TECHNICAL REPORT

Report No: FCC1606062
File reference No: 2016-06-30

Applicant: Haier international(hk) limited

Product: Chromebook

Model No: J5,CMT, Viglen Chromebook Touch, HR-116C

Trademark: CTL (for model J5)
Edugear (for model CMT)
Viglen (for model Viglen Chromebook Touch)
Haier (for model HR-116C)

Test Standards: FCC Part 15 Subpart B: 2016

Test result: It is herewith confirmed and found to comply with the requirements set up by ANSI C63.4&FCC Part 15 regulations for the evaluation of electromagnetic compatibility

Approved By

Jack Chung

Jack Chung

Manager

Dated: June 30, 2016

Results appearing herein relate only to the sample tested
The technical reports is issued errors and omissions exempt and is subject to withdrawal at

SHENZHEN TIMEWAY TESTING LABORATORIES

Room 512-519, 5/F., East Tower, Building 4, Anhua Industrial Zone, Futian District, Shenzhen, Guangdong, China
Tel (755) 83448688, Fax (755) 83442996, E-Mail:info@timeway-lab.com

Special Statement:

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.

The testing quality system of our laboratory meet with ISO/IEC-17025 requirements, which is approved by CNAS. This approval result is accepted by MRA of APLAC.

Our test facility is recognized, certified, or accredited by the following organizations:

CNAS-LAB Code: L2292

The EMC Laboratory has been assessed and in compliance with CNAS-CL01 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of testing Laboratories.

FCC-Registration No.: 899988

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 899988.

IC- Registration No.: IC5205A-02

The EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration IC No.: 5205A-02.

Test Report Conclusion

Content

1.0 General Details

1.1 Test Lab Details

Name :	SHENZHEN TIMEWAY TESTING LABORATORIES.
Address:	Room 512-519,5/F., East Tower,Building 4, Anhua Industrial Zone, Futian District,Shenzhen, Guangdong China
Telephone:	(755) 83448688
Fax:	(755) 83442996

Site on File with the Federal Communications Commission – United Sates
Registration Number: 899988
For 3m & 10 m OATS
Site Listed with Industry Canada of Ottawa, Canada
Registration Number: IC: 5205A-02
For 3m & 10 m OATS

1.2 Applicant Details

Applicant:	Haier international(hk) limited
Address:	Room1908 Harbour Centre, 25 Harbour Road, Wanchai, HK
Telephone:	0532-88937841
Fax:	0532-88937841

1.3 Description of EUT

Product:	Chromebook
Manufacturer:	Haier international(hk) limited
Address:	Room1908 Harbour Centre, 25 Harbour Road, Wanchai, HK
Brand Name:	CTL, Edugear, Viglen, Haier
Model Number:	J5,CMT, Viglen Chromebook Touch, HR-116C

Power Supply: Model: DA-40A19; Input: 100-240V~, 50-60Hz, 1A; Output: 19V, 2.1A.
Highest frequency generated in the EUT: 5825MHz

1.4 Submitted Sample: 2 Samples

1.5 Test Duration: 2016-06-06 to 2016-06-24

1.6 Test Uncertainty

Conducted Emissions Uncertainty =3.6dB

Radiated Emissions Uncertainty =4.7dB

1.7 Test Engineer

The sample tested by Terry Tong

Print Name: Terry Tong

2.0 List of Measurement Equipment

2.1 Conducted Emission Test

Name	Model No.	Serial No.	Manufacturer	Calibration Date	Calibration Cycle
EMI Test Receiver	ESH3	860905/006	RS	2015.08.22	1Year
Spectrum Analyzer	ESA-L1500A	US37451154	HP	2015.08.22	1Year
PULSE LIMITER	ESH3-Z2	100281	RS	2015.08.22	1Year
LISN	ESH3-Z5	100294	RS	2015.08.22	1Year
LISN	ESH3-Z5	100253	RS	2015.08.22	1Year

2.2 Radiated electromagnetic disturbance test

Name	Model No.	Serial No.	Manufacturer	Calibration Date	Calibration Cycle
EMI Test Receiver	ESVD	100008	RS	2015.08.22	1Year
Coaxial Switch	MP59B	M70585	ANRITSU	N/A	N/A
Amplifier	8447D	2727A05017	HP	2015.08.22	1Year
Bilog Antenna	VULB9163	9163/340	Schwarebeck	2015.08.23	1Year
Horn Antenna	BBHA 9120D	9120D-631	Schwarebeck	2015.08.24	1Year
Horn Antenna	BBHA 9170	BBHA9170265	Schwarebeck	2015.08.24	1Year
Test Receiver	ESI26	838786/013	RS	2015.08.22	1Year

2.3 Auxiliary Equipment

Name	Model No.	Serial No.	Manufacturer	Cable	FCC DOC/ ID
Monitor	P2450	--	SAMSUNG	Data cable of 1.5m length	FCC DOC
Passive Earphone	--	--	--	--	--
Mouse	M-F105	--	L.SEletron	--	FCC DOC
TF	G4	--	Glorystar	--	FCC DOC

3.0 Technical Details

3.1 Investigations Requested

Perform Electromagnetic Interference [EMI] tests for FCC Requirement.

3.2 Test Standards

FCC Part 15 Subpart B: 2016

3.3 Description of Test Modes

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

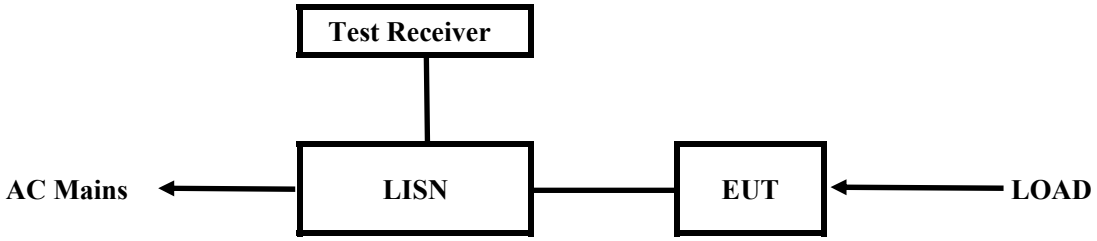
Pre-test Mode	Description
Mode1	Camera On
Mode2	Play SD Card
Mode3	Play USB
Mode4	Play Memory
Mode5	PC working mode

For Conducted Emissions Test	
Pre-test Mode	Description
Mode1	Camera On
Mode3	Play USB
Mode5	PC working mode

For Radiated Emissions Test	
Pre-test Mode	Description
Mode1	Camera On
Mode2	Play SD Card
Mode3	Play USB
Mode4	Play Memory
Mode5	PC working mode

4.0 Conducted Power line Test

4.1 Schematics of the test



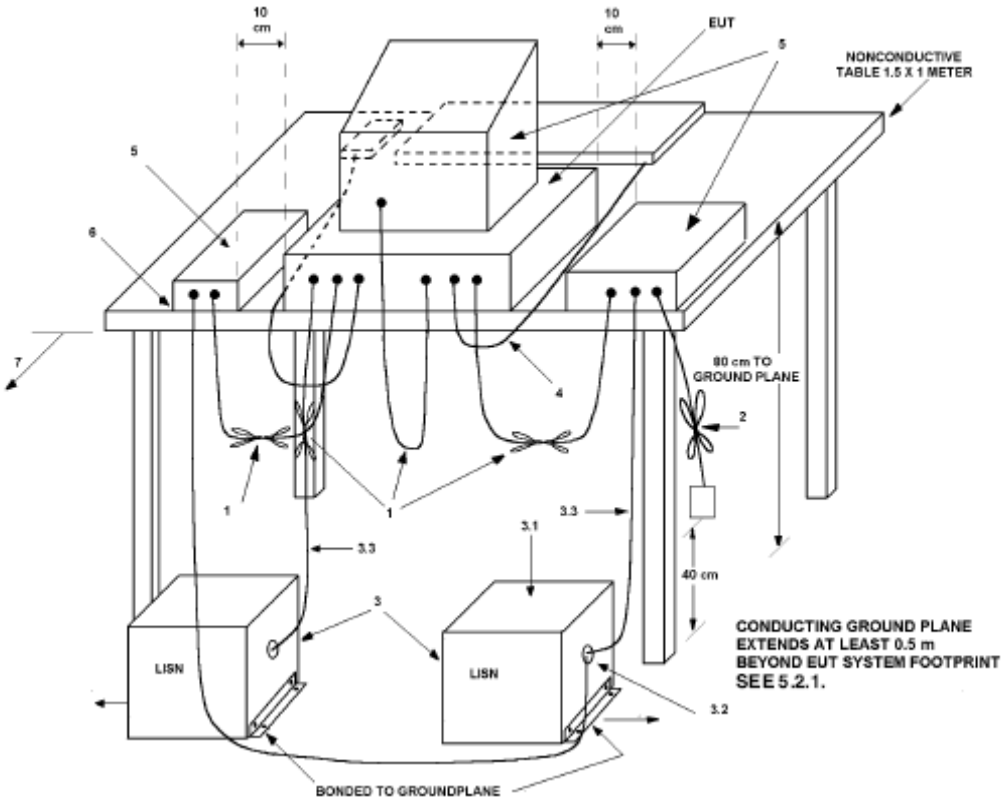
EUT: Equipment Under Test

4.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.4-2014.The Frequency spectrum From 0.15MHz to 30MHz was investigated. The LISN used was 50ohm/50uH as specified by section 5.1 of ANSI C63.4 –2014.Cables and peripherals were moved to find the maximum emission levels for each frequency.

Actual Working Voltage and Frequency: 120V~, 60Hz

Block diagram of Test setup



4.3 Power line conducted Emission Limit

Frequency(MHz)	Class A Limits dB(μV)		Class B Limits dB(μV)	
	Quasi-peak Level	Average Level	Quasi-peak Level	Average Level
0.15 ～ 0.50	79.00	66.00	66.00～56.00*	56.00～46.00*
0.50 ～ 5.00	73.00	60.00	56.00	46.00
5.00 ～ 30.00	73.00	60.00	60.00	50.00

Notes: 1. *decreasing linearly with logarithm of frequency.

2. The tighter limit shall apply at the transition frequencies

4.4 Test Results

The frequency spectrum from 0.15MHz to 30MHz was investigated. All reading are quasi-peak values with a resolution bandwidth of 9kHz.

A: Conducted Emission on Live Terminal (150kHz to 30MHz)

EUT Operating Environment

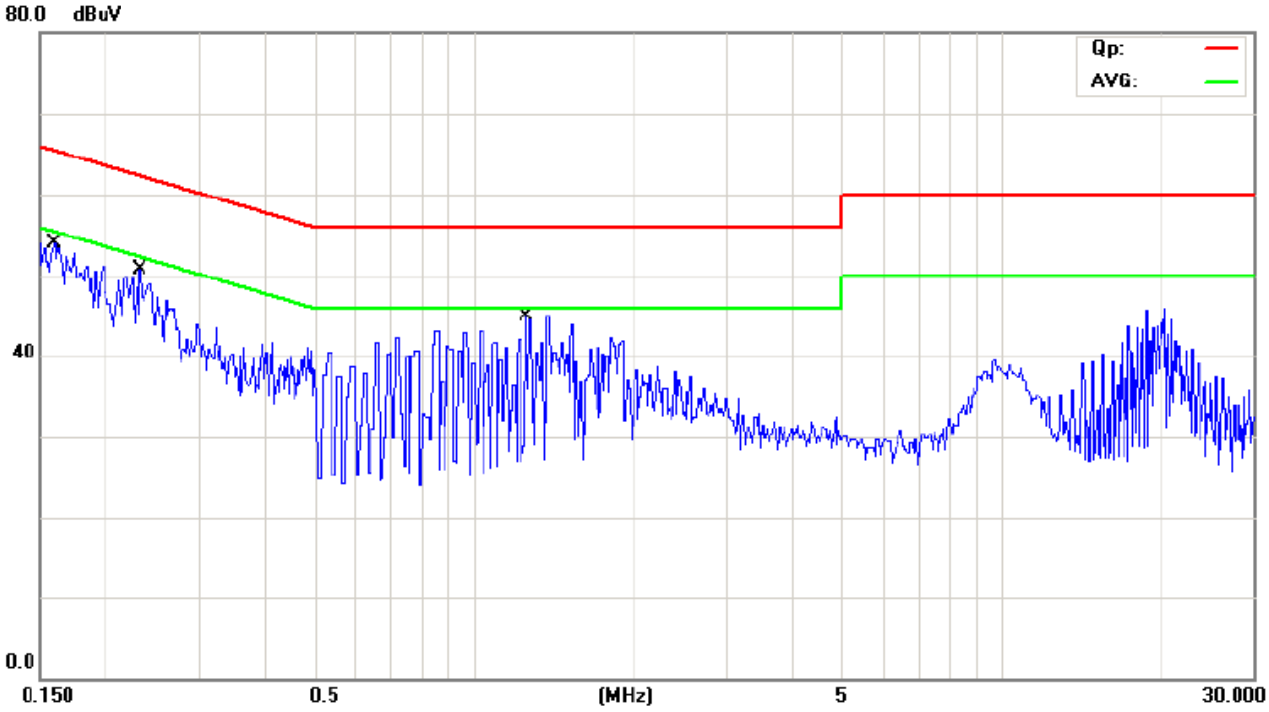
Temperature: 26℃ Humidity: 65%RH Atmospheric Pressure: 101 KPa

EUT set Condition: Camera On

Equipment Level: Class B

Results: PASS

Please refer to following diagram for individual



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.1593	38.60	11.01	49.61	65.50	-15.89	QP	
2		0.1593	7.30	11.01	18.31	55.50	-37.19	AVG	
3		0.2308	28.20	11.09	39.29	62.42	-23.13	QP	
4		0.2308	-1.60	11.09	9.49	52.42	-42.93	AVG	
5		1.2445	16.90	12.00	28.90	56.00	-27.10	QP	
6		1.2445	-10.40	12.00	1.60	46.00	-44.40	AVG	

B: Conducted Emission on Neutral Terminal (150kHz to 30MHz)

EUT Operating Environment

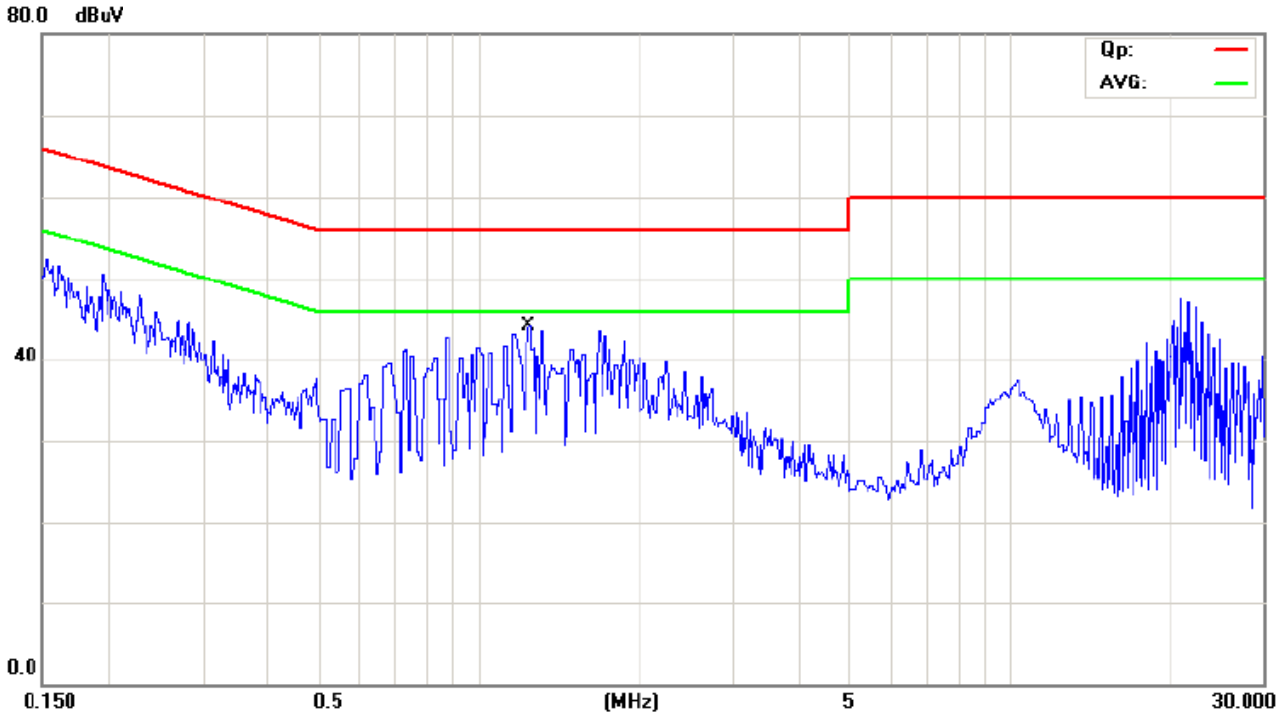
Temperature: 26℃ Humidity: 65%RH Atmospheric Pressure: 101 KPa

EUT set Condition: Camera On

Equipment Level: Class B

Results: Pass

Please refer to following diagram for individual



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	1.2358	17.20	11.99	29.19	56.00	-26.81	QP	
2		1.2358	-9.00	11.99	2.99	46.00	-43.01	AVG	

C: Conducted Emission on Live Terminal (150kHz to 30MHz)

EUT Operating Environment

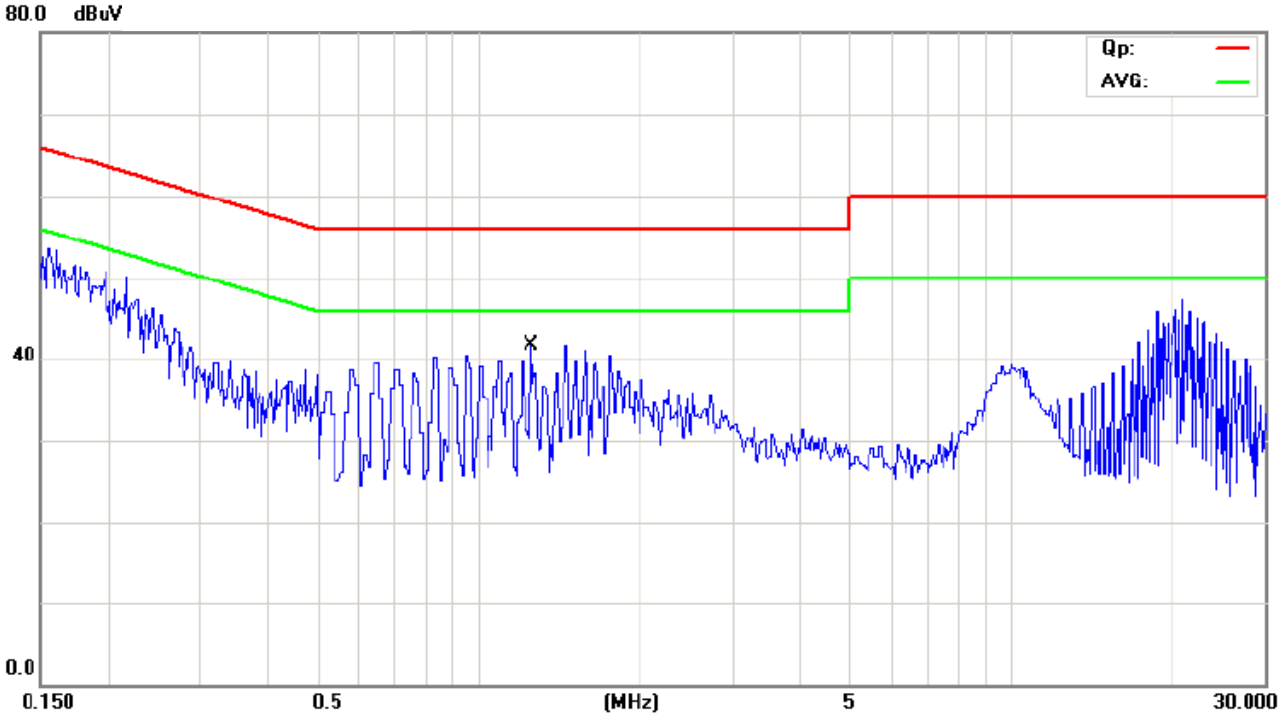
Temperature: 26℃ Humidity: 65%RH Atmospheric Pressure: 101 KPa

EUT set Condition: Play USB

Equipment Level: Class B

Results: PASS

Please refer to following diagram for individual



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	1.2512	15.20	12.00	27.20	56.00	-28.80	QP	
2		1.2512	-13.30	12.00	-1.30	46.00	-47.30	AVG	

D: Conducted Emission on Neutral Terminal (150kHz to 30MHz)

EUT Operating Environment

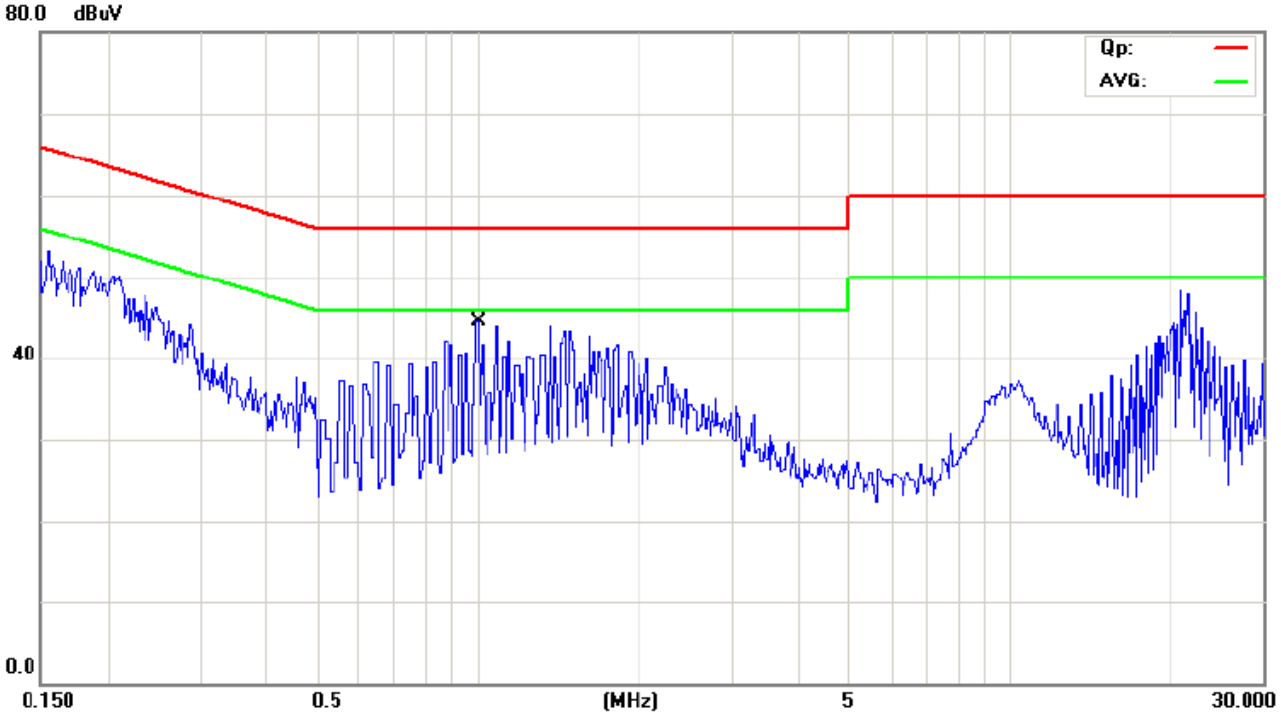
Temperature: 26℃ Humidity: 65%RH Atmospheric Pressure: 101 KPa

EUT set Condition: Play USB

Equipment Level: Class B

Results: Pass

Please refer to following diagram for individual



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	1.0060	15.80	11.90	27.70	56.00	-28.30	QP	
2		1.0060	-10.50	11.90	1.40	46.00	-44.60	AVG	

E: Conducted Emission on Live Terminal (150kHz to 30MHz)

EUT Operating Environment

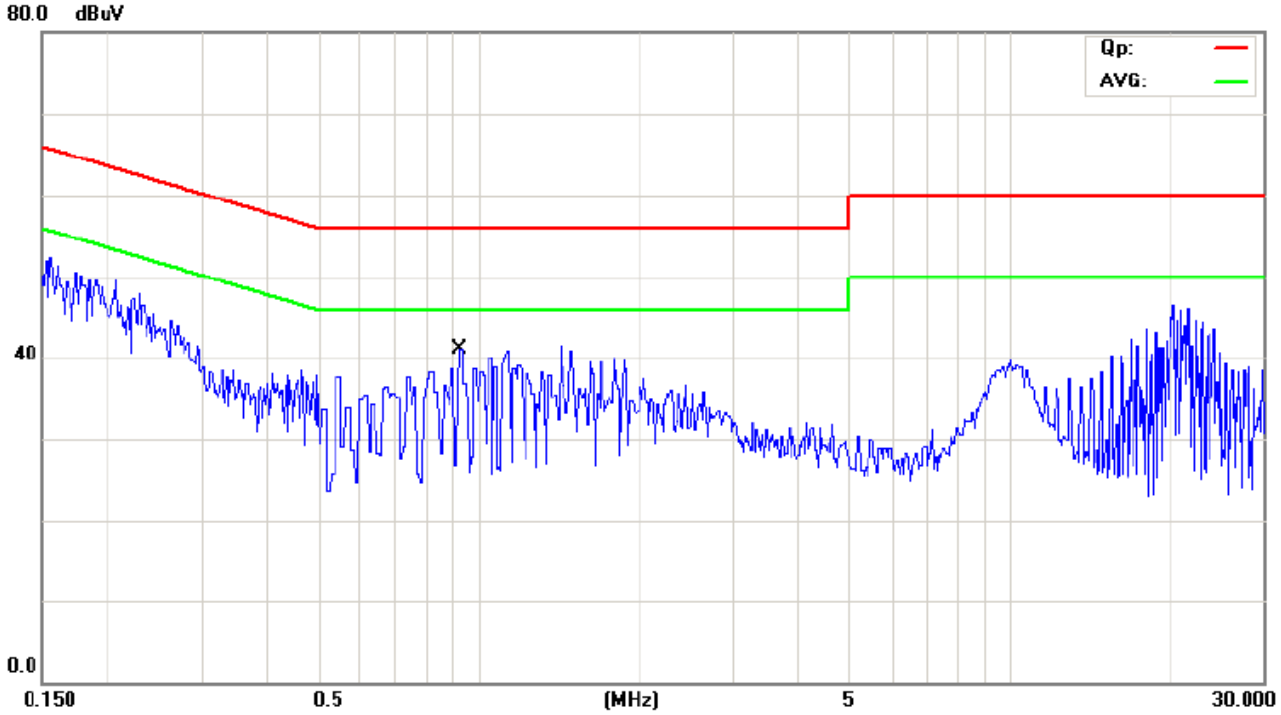
Temperature: 26℃ Humidity: 65%RH Atmospheric Pressure: 101 KPa

EUT set Condition: PC working mode

Equipment Level: Class B

Results: PASS

Please refer to following diagram for individual



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.9240	15.20	11.82	27.02	56.00	-28.98	QP	
2		0.9240	-14.20	11.82	-2.38	46.00	-48.38	AVG	

F: Conducted Emission on Neutral Terminal (150kHz to 30MHz)

EUT Operating Environment

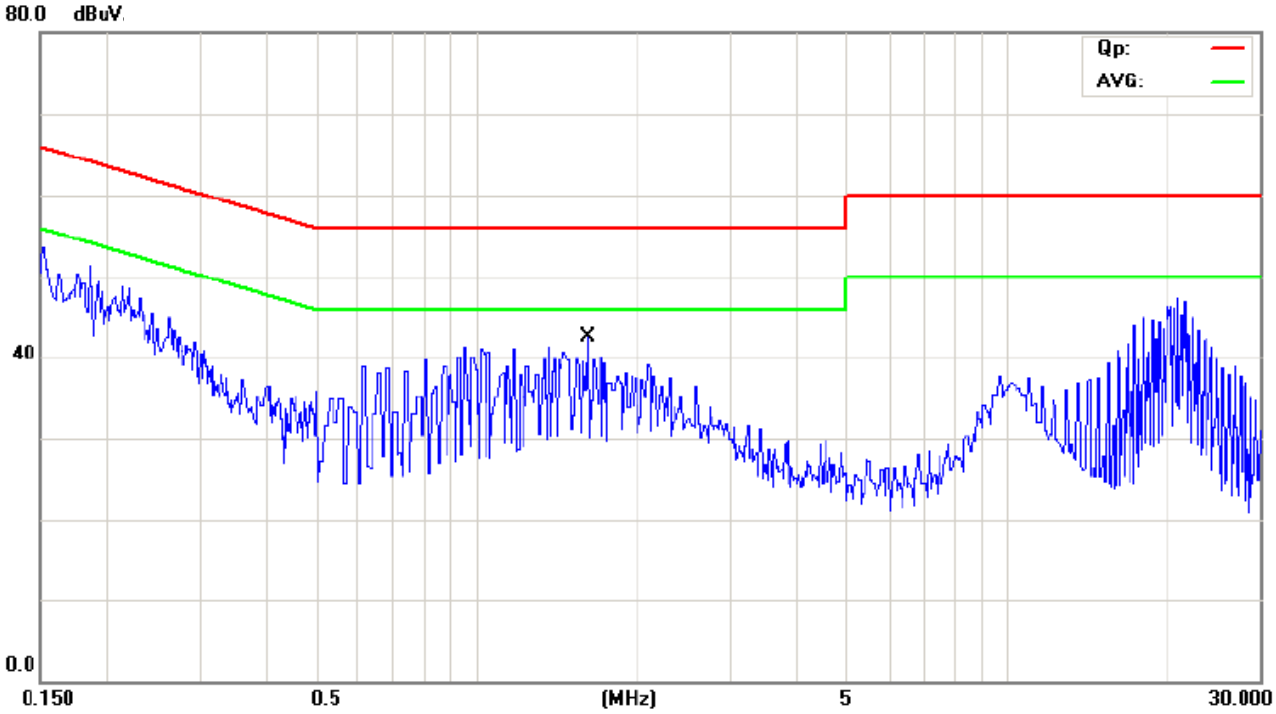
Temperature: 26℃ Humidity: 65%RH Atmospheric Pressure: 101 KPa

EUT set Condition: PC working mode

Equipment Level: Class B

Results: Pass

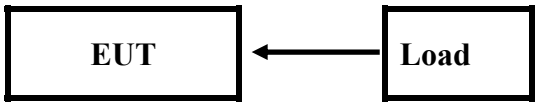
Please refer to following diagram for individual



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	1.6174	16.00	12.15	28.15	56.00	-27.85	QP	
2		1.6174	-8.80	12.15	3.35	46.00	-42.65	AVG	

5.0 Radiated Disturbance Test

5.1 Schematics of the test

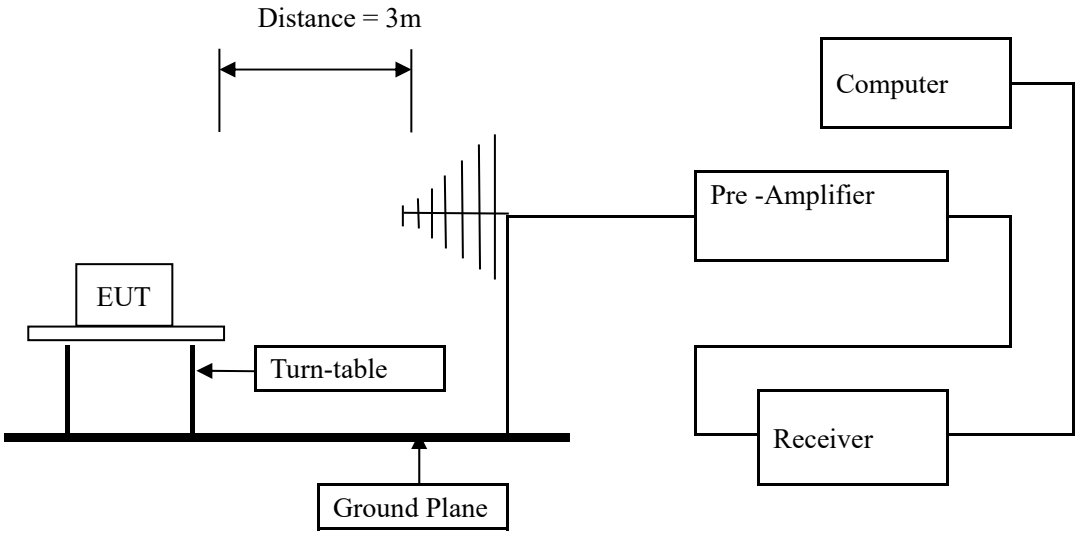


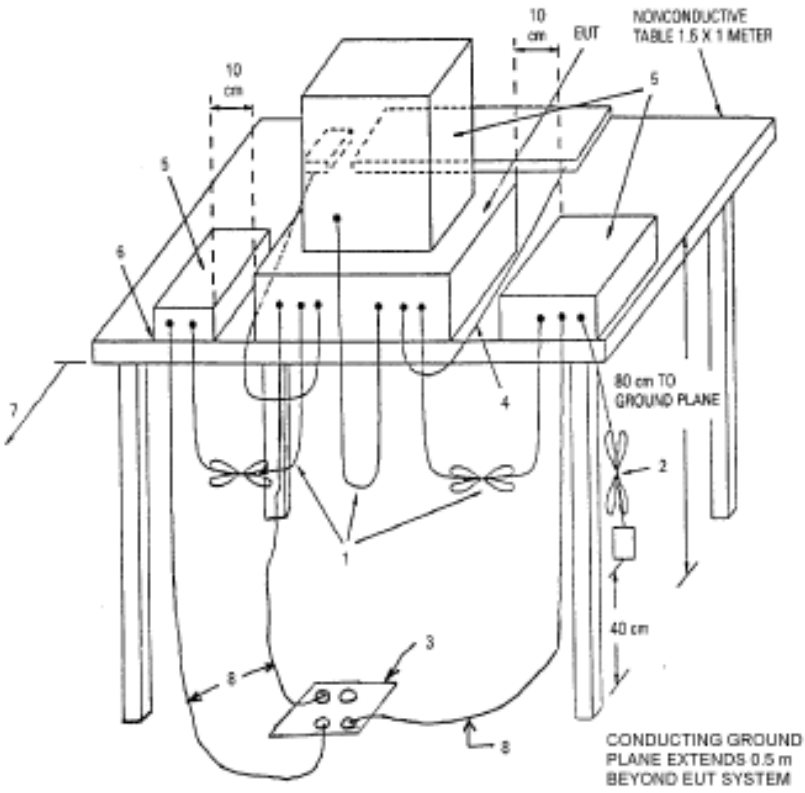
5.2 Test Method and test Procedure:

The EUT was tested according to ANSI C63.4 –2014; The frequency spectrum from 30MHz to 30GHz was investigated. All reading from 30MHz to 1GHz are quasi-peak values with a resolution bandwidth of 120kHz. For measurement above 1GHz, peak values with RBW=VBW=1MHz and PK detector. AV value with RBW=1MHz, VBW=10Hz and PK detector

Actual Working Voltage and Frequency: 120V~, 60Hz

Block diagram of Test setup





5.3 Radiated Emission Limit

Frequency Range (MHz)	Distance (m)	Field strength (dB μ V/m)
30-88	3	40.00
88-216	3	43.50
216-960	3	46.00
Above 960	3	54.00

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

2.This is a handhold device. The radiated emissions should be tested under 3-axes position (Lying, Side, and Stand), After pre-test. It was found that the worse radiated emission was get at the lying position.

5.4 Test result

The frequency spectrum from 30MHz to 30GHz was investigated. All reading from 30MHz to 1GHz are quasi-peak values with a resolution bandwidth of 120kHz. For measurement above 1GHz, peak values with RBW=VBW=1MHz and PK detector. AV value with RBW=1MHz, VBW=10Hz and PK Detector. Measurements were made at 3 meters.

Test result

General Radiated Emission Data and Harmonics Radiated Emission Data

Radiated Emission In Horizontal/ In Vertical (30MHz----1000MHz)

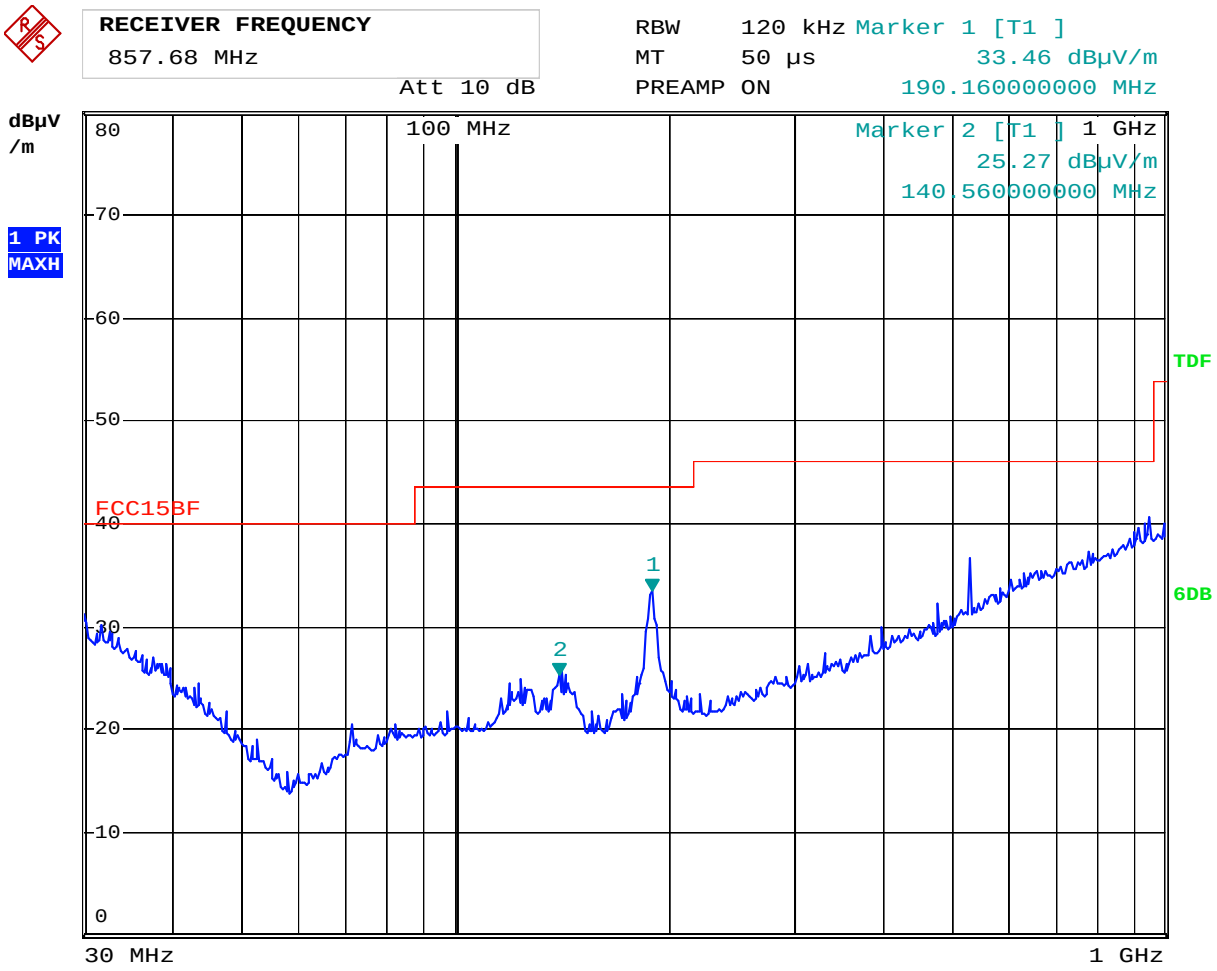
EUT set Condition: **Camera On**

Results: **Pass**

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
190.160	33.46	H	43.50
140.560	25.27	H	43.50
125.160	34.63	V	43.50
533.280	37.38	V	46.00

Test Figure:

H



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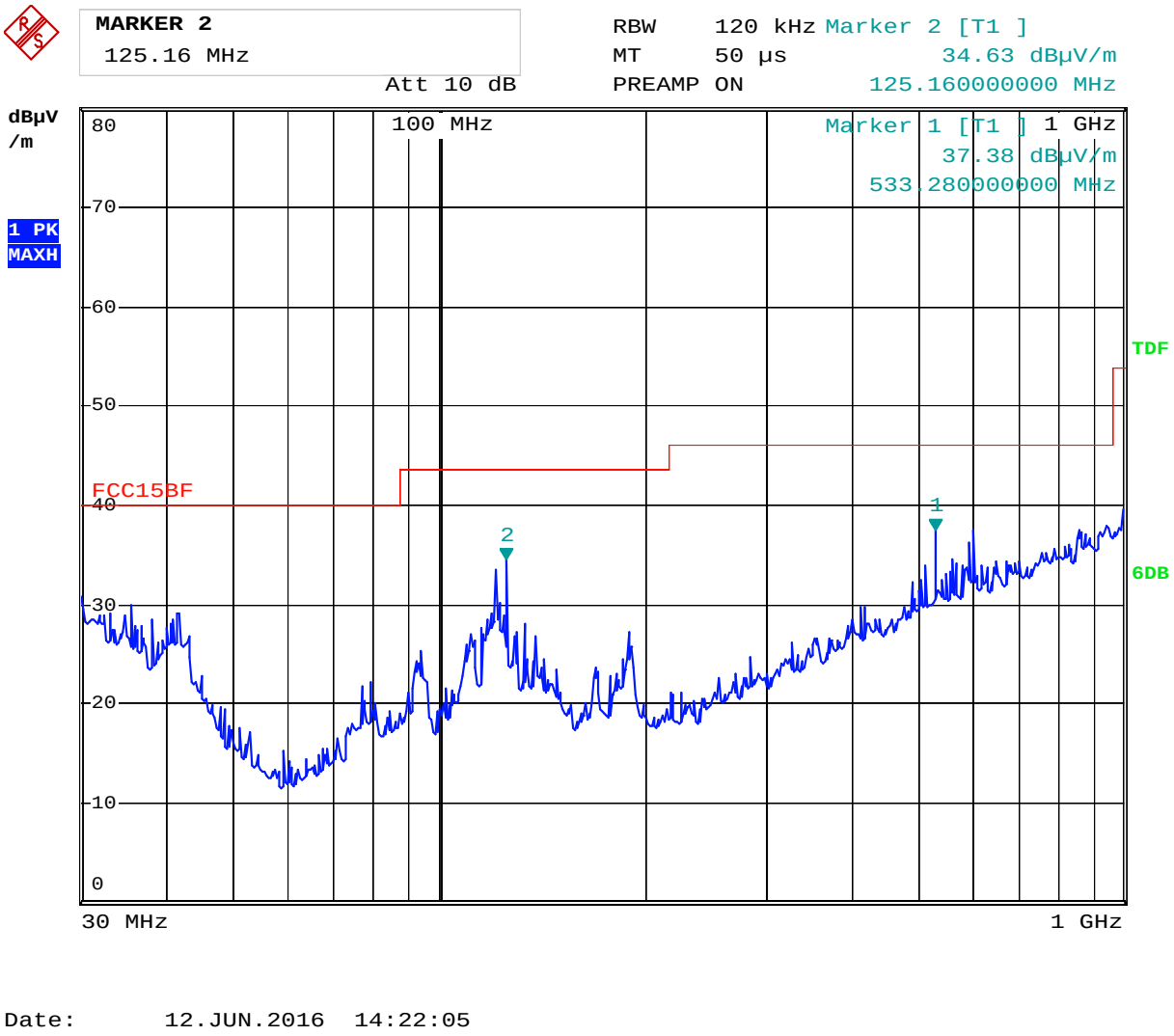
Test Figure:

V



Date: 12.JUN.2016 14:22:05

Test result

General Radiated Emission Data and Harmonics Radiated Emission Data

Radiated Emission In Horizontal/ In Vertical (30MHz----1000MHz)

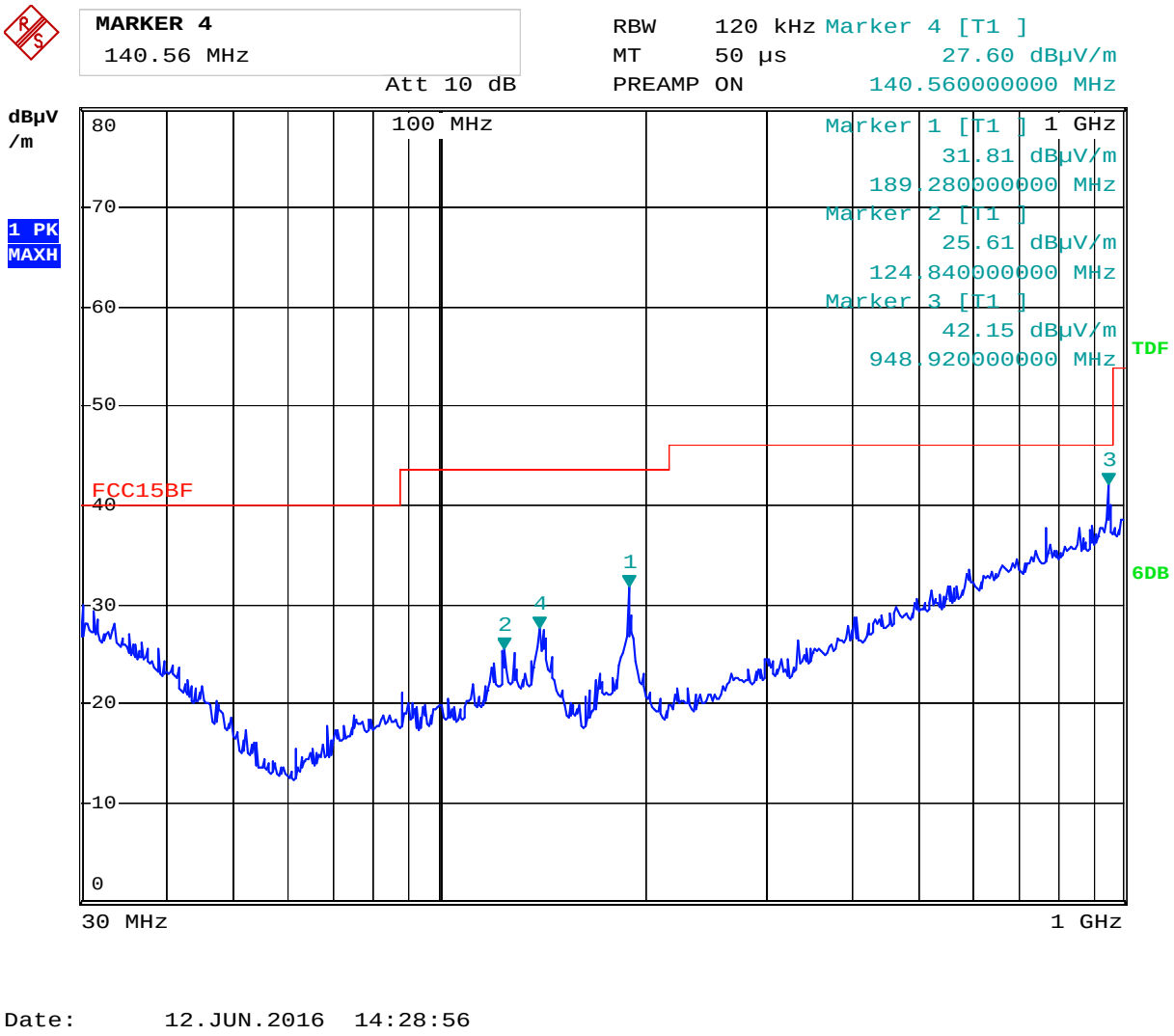
EUT set Condition: **Play SD Card**

Results: **Pass**

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
140.560	27.60	H	43.50
189.280	31.81	H	43.50
124.840	25.61	H	43.50
948.920	42.15	H	46.00
190.080	29.80	V	43.50
124.280	33.04	V	43.50

Test Figure:

H



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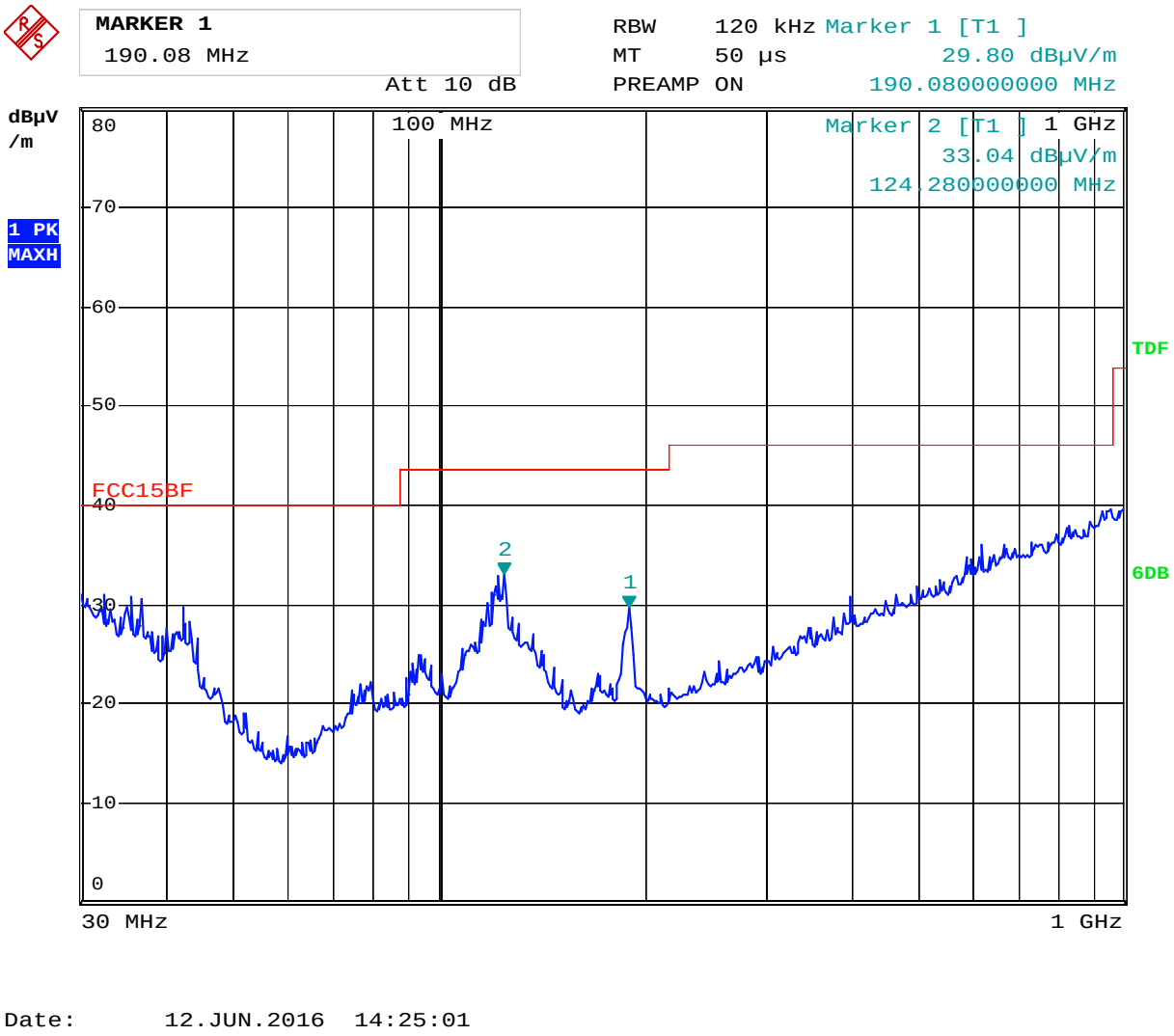
Test Figure:

V



Date: 12.JUN.2016 14:25:01

Test result

General Radiated Emission Data and Harmonics Radiated Emission Data

Radiated Emission In Horizontal/ In Vertical (30MHz----1000MHz)

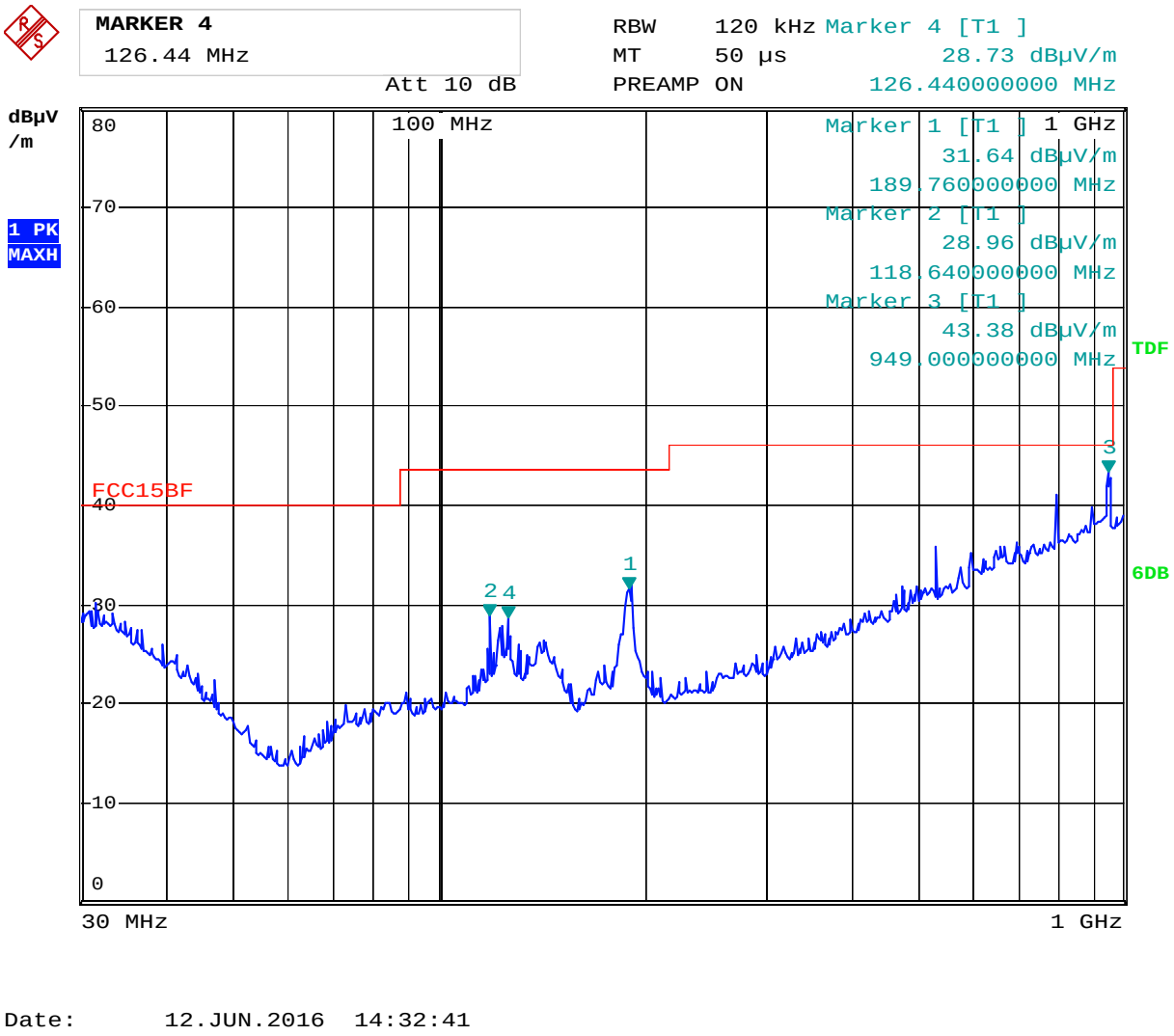
EUT set Condition: **Play USB**

Results: **Pass**

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
126.440	28.73	H	43.50
189.760	31.64	H	43.50
118.640	28.96	H	43.50
949.000	43.38	H	46.00
143.000	25.77	V	43.50
189.360	29.16	V	43.50
949.040	41.55	V	46.00

Test Figure:

H



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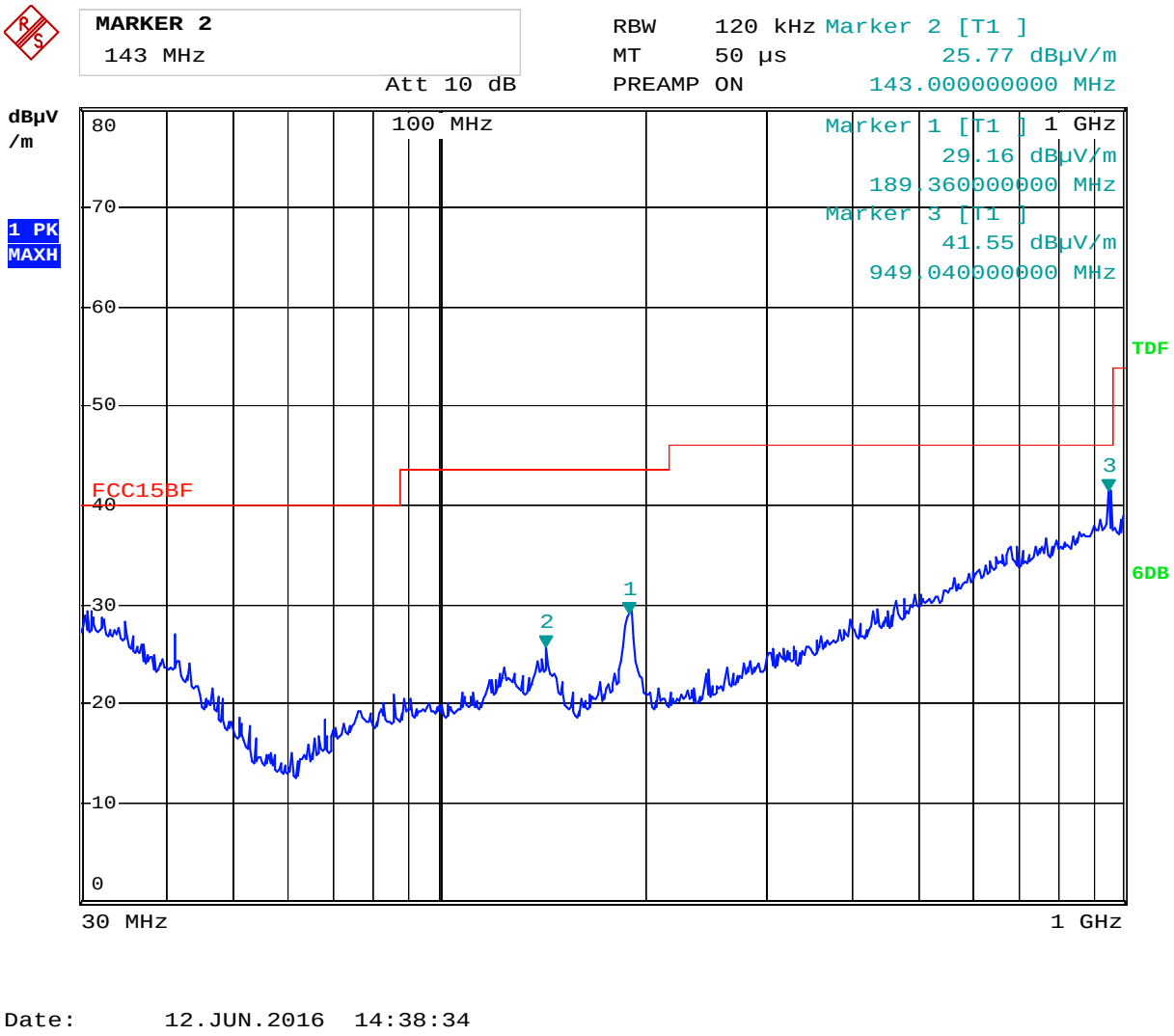
Test Figure:

V



Test result

General Radiated Emission Data and Harmonics Radiated Emission Data

Radiated Emission In Horizontal/ In Vertical (30MHz----1000MHz)

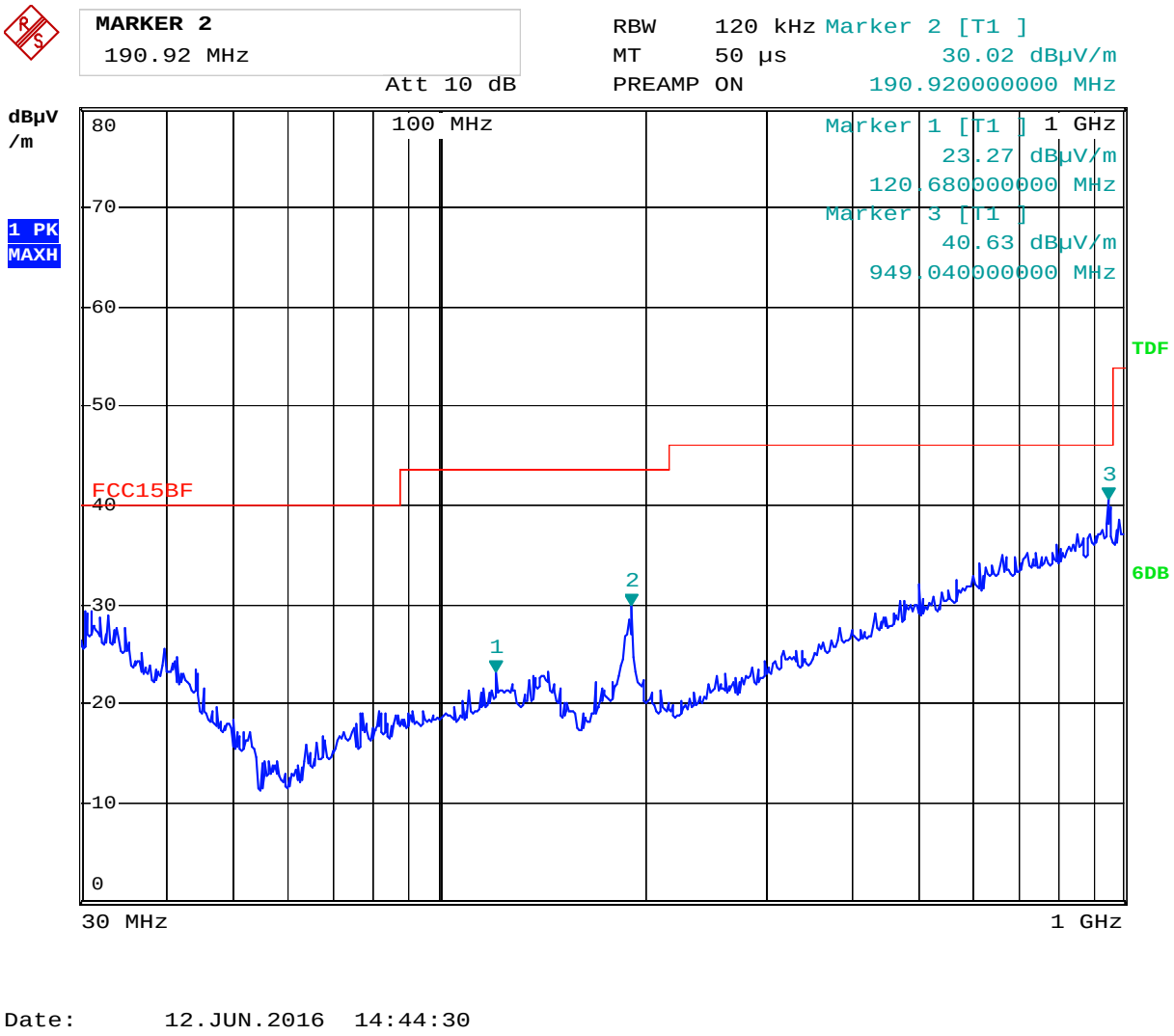
EUT set Condition: **Play Memory**

Results: **Pass**

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
190.920	30.02	H	43.50
120.680	23.27	H	43.50
949.040	40.63	H	46.00
35.840	31.20	V	40.00
120.840	31.52	V	43.50
949.000	42.32	V	46.00

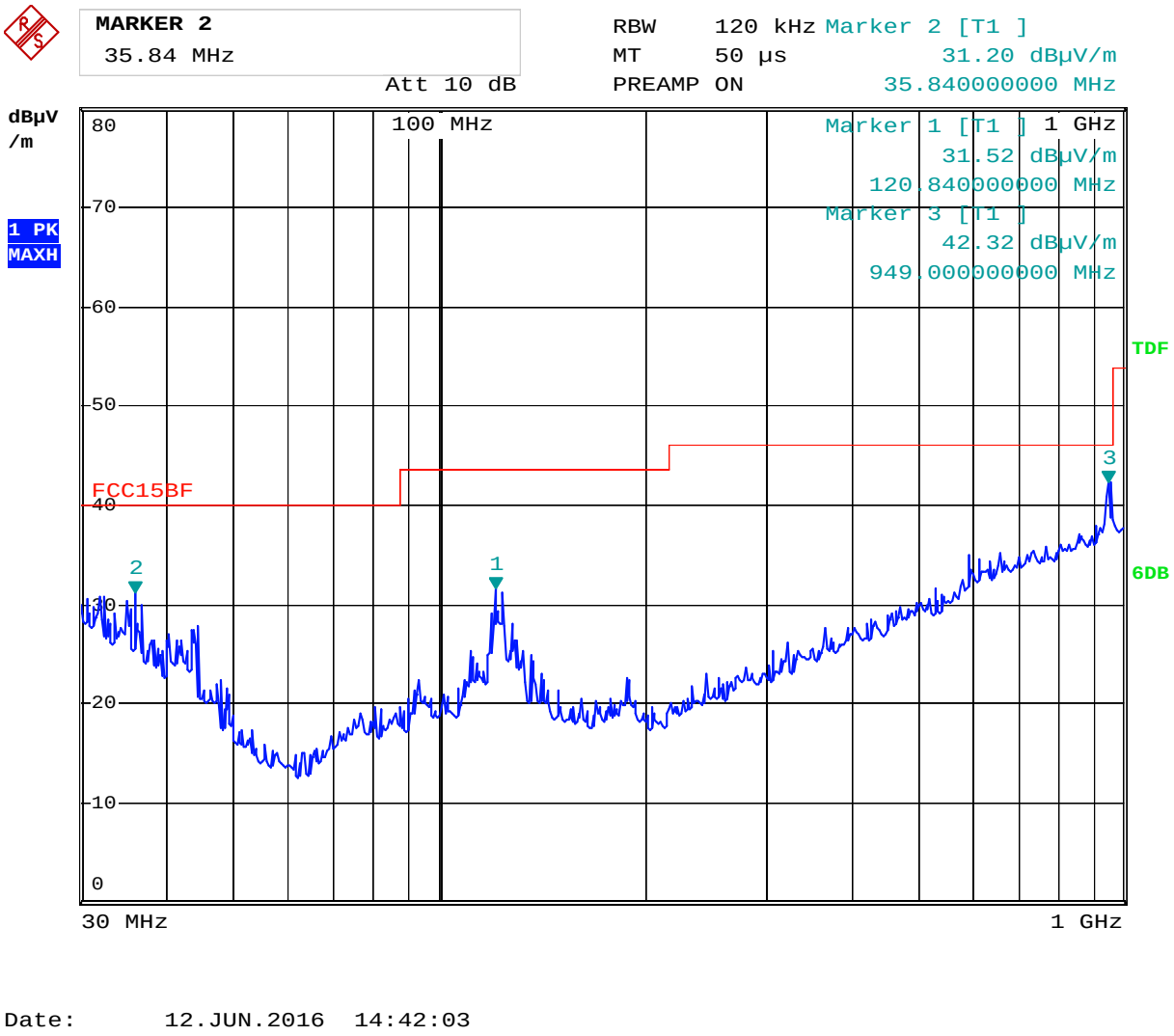
Test Figure:

H



Test Figure:

V



Test result

General Radiated Emission Data and Harmonics Radiated Emission Data

Radiated Emission In Horizontal/ In Vertical (30MHz----1000MHz)

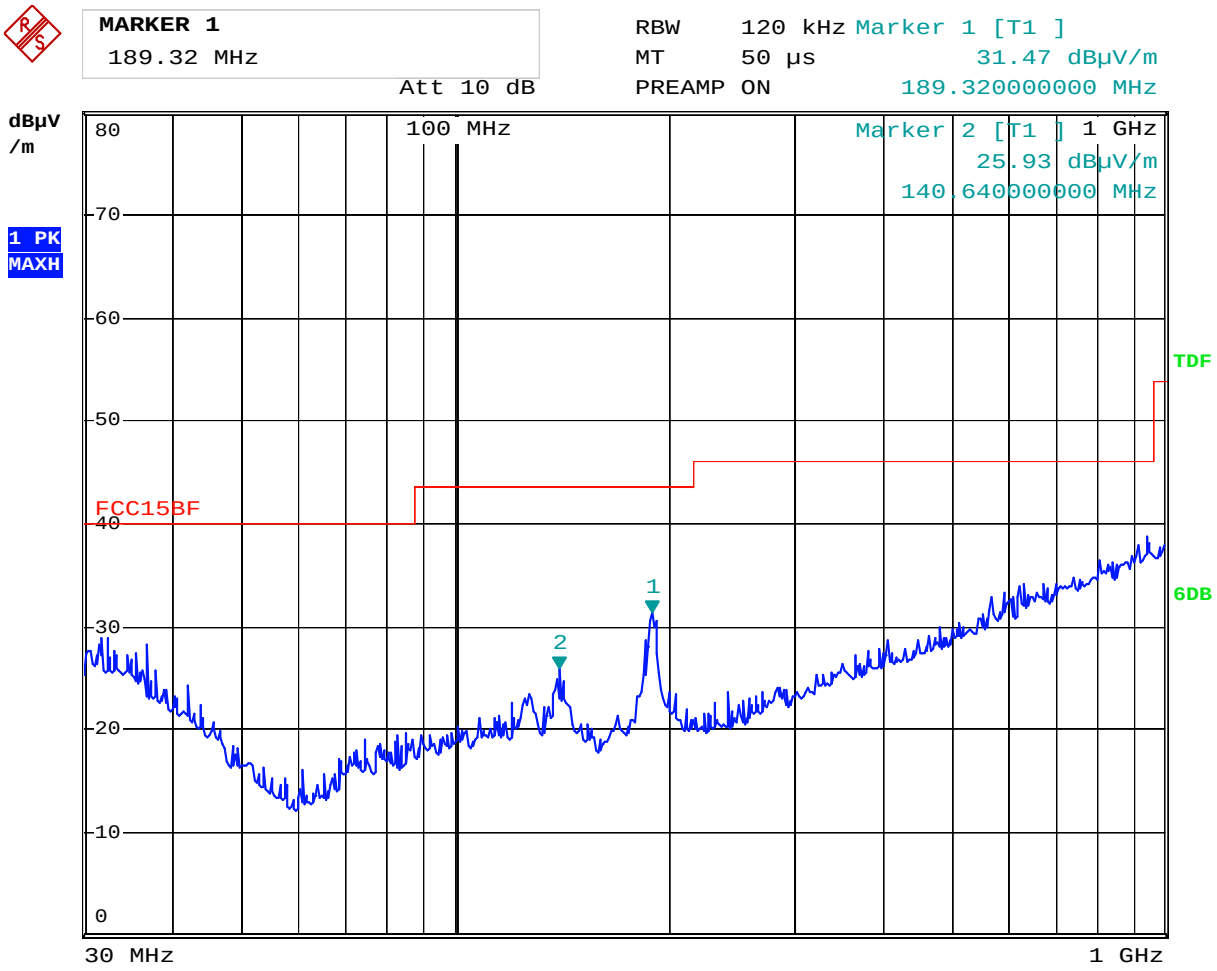
EUT set Condition: PC working mode

Results: **Pass**

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
189.320	31.47	H	43.50
140.640	25.93	H	43.50
34.880	30.87	V	40.00
123.480	34.98	V	43.50
533.320	41.11	V	46.00

Test Figure:

H



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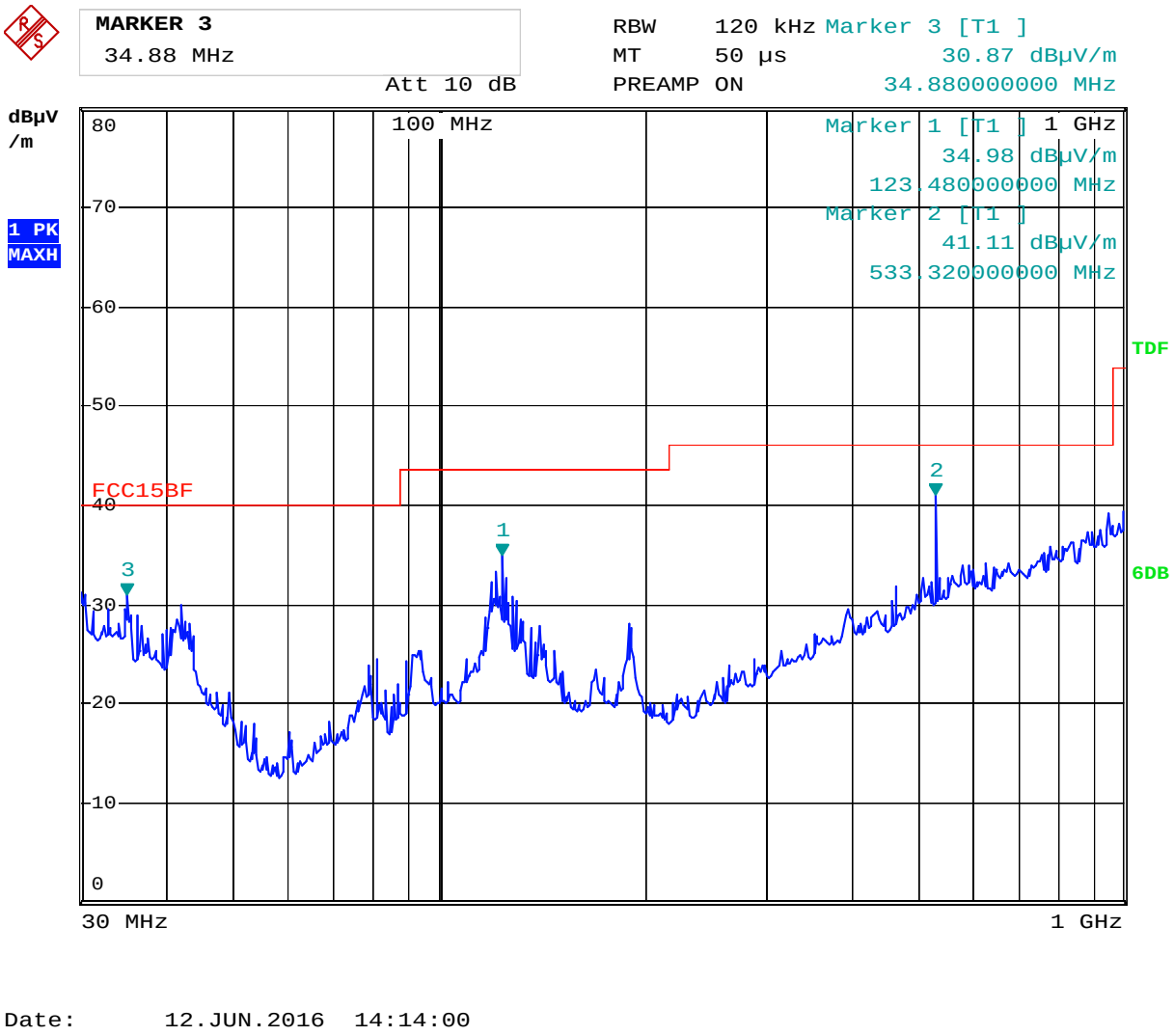
Test Figure:

V



Date: 12.JUN.2016 14:14:00

Radiated Disturbance (1000MHz----18000MHz)

EUT Operating Environment

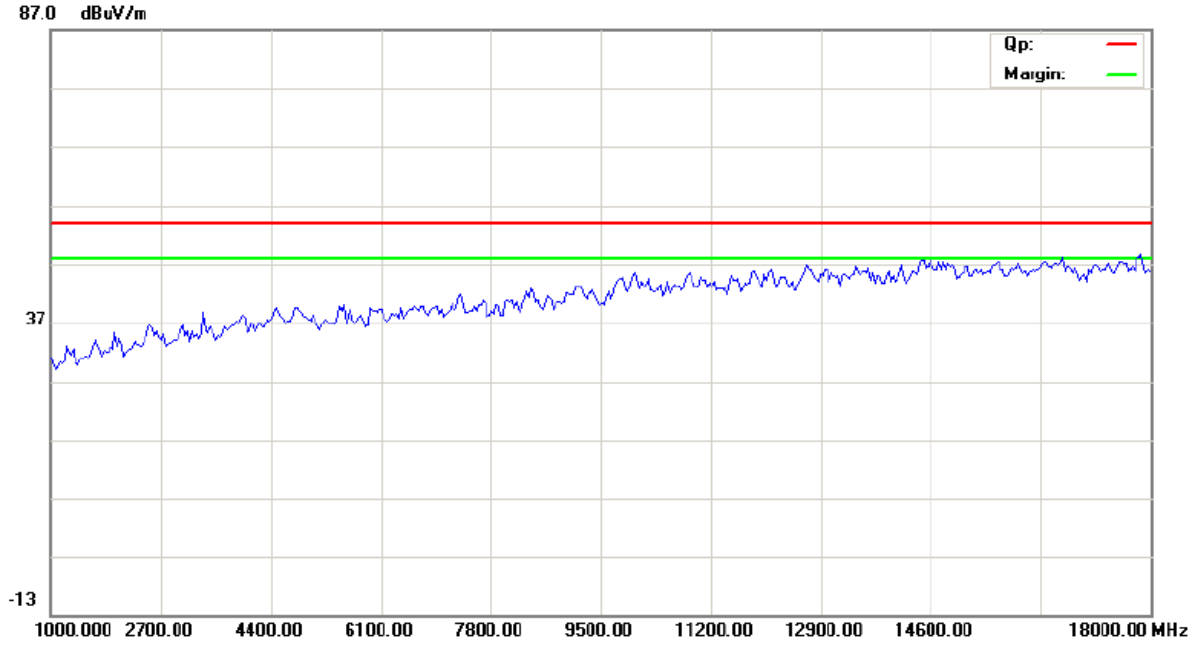
Temperature:25℃ Humidity: 75%RH Atmospheric Pressure: 101 KPa

EUT set Condition: Camera On

Equipment Level: Class B

Results: Pass

Please refer to following diagram for individual



Frequency (MHz)	Level@3m (dBμV/m)	Antenna Polarity	Limit@3m (dBμV/m)
--	--	H	54(AV)

Note: 1. PK result curve is lower than AV limit

2. For radiated Emissions from 18-30GHz, it is only the floor noise.

Radiated Disturbance (1000MHz----18000MHz)

EUT Operating Environment

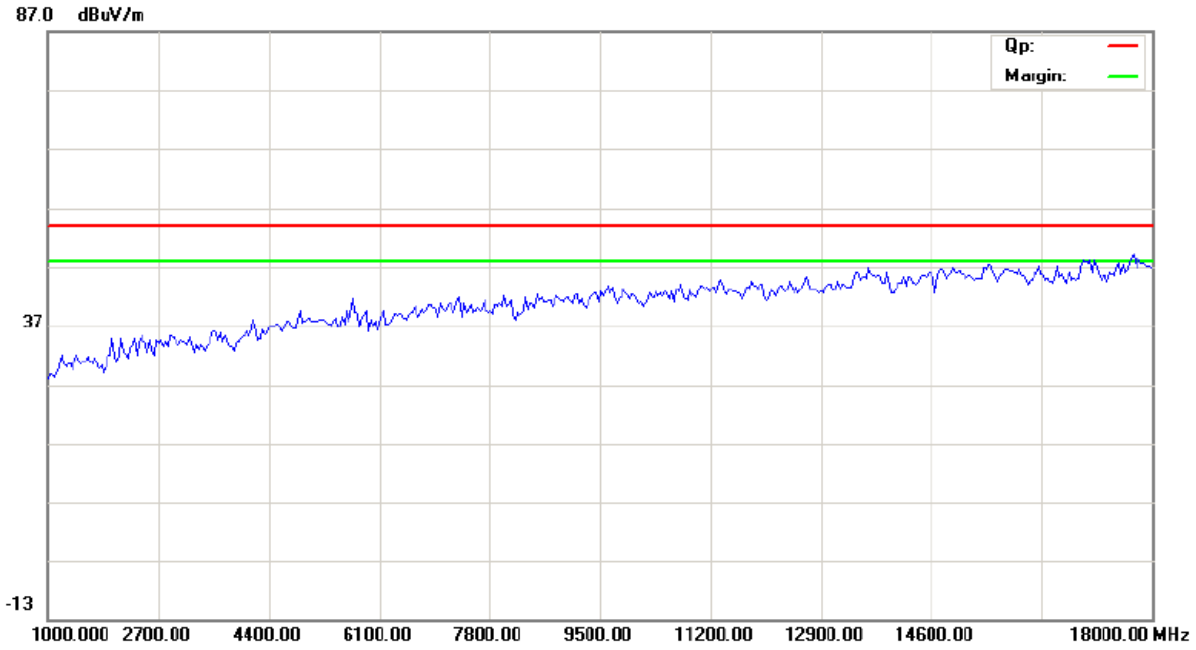
Temperature:25℃ Humidity: 75%RH Atmospheric Pressure: 101 KPa

EUT set Condition: Camera On

Equipment Level: Class B

Results: Pass

Please refer to following diagram for individual



Frequency (MHz)	Level@3m (dBμV/m)	Antenna Polarity	Limit@3m (dBμV/m)
--	--	V	54(AV)

Note: 1. PK result curve is lower than AV limit

2. For radiated Emissions from 18-30GHz, it is only the floor noise.

Radiated Disturbance (1000MHz----18000MHz)

EUT Operating Environment

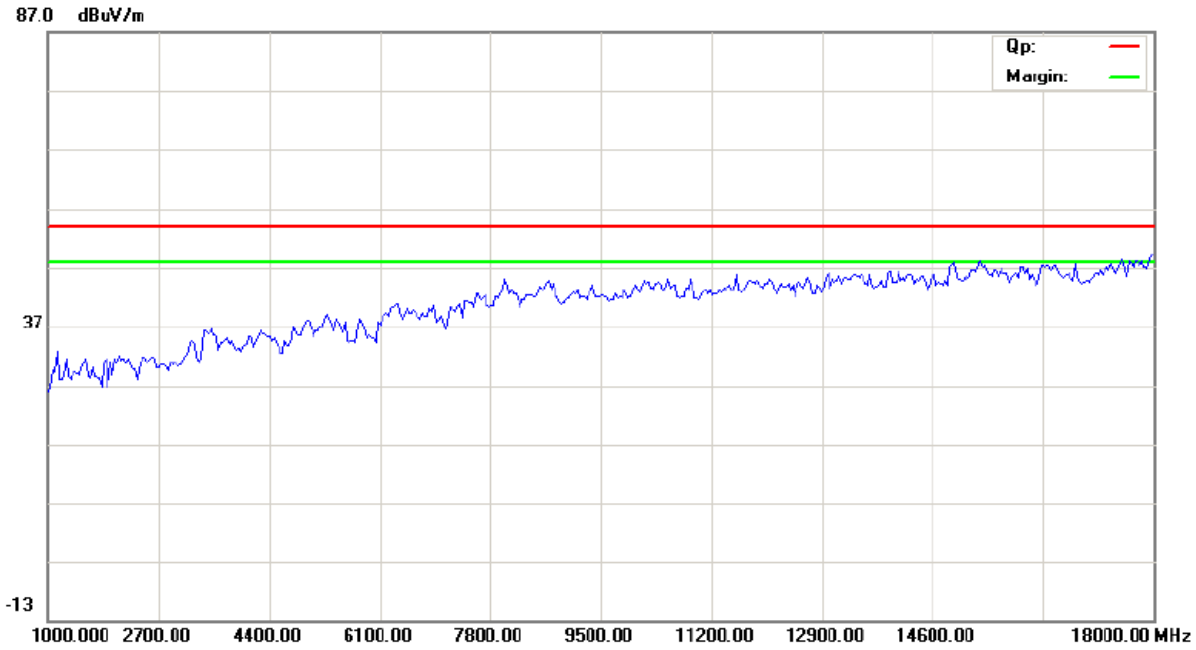
Temperature:25℃ Humidity: 75%RH Atmospheric Pressure: 101 KPa

EUT set Condition: Play SD Card

Equipment Level: Class B

Results: Pass

Please refer to following diagram for individual



Frequency (MHz)	Level@3m (dBμV/m)	Antenna Polarity	Limit@3m (dBμV/m)
--	--	H	54(AV)

Note: 1. PK result curve is lower than AV limit

2. For radiated Emissions from 18-30GHz, it is only the floor noise.

Radiated Disturbance (1000MHz----18000MHz)

EUT Operating Environment

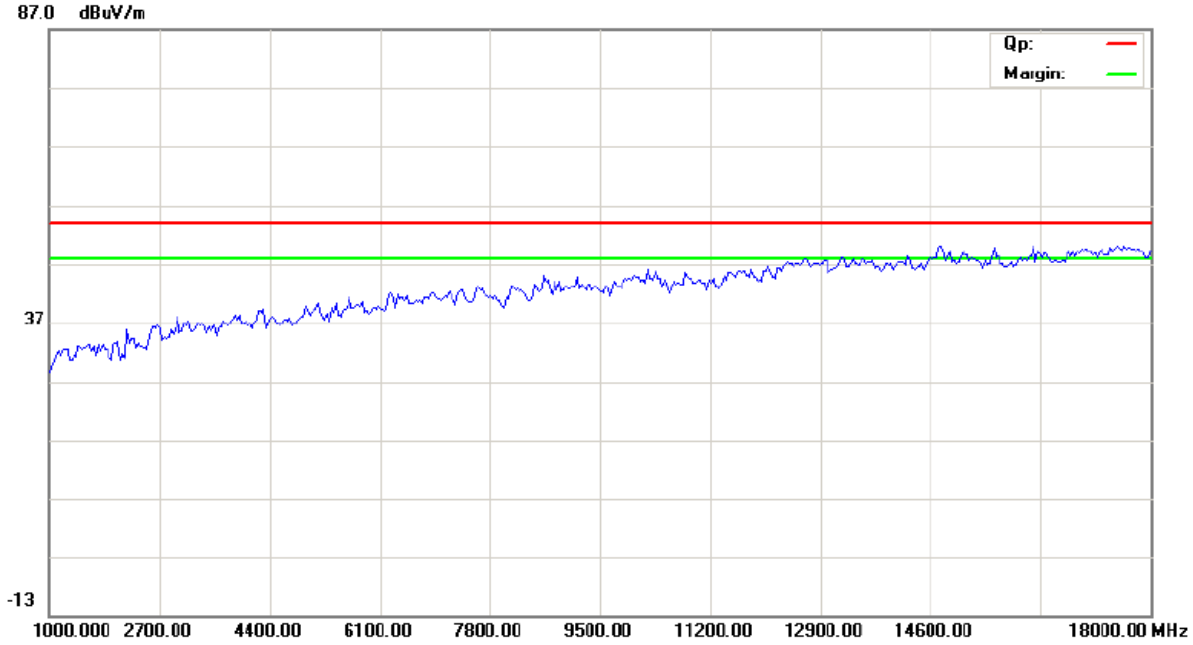
Temperature:25℃ Humidity: 75%RH Atmospheric Pressure: 101 KPa

EUT set Condition: Play SD Card

Equipment Level: Class B

Results: Pass

Please refer to following diagram for individual



Frequency (MHz)	Level@3m (dBμV/m)	Antenna Polarity	Limit@3m (dBμV/m)
--	--	V	54(AV)

Note: 1. PK result curve is lower than AV limit

2. For radiated Emissions from 18-30GHz, it is only the floor noise.

Radiated Disturbance (1000MHz----18000MHz)

EUT Operating Environment

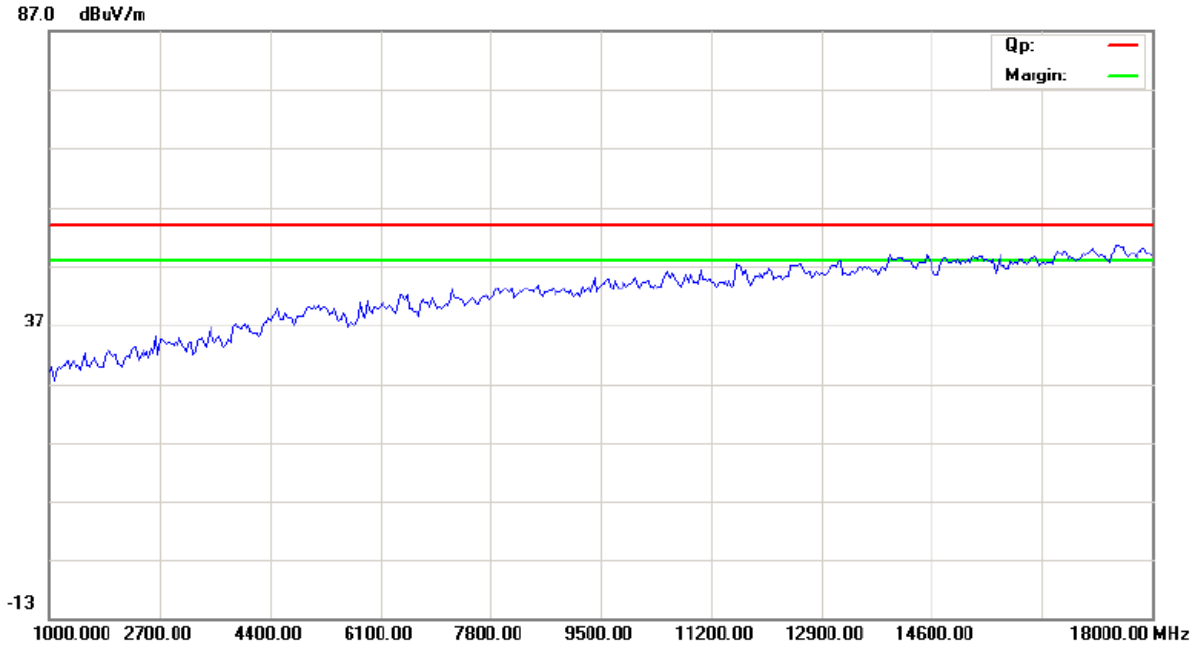
Temperature:25℃ Humidity: 75%RH Atmospheric Pressure: 101 KPa

EUT set Condition: PlayUSB

Equipment Level: Class B

Results: Pass

Please refer to following diagram for individual



Frequency (MHz)	Level@3m (dBμV/m)	Antenna Polarity	Limit@3m (dBμV/m)
--	--	H	54(AV)

Note: 1. PK result curve is lower than AV limit

2. For radiated Emissions from 18-30GHz, it is only the floor noise.

Radiated Disturbance (1000MHz----18000MHz)

EUT Operating Environment

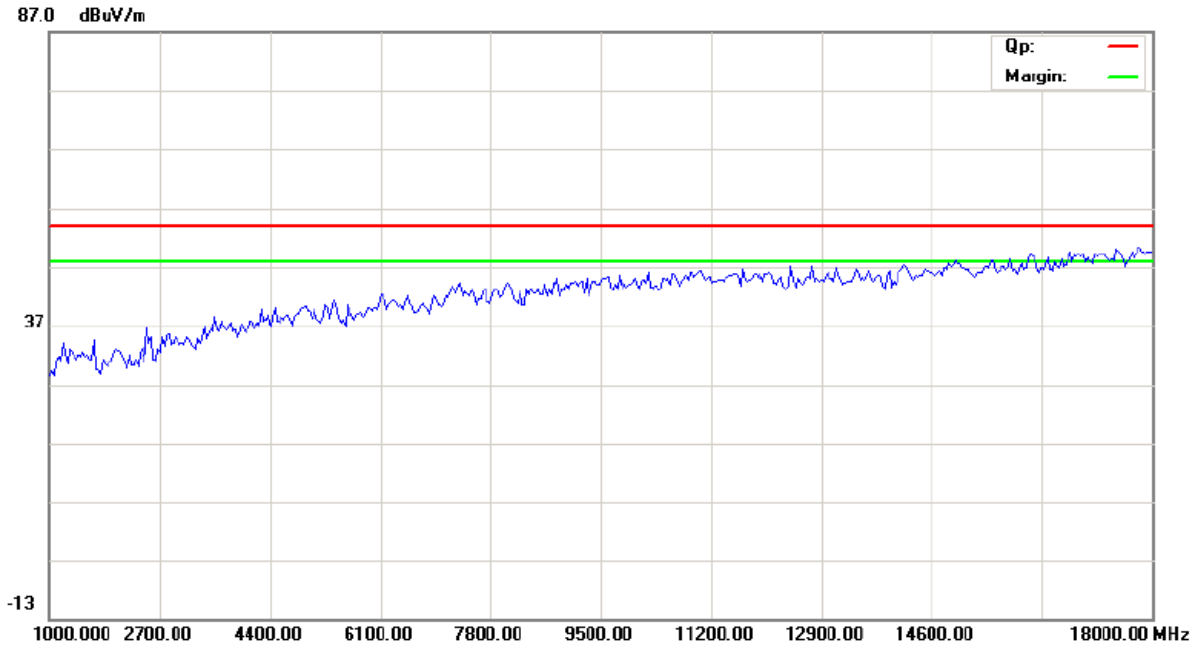
Temperature:25℃ Humidity: 75%RH Atmospheric Pressure: 101 KPa

EUT set Condition: Play USB

Equipment Level: Class B

Results: Pass

Please refer to following diagram for individual



Frequency (MHz)	Level@3m (dBμV/m)	Antenna Polarity	Limit@3m (dBμV/m)
--	--	V	54(AV)

Note: 1. PK result curve is lower than AV limit

2. For radiated Emissions from 18-30GHz, it is only the floor noise.

Radiated Disturbance (1000MHz----18000MHz)

EUT Operating Environment

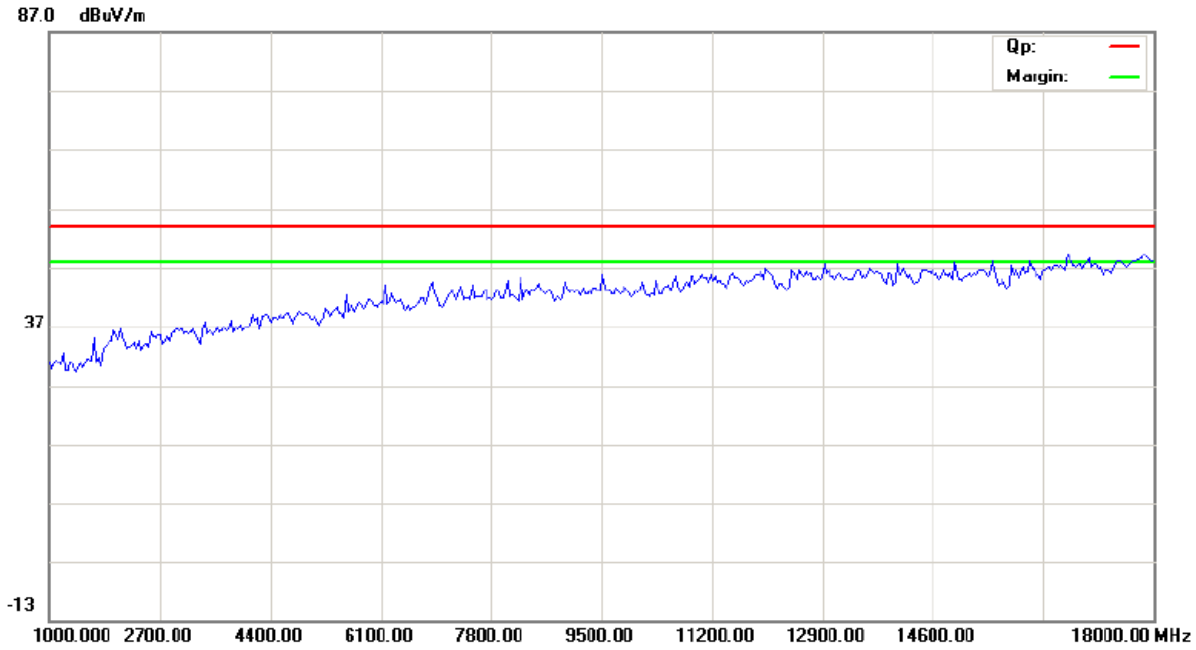
Temperature:25℃ Humidity: 75%RH Atmospheric Pressure: 101 KPa

EUT set Condition: Play Memory

Equipment Level: Class B

Results: Pass

Please refer to following diagram for individual



Frequency (MHz)	Level@3m (dBμV/m)	Antenna Polarity	Limit@3m (dBμV/m)
--	--	H	54(AV)

Note: 1. PK result curve is lower than AV limit

2. For radiated Emissions from 18-30GHz, it is only the floor noise.

Radiated Disturbance (1000MHz----18000MHz)

EUT Operating Environment

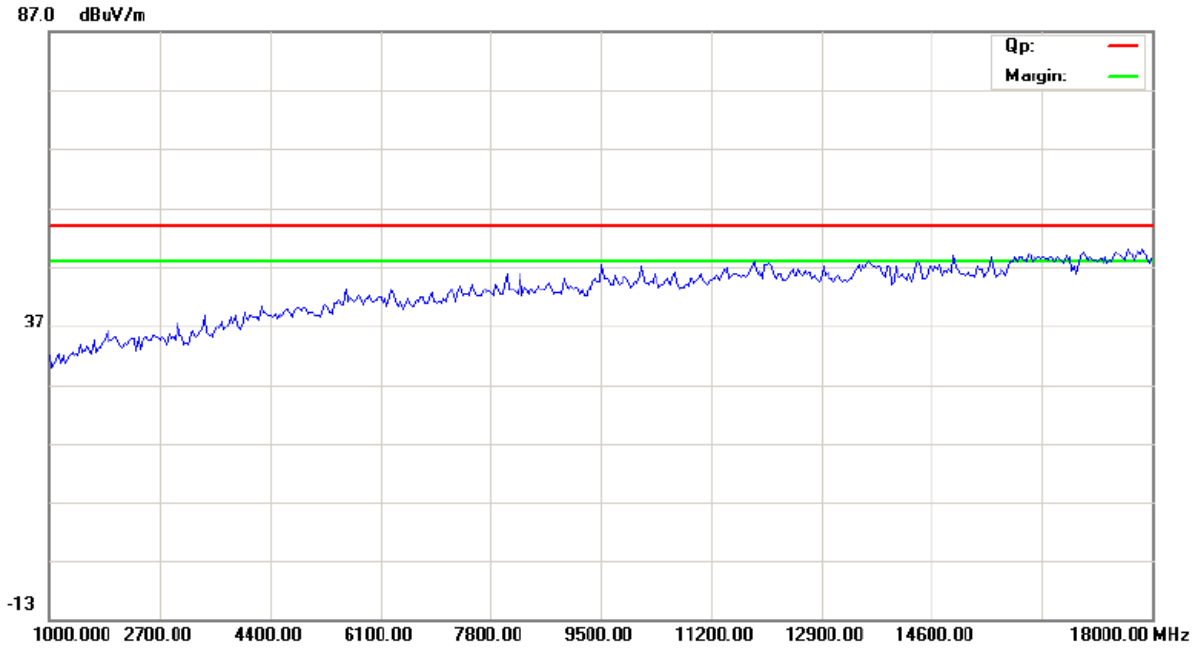
Temperature:25℃ Humidity: 75%RH Atmospheric Pressure: 101 KPa

EUT set Condition: Play Memory

Equipment Level: Class B

Results: Pass

Please refer to following diagram for individual



Frequency (MHz)	Level@3m (dBμV/m)	Antenna Polarity	Limit@3m (dBμV/m)
--	--	V	54(AV)

Note: 1. PK result curve is lower than AV limit

2. For radiated Emissions from 18-30GHz, it is only the floor noise.

Radiated Disturbance (1000MHz----18000MHz)

EUT Operating Environment

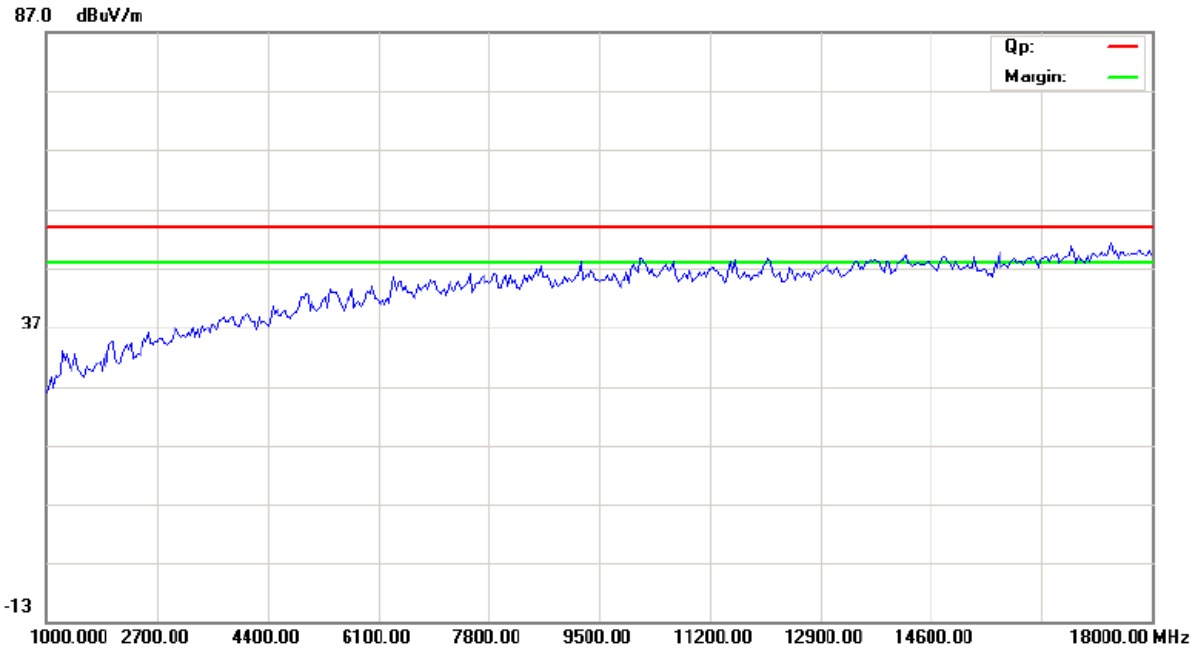
Temperature:25℃ Humidity: 75%RH Atmospheric Pressure: 101 KPa

EUT set Condition:PC working mode

Equipment Level: Class B

Results: Pass

Please refer to following diagram for individual



Frequency (MHz)	Level@3m (dBμV/m)	Antenna Polarity	Limit@3m (dBμV/m)
--	--	H	54(AV)

Note: 1. PK result curve is lower than AV limit

2. For radiated Emissions from 18-30GHz, it is only the floor noise.

Radiated Disturbance (1000MHz----18000MHz)

EUT Operating Environment

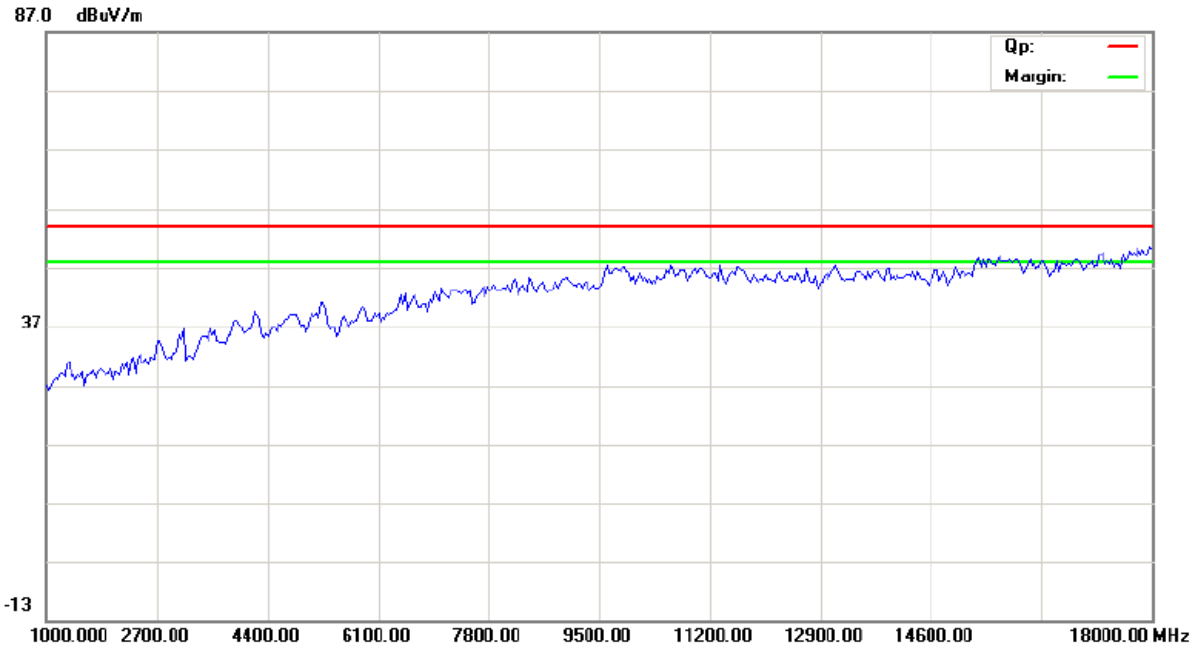
Temperature:25℃ Humidity: 75%RH Atmospheric Pressure: 101 KPa

EUT set Condition: PC working mode

Equipment Level: Class B

Results: Pass

Please refer to following diagram for individual



Frequency (MHz)	Level@3m (dBμV/m)	Antenna Polarity	Limit@3m (dBμV/m)
--	--	V	54(AV)

Note: 1. PK result curve is lower than AV limit

2. For radiated Emissions from 18-30GHz, it is only the floor noise.