

## FCC Report (WIFI)

**Applicant:** Shenzhen Topstar Technology Co., Ltd.

**Address of Applicant:** Room 2417, Sangda Building, Huafa Road 46, Futian District, Shenzhen, China

**Equipment Under Test (EUT)**

Product Name: OPS Computer

Model No.: TOP-H631, TOP-H651, TOP-H632, TOP-H652

**FCC ID:** 2ACM2TOPH651

**Applicable standards:** FCC CFR Title 47 Part 15 Subpart C Section 15.247:2013

**Date of sample receipt:** June 12, 2014

**Date of Test:** June 13-18, 2014

**Date of report issued:** June 23, 2014

**Test Result :** PASS \*

\* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



**Robinson Lo**  
**Laboratory Manager**

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the GTS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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## 2 Version

Version No.	Date	Description
00	June 23, 2014	Original

Prepared By:

*Edward. Pan*

Date:

June 23, 2014

Project Engineer

Check By:

*Hans. Hu*

Date:

June 23, 2014

Reviewer

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## 4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203/15.247 (c)	Pass
AC Power Line Conducted Emission	15.207	Pass
Conducted Peak Output Power	15.247 (b)(3)	Pass
Channel Bandwidth	15.247 (a)(2)	Pass
Power Spectral Density	15.247 (e)	Pass
Band Edge	15.247(d)	Pass
Spurious Emission	15.205/15.209	Pass

*Pass: The EUT complies with the essential requirements in the standard.*

## 5 General Information

### 5.1 Client Information

Applicant:	Shenzhen Topstar Technology Co., Ltd.
Address of Applicant:	Room 2417,Sangda Building, Huaafa Road 46, Futian District, Shenzhen, China
Manufacturer:	Shenzhen Topstar Technology Co., Ltd.
Address of Manufacturer:	Room 2417,Sangda Building, Huaafa Road 46, Futian District, Shenzhen, China
Factory:	Shenzhen Dingyu Technology Co., Ltd Electronics Factory
Address of Factory:	3-4/F, Seven Building, Area B, Hekeng Industry Zone, Langkou Road, Longhua Dalang Community, Baoan District, Shenzhen,China

### 5.2 General Description of EUT

Product Name:	OPS computer
Model No.:	TOP-H631, TOP-H651, TOP-H632, TOP-H652
Operation Frequency:	802.11b/802.11g/802.11n(HT20): 2412MHz~2462MHz 802.11n(HT40): 2422MHz~2452MHz
Channel numbers:	802.11b/802.11g /802.11n(HT20): 11 802.11(HT40): 7
Channel separation:	5MHz
Modulation technology:	802.11b: Direct Sequence Spread Spectrum (DSSS) 802.11g/802.11n(H20)/802.11n(H40): Orthogonal Frequency Division Multiplexing (OFDM)
Antenna Type:	RP-SMA Antenna Connector
Antenna gain:	2dBi (declare by Applicant)
Power supply:	Model No.: EXA0904YH Input: AC 100-240V, 50-60Hz, 1.5A Output: DC 19V, 4.74A

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2412MHz	4	2427MHz	7	2442MHz	10	2457MHz
2	2417MHz	5	2432MHz	8	2447MHz	11	2462MHz
3	2422MHz	6	2437MHz	9	2452MHz		

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Test channel	Frequency (MHz)	
	802.11b/802.11g/802.11n(HT20)	802.11n(HT40)
Lowest channel	2412MHz	2422MHz
Middle channel	2437MHz	2437MHz
Highest channel	2462MHz	2452MHz

## 5.3 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode
<i>Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.</i>	

We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:

Per-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.

Mode	802.11b	802.11g	802.11n(HT20)	802.11n(HT40)
Data rate	1Mbps	6Mbps	6.5Mbps	13Mbps

## 5.4 Description of Support Units

Manufacturer	Description	Model	Serial Number	FCC Approval
HP	Printer	CB495A	05257893	DoC
DELL	MONITOR	E178FPC	N/A	DoC
DELL	KEYBOARD	SK-8115	N/A	DoC
DELL	MOUSE	MOC5UO	N/A	DoC

## 5.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS —Registration No.: CNAS L5775**

CNAS has accredited Global United Technology Services Co., Ltd. To ISO/IEC 17025 General Requirements for the competence of testing and calibration laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **FCC —Registration No.: 600491**

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 600491, June 28, 2013.

- **Industry Canada (IC) —Registration No.: 9079A-2**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2, June 26, 2013.

## 5.6 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: 2nd Floor, Block No.2, Laodong Industrial Zone, Xixiang Road Baoan District, Shenzhen, China

Tel: 0755-27798480

Fax: 0755-27798960

## 6 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	Mar. 28 2014	Mar. 27 2015
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	Spectrum Analyzer	Agilent	E4440A	GTS533	Dec. 5, 2013	Dec. 4 2014
4	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	Jul. 02 2013	Jul. 01 2014
5	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	Jul. 02 2013	Jul. 01 2014
6	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	June 28 2013	June 27 2014
7	Horn Antenna	ETS-LINDGREN	3160	GTS217	Mar. 28 2014	Mar. 27 2015
8	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
9	Coaxial Cable	GTS	N/A	GTS213	Mar. 29 2014	Mar. 28 2015
10	Coaxial Cable	GTS	N/A	GTS211	Mar. 29 2014	Mar. 28 2015
11	Coaxial cable	GTS	N/A	GTS210	Mar. 29 2014	Mar. 28 2015
12	Coaxial Cable	GTS	N/A	GTS212	Mar. 29 2014	Mar. 28 2015
13	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	Jul. 02 2013	Jul. 01 2014
14	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	Jul. 02 2013	Jul. 01 2014
15	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June 28 2013	June 27 2014
16	Band filter	Amindeon	82346	GTS219	Mar. 29 2014	Mar. 28 2015

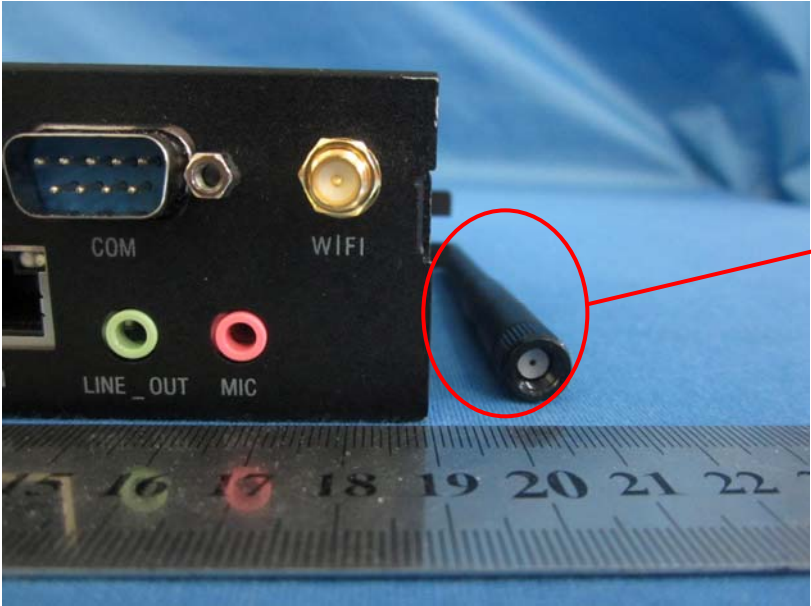
Conducted Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Shielding Room	ZhongYu Electron	7.0(L)x3.0(W)x3.0(H)	GTS264	Sep. 07 2013	Sep. 06 2015
2	EMI Test Receiver	Rohde & Schwarz	ESCS30	GTS223	Jul. 02 2013	Jul. 01 2014
3	10dB Pulse Limita	Rohde & Schwarz	N/A	GTS224	Jul. 02 2013	Jul. 01 2014
4	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	Jul. 02 2013	Jul. 01 2014
5	LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	GTS226	Jul. 02 2013	Jul. 01 2014
6	Coaxial Cable	GTS	N/A	GTS227	Jul. 02 2013	Jul. 01 2014
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A

General used equipment:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Barometer	ChangChun	DYM3	GTS257	July 09 2013	July 08 2014



## 7 Test results and Measurement Data

### 7.1 Antenna requirement:

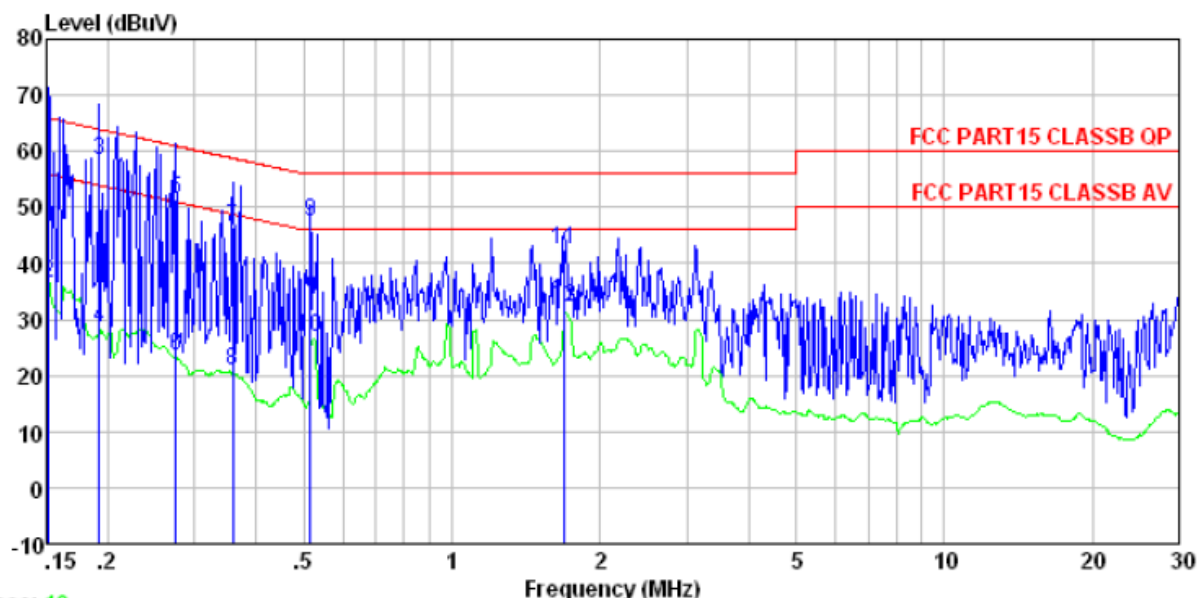
<b>Standard requirement:</b>	FCC Part15 C Section 15.203 /247(c)
<p><b>15.203 requirement:</b></p> <p>An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.</p> <p><b>15.247(c) (1)(i) requirement:</b></p> <p>(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.</p>	
<p><b>E.U.T Antenna:</b></p> <p><i>The antenna is RP-SMA Antenna Connector, the best case gain of the antenna is 2.0dBi</i></p>	
	

## 7.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207		
Test Method:	ANSI C63.4:2003		
Test Frequency Range:	150KHz to 30MHz		
Class / Severity:	Class B		
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto		
Limit:	Frequency range (MHz)	Limit (dBuV)	
		Quasi-peak	Average
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	5-30	60	50
* Decreases with the logarithm of the frequency.			
Test setup:	<div><p style="text-align: center;"><b>Reference Plane</b></p><p style="text-align: center;">Test table/Insulation plane</p><p><i>Remark: E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</i></p></div>		
Test procedure:	<div><div>1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.</div><div>2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).</div><div>3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2003 on conducted measurement.</div></div>		
Test Instruments:	Refer to section 6.0 for details		
Test mode:	Refer to section 5.3 for details,		
Test results:	Pass		

## Measurement data

Line:



Trace: 10

Condition : FCC PART15 CLASSB QP LISN-2013 LINE

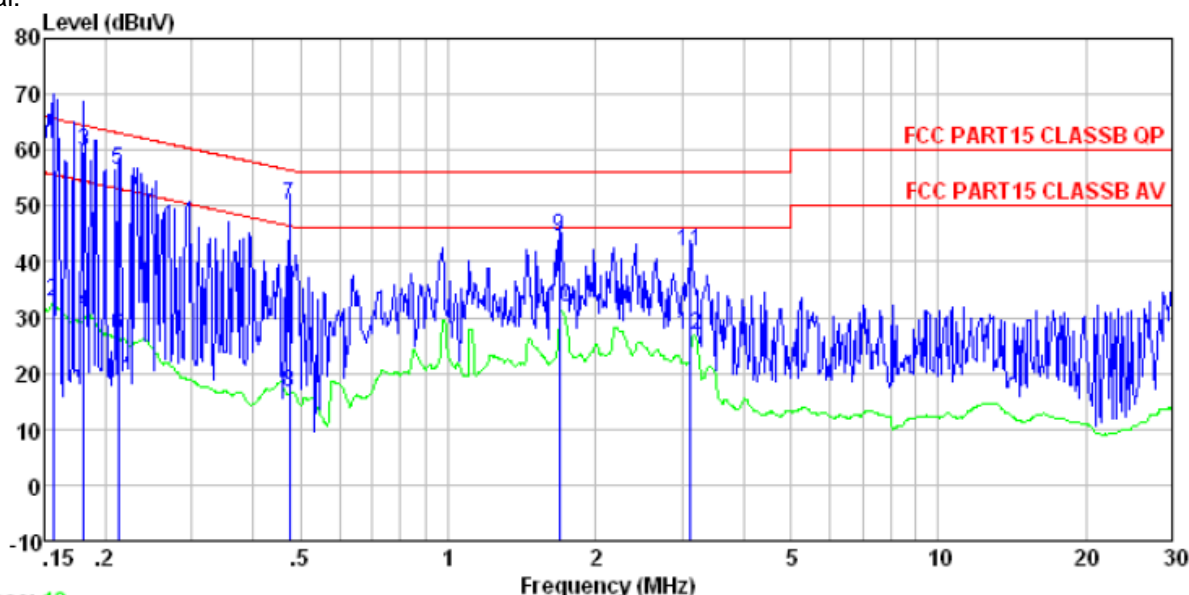
Job No. : 0975RF

Test mode : WIFI mode

Test Engineer: Qing

	Read	LISN	Cable		Limit	Over	
Freq	Level	Factor	Loss	Level	Line	Limit	Remark
MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.152	60.00	0.15	0.12	60.27	65.91	-5.64 QP
2	0.152	36.17	0.15	0.12	36.44	55.91	-19.47 Average
3	0.192	58.08	0.14	0.13	58.35	63.93	-5.58 QP
4	0.192	28.19	0.14	0.13	28.46	53.93	-25.47 Average
5	0.274	51.20	0.11	0.10	51.41	60.98	-9.57 QP
6	0.274	23.50	0.11	0.10	23.71	50.98	-27.27 Average
7	0.360	46.09	0.11	0.10	46.30	58.74	-12.44 QP
8	0.360	20.79	0.11	0.10	21.00	48.74	-27.74 Average
9	0.516	47.14	0.12	0.11	47.37	56.00	-8.63 QP
10	0.516	26.50	0.12	0.11	26.73	46.00	-19.27 Average
11	1.689	42.33	0.12	0.14	42.59	56.00	-13.41 QP
12	1.689	31.91	0.12	0.14	32.17	46.00	-13.83 Average

Neutral:



Trace: 12

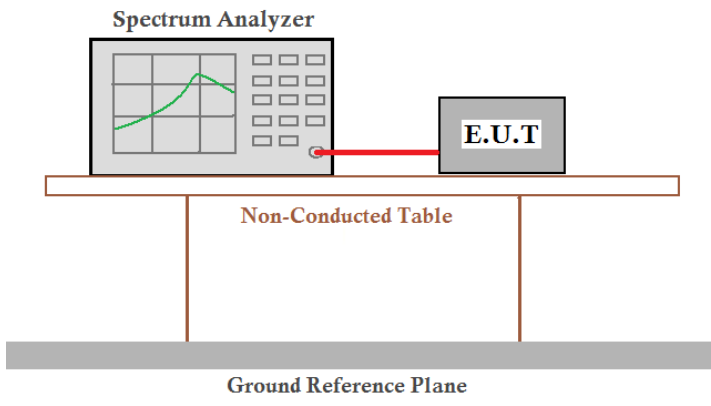
Condition : FCC PART15 CLASSB QP LISN-2013 NEUTRAL  
 Job No. : 0975RF  
 Test mode : WIFI mode  
 Test Engineer: Qing

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.156	61.00	0.07	0.12	61.19	65.65	-4.46	QP
2	0.156	32.65	0.07	0.12	32.84	55.65	-22.81	Average
3	0.181	59.43	0.07	0.13	59.63	64.46	-4.83	QP
4	0.181	30.79	0.07	0.13	30.99	54.46	-23.47	Average
5	0.213	56.11	0.06	0.13	56.30	63.10	-6.80	QP
6	0.213	26.79	0.06	0.13	26.98	53.10	-26.12	Average
7	0.474	49.80	0.06	0.11	49.97	56.45	-6.48	QP
8	0.474	16.49	0.06	0.11	16.66	46.45	-29.79	Average
9	1.689	44.36	0.09	0.14	44.59	56.00	-11.41	QP
10	1.689	31.78	0.09	0.14	32.01	46.00	-13.99	Average
11	3.123	41.60	0.12	0.15	41.87	56.00	-14.13	QP
12	3.123	26.66	0.12	0.15	26.93	46.00	-19.07	Average

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Receiver Read level + LISN Factor + Cable Loss

## 7.3 Conducted Peak Output Power

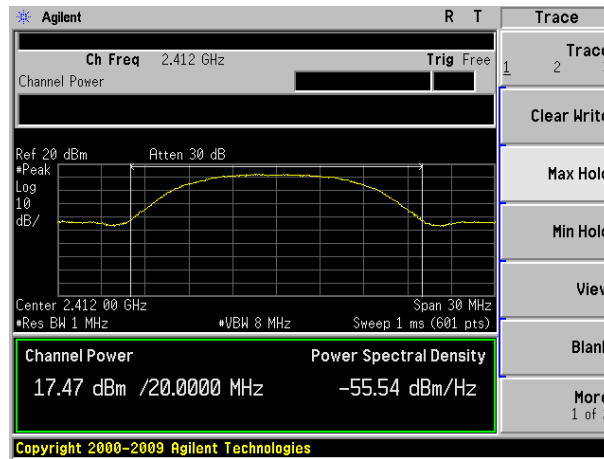
Test Requirement:	FCC Part15 C Section 15.247 (b)(3)
Test Method:	ANSI C63.4:2003 and KDB558074 D01 DTS Meas Guidance V03
Limit:	30dBm
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by two vertical legs and is positioned above a Ground Reference Plane, which is represented by a thick grey bar at the bottom.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

### Measurement Data

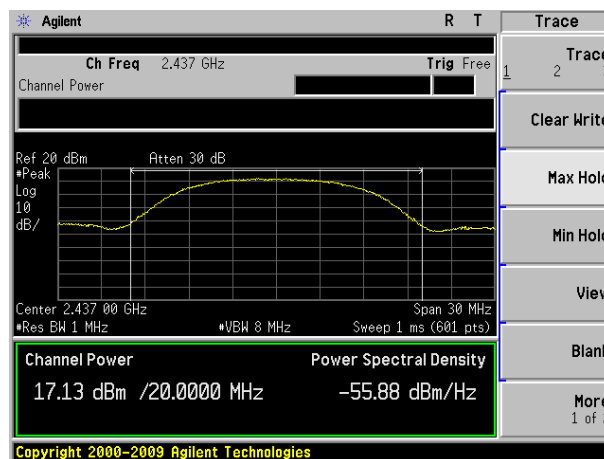
Test CH	Peak Output Power (dBm)				Limit(dBm)	Result
	802.11b	802.11g	802.11n(HT20)	802.11n(HT40)		
Lowest	17.47	13.66	11.68	11.46	30.00	Pass
Middle	17.13	13.49	11.31	11.27		
Highest	17.26	13.23	10.72	10.83		

Test plot as follows:

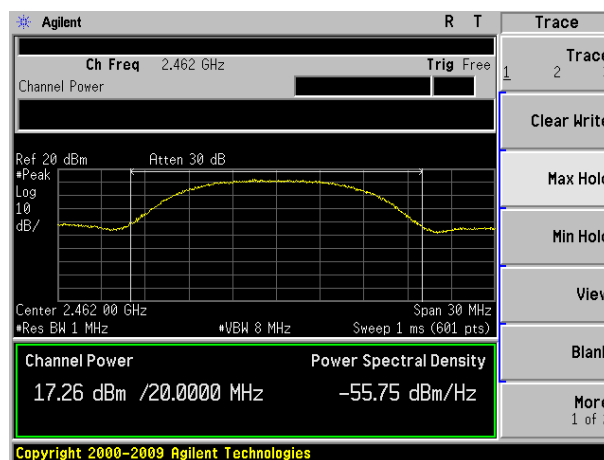
Test mode:	802.11b
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Lowest channel

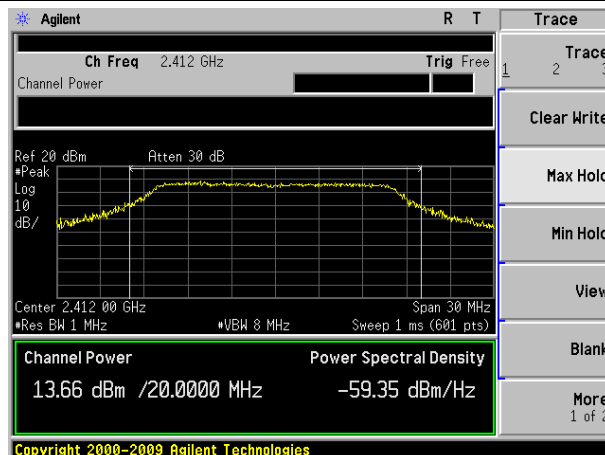


Middle channel

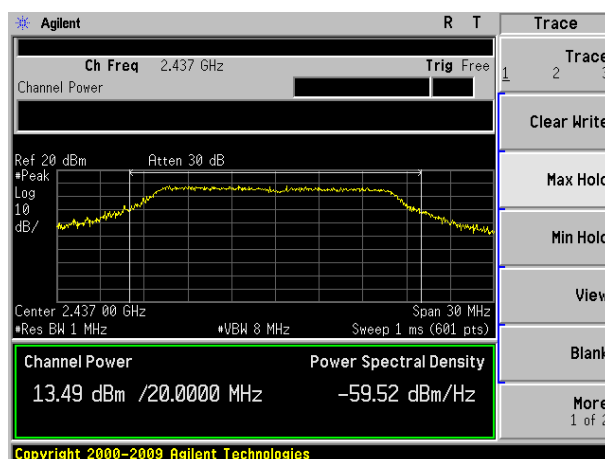


Highest channel

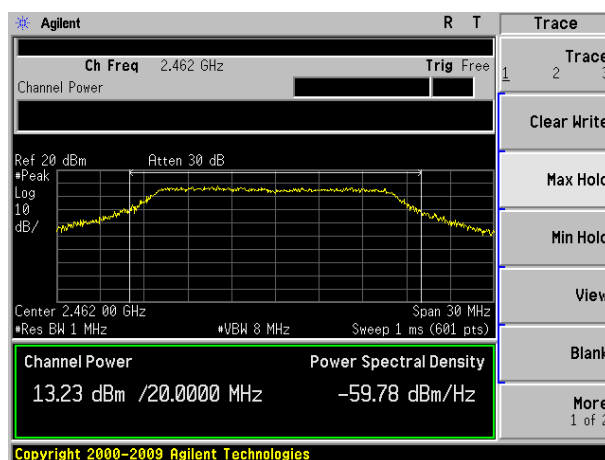
Test mode:	802.11g
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Lowest channel

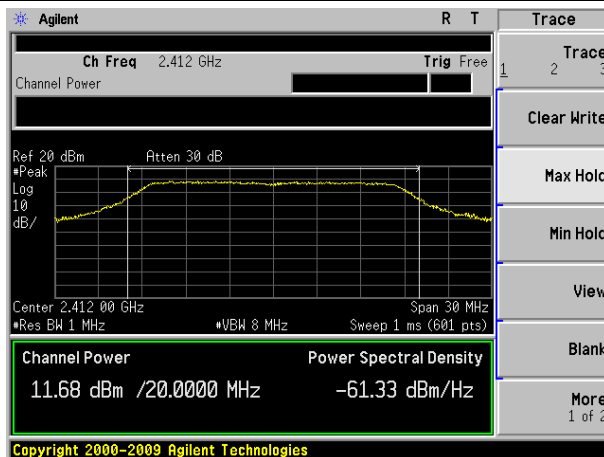


Middle channel

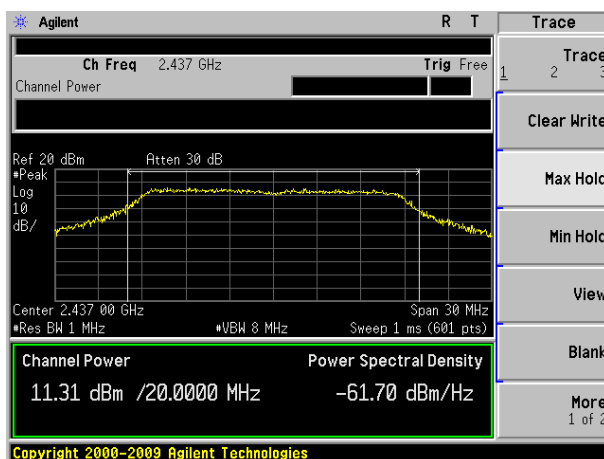


Highest channel

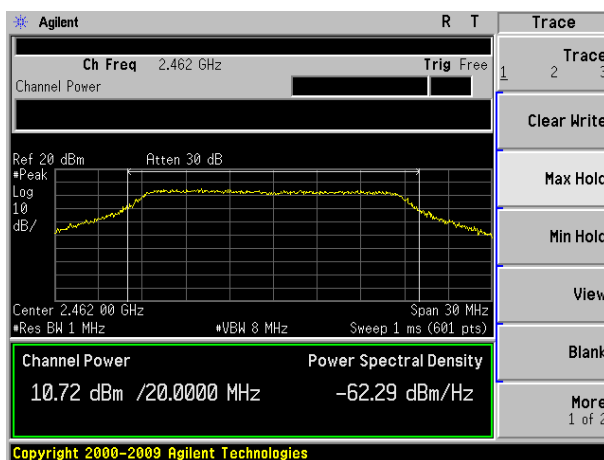
Test mode:	802.11n(HT20)
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Lowest channel



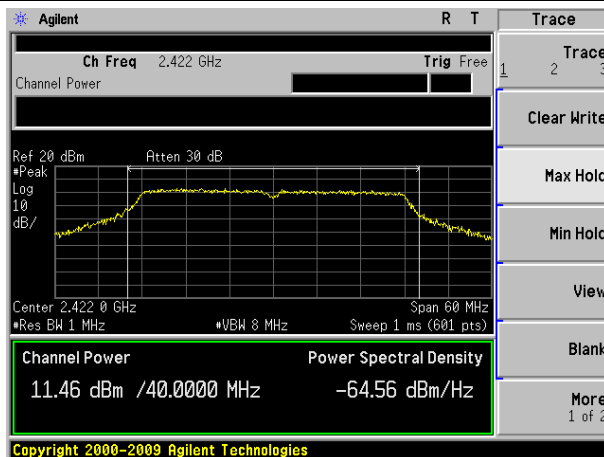
Middle channel



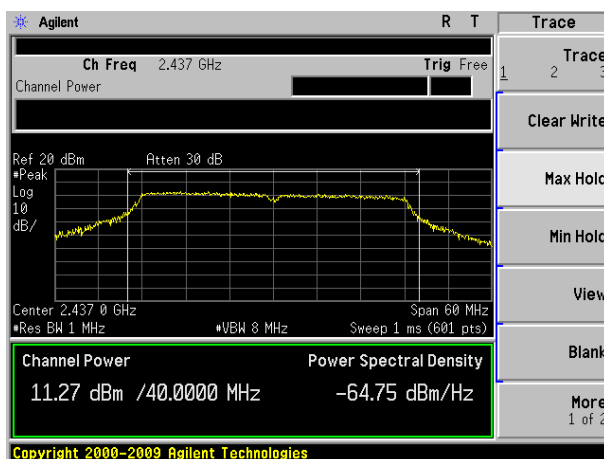
Highest channel



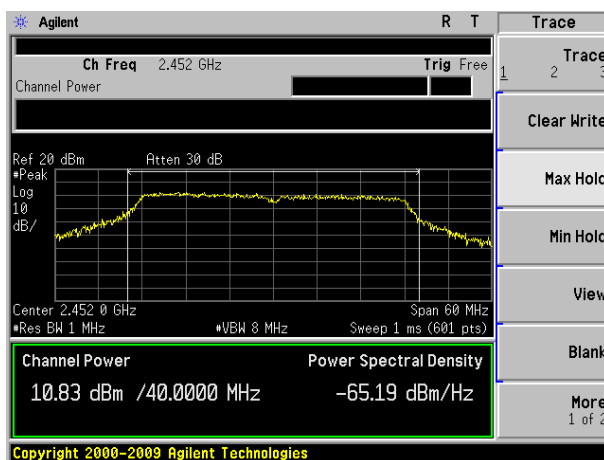
Test mode:	802.11n(HT40)
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Lowest channel

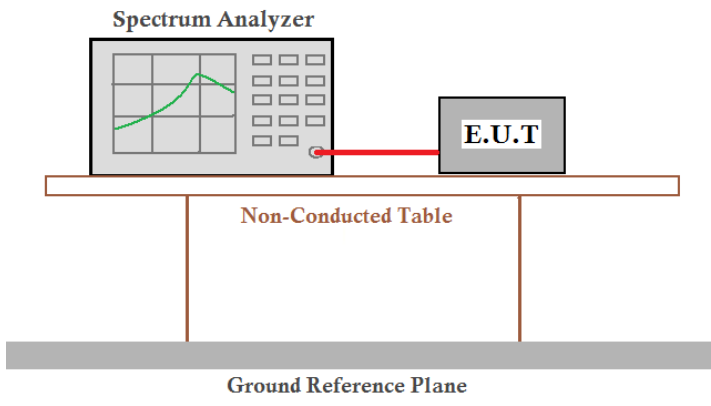


Middle channel



Highest channel

## 7.4 Channel Bandwidth

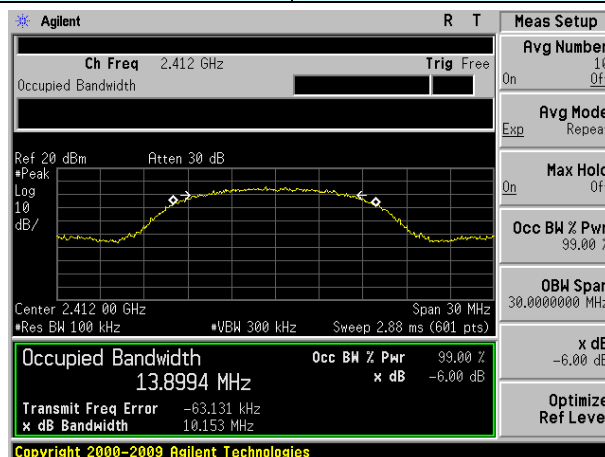
Test Requirement:	FCC Part15 C Section 15.247 (a)(2)
Test Method:	ANSI C63.4:2003 and KDB558074 D01 DTS Meas Guidance V03
Limit:	>500KHz
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

### Measurement Data

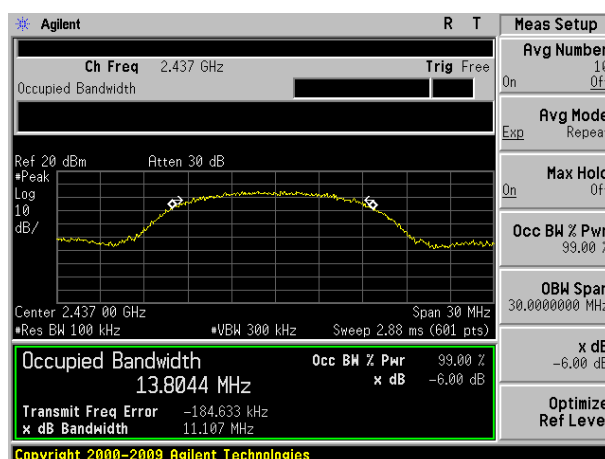
Test CH	Channel Bandwidth (MHz)				Limit(KHz)	Result
	802.11b	802.11g	802.11n(HT20)	802.11n(HT40)		
Lowest	10.153	16.525	17.738	36.482	>500	Pass
Middle	11.107	16.506	17.695	36.098		
Highest	10.028	16.482	17.689	35.926		

Test plot as follows:

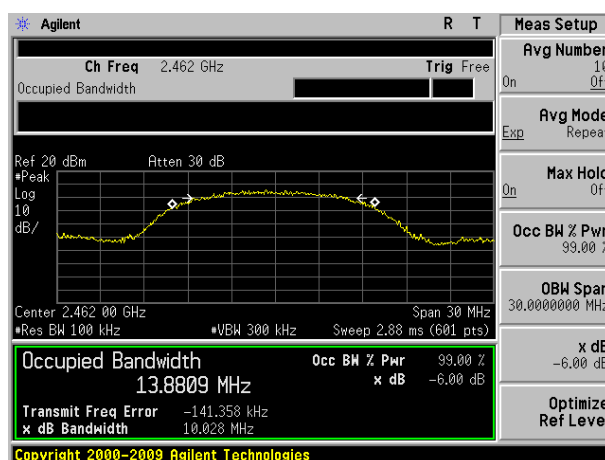
Test mode:	802.11b
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Lowest channel

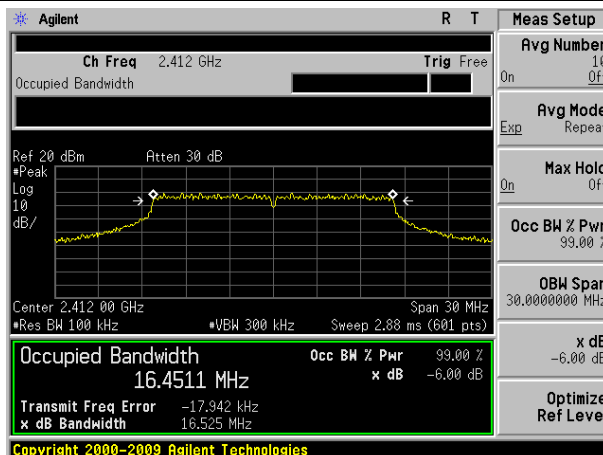


Middle channel

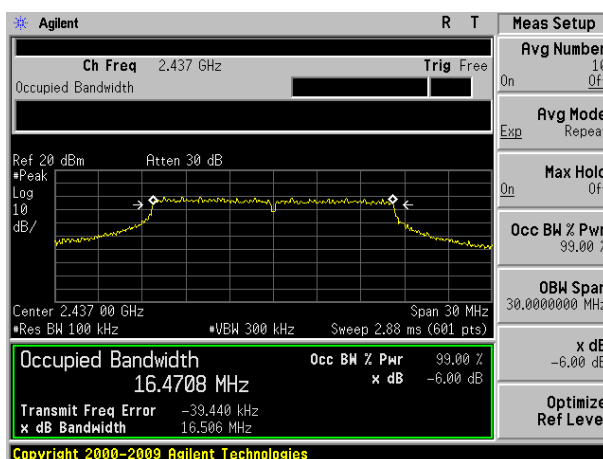


Highest channel

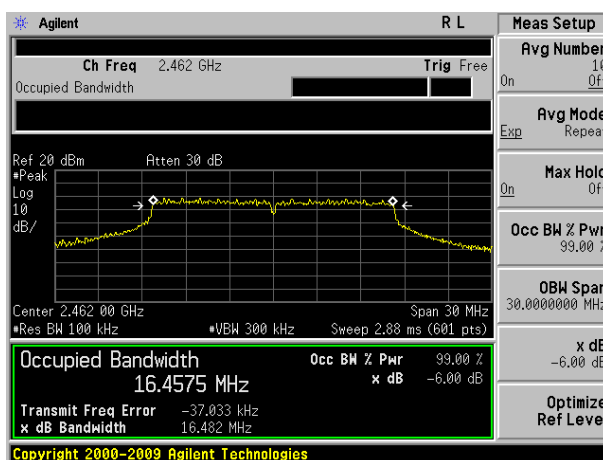
Test mode:	802.11g
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Lowest channel

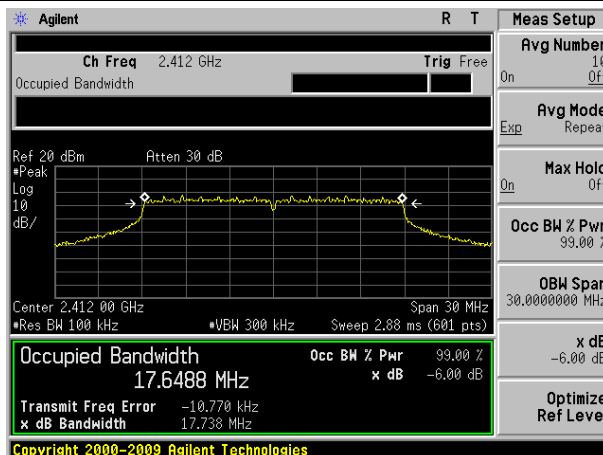


Middle channel

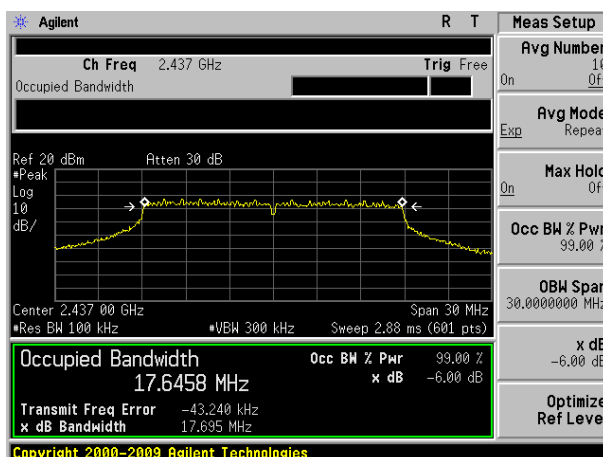


Highest channel

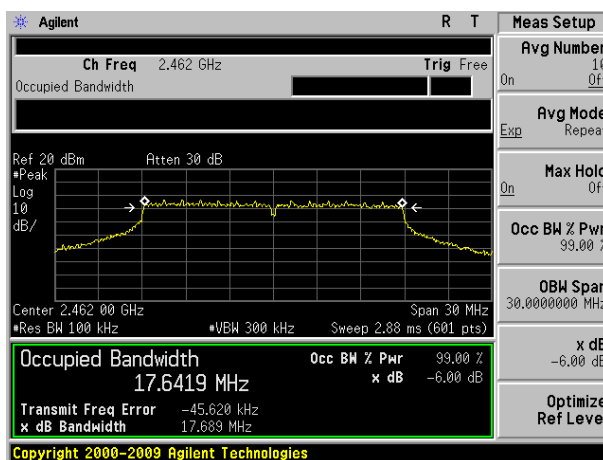
Test mode:	802.11n(HT20)
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Lowest channel

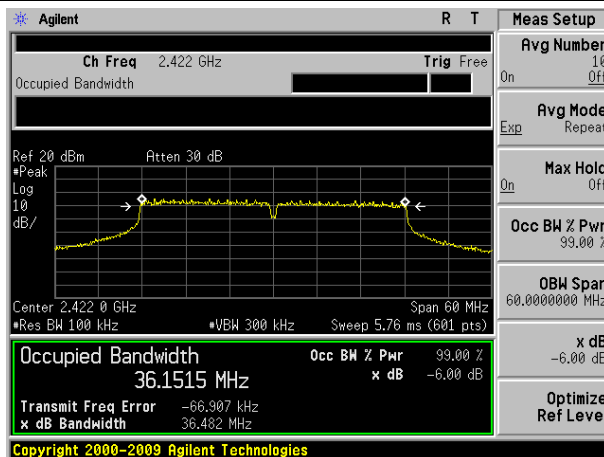


Middle channel

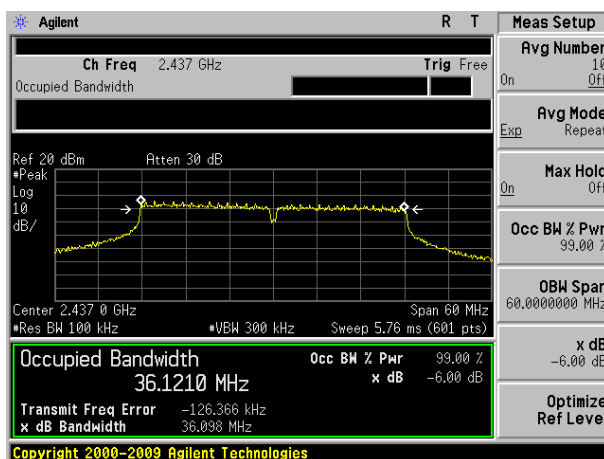


Highest channel

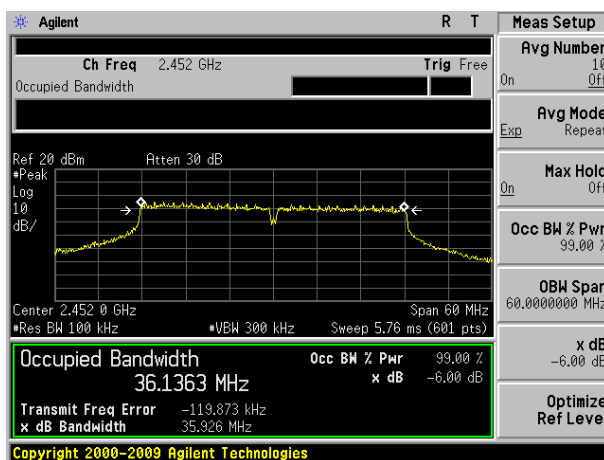
Test mode:	802.11n(HT40)
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Lowest channel

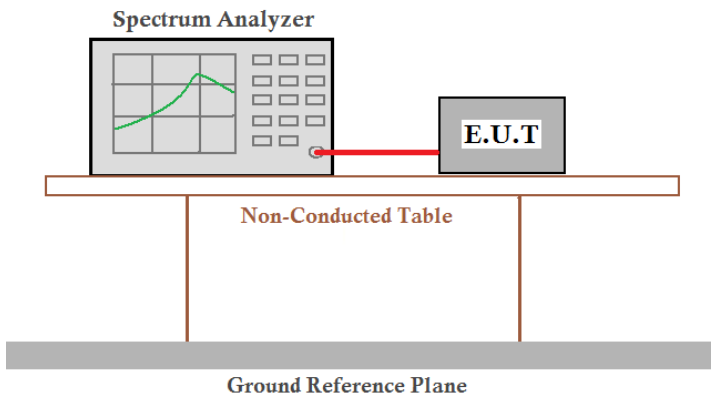


Middle channel



Highest channel

## 7.5 Power Spectral Density

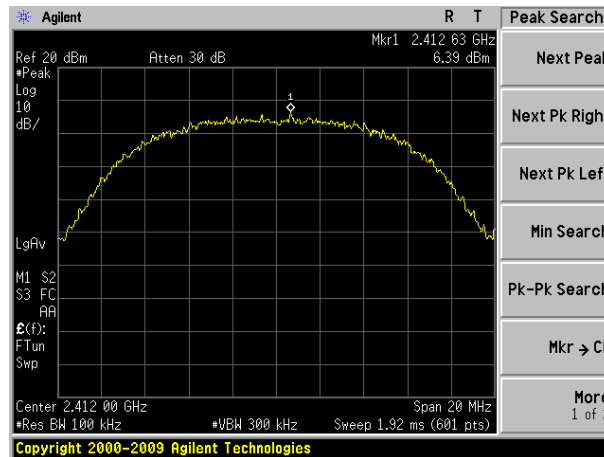
Test Requirement:	FCC Part15 C Section 15.247 (e)
Test Method:	ANSI C63.4:2003 and KDB558074 D01 DTS Meas Guidance V03
Limit:	8dBm
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

### Measurement Data

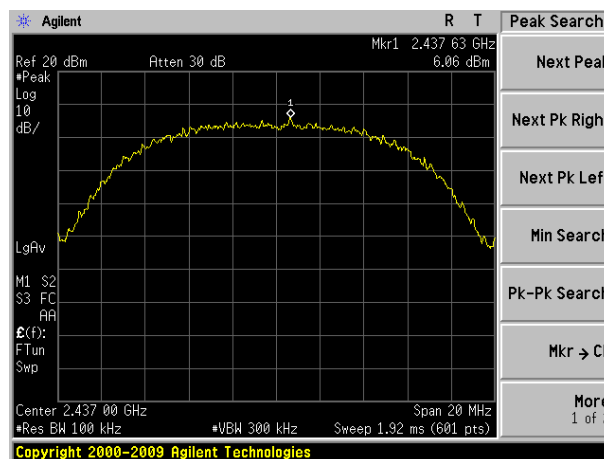
Test CH	Power Spectral Density (dBm)				Limit(dBm/3kHz)	Result
	802.11b	802.11g	802.11n(HT20)	802.11n(HT40)		
Lowest	6.39	-0.59	-2.43	-4.86	8.00	Pass
Middle	6.06	-0.51	-2.51	-4.63		
Highest	6.61	-1.34	-3.27	-5.20		

Test plot as follows:

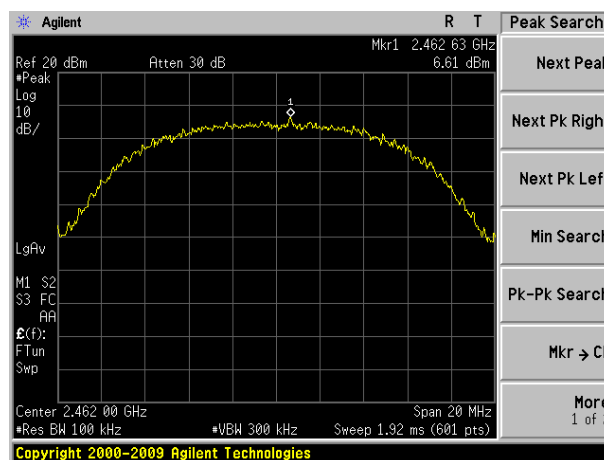
Test mode:	802.11b
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Lowest channel



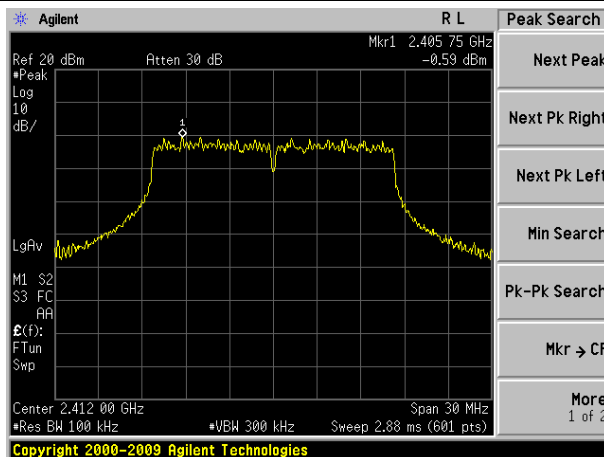
Middle channel



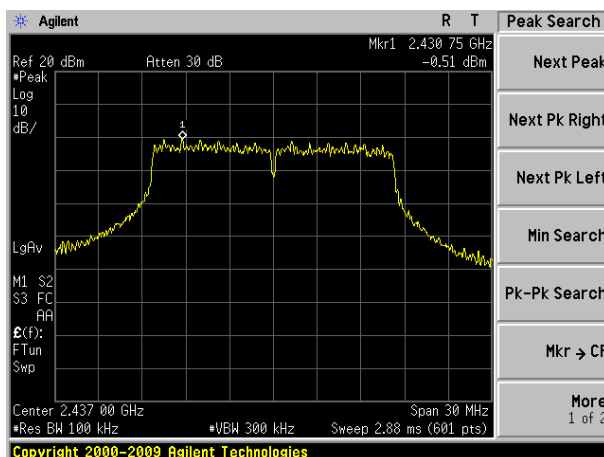
Highest channel



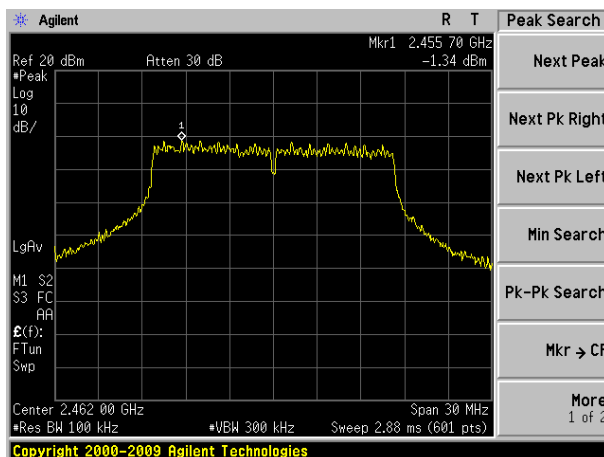
Test mode:	802.11g
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Lowest channel

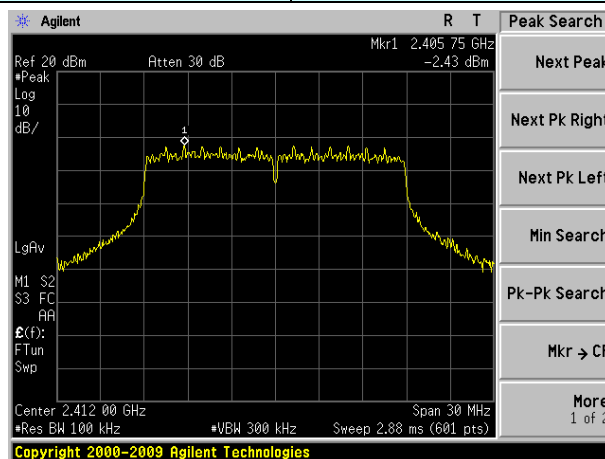


Middle channel

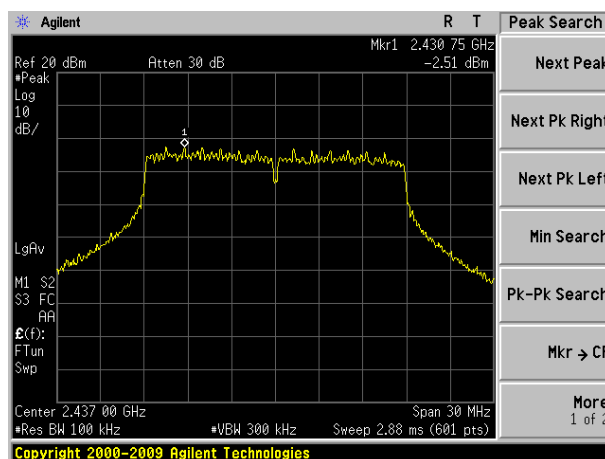


Highest channel

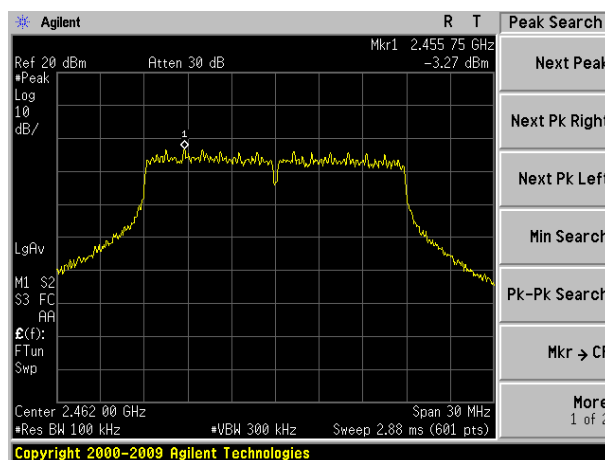
Test mode:	802.11n(HT20)
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Lowest channel

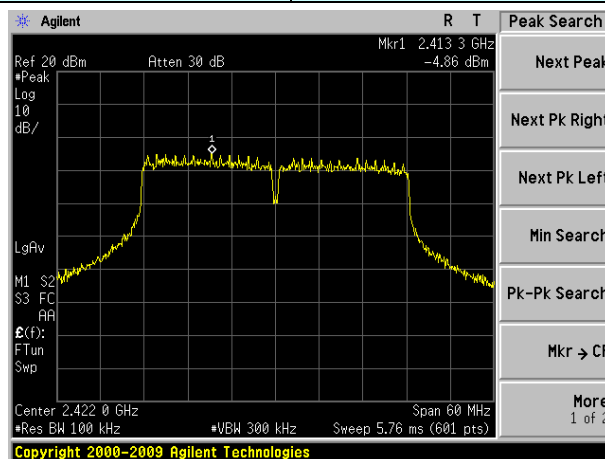


Middle channel

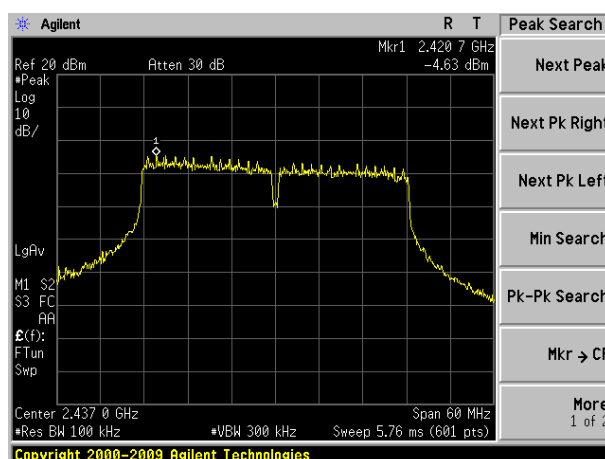


Highest channel

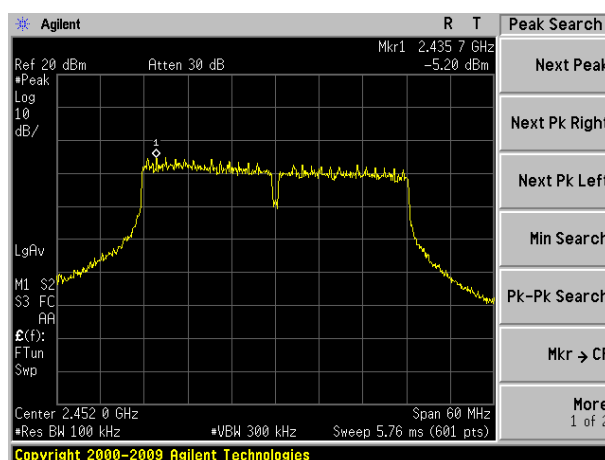
Test mode:	802.11n(HT40)
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Lowest channel



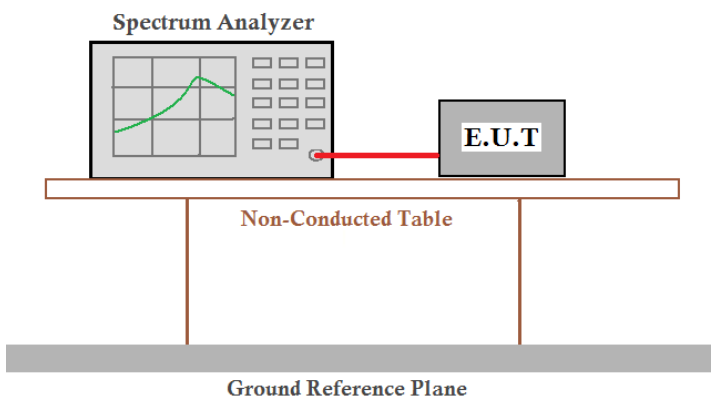
Middle channel



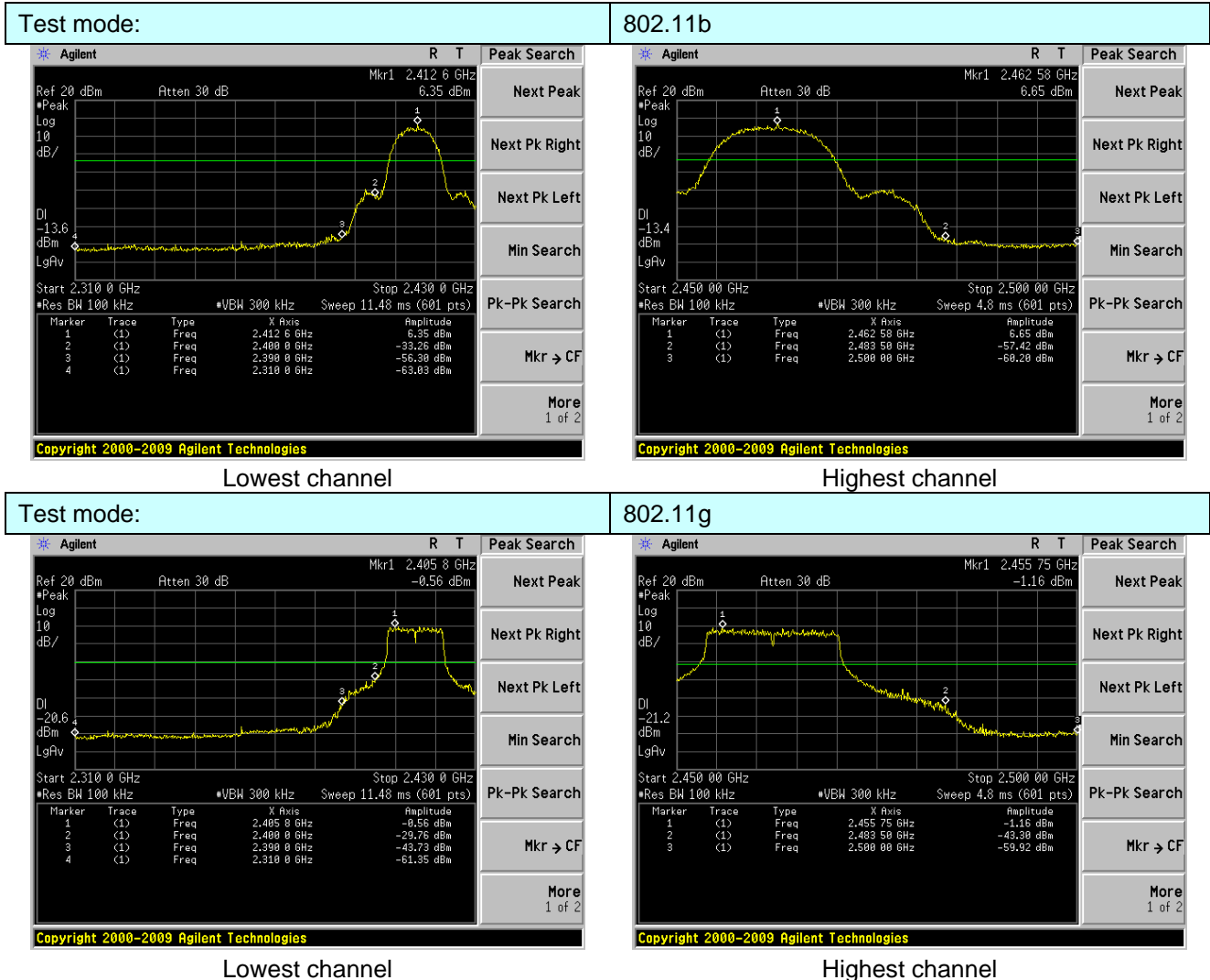
Highest channel

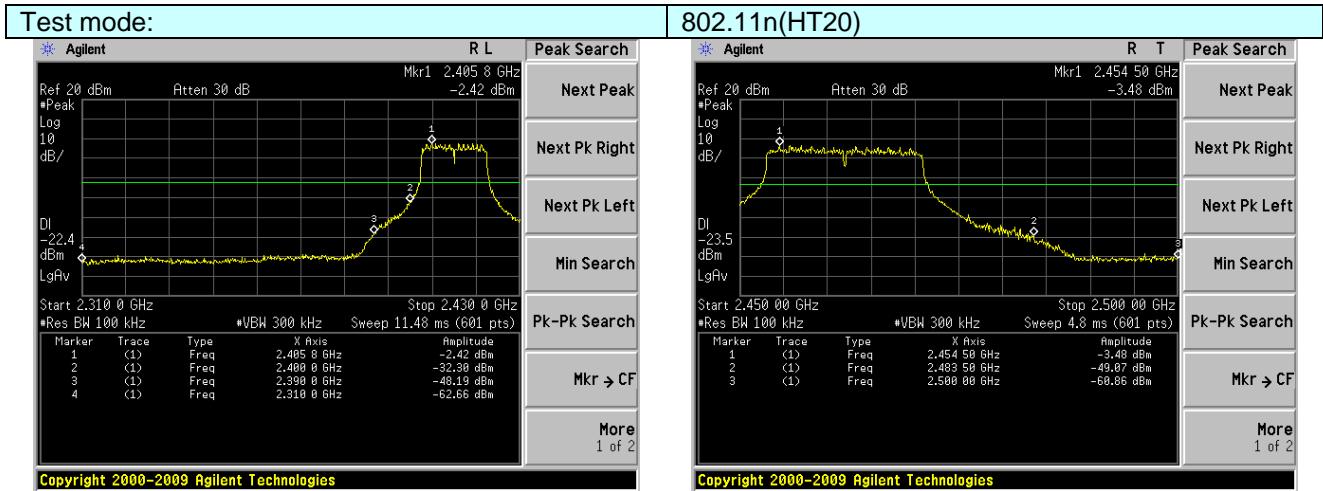
## 7.6 Band edges

### 7.6.1 Conducted Emission Method

Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	ANSI C63.4:2003 and KDB558074 D01 DTS Meas Guidance V03
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by two vertical legs. Below the table is a Ground Reference Plane, represented by a thick grey bar.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

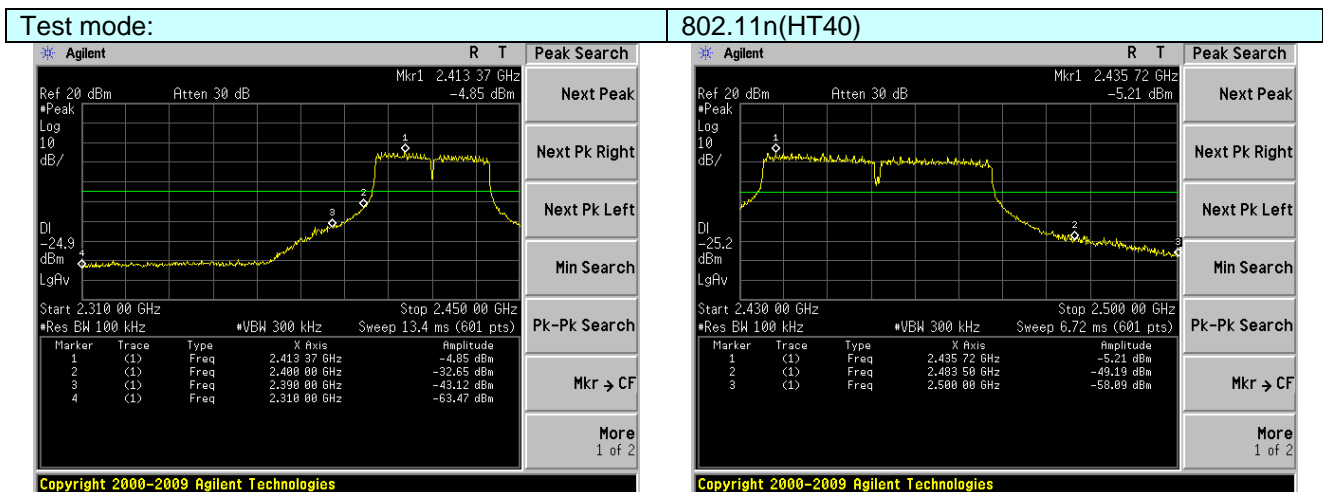
Test plot as follows:





Lowest channel

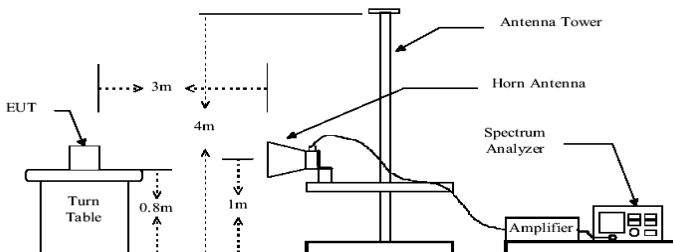
Highest channel



Lowest channel

Highest channel

## 7.6.2 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209 and 15.205				
Test Method:	ANSI C63.4: 2003				
Test Frequency Range:	All of the restrict bands were tested, only the worst band's (2310MHz to 2500MHz) data was showed.				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Value
	Above 1GHz	Peak	1MHz	3MHz	Peak
		Peak	1MHz	10Hz	Average
Limit:	Frequency		Limit (dBuV/m @3m)		Value
	Above 1GHz		54.00		Average
			74.00		Peak
Test setup:					
Test Procedure:	<ol style="list-style-type: none"><li>1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.</li><li>2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</li><li>3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.</li><li>4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.</li><li>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li><li>6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</li><li>7. The radiation measurements are performed in X, Y, Z axis positioning. And found the Y axis positioning which it is worse case, only the test worst case mode is recorded in the report.</li></ol>				
Test Instruments:	Refer to section 6.0 for details				
Test mode:	Refer to section 5.3 for details				
Test results:	Pass				

Measurement data:

Remark: The pre-test were performed on lowest, middle and highest frequencies, only the worst case's (lowest and highest frequencies) data was showed.

Test mode:	802.11b	Test channel:	Lowest
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**Peak value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2390.00	48.33	27.59	5.38	30.18	51.12	74.00	-22.88	Vertical
2400.00	52.27	27.58	5.39	30.18	55.06	74.00	-18.94	Vertical
2390.00	50.52	27.59	5.38	30.18	53.31	74.00	-20.69	Horizontal
2400.00	60.02	27.58	5.39	30.18	62.81	74.00	-11.19	Horizontal

**Average value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2390.00	36.73	27.59	5.38	30.18	39.52	54.00	-14.48	Vertical
2400.00	41.74	27.58	5.39	30.18	44.53	54.00	-9.47	Vertical
2390.00	37.67	27.59	5.38	30.18	40.46	54.00	-13.54	Horizontal
2400.00	50.08	27.58	5.39	30.18	52.87	54.00	-1.13	Horizontal

Test mode:	802.11b	Test channel:	Highest
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**Peak value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	49.20	27.53	5.47	29.93	52.27	74.00	-21.73	Vertical
2500.00	48.36	27.55	5.49	29.93	51.47	74.00	-22.53	Vertical
2483.50	50.28	27.53	5.47	29.93	53.35	74.00	-20.65	Horizontal
2500.00	49.83	27.55	5.49	29.93	52.94	74.00	-21.06	Horizontal

**Average value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	37.21	27.53	5.47	29.93	40.28	54.00	-13.72	Vertical
2500.00	36.79	27.55	5.49	29.93	39.90	54.00	-14.10	Vertical
2483.50	38.54	27.53	5.47	29.93	41.61	54.00	-12.39	Horizontal
2500.00	37.83	27.55	5.49	29.93	40.94	54.00	-13.06	Horizontal

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.



Test mode:	802.11g	Test channel:	Lowest
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**Peak value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2390.00	49.77	27.59	5.38	30.18	52.56	74.00	-21.44	Vertical
2400.00	67.59	27.58	5.39	30.18	70.38	74.00	-3.62	Vertical
2390.00	55.17	27.59	5.38	30.18	57.96	74.00	-16.04	Horizontal
2400.00	76.37	27.58	5.39	30.18	79.16	83.30	-4.14	Horizontal
2416.08	100.46	27.55	5.41	30.12	103.30	N/A	--	Horizontal

**Average value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2390.00	37.01	27.59	5.38	30.18	39.80	54.00	-14.20	Vertical
2400.00	41.78	27.58	5.39	30.18	44.57	54.00	-9.43	Vertical
2390.00	38.91	27.59	5.38	30.18	41.70	54.00	-12.30	Horizontal
2400.00	48.17	27.58	5.39	30.18	50.96	54.00	-3.04	Horizontal

Test mode:	802.11g	Test channel:	Highest
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**Peak value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	57.74	27.53	5.47	29.93	60.81	74.00	-21.73	Vertical
2500.00	50.32	27.55	5.49	29.93	53.43	74.00	-22.53	Vertical
2483.50	67.08	27.53	5.47	29.93	70.15	74.00	-20.65	Horizontal
2500.00	50.22	27.55	5.49	29.93	53.33	74.00	-21.06	Horizontal

**Average value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	39.08	27.53	5.47	29.93	42.15	54.00	-11.85	Vertical
2500.00	36.85	27.55	5.49	29.93	39.96	54.00	-14.04	Vertical
2483.50	44.80	27.53	5.47	29.93	47.87	54.00	-6.13	Horizontal
2500.00	38.48	27.55	5.49	29.93	41.59	54.00	-12.41	Horizontal

**Remark:**

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

Test mode:	802.11n(HT20)	Test channel:	Lowest
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**Peak value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2390.00	50.51	27.59	5.38	30.18	53.30	74.00	-20.70	Vertical
2400.00	65.04	27.58	5.39	30.18	67.83	74.00	-6.17	Vertical
2390.00	53.43	27.59	5.38	30.18	56.22	74.00	-17.78	Horizontal
2400.00	74.33	27.58	5.39	30.18	77.12	81.35	-4.23	Horizontal
2406.60	98.5	27.57	5.40	30.12	101.35	N/A	--	Horizontal

**Average value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2390.00	36.94	27.59	5.38	30.18	39.73	54.00	-14.27	Vertical
2400.00	41.79	27.58	5.39	30.18	44.58	54.00	-9.42	Vertical
2390.00	38.59	27.59	5.38	30.18	41.38	54.00	-12.62	Horizontal
2400.00	48.42	27.58	5.39	30.18	51.21	54.00	-2.79	Horizontal

Test mode:	802.11n(HT20)	Test channel:	Highest
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**Peak value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	51.60	27.53	5.47	29.93	54.67	74.00	-19.33	Vertical
2500.00	48.56	27.55	5.49	29.93	51.67	74.00	-22.33	Vertical
2483.50	61.23	27.53	5.47	29.93	64.30	74.00	-9.70	Horizontal
2500.00	50.17	27.55	5.49	29.93	53.28	74.00	-20.72	Horizontal

**Average value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	37.67	27.53	5.47	29.93	40.74	54.00	-13.26	Vertical
2500.00	36.79	27.55	5.49	29.93	39.90	54.00	-14.10	Vertical
2483.50	43.68	27.53	5.47	29.93	46.75	54.00	-7.25	Horizontal
2500.00	38.06	27.55	5.49	29.93	41.17	54.00	-12.83	Horizontal

**Remark:**

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Pre-amplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

Test mode:	802.11n(HT40)	Test channel:	Lowest
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**Peak value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2390.00	51.05	27.59	5.38	30.18	53.84	74.00	-20.16	Vertical
2400.00	64.46	27.58	5.39	30.18	67.25	74.00	-6.75	Vertical
2390.00	57.66	27.59	5.38	30.18	60.45	74.00	-13.55	Horizontal
2400.02	74.60	27.58	5.39	30.18	77.39	79.86	-2.47	Horizontal
2437.54	96.99	27.50	5.43	30.06	99.86	N/A	--	Horizontal

**Average value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2390.00	37.76	27.59	5.38	30.18	40.55	54.00	-13.45	Vertical
2400.00	40.47	27.58	5.39	30.18	43.26	54.00	-10.74	Vertical
2390.00	41.33	27.59	5.38	30.18	44.12	54.00	-9.88	Horizontal
2400.00	45.92	27.58	5.39	30.18	48.71	54.00	-5.29	Horizontal

Test mode:	802.11n(HT40)	Test channel:	Highest
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**Peak value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	51.99	27.53	5.47	29.93	55.06	74.00	-18.94	Vertical
2500.00	48.47	27.55	5.49	29.93	51.58	74.00	-22.42	Vertical
2483.50	64.57	27.53	5.47	29.93	67.64	74.00	-6.36	Horizontal
2500.00	59.52	27.55	5.49	29.93	62.63	74.00	-11.37	Horizontal

**Average value:**

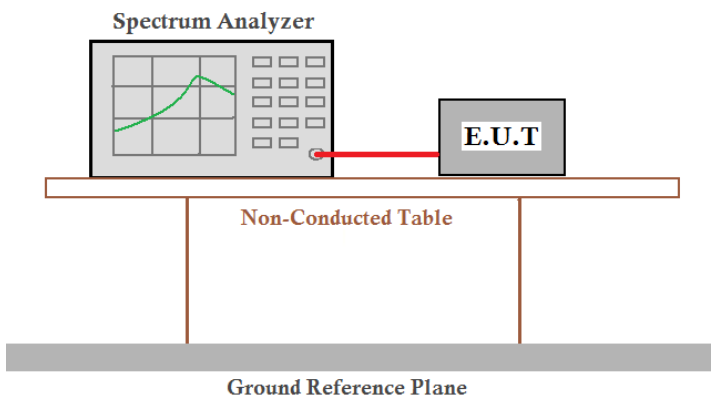
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	38.77	27.53	5.47	29.93	41.84	54.00	-12.16	Vertical
2500.00	37.12	27.55	5.49	29.93	40.23	54.00	-13.77	Vertical
2483.50	47.32	27.53	5.47	29.93	50.39	54.00	-3.61	Horizontal
2500.00	40.48	27.55	5.49	29.93	43.59	54.00	-10.41	Horizontal

**Remark:**

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

## 7.7 Spurious Emission

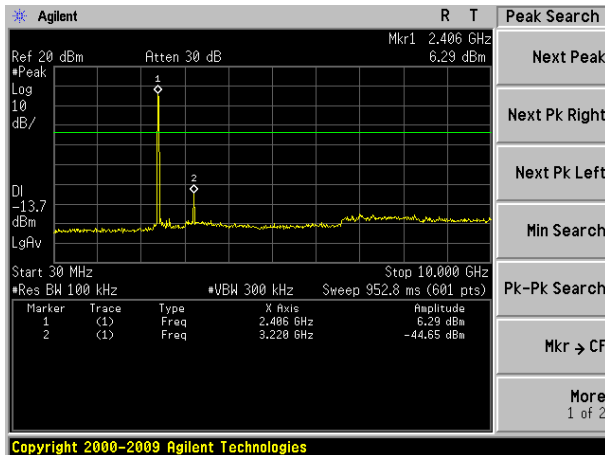
### 7.7.1 Conducted Emission Method

Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	ANSI C63.4:2003 and KDB558074 D01 DTS Meas Guidance V03
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test setup:	 <p>The diagram illustrates the test setup for conducted emission measurement. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table, which is supported by two vertical legs. Below the table is a Ground Reference Plane, represented by a thick grey bar.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

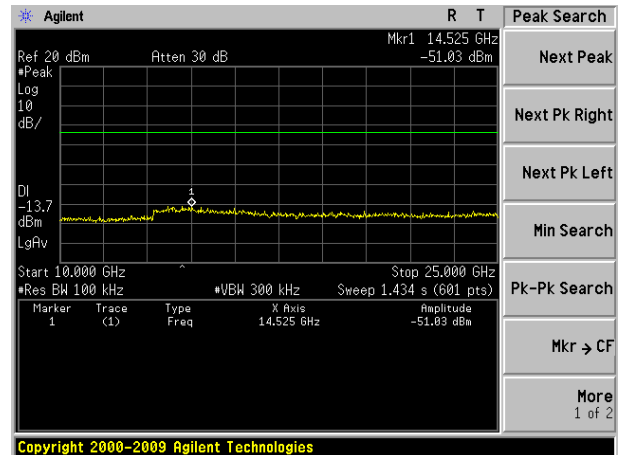
Test plot as follows:

Test mode:	802.11b
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Lowest channel

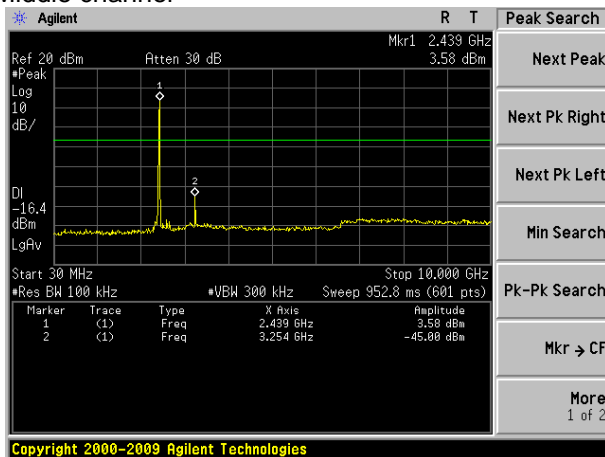


30MHz~10GHz

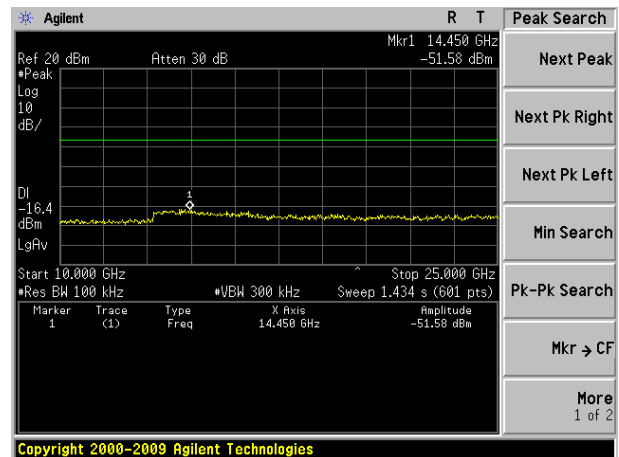


10GHz~25GHz

Middle channel

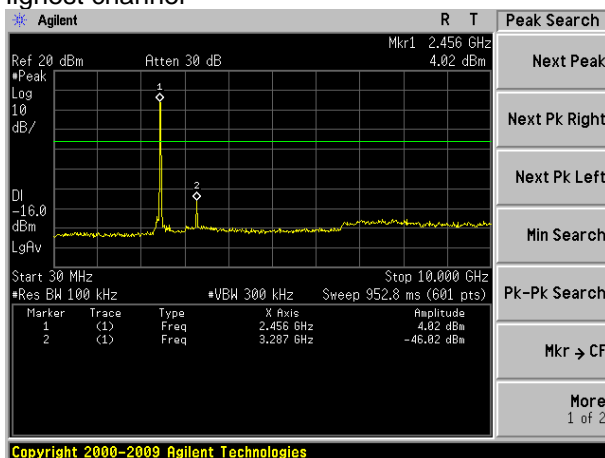


30MHz~10GHz

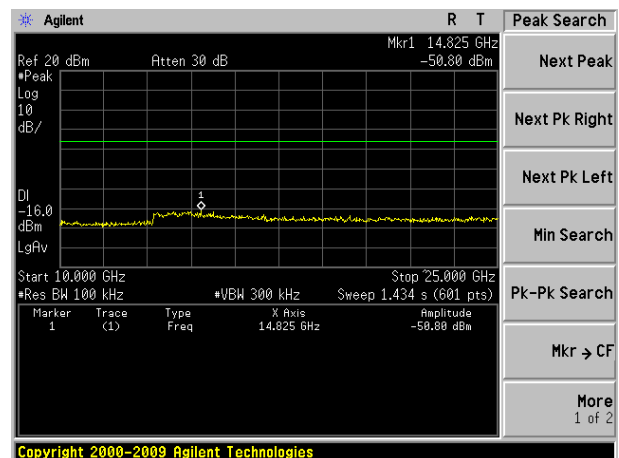


10GHz~25GHz

Highest channel



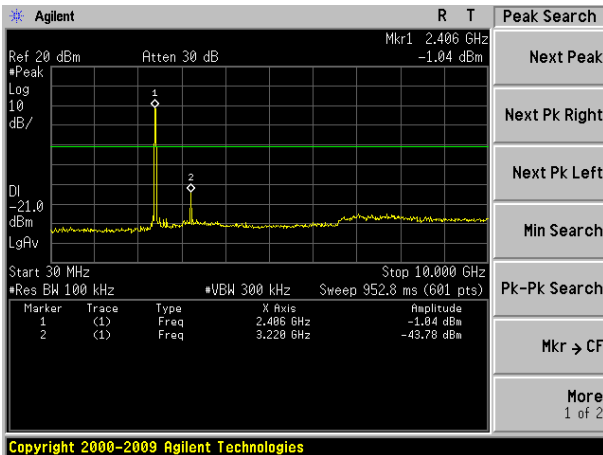
30MHz~10GHz



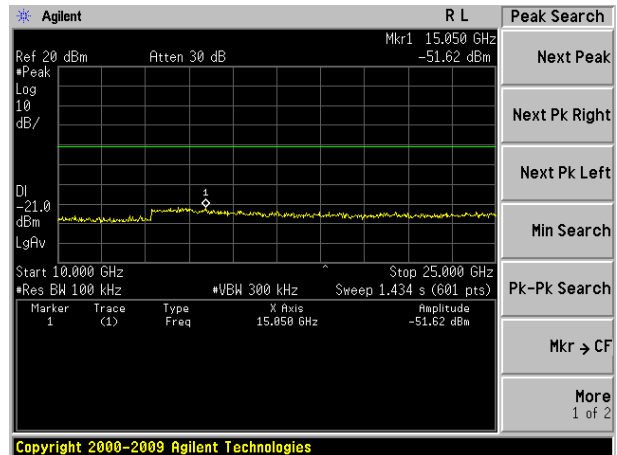
10GHz~25GHz

Test mode: 802.11g

## Lowest channel

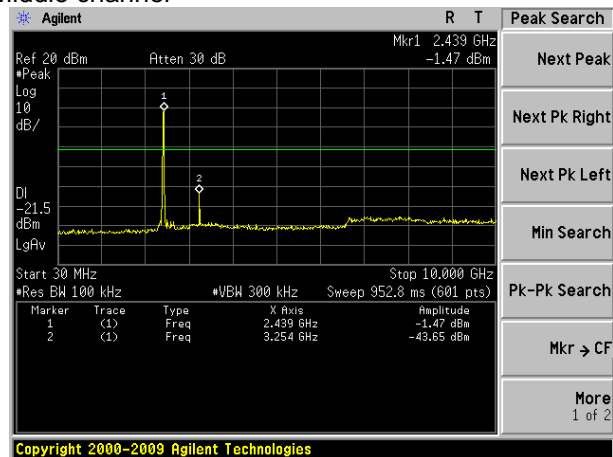


30MHz~10GHz

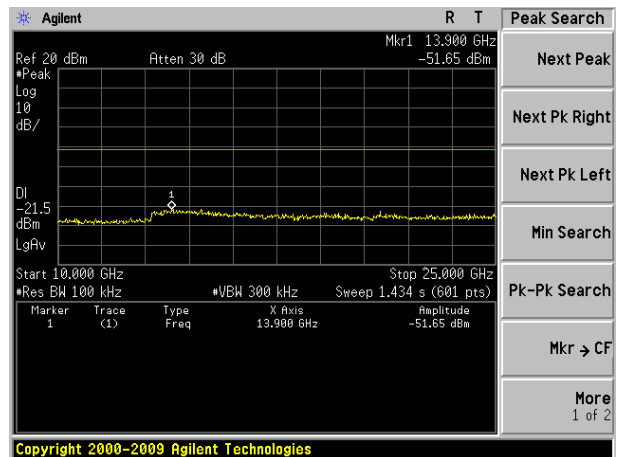


10GHz~25GHz

## Middle channel

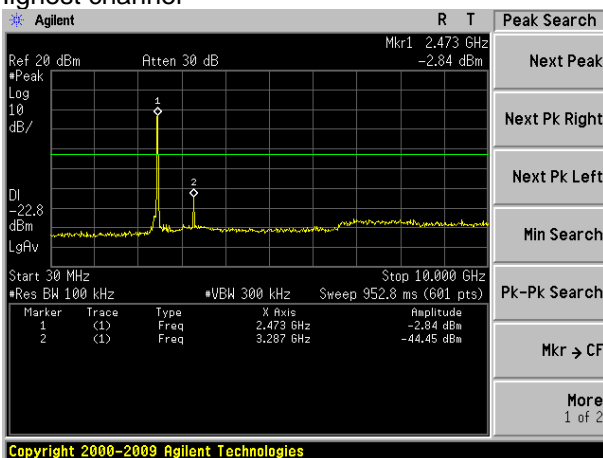


30MHz~10GHz

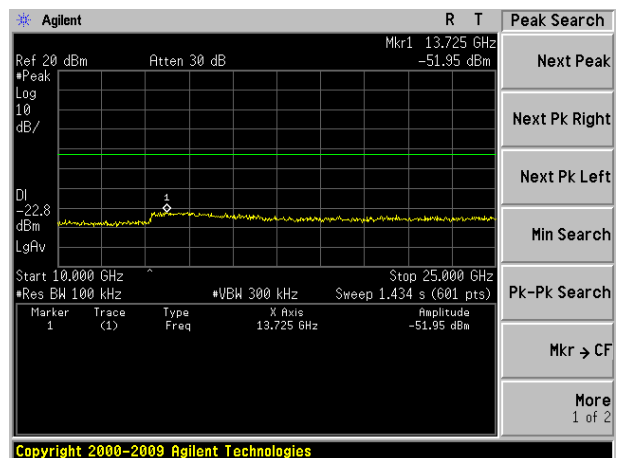


10GHz~25GHz

## Highest channel



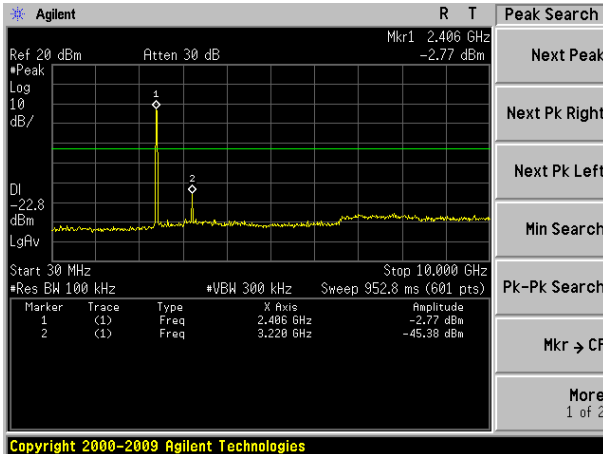
30MHz~10GHz



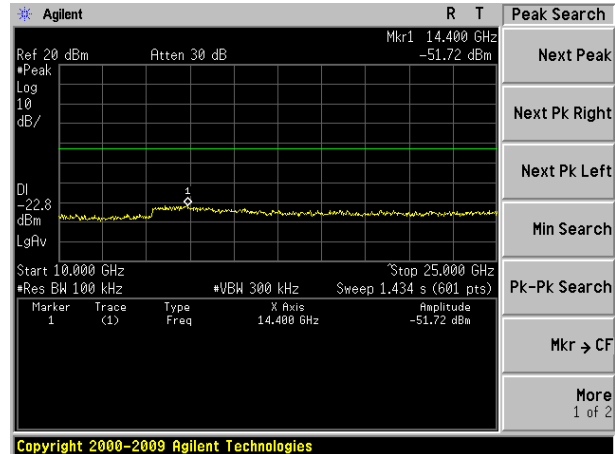
10GHz~25GHz

Test mode:	802.11n(HT20)
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## Lowest channel

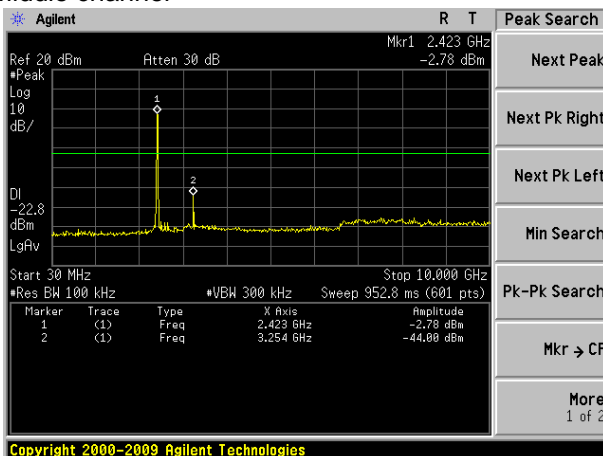


30MHz~10GHz

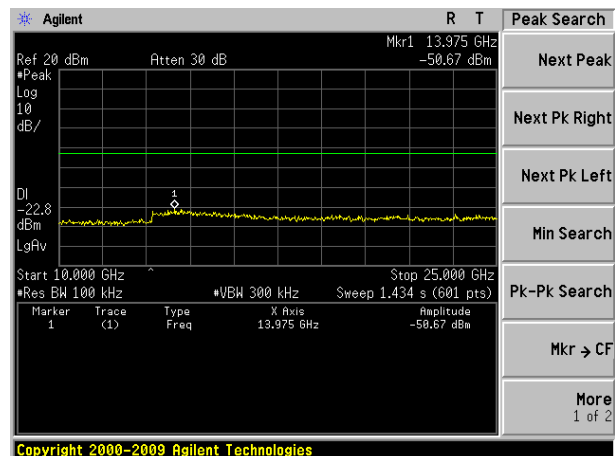


10GHz~25GHz

## Middle channel

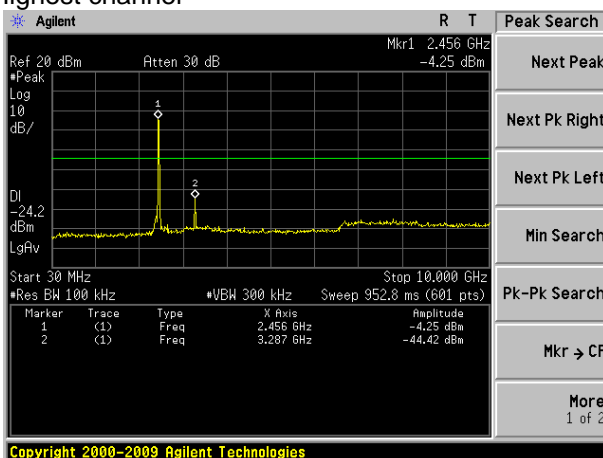


30MHz~10GHz

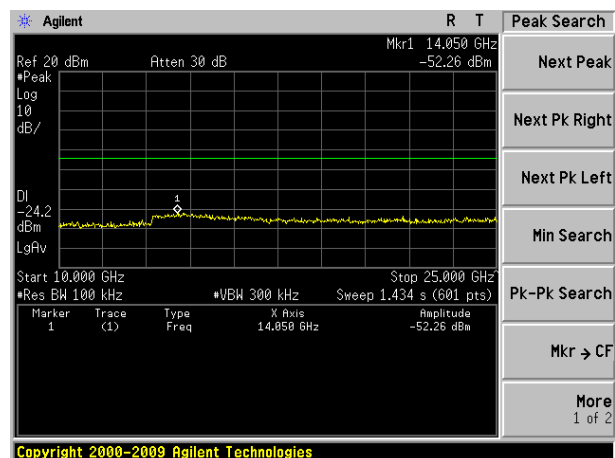


10GHz~25GHz

## Highest channel



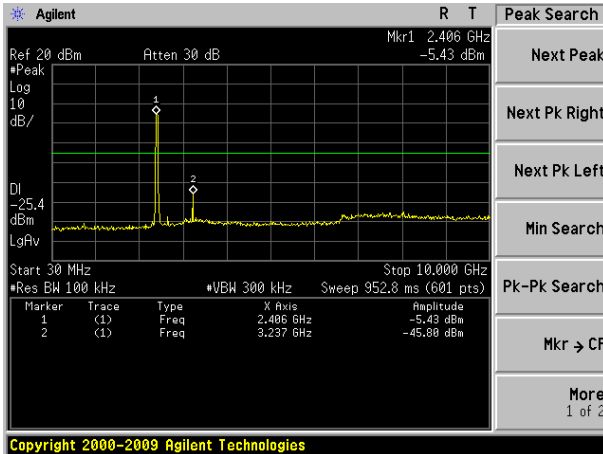
30MHz~10GHz



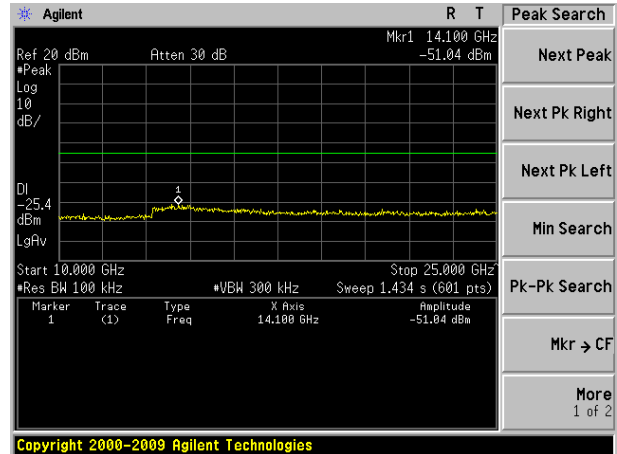
10GHz~25GHz

Test mode:	802.11n(HT40)
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## Lowest channel

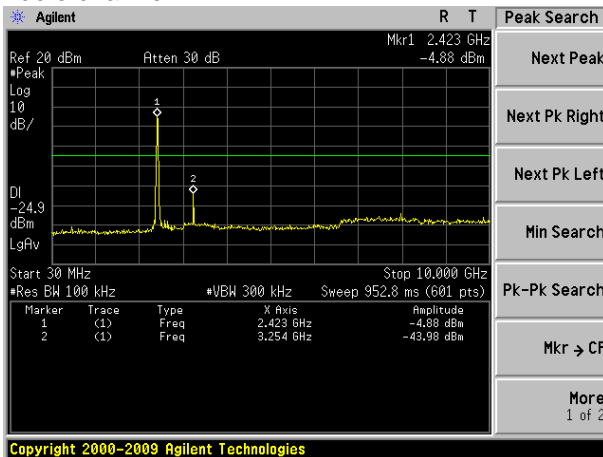


30MHz~10GHz

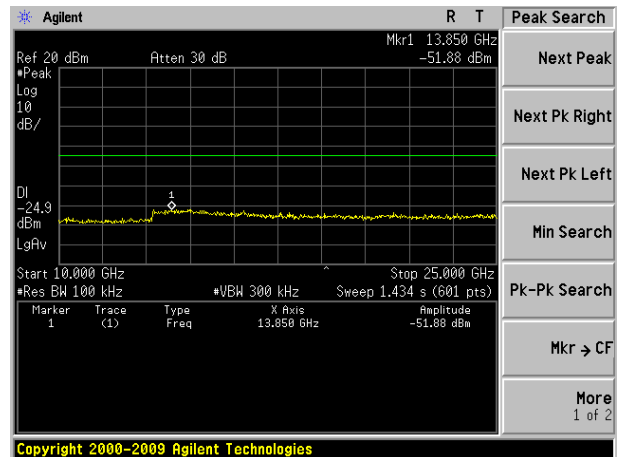


10GHz~25GHz

## Middle channel

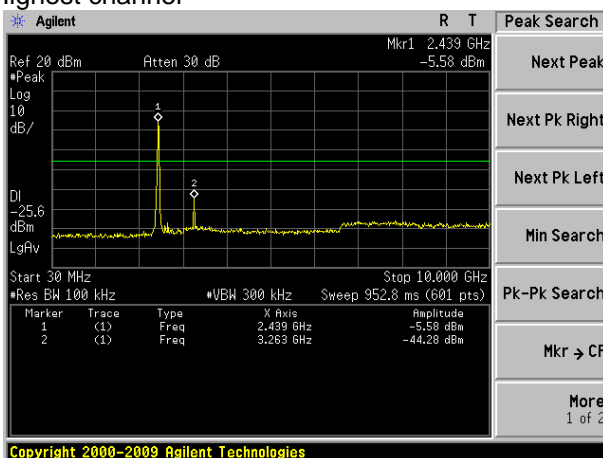


30MHz~10GHz

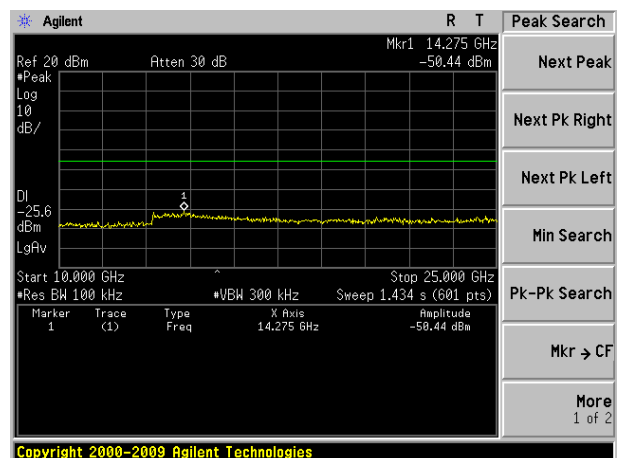


10GHz~25GHz

## Highest channel



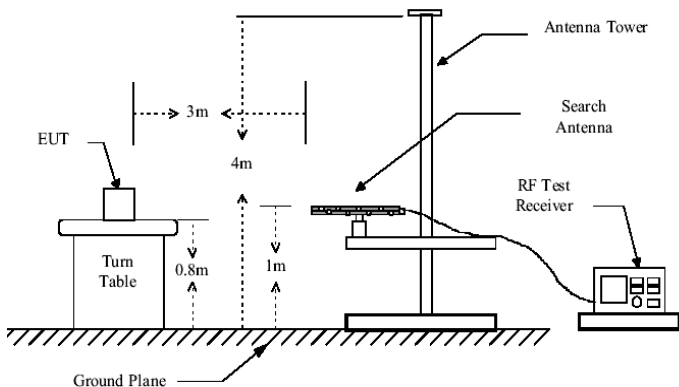
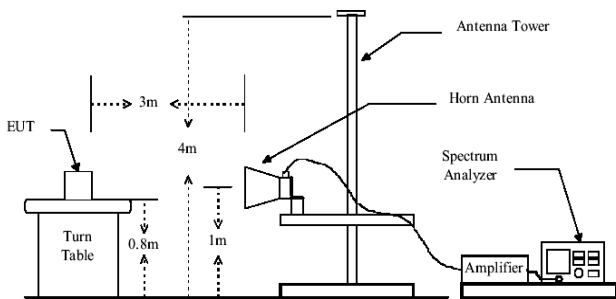
30MHz~10GHz



10GHz~25GHz



## 7.7.2 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209				
Test Method:	ANSI C63.4: 2003				
Test Frequency Range:	30MHz to 25GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Value
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
		Peak	1MHz	10Hz	Average
Limit:	Frequency		Limit (dBuV/m @3m)		Value
	30MHz-88MHz		40.00		Quasi-peak
	88MHz-216MHz		43.50		Quasi-peak
	216MHz-960MHz		46.00		Quasi-peak
	960MHz-1GHz		54.00		Quasi-peak
	Above 1GHz		54.00		Average
			74.00		Peak
Test setup:	Below 1GHz				
					
	Above 1GHz				
					

Test Procedure:	<ol style="list-style-type: none"> <li>1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</li> <li>3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.</li> <li>4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.</li> <li>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li> <li>6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</li> <li>7. The radiation measurements are performed in X, Y, Z axis positioning. And found the Y axis positioning which it is worse case, only the test worst case mode is recorded in the report.</li> </ol>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

*Remark:*

*Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.*

## Measurement Data

### ■ Below 1GHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
38.62	52.99	15.25	0.65	32.06	36.83	40.00	-3.17	Vertical
51.84	50.00	15.16	0.79	31.96	33.99	40.00	-6.01	Vertical
132.22	52.37	10.77	1.45	31.91	32.68	43.50	-10.82	Vertical
191.07	48.10	12.56	1.80	32.11	30.35	43.50	-13.15	Vertical
455.91	46.77	17.58	3.11	31.70	35.76	46.00	-10.24	Vertical
506.48	46.07	18.74	3.33	31.53	36.61	46.00	-9.39	Vertical
38.89	40.40	15.30	0.65	32.06	24.29	40.00	-15.71	Horizontal
62.00	43.84	13.90	0.88	31.93	26.69	40.00	-13.31	Horizontal
131.76	47.16	10.82	1.45	31.91	27.52	43.50	-15.98	Horizontal
202.81	50.48	12.64	1.86	32.14	32.84	43.50	-10.66	Horizontal
252.95	49.40	14.06	2.14	32.16	33.44	46.00	-12.56	Horizontal
455.91	44.67	17.58	3.11	31.70	33.66	46.00	-12.34	Horizontal

## ■ Above 1GHz

Test mode:	802.11b	Test channel:	Lowest
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### Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4824.00	41.12	31.79	8.62	32.10	49.43	74.00	-24.57	Vertical
7236.00	34.74	36.19	11.68	31.97	50.64	74.00	-23.36	Vertical
9648.00	33.09	38.07	14.16	31.56	53.76	74.00	-20.24	Vertical
12060.00	*					74.00		Vertical
14472.00	*					74.00		Vertical
16884.00	*					74.00		Vertical
4824.00	39.66	31.79	8.62	32.10	47.97	74.00	-26.03	Horizontal
7236.00	34.43	36.19	11.68	31.97	50.33	74.00	-23.67	Horizontal
9648.00	32.64	38.07	14.16	31.56	53.31	74.00	-20.69	Horizontal
12060.00	*					74.00		Horizontal
14472.00	*					74.00		Horizontal
16884.00	*					74.00		Horizontal

### Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4824.00	30.14	31.79	8.62	32.10	38.45	54.00	-15.55	Vertical
7236.00	23.59	36.19	11.68	31.97	39.49	54.00	-14.51	Vertical
9648.00	23.42	38.07	14.16	31.56	44.09	54.00	-9.91	Vertical
12060.00	*					54.00		Vertical
14472.00	*					54.00		Vertical
16884.00	*					54.00		Vertical
4824.00	29.16	31.79	8.62	32.10	37.47	54.00	-16.53	Horizontal
7236.00	22.99	36.19	11.68	31.97	38.89	54.00	-15.11	Horizontal
9648.00	22.37	38.07	14.16	31.56	43.04	54.00	-10.96	Horizontal
12060.00	*					54.00		Horizontal
14472.00	*					54.00		Horizontal
16884.00	*					54.00		Horizontal

### Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. “\*”, means this data is the too weak instrument of signal is unable to test.

Test mode:	802.11b	Test channel:	Middle
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## Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4874.00	40.04	31.85	8.66	32.12	48.43	74.00	-25.57	Vertical
7311.00	34.72	36.37	11.71	31.91	50.89	74.00	-23.11	Vertical
9748.00	34.04	38.27	14.25	31.56	55.00	74.00	-19.00	Vertical
12185.00	*					74.00		Vertical
14622.00	*					74.00		Vertical
17059.00	*					74.00		Vertical
4874.00	40.41	31.85	8.66	32.12	48.80	74.00	-25.20	Horizontal
7311.00	33.31	36.37	11.71	31.91	49.48	74.00	-24.52	Horizontal
9748.00	33.91	38.27	14.25	31.56	54.87	74.00	-19.13	Horizontal
12185.00	*					74.00		Horizontal
14622.00	*					74.00		Horizontal
17059.00	*					74.00		Horizontal

## Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4874.00	30.84	31.85	8.66	32.12	39.23	54.00	-14.77	Vertical
7311.00	23.02	36.37	11.71	31.91	39.19	54.00	-14.81	Vertical
9748.00	23.28	38.27	14.25	31.56	44.24	54.00	-9.76	Vertical
12185.00	*					54.00		Vertical
14622.00	*					54.00		Vertical
17059.00	*					54.00		Vertical
4874.00	30.49	31.85	8.66	32.12	38.88	54.00	-15.12	Horizontal
7311.00	22.39	36.37	11.71	31.91	38.56	54.00	-15.44	Horizontal
9748.00	23.61	38.27	14.25	31.56	44.57	54.00	-9.43	Horizontal
12185.00	*					54.00		Horizontal
14622.00	*					54.00		Horizontal
17059.00	*					54.00		Horizontal

## Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. “\*”, means this data is the too weak instrument of signal is unable to test.

Test mode:	802.11b	Test channel:	Highest
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## Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4924.00	46.06	31.90	8.70	32.15	54.51	74.00	-19.49	Vertical
7386.00	35.71	36.49	11.76	31.83	52.13	74.00	-21.87	Vertical
9848.00	35.10	38.62	14.31	31.77	56.26	74.00	-17.74	Vertical
12310.00	*					74.00		Vertical
14772.00	*					74.00		Vertical
17234.00	*					74.00		Vertical
4924.00	45.18	31.90	8.70	32.15	53.63	74.00	-20.37	Horizontal
7386.00	34.52	36.49	11.76	31.83	50.94	74.00	-23.06	Horizontal
9848.00	33.69	38.62	14.31	31.77	54.85	74.00	-19.15	Horizontal
12310.00	*					74.00		Horizontal
14772.00	*					74.00		Horizontal
17234.00	*					74.00		Horizontal

## Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4924.00	36.89	31.90	8.70	32.15	45.34	54.00	-8.66	Vertical
7386.00	25.60	36.49	11.76	31.83	42.02	54.00	-11.98	Vertical
9848.00	23.71	38.62	14.31	31.77	44.87	54.00	-9.13	Vertical
12310.00	*					54.00		Vertical
14772.00	*					54.00		Vertical
17234.00	*					54.00		Vertical
4924.00	35.49	31.90	8.70	32.15	43.94	54.00	-10.06	Horizontal
7386.00	23.89	36.49	11.76	31.83	40.31	54.00	-13.69	Horizontal
9848.00	22.93	38.62	14.31	31.77	44.09	54.00	-9.91	Horizontal
12310.00	*					54.00		Horizontal
14772.00	*					54.00		Horizontal
17234.00	*					54.00		Horizontal

## Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. “\*”, means this data is the too weak instrument of signal is unable to test.

Test mode:	802.11g	Test channel:	lowest
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## Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4824.00	40.11	31.79	8.62	32.10	48.42	74.00	-25.58	Vertical
7236.00	34.11	36.19	11.68	31.97	50.01	74.00	-23.99	Vertical
9648.00	32.63	38.07	14.16	31.56	53.30	74.00	-20.70	Vertical
12060.00	*					74.00		Vertical
14472.00	*					74.00		Vertical
16884.00	*					74.00		Vertical
4824.00	38.81	31.79	8.62	32.10	47.12	74.00	-26.88	Horizontal
7236.00	33.87	36.19	11.68	31.97	49.77	74.00	-24.23	Horizontal
9648.00	32.22	38.07	14.16	31.56	52.89	74.00	-21.11	Horizontal
12060.00	*					74.00		Horizontal
14472.00	*					74.00		Horizontal
16884.00	*					74.00		Horizontal

## Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4824.00	29.21	31.79	8.62	32.10	37.52	54.00	-16.48	Vertical
7236.00	22.98	36.19	11.68	31.97	38.88	54.00	-15.12	Vertical
9648.00	22.98	38.07	14.16	31.56	43.65	54.00	-10.35	Vertical
12060.00	*					54.00		Vertical
14472.00	*					54.00		Vertical
16884.00	*					54.00		Vertical
4824.00	28.36	31.79	8.62	32.10	36.67	54.00	-17.33	Horizontal
7236.00	22.45	36.19	11.68	31.97	38.35	54.00	-15.65	Horizontal
9648.00	21.97	38.07	14.16	31.56	42.64	54.00	-11.36	Horizontal
12060.00	*					54.00		Horizontal
14472.00	*					54.00		Horizontal
16884.00	*					54.00		Horizontal

## Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. “\*”, means this data is the too weak instrument of signal is unable to test.

Test mode:	802.11g	Test channel:	Middle
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## Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4874.00	39.20	31.85	8.66	32.12	47.59	74.00	-26.41	Vertical
7311.00	34.20	36.37	11.71	31.91	50.37	74.00	-23.63	Vertical
9748.00	33.67	38.27	14.25	31.56	54.63	74.00	-19.37	Vertical
12185.00	*					74.00		Vertical
14622.00	*					74.00		Vertical
17059.00	*					74.00		Vertical
4874.00	39.70	31.85	8.66	32.12	48.09	74.00	-25.91	Horizontal
7311.00	32.85	36.37	11.71	31.91	49.02	74.00	-24.98	Horizontal
9748.00	33.56	38.27	14.25	31.56	54.52	74.00	-19.48	Horizontal
12185.00	*					74.00		Horizontal
14622.00	*					74.00		Horizontal
17059.00	*					74.00		Horizontal

## Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4874.00	30.07	31.85	8.66	32.12	38.46	54.00	-15.54	Vertical
7311.00	22.52	36.37	11.71	31.91	38.69	54.00	-15.31	Vertical
9748.00	22.92	38.27	14.25	31.56	43.88	54.00	-10.12	Vertical
12185.00	*					54.00		Vertical
14622.00	*					54.00		Vertical
17059.00	*					54.00		Vertical
4874.00	29.82	31.85	8.66	32.12	38.21	54.00	-15.79	Horizontal
7311.00	21.94	36.37	11.71	31.91	38.11	54.00	-15.89	Horizontal
9748.00	23.28	38.27	14.25	31.56	44.24	54.00	-9.76	Horizontal
12185.00	*					54.00		Horizontal
14622.00	*					54.00		Horizontal
17059.00	*					54.00		Horizontal

## Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. “\*”, means this data is the too weak instrument of signal is unable to test.



Test mode:	802.11g	Test channel:	Highest
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**Peak value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4924.00	44.63	31.90	8.70	32.15	53.08	74.00	-20.92	Vertical
7386.00	34.80	36.49	11.76	31.83	51.22	74.00	-22.78	Vertical
9848.00	34.45	38.62	14.31	31.77	55.61	74.00	-18.39	Vertical
12310.00	*					74.00		Vertical
14772.00	*					74.00		Vertical
17234.00	*					74.00		Vertical
4924.00	43.97	31.90	8.70	32.15	52.42	74.00	-21.58	Horizontal
7386.00	33.73	36.49	11.76	31.83	50.15	74.00	-23.85	Horizontal
9848.00	33.09	38.62	14.31	31.77	54.25	74.00	-19.75	Horizontal
12310.00	*					74.00		Horizontal
14772.00	*					74.00		Horizontal
17234.00	*					74.00		Horizontal

**Average value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4924.00	35.56	31.90	8.70	32.15	44.01	54.00	-9.99	Vertical
7386.00	24.73	36.49	11.76	31.83	41.15	54.00	-12.85	Vertical
9848.00	23.09	38.62	14.31	31.77	44.25	54.00	-9.75	Vertical
12310.00	*					54.00		Vertical
14772.00	*					54.00		Vertical
17234.00	*					54.00		Vertical
4924.00	34.35	31.90	8.70	32.15	42.80	54.00	-11.20	Horizontal
7386.00	23.12	36.49	11.76	31.83	39.54	54.00	-14.46	Horizontal
9848.00	22.36	38.62	14.31	31.77	43.52	54.00	-10.48	Horizontal
12310.00	*					54.00		Horizontal
14772.00	*					54.00		Horizontal
17234.00	*					54.00		Horizontal

**Remark:**

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. “\*”, means this data is the too weak instrument of signal is unable to test.

Test mode:	802.11n(HT20)	Test channel:	Lowest
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**Peak value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4824.00	39.59	31.79	8.62	32.10	47.90	74.00	-26.10	Vertical
7236.00	33.77	36.19	11.68	31.97	49.67	74.00	-24.33	Vertical
9648.00	32.40	38.07	14.16	31.56	53.07	74.00	-20.93	Vertical
12060.00	*					74.00		Vertical
14472.00	*					74.00		Vertical
16884.00	*					74.00		Vertical
4824.00	38.37	31.79	8.62	32.10	46.68	74.00	-27.32	Horizontal
7236.00	33.58	36.19	11.68	31.97	49.48	74.00	-24.52	Horizontal
9648.00	32.00	38.07	14.16	31.56	52.67	74.00	-21.33	Horizontal
12060.00	*					74.00		Horizontal
14472.00	*					74.00		Horizontal
16884.00	*					74.00		Horizontal

**Average value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4824.00	28.73	31.79	8.62	32.10	37.04	54.00	-16.96	Vertical
7236.00	22.66	36.19	11.68	31.97	38.56	54.00	-15.44	Vertical
9648.00	22.76	38.07	14.16	31.56	43.43	54.00	-10.57	Vertical
12060.00	*					54.00		Vertical
14472.00	*					54.00		Vertical
16884.00	*					54.00		Vertical
4824.00	27.94	31.79	8.62	32.10	36.25	54.00	-17.75	Horizontal
7236.00	22.17	36.19	11.68	31.97	38.07	54.00	-15.93	Horizontal
9648.00	21.76	38.07	14.16	31.56	42.43	54.00	-11.57	Horizontal
12060.00	*					54.00		Horizontal
14472.00	*					54.00		Horizontal
16884.00	*					54.00		Horizontal

**Remark:**

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. “\*”, means this data is the too weak instrument of signal is unable to test.

Test mode:	802.11n(HT20)	Test channel:	Middle
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**Peak value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4874.00	38.77	31.85	8.66	32.12	47.16	74.00	-26.84	Vertical
7311.00	33.92	36.37	11.71	31.91	50.09	74.00	-23.91	Vertical
9748.00	33.47	38.27	14.25	31.56	54.43	74.00	-19.57	Vertical
12185.00	*					74.00		Vertical
14622.00	*					74.00		Vertical
17059.00	*					74.00		Vertical
4874.00	39.34	31.85	8.66	32.12	47.73	74.00	-26.27	Horizontal
7311.00	32.61	36.37	11.71	31.91	48.78	74.00	-25.22	Horizontal
9748.00	33.38	38.27	14.25	31.56	54.34	74.00	-19.66	Horizontal
12185.00	*					74.00		Horizontal
14622.00	*					74.00		Horizontal
17059.00	*					74.00		Horizontal

**Average value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4874.00	29.67	31.85	8.66	32.12	38.06	54.00	-15.94	Vertical
7311.00	22.25	36.37	11.71	31.91	38.42	54.00	-15.58	Vertical
9748.00	22.73	38.27	14.25	31.56	43.69	54.00	-10.31	Vertical
12185.00	*					54.00		Vertical
14622.00	*					54.00		Vertical
17059.00	*					54.00		Vertical
4874.00	29.48	31.85	8.66	32.12	37.87	54.00	-16.13	Horizontal
7311.00	21.71	36.37	11.71	31.91	37.88	54.00	-16.12	Horizontal
9748.00	23.10	38.27	14.25	31.56	44.06	54.00	-9.94	Horizontal
12185.00	*					54.00		Horizontal
14622.00	*					54.00		Horizontal
17059.00	*					54.00		Horizontal

**Remark:**

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. “\*”, means this data is the too weak instrument of signal is unable to test.

Test mode:	802.11n(HT20)	Test channel:	Highest
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## Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4924.00	43.88	31.90	8.70	32.15	52.33	74.00	-21.67	4924.00
7386.00	34.33	36.49	11.76	31.83	50.75	74.00	-23.25	7386.00
9848.00	34.11	38.62	14.31	31.77	55.27	74.00	-18.73	9848.00
12310.00	*					74.00		Vertical
14772.00	*					74.00		Vertical
17234.00	*					74.00		Vertical
4924.00	43.34	31.90	8.70	32.15	51.79	74.00	-22.21	Horizontal
7386.00	33.31	36.49	11.76	31.83	49.73	74.00	-24.27	Horizontal
9848.00	32.78	38.62	14.31	31.77	53.94	74.00	-20.06	Horizontal
12310.00	*					74.00		Horizontal
14772.00	*					74.00		Horizontal
17234.00	*					74.00		Horizontal

## Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4924.00	34.87	31.90	8.70	32.15	43.32	54.00	-10.68	Vertical
7386.00	24.27	36.49	11.76	31.83	40.69	54.00	-13.31	Vertical
9848.00	22.76	38.62	14.31	31.77	43.92	54.00	-10.08	Vertical
12310.00	*					54.00		Vertical
14772.00	*					54.00		Vertical
17234.00	*					54.00		Vertical
4924.00	33.76	31.90	8.70	32.15	42.21	54.00	-11.79	Horizontal
7386.00	22.72	36.49	11.76	31.83	39.14	54.00	-14.86	Horizontal
9848.00	22.06	38.62	14.31	31.77	43.22	54.00	-10.78	Horizontal
12310.00	*					54.00		Horizontal
14772.00	*					54.00		Horizontal
17234.00	*					54.00		Horizontal

## Remark:

- 1 Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
- 2 “\*”, means this data is the too weak instrument of signal is unable to test.

Test mode:	802.11n(HT40)	Test channel:	Lowest
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**Peak value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4844.00	39.53	31.81	8.63	32.11	47.86	74.00	-26.14	Vertical
7266.00	33.74	36.28	11.69	31.94	49.77	74.00	-24.23	Vertical
9688.00	32.37	38.13	14.21	31.52	53.19	74.00	-20.81	Vertical
12060.00	*					74.00		Vertical
14472.00	*					74.00		Vertical
16884.00	*					74.00		Vertical
4844.00	38.32	31.81	8.63	32.11	46.65	74.00	-27.35	Horizontal
7266.00	33.55	36.28	11.69	31.94	49.58	74.00	-24.42	Horizontal
9688.00	31.98	38.13	14.21	31.52	52.80	74.00	-21.20	Horizontal
12060.00	*					74.00		Horizontal
14472.00	*					74.00		Horizontal
16884.00	*					74.00		Horizontal

**Average value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4844.00	28.68	31.81	8.63	32.11	37.01	54.00	-16.99	Vertical
7266.00	22.62	36.28	11.69	31.94	38.65	54.00	-15.35	Vertical
9688.00	22.73	38.13	14.21	31.52	43.55	54.00	-10.45	Vertical
12060.00	*					54.00		Vertical
14472.00	*					54.00		Vertical
16884.00	*					54.00		Vertical
4844.00	27.90	31.81	8.63	32.11	36.23	54.00	-17.77	Horizontal
7266.00	22.14	36.28	11.69	31.94	38.17	54.00	-15.83	Horizontal
9688.00	21.73	38.13	14.21	31.52	42.55	54.00	-11.45	Horizontal
12060.00	*					54.00		Horizontal
14472.00	*					54.00		Horizontal
16884.00	*					54.00		Horizontal

**Remark:**

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. “\*”, means this data is the too weak instrument of signal is unable to test.

Test mode:	802.11n(HT40)	Test channel:	Middle
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**Peak value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4874.00	38.72	31.85	8.66	32.12	47.11	74.00	-26.89	Vertical
7311.00	33.89	36.37	11.71	31.91	50.06	74.00	-23.94	Vertical
9748.00	33.45	38.27	14.25	31.56	54.41	74.00	-19.59	Vertical
12185.00	*					74.00		Vertical
14622.00	*					74.00		Vertical
17059.00	*					74.00		Vertical
4874.00	39.30	31.85	8.66	32.12	47.69	74.00	-26.31	Horizontal
7311.00	32.58	36.37	11.71	31.91	48.75	74.00	-25.25	Horizontal
9748.00	33.36	38.27	14.25	31.56	54.32	74.00	-19.68	Horizontal
12185.00	*					74.00		Horizontal
14622.00	*					74.00		Horizontal
17059.00	*					74.00		Horizontal

**Average value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4874.00	29.62	31.85	8.66	32.12	38.01	54.00	-15.99	Vertical
7311.00	22.22	36.37	11.71	31.91	38.39	54.00	-15.61	Vertical
9748.00	22.71	38.27	14.25	31.56	43.67	54.00	-10.33	Vertical
12185.00	*					54.00		Vertical
14622.00	*					54.00		Vertical
17059.00	*					54.00		Vertical
4874.00	29.44	31.85	8.66	32.12	37.83	54.00	-16.17	Horizontal
7311.00	21.68	36.37	11.71	31.91	37.85	54.00	-16.15	Horizontal
9748.00	23.08	38.27	14.25	31.56	44.04	54.00	-9.96	Horizontal
12185.00	*					54.00		Horizontal
14622.00	*					54.00		Horizontal
17059.00	*					54.00		Horizontal

**Remark:**

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. “\*”, means this data is the too weak instrument of signal is unable to test.

Test mode:	802.11n(HT40)	Test channel:	Highest
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## Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4904.00	43.80	31.88	8.68	32.13	52.23	74.00	-21.77	Vertical
7356.00	34.28	36.45	11.75	31.86	50.62	74.00	-23.38	Vertical
9808.00	34.07	38.43	14.29	31.68	55.11	74.00	-18.89	Vertical
12310.00	*					74.00		Vertical
14772.00	*					74.00		Vertical
17234.00	*					74.00		Vertical
4904.00	43.27	31.88	8.68	32.13	51.70	74.00	-22.30	Horizontal
7356.00	33.27	36.45	11.75	31.86	49.61	74.00	-24.39	Horizontal
9808.00	32.75	38.43	14.29	31.68	53.79	74.00	-20.21	Horizontal
12310.00	*					74.00		Horizontal
14772.00	*					74.00		Horizontal
17234.00	*					74.00		Horizontal

## Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4904.00	34.80	31.88	8.68	32.13	43.23	54.00	-10.77	Vertical
7356.00	24.22	36.45	11.75	31.86	40.56	54.00	-13.44	Vertical
9808.00	22.73	38.43	14.29	31.68	43.77	54.00	-10.23	Vertical
12310.00	*					54.00		Vertical
14772.00	*					54.00		Vertical
17234.00	*					54.00		Vertical
4904.00	33.69	31.88	8.68	32.13	42.12	54.00	-11.88	Horizontal
7356.00	22.67	36.45	11.75	31.86	39.01	54.00	-14.99	Horizontal
9808.00	22.02	38.43	14.29	31.68	43.06	54.00	-10.94	Horizontal
12310.00	*					54.00		Horizontal
14772.00	*					54.00		Horizontal
17234.00	*					54.00		Horizontal

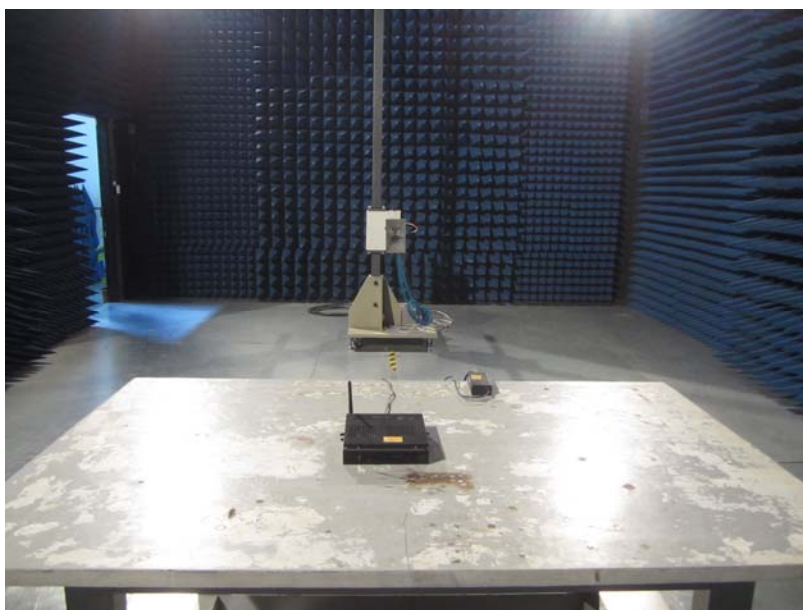
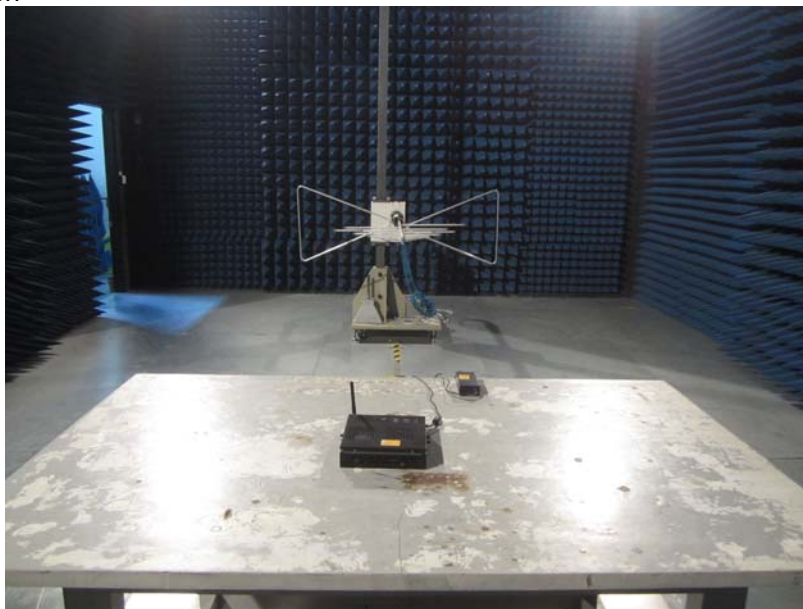
## Remark:

- 1 Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
- 2 “\*”, means this data is the too weak instrument of signal is unable to test.



## 8 Test Setup Photo

Radiated Emission

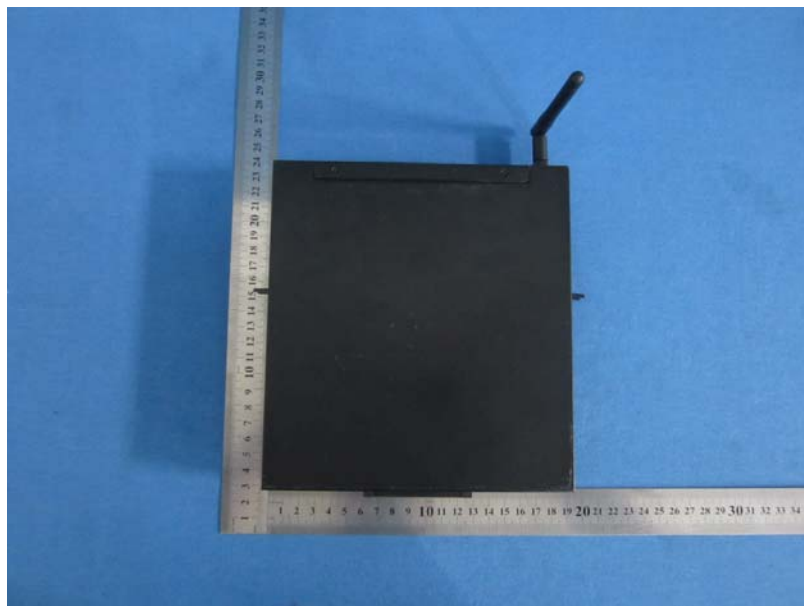


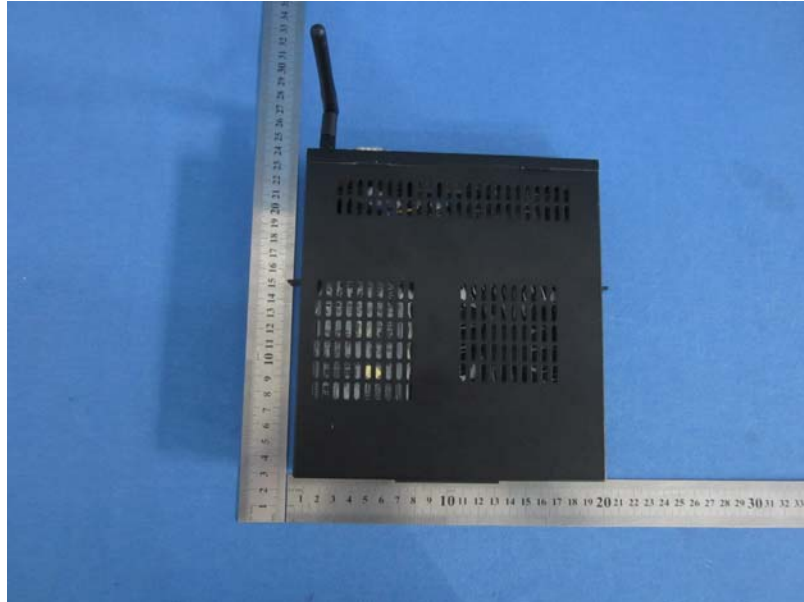


## Conducted Emission



## 9 EUT Constructional Details









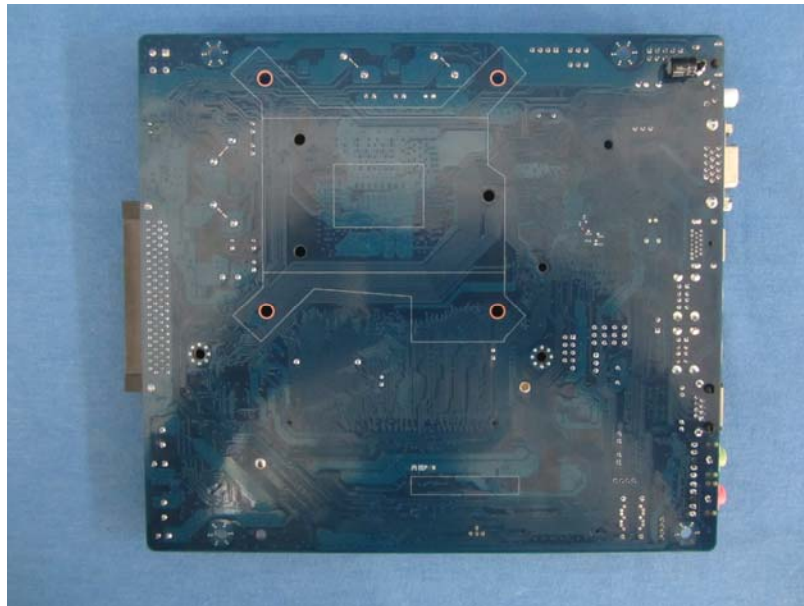








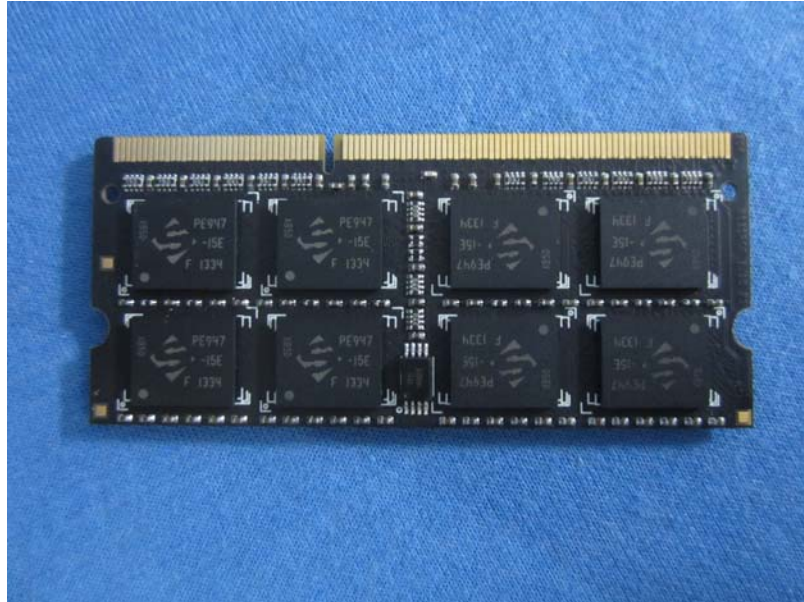












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