

FCC Report (WIFI)

Applicant: Dragino Technology Co., Limited.

Address of Applicant: Room 2073, Zi'An Commercial Building, Qian Jin 1 Road,
Xin'An 6th District, Bao'an District, Shenzhen 518101, China

Equipment Under Test (EUT)

Product Name: Wireless IoT Module

Model No.: HE

FCC ID: ZHZHE

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

Date of sample receipt: January 05, 2015

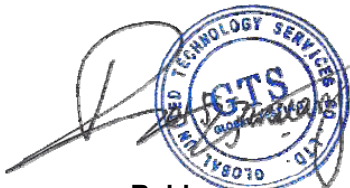
Date of Test: January 06-20, 2015

Date of report issued: January 20, 2015

Test Result : PASS *

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

Authorized Signature:

A handwritten signature in black ink is written over a circular blue seal. The seal contains the text 'GLOBAL UNITED TECHNOLOGY SERVICES CO., LTD.' around the perimeter and 'GTS' in the center.

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	January 20, 2015	Original

Prepared By:

Edward Pan

Date:

January 20, 2015

Project Engineer

Check By:

Hank Yan

Date:

January 20, 2015

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:	Dragino Technology Co., Limited.
Address of Applicant:	Room 2073, Zi'An Commercial Building, Qian Jin 1 Road, Xin'An 6th District, Bao'an District, Shenzhen 518101,China
Manufacturer:	Dragino Technology Co., Limited.
Address of Manufacturer:	Room 2073, Zi'An Commercial Building, Qian Jin 1 Road, Xin'An 6th District, Bao'an District, Shenzhen 518101,China
Factory:	Dragino Technology Co., Limited.
Address of Factory:	Room 2073, Zi'An Commercial Building, Qian Jin 1 Road, Xin'An 6th District, Bao'an District, Shenzhen 518101,China

5.2 General Description of EUT

Product Name:	Wireless IoT Module
Model No.:	HE
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:	Intergal Antenna
Antenna gain:	2.0dBi (declare by Applicant)
Power supply:	DC 3.3V

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)	
	802.11b/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 (with dutycycle>98%)
<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
MEILI	DC Power Supply	MCH-305A	011121168	VoC
Apple	PC	A1278	C1MN99ERDTY3	DoC
DELTA	ADAPTER	ADP-60ADT	N/A	VoC

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	July 01 2014	June 30 2015
4	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	July 01 2014	June 30 2015
5	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	July 01 2014	June 30 2015
6	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	June 27 2014	June 26 2015
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	July 01 2014	June 30 2015
14	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	July 01 2014	June 30 2015
15	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June 27 2014	June 26 2015
16	Band filter	Amindeon	82346	GTS219	Mar. 29 2014	Mar. 28 2015
17	Power Meter	Anritsu	ML2495A	GTS540	July 01 2014	June 30 2015
18	Power Sensor	Anritsu	MA2411B	GTS541	July 01 2014	June 30 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	July 01 2014	June 30 2015
2	EMI Test Receiver	Rohde & Schwarz	ESCS30	GTS223	July 01 2014	June 30 2015
3	10dB Pulse Limita	Rohde & Schwarz	N/A	GTS224	July 01 2014	June 30 2015
4	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	July 01 2014	June 30 2015
5	LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	GTS226	July 01 2014	June 30 2015
6	Coaxial Cable	GTS	N/A	GTS227	July 01 2014	June 30 2015
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 08 2014	July 07 2015

7 Test results and Measurement Data

7.1 Antenna requirement

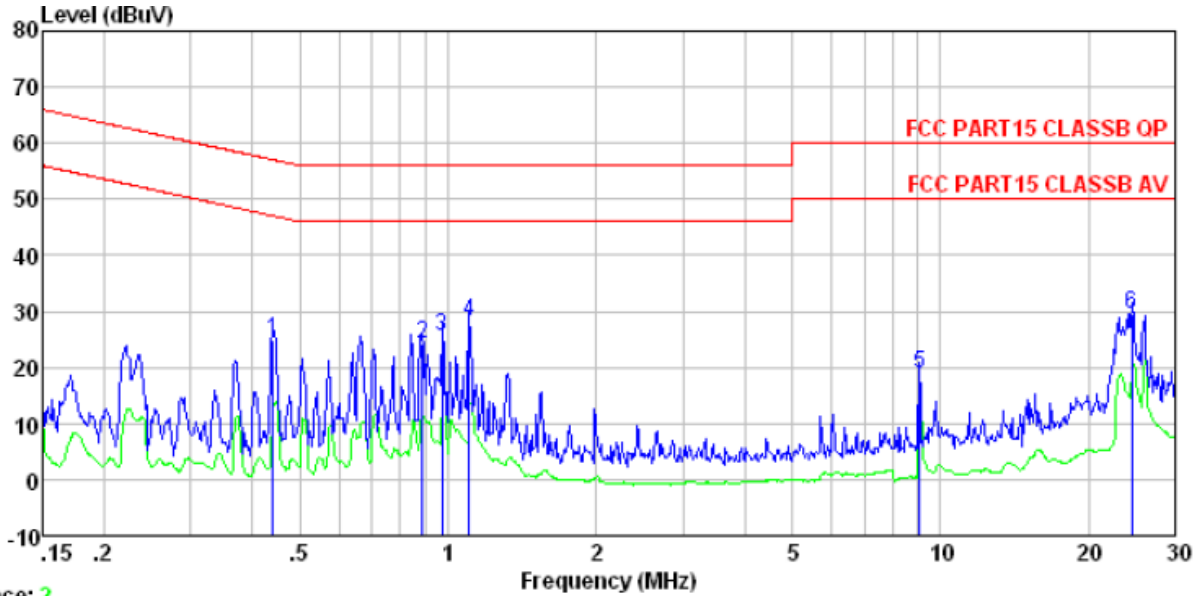
Standard requirement:	FCC Part15 C Section 15.203 /247(c)
<p>15.203 requirement:</p> <p>An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that 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>	
E.U.T Antenna:	
<p><i>The antenna is Intergal Antenna, 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:	<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> <i>E.U.T: Equipment Under Test</i> <i>LISN: Line Impedance Stabilization Network</i> <i>Test table height=0.8m</i></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:

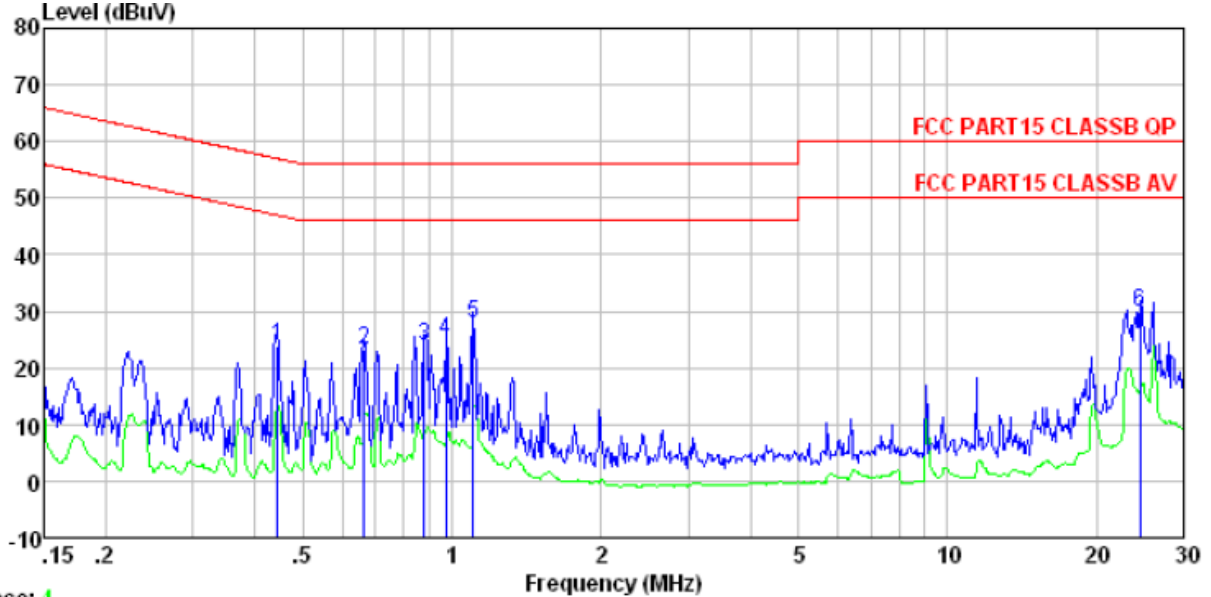


Trace: 2

Site : Shielded room
 Condition : FCC PART15 CLASSB QP LISN-2013 LINE
 Job No. : 0007RF
 Test mode : WiFi mode
 Test Engineer: Mike

	Read Freq	Cable Level	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.440	24.53	0.11	24.76	57.07	-32.31	QP
2	0.885	23.82	0.13	24.09	56.00	-31.91	QP
3	0.974	25.43	0.13	25.70	56.00	-30.30	QP
4	1.106	27.92	0.13	28.18	56.00	-27.82	QP
5	9.059	18.48	0.19	18.95	60.00	-41.05	QP
6	24.529	28.15	0.23	29.49	60.00	-30.51	QP

Neutral:



Trace: 4

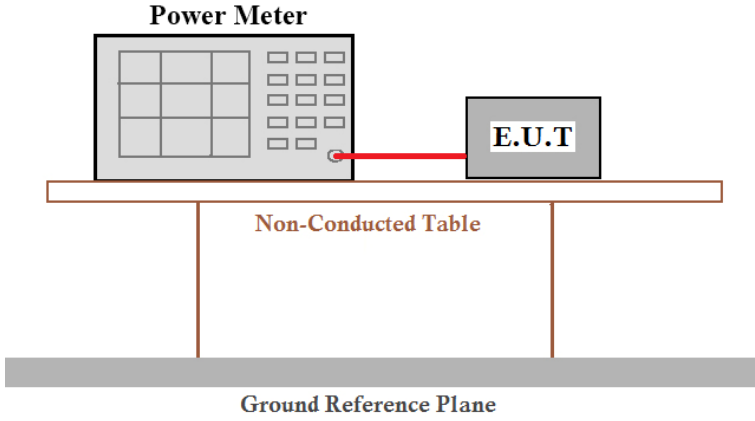
Site : Shielded room
 Condition : FCC PART15 CLASSB QP LISN-2013 NEUTRAL
 Job No. : 0007RF
 Test mode : WiFi mode
 Test Engineer: Mike

	Freq	Read Level	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.444	23.68	0.11	23.85	56.98	-33.13	QP
2	0.665	23.05	0.13	23.25	56.00	-32.75	QP
3	0.880	23.62	0.13	23.82	56.00	-32.18	QP
4	0.974	24.72	0.13	24.92	56.00	-31.08	QP
5	1.106	27.49	0.13	27.70	56.00	-28.30	QP
6	24.529	28.65	0.23	29.89	60.00	-30.11	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
4. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

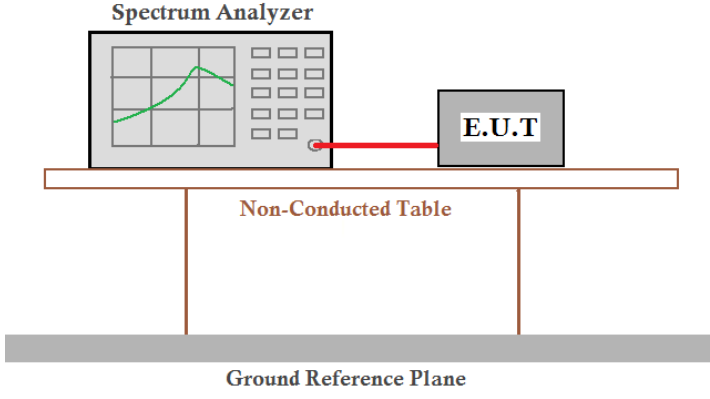
7.3 Conducted Peak Output Power

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:	
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	15.10	12.05	11.71	9.35	30.00	Pass
Middle	15.02	12.11	11.56	9.37		
Highest	14.83	11.90	11.27	9.76		

7.4 Channel Bandwidth

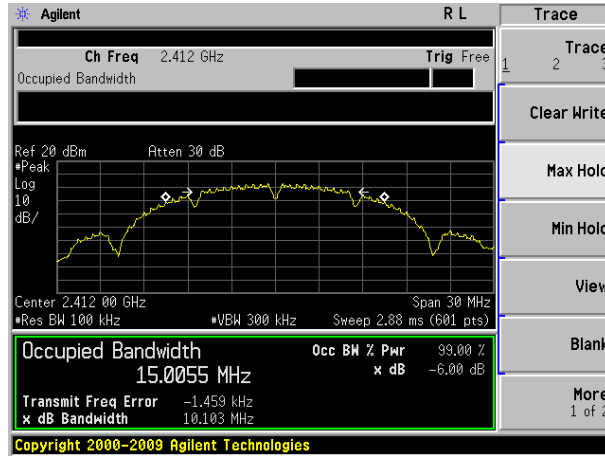
Test Requirement:	FCC Part15 C Section 15.247 (a)(2)
Test Method:	ANSI C63.4:2003 and KDB558074 D01 DTS Meas Guidance V03
Limit:	>500KHz
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both are placed on a Non-Conducted 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

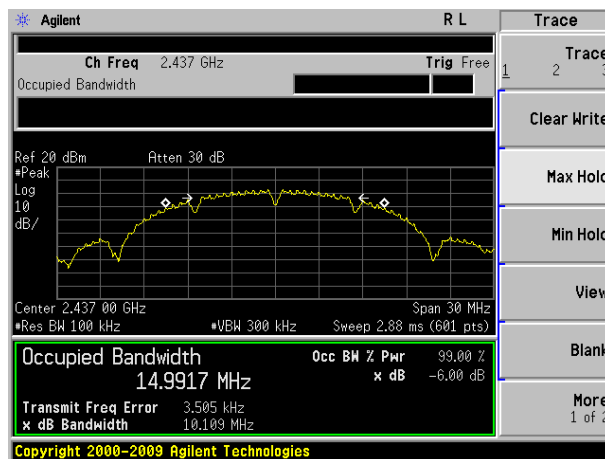
Test CH	Channel Bandwidth (MHz)				Limit(KHz)	Result
	802.11b	802.11g	802.11n(HT20)	802.11n(HT40)		
Lowest	10.103	16.629	17.660	36.522	>500	Pass
Middle	10.109	16.428	17.634	36.488		
Highest	10.115	16.431	17.656	36.023		

Test plot as follows:

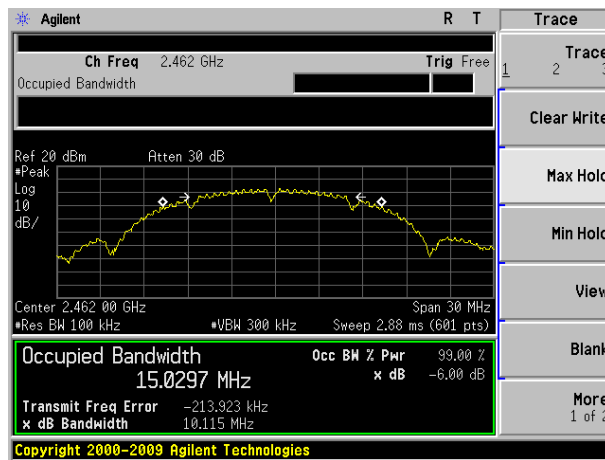
Test mode: 802.11b



Lowest channel

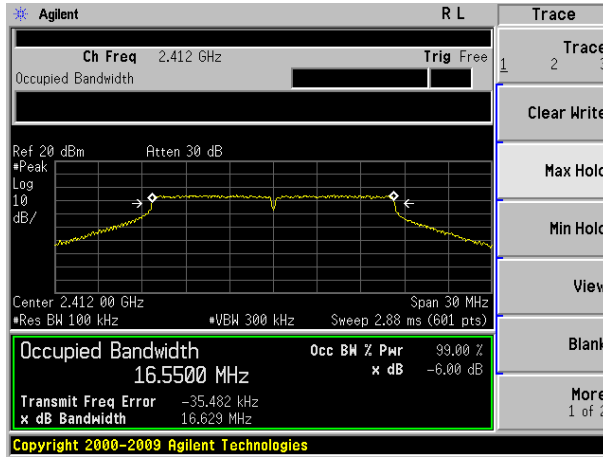


Middle channel

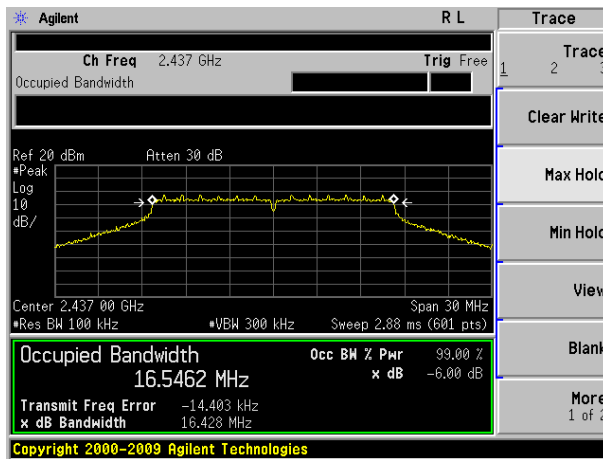


Highest channel

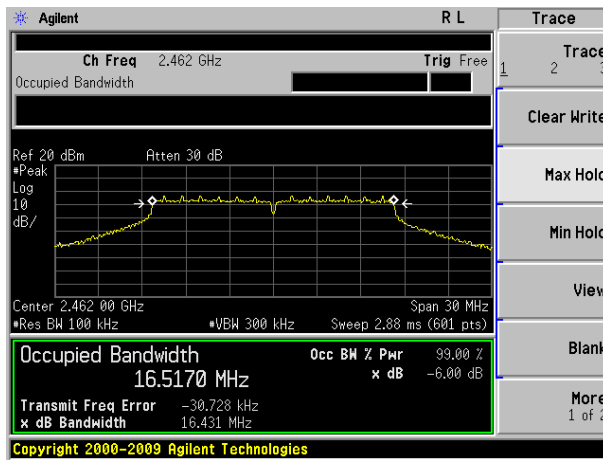
Test mode: 802.11g



Lowest channel

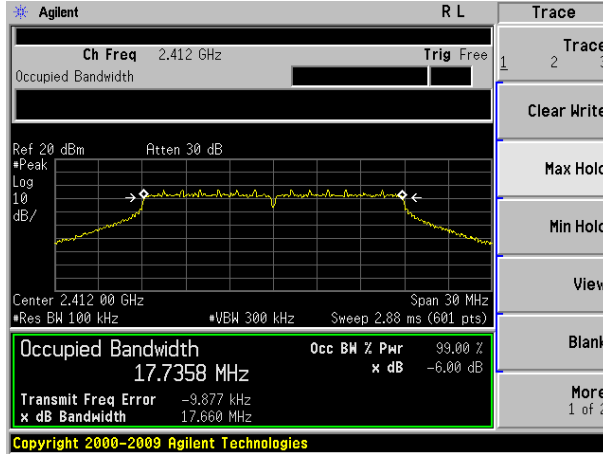


Middle channel

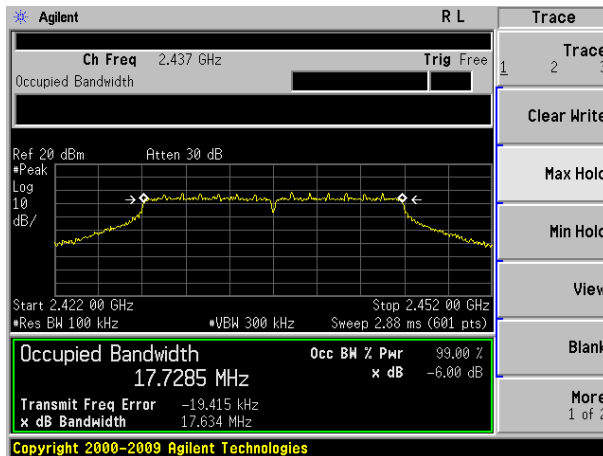


Highest channel

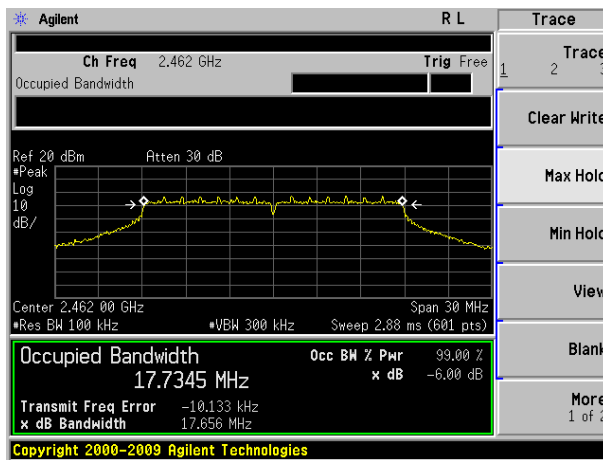
Test mode: 802.11n(HT20)



Lowest channel

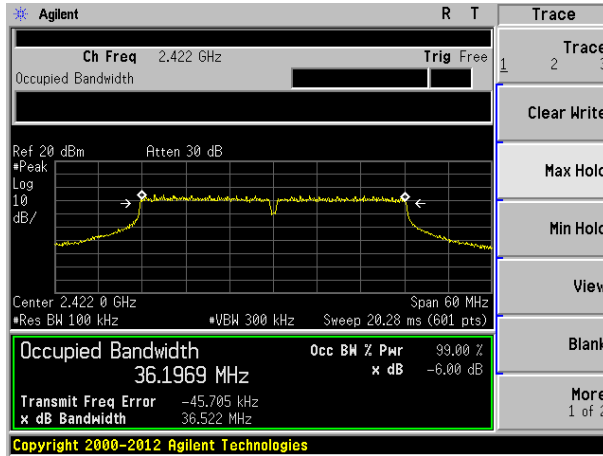


Middle channel

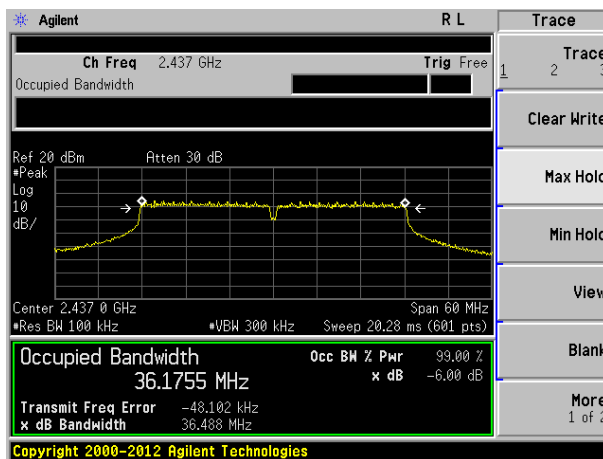


Highest channel

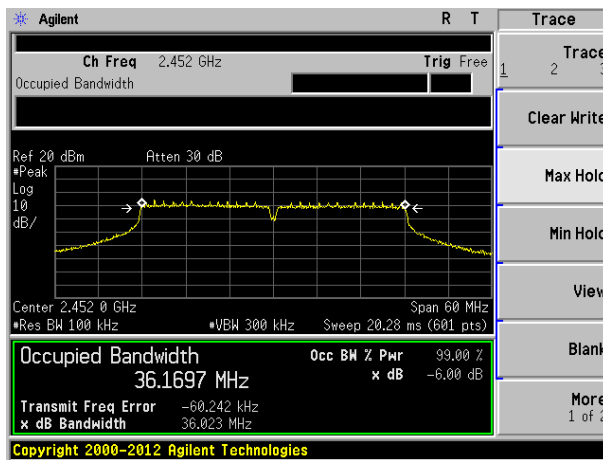
Test mode: 802.11n(HT40)



Lowest channel

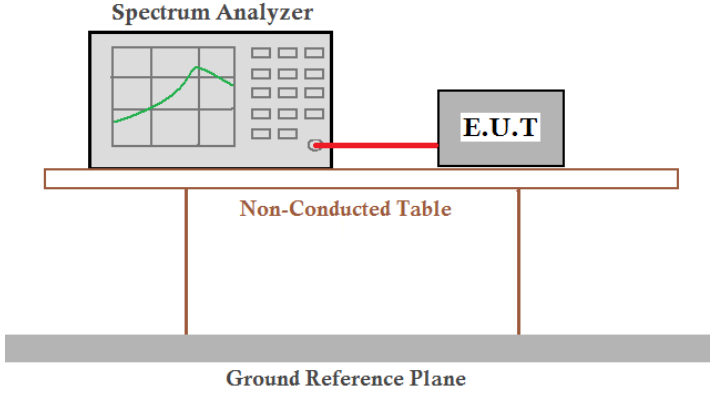


Middle channel



Highest channel

7.5 Power Spectral Density

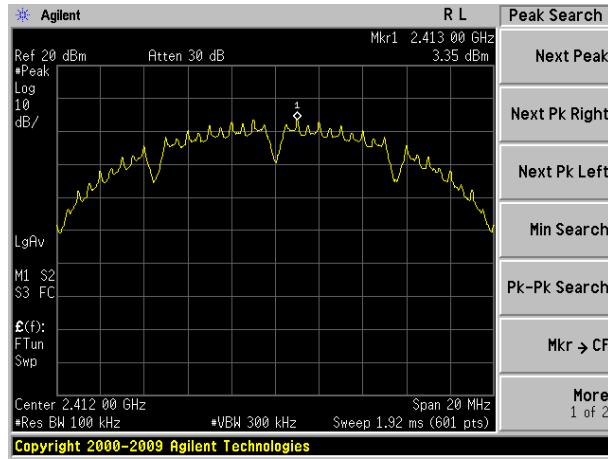
Test Requirement:	FCC Part15 C Section 15.247 (e)
Test Method:	ANSI C63.4:2003 and KDB558074 D01 DTS Meas Guidance V03
Limit:	8dBm
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and 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

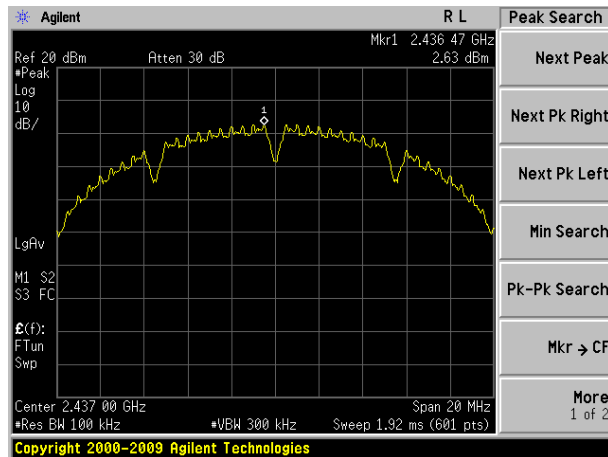
Test CH	Power Spectral Density (dBm)				Limit(dBm/3kHz)	Result
	802.11b	802.11g	802.11n(HT20)	802.11n(HT40)		
Lowest	3.35	-1.76	-3.17	-6.77	8.00	Pass
Middle	2.63	-2.77	-2.86	-6.40		
Highest	2.38	-2.56	-3.06	-6.32		

Test plot as follows:

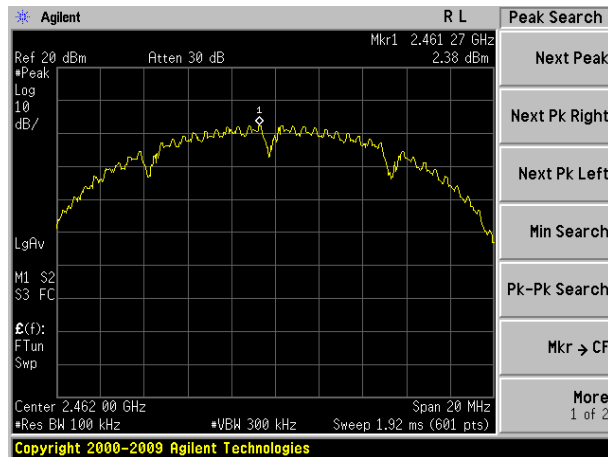
Test mode:	802.11b
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Lowest channel

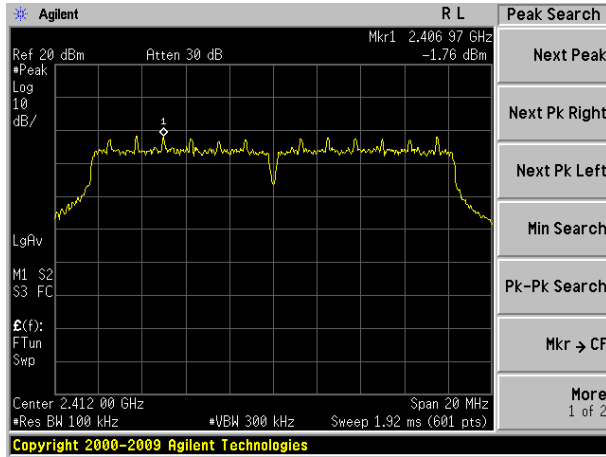


Middle channel

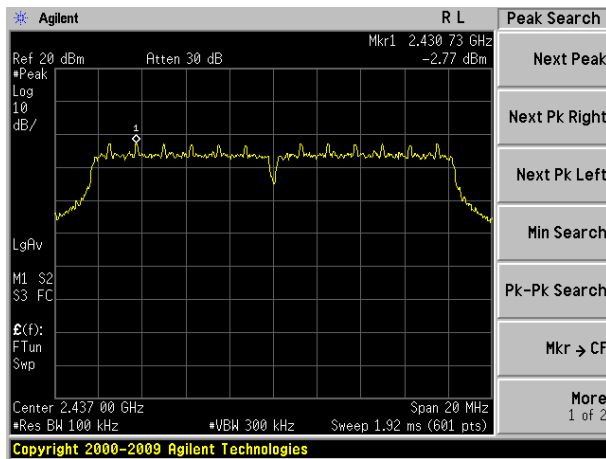


Highest channel

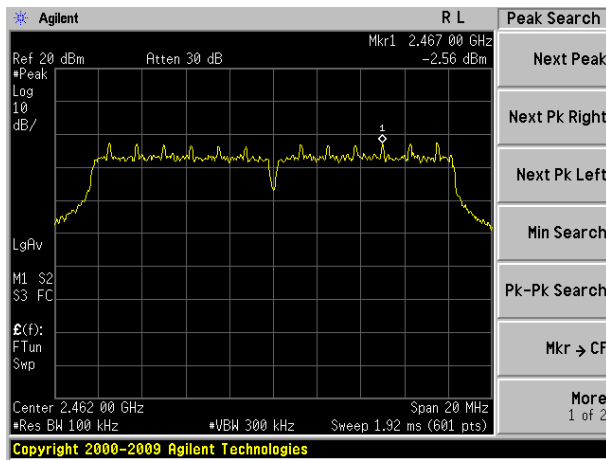
Test mode: 802.11g



Lowest channel

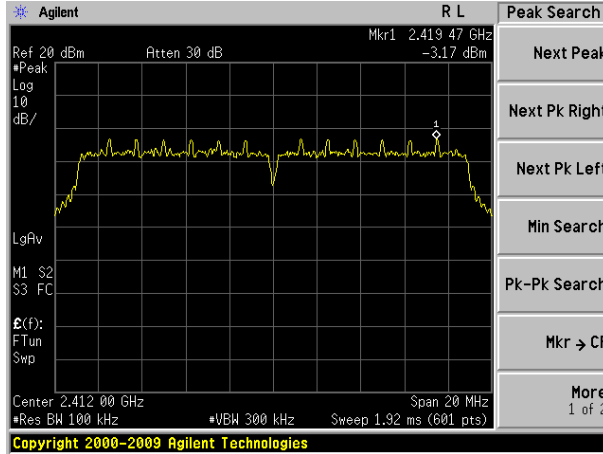


Middle channel

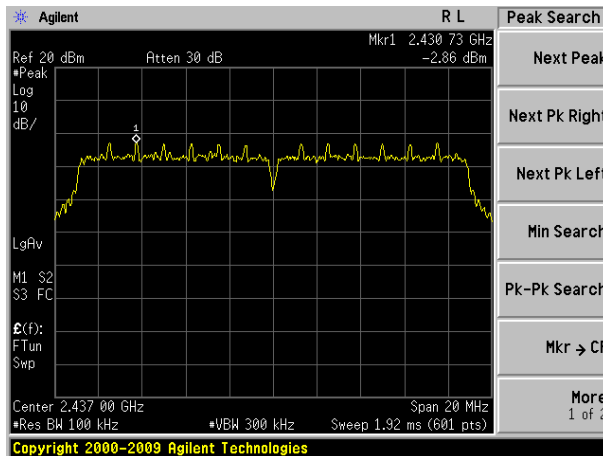


Highest channel

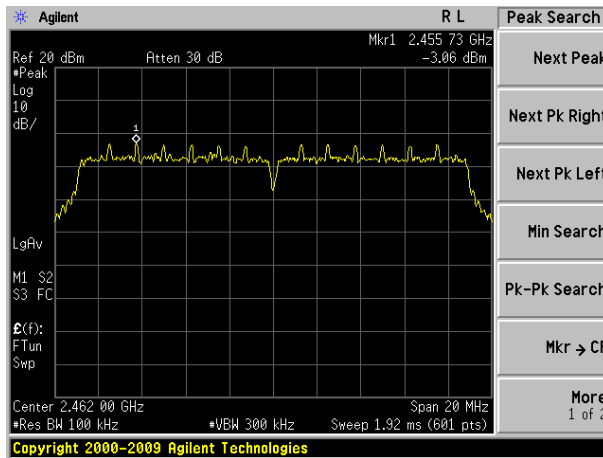
Test mode: 802.11n(HT20)



Lowest channel

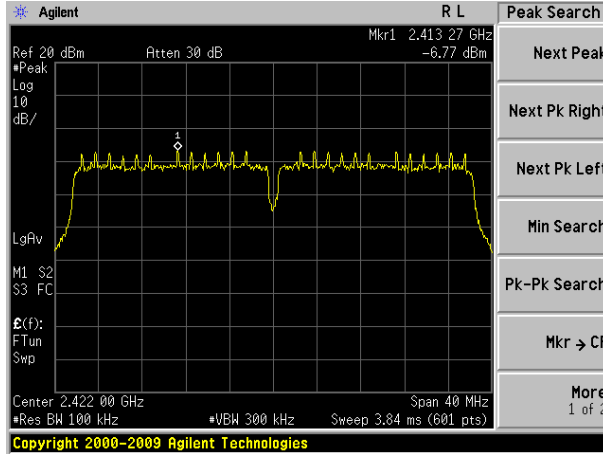


Middle channel

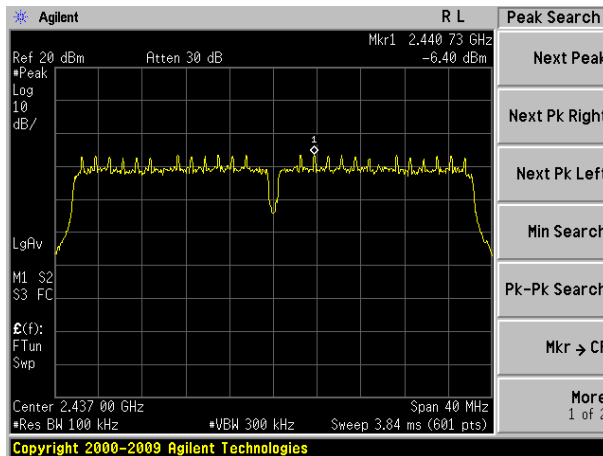


Highest channel

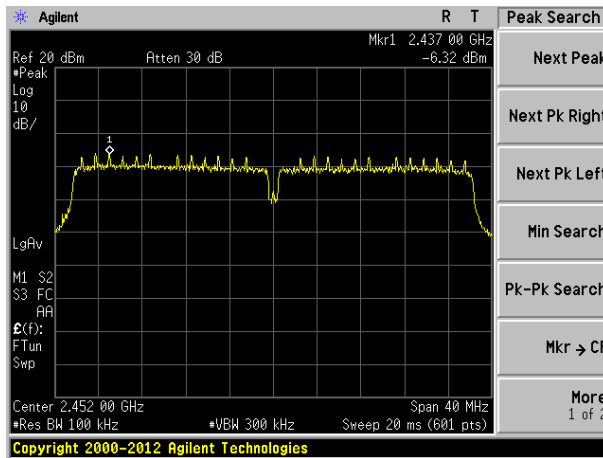
Test mode: 802.11n(HT40)



Lowest channel



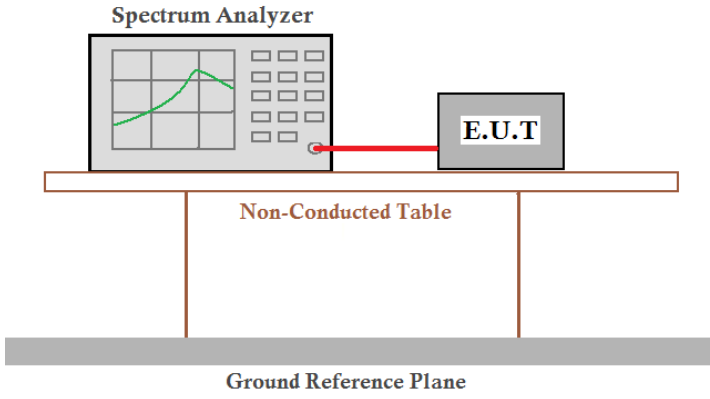
Middle channel



Highest channel

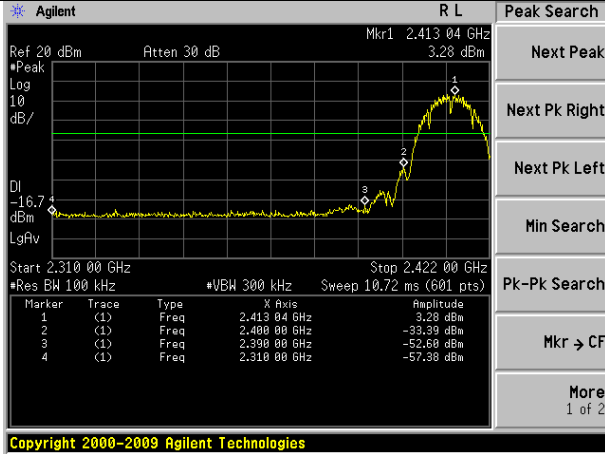
7.6 Band edges

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 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: 802.11b

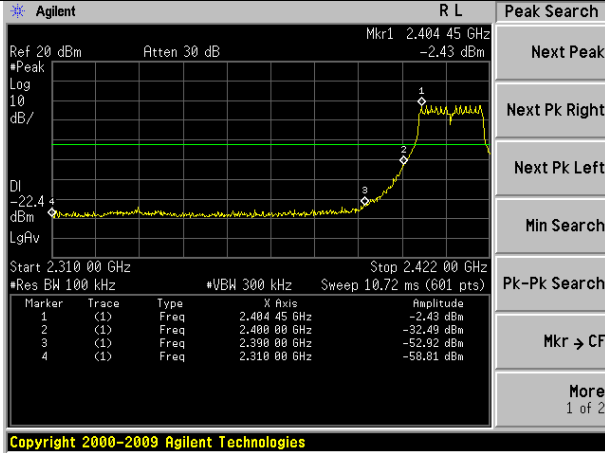


Lowest channel

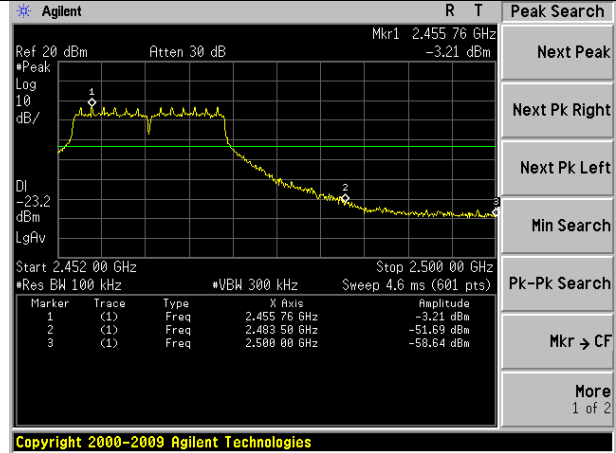


Highest channel

Test mode: 802.11g

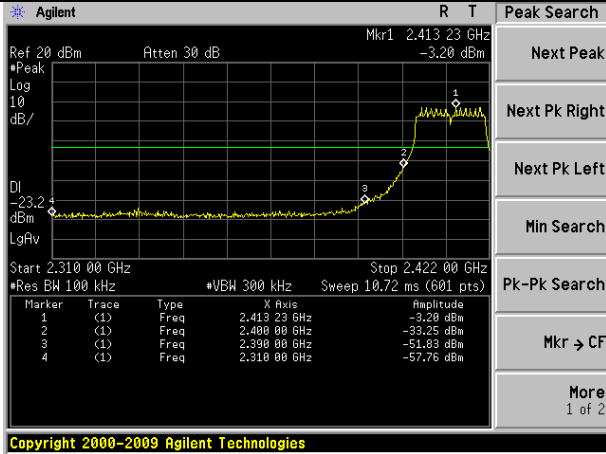


Lowest channel

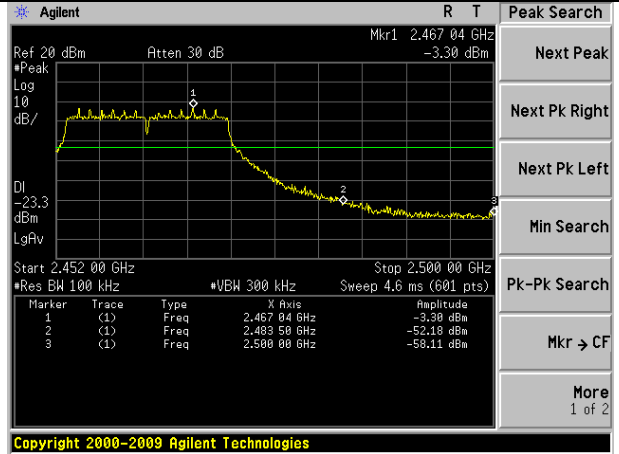


Highest channel

Test mode: 802.11n(HT20)

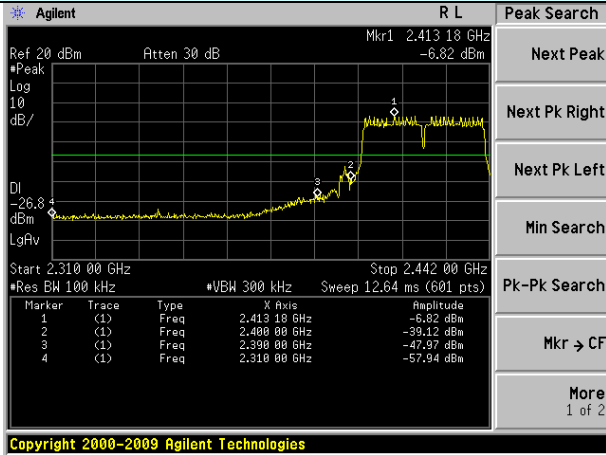


Lowest channel

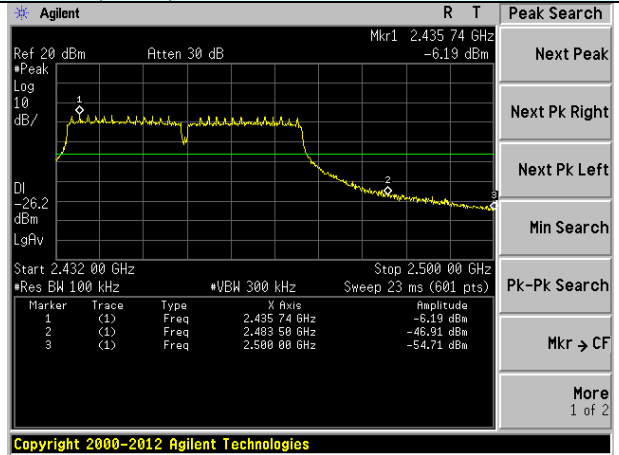


Highest channel

Test mode: 802.11n(HT40)



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 (2390MHz to 2500MHz) data was showed.				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Value
	Above 1GHz	Peak	1MHz	3MHz	Peak
		RMS	1MHz	3MHz	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 Y 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:	802.11b	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	53.44	27.59	5.38	34.01	52.40	74.00	-21.60	Horizontal
2400.00	63.06	27.58	5.39	34.01	62.02	74.00	-11.98	Horizontal
2390.00	55.25	27.59	5.38	34.01	54.21	74.00	-19.79	Vertical
2400.00	65.34	27.58	5.39	34.01	64.30	74.00	-9.70	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	37.75	27.59	5.38	34.01	36.71	54.00	-17.29	Horizontal
2400.00	45.95	27.58	5.39	34.01	44.91	54.00	-9.09	Horizontal
2390.00	39.50	27.59	5.38	34.01	38.46	54.00	-15.54	Vertical
2400.00	47.00	27.58	5.39	34.01	45.96	54.00	-8.04	Vertical

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)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	50.99	27.53	5.47	33.92	50.07	74.00	-23.93	Horizontal
2500.00	47.11	27.55	5.49	29.93	50.22	74.00	-23.78	Horizontal
2483.50	53.06	27.53	5.47	33.92	52.14	74.00	-21.86	Vertical
2500.00	49.45	27.55	5.49	29.93	52.56	74.00	-21.44	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	37.98	27.53	5.47	33.92	37.06	54.00	-16.94	Horizontal
2500.00	34.26	27.55	5.49	29.93	37.37	54.00	-16.63	Horizontal
2483.50	39.84	27.53	5.47	33.92	38.92	54.00	-15.08	Vertical
2500.00	36.10	27.55	5.49	29.93	39.21	54.00	-14.79	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:	802.11g	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	49.44	27.59	5.38	34.01	48.40	74.00	-25.60	Horizontal
2400.00	57.72	27.58	5.39	34.01	56.68	74.00	-17.32	Horizontal
2390.00	50.97	27.59	5.38	34.01	49.93	74.00	-24.07	Vertical
2400.00	58.92	27.58	5.39	34.01	57.88	74.00	-16.12	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	36.84	27.59	5.38	34.01	35.80	54.00	-18.20	Horizontal
2400.00	44.90	27.58	5.39	34.01	43.86	54.00	-10.14	Horizontal
2390.00	38.48	27.59	5.38	34.01	37.44	54.00	-16.56	Vertical
2400.00	45.85	27.58	5.39	34.01	44.81	54.00	-9.19	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	49.15	27.53	5.47	33.92	48.23	74.00	-25.77	Horizontal
2500.00	45.69	27.55	5.49	29.93	48.80	74.00	-25.20	Horizontal
2483.50	50.96	27.53	5.47	33.92	50.04	74.00	-23.96	Vertical
2500.00	47.78	27.55	5.49	29.93	50.89	74.00	-23.11	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	36.87	27.53	5.47	33.92	35.95	54.00	-18.05	Horizontal
2500.00	33.39	27.55	5.49	29.93	36.50	54.00	-17.50	Horizontal
2483.50	38.62	27.53	5.47	33.92	37.70	54.00	-16.30	Vertical
2500.00	35.19	27.55	5.49	29.93	38.30	54.00	-15.70	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)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2390.00	49.85	27.59	5.38	34.01	48.81	74.00	-25.19	Horizontal
2400.00	58.26	27.58	5.39	34.01	57.22	74.00	-16.78	Horizontal
2390.00	51.40	27.59	5.38	34.01	50.36	74.00	-23.64	Vertical
2400.00	59.57	27.58	5.39	34.01	58.53	74.00	-15.47	Vertical

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	37.13	27.59	5.38	34.01	36.09	54.00	-17.91	Horizontal
2400.00	45.23	27.58	5.39	34.01	44.19	54.00	-9.81	Horizontal
2390.00	38.80	27.59	5.38	34.01	37.76	54.00	-16.24	Vertical
2400.00	46.21	27.58	5.39	34.01	45.17	54.00	-8.83	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)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	49.73	27.53	5.47	33.92	48.81	74.00	-25.19	Horizontal
2500.00	46.14	27.55	5.49	29.93	49.25	74.00	-24.75	Horizontal
2483.50	51.62	27.53	5.47	33.92	50.70	74.00	-23.30	Vertical
2500.00	48.31	27.55	5.49	29.93	51.42	74.00	-22.58	Vertical

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	37.22	27.53	5.47	33.92	36.30	54.00	-17.70	Horizontal
2500.00	33.67	27.55	5.49	29.93	36.78	54.00	-17.22	Horizontal
2483.50	39.01	27.53	5.47	33.92	38.09	54.00	-15.91	Vertical
2500.00	35.48	27.55	5.49	29.93	38.59	54.00	-15.41	Vertical

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(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
2390.00	48.93	27.59	5.38	34.01	47.89	74.00	-26.11	Horizontal
2400.00	57.03	27.58	5.39	34.01	55.99	74.00	-18.01	Horizontal
2390.00	50.42	27.59	5.38	34.01	49.38	74.00	-24.62	Vertical
2400.00	58.10	27.58	5.39	34.01	57.06	74.00	-16.94	Vertical

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	36.48	27.59	5.38	34.01	35.44	54.00	-18.56	Horizontal
2400.00	44.48	27.58	5.39	34.01	43.44	54.00	-10.56	Horizontal
2390.00	38.08	27.59	5.38	34.01	37.04	54.00	-16.96	Vertical
2400.00	45.39	27.58	5.39	34.01	44.35	54.00	-9.65	Vertical

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)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	48.42	27.53	5.47	33.92	47.50	74.00	-26.50	Horizontal
2500.00	45.12	27.55	5.49	29.93	48.23	74.00	-25.77	Horizontal
2483.50	50.13	27.53	5.47	33.92	49.21	74.00	-24.79	Vertical
2500.00	47.12	27.55	5.49	29.93	50.23	74.00	-23.77	Vertical

Average value:

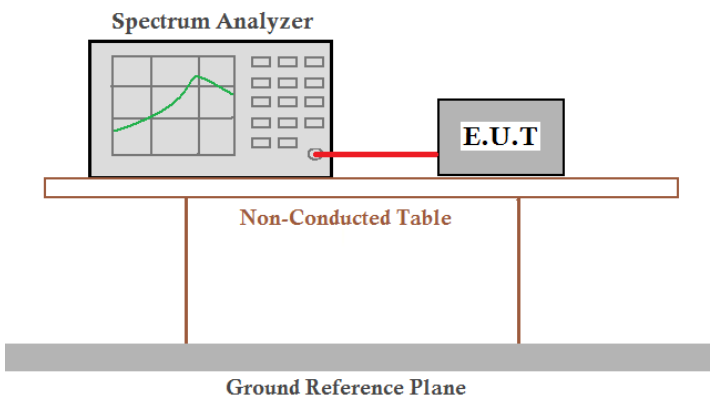
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	36.43	27.53	5.47	33.92	35.51	54.00	-18.49	Horizontal
2500.00	33.05	27.55	5.49	29.93	36.16	54.00	-17.84	Horizontal
2483.50	38.13	27.53	5.47	33.92	37.21	54.00	-16.79	Vertical
2500.00	34.82	27.55	5.49	29.93	37.93	54.00	-16.07	Vertical

Remark:

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

7.7 Spurious Emission

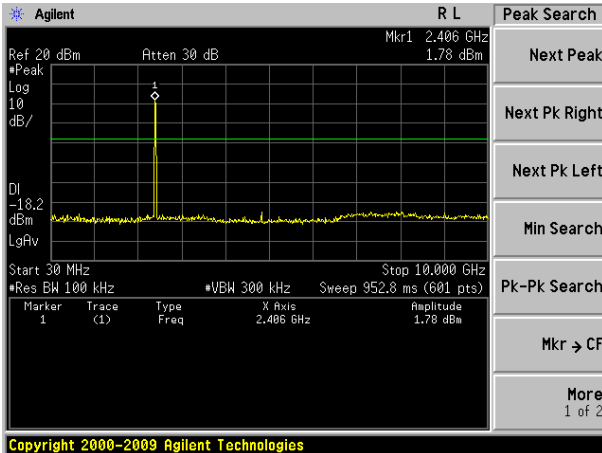
7.7.1 Conducted Emission Method

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. 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

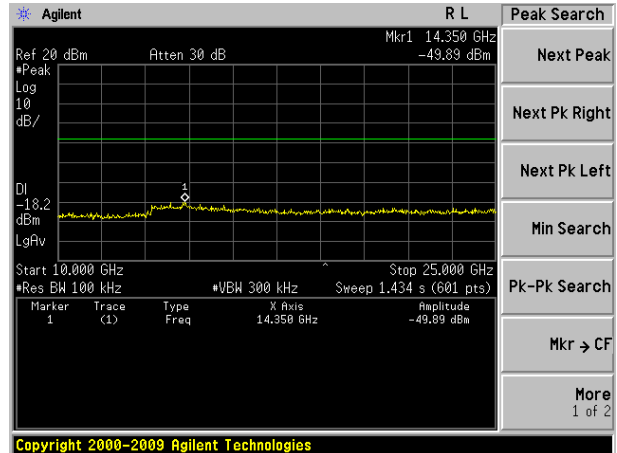
Test plot as follows:

Test mode:	802.11b
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Lowest channel

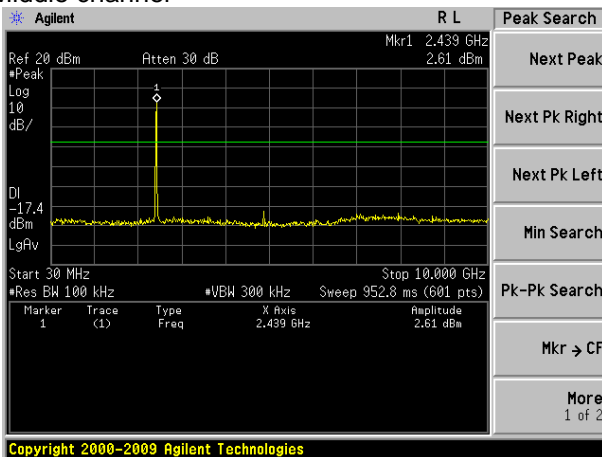


30MHz~10GHz

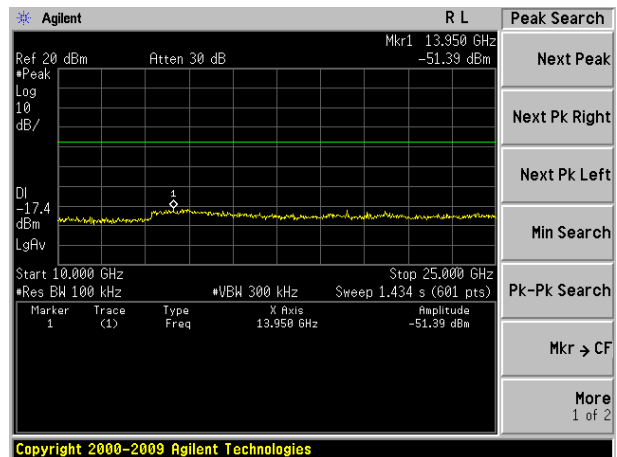


10GHz~25GHz

Middle channel

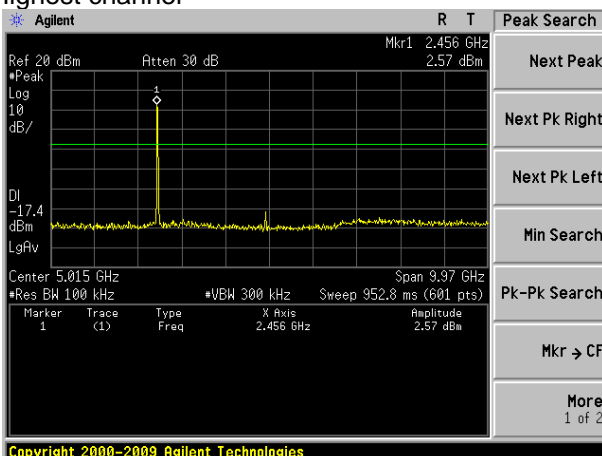


30MHz~10GHz

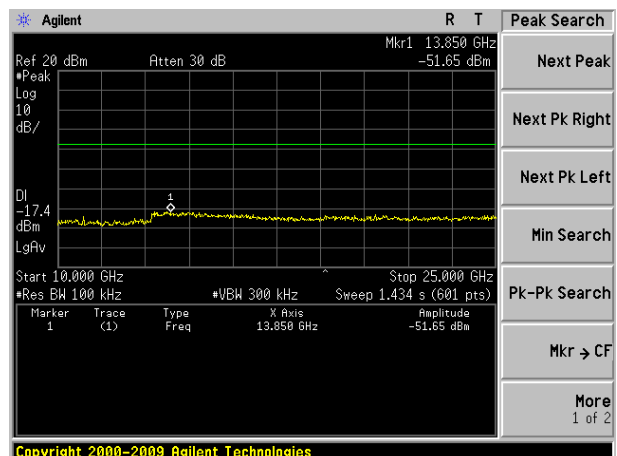


10GHz~25GHz

Highest channel



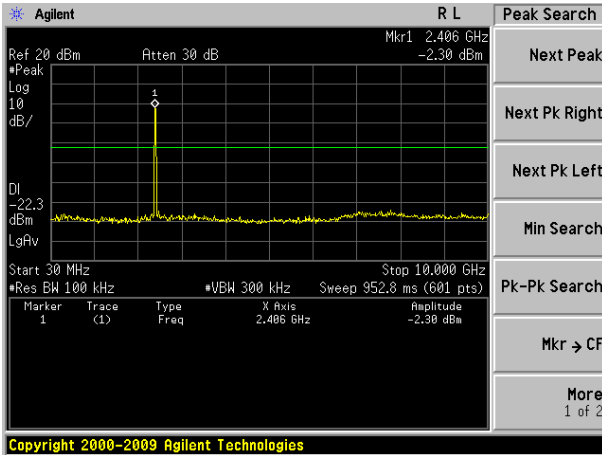
30MHz~10GHz



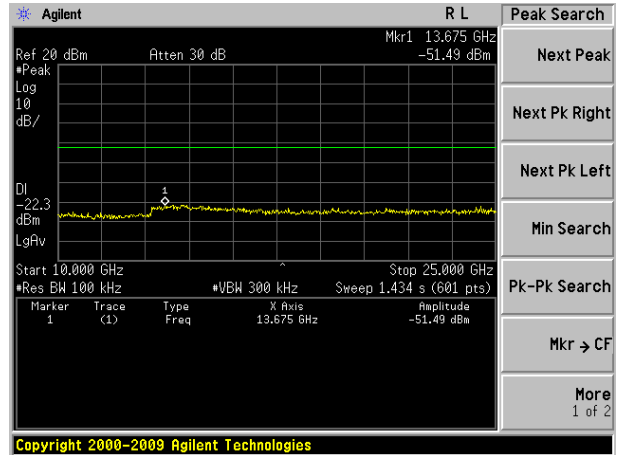
10GHz~25GHz

Test mode: 802.11g

Lowest channel

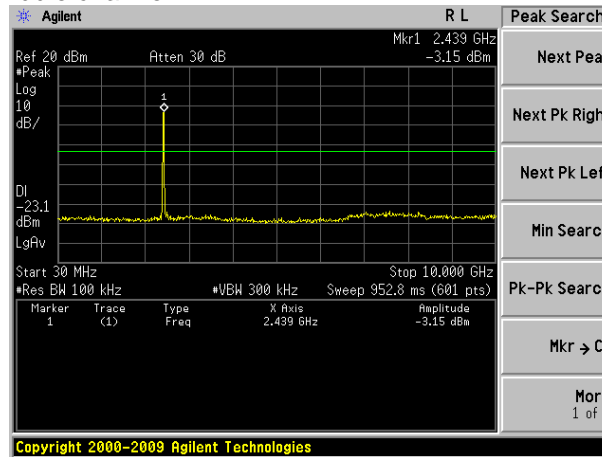


30MHz~10GHz

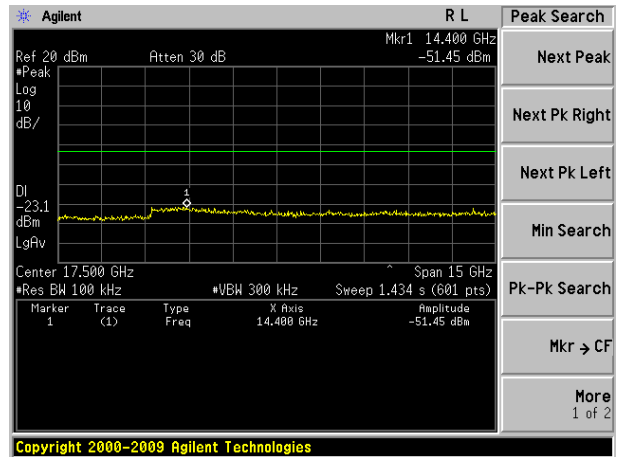


10GHz~25GHz

Middle channel

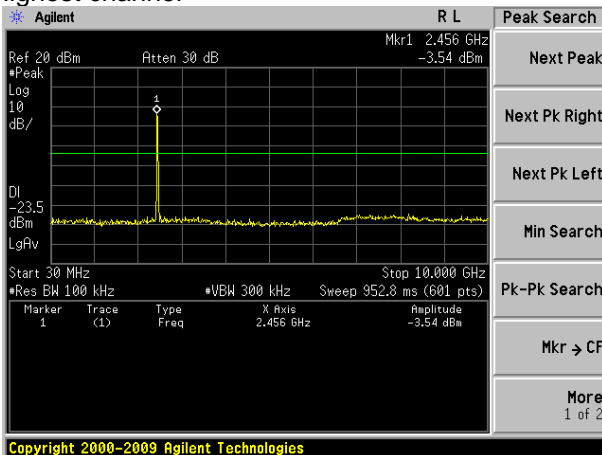


30MHz~10GHz

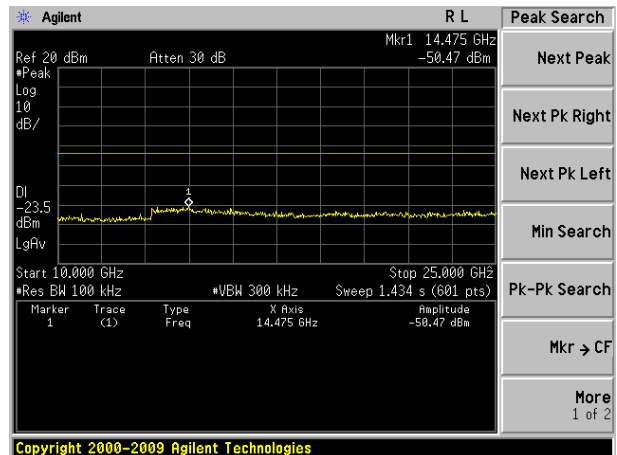


10GHz~25GHz

Highest channel



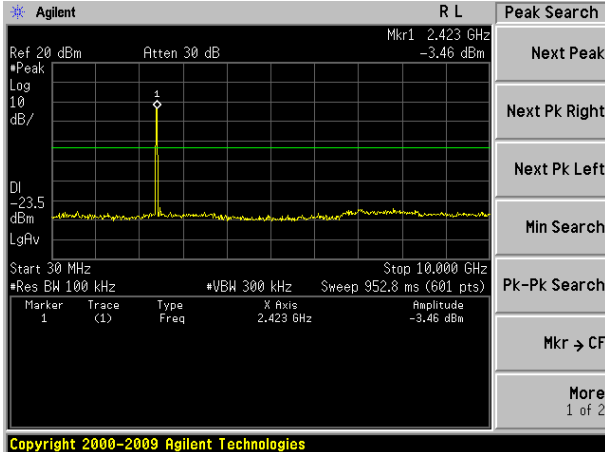
30MHz~10GHz



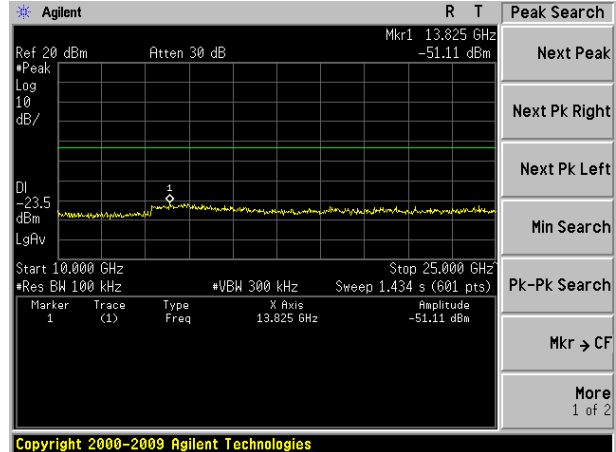
10GHz~25GHz

Test mode: 802.11n(HT20)

Lowest channel

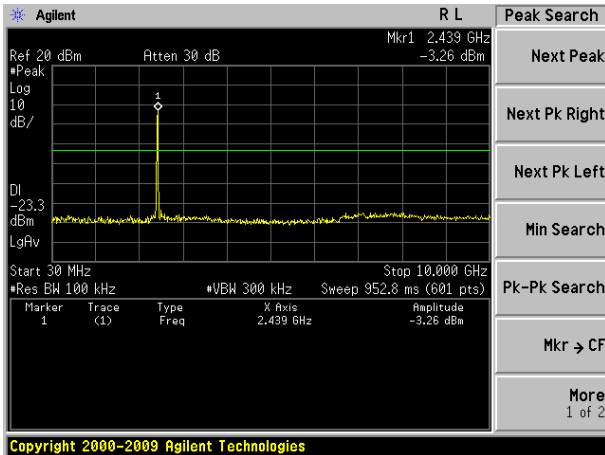


30MHz~10GHz

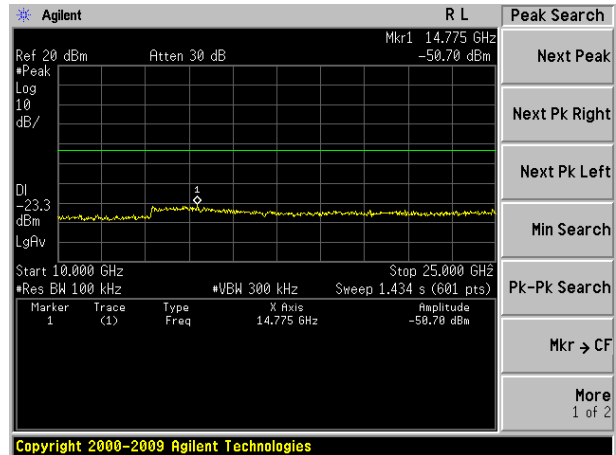


10GHz~25GHz

Middle channel

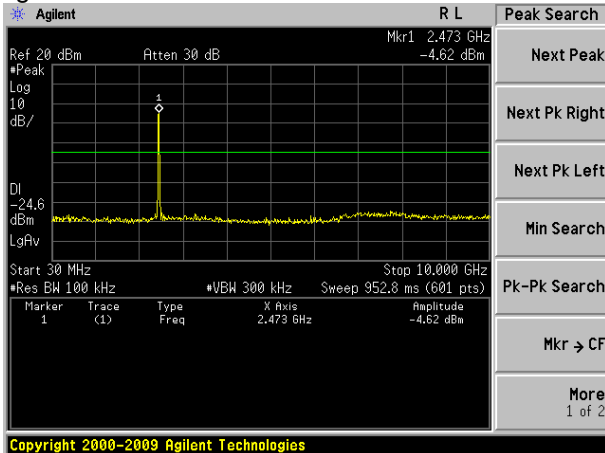


30MHz~10GHz

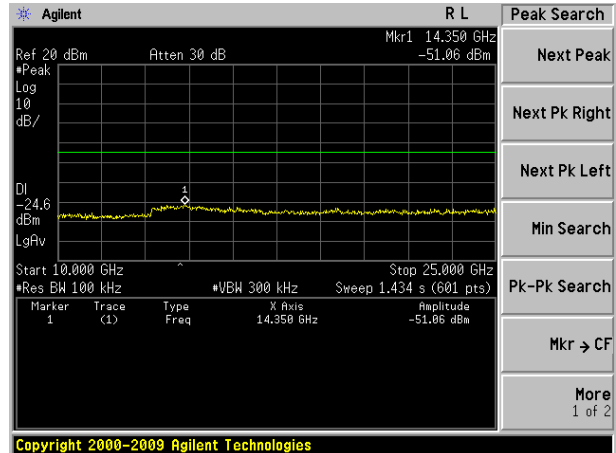


10GHz~25GHz

Highest channel



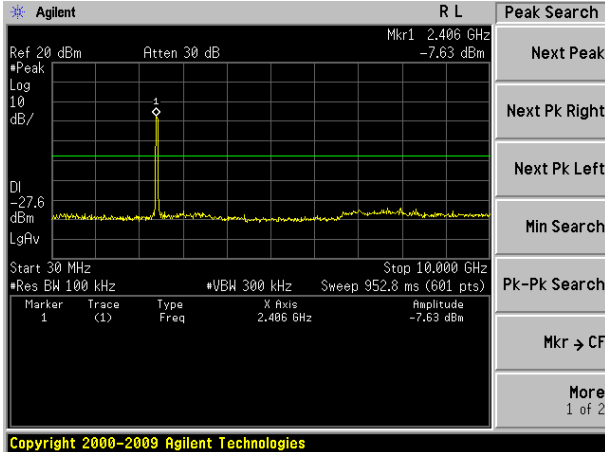
30MHz~10GHz



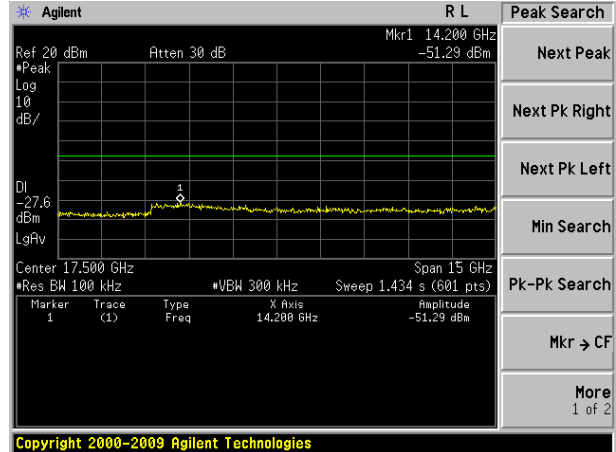
10GHz~25GHz

Test mode: 802.11n(HT40)

Lowest channel

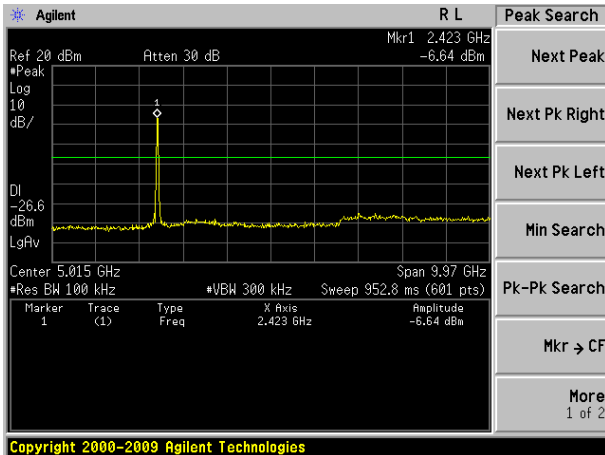


30MHz~10GHz

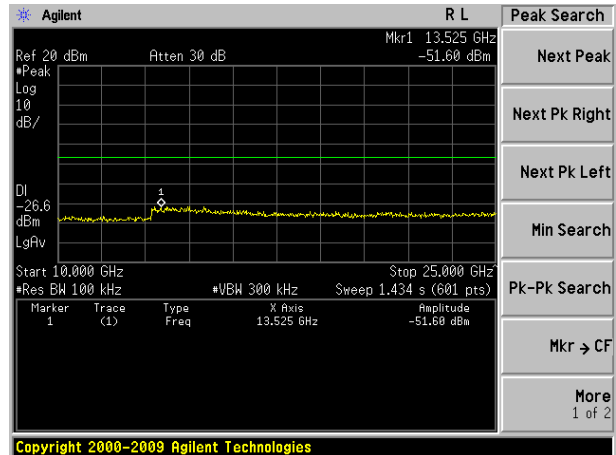


10GHz~25GHz

Middle channel

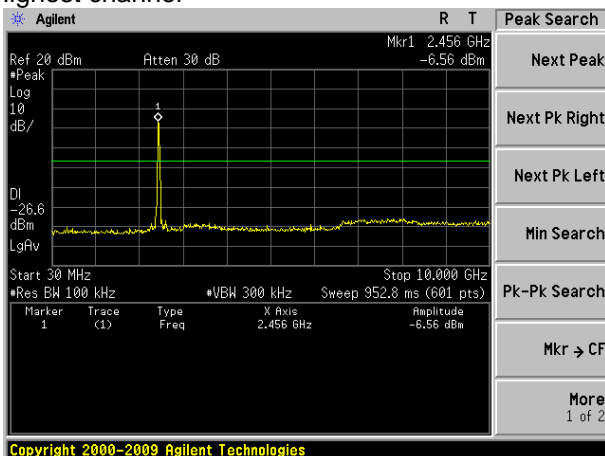


30MHz~10GHz

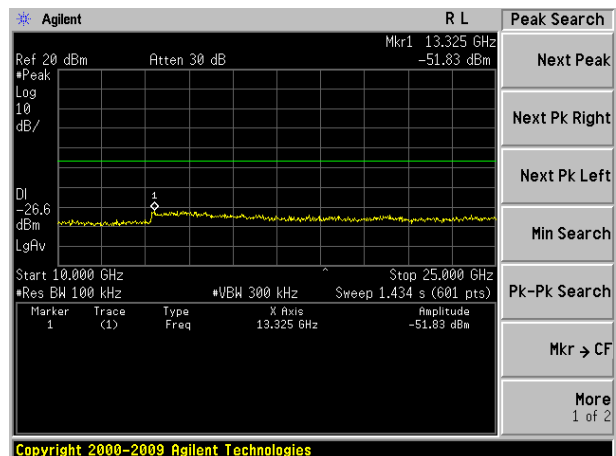


10GHz~25GHz

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
RMS		1MHz	3MHz	
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 Y 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>

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
34.62	52.30	14.30	0.61	30.07	37.14	40.00	-2.86	Vertical
43.81	50.49	15.56	0.71	30.03	36.73	40.00	-3.27	Vertical
125.01	48.82	11.70	1.40	29.54	32.38	43.50	-11.12	Vertical
375.94	47.13	16.56	2.75	29.61	36.83	46.00	-9.17	Vertical
501.18	41.41	18.63	3.31	29.30	34.05	46.00	-11.95	Vertical
875.25	36.39	22.87	4.76	29.12	34.90	46.00	-11.10	Vertical
55.22	45.34	15.00	0.82	29.96	31.20	40.00	-8.80	Horizontal
106.76	43.17	14.54	1.25	29.65	29.31	43.50	-14.19	Horizontal
250.30	49.99	14.07	2.12	29.65	36.53	46.00	-9.47	Horizontal
375.94	52.40	16.56	2.75	29.61	42.10	46.00	-3.90	Horizontal
750.11	37.37	21.43	4.28	29.20	33.88	46.00	-12.12	Horizontal
875.25	41.88	22.87	4.76	29.12	40.39	46.00	-5.61	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)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4824.00	41.70	31.79	8.62	32.10	50.01	74.00	-23.99	Vertical
7236.00	35.11	36.19	11.68	31.97	51.01	74.00	-22.99	Vertical
9648.00	33.35	38.07	14.16	31.56	54.02	74.00	-19.98	Vertical
12060.00	*					74.00		Vertical
14472.00	*					74.00		Vertical
16884.00	*					74.00		Vertical
4824.00	40.15	31.79	8.62	32.10	48.46	74.00	-25.54	Horizontal
7236.00	34.74	36.19	11.68	31.97	50.64	74.00	-23.36	Horizontal
9648.00	32.88	38.07	14.16	31.56	53.55	74.00	-20.45	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	30.67	31.79	8.62	32.10	38.98	54.00	-15.02	Vertical
7236.00	23.94	36.19	11.68	31.97	39.84	54.00	-14.16	Vertical
9648.00	23.67	38.07	14.16	31.56	44.34	54.00	-9.66	Vertical
12060.00	*					54.00		Vertical
14472.00	*					54.00		Vertical
16884.00	*					54.00		Vertical
4824.00	29.61	31.79	8.62	32.10	37.92	54.00	-16.08	Horizontal
7236.00	23.30	36.19	11.68	31.97	39.20	54.00	-14.80	Horizontal
9648.00	22.60	38.07	14.16	31.56	43.27	54.00	-10.73	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 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	40.51	31.85	8.66	32.12	48.90	74.00	-25.10	Vertical
7311.00	35.02	36.37	11.71	31.91	51.19	74.00	-22.81	Vertical
9748.00	34.26	38.27	14.25	31.56	55.22	74.00	-18.78	Vertical
12185.00	*					74.00		Vertical
14622.00	*					74.00		Vertical
17059.00	*					74.00		Vertical
4874.00	40.81	31.85	8.66	32.12	49.20	74.00	-24.80	Horizontal
7311.00	33.57	36.37	11.71	31.91	49.74	74.00	-24.26	Horizontal
9748.00	34.11	38.27	14.25	31.56	55.07	74.00	-18.93	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	31.27	31.85	8.66	32.12	39.66	54.00	-14.34	Vertical
7311.00	23.31	36.37	11.71	31.91	39.48	54.00	-14.52	Vertical
9748.00	23.49	38.27	14.25	31.56	44.45	54.00	-9.55	Vertical
12185.00	*					54.00		Vertical
14622.00	*					54.00		Vertical
17059.00	*					54.00		Vertical
4874.00	30.86	31.85	8.66	32.12	39.25	54.00	-14.75	Horizontal
7311.00	22.64	36.37	11.71	31.91	38.81	54.00	-15.19	Horizontal
9748.00	23.80	38.27	14.25	31.56	44.76	54.00	-9.24	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:	802.11b	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	46.88	31.90	8.70	32.15	55.33	74.00	-18.67	Vertical
7386.00	36.23	36.49	11.76	31.83	52.65	74.00	-21.35	Vertical
9848.00	36.22	38.62	14.31	31.77	57.38	74.00	-16.62	Vertical
12310.00	*					74.00		Vertical
14772.00	*					74.00		Vertical
17234.00	*					74.00		Vertical
4924.00	45.88	31.90	8.70	32.15	54.33	74.00	-19.67	Horizontal
7386.00	34.97	36.49	11.76	31.83	51.39	74.00	-22.61	Horizontal
9848.00	34.03	38.62	14.31	31.77	55.19	74.00	-18.81	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	37.64	31.90	8.70	32.15	46.09	54.00	-7.91	Vertical
7386.00	26.10	36.49	11.76	31.83	42.52	54.00	-11.48	Vertical
9848.00	24.40	38.62	14.31	31.77	45.56	54.00	-8.44	Vertical
12310.00	*					54.00		Vertical
14772.00	*					54.00		Vertical
17234.00	*					54.00		Vertical
4924.00	36.13	31.90	8.70	32.15	44.58	54.00	-9.42	Horizontal
7386.00	24.33	36.49	11.76	31.83	40.75	54.00	-13.25	Horizontal
9848.00	23.26	38.62	14.31	31.77	44.42	54.00	-9.58	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.

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	39.87	31.79	8.62	32.10	48.18	74.00	-25.82	Vertical
7236.00	33.95	36.19	11.68	31.97	49.85	74.00	-24.15	Vertical
9648.00	32.52	38.07	14.16	31.56	53.19	74.00	-20.81	Vertical
12060.00	*					74.00		Vertical
14472.00	*					74.00		Vertical
16884.00	*					74.00		Vertical
4824.00	38.61	31.79	8.62	32.10	46.92	74.00	-27.08	Horizontal
7236.00	33.74	36.19	11.68	31.97	49.64	74.00	-24.36	Horizontal
9648.00	32.12	38.07	14.16	31.56	52.79	74.00	-21.21	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	28.99	31.79	8.62	32.10	37.30	54.00	-16.70	Vertical
7236.00	22.83	36.19	11.68	31.97	38.73	54.00	-15.27	Vertical
9648.00	22.88	38.07	14.16	31.56	43.55	54.00	-10.45	Vertical
12060.00	*					54.00		Vertical
14472.00	*					54.00		Vertical
16884.00	*					54.00		Vertical
4824.00	28.17	31.79	8.62	32.10	36.48	54.00	-17.52	Horizontal
7236.00	22.33	36.19	11.68	31.97	38.23	54.00	-15.77	Horizontal
9648.00	21.87	38.07	14.16	31.56	42.54	54.00	-11.46	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 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	39.00	31.85	8.66	32.12	47.39	74.00	-26.61	Vertical
7311.00	34.07	36.37	11.71	31.91	50.24	74.00	-23.76	Vertical
9748.00	33.58	38.27	14.25	31.56	54.54	74.00	-19.46	Vertical
12185.00	*					74.00		Vertical
14622.00	*					74.00		Vertical
17059.00	*					74.00		Vertical
4874.00	39.54	31.85	8.66	32.12	47.93	74.00	-26.07	Horizontal
7311.00	32.74	36.37	11.71	31.91	48.91	74.00	-25.09	Horizontal
9748.00	33.48	38.27	14.25	31.56	54.44	74.00	-19.56	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	29.88	31.85	8.66	32.12	38.27	54.00	-15.73	Vertical
7311.00	22.39	36.37	11.71	31.91	38.56	54.00	-15.44	Vertical
9748.00	22.84	38.27	14.25	31.56	43.80	54.00	-10.20	Vertical
12185.00	*					54.00		Vertical
14622.00	*					54.00		Vertical
17059.00	*					54.00		Vertical
4874.00	29.67	31.85	8.66	32.12	38.06	54.00	-15.94	Horizontal
7311.00	21.83	36.37	11.71	31.91	38.00	54.00	-16.00	Horizontal
9748.00	23.20	38.27	14.25	31.56	44.16	54.00	-9.84	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	44.28	31.90	8.70	32.15	52.73	74.00	-21.27	Vertical
7386.00	34.59	36.49	11.76	31.83	51.01	74.00	-22.99	Vertical
9848.00	35.04	38.62	14.31	31.77	56.20	74.00	-17.80	Vertical
12310.00	*					74.00		Vertical
14772.00	*					74.00		Vertical
17234.00	*					74.00		Vertical
4924.00	43.68	31.90	8.70	32.15	52.13	74.00	-21.87	Horizontal
7386.00	33.54	36.49	11.76	31.83	49.96	74.00	-24.04	Horizontal
9848.00	32.95	38.62	14.31	31.77	54.11	74.00	-19.89	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	35.24	31.90	8.70	32.15	43.69	54.00	-10.31	Vertical
7386.00	24.52	36.49	11.76	31.83	40.94	54.00	-13.06	Vertical
9848.00	23.28	38.62	14.31	31.77	44.44	54.00	-9.56	Vertical
12310.00	*					54.00		Vertical
14772.00	*					54.00		Vertical
17234.00	*					54.00		Vertical
4924.00	34.08	31.90	8.70	32.15	42.53	54.00	-11.47	Horizontal
7386.00	22.93	36.49	11.76	31.83	39.35	54.00	-14.65	Horizontal
9848.00	22.22	38.62	14.31	31.77	43.38	54.00	-10.62	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	40.56	31.79	8.62	32.10	48.87	74.00	-25.13	Vertical
7236.00	34.39	36.19	11.68	31.97	50.29	74.00	-23.71	Vertical
9648.00	32.83	38.07	14.16	31.56	53.50	74.00	-20.50	Vertical
12060.00	*					74.00		Vertical
14472.00	*					74.00		Vertical
16884.00	*					74.00		Vertical
4824.00	39.19	31.79	8.62	32.10	47.50	74.00	-26.50	Horizontal
7236.00	34.11	36.19	11.68	31.97	50.01	74.00	-23.99	Horizontal
9648.00	32.40	38.07	14.16	31.56	53.07	74.00	-20.93	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	29.62	31.79	8.62	32.10	37.93	54.00	-16.07	Vertical
7236.00	23.25	36.19	11.68	31.97	39.15	54.00	-14.85	Vertical
9648.00	23.17	38.07	14.16	31.56	43.84	54.00	-10.16	Vertical
12060.00	*					54.00		Vertical
14472.00	*					54.00		Vertical
16884.00	*					54.00		Vertical
4824.00	28.71	31.79	8.62	32.10	37.02	54.00	-16.98	Horizontal
7236.00	22.69	36.19	11.68	31.97	38.59	54.00	-15.41	Horizontal
9648.00	22.15	38.07	14.16	31.56	42.82	54.00	-11.18	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)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4874.00	39.57	31.85	8.66	32.12	47.96	74.00	-26.04	Vertical
7311.00	34.43	36.37	11.71	31.91	50.60	74.00	-23.40	Vertical
9748.00	33.83	38.27	14.25	31.56	54.79	74.00	-19.21	Vertical
12185.00	*					74.00		Vertical
14622.00	*					74.00		Vertical
17059.00	*					74.00		Vertical
4874.00	40.01	31.85	8.66	32.12	48.40	74.00	-25.60	Horizontal
7311.00	33.05	36.37	11.71	31.91	49.22	74.00	-24.78	Horizontal
9748.00	33.71	38.27	14.25	31.56	54.67	74.00	-19.33	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	30.40	31.85	8.66	32.12	38.79	54.00	-15.21	Vertical
7311.00	22.74	36.37	11.71	31.91	38.91	54.00	-15.09	Vertical
9748.00	23.08	38.27	14.25	31.56	44.04	54.00	-9.96	Vertical
12185.00	*					54.00		Vertical
14622.00	*					54.00		Vertical
17059.00	*					54.00		Vertical
4874.00	30.11	31.85	8.66	32.12	38.50	54.00	-15.50	Horizontal
7311.00	22.14	36.37	11.71	31.91	38.31	54.00	-15.69	Horizontal
9748.00	23.42	38.27	14.25	31.56	44.38	54.00	-9.62	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)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4924.00	45.26	31.90	8.70	32.15	53.71	74.00	-20.29	Vertical
7386.00	35.20	36.49	11.76	31.83	51.62	74.00	-22.38	Vertical
9848.00	35.48	38.62	14.31	31.77	56.64	74.00	-17.36	Vertical
12310.00	*					74.00		Vertical
14772.00	*					74.00		Vertical
17234.00	*					74.00		Vertical
4924.00	44.50	31.90	8.70	32.15	52.95	74.00	-21.05	Horizontal
7386.00	34.07	36.49	11.76	31.83	50.49	74.00	-23.51	Horizontal
9848.00	33.36	38.62	14.31	31.77	54.52	74.00	-19.48	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	36.14	31.90	8.70	32.15	44.59	54.00	-9.41	Vertical
7386.00	25.11	36.49	11.76	31.83	41.53	54.00	-12.47	Vertical
9848.00	23.70	38.62	14.31	31.77	44.86	54.00	-9.14	Vertical
12310.00	*					54.00		Vertical
14772.00	*					54.00		Vertical
17234.00	*					54.00		Vertical
4924.00	34.85	31.90	8.70	32.15	43.30	54.00	-10.70	Horizontal
7386.00	23.46	36.49	11.76	31.83	39.88	54.00	-14.12	Horizontal
9848.00	22.61	38.62	14.31	31.77	43.77	54.00	-10.23	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)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4844.00	38.84	31.81	8.63	32.11	47.17	74.00	-26.83	Vertical
7266.00	33.30	36.28	11.69	31.94	49.33	74.00	-24.67	Vertical
9688.00	32.06	38.13	14.21	31.52	52.88	74.00	-21.12	Vertical
12060.00	*					74.00		Vertical
14472.00	*					74.00		Vertical
16884.00	*					74.00		Vertical
4844.00	37.74	31.81	8.63	32.11	46.07	74.00	-27.93	Horizontal
7266.00	33.17	36.28	11.69	31.94	49.20	74.00	-24.80	Horizontal
9688.00	31.69	38.13	14.21	31.52	52.51	74.00	-21.49	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
4844.00	28.04	31.81	8.63	32.11	36.37	54.00	-17.63	Vertical
7266.00	22.20	36.28	11.69	31.94	38.23	54.00	-15.77	Vertical
9688.00	22.43	38.13	14.21	31.52	43.25	54.00	-10.75	Vertical
12060.00	*					54.00		Vertical
14472.00	*					54.00		Vertical
16884.00	*					54.00		Vertical
4844.00	27.35	31.81	8.63	32.11	35.68	54.00	-18.32	Horizontal
7266.00	21.77	36.28	11.69	31.94	37.80	54.00	-16.20	Horizontal
9688.00	21.46	38.13	14.21	31.52	42.28	54.00	-11.72	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(HT40)	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	38.15	31.85	8.66	32.12	46.54	74.00	-27.46	Vertical
7311.00	33.53	36.37	11.71	31.91	49.70	74.00	-24.30	Vertical
9748.00	33.19	38.27	14.25	31.56	54.15	74.00	-19.85	Vertical
12185.00	*					74.00		Vertical
14622.00	*					74.00		Vertical
17059.00	*					74.00		Vertical
4874.00	38.82	31.85	8.66	32.12	47.21	74.00	-26.79	Horizontal
7311.00	32.27	36.37	11.71	31.91	48.44	74.00	-25.56	Horizontal
9748.00	33.12	38.27	14.25	31.56	54.08	74.00	-19.92	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	29.10	31.85	8.66	32.12	37.49	54.00	-16.51	Vertical
7311.00	21.87	36.37	11.71	31.91	38.04	54.00	-15.96	Vertical
9748.00	22.47	38.27	14.25	31.56	43.43	54.00	-10.57	Vertical
12185.00	*					54.00		Vertical
14622.00	*					54.00		Vertical
17059.00	*					54.00		Vertical
4874.00	28.99	31.85	8.66	32.12	37.38	54.00	-16.62	Horizontal
7311.00	21.38	36.37	11.71	31.91	37.55	54.00	-16.45	Horizontal
9748.00	22.86	38.27	14.25	31.56	43.82	54.00	-10.18	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	42.81	31.88	8.68	32.13	51.24	74.00	-22.76	Vertical
7356.00	33.66	36.45	11.75	31.86	50.00	74.00	-24.00	Vertical
9808.00	34.38	38.43	14.29	31.68	55.42	74.00	-18.58	Vertical
12310.00	*					74.00		Vertical
14772.00	*					74.00		Vertical
17234.00	*					74.00		Vertical
4904.00	42.44	31.88	8.68	32.13	50.87	74.00	-23.13	Horizontal
7356.00	32.72	36.45	11.75	31.86	49.06	74.00	-24.94	Horizontal
9808.00	32.34	38.43	14.29	31.68	53.38	74.00	-20.62	Horizontal
12310.00	*					74.00		Horizontal
14772.00	*					74.00		Horizontal
17234.00	*					74.00		Horizontal

Average value:

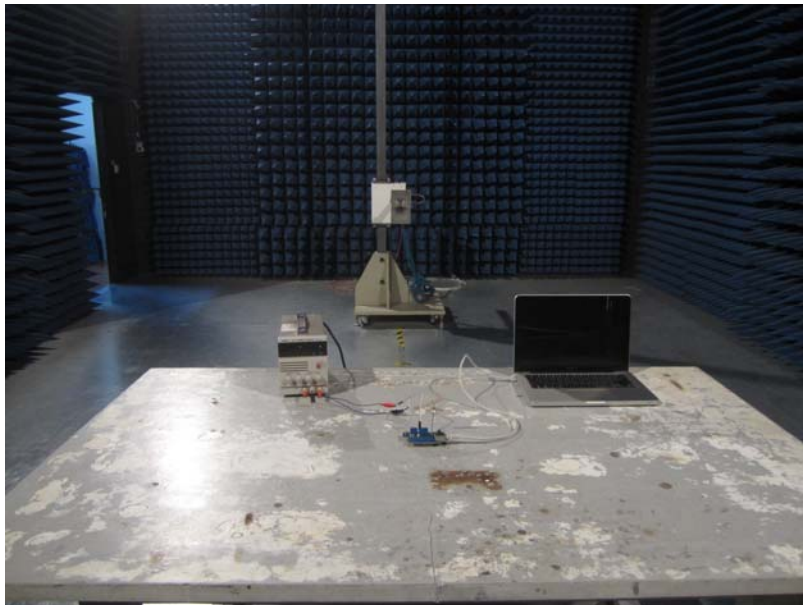
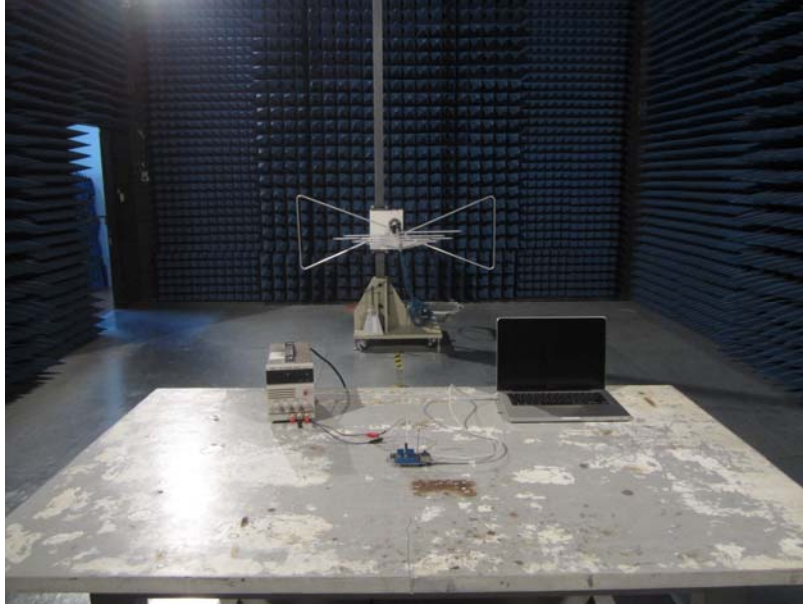
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4904.00	33.89	31.88	8.68	32.13	42.32	54.00	-11.68	Vertical
7356.00	23.62	36.45	11.75	31.86	39.96	54.00	-14.04	Vertical
9808.00	22.64	38.43	14.29	31.68	43.68	54.00	-10.32	Vertical
12310.00	*					54.00		Vertical
14772.00	*					54.00		Vertical
17234.00	*					54.00		Vertical
4904.00	32.91	31.88	8.68	32.13	41.34	54.00	-12.66	Horizontal
7356.00	22.15	36.45	11.75	31.86	38.49	54.00	-15.51	Horizontal
9808.00	21.63	38.43	14.29	31.68	42.67	54.00	-11.33	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

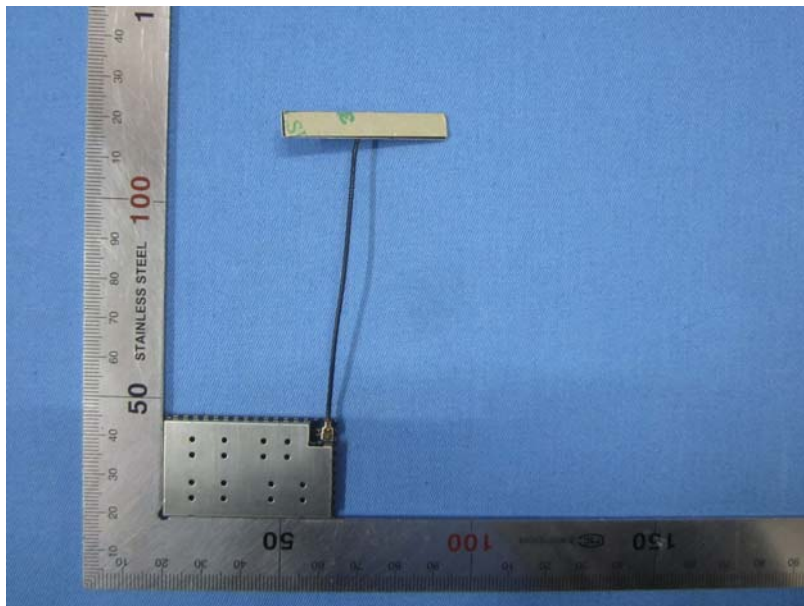
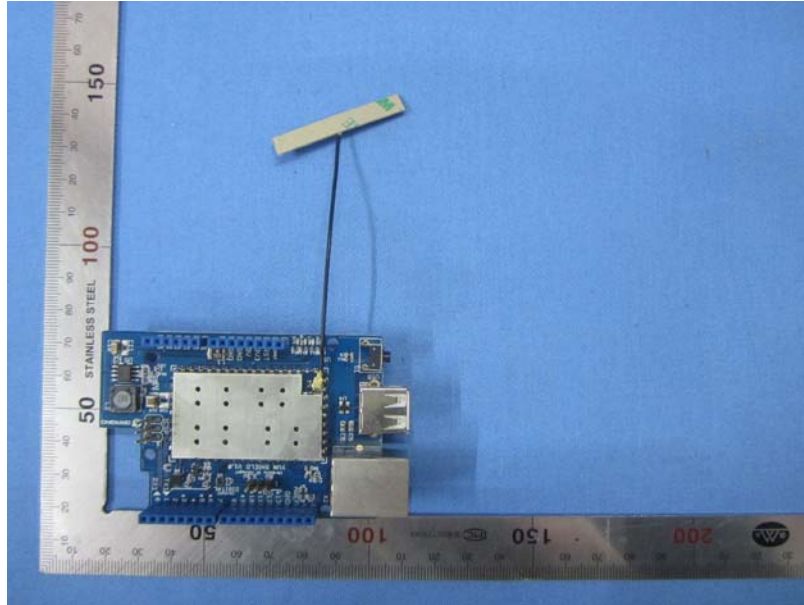
Radiated Emission

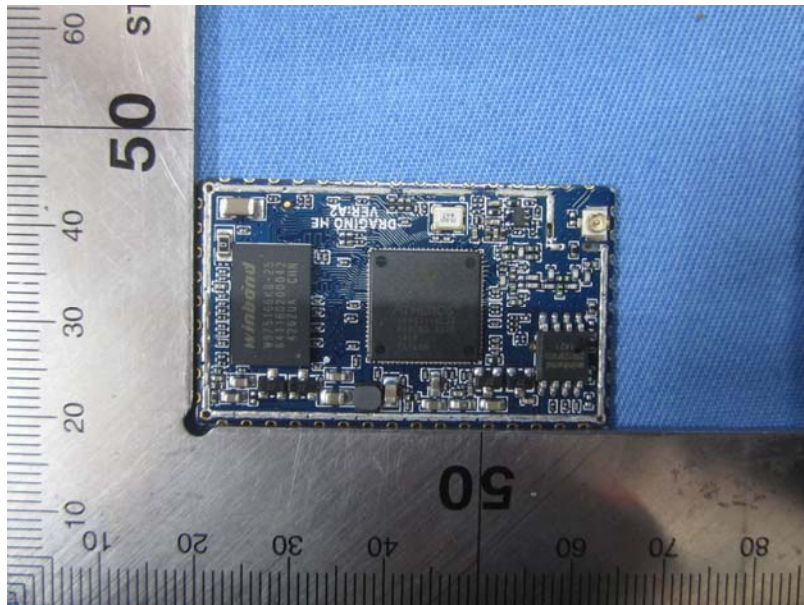
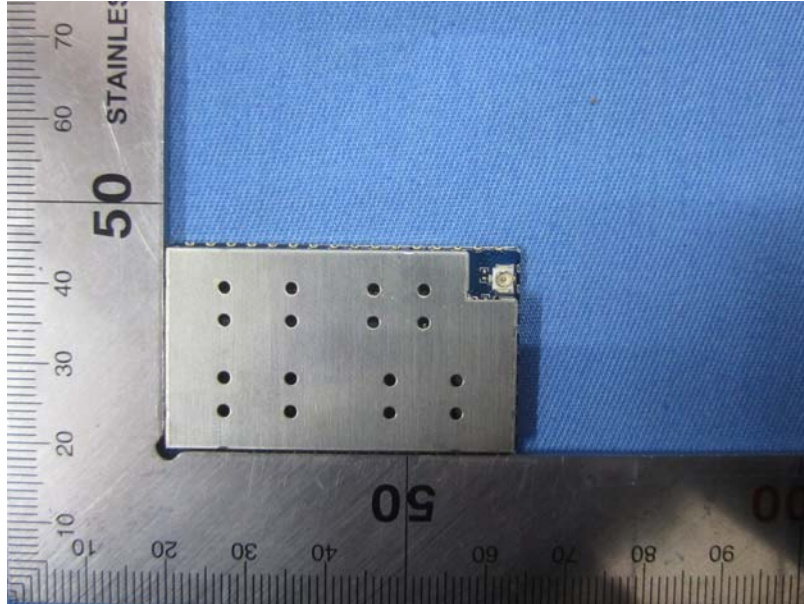


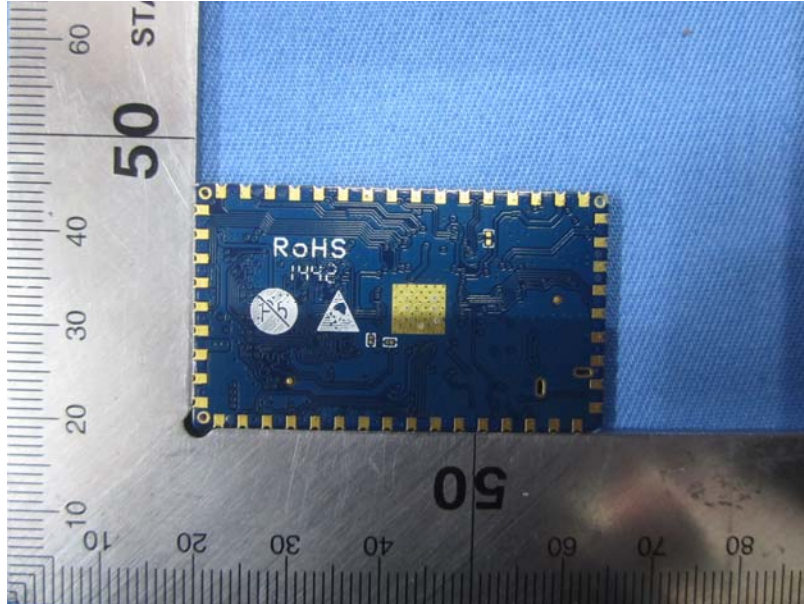
Conducted Emission



9 EUT Constructional Details







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