FCC TEST REPORT

Test report
On Behalf of
Shanghai I-Pivot Intelligent Technology Co., Ltd
For
65inch interactive kiosk, double sided screen
Model No.: 65AMVF32-P03-Bk

FCC ID: 2ASBQ-65AMVF32

Prepared for :	Shanghai I-Pivot Intelligent Technology Co., Ltd Room 404, Unit 62, No. 4499 Dushi Road,Minhang District, Shanghai, China
Prepared By :	Shenzhen Tongzhou Testing Co.,Ltd 1th Floor, Building 1, Haomai High-tech Park, Huating Road 387, Dalang Street, Longhua, Shenzhen, China
Date of Test:	2023/7/5 ~ 2023/7/13
Date of Report:	2023/7/14
Report Number:	TZ230104583-E

TEST RESULT CERTIFICATION

Applicant's name :	Shanghai I-Pivot Intelligent Technology Co., Ltd
Address :	Room 404, Unit 62, No. 4499 Dushi Road,Minhang District, Shanghai, China
Manufacture's Name :	Shanghai I-Pivot Intelligent Technology Co., Ltd
Address :	Room 404, Unit 62, No. 4499 Dushi Road,Minhang District, Shanghai, China
Product description	
Trade Mark :	/
Product name :	65inch interactive kiosk, double sided screen
Model and/or type reference :	65AMVF32-P03-Bk
Standards :	FCC Rules and Regulations Part 15.225 ANSI C63.10:2013

Date of Test ..... :	
Date (s) of performance of tests :	2023/7/5 ~ 2023/7/13
Date of Issue :	2023/7/14
Test Result :	Pass

Testing Engineer : Anna Hu

(Anna Hu)

Technical Manager : Hugo Chen

(Hugo Chen)

Authorized Signatory : Andy Zhang

(Andy Zhang)

Revision History

Revision	Issue Date	Revisions	Revised By
000	2023/7/14	Initial Issue	Andy Zhang

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1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT	:	65inch interactive kiosk, double sided screen
Model Number	:	65AMVF32-P03-Bk
Model Declaration	:	N/A
Test Model	:	65AMVF32-P03-Bk
Power Supply	:	AC 100-240V, 50/60Hz, 5A
Hardware version	:	V1.0
Software version	:	V1.0
Sample ID	:	TZ230104582–1#
NFC		
Frequency Range	:	13.56MHz
Antenna Type And Gain	:	Induction coil antenna, 0.0dBi (Max.)

Note 1: Antenna position refer to EUT Photos.
Note 2: the above information was supplied by the applicant.

1.2. Objective

The primary objective of the manufacturer is compliance with Subpart C of Part 15 of FCC Rules for the radiated and conducted emissions of intentional radiators. Certification of these devices is required as a prerequisite to marketing as defined in Part 2 the FCC Rules.

Certification is a procedure where the manufacturer or a contracted laboratory makes measurements and submits the test data and technical information to the FCC. The FCC issues a grant of equipment authorization upon successful completion of their review of the submitted documents. Once the equipment authorization has been obtained, the label indicating compliance must be attached to all identical units, which are subsequently manufactured.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product which may result in increased emissions should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing or I/O cable changes, etc.).

1.3. Environmental Conditions

During the measurement the environmental conditions were within the listed ranges:
- Temperature: 15-35ºC
- Humidity: 30-60 %
- Atmospheric pressure: 86-106 kPa

1.4. Host System Configuration List and Details

Manufacturer	Description	Model	Serial Number	Certificate
/	/	/	/	/

.....

1.5. External I/O Cable

I/O Port Description	Quantity	Cable
/	/	/

1.6. Description of Test Facility

FCC
Designation Number: CN1275
Test Firm Registration Number: 167722
Shenzhen Tongzhou Testing Co.,Ltd has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

A2LA
Certificate Number: 5463.01
Shenzhen Tongzhou Testing Co.,Ltd has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

IC
ISED#: 22033
CAB identifier: CN0099
Shenzhen Tongzhou Testing Co.,Ltd has been listed by Innovation, Science and Economic Development Canada to perform electromagnetic emission measurement.

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.10 and CISPR 16-1-4:2010

1.7. Statement of the Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To CISPR 16 – 4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements” and is documented in the Shenzhen Tongzhou Testing Co.,Ltd’s quality system acc. To DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

1.8. Measurement Uncertainty

Test Item		Frequency Range	Uncertainty	Note
Radiation Uncertainty	:	9KHz~30MHz	±3.08dB	(1)
		30MHz~1000MHz	±4.42dB	(1)
		1GHz~40GHz	±4.06dB	(1)
Conduction Uncertainty	:	150kHz~30MHz	±2.23dB	(1)

(1). This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

1.9. Description of Test Modes

Mode	description
Mode 1	TX(EUT work in 13.56MHz)

1.10. Antenna System

The directional gains of antenna used for transmitting refer to section 1.1 of this report, and EUT uses an Induction coil antenna which is permanently attached.

2. TEST METHODOLOGY

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.
The radiated testing was performed at an antenna-to-EUT distance of 3 meters. All radiated and conducted emissions measurement was performed at Shenzhen Tongzhou Testing Co.,Ltd.

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 that intends to maximize its emission characteristics in a continuous normal application.

2.2. EUT Exercise

The EUT was operated in the normal operating mode. The TX frequency that was fixed which was for the purpose of the measurements.
According to its specifications, the EUT must comply with the requirements of the Section 15.203, 15.205, 15.207, 15.209 and 15.225 under the FCC Rules Part 15 Subpart C.

2.3. General Test Procedures

2.3.1 Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2.1 of ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using Quasi-peak and average detector modes.

2.3.2 Radiated Emissions

The EUT is placed on a turn table, which is 1.5 m above ground plane. The turntable 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 maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 6.3 of ANSI C63.10-2013

2.4. Instrument Calibration

All test equipment is regularly checked to ensure that performance is maintained in accordance with the manufacturer's specifications. All antennas are calibrated at regular intervals with respect to tuned half-wave dipoles. An exhibit of this report contains the list of test equipment used and calibration information.

2.5. Test Mode

The EUT has been tested under engineering mode.

2.6. Justification

The system was configured for testing in a continuous transmits condition.

2.7. EUT Exercise Software

N/A

2.8. Special Accessories

N/A

2.9. Block Diagram/Schematics

Please refer to the related document

2.10. Equipment Modifications

Shenzhen Tongzhou Testing Co.,Ltd. has not done any modification on the EUT.

3. SUMMARY OF TEST RESULTS

Rules	Description of test	Sample ID	Result
§15.205 §15.209 §15.225 (d)	Radiated Emissions	TZ230104582–1#	Compliant
§15.207	Conducted Emission	TZ230104582–1#	Compliant
§15.225 (a) (b) (c)	In-Band Emission	TZ230104582–1#	Compliant
§15.215 (c)	20dB Bandwidth	TZ230104582–1#	Compliant
15.225(e)	Frequency Tolerance	TZ230104582–1#	Compliant
§15.203	Antenna Requirement	TZ230104582–1#	Compliant

Remark: The measurement uncertainty is not included in the test result.

Note 1: two same NFC module in this product, detail shows in EUT photos, and both were evaluated.

4. TEST ITEMS and RESULTs

4.1. AC Power line conducted emissions

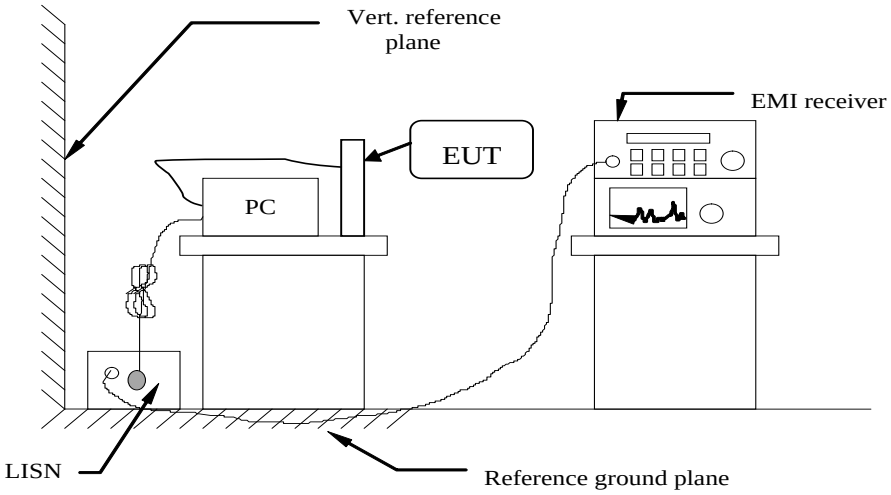
4.1.1. Standard Applicable

According to §15.207 (a): For an intentional radiator which 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 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range are listed as follows:

Frequency Range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

* Decreasing linearly with the logarithm of the frequency

4.1.2. Block Diagram of Test Setup



4.1.3. Test Results

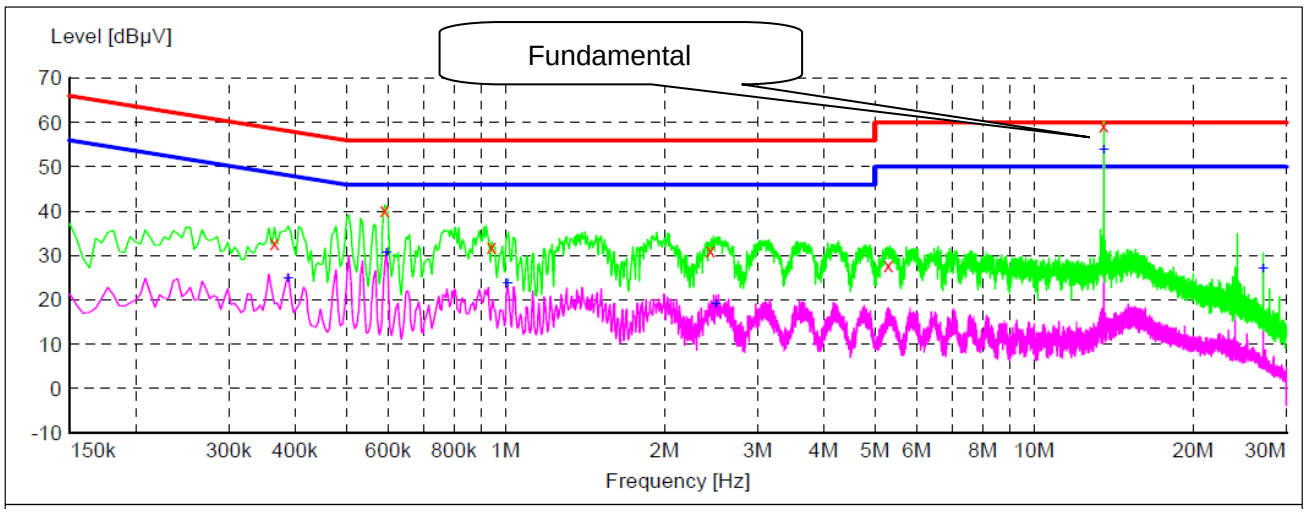
Temperature	24.5℃	Humidity	56%
Test Engineer	Anna Hu	Configurations	TX

PASS.

The test data please refer to following page.

AC Conducted Emission of power adapter @ AC 120V/60Hz@NFC1

Live

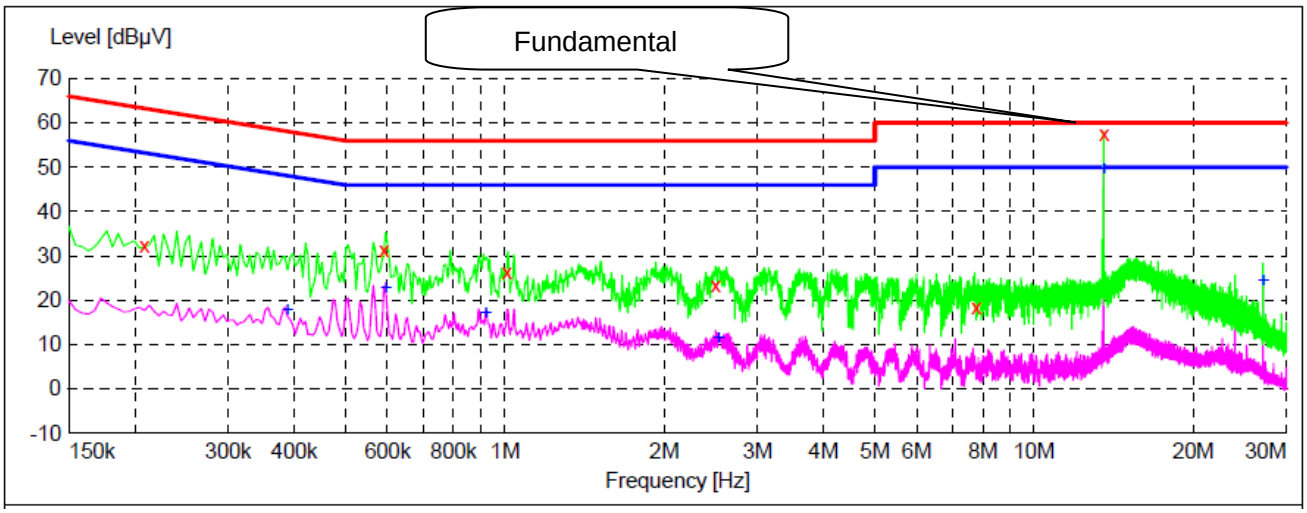


Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.366000	32.70	10.1	59	25.9	QP	L1	GND
0.591000	40.20	9.9	56	15.8	QP	L1	GND
0.942000	32.00	9.8	56	24.0	QP	L1	GND
2.445000	31.20	9.7	56	24.8	QP	L1	GND
5.298000	27.70	9.8	60	32.3	QP	L1	GND
13.560000	59.30	9.8	60	0.7	QP	L1	GND

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.388500	24.70	10.0	48	23.4	AV	L1	GND
0.595500	30.60	9.9	46	15.4	AV	L1	GND
1.009500	23.70	9.8	46	22.3	AV	L1	GND
2.503500	19.00	9.7	46	27.0	AV	L1	GND
13.560000	53.90	9.8	50	-3.9	AV	L1	GND
27.118500	27.10	10.0	50	22.9	AV	L1	GND

Note:
1). Pre-scan all modes and recorded the worst case results in this report
2). Emission level (dBuV) = 20 log Emission level (uV).
3). Margin=Limit-Level

Neutral



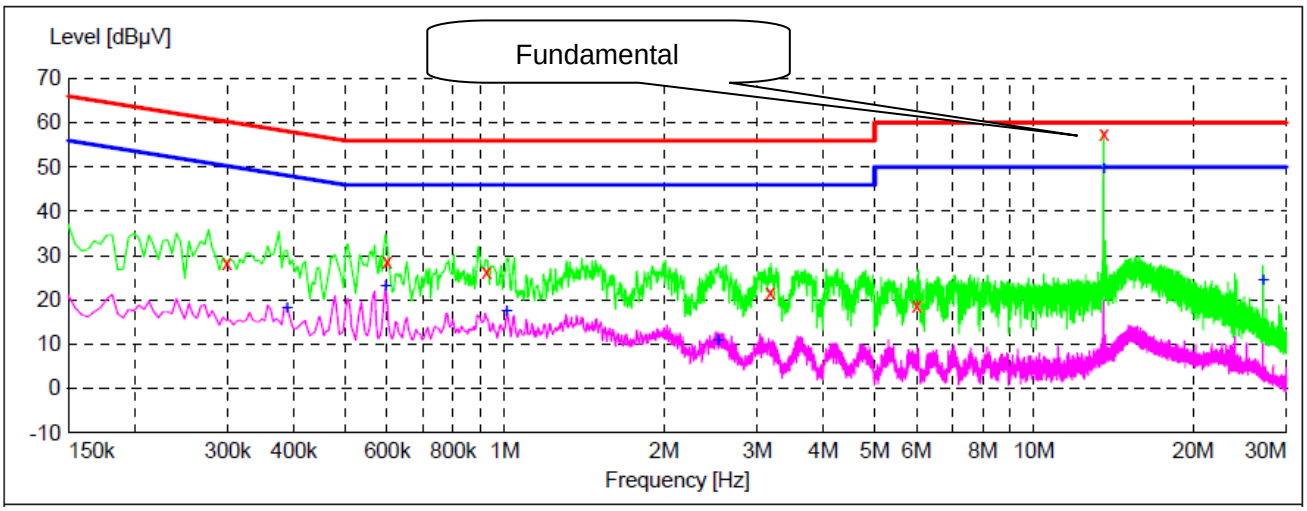
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.208500	32.40	10.6	63	30.9	QP	N	GND
0.591000	31.30	9.9	56	24.7	QP	N	GND
1.009500	26.20	9.8	56	29.8	QP	N	GND
2.503500	23.50	9.7	56	32.5	QP	N	GND
7.773000	18.30	9.8	60	41.7	QP	N	GND
13.560000	57.50	9.8	60	2.5	QP	N	GND

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.388500	17.70	10.0	48	30.4	AV	N	GND
0.595500	22.80	9.9	46	23.2	AV	N	GND
0.919500	16.90	9.8	46	29.1	AV	N	GND
2.535000	11.50	9.7	46	34.5	AV	N	GND
13.560000	49.60	9.8	50	0.4	AV	N	GND
27.118500	24.30	10.0	50	25.7	AV	N	GND

Note:
1). Pre-scan all modes and recorded the worst case results in this report
2). Emission level (dBuV) = 20 log Emission level (uV).
3). Margin=Limit-Level

AC Conducted Emission of power adapter @ AC 120V/60Hz@NFC2

Live

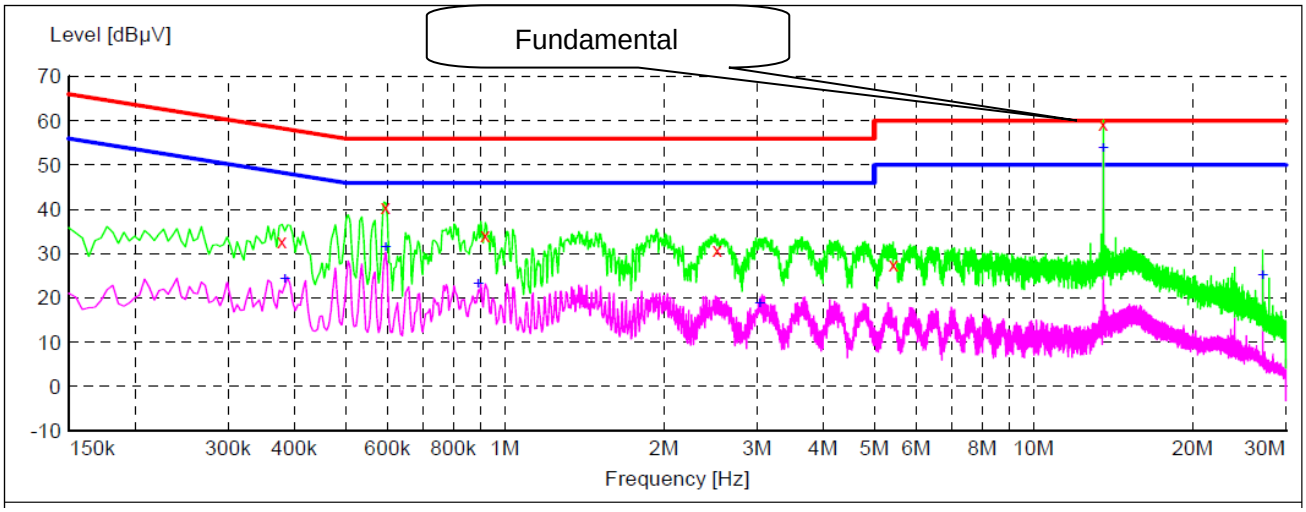


Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.298500	28.40	10.2	60	31.9	QP	N	GND
0.600000	28.70	9.9	56	27.3	QP	N	GND
0.924000	26.40	9.8	56	29.6	QP	N	GND
3.174000	21.80	9.7	56	34.2	QP	N	GND
6.009000	18.80	9.8	60	41.2	QP	N	GND
13.560000	57.40	9.8	60	2.6	QP	N	GND

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.388500	17.90	10.0	48	30.2	AV	N	GND
0.595500	23.00	9.9	46	23.0	AV	N	GND
1.009500	17.30	9.8	46	28.7	AV	N	GND
2.526000	10.90	9.7	46	35.1	AV	N	GND
13.560000	49.60	9.8	50	0.4	AV	N	GND
27.118500	24.40	10.0	50	25.6	AV	N	GND

Note:
1). Pre-scan all modes and recorded the worst case results in this report
2). Emission level (dBuV) = 20 log Emission level (uV).
3). Margin=Limit-Level

Neutral



Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.379500	32.90	10.1	58	25.4	QP	L1	GND
0.595500	40.40	9.9	56	15.6	QP	L1	GND
0.919500	34.20	9.8	56	21.8	QP	L1	GND
2.526000	31.00	9.7	56	25.0	QP	L1	GND
5.437500	27.50	9.8	60	32.5	QP	L1	GND
13.560000	59.30	9.8	60	0.7	QP	L1	GND

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.384000	24.30	10.0	48	23.9	AV	L1	GND
0.595500	31.40	9.9	46	14.6	AV	L1	GND
0.892500	23.10	9.8	46	22.9	AV	L1	GND
3.039000	18.70	9.7	46	27.3	AV	L1	GND
13.560000	53.90	9.8	50	-3.9	AV	L1	GND
27.123000	25.00	10.0	50	25.0	AV	L1	GND

Note:
1). Pre-scan all modes and recorded the worst case results in this report
2). Emission level (dBuV) = 20 log Emission level (uV).
3). Margin=Limit-Level

4.2. Transmitter Field Strength of Emissions

4.2.1. Limit

§ 15.225 Operation within the band 13.110-14.010 MHz.

(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.

=20*log10(15848)+40*log10(30/3) = 124 dBuV/m

(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.

=20*log10(334)+40*log10(30/3) = 90.5 dBuV/m

(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.

=20*log10(106)+40*log10(30/3) = 80.5 dBuV/m

(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.

§15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

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 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	([2])
13.36 – 13.41	322 - 335.4		

1 Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

2 Above 38.6

§15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

§15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field strength (microvolts/meter)	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

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54 72 MHz, 76 88 MHz, 174 216 MHz or 470 806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

§15.209 (b) In the emission table above, the tighter limit applies at the band edges.

4.2.2. Measuring Instruments and Setting

Please refer to section 6 of equipments list in this report. The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average
RB / VB (Emission in non-restricted band)	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average

Spectrum Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

4.2.3. Test Procedures

1) Sequence of testing 9 kHz to 30 MHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 0.8 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions.

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Premeasurement:

--- The turntable rotates from 0° to 315° using 45° steps.

--- The antenna height is 1.3 meter.

--- At each turntable position the analyzer sweeps with peak detection to find the maximum of all emissions

Final measurement:

--- Identified emissions during the premeasurement the software maximizes by rotating the turntable position (0° to 360°) and by rotating the elevation axes (0° to 360°).

--- The final measurement will be done in the position (turntable and elevation) causing the highest emissions with QPK detector.

--- The final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

2) Sequence of testing 30 MHz to 1 GHz
Setup:
--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
--- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.
--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
--- Auxiliary equipment and cables were positioned to simulate normal operation conditions
--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
--- The measurement distance is 3 meter.
--- The EUT was set into operation.
Premeasurement:
--- The turntable rotates from 0° to 315° using 45° steps.
--- The antenna is polarized vertical and horizontal.
--- The antenna height changes from 1 to 3 meter.
--- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.
Final measurement:
--- The final measurement will be performed with minimum the six highest peaks.
--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position (± 45°) and antenna movement between 1 and 4 meter.
--- The final measurement will be done with QP detector with an EMI receiver.
--- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

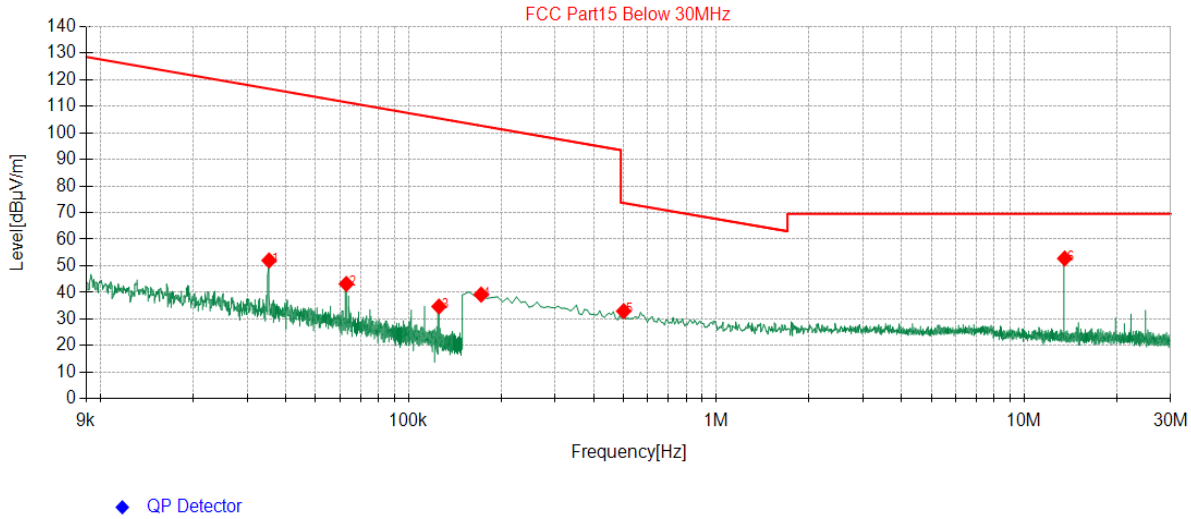
4.2.4. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.2.5. Results of Radiated Emissions (9 kHz ~30MHz)

Temperature	24.5℃	Humidity	56%
Test Engineer	Anna Hu	Configurations	TX

Radiated Emissions (9 kHz ~30MHz)@NFC1



Suspected Data List								
NO.	Freq. [MHz]	Factor [dB/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	0.0353	20.96	52.01	116.54	64.53	100	6	Coaxial
2	0.0629	21.25	43.19	111.48	68.29	100	0	Coaxial
3	0.1258	20.49	34.70	105.41	70.71	100	110	Coaxial
4	0.1724	20.63	39.19	102.65	63.46	100	269	Coaxial
5	0.5007	21.00	32.96	73.61	40.65	100	114	Coaxial
6	13.560	20.22	52.76	69.50	16.74	100	2	Coaxial

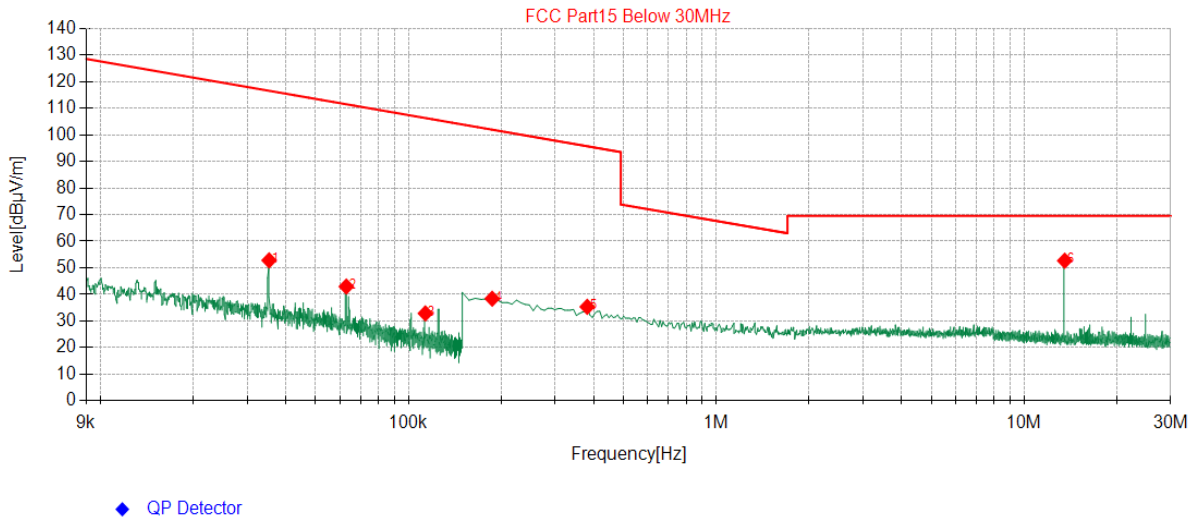
Note:

1、Level [dBµA/m] = Reading [dBµV] + Factor[dB/m]

2、Margin[dB] = Limit [dBµV/m] - Level [dBµV/m]

3、Measured at antenna position coaxial and coplanar, only record the Coaxial.

Radiated Emissions (9 kHz ~30MHz)@NFC2



Suspected Data List								
NO.	Freq. [MHz]	Factor [dB/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	0.0353	20.96	52.82	116.54	63.72	100	8	Coaxial
2	0.0629	21.25	42.97	111.48	68.51	100	172	Coaxial
3	0.1136	21.04	32.87	106.30	73.43	100	201	Coaxial
4	0.1873	20.64	38.40	101.92	63.52	100	269	Coaxial
5	0.3813	20.86	35.35	95.70	60.35	100	206	Coaxial
6	13.560	20.22	52.69	69.50	16.81	100	2	Coaxial

Note:

1、Level [dBµA/m] = Reading [dBµV] + Factor[dB/m]

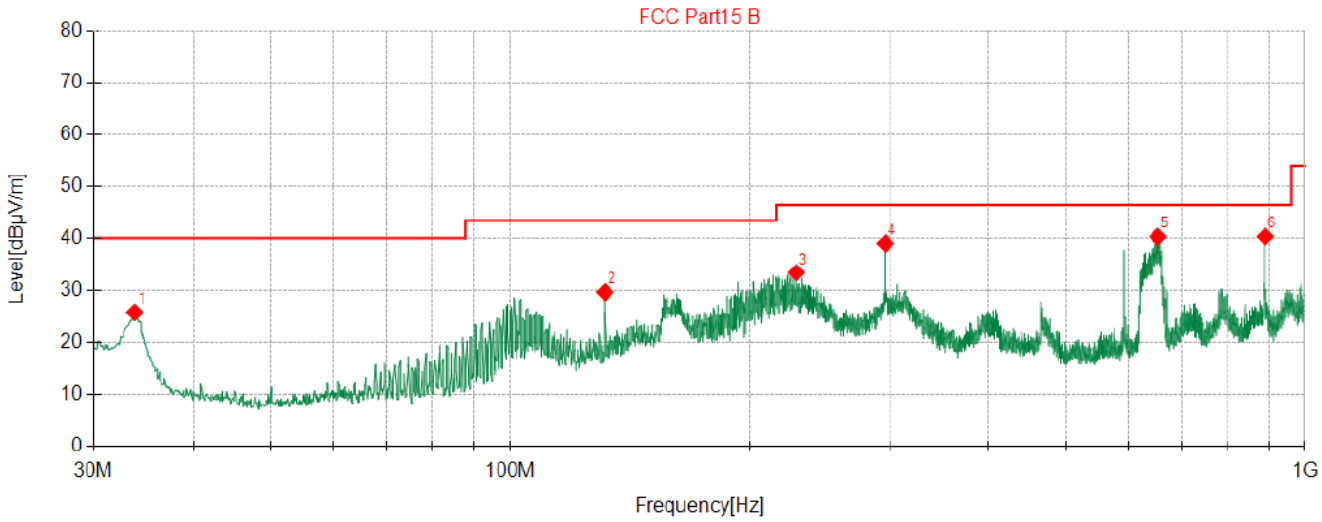
2、Margin[dB] = Limit [dBµV/m] - Level [dBµV/m]

3、Measured at antenna position coaxial and coplanar, only record the Coaxial.

4.2.6. Results of Radiated Emissions (30MHz~1GHz)

Temperature	24.5℃	Humidity	56%
Test Engineer	Anna Hu	Configurations	TX

Radiated Emissions (30MHz~1GHz)@NFC1

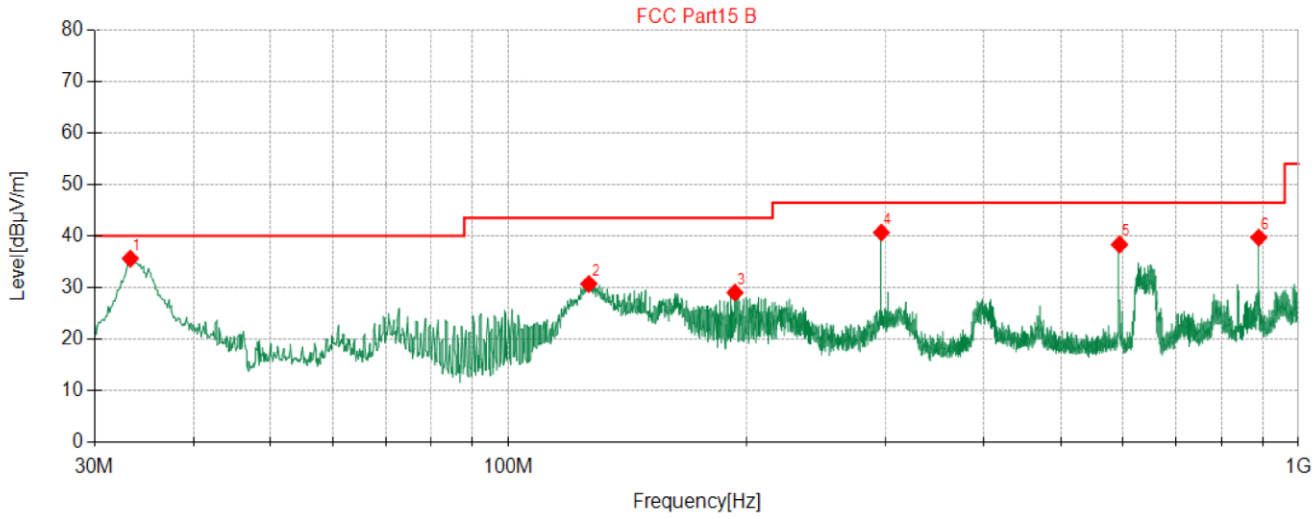


Suspected Data List								
NO.	Freq. [MHz]	Factor [dB/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	33.758	-16.11	25.81	40.00	14.19	100	354	Horizontal
2	131.72	-19.15	29.68	43.50	13.82	100	221	Horizontal
3	229.09	-14.52	33.42	46.50	13.08	100	96	Horizontal
4	296.62	-12.88	39.04	46.50	7.46	100	167	Horizontal
5	652.13	-4.94	40.32	46.50	6.18	100	300	Horizontal
6	890.14	-1.22	40.34	46.50	6.16	100	29	Horizontal

Note:

1、Level [dBµA/m] = Reading [dBµV] + Factor[dB/m]

2、Margin[dB] = Limit [dBµV/m] - Level [dBµV/m]



◆ QP Detector

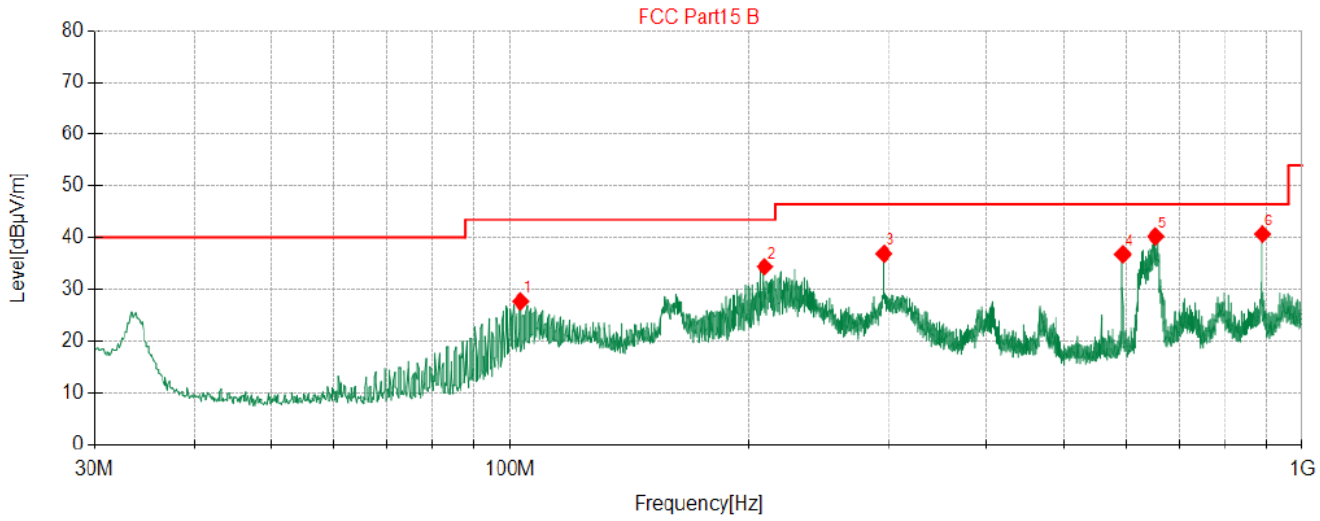
Suspected Data List								
NO.	Freq. [MHz]	Factor [dB/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	33.273	-15.57	35.64	40.00	4.36	100	293	Vertical
2	126.51	-17.82	30.73	43.50	12.77	100	329	Vertical
3	193.68	-15.55	29.04	43.50	14.46	100	251	Vertical
4	296.62	-12.31	40.69	46.50	5.81	100	210	Vertical
5	593.44	-5.97	38.36	46.50	8.14	100	287	Vertical
6	890.14	-1.64	39.72	46.50	6.78	100	228	Vertical

Note:

1、Level [dBµA/m] = Reading [dBµV] + Factor[dB/m]

2、Margin[dB] = Limit [dBµV/m] - Level [dBµV/m]

Radiated Emissions (30MHz~1GHz)@NFC2



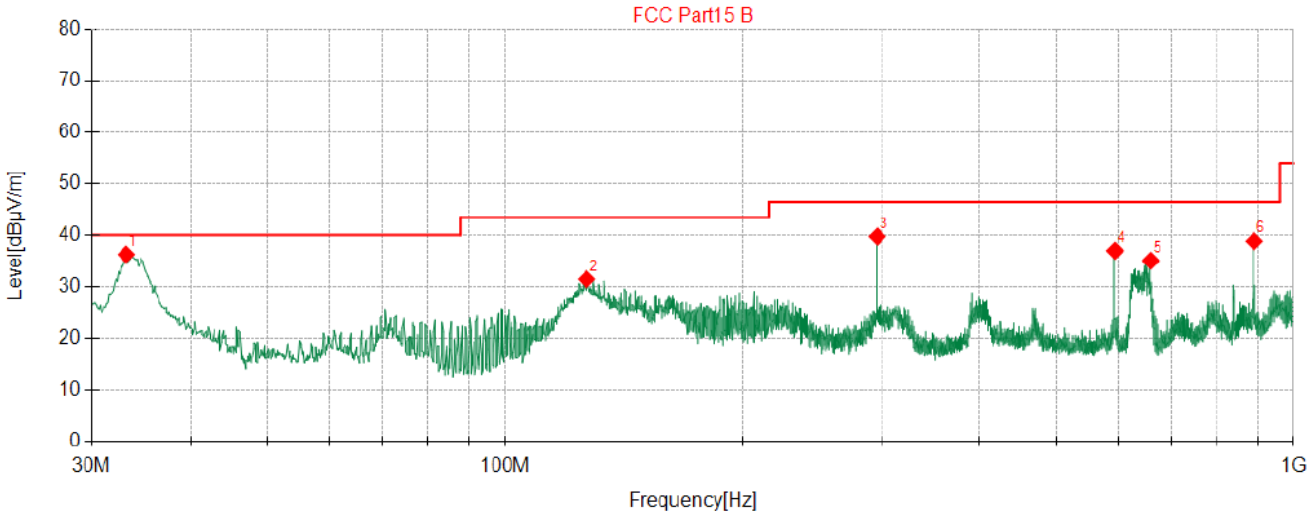
◆ QP Detector

Suspected Data List								
NO.	Freq. [MHz]	Factor [dB/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	103.23	-15.99	27.76	43.50	15.74	100	152	Horizontal
2	209.69	-15.14	34.38	43.50	9.12	100	313	Horizontal
3	296.62	-12.88	36.95	46.50	9.55	100	178	Horizontal
4	593.44	-5.75	36.84	46.50	9.66	100	313	Horizontal
5	652.49	-4.94	40.19	46.50	6.31	100	303	Horizontal
6	890.14	-1.22	40.64	46.50	5.86	100	260	Horizontal

Note:

1、Level [dBµA/m] = Reading [dBµV] + Factor[dB/m]

2、Margin[dB] = Limit [dBµV/m] - Level [dBµV/m]



◆ QP Detector

Suspected Data List								
NO.	Freq. [MHz]	Factor [dB/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	33.152	-15.57	36.31	40.00	3.69	100	280	Vertical
2	127	-17.94	31.48	43.50	12.02	100	306	Vertical
3	296.62	-12.31	39.75	46.50	6.75	100	209	Vertical
4	593.44	-5.97	37.02	46.50	9.48	100	2	Vertical
5	658.80	-5.83	35.09	46.50	11.41	100	43	Vertical
6	890.14	-1.64	38.85	46.50	7.65	100	225	Vertical

Note:

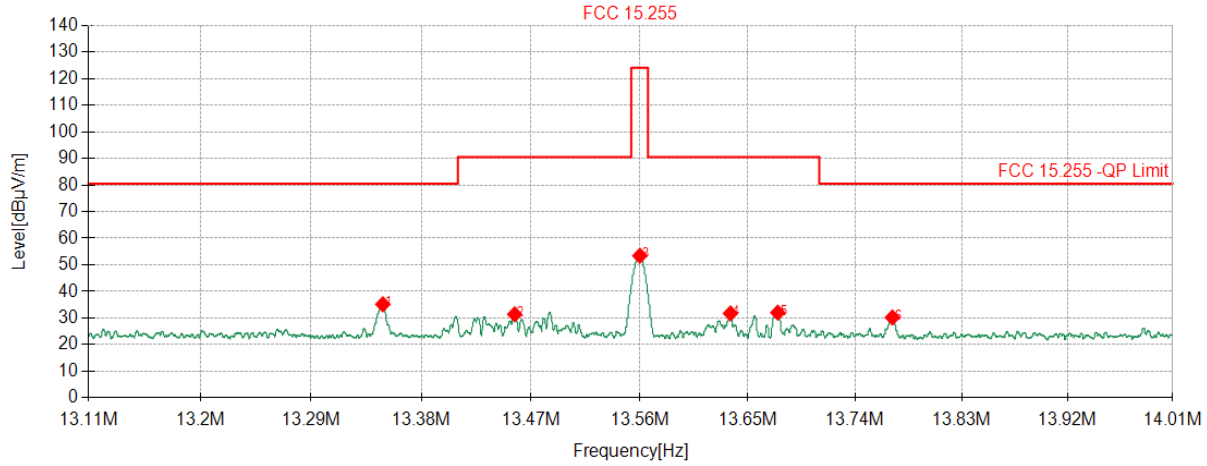
1、Level [dBµA/m] = Reading [dBµV] + Factor[dB/m]

2、Margin[dB] = Limit [dBµV/m] - Level [dBµV/m]

4.2.7. In-Band Emission (13.110-14.010 MHz)

Temperature	24.5℃	Humidity	56%
Test Engineer	Anna Hu	Configurations	TX

In-Band Emission (13.110-14.010 MHz)@NFC1



Suspected Data List								
NO.	Freq. [MHz]	Factor [dB/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	13.348	20.25	35.15	80.50	45.35	100	321	Coaxial
2	13.456	20.23	31.39	90.50	59.11	100	209	Coaxial
3	13.560	20.22	53.42	124.00	70.58	100	353	Coaxial
4	13.635	20.20	31.75	90.50	58.75	100	353	Coaxial
5	13.675	20.20	32.03	90.50	58.47	100	12	Coaxial
6	13.771	20.18	30.21	80.50	50.29	100	143	Coaxial

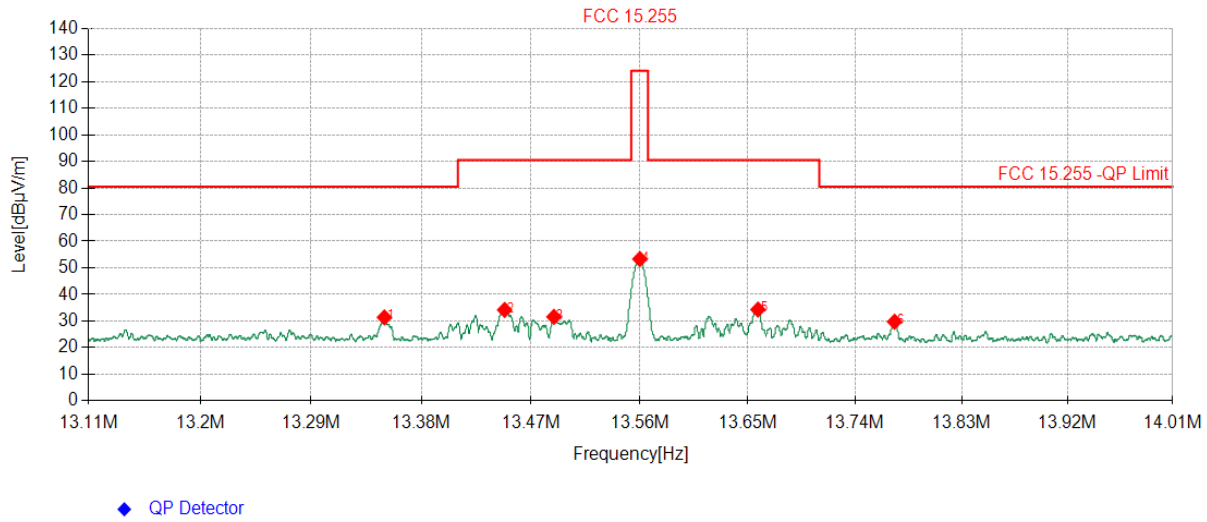
Note:

1、Level [dBµA/m] = Reading [dBµV] + Factor[dB/m]

2、Margin[dB] = Limit [dBµV/m] - Level [dBµV/m]

3、Measured at antenna position coaxial and coplanar, only record the Coaxial.

In-Band Emission (13.110-14.010 MHz)@NFC2



Suspected Data List								
NO.	Freq. [MHz]	Factor [dB/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	13.349	20.25	31.37	80.50	49.13	100	2	Coaxial
2	13.448	20.23	34.17	90.50	56.33	100	10	Coaxial
3	13.489	20.23	31.57	90.50	58.93	100	2	Coaxial
4	13.560	20.22	53.29	124.00	70.71	100	2	Coaxial
5	13.658	20.20	34.32	90.50	56.18	100	359	Coaxial
6	13.773	20.18	29.75	80.50	50.75	100	166	Coaxial

Note:

1、Level [dBµA/m] = Reading [dBµV] + Factor[dB/m]

2、Margin[dB] = Limit [dBµV/m] - Level [dBµV/m]

3、Measured at antenna position coaxial and coplanar, only record the Coaxial.

4.3. 20dB Bandwidth Emissions

§FCC 15.215 (c)

4.3.1. Limit

(c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. In the case of intentional radiators operating under the provisions of subpart E, the emission bandwidth may span across multiple contiguous frequency bands identified in that subpart. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

4.3.2. Test Procedure

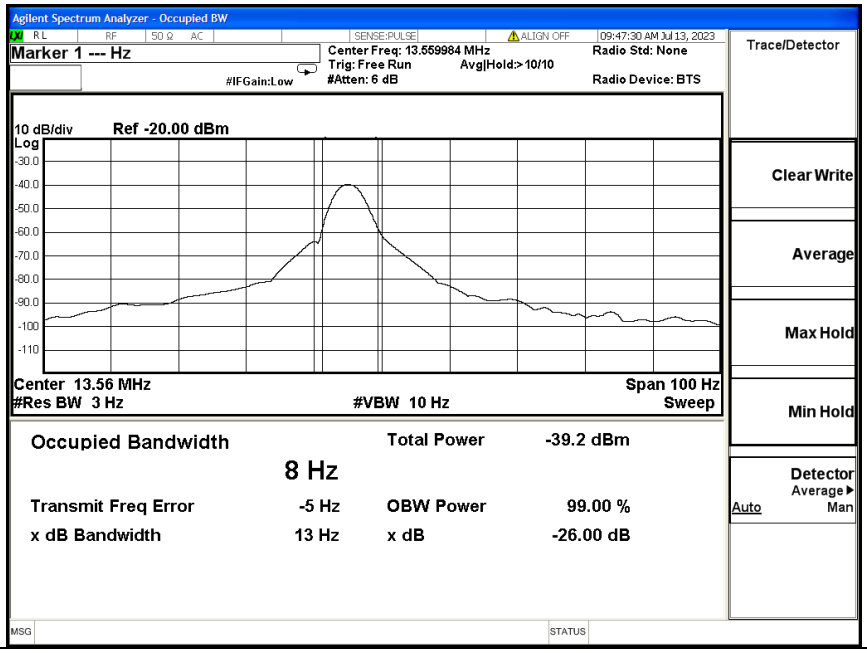
With the EUT's antenna attached, the EUT's 20dB Bandwidth power was received by the test antenna which was connected to the spectrum analyzer with the START and STOP frequencies set to the EUT's operation band.

4.3.1. Test Data

Temperature	24.5℃	Humidity	56%
Test Engineer	Anna Hu	Configurations	TX

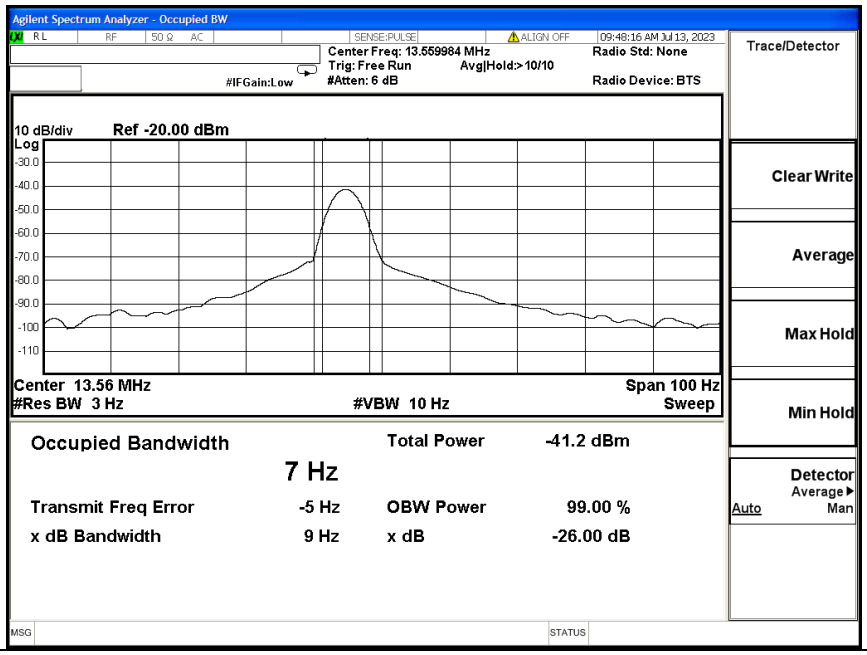
Test Result of NFC1

Mode	Freq. (KHz)	20dB Bandwidth (Hz)	Limit (kHz)	Conclusion
Tx Mode	13.56	8	/	PASS



Test Result of NFC2

Mode	Freq. (KHz)	20dB Bandwidth (Hz)	Limit (kHz)	Conclusion
Tx Mode	13.56	7	/	PASS



4.4. Frequency Tolerance

§FCC 15.225 (e)

4.4.1. Limit

(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.

4.4.2. Test Procedure

a) Supply the EUT with a nominal ac voltage or install a new or fully charged battery in the EUT. If possible, a dummy load shall be connected to the EUT because an antenna near the metallic walls of an environmental test chamber could affect the output frequency of the EUT. If the EUT is equipped with a permanently attached, adjustable-length antenna, then the EUT shall be placed in the center of the chamber with the antenna adjusted to the shortest length possible. Turn ON the EUT and tune it to one of the number of frequencies shown in 5.6.

b) Couple the unlicensed wireless device output to the measuring instrument by connecting an antenna to the measuring instrument with a suitable length of coaxial cable and placing the measuring antenna near the EUT (e.g., 15 cm away), or by connecting a dummy load to the measuring instrument, through an attenuator if necessary.
NOTE—An instrument that has an adequate level of accuracy as specified by the procuring or regulatory agency is the recommended measuring instrument.

c) Adjust the location of the measurement antenna and the controls on the measurement instrument to obtain a suitable signal level (i.e., a level that will not overload the measurement instrument but is strong enough to allow measurement of the operating or fundamental frequency of the EUT).

d) Turn the EUT OFF and place it inside the environmental temperature chamber. For devices that have oscillator heaters, energize only the heater circuit.

e) Set the temperature control on the chamber to the highest specified in the regulatory requirements for the type of device and allow the oscillator heater and the chamber temperature to stabilize.

f) While maintaining a constant temperature inside the environmental chamber, turn the EUT ON and record the operating frequency at startup, and at 2 minutes, 5 minutes, and 10 minutes after the EUT is energized. Four measurements in total are made.

g) Measure the frequency at each of frequencies specified in 5.6.

h) Switch OFF the EUT but do not switch OFF the oscillator heater.

i) Lower the chamber temperature by not more that 10 °C, and allow the temperature inside the chamber to stabilize.

j) Repeat step f) through step i) down to the lowest specified temperature.

4.4.3. Test Result

Test Result of NFC1

F_0 =13.56MHz				
Power Supply(V_{AC})	Temperature (℃)	Measured Frequency(MHz)	FrequencyError(%)	Limit
120	-10	13.5592088	-0.00583	±0.01%
	0	13.5593688	-0.00465	±0.01%
	10	13.5591506	-0.00626	±0.01%
	20	13.5599609	-0.00029	±0.01%
	30	13.5596227	-0.00278	±0.01%
	40	13.5596892	-0.00229	±0.01%
	50	13.5592775	-0.00533	±0.01%
100	20	13.5590781	-0.0068	±0.01%
240	20	13.5591998	-0.0059	±0.01%

Test Result of NFC2

F_0 =13.56MHz				
Power Supply(V_{AC})	Temperature (℃)	Measured Frequency(MHz)	FrequencyError(%)	Limit
120	-10	13.5596303	-0.00273	±0.01%
	0	13.5597463	-0.00187	±0.01%
	10	13.5595989	-0.00296	±0.01%
	20	13.5599826	-0.00013	±0.01%
	30	13.5598877	-0.00083	±0.01%
	40	13.5594591	-0.00399	±0.01%
	50	13.5595053	-0.00365	±0.01%
100	20	13.5595568	-0.00327	±0.01%
240	20	13.5599624	-0.00028	±0.01%

4.5. Antenna Requirement

4.5.1. Standard Applicable

§FCC 15.203
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.

This EUT uses an Induction coil antenna, and maximum antenna gain is 0dBi;

4.5.2. Result

Compliant.

5. LIST OF MEASURING EQUIPMENTS

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
1	MXA Signal Analyzer	Keysight	N9020A	MY52091623	2022/12/28	2023/12/27
2	Power Sensor	Agilent	U2021XA	MY5365004	2022/12/28	2023/12/27
3	Power Meter	Agilent	U2531A	TW53323507	2022/12/28	2023/12/27
4	Loop Antenna	schwarzbeck	FMZB1519B	00023	2022/11/13	2025/11/12
5	Wideband Antenna	schwarzbeck	VULB 9163	958	2022/11/13	2025/11/12
6	EMI Test Receiver	R&S	ESCI	100849/003	2022/12/28	2023/12/27
7	Controller	MF	MF7802	N/A	N/A	N/A
8	Amplifier	schwarzbeck	BBV 9743	209	2022/12/28	2023/12/27
9	RF Cable(below 1GHz)	HUBER+SUHNER	RG214	N/A	2022/12/28	2023/12/27
10	RF Cable(above 1GHz)	HUBER+SUHNER	RG214	N/A	2022/12/28	2023/12/27
11	Artificial Mains	ROHDE & SCHWARZ	ENV 216	101333-IP	2022/12/28	2023/12/27
12	EMI Test Software	ROHDE & SCHWARZ	ESK1	V1.71	N/A	N/A
12	RE test software	Tonscend	JS32-RE	V2.0.2.0	N/A	N/A
14	Test Software	Tonscend	JS1120-3	V2.5.77.0418	N/A	N/A

6. TEST SETUP Photographs of EUT

Please refer to separated files for Test Setup Photos of the EUT.

7. Exterior Photographs of the EUT

Please refer to separated files for External Photos of the EUT.

8. INTERIOR Photographs of the EUT

Please refer to separated files for Internal Photos of the EUT.

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