



FCC RADIO TEST REPORT

Applicant	: Prowise B.V.
Address	: Luchthavenweg 1b, 6021 PX Budel, The Netherlands
Equipment	: PROWISE TOUCHSCREEN TEN G3
Model No.	: PW.1.17075.0003, PW.1.17075.**** (*=0-9)
Trade Name	: 
FCC ID	: 2AGUS-11707503
Standard	: FCC part 15 Subpart C §15.225

I HEREBY CERTIFY THAT:

The sample was received on Nov. 29, 2023 and the testing was completed on Dec. 26, 2023 at CerpPASS Technology Corp. The test result refers exclusively to the test presented test model / sample. Without written approval of CerpPASS Technology Corp., the test report shall not be reproduced except in full.

Approved by:


Leevin Li / Supervisor



Contents

1. Summary of Test Procedure and Test Results	4
1.1. Applicable Standards	4
2. Test Configuration of Equipment under Test.....	5
2.1. Feature of Equipment under Test.....	5
2.2. Carrier Frequency of Channels.....	5
2.3. Test Mode and Test Software.....	5
2.4. Description of Test System.....	6
2.5. General Information of Test.....	7
2.6. Measurement Uncertainty	7
3. Test Equipment and Ancillaries Used for Tests.....	8
4. Antenna Requirements.....	9
4.1. Standard Applicable	9
4.2. Result	9
5. Test of AC Power Line Conducted Emission	10
5.1. Test Limit	10
5.2. Test Procedures	10
5.3. Typical Test Setup	11
5.4. Test Result and Data.....	12
6. Test of Radiated Emission	14
6.1. Test Limit	14
6.2. Test Procedures	15
6.3. Typical Test Setup Layout of Radiated Emission	16
6.4. Test Result and Data.....	17
6.5. 20dB Bandwidth BW	23
7. Frequency Stability	24
7.1. Test Procedure	24
7.2. Test Setup Layout	24
7.3. Test Result and Data.....	25



History of this test report

Version No.	Report No	Date	Description
Rev.01	DEFO2311138	Jan. 02, 2024	Initial Issue



1. Summary of Test Procedure and Test Results

1.1. Applicable Standards

FCC Rules and Regulations Part 15 Subpart C §15.225

FCC Rule	Description of Test	Result
15.203	Antenna Requirement	PASS
15.207	Conducted Emission	PASS
15.209 15.225	Radiated Emission	PASS
15.215	20dB Bandwidth BW	PASS
15.225(e)	Frequency Stability	PASS

Note: Deviations Yes ☐ No ☒

*The lab has reduced the uncertainty risk factor from test equipment, environment and staff technicians which according to the standard on contract. Therefore, the test result will only be determined by standard requirement.



2. Test Configuration of Equipment under Test

2.1. Feature of Equipment under Test

Equipment	PROWISE TOUCHSCREEN TEN G3
Model Name	PW.1.17075.0003, PW.1.17075.**** (*=0-9)
Model Discrepancy	All models are identical except for model designation and appearance color. Model PW.1.17075.0003 is the representative for final test.
Frequency Range	13.56MHz
Modulation Type	ASK
Antenna Type	Loop Antenna
EUT Power Rating:	Input:100-240VAC, 50/60Hz, 8A

Note: For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2.2. Carrier Frequency of Channels

Channel	Frequency (MHz)
*1	13.56

Note: Channel remarked "*" is selected to perform test.

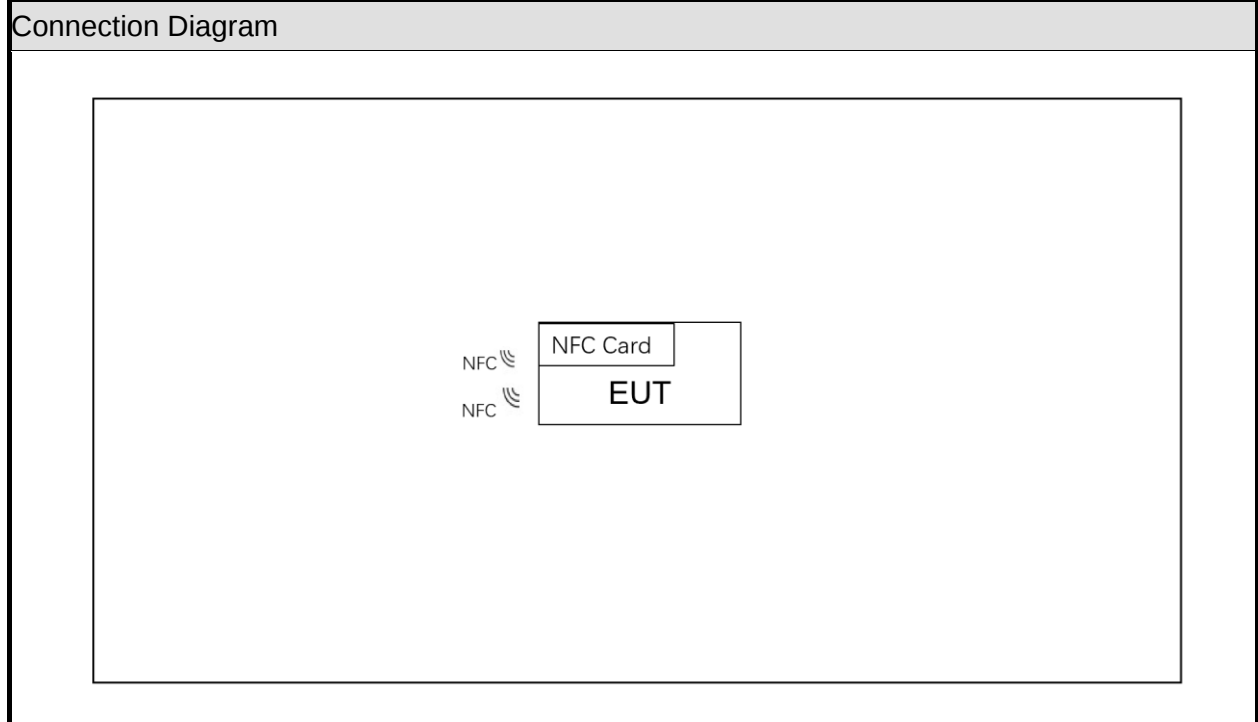
2.3. Test Mode and Test Software

- During testing, the interface cables and equipment positions were varied according to ANSI C63.10.
- The complete test system included EUT for RF test.
- The EUT transmits the NFC signal by contacting the NFC card.
- The test mode of RF test as follow:

Conducted Emissions from the AC mains power ports	
Test Mode	Operating Description
1	NFC(13.56 MHz) Mode for AC120V
2	NFC(13.56 MHz) Mode for AC240V
caused "Test Mode 1" generated the worst case, it was reported as the final data.	
Radiation Emissions (30MHz ~ 1GHz)	
Test Mode	Operating Description
1	NFC(13.56 MHz) Mode
caused "Test Mode 1" generated the worst case, it was reported as the final data.	
Radiation Emissions (<30MHz)	
Test Mode	Operating Description
1	NFC(13.56 MHz) Mode
caused "Test Mode 1" generated the worst case, it was reported as the final data.	



2.4. Description of Test System





2.5. General Information of Test

Test Site	Cerpass Technology Corporation(Cerpass Laboratory) Address: Room 102, No. 5, Xing'an Road, Chang'an Town, Dongguan City, Guangdong Province Tel: +86-769-8547-1212 Fax: +86-769-8547-1912
FCC Designation No.:	CN1288
Frequency Range Investigated:	Conducted: from 150kHz to 30 MHz Radiation: from 9kHz to 40,000MHz
Test Distance:	9KHz~30MHz: radiated emission from antenna to EUT is 3 M. 30MHz~1GHz: radiated emission from antenna to EUT is 3 M.

Test Item	Test Site	Test period	Environmental Conditions	Tested By
Radiated Emissions	3M01-DG	2023/12/26	23°C / 51%	Amos Zhang
AC Power Line Conducted Emission	CON01-DG	2023/12/26	20°C / 53%	Amos Zhang

2.6. Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)).

Measurement Item	Uncertainty
AC Power Line Conduction(150K~30MHz)	±2.60dB
Radiated Spurious Emission(9KHz~30MHz)	±4.10dB
Radiated Spurious Emission(30MHz~1GHz)	±4.51dB
Occupied Bandwidth	±4.5%



3. Test Equipment and Ancillaries Used for Tests

Test Item	AC Power Line Conducted Emission				
Test Site	COND-01				
Instrument	Manufacturer	Modl No.	Srial No.	Calibration	Valid Dat
Test Receiver	R&S	ESCI	100564	2023/01/06	2024/01/05
LISN	SCHWARZBECK	NSLK 8127	8127749	2023/08/03	2024/08/02
LISN	R&S	ENV216	100024	2023/01/06	2024/01/05
Cable	Aoda	RG214	Cable-06	2023/01/06	2024/01/05
Pulse Limiter with 10dB Attenuation	SCHWARZBECK	VTSD 9561-F	9561-F106	2023/01/06	2024/01/05
Temperature/ Humidity Meter	GEMLEAD	STH200A	N/A	2023/08/03	2024/08/02

Radiated Emissions					
Test Site	3M01-DG				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
EMI Test Receiver	R&S	ESCI	100565	2023/08/03	2024/08/02
MXA Signal Analyzer	KEYSIGHT	N9020A	US46220290	2023/05/06	2024/05/05
Amplifier	EMCI	EMC330	980082	2023/05/06	2024/05/05
Loop Antenna	R&S	HFH2-Z2	100150	2022/05/11	2024/05/10
Bilog Antenna	Sunol Science	JB1	A072414-3	2022/06/09	2024/06/08
Preamplifier	Agilent	8449B	3008A02342	2023/08/03	2024/08/02
Preamplifier	COM-POWER	PA-840	711885	2023/05/06	2024/05/05
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120 D	9120D-619	2022/05/22	2024/05/21
Standard Gain Horn Antenna	TRC	HA-2640	18050	2022/05/09	2024/05/08
Standard Gain Horn Antenna	TRC	HA-1726	18051	2022/05/09	2024/05/08
FSQ Signal Analyzer	R&S	FSQ40	200012	2023/05/06	2024/05/05
Cable	EMCI	EM104-NM SM-8.5M	Cable-03	2023/08/03	2024/08/02
Cable	Jiuzhoubona	T-SMA	SMA48AL-70 00	2023/08/03	2024/08/02
Cable	CH-CoDesigh	CCXA40-2.9 2-2.92-1M	21071954	2023/08/03	2024/08/02
Cable	CH-CoDesigh	CCX40-2.92 M-2.92M-9 M	21070892	2023/08/03	2024/08/02
Temperature/ Humidity Meter	GEMLEAD	STH200A	N/A	2023/08/03	2024/08/02



4. Antenna Requirements

4.1. Standard Applicable

According to FCC 47 CFR Section 15.203, an intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

4.2. Result

The EUT has a permanently and irreplaceable attached antenna. Please refer to the EUT internal photos.



5. Test of AC Power Line Conducted Emission

5.1. Test Limit

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 KHz, according to the methods defined in ANSI C63.4-2014. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

Frequency (MHz)	Quasi Peak (dB μ V)	Average (dB μ V)
0.15 – 0.5	66-56*	56-46*
0.5 – 5.0	56	46
5.0 – 30.0	60	50

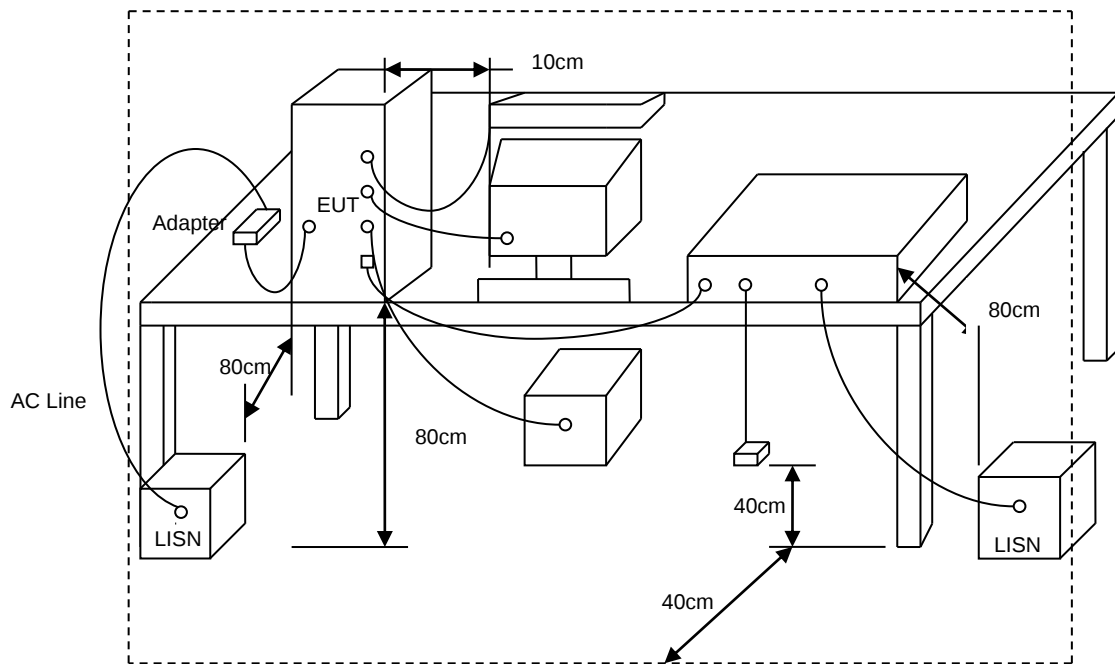
*Decreases with the logarithm of the frequency.

5.2. Test Procedures

- The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
- Connect EUT to the power mains through a line impedance stabilization network (LISN).
- All the support units are connecting to the other LISN.
- The LISN provides 50 ohm coupling impedance for the measuring instrument.
- The FCC states that a 50 ohm, 50 micro-Henry LISN should be used.
- Both sides of AC line were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched.
- Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

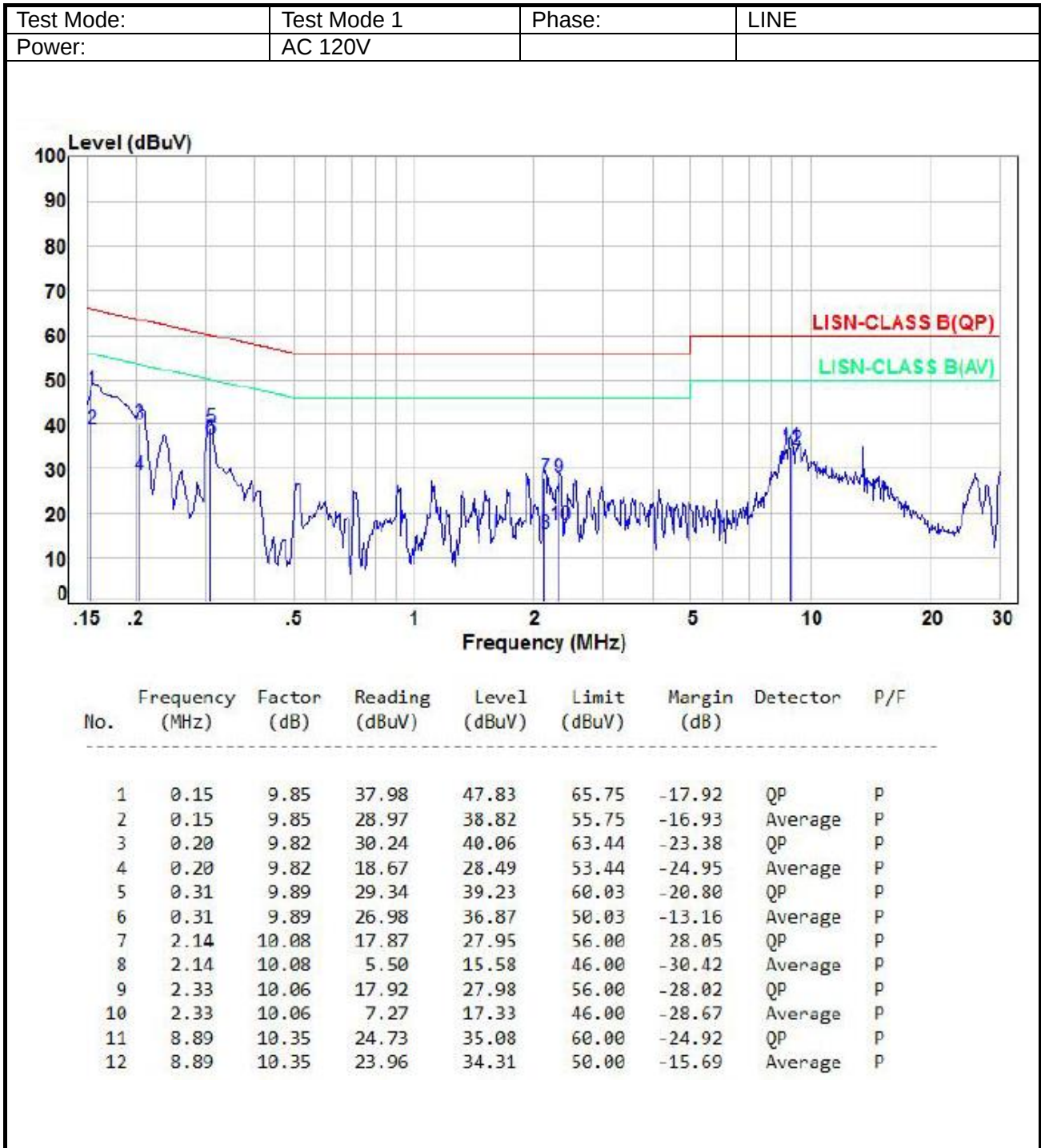


5.3. Typical Test Setup





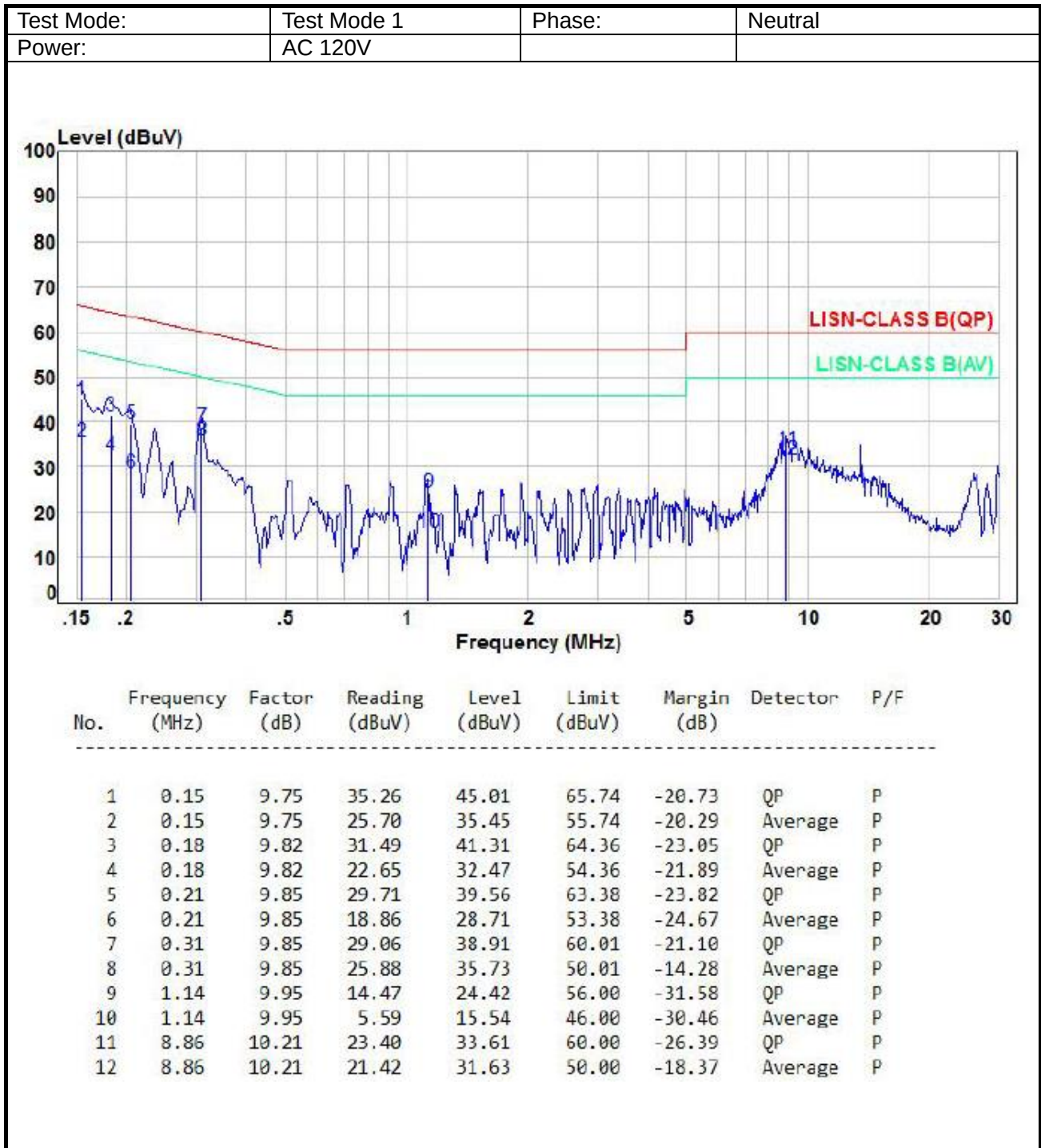
5.4. Test Result and Data



Note: Level = Reading + Factor

Margin = Level – Limit

Factor = (LISN or ISN or PLC or Current Probe) Factor + Cable Loss + Attenuator



Note: Level = Reading + Factor

Margin = Level – Limit

Factor = (LISN or ISN or PLC or Current Probe) Factor + Cable Loss + Attenuator



6. Test of Radiated Emission

6.1. Test Limit

- (a) The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.
- (b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.
- (c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.
- (d) The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in §15.209.

Frequency (MHz)	Distance	Limit ($\mu\text{V}/\text{m}$)
0.09 ~ 0.490	300m	2400/F(kHz)
0.490 ~ 1.705	30m	24000/ F(kHz)
1.705 ~ 30	30m	30
30 ~ 88	3m	100
88 ~ 216	3m	150
216 ~ 960	3m	200
Above 960	3m	500

15.215 Additional provisions to the general radiated emission limitations.:

- (c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.



6.2. Test Procedures

- a. The EUT was placed on a rotatable table top 0.8 meter above ground.
- b. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- c. The table was rotated 360 degrees to determine the position of the highest radiation.
- d. The antenna is a broadband antenna and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
- f. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.
- h. "Cone of radiation" has been considered to be 3dB beamwidth of the measurement antenna.

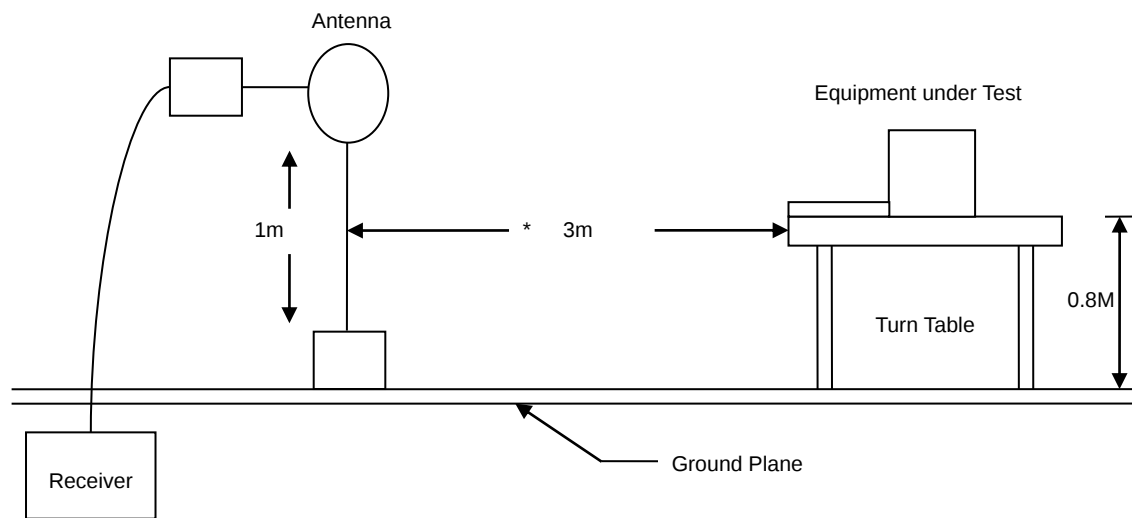
NOTE:

1. The resolution bandwidth of test receiver/spectrum analyzer is 300Hz or CISPS 200Hz(QP detector) at frequency Below 150 kHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 10KHz or CISPS 9KHz(QP detector) at frequency 150 kHz to 30 MHz.
3. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.

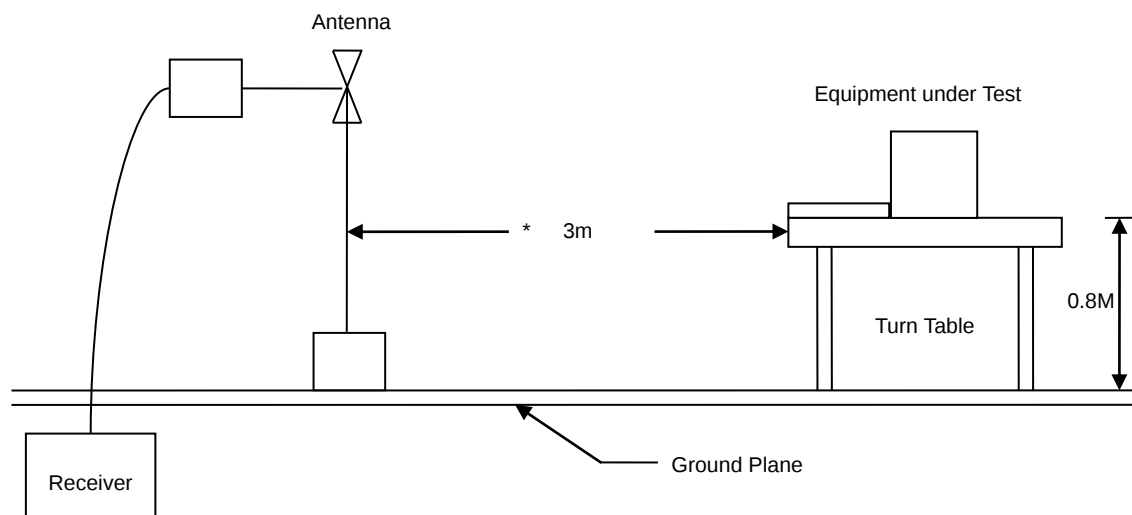


6.3. Typical Test Setup Layout of Radiated Emission

Below 30MHz test setup



30MHz- 1GHz Test Setup

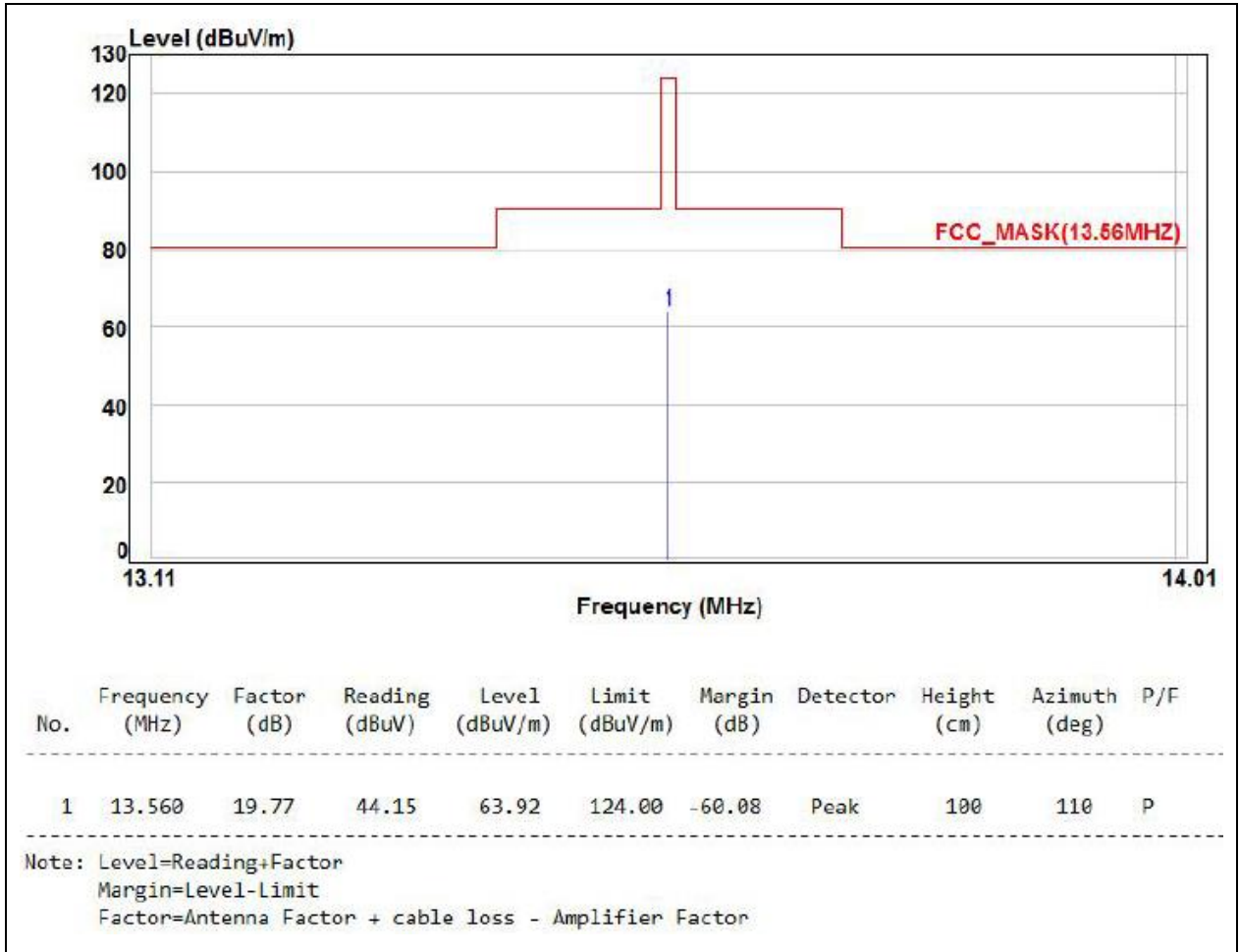




6.4. Test Result and Data

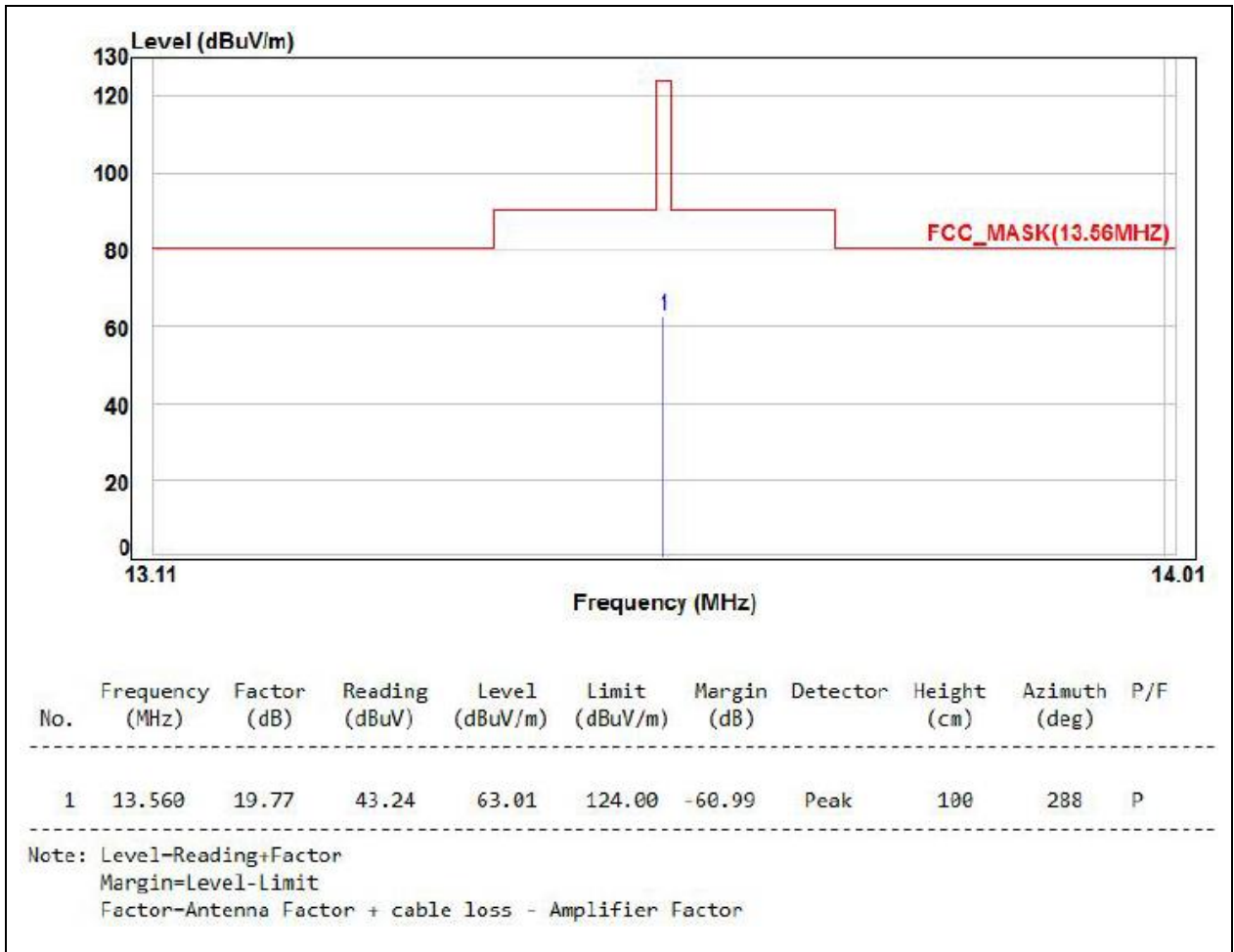
6.4.1. Test Result of Fundamental Emission

Power	:	AC120V/60Hz	Polarization	:	X
Test Mode	:	Mode 1			





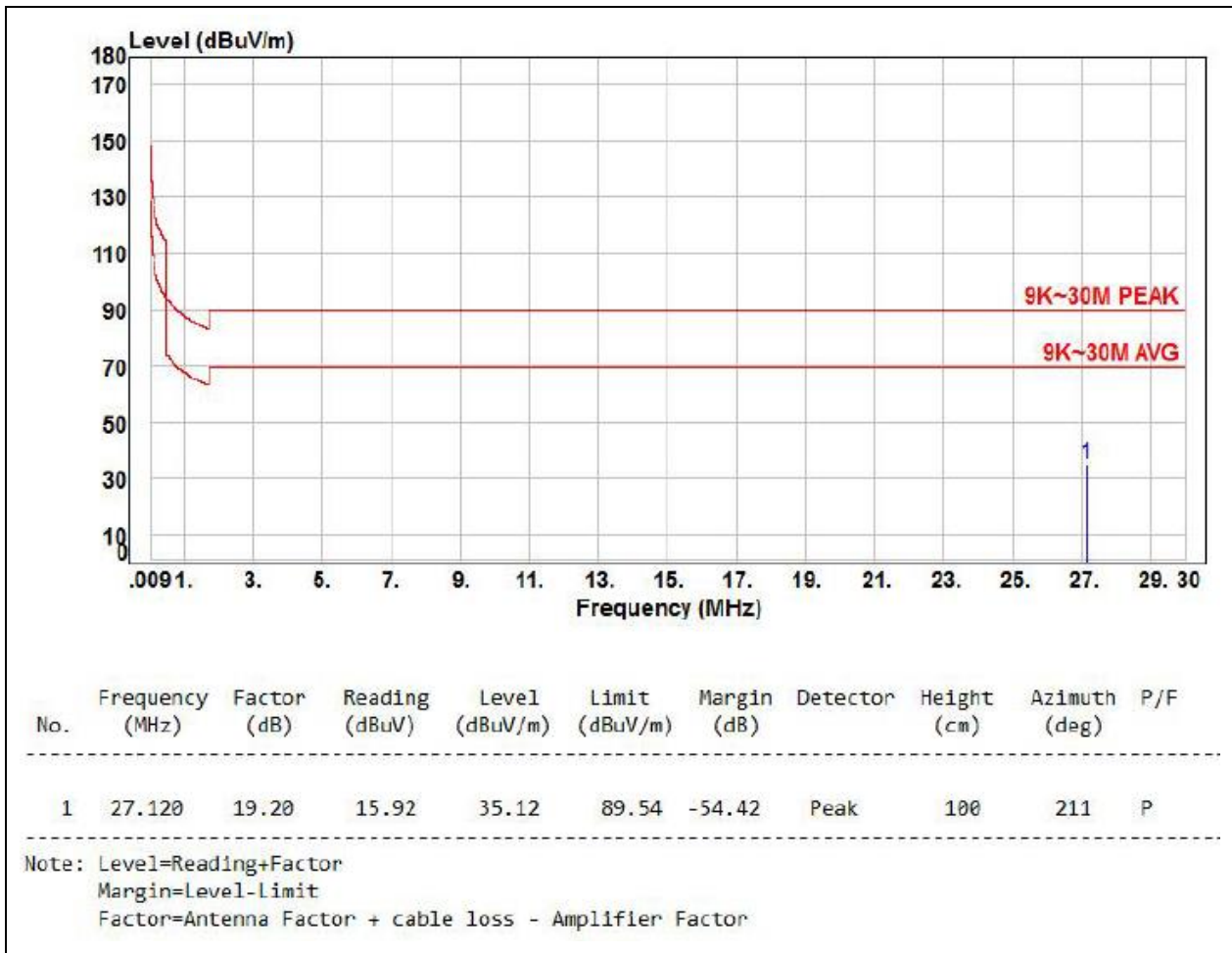
Power	:	AC120V/60Hz	Polarization	:	Y
Test Mode	:	Mode 1			





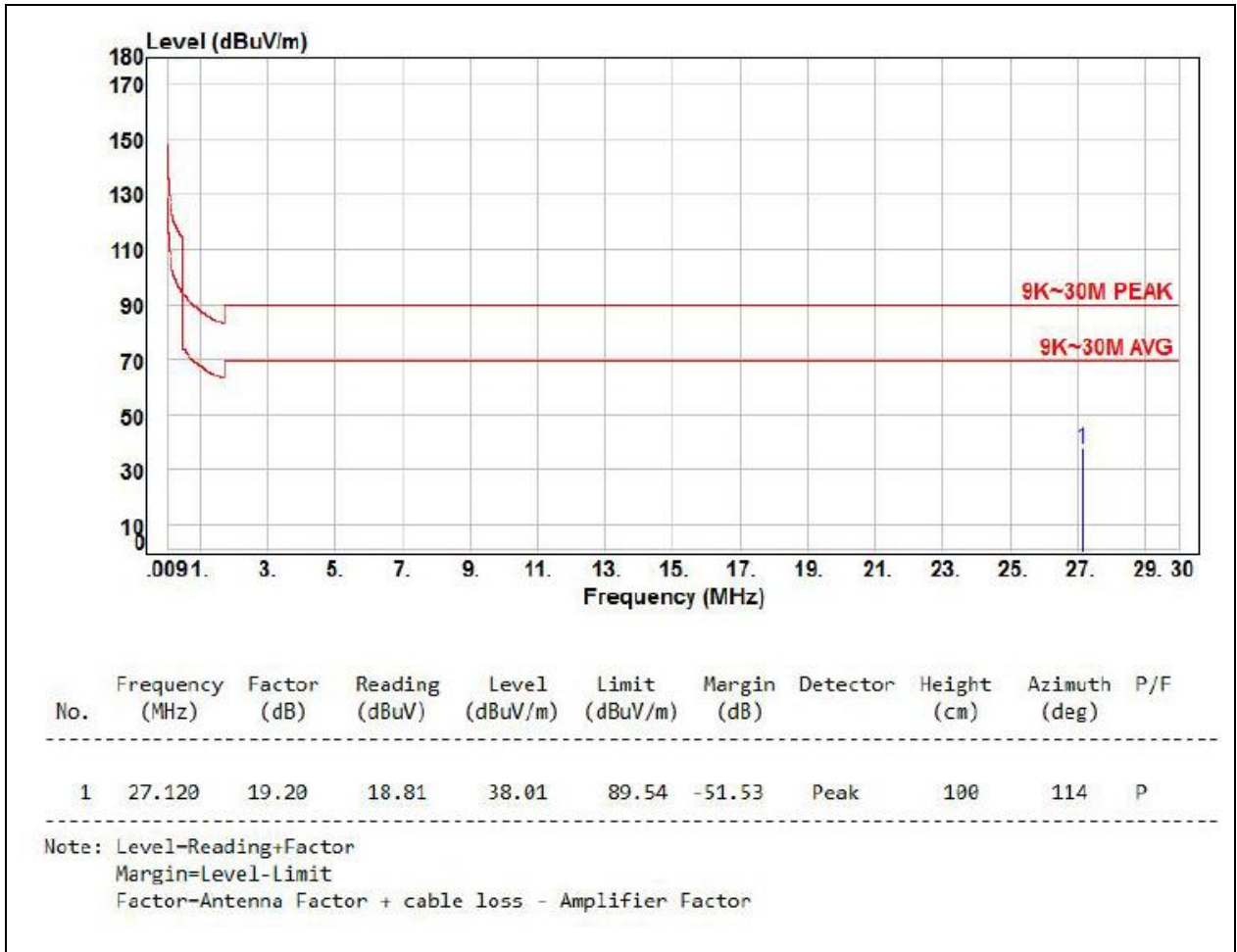
6.4.2. Test Result of Unwanted Spurious emission (9KHz ~ 30MHz)

Power	:	AC120V/60Hz	Polarization	:	X
Test Mode	:	Mode 1			





Power	:	AC120V/60Hz	Polarization	:	Y
Test Mode	:	Mode 1			





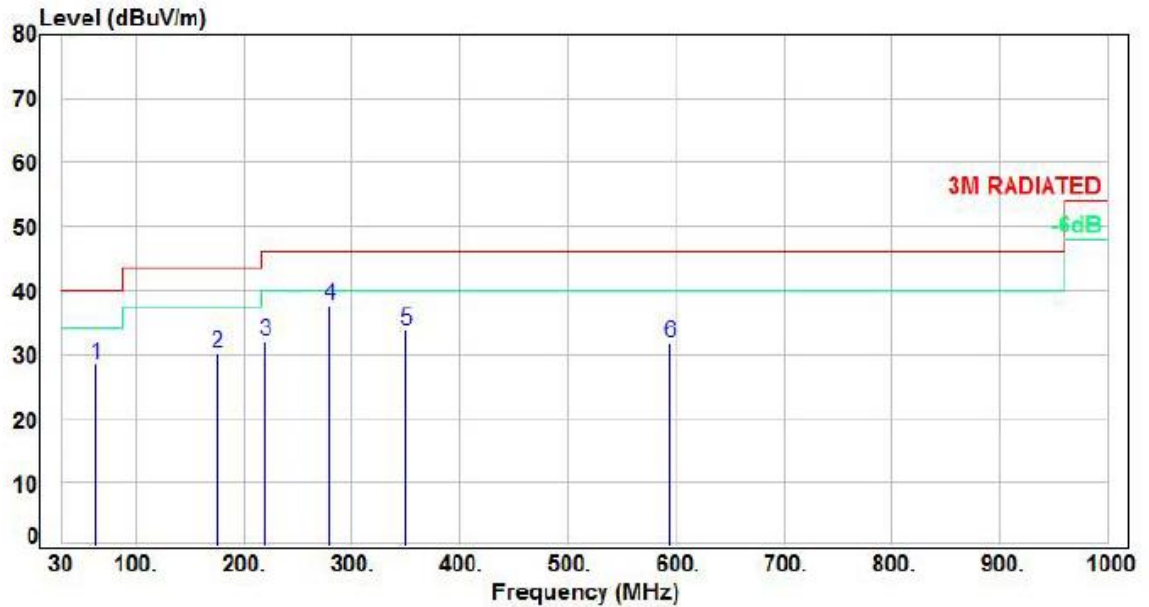
6.4.3. Test Result of Unwanted Spurious emission (30GHz ~ 1GHz)

Power	:	AC120V/60Hz	Pol/Phase	:	VERTICAL
Test Mode	:	Mode 1			





Power	: AC120V/60Hz	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 1		



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	62.98	-16.70	45.17	28.47	40.00	-11.53	Peak	P
2	175.50	-10.61	40.76	30.15	43.50	-13.35	Peak	P
3	219.15	-11.44	43.48	32.04	46.00	-13.96	Peak	P
4	279.29	-9.00	46.78	37.78	46.00	-8.22	Peak	P
5	350.10	-7.80	41.72	33.92	46.00	-12.08	Peak	P
6	594.54	-2.12	33.92	31.80	46.00	-14.20	Peak	P

Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor

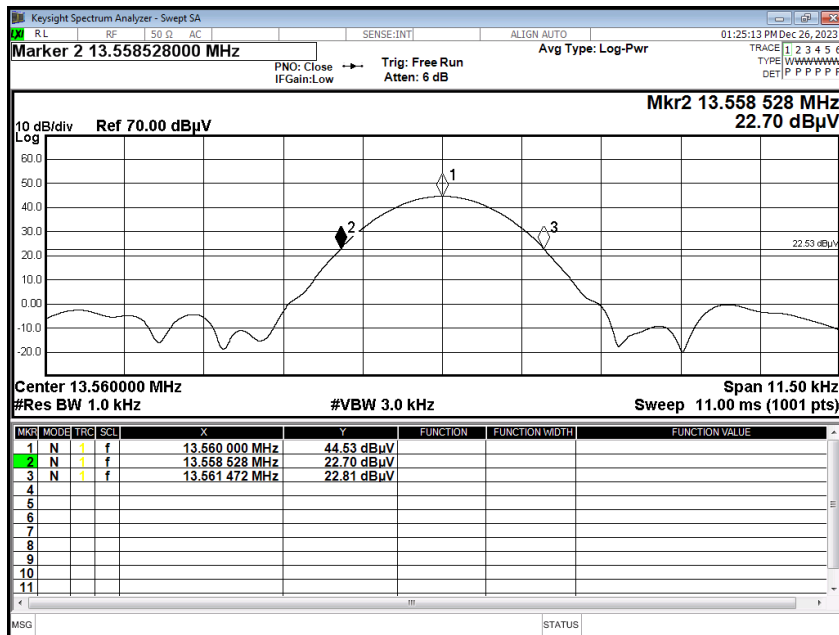


6.5. 20dB Bandwidth BW

Frequency (MHz)	20dB Bandwidth (KHz)	Frequency range MHz (20dB Down) fL > 13.553 MHz	Frequency range MHz (20dB Down) fH < 13.567 MHz
13.56	2.944	13.558528	13.561472

20dB Bandwidth

13.56 MHz



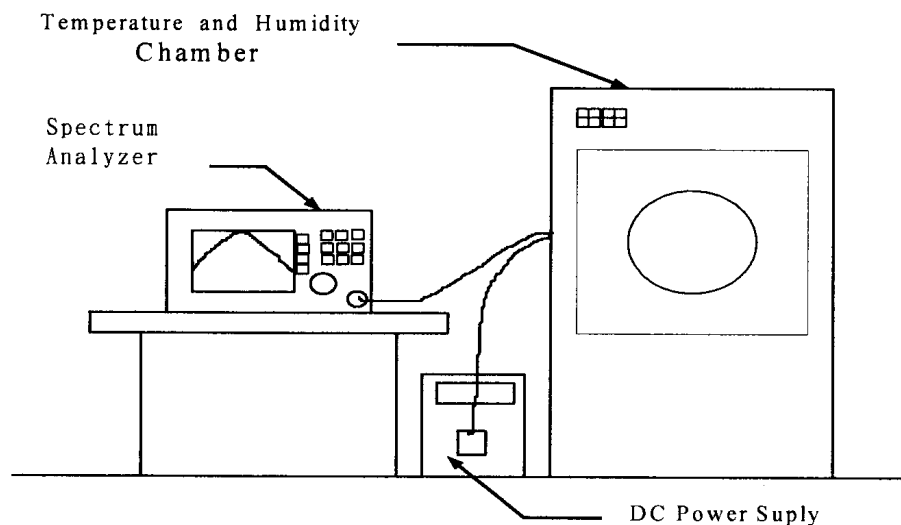


7. Frequency Stability

7.1. Test Procedure

1. The EUT was placed inside the Temperature and Humidity chamber.
2. The transmitter output was connected to spectrum analyzer.
3. Turn the EUT on and couple its output to a spectrum analyzer.
4. Turn the EUT off and set the chamber to the highest temperature specified.
5. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
6. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
7. The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency over a temperature variation of -20 degrees to $+ 50$ degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

7.2. Test Setup Layout





7.3. Test Result and Data

Operating frequency: 13.56 MHz									
Temperature (°C)	Power Supply (V)	0 minute		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	120	13.56005	0.000369	13.56007	0.000516	13.56007	0.000516	13.56009	0.000664
40	120	13.56004	0.000295	13.56006	0.000442	13.56005	0.000369	13.56008	0.000590
30	120	13.56003	0.000221	13.56004	0.000295	13.56004	0.000295	13.56006	0.000442
20	102	13.56001	0.000074	13.56002	0.000147	13.56004	0.000295	13.56006	0.000442
	120	13.56000	0.000000	13.56002	0.000147	13.56004	0.000295	13.56005	0.000369
	138	13.55998	-0.000147	13.56000	0.000000	13.56001	0.000074	13.56002	0.000147
10	120	13.55996	-0.000295	13.55998	-0.000147	13.56000	0.000000	13.56001	0.000074
0	120	13.55995	-0.000369	13.55997	-0.000221	13.55999	-0.000074	13.56000	0.000000
-10	120	13.55994	-0.000442	13.55994	-0.000442	13.55997	-0.000221	13.55980	-0.001475
-20	120	13.55992	-0.000590	13.55993	-0.000516	13.55995	-0.000369	13.55960	-0.002950

----- End of the report -----