EUROFINS ELECTRICAL TESTING SERVICE (SHENZHEN) CO., LTD.

RADIO TEST - REPORT

FCC&IC Compliance Test Report for

Product name: Air Purifie

Model name: CF-8700AS

FCC ID: 2AWVWCF8700AS
IC: 26287- CF8700AS

Test Report Number: EFGX20070186-IE-01-E01

1 General Information

1.1 Notes

The results of this test report relate exclusively to the item tested as specified in chapter "Description of test item" and are not transferable to any other test items.

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Operator:

Date	Eurofins-Lab.	Name / Title	Signature
2020-09-10		Bruce Zheng / Project Engineer	Bruce Zheng

Technical responsibility for area of testing:

Date	Eurofins	Name / Title	Signature
2020-09-10		Tom Tian / Supervisor	Tom Tian

1.2 Testing laboratory

Eurofins Electrical Testing Service (Shenzhen) Co., Ltd.
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The Laboratory has passed the Accreditation by the American Association for Laboratory Accrediation (A2LA). The Accreditation number is 5376.01
The Laboratory has been listed by industry Canada to perform electromagnetic emission measurements, The CAB identifier is CN0088

1.3 Details of applicant

Name	:	Airplove (Xiamen) Electronic Co., Ltd
Address	:	3F-4F,No.823-1, Fangshan Dong Er Road, Xiang'an District, Xiamen,Fujian,China
Telephone	:	+86 15005056461
Fax	:	N/A

1.4 Details of manufacturer

Name	:	Airplove (Xiamen) Electronic Co., Ltd
Address	:	3F-4F,No.823-1, Fangshan Dong Er Road, Xiang'an District, Xiamen,Fujian,China
Telephone	:	+86 15005056461
Fax	:	N/A

1.5 Application details

Date of receipt of application	:	July 20, 2020
Date of receipt of test item	:	July 20, 2020
Date of test	:	July 20, 2020 –August 07, 2020
Date of issue	:	September 10, 2020

1.6 Test item

Product type	:	Air Purifier
Model name	:	CF-8700AS
Brand	:	Airplove
Serial number	:	N/A
Ratings	:	AC120V,60Hz,1A,80W
Test voltage	:	AC120V,60Hz
FCC ID	:	2AWVWCF8700AS
IC ID	:	26287- CF8700AS
Additional information	:	N/A

RadioTechnical data

Frequency range	:	802.11 b/g/n(HT20) :2412MHz – 2462MHz 802.11 n(HT40) :2422MHz – 2452MHz
Radio Tech.	:	WLAN 2.4G
Frequency channel	:	802.11 b/g/n(HT20) :11 802.11 n(HT40) :7
Modulation	:	DSSS,OFDM
Antenna type	:	PCB antenna
Antenna gain	:	2.5dBi

Radio module

Type	:	WLAN 2.4G
Model	:	WR1
Manufacturer	:	Tuya.Inc

1.7 Test standards

Test Standards	
FCC Part 15 Subpart C August 26, 2020	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators
RSS-247 Issue 2 February 2017	RSS-247 — Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices
RSS-GEN Issue 5 March 2019	RSS-Gen — General Requirements for Compliance of Radio Apparatus

Test Method

1: ANSI C63.4-2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
2: ANSI C63.10-2013, American National Standard for Testing Unlicensed Wireless Devices.
3: KDB558074 D01 15.247 Meas Guidance v05r02

2 Technical test

2.1 Summary of test results

No deviations from the technical specification(s) were ascertained in the course of the tests performed. ☒

or

The deviations as specified were ascertained in the course of the tests performed. ☐

2.2 Test environment

Ac line conducted

Enviroment Parameter	Temperature	Relative Humidity
101.5Kpa	24.2	57.3%

RF Conducted

Enviroment Parameter	Temperature	Relative Humidity
101.5Kpa	24.7	59.6%

Radiated

Enviroment Parameter	Temperature	Relative Humidity
101.5Kpa	24.3	52.7%

2.3 Measurement uncertainty

The uncertainty is calculated using the methods suggested in the "Guide to the Expression of Uncertainty in Measurement" (GUM) published by ISO.

System Measurement Uncertainty	
Test Items	Extended Uncertainty
Uncertainty in conducted measurements	1.96dB
Uncertainty for Conducted RF test	RF Power Conducted: 1.16dB Frequency test involved: 1.05×10-7 or 1%
Uncertainty for Radiated Spurious Emission 25MHz-3000MHz	Horizontal: 4.46dB; Vertical: 4.54dB;
Uncertainty for Radiated Spurious Emission 3000MHz-18000MHz	Horizontal: 4.42dB; Vertical: 4.41dB;
Uncertainty for Radiated Spurious Emission 18000MHz-40000MHz	Horizontal: 4.63dB; Vertical: 4.62dB;

2.4 Test mode

The EUT is operating at 2.4GHz ISM; it supports 802.11b, 802.11g, 802.11n(HT20,HT40) and they are all tested in this report.
For 802.11b/g/n(HT20) (2.4GHz band), the lowest, middle, highest channel numbers of the EUT used and tested in this report are separately 1 (2412MHz), 6 (2437MHz) and 11 (2462MHz).
For 802.11n(HT40) (2.4GHz band), the lowest, middle, highest channel numbers of the EUT used and tested in this report are separately 3 (2422MHz), 6 (2437MHz) and 9 (2452MHz).

2.5 Test equipment utilized

EQUIPMENT ID	EQUIPMENT NAME	MODEL NO.	CAL. DUE DATE
23-2-13-05	EMI Test Receiver	ESR3	2021-04-24
23-2-13-06	LISN	NNLK 8127 RC	2021-04-23
23-2-10-16	Attenuator	VTSD 9561-F	2021-04-24
23-2-13-12	Signal Analyzer	N9010B-544	2021-04-24
23-2-13-13	BT/WLAN Tester	CMW270	2021-04-23
23-2-13-14	Signal Generator	N5183B-520	2021-04-23
23-2-13-15	Vector Signal Generator	N5182B-506	2021-04-23
23-2-10-43	Switch and Control Unit	ERIT-E-JS0806-2	2021-06-17
23-2-10-44	DC power supply	E3642A	2021-06-03
23-2-10-45	Temperature test chamber	SG-80-CC-2	2021-04-23
23-2-13-01	EMI Test Receiver	ESR7	2021-04-24
23-2-13-02	Signal Analyzer	N9020B-544	2021-04-24
23-2-12-01	Active Loop Antenna	FMZB 1519B	2021-05-13
23-2-12-02	TRILOG Broadband Antenna	VULB9168	2021-04-27
23-2-12-03	Horn Antenna	3117	2021-05-11
23-2-12-04	Horn Antenna	BBHA 9170	2021-05-11
23-2-10-01	Preamplifier	BBV9745	2021-04-23
23-2-10-02	Preamplifier	TAP01018048	2021-04-24
23-2-10-03	Preamplifier	TAP18040048	2021-04-24
23-2-10-14	Switch and Control Unit	ERIT-E-JS0806-SF1	N/A

2.6 Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.	S/N
Laptop	LENOVO	TP00096A	PF-1QH0LV

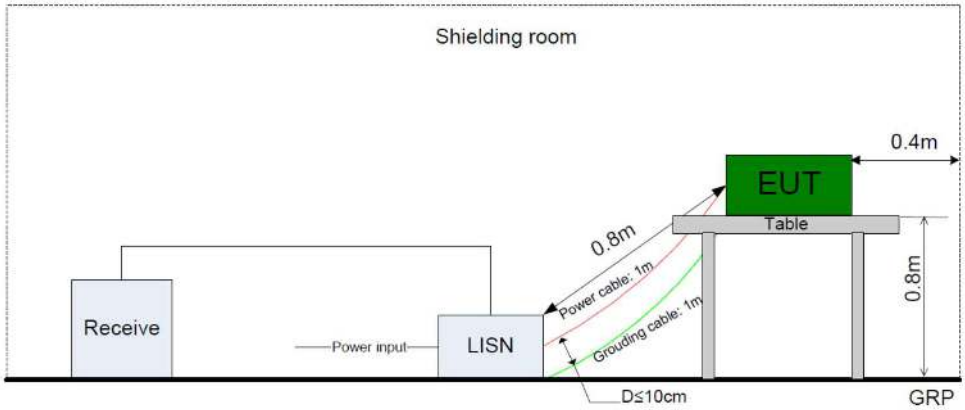
2.7 Test software information:

Test Software Version	MP_tool 1V16		
Mode	Setting TX Power	TX Pattern	Modulation Type
802.11b	37	TX Continuous	DBPSK
802.11g	38	TX Continuous	BPSK
802.11n HT20	38	TX Continuous	BPSK
802.11n HT40	29	TX Continuous	BPSK

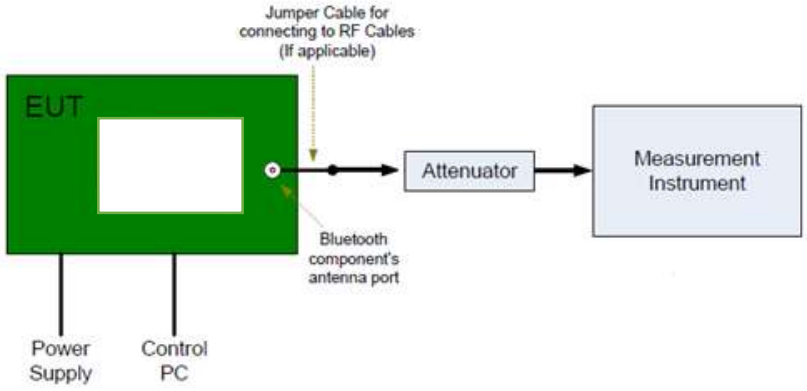
2.8 Customized Configurations

EUT Conf.	Signal Description	Operating Frequency	Duty Cycle
TM1	802.11b(DBPSK)	2412 MHz – 2462MHz	100%
TM1	802.11g(BPSK)	2412 MHz – 2462MHz	100%
TM1	802.11n HT20(BPSK)	2412 MHz – 2462MHz	100%
TM1	802.11n HT40(BPSK)	2422 MHz – 2452MHz	100%

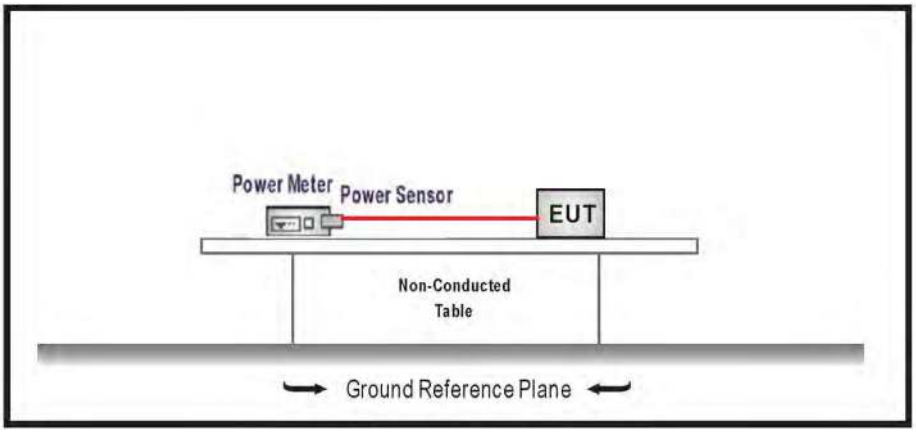
2.9 Test setup- ac line conducted



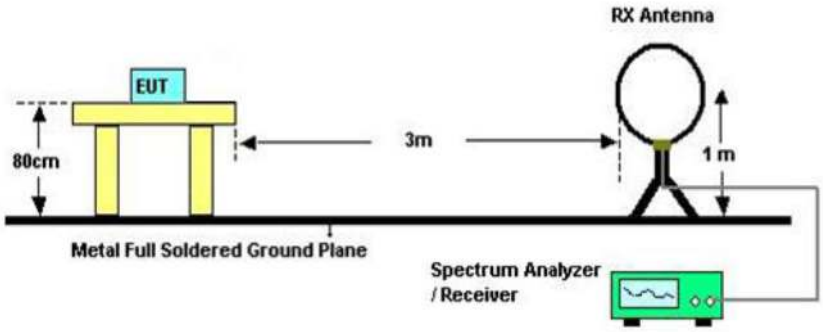
2.10 Setup diagram for conducted tests



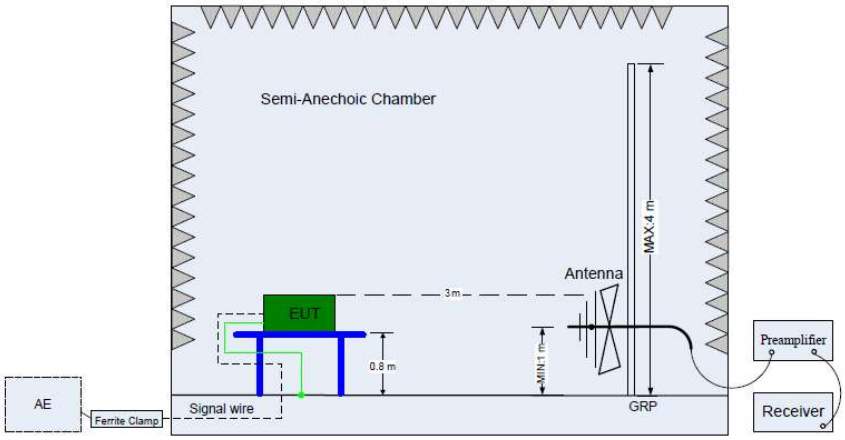
2.11 Setup diagram for peak power output tests



2.12 Setup diagram for radiated tests below 30MHz

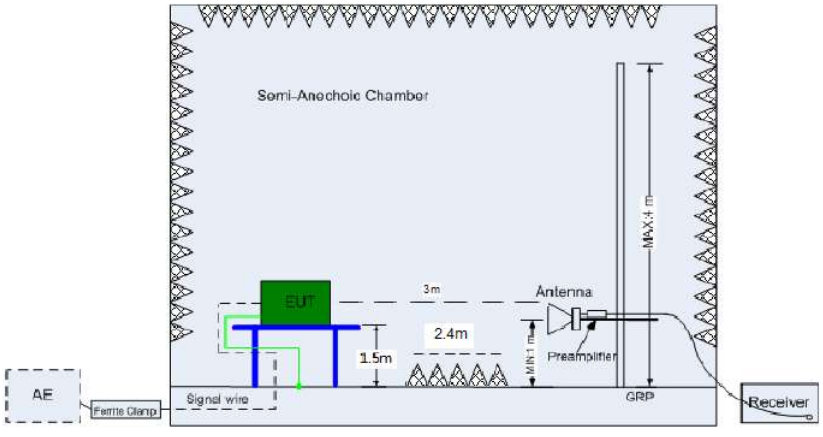


2.13 Setup diagram for radiated tests below 1GHz



(Below 1 GHz)

2.14 Setup diagram for radiated tests above 1GHz



(Above 1 GHz)

2.15 Test results

☒ 1st test ☐ test after modification ☐ production test

Technical Requirements					
FCC Part 15 Subpart C/RSS-247 Issue 2/RSS-Gen Issue 5					
Test Condition			Test Result	Verdict	Test Site
§15.207	RSS-GEN 8.8	Conducted emission AC power port	See page 13	N/A	Site 1
§15.247(b)(1)	RSS-247 Clause 5.4(b)	Conducted output power for FHSS	--	N/A	--
§15.247(b)(3)	RSS-247 Clause 5.4(d)	Conducted output power for DTS	Appendix D	Pass	Site 1
§15.247(e)	RSS-247 Clause 5.2(b)	Power spectral density	Appendix E	Pass	Site 1
§15.247(a)(2)	RSS-247 Clause 5.2(a)	6dB bandwidth	Appendix B	Pass	Site 1
§15.247(a)(1)	RSS-247 Clause 5.1(a)	20dB Occupied band-width	--	N/A	--
--	RSS-GEN 6.7	99% Occupied Band-width	Appendix C	Pass	Site 1
§15.247(a)(1)	RSS-247 Clause 5.1(b)	Carrier frequency sep-aration	--	N/A	--
§15.247(a)(1)(iii)	RSS-247 Clause 5.1(d)	Number of hopping frequencies	--	N/A	--
§15.247(a)(1)(iii)	RSS-247 Clause 5.1(d)	Dwell Time	--	N/A	--
§15.247(d) §15.205	RSS-247 Clause 5.5 RSS-GEN 8.10	Conducted Spurious Emissions	Appendix G Appendix H	Pass	Site 1
§15.247(d)	RSS-247 Clause 5.5	Band edge	Appendix F	Pass	Site 1
§15.247(d) & §15.209 & §15.205	RSS-247 Clause 5.5 & RSS-GEN 6.13 RSS-GEN 8.9 RSS-GEN 8.10	Spurious radiated emissions for transmit-ter	See page 27	Pass	Site 1
	RSS-GEN Clause 6.11	Transmitter frequency stability	Appendix I	Pass	Site 1
§15.203	RSS-GEN 6.8	Antenna requirement	See note 1	Pass	--

Remark 1: N/A – Not Applicable.
Note 1: The EUT uses an chip antenna, the gain: 2.5 dBi. According to §15.203/ RSS-GEN 6.8, it is considered sufficiently to comply with the provisions of this section.

3 Technical Requirement

3.1 Conducted emission AC power port

Test Method:
The test method was refered to the subclause 6.2 of ANSI C63.10-2013.

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.10.

The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both Neutral and Live lines.

Limit:

FCC §15.207 (a)

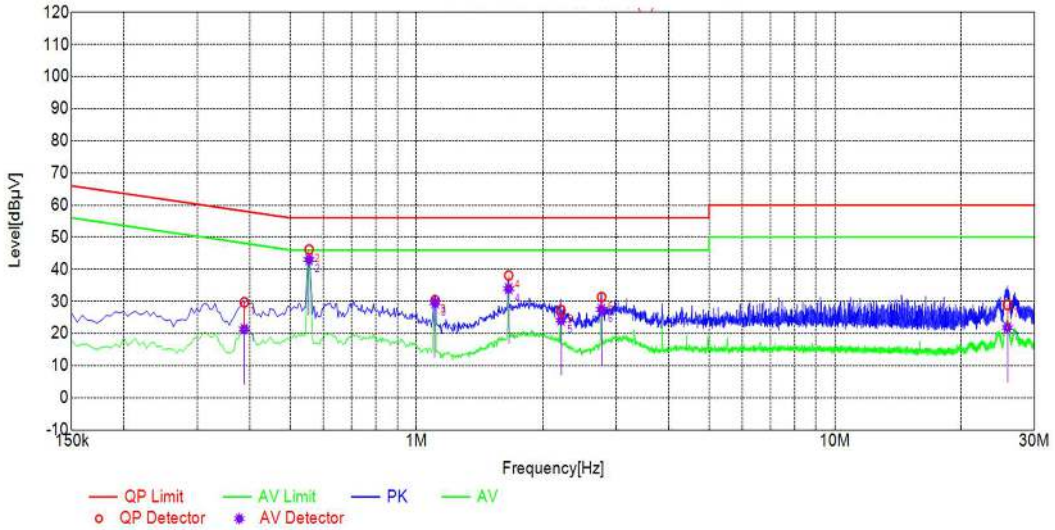
RSS-Gen 8.8

Frequency	QP Limit	AV Limit
MHz	dBµV	dBµV
0.150-0.500	66-56*	56-46*
0.500-5	56	46
5-30	60	50

Decreasing linear.

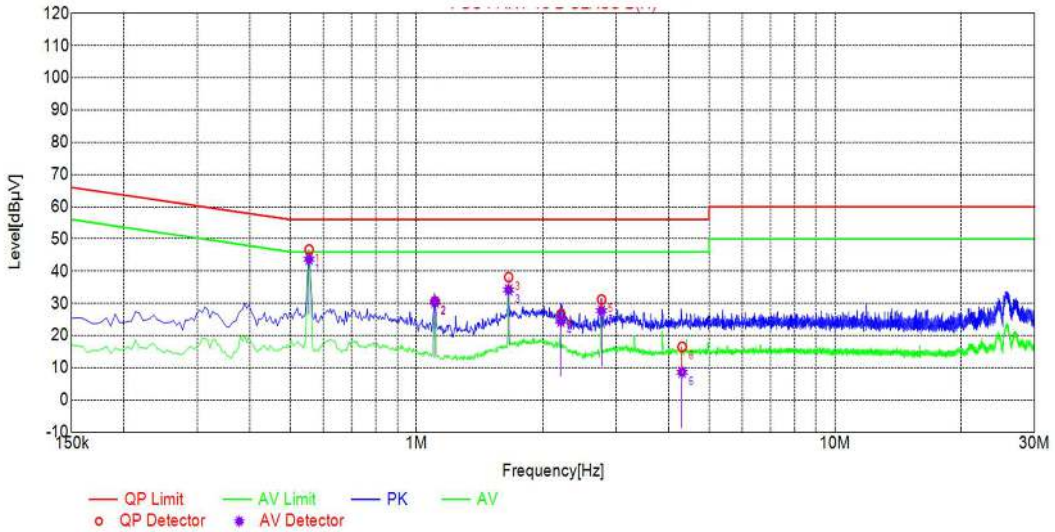
Test Result:

WIFI TX: L



Freq. [MHz]	Factor [dB]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Verdict
0.3876	10.21	29.73	58.12	28.39	21.38	48.12	26.74	PASS
0.5536	10.23	46.18	56.00	9.82	43.04	46.00	2.96	PASS
1.1074	10.23	30.36	56.00	25.64	29.60	46.00	16.40	PASS
1.6606	10.25	38.11	56.00	17.89	33.97	46.00	12.03	PASS
2.2150	10.25	27.25	56.00	28.75	24.14	46.00	21.86	PASS
2.7677	10.27	31.38	56.00	24.62	27.50	46.00	18.50	PASS

WIFI TX: N



Freq. [MHz]	Factor [dB]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Verdict
0.5535	10.22	46.74	56.00	9.26	43.72	46.00	2.28	PASS
1.1070	10.23	30.63	56.00	25.37	30.36	46.00	15.64	PASS
1.6604	10.25	38.12	56.00	17.88	34.20	46.00	11.80	PASS
2.2134	10.25	26.66	56.00	29.34	24.45	46.00	21.55	PASS
2.7673	10.27	31.18	56.00	24.82	27.73	46.00	18.27	PASS
4.3122	10.29	16.50	56.00	39.50	8.64	46.00	37.36	PASS

3.2 Duty cycle

Test Method:
The test method was refered to the subclause 11.6 of ANSI C63.10-2013.

Measurements of duty cycle and transmission duration shall be performed using one of the following techniques:

a) A diode detector and an oscilloscope that together have a sufficiently short response time to permit accurate measurements of the ON and OFF times of the transmitted signal.

b) The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the ON and OFF times of the transmitted signal:

   1) Set the center frequency of the instrument to the center frequency of the transmission.

   2) Set RBW ≧ OBW if possible; otherwise, set RBW to the largest available value.

   3) Set VBW ≧ RBW. Set detector = peak or average.

   4) The zero-span measurement method shall not be used unless both RBW and VBW are > 50/*T* and the number of sweep points across duration *T* exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring the duty cycle shall not be used if *T* ≤16.7 μs.)

Limit:

None; for reporting purposes only.

3.3 6dB bandwidth

Test Method:
The test method was refered to the subclause 11.8 of ANSI C63.10-2013.

Option 1

The steps for the first option are as follows:

a) Set RBW = 100 kHz.

b) Set the VBW ≧ [3 × RBW].

c) Detector = peak.

d) Trace mode = max hold.

e) Sweep = auto couple.

f) Allow the trace to stabilize.

g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Option 2

The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described in Option 1 (i.e., RBW = 100 kHz, VBW ≧ 3 × RBW, and peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≧6 dB.

Limit:

FCC §15.407 (e)

RSS-247 5.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

Test Result: Pass

3.4 99% Occupied Bandwidth

Test Method:
The test method was refered to the subclause 6.9.3 of ANSI C63.10-2013.

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission. The following procedure shall be used for measuring 99% power bandwidth:

a) The instrument center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be between 1.5 times and 5.0 times the OBW.

b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW, and VBW shall be approximately three times the RBW, unless otherwise specified by the applicable requirement.

c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.5.2.

d) Step a) through step c) might require iteration to adjust within the specified range.

e) Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.

f) Use the 99% power bandwidth function of the instrument (if available) and report the measured bandwidth.

g) If the instrument does not have a 99% power bandwidth function, then the trace data points are recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% power bandwidth is the difference between these two frequencies.

h) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

Limit:

None; for reporting purposes only.

Test Result: Pass

3.5 Frequency Stability

Test Method:
The test method was refered to the subclause 6.8.2 of ANSI C63.10-2013.

Unless otherwise specified, these tests shall be made at ambient room temperature (+15 °C to +25 °C). An antenna shall be connected to the antenna output terminals of the EUT if possible. If the EUT is equipped with or uses an adjustable-length antenna, then it shall be fully extended.

a) Supply the EUT with nominal voltage or install a new or fully charged battery in the EUT. Turn ON the EUT and couple its output to a frequency counter or other frequency-measuring instrument.

NOTE—An instrument that has an adequate level of accuracy as specified by the procuring or regulatory agency is the recommended measuring instrument.

b) Tune the EUT to one of the number of frequencies required in 5.6. Adjust the location of the measurement antenna and the controls on the measurement instrument to obtain a suitable signal level (i.e., a level that will not overload the measurement instrument but is strong enough to allow measurement of the operating or fundamental frequency of the EUT).

c) Measure the frequency at each of the frequencies specified in 5.6.

d) Repeat the above procedure at 85% and 115% of the nominal supply voltage as described in 5.13.

Limit:
RSS-Gen 8.11
The fundamental emissions of the radio apparatus should be kept within at least the central 80% of its permitted operating frequency band in order to minimize the possibility of out-of-band operation.

Test Result: Pass

3.6 Conducted Peak output power

Test Method
The test method was refered to the subclause 11.9.1.3 of ANSI C63.10-2013.

The maximum peak conducted output power may be measured using a broadband peak RF power meter.The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall use a fast-responding diode detector.

Limits:

FCC §15.247 (b) (3)
For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt.

RSS-247 Clause 5.4 (d)
For DTSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1 W. The e.i.r.p. shall not exceed 4 W, except as provided in section 5.4(e).

Test Result: Pass

3.7 Power spectral density

Test Method:
The test method was refered to the subclause 11.10.2 of ANSI C63.10-2013.

The following procedure shall be used if maximum peak conducted output power was used to determine compliance, and it is optional if the maximum conducted (average) output power was used to determine compliance:

a) Set analyzer center frequency to DTS channel center frequency.

b) Set the span to 1.5 times the DTS bandwidth.

c) Set the RBW to 3 kHz ≦ RBW ≦ 100 kHz.

d) Set the VBW ≧ [3 × RBW].

e) Detector = peak.

f) Sweep time = auto couple.

g) Trace mode = max hold.

h) Allow trace to fully stabilize.

i) Use the peak marker function to determine the maximum amplitude level within the RBW.

j) If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.

Limit:

FCC §15.247 (e)

RSS-247 (5.2) (b)
For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

Test Result: Pass

3.8 Conducted Spurious Emissions

Test Method:
The test method was refered to the subclause 11.11/11.12 of ANSI C63.10-2013.

Establish a reference level by using the following procedure:

a) Set instrument center frequency to DTS channel center frequency.

b) Set the span to ≧ 1.5 times the DTS bandwidth.

c) Set the RBW = 100 kHz.

d) Set the VBW ≧ [3 × RBW].

e) Detector = peak.

f) Sweep time = auto couple.

g) Trace mode = max hold.

h) Allow trace to fully stabilize.

i) Use the peak marker function to determine the maximum PSD level.

Note that the channel found to contain the maximum PSD level can be used to establish the reference level.

Establish an emission level by using the following procedure:

a) Set the center frequency and span to encompass frequency range to be measured.

b) Set the RBW = 100 kHz.

c) Set the VBW ≧ [3 × RBW].

d) Detector = peak.

e) Sweep time = auto couple.

f) Trace mode = max hold.

g) Allow trace to fully stabilize.

h) Use the peak marker function to determine the maximum amplitude level.

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) is attenuated by at least the minimum requirements specified in 11.11. Report the three highest emissions relative to the limit.

Limit:

FCC §15.247 (d)

RSS-247 5.5
Output power was measured based on the use of a peak measurement, therefore the required attenation is 20 dB.

Test Result: Pass

3.9 Band edge

Test Method:
The test method was refered to the subclause 11.13.3 of ANSI C63.10-2013.

Peak detection
When using a peak detector to measure unwanted emissions at or near the band edge (within 2 MHz of the authorized band), the following integration procedure can be used:

a) Set instrument center frequency to the frequency of the emission to be measured (must be within 2 MHz of the authorized band edge).

b) Set span to 2 MHz.

c) RBW = 100 kHz.

d) VBW ≧ [3 × RBW].

e) Detector = peak.

f) Sweep time = auto.

g) Trace mode = max hold.

h) Allow sweep to continue until the trace stabilizes (required measurement time may increase for low-duty-cycle applications).

i) Compute the power by integrating the spectrum over 1 MHz using the analyzer's band power measurement function with band limits set equal to the emission frequency ($f_{emission}$) ± 0.5 MHz. If the instrument does not have a band power function, then sum the amplitude levels (in power units) at 100 kHz intervals extending across the 1 MHz spectrum defined by $f_{emission}$ ± 0.5 MHz.

Trace averaging with continuous EUT transmission at full power
If the EUT can be configured or modified to transmit continuously (D ≧ 98%), then the average emission levels within 2 MHz of the authorized band edge may be measured using the following method (with EUT transmitting continuously):

a) Set instrument center frequency to the frequency of the emission to be measured (must be within 2 MHz of the authorized band edge).

b) Set span to 2 MHz.

c) RBW = 100 kHz.

d) VBW ≧ [3 × RBW].

e) Detector = RMS (power averaging), if [span / (# of points in sweep)] ≦ (RBW / 2).

f) Averaging type = power (i.e., rms):

   1) As an alternative, the detector and averaging type may be set for linear voltage averaging.

   2) Some instruments require linear display mode to use linear voltage averaging. Log or dB averaging shall not be used.

g) Sweep time = auto.

h) Perform a trace average of at least 100 traces.

i) Compute the power by integrating the spectrum over 1 MHz using the analyzer's band power measurement function with band limits set equal to the emission frequency ($f_{emission}$) ± 0.5 MHz. If the instrument does not have a band power function, then sum the amplitude levels (in power units) at 100 kHz intervals extending across the 1 MHz spectrum defined by $f_{emission}$ ± 0.5 MHz.

Trace averaging across ON and OFF times of the EUT transmissions followed by duty cycle correction

If continuous transmission of the EUT (D ≧ 98%) cannot be achieved and the duty cycle is constant (duty cycle variations are less ±2%), then the following procedure may be used to measure the average power of unwanted emssions within 2 MHz of the authorized band edge:

a) The EUT shall be configured to operate at the maximum achievable duty cycle.

b) Measure the duty cycle *D* of the transmitter output signal as described in 11.6.

c) Set instrument center frequency to the frequency of the emission to be measured.

d) Set span to 2 MHz.

e) RBW = 100 kHz.

f) VBW ≧ 3 × RBW.

g) Detector = RMS (power averaging), if [span / (# of points in sweep)] ≦ (RBW / 2). Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If this condition cannot be satisfied, then the detector mode shall be set to peak.

h) Averaging type = power (i.e., rms):

   1) As an alternative, the detector and averaging type may be set for linear voltage averaging.

   2) Some instruments require linear display mode to use linear voltage averaging. Log or dB averaging shall not be used.

i) Sweep time = auto.

j) Perform a trace average of at least 100 traces.

k) Compute the power by integrating the spectrum over 1 MHz using the instrument's band power measurement function with band limits set equal to the emission frequency ($f_{emission}$) ± 0.5 MHz. If the spectrum analyzer does not have a band power function, then sum the amplitude levels (in power units) at 100 kHz intervals extending across the 1 MHz spectrum defined by $f_{emission}$ ± 0.5 MHz.

l) A correction factor shall be added to the measurement results prior to comparing with the emission limit to compute the emission level that would have been measured had the test been performed at 100% duty cycle. The correction factor is computed as follows:

   1) If power averaging (rms) mode was used in step f), then the applicable correction factor is [10 log (1 / *D*)], where *D* is the duty cycle.

   2) If linear voltage averaging mode was used in step f), then the applicable correction factor is [20 log (1 / *D*)], where *D* is the duty cycle.

   3) If a specific emission is demonstrated to be continuous (*D* ≧98%) rather than turning ON and OFF with the transmit cycle, then no duty cycle correction is required for that emission.

Reduction of the measured emission amplitude levels to account for operational duty cycle is not permitted. Determining compliance is based on emission levels occurring during transmission—it is not based on an average across ON and OFF times of the transmitter.

Reduced VBW averaging across ON and OFF times of the EUT transmissions with max hold
If continuous transmission of the EUT (D ≧ 98%) cannot be achieved and the duty cycle is not constant (duty cycle variations equal or exceed ±2%), then the following procedure may be used to measure unwanted emissions within 2 MHz of the authorized band edge:

a) Set analyzer center frequency to the frequency of the emission to be measured.

b) Set span to 2 MHz.

c) RBW = 100 kHz.

d) VBW ≧ 1 / *T*.

e) Video bandwidth mode or display mode:

1) The analyzer shall be set to ensure that video filtering is applied in the power domain. Typically, this requires setting the detector mode to RMS (power averaging) and setting the average-VBW type to power (rms).

2) As an alternative, the analyzer may be set to linear detector mode. Ensure that video filtering is applied in linear voltage domain (rather than in a log or dB domain). Some analyzers require linear display mode to accomplish this. Others have a setting for average-VBW type, which can be set to “voltage” regardless of the display mode. f) Detector = peak.

g) Sweep time = auto.

h) Trace mode = max hold.

i) Allow max hold to run for at least [50 × (1 / *D*)] traces.

j) Compute the power by integrating the spectrum over 1 MHz using the analyzer’s band power measurement function with band limits set equal to the emission frequency ($f_{emission}$) ± 0.5 MHz. If the spectrum analyzer does not have a band power function, then sum the amplitude levels (in power units) at 100 kHz intervals extending across the 1 MHz spectrum defined by $f_{emission}$ ± 0.5 MHz.

Limit:
FCC §15.247 (d)

RSS-247 5.5
Output power was measured based on the use of a peak measurement, therefore the required at-tenation is 20 dB.

Test Result: Pass

3.10 Spurious radiated emissions for transmitter

Test Method:

The test method was refered to the subclause 11.11/11.12 of ANSI C63.10-2013.

1: The EUT was place on a turn table which is 1.5m above ground plane for above 1GHz and 0.8m above ground for below 1GHz at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

2: The EUT was set 3 meters away from the interference – receiving antenna, which was mounted on the top of a variable – height antenna tower.

3: 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.

4: 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.

5: Use the following spectrum analyzer settings According to C63.10:

For Above 1GHz

Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 1MHz, VBW≥RBW for peak measurement and VBW = 10Hz for average measurement, Sweep = auto, Detector function = peak, Trace = max hold.

For Below 1GHz

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 100 KHz, VBW≥RBW for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.

For Below 30MHz

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 200 Hz, VBW≥RBW from 9KHz to 0.15MHz, RBW 9KHz VBW≥RBW from 0.15MHz to 30MHz for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.

Note:

1: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Quasi-peak detection (QP) at frequency below 1GHz.

2: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for peak detection (PK) at frequency above 1GHz.

3: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average ((duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor (20log(1/duty cycle)).

4: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.

5: When duty cycle <98%, The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is VBW ≥ 1 / T, the T is transmission duration (T).

Limit:

FCC §15.205 and §15.209

RSS-GEN, Section 8.9 and 8.10.

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
0.009-0.490	2400/F(kHz) @ 300 m	-
0.490-1.705	24000/F(kHz) @ 30 m	-
1.705 - 30	30 @ 30m	-
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

§15.205 Restricted bands of operation

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	
13.36-13.41			

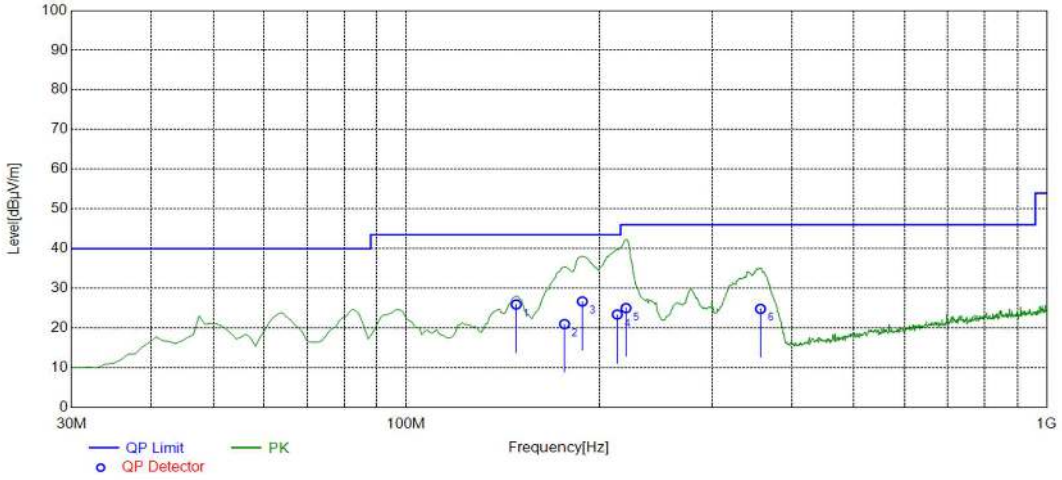
RSS-GEN 8.10

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	1660 - 1710	9.0 - 9.2
0.495 - 0.505	16.69475 - 16.69525	1718.8 - 1722.2	9.3 - 9.5
2.1735 - 2.1905	25.5 - 25.67	2200 - 2300	10.6 - 12.7
3.020 - 3.026	37.5 - 38.25	2310 - 2390	13.25 - 13.4
4.125 - 4.128	73 - 74.6	2483.5 - 2500	14.47 - 14.5
4.17725 - 4.17775	74.8 - 75.2	2655 - 2900	15.35 - 16.2
4.20725 - 4.20775	108 – 138	3260 – 3267	17.7 - 21.4
5.677 - 5.683	149.9 - 150.05	3332 - 3339	22.01 - 23.12
6.215 - 6.218	156.52475 - 156.52525	3345.8 - 3358	23.6 - 24.0
6.26775 - 6.26825	156.7 - 156.9	3500 - 4400	31.2 - 31.8
6.31175 - 6.31225	162.0125 - 167.17	4500 - 5150	36.43 - 36.5
8.291 - 8.294	167.72 - 173.2	5350 - 5460	Above 38.6
8.362 - 8.366	240 – 285	7250 - 7750	
8.37625 - 8.38675	322 - 335.4	8025 – 8500	
8.41425 - 8.41475	399.9 - 410		
12.29 - 12.293	608 - 614		
12.51975 - 12.52025	960 - 1427		
12.57675 - 12.57725	1435 - 1626.5		
13.36 - 13.41	1645.5 - 1646.5		

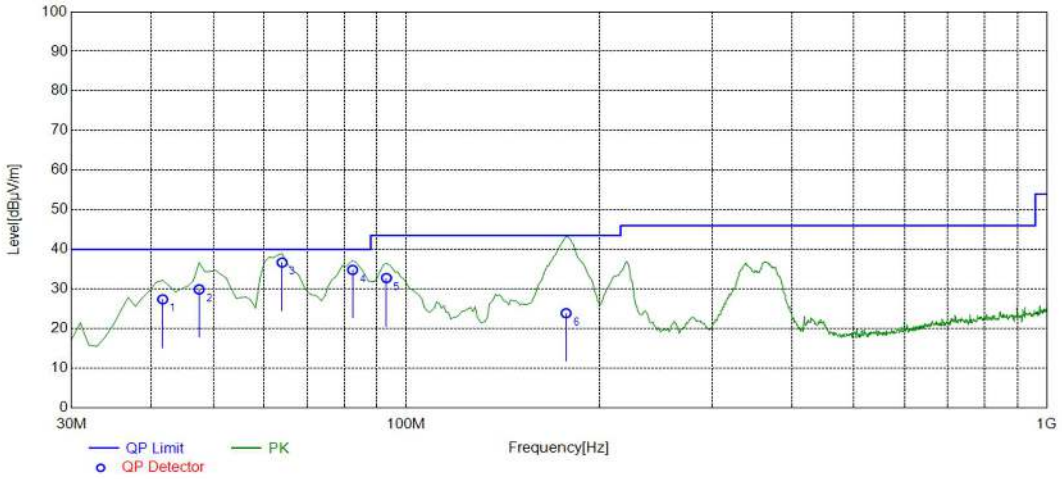
Spurious radiated emissions (Radiated)

According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.

802.11b - 2412MHz Test Result



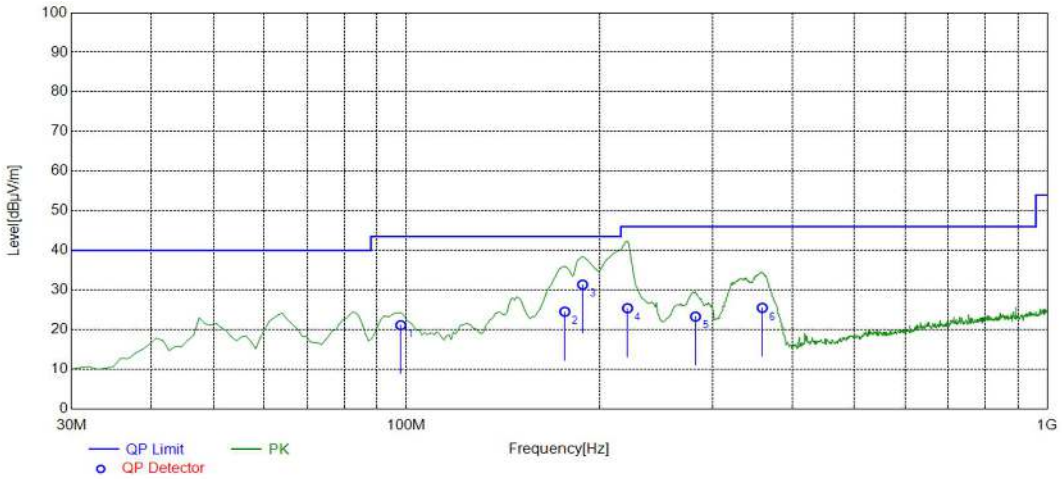
Freq. [MHz]	Factor [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
148.4585	-14.95	25.95	43.50	17.55	100	342	Horizontal
176.6166	-16.23	21.01	43.50	22.49	100	203	Horizontal
188.2683	-17.19	26.72	43.50	16.78	100	186	Horizontal
213.5135	-18.10	23.43	43.50	20.07	100	45	Horizontal
220.3103	-17.90	25.05	46.00	20.95	100	47	Horizontal
357.2172	-14.78	24.86	46.00	21.14	100	145	Horizontal



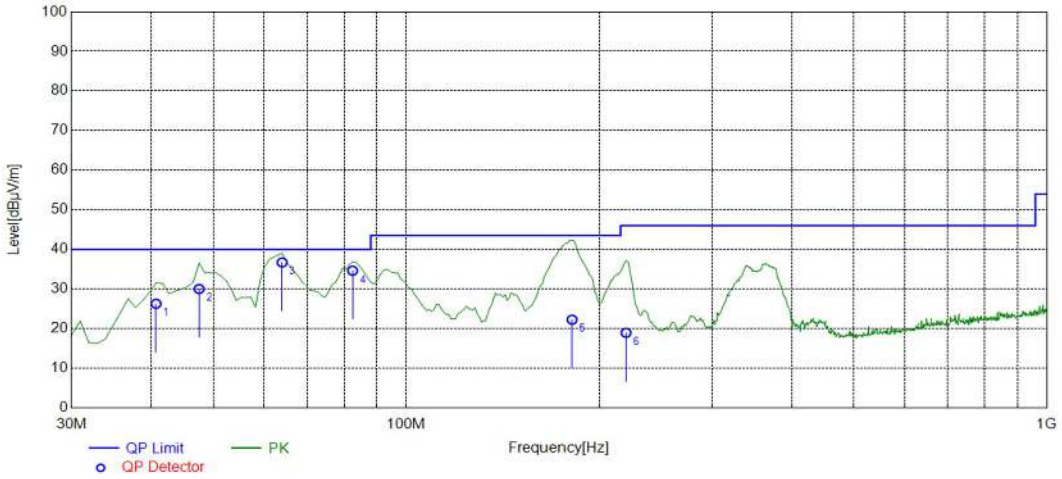
Freq. [MHz]	Factor [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
41.6517	-16.33	27.41	40.00	12.59	100	78	Vertical
47.4775	-16.19	29.92	40.00	10.08	100	226	Vertical
63.9840	-17.49	36.70	40.00	3.30	100	257	Vertical
82.4324	-19.90	34.84	40.00	5.16	100	285	Vertical
93.1131	-20.96	32.79	43.50	10.71	100	199	Vertical
177.5876	-16.36	23.91	43.50	19.59	100	219	Vertical

Fre-quency Band	Frequency	Emission Level	Corr.	Limit	Margin	Detector	Polarization	Result
	MHz	dBuV/m	(dB)	dBµV/m	dB			
1000-25000MHz	17699.8499	62.13	-0.32	74.00	11.87	PK	Horizontal	Pass
	17834.9175	48.62	-0.69	54.00	5.38	AV	Horizontal	Pass
	17677.3387	61.28	-0.43	74.00	12.72	PK	Vertical	Pass
	17707.3537	48.68	-0.44	54.00	5.32	AV	Vertical	Pass

802.11b - 2437MHz Test Result



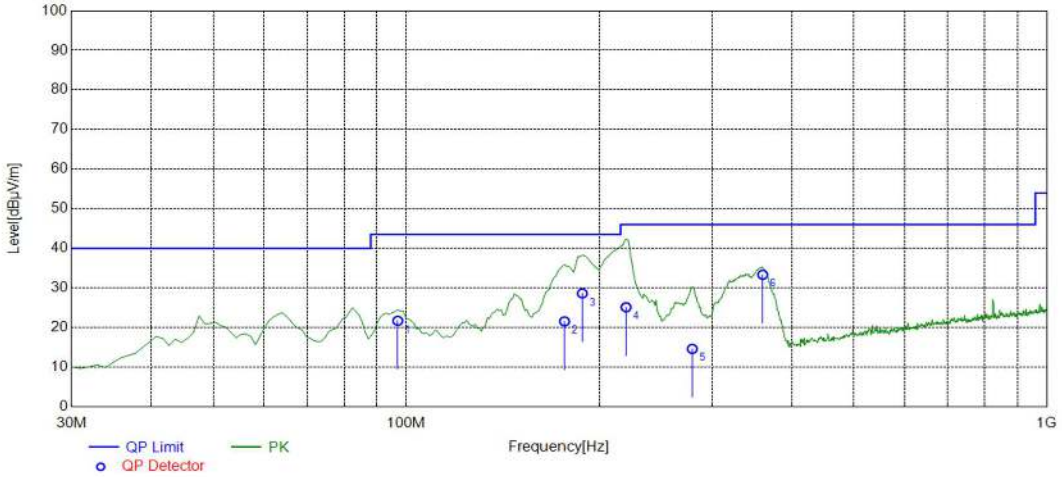
Freq. [MHz]	Factor [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
97.9680	-20.89	21.14	43.50	22.36	100	184	Horizontal
176.6166	-16.23	24.55	43.50	18.95	100	207	Horizontal
188.2683	-17.19	31.37	43.50	12.13	100	174	Horizontal
221.2813	-17.88	25.43	46.00	20.57	100	43	Horizontal
282.4525	-16.12	23.31	46.00	22.69	100	340	Horizontal
359.1592	-14.75	25.51	46.00	20.49	100	158	Horizontal



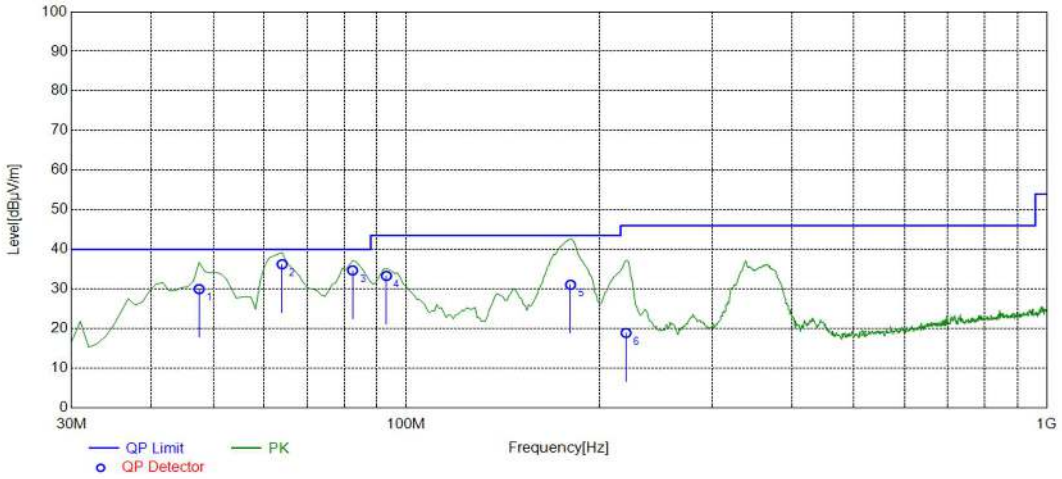
Freq. [MHz]	Factor [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
40.6807	-16.36	26.30	40.00	13.70	100	111	Vertical
47.4775	-16.19	30.03	40.00	9.97	100	239	Vertical
63.9840	-17.49	36.72	40.00	3.28	100	248	Vertical
82.4324	-19.90	34.64	40.00	5.36	100	267	Vertical
181.4715	-16.78	22.28	43.50	21.22	100	202	Vertical
220.3103	-17.90	18.96	46.00	27.04	100	128	Vertical

Fre-quency Band	Frequency	Emission Level	Corr.	Limit	Margin	Detector	Polarization	Result
	MHz	dBuV/m	(dB)	dBµV/m	dB			
1000-25000MHz	17699.8499	61.29	-0.32	74.00	12.71	PK	Horizontal	Pass
	17722.3612	48.93	-0.69	54.00	5.07	AV	Horizontal	Pass
	17399.6999	60.79	0.14	74.00	13.21	PK	Vertical	Pass
	17392.1961	48.55	-0.04	54.00	5.45	AV	Vertical	Pass

802.11b - 2462MHz Test Result



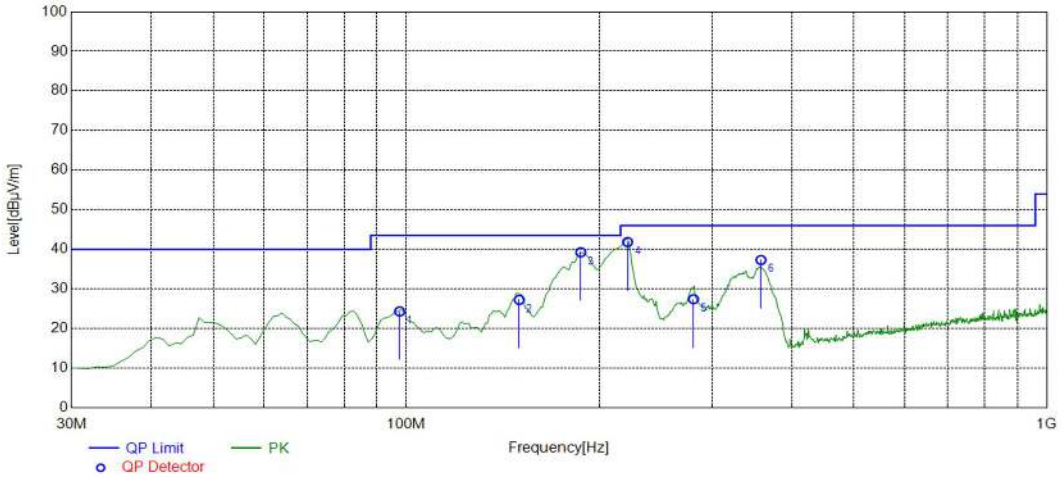
Freq. [MHz]	Factor [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
96.9970	-20.90	21.72	43.50	21.78	100	194	Horizontal
176.6166	-16.23	21.59	43.50	21.91	100	185	Horizontal
188.2683	-17.19	28.63	43.50	14.87	100	178	Horizontal
220.3103	-17.90	25.14	46.00	20.86	100	55	Horizontal
279.5395	-16.24	14.64	46.00	31.36	100	329	Horizontal
360.1301	-14.74	33.35	46.00	12.65	100	149	Horizontal



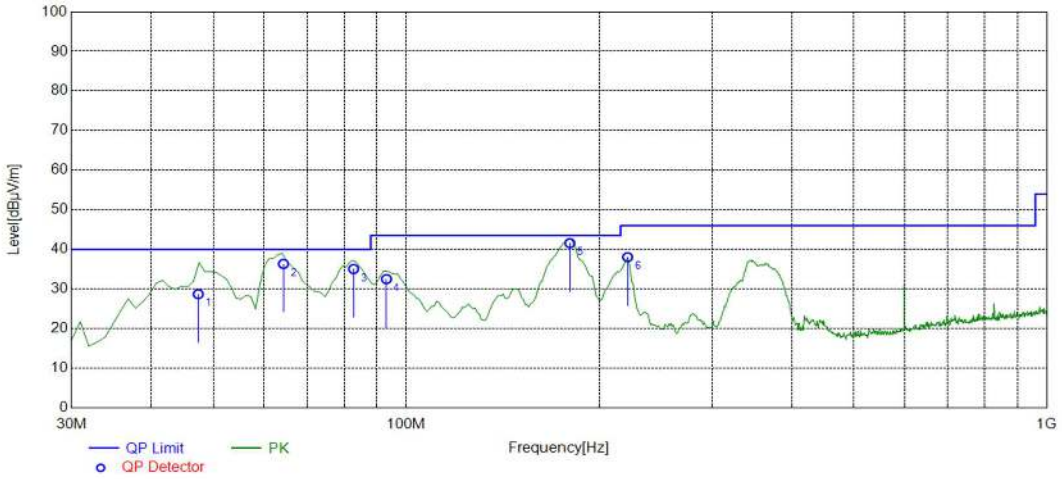
Freq. [MHz]	Factor [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
47.4775	-16.19	30.00	40.00	10.00	100	242	Vertical
63.9840	-17.49	36.27	40.00	3.73	100	221	Vertical
82.4324	-19.90	34.71	40.00	5.29	100	271	Vertical
93.1131	-20.96	33.32	43.50	10.18	100	302	Vertical
180.5005	-16.72	31.09	43.50	12.41	100	214	Vertical
220.3103	-17.90	18.92	46.00	27.08	100	143	Vertical

Fre-quency Band	Frequency	Emission Level	Corr.	Limit	Margin	Detector	Polarization	Result
	MHz	dBuV/m	(dB)	dBµV/m	dB			
1000-25000MHz	17969.9850	61.49	-0.40	74.00	12.51	PK	Horizontal	Pass
	17842.4212	49.03	-0.78	54.00	4.97	AV	Horizontal	Pass
	17107.0535	61.47	-0.10	74.00	12.53	PK	Vertical	Pass
	17197.0985	49.15	-0.26	54.00	4.85	AV	Vertical	Pass

802.11g - 2412MHz Test Result



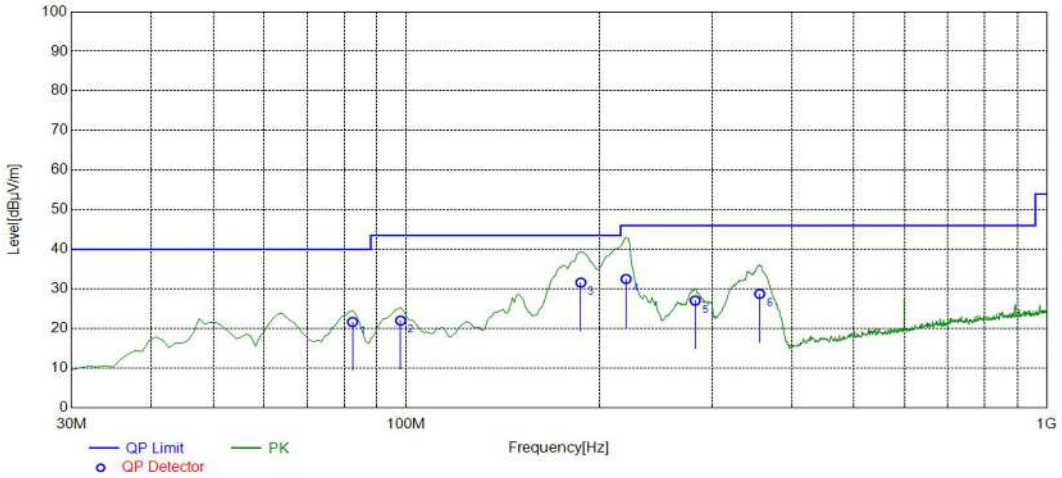
Freq. [MHz]	Factor [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
97.6264	-20.89	24.35	43.50	19.15	168.4	182.7	Horizontal
150.1258	-14.86	27.27	43.50	16.23	123.5	333.6	Horizontal
187.2349	-17.12	39.28	43.50	4.22	116.6	192.5	Horizontal
221.5663	-17.87	41.86	46.00	4.14	105.2	48.6	Horizontal
280.8420	-16.19	27.44	46.00	18.56	105.2	337.4	Horizontal
357.8496	-14.77	37.33	46.00	8.67	196.8	167.7	Horizontal



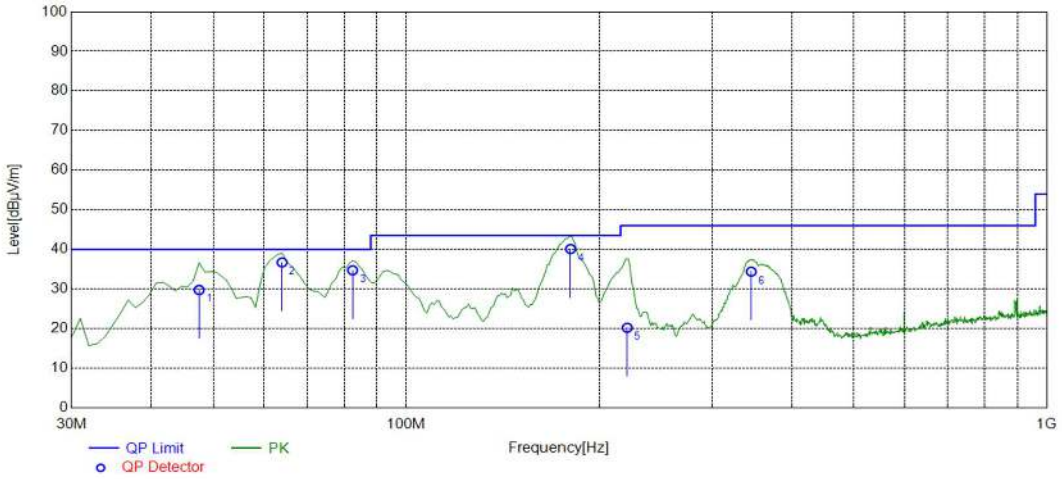
Freq. [MHz]	Factor [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
47.3339	-16.20	28.73	40.00	11.27	149.4	259.4	Vertical
64.2859	-17.56	36.36	40.00	3.64	104.4	262.3	Vertical
82.7354	-19.95	35.08	40.00	4.92	112.9	290	Vertical
93.1131	-20.96	32.52	43.50	10.98	100	312	Vertical
180.0154	-16.69	41.60	43.50	1.90	116.7	198.4	Vertical
221.5759	-17.87	38.05	46.00	7.95	138.9	147.2	Vertical

Fre-quency Band	Frequency	Emission Level	Corr.	Limit	Margin	Detector	Polarization	Result
	MHz	dBuV/m	(dB)	dBµV/m	dB			
1000-25000MHz	17677.3387	61.37	-0.43	74.00	12.63	PK	Horizontal	Pass
	17669.8349	48.89	-0.46	54.00	5.11	AV	Horizontal	Pass
	16671.8359	60.87	-0.19	74.00	13.13	PK	Vertical	Pass
	16709.3547	48.72	0.12	54.00	5.28	AV	Vertical	Pass

802.11g - 2437MHz Test Result



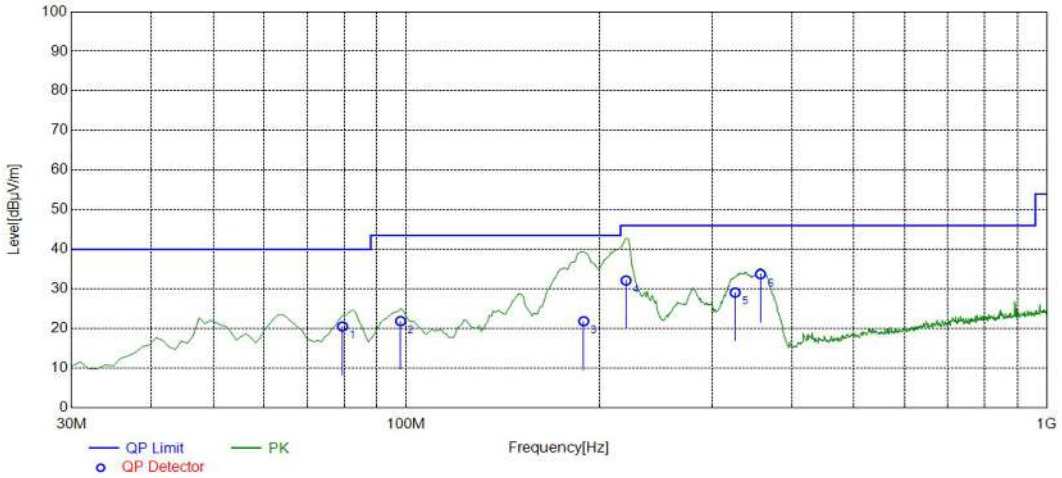
Freq. [MHz]	Factor [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
82.4324	-19.90	21.67	40.00	18.33	100	159	Horizontal
97.9680	-20.89	22.00	43.50	21.50	100	176	Horizontal
187.2973	-17.13	31.63	43.50	11.87	100	183	Horizontal
220.3103	-17.90	32.53	46.00	13.47	100	36	Horizontal
282.4525	-16.12	27.06	46.00	18.94	100	327	Horizontal
356.2462	-14.79	28.76	46.00	17.24	100	148	Horizontal



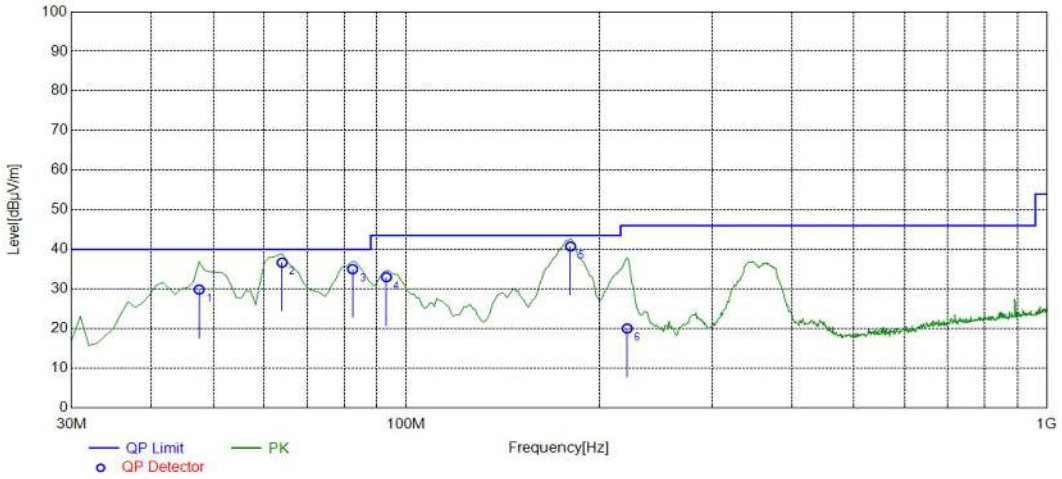
Freq. [MHz]	Factor [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
47.4775	-16.19	29.78	40.00	10.22	100	230	Vertical
63.9840	-17.49	36.73	40.00	3.27	100	263	Vertical
82.4324	-19.90	34.74	40.00	5.26	100	301	Vertical
180.5005	-16.72	40.12	43.50	3.38	100	202	Vertical
221.2813	-17.88	20.24	46.00	25.76	100	145	Vertical
345.5656	-14.92	34.41	46.00	11.59	100	204	Vertical

Fre-quency Band	Frequency	Emission Level	Corr.	Limit	Margin	Detector	Polarization	Result
	MHz	dBuV/m	(dB)	dBµV/m	dB			
1000-25000MHz	17984.9925	61.01	-0.40	74.00	12.99	PK	Horizontal	Pass
	17984.9925	48.81	-0.40	54.00	5.19	AV	Horizontal	Pass
	17114.5573	61.35	-0.09	74.00	12.65	PK	Vertical	Pass
	17122.0610	48.72	-0.07	54.00	5.28	AV	Vertical	Pass

802.11g - 2462MHz Test Result



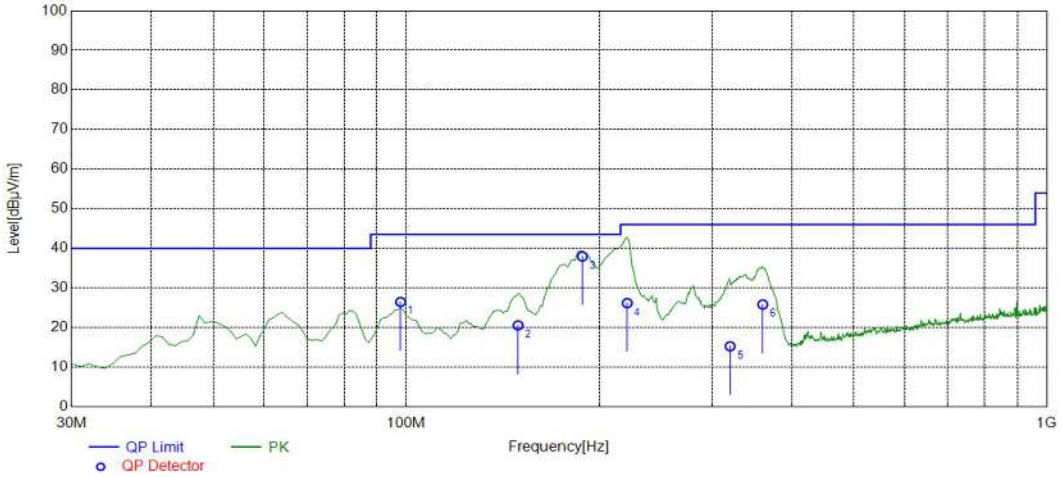
Freq. [MHz]	Factor [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
79.5195	-19.52	20.53	40.00	19.47	100	183	Horizontal
97.9680	-20.89	21.90	43.50	21.60	100	199	Horizontal
189.2392	-17.24	21.86	43.50	21.64	100	173	Horizontal
220.3103	-17.90	32.15	46.00	13.85	100	48	Horizontal
326.1461	-15.07	29.09	46.00	16.91	100	338	Horizontal
357.2172	-14.78	33.75	46.00	12.25	100	143	Horizontal



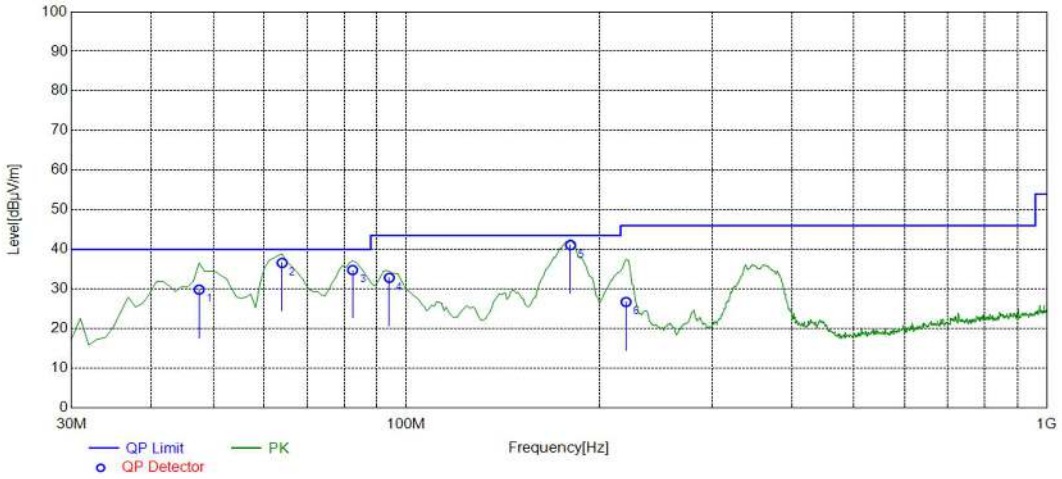
Freq. [MHz]	Factor [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
47.4775	-16.19	29.87	40.00	10.13	100	251	Vertical
63.9840	-17.49	36.67	40.00	3.33	100	246	Vertical
82.4324	-19.90	35.03	40.00	4.97	100	251	Vertical
93.1131	-20.96	33.00	43.50	10.50	100	300	Vertical
180.5005	-16.72	40.76	43.50	2.74	100	209	Vertical
221.2813	-17.88	20.06	46.00	25.94	100	139	Vertical

Fre-quency Band	Frequency	Emission Level	Corr.	Limit	Margin	Detector	Polarization	Result
	MHz	dBuV/m	(dB)	dBµV/m	dB			
1000-25000MHz	17159.5798	60.89	-0.06	74.00	13.11	PK	Horizontal	Pass
	17129.5648	48.78	-0.05	54.00	5.22	AV	Horizontal	Pass
	17797.3987	61.18	-0.29	74.00	12.82	PK	Vertical	Pass
	17924.9625	48.89	-0.65	54.00	5.11	AV	Vertical	Pass

802.11n(HT20) - 2412MHz Test Result



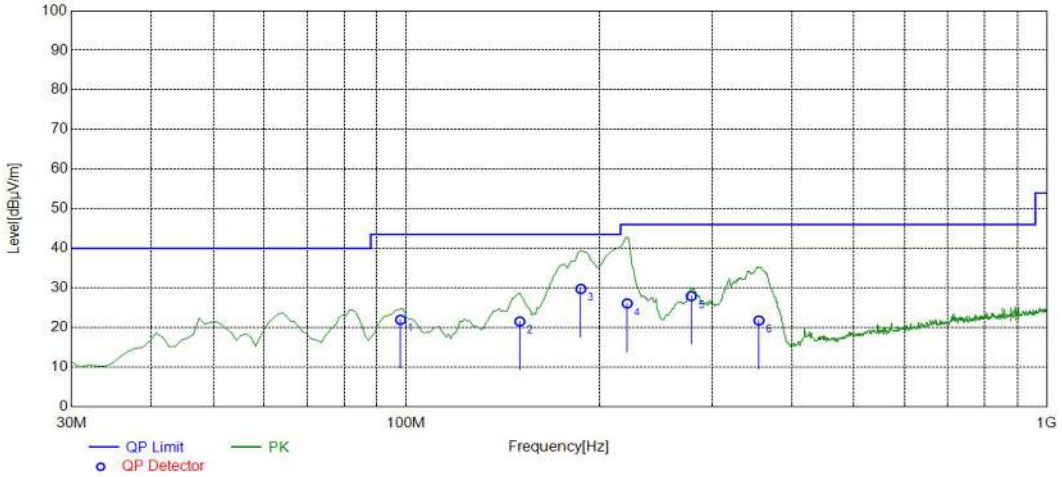
Freq. [MHz]	Factor [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
97.9680	-20.89	26.47	43.50	17.03	100	177	Horizontal
149.4294	-14.89	20.55	43.50	22.95	100	344	Horizontal
188.2683	-17.19	37.95	43.50	5.55	100	193	Horizontal
221.2813	-17.88	26.19	46.00	19.81	100	46	Horizontal
320.3203	-15.11	15.28	46.00	30.72	100	332	Horizontal
360.1301	-14.74	25.84	46.00	20.16	100	153	Horizontal



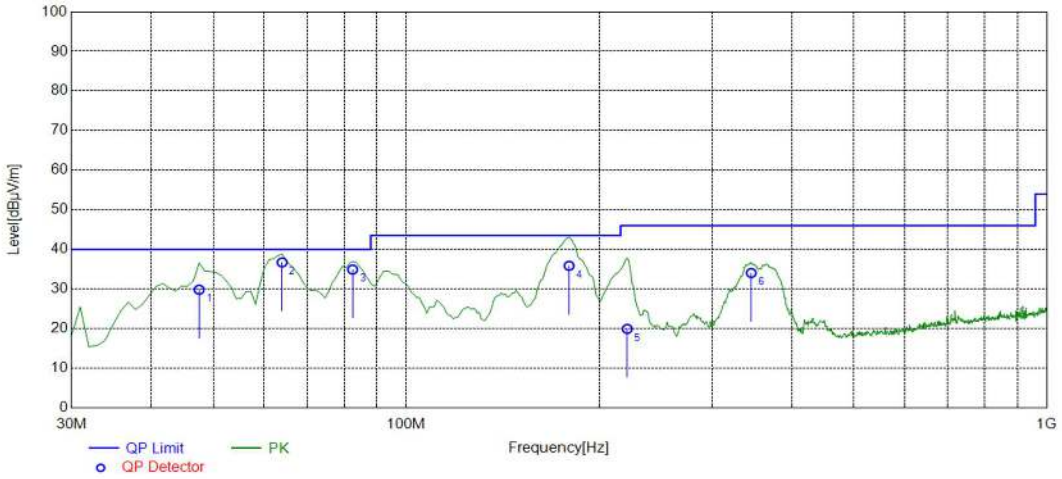
Freq. [MHz]	Factor [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
47.4775	-16.19	29.86	40.00	10.14	100	255	Vertical
63.9840	-17.49	36.60	40.00	3.40	100	238	Vertical
82.4324	-19.90	34.81	40.00	5.19	100	231	Vertical
94.0841	-20.94	32.85	43.50	10.65	100	328	Vertical
180.5005	-16.72	41.09	43.50	2.41	100	203	Vertical
220.3103	-17.90	26.74	46.00	19.26	100	134	Vertical

Fre-quency Band	Frequency	Emission Level	Corr.	Limit	Margin	Detector	Polarization	Result
	MHz	dBuV/m	(dB)	dBµV/m	dB			
1000-25000MHz	17542.2711	61.49	-0.60	74.00	12.51	PK	Horizontal	Pass
	17174.5873	48.59	-0.14	54.00	5.41	AV	Horizontal	Pass
	17827.4137	61.12	-0.59	74.00	12.88	PK	Vertical	Pass
	17812.4062	48.77	-0.40	54.00	5.23	AV	Vertical	Pass

802.11n(HT20) - 2437MHz Test Result



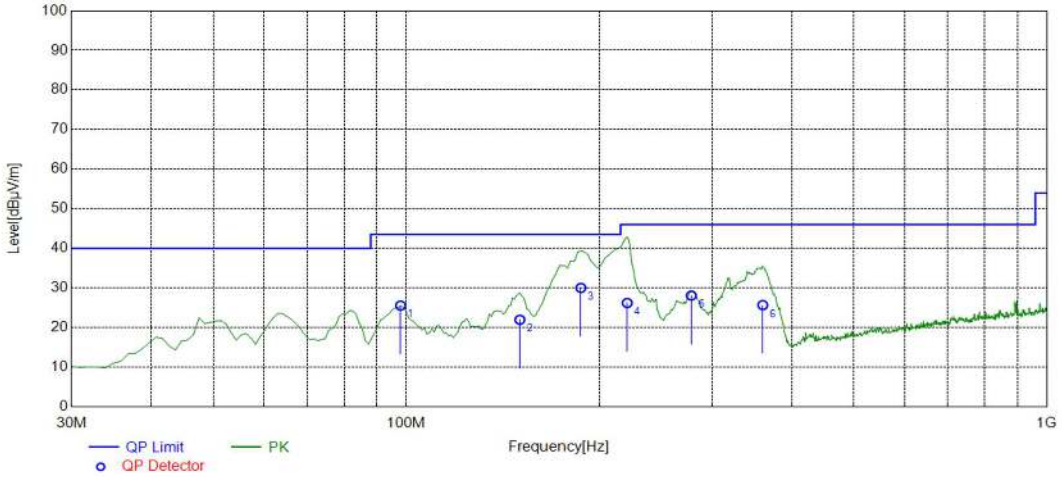
Freq. [MHz]	Factor [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
97.9680	-20.89	21.98	43.50	21.52	100	176	Horizontal
150.4004	-14.87	21.54	43.50	21.96	100	343	Horizontal
187.2973	-17.13	29.78	43.50	13.72	100	184	Horizontal
221.2813	-17.88	26.09	46.00	19.91	100	50	Horizontal
278.5686	-16.26	27.95	46.00	18.05	100	317	Horizontal
355.2753	-14.80	21.79	46.00	24.21	100	334	Horizontal



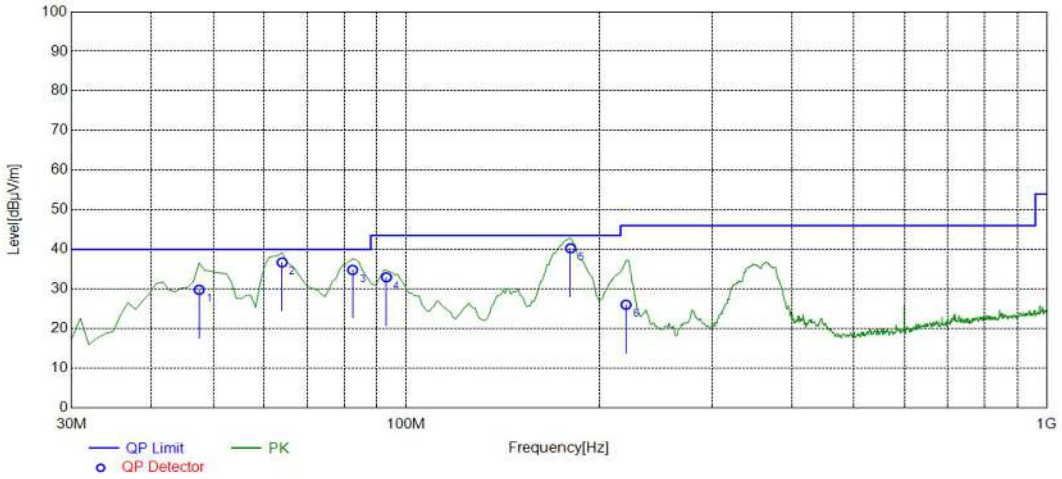
Freq. [MHz]	Factor [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
47.4775	-16.19	29.85	40.00	10.15	100	255	Vertical
63.9840	-17.49	36.73	40.00	3.27	100	258	Vertical
82.4324	-19.90	34.94	40.00	5.06	100	288	Vertical
179.5295	-16.62	35.86	43.50	7.64	100	183	Vertical
221.2813	-17.88	19.94	46.00	26.06	100	134	Vertical
345.5656	-14.92	34.06	46.00	11.94	100	229	Vertical

Fre-quency Band	Frequency	Emission Level	Corr.	Limit	Margin	Detector	Polarization	Result
	MHz	dBuV/m	(dB)	dBµV/m	dB			
1000-25000MHz	17804.9025	60.98	-0.30	74.00	13.02	PK	Horizontal	Pass
	17669.8349	48.81	-0.46	54.00	5.19	AV	Horizontal	Pass
	16701.8509	60.71	0.24	74.00	13.29	PK	Vertical	Pass
	16701.8509	48.35	0.24	54.00	5.65	AV	Vertical	Pass

802.11n(HT20) - 2462MHz Test Result



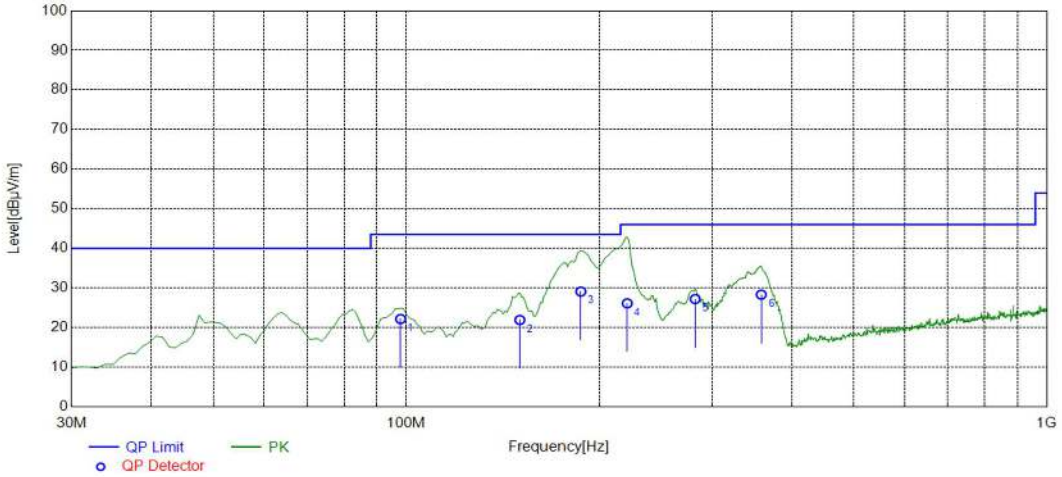
Freq. [MHz]	Factor [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
97.9680	-20.89	25.58	43.50	17.92	100	157	Horizontal
150.4004	-14.87	21.99	43.50	21.51	100	327	Horizontal
187.2973	-17.13	30.03	43.50	13.47	100	183	Horizontal
221.2813	-17.88	26.21	46.00	19.79	100	48	Horizontal
278.5686	-16.26	28.09	46.00	17.91	100	327	Horizontal
360.1301	-14.74	25.69	46.00	20.31	100	162	Horizontal



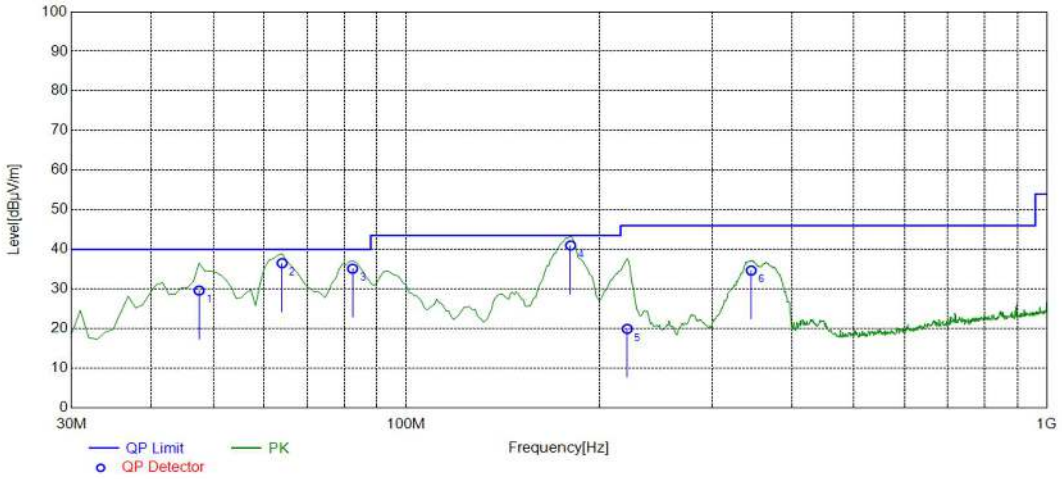
Freq. [MHz]	Factor [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
47.4775	-16.19	29.82	40.00	10.18	100	254	Vertical
63.9840	-17.49	36.71	40.00	3.29	100	254	Vertical
82.4324	-19.90	34.83	40.00	5.17	100	297	Vertical
93.1131	-20.96	32.97	43.50	10.53	100	292	Vertical
180.5005	-16.72	40.29	43.50	3.21	100	186	Vertical
220.3103	-17.90	26.05	46.00	19.95	100	158	Vertical

Fre-quency Band	Frequency	Emission Level	Corr.	Limit	Margin	Detector	Polarization	Result
	MHz	dBuV/m	(dB)	dBµV/m	dB			
1000-25000MHz	17729.8649	61.47	-0.82	74.00	12.53	PK	Horizontal	Pass
	17819.9100	48.57	-0.49	54.00	5.43	AV	Horizontal	Pass
	17977.4887	60.56	-0.40	74.00	13.44	PK	Vertical	Pass
	17812.4062	48.84	-0.40	54.00	5.16	AV	Vertical	Pass

802.11n(HT40) - 2422MHz Test Result



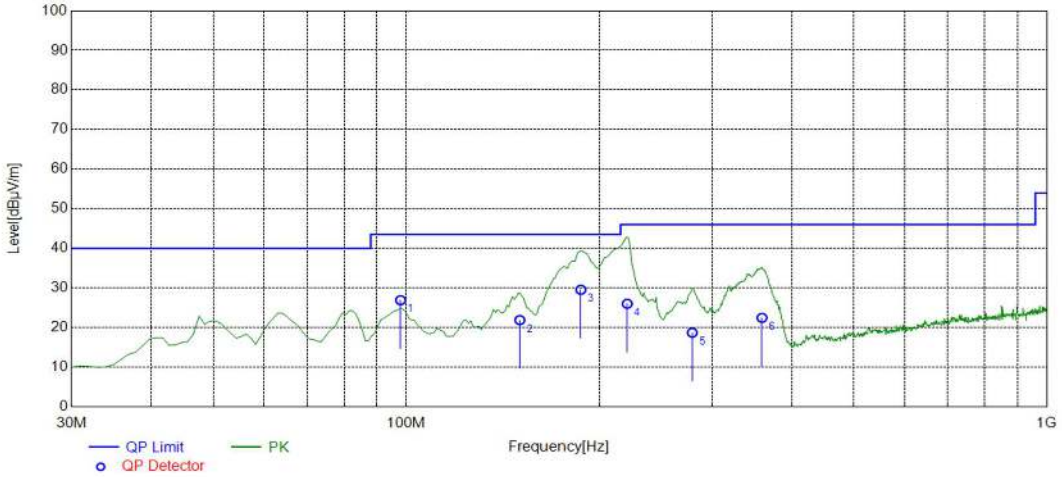
Freq. [MHz]	Factor [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
97.9680	-20.89	22.18	43.50	21.32	100	191	Horizontal
150.4004	-14.87	21.94	43.50	21.56	100	327	Horizontal
187.2973	-17.13	29.10	43.50	14.40	100	193	Horizontal
221.2813	-17.88	26.13	46.00	19.87	100	46	Horizontal
282.4525	-16.12	27.22	46.00	18.78	100	322	Horizontal
358.1882	-14.77	28.33	46.00	17.67	100	160	Horizontal



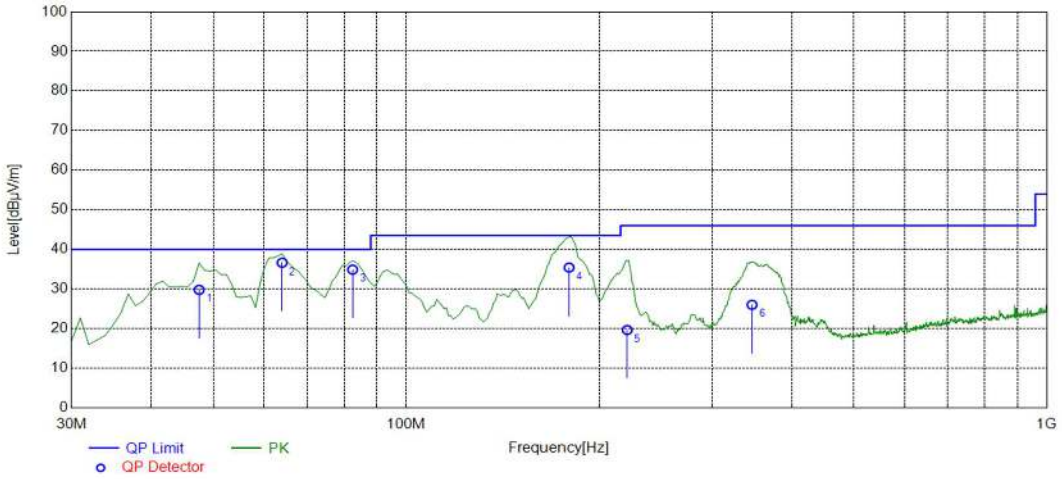
Freq. [MHz]	Factor [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
47.4775	-16.19	29.62	40.00	10.38	100	224	Vertical
63.9840	-17.49	36.55	40.00	3.45	100	241	Vertical
82.4324	-19.90	35.15	40.00	4.85	100	265	Vertical
180.5005	-16.72	41.01	43.50	2.49	100	208	Vertical
221.2813	-17.88	19.95	46.00	26.05	100	139	Vertical
345.5656	-14.92	34.68	46.00	11.32	100	210	Vertical

Fre-quency Band	Frequency	Emission Level	Corr.	Limit	Margin	Detector	Polarization	Result
	MHz	dBuV/m	(dB)	dBµV/m	dB			
1000-25000MHz	17684.8424	60.65	-0.39	74.00	13.35	PK	Horizontal	Pass
	17804.9025	48.71	-0.30	54.00	5.29	AV	Horizontal	Pass
	16686.8434	61.50	0.06	74.00	12.50	PK	Vertical	Pass
	16701.8509	48.58	0.24	54.00	5.42	AV	Vertical	Pass

802.11n(HT40) – 2437MHz Test Result



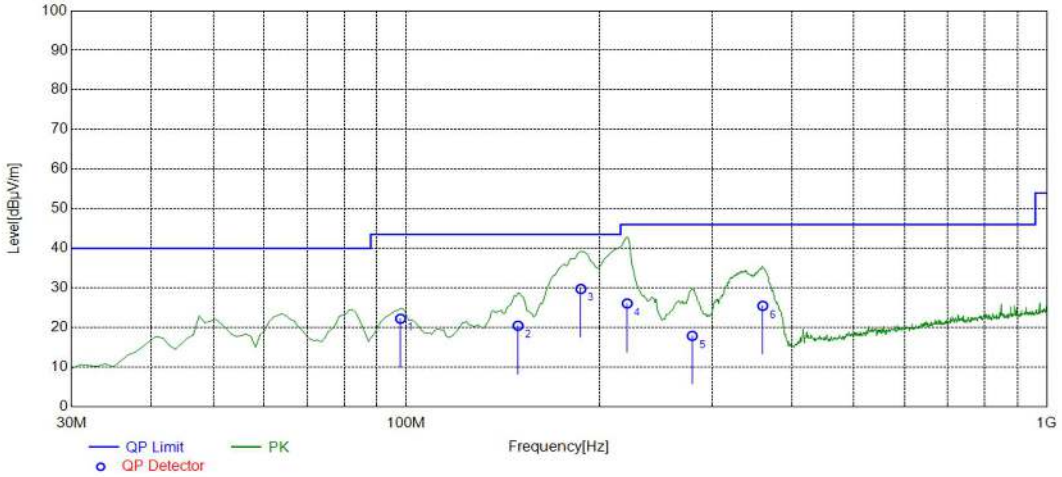
Freq. [MHz]	Factor [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
97.9680	-20.89	26.93	43.50	16.57	100	189	Horizontal
150.4004	-14.87	21.91	43.50	21.59	100	320	Horizontal
187.2973	-17.13	29.57	43.50	13.93	100	182	Horizontal
221.2813	-17.88	26.02	46.00	19.98	100	51	Horizontal
279.5395	-16.24	18.72	46.00	27.28	100	330	Horizontal
359.1592	-14.75	22.48	46.00	23.52	100	151	Horizontal



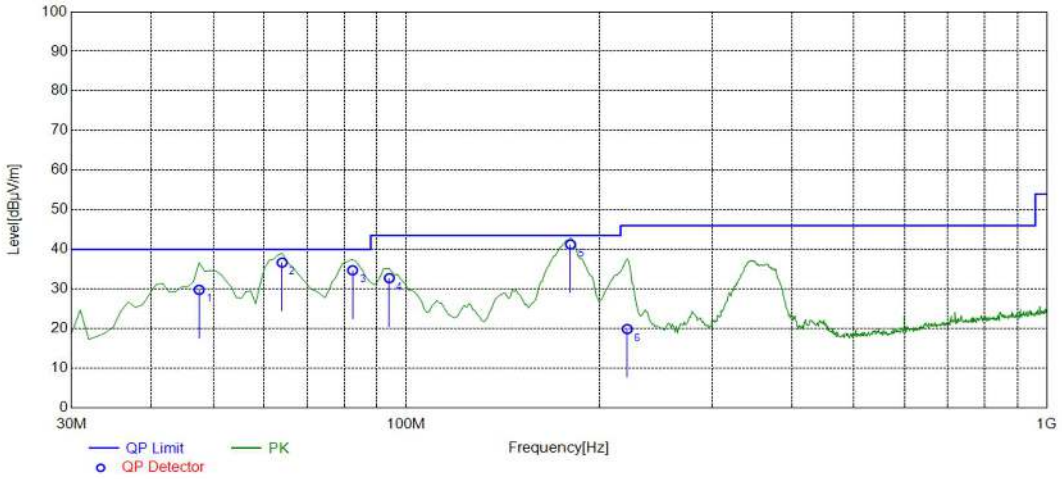
Freq. [MHz]	Factor [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
47.4775	-16.19	29.82	40.00	10.18	100	242	Vertical
63.9840	-17.49	36.65	40.00	3.35	100	268	Vertical
82.4324	-19.90	34.91	40.00	5.09	100	235	Vertical
179.5295	-16.62	35.44	43.50	8.06	100	192	Vertical
221.2813	-17.88	19.67	46.00	26.33	100	162	Vertical
346.5365	-14.91	26.02	46.00	19.98	100	177	Vertical

Fre-quency Band	Frequency	Emission Level	Corr.	Limit	Margin	Detector	Polarization	Result
	MHz	dBuV/m	(dB)	dBµV/m	dB			
1000-25000MHz	17017.0085	60.88	0.10	74.00	13.12	PK	Horizontal	Pass
	17114.5573	48.86	-0.09	54.00	5.14	AV	Horizontal	Pass
	17662.3312	60.86	-0.50	74.00	13.14	PK	Vertical	Pass
	17969.9850	48.62	-0.40	54.00	5.38	AV	Vertical	Pass

802.11n(HT40) – 2452MHz Test Result



Freq. [MHz]	Factor [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
97.9680	-20.89	22.25	43.50	21.25	100	182	Horizontal
149.4294	-14.89	20.48	43.50	23.02	100	326	Horizontal
187.2973	-17.13	29.76	43.50	13.74	100	182	Horizontal
221.2813	-17.88	26.09	46.00	19.91	100	45	Horizontal
279.5395	-16.24	17.93	46.00	28.07	100	340	Horizontal
360.1301	-14.74	25.50	46.00	20.50	100	163	Horizontal



Freq. [MHz]	Factor [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
47.4775	-16.19	29.82	40.00	10.18	100	258	Vertical
63.9840	-17.49	36.69	40.00	3.31	100	267	Vertical
82.4324	-19.90	34.74	40.00	5.26	100	301	Vertical
94.0841	-20.94	32.77	43.50	10.73	100	5	Vertical
180.5005	-16.72	41.26	43.50	2.24	100	210	Vertical
221.2813	-17.88	19.90	46.00	26.10	100	148	Vertical

Fre-quency Band	Frequency	Emission Level	Corr.	Limit	Margin	Detector	Polarization	Result
	MHz	dBuV/m	(dB)	dBµV/m	dB			
1000-25000MHz	17159.5798	61.68	-0.06	74.00	12.32	PK	Horizontal	Pass
	17099.5498	49.10	-0.12	54.00	4.90	AV	Horizontal	Pass
	17009.5048	61.09	0.13	74.00	12.91	PK	Vertical	Pass
	17114.5573	48.85	-0.09	54.00	5.15	AV	Vertical	Pass

Remark:

(1) "*" means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.

(2) Data of measurement within this frequency range shown "--" in the table above means the reading of emissions are the noise floor or attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

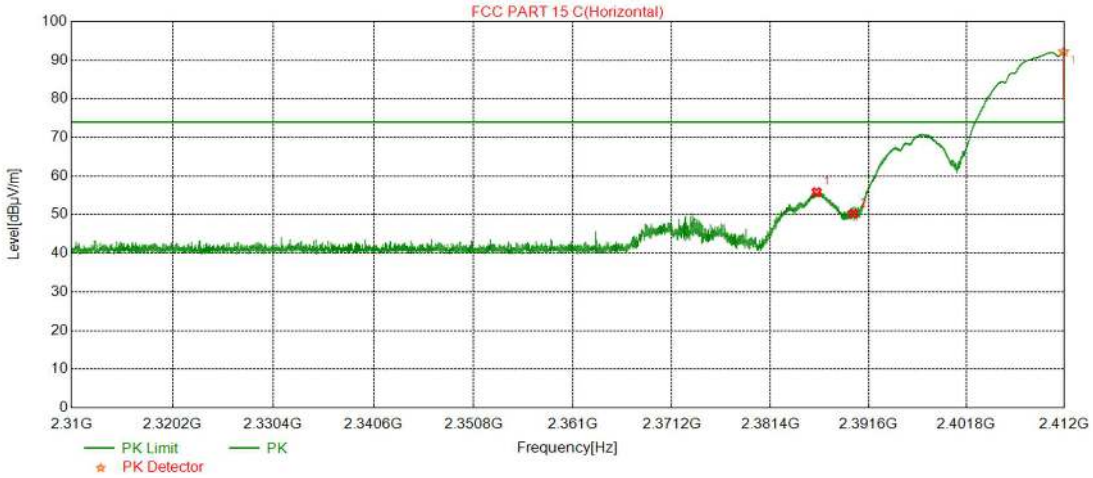
(3) Above 1GHz: Corrector factor = Antenna Factor + Cable Loss - Amplifier Gain.

(4) Below 1GHz: Corrector factor = Antenna Factor + Cable Loss - Amplifier Gain.

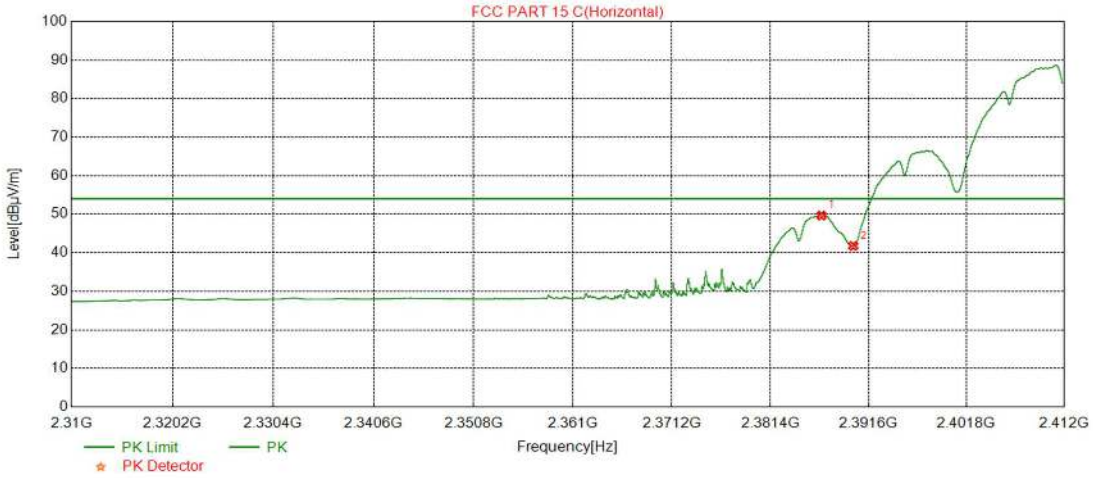
(5) Note: The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

Restricted bands of operation (Radiated)

802.11b - 2412MHz Test Result

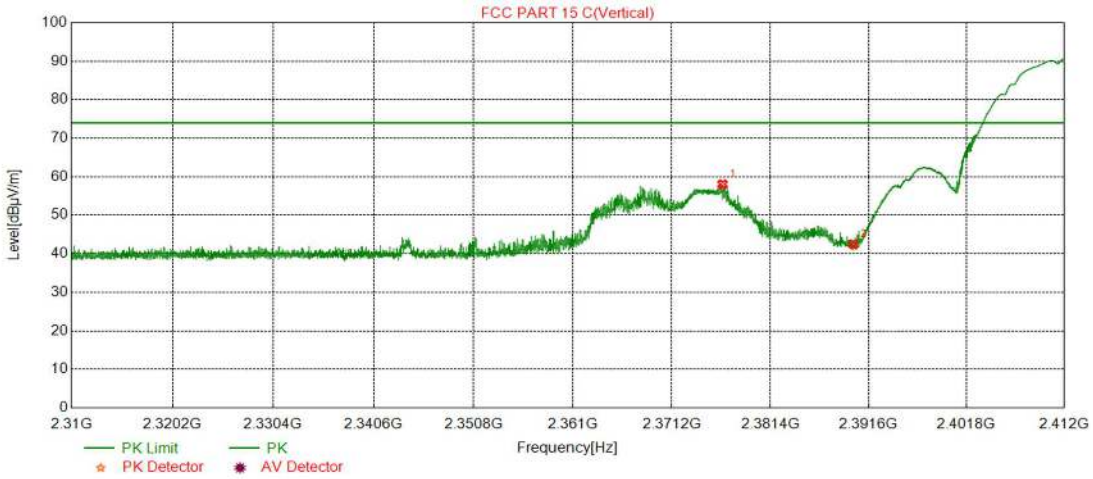


Freq. [MHz]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
2386.187	55.84	-22.82	74.00	18.16	150.4	142.6	Horizontal
2390.000	50.23	-22.81	74.00	23.77	150.4	142.6	Horizontal

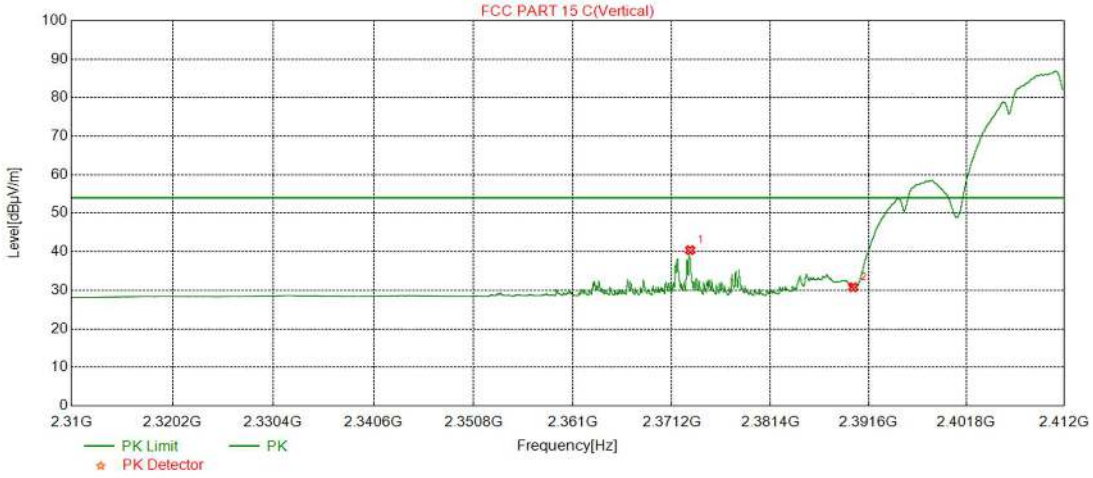


Freq. [MHz]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
2386.692	49.67	-22.82	54.00	4.33	150.4	142.6	Horizontal
2390.000	41.77	-22.81	54.00	12.23	150.4	142.6	Horizontal

Factor= Antenna Factor + Cable loss – Preamp Factor



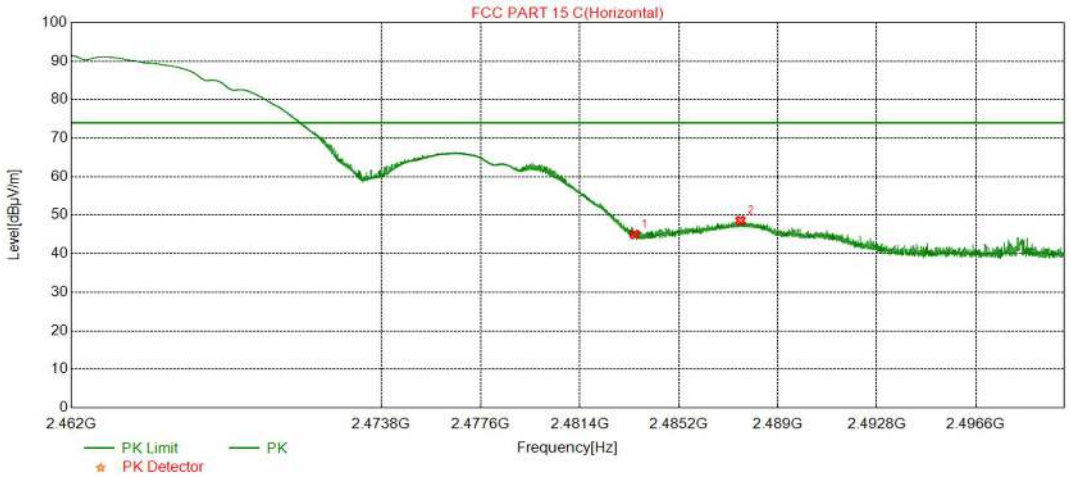
Freq. [MHz]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
2376.430	58.07	-22.85	74.00	15.93	165.5	275.6	Vertical
2390.000	42.48	-22.81	74.00	31.52	165.5	275.6	Vertical



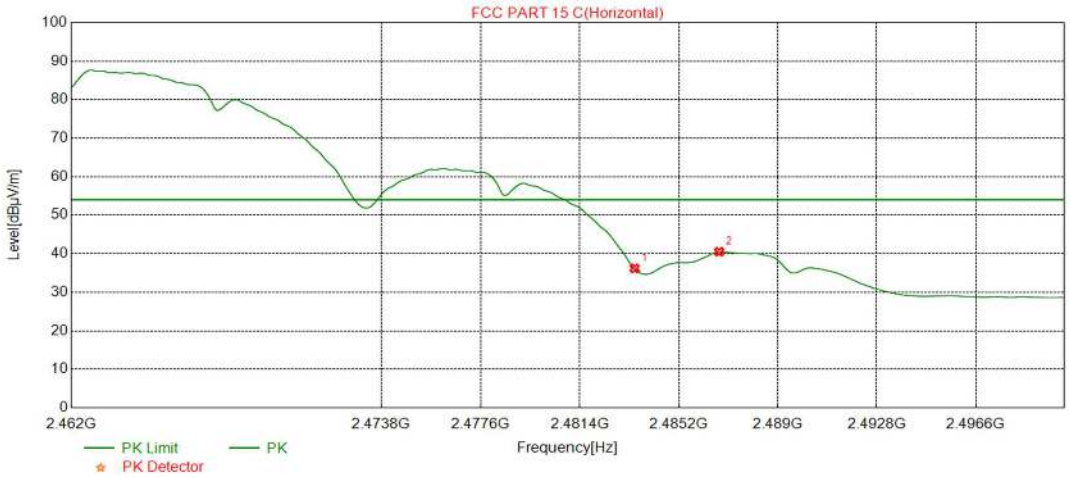
Freq. [MHz]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
2373.090	40.43	-22.86	54.00	13.57	165.5	275.6	Vertical
2390.000	30.80	-22.81	54.00	23.20	165.5	275.6	Vertical

Factor= Antenna Factor + Cable loss – Preamp Factor

802.11b - 2462MHz Test Result



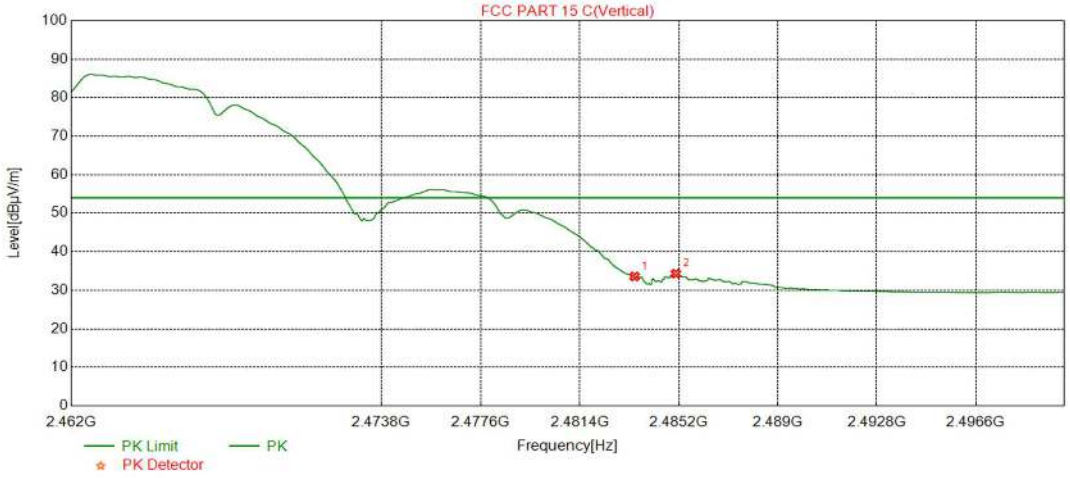
Freq. [MHz]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
2483.500	44.99	-22.52	74.00	29.01	150.4	142.6	Horizontal
2487.558	48.60	-22.51	74.00	25.40	150.4	142.6	Horizontal



Freq. [MHz]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
2483.500	36.20	-22.52	54.00	17.80	150.4	142.6	Horizontal
2486.739	40.51	-22.51	54.00	13.49	150.4	142.6	Horizontal

Factor= Antenna Factor + Cable loss – Preamp Factor

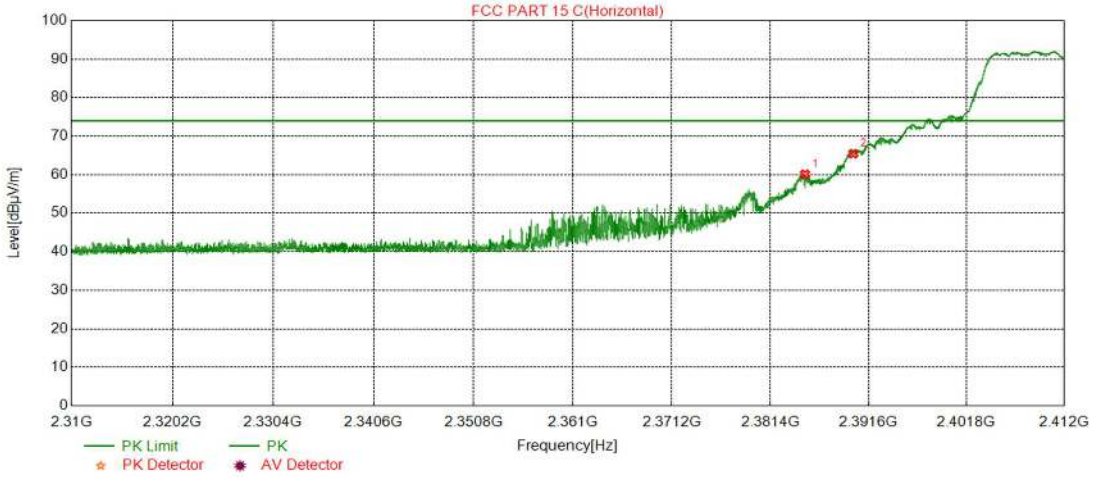
Freq. [MHz]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
2483.500	45.31	-22.52	74.00	28.69	165.5	275.6	Vertical
2484.510	49.03	-22.52	74.00	24.97	165.5	275.6	Vertical



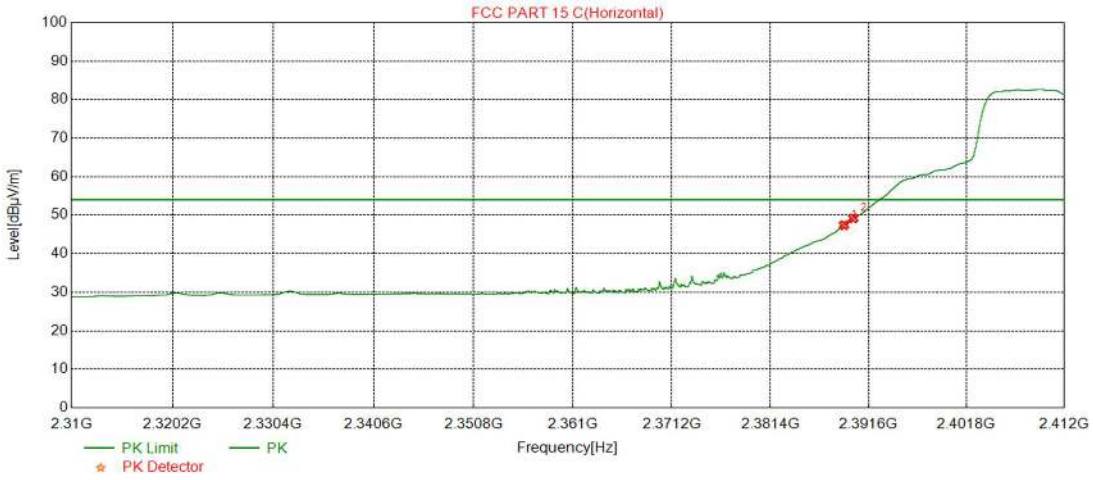
Freq. [MHz]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
2483.500	33.59	-22.52	54.00	20.41	165.5	275.6	Vertical
2485.080	34.33	-22.52	54.00	19.67	165.5	275.6	Vertical

Factor= Antenna Factor + Cable loss – Preamp Factor

802.11g - 2412MHz Test Result

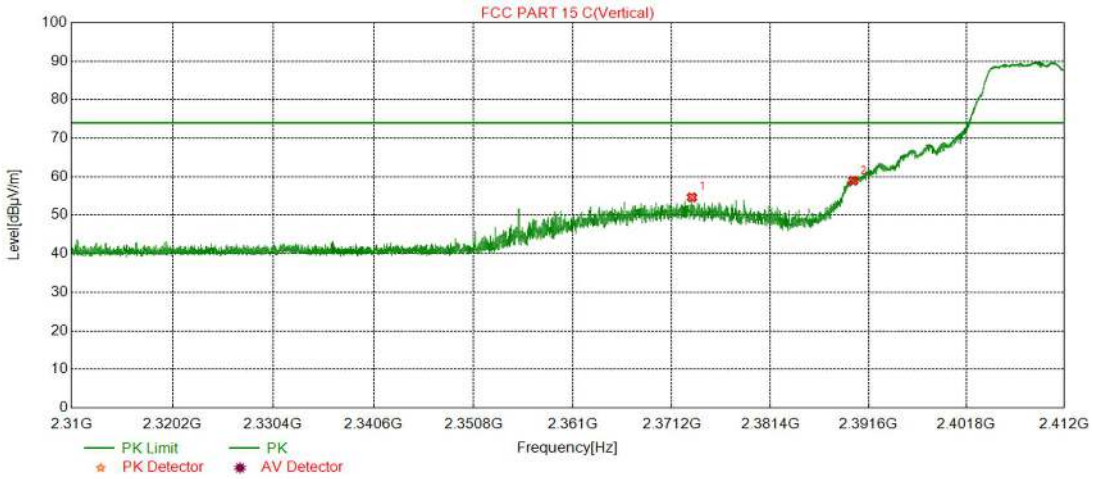


Freq. [MHz]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
2384.983	60.11	-22.82	74.00	13.89	150.4	142.6	Horizontal
2390.000	65.45	-22.81	74.00	8.55	150.4	142.6	Horizontal

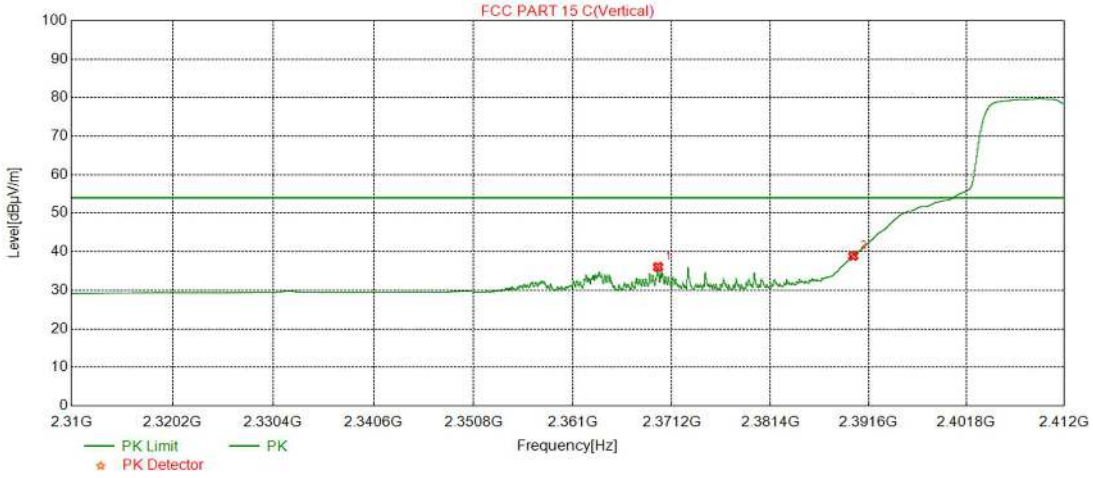


Freq. [MHz]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
2389.038	47.42	-22.81	54.00	6.58	150.4	142.6	Horizontal
2390.000	49.19	-22.81	54.00	4.81	150.4	142.6	Horizontal

Factor= Antenna Factor + Cable loss – Preamp Factor



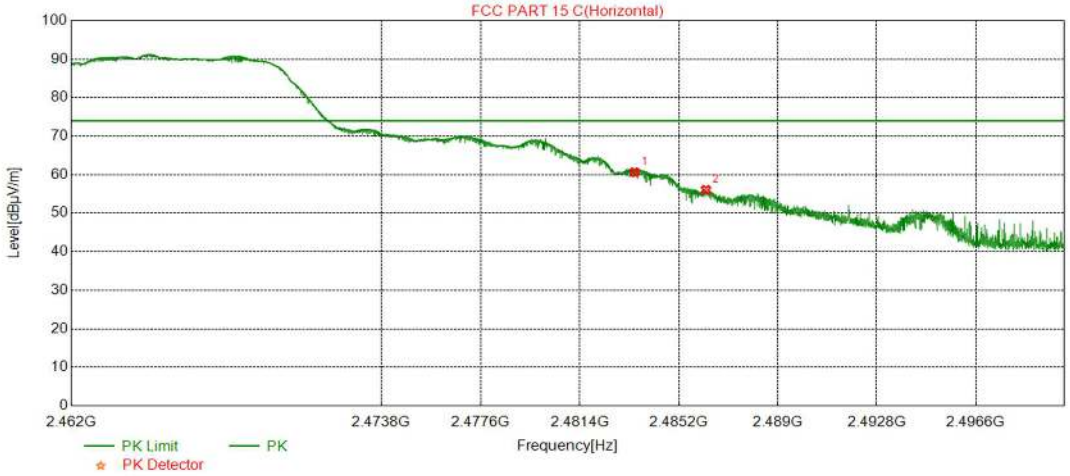
Freq. [MHz]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
2373.268	54.65	-22.86	74.00	19.35	165.5	275.6	Vertical
2390.000	58.96	-22.81	74.00	15.04	165.5	275.6	Vertical



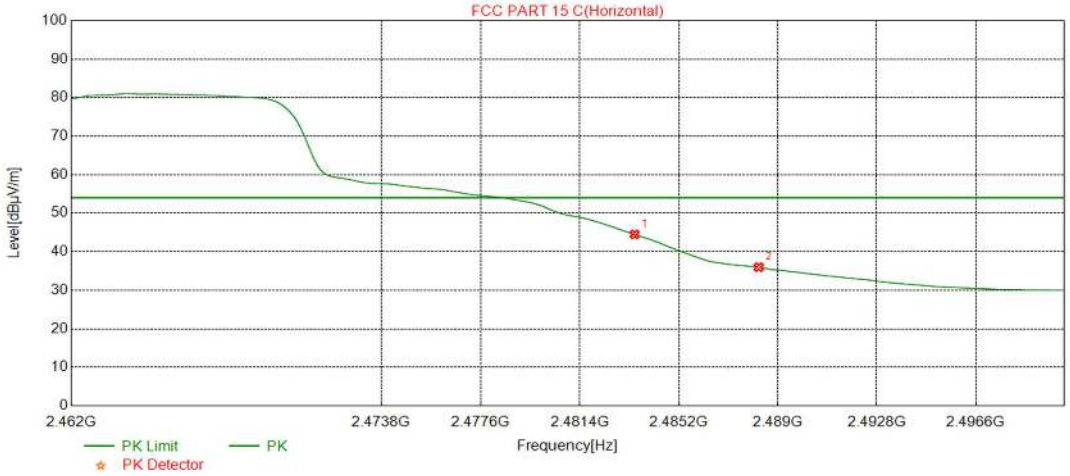
Freq. [MHz]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
2369.775	36.08	-22.87	54.00	17.92	165.5	275.6	Vertical
2390.000	38.92	-22.81	54.00	15.08	165.5	275.6	Vertical

Factor= Antenna Factor + Cable loss – Preamp Factor

802.11g - 2462MHz Test Result

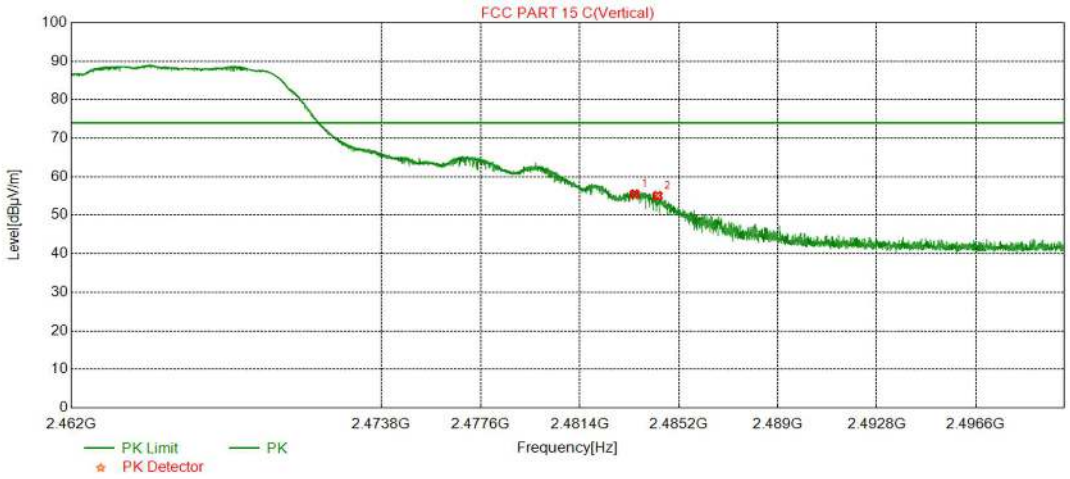


Freq. [MHz]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
2483.500	60.67	-22.52	74.00	13.33	150.4	142.6	Horizontal
2486.235	56.08	-22.51	74.00	17.92	150.4	142.6	Horizontal



Freq. [MHz]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
2483.500	44.50	-22.52	54.00	9.50	150.4	142.6	Horizontal
2488.259	36.01	-22.51	54.00	17.99	150.4	142.6	Horizontal

Factor= Antenna Factor + Cable loss – Preamp Factor

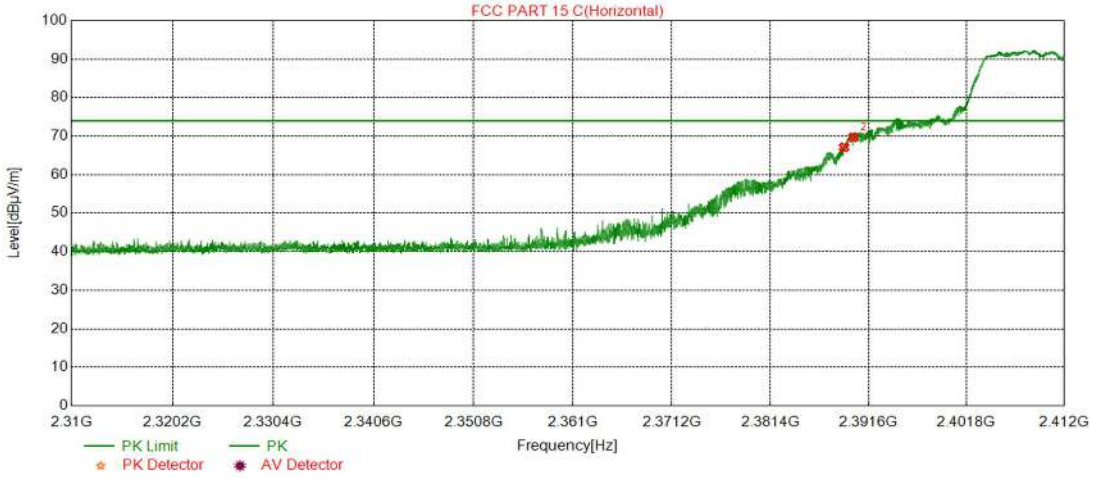


Freq. [MHz]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
2483.500	55.49	-22.52	74.00	18.51	165.5	275.6	Vertical
2484.381	55.06	-22.52	74.00	18.94	165.5	275.6	Vertical

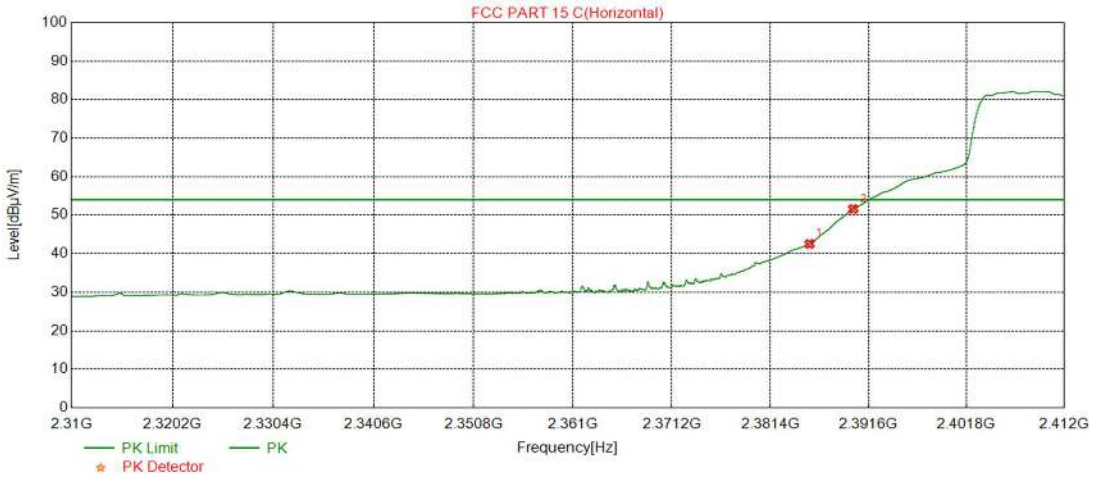
Freq. [MHz]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
2483.500	38.25	-22.52	54.00	15.75	165.5	275.6	Vertical
2483.911	37.43	-22.52	54.00	16.57	165.5	275.6	Vertical

Factor= Antenna Factor + Cable loss – Preamp Factor

802.11n (HT20) - 2412MHz Test Result

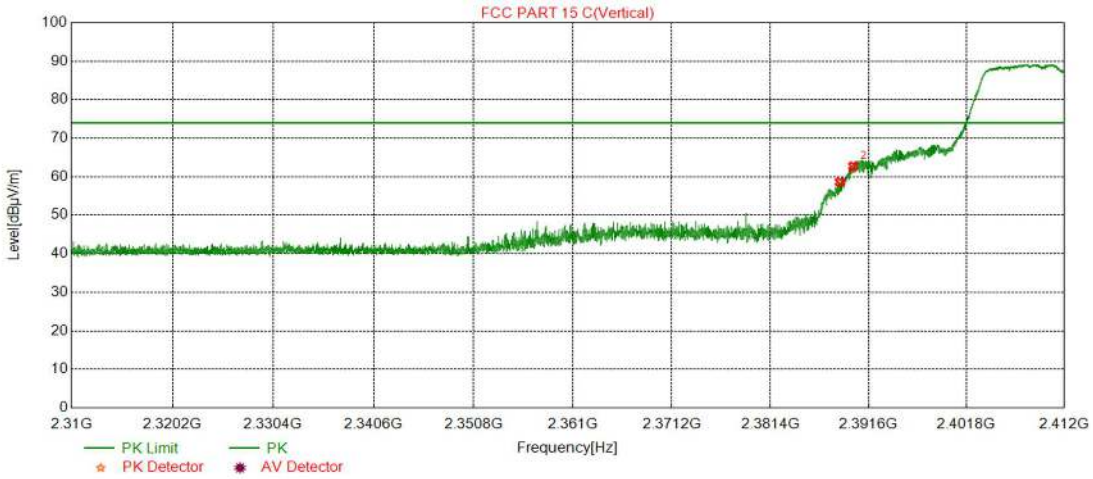


Freq. [MHz]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
2389.043	67.14	-22.81	74.00	6.86	150.4	142.6	Horizontal
2390.000	69.67	-22.81	74.00	4.33	150.4	142.6	Horizontal

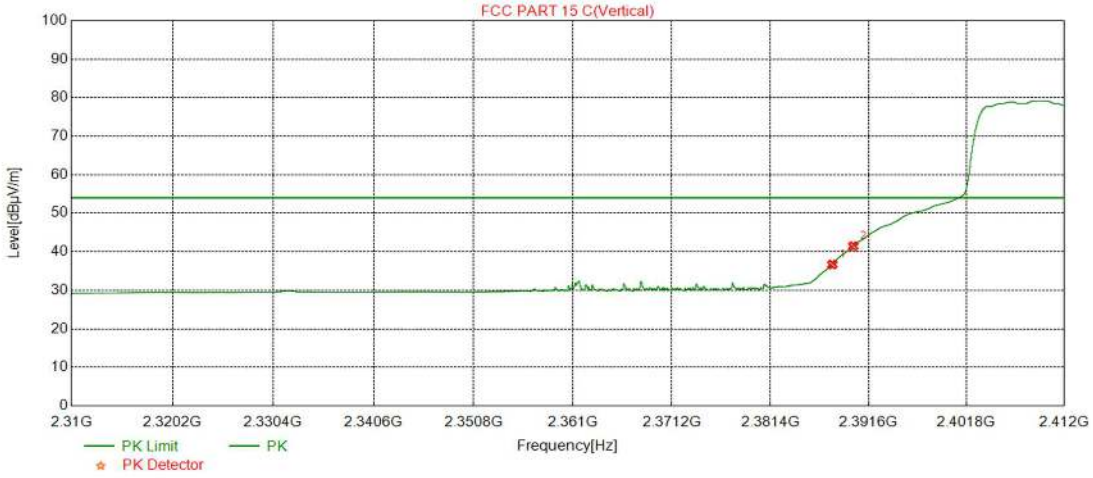


Freq. [MHz]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
2385.448	42.54	-22.82	54.00	11.46	150.4	142.6	Horizontal
2390.000	51.63	-22.81	54.00	2.37	150.4	142.6	Horizontal

Factor= Antenna Factor + Cable loss – Preamp Factor



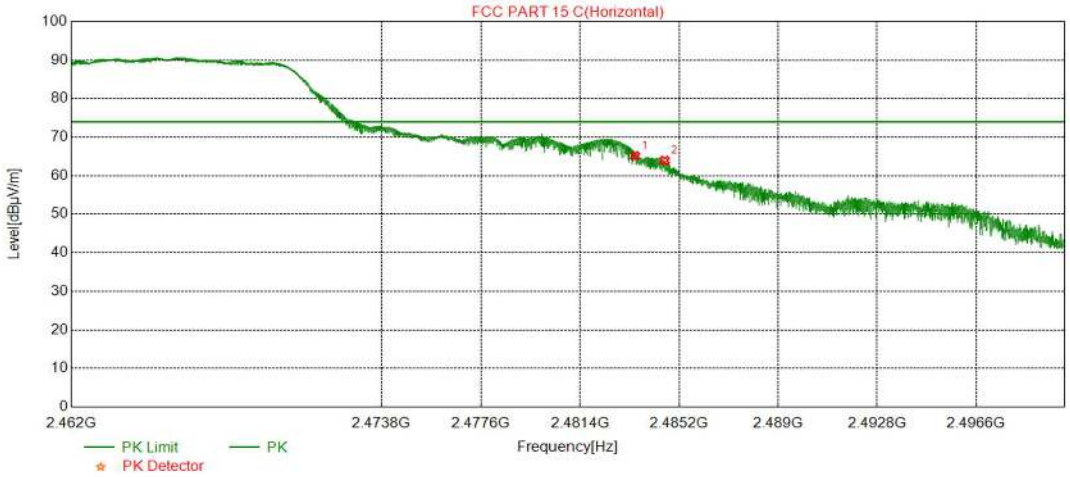
Freq. [MHz]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
2388.610	58.61	-22.81	74.00	15.39	165.5	275.6	Vertical
2390.000	62.73	-22.81	74.00	11.27	165.5	275.6	Vertical



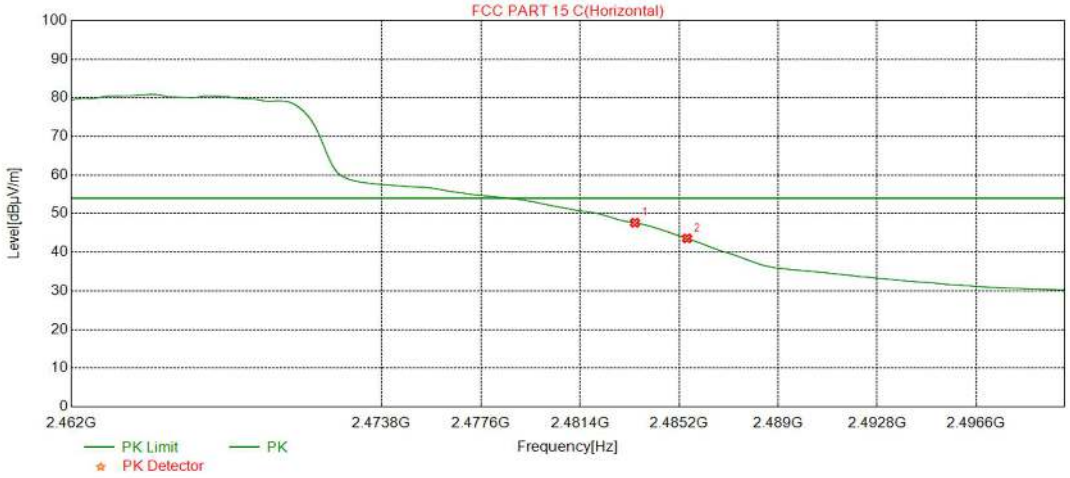
Freq. [MHz]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
2387.819	36.69	-22.81	54.00	17.31	165.5	275.6	Vertical
2390.000	41.47	-22.81	54.00	12.53	165.5	275.6	Vertical

Factor= Antenna Factor + Cable loss – Preamp Factor

802.11n (HT20) - 2462MHz Test Result

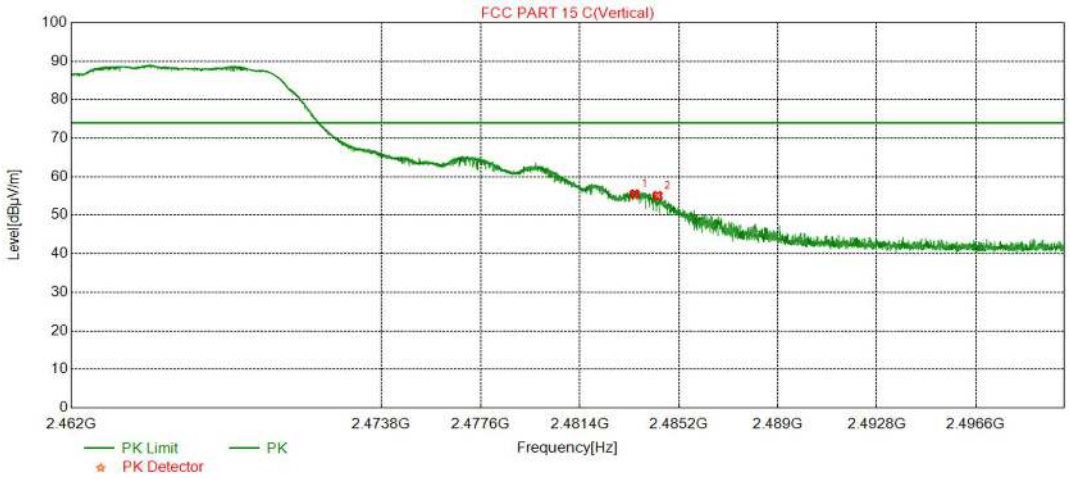


Freq. [MHz]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
2483.500	65.14	-22.52	74.00	8.86	150.4	142.6	Horizontal
2484.635	63.93	-22.52	74.00	10.07	150.4	142.6	Horizontal



Freq. [MHz]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
2483.500	47.66	-22.52	54.00	6.34	150.4	142.6	Horizontal
2485.496	43.62	-22.51	54.00	10.38	150.4	142.6	Horizontal

Factor= Antenna Factor + Cable loss – Preamp Factor

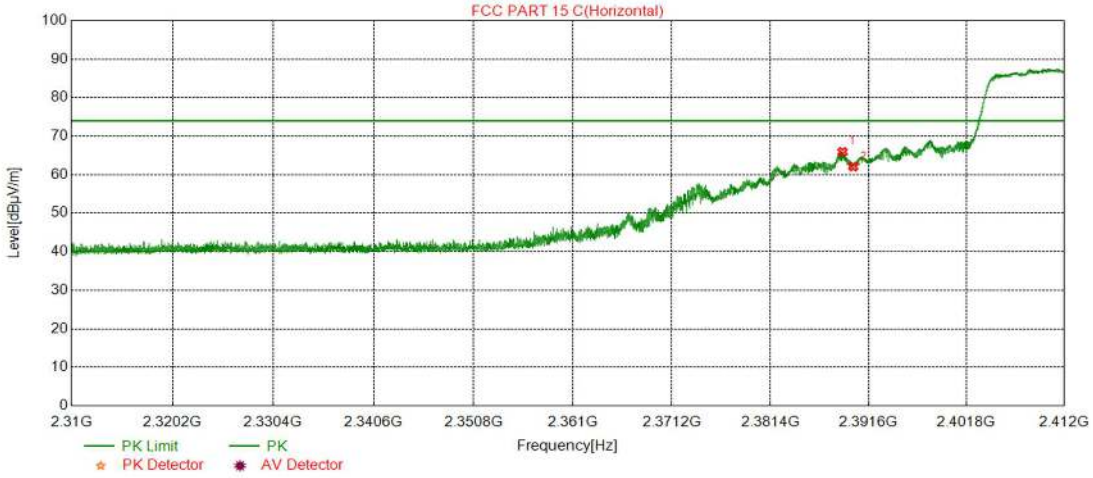


Freq. [MHz]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
2483.500	55.49	-22.52	74.00	18.51	165.5	275.6	Vertical
2484.381	55.06	-22.52	74.00	18.94	165.5	275.6	Vertical

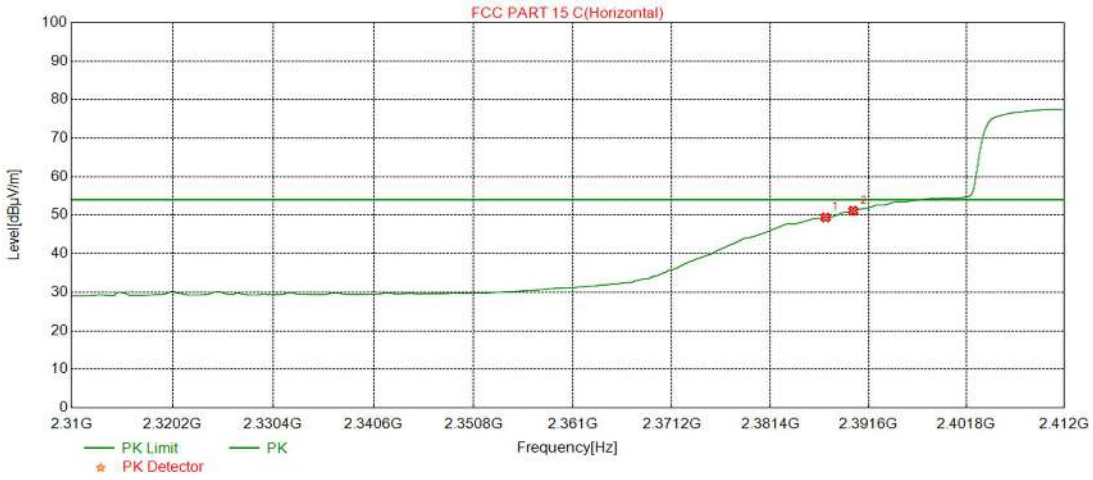
Freq. [MHz]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
2483.500	38.25	-22.52	54.00	15.75	165.5	275.6	Vertical
2483.911	37.43	-22.52	54.00	16.57	165.5	275.6	Vertical

Factor= Antenna Factor + Cable loss – Preamp Factor

802.11n (HT40) - 2422MHz Test Result

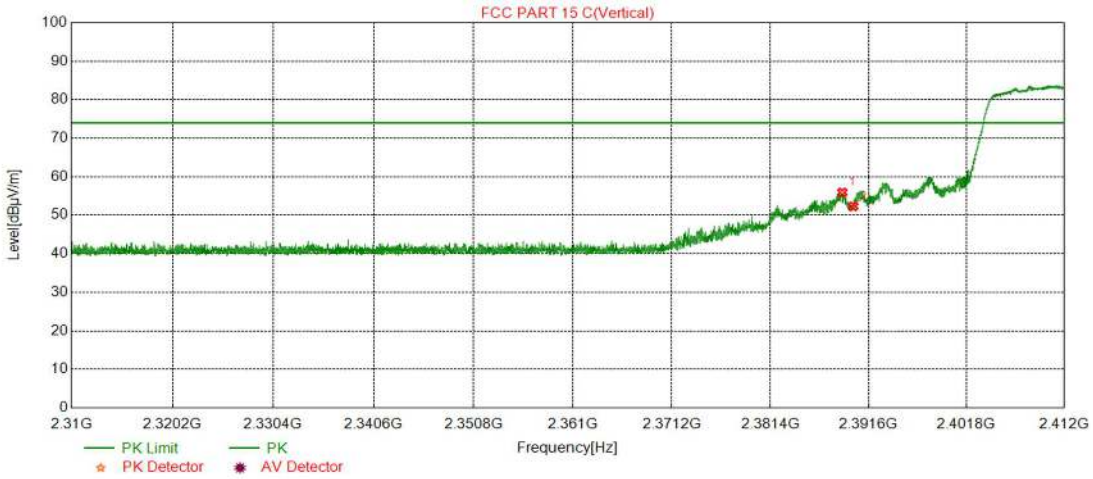


Freq. [MHz]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
2388.885	65.92	-22.81	74.00	8.08	150.4	142.6	Horizontal
2390.000	62.12	-22.81	74.00	11.88	150.4	142.6	Horizontal

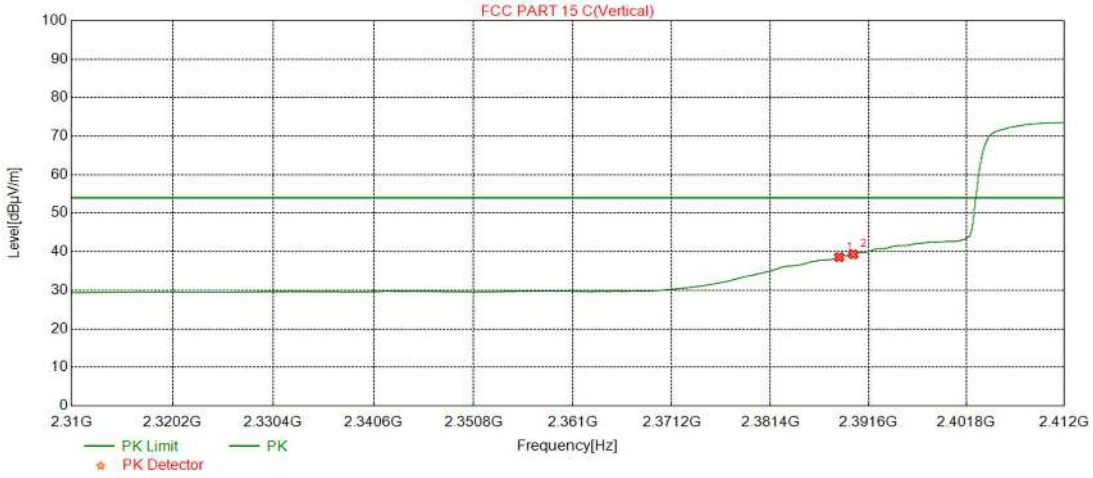


Freq. [MHz]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
2387.121	49.42	-22.82	54.00	4.58	150.4	142.6	Horizontal
2390.000	51.16	-22.81	54.00	2.84	150.4	142.6	Horizontal

Factor= Antenna Factor + Cable loss – Preamp Factor



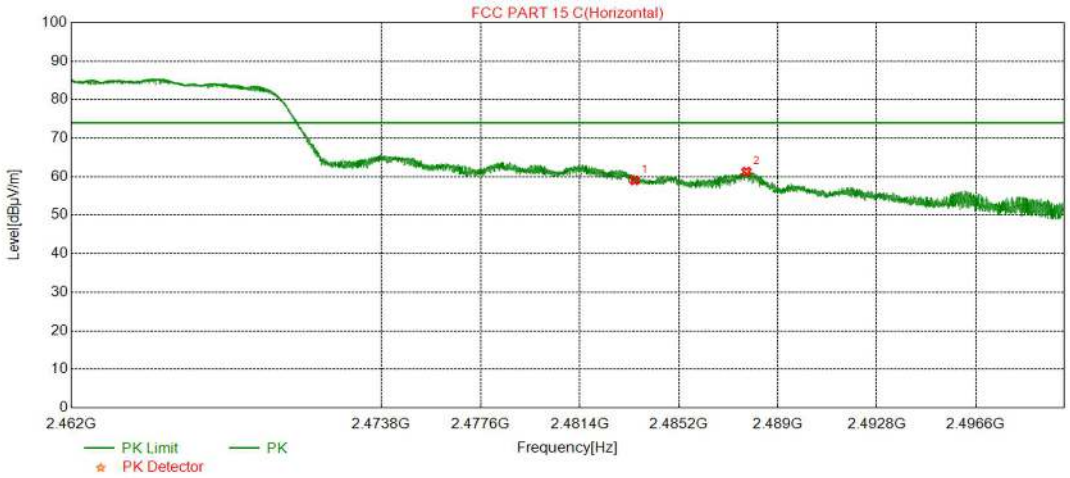
Freq. [MHz]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
2388.855	55.94	-22.81	74.00	18.06	165.5	275.6	Vertical
2390.000	52.31	-22.81	74.00	21.69	165.5	275.6	Vertical



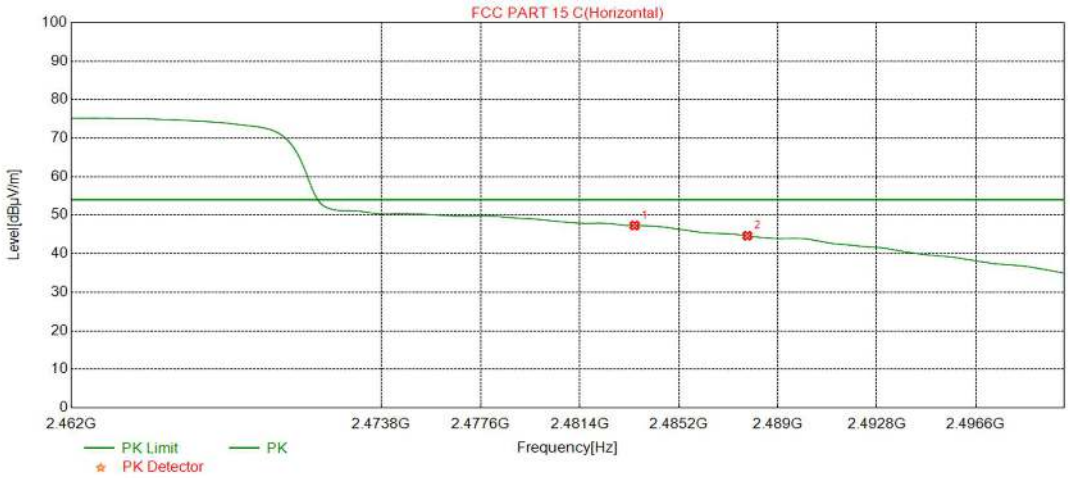
Freq. [MHz]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
2388.533	38.62	-22.81	54.00	15.38	165.5	275.6	Vertical
2390.000	39.35	-22.81	54.00	14.65	165.5	275.6	Vertical

Factor= Antenna Factor + Cable loss – Preamp Factor

802.11n (HT40) - 2452MHz Test Result

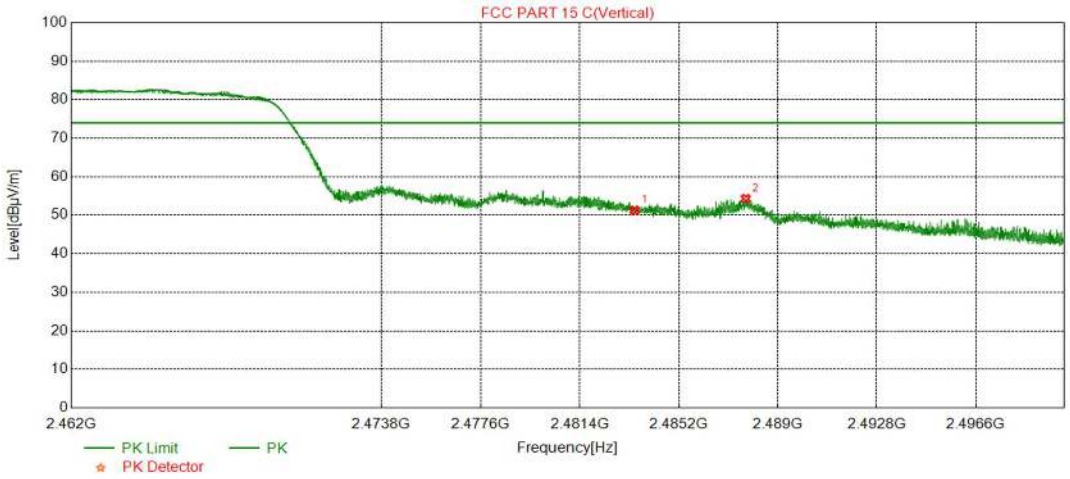


Freq. [MHz]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
2483.500	59.04	-22.52	74.00	14.96	150.4	142.6	Horizontal
2487.788	61.29	-22.51	74.00	12.71	150.4	142.6	Horizontal

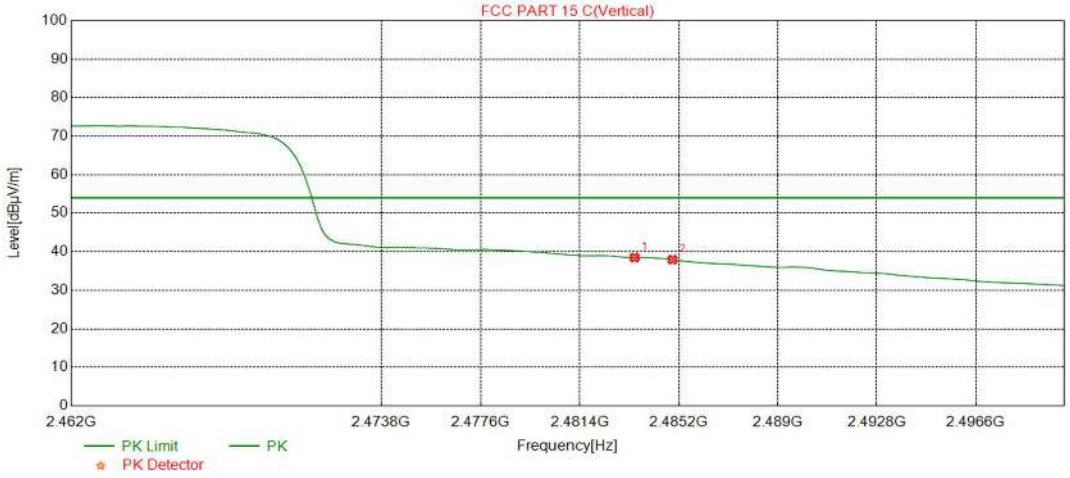


Freq. [MHz]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
2483.500	47.32	-22.52	54.00	6.68	150.4	142.6	Horizontal
2487.824	44.67	-22.51	54.00	9.33	150.4	142.6	Horizontal

Factor= Antenna Factor + Cable loss – Preamp Factor



Freq. [MHz]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
2483.500	51.29	-22.52	74.00	22.71	165.5	275.6	Vertical
2487.759	54.31	-22.51	74.00	19.69	165.5	275.6	Vertical



Freq. [MHz]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
2483.500	38.49	-22.52	54.00	15.51	165.5	275.6	Vertical
2484.951	37.95	-22.52	54.00	16.05	165.5	275.6	Vertical

Factor= Antenna Factor + Cable loss – Preamp Factor

END