FCC RF Test Report

APPLICANT : Ascom (Sweden) AB

EQUIPMENT : Myco 4 WiFi, Myco 4 Slim

BRAND NAME : ascom

MODEL NAME : SH4-AABC, SH4-AABB, SH4-ABBC, SH4-ABBB

FCC ID : BXZSH4

STANDARD : FCC Part 15 Subpart C §15.225

CLASSIFICATION: (DXX) Low Power Communication Device Transmitter

TEST DATE(S) : Feb. 07, 2023 ~ Mar. 24, 2023

We, Sporton International Inc. (Shenzhen), 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. (Shenzhen), the test report shall not be reproduced except in full.

JasonJia

Approved by: Jason Jia





Report No.: FR2D0705D

Sporton International Inc. (ShenZhen)

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People's Republic of China

Sporton International Inc. (ShenZhen)

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- C2. Results of Radiated Emissions (9 kHz~30MHz)
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REVISION HISTORY

Report No. : FR2D0705D

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR2D0705D	Rev. 01	Initial issue of report	Jun. 27, 2023

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SUMMARY OF THE TEST RESULT

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Report Section	FCC Rule	Description of Test	Result	Remark
3.1	15.207	AC Power Line Conducted Emissions	Complies	Under limit 13.84 dB at 0.440MHz
	15.215(c)	20dB Spectrum Bandwidth	Complies	-
3.2	-	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 54.05 dBµV/m at 13.560 MHz
3.5	15.225(d) & 15.209	Radiated Spurious Emissions	Complies	Under limit 13.75 dB at 367.560MHz
3.6	15.203	Antenna Requirements	Complies	-

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

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1. General Description

1.1 Applicant

Ascom (Sweden) AB

Grimbodalen 2, SE-417 49 Gothenburg, Sweden

1.2 Manufacturer

Ascom (Sweden) AB

Grimbodalen 2, SE-417 49 Gothenburg, Sweden

1.3 Product Feature of Equipment Under Test

Product Feature			
Equipment	Myco 4 WiFi, Myco 4 Slim		
Brand Name	ascom		
Model Name SH4-AABC, SH4-AABB, SH4-ABBC, SH4-ABBB			
FCC ID	BXZSH4		
SN Code	JS2250551849		
HW Version	V0.50		
SW Version	SH4_ASCOM_A12		
EUT Stage	Production Unit		

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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.
- There are two SKUs under test, SKU 2 and SKU 3. The differences can be referred to the SH4-AABC, SH4-AABB, SH4-ABBC, SH4-ABBB_Operational Description of Product Equality Declaration which is exhibit separately. Each SKU has different IR/Scanner/Antenna configurations, the detailes are shown as below. According to the differences, we choose SKU2_Sample 1 to perform full test.

SKU	IR	Scanner	2.4G BT/WIFI Antenna
SKU2_Sample 1	Yes	Yes	Same
SKU2_Sample 2	No	Yes	Same
SKU3_Sample 3	No	No	Different

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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	2.567 KHz	
99%OBW	2.188 KHz	
Antenna Type	FPC+FERRITE Antenna type	
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.

1.6 Testing Location

Sporton International Inc. (ShenZhen) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Test Firm	Sporton International Inc. (ShenZhen)			
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595			
Test Site No.	Sportor	n Site No.	FCC Designation No.	FCC Test Firm Registration No.
	TH01-SZ	CO01-SZ		
Test Engineer	Chen Ran	Lily Qiu		
Temperature	24-26℃ 22-24℃		CN1256	421272
Relative Humidity	50-53%	44-50%		

Test Firm	Sporton International Inc. (ShenZhen)			
Test Site 101, 1st Floor, Block B, Building 1, No. 2, Tengfeng 4th Road, Feng Community, Fuyong Street, Baoan District, Shenzhen City Guangdong P China 518103				
	TEL: +86-755-33202398			
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.	
	03CH01-SZ			
Test Engineer	Zhao hui Liang CN1256 4212			
Temperature	24-25°C			

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1.7 Test Software

Item	Site	Manufacturer	Name	Version
1.	03CH01-SZ	AUDIX	E3	6.2009-8-24
2.	CO01-SZ	AUDIX	E3	6.120613b

1.8 Applicable Standards

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

- 47 CFR Part 15 Subpart C §15.225
- ANSI C63.10-2013

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Test Configuration of Equipment Under Test

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	

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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 (Z plane as worst plane) from all possible combinations.

	Test Cases			
AC Conducted Emission	Mode 1: Bluetooth Link + WLAN Link(2.4G) + USB Cable (Charging from Adapter) + Battery 1 + NFC Tx			

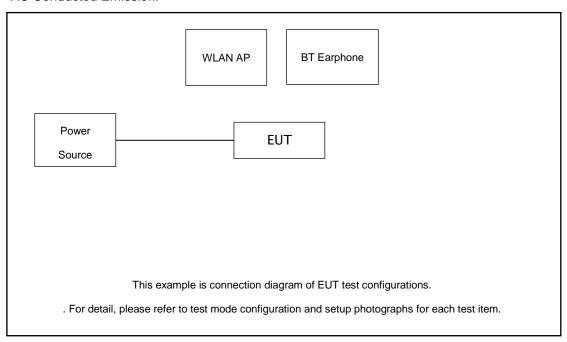
Remark:

- 1. For Radiated Test Cases, The tests were performance with Adapter and USB Cable.
- Between the SKU2 and SKU3 RSE test data, only the worst RSE test data of SKU2 is reported.

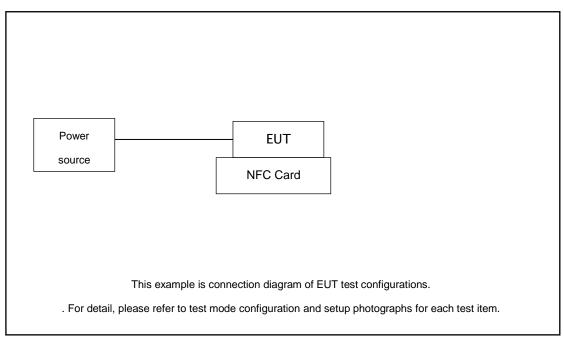
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2.2 Connection Diagram of Test System

AC Conducted Emission:



Radiated Emission:



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2.3 Table for Supporting Units

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord	
1.	Bluetooth	Samsung	EO-MG900	PYAHS-107W	N/A	N/A	
	Earphone						
2.	WLAN AP	Dlink	DIR-820L	KA2IR820LA1	N/A	Unshielded,1.8m	
3.	NFC Card	N/A	N/A	N/A	N/A	N/A	
4.	Adapter	N/A	N/A	N/A	N/A	N/A	
5.	USB Cable	N/A	N/A	N/A	N/A	N/A	

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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 0 cm gap to the EUT.

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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.

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Frequency of Emission	Conducted Limit (dBµV)				
(MHz)	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

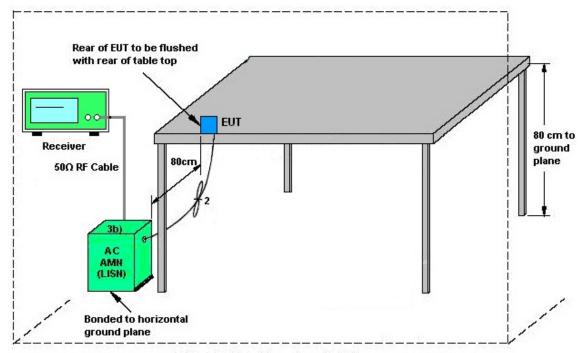
- 1. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
- 2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
- 3. All the support units are connecting to 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.

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3.1.4 Test setup



AMN = Artificial mains network (LISN)

AE = Associated equipment

EUT = Equipment under test

ISN = Impedance stabilization network

3.1.5 Test Result of AC Conducted Emission

Please refer to Appendix A.

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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.

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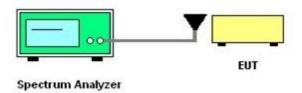
3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 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.

3.2.4 Test Setup



3.2.5 Test Result of Conducted Test Items

Please refer to Appendix B.

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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.

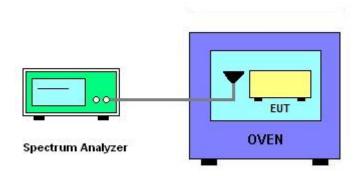
3.3.2 Measuring Instruments

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 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.

3.3.4 Test Setup



3.3.5 Test Result of Conducted Test Items

Please refer to Appendix B.

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3.4 Field Strength of Fundamental Emissions and Mask Measurement

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3.4.1 Limit

Rules and specifications	FCC CFR 47 Part 15 section 15.225						
Description	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			

3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

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3.4.3 Test Procedures

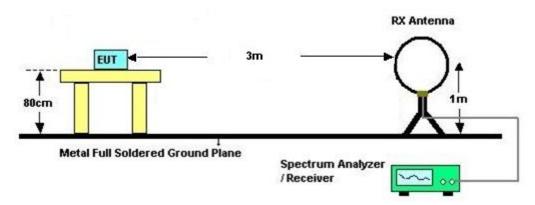
 Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the loop receiving antenna mounted antenna tower was placed 3 meters far away from the turntable.

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- 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 μ V/m) = 20 log Emission level (μ 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.

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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.

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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		

3.5.2 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.

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3.5.4 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.

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- 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

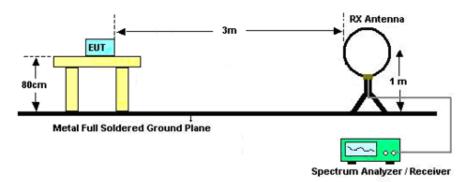
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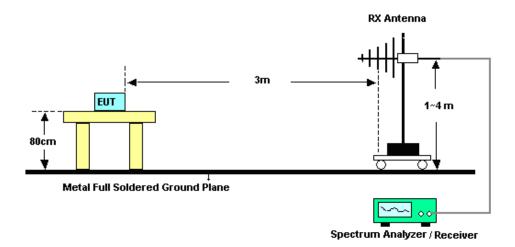
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3.5.5 Test Setup

For radiated emissions below 30MHz



For radiated emissions above 30MHz



3.5.6 Test Result of Radiated Emissions Measurement

Please refer to Appendix C.

Remark:

- 1. There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.
- 2. Tested for radiated below 30 MHz using a loop antenna in accordance with C63.10, the antenna was positioned in three antenna orientations: parallel, perpendicular, and ground-parallel. Pre-scanned the three antenna orientations, the worst case is parallel & perpendicular polarization, and test data of two mode was reported. (Parallel: The loop antenna is placed vertical axis and aligned along the site axis; Perpendicular: The loop antenna is placed vertical axis and orthogonal to the axis; ground-parallel: The loop antenna is placed horizontal axis and parallel with the ground)

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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.

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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.

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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	10Hz~40GHz	Apr. 06, 2022	Feb. 07, 2023~	Apr. 05, 2023	Conducted (TH01-SZ)
Spectrum Analyzer	R&S	FSV40	101078	10Hz~40GHz	Apr. 06, 2023	Mar. 24, 2023	Apr. 05, 2024	Conducted (TH01-SZ)
Pulse Power Senor	Anritsu	MA2411B	1339473	30MHz~40GHz	Dec. 27, 2022	Feb. 07, 2023~ Mar. 24, 2023	Dec. 26, 2023	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1542004	50MHz Bandwidth	Dec. 27, 2022	Feb. 07, 2023~ Mar. 24, 2023	Dec. 26, 2023	Conducted (TH01-SZ)
EMI Test Receiver&SA	Agilent	N9038A	MY522601 85	20Hz~26.5GHz	Dec.26, 2022	Feb. 11, 2023	Dec.25, 2023	Radiation (03CH01-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	Jul. 28, 2022	Feb. 11, 2023	Jul. 27, 2024	Radiation (03CH01-SZ)
Bilog Antenna	TeseQ	CBL6112D	35407	30MHz-2GHz	Sep. 28, 2021	Feb. 11, 2023	Sep. 27, 2023	Radiation (03CH01-SZ)
LF Amplifier	Burgeon	BPA-530	102209	0.01~3000Mhz	Apr. 04, 2022	Feb. 11, 2023	Apr. 03, 2023	Radiation (03CH01-SZ)
AC Power Source	Chroma	61601	616010001 985	N/A	Nov.10.2022	Feb. 11, 2023	Nov.09.2023	Radiation (03CH01-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Feb. 11, 2023	NCR	Radiation (03CH01-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Feb. 11, 2023	NCR	Radiation (03CH01-SZ)
EMI Receiver	R&S	ESR7	101630	9kHz~7GHz;	Jul. 07, 2022	Feb. 06, 2023~ Feb. 09, 2023	Jul. 06 2023	Conduction (CO01-SZ)
AC LISN	R&S	ENV216	100063	9kHz~30MHz	Sep. 15, 2022	Feb. 06, 2023~ Feb. 09, 2023	Sep. 14, 2023	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	EMCO	3816/2SH	00103892	9kHz~30MHz	Oct. 17, 2022	Feb. 06, 2023~ Feb. 09, 2023	Oct. 16, 2023	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	616020000 891	100Vac~250Vac	Jul. 07, 2022	Feb. 06, 2023~ Feb. 09, 2023	Jul. 06, 2023	Conduction (CO01-SZ)

Report No.: FR2D0705D

NCR: No Calibration Required

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5. Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.10-2013. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

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

Measuring Uncertainty for a Level of Confidence	2.2dB
of 95% (U = 2Uc(y))	Z.ZUB

Uncertainty of Radiated Emission Measurement (9 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence	2.8dB
of 95% (U = 2Uc(y))	Z.oub

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence	4.2dB
of 95% (U = 2Uc(y))	4.205

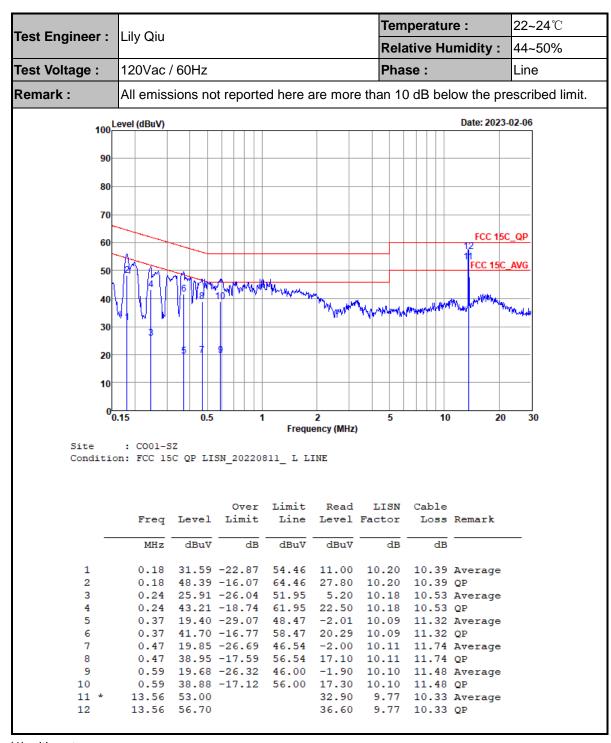
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Appendix A. Test Results of Conducted Emission Test



(1) with antenna

Remark: 13.560MHz is the NFC RF fundamental signal.

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22~24℃ Temperature: Test Engineer: Lily Qiu **Relative Humidity:** 44~50% Test Voltage: 120Vac / 60Hz Phase: Neutral Remark: All emissions not reported here are more than 10 dB below the prescribed limit. 100 Level (dBuV) Date: 2023-02-06 90 80 70 FCC 15C_QP 60 50 30 20 10 0<mark>0.15</mark> 0.5 5 10 20 30 Frequency (MHz) Site : CO01-SZ Condition: FCC 15C QP LISN_20220811 N NEUTRAL Over Limit LISN Cable Read Loss Remark Freq Level Limit Line Level Factor dB dBuV dBuV MHz dBuV dB dB 0.20 36.23 -17.39 53.62 15.80 10.28 10.15 Average 0.20 49.23 -14.39 63.62 28.80 10.28 10.15 QP 0.26 26.10 -25.24 51.34 5.20 10.24 10.66 Average 0.26 43.90 -17.44 61.34 23.00 10.24 10.66 QP 3 0.32 26.93 -22.73 49.66 5.70 10.19 11.04 Average 0.32 43.53 -16.13 59.66 22.30 10.19 11.04 QP 0.44 26.34 -20.64 46.98 4.50 10.19 11.65 Ave 6 7 11.65 Average 0.44 43.14 -13.84 56.98 21.30 10.19 11.65 QP 9 1.01 26.75 -19.25 46.00 6.30 10.22 10.23 Average 10 1.01 40.25 -15.75 56.00 19.80 10.22 10.23 QP 9.90 10.33 Average 11 * 13.56 50.53 30.30 12 13.56 54.93 34.70 9.90 10.33 QP

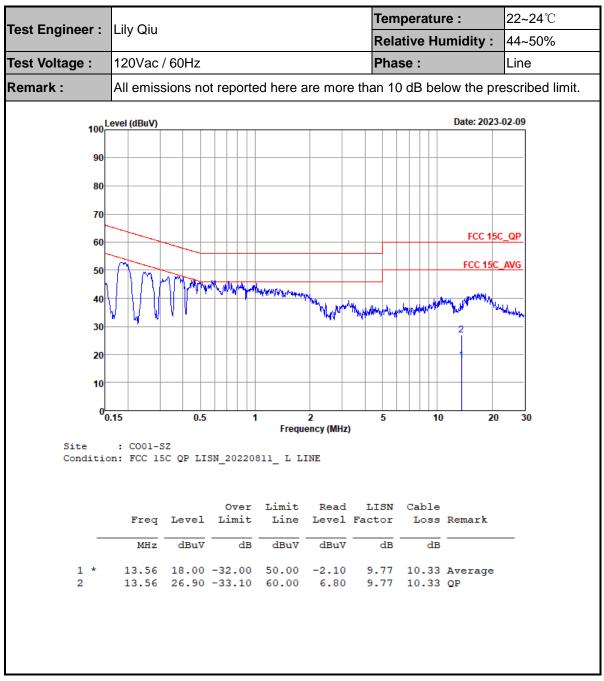
Note:

- 1. Level($dB\mu V$) = Read Level($dB\mu V$) + LISN Factor(dB) + Cable Loss(dB)
- 2. Over Limit(dB) = Level(dB μ V) Limit Line(dB μ V)

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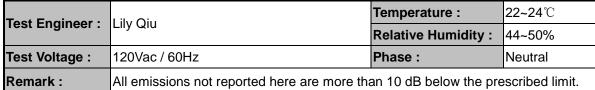


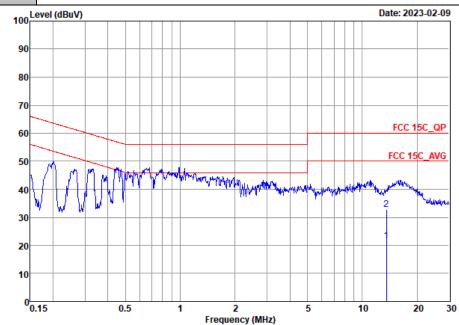
(2) With dummy load

Remark: Only the fundamental NFC signal needs to be retested per KDB 174176.

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CC RF Test Report No.: FR2D0705D





Site : CO01-SZ Condition: FCC 15C OP LISN_20220811_ N NEUTRAL

	Freq	Level	Over Limit			LISN Factor		Remark
	MHz	dBu∇	dB	dBu∇	dBuV	dB	dB	
1 2 *								Average QP

(2) With dummy load

Remark: Only the fundamental NFC signal needs to be retested per KDB 174176.

Note:

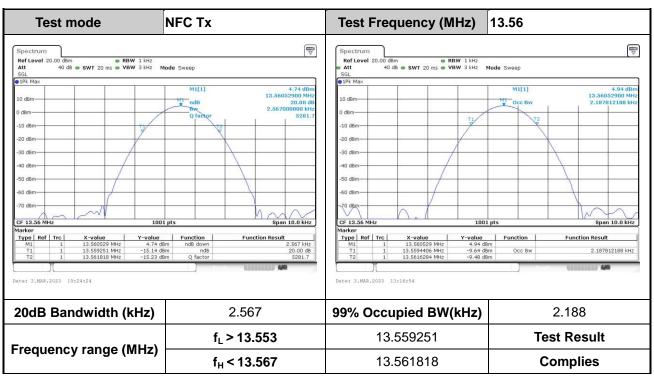
- 1. Level(dB μ V) = Read Level(dB μ V) + LISN Factor(dB) + Cable Loss(dB)
- 2. Over Limit(dB) = Level(dB μ V) Limit Line(dB μ V)

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Appendix B. Test Results of Conducted Test Items

B1.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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B2. Test Result of Frequency Stability

Voltage (Vdc)	Measurement Frequency (MHz)	Temperature (℃)	Time	Measurement Frequency (MHz)
3.5	13.560535		0	13.560535
3.87	13.560535	00	2	13.560530
4.45	13.560535	0	5	13.560530
-	-		10	13.560530
-	-		0	13.560535
-	-	10	2	13.560530
-	-	-10	5	13.560530
-	-		10	13.560530
-	-		0	13.560535
-	-	0	2	13.560530
-	-	U	5	13.560530
-	-		10	13.560530
-	-		0	13.560535
-	-	10	2	13.560530
-	-	10	5	13.560525
-	-		10	13.560525
-	-		0	13.560535
-	-	20	2	13.560530
-	-	20	5	13.560525
-	-		10	13.560525
-	-		0	13.560535
-	-	20	2	13.560525
-	-	30	5	13.560525
-	-		10	13.560525
-	-		0	13.560520
-	-	40	2	13.560525
-	-	40	5	13.560525
-	-		10	13.560525
-	-		0	13.560520
-	-	F.O.	2	13.560525
-	-	50	5	13.560525
-	-		10	13.560525
Max.Deviation (MHz)	0.000535			0.000534
Max.Deviation (ppm)	39.4543	Max.Dev	iation (ppm)	39.4174
Limit	FS < ±100 ppm	L	imit	FS < ±100 ppm
Test Result	PASS	Test	Result	PASS

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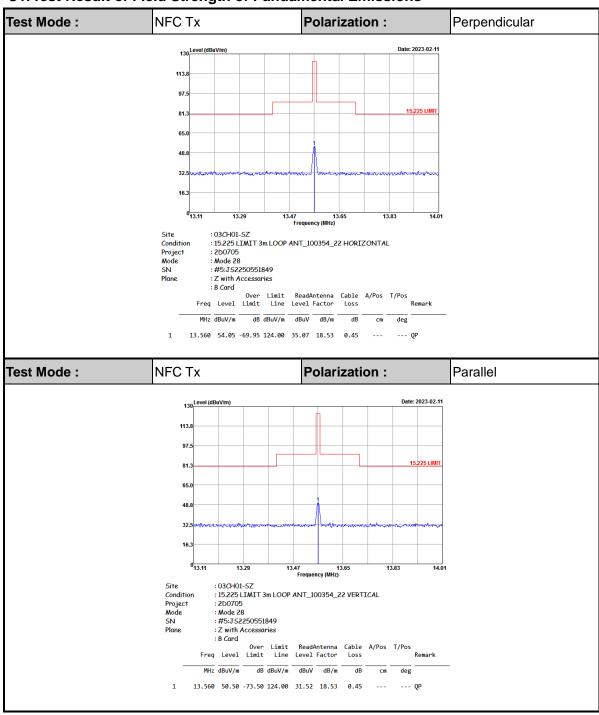
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Appendix C. Test Results of Radiated Test Items

C1. Test Result of Field Strength of Fundamental Emissions



Note:

- 1. Level($dB\mu V/m$) = Read Level($dB\mu V$) + Antenna Factor(dB/m) + Cable Loss(dB)
- 2. Over Limit(dB) = Level(dB μ V/m) Limit Line(dB μ V/m)

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

Test Mode : NFC Tx				Polarization :			Perpendicular		
Frequency	Level	Over	Limit	Read	Antenna	Cable	Ant	Table	Remark
		Limit	Line	Level	Factor	Loss	Pos	Pos	
(MHz)	$(dB\mu V/m)$	(dB)	(dBµV/m)	(dBµV)	(dB)	(dB)	(cm)	(deg)	
0.01119	51.09	-75.54	126.63	31.5	19.54	0.05	-	-	Average
0.07671	43.11	-66.8	109.91	24.15	18.9	0.06	-	-	Average
0.11523	44.62	-61.75	106.37	25.7	18.84	0.08	-	-	Average
0.12657	35.06	-70.5	105.56	16.15	18.83	0.08	-	-	Average
0.50335	39.94	-33.63	73.57	21.09	18.77	0.08	-	-	QP
2.198	36.74	-33.26	70	17.77	18.78	0.19	-	-	QP
15.512	34.73	-35.27	70	15.67	18.58	0.48	-	-	QP
18.781	37.61	-32.39	70	18.4	18.69	0.52	-	-	QP
29.1	35.55	-34.45	70	15.94	18.95	0.66	-	-	QP

Test Mode : NFC Tx			Polariz	ation :	Para	Parallel			
Frequency	Level	Over	Limit	Read	Antenna	Cable	Ant	Table	Remark
		Limit	Line	Level	Factor	Loss	Pos	Pos	
(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB)	(dB)	(cm)	(deg)	
0.00971	50.28	-77.58	127.86	30.63	19.6	0.05	-	-	Average
0.07677	41.8	-68.1	109.9	22.84	18.9	0.06	-	-	Average
0.11535	44.82	-61.54	106.36	25.9	18.84	0.08	-	-	Average
0.12408	34.56	-71.17	105.73	15.64	18.84	0.08	-	-	Average
0.5089	39.72	-33.75	73.47	20.87	18.77	0.08	-	-	QP
2.618	37.5	-32.5	70	18.53	18.77	0.2	-	-	QP
8.688	35.49	-34.51	70	16.49	18.64	0.36	-	-	QP
19.357	36.28	-33.72	70	17.04	18.72	0.52	-	-	QP
25.195	35.43	-34.57	70	15.6	19.24	0.59	-	-	QP

Note:

- 1. 13.56 MHz is fundamental signal which can be ignored.
- 2. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
- 3. Distance extrapolation factor = 40 log (specific distance / test distance) (dB);
- 4. Limit line = specific limits $(dB\mu V)$ + distance extrapolation factor.

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

Test Mode : NFC Tx			Polarizati	ion :	Horizor	Horizontal				
Frequency Level Over Limit Read Antenna Cable Preamp Ant Table Remark										
(MHz)	(dBµV/i	Limit	Line (dBµV/m)	Level	Factor (dB)	Loss (dB)	Factor (dB)	Pos (cm)	Pos (deg)	
96.93	26.63	-16.87	43.5	44.86	14.54	2.03	34.8	-	-	Peak
241.46	27.53	-18.47	46	41.97	17.3	2.96	34.7	-	-	Peak
367.56	32.25	-13.75	46	42.78	20.64	3.39	34.56	-	-	Peak
454.86	27.41	-18.59	46	35.64	22.81	3.46	34.5	-	-	Peak
694.45	26.41	-19.59	46	30.09	27	3.73	34.41	-	-	Peak
953.44	30.09	-15.91	46	30.08	29.78	4.52	34.29	-	-	Peak

Test Mode : NFC Tx					Polarizati	ion :	Vertical	Vertical			
Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark	
(NALL =)	(-ID)//	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos		
(MHz)	(dBµV/m) (dB)	(dBµV/m)	(dBµV)	(dB)	(dB)	(dB)	(cm)	(deg)		
58.13	23.48	-16.52	40	37.62	19.05	1.73	34.92	-	-	Peak	
183.26	26.07	-17.43	43.5	41.24	16.99	2.54	34.7	-	-	Peak	
367.56	30.52	-15.48	46	41.05	20.64	3.39	34.56	-	-	Peak	
454.86	26.19	-19.81	46	34.42	22.81	3.46	34.5	-	-	Peak	
632.37	26.47	-19.53	46	31.18	26.19	3.64	34.54	-	-	Peak	
850.62	28.85	-17.15	46	29.97	28.8	4.38	34.3	-	-	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 μ V/m) = 20 log Emission level (μ V/m).
- 3. Corrected Reading: Antenna Factor + Cable Loss + Read Level Preamp Factor= Level.

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