



IC Test Report

Issued date: Jun. 18, 2021

Project No.: 21Q052805

Product : Network Camera

Model : FE9192-H, FE912-H

Applicant : VIVOTEK INC.

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

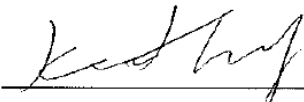
Report No: WD-EI-R-210167-A0

According to

ICES-003: 2020 Issue 7, Class B

ANSI C63.4: 2014

ANSI C63.4a: 2017

Authorized Signatory :  / Ken Huang



Wendell Industrial Co., Ltd
Wendell EMC & RF Laboratory

Add: 5F-1, No. 188, Baoqiao Road, Xindian District, New Taipei City 23145, Taiwan R.O.C.



Table of Contents

1	Certification	5
1.1	Summary of Test Result	6
2	Test Configuration of Equipment Under Test	7
2.1	Test Facility	7
2.2	Measurement Uncertainty	8
2.2.1	Conducted Emission test.....	8
2.2.2	Radiated Emission test.....	8
3	General Information.....	9
3.1	Description of EUT.....	9
3.2	Description of Test Modes.....	10
3.3	EUT Operating Condition	10
3.4	Description of Support Unit	11
3.5	Configuration of System Under Test.....	11
4	Emission Test.....	12
4.1	Conducted Emission Measurement	12
4.2	Radiated Emission Measurement	13
4.2.1	Limits of Radiated Emission Measurement	13
4.2.2	Test Instrument	14
4.2.3	Test Procedure.....	15
4.2.4	Deviation from Test Standard	15
4.2.5	Test Setup.....	16
4.2.6	Test Result	17
4.2.7	Photographs of Test Configuration	21



History of this test report

Report No.	Issue date	Description
WD-EI-R-210167-A0	Jun. 18, 2021	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-EI-R-210167-A0	Jun. 18, 2021	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: FE9192-H, FE912-H

Applicant: VIVOTEK INC.

Tested: Jun. 07 ~ Jun. 08, 2021

Standard: ICES-003: 2020 Issue 7, Class B

ANSI C63.4: 2014

ANSI C63.4a: 2017

The above equipment (Model: FE9192-H) has been tested by **Wendell EMC & RF Laboratory**, 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
ICES-003	Conducted disturbance at mains terminals	-	N/A	Without AC main power port of the EUT
	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)

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

W08: No.119, Wugong 3rd Rd., Wugu Dist., New Taipei City 248, 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 uncertainty is evaluated according to CISPR 16-4-2.

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

Wendell EMC & RF Laboratory U_{lab} is less than U_{cisp} , therefore compliance or non-compliance with a disturbance limit shall be determined in the following manner.

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

Please note that the measurement uncertainty (U_{lab}) is provided for informational purpose only and is not used in determining the Pass/Fail results.

2.2.1 Conducted Emission test

Test Site	Measurement Freq. Range	dB (U_{lab})	Note
W01	150 kHz ~ 30 MHz	2.72	N/A
W08	150 kHz ~ 30 MHz	2.70	N/A

2.2.2 Radiated Emission test

Test Site	Measurement Freq. Range	Ant	dB (U_{lab})	Note
W08	30 MHz ~ 200 MHz	V	3.68	N/A
	30 MHz ~ 200 MHz	H	2.70	N/A
	200 MHz ~ 1000 MHz	V	5.19	N/A
	200 MHz ~ 1000 MHz	H	3.26	N/A
	1 GHz ~ 6 GHz	V	4.98	N/A
	1 GHz ~ 6 GHz	H	5.07	N/A
	6 GHz ~ 18 GHz	V	5.09	N/A
	6 GHz ~ 18 GHz	H	4.99	N/A
	18 GHz ~ 40 GHz	V	4.72	N/A
	18 GHz ~ 40 GHz	H	4.72	N/A



3 General Information

3.1 Description of EUT

Product	Network Camera
Brand	VIVOTEK
Model	FE9192-H, FE912-H
Applicant	VIVOTEK INC.
Received Date	May 28, 2021
EUT Power Rating	55Vdc (from POE injector)
Model Differences	The models are electrically identical, different models no. are for marketing purpose. This series model information is provided by client.
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 2133MHz. Therefore the radiated emission is tested up to 11GHz.

3.2 Description of Test Modes

Test results are presented in the report as below.

Test Mode	Test Condition
Radiated emission 30MHz ~ 1GHz test	
-	PoE mode
Radiated emission above 1GHz test	
-	PoE mode

3.3 EUT Operating Condition

- Placed the EUT on the test table.
- Prepare PC and PoE injector to act as a communication partner and placed it outside of testing area.
- The EUT was connected to PC via LAN and PoE.
- The communication partner sent data to EUT by command “ping” via LAN.
- The EUT sent video signal to PC via LAN cable.
- The server PC show IPCAM’s image on browser.
- The EUT write data with Micro SD card.



3.4 Description of Support Unit

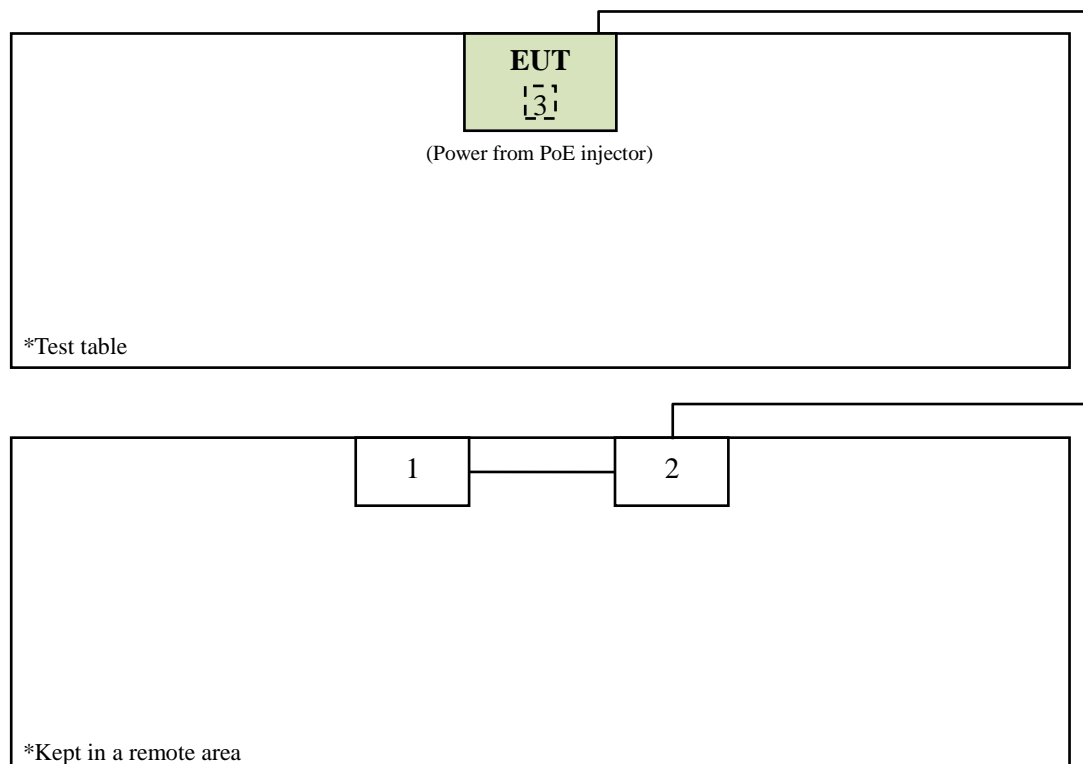
The EUT has been conducted testing with other necessary accessories or support units.

Item	Equipment	Brand	Model No.	Serial No.	FCC ID	Data Cable	Power Cord	Remark
1	Desktop PC	DELL	D13M	H6K10 A00	FCC DoC Approved	1m CAT.5E non-shielded RJ45 cable	1.8m non-shielded cable	-
2	PoE injector	CISCO	MA-INJ-4	N/A	N/A	20m CAT.5E non-shielded RJ45 cable	1.8m non-shielded cable	-
3	Micro SD card	ADATA	32GB	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 adapter and PoE:

PoE injector (support unit only)	
Brand	CISCO
Model	MA-INJ-4
Input Power	100-240Vac, 0.67A, 50/60Hz
Output Power	55Vdc, 0.6A
Power line	1.8m non-shielded cable

3.5 Configuration of System Under Test





4 Emission Test

4.1 Conducted Emission Measurement

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

ICES-003 Radiated Emissions Limits				
Frequency range (MHz)	Class A (3m) Quasi-peak (dBμV/m)	Class A (10m) Quasi-peak (dBμV/m)	Class B (3m) Quasi-peak (dBμV/m)	Class B (10m) Quasi-peak (dBμV/m)
30 - 88	50	40	40	30
88 - 216	54	43.5	43.5	33.1
216 - 230	56.9	46.4	46	35.6
230 - 960	57	47	47	37
960 - 1000	60	49.5	54	43.5

Radiated Frequency range above 1 GHz

ICES-003 Radiated Emissions Limits				
Frequency range (GHz)	Class A (3m) (dBμV/m)		Class B (3m) (dBμV/m)	
	Peak	Average	Peak	Average
1 - 40	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)
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: W08-966					
Item	Equipment	Manufacturer	Model	Meter No.	Calibration Date
1	Horn Antenna	Schwarzbeck	BBHA 9120D	CT-9-031	Jul. 28, 2020
2	Horn Antenna	Schwarzbeck	BBHA 9170	CT-9-032	Dec. 03, 2020
3	TRILOG Broadband Antenna with 5 dB Attenuator	Schwarzbeck	VULB 9168 & FAT-NM5NF5T3G 2W5	CT-1-002-1	Jul. 29, 2020
4	EXA Signal Analyzer	Keysight	N9010A	CT-1-093	Apr. 21, 2021
5	EMI Test Receiver	Keysight	N9038A	CT-9-007	Jul. 28, 2020
6	Preamplifier	EM	EM 330	CT-9-024	Jul. 30, 2020
7	Preamplifier	JPT	JPA0118-55-303K	CT-1-139	Apr. 21, 2021
8	Preamplifier	EMCI	EMC051845SE	CT-9-012	Sep. 04, 2020
9	Preamplifier	EMCI	EMC184045SE	CT-9-013	Sep. 04, 2020
10	Test Cable	EMCI	EMCCFD400-NM-NM-1000	CT-1-132	Jul. 29, 2020
11	Test Cable	PEWC	CFD400NL-LW-N M-NM-3000	CT-1-141	Jul. 30, 2020
12	Test Cable	EMCI	EMCCFD400-NM-NM-15000	CT-1-133	Jul. 30, 2020
13	Test Cable	EMCI	EMC104-SM-35M-600	CT-1-134	Jul. 30, 2020
14	Test Cable	EMCI	EMC104-SM-35M-15000	CT-1-135	Jul. 30, 2020
15	Test Cable	EMCI	EMC102-KM-KM-600	CT-1-136	Jul. 30, 2020
16	Test Cable	MVE	140140.LL404.700	CT-9-066	Apr. 21, 2021
17	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 table-top EUT was placed on the top of a turntable 0.8 meters above the ground at 3 m 966 chamber. The floor-standing EUT and all cables shall be insulated from the ground plane by up to 12 mm of insulating material if required. 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.

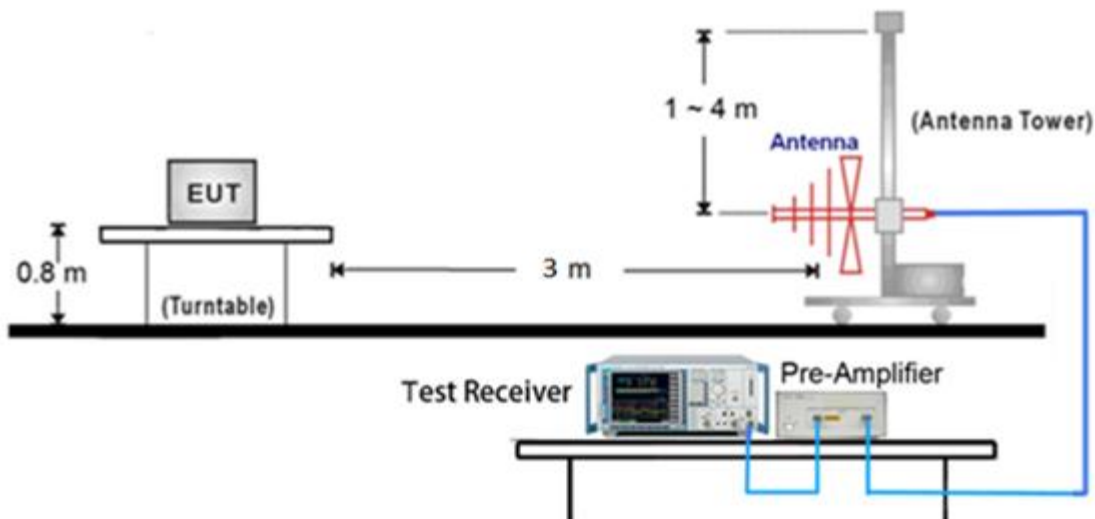
- e. Emission frequency and amplitude were recorded, recording at least six highest emissions. The EUT and cable configuration of the above highest emission levels were recorded. The test data of the worst case was recorded.

4.2.4 Deviation from Test Standard

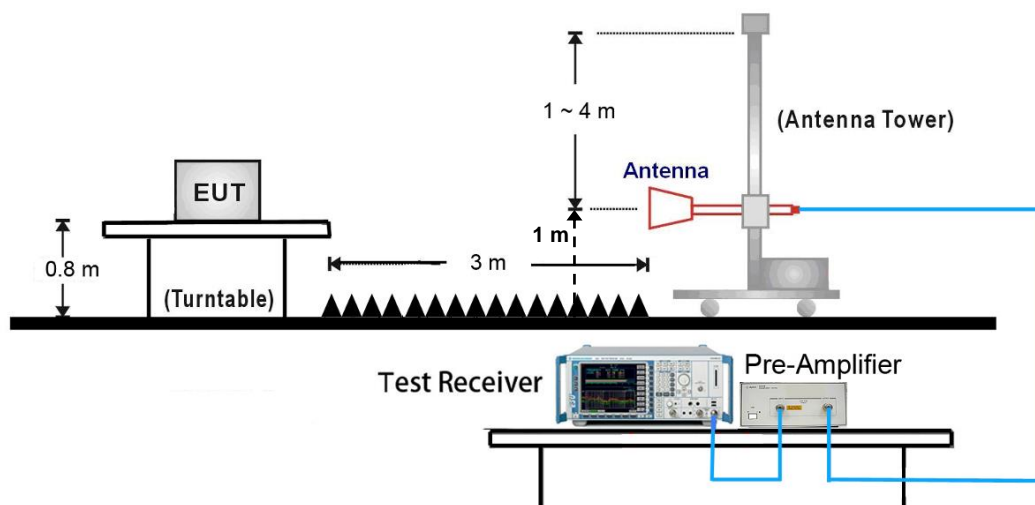
No deviation

4.2.5 Test Setup

< Radiated Emissions Frequency: 30 MHz to 1000 MHz >



< Radiated Emissions Frequency: above 1GHz >

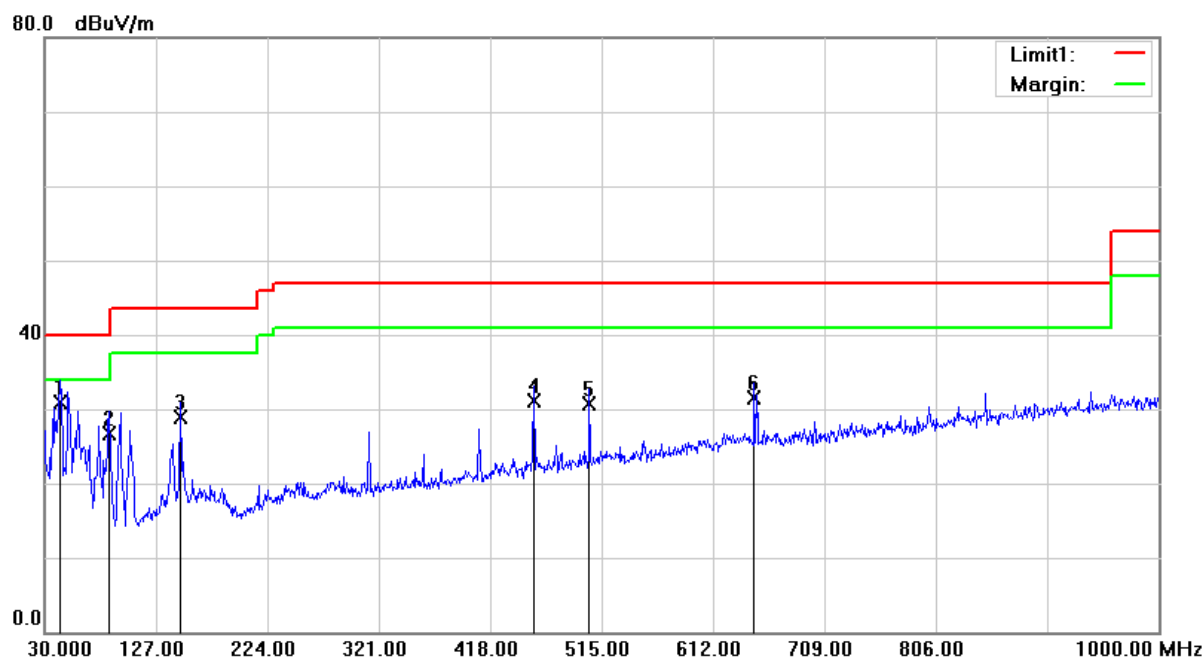


Note:

- (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	55Vdc (from PoE)	Frequency Range	30 – 1000 MHz
Environmental Conditions	22°C, 55% RH	6dB Bandwidth	120 kHz
Test Date	2021/06/07	Test Distance	3m
Tested by	Karwin Kao	Polarization	Vertical
Test Site	W08		



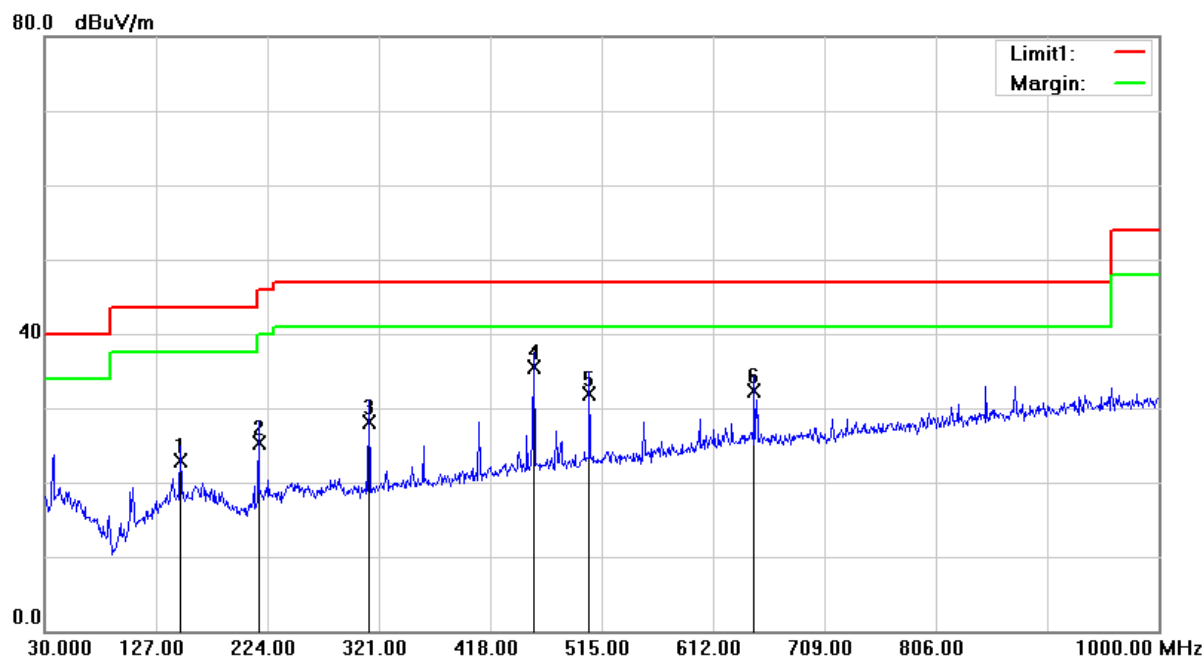
No.	Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB/m)	Measurement (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Table Degree (degree)	Antenna Height (cm)	Detector
1	43.5800	40.10	-9.26	30.84	40.00	-9.16	264	100	QP
2	86.2600	42.18	-15.50	26.68	40.00	-13.32	344	100	QP
3	148.3400	38.19	-9.21	28.98	43.50	-14.52	185	100	QP
4	455.8300	35.87	-4.75	31.12	47.00	-15.88	61	200	QP
5	504.3300	34.55	-3.83	30.72	47.00	-16.28	178	200	QP
6	647.8900	32.70	-1.12	31.58	47.00	-15.42	45	200	QP

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	55Vdc (from PoE)	Frequency Range	30 – 1000 MHz
Environmental Conditions	22°C, 55% RH	6dB Bandwidth	120 kHz
Test Date	2021/06/07	Test Distance	3m
Tested by	Karwin Kao	Polarization	Horizontal
Test Site	W08		



No.	Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB/m)	Measurement (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Table Degree (degree)	Antenna Height (cm)	Detector
1	148.3400	32.16	-9.21	22.95	43.50	-20.55	351	200	QP
2	216.2400	35.75	-10.39	25.36	46.00	-20.64	284	200	QP
3	312.2700	35.97	-7.90	28.07	47.00	-18.93	235	100	QP
4	455.8300	40.22	-4.75	35.47	47.00	-11.53	128	200	QP
5	504.3300	35.65	-3.83	31.82	47.00	-15.18	251	200	QP
6	647.8900	33.37	-1.12	32.25	47.00	-14.75	235	100	QP

Remark: 1. QP = Quasi Peak

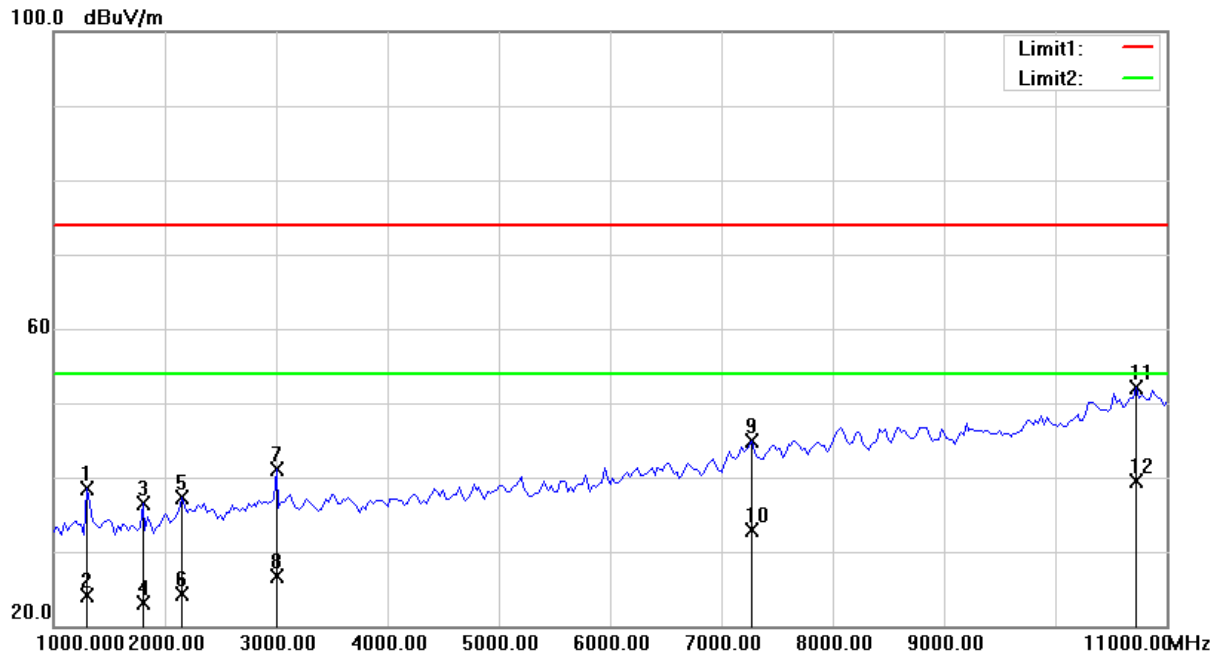
2. Correction Factor = Antenna factor + Cable loss (Antenna to preamplifier) - preamplifier Gain
+ Cable loss (preamplifier to receiver)

3. Measurement Value = Reading Level + Correct Factor

4. Margin Level = Measurement Value - Limit Value



Test Voltage	55Vdc (from PoE)	Frequency Range	1 – 11GHz
Environmental Conditions	22°C, 55% RH	6dB Bandwidth	1MHz
Test Date	2021/06/08	Test Distance	3m
Tested by	Karwin Kao	Polarization	Vertical
Test Site	W08		

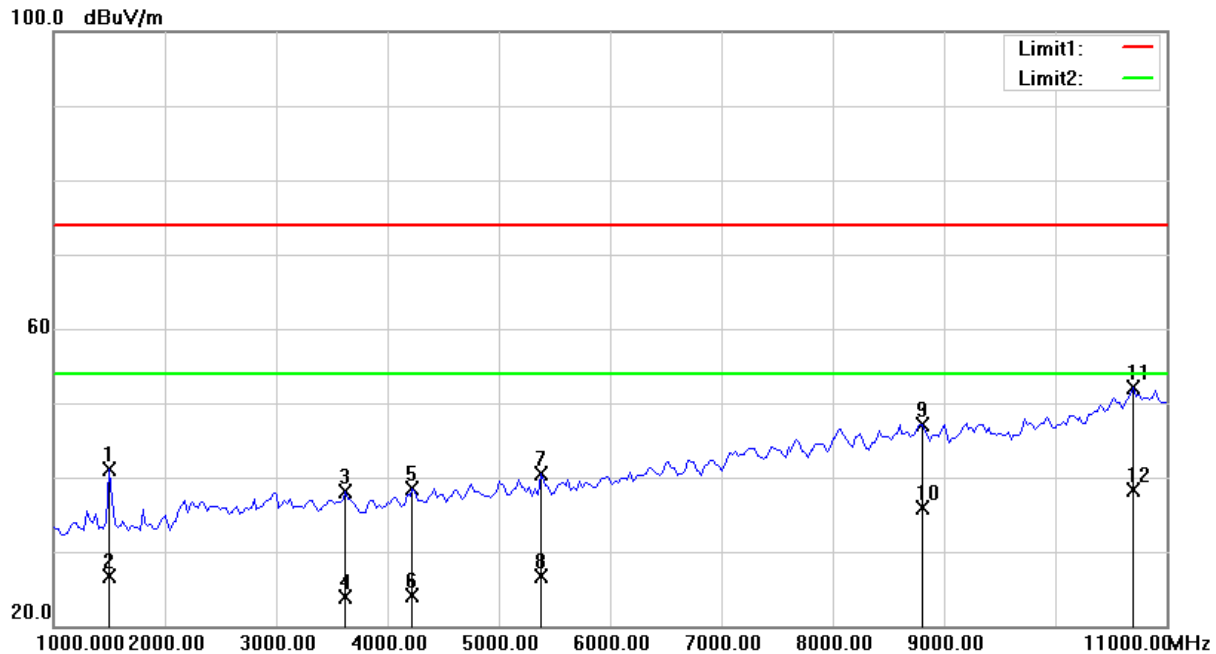


No.	Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB/m)	Measurement (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Table Degree (degree)	Antenna Height (cm)	Detector
1	1300.000	57.69	-19.15	38.54	74.00	-35.46	19	100	peak
2	1300.000	43.32	-19.15	24.17	54.00	-29.83	19	100	AVG
3	1800.000	55.29	-18.70	36.59	74.00	-37.41	0	136	peak
4	1800.000	41.72	-18.70	23.02	54.00	-30.98	0	136	AVG
5	2150.000	53.07	-15.87	37.20	74.00	-36.80	145	100	peak
6	2150.000	40.09	-15.87	24.22	54.00	-29.78	145	100	AVG
7	3000.000	54.79	-13.73	41.06	74.00	-32.94	0	116	peak
8	3000.000	40.50	-13.73	26.77	54.00	-27.23	0	116	AVG
9	7275.000	47.50	-2.67	44.83	74.00	-29.17	173	200	peak
10	7275.000	35.48	-2.67	32.81	54.00	-21.19	173	200	AVG
11	10725.000	49.47	2.57	52.04	74.00	-21.96	0	112	peak
12	10725.000	36.92	2.57	39.49	54.00	-14.51	0	112	AVG

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	55Vdc (from PoE)	Frequency Range	1 – 11GHz
Environmental Conditions	22°C, 55% RH	6dB Bandwidth	1MHz
Test Date	2021/06/08	Test Distance	3m
Tested by	Karwin Kao	Polarization	Horizontal
Test Site	W08		



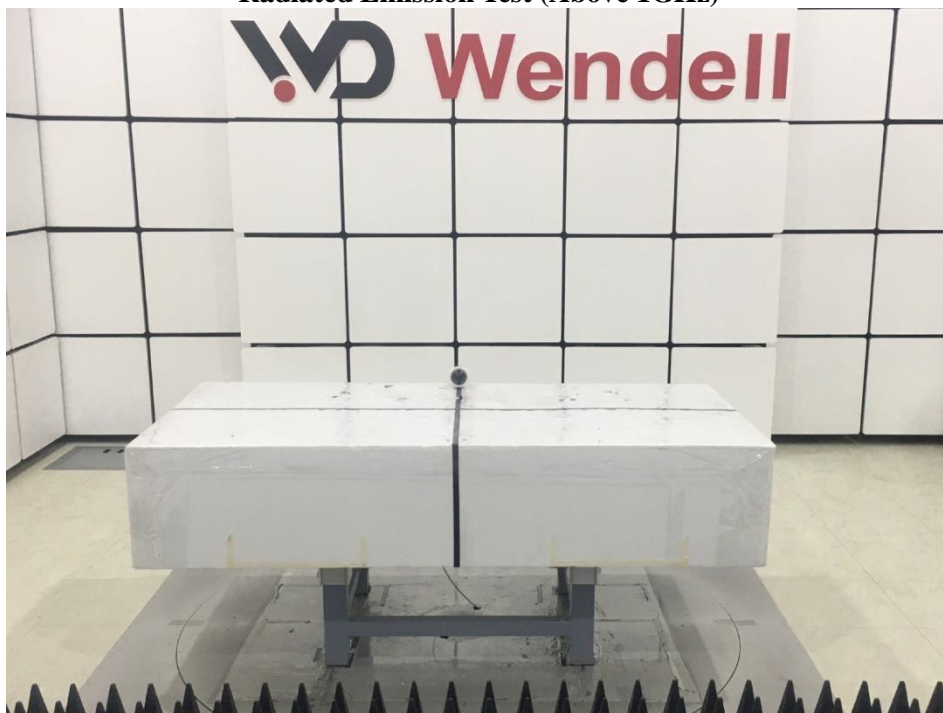
No.	Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB/m)	Measurement (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Table Degree (degree)	Antenna Height (cm)	Detector
1	1500.000	60.10	-19.03	41.07	74.00	-32.93	0	111	peak
2	1500.000	45.72	-19.03	26.69	54.00	-27.31	0	111	AVG
3	3625.000	50.84	-12.74	38.10	74.00	-35.90	16	200	peak
4	3625.000	36.58	-12.74	23.84	54.00	-30.16	16	200	AVG
5	4225.000	49.95	-11.53	38.42	74.00	-35.58	0	184	peak
6	4225.000	35.55	-11.53	24.02	54.00	-29.98	0	184	AVG
7	5375.000	49.59	-9.08	40.51	74.00	-33.49	358	100	peak
8	5375.000	35.84	-9.08	26.76	54.00	-27.24	358	100	AVG
9	8800.000	48.14	-0.99	47.15	74.00	-26.85	123	100	peak
10	8800.000	36.82	-0.99	35.83	54.00	-18.17	123	100	AVG
11	10700.000	49.62	2.48	52.10	74.00	-21.90	258	100	peak
12	10700.000	35.87	2.48	38.35	54.00	-15.65	258	100	AVG

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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