

TEST REPORT

Application No.: KSCR2509001991AT
FCC ID: XMR202401AF68E
Applicant: Quectel Wireless Solutions Co., Ltd.
Address of Applicant: Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233
Manufacturer: Quectel Wireless Solutions Co., Ltd.
Address of Manufacturer: Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233
Equipment Under Test (EUT):
EUT Name: Wi-Fi & Bluetooth Module
Model No.: AF68E
Trade Mark: QUECTEL
Standard(s) : 47 CFR Part 15, Subpart C 15.247
Date of Receipt: 2025-08-31
Date of Test: 2025-09-01 to 2025-09-04
Date of Issue: 2025-09-12

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.

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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.



Revision Record			
Version	Description	Date	Remark
00	Add a new antenna	2025-09-12	Based on KSCR240200030903

Authorized for issue by:				
Tested By		maker Qi		
		Maker_Qi/Project Engineer		
Approved By		Terry Hou		
		Terry Hou /Reviewer		

2 Test Summary

Radio Spectrum Technical Requirement					
Item	Standard	Method	Requirement	Result	Test Lab*
Antenna Requirement	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4)	Customer Declaration	N/A

Radio Spectrum Matter Part					
Item	Standard	Method	Requirement	Result	Test Lab*
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass	B
Conducted Peak Output Power		ANSI C63.10 (2013) Section 11.9.2	47 CFR Part 15, Subpart C 15.247(b)(3)	Pass (Note1)	A
Minimum 6dB Bandwidth		ANSI C63.10 (2013) Section 11.8.1	47 CFR Part 15, Subpart C 15.247a(2)	Pass (Note1)	A
Power Spectrum Density		ANSI C63.10 (2013) Section 11.10.2	47 CFR Part 15, Subpart C 15.247(e)	Pass (Note1)	A
Conducted Band Edges Measurement		ANSI C63.10 (2013) Section 11.13.3.2	47 CFR Part 15, Subpart C 15.247(d)	Pass (Note1)	A
Conducted Spurious Emissions		ANSI C63.10 (2013) Section 11.11	47 CFR Part 15, Subpart C 15.247(d)	Pass (Note1)	A
Radiated Emissions which fall in the restricted bands		ANSI C63.10 (2013) Section 6.10.5	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass	B
Radiated Spurious Emissions Below 1GHz		ANSI C63.10 (2013) Section 6.4,6.5	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass	B
Radiated Spurious Emissions Above 1GHz		ANSI C63.10 (2013) Section 6.6	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass	B

Note1: This report was an additional report copied from the report KSCR240200030903, new report add a new antenna and test items for Conducted Emissions at AC Power Line (150kHz-30MHz), Radiated Spurious Emissions Below 1GHz, Radiated Spurious Emissions Above 1GHz and Radiated Emissions which fall in the restricted bands. And other test items data refer to original report KSCR240200030903.



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4 General Information

4.1 Details of E.U.T.

Power supply:	DC 3.3-4.8V,Typ: 3.85V
Operation Frequency:	802.11b/g/n(HT20)/ax(HEW20): 2412MHz to 2462MHz;802.11n(HT40)/ax(HEW40): 2422MHz to 2452MHz
Modulation Type:	802.11b: DSSS (CCK, DQPSK, DBPSK), 802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK), 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024-QAM)
Number of Channels:	802.11b/g/n(HT20)/ax(HEW20):11;802.11n(HT40)/ax(HEW40):7
Channel Spacing:	5MHz
Antenna Type:	External antenna
Antenna Gain:	ANT5 (WIFI0): 2.5dBi (Provided by the manufacturer) ANT6 (WIFI1):2.7dBi (Provided by the manufacturer)

4.2 Power level setting using in test:

Channel	802.11b		802.11g		802.11n(HT20)		802.11ax(HEW20)	
	Ant 1	Ant 2	Ant 2	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2
1	16.5	16.5	16	16	15.5	15.5	14	14
6	18.5	18.5	18	18	17.5	17.5	17.5	17.5
11	16.5	16.5	14.5	14.5	13	13	12	12
Channel	802.11n(HT20)		802.11ax(HEW20)					
	Ant 2	Ant 2	Ant 1	Ant 2				
3	12.5	12.5	12.5	12.5				
6	17	17	17	17				
9	12	12	12.5	12.5				

4.3 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Router	Smavwave Technology Co.,Ltd	SRT 421	SUWI-04-34-01
Computer	Lenovo	T14	SUWI-03-33-04
Mouse	Lenovo	3D optical Mouse	SUWI-03-33-05
Adaptor	Huawei	HW-050200C02	SUWI-03-33-06
Mouse	Lenovo	3D optical Mouse	SUWI-03-33-05
Bluetooth earphone	Lenovo	Thinplus BH3	SUWI-03-48-01

4.4 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	8.4×10^{-8}
2	Timeout	2s
3	Duty Cycle	0.37%
4	Occupied Bandwidth	3%
5	RF Conducted Power	0.6dB
6	RF Power Density	2.9dB
7	Conducted Spurious Emissions	0.75dB
8	RF Radiated Power	5.2dB (Below 1GHz)
		5.9dB (Above 1GHz)
9	Radiated Spurious Emission Test	4.2dB (Below 30MHz)
		4.5dB (30MHz-1GHz)
		5.1dB (1GHz-18GHz)
		5.4dB (Above 18GHz)
10	Temperature Test	1°C
11	Humidity Test	3%
12	Supply Voltages	1.5%
13	Time	3%
Note: The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.		

4.5 Test Location

Lab A:

Compliance Certification Services (Kunshan) Inc.

No.10 Weiye Rd, Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China.

Tel: +86 512 5735 5888 Fax: +86 512 5737 0818

Lab B:

Conducted Emissions at AC Power Line (150kHz-30MHz), Radiated Spurious Emissions Below 1GHz, Radiated Spurious Emissions Above 1GHz and Radiated Emissions which fall in the restricted bands test at:

SGS-CSTC Standards Technical Services (Suzhou) Co., Ltd.

No.2, Tongsheng Road, Wuzhong District, Suzhou, Jiangsu, China

Tel: +86 512 5735 5888 Fax: +86 512 5737 0818

4.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

Lab A:

• A2LA

Compliance Certification Services (Kunshan) Inc. is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 2541.01.

• FCC

Compliance Certification Services (Kunshan) Inc. has been recognized as an accredited testing laboratory. Designation Number: CN1172.

• ISED

Compliance Certification Services (Kunshan) Inc. has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory. Company Number: 2324E

• VCCI

The 3m and 10m Semi-anechoic chamber and Shielded Room of Compliance Certification Services (Kunshan) Inc. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-20134, R-11600, C-11707, T-11499, G-10216 respectively.

Lab B:

• A2LA (Certificate No. 6336.01)

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 6336.01.

• Innovation, Science and Economic Development Canada

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0120.

IC#: 27594.

• FCC –Designation Number: CN1312

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized as an accredited testing laboratory.

Designation Number: CN1312.

Test Firm Registration Number: 717327

4.7 Deviation from Standards

None

4.8 Abnormalities from Standard Conditions

None

5 Equipment List

Lab B:

Item	Equipment	Manufacturer	Model	Inventory No	Cal Date	Cal. Due Date
Conducted Emission at Mains Terminals						
1	EMI Test Receive	R&S	ESR7	SUWI-01-10-01	1/15/2025	1/14/2026
2	LISN	R&S	ENV216	SUWI-01-19-03	5/8/2025	5/7/2026
3	LISN	Schwarzbeck	ENV216	SUWI-01-19-04	5/8/2025	5/7/2026
4	Test Software	Tonscend	JS32-CE 4.0.0.2	SUWI-02-09-05	N.C.R	N.C.R
RF Radiated Test						
1	Semi-Anechoic Chamber	Brilliant-emc	N/A	SUWI-04-02-01	6/3/2023	6/2/2026
2	Signal Analyzer	ROHDE&SCHWARZ	FSW43	SUWI-01-02-04	1/20/2025	1/19/2026
3	Signal Analyzer	KEYSIGHT	N9020A	SUWI-01-02-09	11/21/2024	11/20/2025
4	Test receiver	ROHDE&SCHWARZ	ESR7	SUWI-01-10-01	1/15/2025	1/14/2026
5	Signal Generator	ROHDE&SCHWARZ	SMW100A	SUWI-01-18-01	1/16/2025	1/15/2026
6	Receiving antenna	SCHWRZBECK MESS- ELEKTRONIK	VULB 9168	SUWI-01-11-04	8/22/2024	8/21/2026
7	Receiving antenna	SCHWRZBECK MESS- ELEKTRONIK	BBHA 9120D	SUWI-01-11-02	5/7/2025	5/6/2027
8	Receiving antenna	SCHWRZBECK MESS- ELEKTRONIK	BBHA 9170	SUWI-01-11-03	5/7/2025	5/6/2027
9	Active Loop Antenna	SCHWRZBECK MESS- ELEKTRONIK	FMZB 1519B	SUWI-01-21-01	5/7/2025	5/6/2027
10	Amplifier	Tonscend	TAP9K3G40	SUWI-01-14-01	1/16/2025	1/15/2026
11	Amplifier	Tonscend	TAP01018050	SUWI-01-14-02	1/16/2025	1/15/2026
12	Amplifier	Tonscend	TAP18040048	SUWI-01-14-03	1/20/2025	1/19/2026
13	Wideband Radio Communication Tester	Anritsu	MT8820C	SUWI-01-26-01	9/10/2024	9/9/2025
14	Wideband Radio Communication Tester	Anritsu	MT8821C	SUWI-01-26-03	11/19/2024	11/18/2025
15	Wideband Radio Communication Tester	ROHDE&SCHWARZ	CMW500	SUWI-01-16-09	9/10/2024	9/9/2025
16	Radio Communication Analyzer	StarPoint	SP9500E	SUWI-01-28-02	11/19/2024	11/18/2025
17	Signal Generator	ROHDE&SCHWARZ	SMB100A	SUWI-01-08-01	1/16/2025	1/15/2026
18	DC Power Supply	HYELEC	HY3005B	SUWI-01-18-01	1/15/2025	1/14/2026
19	Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-05	2/13/2025	2/12/2026
20	Measurement Software	Tonscend	JS32-RE 4.0.0.0	SUWI-02-09-06	NCR	NCR

6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4)

6.1.2 Conclusion

Standard Requirement:

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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna:

The ANT5 (WIFI0) and ANT6 (WIFI1) is External antenna, and all no consideration of replacement. The best case gain of the ANT5 (WIFI0) is 2.5dBi. and ANT6 (WIFI1) is 2.7dBi.

Antenna location: Refer to internal photo.

Directional Gain Calculations for MIMO:

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

Basic methodology with NANT transmit antennas, each with the same directional gain GANT dBi, being driven by NANT transmitter outputs of equal power. Directional gain is to be computed as follows:

- If any transmit signals are correlated with each other,
Directional gain = $GANT + 10 \log(NANT)$ dBi
- If all transmit signals are completely uncorrelated with each other,
Directional gain = GANT

Unequal antenna gains, with equal transmit powers. For antenna gains given by G1, G2, ..., GN dBi

- If transmit signals are correlated, then
Directional gain = $10 \log[(10G1/20 + 10G2/20 + \dots + 10GN/20)^2 / NANT]$ dBi [Note the "20"s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]
- If all transmit signals are completely uncorrelated, then
Directional gain = $10 \log[(10G1/10 + 10G2/10 + \dots + 10GN/10)/NANT]$ dBi

Directional gain may be calculated by using the formulas applicable to equal gain antennas with GANT set equal to the gain of the antenna having the highest gain.

All antennas have the same gain:

Operation Frequency	ANT5(WIFI0) (dBi)	ANT6(WIFI1) (dBi)	Directional gain For Power(dBi)	Directional gain For PSD(dBi)
2400 MHz to 2483.5 MHz	2.5	2.7	2.7	2.7

2400 MHz to 2483.5 MHz:

Power Limit Reduction = Directional gain – 6dBi, (Directional gain < 6dBi) =0

PSD Limit Reduction = Directional gain – 6dBi, (Directional gain < 6dBi) =0

7 Radio Spectrum Matter Test Results

7.1 Conducted Emissions at AC Power Line (150kHz-30MHz)

Test Requirement 47 CFR Part 15, Subpart C 15.207

Test Method: ANSI C63.10 (2013) Section 6.2

Measurement Distance: 3m

Limit:

Frequency of emission(MHz)	Conducted limit(dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
*Decreases with the logarithm of the frequency.		
Detector: Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz		

7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 22.5 °C

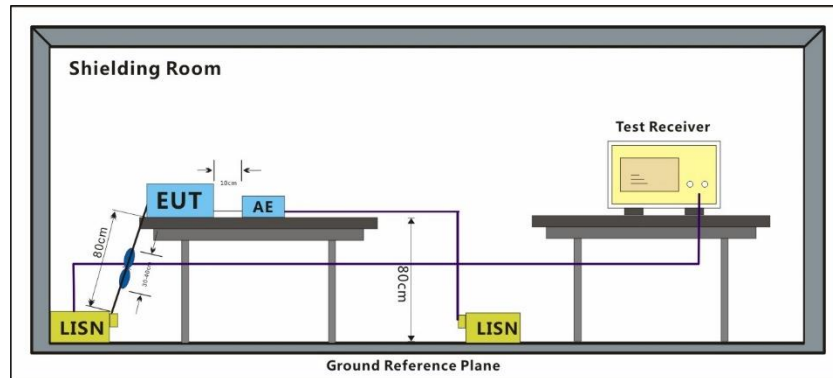
Humidity: 46 % RH

Atmospheric Pressure: 1010 mbar

7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20)/ax(HEW20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40)/ax(HEW40), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.

7.1.3 Test Setup Diagram



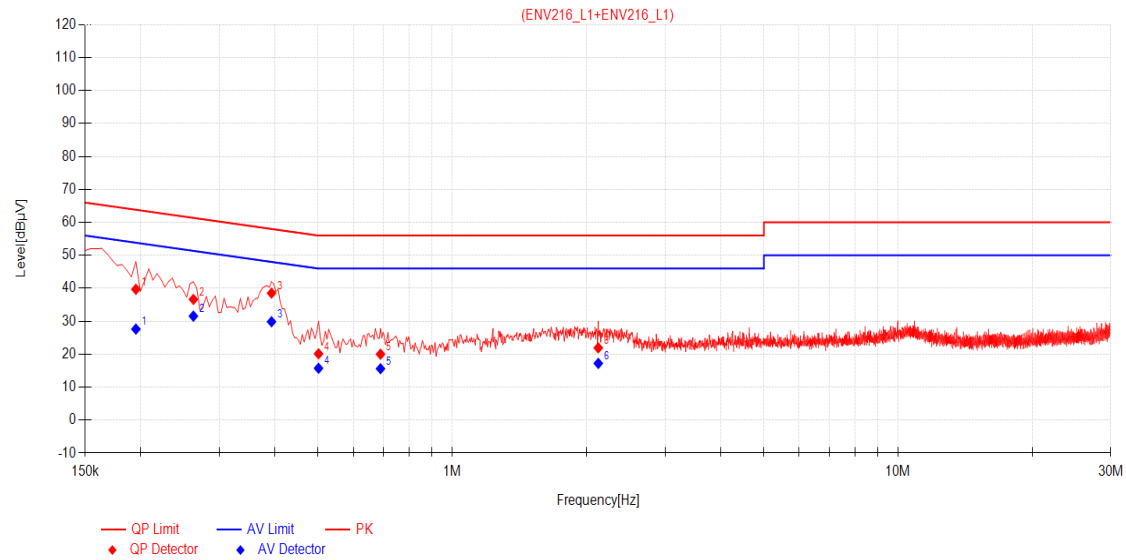
7.1.4 Measurement Procedure and Data

- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a $50\Omega/50\mu\text{H} + 50\Omega$ linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
- 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane.
- 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
- 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Remark: $\text{Level} = \text{Read Level} + \text{Cable Loss} + \text{LISN Factor}$

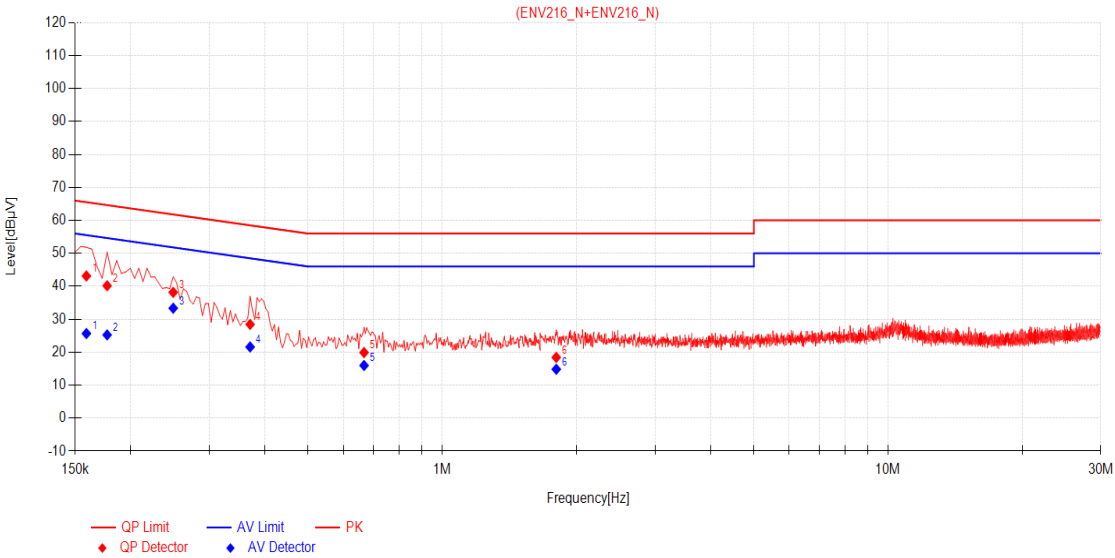


Test Mode: 00; Line: Live line



Final Data List											
NO.	Frequency [MHz]	Factor [dB]	QP Reading [dBμV]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Reading [dBμV]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Verdict
1	0.1950	9.97	29.72	39.69	63.82	24.13	17.64	27.61	53.82	26.21	PASS
2	0.2625	9.97	26.66	36.63	61.35	24.72	21.58	31.55	51.35	19.80	PASS
3	0.3930	9.95	28.57	38.52	58.00	19.48	19.91	29.86	48.00	18.14	PASS
4	0.5010	9.94	10.18	20.12	56.00	35.88	5.79	15.73	46.00	30.27	PASS
5	0.6900	9.92	10.09	20.01	56.00	35.99	5.68	15.60	46.00	30.40	PASS
6	2.1255	9.88	12.04	21.92	56.00	34.08	7.33	17.21	46.00	28.79	PASS

Test Mode: 00; Line: Neutral Line



Final Data List											
NO.	Frequency [MHz]	Factor [dB]	QP Reading [dBμV]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Reading [dBμV]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Verdict
1	0.1590	9.95	33.18	43.13	65.52	22.39	15.71	25.66	55.52	29.86	PASS
2	0.1770	9.94	30.22	40.16	64.63	24.47	15.31	25.25	54.63	29.38	PASS
3	0.2490	9.97	28.19	38.16	61.79	23.63	23.38	33.35	51.79	18.44	PASS
4	0.3705	9.96	18.49	28.45	58.49	30.04	11.64	21.60	48.49	26.89	PASS
5	0.6675	9.94	9.96	19.90	56.00	36.10	6.04	15.98	46.00	30.02	PASS
6	1.8015	9.92	8.50	18.42	56.00	37.58	4.91	14.83	46.00	31.17	PASS

7.2 Radiated Emissions which fall in the restricted bands

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

Test Method: ANSI C63.10 (2013) Section 6.10.5

Measurement Distance: 3m

Limit:

Frequency(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

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 20.5 °C

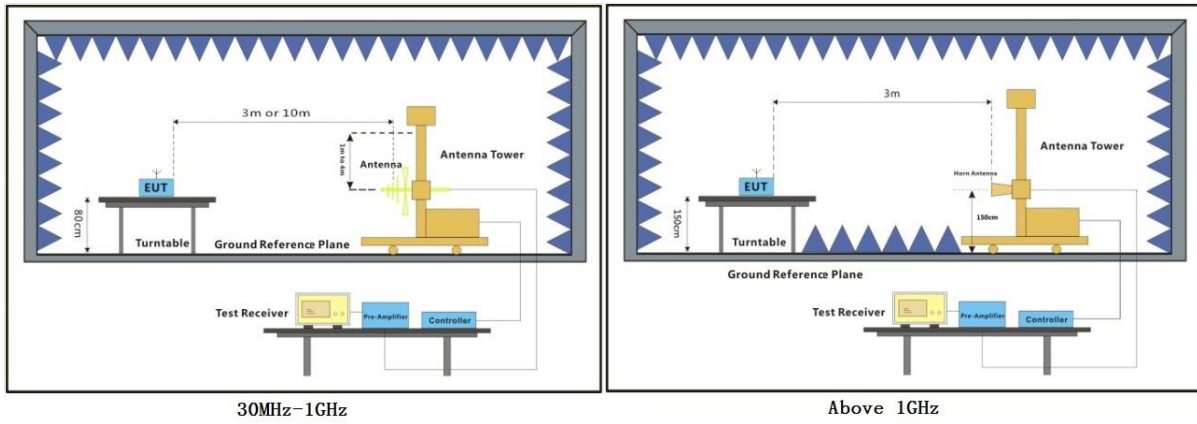
Humidity: 51.3 % RH

Atmospheric Pressure: 1010 mbar

7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20)/ax(HEW20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40)/ax(HEW40), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.

7.2.3 Test Setup Diagram



7.2.4 Measurement Procedure and Data

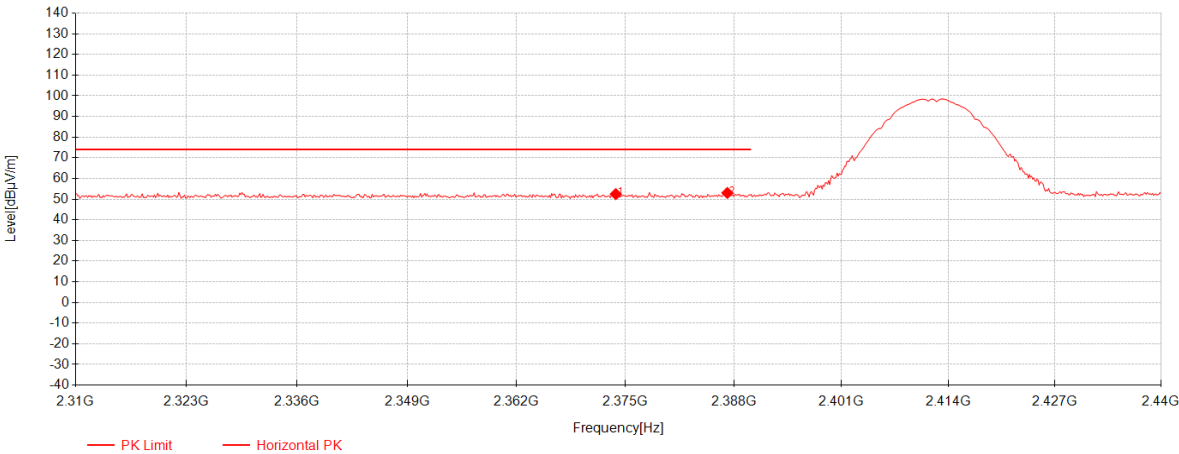
- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

Remark 1: $\text{Level} = \text{Read Level} + \text{Cable Loss} + \text{Antenna Factor} - \text{Preamp Factor}$

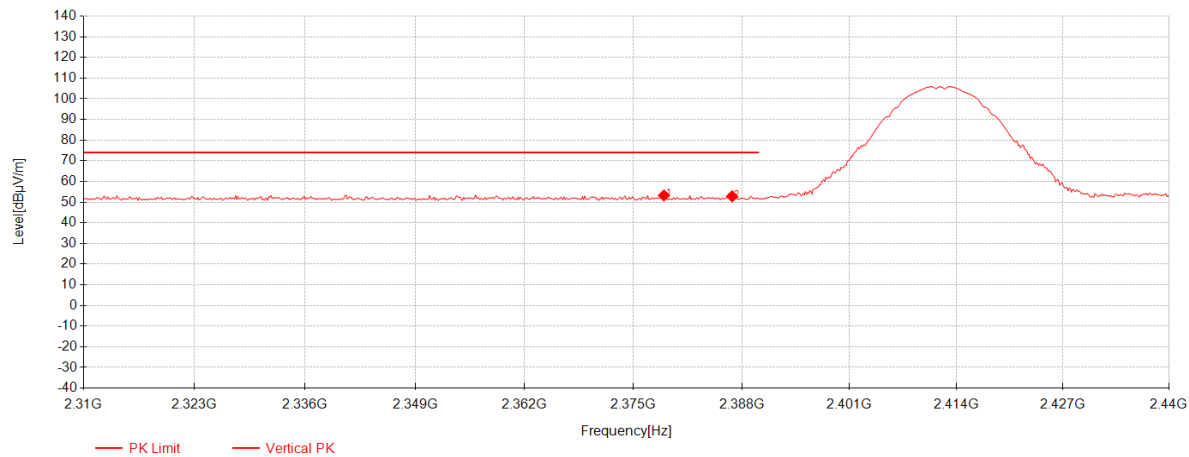
Remark 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

Remark 3: This test item was investigated while operating in SISO and MIMO mode, however, it was determined that SISO antenna 1 operation for b/g modulation and MIMO antenna operation for n/ax modulation produced the worst emissions. So the emissions produced from other operation are not recorded in report.

11b_Channel 01

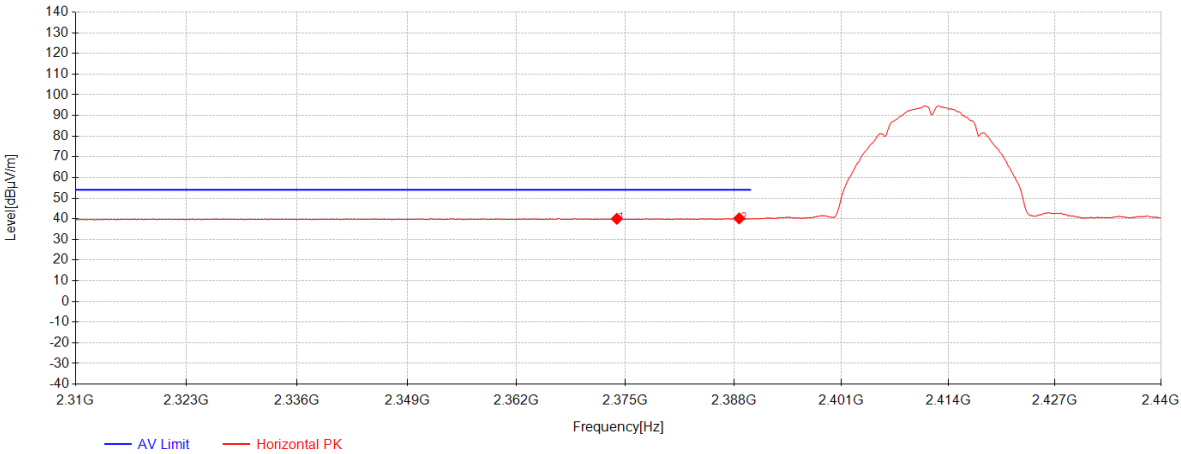


Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2373.83	48.62	27.12	-23.30	52.44	74.00	21.56	Horizontal
2	2387.22	49.16	27.15	-23.31	53.00	74.00	21.00	Horizontal

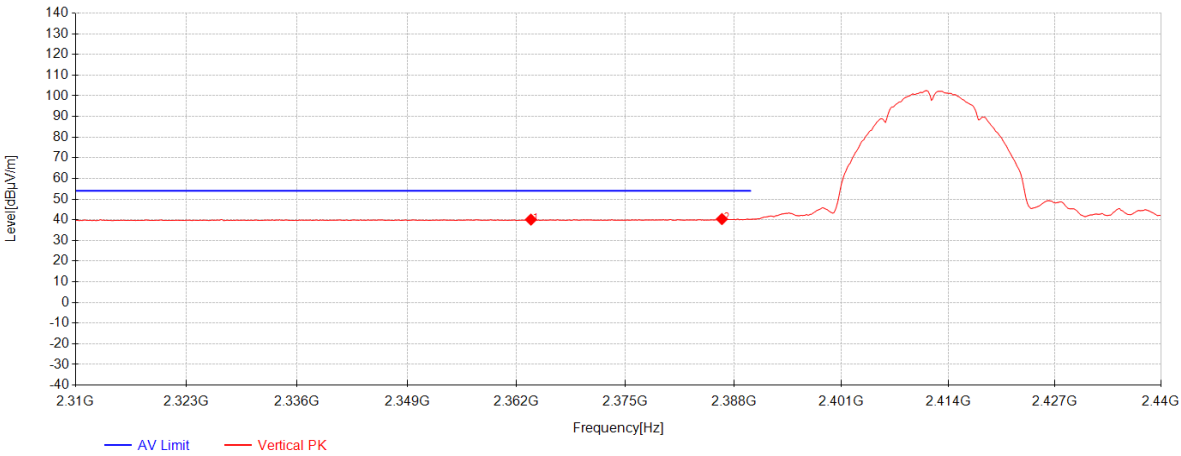


Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2378.64	49.42	27.13	-23.31	53.25	74.00	20.75	Vertical
2	2386.83	48.98	27.15	-23.31	52.82	74.00	21.18	Vertical

11b_Channel 01

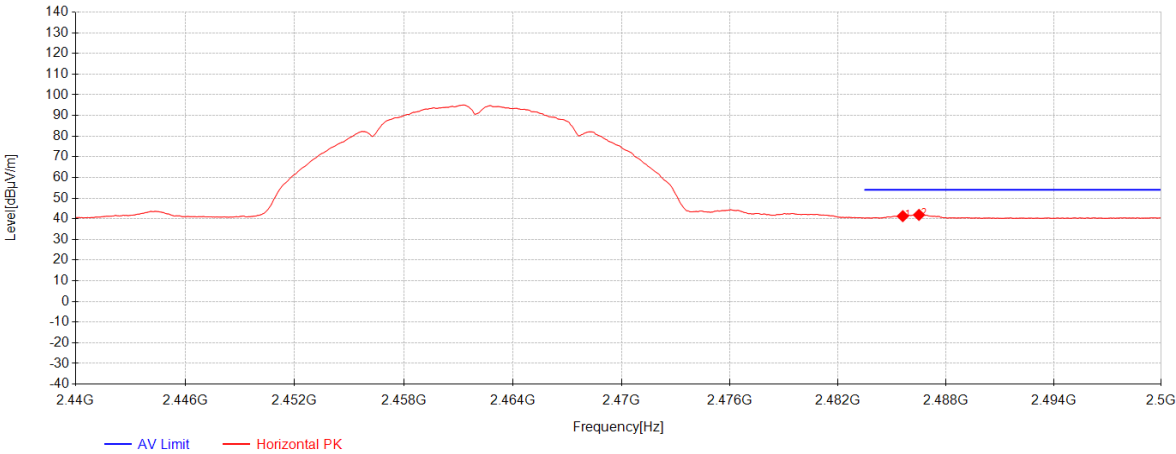


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2373.96	36.20	27.12	-23.30	40.02	54.00	13.98	Horizontal
2	2388.65	36.36	27.16	-23.31	40.20	54.00	13.80	Horizontal

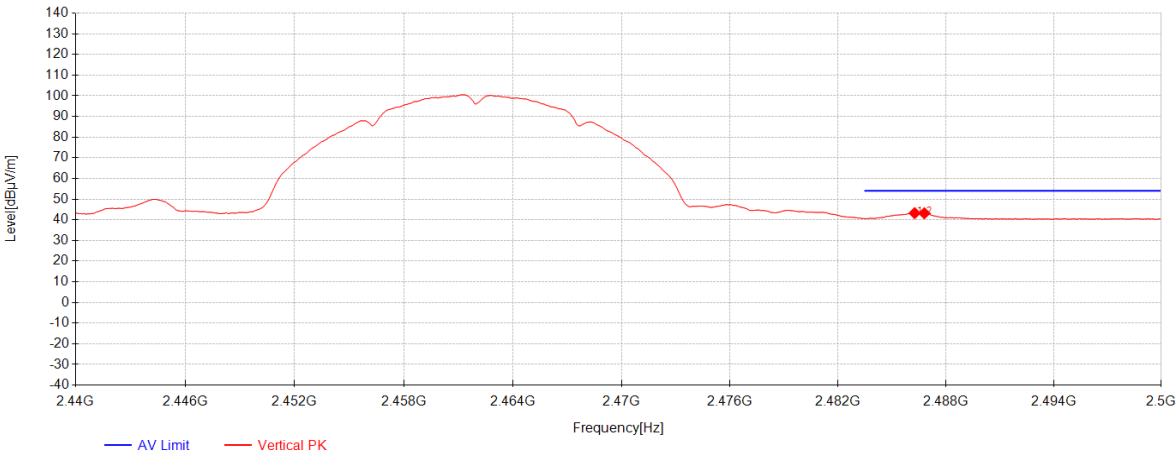


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2363.69	36.29	27.10	-23.29	40.10	54.00	13.90	Vertical
2	2386.57	36.51	27.15	-23.31	40.35	54.00	13.65	Vertical

11b_Channel 11

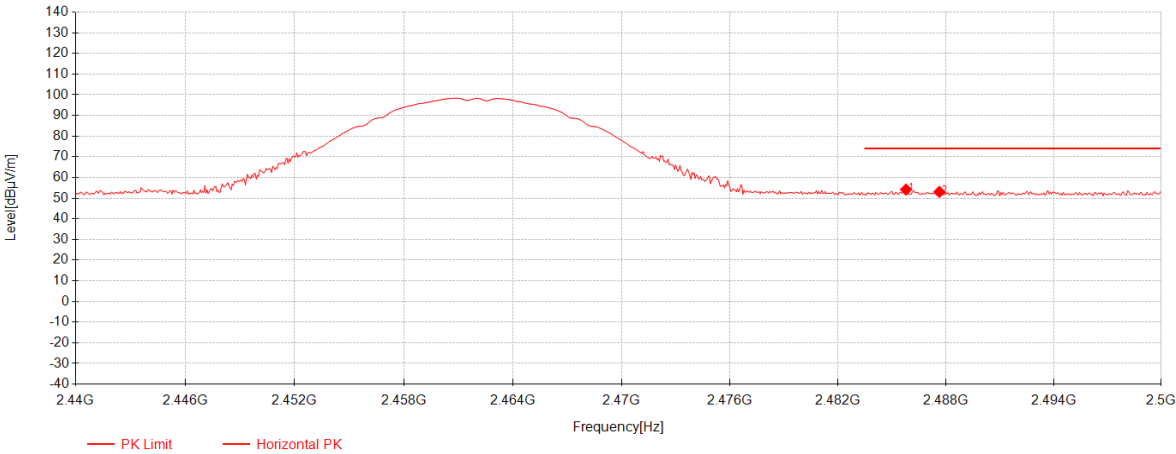


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2485.6	37.19	27.37	-23.27	41.29	54.00	12.71	Horizontal
2	2486.5	37.80	27.37	-23.27	41.90	54.00	12.10	Horizontal

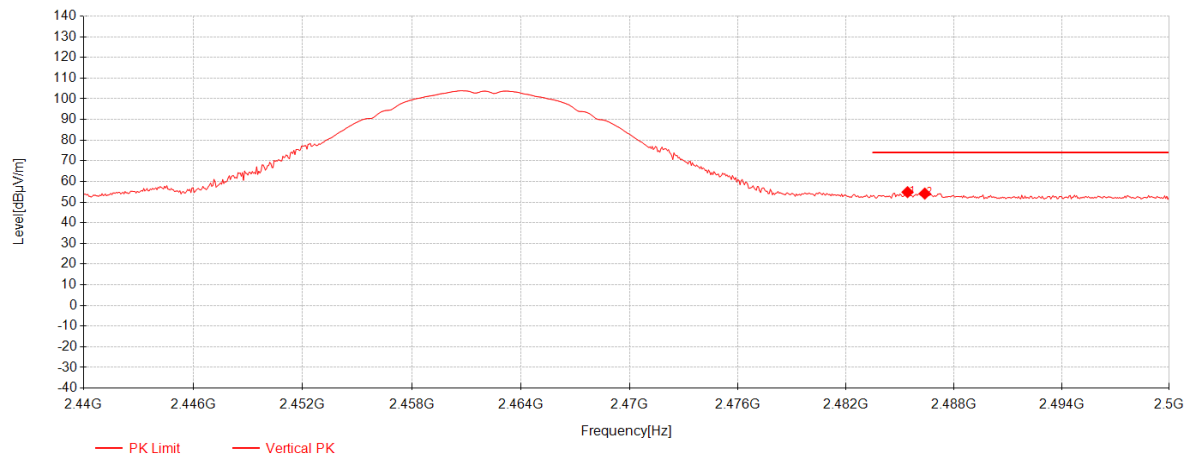


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2486.26	39.12	27.37	-23.27	43.22	54.00	10.78	Vertical
2	2486.8	39.04	27.37	-23.27	43.14	54.00	10.86	Vertical

11b_Channel 11

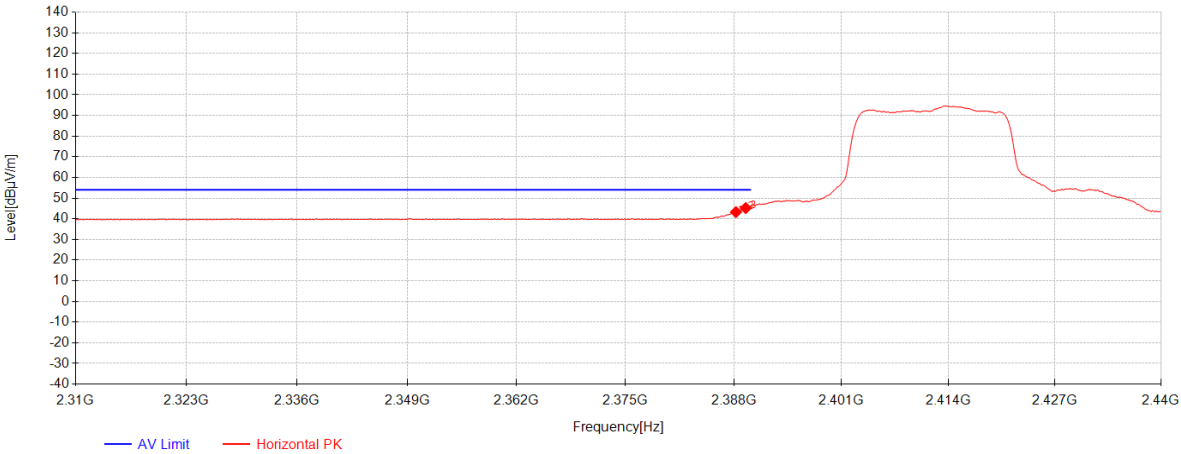


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2485.78	50.06	27.37	-23.27	54.16	74.00	19.84	Horizontal
2	2487.64	48.93	27.37	-23.27	53.04	74.00	20.96	Horizontal

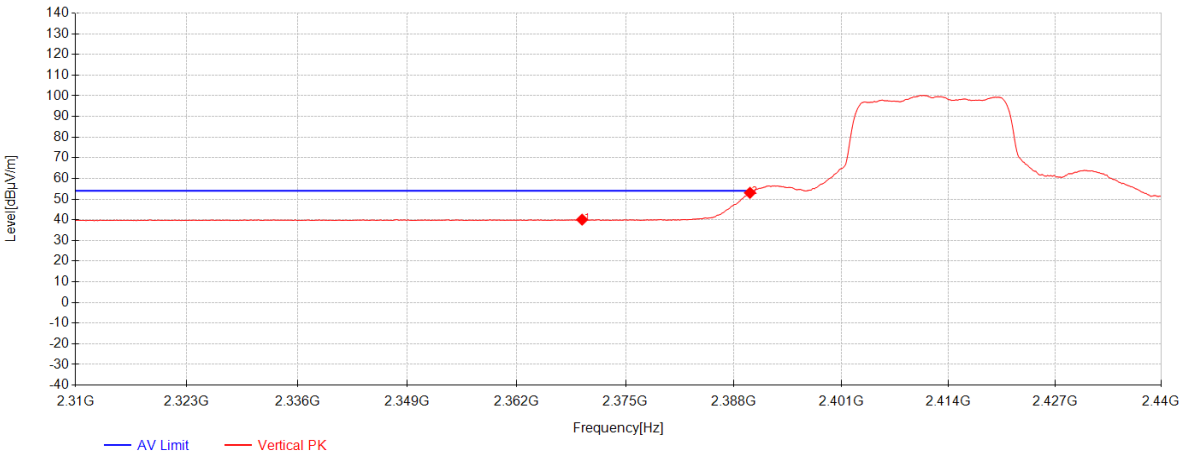


Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2485.42	50.74	27.37	-23.27	54.84	74.00	19.16	Vertical
2	2486.38	50.04	27.37	-23.27	54.14	74.00	19.86	Vertical

11n20_Channel 01

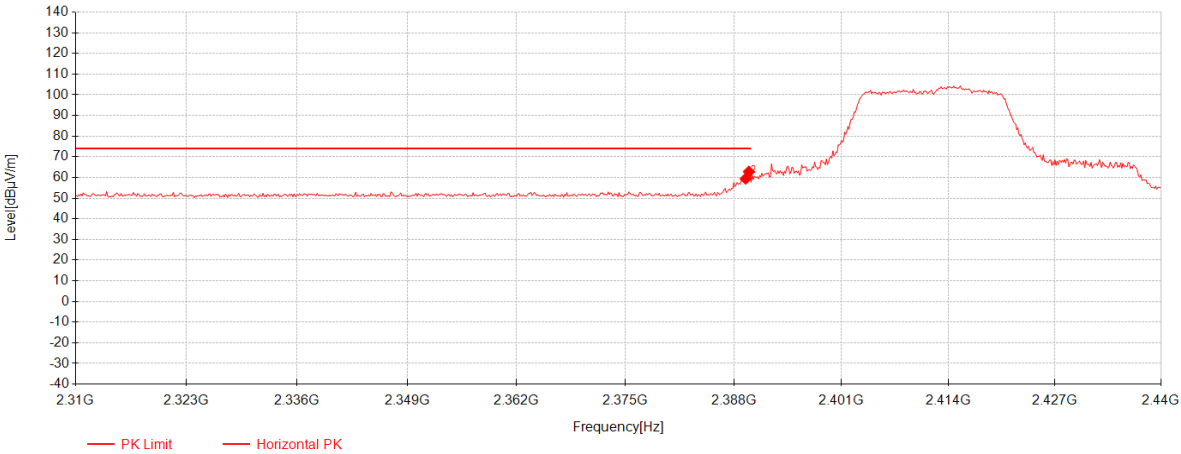


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2388.26	39.40	27.15	-23.31	43.24	54.00	10.76	Horizontal
2	2389.43	41.34	27.16	-23.31	45.18	54.00	8.82	Horizontal
3	2389.82	42.06	27.16	-23.31	45.90	54.00	8.10	Horizontal

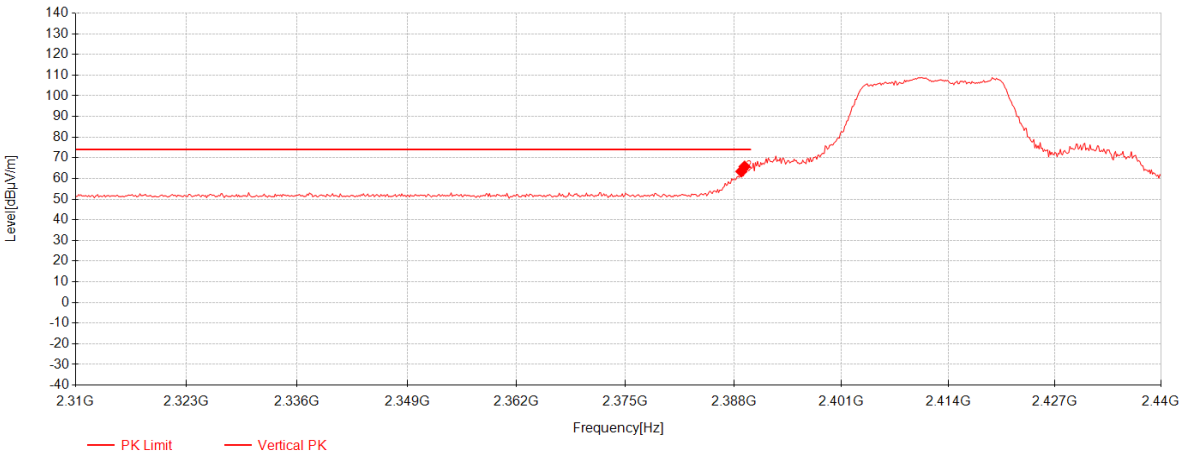


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2369.8	36.26	27.11	-23.30	40.07	54.00	13.93	Vertical
2	2389.95	49.23	27.16	-23.31	53.07	54.00	0.93	Vertical

11n20_Channel 01



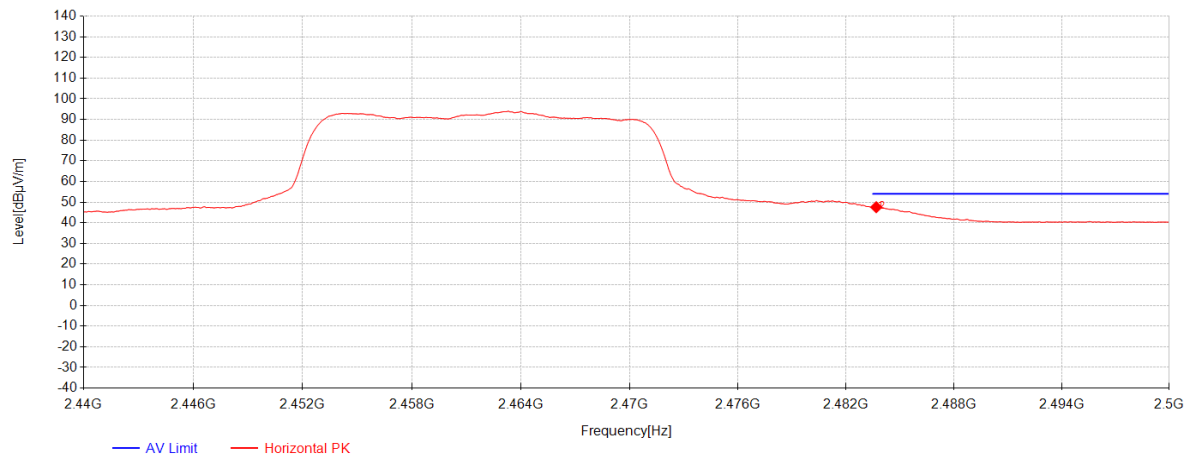
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2389.43	55.57	27.16	-23.31	59.41	74.00	14.59	Horizontal
2	2389.82	58.97	27.16	-23.31	62.81	74.00	11.19	Horizontal



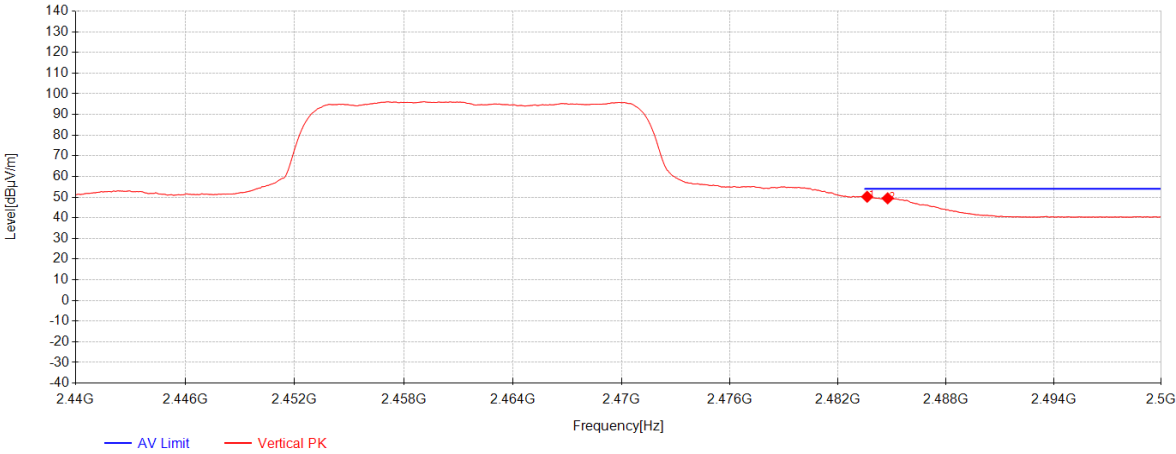
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2388.91	59.53	27.16	-23.31	63.37	74.00	10.63	Vertical
2	2389.3	61.91	27.16	-23.31	65.75	74.00	8.25	Vertical



11n20_Channel 11

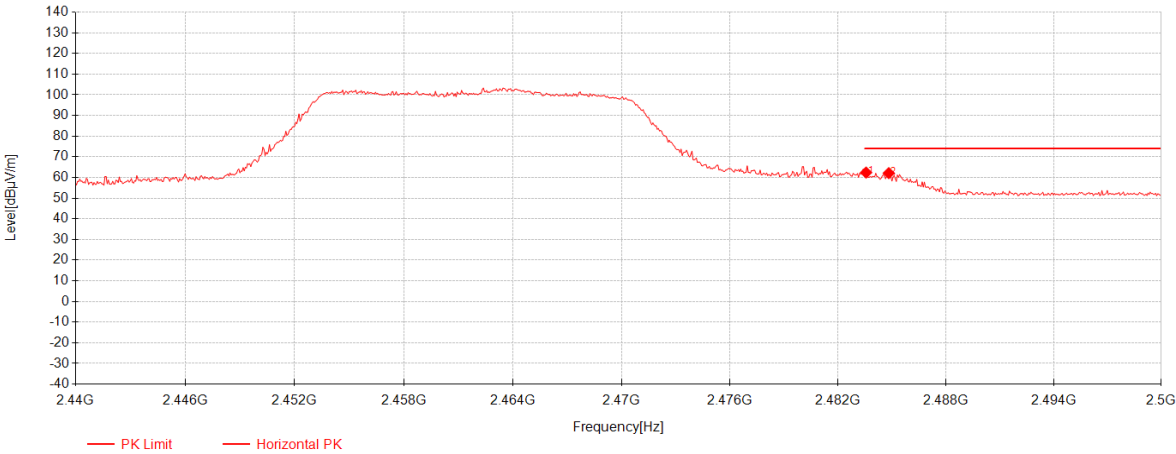


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2483.68	43.46	27.36	-23.27	47.55	54.00	6.45	Horizontal
2	2483.74	43.34	27.36	-23.27	47.43	54.00	6.57	Horizontal

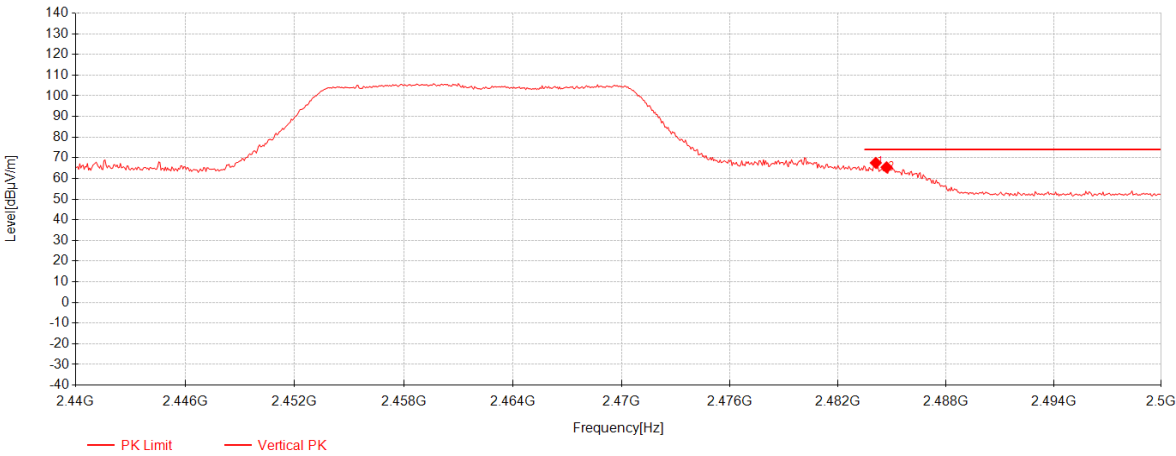


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2483.62	46.08	27.36	-23.27	50.17	54.00	3.83	Vertical
2	2484.76	45.32	27.37	-23.27	49.42	54.00	4.58	Vertical

11n20_Channel 11

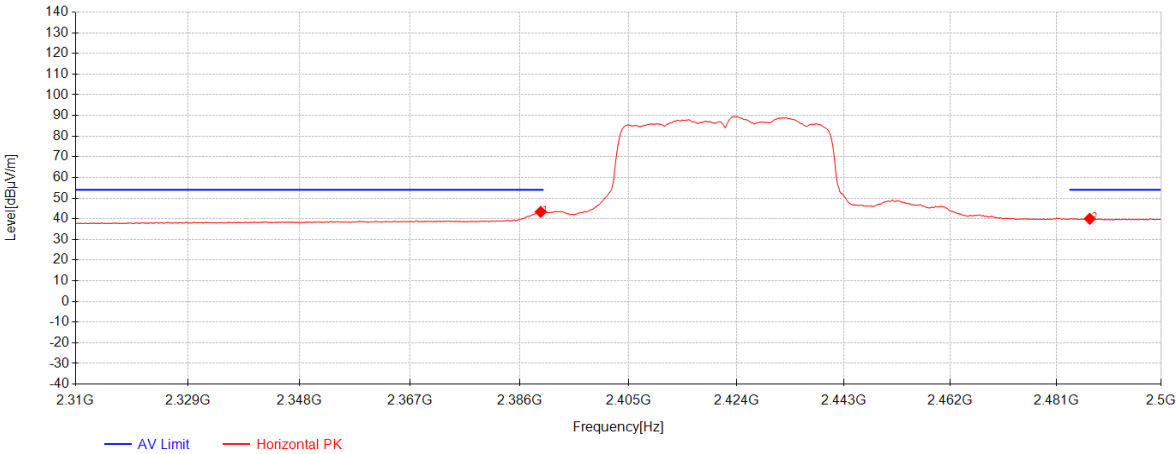


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2483.56	58.28	27.36	-23.27	62.37	74.00	11.63	Horizontal
2	2484.82	57.99	27.37	-23.27	62.09	74.00	11.91	Horizontal

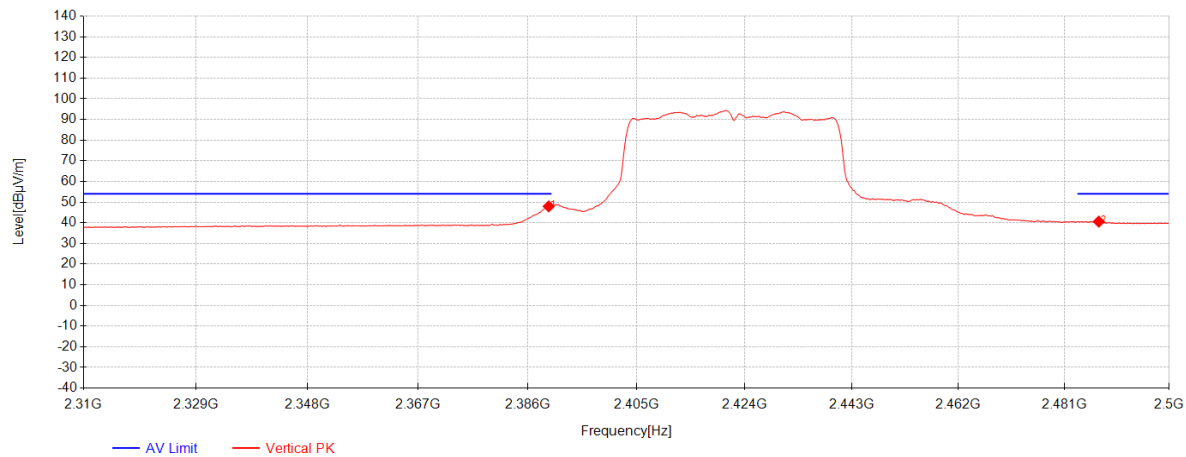


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2484.1	63.44	27.37	-23.27	67.54	74.00	6.46	Vertical
2	2484.7	61.32	27.37	-23.27	65.42	74.00	8.58	Vertical

11n40_Channel 03

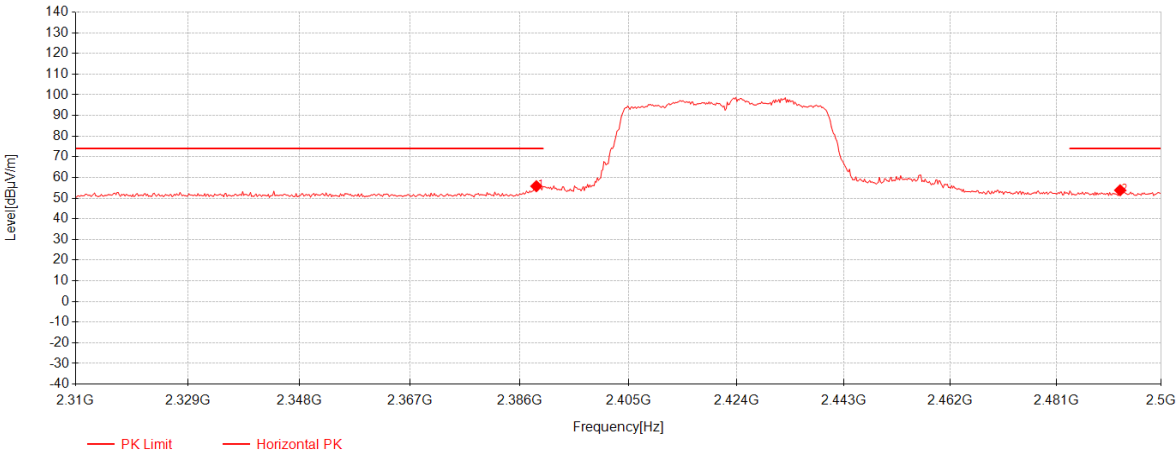


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2389.61	7.32	27.16	8.87	43.35	54.00	10.65	Horizontal
2	2487.08	3.63	27.37	9.04	40.04	54.00	13.96	Horizontal

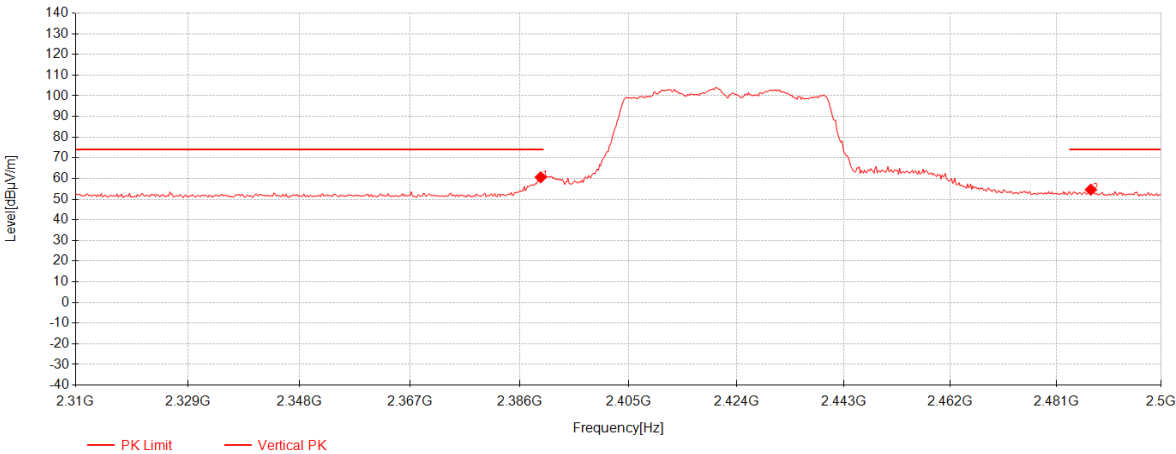


Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2389.61	11.92	27.16	8.87	47.95	54.00	6.05	Vertical
2	2487.27	4.17	27.37	9.04	40.58	54.00	13.42	Vertical

11n40_Channel 03

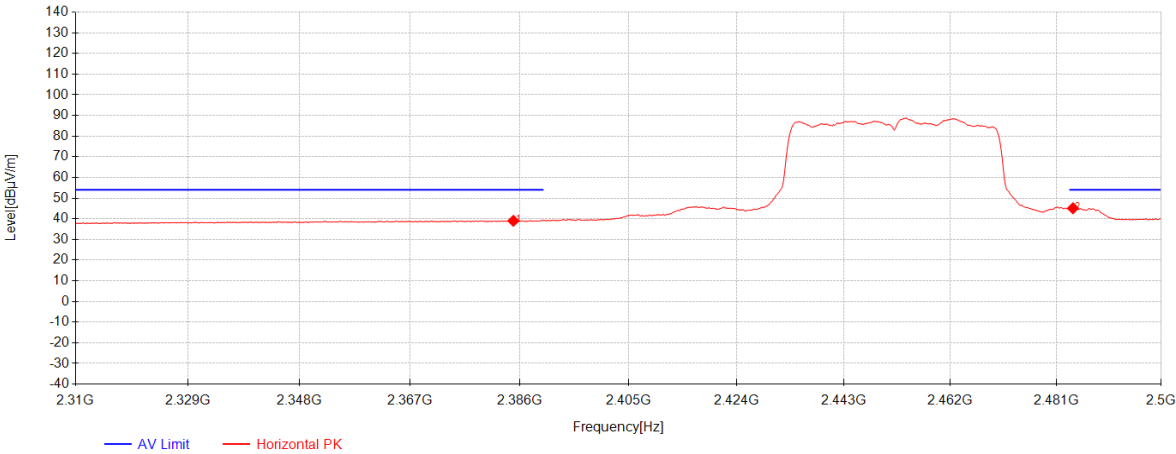


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2388.85	51.93	27.16	-23.31	55.77	74.00	18.23	Horizontal
2	2492.59	49.69	27.38	-23.26	53.81	74.00	20.19	Horizontal

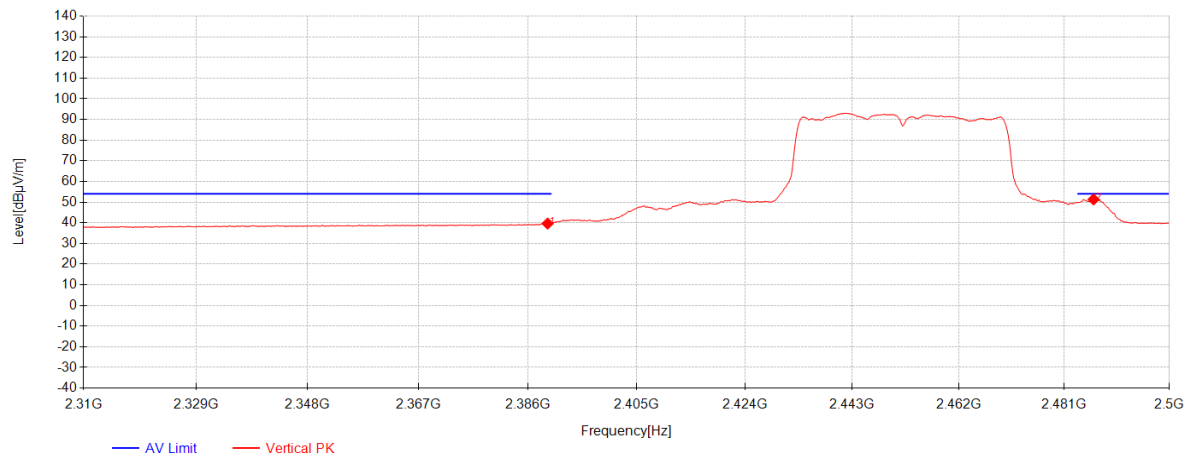


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2389.61	56.74	27.16	-23.31	60.58	74.00	13.42	Vertical
2	2487.27	50.49	27.37	-23.27	54.59	74.00	19.41	Vertical

11n40_Channel 09



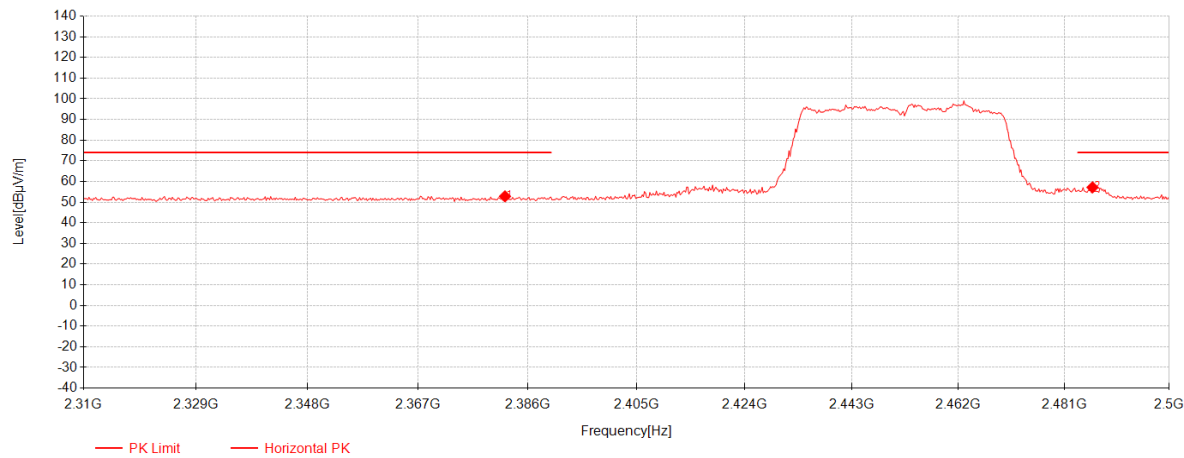
Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2384.86	3.02	27.15	8.84	39.00	54.00	15.00	Horizontal
2	2484.04	8.70	27.36	9.03	45.10	54.00	8.90	Horizontal



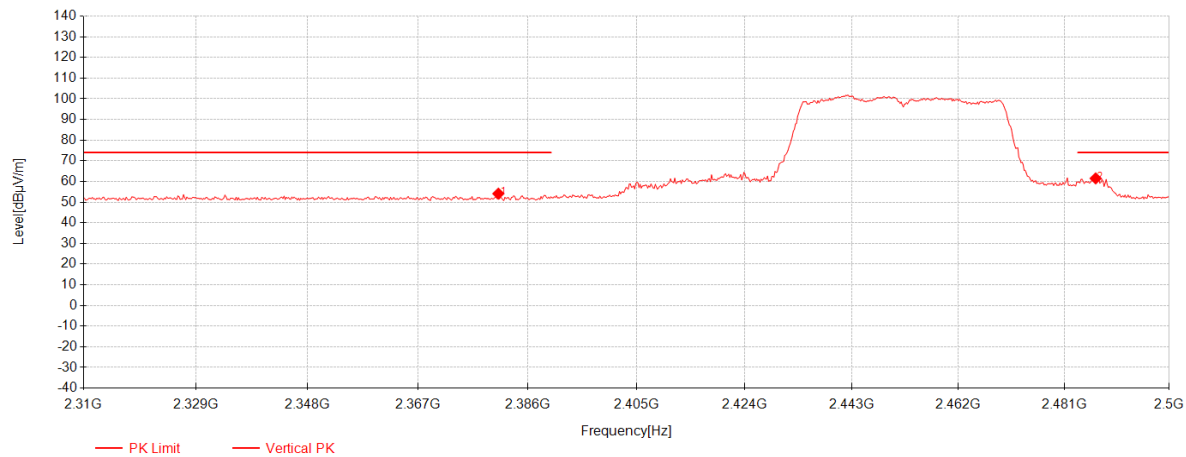
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2389.42	3.59	27.16	8.87	39.62	54.00	14.38	Vertical
2	2486.32	14.90	27.37	9.04	51.31	54.00	2.69	Vertical



11n40_Channel 09

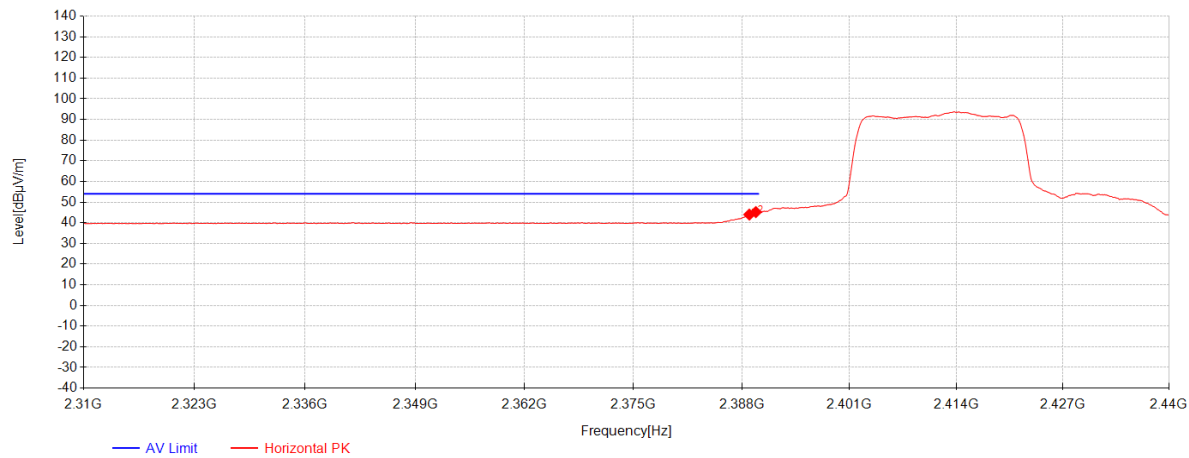


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2382.01	48.97	27.14	-23.31	52.80	74.00	21.20	Horizontal
2	2486.13	53.05	27.37	-23.27	57.15	74.00	16.85	Horizontal

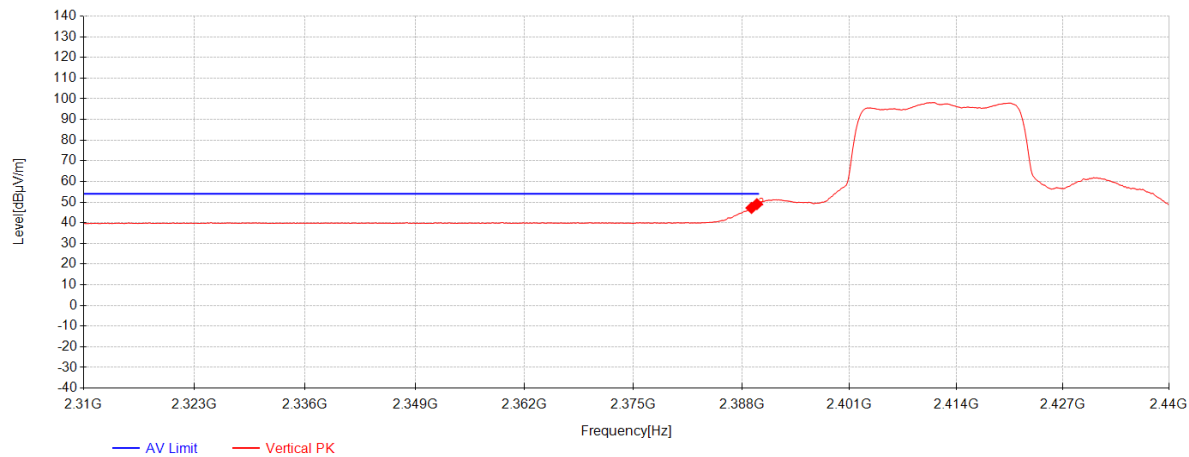


Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2380.87	50.28	27.14	-23.31	54.11	74.00	19.89	Vertical
2	2486.7	57.37	27.37	-23.27	61.47	74.00	12.53	Vertical

11ax20_Channel 01

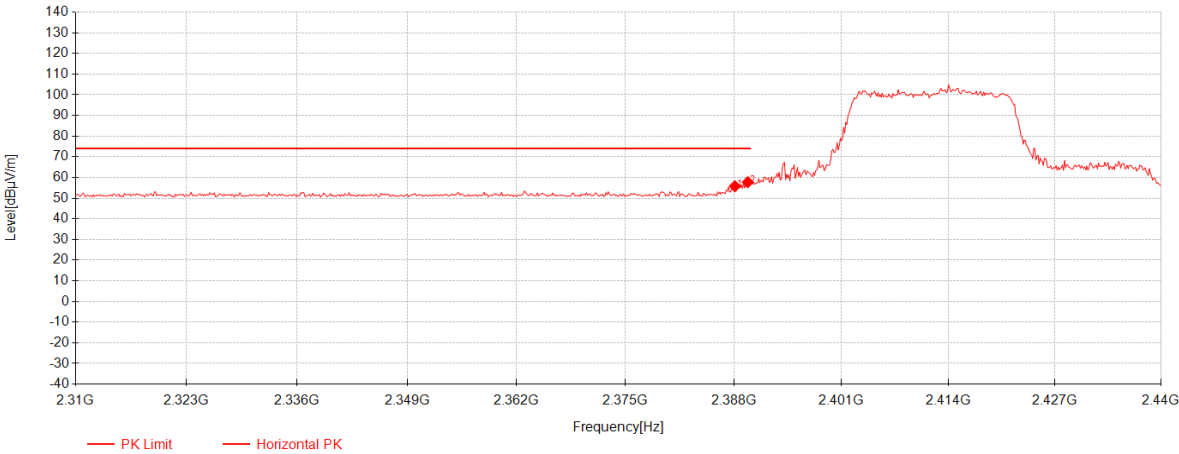


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2388.91	40.13	27.16	-23.31	43.97	54.00	10.03	Horizontal
2	2389.69	41.34	27.16	-23.31	45.18	54.00	8.82	Horizontal

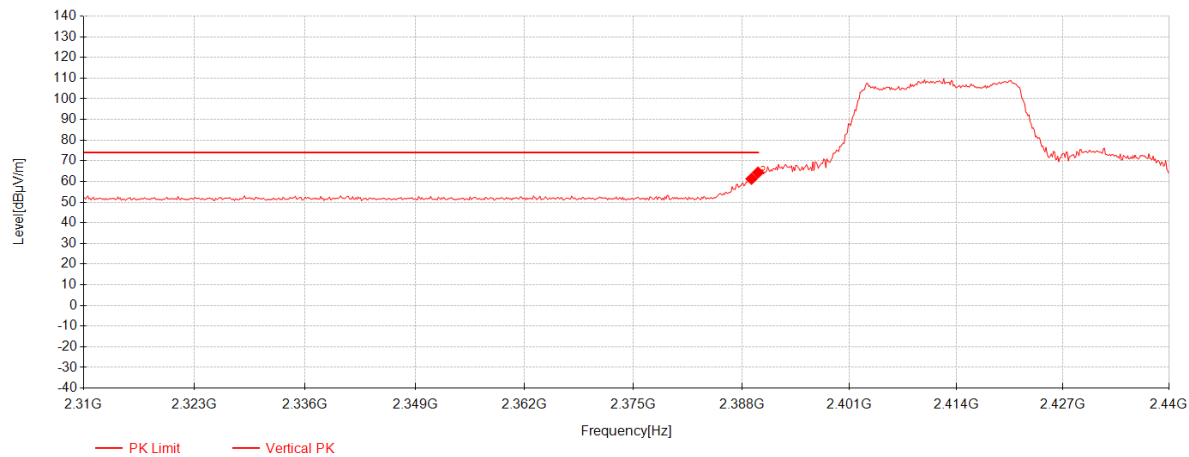


Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2389.17	43.34	27.16	-23.31	47.18	54.00	6.82	Vertical
2	2389.82	45.18	27.16	-23.31	49.02	54.00	4.98	Vertical

11ax20_Channel 01



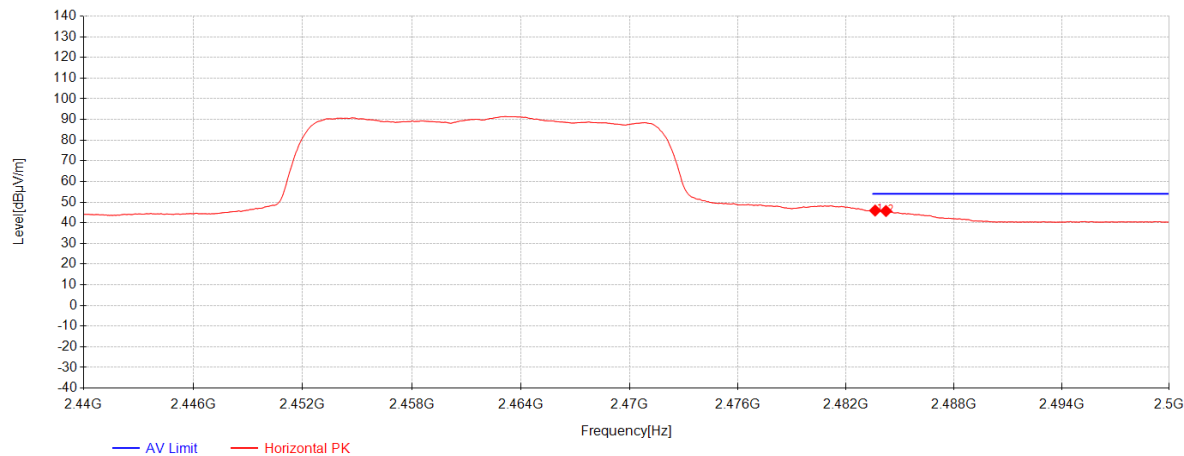
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2388.13	51.91	27.15	-23.31	55.75	74.00	18.25	Horizontal
2	2389.69	53.90	27.16	-23.31	57.74	74.00	16.26	Horizontal



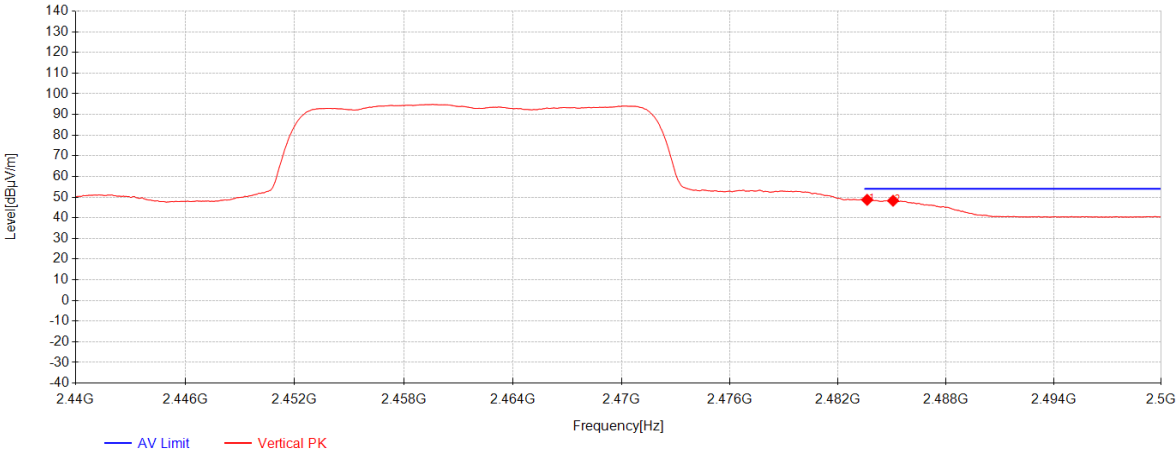
Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2389.17	57.41	27.16	-23.31	61.25	74.00	12.75	Vertical
2	2389.95	60.49	27.16	-23.31	64.33	74.00	9.67	Vertical



11ax20_Channel 11

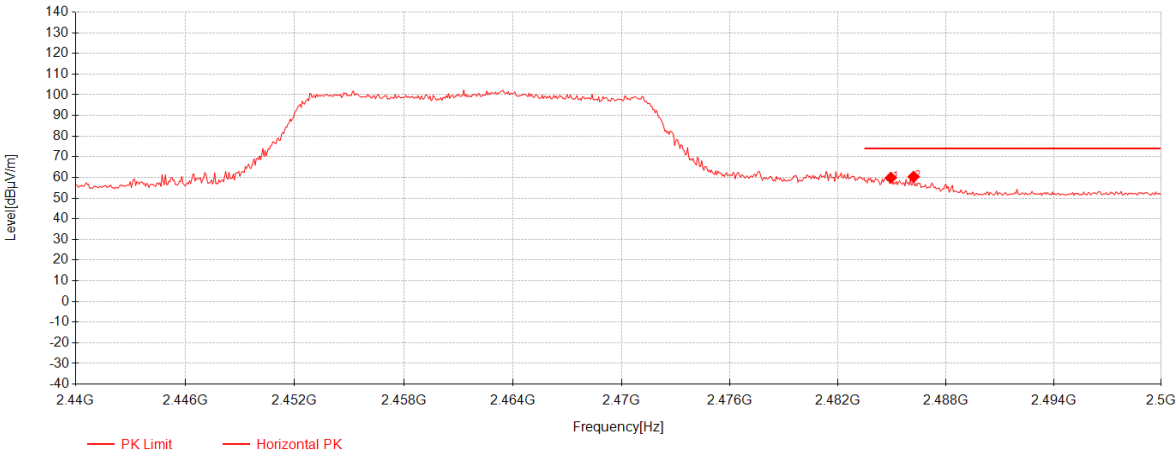


Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2483.62	41.85	27.36	-23.27	45.94	54.00	8.06	Horizontal
2	2484.22	41.61	27.37	-23.27	45.71	54.00	8.29	Horizontal

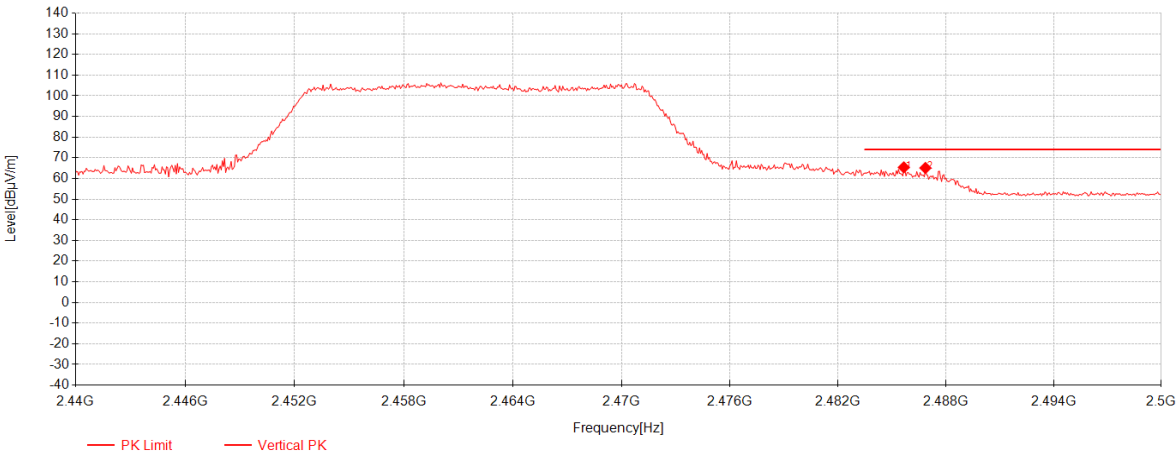


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2483.62	44.60	27.36	-23.27	48.69	54.00	5.31	Vertical
2	2485.06	44.16	27.37	-23.27	48.26	54.00	5.74	Vertical

11ax20_Channel 11

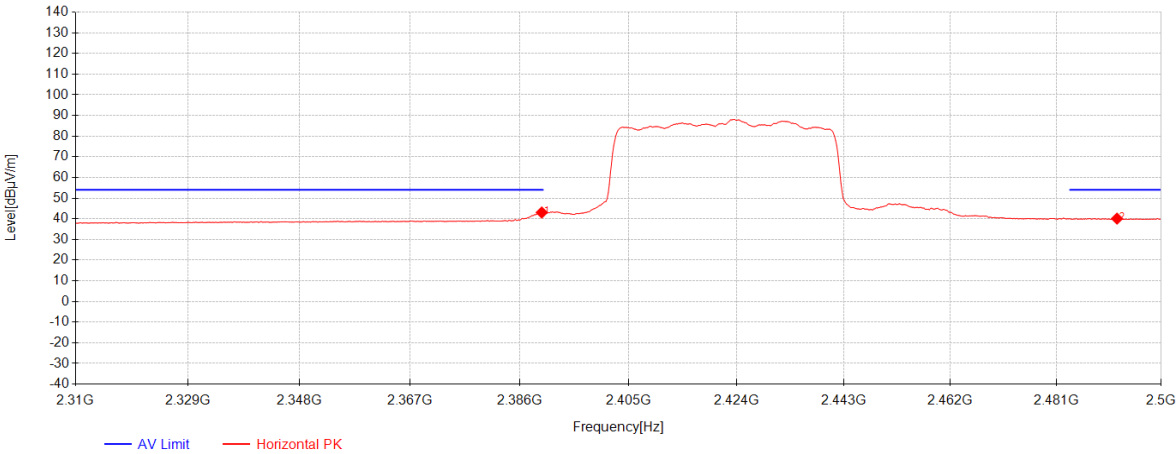


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2484.94	55.79	27.37	-23.27	59.89	74.00	14.11	Horizontal
2	2486.2	56.23	27.37	-23.27	60.33	74.00	13.67	Horizontal

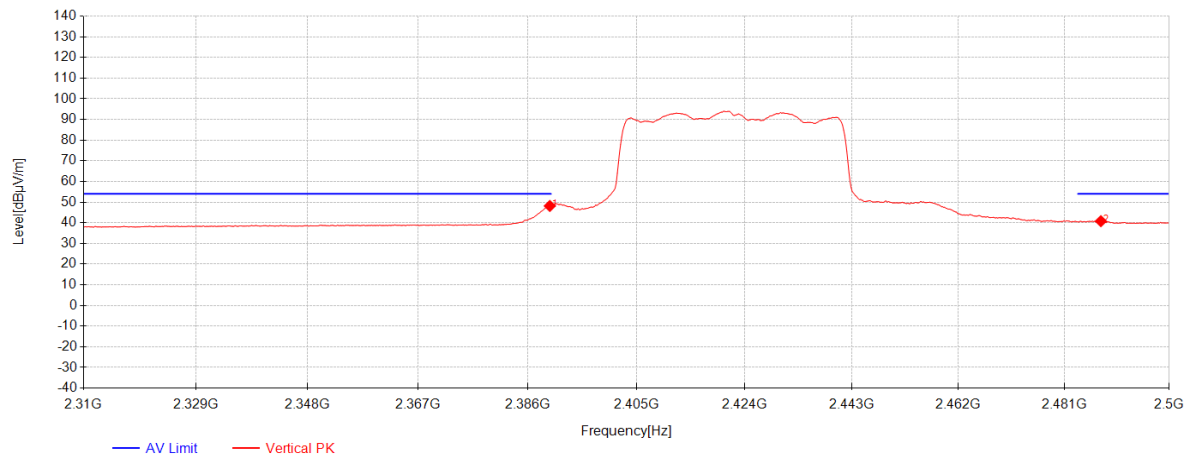


Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2485.66	61.27	27.37	-23.27	65.37	74.00	8.63	Vertical
2	2486.86	60.98	27.37	-23.27	65.08	74.00	8.92	Vertical

11ax40_Channel 03

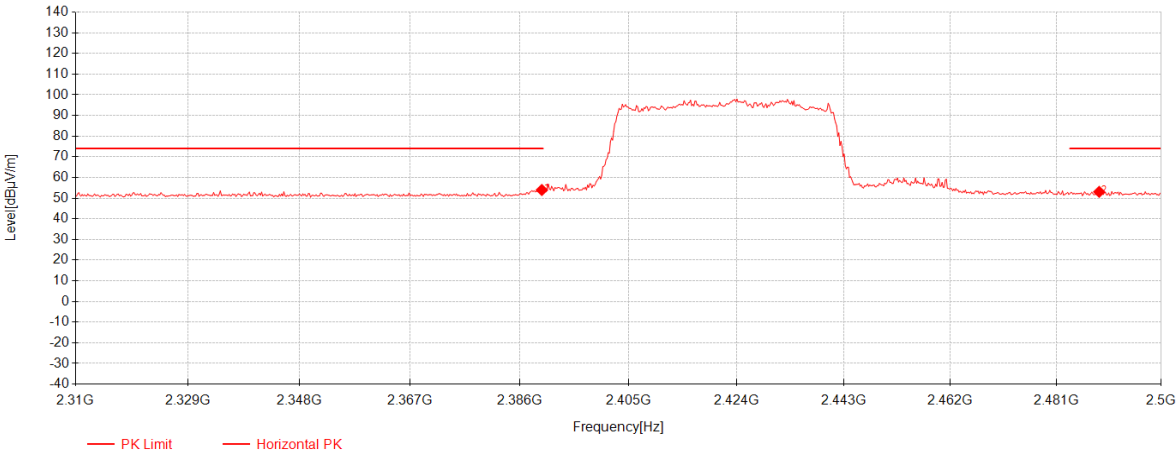


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2389.8	7.02	27.16	8.87	43.05	54.00	10.95	Horizontal
2	2492.02	3.67	27.38	9.04	40.09	54.00	13.91	Horizontal

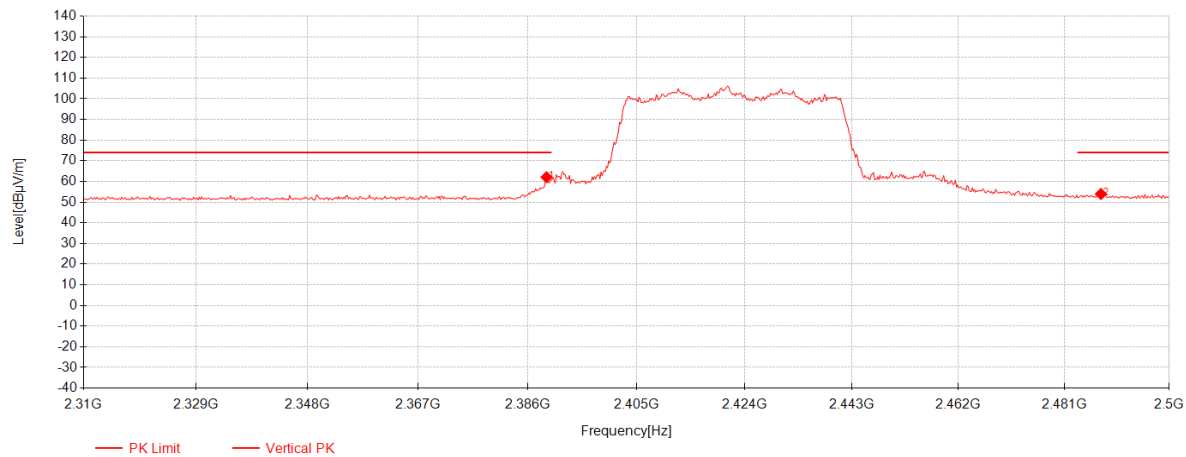


Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2389.8	12.12	27.16	8.87	48.15	54.00	5.85	Vertical
2	2487.65	4.38	27.37	9.04	40.79	54.00	13.21	Vertical

11ax40_Channel 03

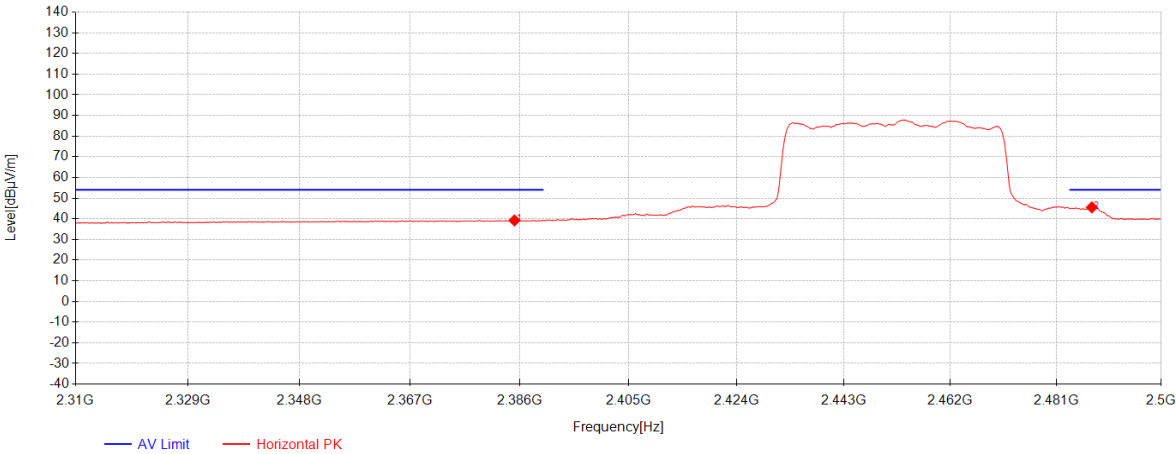


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2389.8	50.10	27.16	-23.31	53.94	74.00	20.06	Horizontal
2	2488.79	48.95	27.38	-23.27	53.06	74.00	20.94	Horizontal

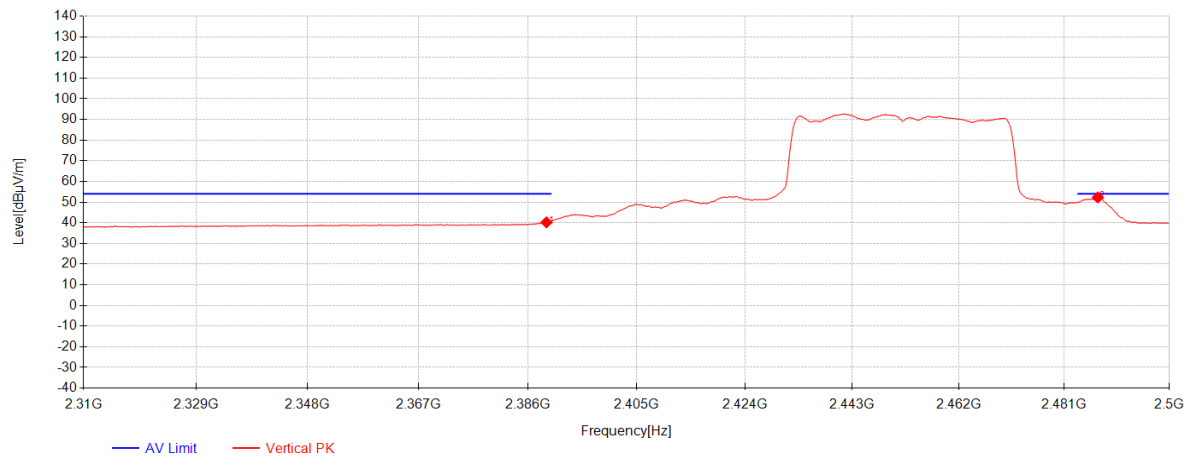


Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2389.23	58.24	27.16	-23.31	62.08	74.00	11.92	Vertical
2	2487.65	49.83	27.37	-23.27	53.94	74.00	20.06	Vertical

11ax40_Channel 09

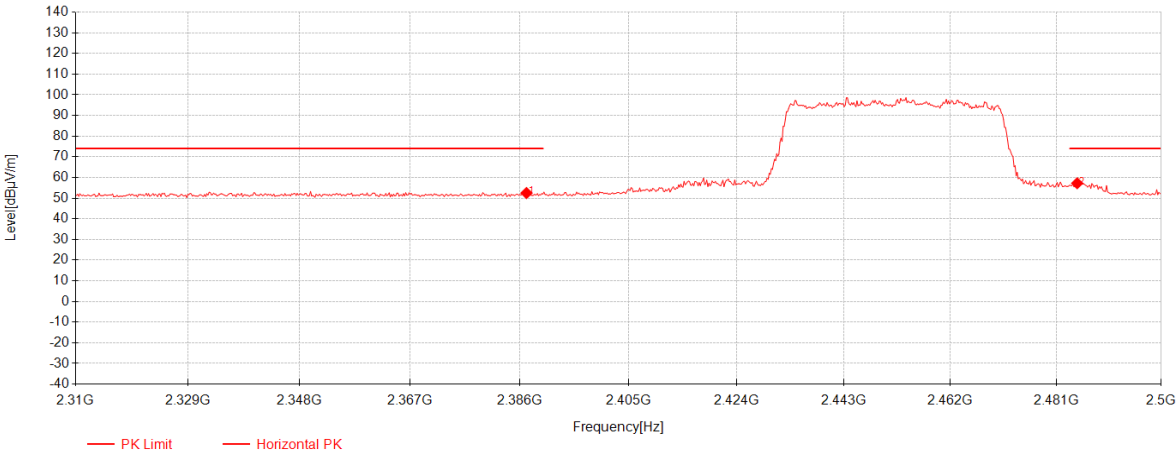


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2385.05	3.21	27.15	8.84	39.20	54.00	14.80	Horizontal
2	2487.46	9.09	27.37	9.04	45.50	54.00	8.50	Horizontal

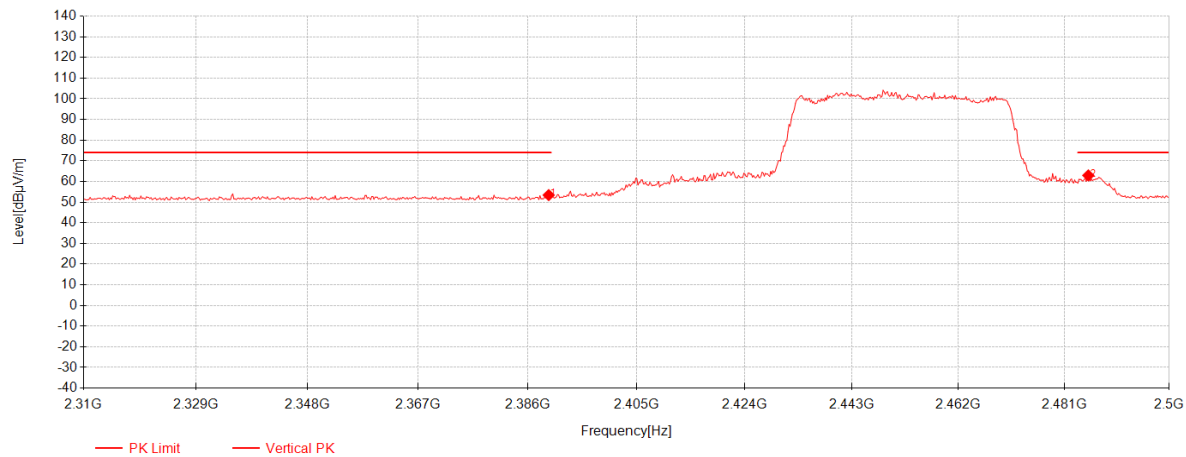


Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2389.23	4.20	27.16	8.87	40.23	54.00	13.77	Vertical
2	2487.08	15.86	27.37	9.04	52.27	54.00	1.73	Vertical

11ax40_Channel 09



Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2387.14	48.64	27.15	-23.31	52.48	74.00	21.52	Horizontal
2	2484.8	53.09	27.37	-23.27	57.19	74.00	16.81	Horizontal



Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2389.61	49.58	27.16	-23.31	53.42	74.00	20.58	Vertical
2	2485.37	58.83	27.37	-23.27	62.93	74.00	11.07	Vertical

7.3 Radiated Spurious Emissions Below 1GHz

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

Test Method: ANSI C63.10 (2013) Section 6.4,6.5

Measurement Distance: 3m

Limit:

Frequency(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
960-1000	500	3

7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 20.5 °C

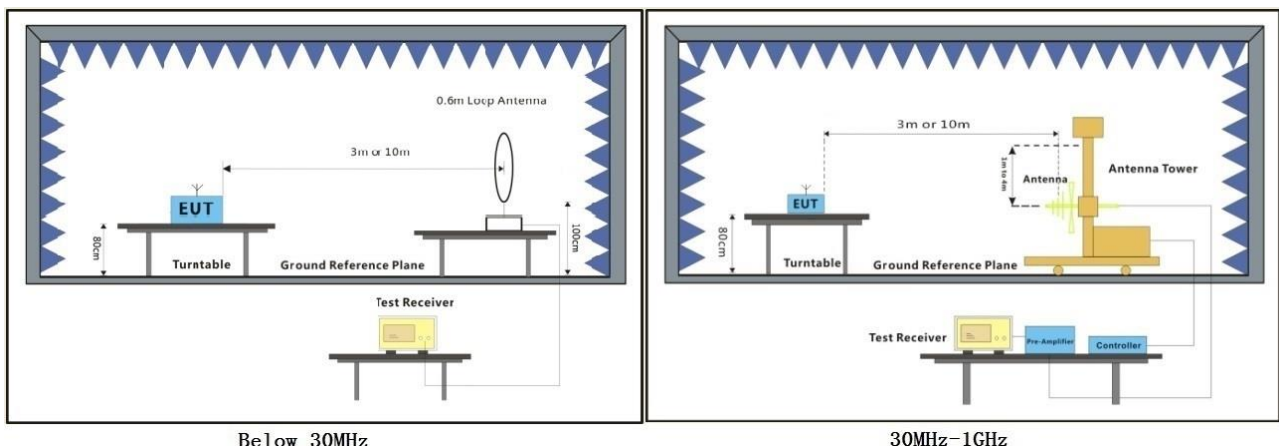
Humidity: 51.3 % RH

Atmospheric Pressure: 1010 mbar

7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20)/ax(HEW20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40)/ax(HEW40), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.

7.3.3 Test Setup Diagram



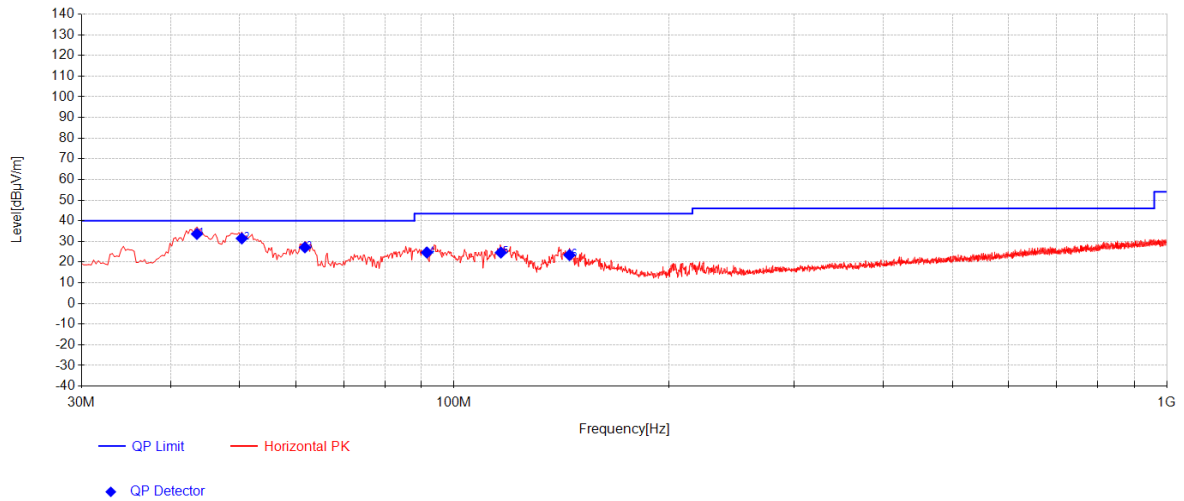
7.3.4 Measurement Procedure and Data

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) 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 Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using quasi-peak method as specified and then reported in a data sheet.
- g. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- i. Repeat above procedures until all frequencies measured was complete.

Remark:

1. $\text{Level} = \text{Read Level} + \text{Cable Loss} + \text{Antenna Factor} - \text{Preamp Factor}$
2. Scan from 9kHz to 30MHz, the disturbance below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.
3. This test item was investigated while operating in SISO and MIMO mode, however, it was determined that SISO antenna 1 operation for b/g modulation and MiMO antenna operation for n/ax modulation produced the worst emissions. So the emissions produced from other operation are not recorded in report.

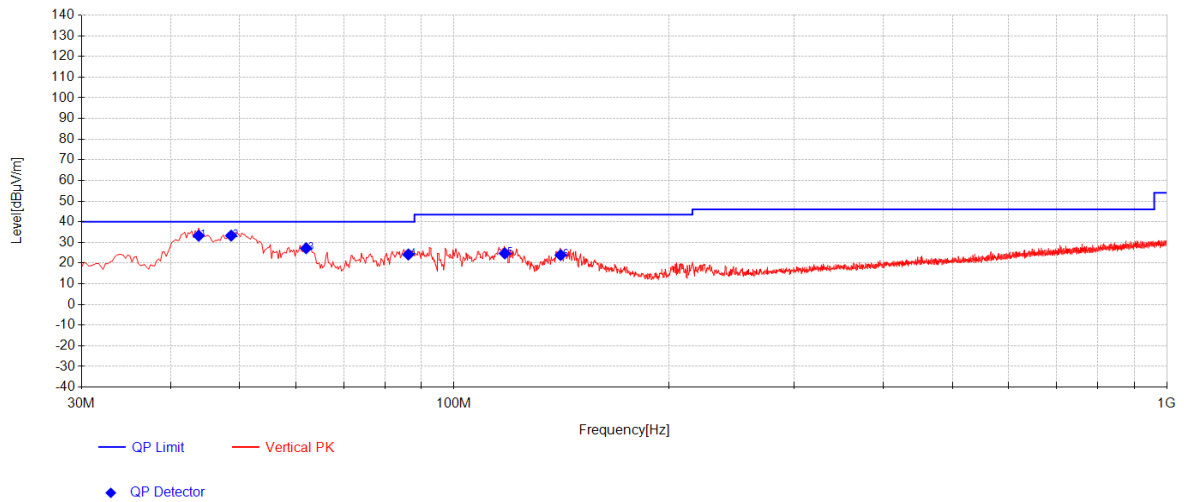
11ax40_Channel 09



Final Data List

NO.	Frequency [MHz]	Reading [dBμV]	Factor [dB]	AF [dB/m]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Polarity
1	43.58	48.65	-33.80	18.80	33.65	40.00	6.35	Horizontal
2	50.37	46.57	-33.69	18.56	31.45	40.00	8.55	Horizontal
3	61.7675	43.25	-33.53	17.42	27.14	40.00	12.86	Horizontal
4	91.595	43.35	-33.24	14.56	24.67	43.50	18.83	Horizontal
5	116.33	41.26	-32.94	16.30	24.62	43.50	18.88	Horizontal
6	145.1875	37.53	-32.73	18.61	23.42	43.50	20.08	Horizontal

11ax40_Channel 09



Final Data List

NO.	Frequency [MHz]	Reading [dBμV]	Factor [dB]	AF [dB/m]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Polarity
1	43.8225	48.24	-33.80	18.80	33.24	40.00	6.76	Vertical
2	48.6725	48.22	-33.71	18.80	33.31	40.00	6.69	Vertical
3	62.01	43.32	-33.53	17.40	27.19	40.00	12.81	Vertical
4	86.26	43.16	-33.29	14.30	24.17	40.00	15.83	Vertical
5	117.785	41.19	-32.93	16.46	24.72	43.50	18.78	Vertical
6	141.065	38.26	-32.76	18.41	23.92	43.50	19.58	Vertical

7.4 Radiated Spurious Emissions Above 1GHz

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

Test Method: ANSI C63.10 (2013) Section 6.6

Measurement Distance: 3m

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
Above 1000	500	3

7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 20.5 °C

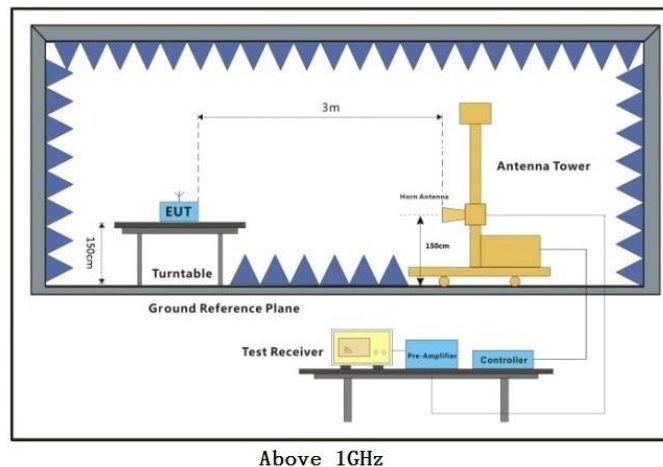
Humidity: 51.3 % RH

Atmospheric Pressure: 1010 mbar

7.4.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20)/ax(HE20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40)/ax(HE40), final test modes are considering the modulation and worse data rates. Only the data of worst case is recorded in the report.

7.4.3 Test Setup Diagram



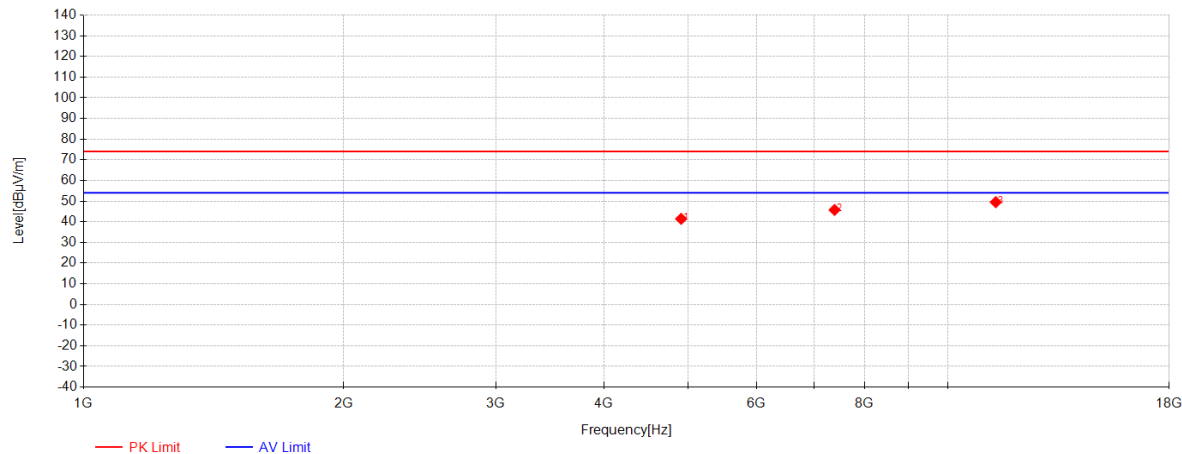
7.4.4 Measurement Procedure and Data

- a. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. 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 antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) 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 Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak or average method as specified and then reported in a data sheet.
- g. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- i. Repeat above procedures until all frequencies measured was complete.

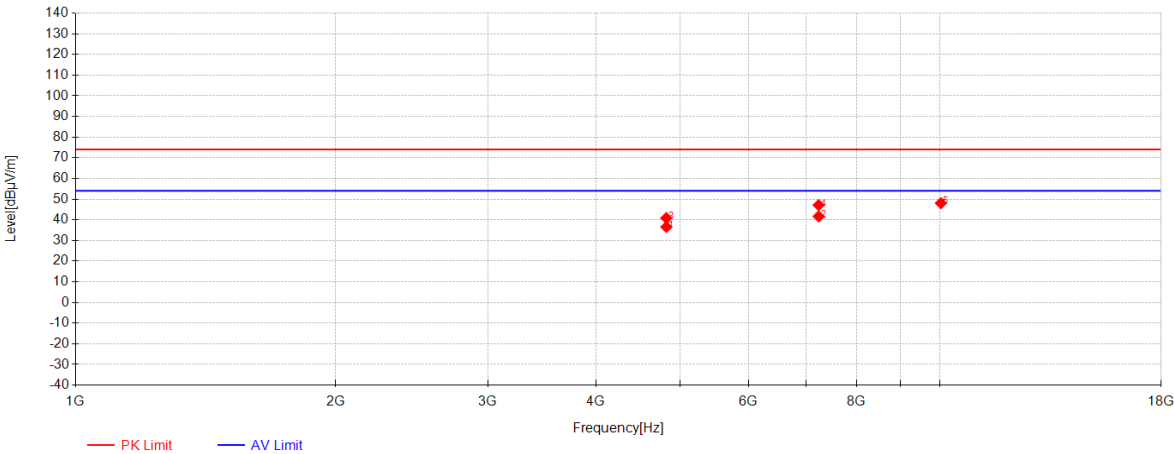
Remark:

1. $\text{Level} = \text{Read Level} + \text{Cable Loss} + \text{Antenna Factor} - \text{Preamp Factor}$
2. Scan from 1GHz to 25GHz, the disturbance above 18GHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.
3. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.
4. This test item was investigated while operating in SISO and MIMO mode, however, it was determined that SISO antenna 1 operation for b/g modulation and MiMO antenna operation for n modulation produced the worst emissions. So the emissions produced from other operation are not recorded in report.

802.11b_Channel 01

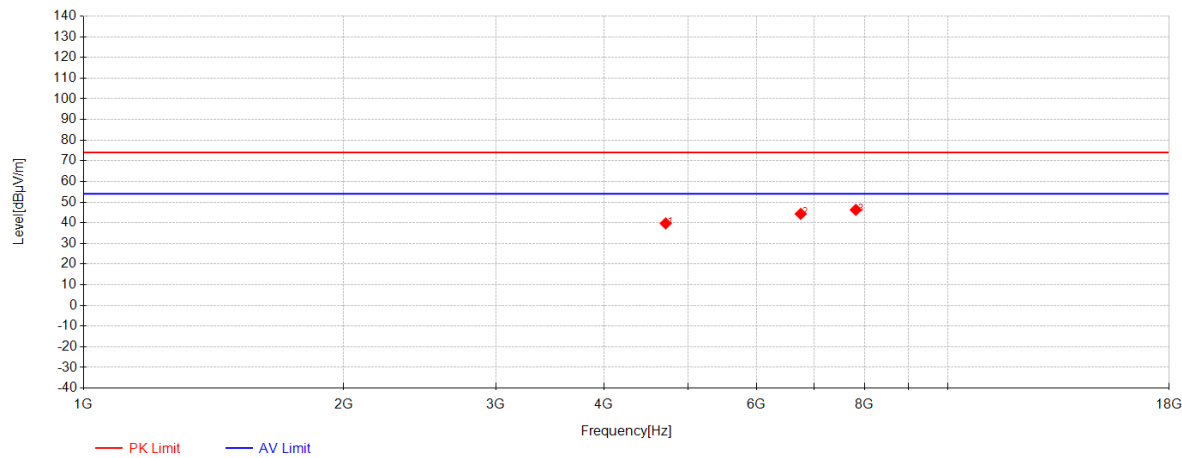


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	4911.75	49.65	33.01	-41.23	41.42	74.00	32.58	Horizontal
2	7390.125	47.10	36.47	-37.84	45.73	74.00	28.27	Horizontal
3	11352	41.30	38.40	-30.21	49.49	74.00	24.51	Horizontal

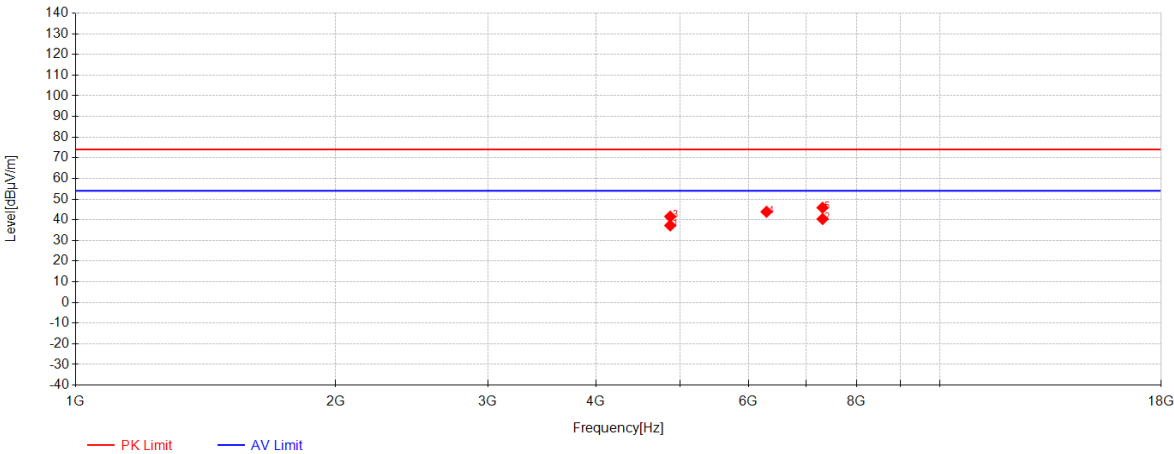


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	4824.375	45.16	32.81	-41.43	36.55	54.00	17.45	Vertical
2	7237.5	43.17	36.29	-37.80	41.66	54.00	12.34	Vertical
3	4824	49.46	32.81	-41.43	40.84	74.00	33.16	Vertical
4	7235.625	48.65	36.28	-37.81	47.12	74.00	26.88	Vertical
5	10019.625	42.52	37.91	-32.37	48.06	74.00	25.94	Vertical

802.11b_Channel 06

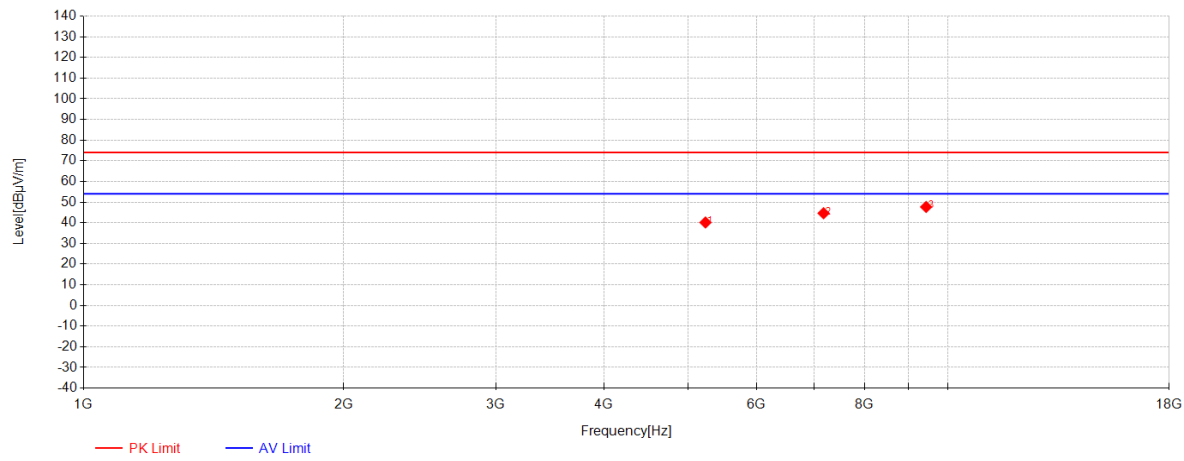


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	4713.75	48.66	32.57	-41.51	39.72	74.00	34.28	Horizontal
2	6753.375	47.04	35.90	-38.60	44.34	74.00	29.66	Horizontal
3	7821	46.08	36.92	-36.75	46.25	74.00	27.75	Horizontal

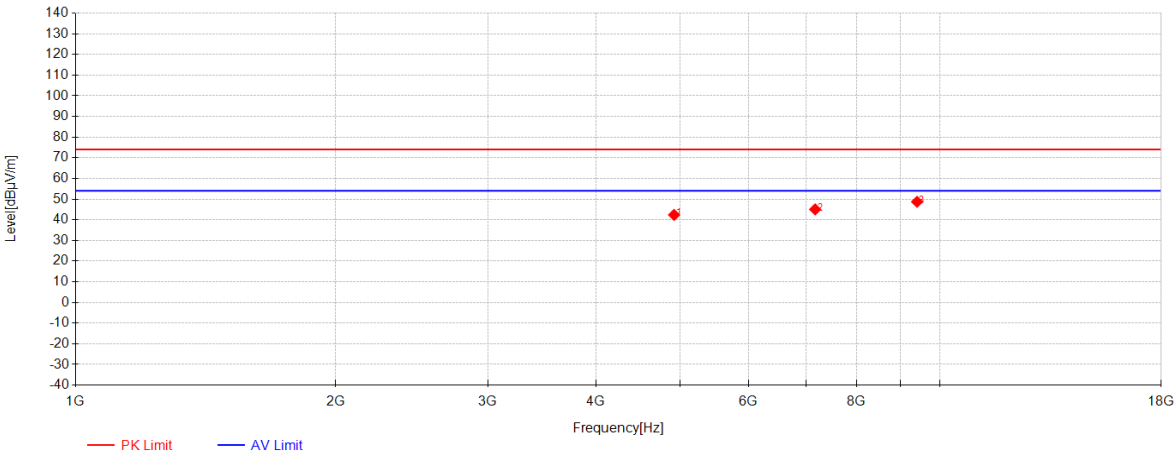


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	4874.25	45.61	32.92	-41.28	37.26	54.00	16.74	Vertical
2	7312.125	41.44	36.37	-37.42	40.39	54.00	13.61	Vertical
3	4873.875	49.92	32.92	-41.28	41.56	74.00	32.44	Vertical
4	6299.25	48.04	35.40	-39.55	43.89	74.00	30.11	Vertical
5	7311.75	46.91	36.37	-37.42	45.86	74.00	28.14	Vertical

802.11b_Channel 11



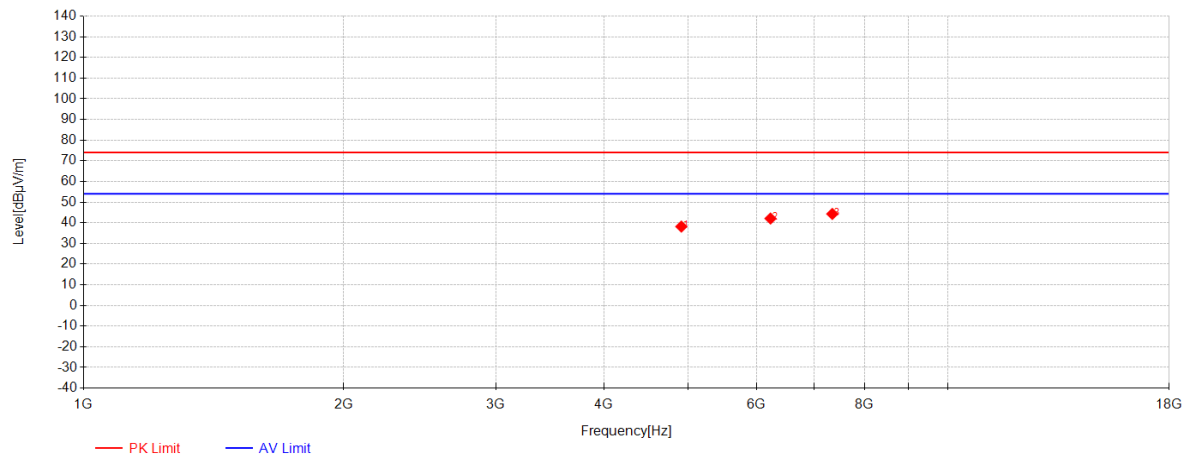
Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	5240.625	47.86	33.15	-40.85	40.16	74.00	33.84	Horizontal
2	7176.75	46.48	36.21	-38.07	44.62	74.00	29.38	Horizontal
3	9430.5	43.74	37.73	-33.79	47.68	74.00	26.32	Horizontal



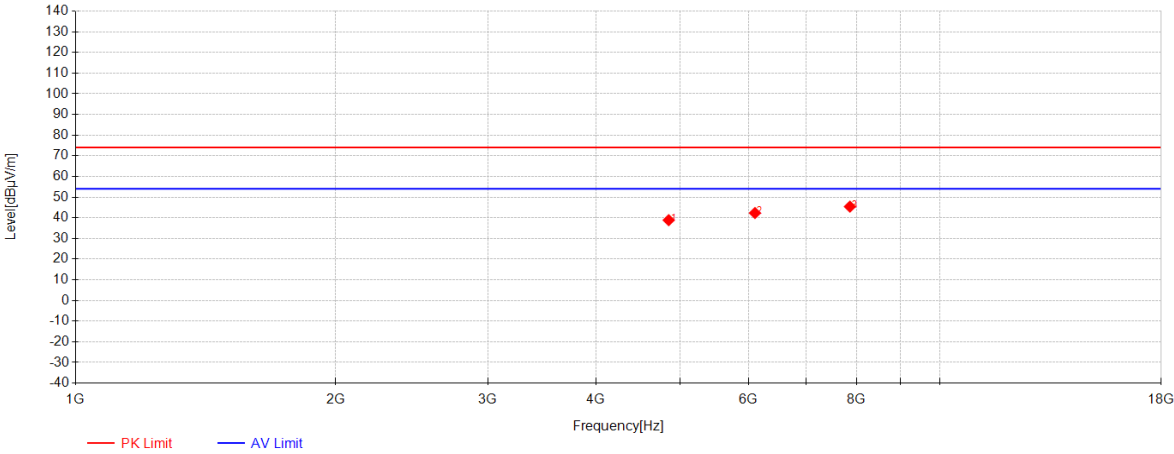
Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	4924.125	50.61	33.03	-41.27	42.38	74.00	31.62	Vertical
2	7169.25	46.92	36.20	-38.08	45.04	74.00	28.96	Vertical
3	9403.5	44.73	37.72	-33.75	48.70	74.00	25.30	Vertical



802.11n20_Channel 01

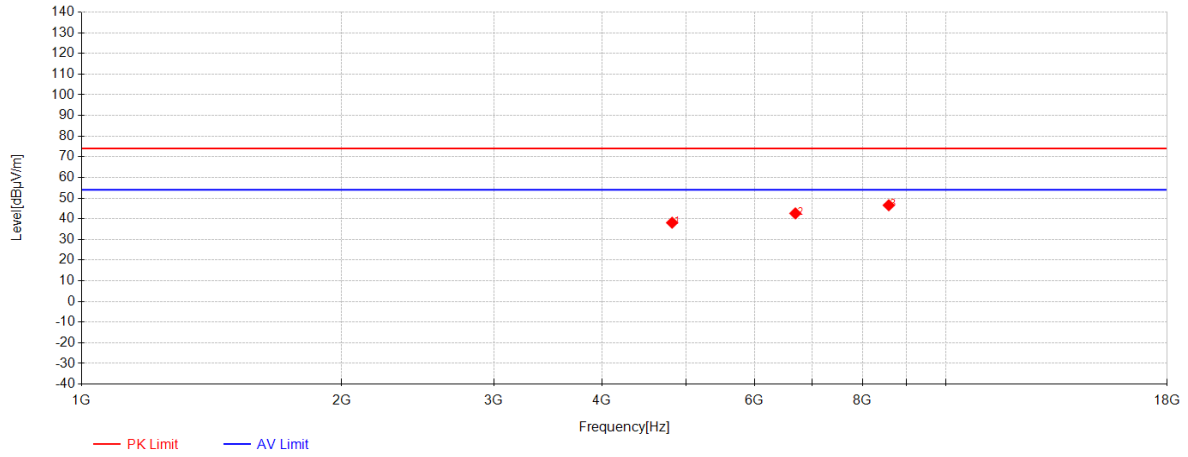


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	4914.75	46.41	33.01	-41.24	38.18	74.00	35.82	Horizontal
2	6231.375	46.39	35.26	-39.58	42.07	74.00	31.93	Horizontal
3	7345.5	45.49	36.41	-37.60	44.30	74.00	29.70	Horizontal

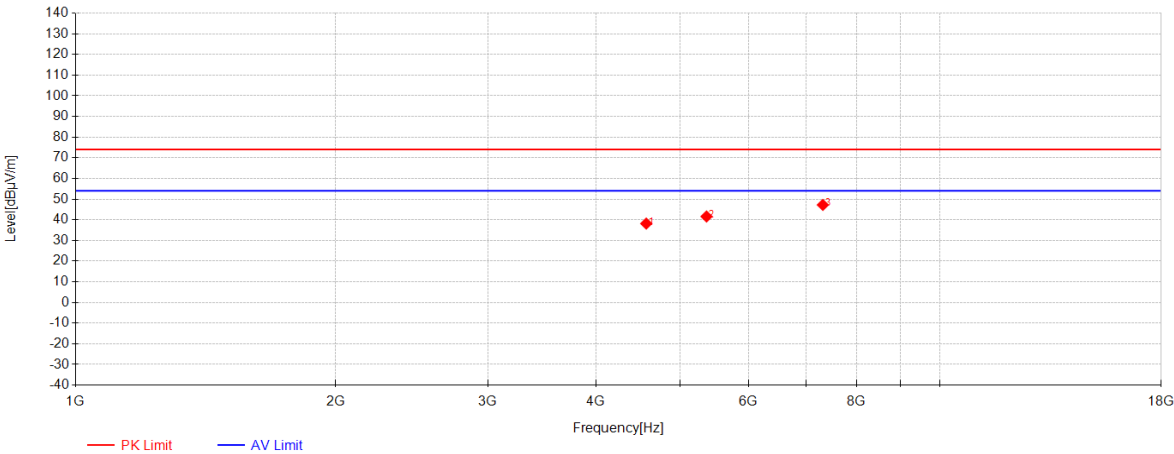


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	4854	47.31	32.88	-41.34	38.85	74.00	35.15	Vertical
2	6107.625	47.19	35.02	-39.90	42.31	74.00	31.69	Vertical
3	7864.5	45.13	36.96	-36.70	45.40	74.00	28.60	Vertical

802.11n20_Channel 06

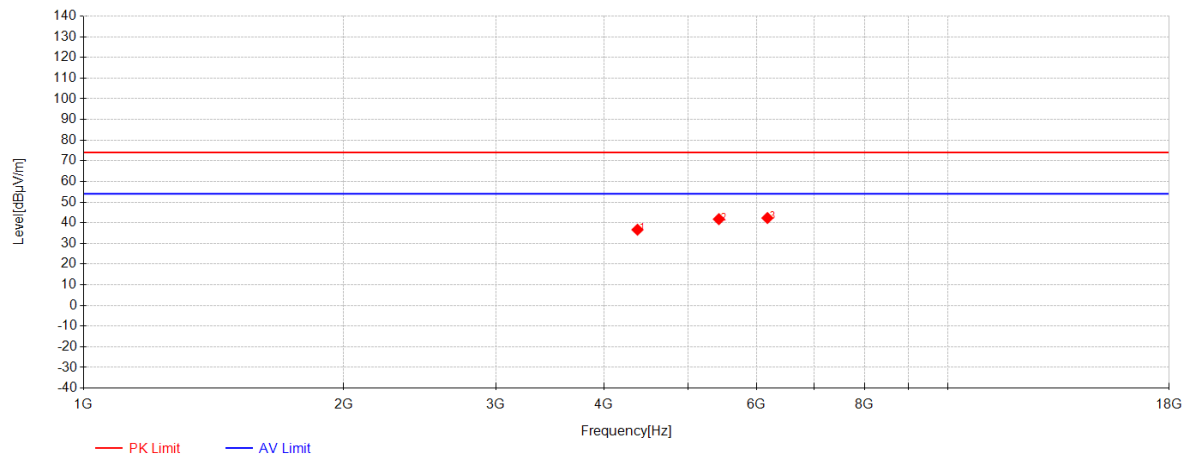


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	4820.625	46.74	32.81	-41.44	38.11	74.00	35.89	Horizontal
2	6694.125	45.53	35.88	-38.78	42.62	74.00	31.38	Horizontal
3	8582.25	44.39	37.39	-35.23	46.55	74.00	27.45	Horizontal

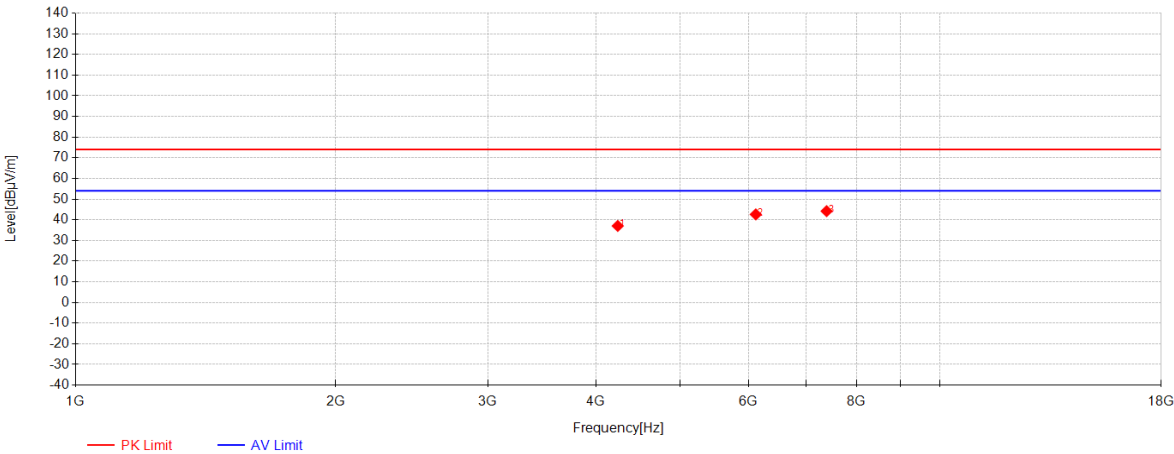


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	4572.375	47.64	32.26	-41.73	38.17	74.00	35.83	Vertical
2	5368.5	49.38	33.13	-40.90	41.60	74.00	32.40	Vertical
3	7317	48.27	36.38	-37.45	47.20	74.00	26.80	Vertical

802.11n20_Channel 11

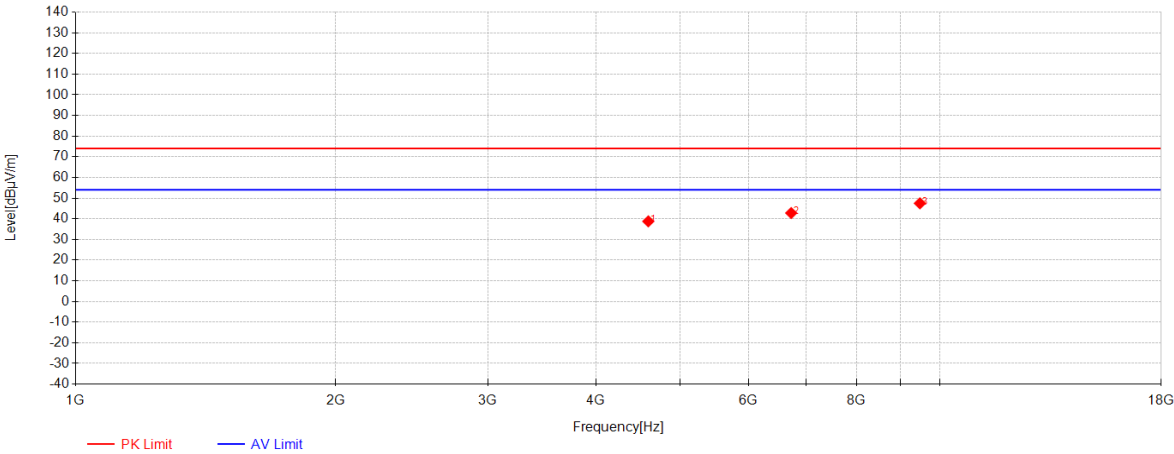


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	4372.875	46.86	31.90	-42.12	36.64	74.00	37.36	Horizontal
2	5431.125	49.46	33.11	-40.81	41.76	74.00	32.24	Horizontal
3	6180.375	46.82	35.16	-39.66	42.32	74.00	31.68	Horizontal

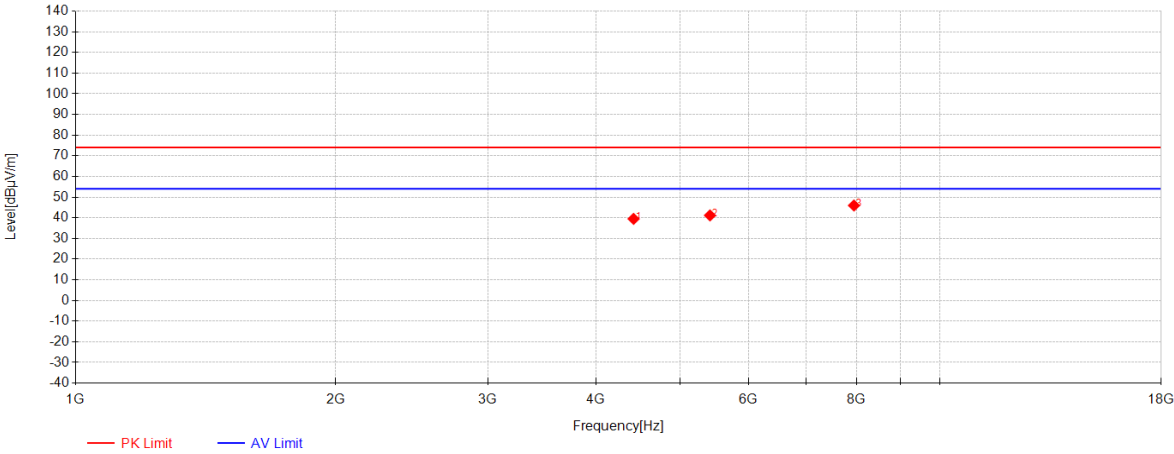


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	4238.25	47.44	31.68	-42.10	37.02	74.00	36.98	Vertical
2	6121.125	47.42	35.04	-39.85	42.61	74.00	31.39	Vertical
3	7391.25	45.56	36.47	-37.84	44.19	74.00	29.81	Vertical

802.11n40_Channel 03

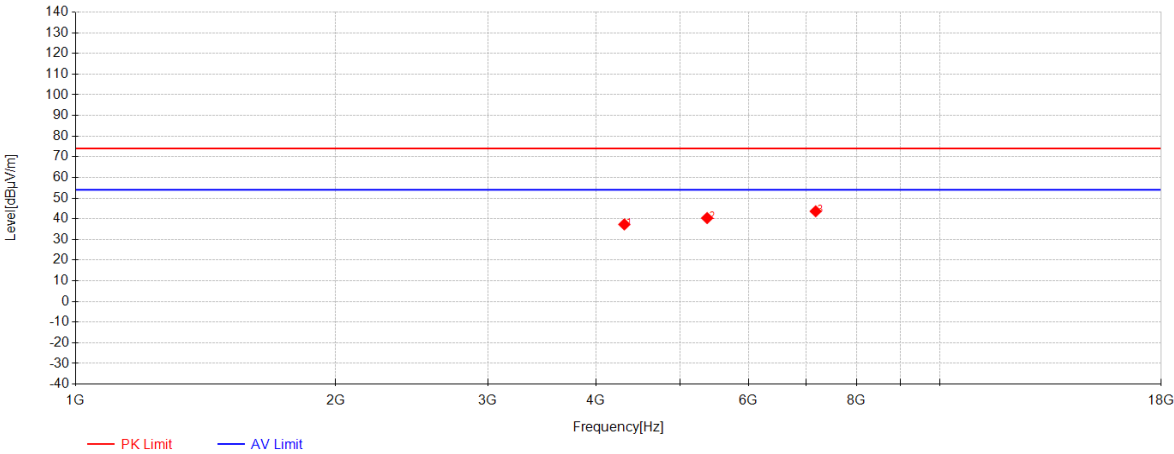


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	4597.5	48.08	32.31	-41.62	38.77	74.00	35.23	Horizontal
2	6726	45.59	35.89	-38.69	42.79	74.00	31.21	Horizontal
3	9475.5	43.60	37.74	-33.85	47.49	74.00	26.51	Horizontal

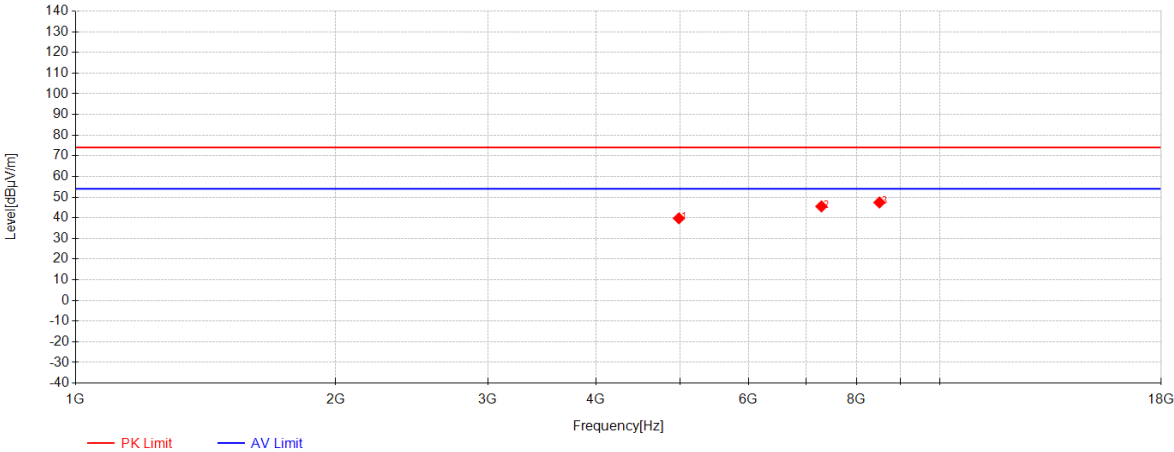


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	4420.875	49.63	31.97	-42.13	39.48	74.00	34.52	Vertical
2	5418	48.89	33.12	-40.85	41.16	74.00	32.84	Vertical
3	7949.25	45.51	37.05	-36.60	45.96	74.00	28.04	Vertical

802.11n40_Channel 06

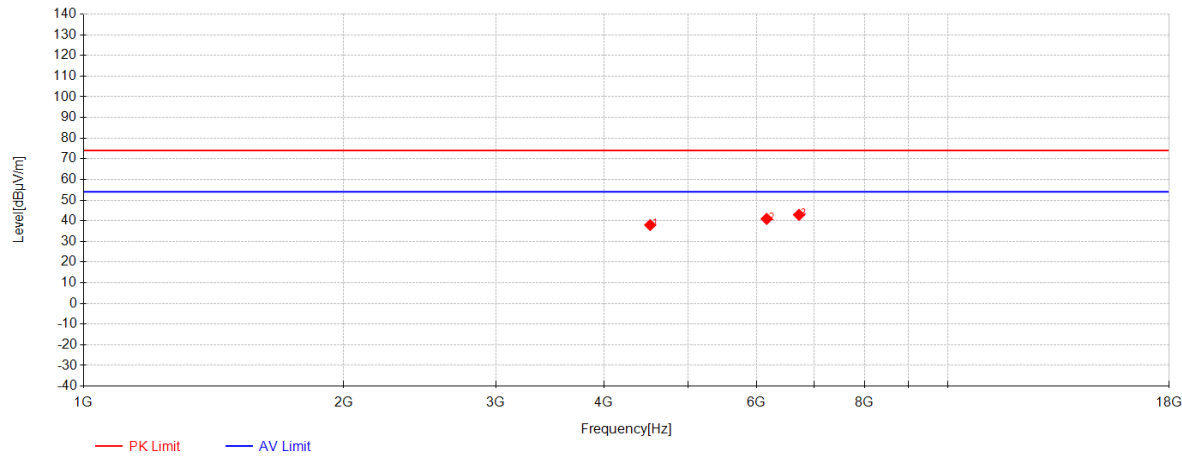


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	4313.25	47.52	31.80	-42.05	37.28	74.00	36.72	Horizontal
2	5376.75	48.15	33.12	-40.90	40.37	74.00	33.63	Horizontal
3	7179	45.49	36.21	-38.07	43.63	74.00	30.37	Horizontal

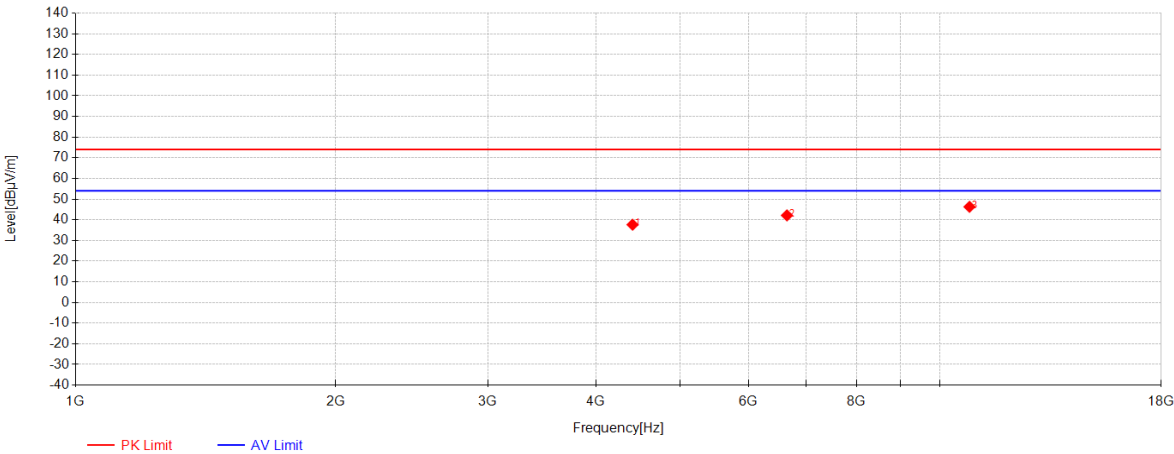


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	4987.5	48.02	33.17	-41.44	39.76	74.00	34.24	Vertical
2	7290	46.59	36.35	-37.43	45.51	74.00	28.49	Vertical
3	8507.25	45.61	37.35	-35.55	47.41	74.00	26.59	Vertical

802.11n40_Channel 09



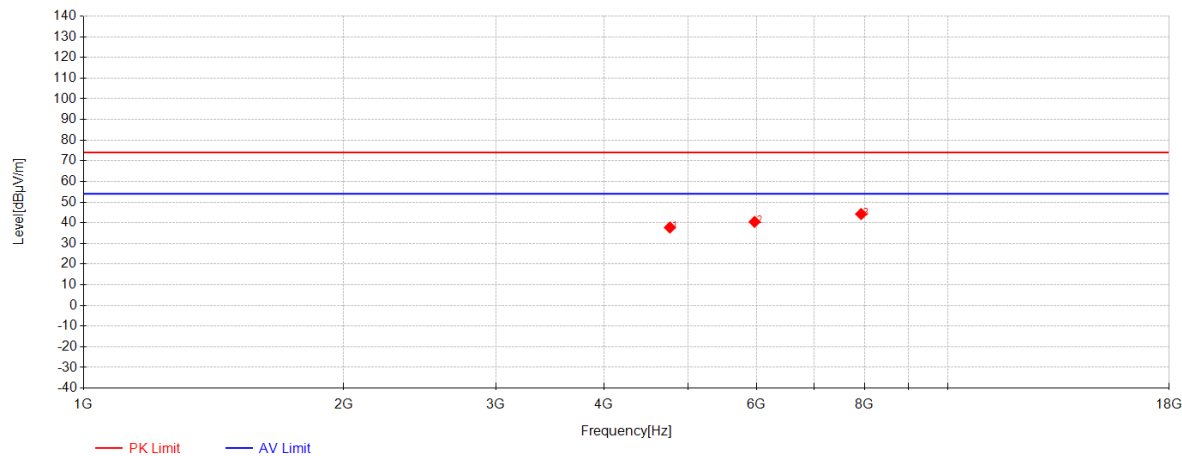
Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	4523.25	47.73	32.15	-41.94	37.94	74.00	36.06	Horizontal
2	6168	45.49	35.14	-39.70	40.92	74.00	33.08	Horizontal
3	6722.625	45.70	35.89	-38.70	42.89	74.00	31.11	Horizontal



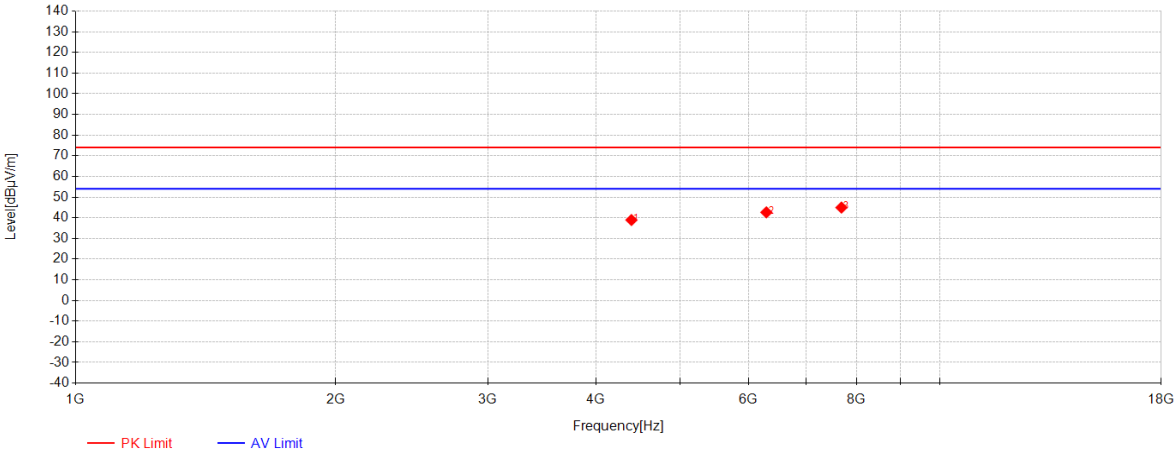
Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	4408.875	47.81	31.95	-42.14	37.62	74.00	36.38	Vertical
2	6650.625	45.15	35.86	-38.88	42.13	74.00	31.87	Vertical
3	10812	38.62	38.31	-30.63	46.29	74.00	27.71	Vertical



802.11ax20_Channel 01

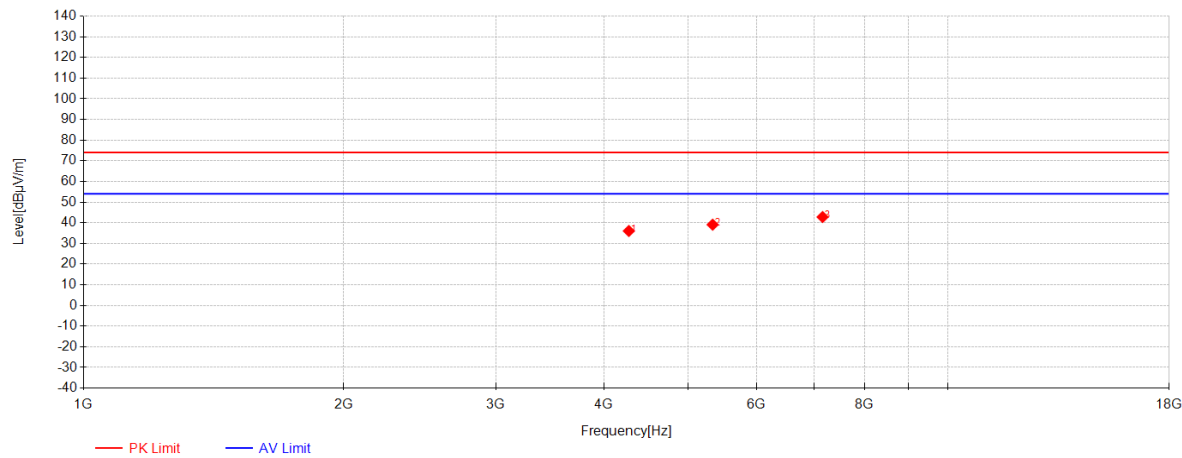


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	4767.375	46.54	32.69	-41.50	37.72	74.00	36.28	Horizontal
2	5972.625	46.00	34.71	-40.25	40.45	74.00	33.55	Horizontal
3	7932.375	43.83	37.03	-36.62	44.24	74.00	29.76	Horizontal

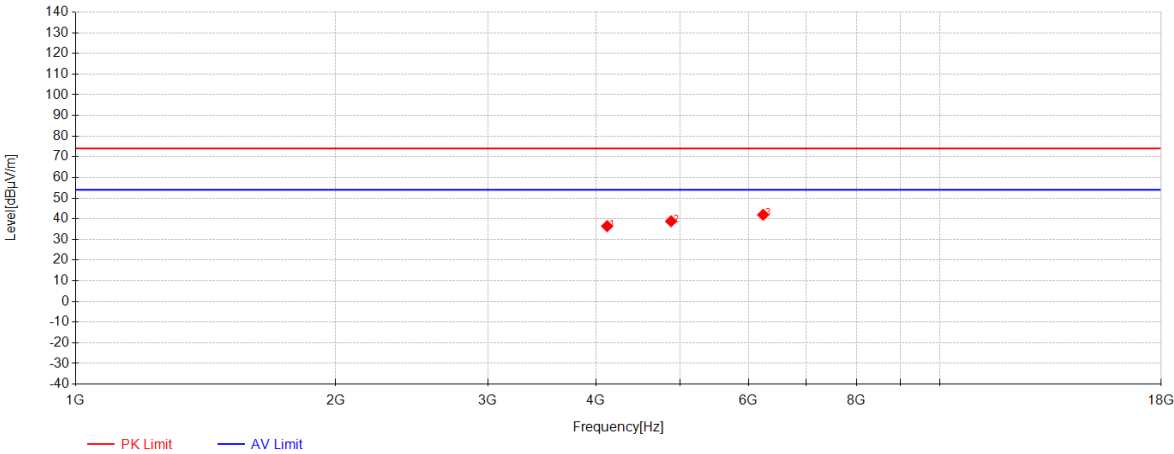


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	4395.75	49.13	31.93	-42.14	38.92	74.00	35.08	Vertical
2	6295.5	46.80	35.39	-39.55	42.64	74.00	31.36	Vertical
3	7688.625	45.54	36.79	-37.38	44.95	74.00	29.05	Vertical

802.11ax20_Channel 06

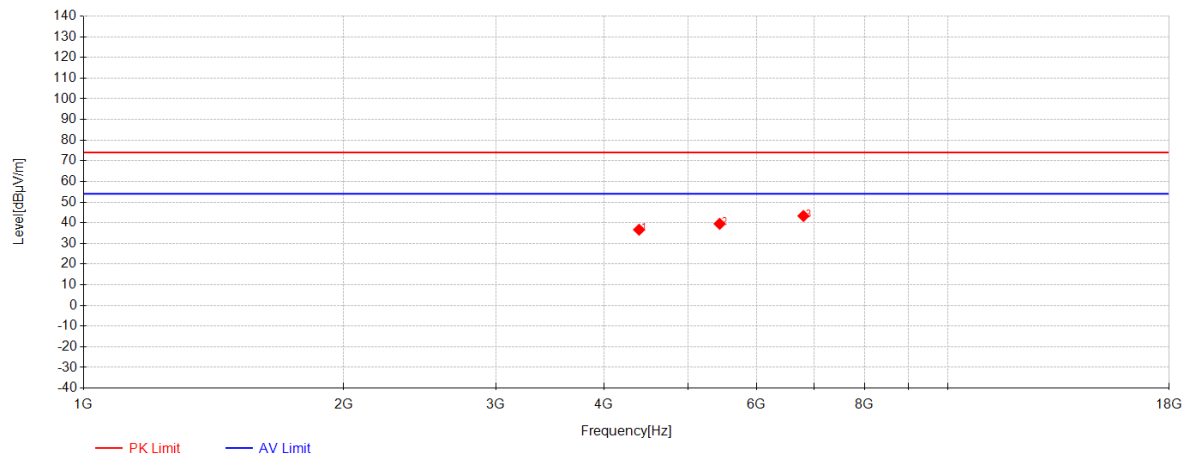


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	4273.5	46.36	31.74	-42.06	36.04	74.00	37.96	Horizontal
2	5341.5	46.86	33.13	-40.91	39.09	74.00	34.91	Horizontal
3	7158.75	44.69	36.19	-38.08	42.80	74.00	31.20	Horizontal

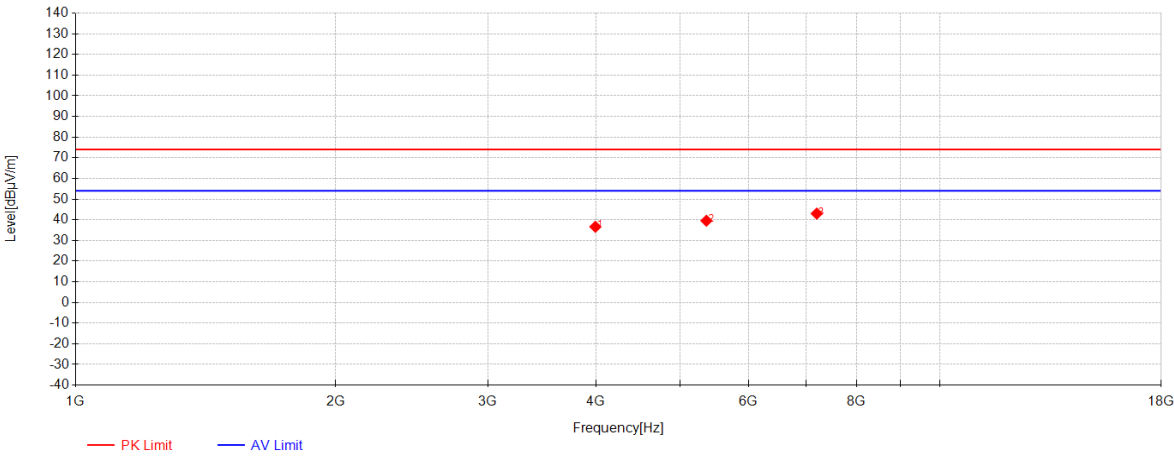


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	4120.125	47.32	31.49	-42.37	36.44	74.00	37.56	Vertical
2	4885.125	47.10	32.95	-41.24	38.80	74.00	35.20	Vertical
3	6241.875	46.24	35.28	-39.58	41.94	74.00	32.06	Vertical

802.11ax20_Channel 11



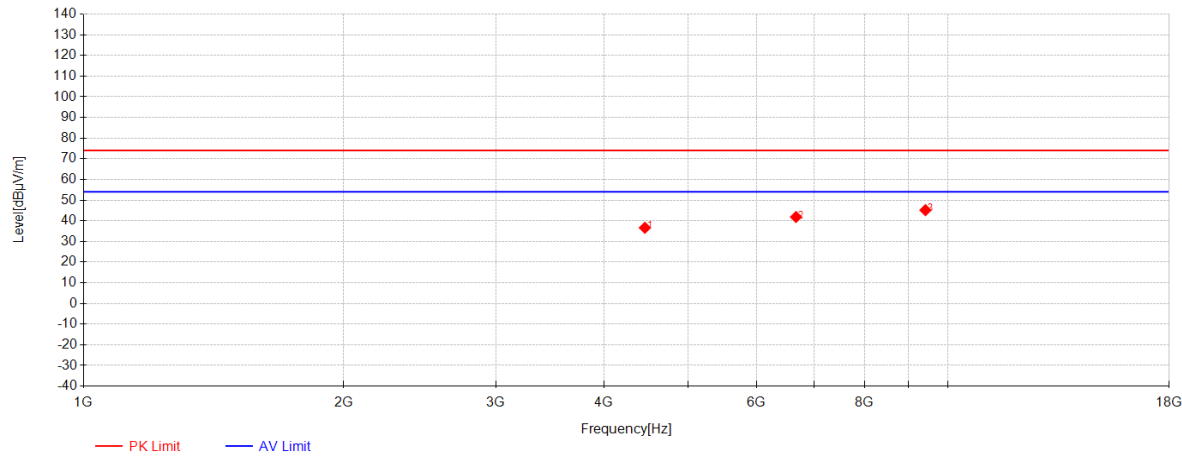
Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	4391.625	46.85	31.93	-42.14	36.64	74.00	37.36	Horizontal
2	5442	47.18	33.11	-40.78	39.51	74.00	34.49	Horizontal
3	6802.5	45.85	35.92	-38.46	43.31	74.00	30.69	Horizontal



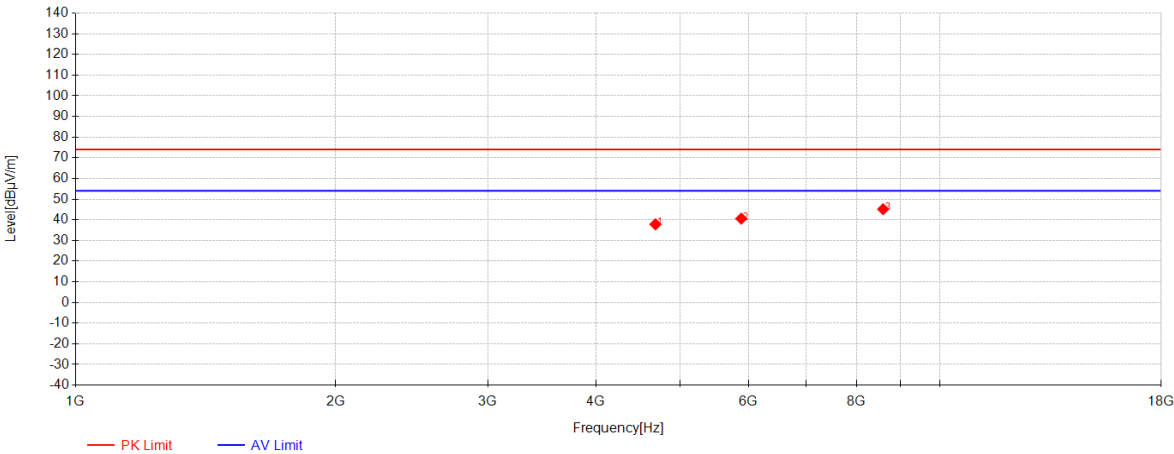
Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	3993.375	48.09	31.28	-42.75	36.61	74.00	37.39	Vertical
2	5367	47.33	33.13	-40.90	39.55	74.00	34.45	Vertical
3	7198.875	44.82	36.24	-38.06	43.00	74.00	31.00	Vertical



802.11ax40_Channel 03

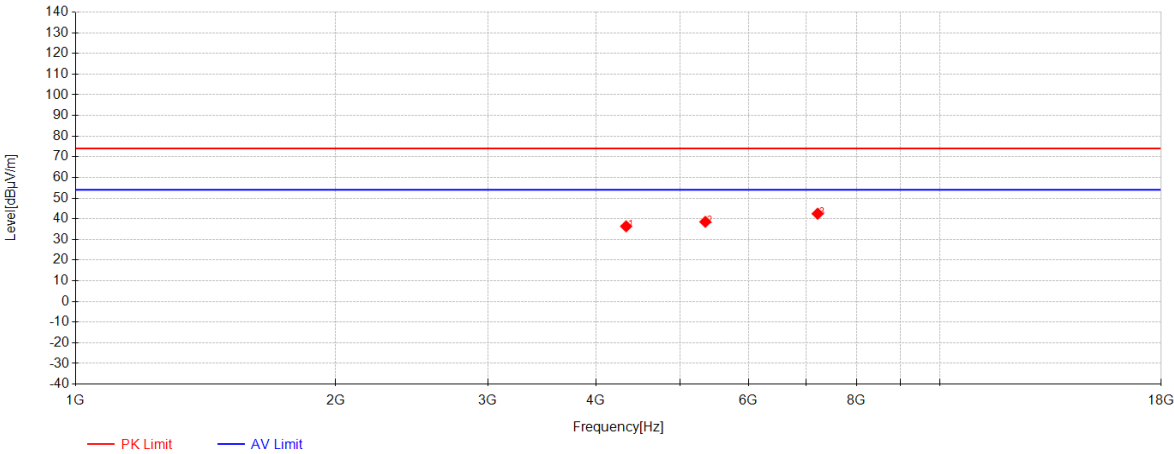


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	4459.875	46.68	32.04	-42.08	36.63	74.00	37.37	Horizontal
2	6669	44.82	35.87	-38.84	41.85	74.00	32.15	Horizontal
3	9412.875	41.20	37.72	-33.77	45.16	74.00	28.84	Horizontal

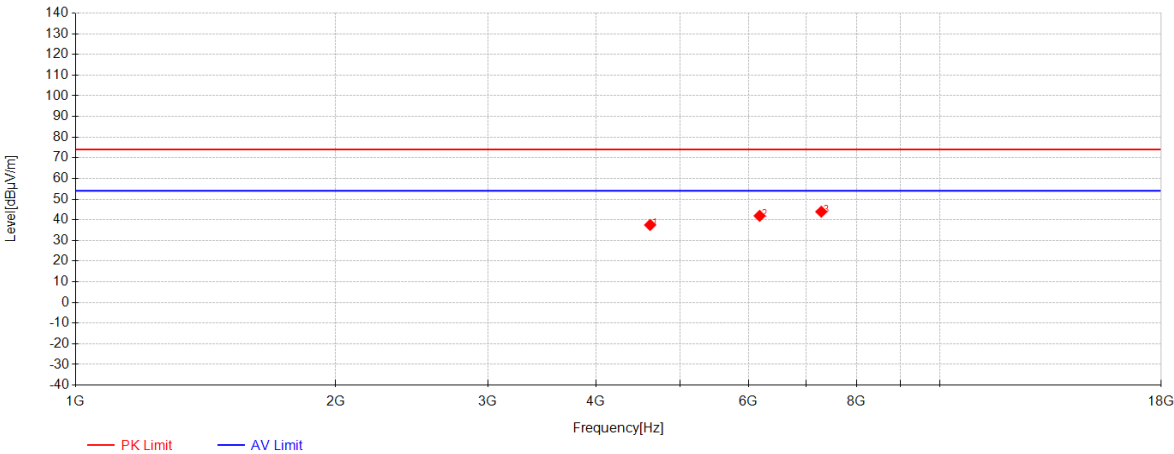


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	4686	46.82	32.51	-41.52	37.81	74.00	36.19	Vertical
2	5889	46.34	34.42	-40.19	40.57	74.00	33.43	Vertical
3	8591.625	42.93	37.40	-35.20	45.13	74.00	28.87	Vertical

802.11ax40_Channel 06

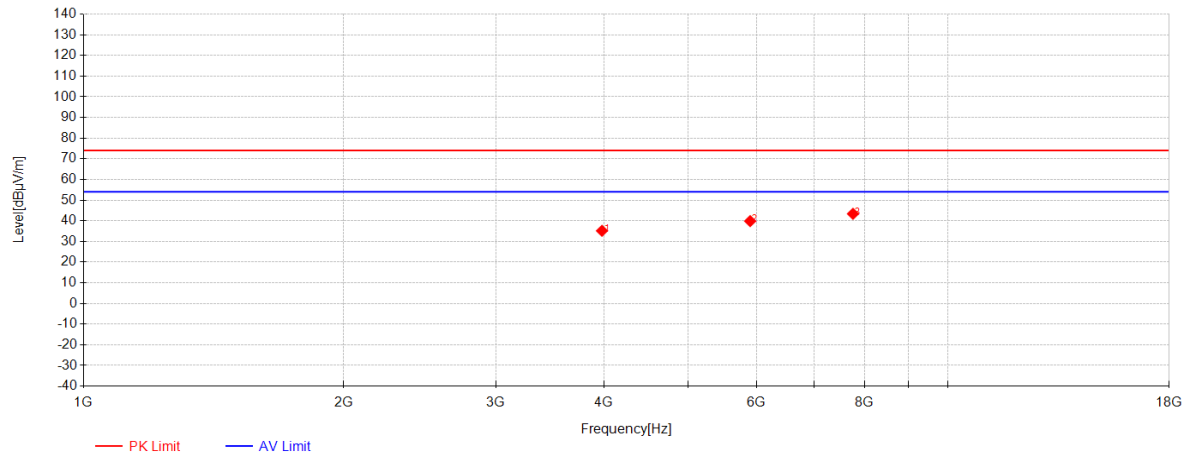


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	4333.875	46.60	31.83	-42.07	36.36	74.00	37.64	Horizontal
2	5351.625	46.31	33.13	-40.90	38.53	74.00	35.47	Horizontal
3	7216.875	44.15	36.26	-37.94	42.47	74.00	31.53	Horizontal

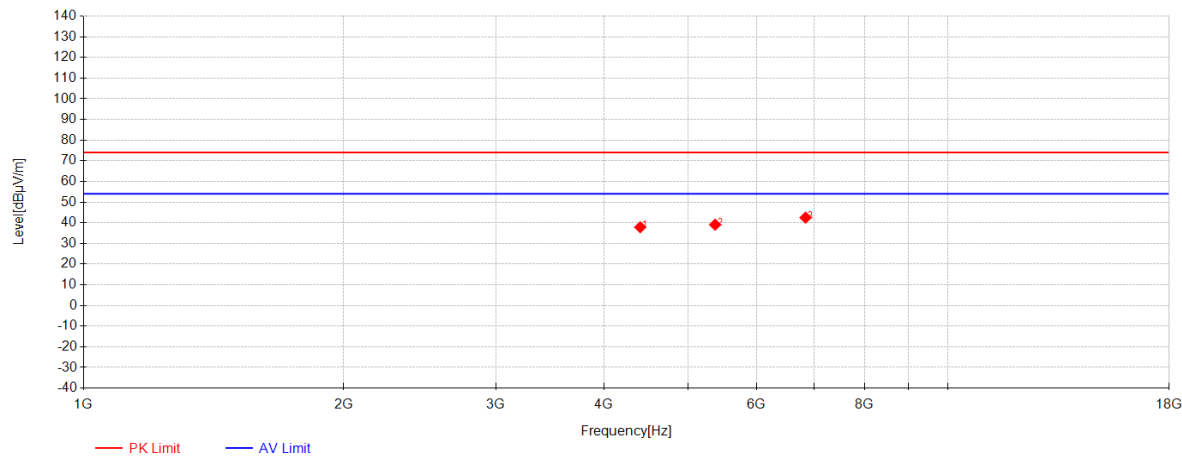


Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	4620	46.73	32.36	-41.59	37.50	74.00	36.50	Vertical
2	6183.75	46.38	35.17	-39.65	41.90	74.00	32.10	Vertical
3	7287.375	45.02	36.34	-37.45	43.92	74.00	30.08	Vertical

802.11ax40_Channel 09



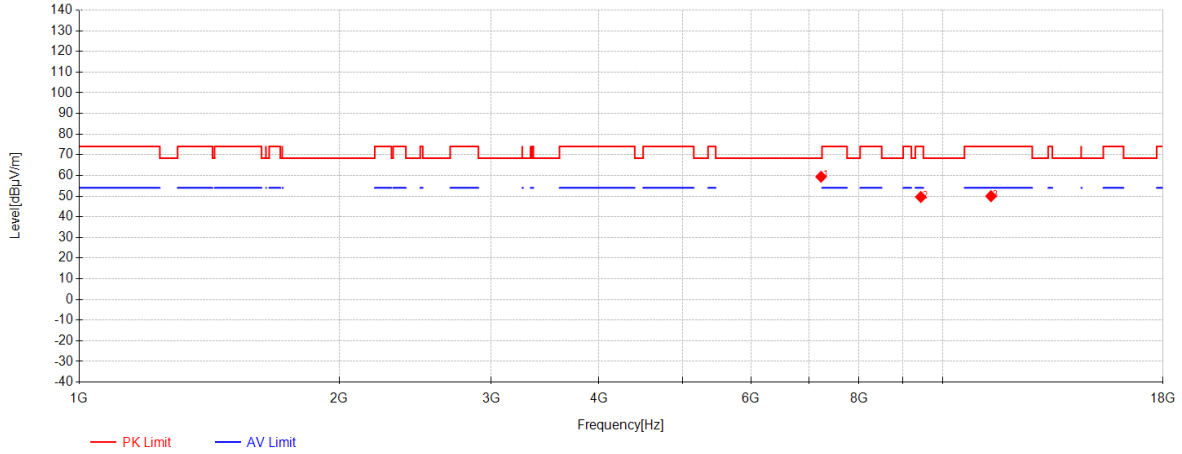
Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	3978.375	46.71	31.23	-42.77	35.17	74.00	38.83	Horizontal
2	5902.875	45.57	34.47	-40.18	39.86	74.00	34.14	Horizontal
3	7761	43.51	36.86	-36.99	43.38	74.00	30.62	Horizontal



Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	4404.75	48.08	31.95	-42.14	37.88	74.00	36.12	Vertical
2	5377.125	46.87	33.12	-40.90	39.09	74.00	34.91	Vertical
3	6840.375	44.98	35.94	-38.41	42.51	74.00	31.49	Vertical

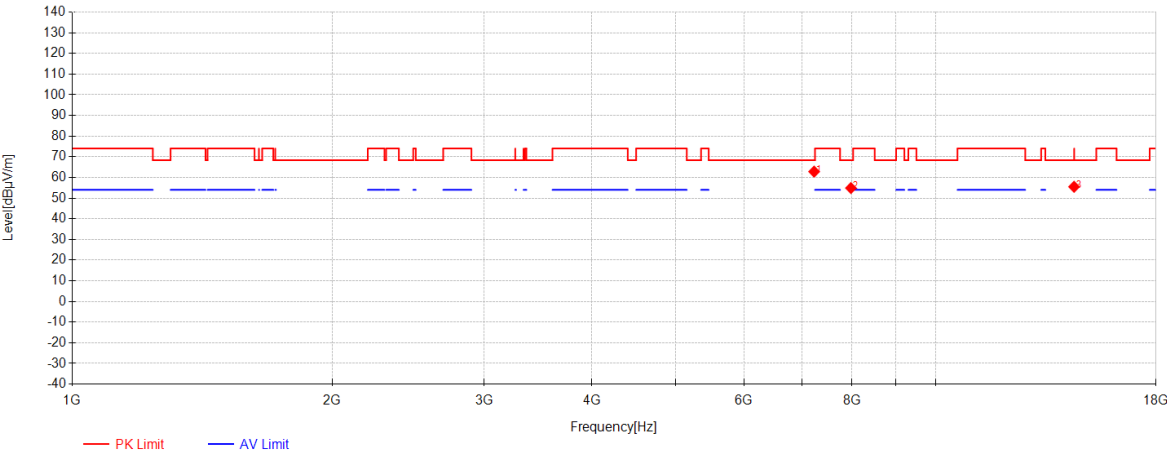
8 Co-location*

802.2.4GWIFI 11n20 CH01+5GWIFI 11a CH140+LTE B48



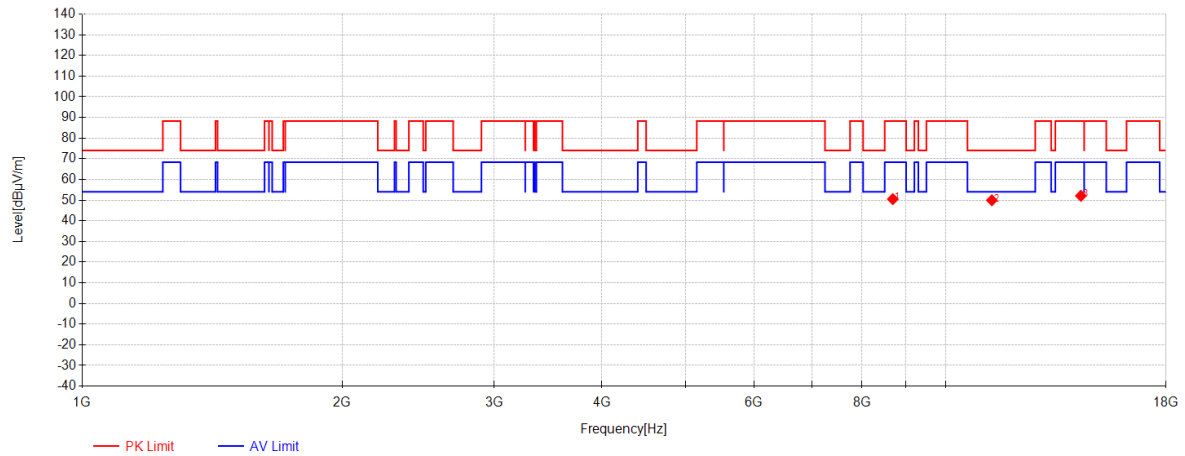
Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	7232.1667	65.17	36.28	-42.06	59.39	68.30	8.91	Horizontal
2	9435.5667	50.42	37.73	-38.57	49.58	74.00	24.42	Horizontal
3	11377.9167	47.27	38.40	-35.70	49.97	74.00	24.03	Horizontal

802.2.4GWIFI 11n20 CH01+5GWIFI 11a CH140+LTE B48



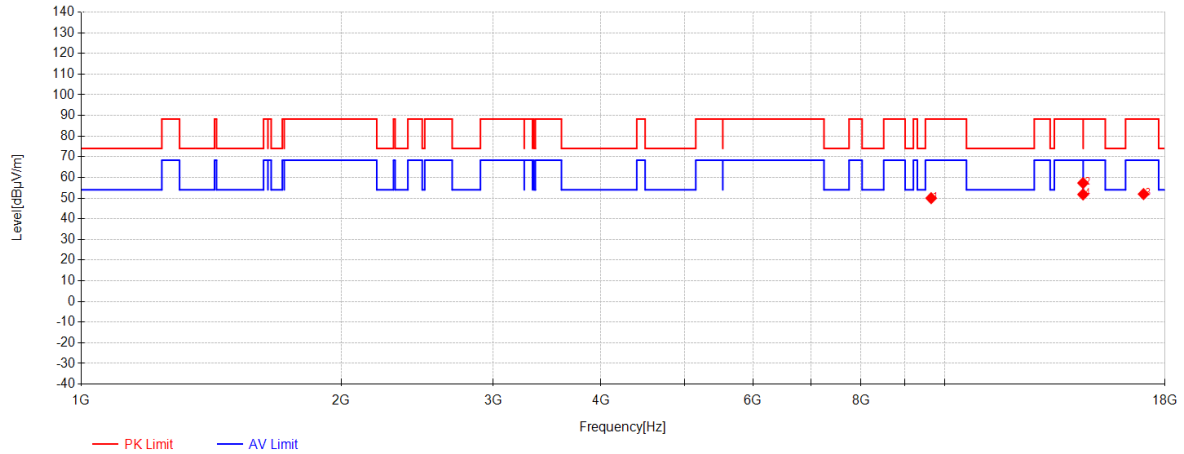
Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	7232.1667	68.62	36.28	-42.06	62.84	68.30	5.46	Vertical
2	7978.1333	59.04	37.08	-41.25	54.87	68.30	13.43	Vertical
3	14464.5167	49.73	40.21	-34.44	55.49	68.30	12.81	Vertical

802.2.4GWIFI 11n20 CH01+WIFI 6E 11ax20 CH233+LTE B48



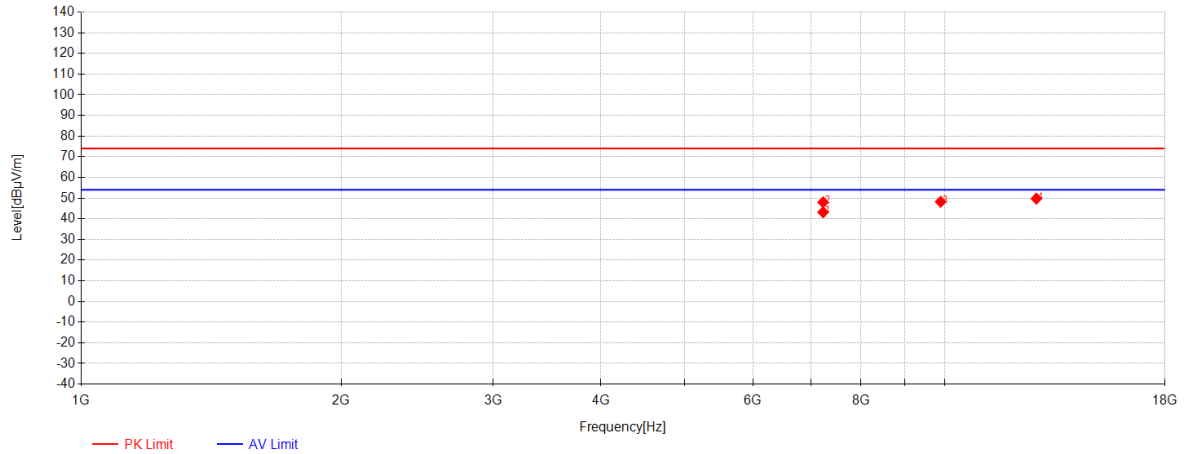
Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	8686	52.26	37.44	-39.22	50.49	88.30	37.81	Horizontal
2	11311.6667	46.90	38.40	-35.36	49.94	74.00	24.06	Horizontal
3	14343.6667	46.04	40.23	-34.17	52.10	88.30	36.20	Horizontal

802.2.4GWIFI 11n20 CH01+WIFI 6E 11ax20 CH233+LTE B48



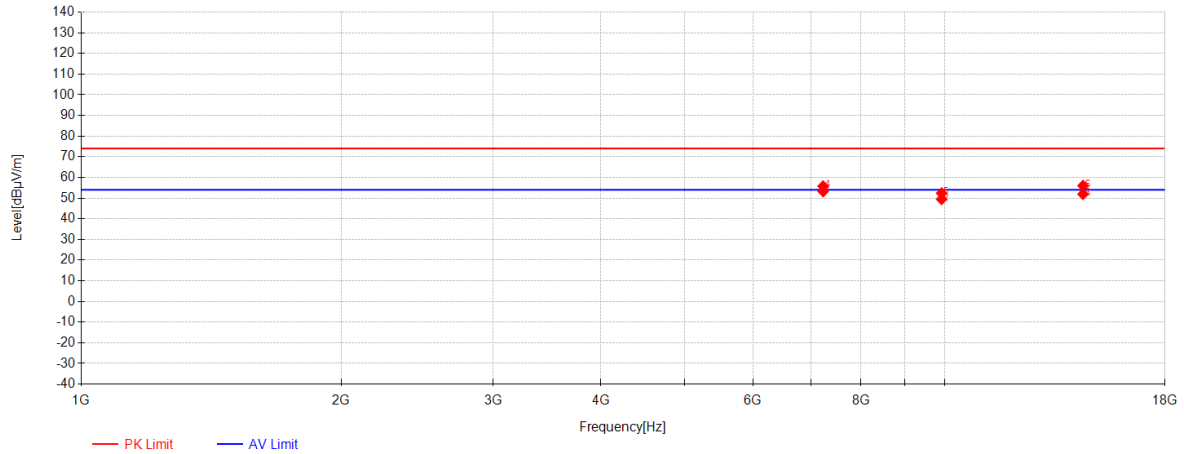
Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	9647.6667	49.87	37.79	-37.68	49.98	88.30	38.32	Vertical
2	14464.3333	51.42	40.21	-34.33	57.30	88.30	31.00	Vertical
3	16997.3333	44.12	38.90	-31.05	51.97	88.30	36.33	Vertical
4	14464.3333	45.89	40.21	-34.33	51.77	68.30	16.53	Vertical

802.2.4GWIFI 11n20 CH01+GFSK CH78+LTE B48



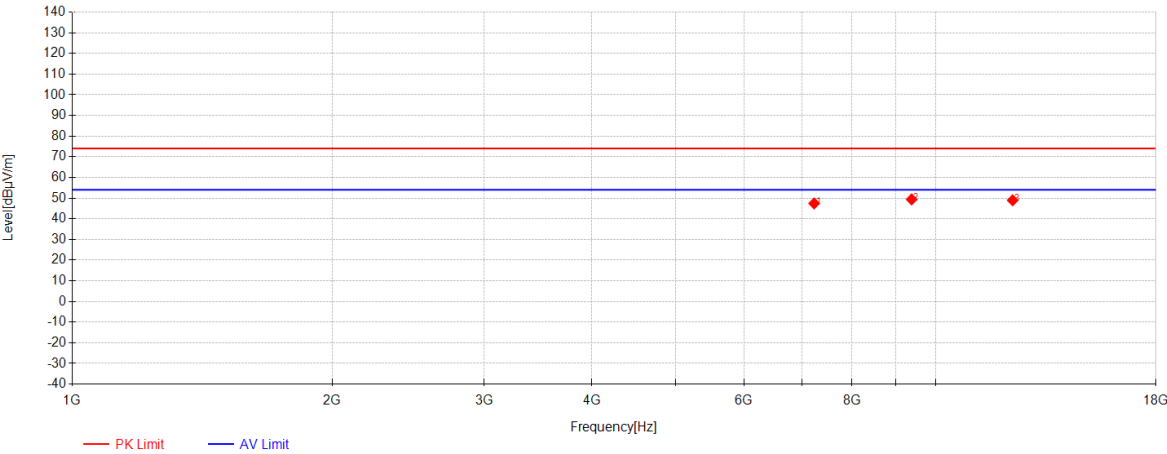
Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	7232.4	49.25	36.28	-42.35	43.18	54.00	10.82	Horizontal
2	7232.4	54.05	36.28	-42.35	47.98	74.00	26.02	Horizontal
3	9893.25	48.28	37.87	-37.91	48.24	74.00	25.76	Horizontal
4	12771.7875	45.43	39.33	-35.00	49.75	74.00	24.25	Horizontal

802.2.4GWIFI 11n20 CH01+GFSK CH78+LTE B48



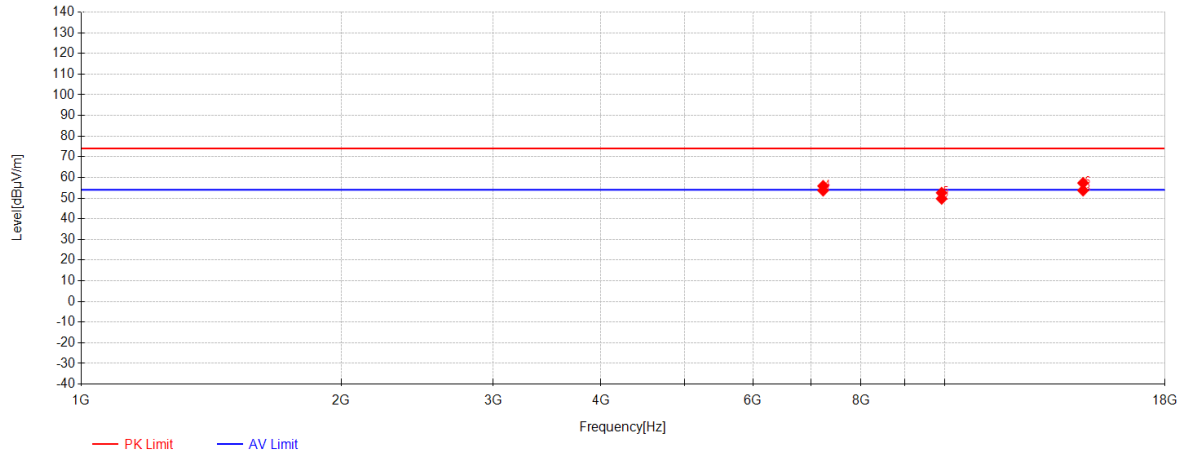
Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	7232.4	59.33	36.28	-42.35	53.26	54.00	0.74	Vertical
2	9920.25	49.47	37.88	-37.87	49.48	54.00	4.52	Vertical
3	14464.6875	46.65	40.21	-34.91	51.94	54.00	2.06	Vertical
4	7232.0625	61.83	36.28	-42.35	55.75	74.00	18.25	Vertical
5	9919.9125	52.36	37.88	-37.87	52.37	74.00	21.63	Vertical
6	14464.35	50.72	40.21	-34.91	56.01	74.00	17.99	Vertical

802.2.4GWIFI 11n20 CH01+BLE CH39+LTE B48



Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	7232.4	53.50	36.28	-42.35	47.43	74.00	26.57	Horizontal
2	9380.5875	50.42	37.71	-38.73	49.40	74.00	24.60	Horizontal
3	12279.375	45.13	38.74	-34.91	48.96	74.00	25.04	Horizontal

802.2.4GWIFI 11n20 CH01+BLE CH39+LTE B48



Data List								
NO.	Frequency [MHz]	Reading [dBμV]	AF [dB/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	7232.4	59.77	36.28	-42.35	53.70	54.00	0.30	Vertical
2	9920.25	49.72	37.88	-37.87	49.73	54.00	4.27	Vertical
3	14464.6875	48.42	40.21	-34.91	53.71	54.00	0.29	Vertical
4	7232.0625	61.96	36.28	-42.35	55.88	74.00	18.12	Vertical
5	9919.9125	52.55	37.88	-37.87	52.56	74.00	21.44	Vertical
6	14464.35	52.04	40.21	-34.91	57.33	74.00	16.67	Vertical

Note: * AF68E is a Wi-Fi & Bluetooth Module that only supports Wi-Fi and Bluetooth functions, and needs to be tested with a PCBA board. This PCBA board integrates a WWAN module AG555Q-GL. In this Co-location test, both AF68E and AG555Q-GL have been included in the scope of evaluation and testing.



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9 Test Setup Photo

Refer to Appendix - Test Setup Photo for KSCR2509001991AT

10 EUT Constructional Details (EUT Photos)

Refer to Appendix - Photographs of EUT Constructional Details for KSCR2509001991AT

- End of the Report -