

# FCC TEST REPORT (PART 27)

**REPORT NO.:** RF980602H02

**MODEL NO.:** MAX-207HW2

**RECEIVED:** June 02, 2009

**TESTED:** June 08 to 19, 2009

**ISSUED:** June 22, 2009

**APPLICANT:** ZyXEL Communications Corporation

**ADDRESS:** No. 6, Innovation Road II, Science-Park, Hsin-Chu,  
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**ISSUED BY :** Bureau Veritas Consumer Products Services (H.K.)  
Ltd., Taoyuan Branch

**LAB LOCATION :** No. 81-1, Lu Liao Keng, 9th Ling,Wu Lung Tsuen,  
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## TABLE OF CONTENTS

1	CERTIFICATION .....	4
2	SUMMARY OF TEST RESULTS .....	5
2.1	MEASUREMENT UNCERTAINTY .....	6
3	GENERAL INFORMATION.....	7
3.1	GENERAL DESCRIPTION OF EUT.....	7
3.2	DESCRIPTION OF TEST MODES.....	9
3.2.1	TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL.....	10
3.3	GENERAL DESCRIPTION OF APPLIED STANDARDS.....	12
3.4	DESCRIPTION OF SUPPORT UNITS .....	13
3.4.1	CONFIGURATION OF SYSTEM UNDER TEST .....	14
4	TEST TYPES AND RESULTS .....	15
4.1	OUTPUT POWER MEASUREMENT .....	15
4.1.1	LIMITS OF OUTPUT POWER MEASUREMENT .....	15
4.1.2	TEST INSTRUMENTS .....	15
4.1.3	TEST PROCEDURES.....	16
4.1.4	TEST SETUP .....	17
4.1.5	EUT OPERATING CONDITIONS.....	17
4.1.6	TEST RESULTS.....	18
4.2	FREQUENCY STABILITY MEASUREMENT.....	26
4.2.1	LIMITS OF FREQUENCY STABILITY MEASUREMENT .....	26
4.2.2	TEST INSTRUMENTS .....	26
4.2.3	TEST PROCEDURE .....	27
4.2.4	TEST SETUP.....	27
4.2.5	TEST RESULTS.....	28
4.3	EMISSION BANDWIDTH MEASUREMENT.....	29
4.3.1	LIMITS OF EMISSION BANDWIDTH MEASUREMENT .....	29
4.3.2	TEST INSTRUMENTS .....	29
4.3.3	TEST SETUP.....	29
4.3.4	TEST PROCEDURES.....	30
4.3.5	TEST RESULTS.....	31
4.4	CHANNEL EDGE MEASUREMENT .....	35
4.4.1	LIMITS OF CHANNEL EDGE MEASUREMENT .....	35
4.4.2	TEST INSTRUMENTS .....	35
4.4.3	TEST SETUP .....	35
4.4.4	TEST PROCEDURES.....	36
4.4.5	EUT OPERATING CONDITION .....	36
4.4.6	TEST RESULTS.....	37
4.5	CONDUCTED SPURIOUS EMISSIONS .....	43
4.5.1	LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT .....	43



A D T

4.5.2	TEST INSTRUMENTS .....	43
4.5.3	TEST PROCEDURE .....	44
4.5.4	TEST SETUP.....	44
4.5.5	EUT OPERATING CONDITIONS .....	44
4.5.6	TEST RESULTS.....	45
4.6	RADIATED EMISSION MEASUREMENT (BELOW 1GHz) .....	57
4.6.1	LIMITS OF RADIATED EMISSION MEASUREMENT .....	57
4.6.2	TEST INSTRUMENTS .....	57
4.6.3	TEST PROCEDURES.....	58
4.6.4	DEVIATION FROM TEST STANDARD .....	58
4.6.5	TEST SETUP.....	59
4.6.6	EUT OPERATING CONDITIONS .....	59
4.6.7	TEST RESULTS.....	60
4.7	RADIATED EMISSION MEASUREMENT (ABOVE 1GHz).....	63
4.7.1	LIMITS OF RADIATED EMISSION MEASUREMENT .....	63
4.7.2	TEST INSTRUMENTS .....	63
4.7.3	TEST PROCEDURES.....	64
4.7.4	DEVIATION FROM TEST STANDARD .....	64
4.7.5	TEST SETUP .....	65
4.7.6	EUT OPERATING CONDITIONS .....	65
4.7.7	TEST RESULTS.....	66
5	PHOTOGRAPHS OF THE TEST CONFIGURATION.....	73
6	INFORMATION ON THE TESTING LABORATORIES .....	74
7	APPENDIX- A DL/UL RATION FOR TEST .....	75

## 1 CERTIFICATION

**PRODUCT:** WiMAX MIMO 2.5GHz Indoor Multiple-user CPE

**BRAND NAME:** ZyXEL

**MODEL NO.:** MAX-207HW2

**APPLICANT:** ZyXEL Communications Corporation

**TESTED:** June 08 to 19, 2009

**TEST SAMPLE:** MASS-PRODUCTION

**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.: MAX-207HW2) 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** :  , **DATE:** June 22, 2009  
( Claire Kuan, Specialist )

**TECHNICAL ACCEPTANCE** :  , **DATE:** June 22, 2009  
Responsible for EMI ( Mike Hsieh, Supervisor )

**APPROVED BY** :  , **DATE:** June 22, 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.

## 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 MIMO 2.5GHz Indoor Multiple-user CPE
<b>MODEL NO.</b>	MAX-207HW2
<b>FCC ID</b>	I88MAX207HW2
<b>POWER SUPPLY</b>	DC 12V from Power Adapter
<b>POWER CORD</b>	AC input cable (Unshielded, 1.85m) DC output cable (Unshielded, 1.8m, with one core)
<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>FREQUENCY RANGE</b>	2505MHz ~ 2685MHz
<b>CHANNEL BANDWIDTH</b>	5MHz & 10MHz
<b>MAX. CONDUCTED POWER</b>	5MHz: 26.29dBm 10MHz: 26.37dBm
<b>ANTENNA TYPE</b>	Please see note 1
<b>DATA CABLE</b>	NA
<b>I/O PORTS</b>	VOIP port x 2 LAN port x 4
<b>ASSOCIATED DEVICES</b>	NA

**NOTE:**

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

No.	Manufacture	Model No.	Antenna Type	Antenna Connector	Antenna Gain (dBi)	Cable Length (cm)	Cable loss(dB)	Frequency range (MHz)
1	ZyXEL	NA	Dipole	I-PXE	6.22153	27	0.5	2500~2700
2	ZyXEL	NA	Dipole	I-PXE	6.22153	27	0.5	2500~2700

- The EUT must be supplied with a power adapter as following:

Brand	Model No.	Spec.
DVE	DSA-36W-123 24	AC Input: 100-240VAC, 50/60Hz, 1A DC Output: 12VDC, 2A

3. For the EUT Modulation type and coding rate. After pre-testing items of output power and spurious emissions, QPSK-1/2 was found to be 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
			3/4
			5/6

4. This device involved a Wireless LAN USB 2.0 Adapter as following:

Brand	Model No.
ZyXEL	WM5204Z

5. The EUT incorporates a SIMO function for WiMAX. Physically, the card provides one completed transmit and two receivers.
6. The EUT is 1 \* 2 spatial SIMO without beam forming function. The antenna configuration is one transmitter antenna and two receiver antennas, as there are 2 antennas. Spatial multiplexing modes for simultaneous transmission using 1 antenna, and for simultaneous receiver using 2 antennas.
7. The EUT embedded a firmware for testing that needs to control from Notebook computer to let EUT with different DL/UL ration.
8. The device has different DL/UL ration in normal operation. It was tested with 38.961% (DL:UL= 29:18) and 38.66% (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). The typical control traffic was transmitted in 3 control symbols.
9. The above EUT information was declared by manufacturer and for more detailed features description, 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 & 10MHz**

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

**Middle channel (M):** 2590MHz.

**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
MODE 3	-	-	-	-	-	√	√	WLAN + WiMAX

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

#### **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 CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
L, M, H	OFDMA	QPSK

#### **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 CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
L, M, H	OFDMA	QPSK

### **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 CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
L, M, H	OFDMA	QPSK

### **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 CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
L, M, H	OFDMA	QPSK

### **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.

Normal test		
TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
M	OFDMA	QPSK
Simultaneously transmit test(WLAN+WiMAX)		
TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
L	OFDMA	QPSK
6	OFDM	BPSK

### **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.

Normal test		
TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
M	OFDMA	QPSK
Simultaneously transmit test(WLAN+WiMAX)		
TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
L	OFDMA	QPSK
6	OFDM	BPSK

### **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.

### 3.4 DESCRIPTION OF SUPPORT UNITS

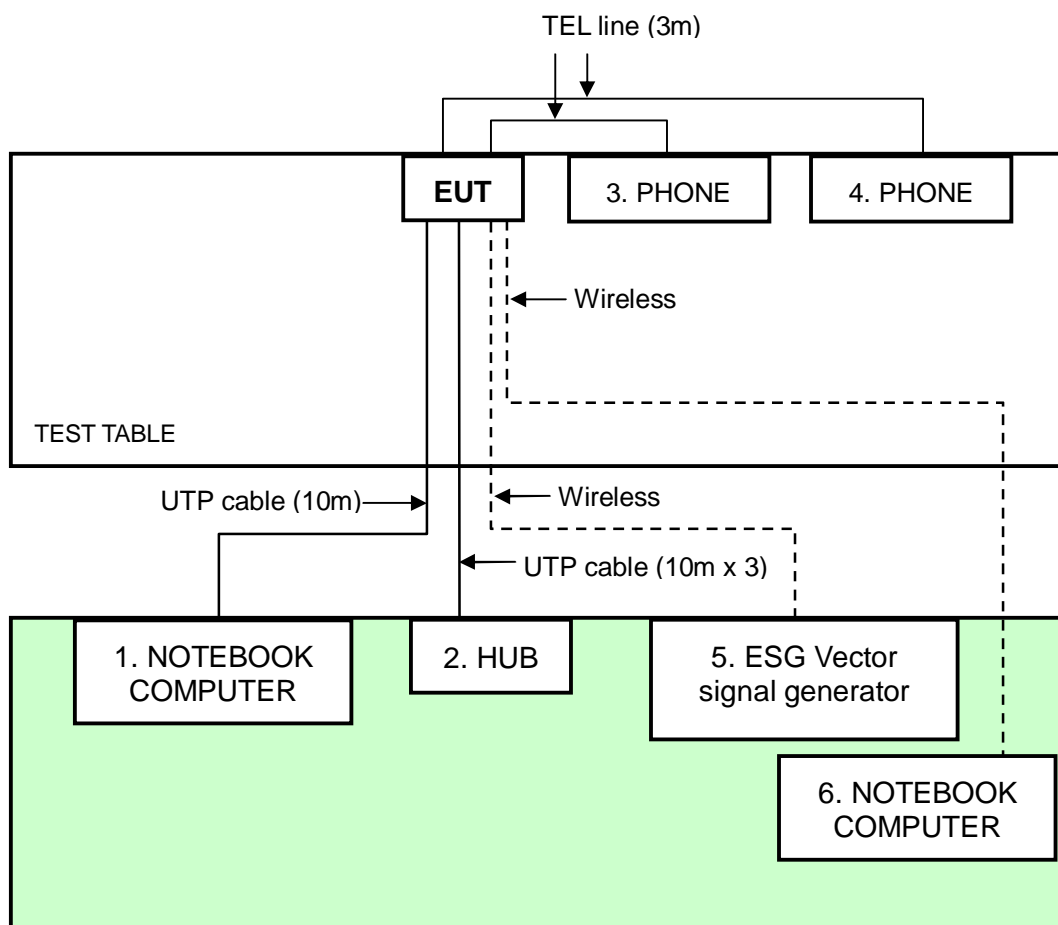
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP17L	CN-ONF743-48643-7 AV-0124	FCC DoC
2	HUB	ZyXEL	ES-116P	S060H02000215	FCC DoC
3	PHONE	HTT	HTT-806	9545065	FCC
4	PHONE	HTT	HTT-806	9543663	FCC
5	ESG Vector signal generator	Agilent	E4438C	MY45094468/005 506 602 UK6 UNJ	NA
6	NOTEBOOK COMPUTER	DELL	PP21L	CN-0GD366-70166-5 B3-09ZX	QDS-BRCM1016

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	UTP cable (10m)
2	UTP cable (10m)
3	TEL line (3m)
4	TEL line (3m)
5	NA
6	NA

**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 DATE	CALIBRATED UNTIL
Agilent Spectrum Analyzer	E4440A	MY46185282	June 19, 2008	June 18, 2009
HUBER+SUHNER	SUCOFLEX104	231115/4	May 29, 2009	May 28, 2010

**NOTE:**

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

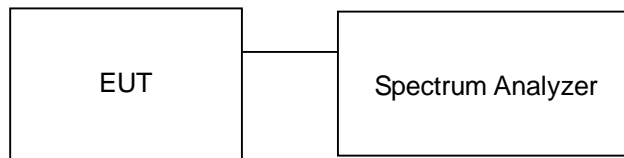
#### 4.1.3 TEST PROCEDURES

For Conducted Power:

- a. Set span to encompass the entire emission bandwidth (EBW) of the signal.
- b. For Channel bandwidth: 5 MHz:  
Set RBW=56kHz, VBW=160kHz, Detector mode=RMS.
- c. For Channel bandwidth: 10 MHz:  
Set RBW=110kHz, VBW=330kHz, Detector mode= RMS.
- d. Compute power by integrating the spectrum across the 26dB EBW of the signal.
- e. Record the power level.
- f. The “Read Value” is the spectrum reading the maximum power value.



#### 4.1.4 TEST SETUP



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

#### 4.1.5 EUT OPERATING CONDITIONS

1. Placed the EUT on testing table.
2. Prepared other computer system (support unit 1) to act as communication partners and placed them outside of testing area.
3. The communication partners run test program “Beceem Diagnostic Control Panel Version 3.2.0” to enable EUT under transmission/receiving condition continuously at specific channel frequency.
4. Support unit 3 & 4 (Phone) are call to each other via EUT.

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#### 4.1.6 TEST RESULTS

##### CHANNEL BANDWIDTH: 5MHz

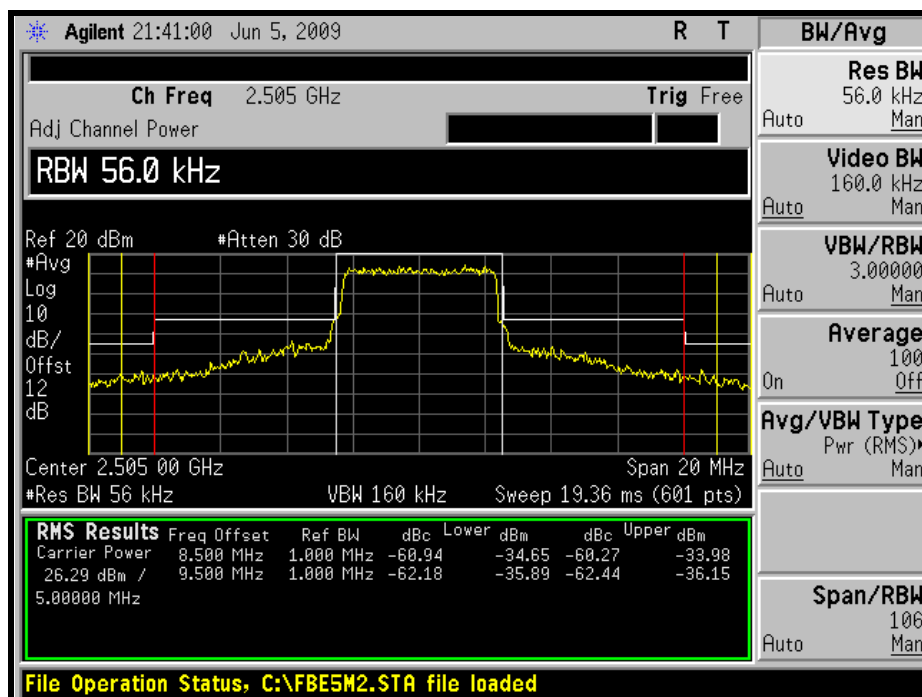
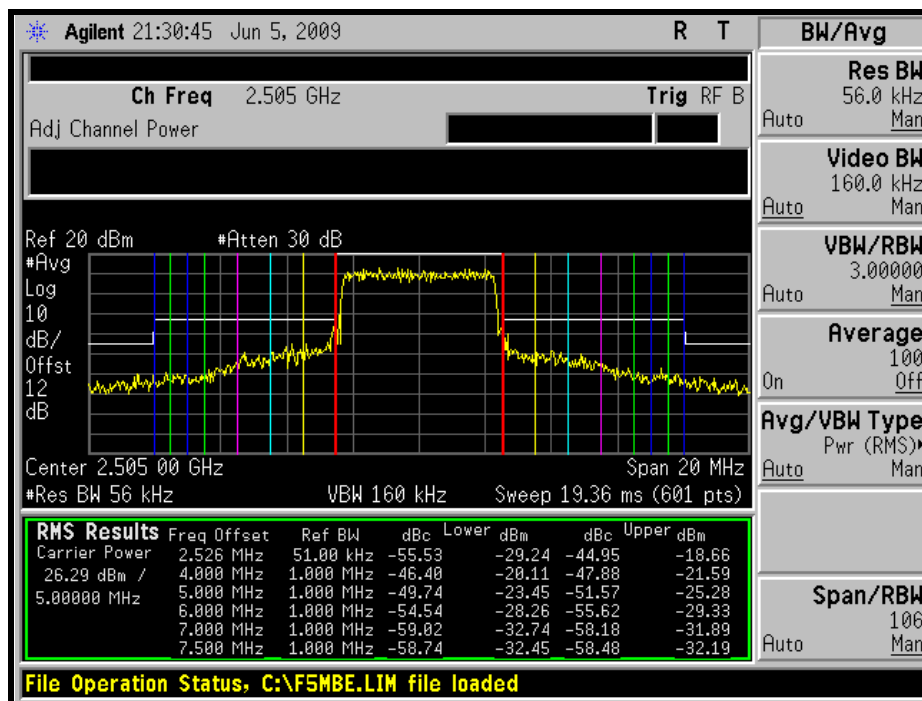
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>DETECTOR FUNCTION</b>	RMS
<b>ENVIRONMENTAL CONDITIONS</b>	20deg°C, 60%RH 965hPa	<b>TESTED BY</b>	Phoenix Huang

CONDUCTED POWER			
CHANNEL	FREQUENCY (MHz)	POWER OUTPUT(mW)	POWER OUTPUT(dBm)
Low	2505	425.598	26.29
Middle	2590	400.867	26.03
High	2685	419.759	26.23

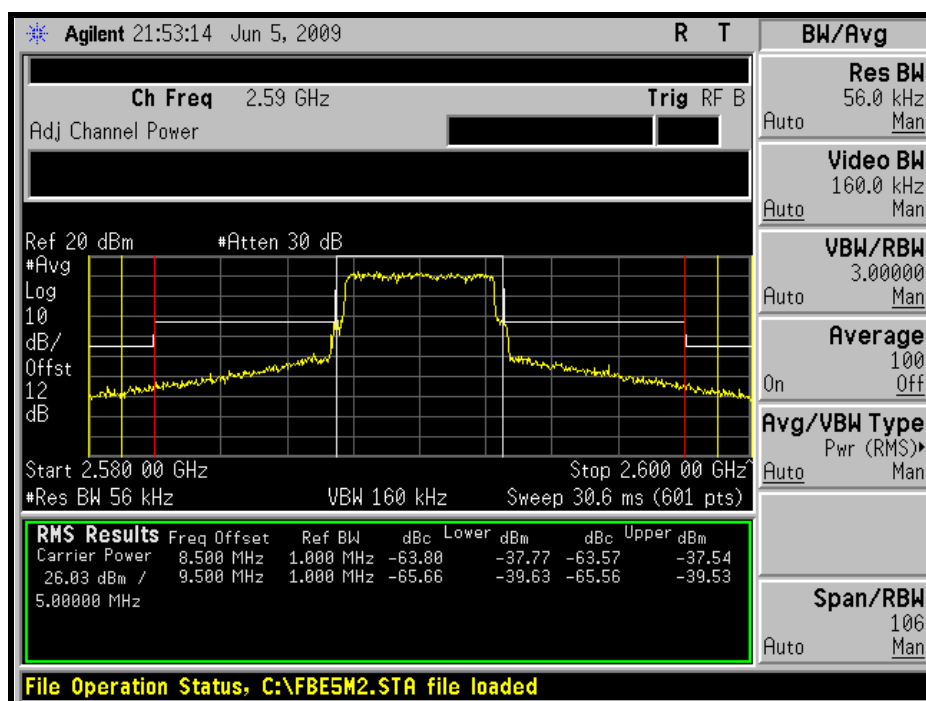
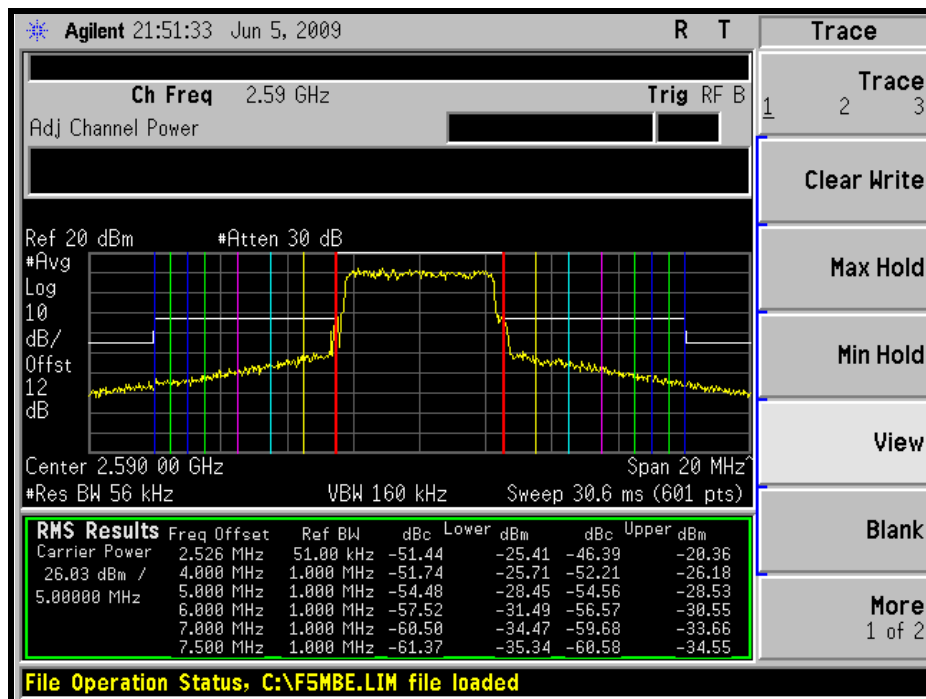


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## LOW CHANNEL



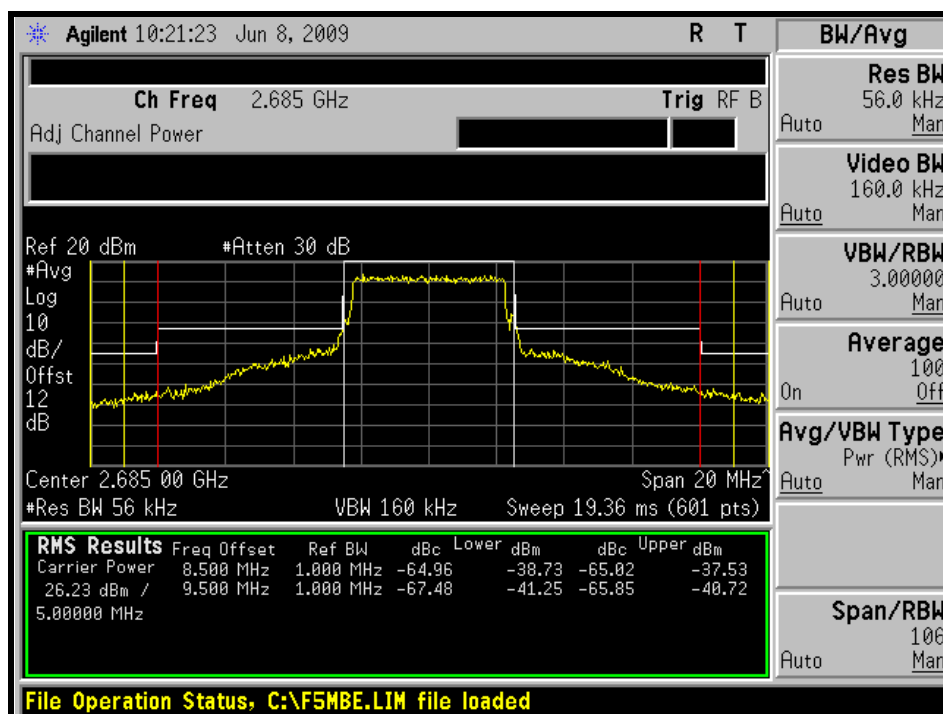
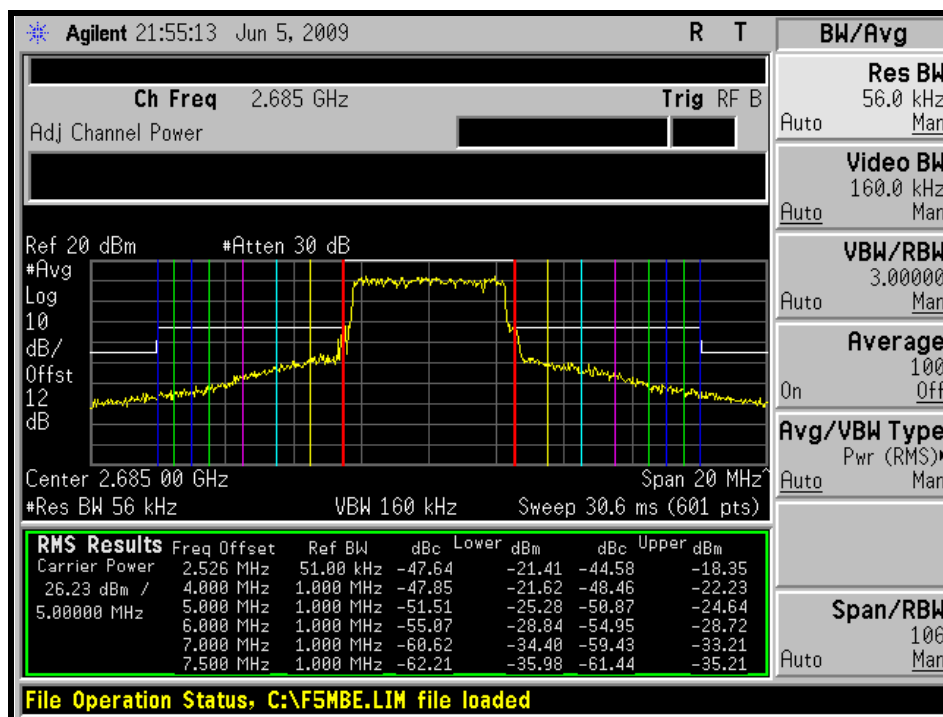
# MIDDLE CHANNEL





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## HIGH CHANNEL





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**CHANNEL BANDWIDTH: 10MHz**

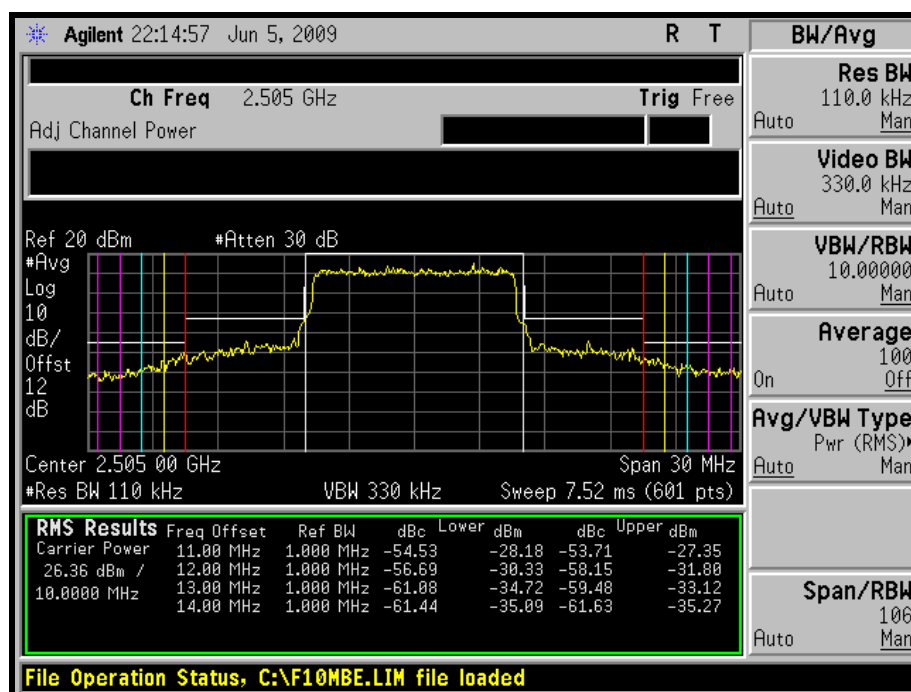
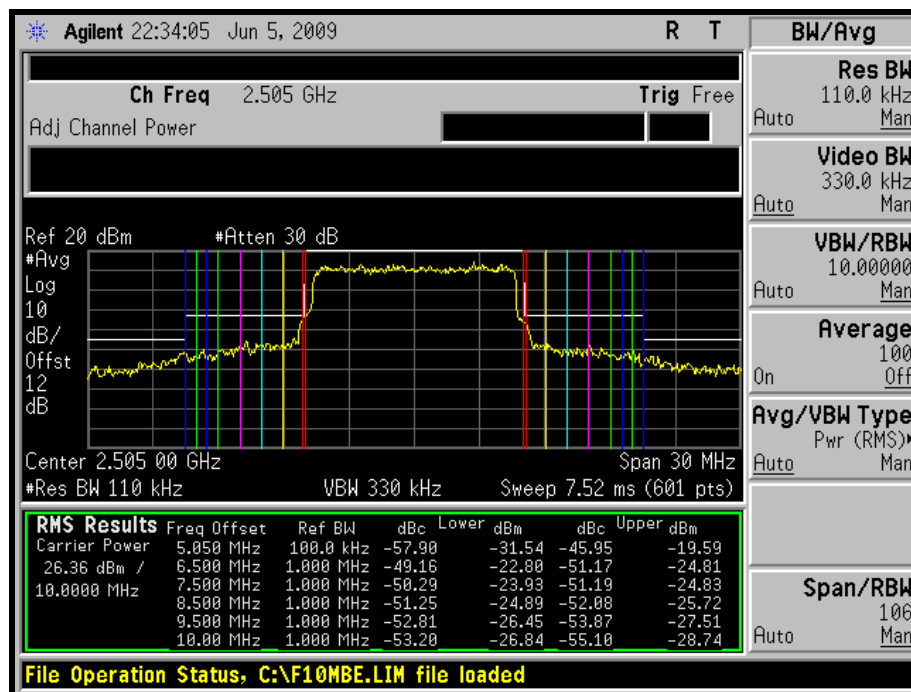
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>DETECTOR FUNCTION</b>	RMS
<b>ENVIRONMENTAL CONDITIONS</b>	20deg°C, 60%RH 960hPa	<b>TESTED BY</b>	Phoenix Huang

CONDUCTED POWER			
CHANNEL	FREQUENCY (MHz)	POWER OUTPUT(mW)	POWER OUTPUT(dBm)
Low	2505	431.519	26.36
Middle	2590	433.511	26.37
High	2685	413.048	26.16



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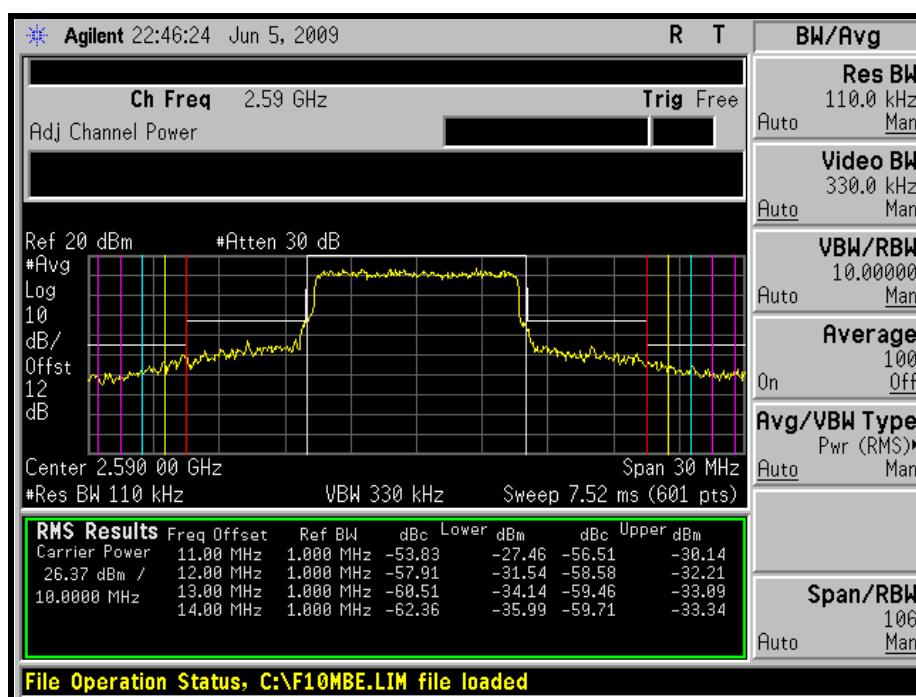
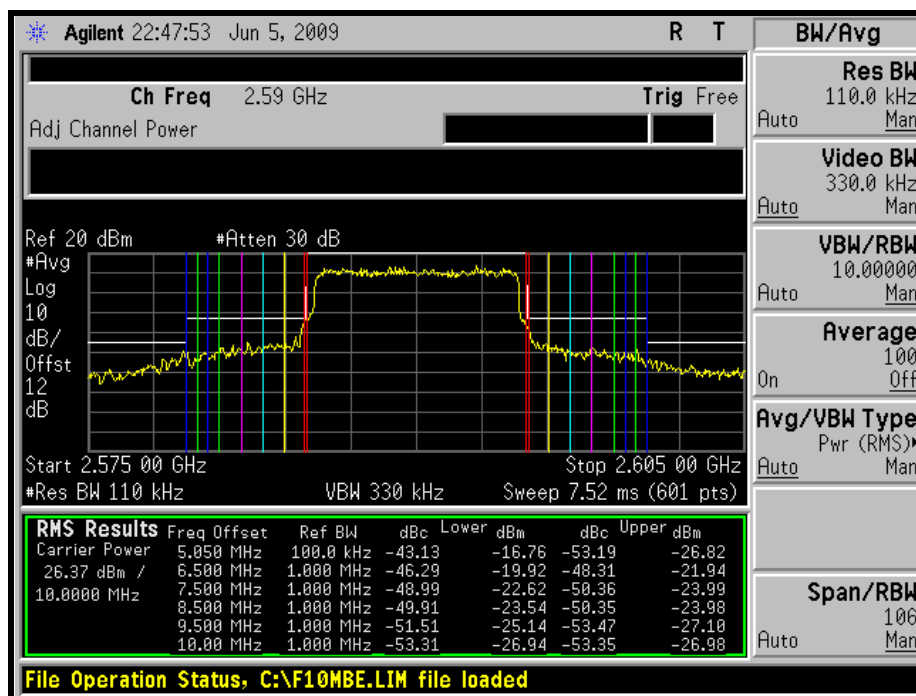
## LOW CHANNEL





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## MIDDLE CHANNEL

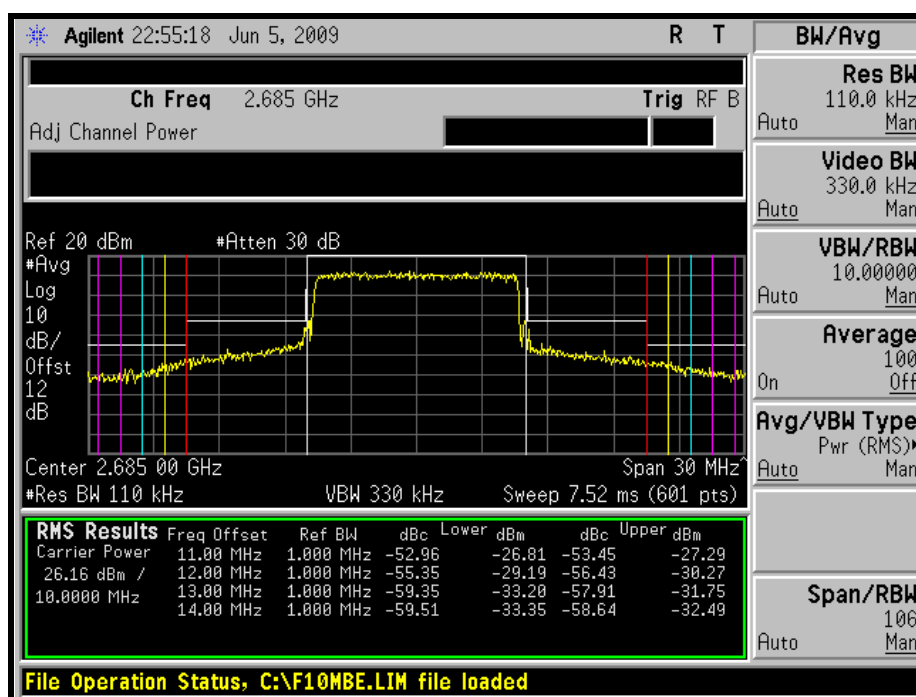
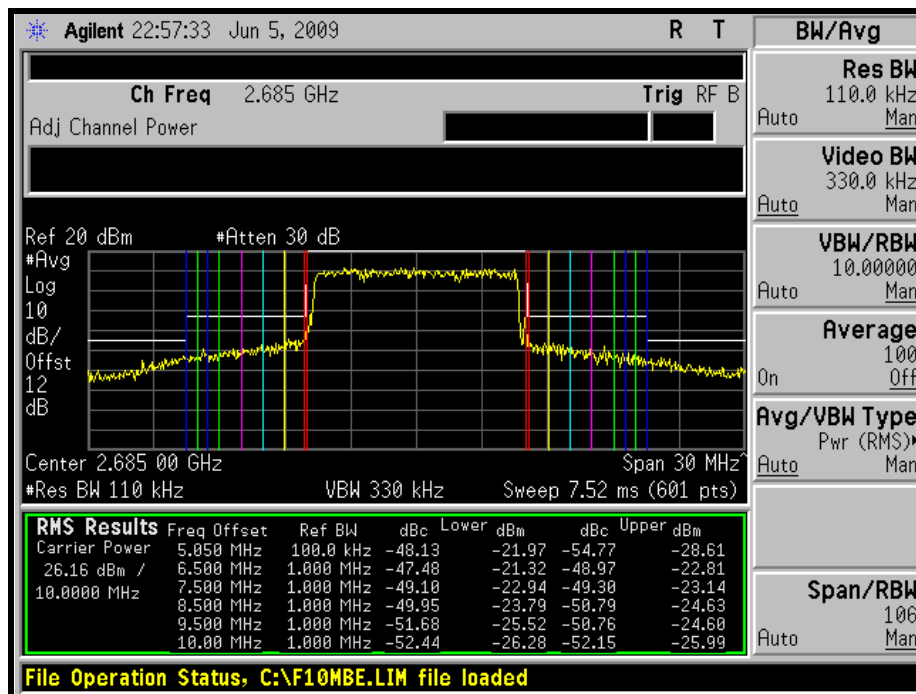






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## HIGH CHANNEL



## 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  $-30^{\circ}\text{C} \sim 55^{\circ}\text{C}$ .

### 4.2.2 TEST INSTRUMENTS

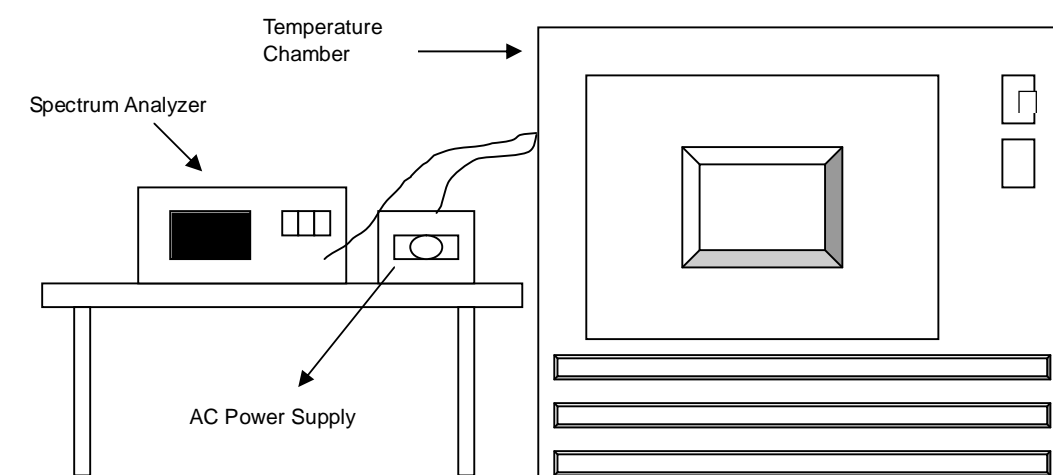
DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 09, 2008	Aug. 08, 2009
OVEN	MHU-225AU	911033	Dec. 18, 2008	Dec. 17, 2009
HUBER+SUHNER	SUCOFLEX104	231115/4	May 03, 2008	Nov. 02, 2009
AC POWER SOURCE	6205	1140503	N/A	N/A

**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

- 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.
- EUT is connected the external power supply to control the AC input power. The various Volts from the minimum 93.5 Volts to 126.5 Volts. Each step shall be record the frequency error rate.
- 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.
- 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



#### 4.2.5 TEST RESULTS

<b>MODE</b>	Low channel (2590MHz)	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz
<b>ENVIRONMENTAL CONDITIONS</b>	20deg°C, 60%RH 960hPa	<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 (%)
126.5	2589.999	0.000039	2590.0020	0.000077	2589.9980	0.000077
110	2589.998	0.000077	2589.9960	0.000154	2590.0030	0.000116
93.5	2589.996	0.000154	2589.9980	0.000077	2590.0010	0.000039

AFC FREQUENCY ERROR VS. TEMP						
TEMP (°C)	2Minutes		5Minutes		10Minutes	
	FREQUENCY (MHz)	PPM (%)	FREQUENCY (MHz)	PPM (%)	FREQUENCY (MHz)	PPM (%)
55	2589.994	0.000232	2589.997	0.000116	2589.9960	0.000154
50	2589.999	0.000039	2589.998	0.000077	2590.0010	0.000039
40	2589.998	0.000077	2589.997	0.000116	2589.9970	0.000116
30	2589.996	0.000154	2590.003	0.000116	2590.0020	0.000077
20	2589.998	0.000077	2589.9960	0.000154	2590.0030	0.000116
10	2590.0018	0.000069	2590.0016	0.000062	2590.0019	0.000073
0	2590.003	0.000116	2590.002	0.000077	2590.0040	0.000154
-10	2590.0001	0.000004	2590.0002	0.000008	2590.0004	0.000015
-20	2590.0003	0.000012	2590.0001	0.000004	2590.0005	0.000019
-30	2590.0004	0.000015	2590.0002	0.000008	2590.0004	0.000015

### 4.3 EMISSION BANDWIDTH MEASUREMENT

#### 4.3.1 LIMITS OF EMISSION BANDWIDTH MEASUREMENT

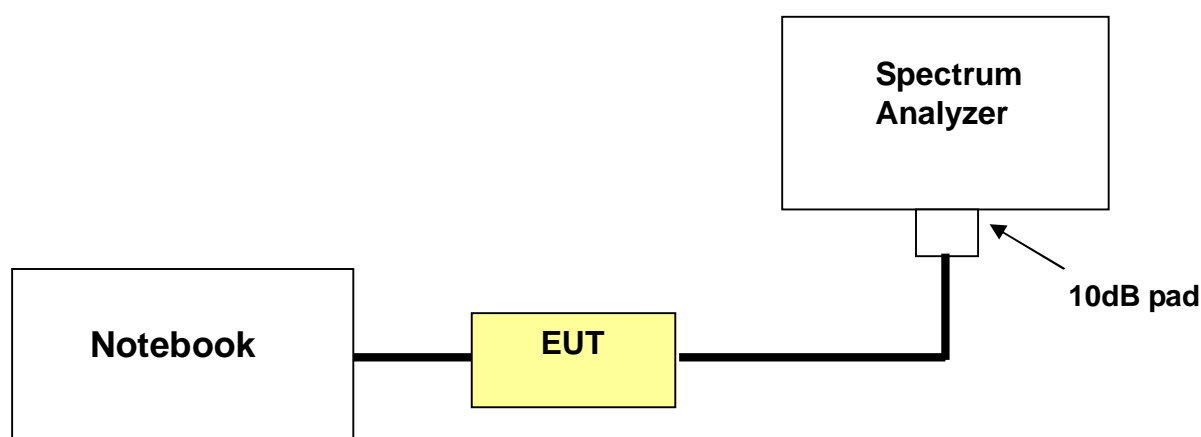
According to FCC 27.53(m)(6) specified that emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power.

#### 4.3.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	CALIBRATED DATE	CALIBRATED UNTIL
Agilent Spectrum Analyzer	E4440A	MY46185282	Jun. 14, 2009	Jun. 13, 2010
HUBER+SUHNER	SUCOFLEX104	231115/4	May 29, 2009	May 28, 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.



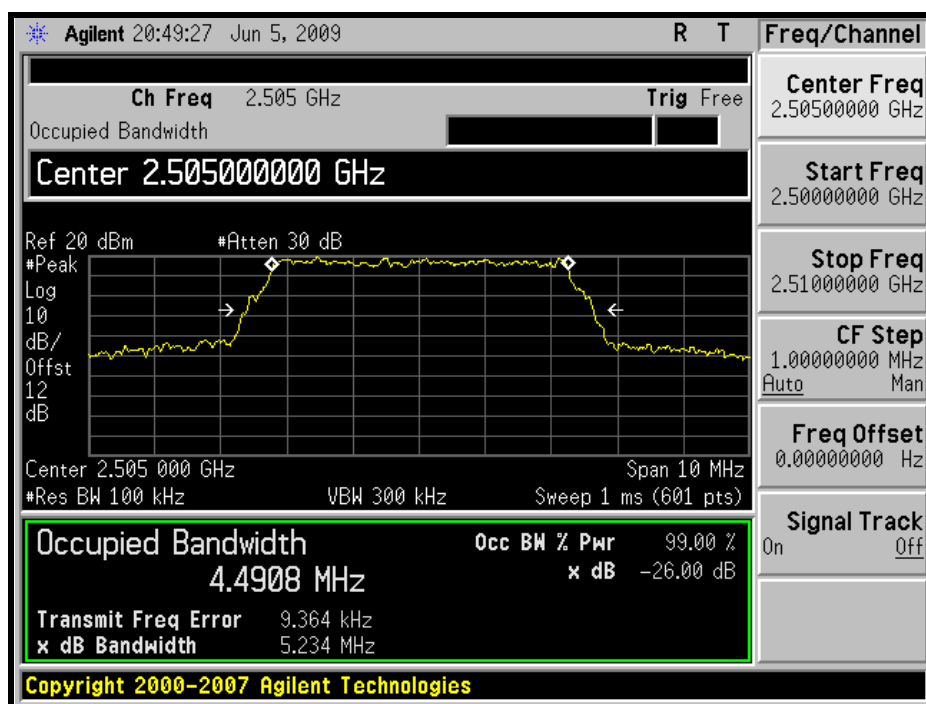
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#### 4.3.5 TEST RESULTS

##### CHANNEL BANDWIDTH: 5MHz

FREQUENCY (MHz)	-26 dBc BANDWIDTH (MHz)
2505	5.234
2590	5.366
2685	5.217

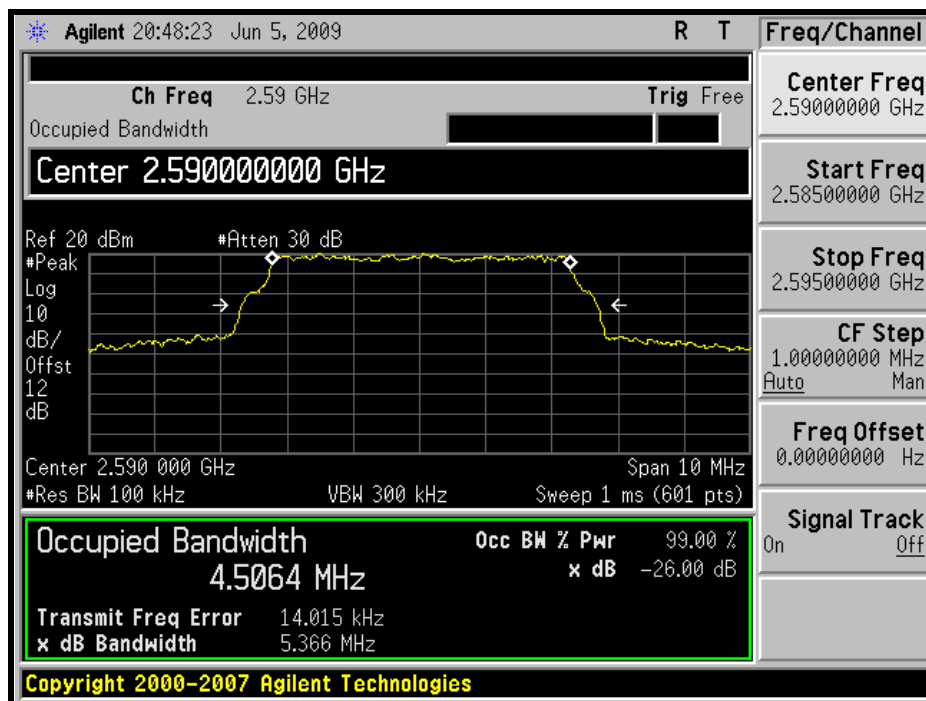
##### LOW CHANNEL



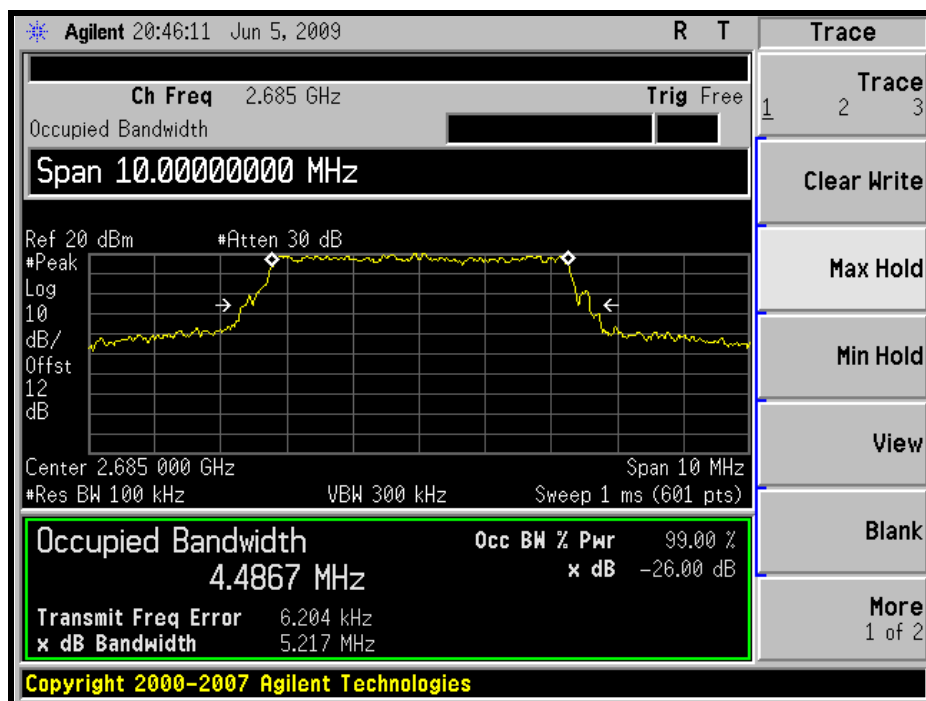


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## MIDDLE CHANNEL



## HIGH CHANNEL





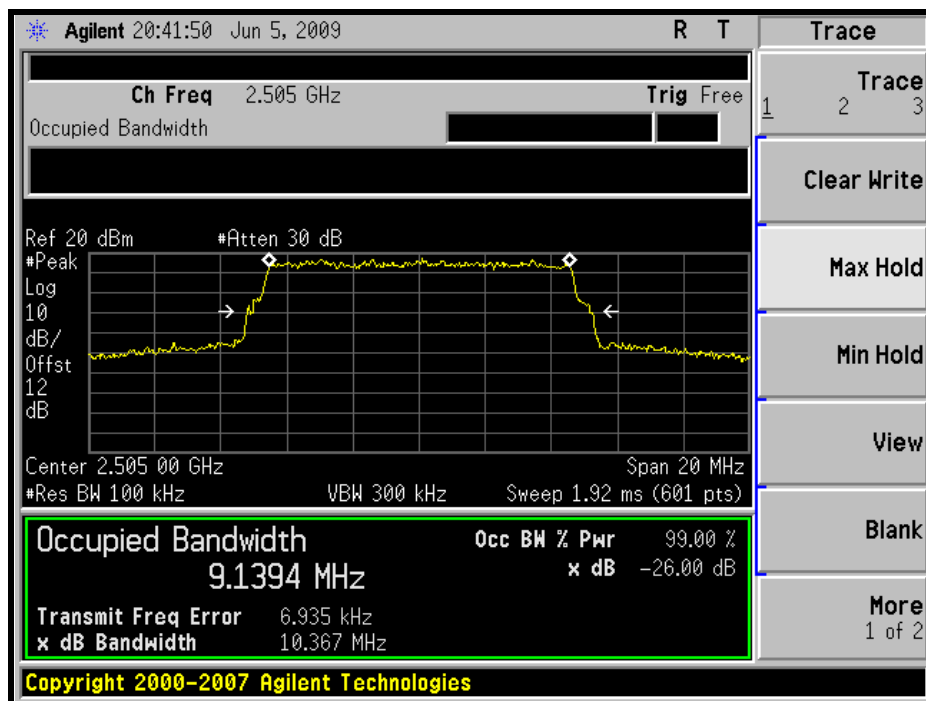


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## CHANNEL BANDWIDTH: 10MHz

FREQUENCY (MHz)	-26 dBc BANDWIDTH (MHz)
2505	10.367
2590	10.325
2685	10.380

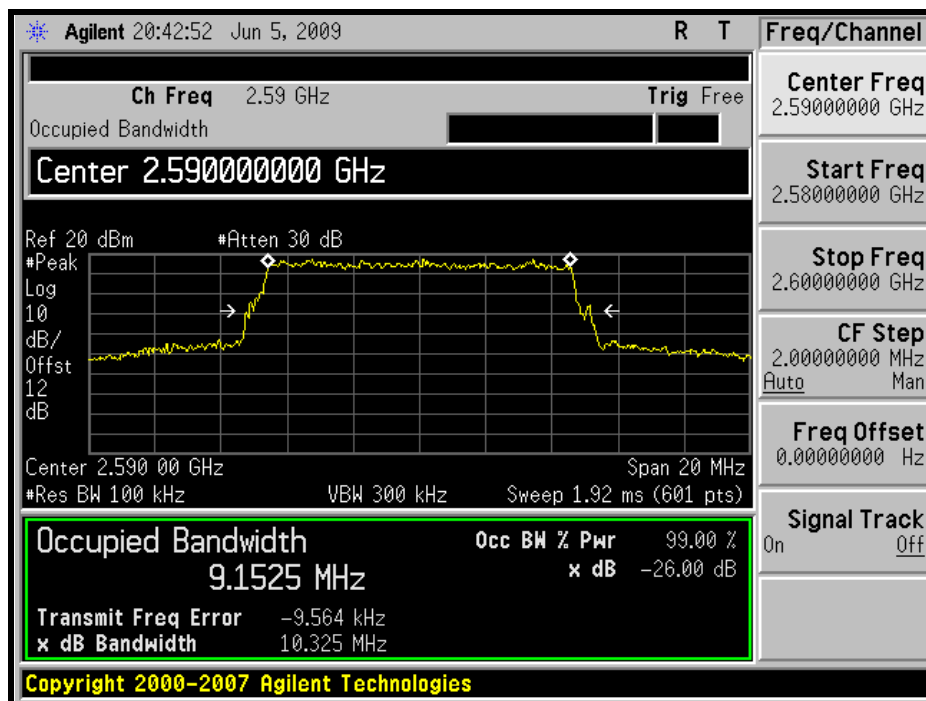
## LOW CHANNEL



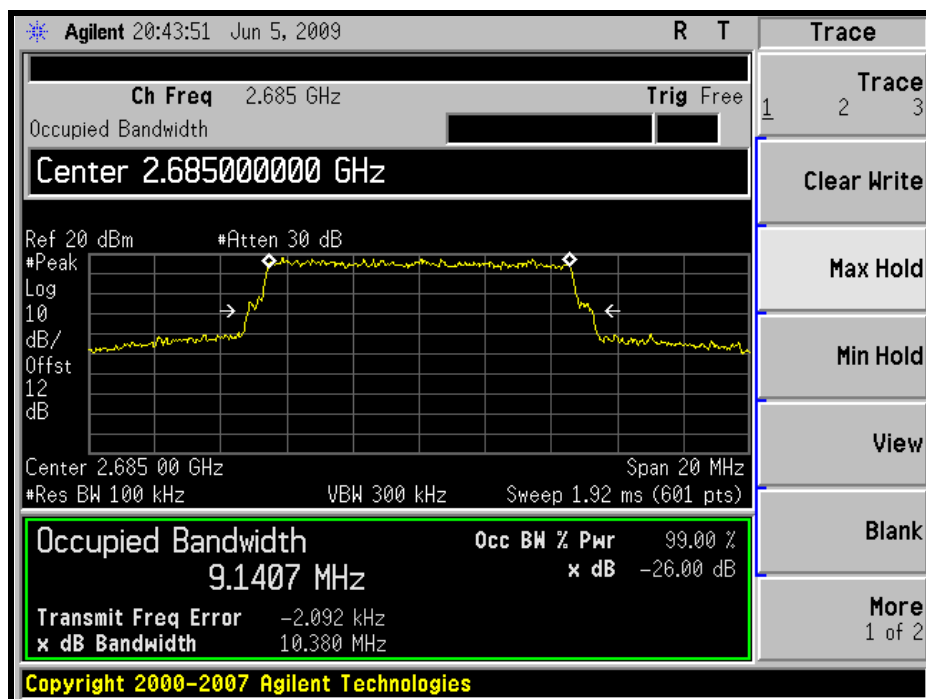


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## MIDDLE CHANNEL



## HIGH CHANNEL



## 4.4 CHANNEL EDGE MEASUREMENT

### 4.4.1 LIMITS OF CHANNEL EDGE MEASUREMENT

According to FCC 27.53(m)(4) 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 and  $55 + 10 \log(P)$  dB at 5.5 MHz from the channel edges. 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	E4440A	MY46185282	Jun. 15, 2008	Jun. 14, 2009
HUBER+SUHNER	SUCOFLEX104	231115/4	May 29, 2009	May 28, 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.

### 4.4.3 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 56kHz and VB of the spectrum is 160kHz.
- 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

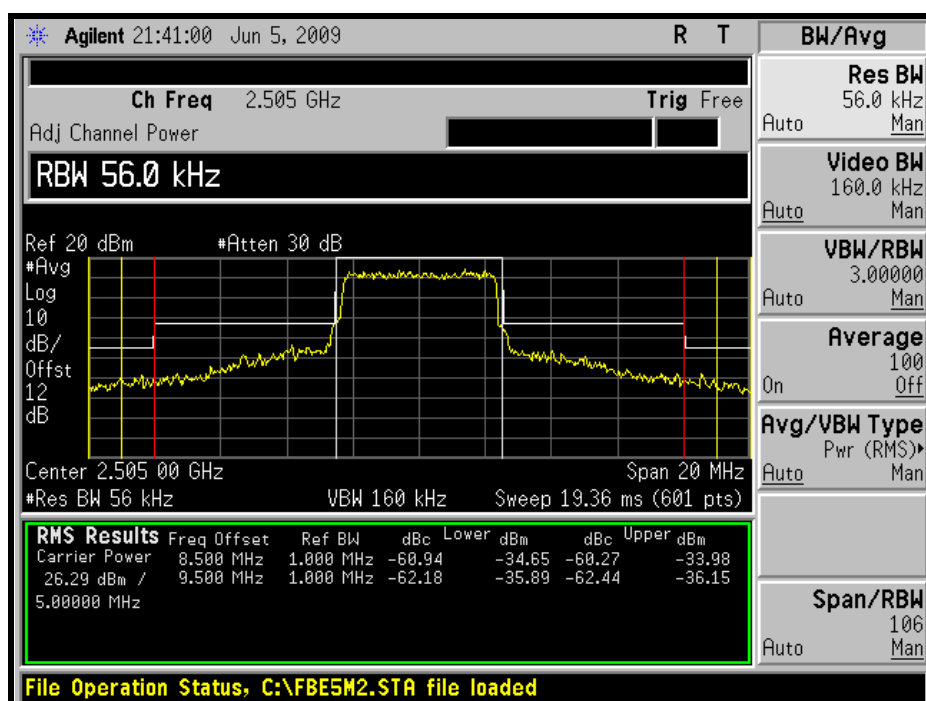
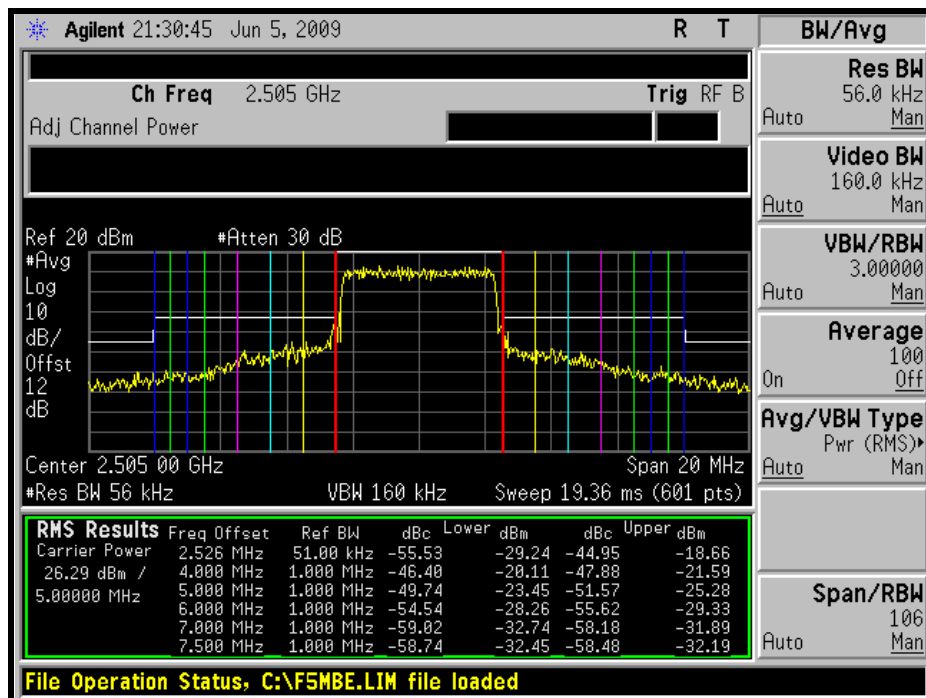


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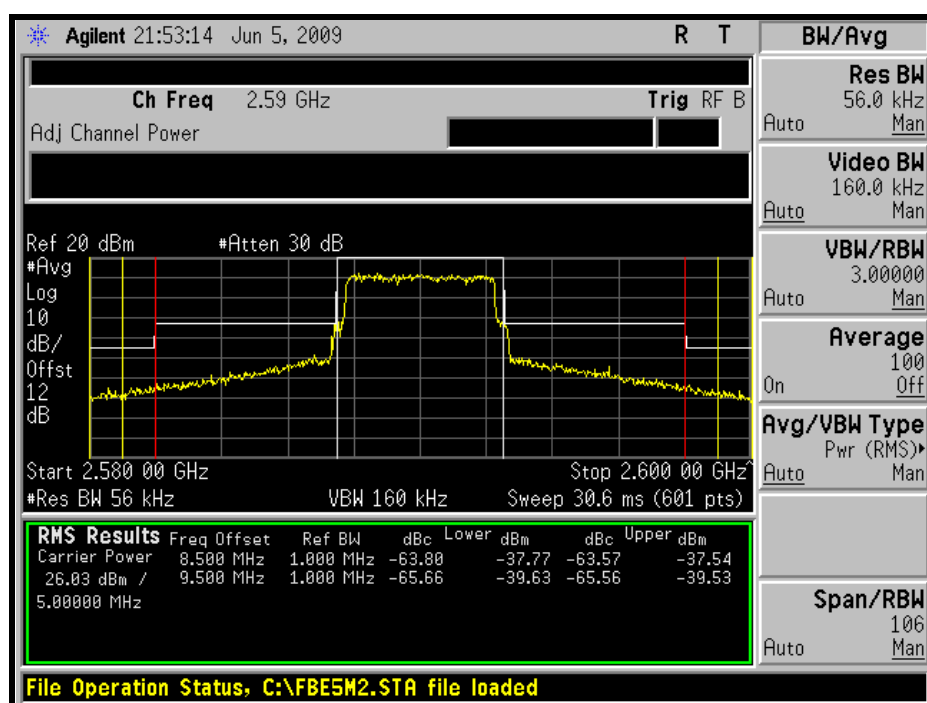
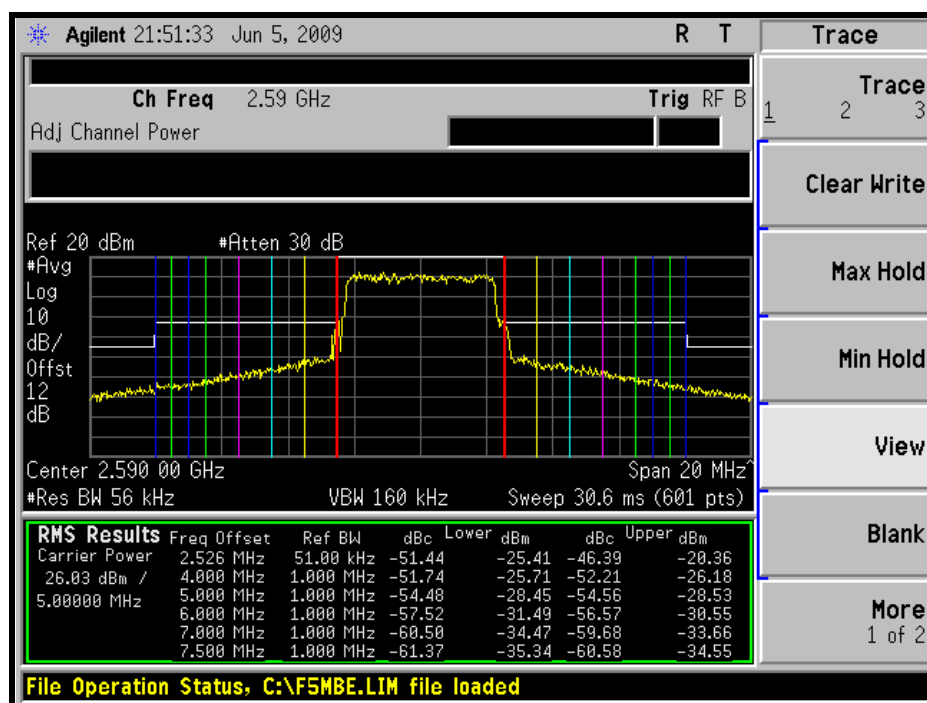
## 4.4.6 TEST RESULTS

## CHANNEL BANDWIDTH: 5MHz

## LOW CHANNEL



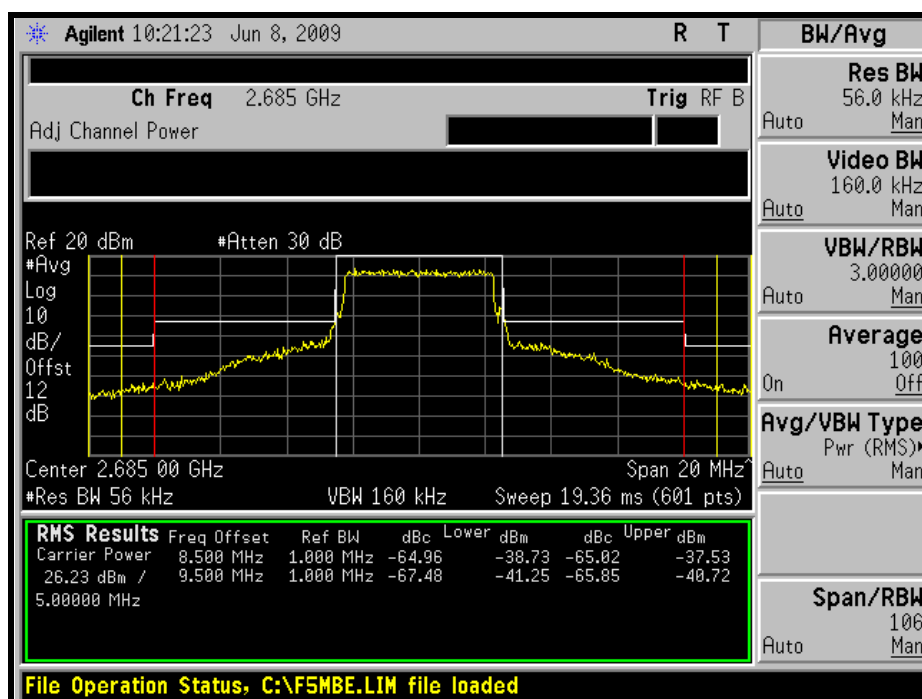
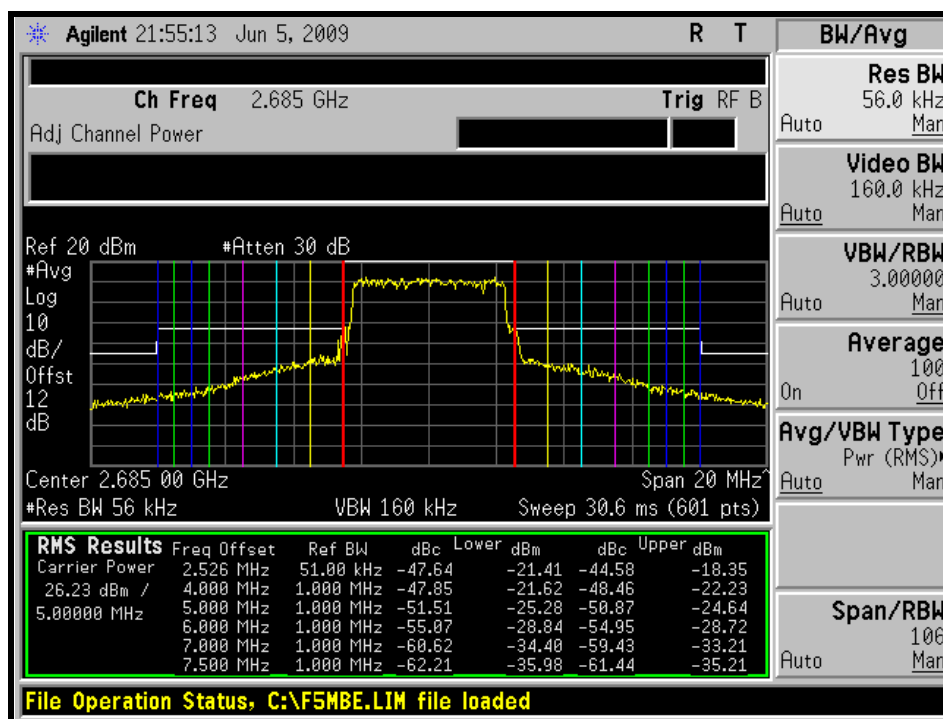
# MIDDLE CHANNEL





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## HIGH CHANNEL

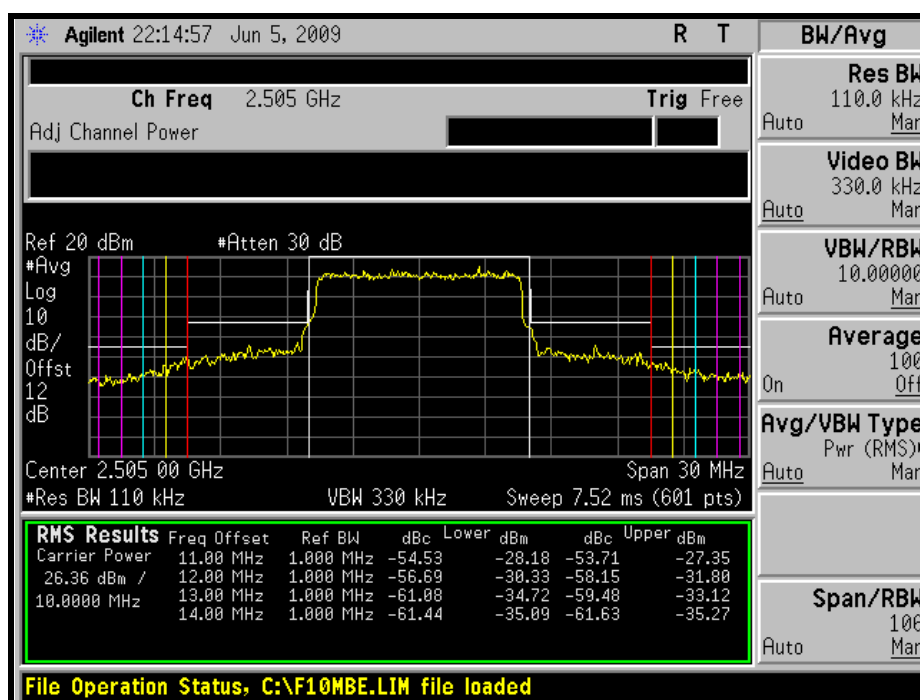
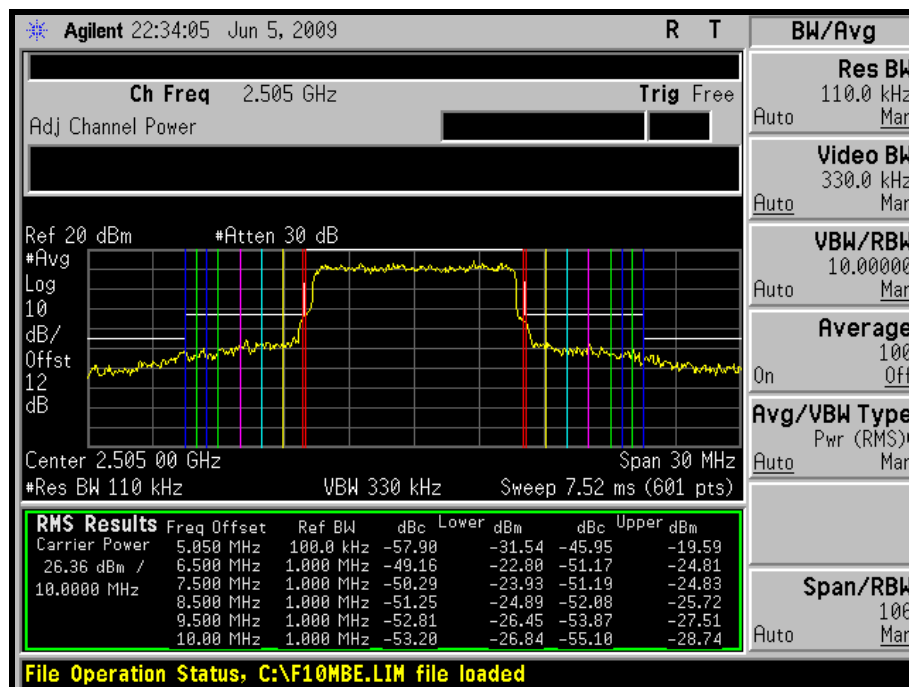




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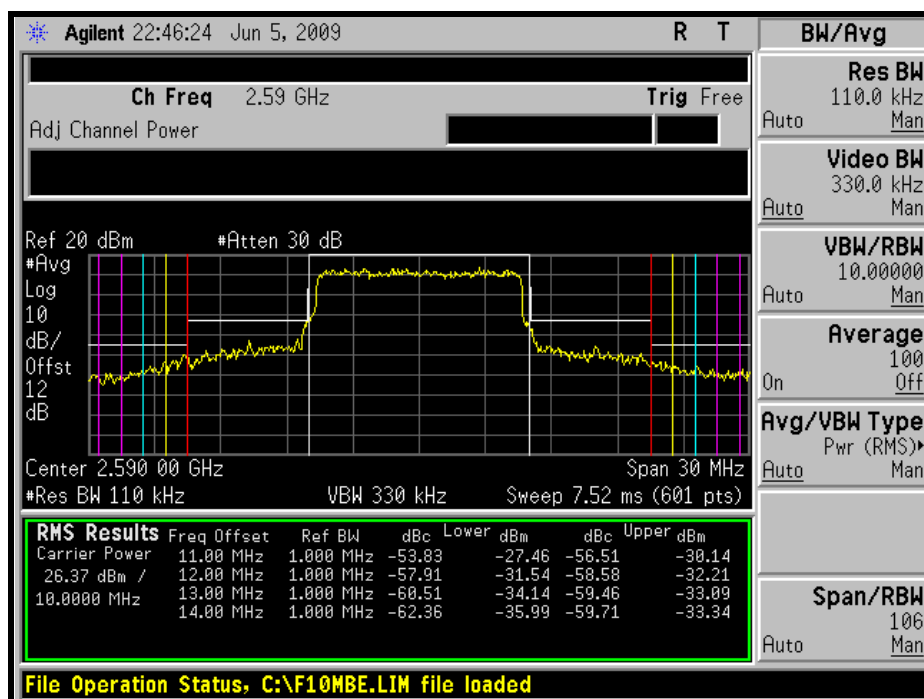
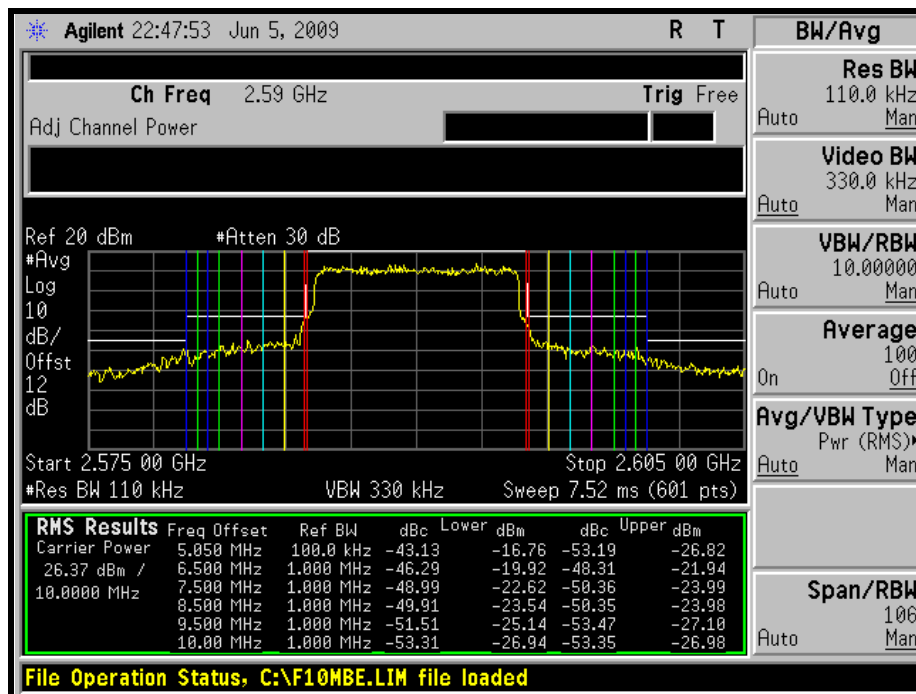
## CHANNEL BANDWIDTH: 10MHz

### LOW CHANNEL





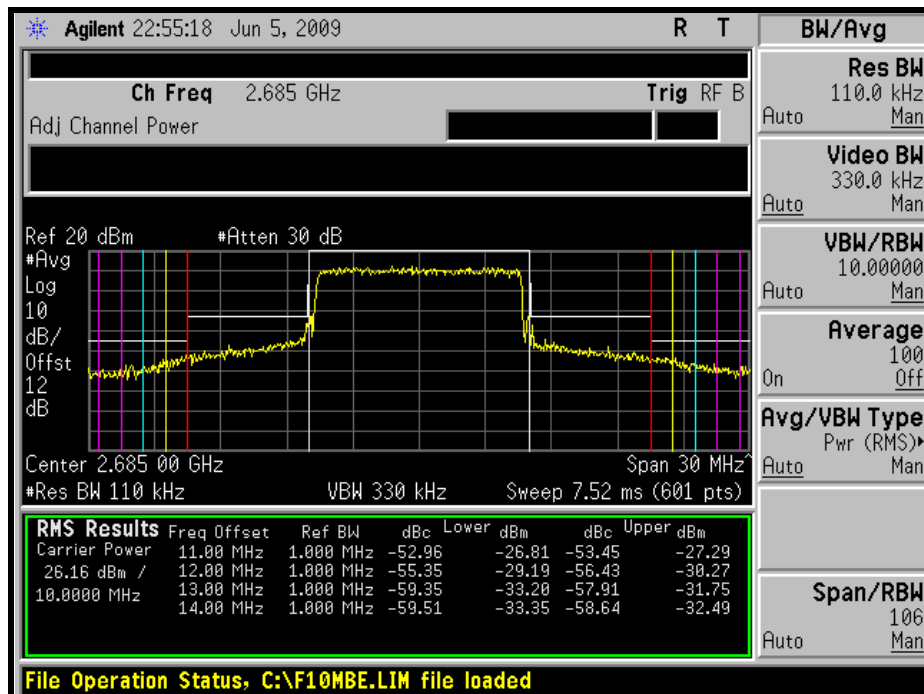
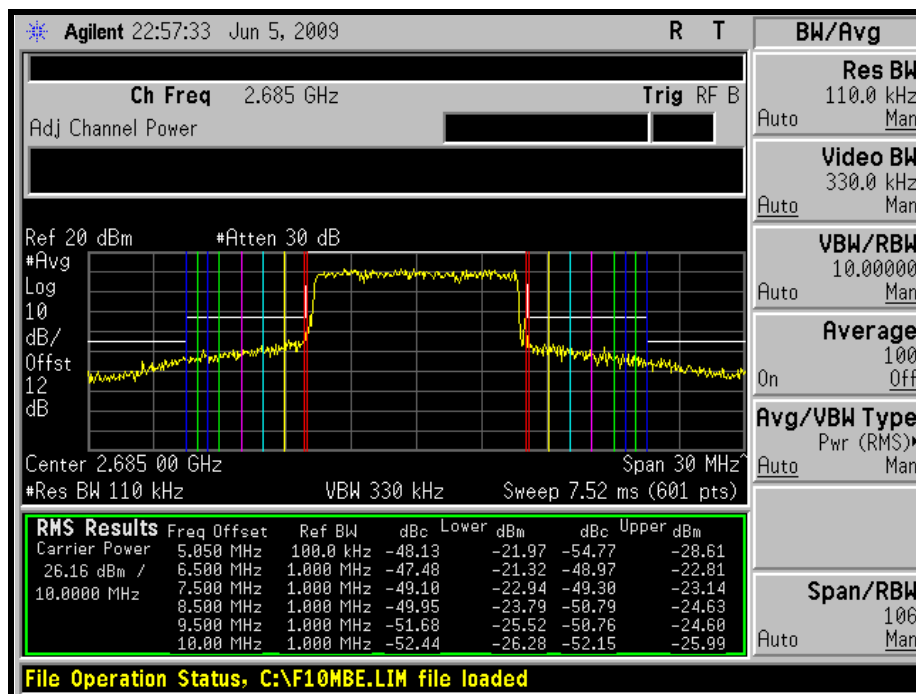
# MIDDLE CHANNEL





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## HIGH CHANNEL



## 4.5 CONDUCTED SPURIOUS EMISSIONS

### 4.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

In the FCC 27.53(m)(4), 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 and  $55 + 10 \log (P)$  dB at 5.5 MHz from the channel edges.

### 4.5.2 TEST INSTRUMENTS

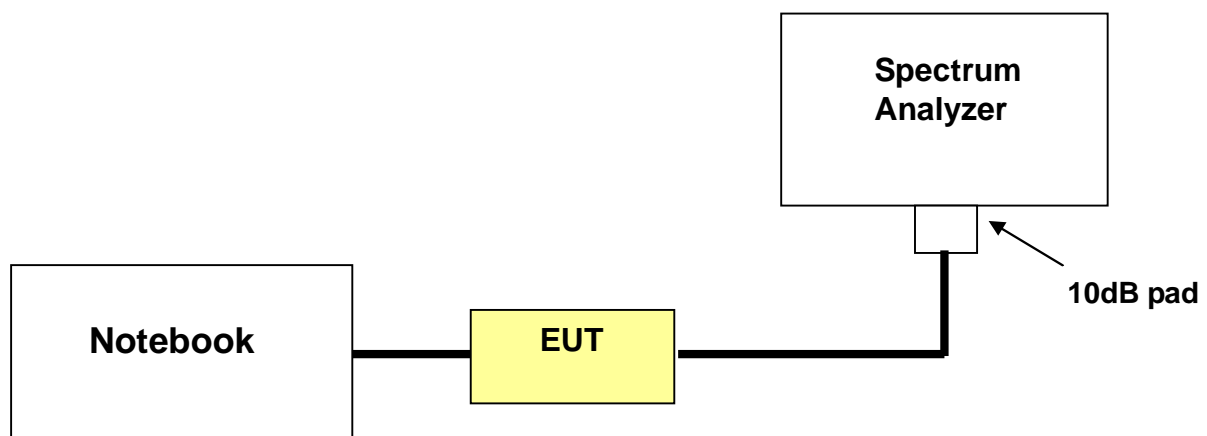
Description & Manufacturer	Model No.	Serial No.	CALIBRATED DATE	CALIBRATED UNTIL
Agilent Spectrum Analyzer	E4440A	MY46185282	Jun. 14, 2009	Jun. 13, 2010
HUBER+SUHNER	SUCOFLEX104	231115/4	May 29, 2009	May 28, 2010
JFW 10dB attenuation	50HF-010-SMA	N/A	N/A	N/A
Wainwright Instruments High Pass Filter	WHK3.1/18G-10SS	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

- 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.
- 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.
- 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



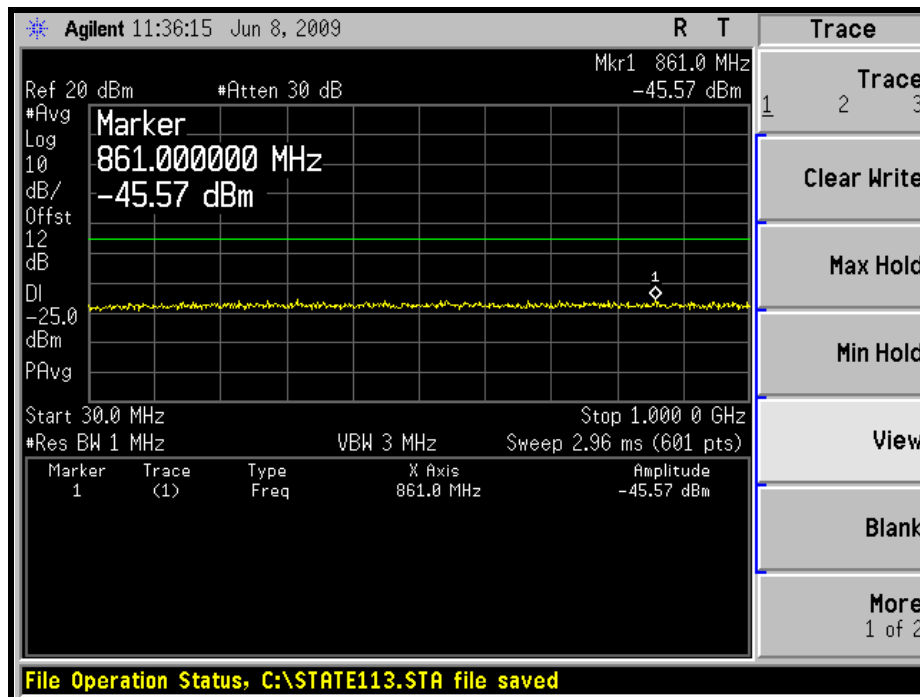
#### 4.5.5 EUT OPERATING CONDITIONS

Same as item 4.1.5

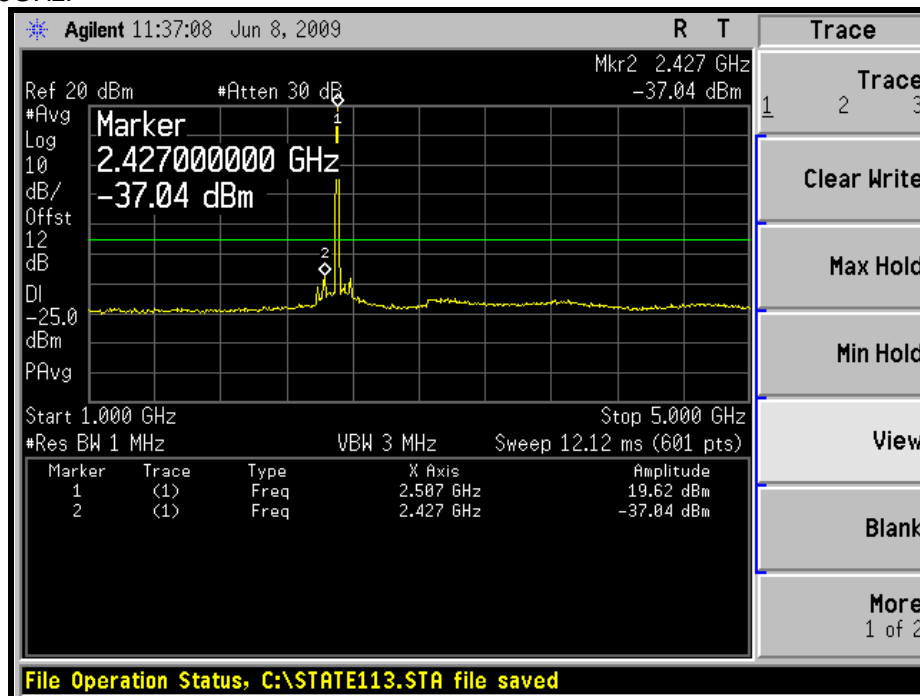
#### 4.5.6 TEST RESULTS

##### CHANNEL BANDWIDTH: 5MHz

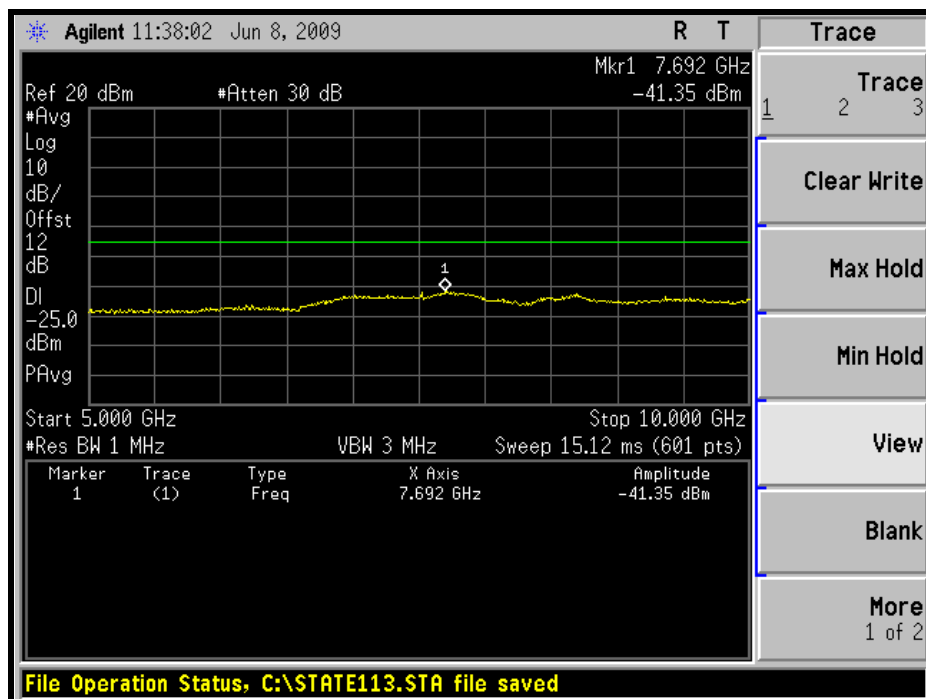
LOW CHANNEL: 30MHz ~ 1GHz:



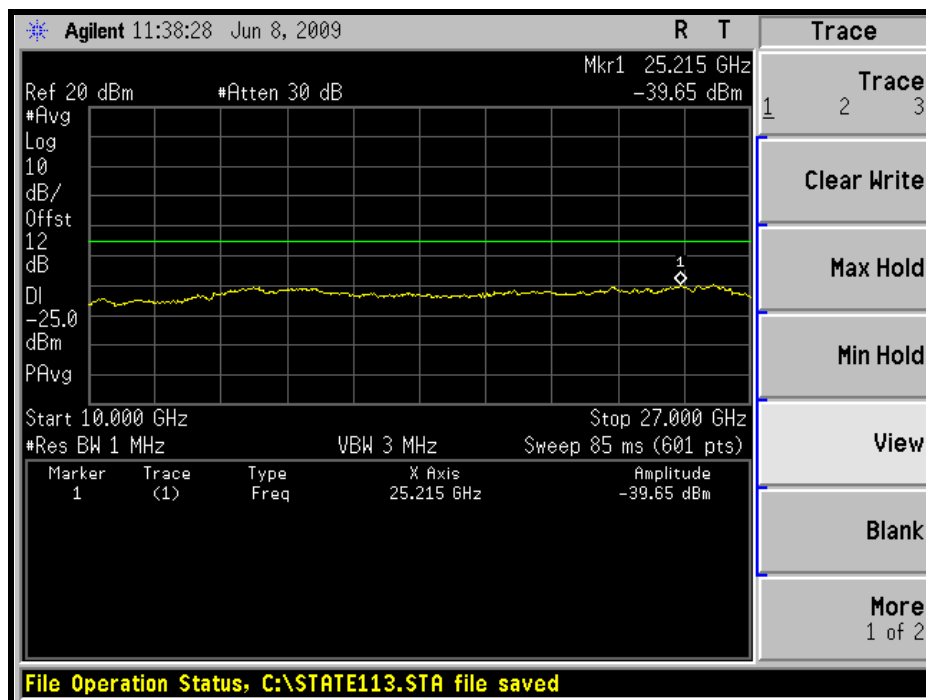
1GHz ~ 5GHz:



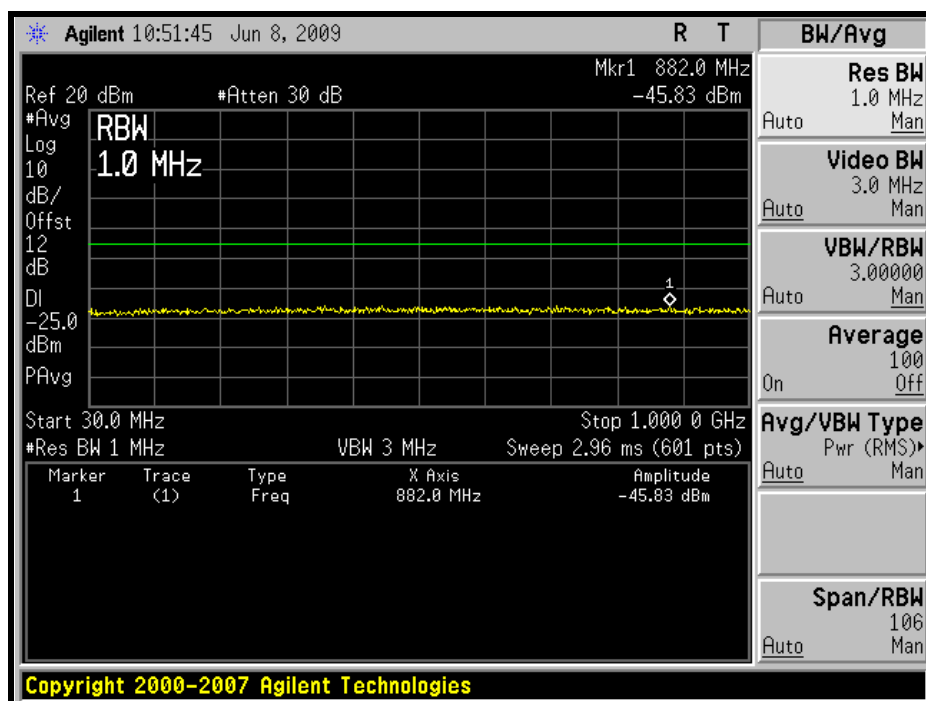
5GHz ~ 10GHz:



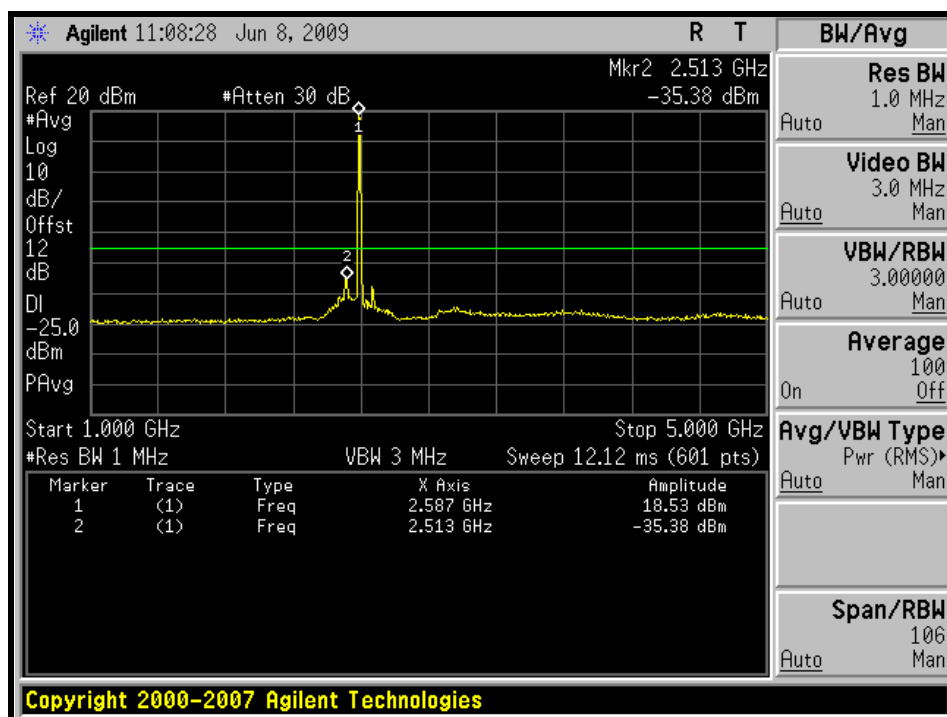
10GHz ~ 27GHz:



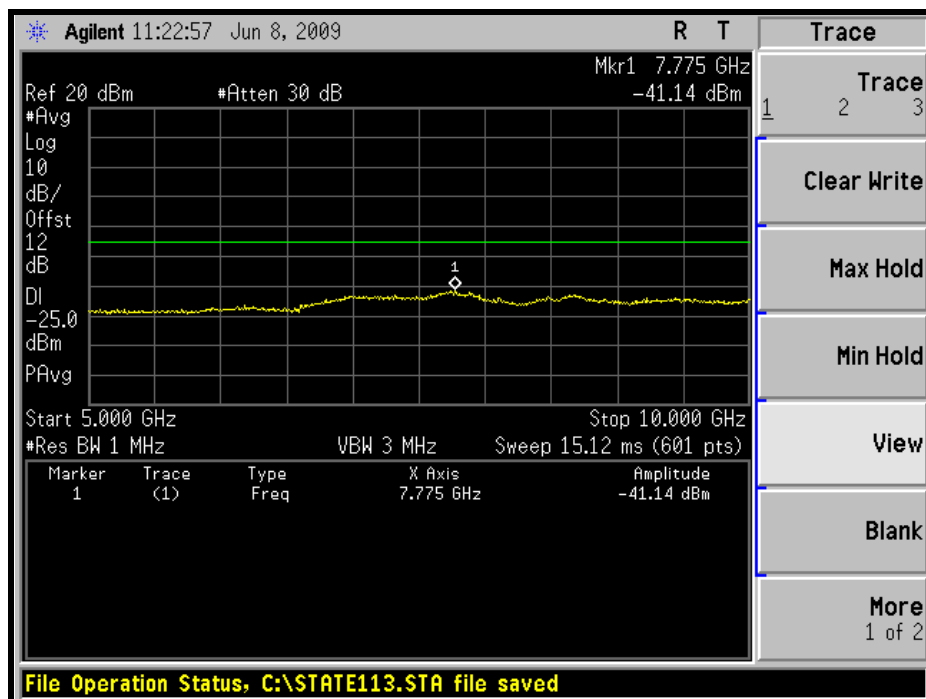
MIDDLE CHANNEL: 30MHz ~ 1GHz:



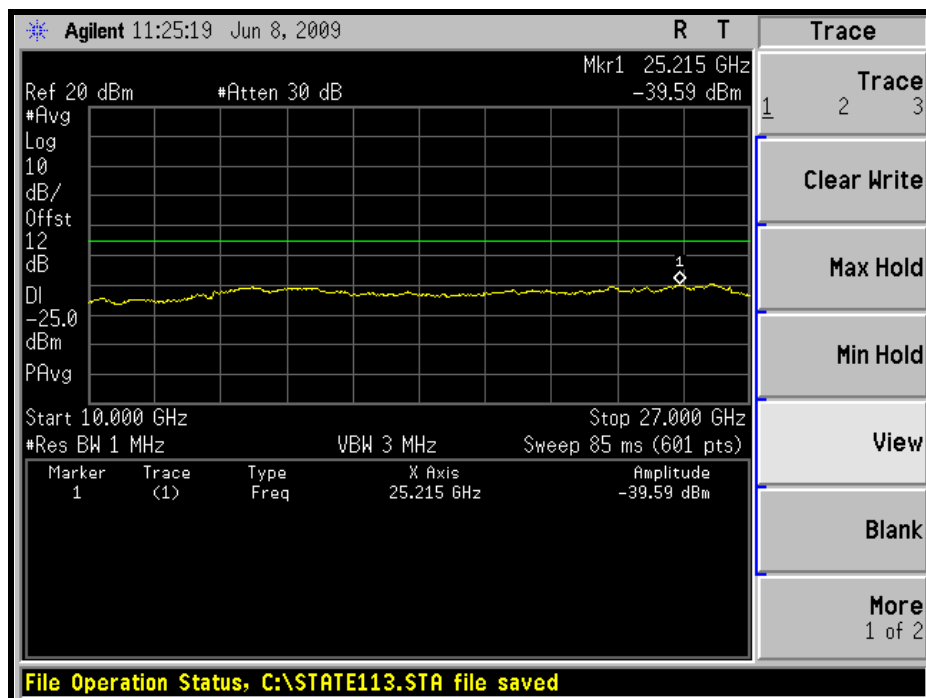
1GHz ~ 5GHz:



5GHz ~ 10GHz:

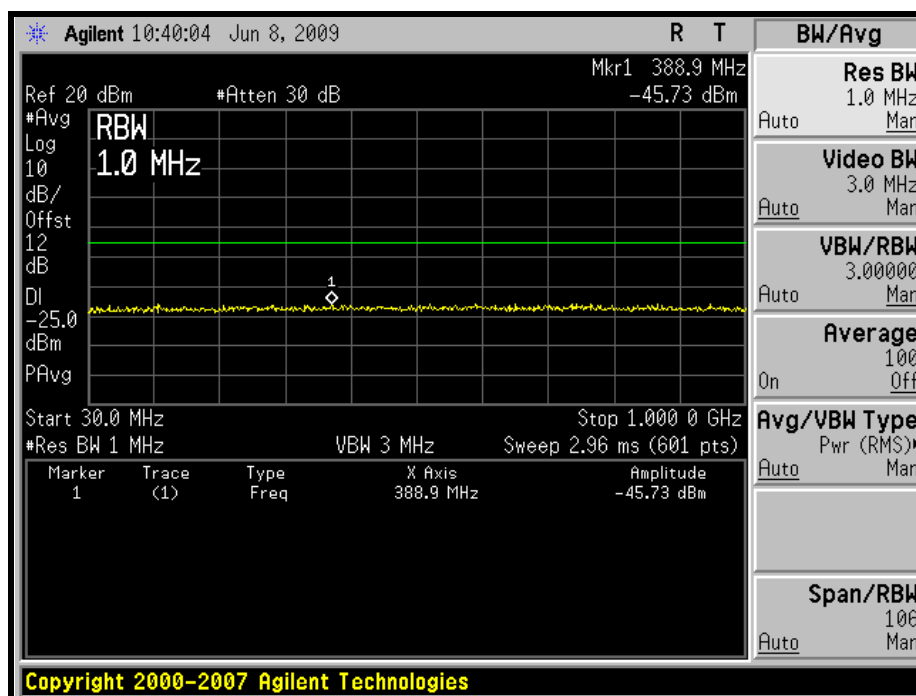


10GHz ~ 27GHz:

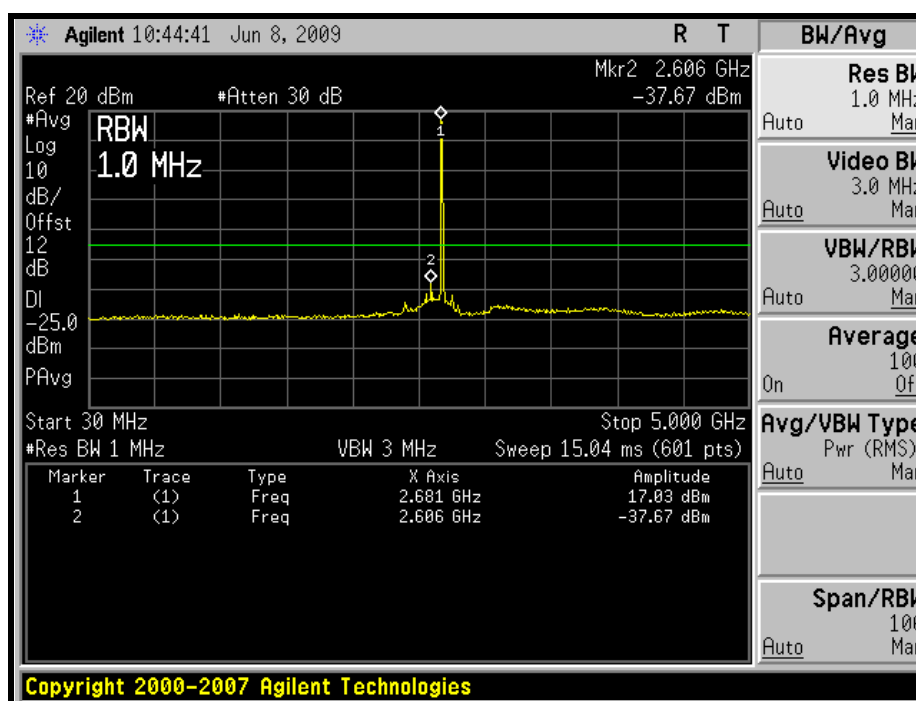




HIGH CHANNEL: 30MHz ~ 1GHz:



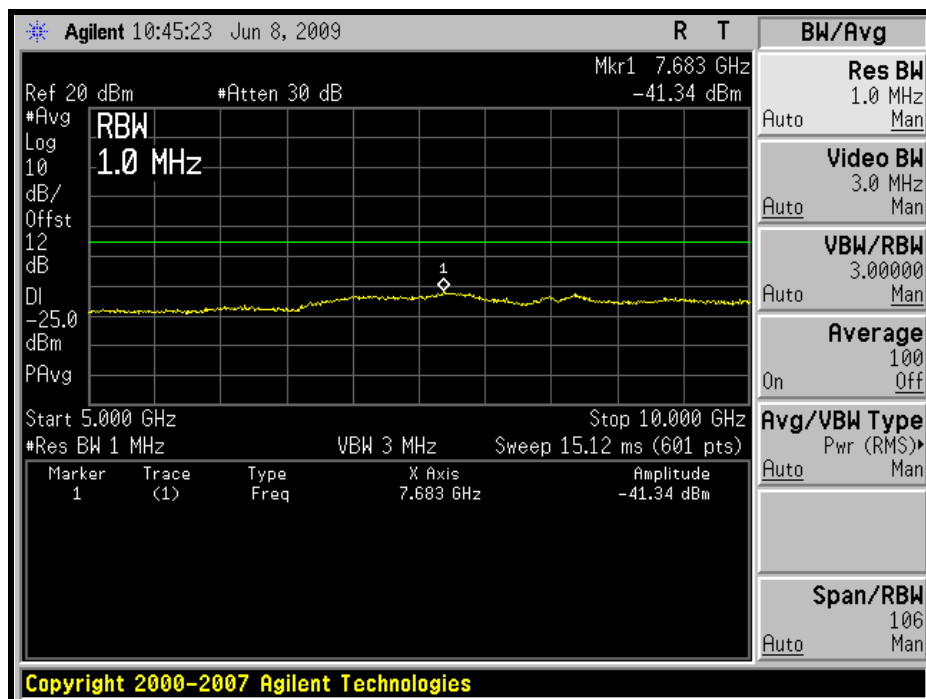
1GHz ~ 5GHz:



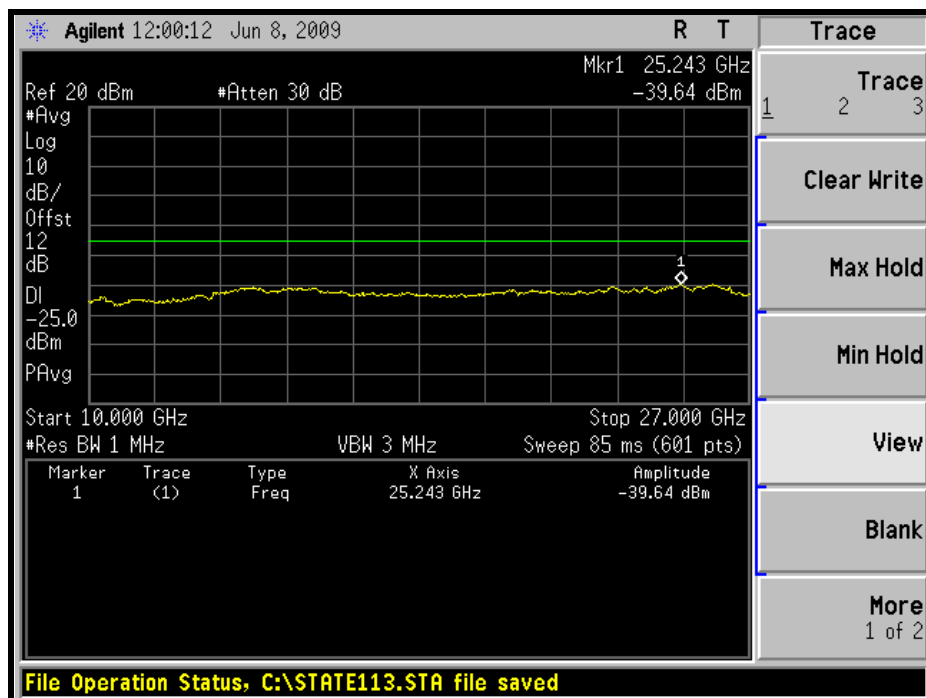


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5GHz ~ 10GHz:

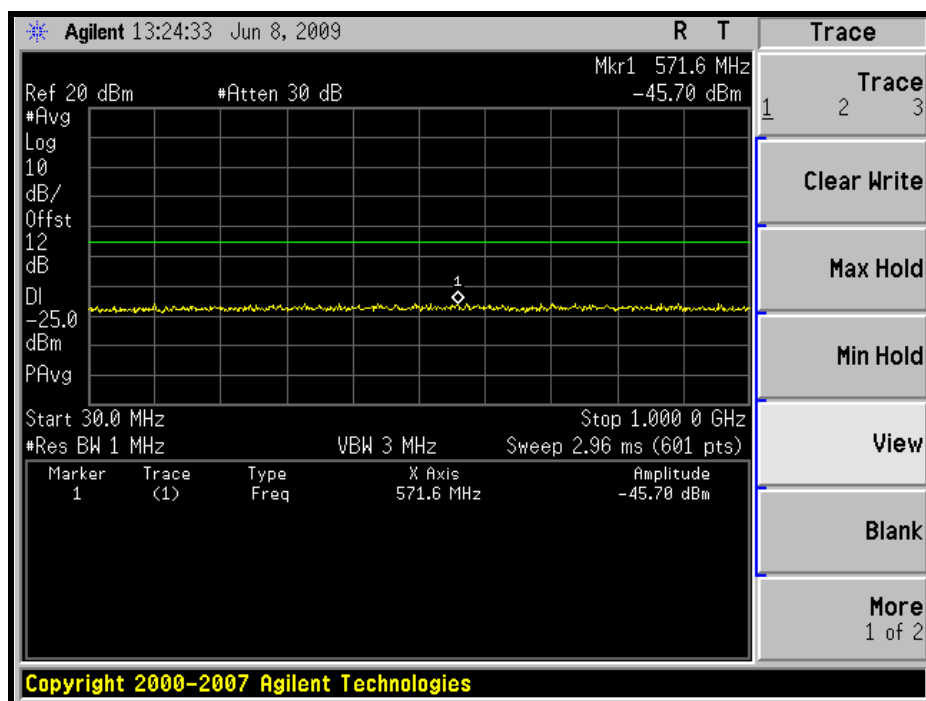


10GHz ~ 27GHz:

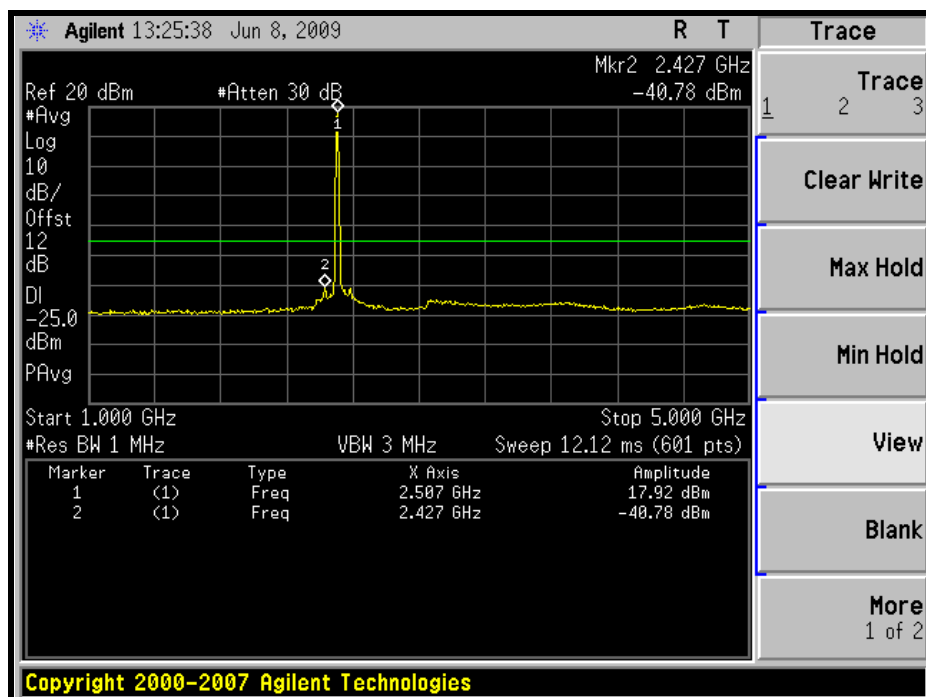


## CHANNEL BANDWIDTH: 10MHz

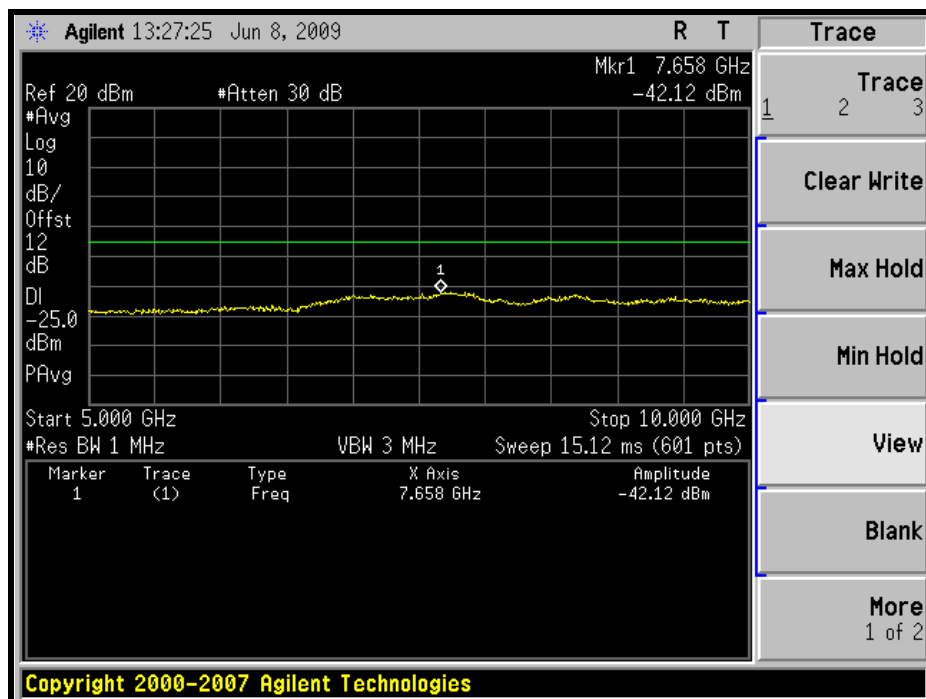
LOW CHANNEL: 30MHz ~ 1GHz:



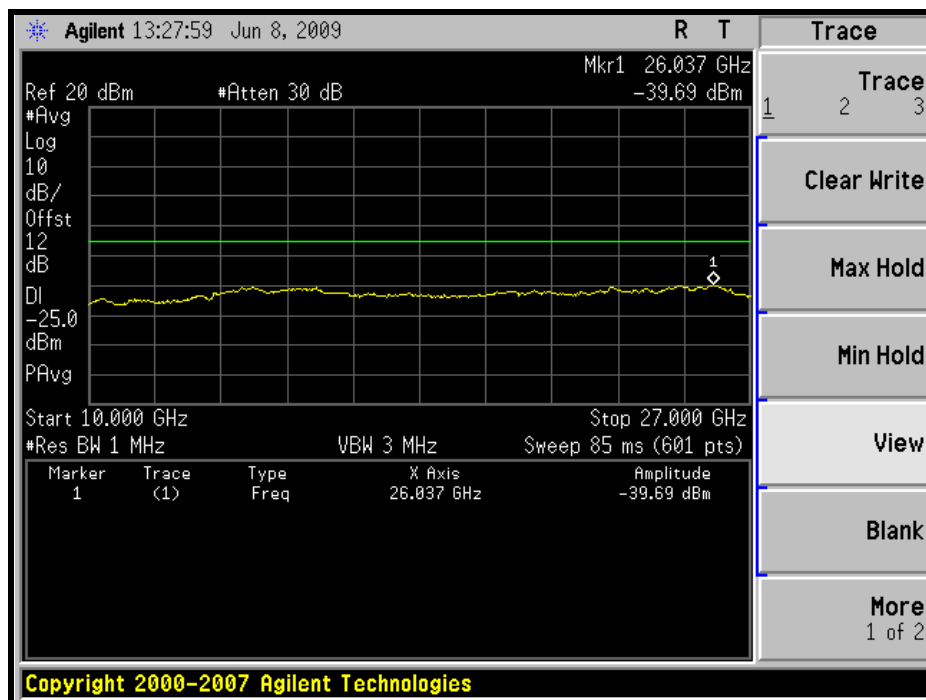
1GHz ~ 5GHz:



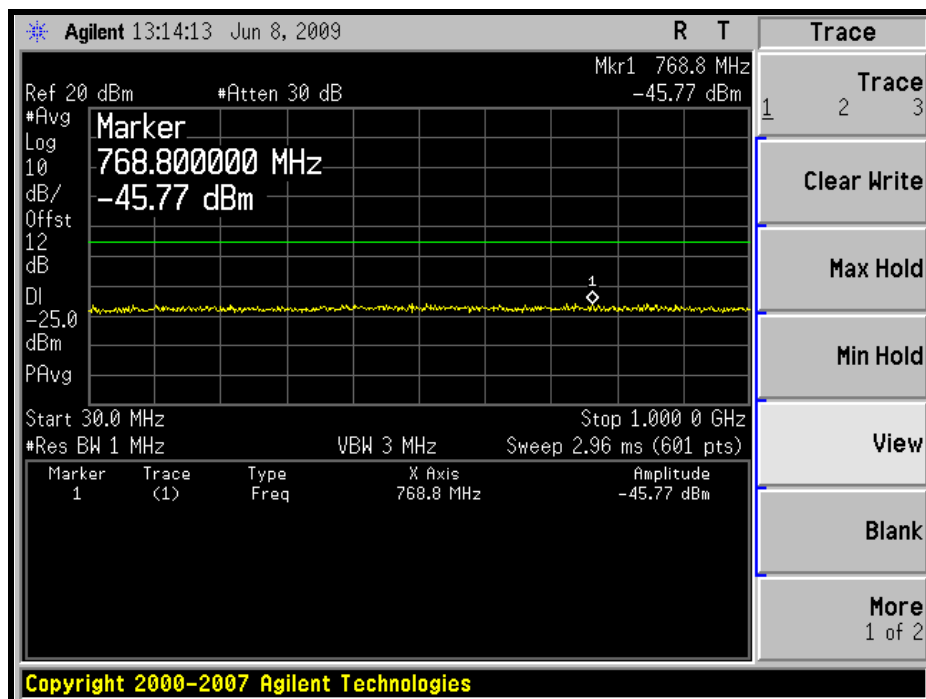
5GHz ~ 10GHz:



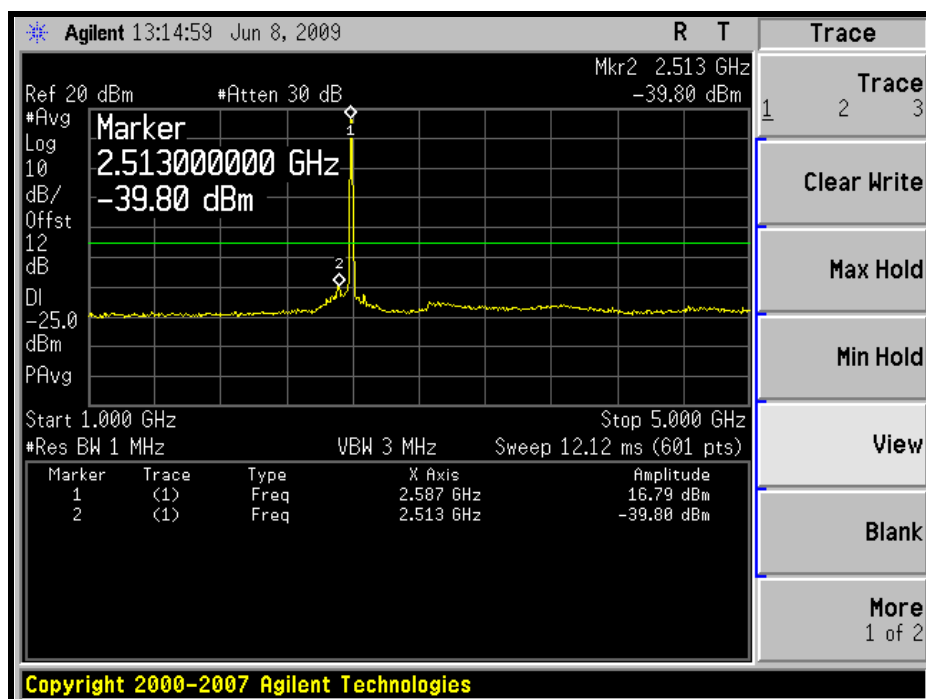
10GHz ~ 27GHz:



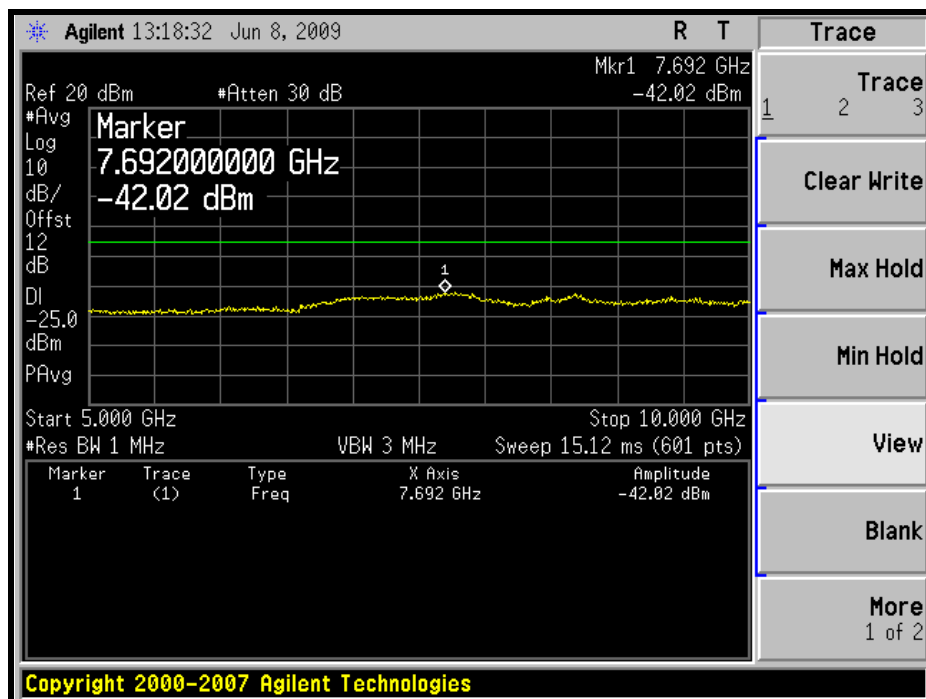
MIDDLE CHANNEL: 30MHz ~ 1GHz:



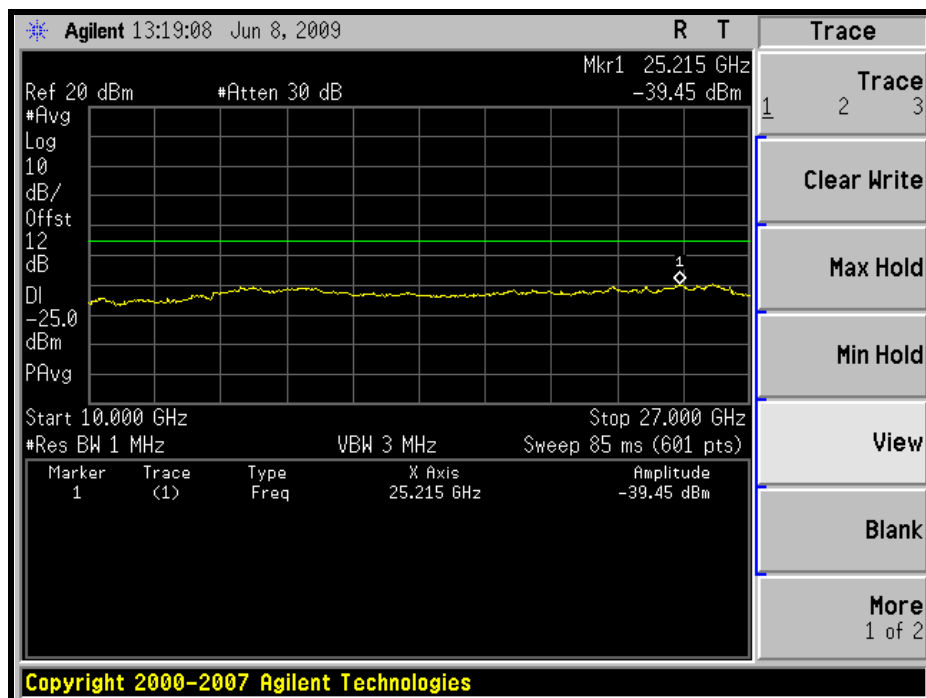
1GHz ~ 5GHz:



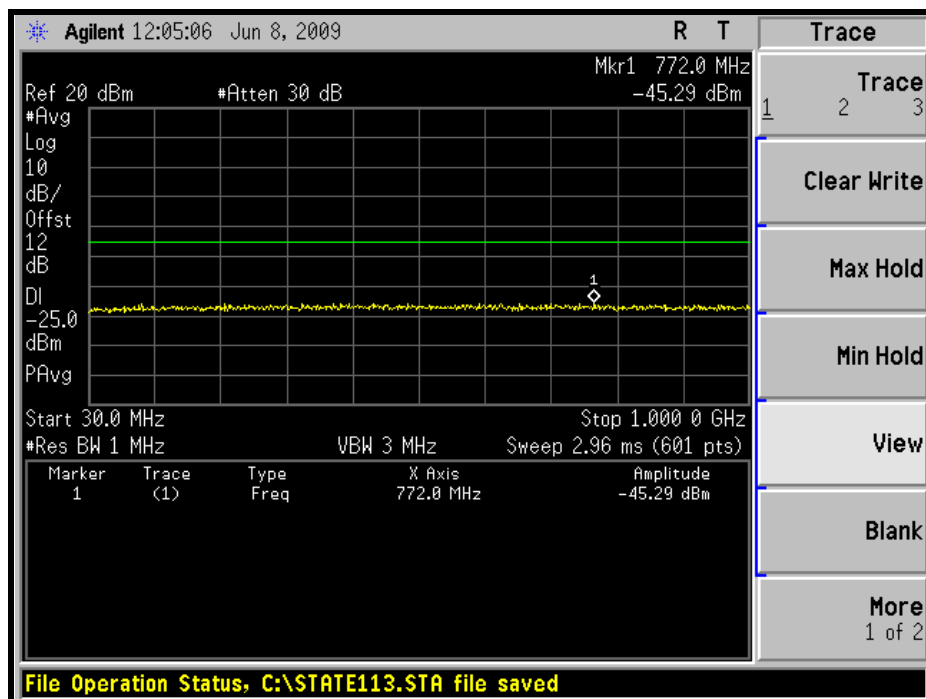
5GHz ~ 10GHz:



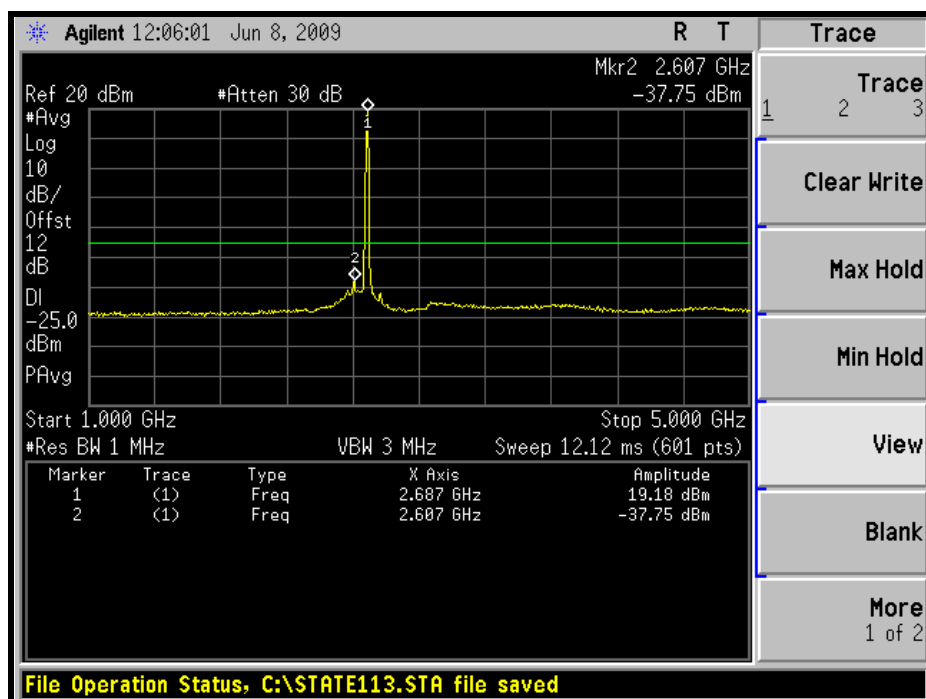
10GHz ~ 27GHz:



HIGH CHANNEL: 30MHz ~ 1GHz:



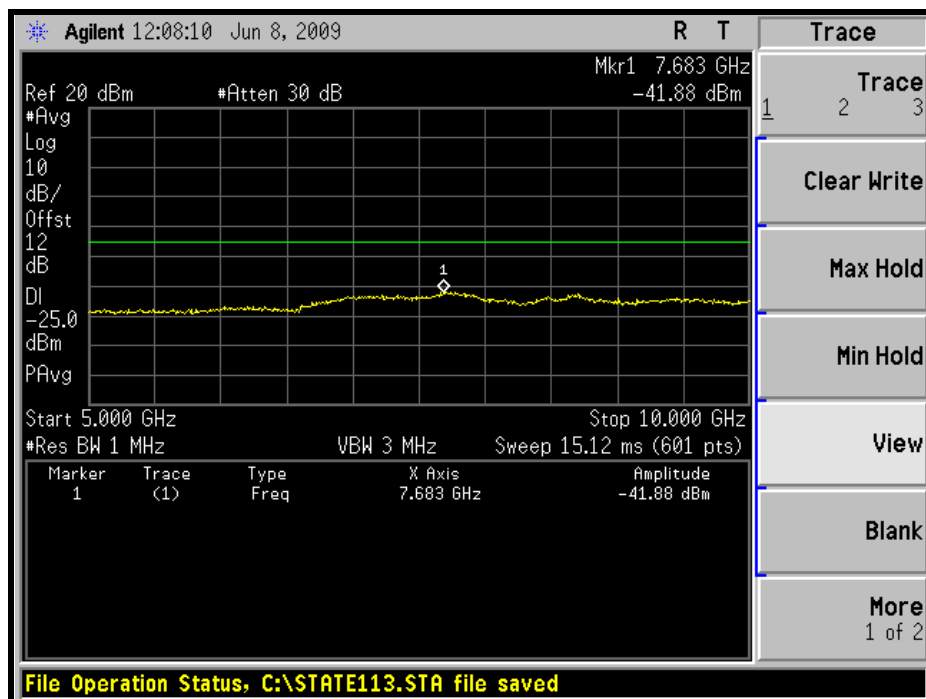
1GHz ~ 5GHz:



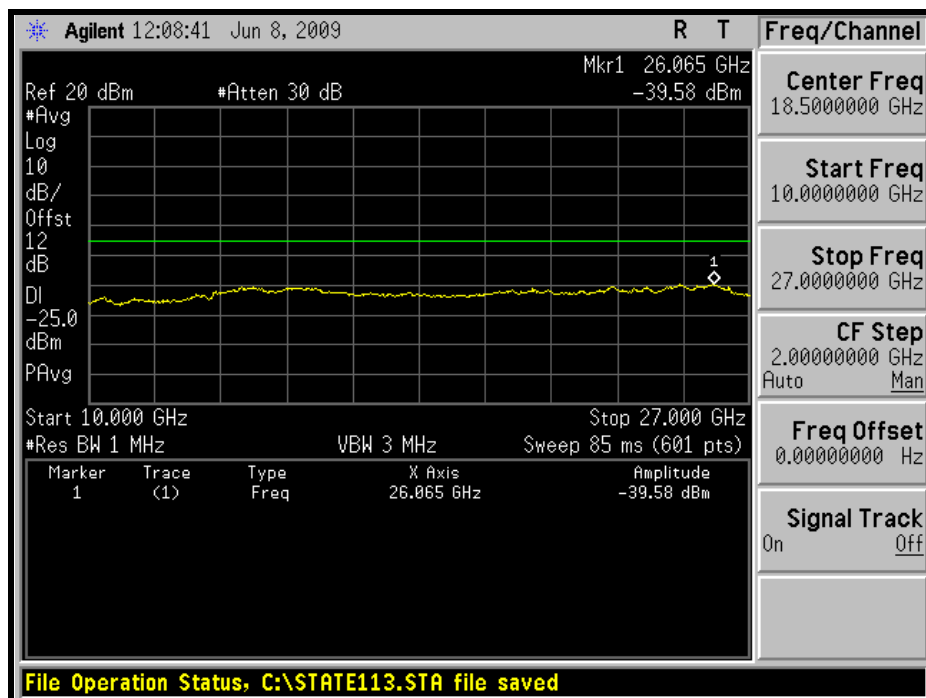


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5GHz ~ 10GHz:



10GHz ~ 27GHz:





## 4.6 RADIATED EMISSION MEASUREMENT (BELOW 1GHz)

### 4.6.1 LIMITS OF RADIATED EMISSION MEASUREMENT

In the FCC 27.53(m) (4), 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 and  $55 + 10 \log (P)$  dB at 5.5 MHz 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
HP Pre_Amplifier	8449B	3008A01923	Nov. 10, 2008	Nov. 09, 2009
ROHDE & SCHWARZ Test Receiver	ESCS30	847124/029	Sep. 09, 2008	Sep. 08, 2009
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	Oct. 07, 2008	Oct. 06, 2009
RF CABLE (Chaintek)	Sucoflex 106	28077	Aug. 15, 2008	Aug. 14, 2009
RF Cable	8DFB	STCCAB-30M-1GHz	Oct. 07, 2008	Oct. 06, 2009
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

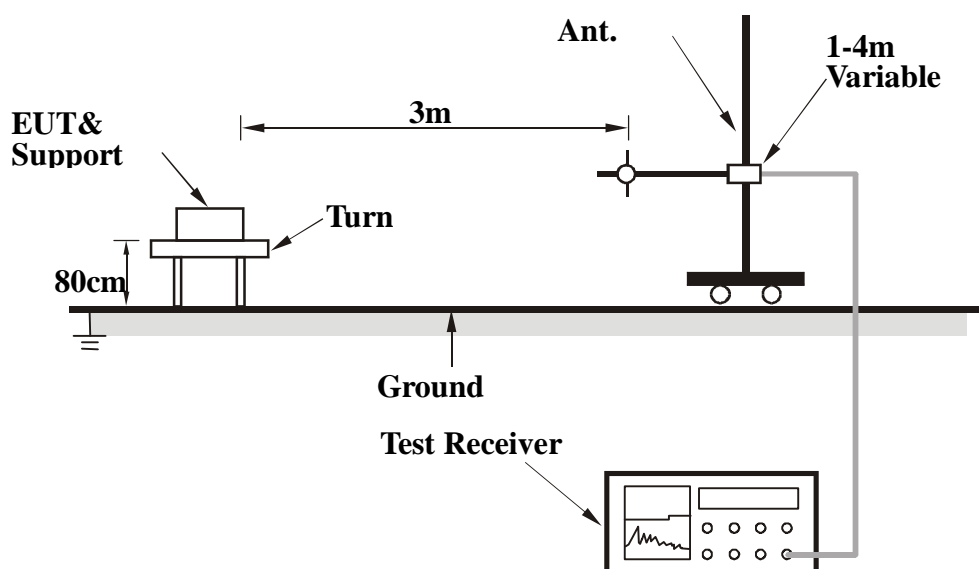
- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the receiving antenna, which was mounted on antenna tower and its position at 0.8 m above the 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

MODE	Low channel	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	20deg°C, 60%RH 965hPa
TESTED BY	Phoenix Huang		

## ANTENNA POLARITY &amp; 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	64.77	29.24	-25.00	-55.74	-6.19	-61.94
2	131.07	40.48	-25.00	-51.52	-1.25	-52.77
3	165.00	32.26	-25.00	-57.34	0.02	-57.32
4	300.00	40.48	-25.00	-55.30	3.71	-51.59
5	325.00	41.28	-25.00	-56.60	3.73	-52.87
6	500.00	36.89	-25.00	-58.63	2.89	-55.74
7	660.00	39.46	-25.00	-55.80	1.72	-54.08
8	750.00	43.26	-25.00	-53.12	0.82	-52.30
9	800.00	36.22	-25.00	-62.50	1.55	-60.95
10	900.00	33.37	-25.00	-65.36	0.49	-64.87

## ANTENNA POLARITY &amp; 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	55.25	45.35	-25.00	-35.05	-8.74	-43.79
2	64.80	37.98	-25.00	-47.02	-6.19	-53.21
3	131.07	34.82	-25.00	-57.18	-1.25	-58.43
4	163.84	38.07	-25.00	-51.21	-0.14	-51.35
5	500.00	39.64	-25.00	-55.88	2.89	-52.99
6	600.00	39.07	-25.00	-55.55	1.79	-53.76
7	700.00	39.71	-25.00	-56.63	1.62	-55.01
8	750.00	41.51	-25.00	-54.87	0.82	-54.05
9	800.00	39.69	-25.00	-59.03	1.55	-57.48
10	888.46	40.49	-25.00	-57.30	0.62	-56.68

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



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**CHANNEL BANDWIDTH: 10MHz**

<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 960hPa
<b>TESTED BY</b>	Eric Lee		

<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	65.02	30.19	-25.00	-54.94	-6.12	-61.06
2	131.15	40.45	-25.00	-51.57	-1.25	-52.82
3	300.00	41.05	-25.00	-54.73	3.71	-51.02
4	325.00	42.81	-25.00	-55.07	3.73	-51.34
5	500.00	36.74	-25.00	-58.78	2.89	-55.89
6	660.00	40.52	-25.00	-54.74	1.72	-53.02
7	750.12	43.51	-25.00	-52.87	0.82	-52.05
8	888.49	33.14	-25.00	-64.65	0.62	-64.04

<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	55.30	45.15	-25.00	-35.27	-8.73	-44.00
2	64.90	38.21	-25.00	-46.85	-6.16	-53.01
3	163.87	38.52	-25.00	-50.77	-0.14	-50.90
4	500.00	40.12	-25.00	-55.40	2.89	-52.51
5	600.00	39.12	-25.00	-55.50	1.79	-53.71
6	700.00	39.95	-25.00	-56.39	1.62	-54.77
7	750.12	41.85	-25.00	-54.53	0.82	-53.71
8	888.51	41.54	-25.00	-56.26	0.62	-55.64

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



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**For Simultaneously transmit test(WLAN+WiMAX)**

<b>MODE</b>	Low channel	<b>FREQUENCY RANGE</b>	Below 1000MHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	20deg°C, 60%RH 960hPa
<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	127.60	23.37	-25.00	-67.88	-1.23	-69.11
2	158.02	26.93	-25.00	-61.84	-0.76	-62.60
3	198.44	23.21	-25.00	-72.15	4.17	-67.98
4	218.70	25.05	-25.00	-70.38	4.10	-66.28
5	324.60	25.70	-25.00	-71.11	3.65	-67.45
6	390.20	26.34	-25.00	-71.51	3.38	-68.12

<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	114.55	27.55	-25.00	-62.34	-1.03	-63.37
2	121.70	23.78	-25.00	-66.19	-1.19	-67.38
3	162.08	26.08	-25.00	-62.70	-0.40	-63.10
4	218.75	25.09	-25.00	-70.34	4.10	-66.24
5	286.10	27.52	-25.00	-67.84	3.80	-64.04
6	390.20	29.70	-25.00	-68.15	3.38	-64.76

**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) (4), 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.

### 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
HP Pre_Amplifier	8449B	3008A01923	Nov. 10, 2008	Nov. 09, 2009
ROHDE & SCHWARZ Test Receiver	ESCS30	847124/029	Sep. 09, 2008	Sep. 08, 2009
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	Oct. 07, 2008	Oct. 06, 2009
RF CABLE (Chaintek)	Sucoflex 106	28077	Aug. 15, 2008	Aug. 14, 2009
RF Cable	8DFB	STCCAB-30M-1GHz	Oct. 07, 2008	Oct. 06, 2009
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.

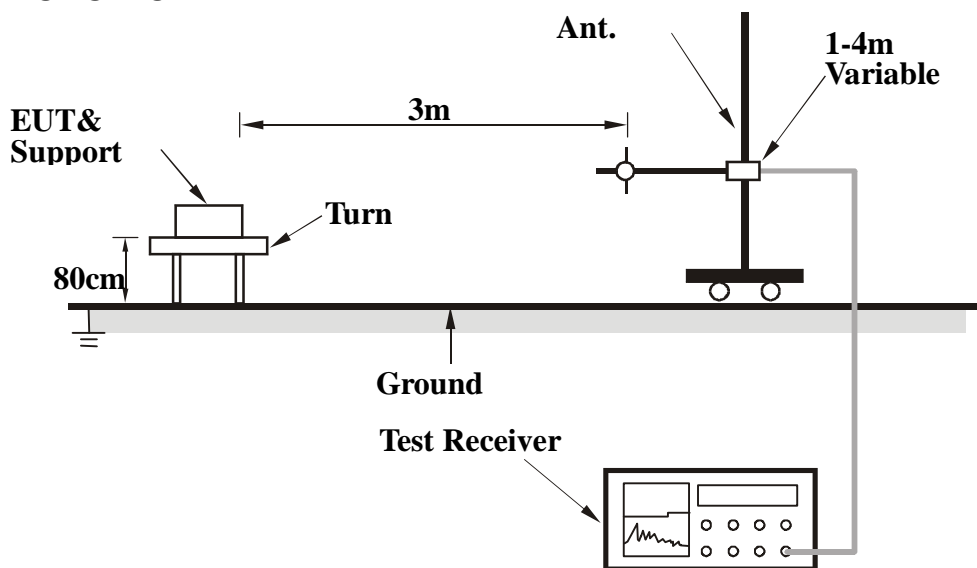
**NOTE:** The resolution bandwidth of spectrum analyzer is 1MHz and the video bandwidth is 3MHz.

#### 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

MODE	Low channel	FREQUENCY RANGE	Above 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	20deg°C, 60%RH 960hPa
TESTED BY	Eric Lee		

## ANTENNA POLARITY &amp; 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	5,010.00	60.14	-25.00	-44.11	7.01	-37.09
2	6,680.00	45.70	-25.00	-57.68	5.58	-52.09
3	7,515.00	53.00	-25.00	-49.64	4.53	-45.10
4	12,525.00	54.50	-25.00	-47.06	4.34	-42.72

## ANTENNA POLARITY &amp; 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	5,010.00	59.20	-25.00	-45.05	7.01	-38.03
2	6,680.00	49.10	-25.00	-54.28	5.58	-48.69
3	7,515.00	53.50	-25.00	-49.14	4.53	-44.60
4	12,525.00	55.70	-25.00	-45.86	4.34	-41.52

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



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MODE	Middle channel	FREQUENCY RANGE	Above 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	20deg°C, 60%RH 960hPa
TESTED BY	Eric Lee		

**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	5,180.00	53.00	-25.00	-51.50	7.05	-44.45
2	7,770.00	50.40	-25.00	-52.54	4.32	-48.23
3	6,096.70	45.00	-25.00	-57.42	5.15	-52.27
4	12,950.00	50.20	-25.00	-50.71	4.44	-46.27

**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	5,180.00	56.40	-25.00	-48.10	7.05	-41.05
2	7,770.00	58.20	-25.00	-44.74	4.32	-40.43
3	6,096.70	45.29	-25.00	-57.13	5.15	-51.98
4	12,950.00	50.12	-25.00	-50.79	4.44	-46.35

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



A D T

MODE	High channel	FREQUENCY RANGE	Above 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	20deg°C, 60%RH 960hPa
TESTED BY	Eric Lee		

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	5,370.00	47.80	-25.00	-56.99	7.09	-49.89
2	8,055.00	48.20	-25.00	-54.42	4.13	-50.29
3	7,160.00	44.90	-25.00	-57.31	4.83	-52.48
4	13,425.00	57.70	-25.00	-42.54	3.43	-39.10

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	5,370.00	50.20	-25.00	-54.59	7.09	-47.49
2	8,055.00	51.30	-25.00	-51.32	4.13	-47.19
3	7,160.00	48.62	-25.00	-53.59	4.83	-48.76
4	13,425.00	54.00	-25.00	-46.24	3.43	-42.80

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 960hPa
<b>TESTED BY</b>	Eric Lee		

**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	5,010.00	55.90	-25.00	-48.35	7.01	-41.33
2	6,680.00	45.45	-25.00	-57.93	5.58	-52.34
3	7,515.00	50.88	-25.00	-51.76	4.53	-47.22
4	12,525.00	52.66	-25.00	-48.90	4.34	-44.56

**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	5,010.00	58.73	-25.00	-45.52	7.01	-38.50
2	6,680.00	50.89	-25.00	-52.49	5.58	-46.90
3	7,515.00	54.55	-25.00	-48.09	4.53	-43.55
4	12,525.00	52.64	-25.00	-48.92	4.34	-44.58

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



A D T

MODE	Middle channel	FREQUENCY RANGE	Above 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	20deg°C, 60%RH 960hPa
TESTED BY	Eric Lee		

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	5,180.00	50.34	-25.00	-54.16	7.05	-47.11
2	7,770.00	46.85	-25.00	-56.09	4.32	-51.78
3	6,096.70	48.65	-25.00	-53.77	5.15	-48.62
4	12,950.00	49.52	-25.00	-51.39	4.44	-46.95

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	5,180.00	54.00	-25.00	-50.50	7.05	-43.45
2	7,770.00	55.30	-25.00	-47.64	4.32	-43.33
3	6,096.70	53.80	-25.00	-48.62	5.15	-43.47
4	12,950.00	50.33	-25.00	-50.58	4.44	-46.14

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



A D T

MODE	High channel	FREQUENCY RANGE	Above 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	20deg°C, 60%RH 960hPa
TESTED BY	Eric Lee		

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	5,370.00	44.10	-25.00	-60.69	7.09	-53.59
2	8,055.00	47.30	-25.00	-55.32	4.13	-51.19
3	7,160.00	45.33	-25.00	-56.88	4.83	-52.05
4	13,425.00	54.23	-25.00	-46.01	3.43	-42.57

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	5,370.00	49.56	-25.00	-55.23	7.09	-48.13
2	8,055.00	52.10	-25.00	-50.52	4.13	-46.39
3	7,160.00	49.32	-25.00	-52.89	4.83	-48.06
4	13,425.00	51.60	-25.00	-48.64	3.43	-45.20

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



A D T

**For Simultaneously transmit test(WLAN+WiMAX)**

<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 960hPa
<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	3229.00	50.50	-25.00	-52.37	7.46	-44.91
2	5180.00	59.70	-25.00	-44.80	7.05	-37.75
3	6096.70	54.50	-25.00	-47.92	5.15	-42.77
4	7770.00	57.10	-25.00	-45.84	4.32	-41.53

**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	3229.00	46.50	-25.00	-56.37	7.46	-48.91
2	5180.00	64.30	-25.00	-40.20	7.05	-33.15
3	6096.70	57.10	-25.00	-45.32	5.15	-40.17
4	7770.00	63.90	-25.00	-39.04	4.32	-34.73

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



## 5 PHOTOGRAPHS OF THE TEST CONFIGURATION

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

## 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)**

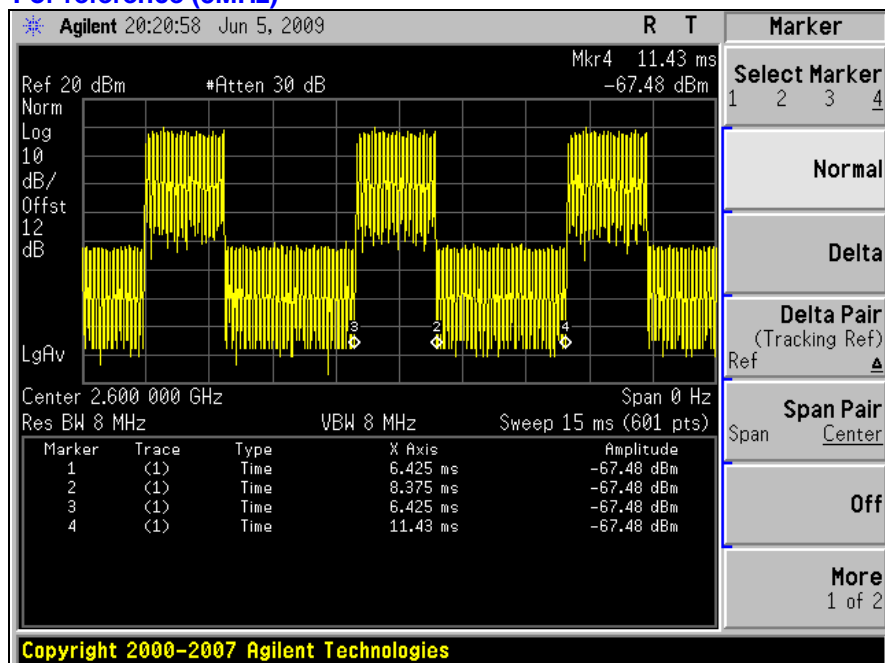
Tel: 886-3-3183232

Fax: 886-3-3185050

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

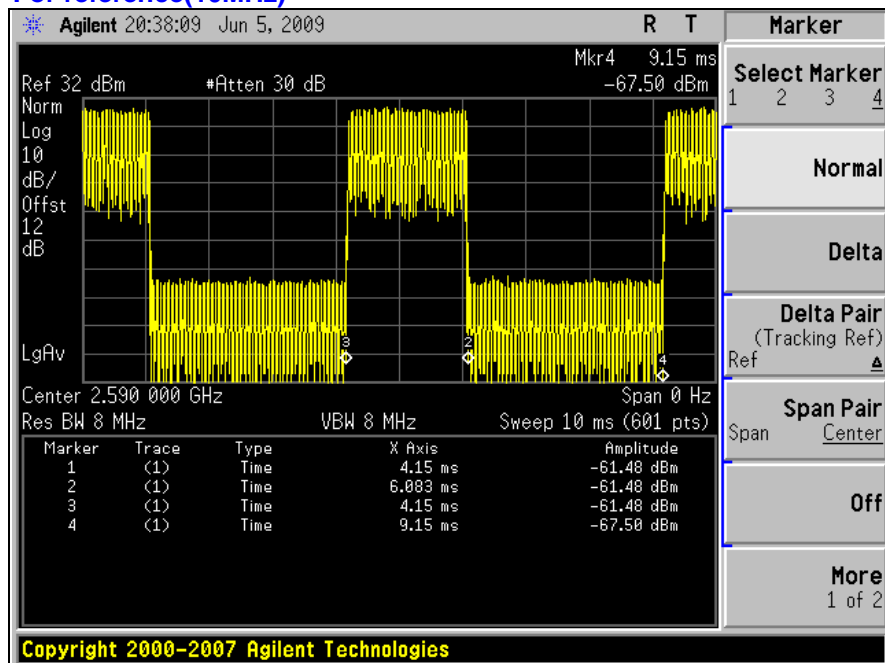
## 7 APPENDIX- A DL/UL RATION FOR TEST

### For reference (5MHz)



The ration is approximate 38.961%.

### For reference(10MHz)



The ration is approximate 38.66%.

--- END ---