FCC SDoC Test Report

Issued date: Jul. 22, 2019

Project No.: 19Q070201

Product : Network Camera

Model : IT9360-H

Applicant : VIVOTEK INC.

Address : 6F, No.192, Lien-Cheng Rd., Chung-Ho , New Taipei City, 235, Taiwan, R.O.C.

Report No: WD-EF-R-190463-A0

According to

47 CFR FCC Part 15, Subpart B, Class B ANSI C63.4: 2014

ICES-003: 2016 Issue 6, Class B

Authorized Signatory : / Ken Huang

Wendell Industrial Co., Ltd

Wendell Electrical Testing Lab.

Add: 6F/6F-1, No.188, Baoqiao Rd., Xindian Dist., New Taipei City 23145, Taiwan R.O.C.

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History of this test report

Report No.	Issue date	Description
WD-EF-R-190463-A0	Jul. 22, 2019	Initial Issue

Declaration

This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us.

History of supplementary report

Report No.	Issue date	Description
WD-EF-R-190463-A0	Jul. 22, 2019	Original report

Declaration

This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us.

1 Certification

Product:	Network Camera
Brand Name:	VIVOTEK
Model:	IT9360-H
Applicant:	VIVOTEK INC.
Tested:	Jul. 08 ~ Jul. 09, 2019
Standard:	47 CFR FCC Part 15, Subpart B, Class B
	ICES-003: 2016 Issue 6, Class B
	ANSI C63.4: 2014

The above equipment (Model: IT9360-H) has been tested by **Wendell Electrical Testing Lab.**, and found compliance with the requirement of the above standards. The test record, data evaluation and Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Please note that the measurement uncertainty are provided for informational purpose only and are not used in determining the Pass/Fail results.

1.1 Summary of Test Result

The EUT has been tested according to the following specifications:

Emission				
Standard	**Test Item**	**Limit**	**Result**	**Remark**
47 CFR FCC Part 15, Subpart B	Conducted disturbance at mains terminals	-	N/A	Without AC main power port of the EUT
ICES-003	Radiated disturbance	Class B	Pass	Meets the requirements

Note: Test record contained in the referenced test report relate only to the EUT sample and test item.

2 Test Configuration of Equipment Under Test

2.1 Test Facility

Conducted disturbance at mains terminals Test

W01: 5F-1, No.188, Baoqiao Rd., Xindian Dist., New Taipei City 23145, Taiwan (R.O.C.)

Radiated emission (9*6*6 Chamber) and Conducted disturbance at mains terminals Tests

W06: No.67-9, Shimen Rd., Tucheng Dist., New Taipei City 23654, Taiwan (R.O.C.)

ACCREDITATIONS

The laboratories are accredited and approved by the TAF according to ISO/IEC 17025.

2.2 Measurement Uncertainty

The measurement instrumentation uncertainly consideration contained in CISPR 16-4-2.

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
Please note that the measurement uncertainty are provided for informational purpose only and are not used in determining the Pass/Fail results.

2.2.1 Conducted Emission test

Test Site	Measurement Freq. Range	dB (U_{cispr})	Note
W01	150 kHz ~ 30 MHz	2.43	N/A
W06	150 kHz ~ 30 MHz	2.52	N/A

2.2.2 Radiated Emission test

Test Site	Measurement Freq. Range	Ant	dB (U_{cispr})	Note
W06	30 MHz ~ 200 MHz	V	3.16	N/A
	30 MHz ~ 200 MHz	H	2.46	N/A
	200 MHz ~ 1000 MHz	V	4.72	N/A
	200 MHz ~ 1000 MHz	H	3.01	N/A
	1 GHz ~ 6 GHz	V	5.04	N/A
	1 GHz ~ 6 GHz	H	4.92	N/A
	6 GHz ~ 18 GHz	V	5.22	N/A
	6 GHz ~ 18 GHz	H	5.16	N/A
	18 GHz ~ 40 GHz	V	4.68	N/A
	18 GHz ~ 40 GHz	H	4.92	N/A

3 Generation Information

3.1 Description of EUT

Product	Network Camera
Brand	VIVOTEK
Model	IT9360-H
Applicant	VIVOTEK INC.
Received date	May 31, 2019
EUT Power Rating	54Vdc (from POE Injector)
Model Differences	N/A
Operating System	N/A
Data Cable Supplied	N/A
Accessory Device	N/A
I/O Port	Please refer to the User's Manual

Note:

1. The EUT's highest operating frequency is 500MHz. Therefore the radiated emission is tested up to 6GHz.

3.2 Description of Test Modes

For radiated emission, the EUT has been pre-tested under the following test modes, and **test mode 1** was the worst case for final test.

Test Mode	Test Condition
1	POE mode (IR ON)
2	POE mode (IR OFF)

Test results are presented in the report as below.

Test Result	Test Condition
Radiated emission 30MHz ~ 1GHz test	
-	POE mode (IR ON)
Radiated emission above 1GHz test	
-	POE mode (IR ON)

3.3 EUT Operating Condition

a. Placed the EUT on the test table.
b. Prepare server PC and POE Injector to act as a communication partner and placed it outside of testing area.
c. The EUT was connected to the server PC with LAN cable and POE.
d. The communication partner sent data to EUT by command "ping" via LAN.
e. The EUT sent video signal to server PC via LAN cable and POE.
f. The server PC show IPCAM’s image on browser.
g. The EUT write data with Micro SD card.

3.4 Description of Support Unit

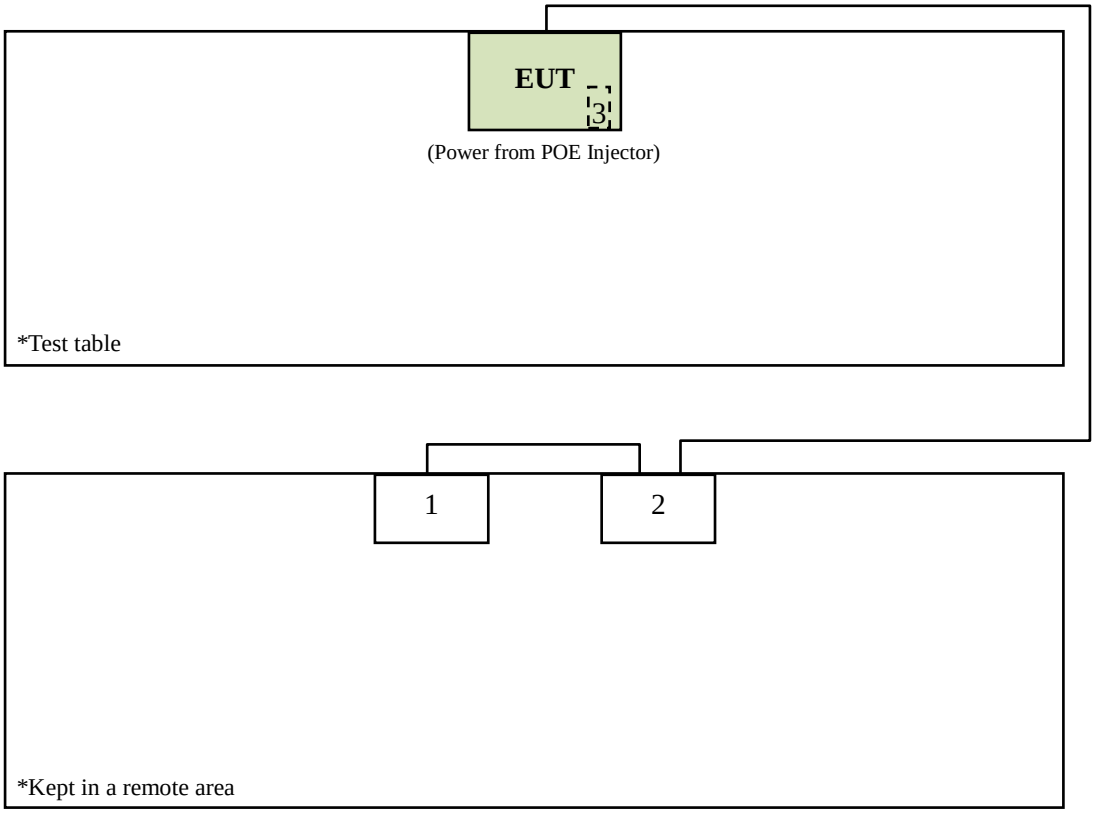
The EUT has been conducted testing with other necessary accessories or support units.

Item	Equipment	Brand	Model No.	Serial No.	FCC ID	Data Cable	Power Cord	Remark
1	Desktop PC	DELL	D19M	N/A	PPD-QCN FA335	1m CAT.5E non-shielded RJ45 cable	1.8m non-shielded cable	-
2	POE Injector	CERIO	POE-G30	N/A	N/A	20m CAT.5E non-shielded RJ45 cable	1.8m non-shielded cable	-
3	Micro SD Card	ADATA	16GB	N/A	N/A	N/A	N/A	-

Note: 1. The core(s) is(are) originally attached to the cable(s).
2. Item 1-2 acted as communication partners to transfer data.
3. The EUT uses the follow POE:

POE Injector (Support Unit)	
Brand	CERIO
Model	POE-G30
Input Power	100-240Vac, 2A
Output Power	54Vdc, 1A
Power line	1.8m non-shielded cable

3.5 Configuration of System Under Test



4 Emission Test

4.1 Conducted Emission Measurement (Frequency Range 150 KHz-30MHz)

The test is determined no necessary for the EUT do not operate from the AC main power lines or contain provisions for operation while connected to the AC main power lines.

4.2 Radiated Emission Measurement

4.2.1 Limits of Radiated Emission Measurement

Radiated Frequency range 30 MHz to 1000 MHz

Radiated Emissions Limits at 10 meters				
Frequencies (MHz)	**FCC 15B/ ICES-003**		**CISPR 22**	
	Class A (dBµV/m)	**Class B (dBµV/m)**	**Class A (dBµV/m)**	**Class B (dBµV/m)**
30-88	39	29.5	40	30
88-216	43.5	33.1		
216-230	46.4	35.6		
230-960			47	37
960-1000	49.5	43.5		

Radiated Emissions Limits at 3 meters				
Frequencies (MHz)	**FCC 15B/ ICES-003**		**CISPR 22**	
	Class A (dBµV/m)	**Class B (dBµV/m)**	**Class A (dBµV/m)**	**Class B (dBµV/m)**
30-88	49.5	40	50.5	40.5
88-216	54	43.5		
216-230	56.9	46		
230-960			57.5	47.5
960-1000	60	54		

Note: 1. The lower limit shall apply at the transition frequency.
2. Detector function in the form: PK = Peak, QP = Quasi Peak, AV = Average
3. The test result calculated as following:
Measurement Value = Reading Level + Correct Factor
Correction Factor = Antenna factor + Cable loss (Antenna to preamplifier) - preamplifier Gain + Cable loss (preamplifier to receiver)
Margin Level = Measurement Value - Limit Value

Radiated Frequency range above 1 GHz

Radiated Emissions Limits at 10 meters						
Frequencies (MHz)	FCC 15B/ ICES-003				CISPR 22	
	Class A (dBµV/m)		Class B (dBµV/m)		Class A (dBµV/m)	Class B (dBµV/m)
	Peak	Average	Peak	Average		
1000-3000	69.5	49.5	63.5	43.5	Not defined	Not defined
Above 3000						

Radiated Emissions Limits at 3meters								
Frequencies (MHz)	FCC 15B/ ICES-003				CISPR 22			
	Class A (dBµV/m)		Class B (dBµV/m)		Class A (dBµV/m)		Class B (dBµV/m)	
	Peak	Average	Peak	Average	Peak	Average	Peak	Average
1000-3000	80	60	74	54	76	56	70	50
Above 3000					80	60	74	54

Note: 1. The lower limit shall apply at the transition frequency.
2. Detector function in the form: PK = Peak, QP = Quasi Peak, AV = Average
3. The test result calculated as following:
Measurement Value = Reading Level + Correct Factor
Correction Factor = Antenna factor + Cable loss (Antenna to preamplifier) - preamplifier Gain + Cable loss (preamplifier to receiver)
Margin Level = Measurement Value - Limit Value

Frequency Range (For unintentional radiators)

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705-108	1000
108-500	2000
500-1000	5000
Above 1000	5th harmonic of the highest frequency or 40GHz, whichever is lower

4.2.2 Test Instrument

Test Site: W06-966					
Item	**Equipment**	**Manufacturer**	**Model**	**Meter No.**	**Calibration Date**
1	Horn Antenna	Schwarzbeck	BBHA 9120D	CT-9-031	Oct. 09, 2018
2	Horn Antenna	Schwarzbeck	BBHA 9170	CT-9-032	Oct. 11, 2018
3	Bilog Antenna	Schwarzbeck	VULB 9168	CT-9-027-2	Oct. 19, 2018
4	EXA Signal Analyzer	Keysight	N9010A	CT-1-093	Apr. 19, 2019
5	EMI Test Receiver	Keysight	N9038A	CT-9-029	Dec. 05, 2018
6	Preamplifier	EMEC	EMC330	CT-9-024	Oct. 16, 2018
7	Preamplifier	EMCI	EMC051845SE	CT-9-012	Oct. 11, 2018
8	Preamplifier	EMCI	EMC184045SE	CT-9-013	Oct. 10, 2018
9	Test Cable	EMEC	EM-CB400	CT-9-001-1	Oct. 18, 2018
10	Test Cable	EMEC	EM-CB400	CT-9-001-2	Oct. 18, 2018
11	Test Cable	EMEC	EM-CB400	CT-9-001-3	Oct. 18, 2018
12	Test Cable	HUBER+SUHNER	SF102	CT-9-002-1	Oct. 10, 2018
13	Test Cable	EMEC	EMC102-KM-KM-600	CT-9-020	Oct. 10, 2018
14	Test Cable	EMEC	EMC102-KM-KM-3000	CT-9-021-1	Oct. 10, 2018
15	Measurement Software	EZ-EMC	Ver : FA-03A2 RE	CT-3-012	No calibration request

Note: 1. The calibration interval of the above test instruments is 12 months.

4.2.3 Test Procedure

a. The EUT was placed on the top of a turntable 0.8 meters above the ground at a 3 m 966 chamber or 10 m open area test site. The table was rotated 360 degrees to determine the position of the high radiation emissions.

b. The height of the test antenna shall vary between 1 m to 4 m. Both vertical and horizontal polarizations of the antenna were set to make the measurement.

c. The EUT was set up as per the test configuration to simulate typical usage per the user's manual. All I/O cables were positioned to simulate typical usage. The actual test configuration, please refer to EUT test photos.

d. The initial step in collecting radiated emission data is a Spectrum Mode scanning the measurement frequency range.

Below 1GHz:

Reading in which marked as QP or Peak means measurements by using Spectrum Mode with detector RBW=120kHz.

If the Spectrum Mode measured peak value compliance with and lower than Quasi Peak Limit, the EUT shall be deemed to meet QP Limits.

Above 1GHz:

Reading in which marked as Peak & AVG means measurements by using Spectrum Mode with setting in RBW=1MHz.

If the Spectrum Mode measured value compliance with the Peak Limits and lower than AVG Limits, the EUT shall be deemed to meet both Peak and AVG Limits.

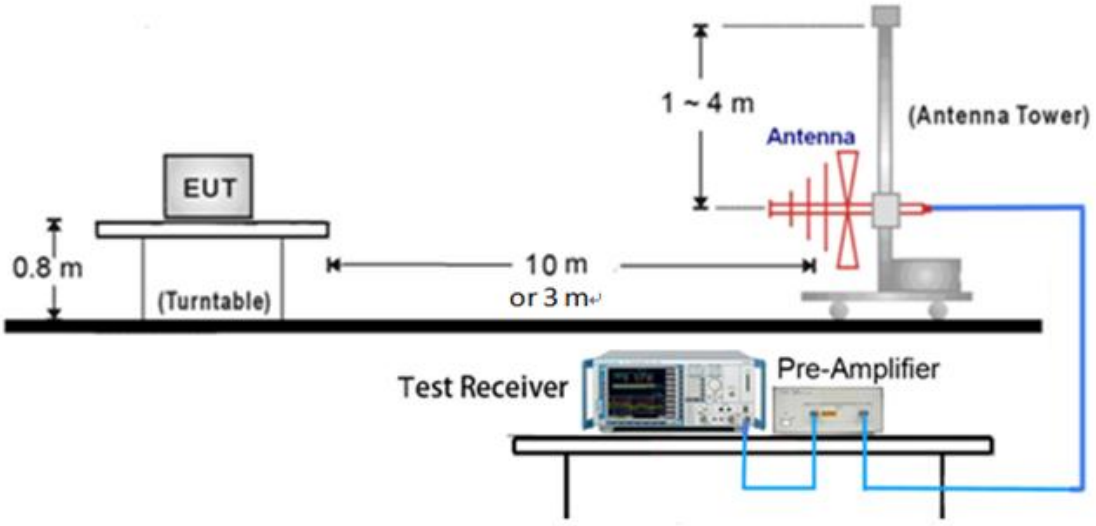
e. Emission frequency and amplitude were recorded, recording at least six highest emissions. The EUT and cable configuration of the above highest emission levels were recorded. The test data of the worst case was recorded.

4.2.4 Deviation from Test Standard

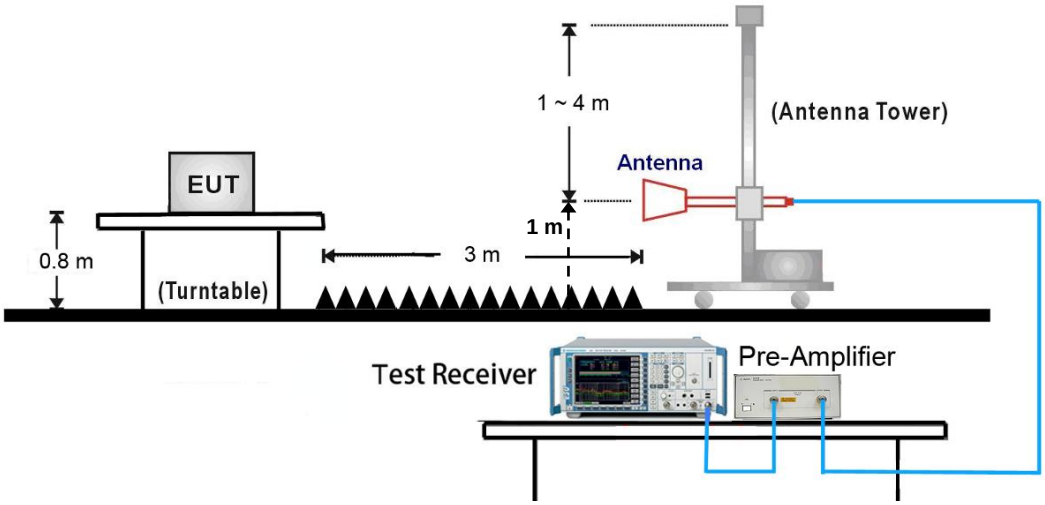
No deviation

4.2.5 Test Setup

< Radiated Emissions Frequency: 30 MHz to 1000 MHz >



< Radiated Emissions Frequency: above 1GHz >

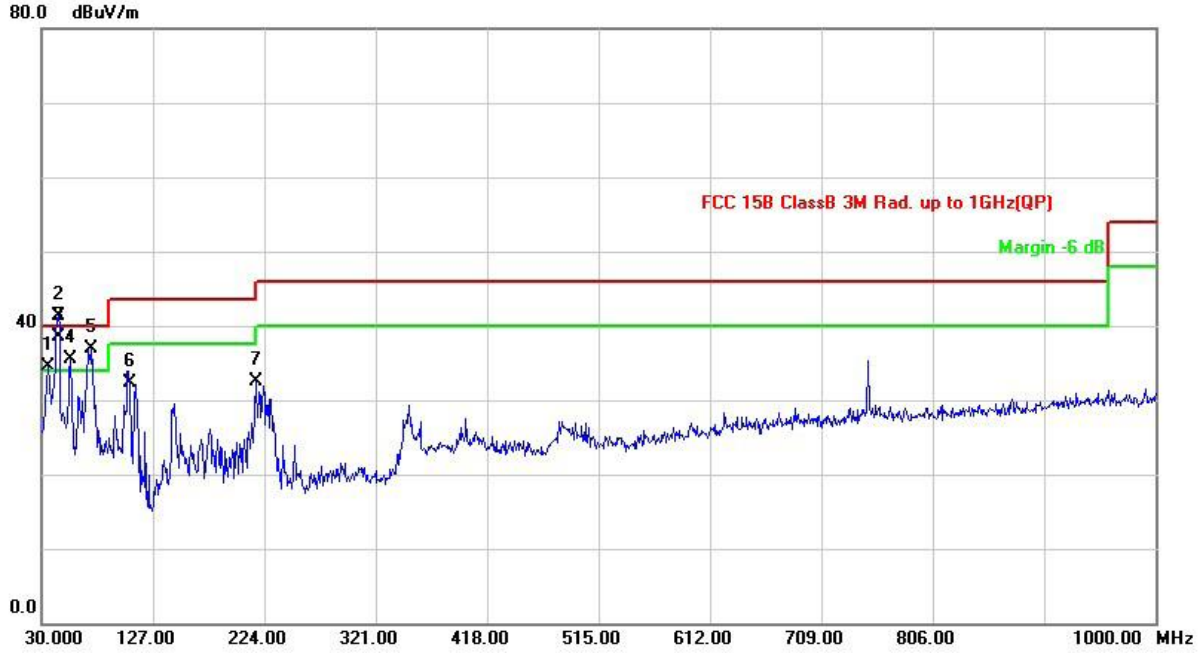


Note:

(1) Please refer to the 4.2.7 for the actual test configuration.
(2) The formula of measured value as: Test Result = Reading + Correction Factor
(3) Detector function in the form: PK = Peak, QP = Quasi Peak, AV = Average
(4) The test result calculated as following:
Measurement Value = Reading Level + Correct Factor
Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain (if use)
Margin Level = Measurement Value - Limit Value

4.2.6 Test Result

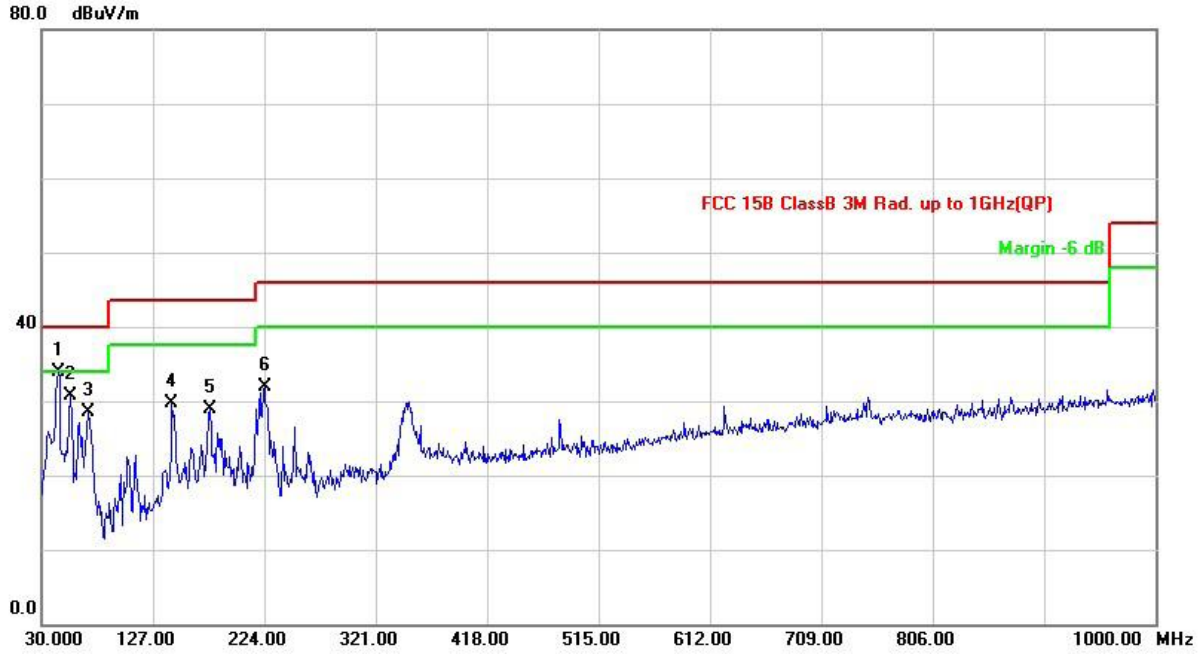
Test Voltage	54Vdc (from POE)	Frequency Range	30 – 1000 MHz
Environmental Conditions	27℃, 69% RH	6dB Bandwidth	120 kHz
Test Date	2019/07/08	Test Distance	3m
Tested by	Karwin Kao	Polarization	Vertical
Test Site	W06		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	35.8200	44.75	-10.33	34.42	40.00	-5.58	peak	100	92
2	44.5499	50.86	-9.48	41.38	40.00	1.38	peak	100	190
3	44.5499	47.94	-9.48	38.46	40.00	-1.54	QP	100	190
4	55.2199	45.12	-9.66	35.46	40.00	-4.54	peak	100	53
5	73.6500	49.94	-13.03	36.91	40.00	-3.09	peak	200	228
6	106.6299	45.77	-13.53	32.24	43.50	-11.26	peak	100	360
7	216.2400	44.83	-12.38	32.45	46.00	-13.55	peak	146	360

Remark: 1. QP = Quasi Peak
2. Correction Factor = Antenna factor + Cable loss (Antenna to preamplifier) - preamplifier Gain + Cable loss (preamplifier to receiver)
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value - Limit Value

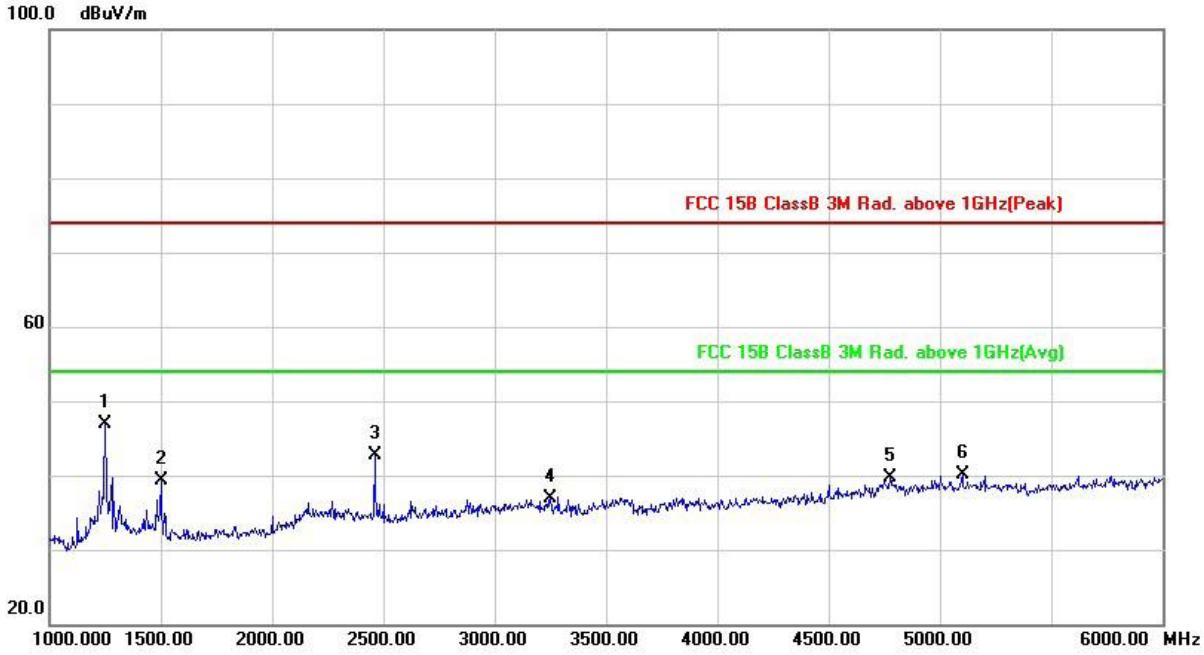
Test Voltage	54Vdc (from POE)	Frequency Range	30 – 1000 MHz
Environmental Conditions	27℃, 69% RH	6dB Bandwidth	120 kHz
Test Date	2019/07/08	Test Distance	3m
Tested by	Karwin Kao	Polarization	Horizontal
Test Site	W06		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	44.5500	43.37	-9.48	33.89	40.00	-6.11	peak	100	91
2	55.2200	40.36	-9.66	30.70	40.00	-9.30	peak	200	82
3	70.7400	40.76	-12.28	28.48	40.00	-11.52	peak	200	92
4	143.4900	39.73	-10.05	29.68	43.50	-13.82	peak	200	82
5	176.4700	39.62	-10.81	28.81	43.50	-14.69	peak	200	112
6	224.0000	44.17	-12.19	31.98	46.00	-14.02	peak	100	81

Remark: 1. QP = Quasi Peak
2. Correction Factor = Antenna factor + Cable loss (Antenna to preamplifier) - preamplifier Gain + Cable loss (preamplifier to receiver)
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value - Limit Value

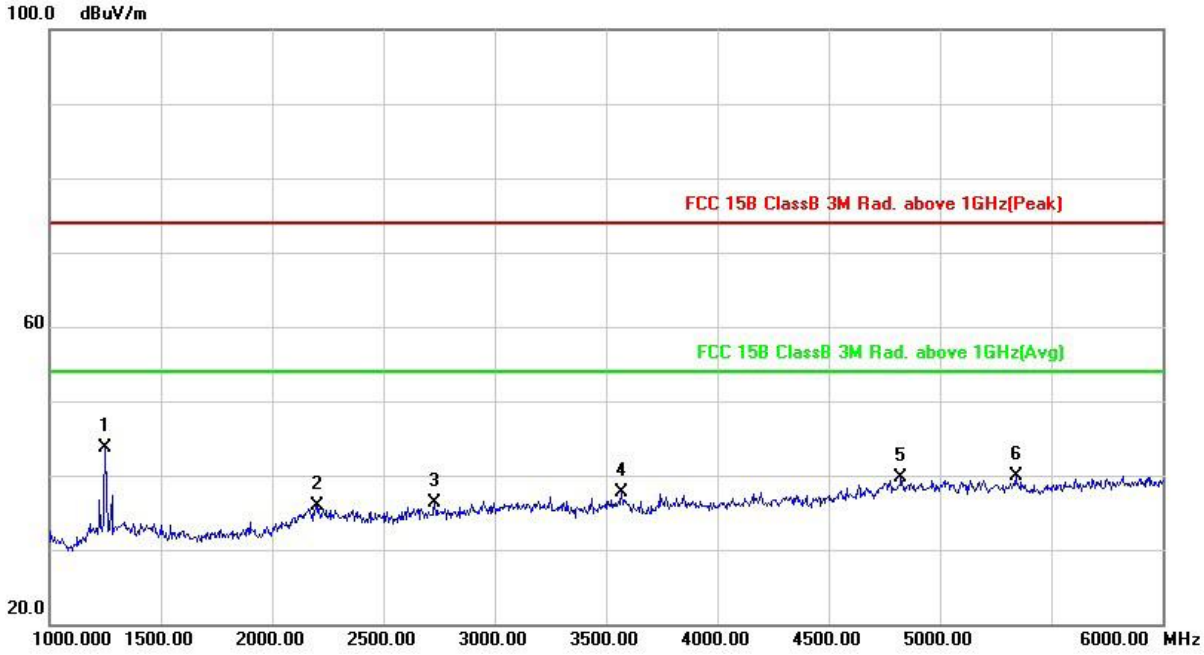
Test Voltage	54Vdc (from POE)	Frequency Range	1 – 6GHz
Environmental Conditions	27℃, 69% RH	6dB Bandwidth	1MHz
Test Date	2019/07/09	Test Distance	3m
Tested by	Karwin Kao	Polarization	Vertical
Test Site	W06		



No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	1250.000	66.04	-19.16	46.88	74.00	-27.12	peak	100	150
2	1500.000	58.82	-19.44	39.38	74.00	-34.62	peak	100	140
3	2460.000	58.82	-16.18	42.64	74.00	-31.36	peak	200	191
4	3250.000	51.19	-14.21	36.98	74.00	-37.02	peak	200	132
5	4775.000	49.51	-9.84	39.67	74.00	-34.33	peak	100	286
6	5100.000	49.25	-9.10	40.15	74.00	-33.85	peak	200	181

Remark: 1. peak = Peak, AVG = Average
2. Correction Factor = Antenna factor + Cable loss (Antenna to preamplifier) - preamplifier Gain + Cable loss (preamplifier to receiver)
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value - Limit Value

Test Voltage	54Vdc (from POE)	Frequency Range	1 – 6GHz
Environmental Conditions	27℃, 69% RH	6dB Bandwidth	1MHz
Test Date	2019/07/09	Test Distance	3m
Tested by	Karwin Kao	Polarization	Horizontal
Test Site	W06		



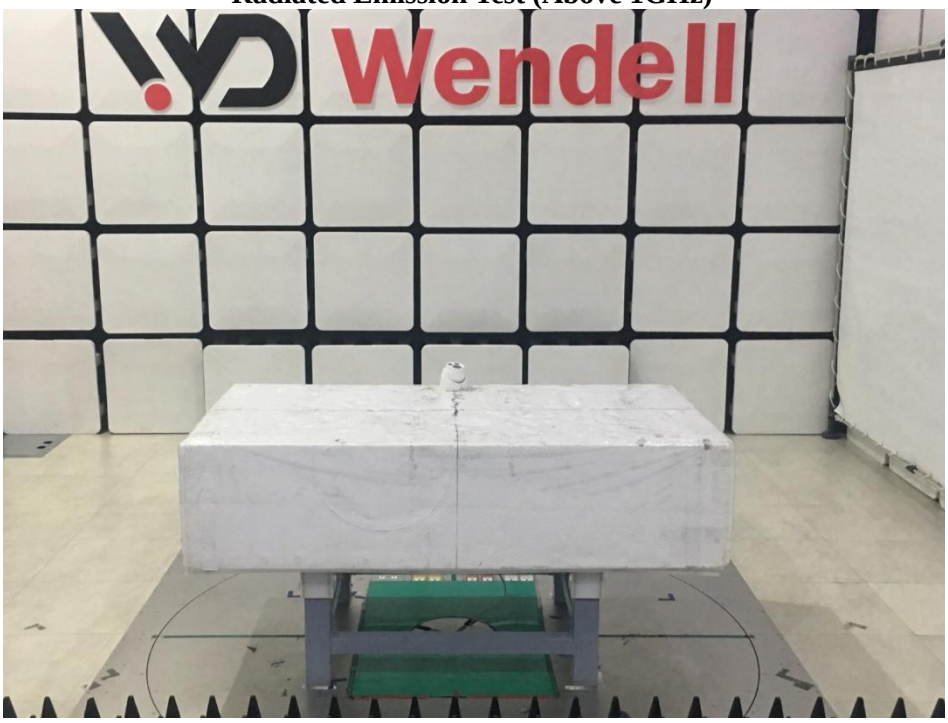
No.	Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Height (cm)	Table Degree (degree)
1	1250.000	62.88	-19.16	43.72	74.00	-30.28	peak	200	304
2	2205.000	51.84	-16.00	35.84	74.00	-38.16	peak	100	230
3	2730.000	51.58	-15.32	36.26	74.00	-37.74	peak	200	121
4	3570.000	50.90	-13.23	37.67	74.00	-36.33	peak	100	162
5	4825.000	49.48	-9.87	39.61	74.00	-34.39	peak	100	104
6	5340.000	49.34	-9.43	39.91	74.00	-34.09	peak	100	133

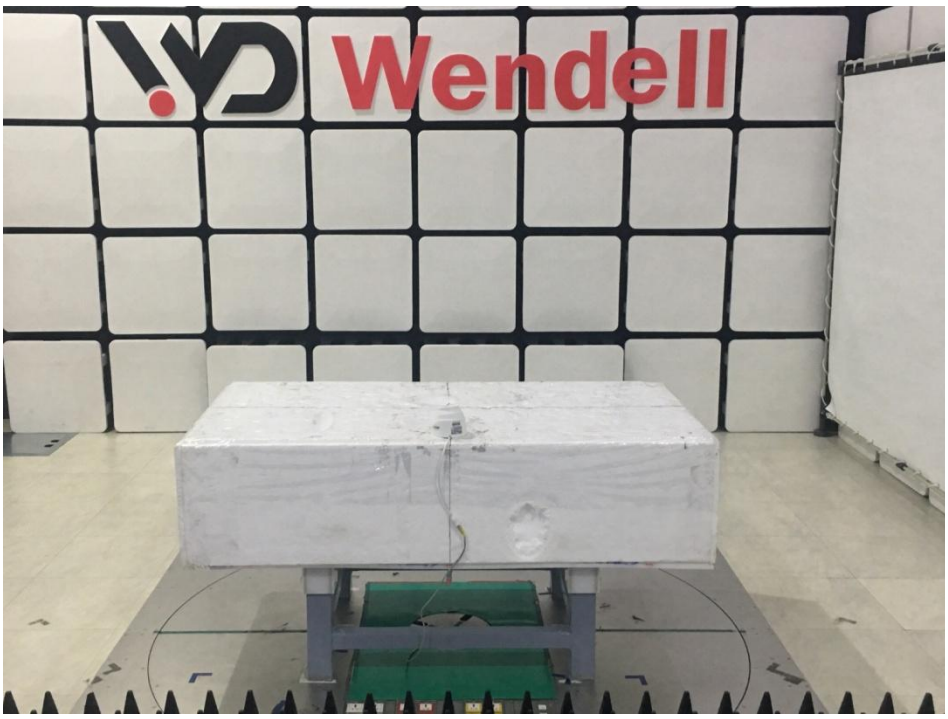
Remark: 1. peak = Peak, AVG = Average
2. Correction Factor = Antenna factor + Cable loss (Antenna to preamplifier) - preamplifier Gain + Cable loss (preamplifier to receiver)
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value - Limit Value

4.2.7 Photographs of Test Configuration

Radiated Emission Test (30MHz~1GHz)

Radiated Emission Test (Above 1GHz)





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