

EMC TEST REPORT


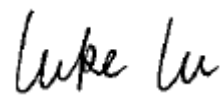
Applicant:	Lenovo(Shanghai) Electronics Technology Co., Ltd.
Address:	Section 304-305, Building No. 4, # 222, Meiyue Road, China (Shanghai) Pilot Free Trade Zone

Manufacturer or Supplier:	Lenovo PC HK Limited
Address:	23/F, Lincoln House, Taikoo Place 979 King's Road, Quarry Bay, Hong Kong
Product:	Portable Tablet Computer
Brand Name:	Lenovo
Model Name:	Lenovo TB-X605LC
FCC ID:	O57TBX605LC
Date of tests:	Sep. 19, 2020 ~ Oct. 19, 2020

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 A
☒ 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: Oct. 19, 2020	Date: Oct. 19, 2020

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Test Report No.: FV200918W001

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
FV200918W001	Original release	Oct. 19, 2020

1 GENERAL INFORMATION

1.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Portable Tablet Computer	
BRAND NAME	Lenovo	
MODEL NAME	Lenovo TB-X605LC	
NOMINAL VOLTAGE	5.0Vdc (adapter or host equipment) 3.85c (Li-ion, battery)	
MODULATION TYPE	WLAN	DSSS, OFDM
	BT_LE	GFSK
	Bluetooth	GFSK, $\pi/4$ -DQPSK, 8DPSK
	GPS/ GLONASS	BPSK
	FM	FM
	WCDMA	BPSK/QPSK
	LTE	QPSK/16QAM
OPERATING FREQUENCY	WLAN	2412 ~ 2462MHz for 11b/g/n(HT20) 5180 ~ 5240MHz, 5260 ~ 5320 MHz, 5500 ~ 5720MHz, 5745 ~ 5805 MHz for 11a/ n(HT20)/ n(HT40) / ac(VHT80)
	Bluetooth/BT_LE	2402MHz ~ 2480MHz
	GPS/ GLONASS	1559MHz ~ 1610MHz
	FM	87.5MHz ~ 108MHz
	WCDMA	1852.4MHz ~ 1907.6MHz(FOR WCDMA Band 2) 826.4MHz ~ 846.6MHz (FOR WCDMA Band 5)
	LTE	824.7MHz ~ 848.3MHz (FOR LTE Band5) 2502.5MHz ~ 2567.5MHz (FOR LTE Band7) 814.7MHz ~ 848.3MHz (FOR LTE Band26) 2572.5MHz ~ 2617.5MHz (FOR LTE Band38) 2535 MHz ~2655MHz (FOR LTE Band41)
HW VERSION	Lenovo Tablet TB-X605LC	
SW VERSION	TB-X605LC_RF01_20190604	
I/O PORTS	Refer to user's manual	
CABLE SUPPLIED	USB cable: shielded, detachable,1meter	
ACCESSORY DEVICES	Refer to note as below	

NOTE:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. There were Sample 1, 2, 3, 4, 5 and 6 for this project, the difference is as below:

SAMPLE	EUT CONFIGURATION INFORMATION
1	LCD Panel 1+Photo Camera 1+Photo Camera 3+CPU1+EMMC1+DDR1+speaker 1+speaker 2+motor1+Main Broad 1+BT/WLAN Module+ Battery 1
2	LCD Panel 2+Photo Camera 2+Photo Camera 4+CPU1+EMMC2+DDR2+speaker 1+speaker 2+motor2+Main Broad 2+BT/WLAN Module+ Battery 2
3	LCD Panel 1+Photo Camera 1+Photo Camera 3+CPU1+EMMC3+DDR3+speaker 1+speaker 2+motor1+Main Broad 1+BT/WLAN Module+ Battery 1
4	LCD Panel 2+Photo Camera 2+Photo Camera 4+CPU1+EMMC4+DDR4+speaker 1+speaker 2+motor2+Main Broad 2+BT/WLAN Module+ Battery 2
5	LCD Panel 1+Photo Camera 1+Photo Camera 3+CPU1+EMMC5+DDR5+speaker 1+speaker 2+motor1+Main Broad 1+BT/WLAN Module+ Battery 1
6	LCD Panel 2+Photo Camera 2+Photo Camera 4+CPU1+EMMC6+DDR6+speaker 1+speaker 2+motor2+Main Broad 2+BT/WLAN Module+ Battery 2

3. 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	SPECIFICATION
AC Adapter 1	Salom	SC-41	I/P:100-240Vac, 0.3A O/P: 5Vdc, 2A
AC Adapter 2	AcBel	SC-41	I/P:100-240Vac, 0.3A O/P: 5Vdc, 2A
Battery 1	SCUD	L16D2P31	Rating: 3.85Vdc, 7000mAh
Battery 2	Celxpert	L16D2P31	Rating: 3.85Vdc, 7000mAh
USB Cable 1	LiQi	L27B-052000100-TCCS	1.0m shielded cable w/o core
USB Cable 2	SaiBao	S27B-052000100-TCCS	1.0m shielded cable w/o core
LCD Panel1	BOE	TV101WUM-LL4	10.1 "
LCD Panel2	BOE	TV101WUM-LL5	10.1 "
Photo Camera 1	O-film	L4H7A00	8M AF
Photo Camera 2	Q-tech	F4H7YAZ	8M AF
Photo Camera 3	Lianyi	LE5220FM	5M FF
Photo Camera 4	Jinkang	G7B5-QL607XFF	5M FF
CPU	Qualcomm	SDM450-D-792NSP-TR-01-0-AA	-
EMMC1+DDR1	SAMSUNG	KMRP60014M-B614(4+64)	64G
EMMC2+DDR2	HYNIX	H9TQ52ACLTMCUR-KUM(4+64)	64G
EMMC3+DDR3	SAMSUNG	KMGD6001BM-B421(3+32)	32G
EMMC4+DDR4	HYNIX	H9TQ27ADFTMCUR-KUM(3+32)	32G
EMMC5+DDR5	SAMSUNG	KMQE60013M-B318(2+16)	16G
EMMC6+DDR6	HYNIX	H9TQ17ABJTCCUR-KUM(2+16)	16G
Speaker 1	Xichun	KFSC1712SBC-S-B232-20J-GT	-
Speaker 2	Xichun	KFSC1712SBC-S-B233-20J-W	-
speaker 1	Haosheng	HB171219B08-13-B1F-RH	-
speaker 2	Haosheng	XHB171219B08-14-B1F-RH	-
motor1	Hongzhifa	HZF-Z04BE-RL67B25-90	-
Motor2	Kunwang	CY0408L-021HB-064	-
Main Broad 1	Hongban	Aae_MB_PCB_V3	-
Main Broad 2	Huashen	Aae_MB_PCB_V3	-
BT/WLAN Module	Qualcomm	WCN-3680B-0-79BWLNSP-TR-05-1	-

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	Test lab*
FCC Part 15, Subpart B, Class B ANSI C63.4:2014	Conducted Test	Compliance	A
	Radiated Emission Test (30MHz ~ 1GHz)	Compliance	B
	Radiated Emission Test (Above 1GHz)	Compliance	A

*Test Lab Information Reference

Lab A:

BV 7Layers Communications Technology (Shenzhen) Co. Ltd

Lab Address:

No.B102, Dazu Chuangxin Mansion, North of Beihuan Avenue, North Area, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, China

Accredited Test Lab Cert 3939.01

Lab B:

Bureau Veritas Shenzhen Co., Ltd. Dongguan Branch.

Lab Address:

No. 34, Chenwulu Section, Guantai Rd., Houjie Town, Dongguan City, Guangdong 523942, China

Accredited Test Lab Cert 2951.01

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	$\pm 2.70\text{dB}$
Radiated emissions	30MHz~1GMHz	$\pm 4.98\text{dB}$
	1GMHz ~6GMHz	$\pm 4.70\text{dB}$
	6GMHz ~18GMHz	$\pm 4.60\text{dB}$



1.4 DESCRIPTION OF TEST MODES

Test Mode	Test Condition
Radiated emission test	
1	WCDMA B2 Idle + Adapter(1#) + USB Cable 1# + Earphone + BT Idle + WIFI 2.4g Idle + GPS Rx + Front Camera On
2	WCDMA B5 Idle + Adapter(2#) + USB Cable 2# + Earphone + BT Idle + WIFI 5g Idle + Glonass Rx + Back Camera On
3	LTE B5 Idle + Adapter(1#) + USB Cable 1# + Earphone + BT Idle + WIFI 2.4g Idle + GPS Rx + MPG4
4	LTE B7 Idle + Adapter(2#) + USB Cable 2# + Earphone + BT Idle + WIFI 5g Idle + Glonass Rx + FM
5	LTE B26 Idle + Adapter(1#) + USB Cable 1# + Earphone + BT Idle + WIFI 2.4g Idle + GPS Rx + Front Camera On
6	LTE B38 Idle + Adapter(2#) + USB Cable 2# + Earphone + BT Idle + WIFI 5g Idle + Glonass Rx + Back Camera On
7	LTE B41 Idle + Adapter(1#) + USB Cable 1# + Earphone + BT Idle + WIFI 2.4g Idle + GPS Rx + MPG4
8	WCDMA B2 Idle + USB Cable 1# + Data Trasmssion + PC To EUT + Earphone + BT Idle + USB Link + GPS Rx + WIFI 2.4g Idle
9	WCDMA B5 Idle + USB Cable 2# + Data Trasmssion + PC To SD + Earphone + BT Idle + USB Link + Glonass Rx + WIFI 5g Idle
10	LTE B5 Idle + USB Cable 1# + Data Trasmssion + PC To EUT + Earphone+ BT Idle + USB Link + GPS Rx + WIFI 2.4g Idle
11	LTE B7 Idle + USB Cable 2# + Data Trasmssion + PC To SD + Earphone + BT Idle + USB Link+ Glonass Rx + WIFI 5g Idle
12	LTE B26 Idle + USB Cable 1# + Data Trasmssion + PC To EUT + Earphone + BT Idle + USB Link + GPS Rx + WIFI 2.4g Idle
13	LTE B38 Idle + USB Cable 2# + Data Trasmssion + PC To SD + Earphone+ BT Idle + USB Link + Glonass Rx + WIFI 5g Idle

Conducted emission test	
1	WCDMA B2 Idle + Adapter(1#) + USB Cable 1# + Earphone + BT Idle + WIFI 2.4g Idle + GPS Rx + Front Camera On
2	WCDMA B5 Idle + Adapter(2#) + USB Cable 2# + Earphone + BT Idle + WIFI 5g Idle + Glonass Rx + Back Camera On
3	LTE B5 Idle + Adapter(1#) + USB Cable 1# + Earphone + BT Idle + WIFI 2.4g Idle + GPS Rx + MPG4
4	LTE B7 Idle + Adapter(2#) + USB Cable 2# + Earphone + BT Idle + WIFI 5g Idle + Glonass Rx + FM
5	LTE B26 Idle + Adapter(1#) + USB Cable 1# + Earphone + BT Idle + WIFI 2.4g Idle + GPS Rx + Front Camera On
6	LTE B38 Idle + Adapter(2#) + USB Cable 2# + Earphone + BT Idle + WIFI 5g Idle + Glonass Rx + Back Camera On
7	LTE B41 Idle + Adapter(1#) + USB Cable 1# + Earphone + BT Idle + WIFI 2.4g Idle + GPS Rx + MPG4
8	WCDMA B2 Idle + USB Cable 1# + Data Trasmssion + PC To EUT + Earphone + BT Idle + USB Link + GPS Rx + WIFI 2.4g Idle
9	WCDMA B5 Idle + USB Cable 2# + Data Trasmssion + PC To SD + Earphone + BT Idle + USB Link + Glonass Rx + WIFI 5g Idle
10	LTE B5 Idle + USB Cable 1# + Data Trasmssion + PC To EUT + Earphone+ BT Idle + USB Link + GPS Rx + WIFI 2.4g Idle
11	LTE B7 Idle + USB Cable 2# + Data Trasmssion + PC To SD + Earphone + BT Idle + USB Link+ Glonass Rx + WIFI 5g Idle
12	LTE B26 Idle + USB Cable 1# + Data Trasmssion + PC To EUT + Earphone + BT Idle + USB Link + GPS Rx + WIFI 2.4g Idle
13	LTE B38 Idle + USB Cable 2# + Data Trasmssion + PC To SD + Earphone+ BT Idle + USB Link + Glonass Rx + WIFI 5g Idle

NOTE:

1. For conducted emission test, test mode 1 was the verification case and only this mode was presented in this report.
2. For radiated emission test, test mode1 was the verification 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 ALL TESTS

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Laptop	Lenovo	Thnikpad L440	R90FTFKP	N/A
2	FM signal generator	Rohde & Schwarz	SMB100A	109279	N/A
3	Printer	HP	Hp LaserJet 1300	CNSJF75989	N/A
4	GPS Simulator +Antenna	TOJOIN	GNSS-5000A	E1-010-010119	N/A
5	Universal radio communication tester	Rohde&Schwarz	CMW500	N/A	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 a CLASS B)

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

TEST STANDARD: FCC Part 15, Subpart B (Section: 15.107 b CLASS A)

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15 ~ 0.5	79	66
0.5 ~ 30	73	60

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. 28,20	Feb. 27, 21
EMC32 test software	Rohde&Schwarz	EMC32	NA	NA	NA
LISN network	Rohde&Schwarz	ENV216	101922	Feb. 28,20	Feb. 27, 21

NOTE: 1. The test was performed in CE shielded room.

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.

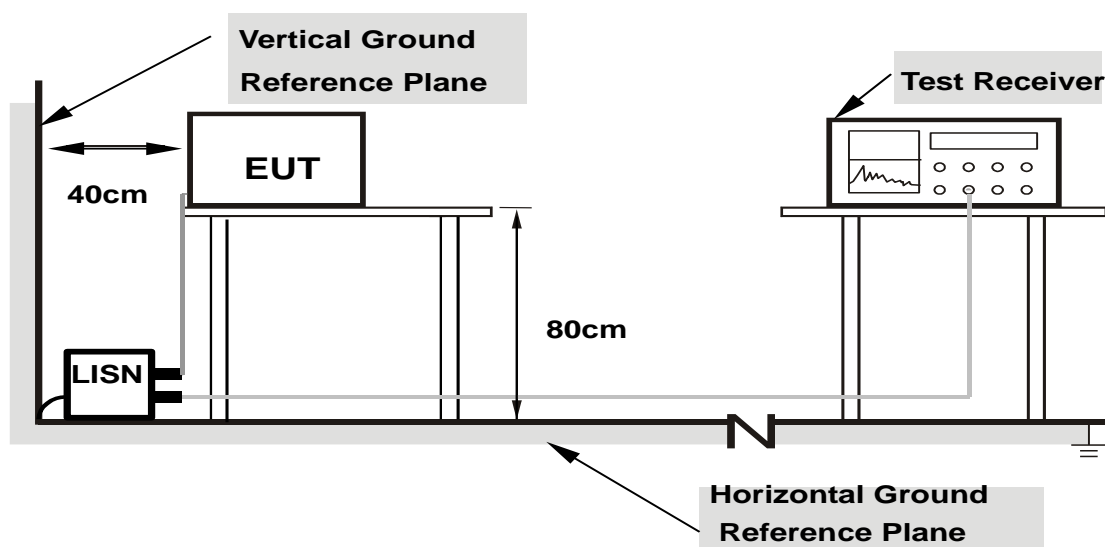
NOTE: All modes of operation were investigated and the worst-case emissions are reported.

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

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



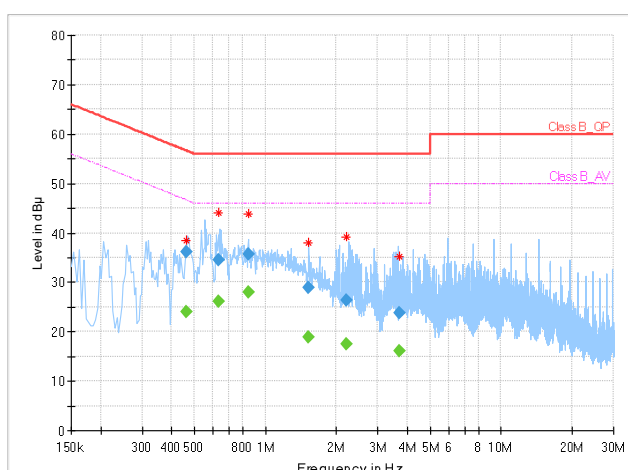
2.1.7 TEST RESULTS

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

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.464000	---	23.97	46.62	-22.65	L	ON	9.7
0.464000	36.07	---	56.62	-20.55	L	ON	9.7
0.632000	---	26.21	46.00	-19.79	L	ON	9.7
0.632000	34.61	---	56.00	-21.39	L	ON	9.7
0.848000	---	28.01	46.00	-17.99	L	ON	9.7
0.848000	35.77	---	56.00	-20.23	L	ON	9.7
1.528000	---	18.87	46.00	-27.13	L	ON	9.8
1.528000	28.97	---	56.00	-27.03	L	ON	9.8
2.204000	---	17.46	46.00	-28.54	L	ON	9.8
2.204000	26.38	---	56.00	-29.62	L	ON	9.8
3.696000	---	16.11	46.00	-29.89	L	ON	9.8
3.696000	23.76	---	56.00	-32.24	L	ON	9.8

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

Full Spectrum

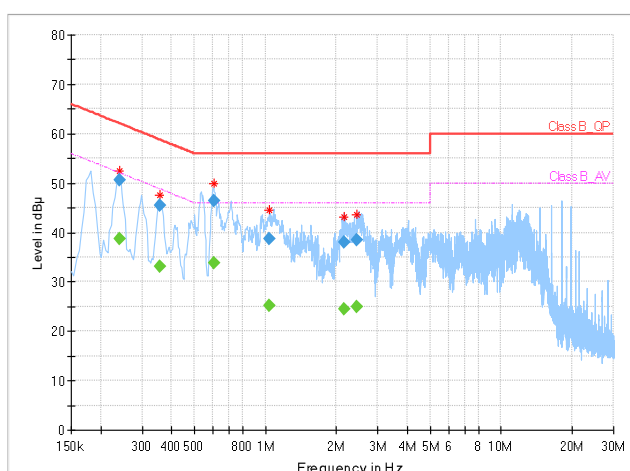


TEST VOLTAGE	DC 5V From Adapter Input 120 Vac, 60 Hz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
ENVIRONMENTAL CONDITIONS	24deg. C, 55%RH	TESTED BY	Chase Zhou

Frequency (MHz)	QuasiPeak (dB μ V)	CAverage (dB μ V)	Limit (dB μ V)	Margin (dB)	Line	Filter	Corr. (dB)
0.240000	---	38.74	52.10	-13.36	N	ON	9.8
0.240000	50.56	---	62.10	-11.54	N	ON	9.8
0.356000	---	33.03	48.82	-15.79	N	ON	9.8
0.356000	45.50	---	58.82	-13.32	N	ON	9.8
0.604000	---	33.82	46.00	-12.18	N	ON	9.8
0.604000	46.38	---	56.00	-9.62	N	ON	9.8
1.044000	---	25.13	46.00	-20.87	N	ON	9.8
1.044000	38.80	---	56.00	-17.20	N	ON	9.8
2.152000	---	24.60	46.00	-21.40	N	ON	9.8
2.152000	38.13	---	56.00	-17.87	N	ON	9.8
2.428000	---	25.01	46.00	-20.99	N	ON	9.8
2.428000	38.60	---	56.00	-17.40	N	ON	9.8

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

Full Spectrum



2.2 RADIATED EMISSION MEASUREMENT

2.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

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

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

Radiated Emissions Limits at 10 meters (dB μ V/m)		
Frequencies (MHz)	FCC 15B/ ICES-003, Class A	FCC 15B / ICES-003, Class B
30-88	39	29.5
88-216	43.5	33.1
216-230	46.4	35.6
230-960		
960-1000	49.5	43.5

Radiated Emissions Limits at 3 meters (dB μ V/m)		
Frequencies (MHz)	FCC 15B / ICES-003, Class A	FCC 15B / ICES-003, Class B
1000-3000	Avg: 60 Peak: 80	Avg: 54 Peak: 74
3000+		

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:**
- The lower limit shall apply at the transition frequencies.
 - Emission level (dB μ V/m) = 20 log Emission level (μ V/m).
 - 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.
 - 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.
EMI Test Receiver	Rohde&Schwarz	ESCI 3	101418	Dec. 27,19	Dec. 26,20
EMI Test Receiver	Rohde&Schwarz	ESR7	101564	Dec. 27,19	Dec. 26,20
Trilog-Broadband Antenna	SCHWARZBECK	VULB 9168	9168-555	Dec. 27,19	Dec. 26,20
Trilog-Broadband Antenna	SCHWARZBECK	VULB 9168	9168-554	Dec. 27,19	Dec. 26,20
Preamplifier	EMCI	EMC1135	980378	Feb. 15,20	Feb. 14,21
Preamplifier	EMCI	EMC1135	980423	Feb. 15,20	Feb. 14,21
10m Semi-anechoic Chamber	CHANGLING	21.4m*12.1m*8.8m	NSEMC006	Feb. 15,20	Feb. 14,21
Test Software	ADT	ADT_Radiated V8.7.07	N/A	N/A	N/A

NOTE: 1. 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.
2. The test was performed in Dongguan 10m Semi-anechoic Chamber

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. 28,20	Feb. 27,21
Horn Antenna	ETS-LINDGREN	3117	00168728	Feb. 28,20	Feb. 27,21
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Feb. 28,20	Feb. 27,21
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	Jun. 02,20	Jun. 01,21

NOTE: 1. The test was performed in 3m chamber.
2. 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 10 meter semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 10 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:

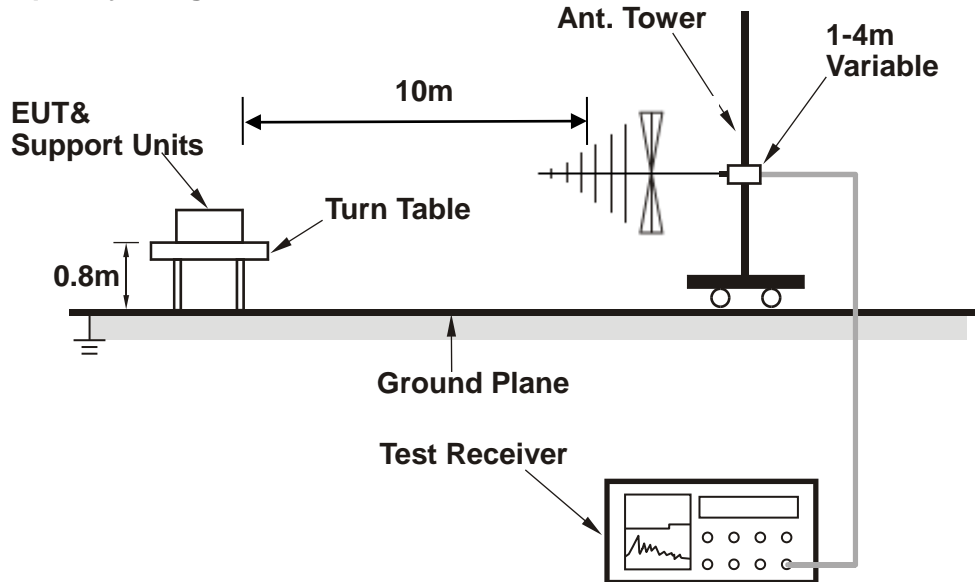
1. The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection at frequency above 1GHz. The resolution bandwidth of test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

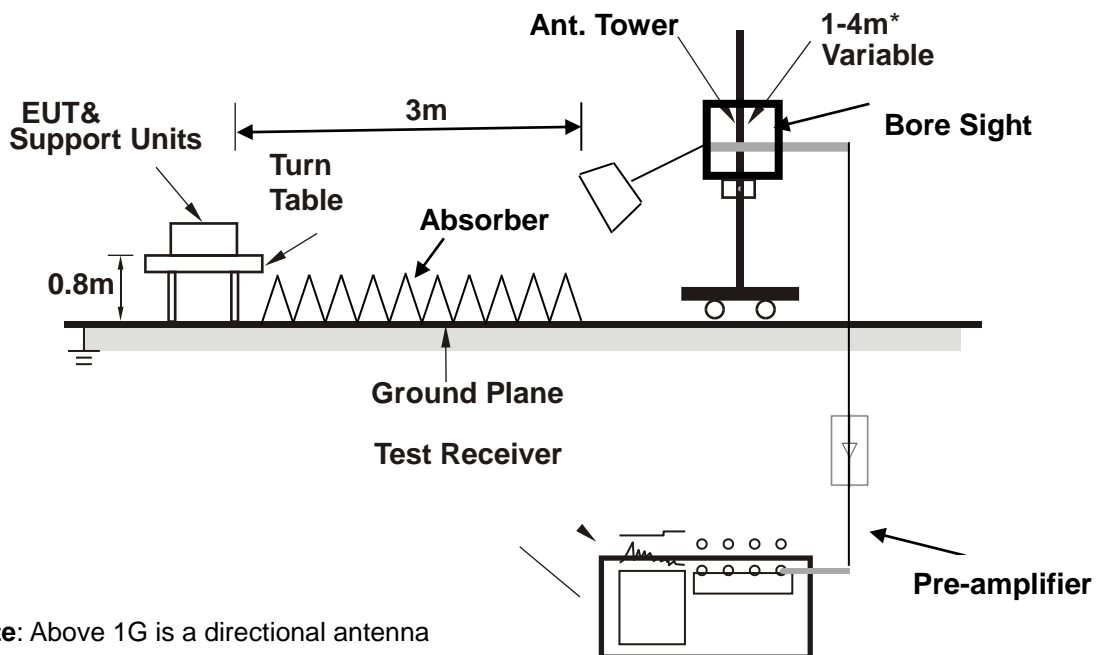
No deviation.

2.2.5 TEST SETUP

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



Note: Above 1G is a directional antenna

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

2.2.6 EUT OPERATING CONDITIONS

Same as item 2.1.6.

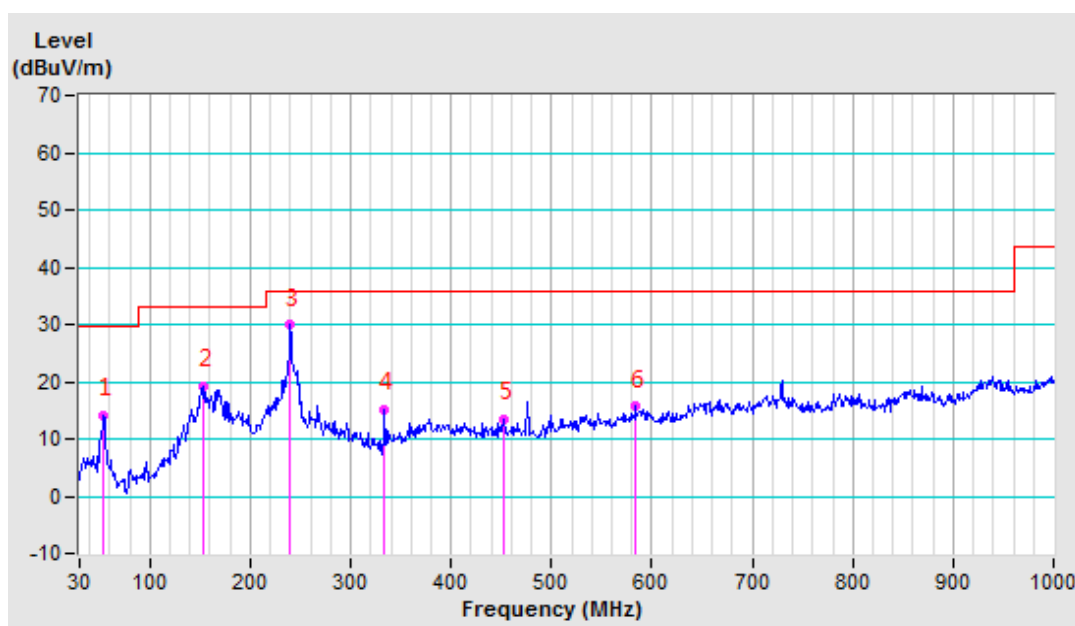
2.2.7 TEST RESULTS

TEST VOLTAGE	Data Transmission Input 120 Vac, 60 Hz	FREQUENCY RANGE	30-1000 MHz
ENVIRONMENTAL CONDITIONS	24deg. C, 58 %RH	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 120 kHz
TESTED BY	Jelly		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 10 M

No.	Frequency MHz	Factor dB/m	Reading dBuV	Emission dBuV/m	Limit dBuV/m	Margin dB	Tower cm	Table deg
1	53.4267	-23.37	37.52	14.15	29.50	-15.35	100	305
2	152.9051	-21.13	40.44	19.31	33.10	-13.79	100	51
* 3	239.8215	-22.71	52.57	29.86	35.60	-5.74	100	155
4	333.3342	-19.14	34.16	15.02	35.60	-20.58	100	66
5	451.9226	-15.94	29.39	13.45	35.60	-22.15	100	82
6	583.8007	-12.89	28.55	15.66	35.60	-19.94	100	102

- 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.

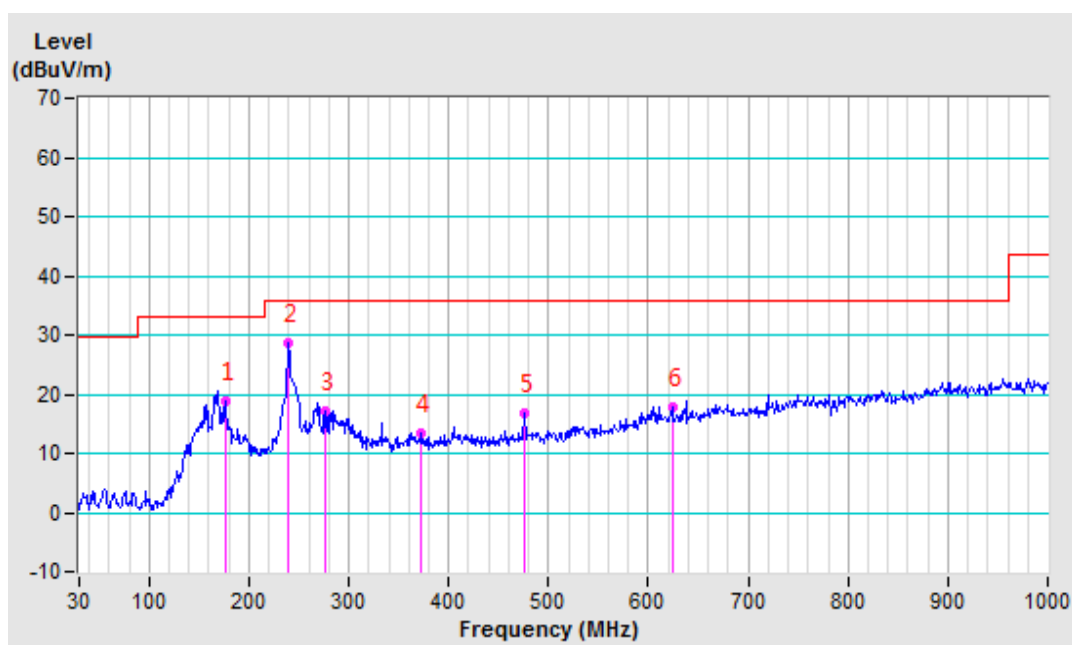


TEST VOLTAGE	Data Transmission Input 120 Vac, 60 Hz	FREQUENCY RANGE	30-1000 MHz
ENVIRONMENTAL CONDITIONS	24deg. C, 58 %RH	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 120 kHz
TESTED BY	Jelly		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 10 M

No.	Frequency MHz	Factor dB/m	Reading dBuV	Emission dBuV/m	Limit dBuV/m	Margin dB	Tower cm	Table deg
1	176.1062	-22.59	41.38	18.79	33.10	-14.31	400	184
* 2	239.8837	-22.16	50.86	28.70	35.60	-6.90	400	148
3	275.5312	-20.59	37.68	17.09	35.60	-18.51	400	109
4	373.1375	-18.18	31.54	13.36	35.60	-22.24	400	311
5	475.8363	-15.13	32.07	16.94	35.60	-18.66	400	340
6	624.3675	-11.41	29.23	17.82	35.60	-17.78	400	78

- 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.



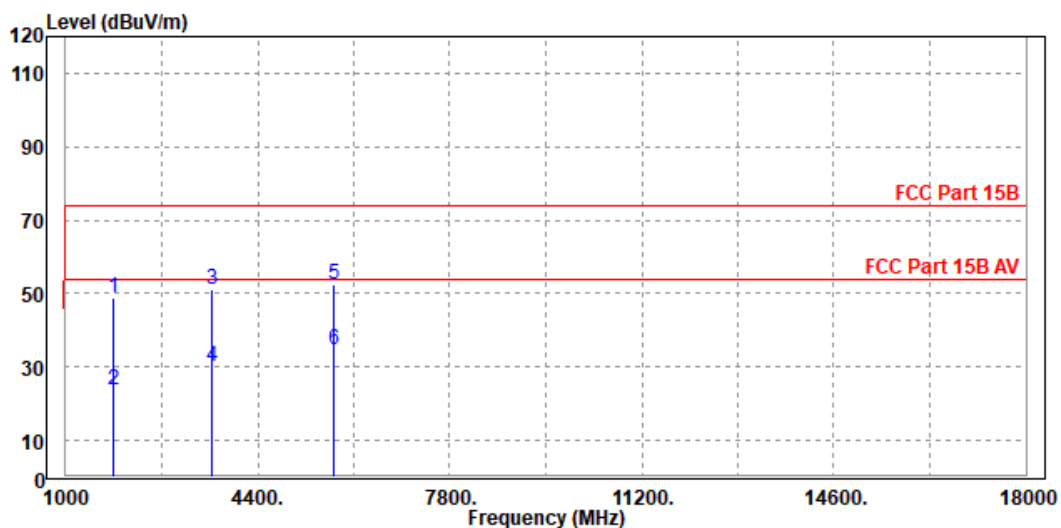
Note: Radiated Emission below 1GHz Test was performed in **Lab B**.

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 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	49.02	64.79	74	-24.98	31.8	-1.13	46.44	100	360	Peak
1833	23.68	39.45	54	-30.32	31.8	-1.13	46.44	100	360	Average
3601	51.09	59.34	74	-22.91	33.18	4.95	46.38	100	360	Peak
3601	29.99	38.24	54	-24.01	33.18	4.95	46.38	100	360	Average
5743	52.33	56.77	74	-21.67	33.99	7.75	46.18	100	360	Peak
5743	34.6	39.04	54	-19.4	33.99	7.75	46.18	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.

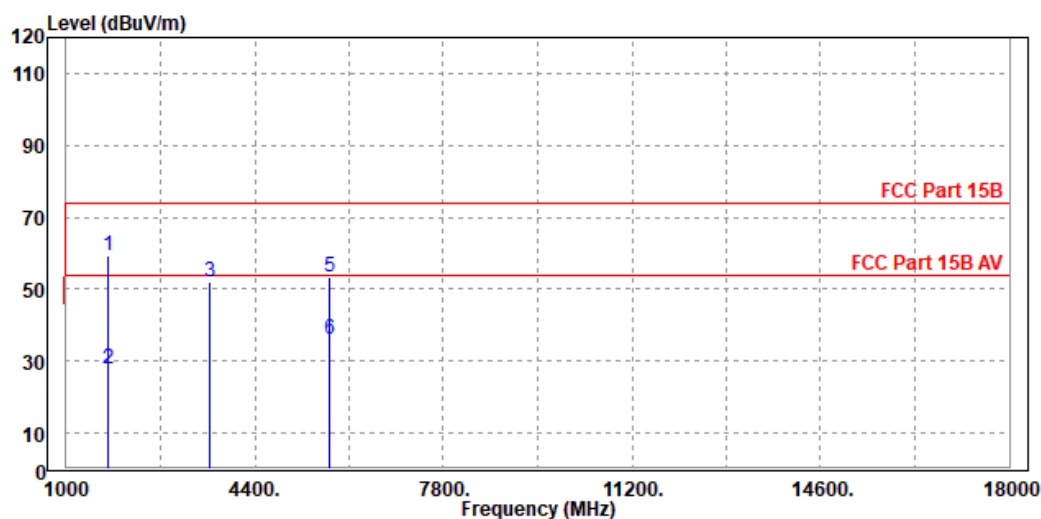


TEST VOLTAGE	Data Transmission Input 120 Vac, 60 Hz	FREQUENCY RANGE	1-18 GHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70 %RH	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Peak/Average, 1 MHz
TESTED BY	Star Le		

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
1748	59.29	71.74	74	-14.71	30.29	3.75	46.49	200	360	Peak
1748	27.8	40.25	54	-26.2	30.29	3.75	46.49	200	360	Average
3584	51.87	58.41	74	-22.13	33.89	5.95	46.38	200	360	Peak
3584	-6.54	0	54	-60.54	33.89	5.95	46.38	200	360	Average
5743	53.53	55.31	74	-20.47	36.65	7.75	46.18	200	360	Peak
5743	36.22	38	54	-17.78	36.65	7.75	46.18	200	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.



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.

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