

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

OF

SMART CARD READER

Model No.: SCC-RF-MI-C401

FCC ID: 2AIRLC401

Trademark: LZT

Report No.:ED160520038E

Issue Date: June 18, 2016

Prepared for

**JIANGMEN WINLONG INDUSTRIAL ROBOT CO., LTD.
Dong Nan Industrial Zone , Wai Hai, Jianghai District, Jiangmen City,
Guangdong, CHINA**

Prepared by

EMTEK(DONGGUAN) CO., LTD.

**No.281, Guantai Road, Nancheng District,
Shenzhen, Guangdong, China**

TEL: 86-769-22807078

FAX: 86-769-22807079

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EMTEK(DONGGUAN) CO., LTD.**

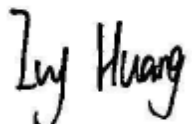
VERIFICATION OF COMPLIANCE

Applicant:	JIANGMEN WINLONG INDUSTRIAL ROBOT CO., LTD Dong Nan Industrial Zone , Wai Hai, Jianghai District, Jiangmen City, Guangdong, CHINA
Manufacturer:	JIANGMEN WINLONG INDUSTRIAL ROBOT CO., LTD Dong Nan Industrial Zone , Wai Hai, Jianghai District, Jiangmen City, Guangdong, CHINA
Product Description:	SMART CARD READER
Model Number:	SCC-RF-MI-C401
Trademark:	LZT


We hereby certify that:

The above equipment was tested by EMTEK(DONGGUAN) 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(2016).

Date of Test : May 20, 2016 to June 17, 2016

Prepared by : 
Ivy Huang/Editor

Reviewer : 
Alan He/Supervisor

Approved & Authorized Signer : 
Sam Lv/Manager

Modified Information

Version	Summary	Revision Date	Report No.
Ver.1.0	Original Report	/	ED160520038E

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APPENDIX (Photos of EUT) (5 pages)

1 General Information

1.1 Product Description

A major technical descriptions of EUT is described as following:

- A). Operation Frequency: 13.56MHz
- B). Modulation: ASK
- C). Number of Channel: 1 channel
- D). Power Supply: DC 5V From PC Input AC 120V/60Hz
- E). Antenna Type: Internal PCB antenna
- F). Antenna Gain: 5 dBi
- G). Product Hardware Version: Rev1.0
- H). Product Software Version: V1.02

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: 2AIRLC401 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 Test Facility

Site Description
EMC Lab. :

Registered on FCC, June 18, 2014
The Certificate Number is 247565

Registered on Industry Canada, February 19, 2014
The Certificate Number is 9444A.

Name of Firm
Site Location :

EMTEK(DONGGUAN) CO., LTD.
No.281, Guantai Road, Nancheng District,
Dongguan, Guangdong, 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

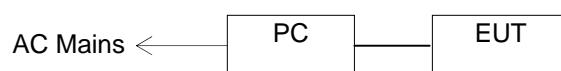


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.	Note
1.	SMART CARD READER	LZT	SCC-RF-MI-C4 01	2AIRLC401	N/A	EUT
2.	PC	DELL	Inspiron 14R-N4110	N/A	78RRRS1	Support Equipment
3.	AC adapter	DELL	AH55NS5-00	N/A	78RRRS2	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

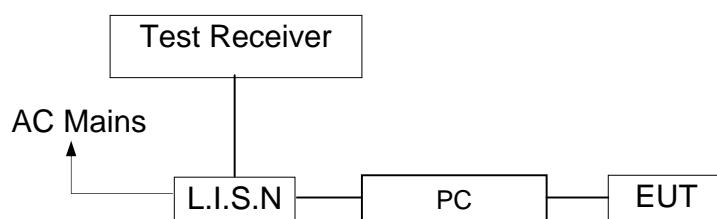
FCC Rules	Description Of Test	Result
§15.107	AC Power Conducted Emission	Complied
§15.225(a)(b)(c), (d), §15.209	Radiated Emission	Complied
§15.225(e)	Frequency Stability	Complied
§15.203	Antenna Application	Complied

4 Conducted Emissions Test

4.1 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.

4.2 Test SET-UP (Block Diagram of Configuration)



4.3 Measurement Equipment Used

Conducted Emission Test Site						
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	Characteristics	Last Cal.	Due date
Test Receiver	Rohde & Schwarz	ESCS30	100018	9kHz~3GHz	06/15/2016	06/14/2017
L.I.S.N	Rohde & Schwarz	ENV216	100017	9KHz-300MHz	06/15/2016	06/14/2017
RF Switching Unit	CDS	RSU-M2	38401	9KHz-300MHz	06/15/2016	06/14/2017
Coaxial Cable	CDS	79254	46107086	9kHz~3GHz	06/15/2016	06/14/2017

4.4 Conducted Emission Limit

**Conducted Emission
Frequency(MHz)**

0.15-0.5

0.5-30.0

Quasi-peak

79

73

Average

66

60

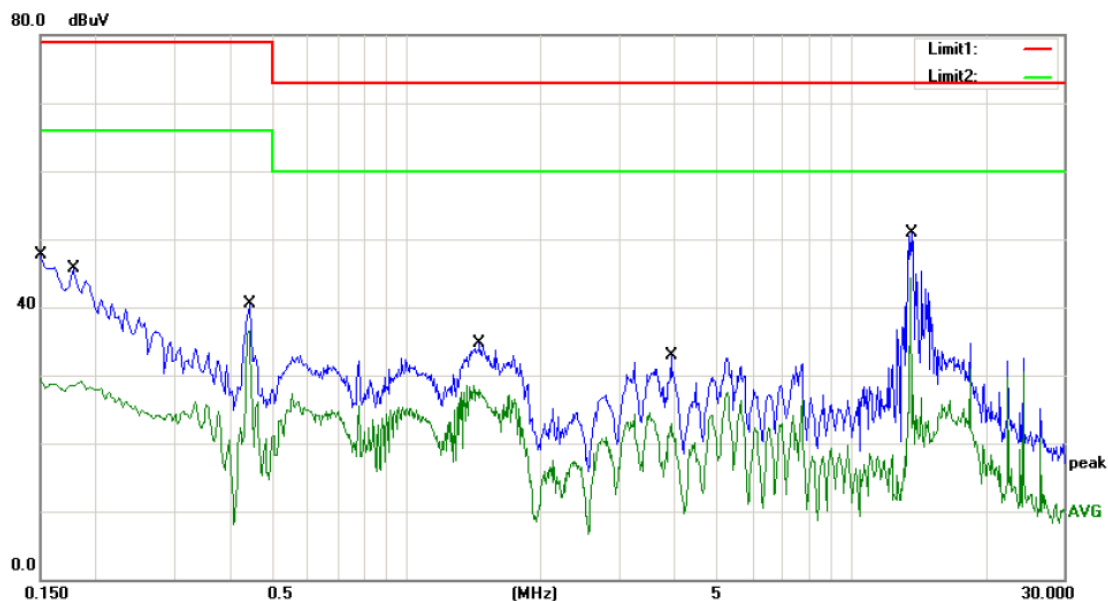
Note: 1. The lower limit shall apply at the transition frequencies

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.5 Measurement Result

Pass.

Please refer to the following.



Site site #1

Phase: **L1**

Temperature: 24

Limit: (CE)FCC PART 15 class A_QP

Power: DC 5V from PC(AC
120V/60Hz)

Humidity: 55 %

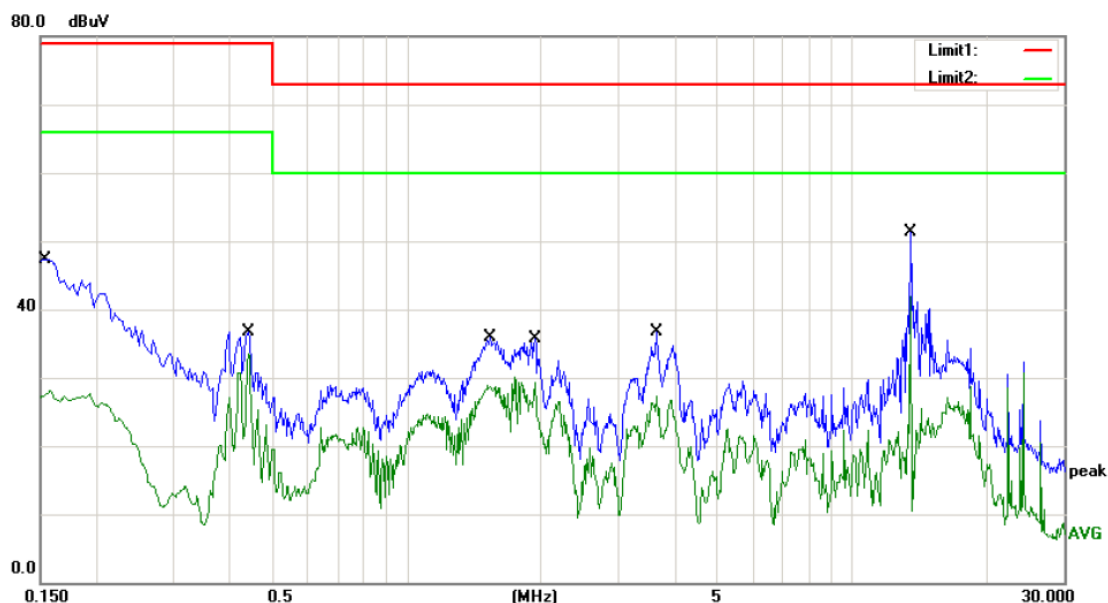
EUT: SMART CARD READER

Mode: TX

Note:

No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	0.1500	37.73	10.01	47.74	79.00	-31.26	QP	
2	0.1500	19.49	10.01	29.50	66.00	-36.50	AVG	
3	0.1780	35.69	10.01	45.70	79.00	-33.30	QP	
4	0.1780	18.49	10.01	28.50	66.00	-37.50	AVG	
5	0.4460	30.54	10.01	40.55	79.00	-38.45	QP	
6	0.4460	22.63	10.01	32.64	66.00	-33.36	AVG	
7	1.4620	24.63	10.02	34.65	73.00	-38.35	QP	
8	1.4620	16.74	10.02	26.76	60.00	-33.24	AVG	
9	3.9340	22.87	10.03	32.90	73.00	-40.10	QP	
10	3.9340	11.03	10.03	21.06	60.00	-38.94	AVG	
11	13.6780	40.74	10.09	50.83	73.00	-22.17	QP	
12 *	13.6780	34.14	10.09	44.23	60.00	-15.77	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator:



Site site #1
 Limit: (CE)FCC PART 15 class A_QP
 EUT: SMART CARD READER
 Mode: TX
 Note:

Phase: **N**
 Power: DC 5V from PC(AC 120V/60Hz)
 Temperature: 24
 Humidity: 55 %

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1540	37.33	10.01	47.34	79.00	-31.66	QP	
2		0.1540	17.47	10.01	27.48	66.00	-38.52	AVG	
3		0.4420	26.60	10.01	36.61	79.00	-42.39	QP	
4		0.4420	23.43	10.01	33.44	66.00	-32.56	AVG	
5		1.5420	25.91	10.02	35.93	73.00	-37.07	QP	
6		1.5420	18.64	10.02	28.66	60.00	-31.34	AVG	
7		1.9460	25.60	10.02	35.62	73.00	-37.38	QP	
8		1.9460	19.26	10.02	29.28	60.00	-30.72	AVG	
9		3.6460	26.67	10.03	36.70	73.00	-36.30	QP	
10		3.6460	17.22	10.03	27.25	60.00	-32.75	AVG	
11		13.5620	41.30	10.09	51.39	73.00	-21.61	QP	
12	*	13.5620	31.77	10.09	41.86	60.00	-18.14	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator:

4.6 Conducted Measurement Photos:



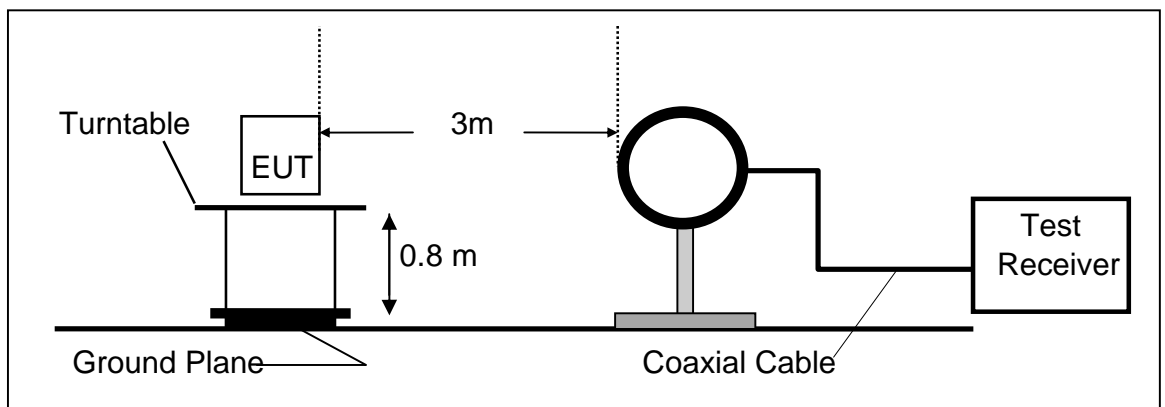
5 Radiated Emission Test

5.1 Measurement Procedure

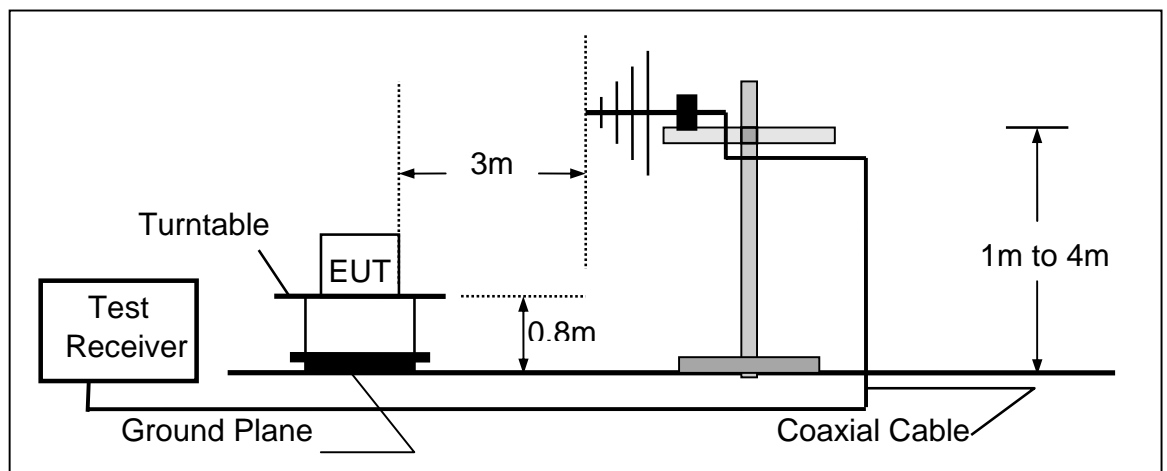
1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above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

5.2 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



5.3 Measurement Equipment Used

Item	Equipment	Manufacturer	Model No.	Serial No.	Characteristics	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI	1166.5950.03	9KHz-3GHz	6/15/2016	1 Year
2.	Loop Antenna	Schwarzbeck	FMZB 1519	012	9 KHz -30MHz	6/15/2016	1 Year
3.	Bilog Antenna	Schwarzbeck	VULB9163	000141	25MHz-2GHz	6/15/2016	1 Year
4.	Power Amplifier	HP	8447F	OPT H64	9 KHz -1300MHz	6/15/2016	1 Year
5.	Color Monitor	SUNSPO	SP-140A	N/A	--	6/15/2016	1 Year
6.	Single Line Filter	JIANLI	XL-3	N/A	--	6/15/2016	1 Year
7.	Single Phase Power Line Filter	JIANLI	DL-2X100B	N/A	--	6/15/2016	1 Year
8.	3 Phase Power Line Filter	JIANLI	DL-4X100B	N/A	--	6/15/2016	1 Year
9.	DC Power Filter	JIANLI	DL-2X50B	N/A	--	6/15/2016	1 Year
10.	Cable	Schwarzbeck	PLF-100	549489	9KHz-3GHz	6/15/2016	1 Year
11.	Cable	Rosenberger	CIL02	A0783566	9KHz-3GHz	6/15/2016	1 Year
12.	Cable	Rosenberger	RG 233/U	525178	9KHz-3GHz	6/15/2016	1 Year

5.4 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 at 3m Measurement Distance	
	(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 § 15.205, and the emissions located in restricted bands also comply with 15.209 limit.

5.5 Measurement Result

Operation Mode: TX Mode Test Date : June 07, 2016
Frequency Range: 9KHz~30MHz Temperature : 28℃
Test Result: PASS Humidity : 65 %
Measured Distance: 3m Test By: KYO

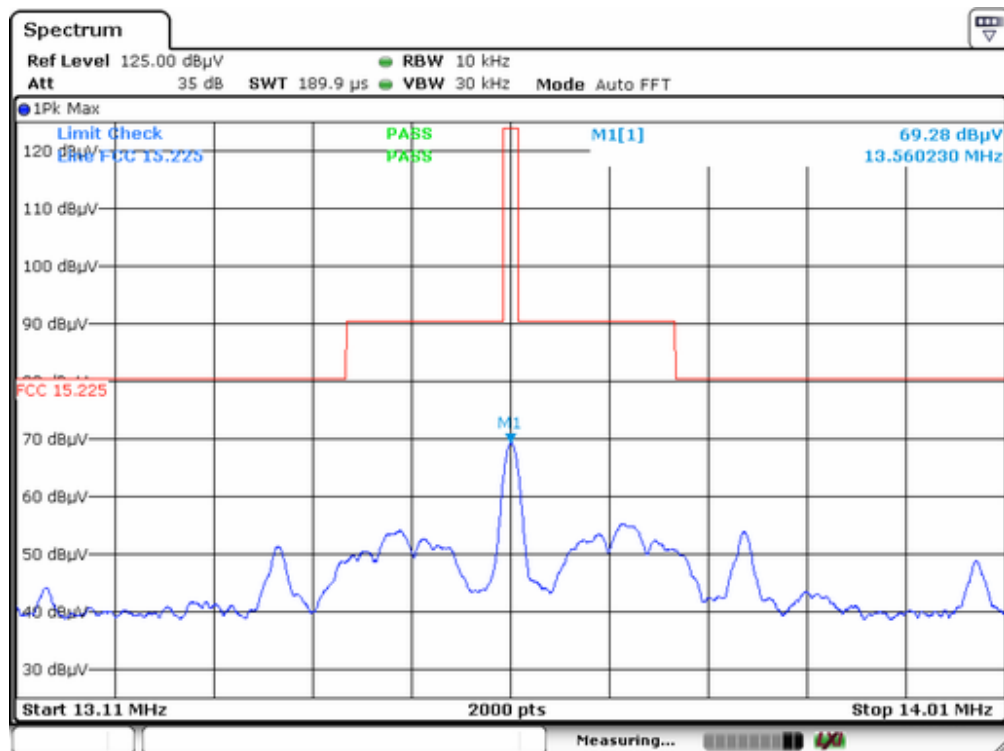
Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Over (dB)	Note
10.23	V	35.01	69.54	-34.53	QP
12.01	V	31.48	69.54	-38.14	QP
14.67	V	39.29	69.54	-30.25	QP
18.23	V	38.56	69.54	-36.55	QP
20.15	V	37.25	69.54	-32.29	QP
26.55	V	35.67	69.54	-33.87	QP
6.23	H	36.35	69.54	-33.19	QP
11.67	H	33.73	69.54	-35.84	QP
15.38	H	36.13	69.54	-33.44	QP
20.89	H	35.89	69.54	-33.74	QP
24.14	H	35.37	69.54	-34.17	QP
27.16	H	34.73	69.54	-34.81	QP

Operation Mode: TX Mode Test Date : June 07, 2016
Frequency Range: 30~1000MHz Temperature : 28℃
Test Result: PASS Humidity : 65 %
Measured Distance: 3m Test By: KYO

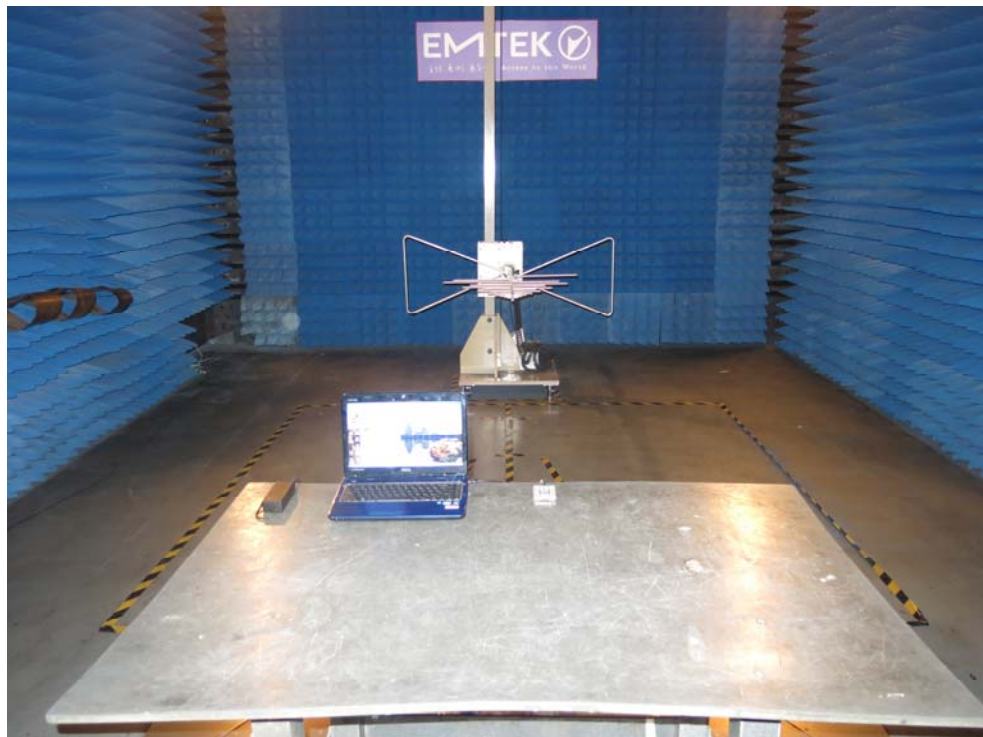
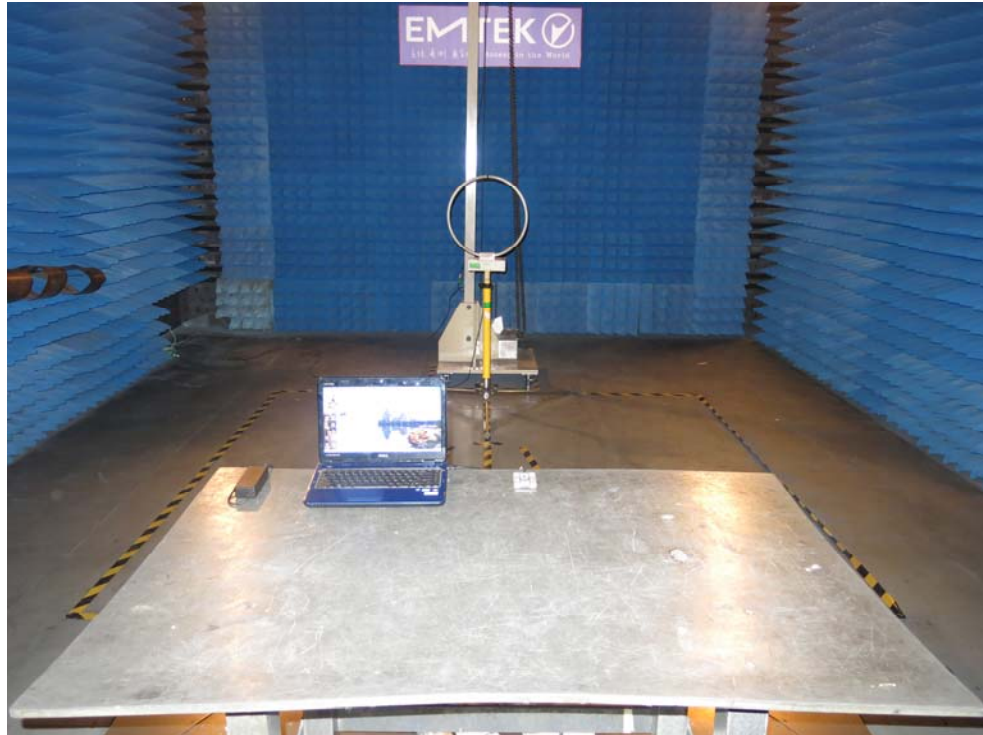
Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Over (dB)	Note
34.8200	V	28.17	40.00	-11.83	QP
42.6400	V	31.89	40.00	-8.11	QP
125.0900	V	32.00	43.50	-11.50	QP
132.8500	V	30.21	43.50	-13.29	QP
143.5900	V	28.23	43.50	-15.27	QP
177.4100	V	20.51	43.50	-22.99	QP
42.6400	H	18.49	40.00	-21.51	QP
56.1900	H	15.28	40.00	-24.72	QP
123.2200	H	16.81	43.50	-26.69	QP
145.4600	H	16.52	43.50	-26.98	QP
201.7200	H	27.69	43.50	-15.81	QP
454.8300	H	19.12	46.00	-26.88	QP

Operation Mode: TX Mode
Frequency Range: 13.110MHz~14.010 MHz
Test Result: PASS
Measured Distance: 3m

Test Date : June 07, 2016
Temperature : 28°C
Humidity : 65 %
Test By: KYO



5.6 Radiated Measurement Photos:



6 FREQUENCY STABILITY MEASUREMENT

6.1 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.

6.2 MEASUREMENT INSTRUMENTS LIST

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	Characteristics	LAST CAL.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	FSV30	1321.3008K	10Hz-30GHz	06/15/2016	06/14/2017
Coaxial Cable	CDS	79254	46107086	10Hz-30GHz	06/15/2016	06/14/2017
Antenna Connector	ARTHUR-YANG	2244-N1TG1	N/A	10Hz-30GHz	06/15/2016	06/14/2017

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.

6.3 TEST PROCEDURE

- 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 at room temperature (25±5°C)
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

6.4 EUT OPERATING CONDITIONS

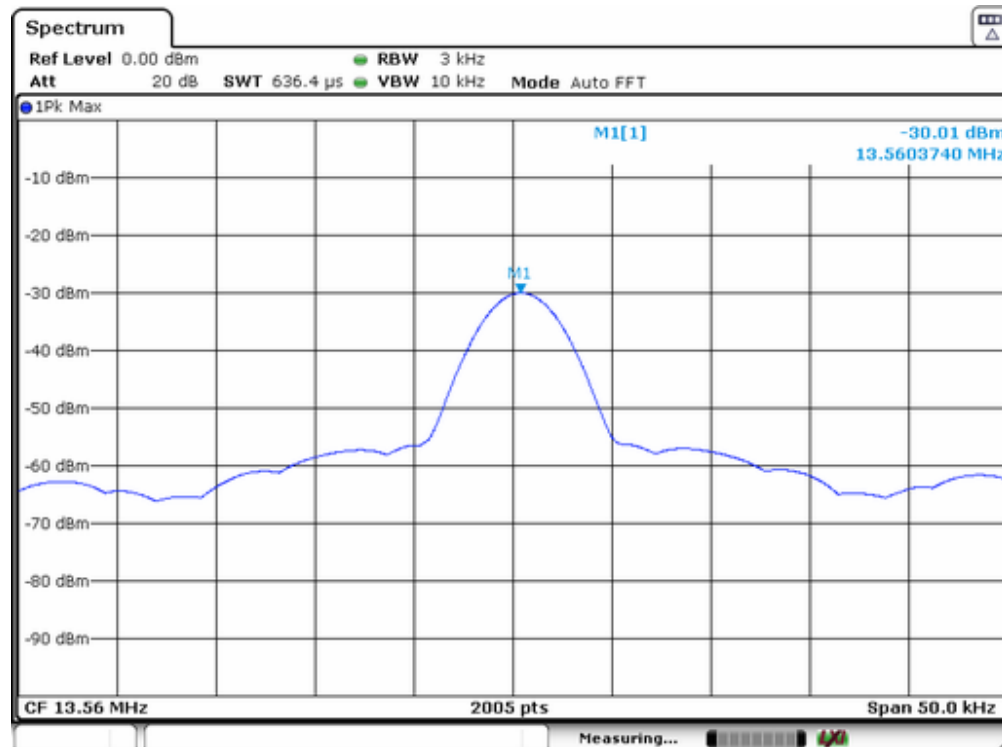
The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

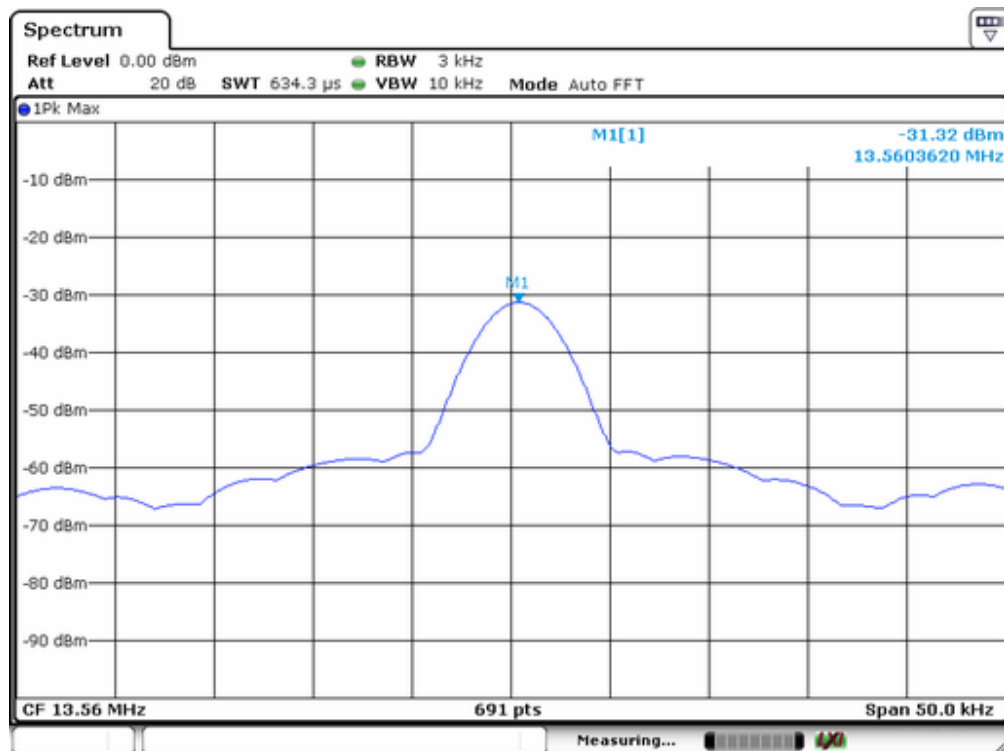
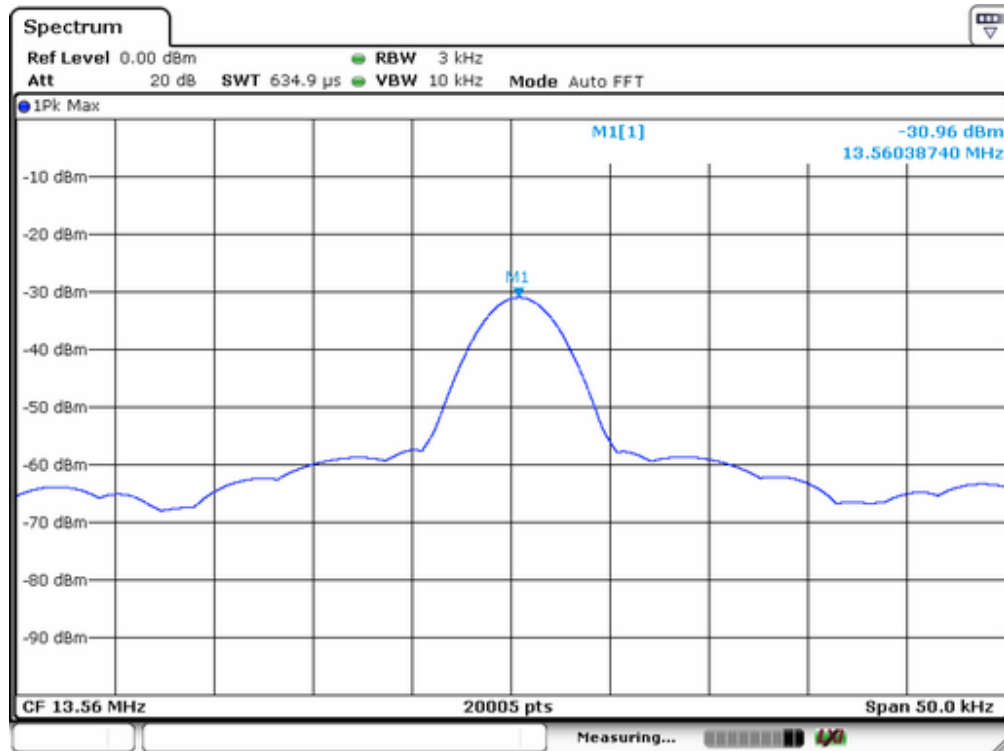
6.5 TEST RESULTS

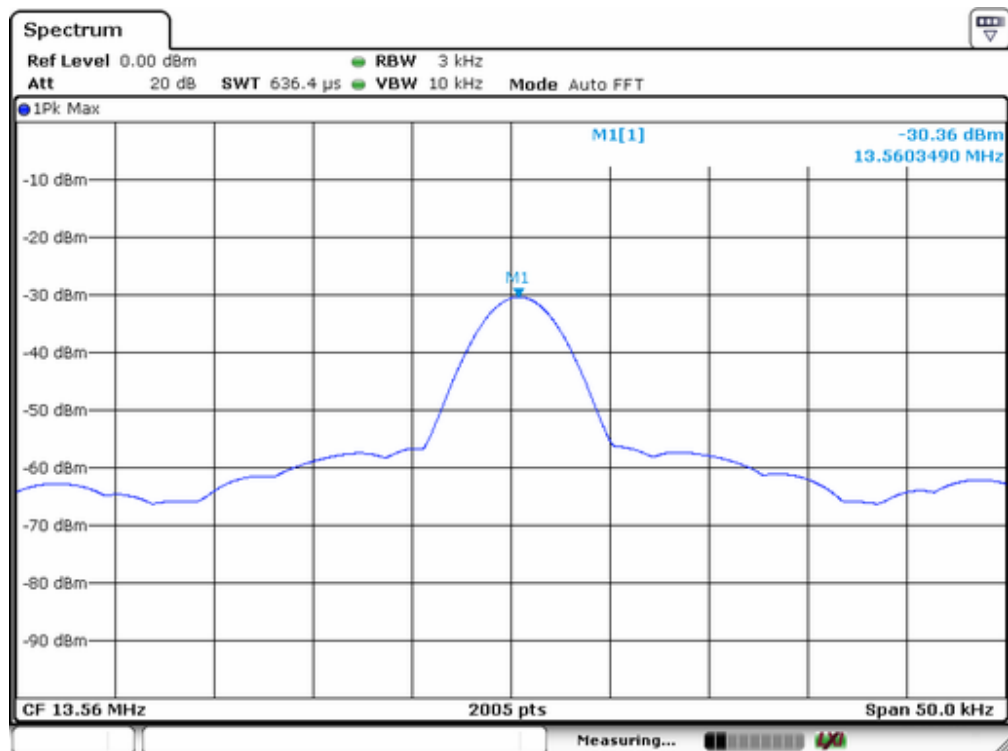
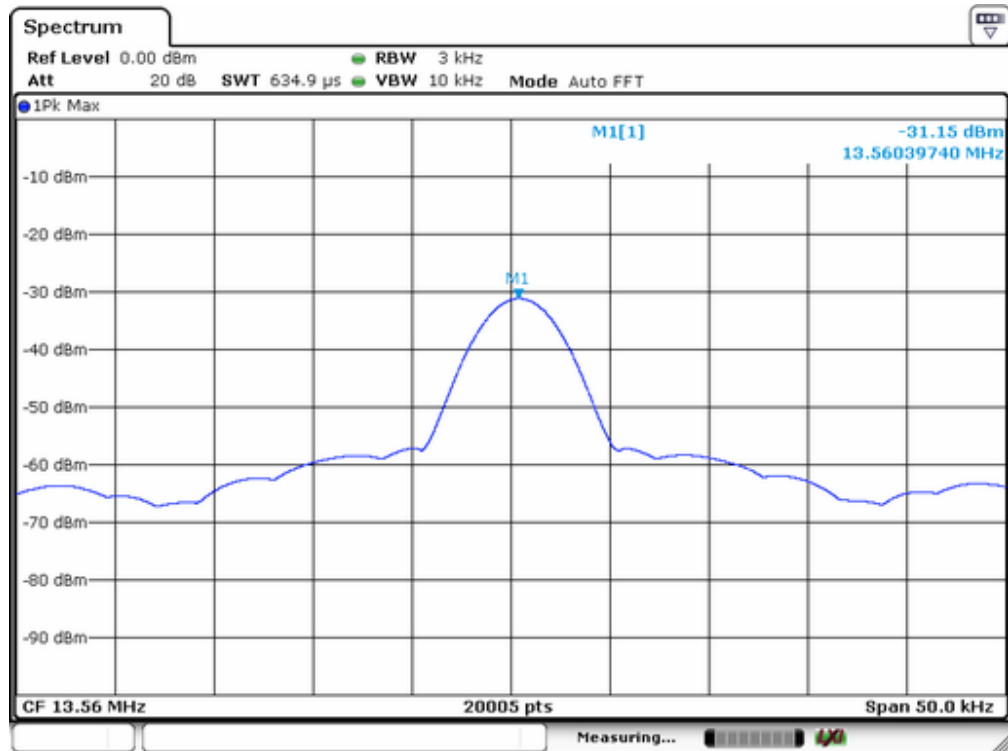
E.U.T :	SMART CARD READER	Test Mode :	TX Mode
Test Voltage :	DC 5V		

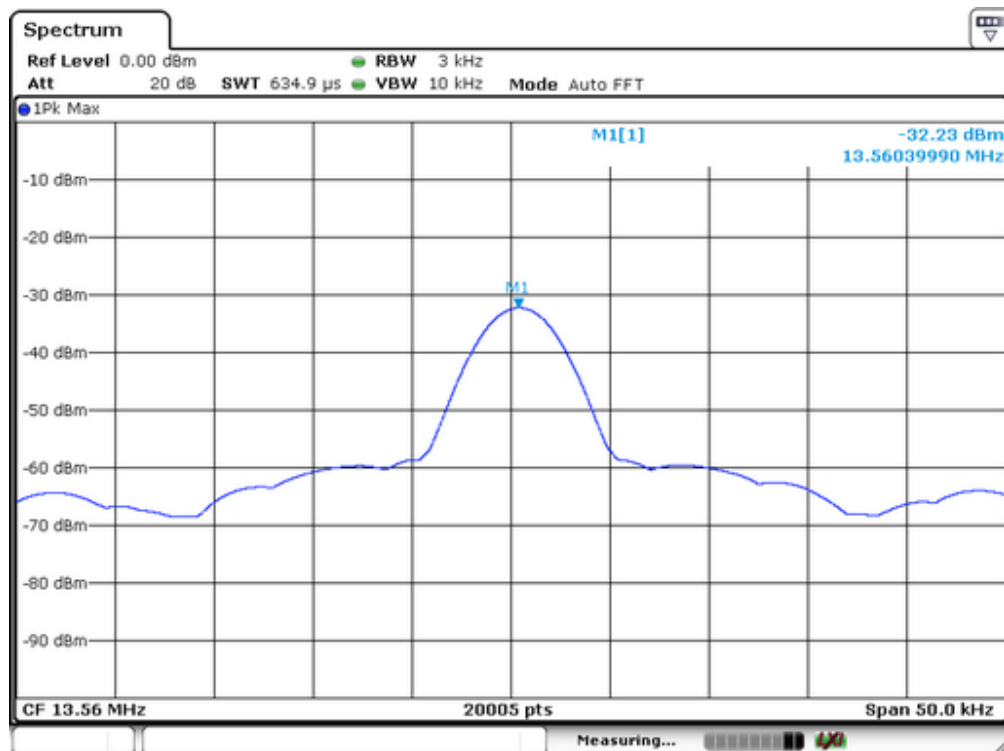
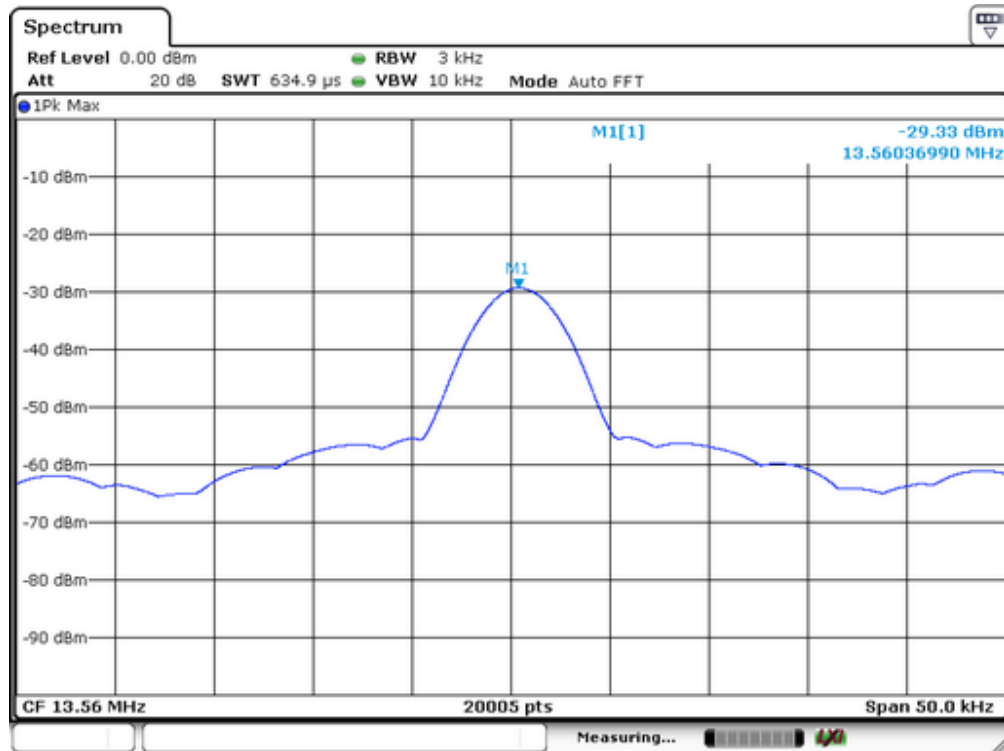
Frequency Stability Versus Environmental Temperature					
Temperature (°C)	Voltage (Vdc)	Frequency (MHz)	Freq Error (ppm)	Limit (ppm)	Results
-20	5V	13.5603740	27.58	100	PASS
-10	5V	13.5603874	28.57	100	PASS
0	5V	13.5603620	26.70	100	PASS
10	5V	13.5609740	71.83	100	PASS
20	5V	13.5603490	25.73	100	PASS
30	5V	13.5603699	27.28	100	PASS
40	5V	13.5603999	29.50	100	PASS
50	5V	13.5603990	29.42	100	PASS

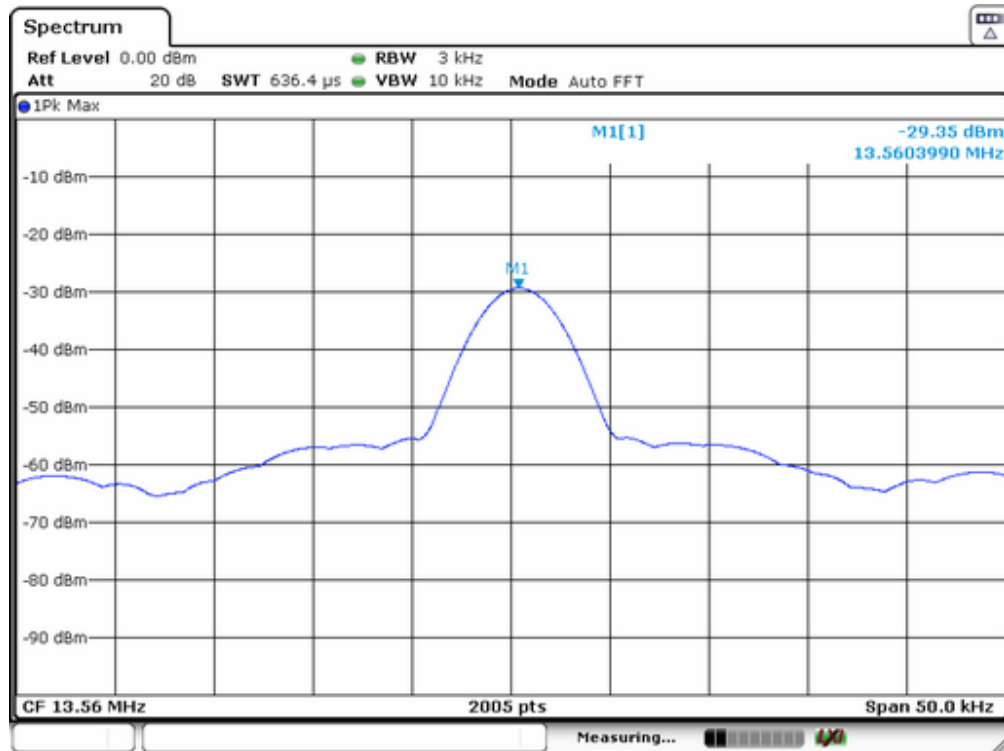
Frequency Stability Versus Environmental Temperature





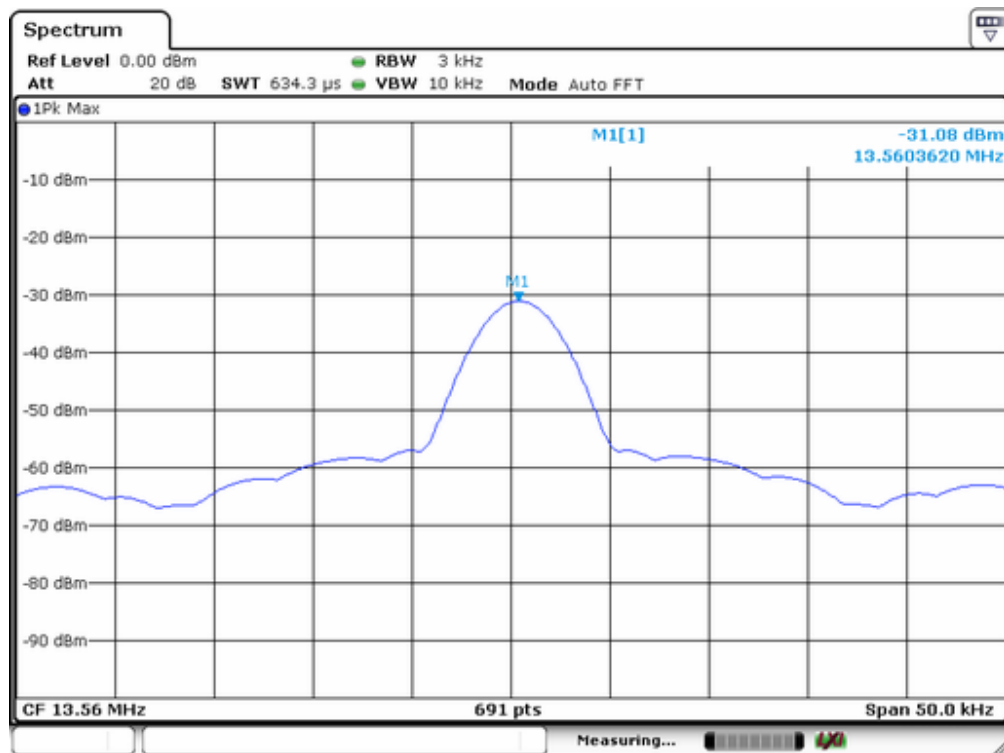


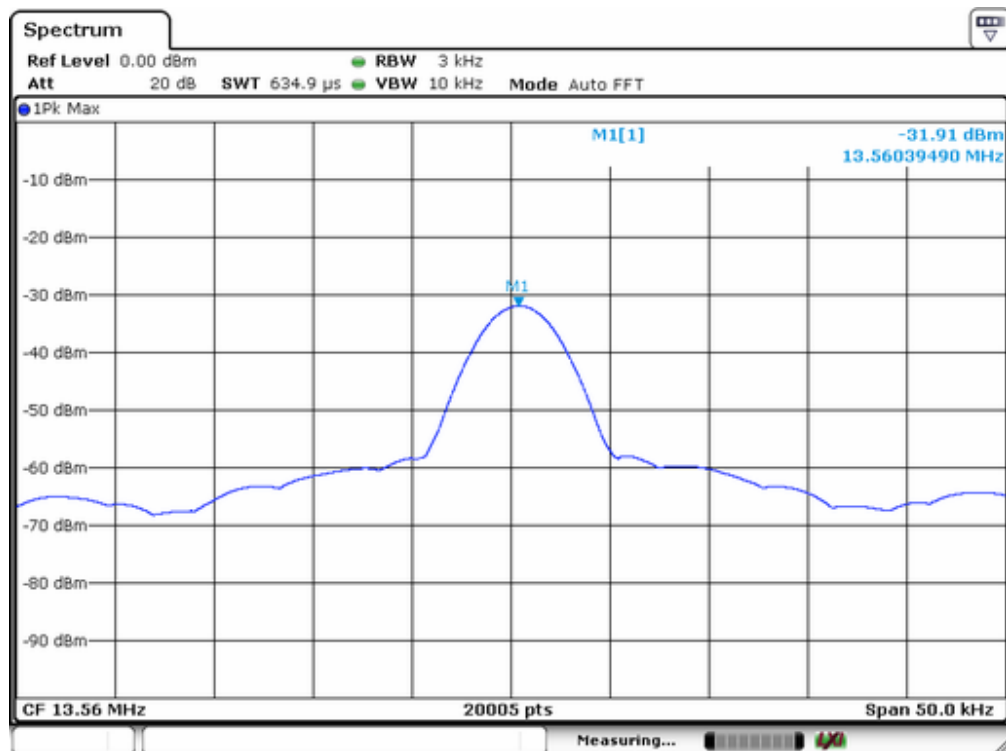
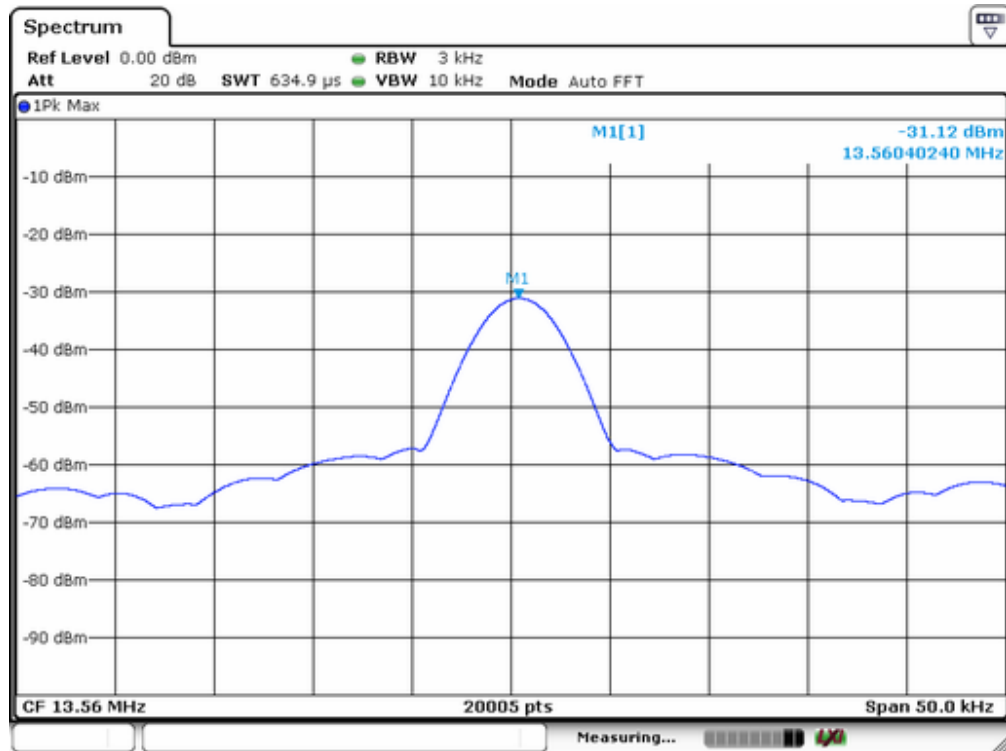


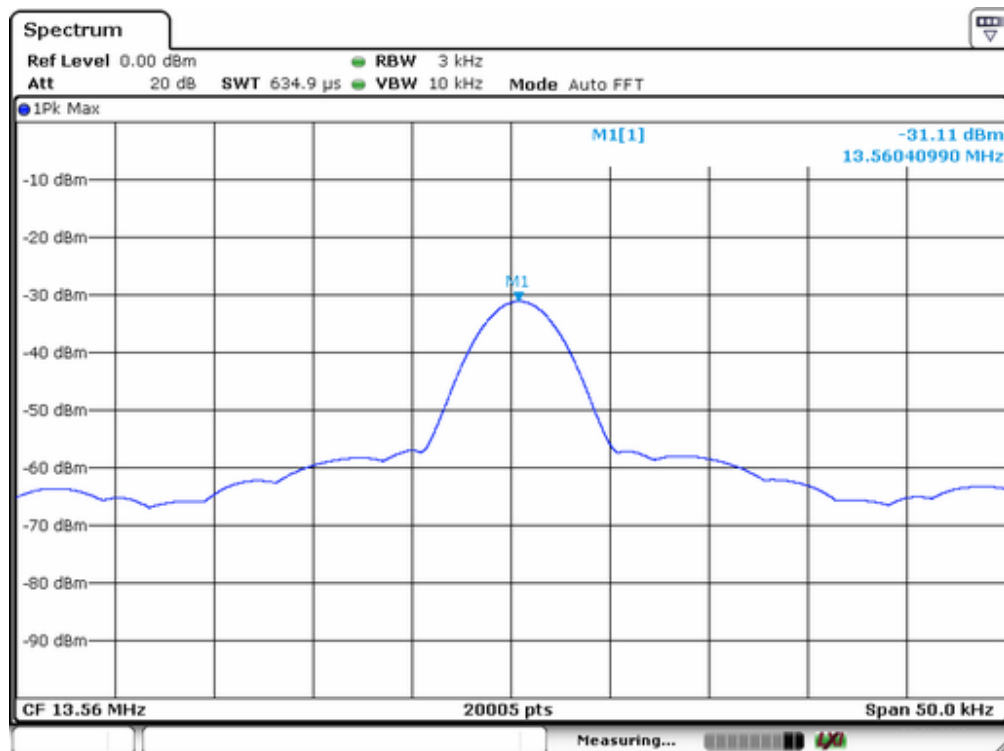
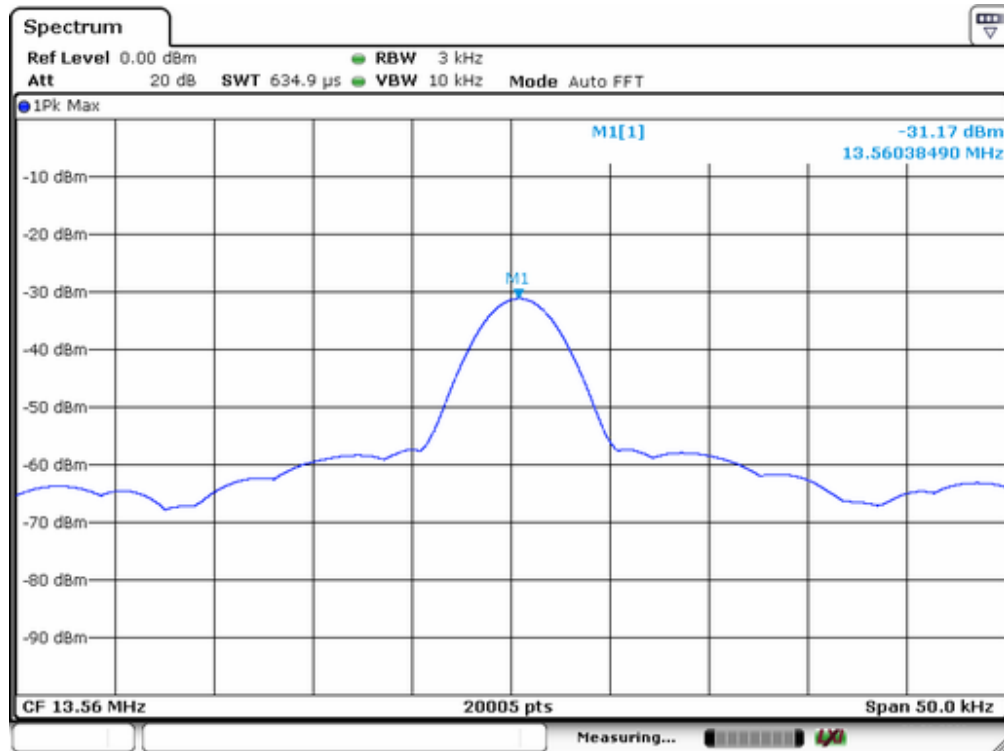


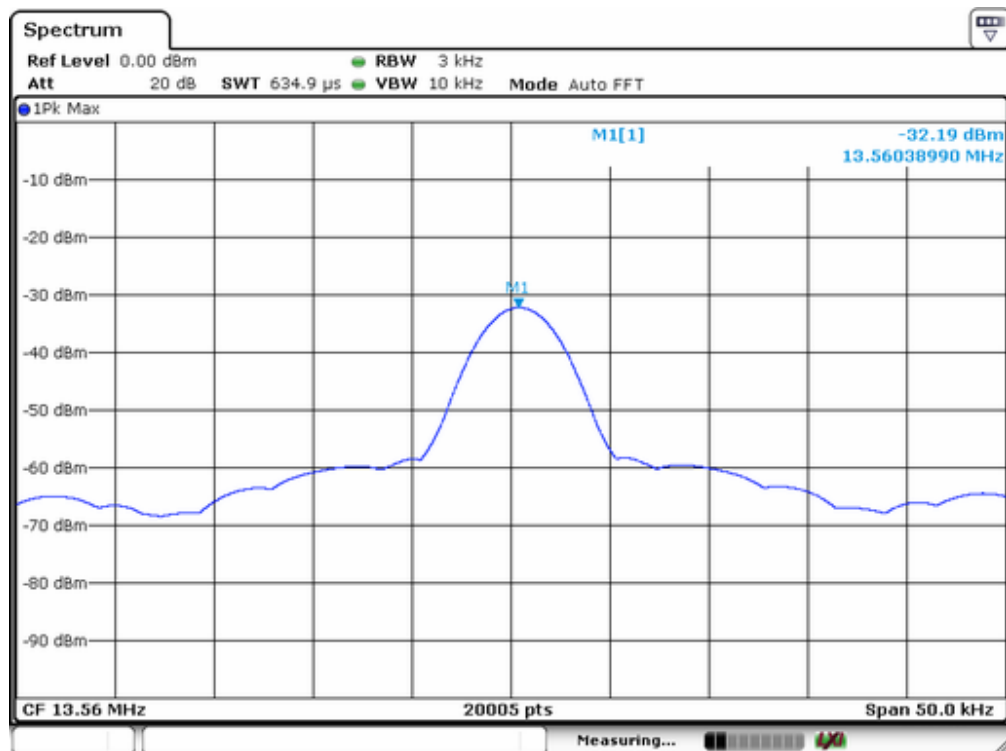
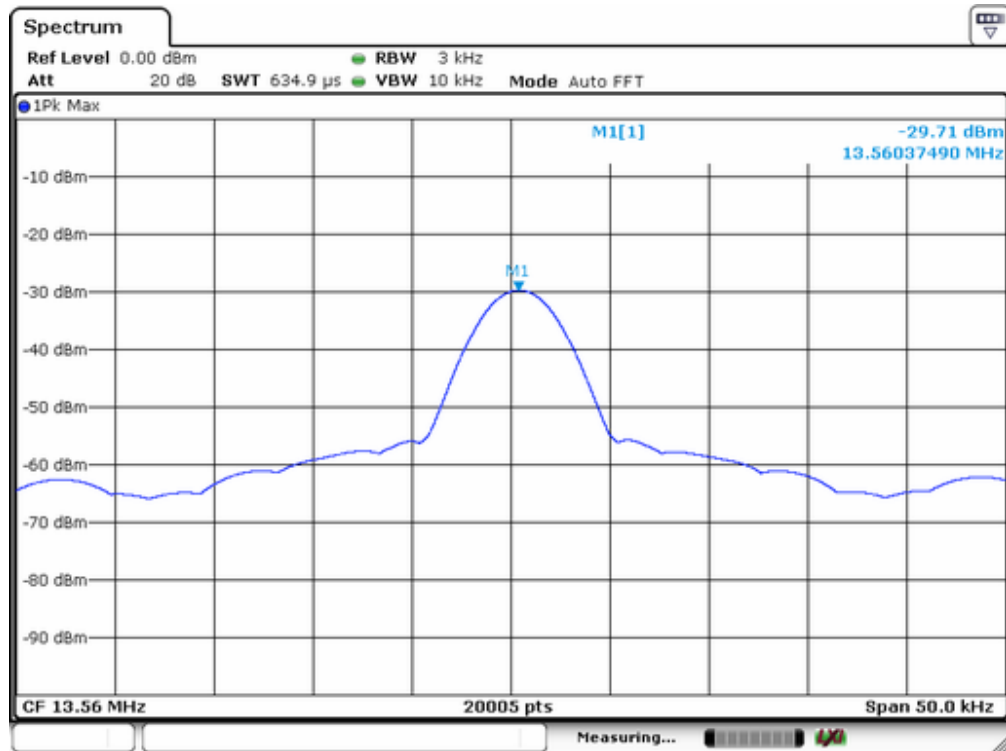
Frequency Stability Versus Input Voltage					
Temperature (°C)	Voltage (Vdc)	Frequency (MHz)	Freq Error (ppm)	Limit (ppm)	Results
20	4.25	13.5603620	26.70	100	PASS
20	4.50	13.5604024	29.68	100	PASS
20	4.75	13.5603949	29.12	100	PASS
20	5.00	13.5603849	28.38	100	PASS
20	5.25	13.5604099	30.23	100	PASS
20	5.50	13.5603749	27.65	100	PASS
20	5.75	13.5603899	28.75	100	PASS

Frequency Stability Versus Input Voltage









7 EMISSION BANDWIDTH

7.1 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).

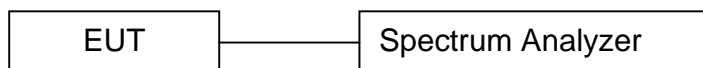
7.2 TEST INSTRUMENTS

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

7.3 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.

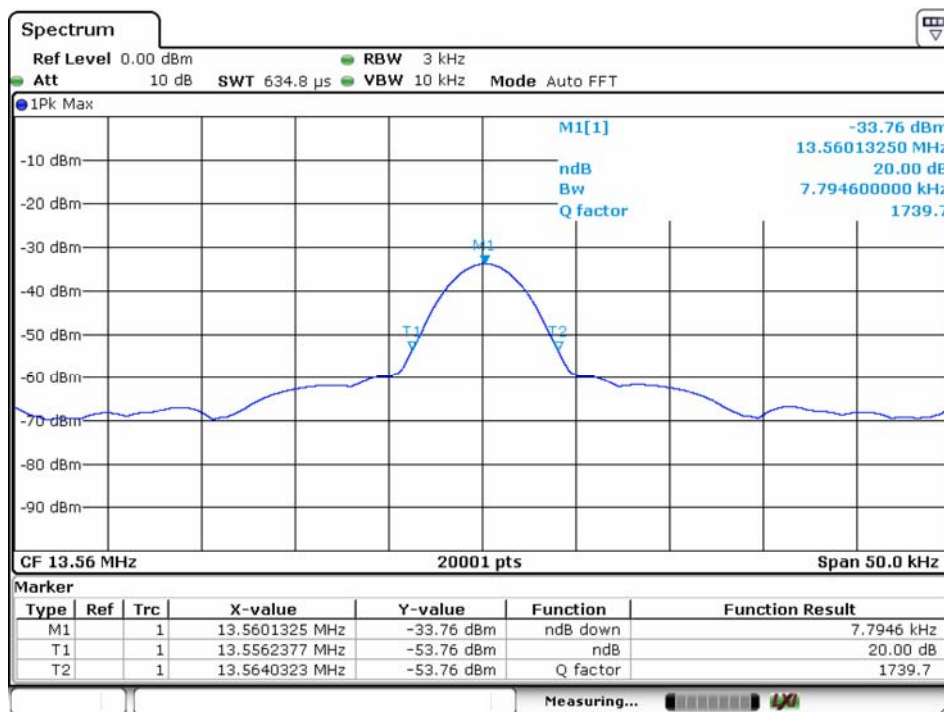
7.4 Test Setup



7.5 Test Result

Frequency (MHz)	20dB Bandwidth (kHz)	Results
13.56	7.795	PASS

BANDWIDTH TEST PLOT



8 ANTENNA REQUIREMENT

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

8.1 Result

The EUT's antenna used an Internal PCB antenna, and the Antenna Gain is 5dBi.

APPENDIX I (Photos of EUT)



