

FCC REPORT

Applicant: Shenzhen Autel Intelligent Tech. Co., Ltd.

Address of Applicant: Rm. 2205, Overseas Chinese Scholars Venture Bldg. Hi-tech Industrial Park Shenzhen China

Equipment Under Test (EUT)

Product Name: J2534 ECU Programming Device

Model No.: MaxiFlash Pro

FCC ID: WQ8-2012J2534

Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.247:2011

Date of sample receipt: December 14, 2012

Date of Test: January 04-07, 2013

Date of report issued: January 07, 2013

Test Result : PASS *

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

Authorized Signature:

A circular logo for GTS (Global United Technology Services Co., Ltd.) is overlaid with a handwritten signature in black ink. The logo contains the text 'GTS', 'GLOBAL TESTING', and 'UNITED TECHNOLOGY SERVICES CO., LTD.' around the perimeter.

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.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of GTS International Electrical Approvals or testing done by GTS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by GTS International Electrical Approvals in writing.

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2 Version

Version No.	Date	Description
00	January 07, 2013	Original

Prepared By:

hank. yan.

Date:

January 07, 2013

Project Engineer

Check By:

Hans. Hu

Date:

January 07, 2013

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 Autel Intelligent Tech. Co., Ltd.
Address of Applicant:	Rm. 2205, Overseas Chinese Scholars Venture Bldg. Hi-tech Industrial Park Shenzhen China
Manufacturer/Factory:	Shenzhen Autel Intelligent Tech. Co., Ltd.
Address of Manufacturer/Factory:	Rm. 2205, Overseas Chinese Scholars Venture Bldg. Hi-tech Industrial Park Shenzhen China

5.2 General Description of EUT

Product Name:	J2534 ECU Programming Device
Model No.:	MaxiFlash Pro
Operation Frequency:	802.11g/802.11n(HT20): 2412MHz~2462MHz
Channel numbers:	802.11g /802.11n(HT20): 11
Channel separation:	5MHz
Modulation technology:	802.11g/802.11n(H20): Orthogonal Frequency Division Multiplexing (OFDM)
Antenna Type:	Dedicated Antenna
Antenna gain:	2.5dBi
Power supply:	Model No. HK-AJ-120A200-DH Input: AC 100-240V 50/60Hz 0.8A Output: DC 12V 2A

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	X	

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)
	802.11g/802.11n(HT20)
Lowest channel	2412MHz
Middle channel	2437MHz
Highest channel	2462MHz

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	802.11g	802.11n(HT20)
Data rate	6Mbps	6.5Mbps

5.4 Description of Support Units

None.

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, July 20, 2010.

- **Industry Canada (IC)**

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-1.

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. 30 2011	Mar. 29 2013
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. 6, 2012	Dec. 5, 2013
4	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	Jul. 03 2012	Jul. 02 2013
5	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	Feb. 25 2012	Feb. 24 2013
6	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	June 29 2012	June 28 2013
7	Horn Antenna	ETS-LINDGREN	3160	GTS217	Mar. 30 2011	Mar. 29 2013
8	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
9	Coaxial Cable	GTS	N/A	GTS213	Mar. 31 2012	Mar. 30 2013
10	Coaxial Cable	GTS	N/A	GTS211	Mar. 31 2012	Mar. 30 2013
11	Coaxial cable	GTS	N/A	GTS210	Mar. 31 2012	Mar. 30 2013
12	Coaxial Cable	GTS	N/A	GTS212	Mar. 31 2012	Mar. 30 2013
13	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	Jul. 03 2012	Jul. 02 2013
14	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	Jul. 03 2012	Jul. 02 2013
15	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June 29 2012	June 28 2013
16	Band filter	Amindeon	82346	GTS219	Mar. 31 2012	Mar. 30 2013

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. 08 2011	Sep. 07 2013
2	EMI Test Receiver	Rohde & Schwarz	ESCS30	GTS223	Jul. 03 2012	Jul. 02 2013
3	10dB Pulse Limita	Rohde & Schwarz	N/A	GTS224	Jul. 03 2012	Jul. 02 2013
4	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	Jul. 03 2012	Jul. 02 2013
5	LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	GTS226	Jul. 03 2012	Jul. 02 2013
6	Coaxial Cable	GTS	N/A	GTS227	Jul. 03 2012	Jul. 02 2013
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 10 2012	July 09 2013

7 Test results and Measurement Data

7.1 Antenna requirement:

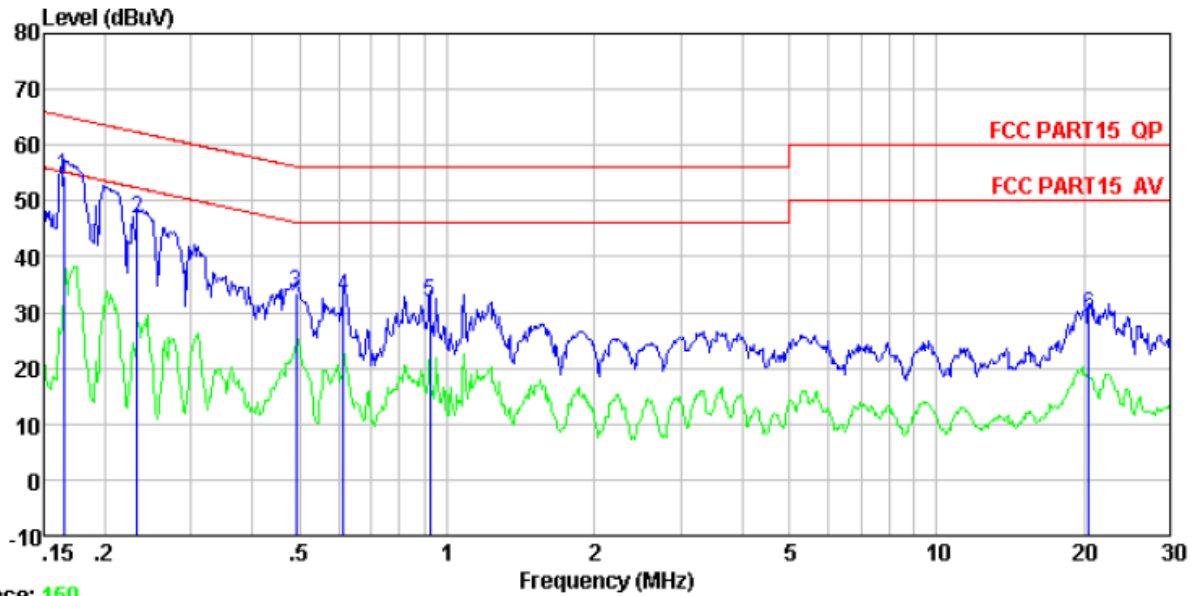
Standard requirement:	FCC Part15 C Section 15.203 /247(c)
<p>15.203 requirement:</p> <p>An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that 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>15.247(c) (1)(i) requirement:</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>E.U.T Antenna:</p> <p><i>The antenna is Dedicated Antenna(Revised SMA connector), the best case gain of the antenna is 2.5dBi</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:	<table border="1"> <thead> <tr> <th rowspan="2">Frequency range (MHz)</th> <th colspan="2">Limit (dBuV)</th> </tr> <tr> <th>Quasi-peak</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>0.15-0.5</td> <td>66 to 56*</td> <td>56 to 46*</td> </tr> <tr> <td>0.5-5</td> <td>56</td> <td>46</td> </tr> <tr> <td>5-30</td> <td>60</td> <td>50</td> </tr> </tbody> </table> <p>* Decreases with the logarithm of the frequency.</p>	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
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													
Test setup:	<p><i>Remark</i> E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p>														
Test procedure:	<ol style="list-style-type: none"> 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. 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). 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. 														
Test Instruments:	Refer to section 6.0 for details														
Test mode:	Refer to section 5.3 for details														
Test results:	Pass														

Measurement data

Line:

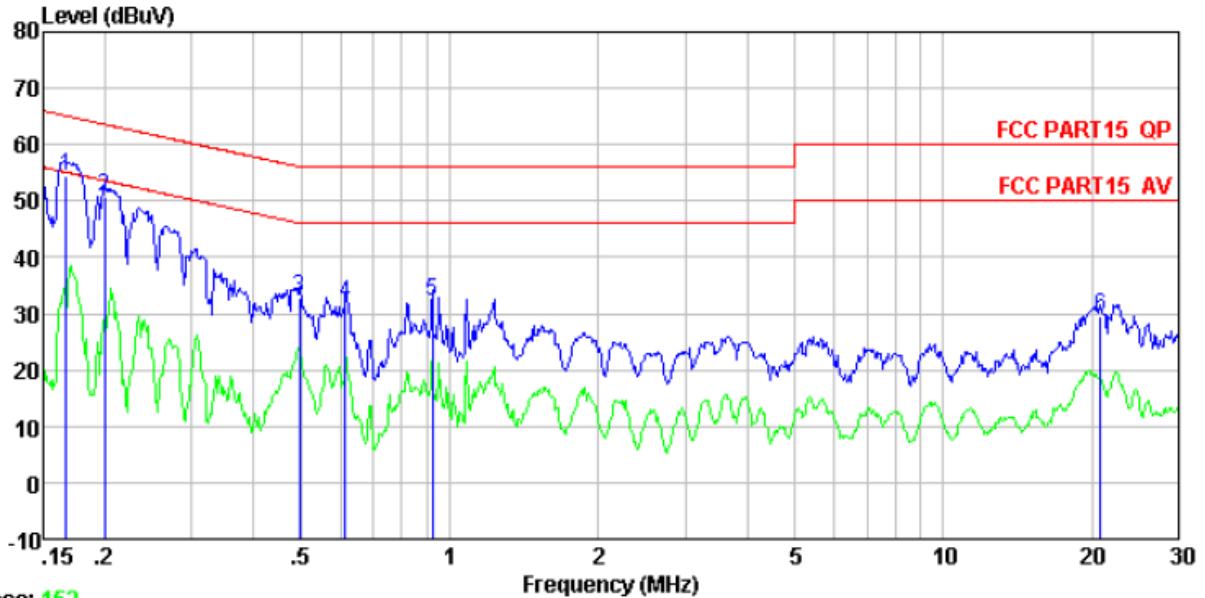


Trace: 150

Condition : FCC PART15 QP LISN-2012 LINE
 Job No. : 1463RF
 Test Mode : WiFi mode
 Test Engineer: Jim

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.165	54.48	-0.26	0.10	54.32	65.21	-10.89	QP
2	0.233	47.07	-0.23	0.10	46.94	62.35	-15.41	QP
3	0.491	33.61	-0.21	0.10	33.50	56.14	-22.64	QP
4	0.614	32.94	-0.20	0.10	32.84	56.00	-23.16	QP
5	0.923	32.07	-0.21	0.10	31.96	56.00	-24.04	QP
6	20.486	29.90	-0.64	0.21	29.47	60.00	-30.53	QP

Neutral:



Trace: 152

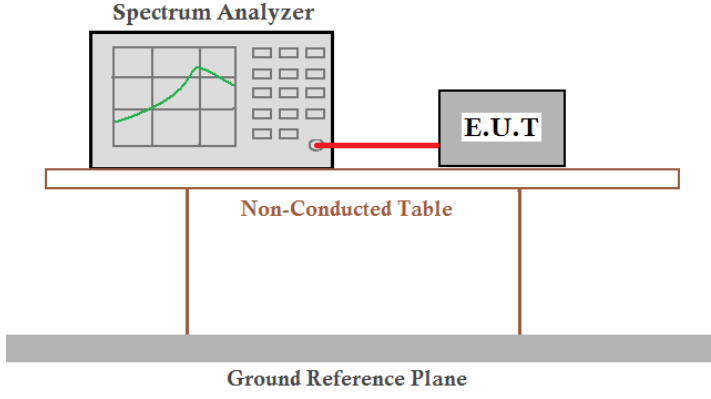
Condition : FCC PART15 QP LISN-2012 NEUTRAL
 Job No. : 1463RF
 Test Mode : WiFi mode
 Test Engineer: Jim

	Read	LISN	Cable	Limit	Over		
Freq	Level	Factor	Loss	Line	Limit	Remark	
MHz	dBuV	dB	dB	dBuV	dB		
1	0.167	54.45	-0.13	0.10	54.42	65.12	-10.70 QP
2	0.200	50.61	-0.09	0.10	50.62	63.62	-13.00 QP
3	0.497	32.89	-0.08	0.10	32.91	56.05	-23.14 QP
4	0.614	31.75	-0.08	0.10	31.77	56.00	-24.23 QP
5	0.923	32.13	-0.09	0.10	32.14	56.00	-23.86 QP
6	20.814	30.02	-0.55	0.21	29.68	60.00	-30.32 QP

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

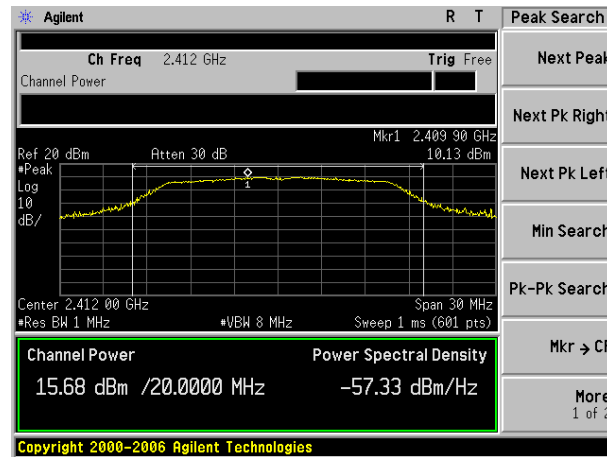
Test Requirement:	FCC Part15 C Section 15.247 (b)(3)
Test Method:	ANSI C63.4:2003 and KDB558074 D01 DTS Meas Guidance V02
Limit:	30dBm
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both are placed on a Non-Conducted Table, which 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

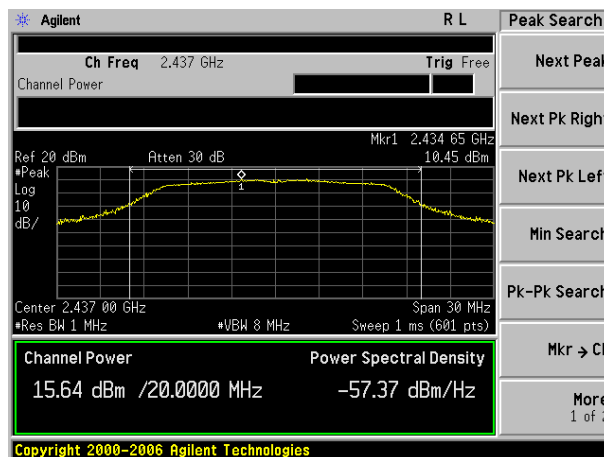
Test CH	Peak Output Power (dBm)		Limit(dBm)	Result
	802.11g	802.11n(HT20)		
Lowest	15.68	12.97	30.00	Pass
Middle	15.64	12.43		
Highest	15.87	12.73		

Test plot as follows:

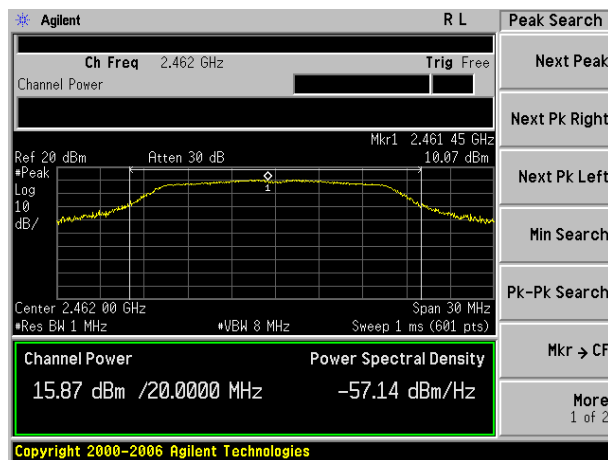
Test mode:	802.11g
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Lowest channel

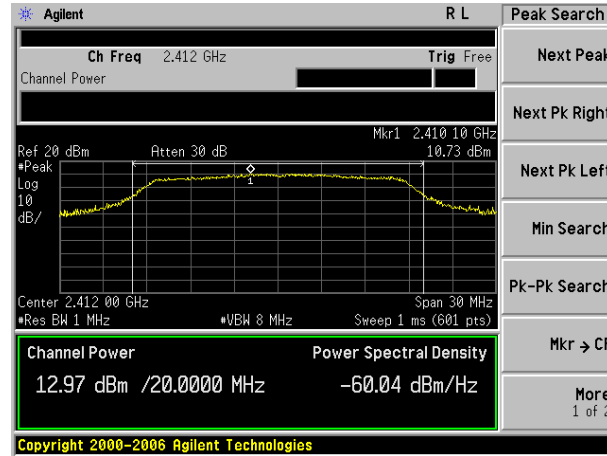


Middle channel

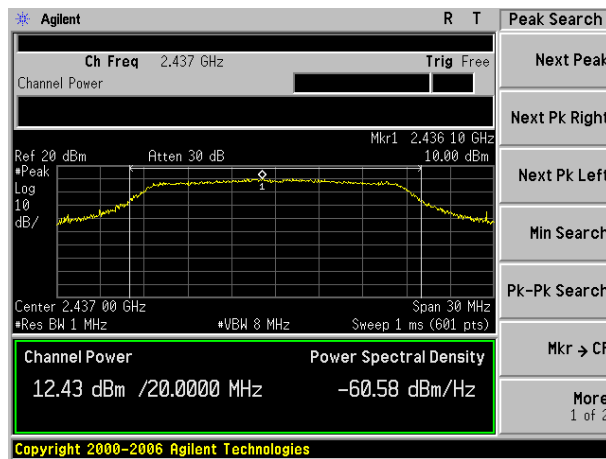


Highest channel

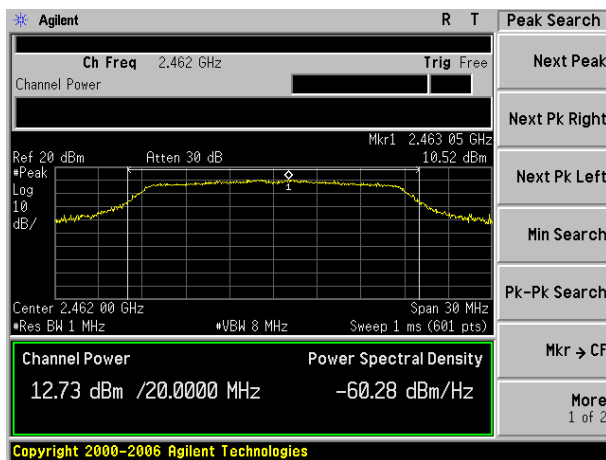
Test mode: 802.11n(HT20)



Lowest channel

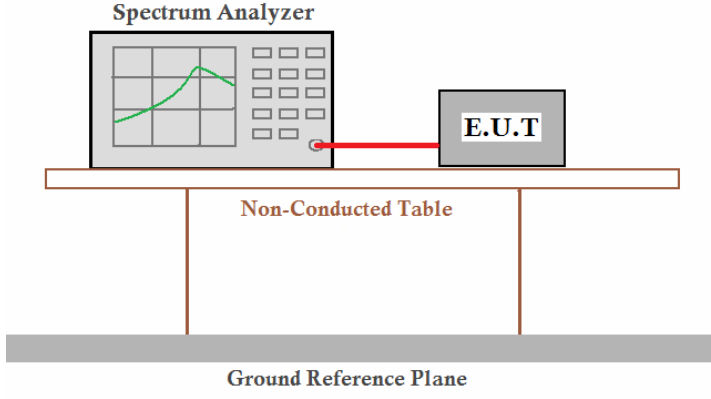


Middle channel



Highest channel

7.4 Channel Bandwidth

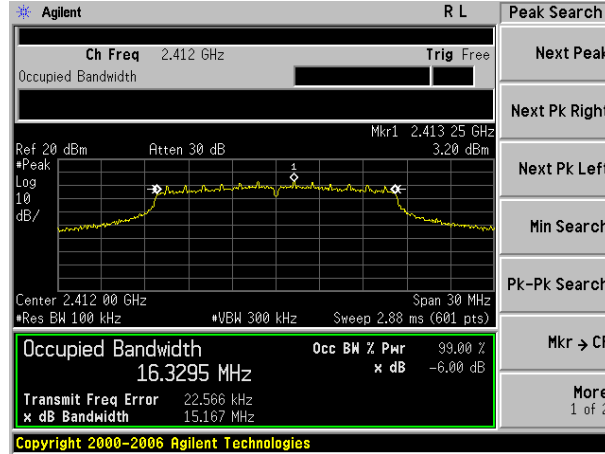
Test Requirement:	FCC Part15 C Section 15.247 (a)(2)
Test Method:	ANSI C63.4:2003 and KDB558074 D01 DTS Meas Guidance V02
Limit:	>500KHz
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both are placed on a Non-Conducted Table, which 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

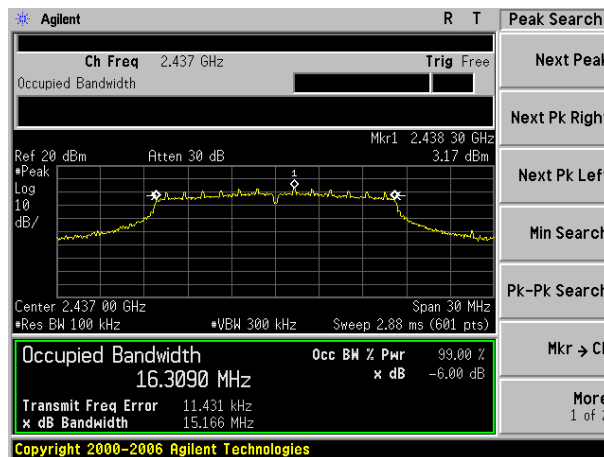
Test CH	Channel Bandwidth (MHz)		Limit(KHz)	Result
	802.11g	802.11n(HT20)		
Lowest	15.167	15.387	>500	Pass
Middle	15.166	15.405		
Highest	15.110	15.201		

Test plot as follows:

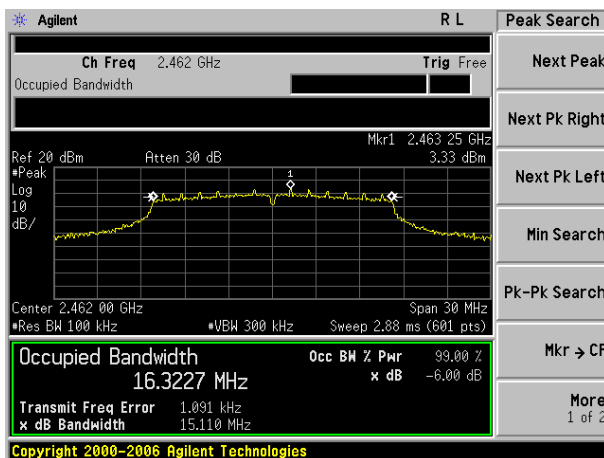
Test mode: 802.11g



Lowest channel

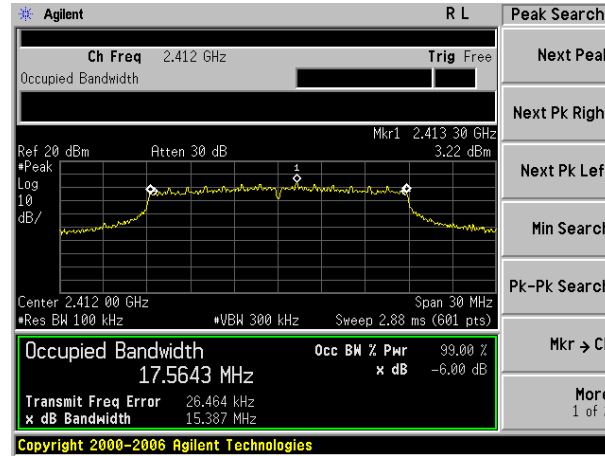


Middle channel

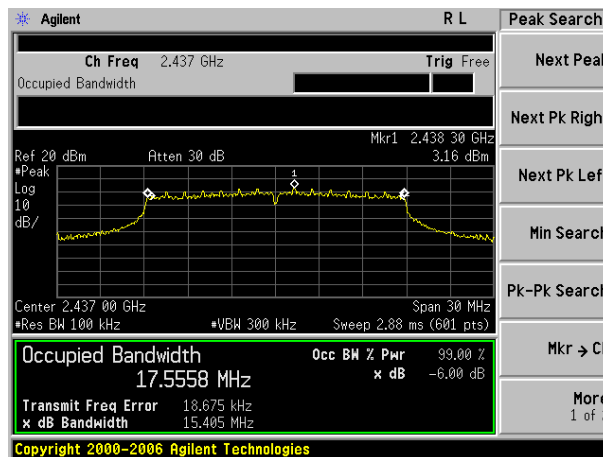


Highest channel

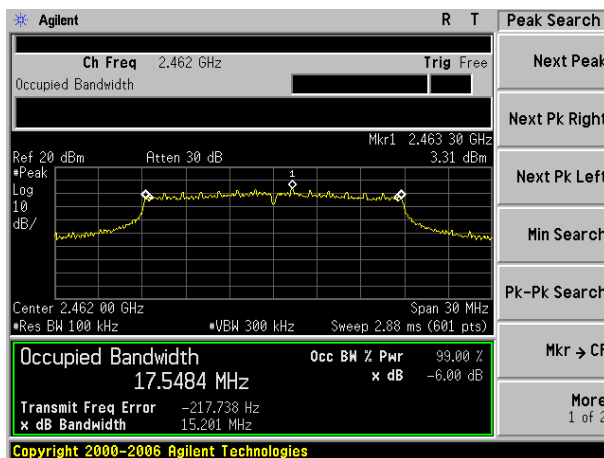
Test mode: 802.11n(HT20)



Lowest channel

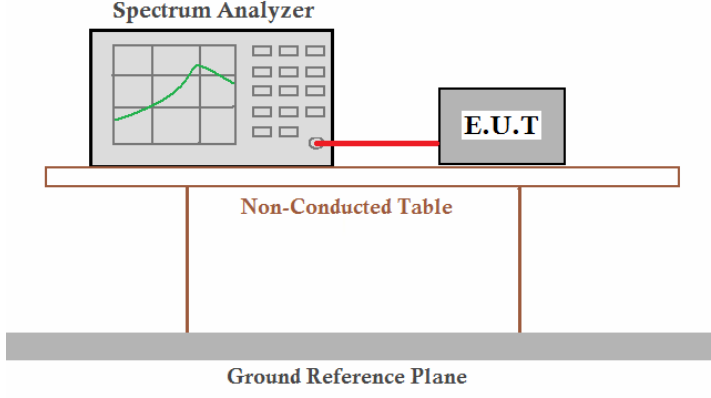


Middle channel



Highest channel

7.5 Power Spectral Density

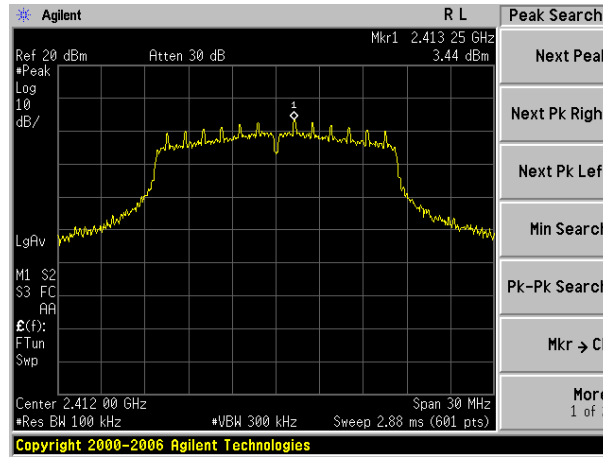
Test Requirement:	FCC Part15 C Section 15.247 (e)
Test Method:	ANSI C63.4:2003 and KDB558074 D01 DTS Meas Guidance V02
Limit:	8dBm
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both are placed on a Non-Conducted Table, which 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

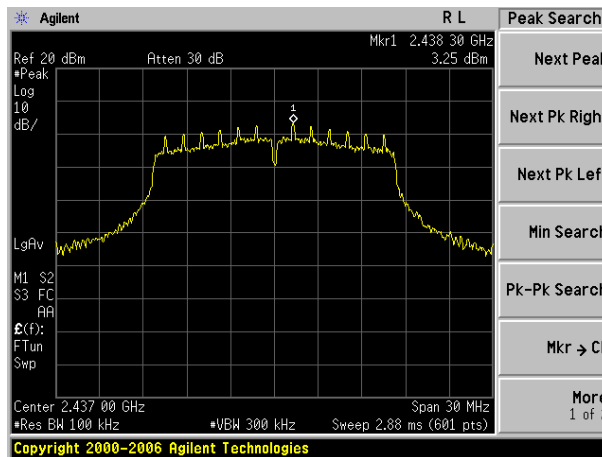
Test CH	Power Spectral Density		Limit(KHz)	Result
	802.11g	802.11n(HT20)		
Lowest	3.44	3.23	8.00	Pass
Middle	3.25	3.14		
Highest	3.68	3.39		

Test plot as follows:

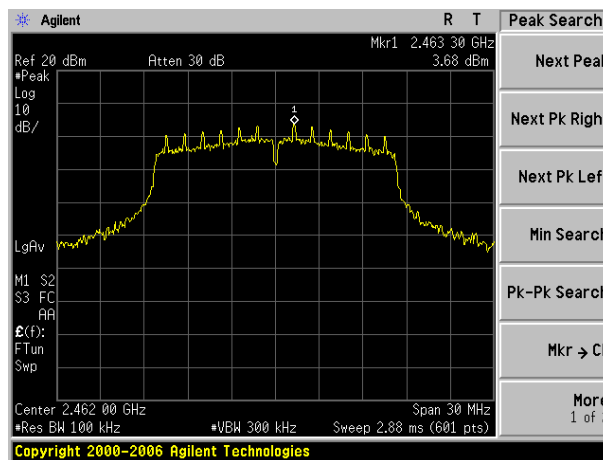
Test mode:	802.11g
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Lowest channel

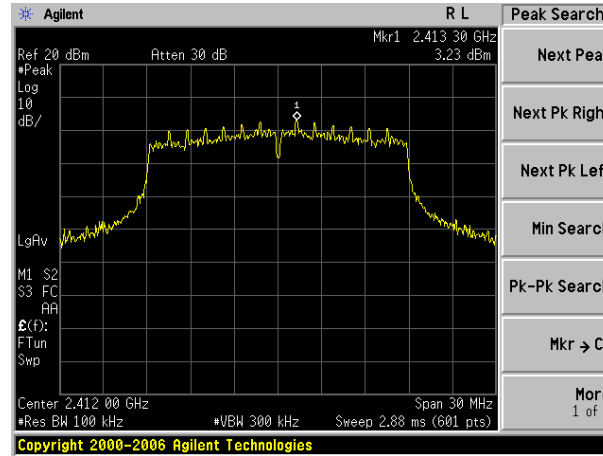


Middle channel

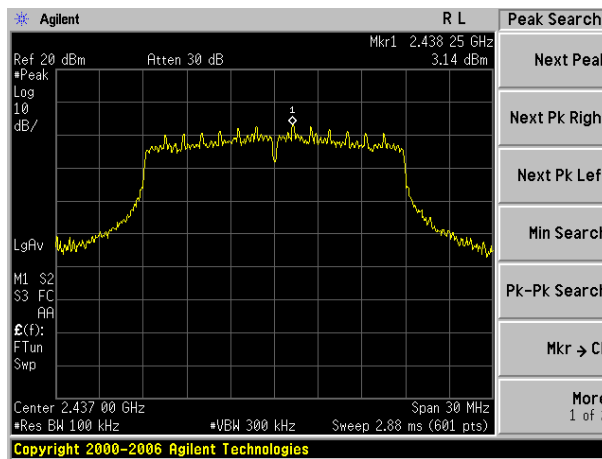


Highest channel

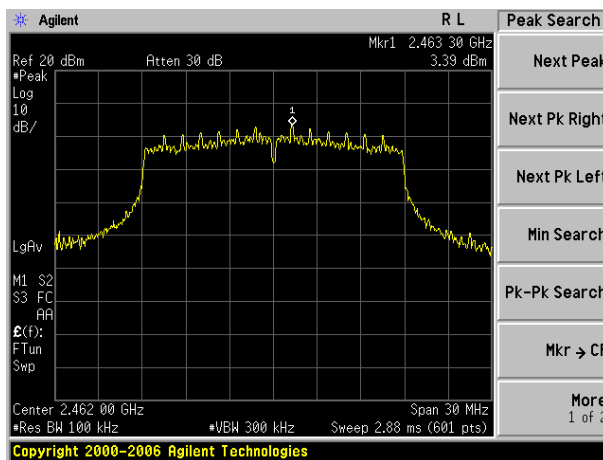
Test mode: 802.11n(HT20)



Lowest channel



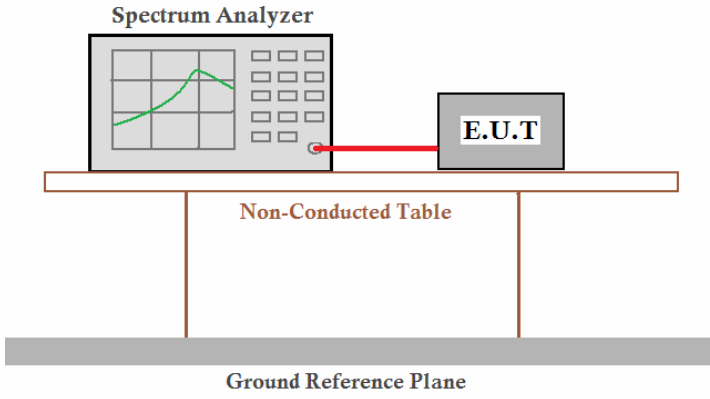
Middle channel



Highest channel

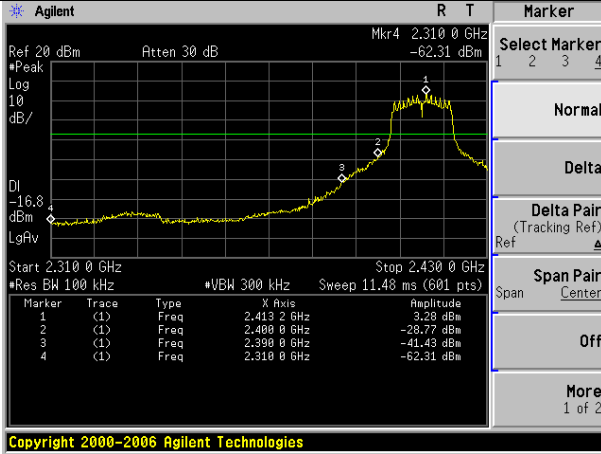
7.6 Band edges

7.6.1 Conducted Emission Method

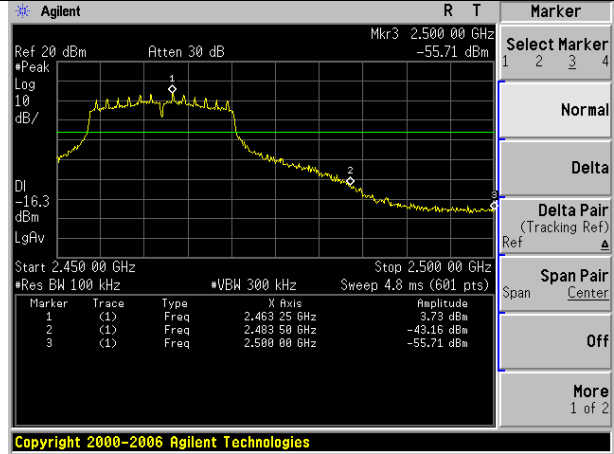
Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	ANSI C63.4:2003 and KDB558074 D01 DTS Meas Guidance V02
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional 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 are placed on a Non-Conducted Table, which 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

Test plot as follows:

Test mode: 802.11g

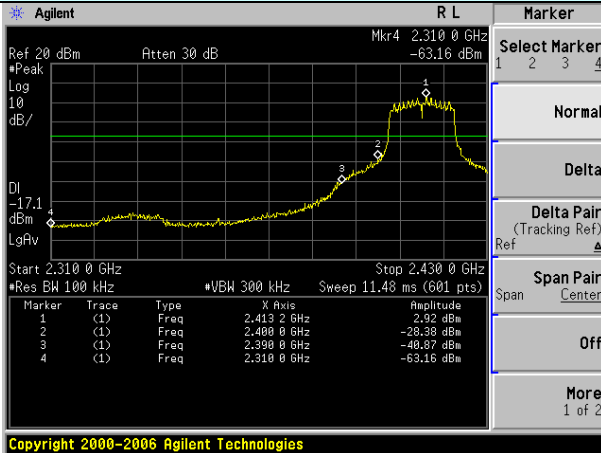


Lowest channel

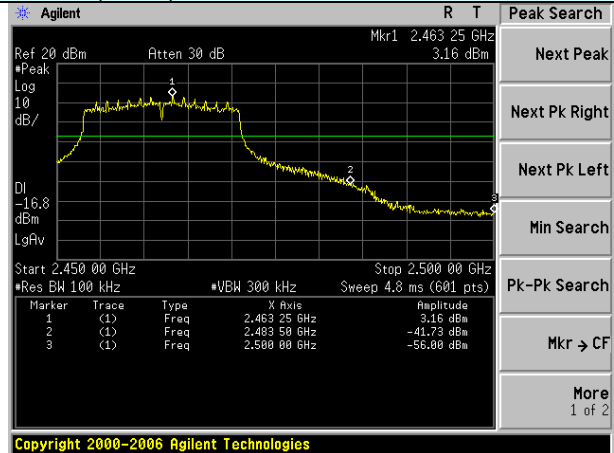


Highest channel

Test mode: 802.11n(HT20)



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
	Above 1GHz	Peak	1MHz	3MHz
		AV	1MHz	10Hz
Value	Peak	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"> 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. 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. 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. 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. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 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. 7. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report. 			
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:	802.11g	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	49.42	27.59	5.38	30.18	52.21	74.00	-21.79	Horizontal
2400.00	65.81	27.58	5.39	30.18	68.60	74.00	-5.40	Horizontal
2390.00	58.08	27.59	5.38	30.18	60.87	74.00	-13.13	Vertical
2400.00	68.11	27.58	5.39	30.18	70.90	74.00	-3.10	Vertical

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	36.32	27.59	5.38	30.18	39.11	54.00	-14.89	Horizontal
2400.00	43.06	27.58	5.39	30.18	45.85	54.00	-8.15	Horizontal
2390.00	40.48	27.59	5.38	30.18	43.27	54.00	-10.73	Vertical
2400.00	45.37	27.58	5.39	30.18	48.16	54.00	-5.84	Vertical

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	45.92	27.53	5.47	29.93	48.99	74.00	-25.01	Horizontal
2500.00	45.13	27.55	5.49	29.93	48.24	74.00	-25.76	Horizontal
2483.50	55.44	27.53	5.47	29.93	58.51	74.00	-15.49	Vertical
2500.00	44.61	27.55	5.49	29.93	47.72	74.00	-26.28	Vertical

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	34.52	27.53	5.47	29.93	37.59	54.00	-16.41	Horizontal
2500.00	32.98	27.55	5.49	29.93	36.09	54.00	-17.91	Horizontal
2483.50	38.90	27.53	5.47	29.93	41.97	54.00	-12.03	Vertical
2500.00	33.43	27.55	5.49	29.93	36.54	54.00	-17.46	Vertical

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(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	47.04	27.59	5.38	30.18	49.83	74.00	-24.17	Horizontal
2400.00	58.61	27.58	5.39	30.18	61.40	74.00	-12.60	Horizontal
2390.00	55.89	27.59	5.38	30.18	58.68	74.00	-15.32	Vertical
2400.00	65.31	27.58	5.39	30.18	68.10	74.00	-5.90	Vertical

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	34.65	27.59	5.38	30.18	37.44	54.00	-16.56	Horizontal
2400.00	38.87	27.58	5.39	30.18	41.66	54.00	-12.34	Horizontal
2390.00	37.51	27.59	5.38	30.18	40.30	54.00	-13.70	Vertical
2400.00	46.02	27.58	5.39	30.18	48.81	54.00	-5.19	Vertical

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	49.26	27.53	5.47	29.93	52.33	74.00	-21.67	Horizontal
2500.00	44.29	27.55	5.49	29.93	47.40	74.00	-26.60	Horizontal
2483.50	54.69	27.53	5.47	29.93	57.76	74.00	-16.24	Vertical
2500.00	44.42	27.55	5.49	29.93	47.53	74.00	-26.47	Vertical

Average value:

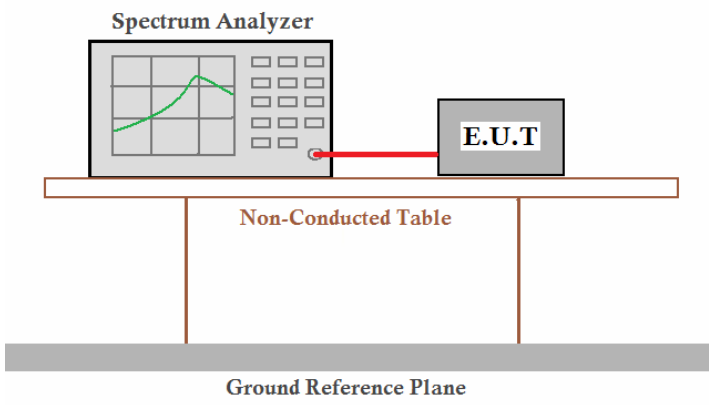
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	34.97	27.53	5.47	29.93	38.04	54.00	-15.96	Horizontal
2500.00	33.00	27.55	5.49	29.93	36.11	54.00	-17.89	Horizontal
2483.50	37.33	27.53	5.47	29.93	40.40	54.00	-13.60	Vertical
2500.00	33.18	27.55	5.49	29.93	36.29	54.00	-17.71	Vertical

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.*

7.7 Spurious Emission

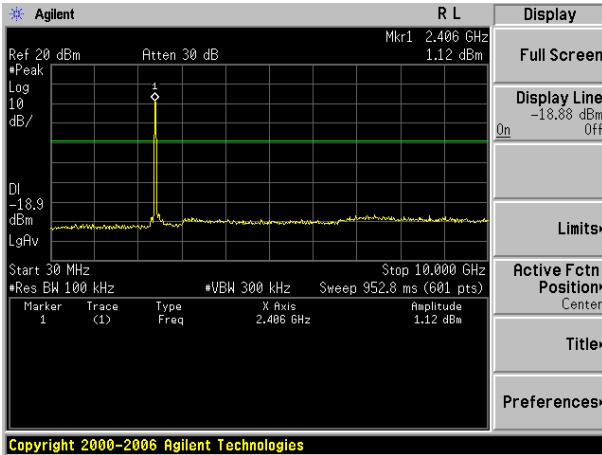
7.7.1 Conducted Emission Method

Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	ANSI C63.4:2003 and KDB558074 D01 DTS Meas Guidance V02
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 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

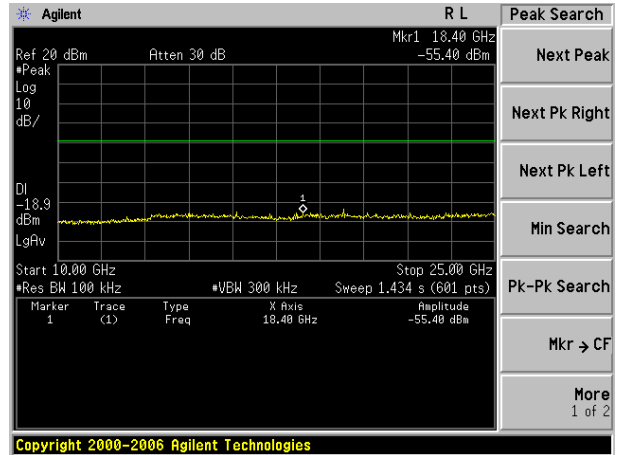
Test plot as follows:

Test mode:	802.11g
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Lowest channel

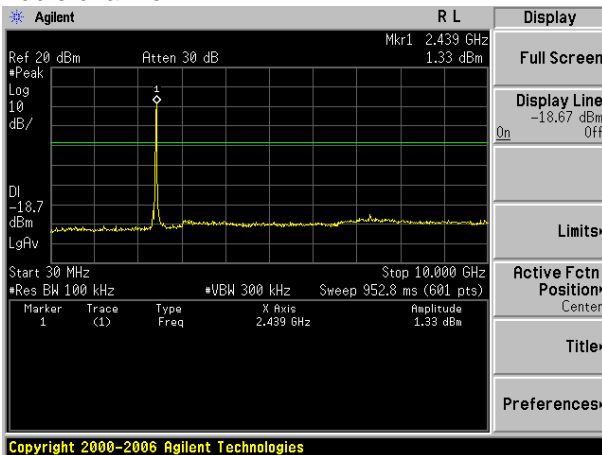


30MHz~10GHz

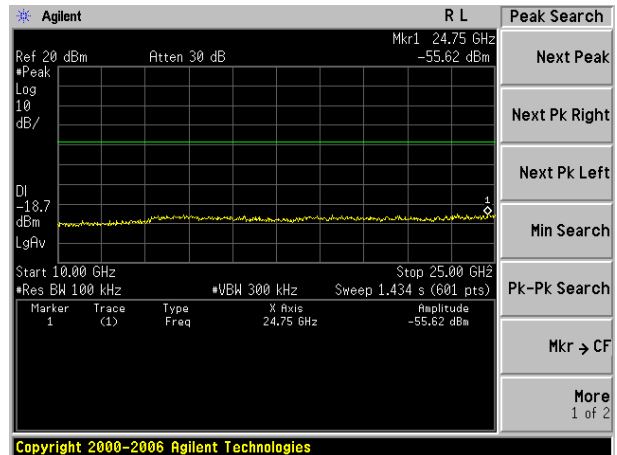


10GHz~25GHz

Middle channel

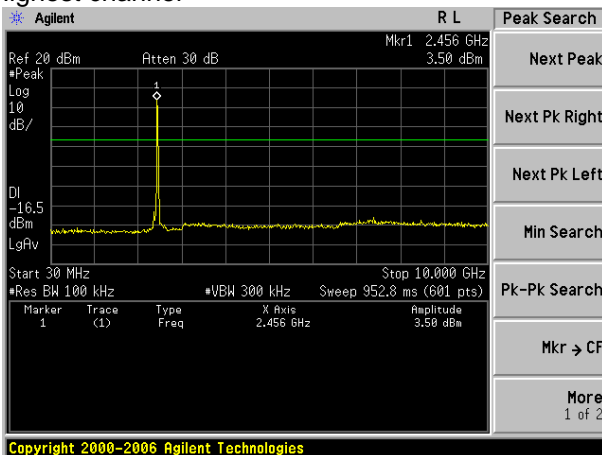


30MHz~10GHz

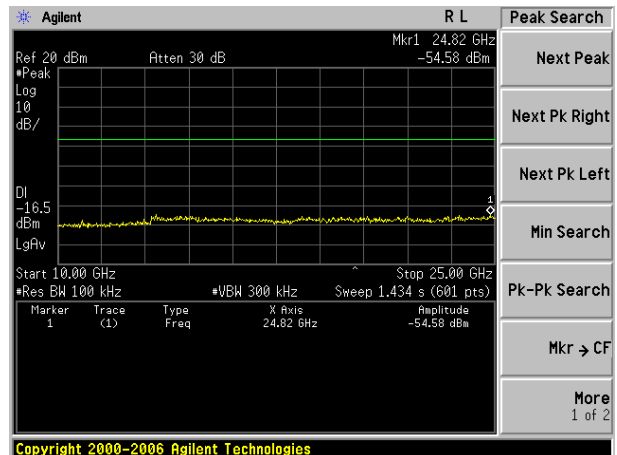


10GHz~25GHz

Highest channel



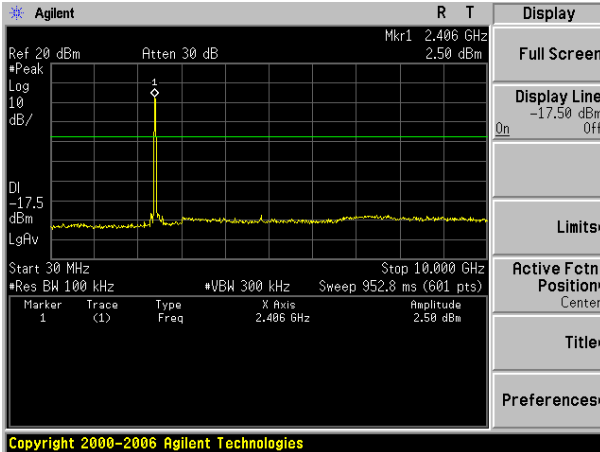
30MHz~10GHz



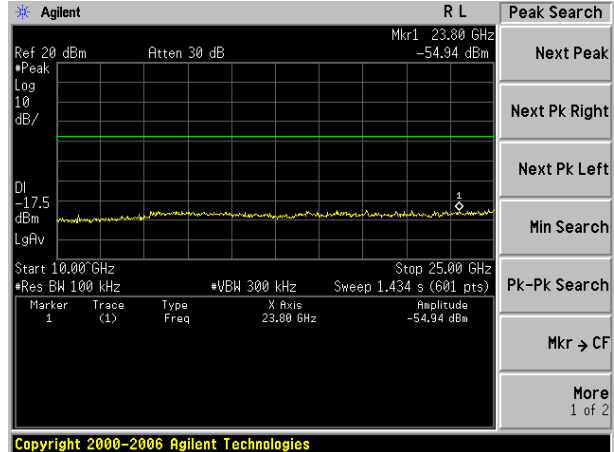
10GHz~25GHz

Test mode: 802.11n(HT20)

Lowest channel

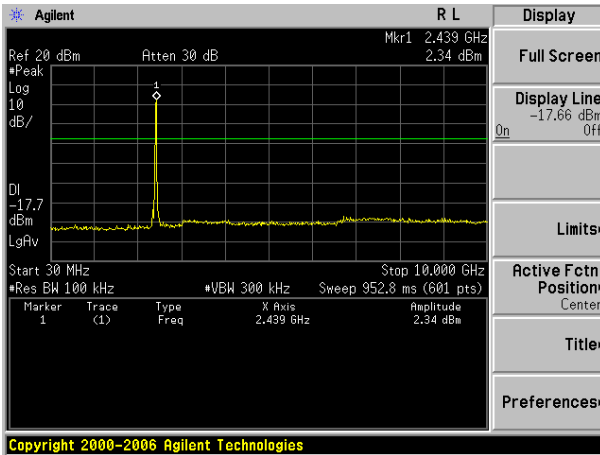


30MHz~10GHz

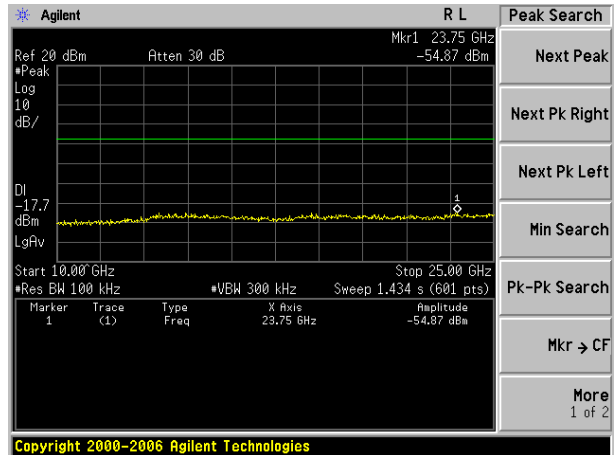


10GHz~25GHz

Middle channel

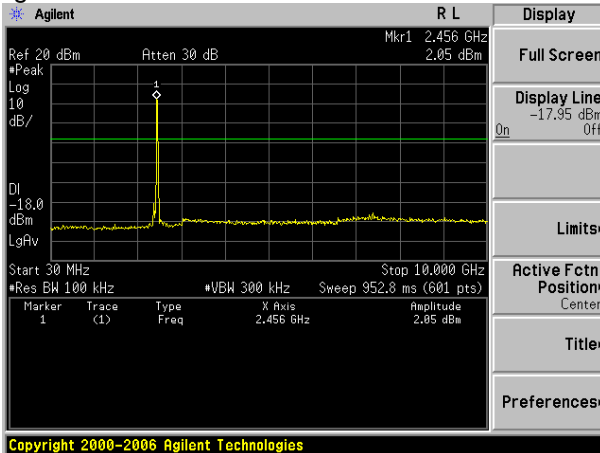


30MHz~10GHz

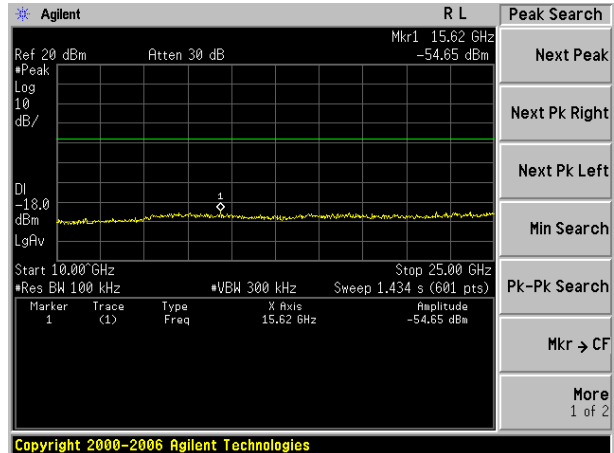


10GHz~25GHz

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
	30MHz-1GHz	Quasi-peak	120KHz	300KHz
	Above 1GHz	Peak	1MHz	3MHz
AV		1MHz	10Hz	
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
	Above 1GHz	54.00		Average
		74.00		Peak
Test setup:	Below 1GHz			
Test setup:	Above 1GHz			

<p>Test Procedure:</p>	<ol style="list-style-type: none"> 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. 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. 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. 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. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 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. 7. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.
<p>Test Instruments:</p>	<p>Refer to section 6.0 for details</p>
<p>Test mode:</p>	<p>Refer to section 5.3 for details</p>
<p>Test results:</p>	<p>Pass</p>

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
42.15	40.29	16.57	0.69	32.04	25.51	40.00	-14.49	Vertical
95.76	43.91	15.99	1.16	31.74	29.32	43.50	-14.18	Vertical
228.49	43.93	14.62	2.01	32.15	28.41	46.00	-17.59	Vertical
432.55	45.24	17.54	3.01	31.78	34.01	46.00	-11.99	Vertical
494.20	46.54	18.45	3.28	31.58	36.69	46.00	-9.31	Vertical
79.80	48.64	11.85	1.03	31.76	29.76	40.00	-10.24	Horizontal
93.11	46.31	15.70	1.14	31.73	31.42	43.50	-12.08	Horizontal
189.74	47.56	13.52	1.79	32.11	30.76	43.50	-12.74	Horizontal
265.68	49.77	15.30	2.20	32.17	35.10	46.00	-10.90	Horizontal
435.59	48.73	17.55	3.03	31.76	37.55	46.00	-8.45	Horizontal

■ Above 1GHz

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	37.75	31.28	8.62	24.17	53.48	74.00	-20.52	Vertical
7236.00	31.34	35.36	11.68	26.52	51.86	74.00	-22.14	Vertical
9648.00	29.90	37.44	14.16	25.44	56.06	74.00	-17.94	Vertical
12060.00	*					74.00		Vertical
14472.00	*					74.00		Vertical
16884.00	*					74.00		Vertical
4824.00	37.06	31.28	8.62	24.17	52.79	74.00	-21.21	Horizontal
7236.00	30.82	35.36	11.68	26.52	51.34	74.00	-22.66	Horizontal
9648.00	32.84	37.44	14.16	25.44	59.00	74.00	-15.00	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	28.15	31.28	8.62	24.17	43.88	54.00	-10.12	Vertical
7236.00	25.55	35.36	11.68	26.52	46.07	54.00	-7.93	Vertical
9648.00	19.50	37.44	14.16	25.44	45.66	54.00	-8.34	Vertical
12060.00	*					54.00		Vertical
14472.00	*					54.00		Vertical
16884.00	*					54.00		Vertical
4824.00	23.78	31.28	8.62	24.17	39.51	54.00	-14.49	Horizontal
7236.00	24.75	35.36	11.68	26.52	45.27	54.00	-8.73	Horizontal
9648.00	19.39	37.44	14.16	25.44	45.55	54.00	-8.45	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 – Pre-amplifier 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	36.22	32.02	8.66	24.12	52.78	74.00	-21.22	Vertical
7311.00	30.33	36.64	11.71	26.71	51.97	74.00	-22.03	Vertical
9748.00	29.68	38.54	14.25	25.38	57.09	74.00	-16.91	Vertical
12185.00	*					74.00		Vertical
14622.00	*					74.00		Vertical
17059.00	*					74.00		Vertical
4874.00	33.39	32.02	8.66	24.12	49.95	74.00	-24.05	Horizontal
7311.00	29.66	36.64	11.71	26.71	51.30	74.00	-22.70	Horizontal
9748.00	30.14	38.54	14.25	25.38	57.55	74.00	-16.45	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	27.65	32.02	8.66	24.12	44.21	54.00	-9.79	Vertical
7311.00	22.84	36.64	11.71	26.71	44.48	54.00	-9.52	Vertical
9748.00	18.38	38.54	14.25	25.38	45.79	54.00	-8.21	Vertical
12185.00	*					54.00		Vertical
14622.00	*					54.00		Vertical
17059.00	*					54.00		Vertical
4874.00	24.72	32.02	8.66	24.12	41.28	54.00	-12.72	Horizontal
7311.00	20.77	36.64	11.71	26.71	42.41	54.00	-11.59	Horizontal
9748.00	17.39	38.54	14.25	25.38	44.80	54.00	-9.20	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 – Pre-amplifier Factor
2. “*”, means this data is 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)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4924.00	38.79	32.14	8.70	24.05	55.58	74.00	-18.42	Vertical
7386.00	31.66	36.75	11.76	26.90	53.27	74.00	-20.73	Vertical
9848.00	30.30	38.79	14.31	25.30	58.10	74.00	-15.90	Vertical
12310.00	*					74.00		Vertical
14772.00	*					74.00		Vertical
17234.00	*					74.00		Vertical
4924.00	36.51	32.14	8.70	24.05	53.30	74.00	-20.70	Horizontal
7386.00	29.81	36.75	11.76	26.90	51.42	74.00	-22.58	Horizontal
9848.00	29.18	38.79	14.31	25.30	56.98	74.00	-17.02	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
4924.00	27.86	32.14	8.70	24.05	44.65	54.00	-9.35	Vertical
7386.00	23.67	36.75	11.76	26.90	45.28	54.00	-8.72	Vertical
9848.00	17.70	38.79	14.31	25.30	45.50	54.00	-8.50	Vertical
12310.00	*					54.00		Vertical
14772.00	*					54.00		Vertical
17234.00	*					54.00		Vertical
4924.00	24.83	32.14	8.70	24.05	41.62	54.00	-12.38	Horizontal
7386.00	21.65	36.75	11.76	26.90	43.26	54.00	-10.74	Horizontal
9848.00	17.83	38.79	14.31	25.30	45.63	54.00	-8.37	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 – Pre-amplifier Factor
2. “*”, means this data is 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)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4824.00	37.13	31.28	8.62	24.17	52.86	74.00	-21.14	Vertical
7236.00	29.65	35.36	11.68	26.52	50.17	74.00	-23.83	Vertical
9648.00	29.49	37.44	14.16	25.44	55.65	74.00	-18.35	Vertical
12060.00	*					74.00		Vertical
14472.00	*					74.00		Vertical
16884.00	*					74.00		Vertical
4824.00	34.89	31.28	8.62	24.17	50.62	74.00	-23.38	Horizontal
7236.00	28.25	35.36	11.68	26.52	48.77	74.00	-25.23	Horizontal
9648.00	28.24	37.44	14.16	25.44	54.40	74.00	-19.60	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	28.26	31.28	8.62	24.17	43.99	54.00	-10.01	Vertical
7236.00	23.97	35.36	11.68	26.52	44.49	54.00	-9.51	Vertical
9648.00	20.06	37.44	14.16	25.44	46.22	54.00	-7.78	Vertical
12060.00	*					54.00		Vertical
14472.00	*					54.00		Vertical
16884.00	*					54.00		Vertical
4824.00	24.47	31.28	8.62	24.17	40.20	54.00	-13.80	Horizontal
7236.00	21.72	35.36	11.68	26.52	42.24	54.00	-11.76	Horizontal
9648.00	16.88	37.44	14.16	25.44	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 – Pre-amplifier 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)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4874.00	36.30	32.02	8.66	24.12	52.86	74.00	-21.14	Vertical
7311.00	30.41	36.64	11.71	26.71	52.05	74.00	-21.95	Vertical
9748.00	30.97	38.54	14.25	25.38	58.38	74.00	-15.62	Vertical
12185.00	*					74.00		Vertical
14622.00	*					74.00		Vertical
17059.00	*					74.00		Vertical
4874.00	36.02	32.02	8.66	24.12	52.58	74.00	-21.42	Horizontal
7311.00	27.77	36.64	11.71	26.71	49.41	74.00	-24.59	Horizontal
9748.00	27.73	38.54	14.25	25.38	55.14	74.00	-18.86	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	26.59	32.02	8.66	24.12	43.15	54.00	-10.85	Vertical
7311.00	22.49	36.64	11.71	26.71	44.13	54.00	-9.87	Vertical
9748.00	19.49	38.54	14.25	25.38	46.90	54.00	-7.10	Vertical
12185.00	*					54.00		Vertical
14622.00	*					54.00		Vertical
17059.00	*					54.00		Vertical
4874.00	24.24	32.02	8.66	24.12	40.80	54.00	-13.20	Horizontal
7311.00	21.20	36.64	11.71	26.71	42.84	54.00	-11.16	Horizontal
9748.00	14.78	38.54	14.25	25.38	42.19	54.00	-11.81	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 – Pre-amplifier Factor
2. “*”, means this data is 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)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4924.00	36.58	32.14	8.70	24.05	53.37	74.00	-20.63	Vertical
7386.00	30.60	36.75	11.76	26.90	52.21	74.00	-21.79	Vertical
9848.00	30.20	38.79	14.31	25.30	58.00	74.00	-16.00	Vertical
12310.00	*					74.00		Vertical
14772.00	*					74.00		Vertical
17234.00	*					74.00		Vertical
4924.00	34.78	32.14	8.70	24.05	51.57	74.00	-22.43	Horizontal
7386.00	27.73	36.75	11.76	26.90	49.34	74.00	-24.66	Horizontal
9848.00	27.29	38.79	14.31	25.30	55.09	74.00	-18.91	Horizontal
12310.00	*					74.00		Horizontal
14772.00	*					74.00		Horizontal
17234.00	*					74.00		Horizontal

Average value:

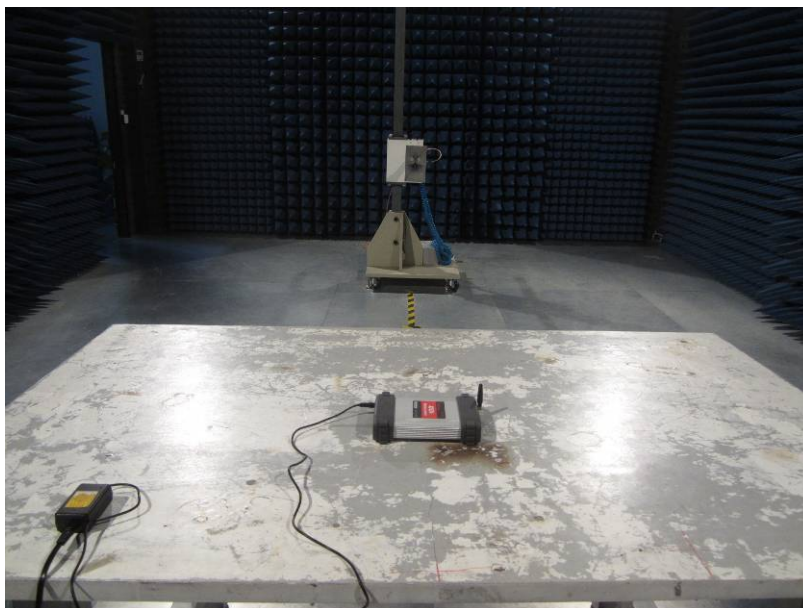
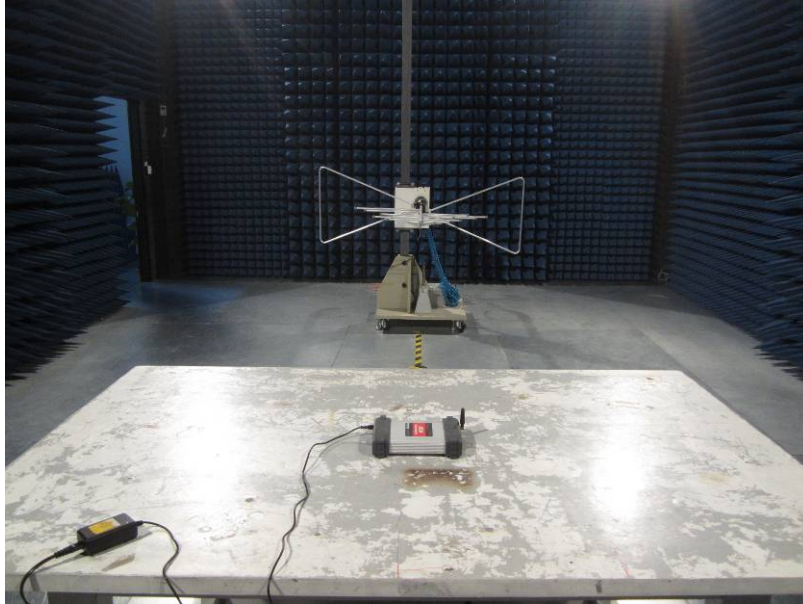
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4924.00	28.29	32.14	8.70	24.05	45.08	54.00	-8.92	Vertical
7386.00	24.77	36.75	11.76	26.90	46.38	54.00	-7.62	Vertical
9848.00	18.88	38.79	14.31	25.30	46.68	54.00	-7.32	Vertical
12310.00	*					54.00		Vertical
14772.00	*					54.00		Vertical
17234.00	*					54.00		Vertical
4924.00	24.95	32.14	8.70	24.05	41.74	54.00	-12.26	Horizontal
7386.00	21.46	36.75	11.76	26.90	43.07	54.00	-10.93	Horizontal
9848.00	14.34	38.79	14.31	25.30	42.14	54.00	-11.86	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 – Pre-amplifier Factor
- 2 “*”, means this data is the too weak instrument of signal is unable to test.

8 Test Setup Photo

Radiated Emission



Conducted Emission



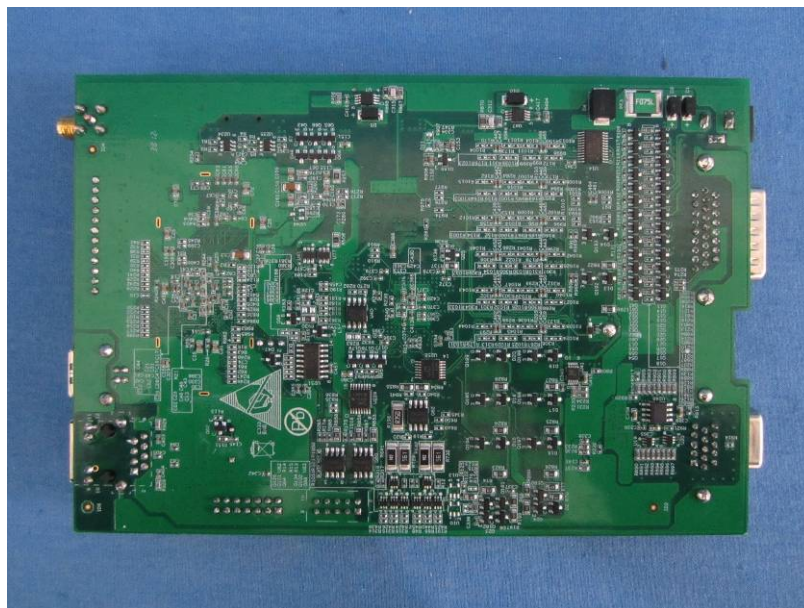
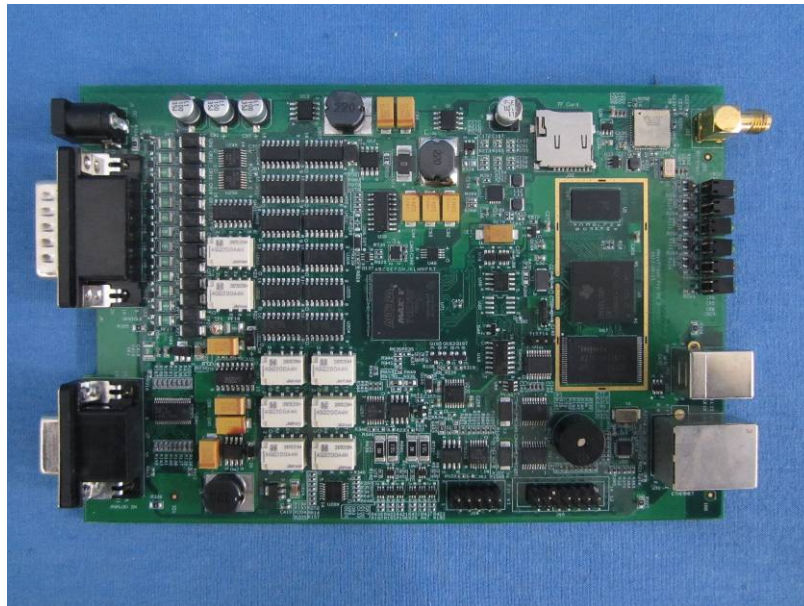
9 EUT Constructional Details













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