

## EMC TEST REPORT


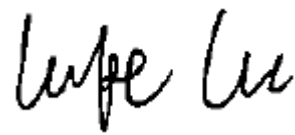
Applicant:	GREAT TALENT TECHNOLOGY LIMITED
Address:	RM602,T3 Software Park, Hi-Tech Park South, Nanshan, Shenzhen, China

Manufacturer	GREAT TALENT TECHNOLOGY LIMITED
Address:	RM602,T3 Software Park, Hi-Tech Park South, Nanshan, Shenzhen, China
Product:	2803
Brand Name:	F30
Model Name:	F30
FCC ID:	2ALZM-F30
Date of tests:	May. 18, 2019 ~ Jun. 10, 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 Luke Lu Manager / Mobile Department
 Date: Jun. 11, 2019	 Date: Jun. 11, 2019

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Test Report No.: FV190517W003

## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
FV190517W003	Original release	Jun. 11, 2019



# 1 GENERAL INFORMATION

## 1.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT</b>	2803	
<b>BRAND NAME</b>	F30	
<b>MODEL NAME</b>	F30	
<b>NOMINAL VOLTAGE</b>	5.0Vdc (adapter or host equipment) 3.85Vdc (Li-ion, battery)	
<b>BATTERY</b>	Brand Name: CHINO-E Model Name: BTE-1400 Power Rating: DC 3.85V, 1400mAh, Li-ion	
<b>MODULATION TYPE</b>	<b>WLAN</b>	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
	<b>BT_LE</b>	BT-LE(GFSK) for DTS
	<b>Bluetooth</b>	GFSK, $\pi/4$ -DQPSK, 8DPSK, LE
	<b>GPS</b>	C/A code
	<b>GLONASS</b>	FDMA code
	<b>CDMA</b>	QPSK
	<b>LTE</b>	QPSK/16QAM
<b>OPERATING FREQUENCY</b>	<b>WLAN</b>	2412-2462MHz for 11b/g/n(HT20) 2422-2452MHz for 11n(HT40)
	<b>Bluetooth/BT_LE</b>	2402MHz ~ 2480MHz
	<b>GPS</b>	1575.42MHz
	<b>GLONASS</b>	1602MHz
	<b>CDMA</b>	824.7MHz ~ 848.31MHz (FOR CDMA BC0) 1851.25MHz ~ 1908.75MHz (FOR CDMA BC1)
	<b>LTE</b>	1850.7MHz ~ 1909.3MHz (FOR LTE Band2) 1710.7MHz ~ 1754.3MHz (FOR LTE Band4) 824.7MHz ~ 848.3MHz (FOR LTE Band5) 699.7MHz ~ 715.3MHz (FOR LTE Band12) 779.5MHz ~ 784.5MHz (FOR LTE Band13) 1852.5MHz ~ 1912.5MHz (FOR LTE Band25)
<b>HW VERSION</b>	Q2803-V1.0	
<b>SW VERSION</b>	F30_V1.1.0	
<b>I/O PORTS</b>	Refer to user's manual	
<b>CABLE SUPPLIED</b>	USB cable: non-shielded, detachable, 1.0meter	
<b>ACCESSORY</b>	Refer to note as below	

**DEVICES****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:

<b>ADAPTER</b>	
<b>BRAND:</b>	KFL
<b>MODEL:</b>	TPA-5950070UU
<b>INPUT:</b>	AC 100-240V, 0.2A
<b>OUTPUT:</b>	DC 5V, 700mA

3. The EUT matched the following USB cable:

<b>USB CABLE</b>	
<b>BRAND:</b>	GuoJun
<b>MODEL:</b>	R0PC1S
<b>SIGNAL LINE:</b>	1.0 METER

4. 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 -14.88dB at 0.476000MHz.
	Radiated Emission Test (30MHz ~ 1GHz)	PASS	Meets Class B Limit Minimum passing margin is -3.03dB at 480.08MHz
	Radiated Emission Test (Above 1GHz)	PASS	Meets Class B Limit Minimum passing margin is -9.24dB at 4867MHz

## 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
<b>Radiated emission test</b>	
1	LTE B2 Idle + Adapter + Earphone + GPS Rx + USB cable + BT Idle + WIFI 2.4g Idle + Front camera on
2	LTE B4 Idle + Adapter + Earphone + GLonass Rx + USB cable + BT Idle + WIFI 2.4g Idle + Back Camera On
3	LTE B5 Idle + Adapter + Earphone + GPS Rx + USB cable + BT Idle + WIFI 2.4g Idle + MPG4
4	LTE B12 Idle + Adapter + Earphone + GLonass Rx+ USB cable + BT Idle + WIFI 2.4g Idle + Front camera on
5	LTE B13 Idle + Adapter + Earphone + GPS Rx + USB cable + BT Idle + WIFI 2.4g Idle + Back Camera On
6	LTE B25 Idle + Adapter + Earphone + GLonass Rx + USB cable + BT Idle + WIFI 2.4g Idle + MPG4
7	CDMA BC0 Idle + USB Link + Data Trasmission + PC to EUT + Earphone + BT Idle + WIFI 2.4g Idle + GPS Rx
8	CDMA BC1 Idle + USB Link + Data Trasmission + PC to SD + Earphone + BT Idle + WIFI 2.4g Idle + GLonass Rx
<b>Conducted emission test</b>	
1	LTE B2 Idle + Adapter + Earphone + GPS Rx + USB cable + BT Idle + WIFI 2.4g Idle + Front camera on
2	LTE B4 Idle + Adapter + Earphone + GLonass Rx + USB cable + BT Idle + WIFI 2.4g Idle + Back Camera On
3	LTE B5 Idle + Adapter + Earphone + GPS Rx + USB cable + BT Idle + WIFI 2.4g Idle + MPG4
4	LTE B12 Idle + Adapter + Earphone + GLonass Rx+ USB cable + BT Idle + WIFI 2.4g Idle + Front camera on
5	LTE B13 Idle + Adapter + Earphone + GPS Rx + USB cable + BT Idle + WIFI 2.4g Idle + Back Camera On
6	LTE B25 Idle + Adapter + Earphone + GLonass Rx + USB cable + BT Idle + WIFI 2.4g Idle + MPG4
7	CDMA BC0 Idle + USB Link + Data Trasmission + PC to EUT + Earphone + BT Idle + WIFI 2.4g Idle + GPS Rx
8	CDMA BC1 Idle + USB Link + Data Trasmission + PC to SD + Earphone + BT Idle + WIFI 2.4g Idle + GLonass Rx

**NOTE:**

- For conducted emission test, test mode 1, 8 was the worst case and only this mode was presented in this report.
- For radiated emission test, test mode 2, 7 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 (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	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

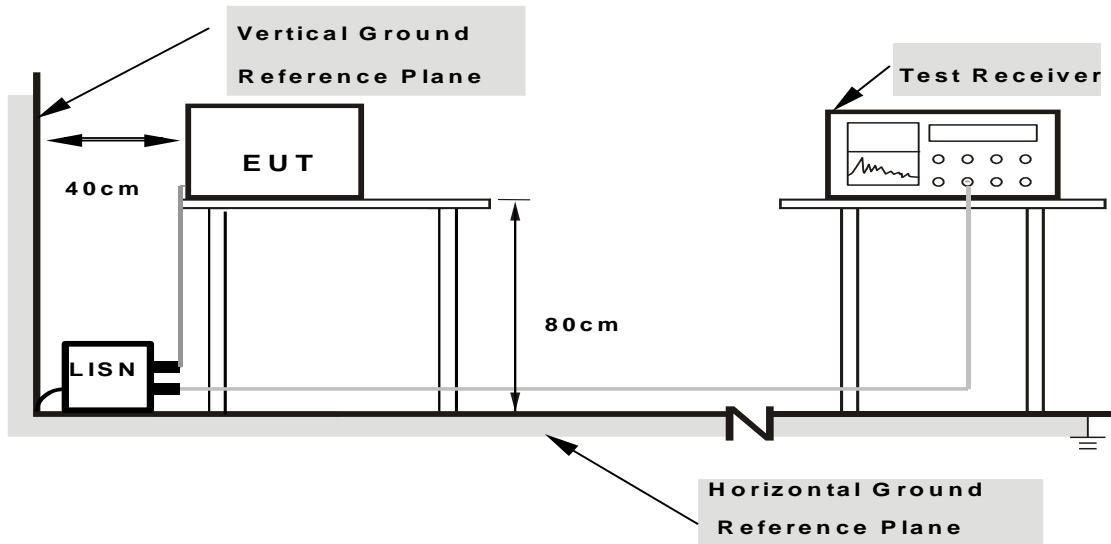
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling 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 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.

## 2.1.7 TEST RESULTS

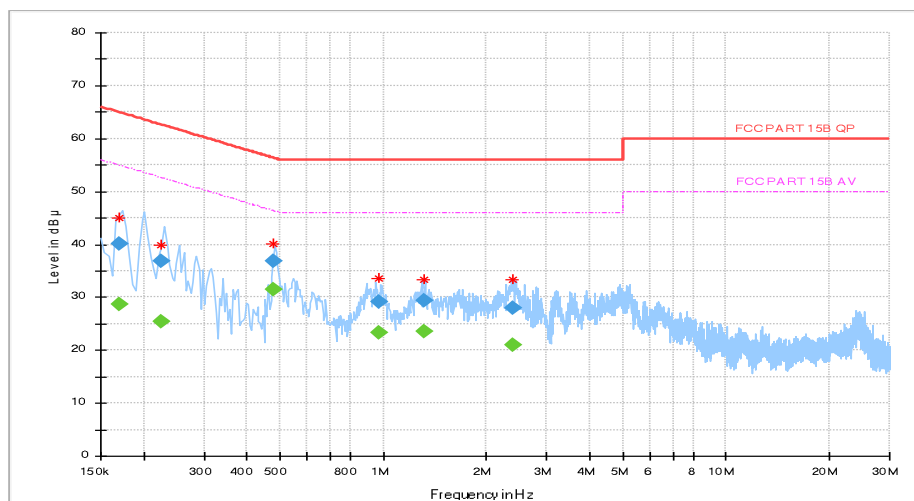
### Mode 1

<b>TEST VOLTAGE</b>	DC 5V From Adapter 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, 52RH	<b>TESTED BY</b>	John Wen

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.170000	---	28.63	54.96	-26.33	L	ON	9.9
0.170000	40.07	---	64.96	-24.90	L	ON	9.9
0.224000	---	25.48	52.67	-27.19	L	ON	9.9
0.224000	36.92	---	62.67	-25.75	L	ON	9.9
<b>0.476000</b>	<b>---</b>	<b>31.52</b>	<b>46.41</b>	<b>-14.88</b>	<b>L</b>	<b>ON</b>	<b>10.1</b>
0.476000	36.85	---	56.41	-19.56	L	ON	10.1
0.976000	---	23.25	46.00	-22.75	L	ON	10.1
0.976000	29.17	---	56.00	-26.83	L	ON	10.1
1.308000	---	23.49	46.00	-22.51	L	ON	10.2
1.308000	29.35	---	56.00	-26.65	L	ON	10.2
2.384000	---	21.06	46.00	-24.94	L	ON	10.2
2.384000	27.91	---	56.00	-28.09	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

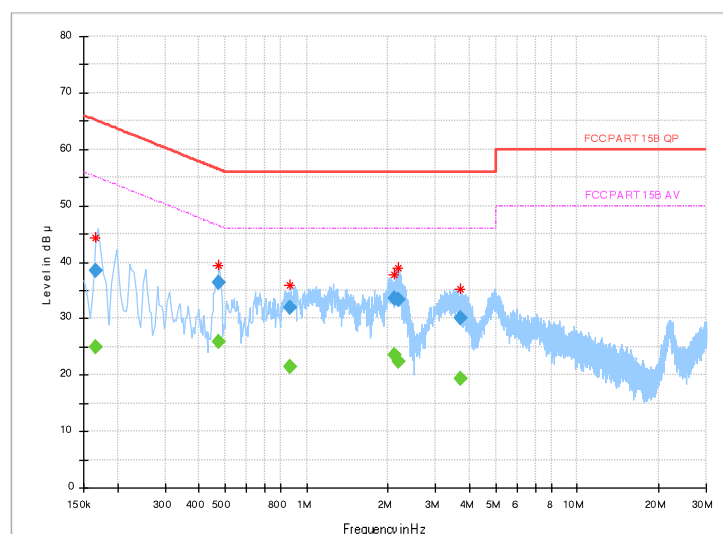


TEST VOLTAGE	DC 5V From Adapter Input 120 Vac, 60 Hz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
ENVIRONMENTAL CONDITIONS	25deg. C, 52RH	TESTED BY	John Wen

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.166000	---	24.93	55.16	-30.23	N	ON	9.9
0.166000	38.46	---	65.16	-26.70	N	ON	9.9
0.472000	---	25.93	46.48	-20.55	N	ON	9.9
0.472000	36.46	---	56.48	-20.02	N	ON	9.9
0.864000	---	21.42	46.00	-24.58	N	ON	10.0
0.864000	32.03	---	56.00	-23.97	N	ON	10.0
2.108000	---	23.51	46.00	-22.49	N	ON	10.1
2.108000	33.67	---	56.00	-22.33	N	ON	10.1
2.180000	---	22.35	46.00	-23.65	N	ON	10.1
2.180000	33.45	---	56.00	-22.55	N	ON	10.1
3.692000	---	19.45	46.00	-26.55	N	ON	10.1
3.692000	30.12	---	56.00	-25.88	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



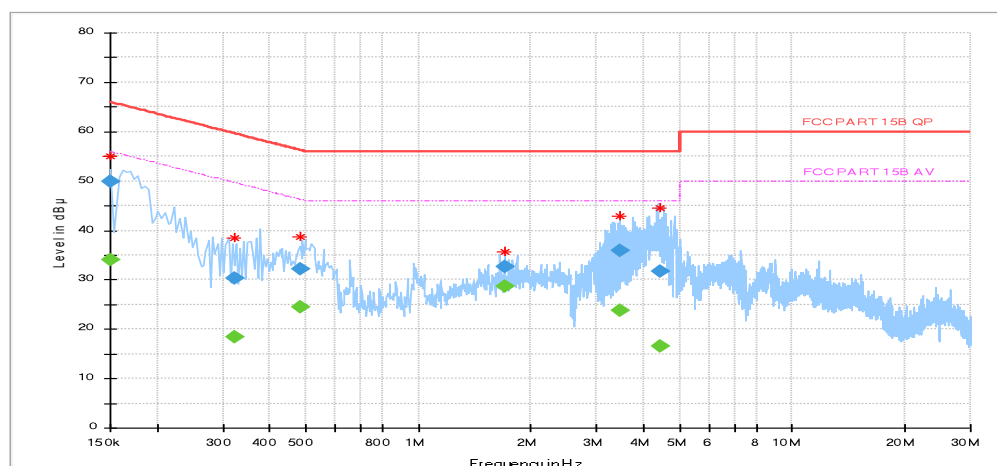
Mode 8

<b>TEST VOLTAGE</b>	Data trasmission 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, 52RH	<b>TESTED BY</b>	John Wen

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.150000	---	33.99	56.00	-22.01	L	ON	9.9
0.150000	49.98	---	66.00	-16.02	L	ON	9.9
0.324000	---	18.38	49.60	-31.22	L	ON	10.0
0.324000	30.33	---	59.60	-29.28	L	ON	10.0
0.484000	---	24.44	46.27	-21.83	L	ON	10.1
0.484000	32.28	---	56.27	-23.99	L	ON	10.1
1.698000	---	28.63	46.00	-17.37	L	ON	10.2
1.698000	32.64	---	56.00	-23.36	L	ON	10.2
3.476000	---	23.90	46.00	-22.10	L	ON	10.3
3.476000	35.89	---	56.00	-20.11	L	ON	10.3
4.424000	---	16.46	46.00	-29.54	L	ON	10.3
4.424000	31.79	---	56.00	-24.21	L	ON	10.3

- 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.

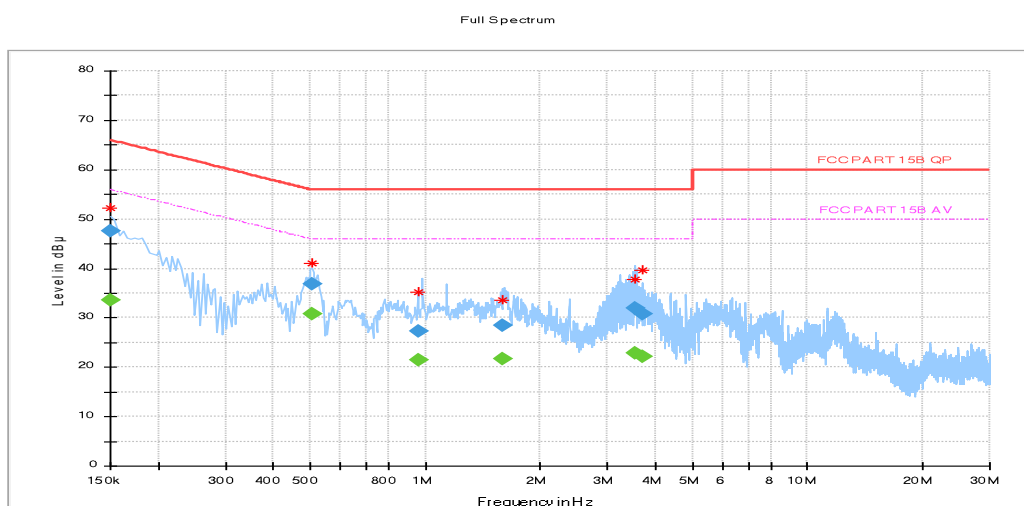
Full Spectrum



<b>TEST VOLTAGE</b>	Data trasmission 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, 52RH	<b>TESTED BY</b>	John Wen

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.150000	---	33.69	56.00	-22.31	N	ON	9.9
0.150000	47.58	---	66.00	-18.42	N	ON	9.9
0.504000	---	30.70	46.00	-15.30	N	ON	10.0
0.504000	36.86	---	56.00	-19.14	N	ON	10.0
0.964000	---	21.47	46.00	-24.53	N	ON	10.0
0.964000	27.36	---	56.00	-28.64	N	ON	10.0
1.596000	---	21.80	46.00	-24.20	N	ON	10.0
1.596000	28.36	---	56.00	-27.64	N	ON	10.0
3.528000	---	22.82	46.00	-23.18	N	ON	10.1
3.528000	32.07	---	56.00	-23.93	N	ON	10.1
3.704000	---	22.19	46.00	-23.81	N	ON	10.1
3.704000	30.70	---	56.00	-25.30	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.



## 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 <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	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.  $\text{Emission level(dBuV/m)} = \text{Raw Value(dBuV)} + \text{Correction Factor(dB/m)}$
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:

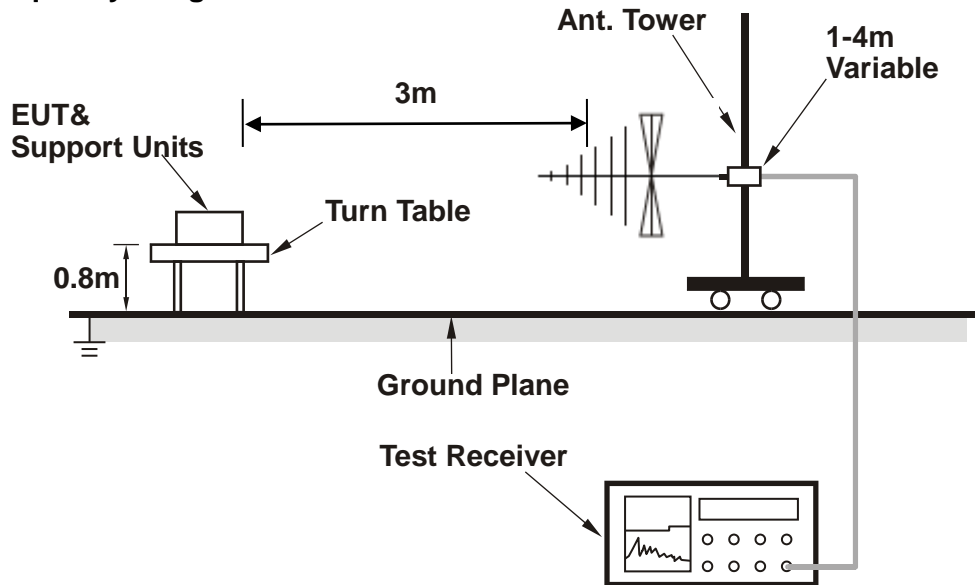
1. The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth of test receiver/spectrum analyzer is 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.  $\text{Emission level(dBuV/m)} = \text{Raw Value(dBuV)} + \text{Correction Factor(dB/m)}$
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

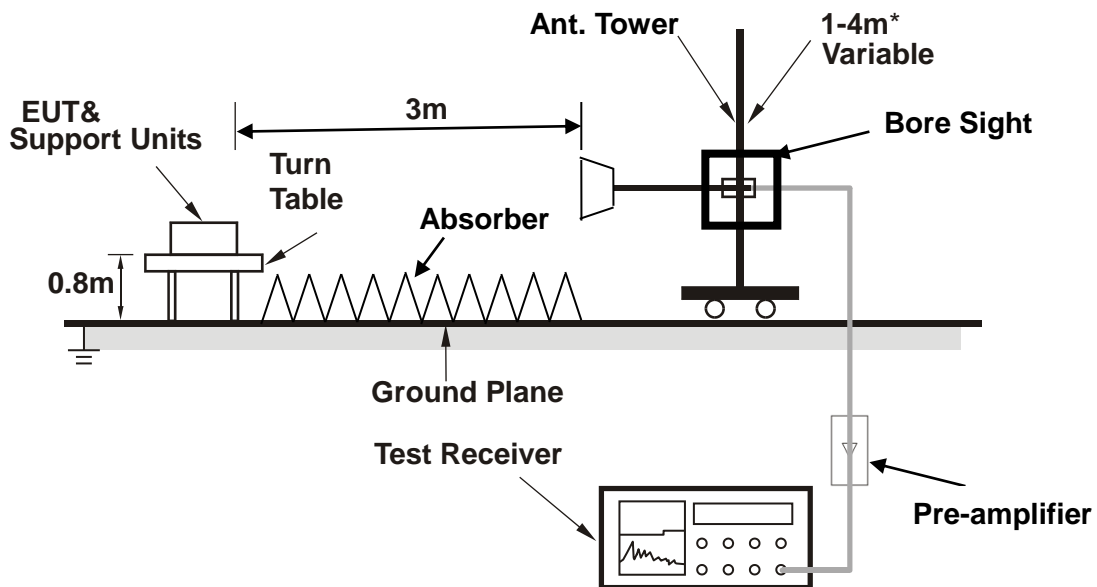
No deviation.

## 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.

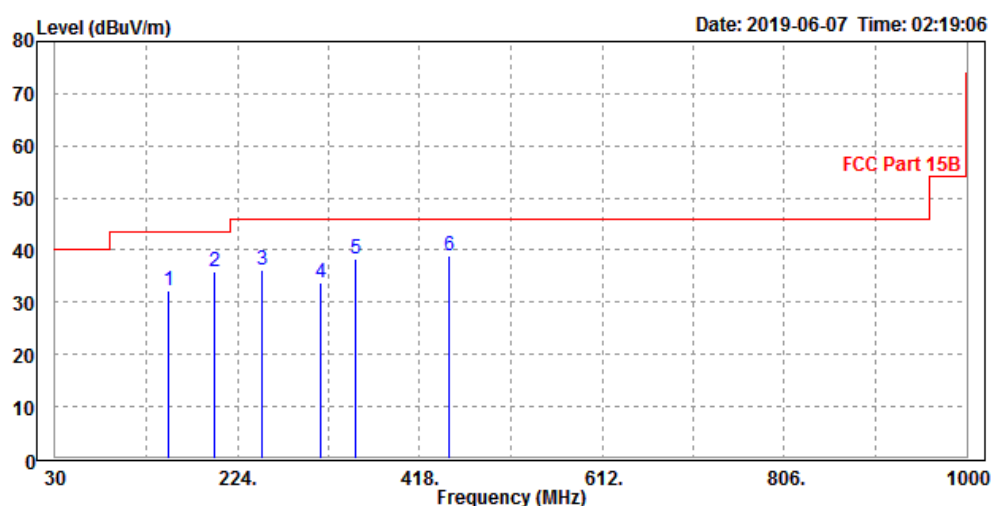
## 2.2.7. TEST RESULTS

### Mode 2

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

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
150.28	32.23	57.77	43.5	-11.27	9.72	1.56	36.82	100	0	QP
199.75	35.97	59.94	43.5	-7.53	10.79	1.79	36.55	100	0	QP
250.19	36.09	57.7	46	-9.91	13	2.04	36.65	100	0	QP
312.27	33.84	53.86	46	-12.16	14.48	2.26	36.76	100	0	QP
350.1	38.47	57.19	46	-7.53	15.65	2.42	36.79	100	0	QP
450.01	38.98	55.24	46	-7.02	17.85	2.81	36.92	100	0	QP

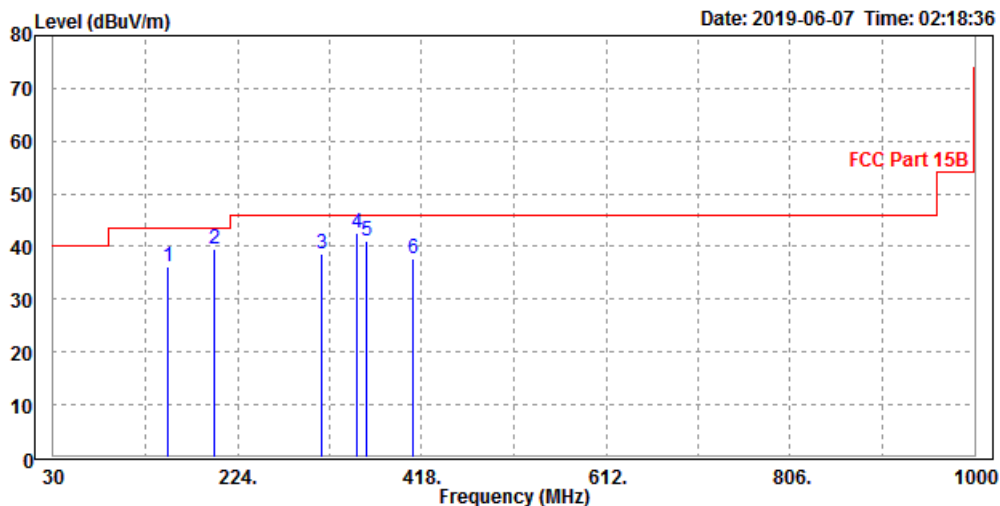
- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
  2. Negative sign (-) in the margin column signify levels below the limit.
  3. Frequency range scanned: 30MHz to 1000MHz.
 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



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

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
150.28	36.17	61.71	43.5	-7.33	9.72	1.56	36.82	100	360	QP
199.75	39.45	63.41	43.5	-4.05	10.8	1.79	36.55	100	360	QP
312.27	38.75	58.67	46	-7.25	14.58	2.26	36.76	100	360	QP
350.1	42.72	61.34	46	-3.28	15.75	2.42	36.79	100	360	QP
359.8	41.18	59.47	46	-4.82	16.05	2.46	36.8	100	360	QP
408.3	37.63	54.4	46	-8.37	17.42	2.65	36.84	100	360	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.

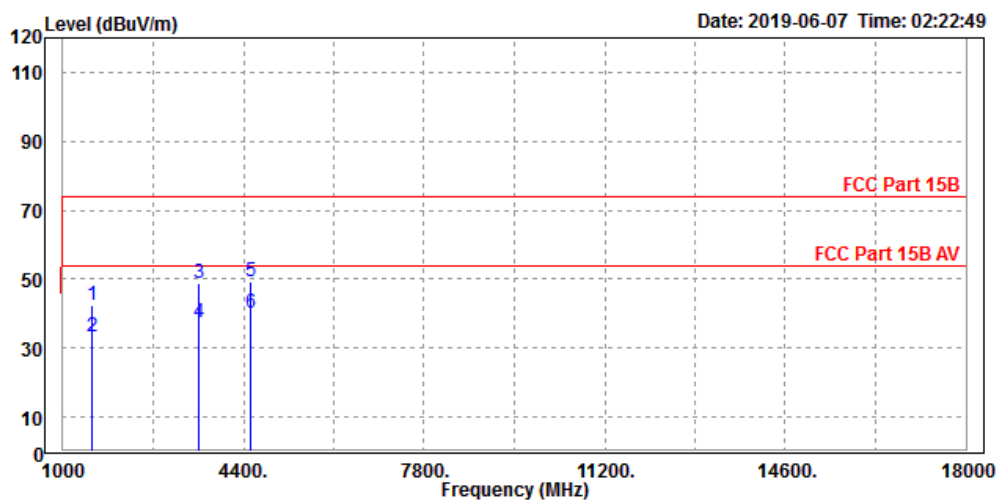


<b>TEST VOLTAGE</b>	DC 5V From Adapter Input 120 Vac, 60 Hz	<b>FREQUENCY RANGE</b>	1-18 GHz
<b>ENVIRONMENTAL CONDITIONS</b>	23deg. C, 70 %RH	<b>DETECTOR FUNCTION &amp; RESOLUTION BANDWIDTH</b>	Peak/Average, 1 MHz
<b>TESTED BY</b>	Tony		

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
1552	42.32	55.21	74	-31.68	29.03	6.44	48.36	100	187	Peak
1552	33.43	46.32	54	-20.57	29.03	6.44	48.36	100	187	Average
3566	48.97	54.23	74	-25.03	33.11	10.06	48.43	115	270	Peak
3566	37.43	42.69	54	-16.57	33.11	10.06	48.43	115	270	Average
4528	49.39	52.34	74	-24.61	34.3	11.53	48.78	152	300	Peak
4528	40.2	43.15	54	-13.8	34.3	11.53	48.78	152	300	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.

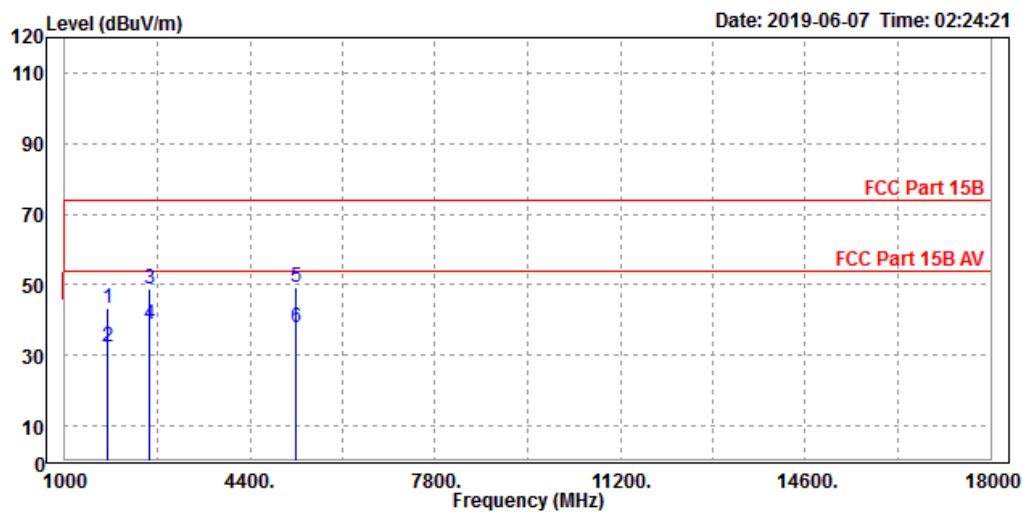


<b>TEST VOLTAGE</b>	DC 5V From Adapter Input 120 Vac, 60 Hz	<b>FREQUENCY RANGE</b>	1-18 GHz
<b>ENVIRONMENTAL CONDITIONS</b>	23deg. C, 70 %RH	<b>DETECTOR FUNCTION &amp; RESOLUTION BANDWIDTH</b>	Peak/Average, 1 MHz
<b>TESTED BY</b>	Tony		

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
1785	43.39	54.26	74	-30.61	30.52	6.96	48.35	100	190	Peak
1785	32.34	43.21	54	-21.66	30.52	6.96	48.35	100	190	Average
2564	49.01	56.39	74	-24.99	32.46	8.46	48.3	100	160	Peak
2564	38.97	46.35	54	-15.03	32.46	8.46	48.3	100	160	Average
5241	49.3	49.78	74	-24.7	34.59	13.97	49.04	100	255	Peak
5241	37.78	38.26	54	-16.22	34.59	13.97	49.04	100	255	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.



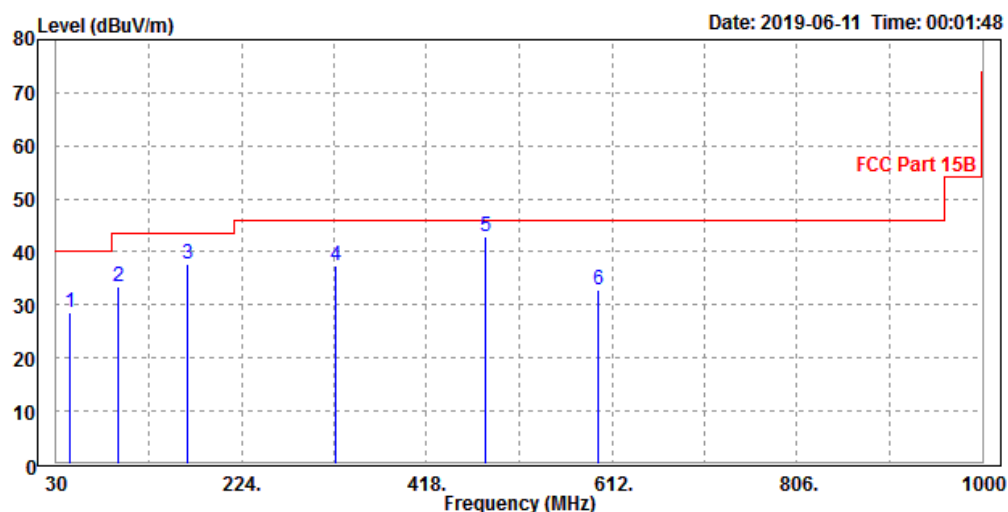


Mode 7

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		

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
43.58	28.68	55.92	40	-11.32	9.2	1	37.44	200	0	QP
94.99	33.34	60.16	43.5	-10.16	9.1	1.29	37.21	200	0	QP
167.74	37.71	62.31	43.5	-5.79	10.42	1.68	36.7	200	0	QP
321.97	37.34	57.03	46	-8.66	14.78	2.3	36.77	200	0	QP
<b>480.08</b>	<b>42.97</b>	<b>58.78</b>	<b>46</b>	<b>-3.03</b>	<b>18.24</b>	<b>2.92</b>	<b>36.97</b>	<b>200</b>	<b>0</b>	<b>QP</b>
598.42	32.74	46.87	46	-13.26	20.07	3.16	37.36	200	0	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.

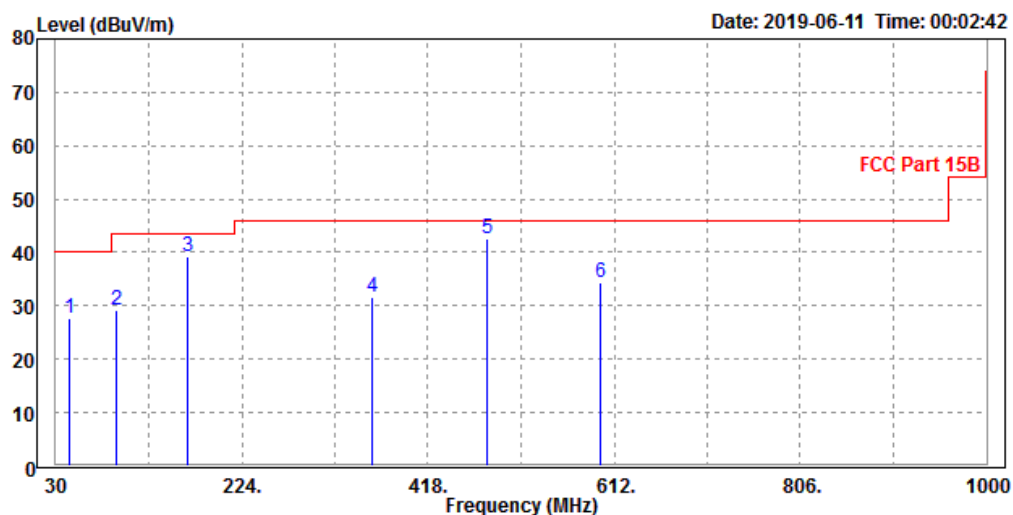


<b>TEST VOLTAGE</b>	Data trasmission Input 120 Vac, 60 Hz	<b>FREQUENCY RANGE</b>	30-1000 MHz
<b>ENVIRONMENTAL CONDITIONS</b>	23deg. C, 70 %RH	<b>DETECTOR FUNCTION &amp; RESOLUTION BANDWIDTH</b>	Quasi-Peak, 120 kHz
<b>TESTED BY</b>	Star		

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
44.55	27.69	55.93	40	-12.31	8.15	1.03	37.42	100	0	QP
94.02	29.08	55.92	43.5	-14.42	9.08	1.29	37.21	100	0	QP
167.74	39.21	63.83	43.5	-4.29	10.4	1.68	36.7	100	0	QP
359.8	31.74	50.03	46	-14.26	16.05	2.46	36.8	100	0	QP
480.08	42.63	58.26	46	-3.37	18.42	2.92	36.97	100	0	QP
598.42	34.39	48.51	46	-11.61	20.08	3.16	37.36	100	0	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.

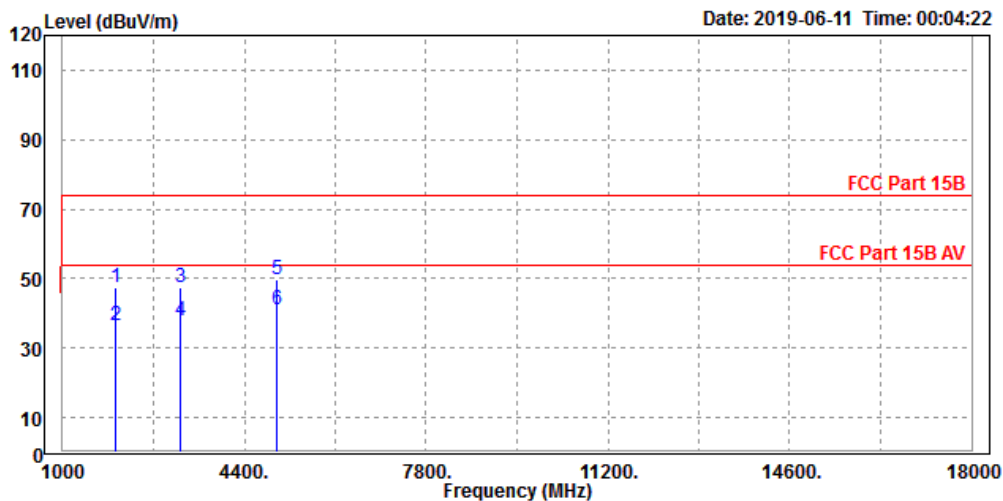


<b>TEST VOLTAGE</b>	Data transmission Input 120 Vac, 60 Hz	<b>FREQUENCY RANGE</b>	1-18 GHz
<b>ENVIRONMENTAL CONDITIONS</b>	23deg. C, 70 %RH	<b>DETECTOR FUNCTION &amp; RESOLUTION BANDWIDTH</b>	Peak/Average, 1 MHz
<b>TESTED BY</b>	Star		

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
2005	47.43	56.42	74	-26.57	31.9	7.46	48.35	100	187	Peak
2005	36.65	45.64	54	-17.35	31.9	7.46	48.35	100	187	Average
3212	47.38	53.28	74	-26.62	32.94	9.52	48.36	115	270	Peak
3212	37.66	43.56	54	-16.34	32.94	9.52	48.36	115	270	Average
5012	49.91	51.26	74	-24.09	34.31	13.31	48.97	152	300	Peak
5012	41.02	42.37	54	-12.98	34.31	13.31	48.97	152	300	Average

**REMARKS:**

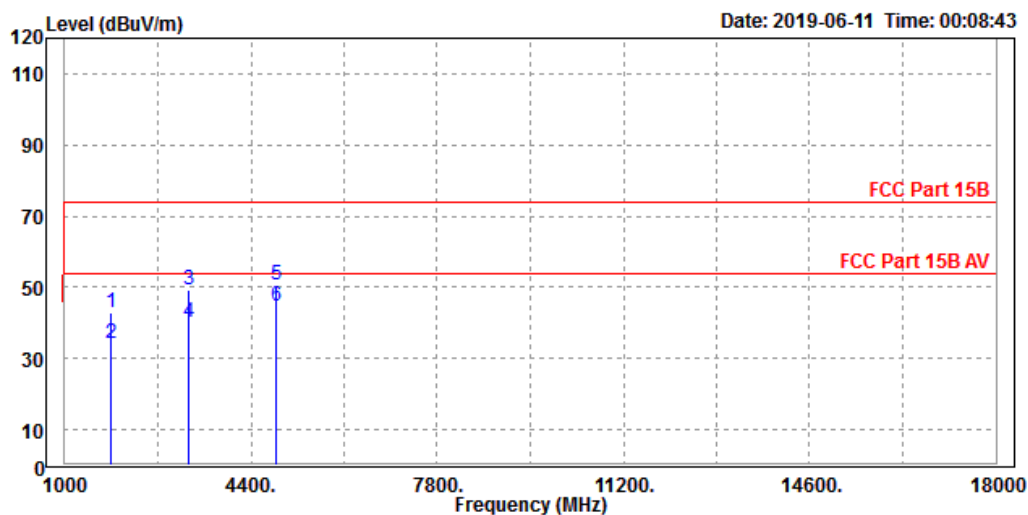
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
2. Negative sign (-) in the margin column signify levels below the limit.
3. Frequency range scanned: 1GHz to 18GHz.
4. Only emissions significantly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



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	Star		

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
1856	42.96	53.21	74	-31.04	30.98	7.12	48.35	100	190	Peak
1856	34.37	44.62	54	-19.63	30.98	7.12	48.35	100	190	Average
3251	49.4	55.24	74	-24.6	32.95	9.58	48.37	100	160	Peak
3251	40.05	45.89	54	-13.95	32.95	9.58	48.37	100	160	Average
4867	50.51	52.34	74	-23.49	34.3	12.79	48.92	100	255	Peak
4867	44.76	46.59	54	-9.24	34.3	12.79	48.92	100	255	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.



### 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---