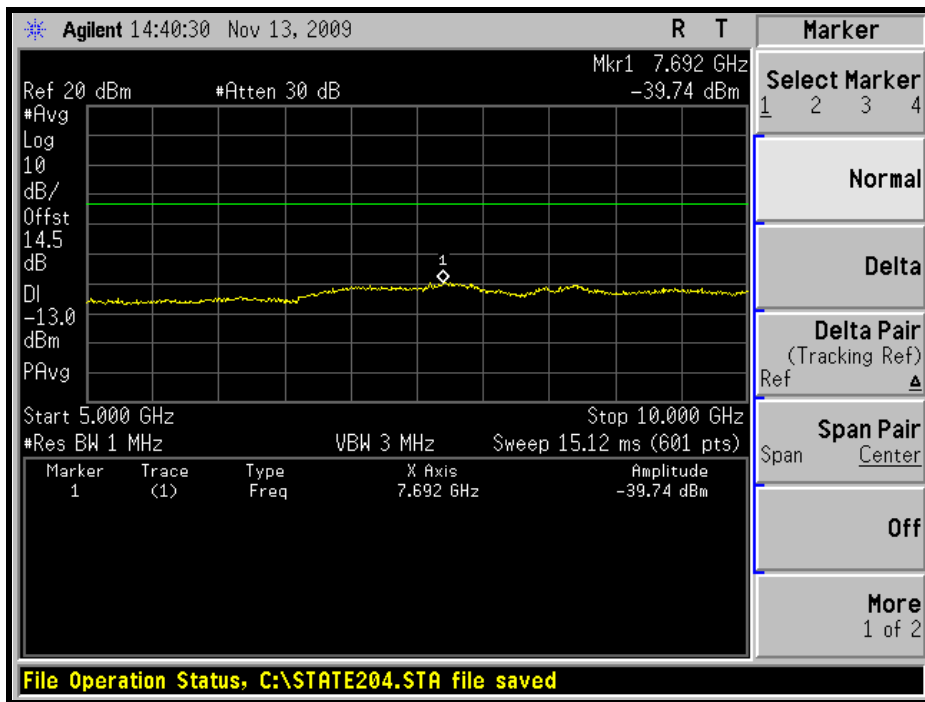
**1GHz ~ 5GHz:**



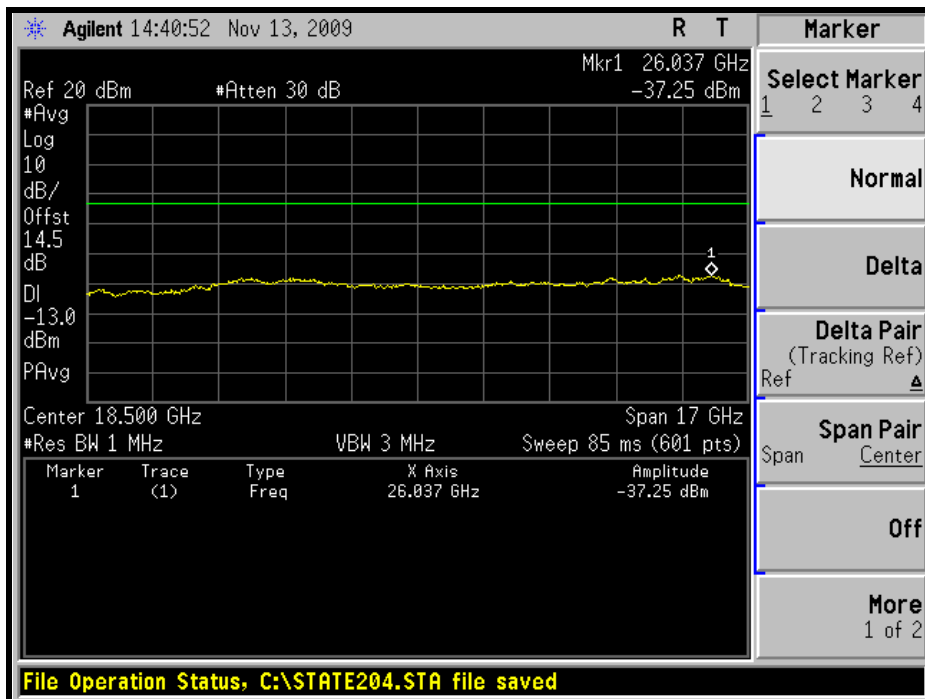


A D T

5GHz ~ 10GHz:



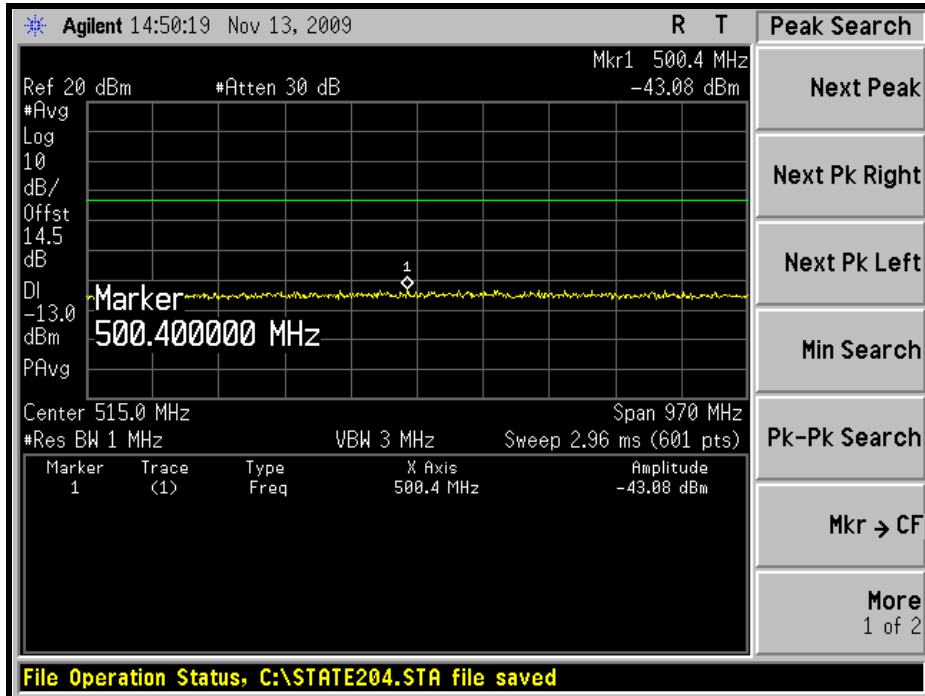
10GHz ~ 27GHz:



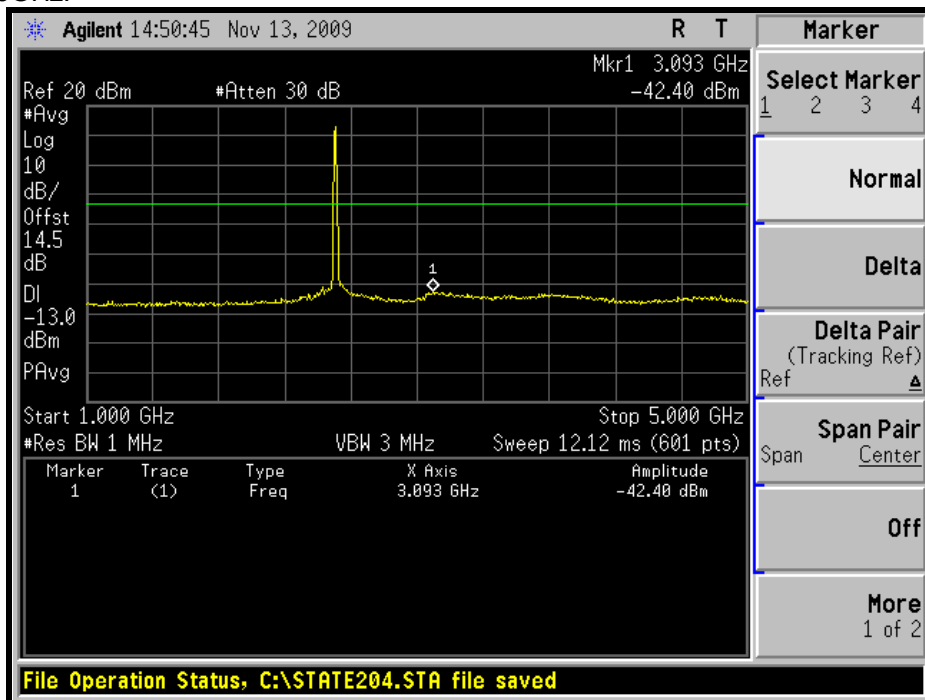


A D T

**CHIN1**  
**LOW CHANNEL: 30MHz ~ 1GHz:**



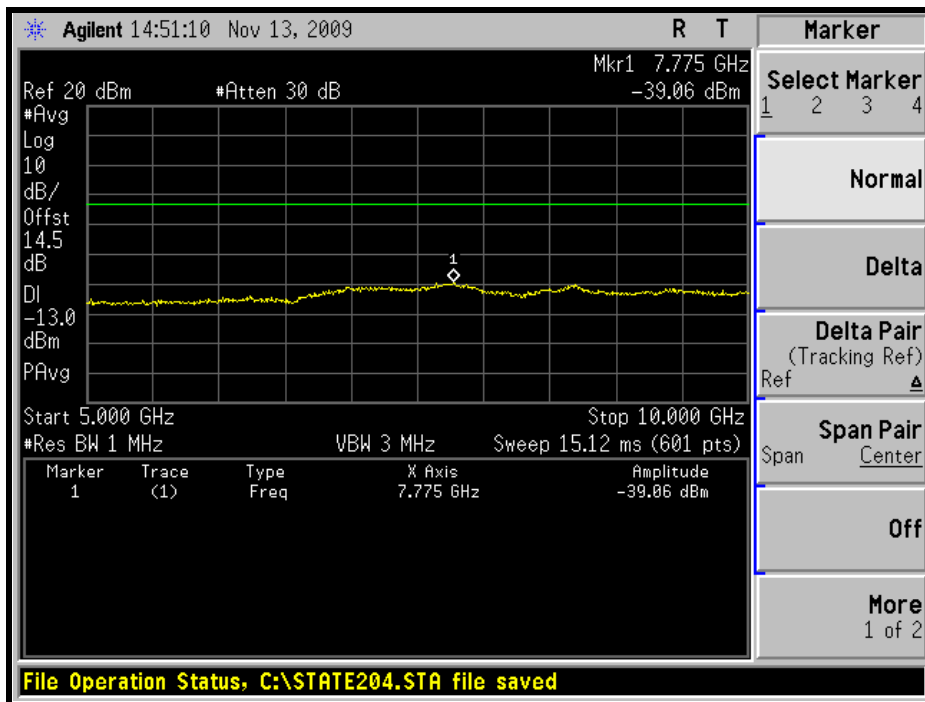
**1GHz ~ 5GHz:**



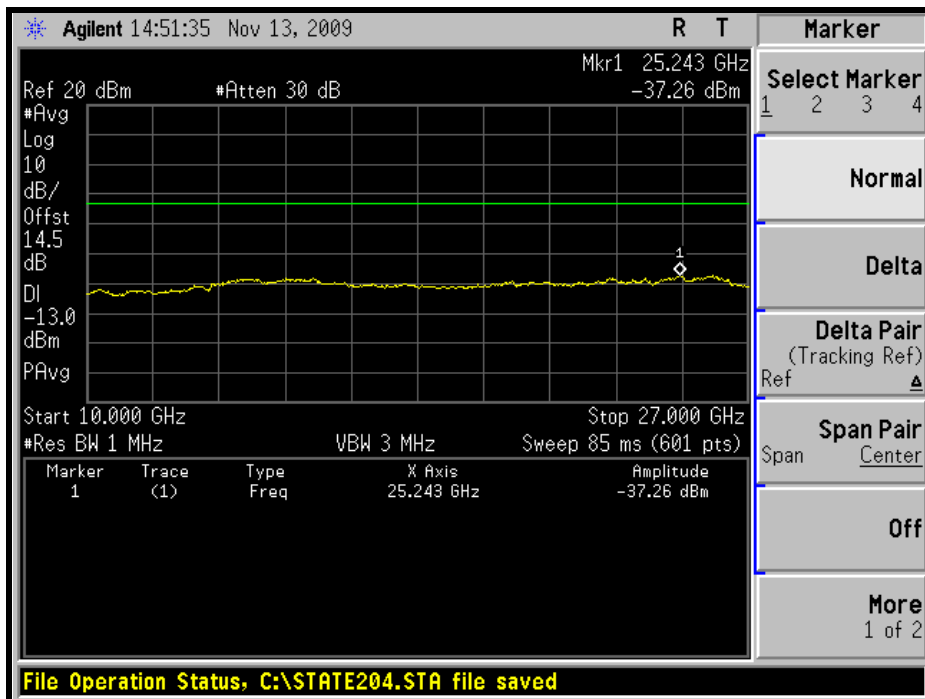


A D T

5GHz ~ 10GHz:



10GHz ~ 27GHz:

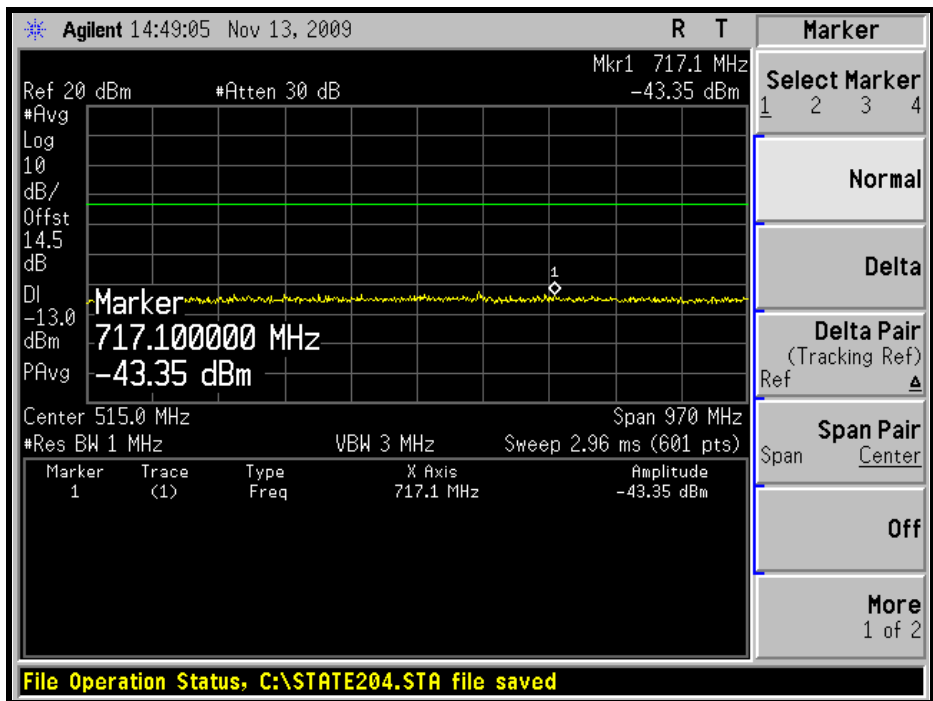




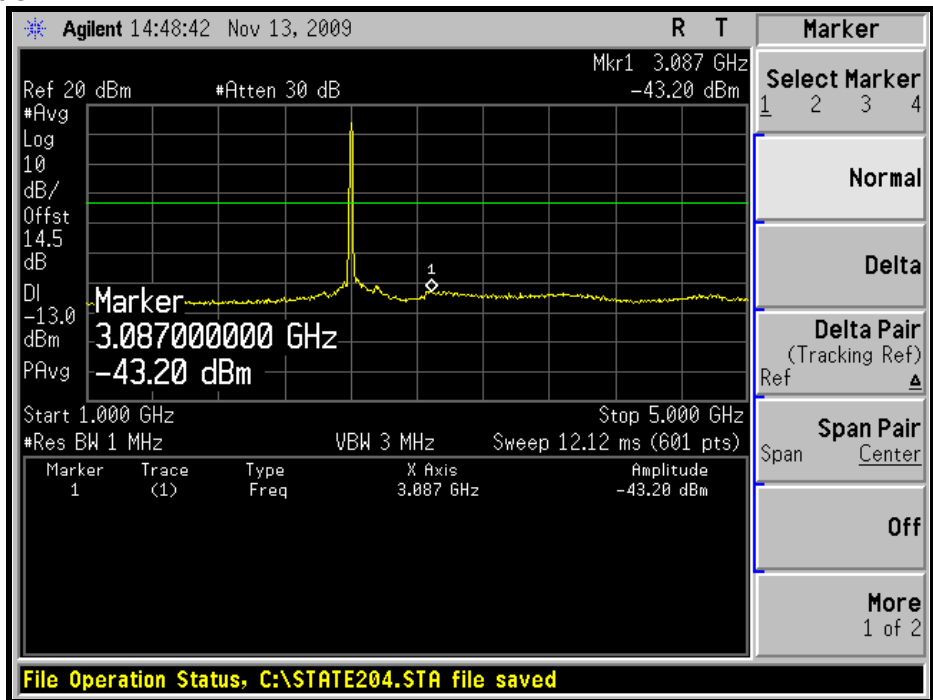


A D T

MIDDLE CHANNEL: 30MHz ~ 1GHz:



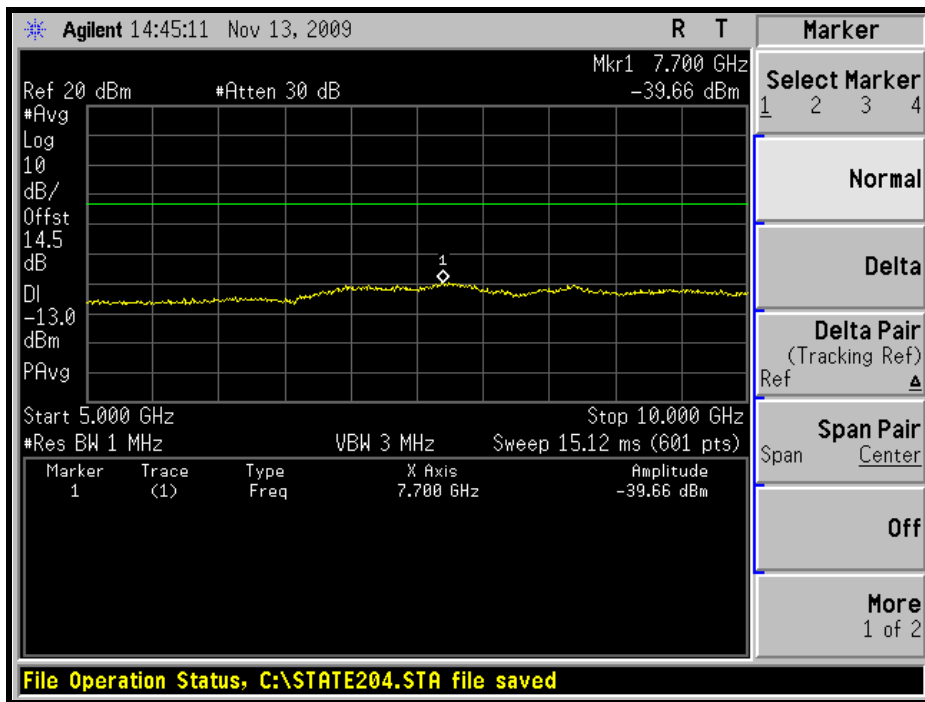
1GHz ~ 5GHz:



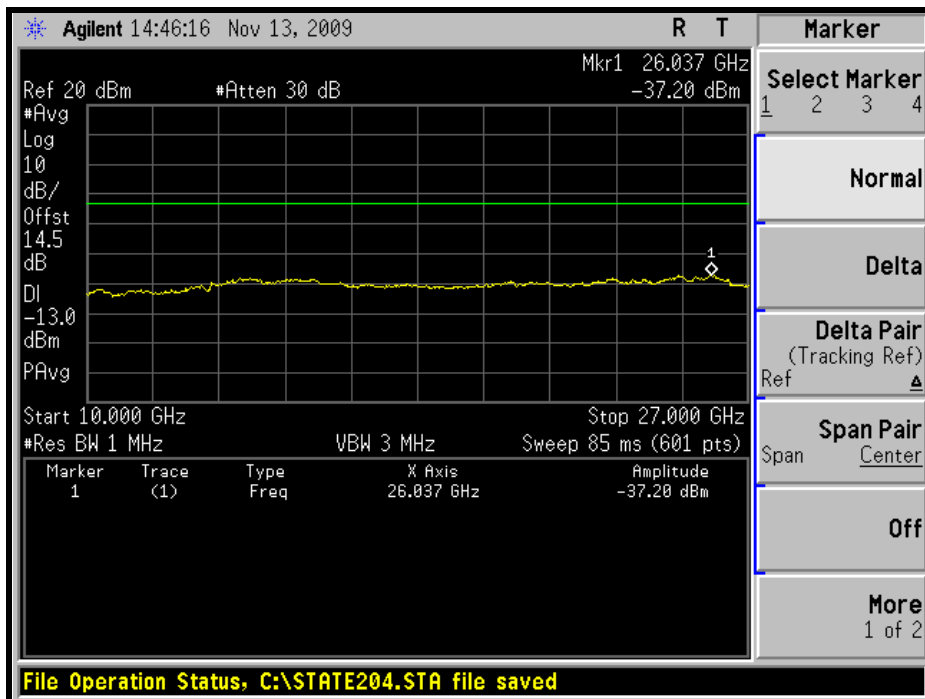


A D T

5GHz ~ 10GHz:



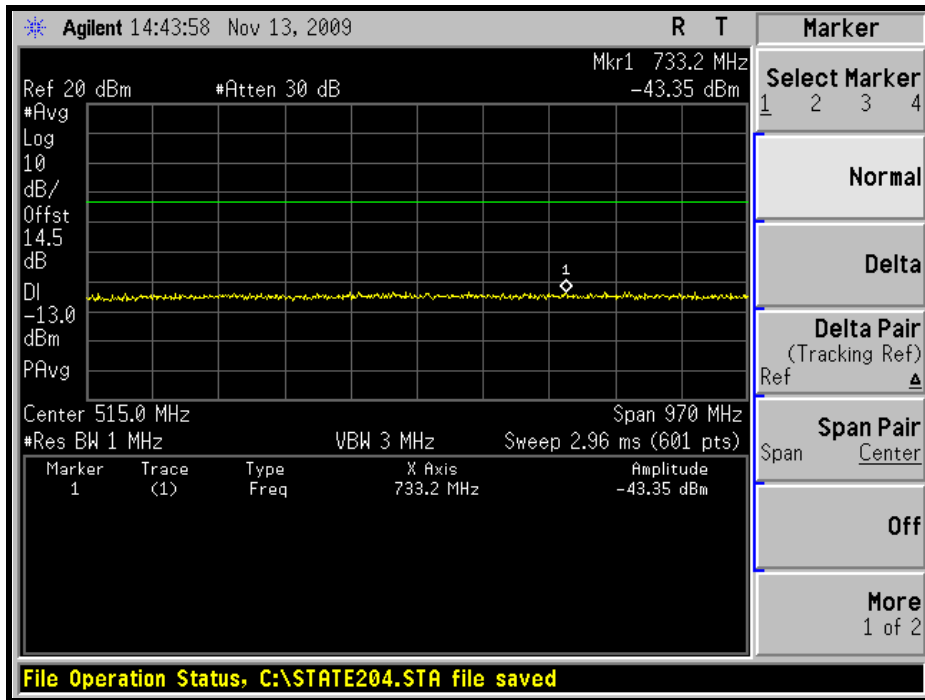
10GHz ~ 27GHz:



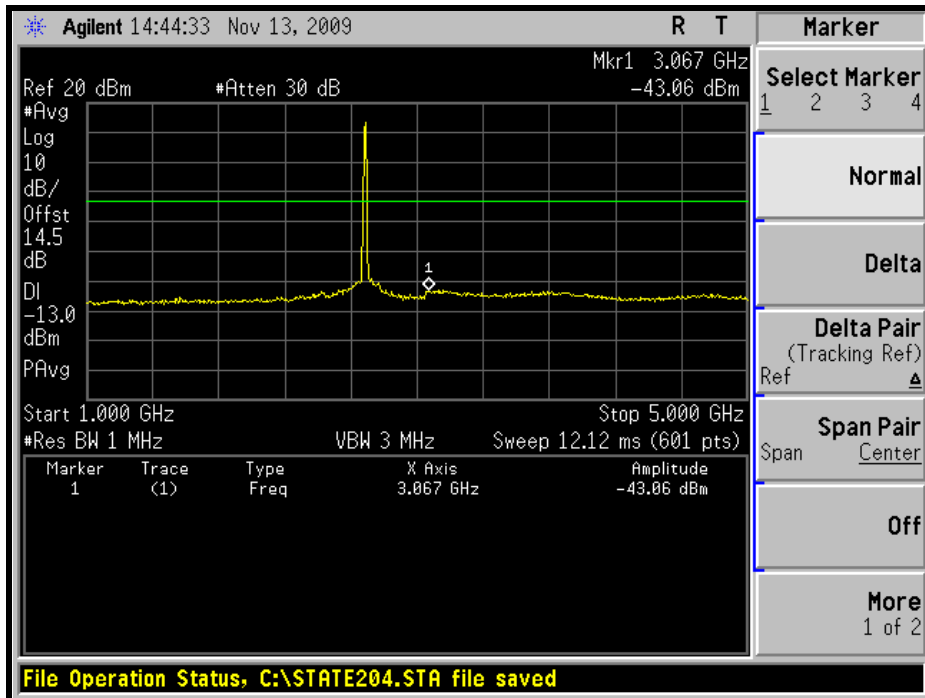


A D T

### HIGH CHANNEL: 30MHz ~ 1GHz:



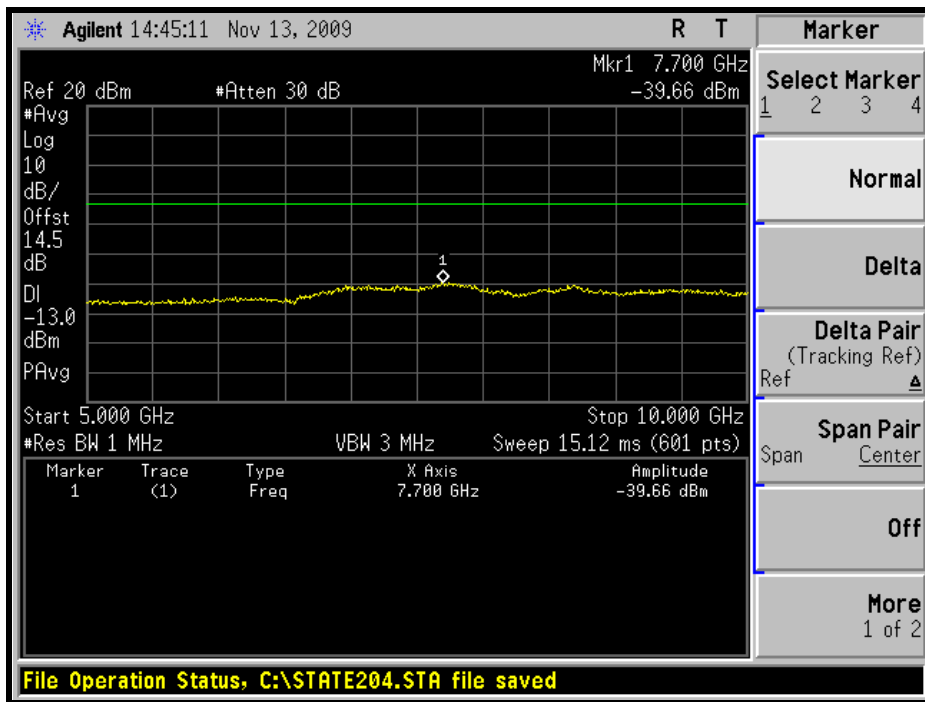
### 1GHz ~ 5GHz:



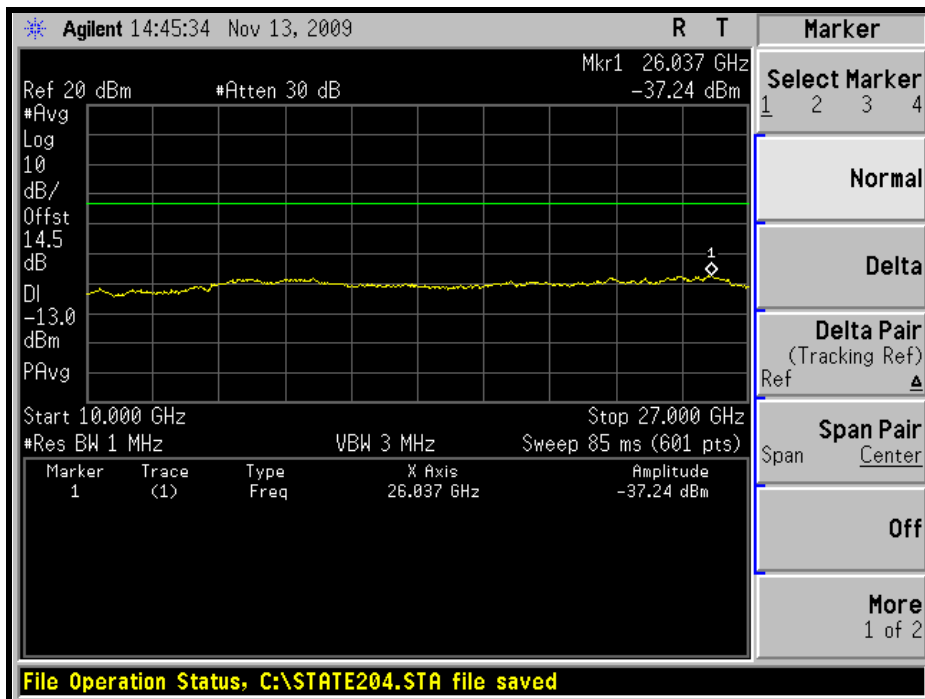


A D T

5GHz ~ 10GHz:



10GHz ~ 27GHz:



## 4.6 RADIATED EMISSION MEASUREMENT (BELOW 1GHz)

### 4.6.1 LIMITS OF RADIATED EMISSION MEASUREMENT

In the FCC 27.53(m) (2), On any frequency outside a licensee's frequency block the power of any emission shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log (P)$  dB from the channel edges.

### 4.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
ROHDE & SCHWARZ Spectrum Analyzer	FSP40	100036	Dec. 09, 2008	Dec. 08, 2009
Agilent PSA Spectrum Analyzer	E4446A	MY46180622	Apr. 24, 2009	Apr. 23, 2010
HP Pre_Amplifier	8449B	3008A01923	Nov. 02, 2009	Nov. 01, 2010
ROHDE & SCHWARZ Test Receiver	ESCS30	847124/029	Aug. 28, 2009	Aug. 28, 2010
SCHWARZBECK TRILOG Broadband Antenna	VULB 9168	138	April 29, 2009	April 28, 2010
Schwarzbeck Horn_Antenna	BBHA9120	D124	Dec. 09, 2008	Dec. 08, 2009
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 22, 2009	Jan. 21, 2010
RF Switches	EMH-011	08009	Sep. 26, 2009	Sep. 25, 2010
RF CABLE (Chaintek)	Sucoflex 106	28077	Aug. 14, 2009	Aug. 13, 2010
RF Cable	8D	STCCAB-001	Sep. 26, 2009	Sep. 25, 2010
Software	ADT_Radiated_V7.6.15.9.2	NA	NA	NA
CT Antenna Tower & Turn Table	NA	NA	NA	NA

- Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
 2. The horn antenna, HP preamplifier (model: 8449B) and Spectrum Analyzer (model: FSP40) are used only for the measurement of emission frequency above 1GHz if tested.  
 3. The test was performed in Open Site No. C.  
 4. The FCC Site Registration No. is 656396.  
 5. The VCCI Site Registration No. is R-1626.  
 6. The CANADA Site Registration No. is IC 7450G-3.

#### 4.6.3 TEST PROCEDURES

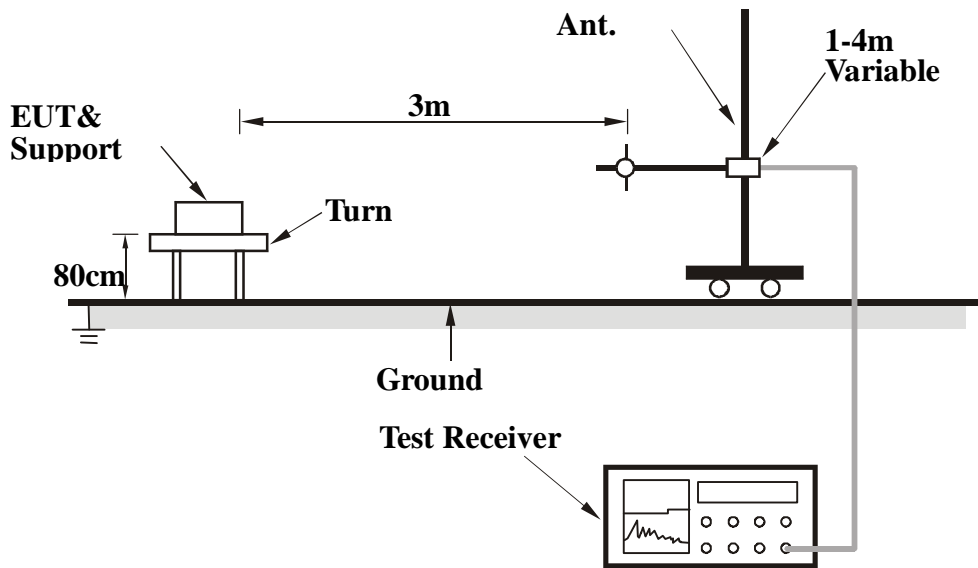
- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the receiving antenna, which was mounted on antenna tower and its position at 0.8 m above the ground.
- c. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading and recorded the value.
- d. The EUT is replaced by a horn antenna connected to a signal generator tuned to the frequency of emission.
- e. The signal generator level has to be adjusted to have the same emission nature.
- f. The radiated power can be calculated via the factor and antenna gain.
- g. Repeat step a ~ f for horizontal polarization.

**NOTE:** The resolution bandwidth of spectrum analyzer is 1MHz and the video bandwidth is 3MHz.

#### 4.6.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.6.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

#### 4.6.6 EUT OPERATING CONDITIONS

Same as item 4.1.5



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### 4.6.7 TEST RESULTS

#### CHANNEL BANDWIDTH: 5MHz

<b>MODE</b>	Middle channel	<b>FREQUENCY RANGE</b>	Below 1000MHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	20deg°C, 60%RH 1023hPa
<b>TESTED BY</b>	Andy Ho		

#### ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBm)	S.G level (dBm)	C.F. (dB)	Power level (dBm)
1	125	30.99	-13	-59.69	-1.21	-60.91
2	200	27.79	-13	-67.70	4.34	-63.36
3	250	35.9	-13	-59.06	3.89	-55.17
4	300	30.42	-13	-65.36	3.71	-61.65
5	460	36.04	-13	-61.67	2.82	-58.85
6	640	35.88	-13	-59.04	1.75	-57.29
7	700	29.25	-13	-67.09	1.62	-65.47
8	920	36.78	-13	-61.73	0.43	-61.30
9	960	32.92	-13	-64.91	0.39	-64.52
10	1000	29.74	-13	-66.73	0.59	-66.14

#### ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBm)	S.G level (dBm)	C.F. (dB)	Power level (dBm)
1	55.89	31.71	-13	-48.92	-8.58	-57.51
2	112.25	32.16	-13	-57.85	-0.97	-58.82
3	125	33.17	-13	-57.51	-1.21	-58.73
4	184.25	30.94	-13	-63.22	2.64	-60.57
5	200	28.4	-13	-67.09	4.34	-62.75
6	250	34.13	-13	-60.83	3.89	-56.94
7	1000	38.34	-13	-58.13	0.59	-57.54

REMARKS: 1. Power Value(dBm)=S.G Power Value (dBm) + Correction Factor(dB)





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**CHANNEL BANDWIDTH: 10MHz**

<b>MODE</b>	High channel	<b>FREQUENCY RANGE</b>	Below 1000MHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	20deg°C, 60%RH 1023hPa
<b>TESTED BY</b>	Andy Ho		

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBm)	S.G level (dBm)	C.F. (dB)	Power level (dBm)
1	125	31.14	-13	-59.54	-1.21	-60.76
2	200	27.8	-13	-67.69	4.34	-63.35
3	250	36.53	-13	-58.43	3.89	-54.54
4	300	30.92	-13	-64.86	3.71	-61.15
5	460	35.84	-13	-61.87	2.82	-59.05
6	640	35.05	-13	-59.87	1.75	-58.12
7	700	31.05	-13	-65.29	1.62	-63.67
8	920	34.51	-13	-64.00	0.43	-63.57
9	960	32.92	-13	-64.91	0.39	-64.52
10	1000	30.97	-13	-65.50	0.59	-64.91

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBm)	S.G level (dBm)	C.F. (dB)	Power level (dBm)
1	55.89	30.92	-13	-49.71	-8.58	-58.30
2	112.25	32.49	-13	-57.52	-0.97	-58.49
3	125	31.04	-13	-59.64	-1.21	-60.86
4	184.25	31.16	-13	-63.00	2.64	-60.35
5	200	29	-13	-66.49	4.34	-62.15
6	250	35.13	-13	-59.83	3.89	-55.94
7	1000	38.94	-13	-57.53	0.59	-56.94

**REMARKS:** 1. Power Value(dBm)=S.G Power Value (dBm) + Correction Factor(dB)



## 4.7 RADIATED EMISSION MEASUREMENT (ABOVE 1GHz)

### 4.7.1 LIMITS OF RADIATED EMISSION MEASUREMENT

In the FCC 27.53(m) (2), On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log (P)$  dB from the channel edges.

### 4.7.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
ROHDE & SCHWARZ Spectrum Analyzer	FSP40	100036	Dec. 09, 2008	Dec. 08, 2009
Agilent PSA Spectrum Analyzer	E4446A	MY46180622	Apr. 24 , 2009	Apr. 23 , 2010
HP Pre_Amplifier	8449B	3008A01923	Nov. 02, 2009	Nov. 01, 2010
ROHDE & SCHWARZ Test Receiver	ESCS30	847124/029	Aug. 28, 2009	Aug. 28, 2010
SCHWARZBECK TRILOG Broadband Antenna	VULB 9168	138	April 29, 2009	April 28, 2010
Schwarzbeck Horn_Antenna	BBHA9120	D124	Dec. 09, 2008	Dec. 08, 2009
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 22, 2009	Jan. 21, 2010
RF Switches	EMH-011	08009	Sep. 26, 2009	Sep. 25, 2010
RF CABLE (Chaintek)	Sucoflex 106	28077	Aug. 14, 2009	Aug. 13, 2010
RF Cable	8D	STCCAB-001	Sep. 26, 2009	Sep. 25, 2010
Software	ADT_Radiated_V7.6.15.9.2	NA	NA	NA
CT Antenna Tower & Turn Table	NA	NA	NA	NA

- Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
 2. The horn antenna, HP preamplifier (model: 8449B) and Spectrum Analyzer (model: FSP40) are used only for the measurement of emission frequency above 1GHz if tested.  
 3. The test was performed in Open Site No. C.  
 4. The FCC Site Registration No. is 656396.  
 5. The VCCI Site Registration No. is R-1626.  
 6. The CANADA Site Registration No. is IC 7450G-3.

#### 4.7.3 TEST PROCEDURES

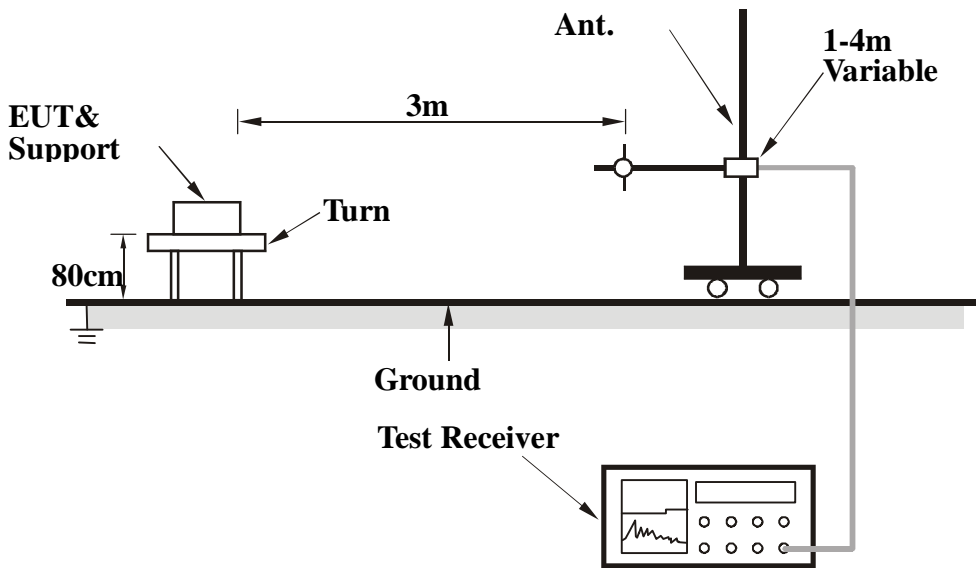
- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the receiving antenna, which was mounted on antenna tower and its position at 0.8 m above the ground.
- c. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading and recorded the value.
- d. The EUT is replaced by a horn antenna connected to a signal generator tuned to the frequency of emission.
- e. The signal generator level has to be adjusted to have the same emission nature.
- f. The radiated power can be calculated via the factor and antenna gain.
- g. Repeat step a ~ f for horizontal polarization.

**NOTE:** The resolution bandwidth of spectrum analyzer is 1MHz and the video bandwidth is 3MHz.

#### 4.7.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.7.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

#### 4.7.6 EUT OPERATING CONDITIONS

Same as item 4.1.5



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#### 4.7.7 TEST RESULTS

##### CHANNEL BANDWIDTH: 5MHz

<b>MODE</b>	Low channel	<b>FREQUENCY RANGE</b>	Above 1000MHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	20deg°C, 60%RH 1023hPa
<b>TESTED BY</b>	Frank Liu		

##### ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBm)	S.G level (dBm)	C.F. (dB)	Power level (dBm)
1	5005	47.99	-13	-56.25	7.01	-49.24
2	7507.5	61.8	-13	-40.82	4.54	-36.28
3	10010	55.4	-13	-46.17	4.03	-42.14

##### ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBm)	S.G level (dBm)	C.F. (dB)	Power level (dBm)
1	5005	58.94	-13	-45.30	7.01	-38.29
2	7507.5	67.85	-13	-34.77	4.54	-30.23
3	10010	54.1	-13	-47.47	4.03	-43.44

**REMARKS:** 1. Power Value(dBm)=S.G Power Value (dBm) + Correction Factor(dB)



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<b>MODE</b>	Middle channel	<b>FREQUENCY RANGE</b>	Above 1000MHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	20deg°C, 60%RH 1023hPa
<b>TESTED BY</b>	Frank Liu		

<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3 M</b>						
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBm)	S.G level (dBm)	C.F. (dB)	Power level (dBm)
1	5200	70.2	-13	-34.33	7.05	-27.28
2	7800	65.49	-13	-37.13	4.29	-32.84
3	10400	56.2	-13	-45.81	3.66	-42.14

<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M</b>						
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBm)	S.G level (dBm)	C.F. (dB)	Power level (dBm)
1	5200	67.43	-13	-37.10	7.05	-30.05
2	7800	77.03	-13	-25.59	4.29	-21.30
3	10400	55.1	-13	-46.91	3.66	-43.24

**REMARKS:** 1. Power Value(dBm)=S.G Power Value (dBm) + Correction Factor(dB)



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<b>MODE</b>	High channel	<b>FREQUENCY RANGE</b>	Above 1000MHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	20deg°C, 60%RH 1023hPa
<b>TESTED BY</b>	Frank Liu		

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBm)	S.G level (dBm)	C.F. (dB)	Power level (dBm)
1	5375	49.41	-13	-55.38	7.09	-48.29
2	8062.5	64.35	-13	-38.27	4.13	-34.14
3	10750	55.3	-13	-46.54	3.33	-43.20

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBm)	S.G level (dBm)	C.F. (dB)	Power level (dBm)
1	5375	59.18	-13	-45.61	7.09	-38.52
2	8062.5	67.54	-13	-35.08	4.13	-30.95
3	10750	55.4	-13	-46.44	3.33	-43.10

**REMARKS:** 1. Power Value(dBm)=S.G Power Value (dBm) + Correction Factor(dB)



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**CHANNEL BANDWIDTH: 10MHz**

<b>MODE</b>	Low channel	<b>FREQUENCY RANGE</b>	Above 1000MHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	20deg°C, 60%RH 1023hPa
<b>TESTED BY</b>	Frank Liu		

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBm)	S.G level (dBm)	C.F. (dB)	Power level (dBm)
1	5010	58.67	-13	-45.58	7.01	-38.56
2	7515	54.39	-13	-48.23	4.53	-43.70
3	10020	55.9	-13	-45.68	4.02	-41.66

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBm)	S.G level (dBm)	C.F. (dB)	Power level (dBm)
1	5010	53.84	-13	-50.41	7.01	-43.39
2	7515	67.72	-13	-34.90	4.53	-30.37
3	10020	54.8	-13	-46.78	4.02	-42.76

**REMARKS:** 1. Power Value(dBm)=S.G Power Value (dBm) + Correction Factor(dB)





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<b>MODE</b>	Middle channel	<b>FREQUENCY RANGE</b>	Above 1000MHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	20deg°C, 60%RH 1023hPa
<b>TESTED BY</b>	Frank Liu		

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBm)	S.G level (dBm)	C.F. (dB)	Power level (dBm)
1	5200	67.81	-13	-36.72	7.05	-29.67
2	7800	60.4	-13	-42.22	4.29	-37.93
3	10400	56.3	-13	-45.71	3.66	-42.04

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBm)	S.G level (dBm)	C.F. (dB)	Power level (dBm)
1	5200	72.9	-13	-31.63	7.05	-24.58
2	7800	53.4	-13	-49.22	4.29	-44.93
3	10400	55.4	-13	-46.61	3.66	-42.94

**REMARKS:** 1. Power Value(dBm)=S.G Power Value (dBm) + Correction Factor(dB)



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<b>MODE</b>	High channel	<b>FREQUENCY RANGE</b>	Above 1000MHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	20deg°C, 60%RH 1023hPa
<b>TESTED BY</b>	Frank Liu		

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBm)	S.G level (dBm)	C.F. (dB)	Power level (dBm)
1	5370	55.64	-13	-49.15	7.09	-42.05
2	8055	62.6	-13	-40.02	4.13	-35.89
3	10740	55.17	-13	-46.68	3.34	-43.34

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBm)	S.G level (dBm)	C.F. (dB)	Power level (dBm)
1	5370	52.82	-13	-51.97	7.09	-44.87
2	8055	60.43	-13	-42.19	4.13	-38.06
3	10740	54.8	-13	-47.05	3.34	-43.71

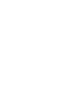
**REMARKS:** 1. Power Value(dBm)=S.G Power Value (dBm) + Correction Factor(dB)



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## 5 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).





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## 6 INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

<b>USA</b>	FCC, NVLAP
<b>Germany</b>	TUV Rheinland
<b>Japan</b>	VCCI
<b>Norway</b>	NEMKO
<b>Canada</b>	INDUSTRY CANADA , CSA
<b>R.O.C.</b>	TAF, BSMI, NCC
<b>Netherlands</b>	Telefication
<b>Singapore</b>	GOST-ASIA(MOU)
<b>Russia</b>	CERTIS(MOU)

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site:

[www.adt.com.tw/index.5/phtml](http://www.adt.com.tw/index.5/phtml). If you have any comments, please feel free to contact us at the following:

**Linko EMC/RF Lab:**

Tel: 886-2-26052180

Fax: 886-2-26051924

**Hsin Chu EMC/RF Lab:**

Tel: 886-3-5935343

Fax: 886-3-5935342

**Hwa Ya EMC/RF/Safety/Telecom Lab: Web Site: [www.adt.com.tw](http://www.adt.com.tw)**

Tel: 886-3-3183232

Fax: 886-3-3185050

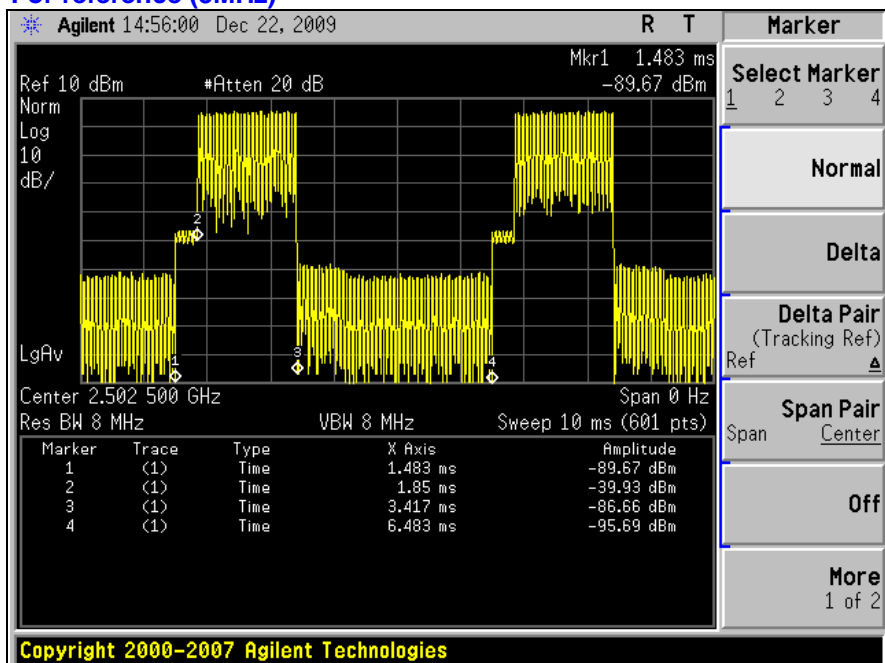
The address and road map of all our labs can be found in our web site also.



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## 7 APPENDIX - A DL/UL RATION FOR TEST

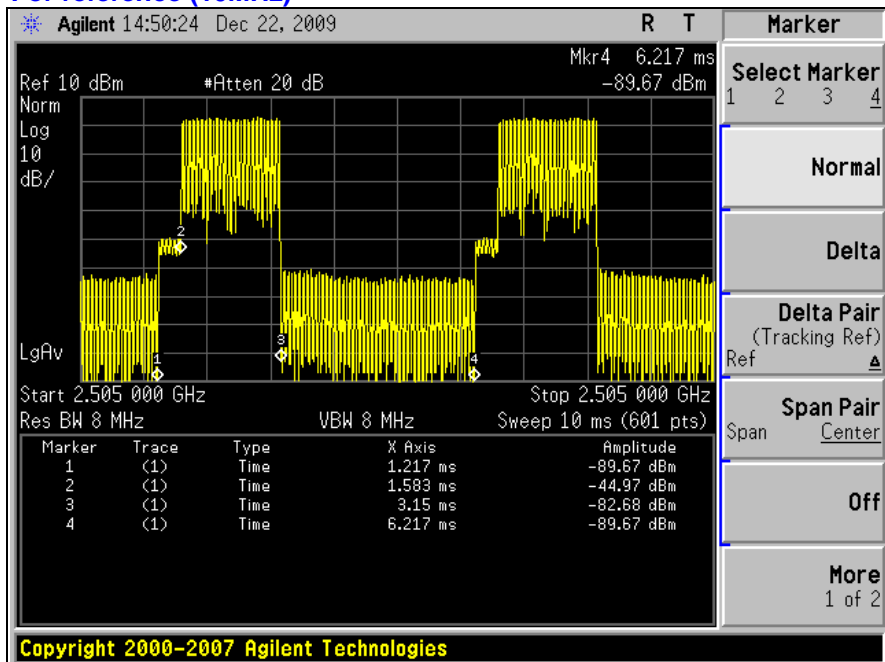
### For reference (5MHz)



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$$\text{Ratio} = [(3.417 - 1.85) / (6.483 - 1.483)] * \% = 31.34\%$$

### For reference (10MHz)



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$$\text{Ratio} = [(3.15 - 1.583) / (6.217 - 1.217)] * \% = 31.34\%$$

--- END ---