

# FCC RF Test Report

**APPLICANT** : Xiaomi Communications Co., Ltd.  
**EQUIPMENT** : Mobile Phone  
**BRAND NAME** : MI  
**MODEL NAME** : M1803E1A  
**FCC ID** : 2AFZZ-XME1A  
**STANDARD** : FCC Part 15 Subpart C §15.225  
**CLASSIFICATION** : (DXX) Low Power Communication Device Transmitter

The product was received on Apr. 20, 2018 and testing was completed on Jun. 07, 2018. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.



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Reviewed by: Joseph Lin / Supervisor



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Approved by: Jones Tsai / Manager



**SPORTON INTERNATIONAL INC.**

**No. 52, Hwa Ya 1<sup>st</sup> Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C.**



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## REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR842002D	Rev. 01	Initial issue of report	Jun. 11, 2018



## SUMMARY OF THE TEST RESULT

Report Section	FCC Rule	Description of Test	Result	Remark
3.1	15.207	AC Power Line Conducted Emissions	Complies	Under limit 15.71 dB at 0.152MHz
3.2	15.215(c)	20dB Spectrum Bandwidth	Complies	-
	-	99% OBW Spectrum Bandwidth	Complies	-
3.3	15.225(e)	Frequency Stability	Complies	-
3.4	15.225(a)(b)(c)	Field Strength of Fundamental Emissions	Complies	Max level 58.71 dB $\mu$ V/m at 13.560 MHz
3.5	15.225(d) & 15.209	Radiated Spurious Emissions	Complies	Under limit 9.40 dB at 40.800MHz
3.6	15.203	Antenna Requirements	Complies	-



## 1. General Description

### 1.1 Applicant

**Xiaomi Communications Co., Ltd.**

The Rainbow City of China Resources, NO.68, Qinghe Middle Street, Haidian District, Beijing, China

### 1.2 Manufacturer

**Xiaomi Communications Co., Ltd.**

The Rainbow City of China Resources, NO.68, Qinghe Middle Street, Haidian District, Beijing, China

### 1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Phone
Brand Name	MI
Model Name	M1803E1A
FCC ID	2AFZZ-XME1A
EUT supports Radios application	CDMA/EV-DO/GSM/GPRS/EGPRS/WCDMA/HSPA/ DC-HSDPA/HSPA+(16QAM uplink is not supported)/LTE/NFC WLAN 2.4GHz 802.11b/g/n HT20 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth v3.0 + EDR/Bluetooth v4.0 LE/Bluetooth v4.2 LE/ Bluetooth v5.0 LE
IMEI Code	Conducted: 867252030140353/867252030140361 Conduction: 867252030157993/867252030158009 Radiation: 867252030140353/867252030140361
HW Version	P2
SW Version	MIUI 9
EUT Stage	Identical Prototype

**Remark:**

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. There are two types of EUT, the difference between two samples is for memory, the sample 1 is 6+64GB capacity and the sample 2 is 6+128GB capacity. According to the difference, we only choose sample 1 to perform full test.



## 1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
<b>Tx/Rx Frequency Range</b>	13.553 ~ 13.567MHz
<b>Channel Number</b>	1
<b>20dBW</b>	2.64 KHz
<b>99%OBW</b>	2.26 KHz
<b>Antenna Type</b>	Planar Antenna
<b>Type of Modulation</b>	ASK

**Remark:** The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

## 1.5 Modification of EUT

No modifications are made to the EUT during all test items.

## 1.6 Testing Location

SPORTON INTERNATIONAL INC. is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and under the FCC-recognized accredited testing laboratories by Mutual Recognition Agreement (MRA) in FCC Test.

<b>Test Site</b>	SPORTON INTERNATIONAL INC.	
<b>Test Site Location</b>	No. 52, Hwa Ya 1 <sup>st</sup> Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978	
<b>Test Site No.</b>	<b>Sporton Site No.</b>	
	TH03-HY	CO05-HY

<b>Test Site</b>	SPORTON INTERNATIONAL INC.		
<b>Test Site Location</b>	No.52, Huaya 1st Rd., Guishan Dist. Taoyuan City Taiwan Tel: 886-3-327-3456 FAX: +886-3-327-0978		
<b>Test Site No.</b>	<b>Sporton Site No.</b>	<b>FCC designation No.</b>	<b>FCC Test Firm Registration No.</b>
	03CH07-HY	TW1190	553509

**Note:** The test site complies with ANSI C63.4 2014 requirement.

## 1.7 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ FCC Part 15 Subpart C §15.225
- ♦ ANSI C63.10-2013

## 2. Test Configuration of Equipment Under Test

### 2.1 Descriptions of Test Mode

Investigation has been done on all the possible configurations.

The following table is a list of the test modes shown in this test report.

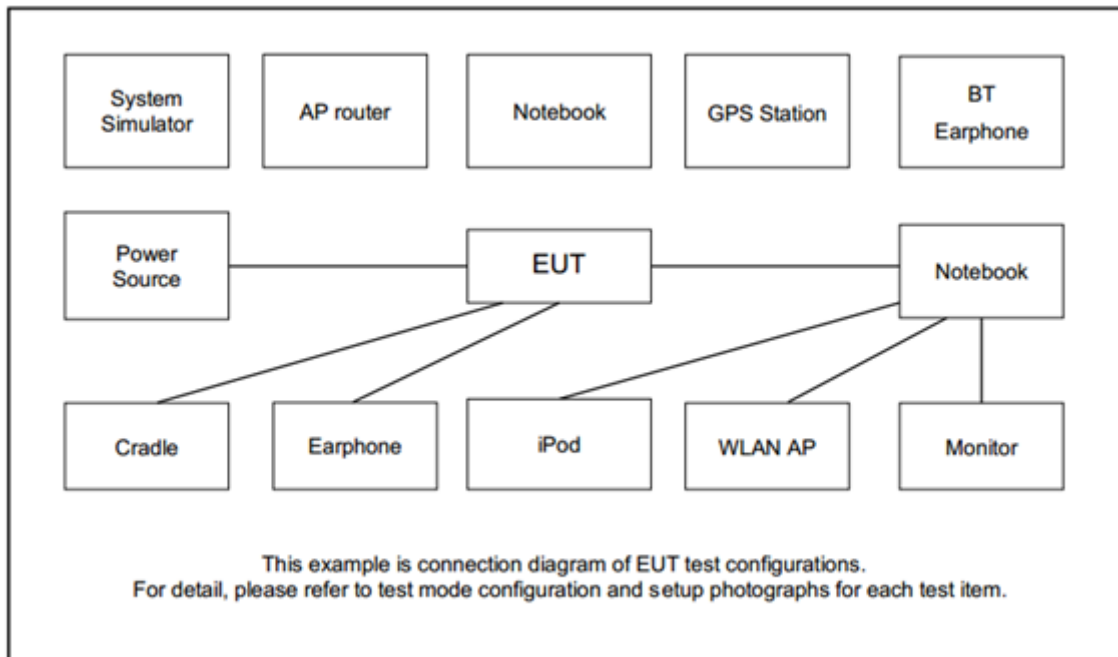
Test Items	
AC Power Line Conducted Emissions	Field Strength of Fundamental Emissions
20dB Spectrum Bandwidth	Frequency Stability
Radiated Emissions 9kHz~30MHz	Radiated Emissions 30MHz~1GHz

The EUT pre-scanned in four NFC type, A, B, F, V. The worst type (type F) was recorded in this report. Pre-scanned tests, X, Y, Z in three orthogonal panels to determine the final configuration (Y plane as worst plane) from all possible combinations.

Test Cases	
AC Conducted Emission	Mode 1 : GSM850 Idle + Bluetooth Link + WLAN Link(2.4G) + USB Cable1(Charging from Adapter) + NFC Tx + SIM 1
<b>Remark:</b> For Radiated Test Cases, The tests were performed with Adapter and USB Cable1..	



## 2.2 Connection Diagram of Test System



## 2.3 Table for Supporting Units

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8m
2.	NOTE BOOK	Dell	Latitude E6320	FCC DoC	NOTE BOOK	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
3.	Bluetooth Earphone	Sony Ericsson	MW600	PY700A2029	N/A	N/A
4.	WLAN AP	ASUS	RT-AC66U	MSQ-RTAC66U	N/A	Unshielded, 1.8m
5.	NFC Card	Metro Taipei	Easy Card	N/A	N/A	N/A

## 2.4 EUT Operation Test Setup

The EUT was programmed to be in continuously transmitting mode.

The ancillary equipment, NFC card, is used to make the EUT (NFC) continuously transmit at 13.56MHz and is placed around 3 cm gap to the EUT.

### 3. Test Results

#### 3.1 AC Power Line Conducted Emissions Measurement

##### 3.1.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of Emission (MHz)	Conducted Limit (dB $\mu$ V)	
	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.

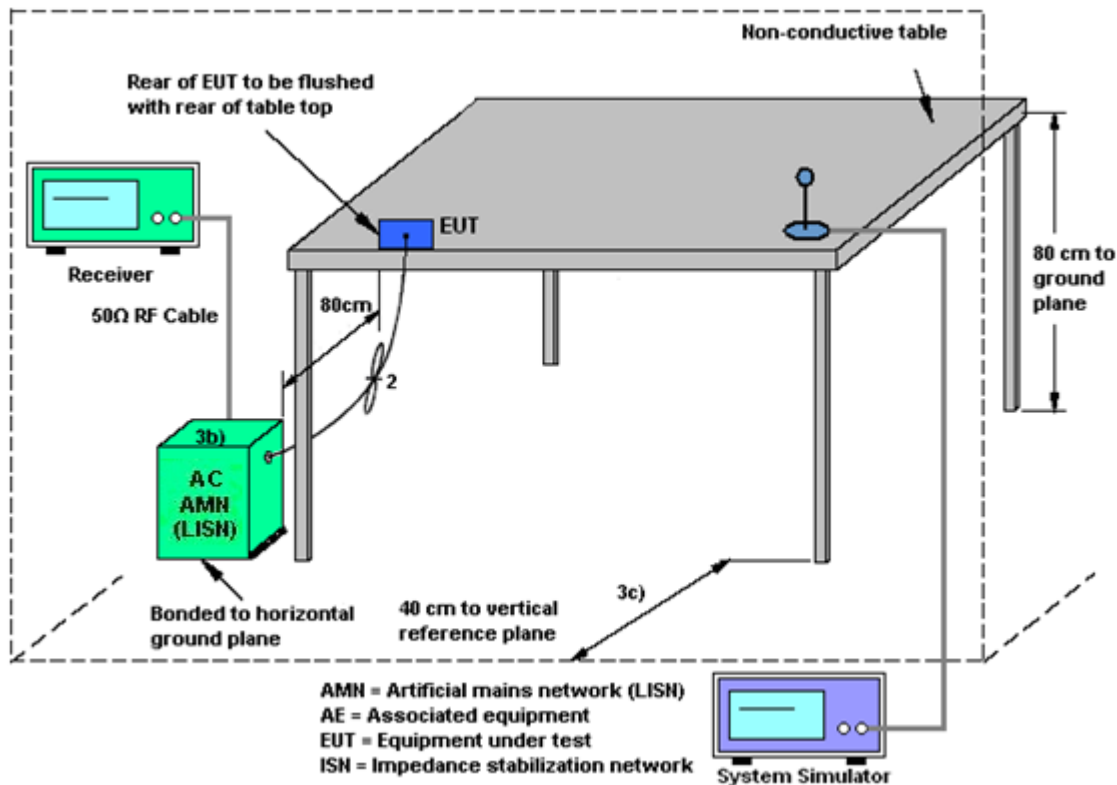
##### 3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

##### 3.1.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

### 3.1.4 Test setup



### 3.1.5 Test Result of AC Conducted Emission

Please refer to Appendix A.

## 3.2 20dB and 99% OBW Spectrum Bandwidth Measurement

### 3.2.1 Limit

Intentional radiators must be designed to ensure that the 20dB and 99% emission bandwidth in the specific band 13.553~13.567MHz.

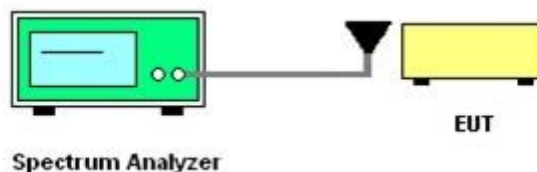
### 3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.2.3 Test Procedures

1. The spectrum analyzer connected via a receive antenna placed near the EUT in peak Max hold mode.
2. The resolution bandwidth of 1 kHz and the video bandwidth of 3 kHz were used.
3. Measured the spectrum width with power higher than 20dB below carrier.
4. Measured the 99% OBW.

### 3.2.4 Test Setup



### 3.2.5 Test Result of Conducted Test Items

Please refer to Appendix B.

### 3.3 Frequency Stability Measurement

#### 3.3.1 Limit

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% (100ppm) 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.

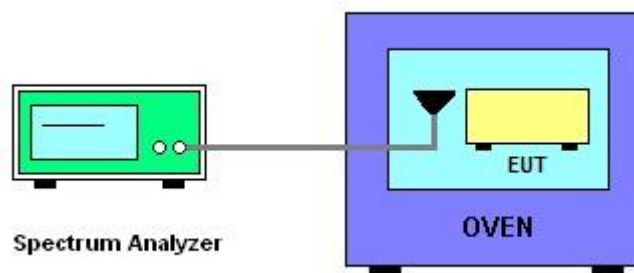
#### 3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

#### 3.3.3 Test Procedures

1. The spectrum analyzer connected via a receive antenna placed near the EUT.
2. EUT have transmitted signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire emissions bandwidth.
4. Set RBW = 1 kHz, VBW = 3 kHz with peak detector and maxhold settings.
5. The  $f_c$  is declaring of channel frequency. Then the frequency error formula is  $(f_c - f)/f_c \times 10^6$  ppm and the limit is less than  $\pm 100$ ppm.
6. Extreme temperature rule is -20°C~50°C.

#### 3.3.4 Test Setup



#### 3.3.5 Test Result of Conducted Test Items

Please refer to Appendix B.

### 3.4 Field Strength of Fundamental Emissions and Mask Measurement

#### 3.4.1 Limit

Rules and specifications	FCC CFR 47 Part 15 section 15.225			
Description	Compliance with the spectrum mask is tested with RBW set to 9kHz.			
Freq. of Emission (MHz)	Field Strength ( $\mu$ V/m) at 30m	Field Strength (dB $\mu$ V/m) at 30m	Field Strength (dB $\mu$ V/m) at 10m	Field Strength (dB $\mu$ V/m) at 3m
1.705~13.110	30	29.5	48.58	69.5
13.110~13.410	106	40.5	59.58	80.5
13.410~13.553	334	50.5	69.58	90.5
13.553~13.567	15848	84.0	103.08	124.0
13.567~13.710	334	50.5	69.58	90.5
13.710~14.010	106	40.5	59.58	80.5
14.010~30.000	30	29.5	48.58	69.5

#### 3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

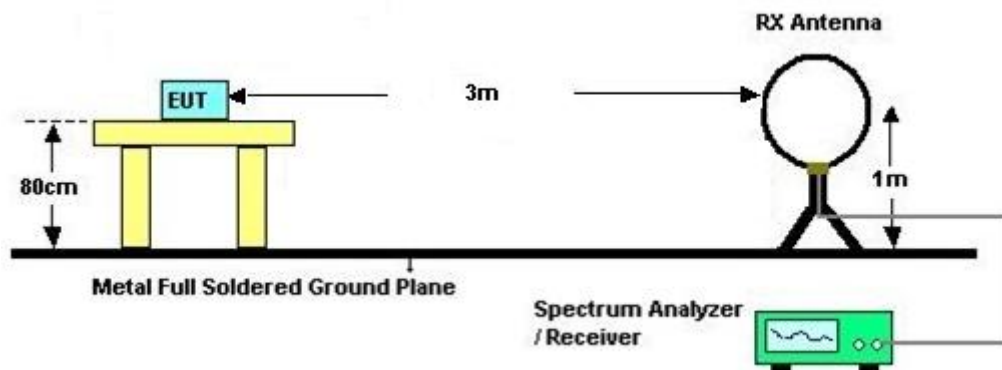
### 3.4.3 Test Procedures

1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the loop receiving antenna mounted antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the receiving antenna was fixed at one meter above ground to find the maximum emissions field strength.
4. For Fundamental emissions, use the receiver to measure QP reading.
5. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
6. Compliance with the spectrum mask is tested with RBW set to 9kHz.

Note: Emission level (dB $\mu$ V/m) = 20 log Emission level ( $\mu$ V/m).

### 3.4.4 Test Setup

For radiated emissions below 30MHz



### 3.4.5 Test Result of Field Strength of Fundamental Emissions and Mask

Please refer to Appendix C.

### 3.5 Radiated Emissions Measurement

#### 3.5.1 Limit

The field strength of any emissions which appear outside of 13.110 ~14.010MHz band shall not exceed the general radiated emissions limits.

Frequencies (MHz)	Field Strength ( $\mu$ V/m)	Measurement Distance (meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

#### 3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

#### 3.5.3 Measuring Instrument Setting

The following table is the setting of receiver.

Receiver Parameter	Setting
Attenuation	Auto
Frequency Range: 9kHz~150kHz	RBW 200Hz for QP
Frequency Range: 150kHz~30MHz	RBW 9kHz for QP
Frequency Range: 30MHz~1000MHz	RBW 120kHz for Peak

**Note:** The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz. Radiated emission limits in these two bands are based on measurements employing an average detector.



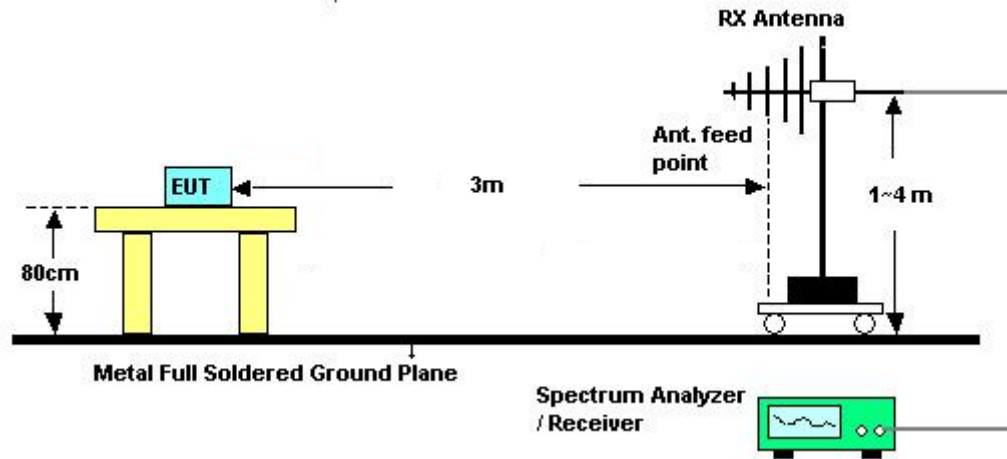


### 3.5.4 Test Procedures

1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
7. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. Antenna Requirements

### 3.5.5 Test Setup

For radiated emissions above 30MHz



### 3.5.6 Test Result of Radiated Emissions Measurement

Please refer to Appendix C.



## **3.6 Antenna Requirements**

### **3.6.1 Standard Applicable**

Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with any jacket for installing an antenna with extension cable. 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 shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited.

The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the rule.

### **3.6.2 Antenna Anti-Replacement Construction**

An embedded-in antenna design is used.



#### 4. List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
AC Power Source	AC POWER	AFC-500W	F10407001 1	50Hz~60Hz	Mar. 21, 2018	May 28, 2018	Mar. 20, 2019	Conducted (TH03-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP30	101329	9kHz~30GHz	Jun. 26, 2017	May 28, 2018	Jun. 25, 2018	Conducted (TH03-HY)
Temperature Chamber	ESPEC	SU-641	92013721	-30℃ ~70℃	Dec. 06, 2017	May 28, 2018	Dec. 05, 2019	Conducted (TH03-HY)
Bilog Antenna	TESEQ	CBL 6111D&00800 N1D01N-06	35419&03	30MHz to 1GHz	Dec. 18, 2017	May 28, 2018~ May 30, 2018	Dec. 17, 2018	Radiation (03CH07-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Nov. 10, 2017	May 28, 2018~ May 30, 2018	Nov. 09, 2018	Radiation (03CH07-HY)
Controller	ChainTek	Chaintek 3000	N/A	Control Turn table	NCR	May 28, 2018~ May 30, 2018	NCR	Radiation (03CH07-HY)
Antenna Mast	Max-Full	MFA520BS	N/A	1m~4m	NCR	May 28, 2018~ May 30, 2018	NCR	Radiation (03CH07-HY)
Turn Table	ChainTek	Chaintek 3000	N/A	0~360 Degree	NCR	May 28, 2018~ May 30, 2018	NCR	Radiation (03CH07-HY)
EMI Test Receiver	Agilent	N9038A(MXE)	MY532900 53	20Hz to 26.5GHz	Jan. 16, 2018	May 28, 2018~ May 30, 2018	Jan. 15, 2019	Radiation (03CH07-HY)
Amplifier	SONOMA	310N	187231	9kHz~1GHz	Jan. 08, 2018	May 28, 2018~ May 30, 2018	Jan. 07, 2019	Radiation (03CH07-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	NCR	Jun. 07, 2018	NCR	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	3.6GHz	Dec. 08, 2017	Jun. 07, 2018	Dec. 07, 2018	Conduction (CO05-HY)
Hygrometer	Testo	608-H1	34913912	N/A	Mar. 06, 2018	Jun. 07, 2018	Mar. 05, 2019	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Nov. 30, 2017	Jun. 07, 2018	Nov. 29, 2018	Conduction (CO05-HY)
LF Cable	HUBER + SUHNER	RG-214/U	LF01	N/A	Jan. 03, 2018	Jun. 07, 2018	Jan. 02, 2019	Conduction (CO05-HY)
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100851	N/A	Jan. 03, 2018	Jun. 07, 2018	Jan. 02, 2019	Conduction (CO05-HY)

NCR: No Calibration Required



## 5. Uncertainty of Evaluation

### Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	2.7dB
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### Uncertainty of Radiated Emission Measurement (9 kHz ~ 30 MHz)

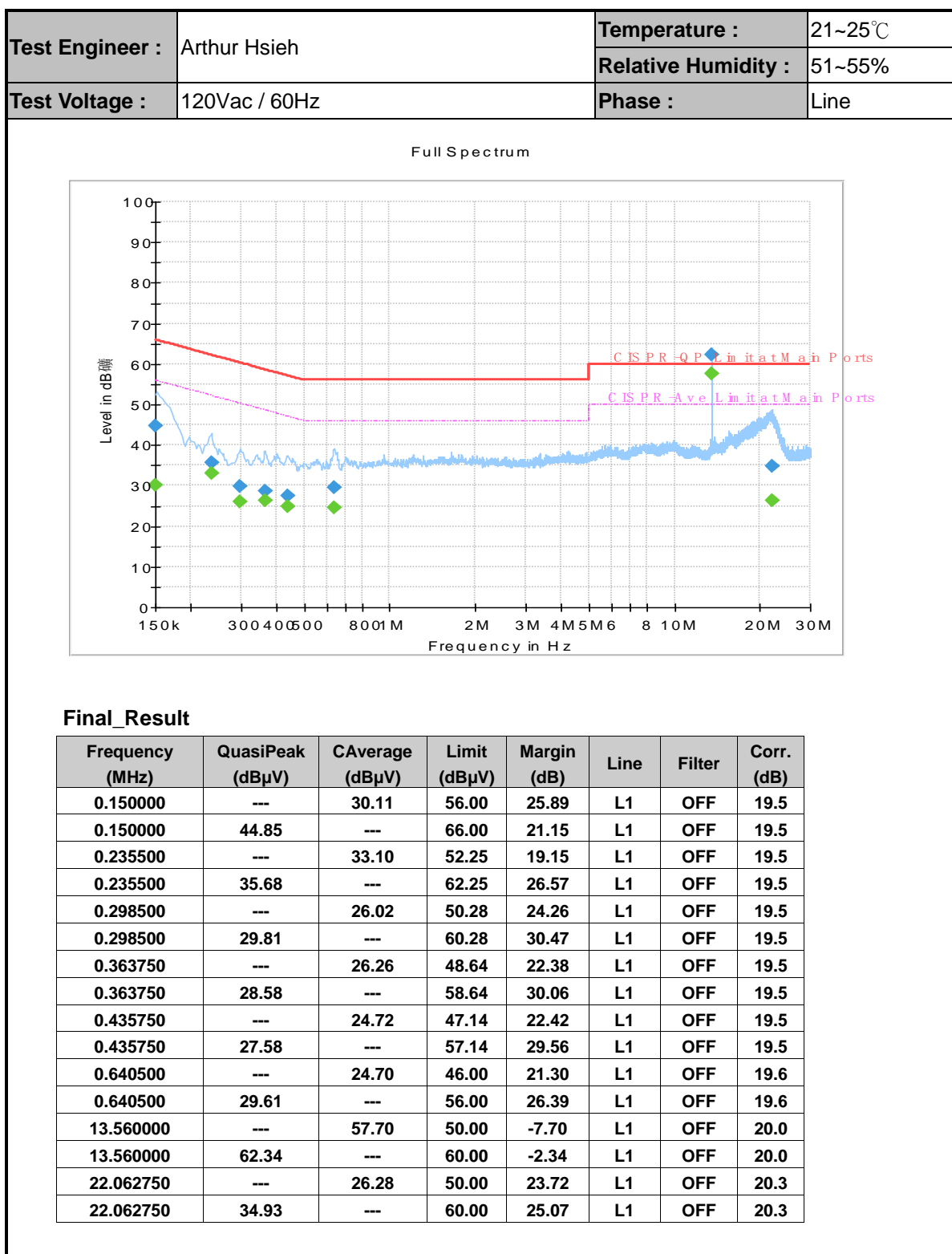
Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	3.4dB
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### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	5.7 dB
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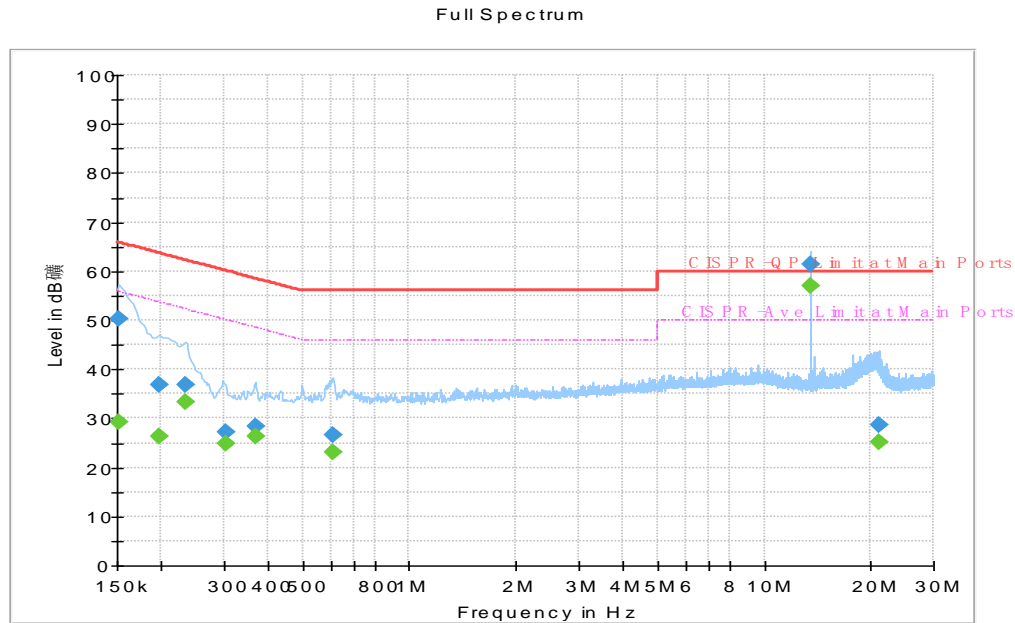
## Appendix A. Test Results of Conducted Emission Test



(1) with antenna

Remark: 13.560MHz is the NFC RF fundamental signal.

<b>Test Engineer :</b>	Arthur Hsieh	<b>Temperature :</b>	21~25°C
		<b>Relative Humidity :</b>	51~55%
<b>Test Voltage :</b>	120Vac / 60Hz	<b>Phase :</b>	Neutral


**Final\_Result**

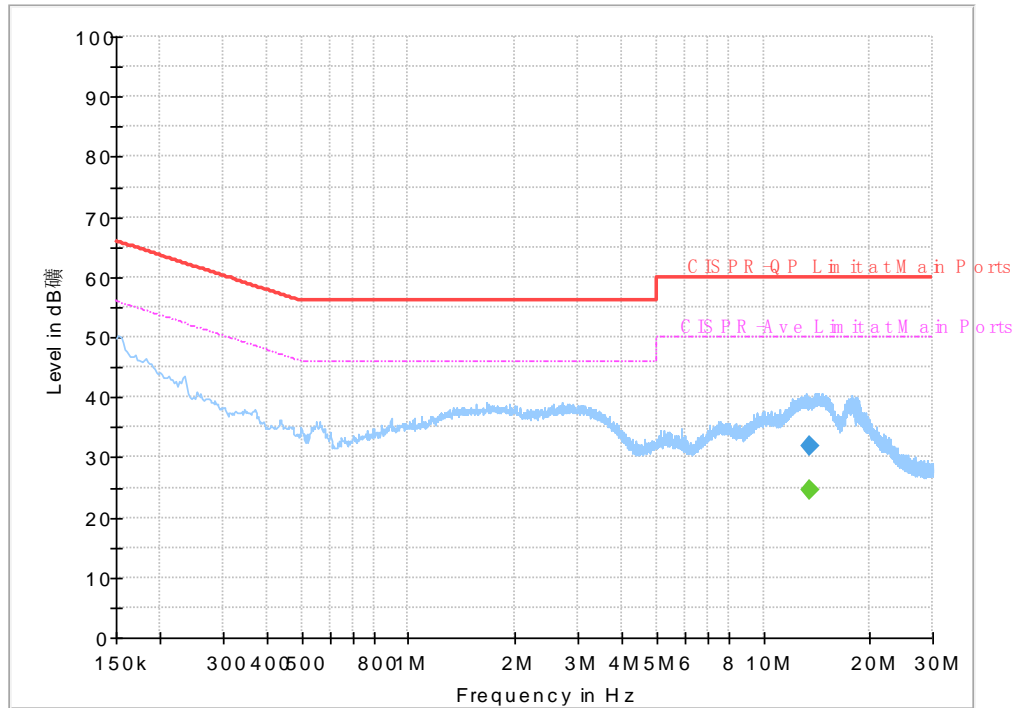
Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152250	---	29.34	55.88	26.54	N	OFF	19.5
0.152250	50.17	---	65.88	15.71	N	OFF	19.5
0.197250	---	26.28	53.73	27.45	N	OFF	19.5
0.197250	36.86	---	63.73	26.87	N	OFF	19.5
0.233250	---	33.47	52.33	18.86	N	OFF	19.5
0.233250	36.83	---	62.33	25.50	N	OFF	19.5
0.303000	---	24.77	50.16	25.39	N	OFF	19.5
0.303000	27.11	---	60.16	33.05	N	OFF	19.5
0.368250	---	26.38	48.54	22.16	N	OFF	19.5
0.368250	28.44	---	58.54	30.10	N	OFF	19.5
0.606750	---	23.07	46.00	22.93	N	OFF	19.6
0.606750	26.54	---	56.00	29.46	N	OFF	19.6
13.560000	---	56.96	50.00	-6.96	N	OFF	20.1
13.560000	61.47	---	60.00	-1.47	N	OFF	20.1
20.980500	---	25.15	50.00	24.85	N	OFF	20.4
20.980500	28.72	---	60.00	31.28	N	OFF	20.4

(1) with antenna

Remark: 13.560MHz is the NFC RF fundamental signal.

<b>Test Engineer :</b>	Arthur Hsieh	<b>Temperature :</b>	21~25°C
		<b>Relative Humidity :</b>	51~55%
<b>Test Voltage :</b>	120Vac / 60Hz	<b>Phase :</b>	Line

Full Spectrum



#### Final Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
13.560000	---	24.46	50.00	25.54	L1	OFF	19.7
13.560000	31.86	---	60.00	28.14	L1	OFF	19.7

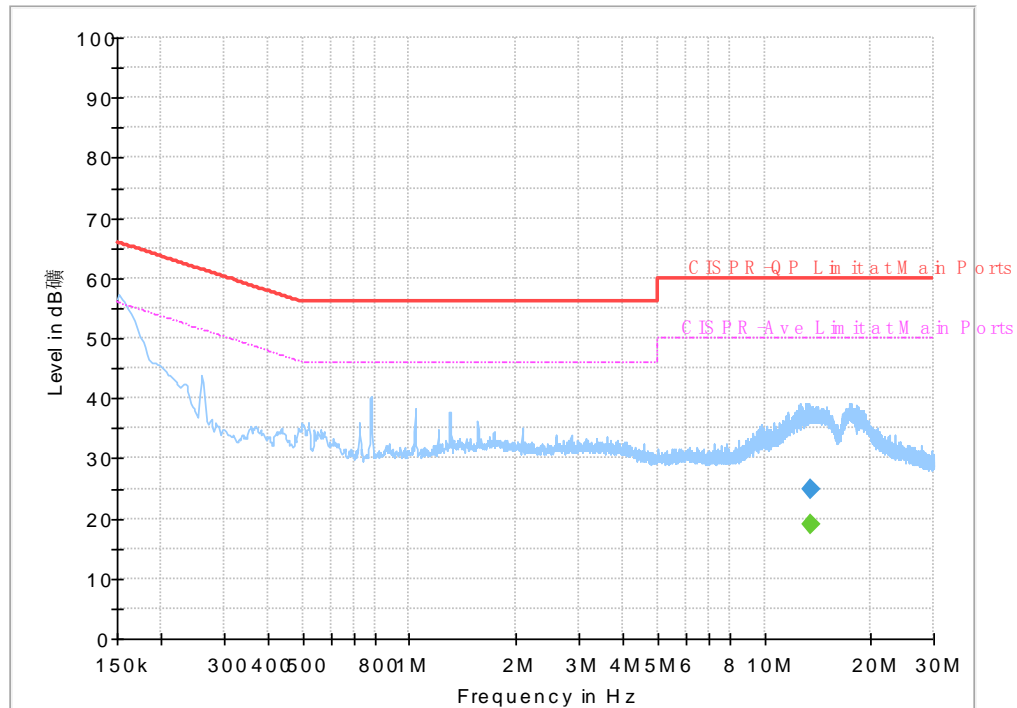
(2) With dummy load

Remark: Only the fundamental NFC signal needs to be retested per C63.4.



<b>Test Engineer :</b>	Arthur Hsieh	<b>Temperature :</b>	25.1~25.3℃
		<b>Relative Humidity :</b>	55~58%
<b>Test Voltage :</b>	120Vac / 60Hz	<b>Phase :</b>	Neutral

Full Spectrum



### Final\_Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
13.560000	---	19.04	50.00	30.96	N	OFF	19.8
13.560000	24.88	---	60.00	35.12	N	OFF	19.8

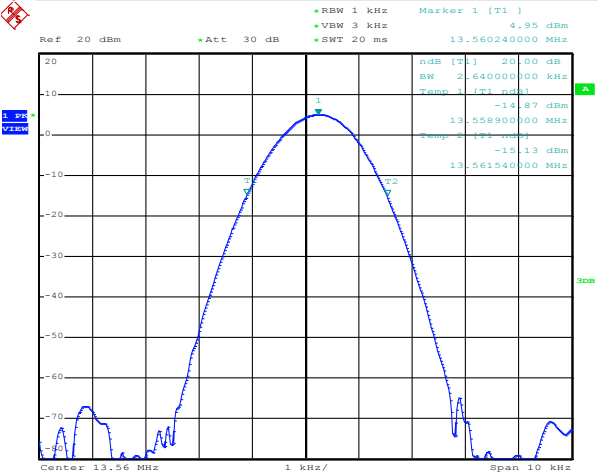
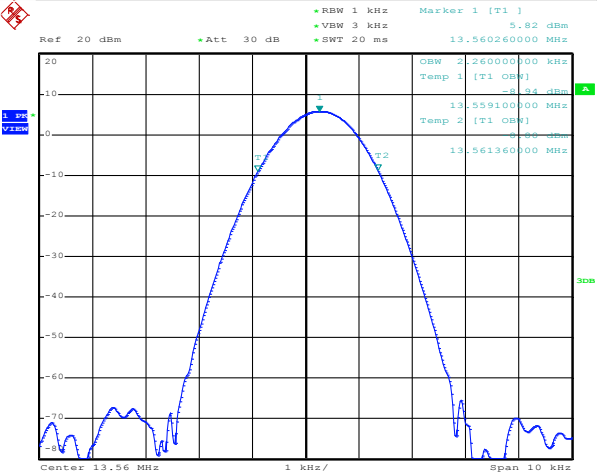
(2) With dummy load

Remark: Only the fundamental NFC signal needs to be retested per C63.4.



## Appendix B. Test Results of Conducted Test Items

### B1. Test Result of 20dB Spectrum Bandwidth

Test mode		Test Frequency (MHz)	
NFC Tx		13.56	
 <p>Ref 20 dBm Att 30 dB SWT 20 ms</p> <p>Marker 1 [T1]</p> <p>ndb 12 1 20.00 dB</p> <p>SW 2.64000000 kHz</p> <p>Temp 1 [T1 ndb]</p> <p>13.55890000 MHz</p> <p>Temp 2 [T1 ndb]</p> <p>13.56154000 MHz</p> <p>Center 13.56 MHz</p> <p>1 kHz/</p> <p>Span 10 kHz</p> <p>Date: 28.MAY.2018 17:00:06</p>		 <p>Ref 20 dBm Att 30 dB SWT 20 ms</p> <p>Marker 1 [T1]</p> <p>OSW 2.26000000 kHz</p> <p>Temp 1 [T1 OSW]</p> <p>13.55910000 MHz</p> <p>Temp 2 [T1 OSW]</p> <p>13.56136000 MHz</p> <p>Center 13.56 MHz</p> <p>1 kHz/</p> <p>Span 10 kHz</p> <p>Date: 28.MAY.2018 09:54:27</p>	
20dB Bandwidth (kHz)	2.64	99% OccupiedBW(kHz)	2.26
Frequency range (MHz)	$f_L > 13.553$	13.5589	Test Result
	$f_H < 13.567$	13.56154	Complies

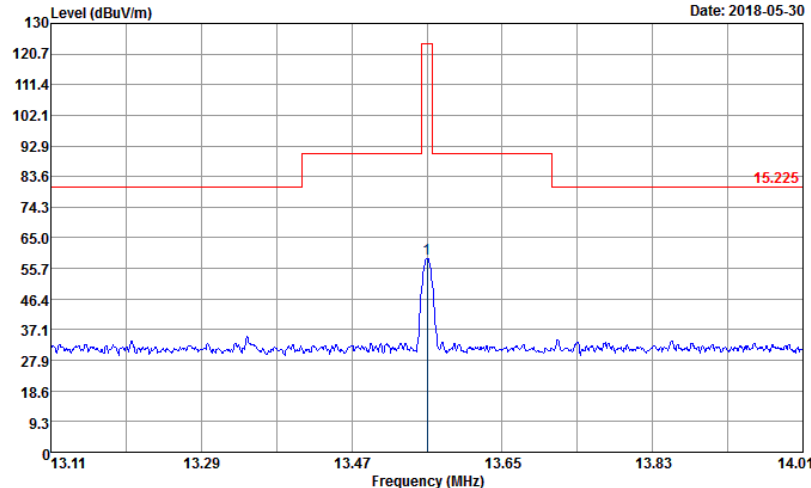
**B2. Test Result of Frequency Stability**

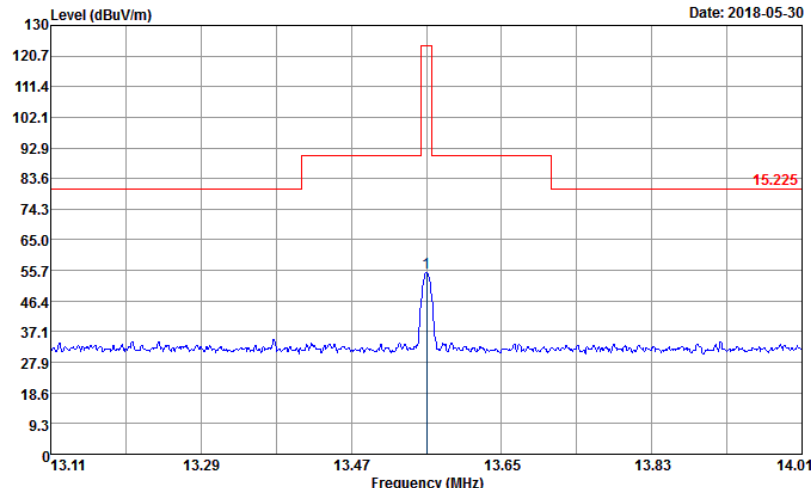
Voltage vs. Frequency Stability		Temperature vs. Frequency Stability	
Voltage (Vac)	Measurement Frequency (MHz)	Temperature (°C)	Measurement Frequency (MHz)
120	13.560220	-20	13.560320
102	13.560220	-10	13.560310
138	13.560220	0	13.560300
		10	13.560300
		20	13.560240
		30	13.560220
		40	13.560220
		50	13.560220
Max.Deviation (MHz)	0.000220	Max.Deviation (MHz)	0.000320
Max.Deviation (ppm)	16.2242	Max.Deviation (ppm)	23.5988
Limit	FS < ±100 ppm	Limit	FS < ±100 ppm
Test Result	PASS	Test Result	PASS



## Appendix C. Test Results of Radiated Test Items

### C1. Test Result of Field Strength of Fundamental Emissions

Test Mode :		NFC Tx		Test Frequency (MHz)		13.56		
						Date: 2018-05-30		
								
						Site : 03CH07-HY Condition : 15.225 3m LOOP_ANT(H)_100315 HORIZONTAL		
Freq	Level	Over	Limit	ReadAntenna	Cable	A/Pos	T/Pos	Remark
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	cm	deg
1	13.56	58.71	-65.29	124.00	38.37	19.91	0.43	100 345 QP

						Date: 2018-05-30		
								
						Site : 03CH07-HY Condition : 15.225 3m LOOP_ANT(V)_100315 VERTICAL		
Freq	Level	Over	Limit	ReadAntenna	Cable	A/Pos	T/Pos	Remark
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	cm	deg
1	13.56	55.15	-68.85	124.00	34.81	19.91	0.43	100 249 QP

**C2. Results of Radiated Spurious Emissions (9 kHz~30MHz)**

Test Mode :		NFC Tx		Polarization :		Horizontal			
Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level (dBμV)	Antenna Factor ( dB )	Cable Loss ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
0.00956	45.58	-82.41	127.99	24.52	20.63	0.43	-	-	Average
0.06123	46.35	-65.52	111.87	25.82	20.1	0.43	-	-	Average
0.09912	47.14	-60.54	107.68	26.62	20.09	0.43	-	-	QP
0.11168	43.51	-63.13	106.64	22.99	20.09	0.43	-	-	Average
0.15646	44.18	-59.54	103.72	23.69	20.06	0.43	-	-	Average
0.491	41.09	-32.71	73.8	20.67	19.99	0.43	100	0	QP
13.024	35.3	-34.2	69.5	14.96	19.91	0.43	-	-	QP
22.273	35.99	-33.51	69.5	14.39	20.4	1.2	-	-	QP
28.31	35.82	-33.68	69.5	14.37	20.25	1.2	-	-	QP

Test Mode :		NFC Tx		Polarization :		Vertical			
Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level (dBμV)	Antenna Factor ( dB )	Cable Loss ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
0.00905	44.52	-83.95	128.47	23.46	20.63	0.43	-	-	Average
0.06342	45.57	-65.99	111.56	25.04	20.1	0.43	-	-	Average
0.09476	45.2	-62.87	108.07	24.68	20.09	0.43	-	-	QP
0.12344	43.37	-62.41	105.78	22.87	20.07	0.43	-	-	Average
0.15442	45.88	-57.95	103.83	25.39	20.06	0.43	-	-	Average
0.491	41.47	-32.33	73.8	21.05	19.99	0.43	100	0	QP
12.632	35.07	-34.43	69.5	14.72	19.92	0.43	-	-	QP
21.616	36.65	-32.85	69.5	15.1	20.35	1.2	-	-	QP
28.825	35.25	-34.25	69.5	13.89	20.16	1.2	-	-	QP

**Note:**

1. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
2. Distance extrapolation factor = 40 log (specific distance / test distance) (dB);
3. Limit line = specific limits (dBμV) + distance extrapolation factor.

**C3. Results of Radiated Spurious Emissions (30MHz~1GHz)**

Test Mode :		NFC Tx			Polarization :		Horizontal			
Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level (dBμV)	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
31.89	22.19	-17.81	40	29.24	23.58	1.2	31.83	-	-	Peak
101.28	25.33	-18.17	43.5	39.29	15.96	1.83	31.75	-	-	Peak
169.86	24.75	-18.75	43.5	38.82	15.57	2.06	31.7	-	-	Peak
759.2	31.44	-14.56	46	31.24	27.83	4.18	31.81	-	-	Peak
867.7	31.07	-14.93	46	29	28.98	4.58	31.49	-	-	Peak
951.7	33.32	-12.68	46	29.07	30.44	4.71	30.9	100	0	Peak

Test Mode :		NFC Tx			Polarization :		Vertical			
Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level (dBμV)	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
40.8	30.6	-9.4	40	42.4	18.81	1.2	31.81	100	0	Peak
57.27	28.88	-11.12	40	47.35	12.12	1.2	31.79	-	-	Peak
85.35	25.22	-14.78	40	41.56	13.87	1.55	31.76	-	-	Peak
779.5	33.15	-12.85	46	32.79	27.98	4.18	31.8	-	-	Peak
850.2	30.52	-15.48	46	28.86	28.78	4.45	31.57	-	-	Peak
956.6	32.26	-13.74	46	27.71	30.69	4.71	30.85	-	-	Peak

**Note:**

1. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
2. Emission level (dBμV/m) = 20 log Emission level (μV/m).
3. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor= Level.