



Test Report No.: FV190411W001



EMC TEST REPORT

Applicant:	TCL Communication Ltd.
Address:	7/F, Block F4, TCL Communication Technology Building, TCL International E City, Zhong Shan Yuan Road, Nanshan District, Shenzhen, Guangdong, P.R. China 518052

Manufacturer or Supplier:	TCL Communication Ltd.
Address:	7/F, Block F4, TCL Communication Technology Building, TCL International E City, Zhong Shan Yuan Road, Nanshan District, Shenzhen, Guangdong, P.R. China 518052
Product:	LTE/UMTS/GSM Smartphone
Brand Name:	Alcatel/TCL
Model Name:	5001A/5001J/5101A
FCC ID:	2ACCJB108
Date of tests:	Apr. 12, 2019 ~ May. 31, 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

Prepared by Alex Chen Engineer / Mobile Department	Approved by Luke Lu Manager / Mobile Department
Date: Jun. 03, 2019	Date: Jun. 03, 2019

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**3 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT
BY THE LAB 31**



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VERITAS**

Test Report No.: FV190411W001

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
FV190411W001	Original release	Jun. 03, 2019



1 GENERAL INFORMATION

1.1 GENERAL DESCRIPTION OF EUT

PRODUCT	LTE/UMTS/GSM Smartphone	
BRAND NAME	Alcatel/TCL	
MODEL NAME	5001A/5001J/5101A	
NOMINAL VOLTAGE	5.0Vdc (adapter or host equipment) 3.85Vdc (Li-ion, ion battery)	
MODULATION TYPE	WLAN	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
	BT_LE	DTS
	Bluetooth	GFSK, $\pi/4$ -DQPSK, 8DPSK
	GPS	BPSK
	FM	FSK
	GSM	GMSK, 8PSK
	WCDMA	BPSK/QPSK
	LTE	QPSK/16QAM
OPERATING FREQUENCY	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) 1712.4 MHz ~ 1752.6MHz(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) 2500MHz ~ 2570MHz (FOR LTE Band7) 779.5MHz ~ 784.5MHz (FOR LTE Band13) 1710.7MHz ~ 1754.3MHz (FOR LTE Band66)
HW VERSION	PIO	
SW VERSION	V1.0	



I/O PORTS	Refer to user's manual
CABLE	USB cable: non-shielded, detachable, 1.0m Earphone cable: non-shielded, detachable, 1.2m
ACCESSORY DEVICES	Refer to note as below

NOTE:

- For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
- The above models are identical except the model name, SIM card and EUT logo for marketing purpose.

Model	SIM card	Logo
5001A	Single SIM	Alcatel Logo
5001J	Dual SIM	Alcatel Logo
5101A	Single SIM	TCL Logo

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

List of Accessory:

Accessories	Brand	Model	Manufacturer	Specification
AC Adapter 1	alcatel	UC11US	PUAN	I/P: 100-240Vac, 200mA O/P: 5Vdc, 1000mA
AC Adapter 2	alcatel	UC11US	Chenyang	I/P: 100-240Vac, 200mA O/P: 5Vdc, 1000mA
Battery 1	alcatel	TLp024C7	Veken	Rating: 3.85Vdc, 2400mAh
Battery 2	alcatel	TLp024C1	BYD	Rating: 3.85Vdc, 2400mAh
Battery 3	alcatel	TLp024CA	TIANMAO	Rating: 3.85Vdc, 2400mAh
Earphone 1	alcatel	WH15	JUWEI	1.2m shielded cable w/o core
Earphone 2	alcatel	WH15	MEIHAO	1.2m shielded cable w/o core
Earphone 3	alcatel	WH15+	MEIHAO	1.2m shielded cable w/o core
USB Cable 1	alcatel	Data Cable	SHENGHUA	1.0m non-shielded cable w/o core
USB Cable 2	alcatel	Data Cable	JUWEI	1.0m non-shielded cable w/o core

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 -14.9dB at 4.120000MHz.
	Radiated Emission Test (30MHz ~ 1GHz)	PASS	Meets Class B Limit Minimum passing margin is -4.05dB at 57.16MHz
	Radiated Emission Test (Above 1GHz)	PASS	Meets Class B Limit Minimum passing margin is -8.61dB at 2659MHz

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	Adapter 1# + USB cable 1# + Battery 1# + Earphone 1# + BT Link + WIFI Link(2.4G) + GPS Rx
2	Adapter 1# + USB cable 1# + Battery 2# + Earphone 1# + BT Link + WIFI Link(2.4G) + GPS Rx
3	Adapter 1# + USB cable 1# + Battery 3# + Earphone 1# + BT Link + WIFI Link(2.4G) + GPS Rx
4	Worst case of(1-3) + USB cable 2#
5	Worst case of(1-4) + Adapter 2#
6	Worst case of(1-5) + Earphone 2#
7	Worst case of(1-5) + Earphone 3#
8	Worst case of(1-7) + FM Rx
9	Worst case of(1-7) + Camera on
10	Worst case of(1-7) + MPG4
11	Worst case of(1-7) + GSM 850 Idle + SIM 1
12	Worst case of(1-7) + GSM 1900 Idle + SIM2
13	Worst case of(1-7) + WCDMA B2 Idle + SIM 1
14	Worst case of(1-7) + WCDMA B4 Idle + SIM2
15	Worst case of(1-7) + WCDMA B5 Idle + SIM 1
16	Worst case of(1-7) + LTE B2 Idle + SIM2
17	Worst case of(1-7) + LTE B4 Idle + SIM 1
18	Worst case of(1-7) + LTE B5 Idle + SIM2
19	Worst case of(1-7) + LTE B7 Idle + SIM 1
20	Worst case of(1-7) + LTE B13 Idle + SIM2
21	Worst case of(1-7) + LTE B66 Idle + SIM 1
22	USB Link + Data Transmission(EUT to PC) + USB cable 1# + Battery 1# + BT Link + WIFI Link(2.4G) + Earphone 1# + GPS Rx
23	Usb Link + Data Transmission(EUT to SD) + USB cable 1# + Battery 1# + BT Link + WIFI Link(2.4G) + Earphone 1# + GPS Rx
24	Worst case of(22-23) + Battery 2#
25	Worst case of(22-23) + Battery 3#
26	Worst case of(22-25) + USB cable 2#
27	Worst case of(22-26) + Earphone 2#
28	Worst case of(22-26) + Earphone 3#
Conducted emission test	
1	Adapter 1# + USB cable 1# + Battery 1# + Earphone 1# + BT Link + WIFI Link(2.4G) + GPS Rx
2	Adapter 1# + USB cable 1# + Battery 2# + Earphone 1# + BT Link + WIFI Link(2.4G) + GPS Rx
3	Adapter 1# + USB cable 1# + Battery 3# + Earphone 1# + BT Link + WIFI Link(2.4G) + GPS Rx
4	Worst case of(1-3) + USB cable 2#



5	Worst case of(1-4) + Adapter 2#
6	Worst case of(1-5) + Earphone 2#
7	Worst case of(1-5) + Earphone 3#
8	Worst case of(1-7) + FM Rx
9	Worst case of(1-7) + Camera on
10	Worst case of(1-7) + MPG4
11	Worst case of(1-7) + GSM 850 Idle + SIM 1
12	Worst case of(1-7) + GSM 1900 Idle + SIM2
13	Worst case of(1-7) + WCDMA B2 Idle + SIM 1
14	Worst case of(1-7) + WCDMA B4 Idle + SIM2
15	Worst case of(1-7) + WCDMA B5 Idle + SIM 1
16	Worst case of(1-7) + LTE B2 Idle + SIM2
17	Worst case of(1-7) + LTE B4 Idle + SIM 1
18	Worst case of(1-7) + LTE B5 Idle + SIM2
19	Worst case of(1-7) + LTE B7 Idle + SIM 1
20	Worst case of(1-7) + LTE B13 Idle + SIM2
21	Worst case of(1-7) + LTE B66 Idle + SIM 1
22	USB Link + Data Transmission(EUT to PC) + USB cable 1# + Battery 1# + BT Link + WIFI Link(2.4G) + Earphone 1# + GPS Rx
23	USB Link + Data Transmission(EUT to SD) + USB cable 1# + Battery 1# + BT Link + WIFI Link(2.4G) + Earphone 1# + GPS Rx
24	Worst case of(22-23) + Battery 2#
25	Worst case of(22-23) + Battery 3#
26	Worst case of(22-25) + USB cable 2#
27	Worst case of(22-26) + Earphone 2#
28	Worst case of(22-26) + Earphone 3#

NOTE:

1. For conducted emission test, test mode 11, 26 was the worst case and only this mode was presented in this report.
2. For radiated emission test, test mode 4, 26 was the worst case and only this mode was 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	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

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 μ 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	Feb. 26,19	Feb. 25, 20
EMC32 test software	Rohde&Schwarz	EMC32	NA	NA	NA
LISN network	Rohde&Schwarz	ENV216	101922	Feb. 26,19	Feb. 25, 20

- 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, GRGT/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.

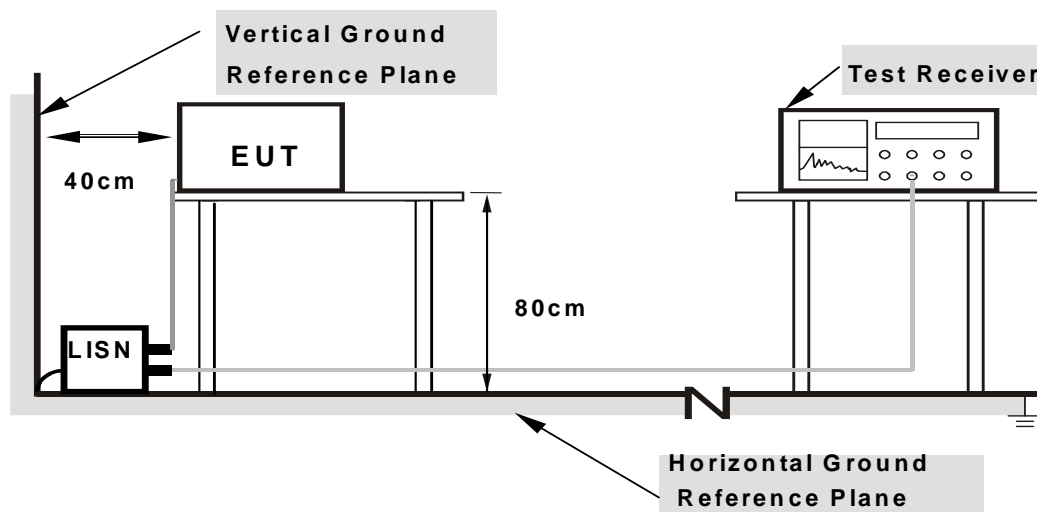
NOTE: All modes of operation were investigated and the worst-case emissions are reported.

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.



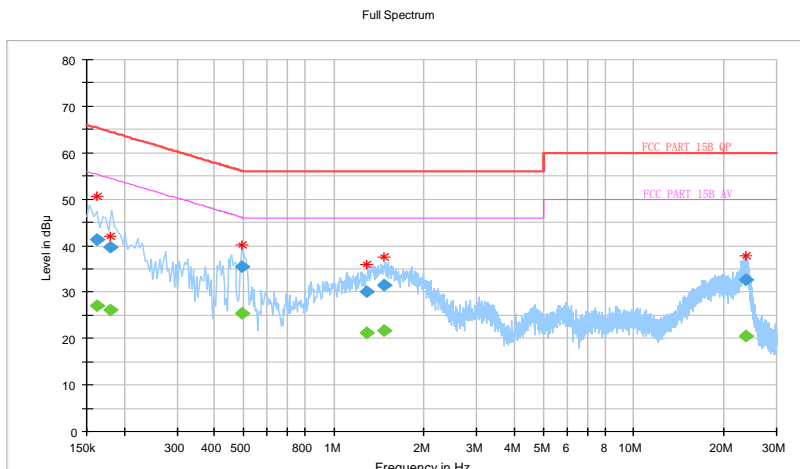
2.1.7 TEST RESULTS

Mode 11

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, 52RH	TESTED BY	John Wen

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.162000	41.34	---	65.36	-24.02	L	ON	9.9
0.162000	---	27.14	55.36	-28.22	L	ON	9.9
0.180000	---	26.03	54.49	-28.46	L	ON	9.9
0.180000	39.72	---	64.49	-24.77	L	ON	9.9
0.492000	---	25.53	46.13	-20.61	L	ON	10.0
0.492000	35.34	---	56.13	-20.79	L	ON	10.0
1.282000	---	21.25	46.00	-24.75	L	ON	10.1
1.282000	30.02	---	56.00	-25.98	L	ON	10.1
1.468000	---	21.78	46.00	-24.22	L	ON	10.1
1.468000	31.43	---	56.00	-24.57	L	ON	10.1
23.660000	---	20.52	50.00	-29.48	L	ON	10.6
23.660000	32.65	---	60.00	-27.35	L	ON	10.6

- 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.

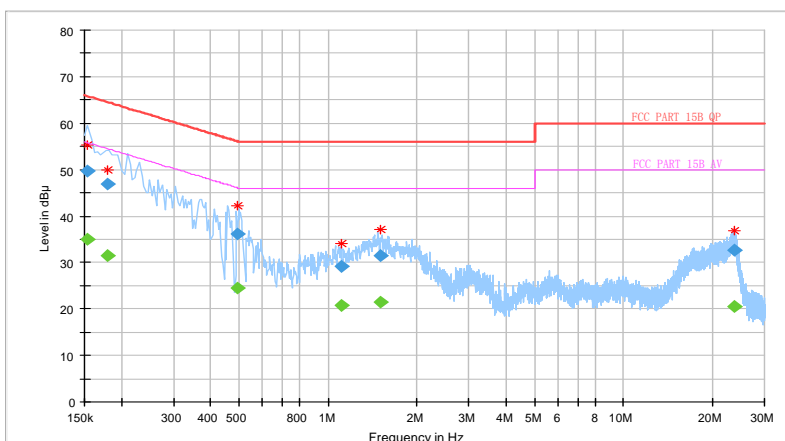


TEST VOLTAGE	DC 5V From Adapter Input 120 Vac, 60 Hz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
ENVIRONMENTAL CONDITIONS	25deg. C, 52RH	TESTED BY	John Wen

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.154000	---	34.96	55.78	-20.82	N	ON	9.9
0.154000	49.77	---	65.78	-16.02	N	ON	9.9
0.180000	---	31.39	54.49	-23.10	N	ON	9.9
0.180000	46.86	---	64.49	17.63	N	ON	9.9
0.492000	---	24.44	46.13	-21.69	N	ON	9.9
0.492000	36.14	---	56.13	-20.00	N	ON	9.9
1.106000	---	20.87	46.00	-25.13	N	ON	10.0
1.106000	29.19	---	56.00	-26.81	N	ON	10.0
1.504000	---	21.34	46.00	-24.66	N	ON	10.0
1.504000	31.38	---	56.00	-24.62	N	ON	10.0
23.688000	---	20.42	50.00	-29.58	N	ON	10.6
23.688000	32.68	---	60.00	-27.32	N	ON	10.6

- 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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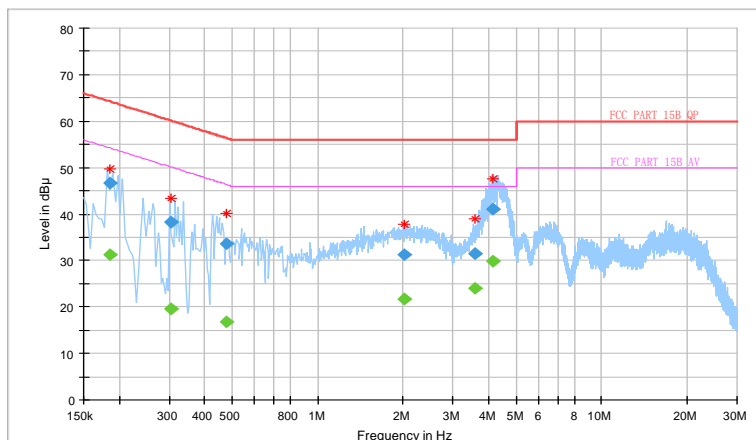
Mode 26

TEST VOLTAGE	Data trasmission Input 120 Vac, 60 Hz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
ENVIRONMENTAL CONDITIONS	25deg. C, 52RH	TESTED BY	John Wen

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.186000	---	31.26	54.21	-22.96	L	ON	9.9
0.186000	46.73	---	64.21	-17.49	L	ON	9.9
0.304000	---	19.63	50.13	-30.51	L	ON	10.0
0.304000	38.19	---	60.13	-21.94	L	ON	10.0
0.480000	---	16.85	46.34	-29.49	L	ON	10.0
0.480000	33.66	---	56.34	-22.68	L	ON	10.0
2.020000	---	21.68	46.00	-24.32	L	ON	10.1
2.020000	31.15	---	56.00	-24.85	L	ON	10.1
3.576000	---	24.09	46.00	-21.91	L	ON	10.2
3.576000	31.60	---	56.00	-24.40	L	ON	10.2
4.120000	---	29.90	46.00	-16.10	L	ON	10.2
4.120000	41.10	---	56.00	-14.90	L	ON	10.2

- 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

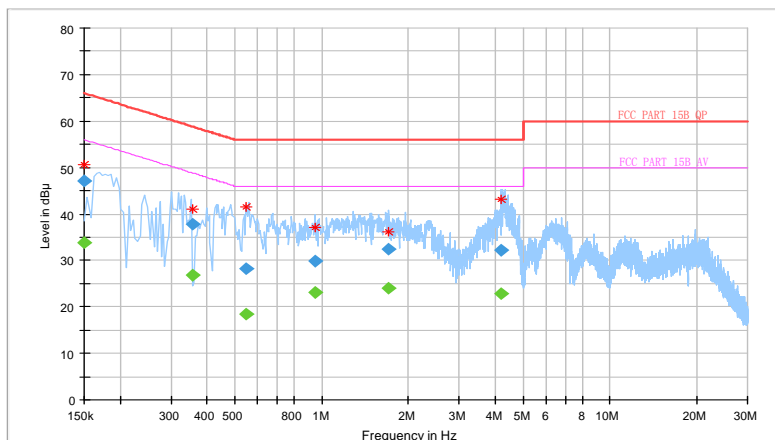


TEST VOLTAGE	Data trasmission Input 120 Vac, 60 Hz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
ENVIRONMENTAL CONDITIONS	25deg. C, 52RH	TESTED BY	John Wen

Frequency (MHz)	QuasiPeak (dBUV)	CAverage (dBUV)	Limit (dBUV)	Margin (dB)	Line	Filter	Corr. (dB)
0.150000	---	33.70	56.00	-22.30	N	ON	9.9
0.150000	47.02	---	66.00	-18.98	N	ON	9.9
0.356000	---	26.92	48.82	-21.90	N	ON	9.9
0.356000	37.73	---	58.82	-21.09	N	ON	9.9
0.548000	---	18.49	46.00	-27.51	N	ON	9.9
0.548000	28.29	---	56.00	-27.71	N	ON	9.9
0.944000	---	23.14	46.00	-22.86	N	ON	10.0
0.944000	29.79	---	56.00	-26.21	N	ON	10.0
1.704000	---	24.03	46.00	-21.97	N	ON	10.0
1.704000	32.49	---	56.00	-23.51	N	ON	10.0
4.196000	---	22.92	46.00	-23.08	N	ON	10.1
4.196000	32.16	---	56.00	-23.84	N	ON	10.1

- 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 (dB μ 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	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		
3000+	Peak: 69.5	Peak: 63.5	Not defined	Not defined

Radiated Emissions Limits at 3 meters (dB μ 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	50.5	40.5
88-216	54	43.5		
216-230	56.9	46		
230-960			57.5	47.5
960-1000	60	54		
1000-3000	Avg: 60	Avg: 54		
3000+	Peak: 80	Peak: 74	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	Feb. 26,19	Feb. 25,20
Bilog Antenna	ETS-LINDGREN	3143B	00161965	Feb. 26,19	Feb. 25,20
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Feb. 26,19	Feb. 25,20
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	Feb. 26,19	Feb. 25,20
Horn Antenna	ETS-LINDGREN	3117	00168728	Feb. 26,19	Feb. 25,20
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Feb. 26,19	Feb. 25, 20
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.

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.

<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:

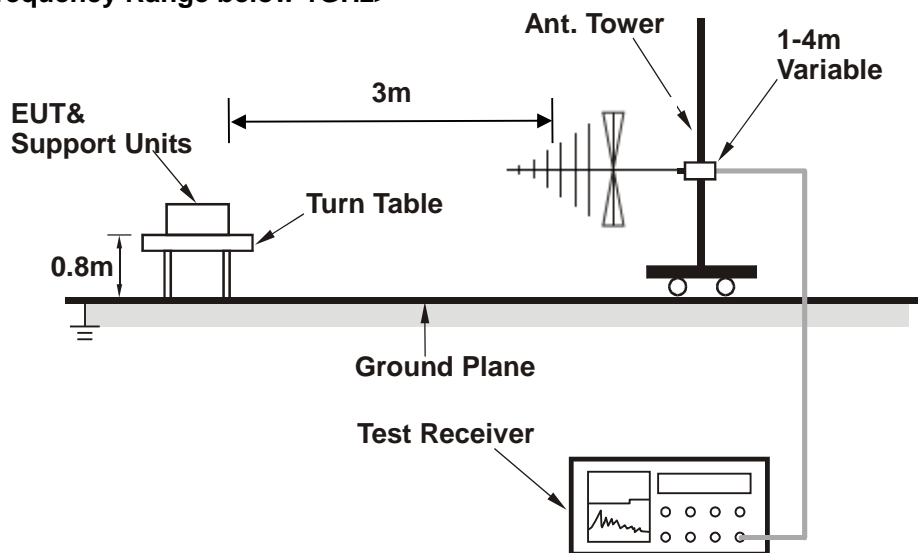
1. The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth of test receiver/spectrum analyzer is 1Hz 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

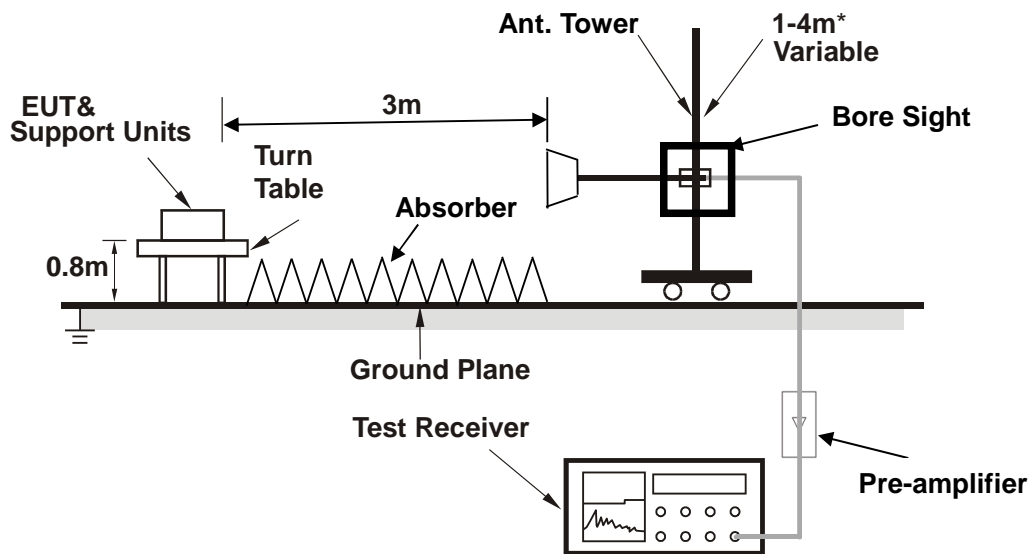
No deviation.

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.

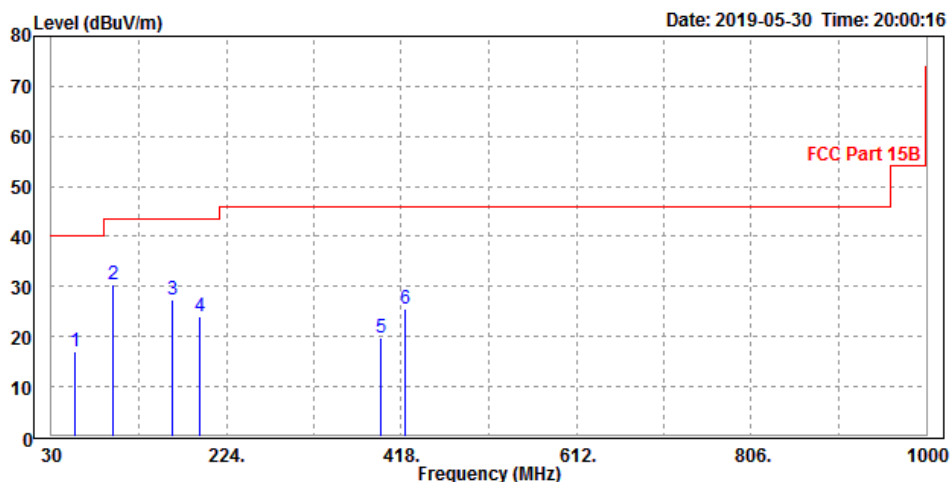
2.2.7 TEST RESULTS

Mode 4

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	Star Le		

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
56.19	17.15	46.47	40	-22.85	6.98	1.04	37.34	200	316	QP
98.87	30.27	56.4	43.5	-13.23	9.56	1.31	37	200	321	QP
164.83	27.23	51.84	43.5	-16.27	10.45	1.67	36.73	200	164	QP
194.9	23.92	48.06	43.5	-19.58	10.67	1.77	36.58	200	246	QP
395.69	19.78	36.82	46	-26.22	17.07	2.6	36.71	200	188	QP
422.85	25.55	42.12	46	-20.45	17.5	2.7	36.77	200	65	QP

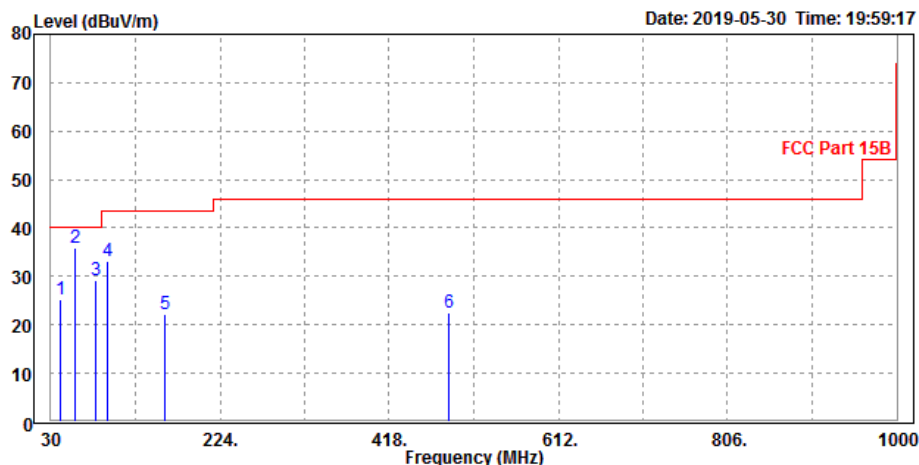
- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
 2. Negative sign (-) in the margin column signify levels below the limit.
 3. Frequency range scanned: 30MHz to 1000MHz.
 4.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

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	25.16	48.82	40	-14.84	12.88	0.93	37.47	100	154	QP
57.16	35.95	65.27	40	-4.05	6.97	1.05	37.34	100	166	QP
81.41	29.33	56.91	40	-10.67	8.34	1.21	37.13	100	192	QP
94.99	33.05	59.58	43.5	-10.45	9.2	1.29	37.02	100	15	QP
159.98	22.21	46.89	43.5	-21.29	10.4	1.66	36.74	100	214	QP
486.87	22.37	37.84	46	-23.63	18.52	2.94	36.93	100	123	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.





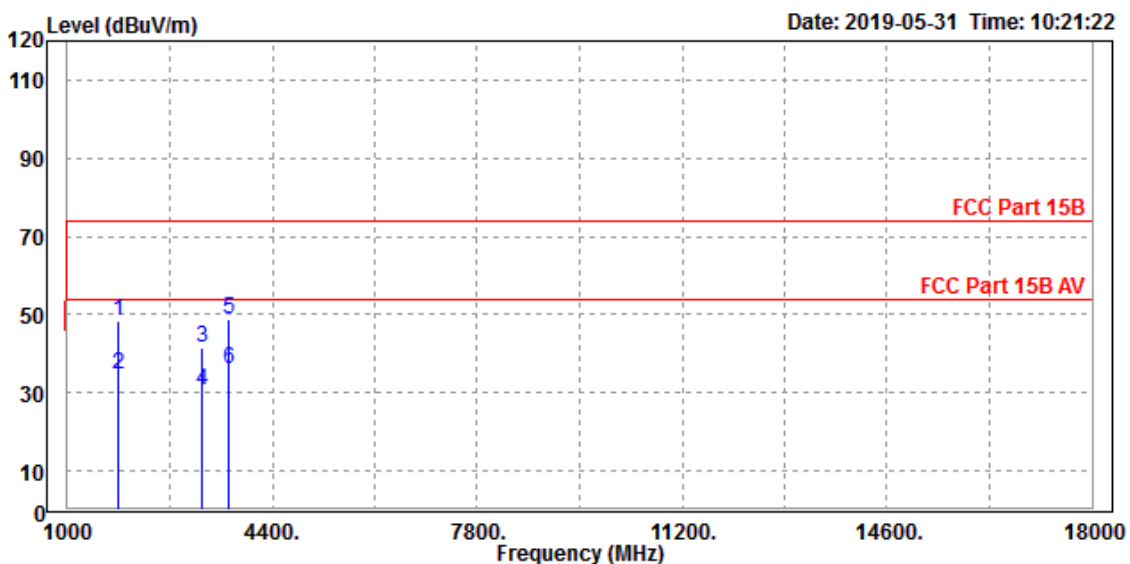
BUREAU VERITAS

Test Report No.: FV190411W001

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	Star Le		

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
1833	48.52	54.55	74	-25.48	31.1	4.2	41.33	100	0	Peak
1833	34.69	40.72	54	-19.31	31.1	4.2	41.33	100	0	Average
3227	41.67	43.61	74	-32.33	34.04	5.69	41.67	100	0	Peak
3227	30.58	32.52	54	-23.42	34.04	5.69	41.67	100	0	Average
3669	48.64	48.81	74	-25.36	35.85	5.76	41.78	100	0	Peak
3669	35.9	36.07	54	-18.1	35.85	5.76	41.78	100	0	Average

- 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.





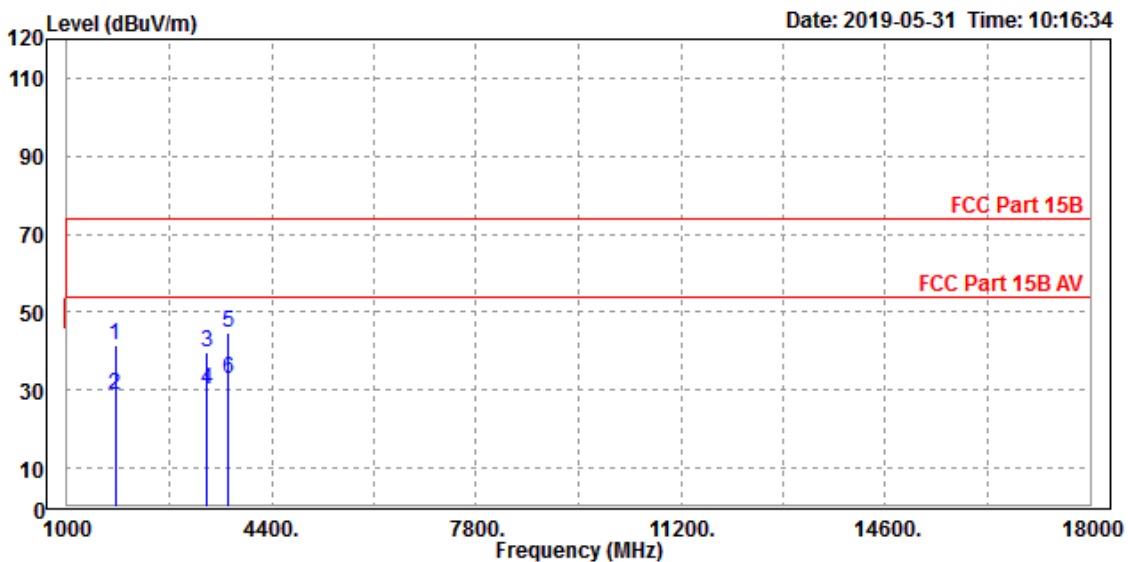
BUREAU VERITAS

Test Report No.: FV190411W001

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	Star Le		

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
1799	41.41	48.1	74	-32.59	30.48	4.15	41.32	100	360	Peak
1799	28.84	35.53	54	-25.16	30.48	4.15	41.32	100	360	Average
3329	39.79	42.53	74	-34.21	33.19	5.76	41.69	100	360	Peak
3329	30.26	33	54	-23.74	33.19	5.76	41.69	100	360	Average
3669	44.84	46.48	74	-29.16	34.38	5.76	41.78	100	360	Peak
3669	32.94	34.58	54	-21.06	34.38	5.76	41.78	100	360	Average

- 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.





**BUREAU
VERITAS**

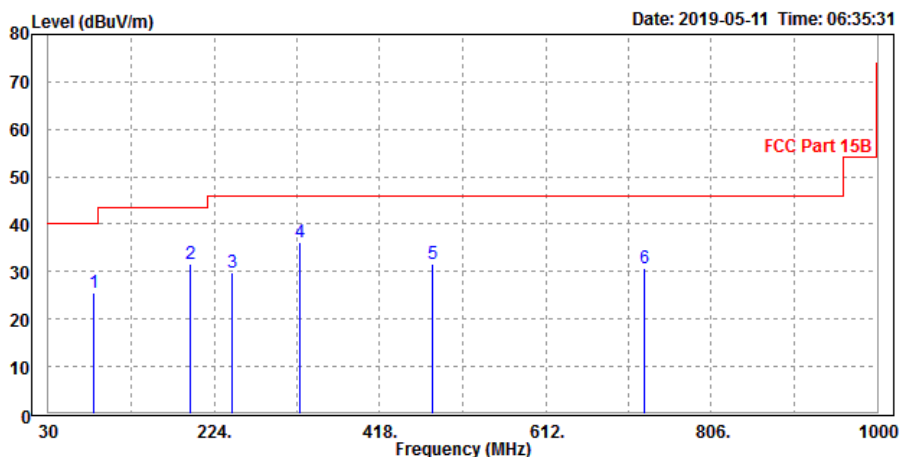
Test Report No.: FV190411W001

Mode 26

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	Star Le		

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
82.38	25.47	53.37	40	-14.53	8.2	1.22	37.32	123	25	QP
196.84	31.64	55.7	43.5	-11.86	10.72	1.78	36.56	142	245	QP
244.37	29.96	51.84	46	-16.04	12.75	2.01	36.64	152	321	QP
324.88	36.11	55.7	46	-9.89	14.87	2.31	36.77	115	258	QP
480.08	31.57	47.38	46	-14.43	18.24	2.92	36.97	128	315	QP
727.43	30.65	41.49	46	-15.35	23.11	3.63	37.58	157	261	QP

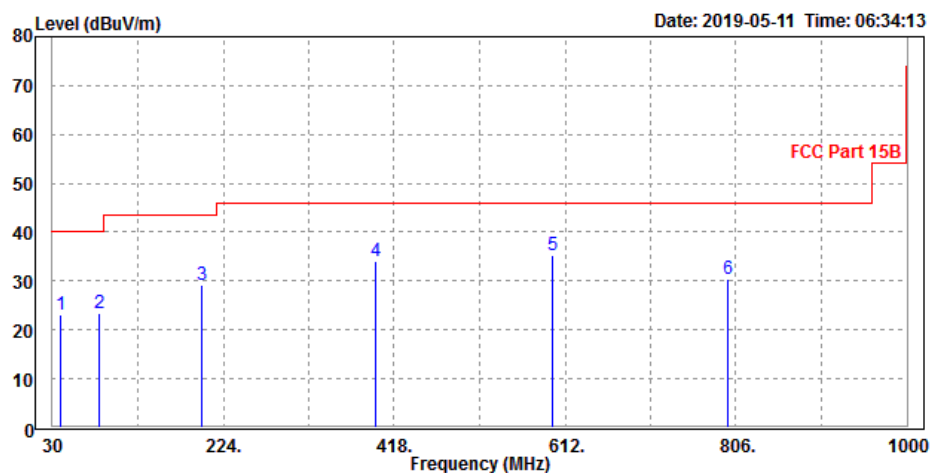
- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
 2. Negative sign (-) in the margin column signify levels below the limit.
 3. Frequency range scanned: 30MHz to 1000MHz.
 4.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

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
39.7	23.24	46.13	40	-16.76	13.72	0.91	37.52	125	23	QP
82.38	23.53	51.26	40	-16.47	8.37	1.22	37.32	112	124	QP
199.75	29.13	53.09	43.5	-14.37	10.8	1.79	36.55	126	321	QP
396.66	34.09	51.11	46	-11.91	17.2	2.61	36.83	145	251	QP
598.42	35.14	49.26	46	-10.86	20.08	3.16	37.36	125	189	QP
796.3	30.47	40.9	46	-15.53	23.39	3.88	37.7	136	325	QP

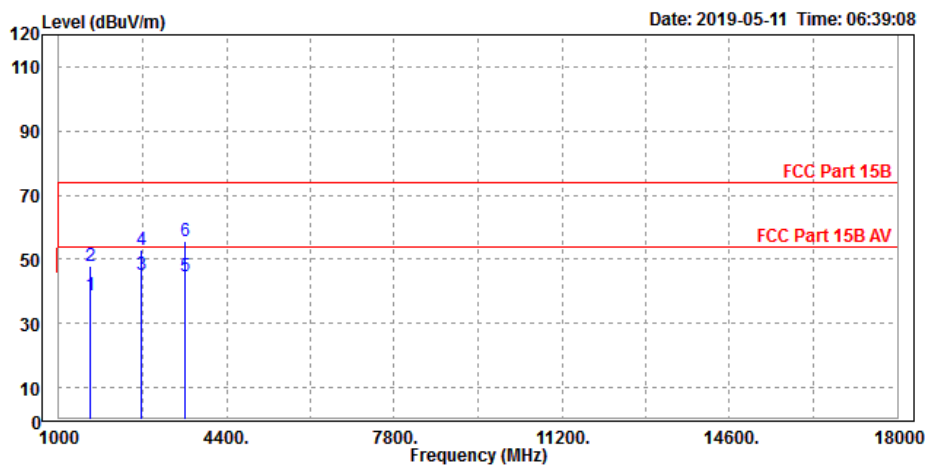
- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
 2. Negative sign (-) in the margin column signify levels below the limit.
 3. Frequency range scanned: 30MHz to 1000MHz.
 4.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

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
1642	38.88	51.41	54	-15.12	30.11	3.9	46.54	200	0	Average
1642	47.85	60.38	74	-26.15	30.11	3.9	46.54	200	0	Peak
2659	45.39	53.46	54	-8.61	33.13	5.17	46.37	200	0	Average
2659	53.15	61.22	74	-20.85	33.13	5.17	46.37	200	0	Peak
3558	44.62	51.26	54	-9.38	33.89	5.85	46.38	200	0	Average
3558	55.81	62.45	74	-18.19	33.89	5.85	46.38	200	0	Peak

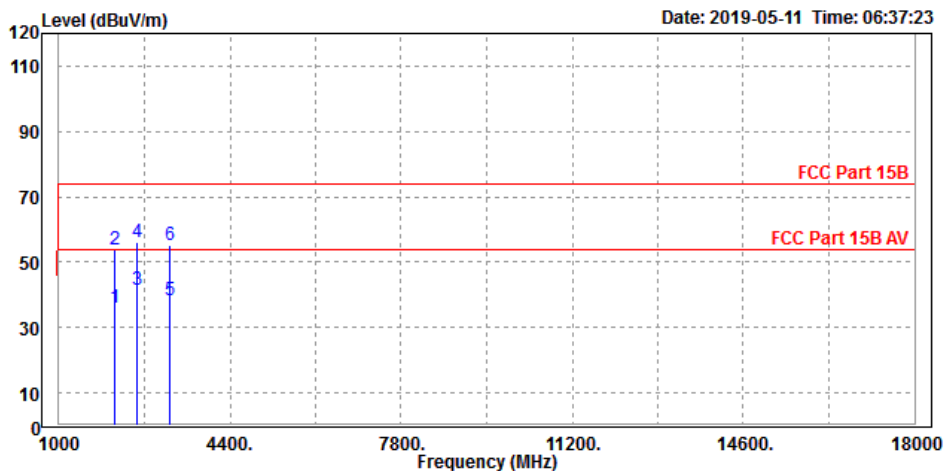
- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
 2. Negative sign (-) in the margin column signify levels below the limit.
 3. Frequency range scanned: 1GHz to 18GHz.
 4. Only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



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	Star Le		

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
2115	35.99	45.23	54	-18.01	32.54	4.58	46.36	100	0	Average
2115	54	63.24	74	-20	32.54	4.58	46.36	100	0	Peak
2561	41.41	49.67	54	-12.59	33.05	5.06	46.37	100	0	Average
2561	55.95	64.21	74	-18.05	33.05	5.06	46.37	100	0	Peak
3215	38.15	45.27	54	-15.85	33.57	5.68	46.37	100	0	Average
3215	55.3	62.42	74	-18.7	33.57	5.68	46.37	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.





Test Report No.: FV190411W001

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---