

FCC REPORT

(RFID)

Applicant: Shenzhen RodinBell Technology Co., Ltd.

Address of Applicant: 905#, Tower B, Xinghe WORLD, Wuhe Avenue, Longgang District, Shenzhen City, PRC

Equipment Under Test (EUT)

Product Name: D-100 UHF RFID Desktop Reader

Model No.: D-100

FCC ID: 2AKQD-D100

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

Date of sample receipt: 08 Jun., 2017

Date of Test: 08 Jun., to 12 Jul., 2017

Date of report issued: 12 Jul., 2017

Test Result: PASS*

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

Authorized Signature:



Bruce Zhang
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 CCIS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

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2 Version

Version No.	Date	Description
00	12 Jul., 2017	Original

Tested by:

Carry Chen
Test Engineer

Date:

12 Jul., 2017

Reviewed by:

Ryan Lee
Project Engineer

Date:

12 Jul., 2017

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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)(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
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:	Shenzhen RodinBell Technology Co., Ltd.
Address:	905#, Tower B, Xinghe WORLD, Wuhe Avenue, Longgang District, Shenzhen City, PRC
Manufacturer:	Shenzhen RodinBell Technology Co., Ltd.
Address:	905#, Tower B, Xinghe WORLD, Wuhe Avenue, Longgang District, Shenzhen City, PRC

5.2 General Description of E.U.T.

Product Name:	D-100 UHF RFID Desktop Reader
Model No.:	D-100
Operation Frequency:	902MHz~928MHz
Number of channel:	50
Modulation type:	GFSK
Modulation technology:	FHSS
Antenna Type:	Ceramic antenna
Antenna gain:	2.0dBi
Power supply:	AC 120V

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
0	902.5 MHz	13	908.61 MHz	26	914.72 MHz	39	921.3 MHz
1	902.97 MHz	14	909.08 MHz	27	915.19 MHz	40	921.77 MHz
2	903.44 MHz	15	909.55 MHz	28	915.66 MHz	41	922.24 MHz
3	903.91 MHz	16	910.02 MHz	29	916.13 MHz	42	922.71 MHz
4	904.38 MHz	17	910.49 MHz	30	916.6 MHz	43	923.18 MHz
5	904.85 MHz	18	910.96 MHz	31	917.07 MHz	44	923.65 MHz
6	905.32 MHz	19	911.43 MHz	32	917.54 MHz	45	924.12 MHz
7	905.79 MHz	20	911.9 MHz	33	918.01 MHz	46	924.59 MHz
8	906.26 MHz	21	912.37 MHz	34	918.48 MHz	47	925.06 MHz
9	906.73 MHz	22	912.84 MHz	35	918.95 MHz	48	925.53 MHz
10	907.2 MHz	23	913.31 MHz	36	919.42 MHz	49	926 MHz
11	907.67 MHz	24	913.78 MHz	37	919.89 MHz		
12	908.14 MHz	25	914.25 MHz	38	920.36 MHz		
Remark: Channel 0, 25 & 49 selected for tested.							

5.3 Test mode

Test mode 1 (TM 1)	Keep the EUT in continuous transmitting mode with 100% duty cycle.
Test mode 2 (TM 2)	Keep the EUT in hopping mode.
The sample was considered typical configuration to obtain the worst position	

5.4 Measurement Uncertainty

Items	Expanded Uncertainty (Confidence of 95%)
Conducted Emission (9kHz ~ 30MHz)	2.14 dB (k=2)
Radiated Emission (9kHz ~ 30MHz)	4.24 dB (k=2)
Radiated Emission (30MHz ~ 1000MHz)	4.35 dB (k=2)
Radiated Emission (1GHz ~ 18GHz)	4.44 dB (k=2)
Radiated Emission (18GHz ~ 26.5GHz)	4.56 dB (k=2)

5.5 Laboratory Facility

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

● **FCC - Registration No.: 817957**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. 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 our files. Registration 817957, February 27, 2012.

● **IC - Registration No.: 10106A-1**

The 3m Semi-anechoic chamber of Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

● **CNAS - Registration No.: CNAS L6048**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. is accredited to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L6048.

5.6 Laboratory Location

Shenzhen Zhongjian Nanfang Testing Co., Ltd.
Address: No. B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road,
Bao'an District, Shenzhen, Guangdong, China
Tel: +86-755-23118282, Fax: +86-755-23116366
Email: info@ccis-cb.com, Website: www.ccis-cb.com

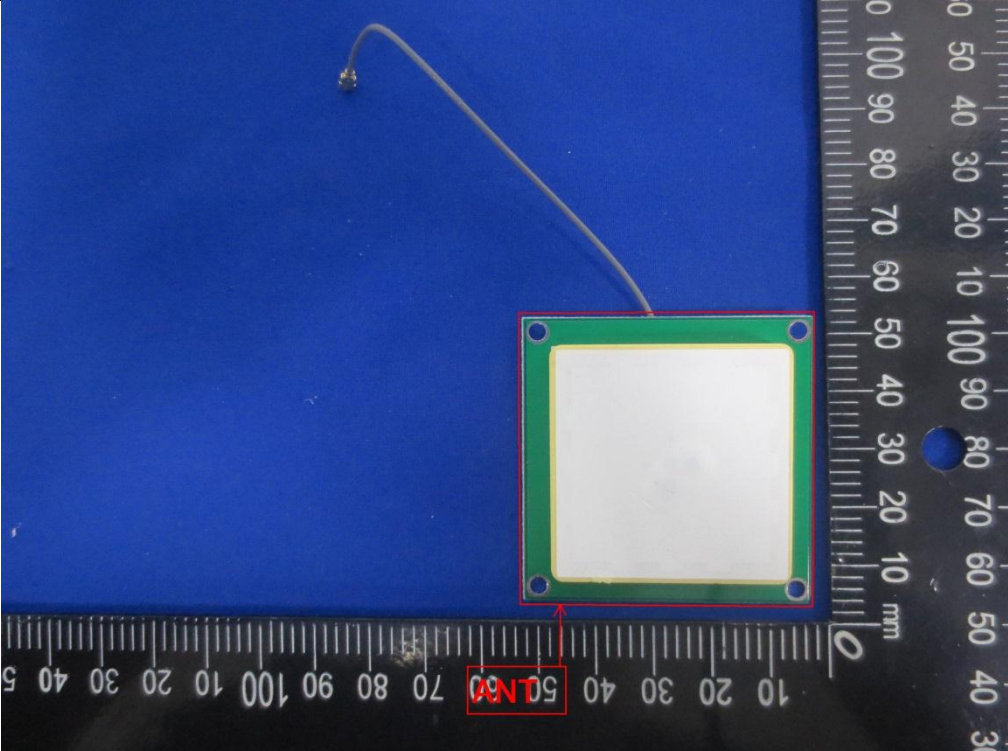
5.7 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
1	3m SAC	SAEMC	9(L)*6(W)* 6(H)	CCIS0001	08-23-2014	08-22-2017
2	BiConiLog Antenna	SCHWARZBECK	VULB9163	CCIS0005	02-25-2017	02-24-2018
3	Horn Antenna	SCHWARZBECK	BBHA9120D	CCIS0006	02-25-2017	02-24-2018
4	Pre-amplifier (10kHz-1.3GHz)	HP	8447D	CCIS0003	02-25-2017	02-24-2018
5	Pre-amplifier (1GHz-18GHz)	Compliance Direction Systems Inc.	PAP-1G18	CCIS0011	02-25-2017	02-24-2018
6	Spectrum analyzer 9k-30GHz	Rohde & Schwarz	FSP30	CCIS0023	02-25-2017	02-24-2018
7	EMI Test Receiver	Rohde & Schwarz	ESRP7	CCIS0167	02-25-2017	02-24-2018
8	Loop antenna	Laplace instrument	RF300	EMC0701	02-25-2017	02-24-2018
9	EMI Test Software	AUDIX	E3	N/A	N/A	N/A

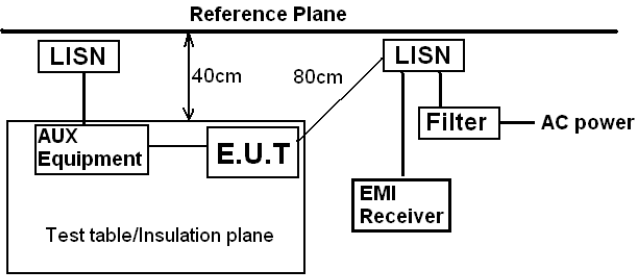
Conducted Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
1	Shielding Room	ZhongShuo Electron	11.0(L)x4.0(W)x3.0(H)	CCIS0061	08-23-2014	08-22-2017
2	EMI Test Receiver	Rohde & Schwarz	ESCI	CCIS0002	02-25-2017	02-24-2018
3	LISN	CHASE	MN2050D	CCIS0074	02-25-2017	02-24-2018
4	Coaxial Cable	CCIS	N/A	CCIS0086	02-25-2017	02-24-2018
5	EMI Test Software	AUDIX	E3	N/A	N/A	N/A

6 Test results and Measurement Data

6.1 Antenna requirement

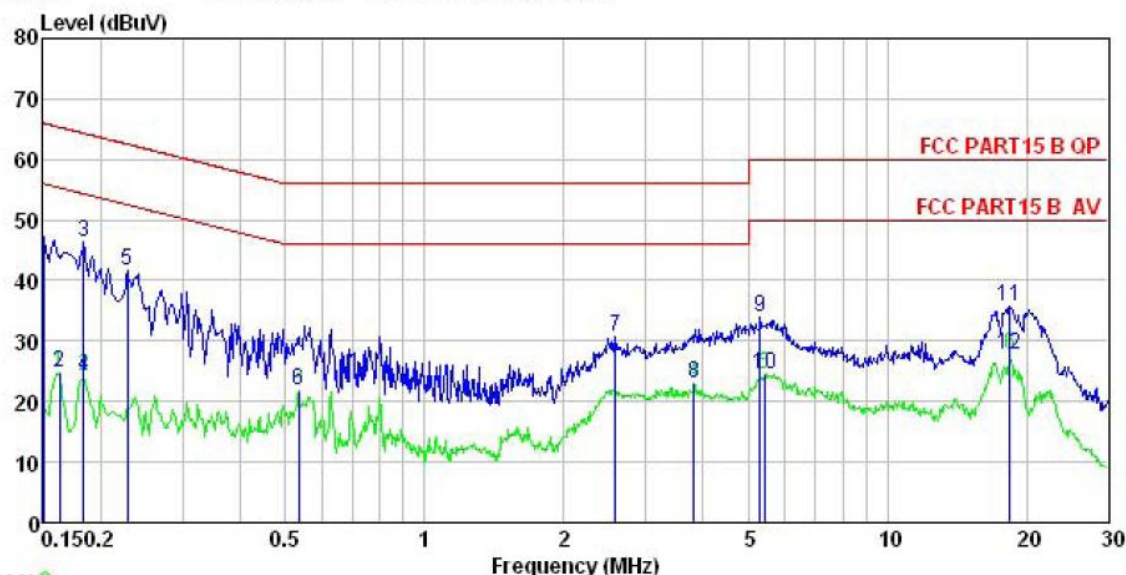
Standard requirement:	FCC Part 15 C Section 15.203 /247(c)
<p><i>15.203 requirement:</i> <i>An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna 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.</i></p> <p><i>15.247(c) (1)(i) requirement:</i> <i>(i) Systems operating in the 902-928MHz 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.</i></p>	
E.U.T Antenna:	
<p><i>The antenna under test sample is a ceramic antenna as below, and the best case gain of the antenna is 2.0dBi. Device is equipped with unique non-standard antenna connector and the recommended specific antenna by the manufacture.</i></p>	
	

6.2 Conducted Emissions

Test Requirement:	FCC Part 15 C Section 15.207		
Test Method:	ANSI C63.10:2013		
Test Frequency Range:	150 kHz to 30 MHz		
Class / Severity:	Class B		
Receiver setup:	RBW=9 kHz, VBW=30 kHz, 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:	 <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 C63.10: 2013 on conducted measurement. 		
Test Instruments:	Refer to section 5.7 for details		
Test mode:	TM 2		
Test results:	Pass		

Measurement Data

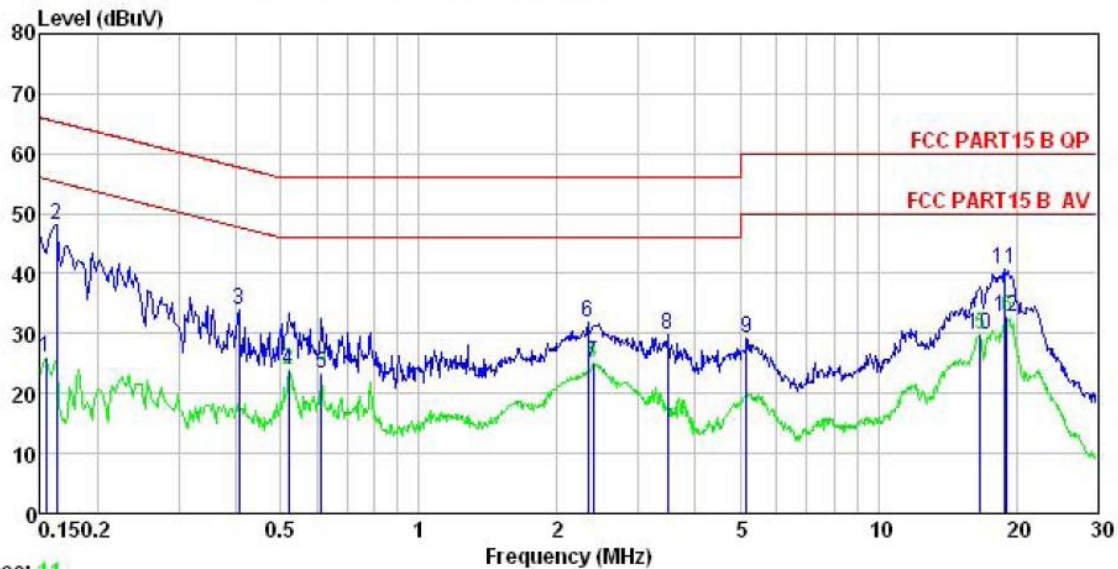
Line:



Site : CCIS Shielding Room
 Condition : FCC PART15 B QP LISN LINE
 EUT : D-100 UHF RFID Desktop Reader
 Model : D-100
 Test Mode : RFID Mode
 Power Rating : AC 120V/60Hz
 Environment : Temp: 23 °C Humi:56% Atmos:101KPa
 Test Engineer: Carey
 Remark :

	Freq	Read		Cable	Limit	Over	
	MHz	Level	LISN	Loss	Line	Limit	Remark
	MHz	dBuV		dB	dBuV	dB	
1	0.150	36.32	0.14	10.78	47.24	66.00	-18.76 QP
2	0.162	13.85	0.14	10.77	24.76	55.34	-30.58 Average
3	0.183	35.36	0.15	10.77	46.28	64.33	-18.05 QP
4	0.183	13.34	0.15	10.77	24.26	54.33	-30.07 Average
5	0.228	30.61	0.15	10.75	41.51	62.52	-21.01 QP
6	0.535	10.84	0.26	10.76	21.86	46.00	-24.14 Average
7	2.581	19.54	0.33	10.93	30.80	56.00	-25.20 QP
8	3.820	11.69	0.34	10.90	22.93	46.00	-23.07 Average
9	5.305	22.78	0.35	10.84	33.97	60.00	-26.03 QP
10	5.419	13.34	0.35	10.84	24.53	50.00	-25.47 Average
11	18.426	24.38	0.31	10.91	35.60	60.00	-24.40 QP
12	18.426	16.56	0.31	10.91	27.78	50.00	-22.22 Average

Neutral:



Trace: 11

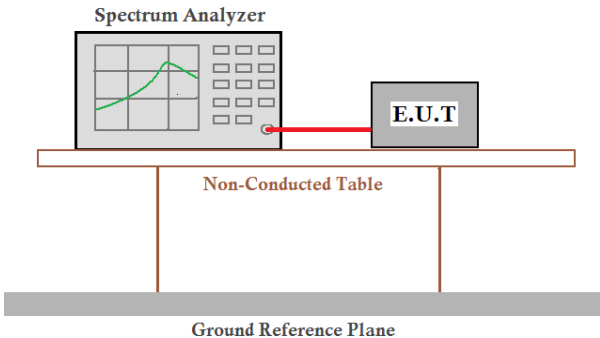
Site : CCIS Shielding Room
 Condition : FCC PART15 B QP LISN NEUTRAL
 EUT : D-100 UHF RFID Desktop Reader
 Model : D-100
 Test Mode : RFID Mode
 Power Rating : AC 120V/60Hz
 Environment : Temp: 23 °C Humi:56% Atmos:101KPa
 Test Engineer: Carey
 Remark :

	Freq	Read	LISN	Cable	Level	Limit	Over	
	MHz	Level		Loss		Line	Limit	Remark
	MHz	dBuV		dB	dBuV	dBuV	dB	
1	0.154	15.02	0.12	10.78	25.92	55.78	-29.86	Average
2	0.162	37.33	0.13	10.77	48.23	65.34	-17.11	QP
3	0.406	23.02	0.23	10.72	33.97	57.73	-23.76	QP
4	0.521	13.04	0.25	10.76	24.05	46.00	-21.95	Average
5	0.614	12.35	0.30	10.77	23.42	46.00	-22.58	Average
6	2.334	20.73	0.28	10.94	31.95	56.00	-24.05	QP
7	2.396	13.79	0.28	10.94	25.01	46.00	-20.99	Average
8	3.472	18.68	0.32	10.91	29.91	56.00	-26.09	QP
9	5.166	18.14	0.33	10.84	29.31	60.00	-30.69	QP
10	16.661	18.60	0.27	10.91	29.78	50.00	-20.22	Average
11	18.820	29.45	0.28	10.92	40.65	60.00	-19.35	QP
12	19.021	21.49	0.28	10.92	32.69	50.00	-17.31	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

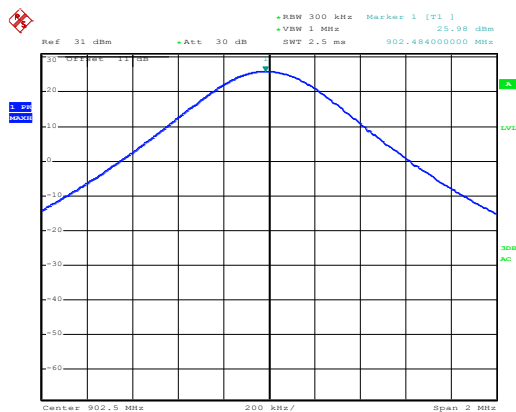
6.3 Conducted Output Power

Test Requirement:	FCC Part 15 C Section 15.247 (b)(3)
Test Method:	ANSI C63.10:2013 and KDB558074v01r04 section 9.2.2
Receiver setup:	RBW=1MHz, VBW=3MHz, Detector=Peak (If 20dB BW \leq 1 MHz) RBW=3MHz, VBW=10MHz, Detector=Peak (If 20dB BW > 1 MHz and <3MHz)
Limit:	1W (30 dBm)
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 5.7 for details
Test mode:	TM 1
Test results:	Pass

Measurement Data

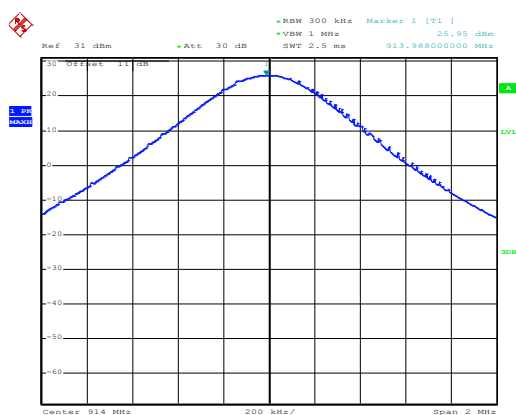
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	25.98	30.00	Pass
Middle	25.95	30.00	Pass
Highest	25.95	30.00	Pass

Test plot as follows:



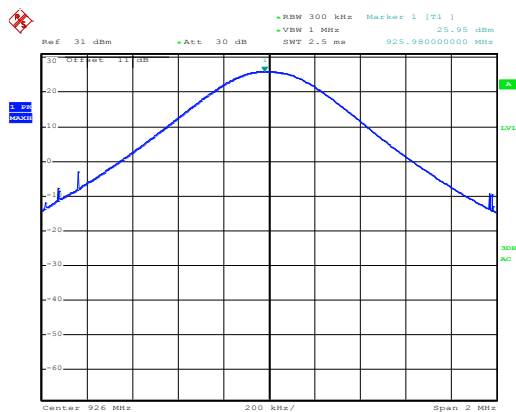
Date: 13.JUN.2017 11:29:41

Lowest channel



Date: 13.JUN.2017 17:59:37

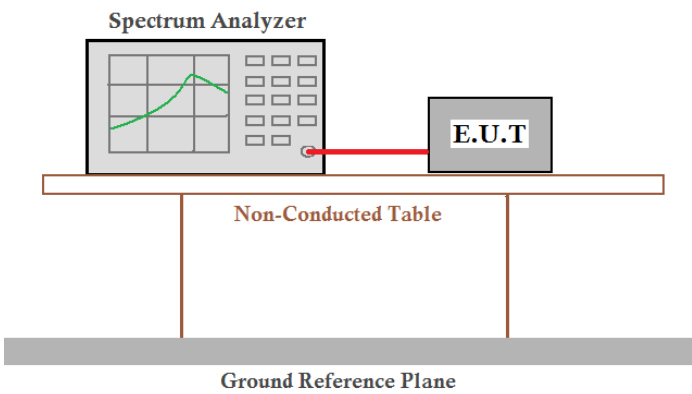
Middle channel



Date: 13.JUN.2017 12:24:20

Highest channel

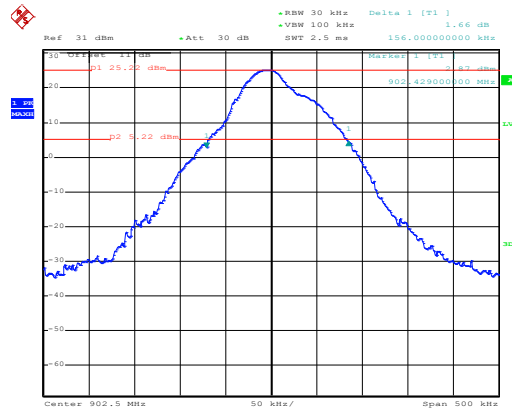
6.4 20dB Occupy Bandwidth

Test Requirement:	FCC Part 15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2013 and KDB558074v01r04 section 8.1
Receiver setup:	RBW=30 kHz, VBW=100 kHz, detector=Peak
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. Below the table is a Ground Reference Plane.</p>
Test Instruments:	Refer to section 5.7 for details
Test mode:	TM 1
Test results:	Pass

Measurement Data

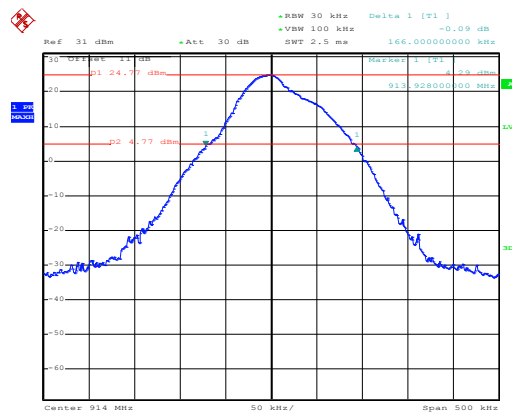
Test channel	20dB Occupy Bandwidth (kHz)	Limit (kHz)
Lowest	156	500
Middle	166	500
Highest	156	500

Test plot as follows:



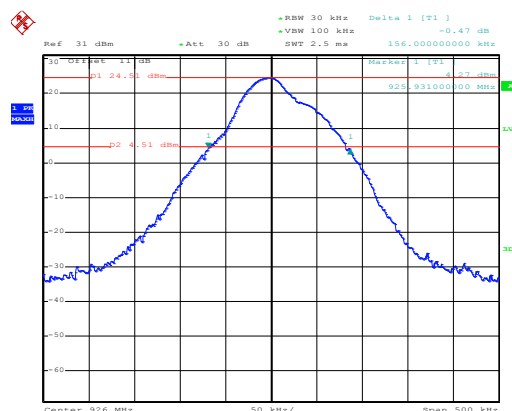
Date: 14.JUN.2017 14:01:24

Lowest channel



Date: 14.JUN.2017 14:02:03

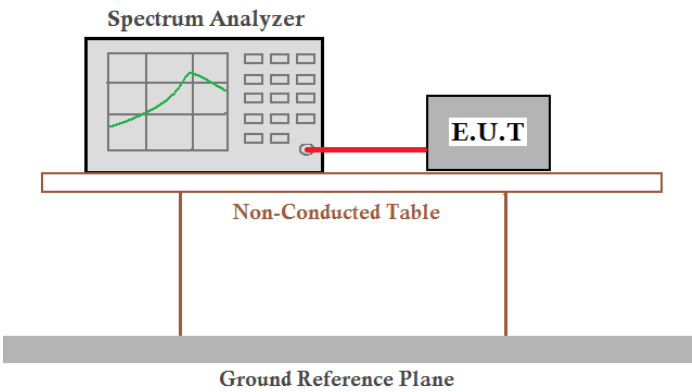
Middle channel



Date: 14.JUN.2017 14:00:07

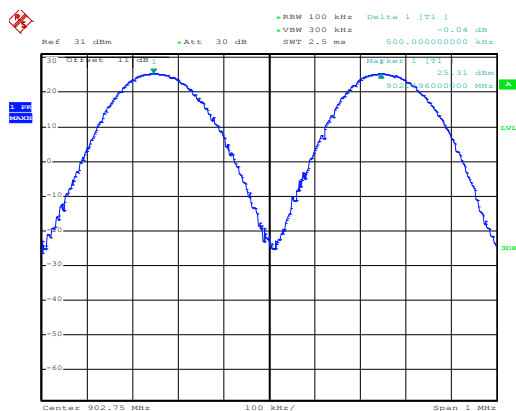
Highest channel

6.5 Carrier Frequencies Separation

Test Requirement:	FCC Part 15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=100 kHz, VBW=300 kHz, detector=Peak
Limit:	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.
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 5.7 for details
Test mode:	TM 2
Test results:	Pass

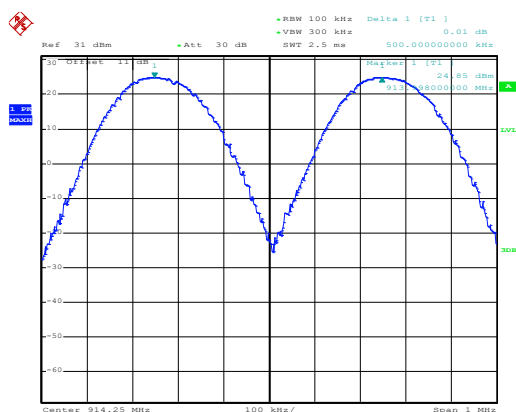
Measurement Data

Test channel	Carrier Frequencies Separation (kHz)	Limit (kHz)
Lowest	500	137
Middle	500	136
Highest	502	141



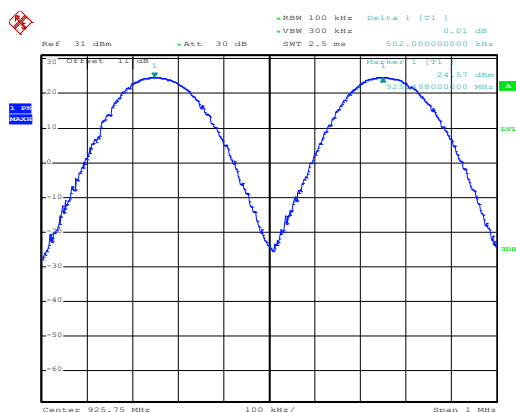
Date: 14.JUN.2017 14:03:38

Lowest channel



Date: 14.JUN.2017 14:04:17

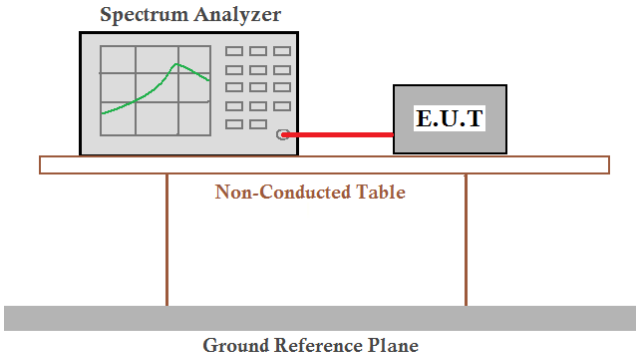
Middle channel



Date: 14.JUN.2017 14:05:02

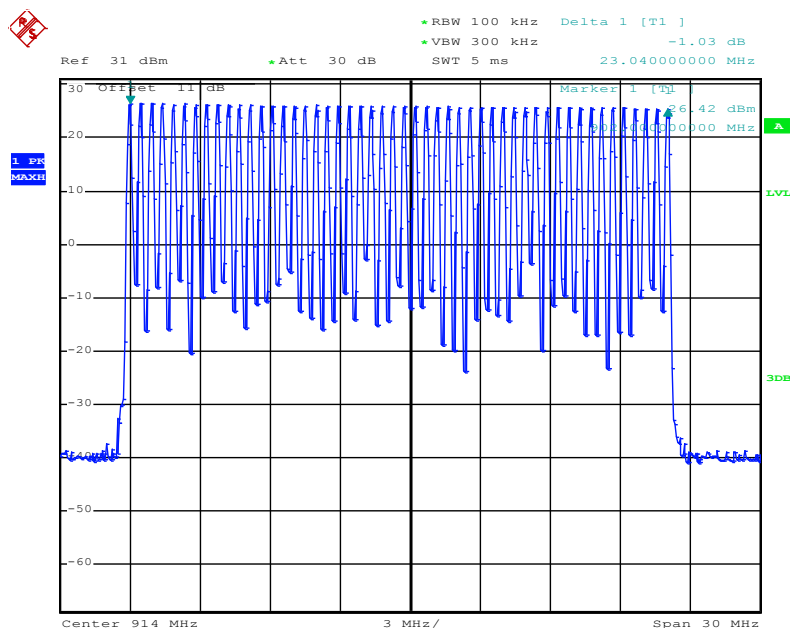
Highest channel

6.6 Hopping Channel Number

Test Requirement:	FCC Part 15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=100 kHz, VBW=300 kHz, Frequency range=2400MHz-2483.5MHz, Detector=Peak
Limit:	For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies.
Test setup:	
Test Instruments:	Refer to section 5.7 for details
Test mode:	TM 2
Test results:	Pass

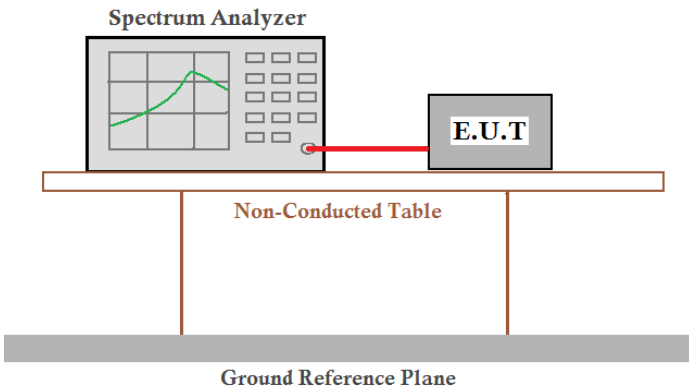
Measurement Data:

Hopping channel numbers	Limit	Result
50	50	Pass



Date: 14.JUN.2017 17:29:51

6.7 Dwell Time

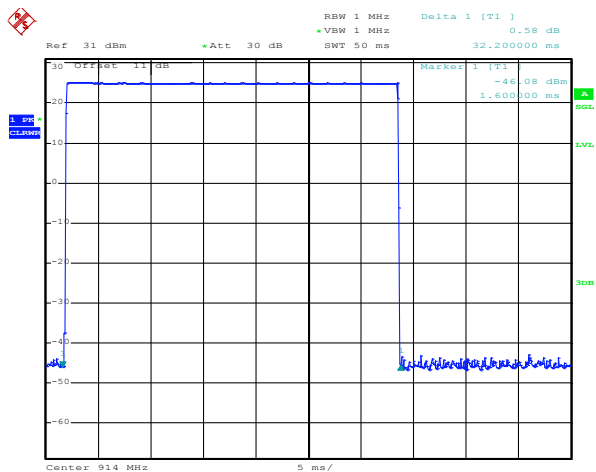
Test Requirement:	FCC Part 15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=1 MHz, VBW=1 MHz, Span=0 Hz, Detector=Peak
Limit:	0.4 seconds within a 20 second period
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected via a red cable to an Equipment Under Test (E.U.T.). Both are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.</p>
Test Instruments:	Refer to section 5.7 for details
Test mode:	TM 2
Test results:	Pass

Measurement Data

Dwell time per hop (Second)	Hopping numbers	Dwell time in one period (Second)	Limit (Second)	Result
0.03220	9	0.290	0.4	Pass

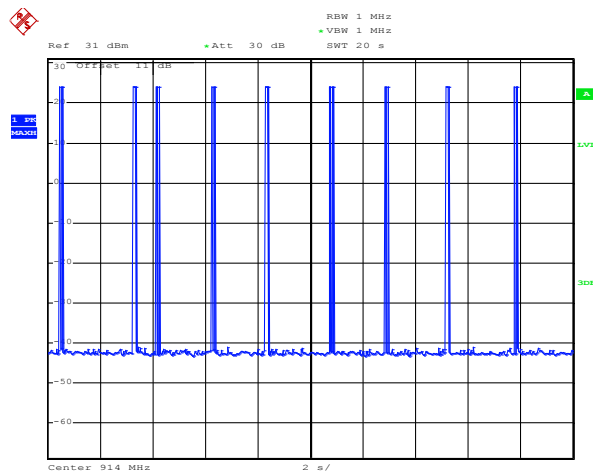
Remark:

The test period: T= 20s



Date: 13.JUN.2017 18:16:59

Duration time



Date: 14.JUN.2017 14:27:22

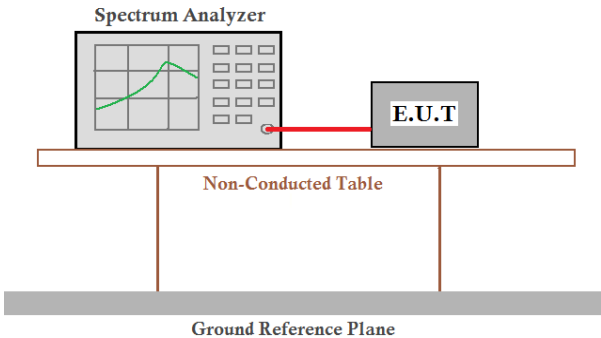
Hopping number

6.8 Pseudorandom Frequency Hopping Sequence

Test Requirement:	FCC Part 15 C Section 15.247 (a)(1) requirement:
<p>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.</p> <p>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.</p>	
EUT Pseudorandom Frequency Hopping Sequence	
<p>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.</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="253 902 1286 1048" data-label="Diagram"> </div> <p style="text-align: center;"><i>Linear Feedback Shift Register for Generation of the PRBS sequence</i></p> <p>Each frequency used equally on the average by each transmitter.</p> <p>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.</p>	

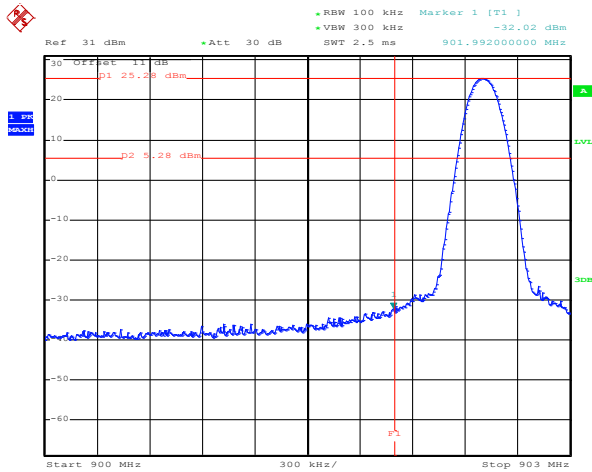
6.9 Band Edge

6.9.1 Conducted Emission Method

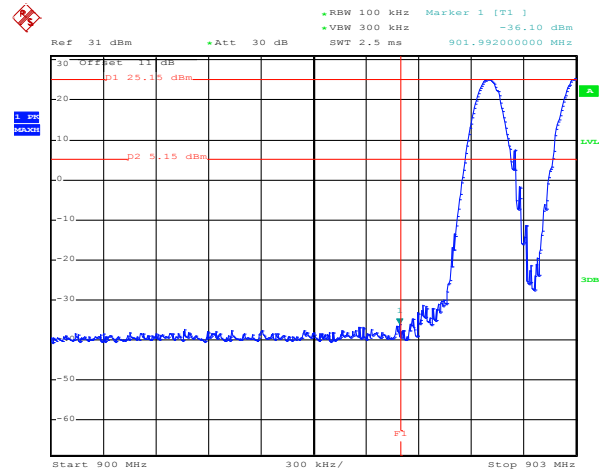
Test Requirement:	FCC Part 15 C Section 15.247 (d)
Test Method:	ANSI C63.10:2013 and KDB558074v01r04 section 13
Receiver setup:	RBW=100 kHz, VBW=300 kHz, Detector=Peak
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio 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 5.7 for details
Test mode:	TM 1 & TM 2
Test results:	Pass

Test plot as follows:

Lowest Channel



Date: 14.JUN.2017 13:55:21

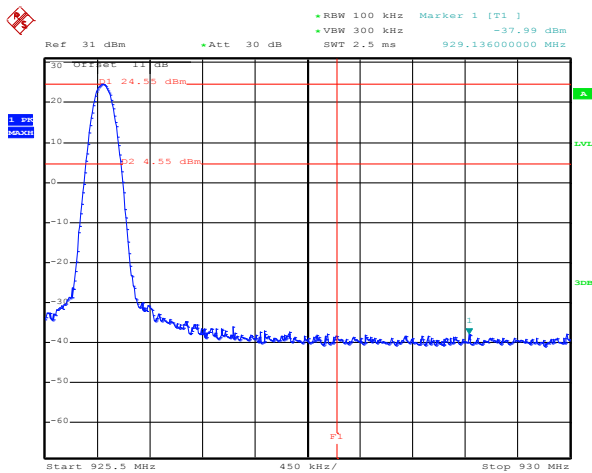


Date: 14.JUN.2017 13:56:04

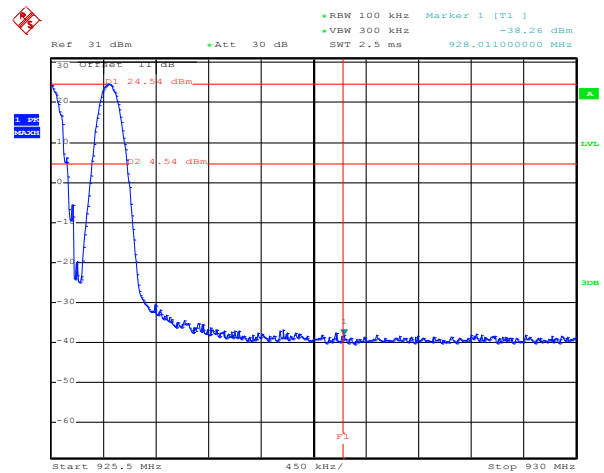
Non-hopping

Hopping

Highest Channel



Date: 14.JUN.2017 13:58:37

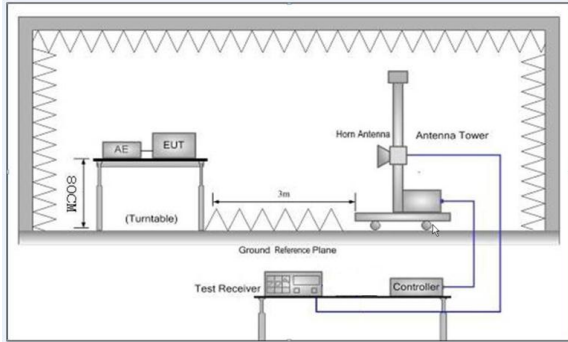


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Non-hopping

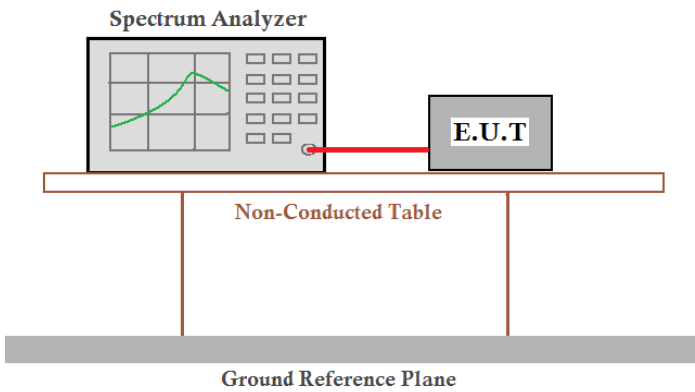
Hopping

6.9.2 Radiated Emission Method

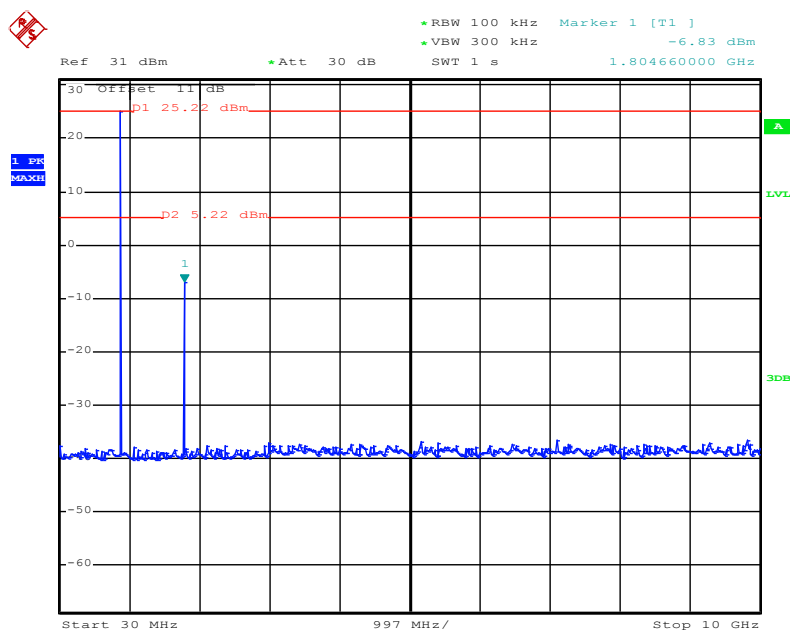
Test Requirement:	FCC Part 15 C Section 15.209 and 15.205				
Test Method:	ANSI C63.10: 2013 and KDB558074v01r04 section 12.1				
Test Frequency Range:	960MHz to 1.240GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	960MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		RMS	1MHz	3MHz	Average Value
Limit:	Frequency		Limit (dBuV/m @3m)		Remark
	960MHz-1GHz		54.0		Quasi-peak Value
	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 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.</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 5.7 for details				
Test mode:					
Test results:	Pass				
Remark:	All the reading values were the noise floor and not recorded.				

6.10 Spurious Emission

6.10.1 Conducted Emission Method

Test Requirement:	FCC Part 15 C Section 15.247 (d)
Test Method:	ANSI C63.10:2013 and KDB558074v01r04 section 11
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 a Ground Reference Plane.</p>
Test Instruments:	Refer to section 5.7 for details
Test mode:	TM 1
Test results:	Pass

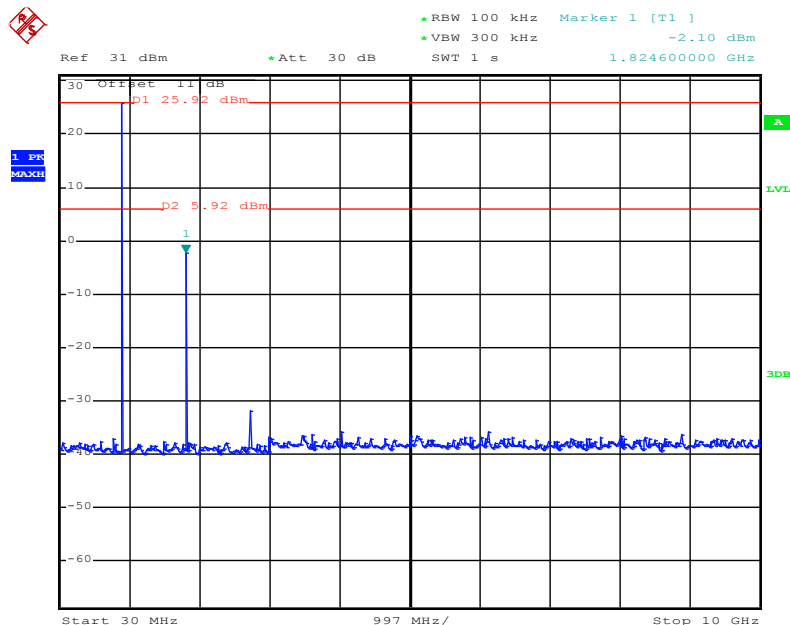
Lowest channel



Date: 13.JUN.2017 18:02:27

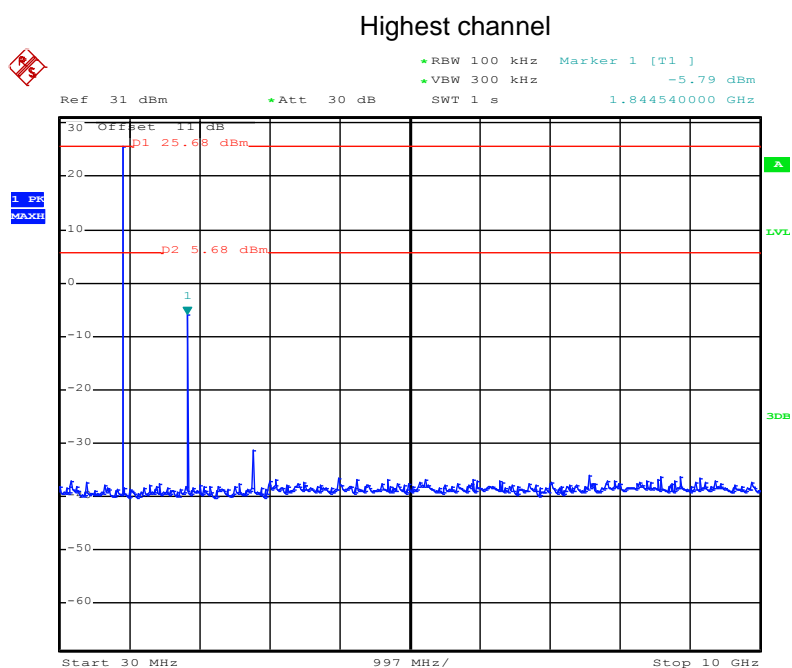
30MHz~10GHz

Middle channel



Date: 13.JUN.2017 18:00:57

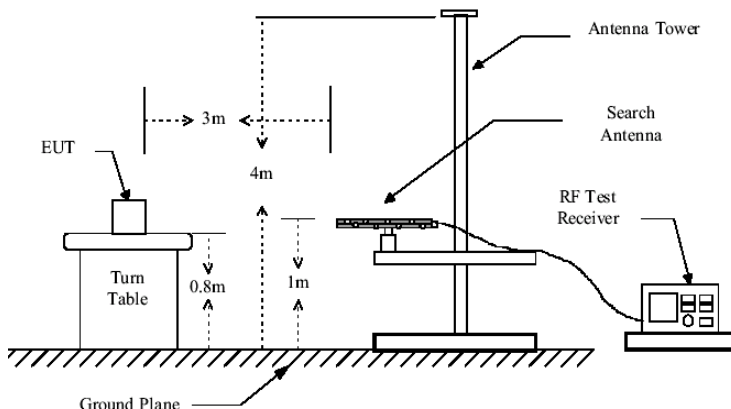
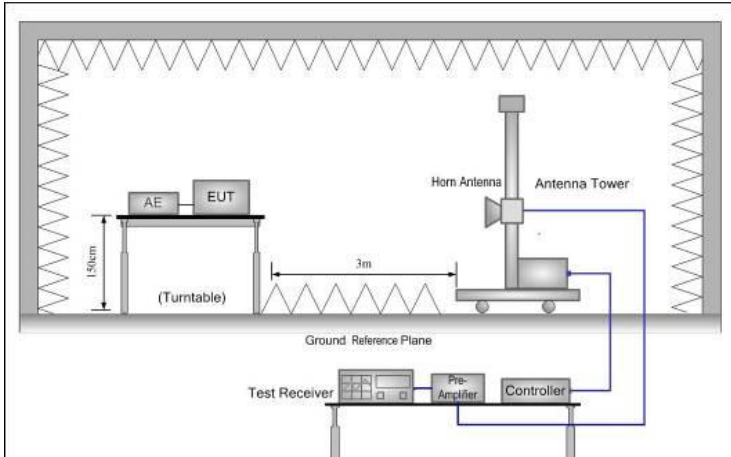
30MHz~10GHz



Date: 13.JUN.2017 18:01:30

30MHz~10GHz

6.10.2 Radiated Emission Method

Test Requirement:	FCC Part 15 C Section 15.209				
Test Method:	ANSI C63.10:2013				
Test Frequency Range:	9 kHz to 10 GHz				
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
		RMS	1MHz	3MHz	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				
					
	Above 1GHz				
					

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 chamber. 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 5.7 for details
Test mode:	TM 1 mode
Test results:	Pass

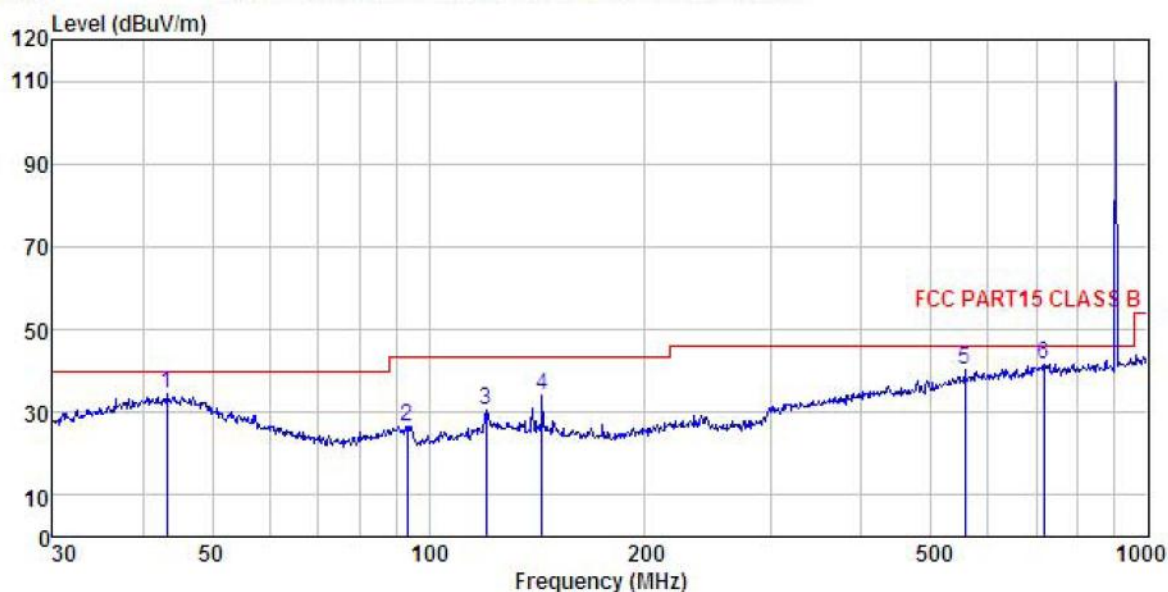
Remark:

1. 9 kHz to 30 MHz is noise floor, so only shows the data of above 30MHz in this report.
2. Low, mid and high 3 channels all have been tested for 30MHz to 1GHz, only report worst case.

Measurement data:

Below 1GHz

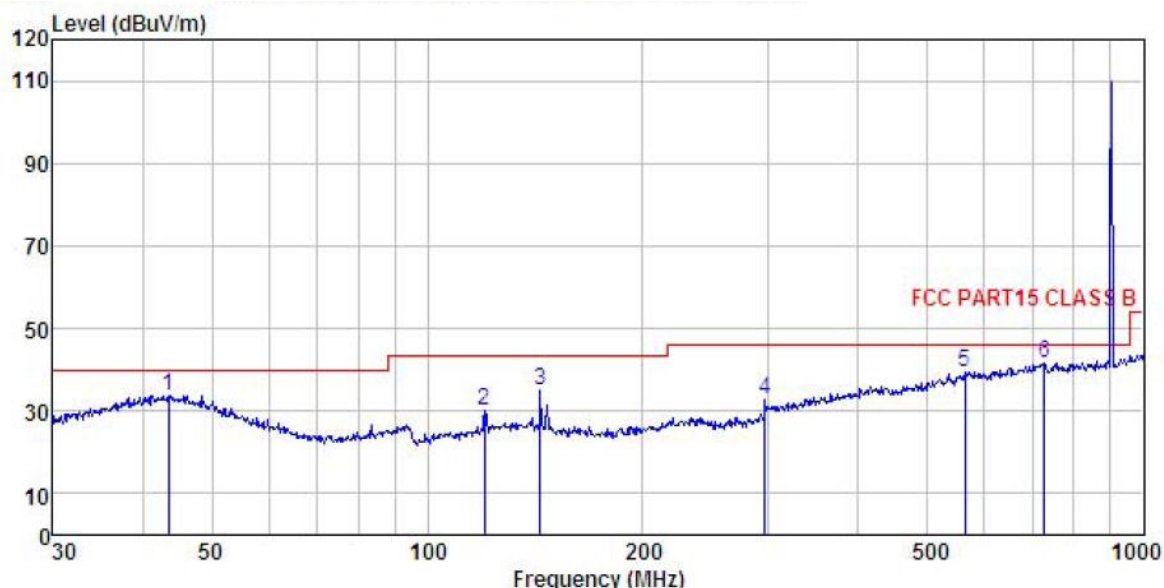
Vertical:



Site : 3m chamber
 Condition : FCC PART15 CLASS B 3m VULB9163(30M3G) VERTICAL
 EUT : D-100 UHF RFID Desktop Reader
 Model : D-100
 Test mode : RFID mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55%
 Test Engineer: Carey
 REMARK :

	Freq	ReadAntenna	Cable	Preamp		Limit	Over	
		Level	Factor	Loss	Factor	Level	Line	Limit
	MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB
1	43.202	15.63	17.44	1.26	0.00	34.33	40.00	-5.67 QP
2	93.440	16.22	8.49	2.02	0.00	26.73	43.50	-16.77 QP
3	120.277	16.76	11.83	2.17	0.00	30.76	43.50	-12.74 QP
4	143.830	20.21	11.34	2.44	0.00	33.99	43.50	-9.51 QP
5	556.774	18.11	18.14	3.90	0.00	40.15	46.00	-5.85 QP
6	716.682	17.76	19.60	4.24	0.00	41.60	46.00	-4.40 QP

Horizontal:



Site : 3m chamber
 Condition : FCC PART15 CLASS B 3m VULB9163(30M3G) HORIZONTAL
 EUT : D-100 UHF RFID Desktop Reader
 Model : D-100
 Test mode : RFID mode
 Power Rating : AC 120V/60Hz
 Environment : Temp:25.5°C Humi:55%
 Test Engineer: Carey
 REMARK :

	Freq	ReadAntenna	Cable	Preamp	Limit	Over	
	MHz	Level	Factor	Loss	Factor	Line	Limit
	MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m
1	43.506	14.98	17.52	1.26	0.00	33.76	40.00
2	120.277	15.98	11.83	2.17	0.00	29.98	43.50
3	143.830	21.26	11.34	2.44	0.00	35.04	43.50
4	296.184	17.09	12.53	2.93	0.00	32.55	46.00
5	562.662	17.46	18.21	3.90	0.00	39.57	46.00
6	726.805	17.59	19.84	4.28	0.00	41.71	46.00

Above 1GHz:

Test channel:			Lowest		Level:		Peak	
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
1805.00	55.18	23.10	4.12	41.21	41.19	74.00	-32.81	Vertical
1805.00	60.36	23.10	4.12	41.21	46.37	74.00	-27.63	Horizontal
Test channel:			Lowest		Level:		Average	
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
1805.00	55.23	23.10	4.12	41.21	41.24	54	-12.76	Vertical
1805.00	49.86	23.10	4.12	41.21	35.87	54	-18.13	Horizontal

Test channel:			Middle		Level:		Peak	
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
1830.00	64.82	23.17	4.15	41.27	50.87	74.00	-23.13	Vertical
1830.00	60.55	23.17	4.15	41.27	46.60	74.00	-27.40	Horizontal
Test channel:			Middle		Level:		Average	
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
1830.00	54.27	23.17	4.15	41.27	40.32	54.00	-13.68	Vertical
1830.00	50.96	23.17	4.15	41.27	37.01	54.00	-16.99	Horizontal

Test channel:			Highest		Level:		Peak	
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
1855.00	64.77	23.22	4.17	41.32	50.84	74.00	-23.16	Vertical
1855.00	57.77	23.22	4.17	41.32	43.84	74.00	-30.16	Horizontal
Test channel:			Highest		Level:		Average	
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
1855.00	54.68	23.22	4.17	41.32	40.75	54.00	-13.25	Vertical
1855.00	47.23	23.22	4.17	41.32	33.30	54.00	-20.70	Horizontal

Remark:

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