TEST REPORT

Product	:	Intelligent Access Control Terminal
Trade mark	:	N/A
Model/Type reference	:	SPS050
Serial Number	:	N/A
Report Number	:	EED32P80611901
FCC ID	:	2BE4YJH-SPS050
Date of Issue	:	May 06, 2025
Test Standards	:	47 CFR Part 15 Subpart C
Test result	:	PASS

Prepared for:

Ji-Haw Industry Co., Ltd
No. 53, Baoxing Rd, Xindian District, New Taipei City, 231 TAIWAN

Prepared by:

Centre Testing International Group Co., Ltd.
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Check No.: 5142270423

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2 Test Summary

Test Item	FCC Test Requirement	Test Method	Result
Antenna Requirement	47 CFR Part 15, Subpart C Section 15.203	ANSI C63.10 2013	Pass
Conducted Emission (150KHz to 30MHz)	47 CFR Part 15, Subpart C Section 15.207	ANSI C63.10 2013	Pass
Electric Field Strength of Fundamental and Outside the Allocated bands	47 CFR Part 15, Subpart C Section 15.225(a)/(b)/(c)	ANSI C63.10 2013	Pass
Radiated Emission	47 CFR Part 15, Subpart C Section 15.225(d)/15.209	ANSI C63.10 2013	Pass
Frequency Tolerance	47 CFR Part 15, Subpart C Section 15.225(e)	ANSI C63.10 2013	Pass
20dB Occupied Bandwidth	47 CFR Part 15, Subpart C Section 15.215	ANSI C63.10 2013	Pass

3 General Information

3.1 Client Information

Applicant:	Ji-Haw Industry Co., Ltd
Address of Applicant:	No. 53, Baoxing Rd, Xindian District, New Taipei City, 231 TAIWAN
Manufacturer:	Ji-Haw Industry Co., Ltd
Address of Manufacturer:	No. 53, Baoxing Rd, Xindian District, New Taipei City, 231 TAIWAN
Factory:	Q.S.C. Industry Co., Ltd
Address of Factory:	5F., NO.193-2,ZHONGXING N. ST., SANCHONG DIST., NEW TAIPEI CITY 241, TAIWAN

3.2 General Description of E.U.T.

Product Name:	Intelligent Access Control Terminal
Model No.(EUT):	SPS050
Trade Mark:	N/A
Product Type:	☐ Mobile ☐ Portable ☒ Fix Location
Operation Frequency:	13.56MHz
Modulation Type:	ASK
Antenna Type:	FPC antenna
Power Supply:	DC 12V, 2A
Test voltage:	DC 12V
Sample Received Date:	Apr. 27, 2023
Sample tested Date:	Apr. 27, 2023 to Oct. 22, 2023

3.3 Test Environment & Test Mode

Operating Environment:	
Radiated Emissions:	
Temperature:	24 °C
Humidity:	64 % RH
Atmospheric Pressure:	1010mbar
Test Mode:	
Test mode:	Keep EUT working in continuous transmitting mode with 100% duty cycle.

3.4 Description of Support Units

The EUT has been tested with associated equipment below.

1）support equipment

Description	Manufacturer	Model No.	Certification	Supplied by
/	/	/	/	/

3.5 Test Location

All tests were performed at:

Centre Testing International Group Co., Ltd
Building C, Hongwei Industrial Park Block 70, Bao'an District, Shenzhen, China
Telephone: +86 (0) 755 33683668 Fax:+86 (0) 755 33683385
No tests were sub-contracted.
FCC Designation No.: CN1164

3.6 Deviation from Standards

None.

3.7 Abnormalities from Standard Conditions

None.

3.8 Other Information Requested by the Customer

None.

3.9 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Radio Frequency	7.9×10^{-8}
2	RF power, conducted	0.46dB (30MHz-1GHz)
		0.55dB (1GHz-18GHz)
3	Radiated Spurious emission test	3.3dB (9kHz-30MHz)
		4.3dB (30MHz-1GHz)
		4.5dB (1GHz-12.75GHz)
4	Conduction emission	3.5dB (9kHz to 150kHz)
		3.1dB (150kHz to 30MHz)
5	Temperature test	0.64°C
6	Humidity test	3.8%
7	DC power voltages	0.026%

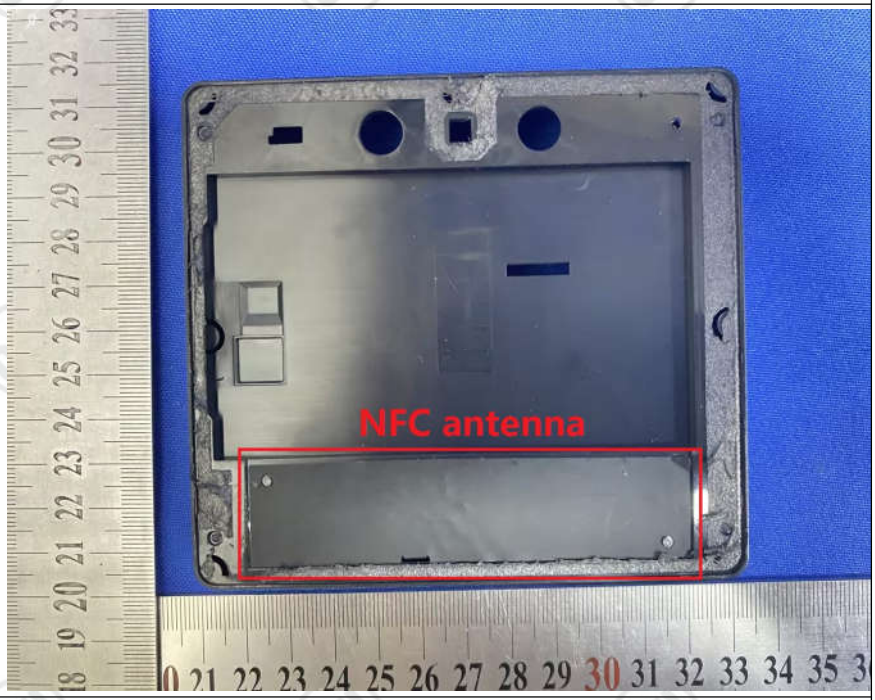
4 Equipment List

Conducted disturbance Test					
Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
Receiver	R&S	ESCI	100435	04-25-2023	04-24-2024
LISN	R&S	ENV216	100098	09-27-2022 09-22-2023	09-26-2023 09-21-2024
Capacitive voltage probe	Schwarzbeck	CVP 9222C	00124	07-13-2022 06-29-2023	07-12-2023 06-28-2024
ISN	TESEQ	ISN T800	30297	12-29-2022	12-28-2023
Barometer	Changchun	DYM3	1188	---	---
Temperature/ Humidity Indicator	Defu	TH128	---	---	---

3M Semi-anechoic Chamber (2)- Radiated disturbance Test					
Equipment	**Manufacturer**	**Model**	**Serial No.**	**Cal. Date**	**Due Date**
3M Chamber & Accessory Equipment	TDK	SAC-3	---	05-22-2022	05-21-2025
Receiver	R&S	ESCI7	100938-003	09-28-2022 09-22-2023	09-27-2023 09-21-2024
Spectrum Analyzer	R&S	FSV40	101200	07-29-2022 07-25-2023	07-28-2023 07-24-2024
Loop Antenna	Schwarzbeck	FMZB 1519B	1519B-076	04-15-2021	04-14-2024
TRILOG Broadband Antenna	Schwarzbeck	VULB9163	9163-618	05-22-2022 05-21-2023	05-21-2023 05-20-2024
Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-1869	04-17-2021	04-16-2024
Horn Antenna	A.H.SYSTEMS	SAS-574	374	05-29-2021	05-28-2024
Preamplifier	Agilent	11909A	12-1	03-28-2023	03-27-2024
Preamplifier	EMCI	EMC051845SE	980380	12-23-2022	12-22-2023
Preamplifier	CD	PAP-1840-60	6041.6042	07-05-2022 07-03-2023	07-04-2023 07-02-2024
Cable line	Fulai(7M)	SF106	5219/6A	---	---
Cable line	Fulai(6M)	SF106	5220/6A	---	---
Cable line	Fulai(3M)	SF106	5216/6A	---	---
Cable line	Fulai(3M)	SF106	5217/6A	---	---

5 Test Result and Measurement Data

5.1 Antenna Requirment

Standard requirement:	47 CFR 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.
EUT Antenna:	
The antenna is coil antenna and integrated on the main PCB and no consideration of replacement.	

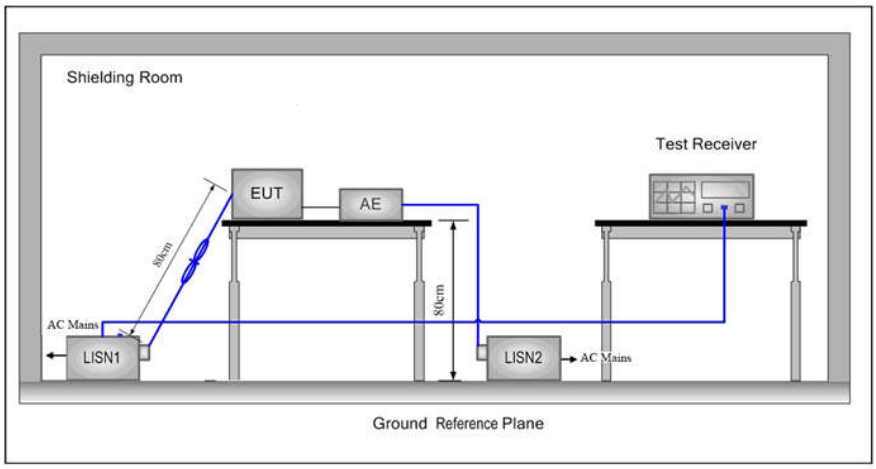
5.2 AC Power Line Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.207
Test Method:	ANSI C63.10: 2013
Test Frequency Range:	150kHz to 30MHz
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:



Test Procedure:

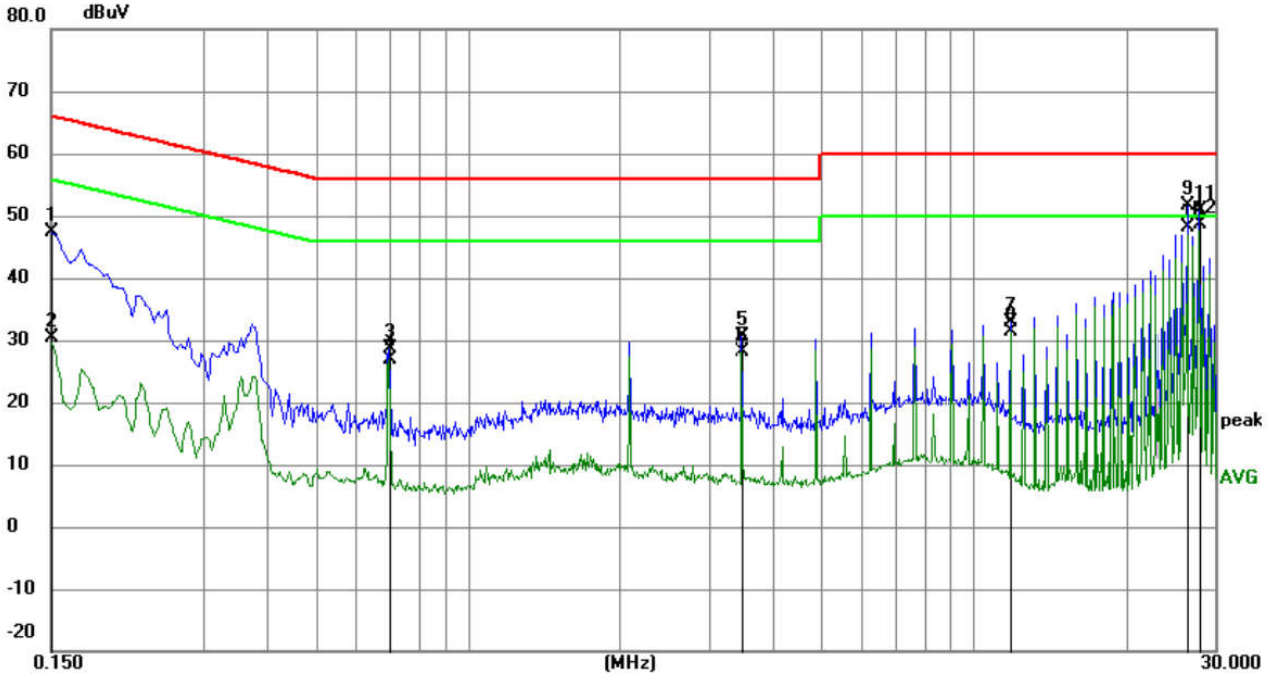
1) The mains terminal disturbance voltage test was conducted in a shielded room.
2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane.
4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
5) 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 Mode: All modes were tested, only the worse case lowest channel of 1Mbps for

	802.11b was recorded in the report.
Test Results:	Pass

Measurement Data

Live line:

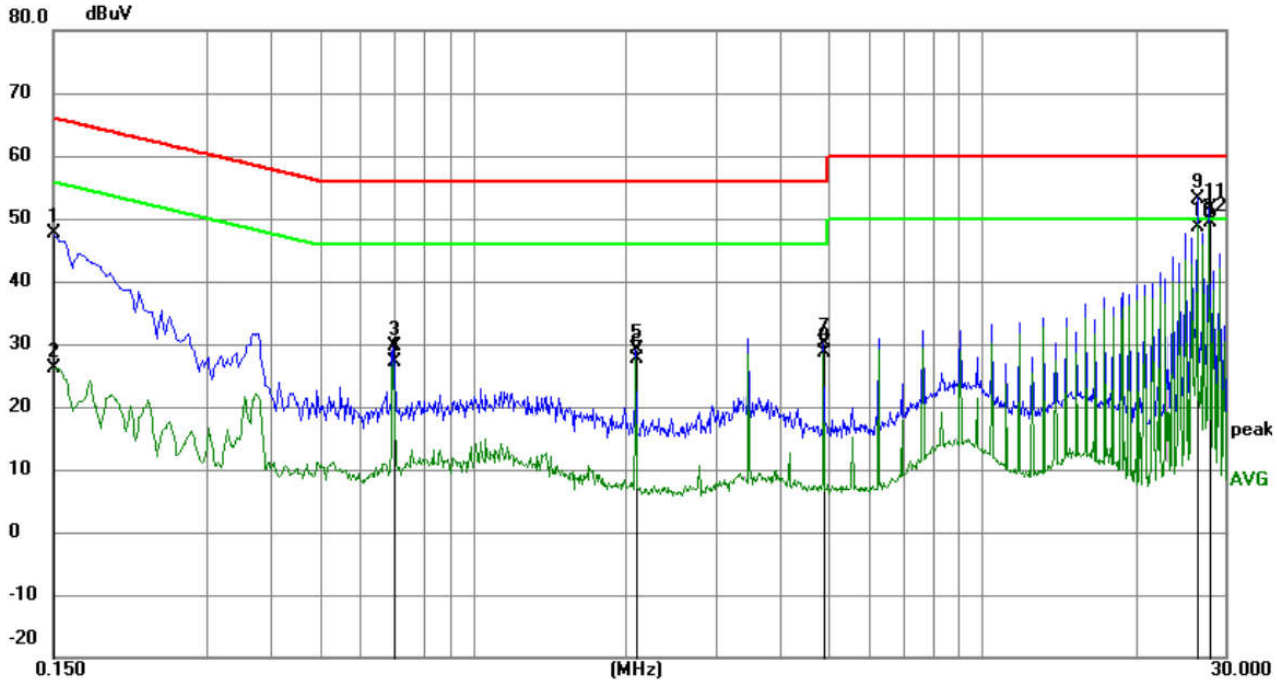


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1500	37.63	9.87	47.50	66.00	-18.50	QP	
2		0.1500	20.59	9.87	30.46	56.00	-25.54	AVG	
3		0.6990	18.67	9.88	28.55	56.00	-27.45	QP	
4		0.6990	16.89	9.88	26.77	46.00	-19.23	AVG	
5		3.4845	20.87	9.78	30.65	56.00	-25.35	QP	
6		3.4845	18.46	9.78	28.24	46.00	-17.76	AVG	
7		11.8500	22.93	9.84	32.77	60.00	-27.23	QP	
8		11.8500	21.47	9.84	31.31	50.00	-18.69	AVG	
9		26.4840	41.70	10.01	51.71	60.00	-8.29	QP	
10		26.4840	38.09	10.01	48.10	50.00	-1.90	AVG	
11		27.8790	40.91	10.02	50.93	60.00	-9.07	QP	
12	*	27.8790	38.68	10.02	48.70	50.00	-1.30	AVG	

Remark:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.
3. If the Peak value under Average limit, the Average value is not recorded in the report.

Neutral line:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1500	37.64	9.87	47.51	66.00	-18.49	QP	
2		0.1500	16.27	9.87	26.14	56.00	-29.86	AVG	
3		0.6990	19.68	9.88	29.56	56.00	-26.44	QP	
4		0.6990	17.29	9.88	27.17	46.00	-18.83	AVG	
5		2.0895	19.44	9.79	29.23	56.00	-26.77	QP	
6		2.0895	17.88	9.79	27.67	46.00	-18.33	AVG	
7		4.8795	20.39	9.78	30.17	56.00	-25.83	QP	
8		4.8795	18.89	9.78	28.67	46.00	-17.33	AVG	
9		26.4885	43.24	10.01	53.25	60.00	-6.75	QP	
10		26.4885	38.69	10.01	48.70	50.00	-1.30	AVG	
11		27.8835	41.53	10.02	51.55	60.00	-8.45	QP	
12	*	27.8835	39.48	10.02	49.50	50.00	-0.50	AVG	

Remark:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.
3. If the Peak value under Average limit, the Average value is not recorded in the report.

5.3 Electric Field Strength of Fundamental and Outside the Allocated bands

Test Requirement: 47 CFR Part 15, Subpart C Section 15.225(a)/(b)/(c)

Test Method: ANSI C63.10: 2013

Test Site: 3m (Semi-Anechoic Chamber)

Receiver Setup:

Frequency	Detector	RBW	VBW	Remark
0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak
0.009MHz-0.090MHz	Average	10kHz	30kHz	Average
0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
0.110MHz-0.490MHz	Peak	10kHz	30kHz	Peak
0.110MHz-0.490MHz	Average	10kHz	30kHz	Average
0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak

Limit:

Frequency Range(MHz)	E-field Strength Limit @ 30 m (μV/m)	E-field Strength Limit @ 3 m (dBμV/m)
13.560 ± 0.007	15848	124
13.410 to 13.553 13.567 to 13.710	334	90
13.110 to 13.410 13.710 to 14.010	106	81

Note: Where the limits have been defined at one distance, and a signal level measured at another, the limits have been extrapolated using the following formula:

Extrapolation(dB)=40log$_{10}$(Measurement Distance/Specification Distance)

Test Setup:

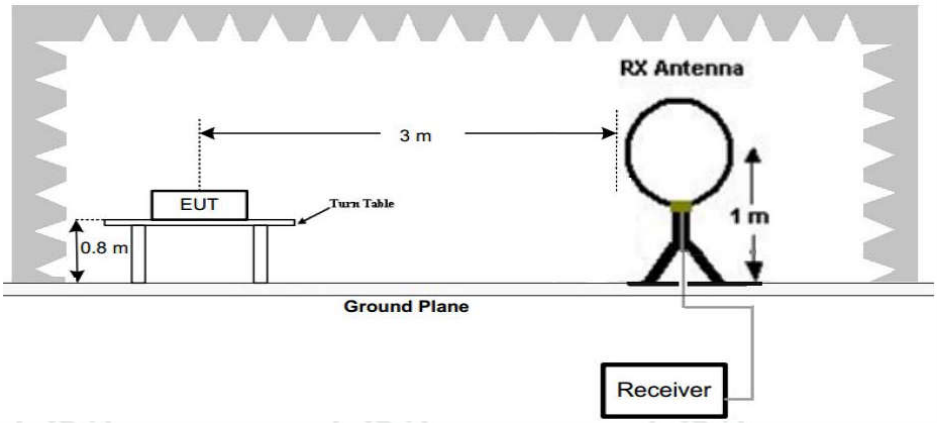


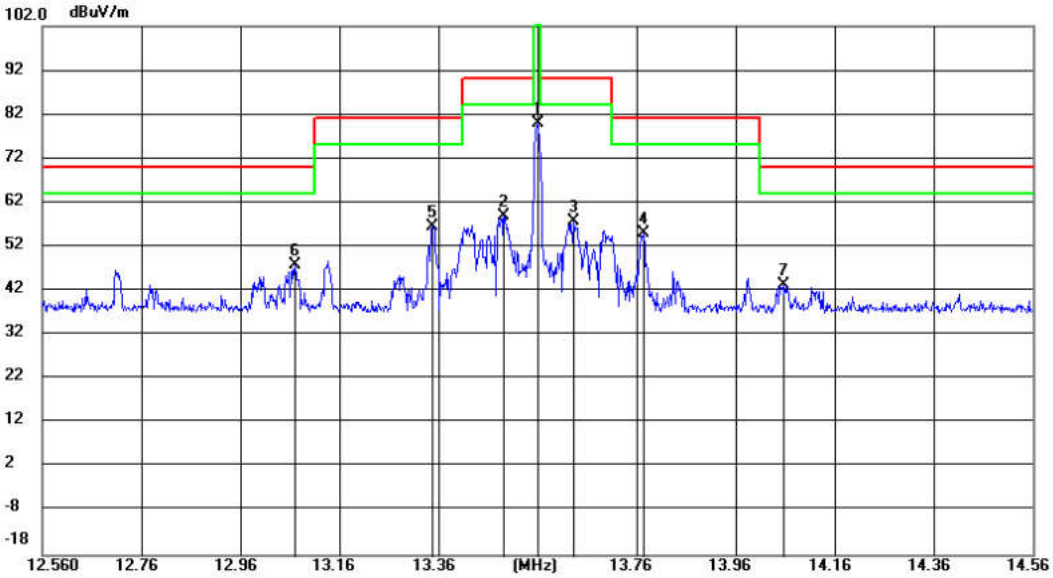
Figure 1. Below 30MHz

Test Procedure:

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) 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. 7. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.
Test Mode:	Transmitting with ASK modulation.
Test Result:	Pass

Measurement Data:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		13.5600	59.50	20.35	79.85	124.00	-44.15	peak			
2		13.4920	38.68	20.35	59.03	90.00	-30.97	peak			
3		13.6329	37.44	20.35	57.79	90.00	-32.21	peak			
4		13.7739	34.77	20.35	55.12	81.00	-25.88	peak			
5		13.3480	36.31	20.35	56.66	81.00	-24.34	peak			
6	*	13.0700	27.55	20.35	47.90	70.00	-22.10	peak			
7		14.0570	22.91	20.34	43.25	70.00	-26.75	peak			

Remark:

Only the worst case data of X axis positioning was recorded in the report.

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier.

The basic equation with a sample calculation is as follows:

Factor= Antenna Factor + Cable Factor – Preamplifier Factor,

Level = Read Level + Factor,

Over Limit=Level-Limit Line.

5.4 Radiated Emissions

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.225(d),
Test Method:	ANSI C63.10: 2013
Test Site:	3m (Semi-Anechoic Chamber)

Receiver Setup:

Frequency	Detector	RBW	VBW	Remark
0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak
0.009MHz-0.090MHz	Average	10kHz	30kHz	Average
0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
0.110MHz-0.490MHz	Peak	10kHz	30kHz	Peak
0.110MHz-0.490MHz	Average	10kHz	30kHz	Average
0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
30MHz-1GHz	Peak	100 kHz	300kHz	Peak

Limit:

Frequency	Field strength (microvolt/meter)	Limit (dBuV/m) @ 3 m	Remark
0.009MHz-0.490MHz	2400/F(kHz) @300m	128.5-93.8	Quasi-peak
0.490MHz-1.705MHz	24000/F(kHz) @30m	73.8-63	Quasi-peak
1.705MHz-30MHz	30 @30m	70	Quasi-peak
30MHz-88MHz	100 @3m	40.0	Quasi-peak
88MHz-216MHz	150 @3m	43.5	Quasi-peak
216MHz-960MHz	200 @3m	46.0	Quasi-peak
960MHz-1GHz	500 @3m	54.0	Quasi-peak

Note: Where the limits have been defined at one distance, and a signal level measured at another, the limits have been extrapolated using the following formula:

Extrapolation(dB)=40log$_{10}$(Measurement Distance/Specification Distance)

Test Setup:

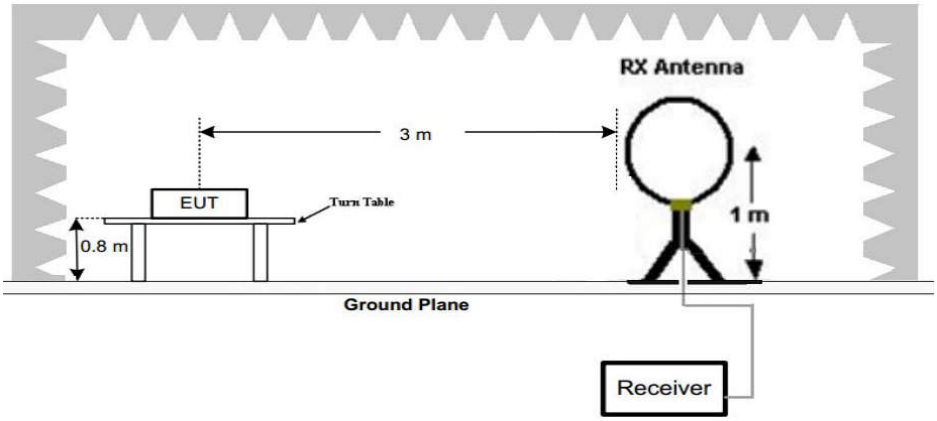


Figure 1. Below 30MHz

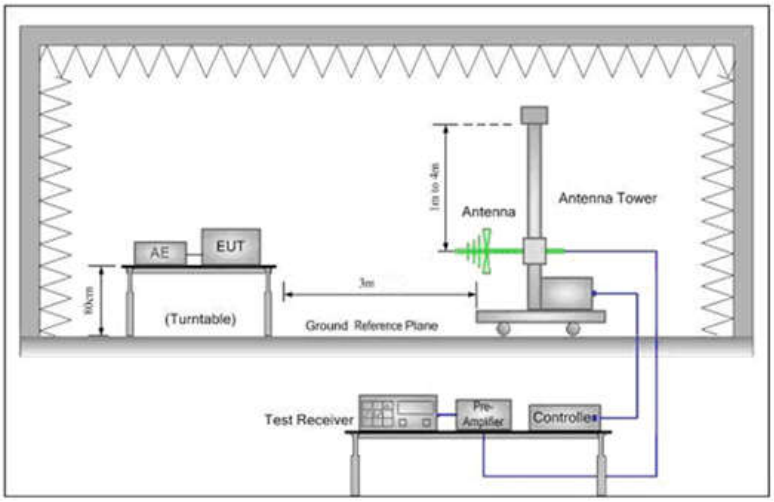


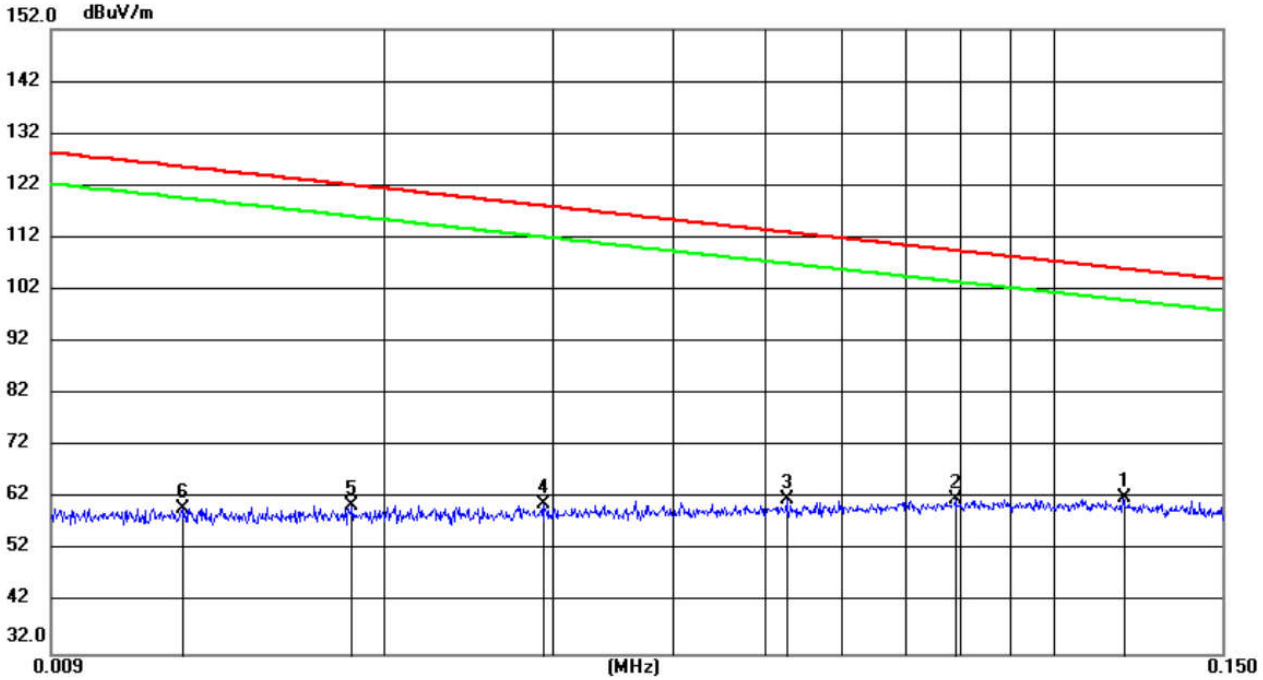
Figure 2. 30MHz to 1GHz

Test Procedure:	5. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation. 6. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 7. 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. 8. 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) 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. 7. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.
Test Mode:	Transmitting with ASK modulation.
Test Result:	Pass

Measurement Data

9kHz – 150kHz:

Horizontal:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	0.1183	41.59	20.55	62.14	106.07	-43.93	peak	100	288	
2		0.0791	41.24	20.63	61.87	109.54	-47.67	peak	100	278	
3		0.0526	41.23	20.71	61.94	113.07	-51.13	peak	100	267	
4		0.0294	40.17	20.77	60.94	118.09	-57.15	peak	100	75	
5		0.0185	39.77	20.85	60.62	122.09	-61.47	peak	100	44	
6		0.0123	38.94	21.14	60.08	125.61	-65.53	peak	100	75	

Remark:

Only the worst case data of X axis positioning was recorded in the report.

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

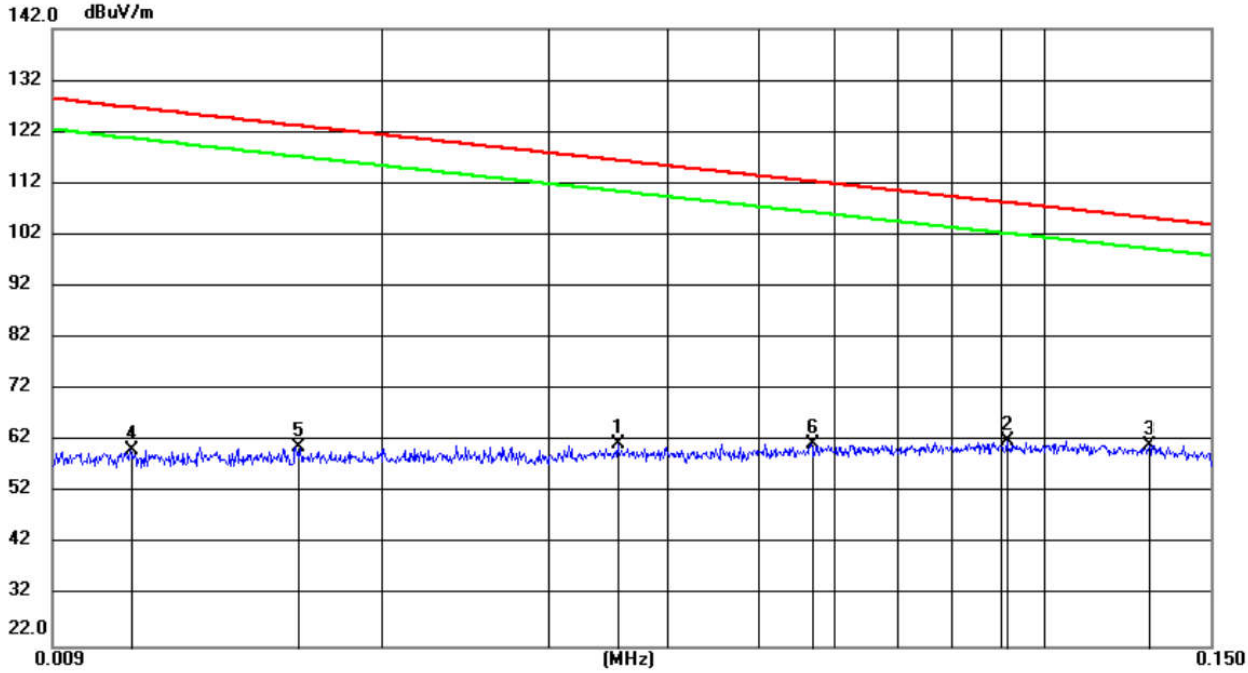
Factor= Antenna Factor + Cable Factor – Preamplifier Factor,

Level = Read Level + Factor,

Over Limit=Level-Limit Line.

9kHz – 150kHz:

Vertical:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		0.0355	40.59	20.76	61.35	116.46	-55.11	peak	100	273	
2		0.0916	41.47	20.60	62.07	108.28	-46.21	peak	100	263	
3	*	0.1292	40.51	20.57	61.08	105.31	-44.23	peak	100	273	
4		0.0109	39.10	21.22	60.32	126.65	-66.33	peak	100	295	
5		0.0163	39.97	20.94	60.91	123.18	-62.27	peak	100	316	
6		0.0570	40.66	20.69	61.35	112.37	-51.02	peak	100	305	

Remark:

Only the worst case data of X axis positioning was recorded in the report.

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

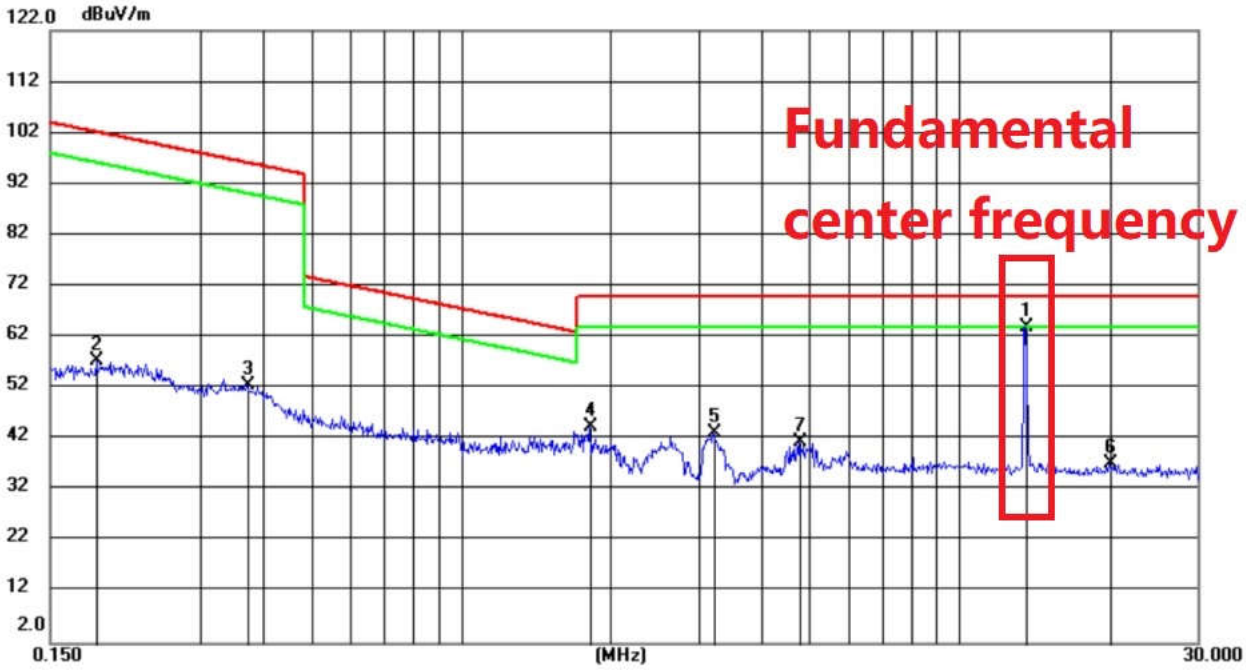
Factor= Antenna Factor + Cable Factor – Preamplifier Factor,

Level = Read Level + Factor,

Over Limit=Level-Limit Line.

150kHz-30MHz:

Horizontal:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	13.5652	43.69	20.35	64.04	70.00	-5.96	peak	100	192	
2		0.1859	36.88	20.55	57.43	102.17	-44.74	peak	100	309	
3		0.3730	31.95	20.49	52.44	96.16	-43.72	peak	100	43	
4		1.8167	23.95	20.39	44.34	70.00	-25.66	peak	100	192	
5		3.2086	22.75	20.36	43.11	70.00	-26.89	peak	100	352	
6		20.0187	16.99	20.35	37.34	70.00	-32.66	peak	100	331	
7		4.7753	21.10	20.39	41.49	70.00	-28.51	peak	100	288	

Remark:

The point of No.1 is fundamental center frequency.

Only the worst case data of X axis positioning was recorded in the report.

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

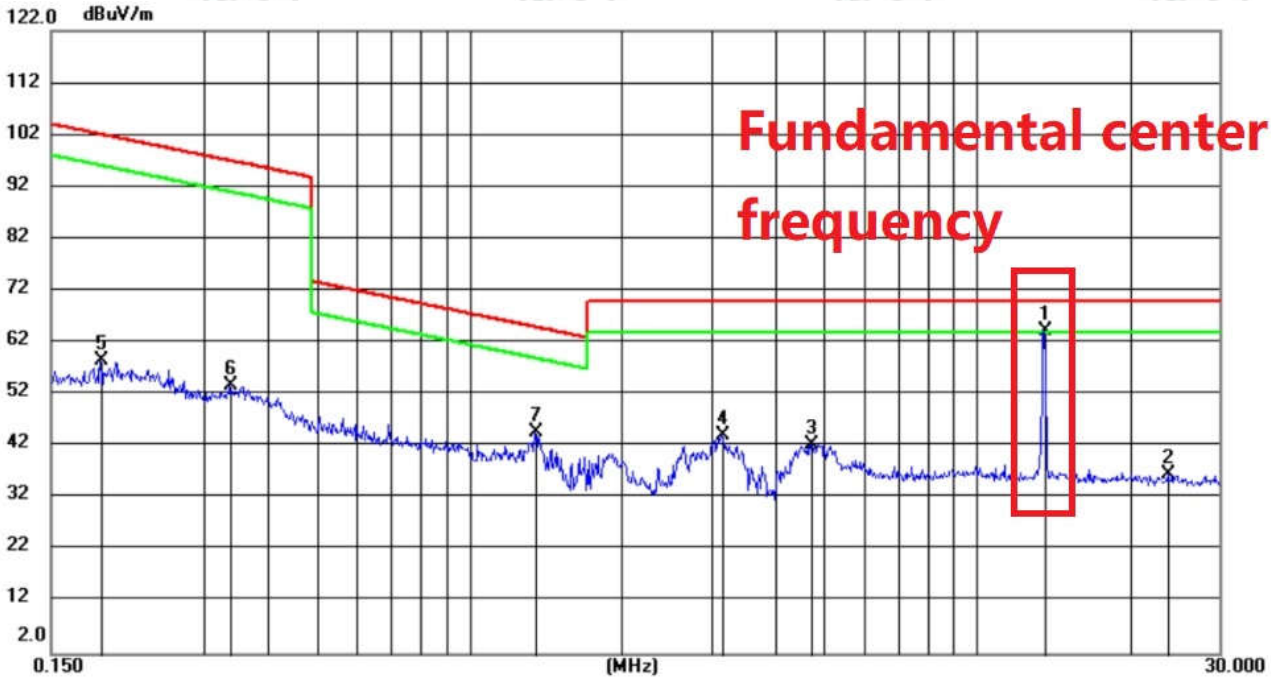
Factor= Antenna Factor + Cable Factor – Preamplifier Factor,

Level = Read Level + Factor,

Over Limit=Level-Limit Line.

150kHz-30MHz:

Vertical:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	13.5580	43.79	20.35	64.14	70.00	-5.86	peak	100	188	
2		23.7742	16.30	20.40	36.70	70.00	-33.30	peak	100	135	
3		4.7037	22.03	20.39	42.42	70.00	-27.58	peak	100	49	
4		3.1505	23.84	20.36	44.20	70.00	-25.80	peak	100	135	
5		0.1882	37.89	20.55	58.44	102.08	-43.64	peak	100	295	
6		0.3383	33.13	20.50	53.63	97.01	-43.38	peak	100	71	
7		1.3464	24.42	20.40	44.82	65.05	-20.23	peak	100	7	

Remark:

The point of No.1 is fundamental center frequency.

Only the worst case data of X axis positioning was recorded in the report.

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

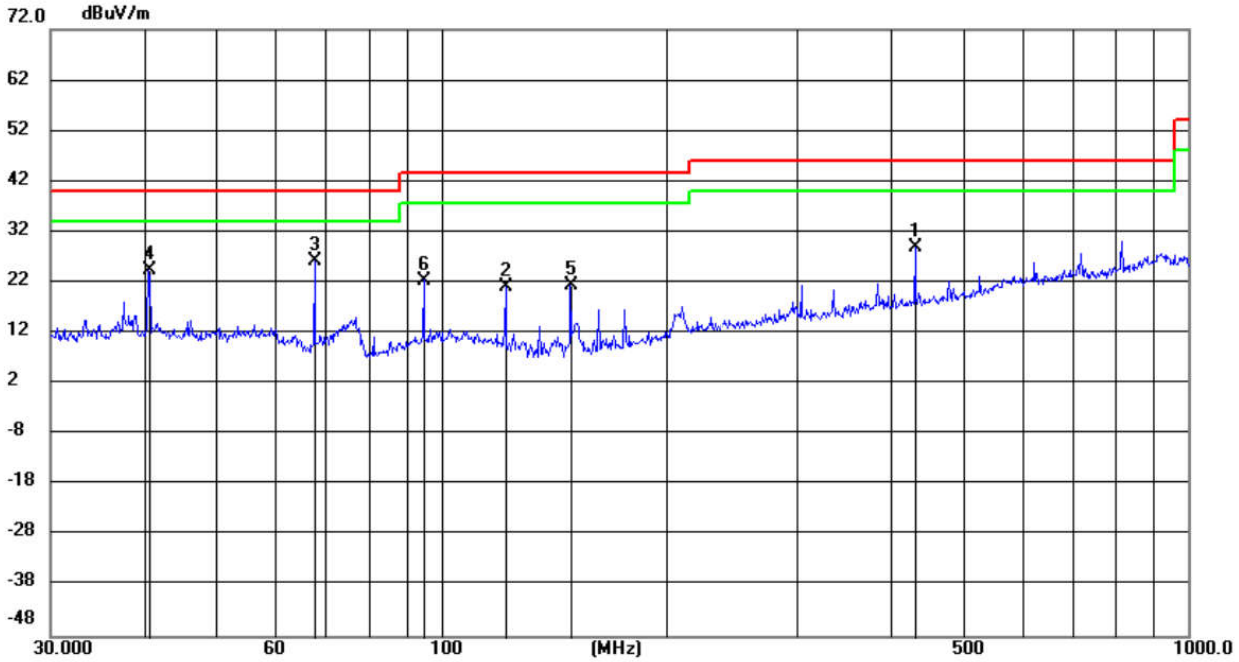
Factor= Antenna Factor + Cable Factor – Preamplifier Factor,

Level = Read Level + Factor,

Over Limit=Level-Limit Line.

30MHz-1GHz

Horizontal:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		432.0151	10.42	18.42	28.84	46.00	-17.16	peak	100	138	
2		122.0397	9.89	11.32	21.21	43.50	-22.29	peak	199	264	
3	*	67.8057	16.05	10.30	26.35	40.00	-13.65	peak	199	89	
4		40.6802	10.68	13.72	24.40	40.00	-15.60	peak	199	7	
5		149.1715	12.25	9.18	21.43	43.50	-22.07	peak	199	326	
6		94.9097	10.30	12.20	22.50	43.50	-21.00	peak	199	38	

Remark:

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

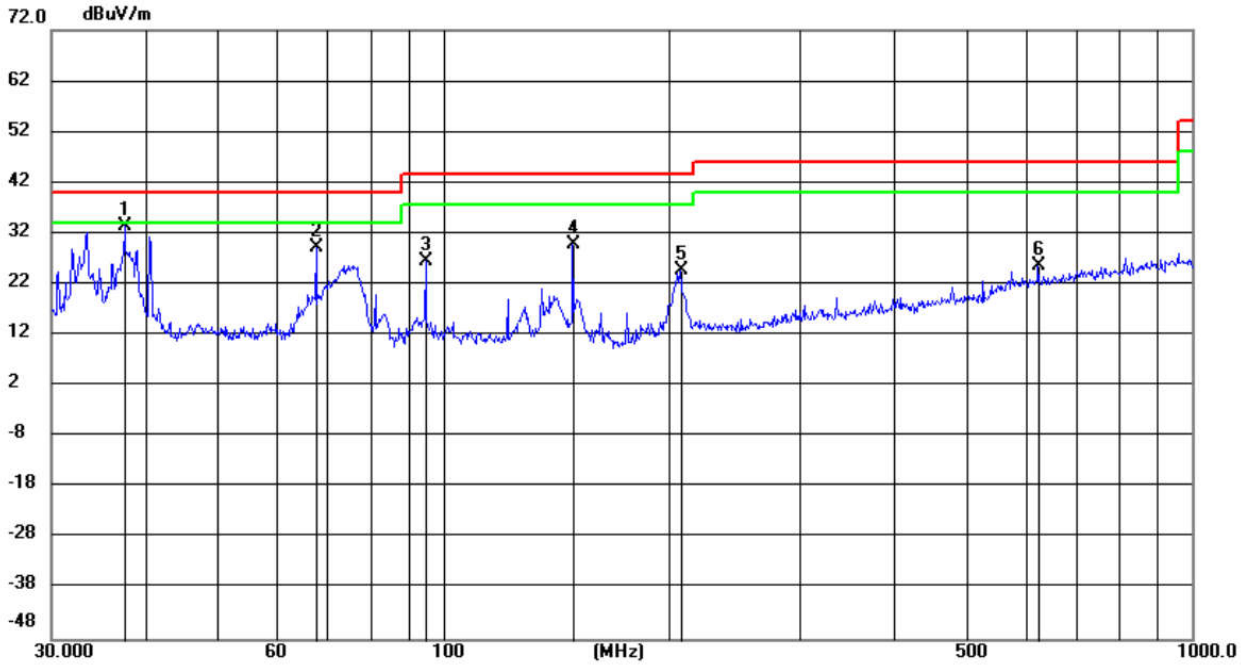
Factor= Antenna Factor + Cable Factor – Preamplifier Factor,

Level = Read Level + Factor,

Over Limit=Level-Limit Line.

30MHz-1GHz

Vertical:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	37.6534	20.09	13.36	33.45	40.00	-6.55	peak	100	312	
2		67.7939	18.82	10.30	29.12	40.00	-10.88	peak	100	217	
3		94.9264	14.35	12.21	26.56	43.50	-16.94	peak	100	49	
4		149.1715	20.78	9.18	29.96	43.50	-13.54	peak	100	133	
5		207.3042	12.11	12.74	24.85	43.50	-18.65	peak	100	175	
6		624.0925	3.13	22.42	25.55	46.00	-20.45	peak	100	70	

Remark:

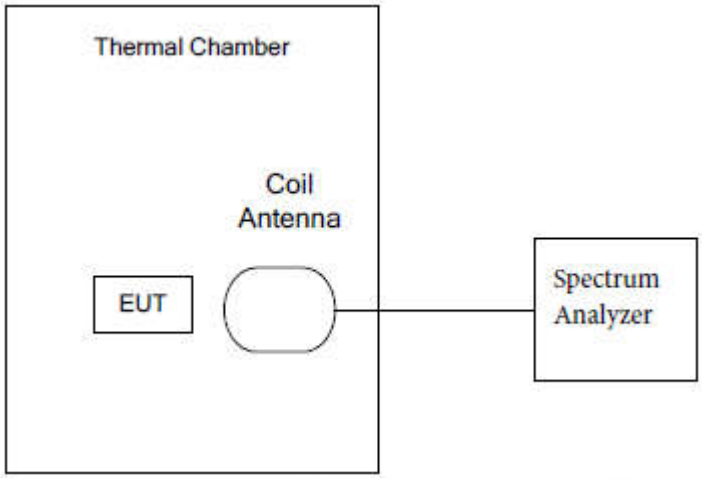
The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Factor= Antenna Factor + Cable Factor – Preamplifier Factor,

Level = Read Level + Factor,

Over Limit=Level-Limit Line.

5.5 Frequency Stability

Test Requirement:	47 CFR Part 15 C Section 15.225(e)
Test Method:	ANSI C63.10: 2013
Test Setup:	
Frequency Range:	Operation within the band 13.110-14.010 MHz
Requirements:	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, and 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.
Method of Measurement:	The EUT was placed in an environmental test chamber and powered such that control element received normal voltage and the transmitter provided maximum RF output.
Test Result:	The unit does meet the FCC Part 15 C Section 15.225(e) requirements.

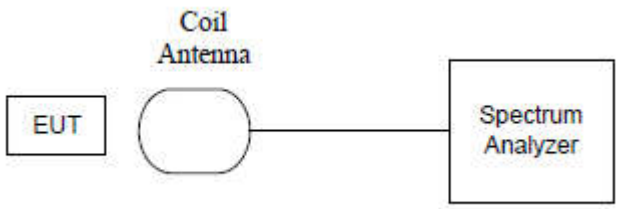
Measurement Data:

Test Frequency: 13.56MHz				Temperature:20℃
Supply Voltage (V) DC	**Test Result (MHz)**	**Deviation (kHz)**	**Limit ±0.01% (kHz)**	**Result**
12.0	13.55955	-0.45	1.3560	Pass
10.8	13.55959	-0.41	1.3560	Pass
13.2	13.55951	-0.49	1.3560	Pass

Test Frequency: 13.56MHz				Normal Voltage:12.0Vdc
Temperature (℃)	**Test Result (MHz)**	**Deviation (kHz)**	**Limit ±0.01% (kHz)**	**Result**
-20	13.55953	-0.47	1.3560	Pass
-10	13.55954	-0.46	1.3560	
0	13.55952	-0.48	1.3560	
10	13.55959	-0.41	1.3560	
20	13.55957	-0.43	1.3560	
30	13.55959	-0.41	1.3560	
40	13.55952	-0.48	1.3560	
50	13.55958	-0.42	1.3560	

Note: Deviation (kHz) = (Test Result-13.56MHz)*1000

5.6 20dB Occupied Bandwidth

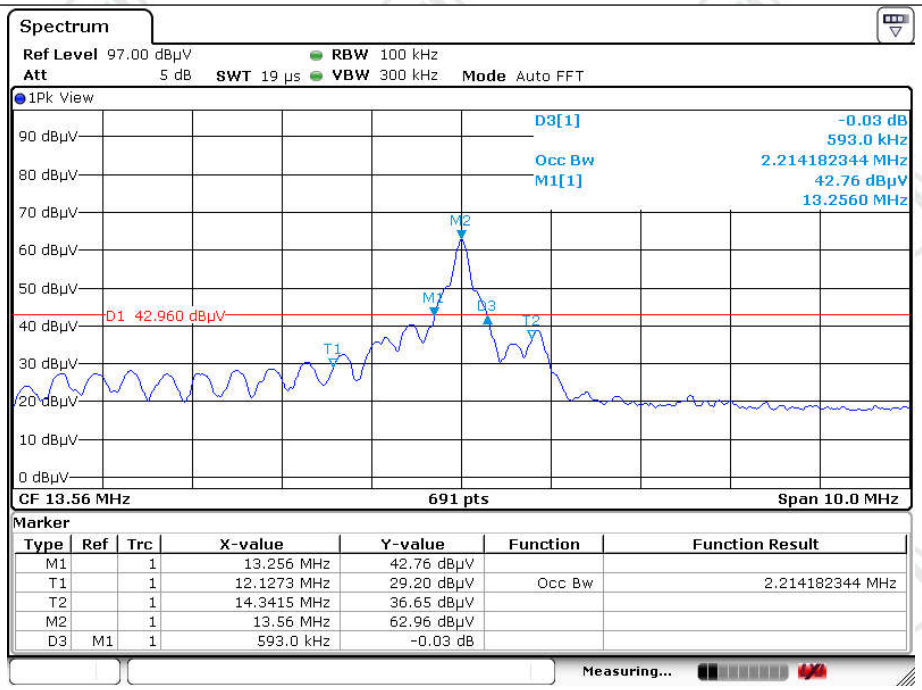
Test Requirement:	47 CFR Part 15 C Section 15.215 (C)
Test Method:	ANSI C63.10: 2013
Test Setup:	
Frequency Range:	Operation within the band 13.110 – 14.010 MHz
Requirements:	Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §15.217 through §15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the 20 dB bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.
Limit:	For 13.56 MHz the permitted frequency band is 14kHz, so the limit is 11.2 kHz.

Test Data:

Frequency (MHz)	20dB bandwidth (kHz)	Frequency Left (MHz)	Frequency Right (MHz)	Limit (MHz)	Result
13.56	593.0	13.256	13.849	13.110 – 14.010	Pass

Test plot as follows:

Measurement Data:



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	13.256 MHz	42.76 dBµV		
T1		1	12.1273 MHz	29.20 dBµV	Occ Bw	2.214182344 MHz
T2		1	14.3415 MHz	36.65 dBµV		
M2		1	13.56 MHz	62.96 dBµV		
D3	M1	1	593.0 kHz	-0.03 dB		