

FCC/ISED RF Test Report

Report No.: FCC/ISED_RF_APT-012_5G_Ver10

FCC ID: L2CEP2000

Test Model (host): EP-2000

Series Model: EP-2000 00126 (Radiated)

EP-2000 00127 (unit modified for conducted testing)

Received Date: 10/14/2021

Test Date: 10/14/2021 to 02/07/2022

Issued Date: 04/30/2022

Applicant: APTIV Connected Services

Address: 5725 Innovation Dr., Troy, MI, 48098

Manufacturer: APTIV Connected Services

Address: 5725 Innovation Dr., Troy, MI, 48098

Issued By: Bureau Veritas Consumer Products Services, Inc.

Lab Address: 775 Montague Expressway, Milpitas, CA 95035, USA

FCC Test Site Reg No.: 540430



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Release Control Record

Issue No.	Description	Date Issued
FCC_RF_APT-012 _5G	Initial Report	02/13/2022
FCC_RF_APT-012 _5G_Ver3	Updated as per reviewer comments	04/30/2022
FCC_RF_APT-012 _5G_Ver4	Removed DFS bands	05/12/2022
FCC_RF_APT-012 _5G_Ver5	Added data for Path A	05/24/2022
FCC_RF_APT-012 _5G_Ver6	Updated as per reviewer comments	06/04/2022
FCC_RF_APT-012 _5G_Ver7	Updated 6dB BW and PSD for UNII-3	06/13/2022
FCC_RF_APT-012 _5G_Ver8	Updated the format	06/17/2022
FCC_RF_APT-012 _5G_Ver9	PSD table updated	06/23/2022
FCC_RF_APT-012 _5G_Ver10	PSD table updated	06/27/2022

1 Certificate of Conformity

Product: Vehicle Data Recorder

Brand: APTIV Connected Services

Test Model (host): EP-2000

Series Model: EP-2000

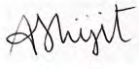
Sample Status: Engineering Sample

Applicant: APTIV Connected Services

Test Date: 10/14/2021 to 02/07/2022

Standard: 47 CFR FCC Part 15, Subpart E (Section 15.407)
RSS-247 Issue 2, RSS-GEN
789033 D02 General UNII Test Procedures New Rules v02r01
ANSI C63.10:2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services, Inc. Milpitas Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by :  , **Date:** 02/13/2022
Abhijit Patibandla/ RF Engineer

Approved by :  , **Date:** 02/16/2022
Suresh Kondapalli /Engineer Reviewer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407) RSS-247, Issue 2, RSS-GEN				
Standard Section	RSS Section	Test Item	Result	Remarks
15.203	RSS-GEN 6.8	Antenna Requirement	Pass	The EUT uses a PCB trace antenna to permanently attach to the device.
15.407 (b)(6)	RSS-Gen 7.2	AC Power Conducted Emissions	N/A	Work with Battery
15.407 (b)(1/2/3/4(i/ii)/6)	RSS-GEN 7.3 RSS-247 6.2	Radiated Emissions & Band Edge Measurement*	Pass	Meet the requirement of limit.
15.407 (a)(1/2/3)	RSS-247 5.4	Max Average Transmit Power	Pass	Meet the requirement of limit.
-	RSS-GEN 6.7	Occupied Bandwidth	Pass	Meet the requirement of limit.
15.407 (e)	RSS-247 5.2	6 dB Emission Bandwidth	Pass	Meet the requirement of limit. (U-NII-3 only)
15.407 (a)(1/2/3)	RSS-247 6.2.2	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(g)	RSS-GEN 6.11	Frequency Stability	Pass	Meet the requirement of limit.

Note: N/A: EUT worked with battery.

2.1 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:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	3.51dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	3.73dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	4.64dB
	6GHz ~ 18GHz	4.82dB
	18GHz ~ 40GHz	4.91dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Vehicle Data Recorder
Brand	APTIV Connected Services
Test Model (host)	EP-2000
Identification No. of EUT	EP-2000 00126 (Radiated) EP-2000 00127 (Conducted)
Series Model	EP-2000
Status of EUT	Engineering Sample
Power Supply Rating	The EUT is supplied with power from vehicle battery 12Vdc.
Modulation Type	802.11a/b/ac/g/n/ax for WLAN
Modulation Technology	OFDM and DSSS
Transfer Rate	802.11a: 6/9/12/18/24/36/48/54 Mbps 802.11n: MCS 0/1/2/3/4/5/6/7 802.11ac: MCS 0/1/2/3/4/5/6/7/8/9 802.11ax: MCS 0/1/2/3/4/5/6/7/8/9/10/11
Operating Frequency	5150 ~ 5250MHz, 5745~5825MHz, Operating in MIMO with Internal and External antennas. (Correlated)
Number of Channel	5150~5250MHz: 802.11a, 802.11n (HT20): 4; 802.11n (HT40); 802.11AC(HT80), 802.11AX(HT80) 5745~5825MHz: 802.11a, 802.11n (HT20): 5; 802.11n (HT40); 802.11AC(HT80), 802.11AX(HT80)
Antenna Type	Chip antenna (Internal antenna), External Patch Antenna. Path A: External Antenna; Path B: Internal Antenna
Antenna Gain (dBi)	Internal Antenna Gain 5GHz -4.31 dBi for WLAN (External Patch antenna +3dBi)
Antenna Connector	For Internal antennas: PCB Trace; For External Antennas: Custom 4-Way FAKRA antenna connector

Note:

1. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 Description of Operation Modes

FOR 5180 ~ 5240MHz

4 channels are provided for 802.11a, 802.11n (HT20):

Channel	Frequency	Channel	Frequency
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

FOR 5745 ~ 5825MHz:

5 channels are provided for 802.11a, 802.11n (HT20):

Channel	Frequency	Channel	Frequency
149	5745MHz	161	5805MHz
153	5765MHz	165	5825MHz
157	5785MHz		

Power setting is as below:

802.11a		802.11n	
Channel	Power Setting dBm	Channel	Power Setting dBm
36	15	36	15
40	15	40	15
48	15	48	15
149	15	149	15
157	15	157	15
165	15	165	15

1. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description
	RE≥1G	RE<1G	PLC	APCM	
A	-	-	NA	√	External Antenna
B	-	-	NA	√	Internal Antenna
A+B	√	√	NA	√	Added Path A and B

Where **RE≥1G**: Radiated Emission above 1GHz

RE<1G: Radiated Emission below 1GHz

PLC: Power Line Conducted Emission

APCM: Antenna Port Conducted Measurement

NOTE:

1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**.
2. "-" means no effect.

Radiated Emission Test (Above 1GHz):

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

EUT Configure Mode	Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	*
-	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	BPSK	*
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	*
-	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	BPSK	*

Radiated Emission Test (Below 1GHz):

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

EUT Configure Mode	Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	*
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	*

*Note- Worst case rate was used with respect to the channel

Software: 88W9098/88Q9098Labtool (Supplied by Aptiv)

The device uses Digital modulation, it doesn't require any tuning.

Power Line Conducted Emission Test: Not Applicable

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, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6
-	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6
-	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	BPSK	6.5

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested By
RE $\geq$ 1G	25deg. C, 65%RH	12Vdc	Abhijit Patibandla
RE<1G	25deg. C, 65%RH	12Vdc	Abhijit Patibandla
PLC	25deg. C, 68%RH	12Vdc	Abhijit Patibandla
APCM	21deg. C, 60%RH	12Vdc	Abhijit Patibandla

3.3 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.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	Acer	N17Q1	NXGNPAA0167300AA 1C7600	N/A	N/A
B.	Power Supply (DC)	RIGOL	DP712	DP7B182100095	N/A	N/A

3.4 General Description of Applied Standard

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

47 CFR FCC Part 15, Subpart E (Section 15.407)

RSS-247 Issue 2, RSS-GEN

789033 D02 General UNII Test Procedures New Rules v02r01

ANSI C63.10:2013

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

4 Test Types and Results

4.1 Antenna Requirement

Spec	Requirement	Applicable
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. Antenna requirement must meet at least one of the following: a) Antenna must be permanently attached to the device. b) The antenna must use a unique type of connector to attach to the device. c) Device must be professionally installed. The installer shall be responsible for ensuring that the correct antenna is employed by the device.	☒
Remark	The EUT uses a PCT trace antenna to permanently attach to the device as Internal Antenna. For External Antennas: Custom 4-Way FAKRA antenna connector. Professionally Installed device.	
Result	☒ PASS ☐ FAIL	

4.2 Radiated Emission and Bandedge Measurement

4.2.1 Limits of Radiated Emission Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table.

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:

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

Limits of unwanted emission out of the restricted bands

Applicable To		Limit	
789033 D02 General UNII Test Procedure New Rules v02r01		Field Strength at 3m	
		PK:74 (dBuV/m)	AV:54 (dBuV/m)
Frequency Band	Applicable To	EIRP Limit	Equivalent Field Strength at 3m
5150~5250 MHz	15.407(b)(1)	PK:-27 (dBm/MHz)	PK:68.2(dBuV/m)
5250~5350 MHz	15.407(b)(2)		
+++5470~5725 MHz	15.407(b)(3)		
5725~5850 MHz	☒ 15.407(b)(4)(i)	PK:-27 (dBm/MHz) ^{*1} PK:10 (dBm/MHz) ^{*2} PK:15.6 (dBm/MHz) ^{*3} PK:27 (dBm/MHz) ^{*4}	PK: 68.2(dBuV/m) ^{*1} PK:105.2 (dBuV/m) ^{*2} PK: 110.8(dBuV/m) ^{*3} PK:122.2 (dBuV/m) ^{*4}
	☐ 15.407(b)(4)(ii)	Emission limits in section 15.247(d)	
^{*1} beyond 75 MHz or more above of the band edge.		^{*2} below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.	
^{*3} below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.		^{*4} from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.	

Note:

The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3} \mu\text{V/m, where P is the eirp (Watts).}$$

4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
EMI Receiver (Rohde and Schwarz)	ESW44	1328.4100K-101662-MH	09/22/2021	09/22/2022
Biconilog Antenna (Sunol)	JB6	A111717	9/4/2020	9/4/2022
Horn Antenn (ETS-Lindgren)	3117	218554	04/21/2021	04/21/2023
Pre-Amplifier (RF-Lambda)	RAMP00M50GA	18040300055	05/07/2021	05/07/2022
Hon Antenna DRG	SAS-574	579	08/05/2020	08/05//2022
PXA Signal Analyzer (Keysight)	N9030B	MY57140100	07/22/2020	07/22/2022
SMA Fixed Attenuator (50ohms, 2w, 30dB, DC-6GHz)	VAT-03W2+	*N/A	*N/A	*N/A
10m Semi-Anechoic Chamber (ETS-Lindgren)	S2010BL8X8	1462	07/21/2020	07/21/2022
Notch Filters MICRO-TRONICS	BRM50705	041	07/21/2020	07/21/2022
Loop Antenna	N/A	00049120	11/25/2019	02/23/2022*
Power Sensor	7002-006	13I00030SNO82	01/16/2020	01/16/2023

*Extended for 90 days.

*N/A – Not calibrated. The Attenuators were verified before testing.

4.2.3 Test Procedure

For Radiated emission below 30MHz

- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. 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.
- Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

NOTE:

- The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. 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.
- 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 1 GHz.
- f. The test-receiver system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) 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 $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

For Band edge Measurement

789033 D02 General U-NII Test Procedures New Rules v02r01, II.G. Method SA-1

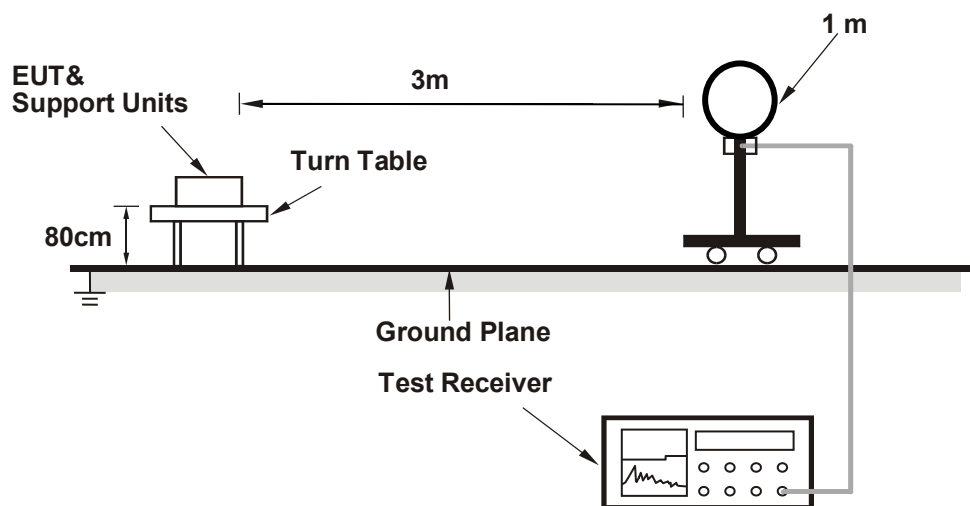
1. For average emissions measurements, follow the procedures described in section II.G.6., "Procedures for Average Unwanted Emissions Measurements above 1000 MHz", except for the following changes:
2. Set RBW=100 kHz
3. Set VBW=300 kHz
4. Perform a band-power integration across the 1 MHz bandwidth in which the band-edge emission level is to be measured.

4.2.4 Deviation from Test Standard

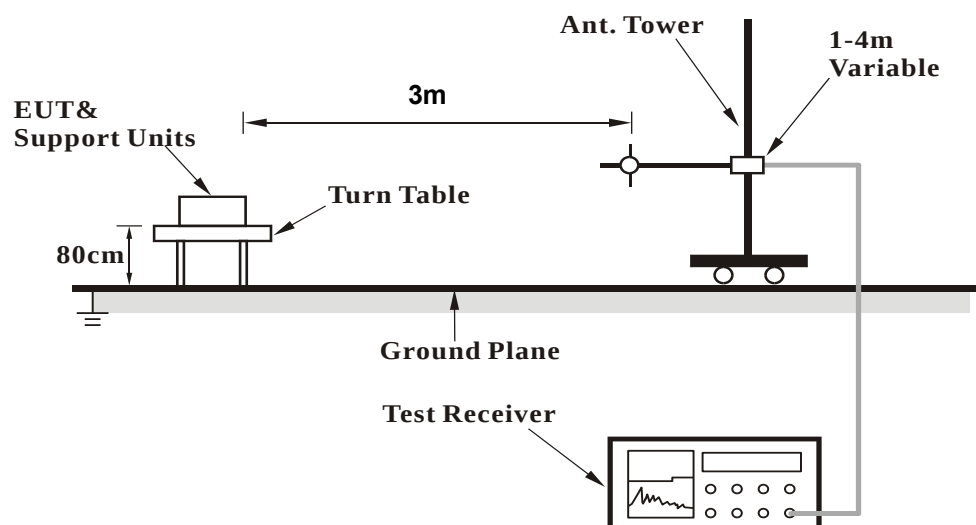
No deviation.

4.2.5 Test Setup

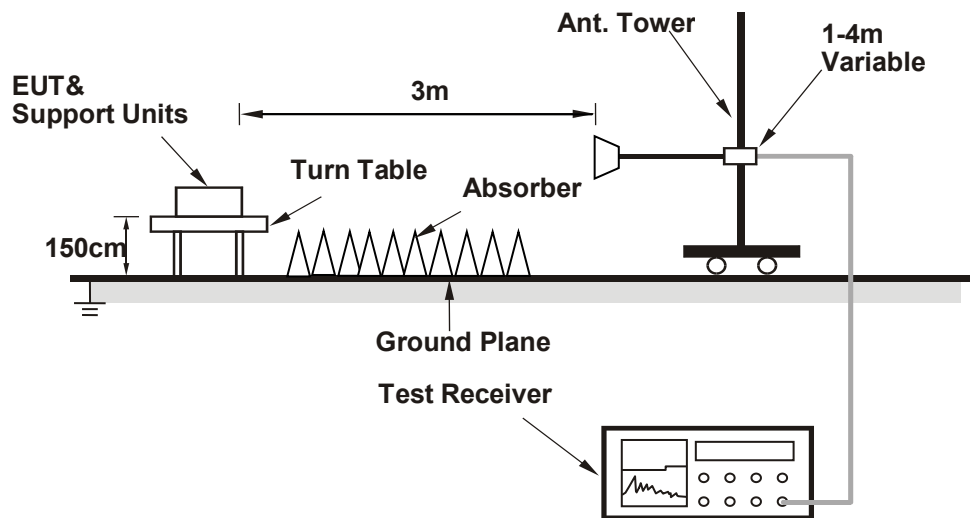
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.2.6 EUT Operating Condition

- Placed the EUT on the testing table.
- Prepared notebooks to act as communication partner and placed it outside of testing area.
- The communication partner connected with EUT via a USB cable and ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
- The necessary accessories enable the system in full functions.

4.2.7 Test Results

Path A+B

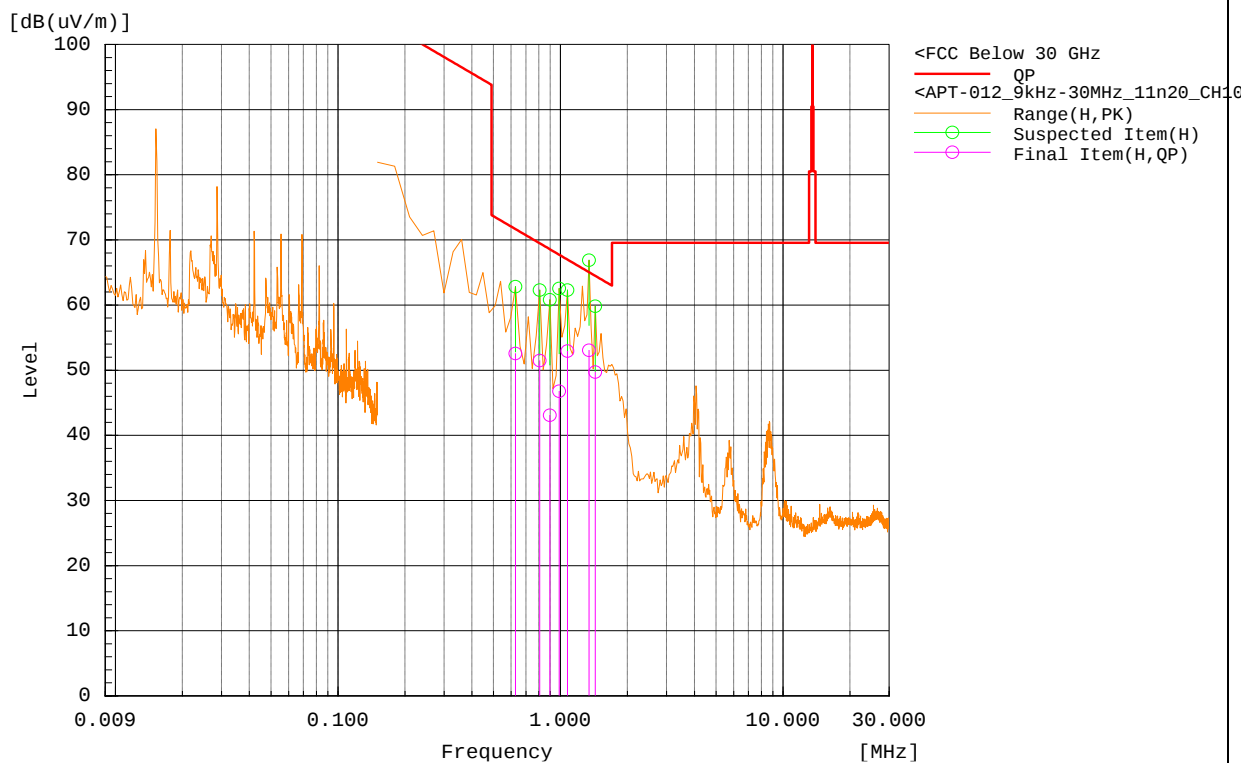
Below 30MHz Worst-Case Data:

CHANNEL	802.11a Channel 36	DETECTOR FUNCTION	Quasi Peak
FREQUENCY RANGE	9KHz-30MHz		

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m- 0 Degree										
No.	Frequency (MHz)	Degree (0/90)	Reading QP [dB(uV)]	Factor [dB(1/m)]	Level QP [dB(uV/m)]	Limit\QP dB(uV/m)	Margin QP [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	0.628	0	2.8	49.8	52.6	71.7	19.1	100	184.1	Pass
2	0.807	0	3.5	48	51.5	69.5	18	100	359.4	Pass
3	0.896	0	-4	47.1	43.1	68.6	25.5	100	0	Pass
4	0.986	0	0.5	46.3	46.8	67.7	20.9	100	356	Pass
5	1.075	0	7.2	45.7	52.9	67	14.1	100	356.8	Pass
6	1.344	0	8.9	44.1	53	65	12	100	137.9	Pass

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Cable Loss (dB) + AF (dB)
2. AF (dB/m) = Antenna Factor (dB/m) – Preamplifier Gain (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.

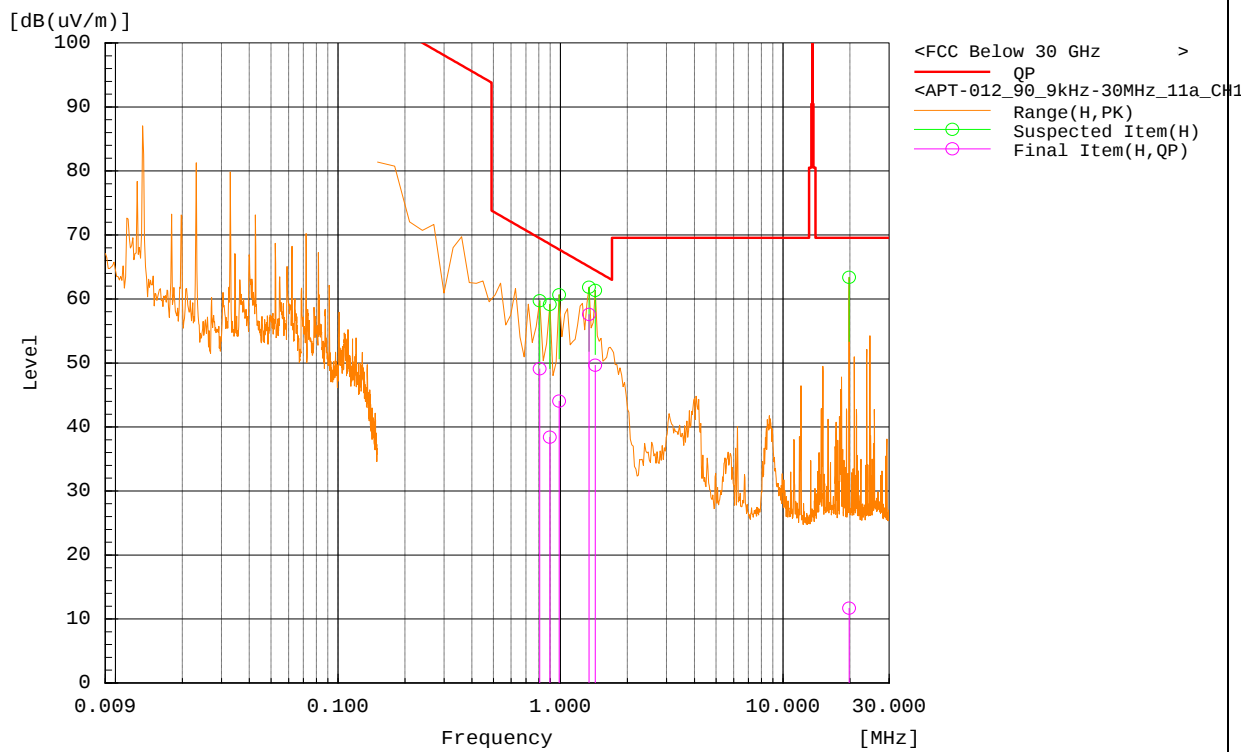


CHANNEL	802.11a Channel 36	DETECTOR FUNCTION	Quasi Peak
FREQUENCY RANGE	9KHz-30MHz		

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m- 90 Degree										
No.	Frequency (MHz)	Degree (0/90)	Reading QP [dB(uV)]	Factor [dB(1/m)]	Level QP [dB(uV/m)]	Limit\QP dB(uV/m)	Margin QP [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	0.807	90	1.1	48	49.1	69.5	20.4	100	292.8	Pass
2	0.896	90	-8.7	47.1	38.4	68.6	30.2	100	123.3	Pass
3	0.986	90	-2.3	46.3	44	67.7	23.7	100	359.8	Pass
4	1.344	90	13.5	44.1	57.6	65	7.4	100	57	Pass
5	1.434	90	6	43.6	49.6	64.5	14.9	100	276.5	Pass
6	19.821	90	-23.5	35.2	11.7	69.5	57.8	100	140.4	Pass

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Cable Loss (dB) + AF (dB)
2. AF (dB/m) = Antenna Factor (dB/m) – Preamplifier Gain (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.

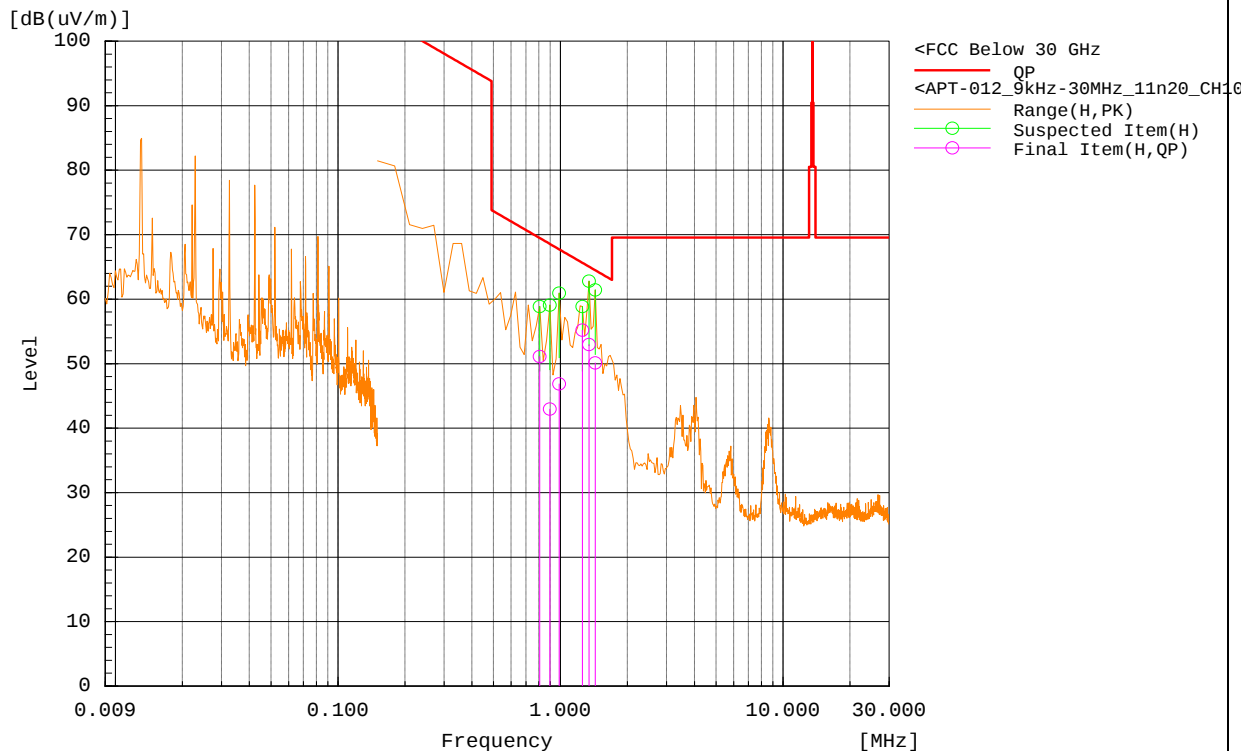


CHANNEL	802.11n 20MHz Channel 36	DETECTOR FUNCTION	Quasi Peak
FREQUENCY RANGE	9KHz-30MHz		

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m- 0 Degree										
No.	Frequency (MHz)	Degree (0/90)	Reading QP [dB(uV)]	Factor [dB(1/m)]	Level QP [dB(uV/m)]	Limit\QP dB(uV/m)	Margin QP [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	0.807	0	3.1	48	51.1	69.5	18.4	100	0	Pass
2	0.896	0	-4.1	47.1	43	68.6	25.6	100	0	Pass
3	0.986	0	0.6	46.3	46.9	67.7	20.8	100	170.8	Pass
4	1.254	0	10.6	44.6	55.2	65.6	10.4	100	48.2	Pass
5	1.344	0	8.9	44.1	53	65	12	100	349.2	Pass
6	1.434	0	6.5	43.6	50.1	64.5	14.4	100	358.3	Pass

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Cable Loss (dB) + AF (dB)
2. AF (dB/m) = Antenna Factor (dB/m) – Preamplifier Gain (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.

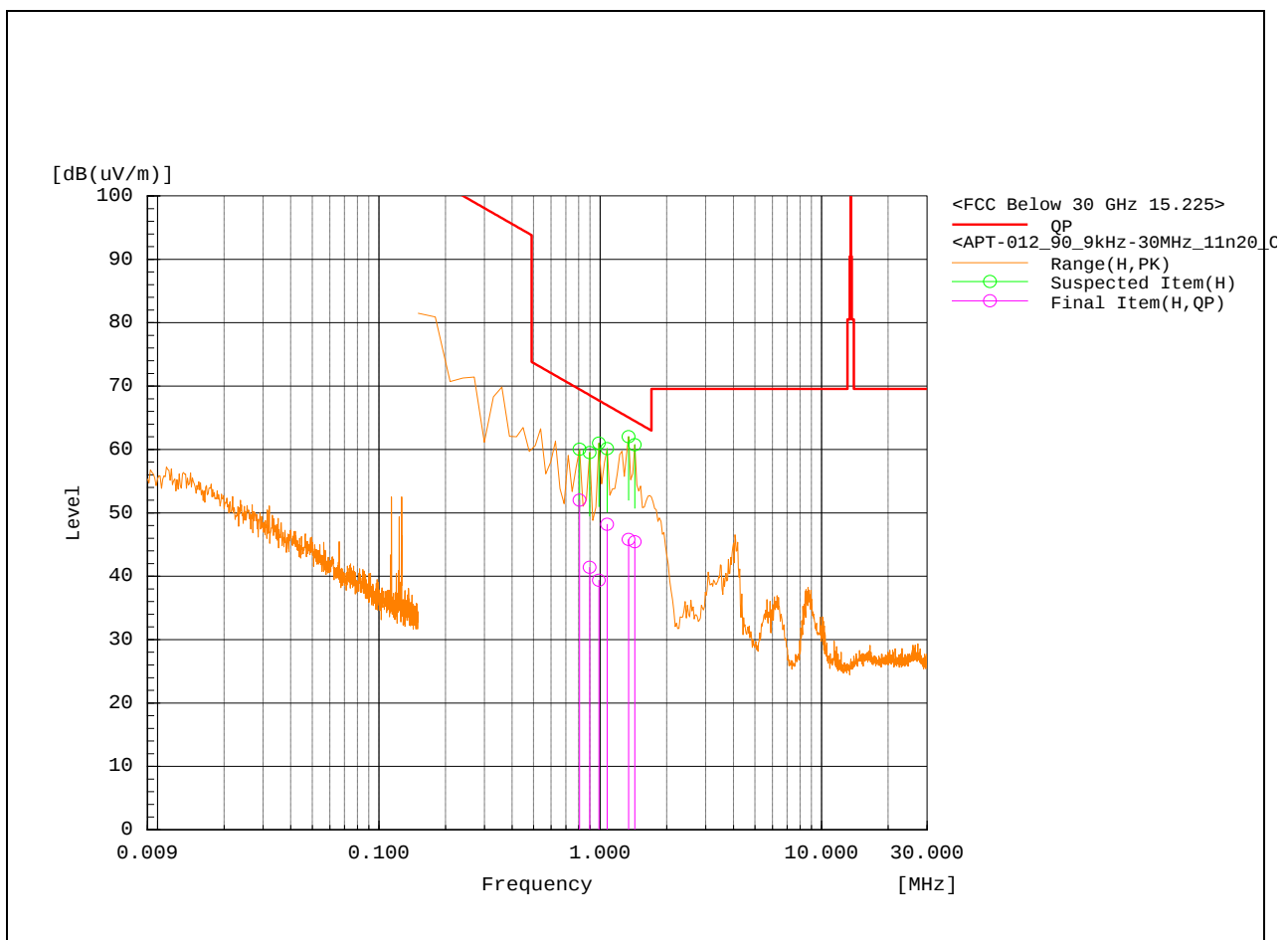


CHANNEL	802.11n 20MHz Channel 36	DETECTOR FUNCTION	Quasi Peak
FREQUENCY RANGE	9KHz-30MHz		

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m- 90 Degree										
No.	Frequency (MHz)	Degree (0/90)	Reading QP [dB(uV)]	Factor [dB(1/m)]	Level QP [dB(uV/m)]	Limit\QP dB(uV/m)	Margin QP [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	0.807	90	4	48	52	69.5	17.5	100	353.9	Pass
2	0.896	90	-5.7	47.1	41.4	68.6	27.2	100	315.2	Pass
3	0.986	90	-7	46.3	39.3	67.7	28.4	100	2.9	Pass
4	1.075	90	2.5	45.7	48.2	67	18.8	100	341.1	Pass
5	1.344	90	1.7	44.1	45.8	65	19.2	100	77.9	Pass
6	1.434	90	1.8	43.6	45.4	64.5	19.1	100	280.2	Pass

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Cable Loss (dB) + AF (dB)
2. AF (dB/m) = Antenna Factor (dB/m) – Preamplifier Gain (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.

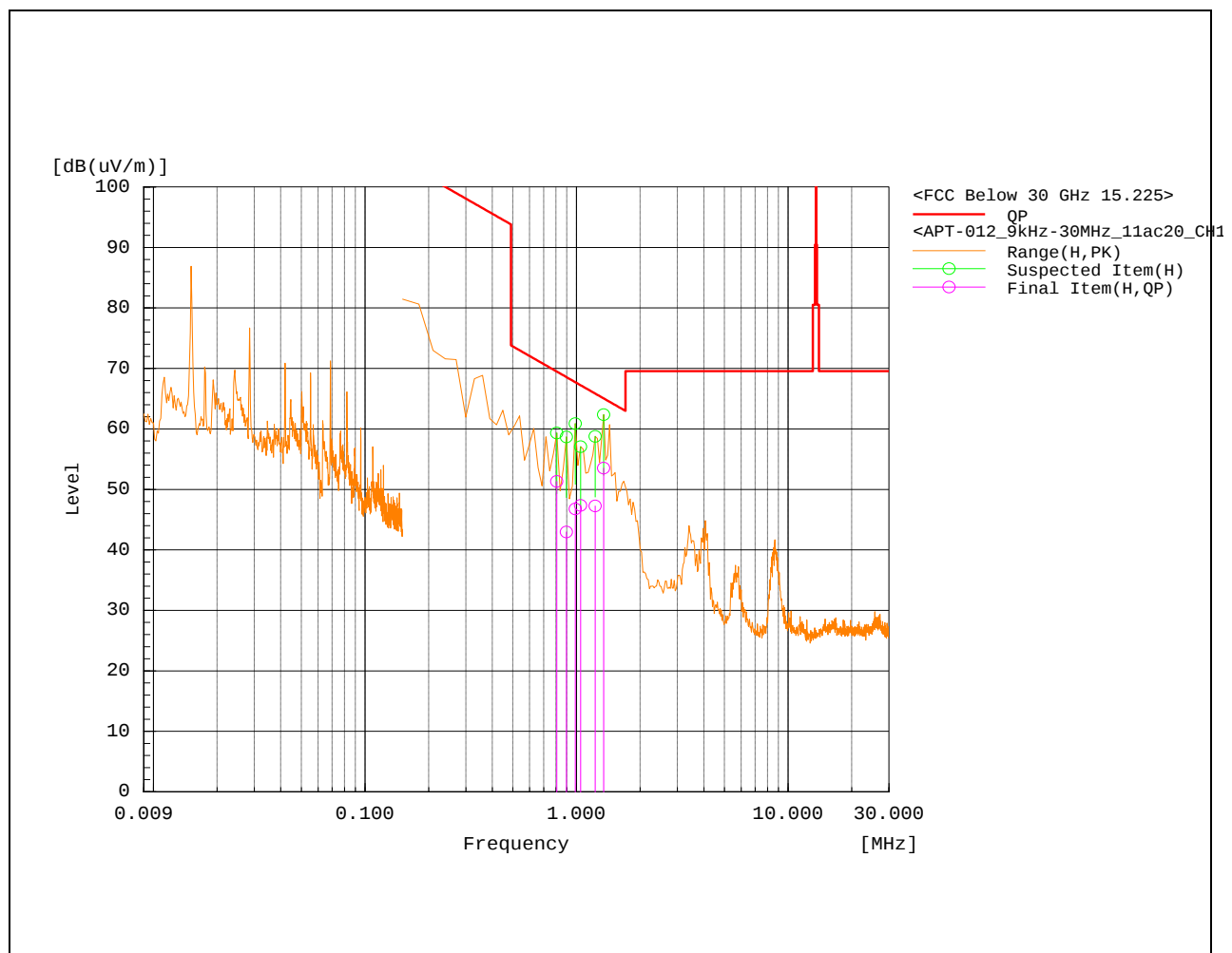


CHANNEL	802.11ac 20MHz Channel 36	DETECTOR FUNCTION	Quasi Peak
FREQUENCY RANGE	9KHz-30MHz		

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m- 0 Degree										
No.	Frequency (MHz)	Degree (0/90)	Reading QP [dB(uV)]	Factor [dB(1/m)]	Level QP [dB(uV/m)]	Limit\QP dB(uV/m)	Margin QP [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	0.807	0	3.3	48	51.3	69.5	18.2	100	172.8	Pass
2	0.896	0	-4.1	47.1	43	68.6	25.6	100	359.4	Pass
3	0.986	0	0.5	46.3	46.8	67.7	20.9	100	252.6	Pass
4	1.046	0	1.5	45.9	47.4	67.2	19.8	100	56.4	Pass
5	1.225	0	2.5	44.8	47.3	65.8	18.5	100	37.4	Pass
6	1.344	0	9.4	44.1	53.5	65	11.5	100	0	Pass

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Cable Loss (dB) + AF (dB)
2. AF (dB/m) = Antenna Factor (dB/m) – Preamplifier Gain (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.



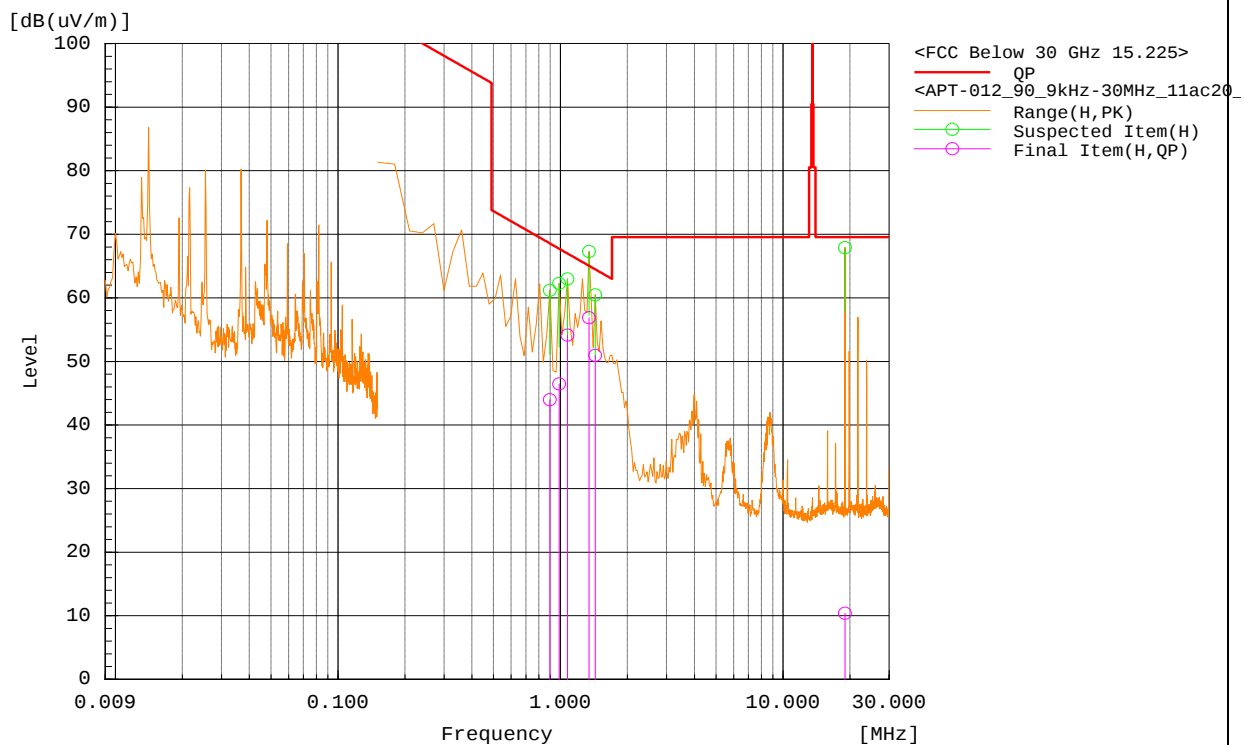
CHANNEL	802.11ac 20MHz Channel 36	DETECTOR FUNCTION	Quasi Peak
FREQUENCY RANGE	9KHz-30MHz		

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m- 90 Degree

No.	Frequency (MHz)	Degree (0/90)	Reading QP [dB(uV)]	Factor [dB(1/m)]	Level QP [dB(uV/m)]	Limit\QP dB(uV/m)	Margin QP [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	0.896	90	-3.1	47.1	44	68.6	24.6	100	285	Pass
2	0.986	90	0.1	46.3	46.4	67.7	21.3	100	0	Pass
3	1.075	90	8.4	45.7	54.1	67	12.9	100	195.5	Pass
4	1.344	90	12.8	44.1	56.9	65	8.1	100	17.4	Pass
5	1.434	90	7.3	43.6	50.9	64.5	13.6	100	282.4	Pass
6	19.015	90	-24.8	35.2	10.4	69.5	59.1	100	128.4	Pass

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Cable Loss (dB) + AF (dB)
2. AF (dB/m) = Antenna Factor (dB/m) – Preamplifier Gain (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.

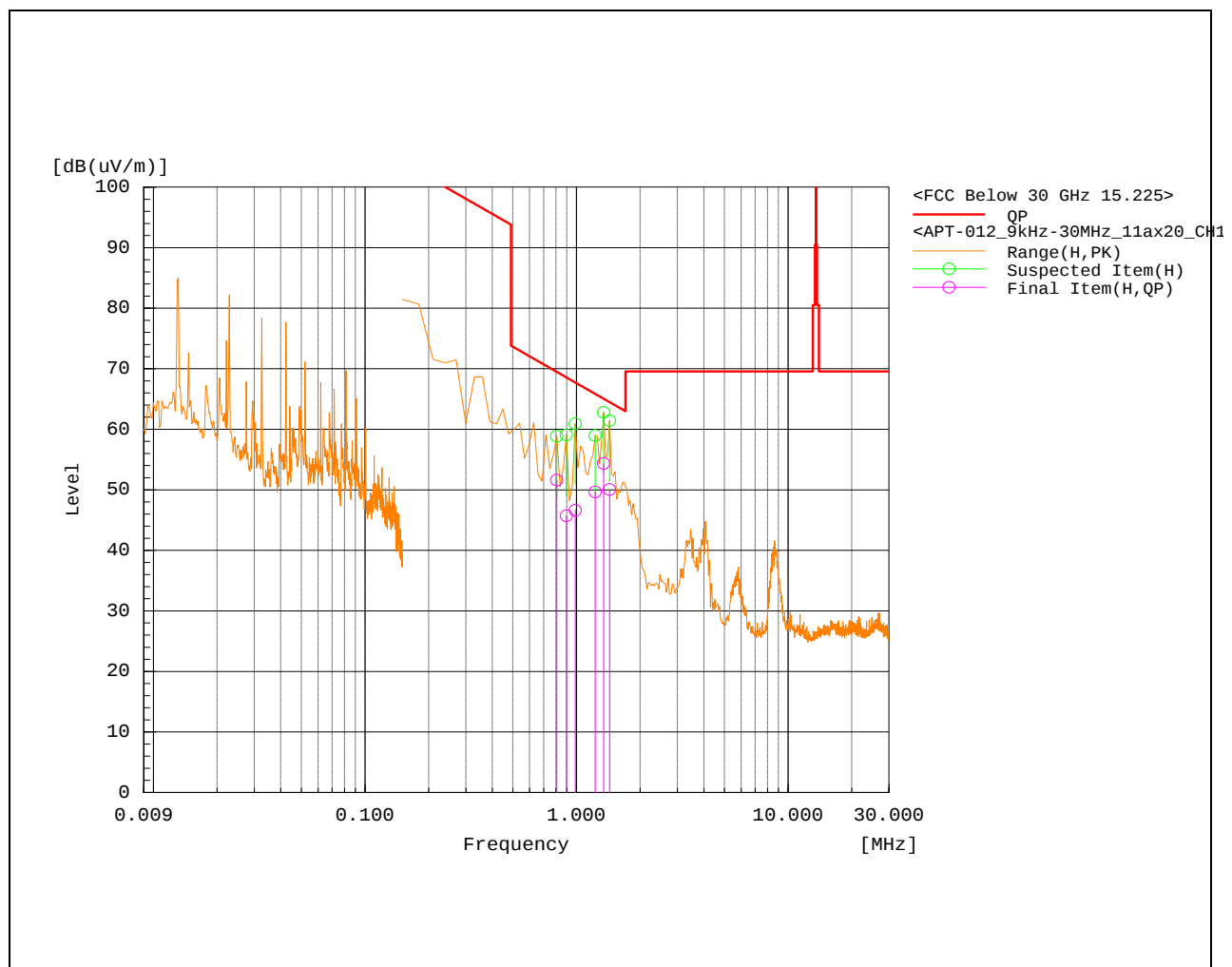


CHANNEL	802.11ax 20MHz Channel 36	DETECTOR FUNCTION	Quasi Peak
FREQUENCY RANGE	9KHz-30MHz		

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m- 0 Degree										
No.	Frequency (MHz)	Degree (0/90)	Reading QP [dB(uV)]	Factor [dB(1/m)]	Level QP [dB(uV/m)]	Limit\QP dB(uV/m)	Margin QP [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	0.807	0	3.6	48	51.6	69.5	17.9	100	40.8	Pass
2	0.896	0	-1.4	47.1	45.7	68.6	22.9	100	310.9	Pass
3	0.986	0	0.3	46.3	46.6	67.7	21.1	100	222.3	Pass
4	1.225	0	4.8	44.8	49.6	65.8	16.2	100	263.5	Pass
5	1.344	0	10.3	44.1	54.4	65	10.6	100	57.1	Pass
6	1.434	0	6.4	43.6	50	64.5	14.5	100	196	Pass

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Cable Loss (dB) + AF (dB)
2. AF (dB/m) = Antenna Factor (dB/m) – Preamplifier Gain (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.

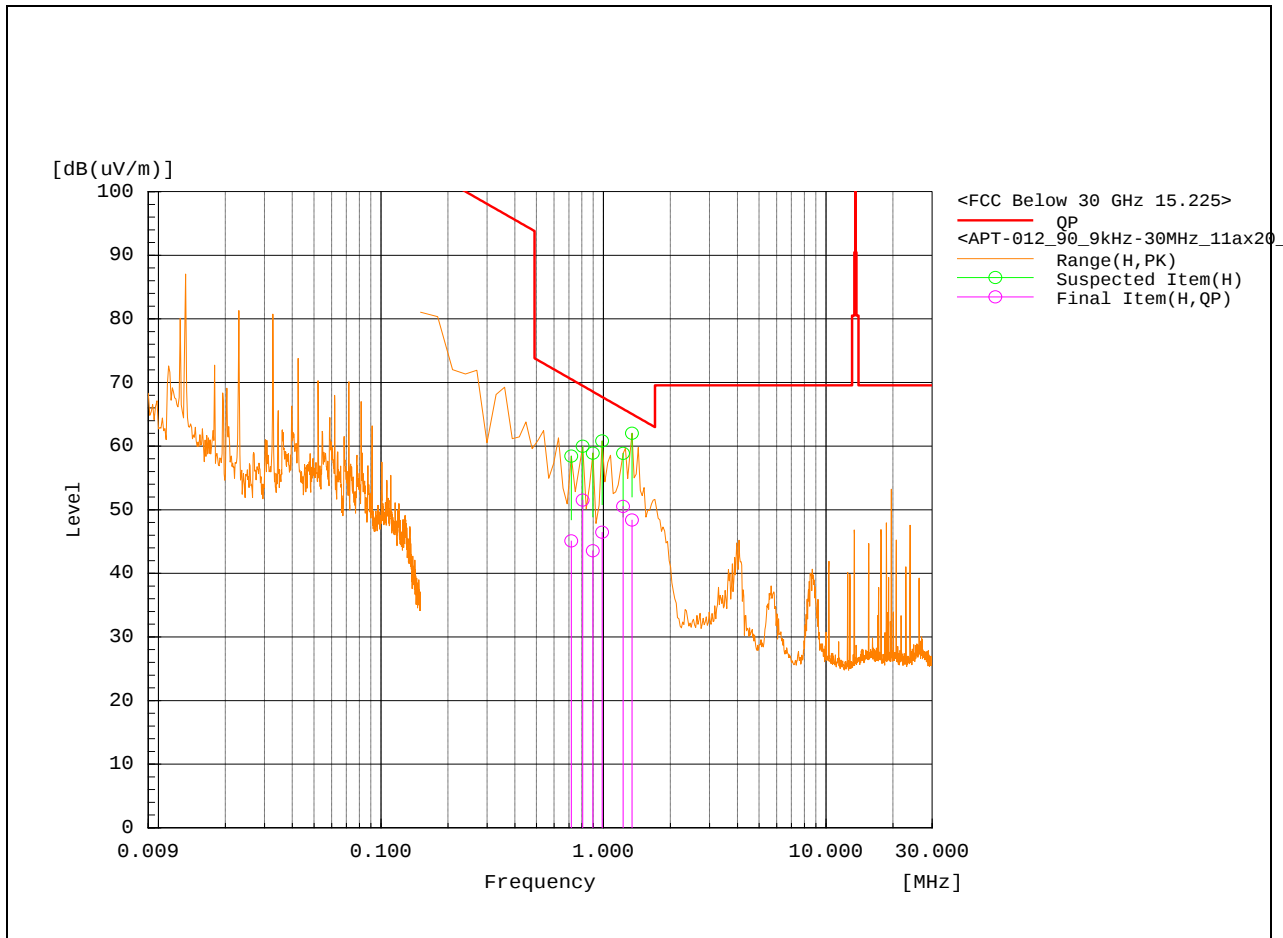


CHANNEL	802.11ax 20MHz Channel 36	DETECTOR FUNCTION	Quasi Peak
FREQUENCY RANGE	9KHz-30MHz		

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m- 90 Degree										
No.	Frequency (MHz)	Degree (0/90)	Reading QP [dB(uV)]	Factor [dB(1/m)]	Level QP [dB(uV/m)]	Limit\QP dB(uV/m)	Margin QP [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	0.717	90	-3.7	48.8	45.1	70.5	25.4	100	184.1	Pass
2	0.807	90	3.5	48	51.5	69.5	18	100	250.1	Pass
3	0.896	90	-3.5	47.1	43.6	68.6	25	100	189.1	Pass
4	0.986	90	0.2	46.3	46.5	67.7	21.2	100	32.7	Pass
5	1.225	90	5.7	44.8	50.5	65.8	15.3	100	131.4	Pass
6	1.344	90	4.3	44.1	48.4	65	16.6	100	359.7	Pass

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Cable Loss (dB) + AF (dB)
2. AF (dB/m) = Antenna Factor (dB/m) – Preamplifier Gain (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.

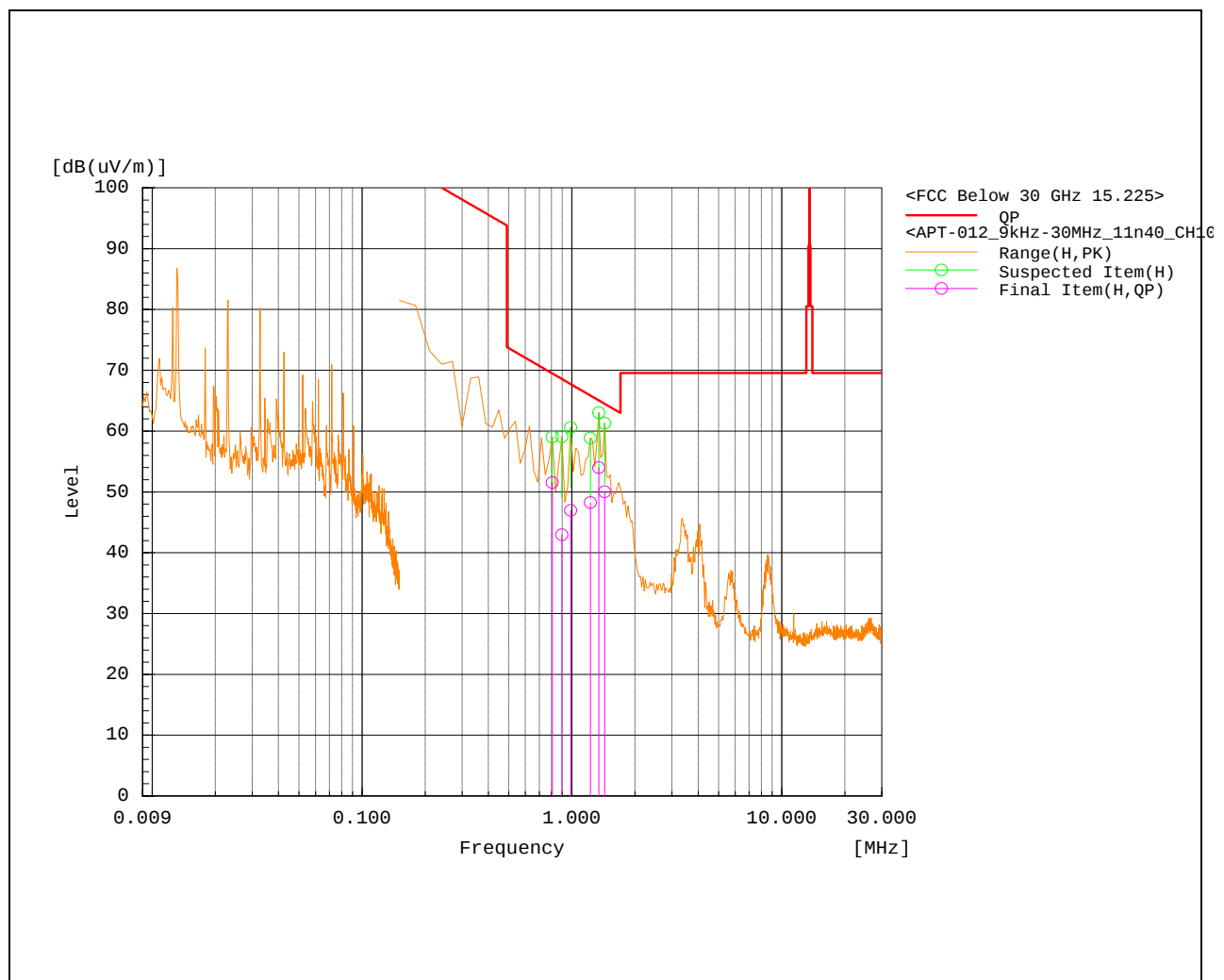


CHANNEL	802.11n 40MHz Channel 38	DETECTOR FUNCTION	Quasi Peak
FREQUENCY RANGE	9KHz-30MHz		

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m- 0 Degree										
No.	Frequency (MHz)	Degree (0/90)	Reading QP [dB(uV)]	Factor [dB(1/m)]	Level QP [dB(uV/m)]	Limit\QP dB(uV/m)	Margin QP [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	0.807	0	3.5	48	51.5	69.5	18	100	151.2	Pass
2	0.896	0	-4.1	47.1	43	68.6	25.6	100	283.9	Pass
3	0.986	0	0.7	46.3	47	67.7	20.7	100	2.8	Pass
4	1.225	0	3.5	44.8	48.3	65.8	17.5	100	121.5	Pass
5	1.344	0	9.9	44.1	54	65	11	100	341.3	Pass
6	1.434	0	6.4	43.6	50	64.5	14.5	100	127.5	Pass

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Cable Loss (dB) + AF (dB)
2. AF (dB/m) = Antenna Factor (dB/m) – Preamplifier Gain (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.



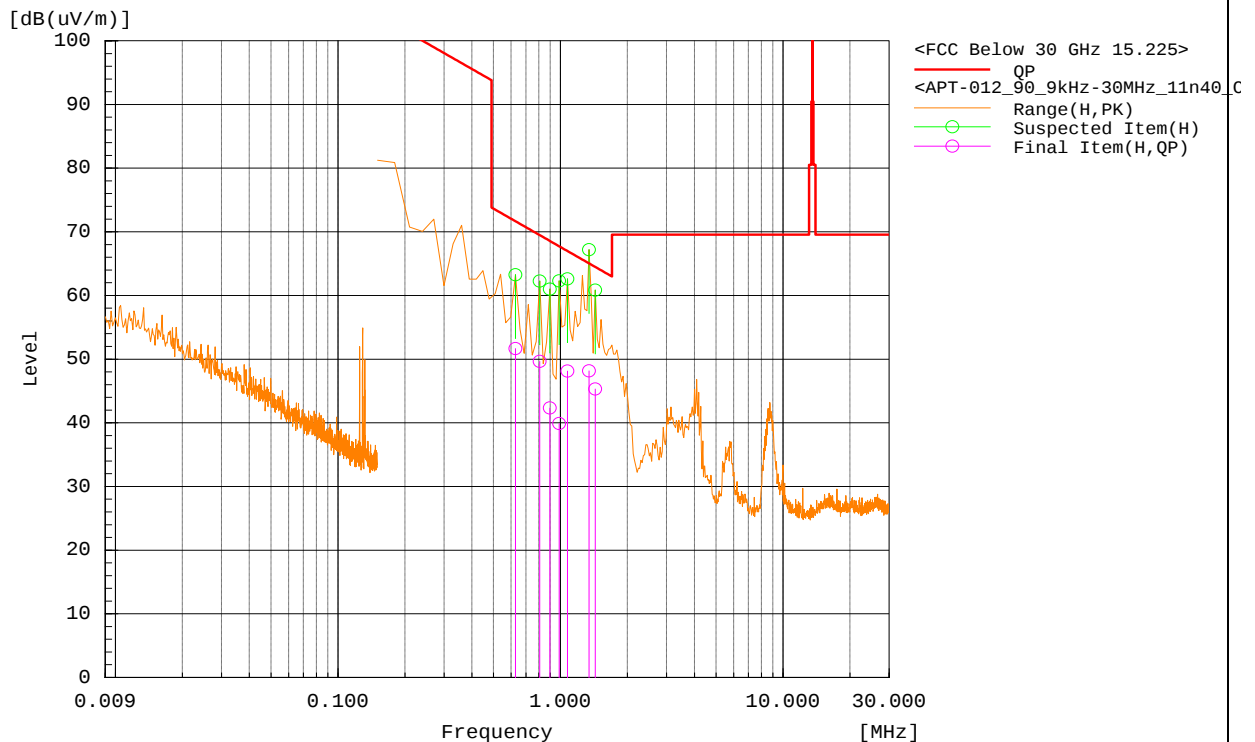
CHANNEL	802.11n 40MHz Channel 38	DETECTOR FUNCTION	Quasi Peak
FREQUENCY RANGE	9KHz-30MHz		

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m- 90 Degree

No.	Frequency (MHz)	Degree (0/90)	Reading QP [dB(uV)]	Factor [dB(1/m)]	Level QP [dB(uV/m)]	Limit\QP dB(uV/m)	Margin QP [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	0.628	90	1.8	49.8	51.6	71.7	20.1	100	202.8	Pass
2	0.807	90	1.7	48	49.7	69.5	19.8	100	111.9	Pass
3	0.896	90	-4.8	47.1	42.3	68.6	26.3	100	289.7	Pass
4	0.986	90	-6.4	46.3	39.9	67.7	27.8	100	62.2	Pass
5	1.075	90	2.4	45.7	48.1	67	18.9	100	0	Pass
6	1.344	90	4	44.1	48.1	65	16.9	100	225	Pass

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Cable Loss (dB) + AF (dB)
2. AF (dB/m) = Antenna Factor (dB/m) – Preamplifier Gain (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.

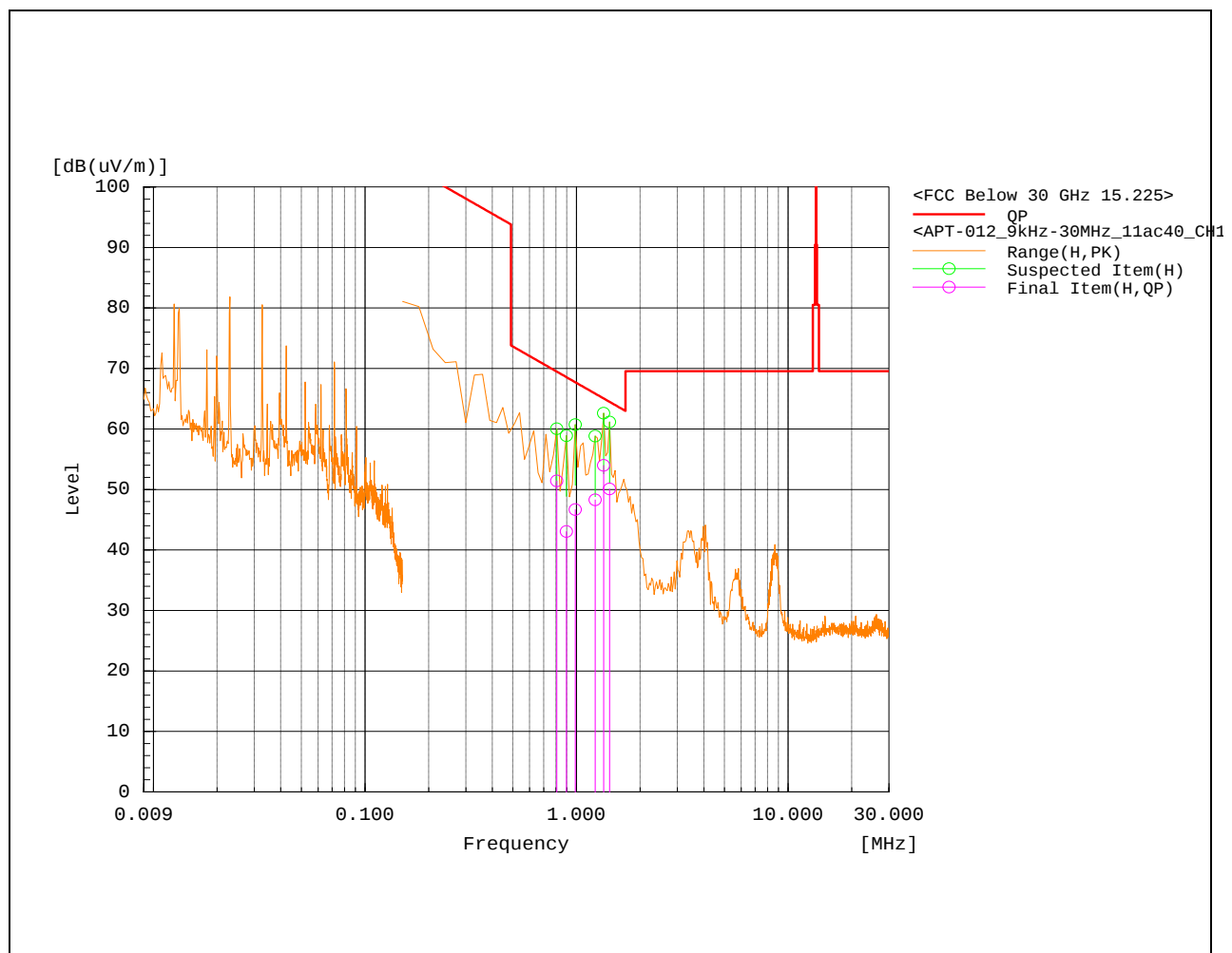


CHANNEL	802.11ac 40MHz Channel 38	DETECTOR FUNCTION	Quasi Peak
FREQUENCY RANGE	9KHz-30MHz		

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m- 0 Degree										
No.	Frequency (MHz)	Degree (0/90)	Reading QP [dB(uV)]	Factor [dB(1/m)]	Level QP [dB(uV/m)]	Limit\QP dB(uV/m)	Margin QP [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	0.807	0	3.4	48	51.4	69.5	18.1	100	0	Pass
2	0.896	0	-4.1	47.1	43	68.6	25.6	100	170.6	Pass
3	0.986	0	0.4	46.3	46.7	67.7	21	100	40.9	Pass
4	1.225	0	3.5	44.8	48.3	65.8	17.5	100	312.7	Pass
5	1.344	0	9.9	44.1	54	65	11	100	111.7	Pass
6	1.434	0	6.5	43.6	50.1	64.5	14.4	100	359.9	Pass

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Cable Loss (dB) + AF (dB)
2. AF (dB/m) = Antenna Factor (dB/m) – Preamplifier Gain (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.

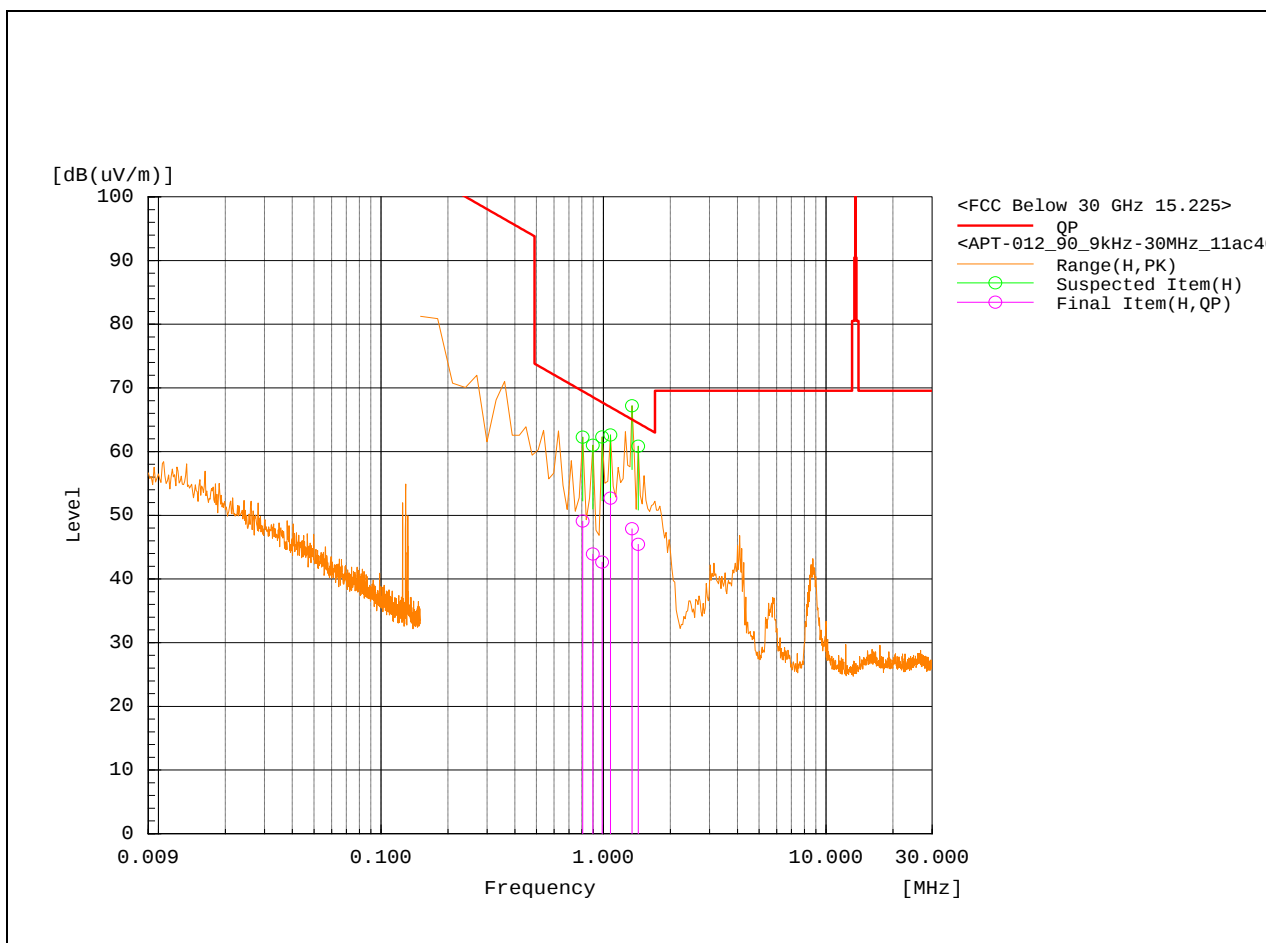


CHANNEL	802.11ac 40MHz Channel 38	DETECTOR FUNCTION	Quasi Peak
FREQUENCY RANGE	9KHz-30MHz		

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m- 90 Degree										
No.	Frequency (MHz)	Degree (0/90)	Reading QP [dB(uV)]	Factor [dB(1/m)]	Level QP [dB(uV/m)]	Limit\QP dB(uV/m)	Margin QP [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	0.807	90	1.1	48	49.1	69.5	20.4	100	21.7	Pass
2	0.896	90	-3.2	47.1	43.9	68.6	24.7	100	127.5	Pass
3	0.986	90	-3.7	46.3	42.6	67.7	25.1	100	231.7	Pass
4	1.075	90	7	45.7	52.7	67	14.3	100	225.8	Pass
5	1.344	90	3.8	44.1	47.9	65	17.1	100	159.7	Pass
6	1.434	90	1.8	43.6	45.4	64.5	19.1	100	213.2	Pass

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Cable Loss (dB) + AF (dB)
2. AF (dB/m) = Antenna Factor (dB/m) – Preamplifier Gain (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.

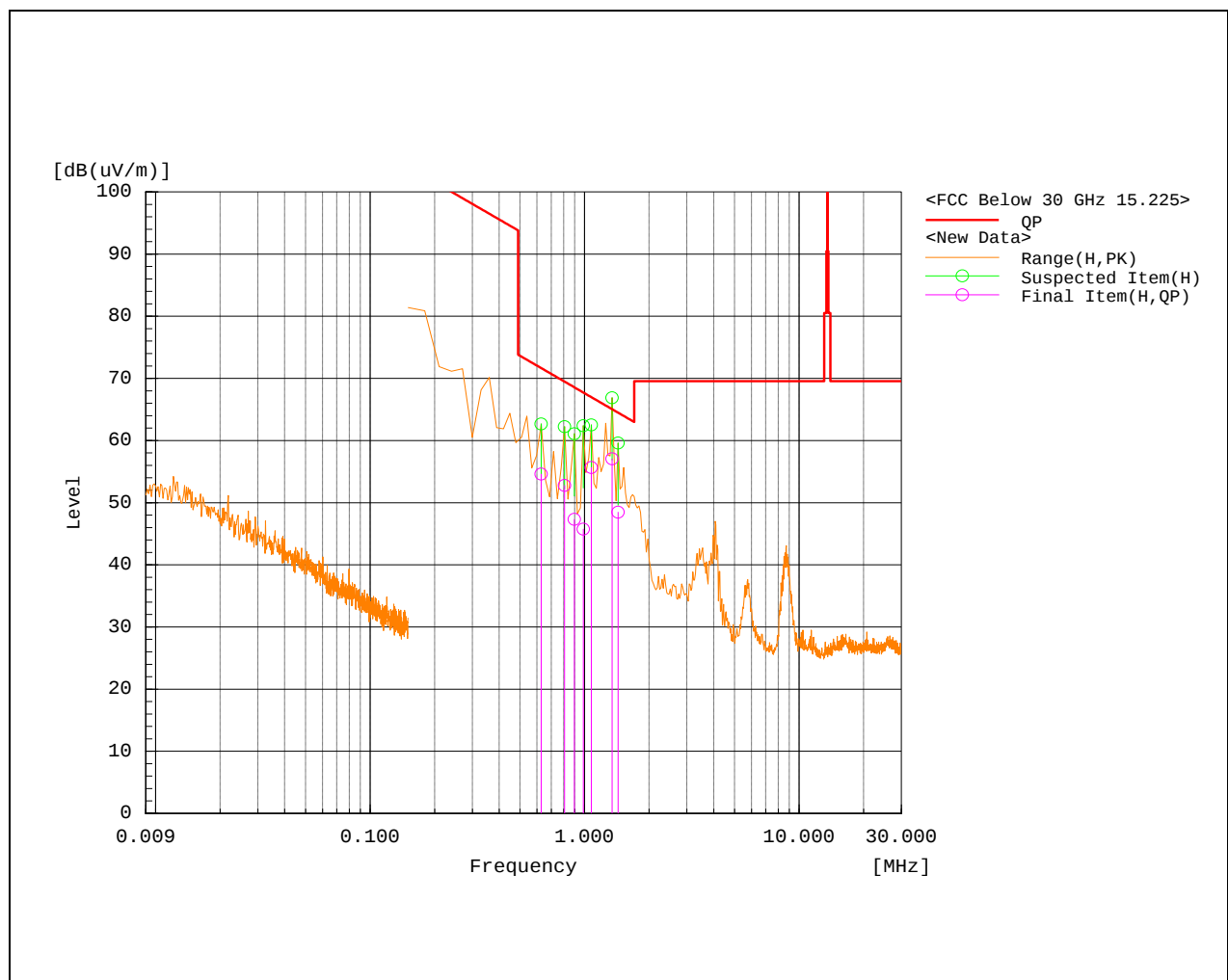


CHANNEL	802.11ax 40MHz Channel 38	DETECTOR FUNCTION	Quasi Peak
FREQUENCY RANGE	9KHz-30MHz		

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m- 0 Degree										
No.	Frequency (MHz)	Degree (0/90)	Reading QP [dB(uV)]	Factor [dB(1/m)]	Level QP [dB(uV/m)]	Limit\QP dB(uV/m)	Margin QP [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	0.628	0	4.8	49.8	54.6	71.7	17.1	100	248.5	Pass
2	0.807	0	4.8	48	52.8	69.5	16.7	100	161.6	Pass
3	0.896	0	0.2	47.1	47.3	68.6	21.3	100	342.6	Pass
4	0.986	0	-0.6	46.3	45.7	67.7	22	100	354.1	Pass
5	1.075	0	9.9	45.7	55.6	67	11.4	100	1.7	Pass
6	1.344	0	13	44.1	57.1	65	7.9	100	114.9	Pass

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Cable Loss (dB) + AF (dB)
2. AF (dB/m) = Antenna Factor (dB/m) – Preamplifier Gain (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.



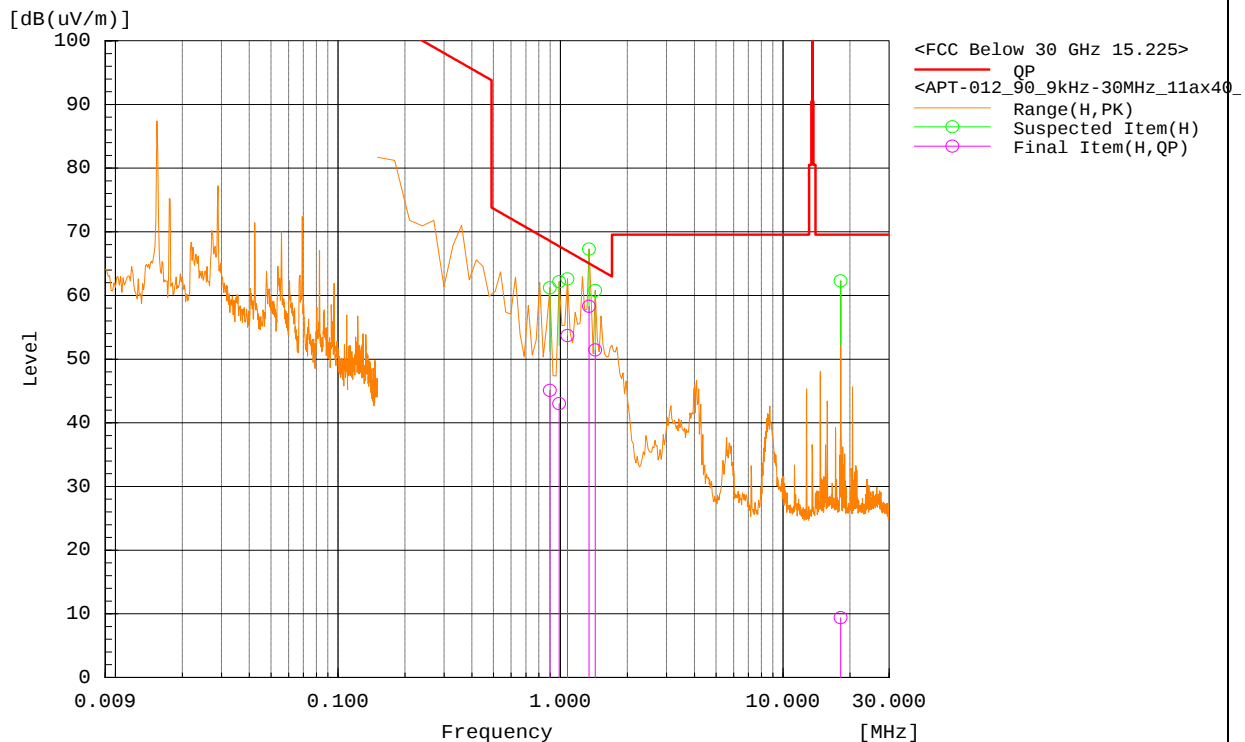
CHANNEL	802.11ax 40MHz Channel 38	DETECTOR FUNCTION	Quasi Peak
FREQUENCY RANGE	9KHz-30MHz		

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m- 90 Degree

No.	Frequency (MHz)	Degree (0/90)	Reading QP [dB(uV)]	Factor [dB(1/m)]	Level QP [dB(uV/m)]	Limit\QP dB(uV/m)	Margin QP [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	0.896	90	-2	47.1	45.1	68.6	23.5	100	312.3	Pass
2	0.986	90	-3.3	46.3	43	67.7	24.7	100	66.2	Pass
3	1.075	90	8	45.7	53.7	67	13.3	100	0	Pass
4	1.344	90	14.2	44.1	58.3	65	6.7	100	359.5	Pass
5	1.434	90	7.8	43.6	51.4	64.5	13.1	100	94.8	Pass
6	18.179	90	-25.9	35.3	9.4	69.5	60.1	100	120.7	Pass

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Cable Loss (dB) + AF (dB)
2. AF (dB/m) = Antenna Factor (dB/m) – Preamplifier Gain (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.

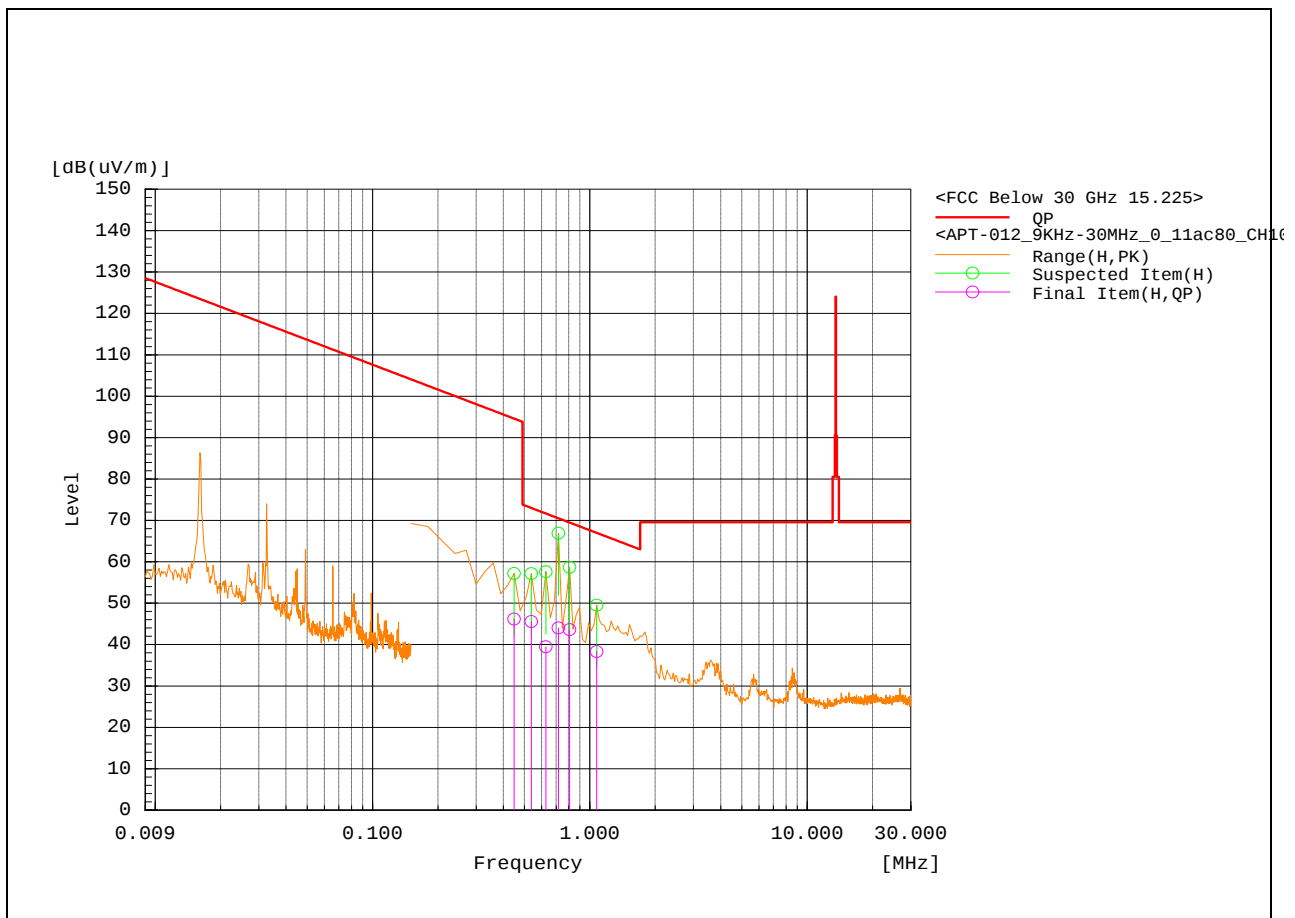


CHANNEL	802.11ac 80MHz Channel 42	DETECTOR FUNCTION	Quasi Peak
FREQUENCY RANGE	9KHz-30MHz		

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m- 0 Degree										
No.	Frequency (MHz)	Degree (0/90)	Reading QP [dB(uV)]	Factor [dB(1/m)]	Level QP [dB(uV/m)]	Limit\QP dB(uV/m)	Margin QP [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	0.538	0	-5.4	51	45.6	73	27.4	99	359.9	Pass
2	0.628	0	-10.3	49.8	39.5	71.7	32.2	99	262.1	Pass
3	0.717	0	-4.8	48.8	44	70.5	26.5	99	0	Pass
4	0.807	0	-4.4	48	43.6	69.5	25.9	99	323	Pass
5	1.075	0	-7.4	45.7	38.3	67	28.7	99	164.6	Pass
6	0.449	0	-6.5	52.6	46.1	94.6	48.5	99	107.1	Pass

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Cable Loss (dB) + AF (dB)
2. AF (dB/m) = Antenna Factor (dB/m) – Preamplifier Gain (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.

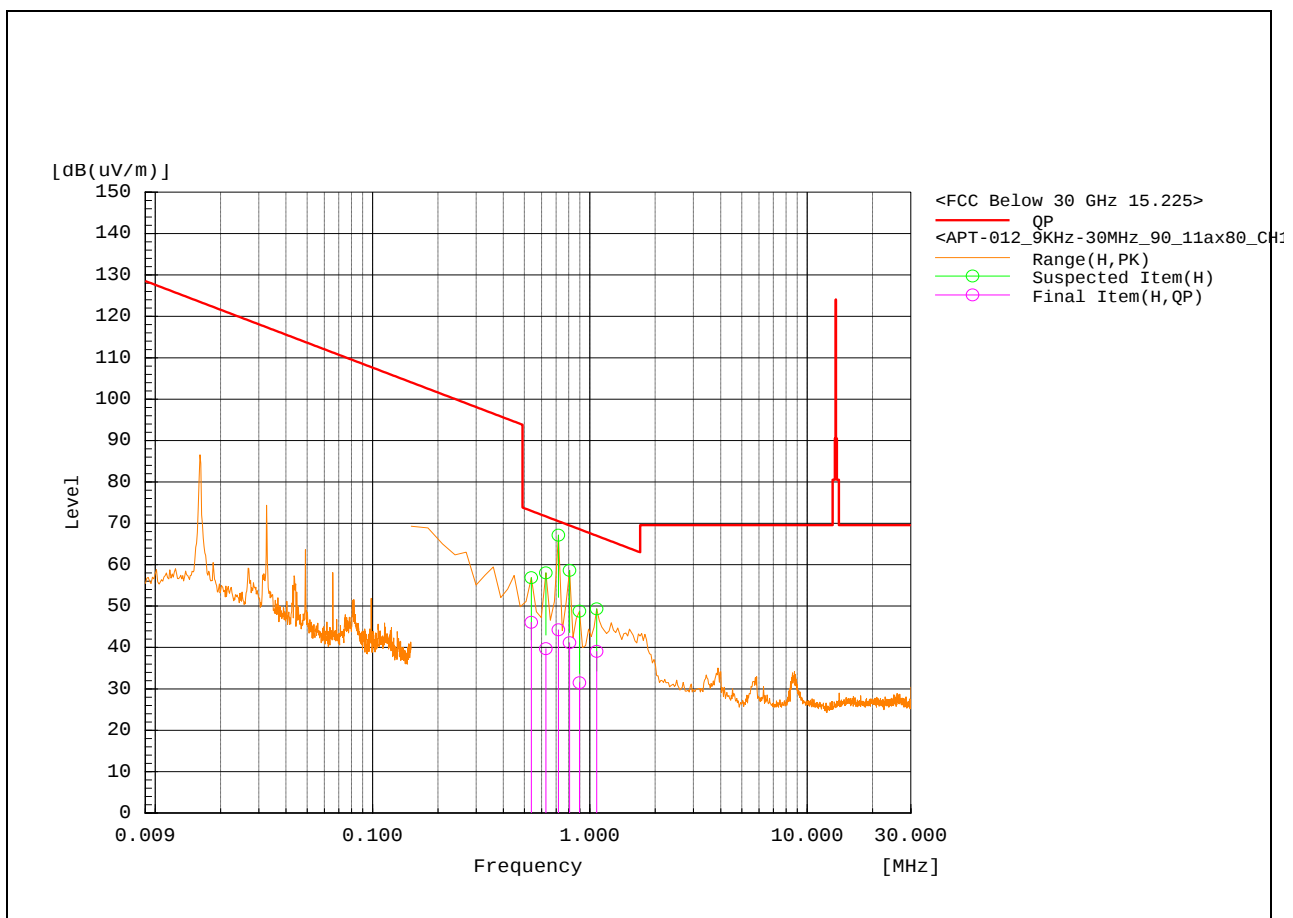


CHANNEL	802.11ac 80MHz Channel 42	DETECTOR FUNCTION	Quasi Peak
FREQUENCY RANGE	9KHz-30MHz		

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m- 90 Degree										
No.	Frequency (MHz)	Degree (0/90)	Reading QP [dB(uV)]	Factor [dB(1/m)]	Level QP [dB(uV/m)]	Limit\QP dB(uV/m)	Margin QP [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	0.538	90	-4.9	51	46.1	73	26.9	99	0.1	Pass
2	0.628	90	-10.1	49.8	39.7	71.7	32	99	167.9	Pass
3	0.717	90	-4.6	48.8	44.2	70.5	26.3	99	274.6	Pass
4	0.807	90	-6.9	48	41.1	69.5	28.4	99	284.6	Pass
5	0.896	90	-15.6	47.1	31.5	68.6	37.1	99	12	Pass
6	1.075	90	-6.7	45.7	39	67	28	99	148.2	Pass

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Cable Loss (dB) + AF (dB)
2. AF (dB/m) = Antenna Factor (dB/m) – Preamplifier Gain (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.

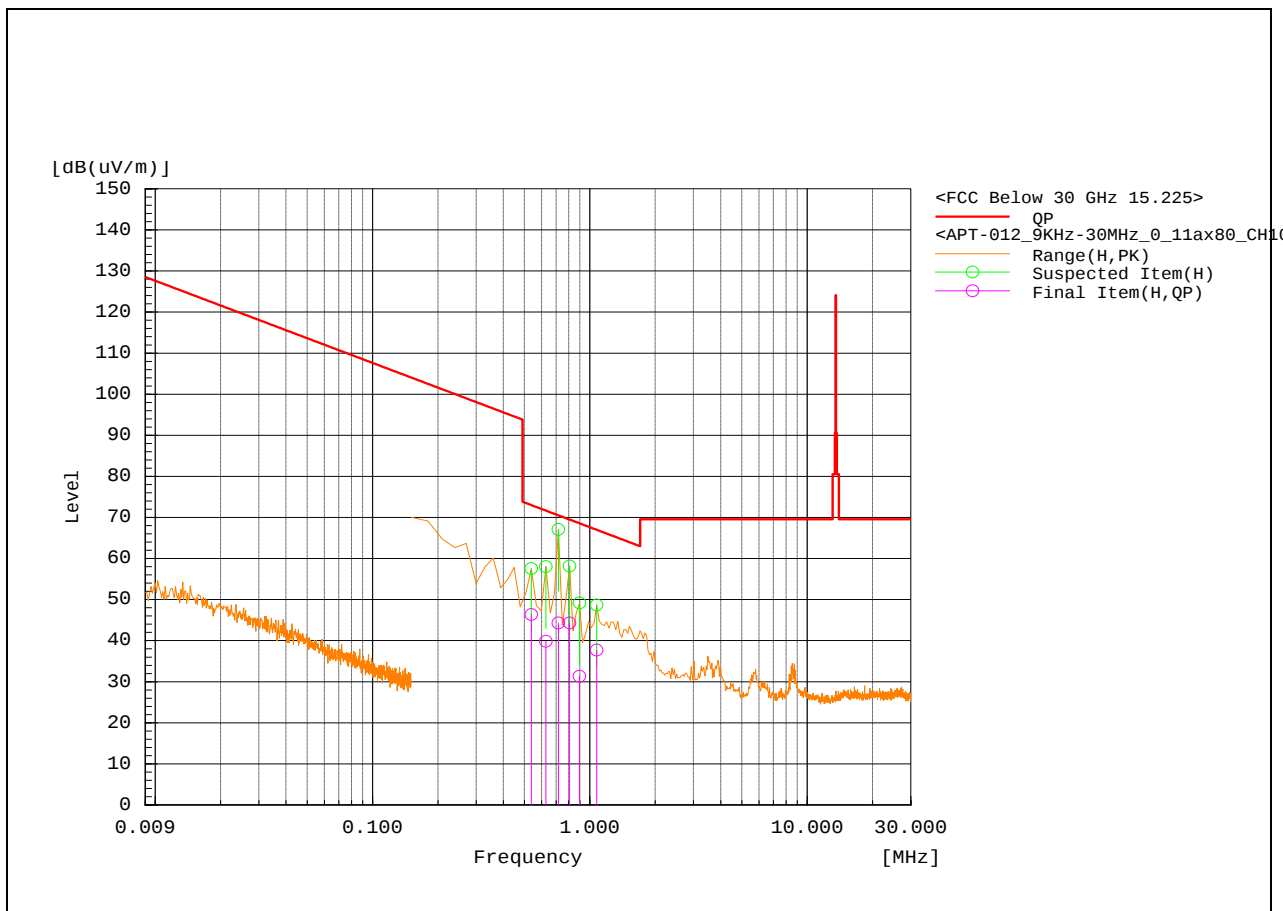


CHANNEL	802.11ax 80MHz Channel 42	DETECTOR FUNCTION	Quasi Peak
FREQUENCY RANGE	9KHz-30MHz		

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m- 0 Degree										
No.	Frequency (MHz)	Degree (0/90)	Reading QP [dB(uV)]	Factor [dB(1/m)]	Level QP [dB(uV/m)]	Limit\QP dB(uV/m)	Margin QP [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	0.538	0	-4.7	51	46.3	73	26.7	99	163.3	Pass
2	0.628	0	-10	49.8	39.8	71.7	31.9	99	7	Pass
3	0.717	0	-4.5	48.8	44.3	70.5	26.2	99	104.6	Pass
4	0.807	0	-3.7	48	44.3	69.5	25.2	99	198.5	Pass
5	0.896	0	-15.8	47.1	31.3	68.6	37.3	99	0	Pass
6	1.075	0	-8	45.7	37.7	67	29.3	99	358.7	Pass

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Cable Loss (dB) + AF (dB)
2. AF (dB/m) = Antenna Factor (dB/m) – Preamplifier Gain (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.

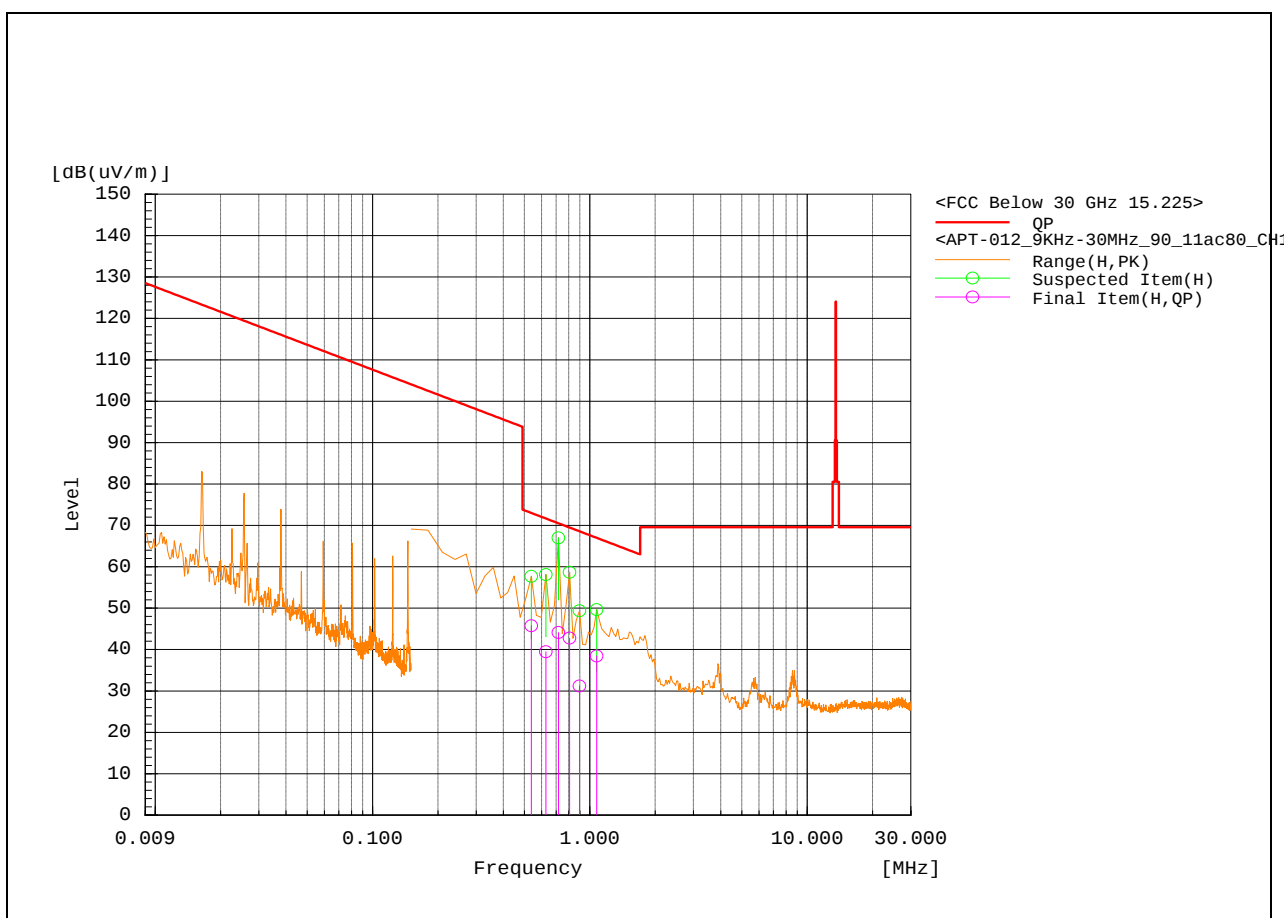


CHANNEL	802.11ax 80MHz Channel 42	DETECTOR FUNCTION	Quasi Peak
FREQUENCY RANGE	9KHz-30MHz		

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m- 90 Degree										
No.	Frequency (MHz)	Degree (0/90)	Reading QP [dB(uV)]	Factor [dB(1/m)]	Level QP [dB(uV/m)]	Limit\QP dB(uV/m)	Margin QP [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	0.538	90	-5.3	51	45.7	73	27.3	99	173.4	Pass
2	0.628	90	-10.3	49.8	39.5	71.7	32.2	99	282.3	Pass
3	0.717	90	-4.7	48.8	44.1	70.5	26.4	99	347	Pass
4	0.807	90	-5.2	48	42.8	69.5	26.7	99	358.1	Pass
5	0.896	90	-15.9	47.1	31.2	68.6	37.4	99	109.7	Pass
6	1.075	90	-7.2	45.7	38.5	67	28.5	99	288.1	Pass

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Cable Loss (dB) + AF (dB)
2. AF (dB/m) = Antenna Factor (dB/m) – Preamplifier Gain (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.



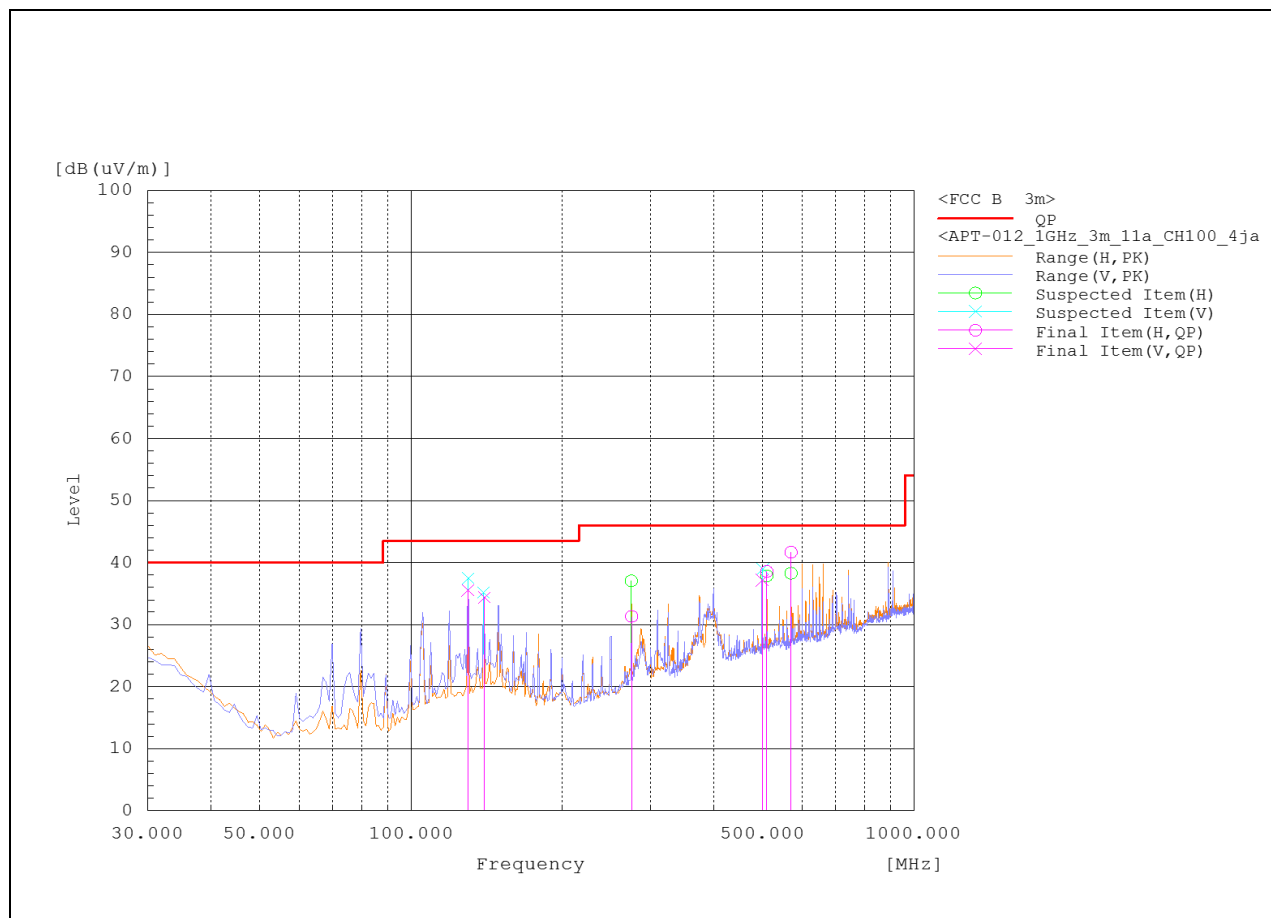
30MHz - 1GHz Worst-Case Data:

CHANNEL	802.11a Channel 36	DETECTOR FUNCTION	Quasi Peak
FREQUENCY RANGE	30MHz – 1GHz		

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m										
No.	Frequency (MHz)	Polarization (H/V)	Reading QP [dB(uV)]	Factor [dB(1/m)]	Level QP [dB(uV/m)]	Limit\QP dB(uV/m)	Margin QP [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	129.992	V	15.9	19.6	35.5	43.5	8	143	281.4	Pass
2	139.993	V	15	19.4	34.4	43.5	9.1	275	48	Pass
3	274.94	H	11.1	20.2	31.3	46	14.7	218	96.6	Pass
4	500.006	V	12.1	25.1	37.2	46	8.8	100	75.4	Pass
5	509.963	H	13.2	25.4	38.6	46	7.4	100	278.6	Pass
6	569.964	H	15	26.7	41.7	46	4.3	100	82	Pass

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Cable Loss (dB) + AF (dB)
2. AF (dB/m) = Antenna Factor (dB/m) – Preamplifier Gain (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.

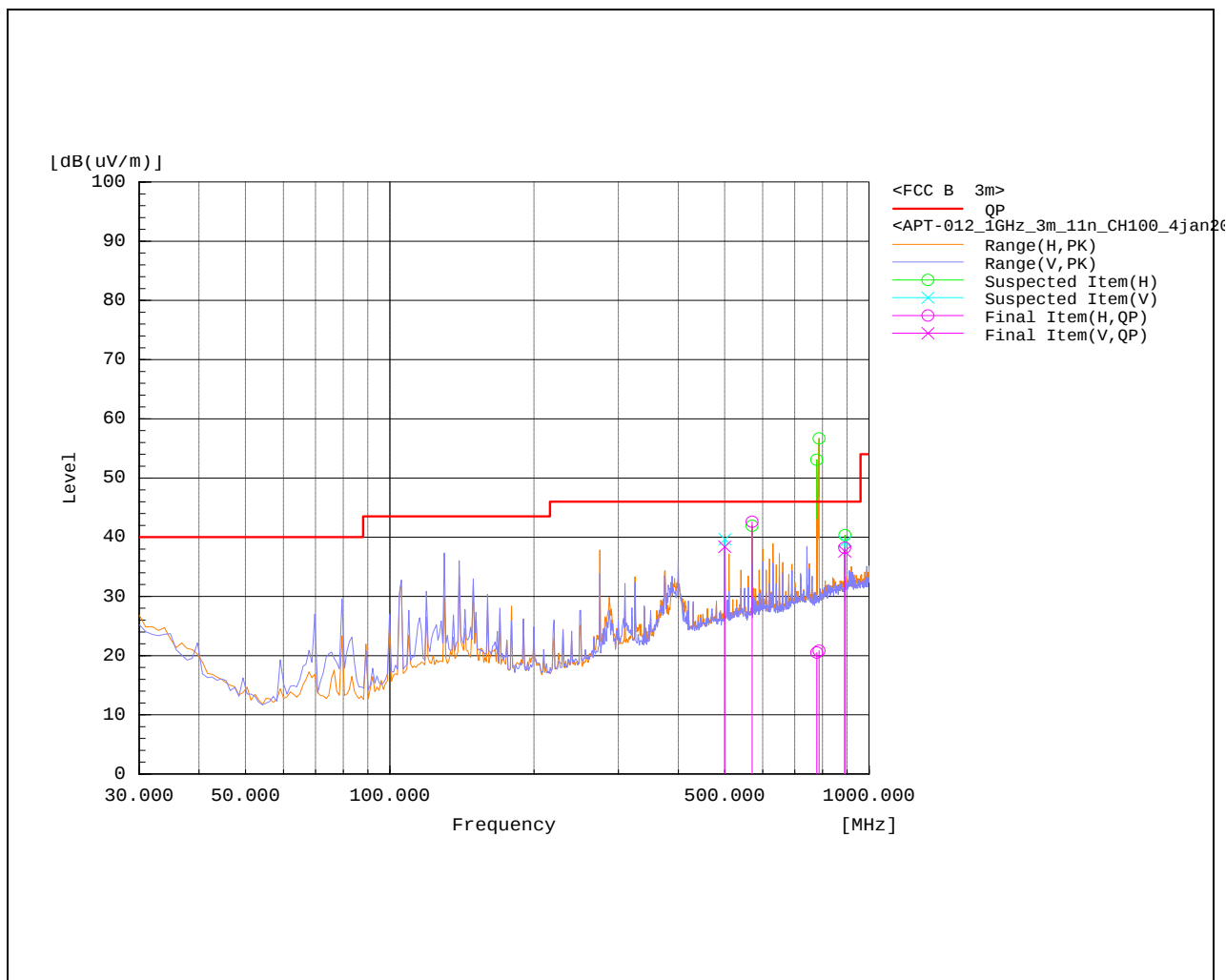


CHANNEL	802.11n 20MHz Channel 36	DETECTOR FUNCTION	Quasi Peak
FREQUENCY RANGE	30MHz – 1GHz		

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m										
No.	Frequency (MHz)	Polarization (H/V)	Reading QP [dB(uV)]	Factor [dB(1/m)]	Level QP [dB(uV/m)]	Limit\QP dB(uV/m)	Margin QP [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	500.016	V	13.3	25.1	38.4	46	7.6	100	78.8	Pass
2	569.973	H	15.9	26.7	42.6	46	3.4	100	74.4	Pass
3	777.489	H	-9	29.5	20.5	46	25.5	243	345.1	Pass
4	786.272	H	-8.8	29.6	20.8	46	25.2	149	52.5	Pass
5	890.098	H	7.1	31.1	38.2	46	7.8	133	120.8	Pass
6	890.093	V	7.1	30.5	37.6	46	8.4	366	6	Pass

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Cable Loss (dB) + AF (dB)
2. AF (dB/m) = Antenna Factor (dB/m) – Preamplifier Gain (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.

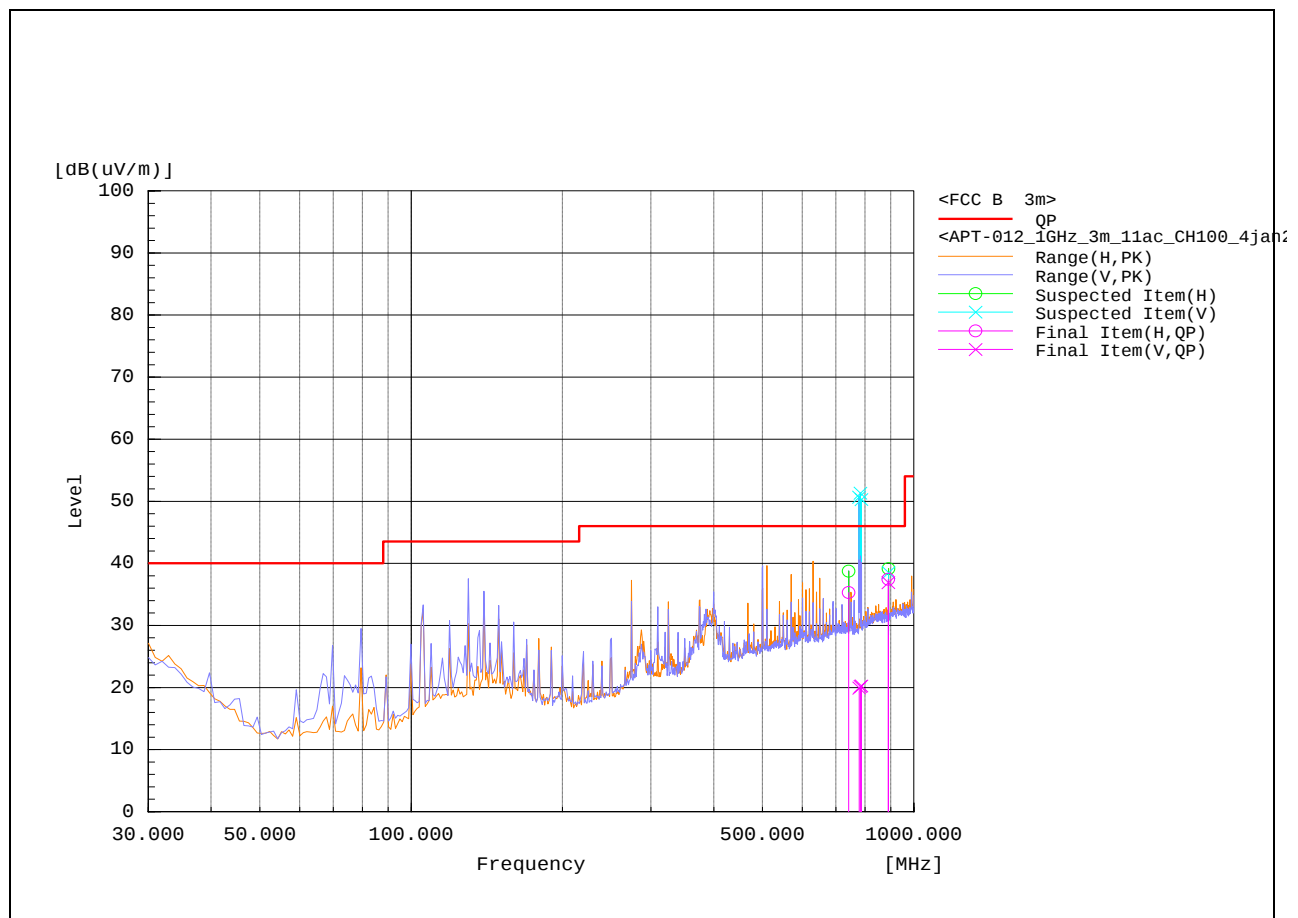


CHANNEL	802.11ac 20MHz Channel 36	DETECTOR FUNCTION	Quasi Peak
FREQUENCY RANGE	30MHz – 1GHz		

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m										
No.	Frequency (MHz)	Polarization (H/V)	Reading QP [dB(uV)]	Factor [dB(1/m)]	Level QP [dB(uV/m)]	Limit\QP dB(uV/m)	Margin QP [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	741.744	H	6.2	29.1	35.3	46	10.7	103	0	Pass
2	778.313	V	-9	28.9	19.9	46	26.1	243	202.6	Pass
3	782.699	V	-8.8	29	20.2	46	25.8	290	0	Pass
4	786.734	V	-8.8	29.1	20.3	46	25.7	168	14.7	Pass
5	890.109	H	6.3	31.1	37.4	46	8.6	386	44.1	Pass
6	890.105	V	6.4	30.5	36.9	46	9.1	143	175.1	Pass

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Cable Loss (dB) + AF (dB)
2. AF (dB/m) = Antenna Factor (dB/m) – Preamplifier Gain (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.

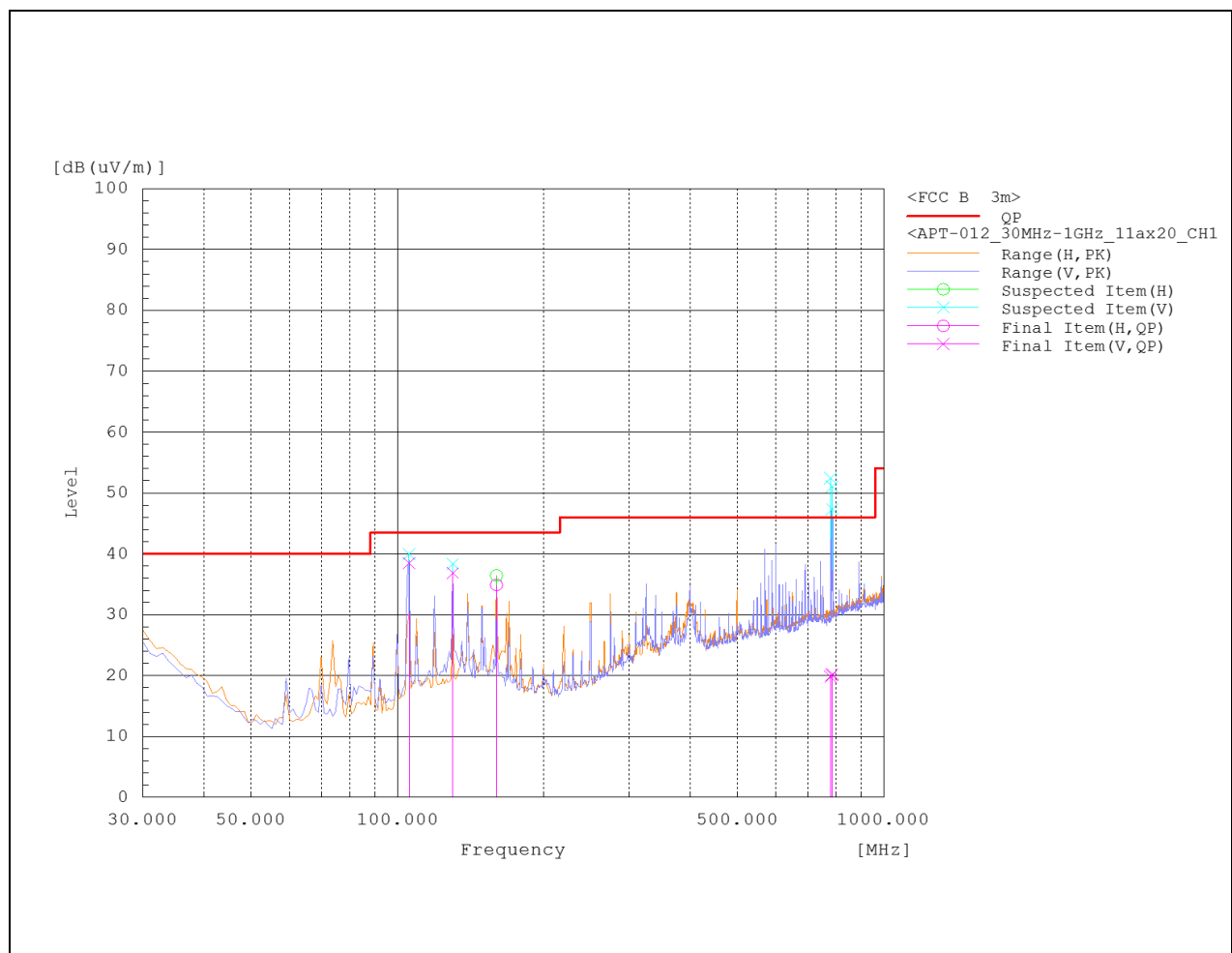


CHANNEL	802.11ax 20MHz Channel 36	DETECTOR FUNCTION	Quasi Peak
FREQUENCY RANGE	30MHz – 1GHz		

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m										
No.	Frequency (MHz)	Polarization (H/V)	Reading QP [dB(uV)]	Factor [dB(1/m)]	Level QP [dB(uV/m)]	Limit\QP dB(uV/m)	Margin QP [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	105.728	V	20.6	17.8	38.4	43.5	5.1	100	234.1	Pass
2	129.984	V	17.3	19.6	36.9	43.5	6.6	115	237.1	Pass
3	159.997	H	16.2	18.7	34.9	43.5	8.6	106	305.8	Pass
4	777.649	V	-9.1	28.9	19.8	46	26.2	130	252.8	Pass
5	782.894	V	-8.9	29	20.1	46	25.9	400	166.3	Pass
6	785.082	V	-8.9	29.1	20.2	46	25.8	262	206	Pass

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Cable Loss (dB) + AF (dB)
2. AF (dB/m) = Antenna Factor (dB/m) – Preamplifier Gain (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.

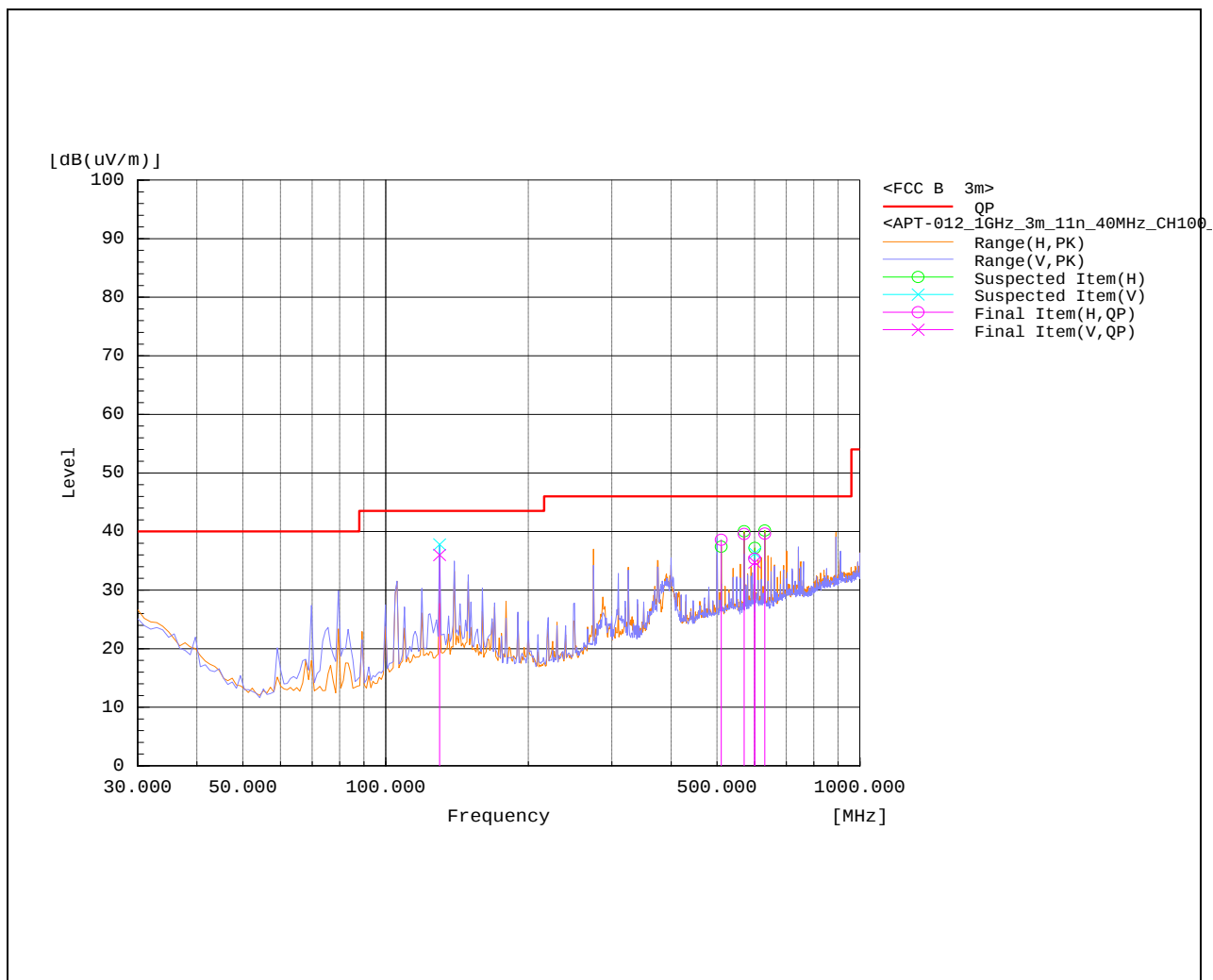


CHANNEL	802.11n 40MHz Channel 38	DETECTOR FUNCTION	Quasi Peak
FREQUENCY RANGE	30MHz – 1GHz		

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m										
No.	Frequency (MHz)	Polarization (H/V)	Reading QP [dB(uV)]	Factor [dB(1/m)]	Level QP [dB(uV/m)]	Limit\QP dB(uV/m)	Margin QP [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	129.993	V	16.4	19.6	36	43.5	7.5	100	326.7	Pass
2	509.966	H	13.2	25.4	38.6	46	7.4	100	289.6	Pass
3	569.96	H	12.9	26.7	39.6	46	6.4	100	47.5	Pass
4	599.958	H	7.4	27.9	35.3	46	10.7	106	84.4	Pass
5	599.963	V	7.4	27.3	34.7	46	11.3	100	40.2	Pass
6	629.951	H	11.8	27.8	39.6	46	6.4	115	157.6	Pass

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Cable Loss (dB) + AF (dB)
2. AF (dB/m) = Antenna Factor (dB/m) – Preamplifier Gain (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.

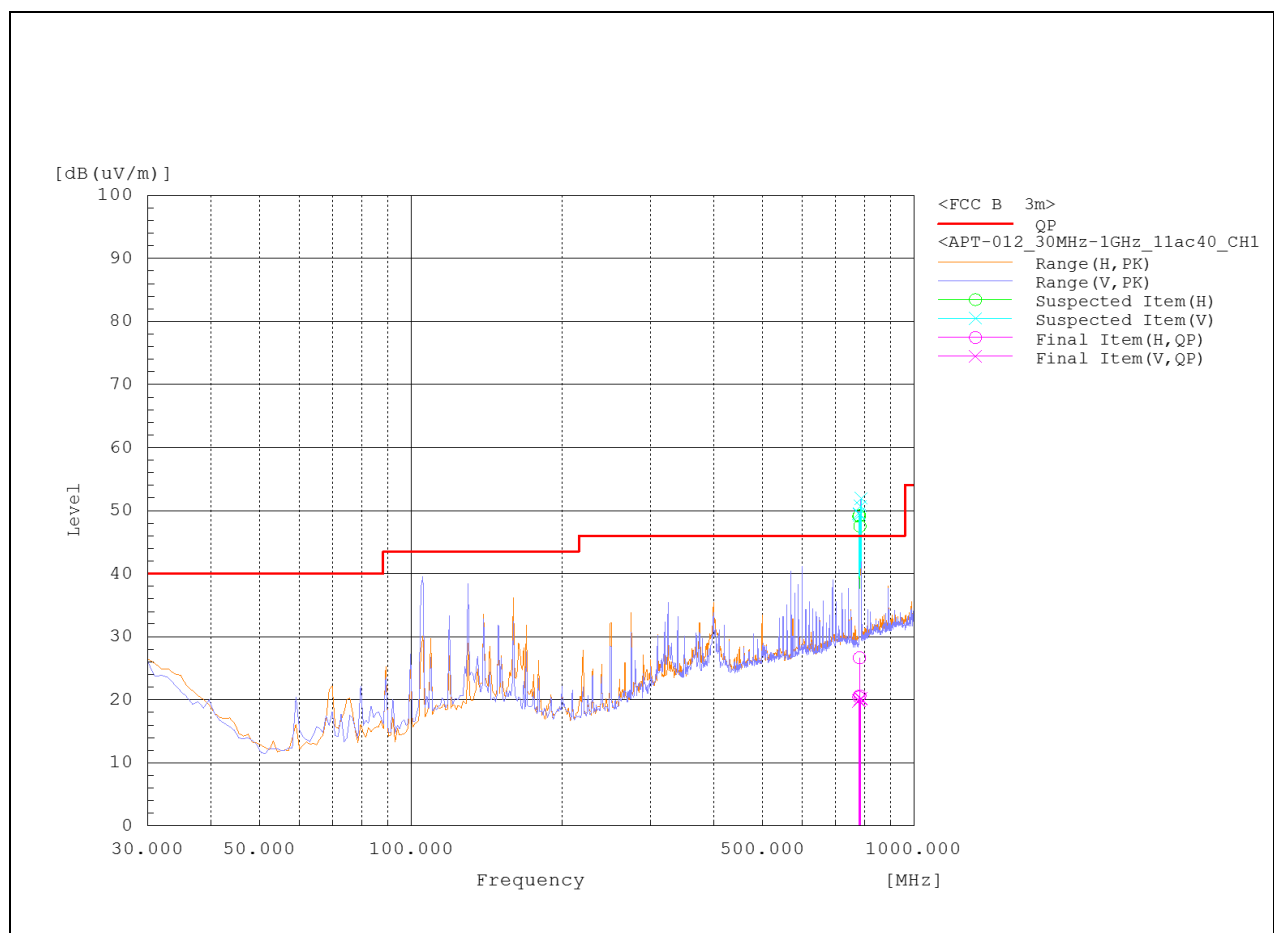


CHANNEL	802.11ac 40MHz Channel 38	DETECTOR FUNCTION	Quasi Peak
FREQUENCY RANGE	30MHz – 1GHz		

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m										
No.	Frequency (MHz)	Polarization (H/V)	Reading QP [dB(uV)]	Factor [dB(1/m)]	Level QP [dB(uV/m)]	Limit\QP dB(uV/m)	Margin QP [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	777.786	V	-9.1	28.9	19.8	46	26.2	281	297.8	Pass
2	778.13	H	-9.1	29.5	20.4	46	25.6	181	344.1	Pass
3	779.935	H	-2.9	29.6	26.7	46	19.3	181	208.3	Pass
4	779.456	V	-9.1	28.9	19.8	46	26.2	396	152.1	Pass
5	781.763	H	-8.9	29.5	20.6	46	25.4	124	105	Pass
6	783.211	V	-8.9	29	20.1	46	25.9	256	72.9	Pass

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Cable Loss (dB) + AF (dB)
2. AF (dB/m) = Antenna Factor (dB/m) – Preamplifier Gain (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.

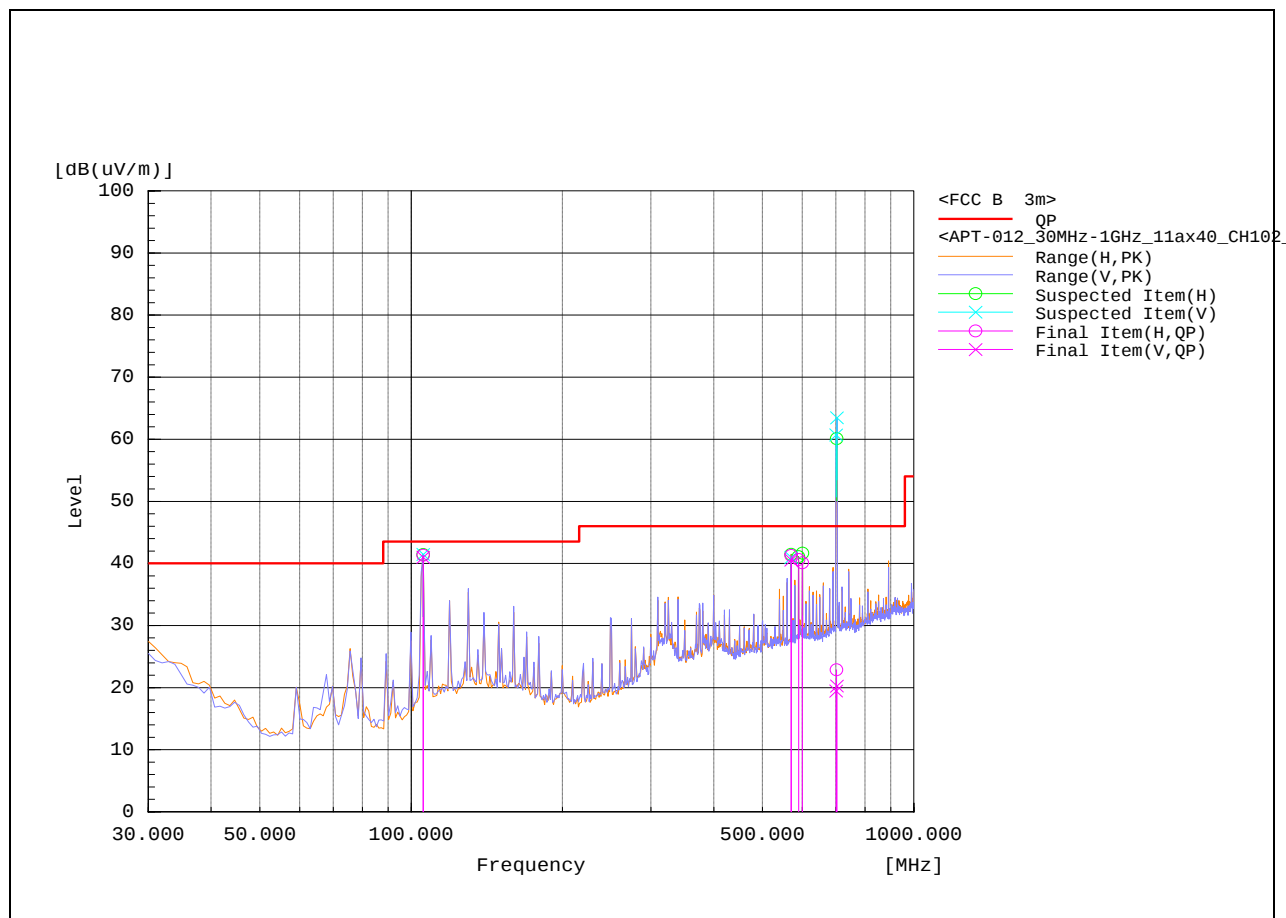


CHANNEL	802.11ax 40MHz Channel 38	DETECTOR FUNCTION	Quasi Peak
FREQUENCY RANGE	30MHz – 1GHz		

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m										
No.	Frequency (MHz)	Polarization (H/V)	Reading QP [dB(uV)]	Factor [dB(1/m)]	Level QP [dB(uV/m)]	Limit\QP dB(uV/m)	Margin QP [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	105.692	V	23.2	17.8	41	43.5	2.5	100	179.9	Pass
2	105.677	H	23.9	17.4	41.3	43.5	2.2	106	235.5	Pass
3	569.962	H	14.6	26.7	41.3	46	4.7	100	234.8	Pass
4	569.962	V	14.3	26.3	40.6	46	5.4	106	249.3	Pass
5	589.957	H	12.9	27.7	40.6	46	5.4	100	0	Pass
6	599.964	H	12.2	27.9	40.1	46	5.9	100	230.8	Pass

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Cable Loss (dB) + AF (dB)
2. AF (dB/m) = Antenna Factor (dB/m) – Preamplifier Gain (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.

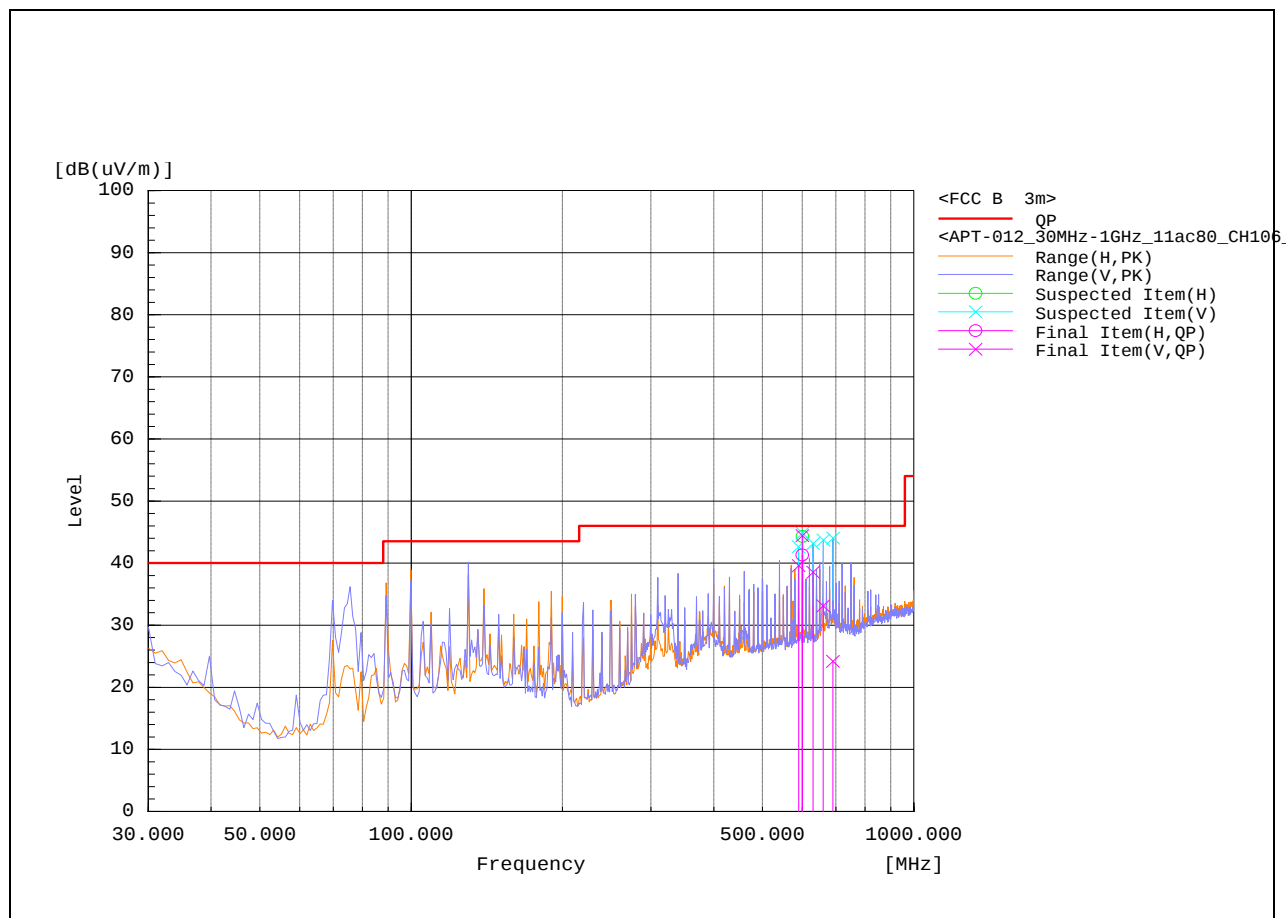


CHANNEL	802.11ac 80MHz Channel 42	DETECTOR FUNCTION	Quasi Peak
FREQUENCY RANGE	30MHz – 1GHz		

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m										
No.	Frequency (MHz)	Polarization (H/V)	Reading QP [dB(uV)]	Factor [dB(1/m)]	Level QP [dB(uV/m)]	Limit\QP dB(uV/m)	Margin QP [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	569.97	V	16.7	26.3	43	46	3	124	334.8	Pass
2	589.962	V	14	27	41	46	5	115	115.2	Pass
3	599.961	V	15.1	27.3	42.4	46	3.6	100	114.9	Pass
4	609.957	V	13.4	27.4	40.8	46	5.2	100	333	Pass
5	619.955	V	10.1	27.4	37.5	46	8.5	100	304.2	Pass
6	700.783	V	-9.3	28.7	19.4	46	26.6	294	26.8	Pass

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Cable Loss (dB) + AF (dB)
2. AF (dB/m) = Antenna Factor (dB/m) – Preamplifier Gain (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.

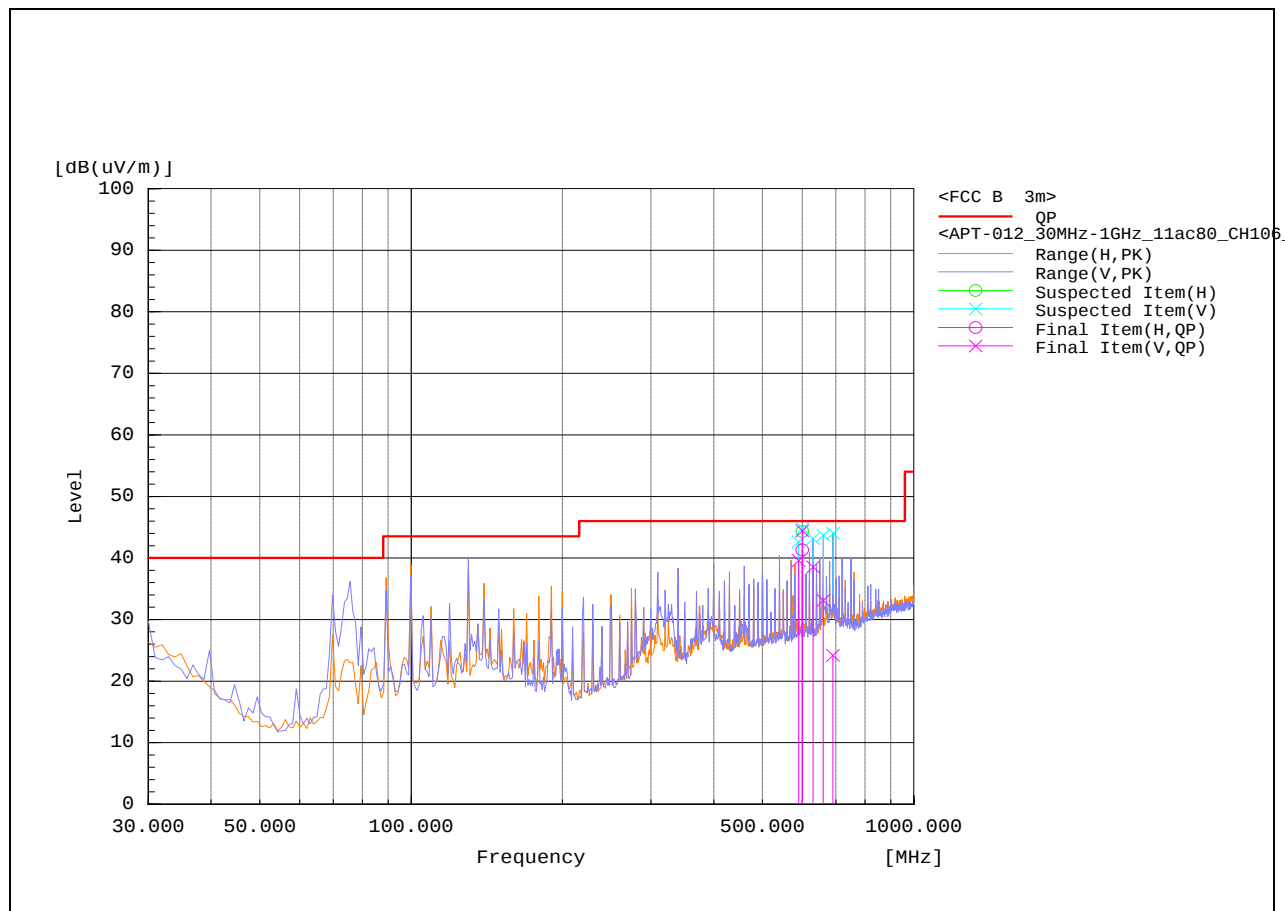


CHANNEL	802.11ax 80MHz Channel 42	DETECTOR FUNCTION	Quasi Peak
FREQUENCY RANGE	30MHz – 1GHz		

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m										
No.	Frequency (MHz)	Polarization (H/V)	Reading QP [dB(uV)]	Factor [dB(1/m)]	Level QP [dB(uV/m)]	Limit\QP dB(uV/m)	Margin QP [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	589.962	V	12.6	27	39.6	46	6.4	100	281.6	Pass
2	599.964	V	17.1	27.3	44.4	46	1.6	100	123.4	Pass
3	599.957	H	13.4	27.9	41.3	46	4.7	100	19.8	Pass
4	629.965	V	11.1	27.4	38.5	46	7.5	100	321.6	Pass
5	660.001	V	5.7	27.4	33.1	46	12.9	100	84.4	Pass
6	690.074	V	-4.2	28.4	24.2	46	21.8	100	127	Pass

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Cable Loss (dB) + AF (dB)
2. AF (dB/m) = Antenna Factor (dB/m) – Preamplifier Gain (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.



1GHz – 18GHz Test Data:

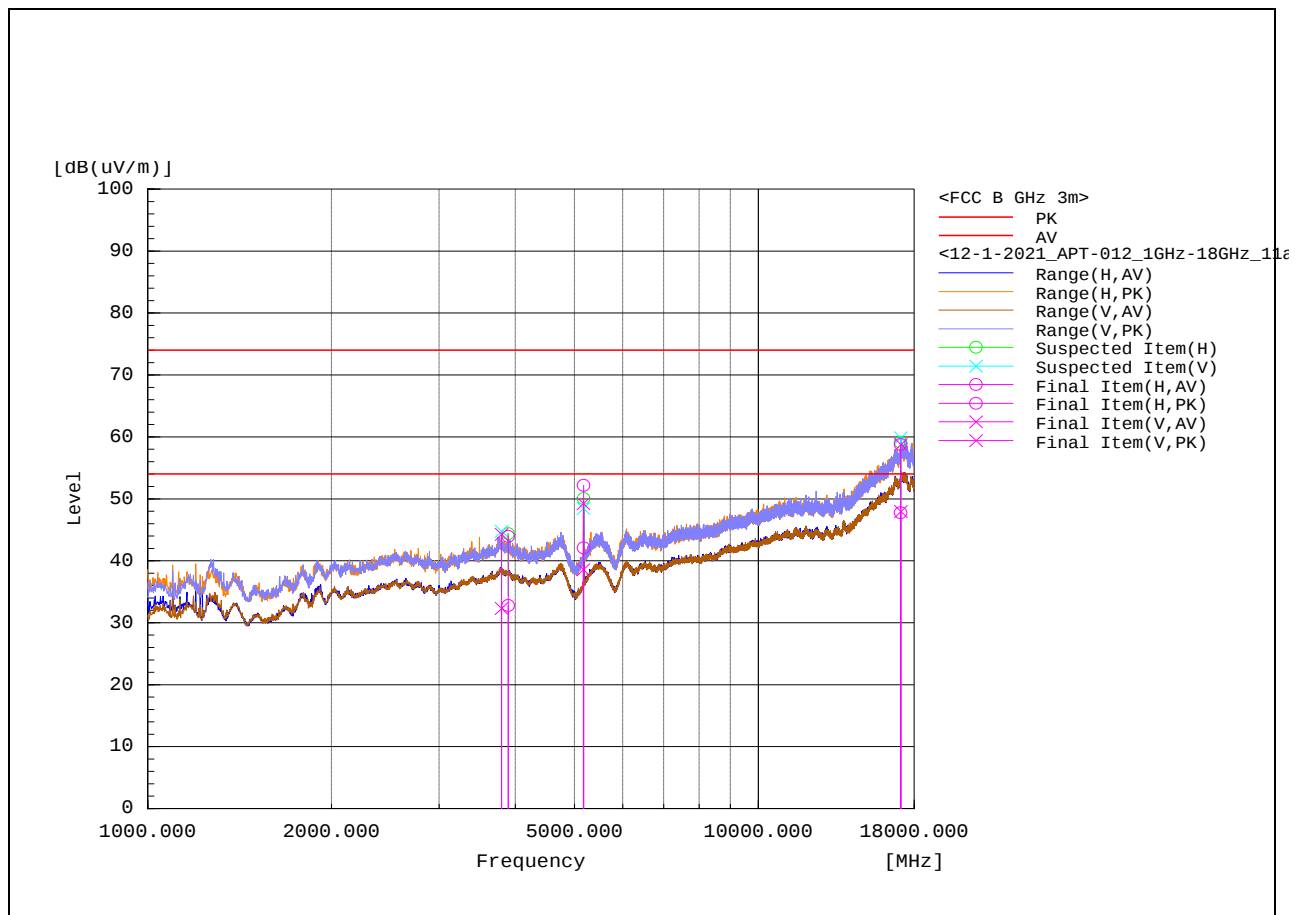
1-18GHz – 802.11a Channel 36

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m

No.	Frequency (MHz)	Polarization (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	3796.348	V	39.7	51.7	-7.4	32.3	44.3	54	74	21.7	29.7	193	153.8	Pass
2	3893.199	H	40.3	51.5	-7.5	32.8	44	54	74	21.2	30.0	298	0	Pass
3	5172.917	V	44.3	54.9	-5.7	38.6	49.2	-	68.2	-	19.0	100	247.6	Pass
4	5173.369	H	47.8	57.9	-5.7	42.1	52.2	-	68.2	-	16.0	100	302.8	Pass
5	17106.14	H	31.8	42.8	16	47.8	58.8	-	68.2	-	9.4	400	184.5	Pass
6	17115.66	V	32	42.8	16	48	58.8	-	68.2	-	9.4	216	350.7	Pass

REMARKS:

1. Emission level (dBuV/m) = Reading Value (dBuV) + Factor (dB)
2. AF (dB/m) = Antenna Factor (dB/m) – Preamplifier Gain (dB).
3. Margin value = Emission level – Limit value.

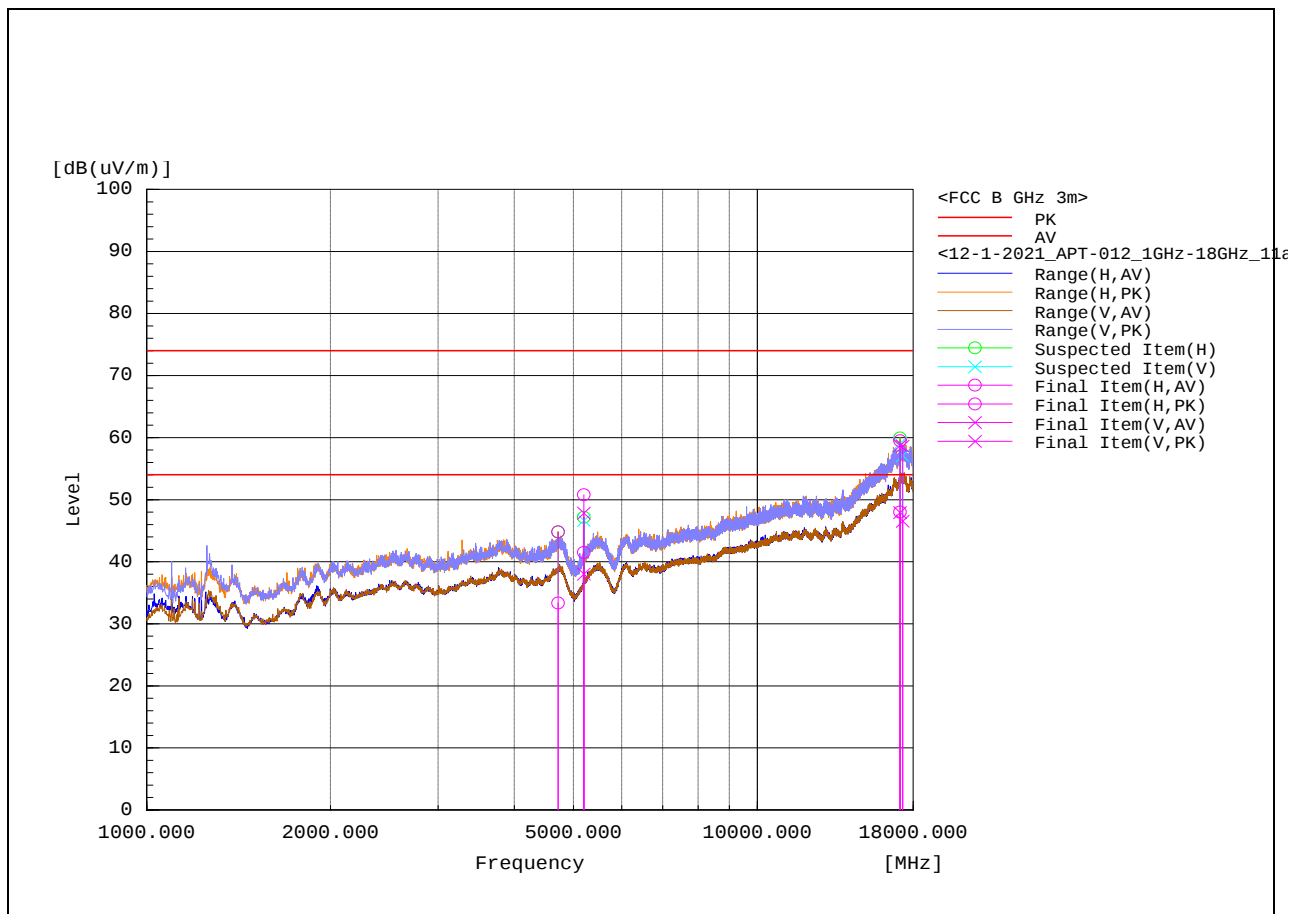


1-18GHz – 802.11a Channel 40

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No.	Frequency (MHz)	Polarization (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	4717.882	H	39.6	51	-6.2	33.4	44.8	54	74	20.6	29.2	162	206.3	Pass
2	5197.497	H	47.1	56.4	-5.6	41.5	50.8	-	68.2	-	17.4	291	311.2	Pass
3	5197.498	V	43.6	53.5	-5.6	38	47.9	-	68.2	-	20.3	253	105.1	Pass
4	17126.97	V	31.9	42.8	16	47.9	58.8	-	68.2	-	9.4	400	0	Pass
5	17131.09	H	32	43.5	16	48	59.5	-	68.2	-	8.1	329	16.9	Pass
6	17297.54	V	31.3	43.4	15.2	46.5	58.6	-	68.2	-	9.6	382	254.5	Pass

REMARKS:

1. Emission level (dBuV/m) = Reading Value (dBuV) + Factor (dB)
2. AF (dB/m) = Antenna Factor (dB/m) – Preamplifier Gain (dB).
3. Margin value = Emission level – Limit value.

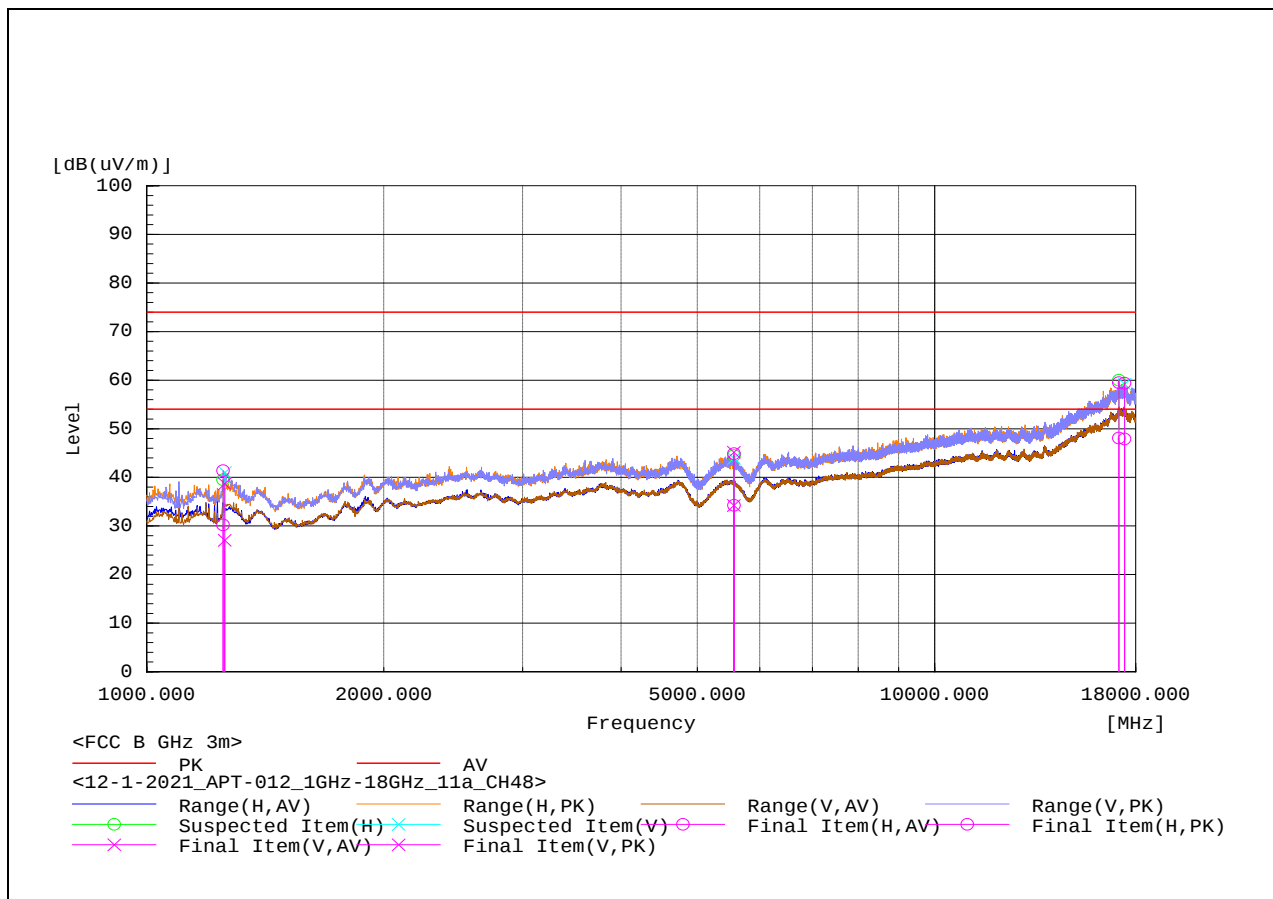


1-18GHz – 802.11a Channel 48

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No .	Frequency (MHz)	Polarization (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	1250.032	H	46.7	57.9	-16.5	30.2	41.4	-	68.2	-	26.8	223	19.8	Pass
2	1255.9	V	43.6	55.2	-16.5	27.1	38.7	-	68.2	-	29.5	100	160.6	Pass
3	5560.974	V	39	50	-4.8	34.2	45.2	-	68.2	-	23	140	42.9	Pass
4	5565.527	H	39.1	49.7	-4.8	34.3	44.9	-	68.2	-	23.3	374	27.4	Pass
5	17139.98	H	32.1	43.5	16	48.1	59.5	-	68.2	-	8.7	99	65.2	Pass
6	17419.42	H	31.9	43.4	16	47.9	59.4	-	68.2	-	8.8	103	247.6	Pass

REMARKS:

- Emission level (dBuV/m) = Reading Value (dBuV) + Factor (dB)
- AF (dB/m) = Antenna Factor (dB/m) – Preamplifier Gain (dB).
- Margin value = Emission level – Limit value.

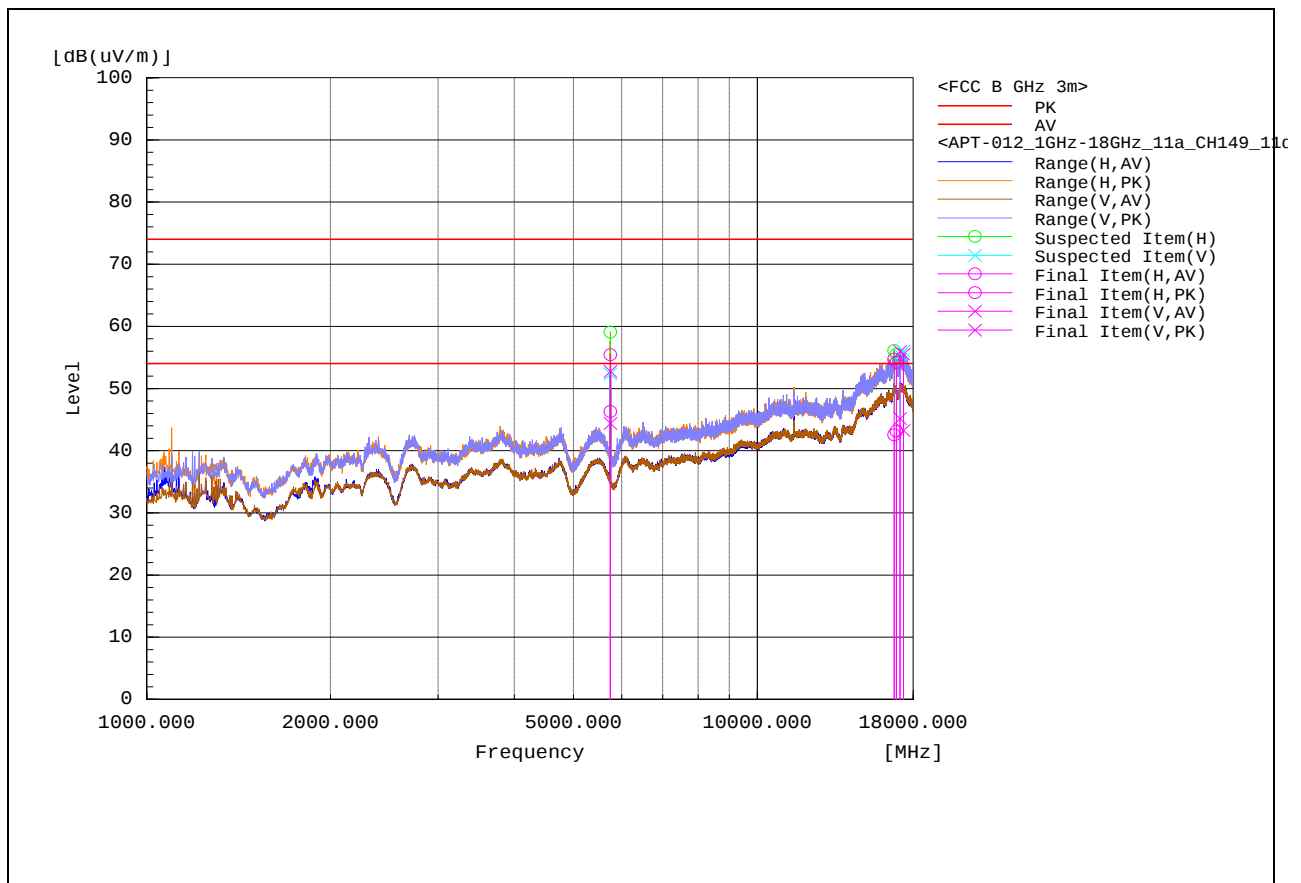


1-18GHz – 802.11a Channel 149

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No .	Frequency (MHz)	Polarization (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	5748.024	H	50.6	59.7	-4.3	46.3	55.4	-	68.2	-	12.8	117	358.5	Pass
2	5748.02	V	48.7	57.1	-4.3	44.4	52.8	-	68.2	-	15.4	253	25.8	Pass
3	16753.34	H	26.8	39	15.7	42.5	54.7	-	68.2	-	13.5	396	56.8	Pass
4	16896.43	H	27.8	38.9	15.3	43.1	54.2	-	68.2	-	14	268	200.6	Pass
5	17122.26	V	28.9	39.7	16.3	45.2	56	-	68.2	-	12.2	389	160	Pass
6	17349.75	V	27.6	39.8	15.7	43.3	55.5	-	68.2	-	12.7	314	261.9	Pass

REMARKS:

1. Emission level (dBuV/m) = Reading Value (dBuV) + Factor (dB)
2. AF (dB/m) = Antenna Factor (dB/m) – Preamplifier Gain (dB).
3. Margin value = Emission level – Limit value.

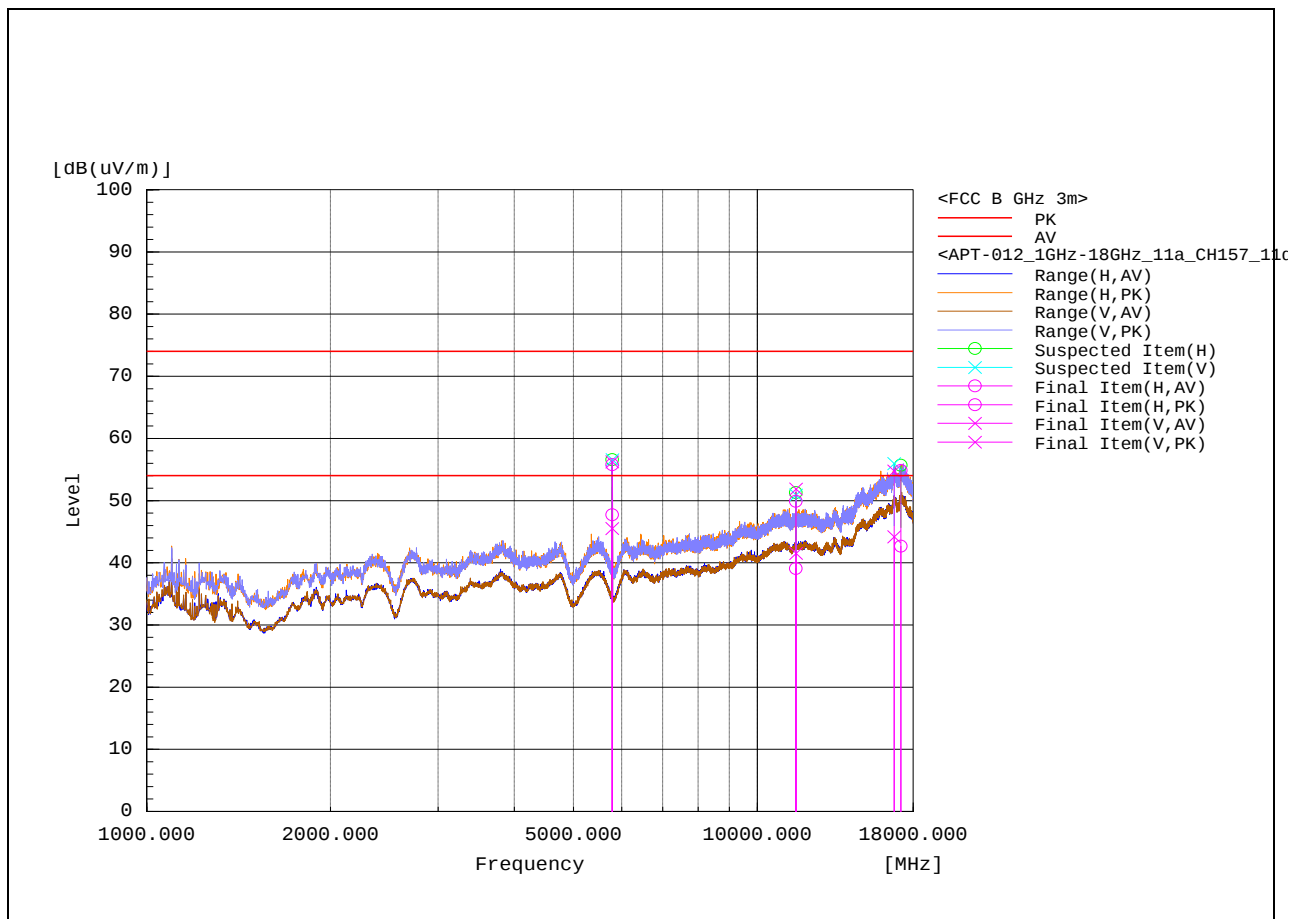


1-18GHz – 802.11a Channel 157

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No.	Frequency (MHz)	Polarization (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	5786.374	H	51.9	60	-4.2	47.7	55.8	-	68.2	-	12.4	223	50.4	Pass
2	5788.015	V	49.7	60.4	-4.2	45.5	56.2	-	68.2	-	12	177	34.8	Pass
3	11563.21	H	32.8	43.6	6.3	39.1	49.9	54	74	14.9	24.1	103	1.5	Pass
4	11575.32	V	35.1	45.5	6.4	41.5	51.9	54	74	12.5	22.1	103	41	Pass
5	16750.73	V	28.5	39	15.7	44.2	54.7	-	68.2	-	13.5	103	57.8	Pass
6	17180.54	H	26.7	38.9	16	42.7	54.9	-	68.2	-	13.3	322	17.2	Pass

REMARKS:

1. Emission level (dBuV/m) = Reading Value (dBuV) + Factor (dB)
2. AF (dB/m) = Antenna Factor (dB/m) – Preamplifier Gain (dB).
3. Margin value = Emission level – Limit value.

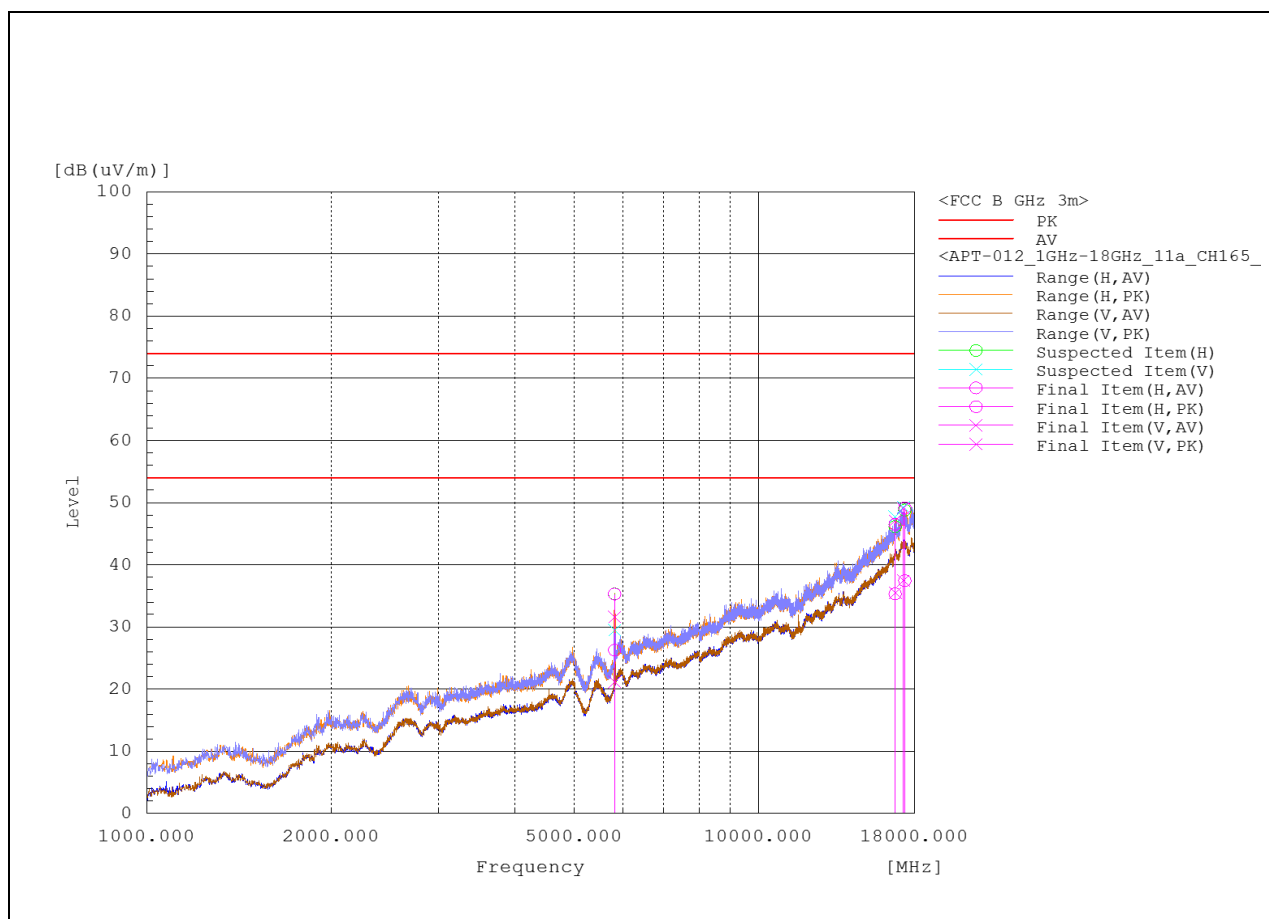


1-18GHz – 802.11a Channel 165

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No.	Frequency (MHz)	Polarization (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	5819.574	H	30.4	39.4	-4.1	26.3	35.3	-	68.2	-	32.9	238	319.1	Pass
2	5820.587	V	25.3	35.7	-4.1	21.2	31.6	-	68.2	-	36.6	103	43.7	Pass
3	16747.064	V	19.8	31.4	15.7	35.5	47.1	-	68.2	-	21.1	238	102.2	Pass
4	16747.885	H	19.6	30.8	15.7	35.3	46.5	-	68.2	-	21.7	100	42	Pass
5	17282.986	V	21.9	33.6	15.5	37.4	49.1	-	68.2	-	19.1	276	19.9	Pass
6	17372.758	H	21.6	33.4	15.8	37.4	49.2	-	68.2	-	19	140	293.6	Pass

REMARKS:

1. Emission level (dBuV/m) = Reading Value (dBuV) + Factor (dB)
2. AF (dB/m) = Antenna Factor (dB/m) – Preamplifier Gain (dB).
3. Margin value = Emission level – Limit value.



1-18GHz – 802.11n20 Channel 36

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No	Frequency (MHz)	Polarization (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	5177.806	H	46.5	56.5	-5.6	40.9	50.9	-	68.2	-	17.3	147	344	Pass
2	17385.34	H	29.2	41.3	15.7	44.9	57	-	68.2	-	11.2	389	359.9	Pass
3	17407.73	V	29.3	41.1	15.9	45.2	57	-	68.2	-	11.2	291	354.7	Pass
4	14846.38	H	27.3	37.9	10.2	37.5	48.1	-	68.2	-	20.1	117	184.3	Pass
5	1277.204	H	44	56.9	-16.4	27.6	40.5	-	68.2	-	27.7	162	215.7	Pass
6	13508.06	V	29.1	40.4	6.6	35.7	47	-	68.2	-	21.2	382	134.9	Pass

REMARKS:

1. Emission level (dBuV/m) = Reading Value (dBuV) + Factor (dB)
2. AF (dB/m) = Antenna Factor (dB/m) – Preamplifier Gain (dB).
3. Margin value = Emission level – Limit value.

