ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT

OF

SmartCard + NFC Reader Module

Model No.: AP-SCRNFCX-XX(X means 0-F, hexadecimal number)

FCC ID: 2AWLWAP-SCRNFCX-XX

Trademark: Jarltech

Report No.: EA2006025F01001

Issue Date: June 05, 2020

Prepared for

Jarltech International Inc.
3F., No.1, Ln. 538, Zhongzheng Rd., Xindian Dist., New Taipei City 23141, Taiwan

Prepared by

Dong Guan Anci Electronic Technology Co., Ltd.

1-2 Floor, Building A, No.11, Headquarters 2 Road, Songshan, Lake Hi-tech Industrial Development Zone, Dongguan City, Guangdong Pr., China.

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VERIFICATION OF COMPLIANCE

Applicant:	Jarltech International Inc. 3F., No.1, Ln. 538, Zhongzheng Rd., Xindian Dist., New Taipei City 23141, Taiwan
Manufacturer:	Jarltech International Inc. 3F., No.1, Ln. 538, Zhongzheng Rd., Xindian Dist., New Taipei City 23141, Taiwan
Product Description:	SmartCard + NFC Reader Module
Model Number:	AP-SCRNFCX-XX(X means 0-F, hexadecimal number) (note: The models are the same except model number, here we prepare AP-SCRNFC1-11for the full test)
Trademark:	Jarltech

We hereby certify that:

The above equipment was tested by Dong Guan Anci Electronic Technology Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10-2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.225(2019).

Date of Test : June 01, 2020 to June 05, 2020

Prepared by : Tomas Yang/Editor

Approved & Authorized Signer : Alan He/Manager

Modified Information

Version	Summary	Revision Date	Report No.
Ver.1.0	Original Report	/	EA2006025F01001

Table of Contents

1 GENERAL INFORMATION **5**

1.1 PRODUCT DESCRIPTION 5
1.2 RELATED SUBMITTAL(S) / GRANT(S) 5
1.3 TEST METHODOLOGY 6
1.4 SPECIAL ACCESSORIES 6
1.5 EQUIPMENT MODIFICATIONS 6
1.6 TEST FACILITY 6

2 SYSTEM TEST CONFIGURATION **7**

2.1 EUT CONFIGURATION 7
2.2 EUT EXERCISE 7
2.3 TEST PROCEDURE 7
2.4 CONFIGURATION OF TESTED SYSTEM 8

3 SUMMARY OF TEST RESULTS **9**

4 TEST SYSTEM UNCERTAINTY **10**

5 CONDUCTED EMISSIONS TEST **11**

5.1 MEASUREMENT PROCEDURE: 11
5.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) 11
5.3 MEASUREMENT EQUIPMENT USED: 11
5.4 MEASUREMENT RESULT: 12

6 RADIATED EMISSION TEST **16**

6.1 MEASUREMENT PROCEDURE 16
6.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) 16
6.3 MEASUREMENT EQUIPMENT USED 17
6.4 RADIATED EMISSION LIMIT 18
6.5 MEASUREMENT RESULT 20
6.6 RADIATED MEASUREMENT PHOTOS: 25

7 FREQUENCY STABILITY MEASUREMENT **26**

7.1 FREQUENCY STABILITY LIMITS 26
7.2 MEASUREMENT INSTRUMENTS LIST 26
7.3 TEST PROCEDURE 26
7.4 EUT OPERATING CONDITIONS 26
7.5 TEST RESULTS 27

8 EMISSION BANDWIDTH **34**

8.1 EMISSION BANDWIDTH LIMIT 34
8.2 TEST INSTRUMENTS 34
8.3 TEST PROCEDURE 34
8.4 TEST SETUP 34
8.5 TEST RESULT 34

9 ANTENNA REQUIREMENT **36**

9.1 RESULT 36

APPENDIX (Photos of EUT) (5 pages)

1 General Information

1.1 Product Description

Characteristics	Description
EUT:	SmartCard + NFC Reader Module
Modulation:	ASK
Operating Frequency:	13.56MHz
Number of Channels:	1 channel
Antenna Type :	Internal Loop antenna
Input rating:	DC 5V
Power supply:	DC 5V from PC
Antenna Gain	The antenna is permanently attached on PCB, no consideration of replacement. Please refer to internal Photos for details.

Note: for a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

1.2 Related Submittal(s) / Grant(s)

This submittal(s) (test report) is intended for FCC ID: 2AWLWAP-SCRNFCX-XX filing to comply with Section 15.225 of the FCC Part 15, Subpart C Rules.

1.3 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10-2013. Radiated testing was performed at an antenna to EUT distance 3 meters.

1.4 Special Accessories

There is a USB cable with two ferrite cores in this submission.

1.5 Equipment Modifications

Not available for this EUT intended for grant.

1.6 Test Facility

Site Description

EMC Lab.	:	Accredited by CNAS, 2017.06.26 The certificate is valid until 2022.10.28 The Laboratory has been assessed and proved to be in compliance with CNAS-CL01:2006 (identical to ISO/IEC 17025:2005) The Certificate Registration Number is L0468. Accredited by A2LA, 2018.03.15 The Certificate Number is 4422.01.
Name of Firm	:	Dong Guan Anci Electronic Technology Co., Ltd.
Site Location	:	1-2 Floor, Building A, No.11, Headquarters 2 Road, Songshan, Lake Hi-tech Industrial Development Zone, Dongguan City, Guangdong Pr., China.

2 System Test Configuration

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode.

2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this transmitter(EUT) was tested according to the requirements in Section 13.1.4.1 of ANSI C63.10-2013.

2.4 Configuration of Tested System

Fig. 2-1 Configuration of Tested System

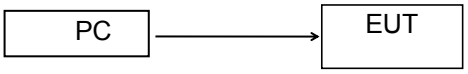


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.	Note
1	SmartCard + NFC Reader Module	Jarltech	AP-SCRNFC1-11	2AWLWAP-SCRNFCX-XX	N/A	EUT
2	Notebook	DELL	E5440	N/A	96LXK12	***Support Equipment***

Note:

(1) Unless otherwise denoted as EUT in 『Remark』 column, device(s) used in tested system is a support equipment.

3 Summary of Test Results

FCC Rules	Description Of Test	Result
§15.207	AC Power Conducted Emission	Complied
§15.225(a)(b)(c), (d), §15.209	Radiated Emission	Complied
§15.225(e)	Frequency Stability	Complied
§15.225(a)	20dB Bandwidth	Complied
§15.203	Antenna Application	Complied
Note：N/A		

For Radiated: The EUT's antenna was pre-tested under the following modes:

Test Mode	Description
Mode A	**X-Y axis**
Mode B	Y-Z axis
Mode C	X-Z axis

From the above modes, the worst case was found in Mode C. Therefore only the test data of the mode was recorded in this report.

4 TEST SYSTEM UNCERTAINTY

The following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Parameter	Uncertainty
Radio Frequency	±1x10^-5
Maximum Peak Output Power Test	±1.0dB
Conducted Emissions Test	±2.0dB
Radiated Emission Test	±2.0dB
Power Density	±2.0dB
Occupied Bandwidth Test	±1.0dB
Band Edge Test	±3dB
All emission, radiated	±3dB
Antenna Port Emission	±3dB
Temperature	±0.5℃
Humidity	±3%

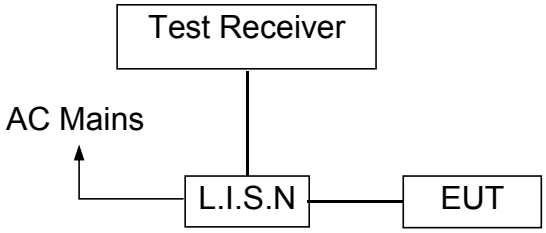
Remark: The coverage Factor (k=2), and measurement Uncertainty for a level of Confidence of 95%

5 Conducted Emissions Test

5.1 Measurement Procedure:

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured was complete.

5.2 Test SET-UP (Block Diagram of Configuration)



5.3 Measurement Equipment Used:

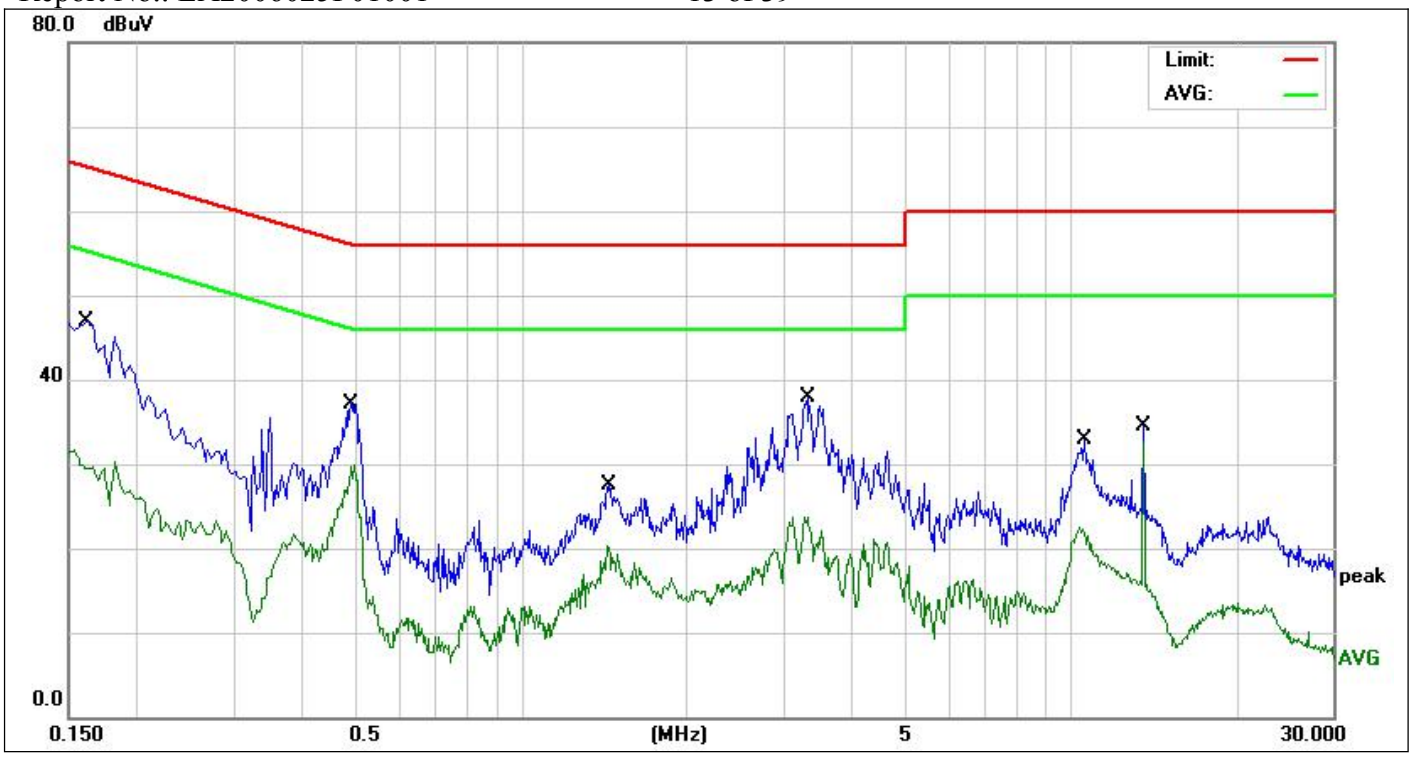
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	Calibrated until
L.I.S.N	SCHWARZBECK	NSLK 8127	8127-669	2021-05-18
10 db attenuator	JFW	50FP-010-H4	4360846-427-1	2021-05-18
RF Cable	N/A	N/A	2#	2021-05-18
EMI Test Receiver	ROHDE&SCHWARZ	ESCI	101358	2021-05-18

5.4 Measurement Result:

Operation Mode:	TX	Test Date :	June 01, 2020
Frequency Range:	0.15MHz~30MHz	Temperature :	24℃
Test Result:	PASS	Humidity :	58 %
Test By:	Best		

Pass.

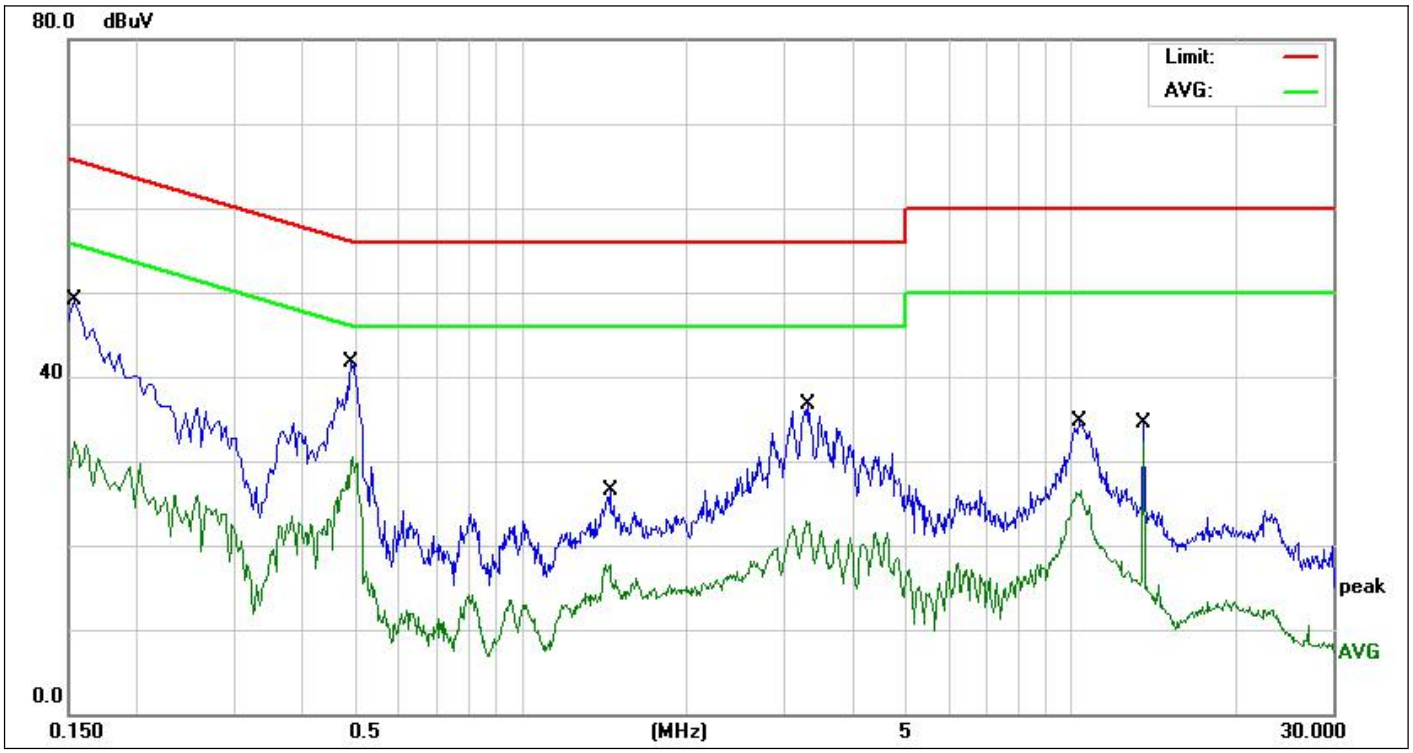
Conducted emission at both 120V & 240V, and emission at 120V represents the worst case. Please refer to the following data.



Site:	**843.3**	**Phase:N**	**Temperature(C):26(C)**
Limit:	**FCC Part 15 C Conduction(QP)**		**Humidity(%):60%**
EUT:	**SmartCard + NFC Reader Module**	**Test Time:**	**2020-06-01**
M/N.:	**AP-SCRNFC1-11**	**Power Rating:**	**AC 120V/60Hz**
Mode:	**TX**	**Test Engineer:**	**Bast**
Note:			

No.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB)	Measure-ment(dBuV)	Limit (dBuV)	Over (dB)	Detector	Comment
1	0.1620	32.02	10.15	42.17	65.36	-23.19	QP	
2	0.1620	18.81	10.15	28.96	55.36	-26.40	AVG	
3	0.4900	23.41	10.20	33.61	56.17	-22.56	QP	
4	0.4900	18.37	10.20	28.57	46.17	-17.60	AVG	
5	1.4460	12.90	10.26	23.16	56.00	-32.84	QP	
6	1.4460	8.08	10.26	18.34	46.00	-27.66	AVG	
7	3.3140	22.81	10.36	33.17	56.00	-22.83	QP	
8	3.3140	10.32	10.36	20.68	46.00	-25.32	AVG	
9	10.5980	15.24	10.75	25.99	60.00	-34.01	QP	
10	10.5980	9.58	10.75	20.33	50.00	-29.67	AVG	
11	13.5620	22.41	10.92	33.33	60.00	-26.67	QP	
12 *	13.5620	21.76	10.92	32.68	50.00	-17.32	AVG	

*:Maximum data x:Over limit !:over margin



Site:	**843.3**	**Phase:L1**	**Temperature(C):26(C)**
Limit:	**FCC Part 15 C Conduction(QP)**		**Humidity(%):60%**
EUT:	**SmartCard + NFC Reader Module**	**Test Time:**	**2020-06-01**
M/N.:	**AP-SCRNFC1-11**	**Power Rating:**	**AC 120V/60Hz**
Mode:	**TX**	**Test Engineer:**	**Bast**
Note:			

No.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB)	Measure-ment(dBuV)	Limit (dBuV)	Over (dB)	Detector	Comment
1	0.1539	33.49	10.15	43.64	65.78	-22.14	QP	
2	0.1539	19.51	10.15	29.66	55.78	-26.12	AVG	
3	0.4900	26.35	10.20	36.55	56.17	-19.62	QP	
4	0.4900	17.83	10.20	28.03	46.17	-18.14	AVG	
5	1.4540	10.40	10.26	20.66	56.00	-35.34	QP	
6	1.4540	5.52	10.26	15.78	46.00	-30.22	AVG	
7	3.3340	20.62	10.36	30.98	56.00	-25.02	QP	
8	3.3340	9.21	10.36	19.57	46.00	-26.43	AVG	
9	10.3700	19.12	10.73	29.85	60.00	-30.15	QP	
10	10.3700	14.55	10.73	25.28	50.00	-24.72	AVG	
11	13.5620	22.08	10.92	33.00	60.00	-27.00	QP	
12 *	13.5620	21.49	10.92	32.41	50.00	-17.59	AVG	

*:Maximum data x:Over limit !:over margin

5.5 Conducted Measurement Photos:

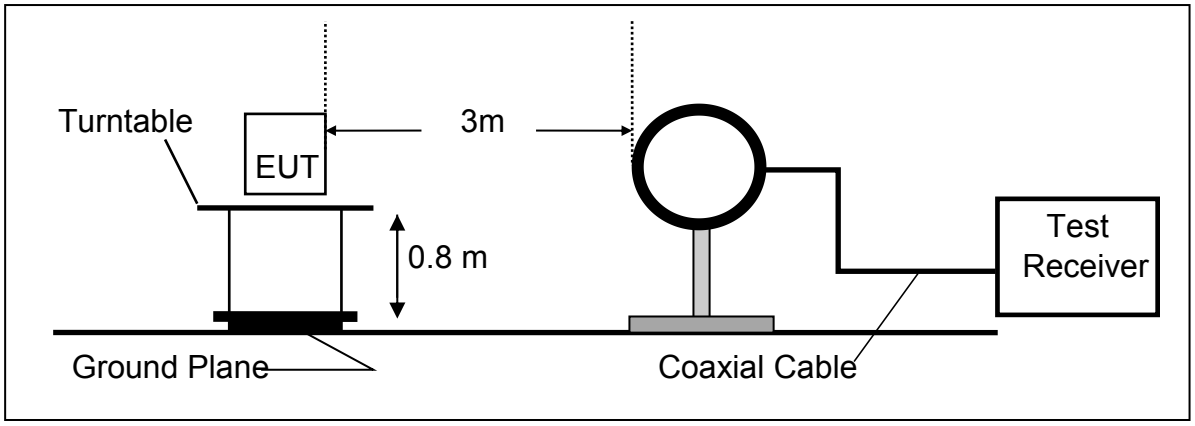
6 Radiated Emission Test

6.1 Measurement Procedure

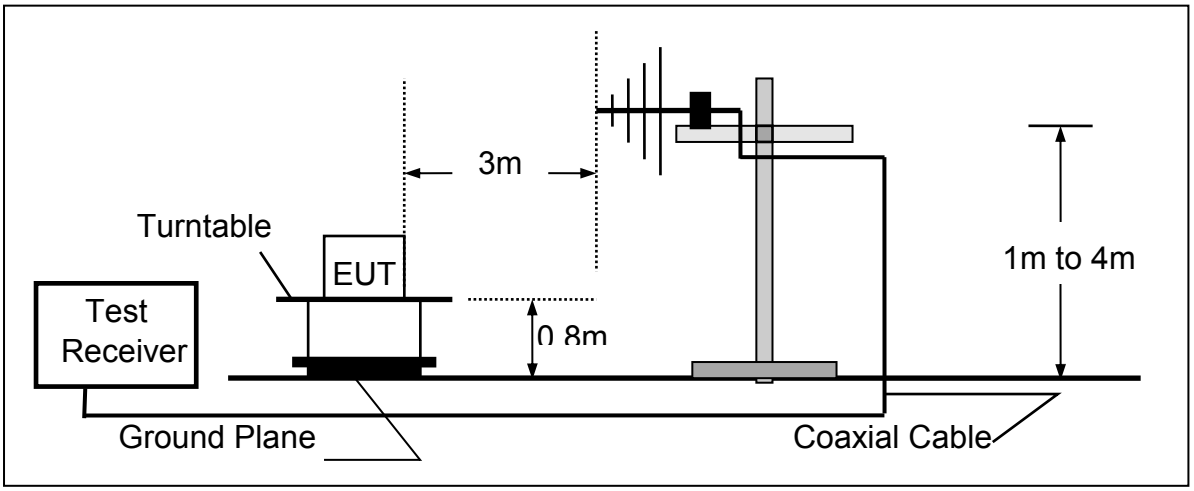
1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measured were complete.

6.2 Test SET-UP (Block Diagram of Configuration)

(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



6.3 Measurement Equipment Used

Item	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1.	EMI Test Receiver	Rohde & Schwarz	ESPI	100502	2020-11-28
2.	Pre-Amplifier	HP	8447D	2727A06172	2021-05-18
3.	Bilog Antenna	Schwarzbeck	VULB9163	VULB9163-588	2021-05-18
4.	Loop Antenna	Schwarzbeck	FMZB 1516	1516-141	2020-11-28
5.	Spectrum Analyzer	Rohde & Schwarz	FSV40	US40240623	2020-11-28
6.	Low noise Amplifiers	A-INFO	LA1018N4009	J1013130524001	2021-05-18
7.	Horn antenna	A-INFO	LB-10180-SF	J2031090612123	2021-05-18
8.	Broadband RF Power Amplifier	AEROFLEX	AEROFLEX100KHz-40GHz	J1013130524001	2020-11-28
9.	DRG Horm Antenna	A.H.SYSTEMS	SAS-574	J2031090612123	2020-11-28
10.	RF Cable	Gigalink Microwave	ZT40-2.92J-2.92J-2m	N/A	2020-11-28
11.	RF Cable	Gigalink Microwave	ZT40-2.92J-2.92J-0.3m	N/A	2020-11-28
12.	RF Cable	N/A	N/A	6#	2021-05-18
13.	RF Cable	N/A	N/A	1-1#	2021-05-18
14.	RF Cable	N/A	N/A	1-2#	2021-05-18
15.	RF Cable	N/A	N/A	7#	2021-05-18
16.	3m Semi-anechoic Chamber	chengyu	9m*6m*6m	N/A	2022-05-28
17.	Test Software	Farad	EZ-EMC Ver:ANCI-3A1	N/A	N/A

6.4 Radiated Emission Limit

The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table 15.209(a):

FCC Part 15.209				
Frequency (MHz)	Field Strength Limitation		Field Strength Limitation Frequency at 3m Measurement Distance	
	(uV/m)	Dist	(uV/m)	(dBuV/m)
0.009 – 0.490	2400 / F(KHz)	300m	10000 * 2400/F(KHz)	20log 2400/F(KHz) + 80
0.490 – 1.705	24000 / F(KHz)	30m	100 * 24000/F(KHz)	20log 24000/F(KHz) + 40
1.705 – 30.00	30	30m	100* 30	20log 30 + 40
30.0 – 88.0	100	3m	100	20log 100
88.0 – 216.0	150	3m	150	20log 150
216.0 – 960.0	200	3m	200	20log 200
Above 960.0	500	3m	500	20log 500

FCC Part 15.225(a)/(b)/(c)				
Frequency (MHz)	Field Strength Limitation		Field Strength Limitation Frequency tion at 3m Measurement Dist	
	(uV/m)	Dist	(uV/m)	(dBuV/m)
13.110 – 13.410	106	30 m	106*100	80.5
13.410 – 13.553	334	30 m	334*100	90.5
13.553 – 13.567	15,848	30 m	15,848*100	124
13.567 – 13.710	334	30 m	334*100	90.5
13.710 – 14.010	106	30 m	106*100	80.5

15.205 Restricted bands of operation

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])

Remark : 1. Emission level in dBuV/m=20 log (uV/m)
2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
3. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of ξ 15.205, and the emissions located in restricted bands also comply with 15.209 limit.

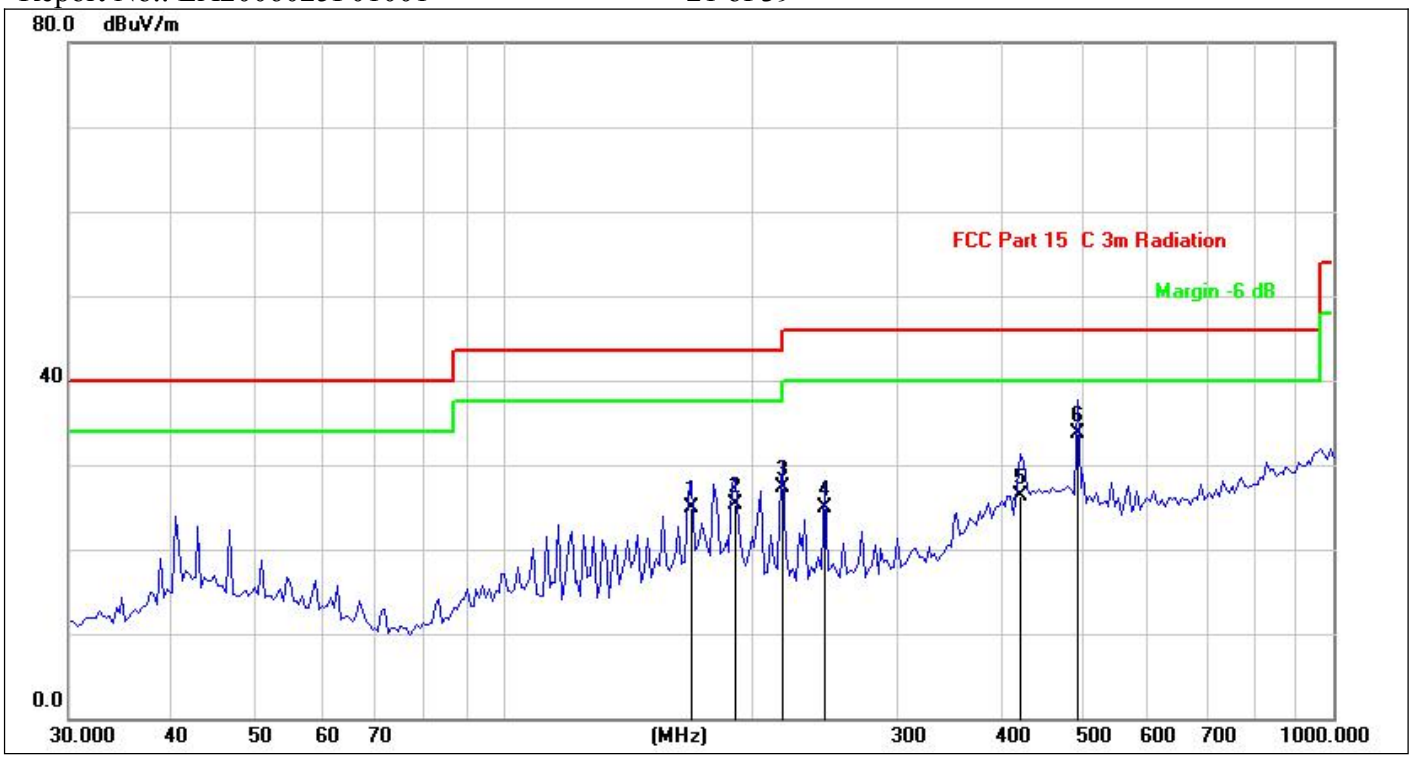
6.5 Measurement Result

Operation Mode:	TX Mode	Test Date :	2020-06-04
Frequency Range:	9kHz~30MHz	Temperature :	28℃
Test Result:	PASS	Humidity :	65 %
Measured Distance:	3m	Test By:	BEST

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Over (dB)	Note
9.32	V	33.08	69.54	-36.46	QP
12.32	V	31.19	69.54	-38.35	QP
14.55	V	35.52	69.54	-34.02	QP
16.32	V	34.19	69.54	-35.35	QP
23.52	V	36.90	69.54	-32.64	QP
27.12	V	40.33	69.54	-19.29	QP
10.23	H	31.47	69.54	-38.07	QP
11.56	H	32.60	69.54	-36.94	QP
15.32	H	36.73	69.54	-32.81	QP
20.66	H	37.81	69.54	-31.73	QP
25.34	H	34.09	69.54	-35.45	QP
27.12	H	48.36	69.54	-21.18	QP

Operation Mode:	TX Mode	Test Date :	2020-06-04
Frequency Range:	30~1000MHz	Temperature :	28℃
Test Result:	PASS	Humidity :	65 %
Measured Distance:	3m	Test By:	BEST

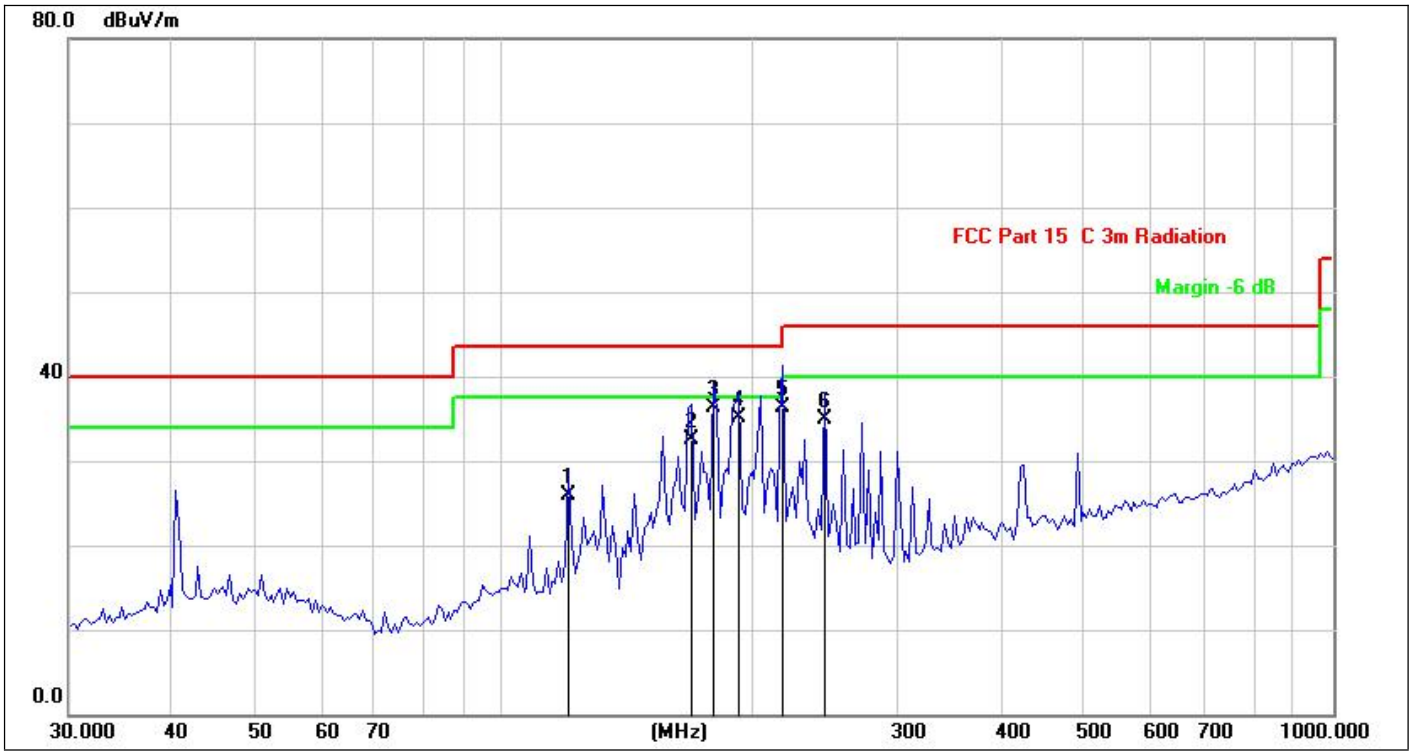
Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Over (dB)	Note
168.7093	V	25.00	43.50	-18.50	QP
190.7390	V	25.40	43.50	-18.10	QP
217.5441	V	27.40	46.00	-18.60	QP
243.8043	V	24.90	46.00	-21.10	QP
419.8435	V	26.40	46.00	-19.60	QP
491.6059	V	33.70	46.00	-12.30	QP
119.8555	H	25.90	43.50	-17.60	QP
168.7093	H	32.60	43.50	-10.90	QP
179.3863	H	36.40	43.50	-7.10	QP
192.4185	H	35.10	43.50	-8.40	QP
217.5442	H	36.30	46.00	-9.70	QP
243.8043	H	35.00	46.00	-11.00	QP



Site:	**LAB**	**Antenna::Vertical**	**Temperature(C):26(C)**
Limit:	**FCC Part 15 C 3m Radiation(QP)**		**Humidity(%):60%**
EUT:	**SmartCard + NFC Reader Module**	**Test Time:**	**2020-06-04**
M/N.:	**AP-SCRNFC1-11**	**Power Rating:**	**AC 120V/60HZ**
Mode:	**TX**	**Test Engineer:**	**sunshine**
Note:			

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Remark
1	168.7093	37.26	-12.26	25.00	43.50	-18.50	QP	
2	190.7390	35.94	-10.54	25.40	43.50	-18.10	QP	
3	217.5441	37.01	-9.61	27.40	46.00	-18.60	QP	
4	243.8043	33.87	-8.97	24.90	46.00	-21.10	QP	
5	419.8435	32.19	-5.79	26.40	46.00	-19.60	QP	
6 *	491.6059	37.83	-4.13	33.70	46.00	-12.30	QP	

*:Maximum data x:Over limit !:over margin



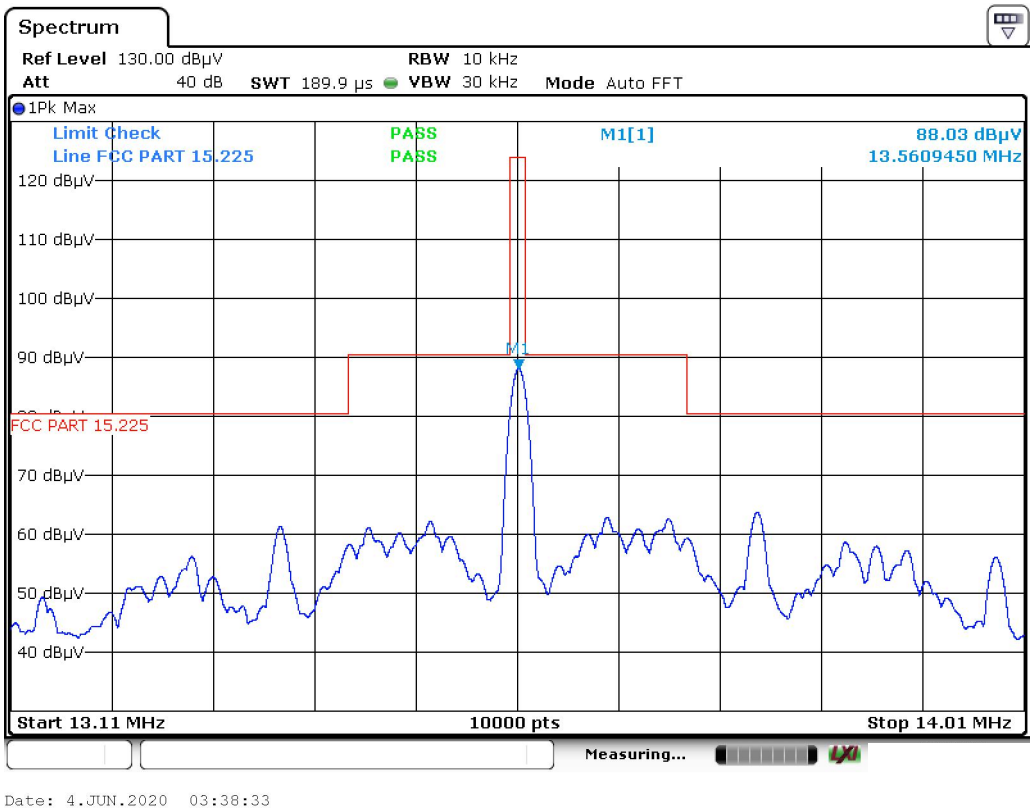
Site:	**LAB**	**Antenna::Horizontal**	**Temperature(C):26(C)**
Limit:	**FCC Part 15 C 3m Radiation(QP)**		**Humidity(%):60%**
EUT:	**SmartCard + NFC Reader Module**	**Test Time:**	**2020-06-04**
M/N.:	**AP-SCRNFC1-11**	**Power Rating:**	**AC 120V/60HZ**
Mode:	**TX**	**Test Engineer:**	**sunshine**
Note:			

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Remark
1	119.8555	38.15	-12.25	25.90	43.50	-17.60	QP	
2	168.7093	44.86	-12.26	32.60	43.50	-10.90	QP	
3 *	179.3863	47.96	-11.56	36.40	43.50	-7.10	QP	
4	192.4185	45.55	-10.45	35.10	43.50	-8.40	QP	
5	217.5442	45.91	-9.61	36.30	46.00	-9.70	QP	
6	243.8043	43.97	-8.97	35.00	46.00	-11.00	QP	

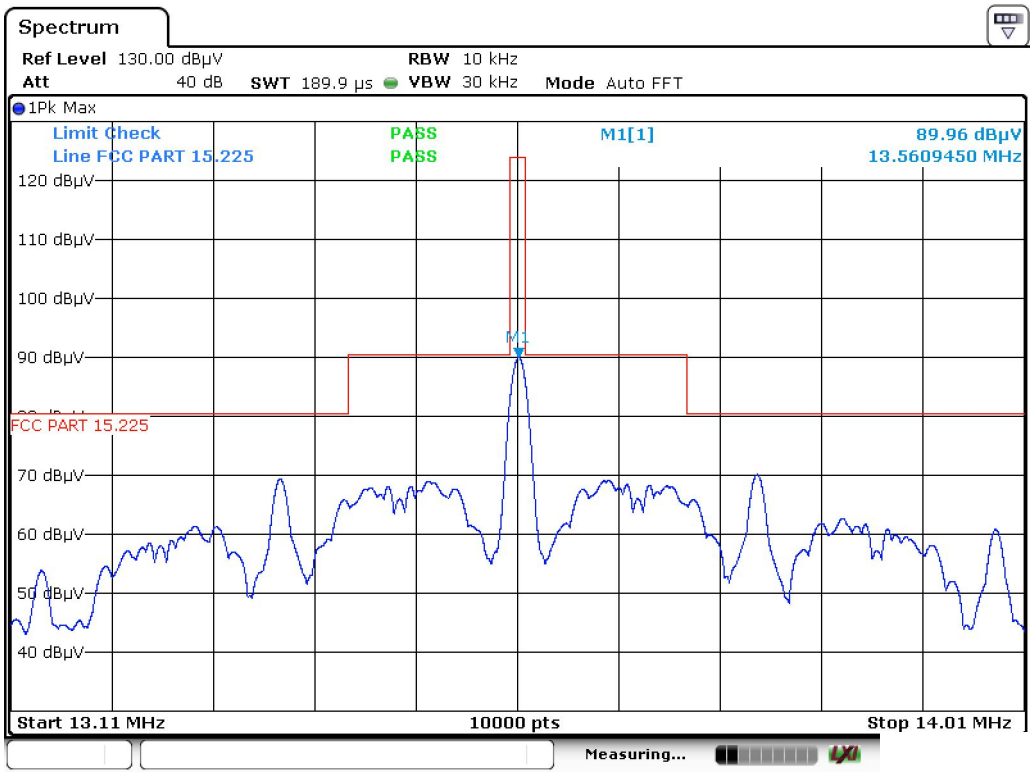
*:Maximum data x:Over limit !:over margin

Operation Mode:	TX Mode	Test Date :	2020-06-04
Frequency Range:	13.560 MHz	Temperature :	28℃
Test Result:	PASS	Humidity :	65 %
Measured Distance:	3m	Test By:	BEST

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Over (dB)
13.56	V	88.03	124	-35.97
13.56	H	89.96	124	-34.04

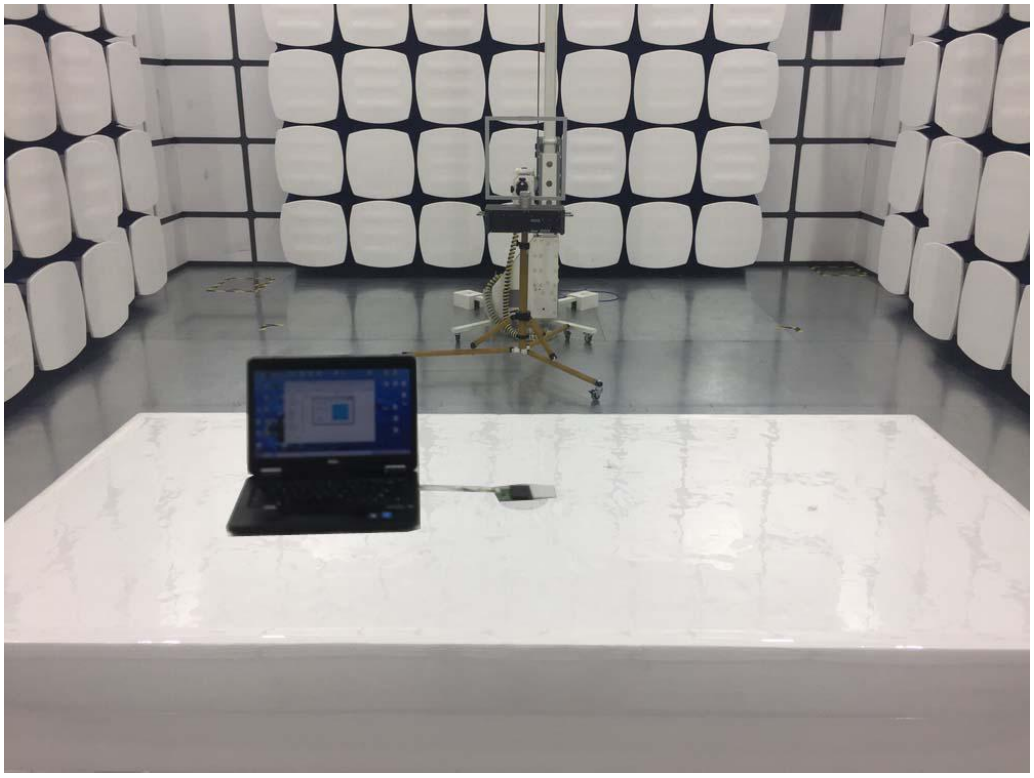


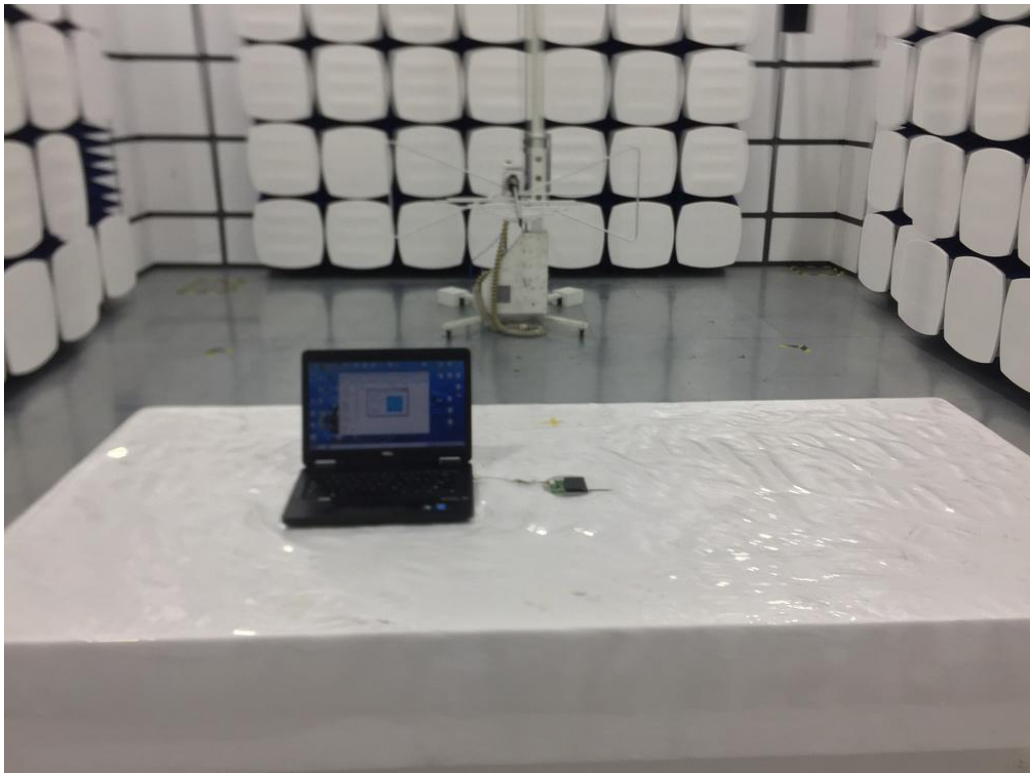
VERTICAL


Spectrum
Ref Level 130.00 dBµV
RBW 10 kHz
Att 40 dB
SWT 189.9 µs
VBW 30 kHz
Mode Auto FFT
1Pk Max
Limit Check
PASS
M1[1]
89.96 dBµV
Line FCC PART 15.225
PASS
13.5609450 MHz
120 dBµV
110 dBµV
100 dBµV
90 dBµV
M1
FCC PART 15.225
70 dBµV
60 dBµV
50 dBµV
40 dBµV
Start 13.11 MHz
10000 pts
Stop 14.01 MHz
Measuring...
Date: 4.JUN.2020 03:39:49

HORIZONTAL

6.6 Radiated Measurement Photos:





7 FREQUENCY STABILITY MEASUREMENT

7.1 FREQUENCY STABILITY LIMITS

FCC Part 15.225(e)

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.

7.2 MEASUREMENT INSTRUMENTS LIST

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	CALIBRATED UNTIL
Spectrum Analyzer	Rohde & Schwarz	FSV40	US40240623	2020-11-28
Coaxial Cable	Gigalink Microwave	ZT40	19022092	2020-11-28
Antenna Connector	ARTHUR-YANG	2244-N1TG1	N/A	2020-11-28

Remark: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

7.3 TEST PROCEDURE

a. The equipment under test was connected to an external AC power supply and the RF output was connected to a frequency counter via feed through attenuators. The EUT was placed inside the temperature chamber. After the temperature stabilized for approximately 20 minutes, the frequency of the output signal was recorded from the counter.

b. At room temperature (25±5°C), an external variable DC power supply was connected to the EUT. The frequency of the transmitter was measured for 115%, 100% and 85% of the nominal operating input voltage.

c. For the actual test configuration, please refer to the related Item –EUT Test Photos.

7.4 EUT OPERATING CONDITIONS

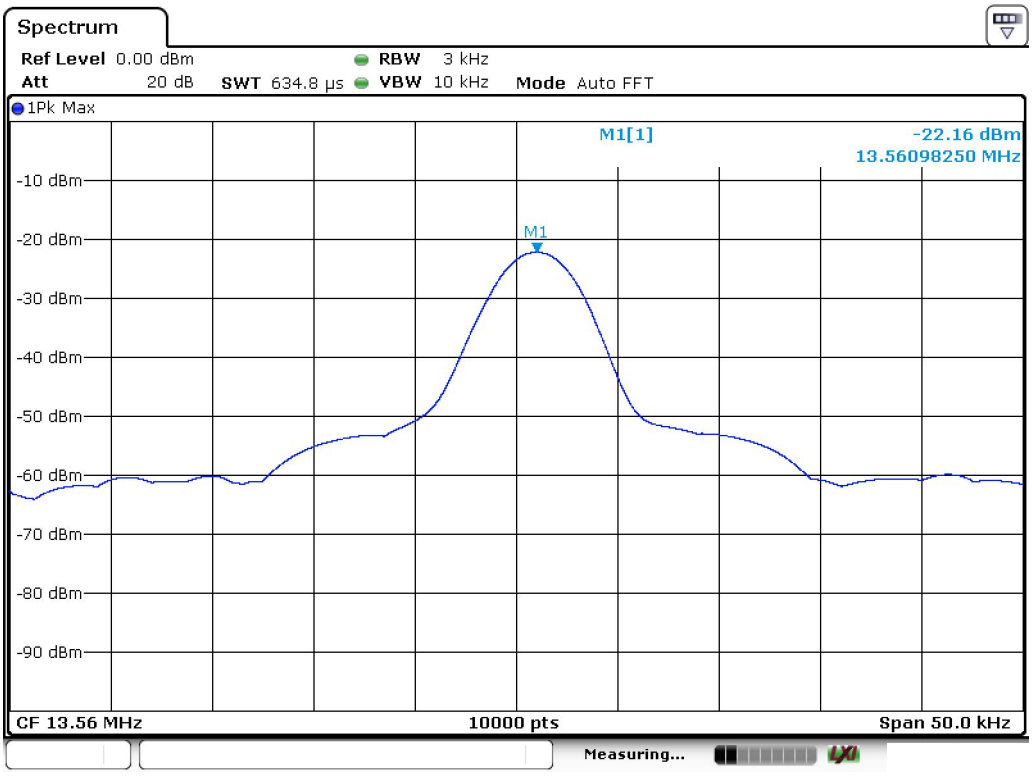
The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

7.5 TEST RESULTS

E.U.T :	SmartCard + NFC Reader Module	Test Mode :	TX Mode
Test Voltage :	DC 5V		

Frequency Stability Versus Environmental Temperature					
Temperature (℃)	**Voltage (Vac)**	**Frequency (MHz)**	**Freq Error (ppm)**	**Limit (ppm)**	**Results**
-20	DC 5V	13.5609825	72.46	100	PASS
-10	DC 5V	13.5609775	72.09	100	PASS
0	DC 5V	13.5609725	71.72	100	PASS
10	DC 5V	13.5609825	72.46	100	PASS
20	DC 5V	13.5609675	71.35	100	PASS
30	DC 5V	13.5609875	72.82	100	PASS
40	DC 5V	13.5609875	72.82	100	PASS
50	DC 5V	13.5609775	72.09	100	PASS

Frequency Stability Versus Environmental Temperature



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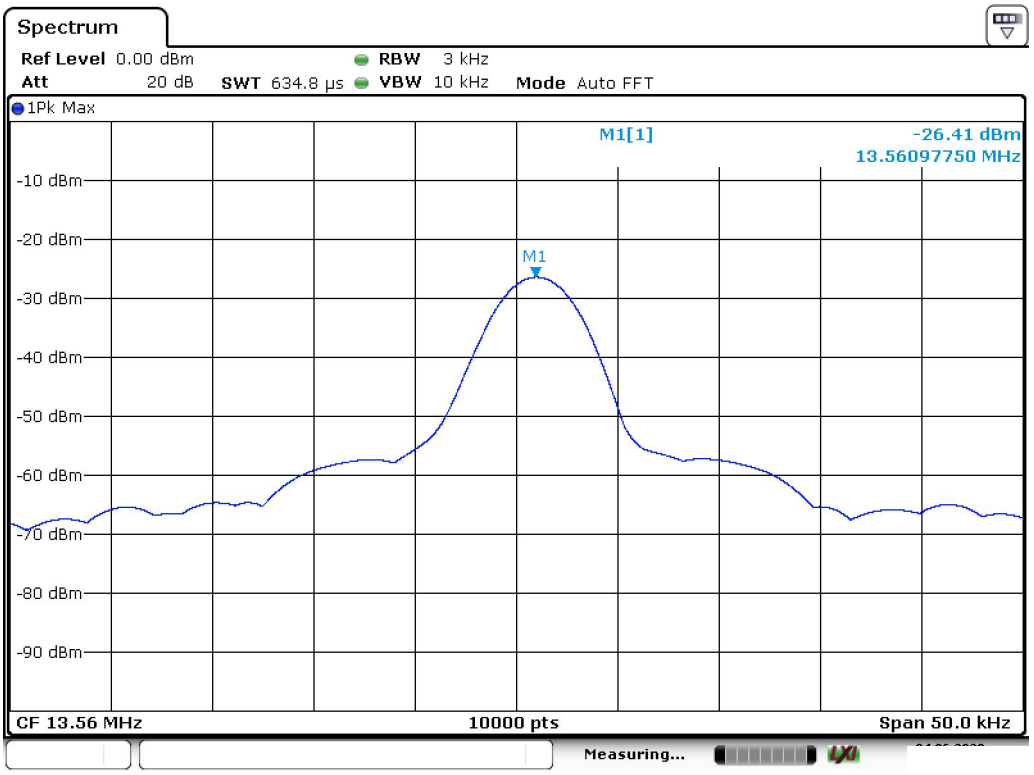

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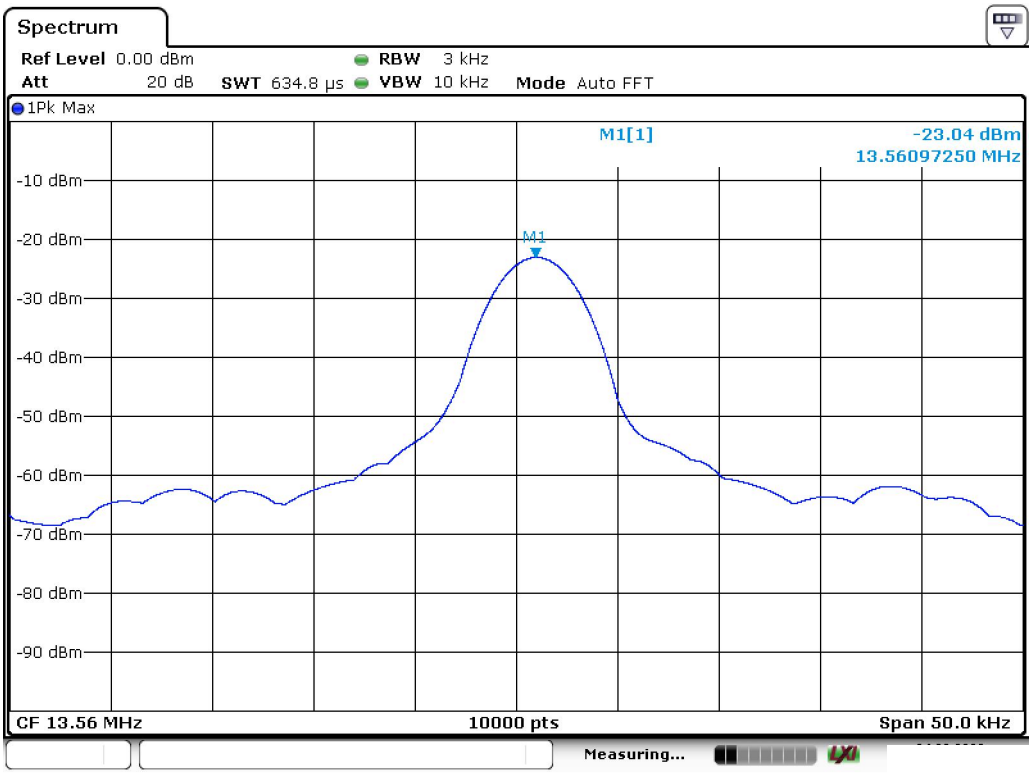

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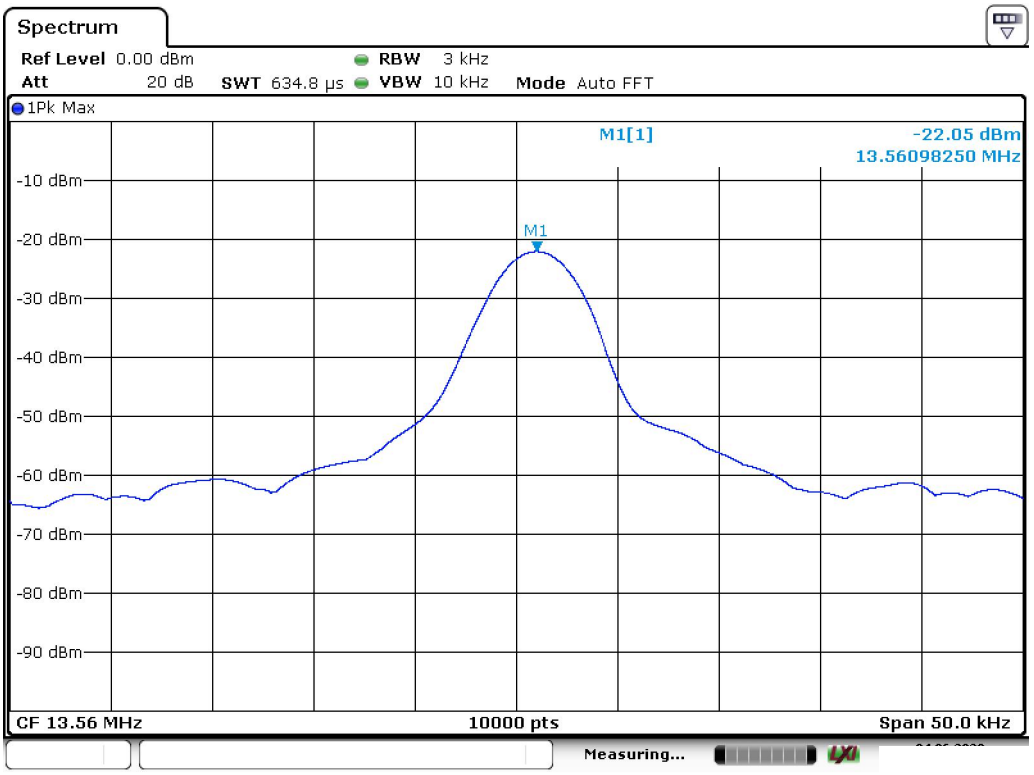

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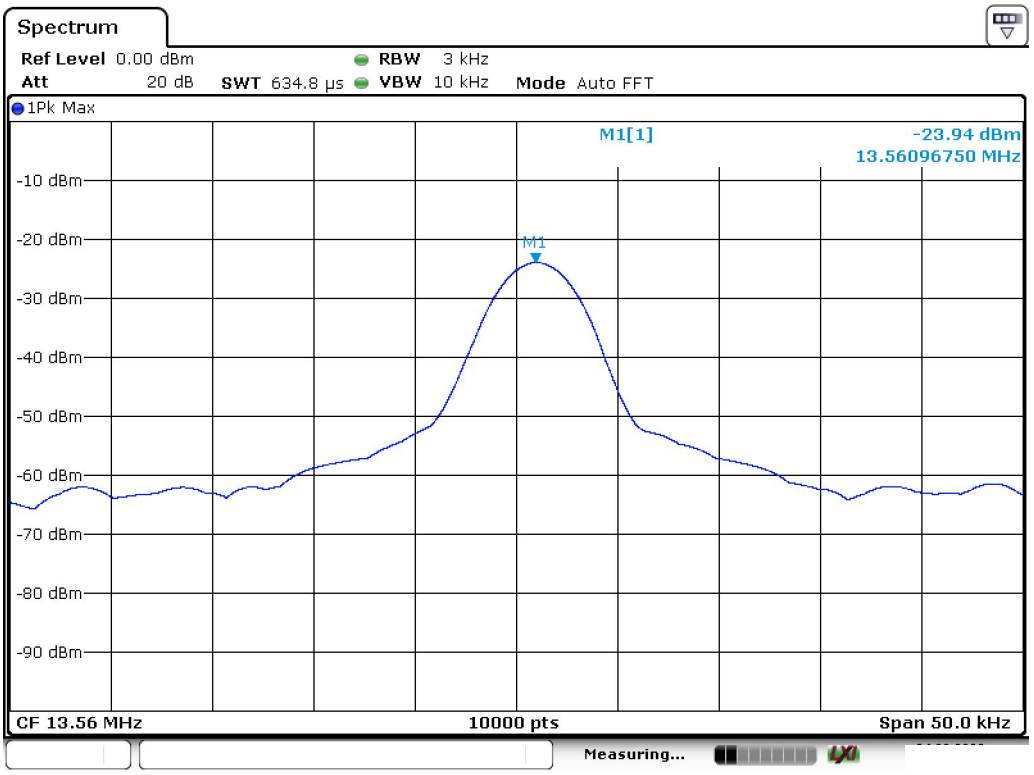

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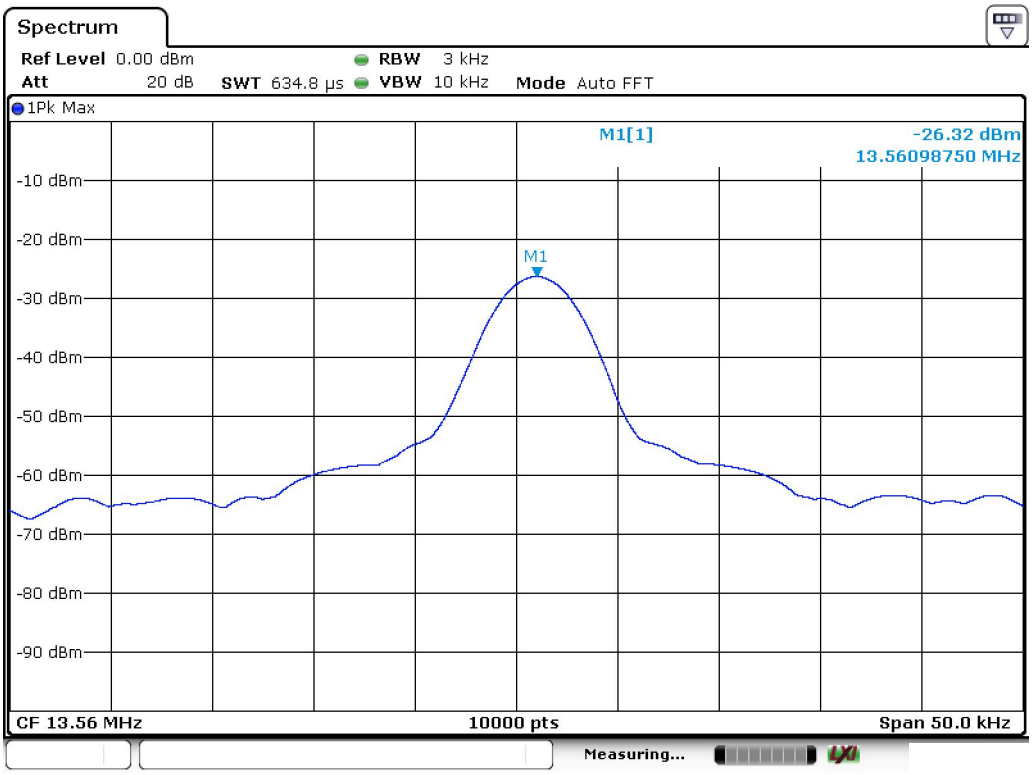

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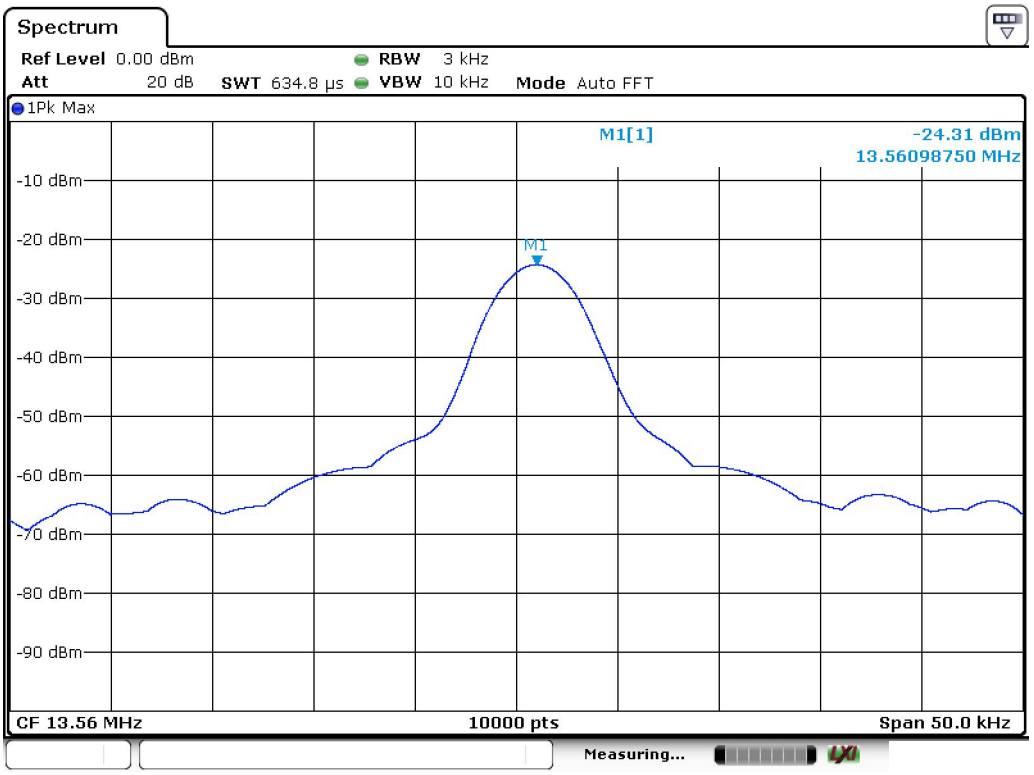

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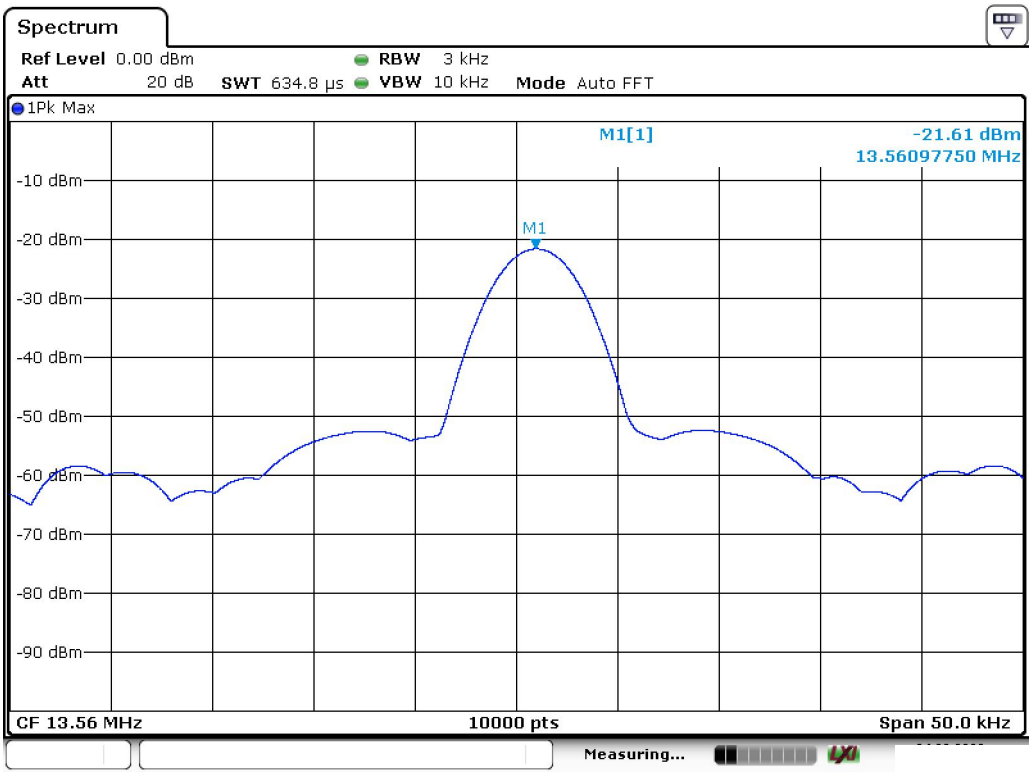
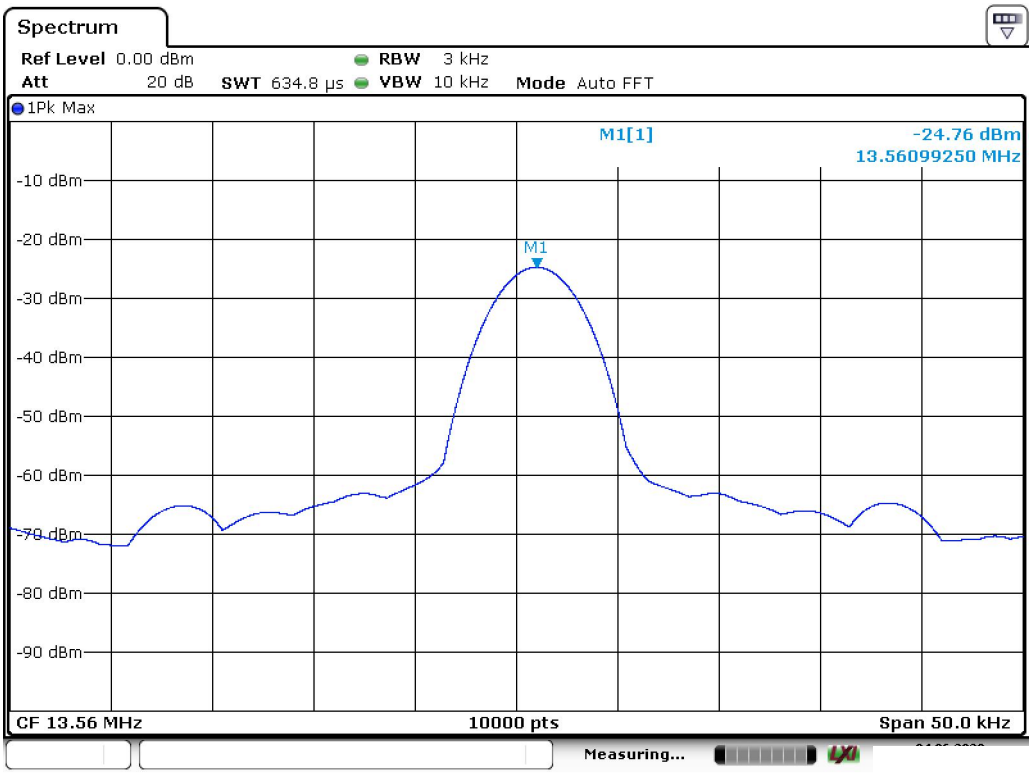


Date: 4.JUN.2020 03:47:13

Frequency Stability Versus Input Voltage					
Temperature (℃)	Voltage (Vdc)	Frequency (MHz)	Freq Error (ppm)	Limit (ppm)	Results
25	4.25V	13.5609925	73.19	100	PASS
25	5.0V	13.5609775	72.09	100	PASS
25	5.75V	13.5609725	71.72	100	PASS

Frequency Stability Versus Input Voltage



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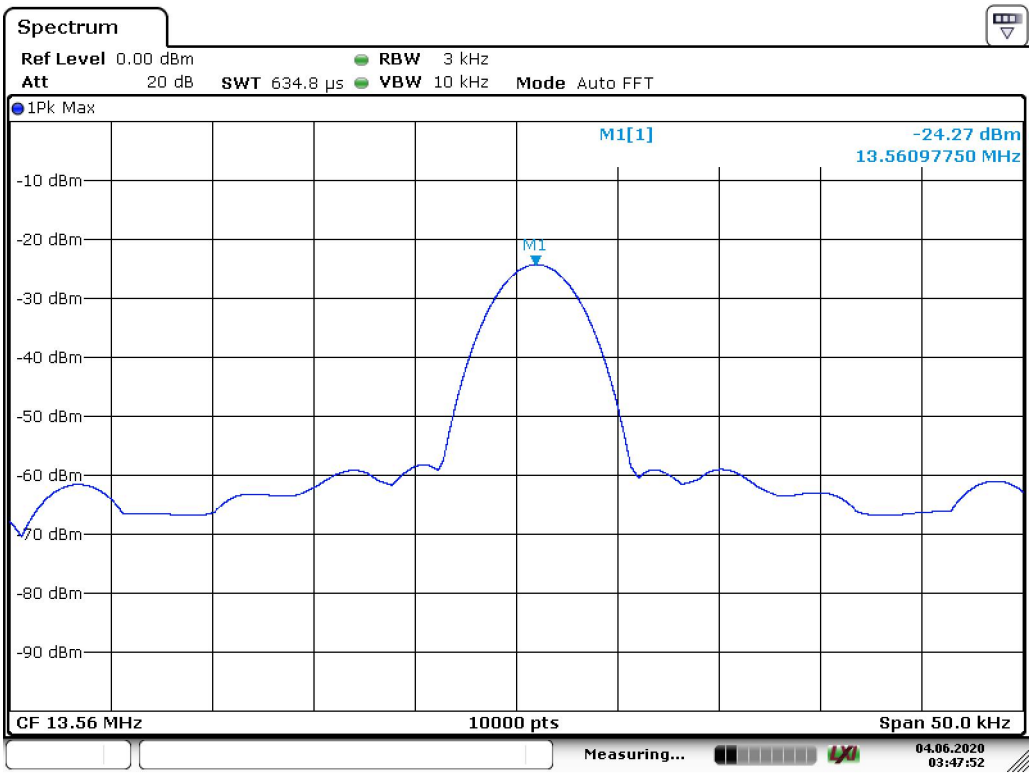

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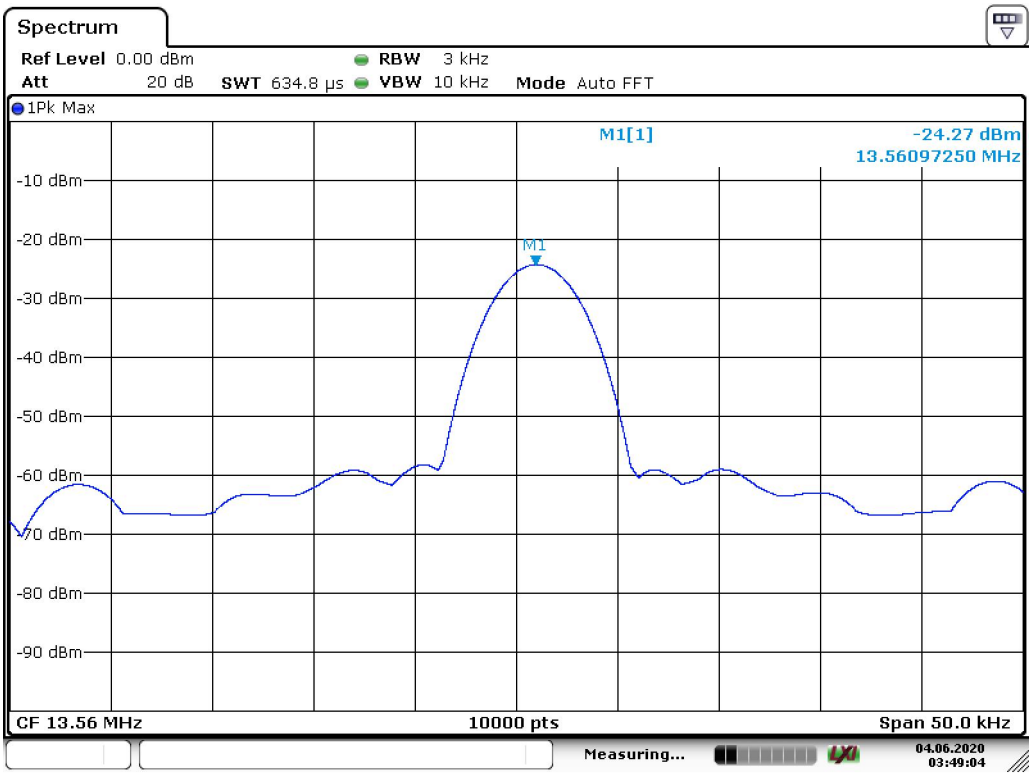


Date: 4.JUN.2020 03:49:04

8 EMISSION BANDWIDTH

8.1 Emission Bandwidth Limit

Intentional radiators must be designed to ensure that the 20 dB bandwidth of the emissions in the specific band (13.553 – 13.567 MHz).

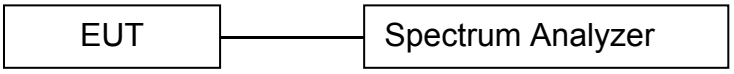
8.2 TEST INSTRUMENTS

Refer a test equipment and calibration data table in this test report.

8.3 TEST PROCEDURE

The bandwidth of the fundamental frequency was measured by spectrum analyzer with 3kHz RBW and 10kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

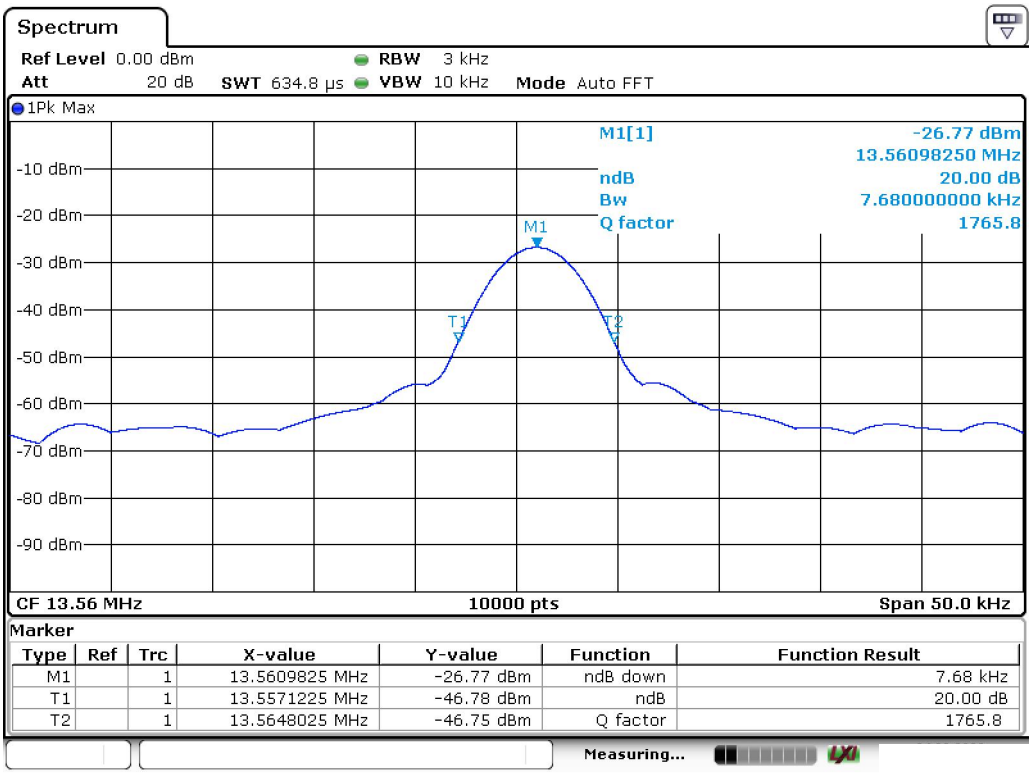
8.4 Test Setup



8.5 Test Result

Frequency (MHz)	20dB Bandwidth (kHz)	Results
13.56	7.68	PASS

BANDWIDTH TEST PLOT



Date: 4.JUN.2020 03:44:10

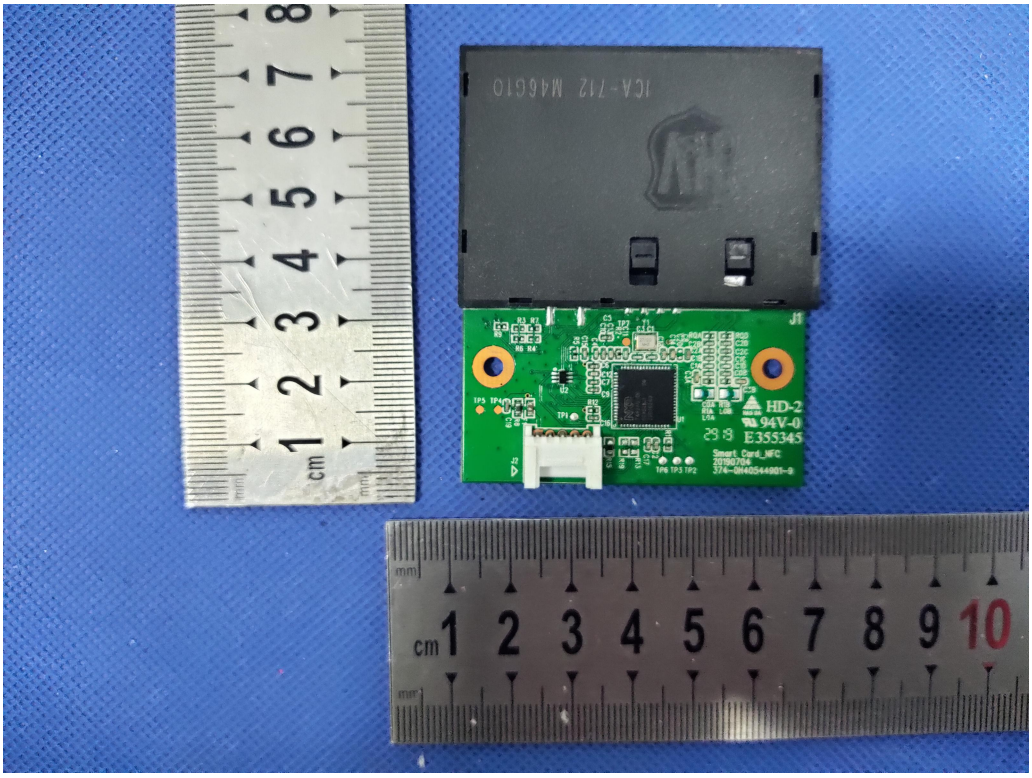
9 ANTENNA REQUIREMENT

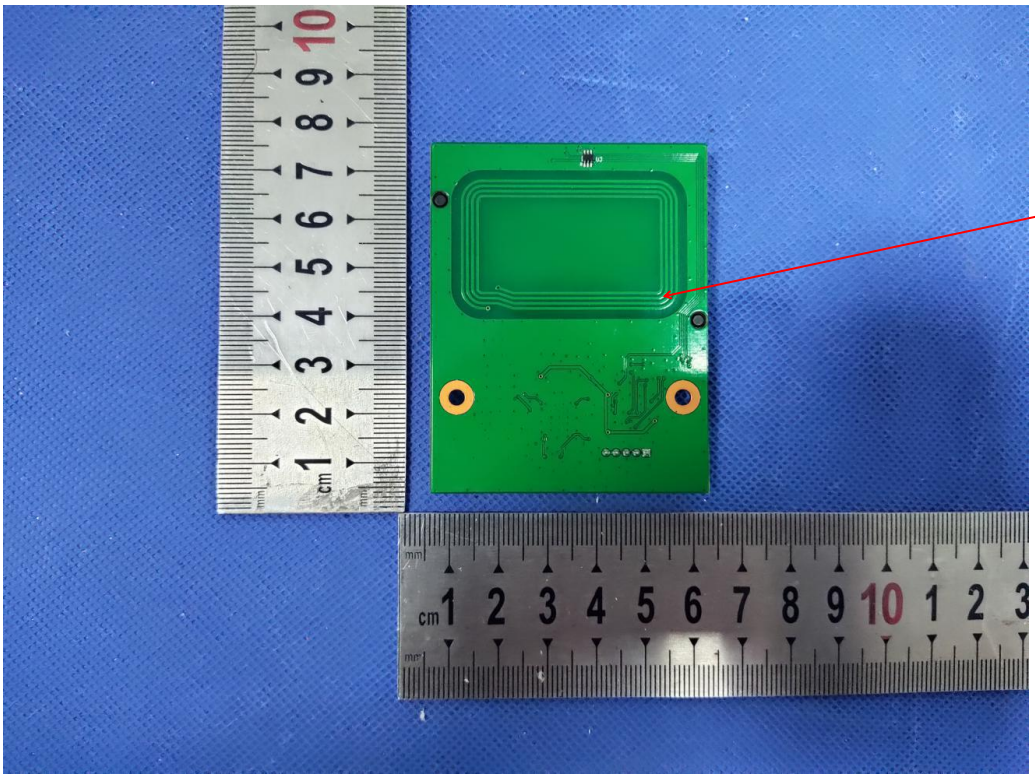
The EUT'S antenna is met the requirement of FCC part 15C section 15.203.

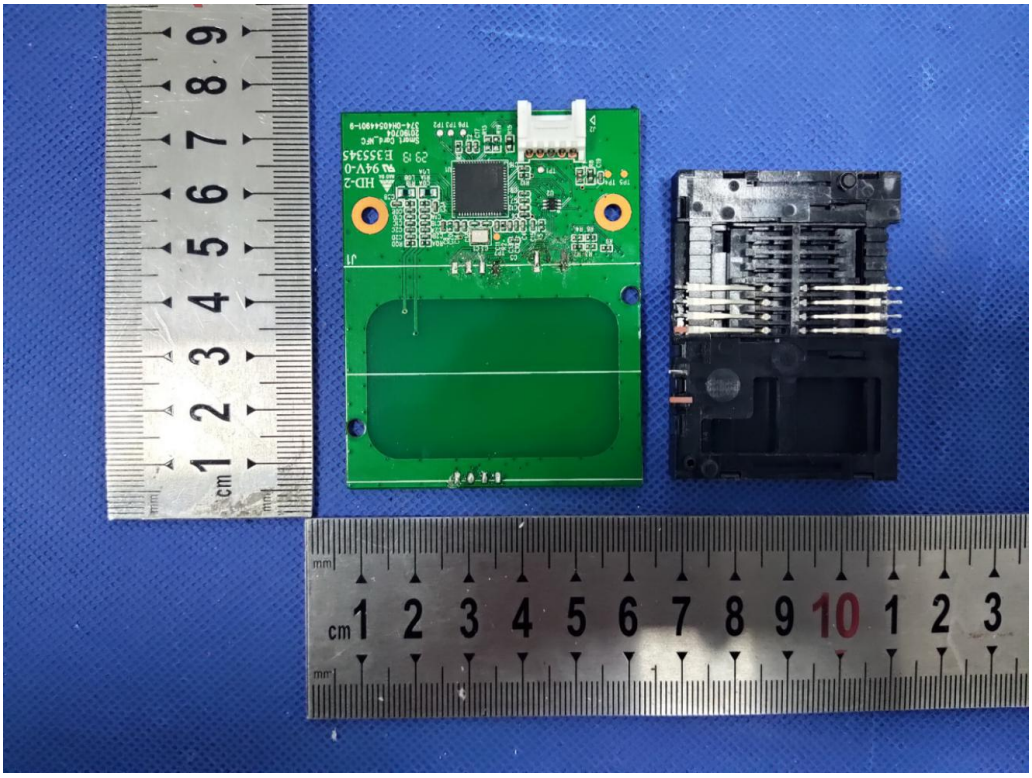
9.1 Result

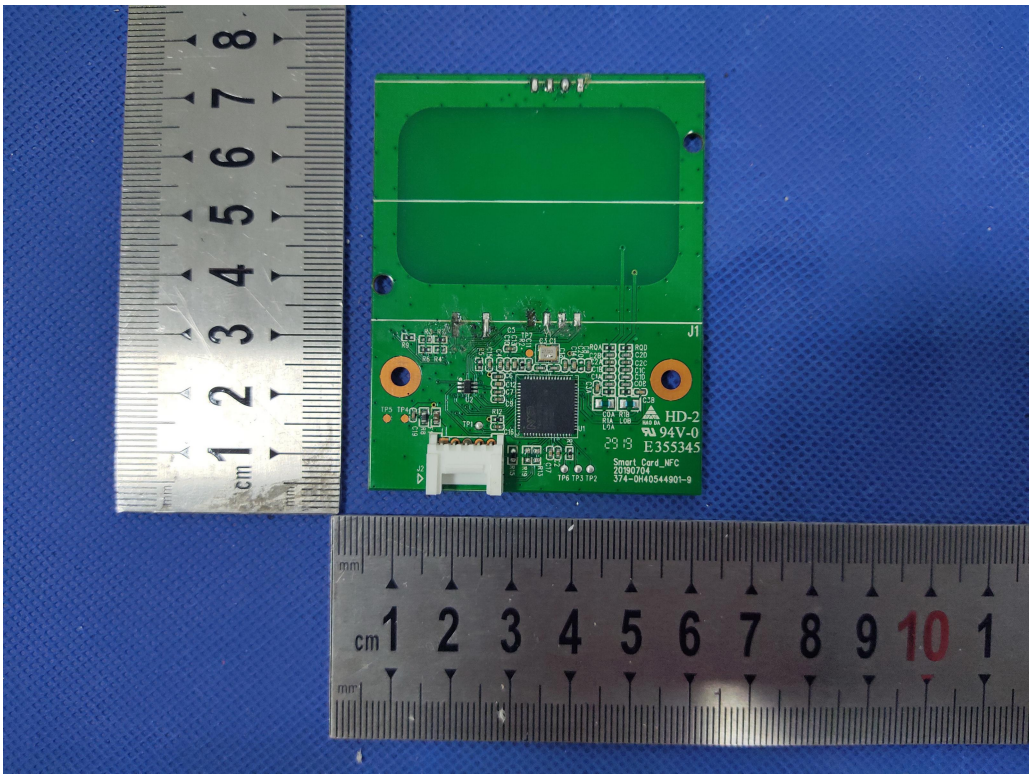
The EUT's antenna used an inter Loop Antenna and integral on the PCB.
The antenna is permanently attached on PCB, no consideration of replacement. Please refer to internal Photos for details. So it meets the requirement.

APPENDIX I
(Photos of EUT)




ANTENNA





----------END OF REPORT----------