Report No.: GTS201606000134E01

FCC Report *(NFC)*

Applicant:	Magtek Incorporated
Address of Applicant:	1710 Apollo Court, Seal Beach, California 90740, United States
Equipment Under Test (EUT)	
Product Name:	kDynamo
Model No.:	21097101, 21097102, 21097103
Trade Name:	MagTek
FCC ID:	U73-21097101
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.225: 2015
Date of sample receipt:	April 11, 2016
Date of Test:	April 11-October 17, 2016
Date of report issued:	October 17, 2016
Test Result :	PASS *

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

Authorized Signature:

Robinson Lo
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the GTS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.
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. Any mention of GTS or testing done by GTS in connection with, distribution or use of the product described in this report must be approved by GTS in writing.
This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

2 Version

Version No.	Date	Description
00	*October 17, 2016*	*Original*

Prepared By: Edward.Pan ***Date:*** *October 17, 2016*

Project Engineer

Check By: Andy.Wu ***Date:*** *October 17, 2016*

Reviewer

3 Contents

Page

4 Test Summary

Test Item	Section in CFR 47	Result
Antenna Requirement	15.203	Pass
AC Power Line Conducted Emission	15.207	Pass
Field Strength of Fundamental Emissions and Mask Measurement	15.225	Pass
Radiated Emission	15.209	Pass
20dB Emission Bandwidth	15.225	Pass
Frequency Stability Measurement	15.225	Pass

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

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

4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	9kHz ~ 30MHz	± 4.34dB	(1)
Radiated Emission	30MHz ~ 1000MHz	± 4.24dB	(1)
Radiated Emission	1GHz ~ 26.5GHz	± 4.68dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	± 3.45dB	(1)
Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.			

5 General Information

5.1 Client Information

Applicant:	Magtek Incorporated
Address of Applicant:	1710 Apollo Court, Seal Beach, California 90740, United States
Manufacturer/Factory:	Magtek Incorporated
Address of Manufacturer/ Factory:	1710 Apollo Court, Seal Beach, California 90740, United States

5.2 General Description of E.U.T.

Product Name:	kDynamo
Model No.:	21097101, 21097102, 21097103
Operation Frequency:	13.56MHz
Channel Number:	1
Modulation:	ASK
Antenna type:	Integral antenna
Antenna gain:	2dBi
Adapter information :	DC5.0V Or DC 3.7V, 760mAh Li-ion Battery

5.3 Test mode

Transmitter mode	Keep the EUT in continuously transmitting.

5.4 Description of Support Units

Manufacturer	Description	Model	Serial Number	FCC Approval
Emerson Network Power	USB Charger	A1299	N/A	FCC DoC

5.5 Test Facility

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

- **FCC —Registration No.: 600491**

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fuly described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 600491, June 22, 2016.

- **Industry Canada (IC) —Registration No.: 9079A-2**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2, August 15, 2016.

5.6 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.
Address: No. 301-309, 3/F., Jinyuan Business Building, No.2, Laodong Industrrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102
Tel: 0755-27798480
Fax: 0755-27798960

6 Test Instruments list

Radiated Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.0(L)*6.0(W)* 6.0(H)	GTS250	July. 03 2015	July. 02 2020
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	ESU EMI Test Receiver	R&S	ESU26	GTS203	June. 29 2016	June. 28 2017
4	BiConiLog Antenna	SCHWARZBECK	VULB9163	GTS214	June. 29 2016	June. 28 2017
5	Double-ridged horn antenna	SCHWARZBECK	9120D	GTS208	June. 29 2016	June. 28 2017
6	RF Amplifier	HP	8347A	GTS204	June. 29 2016	June. 28 2017
7	Broadband Preamplifier	SCHWARZBECK	BBV9718	GTS535	June. 29 2016	June. 28 2017
8	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
9	Coaxial cable	GTS	N/A	GTS210	N/A	N/A
10	Coaxial Cable	GTS	N/A	GTS211	N/A	N/A
11	Thermo meter	N/A	N/A	GTS256	June. 29 2016	June. 28 2017

Conducted Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	May.16 2014	May.15 2019
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 29 2016	June. 28 2017
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June. 29 2016	June. 28 2017
4	Artificial Mains Network	SCHWARZBECK MESS	NSLK8127	GTS226	June. 29 2016	June. 28 2017
5	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Thermo meter	KTJ	TA328	GTS233	June. 29 2016	June. 28 2017

General used equipment:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Barometer	ChangChun	DYM3	GTS257	Jun. 29 2016	Jun. 28 2017

7 Test results and Measurement Data

7.1 Antenna requirement:

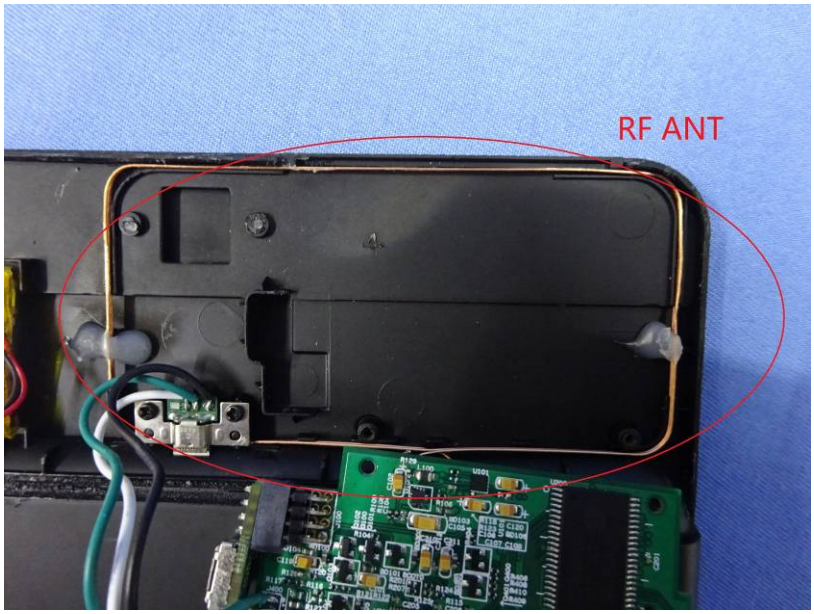
Standard requirement:	FCC Part15 C Section 15.203

15.203 requirement:

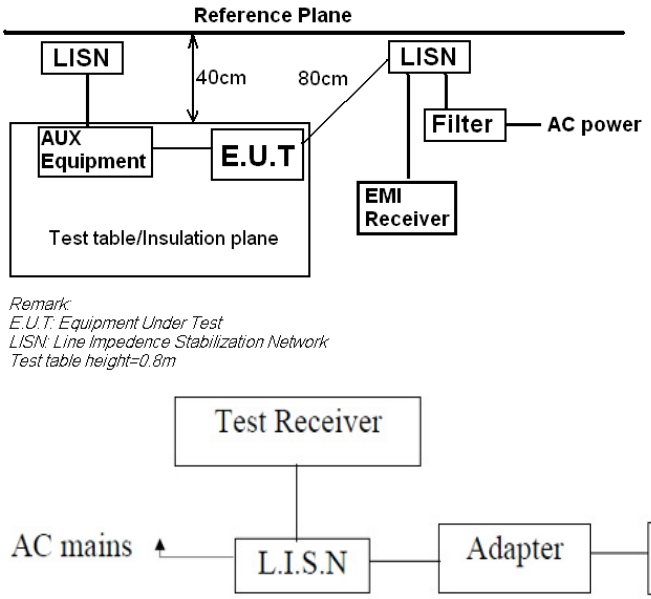
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit 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 integral antenna, the best case gain of the antenna is 2dBi

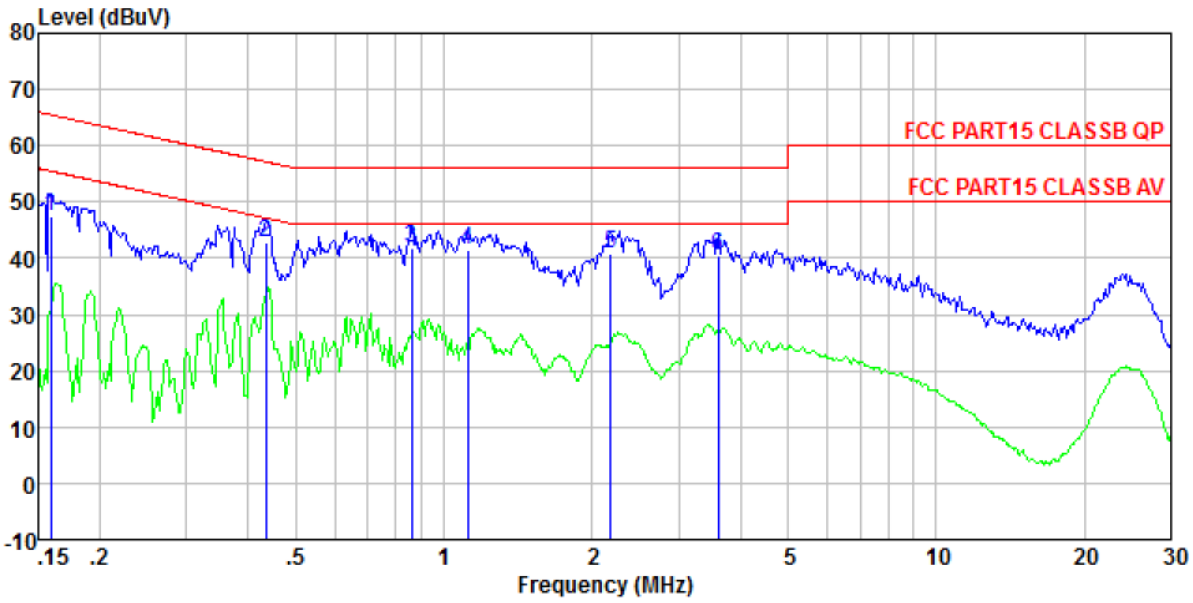


7.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.10:2013
Test Frequency Range:	150KHz to 30MHz
Class / Severity:	Class B
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto
Limit:	Frequency range (MHz) / Limit (dBuV): Quasi-peak / Average 0.15-0.5: 66 to 56* / 56 to 46* 0.5-5: 56 / 46 5-30: 60 / 50 * Decreases with the logarithm of the frequency.
Test setup:	
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 C63.10: 2013 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:

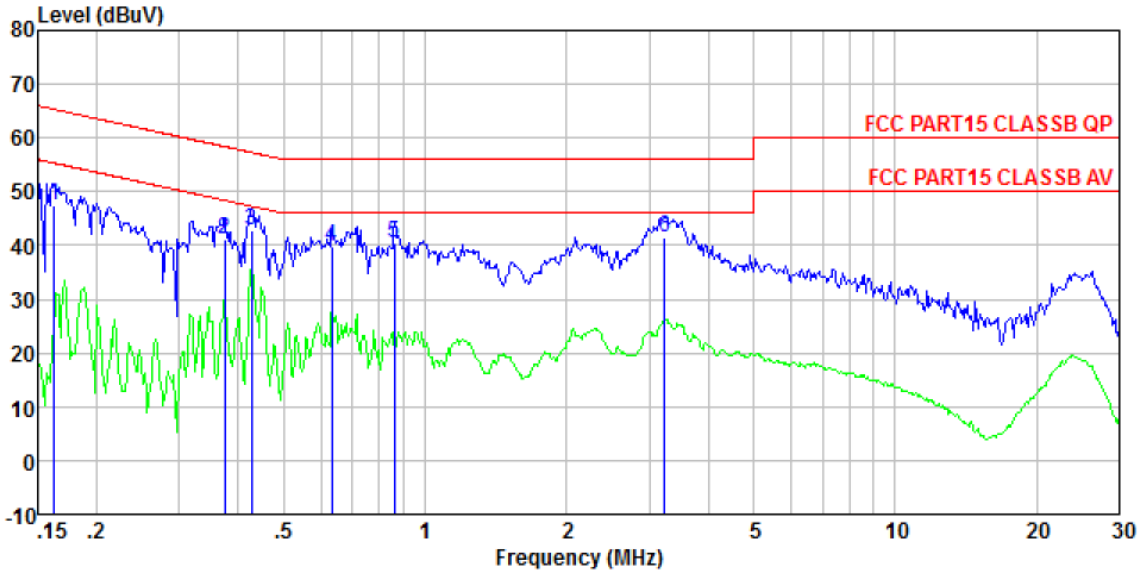
Line:



Site : Shielded room
Condition : FCC PART15 CLASSB QP LINE
Job No. : 0134
Test mode : Transmitting mode
Test Voltage : AV 120V/60Hz
Test Engineer: Boy

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.159	47.15	0.15	0.12	47.42	65.52	-18.10	QP
2	0.435	42.71	0.12	0.11	42.94	57.15	-14.21	QP
3	0.862	41.39	0.14	0.13	41.66	56.00	-14.34	QP
4	1.117	41.32	0.13	0.13	41.58	56.00	-14.42	QP
5	2.178	40.53	0.12	0.15	40.80	56.00	-15.20	QP
6	3.603	40.21	0.19	0.15	40.55	56.00	-15.45	QP

Neutral:



Site : Shielded room
Condition : FCC PART15 CLASSB QP NEUTRAL
Job No. : 0134
Test mode : Transmitting mode
Test Voltage : AC 120V/60Hz
Test Engineer: Boy

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.162	47.30	0.07	0.12	47.49	65.34	-17.85	QP
2	0.375	40.99	0.06	0.10	41.15	58.39	-17.24	QP
3	0.428	42.61	0.06	0.11	42.78	57.29	-14.51	QP
4	0.634	39.46	0.07	0.13	39.66	56.00	-16.34	QP
5	0.862	40.18	0.07	0.13	40.38	56.00	-15.62	QP
6	3.241	41.23	0.13	0.15	41.51	56.00	-14.49	QP

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

7.3 Field Strength of Fundamental Emissions and Mask Measurement

Test Requirement:	FCC Part15 C Section 15.225 and 15.209
Test Method:	ANSI C63.10:2013
Test site:	Measurement Distance: 3m
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=Auto

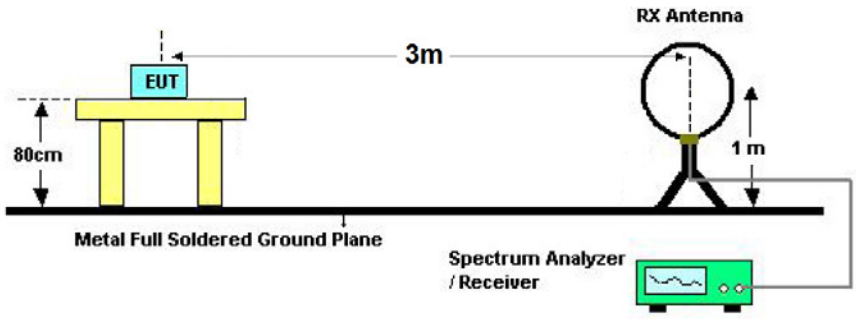
Limit:

Frequency (MHz)	Field Strength (microvolts/meter) at 30m	Field Strength (dBuV/m) at 3m
13.553~13.567	15848	124 (QP)

Mark limit:

Frequency (MHz)	Field Strength (microvolts/meter) at 30m	Field Strength (dBuV/m) at 3m
1.705~13.110	30	69.5
13.110~13.410	106	80.5
13.410~13.553	334	90.5
13.553~13.567	15848	124.0
13.567~13.710	334	90.5
13.710~14.010	106	80.5
14.010~30.000	30	69.5

Test setup:

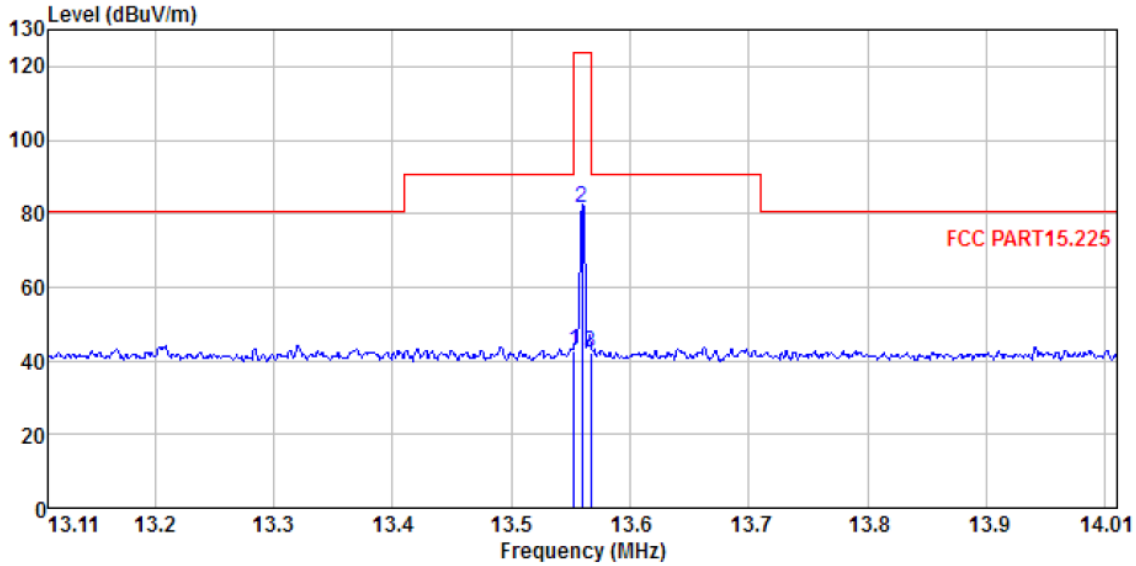


Test Procedure:

1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8meter above ground. The phase center of the loop receiving antenna mounted antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT, the turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the receiving antenna was fixed at one meter above ground to find the maximum emissions field strength.
4. For Fundamental emissions, use the receiver to measure QP reading.
5. When the radiated emissions limits are expressed in terms of the average value of the emissions and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided

	the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. 6. Compliance with the spectrum mask is tested using a spectrum analyzer with RB set to a 1KHz for the band 13.553~13.567MHz.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

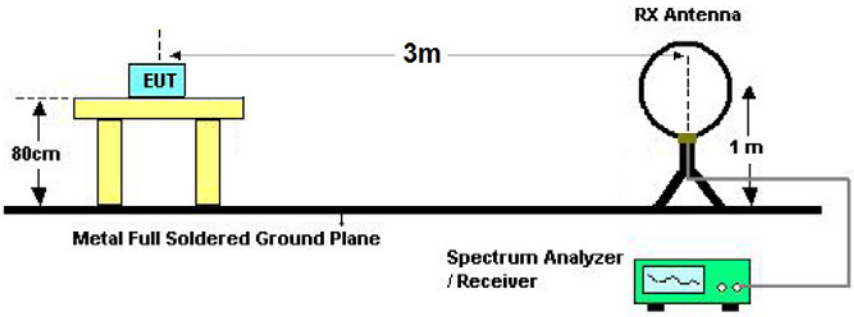
Measurement data:



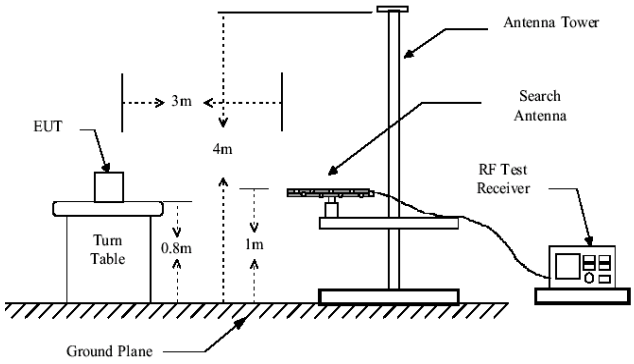
Site : 3m chamber
Condition : FCC PART15.225 3m ZN309000A(<30M)-2013
Job No. : 0134
Test mode : Transmitting mode
Test Engineer: Sky

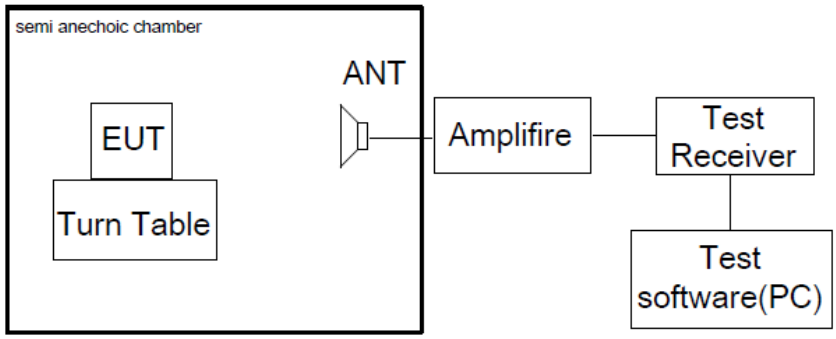
	Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	13.553	19.27	22.86	0.51	0.00	42.64	90.47	-47.83	QP
2	13.560	57.99	22.86	0.51	0.00	81.36	124.00	-42.64	QP
3	13.567	19.00	22.86	0.51	0.00	42.37	90.47	-48.10	QP

7.4 Radiated Emission

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.209</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10: 2013</td></tr>
<tr><td>Test Frequency Range:</td><td>9KHz to 1000MHz</td></tr>
<tr><td>Test site:</td><td>Measurement Distance: 3m</td></tr>
<tr><td>Receiver setup:</td><td>
<table>
<tr><th>Frequency (MHz)</th><th>RBW(KHz)</th><th>Detector</th></tr>
<tr><td>0.009~0.15</td><td>0.2</td><td>QP</td></tr>
<tr><td>0.15~30</td><td>9</td><td>QP</td></tr>
<tr><td>30~1000</td><td>120</td><td>QP</td></tr>
</table>
</td></tr>
<tr><td>Limit:</td><td>The Field strength of any emissions which appear outside of 13.553~13.567MHz band shall not exceed the general radiated emissions limits
<table>
<tr><th>Frequency (MHz)</th><th>Field strength (micorvolts/meter)</th><th>Measurement distance (meters)</th></tr>
<tr><td>0.009~0.490</td><td>2400/F(KHz)</td><td>300</td></tr>
<tr><td>0.490~1.705</td><td>24000/F(KHz)</td><td>30</td></tr>
<tr><td>1.705~30</td><td>30</td><td>30</td></tr>
<tr><td>30~88</td><td>100</td><td>3</td></tr>
<tr><td>88~216</td><td>150</td><td>3</td></tr>
<tr><td>216~960</td><td>200</td><td>3</td></tr>
<tr><td>960~1000</td><td>500</td><td>3</td></tr>
</table>
</td></tr>
<tr><td>Test setup:</td><td>Below 30MHz
 

Above 30MHz</td></tr>
</table>



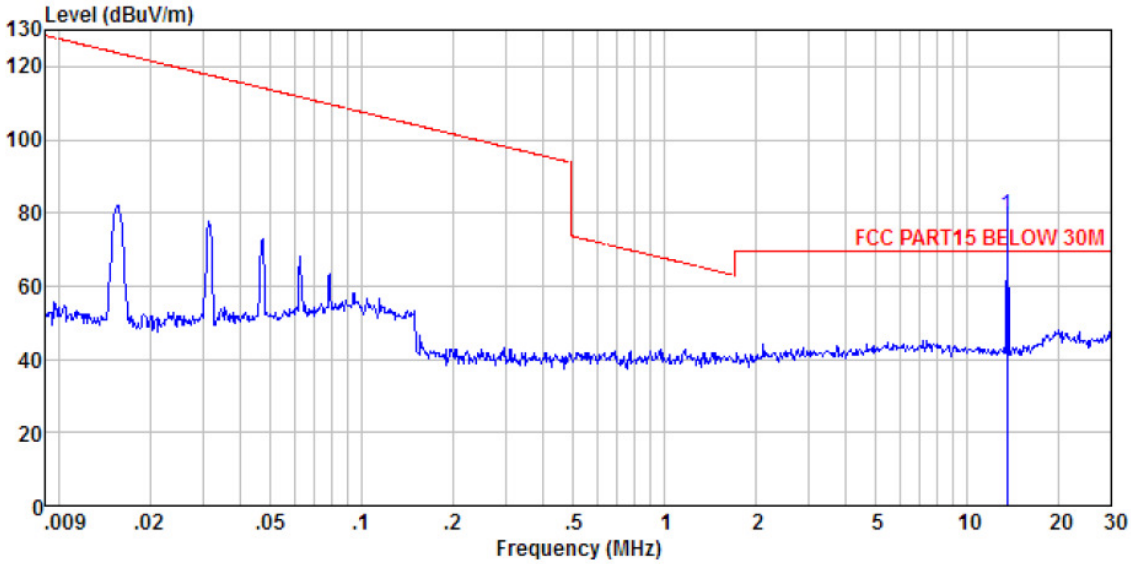


Test Procedure:	1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8meter above ground. The phase center of the loop receiving antenna mounted antenna tower was placed 3 meters far away from the turntable. 2. Power on the EUT, the turntable was rotated by 360 degrees to determine the position of the highest radiation. 3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization. 4. For each suspected emissions, the antenna tower was scan (from 1M to 4M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading. 5. Set the test-receiver system to Peak or CISPR quasi-peak detect function with specified bandwidth under maximum hold mode. 6. When the radiated emissions limits are expressed in terms of the average value of the emissions and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.

	7. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement data:

Below 30M:

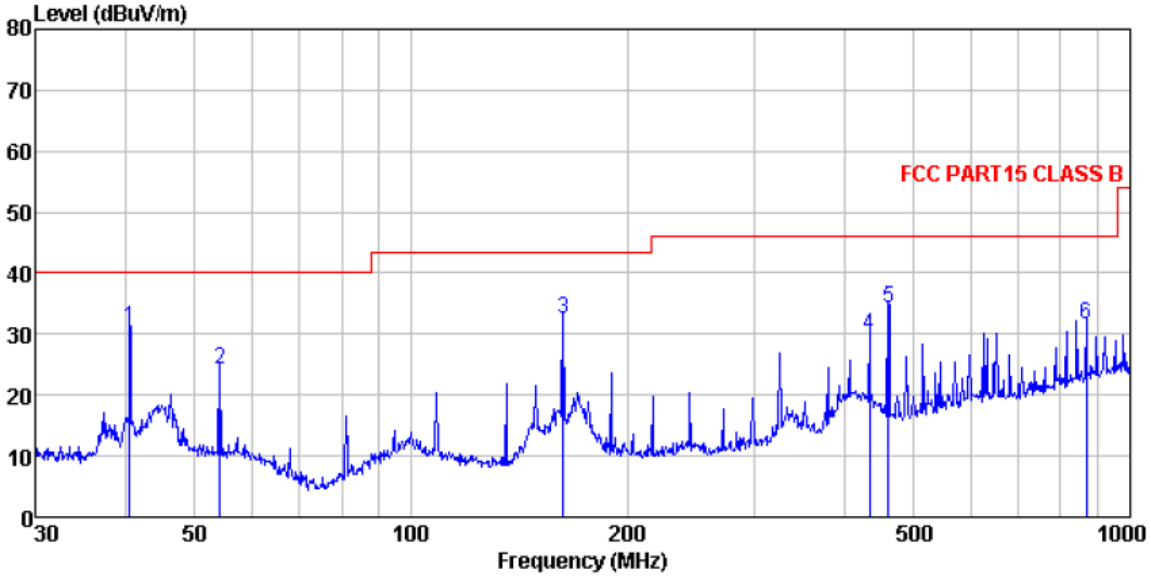


Site : 3m chamber
Condition : FCC PART15 BELOW 30M 3m ZN309000A(<30M)-2013
Job No. : 0134
Test mode : Transmitting mode
Test Engineer: Sky

	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 *	13.560	55.95	22.86	0.51	0.00	79.32	69.54	9.78	QP

30M~1G:

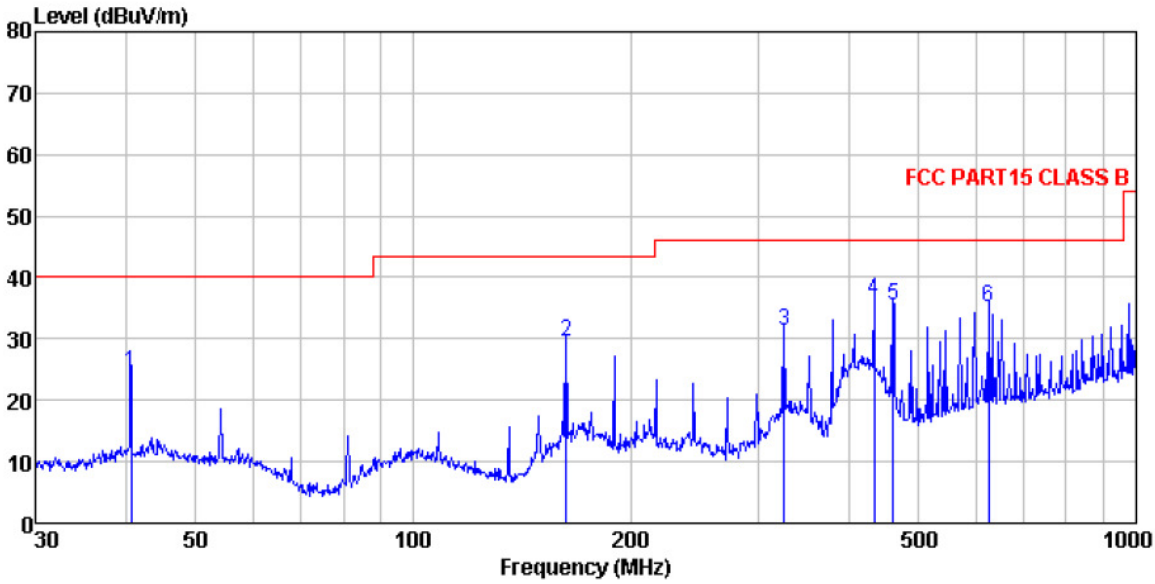
Horizontal:



Site : 3m chamber
Condition : FCC PART15 CLASS B 3m VULB9163-2013M HORIZONTAL
Job NO. : 0134
Test Mode : Transmitting mode
Test Engineer: Sky

	Freq	ReadLevel	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	40.559	44.70	15.58	30.04	0.67	30.91	40.00	-9.09	QP
2	54.261	38.27	15.05	29.96	0.81	24.17	40.00	-15.83	QP
3	162.611	49.45	10.74	29.35	1.65	32.49	43.50	-11.01	QP
4	434.065	38.82	17.53	29.43	3.02	29.94	46.00	-16.06	QP
5	460.727	42.97	17.59	29.37	3.14	34.33	46.00	-11.67	QP
6	869.130	33.14	22.78	29.13	4.74	31.53	46.00	-14.47	QP

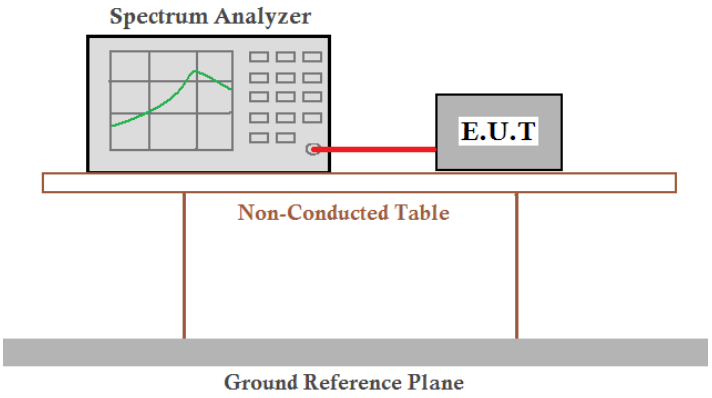
Vertical:



Site : 3m chamber
Condition : FCC PART15 CLASS B 3m VULB9163-2013M VERTICAL
Job NO. : 0134
Test Mode : Transmitting mode
Test Engineer: Sky

	Freq	ReadLevel	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	40.702	38.38	15.58	30.04	0.67	24.59	40.00	-15.41	QP
2	162.611	46.51	10.74	29.35	1.65	29.55	43.50	-13.95	QP
3	325.596	43.02	15.59	29.85	2.49	31.25	46.00	-14.75	QP
4	434.065	45.15	17.53	29.43	3.02	36.27	46.00	-9.73	QP
5	460.727	44.19	17.59	29.37	3.14	35.55	46.00	-10.45	QP
6	625.078	40.01	20.54	29.27	3.82	35.10	46.00	-10.90	QP

7.5 20dB Emission Bandwidth

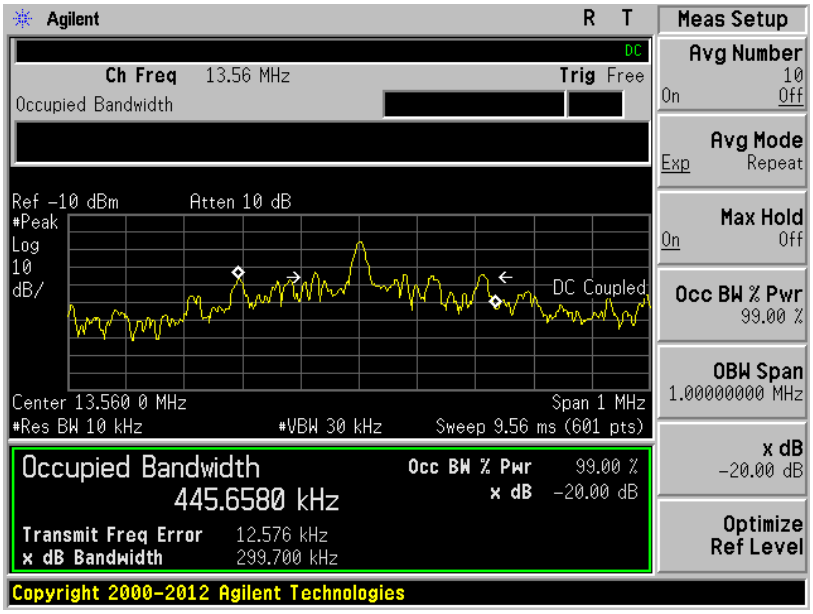
Test Requirement:	FCC Part15 C Section 15.225 and 15.215
Test Method:	ANSI C63.10:2013
Limit:	N/A
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement Data

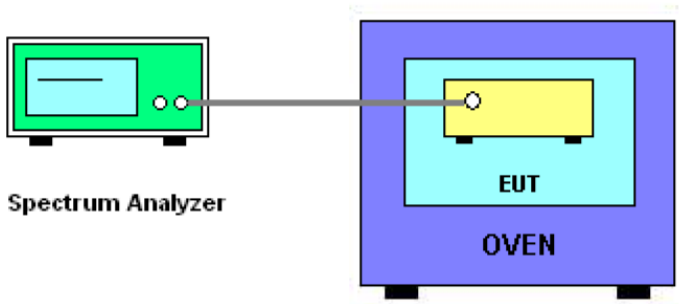
Frequency (MHz)	20dB Bandwidth (KHz)	99% OBW (KHz)
13.56MHz	299.700	445.6580

Test plot as follows:

Test mode:	-20dB bandwidth/99% OBW



7.6 Frequency Stability Measurement

Test Requirement:	FCC Part15 C Section 15.225
Test Method:	ANSI C63.10: 2013
Receiver setup:	RBW=1KHz, VBW=1KHz, Sweep time=Auto
Limit:	The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of –20 degrees to +50 degrees C at normal supply voltage, for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.
Test setup:	
Test Procedure:	1. The transmitter output (antenna port) was connected to the spectrum analyzer. 2. EUT have transmitted absence of modulation signal and fixed channelize 3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth. 4. Set RBW=1KHz, VBW=1KHz with peak detector and maxhold settings. 5. fc is declaring of channel frequency. Then the frequency error formula is (fc-f)/fc x10^6 ppm and the limit is less than ±100ppm. 6. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value 7. Extreme temperature rule is -20℃ ~50℃
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

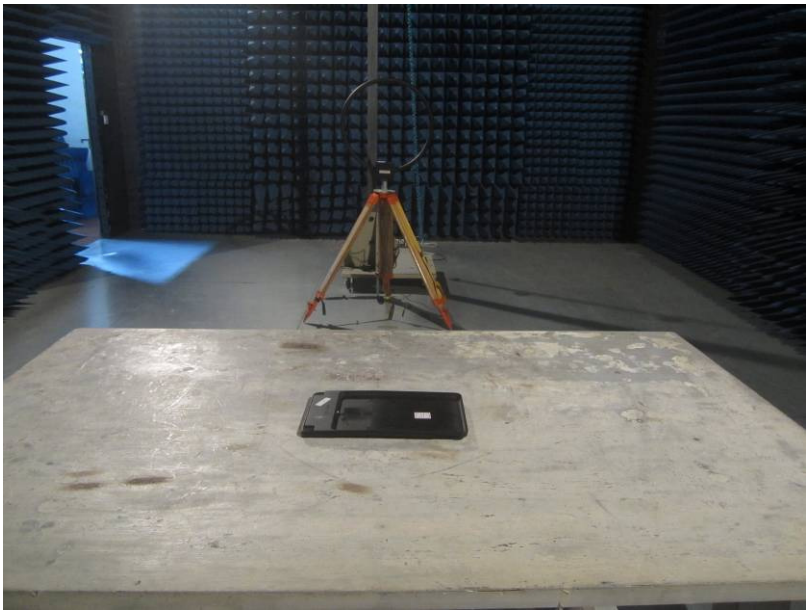
Measurement data:

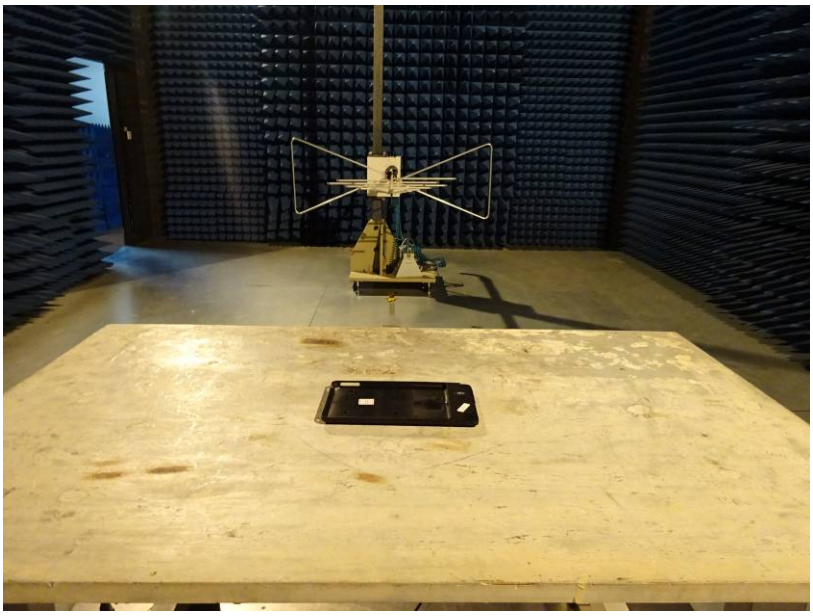
Reference Frequency: 13.56MHz					
Power supplied (Vdc)	Temperature (℃)	Frequency error		Limit	Result
		Hz	%		
3.70	-20	31	0.00023%	+/- 0.01%	Pass
	-10	43	0.00032%		
	0	48	0.00036%		
	10	23	0.00017%		
	20	34	0.00025%		
	30	38	0.00028%		
	40	55	0.00041%		
	50	52	0.00038%		

Reference Frequency: 13.56MHz					
Temperature (℃)	Power supplied (Vdc)	Frequency error		Limit	Result
		Hz	ppm		
20	3.60	35	0.00026%	+/- 0.01%	Pass
	3.70	28	0.00021%		
	4.07	32	0.00024%		

8 Test Setup Photo

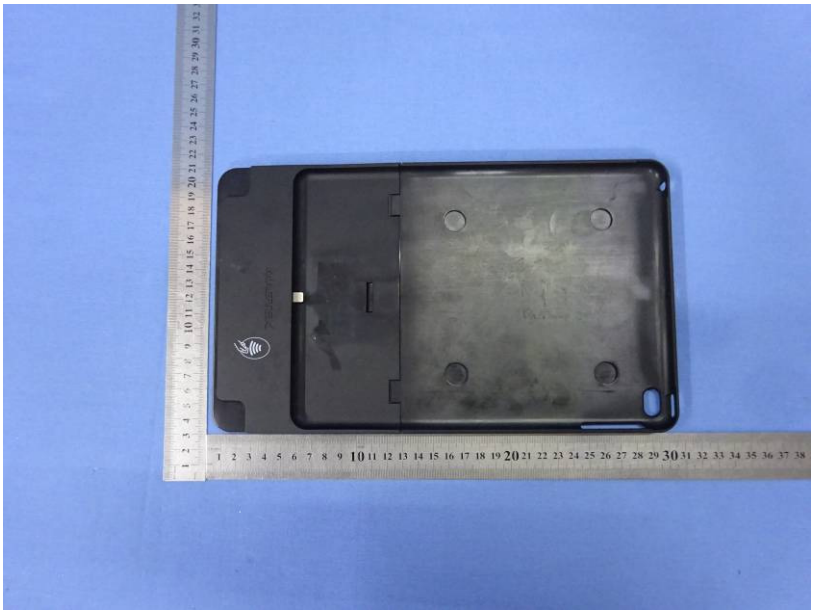
Radiated Emission

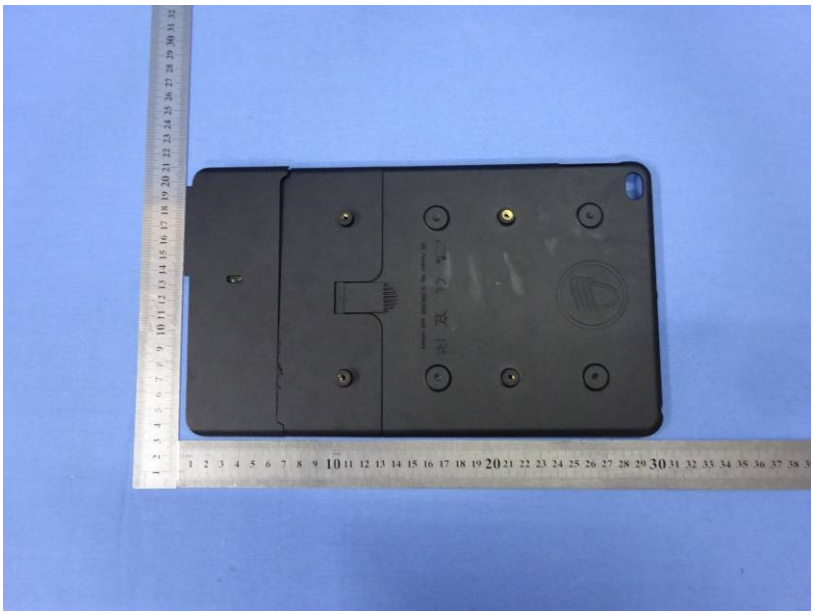


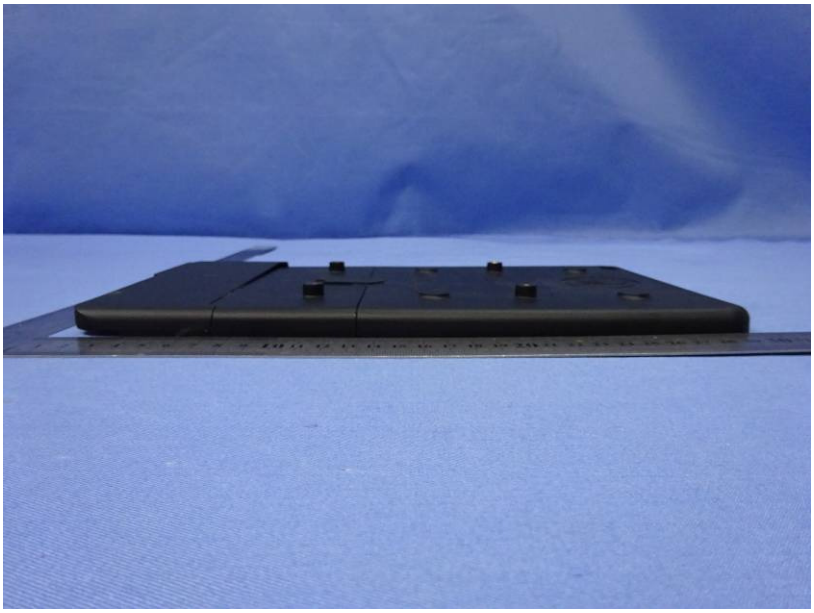


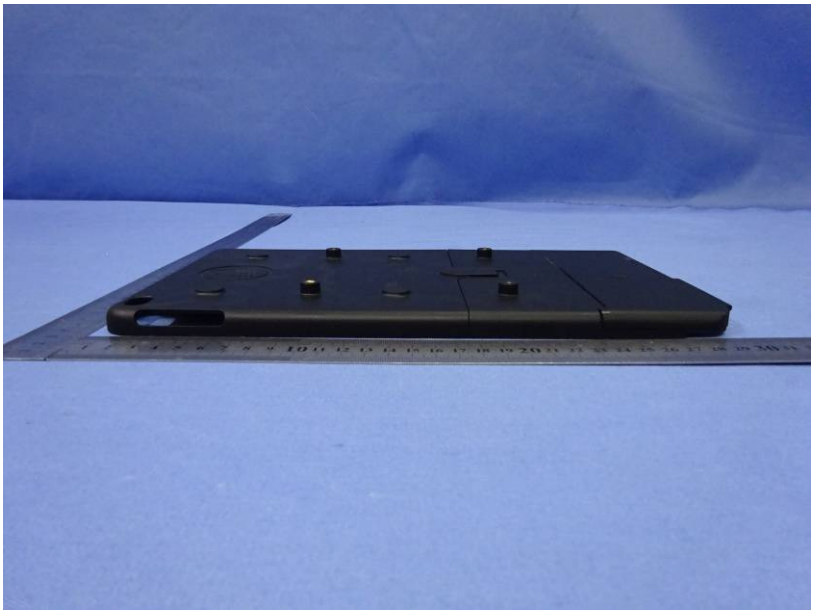
Conducted Emission

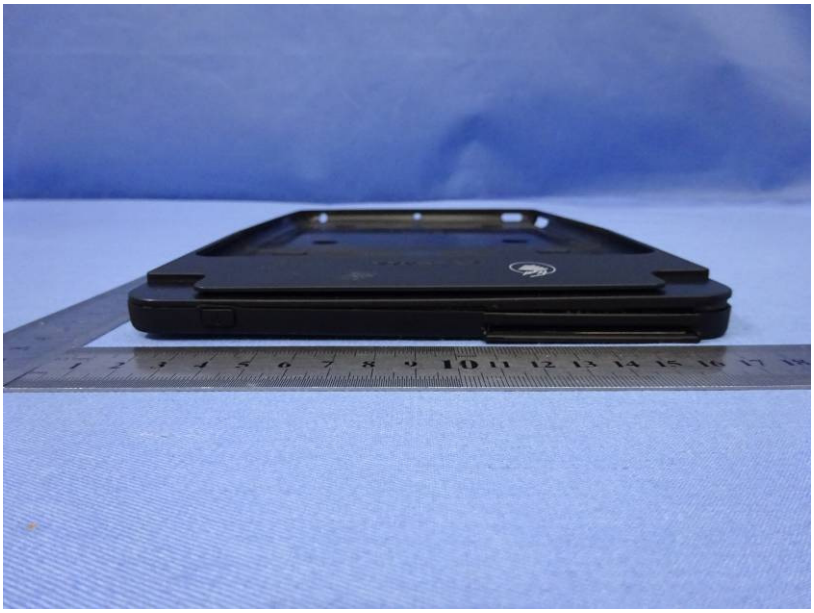
9 EUT Constructional Details

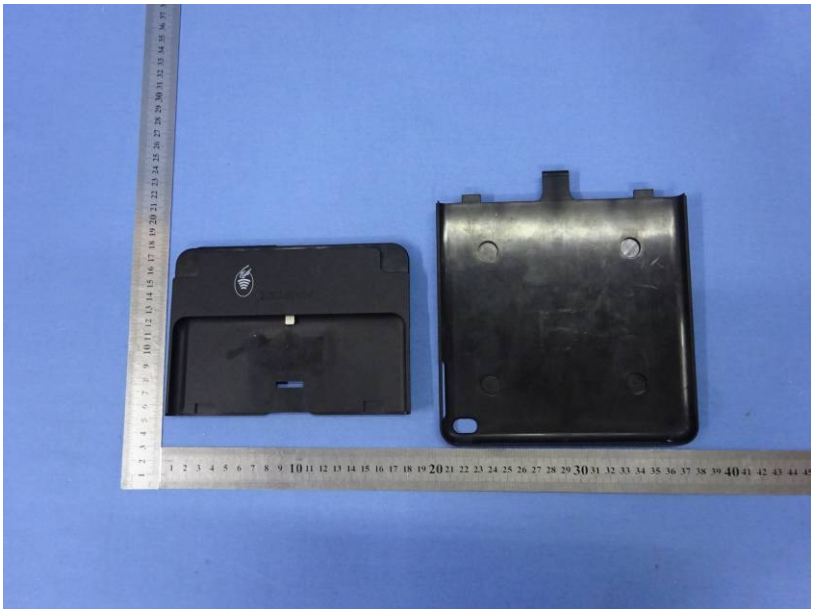


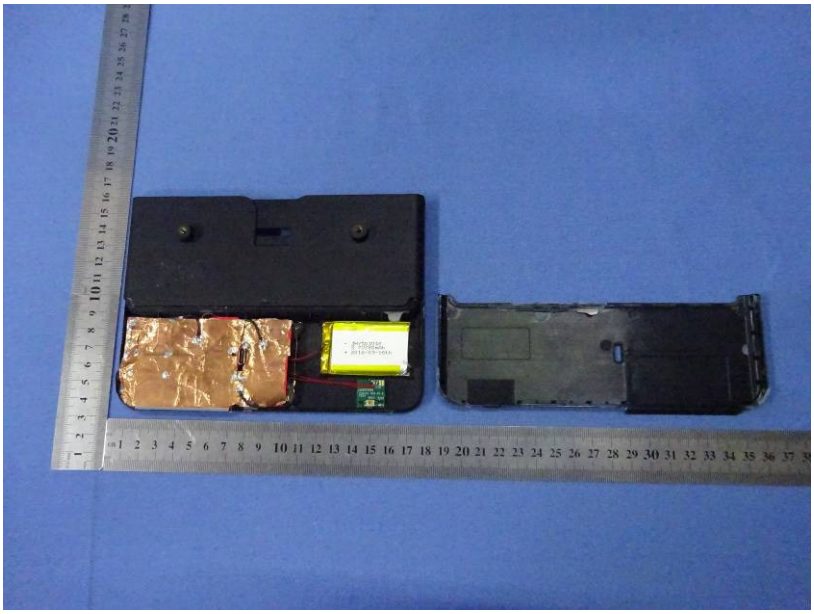


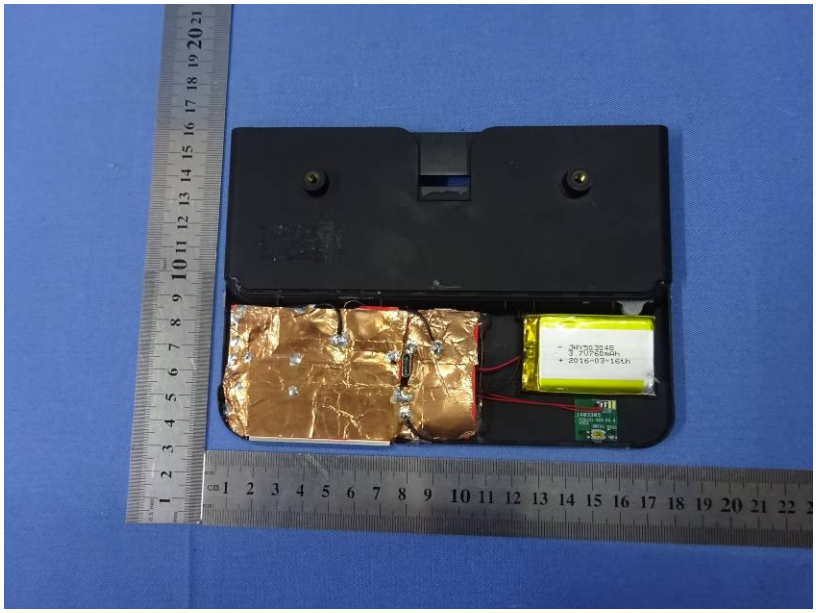


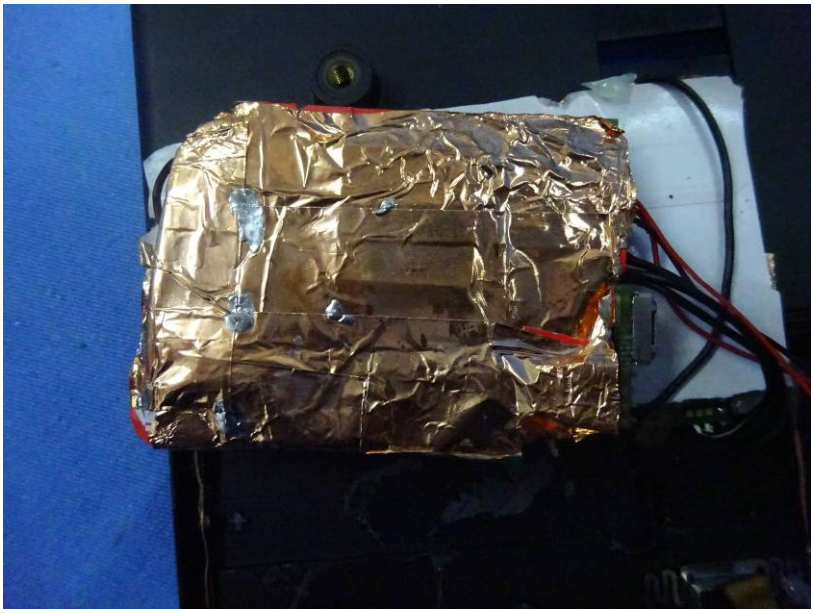


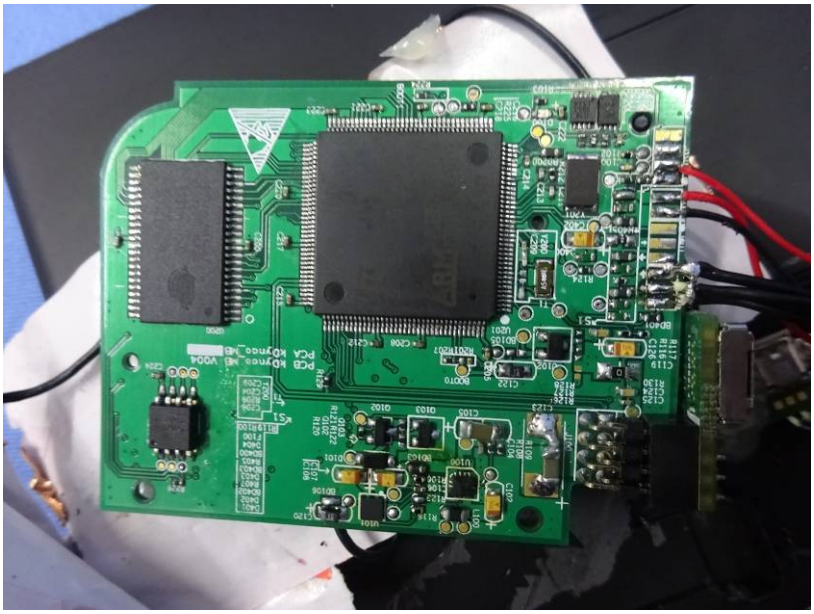




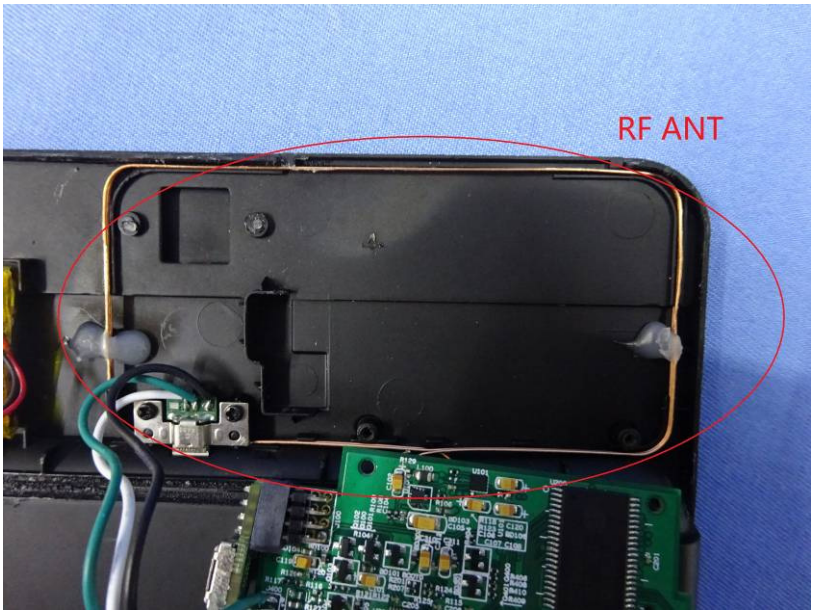


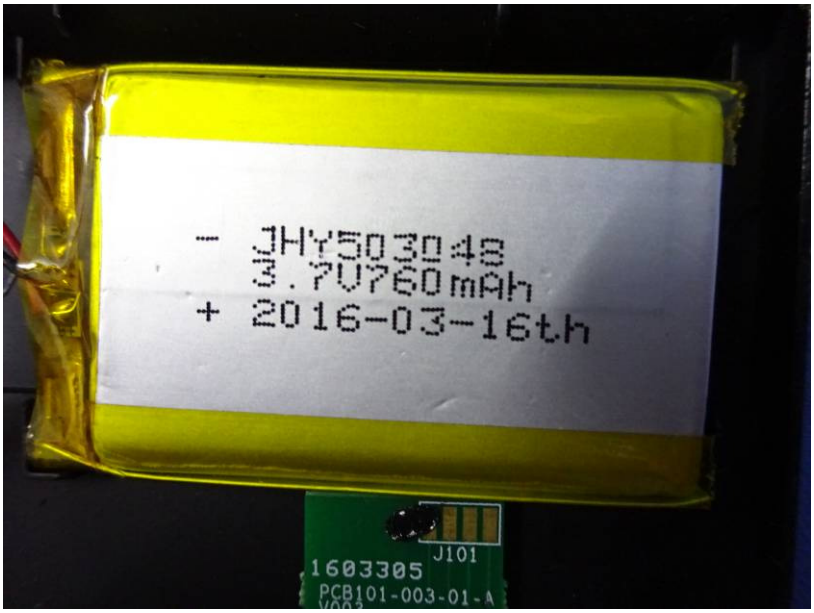







J101
1603305
PCB101-003-01-A
V003
SW101
D101


RF ANT


JHY503048
3.7V760mAh
2016-03-16th
J101
1603305
PCB101-003-01-A

------ End ------