

EMC TEST REPORT

Applicant:	Mundo Reader S.L.
Address:	Calle Sofía 10, Parque Industrial y Tecnológico Európolis 28232 Las Rozas - Madrid SPAIN

Manufacturer or Supplier:	Mundo Reader S.L.
Address:	Calle Sofía 10, Parque Industrial y Tecnológico Európolis 28232 Las Rozas - Madrid SPAIN
Product:	Smartphone
Brand Name:	BQ
Model Name:	Aquaris X2
FCC ID:	2AN87AQUARISX2
Date of tests:	Aug. 10, 2018 ~ Sep. 11, 2018

The submitted sample of the above equipment has been tested for according to the requirements of the following standards:

- ☒ **FCC Part 15, Subpart B, Class B**
- ☒ **ANSI C63.4:2014**

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Issued by Alex Chen Engineer / Mobile Department	Approved by Sam Tung Manager / Mobile Department
	
Date: Sep. 12, 2018	Date: Sep. 12, 2018

This report is governed by, and incorporates by reference, CPS Conditions of Service as posted at the date of issuance of this report at <http://www.bureauveritas.com/home/about-us/our-business/cps/about-us/terms-conditions> and is intended 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. Measurement uncertainty is only provided upon request for accredited tests. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence or if you require measurement uncertainty; provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents.

TABLE OF CONTENTS

RELEASE CONTROL RECORD	3
1 GENERAL INFORMATION	4
1.1 GENERAL DESCRIPTION OF EUT	4
1.2 SUMMARY OF TEST RESULTS	6
1.3 MEASUREMENT UNCERTAINTY	6
1.4 DESCRIPTION OF TEST MODES	7
1.5 DESCRIPTION OF SUPPORT UNITS	8
2 EMISSION TEST	9
2.1 CONDUCTED EMISSION MEASUREMENT	9
2.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT	9
2.1.2 TEST INSTRUMENTS	9
2.1.3 TEST PROCEDURES	10
2.1.4 DEVIATION FROM TEST STANDARD	10
2.1.4 TEST SETUP	11
2.1.6 EUT OPERATING CONDITIONS	11
2.1.7 TEST RESULTS	12
2.2 RADIATED EMISSION MEASUREMENT	16
2.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT	16
2.2.2 TEST INSTRUMENTS	17
2.2.3 TEST PROCEDURE	18
2.2.4 DEVIATION FROM TEST STANDARD	19
2.2.5 TEST SETUP	20
2.2.6 EUT OPERATING CONDITIONS	20
2.2.7 TEST RESULTS	21
3 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB	29



Test Report No.: FV180402W006

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
FV180402W006	Original release	Sep. 12, 2018

1 GENERAL INFORMATION

1.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Smartphone	
BRAND NAME	BQ	
MODEL NAME	Aquaris X2	
NOMINAL VOLTAGE	5.0Vdc (adapter or host equipment) 3.85Vdc (Li-ion, battery)	
BATTERY	Brand Name: BQ Model Name: BQ battery 3100 (1 CP5/61/70) Power Rating: DC 3.85V, 3100mAh, Li-ion	
MODULATION TYPE	WLAN	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
	BT_LE	BT-LE(GFSK) for DTS
	Bluetooth	GFSK, $\pi/4$ -DQPSK, 8DPSK
	GPS/ Glonass	C/A code
	GSM	GMSK
	WCDMA	BPSK/QPSK
	LTE	QPSK/16QAM
	NFC	ASK
	FM	FSK
OPERATING FREQUENCY	WLAN	2412 ~ 2462MHz for 11b/g/n(HT20) 2422 ~ 2452MHz for 11n(HT40) 5150 ~ 5250MHz, 5250 ~ 5350MHz, 5470 ~ 5725MHz, 5725 ~ 5825MHz for 11a/n(HT20)/n(HT40)/ac(HT80)
	Bluetooth/BT_LE	2402MHz ~ 2480MHz
	GPS	1575.42MHz
	GLONASS	1602MHz
	GSM	824.2MHz ~ 848.8MHz (FOR GSM 850) 1850.2MHz ~ 1909.8MHz (FOR GSM 1900)
	WCDMA	1852.4MHz ~ 1907.6MHz (FOR WCDMA Band 2) 1710.7MHz ~ 1754.3MHz (FOR WCDMA Band 4) 826.4MHz ~ 846.6MHz (FOR WCDMA Band 5)
	LTE	1850.7MHz ~ 1909.3MHz (FOR LTE Band2) 1710.7MHz ~ 1754.3MHz (FOR LTE Band4) 824.7MHz ~ 848.3MHz (FOR LTE Band5)
	NFC	13.56MHz



Test Report No.: FV180402W006

	FM	88MHz ~ 108MHz
HW VERSION	LLDM0893-3 VER:B3	
SW VERSION	1.3.1_20180904-0601	
I/O PORTS	Refer to user's manual	
CABLE SUPPLIED	USB Cable: non-shielded, detachable, 1.0m	
ACCESSORY DEVICES	Refer to note as below	

NOTE:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. The EUT matched the following USB Cable:

USB CABLE	
BRAND:	bq
MODEL:	HY-005015
SIGNAL LINE:	1.0 METER

3. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

1.2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart B			
Standard Section	Test Item	Result	Remark
FCC Part 15, Subpart B, Class B ANSI C63.4:2014	Conducted Test	PASS	Meets limits minimum passing margin is -13.18dB at 4.548000MHz.
	Radiated Emission Test (30MHz ~ 1GHz)	PASS	Meets Class B Limit Minimum passing margin is -6.84dB at 399.57MHz
	Radiated Emission Test (Above 1GHz)	PASS	Meets Class B Limit Minimum passing margin is -9.86dB at 3750MHz

1.3 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified 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.

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	150kHz ~ 30MHz	+/-2.66dB
Radiated emissions	30MHz ~ 1GHz	+/-3.26dB
	1GHz ~ 18GHz	+/-4.48dB

1.4 DESCRIPTION OF TEST MODES

Test Mode	Test Condition
Radiated emission test	
1	GSM850 Idle+ Adapter+ Earphone+ USB cable+ BT Idle+ WIFI 2.4g Idle+ Back Camera on
2	GSM1900 Idle+ Adapter+ Earphone+ USB cable+ BT Idle+ WIFI 5g Idle+ Front Camera On
3	WCDMA B2 Idle+ Adapter+ Earphone+ USB cable+ BT Idle+ WIFI 2.4g Idle+ FM RX
4	WCDMA B4 Idle+ Adapter+ Earphone+ USB cable+ BT Idle+ WIFI 5g Idle+ GPS RX
5	WCDMA B5 Idle+ Adapter+ Earphone+ USB cable+ BT Idle+ WIFI 2.4g Idle+ Glonass Rx
6	LTE B2 Idle+ Adapter+ Earphone+ USB cable+ BT Idle+ WIFI 5g Idle
7	LTE B4 Idle+ Adapter+ Earphone+ USB cable+ BT Idle+ WIFI 2.4g Idle+ NFC RX
8	LTE B5 Idle+USB cable+ data transmission+ Earphone +BT Idle+ WIFI 5g Idle
Conducted emission test	
1	GSM850 Idle+ Adapter+ Earphone+ USB cable+ BT Idle+ WIFI 2.4g Idle+ Back Camera on
2	GSM1900 Idle+ Adapter+ Earphone+ USB cable+ BT Idle+ WIFI 5g Idle+ Front Camera On
3	WCDMA B2 Idle+ Adapter+ Earphone+ USB cable+ BT Idle+ WIFI 2.4g Idle+ FM RX
4	WCDMA B4 Idle+ Adapter+ Earphone+ USB cable+ BT Idle+ WIFI 5g Idle+ GPS RX
5	WCDMA B5 Idle+ Adapter+ Earphone+ USB cable+ BT Idle+ WIFI 2.4g Idle+ Glonass Rx
6	LTE B2 Idle+ Adapter+ Earphone+ USB cable+ BT Idle+ WIFI 5g Idle
7	LTE B4 Idle+ Adapter+ Earphone+ USB cable+ BT Idle+ WIFI 2.4g Idle+ NFC RX
8	LTE B5 Idle+USB cable+ data transmission+ Earphone +BT Idle+ WIFI 5g Idle

NOTE:

1. For conducted emission test, test mode 8 was the worst case, the worst case and mode 6 were presented in this report.
2. For radiated emission test, test mode 8 was the worst case, the worst case and mode 6 were presented in this report

1.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

FOR EMISSION TESTS

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Adapter	BQ	AS24A-120150U	0008170	N/A
2	Earphone	Nokia	WH-108	N/A	N/A
3	Notebook	Lenovo	Thnikpad X520	SL10H14859JS	N/A
4	Printer	HP	Hp LaserJet 1300	CNSJF75989	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	N/A
2	N/A
3	N/A
4	N/A

2 EMISSION TEST

2.1 CONDUCTED EMISSION MEASUREMENT

2.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

TEST STANDARD: FCC PART 15, SUBPART B (SECTION: 15.107)

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	60	50

- NOTE:**
1. The lower limit shall apply at the transition frequencies.
 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.
 3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

2.1.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR3	101900	Mar. 15,18	Mar. 14,19
EMC32 test software	Rohde&Schwarz	EMC32	NA	NA	NA
LISN network	Rohde&Schwarz	ENV216	101922	Sep. 18,17	Sep. 17,18

- NOTE:**
1. The test was performed in CE shielded room.
 2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GREGT/CHINA and NIM/CHINA.

2.1.3 TEST PROCEDURES

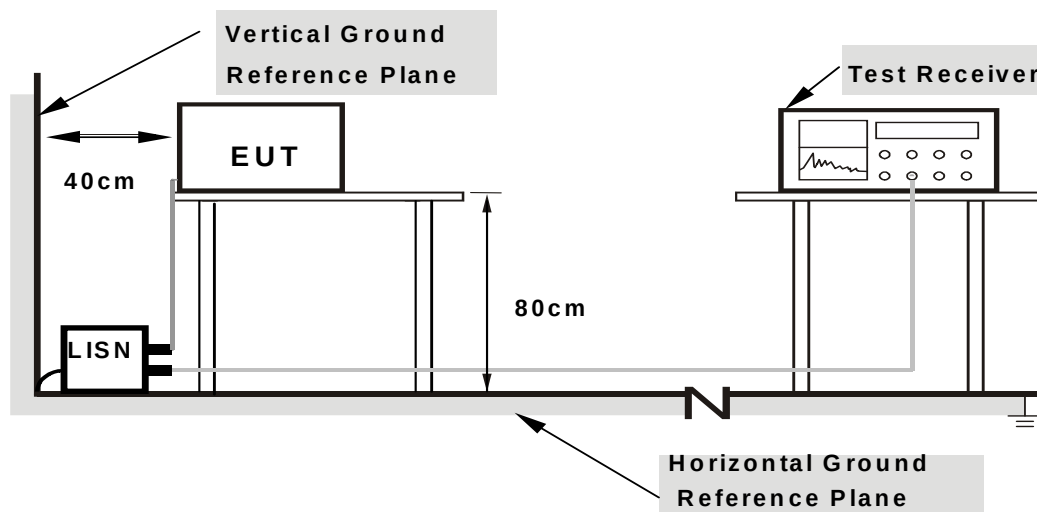
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150 kHz to 30MHz was searched. Emission levels under (Limit - 20dB) were not recorded.

NOTE: All modes of operation were investigated and the worst-case emissions are reported.

2.1.4 DEVIATION FROM TEST STANDARD

No deviation.

2.1.5 TEST SETUP



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

For the actual test configuration, please refer to the attached file (Test Setup Photo).

2.1.6 EUT OPERATING CONDITIONS

- a. Turned on the power and connected of all equipment.
- b. EUT was operated according to the use type described in the manufacturer's specifications or the user's manual.

2.1.7 TEST RESULTS

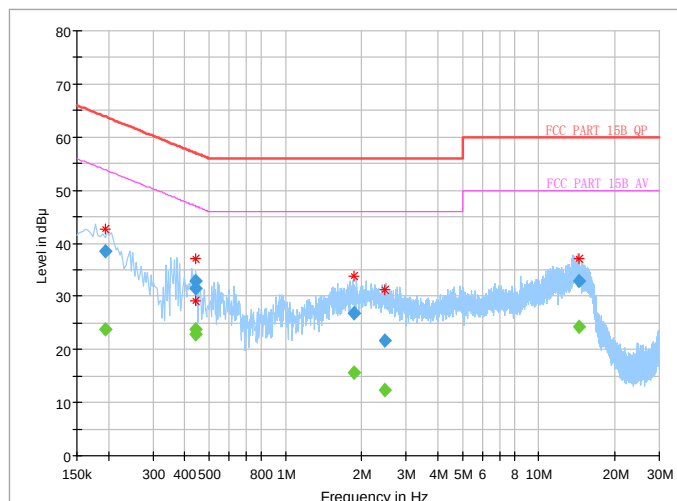
Mode 1

TEST VOLTAGE	DC 5V From Adapter Input 120 Vac, 60 Hz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
ENVIRONMENTAL CONDITIONS	24deg. C, 55RH	TESTED BY	John Wen

Frequency (MHz)	QuasiPeak (dB μ V)	CAverage (dB μ V)	Limit (dB μ V)	Margin (dB)	Line	Filter	Corr. (dB)
0.194000	---	23.77	53.86	-30.09	L1	ON	9.7
0.194000	38.47	---	63.86	-25.39	L1	ON	9.7
0.440000	31.38	---	57.06	-25.68	L1	ON	9.7
0.440000	---	22.84	47.06	-24.22	L1	ON	9.7
0.444000	32.79	---	56.99	-24.20	L1	ON	9.7
0.444000	---	23.79	46.99	-23.20	L1	ON	9.7
1.860000	---	15.72	46.00	-30.28	L1	ON	9.7
1.860000	26.83	---	56.00	-29.17	L1	ON	9.7
2.464000	---	12.26	46.00	-33.74	L1	ON	9.7
2.464000	21.67	---	56.00	-34.33	L1	ON	9.7
14.400000	---	24.34	50.00	-25.66	L1	ON	9.9
14.400000	32.88	---	60.00	-27.12	L1	ON	9.9

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.

Full Spectrum

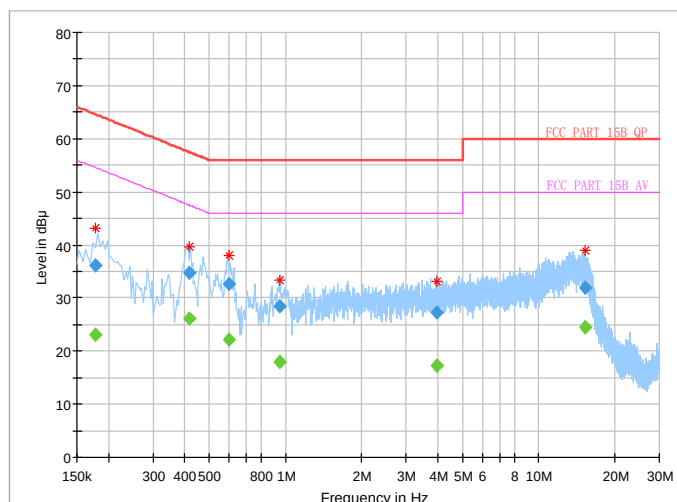


TEST VOLTAGE	DC 5V From Adapter Input 120 Vac, 60 Hz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
ENVIRONMENTAL CONDITIONS	24deg. C, 55RH	TESTED BY	John Wen

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.178000	---	22.98	54.58	-31.60	N	ON	10.2
0.178000	36.16	---	64.58	-28.42	N	ON	10.2
0.416000	---	26.05	47.53	-21.48	N	ON	10.1
0.416000	34.77	---	57.53	-22.76	N	ON	10.1
0.596000	---	22.27	46.00	-23.73	N	ON	10.1
0.596000	32.69	---	56.00	-23.31	N	ON	10.1
0.952000	---	17.95	46.00	-28.05	N	ON	9.9
0.952000	28.56	---	56.00	-27.44	N	ON	9.9
3.956000	---	17.18	46.00	-28.82	N	ON	9.8
3.956000	27.24	---	56.00	-28.76	N	ON	9.8
15.244000	---	24.44	50.00	-25.56	N	ON	9.9
15.244000	32.01	---	60.00	-27.99	N	ON	9.9

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.

Full Spectrum





Test Report No.: FV180402W006

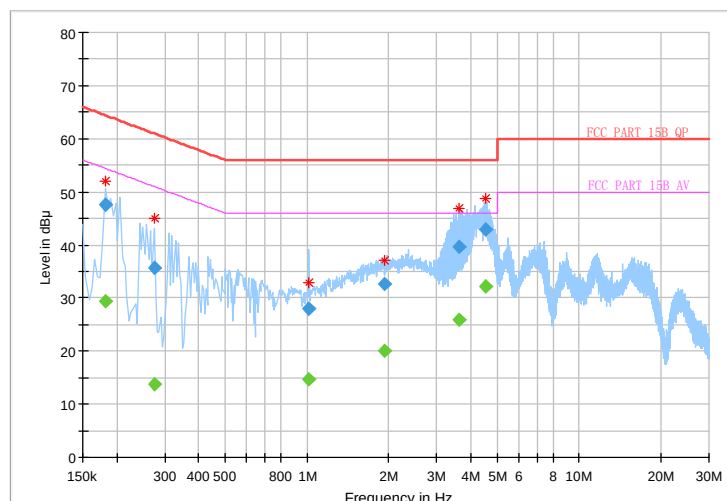
Mode 8

TEST VOLTAGE	Data transmission Input 120 Vac, 60 Hz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
ENVIRONMENTAL CONDITIONS	24deg. C, 55RH	TESTED BY	John Wen

Frequency (MHz)	QuasiPeak (dB μ V)	CAverage (dB μ V)	Limit (dB μ V)	Margin (dB)	Line	Filter	Corr. (dB)
0.182000	---	29.31	54.39	-25.08	L1	ON	9.7
0.182000	47.51	---	64.39	-16.88	L1	ON	9.7
0.276000	---	13.70	50.94	-37.24	L1	ON	9.7
0.276000	35.75	---	60.94	-25.19	L1	ON	9.7
1.016000	---	14.73	46.00	-31.27	L1	ON	9.7
1.016000	28.10	---	56.00	-27.90	L1	ON	9.7
1.920000	---	20.08	46.00	-25.92	L1	ON	9.7
1.920000	32.69	---	56.00	-23.31	L1	ON	9.7
3.616000	---	25.83	46.00	-20.17	L1	ON	9.7
3.616000	39.66	---	56.00	-16.34	L1	ON	9.7
4.548000	---	32.26	46.00	-13.74	L1	ON	9.7
4.548000	42.82	---	56.00	-13.18	L1	ON	9.7

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.

Full Spectrum

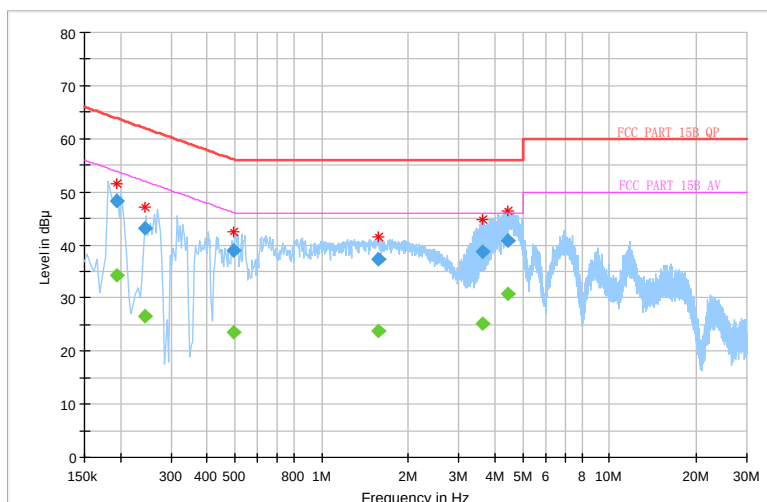


TEST VOLTAGE	Data trasmission Input 120 Vac, 60 Hz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
ENVIRONMENTAL CONDITIONS	24deg. C, 55RH	TESTED BY	John Wen

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.194000	---	34.32	53.86	-19.54	N	ON	10.0
0.194000	48.31	---	63.86	-15.55	N	ON	10.0
0.244000	---	26.49	51.96	-25.47	N	ON	9.9
0.244000	43.10	---	61.96	-18.86	N	ON	9.9
0.496000	---	23.65	46.07	-22.42	N	ON	10.1
0.496000	38.93	---	56.07	-17.14	N	ON	10.1
1.580000	---	23.68	46.00	-22.32	N	ON	9.9
1.580000	37.26	---	56.00	-18.74	N	ON	9.9
3.636000	---	25.22	46.00	-20.78	N	ON	9.8
3.636000	38.79	---	56.00	-17.21	N	ON	9.8
4.416000	---	30.80	46.00	-15.20	N	ON	9.8
4.416000	40.87	---	56.00	-15.13	N	ON	9.8

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.

Full Spectrum



2.2 RADIATED EMISSION MEASUREMENT

2.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

TEST STANDARD: FCC Part 15, Subpart B (Section: 15.109)

Emissions radiated outside of the specified bands, shall be according to the general radiated limits as following:

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

Radiated Emissions Limits at 3 meters (dBμV/m)				
Frequencies (MHz)	FCC 15B / ICES-003, Class A	FCC 15B / ICES-003, Class B	CISPR 22, Class A	CISPR 22, Class B
30-88	49.5	40	50.5	40.5
88-216	54	43.5		
216-230	56.9	46		
230-960				
960-1000	60	54	57.5	47.5
1000-3000	Avg: 60 Peak: 80	Avg: 54 Peak: 74	Avg: 56 Peak: 76	Avg: 50 Peak: 70
3000+			Avg: 60 Peak: 80	Avg: 54 Peak: 74

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	5 th harmonic of the highest frequency or 40GHz, whichever is lower

- NOTE:**
1. The lower limit shall apply at the transition frequencies.
 2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
 3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.
 4. QP detector shall be applied if not specified.

2.2.2 TEST INSTRUMENTS

Frequency range below 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	Euroshieldpn-CT0001143-1216	Apr. 21,18	Apr. 20,19
Bilog Antenna	ETS-LINDGREN	3143B	00161965	Nov. 26,16	Nov. 25,18
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Mar. 16,18	Mar. 15,19
Signal Pre-Amplifier	EMSI	EMC 9135	980249	Jul. 09,18	Jul. 08,19

Frequency range above 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	Euroshieldpn-CT0001143-1216	Apr. 21,18	Apr. 20,19
Horn Antenna	ETS-LINDGREN	3117	00168728	Nov. 10,16	Nov. 09,18
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Mar. 16,18	Mar. 15,19
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	Jul. 09,18	Jul. 08,19

- NOTE:**
1. The test was performed in 3m chamber.
 2. The calibration interval of the above test instruments is 12 months or 24 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
 3. The FCC Site Registration No. is 525120.

2.2.3 TEST PROCEDURE

<Frequency Range below 1GHz>

The basic test procedure was in accordance with ANSI C63.4:2014 (section 12).

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from 1 meter to 4 meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1GHz.

NOTE:

1. The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. $\text{Emission level(dBuV/m)} = \text{Raw Value(dBuV)} + \text{Correction Factor(dB/m)}$
3. $\text{Correction Factor(dB/m)} = \text{Antenna Factor (dB/m)} + \text{Cable Factor (dB)}$ (if the raw value not contains the amplifier);
4. $\text{Correction Factor(dB/m)} = \text{Antenna Factor (dB/m)} + \text{Cable Factor (dB)} - \text{Amplifier Gain(dB)}$ (if the raw value contains the amplifier).
5. $\text{Margin value} = \text{Emission level} - \text{Limit value}$.

<Frequency Range above 1GHz>

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter fully-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. The bore sight should be used during the test above 1GHz.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz

NOTE:

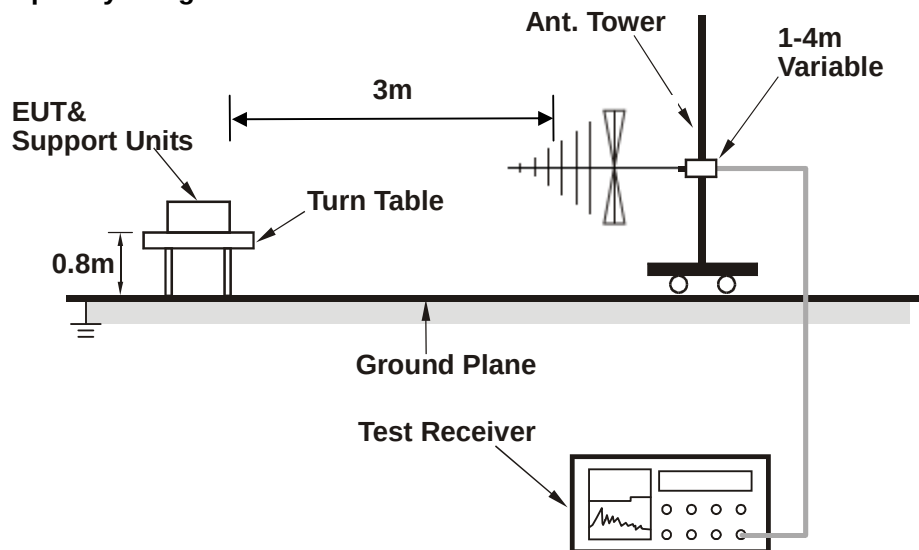
1. The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth of test receiver/spectrum analyzer is 10Hz for Average detection (AV) at frequency above 1GHz.
3. For measurement of frequency above 1000 MHz, the EUT was set 3 meters away from the receiver antenna.
4. $\text{Emission level(dBuV/m)} = \text{Raw Value(dBuV)} + \text{Correction Factor(dB/m)}$
5. $\text{Correction Factor(dB/m)} = \text{Antenna Factor (dB/m)} + \text{Cable Factor (dB)}$ (if the raw value not contains the amplifier);
6. $\text{Correction Factor(dB/m)} = \text{Antenna Factor (dB/m)} + \text{Cable Factor (dB)} - \text{Amplifier Gain(dB)}$ (if the raw value contains the amplifier)
7. $\text{Margin value} = \text{Emission level} - \text{Limit value}$.

2.2.4 DEVIATION FROM TEST STANDARD

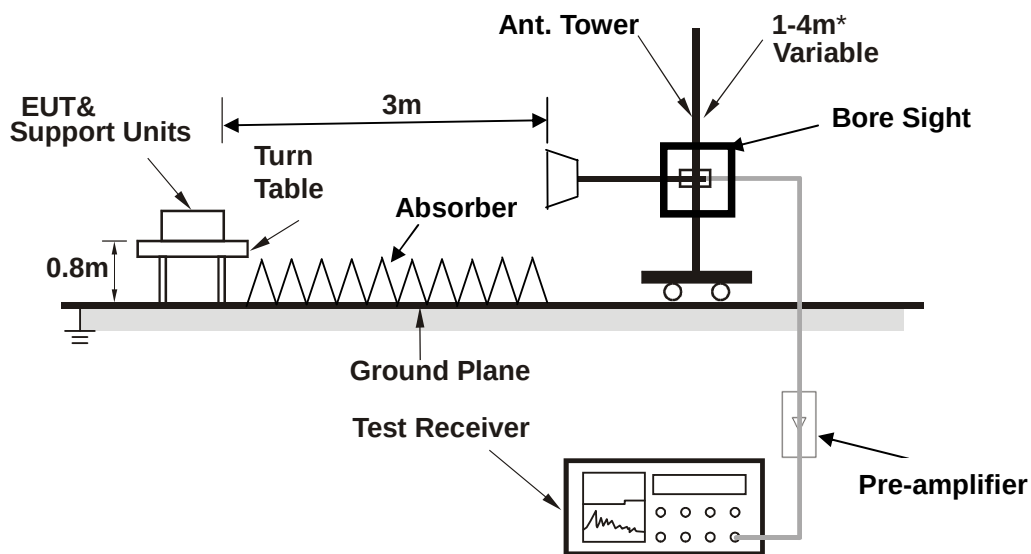
No deviation.

2.2.5 TEST SETUP

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



* : depends on the EUT height and the antenna 3dB beamwidth both, refer to section 7.3 of CISPR 16-2-3.

2.2.6 EUT OPERATING CONDITIONS

Same as item 2.1.6.

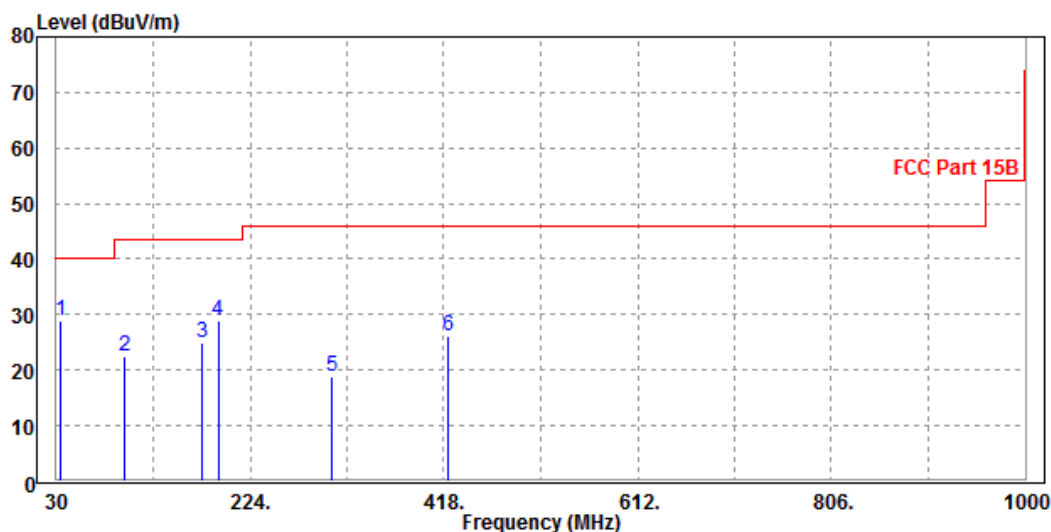
2.2.7 TEST RESULTS

Mode 1

TEST VOLTAGE	DC 5V From Adapter Input 120 Vac, 60 Hz	FREQUENCY RANGE	30-1000 MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70 %RH	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 120 kHz
TESTED BY	Vincent Chen		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
33.88	28.97	51.23	40	-11.03	14.83	0.53	37.62	200	278	QP
98.87	22.37	49.36	43.5	-21.13	9.11	1.07	37.17	200	312	QP
176.47	25.01	50.13	43.5	-18.49	10.19	1.35	36.66	200	59	QP
191.99	28.8	53.58	43.5	-14.7	10.4	1.41	36.59	200	166	QP
306.45	18.79	39.8	46	-27.21	14.01	1.74	36.76	200	208	QP
422.85	26.12	43.63	46	-19.88	17.31	2.05	36.87	200	99	QP

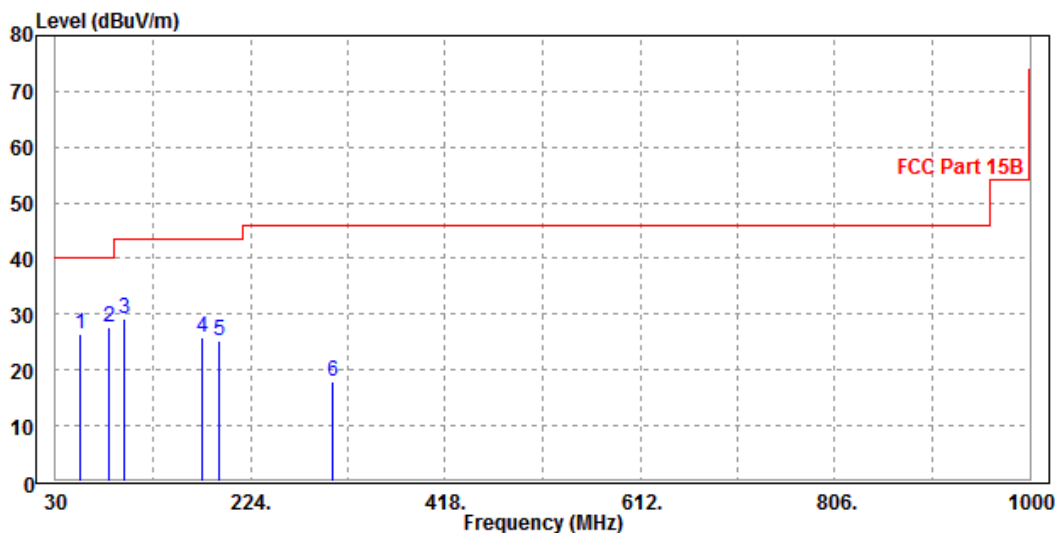
- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
 2. Negative sign (-) in the margin column signify levels below the limit.
 3. Frequency range scanned: 30MHz to 1000MHz.
 4. Only emissions significantly above equipment noise floor are reported.



TEST VOLTAGE	DC 5V From Adapter Input 120 Vac, 60 Hz	FREQUENCY RANGE	30-1000 MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70 %RH	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 120 kHz
TESTED BY	Vincent Chen		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
55.22	26.57	56.34	40	-13.43	6.8	0.76	37.33	100	189	QP
82.38	27.74	56.01	40	-12.26	8.1	0.95	37.32	100	58	QP
98.87	29.16	56.15	43.5	-14.34	9.11	1.07	37.17	100	123	QP
176.47	25.87	50.99	43.5	-17.63	10.19	1.35	36.66	100	289	QP
192.96	25.19	49.93	43.5	-18.31	10.42	1.42	36.58	100	37	QP
305.48	17.94	38.97	46	-28.06	13.98	1.74	36.75	100	303	QP

- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
 2. Negative sign (-) in the margin column signify levels below the limit.
 3. Frequency range scanned: 30MHz to 1000MHz.
 4. Only emissions significantly above equipment noise floor are reported.

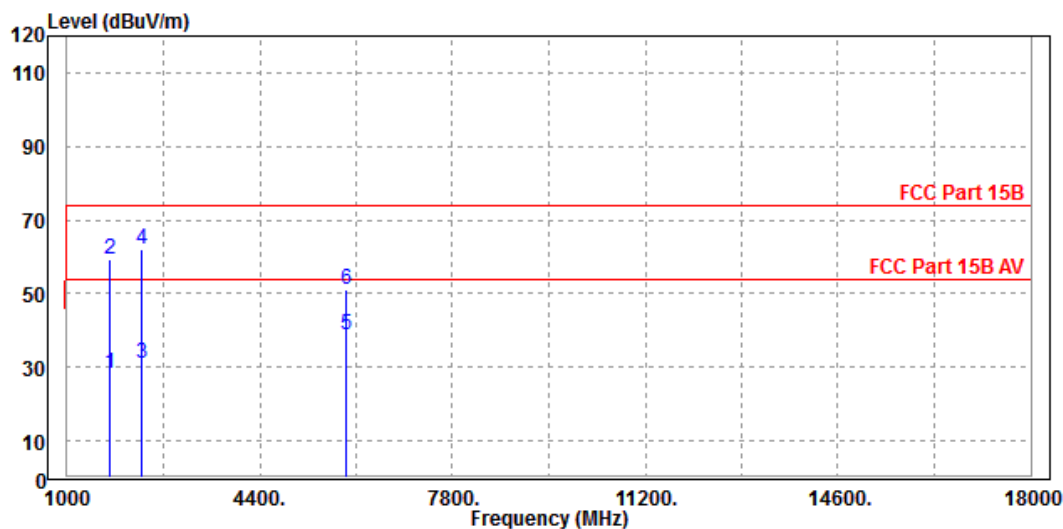


TEST VOLTAGE	DC 5V From Adapter Input 120 Vac, 60 Hz	FREQUENCY RANGE	1-18 GHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70 %RH	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Peak/Average, 1 MHz
TESTED BY	Vincent Chen		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
1765	28.5	39.99	54	-25.5	30.9	4.09	46.48	200	156	Average
1765	59.16	70.65	74	-14.84	30.9	4.09	46.48	200	156	Peak
2326	30.89	39.66	54	-23.11	32.79	4.81	46.37	200	322	Average
2326	61.86	70.63	74	-12.14	32.79	4.81	46.37	200	322	Peak
5913	38.76	39.32	54	-15.24	37.65	7.92	46.13	200	87	Average
5913	51.19	51.75	74	-22.81	37.65	7.92	46.13	200	87	Peak

REMARKS:

1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
2. Negative sign (-) in the margin column signify levels below the limit.
3. Frequency range scanned: 1GHz to 18GHz.
4. Only emissions significantly above equipment noise floor are reported.

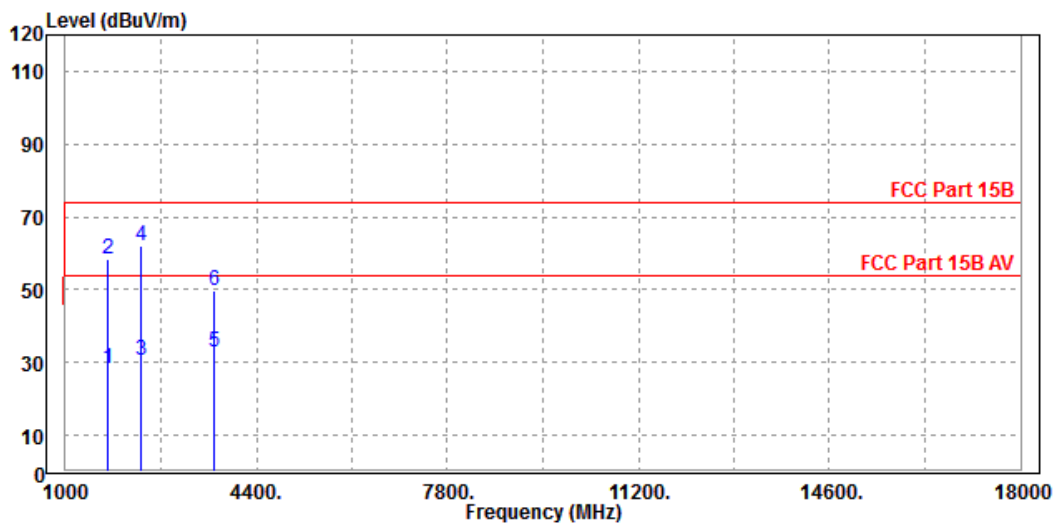


TEST VOLTAGE	DC 5V From Adapter Input 120 Vac, 60 Hz	FREQUENCY RANGE	1-18 GHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70 %RH	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Peak/Average, 1 MHz
TESTED BY	Vincent Chen		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
1748	28.13	39.76	54	-25.87	30.79	4.07	46.49	100	62	Average
1748	58.51	70.14	74	-15.49	30.79	4.07	46.49	100	62	Peak
2343	30.7	39.43	54	-23.3	32.81	4.83	46.37	100	191	Average
2343	62.14	70.87	74	-11.86	32.81	4.83	46.37	100	191	Peak
3652	32.91	39.48	54	-21.09	34.04	5.77	46.38	100	259	Average
3652	49.64	56.21	74	-24.36	34.04	5.77	46.38	100	259	Peak

REMARKS:

1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
2. Negative sign (-) in the margin column signify levels below the limit.
3. Frequency range scanned: 1GHz to 18GHz.
4. Only emissions significantly above equipment noise floor are reported.

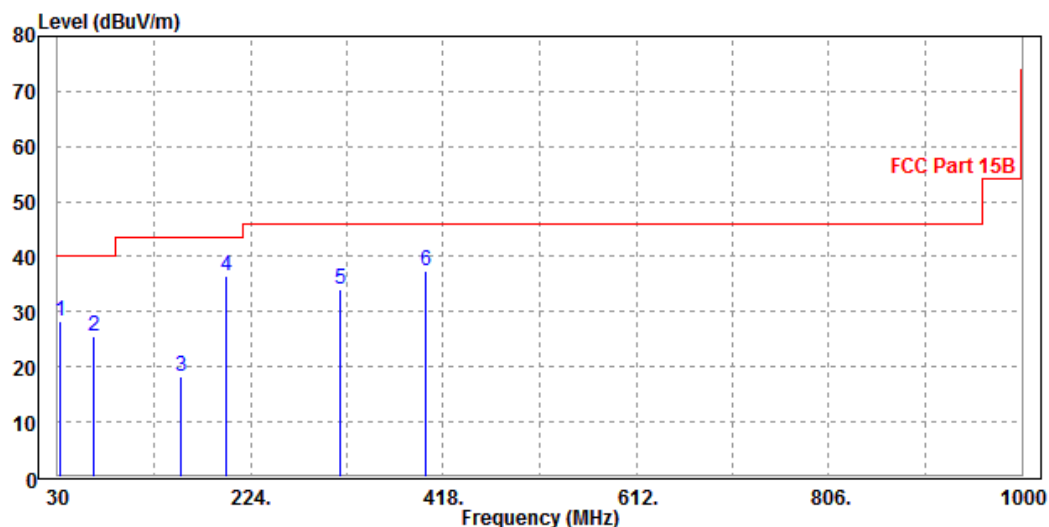


Mode 8

TEST VOLTAGE	Data trasmission Input 120 Vac, 60 Hz	FREQUENCY RANGE	30-1000 MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70 %RH	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 120 kHz
TESTED BY	Vincent Chen		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
32.91	28.16	49.91	40	-11.84	15.37	0.52	37.64	100	220	QP
65.89	25.58	54.8	40	-14.42	7.27	0.84	37.33	100	160	QP
154.16	18.32	43.74	43.5	-25.18	10.07	1.29	36.78	100	300	QP
199.75	36.57	61.09	43.5	-6.93	10.59	1.44	36.55	100	230	QP
314.21	34.17	54.9	46	-11.83	14.27	1.76	36.76	100	170	QP
399.57	37.48	55.22	46	-8.52	17.09	2	36.83	100	90	QP

- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
 2. Negative sign (-) in the margin column signify levels below the limit.
 3. Frequency range scanned: 30MHz to 1000MHz.
 4. Only emissions significantly above equipment noise floor are reported.

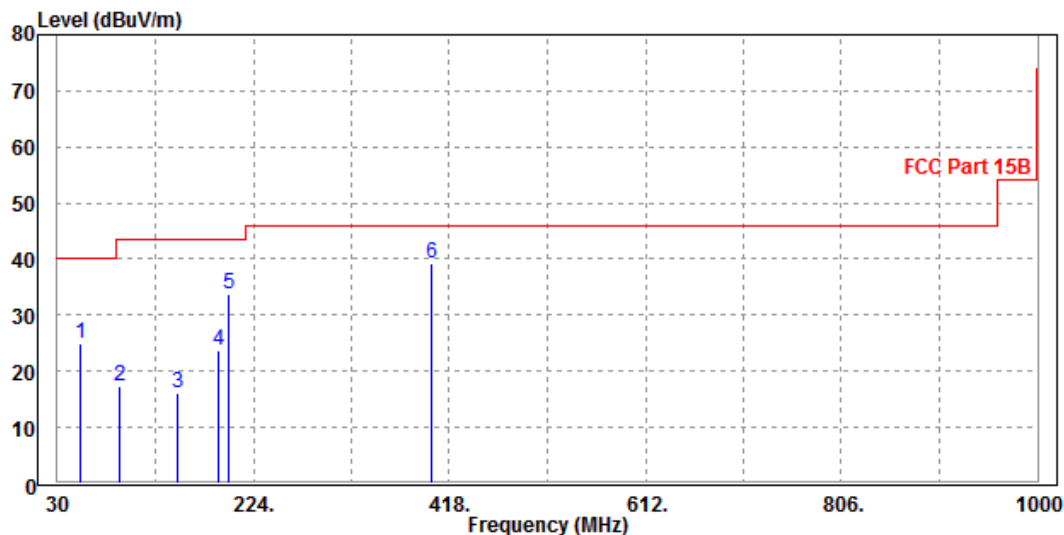


TEST VOLTAGE	Data trasmission Input 120 Vac, 60 Hz	FREQUENCY RANGE	30-1000 MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70 %RH	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 120 kHz
TESTED BY	Vincent Chen		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
53.28	25.06	54.84	40	-14.94	6.8	0.74	37.32	200	200	QP
92.08	17.47	45.11	43.5	-26.03	8.57	1.02	37.23	200	270	QP
149.31	16.07	41.96	43.5	-27.43	9.64	1.3	36.83	200	120	QP
189.08	23.79	48.66	43.5	-19.71	10.33	1.4	36.6	200	95	QP
199.75	33.71	58.23	43.5	-9.79	10.59	1.44	36.55	200	350	QP
399.57	39.16	56.9	46	-6.84	17.09	2	36.83	200	180	QP

REMARKS:

1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
2. Negative sign (-) in the margin column signify levels below the limit.
3. Frequency range scanned: 30MHz to 1000MHz.
4. Only emissions significantly above equipment noise floor are reported.

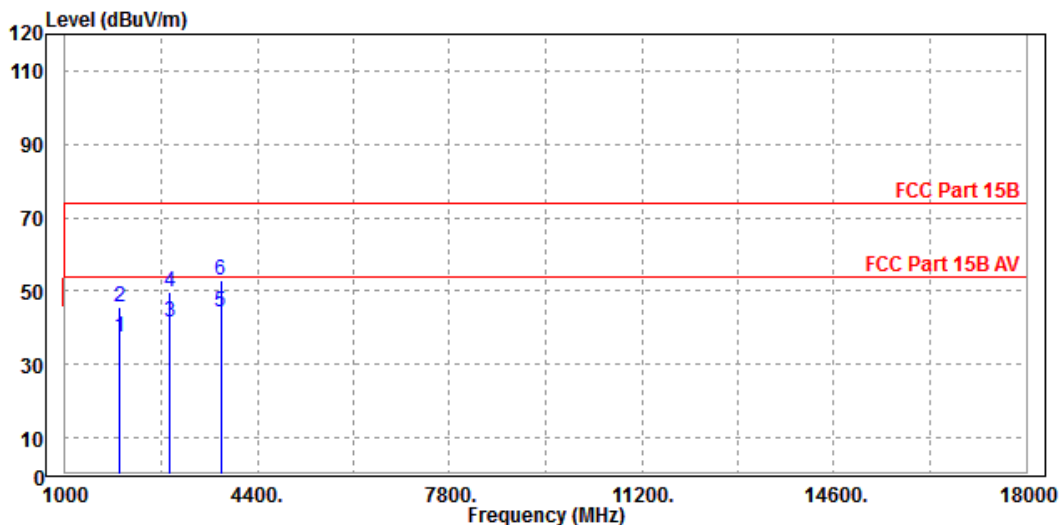


TEST VOLTAGE	Data trasmission Input 120 Vac, 60 Hz	FREQUENCY RANGE	1-18 GHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70 %RH	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Peak/Average, 1 MHz
TESTED BY	Vincent Chen		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
1950	37.43	44.55	54	-16.57	31.58	7.34	46.04	200	217	Average
1950	45.76	52.88	74	-28.24	31.58	7.34	46.04	200	217	Peak
2850	41.42	45.56	54	-12.58	32.75	8.95	45.84	200	174	Average
2850	49.64	53.78	74	-24.36	32.75	8.95	45.84	200	174	Peak
3750	44.14	46.23	54	-9.86	33.4	10.38	45.87	200	75	Average
3750	52.89	54.98	74	-21.11	33.4	10.38	45.87	200	75	Peak

REMARKS:

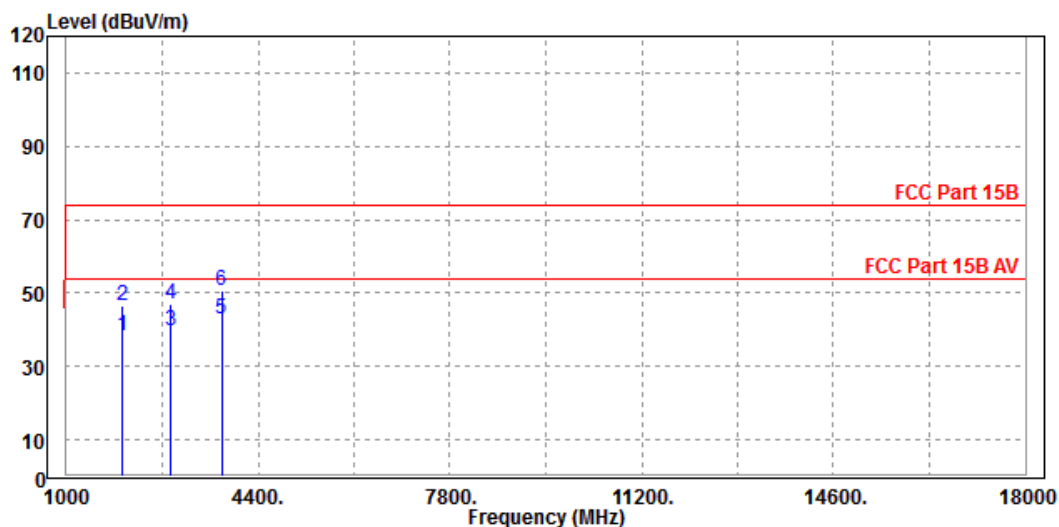
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
2. Negative sign (-) in the margin column signify levels below the limit.
3. Frequency range scanned: 30MHz to 1000MHz.
4. Only emissions significantly above equipment noise floor are reported.



TEST VOLTAGE	Data trasmission Input 120 Vac, 60 Hz	FREQUENCY RANGE	1-18 GHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70 %RH	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Peak/Average, 1 MHz
TESTED BY	Vincent Chen		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
1995	38.33	45.05	54	-15.67	31.87	7.44	46.03	100	132	Average
1995	46.54	53.26	74	-27.46	31.87	7.44	46.03	100	132	Peak
2860	39.56	43.67	54	-14.44	32.76	8.97	45.84	100	306	Average
2860	46.98	51.09	74	-27.02	32.76	8.97	45.84	100	306	Peak
3750	42.69	44.78	54	-11.31	33.4	10.38	45.87	100	32	Average
3750	50.76	52.85	74	-23.24	33.4	10.38	45.87	100	32	Peak

- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
 2. Negative sign (-) in the margin column signify levels below the limit.
 3. Frequency range scanned: 30MHz to 1000MHz.
 4. Only emissions significantly above equipment noise floor are reported.





Test Report No.: FV180402W006

3 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications were made to the EUT by the lab during the test.

---END---