

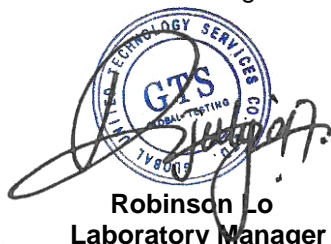
### FCC Report (WIFI)

**Applicant:** Shenzhen Guoyun Technology Co.,Ltd.  
**Address of Applicant:** 1906,Shenfang Building B,Huaqiangbei Street,Futian District,Shenzhen,China  
**Manufacturer:** Shenzhen Guoyun Technology Co.,Ltd.  
**Address of Manufacturer:** 1906,Shenfang Building B,Huaqiangbei Street,Futian District,Shenzhen,China  
**Equipment Under Test (EUT)**

**Product Name:** Module  
**Model No.:** ESP-32F  
**FCC ID:** 2AM77-ESP-32F  
**Applicable standards:** FCC CFR Title 47 Part 15.247:2017  
**Date of sample receipt:** June 30, 2017  
**Date of Test:** July 03-05, 2017  
**Date of report issued:** July 06, 2017  
**Test Result :** PASS \*

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

Authorized Signature:



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

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

## 2 Version

Version No.	Date	Description
00	July 06, 2017	Original

**Prepared By:**

*Tiger Chen*

**Date:**

July 06, 2017

**Project Engineer**

**Check By:**

*Andy Wu*

**Date:**

July 06, 2017

**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.

Remark: Test according to ANSI C63.4:2014 and ANSI C63.10:2013.

### Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	9kHz ~ 30MHz	$\pm 4.34\text{dB}$	(1)
Radiated Emission	30MHz ~ 1000MHz	$\pm 4.24\text{dB}$	(1)
Radiated Emission	1GHz ~ 26.5GHz	$\pm 4.68\text{dB}$	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	$\pm 3.45\text{dB}$	(1)

Note (1): The measurement uncertainty is for coverage factor of  $k=2$  and a level of confidence of 95%.

## 5 General Information

### 5.1 General Description of EUT

Product Name:	Module
Model No.:	ESP-32F
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:	PCB antenna
Antenna gain:	2.0dBi
Power supply:	DC 3.7V

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

Note:

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

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

## 5.2 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode
<i>Remark: During the test, the dutycycle &gt;98%, 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

## 5.3 Description of Support Units

None
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## 5.4 Test Facility

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

- **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 22, 2016.

- **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, August 15, 2016.

## 5.5 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: No. 301-309, 3/F., Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102

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	July 03 2015	July 02 2020
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	June 28 2017	June 27 2018
4	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June 28 2017	June 27 2018
5	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June 28 2017	June 27 2018
6	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	June 28 2017	June 27 2018
7	Horn Antenna	ETS-LINDGREN	3160	GTS217	June 28 2017	June 27 2018
8	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
9	Coaxial Cable	GTS	N/A	GTS213	June 28 2017	June 27 2018
10	Coaxial Cable	GTS	N/A	GTS211	June 28 2017	June 27 2018
11	Coaxial cable	GTS	N/A	GTS210	June 28 2017	June 27 2018
12	Coaxial Cable	GTS	N/A	GTS212	June 28 2017	June 27 2018
13	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June 28 2017	June 27 2018
14	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	June 28 2017	June 27 2018
15	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June 28 2017	June 27 2018
16	Band filter	Amindeon	82346	GTS219	June 28 2017	June 27 2018
17	Power Meter	Anritsu	ML2495A	GTS540	June 28 2017	June 27 2018
18	Power Sensor	Anritsu	MA2411B	GTS541	June 28 2017	June 27 2018

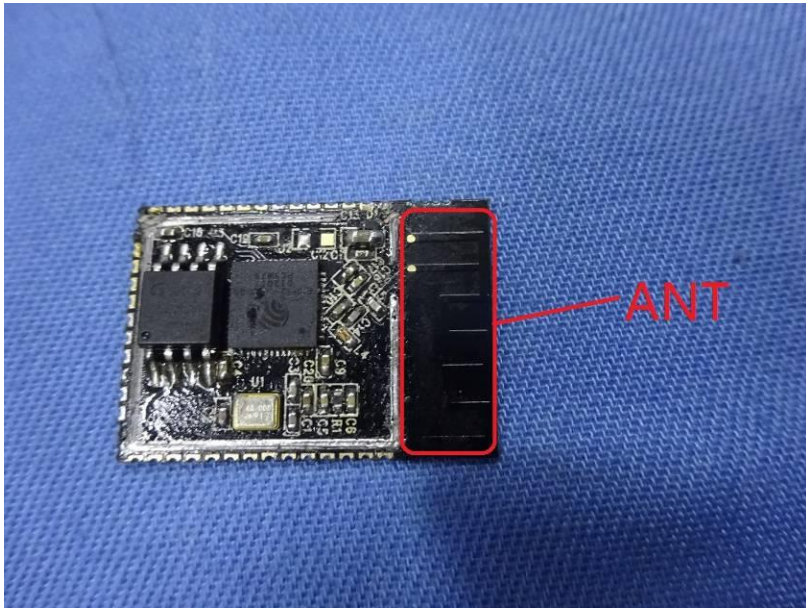
Conducted Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	May.16 2014	May.15 2019
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June 28 2017	June 27 2018
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June 28 2017	June 27 2018
4	Artificial Mains Network	SCHWARZBECK MESS	NSLK8127	GTS226	June 28 2017	June 27 2018
5	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Thermo meter	KTJ	TA328	GTS233	June 28 2017	June 27 2018

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	June 28 2017	June 27 2018

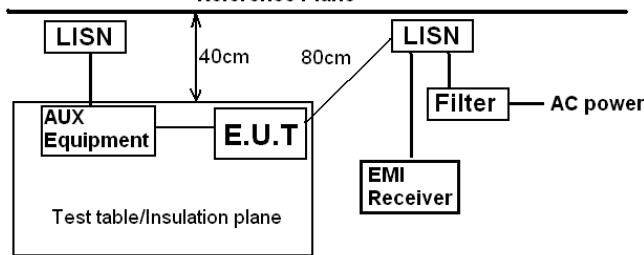


## 7 Test results and Measurement Data

### 7.1 Antenna requirement

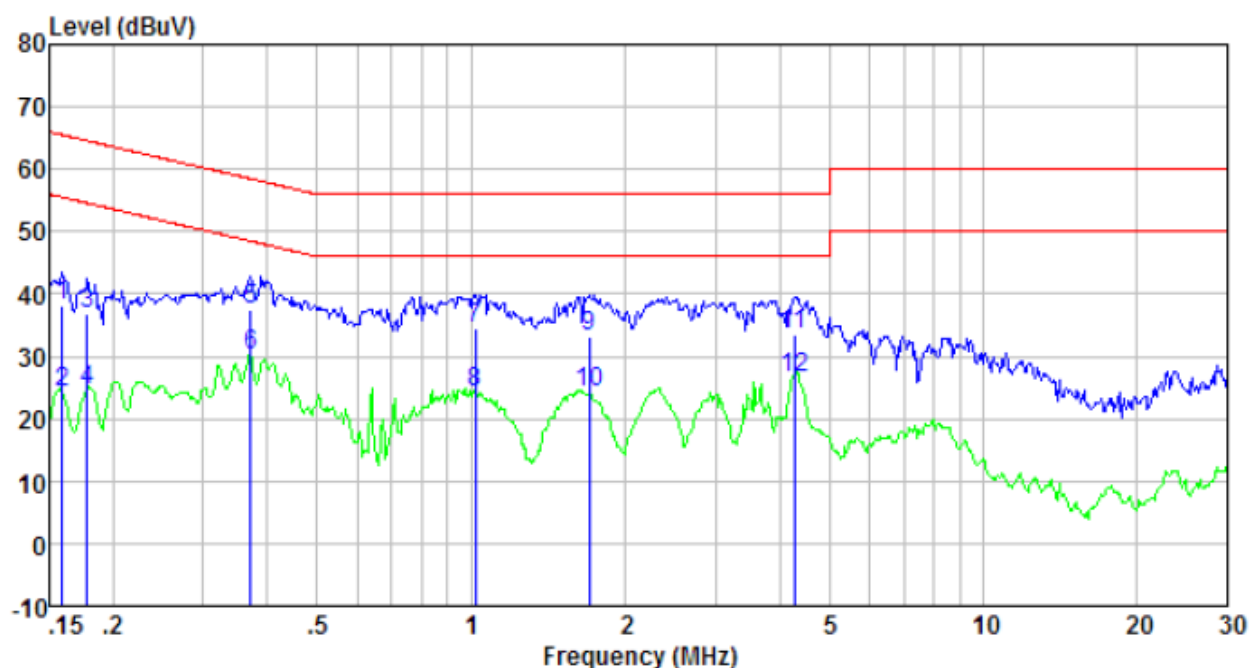
Standard requirement:	FCC Part15 C Section 15.203 /247(c)
<p><b>15.203 requirement:</b></p> <p>An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna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

## 7.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207		
Test Method:	ANSI C63.10:2013		
Test Frequency Range:	150KHz to 30MHz		
Class / Severity:	Class B		
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto		
Limit:	Frequency range (MHz)	Limit (dBuV)	
		Quasi-peak	Average
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	5-30	60	50
* Decreases with the logarithm of the frequency.			
Test setup:	<div><p style="text-align: center;"><b>Reference Plane</b></p><p>Remark: E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p></div>		
Test procedure:	<div><ol style="list-style-type: none"><li>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.</li><li>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).</li><li>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 C63.10:2013 on conducted measurement.</li></ol></div>		
Test Instruments:	Refer to section 6.0 for details		
Test mode:	Refer to section 5.2 for details		
Test results:	Pass		

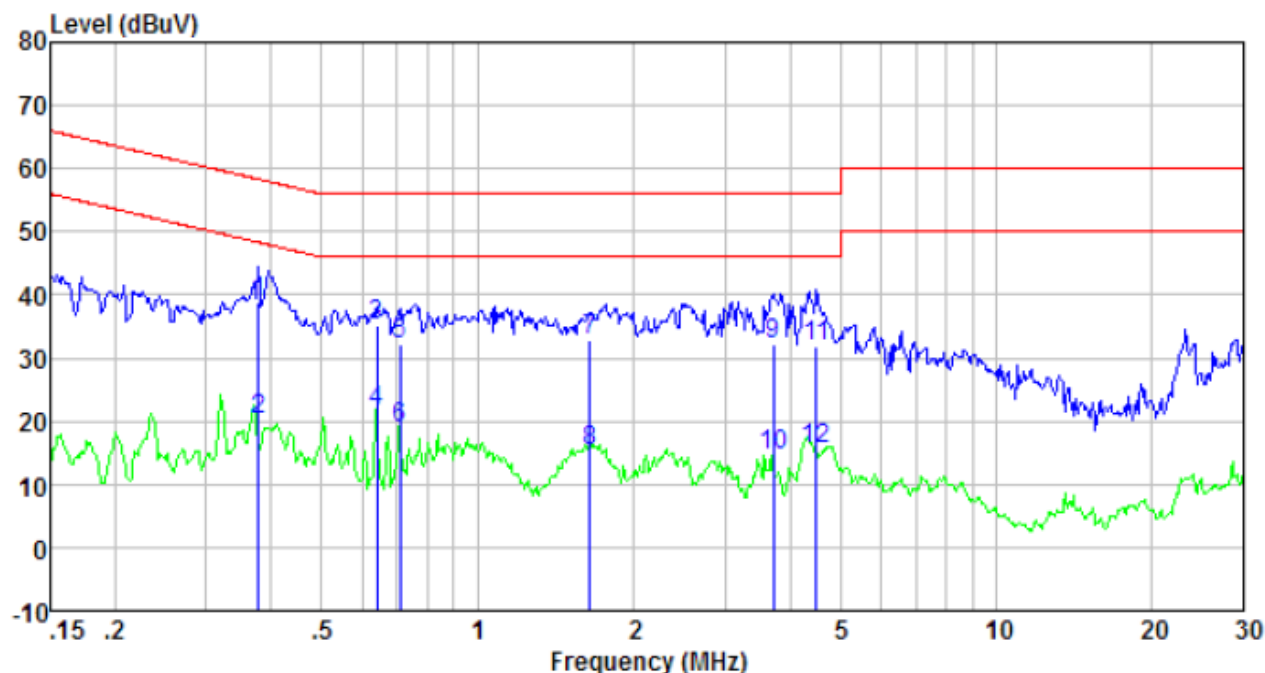
## Measurement data

Line:



Freq MHz	Reading level dBuV	lISN/ISN factor dB	Cable loss dB	level dBuV	Limit level dBuV	Over limit dB	Remark
0.159	37.55	0.42	0.12	38.09	65.52	-27.43	QP
0.159	23.60	0.42	0.12	24.14	55.52	-31.38	Average
0.178	36.23	0.42	0.13	36.78	64.59	-27.81	QP
0.178	24.13	0.42	0.13	24.68	54.59	-29.91	Average
0.371	37.00	0.42	0.10	37.52	58.47	-20.95	QP
0.371	29.66	0.42	0.10	30.18	48.47	-18.29	Average
1.021	34.14	0.25	0.13	34.52	56.00	-21.48	QP
1.021	23.68	0.25	0.13	24.06	46.00	-21.94	Average
1.698	32.94	0.21	0.14	33.29	56.00	-22.71	QP
1.698	24.02	0.21	0.14	24.37	46.00	-21.63	Average
4.269	32.99	0.21	0.15	33.35	56.00	-22.65	QP
4.269	26.27	0.21	0.15	26.63	46.00	-19.37	Average

Neutral:

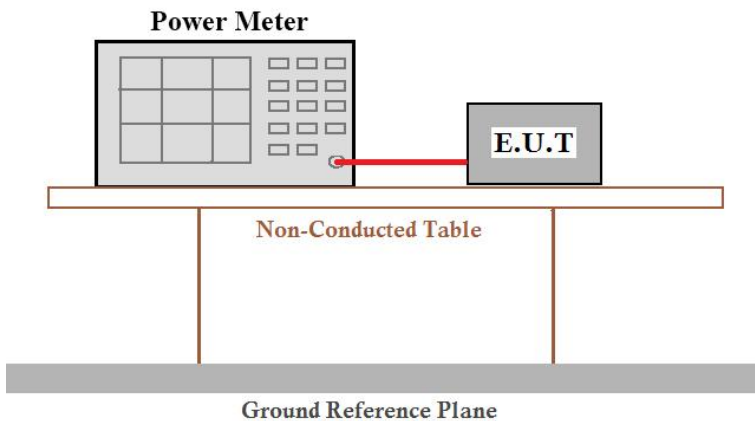


Freq MHz	Reading level dBuV	LISN/ISN factor dB	Cable loss dB	level dBuV	Limit level dBuV	Over limit dB	Remark
0.377	38.48	0.40	0.10	38.98	58.34	-19.36	QP
0.377	19.88	0.40	0.10	20.38	48.34	-27.96	Average
0.641	34.61	0.26	0.13	35.00	56.00	-21.00	QP
0.641	21.24	0.26	0.13	21.63	46.00	-24.37	Average
0.708	31.83	0.24	0.13	32.20	56.00	-23.80	QP
0.708	18.36	0.24	0.13	18.73	46.00	-27.27	Average
1.645	32.48	0.20	0.14	32.82	56.00	-23.18	QP
1.645	15.02	0.20	0.14	15.36	46.00	-30.64	Average
3.720	31.80	0.21	0.15	32.16	56.00	-23.84	QP
3.720	14.34	0.21	0.15	14.70	46.00	-31.30	Average
4.501	31.46	0.21	0.15	31.82	56.00	-24.18	QP
4.501	15.16	0.21	0.15	15.52	46.00	-30.48	Average

Notes:

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

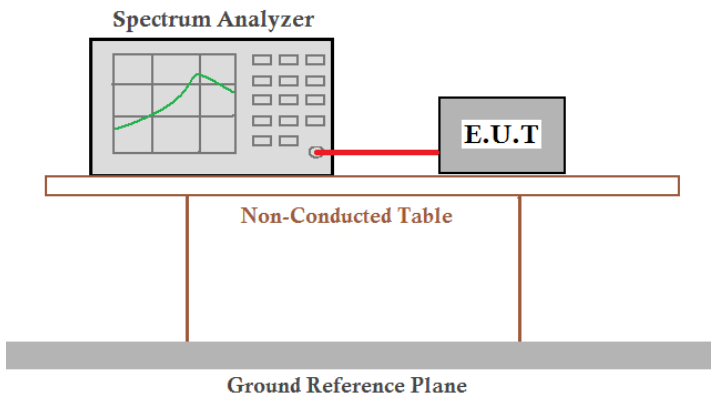
## 7.3 Conducted Peak Output Power

Test Requirement:	FCC Part15 C Section 15.247 (b)(3)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance V03
Limit:	30dBm
Test setup:	 <p>The diagram illustrates the test setup. A Power Meter is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Power Meter and the E.U.T. are placed on a Non-Conducted Table. The table is supported by two vertical legs. Below the table is a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 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	19.56	18.00	17.87	19.22	30.00	Pass
Middle	19.25	18.75	17.75	19.30		
Highest	19.07	19.01	17.13	19.07		

## 7.4 Channel Bandwidth

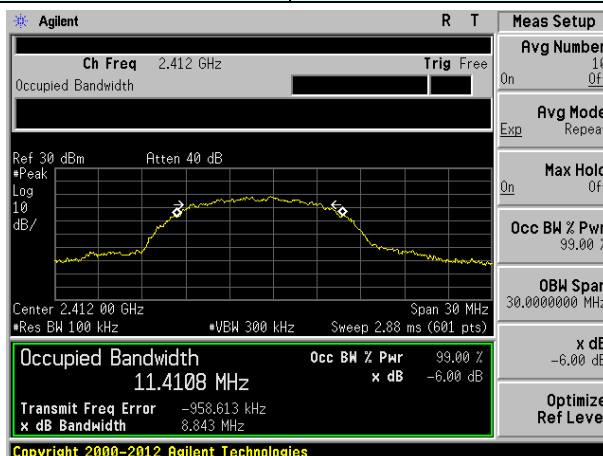
Test Requirement:	FCC Part15 C Section 15.247 (a)(2)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance V03
Limit:	>500KHz
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T are placed on a Non-Conducted Table. The table is supported by a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

## Measurement Data

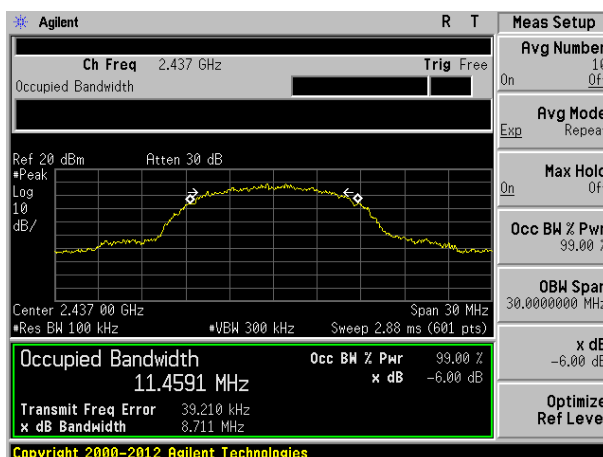
Test CH	Channel Bandwidth (MHz)				Limit(KHz)	Result
	802.11b	802.11g	802.11n(HT20)	802.11n(HT40)		
Lowest	8.843	15.202	15.994	35.520	>500	Pass
Middle	8.711	16.078	16.015	35.588		
Highest	8.782	16.082	15.999	35.329		

Test plot as follows:

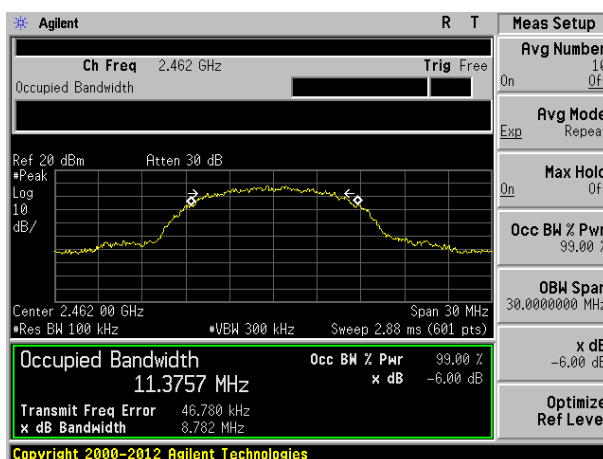
Test mode:	802.11b
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Lowest channel

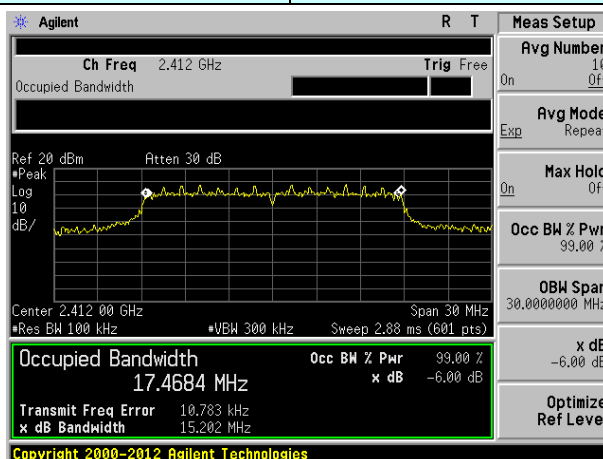


Middle channel

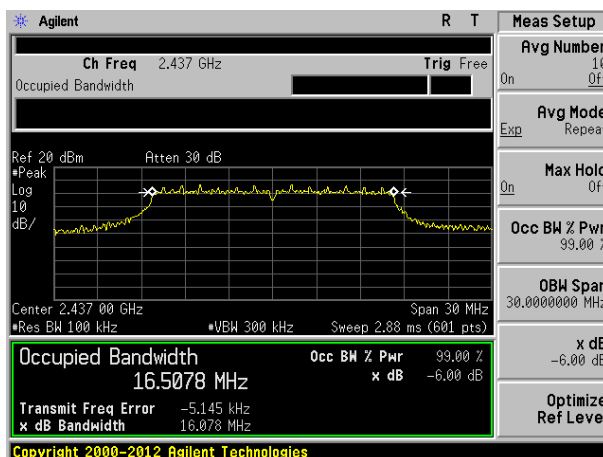


Highest channel

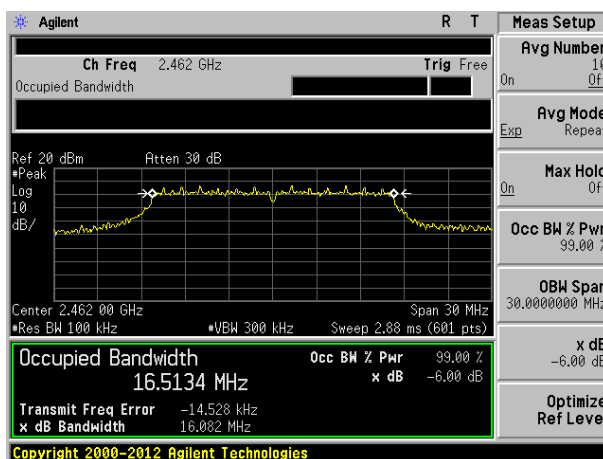
Test mode:	802.11g
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Lowest channel



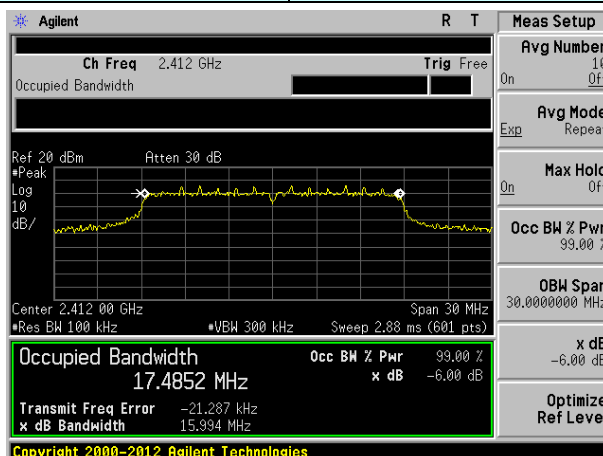
Middle channel



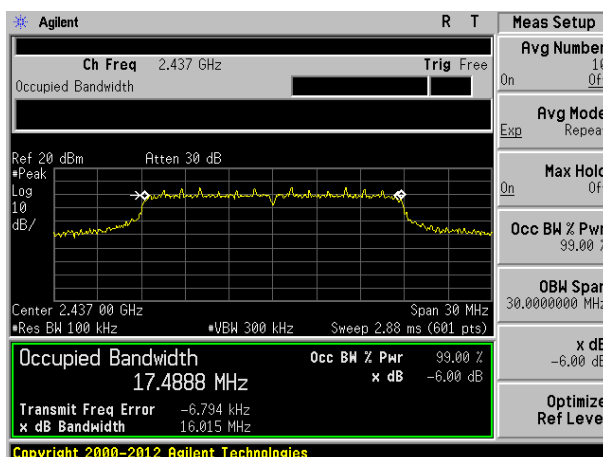
Highest channel



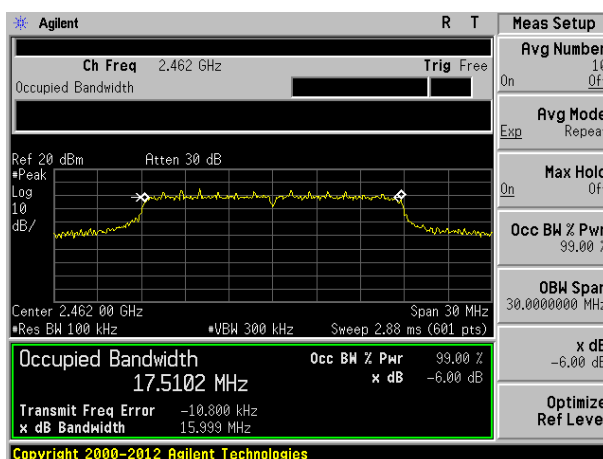
Test mode:	802.11n(HT20)
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Lowest channel

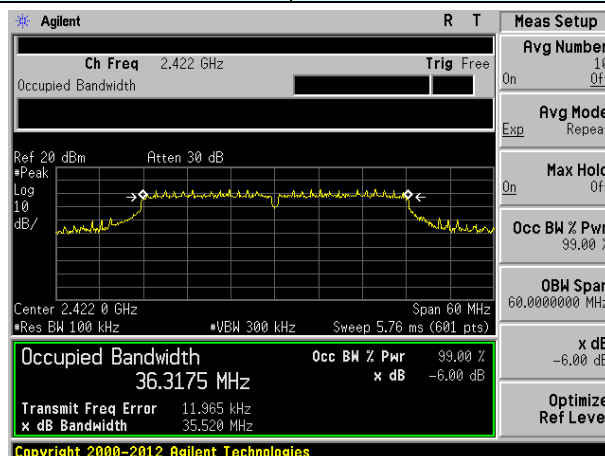


Middle channel

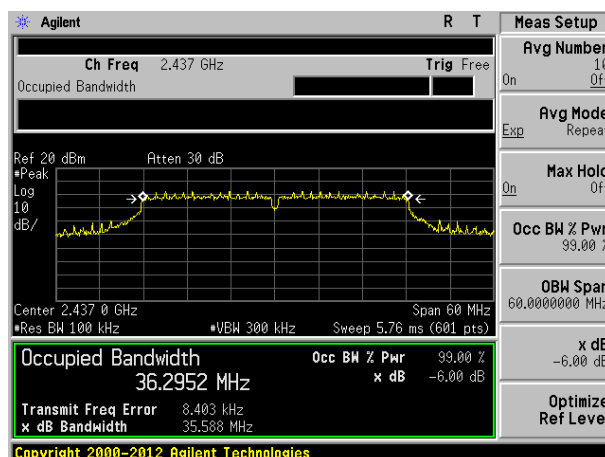


Highest channel

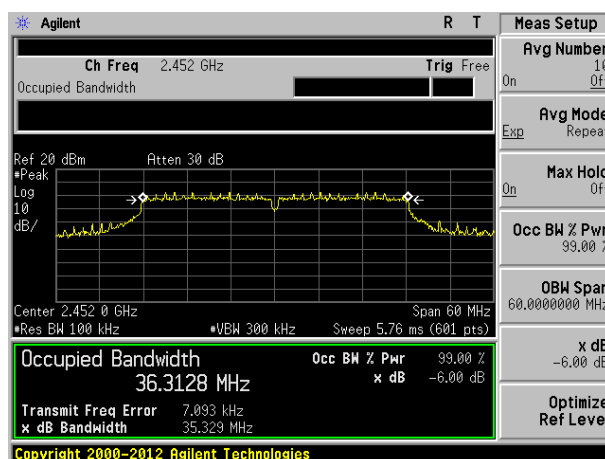
Test mode:	802.11n(HT40)
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Lowest channel

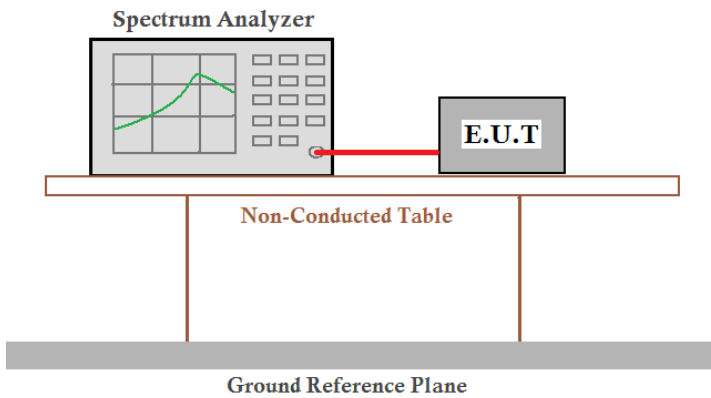


Middle channel



Highest channel

## 7.5 Power Spectral Density

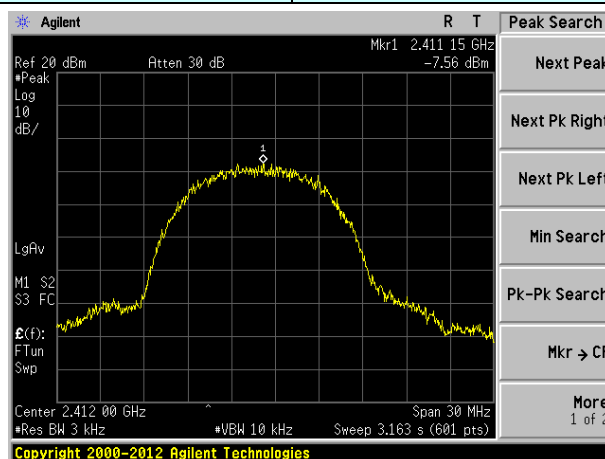
Test Requirement:	FCC Part15 C Section 15.247 (e)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance V03
Limit:	8dBm/3KHz
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer 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 5.2 for details
Test results:	Pass

### Measurement Data

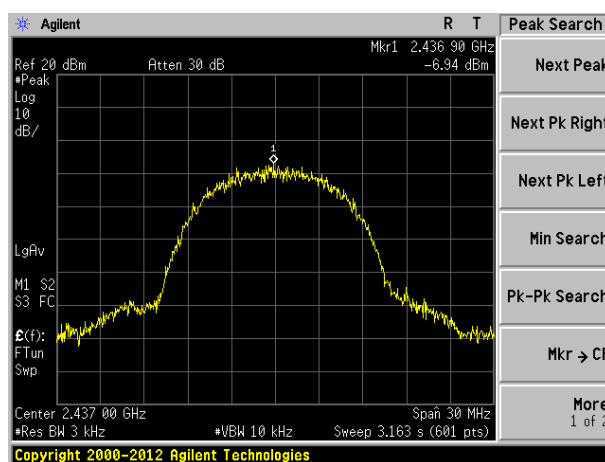
Test CH	Power Spectral Density (dBm)				Limit (dBm/3kHz)	Result
	802.11b	802.11g	802.11n(HT20)	802.11n(HT40)		
Lowest	-7.56	-8.80	-10.64	-11.89	8.00	Pass
Middle	-6.94	-9.45	-11.54	-13.06		
Highest	-7.38	-9.15	-11.86	-12.05		

Test plot as follows:

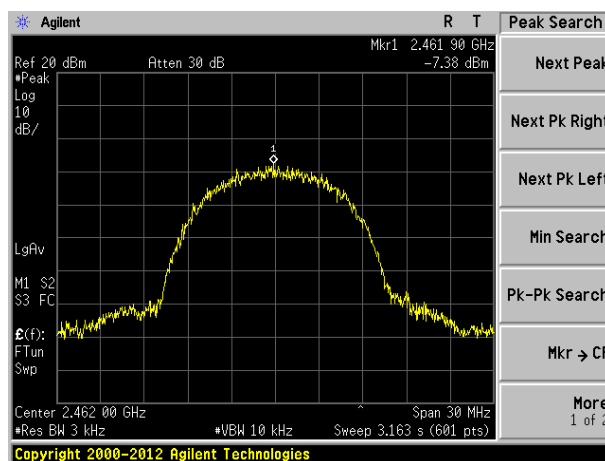
Test mode:	802.11b
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Lowest channel

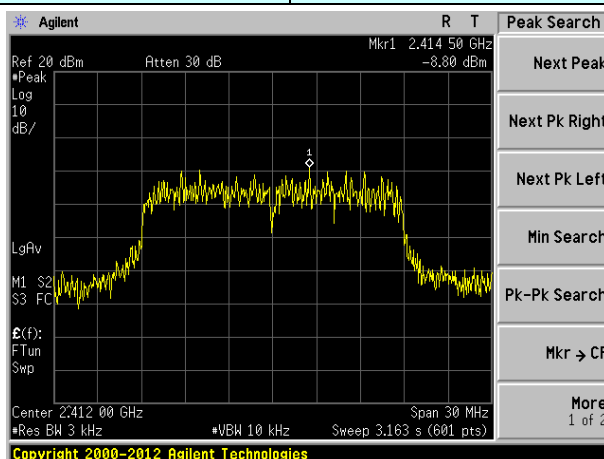


Middle channel

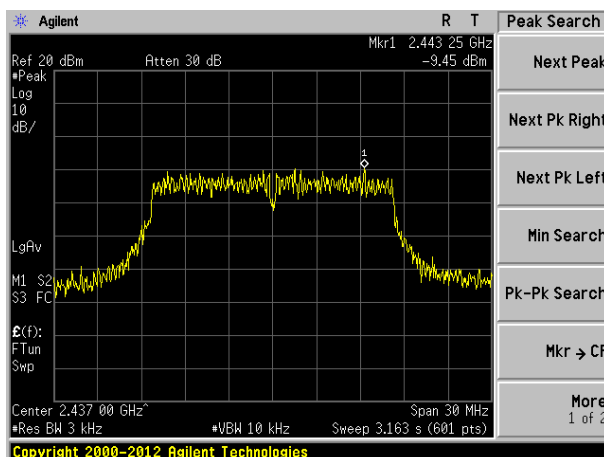


Highest channel

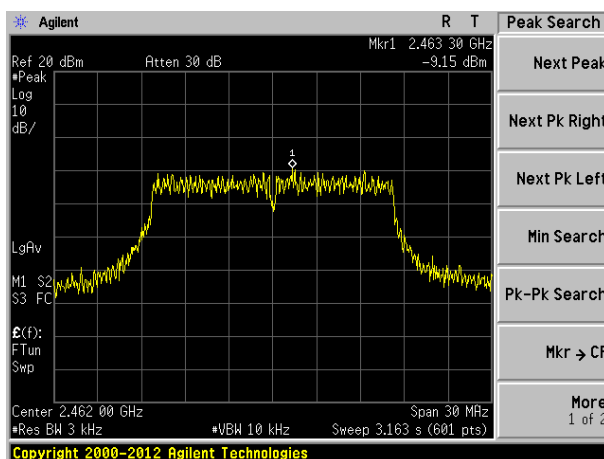
Test mode:	802.11g
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Lowest channel

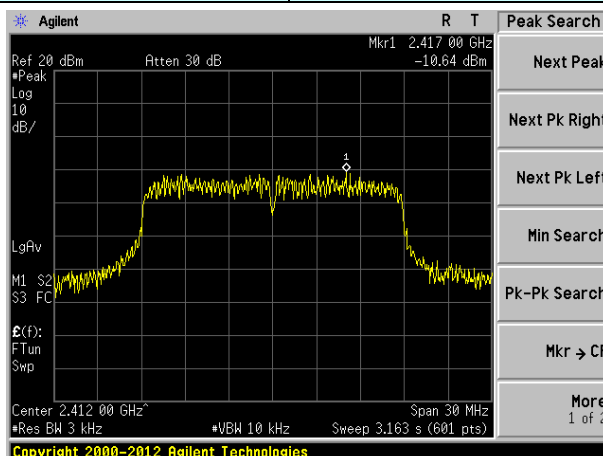


Middle channel

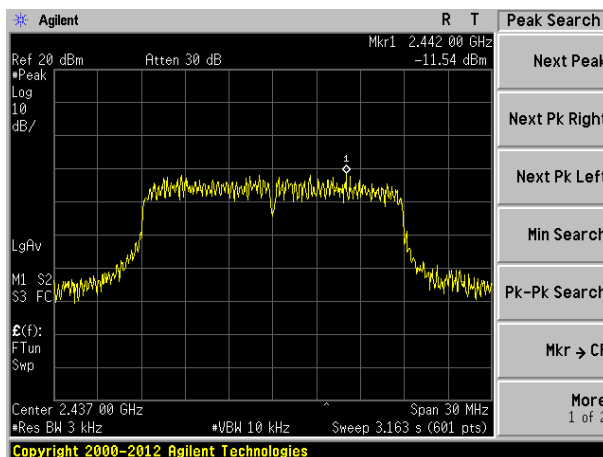


Highest channel

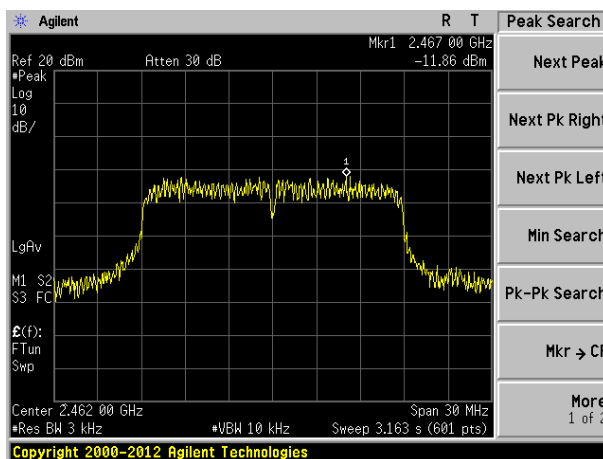
Test mode:	802.11n(HT20)
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Lowest channel

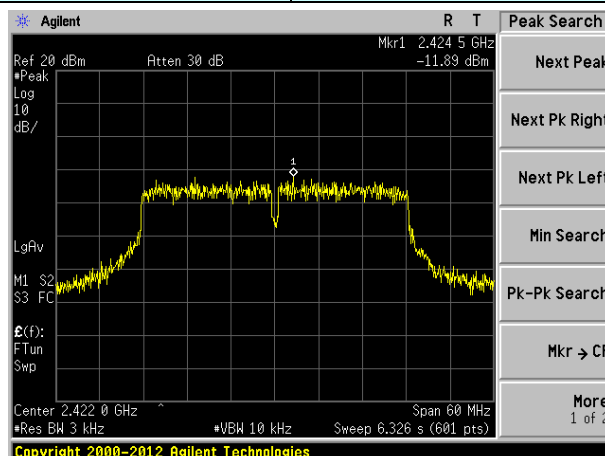


Middle channel

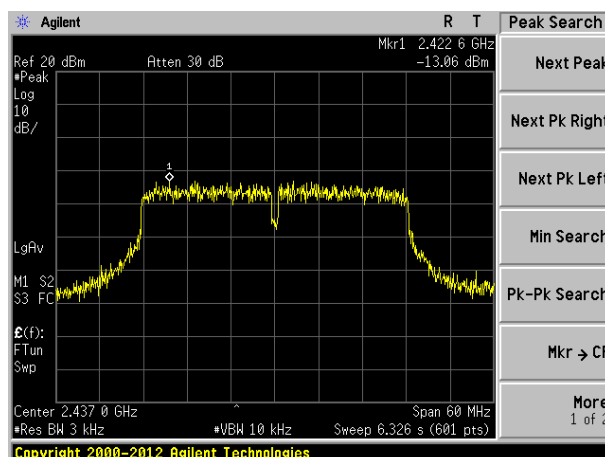


Highest channel

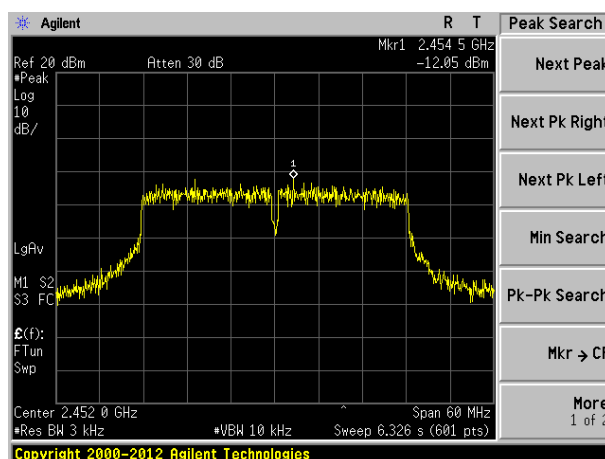
Test mode:	802.11n(HT40)
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Lowest channel



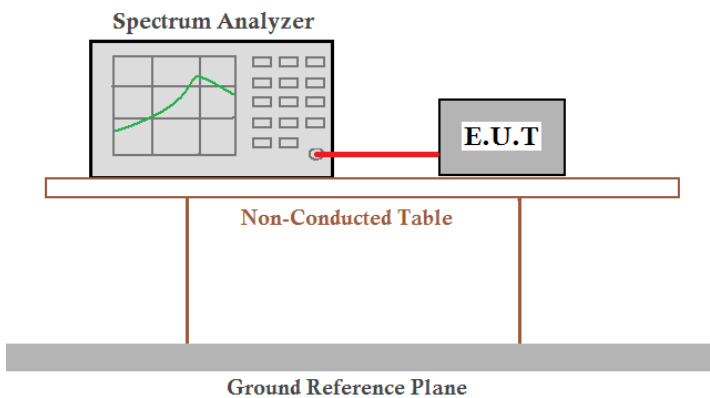
Middle channel



Highest channel

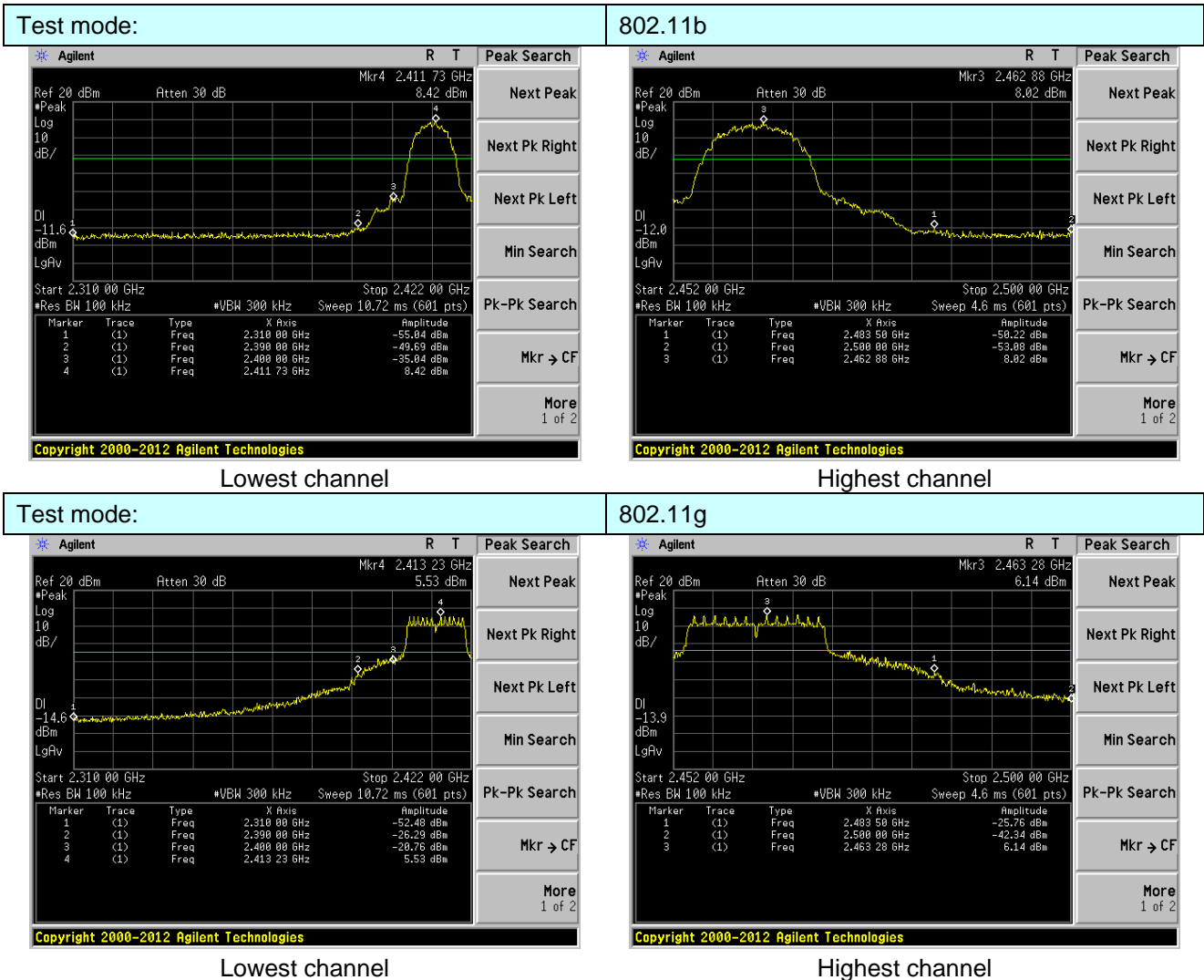
## 7.6 Band edges

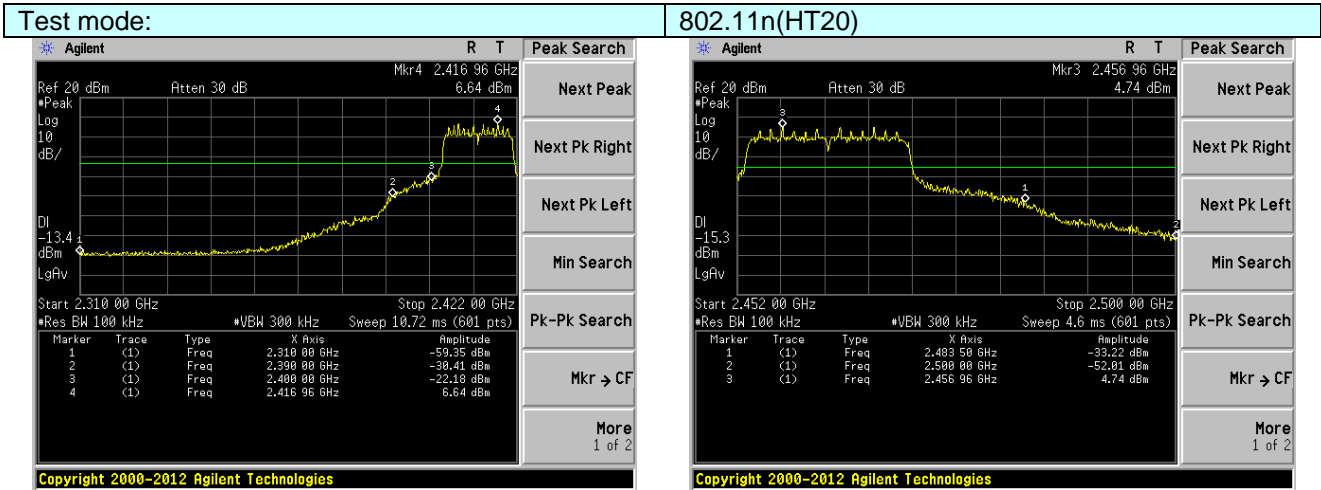
### 7.6.1 Conducted Emission Method

Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance V03
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test setup:	 <p>The diagram illustrates the test setup for conducted emission measurement. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table, which is supported by two vertical legs. Below the table is a Ground Reference Plane, represented by a thick grey bar.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass



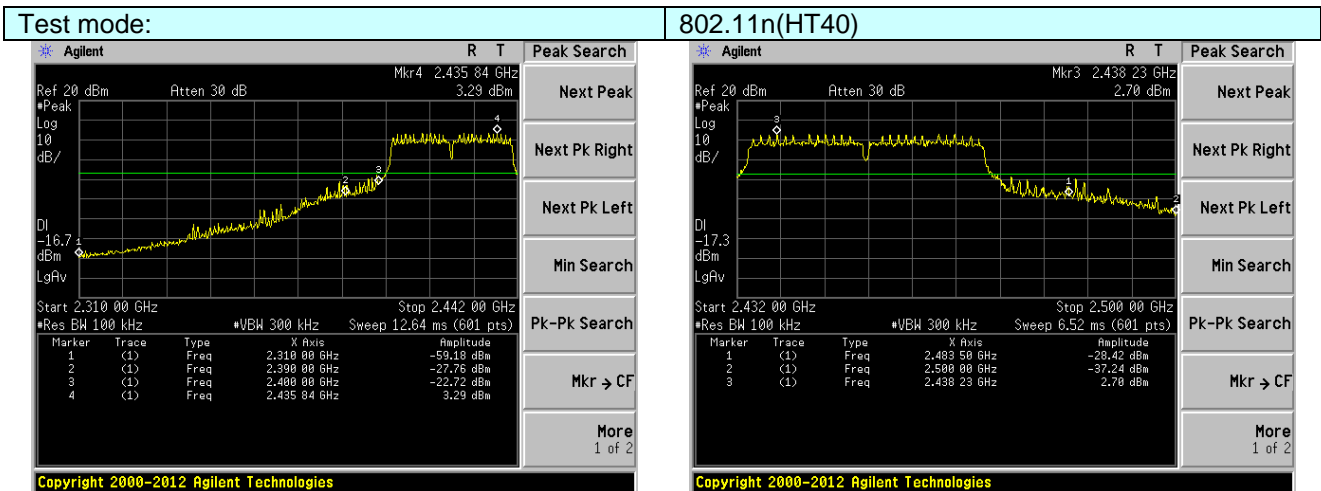
Test plot as follows:





Lowest channel

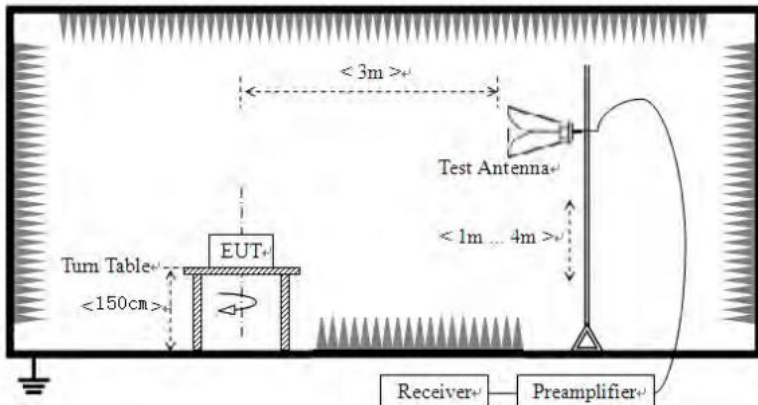
Highest channel



Lowest channel

Highest channel

## 7.6.2 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209 and 15.205				
Test Method:	ANSI C63.10:2013				
Test Frequency Range:	All of the restrict bands were tested, only the worst band's (2310MHz to 2500MHz) data was showed.				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Value
	Above 1GHz	Peak	1MHz	3MHz	Peak
		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"><li>1. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.</li><li>2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</li><li>3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.</li><li>4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.</li><li>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li><li>6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</li><li>7. The radiation measurements are performed in X, Y, Z axis positioning. And found the Y axis positioning which it is worse case, only the test worst case mode is recorded in the report.</li></ol>				

Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement data:

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

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

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2390.00	50.79	27.59	5.38	34.01	49.75	74.00	-24.25	Horizontal
2400.00	59.52	27.58	5.39	34.01	58.48	74.00	-15.52	Horizontal
2390.00	52.41	27.59	5.38	34.01	51.37	74.00	-22.63	Vertical
2400.00	61.08	27.58	5.39	34.01	60.04	74.00	-13.96	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	37.80	27.59	5.38	34.01	36.76	54.00	-17.24	Horizontal
2400.00	46.00	27.58	5.39	34.01	44.96	54.00	-9.04	Horizontal
2390.00	39.55	27.59	5.38	34.01	38.51	54.00	-15.49	Vertical
2400.00	47.06	27.58	5.39	34.01	46.02	54.00	-7.98	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)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	51.08	27.53	5.47	33.92	50.16	74.00	-23.84	Horizontal
2500.00	47.18	27.55	5.49	29.93	50.29	74.00	-23.71	Horizontal
2483.50	53.16	27.53	5.47	33.92	52.24	74.00	-21.76	Vertical
2500.00	49.53	27.55	5.49	29.93	52.64	74.00	-21.36	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	38.04	27.53	5.47	33.92	37.12	54.00	-16.88	Horizontal
2500.00	34.30	27.55	5.49	29.93	37.41	54.00	-16.59	Horizontal
2483.50	39.91	27.53	5.47	33.92	38.99	54.00	-15.01	Vertical
2500.00	36.15	27.55	5.49	29.93	39.26	54.00	-14.74	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:	802.11g	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	50.37	27.59	5.38	34.01	49.33	74.00	-24.67	Horizontal
2400.00	58.96	27.58	5.39	34.01	57.92	74.00	-16.08	Horizontal
2390.00	51.97	27.59	5.38	34.01	50.93	74.00	-23.07	Vertical
2400.00	60.41	27.58	5.39	34.01	59.37	74.00	-14.63	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	37.50	27.59	5.38	34.01	36.46	54.00	-17.54	Horizontal
2400.00	45.66	27.58	5.39	34.01	44.62	54.00	-9.38	Horizontal
2390.00	39.22	27.59	5.38	34.01	38.18	54.00	-15.82	Vertical
2400.00	46.69	27.58	5.39	34.01	45.65	54.00	-8.35	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)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	50.48	27.53	5.47	33.92	49.56	74.00	-24.44	Horizontal
2500.00	46.72	27.55	5.49	29.93	49.83	74.00	-24.17	Horizontal
2483.50	52.48	27.53	5.47	33.92	51.56	74.00	-22.44	Vertical
2500.00	48.99	27.55	5.49	29.93	52.10	74.00	-21.90	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	37.67	27.53	5.47	33.92	36.75	54.00	-17.25	Horizontal
2500.00	34.02	27.55	5.49	29.93	37.13	54.00	-16.87	Horizontal
2483.50	39.51	27.53	5.47	33.92	38.59	54.00	-15.41	Vertical
2500.00	35.85	27.55	5.49	29.93	38.96	54.00	-15.04	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(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	50.50	27.59	5.38	34.01	49.46	74.00	-24.54	Horizontal
2400.00	59.12	27.58	5.39	34.01	58.08	74.00	-15.92	Horizontal
2390.00	52.10	27.59	5.38	34.01	51.06	74.00	-22.94	Vertical
2400.00	60.61	27.58	5.39	34.01	59.57	74.00	-14.43	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	37.59	27.59	5.38	34.01	36.55	54.00	-17.45	Horizontal
2400.00	45.76	27.58	5.39	34.01	44.72	54.00	-9.28	Horizontal
2390.00	39.32	27.59	5.38	34.01	38.28	54.00	-15.72	Vertical
2400.00	46.80	27.58	5.39	34.01	45.76	54.00	-8.24	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	50.66	27.53	5.47	33.92	49.74	74.00	-24.26	Horizontal
2500.00	46.85	27.55	5.49	29.93	49.96	74.00	-24.04	Horizontal
2483.50	52.68	27.53	5.47	33.92	51.76	74.00	-22.24	Vertical
2500.00	49.15	27.55	5.49	29.93	52.26	74.00	-21.74	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	37.78	27.53	5.47	33.92	36.86	54.00	-17.14	Horizontal
2500.00	34.10	27.55	5.49	29.93	37.21	54.00	-16.79	Horizontal
2483.50	39.62	27.53	5.47	33.92	38.70	54.00	-15.30	Vertical
2500.00	35.94	27.55	5.49	29.93	39.05	54.00	-14.95	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	50.00	27.59	5.38	34.01	48.96	74.00	-25.04	Horizontal
2400.00	58.46	27.58	5.39	34.01	57.42	74.00	-16.58	Horizontal
2390.00	51.57	27.59	5.38	34.01	50.53	74.00	-23.47	Vertical
2400.00	59.81	27.58	5.39	34.01	58.77	74.00	-15.23	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	37.24	27.59	5.38	34.01	36.20	54.00	-17.80	Horizontal
2400.00	45.35	27.58	5.39	34.01	44.31	54.00	-9.69	Horizontal
2390.00	38.92	27.59	5.38	34.01	37.88	54.00	-16.12	Vertical
2400.00	46.35	27.58	5.39	34.01	45.31	54.00	-8.69	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	49.95	27.53	5.47	33.92	49.03	74.00	-24.97	Horizontal
2500.00	46.30	27.55	5.49	29.93	49.41	74.00	-24.59	Horizontal
2483.50	51.87	27.53	5.47	33.92	50.95	74.00	-23.05	Vertical
2500.00	48.50	27.55	5.49	29.93	51.61	74.00	-22.39	Vertical

**Average value:**

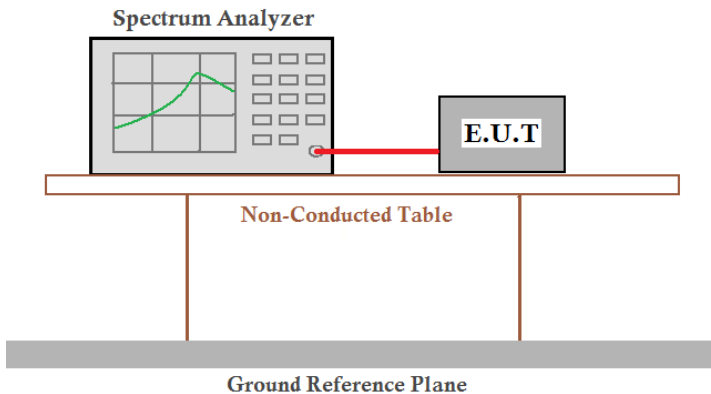
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	37.35	27.53	5.47	33.92	36.43	54.00	-17.57	Horizontal
2500.00	33.77	27.55	5.49	29.93	36.88	54.00	-17.12	Horizontal
2483.50	39.15	27.53	5.47	33.92	38.23	54.00	-15.77	Vertical
2500.00	35.58	27.55	5.49	29.93	38.69	54.00	-15.31	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.

## 7.7 Spurious Emission

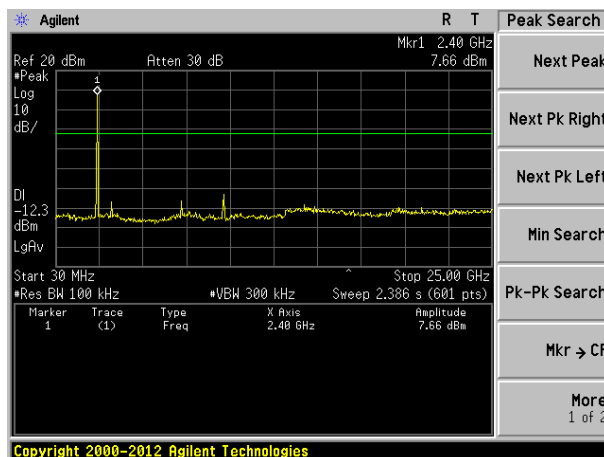
### 7.7.1 Conducted Emission Method

Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance V03
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test setup:	 <p>The diagram illustrates the test setup for conducted emission measurement. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table, which is supported by two vertical legs. Below the table is a Ground Reference Plane, represented by a thick grey bar.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Test plot as follows:

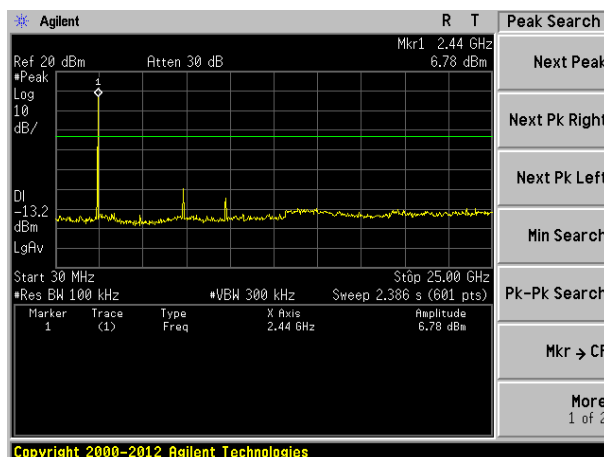


Test mode:	802.11b
Lowest channel	



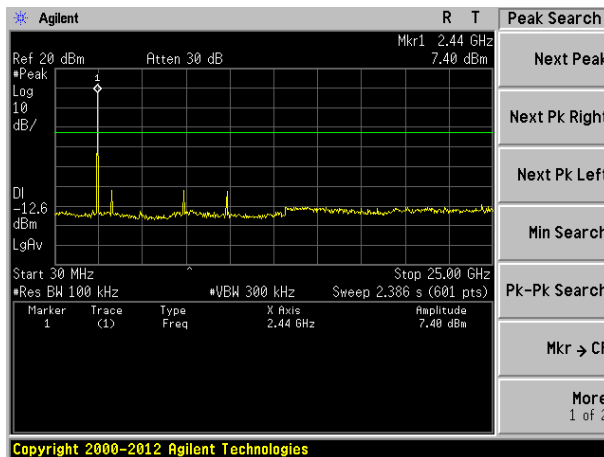
30MHz~25GHz

Middle channel



30MHz~25GHz

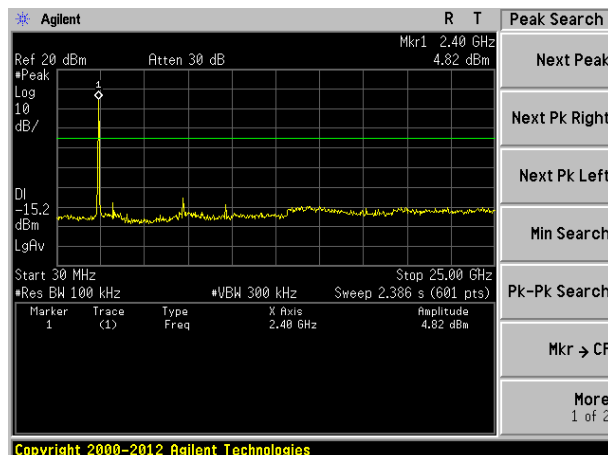
Highest channel



30MHz~25GHz

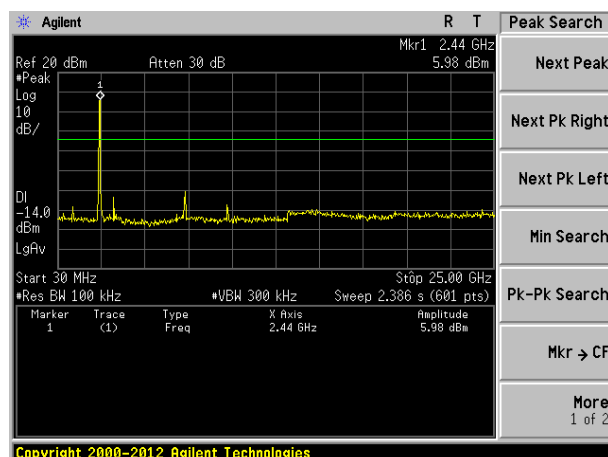
Test mode:	802.11g
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Lowest channel



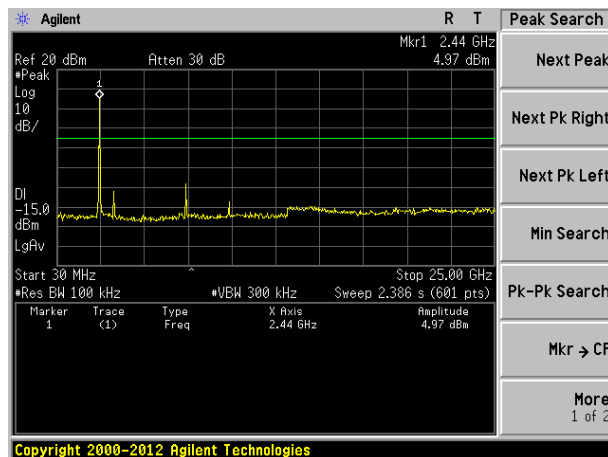
30MHz~25GHz

Middle channel



30MHz~25GHz

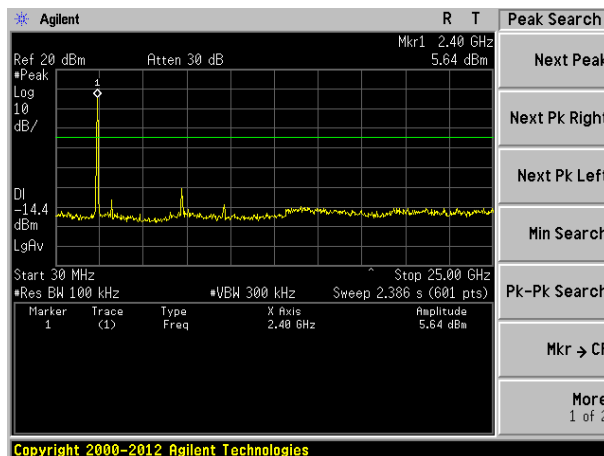
Highest channel



30MHz~25GHz

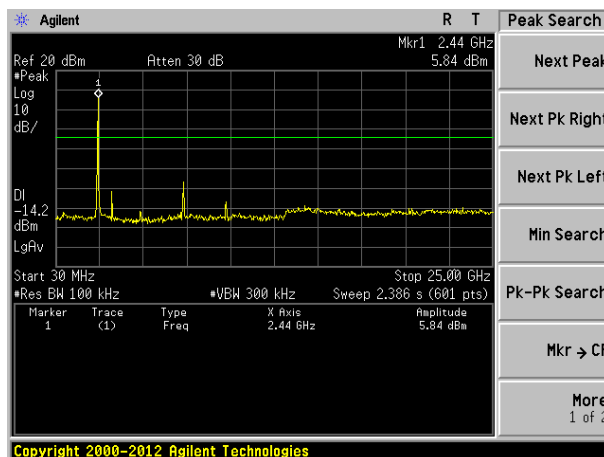
Test mode:	802.11n(HT20)
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Lowest channel



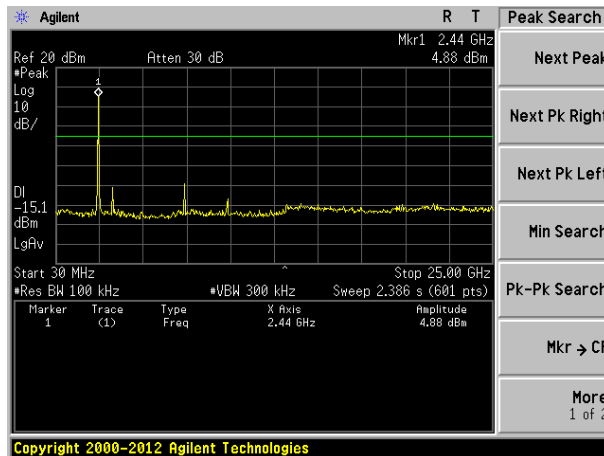
30MHz~25GHz

Middle channel



30MHz~25GHz

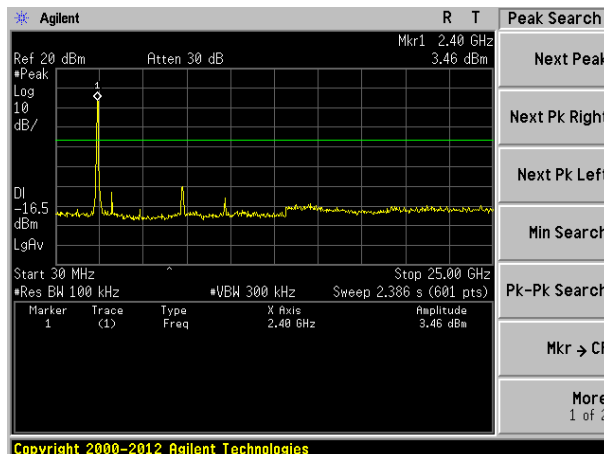
Highest channel



30MHz~25GHz

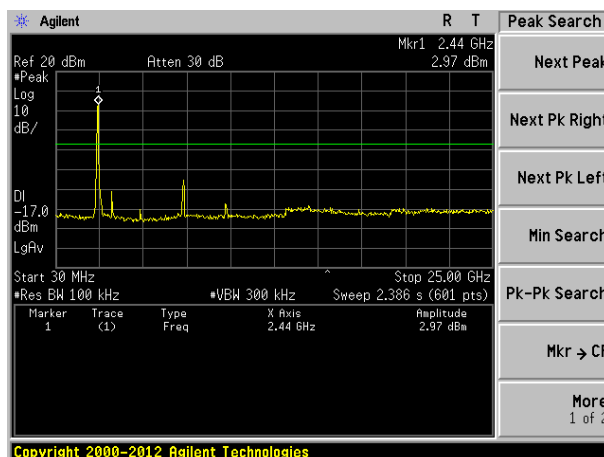
Test mode:	802.11n(HT40)
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Lowest channel



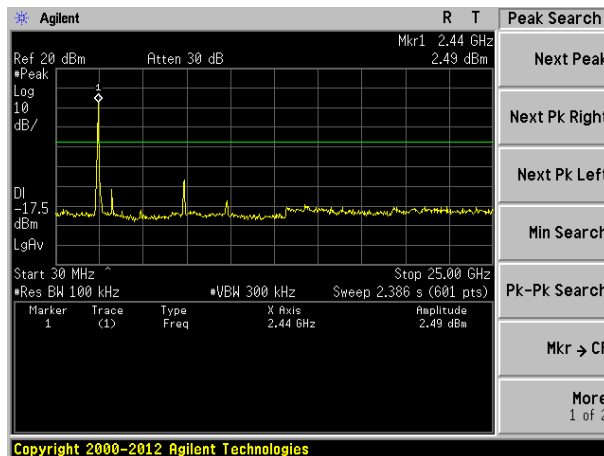
30MHz~25GHz

Middle channel



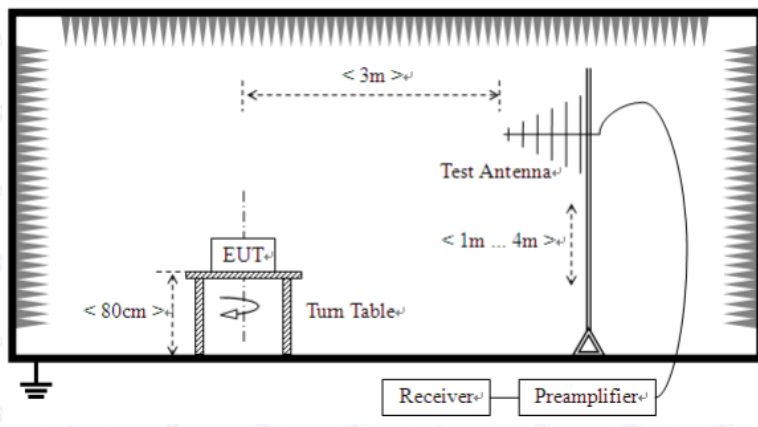
30MHz~25GHz

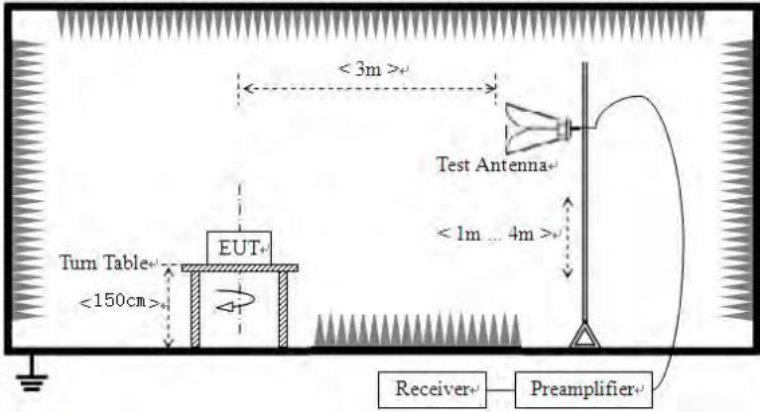
Highest channel



30MHz~25GHz

## 7.7.2 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209				
Test Method:	ANSI C63.10:2013				
Test Frequency Range:	30MHz to 25GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Value
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
		RMS	1MHz	3MHz	Average
Limit:	Frequency		Limit (dBuV/m @3m)		Value
	30MHz-88MHz		40.00		Quasi-peak
	88MHz-216MHz		43.50		Quasi-peak
	216MHz-960MHz		46.00		Quasi-peak
	960MHz-1GHz		54.00		Quasi-peak
	Above 1GHz		54.00		Average
			74.00		Peak
Test setup:	Below 1GHz				
	<div></div>				
Test setup:	Above 1GHz				

	
<p>Test Procedure:</p>	<ol style="list-style-type: none"> <li>1. The EUT was placed on the top of a rotating table(0.8 meters below 1G and 1.5 meters above 1G) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</li> <li>3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.</li> <li>4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.</li> <li>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li> <li>6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</li> <li>7. The radiation measurements are performed in X, Y, Z axis positioning. And found the Y axis positioning which it is worse case, only the test worst case mode is recorded in the report.</li> </ol>
<p>Test Instruments:</p>	<p>Refer to section 6.0 for details</p>
<p>Test mode:</p>	<p>Refer to section 5.2 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
32.63	37.21	14.31	0.58	30.08	22.02	40.00	-17.98	Vertical
52.39	36.82	15.14	0.79	29.98	22.77	40.00	-17.23	Vertical
63.98	40.03	13.11	0.89	29.89	24.14	40.00	-15.86	Vertical
124.13	41.70	11.80	1.39	29.54	25.35	43.50	-18.15	Vertical
164.91	46.36	10.82	1.66	29.34	29.50	43.50	-14.00	Vertical
204.24	40.60	12.70	1.86	29.25	25.91	43.50	-17.59	Vertical
40.14	26.38	15.58	0.66	30.04	12.58	40.00	-27.42	Horizontal
85.00	26.20	12.31	1.07	29.77	9.81	40.00	-30.19	Horizontal
136.46	36.57	10.45	1.48	29.48	19.02	43.50	-24.48	Horizontal
222.95	35.44	13.30	1.98	29.41	21.31	46.00	-24.69	Horizontal
383.93	26.91	16.68	2.78	29.57	16.80	46.00	-29.20	Horizontal
640.61	24.80	20.60	3.87	29.26	20.01	46.00	-25.99	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	41.18	31.79	8.62	32.10	49.49	74.00	-24.51	Vertical
7236.00	34.78	36.19	11.68	31.97	50.68	74.00	-23.32	Vertical
9648.00	33.12	38.07	14.16	31.56	53.79	74.00	-20.21	Vertical
12060.00	*					74.00		Vertical
14472.00	*					74.00		Vertical
16884.00	*					74.00		Vertical
4824.00	39.71	31.79	8.62	32.10	48.02	74.00	-25.98	Horizontal
7236.00	34.46	36.19	11.68	31.97	50.36	74.00	-23.64	Horizontal
9648.00	32.66	38.07	14.16	31.56	53.33	74.00	-20.67	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	30.20	31.79	8.62	32.10	38.51	54.00	-15.49	Vertical
7236.00	23.63	36.19	11.68	31.97	39.53	54.00	-14.47	Vertical
9648.00	23.45	38.07	14.16	31.56	44.12	54.00	-9.88	Vertical
12060.00	*					54.00		Vertical
14472.00	*					54.00		Vertical
16884.00	*					54.00		Vertical
4824.00	29.21	31.79	8.62	32.10	37.52	54.00	-16.48	Horizontal
7236.00	23.03	36.19	11.68	31.97	38.93	54.00	-15.07	Horizontal
9648.00	22.40	38.07	14.16	31.56	43.07	54.00	-10.93	Horizontal
12060.00	*					54.00		Horizontal
14472.00	*					54.00		Horizontal
16884.00	*					54.00		Horizontal

### Remark:

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



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

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4874.00	40.09	31.85	8.66	32.12	48.48	74.00	-25.52	Vertical
7311.00	34.76	36.37	11.71	31.91	50.93	74.00	-23.07	Vertical
9748.00	34.07	38.27	14.25	31.56	55.03	74.00	-18.97	Vertical
12185.00	*					74.00		Vertical
14622.00	*					74.00		Vertical
17059.00	*					74.00		Vertical
4874.00	40.45	31.85	8.66	32.12	48.84	74.00	-25.16	Horizontal
7311.00	33.34	36.37	11.71	31.91	49.51	74.00	-24.49	Horizontal
9748.00	33.93	38.27	14.25	31.56	54.89	74.00	-19.11	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	30.88	31.85	8.66	32.12	39.27	54.00	-14.73	Vertical
7311.00	23.06	36.37	11.71	31.91	39.23	54.00	-14.77	Vertical
9748.00	23.31	38.27	14.25	31.56	44.27	54.00	-9.73	Vertical
12185.00	*					54.00		Vertical
14622.00	*					54.00		Vertical
17059.00	*					54.00		Vertical
4874.00	30.52	31.85	8.66	32.12	38.91	54.00	-15.09	Horizontal
7311.00	22.41	36.37	11.71	31.91	38.58	54.00	-15.42	Horizontal
9748.00	23.63	38.27	14.25	31.56	44.59	54.00	-9.41	Horizontal
12185.00	*					54.00		Horizontal
14622.00	*					54.00		Horizontal
17059.00	*					54.00		Horizontal

**Remark:**

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

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

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4924.00	46.15	31.90	8.70	32.15	54.60	74.00	-19.40	Vertical
7386.00	35.77	36.49	11.76	31.83	52.19	74.00	-21.81	Vertical
9848.00	37.60	38.62	14.31	31.77	58.76	74.00	-15.24	Vertical
12310.00	*					74.00		Vertical
14772.00	*					74.00		Vertical
17234.00	*					74.00		Vertical
4924.00	45.26	31.90	8.70	32.15	53.71	74.00	-20.29	Horizontal
7386.00	34.57	36.49	11.76	31.83	50.99	74.00	-23.01	Horizontal
9848.00	33.73	38.62	14.31	31.77	54.89	74.00	-19.11	Horizontal
12310.00	*					74.00		Horizontal
14772.00	*					74.00		Horizontal
17234.00	*					74.00		Horizontal

**Average value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4924.00	36.97	31.90	8.70	32.15	45.42	54.00	-8.58	Vertical
7386.00	25.66	36.49	11.76	31.83	42.08	54.00	-11.92	Vertical
9848.00	26.08	38.62	14.31	31.77	47.24	54.00	-6.76	Vertical
12310.00	*					54.00		Vertical
14772.00	*					54.00		Vertical
17234.00	*					54.00		Vertical
4924.00	35.56	31.90	8.70	32.15	44.01	54.00	-9.99	Horizontal
7386.00	23.94	36.49	11.76	31.83	40.36	54.00	-13.64	Horizontal
9848.00	22.97	38.62	14.31	31.77	44.13	54.00	-9.87	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 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)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4824.00	39.58	31.79	8.62	32.10	47.89	74.00	-26.11	Vertical
7236.00	33.77	36.19	11.68	31.97	49.67	74.00	-24.33	Vertical
9648.00	32.39	38.07	14.16	31.56	53.06	74.00	-20.94	Vertical
12060.00	*					74.00		Vertical
14472.00	*					74.00		Vertical
16884.00	*					74.00		Vertical
4824.00	38.36	31.79	8.62	32.10	46.67	74.00	-27.33	Horizontal
7236.00	33.57	36.19	11.68	31.97	49.47	74.00	-24.53	Horizontal
9648.00	32.00	38.07	14.16	31.56	52.67	74.00	-21.33	Horizontal
12060.00	*					74.00		Horizontal
14472.00	*					74.00		Horizontal
16884.00	*					74.00		Horizontal

**Average value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4824.00	28.72	31.79	8.62	32.10	37.03	54.00	-16.97	Vertical
7236.00	22.65	36.19	11.68	31.97	38.55	54.00	-15.45	Vertical
9648.00	22.75	38.07	14.16	31.56	43.42	54.00	-10.58	Vertical
12060.00	*					54.00		Vertical
14472.00	*					54.00		Vertical
16884.00	*					54.00		Vertical
4824.00	27.94	31.79	8.62	32.10	36.25	54.00	-17.75	Horizontal
7236.00	22.17	36.19	11.68	31.97	38.07	54.00	-15.93	Horizontal
9648.00	21.75	38.07	14.16	31.56	42.42	54.00	-11.58	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 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	38.76	31.85	8.66	32.12	47.15	74.00	-26.85	Vertical
7311.00	33.92	36.37	11.71	31.91	50.09	74.00	-23.91	Vertical
9748.00	33.47	38.27	14.25	31.56	54.43	74.00	-19.57	Vertical
12185.00	*					74.00		Vertical
14622.00	*					74.00		Vertical
17059.00	*					74.00		Vertical
4874.00	39.33	31.85	8.66	32.12	47.72	74.00	-26.28	Horizontal
7311.00	32.61	36.37	11.71	31.91	48.78	74.00	-25.22	Horizontal
9748.00	33.38	38.27	14.25	31.56	54.34	74.00	-19.66	Horizontal
12185.00	*					74.00		Horizontal
14622.00	*					74.00		Horizontal
17059.00	*					74.00		Horizontal

**Average value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4874.00	29.66	31.85	8.66	32.12	38.05	54.00	-15.95	Vertical
7311.00	22.25	36.37	11.71	31.91	38.42	54.00	-15.58	Vertical
9748.00	22.73	38.27	14.25	31.56	43.69	54.00	-10.31	Vertical
12185.00	*					54.00		Vertical
14622.00	*					54.00		Vertical
17059.00	*					54.00		Vertical
4874.00	29.48	31.85	8.66	32.12	37.87	54.00	-16.13	Horizontal
7311.00	21.70	36.37	11.71	31.91	37.87	54.00	-16.13	Horizontal
9748.00	23.10	38.27	14.25	31.56	44.06	54.00	-9.94	Horizontal
12185.00	*					54.00		Horizontal
14622.00	*					54.00		Horizontal
17059.00	*					54.00		Horizontal

**Remark:**

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

Test mode:	802.11g	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	43.87	31.90	8.70	32.15	52.32	74.00	-21.68	Vertical
7386.00	34.32	36.49	11.76	31.83	50.74	74.00	-23.26	Vertical
9848.00	36.57	38.62	14.31	31.77	57.73	74.00	-16.27	Vertical
12310.00	*					74.00		Vertical
14772.00	*					74.00		Vertical
17234.00	*					74.00		Vertical
4924.00	43.33	31.90	8.70	32.15	51.78	74.00	-22.22	Horizontal
7386.00	33.31	36.49	11.76	31.83	49.73	74.00	-24.27	Horizontal
9848.00	32.78	38.62	14.31	31.77	53.94	74.00	-20.06	Horizontal
12310.00	*					74.00		Horizontal
14772.00	*					74.00		Horizontal
17234.00	*					74.00		Horizontal

**Average value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4924.00	34.86	31.90	8.70	32.15	43.31	54.00	-10.69	Vertical
7386.00	24.26	36.49	11.76	31.83	40.68	54.00	-13.32	Vertical
9848.00	25.09	38.62	14.31	31.77	46.25	54.00	-7.75	Vertical
12310.00	*					54.00		Vertical
14772.00	*					54.00		Vertical
17234.00	*					54.00		Vertical
4924.00	33.75	31.90	8.70	32.15	42.20	54.00	-11.80	Horizontal
7386.00	22.71	36.49	11.76	31.83	39.13	54.00	-14.87	Horizontal
9848.00	22.05	38.62	14.31	31.77	43.21	54.00	-10.79	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)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4824.00	40.27	31.79	8.62	32.10	48.58	74.00	-25.42	Vertical
7236.00	34.20	36.19	11.68	31.97	50.10	74.00	-23.90	Vertical
9648.00	32.70	38.07	14.16	31.56	53.37	74.00	-20.63	Vertical
12060.00	*					74.00		Vertical
14472.00	*					74.00		Vertical
16884.00	*					74.00		Vertical
4824.00	38.94	31.79	8.62	32.10	47.25	74.00	-26.75	Horizontal
7236.00	33.95	36.19	11.68	31.97	49.85	74.00	-24.15	Horizontal
9648.00	32.28	38.07	14.16	31.56	52.95	74.00	-21.05	Horizontal
12060.00	*					74.00		Horizontal
14472.00	*					74.00		Horizontal
16884.00	*					74.00		Horizontal

**Average value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4824.00	29.35	31.79	8.62	32.10	37.66	54.00	-16.34	Vertical
7236.00	23.07	36.19	11.68	31.97	38.97	54.00	-15.03	Vertical
9648.00	23.05	38.07	14.16	31.56	43.72	54.00	-10.28	Vertical
12060.00	*					54.00		Vertical
14472.00	*					54.00		Vertical
16884.00	*					54.00		Vertical
4824.00	28.48	31.79	8.62	32.10	36.79	54.00	-17.21	Horizontal
7236.00	22.53	36.19	11.68	31.97	38.43	54.00	-15.57	Horizontal
9648.00	22.03	38.07	14.16	31.56	42.70	54.00	-11.30	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 too weak, the instrument of signal is unable to test.*

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

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4874.00	39.33	31.85	8.66	32.12	47.72	74.00	-26.28	Vertical
7311.00	34.28	36.37	11.71	31.91	50.45	74.00	-23.55	Vertical
9748.00	33.72	38.27	14.25	31.56	54.68	74.00	-19.32	Vertical
12185.00	*					74.00		Vertical
14622.00	*					74.00		Vertical
17059.00	*					74.00		Vertical
4874.00	39.81	31.85	8.66	32.12	48.20	74.00	-25.80	Horizontal
7311.00	32.92	36.37	11.71	31.91	49.09	74.00	-24.91	Horizontal
9748.00	33.61	38.27	14.25	31.56	54.57	74.00	-19.43	Horizontal
12185.00	*					74.00		Horizontal
14622.00	*					74.00		Horizontal
17059.00	*					74.00		Horizontal

**Average value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4874.00	30.18	31.85	8.66	32.12	38.57	54.00	-15.43	Vertical
7311.00	22.59	36.37	11.71	31.91	38.76	54.00	-15.24	Vertical
9748.00	22.98	38.27	14.25	31.56	43.94	54.00	-10.06	Vertical
12185.00	*					54.00		Vertical
14622.00	*					54.00		Vertical
17059.00	*					54.00		Vertical
4874.00	29.92	31.85	8.66	32.12	38.31	54.00	-15.69	Horizontal
7311.00	22.01	36.37	11.71	31.91	38.18	54.00	-15.82	Horizontal
9748.00	23.33	38.27	14.25	31.56	44.29	54.00	-9.71	Horizontal
12185.00	*					54.00		Horizontal
14622.00	*					54.00		Horizontal
17059.00	*					54.00		Horizontal

**Remark:**

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

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

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4924.00	44.84	31.90	8.70	32.15	53.29	74.00	-20.71	Vertical
7386.00	34.94	36.49	11.76	31.83	51.36	74.00	-22.64	Vertical
9848.00	37.01	38.62	14.31	31.77	58.17	74.00	-15.83	Vertical
12310.00	*					74.00		Vertical
14772.00	*					74.00		Vertical
17234.00	*					74.00		Vertical
4924.00	44.15	31.90	8.70	32.15	52.60	74.00	-21.40	Horizontal
7386.00	33.84	36.49	11.76	31.83	50.26	74.00	-23.74	Horizontal
9848.00	33.18	38.62	14.31	31.77	54.34	74.00	-19.66	Horizontal
12310.00	*					74.00		Horizontal
14772.00	*					74.00		Horizontal
17234.00	*					74.00		Horizontal

**Average value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4924.00	35.76	31.90	8.70	32.15	44.21	54.00	-9.79	Vertical
7386.00	24.86	36.49	11.76	31.83	41.28	54.00	-12.72	Vertical
9848.00	25.51	38.62	14.31	31.77	46.67	54.00	-7.33	Vertical
12310.00	*					54.00		Vertical
14772.00	*					54.00		Vertical
17234.00	*					54.00		Vertical
4924.00	34.52	31.90	8.70	32.15	42.97	54.00	-11.03	Horizontal
7386.00	23.23	36.49	11.76	31.83	39.65	54.00	-14.35	Horizontal
9848.00	22.44	38.62	14.31	31.77	43.60	54.00	-10.40	Horizontal
12310.00	*					54.00		Horizontal
14772.00	*					54.00		Horizontal
17234.00	*					54.00		Horizontal

**Remark:**

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



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

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4844.00	38.92	31.81	8.63	32.11	47.25	74.00	-26.75	Vertical
7266.00	33.35	36.28	11.69	31.94	49.38	74.00	-24.62	Vertical
9688.00	32.09	38.13	14.21	31.52	52.91	74.00	-21.09	Vertical
12060.00	*					74.00		Vertical
14472.00	*					74.00		Vertical
16884.00	*					74.00		Vertical
4844.00	37.80	31.81	8.63	32.11	46.13	74.00	-27.87	Horizontal
7266.00	33.21	36.28	11.69	31.94	49.24	74.00	-24.76	Horizontal
9688.00	31.72	38.13	14.21	31.52	52.54	74.00	-21.46	Horizontal
12060.00	*					74.00		Horizontal
14472.00	*					74.00		Horizontal
16884.00	*					74.00		Horizontal

**Average value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4844.00	28.11	31.81	8.63	32.11	36.44	54.00	-17.56	Vertical
7266.00	22.25	36.28	11.69	31.94	38.28	54.00	-15.72	Vertical
9688.00	22.46	38.13	14.21	31.52	43.28	54.00	-10.72	Vertical
12060.00	*					54.00		Vertical
14472.00	*					54.00		Vertical
16884.00	*					54.00		Vertical
4844.00	27.41	31.81	8.63	32.11	35.74	54.00	-18.26	Horizontal
7266.00	21.81	36.28	11.69	31.94	37.84	54.00	-16.16	Horizontal
9688.00	21.49	38.13	14.21	31.52	42.31	54.00	-11.69	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 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	38.21	31.85	8.66	32.12	46.60	74.00	-27.40	Vertical
7311.00	33.57	36.37	11.71	31.91	49.74	74.00	-24.26	Vertical
9748.00	33.22	38.27	14.25	31.56	54.18	74.00	-19.82	Vertical
12185.00	*					74.00		Vertical
14622.00	*					74.00		Vertical
17059.00	*					74.00		Vertical
4874.00	38.87	31.85	8.66	32.12	47.26	74.00	-26.74	Horizontal
7311.00	32.30	36.37	11.71	31.91	48.47	74.00	-25.53	Horizontal
9748.00	33.15	38.27	14.25	31.56	54.11	74.00	-19.89	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	29.16	31.85	8.66	32.12	37.55	54.00	-16.45	Vertical
7311.00	21.91	36.37	11.71	31.91	38.08	54.00	-15.92	Vertical
9748.00	22.49	38.27	14.25	31.56	43.45	54.00	-10.55	Vertical
12185.00	*					54.00		Vertical
14622.00	*					54.00		Vertical
17059.00	*					54.00		Vertical
4874.00	29.04	31.85	8.66	32.12	37.43	54.00	-16.57	Horizontal
7311.00	21.41	36.37	11.71	31.91	37.58	54.00	-16.42	Horizontal
9748.00	22.88	38.27	14.25	31.56	43.84	54.00	-10.16	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	42.92	31.88	8.68	32.13	51.35	74.00	-22.65	Vertical
7356.00	33.73	36.45	11.75	31.86	50.07	74.00	-23.93	Vertical
9808.00	36.14	38.43	14.29	31.68	57.18	74.00	-16.82	Vertical
12310.00	*					74.00		Vertical
14772.00	*					74.00		Vertical
17234.00	*					74.00		Vertical
4904.00	42.53	31.88	8.68	32.13	50.96	74.00	-23.04	Horizontal
7356.00	32.78	36.45	11.75	31.86	49.12	74.00	-24.88	Horizontal
9808.00	32.38	38.43	14.29	31.68	53.42	74.00	-20.58	Horizontal
12310.00	*					74.00		Horizontal
14772.00	*					74.00		Horizontal
17234.00	*					74.00		Horizontal

**Average value:**

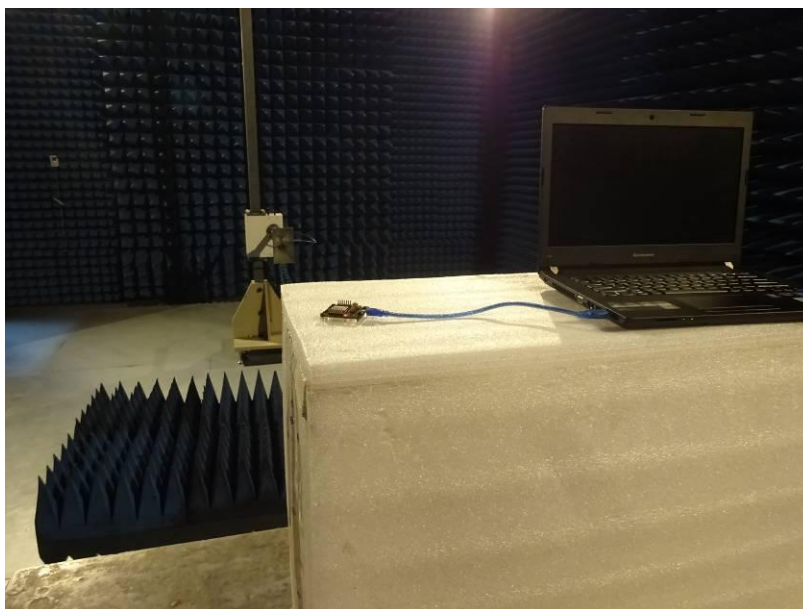
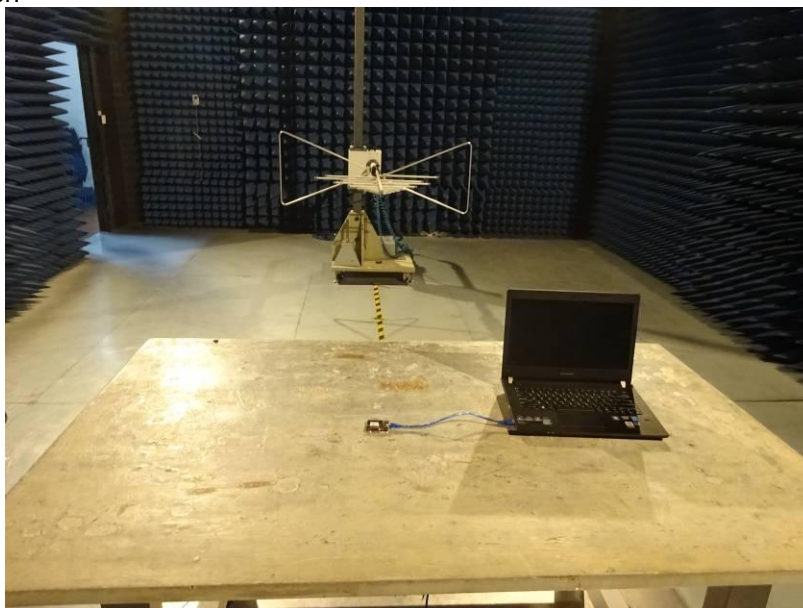
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4904.00	33.99	31.88	8.68	32.13	42.42	54.00	-11.58	Vertical
7356.00	23.68	36.45	11.75	31.86	40.02	54.00	-13.98	Vertical
9808.00	24.68	38.43	14.29	31.68	45.72	54.00	-8.28	Vertical
12310.00	*					54.00		Vertical
14772.00	*					54.00		Vertical
17234.00	*					54.00		Vertical
4904.00	33.00	31.88	8.68	32.13	41.43	54.00	-12.57	Horizontal
7356.00	22.20	36.45	11.75	31.86	38.54	54.00	-15.46	Horizontal
9808.00	21.67	38.43	14.29	31.68	42.71	54.00	-11.29	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

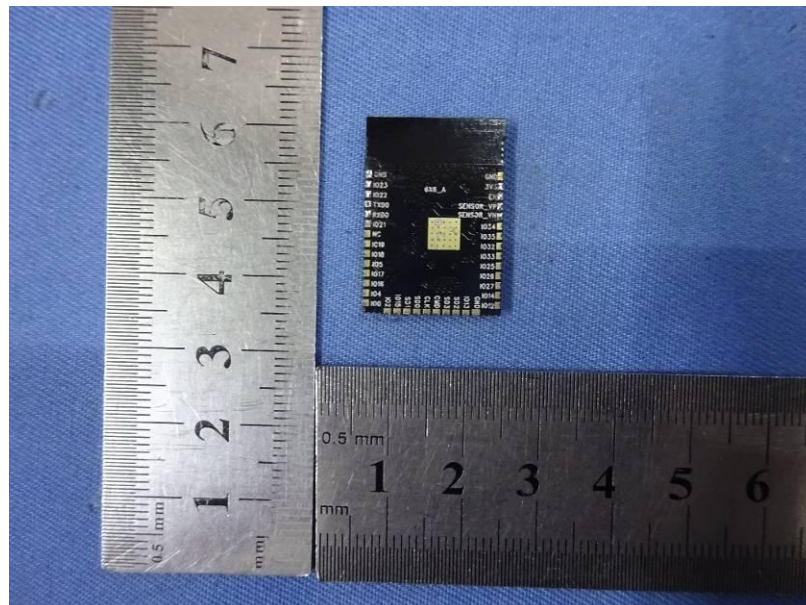
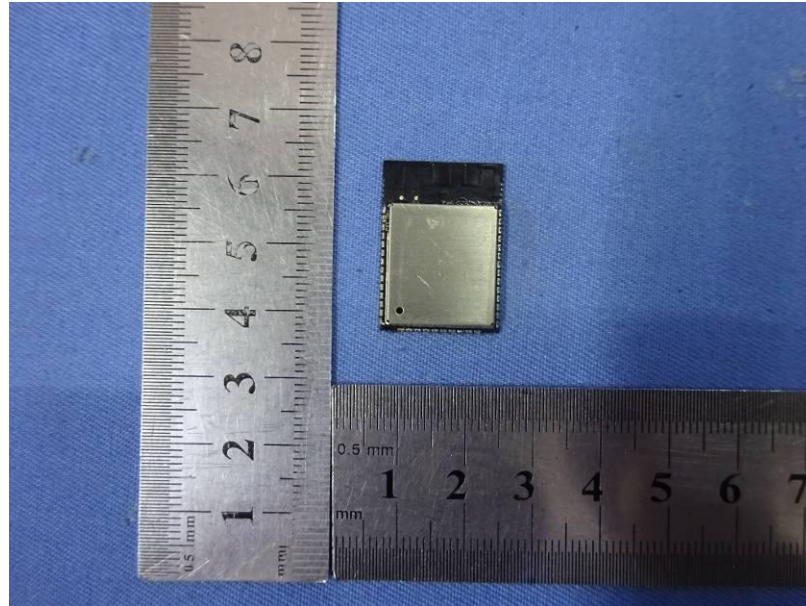


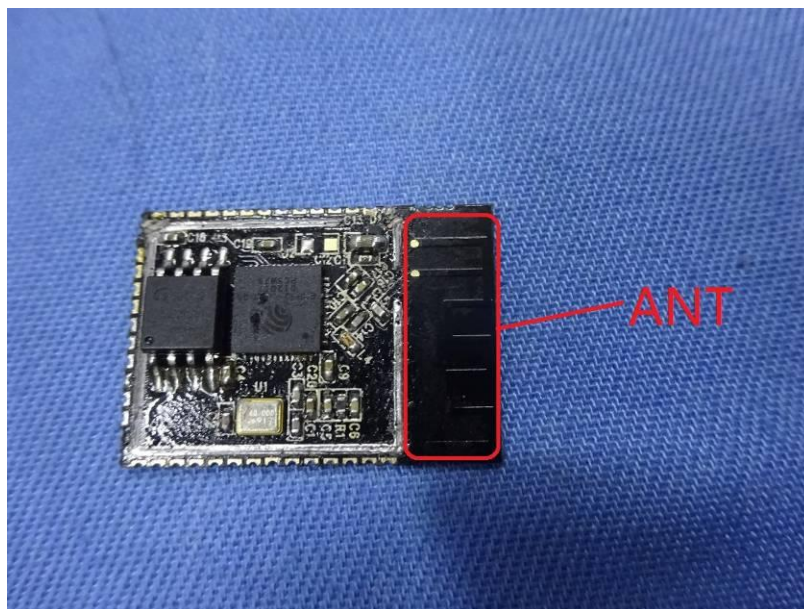
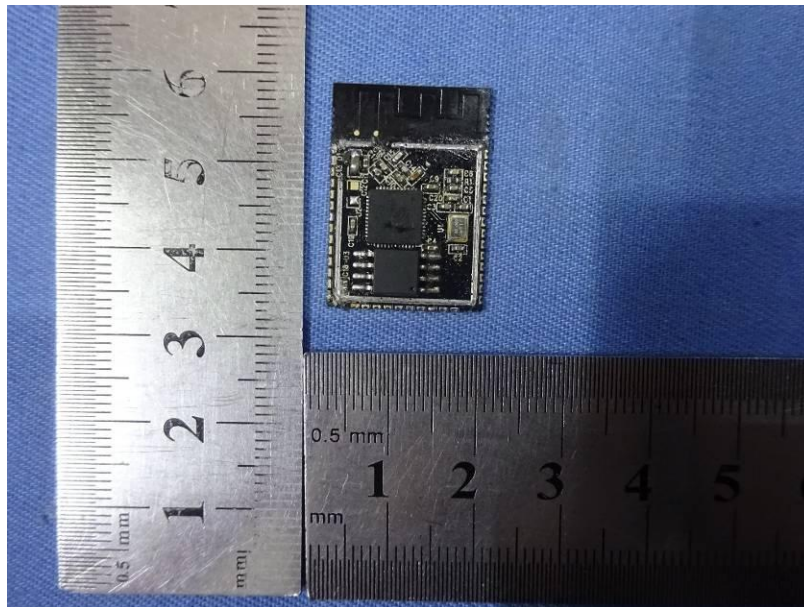
## Conducted Emission





## 9 EUT Constructional Details





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