



Test Report No.:
FCC2023-0025-RF1

RF Test Report

EUT	:	Quamtum HotSpot HS2
MODEL	:	HotSpot HS2
BRAND NAME	:	QUAMTUM CONNECTIVITY DE MÉXICO, S.A. DE C.V.
APPLICANT	:	QUAMTUM CONNECTIVITY DE MEXICO, S.A. DE C.V.
Classification Of Test	:	N/A

CVC Testing Technology Co., Ltd.



Applicant		Name: QUAMTUM CONNECTIVITY DE MEXICO, S.A. DE C.V. Address: Torcuato Tasso 245, Despacho 403, Oficina 21Col. Polanco V Sección, C.P. 11560 Alcaldía Miguel Hidalgo, CDMX,México	
Manufacturer		Name: QUAMTUM CONNECTIVITY DE MEXICO, S.A. DE C.V. Address: Torcuato Tasso 245, Despacho 403, Oficina 21Col. Polanco V Sección, C.P. 11560 Alcaldía Miguel Hidalgo, CDMX,México	
Equipment Under Test		Product Name: Quantum HotSpot HS2 Model/Type: HotSpot HS2 Brand Name: QUAMTUM CONNECTIVITY DE MÉXICO, S.A. DE C.V. Serial NO.: N/A Sample NO.:4-1	
Date of Receipt.	2023.05.10	Date of Testing	2023.05.10~2023.05.26
Test Specification		Test Result	
FCC Part 15, Subpart C, Section 15.247		PASS	
Evaluation of Test Result		The equipment under test was found to comply with the requirements of the standards applied. Seal of CVC Issue Date: 2023.06.09	
Tested by:  Xu ZhenFei Name Signature		Reviewed by:  Liu YongHai Name Signature	Approved by:  Chen HuaWen Name Signature
Other Aspects: NONE.			
Abbreviations:OK, Pass= passed Fail = failed N/A= not applicable EUT= equipment, sample(s) under tested			

This test report relates only to the EUT, and shall not be reproduced except in full, without written approval of CVC.



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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
FCC2023-0025-RF1	Original release	2023.06.09



1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C, Canada RSS-247, Canada RSS-Gen			
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT	REMARK
FCC 15.207	AC Power Conducted Emission	PASS	See setion 3.1
FCC 15.247(d) FCC 15.209	Radiated Emissions	PASS	See setion 3.2
FCC 15.247(d)	Out of band Emission Measurement	PASS	Annex E&F&G of FCC2023-0025-RF1-A1
FCC 15.247(a)(2)	6dB bandwidth	PASS	Annex A of FCC2023-0025-RF1-A1
--	Occupied Bandwidth Measurement	PASS	Annex B of FCC2023-0025-RF1-A1
FCC 15.247(b)	Conducted Output power	PASS	Annex C of FCC2023-0025-RF1-A1
FCC 15.247(e)	Power Spectral Density	PASS	Annex D of FCC2023-0025-RF1-A1
FCC 15.203	Antenna Requirement	PASS	No antenna connector is used



1.1 LIST OF TEST AND MEASUREMENT INSTRUMENTS

Test Equipment	Type/Mode	SERIAL NO.	Equipment No.	Manufacturer	Cal. Due
WIFI & Bluetooth Test System 1					/
Communication Shielded Room 1	4m*3m*3m	CRTDSWKS44301	VGDS-0699	CRT	2024/04/24
Spectrum Analyzer	FSV40	101580	DZ-000238-3	R&S	2023/06/05
Analog Signal Generator	SMB100A	181858	DZ-000238-2	R&S	2023/06/05
Vector Signal Generator	SGT100A	111661	DZ-000238-1	R&S	2023/06/05
RF Radio Frequency Switch	JS0806-2	19H9080187		Tonscend	2023/06/06
Spectrum Analyzer	FSV40	101580	DZ-000238-3	R&S	2023/06/05
Radiation SpuriousTest System					/
3m Semi-Anechoic Chamber	FACT-4	ST08035	WKNA-0024	ETS	2024/12/12
Loop Antenna	FMZB1513	1513-170	EM-000384	SCHWARZBECK	2024-02-24
Spectrum Analyzer	N9010B	MY57470323	DZ-000174	KEYSIGHT	2024-02-22
EMI Test Receiver (3M)	N9038A-508	MY532290079	EM-000397	Agilent	2024-02-22
Broadband Antenna	VULB 9163	9163-530	EM-000342	SCHWARZBECK	2023/06/25
Waveguide Horn Antenna	BBHA9120B	602	EM-000383	SCHWARZBECK	2024-01-11
Waveguide Horn Antenna	HF906	360306/008	WKNA-0024-8	R&S	2024-02-24
Preamplifier	BBV 9721	9721-050	DZ-000209-1	SCHWARZBECK	2023/06/05
5G Bandstop Filters	WRCJV12-4900-5100-5900-6100-50EE	1	DZ-000186	WI	2023/12/06
Comprehensive tester	CMW500	159000	DZ-000240-2	R&S	2023/12/06
Conducted emission					/
EMI Test Receiver	ESW44	103123	EM-000698	R&S	2023-06-17
EMI Test Receiver	ESR3	102394	VG DY-0705	R&S	2024-02-22
LISN	NSLK 8127	8127644	VG DY-0150	SCHWARZBECK	2023-09-03
LISN	NSLK 8128	8128-316	VG DY-0149	SCHWARZBECK	2023-09-03
DC LISN	PVDC8301-017	PVDC8301#17	VG DY-0692	SCHWARZBECK	2023-10-07
LISN	NSLK 8129	8129-268	EM-000388	SCHWARZBECK	2024-02-22
Plus Limiter (#1)	VTSD 9561 F-N	00515	VG DY-0808	SCHWARZBECK	2024-03-03
Plus Limiter (#2)	VTSD 9561	9561-F017	VG DY-0152	SCHWARZBECK	2024-09-03
Impedance Stabilization Network	ISN T800	27095	WKNE-0195	TESEQ	2023-09-03
Impedance Stabilization Network	NTFM8158	8158-0092	VG DY-0356	SCHWARZBECK	2023-06-06
ImpedanceStabilizationNetwork	NTFM8131	#184	EM-000498	SCHWARZBECK	2023-06-06
Voltage Probe	TK9420	9420-499	VG DY-0128	SCHWARZBECK	2024-02-22
Power Divider	4901.17.B	22643830	DB-0016	HUBER+SUHNE R	2023-08-31
Video Signal Generator	GV-798+	151064920001	VGDS-0215	PROMAX	2023-05-29
AudioSignalGenerator	GAG-810	EK871591	EM-000309	GW	2023-12-06
Shielding Room(#1)	GP1A	001	WKNF-0001	LEINING	2024-08-07



1.2 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:

No.	ITEM	FREQUENCY	UNCERTAINTY
1	Conducted emissions	9kHz~30MHz	±2.66dB
2	Radiated emissions	9KHz ~ 30MHz	±0.769dB
		30MHz ~ 1GMHz	±0.877dB
		1GHz ~ 18GHz	±0.777dB
		18GHz ~ 40GHz	±1.315dB

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

1.3 TEST LOCATION

The tests and measurements refer to this report were performed by EMC testing Lab. of CVC Testing Technology Co., Ltd.

CABID:CN0103

Address: No.3,TiantaiyiRoad,KaitaiAvenue,ScienceCity,Guangzhou,China

Post Code: 510663 Tel: 0755-23763060-8805

Fax: 0755-23763060 E-mail: sz-kf@cvc.org.cn

<http://www.cvc.org.cn>



2 GENERAL INFORMATION

2.1 GENERAL PRODUCT INFORMATION

PRODUCT	Quamtum HotSpot HS2
BRAND	QUANTUM CONNECTIVITY DE MÉXICO, S.A. DE C.V.
TEST MODEL	HotSpot HS2
ADDITIONAL MODEL	N/A
FCC ID	2A3WD-HS2
POWER SUPPLY	DC 3.8 from Battery or USB host unit
MODULATIONTECHNOLOGY	DSSS, OFDM
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
OPERATING FREQUENCY	2412MHz ~ 2462MHz for 11b/g/n(HT20) 2422MHz ~ 2452MHz for 11n(HT40)
NUMBER OF CHANNEL	802.11b/g/n(HT20): 11 802.11n(HT40): 7
PEAK OUTPUT POWER	WLAN: 21.29dBm (Maximum)
ANTENNA TYPE(Note 4)	WLAN: ANT1: PIFA Antenna, with 1.8dBi gain ANT2: PIFA Antenna, with 1.8dBi gain
FIX FREQUENCY SOFTWARE	ADB
HW	V1.0
SW	HotSpot HS2_TELCEL Ver 1.0
I/O PORTS	Refer to user's manual
CABLE SUPPLIED	USB line, 0.35 Meter, Shielded without ferrite
Note: 1. For more detailed features description, please refer to the manufacturer's specifications or the User's Manual. 2. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report. 3. Please refer to the EUT photo document for detailed product photo. (Report NO.:FCC2023-0025-E) 4. Since the above data and/or information is provided by the client relevant results or conclusions of this report are only made for these data and/or information, CVC is not responsible for the authenticity, integrity and results of the data and information and/or the validity of the conclusion. 5. The EUT have MIMO function, provides 2 completed transmitter and 2 receiver	



2.2 OTHER INFORMATION

Operating frequency of each channel

2.4G WIFI					
802.11b/g/n(HT20)					
CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)
1	2412	5	2432	9	2452
2	2417	6	2437	10	2457
3	2422	7	2442	11	2462
4	2427	8	2447		
802.11n(HT40)					
CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)
3	2422	6	2437	9	2452
4	2427	7	2442		
5	2432	8	2447		

1. The channels which were indicated in bold type of the above channel list were selected as representative test channel. Therefore only the data of the test channels were recorded in this report.
2. By means of test software which provided by manufacture, the power levels during the tests were set

802.11b		802.11g		802.11n(HT20)		802.11n(HT40)	
FREQUEN CY(MHZ)	POWER SETTING	FREQUEN CY(MHZ)	POWER SETTING	FREQUEN CY(MHZ)	POWER SETTING	FREQUEN CY(MHZ)	POWER SETTING
2412	44	2412	44	2412	44	2422	44
2437	44	2437	44	2437	40	2437	42
2462	44	2462	44	2462	42	2452	42

2.3 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, xyz axis and antenna ports

EUT CONFIGURE MODE	APPLICABLE TEST ITEMS				DESCRIPTION
	RE<1G	RE≥1G	PLC	APCM	
A	√	√	√	√	2.4G WIFI Function

Where **RE<1G**: Radiated Emission below 1GHz
PLC: Power Line Conducted Emission

RE≥1G: Radiated Emission above 1GHz
APCM: Antenna Port Conducted Measurement

MODULATION	DATA RATE
802.11b	1Mbps
802.11g	6Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0

RADIATED EMISSION TEST (BELOW 1 GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis, antenna ports (if EUT with antenna diversity architecture) and packet type.
- ☒ The worst case was found when positioned on x axis for radiated emission. Following channel(s) was (were) selected for the final test as listed below:

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11b	1 to 11	1	DSSS	DBPSK	6.0

For the test results, only the worst case was shown in test report.

RADIATED EMISSION TEST (ABOVE 1 GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis, antenna ports (if EUT with antenna diversity architecture) and packet type.
- ☒ The worst case was found when positioned on x axis for radiated emission. Following channel(s) was (were) selected for the final test as listed below:

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE PARAMETER
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0 Mbps
A	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0 Mbps
A	802.11n(HT20)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0
A	802.11n(HT40)	3 to 9	3, 6, 9	OFDM	BPSK	MCS0



POWER LINE CONDUCTED EMISSION TEST:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, antenna ports (if EUT with antenna diversity architecture), and packet types.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	TESTED CONDITION
-	WIFI (2.4G) Link

ANTENNA PORT CONDUCTED MEASUREMENT:

- ☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, antenna ports (if EUT with antenna diversity architecture), and packet types.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0 Mbps
A	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0 Mbps
A	802.11n(HT20)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0
A	802.11n(HT40)	3 to 9	3, 6, 9	OFDM	BPSK	MCS0

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	TEST VOLTAGE (SYSTEM)	TESTED BY
RE<1G	24deg. C, 55%RH	DC 3.80V from battery	LiuShiWei
RE≥1G	24deg. C, 55%RH	DC 3.80V from battery	LiuShiWei
PLC	24deg. C, 55%RH	DC 3.80V from battery	LiuShiWei
APCM	25deg. C, 58%RH	DC 3.80V from battery	LiuShiWei



2.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product, according to the specifications of the manufacturers. It must comply with the requirements of the following standards:

FCC PART 15, Subpart C. Section 15.247
KDB 558074 D01 15.247 Meas Guidance v05r02
KDB 662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10-2013

All test items have been performed and recorded as per the above standards

2.5 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.

Support Equipment							
NO	Description	Brand	Model No.	Serial Number	Supplied by		
N/A	N/A	N/A	N/A	N/A	N/A		
Support Cable							
NO	Description	Quantity (Number)	Length (cm)	Detachable (Yes/ No)	Shielded (Yes/ No)	Cores (Number)	Supplied by
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

3 TEST TYPES AND RESULTS

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 Limit

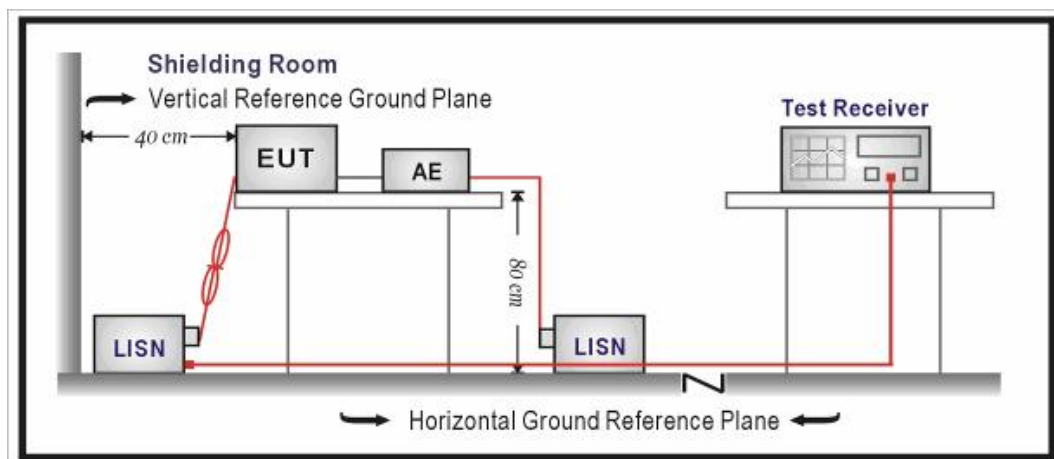
Frequency (MHz)	Conducted Limits(dBμV)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56 *	56 to 46*
0.5 - 5	56	46
5 - 30	60	50

NOTE: 1. The lower limit shall apply at the transition frequencies.
NOTE: 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

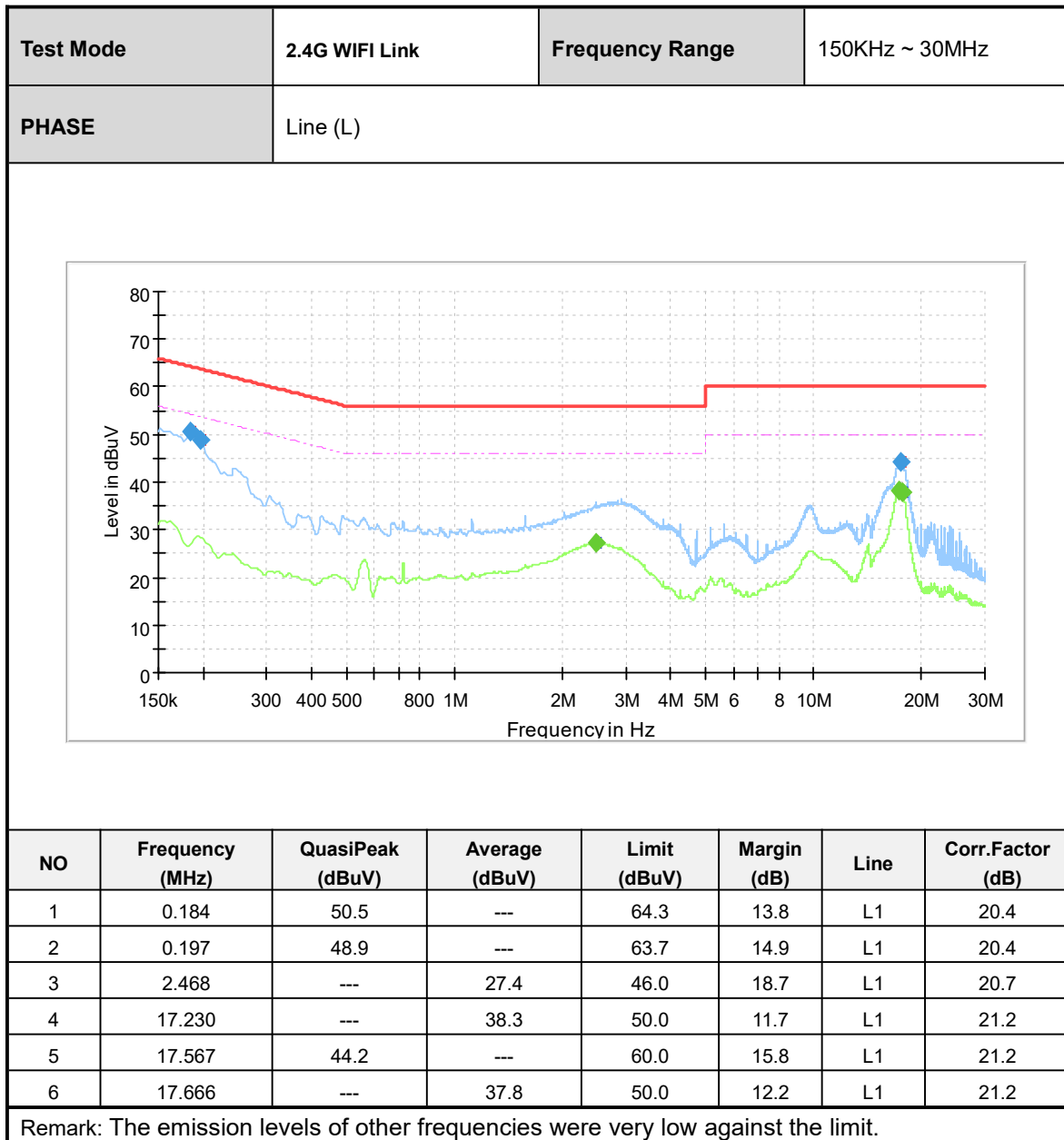
3.1.2 Measurement procedure

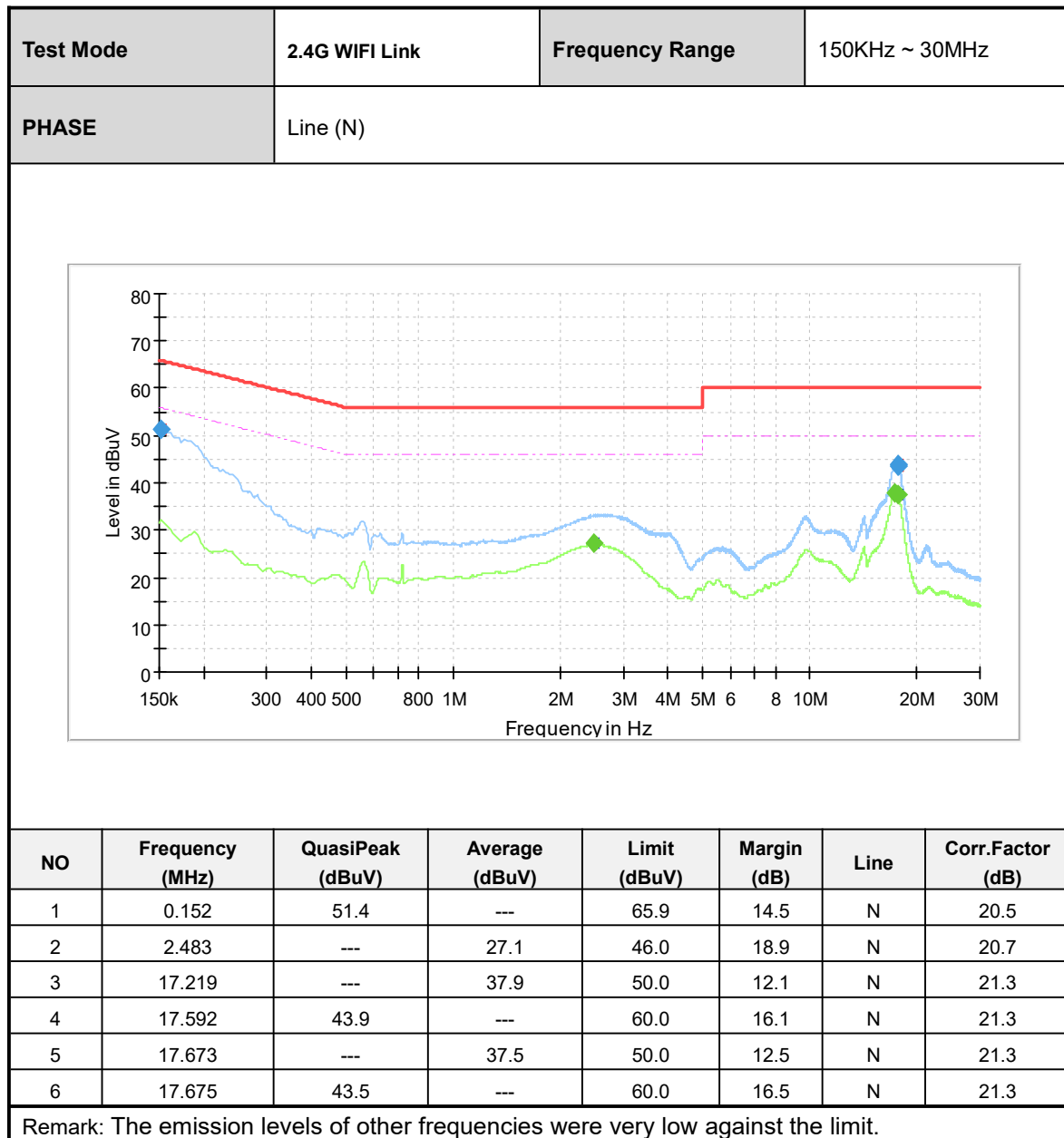
- The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the Test photographs) Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source. The equipment under test shall be placed on a support of non-metallic material, the height of which shall be 1.5m above the ground,
- The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
- Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.

3.1.3 Test setup



3.1.4 Test results







3.2 RADIATED EMISSION AND BANDEDGE MEASUREMENT

3.2.1 Limit

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

FREQUENCIES (MHz)	FIELD STRENGTH (Microvolts/Meter)	MEASUREMENT DISTANCE (Meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTE: 1. The lower limit shall apply at the transition frequencies.
NOTE: 2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
NOTE: 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.

3.2.2 Measurement procedure

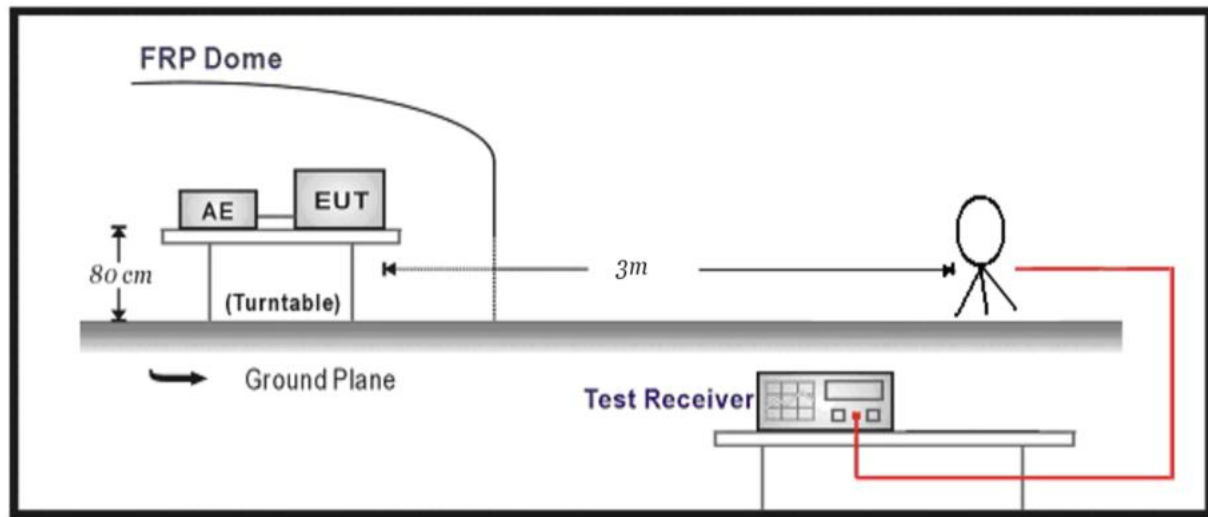
- The EUT was placed on the top of a rotating table 1.5 meters(above 1GHz) and 0.8 meters(below 1GHz) above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- For below 1GHz was used bilog antenna, and above 1GHz was used horn antenna, and its height 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.
- 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.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- For below 30MHz, a loop antenna with its vertical plane is place 3m from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1m above the ground.
- During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, For battery operated equipment, the equipment tests shall be perform using fresh batteries. The turntable was rotated to maximize the emission level.

NOTE:

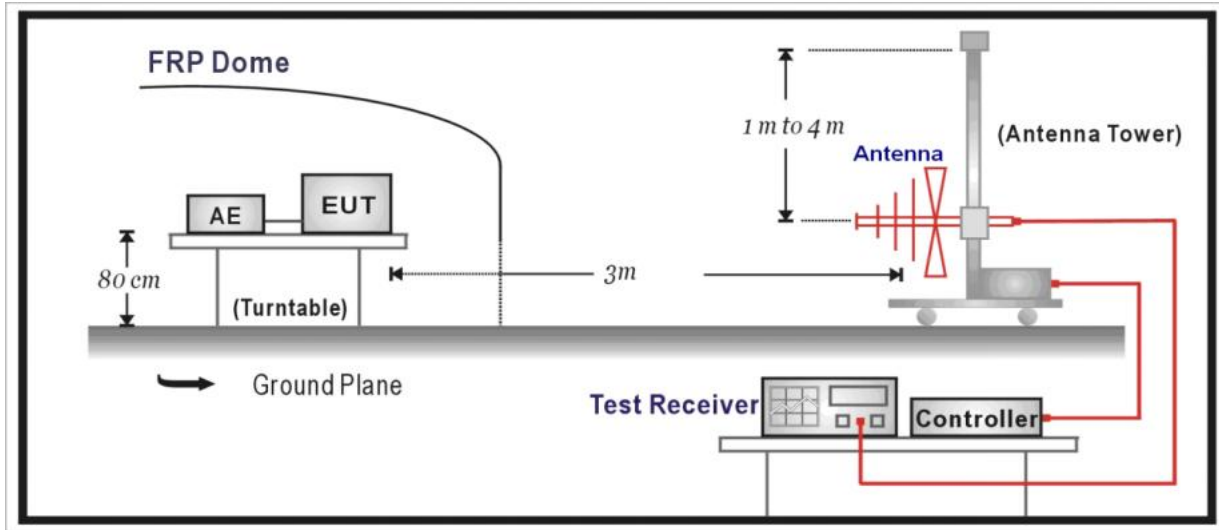
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz(Duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.
5. The testing of the EUT was performed on all 3 orthogonal axes; the worst-case test configuration was reported on the file test setup photo.

3.2.3 Test setup

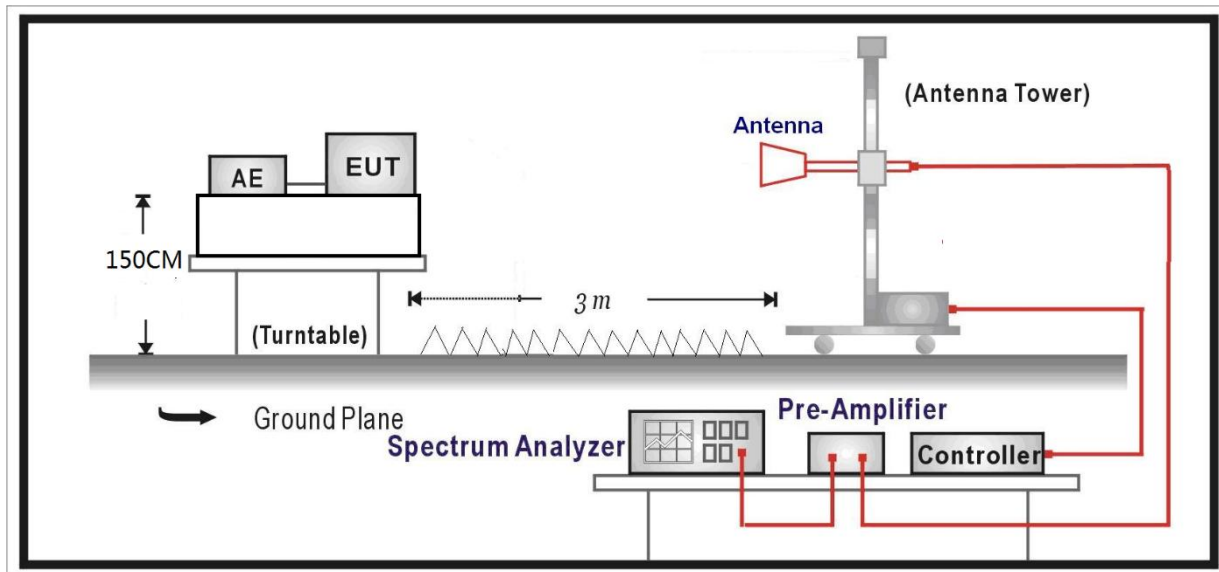
Below 30MHz Test Setup:



Below 1GHz Test Setup:

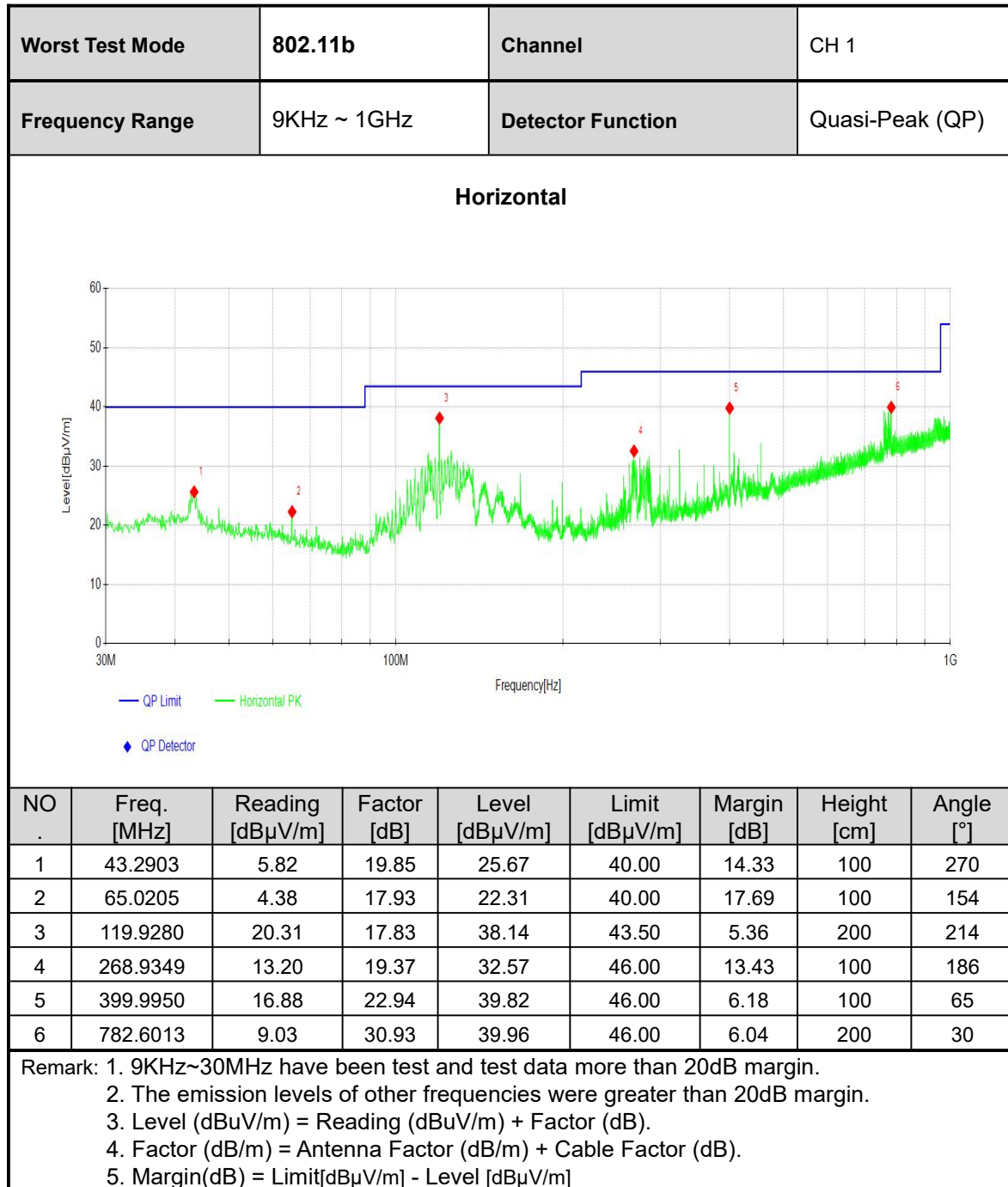


Above 1GHz Test Setup:

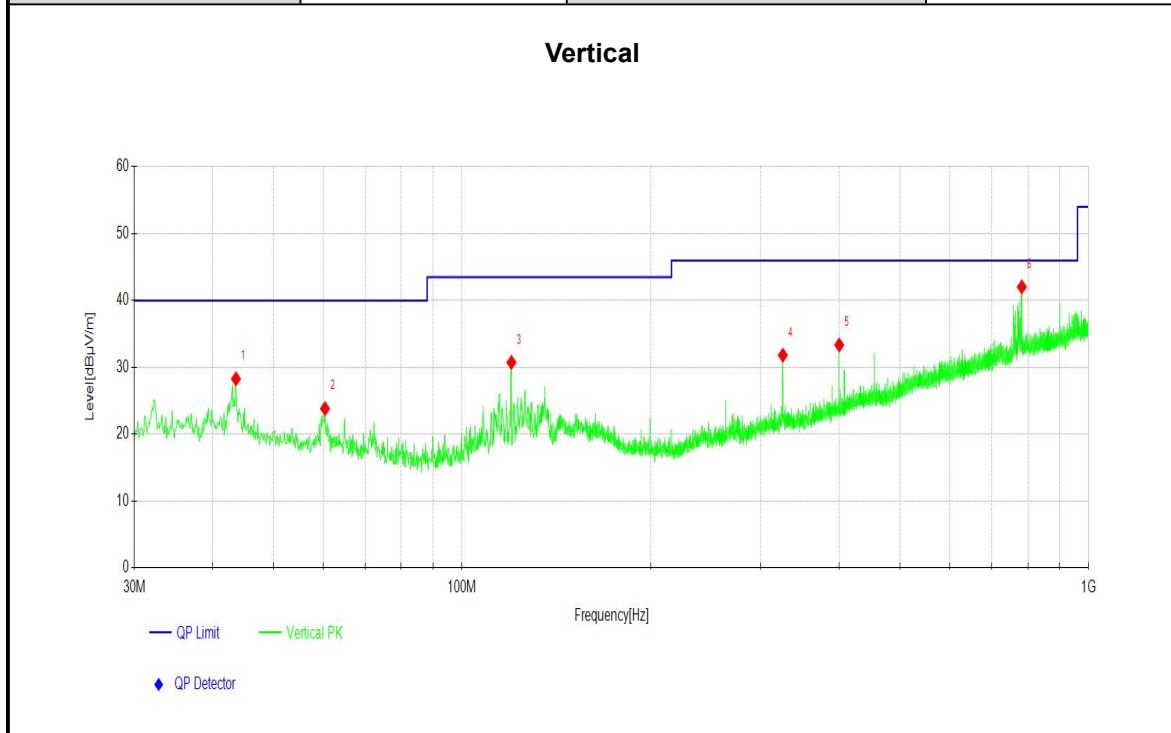


3.2.4 Test results

BELOW 1GHz WORST-CASE DATA:



Worst Test Mode	802.11b	Channel	CH 1
Frequency Range	9KHz ~ 1GHz	Detector Function	Quasi-Peak (QP)



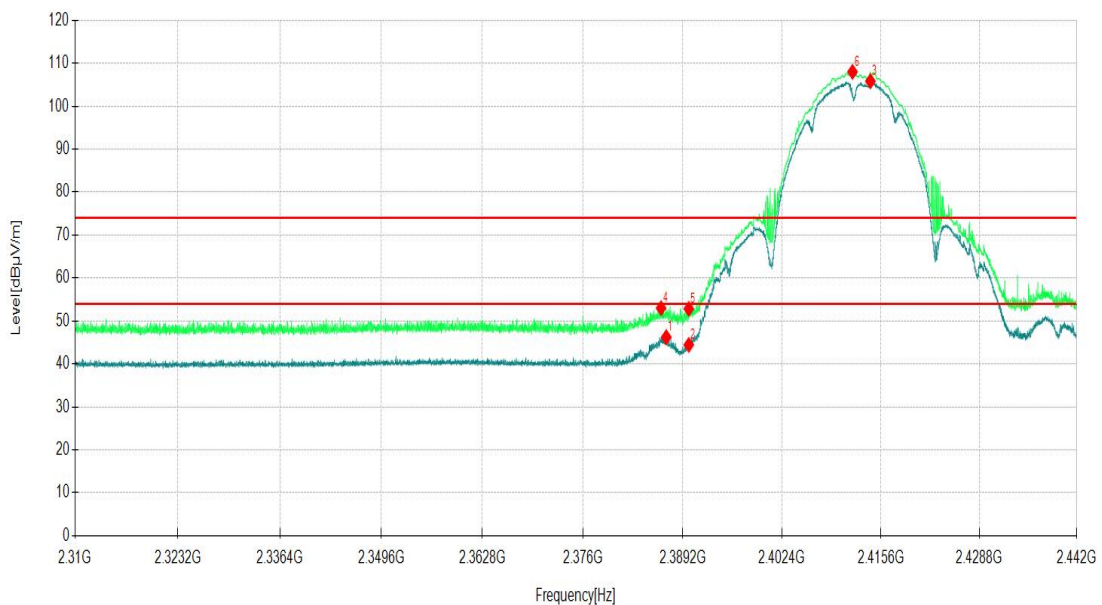
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]
1	43.5814	8.43	19.86	28.29	40.00	11.71	200	127
2	60.4610	5.19	18.65	23.84	40.00	16.16	100	200
3	119.9280	12.93	17.83	30.76	43.50	12.74	200	293
4	325.2005	10.57	21.27	31.84	46.00	14.16	100	58
5	399.9950	10.43	22.94	33.37	46.00	12.63	100	190
6	782.4072	11.13	30.92	42.05	46.00	3.95	100	319

Remark: 1. 9KHz~30MHz have been test and test data more than 20dB margin.
 2. The emission levels of other frequencies were greater than 20dB margin.
 3. Level (dBμV/m) = Reading (dBμV/m) + Factor (dB).
 4. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 5. Margin(dB) = Limit[dBμV/m] - Level [dBμV/m]

ABOVE 1GHz DATA

Channel	802.11b CH 1	Frequency	2412MHz
Frequency Range	Above 1G	Detector Function	PK/AV

Horizontal



NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector
1	2387.0165	46.42	-0.19	46.23	54.00	7.77	300	296	AV
2	2390	44.58	-0.15	44.43	54.00	9.57	400	290	AV
3	2414.198#	105.63	0.18	105.81			400	342	AV
4	2386.33	53.19	-0.20	52.99	74.00	21.01	400	8	PK
5	2390	52.98	-0.15	52.83	74.00	21.17	100	290	PK
6	2411.8086#	107.85	0.15	108.00			300	342	PK
7	4824	34.55	9.68	44.23	54.00	9.77	400	251	AV
8	7236	20.50	12.39	32.89	54.00	21.11	300	344	AV
9	9648	19.34	13.13	32.47	54.00	21.53	400	238	AV
10	4824	43.25	9.68	52.93	74.00	21.07	200	21	PK
11	7236	28.62	12.39	41.01	74.00	32.99	100	344	PK
12	9648	27.48	13.13	40.61	74.00	33.39	300	82	PK

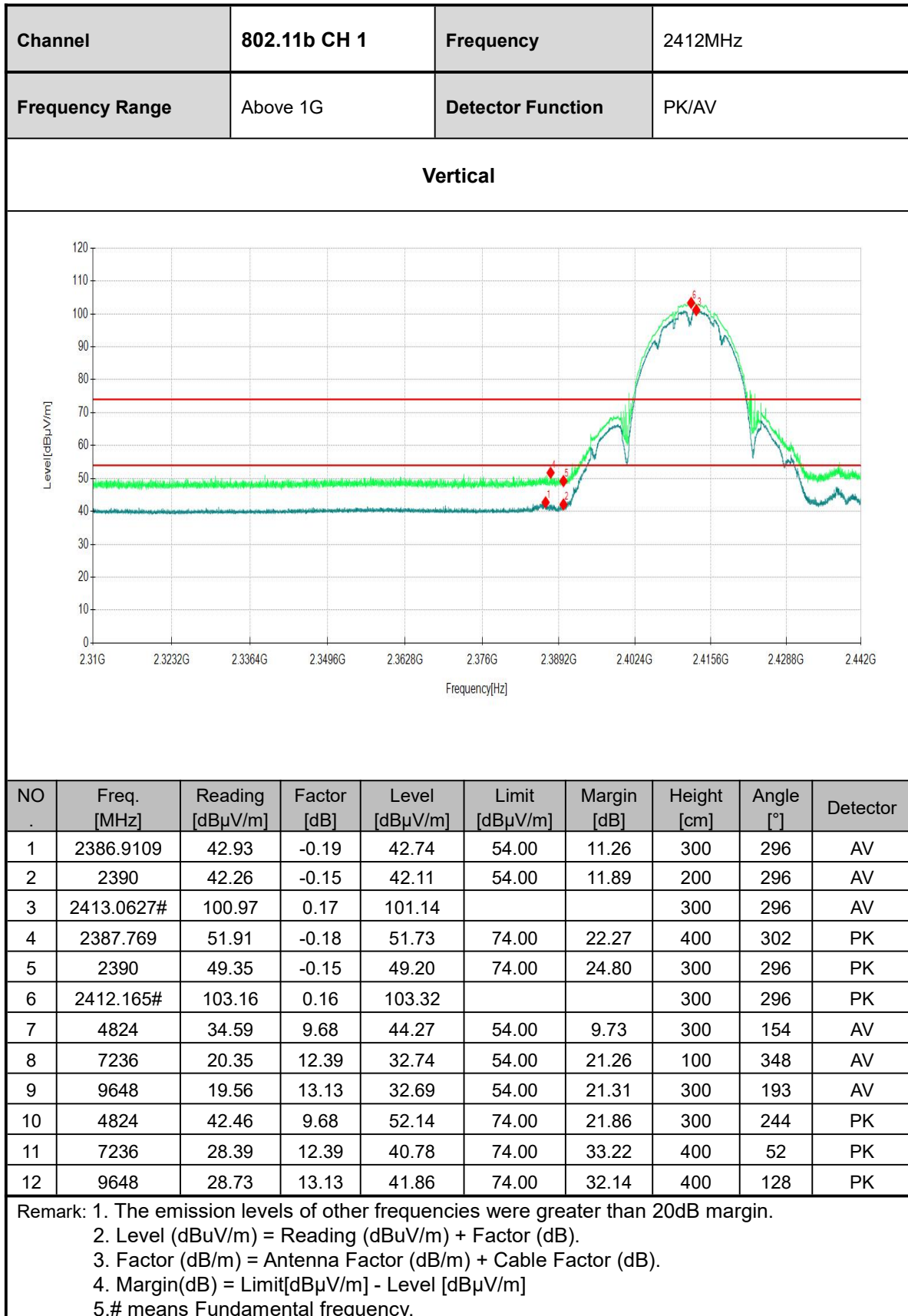
Remark: 1. The emission levels of other frequencies were greater than 20dB margin.

2. Level (dBμV/m) = Reading (dBμV/m) + Factor (dB).

3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).

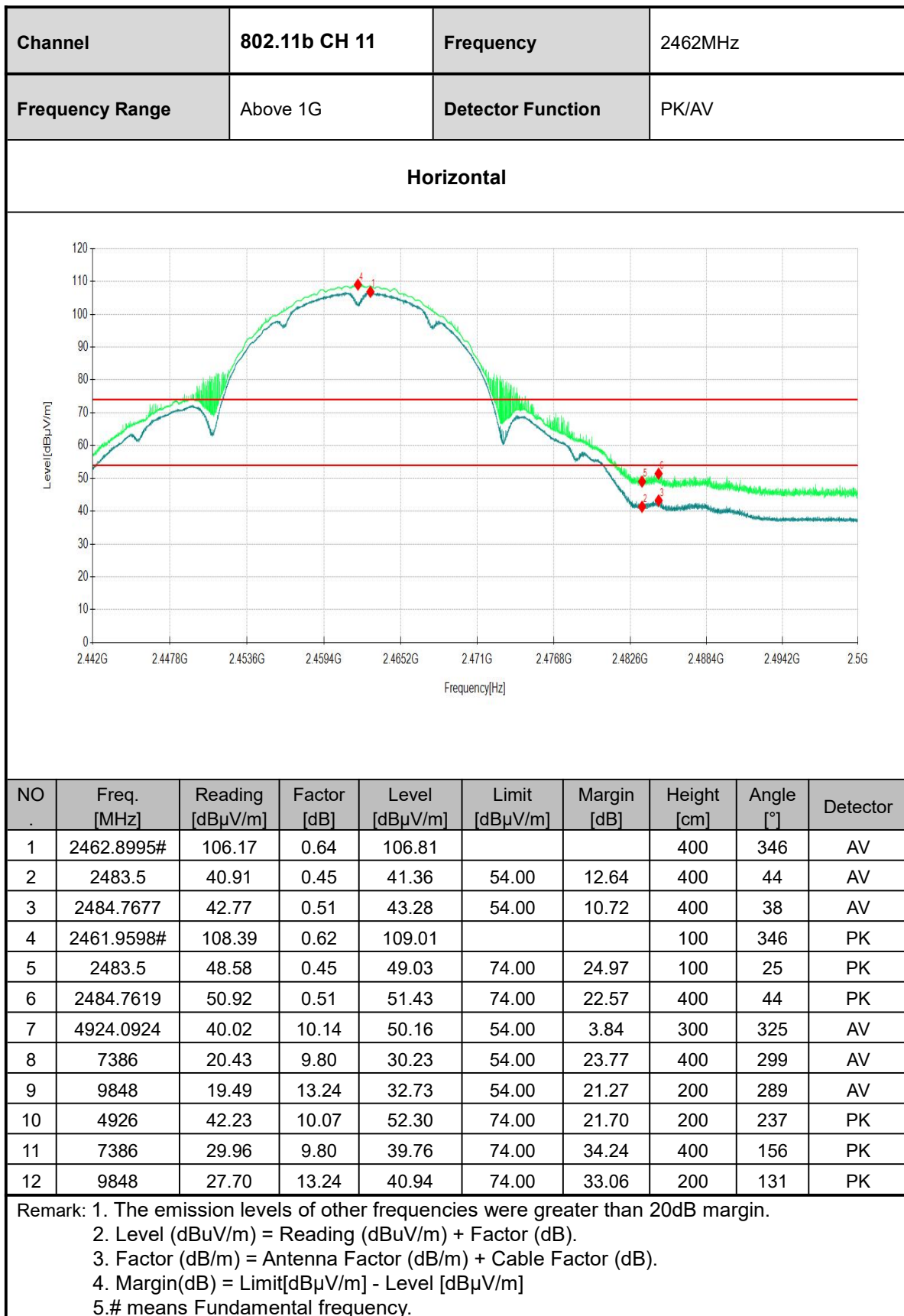
4. Margin(dB) = Limit[dBμV/m] - Level [dBμV/m]

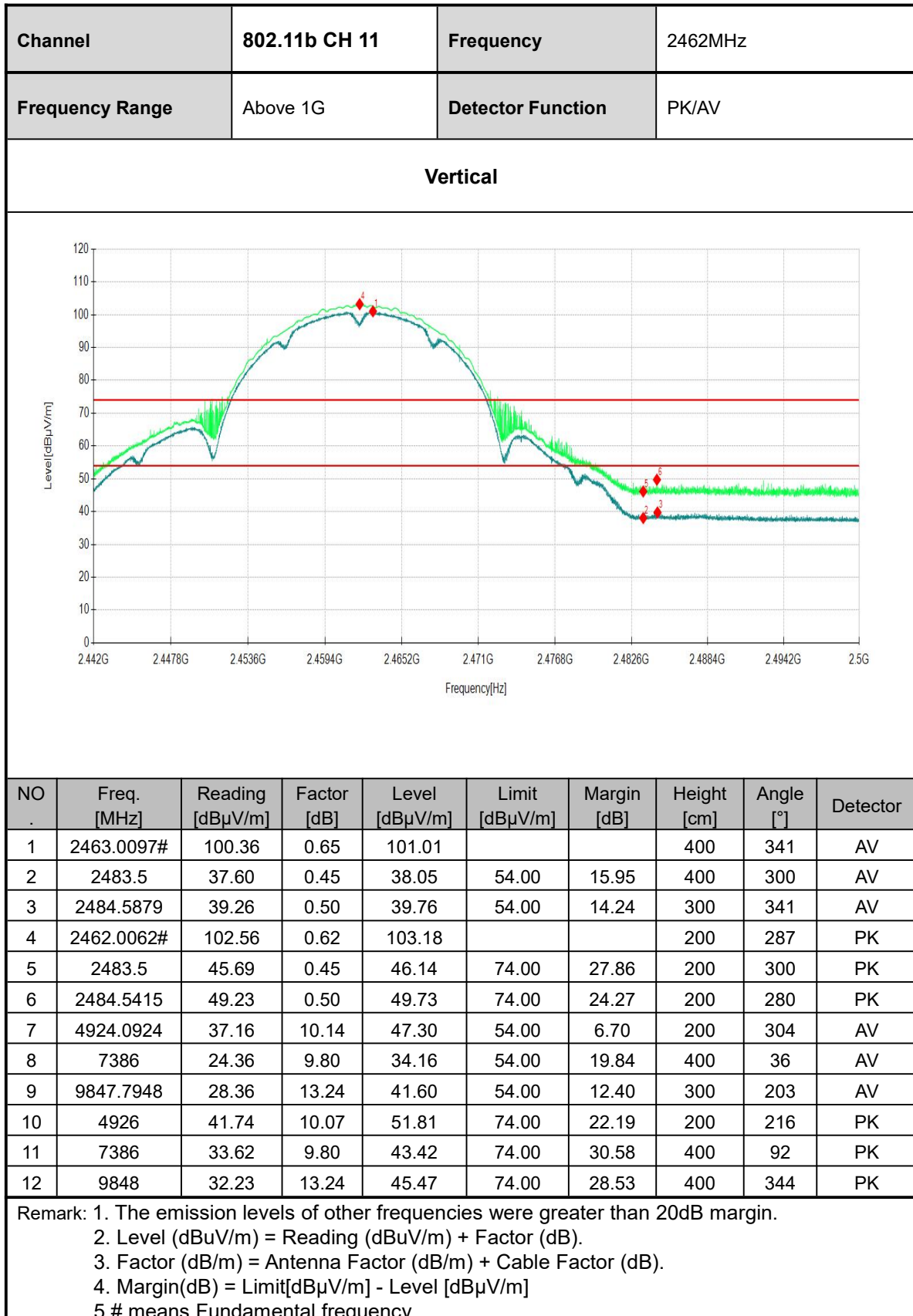
5.# means Fundamental frequency.

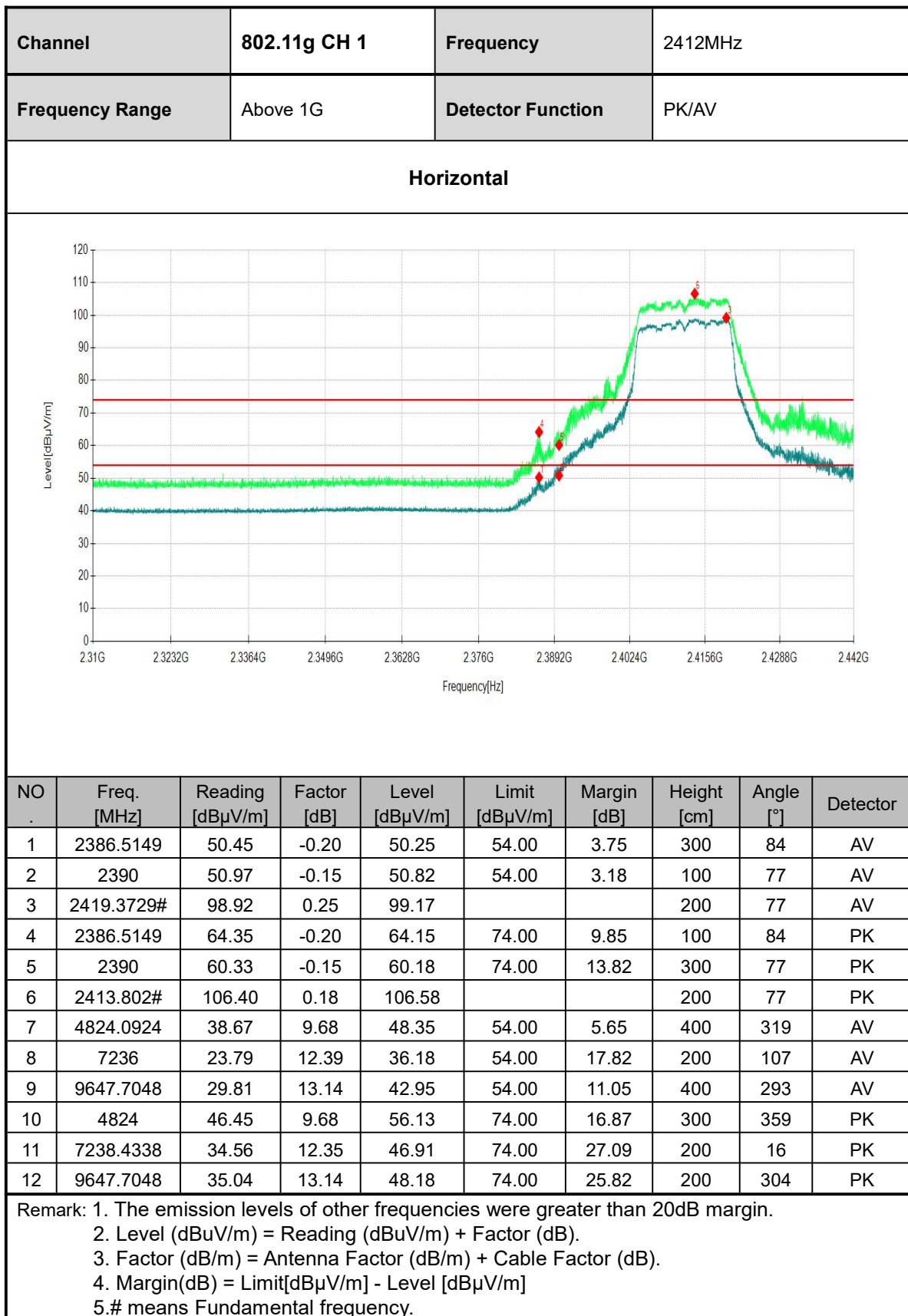


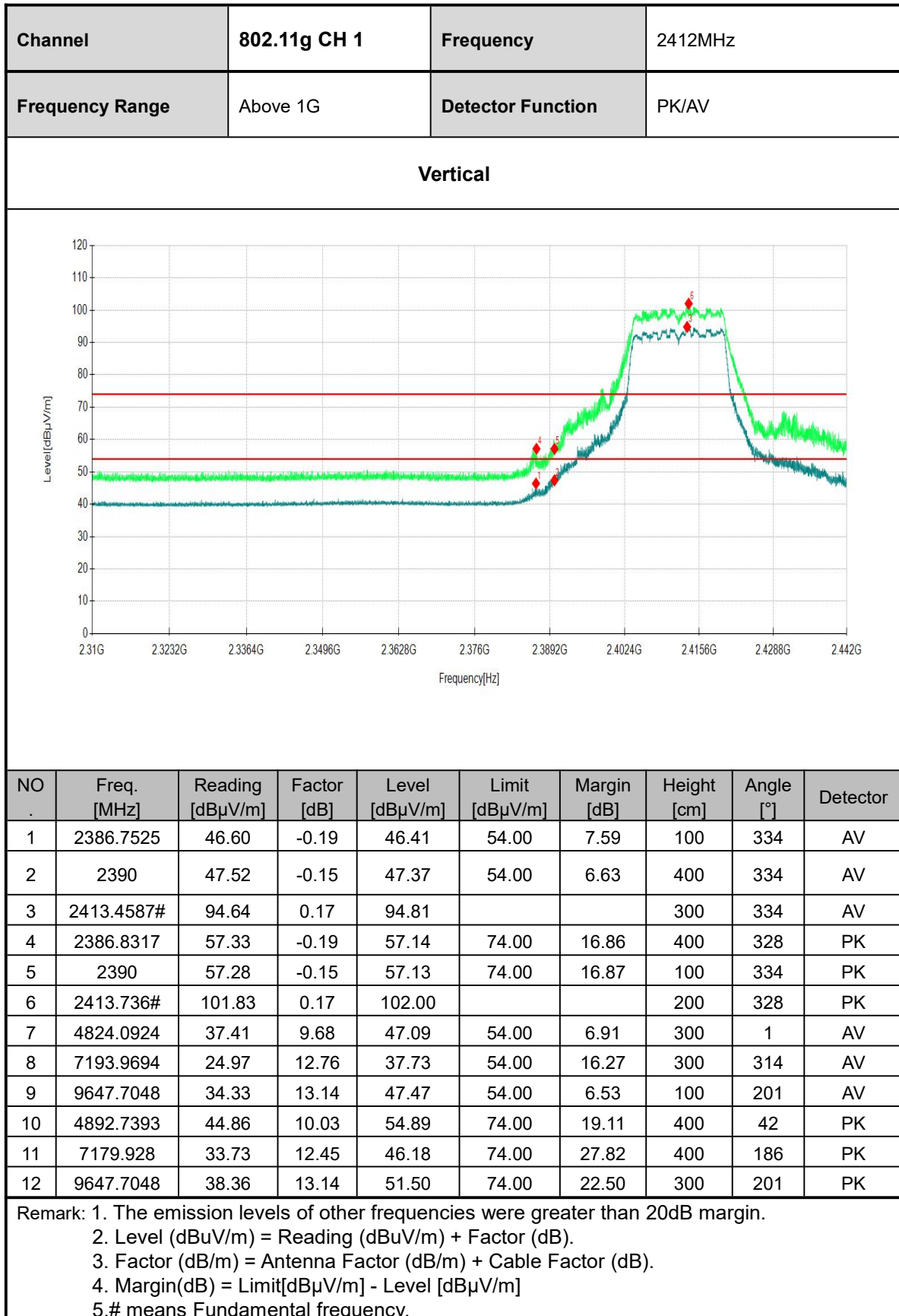


Channel		802.11b CH 6		Frequency		2437MHz			
Frequency Range		Above 1G		Detector Function		PK/AV			
Horizontal									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector
1	4824.0924	41.28	9.68	50.96	54.00	3.04	200	304	AV
2	7311	25.02	11.03	36.05	54.00	17.95	100	1	AV
3	9647.7048	28.00	13.14	41.14	54.00	12.86	200	320	AV
4	4824.0924	46.38	9.68	56.06	74.00	17.94	300	304	PK
5	7311	32.24	11.03	43.27	74.00	30.73	100	51	PK
6	9748	30.66	13.24	43.90	74.00	30.10	200	46	PK
Vertical									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	4874	34.56	9.71	44.27	54.00	9.73	100	61	AV
2	7311	24.55	11.03	35.58	54.00	18.42	200	157	AV
3	9647.7048	30.47	13.14	43.61	54.00	10.39	100	208	AV
4	4874	43.12	9.71	52.83	74.00	21.17	100	61	PK
5	7311	32.43	11.03	43.46	74.00	30.54	300	288	PK
6	9647.7048	34.97	13.14	48.11	74.00	25.89	100	288	PK
Remark: 1. The emission levels of other frequencies were greater than 20dB margin. 2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB). 3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB). 4. Margin(dB) = Limit[dBuV/m] - Level [dBuV/m]									



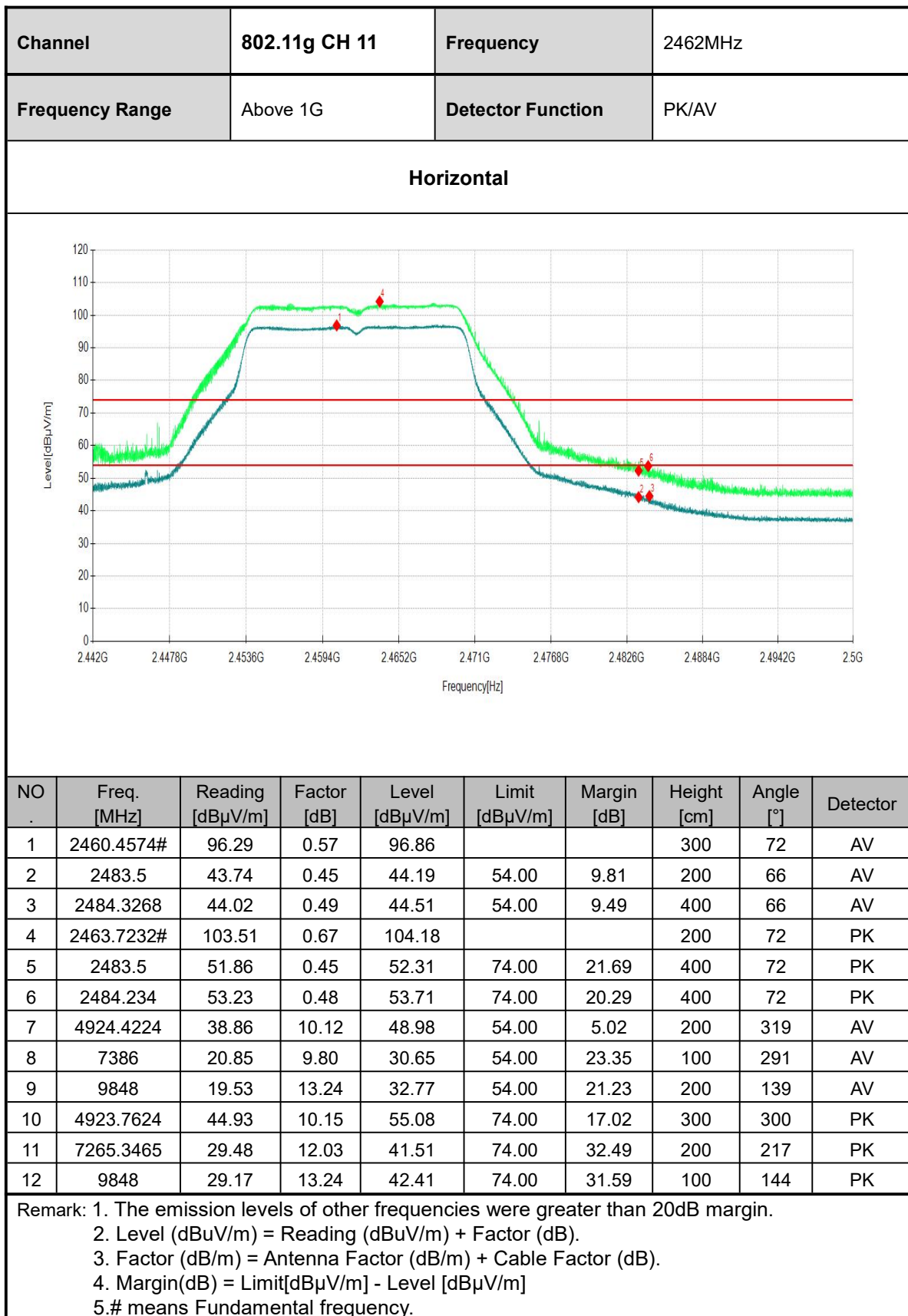


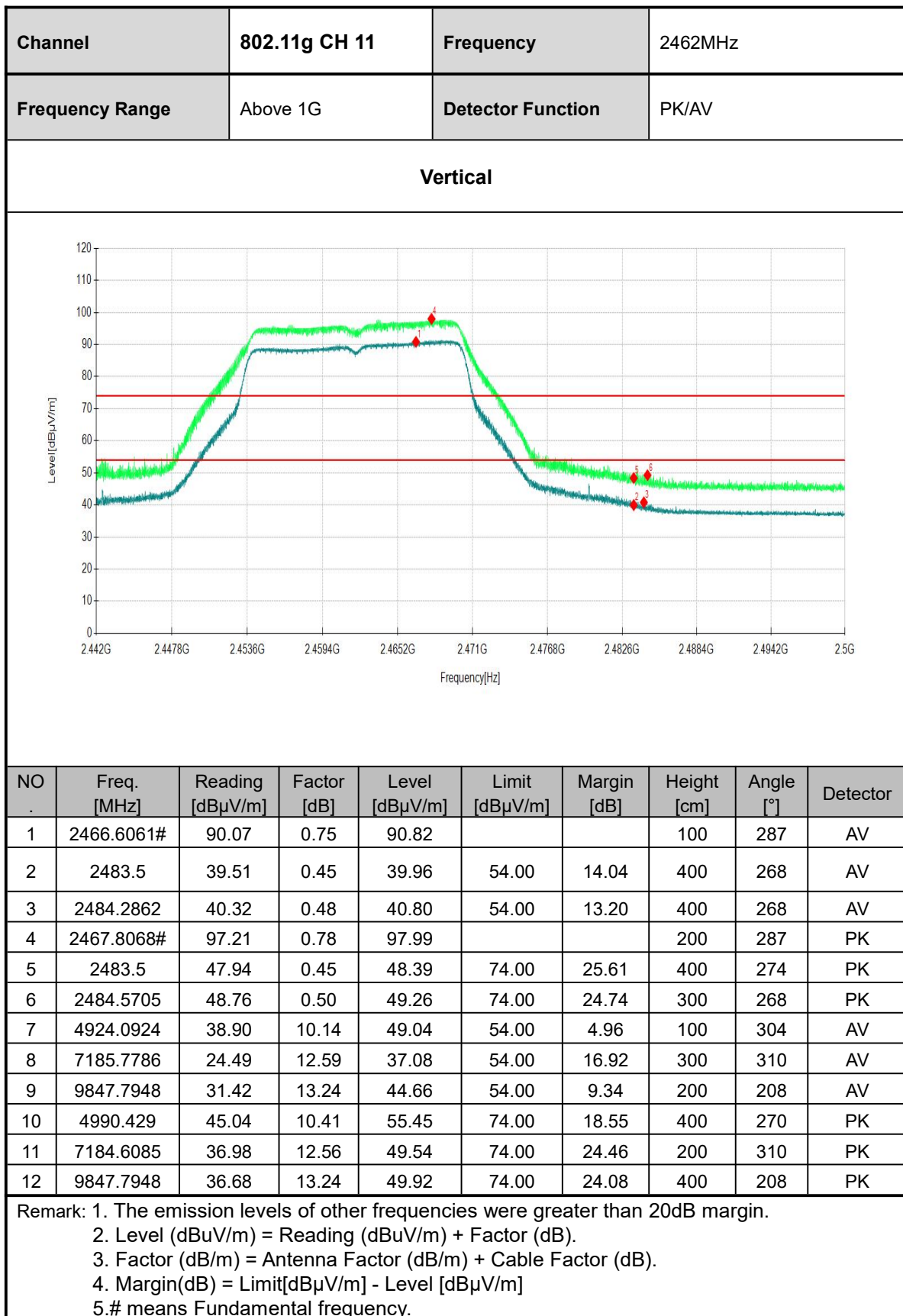


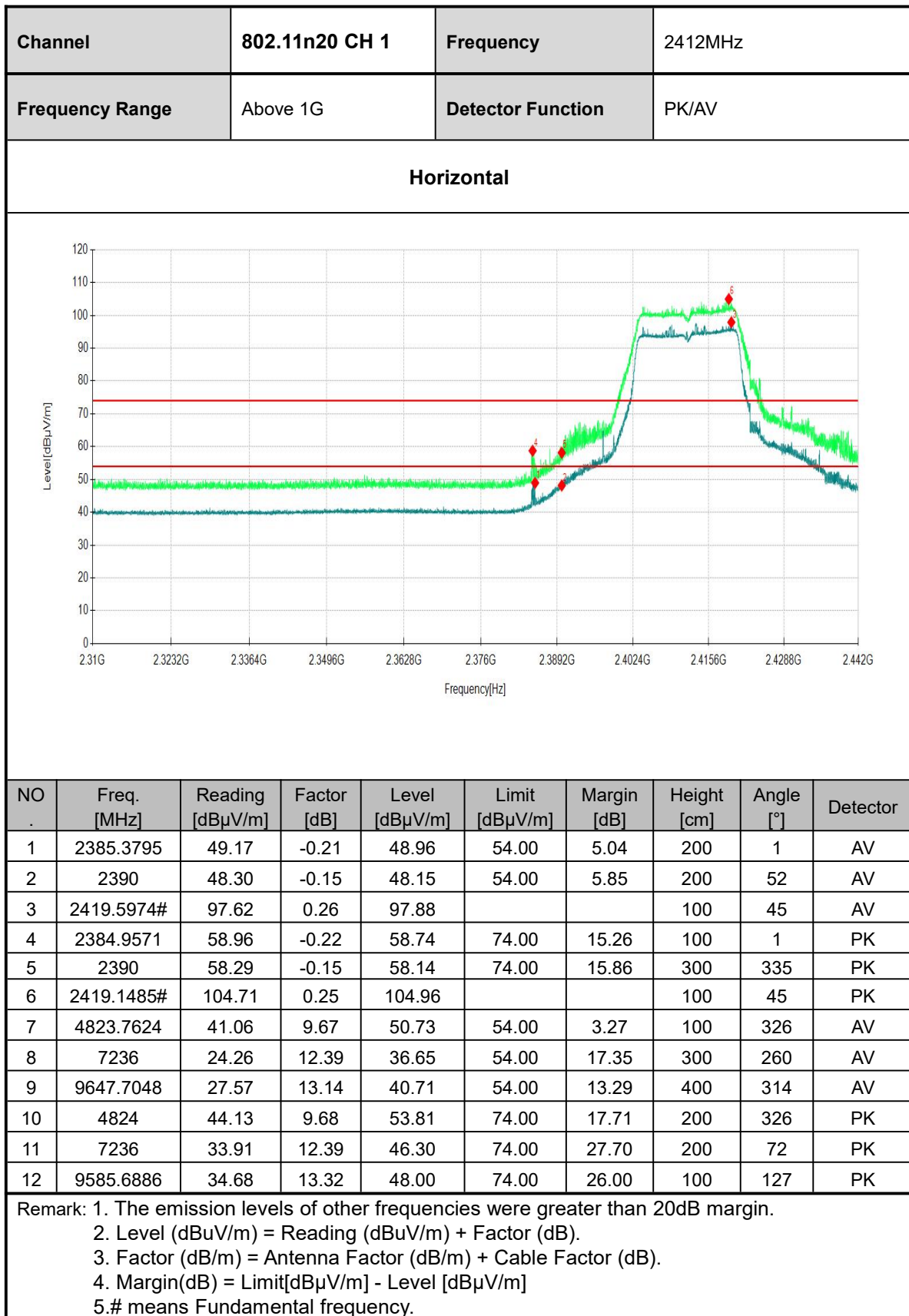


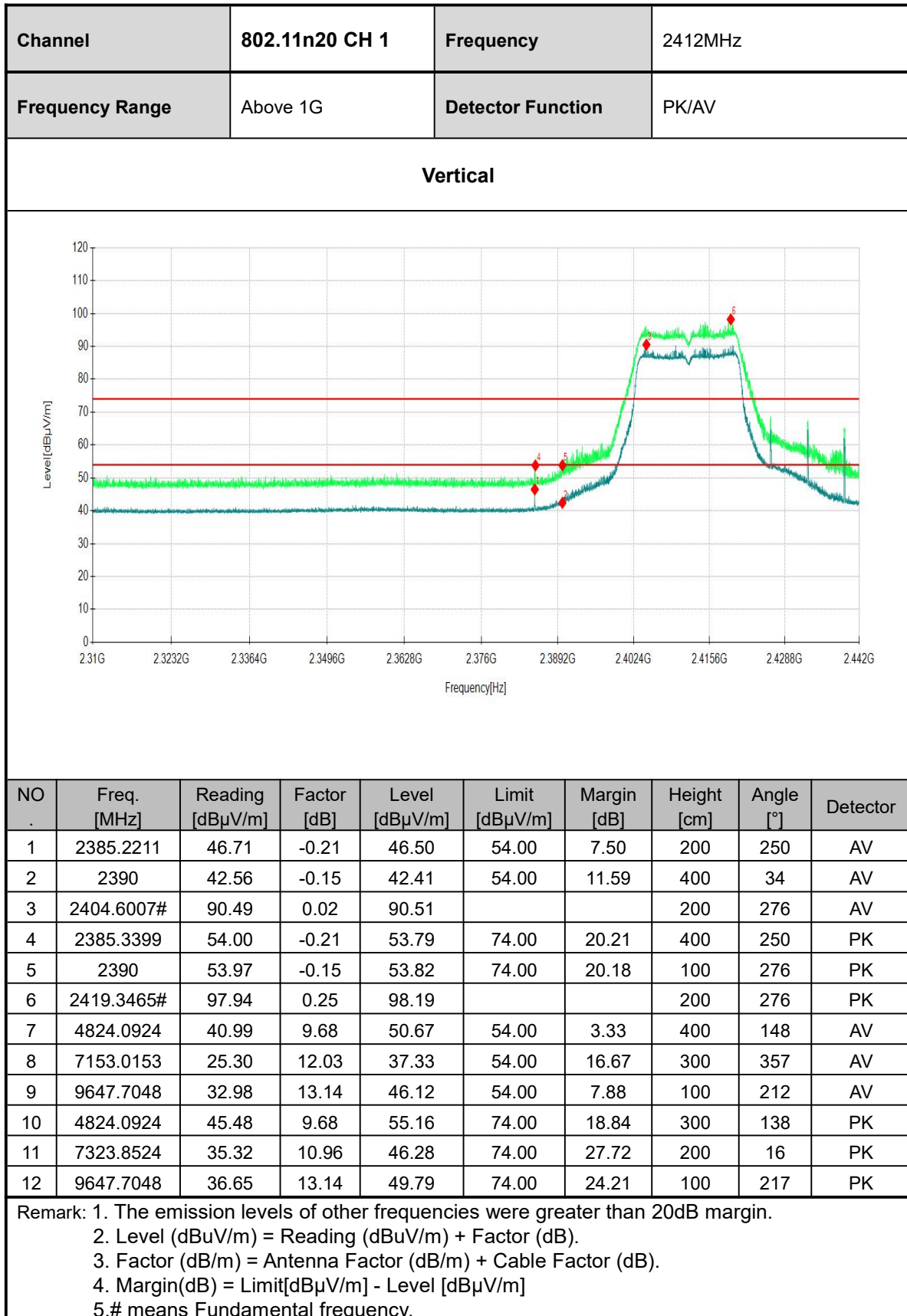


Channel		802.11g CH 6		Frequency		2437MHz			
Frequency Range		Above 1G		Detector Function		PK/AV			
Horizontal									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector
1	4873.9274	38.37	9.69	48.06	54.00	5.94	400	327	AV
2	7311	21.33	11.03	32.36	54.00	21.64	200	119	AV
3	9748	21.98	13.24	35.22	54.00	18.78	100	187	AV
4	4874	46.00	9.71	55.71	74.00	18.29	200	322	PK
5	7311	29.52	11.03	40.55	74.00	33.45	100	143	PK
6	9748	30.48	13.24	43.72	74.00	30.28	400	295	PK
Vertical									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	4874	37.70	9.71	47.41	54.00	6.59	300	308	AV
2	7311	24.35	11.03	35.38	54.00	18.62	200	197	AV
3	9748	29.28	13.24	42.52	54.00	11.48	100	202	AV
4	4874	43.82	9.71	53.53	74.00	20.47	300	298	PK
5	7311	32.01	11.03	43.04	74.00	30.96	400	319	PK
6	9748	35.80	13.24	49.04	74.00	24.96	200	192	PK
Remark: 1. The emission levels of other frequencies were greater than 20dB margin. 2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB). 3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB). 4. Margin(dB) = Limit[dBμV/m] - Level [dBuV/m]									



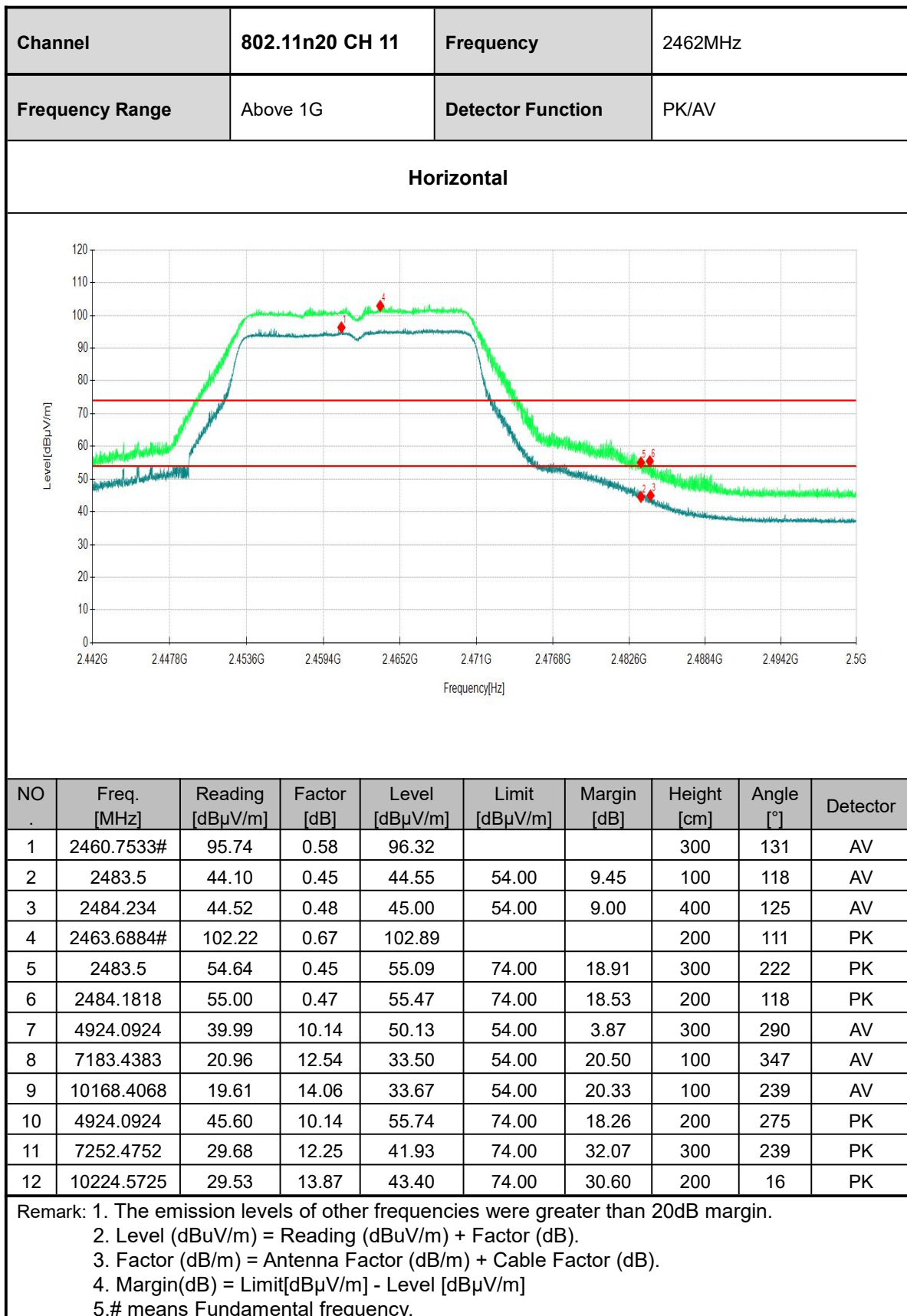


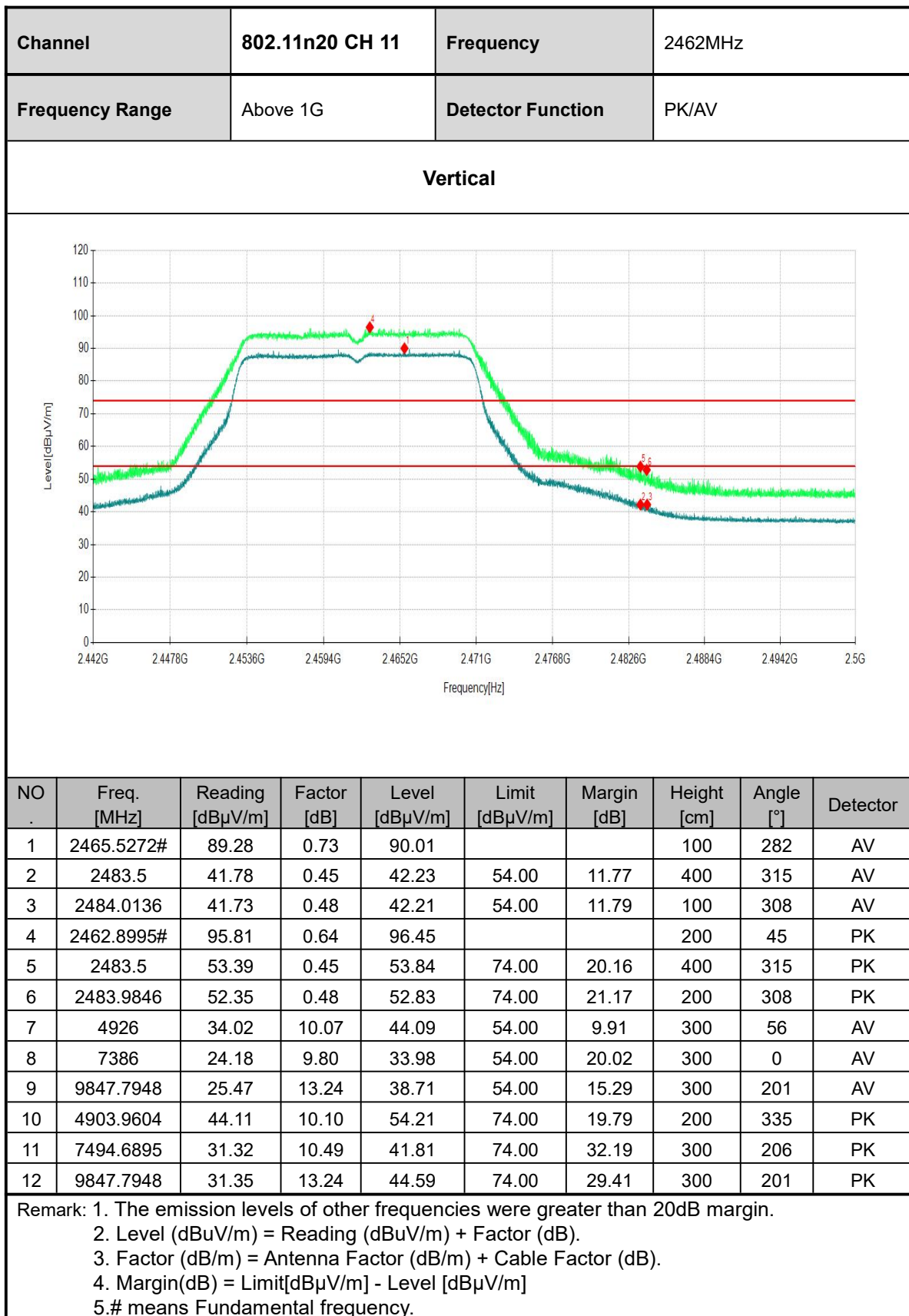


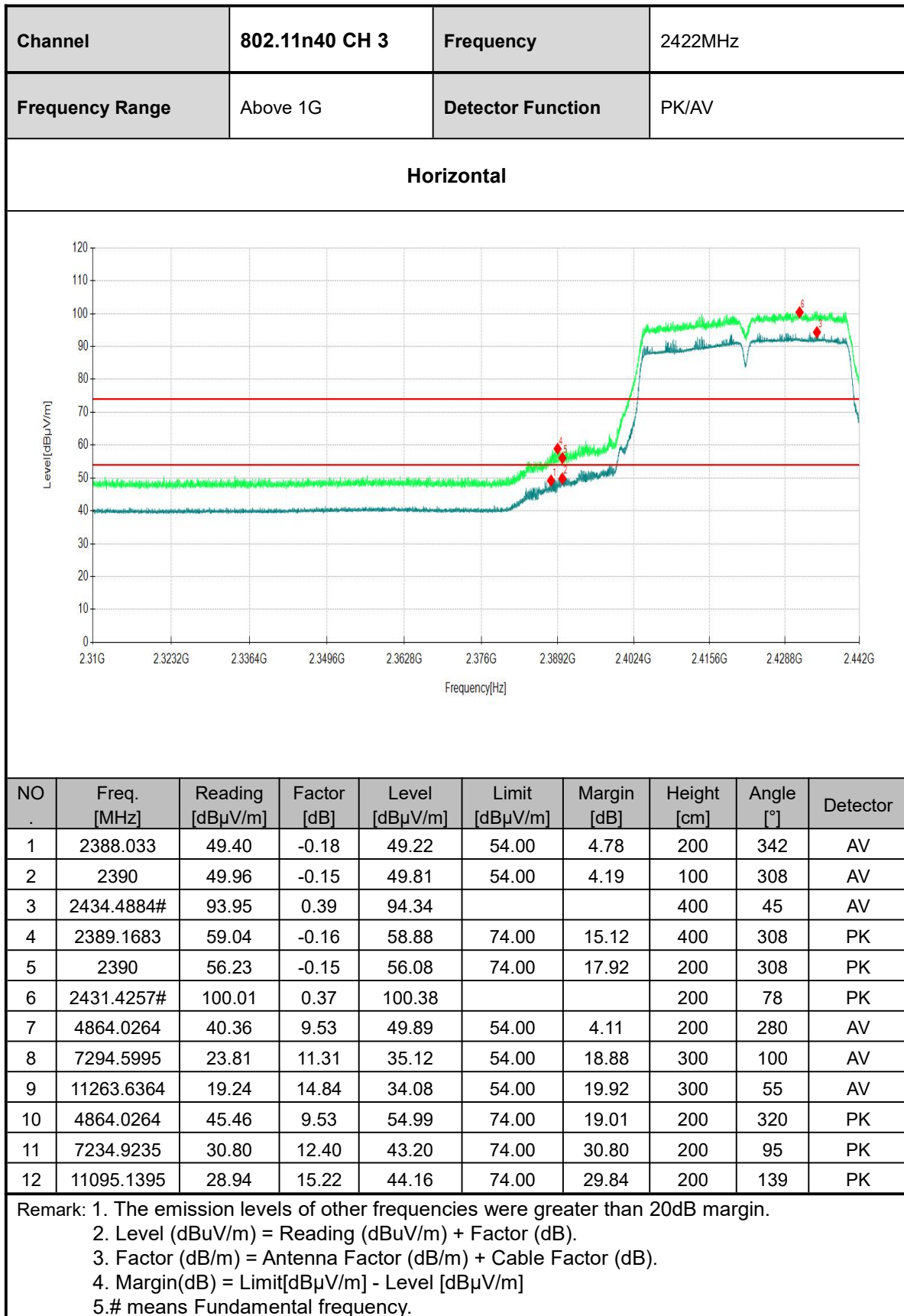


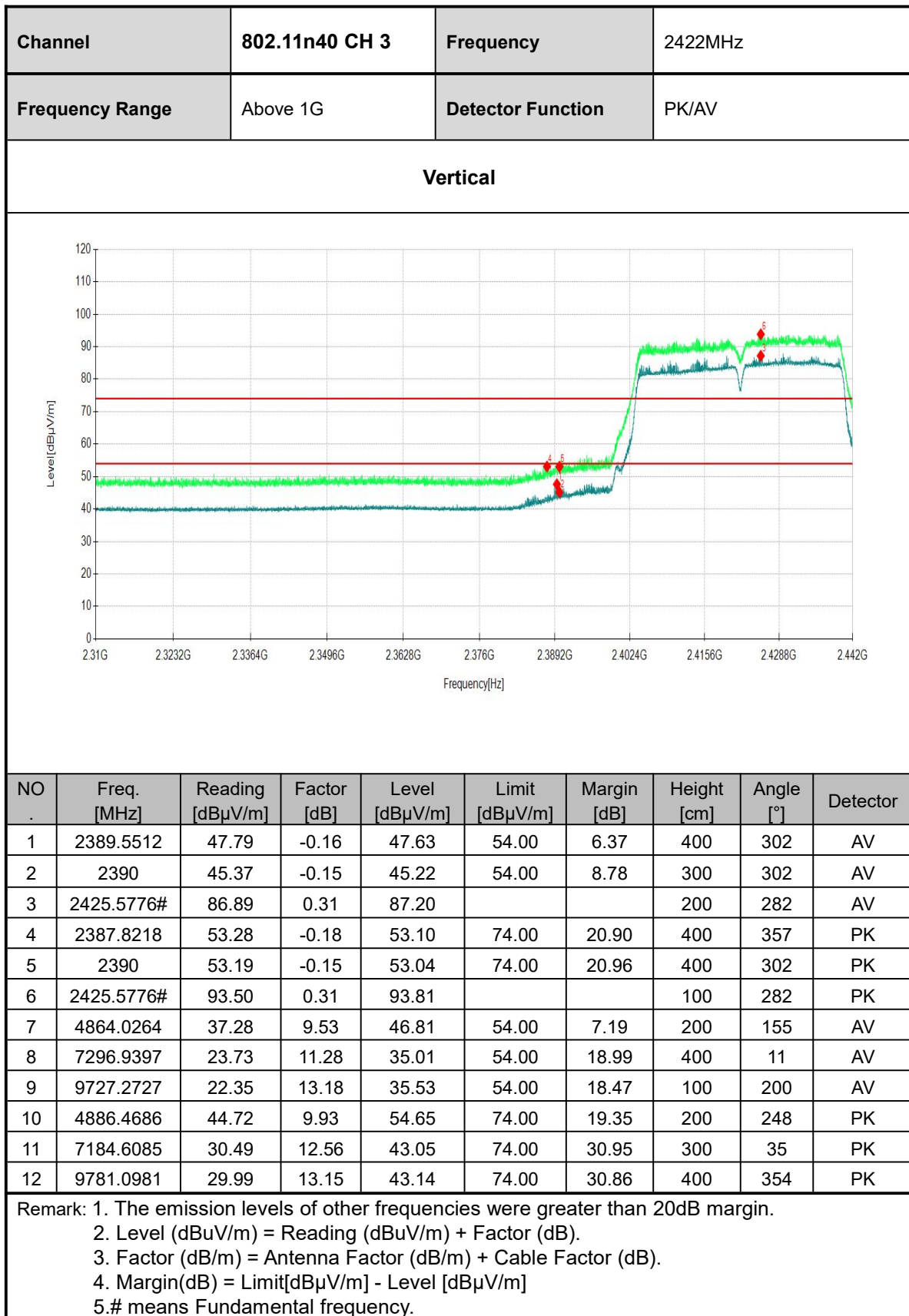


Channel		802.11n20 CH 6			Frequency		2437MHz		
Frequency Range		Above 1G			Detector Function		PK/AV		
Horizontal									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector
1	4874	37.39	9.71	47.10	54.00	6.90	400	328	AV
2	7311	21.13	11.03	32.16	54.00	21.84	200	210	AV
3	9748	20.38	13.24	33.62	54.00	20.38	300	195	AV
4	4874	43.62	9.71	53.33	74.00	20.67	200	303	PK
5	7311	28.72	11.03	39.75	74.00	34.25	400	254	PK
6	9748	28.14	13.24	41.38	74.00	32.62	300	259	PK
Vertical									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	4874	35.85	9.71	45.56	54.00	8.44	400	45	AV
2	7311	20.84	11.03	31.87	54.00	22.13	400	36	AV
3	9748	22.23	13.24	35.47	54.00	18.53	100	208	AV
4	4874	43.27	9.71	52.98	74.00	21.02	300	50	PK
5	7311	28.48	11.03	39.51	74.00	34.49	400	115	PK
6	9748	29.54	13.24	42.78	74.00	31.22	300	213	PK
Remark: 1. The emission levels of other frequencies were greater than 20dB margin. 2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB). 3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB). 4. Margin(dB) = Limit[dBμV/m] - Level [dBμV/m]									



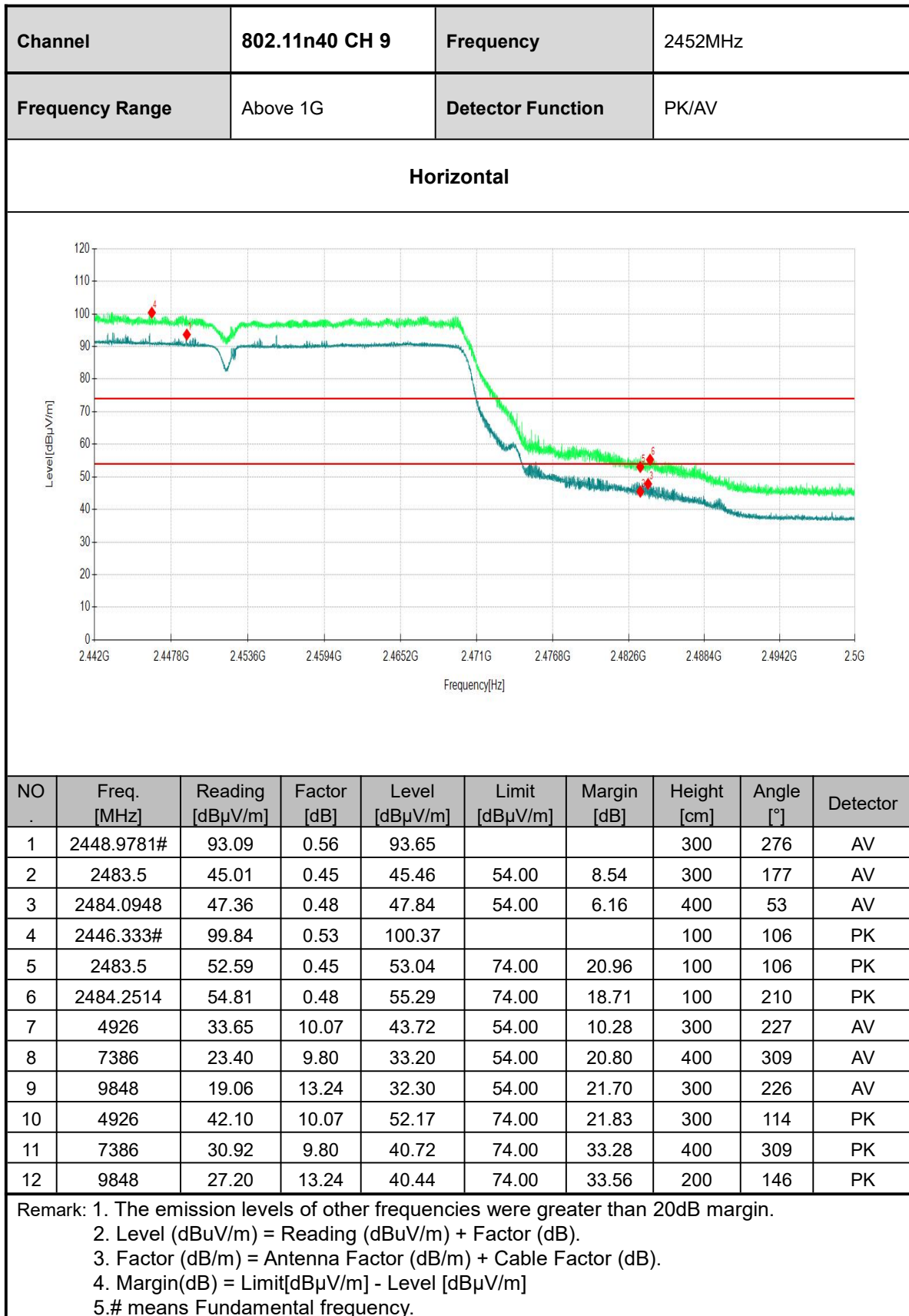


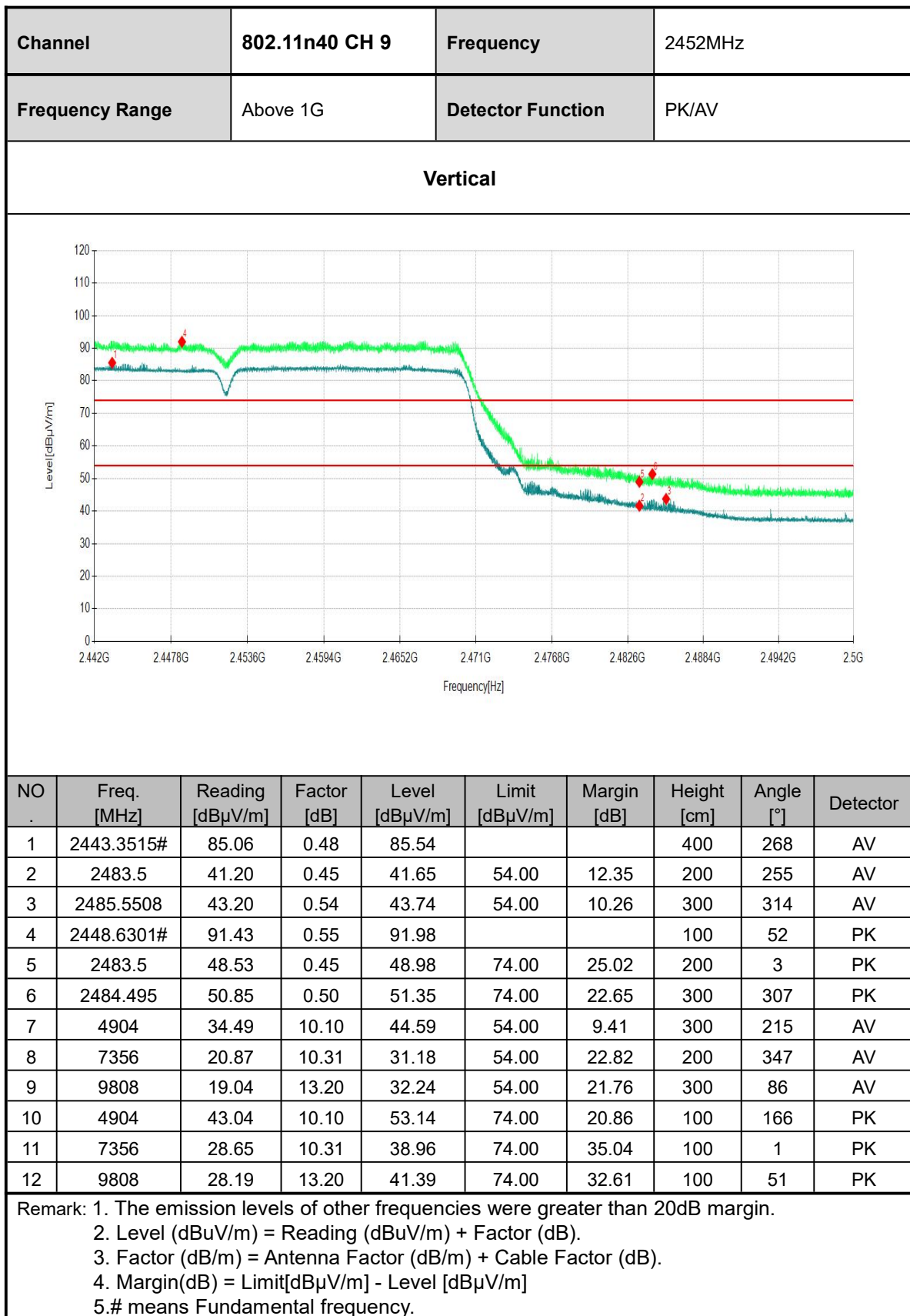






Channel		802.11n40 CH 6		Frequency		2437MHz			
Frequency Range		Above 1G		Detector Function		PK/AV			
Horizontal									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector
1	4864.0264	37.83	9.53	47.36	54.00	6.64	300	147	AV
2	7296.9397	23.87	11.28	35.15	54.00	18.85	100	276	AV
3	9727.2727	22.56	13.18	35.74	54.00	18.26	300	202	AV
4	4874	42.40	9.71	52.11	74.00	21.89	400	186	PK
5	7311	28.64	11.03	39.67	74.00	34.33	200	6	PK
6	9748	27.72	13.24	40.96	74.00	33.04	100	60	PK
Vertical									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	4864.0264	38.00	9.53	47.53	54.00	6.47	400	159	AV
2	7311	20.57	11.03	31.60	54.00	22.40	300	42	AV
3	9748	18.84	13.24	32.08	54.00	21.92	200	265	AV
4	4874	42.98	9.71	52.69	74.00	21.31	200	75	PK
5	7311	28.71	11.03	39.74	74.00	34.26	100	357	PK
6	9748	28.72	13.24	41.96	74.00	32.04	200	121	PK
Remark: 1. The emission levels of other frequencies were greater than 20dB margin. 2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB). 3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB). 4. Margin(dB) = Limit[dBuV/m] - Level [dBuV/m]									





3.3 6dB BANDWIDTH MEASUREMENT

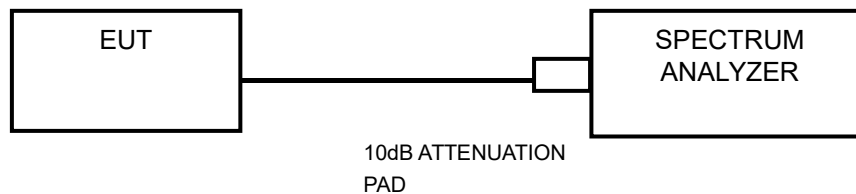
3.3.1 Limits

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

3.3.2 Measurement procedure

- Set resolution bandwidth (RBW) = 100KHz
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

3.3.3 Test setup



3.4 CONDUCTED OUTPUT POWER

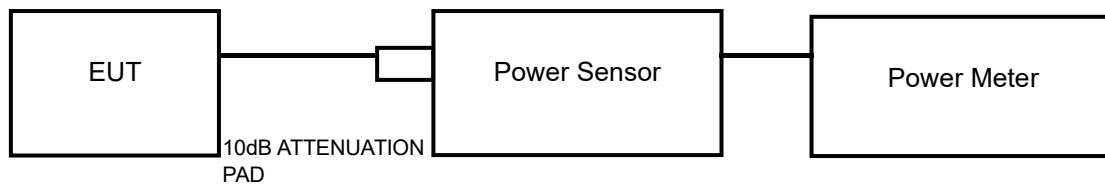
3.4.1 Limits

For systems using digital modulation in the 2400–2483.5 MHz band: 1 Watt (30dBm).

3.4.2 Measurement procedure

- A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor and set the detector to PEAK. Record the power level.
- An average power sensor was used on the output port of the EUT. A power meter was used to read the response of the average power sensor and set the detector to AVERAGE. Record the power level.

3.4.3 Test setup



3.5 POWER SPECTRAL DENSITY MEASUREMENT

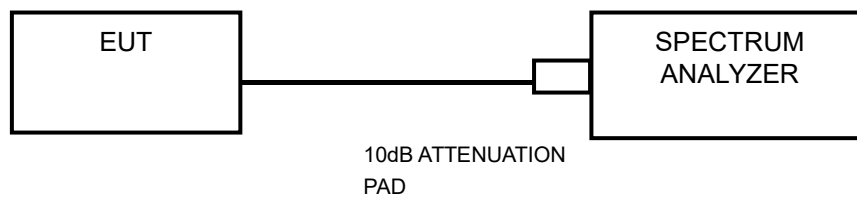
3.5.1 Limits

The Maximum of Power Spectral Density Measurement is 8dBm/3KHz.

3.5.2 Measurement procedure

- Set instrument center frequency to DTS channel center frequency.
- Set the span to 1.5 times the DTS bandwidth.
- Set RBW to: 3KHz
- Set VBW $\geq 3 \times$ RBW.
- Detector = peak
- Ensure that the number of measurement points in the sweep $\geq 2 \times$ span/RBW.
- Sweep time = auto couple.
- Use the peak marker function to determine the maximum amplitude level.

3.5.3 Test setup



3.6 OUT OF BAND EMISSION MEASUREMENT

3.6.1 Limits

Below -20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

3.6.2 Measurement procedure

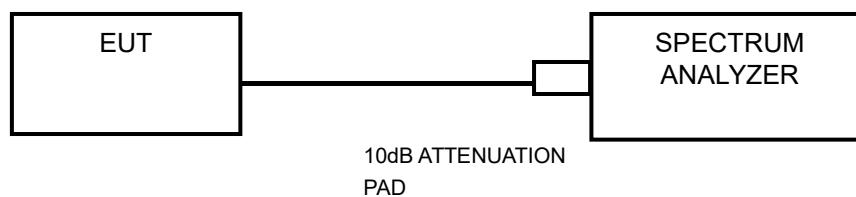
Measurement Procedure -Reference Level

- Set the RBW = 100 kHz.
- Set the VBW $\geq$ 300 kHz.
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum power level in any 100 kHzband segment within the fundamental EBW.

Measurement Procedure –Unwanted Emission Level

- Set RBW = 100 kHz.
- Set VBW $\geq$ 300 kHz.
- Set span to encompass the spectrum to be examined
- Detector = peak.
- Trace Mode = max hold.
- Sweep = auto couple.

3.6.3 Test setup



3.7 OCCUPIED BANDWIDTH MEASUREMENT

3.7.1 Measurement procedure

The transmitter antenna output was connected to the spectrum analyzer through an attenuator. The resolution bandwidth shall be set to the range of 1% to 5% of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth.

below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 %of the total mean power of a given emission.

3.7.2 TEST SETUP





4 PHOTOGRAPHS OF TEST SETUP

Please refer to the attached file (Test Setup Photo).

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5 PHOTOGRAPHS OF THE EUT

Please refer to the attached file (External Photos report and Internal Photos).



Important

- (1) The test report is valid without the official stamp of CVC;
- (2) Any part photocopies of the test report are forbidden without the written permission from CVC;
- (3) The test report is invalid without the signatures of Approval and Reviewer;
- (4) The test report is invalid if altered;
- (5) Objections to the test report must be submitted to CVC within 15 days.
- (6) Generally, commission test is responsible for the tested samples only.
- (7) As for the test result “-” or “N” means “not applicable”, “/” means “not test”, “P” means “pass” and “F” means “fail”

The test data and test results given in this test report should only be used for purposes of scientific research, teaching and internal quality control when the CMA symbol is not presented.

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