47 CFR Part 15 Subpart C

Section 15.247

Test Report

Product： ACP Keypad

Trade Name： N/A

Model Number： 4360715

FCC ID： ELVATRG

Prepared for

Nutek Corporation

No.167, Lane 235, Bauchiau Rd., Xindian District,
New Taipei City 23145, Taiwan

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Prepared by

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Remark:

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The test result in this report is only subjected to the test sample.

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Statement of Compliance

Applicant: Nutek Corporation

Manufacturer: Nutek Corporation

Product: ACP Keypad

Model No.: 4360715

Tested Power Voltage: DC 3.7 V

Date of Final Test: Nov. 28, 2017

Revision of Report: Rev. 00

Configuration of Measurements and Standards Used：

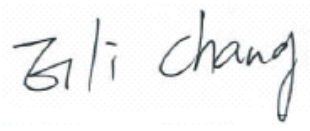
FCC Rules and Regulations Part 15 Subpart C

I HEREBY CERTIFY THAT: The data shown in this report were made in accordance with the procedures given in ANSI C63.10, and the energy emitted by the device was founded to be within the limits applicable. I assume full responsibility for accuracy and completeness of these data.

Note: 1. The result of the testing report relate only to the item tested.

2. The testing report shall not be reproduced expect in full, without the written approval of IETC

Report Issued: 2017/12/01

Project Engineer:  Approved: 

Elli Chang Jerry Liu

1 General Information

1.1 Description of Equipment Under Test

Product	:	ACP Keypad
Model Number	:	4360715
Applicant	:	**Nutek Corporation** No.167, Lane 235, Bauchiau Rd., Xindian District, New Taipei City 23145, Taiwan
Manufacturer	:	**Nutek Corporation** No.167, Lane 235, Bauchiau Rd., Xindian District, New Taipei City 23145, Taiwan
Power Supply	:	DC 3.7 V
Operating Frequency	:	904 MHz - 923.6 MHz
Channel Number	:	50 channels
Type of Modulation	:	2FSK
Antenna Description	:	This device uses PCB printed antenna. Antenna gain 0dBi. The antenna is integral to the device, thereby meeting the requirement of FCC 15.203.
Date of Test	:	Nov. 13 ~ 28, 2017
Additional Description	:	1) The test model is “**4360715**” and included in this report. 2) For more detail specification about EUT, please refer to the user’s manual.

1.2 Details of tested peripheral equipment

1.2.1 PC

PC40

Model Number	:	CM6850
CPU Speed	:	Dual Core Intel Core i7 2600 3.4GHz
RAM	:	4GB DDR3 1333MHz
EMC Compliance	:	CE, C-Tick, NCC, BSMI: R33567
Hard Disk Drive	:	1TB Serial ATA3
Manufacturer	:	ASUS
Switching Power Supply	:	HBA005
Power Cord	:	Non-shielded, Detachable, 1.8m, w/o core

1.2.2 Monitor

MT29

Model Number	:	CMV 92GH 19”
Serial Number	:	92GHAGCN9120266
EMC Compliance	:	FCC, CE, BSMI: R31374, UL, TUV
Manufacturer	:	CHIMEI
Power Cord	:	Non-shielded, Detachable, 1.8m, w/o core
D-Sub Cable	:	Non-shielded, Detachable, 1.8m, with core

1.2.3 USB Keyboard

KB32

Model Number	:	Y-U0011
Serial Number	:	N/A
EMC Compliance	:	CE, FCC, C-Tick, BSMI T51160, VCCI
Manufacturer	:	LOGITECH
Data Cable	:	Non-Shielded, Un-detachable, 1.5m

1.2.4 USB Mouse

USB73

Model Number	:	MS11-T
Serial Number	:	CN-0KW2YH-71616-322-1KPC-A02
EMC Compliance	:	FCC, CE, ICC, BSMI R3A002, VCCI
Manufacturer	:	DELL
Data Cable	:	Non-shielded, Un-detachable, 1.8m

1.2.5 Test Cable

USB Cable	:	Non-shielded, Detachable, 1.0 m, with core

1.3 Table for Carrier Frequencies

	FC (MHz)		FC (MHz)		FC (MHz)		FC (MHz)
CH0	904.00	**CH13**	909.20	**CH26**	914.40	**CH39**	919.60
CH1	904.40	**CH14**	909.60	**CH27**	914.80	**CH40**	920.00
CH2	904.80	**CH15**	910.00	**CH28**	915.20	**CH41**	920.40
CH3	905.20	**CH16**	910.40	**CH29**	915.60	**CH42**	920.80
CH4	905.60	**CH17**	910.80	**CH30**	916.00	**CH43**	921.20
CH5	906.00	**CH18**	911.20	**CH31**	916.40	**CH44**	921.60
CH6	906.40	**CH19**	911.60	**CH32**	916.80	**CH45**	922.00
CH7	906.80	**CH20**	912.00	**CH33**	917.20	**CH46**	922.40
CH8	907.20	**CH21**	912.40	**CH34**	917.60	**CH47**	922.80
CH9	907.60	**CH22**	912.80	**CH35**	918.00	**CH48**	923.20
CH10	908.00	**CH23**	913.20	**CH36**	918.40	**CH49**	923.60
CH11	908.40	**CH24**	913.60	**CH37**	918.80		
CH12	908.80	**CH25**	914.00	**CH38**	919.20		

1.4 Hopping Sequence

48, 8, 42, 45, 24, 39, 28, 18, 17, 36, 11, 29, 3, 44, 12, 21, 47, 49, 31, 14, 32, 15, 34, 20, 2, 6, 25, 35, 26, 13, 0, 37, 16, 43, 10, 5, 40, 30, 46, 4, 33, 19, 1, 27, 23, 9, 22, 41, 38, 7

1.5 Test Facility

Site Description : ☒Chamber 3 ☒RF Test Room ☒Conducted 1

Name of Firm : Interocean EMC Technology Corp.

Company web : http://www.ietc.com.tw

Location : No. 5-2, Lin 1, Tin-Fu, Lin-Kou Dist., New Taipei City, Taiwan 244, R.O.C.

Site Filing :

- Federal Communication Commissions – USA
  Designation No.: TW1020 (Test Firm Registration #: 651092)
  Designation No.: TW1113 (Test Firm Registration #: 959554)
- Industry Canada (IC)
  OUR FILE: 46405-4437
  Registration No. (OATS 1): Site# 4437A-1
  Registration No. (OATS 3): Site# 4437A-3
  Registration No. (Chamber 3): Site# 4437A-5
  Registration No. (OATS 5): Site# 4437A-6
- Voluntary Control Council for Interference by Information Technology Equipment (VCCI) – Japan
  Member No.: 1349
  Registration No. (Conducted Room): C-1094
  Registration No. (Conducted Room): T-1562
  Registration No. (OATS 1): R-1040; G-10274

Site Accreditation :

- Bureau of Standards and Metrology and Inspection (BSMI) – Taiwan, R.O.C.
  Accreditation No.:
  SL2-IN-E-0026 for CNS 13438 / CISPR 22
  SL2-R1-E-0026 for CNS 13439 / CISPR 13
  SL2-R2-E-0026 for CNS 13439 / CISPR 13
  SL2-L1-E-0026 for CNS 14115 / CISPR 15
- Taiwan Accreditation Foundation (TAF)
  Accreditation No.: 1113
- Vehicle Safety Certification Center (VSCC)
  Approval No.: TW16-11
- TüV NORD
  Certificate No: TNTW0801R

1.6 Test Equipment

Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
EMI Test Receiver	R&S	ESI7	830154/002	2018/10/17
EMI Test Receiver	R&S	ESCS 30	100134	2018/08/09
Pre-Amplifier	Burgeon	BPA-530	100216	2018/09/25
Spectrum Analyzer	R&S	FSP40	100478	2018/06/19
Bilog Antenna	ETC	MCTD 2786B	BLB17S04020	2018/10/04
Horn Antenna	Schwarzbeck	BBHA9120	9120D-583	2018/09/24
Pre-Amplifier	EMCI	EMC 051845	980110	2018/09/21
RF Cable	Jye Bao	A30N30-5005	CBL51	2018/07/31
RF Cable	Jye Bao	N30N30-5006	CBL53	2018/07/31
RF Cable	HARBOUR	27478LL142	CBL65	2018/07/31
RF Cable	IETC	CBL68	CBL68	2018/07/31
L.I.S.N.	Schwarzbeck	NNLK8121	8121417	2018/03/24
L.I.S.N.	Schaffner	MN2050D	1598	2018/08/22
Measurement Software	AUDIX-e3			

Note: The above equipments are within the valid calibration period.

1.7 Measurement Uncertainty

Item	Expended Uncertainty (k=2)
Conduction 1:	
Conducted Emission (9 kHz to 30 MHz)	2.98 dB
Chamber 3:	
Radiated Emission Test (30 MHz to 1 GHz)	4.86 dB
Radiated Emission Test (above 1 GHz)	5.12 dB
RF test:	
RF conducted measurement (9 kHz to 40GHz)	2.92 dB

1.8 Summary of Measurement

Report Clause	Test Parameter	Reference Document CFR47 Part15	Results
3	20dB Bandwidth test	§15.247(a)(1)	Pass
4	Carrier Frequency Separation test	§15.247(a)(1)	Pass
5	Number of hopping frequencies test	§15.247(a)(1)	Pass
6	Time of Occupancy (dwell time) test	§15.247(a)(1)	Pass
7	Maximum Peak output power test	§15.247(b)	Pass
8	RF Conducted spurious emission & Band-edge	§15.247(d)	Pass
9	RF Radiated spurious emission test	§15.205, 15.209	Pass
10	AC Power Line Conducted Emission test	§15.207	Pass

1.9 Justification

The test of radiated measurements according to FCC Part15 Section 15.33(a) had been conducted and the field strength of the frequency band were all arrive limit requirement, thus we evaluate the EUT pass the specified test.

2 Test specifications

2.1 Test standard

The EUT was performed according to FCC Part 15 Subpart C Section 15.247 procedure and setup followed by ANSI C63.10, 2013 requirements.

2.2 Operation mode

By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that “Z axis” position was the worst, then the final test was executed the worst condition and test data were recorded in this report

The EUT was operated in continuous transmission mode during all of the tests.

X axis mode

Y axis mode

Z axis mode

2.3 Test Step of EUT

2.3.1 Setup the fixture to EUT for power supplying.

2.3.2 Turn on the power of all equipment.

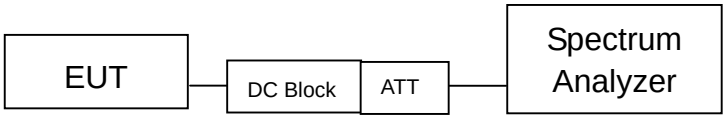
2.3.3 Let the EUT continuous transmission. Executed the test.

3 20dB Bandwidth test

3.1 Limit

For frequency hopping systems operating in the 902–928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

3.2 Configuration of Measurement



3.3 Test Procedure

The EUT was setup to ANSI C63.10, 2013; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.
The 20dB bandwidth per FCC §15.247(a)(1) was measured using a 50 ohm spectrum analyzer with the resolutions bandwidth set at 10 kHz, the video bandwidth≧RBW, and the SPAN may equal to approximately 2 to 3 time the 20dB bandwidth.

3.4 Test Result

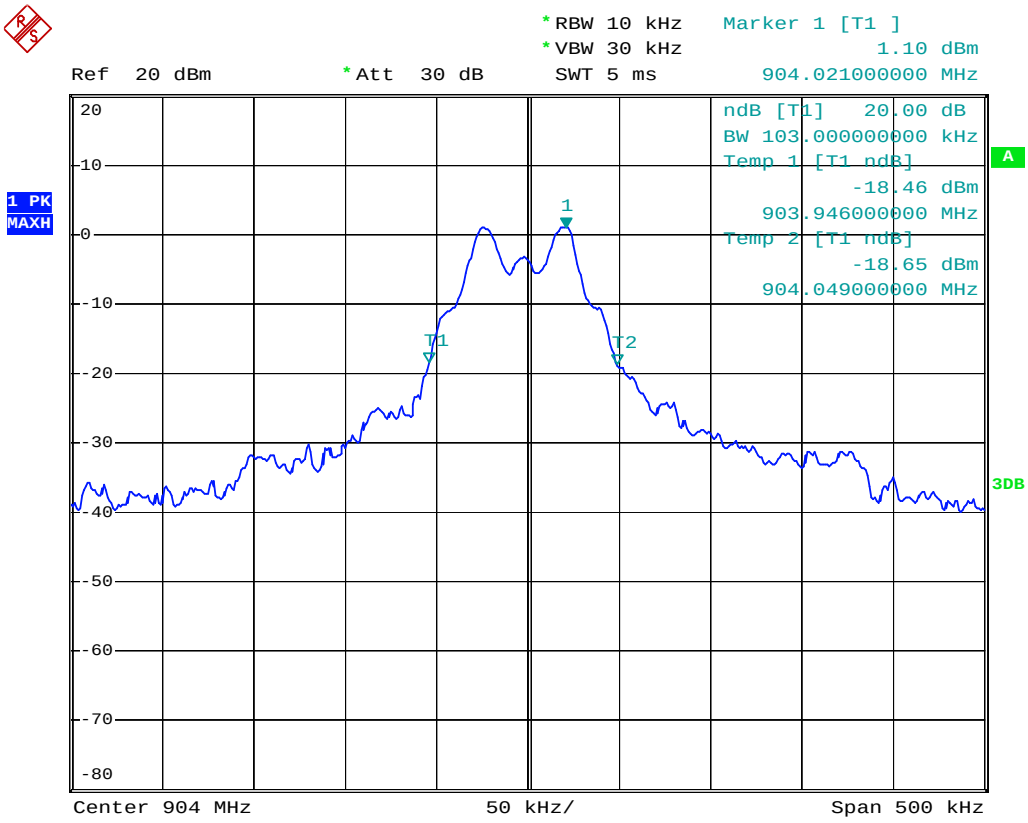
PASS.

The final test data is shown as following pages.

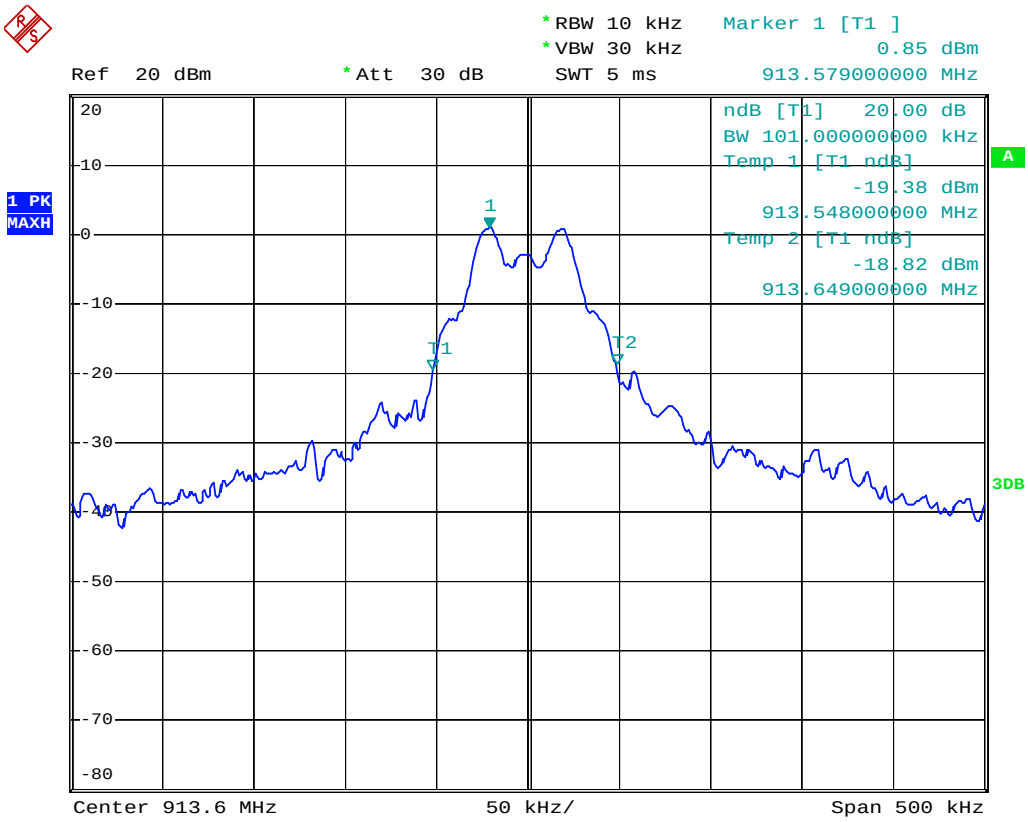
20dB bandwidth

Test CH		20dB Bandwidth (kHz)	Limit (kHz)	Result
CH No.	Freq. (MHz)			
0	904.0	103.0	＜ 250	PASS
24	913.6	101.0	＜ 250	PASS
49	923.6	98.0	＜ 250	PASS

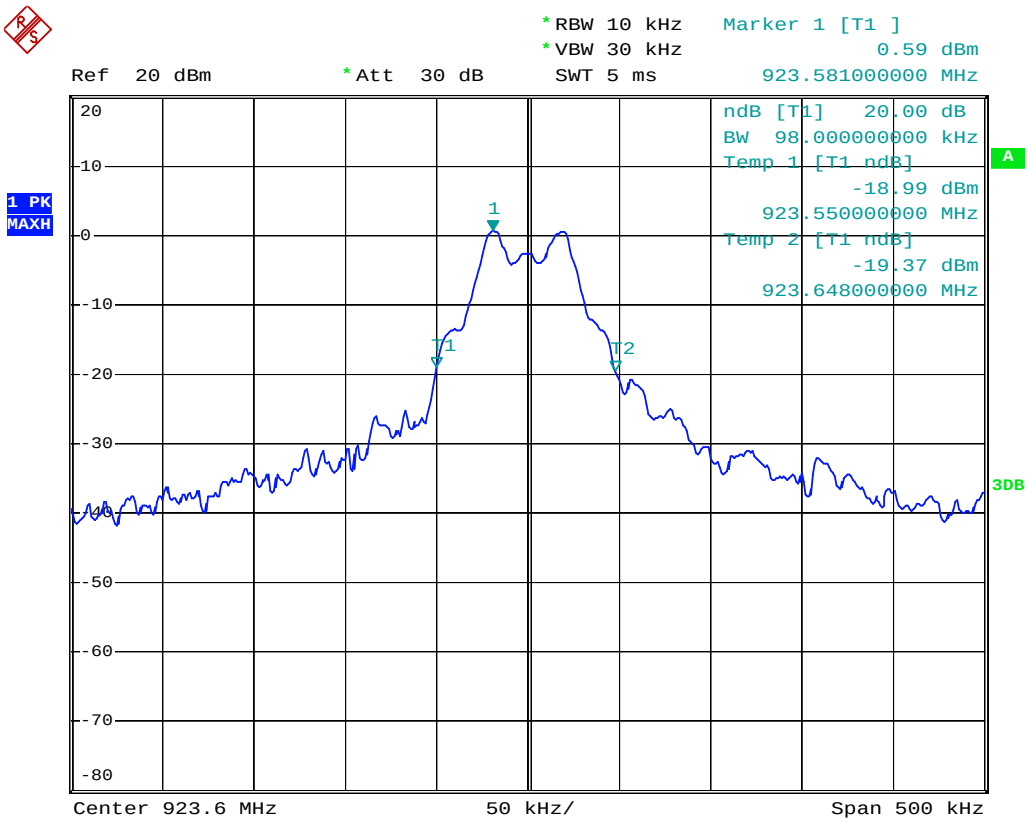
CH0 904.0MHz



CH12 913.6MHz



CH49 923.6MHz

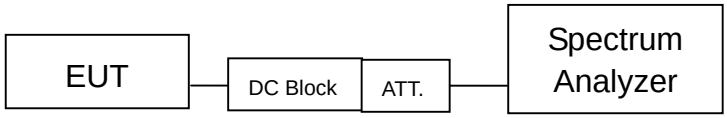


4 Carrier Frequency Separation test

4.1 Limit

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater.

4.2 Configuration of Measurement



4.3 Test Procedure

The EUT was setup to ANSI C63.10, 2013; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.
The carrier frequency separation per FCC Part15.247(a)(1) was measured using a 50 ohm spectrum analyzer with the resolutions bandwidth set at ≧1% of the span, the video bandwidth≧RBW, and the SPAN was wide enough to capture the peaks of two adjacent channels.

4.4 Test Result

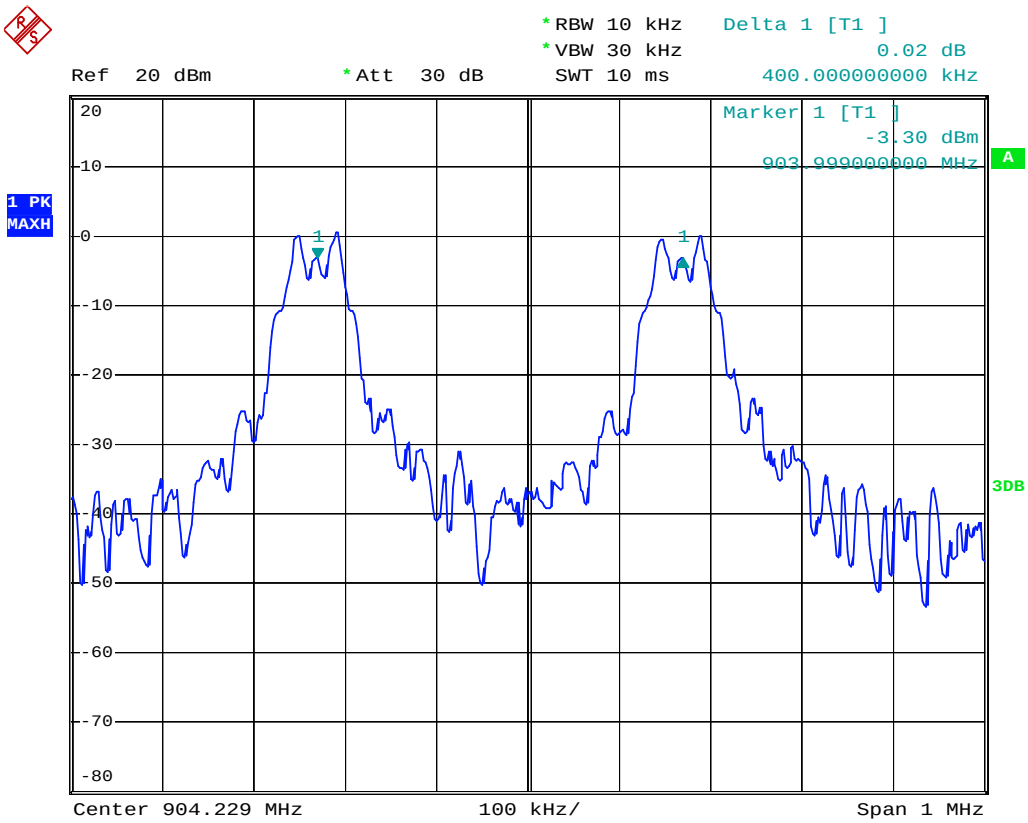
PASS.

The final test data is shown as following pages.

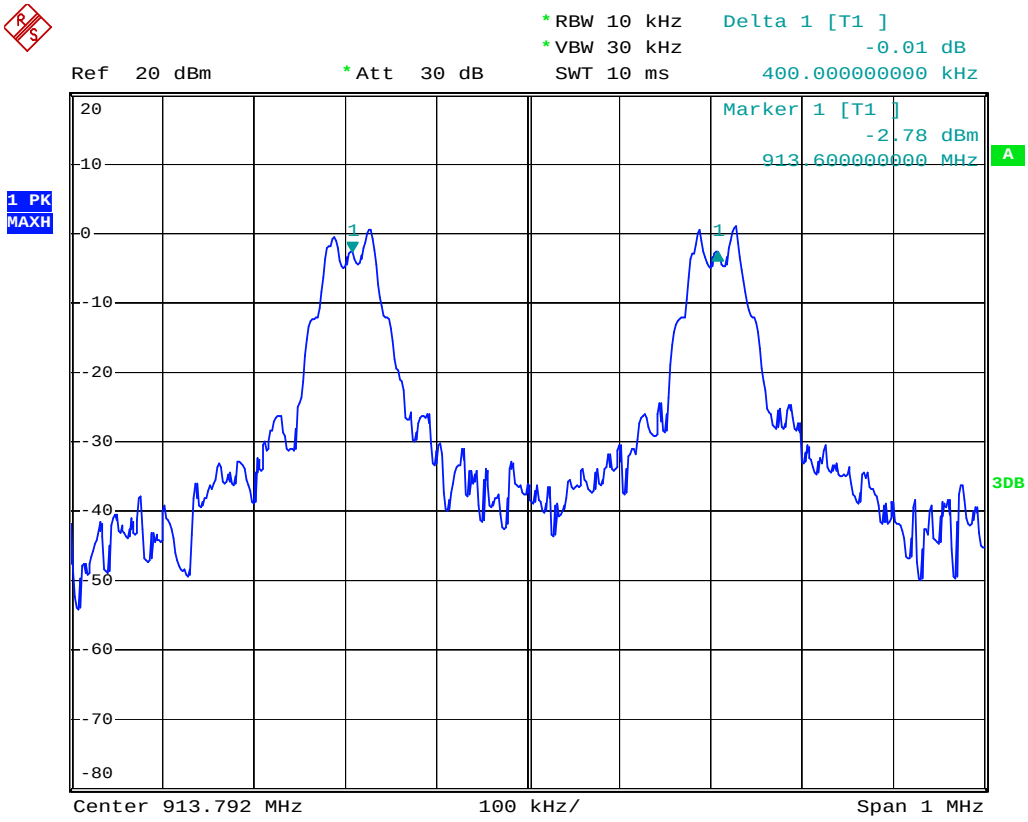
Carrier Frequency Separation test

Modulation type	Frequency (MHz)	Separation (kHz)	Result
2FSK	904 - 904.4	400.0	PASS
2FSK	913.6 - 914	400.0	PASS
2FSK	923.2 - 923.6	400.0	PASS

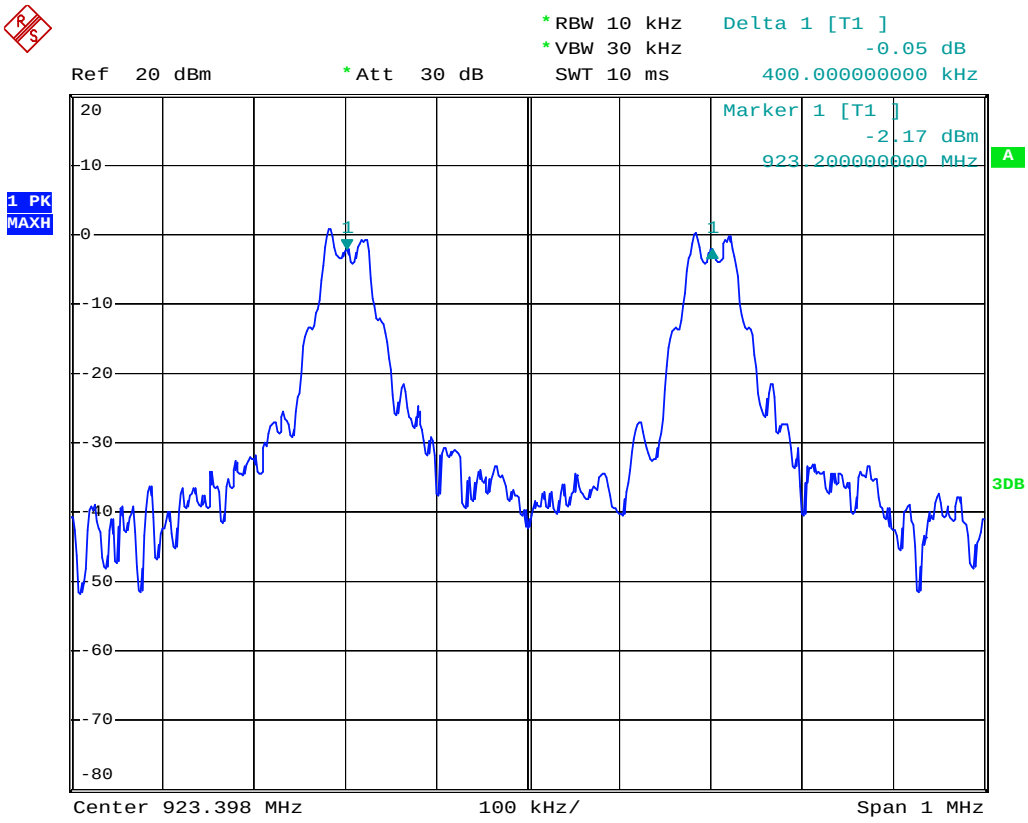
Channel Separation (904.0MHz)



Channel Separation (913.6MHz)

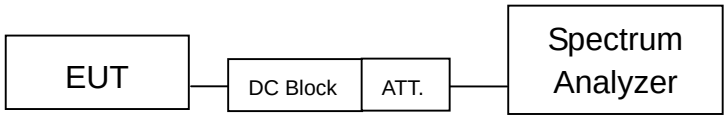


Channel Separation (923.6MHz)



5 Number of hopping frequencies test

5.1 Configuration of Measurement



5.2 Test Procedure

The EUT was setup to ANSI C63.10, 2013; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

The number of hopping frequencies per FCC Part15.247(a)(1) was measured using a 50 ohm spectrum analyzer with the resolutions bandwidth set at ≧1% of the span, the video bandwidth≧RBW, and the SPAN was the frequency band of operation.

5.3 Test Result

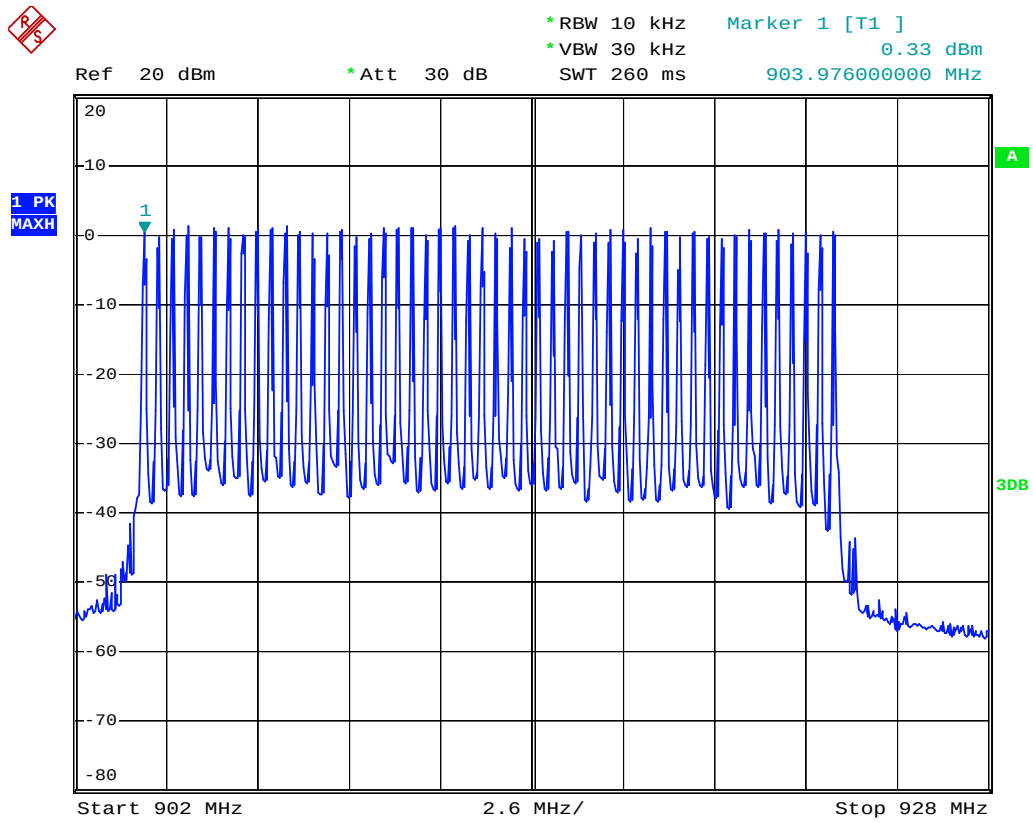
PASS.

The final test data is shown as following pages.

Number of hopping frequencies test

Modulation type	Channel No.
2FSK	50

Channel Number

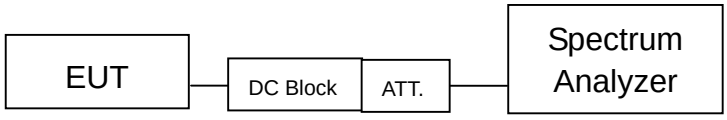


6 Time of Occupancy (dwell time) test

6.1 Limit

For frequency hopping systems operating in the 902–928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

6.2 Configuration of Measurement



6.3 Test Procedure

The EUT was setup to ANSI C63.10, 2013; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.
According to FCC Part15.247(a)(1) the time of occupancy (dwell time) was measured using a 50 ohm spectrum analyzer with the resolutions bandwidth set at 1MHz, the video bandwidth≧ RBW and the zero span function of spectrum analyzer was enable. The EUT has its hopping function enable.

6.4 Test Result

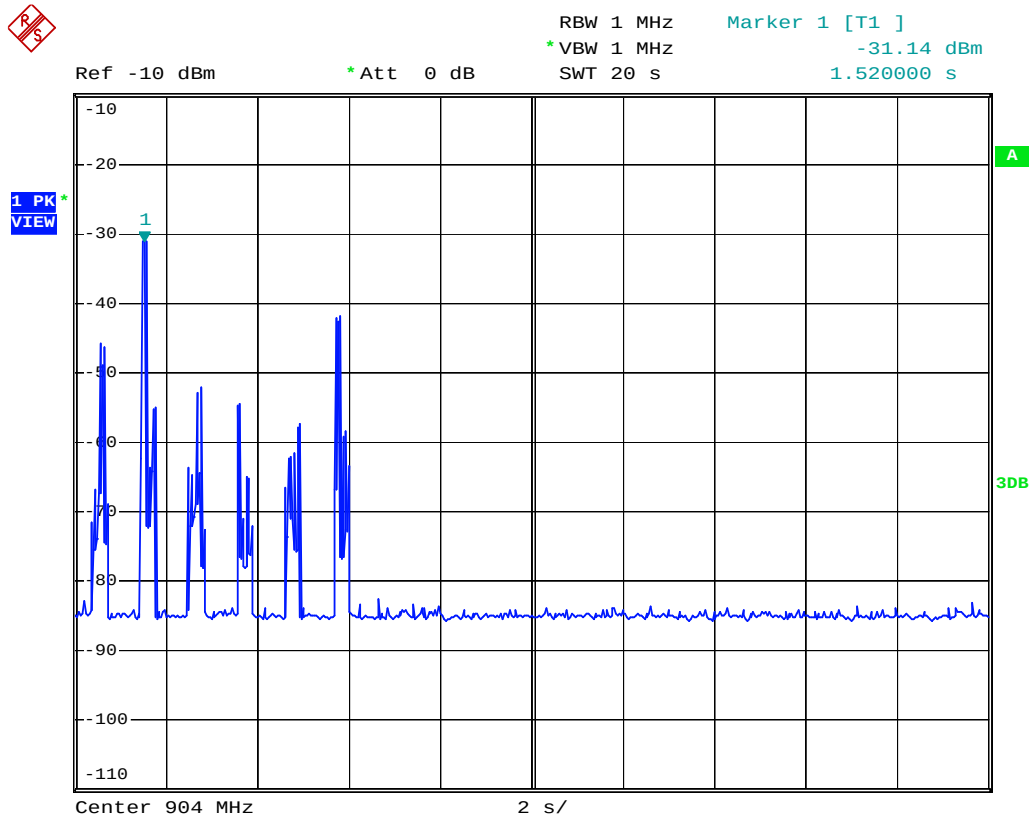
PASS.

The final test data is shown as following pages.

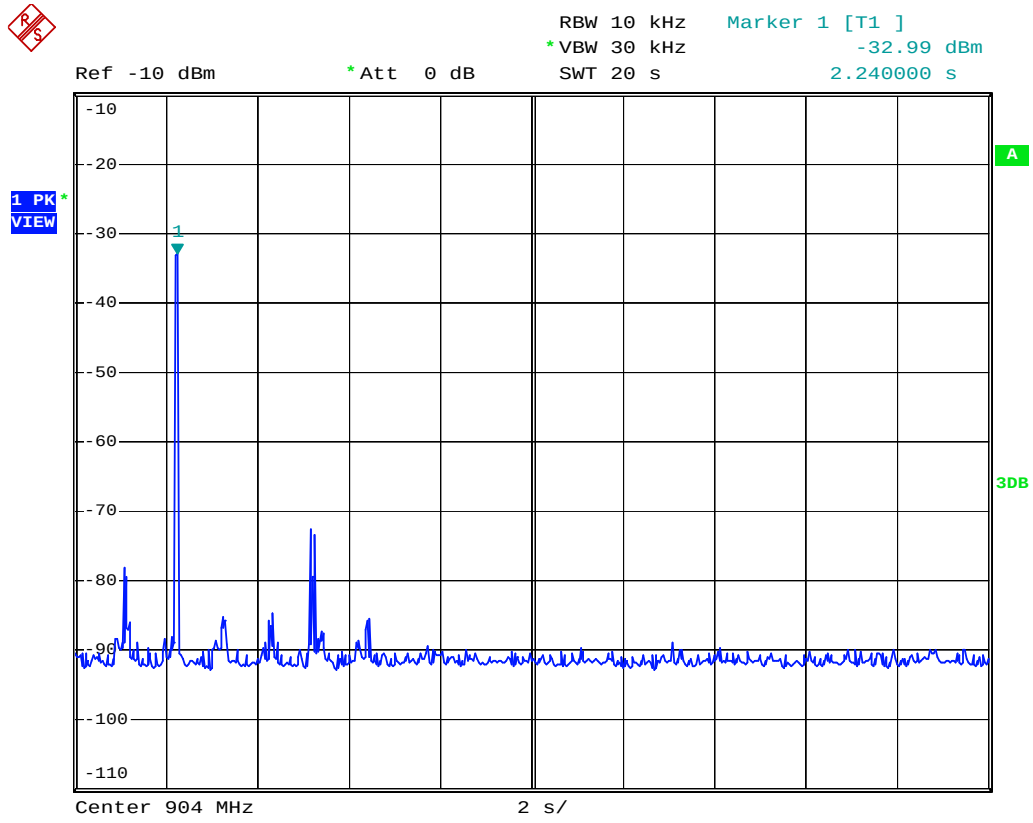
Time of Occupancy (dwell time) test

1 occurrences in 20 seconds x 63.262 ms = 63.262 ms which is less than 400 ms.

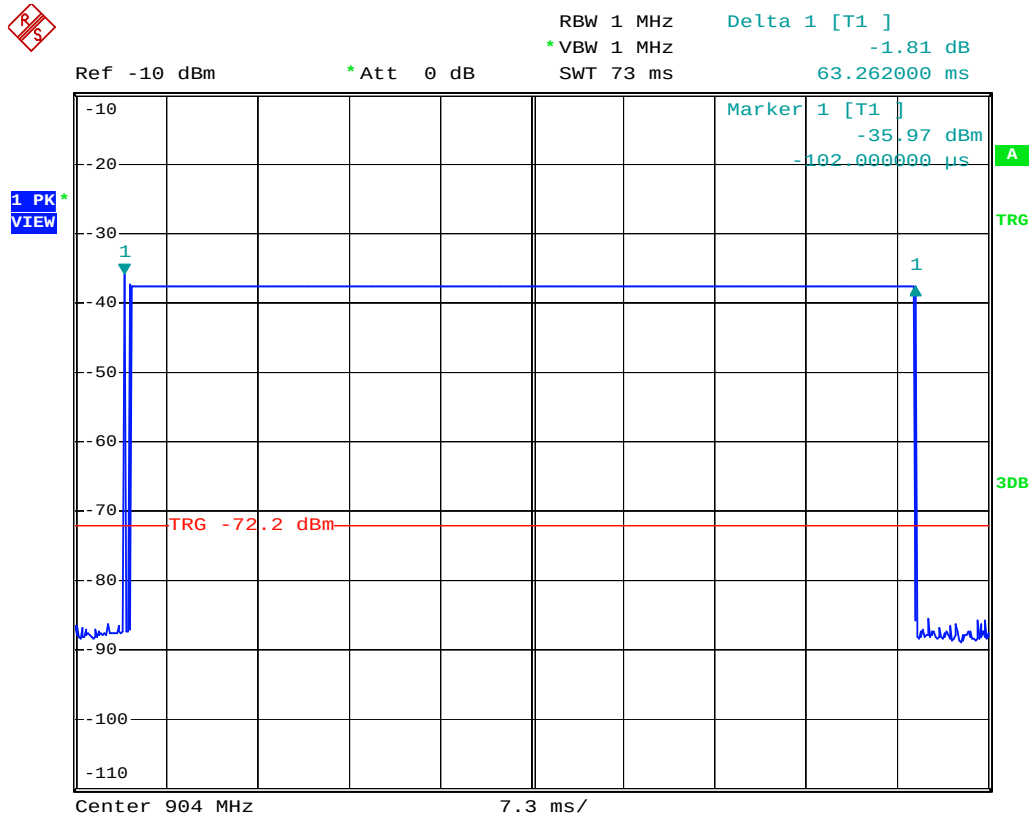
Time of occupancy-1



Time of occupancy-2 (10kHz)



Time of occupancy-3

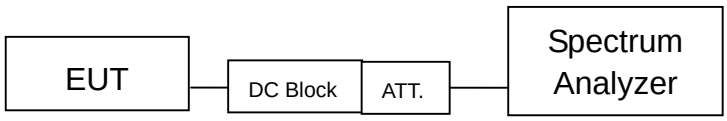


7 Maximum Output Power test

7.1 Limit

For frequency hopping systems operating in the 902–928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.

7.2 Configuration of Measurement



7.3 Test Procedure

The EUT was setup to ANSI C63.10, 2013; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.
For FCC Part 15.247(b) the power output per was measured on the EUT using a 50 ohm SMA cable connected to peak Spectrum Analyzer. Peak output power was read directly from Spectrum Analyzer. The test was performed at 3 channels (lowest, middle and highest).

7.4 Test Result

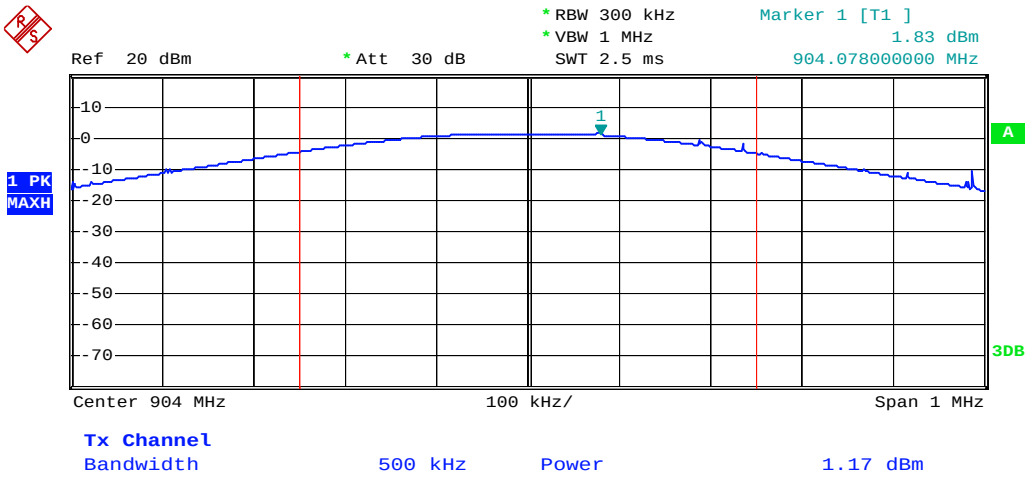
PASS.

The final test data is shown as following pages.

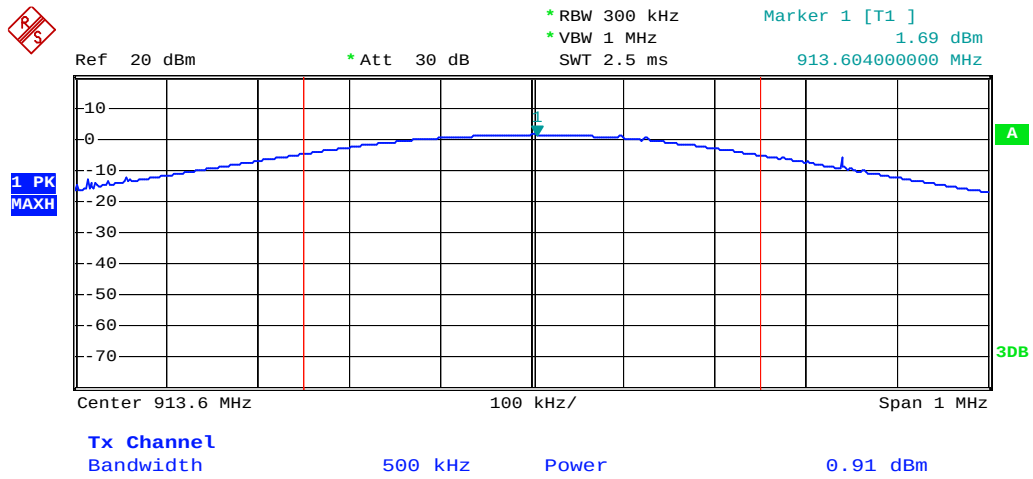
Maximum output power

Channel	Frequency (MHz)	Output peak power (dBm)	Output peak power (W)	Limit (dBm)	Margin (dB)
0	904.0	1.83	0.0015	30	-28.17
24	913.6	1.69	0.0015	30	-28.31
49	923.6	1.15	0.0013	30	-28.85

CH0 904.0MHz



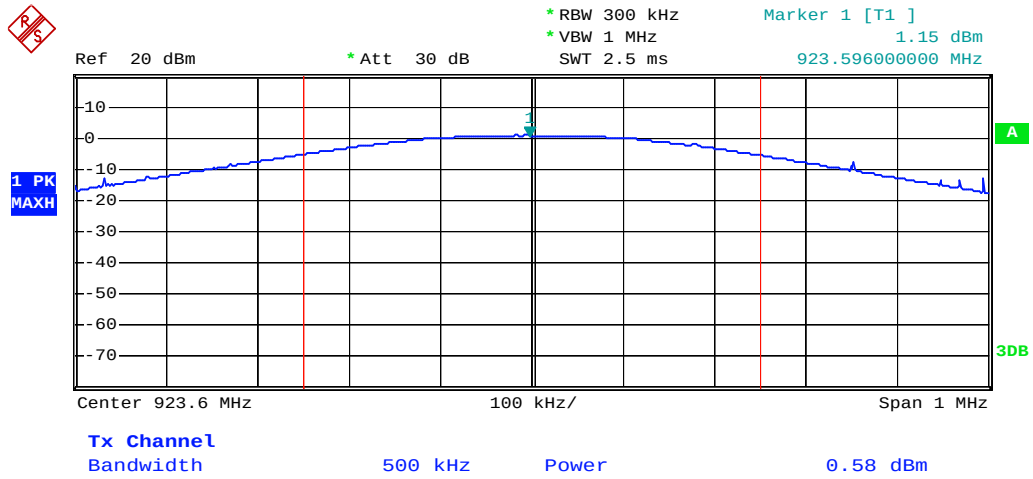
CH24 913.6MHz



Tx Channel

Bandwidth	500 kHz	Power	0.91 dBm

CH49 923.6 MHz



Tx Channel

Bandwidth	500 kHz	Power	0.58 dBm

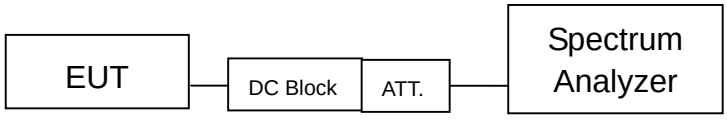
8 RF Conducted Spurious Emission & Band-edge

8.1 Limit

According to FCC Part 15.247(d) requirement：

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

8.2 Configuration of Measurement



8.3 Test Procedure

The EUT was setup to ANSI C63.10, 2013; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

RF antenna conducted spurious emissions was measured from the EUT antenna port using a 50ohm spectrum analyzer with the resolution bandwidth set at 100 kHz, and the video bandwidth set ≧100 kHz.

The measurements were performed from 9 kHz to 10 GHz.

8.4 Test Result

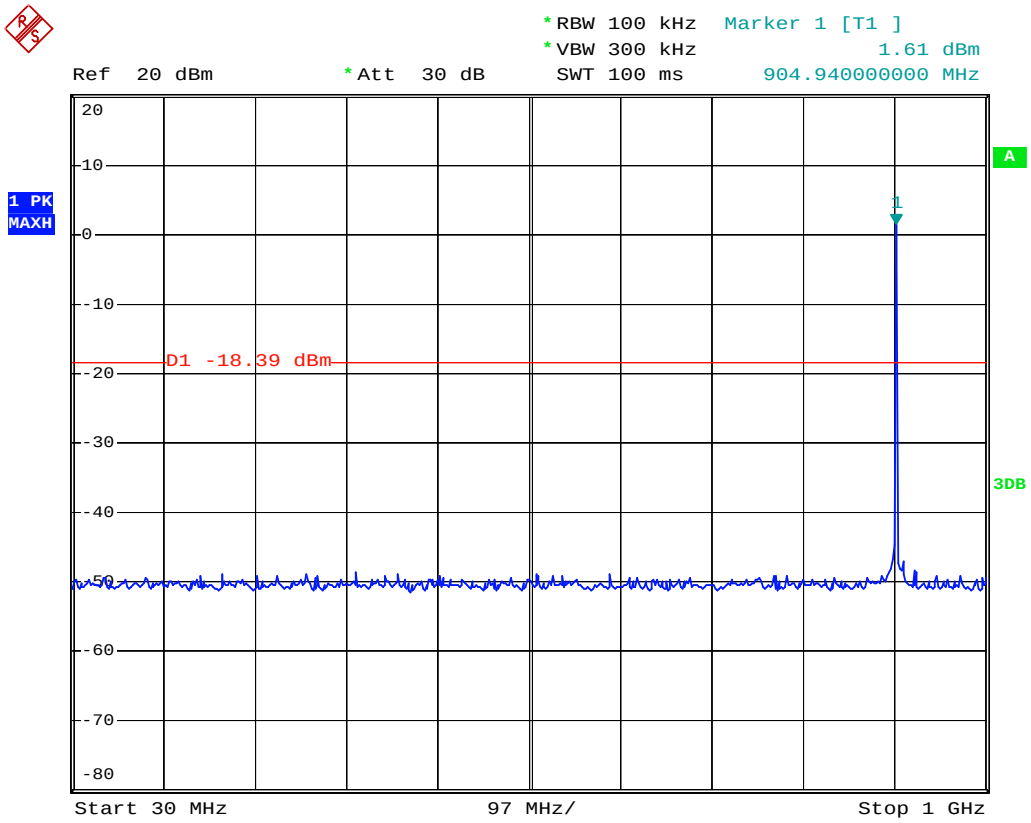
PASS.

The final test data is shown as following pages.

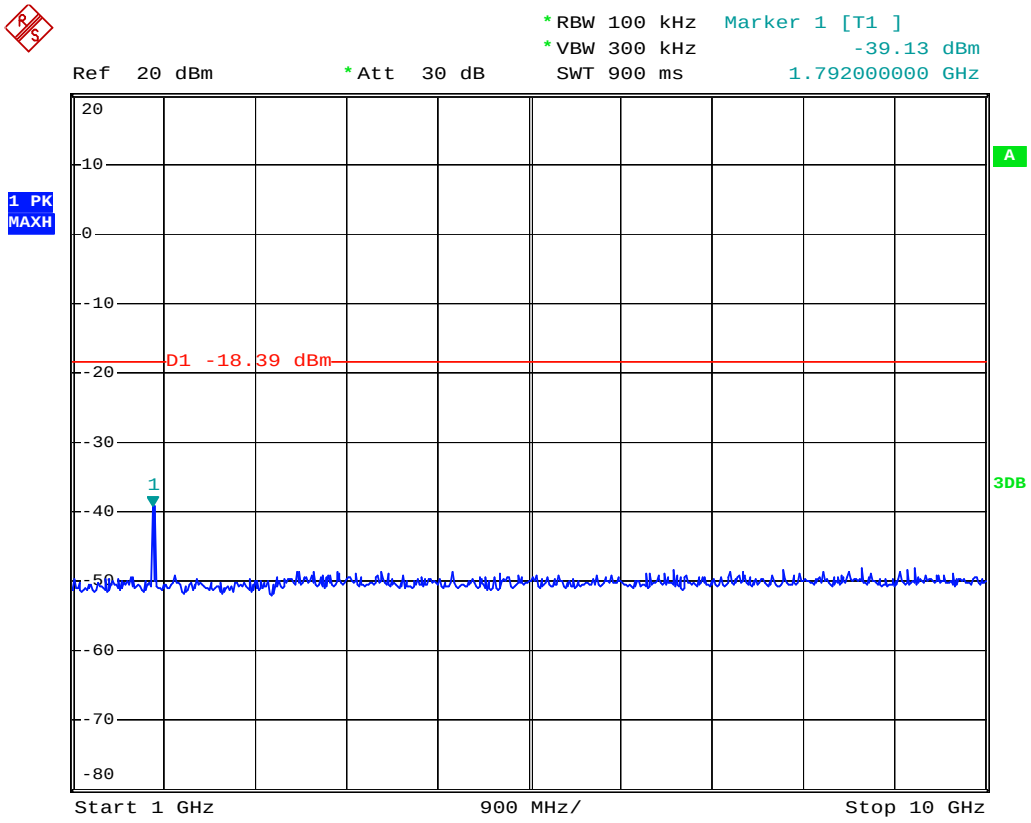
Remark: The frequency range from 9 kHz to 30 MHz was pre-scanned and the results were 20 dB lower than the limit line which according to FCC 15.31(o) needs not be recorded.

Conducted spurious emission

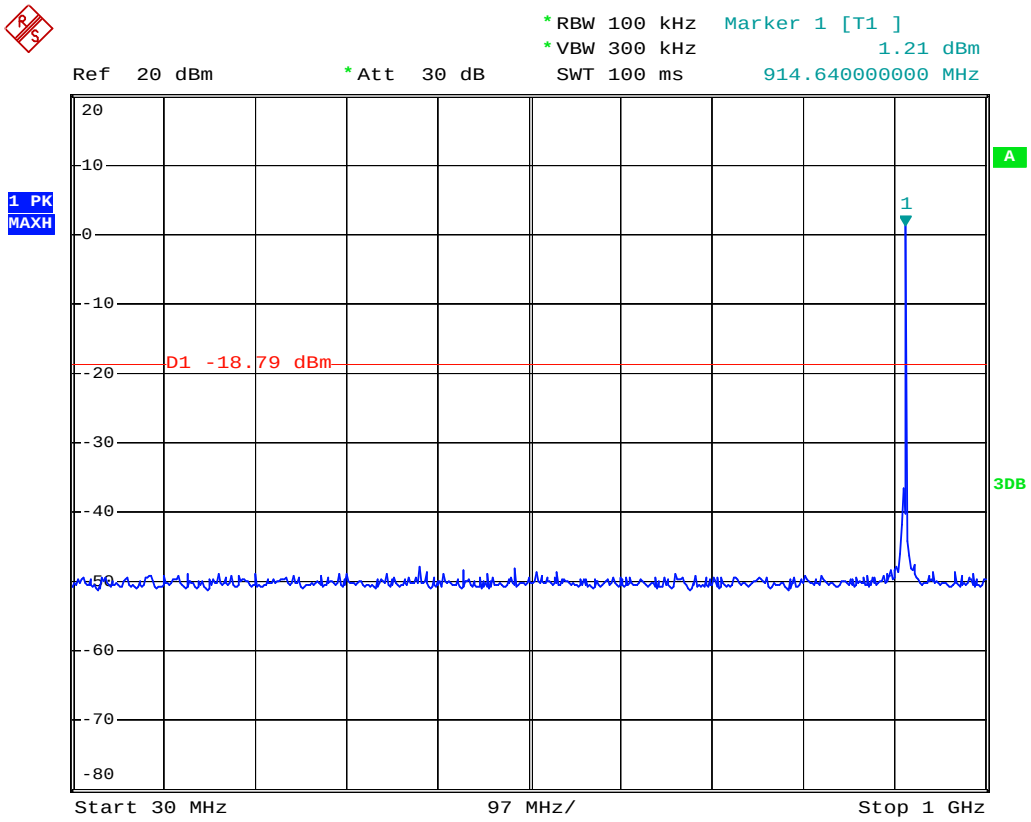
904.0MHz (30MHz ~ 1GHz)



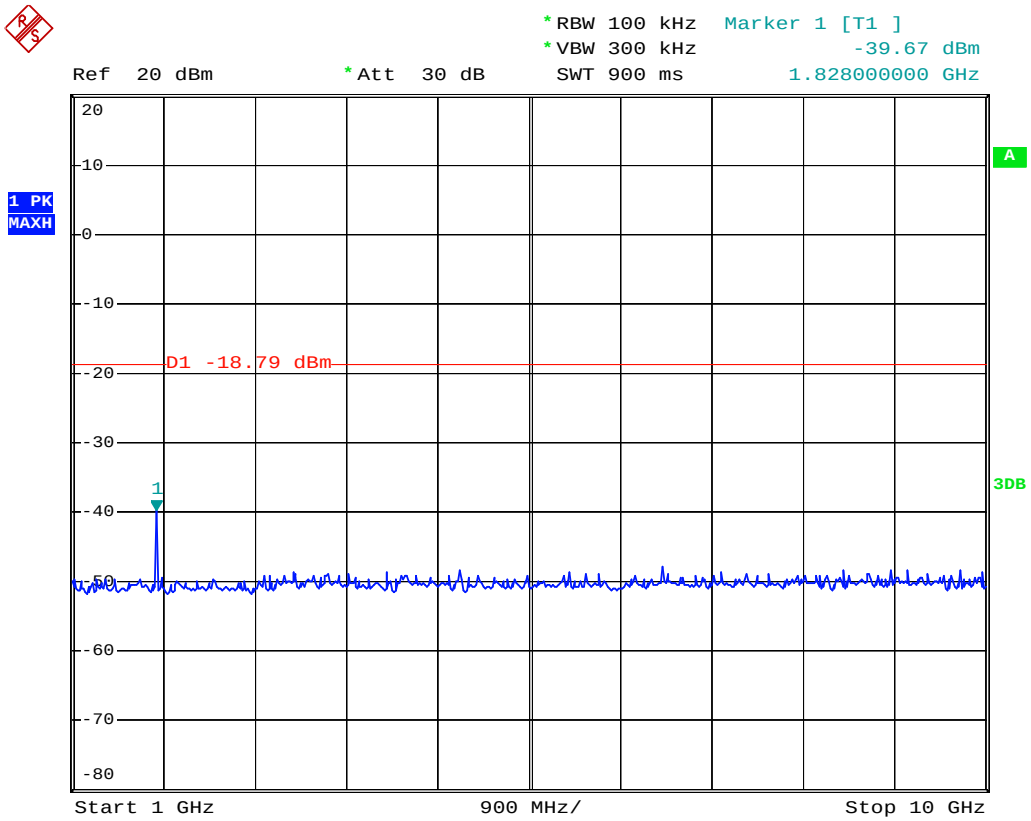
904.0MHz (1~10GHz)



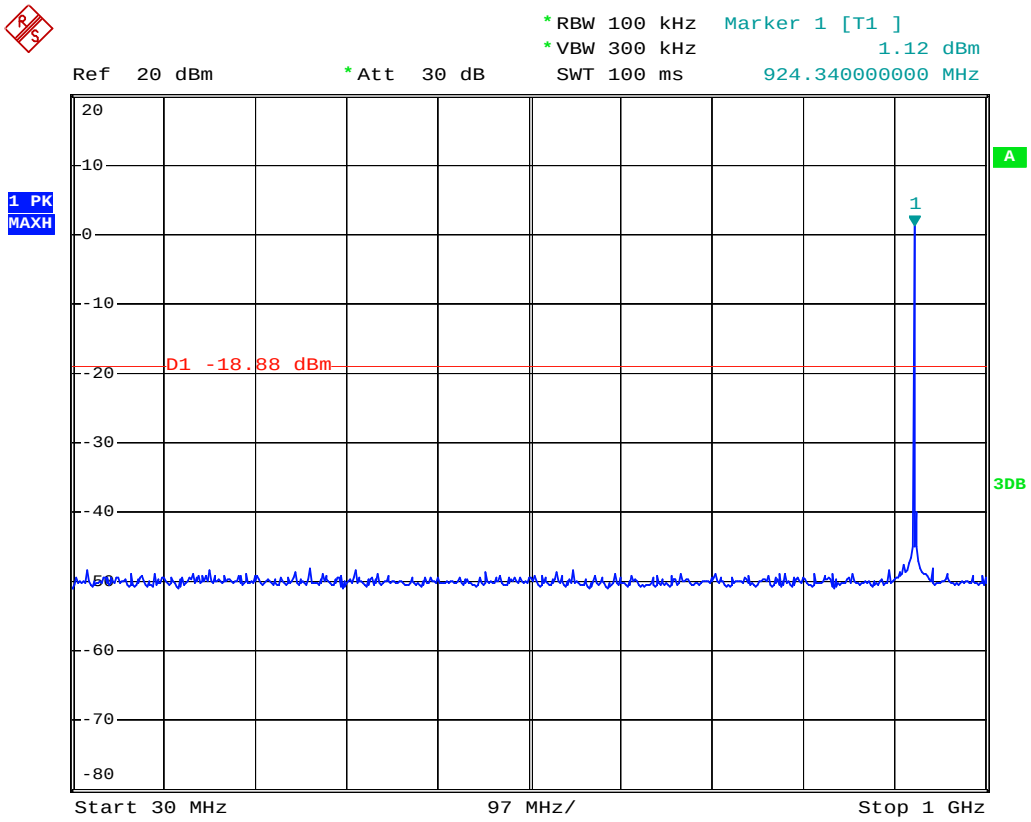
913.6MHz (30MHz ~ 1GHz)



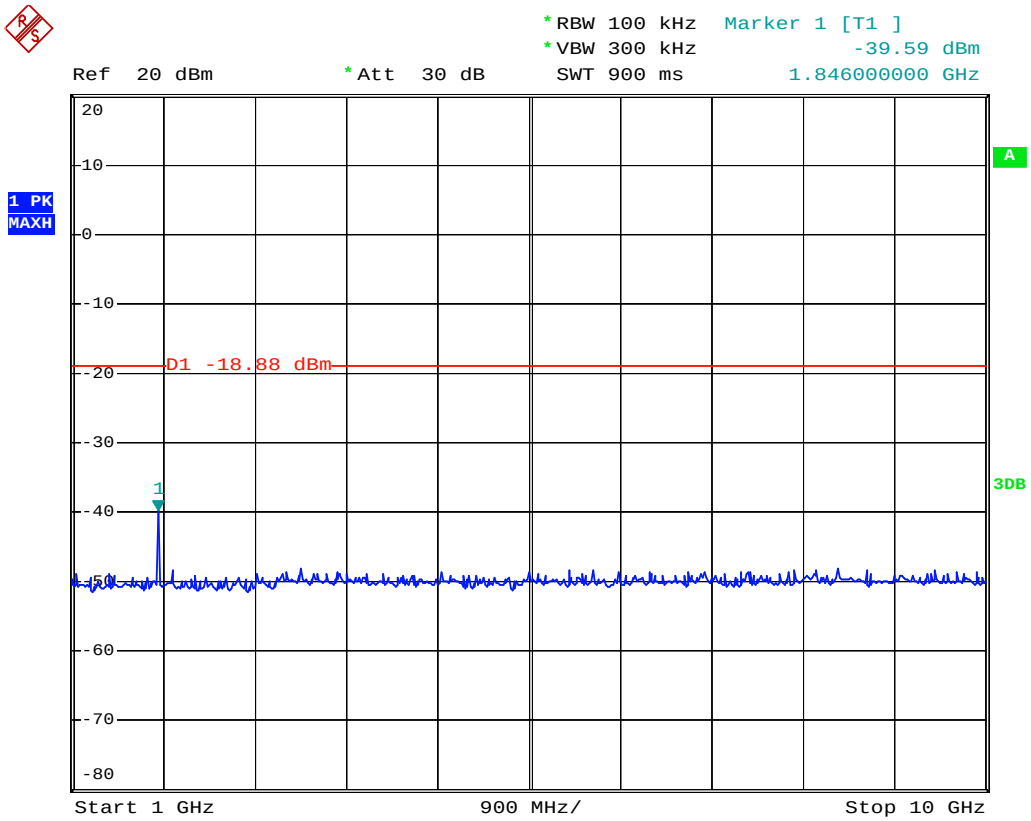
913.6MHz (1~10GHz)



923.6MHz (30MHz ~ 1GHz)

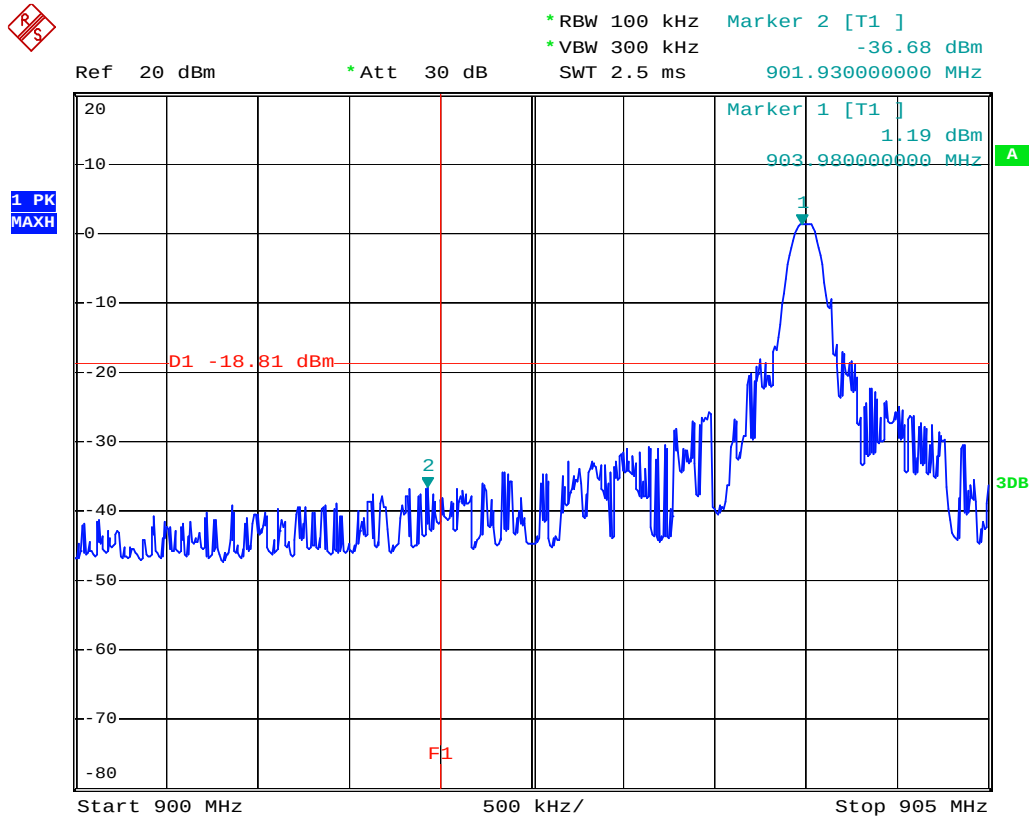


923.6MHz (1~10GHz)

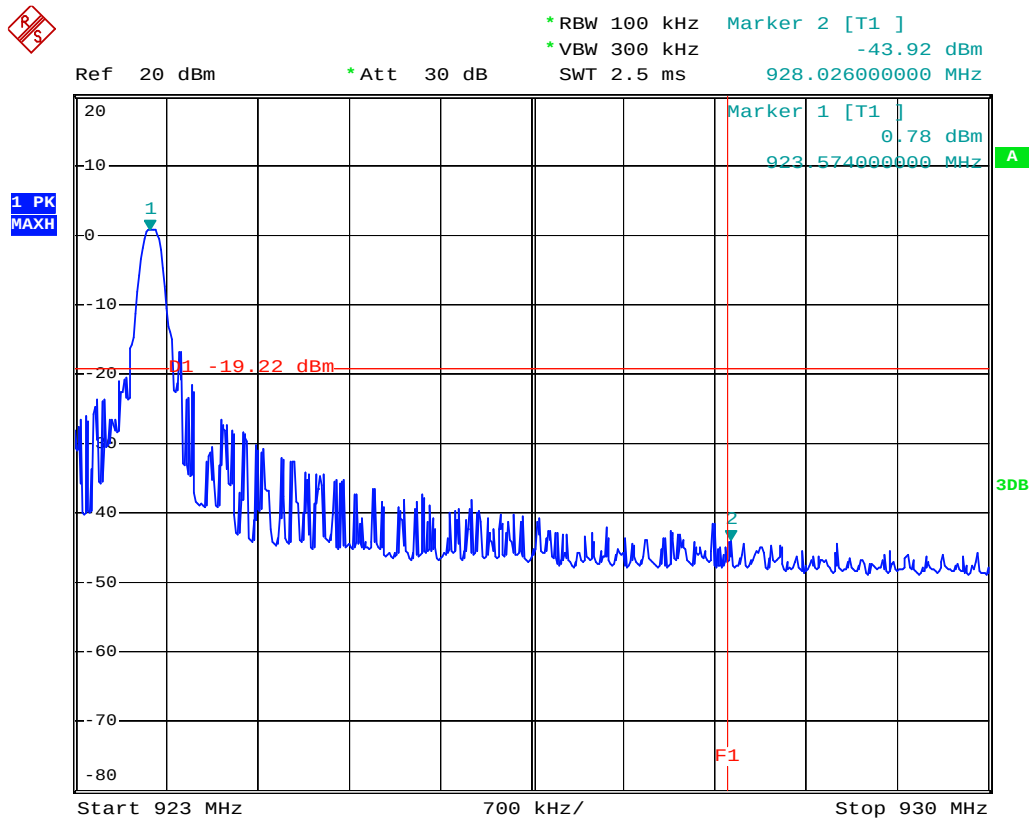


Band-edge

904.0 MHz



928.0 MHz



9 RF Radiated spurious emission test

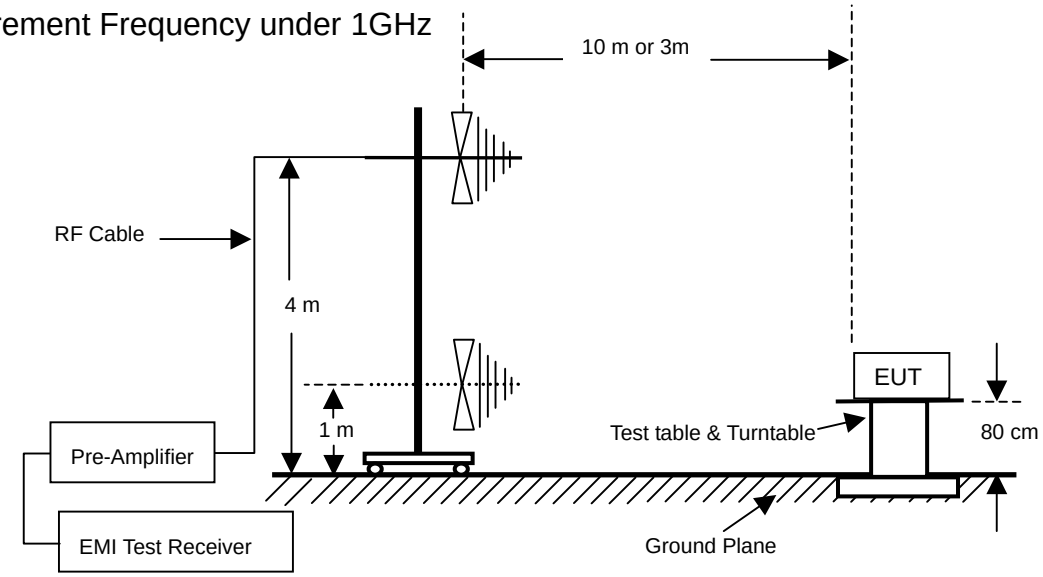
9.1 Limit

For intentional radiator, the radiated emission shall comply with FCC Part 15.209(a).
For intentional radiators, according to FCC Part 15.247 (a), operation under this provision is limited to frequency hopping and direct sequence spread spectrum, and the out band emission shall be comply with FCC Part 15.247 (c)

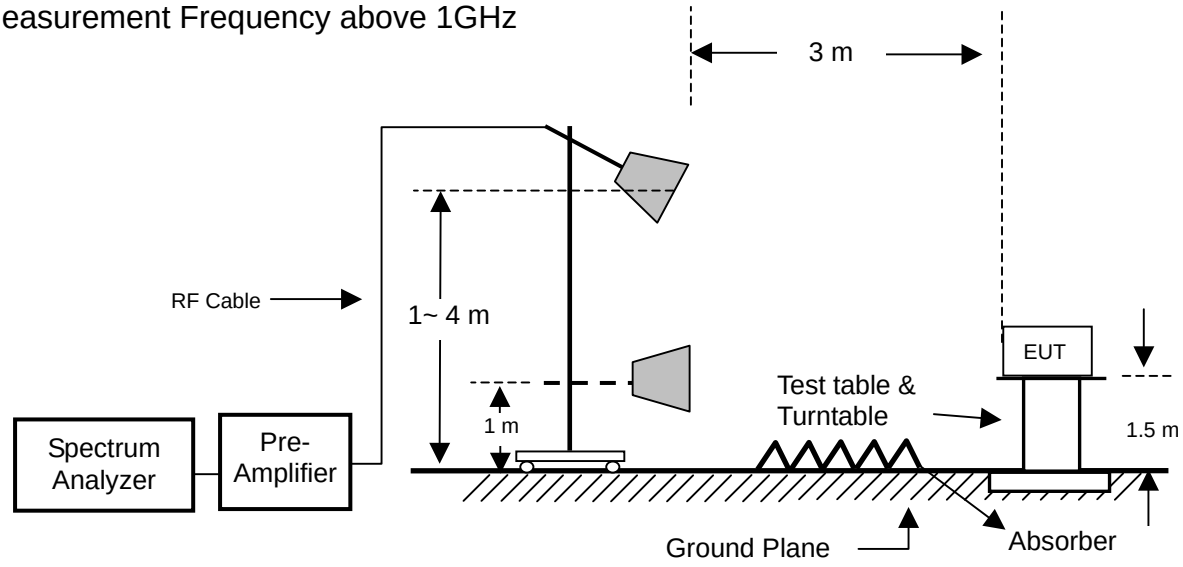
Frequency (MHz)	Field strength dB(μV/m)	Measurement distance (meters)
1.705~30.0	29.5	30
30 ~ 88	40	3
88~216	43.5	3
216~960	46	3
Above 960	54	3

9.2 Configuration of Measurement

Measurement Frequency under 1GHz



Measurement Frequency above 1GHz



9.3 Test Procedure

The EUT was setup to ANSI C63.10, 2013; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

Radiated emission measurements were performed from 9kHz to 10GHz. Spectrum Analyzer set as below: For frequency range from 9kHz to 30MHz RBW=9kHz; 30MHz to 1GHz: RBW=100kHz or greater. For frequencies above 1GHz: set RBW=VBW=1MHz for peak detector and RBW=1MHz, VBW=10Hz for average detector.

The EUT for testing is arranged on a wooden turntable. If some peripherals apply to the EUT, the peripherals will be connected to EUT and whole system. During the test, all cables were arranged to present worst-case emissions. The signal is maximized through rotation. The height of antenna and polarization is changing constantly for exploring for maximum signal level. The height of antenna can be up to 4 meter and down to 1 meter.

9.4 Test Result

PASS.

The final test data is shown as following pages.

Radiated Emission Below 1 GHz

After verifying low, middle and high channel, worse case was found at Low channel

Frequency	Antenna	Reading	Preamp	Correction Factor	Corrected Level	Limits	Margin	Det
(MHz)	Polarization	(dBuV)	(dB)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Mode
96.25	H	40.13	31.55	17.810	26.39	43.52	-17.13	PK
170.20	H	36.56	31.29	17.670	22.94	43.52	-20.58	PK
211.32	H	35.40	31.21	17.670	21.86	43.52	-21.66	PK
376.90	H	32.94	31.30	24.160	25.80	46.02	-20.22	PK
478.23	H	30.91	31.29	25.990	25.61	46.02	-20.41	PK
578.46	H	31.70	31.34	27.480	27.84	46.02	-18.18	PK
54.40	V	38.12	31.66	17.960	24.42	40.00	-15.58	PK
116.40	V	35.78	31.47	21.820	26.13	43.52	-17.39	PK
169.53	V	38.65	31.29	17.760	25.12	43.52	-18.40	PK
297.30	V	34.15	31.24	21.920	24.83	46.02	-21.19	PK
463.20	V	30.89	31.30	25.750	25.34	46.02	-20.68	PK
645.89	V	29.90	31.34	28.440	27.00	46.02	-19.02	PK

Remark ： Corrected Level = Reading + Correction Factor - Preamp
Correction Fcator = Antenna Factor + Cable Loss
Margin = Correction Factor - Limits
*ANSI C63.10_2013_11.12.2.3: As an alternative to CISPR quasi-peak measurement, compliance can be determined for the applicable emission requirements using a peak detector.

Radiated Emission Above 1 GHz

Radiated emission above 1 GHz (Worse case Z axis)

CH0 (904.0MHz)

Frequency	Antenna	Reading	Preamp	Correction Factor	Corrected Level	Limits	Margin	Det
(MHz)	Polarization	(dBuV)	(dB)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Mode
1808(X Axis)	H	66.43	52.84	32.24	45.83	54	-8.17	PK
1808(Y Axis)	H	71.78	52.84	32.24	51.18	54	-2.82	PK
1808(Z Axis)	**H**	**73.94**	**52.84**	**32.24**	**53.34**	**74**	**-20.66**	**PK**
1808(Z Axis)	**H**	**71.91**	**52.84**	**32.24**	**51.31**	**54**	**-2.69**	**AV**
2712.0	H	63.74	52.34	35.26	46.66	54	-7.34	PK
3616.0	H	62.58	52.48	37.27	47.37	54	-6.63	PK
4520.0	H	58.02	52.40	40.04	45.66	54	-8.34	PK
5424.0	H	57.61	52.50	42.22	47.33	54	-6.67	PK
6328.0	H	56.72	52.23	44.85	49.34	54	-4.66	PK
7232.0	H	56.04	52.22	47.92	51.74	54	-2.26	PK
8136.0	H	54.63	51.83	49.95	52.75	54	-1.25	PK
9040.0	H	54.12	52.01	50.59	52.70	54	-1.30	PK
1808(X Axis)	V	73.02	52.84	32.24	52.42	54	-1.58	PK
1808(Y Axis)	V	71.09	52.84	32.24	50.49	54	-3.51	PK
1808(Z Axis)	V	69.23	52.84	32.24	48.63	54	-5.37	PK
2712.0	V	65.91	52.34	35.26	48.83	54	-5.17	PK
3616.0	V	61.61	52.48	37.27	46.40	54	-7.60	PK
4520.0	V	58.39	52.40	40.04	46.03	54	-7.97	PK
5424.0	V	57.56	52.50	42.22	47.28	54	-6.72	PK
6328.0	V	57.91	52.23	44.85	50.53	54	-3.47	PK
7232.0	V	55.80	52.22	47.92	51.50	54	-2.50	PK
8136.0	V	54.79	51.83	49.95	52.91	54	-1.09	PK
9040.0	V	54.32	52.01	50.59	52.90	54	-1.10	PK

Remark ： Corrected Level = Reading + Correction Factor – Preamp
Correction Fcator = Antenna Factor + Cable Loss
Margin = Correction Factor - Limits
* Mark indicated background noise level.

CH24 (913.6MHz)

Frequency	Antenna	Reading	Preamp	Correction Factor	Corrected Level	Limits	Margin	Det
(MHz)	Polarization	(dBuV)	(dB)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Mode
1827.2	H	72.74	52.83	32.31	52.22	74	-21.78	PK
1827.2	H	70.63	52.83	32.31	50.11	54	-3.89	AV
2740.8	H	64.72	52.35	35.33	47.70	54	-6.30	PK
3654.4	H	61.67	52.47	37.38	46.58	54	-7.42	PK
4568.0	H	57.93	52.41	40.18	45.70	54	-8.30	PK
5481.6	H	56.59	52.50	42.33	46.42	54	-7.58	PK
6395.2	H	56.22	52.22	45.15	49.15	54	-4.85	PK
7308.8	H	54.99	52.13	48.20	51.06	54	-2.94	PK
8222.4	H	54.31	51.84	50.01	52.48	54	-1.52	PK
9136.0	H	54.13	52.03	50.81	52.91	54	-1.09	PK
1827.2	V	68.98	52.83	32.31	48.46	54	-5.54	PK
2740.8	V	64.17	52.35	35.33	47.15	54	-6.85	PK
3654.4	V	60.56	52.47	37.38	45.47	54	-8.53	PK
4568.0	V	58.21	52.41	40.18	45.98	54	-8.02	PK
5481.6	V	56.58	52.50	42.33	46.41	54	-7.59	PK
6395.2	V	57.02	52.22	45.15	49.95	54	-4.05	PK
7308.8	V	55.70	52.13	48.20	51.77	54	-2.23	PK
8222.4	V	54.32	51.84	50.01	52.49	54	-1.51	PK
9136.0	V	54.09	52.03	50.81	52.87	54	-1.13	PK

Remark ： Corrected Level = Reading + Correction Factor – Preamp
Correction Fcator = Antenna Factor + Cable Loss
Margin = Correction Factor - Limits
* Mark indicated background noise level.

CH49 (923.6MHz)

Frequency	Antenna	Reading	Preamp	Correction Factor	Corrected Level	Limits	Margin	Det
(MHz)	Polarization	(dBuV)	(dB)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Mode
1847.2	H	72.95	52.83	32.40	52.52	74	-21.48	PK
1847.2	H	70.90	52.83	32.40	50.47	54	-3.53	AV
2770.8	H	64.83	52.35	35.40	47.88	54	-6.12	PK
3694.4	H	60.53	52.46	37.50	45.57	54	-8.43	PK
4618.0	H	57.15	52.42	40.33	45.06	54	-8.94	PK
5541.6	H	56.89	52.48	42.45	46.86	54	-7.14	PK
6465.2	H	55.79	52.21	45.45	49.03	54	-4.97	PK
7388.8	H	55.09	52.03	48.50	51.56	54	-2.44	PK
8312.4	H	54.41	51.86	50.07	52.62	54	-1.38	PK
9236.0	H	53.93	52.05	51.05	52.93	54	-1.07	PK
1847.2	V	69.32	52.83	32.40	48.89	54	-5.11	PK
2770.8	V	64.29	52.35	35.40	47.34	54	-6.66	PK
3694.4	V	58.85	52.46	37.50	43.89	54	-10.11	PK
4618.0	V	56.68	52.42	40.33	44.59	54	-9.41	PK
5541.6	V	56.41	52.48	42.45	46.38	54	-7.62	PK
6465.2	V	55.62	52.21	45.45	48.86	54	-5.14	PK
7388.8	V	54.73	52.03	48.50	51.20	54	-2.80	PK
8312.4	V	54.38	51.86	50.07	52.59	54	-1.41	PK
9236.0	V	54.12	52.05	51.05	53.12	54	-0.88	PK

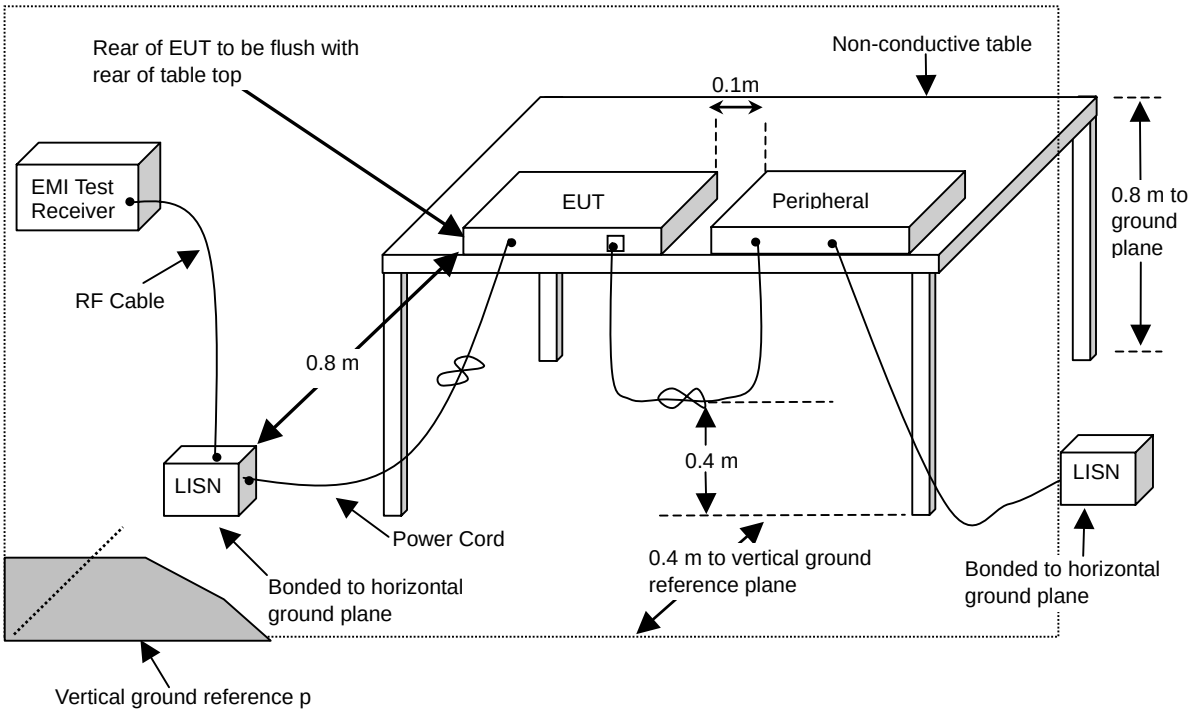
Remark ： Corrected Level = Reading + Correction Factor – Preamp
Correction Fcator = Antenna Factor + Cable Loss
Margin = Correction Factor - Limits
* Mark indicated background noise level.

10 AC Power Line Conducted Emission test

10.1 Limits

Frequency (MHz)	Quasi-Peak (dB μV)	Average (dB μV)
0.15 to 0.5	66 to 56	56 to 46
> 0.5 to 5	56	46
> 5 to 30	60	50
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 30 MHz.		

10.2 Configuration of Measurement



10.3 Test Procedures

The EUT was setup to ANSI C63.10, 2013; tested procedure of Jan. 2016 KDB558074 D01 for compliance to FCC 47CFR 15.247 requirements.

1) The EUT was placed 80cm height above ground on a non-conductive table and vertical conducting plane located 40cm to the rear of the EUT.
2) The EUT was connected to the main power through Line Impedance Stabilization Networks (LISN). This setup provided a 50ohm/50mH coupling impedance for the measuring equipment. The auxiliary equipment will place in secondary LISN.
3) Both sides (Line and Neutral) of AC line are checked for maximum conducted interference. 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, 2013 on conducted measurement.

10.4 Test Result

PASS.

The final test data is shown as following pages.

Factor = Insertion Loss + Cable Loss

Level = Reading + Factor

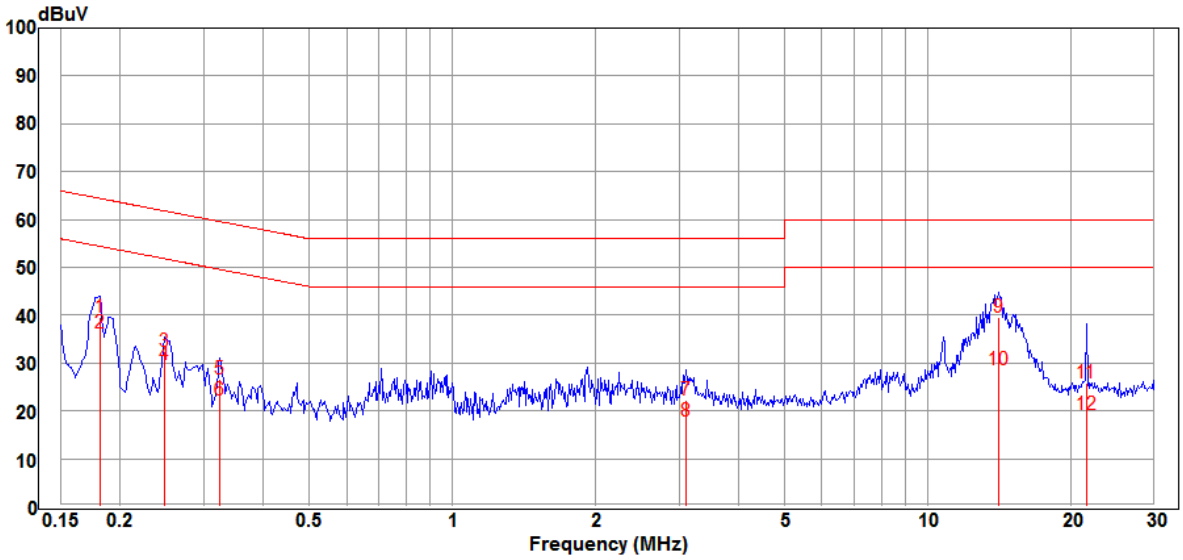
Margin = Level - Limit

Power Line Conducted Test Data

CLIENT: Nutek Corporation
EUT: ACP Keypad
MODEL: 4360715
RATING: 120 Vac / 60 Hz
COMMENT: Charger mode

OPERATOR: Elli
TEST SITE: Conducted 1
POLARIZATION: Line
TEMP/HUM: 22.4°C / 61%

Data:11 2017-11-22



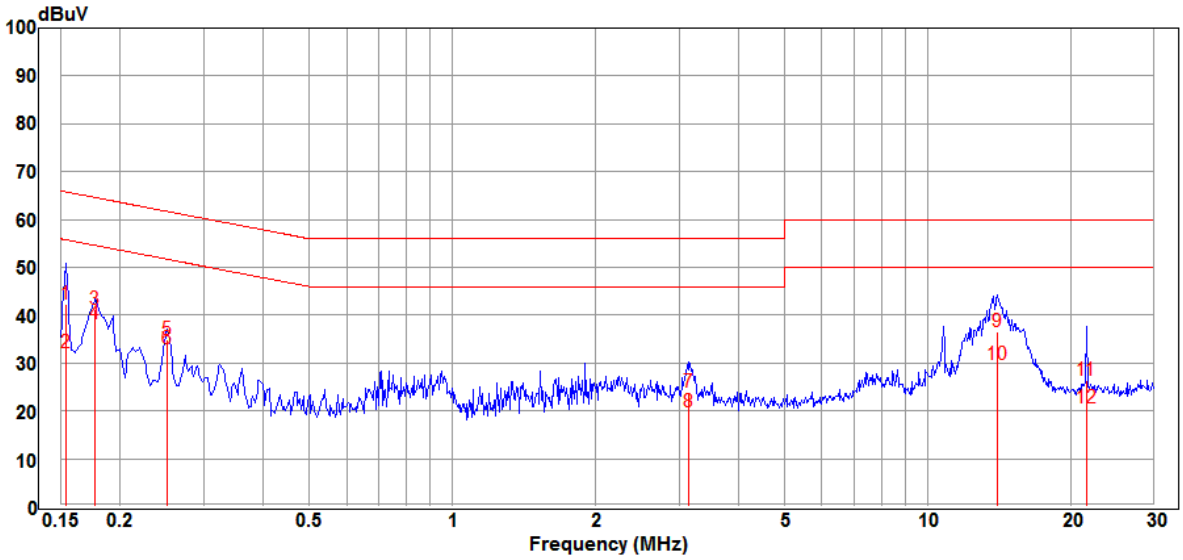
Item Mark	Freq. MHz	Reading dBuV	Factor dB	Level dBuV	Limit dBuV	Margin dB	Remark
1	0.1815	29.24	10.26	39.50	64.42	-24.92	QP
2	0.1815	26.08	10.26	36.34	54.42	-18.08	Average
3	0.2481	22.04	10.27	32.31	61.82	-29.51	QP
4	0.2481	19.40	10.27	29.67	51.82	-22.15	Average
5	0.3251	16.29	10.28	26.57	59.57	-33.00	QP
6	0.3251	11.92	10.28	22.20	49.57	-27.37	Average
7	3.1070	11.86	10.53	22.39	56.00	-33.61	QP
8	3.1070	7.47	10.53	18.00	46.00	-28.00	Average
9	14.1380	28.67	10.81	39.48	60.00	-20.52	QP
10	14.1380	17.84	10.81	28.65	50.00	-21.35	Average
11	21.6000	14.65	11.27	25.92	60.00	-34.08	QP
12	21.6000	8.09	11.27	19.36	50.00	-30.64	Average

Power Line Conducted Test Data

CLIENT: Nutek Corporation
EUT: ACP Keypad
MODEL: 4360715
RATING: 120 Vac / 60 Hz
COMMENT: Charger mode

OPERATOR: Elli
TEST SITE: Conducted 1
POLARIZATION: Neutral
TEMP/HUM: 22.4°C / 61%

Data:10
2017-11-22



Item Mark	Freq. MHz	Reading dBuV	Factor dB	Level dBuV	Limit dBuV	Margin dB	Remark
1	0.1540	32.04	10.21	42.25	65.78	-23.53	QP
2	0.1540	21.92	10.21	32.13	55.78	-23.65	Average
3	0.1777	30.91	10.22	41.13	64.59	-23.46	QP
4	0.1777	28.03	10.22	38.25	54.59	-16.34	Average
5	0.2521	24.59	10.23	34.82	61.69	-26.87	QP
6	0.2521	22.65	10.23	32.88	51.69	-18.81	Average
7	3.1560	13.50	10.51	24.01	56.00	-31.99	QP
8	3.1560	9.25	10.51	19.76	46.00	-26.24	Average
9	14.0630	25.59	10.86	36.45	60.00	-23.55	QP
10	14.0630	18.70	10.86	29.56	50.00	-20.44	Average
11	21.6000	15.19	11.32	26.51	60.00	-33.49	QP
12	21.6000	9.25	11.32	20.57	50.00	-29.43	Average