

FCC Part 18 Test Report

FCC ID:2A4QG-XD-SC-013

Report No. : TBR-C-202202-0060-4
Applicant : X-DRAGON Electronic Technology Co.,Ltd
Equipment Under Test (EUT)
EUT Name : Power Bank
Model No. : XD-SC-013
Series Model No. : Please Refer To Page 4
Brand Name : X-DRAGON
Receipt Date : 2022-02-21
Test Date : 2022-02-21 to 2022-05-07
Issue Date : 2022-05-07
Standards : FCC 47 CFR Part 18
Conclusions : **PASS**

In the configuration tested, the EUT complied with the standards specified above,
The EUT technically complies with the FCC requirements

Test/Witness Engineer :

Camille Li

Camille Li

Engineer Supervisor :

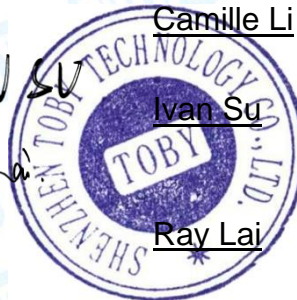
Ivan Su

Ivan Su

Engineer Manager :

Ray Lai

Ray Lai



This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in the report.

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Revision History

Report No.	Version	Description	Issued Date
TBR-C-202202-0060-4	Rev.01	Initial issue of report	2022-05-07

1. General Information

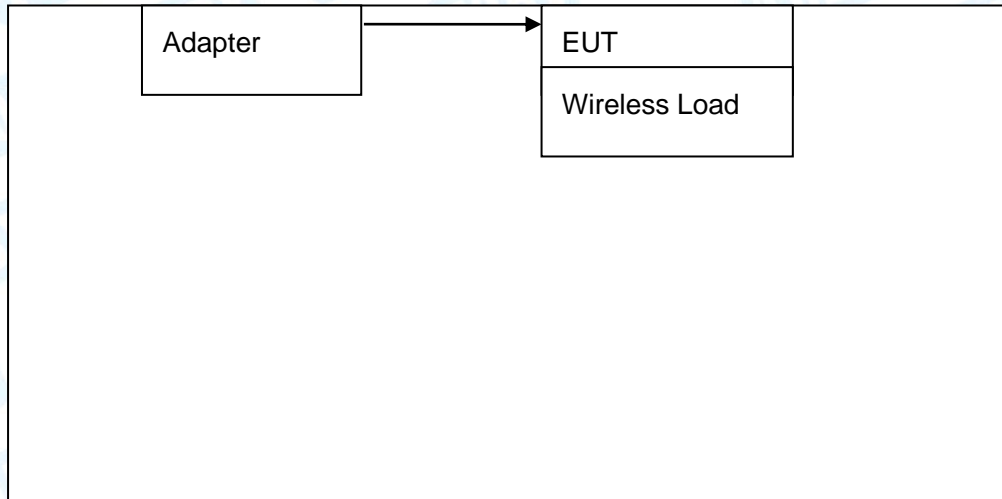
1.1 Client Information

Applicant	:	X-DRAGON Electronic Technology Co.,Ltd
Address	:	Room 201, Building No.2, Kai Yuan Da Dao 182, Huangpu District, Guangzhou, China
Manufacturer	:	X-DRAGON Electronic Technology Co.,Ltd
Address	:	Room 201, Building No.2, Kai Yuan Da Dao 182, Huangpu District, Guangzhou, China

1.2 General Description of EUT (Equipment Under Test)

EUT Name	:	Power Bank	
Models No.	:	XD-SC-013, BLX-XD-SC-012-BLACK, BLX-XD-SC-012-BLUE, BLX-XD-SC-012-BORA, BLX-XD-SC-013-BORA, XD-SC-010,XD-SC-009, XD-SC-012,XD-SC-014, XD-SC-015,XD-SC-016, MP-3103BK, AP-PB-020,AP-PB-021, XD-PB-032, XD-PB-020, XD-PB-021, XD-PB-033, XD-PB-037-BLA-E, XD-PB-020-BLU-E, XD-PB-020-PUR-E, XD-PB-020-ORA-E	
Product Description	:	Operation Frequency:	110KHz-205KHz
		Modulation Type:	FSK
		Antenna:	Coil Antenna
Power Rating	:	Micro Input: DC 5V/2A USB Output: DC 5V/2.4A 5V2.8A Wireless Charging: 10W(Max) DC 3.7V by 2500mAh Rechargeable Li-ion battery	
Connecting I/O Port(S)	:	Please refer to the User's Manual	
Remark	:	The antenna gain provided by the applicant, the verified for the RF conduction test and adapter provided by TOBY test lab.	

1.3 Block Diagram Showing The Configuration of System Tested



1.4 Description of Support Units

Equipment Information				
Name	Model	S/N	Manufacturer	Used “√”
Adapter	----	----	HUAWEI	√
Wireless Load	----	----	----	√
Cable Information				
Number	Shielded Type	Ferrite Core	Length	Note
----	----	----	----	
Remark:The USB Cable provided by the Applicant, The adapter and Load provided by TOBY test lab.				

1.5 Description of Test Mode

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned follow was evaluated respectively.

Test Modes:		
Mode 1	AC Mode: EUT+Load (Battery Status: <1%)	Record
Mode 2	AC Mode: EUT+Load (Battery Status: <50%)	Pre-tested
Mode 3	AC Mode: EUT+Load (Battery Status: 99%)	Pre-tested
Mode 4	Battery mode: EUT+Load (Battery Status: <1%)	Pre-tested
Mode 5	Battery mode: EUT+Load (Battery Status: <50%)	Pre-tested
Mode 6	Battery mode: EUT+Load (Battery Status: 99%)	Pre-tested
Note: All test modes were pre-tested, but we only recorded the worst case in this report.		

Note:

- (1) For all test, we have verified the construction and function in typical operation. And all the test modes were carried out with the EUT in transmitting operation in maximum power with all kinds of data rate.

According to ANSI C63.10 standards, All test modes were pre-tested, but we only recorded the worst case in this report.

- (2) During the testing procedure, the continuously transmitting with the maximum power mode was programmed by the customer.
- (3) The EUT is considered a portable unit; in normal use it was positioned on X-plane. The worst case was found positioned on X-plane. Therefore only the test data of this X-plane was used for radiated emission measurement test.

1.6 Test Location

The testing report were performed by the Shenzhen Toby Technology Co., Ltd., in their facilities located at 1A/F., Building 6, Rundongsheng Industrial Zone, Longzhu, Xixiang, Bao'an District, Shenzhen, Guangdong, China. At the time of testing, the following bodies accredited the Laboratory:

CNAS (L5813)

The Laboratory has been accredited by CNAS to ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories for the competence in the field of testing. And the Registration No.: CNAS L5813.

A2LA Certificate No.: 4750.01

The laboratory has been accredited by American Association for Laboratory Accreditation(A2LA) to ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories for the technical competence in the field of Electrical Testing. And the A2LA Certificate No.: 4750.01. FCC Accredited Test Site Number: 854351.

IC Registration No.: (11950A)

The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing. The site registration: Site# 11950A.

1.7 Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

Test	Parameters	Expanded Uncertainty (U_{Lab})	Expanded Uncertainty (U_{Cispr})
Conducted Emission	Level Accuracy: 9kHz~150kHz 150kHz to 30MHz	± 3.50 dB ± 3.10 dB	± 4.0 dB ± 3.6 dB
Radiated Emission	Level Accuracy: Above 1000MHz	± 4.50 dB	N/A
Radiated Emission	Level Accuracy: 30MHz to 1000 MHz	± 4.40 dB	± 5.2 dB

2. Test Summary

Standard Section	Test Item	Test Method	Judgment
18.305	Radiated Emission (9KHz to 1GHz)	FCC OST/MP-5:1986	PASS
18.307(b)	Conducted Emission (150KHz to 30MHz)	FCC OST/MP-5:1986	PASS
Note: N/A is an abbreviation for Not Applicable.			

3. Test Software

Test Item	Test Software	Manufacturer	Version No.
Conducted Emission	EZ-EMC	EZ	CDI-03A2
Radiation Emission	EZ-EMC	EZ	FA-03A2RE

4. Test Equipment Used

Conducted Emission Test					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due Date
EMI Test Receiver	Rohde & Schwarz	ESCI	100321	Jul. 05, 2021	Jul. 04, 2022
RF Switching Unit	Compliance Direction Systems Inc	RSU-A4	34403	Jul. 05, 2021	Jul. 04, 2022
AMN	SCHWARZBECK	NNBL 8226-2	8226-2/164	Jul. 05, 2021	Jul. 04, 2022
LISN	Rohde & Schwarz	ENV216	101131	Jul. 05, 2021	Jul. 04, 2022
Radiation Emission Test					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul. 05, 2021	Jul. 04, 2022
EMI Test Receiver	Rohde & Schwarz	ESCI	101165	Jul. 05, 2021	Jul. 04, 2022
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Feb. 28, 2022	Feb. 27, 2024
Horn Antenna	ETS-LINDGREN	3117	00143207	Feb. 28, 2022	Feb. 27, 2024
Loop Antenna	SCHWARZBECK	FMZB 1519 B	1519B-059	Jul. 06, 2021	Jul. 05, 2022
Pre-amplifier	Sonoma	310N	185903	Feb. 24, 2022	Feb. 23, 2023
Pre-amplifier	HP	8449B	3008A00849	Feb. 24, 2022	Feb. 23, 2023
Cable	HUBER+SUHNER	100	SUCOFLEX	Feb. 24, 2022	Feb. 23, 2023
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A

5. Conducted Emission Test

5.1 Test Standard and Limit

5.1.1 Test Standard

FCC Part 18.307(b)

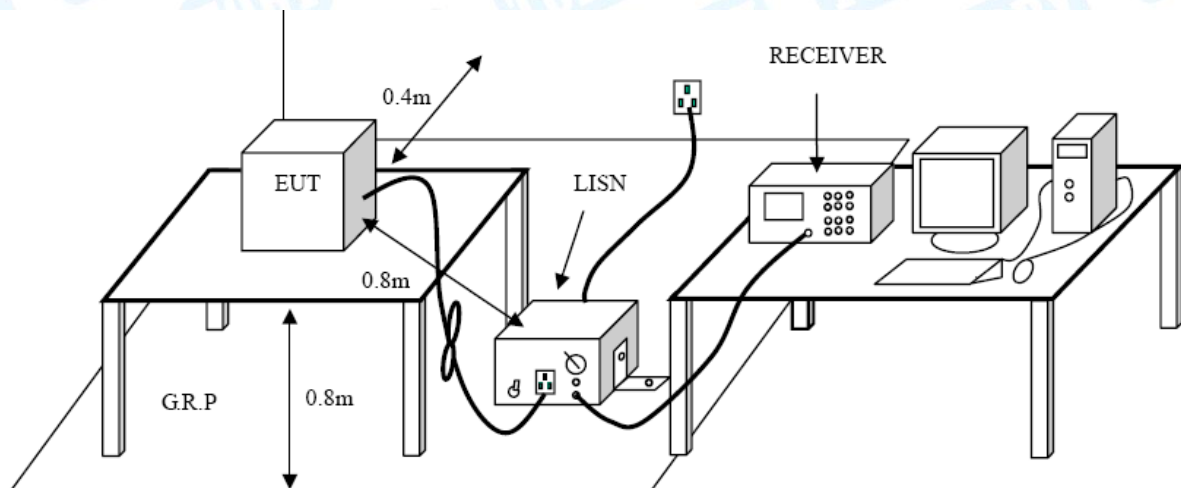
5.1.2 Test Limit

Conducted Emission Test Limit

Frequency (MHz)	Maximum RF Line Voltage (dB μ V)	
	Quasi-peak Level	Average Level
0.15 ~ 0.5	66 ~ 56 *	56 ~ 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50

Notes: (1) *Decreasing linearly with logarithm of the frequency.
(2) The lower limit shall apply at the transition frequencies.

5.2 Test Setup



4.3 Test Procedure

The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

LISN at least 80 cm from the nearest part of EUT chassis.

The bandwidth of EMI test receiver is set at 9kHz, and the test frequency band is from 0.15MHz to 30MHz.

5.4 Deviation

The test is no deviation from the standard.

5.5 Deviation From Test Standard

No deviation

5.6 Test Data

Please refer to the Attachment A.

6. Radiated Emission Test

6.1 Test Standard and Limit

6.1.1 Test Standard

FCC Part 18.305

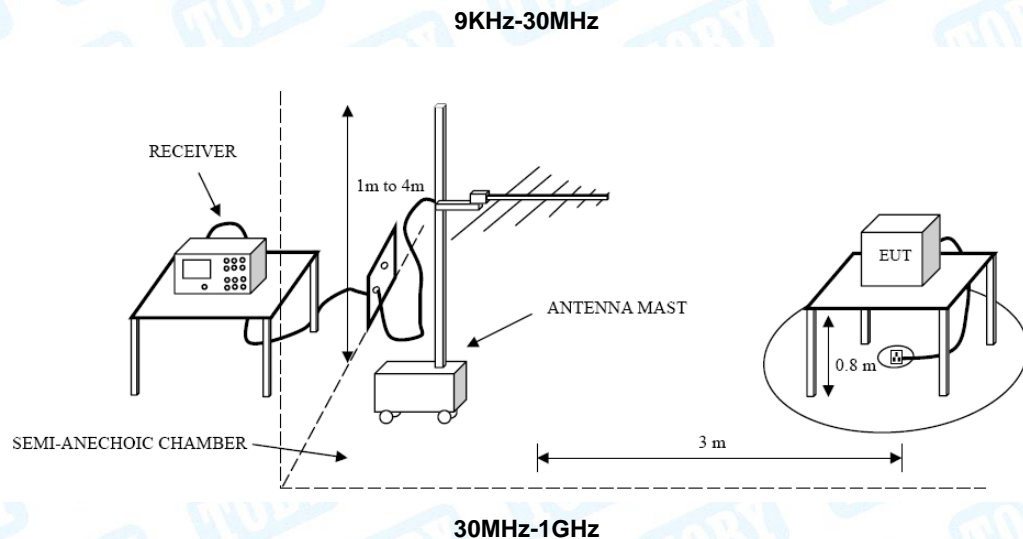
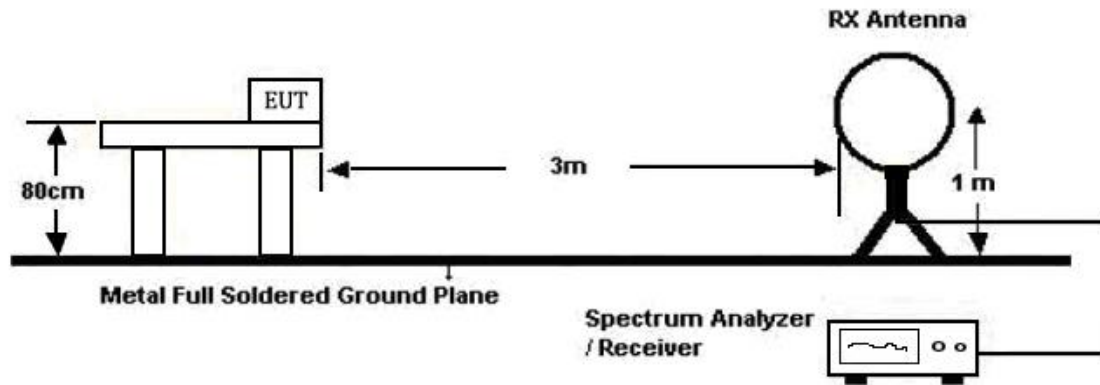
6.1.2 Test Limit

Radiated Emission Limit

Equipment	Operating frequency	RF Power generated by equipment (watts)	Field strength limit (uV/m)	Distance (meters)
Any type unless otherwise specified (miscellaneous)	Any ISM frequency	Below 500	25	300
		500 or more	$25 \times \text{SQRT}(\text{power}/500)$	1300
	Any non-ISM frequency	Below 500	15	300
		500 or more	$15 \times \text{SQRT}(\text{power}/500)$	1300
Industrial heaters and RF stabilized arc welders	On or below 5,725 MHz Above 5,725 MHz	Any Any	10 (²)	1,600 (²)
Medical diathermy	Any ISM frequency Any non-ISM frequency	Any Any	25	300
			15	300
Ultrasonic	Below 490 kHz	Below 500 500 or more	2,400/F(kHz)	300
			$2,400/F(\text{kHz}) \times \text{SQRT}(\text{power}/500)$	3300
	490 to 1,600 kHz Above 1,600 kHz	Any Any	24,000/F(kHz)	30
			15	30
Induction cooking ranges	Below 90 kHz On or above 90 kHz	Any Any	1,500	430
			300	430

Frequency (MHz)	Limit (dBuV/m)	Remark	Measurement Distance(m)
0.009-30	103.5	Quasi-Peak	3
30-88	40.0	Quasi-Peak	3
88-216	43.5	Quasi-Peak	3
216-1000	46.0	Quasi-Peak	3
Note: According to the article 18.305(b), The operating frequency is non-ISM frequency; the RF power generated by equipment is below 500(Watts).			
Note: Emission Level(dBuV/m)=20log Emission Level(uV/m)			

6.2 Test Setup



6.3 Test Procedure

- (1) The measuring distance of 3m shall be used for measurements at frequency up to 30MHz. The EUT was placed on a rotating 0.8m high above ground, the table was rotated 360 degrees to determine the position of the highest radiation.
- (2) The EUT was placed on the top of a rotating table which is 0.8 meters above the ground. EUT is set 3.0 meters away from the receiving antenna that mounted on an antenna tower. The table was rotated 360 degrees to determine the position of the highest radiation, the antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- (3) An initial scan was performed in the 3m chamber using the spectrum analyzer in peak detection mode. Average measurements were conducted based on the peak sweep graph. The EUT was measured by a loop antenna.
- (4) For the actual test configuration, please see the test setup photo.

6.4 Deviation

For Radiated Emission, test at 3m distance instead of 30m distance. 40dB was plus to the limit of 30m measurement limit. More details refer to FCC part 15.31(f)(2).

6.5 Deviation From Test Standard

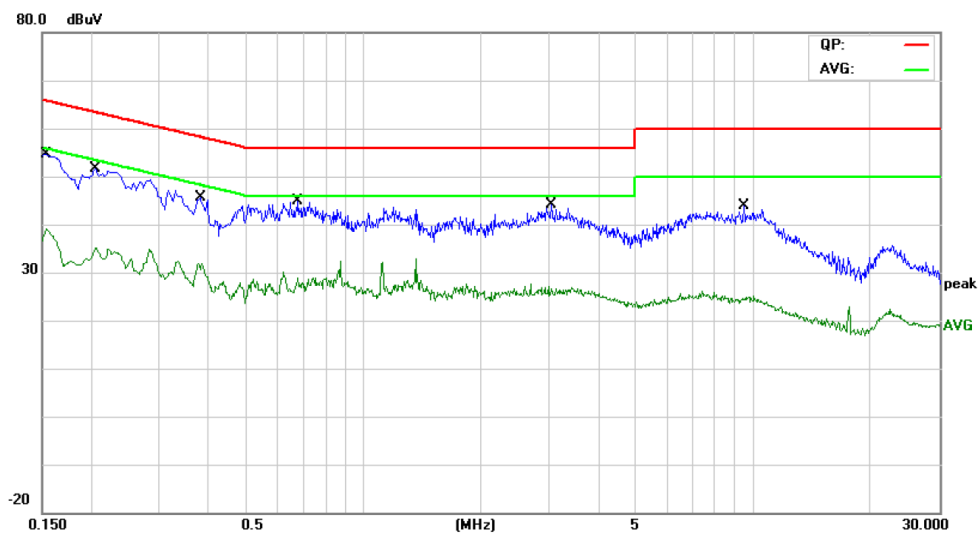
No deviation

6.6 Test Data

Please refer to the Attachment B.

Attachment A--Conducted Emission Test Data

Temperature:	24.5°C	Relative Humidity:	45%
Test Voltage:	AC 120V/60Hz		
Terminal:	Line		
Test Mode:	Mode 1		
Remark:	Only worse case is reported		



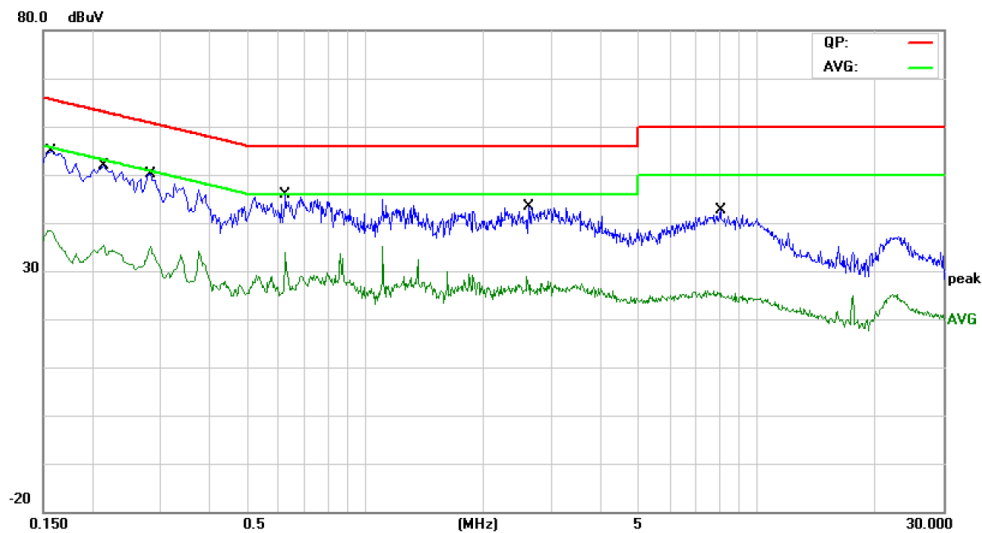
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1	*	0.1539	39.56	11.62	51.18	65.78	-14.60	QP
2		0.1539	25.21	11.62	36.83	55.78	-18.95	AVG
3		0.2060	35.38	11.65	47.03	63.36	-16.33	QP
4		0.2060	21.69	11.65	33.34	53.36	-20.02	AVG
5		0.3820	29.68	11.47	41.15	58.23	-17.08	QP
6		0.3820	18.97	11.47	30.44	48.23	-17.79	AVG
7		0.6820	27.97	11.42	39.39	56.00	-16.61	QP
8		0.6820	16.28	11.42	27.70	46.00	-18.30	AVG
9		3.0340	25.59	10.24	35.83	56.00	-20.17	QP
10		3.0340	14.73	10.24	24.97	46.00	-21.03	AVG
11		9.4580	25.57	10.20	35.77	60.00	-24.23	QP
12		9.4580	12.73	10.20	22.93	50.00	-27.07	AVG

Remark:

1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)

2. Margin (dB) = QuasiPeak/Average (dBuV) - Limit (dBuV)

Temperature:	24.5°C	Relative Humidity:	45%
Test Voltage:	AC 120V/60Hz		
Terminal:	Neutral		
Test Mode:	Mode 1		
Remark:	Only worse case is reported		



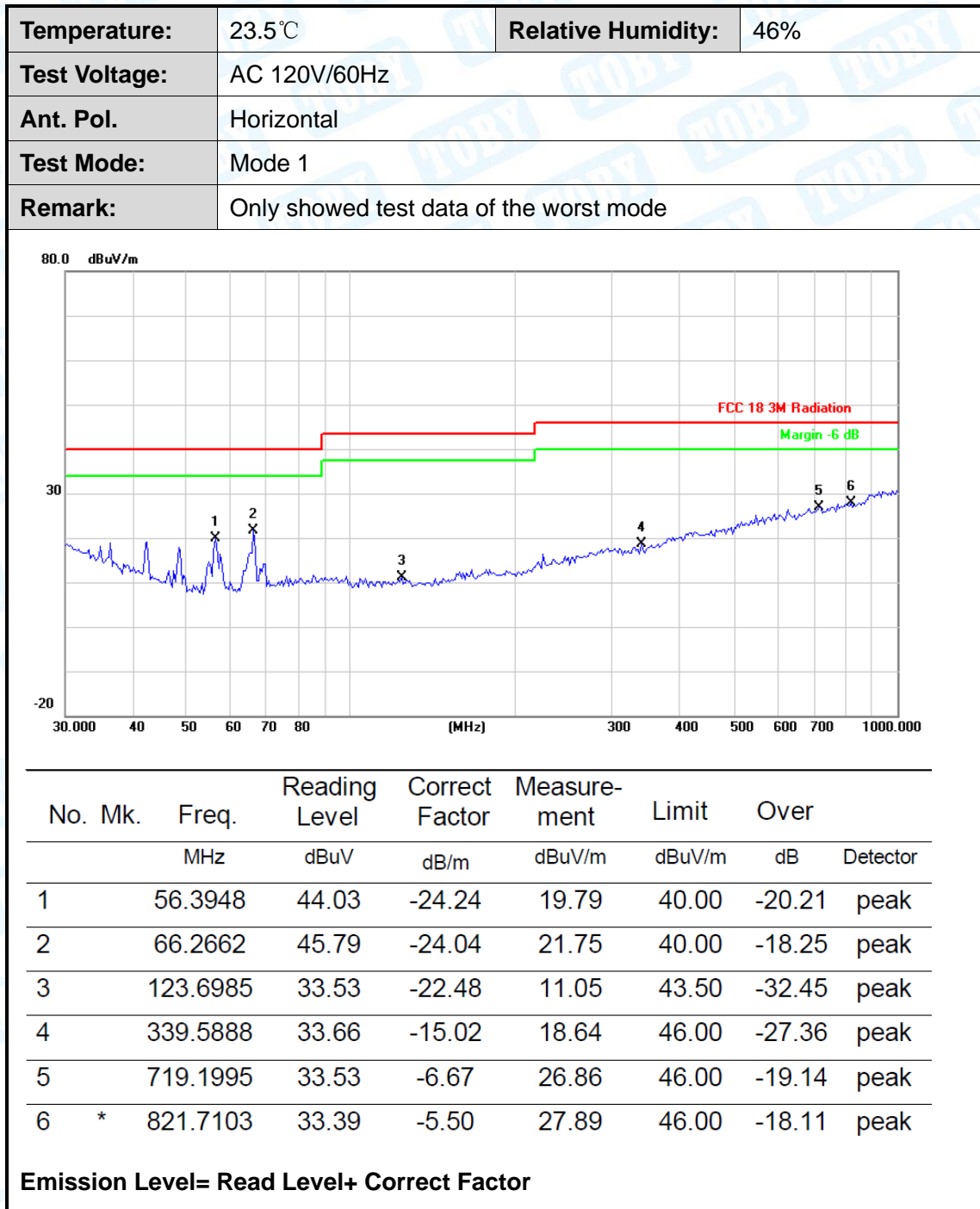
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1	*	0.1580	39.78	11.63	51.41	65.56	-14.15	QP
2		0.1580	25.73	11.63	37.36	55.56	-18.20	AVG
3		0.2162	35.82	11.65	47.47	62.96	-15.49	QP
4		0.2162	21.64	11.65	33.29	52.96	-19.67	AVG
5		0.2819	34.18	11.60	45.78	60.76	-14.98	QP
6		0.2819	21.76	11.60	33.36	50.76	-17.40	AVG
7		0.6260	28.95	11.45	40.40	56.00	-15.60	QP
8		0.6260	19.86	11.45	31.31	46.00	-14.69	AVG
9		2.6099	25.25	10.36	35.61	56.00	-20.39	QP
10		2.6099	14.61	10.36	24.97	46.00	-21.03	AVG
11		8.0980	24.89	10.14	35.03	60.00	-24.97	QP
12		8.0980	13.36	10.14	23.50	50.00	-26.50	AVG

Remark:

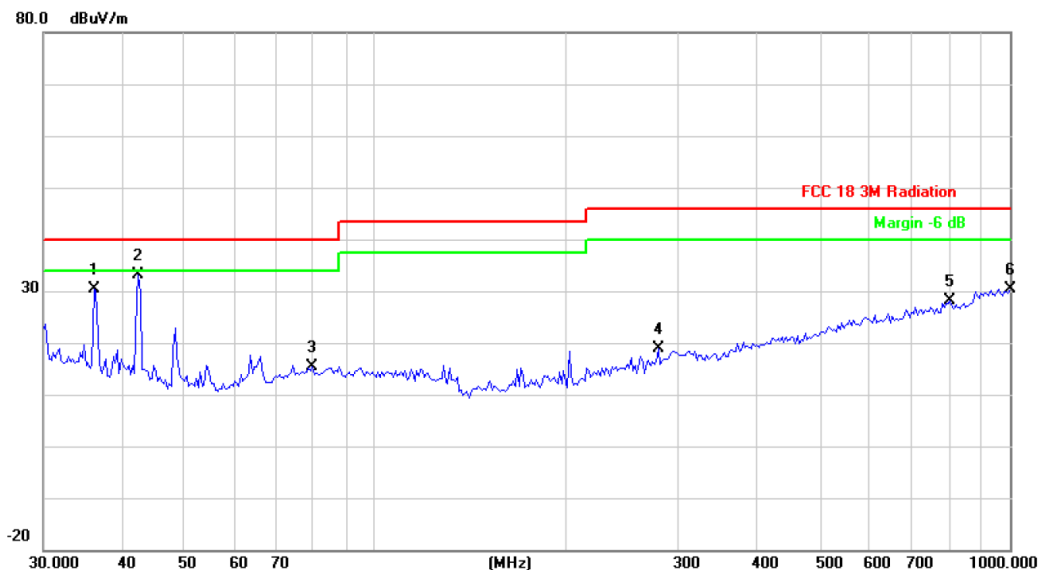
1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)

2. Margin (dB) = QuasiPeak/Average (dBuV) - Limit (dBuV)

Attachment B-- Radiated Emission Test Data

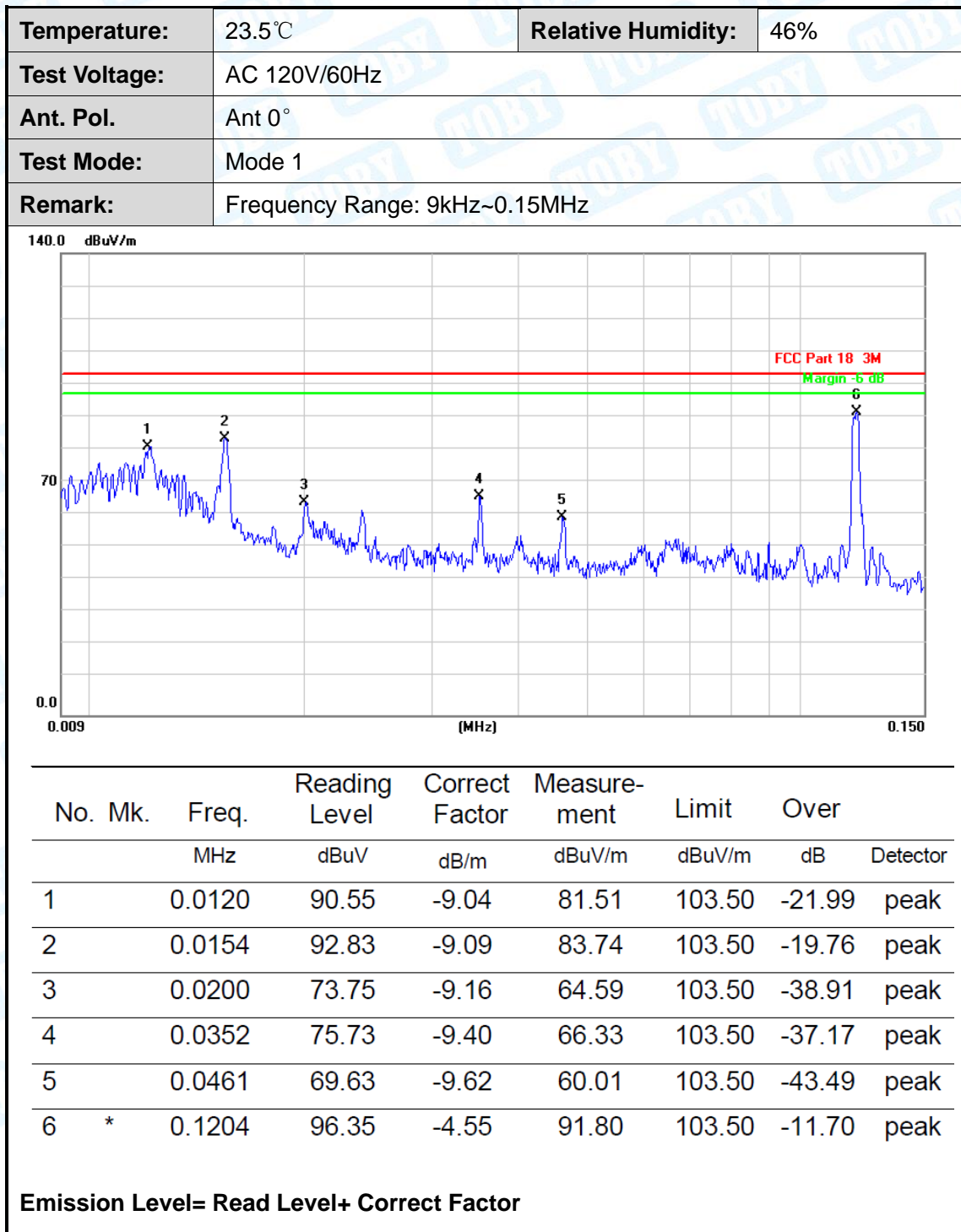


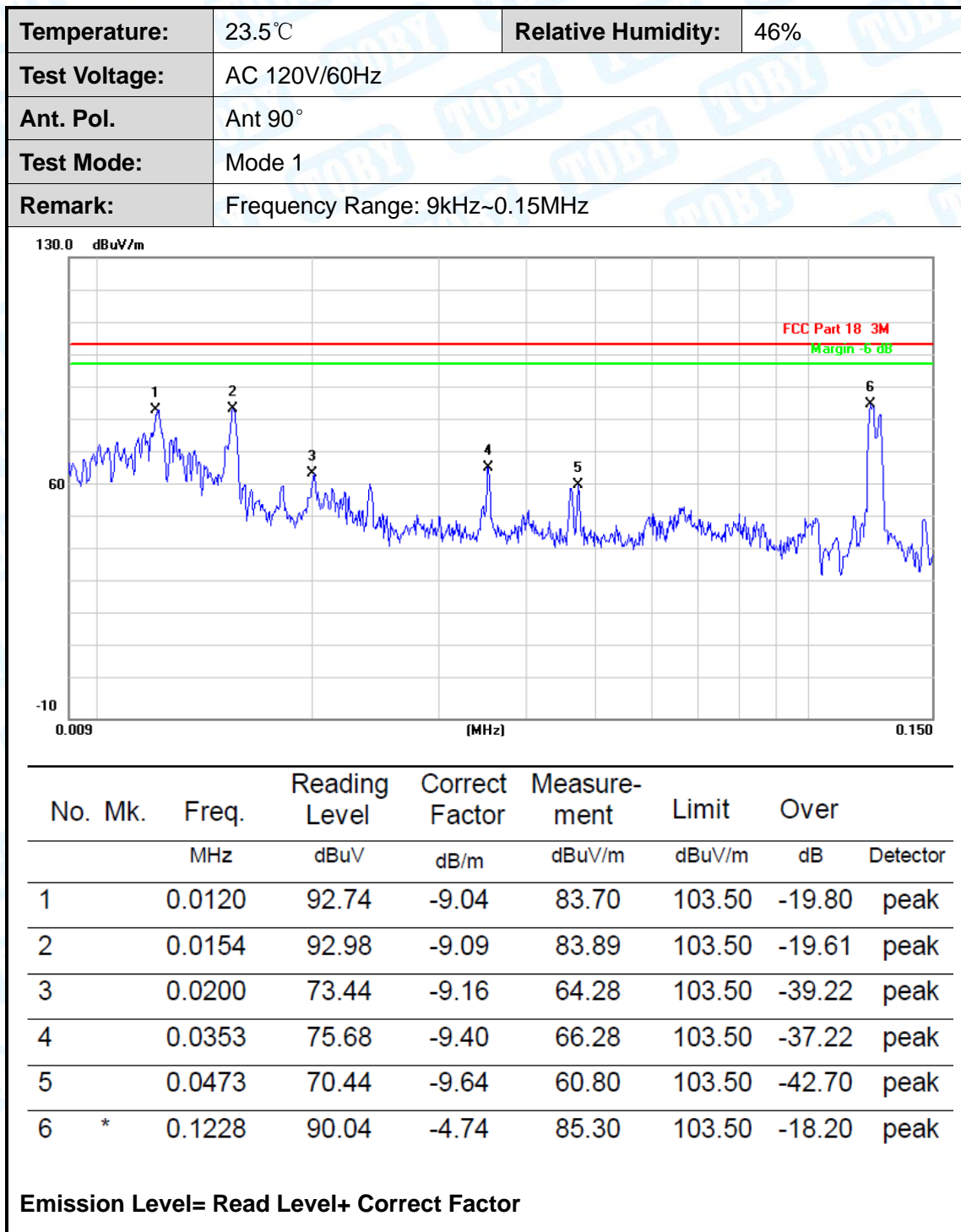
Temperature:	23.5℃	Relative Humidity:	46%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Vertical		
Test Mode:	Mode 1		
Remark:	Only showed test data of the worst mode		



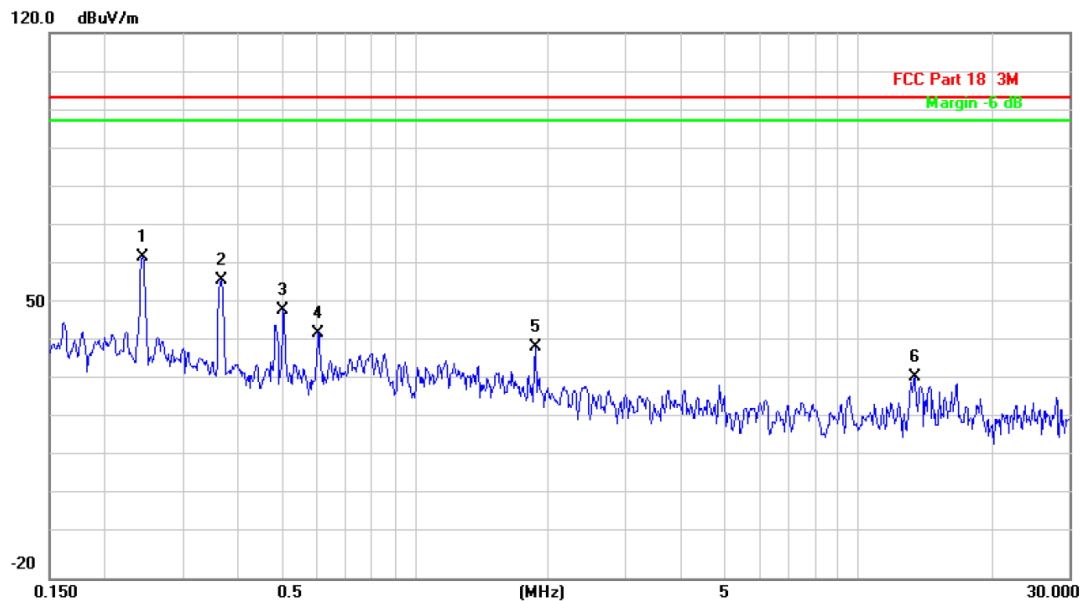
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		36.0007	47.96	-17.60	30.36	40.00	-9.64	peak
2	*	42.3022	53.80	-20.59	33.21	40.00	-6.79	peak
3		79.5209	38.03	-22.70	15.33	40.00	-24.67	peak
4		279.0436	35.49	-16.72	18.77	46.00	-27.23	peak
5		804.6028	33.74	-5.54	28.20	46.00	-17.80	peak
6		1000.0000	32.72	-2.30	30.42	46.00	-15.58	peak

Emission Level= Read Level+ Correct Factor



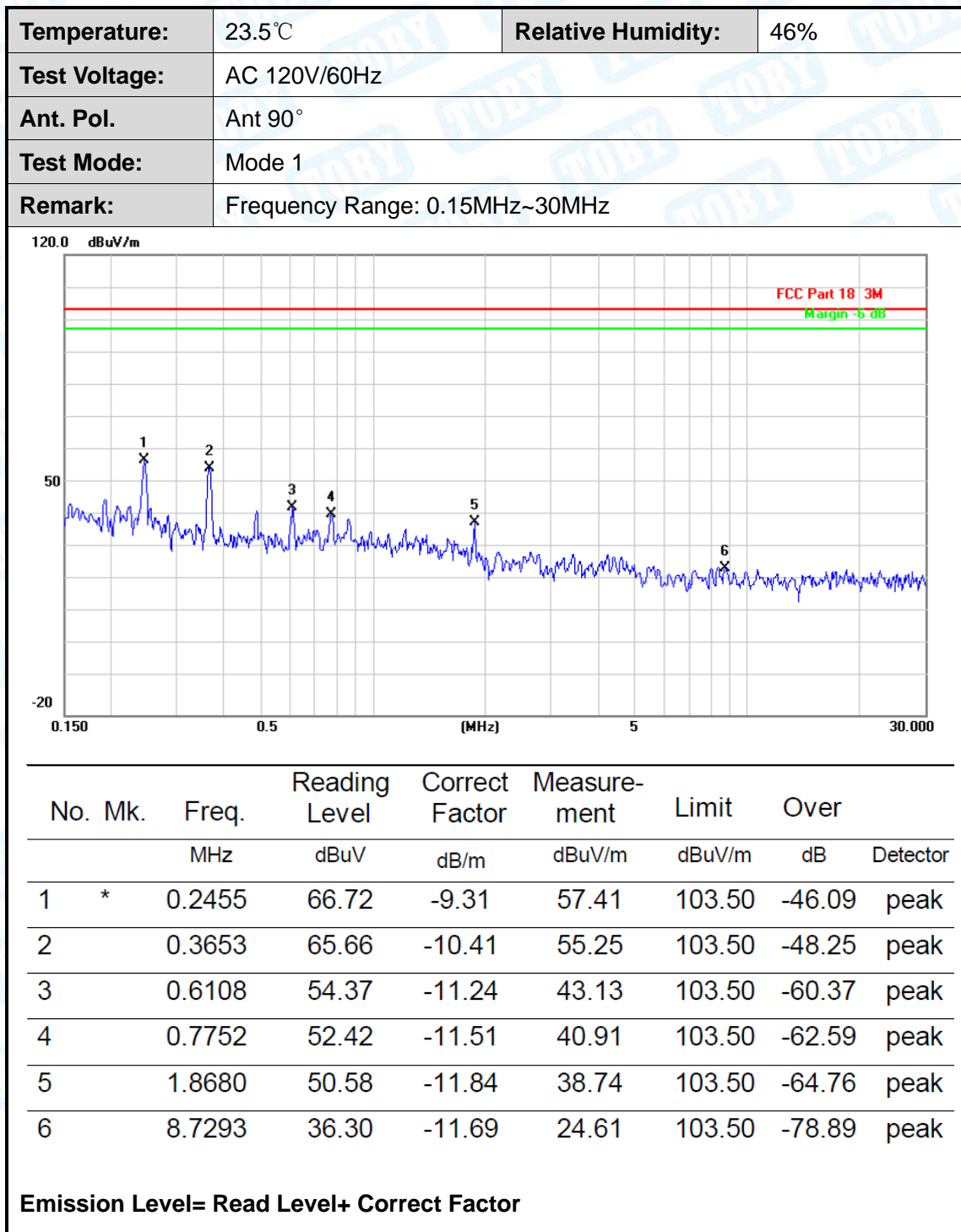


Temperature:	23.7°C	Relative Humidity:	40%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Ant 0°		
Test Mode:	Mode 1		
Remark:	Frequency Range: 0.15MHz~30MHz		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1	*	0.2429	71.55	-9.27	62.28	103.50	-41.22	peak
2		0.3673	67.03	-10.42	56.61	103.50	-46.89	peak
3		0.5047	59.84	-11.08	48.76	103.50	-54.74	peak
4		0.6043	54.02	-11.24	42.78	103.50	-60.72	peak
5		1.8680	51.08	-11.84	39.24	103.50	-64.26	peak
6		13.4080	43.65	-12.16	31.49	103.50	-72.01	peak

Emission Level= Read Level+ Correct Factor



-----END OF REPORT-----