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FCC TEST REPORT (PART 27)

REPORT NO.: RF110729E04

MODEL NO.: HES-209M1H, BM2022

FCC ID: ZMYHES209M1H

RECEIVED: July 29, 2011

TESTED: Sep. 28 to Oct. 04, 2011

ISSUED: Oct. 11, 2011

APPLICANT: MitraStar Technology Corporation

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF110729E04	Original release	Oct. 11, 2011



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1 CERTIFICATION

PRODUCT: WiMAX Indoor VoIP IAD

BRAND NAME: Mitrastar, Huawei

MODEL NO.: HES-209M1H, BM2022

APPLICANT: MitraStar Technology Corporation

TESTED: Sep. 28 to Oct. 04, 2011

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.: HES-209M1H) 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 : Claire Kuan , **DATE:** Oct. 11, 2011
(Claire Kuan, Specialist)

APPROVED BY : May Chen , **DATE:** Oct. 11, 2011
(May Chen, Deputy Manager)



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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)	4.00 dB
Radiated emissions (1GHz -18GHz)	2.49 dB
Radiated emissions (18GHz -40GHz)	2.70 dB



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3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	WiMAX Indoor VoIP IAD
MODEL NO.	HES-209M1H, BM2022
FCC ID	ZMYHES209M1H
POWER SUPPLY	DC 12V from power adapter
MODULATION TECHNOLOGY	OFDMA
MODULATION	Up Link : QPSK-1/2, -3/4, 16QAM-1/2, 3/4, 64QAM-1/2, -3/4, -2/3, -5/6 Down Link: QPSK-1/2, -3/4, 16QAM-1/2, 3/4, 64QAM-1/2, -3/4, -2/3, -5/6
OPERATING FREQUENCY	5MHz: 2505MHz ~ 2680MHz 10MHz: 2505MHz ~ 2685MHz
CHANNEL BANDWIDTH	5MHz & 10MHz
MAX. CONDUCTED POWER	5MHz: 26.5dBm 10MHz: 26.5dBm
ANTENNA TYPE	Please see note
DATA CABLE	Ethernet cable (Unshielded, 1.8m)
I/O PORTS	VoIP port x 1 LAN (10/100Mbps) port x 1
ASSOCIATED DEVICES	Adapter x 1

NOTE:

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

Transmitter Circuit	Antenna Type	Antenna Connector	Antenna Gain (peak, Included cable loss)
Chain(0)	Internal Omni-directional	I-PEX	5.9 dBi
Chain(1)	Internal Omni-directional	I-PEX	5.9 dBi

2. The EUT must be supplied with a power adapter as following table:

Brand	Model No.	Spec.
DVE	DSA-12G-12 FUS 120120	AC Input: 100-240V, 0.3A, 50/60Hz DC Output: 12V, 1A DC output cable(Unshielded, 1.5m)



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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 5MHz /10MHz worst case, and was selected for the final test configuration.

Up 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	64QAM	1/2
	3/4		3/4
	2/3		2/3
	5/6		5/6

4. The EUT operates in 2505 ~ 2685MHz Bands and support MIMO technology.
5. The device has different DL/UL ration in normal operation. It was tested with (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).
6. 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

The following channels have been tested and presented.

Channel bandwidth: 5MHz

Low channel (L): 2505MHz.

Middle channel (M): 2590MHz.

High channel (H): 2680MHz.

Channel bandwidth: 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 ³ 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**RE³1G:** 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.

CONFIGURE MODE	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
MODE 1	L, M, H	OFDMA	QPSK
MODE 2	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.

CONFIGURE MODE	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
MODE 1	M	OFDMA	Unmodulation



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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.

CONFIGURE MODE	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
MODE 1	L, M, H	OFDMA	QPSK
MODE 2	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.

CONFIGURE MODE	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
MODE 1	L, M, H	OFDMA	QPSK
MODE 2	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.

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



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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.

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

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.

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

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	DELL	D531	CN-0XM006-48643-86L-4472	QDS-BRCM1019
2	TELEPHONE	ROMEO	TE-812	97280903	NA

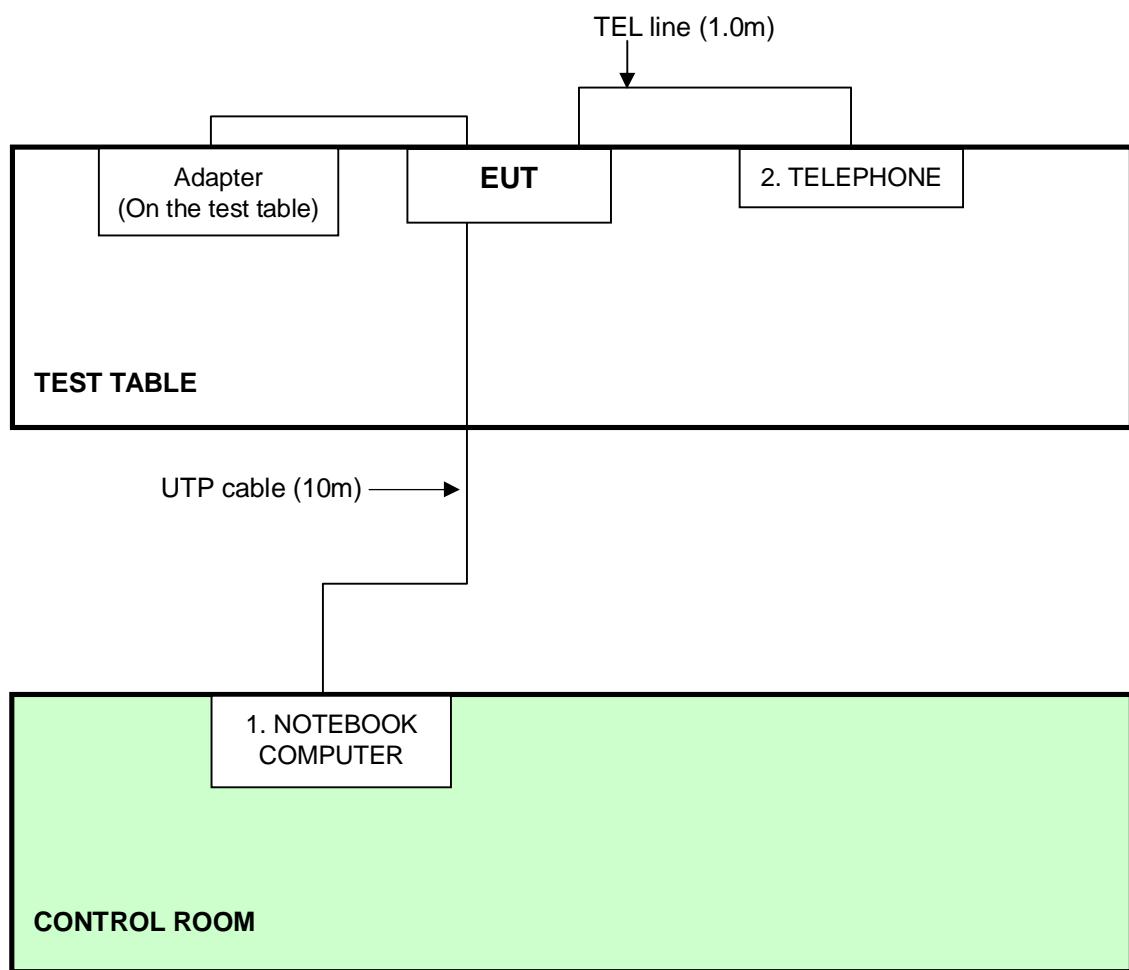
NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	10m UTP cable
2	1.0m TEL line

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



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3.4.1 CONFIGURATION OF SYSTEM UNDER TEST





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4 TEST TYPES AND RESULTS

4.1 OUTPUT POWER MEASUREMENT

4.1.1 LIMITS OF OUTPUT POWER MEASUREMENT

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

4.1.2 TEST INSTRUMENTS

Test date: Sep. 28, 2011

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Anritsu Power meter	ML2495A	0824006	May 04, 2011	May 03, 2012
JFW 10dB attenuation	50HF-010-SMA	N/A	NA	NA

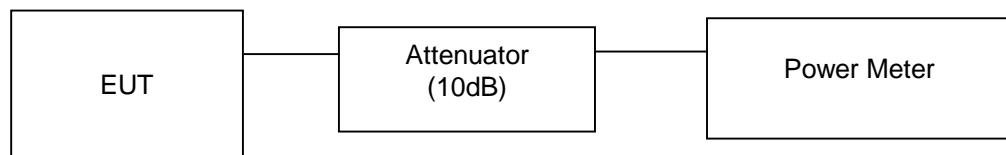
NOTE:

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

4.1.3 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





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4.1.5 EUT OPERATING CONDITIONS

1. Connected the EUT with the support unit 1 (Notebook Computer) which was placed on a testing table.
2. Support unit 1(Notebook computer) ran the test program “MTK RFCAL Tool v1.6.6 build 649” which was used to set the frequency continuous transmit mode.
3. Support unit 2 (telephone) was connected to EUT by one TEL line.



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4.1.6 TEST RESULTS(MODE 1)

CHANNEL BANDWIDTH: 5MHz

INPUT POWER	120Vac, 60Hz		
ENVIRONMENTAL CONDITIONS	20deg°C, 60%RH	TESTED BY	Kent Liu

CHANNEL BANDWIDTH: 5MHz

CONDUCTED POWER							
CHANNEL	FREQUENCY (MHz)	POWER OUTPUT(dBm)		POWER OUTPUT(mW)		TOTAL POWER OUTPUT (mW)	TOTAL POWER OUTPUT (dBm)
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1		
Low	2505	23.0	23.5	199.526	223.872	423.4	26.3
Middle	2590	23.6	23.1	229.087	204.174	433.3	26.4
High	2680	23.5	23.4	223.872	218.776	442.6	26.5

4.1.7 TEST RESULTS(MODE 2)

CHANNEL BANDWIDTH: 10MHz

INPUT POWER	120Vac, 60Hz		
ENVIRONMENTAL CONDITIONS	20deg°C, 60%RH	TESTED BY	Kent Liu

CHANNEL BANDWIDTH: 10MHz

CONDUCTED POWER							
CHANNEL	FREQUENCY (MHz)	POWER OUTPUT(dBm)		POWER OUTPUT(mW)		TOTAL POWER OUTPUT (mW)	TOTAL POWER OUTPUT (dBm)
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1		
Low	2505	23.2	23.2	208.930	208.930	417.9	26.2
Middle	2590	23.9	23.0	245.471	199.526	445.0	26.5
High	2685	22.9	22.8	194.984	190.546	385.5	25.9



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4.2 FREQUENCY STABILITY MEASUREMENT

4.2.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

According to the FCC part 2.1055 and 27.54 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°C ~ 50°C.

4.2.2 TEST INSTRUMENTS

Test date: Sep. 28, 2011

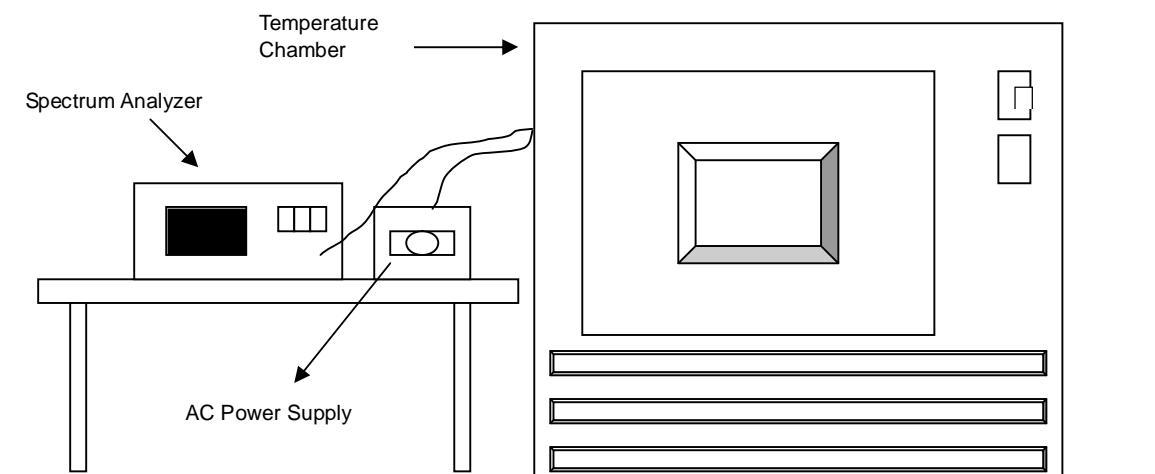
DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 08, 2010	Dec. 07, 2011
OVEN	MHU-225AU	911033	Dec. 16, 2010	Dec. 15, 2011
HUBER+SUHNER	SUCOFLEX 104	222689/4	May 17, 2011	May 16, 2012
AC POWER SOURCE	6205	1140503	NA	NA

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

MODE	Middle channel (2590MHz)	INPUT POWER	120Vac, 60Hz
ENVIRONMENTAL CONDITIONS	20deg°C, 60%RH	TESTED BY	Kent Liu

AFC FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	0Minutes		2Minutes		5Minutes		10Minutes	
	FREQUENCY (MHz)	PPM (%)						
138	2589.9968	0.000124	2589.9959	0.000158	2589.9942	0.000224	2589.9947	0.000205
120	2589.9963	0.000143	2589.9958	0.000162	2589.9944	0.000216	2589.9943	0.000220
102	2589.9961	0.000151	2589.9952	0.000185	2589.9946	0.000208	2589.9941	0.000228

AFC FREQUENCY ERROR VS. TEMP

TEMP (°C)	0Minutes		2Minutes		5Minutes		10Minutes	
	FREQUENCY (MHz)	PPM (%)						
50	2589.9964	0.000139	2589.9958	0.000162	2589.9954	0.000178	2589.9951	0.000189
40	2589.9956	0.000170	2589.9954	0.000178	2589.9952	0.000185	2589.9948	0.000201
30	2589.9957	0.000166	2589.9952	0.000185	2589.9954	0.000178	2589.9951	0.000189
20	2589.9963	0.000143	2589.9958	0.000162	2589.9944	0.000216	2589.9943	0.000220
10	2589.9963	0.000143	2589.9956	0.000170	2589.9951	0.000189	2589.9947	0.000205
0	2589.9954	0.000178	2589.9947	0.000205	2589.9943	0.000220	2589.9941	0.000228
-10	2589.9943	0.000220	2589.9938	0.000239	2589.9934	0.000255	2589.9932	0.000263
-20	2589.9937	0.000243	2589.9931	0.000266	2589.9929	0.000274	2589.9925	0.000290
-30	2589.9931	0.000266	2589.9927	0.000282	2589.9918	0.000317	2589.9921	0.000305



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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

Test date: Sep. 28, 2011

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Agilent Spectrum Analyzer	E4446A	MY46180622	Apr. 25, 2011	Apr. 24, 2012
HUBER+SUHNER	SUCOFLEX 104	222689/4	May 17, 2011	May 16, 2012
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.

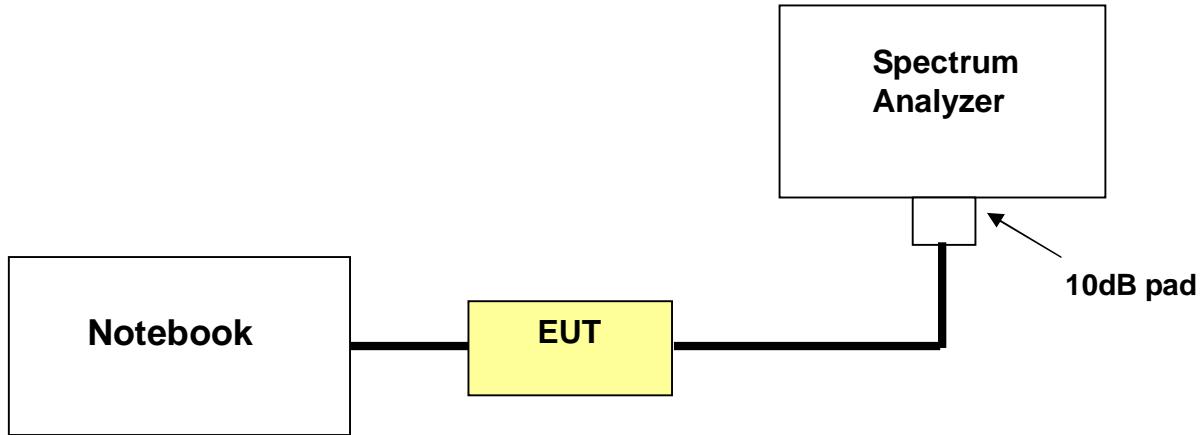
4.3.3 TEST PROCEDURES

- 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. Measure the band width at the -26dB levels with respect to the reference level.



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4.3.4 TEST SETUP



4.3.5 EUT OPERATING CONDITIONS

Same as 4.1.5



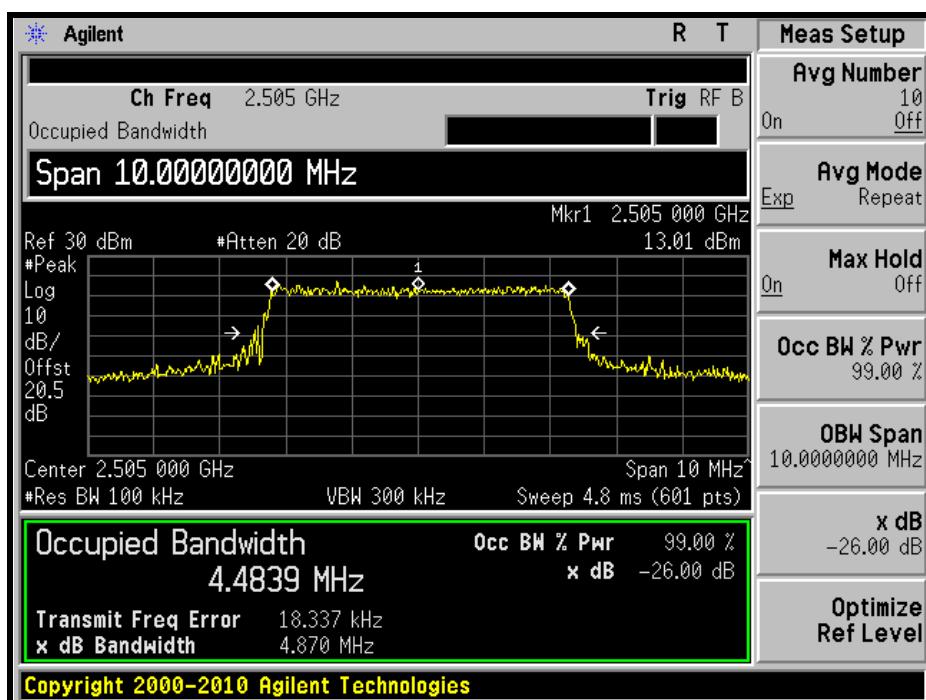
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4.3.6 TEST RESULTS(MODE 1)

CHANNEL BANDWIDTH: 5MHz

FREQUENCY (MHz)	-26 dBc BANDWIDTH (MHz)	
	CHAIN 0	CHAIN 1
2505	4.87	4.85
2590	4.84	4.80
2680	4.83	4.82

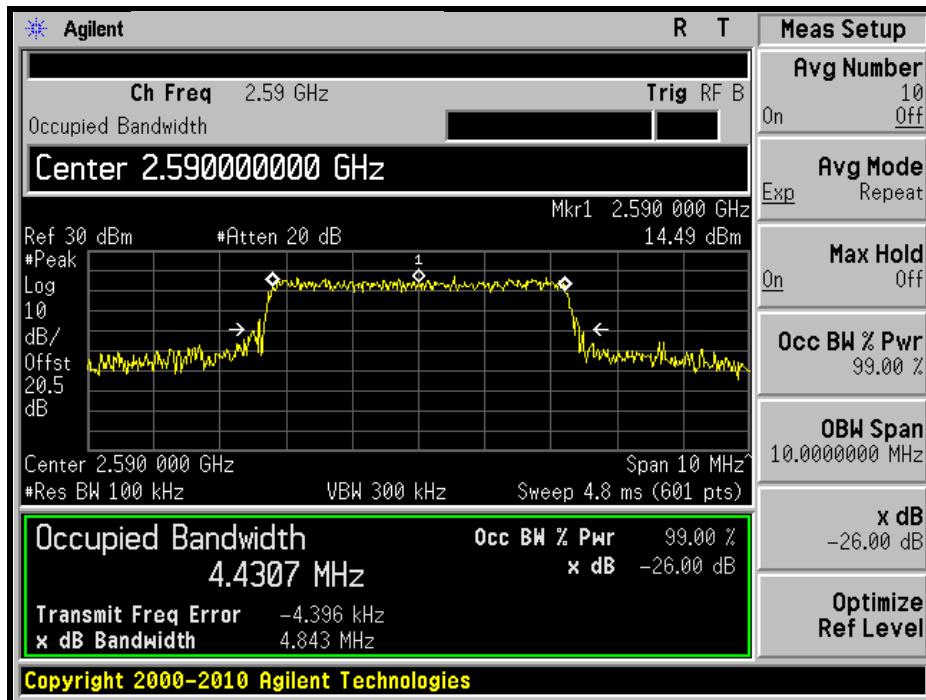
CHAIN 0 LOW CHANNEL



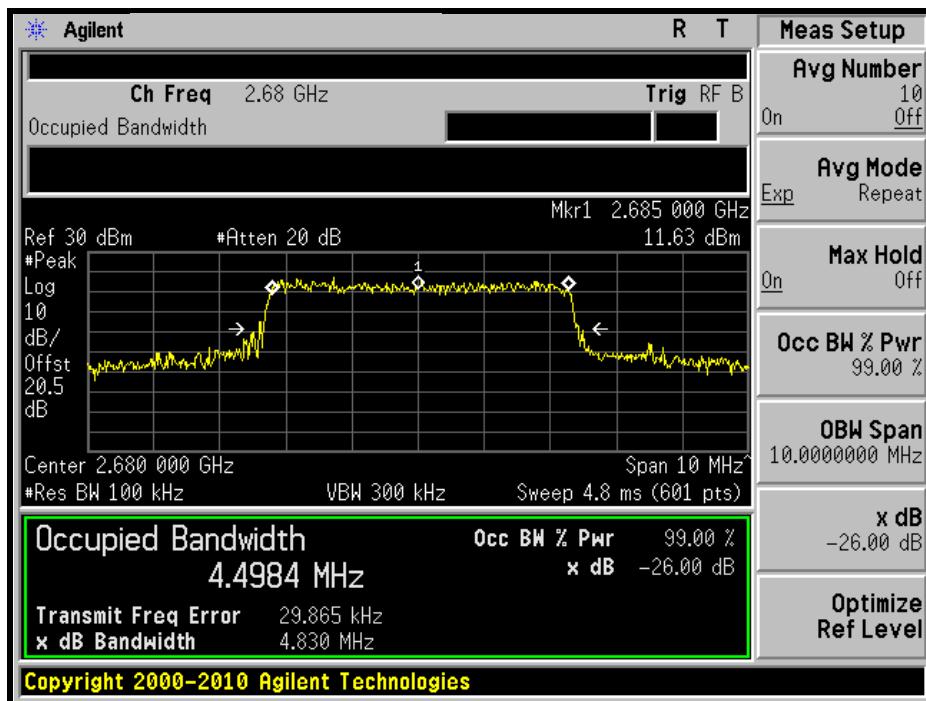


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MIDDLE CHANNEL



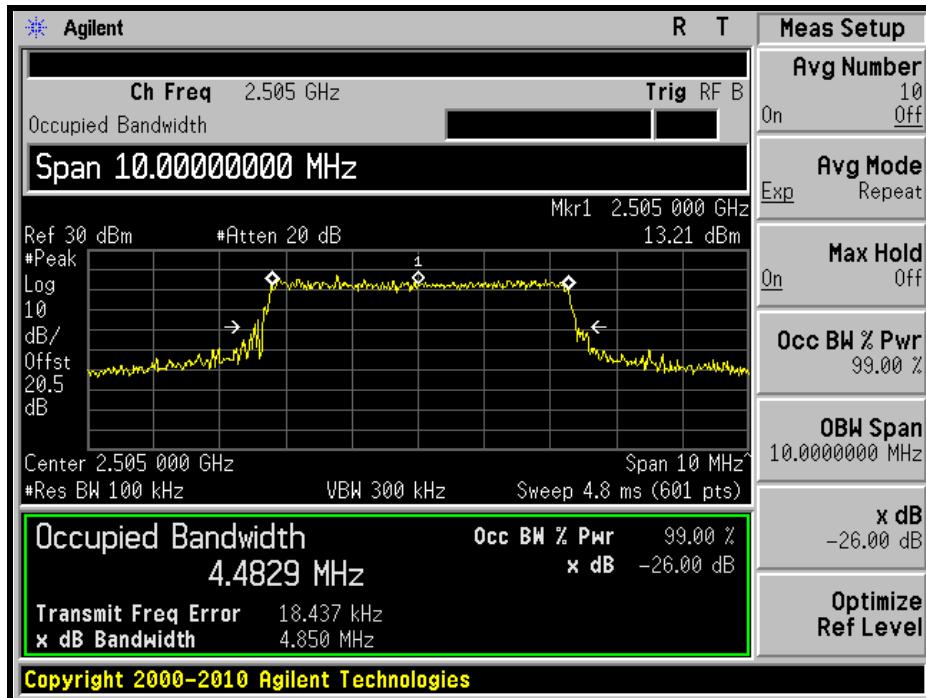
HIGH CHANNEL



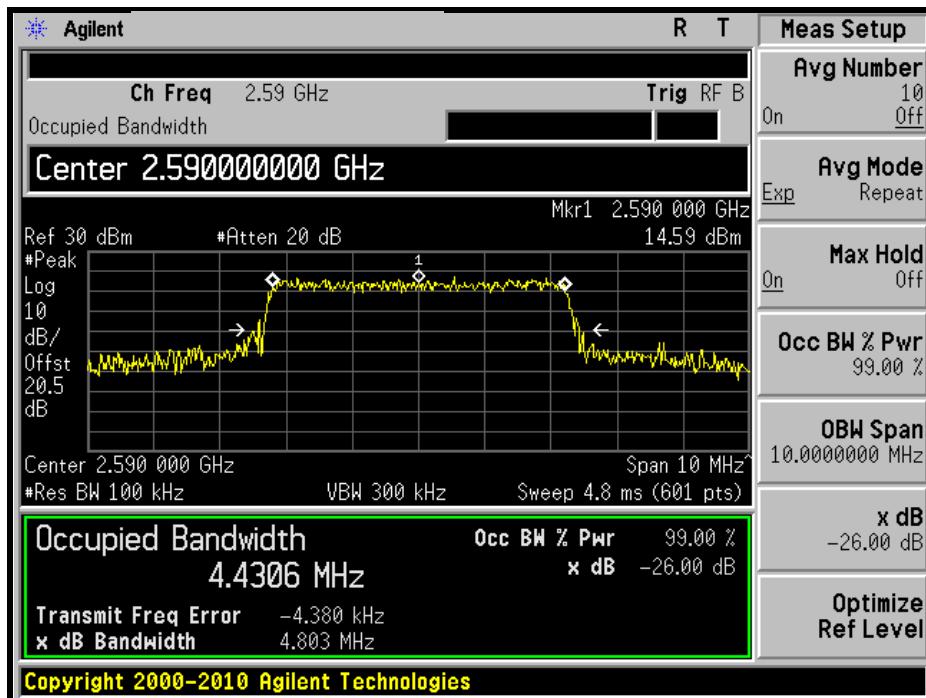


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CHAIN 1 LOW CHANNEL



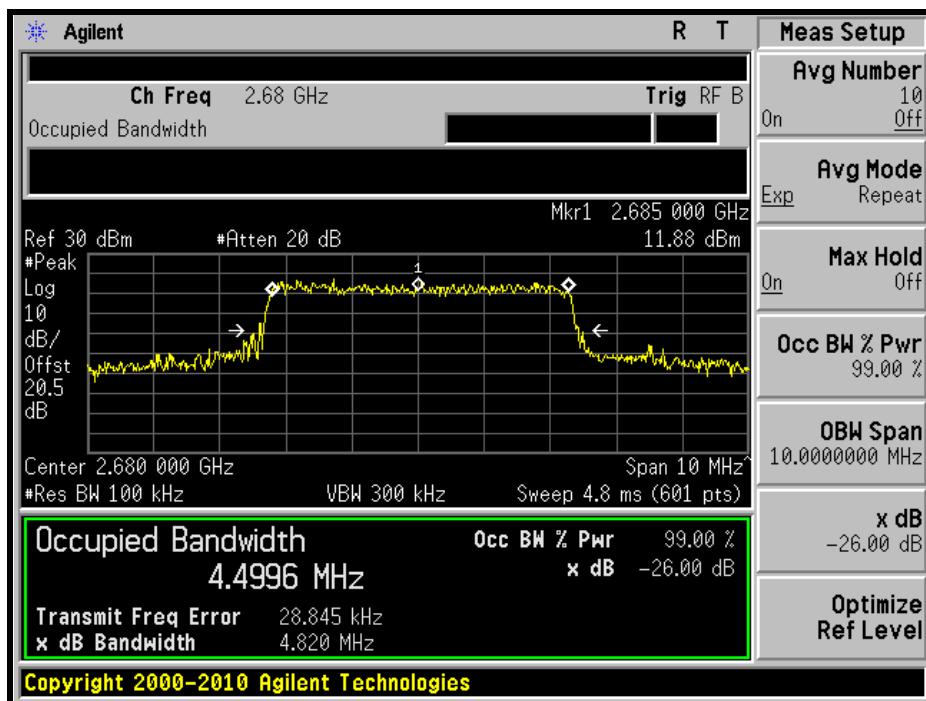
MIDDLE CHANNEL





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HIGH CHANNEL





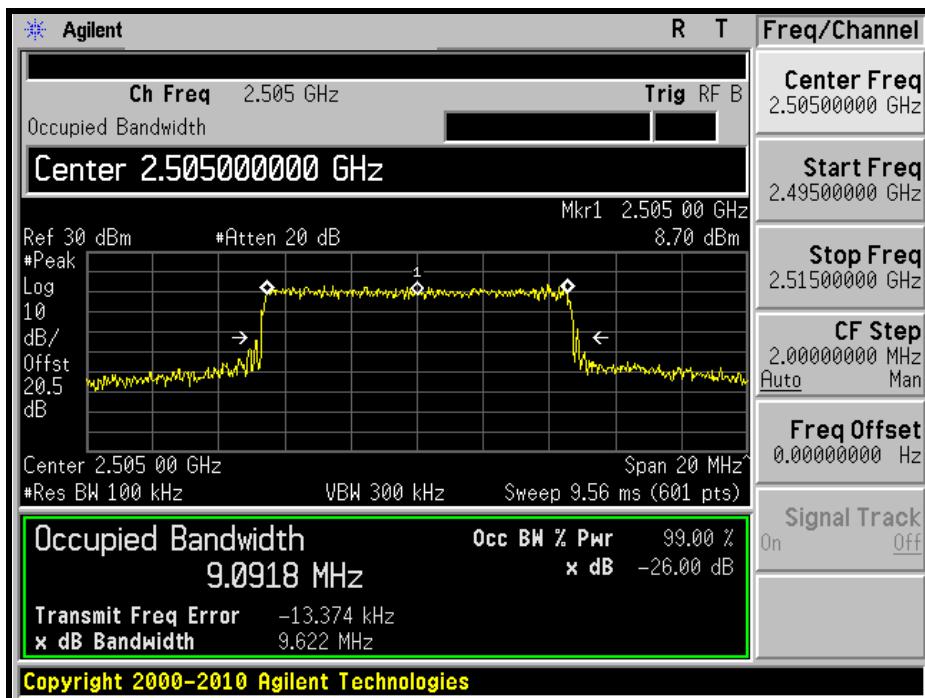
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4.3.7 TEST RESULTS(MODE 2)

CHANNEL BANDWIDTH: 10MHz

FREQUENCY (MHz)	-26 dBc BANDWIDTH (MHz)	
	CHAIN 0	CHAIN 1
2505	9.62	9.60
2590	9.61	9.58
2680	9.68	9.66

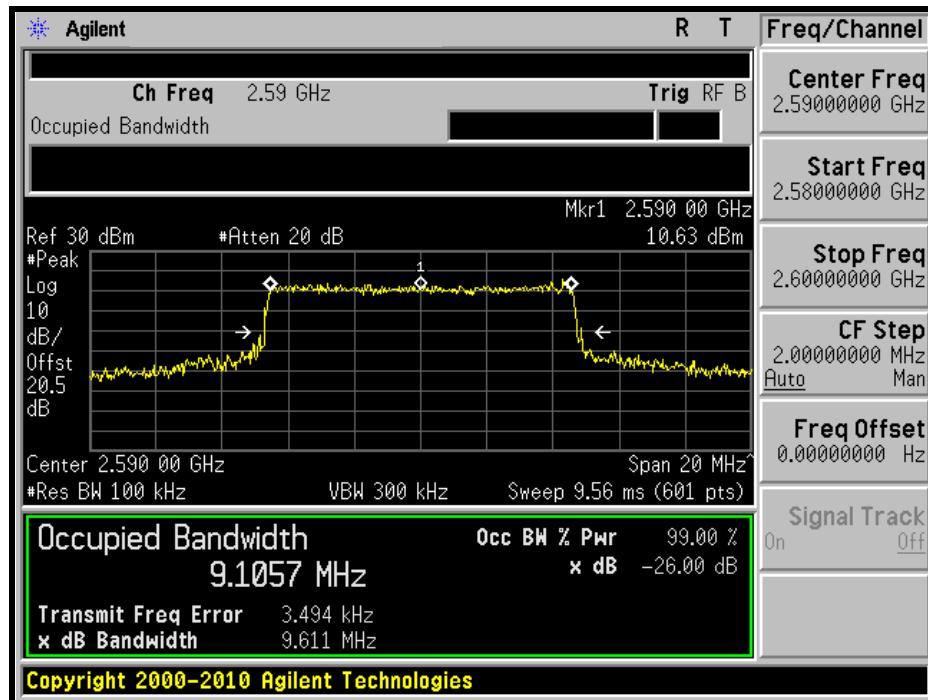
CHAIN 0 LOW CHANNEL



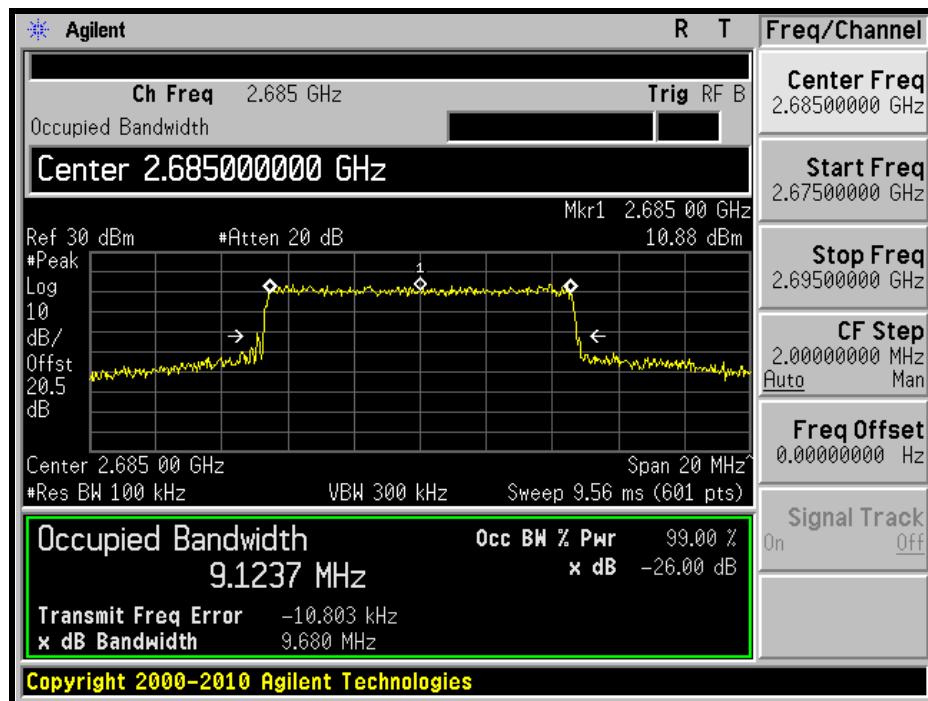


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MIDDLE CHANNEL



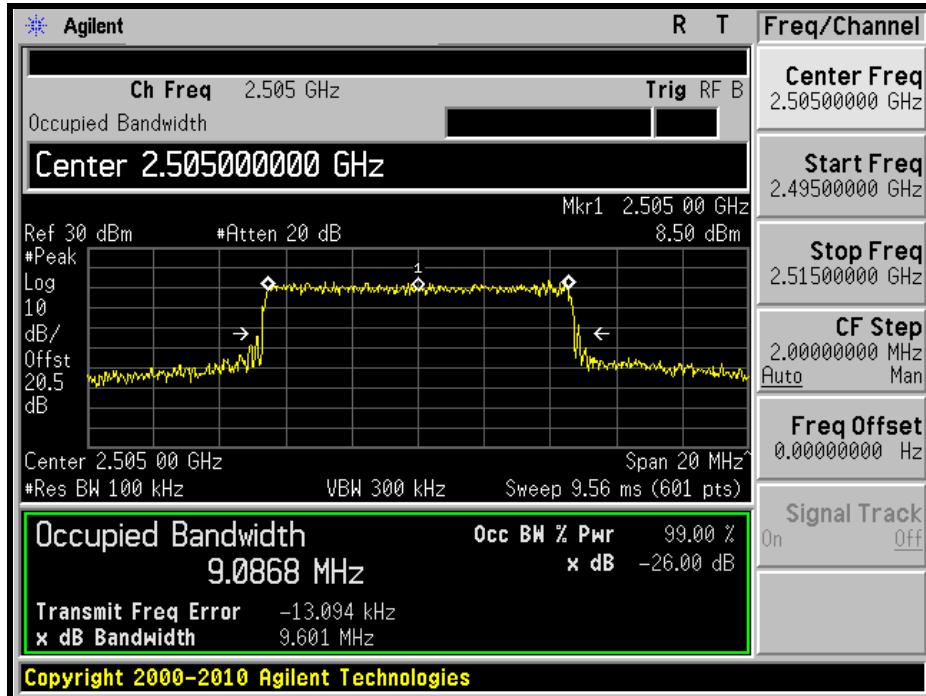
HIGH CHANNEL



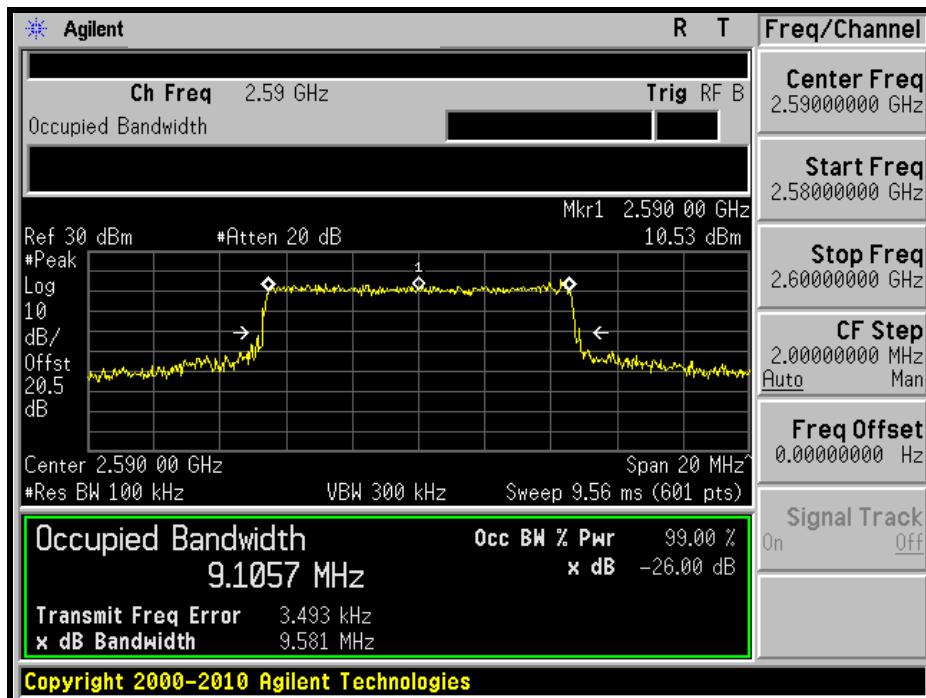


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CHAIN 1 LOW CHANNEL



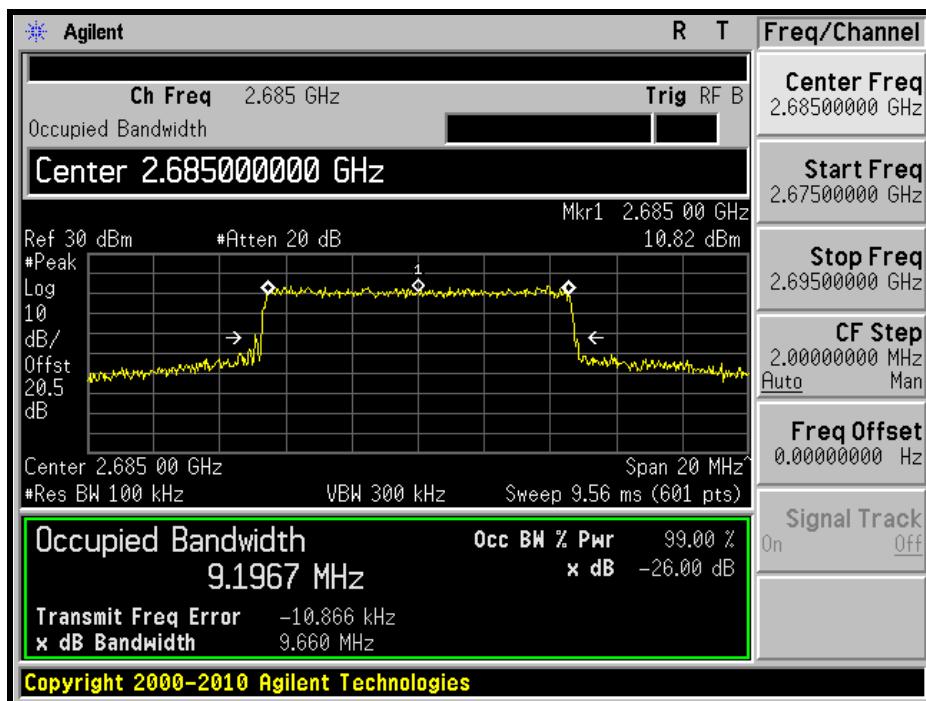
MIDDLE CHANNEL





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HIGH CHANNEL





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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

Test date: Sep. 28, 2011

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Agilent Spectrum Analyzer	E4446A	MY46180622	Apr. 25, 2011	Apr. 24, 2012
HUBER+SUHNER	SUCOFLEX 104	222689/4	May 17, 2011	May 16, 2012
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



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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. RBW of the spectrum is 51kHz and VB W 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 W of the spectrum is 100kHz and VB W of the spectrum is 300kHz.

- 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(MODE 1)

CHANNEL BANDWIDTH: 5MHz

LOW CHANNEL-LEFT

CHANNEL	EMISSION FREQUENCY (MHz)	EMISSION OF AT EACH ANTENNA PORT (dBm)		TOTAL EMISSION (mW)	TOTAL EMISSION (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)				
2505	2502.474	-29.05	-27.49	0.003	-25.20	-13	PASS
	2501	-25.35	-23.06	0.008	-21.00	-13	PASS
	2500	-29.28	-27.46	0.003	-25.30	-13	PASS
	2499	-33.52	-32.77	0.001	-30.10	-13	PASS
	2498	-36.78	-38.39	0.000	-34.50	-13	PASS
	2497.5	-37.42	-39.38	0.000	-35.30	-13	PASS
	2496.5	-39.46	-40.73	0.000	-37.00	-25	PASS
	2495.5	-43.02	-44.41	0.000	-40.60	-25	PASS

NOTE:

Measure conducted emissions of at each antenna port and add the emissions in linear power units. Emission limits apply to the total of emissions from all outputs.

LOW CHANNEL-RIGHT

CHANNEL	CHANNEL FREQUENCY (MHz)	EMISSION OF AT EACH ANTENNA PORT (dBm)		TOTAL EMISSION (mW)	TOTAL EMISSION (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)				
2505	2507.526	-27.99	-26.91	0.004	-24.40	-13	PASS
	2509	-23.61	-20.60	0.013	-18.80	-13	PASS
	2510	-26.73	-24.19	0.006	-22.30	-13	PASS
	2511	-30.98	-29.77	0.002	-27.30	-13	PASS
	2512	-34.97	-36.83	0.001	-32.80	-13	PASS
	2512.5	-35.98	-38.09	0.000	-33.90	-13	PASS
	2513.5	-38.05	-39.24	0.000	-35.60	-25	PASS
	2514.5	-39.78	-41.48	0.000	-37.50	-25	PASS

NOTE:

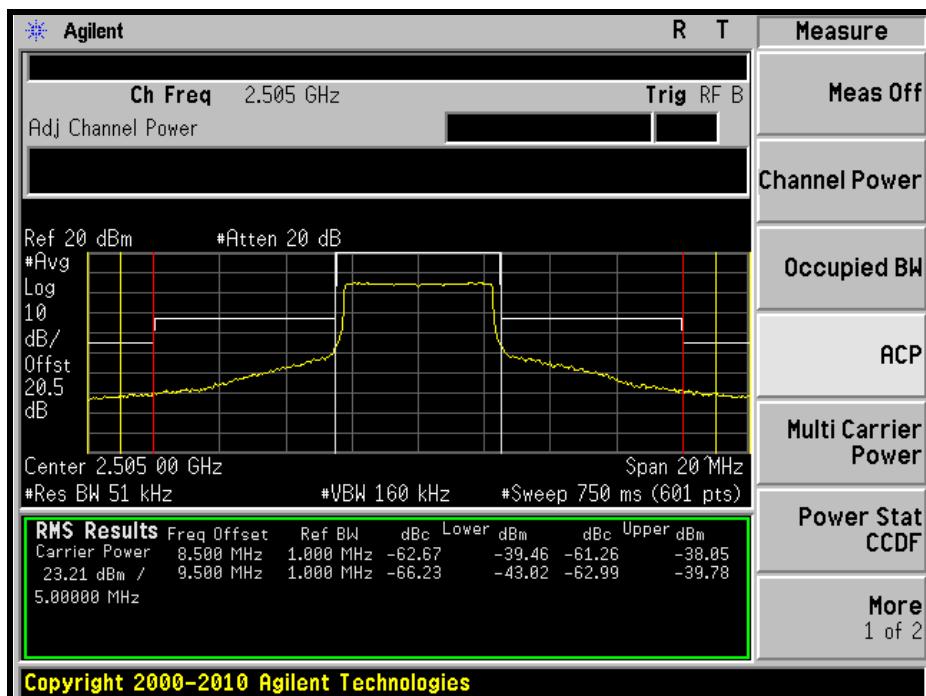
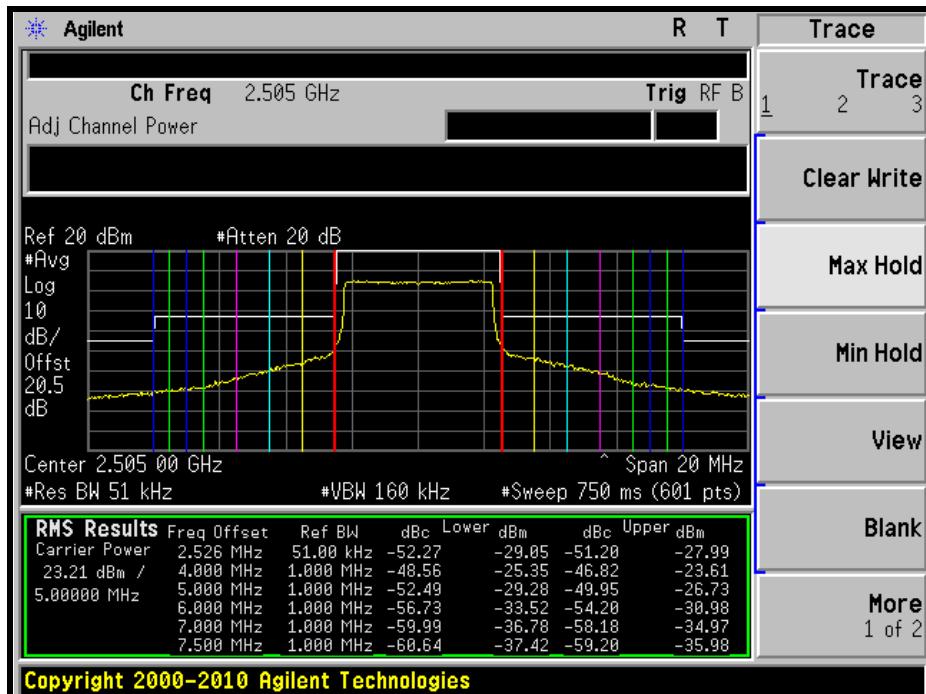
Measure conducted emissions of at each antenna port and add the emissions in linear power units. Emission limits apply to the total of emissions from all outputs.



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CHAIN 0

LOW CHANNEL

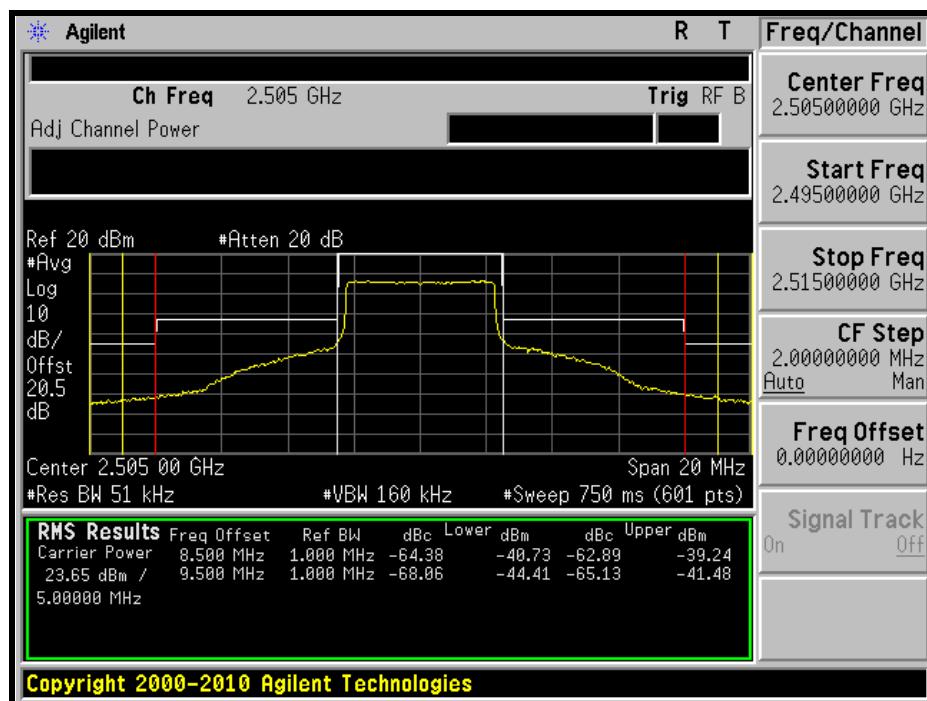
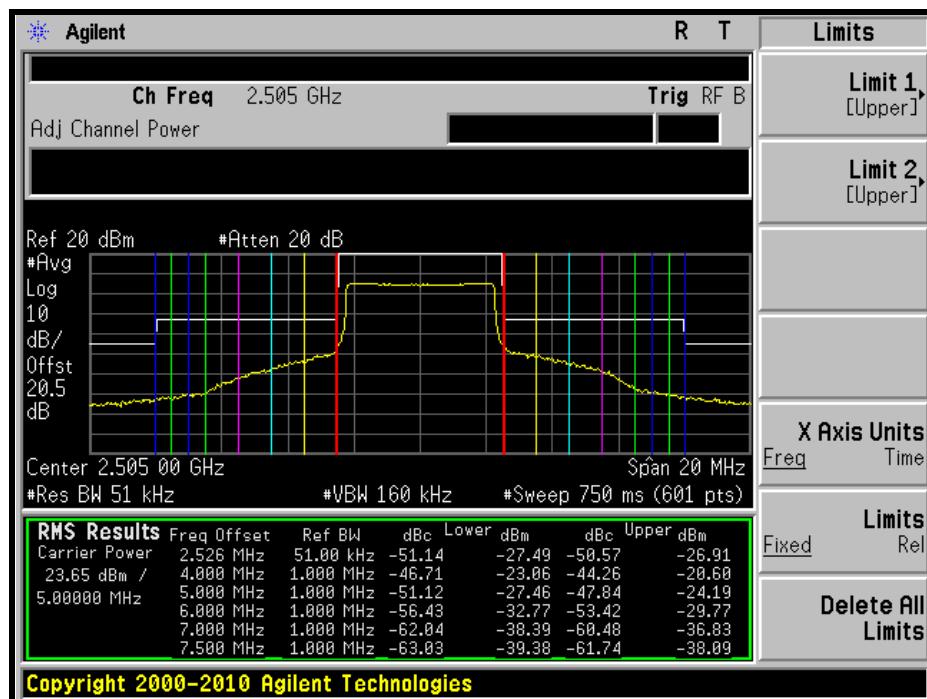




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CHAIN 1

LOW CHANNEL





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MIDDLE CHANNEL-LEFT

CHANNEL	CHANNEL FREQUENCY (MHz)	EMISSION OF AT EACH ANTENNA PORT (dBm)		TOTAL EMISSION (mW)	TOTAL EMISSION (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)				
2590	2587.474	-25.64	-26.98	0.005	-23.20	-13	PASS
	2586	-20.11	-21.52	0.017	-17.70	-13	PASS
	2585	-24.39	-25.81	0.006	-22.00	-13	PASS
	2584	-30.12	-31.67	0.002	-27.80	-13	PASS
	2583	-36.29	-38.61	0.000	-34.30	-13	PASS
	2582.5	-36.98	-39.20	0.000	-34.90	-13	PASS
	2581.5	-39.93	-40.39	0.000	-37.10	-25	PASS
	2580.5	-43.39	-43.29	0.000	-40.30	-25	PASS

NOTE:

Measure conducted emissions of at each antenna port and add the emissions in linear power units. Emission limits apply to the total of emissions from all outputs.

MIDDLE CHANNEL-RIGHT

CHANNEL	CHANNEL FREQUENCY (MHz)	EMISSION OF AT EACH ANTENNA PORT (dBm)		TOTAL EMISSION (mW)	TOTAL EMISSION (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)				
2590	2592.526	-24.98	-25.97	0.006	-22.40	-13	PASS
	2594	-19.24	-19.58	0.023	-16.40	-13	PASS
	2595	-23.07	-23.16	0.010	-20.10	-13	PASS
	2596	-28.37	-28.72	0.003	-25.50	-13	PASS
	2597	-34.38	-36.13	0.001	-32.20	-13	PASS
	2597.5	-35.40	-37.16	0.000	-33.20	-13	PASS
	2598.5	-38.89	-38.85	0.000	-35.90	-25	PASS
	2599.5	-40.56	-40.72	0.000	-37.60	-25	PASS

NOTE:

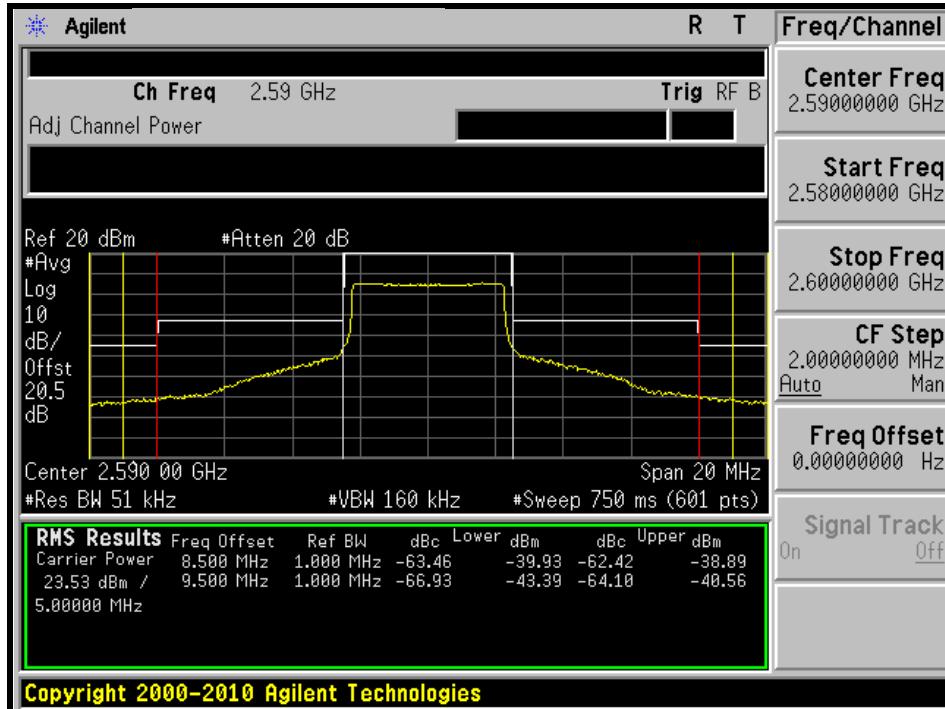
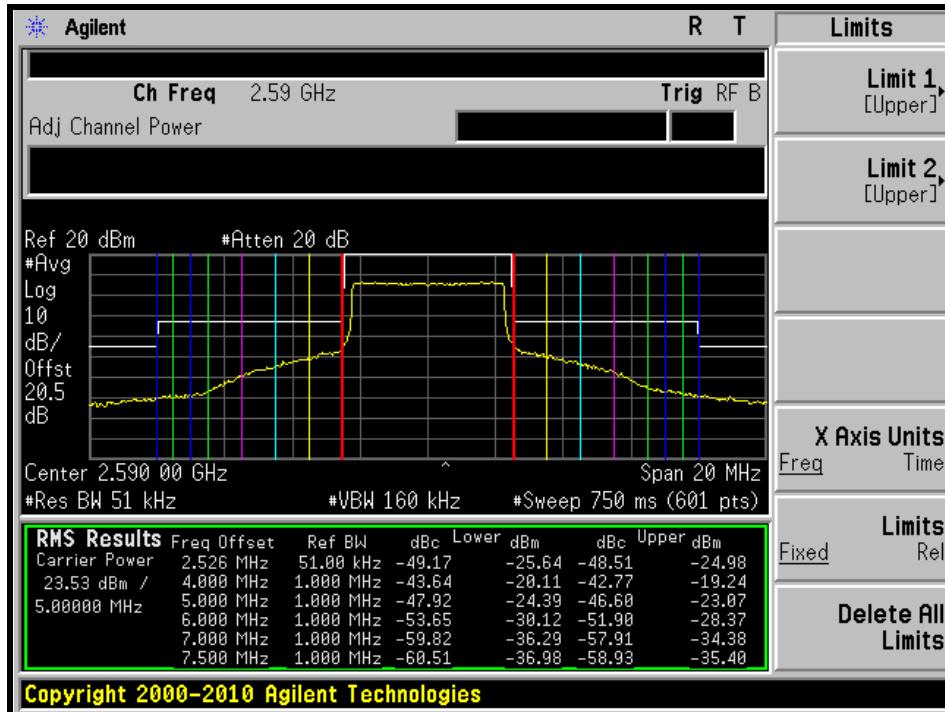
Measure conducted emissions of at each antenna port and add the emissions in linear power units. Emission limits apply to the total of emissions from all outputs.



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CHAIN 0

MIDDLE CHANNEL

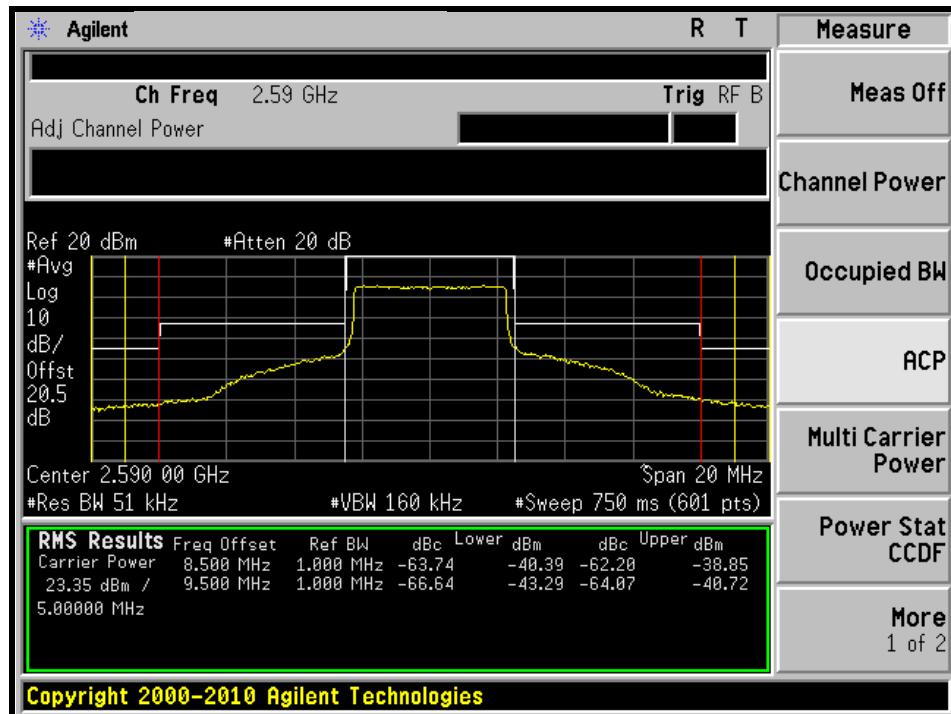
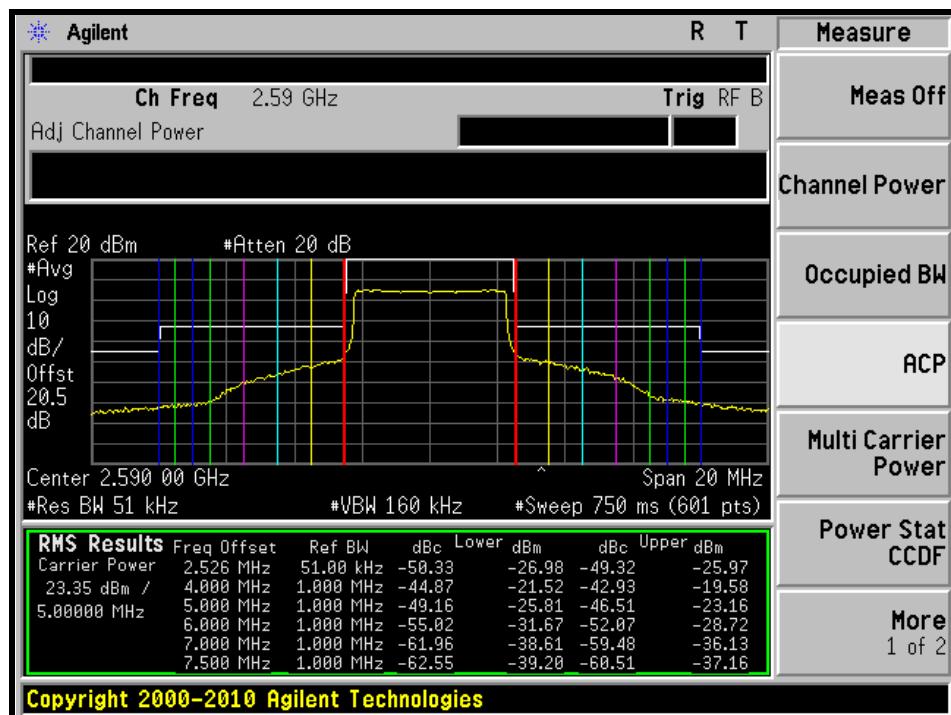




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CHAIN 1

MIDDLE CHANNEL





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HIGH CHANNEL-LEFT

CHANNEL	CHANNEL FREQUENCY (MHz)	EMISSION OF AT EACH ANTENNA PORT (dBm)		TOTAL EMISSION (mW)	TOTAL EMISSION (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)				
2680	2677.474	-26.96	-25.74	0.005	-23.30	-13	PASS
	2676	-21.63	-18.92	0.020	-17.10	-13	PASS
	2675	-25.79	-22.64	0.008	-20.90	-13	PASS
	2674	-31.23	-27.24	0.003	-25.80	-13	PASS
	2673	-36.63	-31.74	0.001	-30.50	-13	PASS
	2672.5	-37.58	-32.94	0.001	-31.70	-13	PASS
	2671.5	-39.84	-35.13	0.000	-33.90	-25	PASS
	2670.5	-43.05	-38.63	0.000	-37.30	-25	PASS

NOTE:

Measure conducted emissions of at each antenna port and add the emissions in linear power units. Emission limits apply to the total of emissions from all outputs.

HIGH CHANNEL-RIGHT

CHANNEL	CHANNEL FREQUENCY (MHz)	EMISSION OF AT EACH ANTENNA PORT (dBm)		TOTAL EMISSION (mW)	TOTAL EMISSION (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)				
2680	2682.526	-26.09	-25.14	0.006	-22.60	-13	PASS
	2684	-19.77	-17.35	0.029	-15.40	-13	PASS
	2685	-23.31	-20.57	0.013	-18.70	-13	PASS
	2686	-28.55	-25.36	0.004	-23.70	-13	PASS
	2687	-34.85	-30.83	0.001	-29.40	-13	PASS
	2687.5	-36.02	-31.97	0.001	-30.50	-13	PASS
	2688.5	-38.79	-34.40	0.000	-33.10	-25	PASS
	2689.5	-40.51	-36.47	0.000	-35.00	-25	PASS

NOTE:

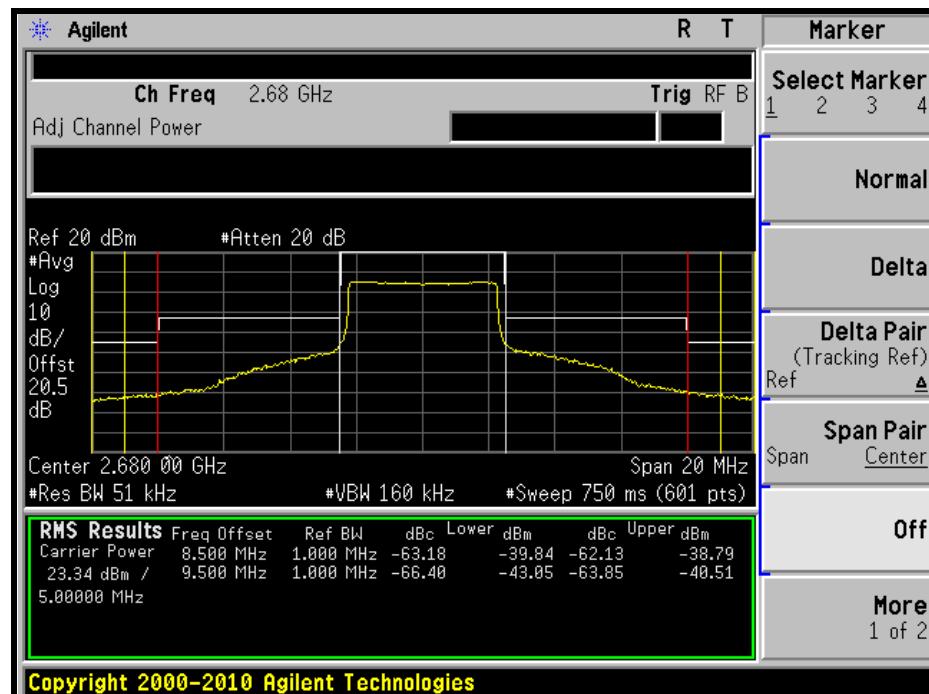
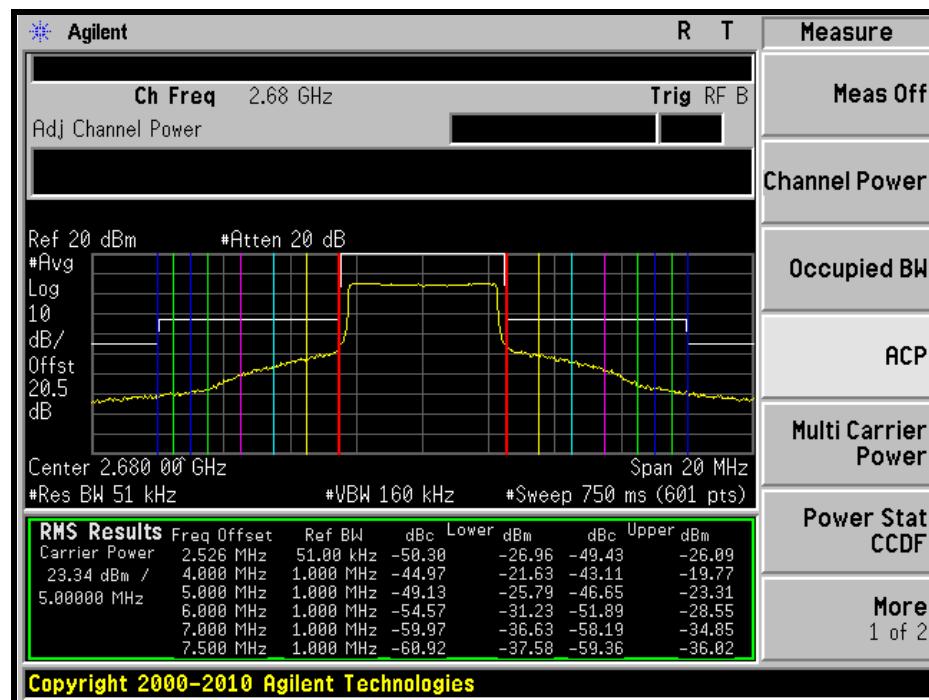
Measure conducted emissions of at each antenna port and add the emissions in linear power units. Emission limits apply to the total of emissions from all outputs.



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CHAIN 0

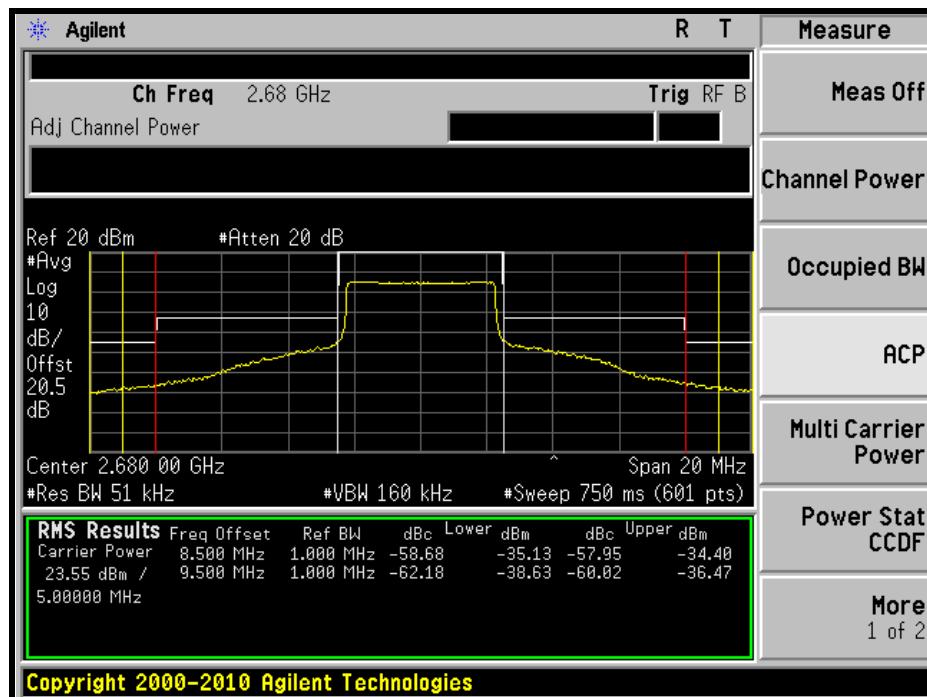
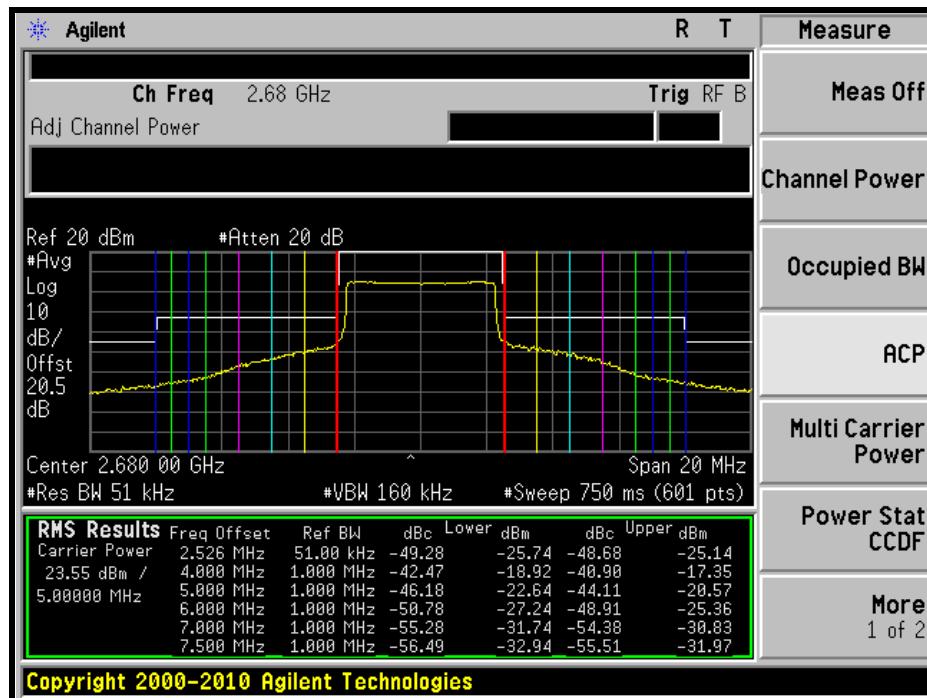
HIGH CHANNEL





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HIGH CHANNEL





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4.4.7 TEST RESULTS(MODE 2)

CHANNEL BANDWIDTH: 10MHz

LOW CHANNEL-LEFT

CHANNEL	EMISSION FREQUENCY (MHz)	EMISSION OF AT EACH ANTENNA PORT (dBm)		TOTAL EMISSION (mW)	TOTAL EMISSION (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)				
2505	2499.95	-32.03	-30.48	0.002	-28.20	-13	PASS
	2498.5	-26.97	-24.22	0.006	-22.40	-13	PASS
	2497.5	-28.82	-25.74	0.004	-24.00	-13	PASS
	2496.5	-30.59	-26.87	0.003	-25.30	-13	PASS
	2495.5	-32.33	-28.26	0.002	-26.80	-13	PASS
	2495	-34.06	-30.06	0.001	-28.60	-13	PASS
	2494	-34.96	-33.01	0.001	-30.90	-25	PASS
	2493	-37.57	-35.76	0.000	-33.60	-25	PASS
	2492	-41.53	-40.09	0.000	-37.70	-25	PASS
	2491	-44.19	-43.62	0.000	-40.90	-25	PASS

NOTE:

Measure conducted emissions of at each antenna port and add the emissions in linear power units. Emission limits apply to the total of emissions from all outputs.

LOW CHANNEL-RIGHT

CHANNEL	CHANNEL FREQUENCY (MHz)	EMISSION OF AT EACH ANTENNA PORT (dBm)		TOTAL EMISSION (mW)	TOTAL EMISSION (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)				
2505	2510.05	-30.76	-28.92	0.002	-26.70	-13	PASS
	2511.5	-24.94	-21.95	0.010	-20.20	-13	PASS
	2512.5	-26.10	-22.95	0.008	-21.20	-13	PASS
	2513.5	-27.78	-24.47	0.005	-22.80	-13	PASS
	2514.5	-29.85	-26.65	0.003	-25.00	-13	PASS
	2515	-30.63	-27.74	0.003	-25.90	-13	PASS
	2516	-31.04	-29.15	0.002	-27.00	-25	PASS
	2517	-34.23	-32.45	0.001	-30.20	-25	PASS
	2518	-38.42	-36.99	0.000	-34.60	-25	PASS
	2519	-40.91	-39.86	0.000	-37.30	-25	PASS

NOTE:

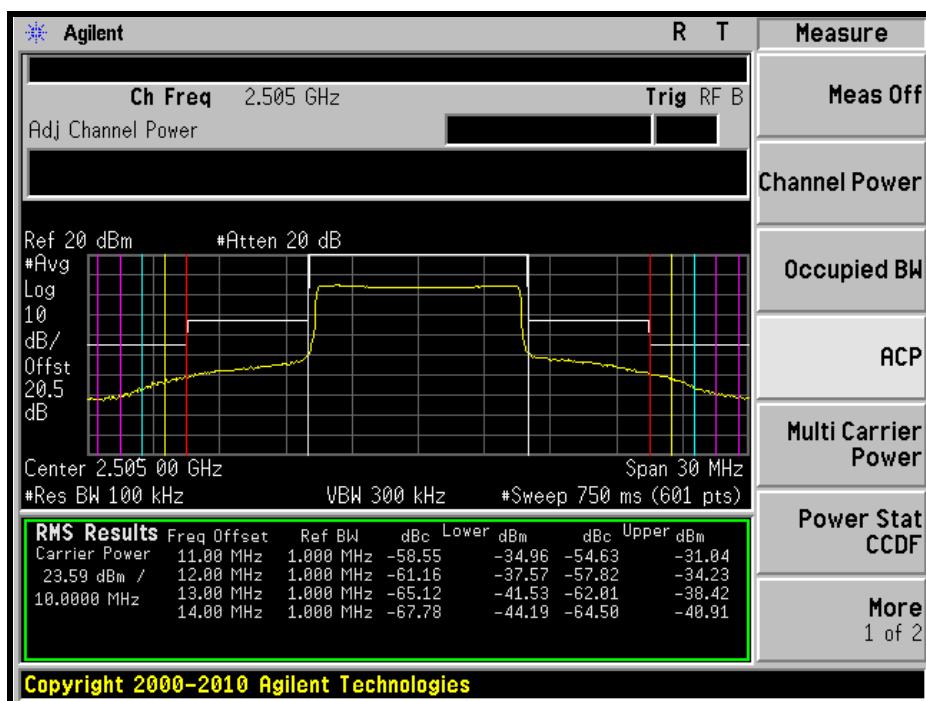
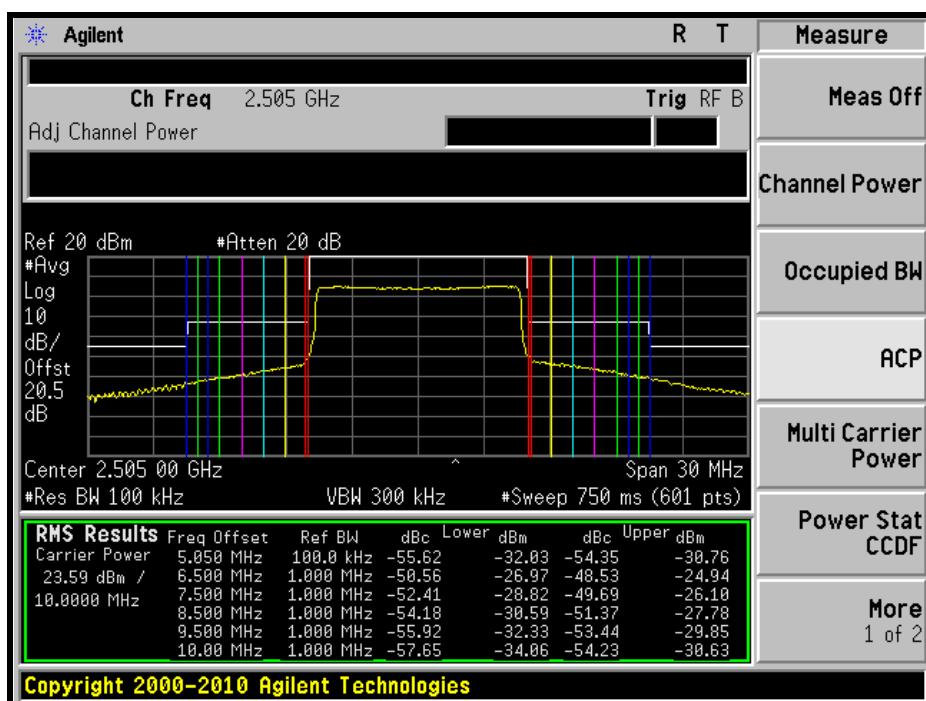
Measure conducted emissions of at each antenna port and add the emissions in linear power units. Emission limits apply to the total of emissions from all outputs.

CHAIN 0

LOW CHANNEL



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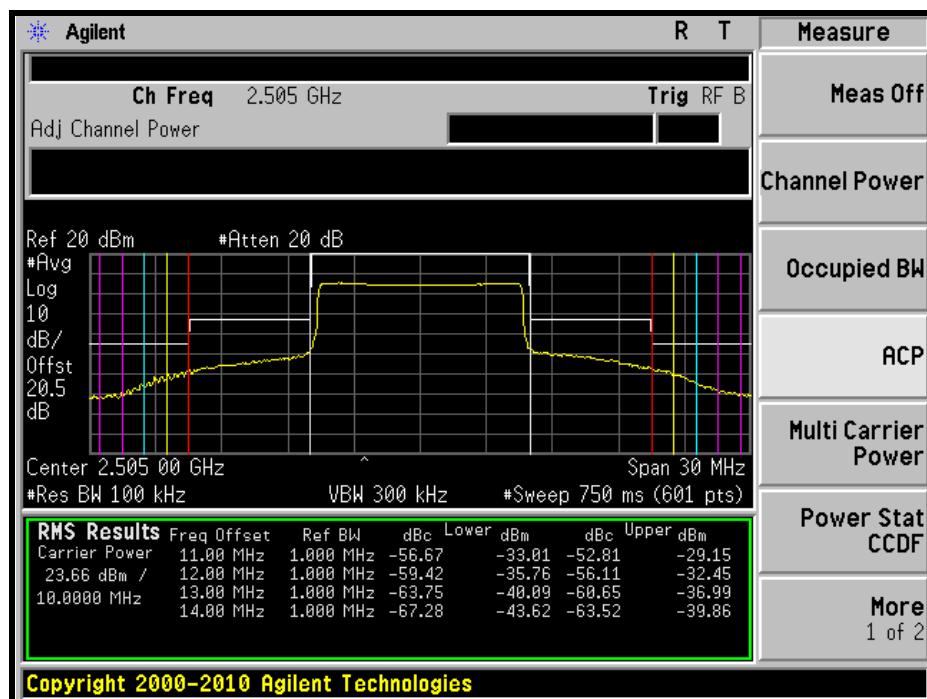
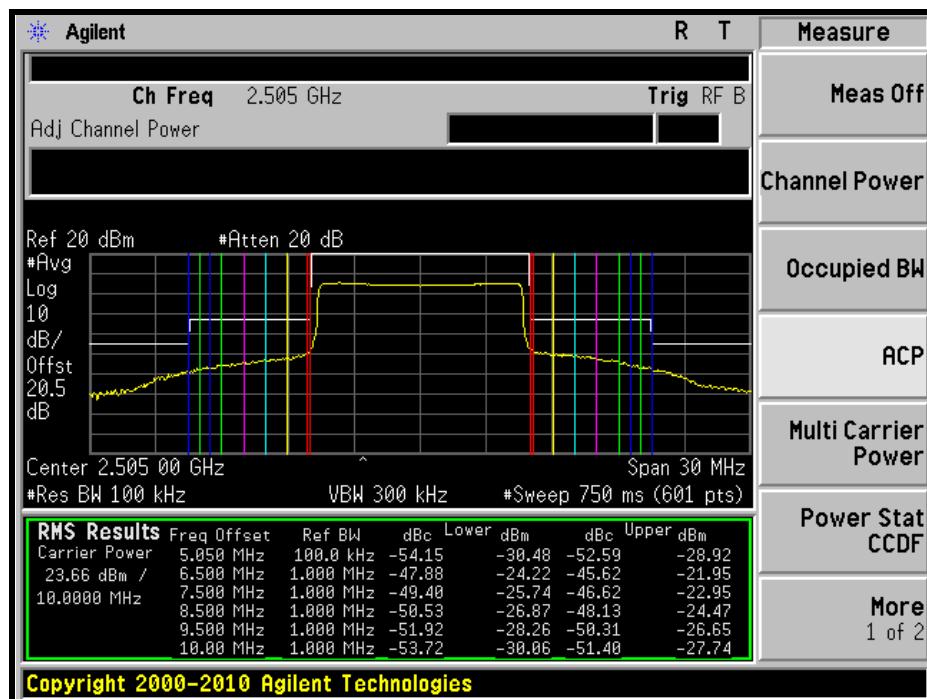




A D T

CHAIN 1

LOW CHANNEL





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MIDDLE CHANNEL-LEFT

CHANNEL	CHANNEL FREQUENCY (MHz)	EMISSION OF AT EACH ANTENNA PORT (dBm)		TOTAL EMISSION (mW)	TOTAL EMISSION (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)				
2590	2584.95	-30.39	-29.97	0.002	-27.20	-13	PASS
	2583.5	-24.97	-23.57	0.008	-21.20	-13	PASS
	2582.5	-26.82	-25.17	0.005	-22.90	-13	PASS
	2581.5	-28.47	-26.66	0.004	-24.50	-13	PASS
	2580.5	-30.92	-28.75	0.002	-26.70	-13	PASS
	2580	-32.86	-30.56	0.001	-28.50	-13	PASS
	2579	-35.76	-36.47	0.000	-33.10	-25	PASS
	2578	-38.03	-38.64	0.000	-35.30	-25	PASS
	2577	-40.61	-40.93	0.000	-37.80	-25	PASS
	2576	-42.38	-42.62	0.000	-39.50	-25	PASS

NOTE:

Measure conducted emissions of at each antenna port and add the emissions in linear power units. Emission limits apply to the total of emissions from all outputs.

MIDDLE CHANNEL-RIGHT

CHANNEL	CHANNEL FREQUENCY (MHz)	EMISSION OF AT EACH ANTENNA PORT (dBm)		TOTAL EMISSION (mW)	TOTAL EMISSION (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)				
2590	2595.05	-29.22	-28.25	0.003	-25.70	-13	PASS
	2596.5	-23.27	-21.36	0.012	-19.20	-13	PASS
	2597.5	-24.46	-22.46	0.009	-20.30	-13	PASS
	2598.5	-26.33	-23.95	0.006	-22.00	-13	PASS
	2599.5	-28.52	-26.17	0.004	-24.20	-13	PASS
	2600	-29.43	-27.19	0.003	-25.20	-13	PASS
	2601	-31.42	-32.09	0.001	-28.70	-25	PASS
	2602	-33.93	-34.60	0.001	-31.20	-25	PASS
	2603	-36.80	-37.35	0.000	-34.10	-25	PASS
	2604	-38.48	-38.82	0.000	-35.60	-25	PASS

NOTE:

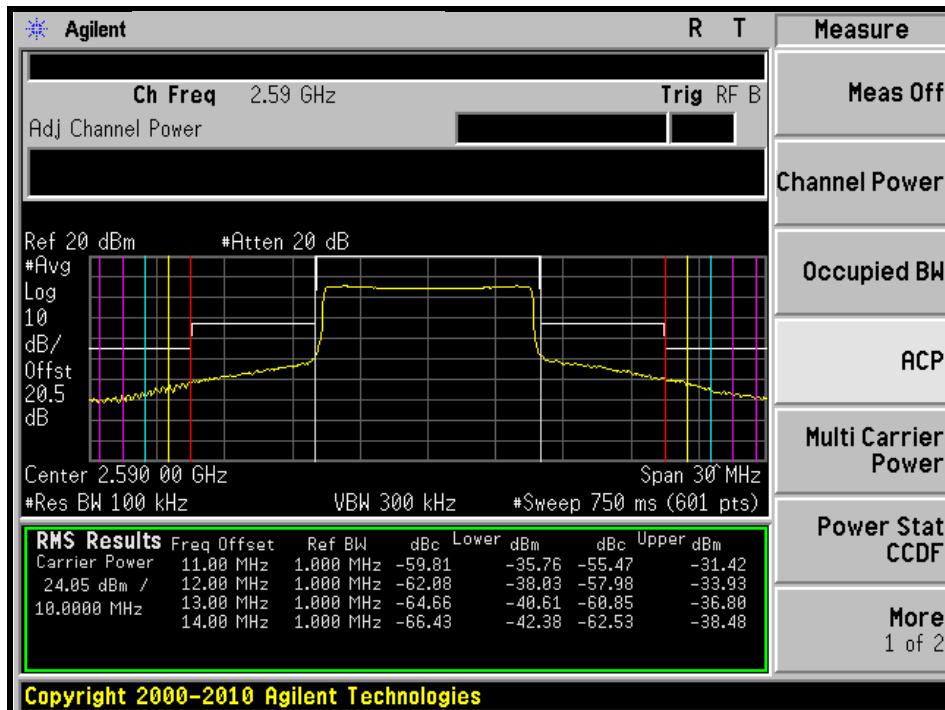
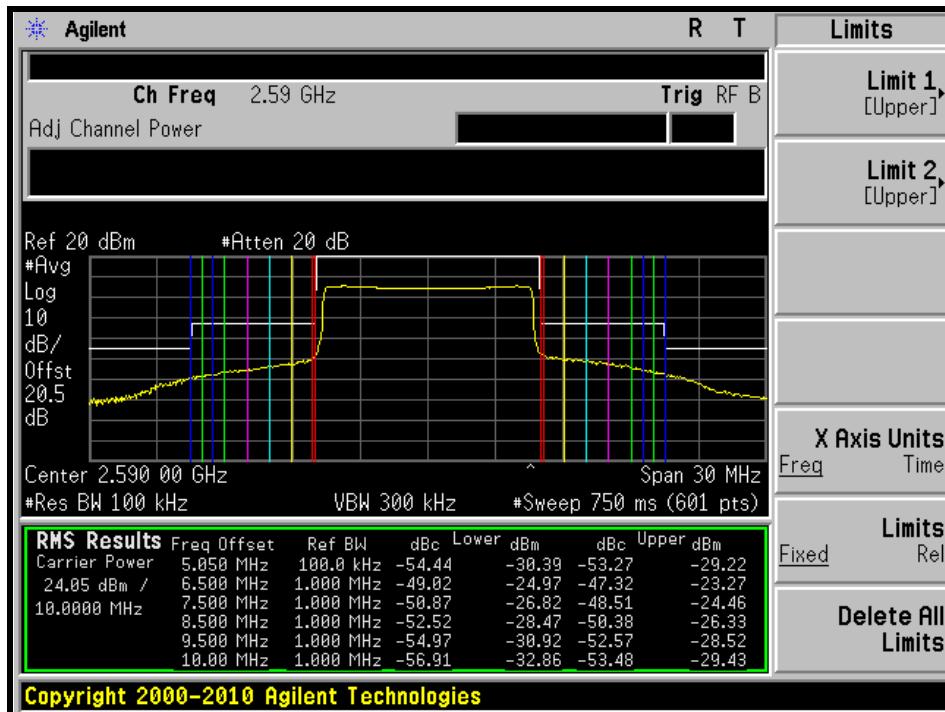
Measure conducted emissions of at each antenna port and add the emissions in linear power units. Emission limits apply to the total of emissions from all outputs.



A D T

CHAIN 0

MIDDLE CHANNEL

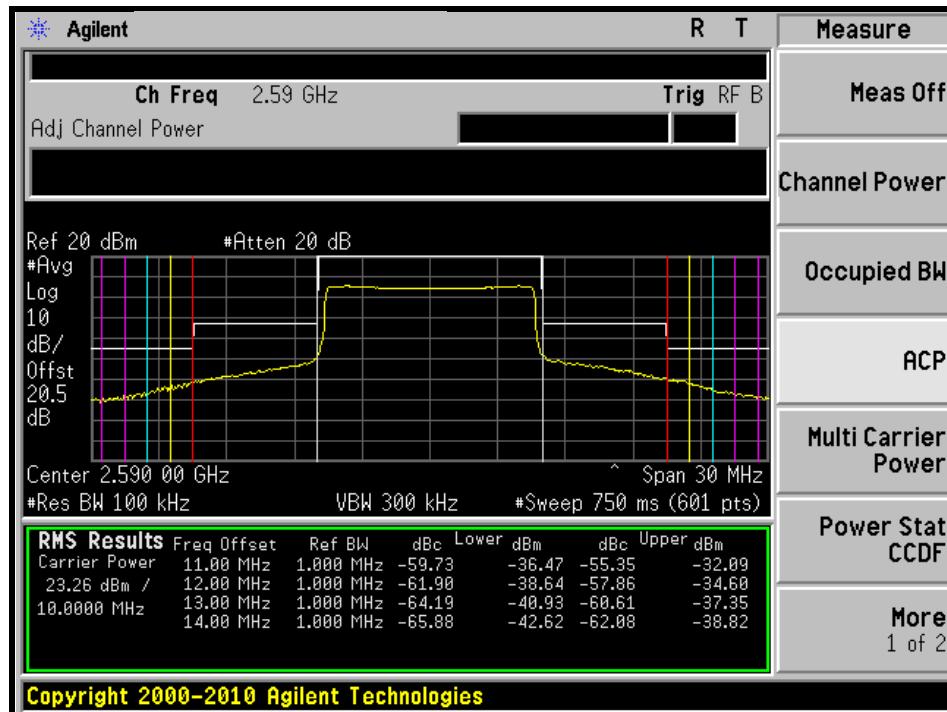
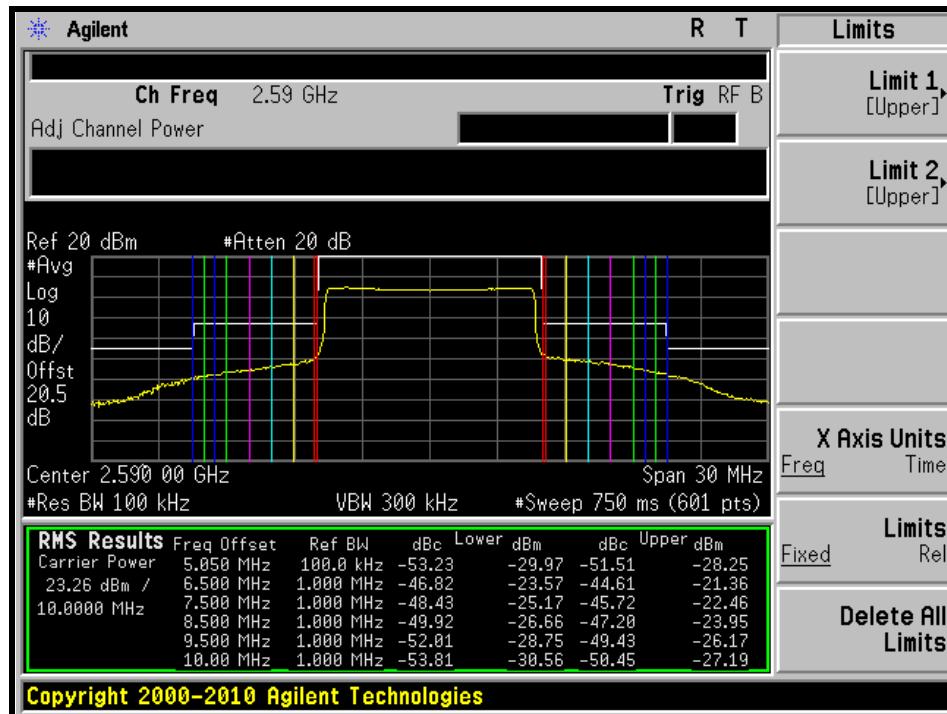




A D T

CHAIN 1

MIDDLE CHANNEL





A D T

HIGH CHANNEL-LEFT

CHANNEL	CHANNEL FREQUENCY (MHz)	EMISSION OF AT EACH ANTENNA PORT (dBm)		TOTAL EMISSION (mW)	TOTAL EMISSION (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)				
2685	2679.95	-30.07	-26.90	0.003	-25.20	-13	PASS
	2678.5	-23.79	-19.76	0.015	-18.30	-13	PASS
	2677.5	-25.50	-21.27	0.010	-19.90	-13	PASS
	2676.5	-26.98	-22.69	0.007	-21.30	-13	PASS
	2675.5	-29.10	-24.25	0.005	-23.00	-13	PASS
	2675	-31.38	-25.71	0.003	-24.70	-13	PASS
	2674	-33.85	-31.63	0.001	-29.60	-25	PASS
	2673	-36.37	-34.07	0.001	-32.10	-25	PASS
	2672	-39.91	-36.68	0.000	-35.00	-25	PASS
	2671	-42.17	-38.66	0.000	-37.10	-25	PASS

NOTE:

Measure conducted emissions of at each antenna port and add the emissions in linear power units. Emission limits apply to the total of emissions from all outputs.

HIGH CHANNEL-RIGHT

CHANNEL	CHANNEL FREQUENCY (MHz)	EMISSION OF AT EACH ANTENNA PORT (dBm)		TOTAL EMISSION (mW)	TOTAL EMISSION (dBm)	MAXIMUM LIMIT (dBm)	PASS / FAIL
		CHAIN(0)	CHAIN(1)				
2685	2690.05	-28.37	-25.98	0.004	-24.00	-13	PASS
	2691.5	-21.68	-18.49	0.021	-16.80	-13	PASS
	2692.5	-22.82	-19.53	0.016	-17.90	-13	PASS
	2693.5	-24.30	-20.94	0.012	-19.30	-13	PASS
	2694.5	-26.37	-22.87	0.007	-21.30	-13	PASS
	2695	-27.40	-23.86	0.006	-22.30	-13	PASS
	2696	-29.68	-27.22	0.003	-25.30	-25	PASS
	2697	-32.64	-29.98	0.002	-28.10	-25	PASS
	2698	-36.59	-33.21	0.001	-31.60	-25	PASS
	2699	-38.97	-35.33	0.000	-33.80	-25	PASS

NOTE:

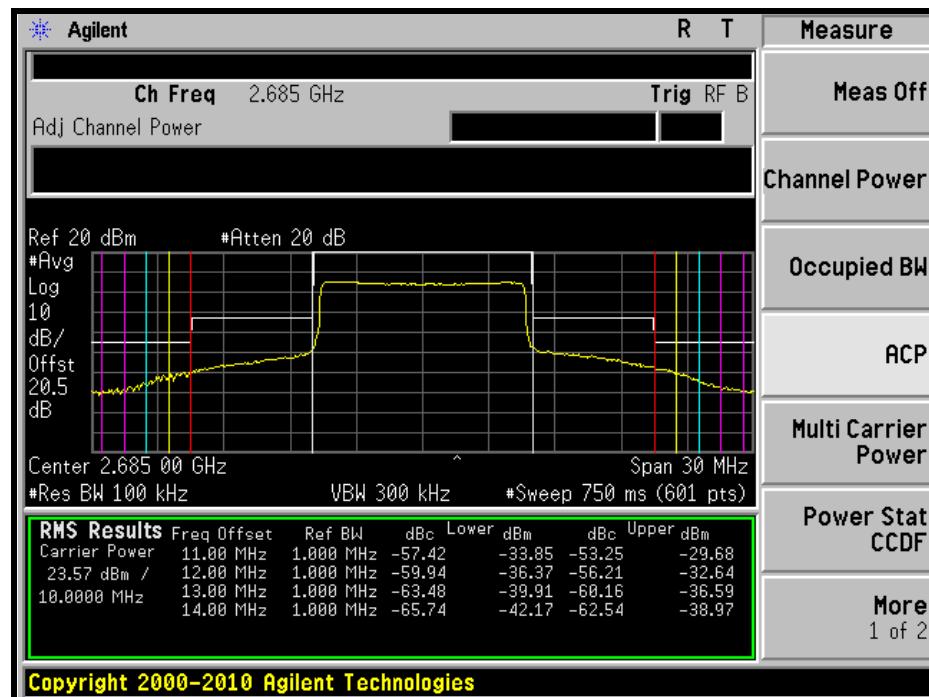
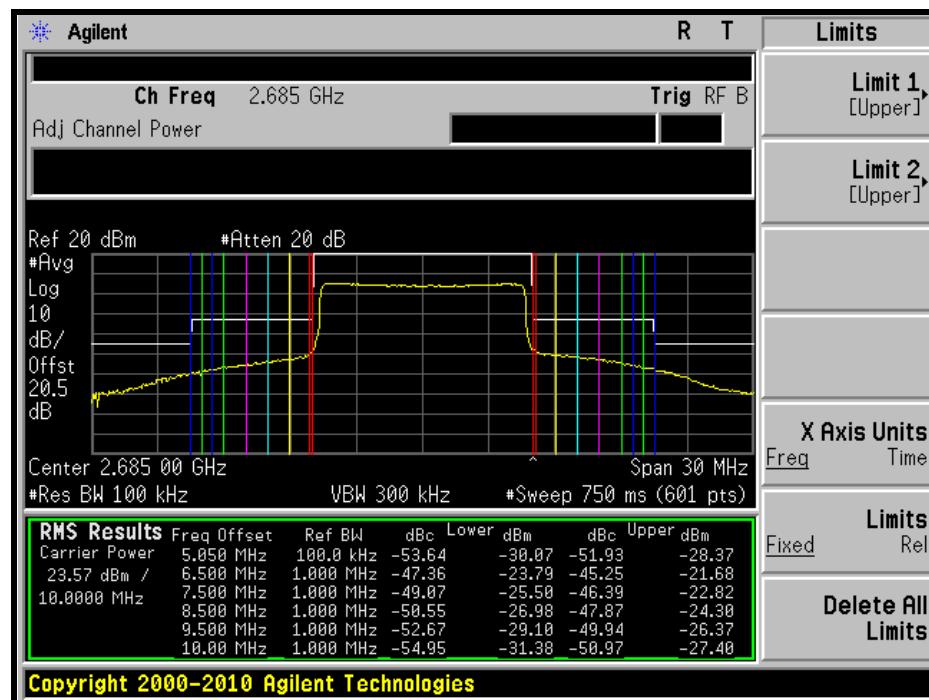
Measure conducted emissions of at each antenna port and add the emissions in linear power units. Emission limits apply to the total of emissions from all outputs.



A D T

CHAIN 0

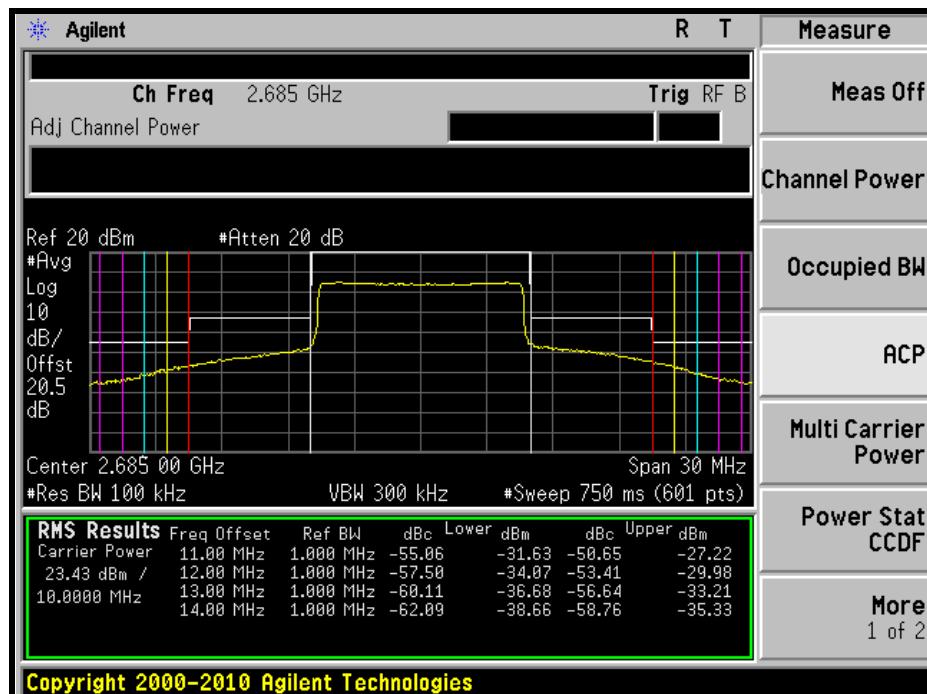
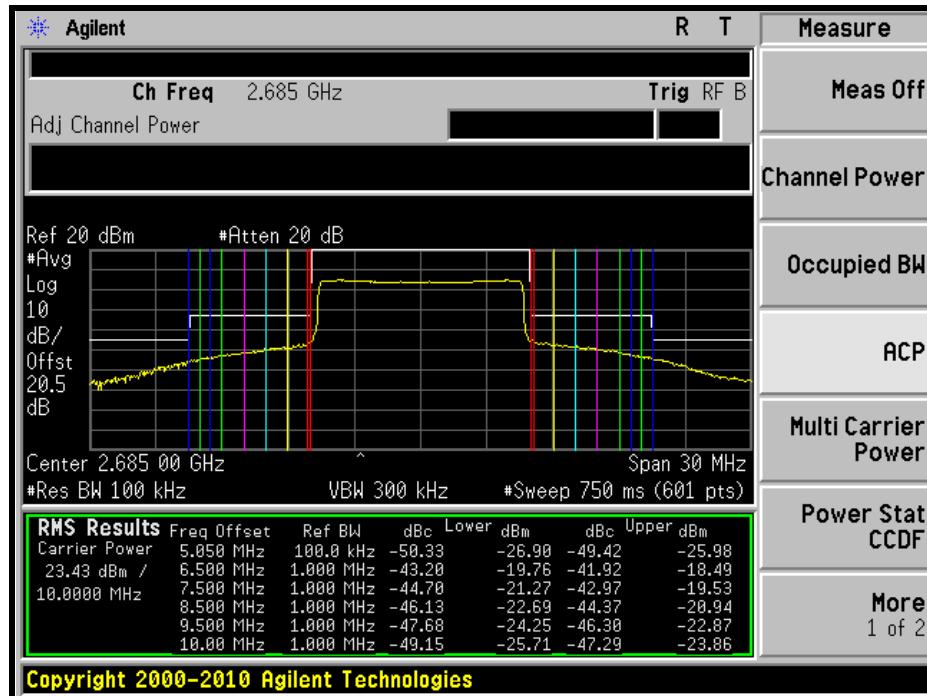
HIGH CHANNEL





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HIGH CHANNEL





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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

Test date: Sep. 28, 2011

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Agilent Spectrum Analyzer	E4446A	MY46180622	Apr. 25, 2011	Apr. 24, 2012
HUBER+SUHNER	SUCOFLEX 104	222689/4	May 17, 2011	May 16, 2012
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.

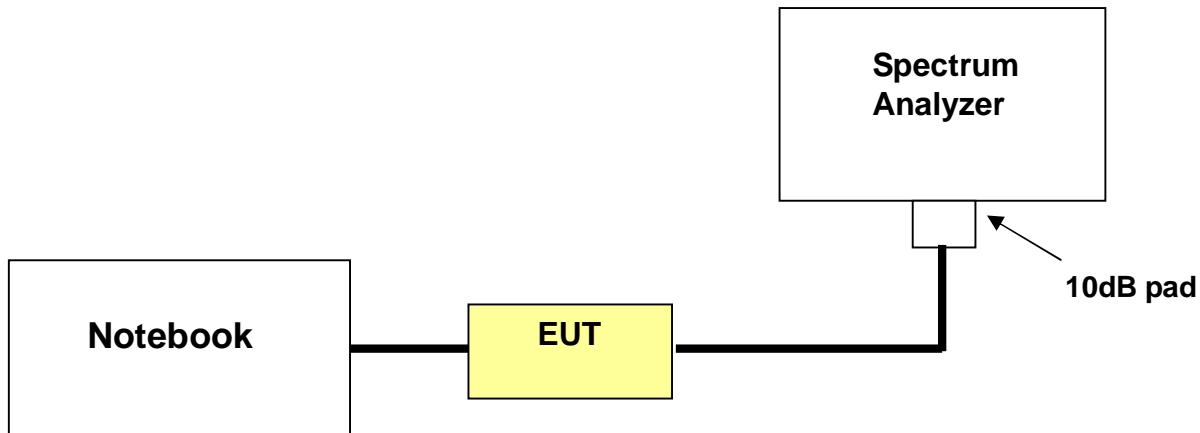


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4.5.3 TEST PROCEDURE

- 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 27GHz, it shall be connected to the 10dB pad 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



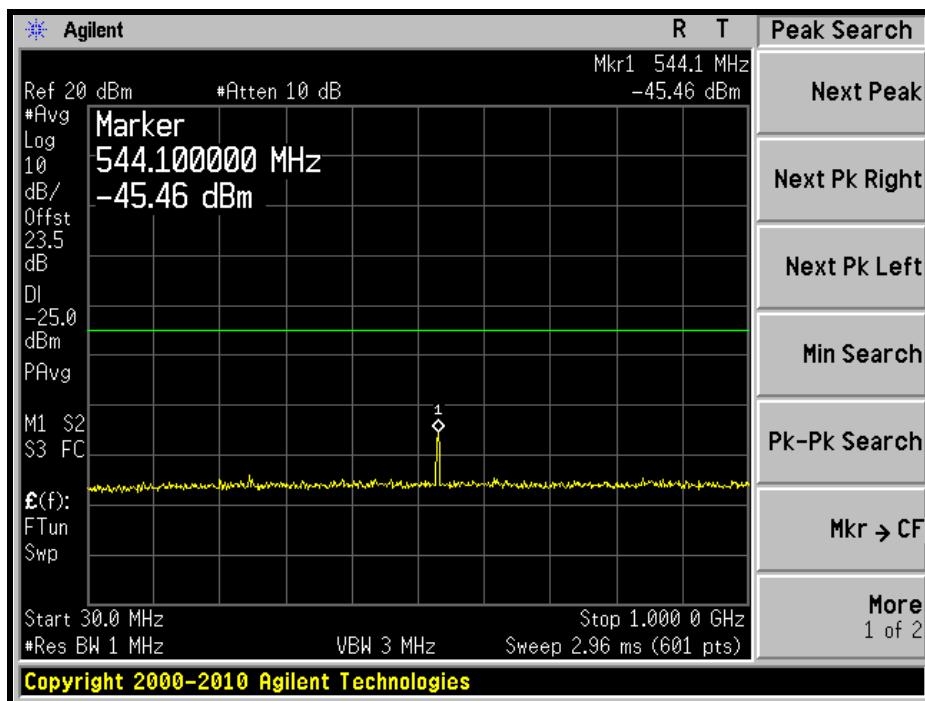
A D T

4.5.6 TEST RESULTS(MODE 1)

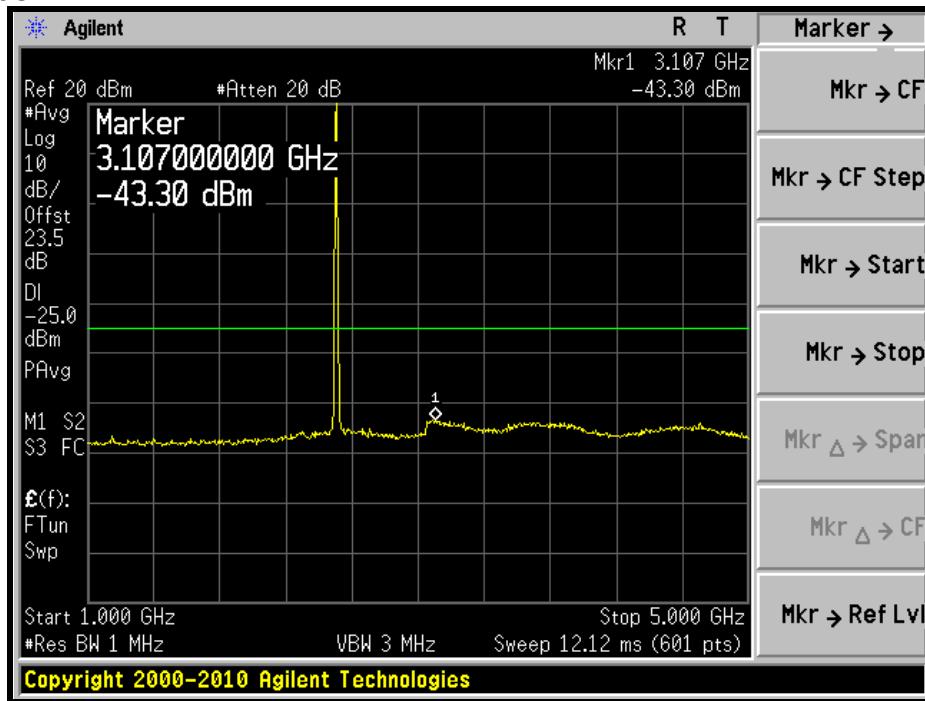
Performing measurements: Measure and add 10 log(N) dB

CHANNEL BANDWIDTH: 5MHz

LOW CHANNEL: 30MHz ~ 1GHz:



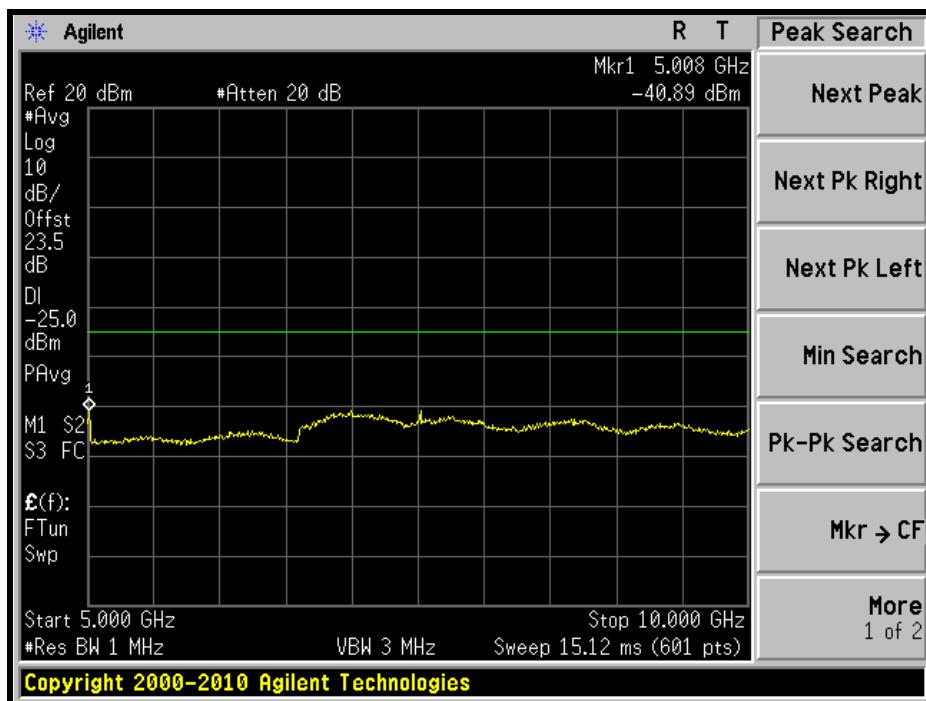
1GHz ~ 5GHz:



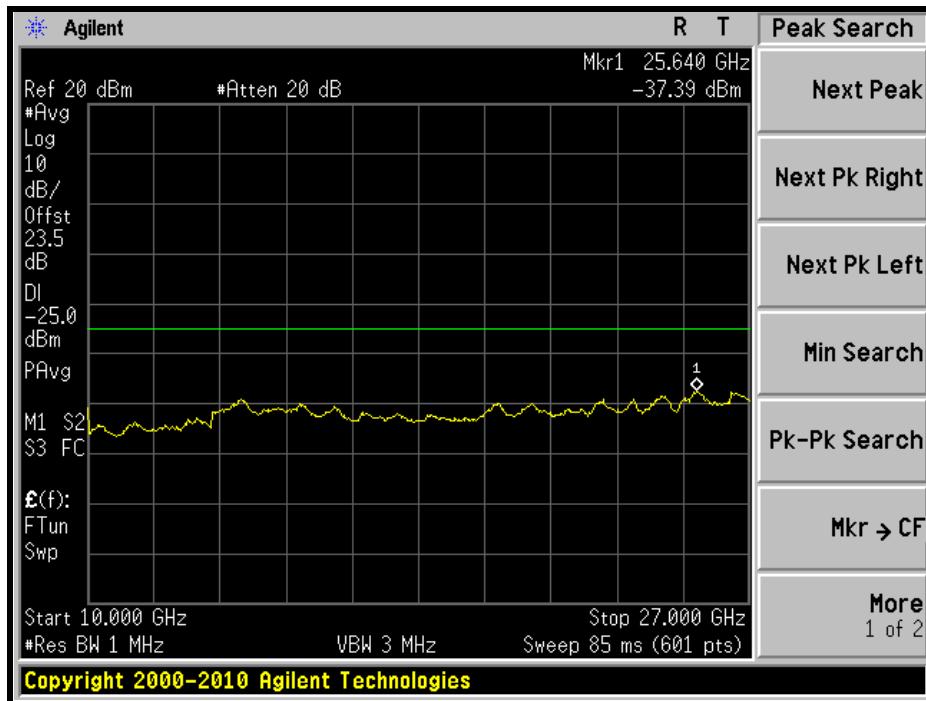


A D T

5GHz ~ 10GHz:



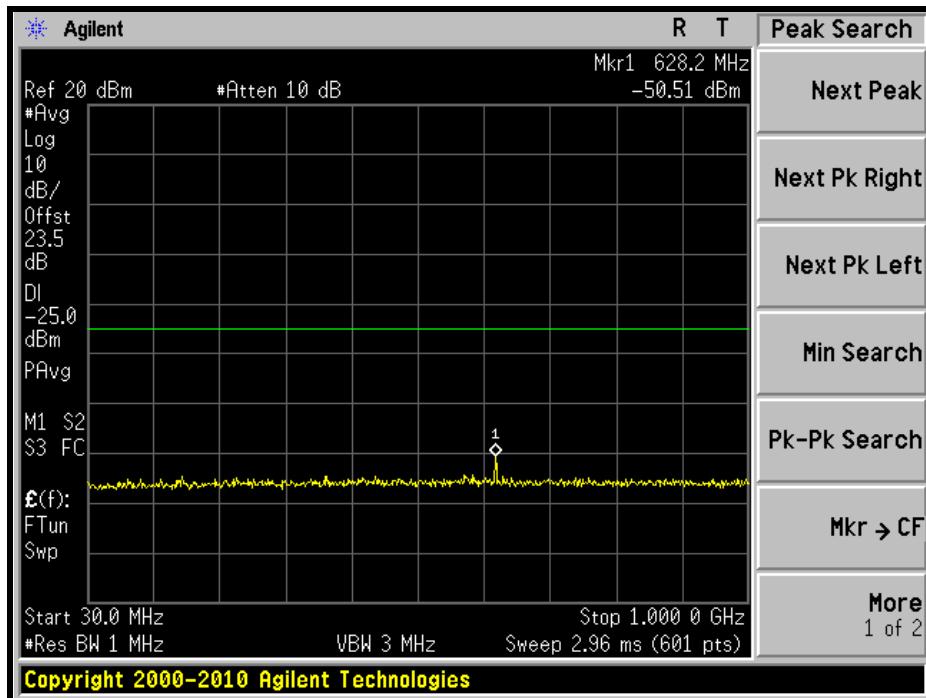
10GHz ~ 27GHz:



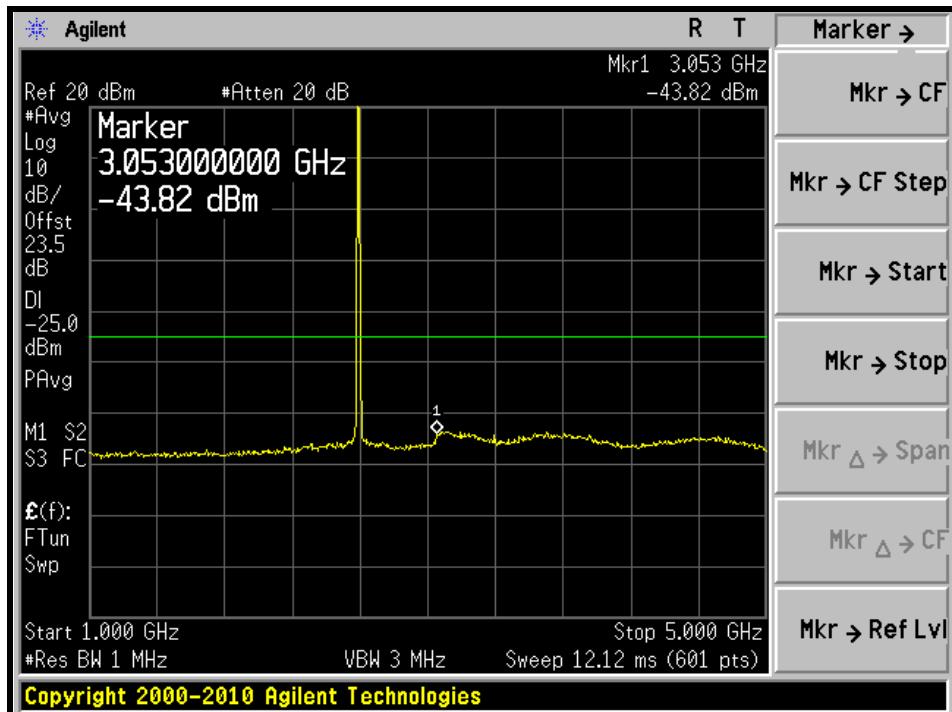


A D T

MIDDLE CHANNEL: 30MHz ~ 1GHz:



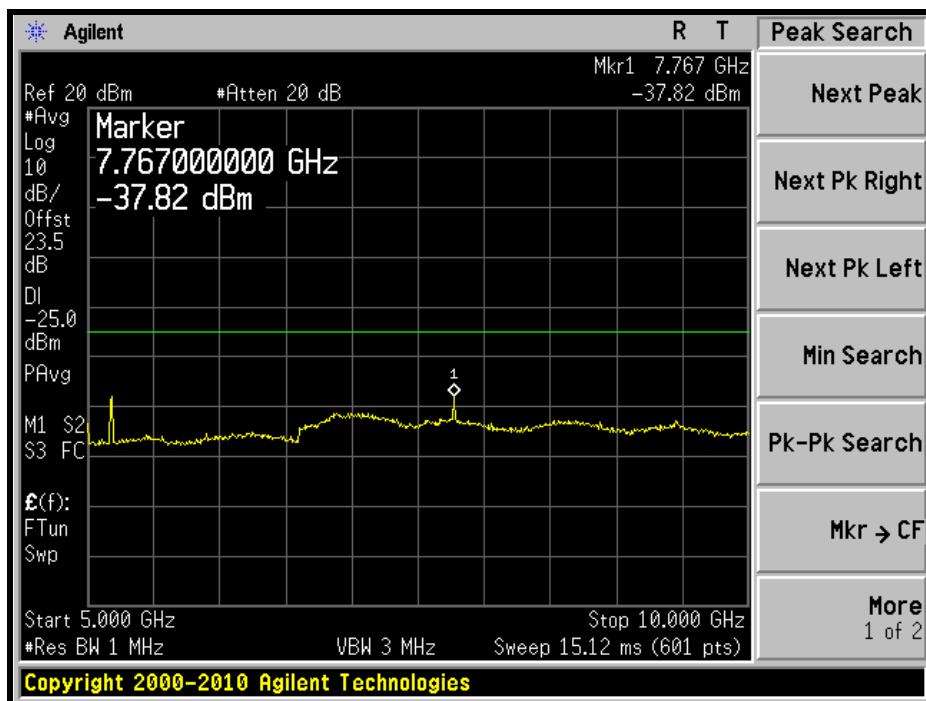
1GHz ~ 5GHz:



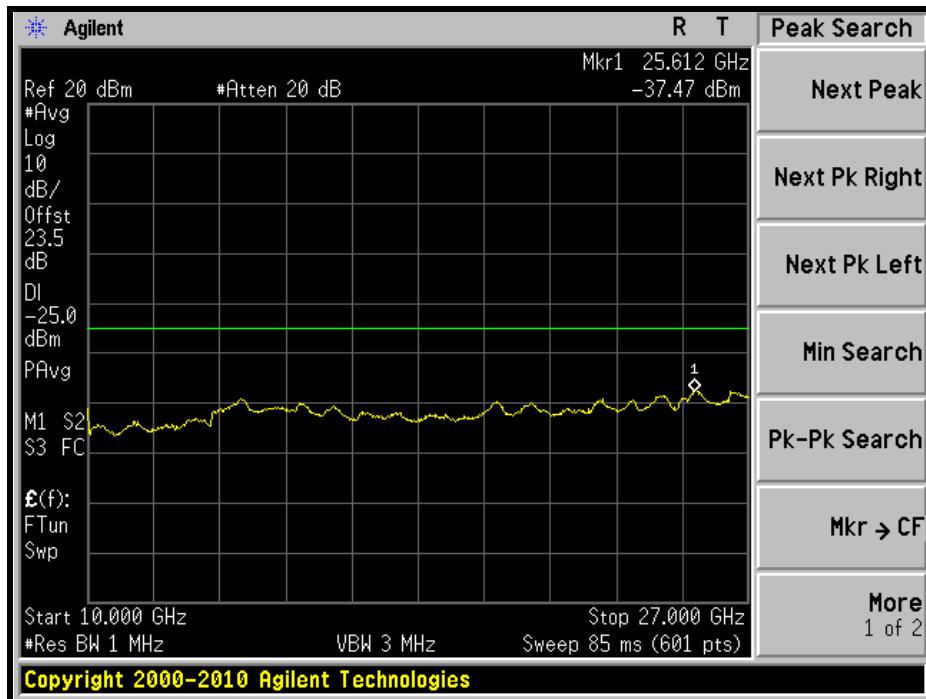


A D T

5GHz ~ 10GHz:

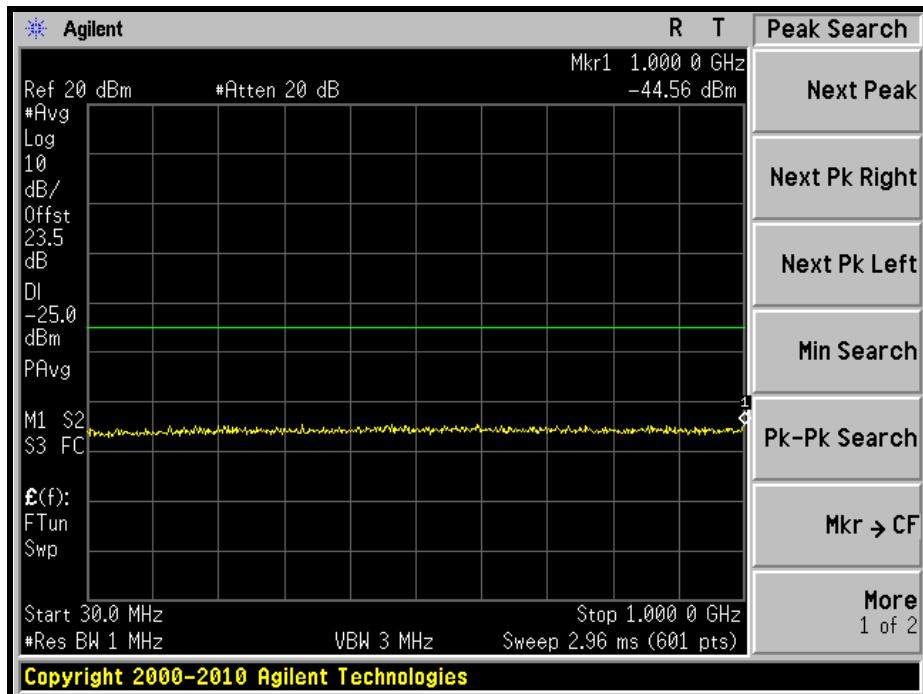
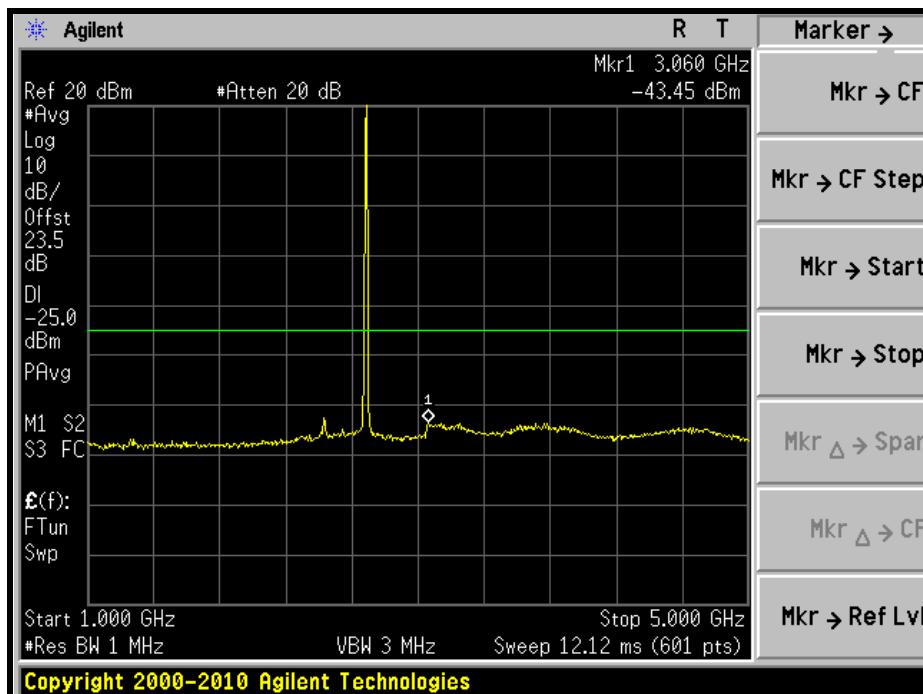


10GHz ~ 27GHz:





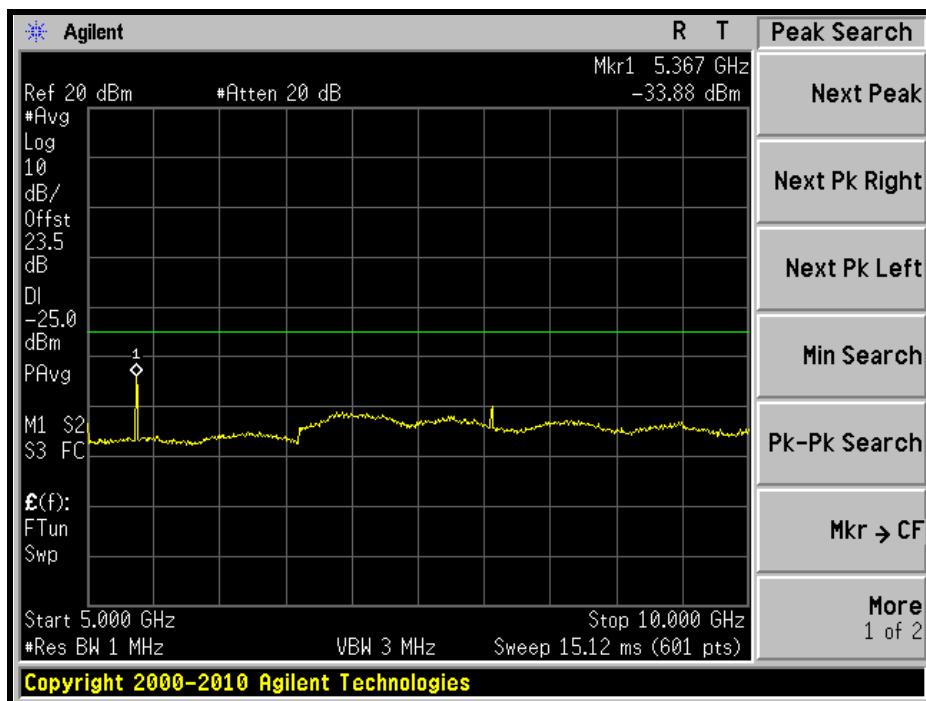
A D T

HIGH CHANNEL: 30MHz ~ 1GHz:**1GHz ~ 5GHz:**

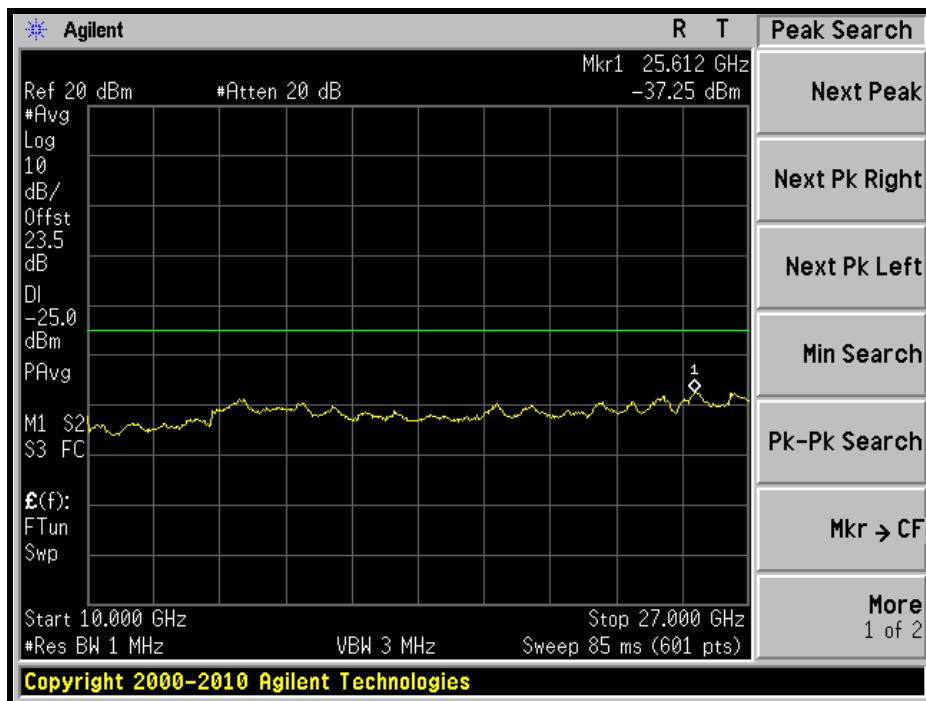


A D T

5GHz ~ 10GHz:



10GHz ~ 27GHz:





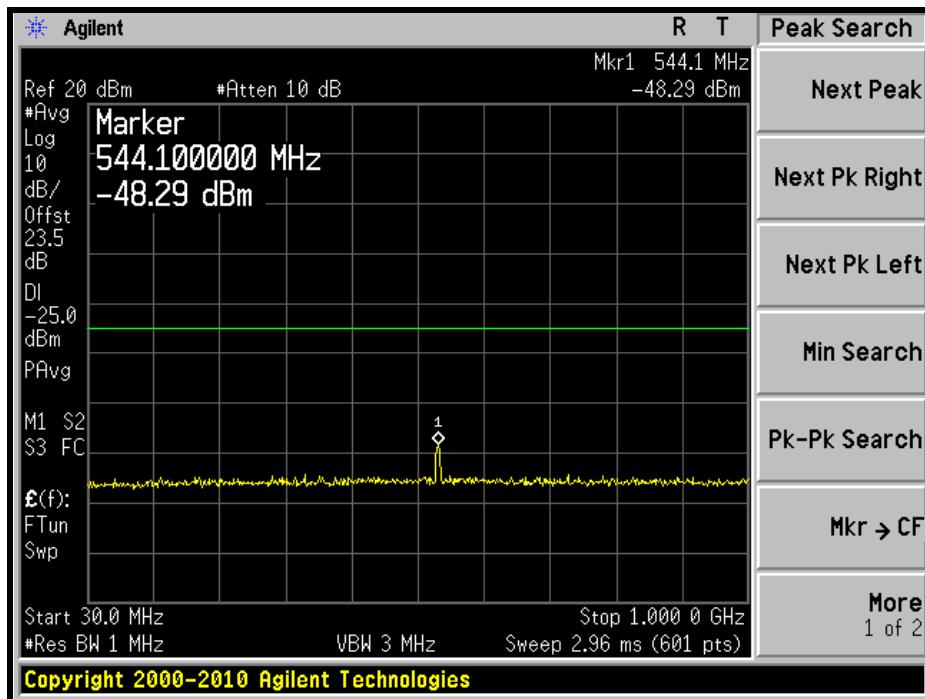
A D T

4.5.7 TEST RESULTS(MODE 2)

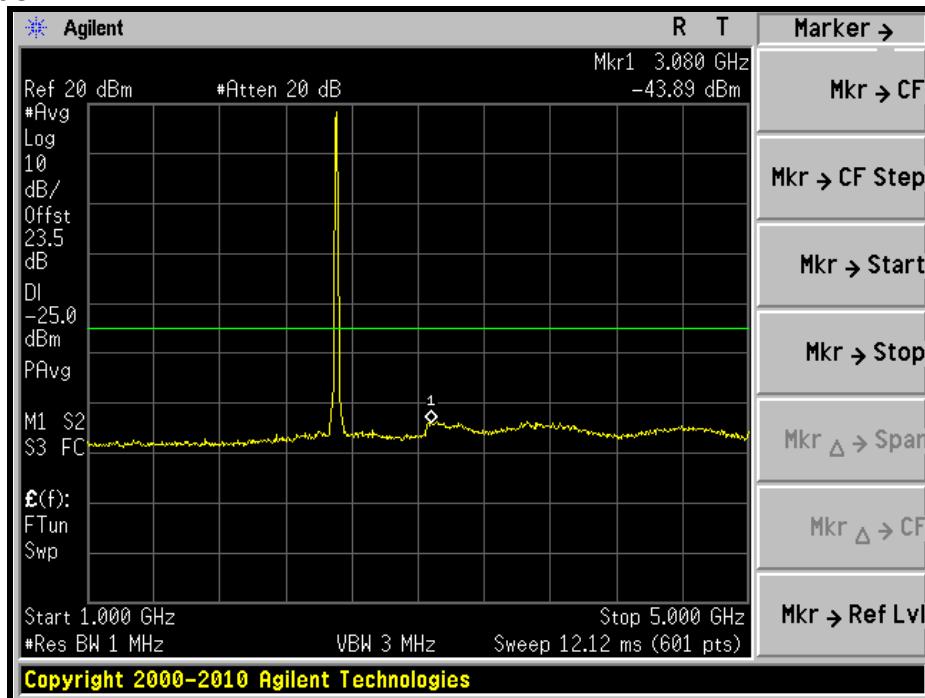
Performing measurements: Measure and add $10 \log(N) \text{ dB}$

CHANNEL BANDWIDTH: 10MHz

LOW CHANNEL: 30MHz ~ 1GHz:



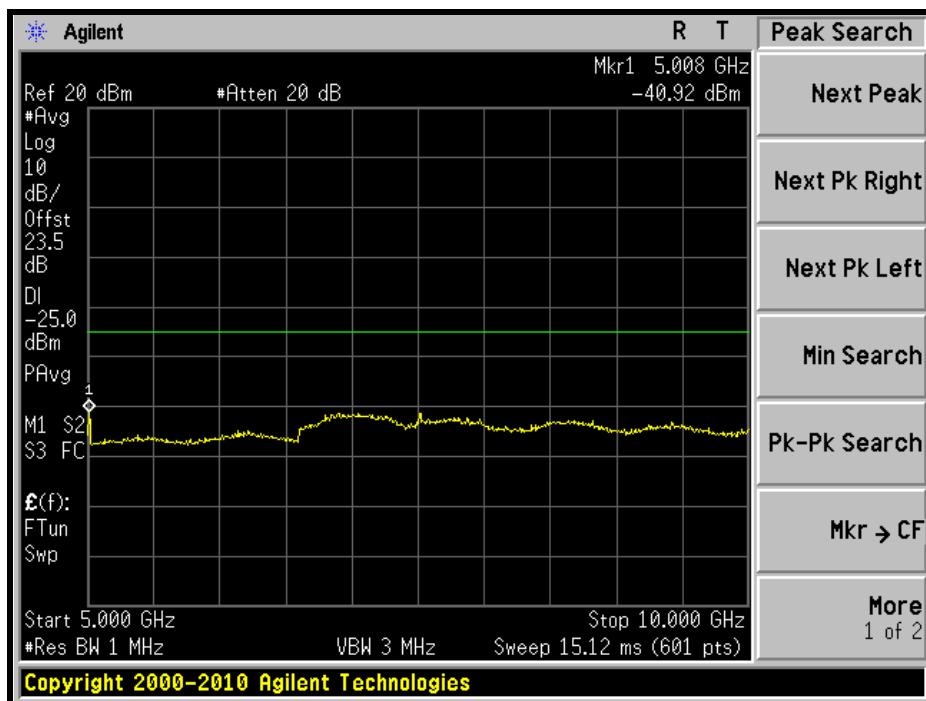
1GHz ~ 5GHz:



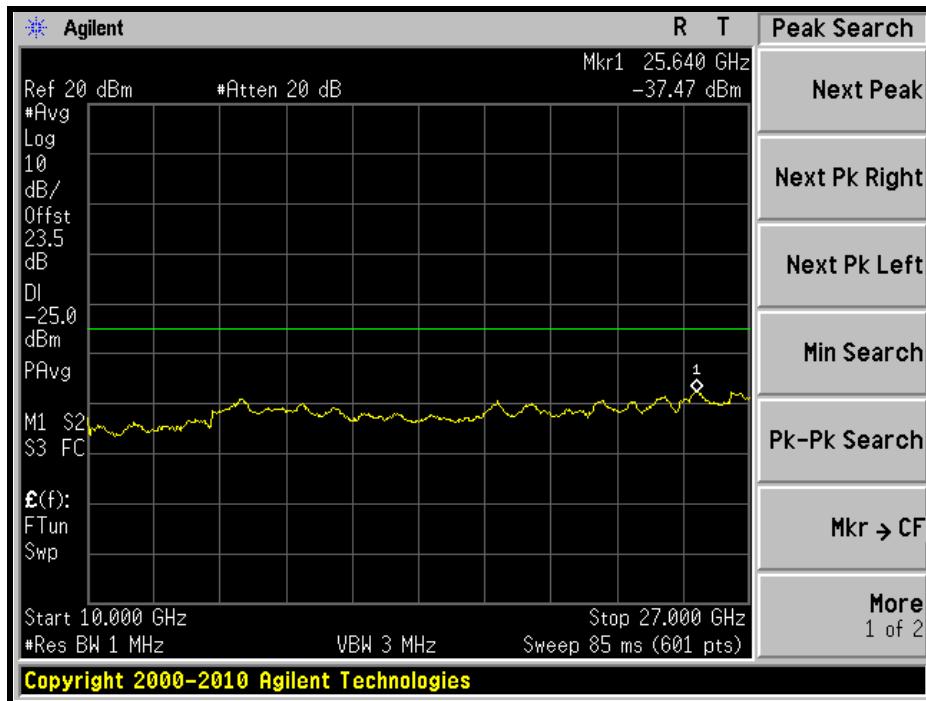


A D T

5GHz ~ 10GHz:



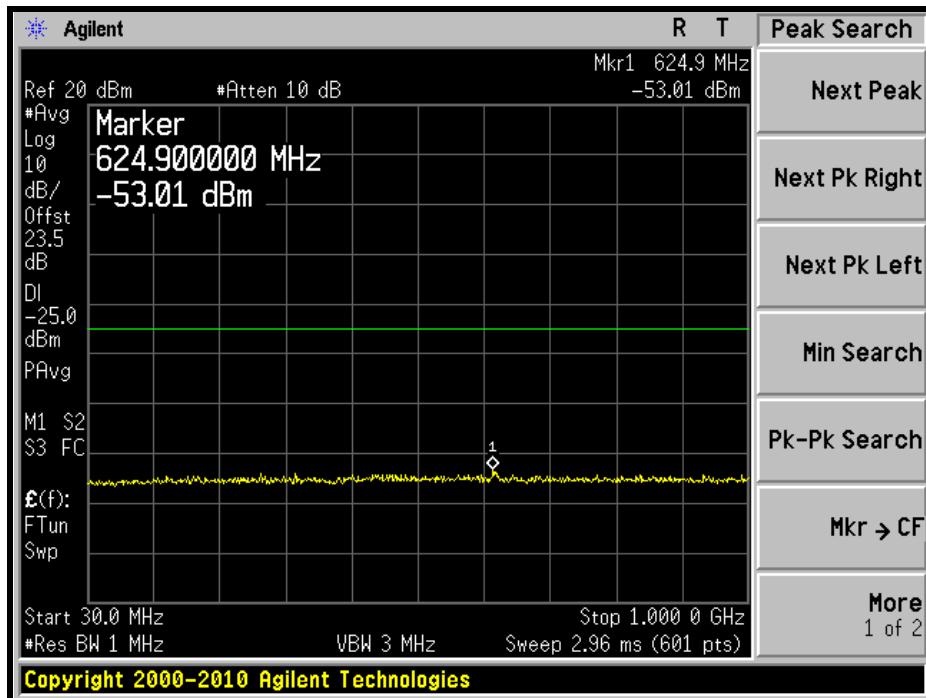
10GHz ~ 27GHz:



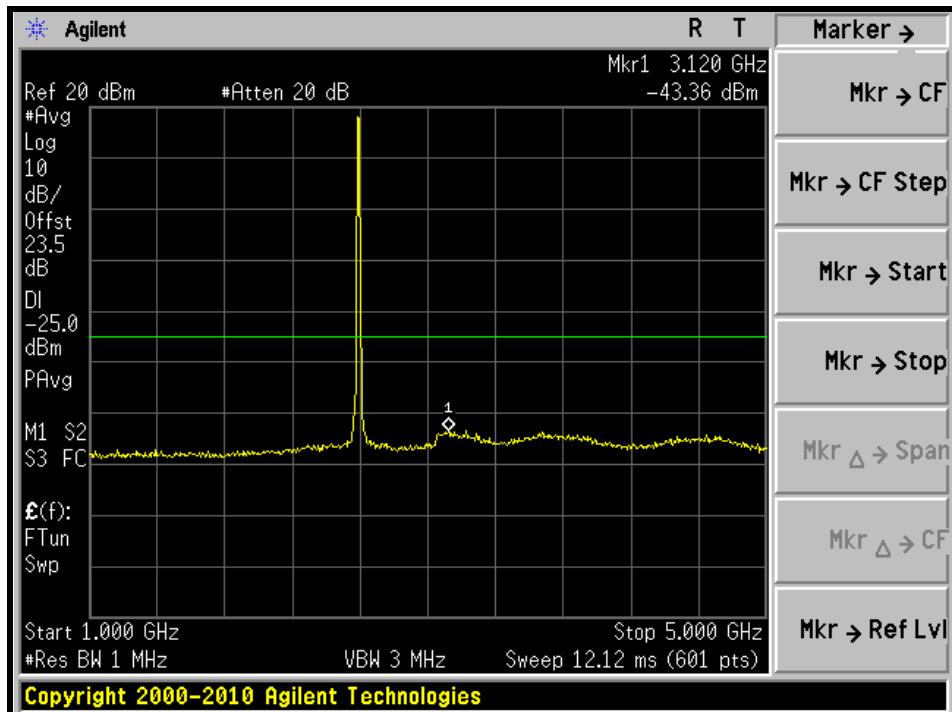


A D T

MIDDLE CHANNEL: 30MHz ~ 1GHz:



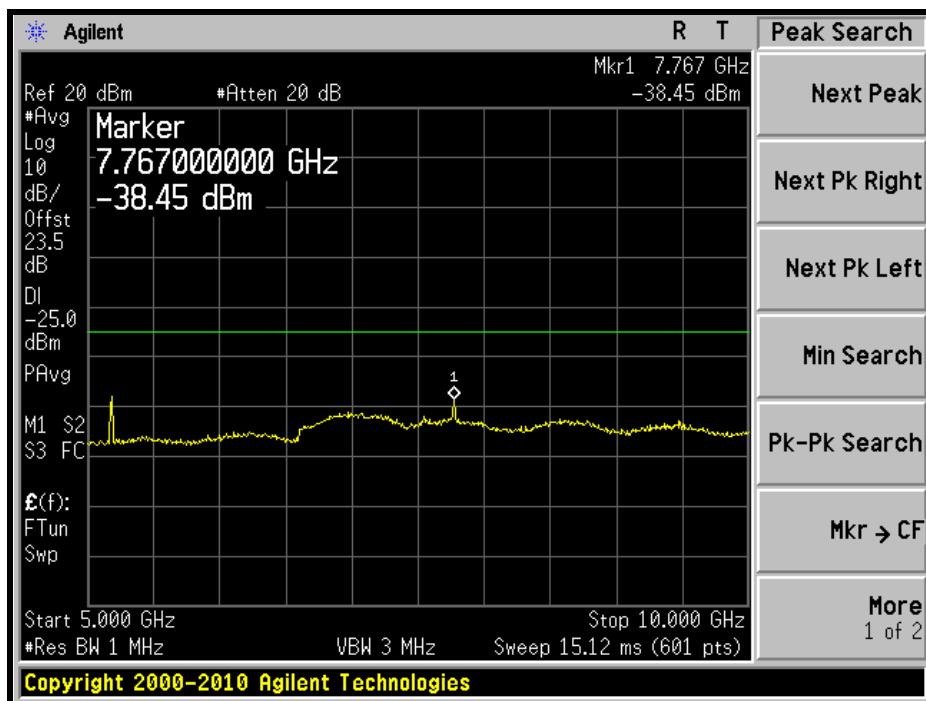
1GHz ~ 5GHz:



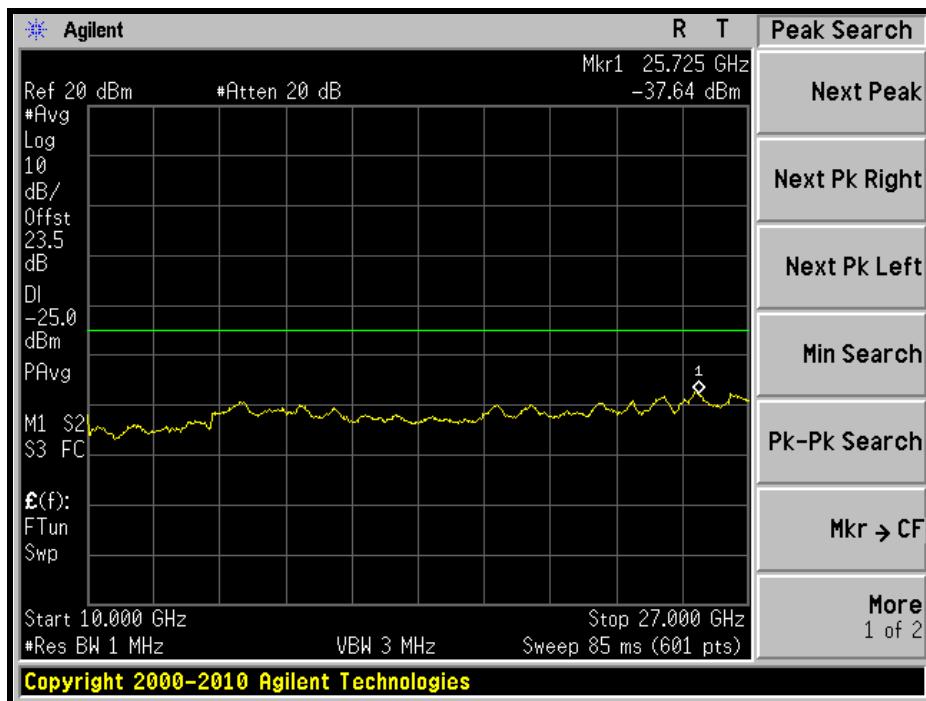


A D T

5GHz ~ 10GHz:

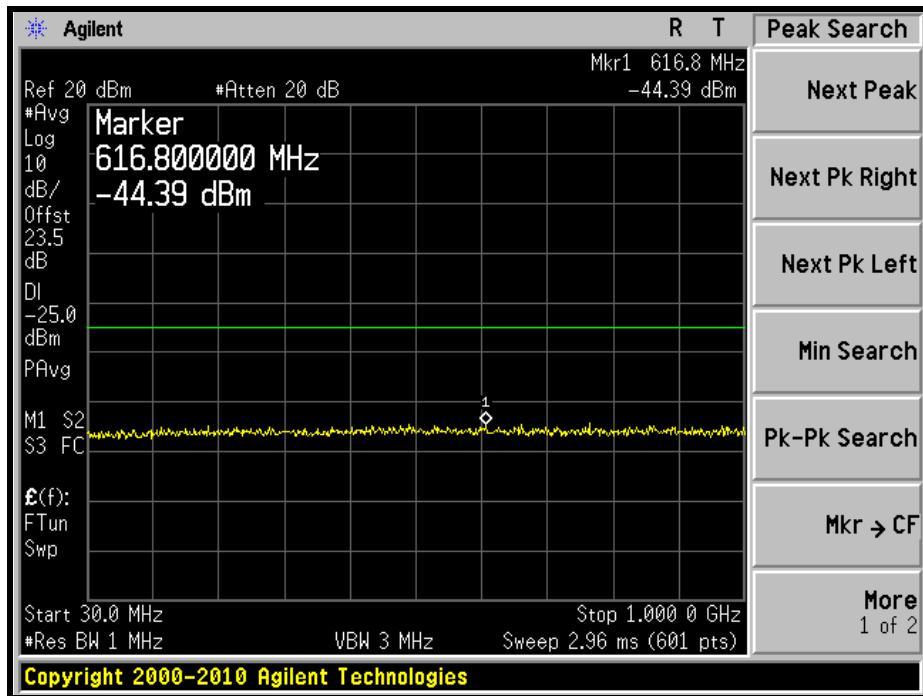
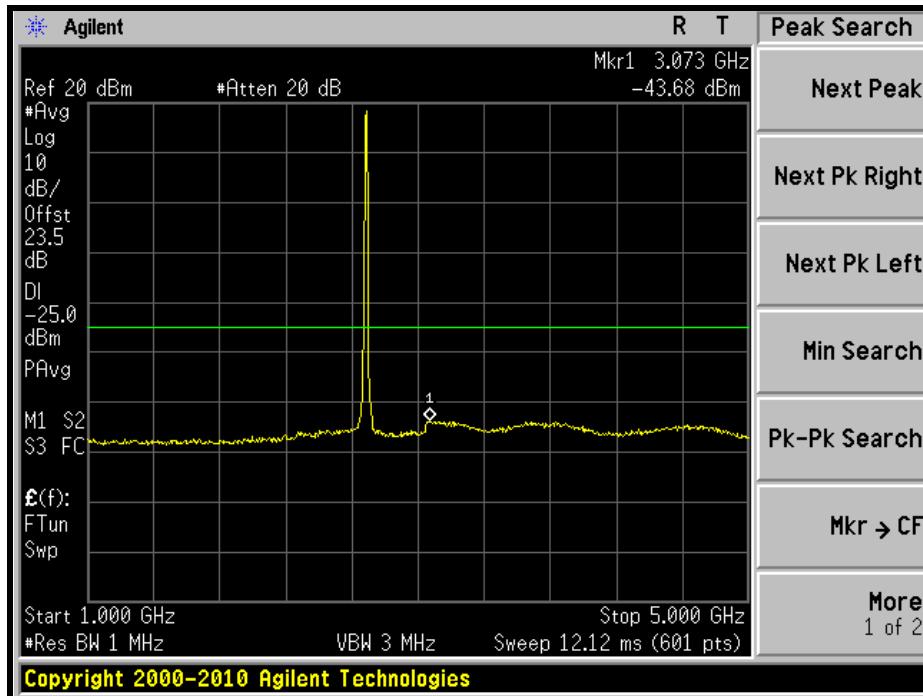


10GHz ~ 27GHz:





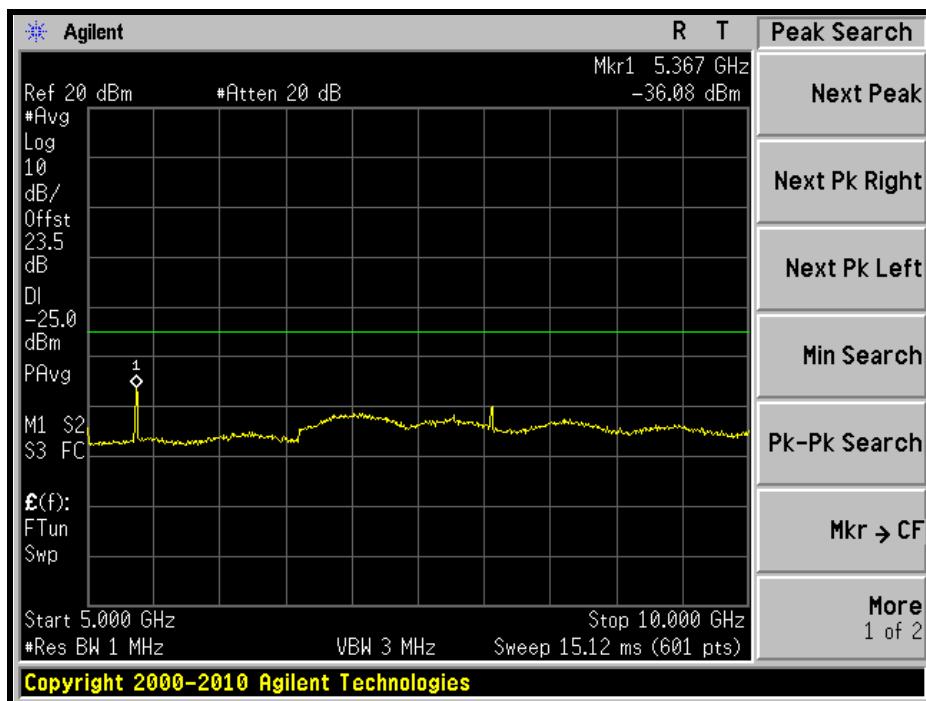
A D T

HIGH CHANNEL: 30MHz ~ 1GHz:**1GHz ~ 5GHz:**

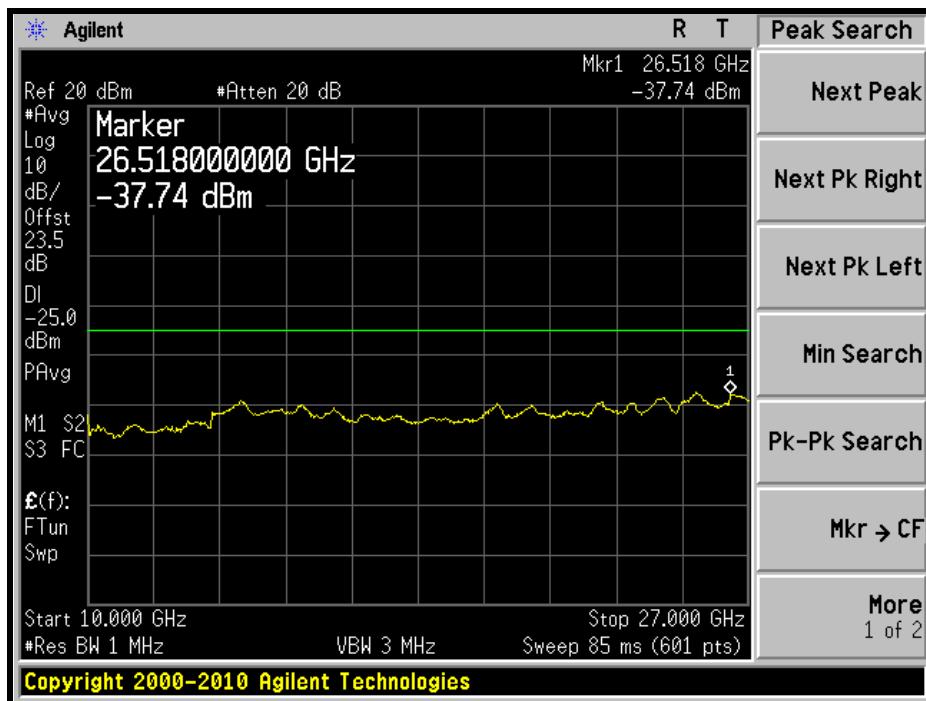


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5GHz ~ 10GHz:



10GHz ~ 27GHz:





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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 $43 + 10 \log (P) \text{dB}$ and $55 + 10 \log (P) \text{ dB}$ at 5.5 MHz from the channel edges.

4.6.2 TEST INSTRUMENTS

Test date: Oct. 04, 2011

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
ROHDE & SCHWARZ Spectrum Analyzer	FSP40	100036	Dec. 08, 2010	Dec. 07, 2011
Agilent PSA Spectrum Analyzer	E4446A	MY48250113	Nov. 30 , 2010	Nov. 29 , 2011
HP Pre_Amplifier	8449B	300801923	Nov. 01, 2010	Oct. 31, 2011
ROHDE & SCHWARZ Test Receiver	ESCS30	847124/029	Sep. 02, 2011	Sep. 01, 2012
SCHWARZBECK TRILOG Broadband Antenna	VULB 9168	138	Apr. 14, 2011	Apr. 13, 2012
Schwarzbeck Horn_Antenna	BBHA9120	D124	Dec. 17, 2010	Dec. 16, 2011
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 17, 2011	Jan. 16, 2012
RF Switches	EMH-011	1001	Sep. 24, 2011	Sep. 23, 2012
RF CABLE (Chaintek)	Sucoflex 106	RF106-102	Jan. 27, 2011	Jan. 26, 2012
RF Cable	8DFB	STCCAB-30M-1GHz	Sep. 24, 2011	Sep. 23, 2012
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, 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.



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4.6.3 TEST PROCEDURES

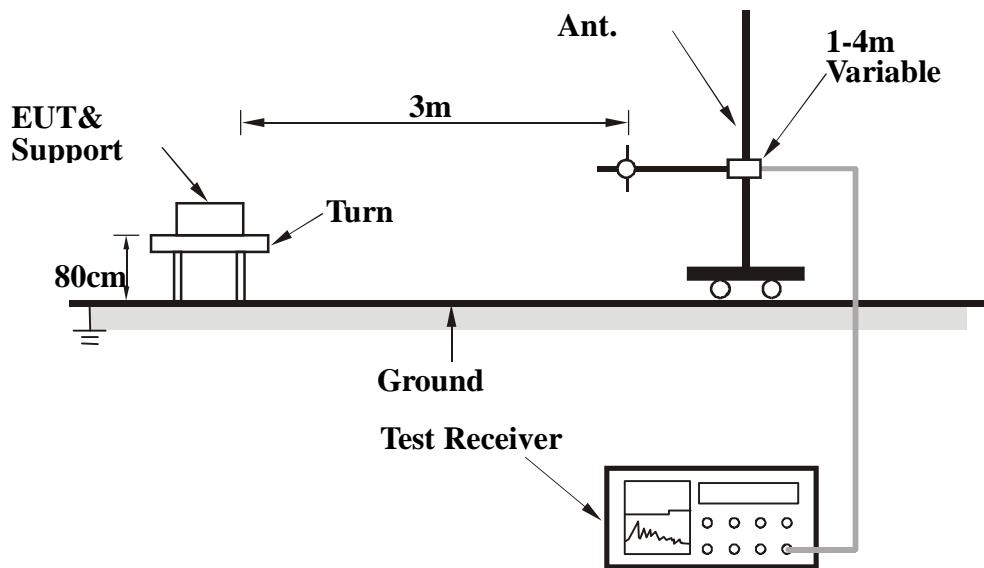
1. The power was measured with Spectrum Analyzer. All measurements were done at 3 channels (low, middle and high channel of operational frequency range.)
2. Substitution method is used for E.I.R.P measurement. In the open area test site, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.
3. The substitution antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a tx cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value ” of step b. Record the power level of S.G
4. $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution antenna}$.

NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/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(MODE 1)

CHANNEL BANDWIDTH: 5MHz

MODE	High channel	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	20deg°C, 60%RH
TESTED BY	Kent 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	43.7	47.01	-25	-29.21	-11.56	-40.77
2	57.45	40.97	-25	-40.23	-8.20	-48.43
3	125.65	45.91	-25	-44.91	-1.22	-46.13
4	131.7	45.41	-25	-46.72	-1.26	-47.98
5	182.85	41.82	-25	-52.21	2.49	-49.72
6	185.6	40.69	-25	-53.58	2.79	-50.79
7	208.7	38.93	-25	-56.53	4.23	-52.30
8	221.35	37.21	-25	-58.88	3.67	-55.21
9	818	27.98	-25	-69.28	1.37	-67.91
10	851.6	29.54	-25	-65.24	1.01	-64.23

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	58.55	26.00	-25	-55.60	-7.93	-63.53
2	69	30.73	-25	-56.79	-4.97	-61.76
3	98.15	27.52	-25	-63.47	-0.73	-64.20
4	102	27.00	-25	-63.57	-0.68	-64.25
5	114.65	30.14	-25	-59.75	-1.03	-60.78
6	188.35	25.22	-25	-69.29	3.09	-66.20
7	780.2	23.97	-25	-73.82	1.26	-72.56
8	818	27.67	-25	-69.59	1.37	-68.22
9	829.2	22.70	-25	-73.65	1.25	-72.40
10	851.6	29.29	-25	-65.49	1.01	-64.48

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



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4.6.8 TEST RESULTS(MODE 2)

CHANNEL BANDWIDTH: 10MHz

MODE	Middle channel	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	20deg°C, 60%RH
TESTED BY	Kent Liu		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBm)	S.G level (dBm)	C.F. (dB)	Power level (dBm)
1	43.7	47.22	-25	-29.00	-11.56	-40.56
2	57.45	40.85	-25	-40.35	-8.20	-48.55
3	125.65	45.85	-25	-44.97	-1.22	-46.19
4	131.7	45.49	-25	-46.65	-1.26	-47.90
5	182.85	41.94	-25	-52.10	2.49	-49.60
6	185.6	40.77	-25	-53.50	2.79	-50.71
7	208.7	38.78	-25	-56.68	4.23	-52.45
8	221.35	37.26	-25	-58.82	3.67	-55.16
9	818	27.89	-25	-69.37	1.37	-68.00
10	851.6	29.68	-25	-65.10	1.01	-64.09

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	58.55	26.35	-25	-55.25	-7.93	-63.18
2	69	30.85	-25	-56.67	-4.97	-61.64
3	98.15	27.66	-25	-63.33	-0.73	-64.06
4	102	27.15	-25	-63.42	-0.68	-64.10
5	114.65	30.25	-25	-59.63	-1.03	-60.67
6	188.35	25.33	-25	-69.17	3.09	-66.09
7	780.2	23.89	-25	-73.90	1.26	-72.64
8	818	27.78	-25	-69.48	1.37	-68.11
9	829.2	22.94	-25	-73.41	1.25	-72.16
10	851.6	29.33	-25	-65.45	1.01	-64.44

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



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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 $43 + 10 \log (P) \text{dB}$ and $55 + 10 \log (P) \text{ dB}$ at 5.5 MHz from the channel edges.

4.7.2 TEST INSTRUMENTS

Test date: Oct. 04, 2011

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
ROHDE & SCHWARZ Spectrum Analyzer	FSP40	100036	Dec. 08, 2010	Dec. 07, 2011
Agilent PSA Spectrum Analyzer	E4446A	MY48250113	Nov. 30 , 2010	Nov. 29 , 2011
HP Pre_Amplifier	8449B	300801923	Nov. 01, 2010	Oct. 31, 2011
ROHDE & SCHWARZ Test Receiver	ESCS30	847124/029	Sep. 02, 2011	Sep. 01, 2012
SCHWARZBECK TRILOG Broadband Antenna	VULB 9168	138	Apr. 14, 2011	Apr. 13, 2012
Schwarzbeck Horn_Antenna	BBHA9120	D124	Dec. 17, 2010	Dec. 16, 2011
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 17, 2011	Jan. 16, 2012
RF Switches	EMH-011	1001	Sep. 24, 2011	Sep. 23, 2012
RF CABLE (Chaintek)	Sucoflex 106	RF106-102	Jan. 27, 2011	Jan. 26, 2012
RF Cable	8DFB	STCCAB-30M-1GHz	Sep. 24, 2011	Sep. 23, 2012
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, 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.



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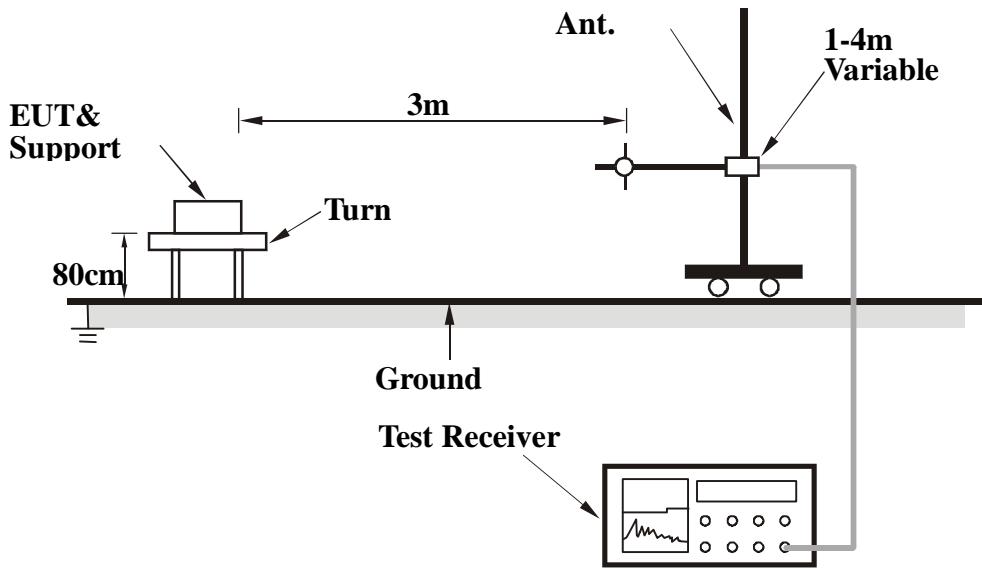
4.7.3 TEST PROCEDURES

1. The power was measured with Spectrum Analyzer. All measurements were done at 3 channels (low, middle and high channel of operational frequency range.)
2. Substitution method is used for E.I.R.P measurement. In the open area test site, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.
3. The substitution antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a tx cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value ” of step b. Record the power level of S.G
4. $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution antenna}$
5. NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/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



A D T

4.7.7 TEST RESULTS(MODE 1)

CHANNEL BANDWIDTH: 5MHz

MODE	Low channel	FREQUENCY RANGE	Above 1000MHz
INPUT POWER	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	20deg°C, 60%RH
TESTED BY	Kent 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	61.3	-25	-42.95	7.01	-35.93
2	7515	60	-25	-42.62	4.53	-38.09

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	63.8	-25	-40.45	7.01	-33.43
2	7515	68.4	-25	-34.22	4.53	-29.69

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	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	20deg°C, 60%RH
TESTED BY	Kent 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	5180	60.3	-25	-44.20	7.05	-37.15
2	7770	64.4	-25	-38.22	4.31	-33.91

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	5180	69.5	-25	-35.00	7.05	-27.95
2	7770	62.7	-25	-39.92	4.31	-35.61

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	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	20deg°C, 60%RH
TESTED BY	Kent 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	5360	67.3	-25	-37.47	7.09	-30.38
2	8040	66.7	-25	-35.92	4.12	-31.80

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	5360	69.4	-25	-35.37	7.09	-28.28
2	8040	67.8	-25	-34.82	4.12	-30.70

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



A D T

4.7.8 TEST RESULTS(MODE 2)

CHANNEL BANDWIDTH: 10MHz

MODE	Low channel	FREQUENCY RANGE	Above 1000MHz
INPUT POWER	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	20deg°C, 60%RH
TESTED BY	Kent 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	58.4	-25	-45.85	7.01	-38.83
2	7515	56.4	-25	-46.22	4.53	-41.69

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	69.4	-25	-34.85	7.01	-27.83
2	7515	66.4	-25	-36.22	4.53	-31.69

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	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	20deg°C, 60%RH
TESTED BY	Kent 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	5180	57.1	-25	-47.40	7.05	-40.35
2	7770	59.9	-25	-42.72	4.31	-38.41

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	5180	66.5	-25	-38.00	7.05	-30.95
2	7770	65.6	-25	-37.02	4.31	-32.71

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	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	20deg°C, 60%RH
TESTED BY	Kent 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	65.7	-25	-39.09	7.09	-31.99
2	8055	64	-25	-38.62	4.13	-34.49

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	64.7	-25	-40.09	7.09	-32.99
2	8055	70.5	-25	-32.12	4.13	-27.99

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 according to ISO/IEC 17025:

Copies of accreditation and authorization certificates of our laboratories obtained from approval agencies can be downloaded from our web site:
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: 886-2-26052943

Hsin Chu EMC/RF Lab:

Tel: 886-3-5935343

Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety/Telecom Lab:

Tel: 886-3-3183232

Fax: 886-3-3185050

Email: service.adt@tw.bureauveritas.com

Web Site: www.adt.com.tw

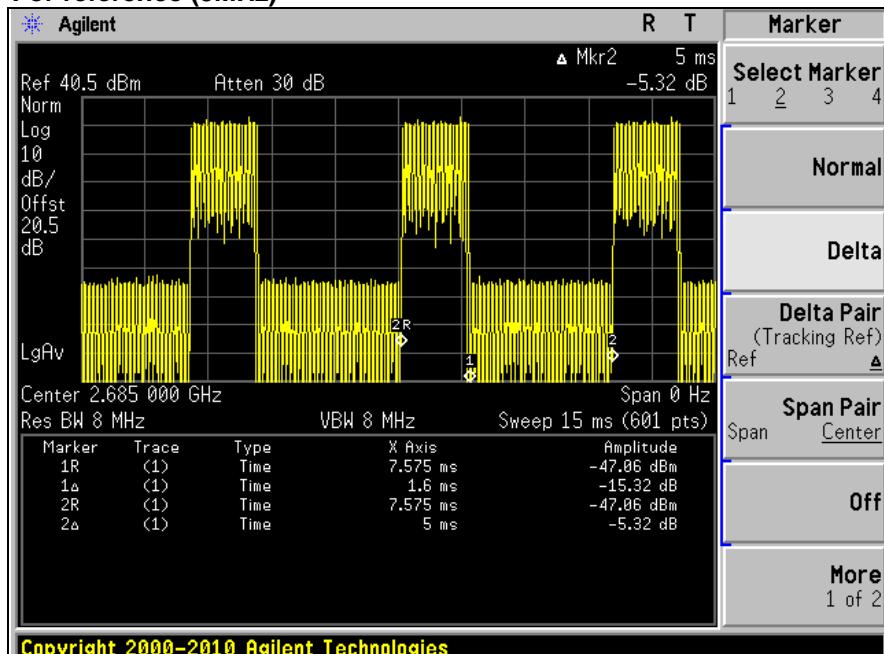
The address and road map of all our labs can be found in our web site also.



A D T

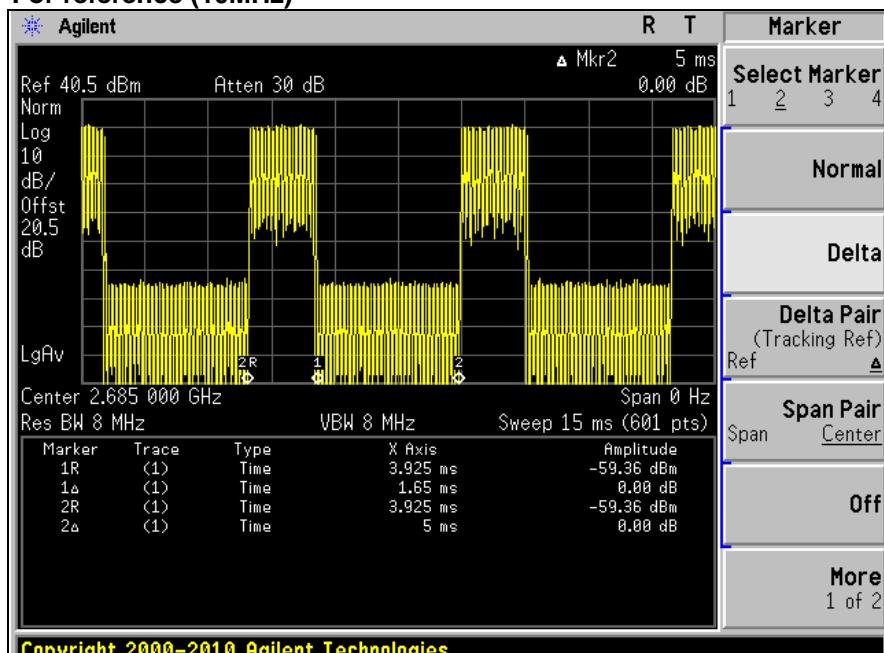
7 APPENDIX - A DL/UL RATION FOR TEST

For reference (5MHz)



$$\text{Ratio} = (1.6 / 5) * \% = 32\%$$

For reference (10MHz)



$$\text{Ratio} = (1.65 / 5) * \% = 33\%$$

--- END ---