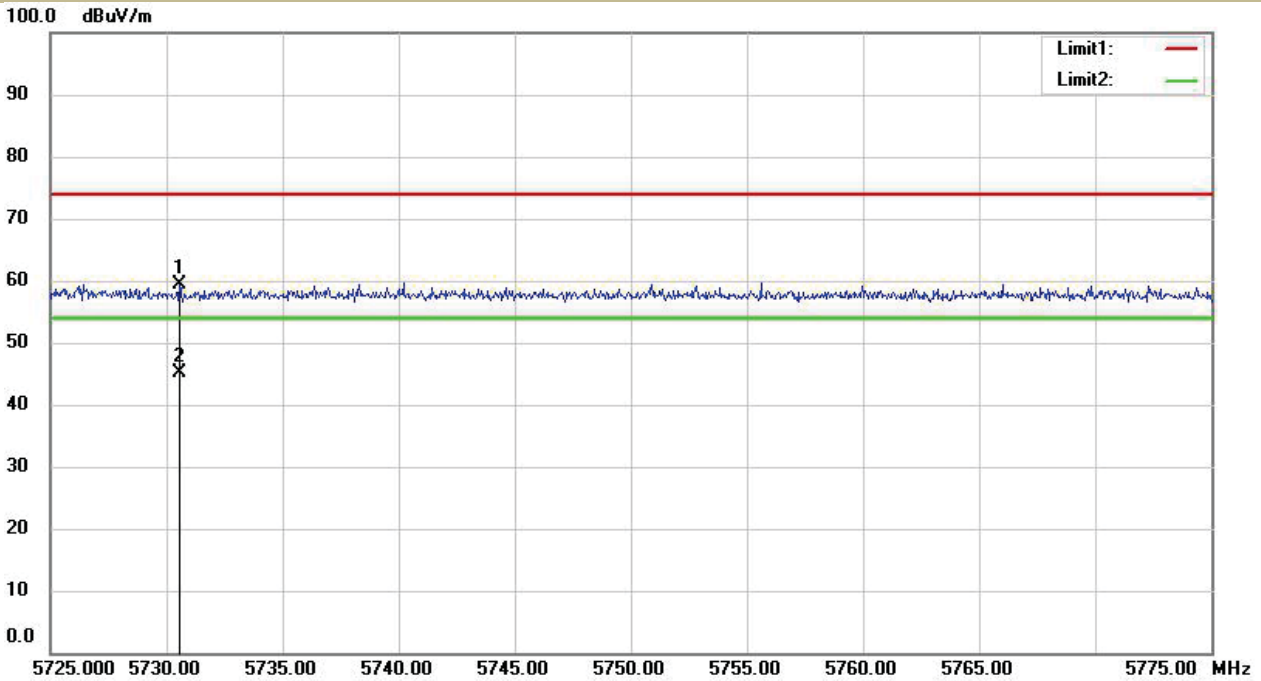


U-NII -2C

Test Model Undesirable radiated Spurious Emission in Restricted Band (5350-5400MHz)

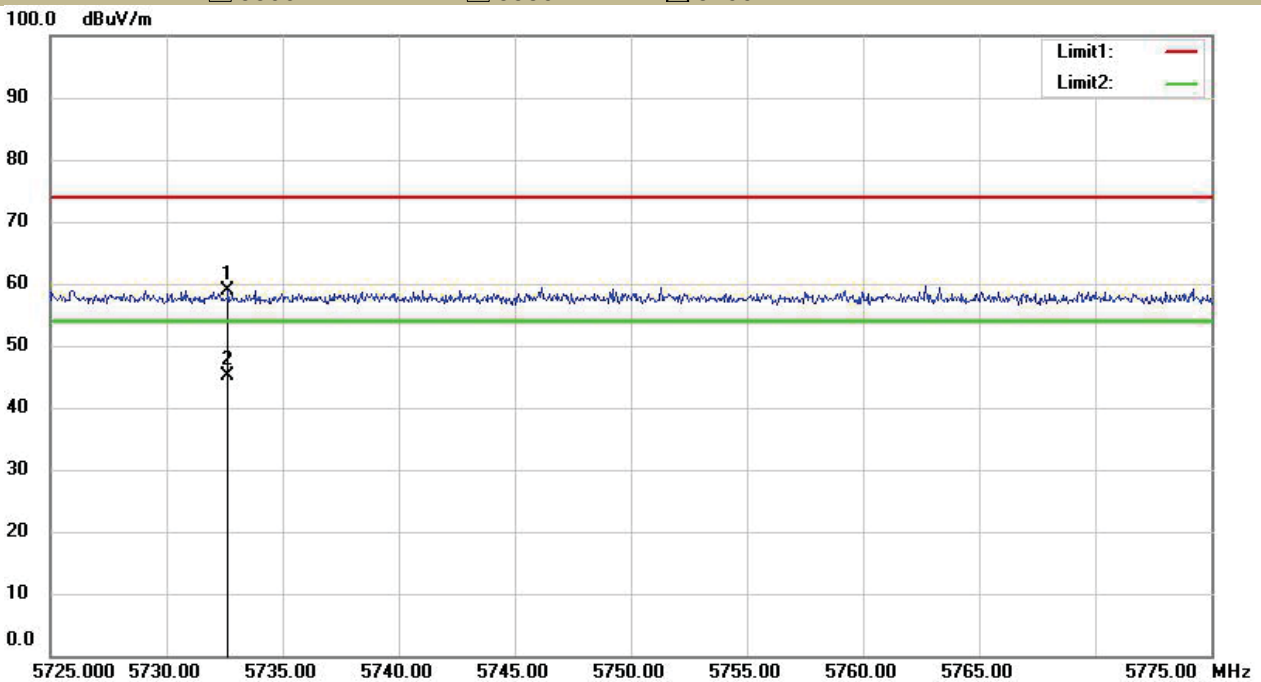
802.11a 802.11n(HT20) 802.11 ac (VHT20)
 5500 5580 5700 Ant.Pol H



U-NII -2C

Test Model Undesirable radiated Spurious Emission in Restricted Band (5350-5400MHz)

802.11a 802.11n(HT20) 802.11 ac (VHT20)
 5500 5580 5700 Ant.Pol V



■ For Undesirable radiated Spurious Emission in U-NII -3

All the modes 802.11a/n/ac has been tested and the worst result 802.11a recorded as below:

● Undesirable radiated Spurious Emission Above 1GHz (1GHz to 40GHz)

Test mode: 802.11a Frequency(MHz): 5745

Freq. (MHz)	Ant.Pol. H/V	Field Strength (dBuV/m)	E.I.R.P (dBm)	Limit (dBm)	Over(dB)
3924.85	V	46.19	-49.13	-27	-22.13
11413.35	V	56.96	-38.36	-27	-11.36
17739.05	V	60.3	-35.02	-27	-8.02
3897.65	H	44.83	-50.49	-27	-23.49
11598.65	H	56.51	-38.81	-27	-11.81
17773.05	H	60.12	-35.2	-27	-8.2

Test mode: 802.11a Frequency(MHz): 5785

Freq. (MHz)	Ant.Pol. H/V	Field Strength (dBuV/m)	E.I.R.P (dBm)	Limit (dBm)	Over(dB)
3924.85	V	45.19	-50.13	-27	-23.13
11994.75	V	57.09	-38.23	-27	-11.23
17739.05	V	59.3	-36.02	-27	-9.02
3788.85	H	45.62	-49.7	-27	-22.7
12172.4	H	57.21	-38.11	-27	-11.11
17773.05	H	59.62	-35.7	-27	-8.7

Test mode: 802.11a Frequency(MHz): 5825

Freq. (MHz)	Ant.Pol. H/V	Field Strength (dBuV/m)	E.I.R.P (dBm)	Limit (dBm)	Over(dB)
3924.85	V	46.19	-49.13	-27	-22.13
11413.35	V	56.96	-38.36	-27	-11.36
17739.05	V	59.8	-35.52	-27	-8.52
3806.7	H	45.49	-49.83	-27	-22.83
12384.05	H	57.37	-37.95	-27	-10.95
17938.8	H	59.86	-35.46	-27	-8.46

Note: (1) All Readings are Peak Value (VBW=3MHz) and AV Value (VBW=10Hz).

(2) Emission Level= Reading Level+Probe Factor +Cable Loss.

(3)EIRP[dBm] = E[dBμV/m] + 20 log(d[meters]) - 104.77

d is the measurement distance in 3 meters

(4)The reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

Frequency: 802.11a				Frequency(MHz): 5745			
Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin (dB)	
		PK	AV	PK	AV	PK	AV
3924.85	V	46.19	33.29	74	54	-27.81	-20.71
11413.35	V	56.96	42.26	74	54	-17.04	-11.74
17739.05	V	60.30	44.75	74	54	-13.70	-9.25
3897.65	H	44.83	31.56	74	54	-29.17	-22.44
11598.65	H	56.51	42.08	74	54	-17.49	-11.92
17773.05	H	60.12	44.47	74	54	-13.88	-9.53

Frequency: 802.11a				Frequency(MHz): 5785			
Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin (dB)	
		PK	AV	PK	AV	PK	AV
3924.85	V	45.19	32.51	74	54	-28.81	-21.49
11994.75	V	57.09	41.52	74	54	-16.91	-12.48
17739.05	V	59.30	45.06	74	54	-14.70	-8.94
3788.85	H	45.62	32.04	74	54	-28.38	-21.96
12172.4	H	57.21	42.22	74	54	-16.79	-11.78
17773.05	H	59.62	44.26	74	54	-14.38	-9.74

Frequency: 802.11a				Frequency(MHz): 5825			
Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin (dB)	
		PK	AV	PK	AV	PK	AV
3924.85	V	46.19	33.22	74	54	-27.81	-20.78
11413.35	V	56.96	41.29	74	54	-17.04	-12.71
17739.05	V	59.80	44.55	74	54	-14.20	-9.45
3806.7	H	45.49	32.42	74	54	-28.51	-21.58
12384.05	H	57.37	41.24	74	54	-16.63	-12.76
17938.8	H	59.86	45.05	74	54	-14.14	-8.95

- Note:**
- (1) All Readings are Peak Value (VBW=3MHz) and Peak Value (VBW=10Hz).
 - (2) Emission Level= Reading Level+Correct Factor +Cable Loss.
 - (3) Correct Factor= Ant_F + Cab_L - Preamp
 - (4)The reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

- Undesirable radiated Spurious Emission in band edge

Test mode: 802.11a Frequency: 5745

Freq. (MHz)	Ant.Pol. H/V	Field Strength (RBW=100KHz) (dBuV/m)	E.I.R.P (dBm)	Limit (dBm)	Verdict
5723.350	H	66.09	-29.23	26.31	PASS
5723.163	V	65.89	-29.43	29.87	PASS

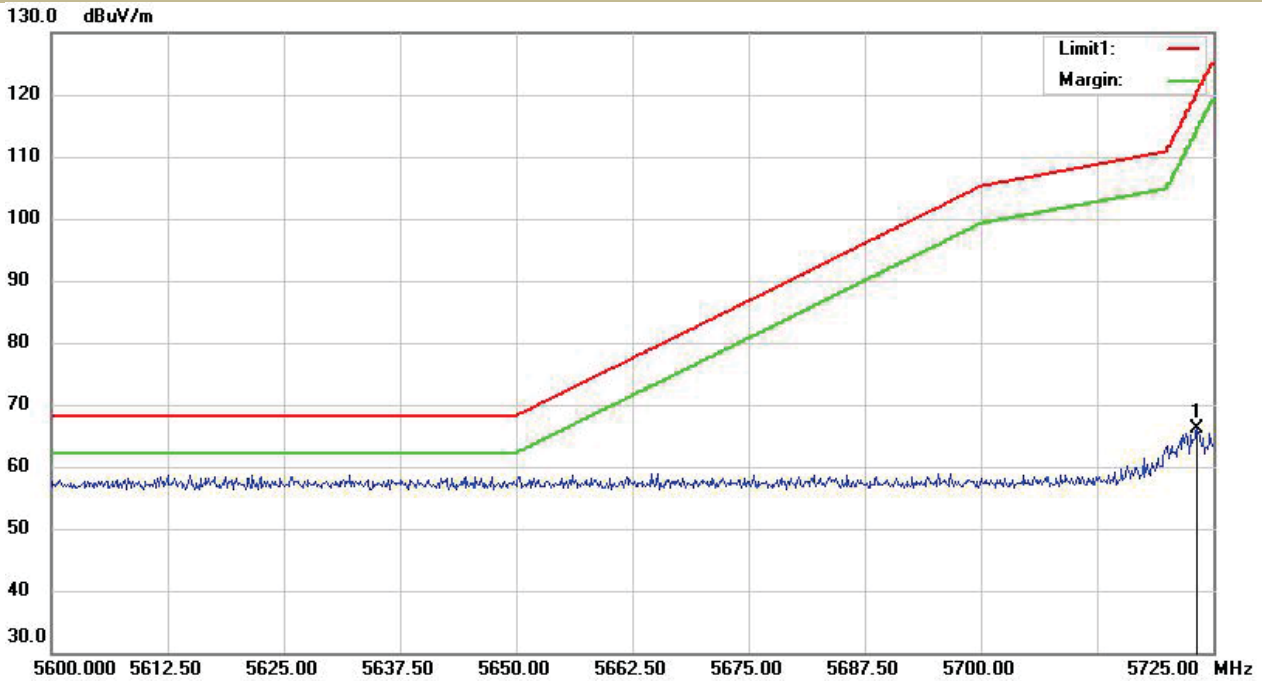
Test mode: 802.11a Frequency: 5825

Freq. (MHz)	Ant.Pol. H/V	Field Strength (RBW=100KHz) (dBuV/m)	E.I.R.P (dBm)	Limit (dBm)	Verdict
5850.813	H	60.15	-35.17	27.57	PASS
5850.163	V	59.71	-35.61	28.47	PASS

- Note:** (1) All Readings are Peak Value (VBW=3MHz) and Peak Value (VBW=10Hz).
 (2) Emission Level= Reading Level+Correct Factor +Cable Loss.
 (3) Correct Factor= Ant_F + Cab_L - Preamp
 (4) EIRP[dBm] = E[dBμV/m] + 20 log(d[meters]) - 104.77
 d is the measurement distance in 3 meters

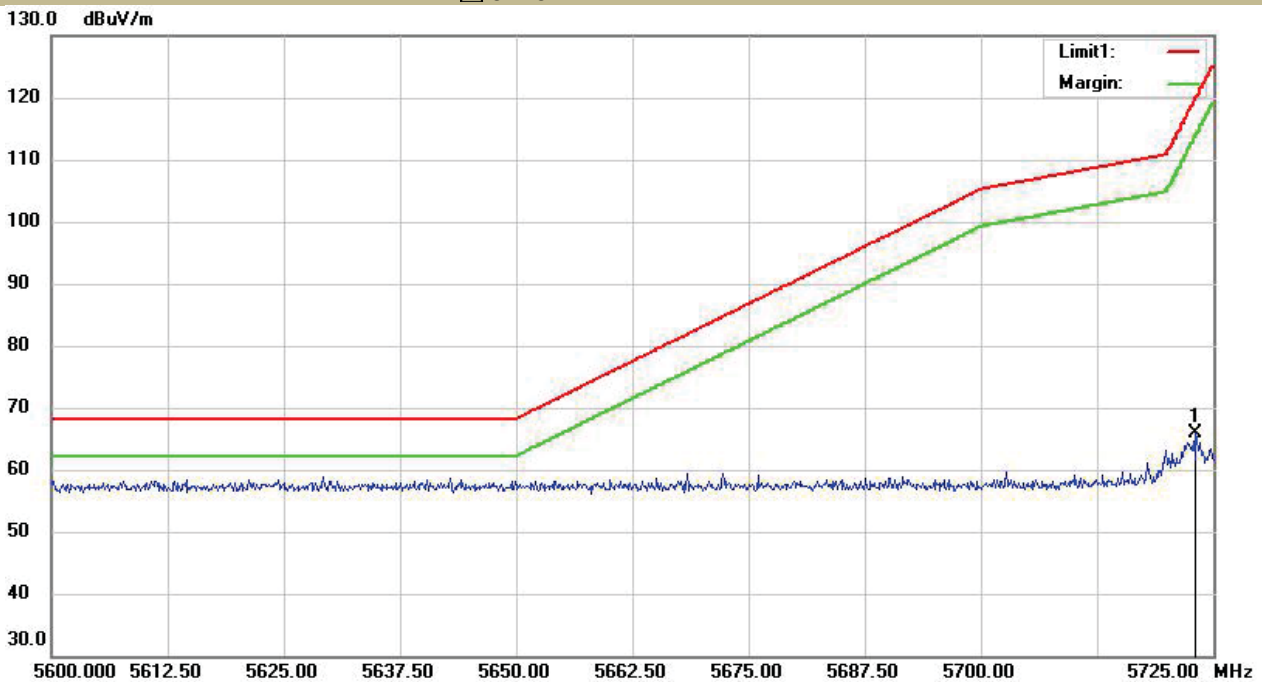
U-NII -3

Test Model	Undesirable radiated <input checked="" type="checkbox"/> 802.11a	Undesirable radiated <input checked="" type="checkbox"/> 5745	Spurious Emission in Band Edge <input type="checkbox"/> 802.11n(HT20)	Spurious Emission in Band Edge <input type="checkbox"/> 802.11n(HT40)
			Ant. Pol	H

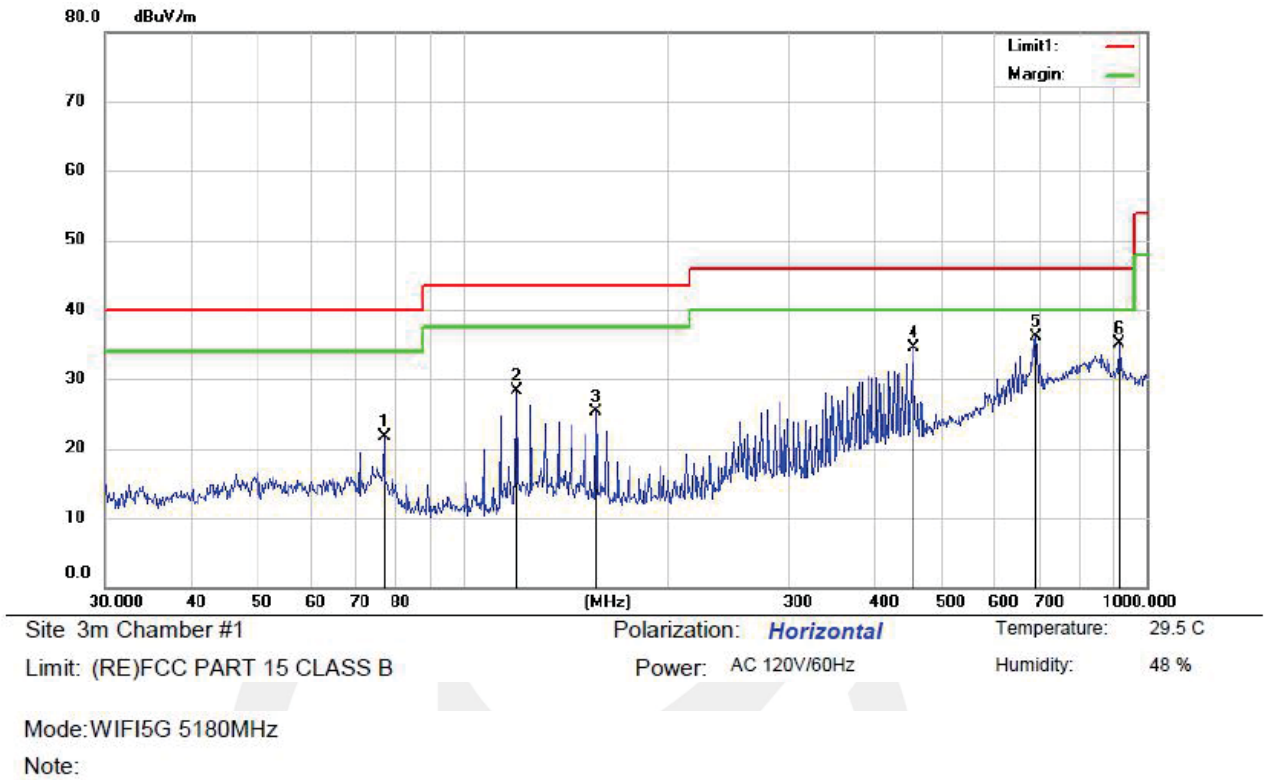


U-NII -3

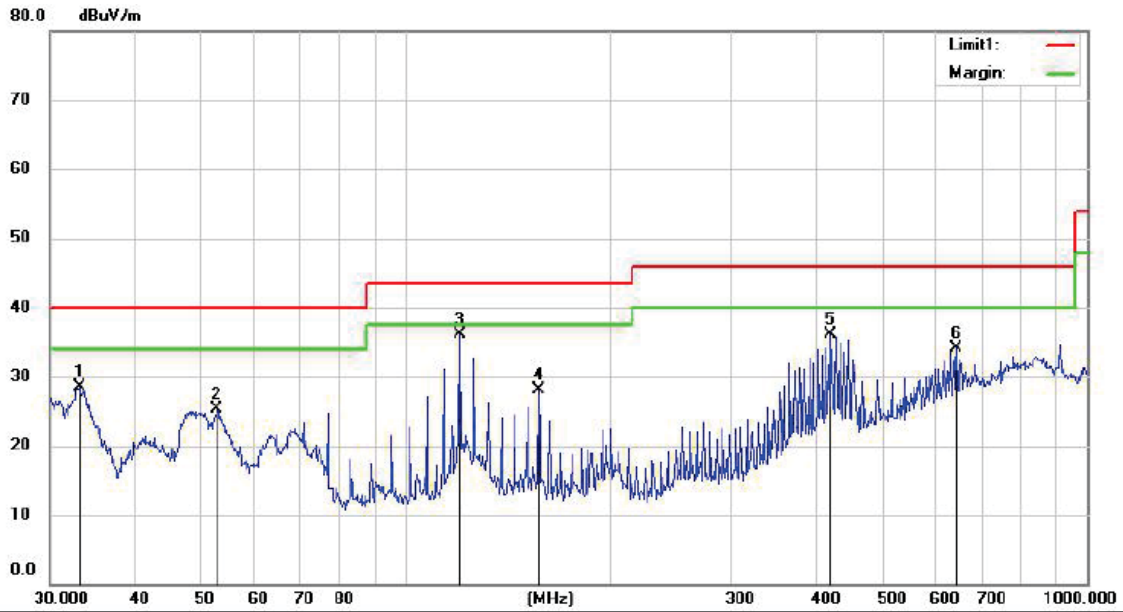
Test Model	Undesirable radiated <input checked="" type="checkbox"/> 802.11a	Undesirable radiated <input checked="" type="checkbox"/> 5745	Spurious Emission in Band Edge <input type="checkbox"/> 802.11n(HT20)	Spurious Emission in Band Edge <input type="checkbox"/> 802.11n(HT40)
			Ant. Pol	V



- Undesirable radiated Spurious Emission below 1GHz (30MHz to 1GHz)
All the modes 802.11a/n/ac has been tested and the worst result 802.11a recorded as below:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		76.7808	35.94	-14.27	21.67	40.00	-18.33	QP		
2		119.8556	42.42	-14.16	28.26	43.50	-15.24	QP		
3		156.4577	39.16	-13.80	25.36	43.50	-18.14	QP		
4		455.9058	39.26	-4.78	34.48	46.00	-11.52	QP		
5	*	689.5644	35.16	1.02	36.18	46.00	-9.82	QP		
6		912.8620	32.27	2.91	35.18	46.00	-10.82	QP		

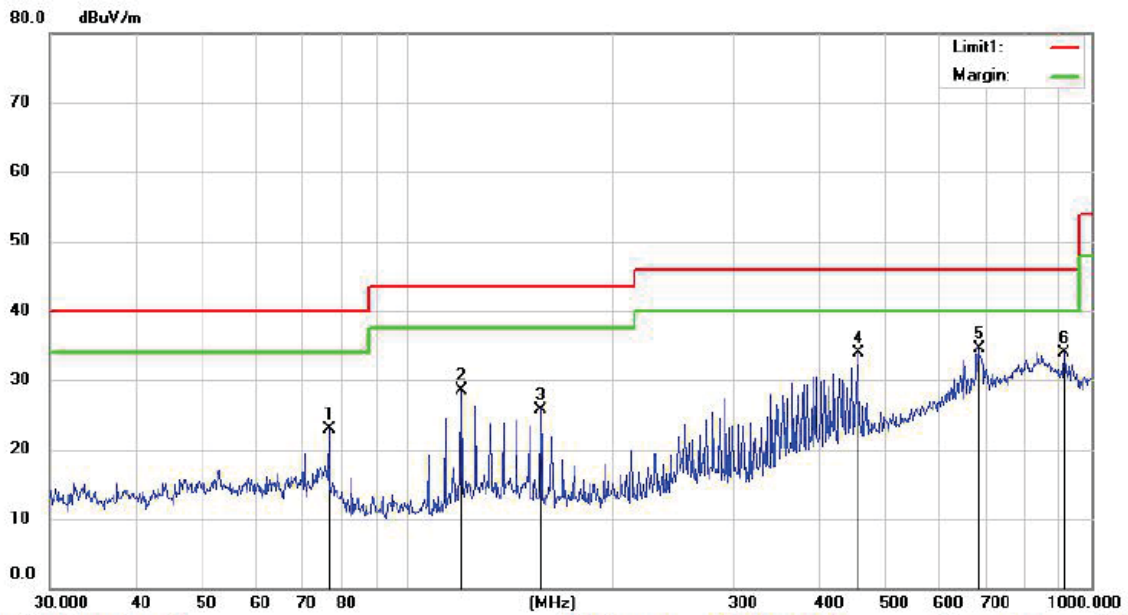


Site 3m Chamber #1 Polarization: **Vertical** Temperature: 29.5 C
 Limit: (RE)FCC PART 15 CLASS B Power: AC 120V/60Hz Humidity: 48 %

Mode: WIFI5G 5180MHz

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	
1		33.0950	42.41	-13.89	28.52	40.00	-11.48	QP		
2		52.7600	36.80	-11.58	25.22	40.00	-14.78	QP		
3	*	119.8556	50.33	-14.16	36.17	43.50	-7.33	QP		
4		156.4577	41.93	-13.80	28.13	43.50	-15.37	QP		
5		420.5803	41.51	-5.41	36.10	46.00	-9.90	QP		
6		642.8612	34.01	0.03	34.04	46.00	-11.96	QP		



Site 3m Chamber #1

Polarization: **Horizontal**

Temperature: 29.5 C

Limit: (RE)FCC PART 15 CLASS B

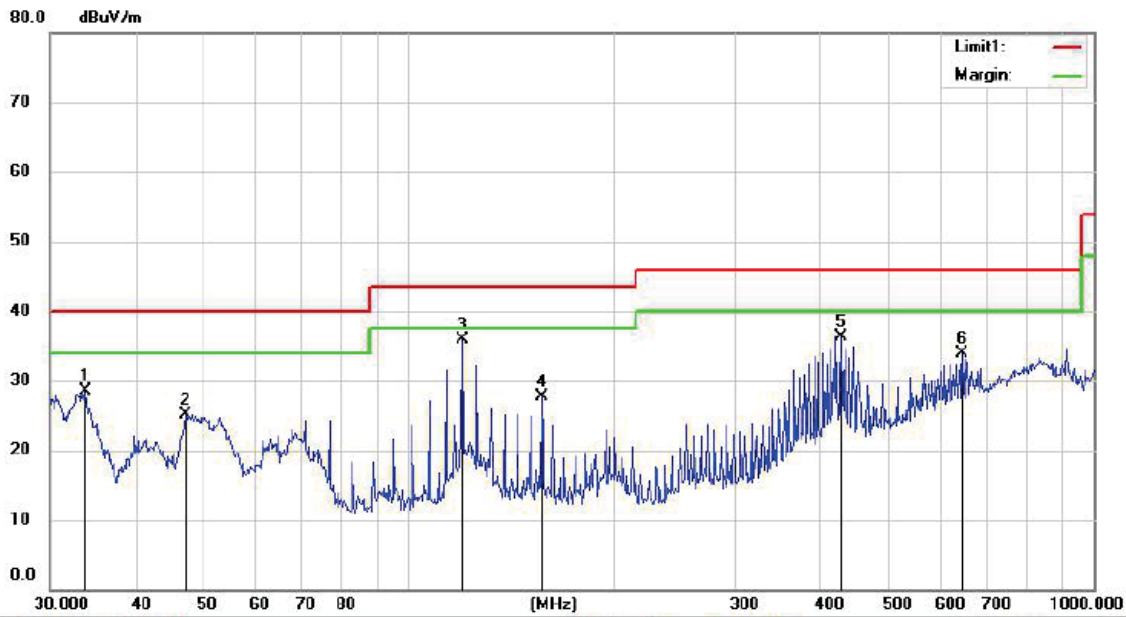
Power: AC 120V/60Hz

Humidity: 48 %

Mode: WIFI5G 5200MHz

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		76.7808	37.13	-14.27	22.86	40.00	-17.14	QP		
2		119.8556	42.74	-14.16	28.58	43.50	-14.92	QP		
3		156.4577	39.45	-13.80	25.65	43.50	-17.85	QP		
4		455.9058	38.78	-4.78	34.00	46.00	-12.00	QP		
5	*	684.7453	33.59	0.95	34.54	46.00	-11.46	QP		
6		912.8620	30.95	2.91	33.86	46.00	-12.14	QP		



Site 3m Chamber #1

Polarization: **Vertical**

Temperature: 29.5 C

Limit: (RE)FCC PART 15 CLASS B

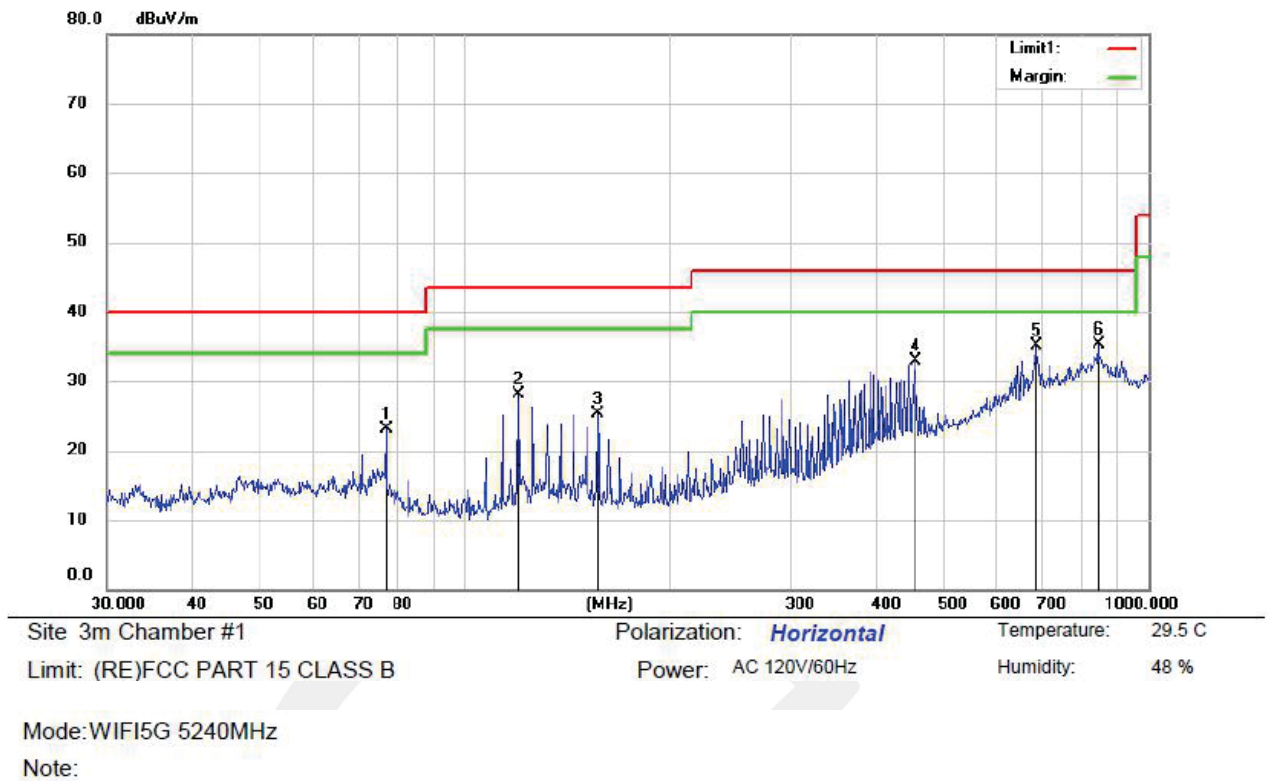
Power: AC 120V/60Hz

Humidity: 48 %

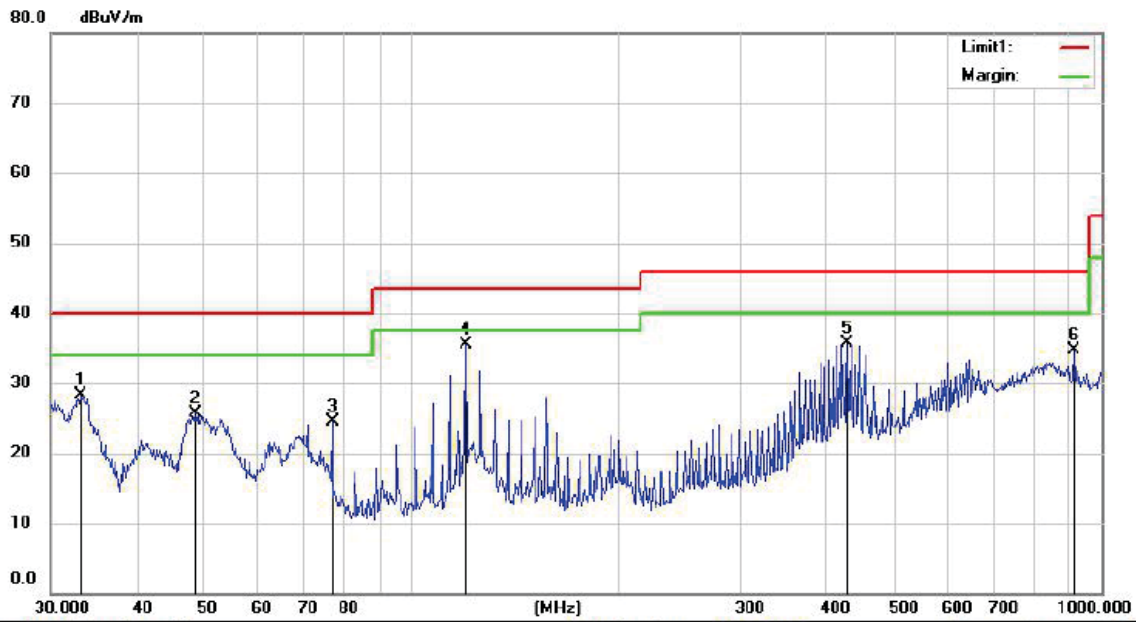
Mode: WIFI5G 5200MHz

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree	Comment
1		33.7986	42.37	-13.77	28.60	40.00	-11.40	QP		
2		47.3255	37.22	-12.19	25.03	40.00	-14.97	QP		
3	*	119.8556	50.04	-14.16	35.88	43.50	-7.62	QP		
4		156.4577	41.55	-13.80	27.75	43.50	-15.75	QP		
5		428.0192	41.31	-4.99	36.32	46.00	-9.68	QP		
6		642.8612	33.88	0.03	33.91	46.00	-12.09	QP		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree degree	Comment
1		76.7808	37.34	-14.27	23.07	40.00	-16.93	QP		
2		119.8556	42.32	-14.16	28.16	43.50	-15.34	QP		
3		156.4577	39.19	-13.80	25.39	43.50	-18.11	QP		
4		455.9058	37.69	-4.78	32.91	46.00	-13.09	QP		
5		684.7453	34.16	0.95	35.11	46.00	-10.89	QP		
6	*	845.0877	30.37	4.93	35.30	46.00	-10.70	QP		



Site 3m Chamber #1

Polarization: **Vertical**

Temperature: 29.5 C

Limit: (RE)FCC PART 15 CLASS B

Power: AC 120V/60Hz

Humidity: 48 %

Mode:WIFI5G 5240MHz

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		33.2112	42.25	-13.87	28.38	40.00	-11.62	QP		
2		48.6720	37.76	-12.06	25.70	40.00	-14.30	QP		
3		76.7808	38.82	-14.27	24.55	40.00	-15.45	QP		
4	*	119.8556	49.71	-14.16	35.55	43.50	-7.95	QP		
5		428.0192	40.73	-4.99	35.74	46.00	-10.26	QP		
6		912.8620	31.78	2.91	34.69	46.00	-11.31	QP		

8.6 POWER LINE CONDUCTED EMISSIONS

8.6.1 Applicable Standard

According to FCC Part 15.207(a)

8.6.2 Conformance Limit

Frequency(MHz)	Conducted Emission Limit	
	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

8.6.3 Test Configuration

Test according to clause 6.3 conducted emission test setup

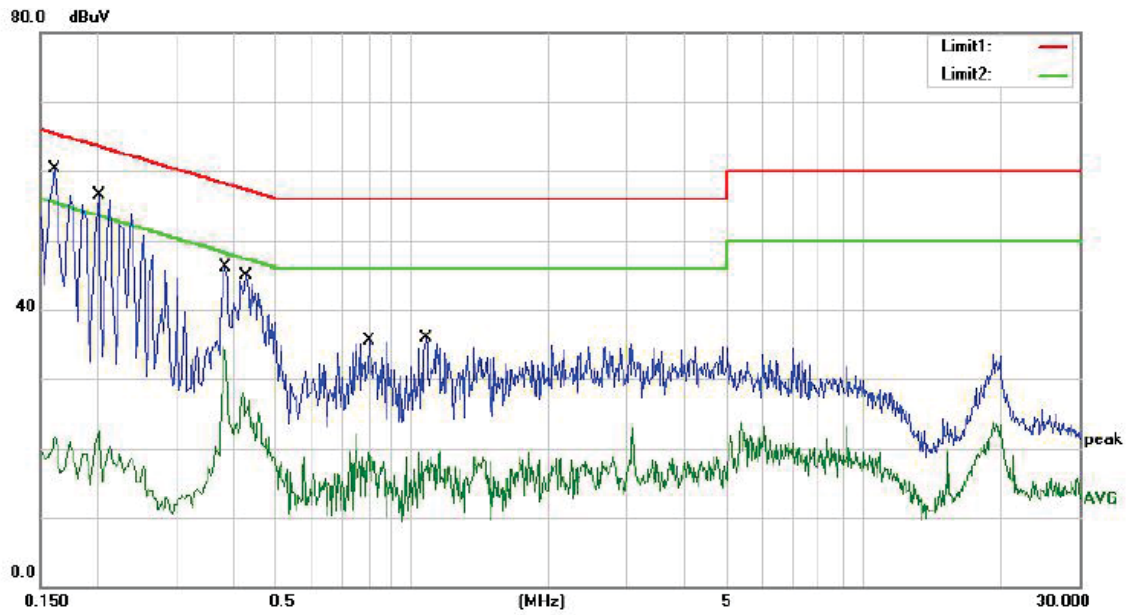
8.6.4 Test Procedure

The EUT was placed on a table which is 0.8m above ground plane.
Maximum procedure was performed on the highest emissions to ensure EUT compliance.
Repeat above procedures until all frequency measured were complete.

8.6.5 Test Results

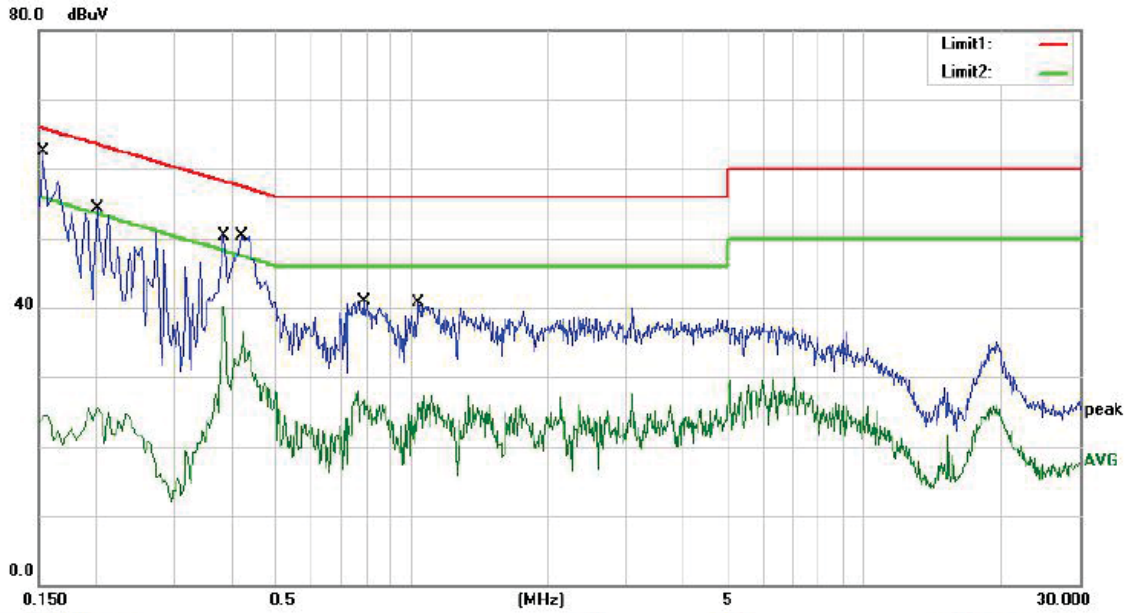
Pass

The 120V & 240V voltage have been tested, and the worst result recorded was report as below:



Site Conduction #1 Phase: **N** Temperature: 24.9
 Limit: (CE)FCC PART 15 class B_QP Power: AC 120V/60Hz Humidity: 54 %
 Mode: WIFI MODE(5G)
 Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1620	38.20	9.60	47.80	65.36	-17.56	QP	
2		0.1620	12.12	9.60	21.72	55.36	-33.64	AVG	
3	*	0.2020	46.93	9.55	56.48	63.53	-7.05	QP	
4		0.2020	13.00	9.55	22.55	53.53	-30.98	AVG	
5		0.3860	36.52	9.56	46.08	58.15	-12.07	QP	
6		0.3860	25.08	9.56	34.64	48.15	-13.51	AVG	
7		0.4300	35.44	9.56	45.00	57.25	-12.25	QP	
8		0.4300	18.61	9.56	28.17	47.25	-19.08	AVG	
9		0.8060	25.88	9.58	35.46	56.00	-20.54	QP	
10		0.8060	12.52	9.58	22.10	46.00	-23.90	AVG	
11		1.0740	26.32	9.58	35.90	56.00	-20.10	QP	
12		1.0740	9.86	9.58	19.44	46.00	-26.56	AVG	



Site Conduction #1 Phase: **L1** Temperature: 24.9
 Limit: (CE)FCC PART 15 class B_QP Power: AC 120V/60Hz Humidity: 54 %
 Mode: WIFI MODE(5G)
 Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1540	38.75	9.65	48.40	65.78	-17.38	QP	
2		0.1540	14.85	9.65	24.50	55.78	-31.28	AVG	
3		0.2020	44.83	9.55	54.38	63.53	-9.15	QP	
4		0.2020	16.04	9.55	25.59	53.53	-27.94	AVG	
5		0.3860	40.65	9.56	50.21	58.15	-7.94	QP	
6		0.3860	30.63	9.56	40.19	48.15	-7.96	AVG	
7	*	0.4220	40.73	9.56	50.29	57.41	-7.12	QP	
8		0.4220	26.94	9.56	36.50	47.41	-10.91	AVG	
9		0.7860	31.42	9.57	40.99	56.00	-15.01	QP	
10		0.7860	18.63	9.57	28.20	46.00	-17.80	AVG	
11		1.0380	31.07	9.58	40.65	56.00	-15.35	QP	
12		1.0380	17.76	9.58	27.34	46.00	-18.66	AVG	

8.7 ANTENNA APPLICATION

8.7.1 Antenna Requirement

Standard	Requirement
FCC CRF Part 15.203	An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. 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. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.407 (a), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

8.7.2 Result

PASS.

- The EUT has 1 antenna: a FPC Antenna for WIFI 5G, the gain is 4.18 dBi
- Note:
- Antennas use a permanently attached antenna which is not replaceable.
 - Not using a standard antenna jack or electrical connector for antenna replacement
 - The antenna has to be professionally installed (please provide method of installation)

Which in accordance to section 15.203, please refer to the internal photos.

Detail of factor for radiated emission

Frequency(MHz)	Ant_F(dB)	Cab_L(dB)	Preamp(dB)	Correct Factor(dB)
0.009	20.6	0.03	\	20.63
0.15	20.7	0.1	\	20.8
1	20.9	0.15	\	21.05
10	20.1	0.28	\	20.38
30	18.8	0.45	\	19.25
30	11.7	0.62	27.9	-15.58
100	12.5	1.02	27.8	-14.28
300	12.9	1.91	27.5	-12.69
600	19.2	2.92	27	-4.88
800	21.1	3.54	26.6	-1.96
1000	22.3	4.17	26.2	0.27
1000	25.6	1.76	41.4	-14.04
3000	28.9	3.27	43.2	-11.03
5000	31.1	4.2	44.6	-9.3
8000	36.2	5.95	44.7	-2.55
10000	38.4	6.3	43.9	0.8
12000	38.5	7.14	42.3	3.34
15000	40.2	8.15	41.4	6.95
18000	45.4	9.02	41.3	13.12
18000	37.9	1.81	47.9	-8.19
21000	37.9	1.95	48.7	-8.85
25000	39.3	2.01	42.8	-1.49
28000	39.6	2.16	46.0	-4.24
31000	41.2	2.24	44.5	-1.06
34000	41.5	2.29	46.6	-2.81
37000	43.8	2.30	46.4	-0.3
40000	43.2	2.50	42.2	3.5