



Shenzhen EBO Technology Co., Ltd.

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Report No.: EBO1512003-E335
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FCC Report **(NFC)**

Applicant: MAGTEK INCORPORATED.
Address of Applicant: 1710 Apollo Court, Seal Beach, California 90740, United States

Equipment Under Test (EUT)

Product Name: DYNASTY READER
Trade Mark: MAGTEK
Model No.: 33040005
FCC ID: U73-33040005
Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.225: 2014
Date of sample receipt: December 17, 2015
Date of Test: December 17, 2015 To January 12, 2016
Date of report issued: January 12, 2016
Test Result : PASS *

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

Authorized Signature:


Kevin Yu
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 EBO 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 EBO International Electrical Approvals or testing done by EBO International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by EBO International Electrical Approvals 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	January 12, 2016	Original

Prepared By:  **Date:** January 12, 2016

Project Engineer

Check By:  **Date:** January 12, 2016

Reviewer



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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 C63.4 2014 and ANSI C63.10 2013.

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:	DYNASTY READER
Trade Mark:	MAGTEK
Model No.:	33040005
Operation Frequency:	13.56MHz
Channel Number:	1
Modulation:	ASK
Antenna type:	Integral antenna
Power supply:	DC 5.0V (by USB port)

5.3 Test mode

Transmitter mode	Keep the EUT in continuously transmitting.
------------------	--------------------------------------------

5.4 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 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 tests were performed at:
Global United Technology Services Co., Ltd. Address: 2nd Floor, Block No.2, Laodong Industrial Zone, Xixiang Road Baoan District, Shenzhen, China



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	9.2(L)*6.2(W)* 6.4(H)	GTS250	Mar. 28 2015	Mar. 27 2016
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	Spectrum Analyzer	Agilent	E4440A	GTS533	Jun. 30 2015	Jun. 29 2016
4	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	Jun. 30 2015	Jun. 29 2016
5	Loop Antenna	ZHINAN	ZN30900A	GTS220	Jun. 30 2015	Jun. 29 2016
6	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	Jun. 30 2015	Jun. 29 2016
7	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	Jun. 26 2015	Jun. 25 2016
8	Horn Antenna	ETS-LINDGREN	3160	GTS217	Mar. 27 2015	Mar. 26 2016
9	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
10	Coaxial Cable	GTS	N/A	GTS213	Mar. 28 2015	Mar. 27 2016
11	Coaxial Cable	GTS	N/A	GTS211	Mar. 28 2015	Mar. 27 2016
12	Coaxial cable	GTS	N/A	GTS210	Mar. 28 2015	Mar. 27 2016
13	Coaxial Cable	GTS	N/A	GTS212	Mar. 28 2015	Mar. 27 2016
14	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	Jun. 30 2015	Jun. 29 2016
15	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	Jun. 30 2015	Jun. 29 2016
16	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	Jun. 26 2015	Jun. 25 2016
17	Band filter	Amindeon	82346	GTS219	Mar. 28 2015	Mar. 27 2016
18	Power Meter	Anritsu	ML2495A	GTS540	Jun. 30 2015	Jun. 29 2016
19	Power Sensor	Anritsu	MA2411B	GTS541	Jun. 30 2015	Jun. 29 2016

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	Jun. 30 2015	Jun. 29 2016
2	EMI Test Receiver	Rohde & Schwarz	ESCS30	GTS223	Jun. 30 2015	Jun. 29 2016
3	10dB Pulse Limita	Rohde & Schwarz	N/A	GTS224	Jun. 30 2015	Jun. 29 2016
4	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	Jun. 30 2015	Jun. 29 2016
5	LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	GTS226	Jun. 30 2015	Jun. 29 2016
6	Coaxial Cable	GTS	N/A	GTS227	Jun. 30 2015	Jun. 29 2016
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A

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General used equipment:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Barometer	ChangChun	DYM3	GTS257	July 07 2015	July 06 2016

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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:	
<i>The antenna is integral antenna.</i>	



7.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207														
Test Method:	ANSI C63.4:2014														
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 C63.4:2014 on conducted measurement. 														
Test Instruments:	Refer to section 6.0 for details														
Test mode:	Refer to section 5.3 for details														
Test results:	Pass														

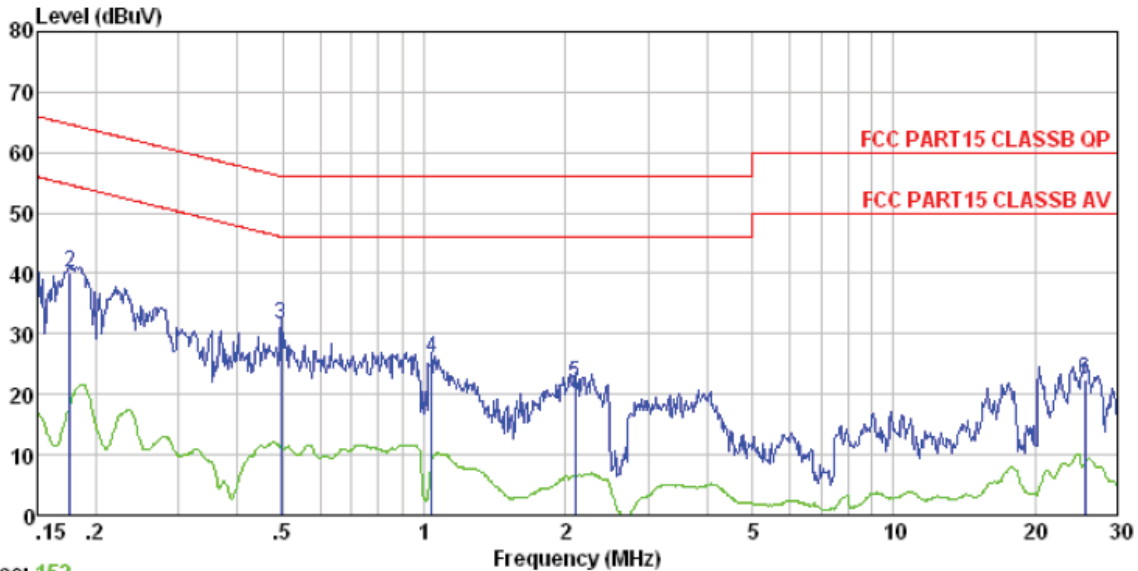
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Measurement data:

Transmitting mode:

Line:



Trace: 152

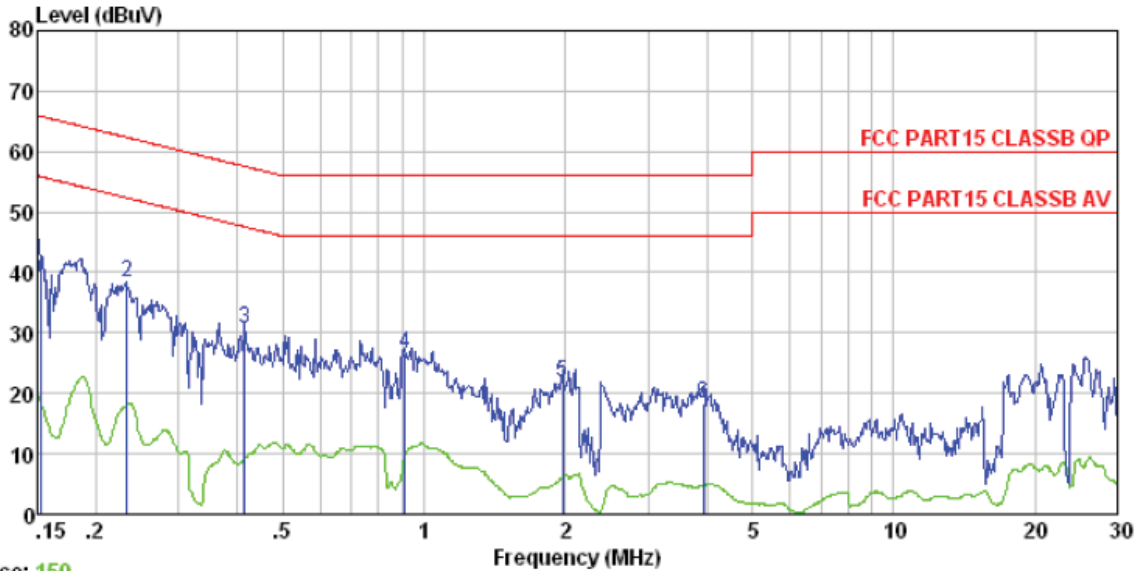
Condition : FCC PART15 CLASSB QP LISN-2013 LINE

	Read Freq	LISN Level	Cable Factor	Cable Loss	Limit Level	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dB	
1	0.150	40.28	0.15	0.12	40.55	66.00	-25.45 QP
2	0.176	39.98	0.14	0.13	40.25	64.68	-24.43 QP
3	0.497	31.45	0.12	0.11	31.68	56.05	-24.37 QP
4	1.037	25.62	0.14	0.13	25.89	56.00	-30.11 QP
5	2.099	21.43	0.12	0.15	21.70	56.00	-34.30 QP
6	25.591	21.01	1.12	0.23	22.36	60.00	-37.64 QP

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Neutral:



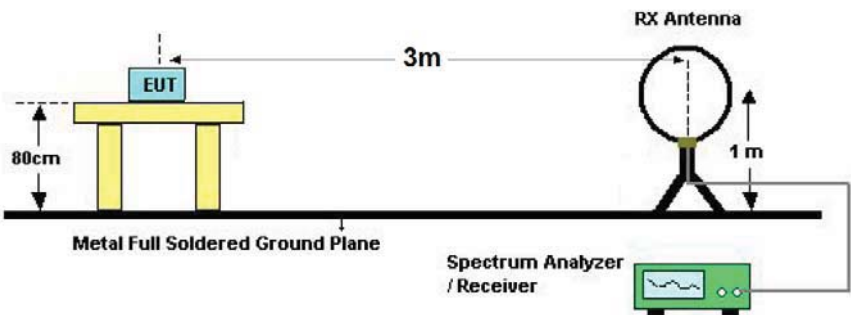
Trace: 150

Condition : FCC PART15 CLASSB QP LISN-2013 NEUTRAL							
Read	LISN	Cable	Limit	Over			
Freq	Level	Factor	Loss	Level	Line	Limit	Remark
MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.152	41.75	0.07	0.12	41.94	65.87	-23.93 QP
2	0.233	38.17	0.06	0.12	38.35	62.35	-24.00 QP
3	0.415	30.52	0.06	0.11	30.69	57.55	-26.86 QP
4	0.909	26.38	0.07	0.13	26.58	56.00	-29.42 QP
5	1.970	21.71	0.09	0.14	21.94	56.00	-34.06 QP
6	3.943	17.91	0.14	0.15	18.20	56.00	-37.80 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 C63.4:2014		
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:	<ol style="list-style-type: none"> 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 		



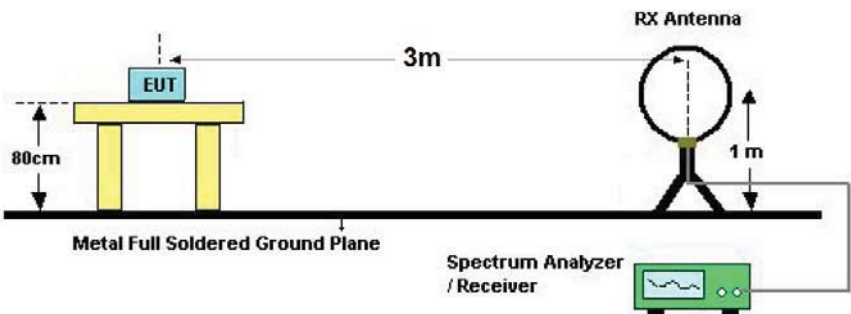
	<p>one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.</p> <p>6. Compliance with the spectrum mask is tested using a spectrum analyzer with RB set to a 9KHz for the band 13.553~13.567MHz.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

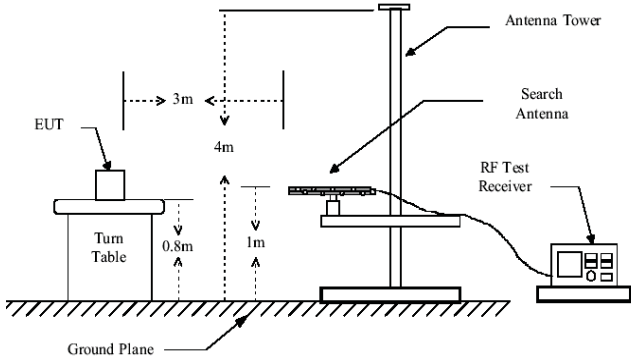
Measurement data:

Frequency (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
13.110	30.88	22.72	0.51	0.00	54.11	69.54	-15.43	Vertical
13.410	31.03	22.77	0.51	0.00	54.31	80.51	-26.20	Vertical
13.553	31.14	22.86	0.51	0.00	54.51	90.50	-35.99	Vertical
13.560	52.38	22.86	0.51	0.00	75.75	124.00	-48.25	Vertical
13.567	31.46	22.86	0.51	0.00	54.83	90.50	-35.67	Vertical
13.710	31.29	22.94	0.51	0.00	54.74	80.51	-25.77	Vertical
14.010	31.17	23.05	0.51	0.00	54.73	69.54	-14.81	Vertical
13.110	30.16	22.72	0.51	0.00	53.39	69.54	-16.15	Horizontal
13.410	30.24	22.77	0.51	0.00	53.52	80.51	-26.99	Horizontal
13.553	30.35	22.86	0.51	0.00	53.72	90.50	-36.78	Horizontal
13.560	51.17	22.86	0.51	0.00	74.54	124.00	-49.46	Horizontal
13.567	30.58	22.86	0.51	0.00	53.95	90.50	-36.55	Horizontal
13.710	30.41	22.94	0.51	0.00	53.86	80.51	-26.65	Horizontal

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7.4 Radiated Emission

Test Requirement:	FCC Part15 C Section 15.209		
Test Method:	ANSI C63.4: 2014		
Test Frequency Range:	9KHz to 1000MHz		
Test site:	Measurement Distance: 3m		
Receiver setup:	Frequency (MHz)	RBW(KHz)	Detector
	0.009~0.15	0.2	QP
	0.15~30	9	QP
	30~1000	120	QP
Limit:	The Field strength of any emissions which appear outside of 13.553~13.567MHz band shall not exceed the general radiated emissions limits		
	Frequency (MHz)	Field strength (microrvolts/meter)	Measurement distance (meters)
	0.009~0.490	2400/F(KHz)	300
	0.490~1.705	24000/F(KHz)	30
	1.705~30	30	30
	30~88	100	3
	88~216	150	3
	216~960	200	3
	960~1000	500	3
Test setup:	Below 30MHz		
			
	Above 30MHz		

	
<p>Test Procedure:</p>	<ol style="list-style-type: none"> 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.
<p>Test Instruments:</p>	<p>Refer to section 6.0 for details</p>
<p>Test mode:</p>	<p>Refer to section 5.3 for details</p>
<p>Test results:</p>	<p>Pass</p>



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Measurement data:

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
1.583	13.67	20.80	0.36	0.00	34.83	63.64	-28.81	Vertical
8.926	15.76	23.17	0.48	0.00	39.41	69.54	-30.13	Vertical
15.493	14.47	23.32	0.51	0.00	38.30	69.54	-31.24	Vertical
34.880	43.85	15.82	0.61	32.06	28.22	40.00	-11.78	Vertical
54.070	42.41	16.15	0.81	31.95	27.42	40.00	-12.58	Vertical
113.320	45.30	14.15	1.31	31.83	28.93	43.50	-14.57	Vertical
234.170	44.50	14.88	2.04	32.16	29.26	46.00	-16.74	Vertical
742.260	36.23	22.34	4.24	31.25	31.56	46.00	-14.44	Vertical
4.269	8.16	21.80	0.43	0.00	30.39	69.54	-39.15	Horizontal
17.821	11.52	25.94	0.52	0.00	37.98	69.54	-31.56	Horizontal
25.284	16.35	26.21	0.55	0.00	43.11	69.54	-26.43	Horizontal
34.280	38.66	15.80	0.60	32.06	23.00	40.00	-17.00	Horizontal
72.590	39.56	12.53	0.96	31.84	21.21	40.00	-18.79	Horizontal
96.440	37.85	16.02	1.16	31.75	23.28	43.50	-20.22	Horizontal
147.400	43.02	11.27	1.55	31.97	23.87	43.50	-19.63	Horizontal
239.150	40.95	15.06	2.06	32.16	25.91	46.00	-20.09	Horizontal

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7.5 20dB Emission Bandwidth

Test Requirement:	FCC Part15 C Section 15.225 and 15.215
Test Method:	ANSI C63.4:2014
Limit:	N/A
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 6.0 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement Data

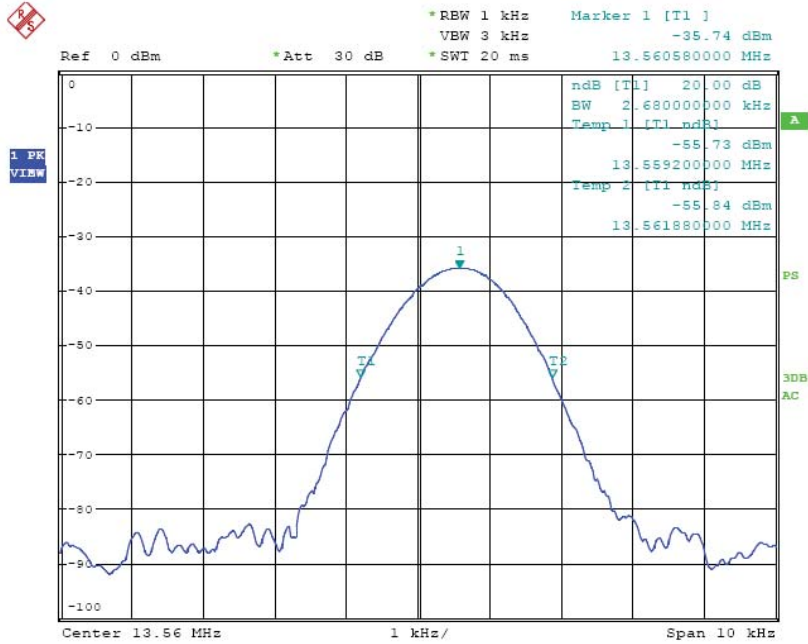
Frequency (MHz)	20dB Bandwidth (KHz)	Frequency range (MHz) fL>13.553MHz	Frequency range (MHz) fH<13.567MHz	Result
13.56MHz	2.68	13.5592	13.56188	Pass

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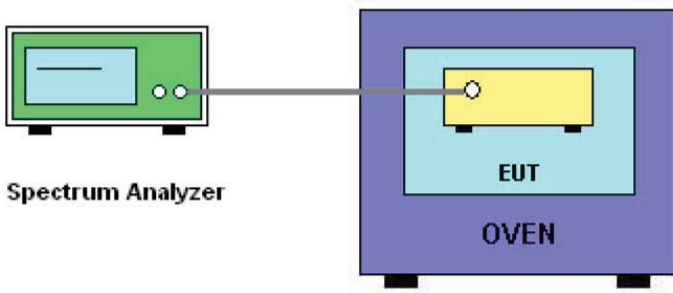
Test plot as follows:

Test mode:	20dB bandwidth
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7.6 Frequency Stability Measurement

Test Requirement:	FCC Part15 C Section 15.225
Test Method:	ANSI C63.4: 2014
Receiver setup:	RBW=1KHz, VBW=1KHz, Sweep time=Auto
Limit:	<p>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,</p> <p>for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.</p> <p>For battery operated equipment, the equipment tests shall be performed using a new battery.</p>
Test setup:	 <p>The diagram illustrates the test setup. On the left is a green Spectrum Analyzer. A cable connects its antenna port to a yellow EUT (Equipment Under Test) located inside a blue Oven. The labels 'Spectrum Analyzer', 'EUT', and 'OVEN' are placed below their respective components.</p>
Test Procedure:	<ol style="list-style-type: none"> 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 $(fc-f)/fc \times 10^6$ 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°C ~50°C
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 (°C)	Frequency error		Limit	Result
		Hz	%		
5.0	-20	572	0.0042	+/- 0.01%	Pass
	-10	574	0.0042		
	0	585	0.0043		
	10	591	0.0044		
	20	583	0.0043		
	30	580	0.0043		
	40	578	0.0043		
	50	595	0.0044		

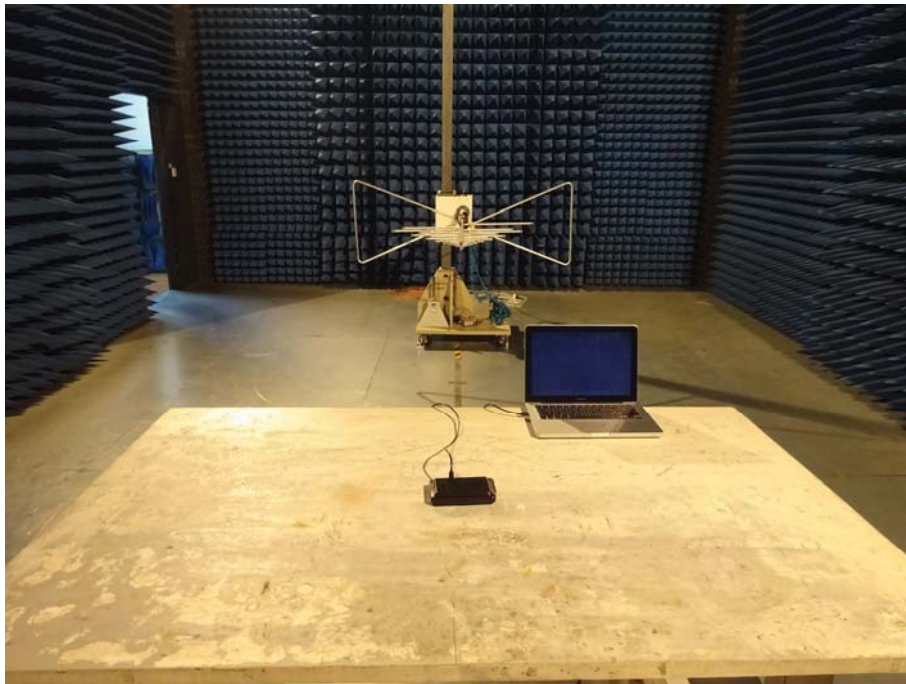
Reference Frequency: 13.56MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit	Result
		Hz	ppm		
25	4.25	568	0.0042	+/- 0.01%	Pass
	5.0	580	0.0043		
	5.75	582	0.0043		

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8 Test Setup Photo

Radiated Emission



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Conducted Emission



9 EUT Constructional Details

Reference to the test report No. : EBO1512003-E333.

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