Ho: The variables are independent. No relationship between the categorical variables.

Ha: There is a significant relationship between the device purchased and customer satisfaction.

Expected frequencies = (Total no. of observations for the row\* Total no. of observations for the col)/Total no. of observations

Expected frequency table:

Satisfaction Smart thermostat Smart light Total

Very satisfied 48 72 120

Satisfied 72 108 180

Neutral 60 90 150

Unsatisfied 32 48 80

Very unsatisfied 28 42 70

Total: 240 360 600

ꭓ2 = (n∑i=1 (Oi -Ei)2)/Ei

1. In the subgroup of Smart thermostat and very satisfied = (50-48)2/48= 0.08
2. In the subgroup of Smart thermostat and satisfied = (80-72)2/72= 0.89
3. In the subgroup of Smart thermostat and neutral = (60-60)2/60= 0.0
4. In the subgroup of Smart thermostat and unsatisfied= (30-32)2/32= 0.125
5. In the subgroup of Smart thermostat and very unsatisfied = (20-28)2/28= 2.29
6. In the subgroup of Smart light and very satisfied = (70-72)2/72= 0.06
7. In the subgroup of Smart light and satisfied = (100-108)2/108= 0.59
8. In the subgroup of Smart light and neutral = (90-90)2/90= 0
9. In the subgroup of Smart light and unsatisfied = (50-48)2/48 = 0.08
10. In the subgroup of Smart light and very unsatisfied = (50-42)2/42 = 1.52

ꭓ2 = 0.08+0.89+0+0.125+2.29+0.06+0.59+0+0.08+1.52 = 5.635

This is the test statistics value= 5.635.

Next either calculate the corresponding probability of the test statistic value

OR

Calculate at 0.05 probability, what is the corresponding test statistic value.

Let’s calculate the test statistic value

df= (no of rows-1) X (no of cols-1)

(5-1) X (2-1)

4 X 1 = 4

From chi square table (alpha = 0.05 and df=4). The critical value = 9.488

Test statistic = 5.635

5.635 < 9.488. Hence this comes under the acceptance region.

Null hypothesis s accepted. The variables are independent. There is no relationship between the categorical variables.