FCC RF Test Report

APPLICANT : Tabletop Media, LLC d/b/a Ziosk

EQUIPMENT: Ziosk Aurizon

BRAND NAME : Ziosk MODEL NAME : Z500

FCC ID : XOX-Z500

STANDARD : FCC Part 15 Subpart C §15.225

CLASSIFICATION: (DXX) Low Power Communication Device Transmitter

The product was received on Feb. 08, 2018 and testing was completed on Mar. 30, 2018. We, Sporton International (Shenzhen) 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 (Shenzhen) Inc., the test report shall not be reproduced except in full.



Approved by: Eric Shih / Manager

Sporton International (Shenzhen) Inc.

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Sporton International (Shenzhen) Inc.

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Report Version : Rev. 01

Report No.: FR820812D

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REVISION HISTORY

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REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR820812D	Rev. 01	Initial issue of report	Apr. 16, 2018

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SUMMARY OF THE TEST RESULT

	Applied Standard: 47 CFR FCC Part 15 Subpart C §15.225				
Part	Part FCC Rule Description of Test		Result	Remark	
1	15.207	AC Power Line Conducted Emissions	Not Required	-	
2.4	15.215(c)	20dB Spectrum Bandwidth	Complies	-	
3.1	-	99% OBW Spectrum Bandwidth	Complies	-	
3.2	15.225(e)	Frequency Stability	Complies	-	
3.3	15.225(a)(b)(c)	Field Strength of Fundamental Emissions	Complies	Max level 63.45 dBµV/m at 13.56 MHz	
3.4	15.225(d) & 15.209	Radiated Spurious Emissions	Complies	Under limit 4.66 dB at 203.630MHz	
3.5	15.203	Antenna Requirements	Complies	-	

Note: Not required means after assessing, test items are not necessary to carry out.

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1. General Description

1.1 Applicant

Tabletop Media, LLC d/b/a Ziosk

12404 Park Central Dr, Suite 350, Dallas, TX 75251

1.2 Manufacturer

SMTC de Chihuahua SA. DE C.V.

Washington 3701 building 20. Parque Industrial Las Americas, Chihuahua, Chih. 31200

1.3 Product Feature of Equipment Under Test

Product Feature			
Equipment	Ziosk Aurizon		
Brand Name	Ziosk		
Model Name	Z500		
FCC ID	XOX-Z500		
EUT supports Radios application	NFC WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth v3.0 + EDR / Bluetooth v4.0 LE/ Bluetooth v4.1 LE		
HW Version	DV2		
SW Version	Android 5.1.1		
EUT Stage	Identical Prototype		

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

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1.4 Product Specification of Equipment Under Test

Standards-related Product Specification		
Tx/Rx Frequency Range	13.553 ~ 13.567MHz	
Channel Number	1	
20dBW	2.59 KHz	
99%OBW	2.20 KHz	
Antenna Type	Inductive Loop Antenna	
Type of Modulation	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.

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1.6 Testing Location

Sporton International (Shenzhen) Inc. is accredited to ISO 17025 by National Voluntary Laboratory Accreditation Program (NVLAP code: 600156-0) and the FCC designation No are CN5018.

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Test Site	Sporton International (Shenzhen) Inc.		
	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan Shenzhen		
Took Site I continu	City Guangdong Province 518055 China		
Test Site Location	TEL: +86-755-8637-9589		
	FAX: +86-755-8637-9595		
Took Cito No	Sporton Site No.	FCC Registration No.	
Test Site No.	TH01-KS		
Test Engineer	Walker Ye	254265	
Temperature 24~26°C		251365	
Relative Humidity 50~53%			

Sporton International (Shenzhen) Inc. is accredited to ISO 17025 by National Voluntary Laboratory Accreditation Program (NVLAP code: 600156-0) and the FCC designation No are CN5019.

Test Site	Sporton International (Shenzhen) Inc.			
	No. 3 Bldg the third floor of south, Shahe River west, Fengzeyuan Warehouse,			
Test Site Location	Nanshan District Shenzhen City Guangdong Pro	ovince 518055 China		
	TEL: +86-755-3320-2398			
Test Site No.	Sporton Site No.	FCC Registration No.		
rest site No.	03CH04-SZ			
Test Engineer	Barry Chang	£77720		
Temperature	22~25℃	577730		
Relative Humidity 48~52%				

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

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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	

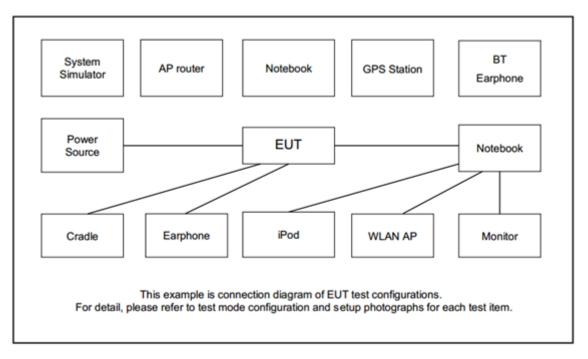
The EUT pre-scanned in four NFC type, A, B. The worst type (type A) was recorded in this report. Pre-scanned tests, X, Y, Z in three orthogonal panels to determine the final configuration (Y plane as worst plane) from all possible combinations.

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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.	NFC Card	N/A	N/A	N/A	NFC Card	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.

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3. Test Results

3.1 20dB and 99% OBW Spectrum Bandwidth Measurement

3.1.1 Limit

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

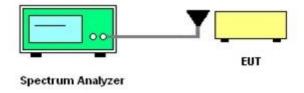
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedures

- 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.

3.1.4 Test Setup



3.1.5 Test Result of Conducted Test Items

Please refer to Appendix B.

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3.2 Frequency Stability Measurement

3.2.1 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.

3.2.2 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.
- 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 fc is declaring of channel frequency. Then the frequency error formula is $(fc-f)/fc \times 10^6$ ppm and the limit is less than ± 100 ppm.
- 6. Extreme temperature rule is -20°C~50°C.

3.2.4 Test Setup



3.2.5 Test Result of Conducted Test Items

Please refer to Appendix B.

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3.3 Field Strength of Fundamental Emissions and Mask Measurement

3.3.1 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.			
From of Emission (MUT)	Field Strength	Field Strength	Field Strength	Field Strength
Freq. of Emission (MHz)	(µV/m) at 30m	(dBµV/m) at 30m	(dBµV/m) at 10m	(dBµV/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

3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

3.3.3 Test Procedures

- 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.

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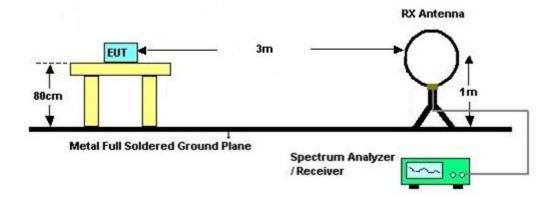
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- 5. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking 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.
- Compliance with the spectrum mask is tested with RBW set to 9kHz.
 Note: Emission level (dBμV/m) = 20 log Emission level (μV/m).

3.3.4 Test Setup

For radiated emissions below 30MHz



3.3.5 Test Result of Field Strength of Fundamental Emissions and Mask

Please refer to Appendix C.

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3.4 Radiated Emissions Measurement

3.4.1 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	Field Strength	Measurement Distance
(MHz)	(μV/m)	(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

3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

3.4.3 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.

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3.4.4 Test Procedures

- 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.
- 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.
- 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.
- 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

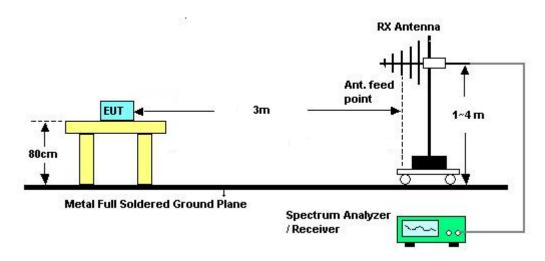
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3.4.5 Test Setup

For radiated emissions above 30MHz



3.4.6 Test Result of Radiated Emissions Measurement

Please refer to Appendix C.

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3.5 Antenna Requirements

3.5.1 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.

3.5.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

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4. List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101078	9kHz~40GHz	Apr. 20, 2017	Mar. 06, 2018~ Mar. 09, 2018	Apr. 19, 2018	Conducted (TH01-SZ)
Pulse Power Senor	Anritsu	MA2411B	1207253	30MHz~40GHz	Dec. 26, 2017	Mar. 06, 2018~ Mar. 09, 2018	Dec. 25, 2018	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1218010	50MHz Bandwidth	Dec. 26, 2017	Mar. 06, 2018~ Mar. 09, 2018	Dec. 25, 2018	Conducted (TH01-SZ)
EMI Test Receiver	R&S	ESR7	101404	9kHz~7GHz	Apr. 20, 2017	Mar. 29, 2018~ Mar. 30, 2018	Apr. 19, 2018	Radiation (03CH04-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY551502 13	10Hz~44GHz	Apr. 20, 2017	Mar. 29, 2018~ Mar. 30, 2018	Apr. 19, 2018	Radiation (03CH04-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	May 14, 2017	Mar. 29, 2018~ Mar. 30, 2018	May 13, 2018	Radiation (03CH04-SZ)
Bilog Antenna	TeseQ	CBL6111D	41909	30MHz~1GHz	May 16, 2017	Mar. 29, 2018~ Mar. 30, 2018	May 15, 2018	Radiation (03CH04-SZ)
Double Ridge Horn Antenna	SCHWARZBE CK	BBHA9120D	9120D-128 5	1GHz~18GHz	Dec. 13, 2017	Mar. 29, 2018~ Mar. 30, 2018	Dec. 12, 2018	Radiation (03CH04-SZ)
Horn Antenna	SCHWARZBE CK	BBHA9170	9170#679	15GHz~40GHz	May 17, 2017	Mar. 29, 2018~ Mar. 30, 2018	May 16, 2018	Radiation (03CH04-SZ)
Amplifier	Burgeon	BPA-530	102211	0.01Hz ~3000MHz	Oct.19, 2017	Mar. 29, 2018~ Mar. 30, 2018	Oct 18, 2018	Radiation (03CH04-SZ)
HF Amplifier	MITEQ	AMF-7D-0010 1800-30-10P- R	1989346	1GHz~18GHz	Jul. 27, 2017	Mar. 29, 2018~ Mar. 30, 2018	Jul. 26, 2018	Radiation (03CH04-SZ)
HF Amplifier	MITEQ	TTA1840-35- HG	1988315	18GHz~40GHz	Jul. 27, 2017	Mar. 29, 2018~ Mar. 30, 2018	Jul. 26, 2018	Radiation (03CH04-SZ)
Amplifier	Agilent Technologies	83017A	MY532701 56	500MHz~26.5G Hz	Apr. 20, 2017	Mar. 29, 2018~ Mar. 30, 2018	Apr. 19, 2018	Radiation (03CH04-SZ)
AC Power Source	Chroma	61601	N/A	N/A	NCR	Mar. 29, 2018~ Mar. 30, 2018	NCR	Radiation (03CH04-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Mar. 29, 2018~ Mar. 30, 2018	NCR	Radiation (03CH04-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Mar. 29, 2018~ Mar. 30, 2018	NCR	Radiation (03CH04-SZ)

NCR: No Calibration Required

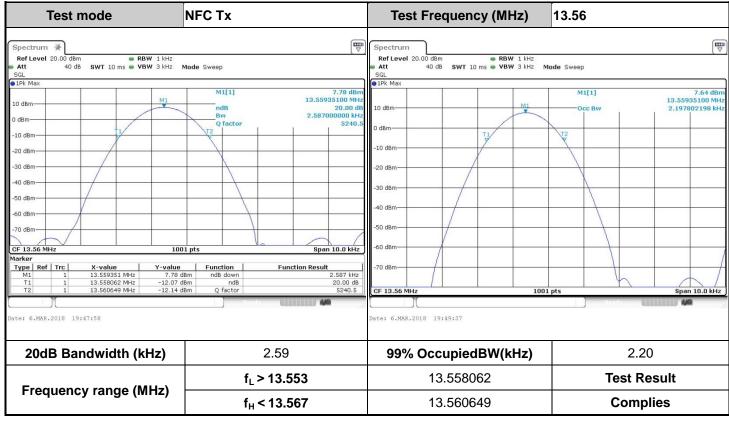
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Appendix A. Test Results of Conducted Test Items

A1. Test Result of 20dB Spectrum Bandwidth



Remark: Because the measured signal is CW adjusting the RBW per C63.10 would not be practical since measured bandwidth will always follow the RBW and the result will be approximately twice the RBW.

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A2. Test Result of Frequency Stability

Voltage vs. Fre	equency Stability	Temperature vs. Fre	equency Stability
Voltage (Vac)	Measurement Frequency (MHz)	Temperature (°C)	Measurement Frequency (MHz)
3	13.559426	-20	13.559416
3.78	13.559416	-10	13.559386
4.1	13.559441	0	13.559356
		10	13.559346
		20	13.559341
		30	13.559346
		40	13.559351
		50	13.559356
Max.Deviation (MHz)	-0.000585	Max.Deviation (MHz)	-0.000659
Max.Deviation (ppm)	-43.1047	Max.Deviation (ppm)	-48.6357
Limit	FS < ±100 ppm	Limit	FS < ±100 ppm
Test Result	PASS	Test Result	PASS

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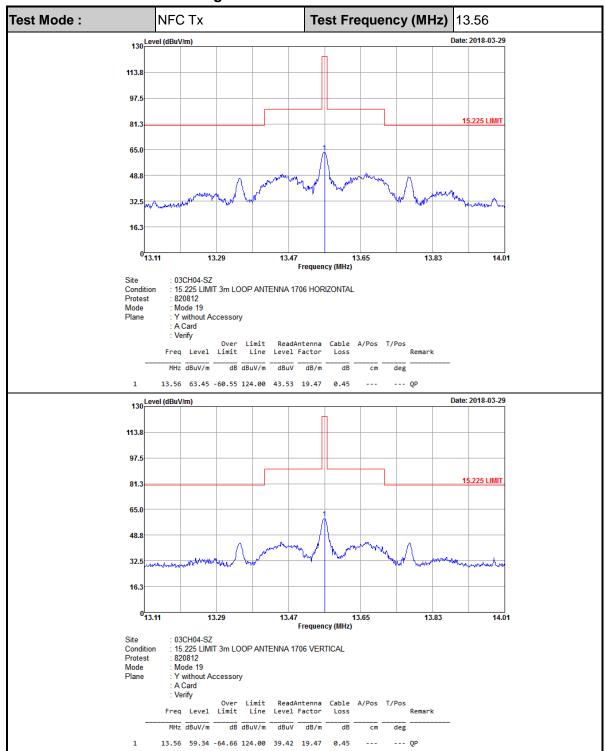
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Appendix B. Test Results of Radiated Test Items

B1. Test Result of Field Strength of Fundamental Emissions



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B2. Results of Radiated Spurious Emissions (9 kHz~30MHz)

Test Mode	: NFC	Tx		Polariz	zation :	Hori	zontal		
Frequency (MHz)	Level	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
0.01313	61.32	-63.92	125.24	40.26	21	0.06	-	-	Average
0.06111	56.51	-55.37	111.88	35.94	20.5	0.07	-	-	Average
0.0909	43.26	-65.17	108.43	22.49	20.7	0.07	-	-	QP
0.12768	41.13	-64.35	105.48	20.45	20.6	0.08	-	-	Average
0.54405	46.83	-26.06	72.89	26.3	20.42	0.11	-	-	QP
2.276	36.67	-33.33	70	16.05	20.54	0.08	-	-	QP
9.808	35.32	-34.68	70	14.57	20.36	0.39	-	-	QP
17.917	33.33	-36.67	70	13.27	19.55	0.51	-	-	QP
26.56	34.86	-35.14	70	14.61	19.54	0.71	-	-	QP

Test Mode	: NFC	Tx		Polariz	ation :	Vert	ical		
Frequency (MHz)	Level	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
0.01252	58.02	-67.63	125.65	36.96	21	0.06	-	-	Average
0.06165	57.49	-54.32	111.81	36.92	20.5	0.07	-	-	Average
0.09576	52.66	-55.32	107.98	31.89	20.7	0.07	-	-	QP
0.12633	42.75	-62.82	105.57	22.07	20.6	0.08	-	-	Average
0.5052	49.73	-23.8	73.53	29.22	20.41	0.1	-	-	QP
2.642	35.58	-34.42	70	15.02	20.52	0.04	-	-	QP
10.344	34.76	-35.24	70	14.02	20.33	0.41	-	-	QP
18.664	32.91	-37.09	70	12.87	19.52	0.52	-	-	QP
26.745	33.46	-36.54	70	13.22	19.53	0.71	-	-	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 $(dB\mu V)$ + distance extrapolation factor.

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B3. Results of Radiated Spurious Emissions (30MHz~1GHz)

Test Mode : NFC Tx					larization	Horizontal				
Frequency (MHz)	Level	Over Limit	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30	23.82	-16.18	40	30.64	24.9	0.25	31.97	-	-	Peak
203.63	38.84	-4.66	43.5	53.24	15.3	1.62	31.32	100	189	Peak
257.95	40.56	-5.44	46	49.95	20.12	1.73	31.24	-	-	Peak
363.68	38.57	-7.43	46	46.66	21	2.12	31.21	-	-	Peak
546.04	38.7	-7.3	46	42.58	24.82	2.55	31.25	-	-	Peak
937.92	39.2	-6.8	46	37.3	29.75	3.45	31.3	-	-	Peak

Test Mode	e: NFC	СТх		Polarization :				Vertical			
Frequency		Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark	
(MHz)	(dBµV/m)	(dB)	(dBµV/m)	·	(dB)	(dB)	(dB)	(cm)	(deg)		
40.67	25.64	-14.36	40	37.51	19.68	0.42	31.97	-	-	Peak	
203.63	28.06	-15.44	43.5	42.46	15.3	1.62	31.32	-	-	Peak	
353.01	37.61	-8.39	46	45.99	20.73	2.1	31.21	100	154	Peak	
460.68	35.7	-10.3	46	41.48	23.17	2.33	31.28	-	-	Peak	
600.36	37.09	-8.91	46	39.86	25.8	2.7	31.27	-	-	Peak	
937.92	36	-10	46	34.1	29.75	3.45	31.3	-	-	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 $(dB\mu V/m) = 20 \log Emission level (\mu V/m)$.
- 3. Corrected Reading: Antenna Factor + Cable Loss + Read Level Preamp Factor= Level.

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