



FCC RADIO TEST REPORT

Applicant : ViewSonic Corporation
Address : 10 Pointe Dr. Suite 200. Brea, CA 92821, USA
Equipment : USB receiver
Model No. : VB-PEN-007-2, VS19567
Trade Name : Viewsonic
FCC ID : GSS-VS19567

I HEREBY CERTIFY THAT:

The sample was received on Feb. 08, 2023 and the testing was completed on Feb. 14, 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:

Mark Liao / Supervisor

Laboratory Accreditation:

CerpPASS Technology Corporation Test Laboratory





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History of this test report

Report No.	Issued Date	Description
22120095-TRFCC02	Mar. 14, 2023	Original



1. Summary of Test Procedure and Test Results

1.1 Applicable Standards

ANSI C63.10:2013

FCC Rules and Regulations Part 15 Subpart C §15.249

FCC Rule	Description of Test	Result
15.203	. Antenna Requirement	PASS
15.207	. AC Power Line Conducted Emission	PASS
15.249(a)	. Radiated Spurious Emission	PASS

*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.

*This EUT has been also tested and compiled with the requirement of FCC Part 15, Subpart B, recorded in a separate test report(22120095-TEFV01).



2. Test Configuration of Equipment under Test

2.1 Feature of Equipment under Test

Operation Frequency Range	2400MHz~2483.5MHz
Center Frequency Range	2406MHz, 2417MHz, 2436MHz
Modulation Type	GFSK
Antenna Type	PIFA Antenna
Antenna Gain	-5 dBi

Note: For more details, please refer to the User's manual of the EUT.

Difference Description

Model No.	Difference
VB-PEN-007-2	Marketing purpose.
VS19567	

2.2 Carrier Frequency of Channels

Channel	Frequency (MHz)
00	2406
01	2417
02	2436



2.3 Test Mode and Test Software

- During testing, the interface cables and equipment positions were varied according to ANSI C63.10.
- An executive program, "hclient ver. 10.0.10011.16384" was executed to transmit and receive data via 2.4G.
- The following test modes were performed for the test:

Conducted Emissions from the AC mains power ports	
Test Mode 1	TX Mode, DC 5V from System (AC 120V/60Hz)
Test Mode 2	TX Mode, DC 5V from System (AC 240V/60Hz)
caused "Test Mode 1" generated the worst case, it was reported as the final data.	
Radiated Emissions (Below 1GHz)	
Test Mode 1	TX Mode, DC 5V from System (AC 120V/60Hz)
Test Mode 2	TX Mode, DC 5V from System (AC 240V/60Hz)
caused "Test Mode 1" generated the worst case, it was reported as the final data.	
Radiated Emissions (Above 1GHz)	
Test Mode 1	TX Mode, DC 5V from System (AC 120V/60Hz)

2.4 Description of Test System

Radiated Emissions				
Equipment	Brand	Model	Length/Type	Power cord/Length/Type
Notebook	ASUS	P2430U	N/A	Adapter / 1.8m / NS
USB Cable(A to B)	BENEVO	E210567AWM	1m / NS	N/A

AC Power Line Conducted Emission				
Equipment	Brand	Model	Length/Type	Power cord/Length/Type
Notebook	ASUS	P2430U	N/A	Adapter / 1.8m / NS
USB Cable(A to B)	BENEVO	E210567AWM	1m / NS	N/A



2.5 General Information of Test

Test Site	Cerpass Technology Corporation Test Laboratory Address: No.10, Ln. 2, Lianfu St., Luzhu Dist., Taoyuan City 33848, Taiwan (R.O.C.) Tel: +886-3-3226-888 Fax: +886-3-3226-881	
	FCC	TW1439, TW1079
	IC	4934E-1, 4934E-2
	VCCI	T-12205 for Telecommunication test C-14663 for Conducted emission test R-14218 for Radiated emission test G-10812, G-10813 for radiated disturbance above 1GHz
Frequency Range Investigated:	Conducted: from 150kHz to 30 MHz Radiation: from 30 MHz to 25,000MHz	
Test Distance:	The test distance of radiated emission from antenna to EUT is 3 M.	

Test Item	Test Site	Test Period	Environmental Conditions	Tested by
Radiated Emissions	3M02-NK	2023/02/14	21 °C / 47%	Leon Huang
AC Power Line Conducted Emission	CON02-NK	2023/02/14	20 °C / 53%	Leon Huang

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)	±3.28dB
Radiated Spurious Emission(9KHz~30MHz)	±3.4dB
Radiated Spurious Emission(30MHz~1GHz)	±5.7dB
Radiated Spurious Emission(1GHz~25GHz)	±6.8dB
20dB Bandwidth	±4.4%



3. Test Equipment and Ancillaries Used for Tests

Test Item	Radiated Emissions				
Test Site	Semi Anechoic Room(3M02-NK)				
Instrument	Manufacturer	Model No	Serial No	Calibration Date	Valid Date
Bilog Antenna	Schwarzbeck	VULB9168	275	2022/11/18	2023/11/17
Active Loop Antenna	EMCO	6507	40855	2022/05/25	2023/05/24
Horn Antenna	EMCO	3115	31601	2022/10/12	2023/10/11
Horn Antenna	EMCO	3116	31970	2022/03/18	2023/03/17
EMI Receiver	ROHDE & SCHWARZ	ESCI	101423	2022/07/05	2023/07/04
Spectrum Analyzer	ROHDE & SCHWARZ	FSV 40-N	101329	2022/07/20	2023/07/19
Preamplifier	Agilent	8449B	3008A01954	2022/03/17	2023/03/16
Preamplifier	EMC INSTRUMENTS	EMC184045	980065	2022/11/11	2023/11/10
Preamplifier	EM Electronics corp.	EM330	60660	2022/04/08	2023/04/07
Cable-6m (9k~300M)	NA	EMC5D-BM-BM-6	130605	2022/09/06	2023/09/05
Cable-3in1 (30M-1G)	HARBOUR INDUSTRIES	LL142	CCE1315	2022/03/21	2023/03/20
Cable-0.5m (30M-40G)	HUBER SUHNER	SUCOFLEX 102	28420/2	2022/04/09	2023/04/08
Cable-3m (30M-40G)	HUBER SUHNER	SUCOFLEX 102	MY2608/2	2022/04/09	2023/04/08
Cable-0.5m (1G-40G)	Rapidtek	40GHZ 50CM	38MS-38MS50314	2022/04/09	2023/04/08
Cable-3m (1G-40G)	Rapidtek	40GHZ 300CM	38MS-38MS300314	2022/04/09	2023/04/08
Cable-8m (10M-26.5G)	HUBER SUHNER	SF126E	587398	2022/10/07	2023/10/06
Cable-3m (10M-26.5G)	HUBER SUHNER	SF126E	587399	2022/10/07	2023/10/06
Cable-1m (10M-40G)	HUBER SUHNER	SF102	804398/2	2022/10/11	2023/10/10
E3	AUDIX	v8.2014-8-6	RK-000529	NA	NA

Test Item	AC Power Line Conducted Emission				
Test Site	CON02-NK				
Instrument	Manufacturer	Model No	Serial No	Calibration Date	Valid Date
EMI Receiver	ROHDE & SCHWARZ	ESCI	101423	2022/07/05	2023/07/04
TWO-LINE V-NETWORK	ROHDE & SCHWARZ	ENV216	102185	2022/08/24	2023/08/23
Pulse Limiter	ROHDE & SCHWARZ	ESH3-Z2	101934	2022/03/21	2023/03/20
Cable-6m (9k~300M)	NA	EMC5D-BM-BM-6	130606	2022/03/21	2023/03/20
E3	AUDIX	v8.2014-8-6	RK-000531	NA	NA



4. Antenna Requirements

4.1 Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

4.2 Antenna Construction and Directional Gain

Antenna Type	PIFA Antenna
Antenna Gain	-5 dBi



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 C63.10-2013. 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

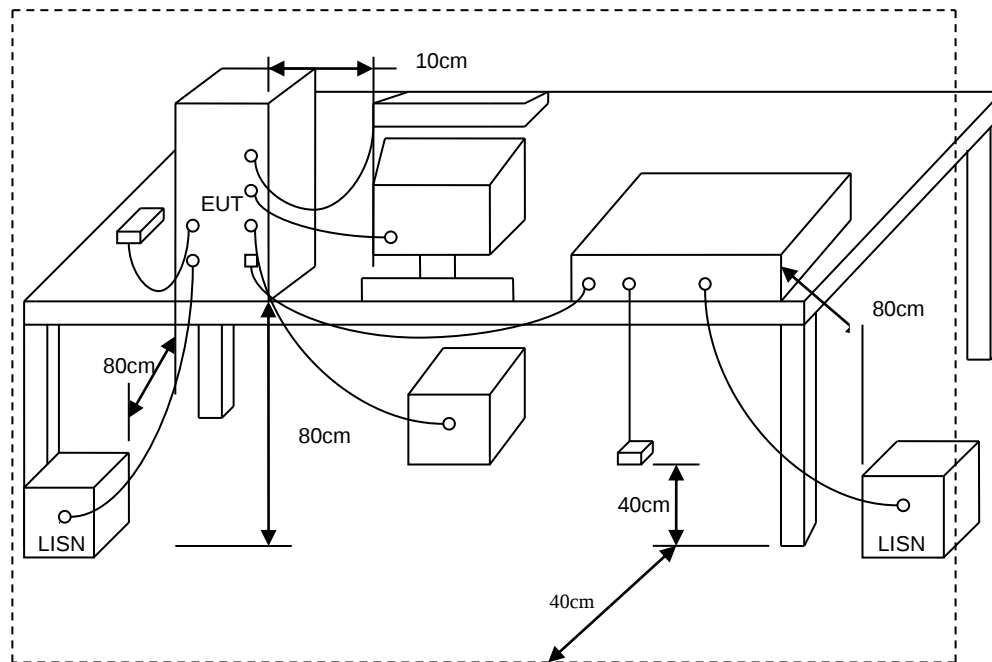
*Decreases with the logarithm of the frequency.

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.

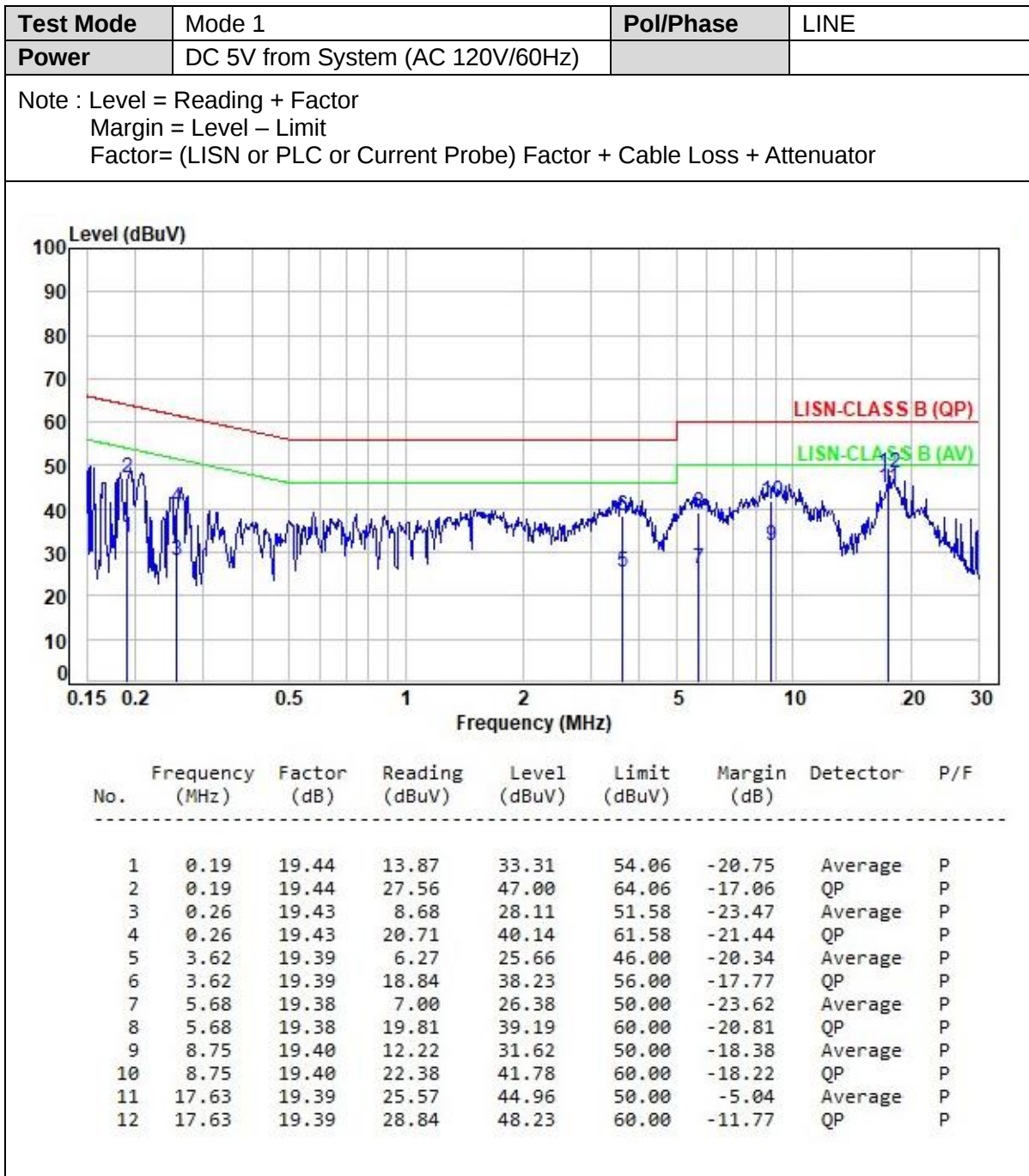


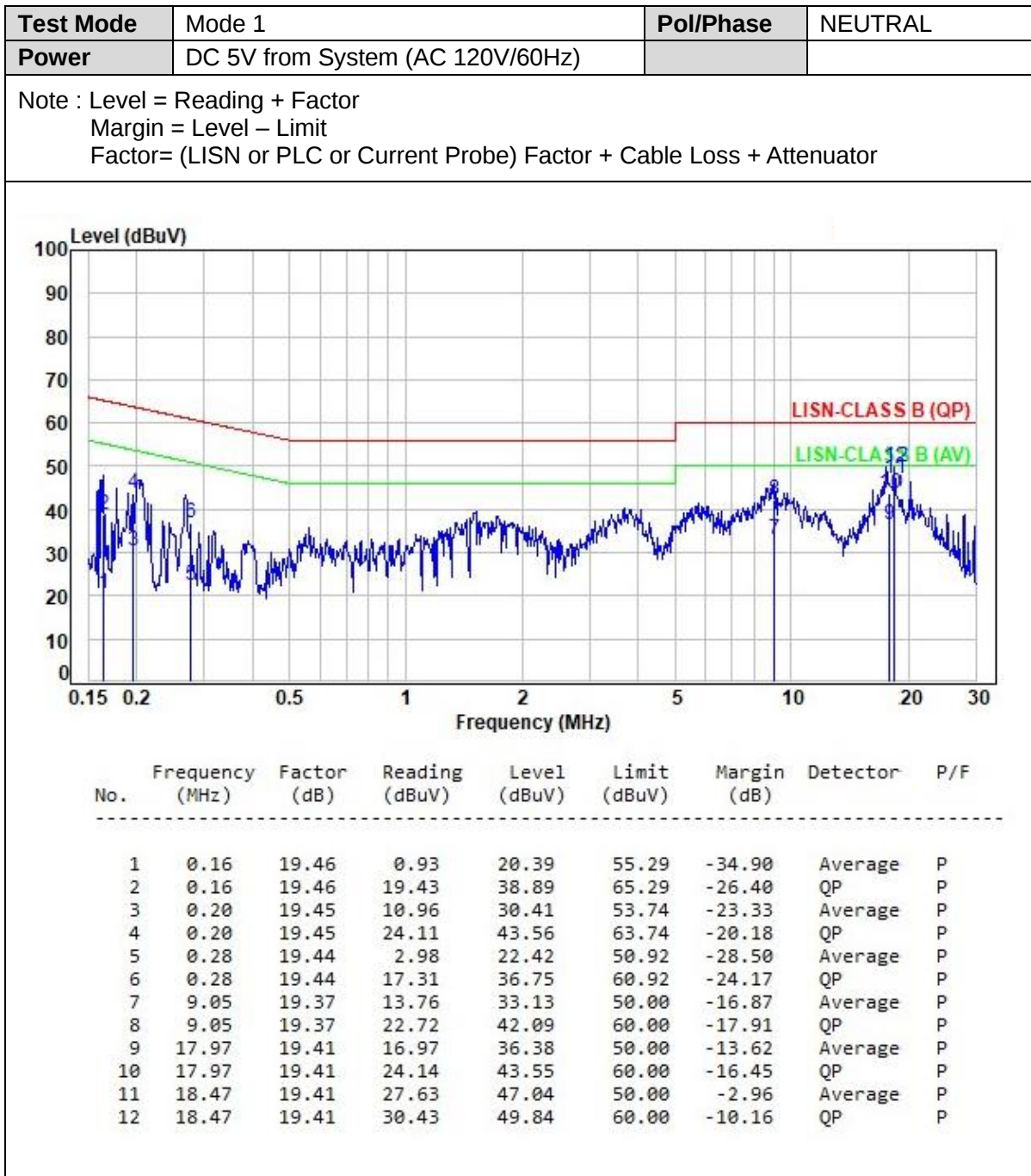
5.3 Typical Test Setup





5.4 Test Result and Data







6. Test of Spurious Emission (Radiated)

6.1 Test Limit

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)	Measurement Distance (meters)
902-928 MHz	50	500	3
2400-2483.5 MHz	50	500	3
5725-5875 MHz	50	500	3
24.0-24.25 GHz	250	2500	3

6.2 Test Procedures

- The EUT was placed on a rotatable table top 0.8 meter above ground.
- The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- The table was rotated 360 degrees to determine the position of the highest radiation.
- 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.
- 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.
- Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
- 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.
- For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
- "Cone of radiation" has been considered to be 3dB bandwidth of the measurement antenna.

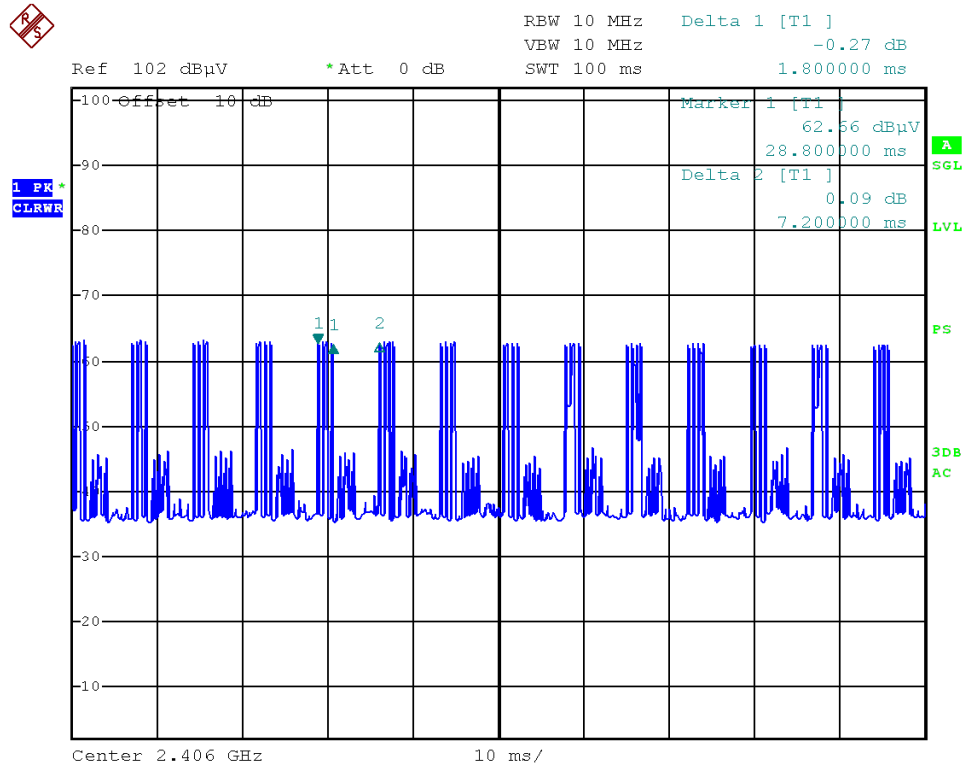
Note:

- The Average value = Peak value + 20log(Duty cycle)
- Duty Factor = 20log(total duty / period of pulse train)
= 20log[(Pulse Time) / period of pulse train]
= 20log[(14 * 1.8ms) / 100ms]
= -11.97

Note: The supporting fixture shall permit orientation of the EUT in each of three orthogonal axis positions such that emissions from the EUT are maximized.
(Z-AXIS is the worst.)



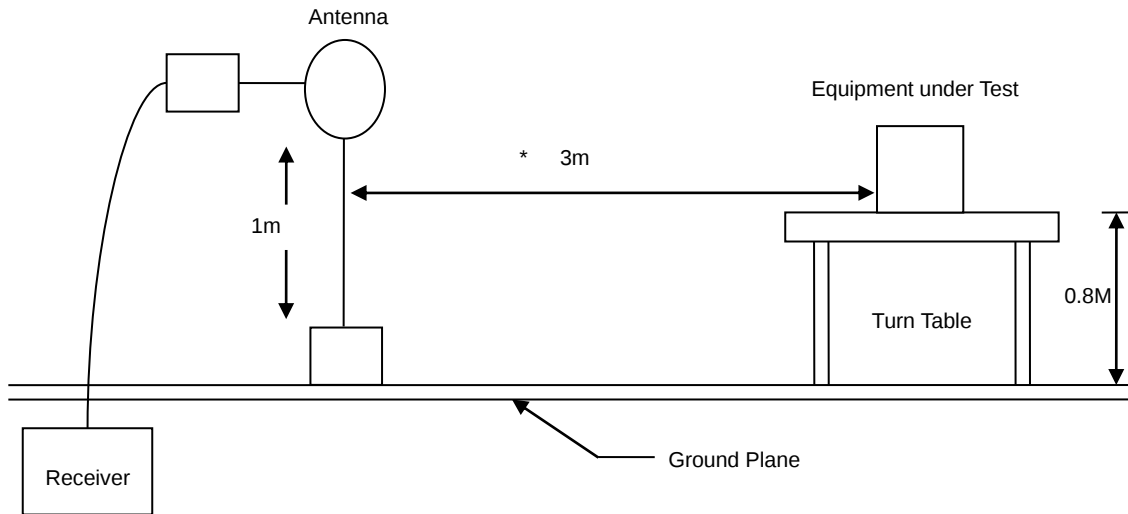
Period of Pulse Train



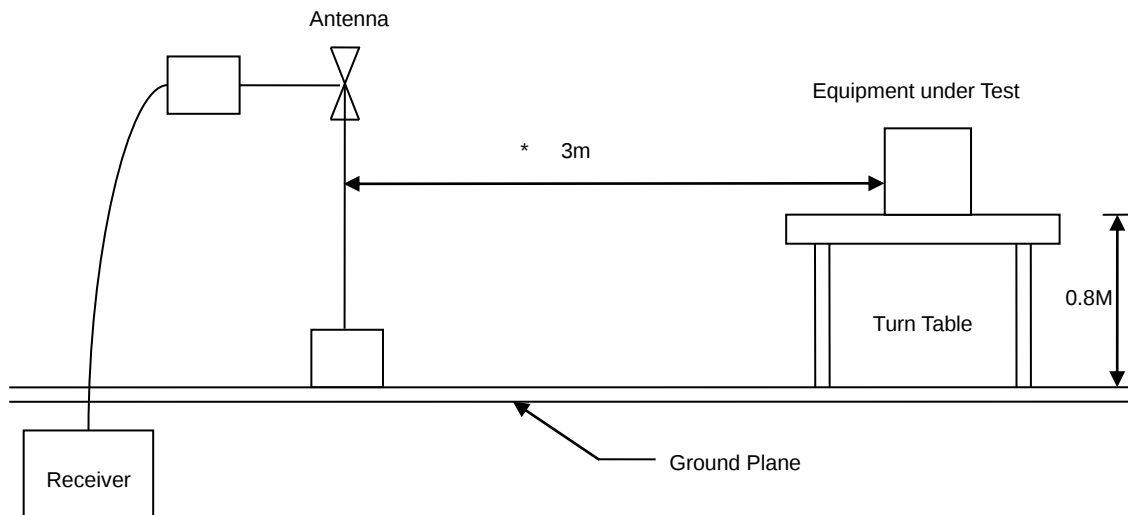


6.3 Typical Test Setup

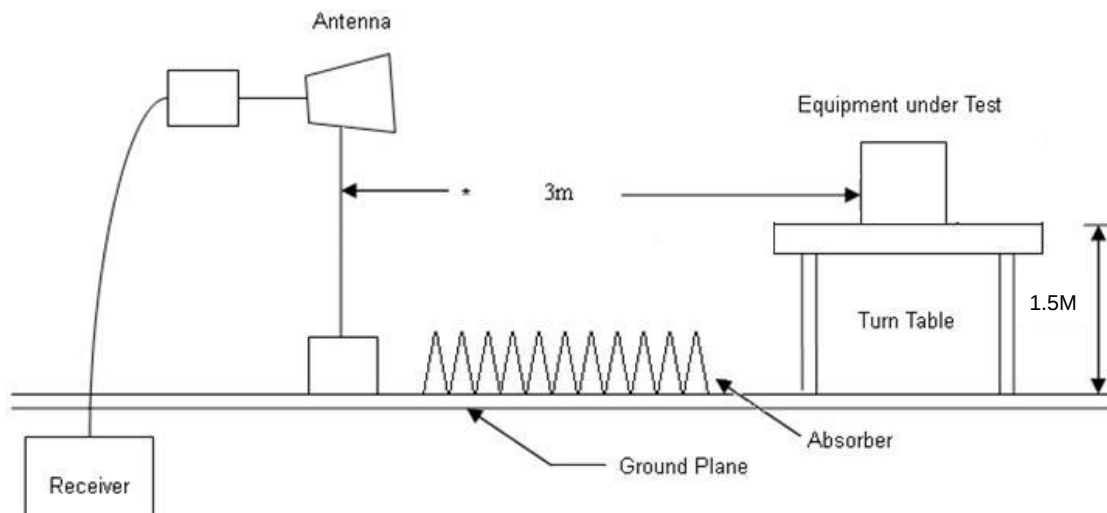
Below 30MHz test setup



30MHz- 1GHz Test Setup



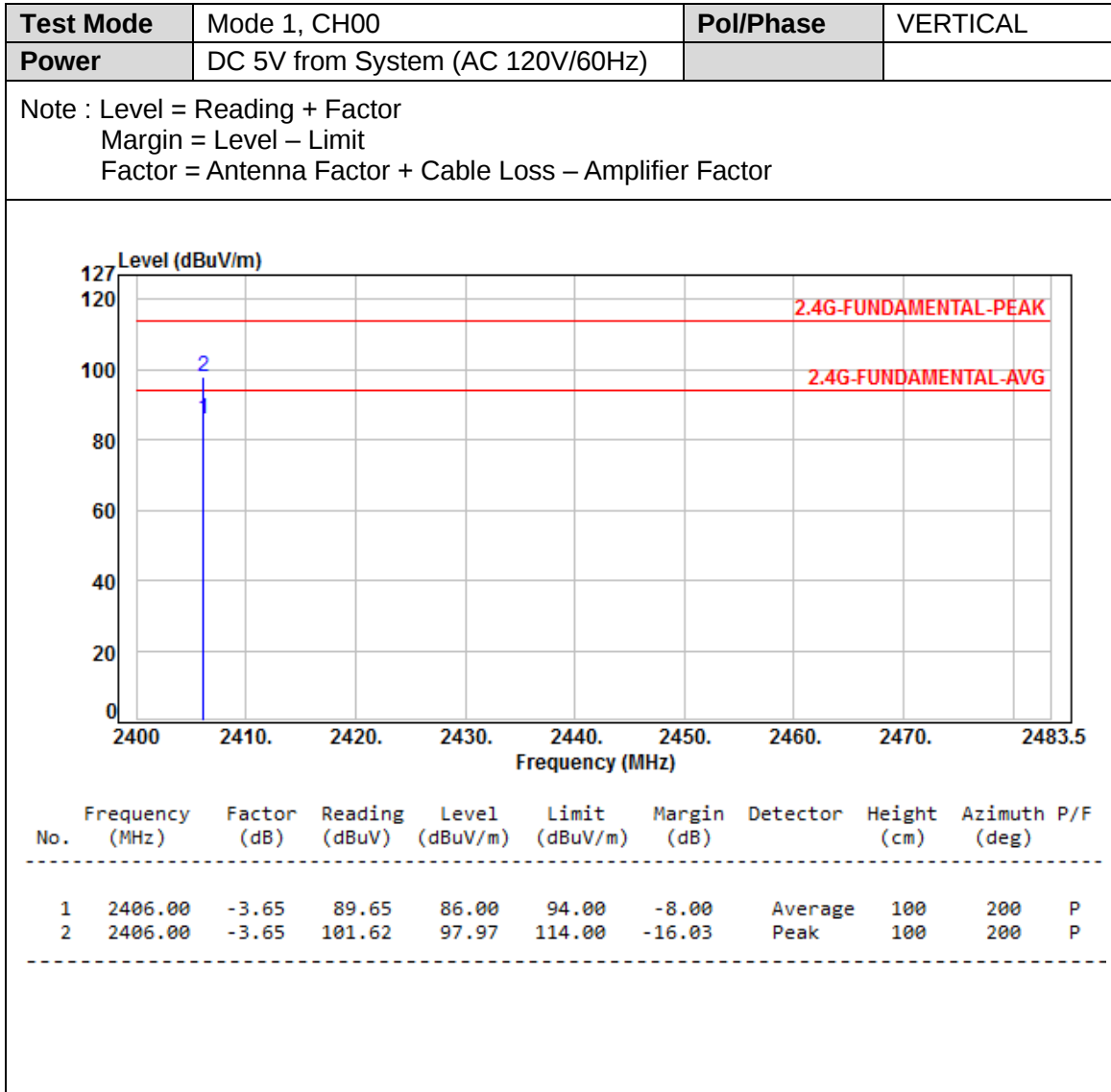
Above 1GHz Test Setup

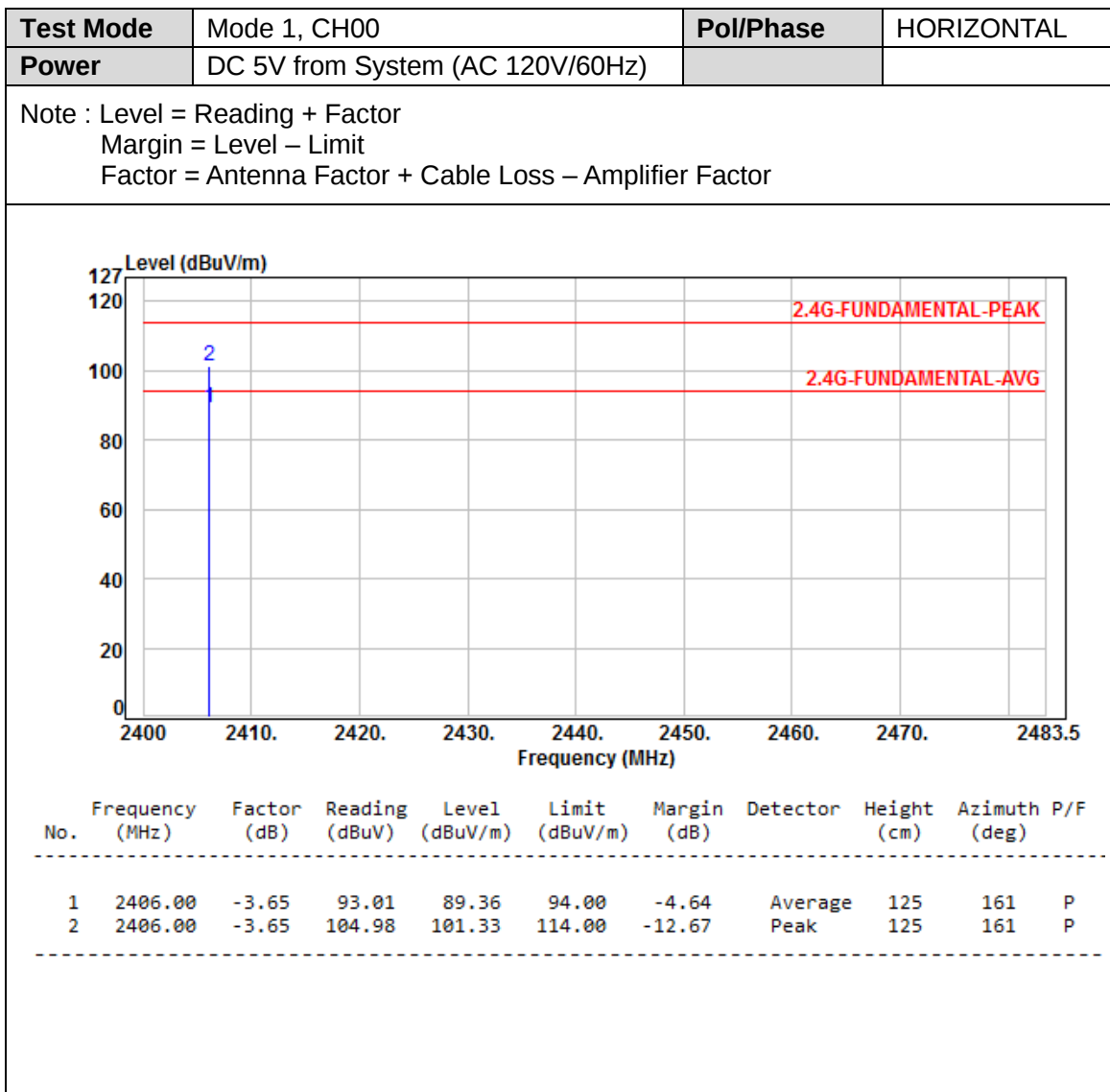


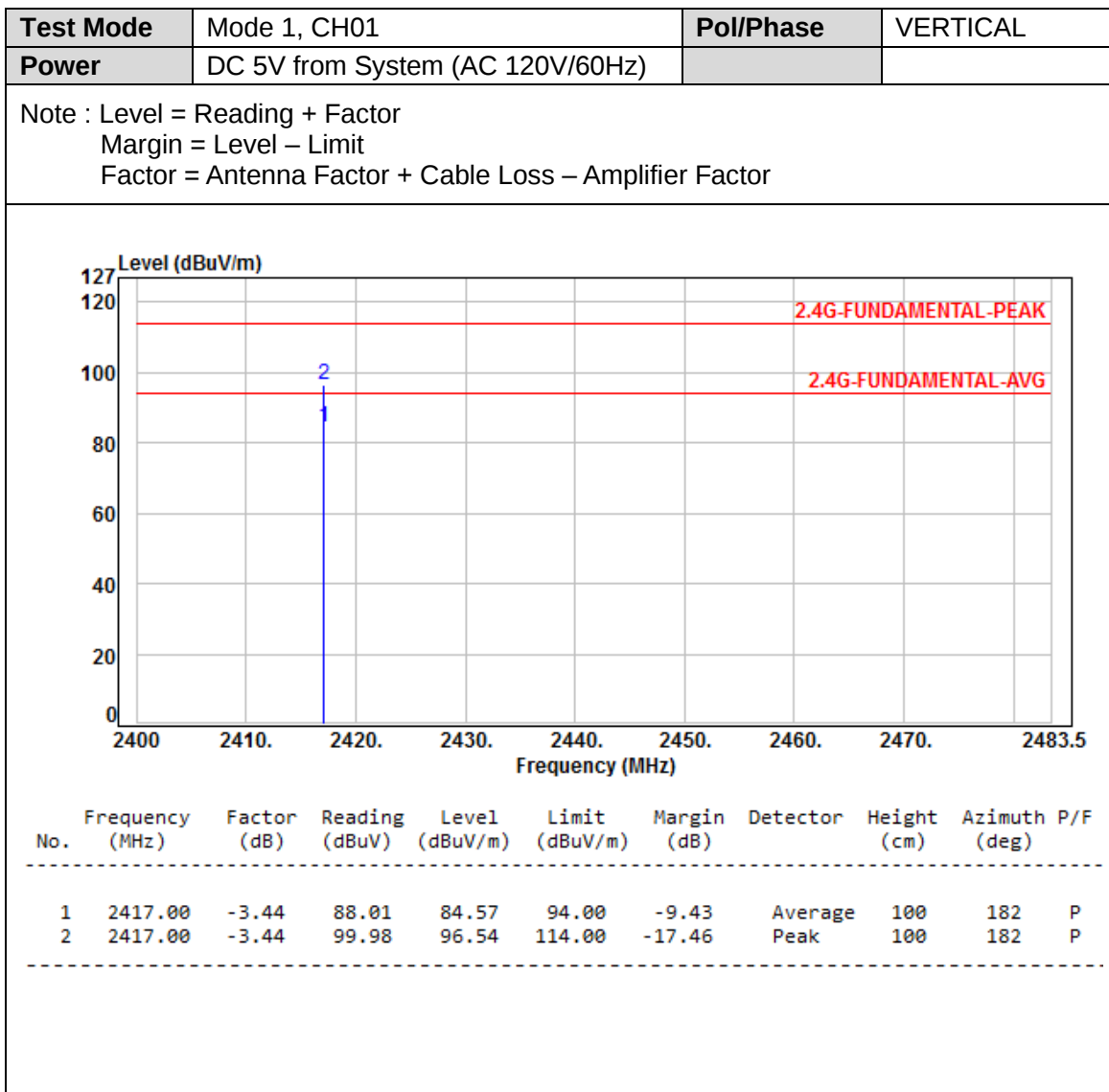


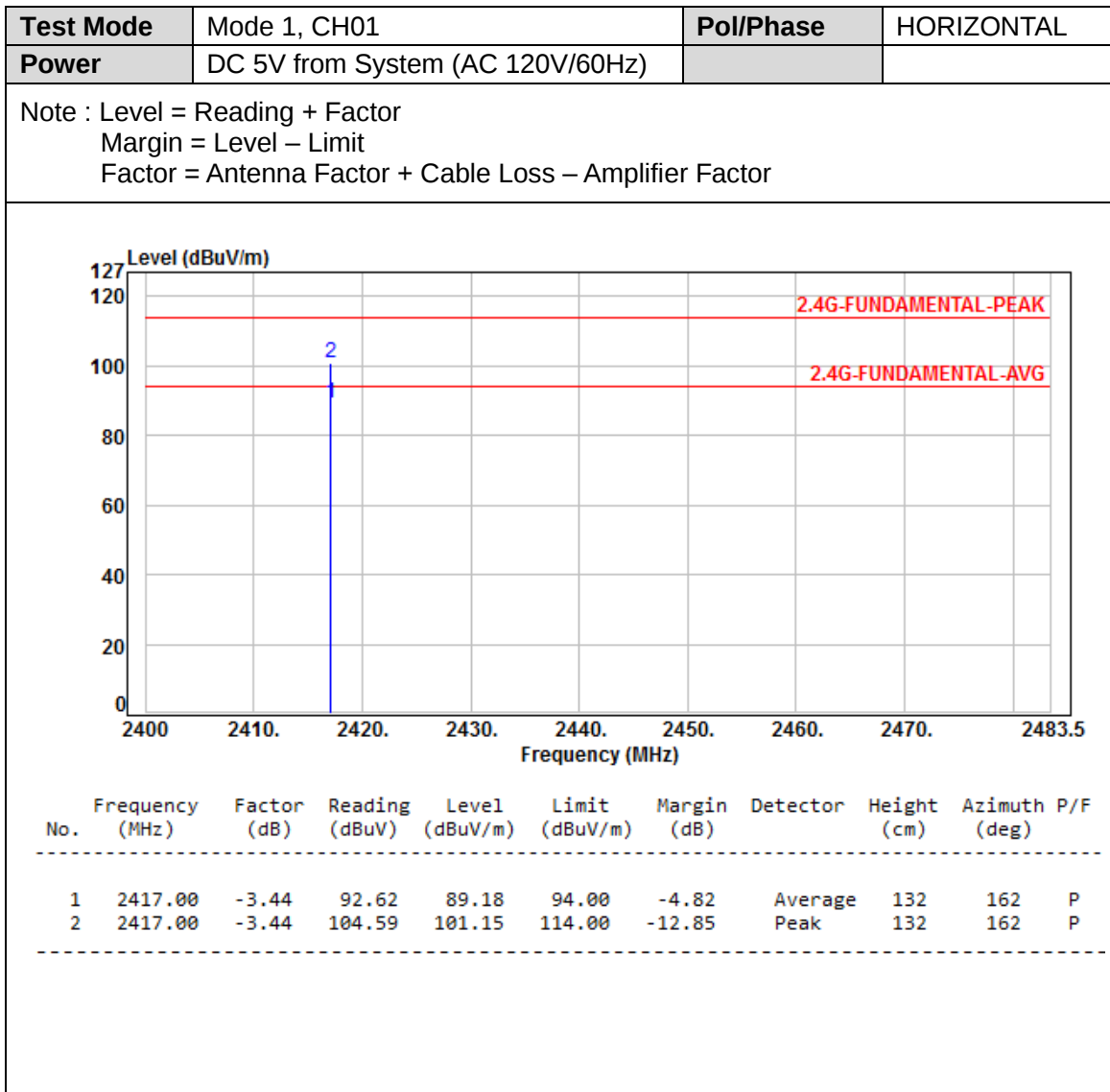
6.4 Test Result and Data

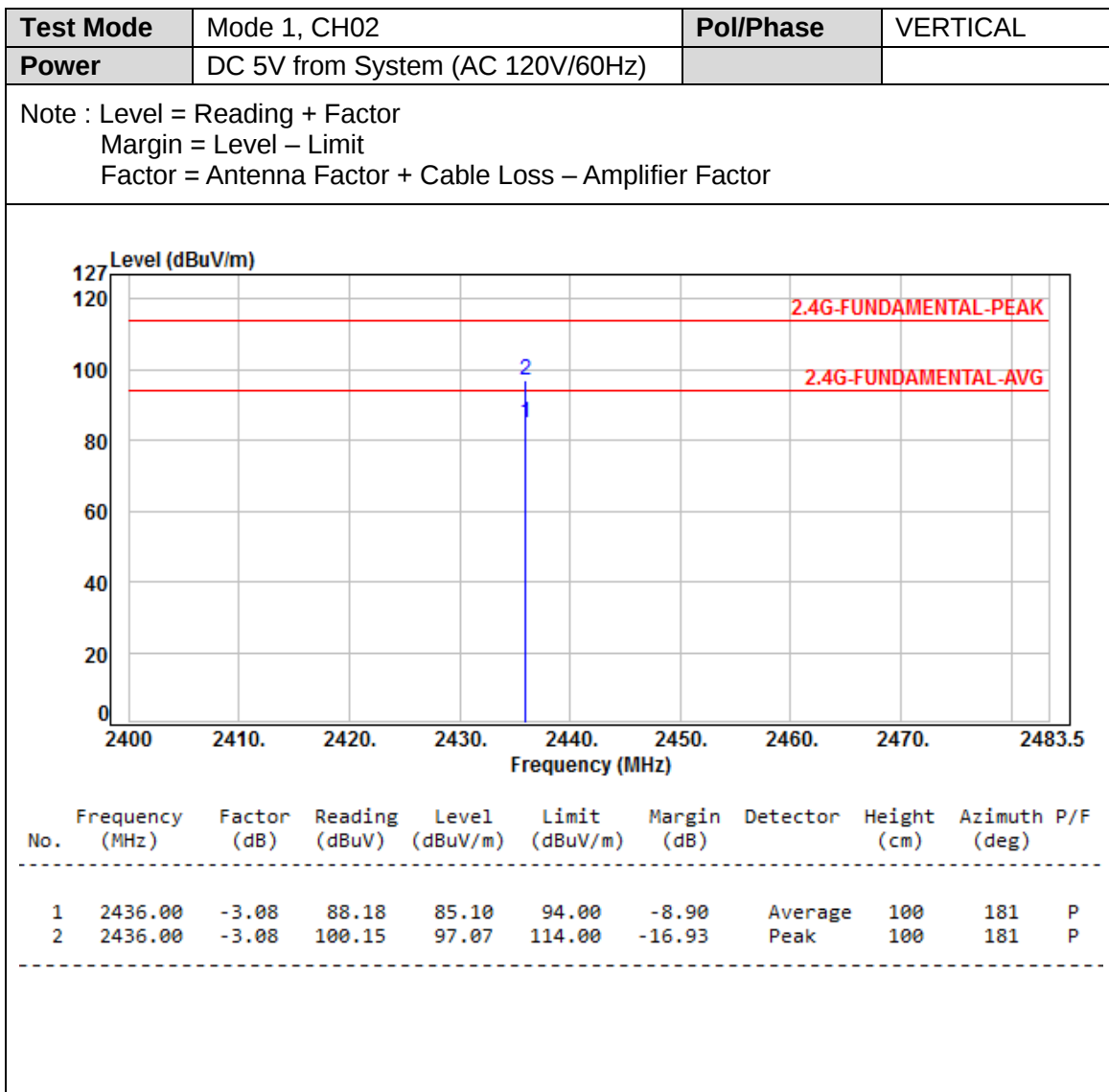
6.4.1 Test Result of Fundamental Emission

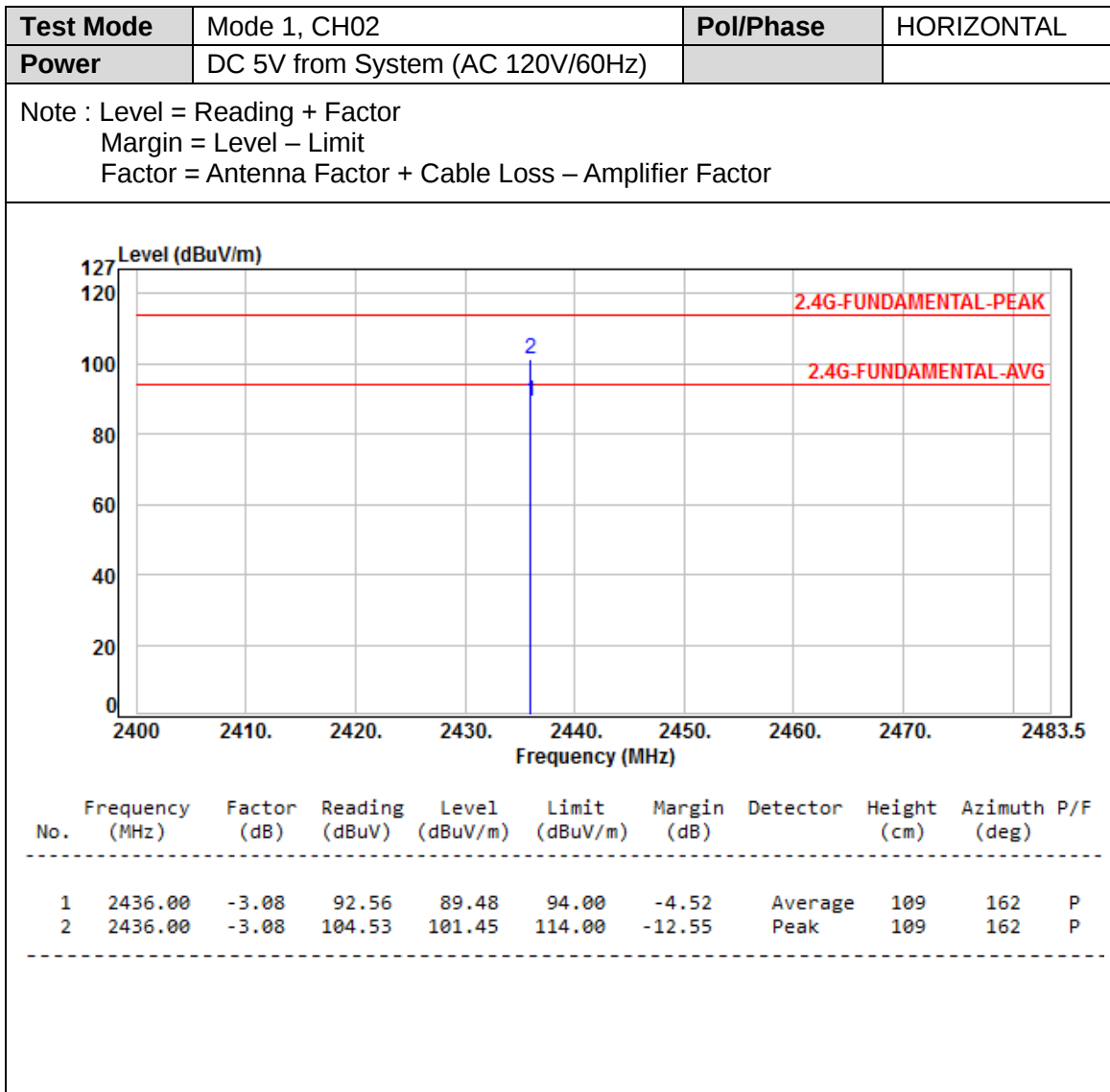










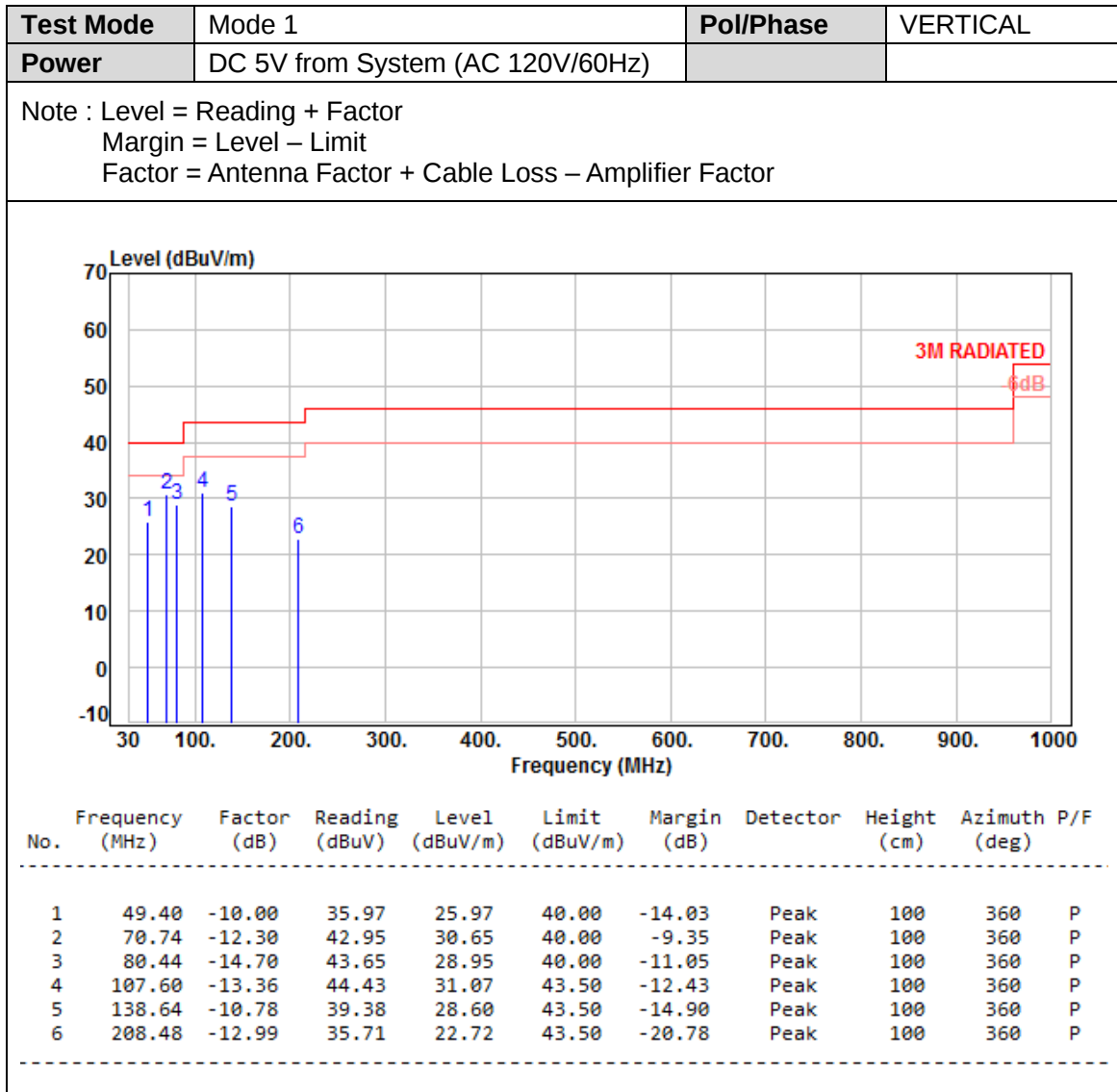


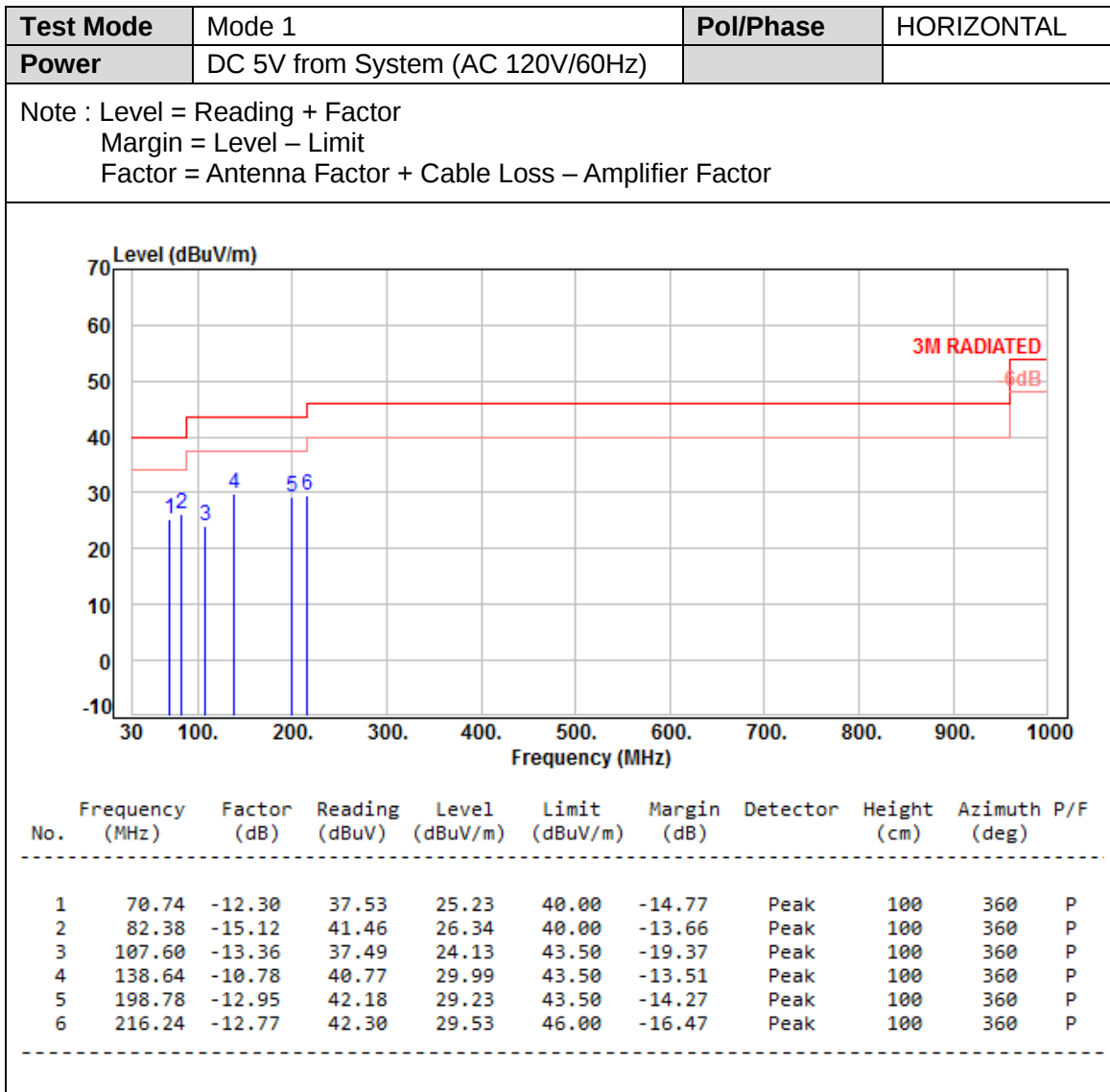


6.5 Test Result and Data (9kHz ~ 30MHz)

The 9kHz - 30MHz spurious emission is under limit 20dB more.

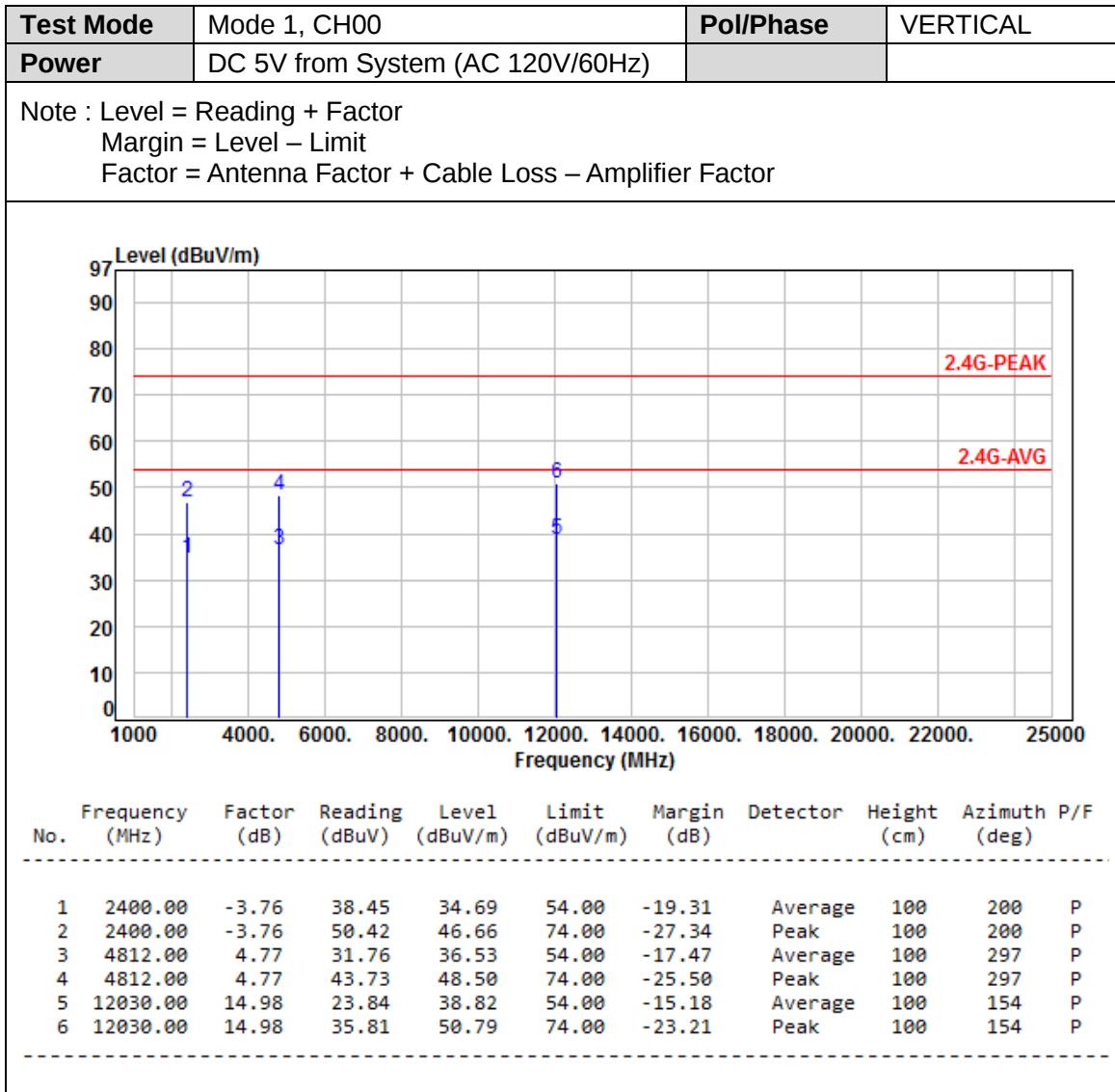
6.6 Test Result and Data (30MHz ~ 1GHz)

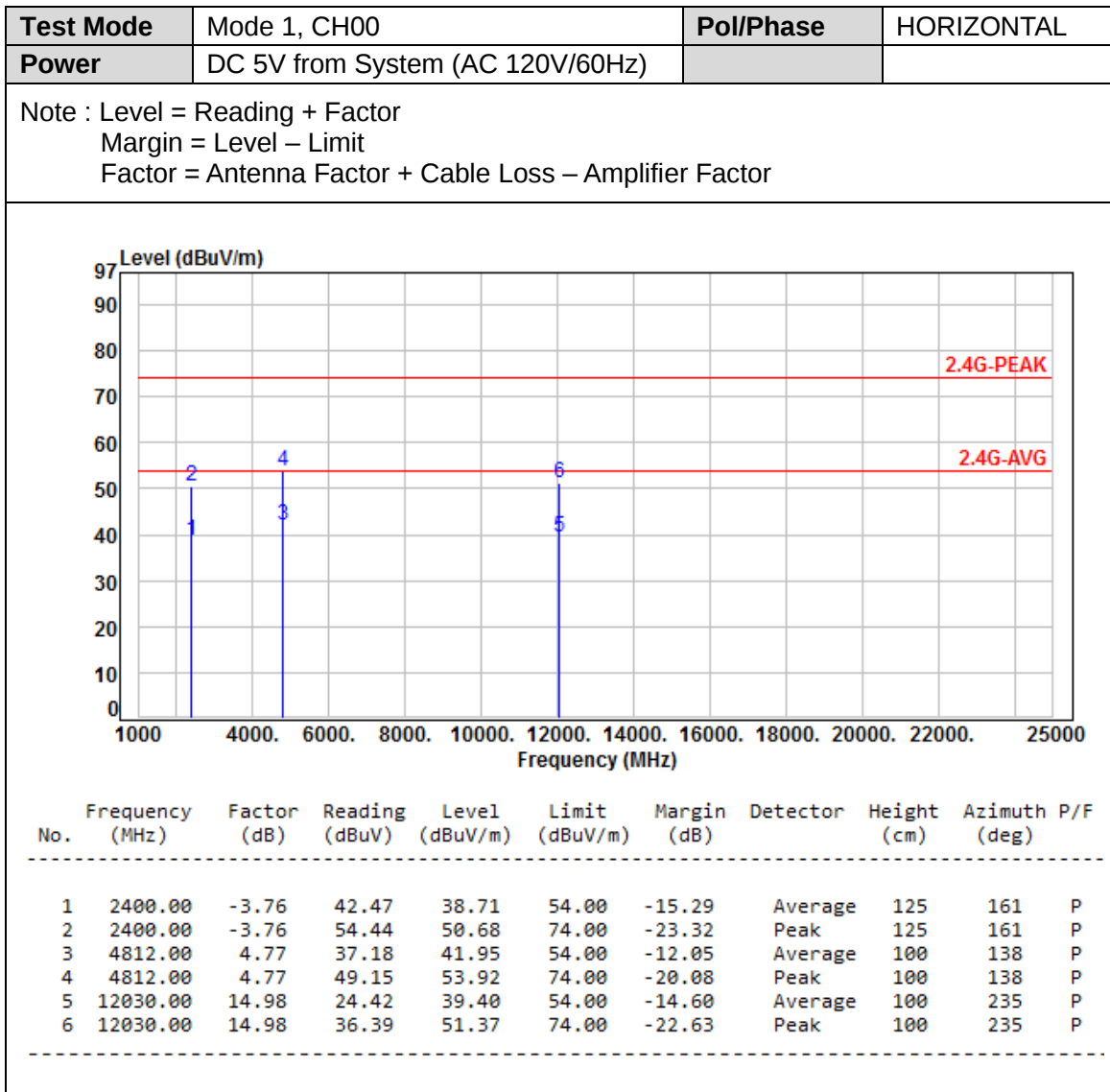


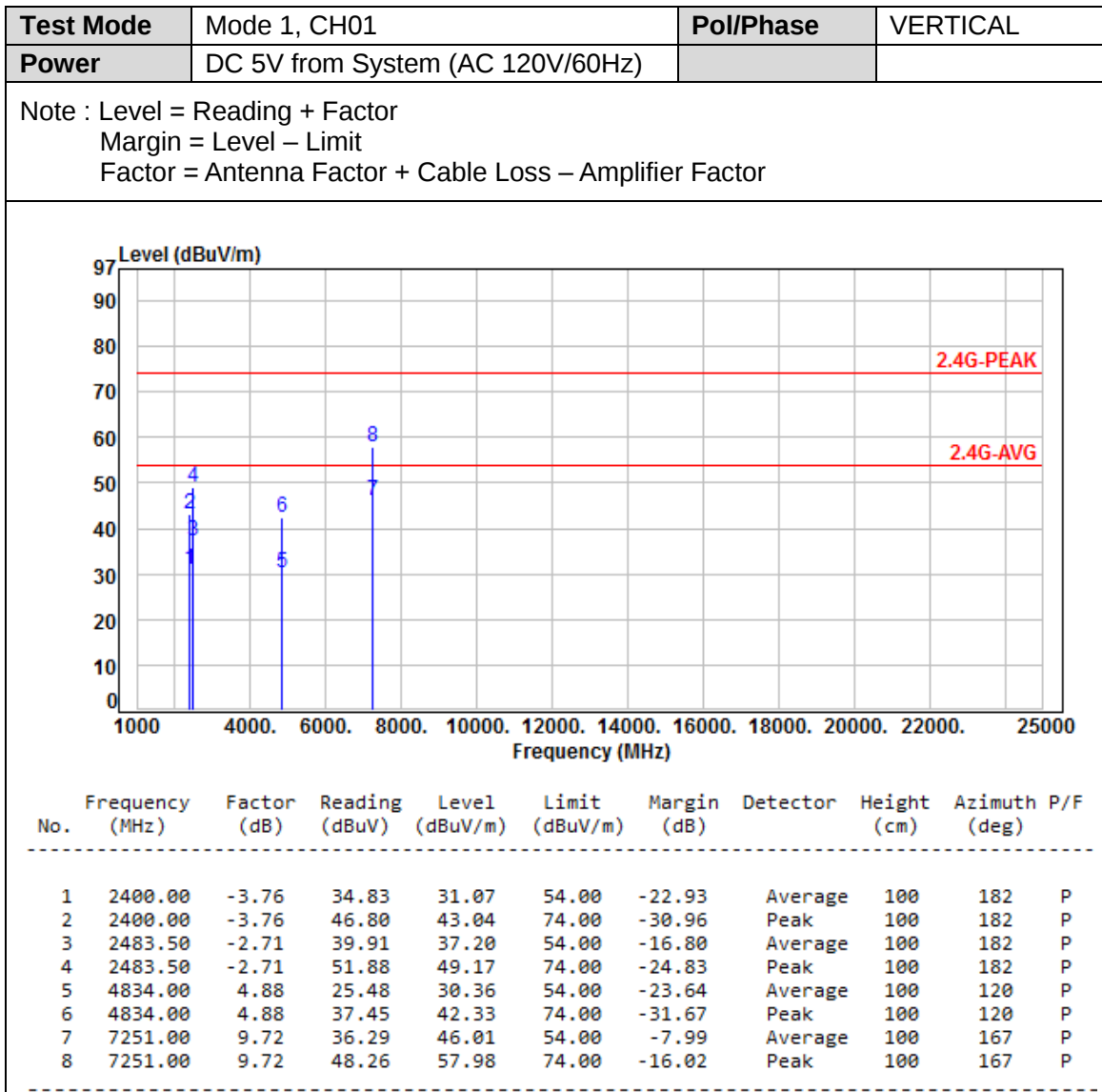


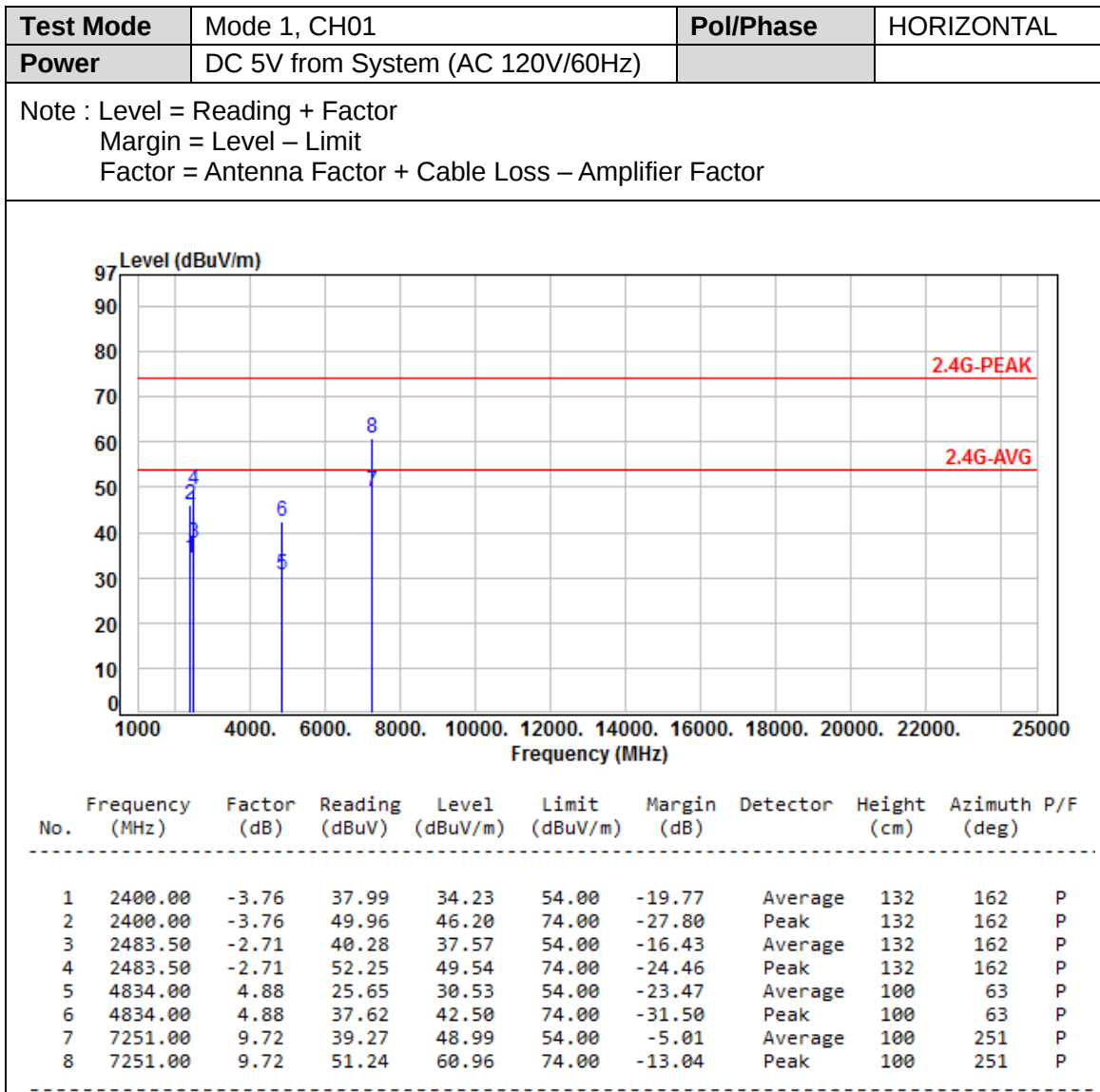


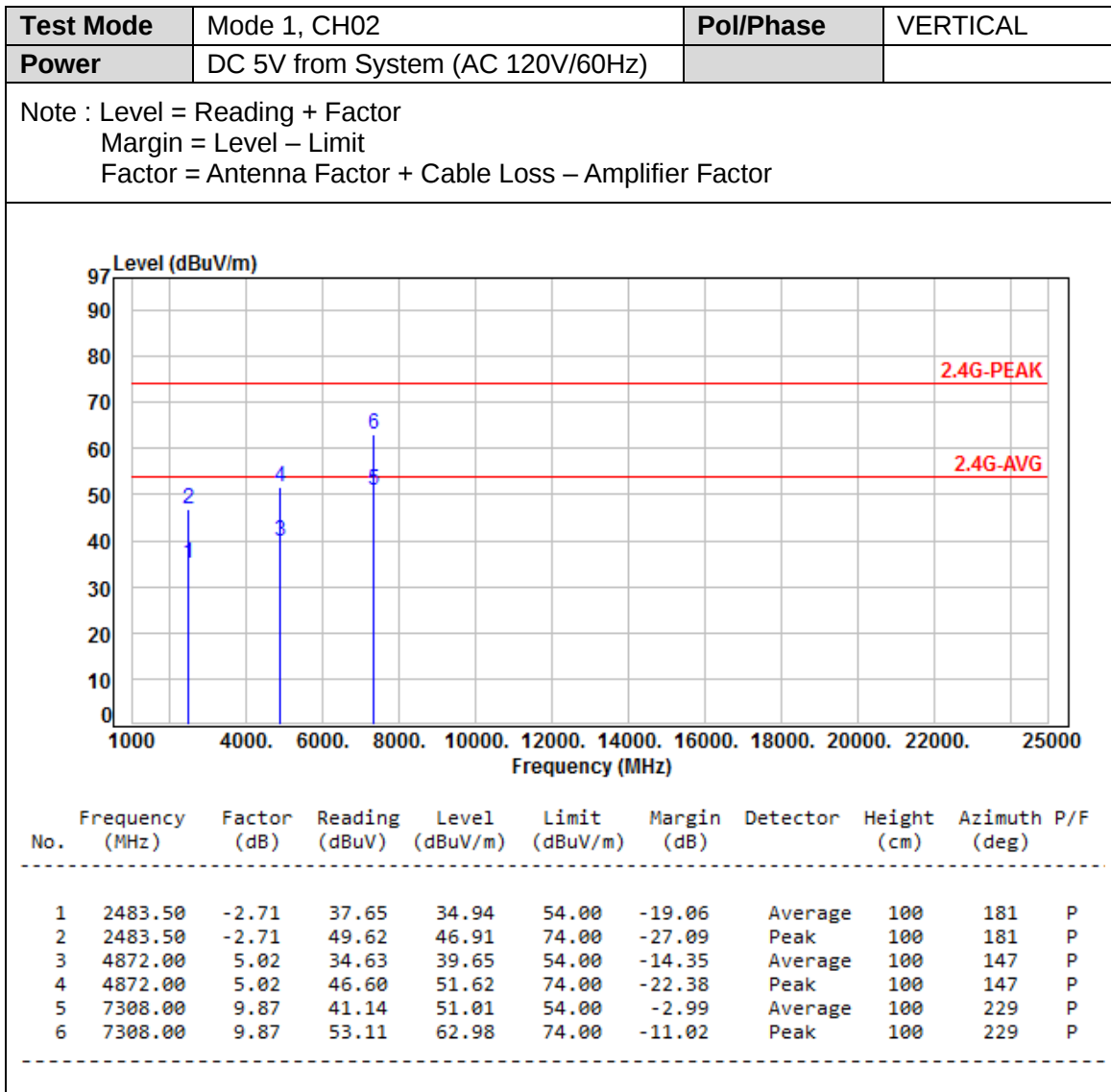
6.7 Test Result and Data (1GHz ~ 25GHz)

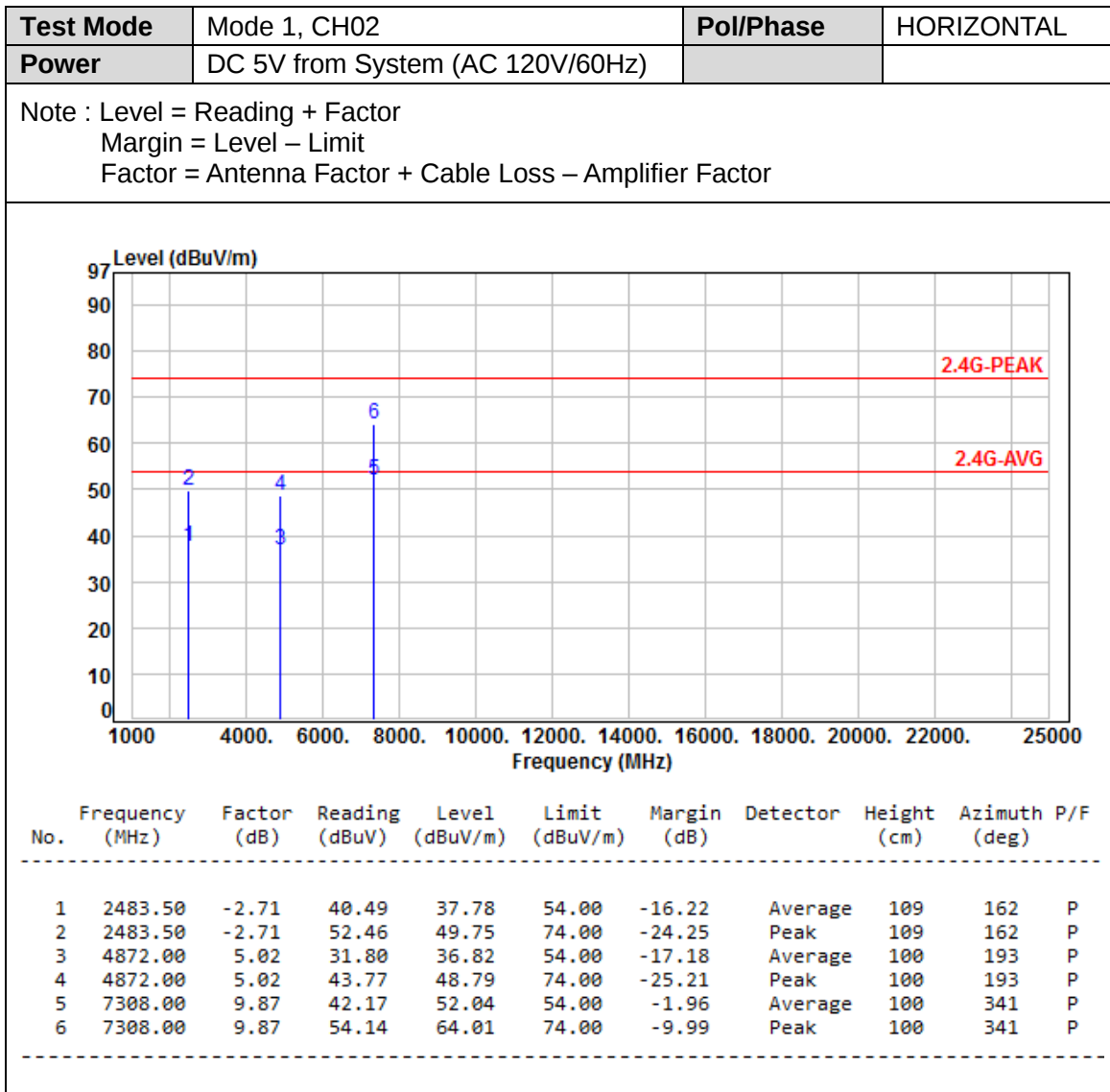














6.10 Restricted Bands of Operation

Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.09000 – 0.11000	16.42000 – 16.42300	399.9 – 410.0	4.500 – 5.250
0.49500 – 0.505**	16.69475 – 16.69525	608.0 – 614.0	5.350 – 5.460
2.17350 – 2.19050	16.80425 – 16.80475	960.0 – 1240.0	7.250 – 7.750
4.12500 – 4.12800	25.50000 – 25.67000	1300.0 – 1427.0	8.025 – 8.500
4.17725 – 4.17775	37.50000 – 38.25000	1435.0 – 1626.5	9.000 – 9.200
4.20725 – 4.20775	73.00000 – 74.60000	1645.5 – 1646.5	9.300 – 9.500
6.21500 – 6.21800	74.80000 – 75.20000	1660.0 – 1710.0	10.600 – 12.700
6.26775 – 6.26825	108.00000 – 121.94000	1718.8 – 1722.2	13.250 – 13.400
6.31175 – 6.31225	123.00000 – 138.00000	2200.0 – 2300.0	14.470 – 14.500
8.29100 – 8.29400	149.90000 – 150.05000	2310.0 – 2390.0	15.350 – 16.200
8.36200 – 8.36600	156.52475 – 156.52525	2483.5 – 2500.0	17.700 – 21.400
8.37625 – 8.38675	156.70000 – 156.90000	2655.0 – 2900.0	22.010 – 23.120
8.41425 – 8.41475	162.01250 – 167.17000	3260.0 – 3267.0	23.600 – 24.000
12.29000 – 12.29300	167.72000 – 173.20000	3332.0 – 3339.0	31.200 – 31.800
12.51975 – 12.52025	240.00000 – 285.00000	3345.8 – 3358.0	36.430 – 36.500
12.57675 – 12.57725	322.00000 – 335.40000	3600.0 – 4400.0	Above 38.6
13.36000 – 13.41000			

** : Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz



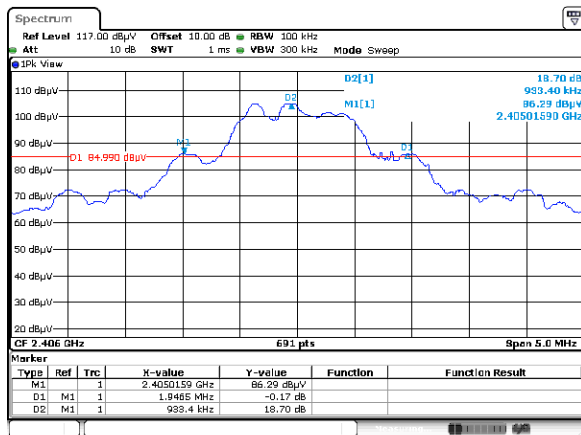
6.11 20dB Bandwidth Measurement Data

Frequency (MHz)	20dB Bandwidth (MHz)	Frequency range MHz (20dB Down) fL > 2400 MHz	Frequency range MHz (20dB Down) fH < 2483.5 MHz
2406.0	1.9465	2405.0159	-
2417.0	1.8379	-	-
2436.0	2.0550	-	2436.9913

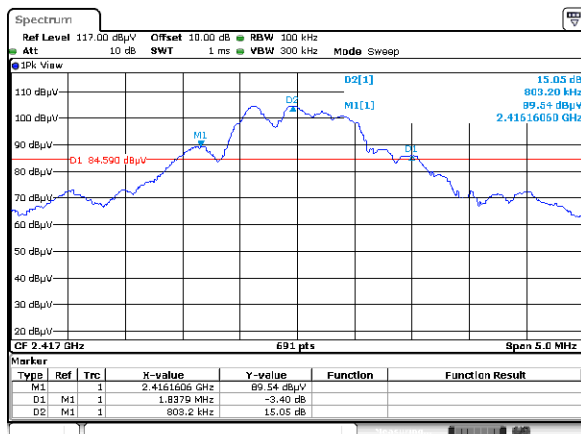


20dB Bandwidth, GFSK

2406 MHz



2417 MHz



2436 MHz

