Compliance Laboratory

Test Report

Applicant:	Tyco Safety Products（Shanghai）Co., Ltd.
Product Name:	IP CAMERA
Brand Name:	TYCO
Model No.:	ISV-X04N005SAF,ISA-X04N005SAF,ISV-X02N005SAF, ISA-X02N005SAF,ISV-X02N004S,ISV-X02N003S, ISV-X05N004S
Model Difference:	There are some differences in appearance, color, screen printing and structure between models, and the internal key hardware is consistent without affecting EMC.
Remark:	Provision is made on the basis of the original report, MTE/AVJ/E18071389 basis; Changed applicant, manufacturer, trademark, product name and model.
Date of Receipt :	Jul.20, 2018 Jul.01, 2020
Date of Test:	Jul.23-25, 2018
Date of Report:	Jul.02, 2020
Prepared by:	Shenzhen Most Technology Service Co., Ltd.

The EMC testing has been performed on the submitted samples and found in compliance with the council EMC directive 2014/30/EU.

Shenzhen Most Technology Service Co., Ltd.
No.5, 2nd Langshan Road, North District, Hi-tech Industry Park,
Nanshan, Shenzhen, Guangdong, China
Phone: 86-755-86026850
Fax: 86-755-26013350
http:// www.szmost.com

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TEST REPORT DECLARATION

Report Number	MTET20071034	
Applicant	Tyco Safety Products（Shanghai）Co., Ltd.	
	Zone B, Building 2, 88 Wansong Road, Shuyuan Town, Pudong New District, Shanghai, China	
Manufacturer	Tyco Safety Products（Shanghai）Co., Ltd.	
	Zone B, Building 2, 88 Wansong Road, Shuyuan Town, Pudong New District, Shanghai, China	
Product	Product Name	IP CAMERA
	Model No.	ISV-X04N005SAF
	Power Supply	DC 12V by DC Source
Test Result	The EUT was found compliant with the requirement(s) of the standards.	
Standard	EN 55032:2015, EN 55035:2017 (IEC 61000-4-2:2008, IEC 61000-4-3:2006+A1:2007+A2:2010, IEC 61000-4-4:2012, IEC 61000-4-5:2014+A1:2017, IEC 61000-4-6:2013, IEC 61000-4-8:2009)	

*Note

The above device has been tested by Shenzhen Most Technology Service Co., Ltd. To determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The test record, data evaluation & Equipment Under Test (EUT) configurations represented are contained in this test report and Shenzhen Most Technology Service Co., Ltd. Is assumed full responsibility for the accuracy and completeness of test. Also, this report shows that the EUT is technically compliant with the requirement of the above standards.

This report applies to above tested sample only. This report shall not be reproduced except in full, without written approval of Shenzhen Most Technology Service Co., Ltd., this document may be altered or revised by Shenzhen Most Technology Service Co., Ltd., personal only, and shall be noted in the revision of the document.

Prepared by	Lili Lu
	Lili Lu(Engineer)
Reviewed by	Sunny
	Sunny Deng(Engineer)
Approved by	
	Yvette Zhou(Manager)

SHENZHEN MOST TECHNOLOGY SERVICE CO., LTD. APPROVED

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

Description	:	IP CAMERA
Model Number	:	ISV-X04N005SAF
Remark	:	Used ISV-X04N005SAF does all tests

1.2. Operational Mode(s) of EUT

Order Number	:	Test Mode(s)
1	:	Running
2	:	Ping

1.3. Test Voltage(s) of EUT

Order Number	:	Test Voltage(s)
1	:	DC 12V by DC Source

2. DESCRIPTION OF TEST STANDARD

The intention of this publication is to establish uniform requirements for the radio disturbance level of the equipment contained in the scope, to fix limits of disturbance, to describe methods of measurement and to standardize operating conditions and interpretation of results.

The following referenced standard are indispensable for the application of this report.

Referenced Description below:

EN 55032:2015
Information Technology Equipment-Radio disturbance characteristics-Limits and methods of measurement.

EN 55035:2017
Information technology equipment - Immunity characteristics - Limits and methods of measurement.

3. LABORATORY INFORMATION

3.1. Laboratory Name

Shenzhen Most Technology Service Co., Ltd.

3.2. Location

No.5, 2nd Langshan Road, North District, Hi-tech Industrial Park, Nanshan, Shenzhen, Guangdong, China

3.3. Test facility

3m Anechoic Chamber	:	Nov. 28, 2012 File on Federal Communication Commission Registration Number:490827
Shielding Room	:	Nov. 28, 2012 File on Federal Communication Commission Registration Number:490827
EMC Lab.	:	Accredited by TUV Rheinland Shenzhen Audit Report: UA 50149851 Mar. 12, 2009 Accredited by Industry Canada Registration Number: 7103A-1 Oct. 22, 2012 Accredited by TIMCO Registration Number: Q1460 March 28, 2010

3.4. Measurement Uncertainty

No.	Item	Uncertainty
1.	Uncertainty for Conducted Disturbance Test	1.25dB
2.	Uncertainty for Radiated Disturbance Test	3.15dB

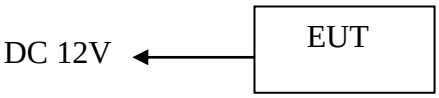
4. SUMMARY OF TEST RESULTS

EMISSION			
Test Item	**Standard**	**Limits**	**Results**
Conducted disturbance at mains terminals	EN 55032:2015	Class B	N/A
Conducted disturbance at telecommunication ports terminals test	EN 55032:2015	Class B	PASS
Radiated disturbance	EN 55032:2015	Class B	PASS
Conducted Emissions From Asymmetric Mode	EN 55032:2015	Class B	N/A
Conducted Differential Voltage Emissions	EN 55032:2015	Class B	N/A
Harmonic current emissions	EN IEC 61000-3-2:2019	---	N/A
Voltage fluctuations & flicker	EN 61000-3-3:2013+A1:2019	---	N/A
IMMUNITY (EN 55035:2017)			
Test Item	**Basic Standard**	**Performance Criteria**	**Results**
Electrostatic discharge (ESD)	IEC 61000-4-2:2008	B	PASS
Radio-frequency, Continuous radiated disturbance	IEC 61000-4-3:2006 +A1:2007+A2:2010	A	PASS
Electrical fast transient (EFT)	IEC 61000-4-4:2012	B	N/A
Surge (Input d.c. power ports)	IEC 61000-4-5:2014+A1:2017	B	N/A
Surge (Telecommunication ports)		B	N/A
Radio-frequency, Continuous conducted disturbance	IEC 61000-4-6:2013	A	N/A
Power frequency magnetic field	IEC 61000-4-8:2009	A	PASS
Voltage dips, >95% reduction	IEC 61000-4-11:2020	B	N/A
Voltage dips, 30% reduction		C	N/A
Voltage interruptions		C	N/A
N/A is an abbreviation for Not Applicable.			

5. BLOCK DIAGRAM OF TEST SETUP

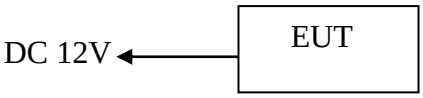
The equipments are installed test to meet EN55032requirement and operating in a manner which tends to maximize its emission characteristics in a normal application. EUT was tested in normal configuration (Please See following Block diagrams)

5.1. Block Diagram of connection between EUT and simulation-EMI



(EUT: IP CAMERA)

5.2. Block Diagram of connection between EUT and simulation-EMS



(EUT: IP CAMERA)

6. TEST INSTRUMENT USED

6.1. For Conducted Disturbance at Mains Terminals Emission Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI	100492	Mar. 10, 18	1 Year
2.	L.I.S.N.	Rohde & Schwarz	ENV216	100093	Mar. 10, 18	1 Year
3.	Coaxial Switch	Anritsu Corp	MP59B	6200283933	Mar. 10, 18	1 Year
4.	Terminator	Hubersuhner	50Ω	No.1	Mar. 10, 18	1 Year
5.	RF Cable	SchwarzBeck	N/A	No.1	Mar. 10, 18	1 Year

6.2. For Radiation Test (In Anechoic Chamber)

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESPI	101202	Mar. 10, 18	1 Year
2.	Bilog Antenna	Sunol	JB3	A121206	Mar. 10, 18	1 Year
3.	Cable	Resenberger	N/A	NO.1	Mar. 10, 18	1 Year
4.	Cable	SchwarzBeck	N/A	NO.2	Mar. 10, 18	1 Year
5.	Cable	SchwarzBeck	N/A	NO.3	Mar. 10, 18	1 Year
6.	DC Power Filter	DuoJi	DL2×30B	N/A	N/A	N/A
7.	Single Phase Power Line Filter	DuoJi	FNF 202B30	N/A	N/A	N/A
8.	3 Phase Power Line Filter	DuoJi	FNF 402B30	N/A	N/A	N/A

6.3. For Harmonic / Flicker Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	AC Power Source	Kikusui	AC40MA	LM003232	Mar. 10, 18	1 Year
2.	Test Analyzer	Kikusui	KHA1000	LM003720	Mar. 10, 18	1 Year
3.	Line Impendence Network	Kikusui	LIN40MA-PCR-L	LM002352	Mar. 10, 18	1 Year

6.4. For Electrostatic Discharge Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	ESD Tester	Zhongsheng	ESD-203AX	023K14538	Mar. 10, 18	1 Year

6.5. For RF Strength Susceptibility Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Signal Generator	IFR	2032	203002/100	Mar. 10, 18	1 Year
2.	Amplifier	A&R	150W1000	301584	NCR	NCR
3.	Dual Directional Coupler	A&R	DC6080	301508	Mar. 10, 18	1 Year
4.	Power Sensor	Anritsu	MA2491A	32263	Mar. 10, 18	1 Year
5.	Power Meter	R&S	NRVS	100444	Mar. 10, 18	1 Year
6.	Field Monitor	A&R	FM5004	300329	Mar. 10, 18	1 Year
7.	Field Probe	A&R	FP5000	300221	Mar. 10, 18	1 Year
8.	Log-periodic Antenna	A&R	AT1080	16512	Mar. 10, 18	1 Year
9.	RF Cable	MIYAZAKI	N/A	No.1/No.2	Mar. 10, 18	1 Year

6.6. For Electrical Fast Transient/Burst Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMCPRO System	EM Test	UCS-500-M4	V0648102026	Mar. 10, 18	1 Year

6.7. For Surge Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMCPRO System	EM Test	UCS-500-M4	V0648102026	Mar. 10, 18	1 Year

6.8. For Injected Currents Susceptibility Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Signal Generator	IFR	2032	203002/100	Mar. 10, 18	1 Year
2.	Amplifier	A&R	150W1000	301584	NCR	NCR
3.	CDN	FCC	FCC-801-M2-25	47	Mar. 10, 18	1 Year
4.	CDN	FCC	FCC-801-M3-25	107	Mar. 10, 18	1 Year
5.	EM Injection Clamp	FCC	F-203I-23mm	403	Mar. 10, 18	1 Year
6.	RF Cable	MIYAZAKI	N/A	No.1/No.2	Mar. 10, 18	1 Year

6.9. For Magnetic Field Immunity Test

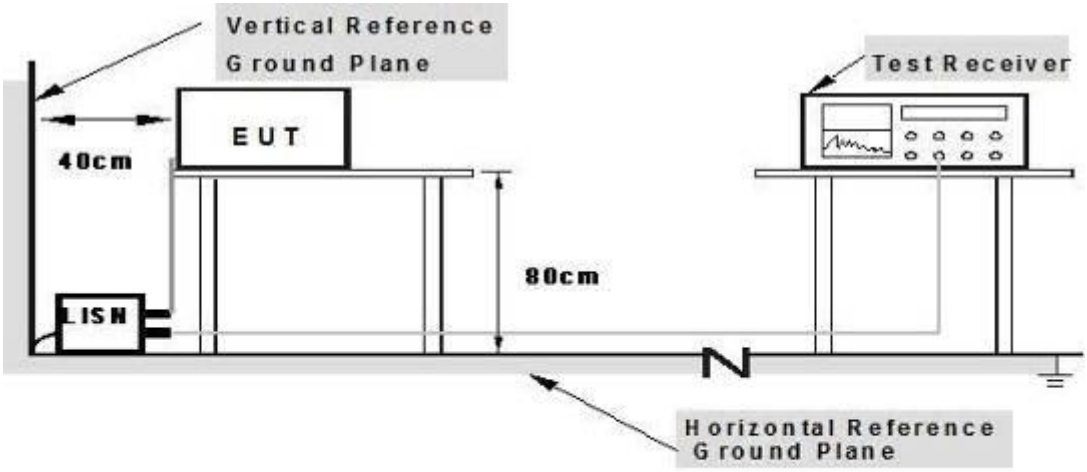
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMCPRO System	EM Test	UCS-500-M4	V0648102026	Mar. 10, 18	1 Year

6.10. For Voltage Dips and Interruptions Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMCPRO System	EM Test	UCS-500-M4	V0648102026	Mar. 10, 18	1 Year

7. CONDUCTED DISTURBANCE AT MAINS TERMINALS TEST

7.1. Configuration of Test System



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

7.2. Test Standard

EN 55032:2015

7.3. Power Line Conducted Disturbance at Mains Terminals Limit

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Notes: 1. * Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

7.4. Test Procedure

The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT Power connected to the power mains through a line impedance stabilization network (L.I.S.N. 1#). This provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). The other peripheral devices power cord connected to the power mains through a line impedance stabilization network (L.I.S.N.#2). Both sides of power line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to EN 55032 Class B on conducted Disturbance test.

The bandwidth of test receiver is set at 9kHz.

The frequency range from 150kHz to 30MHz is checked. The test result are reported on Section 7.5.

7.5. Conducted Disturbance at Mains Terminals Test Results

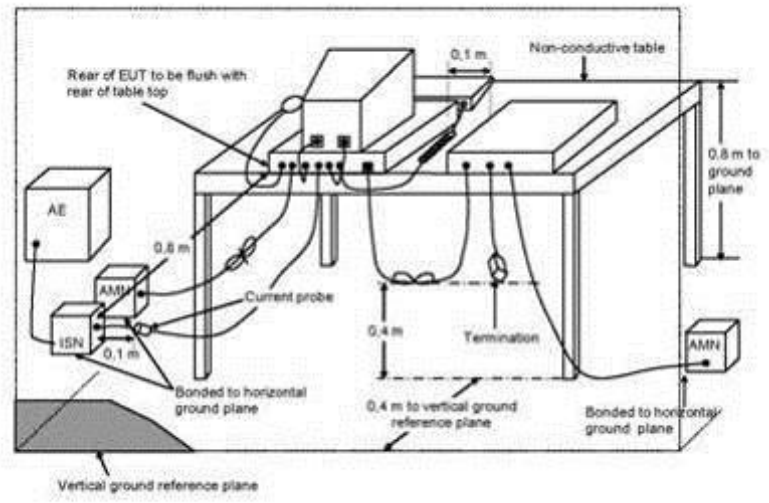
7.5.1. Test Results: **N/A**

7.5.2. If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

7.5.3. Emission Level= Correct Factor + Reading Level.

8. CONDUCTED DISTURBANCE AT TELECOMMUNICATION PORTS TERMINALS TEST

8.1. Configuration of Test System



8.2. Test Standard

EN 55032:2015

8.3. Conducted Disturbance at Telecommunication port Limit

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz ~ 500kHz	84 to 74	74 to 64
500kHz ~ 30MHz	74	64

Notes: 1. The lower limit shall apply at the transition frequencies.
2. The limits decrease linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

8.4. Operating Condition of EUT

8.4.1.Environmental Conditions:

Ambient Temperature: 26℃, Relative Humidity: 60 %

8.4.2.Setup the EUT and the simulators as shown on Section 5.1.

8.4.3.Turn on the power of all equipments.

8.4.4.Let the EUT work in POE transmission mode and test it.

8.5. Test Procedure

The EUT was placed on a non-metallic table, 80cm above the ground plane. ISN are used for measurements on telecom ports, they shall be nominally 0.8m from the EUT and bonded to a ground reference plane, other units of the equipment under test shall be at least 0.8m form the ISN, an ISN is connected to a telecommunications port during the measurement of conducted disturbances at the mains port,then ISN receiver port shall be teminated in 50-ohm and the LCL Shall be representative of the telecommunications network to which that port attaches, In order to make reliable emission measurements representative of high LAN utilization it is only necessary to create a condition of LAN utilization in excess of 10% and sustain that and pseudo-random messages in order to emulate realistic types of data transmission. If the LAN maintains transmission during idle periods measurements shall also be made during idle periods.

The bandwidth of test receiver is set at 9 kHz.

The frequency range from 150kHz to 30MHz is checked. The test result are reported on Section 8.6.

8.6. Conducted Disturbance At Telecommunication Ports Terminals Test Results

8.6.1.Test Results: **PASS.**

8.6.2.If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

8.6.3.Emission Level= Correct Factor + Reading Level.

8.6.4.The test data and the scanning waveform are attached within Appendix I.

9. RADIATED DISTURBANCE TEST

9.1. Configuration of Test System

Radiated Emission Test Set-Up Frequency Below 1 GHz

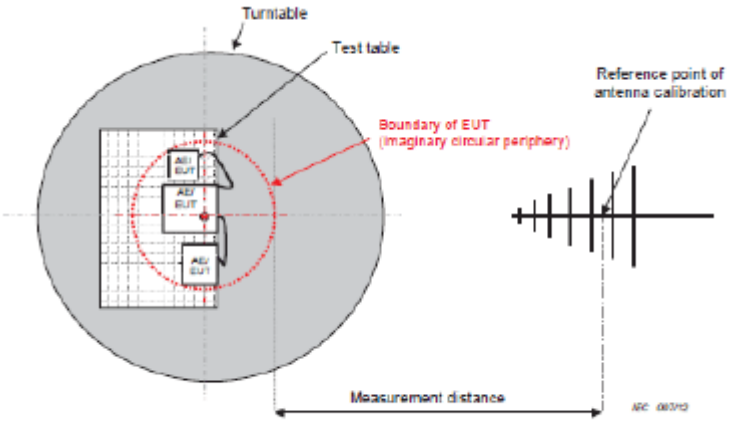


Figure C.1 – Measurement distance

Radiated Emission Test Set-Up Frequency Above 1GHz

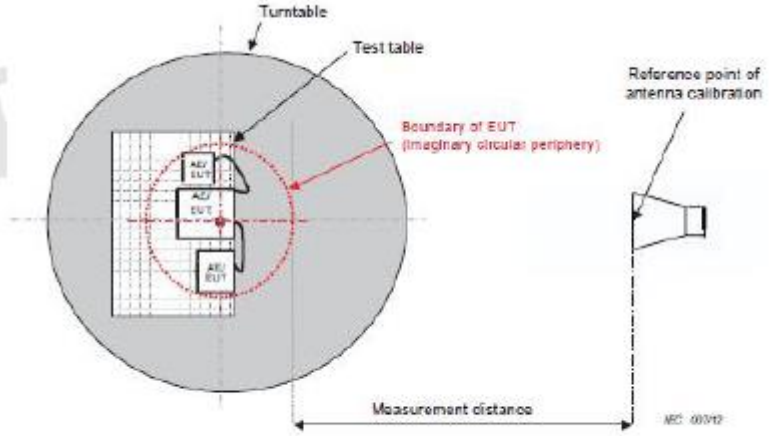


Figure C.1 – Measurement distance

9.2. Test Standard

EN 55032:2015

9.3. Radiated Disturbance Limit

All emanations from a Class B computing devices or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified below:

FREQUENCY (MHz)	Distance (m)	Detector type/ bandwidth	Class A dBuV/m	Class B dBuV/m
30 - 230	3	Quasi peak/ 120 kHz	50	40
230 - 1000	3	Quasi peak/ 120 kHz	57	47
1000-3000	3	Peak/1 MHz	76	70
3000-6000	3	Peak/1 MHz	80	74
1000-3000	3	AV/1 MHz	56	50
3000-6000	3	AV/1 MHz	60	54

Note: 1.The lower limit shall apply at the transition frequencies.

2. Distance refers to the distance in meters between the test antenna and the closed point of any part of the EUT.

9.4. Test Procedure

The EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber. An antenna was located 3m from the EUT on an adjustable mast. A pre-scan was first performed in order to find prominent radiated emissions. For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to EN 55032 Class B on Radiated Disturbance test.

The bandwidth setting on the test receiver is 120 kHz.

The frequency range from 30MHz to 1000MHz is checked. The test result are reported on Section 8.5.

9.5. Radiated Disturbance Test Results

9.5.1. Test Results: **PASS**

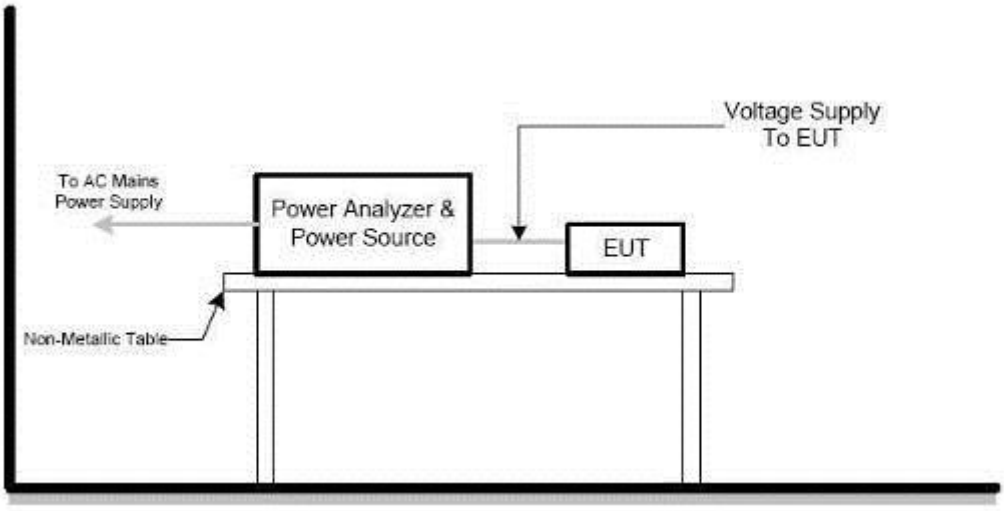
9.5.2. Emission Level= Correct Factor + Reading Level.

9.5.3. All reading are Quasi-Peak values.

9.5.4. The test data and the scanning waveform are attached within Appendix II .

10. HARMONIC CURRENT TEST

10.1. Configuration of Test System



10.2. Test Standard

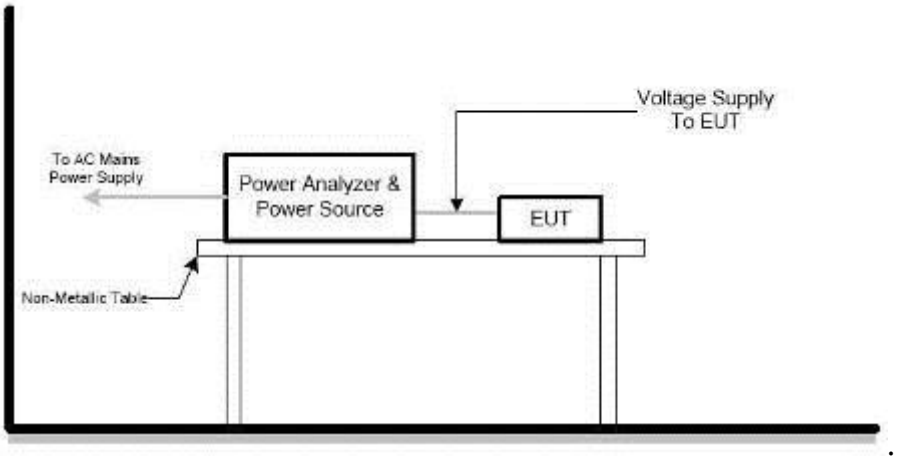
EN IEC 61000-3-2:2019; Class A

10.3. Test Results

10.3.1. Test Results: **N/A**

11. VOLTAGE FLUCTUATIONS & FLICKER TEST

11.1. Configuration of Test System



11.2. Test Standard

EN 61000-3-3:2013+A1:2019

11.3. Test Limits

The limits shall be applicable to voltage fluctuations and flicker ata the supply terminal s of the equipment under test, the followinglimites apply:
the value of Pst shall not be greater than 1.0;
the value of Plt shall not be greater than 0.65;
the value of d(t) during a voltage change shall not exceed 3.3% for more than 500ms;
the relative steady-state voltage change, dc, shall not exceed 3.3%;
the maximum relative voltage change dmax, shall not exceed
a) 4% without additional conditions;
b) 6% for equipment which is:
Switched manually, or
Swithced automatically more frequently than twice per day, and also has either a delayed restart(the delay being not less than a few thens of seconds), or manual restart, after a power supply interruption.
c) 7%for equipment which is
Attended whilst in use (for example: hair dryers, vacuum cleaners, kitchen equipment such as mixers, garden equipment such as lawn mowers, portable tools such as electric drills), or
switched on automatically, or is intended to be switched on manually, no more than twice per day, and also has either a delayed restart(the delay being not less than a few tens of seconds) or manual restart, after a power supply interruption.

11.4. Test Results

11.4.1. Test Results: **N/A**

12. IMMUNITY PERFORMANCE CRITERIA

The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance level by its manufacturer or the requestor of the test, or the agreed between the manufacturer and the purchaser of the product.

Definition related to the performance level:
Based on the used product standard
Based on the declaration of the manufacturer, requestor or purchaser

Criterion A:
The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

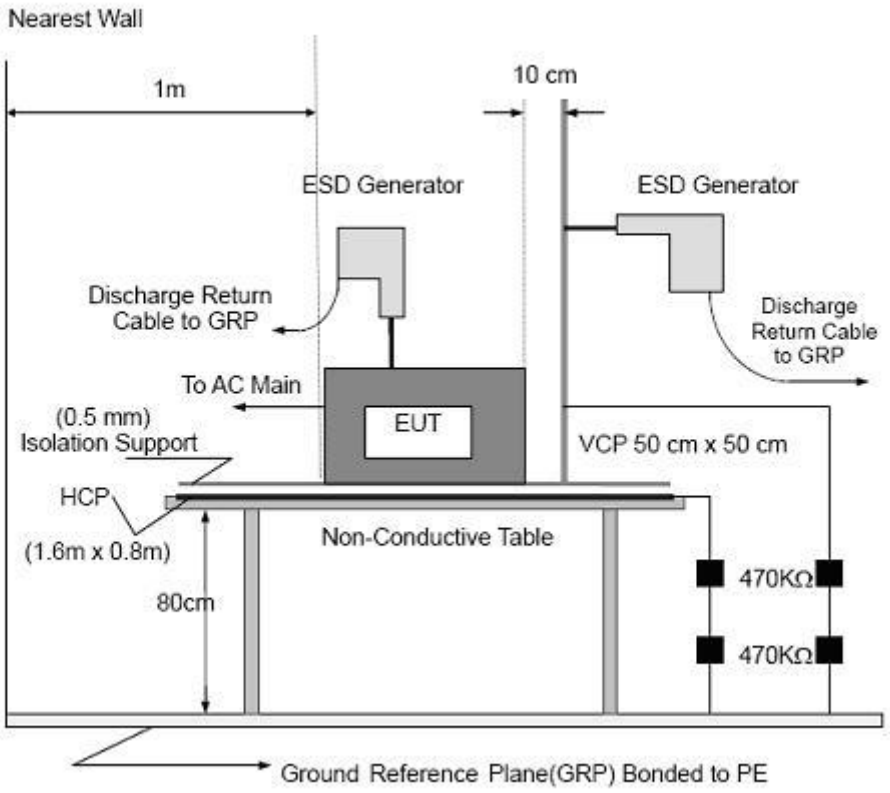
Criterion B:
After the test, the equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test. If the minimum performance level (or the permissible performance loss) is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect form the equipment if used as intended.

Criterion C:
Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

13.ELECTROSTATIC DISCHARGE IMMUNITY TEST

13.1.Configuration of Test System

13.1.1. TEST SETUP



13.2.Test Standard

EN 55035:2017(IEC 61000-4-2:2008)
(Severity Level 3 for Air Discharge at 8KV,
Severity Level 2 for Contact Discharge at 4KV)

13.3.Severity Levels and Performance Criterion

13.3.1.Severity level

Level	Test Voltage Contact Discharge (KV)	Test Voltage Air Discharge (KV)
1.	2	2
2.	4	4
3.	6	8
4.	8	15
X	Special	Special

13.3.2.Performance criterion : **B**

13.4.Test Procedure

13.4.1.Air Discharge:

The test was applied on non-conductive surfaces of EUT. The round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT. After each discharge, the discharge electrode was removed from the EUT. The generator was re-triggered for a new single discharge and repeated 20 times for each pre-selected test point. This procedure was repeated until all the air discharge completed

13.4.2.Contact Discharge:

All the procedure was same as Section 12.4.1. except that the generator was re-triggered for a new single discharge and repeated 50 times for each pre-selected test point. the tip of the discharge electrode was touch the EUT before the discharge switch was operated.

13.5.Test Results

13.5.1.Test Results: **PASS**

13.5.2.Test data on the following pages.

Electrostatic Discharge Test Results

Shenzhen Most Technology Service Co., Ltd.

Test Voltage :	*1*	*Test Date:*	*Jul.24, 2018*
Test Mode :	*1*	*Criterion :*	*B*
Temperature:	*24℃*	*Humidity:*	*56%*

Air Discharge: ±8KV *# For Air Discharge each Point Positive 10 times and negative 10 times discharge.*

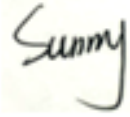
Contact Discharge: ±4KV *# For Contact Discharge each point positive 25 times and negative 25 times discharge*

Test Results Description

Location	***Kind*** *A-Air Discharge C-Contact Discharge*	***Result***
Gaps	*A*	*PASS*
Buttons	*A*	*PASS*
Switch	*A*	*PASS*
Port	*C*	*PASS*
Metal housing	*C*	*PASS*
HCP	*C*	*PASS*
VCP of Front	*C*	*PASS*
VCP of Rear	*C*	*PASS*
VCP of Left	*C*	*PASS*
VCP of Right	*C*	*PASS*

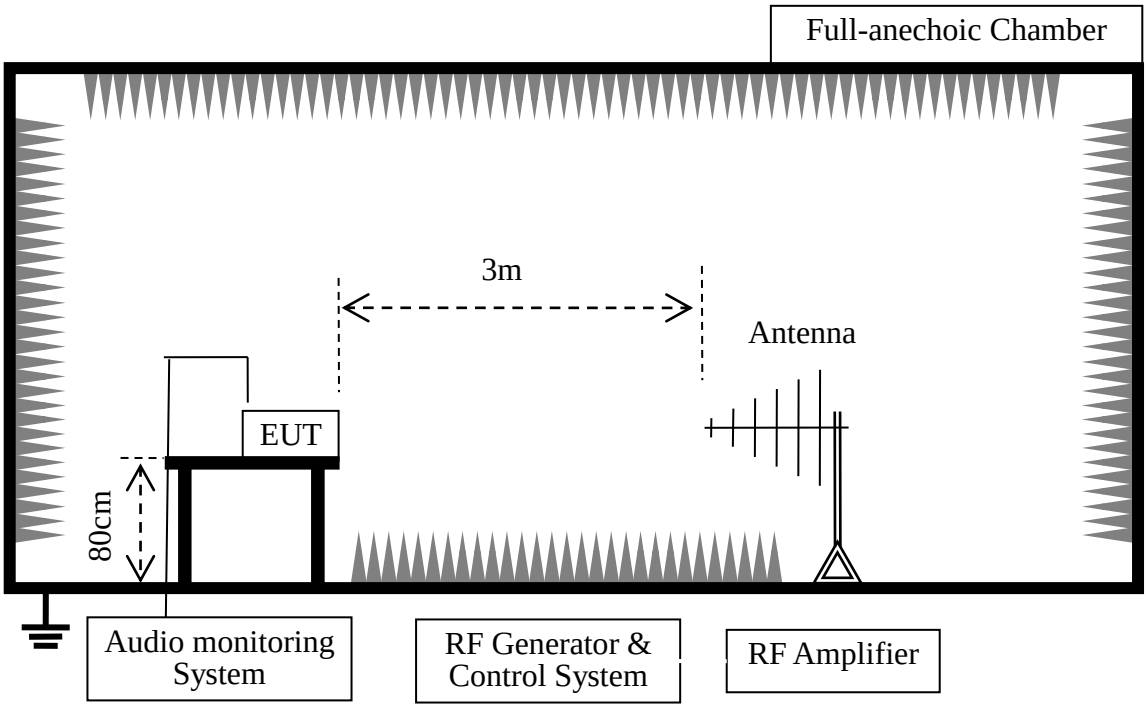
Remark :

Discharge was considered on Contact and Air and Horizontal Coupling Plane (HCP) and Vertical Coupling Plane (VCP).

Reviewer : 

14. RF FIELD STRENGTH SUSCEPTIBILITY TEST

14.1. Configuration of Test System



14.2. Test Standard

EN 55035:2017 (IEC 61000-4-3:2006+A1:2007+A2:2010)
(Severity Level: 2 at 3V / m)

14.3. Severity Levels and Performance Criterion

Basic Standard:	IEC 61000-4-3
Required Performance:	A
Frequency Range:	80 MHz - 1000 MHz,1800MHz,2600MHz,3500MHz,5000MHz
Field Strength:	3 V/m
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of fundamental
Polarity of Antenna:	Horizontal and Vertical
Test Distance:	3 m
Antenna Height:	1.5 m
Dwell Time:	at least 3 seconds

14.4.Test Procedure

a. The testing was performed in a fully anechoic chamber. The transmit antennawas located at a distance of 3 meters from the EUT.

b. The frequency range is swept from 80 MHz to 1000 MHz, 1800 MHz, 2600 MHz, 3500 MHz, 5000 MHz, with the signal 80% amplitude modulated with a 1kHz sine-wave. The rate ofsweep did not exceed 1.5 x 10^{-3} decade/s,where the frequency range is sweptincrementally, the step size was 1% of preceding frequency value.

c. The dwell time at each frequency shall be not less than the time necessary for theEUT to be able to respond.

e. The test was performed with the EUT exposed to both vertically and horizontallypolarized fields on each of the four sides.

14.5.Test Results

14.5.1.Test Results: **PASS**

14.5.2.Test data on the following pages.

RF Field Strength Susceptibility Test Results

Shenzhen Most Technology Service Co., Ltd.

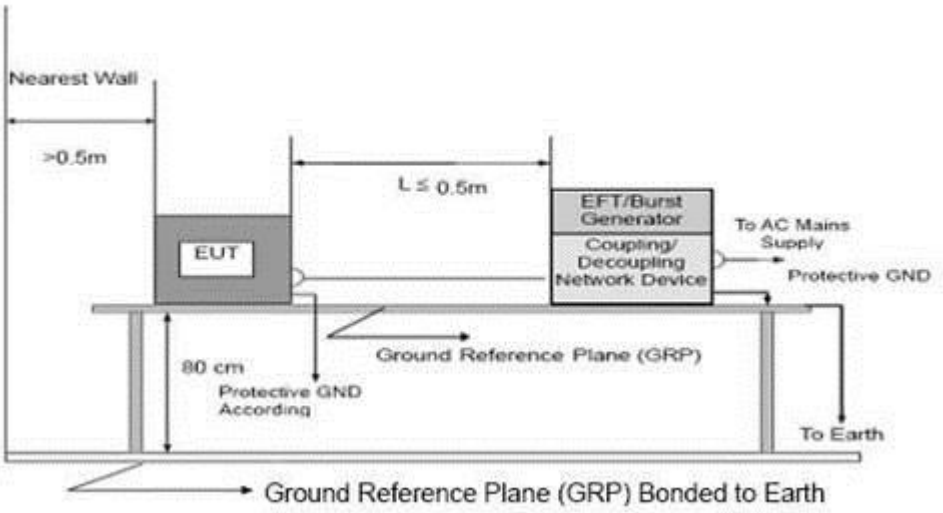
Temperature:	24℃	Relative Humidity:	56%
Test Voltage:	1	Test Mode:	1

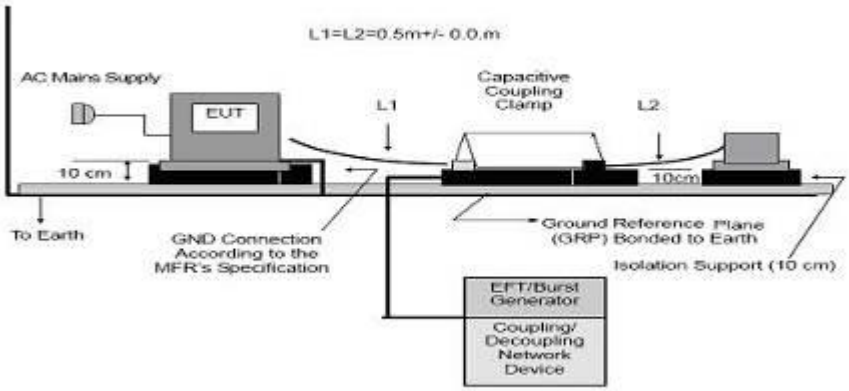
Frequency Range (MHz)	RF Field Position	R.F. Field Strength	Azimuth	Perform. Criteria	Results	Judgment
80MHz - 1000MHz	H / V	3 V/m (rms) AM Modulated 1000Hz, 80%	Front	A	A	PASS
			Rear			
			Left			
			Right			
1800MHz	H / V	3 V/m (rms) AM Modulated 1000Hz, 80%	Front	A	A	PASS
			Rear			
			Left			
			Right			
2600MHz	H / V	3 V/m (rms) AM Modulated 1000Hz, 80%	Front	A	A	PASS
			Rear			
			Left			
			Right			
3500MHz	H / V	3 V/m (rms) AM Modulated 1000Hz, 80%	Front	A	A	PASS
			Rear			
			Left			
			Right			
5000MHz	H / V	3 V/m (rms) AM Modulated 1000Hz, 80%	Front	A	A	PASS
			Rear			
			Left			
			Right			

Reviewer : Sunny

15.ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST

15.1.Configuration of Test System





15.2.Test Standard

EN 55035:2017(IEC 61000-4-4:2012)
(Severity Level 1 at 0.5KV)

15.3.Severity Levels and Performance Criterion

15.3.1.Severity level

Open Circuit Output Test Voltage ±10%		
Level	On Power Supply Lines	On I/O (Input/Output) Signal data and control lines
1.	0.5 KV	0.25 KV
2.	1 KV	0.5 KV
3.	2 KV	1 KV
4.	4 KV	2 KV
X	Special	Special

15.3.2.Performance criterion **: B**

15.4.Test Procedure

The EUT and its simulators were placed on a the ground reference plane and were insulated from it by an wood support 0.1m ± 0.01m thick. The ground reference plane was 1m*1m metallic sheet with 0.65mm minimum thickness. This reference ground plane was project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane was more than 0.5m. All cables to the EUT was placed on the wood support, cables not subject to EFT/B was routed as far as possible from the cable under test to minimize the coupling between the cables.

15.4.1.For input and AC power ports:

The EUT was connected to the power mains by using a coupling device which couples the EFT interference signal to AC power lines. Both positive transients and negative transients of test voltage was applied during compliance test and the duration of the test can't less than 2mins.

15.4.2.For signal lines and control lines ports:

It's unnecessary to test.

15.4.3.For DC input and DC output power ports:

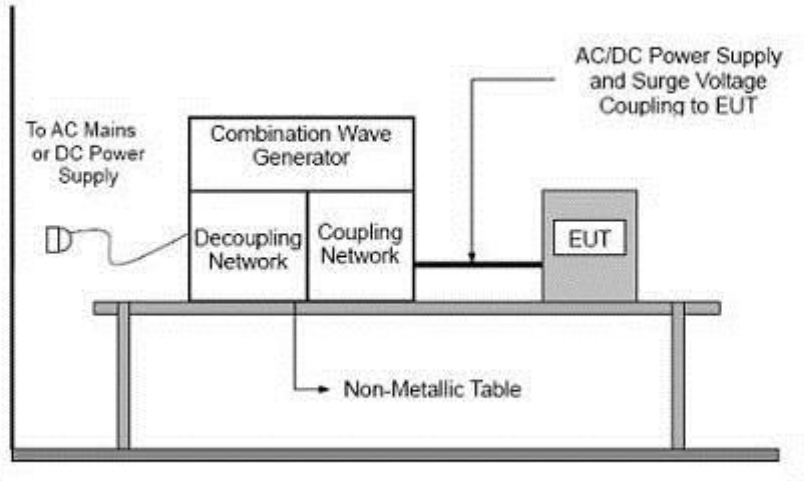
It's unnecessary to test.

15.5.Test Results

15.5.1.Test Results: **N/A**

16. SURGE TEST

16.1. Configuration of Test System



16.2. Test Standard

EN 55032:2015(IEC 61000-4-5:2014+A1:2017)
(Severity Level **:** Line to Line was Level 1 at 0.5KV
POE port was Level 1at 0.5KV)

16.3. Severity Levels and Performance Criterion

16.3.1. Severity level

Severity Level	Open-Circuit Test Voltage KV
1	0.5
2	1.0
3	2.0
4	4.0
*	Special

16.3.2. Performance criterion **: B**

16.4. Test Procedure

16.4.1. Set up the EUT and test generator as shown on Section 15.1.

16.4.2. For line to line coupling mode, provide a 1KV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to EUT selected points, and for active line / neutral line to ground are same except test level is 2KV.

16.4.3. At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are applied during test.

16.4.4. Different phase angles are done individually.

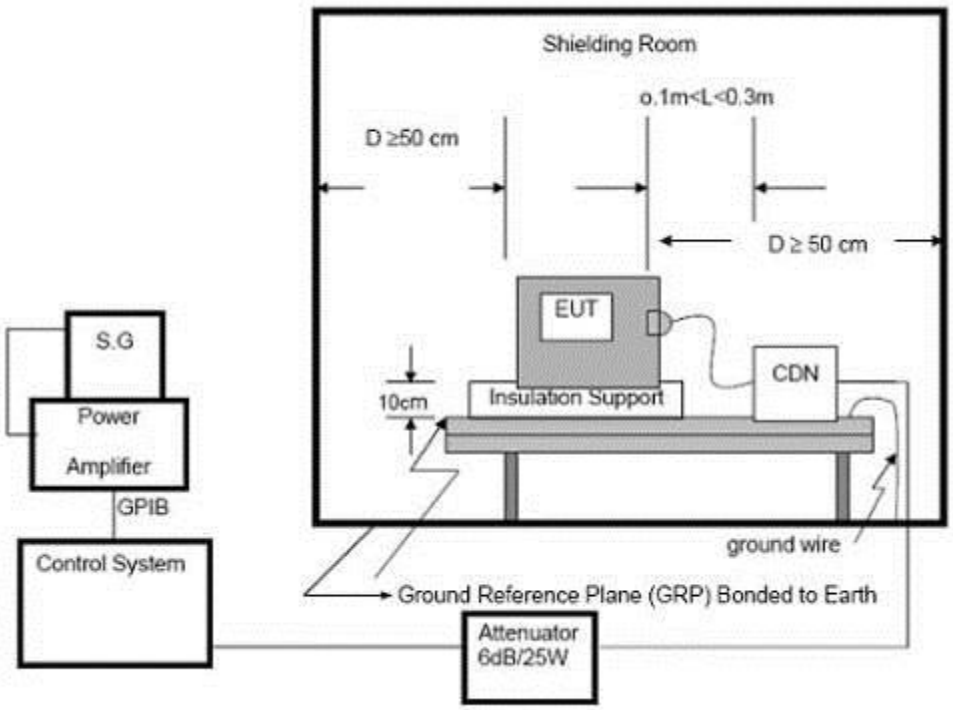
16.4.5. Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

16.5. Test Results

16.5.1. Test Results: **N/A**

17.INJECTED CURRENTS SUSCEPTIBILITY TEST

17.1.Configuration of Test System



17.2.Test Standard

EN 55035:2017(IEC 61000-4-6:2013)
(Severity Level 2 at 3V (r.m.s.) and frequency is from 0.15MHz to 10MHz
Severity Level 1& Level 2 at 3V (r.m.s.) to 1V (r.m.s.) and frequency is from 10MHz to 30MHz
Severity Level 1 at 1V (r.m.s.) and frequency is from30MHz to 80MHz)

17.3. Severity Levels and Performance Criterion

17.3.1.Severity level

Level	Voltage Level (e.m.f.) V
1.	1
2.	3
3.	10
X	Special

17.3.2.Performance criterion: **A**

17.4.Test Procedure

17.4.1.Set up the EUT, CDN and test generators as shown on Section 16.1.

17.4.2.Let the EUT work in test mode and test it.

17.4.3.The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).

17.4.4.The disturbance signal description below is injected to EUT through CDN.

17.4.5.The EUT operates within its operational mode(s) under intended climatic conditions after power on.

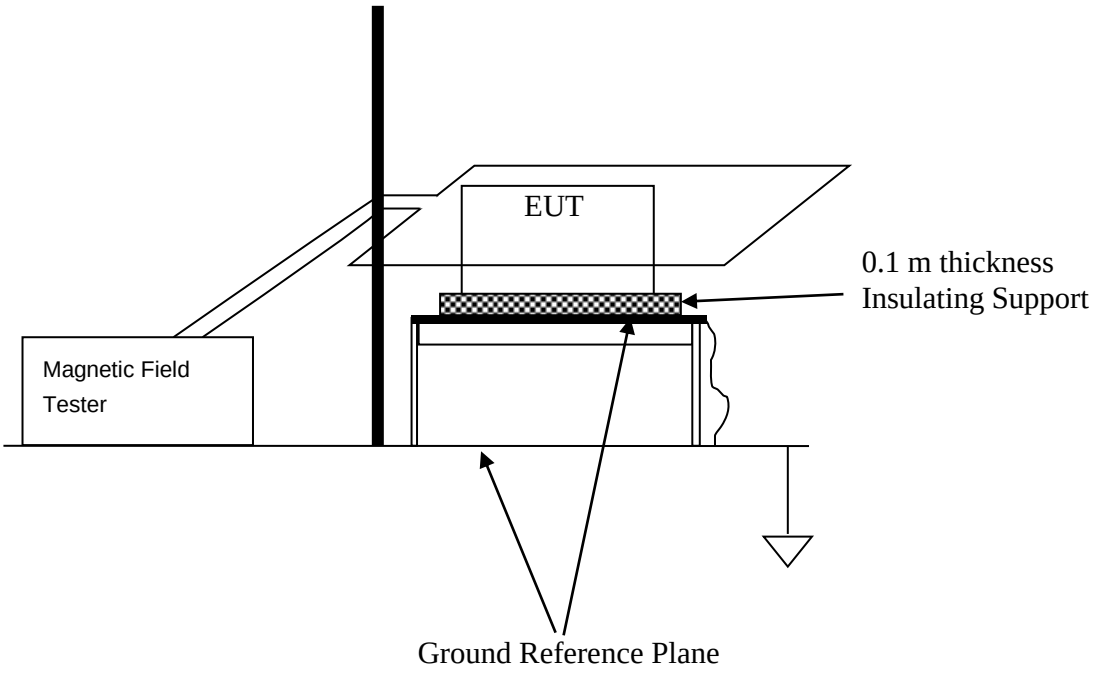
17.4.6.Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

17.5.Test Results

17.5.1.Test Results: **N/A**

18. MAGNETIC FIELD IMMUNITY TEST

18.1. Configuration of Test System



18.2. Test Standard

EN 55035:2017(IEC 61000-4-8:2009)
(Severity Level 1 at 1A/m)

18.3. Severity Levels and Performance Criterion

18.3.1. Severity level

Level	Magnetic Field Strength A/m
1.	1
2.	3
3.	10
4.	30
5.	100
X.	Special

18.3.2. Performance criterion : **A**

18.4.Test Procedure

The EUT was subjected to the test magnetic field by using the induction coil of standard dimensions (1m*1m) and shown in Section 17.1. The induction coil was then rotated by 90°in order to expose the EUT to the test field with different orientations.

18.5.Test Results

18.5.1.Test Results: **PASS**

18.5.2.Test data on the following pages.

Magnetic Field Immunity Test Results

Shenzhen Most Technology Service Co., Ltd.

Test Voltage :	*1*	*Test Date:*	*Jul.24, 2018*
Test Mode :	*1*	*Criterion :*	*A*
Temperature:	*24℃*	*Humidity:*	*57%*

Test Results Description

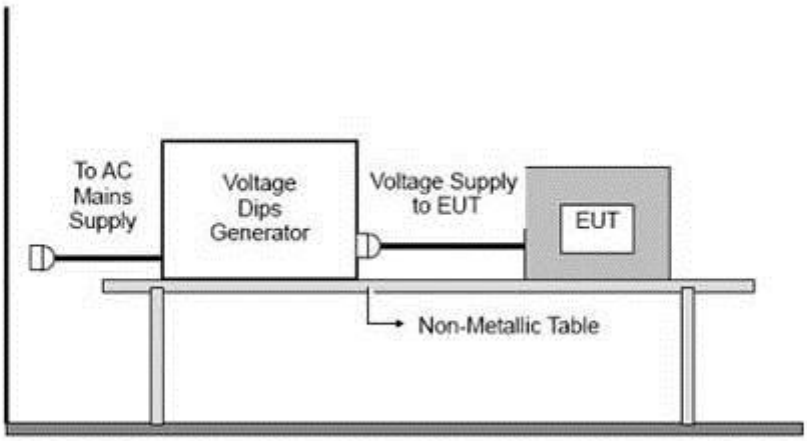
Test Level	*Testing Duration*	*Coil Orientation*	*Criterion*	*Result*
1A/m(50Hz/60Hz)	*5 mins*	*X*	*A*	*PASS*
1A/m(50Hz/60Hz)	*5 mins*	*Y*	*A*	*PASS*
1A/m(50Hz/60Hz)	*5 mins*	*Z*	*A*	*PASS*

Remark: *No function loss*

Reviewer **:** 

19. VOLTAGE DIPS AND INTERRUPTIONS TEST

19.1. Configuration of Test System



19.2. Test Standard

EN 55035:2017(IEC 61000-4-11:2020)
(Severity level: 0% 250 period
0% 0.5 periods
70% 25 periods)

19.3. Severity Levels and Performance Criterion

19.3.1. Severity level

Test Level %U_T	Voltage dip and short interruptions %U_T	Performance Criterion	Duration (in period)
0	100	C	250
0	100	B	0.5
70	30	C	25

19.3.2. Performance criterion : **B & C**

19.4.Test Procedure

19.4.1.The EUT and test generator were setup as shown on Section 18.1.

19.4.2.The interruptions is introduced at selected phase angles with specified duration.

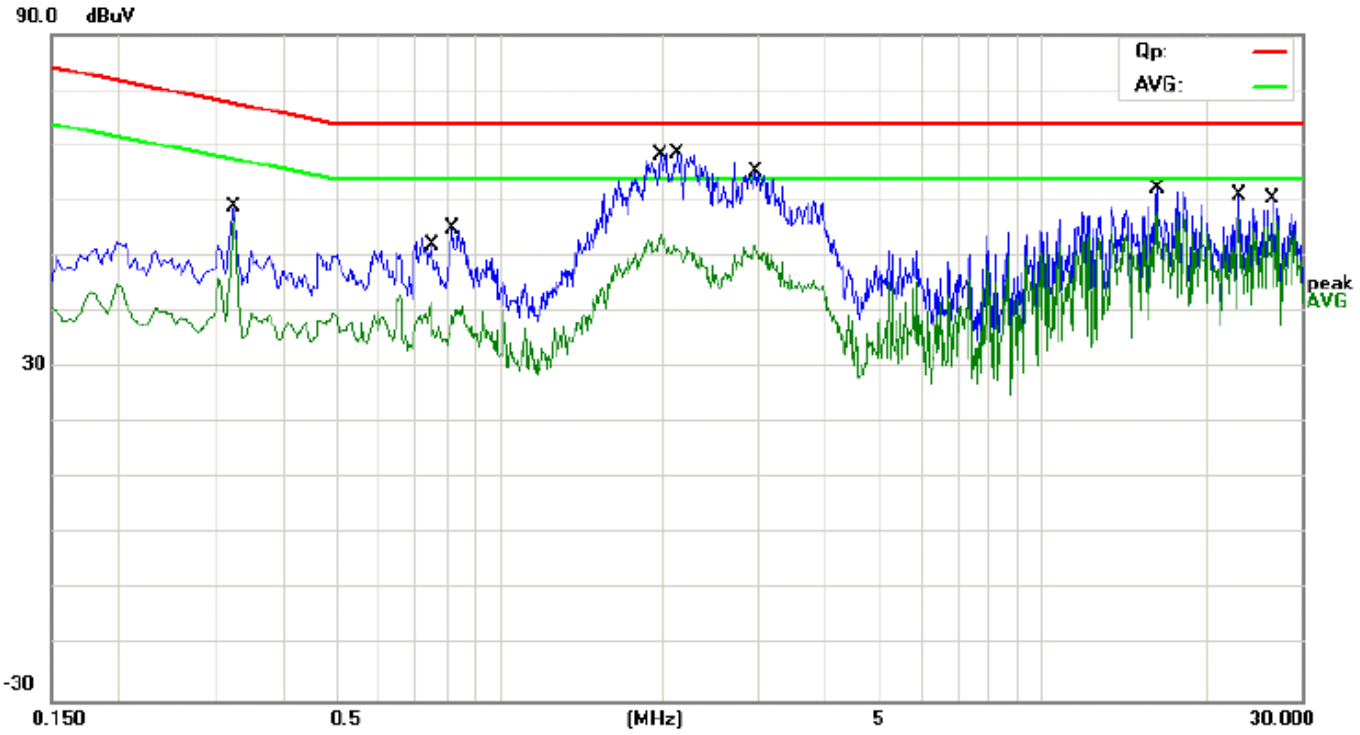
19.4.3.Record any degradation of performance.

19.5.Test Results

19.5.1.Test Results: N/A

APPENDIX I

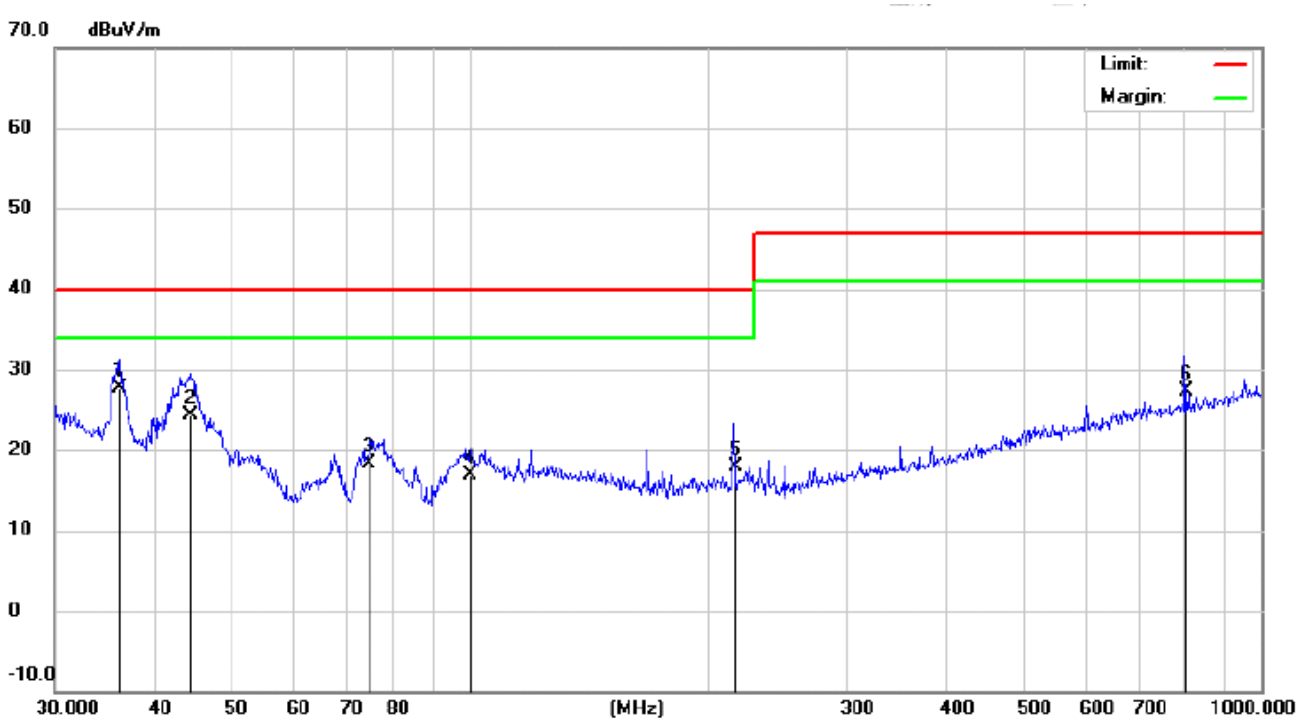
EUT:	IP CAMERA	M/N:	ZBOX-CI660NANO-P
Mode:	Ping	Phase:	N/A
Test by:	Roert	Power:	DC 12V by DC Source
Temperature: / Humidity	23.40℃/ 52.7.0%	Test date:	2018-07-24



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.3260	49.42	9.59	59.01	77.55	-18.54	QP	
2		0.3260	47.44	9.59	57.03	67.55	-10.52	AVG	
3		0.7500	32.30	9.60	41.90	64.00	-22.10	AVG	
4		0.8220	45.50	9.60	55.10	74.00	-18.90	QP	
5		1.9860	44.65	9.60	54.25	64.00	-9.75	AVG	
6	*	2.1420	59.09	9.60	68.69	74.00	-5.31	QP	
7		2.9540	42.42	9.61	52.03	64.00	-11.97	AVG	
8		2.9620	55.69	9.61	65.30	74.00	-8.70	QP	
9		16.2300	52.60	9.71	62.31	74.00	-11.69	QP	
10		16.2300	48.36	9.71	58.07	64.00	-5.93	AVG	
11		23.1300	51.28	9.74	61.02	74.00	-12.98	QP	
12		26.6100	48.04	9.76	57.80	64.00	-6.20	AVG	

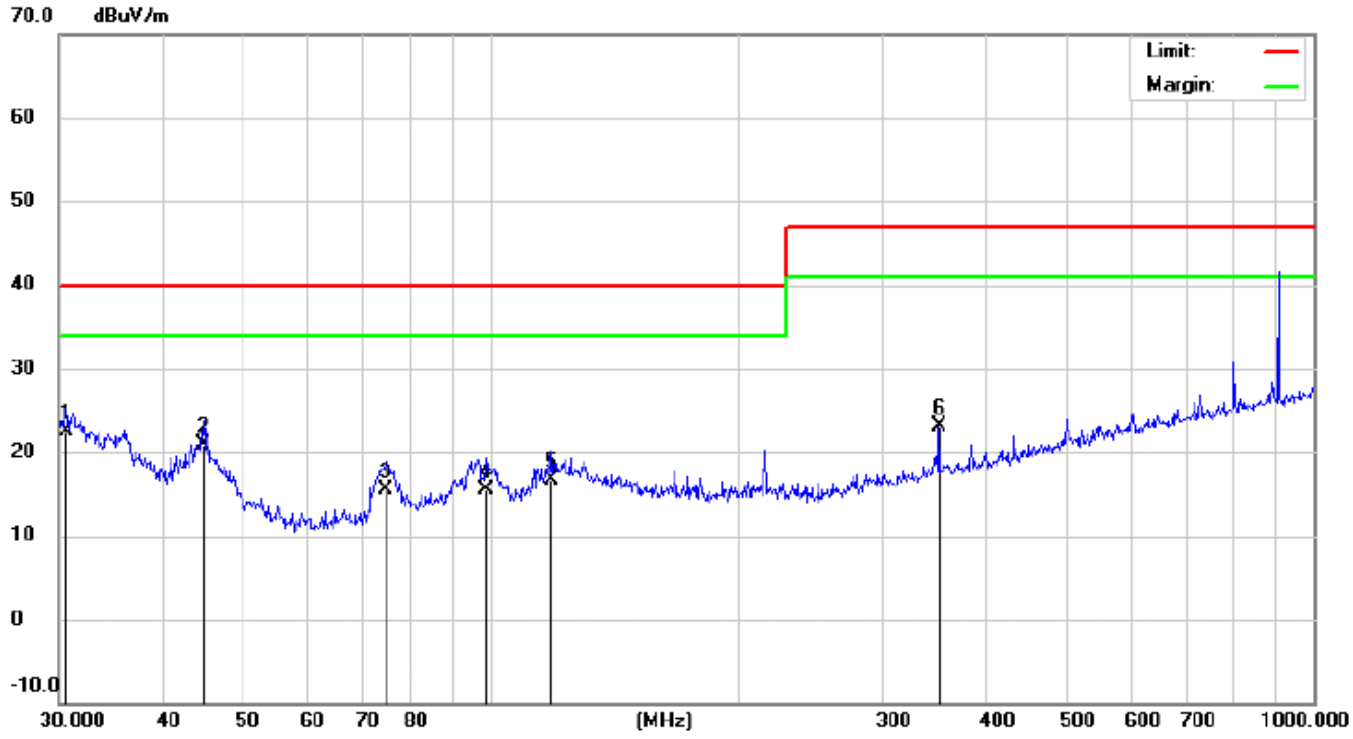
APPENDIX II

EUT:	**IP CAMERA**	**M/N:**	**ISV-X04N005SAF**
Mode:	**Running**	**Polarization:**	**Vertical**
Test by:	**Lidegan**	**Power:**	**DC 12V by DC Source**
Temperature: / Humidity	**24℃/ 51%**	**Test date:**	**2018-07-24**



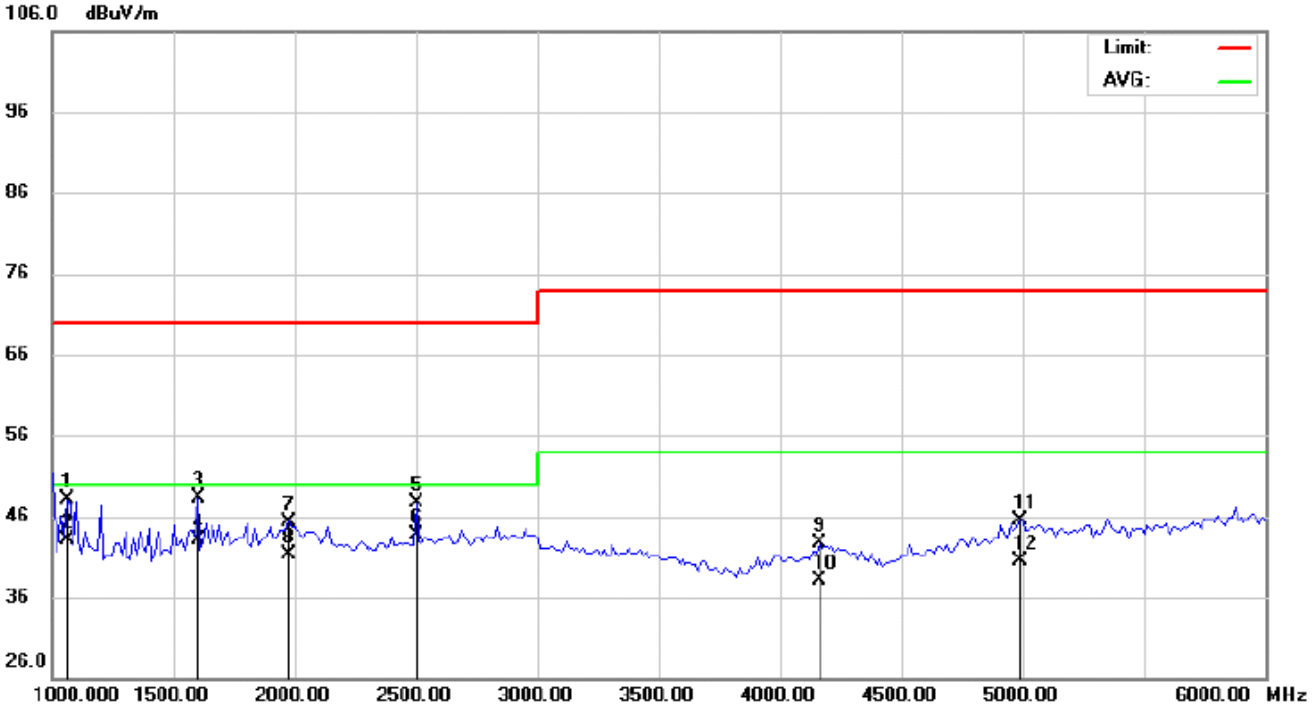
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	36.2540	11.20	16.57	27.77	40.00	-12.23	QP			
2		44.4307	13.50	10.88	24.38	40.00	-15.62	QP			
3		74.9191	10.10	8.20	18.30	40.00	-21.70	QP			
4		100.2285	7.20	9.65	16.85	40.00	-23.15	QP			
5		216.0239	5.90	12.07	17.97	40.00	-22.03	QP			
6		801.7863	6.30	20.92	27.22	47.00	-19.78	QP			

EUT:	IP CAMERA	M/N:	ISV-X04N005SAF
Mode:	Running	Polarization:	Horizontal
Test by:	Lidegan	Power:	DC 12V by DC Source
Temperature: / Humidity	24℃/ 51%	Test date:	2018-07-24



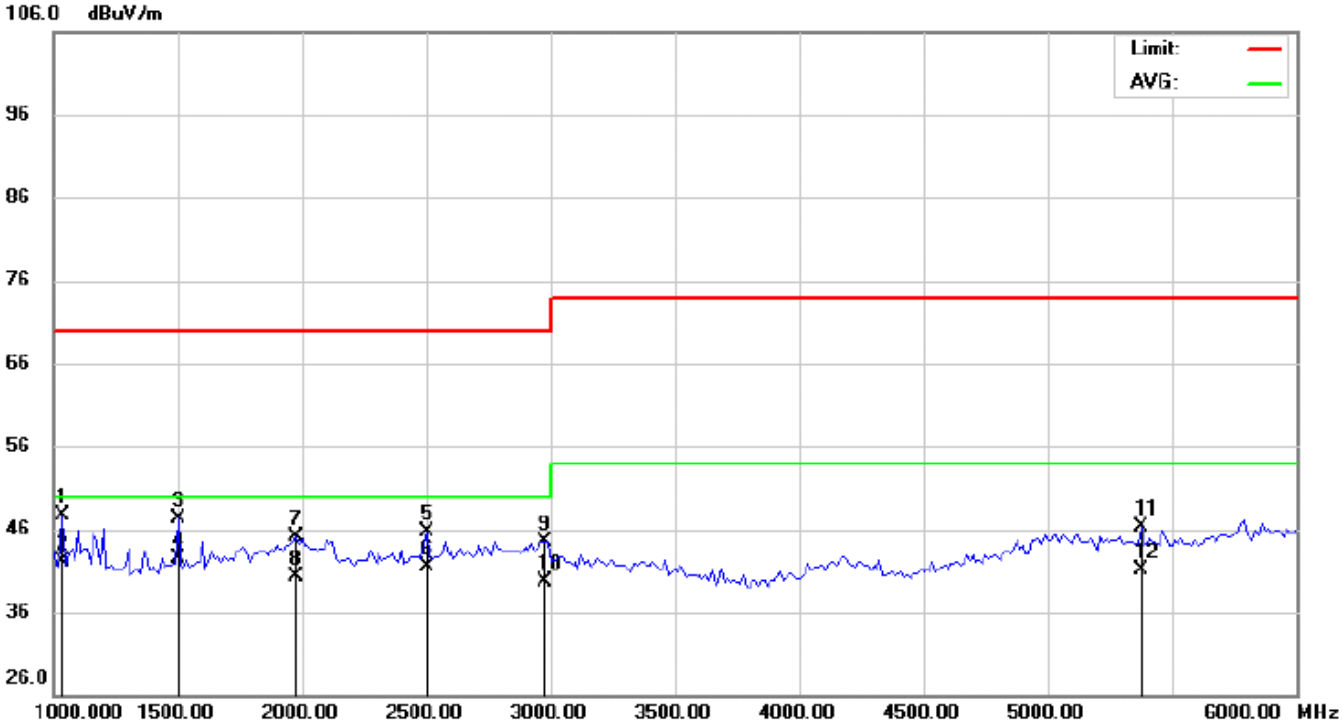
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	30.6378	2.10	20.47	22.57	40.00	-17.43	QP			
2		44.9006	10.30	10.57	20.87	40.00	-19.13	QP			
3		74.6568	7.20	8.21	15.41	40.00	-24.59	QP			
4		99.1797	6.10	9.46	15.56	40.00	-24.44	QP			
5		119.0179	3.10	13.59	16.69	40.00	-23.31	QP			
6		350.4767	8.58	14.46	23.04	47.00	-23.96	QP			

EUT:	IP CAMERA	M/N:	ISV-X04N005SAF
Mode:	Running	Polarization:	Vertical
Test by:	hzy	Power:	DC 12V by DC Source
Temperature: / Humidity	25℃/ 51%	Test date:	2018-07-24



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		1062.500	57.44	-9.30	48.14	70.00	-21.86	peak			
2		1062.500	52.40	-9.30	43.10	50.00	-6.90	AVG			
3		1600.000	56.41	-8.08	48.33	70.00	-21.67	peak			
4		1600.000	51.10	-8.08	43.02	50.00	-6.98	AVG			
5		2500.000	56.04	-8.26	47.78	70.00	-22.22	peak			
6	*	2500.000	52.00	-8.26	43.74	50.00	-6.26	AVG			
7		1975.000	51.69	-6.29	45.40	70.00	-24.60	peak			
8		1975.000	47.50	-6.29	41.21	50.00	-8.79	AVG			
9		4162.500	49.49	-6.81	42.68	74.00	-31.32	peak			
10		4162.500	44.90	-6.81	38.09	54.00	-15.91	AVG			
11		4987.500	49.36	-3.94	45.42	74.00	-28.58	peak			
12		4987.500	44.50	-3.94	40.56	54.00	-13.44	AVG			

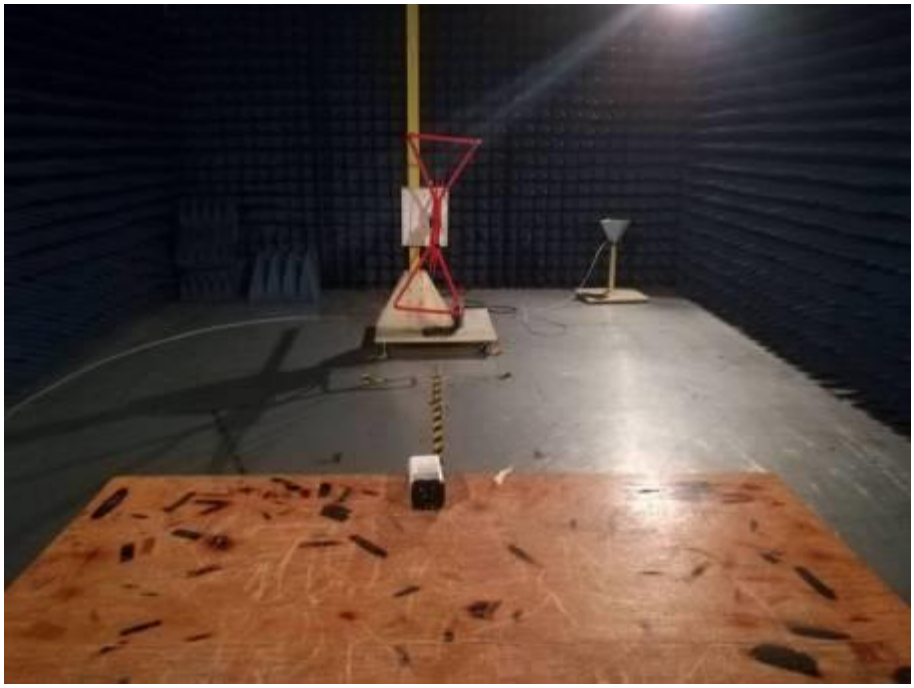
EUT:	IP CAMERA	M/N:	ISV-X04N005SAF
Mode:	Running	Polarization:	Horizontal
Test by:	hzy	Power:	DC 12V by DC Source
Temperature: / Humidity	25℃/ 51%	Test date:	2018-07-24



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		1037.500	57.12	-9.41	47.71	70.00	-22.29	peak			
2		1037.500	51.50	-9.41	42.09	50.00	-7.91	AVG			
3		1500.000	55.78	-8.46	47.32	70.00	-22.68	peak			
4	*	1500.000	51.00	-8.46	42.54	50.00	-7.46	AVG			
5		2500.000	54.01	-8.26	45.75	70.00	-24.25	peak			
6		2500.000	49.80	-8.26	41.54	50.00	-8.46	AVG			
7		1975.000	51.38	-6.29	45.09	70.00	-24.91	peak			
8		1975.000	46.50	-6.29	40.21	50.00	-9.79	AVG			
9		2975.000	52.89	-8.31	44.58	70.00	-25.42	peak			
10		2975.000	48.10	-8.31	39.79	50.00	-10.21	AVG			
11		5375.000	50.69	-4.44	46.25	74.00	-27.75	peak			
12		5375.000	45.50	-4.44	41.06	54.00	-12.94	AVG			

APPENDIX III
(Test Photos)

Radiated Test Setup Photograph



APPENDIX IV
(Photos of the EUT)

Figure 1
General Appearance of the EUT

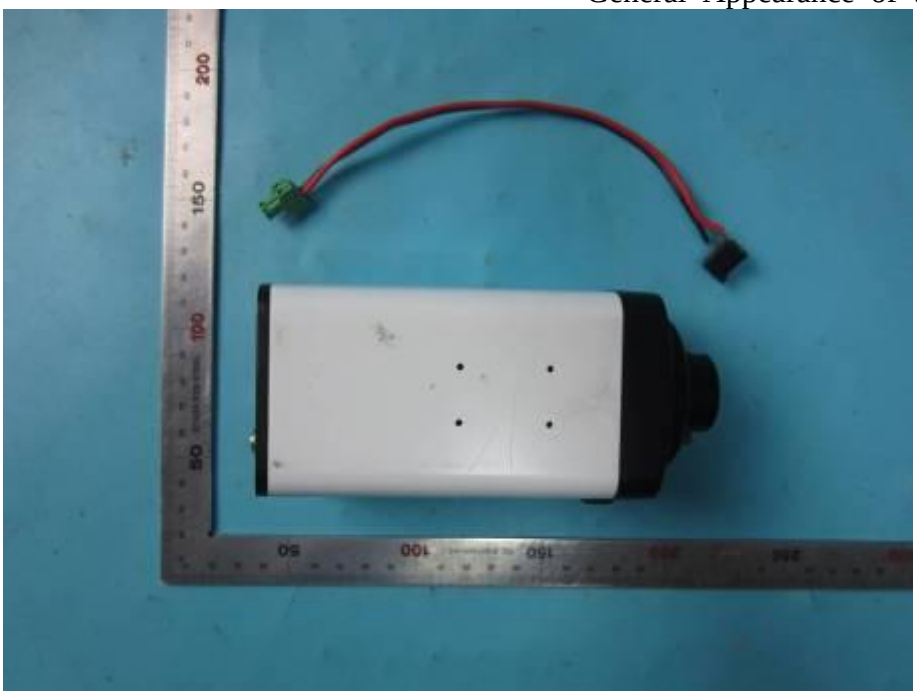


Figure 2
General Appearance of the EUT

Figure 3
General Appearance of the EUT

Figure 4
General Appearance of the EUT

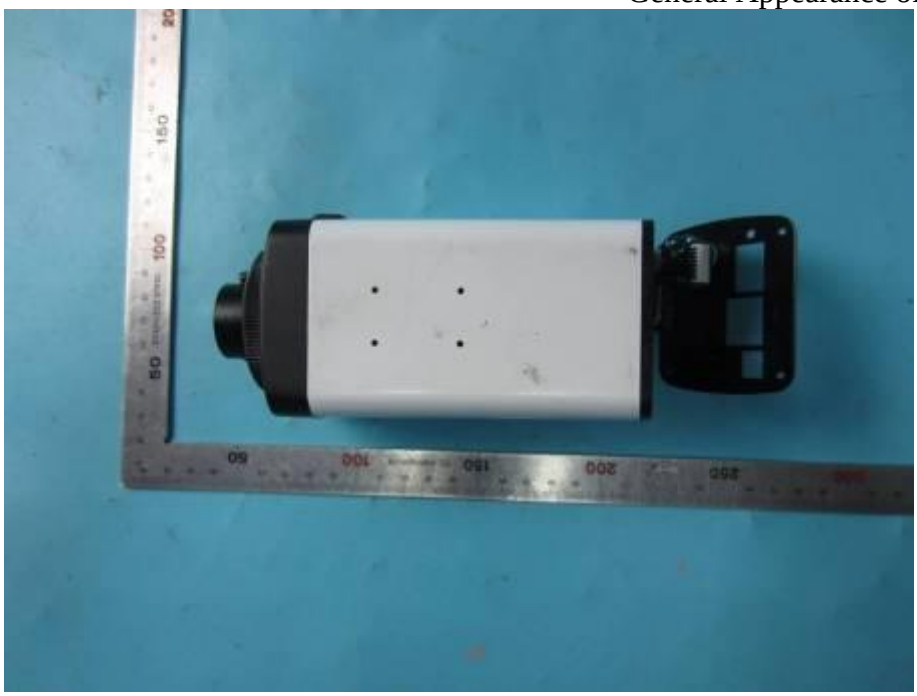


Figure 5
Inside of the EUT

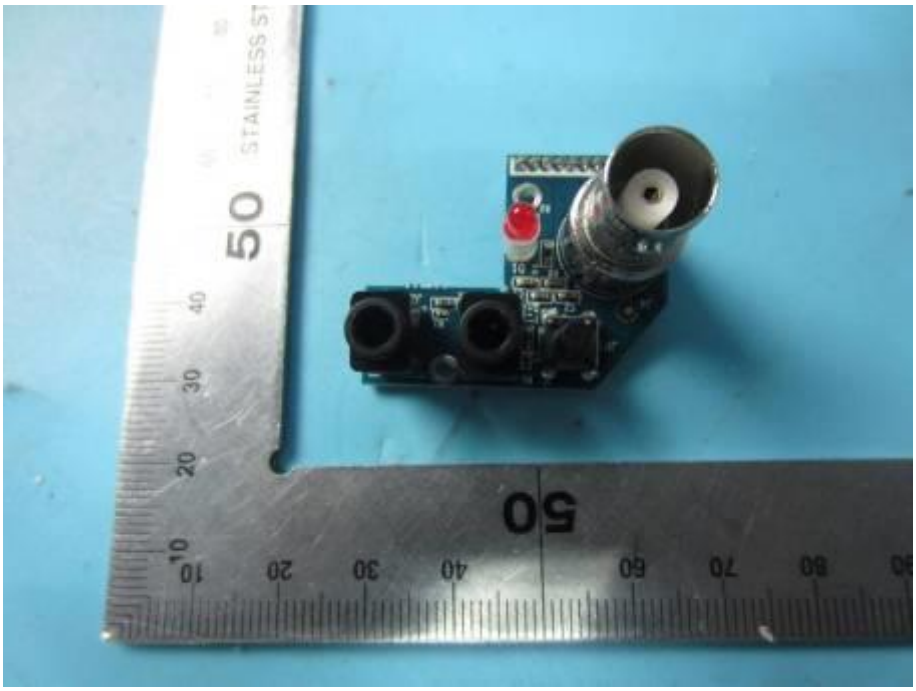


Figure 6
Components Side of the PCB

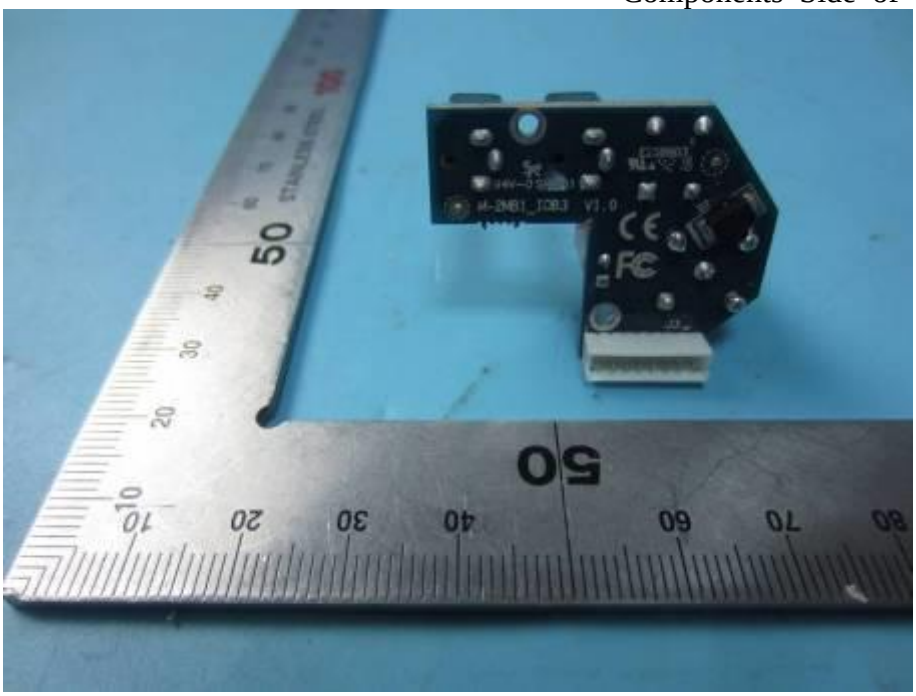


Figure 7
Components Side of the PCB

Figure 8
Components Side of the PCB

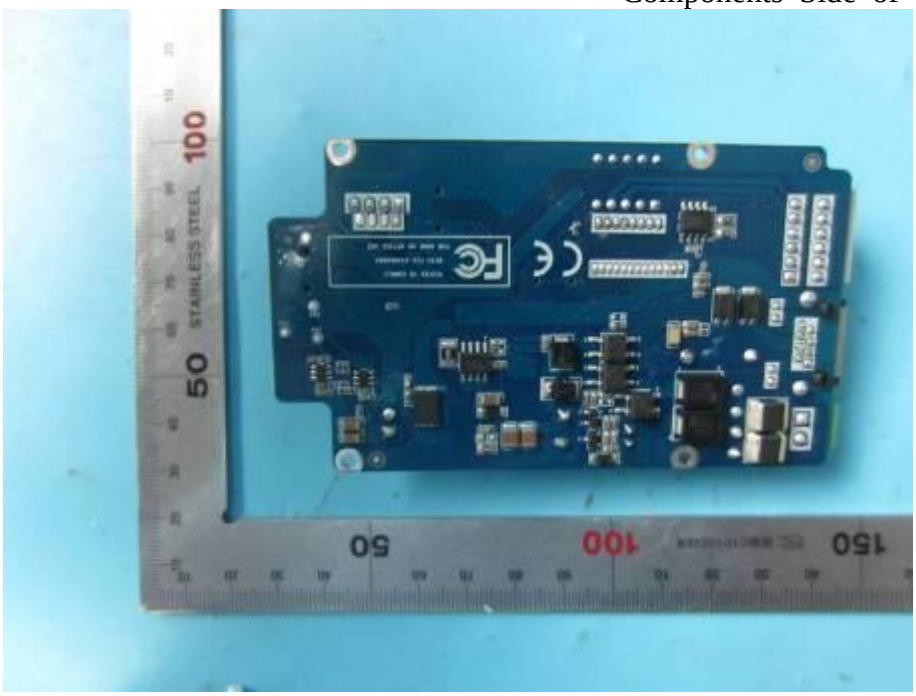


Figure 9
Components Side of the PCB

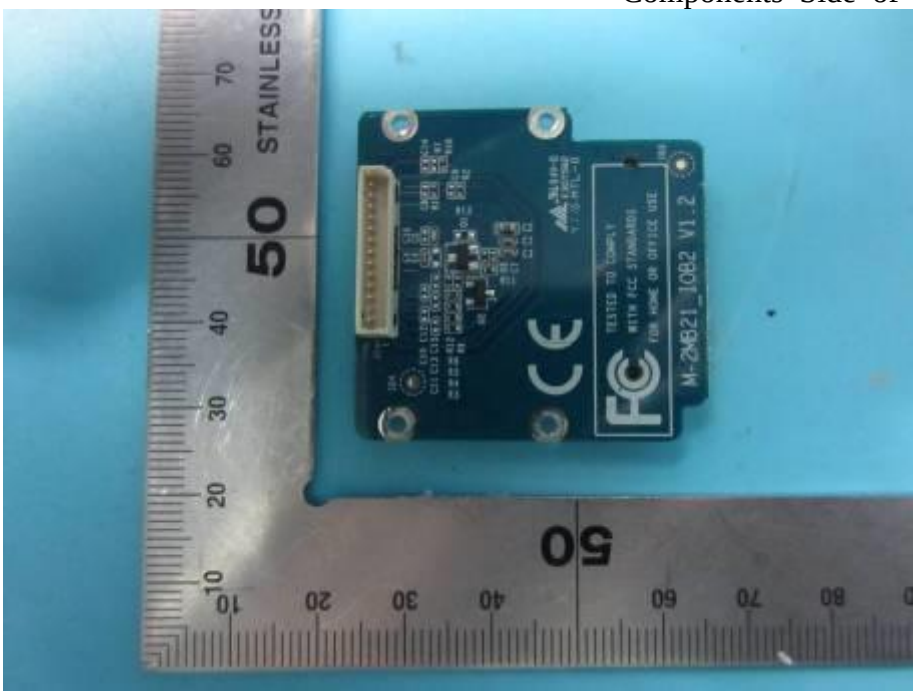


Figure 10
Components Side of the PCB

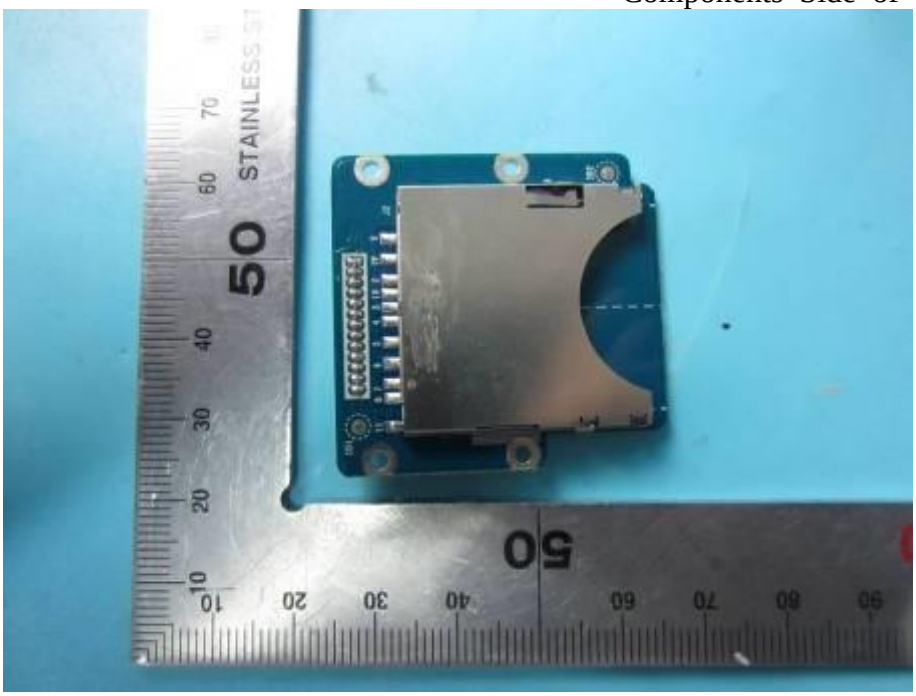


Figure 11
Components Side of the PCB

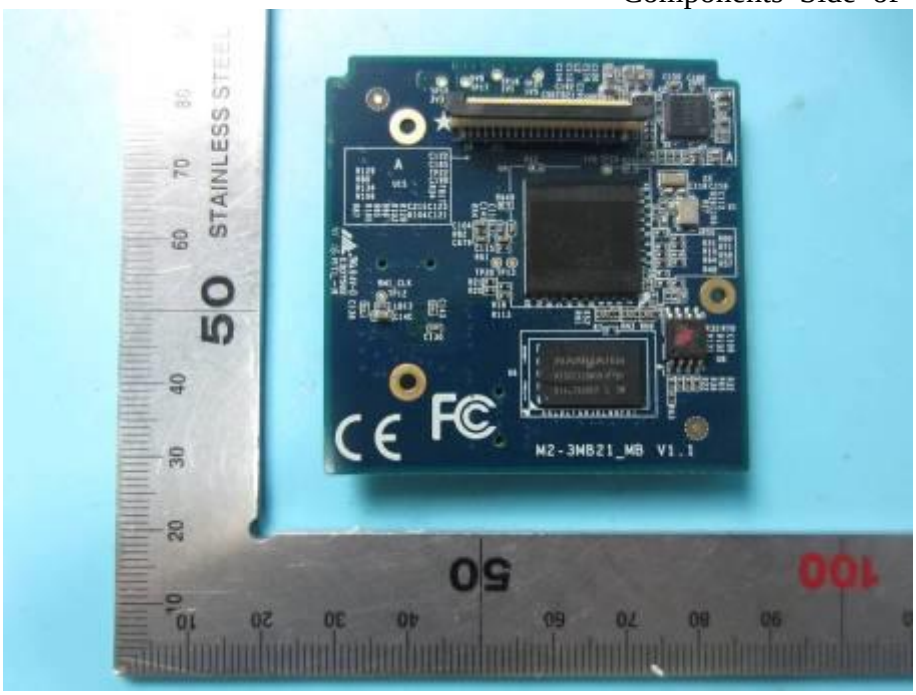


Figure 12
Components Side of the PCB

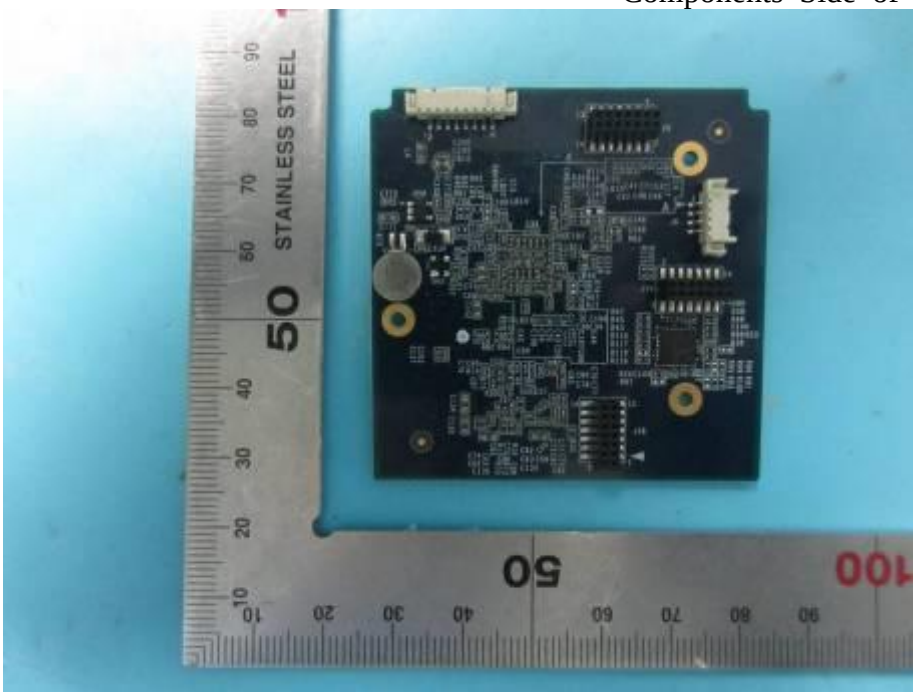


Figure 13
Components Side of the PCB

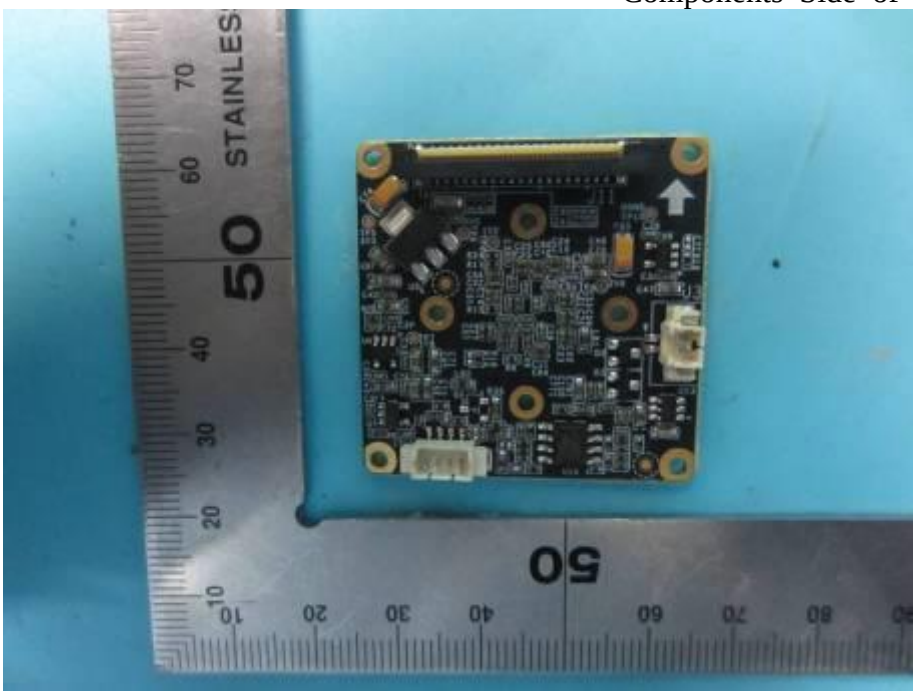


Figure 14
Components Side of the PCB