

FCC Report

Applicant: COLI BUILDING MATERIAL LIMITED

Address of Applicant: Warehouse9th,404, Ma'an Building, Xixiang Road,Baoan District, Shenzhen China

Equipment Under Test (EUT)

Product Name: UHF reader

Model No.: BM-0702

FCC ID: 2ADNEBM-0702

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

Date of sample receipt: September 24, 2014

Date of Test: November 17-20, 2014

Date of report issued: November 20, 2014

Test Result : PASS *

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

Authorized Signature:

A circular blue ink stamp from GTS Global United Technology Services Co., Ltd. is visible. The stamp contains the text "GTS", "GLOBAL TESTING", and "GLOBAL UNITED TECHNOLOGY SERVICES CO., LTD.". Overlaid on the stamp is a handwritten signature in blue ink, which appears to be "Robinson Lo".

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	November 20, 2014	Original

Prepared By:

Edward Pan

Date:

November 20, 2014

Project Engineer

Check By:

Hank Yan

Date:

November 20, 2014

Reviewer

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4 Test Summary

Test Item	Section	Result
Antenna Requirement	15.203/15.247 (c)	Pass
AC Power Line Conducted Emission	15.207	Pass
Conducted Peak Output Power	15.247 (b)(2)	Pass
20dB Occupied Bandwidth	15.247 (a)(1)	Pass
Carrier Frequencies Separation	15.247 (a)(1)(i)	Pass
Hopping Channel Number	15.247 (a)(1)(i)	Pass
Dwell Time	15.247 (a)(1)(i)	Pass
Pseudorandom Frequency Hopping Sequence	15.247(b)(4)&TCB Exclusion List (7 July 2002)	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.

5 General Information

5.1 Client Information

Applicant:	COLI BUILDING MATERIAL LIMITED
Address of Applicant:	Warehouse9th,404, Ma'an Building, Xixiang Road,Baoan District, Shenzhen China
Manufacturer:	COLI BUILDING MATERIAL LIMITED
Address of Manufacturer:	Warehouse9th,404, Ma'an Building, Xixiang Road,Baoan District, Shenzhen China
Factory:	COLI BUILDING MATERIAL LIMITED
Address of Factory:	Warehouse9th,404, Ma'an Building, Xixiang Road,Baoan District, Shenzhen China

5.2 General Description of EUT

Product Name:	UHF reader
Model No.:	BM-0702
Operation Frequency:	917.1MHz~926.9MHz
Channel numbers:	50
Modulation technology:	GFSK
Antenna Type:	Integral Antenna
Antenna gain:	12dBi
Power supply:	Adapter: Model No.: ZF120A-1501600 Input: AC 100-240V 1.0A 50/60Hz Output: DC 12V 2.0A

Operation Frequency each of channel							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	917.10	14	919.70	27	922.30	40	924.90
2	917.30	15	919.90	28	922.50	41	925.10
3	917.50	16	920.10	29	922.70	42	925.30
4	917.70	17	920.30	30	922.90	43	925.50
5	917.90	18	920.50	31	923.10	44	925.70
6	918.10	19	920.70	32	923.30	45	925.90
7	918.30	20	920.90	33	923.50	46	926.10
8	918.50	21	921.10	34	923.70	47	926.30
9	918.70	22	921.30	35	923.90	48	926.50
10	918.90	23	921.50	36	924.10	49	926.70
11	919.10	24	921.70	37	924.30	50	926.90
12	919.30	25	921.90	38	924.50		
13	919.50	26	922.10	39	924.70		

In section 15.31(m), regards to the operating frequency range over 1MHz but less than 10 MHz, the Lowest frequency and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The lowest channel	917.1MHz
The Highest channel	926.9MHz

5.3 Test mode

Transmitting mode	Keep the EUT in transmitting mode.
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5.4 Test Facility

<p>The test facility is recognized, certified, or accredited by the following organizations:</p> <ul style="list-style-type: none"> • CNAS —Registration No.: CNAS L5775 CNAS has accredited Global United Technology Services Co., Ltd. To ISO/IEC 17025 General Requirements for the competence of testing and calibration laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing. • FCC —Registration No.: 600491 Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 600491, June 28, 2013. • Industry Canada (IC) —Registration No.: 9079A-2 The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2, June 26, 2013.

5.5 Test Location

All other tests were performed at:
<p>Global United Technology Services Co., Ltd. Address: 2nd Floor, Block No.2, Laodong Industrial Zone, Xixiang Road Baoan District, Shenzhen, China Tel: 0755-27798480 Fax: 0755-27798960</p>

5.6 Other Information Requested by the Customer

None.

5.7 Description of Support Units

None.

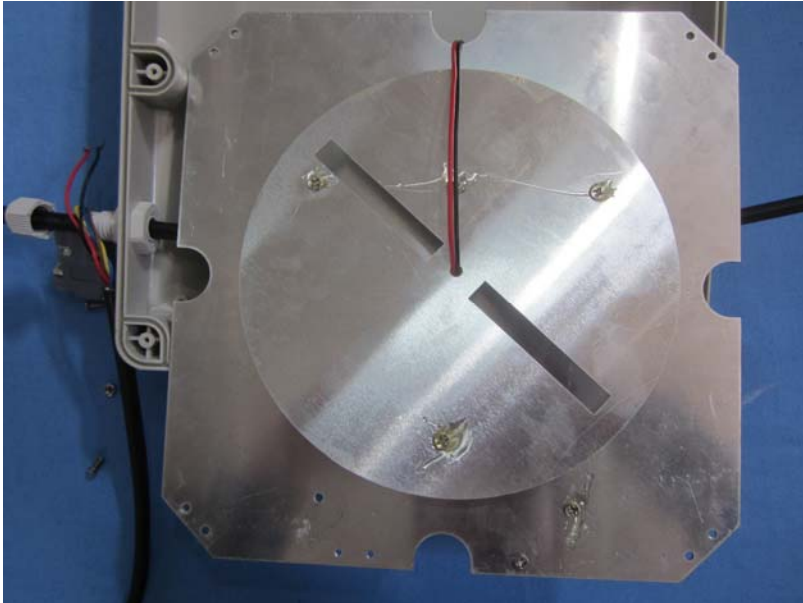
5.8 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	Mar. 29 2013	Mar. 28 2015
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	Spectrum Analyzer	Agilent	E4440A	GTS536	Nov. 19, 2014	Nov. 18, 2015
4	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	Jul. 05 2014	Jul. 04 2015
5	Loop Antenna	ZHINAN	ZN30900A	GTS534	Feb. 23 2014	Feb. 22 2015
6	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	Feb. 23 2014	Feb. 22 2015
7	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	Jul. 05 2014	Jul. 04 2015
8	Horn Antenna	ETS-LINDGREN	3160	GTS217	Mar. 29 2013	Mar. 28 2015
9	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
10	Coaxial Cable	GTS	N/A	GTS213	Mar. 29 2013	Mar. 28 2015
11	Coaxial Cable	GTS	N/A	GTS211	Mar. 29 2013	Mar. 28 2015
12	Coaxial cable	GTS	N/A	GTS210	Mar. 29 2013	Mar. 28 2015
13	Coaxial Cable	GTS	N/A	GTS212	Mar. 29 2013	Mar. 28 2015
14	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	Jul. 05 2014	Jul. 04 2015
15	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	Jul. 05 2014	Jul. 04 2015
16	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	Jul. 05 2014	Jul. 04 2015
17	Band filter	Amindeon	82346	GTS219	Mar. 29 2013	Mar. 28 2015

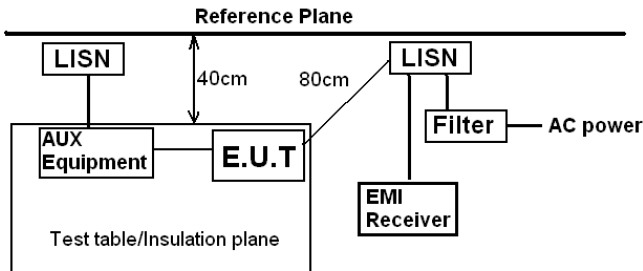
Conducted Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Shielding Room	ZhongYu Electron	7.0(L)x3.0(W)x3.0(H)	GTS264	July 01 2014	June 30 2015
2	EMI Test Receiver	Rohde & Schwarz	ESCS30	GTS223	July 01 2014	June 30 2015
3	10dB Pulse Limita	Rohde & Schwarz	N/A	GTS224	July 01 2014	June 30 2015
4	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	July 01 2014	June 30 2015
5	LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	GTS226	July 01 2014	June 30 2015
6	Coaxial Cable	GTS	N/A	GTS227	July 01 2014	June 30 2015
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A

6 Test results and Measurement Data

6.1 Antenna requirement

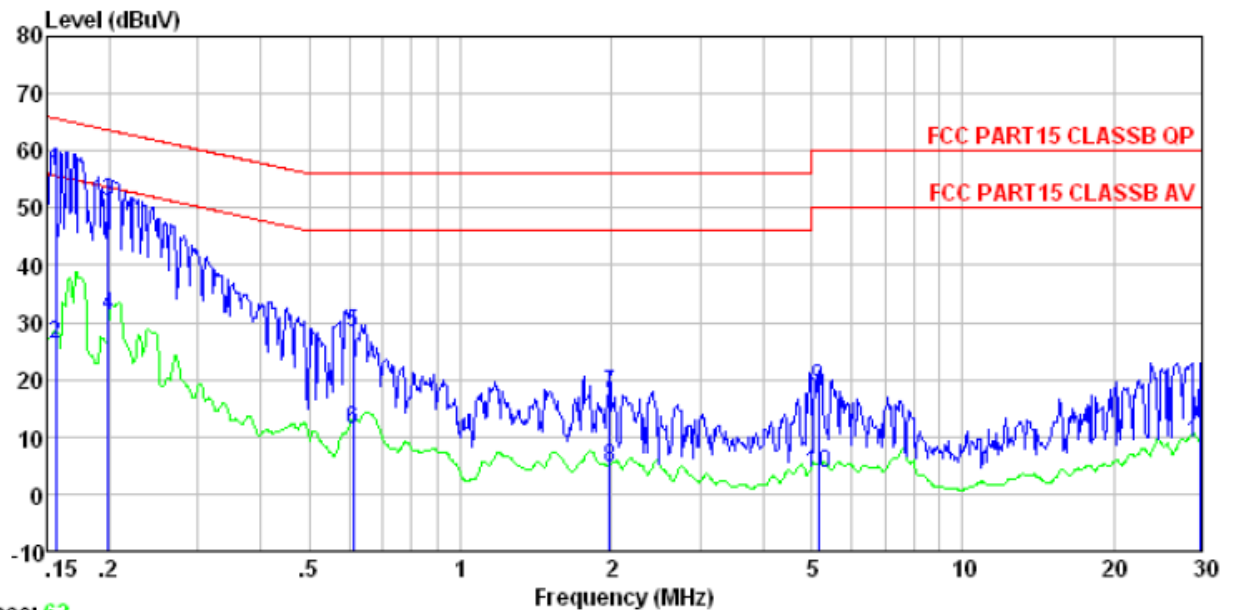
Standard requirement:	FCC Part15 C Section 15.203 /247(c)
<p>15.203 requirement:</p> <p>An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that 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 (b)(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.</p>	
EUT Antenna:	
<p><i>The antenna is integral Antenna, the best case gain of the antenna is 12dBi</i></p> 	

6.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207															
Test Method:	ANSI C63.4:2003															
Test Frequency Range:	150KHz to 30MHz															
Class / Severity:	Class B															
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto															
Limit:	<table border="1"> <thead> <tr> <th rowspan="2">Frequency range (MHz)</th><th colspan="2">Limit (dBuV)</th></tr> <tr> <th>Quasi-peak</th><th>Average</th></tr> </thead> <tbody> <tr> <td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr> <tr> <td>0.5-5</td><td>56</td><td>46</td></tr> <tr> <td>5-30</td><td>60</td><td>50</td></tr> </tbody> </table> <p>* Decreases with the logarithm of the frequency.</p>		Frequency range (MHz)	Limit (dBuV)		Quasi-peak	Average	0.15-0.5	66 to 56*	56 to 46*	0.5-5	56	46	5-30	60	50
Frequency range (MHz)	Limit (dBuV)															
	Quasi-peak	Average														
0.15-0.5	66 to 56*	56 to 46*														
0.5-5	56	46														
5-30	60	50														
Test setup:	 <p>Remark: E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p>															
Test procedure:	<ol style="list-style-type: none"> 1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2003 on conducted measurement. 															
Test Instruments:	Refer to section 6.0 for details															
Test mode:	Refer to section 5.3 for details															
Test results:	Pass															

Measurement data

Line:



Trace: 62

Condition : FCC PART15 CLASSB QP LISN-2013 LINE

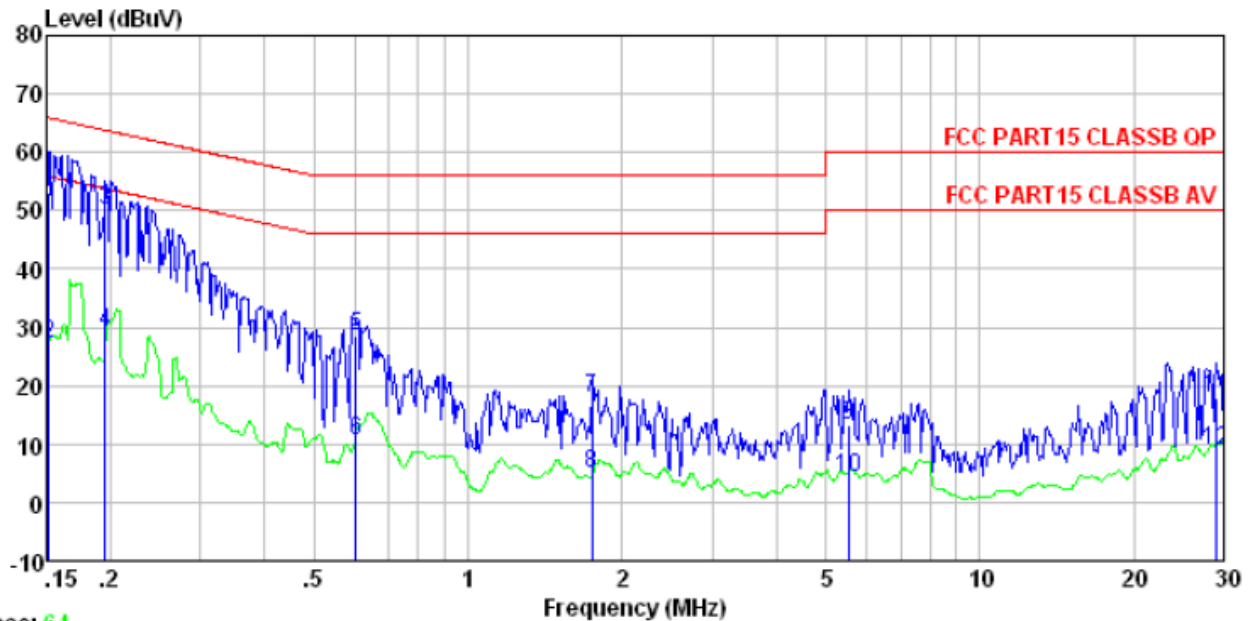
Job No. : 1658RF

Test mode : Transmitting mode

Test Engineer: Mike

	Freq	Read Level	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.156	56.00	0.12	56.27	65.65	-9.38	QP
2	0.156	26.00	0.12	26.27	55.65	-29.38	Average
3	0.199	50.93	0.13	51.20	63.67	-12.47	QP
4	0.199	30.93	0.13	31.20	53.67	-22.47	Average
5	0.611	27.93	0.12	28.18	56.00	-27.82	QP
6	0.611	10.93	0.12	11.18	46.00	-34.82	Average
7	1.980	17.21	0.14	17.47	56.00	-38.53	QP
8	1.980	4.21	0.14	4.47	46.00	-41.53	Average
9	5.166	18.24	0.15	18.60	60.00	-41.40	QP
10	5.166	3.24	0.15	3.60	50.00	-46.40	Average
11	29.684	17.92	0.24	18.90	60.00	-41.10	QP
12	29.684	7.92	0.24	8.90	50.00	-41.10	Average

Neutral:



Trace: 64

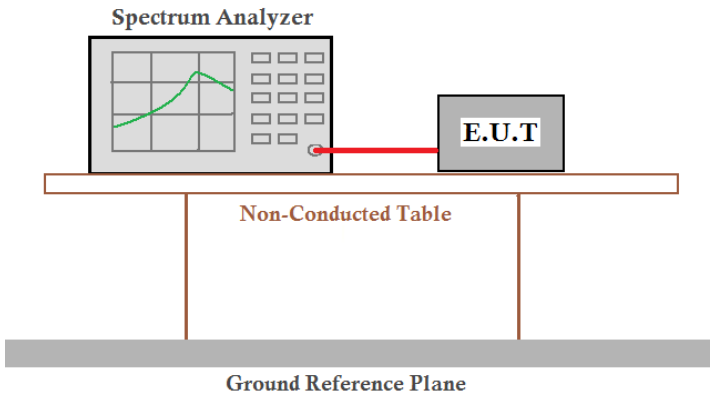
Condition : FCC PART15 CLASSB QP LISN-2013 NEUTRAL
 Job No. : 1658RF
 Test mode : Transmitting mode
 Test Engineer: Mike

	Freq	Read Level	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.152	53.01	0.12	53.20	65.91	-12.71	QP
2	0.152	27.01	0.12	27.20	55.91	-28.71	Average
3	0.195	49.91	0.13	50.11	63.80	-13.69	QP
4	0.195	28.91	0.13	29.11	53.80	-24.69	Average
5	0.604	28.40	0.12	28.59	56.00	-27.41	QP
6	0.604	10.40	0.12	10.59	46.00	-35.41	Average
7	1.744	17.55	0.14	17.78	56.00	-38.22	QP
8	1.744	4.55	0.14	4.78	46.00	-41.22	Average
9	5.535	13.08	0.15	13.39	60.00	-46.61	QP
10	5.535	4.08	0.15	4.39	50.00	-45.61	Average
11	29.061	16.82	0.24	17.78	60.00	-42.22	QP
12	29.061	7.82	0.24	8.78	50.00	-41.22	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

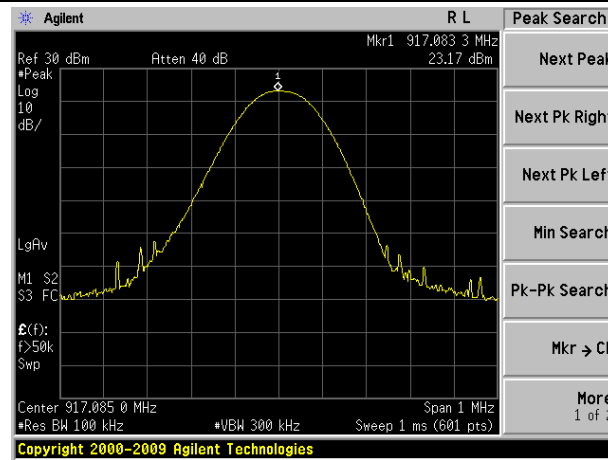
6.3 Conducted Peak Output Power

Test Requirement:	FCC Part15 C Section 15.247 (b)(2) & (b)(4)
Test Method:	DA 00-705, ANSI C63.4:2003
Limit:	24dBm
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 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

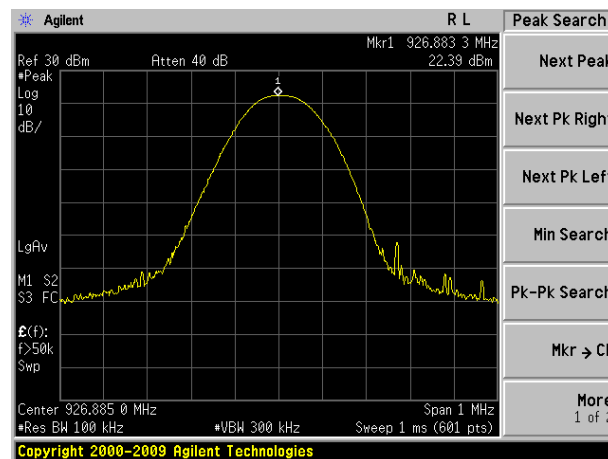
Measurement Data

Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	23.17	24.00	Pass
Highest	22.39		

Test plot as follows:

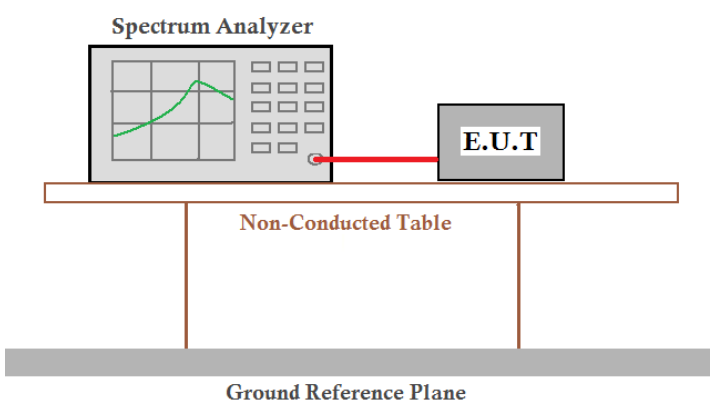


Lowest channel



Highest channel

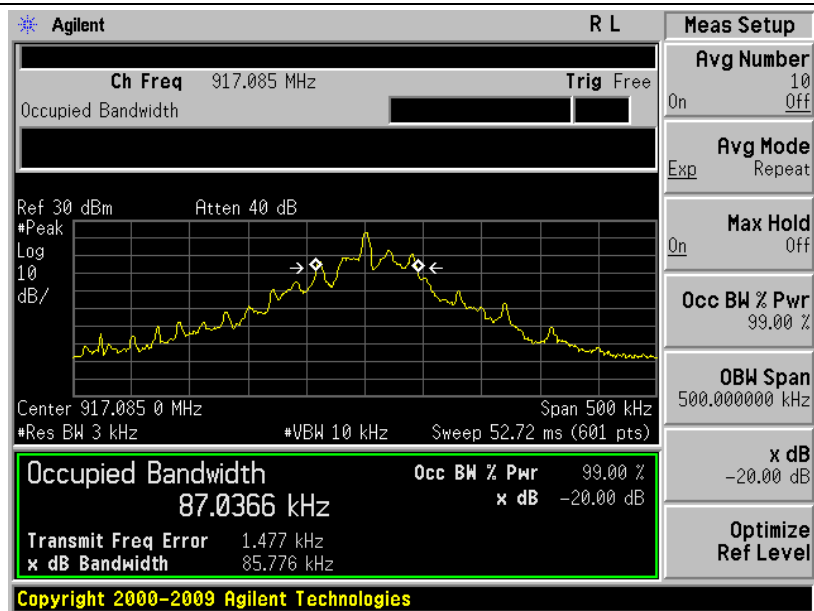
6.4 20dB Emission Bandwidth

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)(i)
Test Method:	DA 00-705, ANSI C63.4:2003
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 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

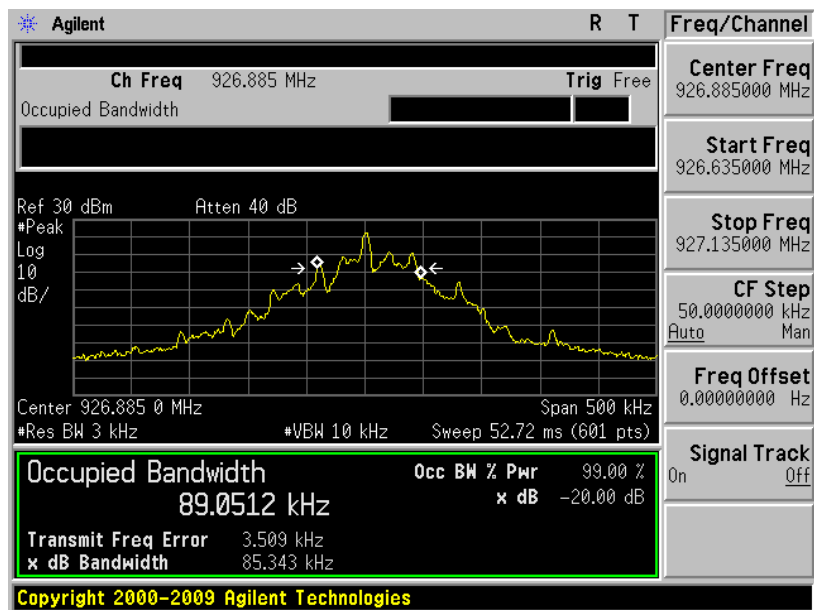
Measurement Data

Test channel	20dB Emission Bandwidth (kHz)	Result
Lowest	85.776	Pass
Highest	85.343	

Test plot as follows:

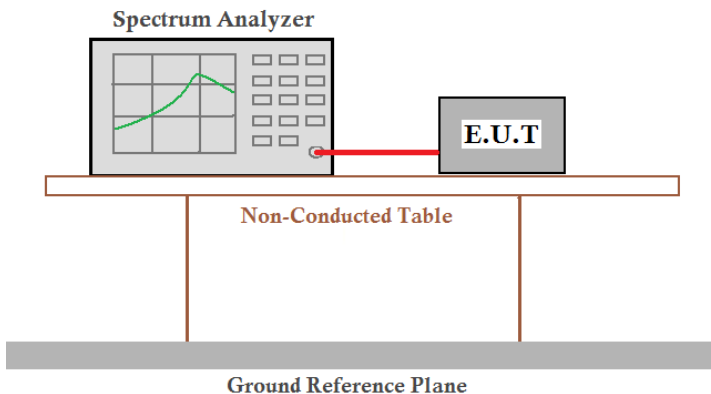


Lowest channel



Highest channel

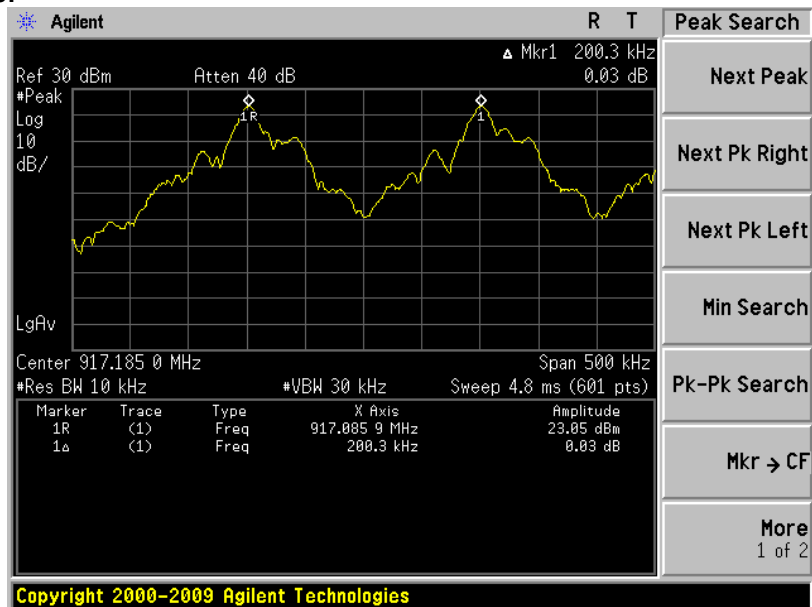
6.5 Carrier Frequencies Separation

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)
Test Method:	DA 00-705, ANSI C63.4:2003
Receiver setup:	RBW=100KHz, VBW=300KHz, detector=Peak
Limit:	$\geq 0.025\text{MHz}$ or 20dB bandwidth (whichever is greater)
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 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

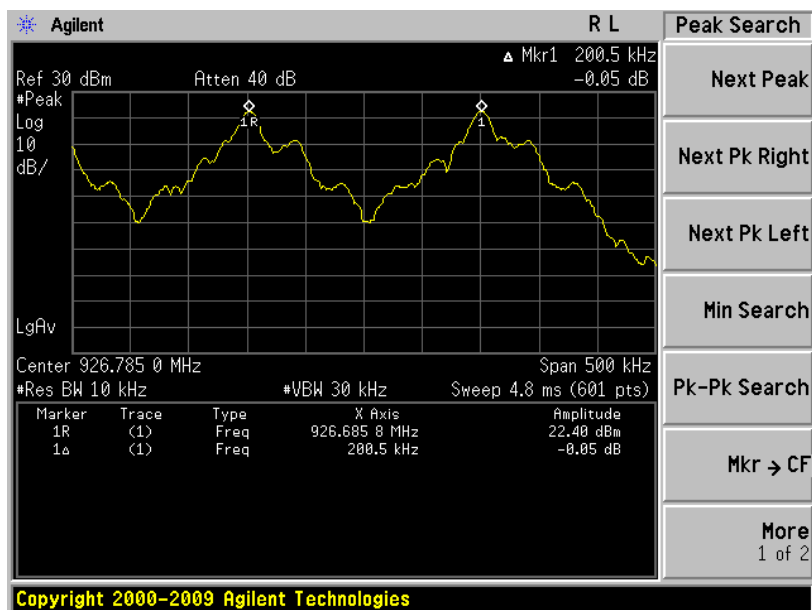
Measurement Data

Test channel	Carrier Frequencies Separation (kHz)	Limit (kHz)	Result
Lowest	200.3	≥ 85.776	Pass
Highest	200.5	≥ 85.343	Pass

Test plot as follows:

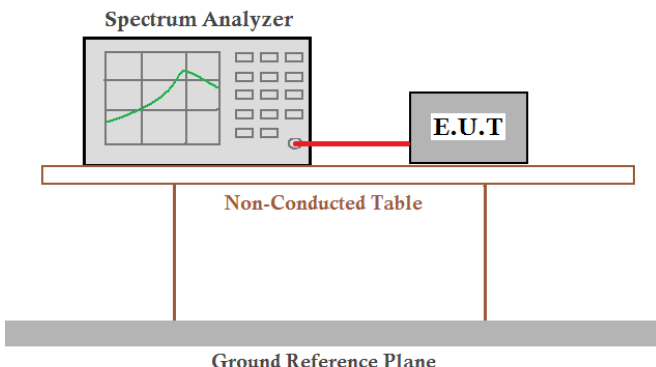


Lowest channel



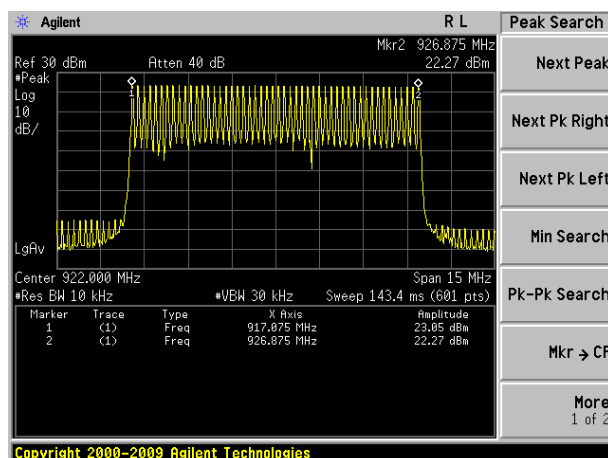
Highest channel

6.6 Hopping Channel Number

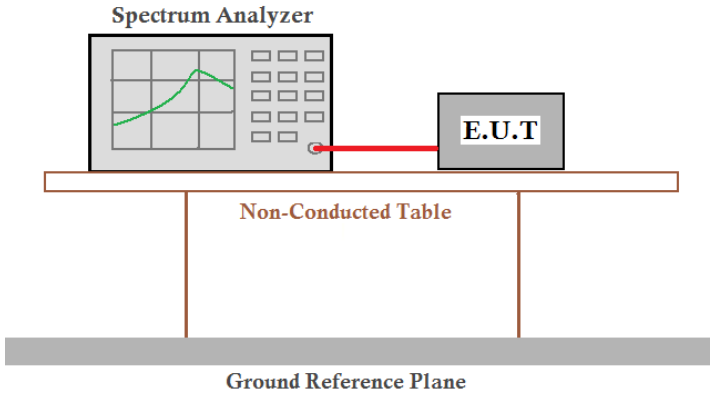
Test Requirement:	FCC Part15 C Section 15.247 (a)(1)(i)
Test Method:	DA 00-705, ANSI C63.4:2003
Receiver setup:	RBW=100kHz, VBW=300kHz, Detector=Peak
Limit:	If the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 50 channel
Test setup:	 <p>The diagram illustrates the test setup. 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. Below the table is a Ground Reference Plane.</p>
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement Data:

Hopping channel numbers	Limit	Result
50	≥ 50	Pass



6.7 Dwell Time

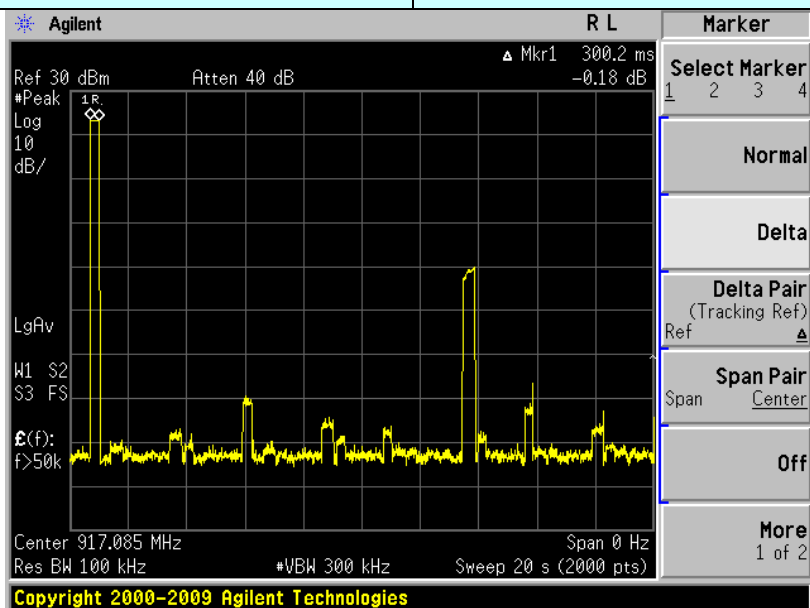
Test Requirement:	FCC Part15 C Section 15.247 (a)(1)(i)
Test Method:	DA 00-705, ANSI C63.4:2003
Receiver setup:	RBW=100kHz, VBW=300kHz, Span=0Hz, Detector=Peak
Limit:	If the 20 dB bandwidth of the hopping channel is less than 250 kHz, the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10s period.
Test setup:	 <p>The diagram shows a Spectrum Analyzer and an E.U.T. (Equipment Under Test) connected by a red cable. They are both placed on a table labeled 'Non-Conducted Table'. Below the table is a 'Ground Reference Plane'.</p>
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement Data

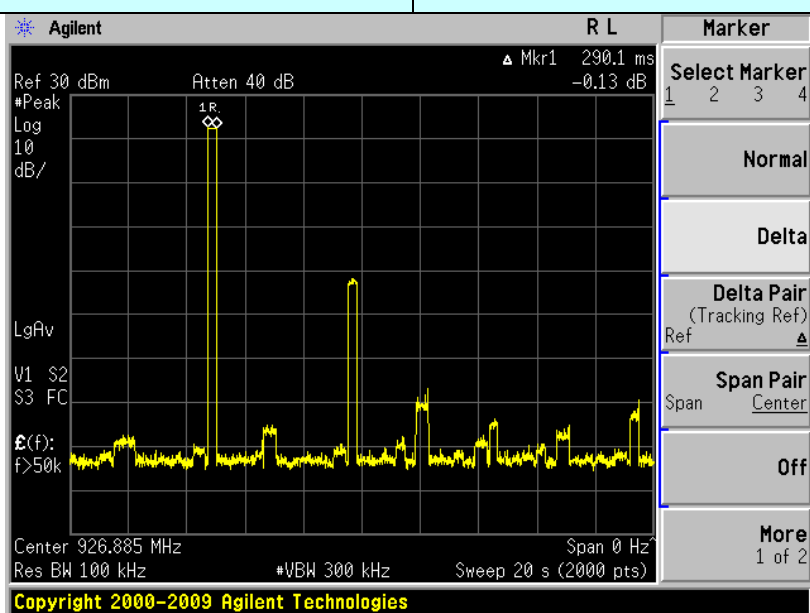
Frequency (MHz)	Ton (ms)	Observe time(s)	Limit(ms)	Result
917.10	300.2	20	400	Pass
926.90	290.1	20	400	Pass

Test plot as follows:

Frequency:	917.1MHz
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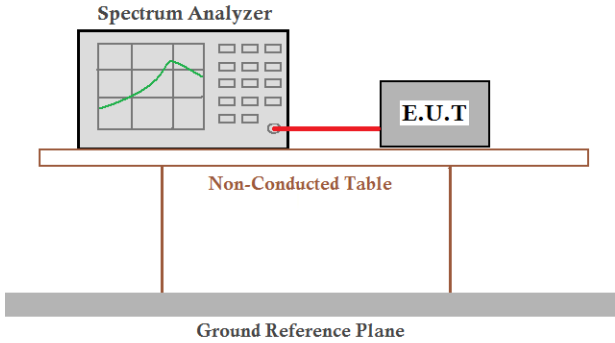


Frequency:	926.9MHz
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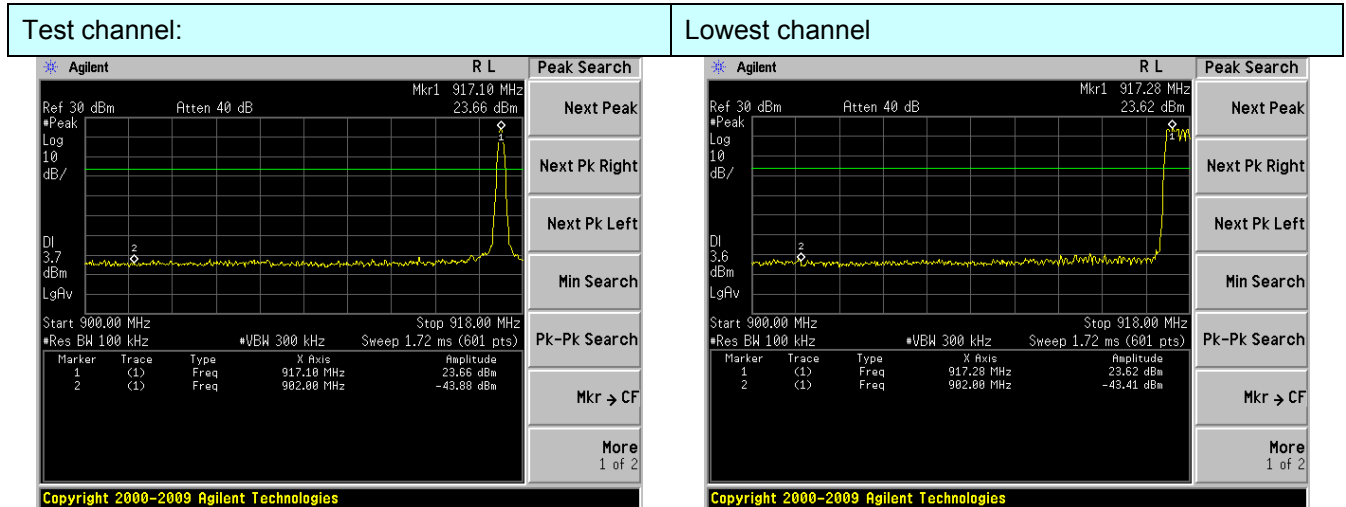


6.8 Band Edge

6.8.1 Conducted Emission Method

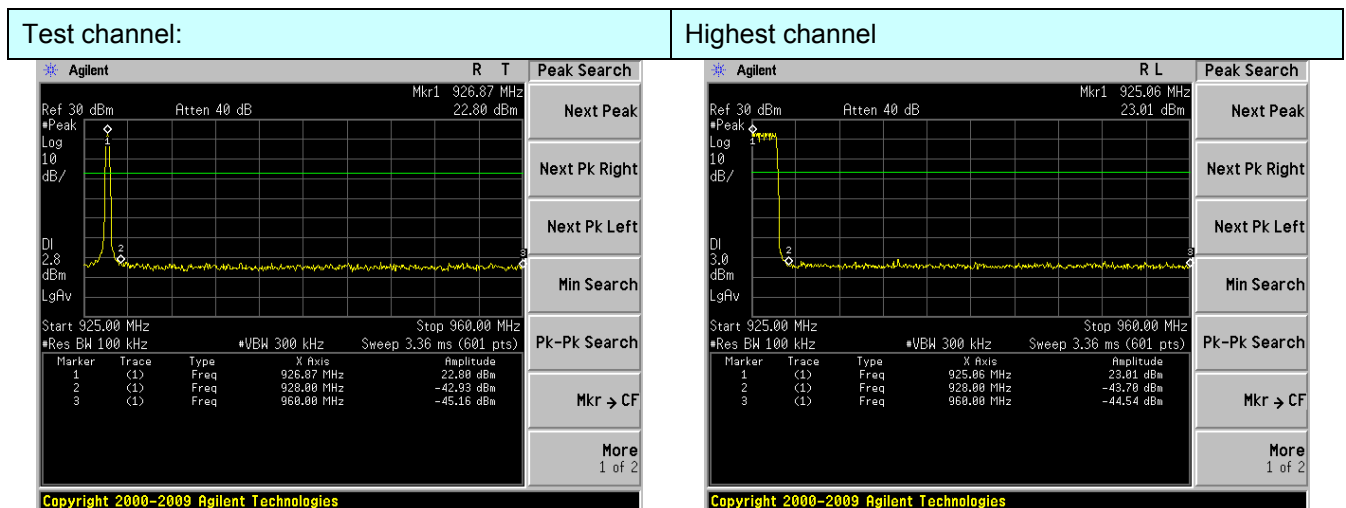
Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	DA 00-705, ANSI C63.4:2003
Receiver setup:	RBW=100kHz, VBW=300kHz, Detector=Peak
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is 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 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 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Test plot as follows:



No-hopping mode

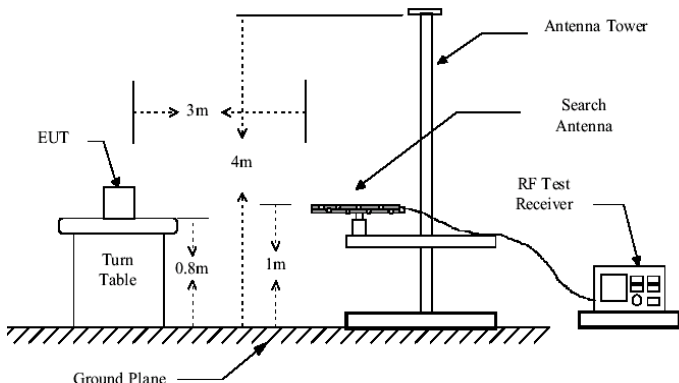
Hopping mode



No-hopping mode

Hopping mode

6.8.2 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.247, 15.209 and 15.205				
Test Method:	ANSI C63.4: 2003				
Test Frequency Range:	All restriction band have been tested, and only worse case is reported				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	Below 1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak
Limit:	Frequency		Limit (dBuV/m @3m)		Remark
	216MHz ~ 960MHz		46.00		Quasi-peak
Test setup:					
Test Procedure:	<ol style="list-style-type: none">1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.				
Test Instruments:	Refer to section 5.8 for details				
Test mode:	Refer to section 5.3 for details				
Test results:	Pass				

Remark:

1. Pre-scan all kind of the antenna place mode (360°), only the worst case is reported.

Test channel:	Lowest
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Quasi-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
902.00	46.68	23.12	4.87	31.18	43.49	46.00	-2.51	Horizontal
902.00	42.51	23.12	4.87	31.18	39.32	46.00	-6.68	Vertical

Test channel:	Highest
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Quasi-peak value:

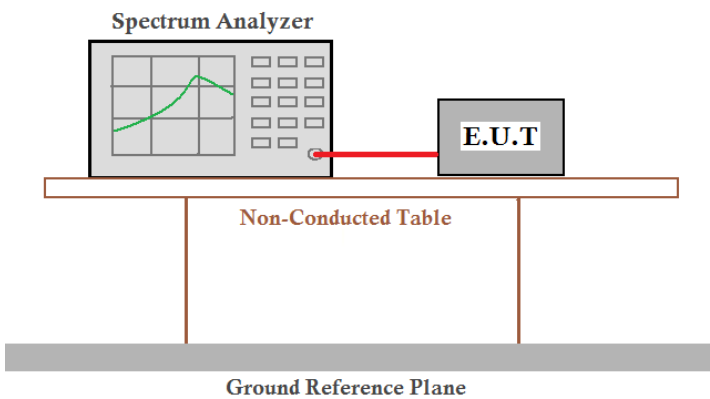
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
928.00	47.03	23.28	4.96	31.20	44.07	46.00	-1.93	Horizontal
928.00	42.88	23.28	4.96	31.20	39.92	46.00	-6.08	Vertical

Remark:

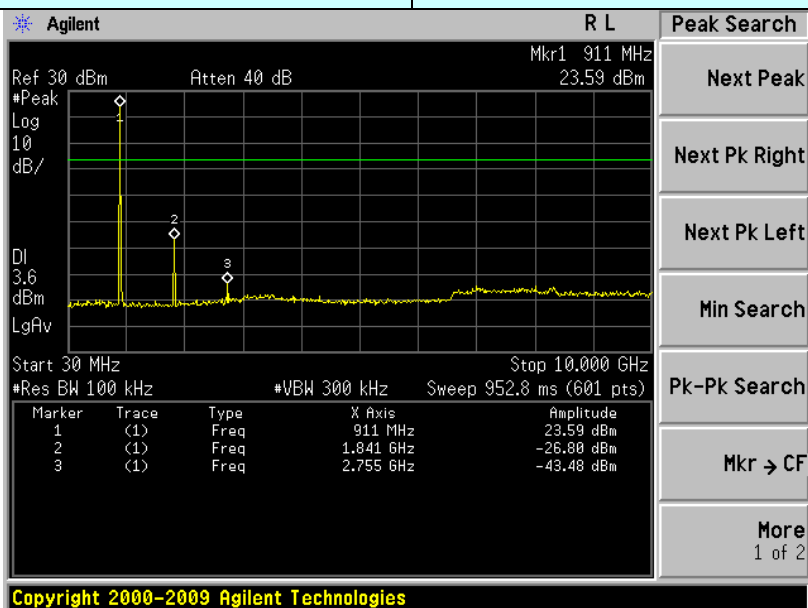
1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

6.9 Spurious Emission

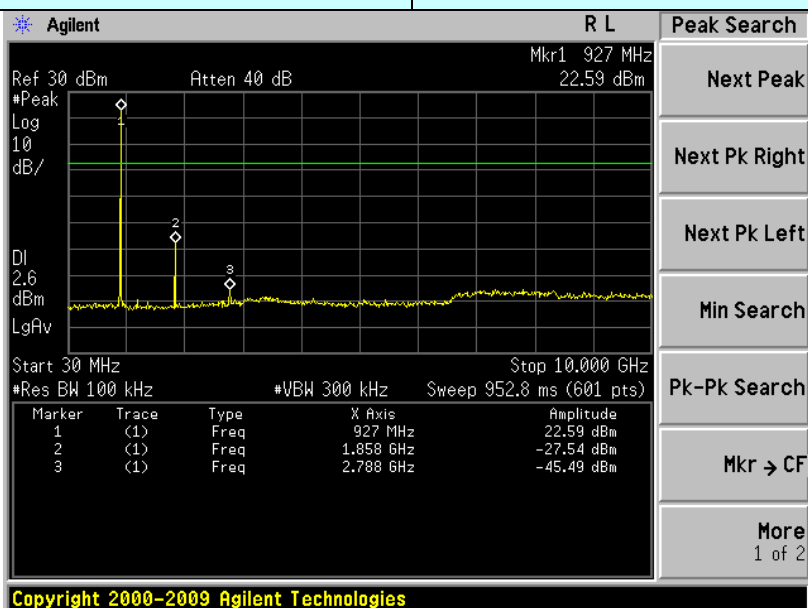
6.9.1 Conducted Emission Method

Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	ANSI C63.4:2003
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 emissions. A Spectrum Analyzer is connected to an Equipment Under Test (E.U.T.) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by two vertical legs and sits on a Ground Reference Plane.</p>
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

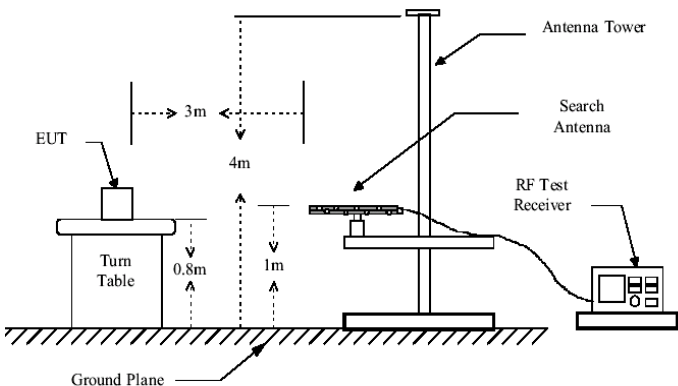
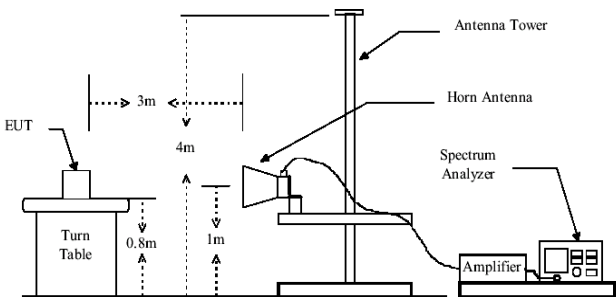
Test channel:	Lowest channel
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Test channel:	Highest channel
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6.9.2 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209				
Test Method:	ANSI C63.4: 2003				
Test Frequency Range:	30MHz to 10GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Value
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
		Peak	1MHz	10Hz	Average
Test setup:	<p>Below 1GHz</p> 				
	<p>Above 1GHz</p> 				
Test Procedure:	<ol style="list-style-type: none"> 1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 				

	<p>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</p> <p>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.</p>
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Remark:

1. Pre-scan all kind of the antenna place mode (360°), only the worst case is 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
36.77	52.42	14.77	0.63	32.06	35.76	40.00	-4.24	Vertical
52.76	51.52	15.12	0.80	31.95	35.49	40.00	-4.51	Vertical
91.18	51.37	14.16	1.12	31.72	34.93	43.50	-8.57	Vertical
137.90	54.79	10.35	1.49	31.94	34.69	43.50	-8.81	Vertical
454.31	45.21	17.58	3.11	31.70	34.20	46.00	-11.80	Vertical
782.35	46.17	21.82	4.40	31.30	41.09	46.00	-4.91	Vertical
55.81	46.49	14.97	0.82	31.95	30.33	40.00	-9.67	Horizontal
80.08	52.02	10.54	1.03	31.76	31.83	40.00	-8.17	Horizontal
87.11	48.12	13.03	1.09	31.73	30.51	40.00	-9.49	Horizontal
142.82	52.00	10.21	1.52	31.95	31.78	43.50	-11.72	Horizontal
191.75	45.37	12.56	1.80	32.12	27.61	43.50	-15.89	Horizontal
699.31	39.88	20.80	4.08	31.19	33.57	46.00	-12.43	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
1834.20	68.21	25.45	4.88	34.17	64.37	74.00	-9.63	Vertical
2751.30	58.07	28.26	5.72	33.61	58.44	74.00	-15.56	Vertical
3668.40	54.85	29.20	7.27	32.56	58.76	74.00	-15.24	Vertical
4585.50	37.05	31.49	8.41	31.98	44.97	74.00	-29.03	Vertical
5502.60	31.01	31.98	9.51	32.43	40.07	74.00	-33.93	Vertical
6419.70	33.56	33.49	10.78	32.12	45.71	74.00	-28.29	Vertical
7336.80	29.65	36.41	11.72	31.88	45.90	74.00	-28.10	Vertical
8253.90	29.37	36.76	12.51	31.77	46.87	74.00	-27.13	Vertical
9171.00	30.29	37.34	13.80	32.11	49.32	74.00	-24.68	Vertical
1834.20	64.49	25.45	4.88	34.17	60.65	74.00	-13.35	Horizontal
2751.30	57.66	28.26	5.72	33.61	58.03	74.00	-15.97	Horizontal
3668.40	50.76	29.20	7.27	32.56	54.67	74.00	-19.33	Horizontal
4585.50	33.59	31.49	8.41	31.98	41.51	74.00	-32.49	Horizontal
5502.60	31.57	31.98	9.51	32.43	40.63	74.00	-33.37	Horizontal
6419.70	32.47	33.49	10.78	32.12	44.62	74.00	-29.38	Horizontal
7336.80	30.71	36.41	11.72	31.88	46.96	74.00	-27.04	Horizontal
8253.90	30.25	36.76	12.51	31.77	47.75	74.00	-26.25	Horizontal
9171.00	30.56	37.34	13.80	32.11	49.59	74.00	-24.41	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
1834.20	56.43	25.45	4.88	34.17	52.59	54.00	-1.41	Vertical
2751.30	48.27	28.26	5.72	33.61	48.64	54.00	-5.36	Vertical
3668.40	44.76	29.20	7.27	32.56	48.67	54.00	-5.33	Vertical
4585.50	*				*	54.00	*	Vertical
5502.60	*				*	54.00	*	Vertical
6419.70	*				*	54.00	*	Vertical
7336.80	*				*	54.00	*	Vertical
8253.90	*				*	54.00	*	Vertical
9171.00	*				*	54.00	*	Vertical
1834.20	53.89	25.45	4.88	34.17	50.05	54.00	-3.95	Horizontal
2751.30	46.73	28.26	5.72	33.61	47.10	54.00	-6.90	Horizontal
3668.40	40.14	29.20	7.27	32.56	44.05	54.00	-9.95	Horizontal
4585.50	*				*	54.00	*	Horizontal
5502.60	*				*	54.00	*	Horizontal
6419.70	*				*	54.00	*	Horizontal
7336.80	*				*	54.00	*	Horizontal

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *(*)The test result on peak is lower than average limit, then average measurement needn't be performed.*

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
1853.80	64.89	25.54	4.89	34.20	61.12	74.00	-12.88	Vertical
2780.70	52.30	28.37	5.74	33.57	52.84	74.00	-21.16	Vertical
3707.60	54.13	29.25	7.34	32.52	58.20	74.00	-15.80	Vertical
4634.50	38.81	31.57	8.46	32.01	46.83	74.00	-27.17	Vertical
5561.40	33.02	32.13	9.61	32.40	42.36	74.00	-31.64	Vertical
6488.30	30.73	33.64	10.88	32.15	43.10	74.00	-30.90	Vertical
7415.20	29.92	36.56	11.77	31.81	46.44	74.00	-27.56	Vertical
8342.10	29.06	36.50	12.66	31.94	46.28	74.00	-27.72	Vertical
9269.00	28.88	37.44	13.86	31.99	48.19	74.00	-25.81	Vertical
1853.80	62.03	25.54	4.89	34.20	58.26	74.00	-15.74	Horizontal
2780.70	53.20	28.37	5.74	33.57	53.74	74.00	-20.26	Horizontal
3707.60	47.40	29.25	7.34	32.52	51.47	74.00	-22.53	Horizontal
4634.50	35.55	31.57	8.46	32.01	43.57	74.00	-30.43	Horizontal
5561.40	31.99	32.13	9.61	32.40	41.33	74.00	-32.67	Horizontal
6488.30	30.08	33.64	10.88	32.15	42.45	74.00	-31.55	Horizontal
7415.20	30.77	36.56	11.77	31.81	47.29	74.00	-26.71	Horizontal
8342.10	28.83	36.50	12.66	31.94	46.05	74.00	-27.95	Horizontal

Average value:

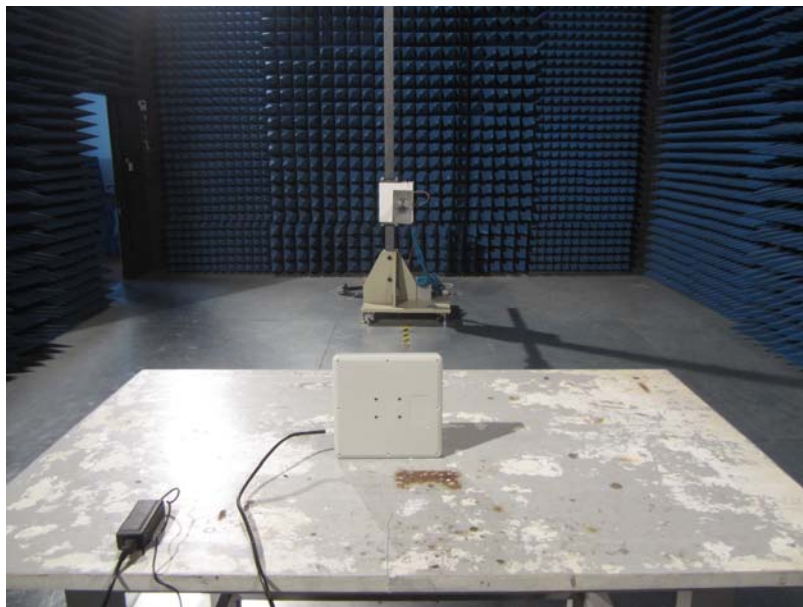
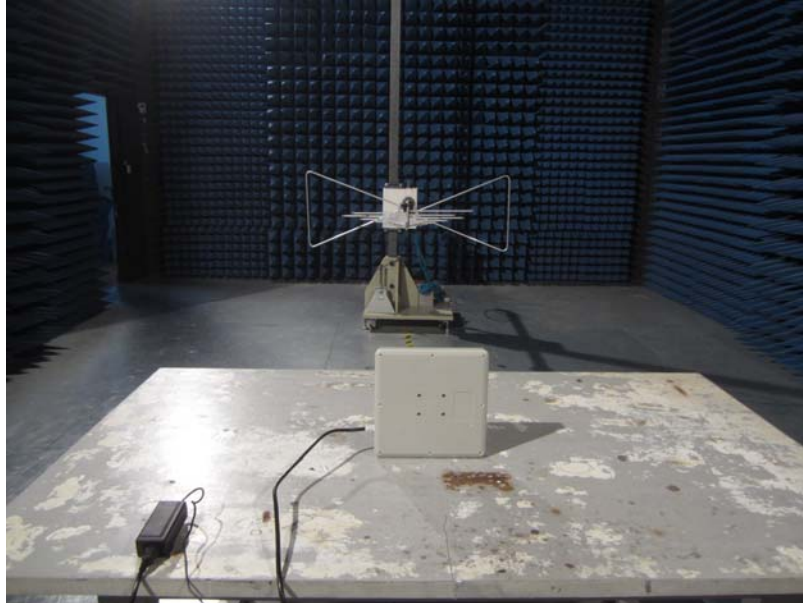
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1853.80	51.57	25.54	4.89	34.20	47.80	54.00	-6.20	Vertical
2780.70	42.08	28.37	5.74	33.57	42.62	54.00	-11.38	Vertical
3707.60	43.47	29.25	7.34	32.52	47.54	54.00	-6.46	Vertical
4634.50	*				*	54.00	*	Vertical
5561.40	*				*	54.00	*	Vertical
6488.30	*				*	54.00	*	Vertical
7415.20	*				*	54.00	*	Vertical
8342.10	*				*	54.00	*	Vertical
9269.00	*				*	54.00	*	Vertical
1853.80	50.15	25.54	4.89	34.20	46.38	54.00	-7.62	Horizontal
2780.70	*				*	54.00	*	Horizontal
3707.60	*				*	54.00	*	Horizontal
4634.50	*				*	54.00	*	Horizontal
5561.40	*				*	54.00	*	Horizontal
6488.30	*				*	54.00	*	Horizontal
7415.20	*				*	54.00	*	Horizontal

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *(*)The test result on peak is lower than average limit, then average measurement needn't be performed.*

7 Test Setup Photo

Radiated Emission

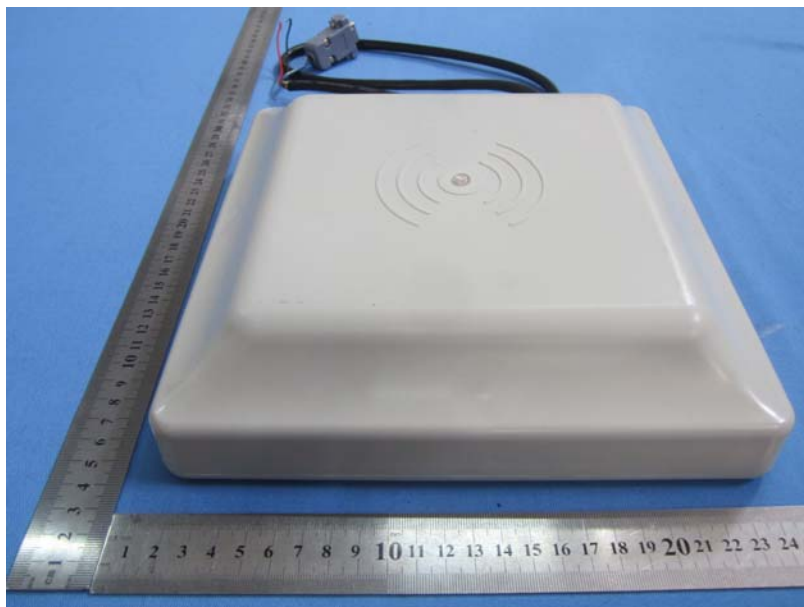
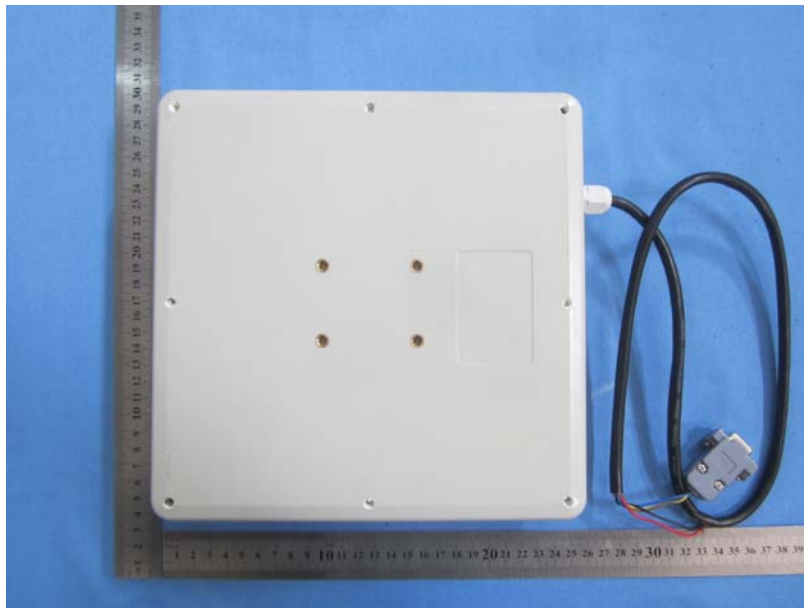


Conducted Emissions

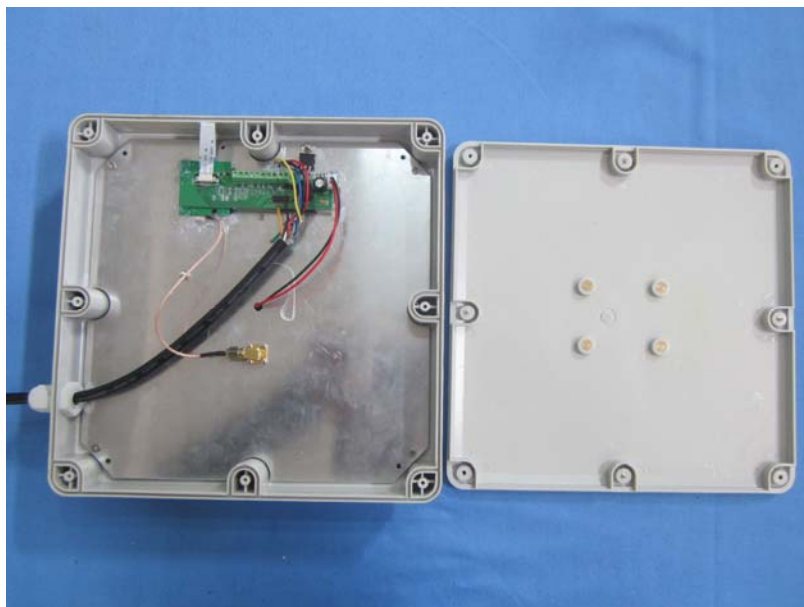


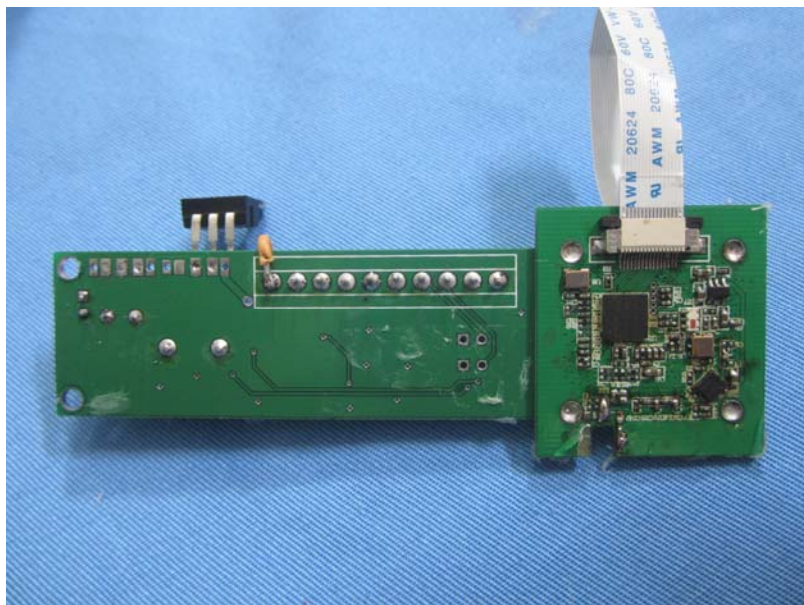
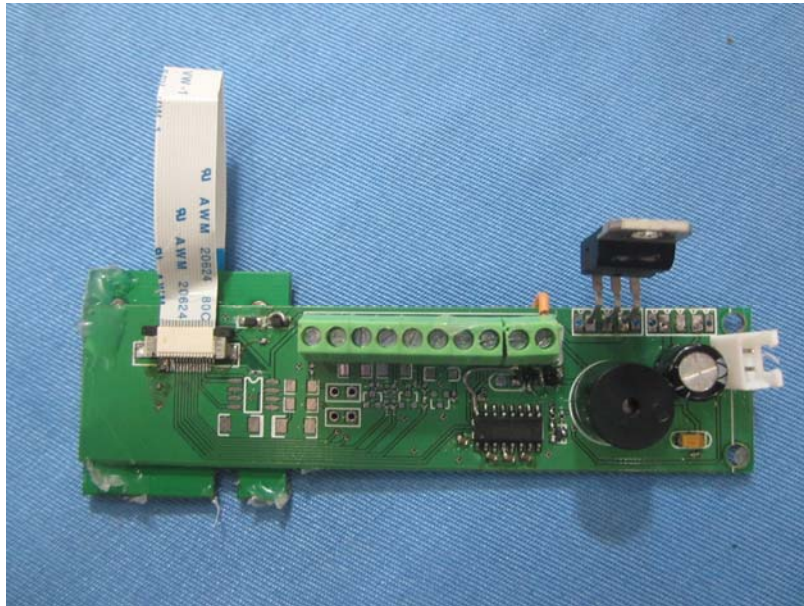
8 EUT Constructional Details

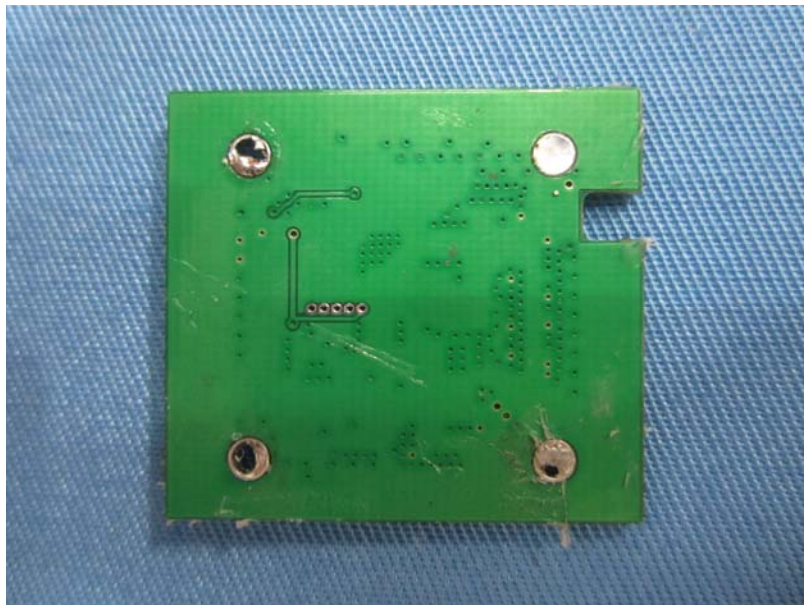
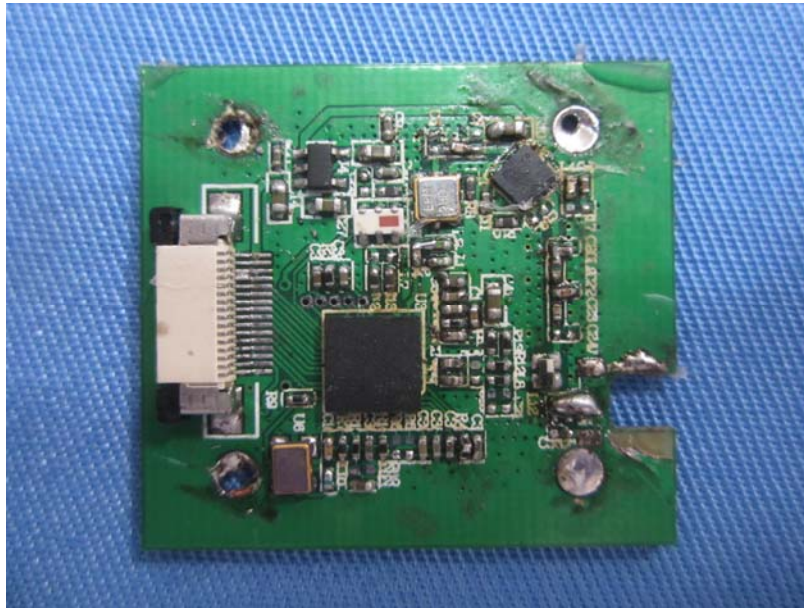


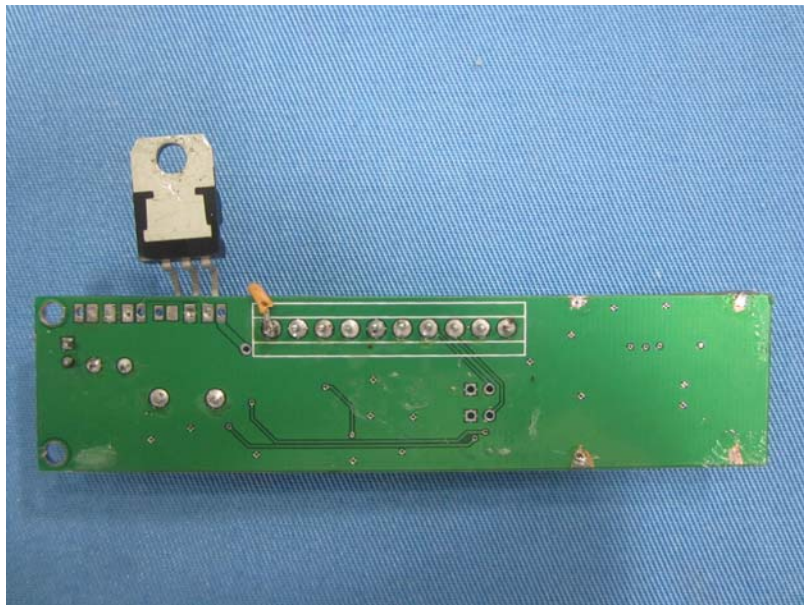
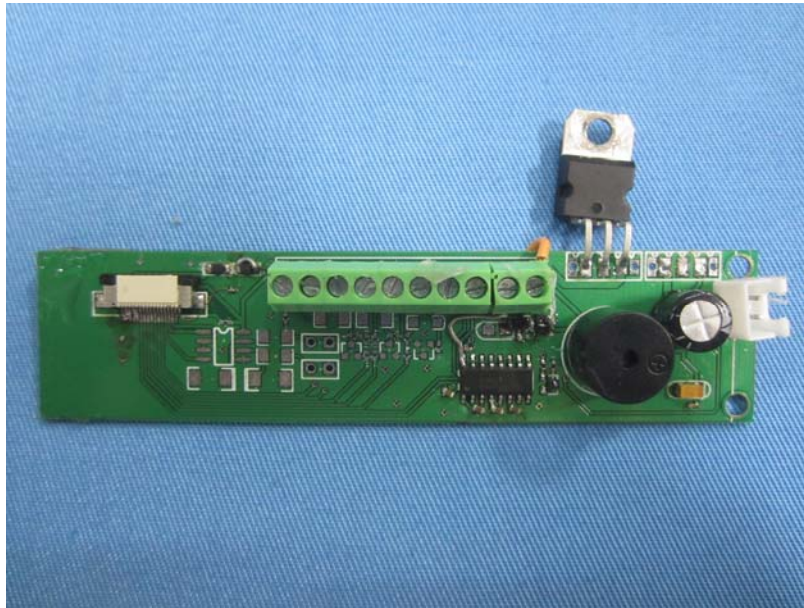














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