



FCC Report

Applicant: Radiolink Electronic Limited

Address of Applicant: 3/F, BLD2, FuGuo industrial park, KaiFeng North Road, MeiLin
Shenzhen China

Equipment Under Test (EUT)

Product Name: Radio Control

Model No.: AT9, AT9S

FCC ID: U2BRL039AT9S

Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.247:2015

Date of sample receipt: July 18, 2016

Date of Test: July 18-21, 2016

Date of report issued: July 22, 2016

Test Result : PASS *

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

Authorized Signature:

Robinson Lo

Laboratory Manager

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

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2 Version

Version No.	Date	Description
00	July 22, 2016	Original

Prepared By:

Yang. Liu

Date:

July 22, 2016

Project Engineer

Check By:

Andy. Wu

Date:

July 22, 2016

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	N/A
Conducted Peak Output Power	15.247 (b)(1)	Pass
20dB Occupied Bandwidth	15.247 (a)(1)	Pass
Carrier Frequencies Separation	15.247 (a)(1)	Pass
Hopping Channel Number	15.247 (a)(1)	Pass
Dwell Time	15.247 (a)(1)	Pass
Pseudorandom Frequency Hopping Sequence	15.247(g)(h)	Pass
Radiated Emission	15.205/15.209	Pass
Band Edge	15.247(d)	Pass

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

N/A: Not applicable

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 Client Information

Applicant:	Radiolink Electronic Limited
Address of Applicant:	3/F, BLD2, FuGuo industrial park, KaiFeng North Road, MeiLin Shenzhen China
Manufacturer:	Radiolink Electronic Limited
Address of Manufacturer:	3/F, BLD2, FuGuo industrial park, KaiFeng North Road, MeiLin Shenzhen China

5.2 General Description of EUT

Product Name:	Radio Control
Model No.:	AT9, AT9S
Operation Frequency:	2409MHz ~2474MHz
Channel numbers:	32
Channel separation:	2MHz
Modulation technology:	GFSK
Antenna Type:	Integral Antenna
Antenna gain:	2.00dBi (declare by Applicant)
Power supply:	DC 12V (8*AA battery)

Operation Frequency each of channel							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2409.0MHz	9	2425.0MHz	17	2444.0MHz	25	2460.0MHz
2	2411.0MHz	10	2427.0MHz	18	2446.0MHz	26	2462.0MHz
3	2413.0MHz	11	2429.0MHz	19	2448.0MHz	27	2464.0MHz
4	2415.0MHz	12	2431.0MHz	20	2450.0MHz	28	2466.0MHz
5	2417.0MHz	13	2433.0MHz	21	2452.0MHz	29	2468.0MHz
6	2419.0MHz	14	2435.0MHz	22	2454.0MHz	30	2470.0MHz
7	2421.0MHz	15	2437.0MHz	23	2456.0MHz	31	2472.0MHz
8	2423.0MHz	16	2439.0MHz	24	2458.0MHz	32	2474.0MHz

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:

Channel	Frequency
The lowest channel	2409MHz
The middle channel	2444MHz
The Highest channel	2474MHz

5.3 Test mode

Transmitting mode	Keep continuously transmitting mode
Remark: New battery is used during all tests	

5.4 Test Facility

<p>The test facility is recognized, certified, or accredited by the following organizations:</p> <ul style="list-style-type: none">● 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, June 26, 2013.
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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

5.6 Other Information Requested by the Customer

None.

5.7 Description of Support Units

None.

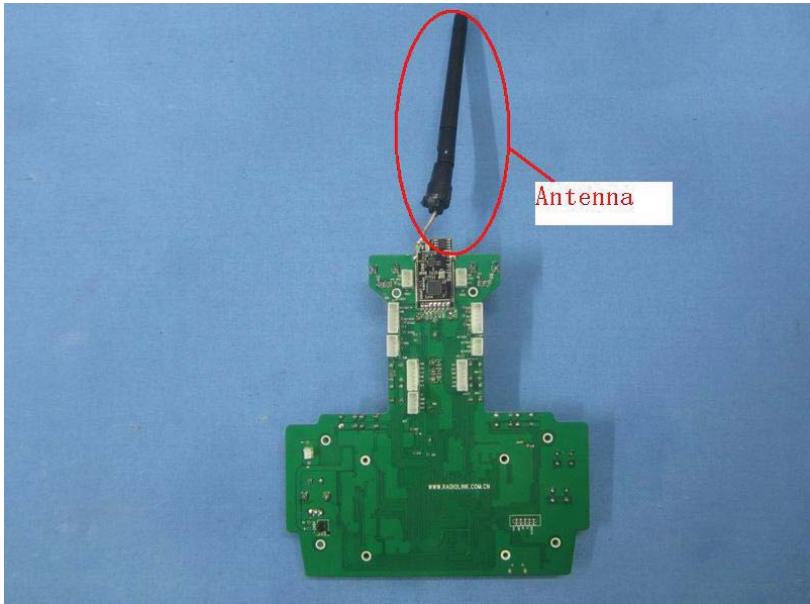
6 Test Instruments list

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	9.0(L)*6.0(W)* 6.0(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	Jun. 29 2016	Jun. 28 2017
4	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	Jun. 29 2016	Jun. 28 2017
5	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	Jun. 29 2016	Jun. 28 2017
6	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	Jun. 25 2016	Jun. 24 2017
7	Horn Antenna	ETS-LINDGREN	3160	GTS217	Mar. 26 2016	Mar. 25 2017
8	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
9	Coaxial Cable	GTS	N/A	GTS213	Mar. 27 2016	Mar. 26 2017
10	Coaxial Cable	GTS	N/A	GTS211	Mar. 27 2016	Mar. 26 2017
11	Coaxial cable	GTS	N/A	GTS210	Mar. 27 2016	Mar. 26 2017
12	Coaxial Cable	GTS	N/A	GTS212	Mar. 27 2016	Mar. 26 2017
13	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	Jun. 29 2016	Jun. 28 2017
14	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	Jun. 29 2016	Jun. 28 2017
15	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	Jun. 25 2016	Jun. 24 2017
16	Band filter	Amindeon	82346	GTS219	Mar. 27 2016	Mar. 26 2017

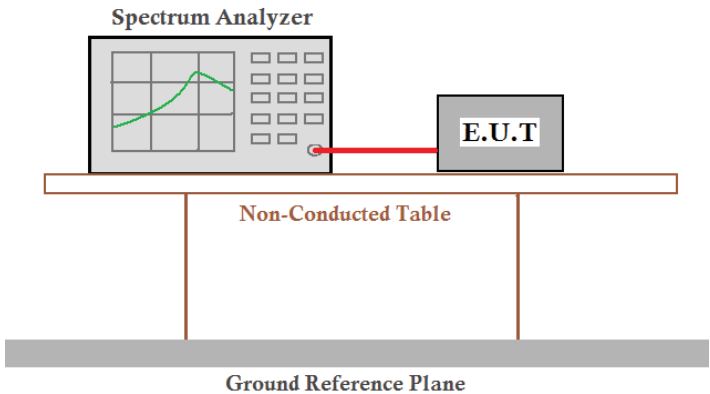
General used equipment:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Barometer	ChangChun	DYM3	GTS257	July 06 2016	July 05 2017

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 integral antenna, the best case gain of the antenna is 2dBi</i></p> 	

7.2 Conducted Peak Output Power

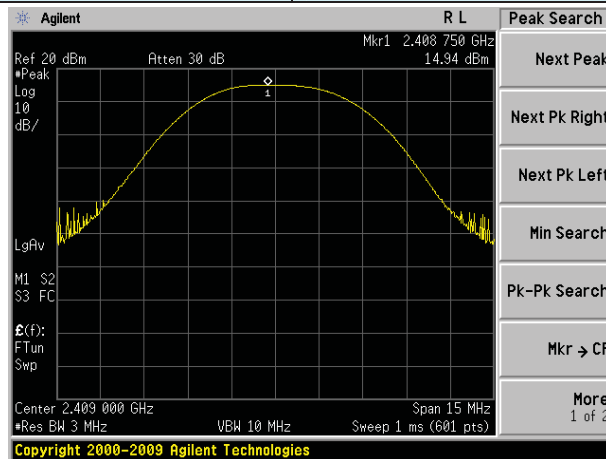
Test Requirement:	FCC Part15 C Section 15.247 (b)(3)
Test Method:	ANSI C63.10:2013
Limit:	20.97dBm
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted 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

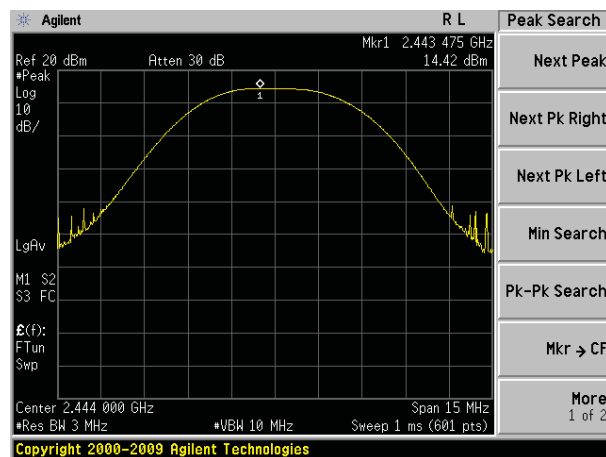
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	14.94	20.97	Pass
Middle	14.42		
Highest	14.97		

Test plot as follows:

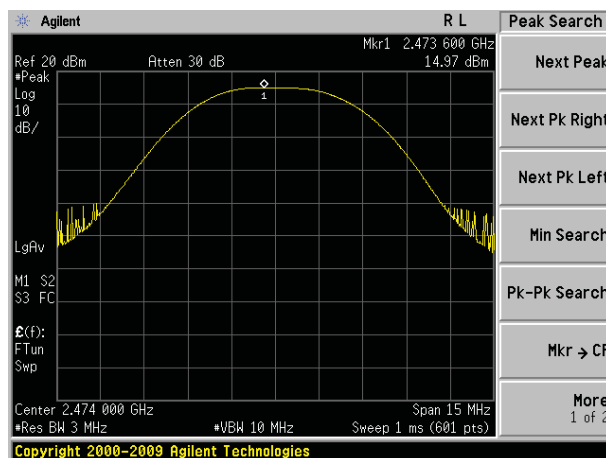
Test mode:	GFSK mode
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Lowest channel

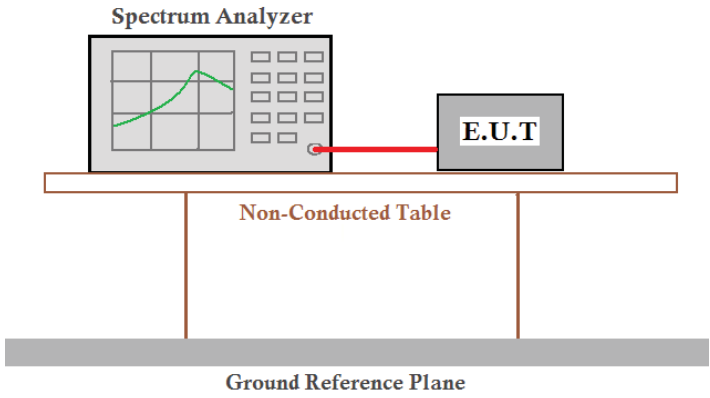


Middle channel



Highest channel

7.3 20dB Emission Bandwidth

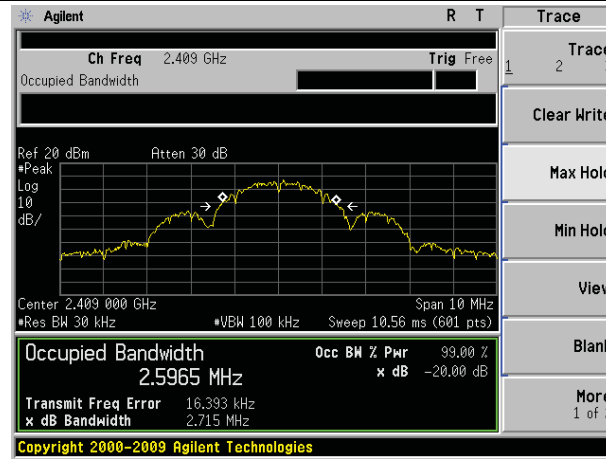
Test Requirement:	FCC Part15 C Section 15.247 (a)(2)
Test Method:	ANSI C63.10:2013
Limit:	N/A
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. Below the table is 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

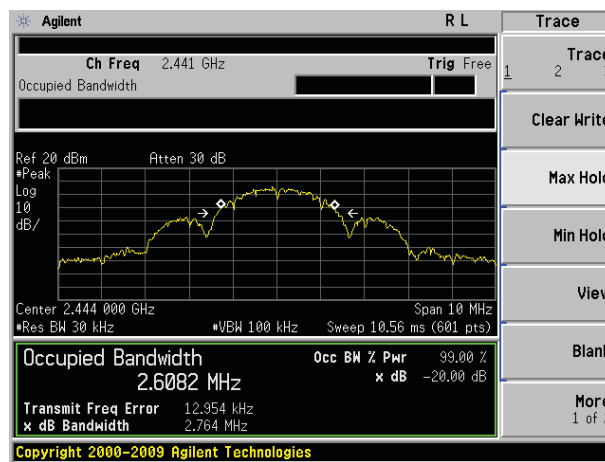
Test channel	Channel Bandwidth (MHz)
Lowest	2.715
Middle	2.764
Highest	2.744

Result
Pass

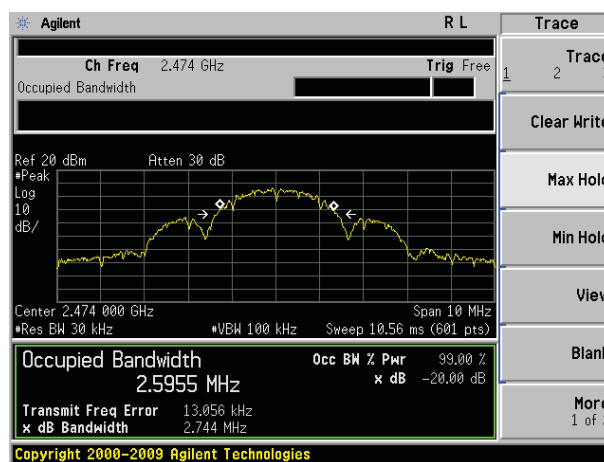
Test plot as follows:



Lowest channel

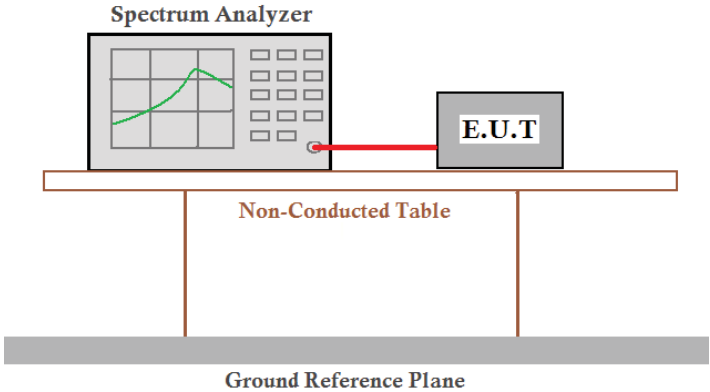


Middle channel



Highest channel

7.4 Carrier Frequencies Separation

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=100KHz, VBW=300KHz, detector=Peak
Limit:	0.025MHz or 2/3 of the 20dB bandwidth (whichever is greater)
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer and an E.U.T. (Equipment Under Test) are connected by a red cable. They are positioned on a 'Non-Conducted Table' which has two vertical legs. Below this table is 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

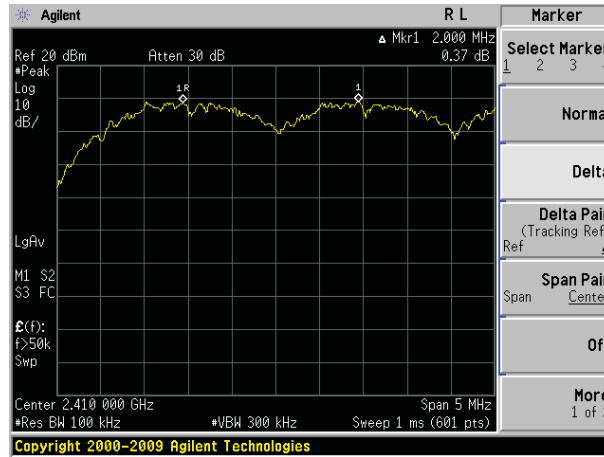
Measurement Data

Test channel	Carrier Frequencies Separation (kHz)	Limit (kHz)	Result
Lowest	2000	1843	Pass
Middle	2000	1843	Pass
Highest	2000	1843	Pass

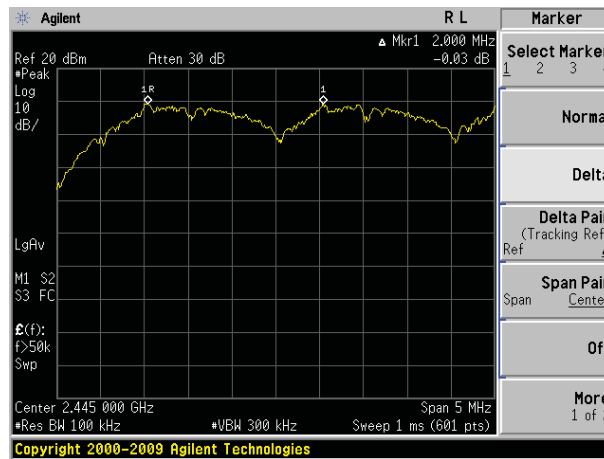
Note: According to section 7.4

Mode	20dB bandwidth (kHz) (worse case)	Limit (kHz) (Carrier Frequencies Separation)
GFSK	2764	1843

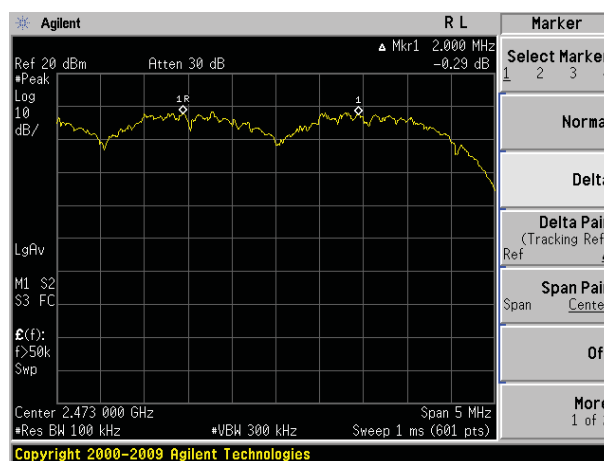
Test plot as follows:



Lowest channel

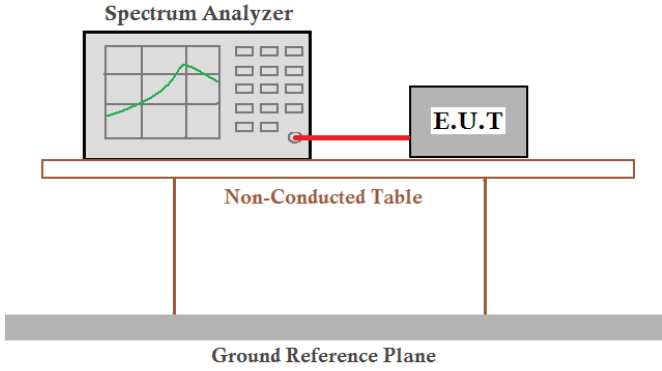


Middle channel



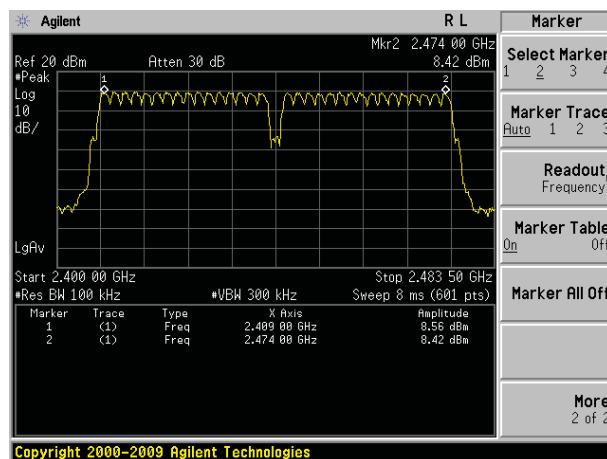
Highest channel

7.5 Hopping Channel Number

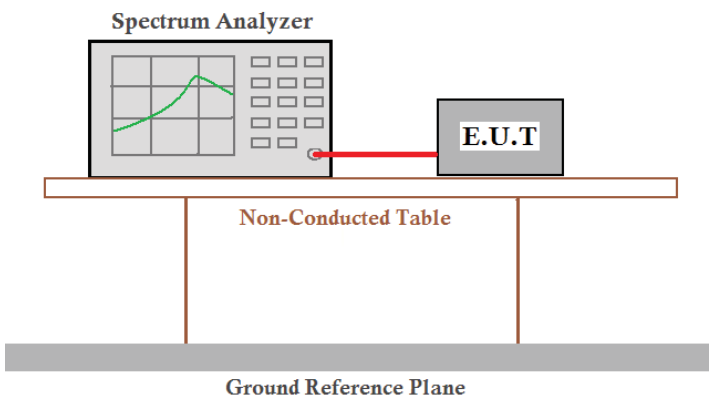
Test Requirement:	FCC Part15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=100kHz, VBW=300kHz, Frequency range=2400MHz-2483.5MHz, Detector=Peak
Limit:	15 channels
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement Data:

Mode	Hopping channel numbers	Limit	Result
GFSK	32	15	Pass



7.6 Dwell Time

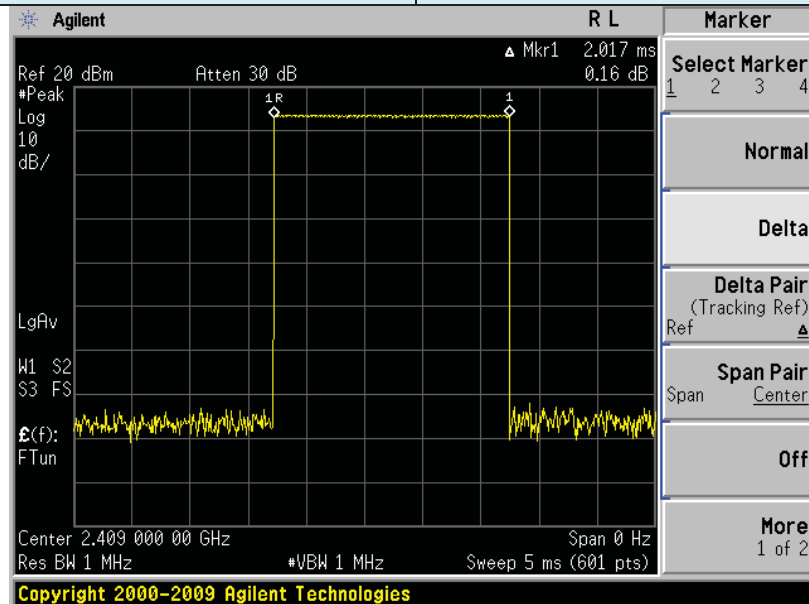
Test Requirement:	FCC Part15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=1MHz, VBW=1MHz, Span=0Hz, Detector=Peak
Limit:	0.4 Second
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T (Equipment Under Test) via a red cable. 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

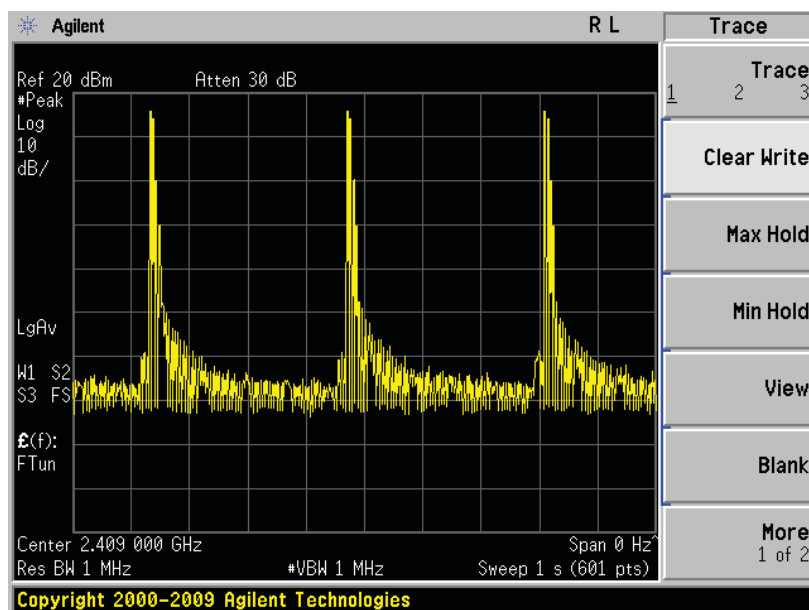
Frequency		Dwell time(ms)	Limit(ms)	Result
2.409GHz	2.017X3X3X0.4X32=232.36	232.36	400	Pass
2.444GHz	2.017X3X3X0.4X32=232.36	232.36	400	Pass
2.474GHz	2.025X3X3X0.4X32=233.28	233.28	400	Pass

Test plot as follows:

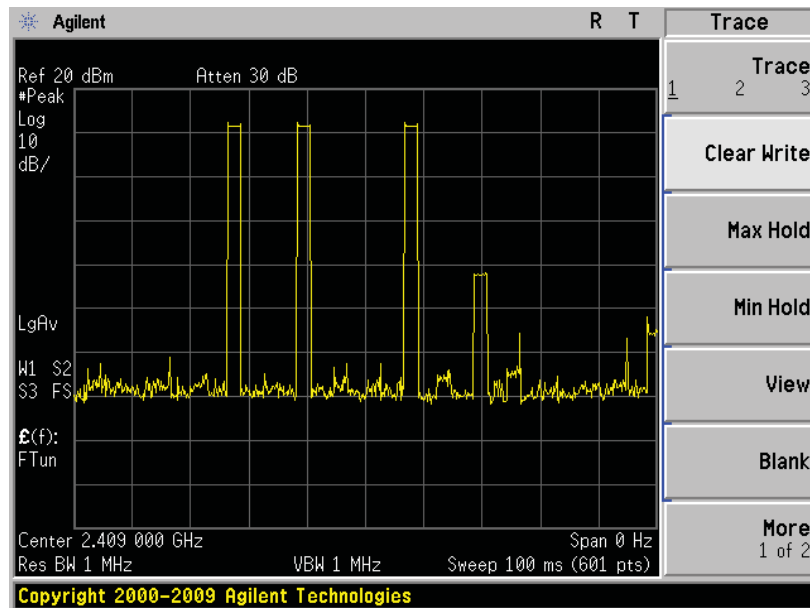
Frequency:	2409MHz
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Ton

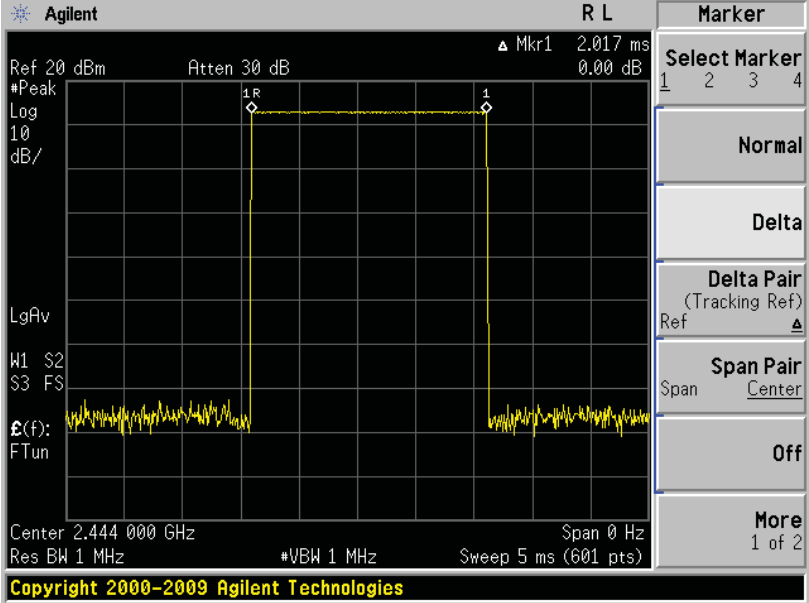


Ton times in 1s

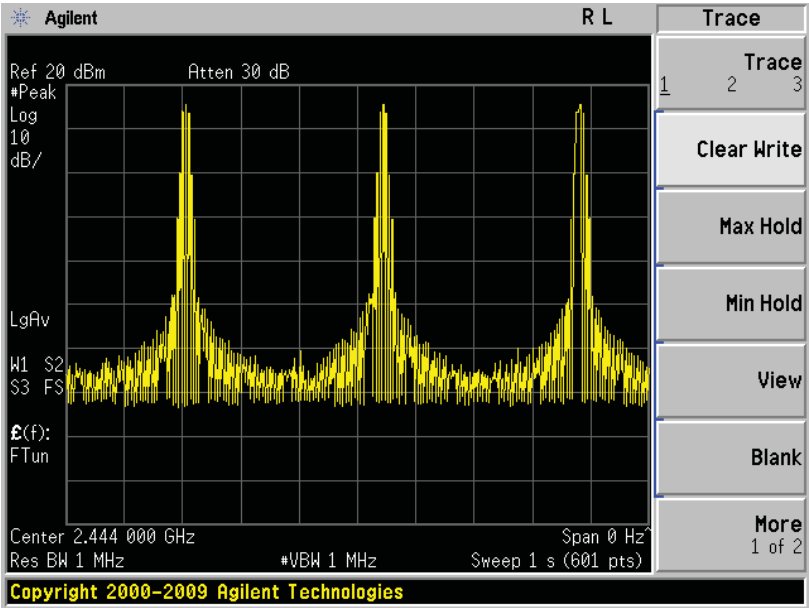


Ton times in 100ms

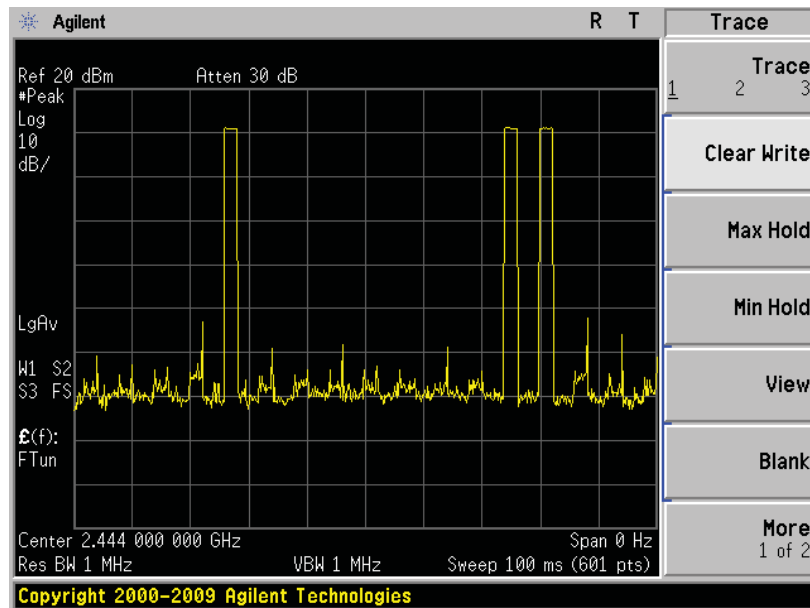
Frequency:	2444MHz
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Ton

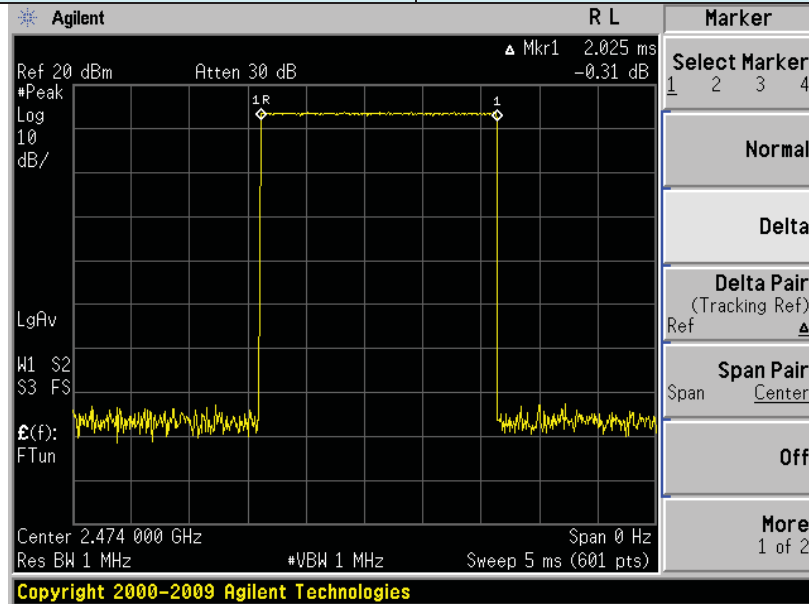


Ton times in 1s

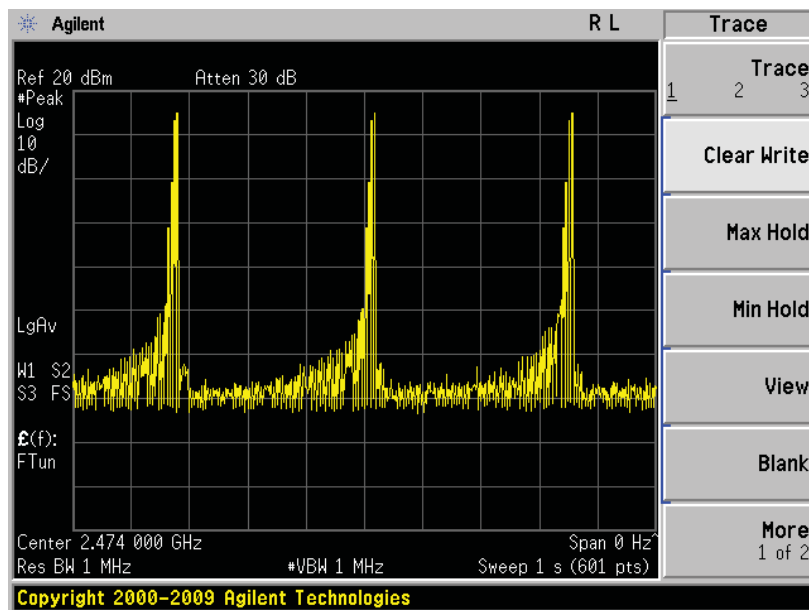


Ton times in 100ms

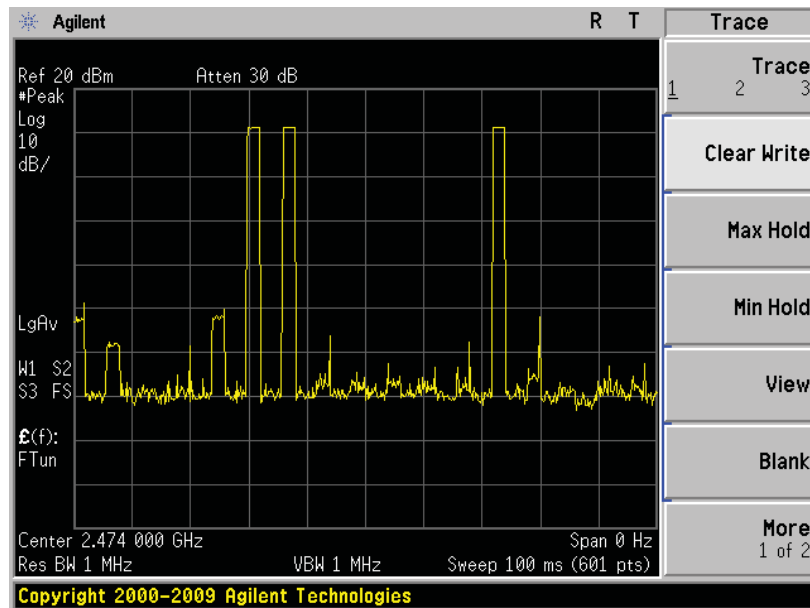
Frequency:	2474MHz
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Ton



Ton times in 1s



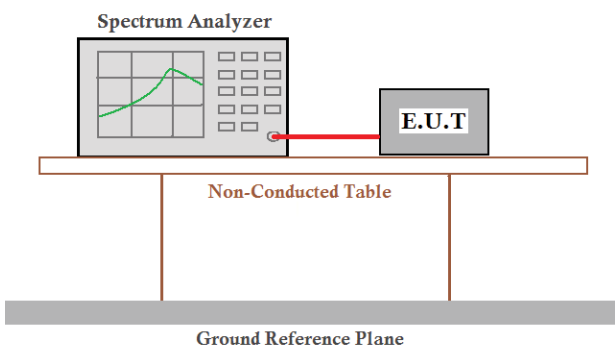
Ton times in 100ms

7.7 Pseudorandom Frequency Hopping Sequence

Test Requirement:	FCC Part15 C Section 15.247 (a)(1) requirement:
<p><i>Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.</i></p> <p><i>Alternatively. Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a Pseudorandom ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.</i></p>	
EUT Pseudorandom Frequency Hopping Sequence	
<p><i>The pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first ONE of 9 consecutive ONES; i.e. the shift register is initialized with nine ones.</i></p> <ul style="list-style-type: none"> • Number of shift register stages: 9 • Length of pseudo-random sequence: $2^9 - 1 = 511$ bits • Longest sequence of zeros: 8 (non-inverted signal) <div data-bbox="244 1010 1294 1160" data-label="Diagram"> </div> <p><i>Linear Feedback Shift Register for Generation of the PRBS sequence</i></p> <p><i>An example of Pseudorandom Frequency Hopping Sequence as follow:</i></p> <div data-bbox="244 1261 1241 1408" data-label="Figure"> </div> <p><i>Each frequency used equally on the average by each transmitter.</i></p> <p><i>The system receivers have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shift frequencies in synchronization with the transmitted signals.</i></p>	

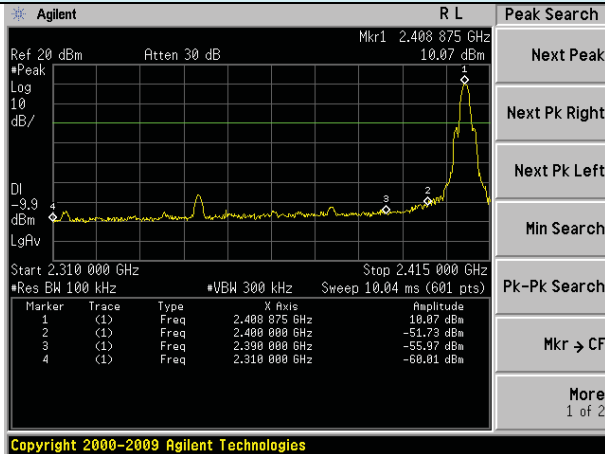
7.8 Band Edge

7.8.1 Conducted Emission Method

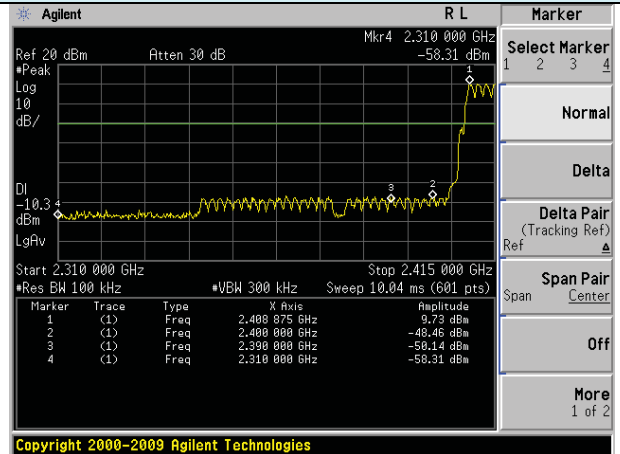
Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=100kHz, VBW=300kHz, Detector=Peak
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by 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.</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 channel:	Lowest channel
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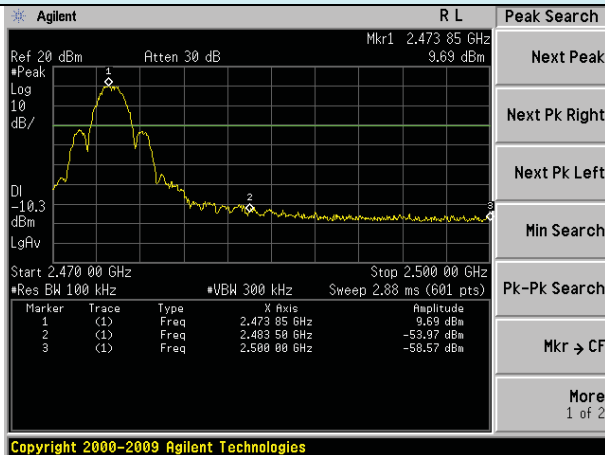


No-hopping mode

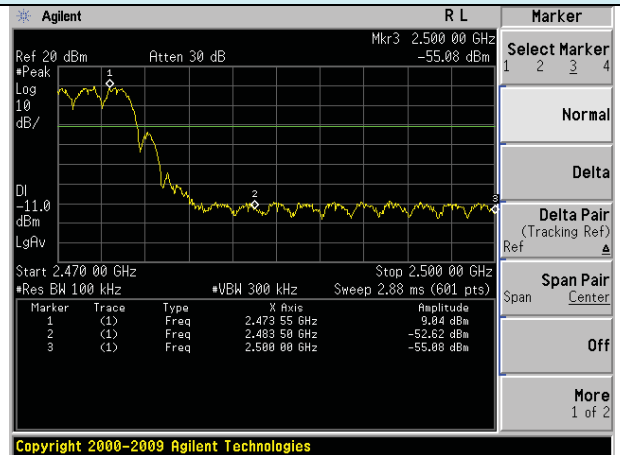


Hopping mode

Test channel:	Highest channel
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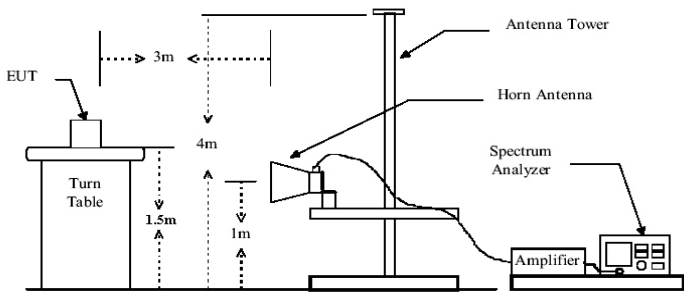


No-hopping mode



Hopping mode

7.8.2 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209 and 15.205				
Test Method:	ANSI C63.10:2013				
Test Frequency Range:	All restriction band have been tested, and 2.3GHz to 2.5GHz band is the worse case				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		Peak	1MHz	10Hz	Average Value
Limit:	Frequency		Limit (dBuV/m @3m)		Remark
	Above 1GHz		54.00		Average Value
			74.00		Peak Value
Test setup:					
Test Procedure:	<div>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.</div> <div>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.</div> <div>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.</div> <div>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.</div> <div>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</div> <div>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.</div>				
Test Instruments:	Refer to section 6.0 for details				
Test mode:	Refer to section 5.3 for details				
Test results:	Pass				

Remark:

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

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
2310.00	52.46	27.91	5.30	30.37	55.30	74.00	-18.70	Horizontal
2390.00	53.65	27.59	5.38	30.18	56.44	74.00	-17.56	Horizontal
2400.00	54.15	27.58	5.39	30.18	56.94	74.00	-17.06	Horizontal
2310.00	53.91	27.91	5.30	30.37	56.75	74.00	-17.25	Vertical
2390.00	55.27	27.59	5.38	30.18	58.06	74.00	-15.94	Vertical
2400.00	55.44	27.58	5.39	30.18	58.23	74.00	-15.77	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
2310.00	32.63	27.91	5.30	30.37	35.47	54.00	-18.53	Horizontal
2390.00	32.42	27.59	5.38	30.18	35.21	54.00	-18.79	Horizontal
2400.00	33.70	27.58	5.39	30.18	36.49	54.00	-17.51	Horizontal
2310.00	34.08	27.91	5.30	30.37	36.92	54.00	-17.08	Vertical
2390.00	34.04	27.59	5.38	30.18	36.83	54.00	-17.17	Vertical
2400.00	34.99	27.58	5.39	30.18	37.78	54.00	-16.22	Vertical

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	53.47	27.53	5.47	29.93	56.54	74.00	-17.46	Horizontal
2500.00	53.56	27.55	5.49	29.93	56.67	74.00	-17.33	Horizontal
2483.50	54.83	27.53	5.47	29.93	57.90	74.00	-16.10	Vertical
2500.00	54.98	27.55	5.49	29.93	58.09	74.00	-15.91	Vertical

Average value:

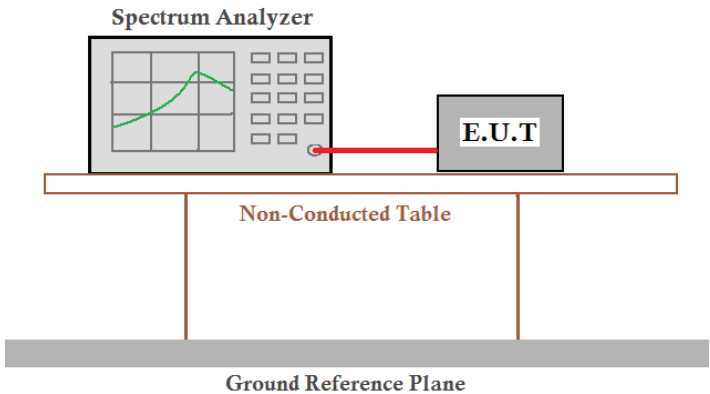
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2483.50	34.55	27.53	5.47	29.93	37.62	54.00	-16.38	Horizontal
2500.00	31.86	27.55	5.49	29.93	34.97	54.00	-19.03	Horizontal
2483.50	35.91	27.53	5.47	29.93	38.98	54.00	-15.02	Vertical
2500.00	33.28	27.55	5.49	29.93	36.39	54.00	-17.61	Vertical

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.

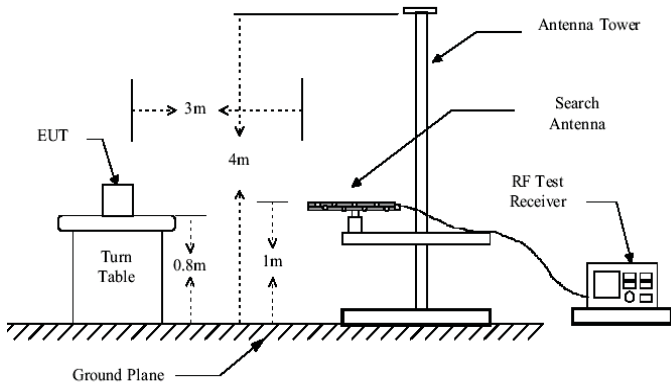

7.9 Spurious Emission

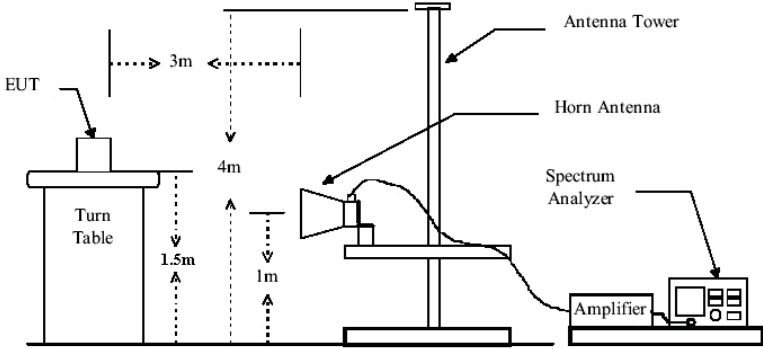
7.9.1 Conducted Emission Method

Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 Meas Guidance
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by two vertical legs. Below the table is a Ground Reference Plane, represented by a thick grey bar.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass



7.9.2 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	Remark
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		Peak	1MHz	10Hz	Average Value
Limit:	Frequency		Limit (dBuV/m @3m)		Remark
	30MHz-88MHz		40.0		Quasi-peak Value
	88MHz-216MHz		43.5		Quasi-peak Value
	216MHz-960MHz		46.0		Quasi-peak Value
	960MHz-1GHz		54.0		Quasi-peak Value
	Above 1GHz		54.0		Average Value
			74.0		Peak Value
Test setup:	Below 1GHz				
					
Test setup:	Above 1GHz				
					

	 <p>The diagram illustrates the test setup. An EUT (Equipment Under Test) is placed on a Turn Table. The Turn Table is 1.5m above the ground. The EUT is 3m away from the Antenna Tower. The Antenna Tower has a Horn Antenna at a height of 4m. The Spectrum Analyzer is connected to the Antenna Tower via an Amplifier. The Spectrum Analyzer is 1m away from the Antenna Tower.</p>
Test Procedure:	<ol style="list-style-type: none"> 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. 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.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Remark:

1. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.
2. The measured filed strength at frequencies below 30MHz are lower than the limit over 30dB. So the data isn't reported.

Measurement data:

■ Below 1GHz

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
40.56	34.36	15.58	0.67	32.05	18.56	40.00	-21.44	Vertical
49.19	34.27	15.31	0.76	31.97	18.37	40.00	-21.63	Vertical
96.10	34.12	14.90	1.16	31.75	18.43	43.50	-25.07	Vertical
107.89	34.52	14.44	1.26	31.80	18.42	43.50	-25.08	Vertical
242.53	35.28	14.08	2.08	32.16	19.28	46.00	-26.72	Vertical
341.98	34.85	16.15	2.58	32.05	21.53	46.00	-24.47	Vertical
30.85	35.14	14.32	0.56	32.06	17.96	40.00	-22.04	Horizontal
52.76	35.32	15.12	0.80	31.95	19.29	40.00	-20.71	Horizontal
96.10	34.78	14.90	1.16	31.75	19.09	43.50	-24.41	Horizontal
204.24	35.80	12.70	1.86	32.14	18.22	43.50	-25.28	Horizontal
316.59	35.80	15.28	2.45	32.12	21.41	46.00	-24.59	Horizontal
489.03	35.61	18.33	3.26	31.59	25.61	46.00	-20.39	Horizontal

■ Above 1GHz

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
4818.00	44.58	31.79	8.61	32.10	52.88	74.00	-21.12	Vertical
7227.00	45.00	36.19	11.66	31.99	60.86	74.00	-13.14	Vertical
9636.00	39.07	38.01	14.16	31.58	59.66	74.00	-14.34	Vertical
12045.00	35.28	39.05	15.05	35.57	53.81	74.00	-20.19	Vertical
4818.00	43.02	31.79	8.61	32.10	51.32	74.00	-22.68	Horizontal
7227.00	43.53	36.19	11.66	31.99	59.39	74.00	-14.61	Horizontal
9636.00	37.39	38.01	14.16	31.58	57.98	74.00	-16.02	Horizontal
12045.00	33.56	39.05	15.05	35.57	52.09	74.00	-21.91	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
4818.00	30.47	31.79	8.61	32.10	38.77	54.00	-15.23	Vertical
7227.00	30.55	36.19	11.66	31.99	46.41	54.00	-7.59	Vertical
9636.00	24.45	38.01	14.16	31.58	45.04	54.00	-8.96	Vertical
12045.00	20.54	39.05	15.05	35.57	39.07	54.00	-14.93	Vertical
4818.00	28.91	31.79	8.61	32.10	37.21	54.00	-16.79	Horizontal
7227.00	29.08	36.19	11.66	31.99	44.94	54.00	-9.06	Horizontal
9636.00	22.77	38.01	14.16	31.58	43.36	54.00	-10.64	Horizontal
12045.00	18.82	39.05	15.05	35.57	37.35	54.00	-16.65	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.
3. The emission levels of other frequencies are very lower than the limit and not show in test report.

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
4882.00	44.92	31.85	8.67	32.12	53.32	74.00	-20.68	Vertical
7323.00	39.49	36.37	11.72	31.89	55.69	74.00	-18.31	Vertical
9764.00	36.49	38.35	14.25	31.62	57.47	74.00	-16.53	Vertical
12205.00	36.61	38.92	15.16	35.65	55.04	74.00	-18.96	Vertical
4882.00	43.36	31.85	8.67	32.12	51.76	74.00	-22.24	Horizontal
7323.00	38.02	36.37	11.72	31.89	54.22	74.00	-19.78	Horizontal
9764.00	34.81	38.35	14.25	31.62	55.79	74.00	-18.21	Horizontal
12205.00	34.89	38.92	15.16	35.65	53.32	74.00	-20.68	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
4882.00	30.64	31.85	8.67	32.12	39.04	54.00	-14.96	Vertical
7323.00	25.75	36.37	11.72	31.89	41.95	54.00	-12.05	Vertical
9764.00	22.40	38.35	14.25	31.62	43.38	54.00	-10.62	Vertical
12205.00	21.77	38.92	15.16	35.65	40.20	54.00	-13.80	Vertical
4882.00	29.08	31.85	8.67	32.12	37.48	54.00	-16.52	Horizontal
7323.00	24.28	36.37	11.72	31.89	40.48	54.00	-13.52	Horizontal
9764.00	20.72	38.35	14.25	31.62	41.70	54.00	-12.30	Horizontal
12205.00	20.05	38.92	15.16	35.65	38.48	54.00	-15.52	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.
3. The emission levels of other frequencies are very lower than the limit and not show in test report.

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
4948.00	44.24	31.91	8.71	32.16	52.70	74.00	-21.30	Vertical
7422.00	40.64	36.56	11.77	31.80	57.17	74.00	-16.83	Vertical
9896.00	35.47	38.81	14.35	31.82	56.81	74.00	-17.19	Vertical
12050.00	33.81	39.05	15.05	35.57	52.34	74.00	-21.66	Vertical
4948.00	42.68	31.91	8.71	32.16	51.14	74.00	-22.86	Horizontal
7422.00	39.17	36.56	11.77	31.80	55.70	74.00	-18.30	Horizontal
9896.00	33.79	38.81	14.35	31.82	55.13	74.00	-18.87	Horizontal
12050.00	32.09	39.05	15.05	35.57	50.62	74.00	-23.38	Horizontal

Average value:

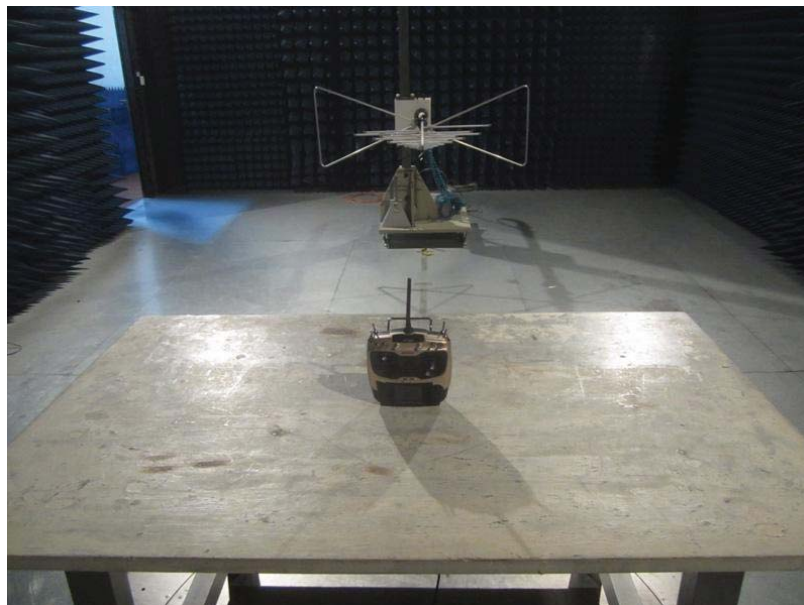
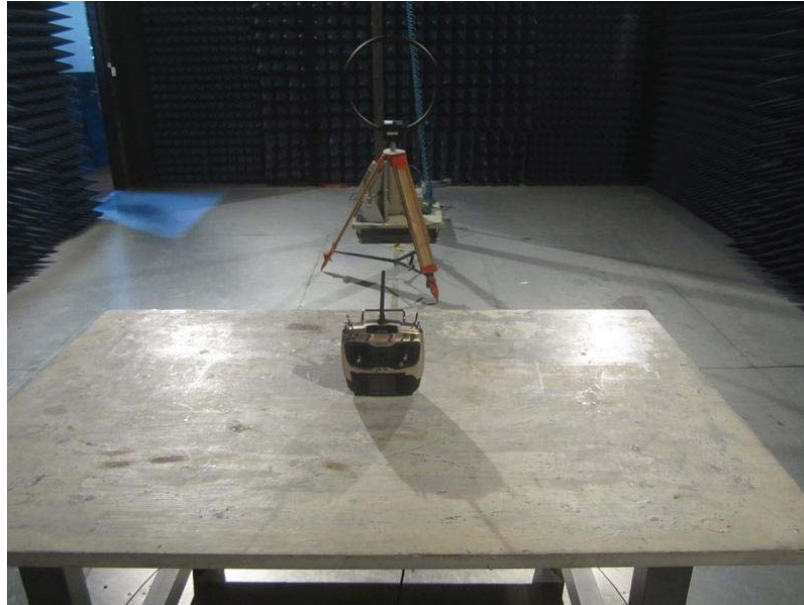
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4948.00	30.47	31.91	8.71	32.16	38.93	54.00	-15.07	Vertical
7422.00	25.65	36.56	11.77	31.80	42.18	54.00	-11.82	Vertical
9896.00	20.46	38.81	14.35	31.82	41.80	54.00	-12.20	Vertical
12050.00	18.64	39.05	15.05	35.57	37.17	54.00	-16.83	Vertical
4948.00	28.91	31.91	8.71	32.16	37.37	54.00	-16.63	Horizontal
7422.00	24.18	36.56	11.77	31.80	40.71	54.00	-13.29	Horizontal
9896.00	18.78	38.81	14.35	31.82	40.12	54.00	-13.88	Horizontal
12050.00	16.92	39.05	15.05	35.57	35.45	54.00	-18.55	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.
3. The emission levels of other frequencies are very lower than the limit and not show in test report.

8 Test Setup Photo

Radiated Emission





9 EUT Constructional Details

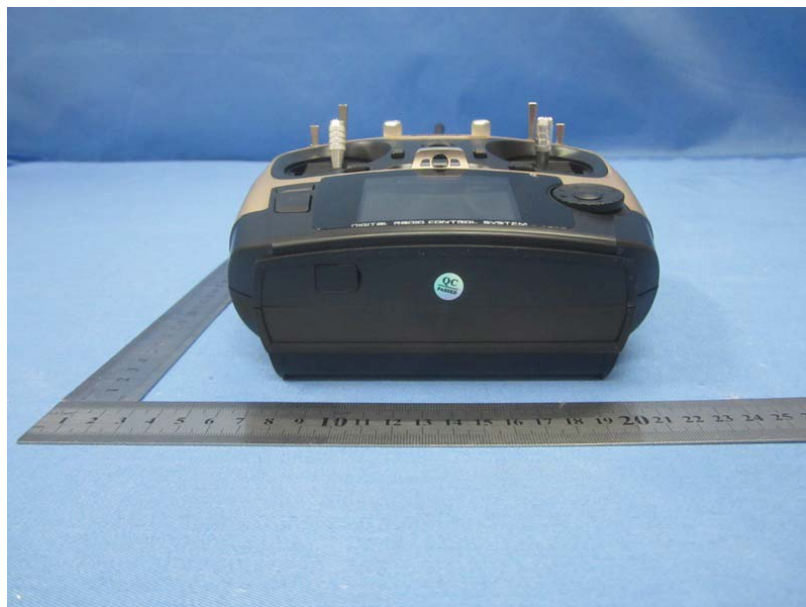
AT9





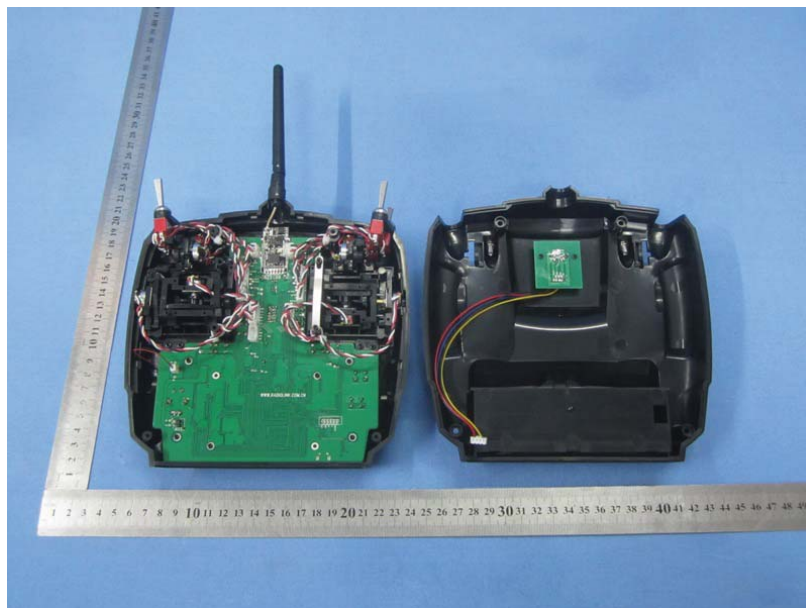


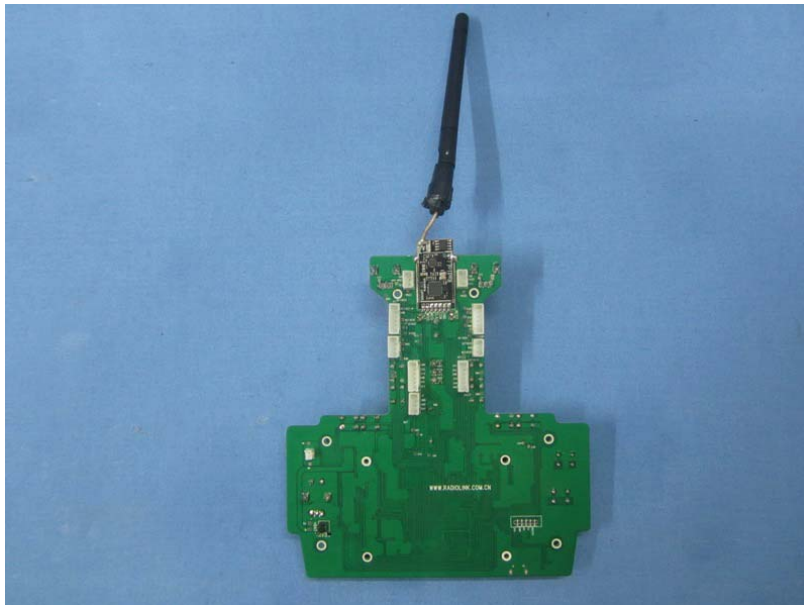
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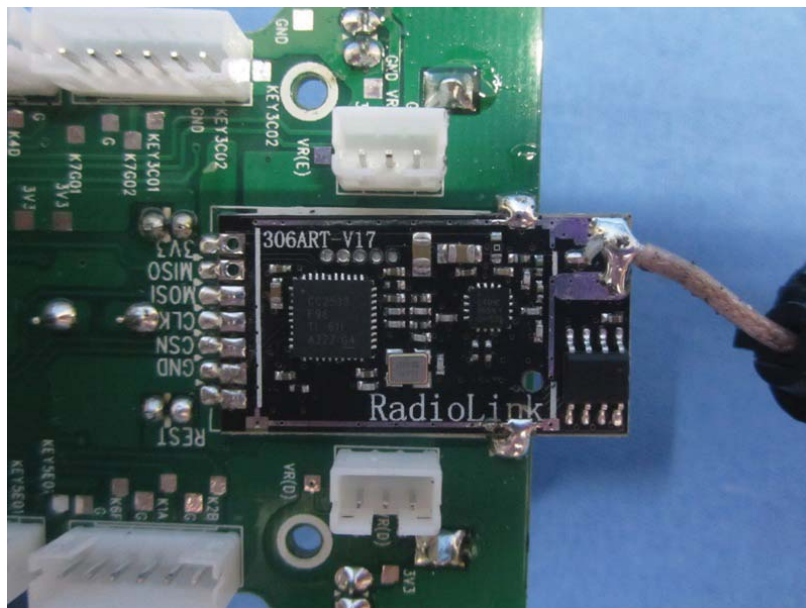
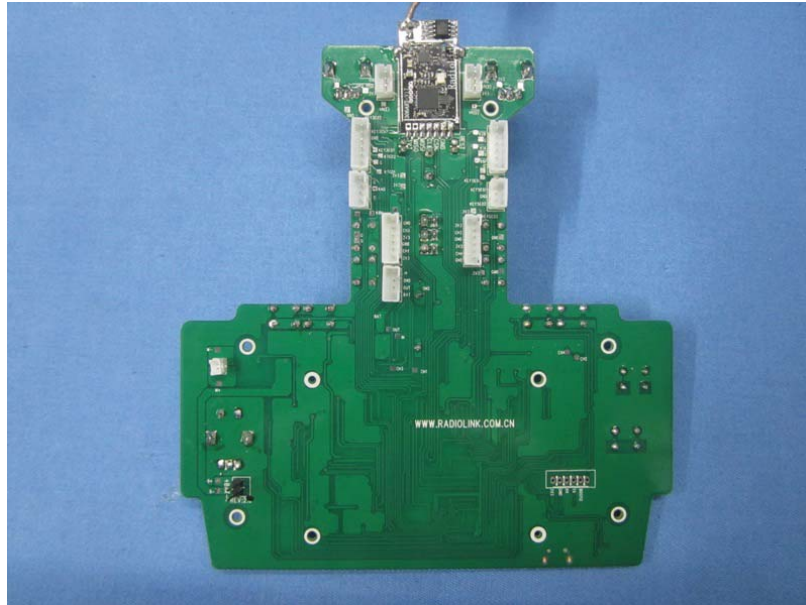


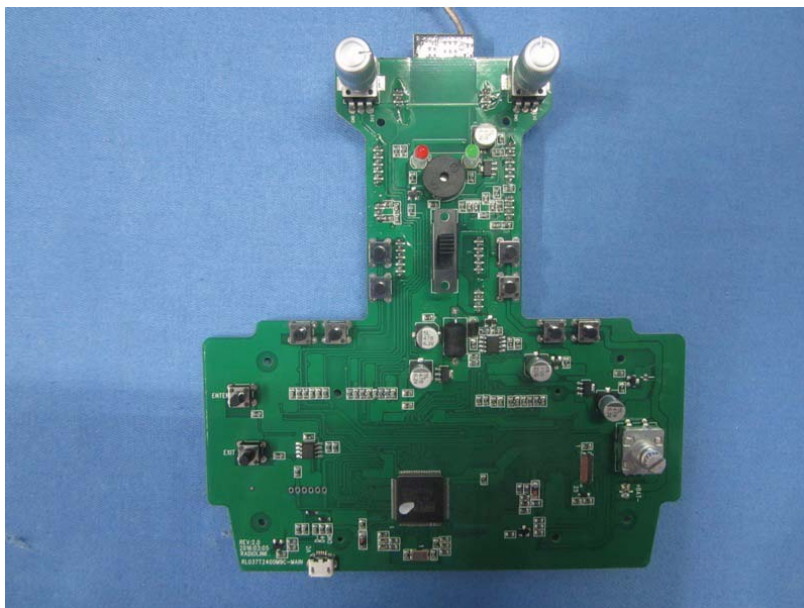


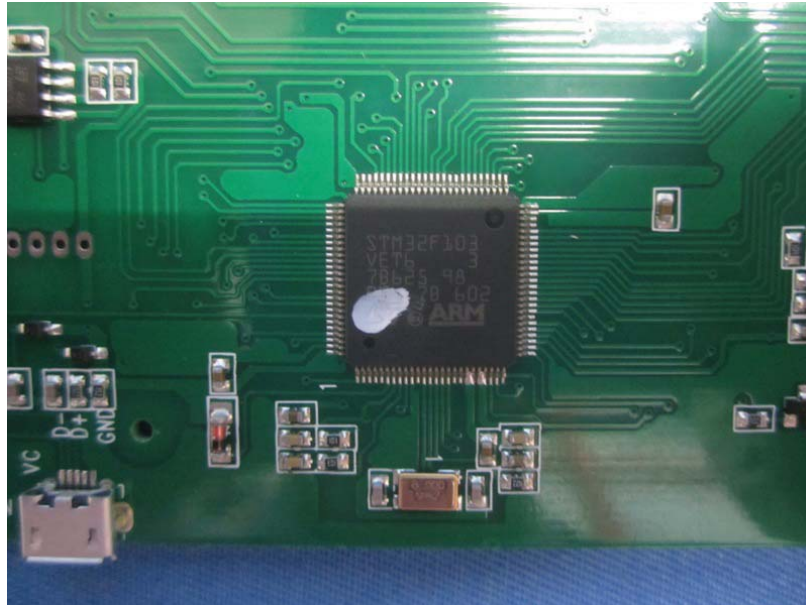


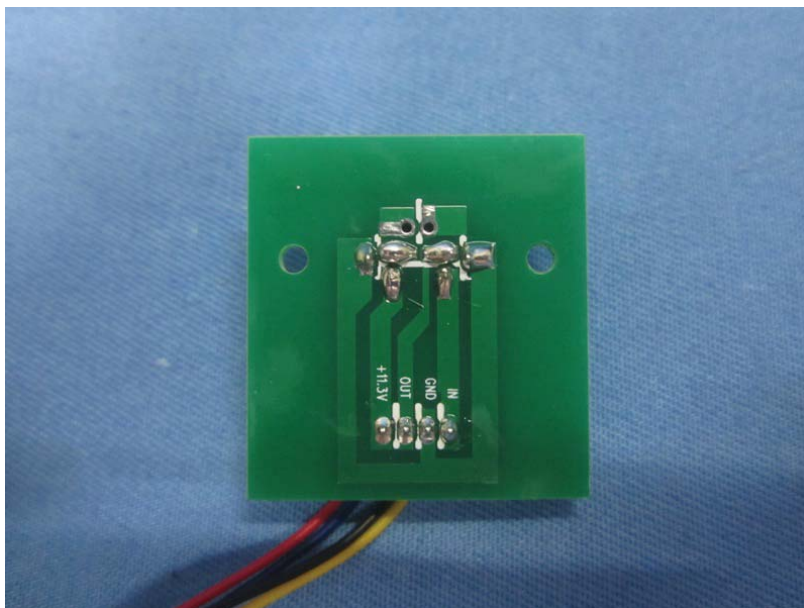


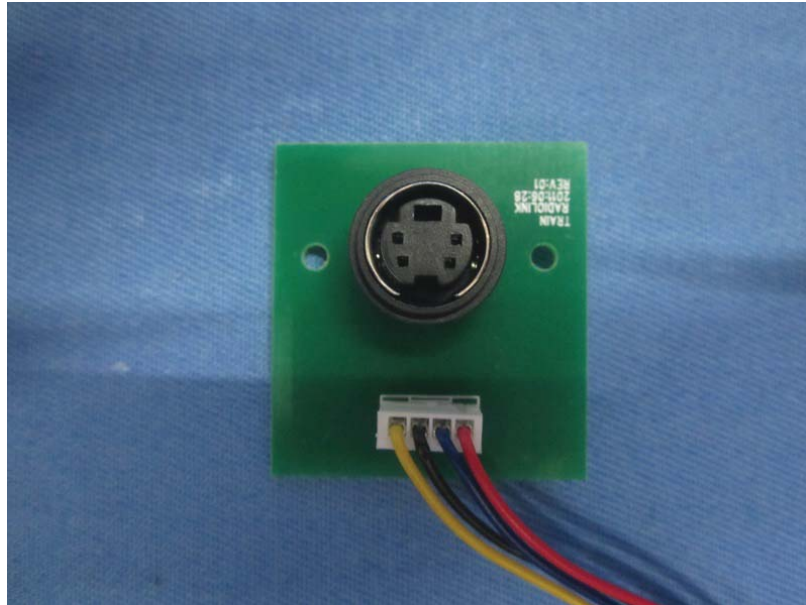












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