

TEST REPORT

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The tests reported herein have been performed in accordance with its terms of accreditation.

Test Report No. : LR500171708O
Issue Date : October 16, 2017
Applied Standard : VCCI V-3/2016.11 CLASS A
Applicant Name : Hanwha Techwin Co., Ltd.
Product Name : NETWORK CAMERA
Model Name : XNB-6001N
Brand : -
Serial Number : -

This test result only responds to the tested sample. It is not allowed to copy this report even partly without the allowance of the test laboratory. The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.



NVLAP LAB CODE 200723-0

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LTA Certification

Client / Manufacturer

Company name : Hanwha Techwin Co., Ltd.
Address : 1204, Changwon-daero, Seongsan-gu, Chang-won-si, Gyeongsangnam-do, korea
Telephone / Facsimile : +82-70-7147-8361

Factory

Company name : Hanwha Techwin (Tianjin) Co., Ltd.
Address : No.11 Weiliu Rd, Micro-Electronic Industrial Park, TEDA, Tianjin, 300385, People's Republic of China

Equipment Under Test (EUT)

Trade name : -
Product name : NETWORK CAMERA
Model name : XNB-6001N
Variant model name : -
Serial number : -
Intended environment : Residential area
Date of receipt : August 07, 2017
EUT condition : Pre-production, not damaged
Interface Ports : DC IN, LAN (Network), Micro USB, Audio IN/OUT, POE (CAM), VIDEO, ALARM, Micro SD
Power Source : DC 12 V
Crystal/Oscillator(s) : -
Firmware version : XXXX

Model Description

- None

Test Performed

Test started & completed : August 18, 2017
Location : LTA Co., Ltd.

*** To be continued next page ***

Test Specification

Purpose of the test : Compliance test to the following standard
Applied standard : VCCI V-3/2016.11 CLASS A

Test Results

Measurement	Results*	Test method
Radiated disturbance	Complies	V-3/2016.11
Radiated disturbance at above 1 GHz	Complies	V-3/2016.11
Conducted disturbance	Not Applicable	V-3/2016.11
Conducted disturbances at telecommunication ports	Not Applicable	V-3/2016.11

* : The compliance statement is based on nominal value only.

Laboratory's Certificate

Report number : LR500171708O
Issue date : October 16, 2017

This test report is issued under the authority of:

The test was supervised by:



Young Kyu Shin, Technical Manager



Hyo Joon Kang , Test Engineer

General information's

Purpose

This document is based on the Electromagnetic Interference (EMI) tests performed on the “XNB-6001N”.

The measurements were performed according to the measurement procedure described in VCCI V-3/2016.11

Test Performed

Company name : LTA Co., Ltd.
Address : 243, Jubug-ri, Yangji-Myeon, Cheoin-gu, Youngin-Si, Kyunggi-Do, Korea. 449-822
Telephone / Facsimile : +82-31-323-6008 / +82-31-323-6010

Measurement uncertainty

Radiated disturbance	(30 – 1 000 MHz)	:	+4.52 [dB] , -4.43 [dB] (k=2)
Radiated disturbance at above 1 GHz	(1 GHz – 6 GHz)	:	+3.0 [dB] , -3.0 [dB] (k=2)
Conducted disturbance	(0.15 – 30 MHz)	:	+0.11 [dB] , -0.11 [dB] (k=2)
Conducted disturbances at telecommunication ports	(0.15 – 30 MHz)	:	+0.11 [dB] , -0.11 [dB] (k=2)

The coverage factor k=2 yields approx. a 95% level of confidence for near-normal distribution typical of most measurement results.

Accredited agencies

LTA Co., Ltd. Is approved to perform EMC testing by the following agencies:

Agency	Country	Accreditation No.	Validity	Reference
NVLAP	U.S.A	200723-0	Updating	ECT accredited Lab.
RRA	KOREA	KR0049	-	EMC accredited Lab.
FCC	U.S.A	649054	2019-04-13	FCC CAB
VCCI	JAPAN	C-4948,	2020-09-10	VCCI registration
		T-2416,	2020-09-10	
		R-4483(10 m),	2020-10-15	
		G-847	2018-12-13	
IC	CANADA	5799A-1	2019-11-07	IC filing
KOLAS	KOREA	NO.551	Updating	KOLAS accredited Lab.

Brief Information

1-1 Test Summary

Parameter	Applied Standard	Status (note 1)
I. Emission		
Radiated disturbance	V-3/2016.11	C
Radiated disturbance at above 1 GHz	V-3/2016.11	C
Conducted disturbance	V-3/2016.11	NA
Conducted disturbances at telecommunication ports	V-3/2016.11	NA
Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable		
* The data in this test report are traceable to the national or international standards.		

Frequency range to be scanned:

0.15 MHz - 30 MHz as conducted measurement

30 MHz – 1 000 MHz (1 GHz) as radiated measurement

1 000 MHz(1 GHz)-1 000 MHz (1 GHz) as radiated measurement

Bandwidth:

Measured by the CISPR quasi-peak function Bandwidth is 10 kHz in the frequency 0.15 MHz to 30 MHz, 120 kHz in the frequency 30 MHz to 1,000 MHz and 1 MHz in the frequency 1 GHz to 6 GHz.

A sample calculation:

COR. F (correction factor)= Antenna factor + Cable loss- Amp.gain- Distance correction

Emission Level= meter reading + COR.F

1-2 Operating Mode of the EUT

The tests have been conducted with the following operational mode(s) of the EUT.

Name of mode in the report Description

Operating mode : -

1-3 Modification

- None

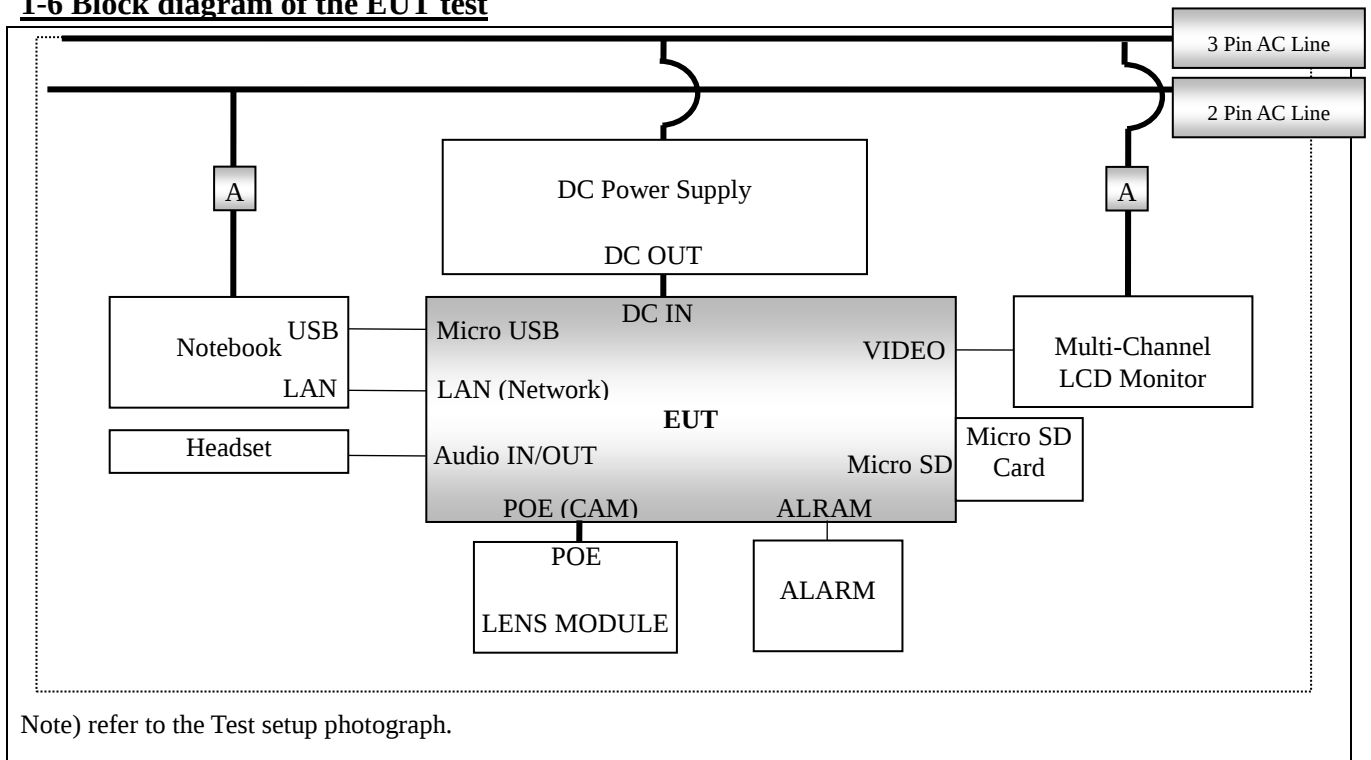
1-4 List of EUT and accessory

EUT				
Category	Model Name	Serial No.	Manufacturer	Remarks
NETWORK CAMERA	XNB-6001N	N/A	Hanwha Techwin (Tianjin) Co., Ltd.	-
ACCESSORY				
Category	Model Name	Serial No.	Manufacturer	Remarks
LENS MODULE	SLA-T4680V	N/A	Hanwha Techwin (Tianjin) Co., Ltd.	-
Notebook	PP37L	N/A	DELL	-
ALARM	N/A	N/A	N/A	-
Headset	SHS-100VB	N/A	SAMSUNG	-
DC Power Supply	N/A	N/A	N/A	-
MICRO SD Card	N/A	N/A	N/A	-
Multi-Channel LCD Monitor	RPM-501A	501GW10070	POSTIUM	-

1-5 Cable List

Cable List				
Cable Type	Length (m)	Shielding (Cable/backshell)	Remarks	
			From	to
DC Power Supply	1.5	NO/NO	DC IN	DC OUT
Notebook	3.0	NO/NO	LAN (Notebook)	LAN
Notebook	1.2	NO/NO	Micro USB	USB
Headset	2.0	NO/NO	Audio IN/OUT	Audio IN/OUT
LENS MODULE	8.0	NO/NO	POE (CAM)	POE
Multi-Channel LCD Monitor	1.0	NO/NO	VIDEO	BNC
ALRAM	0.2	NO/NO	ALRAM	ALRAM
Micro SD Card	-	-	Micro SD	-
AC Power Source	1.5	NO/NO	AC IN	3 Pin AC Line
Adapter	1.5	NO/NO	DC IN	DC OUT
Adapter	1.5	NO/NO	DC IN	DC OUT

1-6 Block diagram of the EUT test

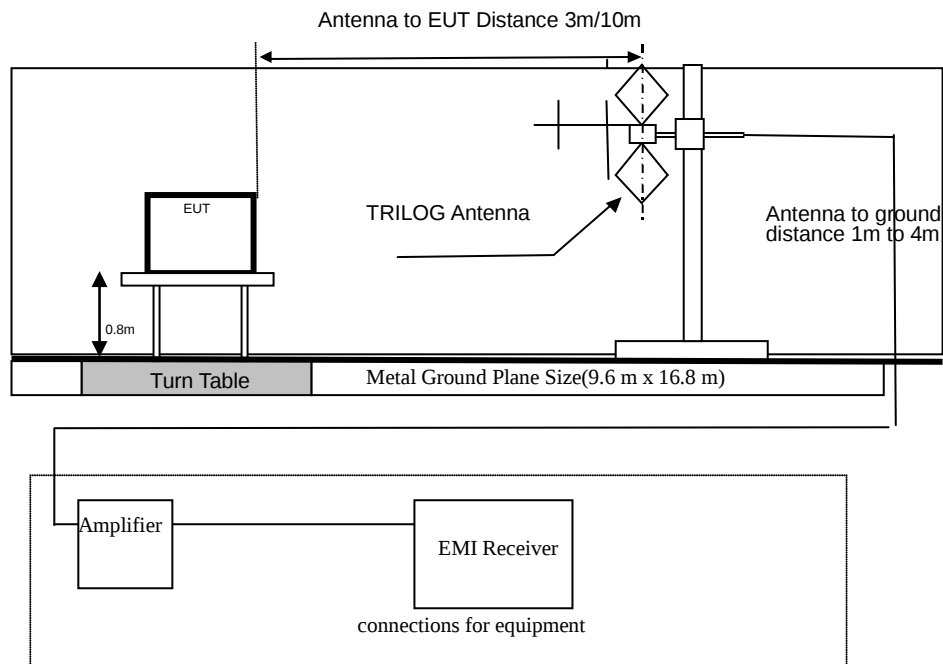


2- Test Site Description

1-Facility

All the testing facilities are periodically serviced as a daily check for equipment and cables systems, an every 6 months facility check for the facilities and a monthly check and annual calibration for testing equipment according to ISO/IEC 17025. All the testing facilities are used as the same specifications shown below. There are descriptions both for radiated disturbance measurement and conducted disturbance measurement conformed by VCCI V-3/2016.11

2-1 Radiated Disturbance Measurement – Below 1 GHz



2-2 Conducted Disturbance Measurement

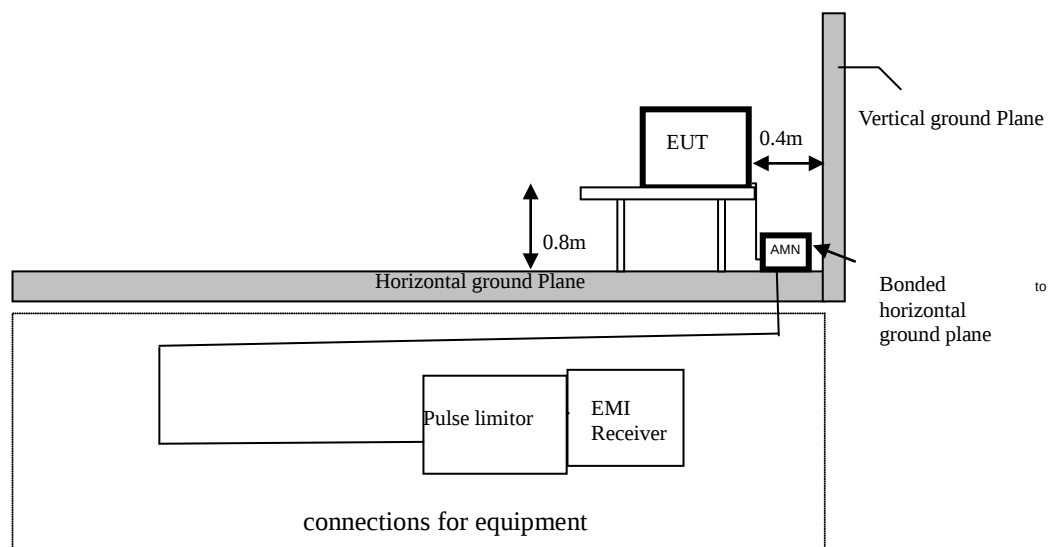


Diagram illustrating the test setup for a Current probe (if applied). The setup includes the EUT (Equipment Under Test), a Current probe (if applied), a CDN/ISN (Common Mode Decoupling Network/Isolation Shielding Network), and the AE (Associated Equipment). The EUT and AE are connected to a common ground. The distance between the EUT and AE is 80cm. The distance between the Current probe and the EUT is 10cm. The height of the EUT and AE is 40cm. The height of the CDN/ISN is 20cm. The height of the ground plane is 10cm.

AE = Associated equipment
EUT = Equipment under test

The diagram illustrates a 3m Semi Anechoic Chamber (5 x 8 x 3.8) used for EMI testing. Two Horn Antennas are positioned on the left wall, with a distance of 3m between them. The distance from the antennas to the ground is 1m to 2m. A table with a 1.2m diameter base is positioned on the right. The chamber is lined with absorbers, and a wavy line indicates the signal path. The setup is connected to an Amplifier and an EMI Test Receiver.

3- Test Procedure

3-1 Radiated Disturbance Measurements

- Test site is met the requirements of VCCI V-3/2016.11 and the distance between the EUT and the antenna is adjusted 3 m or 10m.
- The turntable can be rotated 360 degrees.
- The antenna can be adjusted between 1m and 4m in height above the ground.
- The EUT is placed on the non-conducting table with 0.8m height on the turntable.
- Measurements are carried out using a spectrum analyzer with peak detectors (100kHz bandwidth) and an EMI receiver with quasi-peak detectors(120 kHz bandwidth).
- Refer to the list of test equipment used for the test.
- Biconical antenna and logperiodic antenna are used as wideband antenna.
- The Biconical antenna is used in the frequency range of 30 MHz to 300 MHz and the Logperiodic antenna is used in the frequency range of 300 MHz to 1 GHz.
- A variable attenuator is used for verifying amplifier's linearity.
- Rotating the turntable and adjusting the height of the antenna are carried out by control buttons on the console.
- Refer to "Brief Information"(page 6-10) about details of the EUT and configuration of the cables.

- Measurement is carried out by a LTA operator as manual operation.
 - searching for some of High disturbance frequency points than the other points with the following settings; bandwidth 100 kHz, frequency range 10 MHz between 30 MHz and 300 MHz and frequency range 50 MHz between 300 MHz and 1 GHz.
 - searching the worst direction with the maximum level of the disturbance wave in rotating the turntable 360 degrees at each searched frequency point.
 - setting the height of the antenna with the maximum level of the disturbance wave from 1m to 4 m.
 - reading the disturbance level by the EMI receiver with quasi-peak detectors (120 kHz bandwidth) according to VCCI V-3/2016.11
 - measuring to vertical and horizontal polarization.
 - calculating the measurement result with the following formula or equation:
(Measurement result= measured value + antenna factor + antenna cable loss)

3-2 Conducted Disturbance Measurements

- The measurement is carried out on an open site with horizontal and metallic ground plane.
- An AMN(Artificial Mains Network) with a nominal impedance ($50 \Omega/50 \mu\text{H}$) as defined in VCCI V-3/2016.11. shall be utilized.
- The AMN is grounded on a horizontal metal ground plane.
- Measurement is carried out using a spectrum analyzer with peak detectors (10kHz bandwidth) and an EMI receiver with quasi-peak detectors and average detector. (Refer to the List of test equipment used for the test.)
- The shortest distance between the EUT and the AMN is 0.8 m.
- The EUT is placed on the non-conducting table with 0.8 m height.
- A remote switch is used for changing phases between Line (L) and Neutral (N).
- Refer to "Brief Information"(page 6-10) about details of the EUT and configuration of the cables.

- Measurement is carried out as manual operation.
 - detecting the maximized emission level using the maxhold function after setting the spectrum analyzer bandwidth 1MHz and the frequency range from 150 kHz to 1 MHz , 1 MHz to 5 MHz and 5 MHz to 30 MHz.
 - searching the maximum frequency point of the disturbance wave in each frequency range.
 - reading the disturbance level of quasi-peak, average and Line (L) and Neutral (N) in 10 kHz bandwidth by the EMI receiver.
 - calculating the measurement result with the following formula or equation.
(Result = Reading + Cor.F.)
(Margin = Limit- Result)

3-3 Conducted Disturbances at telecommunication ports Measurements

- In the range of 0.15 MHz to 30 MHz, the conducted disturbance was measured and set-up was made accordance with VCCI V-3/2016.11, CLASS A ITE.
- The EUT is placed on a non-conducting table, which is: 0.8 meters above an earth-grounded floor; 0.4 meters away from a vertical ground plane (i.e. the chamber wall); and 0.8 meter away from all other metal objects. For cables where there is no appropriate CDN / ISN available, measurement was done using a combination of current probe and capacitive voltage probe.

- Measure current with a current probe.
 - Measure voltage with a capacitive probe
- Compare the measured voltage with the voltage limit.
- Compare the measured current with the current limit.
- The EUT shall meet both the voltage and current limits.

3-4 Radiated Disturbance at above 1 GHz

- Test site is met the requirements of VCCI V-3/2016.11 and the distance between the EUT and the antenna is adjusted 3 m.
- The turntable can be rotated 360 degrees.
- The antenna can be adjusted between 1m in height above the ground.
- The EUT is placed on the non-conducting table with 1m height on the turntable.
- Measurements are carried out using a EMI test receiver with peak detectors (1 MHz bandwidth) and an EMI receiver with peak and average detectors(1 MHz bandwidth).
- Refer to the list of test equipment used for the test.
- HORN antenna are used as wideband antenna.
- The HORN antenna is used in the frequency range of 1 GHz to 18 GHz.
- A variable attenuator is used for verifying amplifier's linearity.
- Rotating the turntable and adjusting the height of the antenna are carried out by control buttons on the console.
- Refer to "Brief Information"(page 6-10) about details of the EUT and configuration of the cables.
- Measurement is carried out by a LTA operator as manual operation.
 - searching the worst direction with the maximum level of the disturbance wave in rotating the turntable 360 degrees at each searched frequency point.
 - setting the height of the antenna with the maximum level of the disturbance wave from 1m
 - reading the disturbance level by the EMI receiver with peak and average detectors (1 MHz bandwidth) according to ANSI C 63.4:2003.
 - measuring to vertical and horizontal polarization.
 - calculating the measurement result with the following formula or equation:
(Measurement result= measured value + antenna factor + antenna cable loss)

4- List of Equipment Used For the Tests

Radiated Emission – Below 1 GHz

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	EMI TEST Receiver	ESCI7	Rohde & Schwarz	100772	2017.09.12	1 year
☒	Amplifier (25 dB)	8447D	HP	2944A07974	2017.09.12	1 year
☐	DTV Signal Generator	MFG-100	MFLO	15M2002	2018.03.20	1 year
☐	Color TV Pattern Generator	PM-5518-TX	Philips	LO5333	-	-
☒	TRILOG Antenna	VULB9160	SCHWARZBECK	9160-3237	2019.05.16	2 year
☒	TEST PROGRAM	e3_Ver: 6.2009-10-12a	AUDIX	-	-	-

Radiated Emission – Above 1 GHz

	Item	Model Name	Manufacturer	Serial No.	Next Cal.	Interval
☒	EMI TEST Receiver	ESCI7	Rohde & Schwarz	100772	2017.09.12	1 year
☒	Amplifier (25 dB)	8449B	HP	3008A00337	2018.03.20	1 year
☐	DTV Signal Generator	MFG-100	MFLO	15M2002	2018.03.20	1 year
☐	Color TV Pattern Generator	PM-5518-TX	Philips	LO5333	-	-
☒	HORN ANTENNA	3115	ETS	00055005	2019.05.16	2 year
☒	TEST PROGRAM	e3_Ver: 6.2009-10-12a	AUDIX	-	-	-

5-1 Radiated Disturbance Measurements (Below 1GHz) / V



4, Songjuro 236Beon-gil, yanggi-myeon,
Yongin-si, Gyeonggi-do, Korea
Tel : +82-31-3236008,9
Fax : +82-31-3236010
www.ltalab.com

EUT/Model No.: XNB-6001

Temp/Humi: 27 / 57

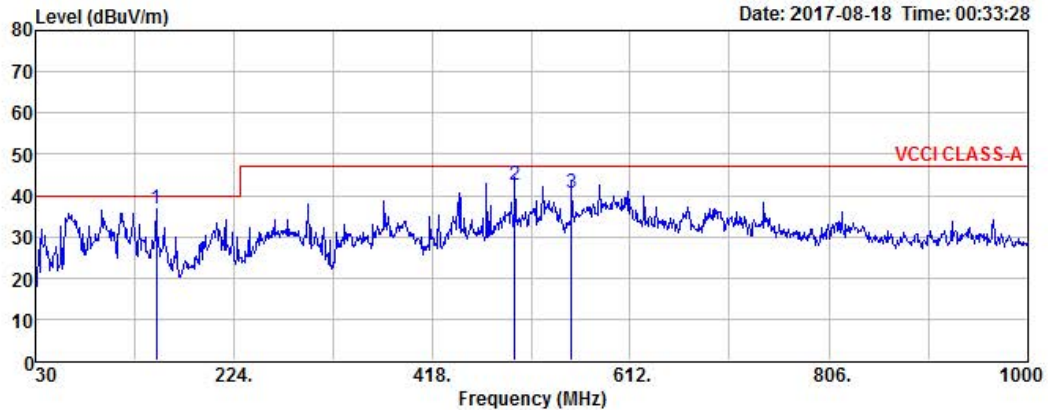
Test Mode : Operating mode

Tested by: KANG H J

Data: 1268

File: C:\Program Files (x86)\e3\1708-1.EM6 (1268)

Date: 2017-08-18 Time: 00:33:28



Freq MHz	Reading dBuV	C.F dB	Result QP dBuV/m	Limit dBuV/m	Margin dB	Height cm	Angle deg	Polarity
148.34	48.59	-11.94	36.65	40.00	3.35	104	179	VERTICAL
499.48	49.06	-6.65	42.41	47.00	4.59	108	114	VERTICAL
554.77	45.95	-5.56	40.39	47.00	6.61	105	228	VERTICAL

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

-Continue
(Below 1GHz) / H



4, Songjiuro 236Beon-gil, yanggi-myeon,
Yongin-si, Gyeonggi-do, Korea
Tel : +82-31-3236008,9
Fax : +82-31-3236010
www.ltalab.com

EUT/Model No.: XNB-6001

Temp/Humi: 27 / 57

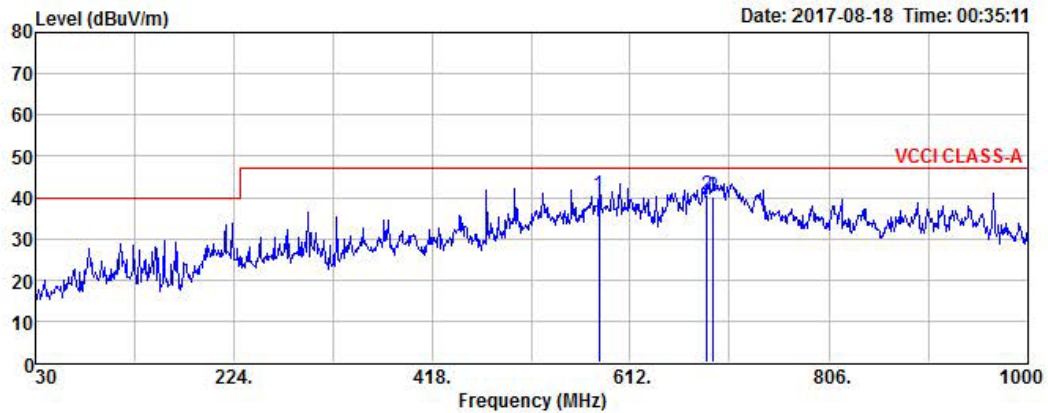
Test Mode : Operating mode

Tested by: KANG H J

Data: 1269

File: C:\Program Files (x86)\e3\1708-1.EM6 (1269)

Date: 2017-08-18 Time: 00:35:11

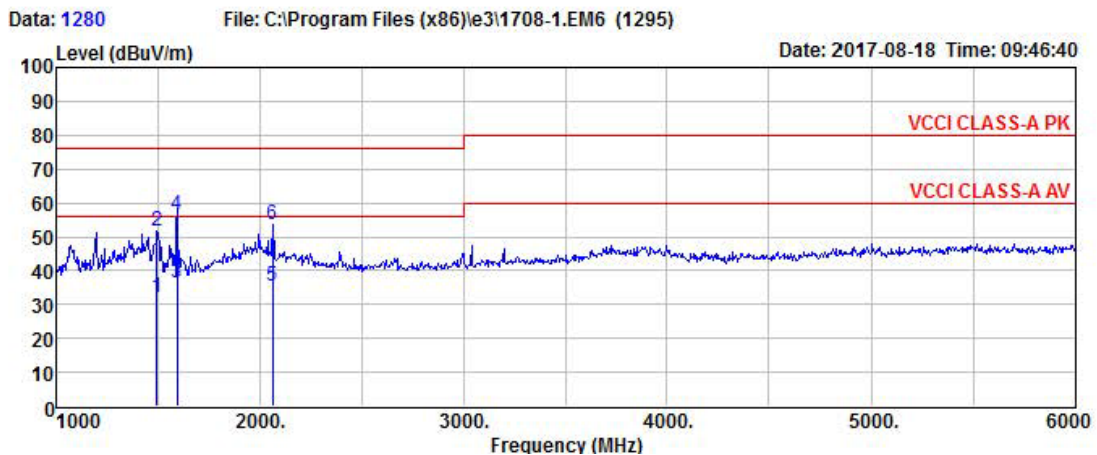


Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
MHz	dBuV	dB	QP dBuV/m	dBuV/m	dB	cm	deg	
581.93	45.07	-4.66	40.41	47.00	6.59	120	46	HORIZONTAL
687.66	43.33	-2.90	40.43	47.00	6.57	325	194	HORIZONTAL
693.48	43.18	-2.81	40.37	47.00	6.63	382	213	HORIZONTAL

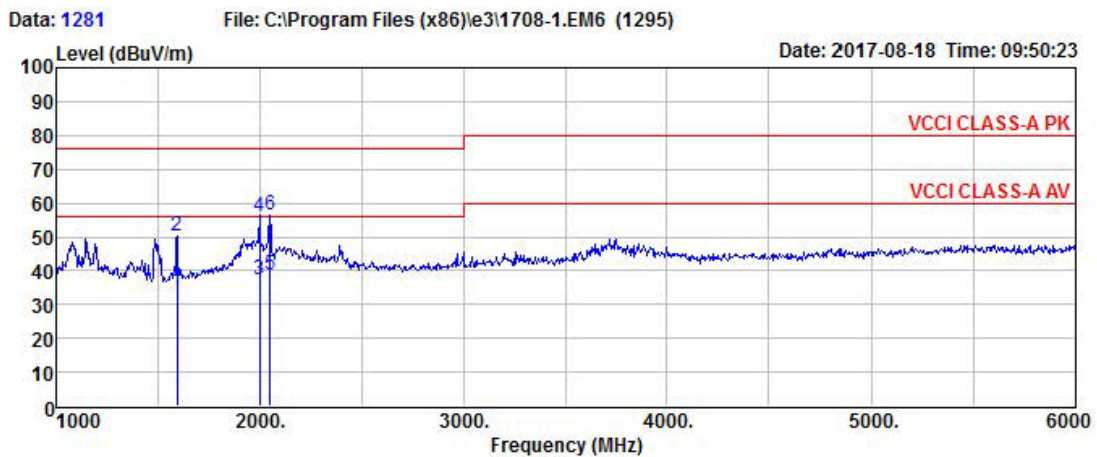
Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

**-Continue
(Above 1GHz)**

EUT/Model No.: XNB-6001 Temp/Humi: 25 / 57
Test Mode : Operating mode Tested by: KANG H J



EUT/Model No.: XNB-6001 Temp/Humi: 25 / 57
Test Mode : Operating mode Tested by: KANG H J



Manufacture : Hanwha Techwin (Tianjin) Co.

Test Date

Temp.: Humidity Distance
[°C] : [%] (m)

Model : XNB-6001

2017-08-18

25

57

4.5

TEST mode : Operating mode

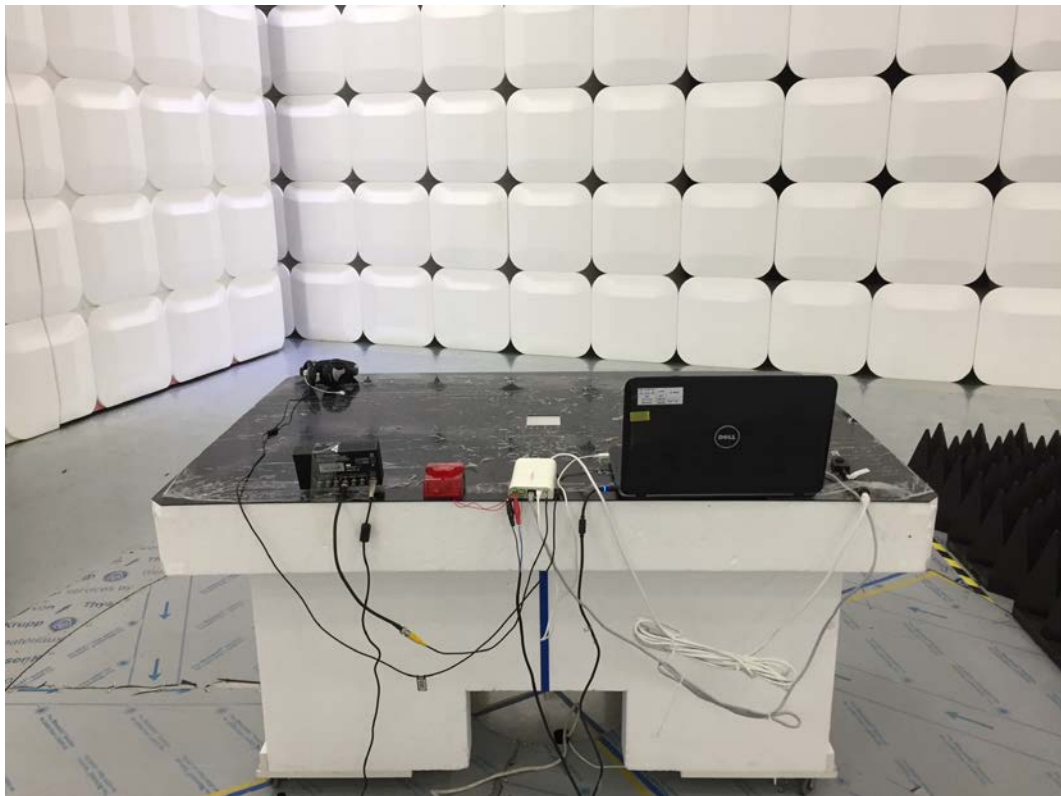
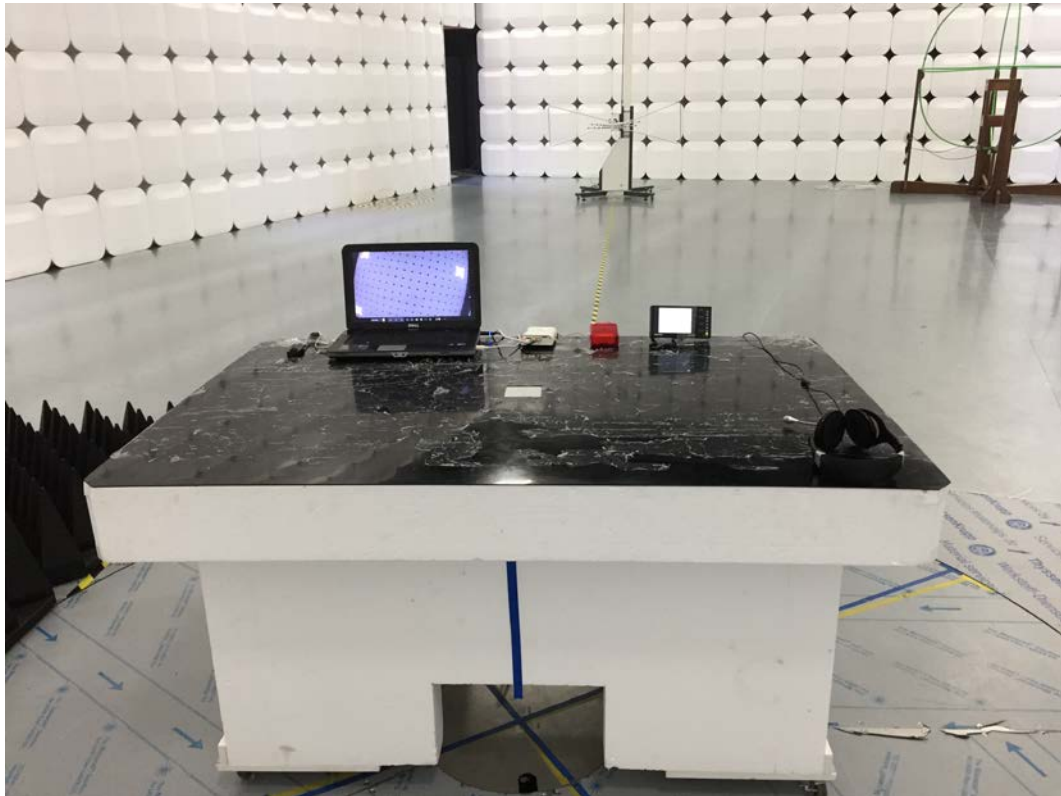
Ver Data: 1280 Hor Data: 1281

Freq.(MHz)	Reading(PK)	Reading(AV)	C.F	Result(PK)	Result(AV)	Limit(PK)	Limit(AV)	Margin(PK)	Margin(AV)	Height	Angle	Polarity
MHz	dBuV	dBuV	dB	dBuV/m	dBuV/m	dBuV/m	dBuV/m	dB	dB	cm	deg	Hor/Ver
1595.0	57.9	41.3	-4.02	53.91	37.32	76.0	56.0	22.09	18.68	100	246	H
2000.0	60.1	41.4	-0.64	59.43	40.78	76.0	56.0	16.57	15.22	100	319	H
2050.0	60.0	42.6	-0.25	59.78	42.36	76.0	56.0	16.22	13.64	100	224	H
1495.0	59.9	40.2	-4.63	55.23	35.58	76.0	56.0	20.77	20.42	100	189	V
1595.0	63.9	43.7	-4.02	59.83	39.69	76.0	56.0	16.17	16.31	100	274	V
2065.0	57.2	38.9	-0.18	57.02	38.75	76.0	56.0	18.98	17.25	100	301	V

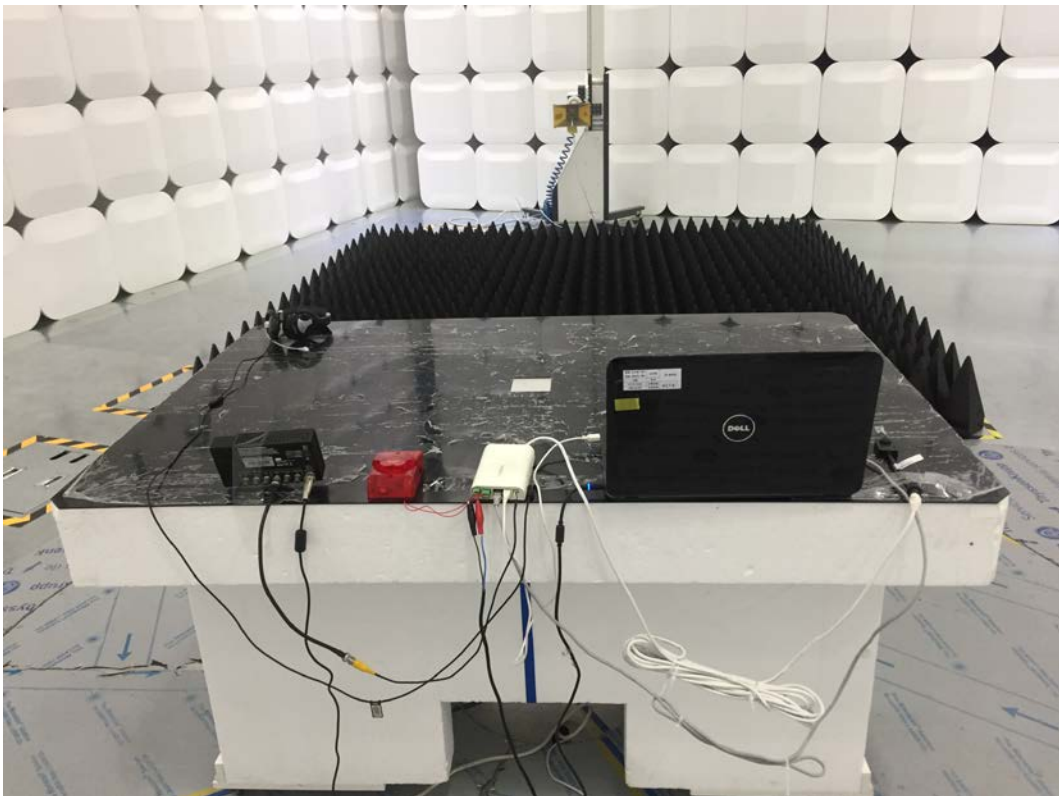
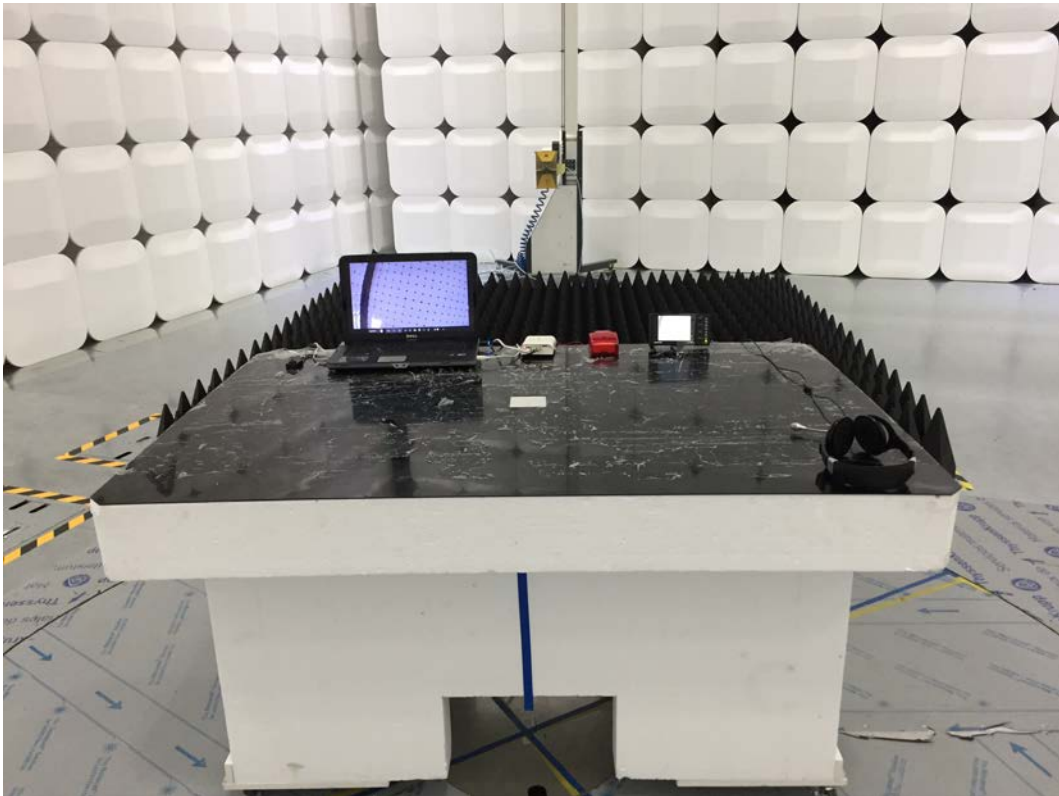
Conclusions

Product models " **XNB-6001N** " meets all of the CLASS A requirements of the VCCI V-3/2016.11
(Limits of radio disturbance characteristics of ITE).
(Refer to Test Specification and Test Results in the "LTA certification", page 4 and 5.)

Photograph of the Radiated Disturbance Measurements (Below 1GHz)



Photograph of the Radiated Disturbance Measurements (Above 1GHz)



Photograph of the Equipment Under Test

