

TEST REPORT

Application No.: FYCR2204000089AT
Applicant: Armatura LLC
Address of Applicant: 190 Bluegrass Valley Parkway Alpharetta, GA 30005, USA
Manufacturer: Armatura LLC
Address of Manufacturer: 190 Bluegrass Valley Parkway Alpharetta, GA 30005, USA
Factory: Armatura Tech Co., Ltd
Address of Factory: 1. 999/43 Moo 15 Bangsaothong, Samutprakarn 10570, Thailand
2. 999/120-121 Moo15 Bangsaothong, Samutprakarn 10570, Thailand

Equipment Under Test (EUT):**EUT Name:** Smart Reader**Model No.:** EP10C**Trade Mark:****FCC ID:** 2A5UQ-EP10C**Standard(s) :** 47 CFR Part 15, Subpart C 15.225**Date of Receipt:** 2022-03-07**Date of Test:** 2022-03-23 to 2022-04-24**Date of Issue:** 2022-04-26

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.

Kidd Yang
EMC Laboratory Manager



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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2022-04-26		Original

Authorized for issue by:				
		Tree Zhan		
		Tree Zhan/Project Engineer		
		Winkey Wang		
		Winkey Wang/Reviewer		



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2 Test Summary

Radio Spectrum Technical Requirement				
Item	Standard	Method	Requirement	Result
Antenna Requirement	47 CFR Part 15, Subpart C 15.225	N/A	47 CFR Part 15, Subpart C 15.203	Pass

Radio Spectrum Matter Part				
Item	Standard	Method	Requirement	Result
20dB Bandwidth	47 CFR Part 15, Subpart C 15.225	ANSI C63.10 (2013) Section 6.9	47 CFR Part 15, Subpart C 15.215	Pass
Emission Mask		ANSI C63.10 (2013) Section 6.4	47 CFR Part 15, Subpart C 15.225(a)&(b)&(C)	Pass
Frequency tolerance		ANSI C63.10 (2013) Section 6.8	47 CFR Part 15, Subpart C 15.225(e)	Pass
Radiated Emissions (30MHz-1GHz)		ANSI C63.10 (2013) Section 6.4&6.5	47 CFR Part 15, Subpart C 15.225(d) & 15.209	Pass
Radiated Emissions (9kHz-30MHz)		ANSI C63.10 (2013) Section 6.4&6.5	47 CFR Part 15, Subpart C 15.225(d) & 15.209	Pass



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Shenzhen Branch

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4 General Information

4.1 Details of E.U.T.

Power supply:	DC 9-24V
Operation Frequency:	13.56MHz
Modulation Type:	ASK
Antenna Type:	Loop Antenna

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
--	--	--	--

The EUT has been tested as an independent unit.

4.3 Measurement Uncertainty

Test Item	Measurement Uncertainty
20dB Bandwidth	$\pm 0.3\%$
Emission Mask	$\pm 0.3\%$
Frequency tolerance	$\pm 5.4 \times 10^{-8}$
Radiated Emissions (30MHz-1GHz)	$\pm 5.6 \text{ dB (30MHz-1GHz)}$
Radiated Emissions (9kHz-30MHz)	$\pm 2.7 \text{ dB (9kHz-30MHz)}$

Remark:

The U_{lab} (lab Uncertainty) is less than $U_{\text{CISPR/ETSI}}$ (CISPR/ETSI Uncertainty), so the test results

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.



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4.4 Test Location

All tests were performed at:

Compliance Certification Services (Kunshan) Inc. Shenzhen branch.

Fuyong lab. Xinlong TechnoPark, Fengtang Road, Fuyong Subdistrict, Bao'an, Shenzhen, China

Tel: +86 755 8866 3988 Fax: +86 755 2671 0594

No tests were sub-contracted.

4.5 Test Facility

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

- **A2LA (Certificate No. 6606.01)**

Compliance Certification Services (Kunshan) Inc. Shenzhen branch is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 6606.01.

- **FCC –Designation Number: CN1322**

Compliance Certification Services (Kunshan) Inc. Shenzhen branch has been recognized as an accredited testing laboratory.

Designation Number: CN1322. Test Firm Registration Number: 718073

- **Innovation, Science and Economic Development Canada**

Compliance Certification Services (Kunshan) Inc. Shenzhen branch has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0129.

IC#: 28189.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None



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5 Equipment List

20dB Bandwidth					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Programmable Temperature & Humidity Chamber	Votsch Industrietechnik GmbH	VT 4002	SEM002-15	2021/7/13	2022/7/12
MXA Signal Analyzer(10Hz-26.5GHz)	Agilent	N9020A	SEM004-20	2021/7/13	2022/7/12
Signal Generator(9kHz-40GHz)	Agilent	N5173B	SEM006-05	2021/7/13	2022/7/12
ESG Vector Signal Generator(250kHz-6GHz)	Agilent	E4438C	SEM006-15	2021/7/13	2022/7/12
Power Sensor	Erika Fiedler	U2021XA	SEM009-15	2021/7/13	2022/7/12
Power Sensor	Erika Fiedler	U2021XA	SEM009-16	2021/7/13	2022/7/12
Wideband Radio Communication Tester	Rohde & Schwarz	CMW 500	SEM010-08	2021/7/13	2022/7/12
Programmable DC Source	Chroma	62024P-80-60	SEM011-09	2021/7/13	2022/7/12
Attenuator(18GHz, 20dB, 2W)	Huber+Suhner	6620_SMA-50-1	SEM021-09	2021/7/13	2022/7/12

Emission Mask					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
3m Anechoic Chamber	CRT	N/A	SEM001-13	2021/7/13	2022/7/12
Trilog-Broadband Antenna(25MHz-2GHz)	Schwarzbeck	VULB9168	SEM003-33	2021/9/25	2024/9/24
Biconical Antenna(150MHz-1GHz)	Schwarzbeck	VUBA9117	SEM003-35	2021/12/26	2024/12/25
Loop Antenna(9kHz-30MHz)	ETS-LINDGREN	6502	SEM003-36	2021/9/26	2024/9/25
MXE EMI receiver(20Hz-8.4GHz)	Agilent	N9038A	SEM004-05	2021/7/13	2022/7/12
Pre-amplifier (0.1-1.3GHz)	HP	8447D	SEM005-02	2021/7/13	2022/7/12
Broad-Band Horn Antenna (15-40GHz)	Schwarzbeck	BBHA 9170	SEM003-15	2021/7/11	2024/7/10
Broad-Band Horn Antenna (1-18GHz)	Schwarzbeck	BBHA 9120D	SEM003-32	2021/9/26	2024/9/25
Double-ridged waveguide horn (1-18GHz)	ETS-LINDGREN	3117	SEM003-34	2021/9/25	2024/9/24



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Spectrum Analyzer(20Hz-43GHz)	Rohde & Schwarz	101288	SEM004-08	2021/7/13	2022/7/12
Low Noise Amplifier(100MHz-18GHz)	CLAVIO	BDLNA-0118-352810	SEM005-05	2021/7/13	2022/7/12
Pre-amplifier(26GHz-40GHz)	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2021/7/13	2022/7/12
Pre-amplifier(18GHz-26GHz)	Rohde & Schwarz	CH14-H052	SEM005-17	2021/7/13	2022/7/12

Frequency tolerance					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Programmable Temperature & Humidity Chamber	Votsch Industrietechnik GmbH	VT 4002	SEM002-15	2021/7/13	2022/7/12
MXA Signal Analyzer(10Hz-26.5GHz)	Agilent	N9020A	SEM004-20	2021/7/13	2022/7/12
Signal Generator(9kHz-40GHz)	Agilent	N5173B	SEM006-05	2021/7/13	2022/7/12
ESG Vector Signal Generator(250kHz-6GHz)	Agilent	E4438C	SEM006-15	2021/7/13	2022/7/12
Power Sensor	Erika Fiedler	U2021XA	SEM009-15	2021/7/13	2022/7/12
Power Sensor	Erika Fiedler	U2021XA	SEM009-16	2021/7/13	2022/7/12
Wideband Radio Communication Tester	Rohde & Schwarz	CMW 500	SEM010-08	2021/7/13	2022/7/12
Programmable DC Source	Chroma	62024P-80-60	SEM011-09	2021/7/13	2022/7/12
Attenuator(18GHz, 20dB, 2W)	Huber+Suhner	6620_SMA-50-1	SEM021-09	2021/7/13	2022/7/12

Radiated Emissions (30MHz-1GHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
3m Anechoic Chamber	CRT	N/A	SEM001-13	2021/7/13	2022/7/12
Trilog-Broadband Antenna(25MHz-2GHz)	Schwarzbeck	VULB9168	SEM003-33	2021/9/25	2024/9/24
Biconical Antenna(150MHz-1GHz)	Schwarzbeck	VUBA9117	SEM003-35	2021/12/26	2024/12/25
Loop Antenna(9kHz-30MHz)	ETS-LINDGREN	6502	SEM003-36	2021/9/26	2024/9/25
MXE EMI receiver(20Hz-8.4GHz)	Agilent	N9038A	SEM004-05	2021/7/13	2022/7/12



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Pre-amplifier (0.1-1.3GHz)	HP	8447D	SEM005-02	2021/7/13	2022/7/12
Broad-Band Horn Antenna (15-40GHz)	Schwarzbeck	BBHA 9170	SEM003-15	2021/7/11	2024/7/10
Broad-Band Horn Antenna (1-18GHz)	Schwarzbeck	BBHA 9120D	SEM003-32	2021/9/26	2024/9/25
Double-ridged waveguide horn (1-18GHz)	ETS-LINDGREN	3117	SEM003-34	2021/9/25	2024/9/24
Spectrum Analyzer(20Hz-43GHz)	Rohde & Schwarz	101288	SEM004-08	2021/7/13	2022/7/12
Low Noise Amplifier(100MHz-18GHz)	CLAVIO	BDLNA-0118-352810	SEM005-05	2021/7/13	2022/7/12
Pre-amplifier(26GHz-40GHz)	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2021/7/13	2022/7/12
Pre-amplifier(18GHz-26GHz)	Rohde & Schwarz	CH14-H052	SEM005-17	2021/7/13	2022/7/12

Radiated Emissions (9kHz-30MHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
3m Anechoic Chamber	CRT	N/A	SEM001-13	2021/7/13	2022/7/12
Trilog-Broadband Antenna(25MHz-2GHz)	Schwarzbeck	VULB9168	SEM003-33	2021/9/25	2024/9/24
Biconical Antenna(150MHz-1GHz)	Schwarzbeck	VUBA9117	SEM003-35	2021/12/26	2024/12/25
Loop Antenna(9kHz-30MHz)	ETS-LINDGREN	6502	SEM003-36	2021/9/26	2024/9/25
MXE EMI receiver(20Hz-8.4GHz)	Agilent	N9038A	SEM004-05	2021/7/13	2022/7/12
Pre-amplifier (0.1-1.3GHz)	HP	8447D	SEM005-02	2021/7/13	2022/7/12
Broad-Band Horn Antenna (15-40GHz)	Schwarzbeck	BBHA 9170	SEM003-15	2021/7/11	2024/7/10
Broad-Band Horn Antenna (1-18GHz)	Schwarzbeck	BBHA 9120D	SEM003-32	2021/9/26	2024/9/25
Double-ridged waveguide horn (1-18GHz)	ETS-LINDGREN	3117	SEM003-34	2021/9/25	2024/9/24
Spectrum Analyzer(20Hz-43GHz)	Rohde & Schwarz	101288	SEM004-08	2021/7/13	2022/7/12
Low Noise Amplifier(100MHz-18GHz)	CLAVIO	BDLNA-0118-352810	SEM005-05	2021/7/13	2022/7/12



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Pre-amplifier(26GHz-40GHz)	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2021/7/13	2022/7/12
Pre-amplifier(18GHz-26GHz)	Rohde & Schwarz	CH14-H052	SEM005-17	2021/7/13	2022/7/12

General used equipment					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Humidity/ Temperature Indicator	Mingle	TH607	SEM002-22	2021-07-13	2022-07-12
Humidity/ Temperature Indicator	Mingle	TH607	SEM002-23	2021-07-13	2022-07-12
Barometer	DUMAI	DYM3	SEM002-24	2021-07-13	2022-07-12



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6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203

6.1.2 Conclusion

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 integrated on the main PCB and no consideration of replacement.

Antenna location: Refer to Internal photos



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7 Radio Spectrum Matter Test Results

7.1 20dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.215
Test Method: ANSI C63.10 (2013) Section 6.9

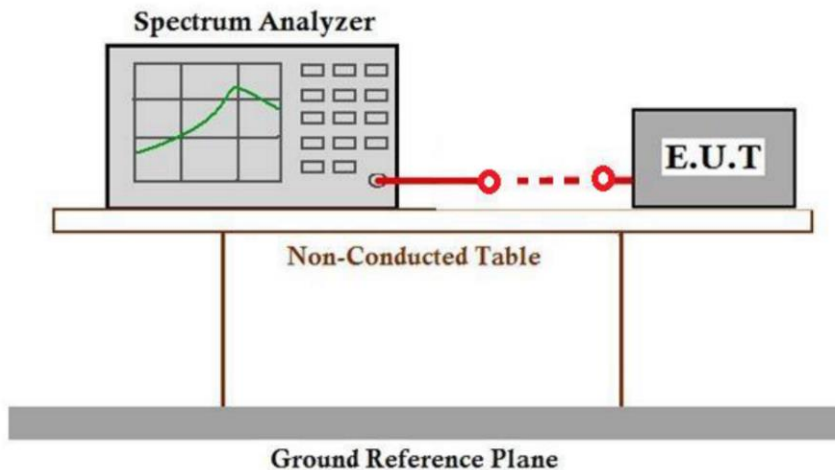
7.1.1 E.U.T. Operation

Operating Environment:
Temperature: 21.6 °C Humidity: 52.3 % RH Atmospheric Pressure: 1020 mbar

7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode with modulation

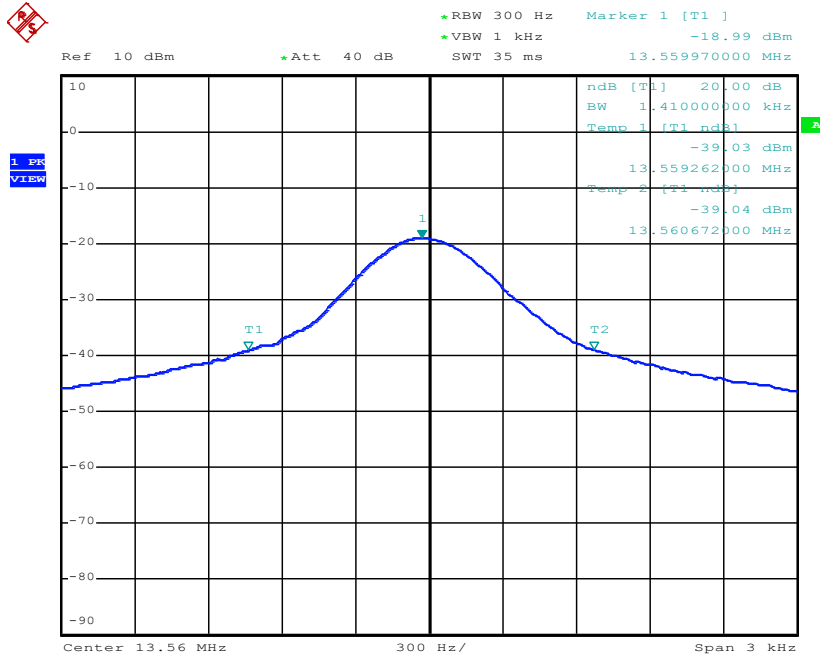
7.1.3 Test Setup Diagram



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7.1.4 Measurement Procedure and Data



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7.2 Emission Mask

Test Requirement 47 CFR Part 15, Subpart C 15.225(a)&(b)&(C)
Test Method: ANSI C63.10 (2013) Section 6.4
Measurement Distance: 3m

Limit:

- (a) The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.
- (b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.
- (c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.
- (d) The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.

Below 30MHz

The limit at 30m test distance is below:

$$FS_{\text{limit}} = FS_{\text{max}} - 40 \log \left(\frac{d_{\text{limit}}}{d_{\text{measure}}} \right)$$

where

FS_{limit} is the calculation of field strength at the limit distance, expressed in dBμV/m
 FS_{max} is the measured field strength, expressed in dBμV/m
 d_{measure} is the distance of the measurement point from the EUT
 d_{limit} is the reference distance or the distance of the $\lambda/2\pi$ point

The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 84dBuV/m at 30 meters.



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7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 23.6 °C

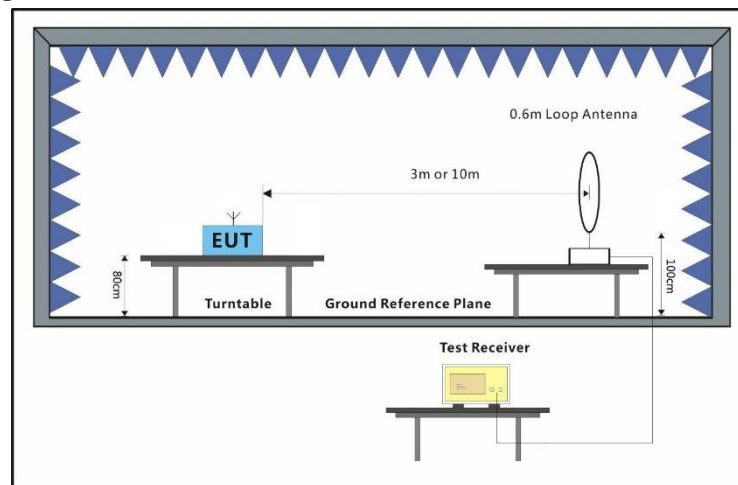
Humidity: 52.4 % RH

Atmospheric Pressure: 1020 mbar

7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode with modulation

7.2.3 Test Setup Diagram



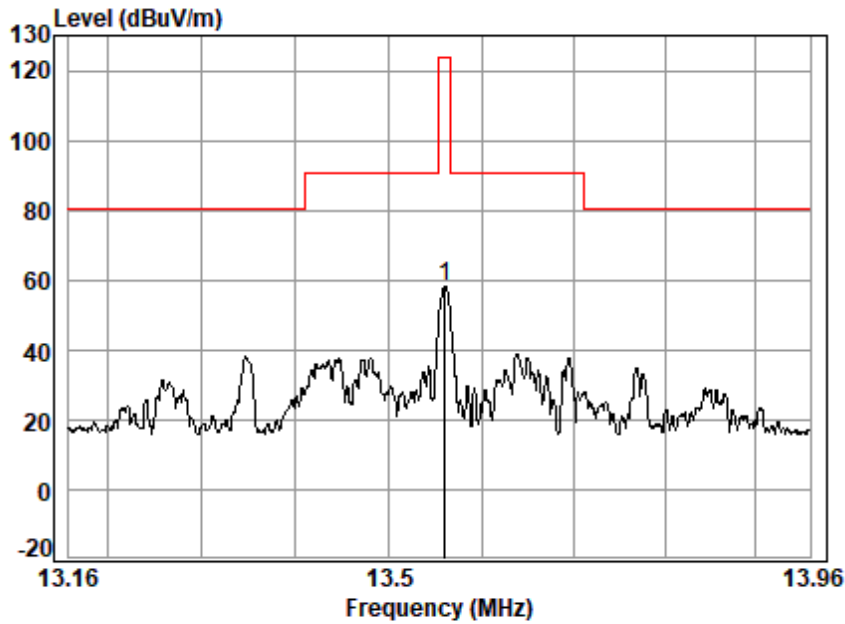
7.2.4 Measurement Procedure and Data

For testing performed with the loop antenna, the center of the loop was positioned 1 m above the ground and positioned with its plane vertical at the specified distance from the EUT. During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane. Only the worst position of vertical was shown in the report.



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Condition: 3m

Job No. : 00089AT

Test Mode: 01

	Cable	Ant	Preamp	Read		Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 P 13.5600	0.60	8.65	32.06	81.00	58.19	124.00	-65.81	QP

Frequency (MHz)	Cable loss (dB)	ANT Factor (dB)	Preamp Factor (dB)	Read Level @ 3m (dBuV)	Level @ 3m (dBuV/m)	Level @ 30m (dBuV/m)	Limit @ 30m (dBuV/m)	Margin (dB)
13.56	0.6	8.65	32.06	81	58.19	18.19	84.00	-65.81



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7.3 Frequency tolerance

Test Requirement 47 CFR Part 15, Subpart C 15.225(e)

Test Method: ANSI C63.10 (2013) Section 6.8

Limit:

$\pm 0.01\%$

7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 21.6 °C

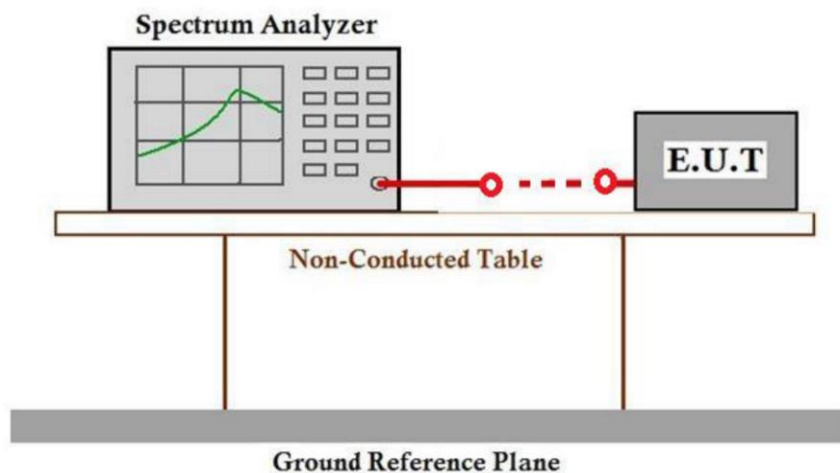
Humidity: 52.4 % RH

Atmospheric Pressure: 1020 mbar

7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode with modulation

7.3.3 Test Setup Diagram



7.3.4 Measurement Procedure and Data

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.



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Declared Frequency (MHz)	13.56MHz
--------------------------	----------

Temperature (°C)	Voltage(VDC)	Measurement Frequency(MHz)	Frequency Tolerance (%)	Limit (%)	Result
50	12	13.5613	0.000096	±0.01	Pass
40		13.5608	0.000059		Pass
30		13.5617	0.000125		Pass
20		13.5614	0.000103		Pass
10		13.5613	0.000096		Pass
0		13.5612	0.000088		Pass
-10		13.5613	0.000096		Pass
-20		13.5608	0.000059		Pass
20	9	13.5611	0.000081		Pass
	24	13.5612	0.000088		Pass



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7.4 Radiated Emissions (30MHz-1GHz)

Test Requirement 47 CFR Part 15, Subpart C 15.225(d) & 15.209

Test Method: ANSI C63.10 (2013) Section 6.4&6.5

Measurement Distance: 3m

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 23.6 °C

Humidity: 52.3 % RH

Atmospheric Pressure: 1020 mbar

7.4.2 Test Mode Description

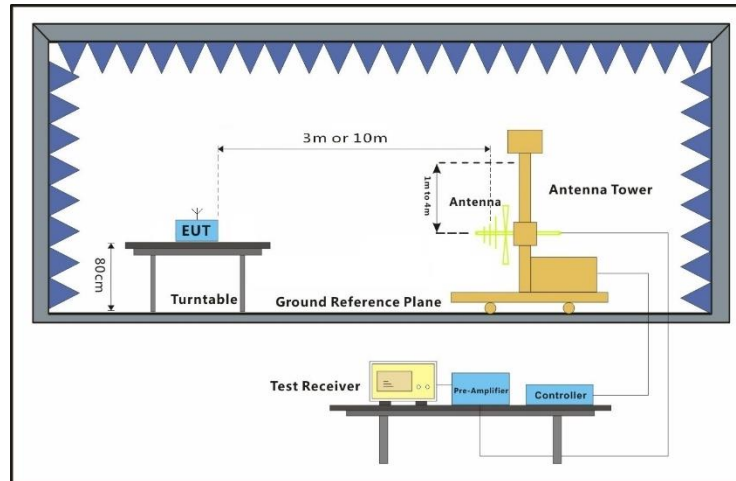
Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode with modulation



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7.4.3 Test Setup Diagram



7.4.4 Measurement Procedure and Data

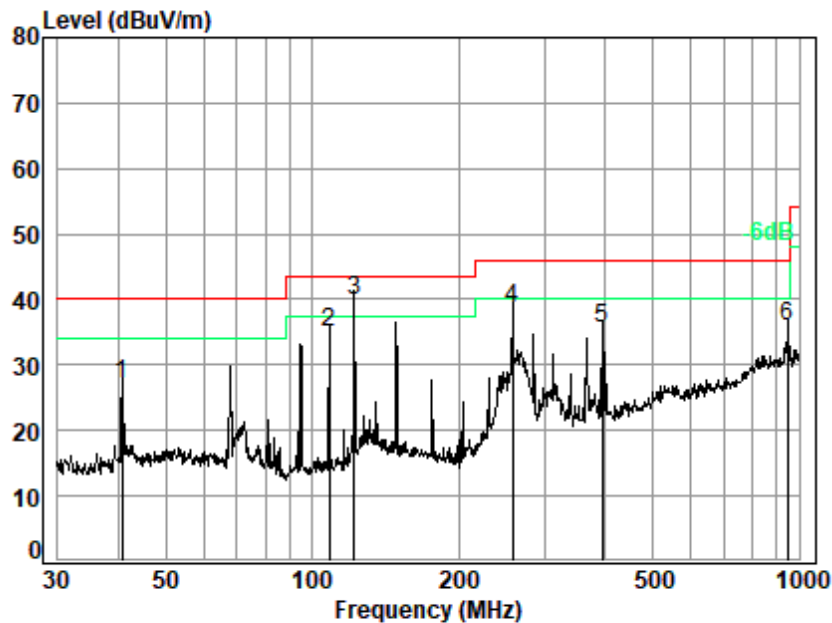
a. The EUT was placed on the top of a rotating table 0.8 meters above the ground for below 1GHz at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation. b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. c. 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. d. 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. e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. f. 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. g. 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. Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor



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Test Mode: 01; Polarity: Horizontal



Site : chamber
Condition: 3m HORIZONTAL
Job No : 00089AT
Mode : 01

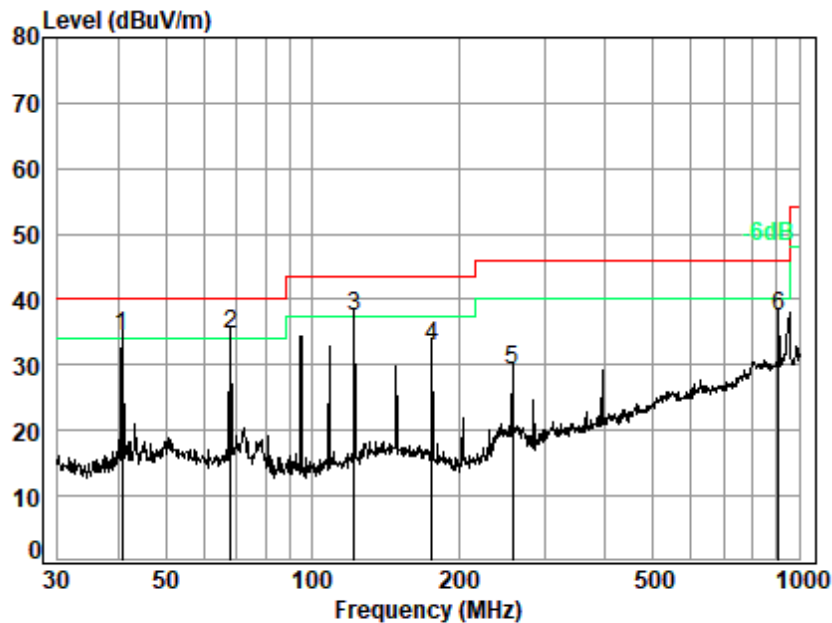
		Cable	Ant	Preamp	Read	Limit	Over	
	Freq	Loss	Factor	Factor	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	40.7016	0.20	16.88	25.88	35.75	26.95	40.00	-13.05 QP
2	108.2667	0.88	15.22	25.75	44.73	35.08	43.50	-8.42 QP
3 P	121.9755	0.93	15.89	25.67	48.76	39.91	43.50	-3.59 QP
4	257.4221	0.85	16.78	25.20	46.07	38.50	46.00	-7.50 QP
5	393.4724	1.68	20.62	25.77	39.18	35.71	46.00	-10.29 QP
6	948.7610	2.08	29.26	26.29	30.75	35.80	46.00	-10.20 QP



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Test Mode: 01; Polarity: Vertical



Site : chamber
Condition: 3m VERTICAL
Job No : 00089AT
Mode : 01

		Cable	Ant	Preamp	Read	Limit	Over	
	Freq	Loss	Factor	Factor	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	40.7016	0.20	16.88	25.88	43.17	34.37	40.00	-5.63 QP
2 P	67.9129	0.27	16.37	25.83	44.00	34.81	40.00	-5.19 QP
3	121.9755	0.93	15.89	25.67	46.25	37.40	43.50	-6.10 QP
4	176.2686	0.68	16.43	25.44	41.28	32.95	43.50	-10.55 QP
5	257.4221	0.85	16.78	25.20	36.89	29.32	46.00	-16.68 QP
6	906.4824	2.25	28.71	26.38	32.89	37.47	46.00	-8.53 QP



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7.5 Radiated Emissions (9kHz-30MHz)

Test Requirement 47 CFR Part 15, Subpart C 15.225(d) & 15.209
Test Method: ANSI C63.10 (2013) Section 6.4&6.5
Measurement Distance: 3m

Limit:

Frequency(MHz)	Field strength (microvolts/meter)	Limit (dBuV/m)	Detector	Measurement Distance (meters)
0.009-0.490	2400/F(kHz)	-	-	300
0.490-1.705	24000/F(kHz)	-	-	30
1.705-30	30	-	-	30

Below 30MHz

If field strength is measured at only a single point, then that point shall be at the radial from the EUT that produces the maximum emission at the frequency being measured, as described in 5.4. If that point is closer to the EUT than $\lambda/2\pi$ and the limit distance is greater than $\lambda/2\pi$, the measurement shall be extrapolated to the limit distance by conservatively presuming that the field strength decreases at a 40 dB/decade of distance rate to the $\lambda/2\pi$ distance, and at a 20 dB/decade of distance rate beyond $\lambda/2\pi$. This shall be accomplished using Equation (2):

$$FS_{(10m)} = FS_{(30/300m)} + 40\log\{d_{(near\ field)}/d_{(10m)}\} + 20\log\{d_{(30/300m)}/d_{(near\ field)}\} \quad (2)$$

If the single point measured is at a distance greater than $\lambda/2\pi$, then extrapolation to the limit distance shall be calculated using Equation (3):

$$FS_{(10m)} = FS_{(30/300m)} + 20\log\{d_{(30/300m)}/d_{(10m)}\} \quad (3)$$

If both the single point and the limit distance are equal to or closer to the EUT than $\lambda/2\pi$, then extrapolation to the limit distance shall be calculated using Equation (4):

$$FS_{(10m)} = FS_{(30/300m)} + 40\log\{d_{(30/300m)}/d_{(10m)}\} \quad (4)$$

Remark:

$$d_{near\ field} = 47.77 / f_{MHz}$$

where f_{MHz} is the frequency of the emission being measured in MHz.

Remark:

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

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor



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$$FS_{\text{limit}} = FS_{\text{max}} - 40 \log \left(\frac{d_{\text{limit}}}{d_{\text{measure}}} \right)$$

where

FS_{limit} is the calculation of field strength at the limit distance, expressed in dBμV/m
 FS_{max} is the measured field strength, expressed in dBμV/m
 d_{measure} is the distance of the measurement point from the EUT
 d_{limit} is the reference distance or the distance of the $\lambda/2\pi$ point

r

7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 23.6 °C

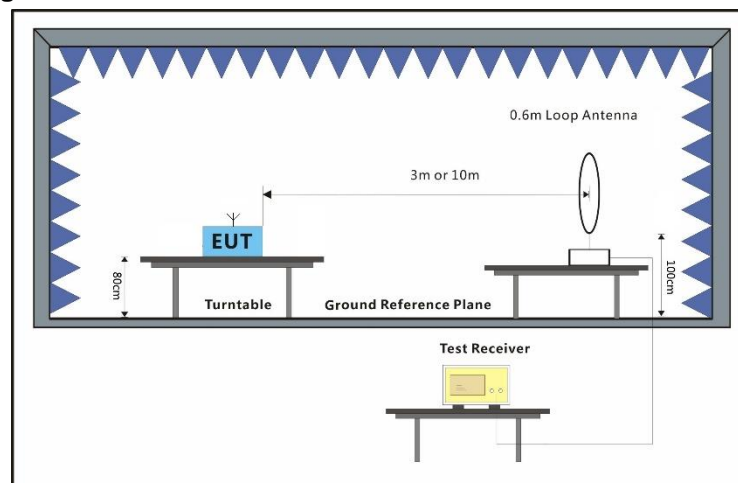
Humidity: 52.3 % RH

Atmospheric Pressure: 1020 mbar

7.5.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode with modulation

7.5.3 Test Setup Diagram



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7.5.4 Measurement Procedure and Data

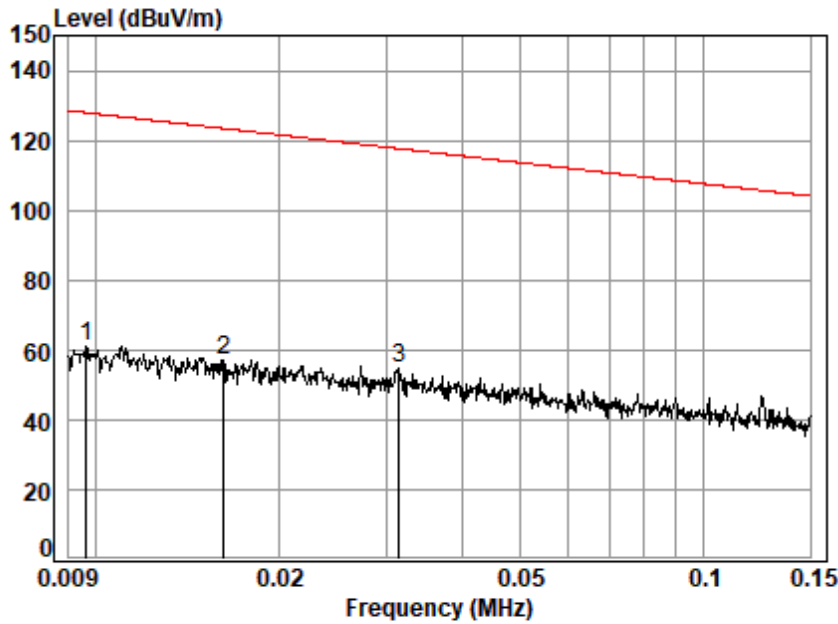
For testing performed with the loop antenna, the center of the loop was positioned 1 m above the ground and positioned with its plane vertical at the specified distance from the EUT. During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane. Only the worst position of vertical was shown in the report.



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Condition: 3m

Job No. : 00089AT

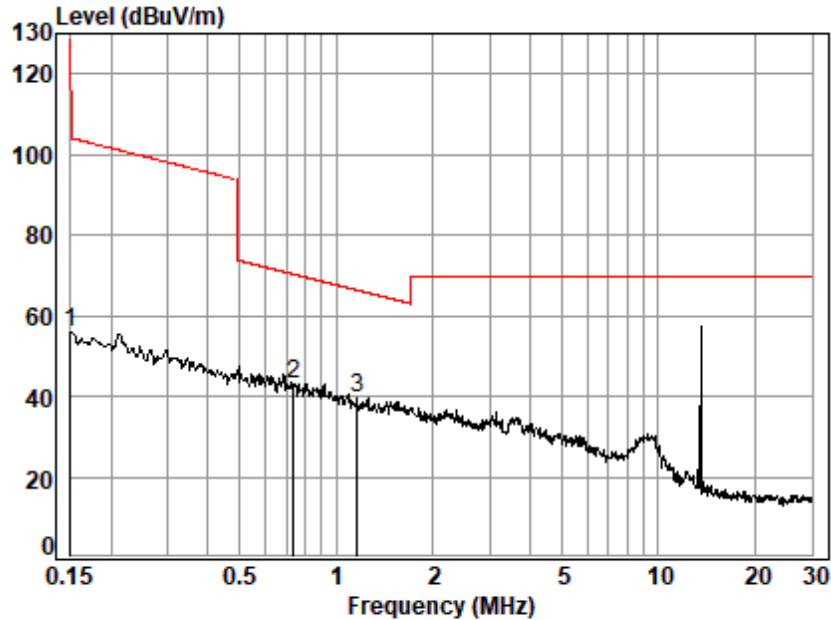
Test Mode: 01

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	0.0096	0.29	18.54	31.25	73.28	60.86	127.96	-67.10	Average
2	0.0162	0.30	15.05	31.64	73.37	57.08	123.41	-66.33	Average
3 P	0.0316	0.31	11.94	31.70	73.98	54.53	117.62	-63.09	Average



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Condition: 3m

Job No. : 00089AT

Test Mode: 01

		Cable	Ant	Preamp	Read	Limit	Over	
Freq		Loss	Factor	Factor	Level	Level	Line	Limit Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 a	0.1500	0.33	10.41	31.78	76.73	55.69	104.08	-48.39 Average
2	0.7391	0.28	10.29	31.71	64.33	43.19	70.23	-27.04 QP
3 P	1.1657	0.31	10.28	31.72	60.75	39.62	66.27	-26.65 QP



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Frequency (MHz)	Level @ 3m (dBuV/m)	Limit @ 300m (dBuV/m)	Limit @ 30m (dBuV/m)	Factor (dB)	Level @ 300m (dBuV/m)	Level @ 30m (dBuV/m)	Margin (dB)
0.00960	60.86	47.96	-	80.00	-19.14	-	-67.10
0.01620	57.08	43.41	-	80.00	-22.92	-	-66.33
0.03156	54.53	37.62	-	80.00	-25.47	-	-63.09
0.1500	55.69	24.08	-	80.00	-24.31	-	-48.39
0.7391	43.19	-	30.23	40.00	-	3.19	-27.04
1.1660	39.62	-	26.27	40.00	-	-0.38	-26.65

Remark:

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

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

$$FS_{\text{limit}} = FS_{\text{max}} - 40 \log \left(\frac{d_{\text{limit}}}{d_{\text{measure}}} \right)$$

where

FS_{limit} is the calculation of field strength at the limit distance, expressed in dBuV/m
 FS_{max} is the measured field strength, expressed in dBuV/m
 d_{measure} is the distance of the measurement point from the EUT
 d_{limit} is the reference distance or the distance of the $\lambda/2\pi$ point



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8 Test Setup Photo

Refer to Appendix –Setup Photos for FYCR2204000089AT

9 EUT Constructional Details (EUT Photos)

Refer to Appendix – External and Internal Photos for FYCR2204000089AT

- End of the Report -



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