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VERITAS

Test Report No.: FV190129W002



Certificate # 3939.01

## EMC TEST REPORT

Applicant:	Corporativo Lanix S. A. de C. V.
Address:	Carretera Internacional Hermosillo-Nogales Km 8.5, Hermosillo Sonora, Mexico

Manufacturer or Supplier:	Corporativo Lanix S. A. de C. V.
Address:	Carretera Internacional Hermosillo-Nogales Km 8.5, Hermosillo Sonora, Mexico
Product:	smartphone
Brand Name:	LANIX
Model Name:	Ilium M5s
FCC ID:	ZC4M5S
Date of tests:	Jan. 30, 2019 ~ Feb. 25, 2019

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: Feb. 26, 2019      Date: Feb. 26, 2019

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## **RELEASE CONTROL RECORD**

<b>ISSUE NO.</b>	<b>REASON FOR CHANGE</b>	<b>DATE ISSUED</b>
FV190129W002	Original release	Feb. 26, 2019



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## 1 GENERAL INFORMATION

### 1.1 GENERAL DESCRIPTION OF EUT

PRODUCT	smartphone	
BRAND NAME	LANIX	
MODEL NAME	Ilium M5s	
NOMINAL VOLTAGE	5.0Vdc (adapter or host equipment) 3.8Vdc (Li-ion, battery)	
BATTERY	Brand Name: LANIX Model Name: Ilium M5s-BAT Power Rating: DC 3.8V, 2200mAh, 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, π/4-DQPSK, 8DPSK, LE
	GPS	C/A code
	FM	FSK
	GSM	GMSK/8PSK
	WCDMA	BPSK/QPSK
OPERATING FREQUENCY	LTE	QPSK/16QAM
	WLAN	2412-2462MHz for 11b/g/n(HT20)
	Bluetooth/BT_LE	2402MHz ~ 2480MHz
	GPS	1575.42MHz
	FM	87.5MHz ~ 108MHz
	GSM	824.2MHz ~ 848.8MHz (FOR GSM 850) 1850.2MHz ~ 1909.8MHz (FOR GSM 1900)
	WCDMA	1852.4MHz ~ 1907.6MHz(FOR WCDMA Band 2) 826.4MHz ~ 846.6MHz (FOR WCDMA Band 5)
I/O PORTS	LTE	1850.7MHz ~ 1909.3MHz (FOR LTE Band2)
		1710.7MHz ~ 1754.3MHz (FOR LTE Band4)
		824MHz ~ 849MHz (FOR LTE Band5)
		2500MHz ~ 2570MHz (FOR LTE Band7)
HW VERSION		1710MHz ~ 1780MHz (FOR LTE Band66)
SW VERSION	Ilium M5s_SW_01_V01	
I/O PORTS	Refer to user's manual	



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<b>CABLE SUPPLIED</b>	USB cable: non-shielded, detachable, 1.0meter Earphone cable: non-shielded, detachable, 1.2meter
<b>ACCESSORY DEVICES</b>	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 was powered by the following adapter:

**ADAPTER**

<b>BRAND:</b>	LANIX
<b>MODEL:</b>	llium M5s-C
<b>INPUT:</b>	AC 100-240V, 150mA
<b>OUTPUT:</b>	DC 5V, 1000mA

3. The EUT matched the following USB cable and Earphone:

**USB CABLE**

<b>BRAND:</b>	LANIX
<b>MODEL:</b>	llium M5s
<b>SIGNAL LINE:</b>	1.0 METER

**EARPHONE**

<b>BRAND:</b>	LANIX
<b>MODEL:</b>	llium M5s
<b>SIGNAL LINE:</b>	1.2 METER

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



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## 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 -10.53dB at 4.852000MHz.
	Radiated Emission Test (30MHz ~ 1GHz)	PASS	Meets Class B Limit Minimum passing margin is -3.05dB at 40.67MHz
	Radiated Emission Test (Above 1GHz)	PASS	Meets Class B Limit Minimum passing margin is -13.51dB at 3565MHz

## 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



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## 1.4 DESCRIPTION OF TEST MODES

Test Mode	Test Condition
<b>Radiated emission test</b>	
1	GSM850 Idle+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4g Idle+ Front camera on
2	GSM1900 Idle+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4g Idle+ Back camera on
3	WCDMA B2 Idle+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4g Idle+ MPEG4
4	WCDMA B5 Idle+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4g Idle+ FM Rx
5	LTE B2 Idle+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4g Idle+ Front camera on
6	LTE B4 Idle+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4g Idle+ Back camera on
7	LTE B5 Idle+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4g Idle+ MPEG4
8	LTE B7 Idle+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4g Idle+ FM Rx
9	LTE B66 Idle+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4g Idle+ Front camera on
10	WCDMA B5 Idle+ Usb Link+ Data Trasmission(EUT to SD)+ Earphone+ GPS Rx+ BT Idle+ WIFI 2.4g Idle
11	GSM850 Idle+ Usb Link+ Data Trasmission(EUT to PC)+ Earphone+ GPS Rx+ BT Idle+ WIFI 2.4g Idle
<b>Conducted emission test</b>	
1	GSM850 Idle+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4g Idle+ Front camera on
2	GSM1900 Idle+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4g Idle+ Back camera on
3	WCDMA B2 Idle+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4g Idle+ MPEG4
4	WCDMA B5 Idle+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4g Idle+ FM Rx
5	LTE B2 Idle+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4g Idle+ Front camera on
6	LTE B4 Idle+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4g Idle+ Back camera on
7	LTE B5 Idle+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4g Idle+ MPEG4
8	LTE B7 Idle+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4g Idle+ FM Rx
9	LTE B66 Idle+ Adapter+ Earphone+ GPS Rx+ USB cable+ BT Idle+ WIFI 2.4g Idle+ Front camera on
10	WCDMA B5 Idle+ Usb Link+ Data Trasmission(EUT to SD)+ Earphone+ GPS Rx+ BT Idle+ WIFI 2.4g Idle
11	GSM850 Idle+ Usb Link+ Data Trasmission(EUT to PC)+ Earphone+ GPS Rx+ BT Idle+ WIFI 2.4g Idle



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**NOTE:**

1. For conducted emission test, test mode 1, 11 was the worst case and only this mode was presented in this report.
2. For radiated emission test, test mode 1, 11 was the worst case and only this mode was presented in this report



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## 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	GPS Simulator +Antenna	TOJOIN	GNSS-5000A	E1-010-010119	N/A
2	Wireless AP	ABOCOM	WR224GR	060500749P	N/A
3	FM signal generator	Rohde & Schwarz	SMB100A	109279	N/A
4	Printer	HP	Hp LaserJet 1300	CNSJF75989	N/A
5	Notebook	Lenovo	Thnikpad X520	SL10H14859JS	N/A

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



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## 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 (dB $\mu$ V)	
	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	Mar. 15,18	Mar. 14,19

**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, GRT/CHINA and NIM/CHINA.



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## 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

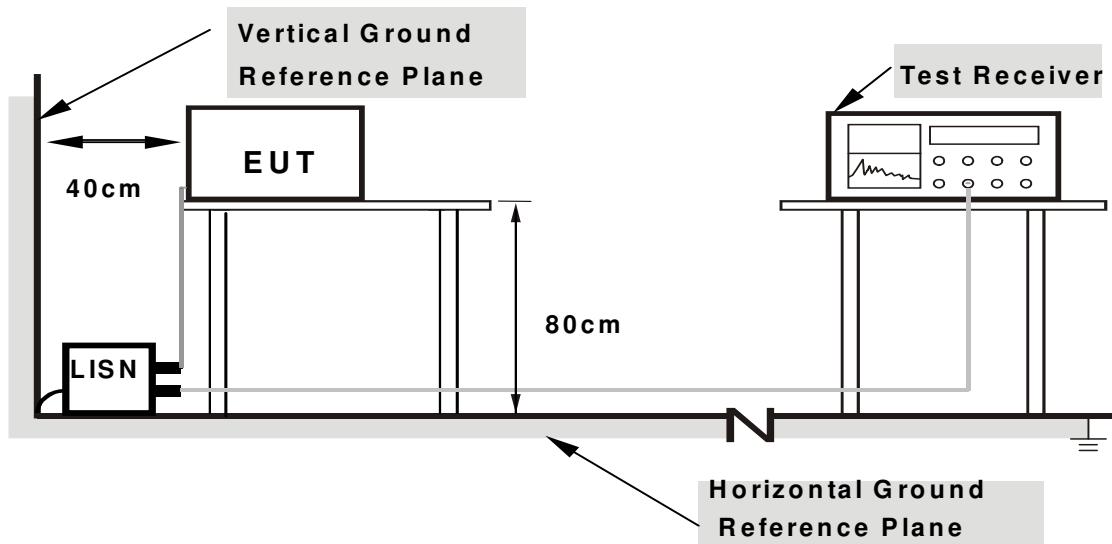
No deviation.



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## 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 cm 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.

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## 2.1.7 TEST RESULTS

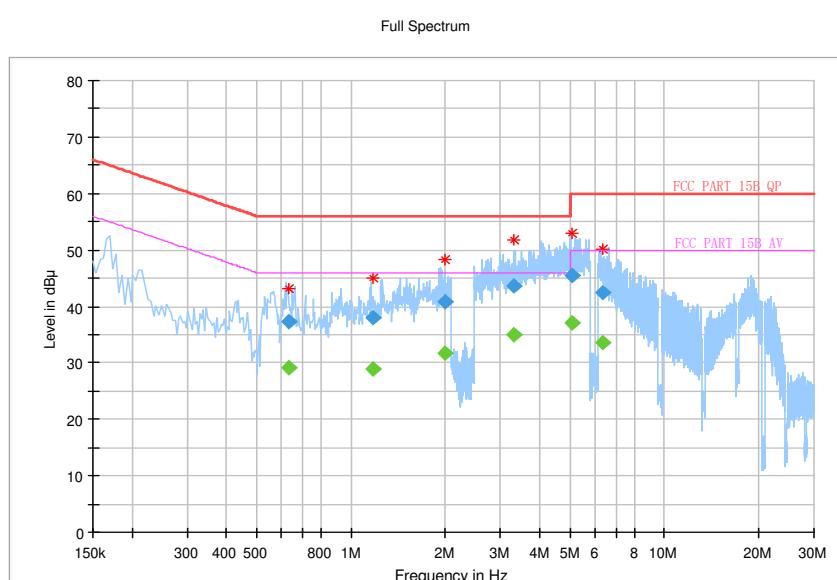
### Mode 1

TEST VOLTAGE	DC 5V From Adapter Input 120 Vac, 60 Hz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
ENVIRONMENTAL CONDITIONS	25deg. C, 50RH	TESTED BY	Star Le

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.632000	---	29.20	46.00	-16.80	L1	ON	9.7
0.632000	37.21	---	56.00	-18.79	L1	ON	9.7
1.180000	---	29.03	46.00	-16.97	L1	ON	9.7
1.180000	37.93	---	56.00	-18.07	L1	ON	9.7
1.986000	---	31.70	46.00	-14.30	L1	ON	9.7
1.986000	40.75	---	56.00	-15.25	L1	ON	9.7
3.292000	---	34.97	46.00	-11.03	L1	ON	9.7
3.292000	43.57	---	56.00	-12.43	L1	ON	9.7
5.056000	---	37.01	50.00	-12.99	L1	ON	9.7
5.056000	45.49	---	60.00	-14.51	L1	ON	9.7
6.324000	---	33.57	50.00	-16.43	L1	ON	9.8
6.324000	42.41	---	60.00	-17.59	L1	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.



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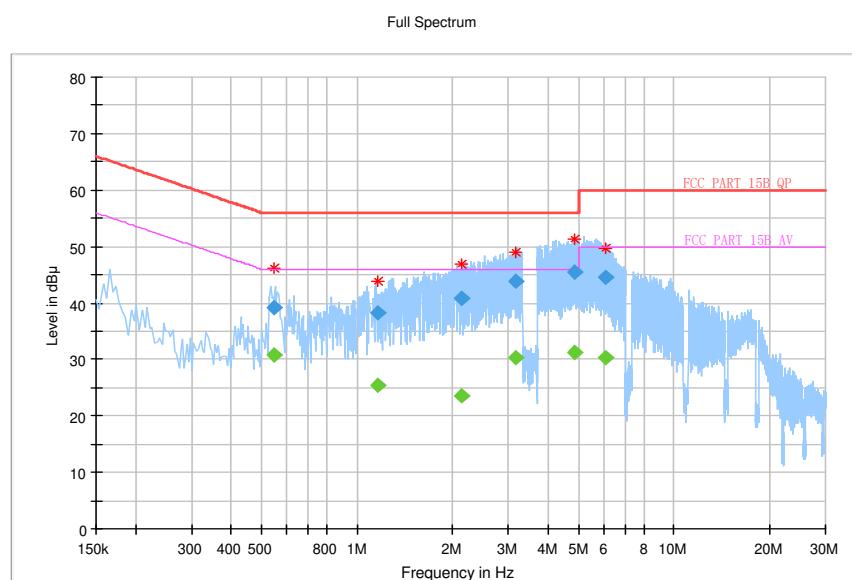
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TEST VOLTAGE	DC 5V From Adapter Input 120 Vac, 60 Hz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
ENVIRONMENTAL CONDITIONS	25deg. C, 50RH	TESTED BY	Star Le

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.548000	---	30.85	46.00	-15.15	N	ON	10.1
0.548000	39.23	---	56.00	-16.77	N	ON	10.1
1.164000	---	25.52	46.00	-20.48	N	ON	9.9
1.164000	38.16	---	56.00	-17.84	N	ON	9.9
2.124000	---	23.66	46.00	-22.34	N	ON	9.8
2.124000	40.82	---	56.00	-15.18	N	ON	9.8
3.164000	---	30.23	46.00	-15.77	N	ON	9.8
3.164000	43.81	---	56.00	-12.19	N	ON	9.8
4.852000	---	31.35	46.00	-14.65	N	ON	9.8
<b>4.852000</b>	<b>45.47</b>	---	<b>56.00</b>	<b>-10.53</b>	<b>N</b>	<b>ON</b>	<b>9.8</b>
6.104000	---	30.41	50.00	-19.59	N	ON	9.8
6.104000	44.43	---	60.00	-15.57	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.



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**Mode 11**

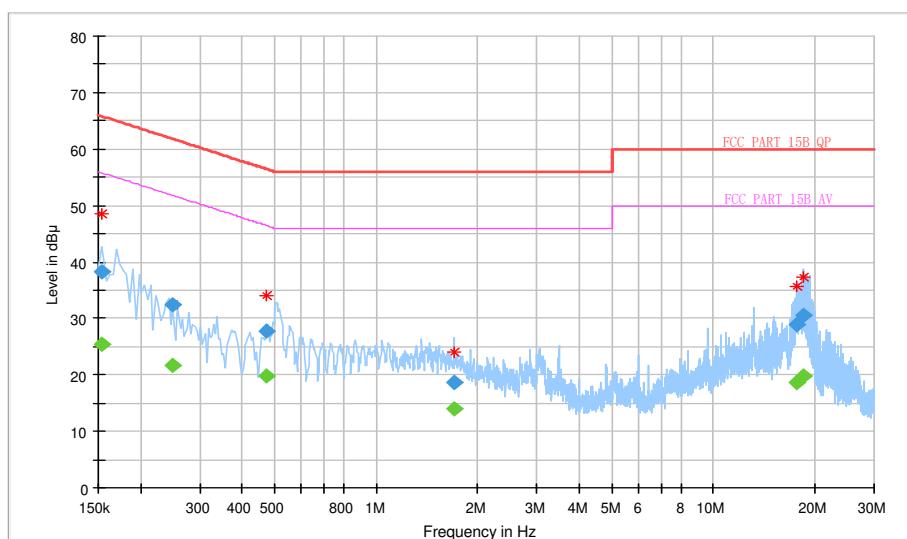
<b>TEST VOLTAGE</b>	Data transmission Input 120 Vac, 60 Hz	<b>Detector Function &amp; Resolution Bandwidth</b>	Quasi-Peak (QP) / Average (AV), 9 kHz
<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 50RH	<b>TESTED BY</b>	Star Le

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.154000	---	25.50	55.78	-30.28	L1	ON	9.6
0.154000	38.30	---	65.78	-27.48	L1	ON	9.6
0.248000	---	21.72	51.82	-30.10	L1	ON	9.7
0.248000	32.53	---	61.82	-29.29	L1	ON	9.7
0.472000	---	19.81	46.48	-26.66	L1	ON	9.7
0.472000	27.66	---	56.48	-28.82	L1	ON	9.7
1.696000	---	13.97	46.00	-32.03	L1	ON	9.7
1.696000	18.55	---	56.00	-37.45	L1	ON	9.7
17.648000	---	18.55	50.00	-31.45	L1	ON	9.9
17.648000	28.88	---	60.00	-31.12	L1	ON	9.9
18.492000	---	19.86	50.00	-30.14	L1	ON	9.9
18.492000	30.54	---	60.00	-29.46	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



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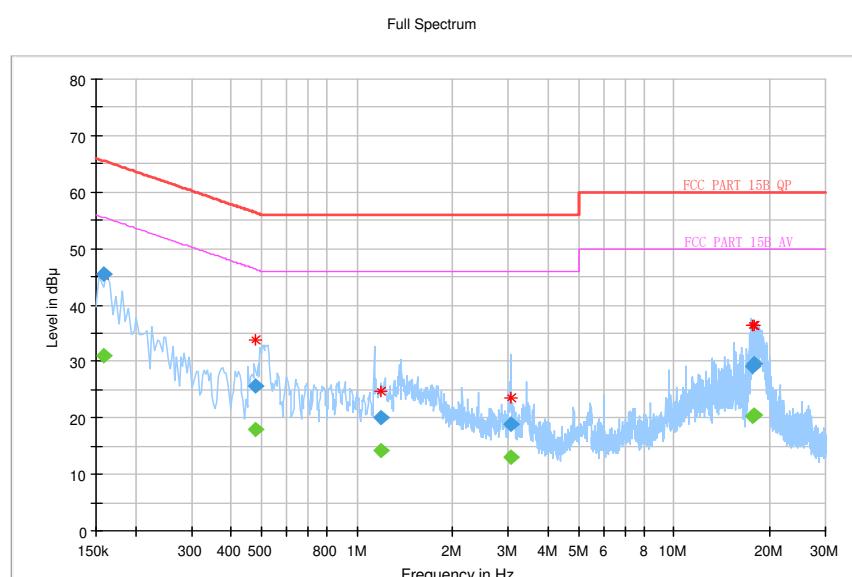
Test Report No.: FV190129W002

<b>TEST VOLTAGE</b>	Data transmission Input 120 Vac, 60 Hz	<b>Detector Function &amp; Resolution Bandwidth</b>	Quasi-Peak (QP) / Average (AV), 9 kHz
<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 50RH	<b>TESTED BY</b>	Star Le

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.158000	---	31.13	55.57	-24.44	N	ON	10.1
<b>0.158000</b>	<b>45.52</b>	---	<b>65.57</b>	<b>-20.04</b>	<b>N</b>	<b>ON</b>	<b>10.1</b>
0.476000	---	17.96	46.41	-28.45	N	ON	10.1
0.476000	25.60	---	56.41	-30.80	N	ON	10.1
1.186000	---	14.29	46.00	-31.71	N	ON	9.9
1.186000	20.09	---	56.00	-35.91	N	ON	9.9
3.044000	---	13.01	46.00	-32.99	N	ON	9.8
3.044000	18.80	---	56.00	-37.20	N	ON	9.8
17.614000	---	20.19	50.00	-29.81	N	ON	10.0
17.614000	29.22	---	60.00	-30.78	N	ON	10.0
17.884000	---	20.59	50.00	-29.41	N	ON	10.0
17.884000	29.67	---	60.00	-30.33	N	ON	10.0

**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.





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## 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 (dB $\mu$ V/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		
88-216	43.5	33.1	40	30
216-230				
230-960	46.4	35.6		
960-1000	49.5	43.5	47	37
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 (dB $\mu$ V/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		
88-216	54	43.5	50.5	40.5
216-230				
230-960	56.9	46		
960-1000	60	54	57.5	47.5
1000-3000			Avg: 56 Peak: 76	Avg: 50 Peak: 70
3000+	Avg: 60 Peak: 80	Avg: 54 Peak: 74	Avg: 60 Peak: 80	Avg: 54 Peak: 74



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### 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 <sup>th</sup> 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	Mar. 15,18	Mar. 14,19
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	Mar. 15,18	Mar. 14,19
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; The Designation No. is CN1171.



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## 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. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
3. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) (if the raw value not contains the amplifier);
4. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Amplifier Gain(dB) (if the raw value contains the amplifier).
5. Margin value = Emission level – Limit value.



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### <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. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
5. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) (if the raw value not contains the amplifier);
6. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Amplifier Gain(dB) (if the raw value contains the amplifier)
7. Margin value = Emission level – Limit value.

### 2.2.4. DEVIATION FROM TEST STANDARD

No deviation.

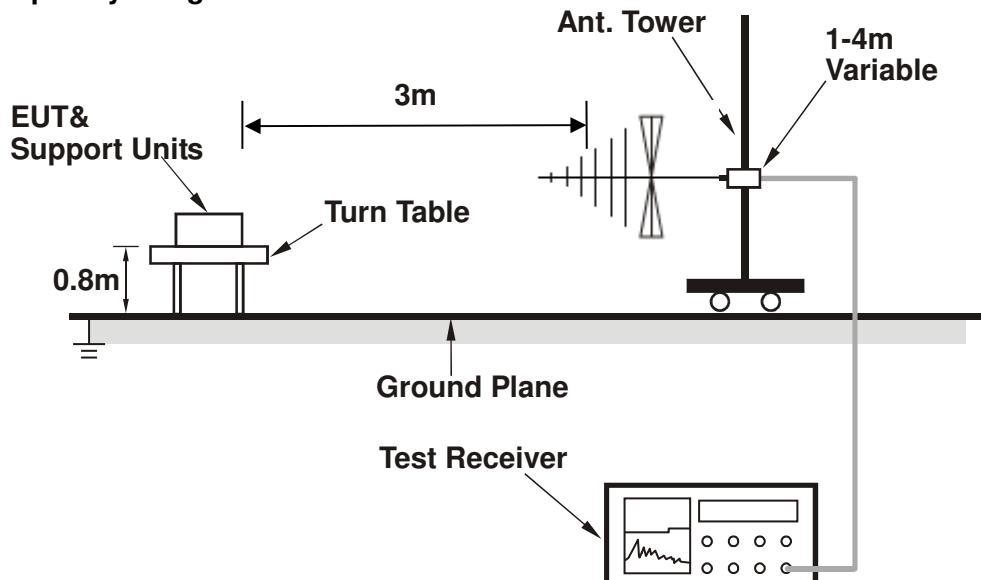


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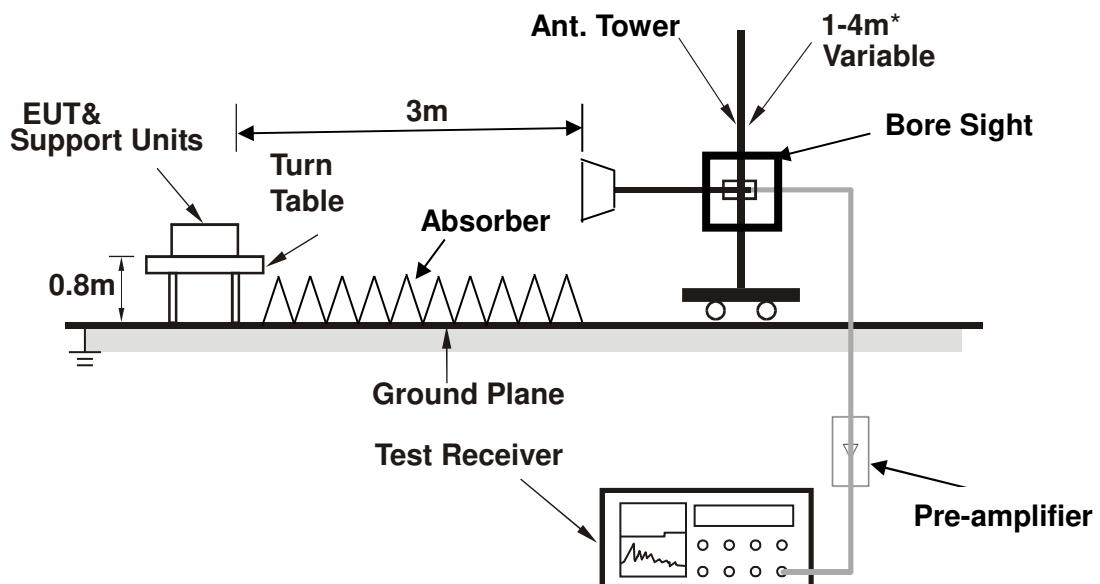
Test Report No.: FV190129W002

## 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.

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## 2.2.7. TEST RESULTS

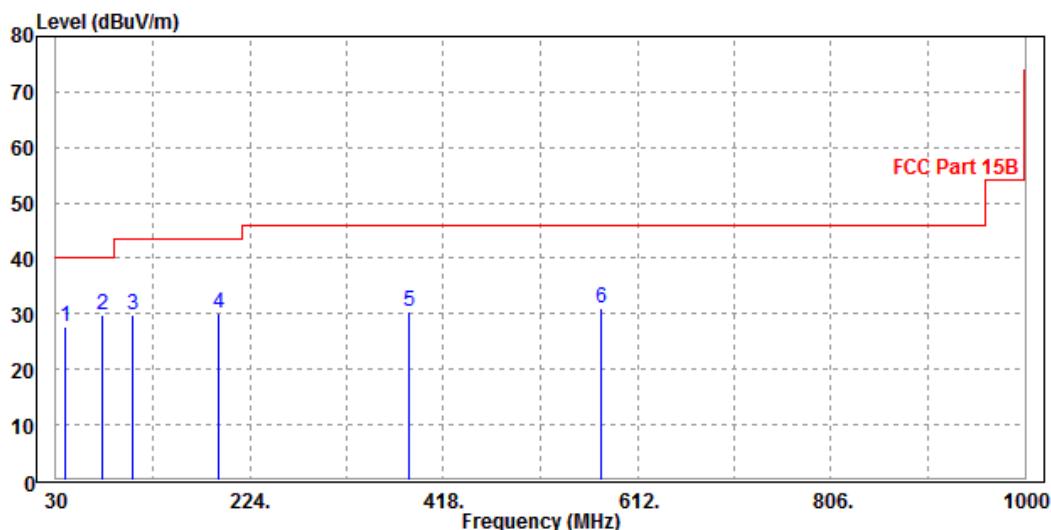
### Mode 1

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	Rose Ma		

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
39.7	27.69	52.97	40	-12.31	11.29	0.91	37.48	100	45	QP
76.56	29.71	57.84	40	-10.29	7.86	1.2	37.19	100	68	QP
106.63	29.79	56.47	43.5	-13.71	8.93	1.36	36.97	100	196	QP
192.96	29.99	54.4	43.5	-13.51	10.42	1.76	36.59	100	232	QP
384.05	30.52	48.08	46	-15.48	16.57	2.55	36.68	100	110	QP
576.11	30.89	45.43	46	-15.11	19.52	3.12	37.18	100	230	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.



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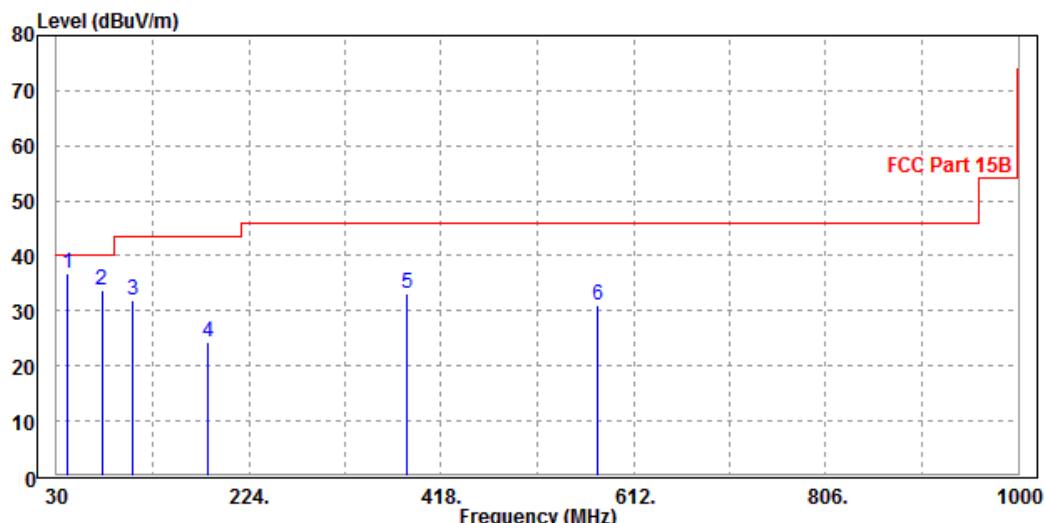
Test Report No.: FV190129W002

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	Rose Ma		

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
40.67	36.95	63.07	40	-3.05	10.42	0.93	37.47	200	100	QP
75.59	33.79	61.97	40	-6.21	7.82	1.2	37.2	200	126	QP
106.63	31.95	58.63	43.5	-11.55	8.93	1.36	36.97	120	147	QP
183.26	24.31	49.09	43.5	-19.19	10.18	1.71	36.67	200	170	QP
384.05	33.23	50.79	46	-12.77	16.57	2.55	36.68	200	148	QP
576.11	31.15	45.69	46	-14.85	19.52	3.12	37.18	200	169	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.





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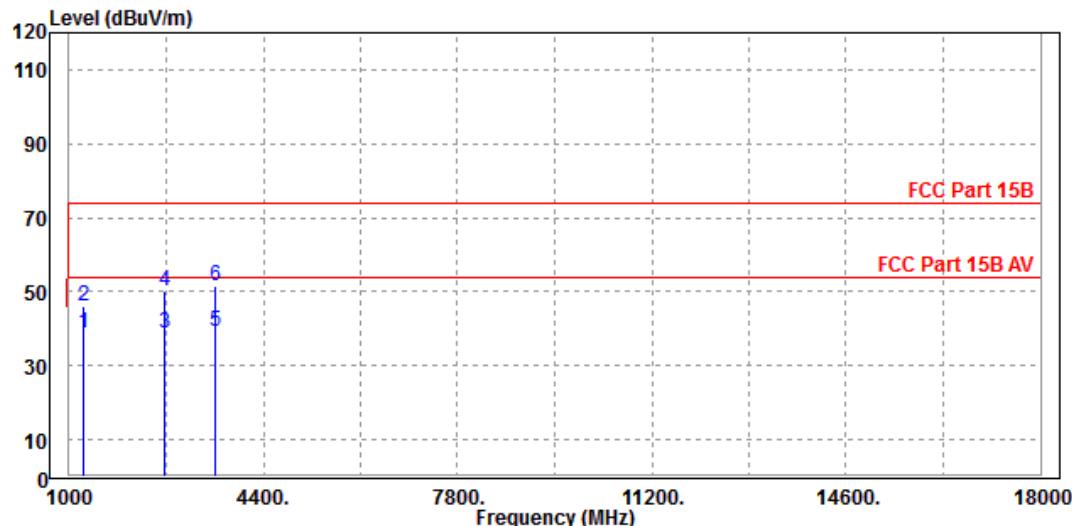
Test Report No.: FV190129W002

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	Rose Ma		

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
1254	38.64	52.31	54	-15.36	28.95	5.74	48.36	100	54	Average
1254	45.94	59.61	74	-28.06	28.95	5.74	48.36	100	54	Peak
2680	38.56	45.63	54	-15.44	32.58	8.66	48.31	120	250	Average
2680	50.28	57.35	74	-23.72	32.58	8.66	48.31	120	250	Peak
3567	39.02	44.27	54	-14.98	33.11	10.07	48.43	100	160	Average
3567	51.63	56.88	74	-22.37	33.11	10.07	48.43	100	160	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.





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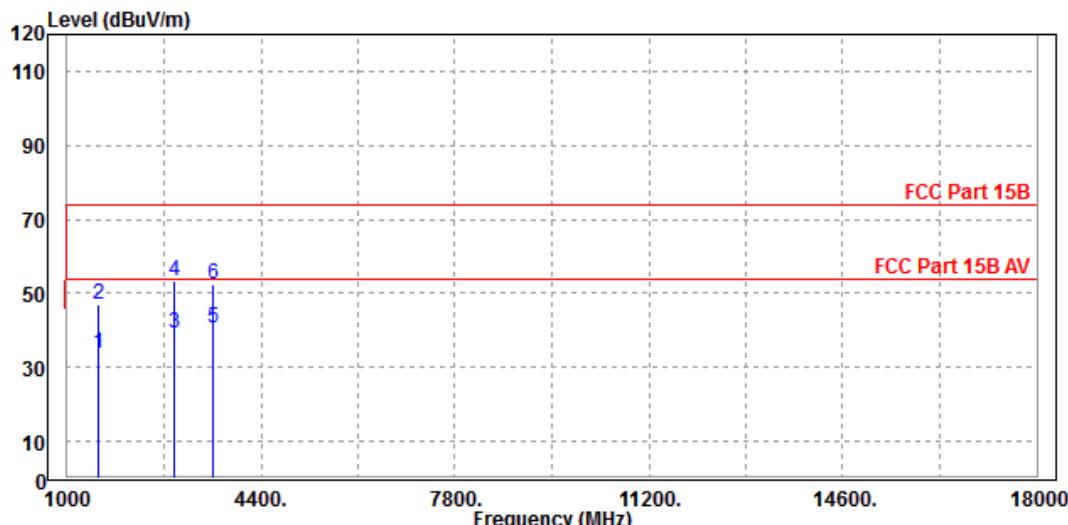
Test Report No.: FV190129W002

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	Rose Ma		

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
1550	33.63	46.54	54	-20.37	29.02	6.43	48.36	100	200	Average
1550	47.21	60.12	74	-26.79	29.02	6.43	48.36	100	200	Peak
2875	39.11	45.66	54	-14.89	32.78	8.99	48.32	100	260	Average
2875	53.26	59.81	74	-20.74	32.78	8.99	48.32	100	260	Peak
<b>3565</b>	<b>40.49</b>	<b>45.76</b>	<b>54</b>	<b>-13.51</b>	<b>33.1</b>	<b>10.06</b>	<b>48.43</b>	<b>100</b>	<b>210</b>	<b>Average</b>
3565	52.56	57.83	74	-21.44	33.1	10.06	48.43	100	210	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.





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Test Report No.: FV190129W002

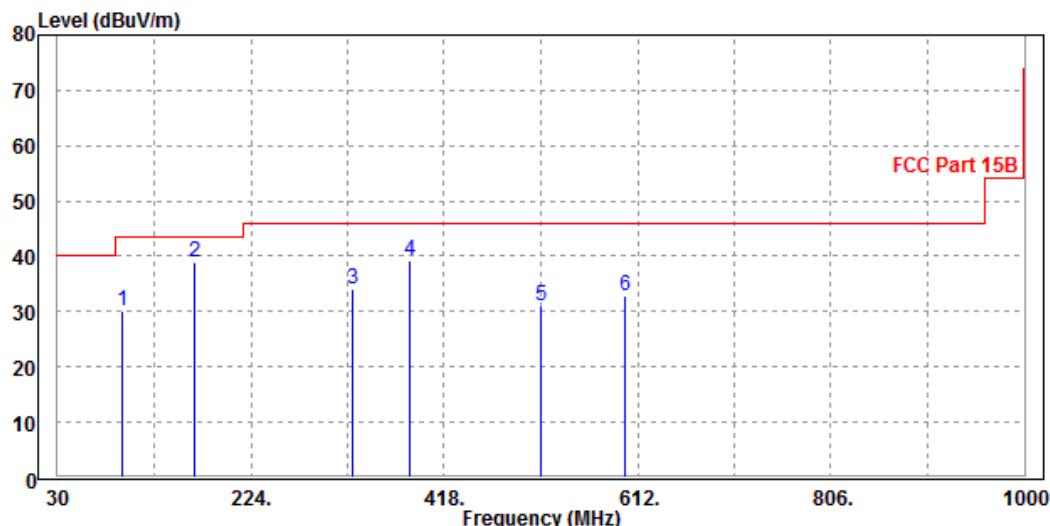
**Mode 11**

TEST VOLTAGE	Data transmission 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	Rose Ma		

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
94.99	30.11	57.04	43.5	-13.39	8.8	1.29	37.02	100	232	QP
167.74	38.92	63.55	43.5	-4.58	10.41	1.68	36.72	100	360	QP
325.85	33.92	53.51	46	-12.08	14.65	2.32	36.56	100	100	QP
384.05	39.38	56.94	46	-6.62	16.57	2.55	36.68	100	213	QP
515	31.1	46.78	46	-14.9	18.3	3.02	37	100	120	QP
599.39	32.97	47.07	46	-13.03	19.99	3.16	37.25	112	155	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.





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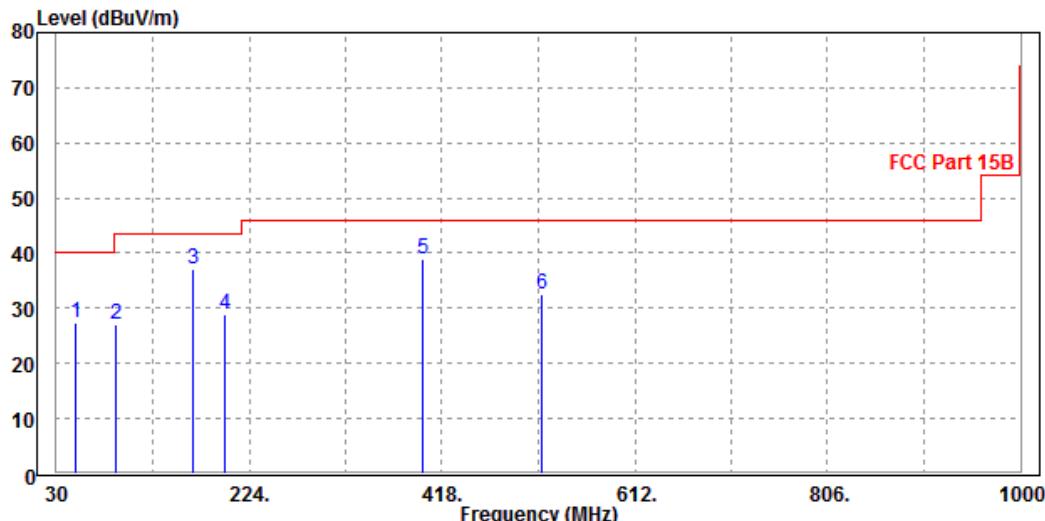
Test Report No.: FV190129W002

TEST VOLTAGE	Data transmission 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	Rose Ma		

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
49.4	27.5	57.19	40	-12.5	6.7	1	37.39	200	138	QP
89.17	26.94	54.35	43.5	-16.56	8.37	1.27	37.05	200	256	QP
167.74	37.19	61.82	43.5	-6.31	10.41	1.68	36.72	200	169	QP
198.78	28.93	53.13	43.5	-14.57	10.57	1.78	36.55	200	283	QP
398.6	38.88	55.94	46	-7.12	17.05	2.61	36.72	200	246	QP
518.88	32.6	48.21	46	-13.4	18.38	3.02	37.01	200	300	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.



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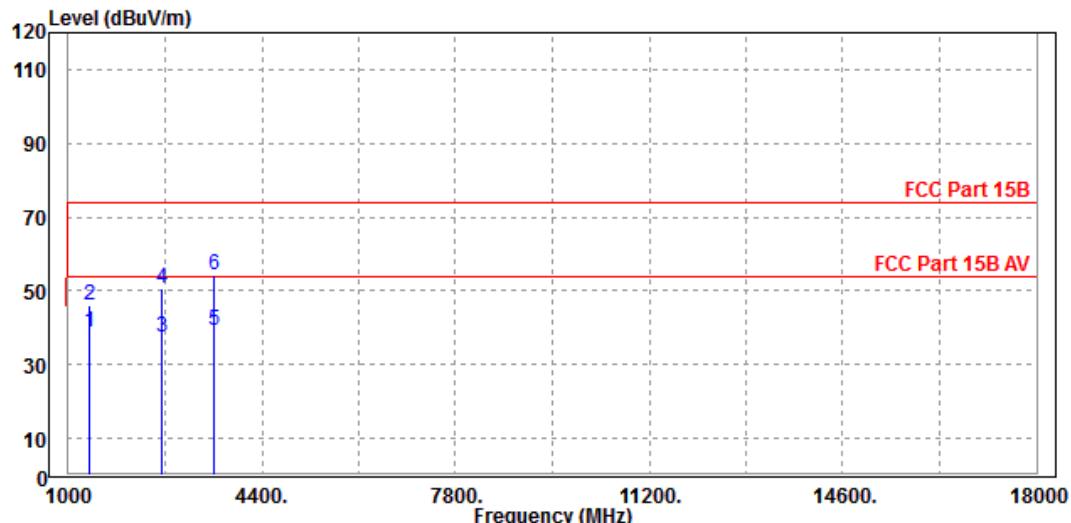
Test Report No.: FV190129W002

TEST VOLTAGE	Data transmission 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	Rose Ma		

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
1380	38.86	52.36	54	-15.14	28.82	6.04	48.36	100	230	Average
1380	45.92	59.42	74	-28.08	28.82	6.04	48.36	100	230	Peak
2650	37.63	44.78	54	-16.37	32.55	8.61	48.31	160	210	Average
2650	50.74	57.89	74	-23.26	32.55	8.61	48.31	160	210	Peak
3550	39.41	44.72	54	-14.59	33.08	10.04	48.43	100	164	Average
3550	54.37	59.68	74	-19.63	33.08	10.04	48.43	100	164	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.





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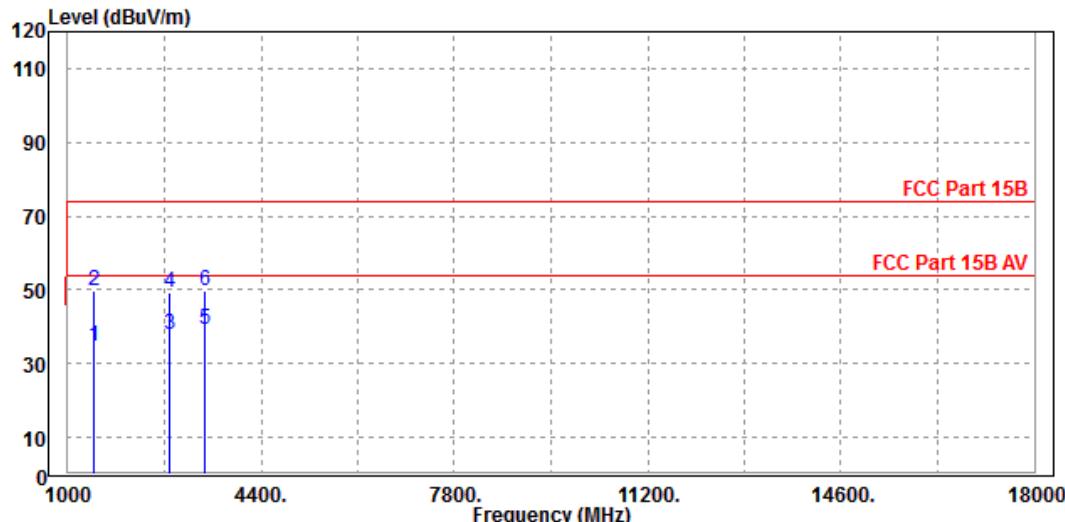
TEST VOLTAGE	Data transmission Input 120 Vac, 60 Hz	FREQUENCY RANGE	1-18 GHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70 %RH	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Peak/Average, 1 MHz
TESTED BY	Rose Ma		

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
1450	34.77	48.18	54	-19.23	28.75	6.2	48.36	100	179	Average
1450	49.71	63.12	74	-24.29	28.75	6.2	48.36	100	179	Peak
2780	37.95	44.76	54	-16.05	32.68	8.83	48.32	100	188	Average
2780	49.36	56.17	74	-24.64	32.68	8.83	48.32	100	188	Peak
3400	39.18	44.79	54	-14.82	32.98	9.8	48.39	100	0	Average
3400	49.87	55.48	74	-24.13	32.98	9.8	48.39	100	0	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.





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### **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---**