FCC REPORT

Applicant:	Radiant Sensors LLC
Address of Applicant:	11340 Lakefield Drive, Suite 200, Johns Creek, GEORGIA, USA

Equipment Under Test (EUT)

Product Name:	POS RFID Barcode Encoder Scanner
Model No.:	RSPOS-100
FCC ID:	2AMX9RSPOS-100
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.249
Date of sample receipt:	26 Sep., 2016
Date of Test:	26 Sep., to 09 Oct., 2016
Date of report issued:	09 Oct., 2016
Test Result:	PASS*

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

Authorized Signature:

Bruce Zhang
Laboratory Manager

2 Version

Version No.	Date	Description
00	*09 Oct., 2016*	*Original*

Tested By: Carey Chen ***Date:*** *09 Oct., 2016*

Project Engineer

Check By: RYan.Lee ***Date:*** *09 Oct., 2016*

Reviewer

3 Contents

4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203	Pass
Conducted Emission	15.207	Pass
20dB bandwidth	15.215(c)	Pass
Field strength of the fundamental signal	15.249 (a)(e)	Pass
Out of band emissions	15.249 (d)/15.209/15.205	Pass

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

4.1 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 General Information

5.1 Client Information

Applicant:	Radiant Sensors LLC
Address of Applicant:	11340 Lakefield Drive, Suite 200, Johns Creek, GEORGIA, USA
Manufacturer:	Radiant Sensors LLC
Address of Manufacturer :	11340 Lakefield Drive, Suite 200, Johns Creek, GEORGIA, USA

5.2 General Description of E.U.T.

Product Name:	POS RFID Barcode Encoder Scanner
Model No.:	RSPOS-100
Operation Frequency:	917.10MHz
Channel numbers:	1
Modulation type:	GFSK
Antenna Type:	Internal antenna
Antenna gain:	0 dBi
Power supply:	AC 120/60Hz

5.3 Test mode

Transmitting mode:	Keep the EUT in transmitting mode with modulation.

5.4 Description of Support Units

Manufacturer	Description	Model	Serial Number	FCC ID/DoC
DELL	PC	OPTIPLEX745	N/A	DoC

5.5 Laboritory 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 out 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 Laboritory 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

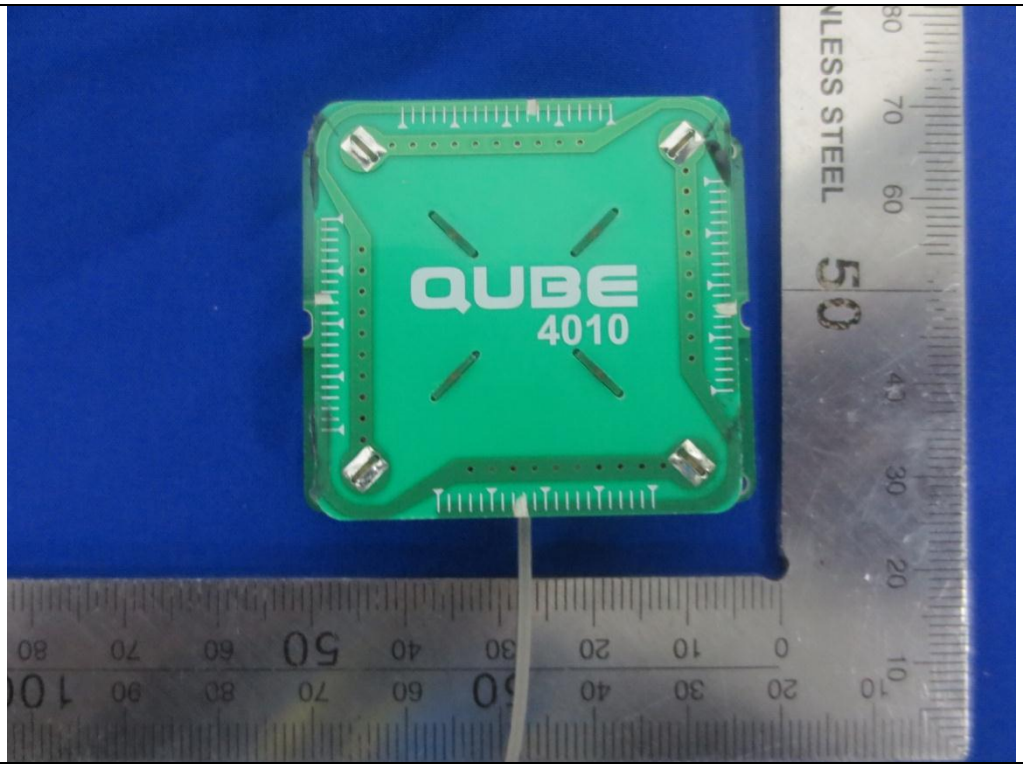
5.7 Test Instruments list

Radiated Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	CCIS0005	03-25-2016	03-25-2017
2	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	CCIS0006	03-25-2016	03-25-2017
3	Amplifier (10KHz-1.3GHz)	HP	8447D	CCIS0003	04-01-2016	03-31-2017
4	Amplifier (1GHz-18GHz)	Compliance Direction Systems Inc.	PAP-1G18	CCIS0011	04-01-2016	03-31-2017
5	Spectrum analyzer	Rohde & Schwarz	FSP	CCIS0023	04-01-2016	03-31-2017
6	EMI Test Receiver	Rohde & Schwarz	ECSI	CCIS0002	04-01-2016	03-31-2017
7	Pre-amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	04-01-2016	03-31-2017
8	Horn Antenna	ETS-LINDGREN	3160	GTS217	04-01-2016	03-31-2017

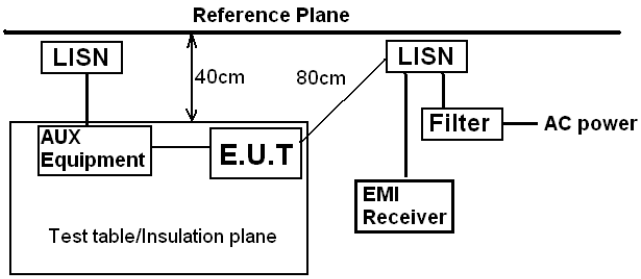
6 Test results and Measurement Data

6.1 Antenna requirement:

Standard requirement:	FCC Part15 C Section 15.203
15.203 requirement: *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.*	
E.U.T Antenna:	
The antenna is monopole antenna which cannot detachable . The best case gain of the antenna is 0dBi.	

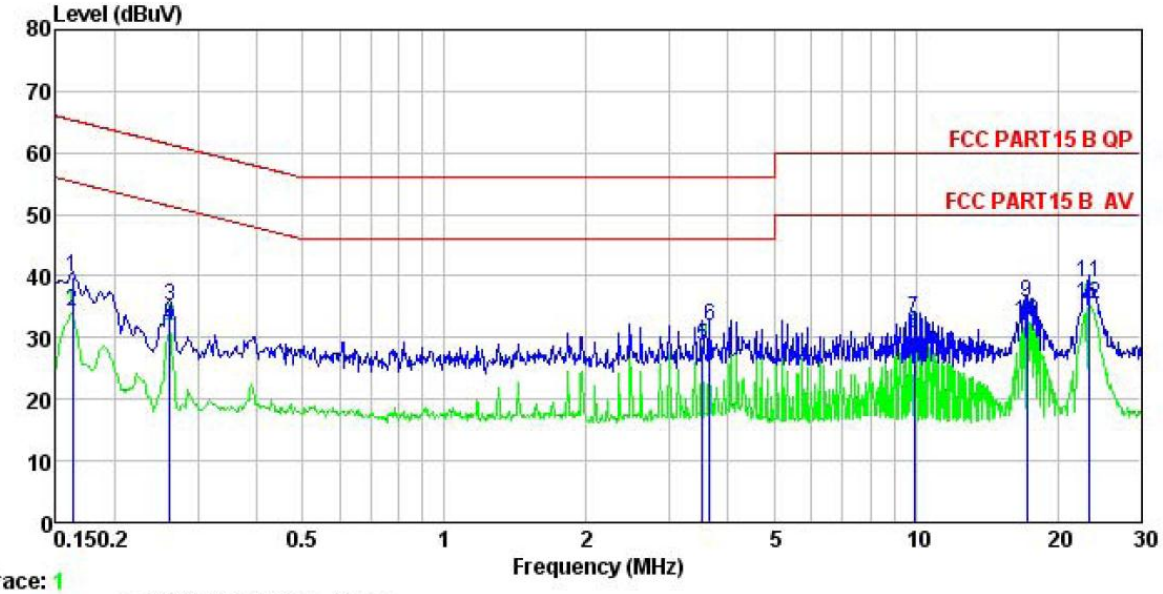


6.2 Conducted Emissions

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:	 *Remark:* *E.U.T: Equipment Under Test* *LISN: Line Impedence Stabilization Network* *Test table height=0.8m*		
Test procedure:	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: 2014 on conducted measurement.		
Test Instruments:	Refer to section 5.7 for details		
Test mode:	TX (Continuous transmitting) mode		
Test results:	Pass		

Measurement Data:

Line:



Trace: 1

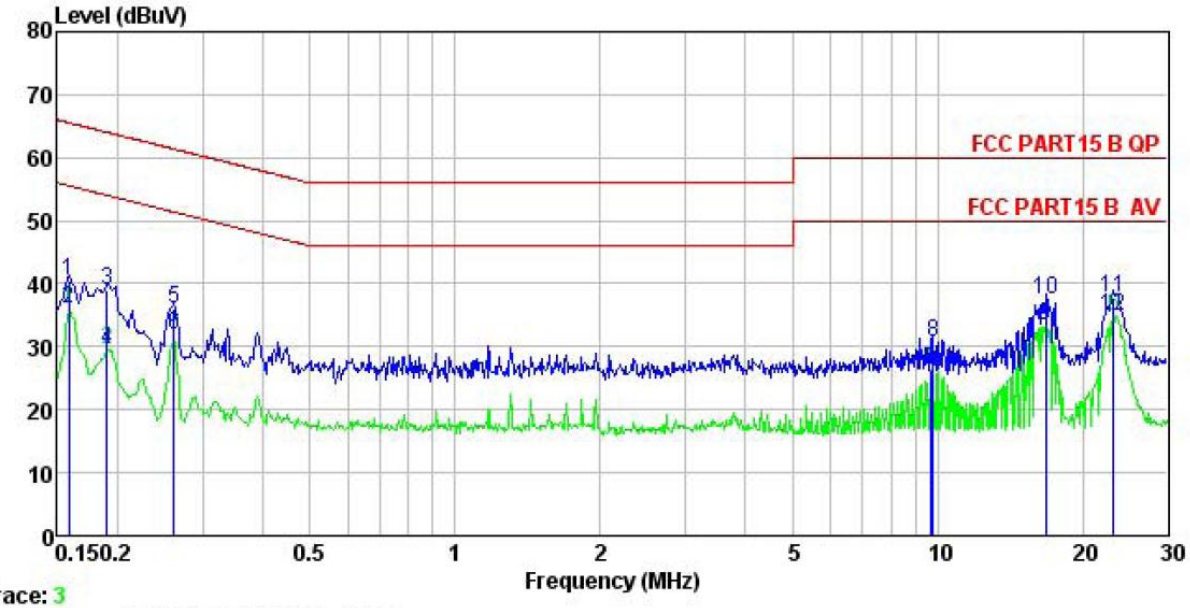
Site : CCIS Shielding Room
Condition : FCC PART15 B QP LISN LINE
EUT : POS RFID Barcode Encoder Scanner
Model : RSPOS-100
Test Mode : RFID mode
Power Rating : AC 120/60Hz
Environment : Temp: 23 ℃ Huni:56% Atmos:101KPa
Test Engineer: Carey
Remark :

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.162	28.81	0.14	10.77	39.72	65.34	-25.62	QP
2	0.162	23.31	0.14	10.77	34.22	55.34	-21.12	Average
3	0.262	24.22	0.16	10.75	35.13	61.38	-26.25	QP
4	0.262	20.93	0.16	10.75	31.84	51.38	-19.54	Average
5	3.528	17.30	0.34	10.90	28.54	46.00	-17.46	Average
6	3.661	20.59	0.34	10.90	31.83	56.00	-24.17	QP
7	9.913	21.69	0.30	10.93	32.92	60.00	-27.08	QP
8	9.913	19.53	0.30	10.93	30.76	50.00	-19.24	Average
9	17.199	24.51	0.29	10.91	35.71	60.00	-24.29	QP
10	17.199	21.39	0.29	10.91	32.59	50.00	-17.41	Average
11	23.263	27.85	0.35	10.89	39.09	60.00	-20.91	QP
12	23.387	24.07	0.35	10.89	35.31	50.00	-14.69	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.*

Neutral:



Trace: 3

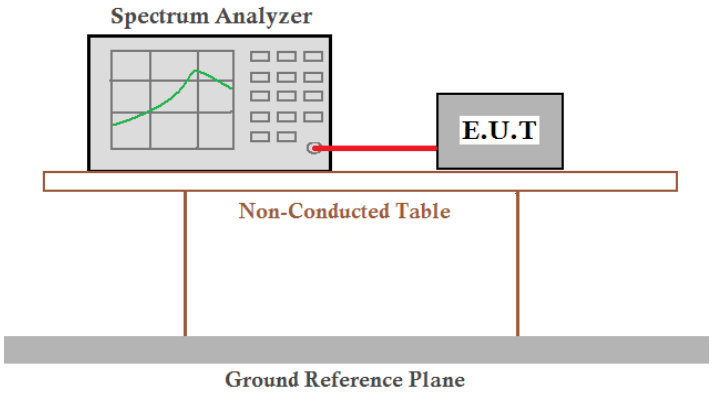
```
Site          : CCIS Shielding Room
Condition     : FCC PART15 B QP LISN NEUTRAL
EUT           : POS RFID Barcode Encoder Scanner
Model         : RSPOS-100
Test Mode     : RFID mode
Power Rating  : AC 120/60Hz
Environment   : Temp: 23 'C Huni:56%  Atmos:101KPa
Test Engineer: Carey
Remark        :
```

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.158	29.39	0.13	10.78	40.30	65.56	-25.26	QP
2	0.158	25.08	0.13	10.78	35.99	55.56	-19.57	Average
3	0.190	28.10	0.14	10.76	39.00	64.02	-25.02	QP
4	0.190	18.67	0.14	10.76	29.57	54.02	-24.45	Average
5	0.262	25.06	0.18	10.75	35.99	61.38	-25.39	QP
6	0.262	20.94	0.18	10.75	31.87	51.38	-19.51	Average
7	9.654	15.08	0.25	10.92	26.25	50.00	-23.75	Average
8	9.809	19.62	0.25	10.93	30.80	60.00	-29.20	QP
9	16.750	22.25	0.27	10.91	33.43	50.00	-16.57	Average
10	16.839	26.30	0.27	10.91	37.48	60.00	-22.52	QP
11	23.140	26.70	0.25	10.89	37.84	60.00	-22.16	QP
12	23.140	23.81	0.25	10.89	34.95	50.00	-15.05	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.*

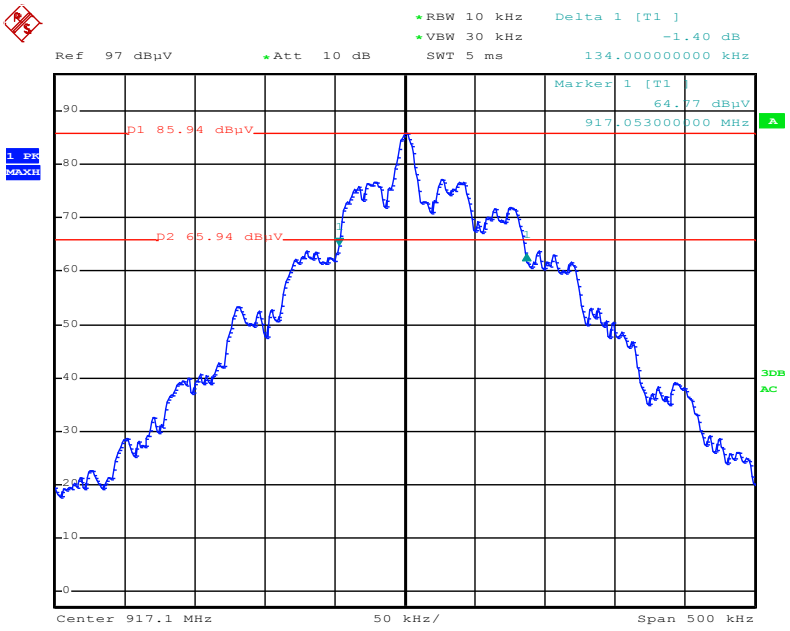
6.3 Occupy Bandwidth

Test Requirement:	FCC Part15 C Section 15.249
Test Method:	ANSI C63.10:2013
Limit:	/
Test setup:	
Test Instruments:	Refer to section 5.7 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data:

Test Frequency	20dB Emission Bandwidth (kHz)	Limit(kHz)	Result
917.10 MHz	134	--	Pass

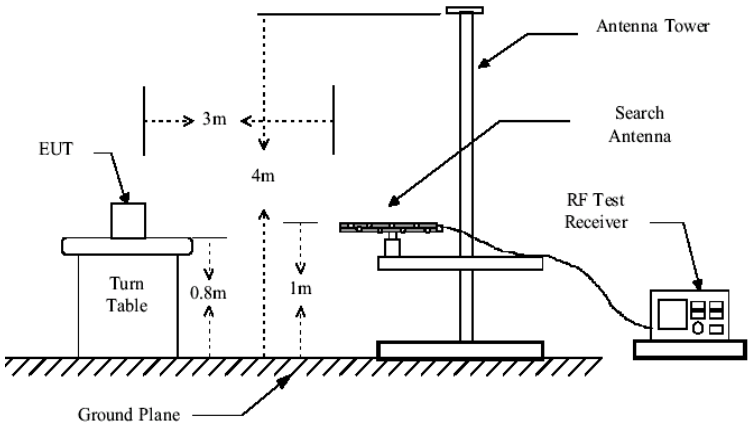
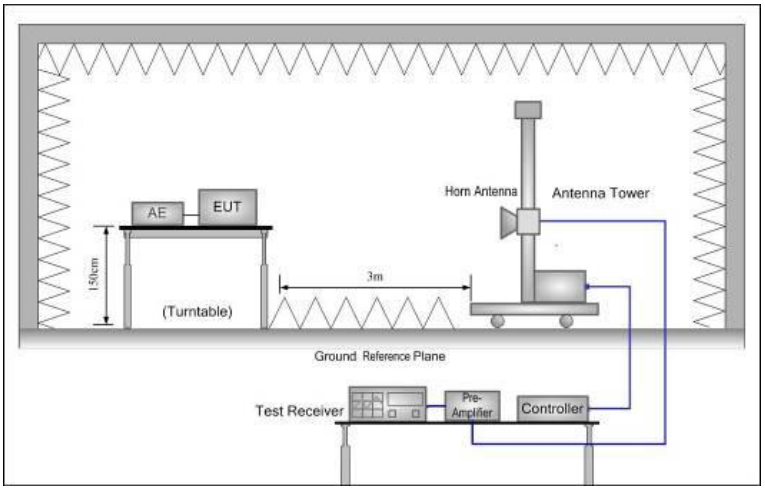
Test plot as below:



Date: 27.SEP.2016 15:55:33

6.4 Radiated Emission

<table>
<tr><td>Test Requirement:</td><td colspan="5">FCC Part15 C Section 15.249 and 15.209</td></tr>
<tr><td>Test Method:</td><td colspan="5">ANSI C63.10: 2013</td></tr>
<tr><td>Test Frequency Range:</td><td colspan="5">30MHz to 10GHz</td></tr>
<tr><td>Test site:</td><td colspan="5">Measurement Distance: 3m</td></tr>
<tr><td>Receiver setup:</td><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr>
<tr><td></td><td>30MHz-1GHz</td><td>Quasi-peak</td><td>120kHz</td><td>300kHz</td><td>Quasi-peak Value</td></tr>
<tr><td></td><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr>
<tr><td></td><td>Peak</td><td>1MHz</td><td>10Hz</td><td>Average Value</td></tr>
<tr><td>Limit:
(Field strength of the fundamental signal)</td><td colspan="2">Frequency</td><td colspan="2">Limit (dBuV/m @3m)</td><td>Remark</td></tr>
<tr><td></td><td colspan="2">902-928MHz</td><td colspan="2">94.00</td><td>Peak Value，
Quasi-peak Value</td></tr>
<tr><td>Limit:
(Spurious Emissions)</td><td colspan="2">Frequency</td><td colspan="2">Limit (dBuV/m @3m)</td><td>Remark</td></tr>
<tr><td></td><td colspan="2">30MHz-88MHz</td><td colspan="2">40.00</td><td>Quasi-peak Value</td></tr>
<tr><td></td><td colspan="2">88MHz-216MHz</td><td colspan="2">43.50</td><td>Quasi-peak Value</td></tr>
<tr><td></td><td colspan="2">216MHz-960MHz</td><td colspan="2">46.00</td><td>Quasi-peak Value</td></tr>
<tr><td></td><td colspan="2">960MHz-1GHz</td><td colspan="2">54.00</td><td>Quasi-peak Value</td></tr>
<tr><td></td><td colspan="2" rowspan="2">Above 1GHz</td><td colspan="2">54.00</td><td>Average Value</td></tr>
<tr><td></td><td colspan="2">74.00</td><td>Peak Value</td></tr>
<tr><td>Limit:
(outside of the specified frequency band)</td><td colspan="5">Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.</td></tr>
<tr><td>Test Procedure:</td><td colspan="5">1. The EUT was placed on the top of a rotating table 0.8m(below 1GHz)/1.5m(above 1GHz) 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 rotatable 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.</td></tr>
</table>

Test setup:	Below 1GHz  Above 1GHz 
Test Instruments:	Refer to section 5.7
Test mode:	Refer to section 5.3
Test results:	Passed

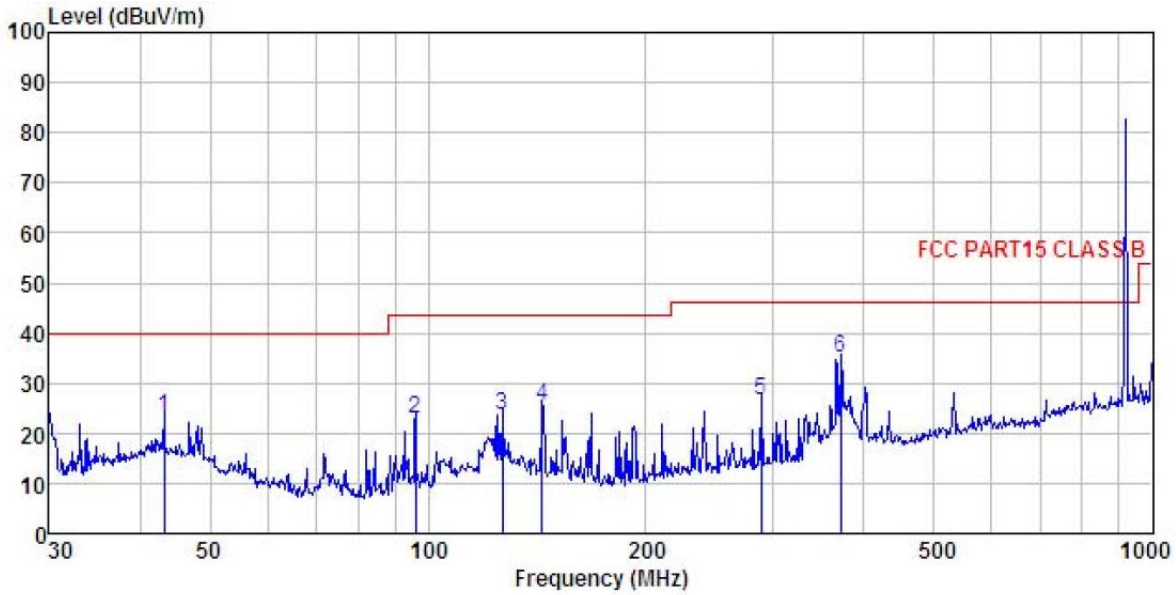
6.4.1 Field Strength Of The Fundamental Signal

Peak Value							
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
917.10	61.70	21.75	3.88	87.33	94	-6.67	Vertical
	61.15	21.75	3.88	86.78	94	-7.22	Horizontal

6.4.2 Spurious Emissions

Below 1GHz

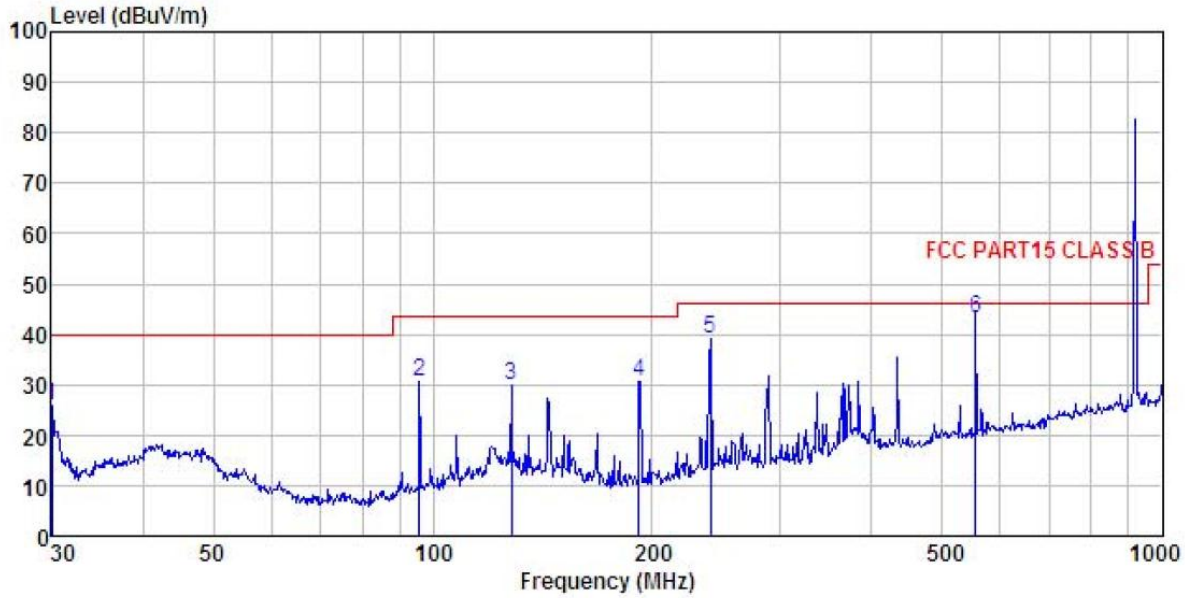
Vertical:




```
Site          : 3m chamber
Condition     : FCC PART15 CLASS B 3m VULB9163(30M3G) VERTICAL
Job No.       : 999RF
EUT           : POS RFID Barcode Encoder Scanner
Model         : RSPOS-100
Test mode     : RFID mode
Power Rating  : AC 120V/60Hz
Environment   : Temp:25.5'C  Huni:55%
Test Engineer: Carey
REMARK        :
```

	Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	43.202	34.40	17.44	1.26	29.87	23.23	40.00	-16.77	QP
2	96.099	41.43	8.93	2.00	29.55	22.81	43.50	-20.69	QP
3	126.772	38.64	12.15	2.25	29.35	23.69	43.50	-19.81	QP
4	143.830	40.99	11.34	2.44	29.25	25.52	43.50	-17.98	QP
5	287.990	39.80	12.27	2.91	28.47	26.51	46.00	-19.49	QP
6	370.702	45.62	14.91	3.09	28.65	34.97	46.00	-11.03	QP

Horizontal:



Site : 3m chamber
Condition : FCC PART15 CLASS B 3m VULB9163(30M3G) HORIZONTAL
Job No. : 999RF
EUT : POS RFID Barcode Encoder Scanner
Model : RSPOS-100
Test mode : RFID mode
Power Rating : AC 120V/60Hz
Environment : Temp:25.5'C Huni:55%
Test Engineer: Carey
REMARK :

	Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	30.000	43.44	11.80	0.72	29.98	25.98	40.00	-14.02	QP
2	95.762	49.38	8.82	2.01	29.55	30.66	43.50	-12.84	QP
3	128.113	44.79	12.21	2.26	29.34	29.92	43.50	-13.58	QP
4	191.745	47.09	9.79	2.81	28.89	30.80	43.50	-12.70	QP
5	239.987	52.98	11.80	2.82	28.59	39.01	46.00	-6.99	QP
6	554.825	50.16	18.14	3.89	29.09	43.10	46.00	-2.90	QP

Below 1GHz bandedge

Low channel

Quasi-peak Value							
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
902	0.62	21.60	3.73	25.95	46	-20.05	Vertical
	1.90	21.60	3.73	27.23	46	-18.77	Horizontoal

High channel

Quasi-peak Value							
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
928	10.23	21.82	3.99	36.04	46	-9.96	Vertical
	11.38	21.82	3.99	37.19	46	-8.81	Horizontoal

.

Above 1GHz

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
1834.10	53.96	23.18	4.15	41.29	40.00	74.00	-34.00	Vertical
2751.20	58.24	24.73	5.09	41.70	46.36	74.00	-27.64	Vertical
3668.30	51.36	29.43	5.96	41.63	45.12	74.00	-28.88	Vertical
4585.40	60.57	34.95	6.89	42.13	60.28	74.00	-13.72	Vertical
1834.10	53.28	23.18	4.15	41.29	39.32	74.00	-34.68	Horizontal
2751.20	59.96	24.73	5.09	41.70	48.08	74.00	-25.92	Horizontal
3668.30	62.93	29.43	5.96	41.63	56.69	74.00	-17.31	Horizontal
4585.40	59.97	34.95	6.89	42.13	59.68	74.00	-14.32	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
1834.10	44.26	23.18	4.15	41.29	30.30	54.00	-23.70	Vertical
2751.20	49.29	24.73	5.09	41.70	37.41	54.00	-16.59	Vertical
3668.30	42.45	29.43	5.96	41.63	36.21	54.00	-17.79	Vertical
4585.40	51.98	34.95	6.89	42.13	51.69	54.00	-2.31	Vertical
1834.10	44.59	23.18	4.15	41.29	30.63	54.00	-23.37	Horizontal
2751.20	50.95	24.73	5.09	41.70	39.07	54.00	-14.93	Horizontal
3668.30	53.58	29.43	5.96	41.63	47.34	54.00	-6.66	Horizontal
4585.40	50.24	34.95	6.89	42.13	49.95	54.00	-4.05	Horizontal

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.*