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Test Report for FCC

Report Number		ESTCFC2009-003(1)		
Applicant	Company name	Xperix Inc.		
	Address	1207, 37, Sagimakgol-ro 62beon-gil, Jungwon-gu, Seongnam-si, Gyeonggi-do, Republic of Korea		
	Telephone	+82-31-710-4941		
	Contact Person	Byoung-Joon Jang		
	Factory address	1207, 37, Sagimakgol-ro 62beon-gil, Jungwon-gu, Seongnam-si, Gyeonggi-do, Republic of Korea		
Product	Product name	Enrollment Scanner		
	Model No.	RealScan-FC	Manufacturer	Xperix Inc.
	Serial No.	NONE	Country of origin	Korea
Test date	31-Jul-20		Date of issued	11-Oct-23
Test location	EMC Test Lab 140-16, Eongmalli-ro, Majang-myeon, Icheon-si, Gyeonggi-do, R. O. Korea			
Standard	FCC PART 15 Subpart B , ANSI C 63.4(2014)			
Test item	■ Conducted Emission	■ Class A ☐ Class B	Test result	OK
	■ Radiated Emission	■ Class A ☐ Class B	Test result	OK
Measurement facility registration number	659627			
Tested by	Test Engineer Hak-Hyun Yeon (Signature)			
Reviewed by	Technical Manager Jin-Mo Yang (Signature)			
Abbreviation	OK, Pass = Complied, Fail = Failed, N/A = not applicable			

* Note
- This report was reissued according to the change applicant, manufacturer and product name from original report. (Report No. : ESTCFC2009-003).
  Reissued without testing as the same product as the original one.
- Basic Model : RealScan-FC, Additional Model(s) : RS-FC
- This test report is not permitted to copy partly without our permission.
- This test report is not related to KOLAS accreditation.
- This test result is dependent on only equipment to be used.
- This test result based on a single evaluation of one sample of the above mentioned.

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1. Laboratory Information

1.1 General

This EUT (Equipment Under Test) has been shown to be capable of compliance with the applicable technical standards and is tested in accordance with the measurement procedures as indicated in this report.ESTECH Lab attests to accuracy of test data. All measurement reported herein were performed by ESTECH Co., Ltd.

ESTECH Lab assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

1.2 Test Lab.

Corporation Name : ESTECH Co., Ltd.

Head Office : Suite 1015 World Meridian II, 123 Gasan Digital 2-ro, Geumcheon-gu, Seoul 153-759, R. O. Korea

EMC Test Lab : 140-16, Eongmalli-ro, Majang-myeon, Icheon-si, Gyeonggi-do, R.O.Korea

1.3 Official Qualification(s)

MSIT : Designated in accordance with the provisions of Radio Waves Act and International Standard ISO/IEC 17025

FCC : Designated with registration number 659627 under APECTEL MRA between the RRA and the FCC.

VCCI : Registrated in the scope of conducted and radiated measurement, (R-20023,T-20023,G-20033 and C-20021)

2. Description of EUT

2.1 Summary of Equipment Under Test

Product	: Enrollment Scanner
Model Number	: RealScan-FC
Serial Number	: NONE
Manufacturer	: Xperix Inc.
Country of origin	: Korea
Sample Receipt Date	: 7-Jul-20
Rating	: Adapter INPUT : AC(100 ~ 240) V, (50 / 60) Hz, 1.0 A Adapter OUTPUT : DC 12 V, 2.5 A EUT INPUT : DC 12 V, 400 mA or DC 5 V, 500 mA
Testing Voltage	: AC 120 V, 60 Hz
Internal clock	: 600 MHz

2.2 General descriptions of EUT

General Information

Can scan various fingerprint images (1, 2, 4 flats, palm and 1 roll).
Can scan high quality image regardless of finger's condition.
Can segment automatically for 4-finger slaps and can detect slippage for flats and rolls.
Can prevent external light, halo effect, and ghost images.
User-friendly Interfaces
① Beep and voice messages alert by the built-in speaker.
Waterproof IP64.
USB 2.0 transmits data.
Use only for UL Listed I.T.E computer(TBD)
Input Power
① 12VDC / 400mA or 5VDC / 500mA

3. Test Standards

Test Standard : FCC PART 15 Subpart B

This Standard sets out the regulations under which an intentional, unintentional, or incidental radiator may be operated without an individual license. It also contains the technical specifications, administrative requirements and other conditions relating to the marketing of Part 15 devices.

Test Method : ANSI C 63.4 (2014)

This standard sets forth uniform methods of measurement of radio-frequency (RF) signals and noise emitted from both unintentional and intentional emitters of RF energy in the frequency range 9 kHz to 40 GHz. Methods for the measurement of radiated and AC power-line conducted radio noise are covered and may be applied to any such equipment unless otherwise specified by individual equipment requirements. These methods cover measurement of certain decides that deliberately radiate energy, such as intentional emitters, but does not cover licensed transmitters. This standard is not intended for certification/approval of avionic equipment or for industrial, scientific, and medical (ISM) equipment These method apply to the measurement of individual units or systems comprised of multiple units

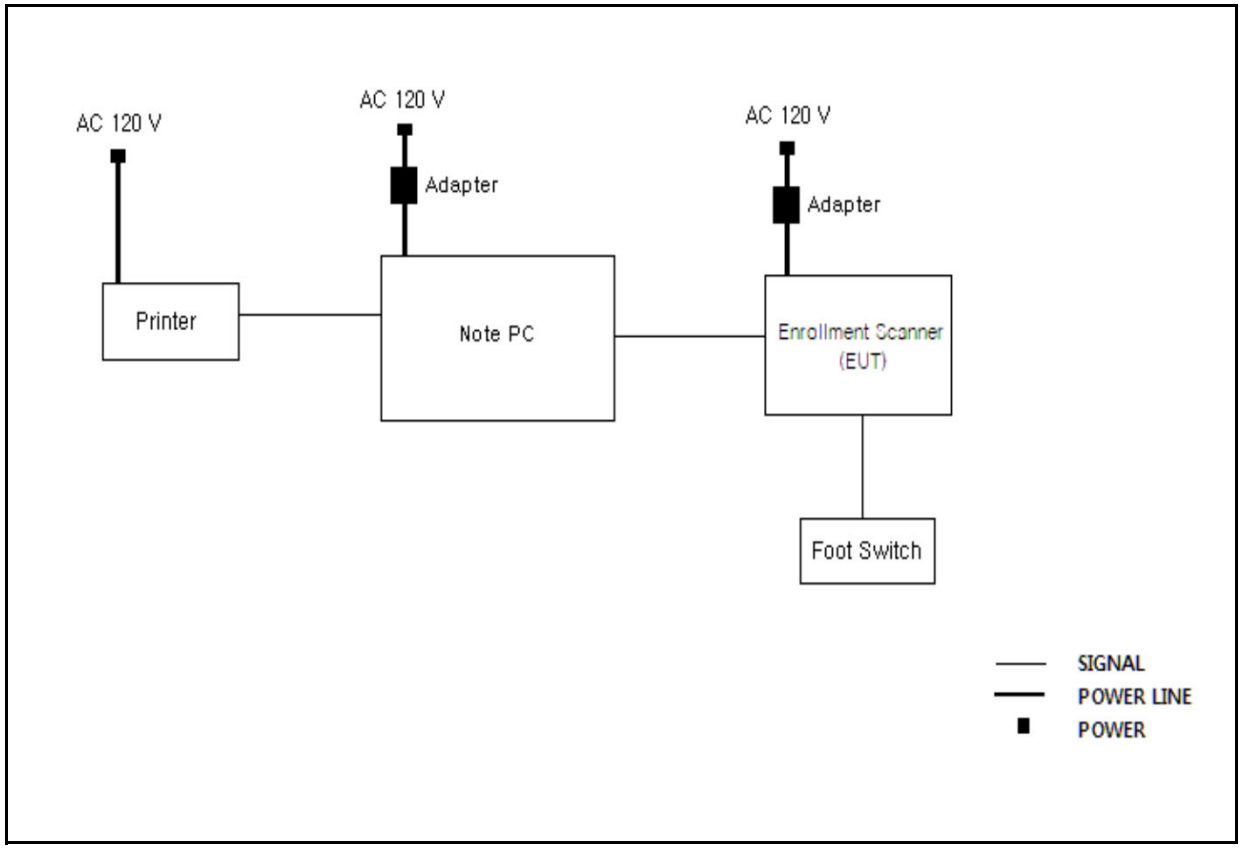
4. Measurement Condition

4.1 EUT Operation.

EUT was in the following mode of operation during all tests.

1. Connected EUT to Note PC.
2. Checked the operation and recognizing fingerprint with the software.
3. Connected Foot Switch to EUT.

4.2 Configuration and Peripherals



4.3 EUT and Support equipment

Equipment Name	Model Name	S/N	Manufacturer	Remark (FCC ID)
Enrollment Scanner	RealScan-FC	NONE	Xperix Inc.	EUT
Adapter	JPW128KA1200F05	NONE	BridgePower Corp.	
Foot Switch	HRF-MX1	NONE	KOREA AUTO CONTROLS CO.,LTD.	
Note PC	P83F	B2S3HX2	Dell Inc.	
Adapter	LA130PM121	NONE	Lite-On Technology (Changzhou) Co., Ltd.	
Printer	K10229	NONE	CANON VIETNAM CO.,LTD.	

4.4 Cable Connecting

Start Equipment		End Equipment		Cable Standard		Remark
Name	I/O port	Name	I/O port	Length(m)	Shielded	
Enrollment Scanner	DC-IN	Adapter	Power	2.0	Shielded	
Enrollment Scanner	USB Type-B	Note PC	USB	1.0	Shielded	
Enrollment Scanner	Connector (2 Pins)	Foot Switch	Connector (2 Pins)	2.0	Unshielded	
Note PC	USB	Printer	USB	2.0	Shielded	
Note PC	DC-IN	Adapter	Power	2.0	Shielded	

5. Measurement of radiated disturbance

Above 30 MHz Electric Field strength was measured in accordance with FCC PART 15 Subpart B. The test setup was made according to ANSI C 63.4 (2014) on an 10 m semi-anechoic chamber, which allows a 3 m distance measurement. The EUT was placed in the center of Plastic table. The height of this table was 0.8 m. The measurement was conducted with both horizontal and vertical antenna polarization. The turntable has fully rotated. For further description of the configuration refer to the picture of the test setup.

5.1 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
Test Receiver	ESCI7	ROHDE & SCHWARZ	100916	9-Sep-20
Logbicon Antenna	VULB 9168	SCHWARZBECK	193	14-Jan-22
Turn Table	DT3000-2t	Innco System GmbH	N/A	N/A
Antenna Mast	MA4000-EP	Innco System GmbH	N/A	N/A
Antenna Master & Turn table controller	CO3000-P	Innco System GmbH	CO3000/1138 /44661018/P	N/A
EMI TEST RECEIVER	ESU	ROHDE & SCHWARZ	100529	6-Nov-20
PREAMPLIFIER	8449B	HP	3008A00581	9-Sep-20
Horn Antenna	BBHA9120D	SCHWARZBECK	469	6-Jan-21
Turn Table	DT1500-S	Innco System GmbH	N/A	N/A
Antenna Mast	MA4640-XP-ET	Innco System GmbH	N/A	N/A
Antenna Master & Turn table controller	CO3000	Innco System GmbH	CO3000/931 /38240516/L	N/A

5.2 Environmental Condition

Below 1 GHz -Test Place : 10 m Semi-anechoic chamber

Temperature (°C) : 22.5 ℃

Humidity (% R.H.) : 51.8 % R.H.

Above 1 GHz-Test Place : 3 m Semi-anechoic chamber

Temperature (°C) : 22.0 ℃

Humidity (% R.H.) : 51.9 % R.H.

5.3 Test data (Below 1 GHz)

Test Date : 31-Jul-20 Measurement Distance : 10 m

Frequency (MHz)	Reading (dBμV)	Position (V/H)	Height (m)	Correction Factor		Result Value(Quasi-peak)		
				Ant Factor (dB)	Cable (dB)	Limit (dBμV/m)	Result (dBμV/m)	Margin (dB)
36.70	16.70	V	1.0	12.12	0.88	39.50	29.70	9.80
74.20	14.98	V	1.0	11.86	1.30	39.50	28.14	11.36
153.70	11.52	V	1.0	13.05	1.88	43.50	26.45	17.05
209.50	21.61	V	1.0	9.91	2.26	43.50	33.78	9.72
353.30	14.60	H	3.6	14.27	2.99	46.50	31.86	14.64
480.00	15.08	V	1.0	17.50	3.51	46.50	36.09	10.41

Remark	H : Horizontal, V : Vertical *Result Value = Reading + Ant Factor + Cable loss *Margin= Limit - Result *The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection

5.4 Test data (Above 1 GHz)

Test Date : 31-Jul-20 Measurement Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Position (V/H)	Height (m)	Correction Factor		Result Value		
				Ant Factor (dB)	Cable (dB)	Limit (dBμV/m)	Result (dBμV/m)	Margin (dB)
Peak(RBW:1 MHz VBW:1 MHz)								
1264.00	45.77	H	1.0	25.46	-32.09	80.00	39.14	40.86
1264.00	48.29	V	1.0	25.46	-32.09	80.00	41.66	38.34
1548.00	45.40	H	1.0	25.21	-31.38	80.00	39.23	40.77
1548.00	47.28	V	1.0	25.21	-31.38	80.00	41.11	38.89
1834.00	47.83	H	1.0	25.60	-30.96	80.00	42.47	37.53
1834.00	44.55	V	1.0	25.60	-30.96	80.00	39.19	40.81
Average(RBW:1 MHz VBW:10 Hz)								
1264.00	37.47	H	1.0	25.46	-32.09	60.00	30.84	29.16
1264.00	35.79	V	1.0	25.46	-32.09	60.00	29.16	30.84
1548.00	38.09	H	1.0	25.21	-31.38	60.00	31.92	28.08
1548.00	38.99	V	1.0	25.21	-31.38	60.00	32.82	27.18
1834.00	36.18	H	1.0	25.60	-30.96	60.00	30.82	29.18
1834.00	36.79	V	1.0	25.60	-30.96	60.00	31.43	28.57

Remark

H : Horizontal, V : Vertical
* Result Value = Reading + Ant Factor + Cable loss - Amplifier Gain
* Margin= Limit - Result
* This test was performed up to 6 GHz because the highest operating frequency is less than 1 GHz.
*Application method of the highest frequency is in the following
*Highest frequency of the EUT is less than 108 MHz, the measurement shall only be made up to 1 GHz.
*Highest frequency of the EUT is between 108 MHz and 500 MHz, the measurement shall only be made up to 2 GHz.
*Highest frequency of the EUT is between 500 MHz and 1 GHz, the measurement shall only be made up to 5 GHz.
*Highest frequency of the EUT is above 1 GHz, the measurement shall be made up to 5 times the highest frequency or 40 GHz,

6. Measurement of conducted disturbance

The continuous disturbance voltage of AC Mains in the frequency from 0.15 MHz to 30 MHz was measured in accordance to FCC PART 15 Subpart B . The test setup was made according to ANSI C 63.4 (2014) in a shielded room. The EUT was placed on a non-conductive table at least 0.8 m above the ground plan. A grounded vertical reference plane was positioned in a distance of 0.4 m from the EUT. The distance from the EUT to other metal surfaces was at least 0.8 m. The EUT was only earthen by its power cord through the line impedance stabilizing network. The power cord has been bundled to a length of 1.0 m. The test receiver with Quasi Peak detector complies with CISPR 16.

6.1 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
Pulse Limiter	ESH3-Z2	ROHDE & SCHWARZ	NONE	9-Sep-20
TEST Receiver	ESPI	ROHDE & SCHWARZ	100005	9-Sep-20
LISN	ENV216	ROHDE & SCHWARZ	101231	9-Sep-20
LISN	NNLK8121	SCHWARZBECK	#695	19-Aug-20

6.2 Environmental Condition

Test Place : **Shielded Room**

Temperature (°C) : 21.3 ℃

Humidity (% R.H.) : 51.1 % R.H.

6.3 Test data

Test Date : 31-Jul-20

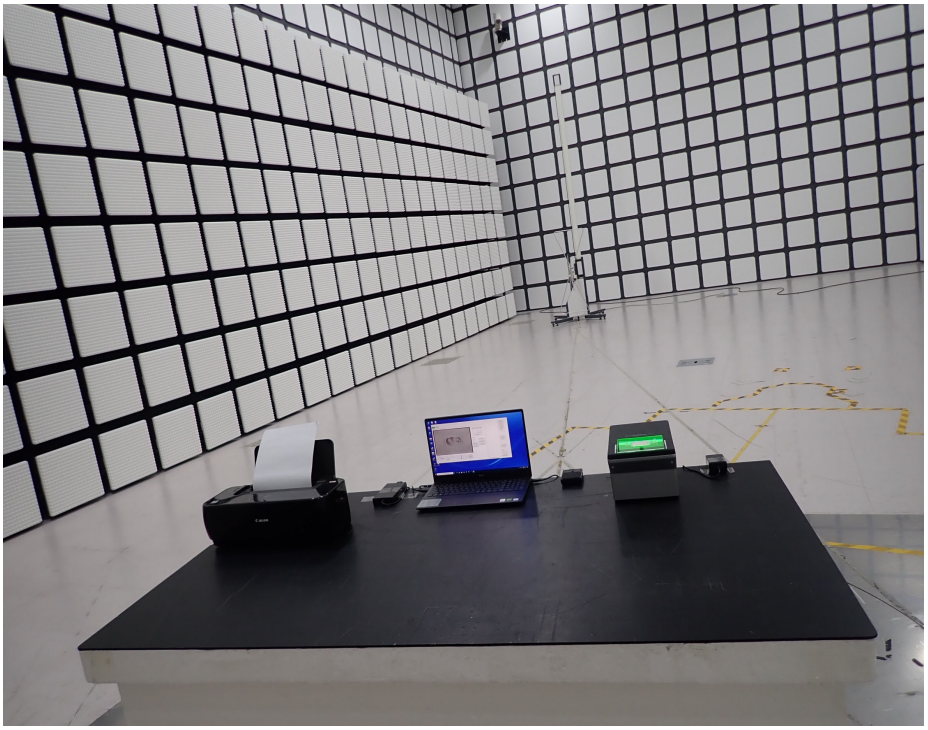
Frequency (MHz)	Correction Factor		Line (H/N)	Quasi-peak Value			Cispr Average Value		
	Lisn (dB)	Cable (dB)		Limit (dBμV)	Reading (dBμV)	Result (dBμV)	Limit (dBμV)	Reading (dBμV)	Result (dB)
0.20	0.04	0.16	H	79.00	49.25	49.45	66.00	41.01	41.21
0.61	0.03	0.17	H	73.00	46.72	46.92	60.00	46.97	47.17
0.68	0.03	0.17	H	73.00	46.16	46.36	60.00	46.40	46.60
7.02	0.12	0.31	N	73.00	42.24	42.67	60.00	41.67	42.10
7.62	0.13	0.31	N	73.00	42.25	42.69	60.00	42.04	42.48
7.69	0.12	0.31	H	73.00	42.61	43.04	60.00	42.15	42.58

Remark	H : Hot Line, N : Neutral Line *Correction Factor = Lisn + Cable *Result = Correction Factor + Reading

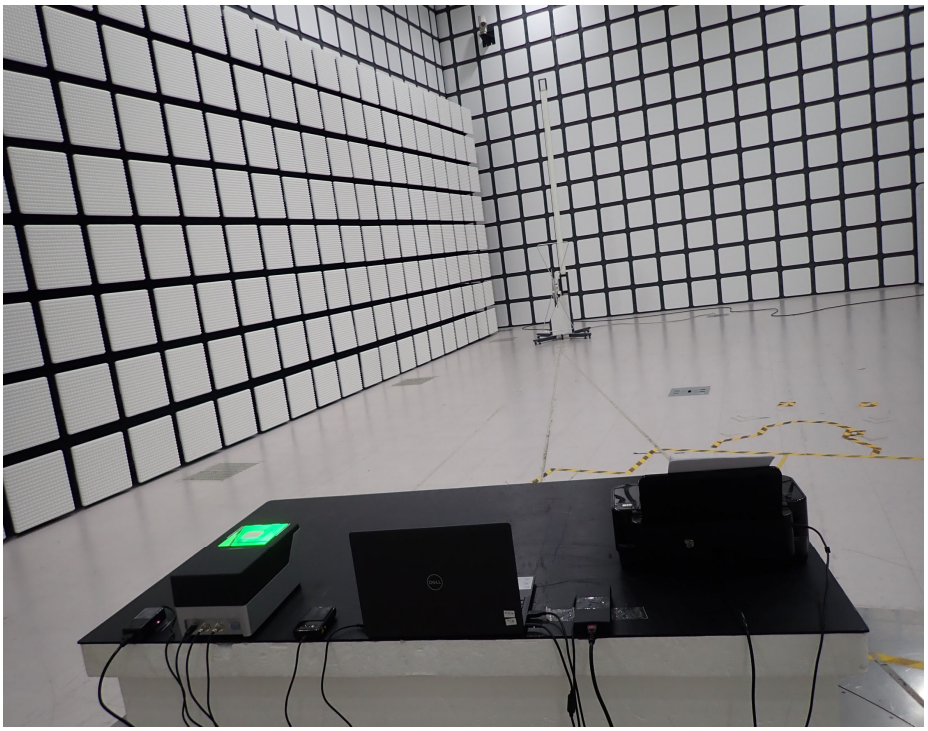
7. Photographs of test setup

7.1 Setup for Radiated Test : (30 ~ 1 000) MHz

[Front]

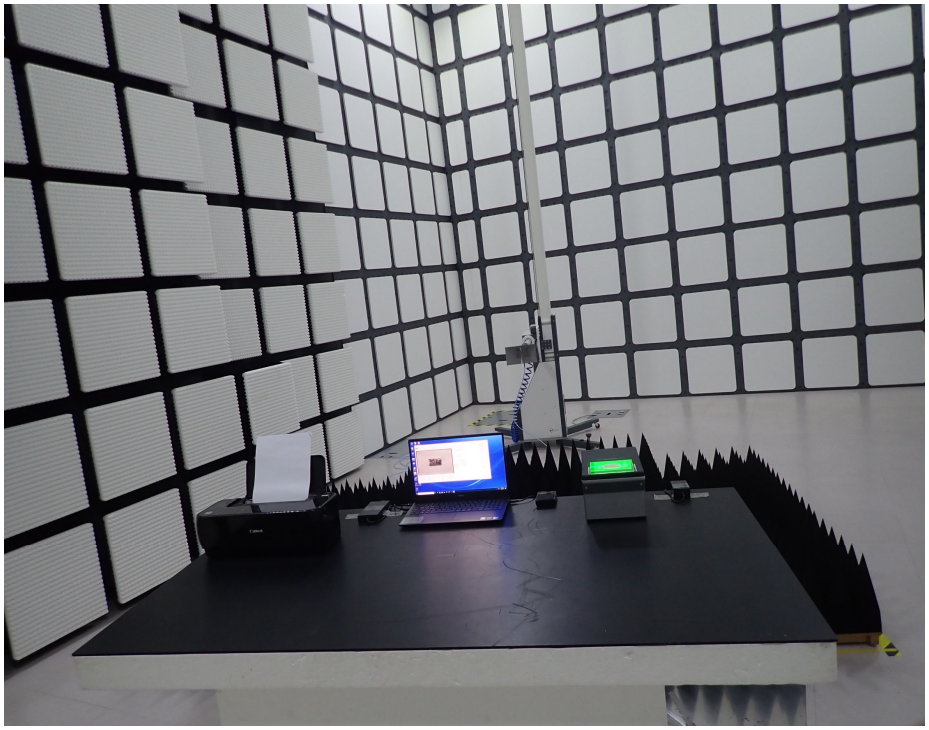


[Rear]

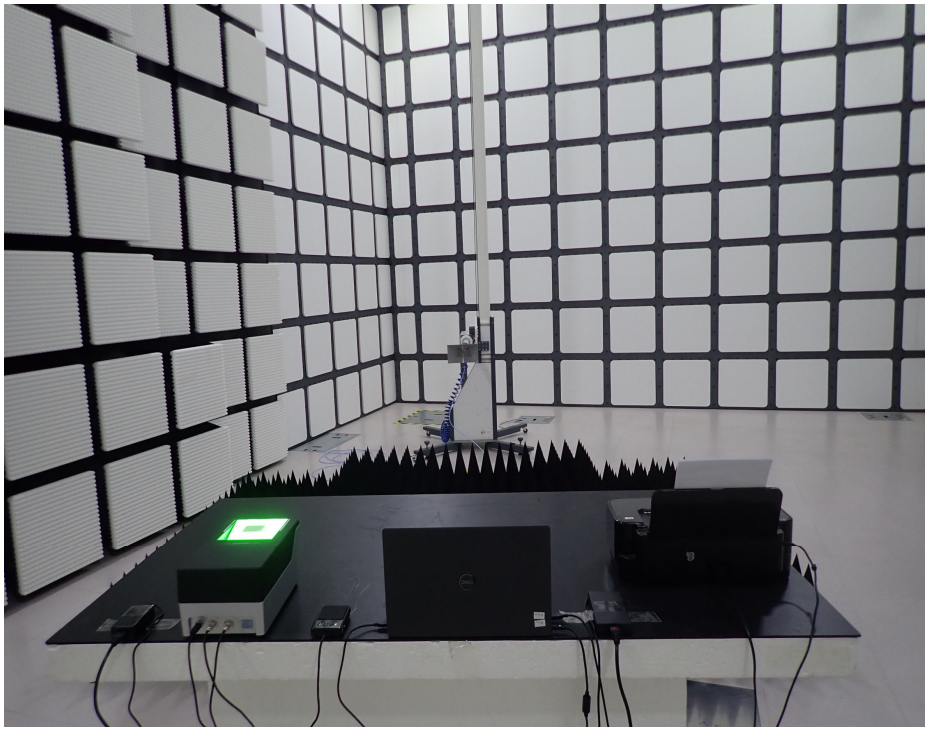


7.2 Setup for Radiated Test : above 1 GHz

[Front]

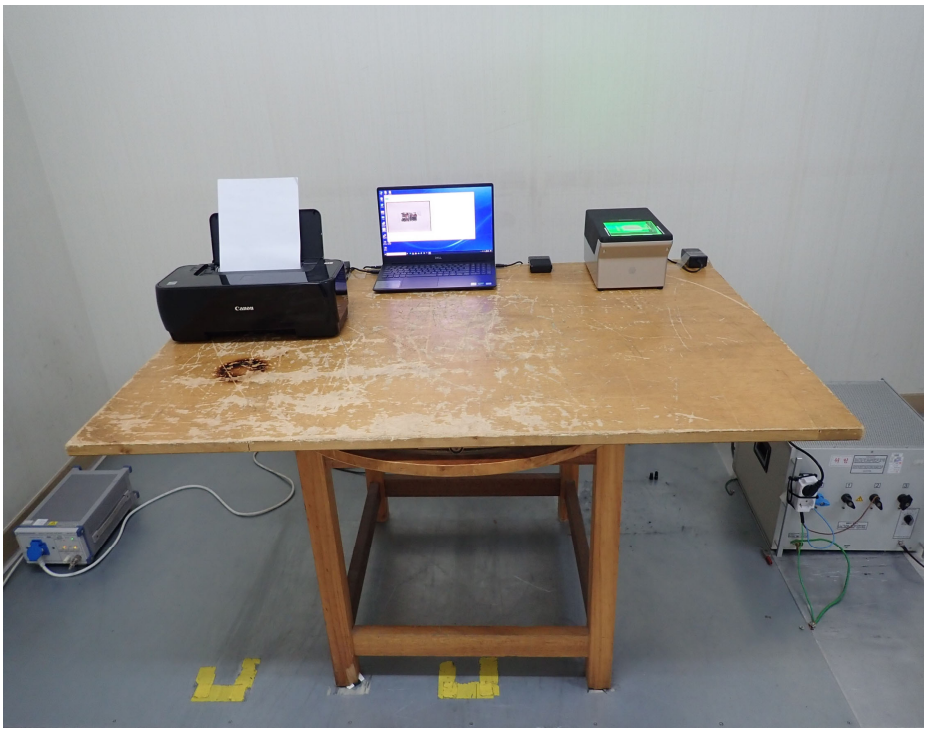


[Rear]



7.3 Setup for Conducted Test : (0.15 ~ 30) MHz

[Front]

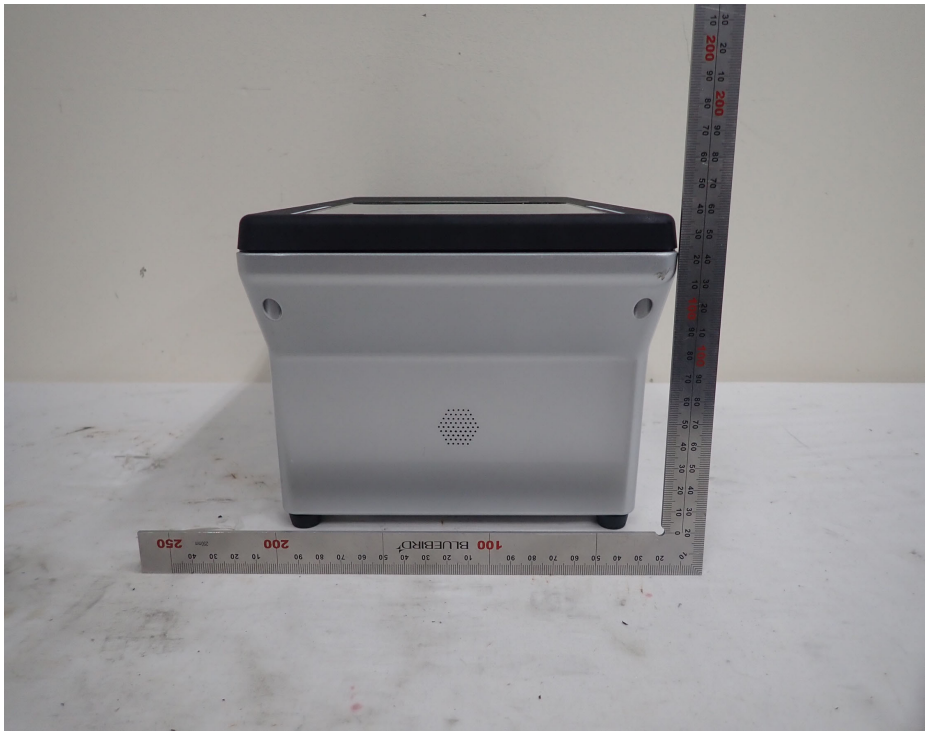


[Rear]

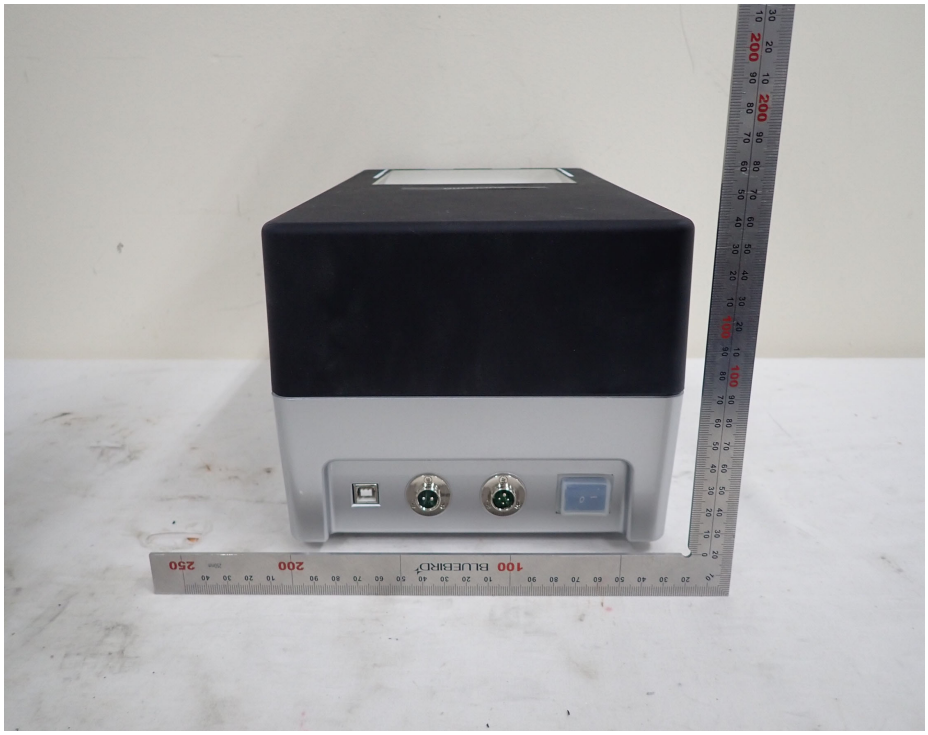


8. Photographs of EUT

[Front]



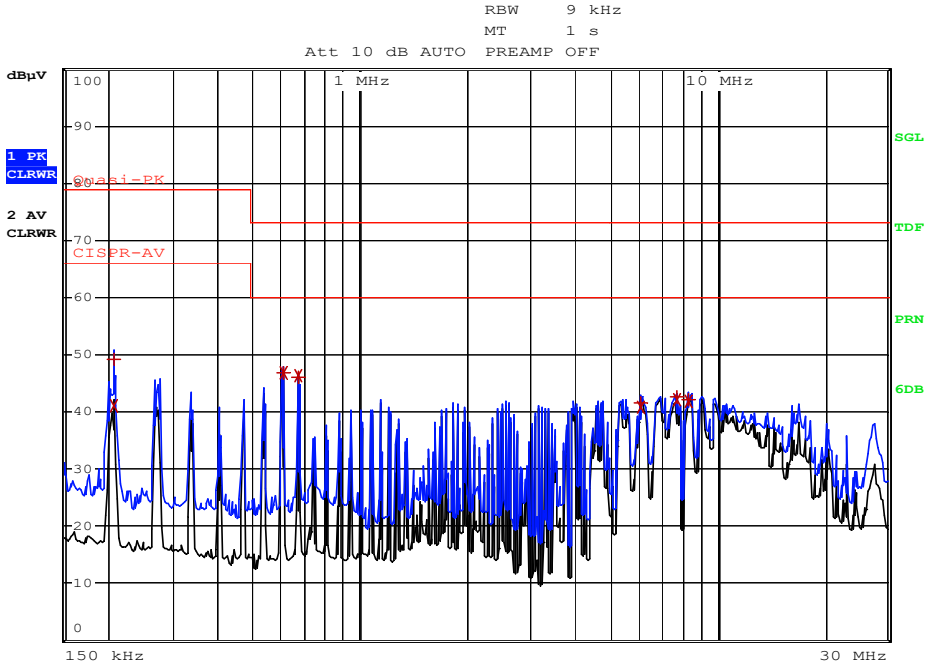
[Rear]



Appendix 1. Test data graphs

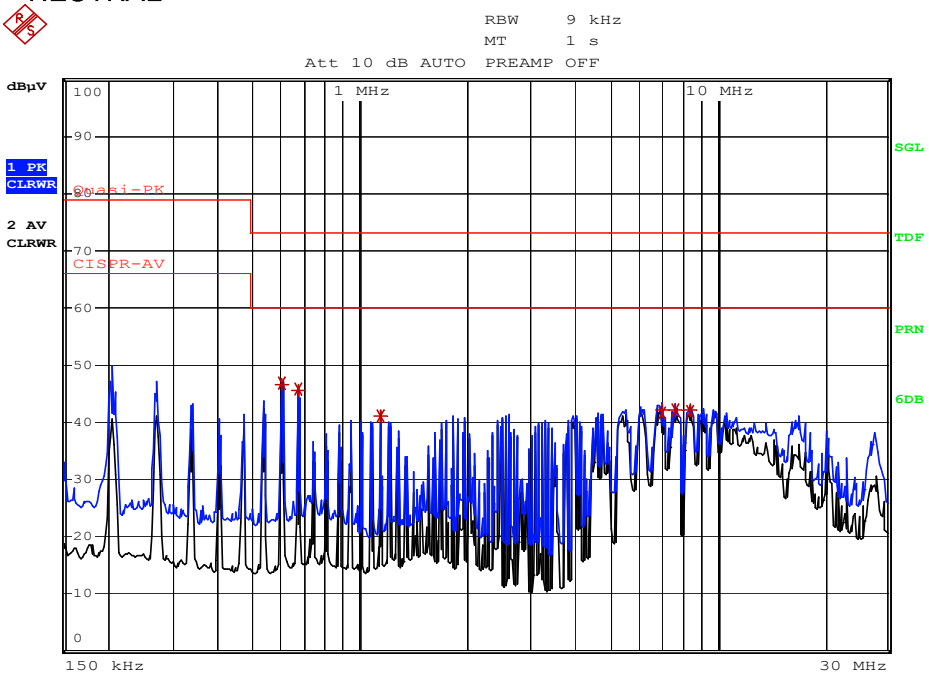
* conducted emission

* Hot



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Date: 31.JUL.2020 18:21:42

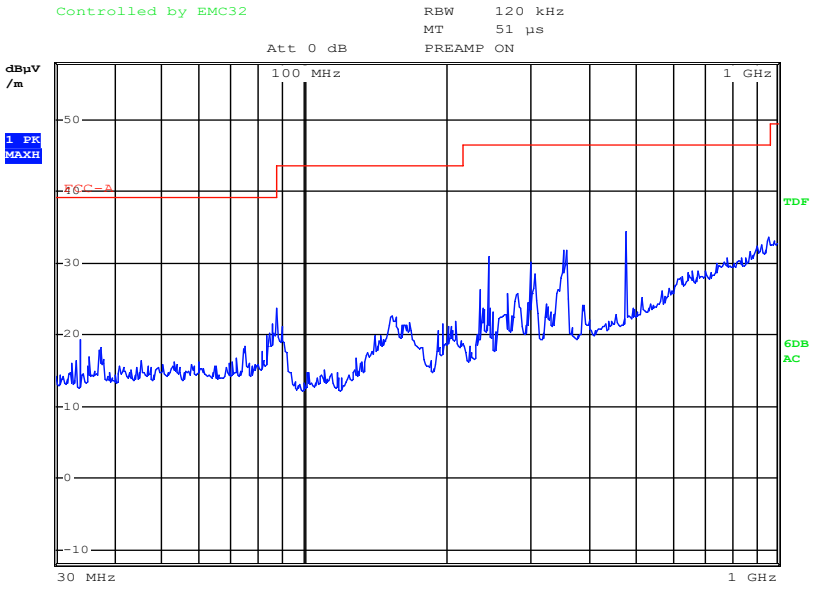
*NEUTRAL



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Date: 31.JUL.2020 18:29:18

* radiated emission (below 1 GHz)

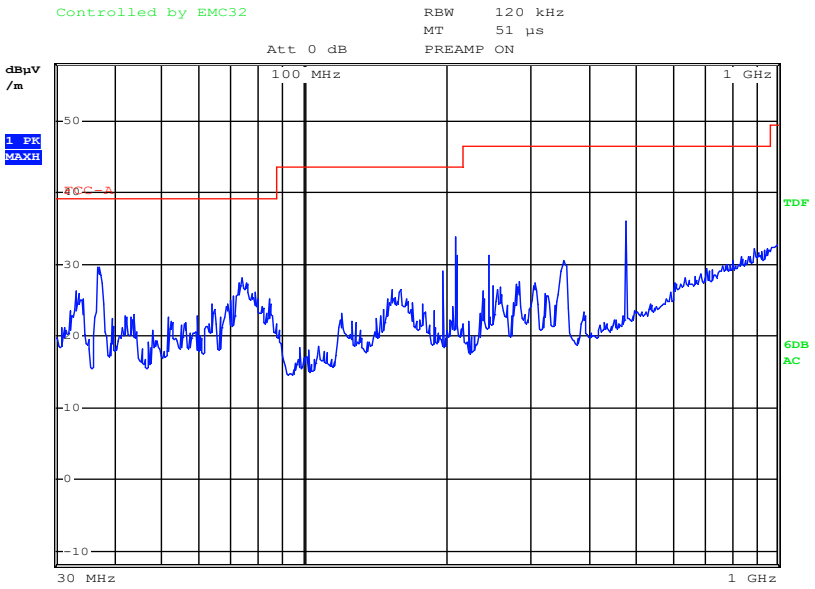
*HORIZONTAL



ESTC-20-00900-H

Date: 31.JUL.2020 17:21:59

*VERTICAL

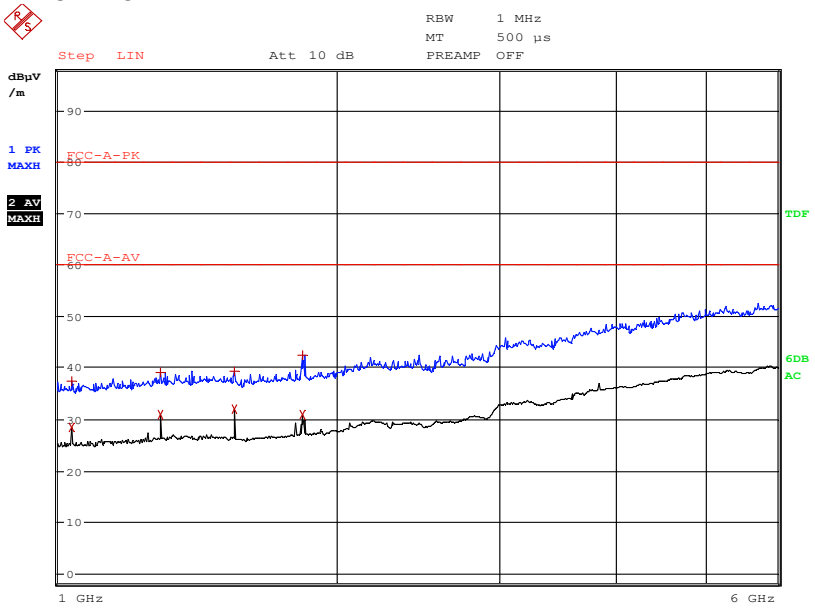


ESTC-20-00900-V

Date: 31.JUL.2020 17:15:26

* radiated emission (above 1 GHz)

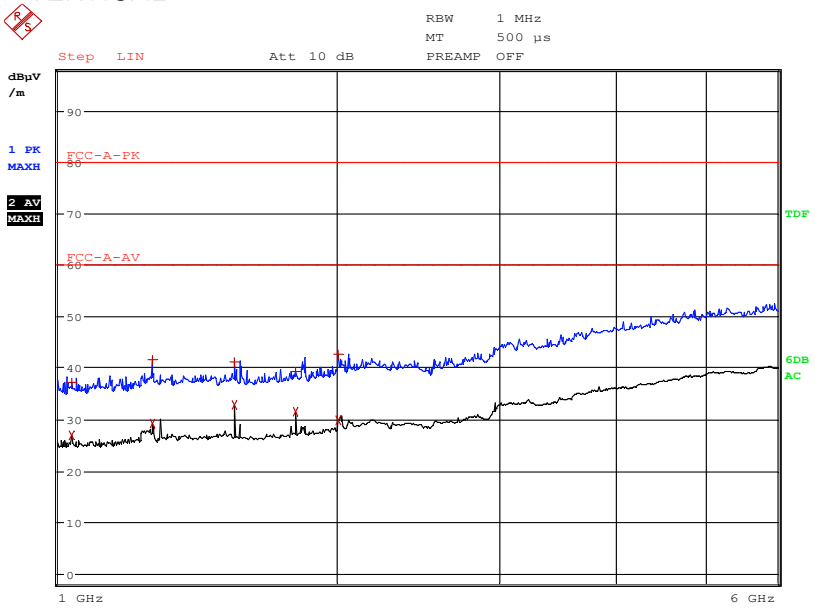
*HORIZONTAL



ESTC-20-00900-H

Date: 31.JUL.2020 19:26:58

*VERTICAL



ESTC-20-00900-V

Date: 31.JUL.2020 19:21:44