FCC Part 15.247

TEST REPORT

For

Draytek Corporation

No. 26, Fu shing Rd., Hukou County, Hsinchu Industrial Park Hsinchu, 303, Taiwan

FCC ID: VGY2862N

Report Type:	**Product Type:**
Original Report	VDSL2 & ADSL2 + Dual-WAN Security Router

Report Producer:	Kaylee Chiang
Report Number:	RTWA170214001-00F
Report Date:	2017-09-28
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REVISION HISTORY

Revision	Issue Date	Description
1.0	2017.09.28	Original

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1 General Information

1.1 Product Description for Equipment Under Test (EUT)

Applicant:	Draytek Corporation No. 26, Fu shing Rd., Hukou County, Hsinchu Industrial Park Hsinchu, 303, Taiwan
Manufacturer:	Draytek Corporation No. 26, Fu shing Rd., Hukou County, Hsinchu Industrial Park Hsinchu, 303, Taiwan
Product:	VDSL2 & ADSL2 + Dual-WAN Security Router
Model:	Vigor2862BLgVn
Series Model:	*Please refer to DECLARATION OF SIMILARITY*
Trade Name:	DrayTek
Frequency Range:	IEEE 802.11b/g / IEEE 802.11n HT20 MHz Mode: 2412 ~ 2462 MHz / IEEE 802.11n HT40 MHz Mode: 2422 ~ 2452 MHz
Transmit Power:	IEEE 802.11b Mode: 24.25 dBm (0.266W) IEEE 802.11g Mode: 29.63 dBm (0.918W) IEEE 802.11n HT20 MHz Mode: 29.88 dBm (0.972W) IEEE 802.11n HT40 MHz Mode: 29.77 dBm (0.948W)
Modulation Technique:	IEEE 802.11b: DSSS IEEE 802.11g: OFDM IEEE 802.11n HT20 MHz Mode: OFDM IEEE 802.11n HT40 MHz Mode: OFDM
Transmit Data Rate:	IEEE 802.11b Mode: 11, 5.5, 2, 1 Mbps IEEE 802.11g Mode: 54, 48, 36, 24, 18, 12, 11 , 9, 6Mbps IEEE 802.11n HT 20 MHz Channel mode: 6.5, 7.2, 13, 14.4, 14.44, 19.5, 21.7, 26, 28.89, 28.9, 39, 43.3, 43.33 52, 57.78, 57.8, 58.5, 65.0, 72.2, 78, 86.67, 104, 115.56, 117, 130, 144.44 Mbps IEEE 802.11n HT 40 MHz Channel mode: 13.5, 15,27, 30, 40.5, 45, 54, 60, 81, 90, 108, 120, 121.5, 135, 150, 162, 180, 216, 240, 243, 270, 300 Mbps
Number of Channels:	IEEE 802.11b/g / IEEE 802.11n HT20 MHz Mode: 11 Channels IEEE 802.11n HT40 MHz Mode: 7 Channels
Antenna Specification:	Diploe Antenna/Gain: 2.18 dBi
Voltage Range:	I/P: 100-240Vac, 50-60Hz O/P: 12Vdc
Date of Test:	Feb 22, 2017 ~ Sep 25, 2017

**All measurement and test data in this report was gathered from production sample serial number: 17021401 (Assigned by BACL, Taiwan) The EUT supplied by the applicant was received on 2017-02-14.*

Adaptor 1 Information:
Model: WA-36A12FU
I/P: 100-240Vac, 50-60Hz, 0.9A Max
O/P: 12Vdc, 3A

Adaptor 2 Information:
Model: 2ABN036F US
I/P: 100-240Vac, 50-60Hz, 1.0A
O/P: 12Vdc, 3A

Adaptor 3 Information:
Model: 2ABB018F US
I/P: 100-240Vac, 50-60Hz, 0.6A
O/P: 12Vdc, 1.5A

Adaptor 4 Information:
Model: 2ABL030F US
I/P: 100-240Vac, 50-60Hz, 1.0A
O/P: 12Vdc, 2.5A

1.2 Objective

This report is prepared on behalf of *Draytek Corporation* in accordance with Part 2, Subpart J, Part 15, Subparts A and C of the Federal Communication Commission's rules.

The objective is to determine compliance with FCC Part 15.247 rules for Output Power, Antenna Requirements, 6 dB Bandwidth, power spectral density, 100 kHz Bandwidth of Band Edges Measurement, Conducted and Radiated Spurious Emissions.

1.3 Related Submittal(s)/Grant(s)

N/A

1.4 Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

KDB 662911 D01 Multiple Transmitter Output v02r01

KDB 558074 D01 DTS Meas Guidance v04

1.5 Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Taiwan) to collect test data is located on
☒ 70, Lane 169, Sec. 2, Datong Road, Xizhi Dist., New Taipei City 22183, Taiwan, R.O.C.
☐ 68-3, Lane 169, Sec. 2, Datong Road, Xizhi Dist., New Taipei City 22183, Taiwan, R.O.C.

Bay Area Compliance Laboratories Corp. (Taiwan) Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 3180) and the FCC designation No. TW3180 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.10.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 974454. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

2 System Test Configuration

2.1 Description of Test Configuration

For WIFI mode, there are totally 11 channels.

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	7	2442
2	2417	8	2447
3	2422	9	2452
4	2427	10	2457
5	2432	11	2462
6	2437		

For 802.11 b/g/n20 Modes were testd with channel 1, 6 and 11.
For 802.11n40 Mode were testd with channel 3, 6 and 9.

SISO mode and MIMO mode have the same power level setting and base on output power testing, MIMO mode power than SISO mode large, MIMO mode was selected for full testing.

The device supports MIMO (CDD) at all modes.

2.2 Equipment Modifications

No modification was made to the EUT

2.3 Test Mode

Mode 1: Full System (Vigor2862BLgVn, Adapter WA-36A12FU) tested all measure item.

Mode 2: Full System (Vigor2862BLgFVn, Adapter WA-36A12FU) tested Radiated Emission below 1GHz.

The mode difference is fiber function.

Mode 3: Full System (Vigor2862BLgVn, Adapter 2ABN036F US) tested Radiated Emission below 1GHz and AC Line Conducted Emissions.

Mode 4: Full System (Vigor2862BLgVn, Adapter 2ABB018F US) tested Radiated Emission below 1GHz and AC Line Conducted Emissions.

Mode 5: Full System (V Vigor2862BLgVn, Adapter 2ABL030F US) tested Radiated Emission below 1GHz and AC Line Conducted Emissions.

2.4 EUT Exercise Software

Used "MP-Tool RTL819 x3.0" software.

Engineering Mode		Chain 0		
Test Frequency		Low	Mid	High
Power Level Setting	B Mode MIMO(CDD)	20	21	19
	G Mode MIMO(CDD)	31	28	29
	N20 Mode MIMO(CDD)	31	28	28
	N40 Mode MIMO(CDD)	32	31	30
Engineering Mode		Chain 1		
Test Frequency		Low	Mid	High
Power Level Setting	B Mode MIMO(CDD)	23	25	22
	G Mode MIMO(CDD)	31	28	29
	N20 Mode MIMO(CDD)	31	28	28
	N40 Mode MIMO(CDD)	32	31	30

The EUT was configured for testing in an engineering mode which was provided by the manufacturer.
The worst-case data rates are determined to be as follows for each mode based upon investigations by measuring the average power and PSD across all data rates bandwidths, and modulations.

802.11b: 1Mbps
802.11g: 6Mbps
802.11n ht20 MIMO: MCS0
802.11n ht40 MIMO: MCS0

2.5 Support Equipment List and Details

Description	Manufacturer	Model Number	S/N
Telephone	ASITO	AS-10301	3CN061J03758
Telephone	TECO	N/A	XYFXC601
USB dongle	Kingston	N/A	N/A
USB dongle	Kingston	N/A	N/A
NB	Dell	E6410	10912240367
PSTN	Draytek	N/A	N/A

2.6 External Cable List and Details

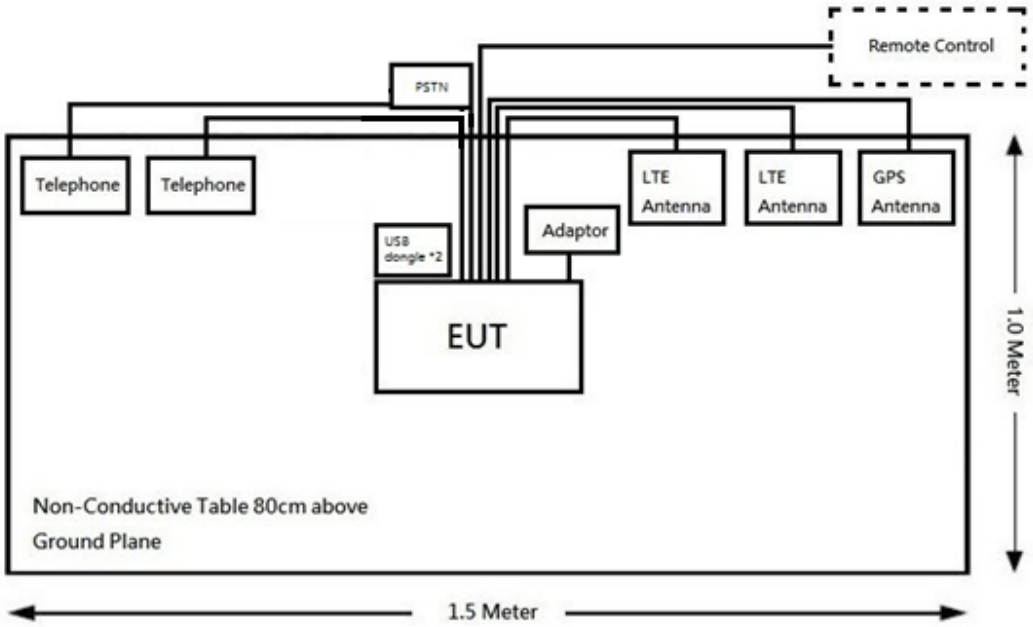
Cable Description	Length (m)	From	To
RJ11 Cable * 2	2M	Telephone	EUT
LTE Extension cord	1M	LTE Antenna	EUT
LTE Extension cord	1M	LTE Antenna	EUT
GPS Extension cord	1M	GPS Antenna	EUT
RJ45 Cable * 4	10M	Remote Control	EUT

2.7 Block Diagram of Test Setup

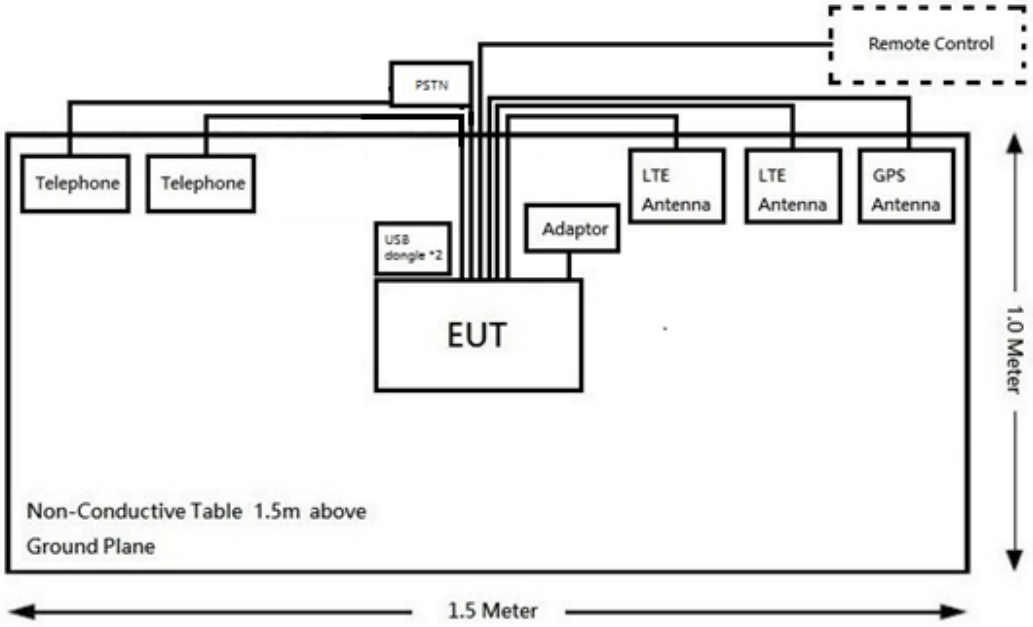
See test photographs attached in Exhibit A for the actual connections between EUT and support equipment.

Radiation:

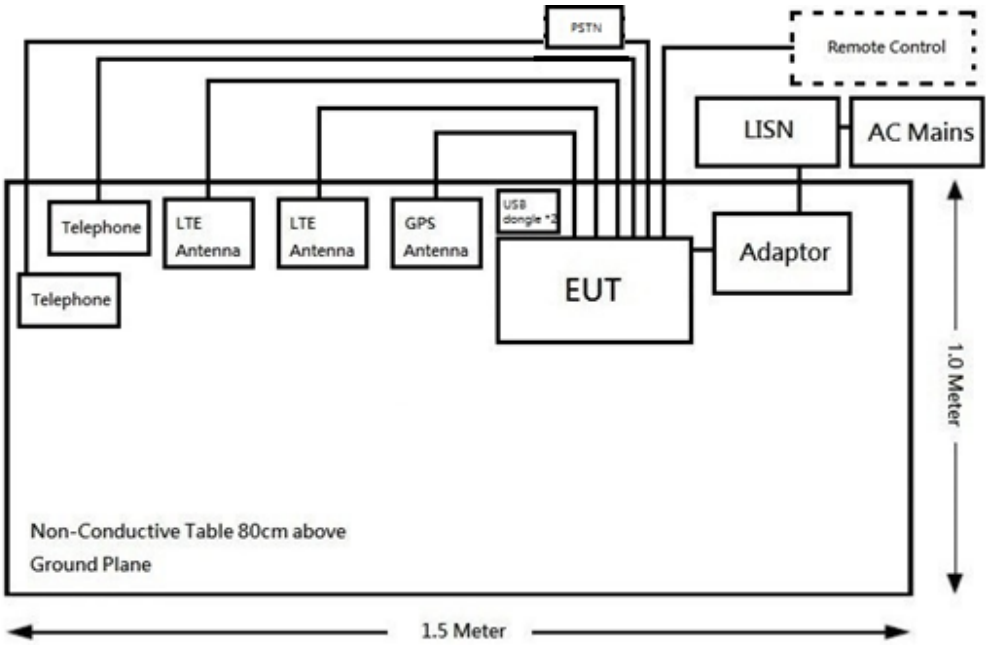
Below 1GHz:



Above 1GHz:



Conduction:


PSTN
Remote Control
LISN
AC Mains
Telephone
LTE Antenna
LTE Antenna
GPS Antenna
USB dongle *2
Adaptor
EUT
Telephone
1.0 Meter
Non-Conductive Table 80cm above Ground Plane
1.5 Meter

2.8 Duty Cycle

According to KDB 558074 D01 DTS Meas Guidance v04 section 6.0:

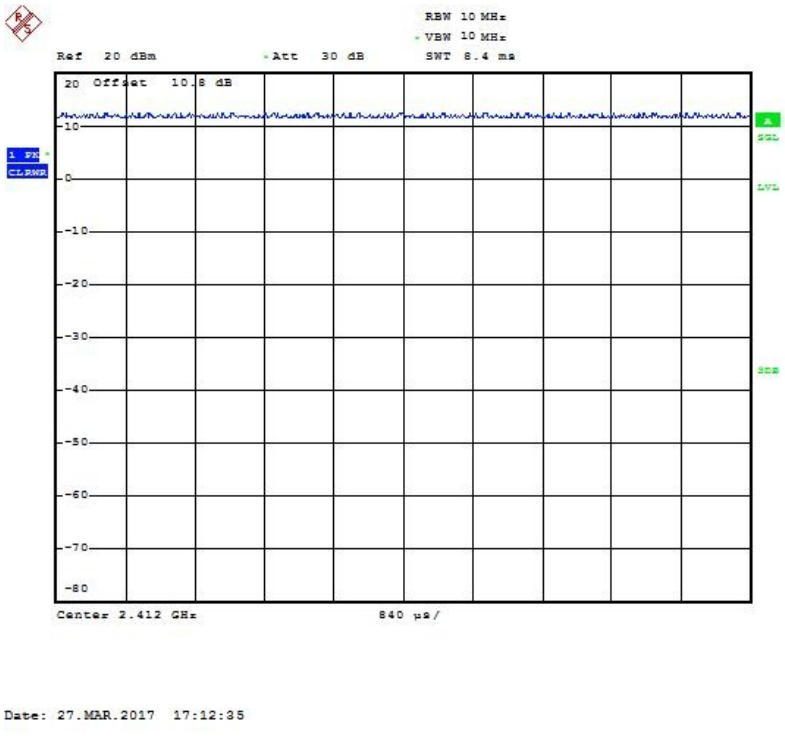
All measurements are to be performed with the EUT transmitting at 100% duty cycle at its maximum power control level; however, if 100% duty cycle cannot be achieved, measurements of duty cycle, x, and maximumpower transmission duration, T, are required for each tested mode of operation.

Radio Mode	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
802.11b	8.4	8.4	100	0
802.11g	5	5	100	0
802.11n20	5	5	100	0
802.11n40	5	5	100	0

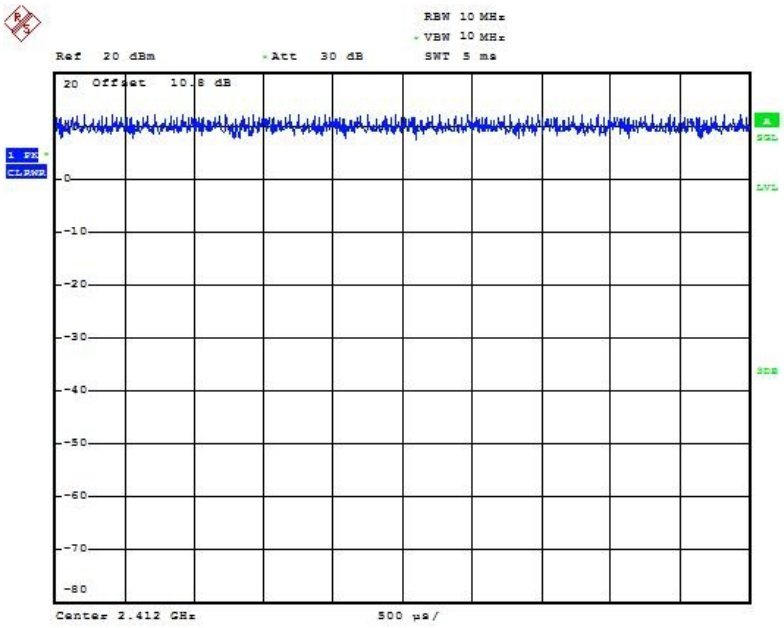
Note: Duty Cycle Correction Factor = 10*log(1/duty cycle)

Please refer to the following plots.

B Mode

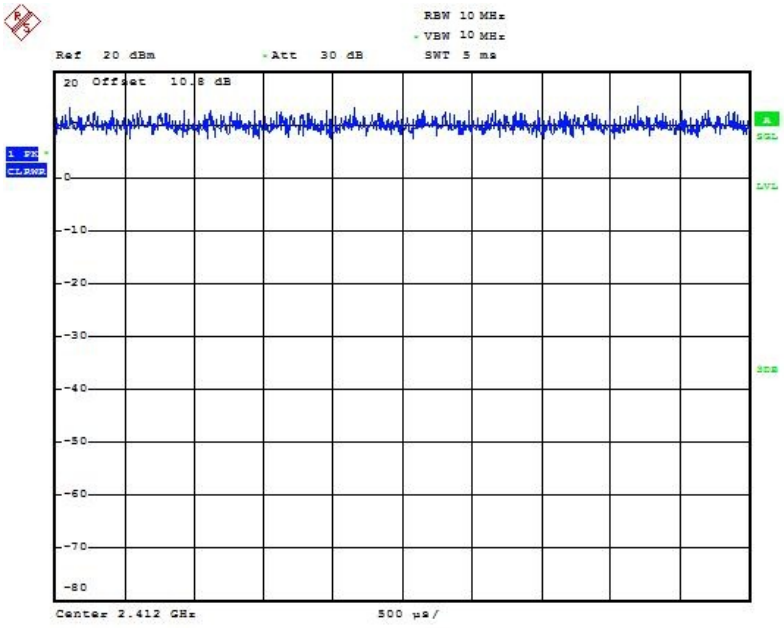


G Mode



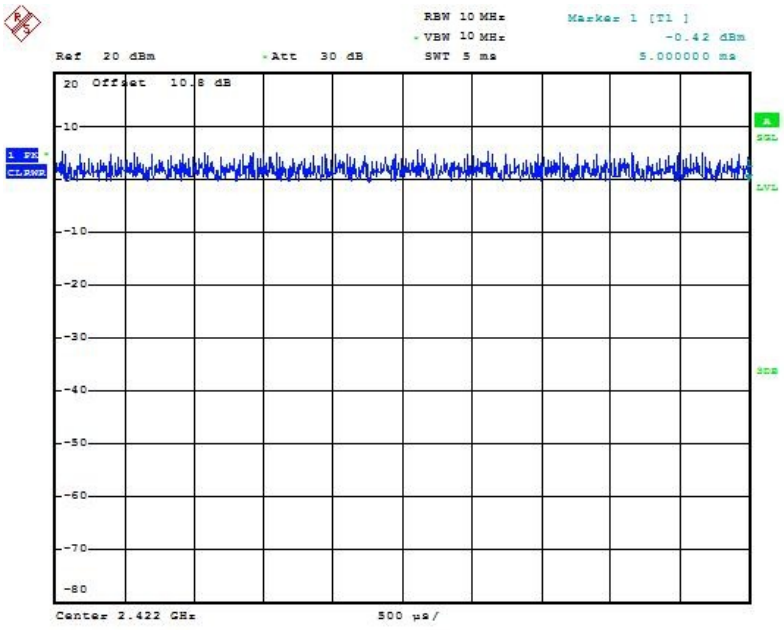
Date: 27.MAR.2017 17:13:34

N20 Mode



Date: 27.MAR.2017 17:14:00

N40 Mode


RBW 10 MHz
VBW 10 MHz
SWT 5 ms
Marker 1 [T1]
-0.42 dBm
5.000000 ms
Ref 20 dBm
Att 30 dB
Offset 10.8 dB
Center 2.422 GHz
500 µs/
Date: 27.MAR.2017 17:11:21

3 Summary of Test Results

FCC Rules	Description of Test	Result
§15.247(i), §1.1310 ,§ 2.1091	Maximum Permissible Exposure (MPE)	Compliance
§15.203	Antenna Requirement	Compliance*
§15.207(a)	AC Line Conducted Emissions	Compliance
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliance
§15.247(a)(2)	6 dB Emission Bandwidth	Compliance*
§15.247(b)(3)	Maximum Peak Output Power	Compliance*
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliance*
§15.247(e)	Power Spectral Density	Compliance*

Note:
Compliance*: Refer to RTWA170214001-00A Report with FCC ID: VGY2862

4 FCC § 15.247(i), §1.1310, § 2.1091 - Maximum Permissible Exposure (MPE)

4.1 Applicable Standard

According to subpart 15.247(i)and subpart §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (V/m)**	**Magnetic Field Strength (A/m)**	**Power Density (mW/cm^2)**	**Averaging Time (minutes)**
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*($180/f^2$)	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

f = frequency in MHz; * = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

Calculated Formulary:

Predication of MPE limit at a given distance
$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm^2);
P = power input to the antenna (in appropriate units, e.g., mW);
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

For simultaneously transmit system, the calculated power density should comply with:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

4.2 RF Exposure Evaluation Result

MPE evaluation for single transmission:

Mode	Frequency Range (MHz)	Antenna Gain		Target Power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
		(dBi)	(numeric)	(dBm)	(mW)			
2.4G WIFI	2412-2462	2.18	1.65	23.5	223.87	20	0.07	1.0
WCDMA B V	826.4-846.6	2.13	1.63	23.5	223.87	20	0.07	0.551
WCDMA B II	1852.4-1907.6	3.42	2.20	23.5	223.87	20	0.10	1.0
LTE B II	1850.7-1909.3	3.42	2.20	24.0	251.19	20	0.11	1.0
LTE B IV	1710.7-1754.3	3.68	2.33	24.0	251.19	20	0.17	1.0
LTE B XII	699.7-715.3	0.35	1.08	24.0	251.19	20	0.05	0.466

MPE evaluation for simultaneous transmission:

2.4G WIFI and 3G&4G can transmit at the same time, MPE evaluation is as below formula:

PD1/Limit1+PD2/Limit2+……＜1, PD (Power Density)

MPE evaluation=
MPE of 2.4G WIFI/1 + MPE of 3G&4G/0.551
= 0.07/1+ 0.07/0.551=0.20＜1.0

Result: MPE evaluation of single and simultaneous transmission meet the requirement of standard.

5 FCC §15.207 - AC Line Conducted Emissions

5.1 Applicable Standard

According to FCC §15.207 Conducted limits:

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequencies ranges.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15-0.5	66 to 56 Note 1	56 to 46 Note 2
0.5-5	56	46
5-30	60	50

Note 1: Decreases with the logarithm of the frequency.
Note 2: A linear average detector is required

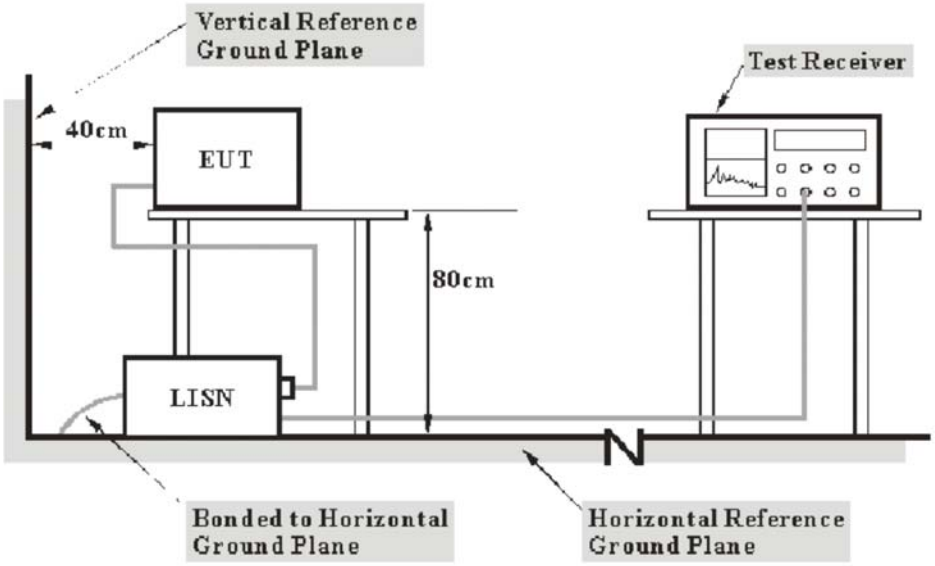
5.2 Measurement Uncertainty

Input quantities to be considered for conducted disturbance measurements maybe receiver reading, attenuation of the connection between LISN/ISN and receiver, LISN/ISN voltage division factor, LISN/ISN VDF frequency interpolation and receiver related input quantities, etc.

Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of conducted disturbance test at Bay Area Compliance Laboratories Corp. (Taiwan) is shown as below. And the uncertainty will not be taken into consideration for the test data recorded in the report

Port	Expanded Measurement uncertainty
AC Mains	4.64 dB (k=2, 95% level of confidence)

5.3 EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

5.4 EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz. During the conducted emission test, the EMI test receiver was set with the following configurations

Frequency Range	Receiver RBW
150 kHz - 30 MHz	9 kHz

5.5 Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the LISN. Maximizing procedure was performed on the six (6) highest emissions of the EUT. All data was recorded in the Quasi-peak and average detection mode.

5.6 Corrected Factor & Margin Calculation

The factor is calculated by adding LISN/ISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

Factor = LISN VDF + Cable Loss + Transient Limiter Attenuation

The "Over Limit" column of the following data tables indicates the degree of compliance with the applicable limit. For example, an over limit of -7 dB means the emission is 7 dB below the limit. The equation for Over Limit calculation is as follows:

Over Limit = Level – Limit Line

5.7 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Date	Calibration Due Date
LISN	Rohde & Schwarz	ENV216	101248	2017/07/20	2018/07/19
LISN	EMCO	3816/2	00075848	2017/08/02	2018/08/01
EMI Test Receiver	Rohde & Schwarz	ESR7	101419	2016/11/03	2017/11/02
Pulse Limiter	Rohde & Schwarz	ESH3Z2	TXZEM025	2017/08/11	2018/08/10
RF Cable	EMEC	EM-CB5D	001	2017/07/24	2018/07/23
Software	AUDIX	E3	V9.150826k	N.C.R	N.C.R

**** Statement of Traceability:*** BACL Corp. attests that all calibrations have been performed according to TAF requirements, traceable to the ETC.

5.8 Test Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	58 %
ATM Pressure:	1020 hPa

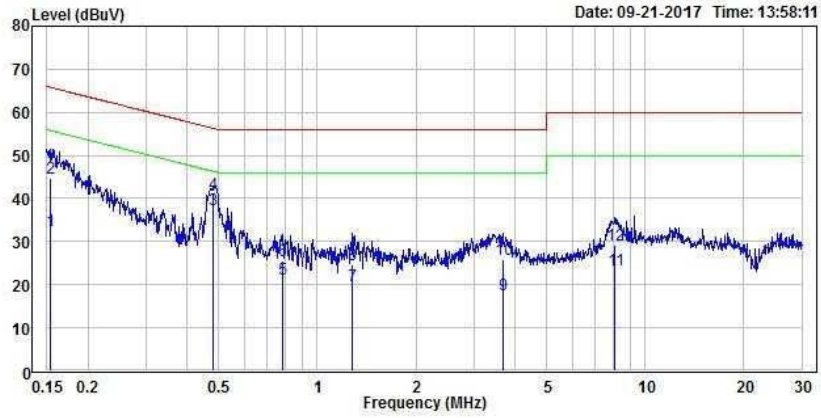
The testing was performed by David Hsu on 2017-09-21.

5.9 Test Results

Mode: Transmitting Mode

Please refer to the following plots and tables.

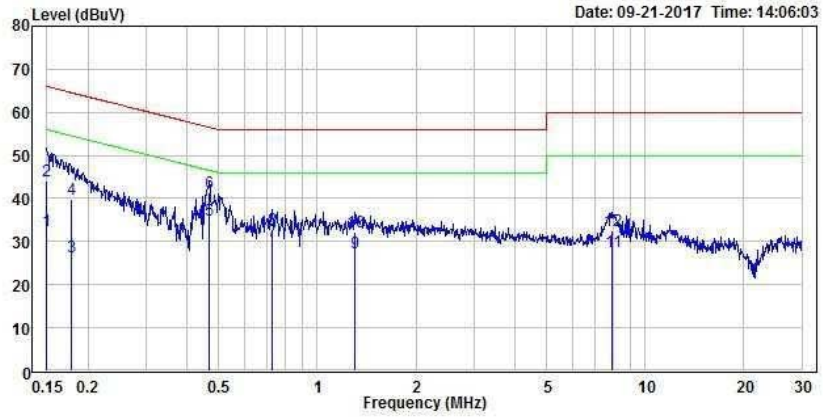
Main: AC 120V/60 Hz, Line (Mode 1)



Condition: Line
EUT :
Mode :
Note : 120V/60Hz,

	Freq	Level	Limit Line	Over Limit	Factor	Read Level	Remark	Pol/Phase
	MHz	dBuV	dBuV	dB	dB	dBuV		
1	0.154	32.60	55.80	-23.20	19.56	13.04	Average	Line
2	0.154	44.86	65.80	-20.94	19.56	25.30	QP	Line
3	0.483	37.31	46.28	-8.97	19.55	17.76	Average	Line
4	0.483	41.20	56.28	-15.08	19.55	21.65	QP	Line
5	0.783	21.17	46.00	-24.83	19.58	1.59	Average	Line
6	0.783	25.43	56.00	-30.57	19.58	5.85	QP	Line
7	1.275	19.75	46.00	-26.25	19.61	0.14	Average	Line
8	1.275	24.49	56.00	-31.51	19.61	4.88	QP	Line
9	3.688	17.67	46.00	-28.33	19.63	-1.96	Average	Line
10	3.688	25.76	56.00	-30.24	19.63	6.13	QP	Line
11	8.098	23.51	50.00	-26.49	19.77	3.74	Average	Line
12	8.098	29.19	60.00	-30.81	19.77	9.42	QP	Line

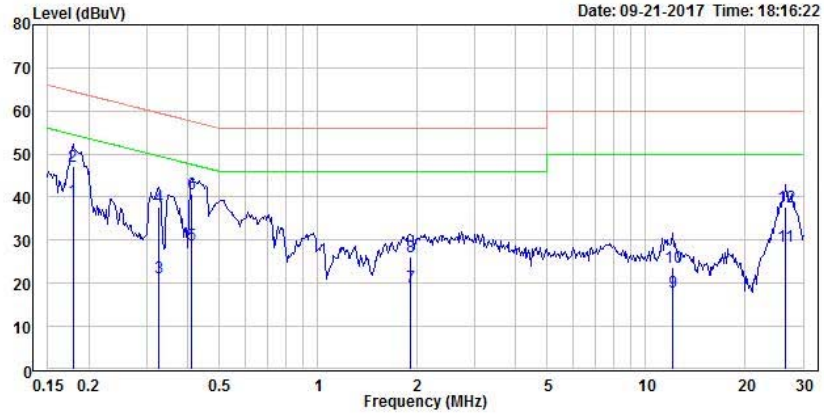
Main: AC 120V/60 Hz, Neutral



Condition: Neutral
EUT :
Mode :
Note : 120V/60Hz,

	Freq	Level	Limit Line	Over Limit	Factor	Read Level	Remark	Pol/Phase
	MHz	dBuV	dBuV	dB	dB	dBuV		
1	0.150	32.52	56.00	-23.48	19.56	12.96	Average	Neutral
2	0.150	44.08	66.00	-21.92	19.56	24.52	QP	Neutral
3	0.177	26.40	54.61	-28.21	19.54	6.86	Average	Neutral
4	0.177	39.90	64.61	-24.71	19.54	20.36	QP	Neutral
5	0.468	35.09	46.55	-11.46	19.55	15.54	Average	Neutral
6	0.468	41.29	56.55	-15.26	19.55	21.74	QP	Neutral
7	0.726	29.97	46.00	-16.03	19.57	10.40	Average	Neutral
8	0.726	32.71	56.00	-23.29	19.57	13.14	QP	Neutral
9	1.306	27.35	46.00	-18.65	19.60	7.75	Average	Neutral
10	1.306	32.38	56.00	-23.62	19.60	12.78	QP	Neutral
11	7.938	27.60	50.00	-22.40	19.81	7.79	Average	Neutral
12	7.938	32.66	60.00	-27.34	19.81	12.85	QP	Neutral

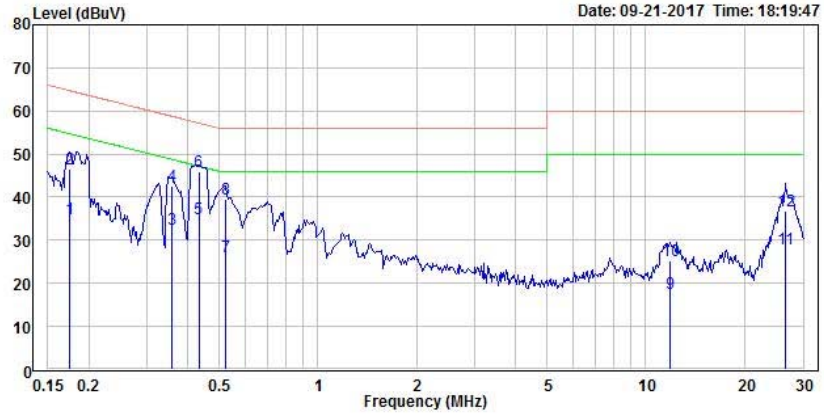
Main: AC 120V/60 Hz, Line (Mode 3)



Condition: Line
EUT :
Mode :
Note : 120V/60Hz,

	Freq	Level	Limit Line	Over Limit	Factor	Read Level	Remark	Pol/Phase
	MHz	dBuV	dBuV	dB	dB	dBuV		
1	0.179	39.21	54.54	-15.33	19.50	19.71	Average	Line
2	0.179	47.04	64.54	-17.50	19.50	27.54	QP	Line
3	0.327	21.40	49.51	-28.11	19.51	1.89	Average	Line
4	0.327	37.87	59.51	-21.64	19.51	18.36	QP	Line
5	0.413	28.95	47.60	-18.65	19.51	9.44	Average	Line
6	0.413	40.86	57.60	-16.74	19.51	21.35	QP	Line
7	1.920	19.20	46.00	-26.80	19.58	-0.38	Average	Line
8	1.920	26.10	56.00	-29.90	19.58	6.52	QP	Line
9	12.096	17.92	50.00	-32.08	19.77	-1.85	Average	Line
10	12.096	23.67	60.00	-36.33	19.77	3.90	QP	Line
11	26.409	28.54	50.00	-21.46	19.87	8.67	Average	Line
12	26.409	37.71	60.00	-22.29	19.87	17.84	QP	Line

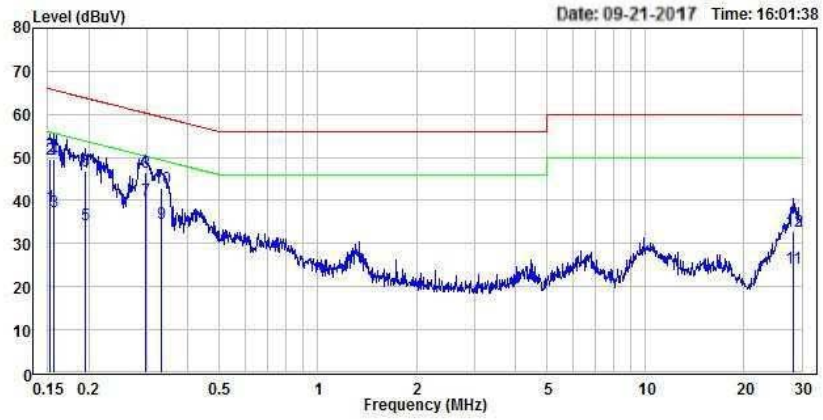
Main: AC 120V/60 Hz, Neutral



Condition: Neutral
EUT :
Mode :
Note : 120V/60Hz,

	Freq	Level	Limit Line	Over Limit	Factor	Read Level	Remark	Pol/Phase
	MHz	dBuV	dBuV	dB	dB	dBuV		
1	0.175	34.97	54.74	-19.77	19.63	15.34	Average	Neutral
2	0.175	46.66	64.74	-18.08	19.63	27.03	QP	Neutral
3	0.357	32.50	48.79	-16.29	19.64	12.86	Average	Neutral
4	0.357	42.66	58.79	-16.13	19.64	23.02	QP	Neutral
5	0.433	35.06	47.20	-12.14	19.64	15.42	Average	Neutral
6	0.433	45.98	57.20	-11.22	19.64	26.34	QP	Neutral
7	0.524	26.18	46.00	-19.82	19.64	6.54	Average	Neutral
8	0.524	39.68	56.00	-16.32	19.64	20.04	QP	Neutral
9	11.905	17.62	50.00	-32.38	19.93	-2.31	Average	Neutral
10	11.905	25.10	60.00	-34.90	19.93	5.17	QP	Neutral
11	26.409	28.11	50.00	-21.89	20.11	8.00	Average	Neutral
12	26.409	36.74	60.00	-23.26	20.11	16.63	QP	Neutral

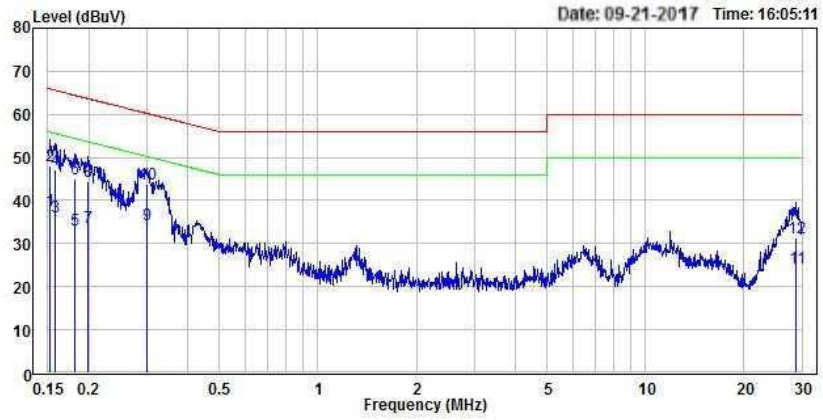
Main: AC 120V/60 Hz, Line (Mode 4)



Condition: Line
EUT :
Mode :
Note : 120V/60Hz,

	Freq	Level	Limit Line	Over Limit	Factor	Read Level	Remark	Pol/Phase
	MHz	dBuV	dBuV	dB	dB	dBuV		
1	0.152	38.77	55.87	-17.10	19.56	19.21	Average	Line
2	0.152	49.63	65.87	-16.24	19.56	30.07	QP	Line
3	0.157	37.33	55.64	-18.31	19.56	17.77	Average	Line
4	0.157	49.43	65.64	-16.21	19.56	29.87	QP	Line
5	0.195	34.23	53.81	-19.58	19.58	14.65	Average	Line
6	0.195	46.83	63.81	-16.98	19.58	27.25	QP	Line
7	0.297	40.05	50.33	-10.28	19.55	20.50	Average	Line
8	0.297	46.41	60.33	-13.92	19.55	26.86	QP	Line
9	0.333	34.70	49.37	-14.67	19.55	15.15	Average	Line
10	0.333	42.91	59.37	-16.46	19.55	23.36	QP	Line
11	28.256	24.38	50.00	-25.62	19.92	4.46	Average	Line
12	28.256	32.87	60.00	-27.13	19.92	12.95	QP	Line

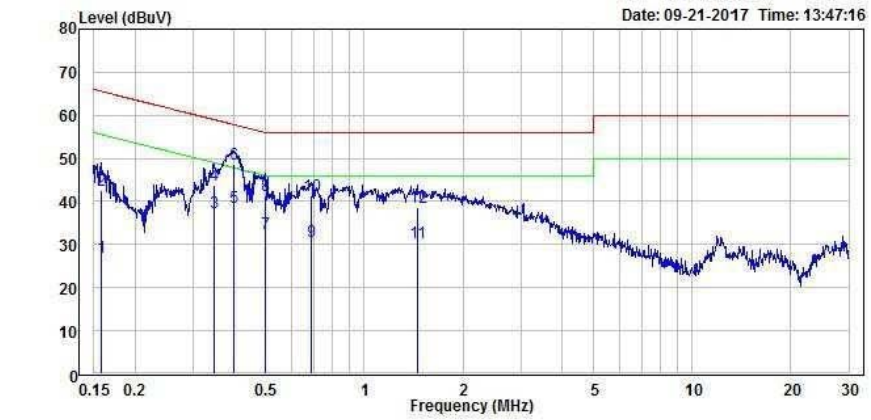
Main: AC 120V/60 Hz, Neutral



Condition: Neutral
EUT :
Mode :
Note : 120V/60Hz,

	Freq	Level	Limit Line	Over Limit	Factor	Read Level	Remark	Pol/Phase
	MHz	dBuV	dBuV	dB	dB	dBuV		
1	0.152	37.62	55.87	-18.25	19.56	18.06	Average	Neutral
2	0.152	48.06	65.87	-17.81	19.56	28.50	QP	Neutral
3	0.157	36.20	55.60	-19.40	19.55	16.65	Average	Neutral
4	0.157	47.24	65.60	-18.36	19.55	27.69	QP	Neutral
5	0.181	33.01	54.44	-21.43	19.53	13.48	Average	Neutral
6	0.181	44.97	64.44	-19.47	19.53	25.44	QP	Neutral
7	0.199	33.68	53.65	-19.97	19.52	14.16	Average	Neutral
8	0.199	44.40	63.65	-19.25	19.52	24.88	QP	Neutral
9	0.300	34.36	50.23	-15.87	19.53	14.83	Average	Neutral
10	0.300	43.83	60.23	-16.40	19.53	24.30	QP	Neutral
11	28.826	24.23	50.00	-25.77	20.03	4.20	Average	Neutral
12	28.826	31.22	60.00	-28.78	20.03	11.19	QP	Neutral

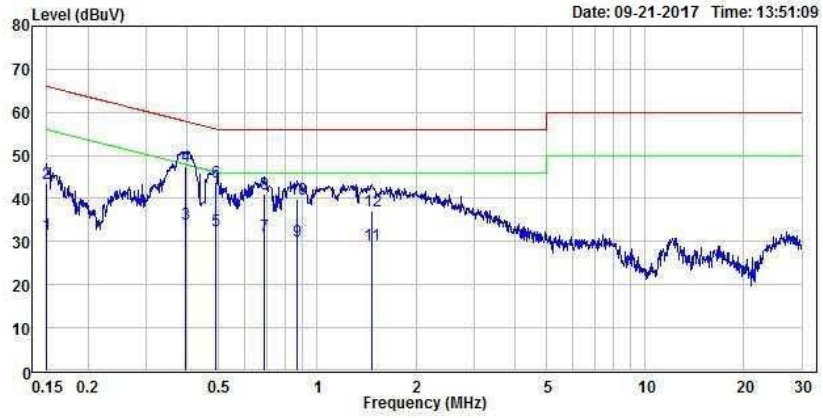
Main: AC 120V/60 Hz, Line (Mode 5)



Condition: Line
EUT :
Mode :
Note : 120V/60Hz,

	Freq	Level	Limit Line	Over Limit	Factor	Read Level	Remark	Pol/Phase
	MHz	dBuV	dBuV	dB	dB	dBuV		
1	0.157	27.15	55.60	-28.45	19.56	7.59	Average	Line
2	0.157	42.59	65.60	-23.01	19.56	23.03	QP	Line
3	0.350	37.43	48.97	-11.54	19.55	17.88	Average	Line
4	0.350	43.86	58.97	-15.11	19.55	24.31	QP	Line
5	0.401	38.58	47.84	-9.26	19.54	19.04	Average	Line
6	0.401	48.78	57.84	-9.06	19.54	29.24	QP	Line
7	0.499	32.54	46.02	-13.48	19.55	12.99	Average	Line
8	0.499	41.38	56.02	-14.64	19.55	21.83	QP	Line
9	0.689	30.68	46.00	-15.32	19.56	11.12	Average	Line
10	0.689	41.46	56.00	-14.54	19.56	21.90	QP	Line
11	1.449	30.38	46.00	-15.62	19.64	10.74	Average	Line
12	1.449	38.54	56.00	-17.46	19.64	18.90	QP	Line

Main: AC 120V/60 Hz, Neutral



Condition: Neutral
EUT :
Mode :
Note : 120V/60Hz,

	Freq	Level	Limit Line	Over Limit	Factor	Read Level	Remark	Pol/Phase
	MHz	dBuV	dBuV	dB	dB	dBuV		
1	0.150	31.51	56.00	-24.49	19.56	11.95	Average	Neutral
2	0.150	43.57	66.00	-22.43	19.56	24.01	QP	Neutral
3	0.397	34.22	47.91	-13.69	19.54	14.68	Average	Neutral
4	0.397	47.54	57.91	-10.37	19.54	28.00	QP	Neutral
5	0.491	32.54	46.15	-13.61	19.55	12.99	Average	Neutral
6	0.491	43.68	56.15	-12.47	19.55	24.13	QP	Neutral
7	0.687	31.18	46.00	-14.82	19.56	11.62	Average	Neutral
8	0.687	41.05	56.00	-14.95	19.56	21.49	QP	Neutral
9	0.869	30.14	46.00	-15.86	19.58	10.56	Average	Neutral
10	0.869	39.86	56.00	-16.14	19.58	20.28	QP	Neutral
11	1.466	29.21	46.00	-16.79	19.63	9.58	Average	Neutral
12	1.466	37.05	56.00	-18.95	19.63	17.42	QP	Neutral

6 FCC §15.209, §15.205, §15.247(d) – Spurious Emissions

6.1 Applicable Standard

As per FCC §15.35(d): Unless otherwise specified, on any frequency or frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000 MHz shall be performed using a minimum resolution bandwidth of 1 MHz.

As Per FCC §15.205(a) and RSS-Gen except as show in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 – 0.110 0.495 – 0.505 2.1735 – 2.1905 4.125 – 4.128 4.17725 – 4.17775 4.20725 – 4.20775 6.215 – 6.218 6.26775 – 6.26825 6.31175 – 6.31225 8.291 – 8.294 8.362 – 8.366 8.37625 – 8.38675 8.41425 – 8.41475 12.29 – 12.293 12.51975 – 12.52025 12.57675 – 12.57725 13.36 – 13.41	16.42 – 16.423 16.69475 – 16.69525 25.5 – 25.67 37.5 – 38.25 73 – 74.6 74.8 – 75.2 108 – 121.94 123 – 138 149.9 – 150.05 156.52475 – 156.52525 156.7 – 156.9 162.0125 –167.17 167.72 – 173.2 240 – 285 322 – 335.4 399.9 – 410 608 – 614	960 – 1240 1300 – 1427 1435 – 1626.5 1645.5 – 1646.5 1660 – 1710 1718.8 – 1722.2 2200 – 2300 2310 – 2390 2483.5 – 2500 2690 – 2900 3260 – 3267 3.332 – 3.339 3 3458 – 3 358 3.600 – 4.400	4. 5 – 5. 15 5. 35 – 5. 46 7.25 – 7.75 8.025 – 8.5 9.0 – 9.2 9.3 – 9.5 10.6 – 12.7 13.25 – 13.4 14.47 – 14.5 15.35 – 16.2 17.7 – 21.4 22.01 – 23.12 23.6 – 24.0 31.2 – 31.8 36.43 – 36.5 Above 38.6

As per FCC §15.209(a): Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (micro volts/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

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

As per FCC §15.247 (d) 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c).

6.2 Measurement Uncertainty

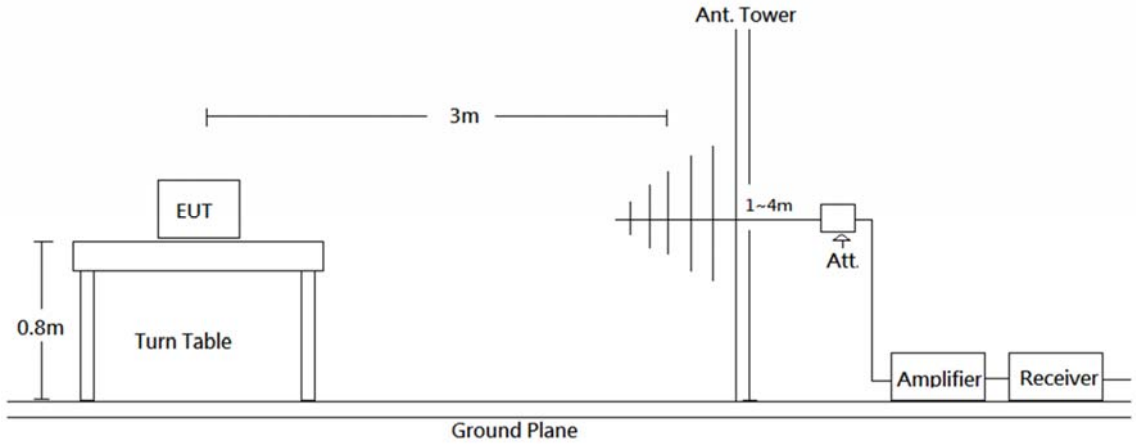
All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of radiation emissions at Bay Area Compliance Laboratories Corp. (Taiwan) is shown in below table. And the uncertainty will not be taken into consideration for the test data recorded in the report.

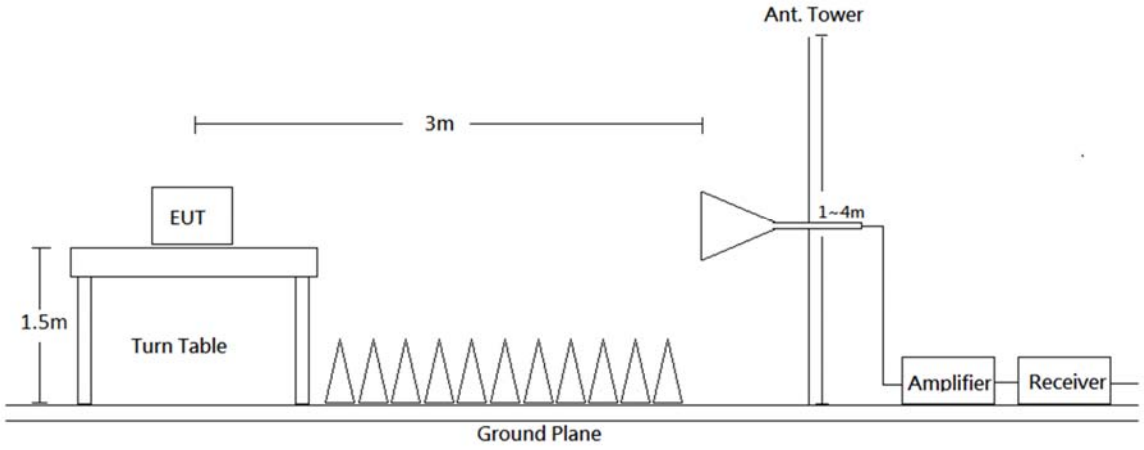
Frequency	Measurement uncertainty
30 MHz~200 MHz	3.76 dB (k=2, 95% level of confidence)
200 MHz~1 GHz	4.12 dB (k=2, 95% level of confidence)
1 GHz~6 GHz	4.84 dB (k=2, 95% level of confidence)
6 GHz~18 GHz	5.16 dB (k=2, 95% level of confidence)
18 GHz~26 GHz	4.84 dB (k=2, 95% level of confidence)
26 GHz~40 GHz	4.30 dB (k=2, 95% level of confidence)

6.3 EUT Setup

Blow 1 GHz:



Above 1 GHz:



Radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC Part 15.209 and FCC 15.247 Limits.

6.4 EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 26.5 GHz. During the radiated emission test, the EMI test receiver was set with the following configurations measurement method 6.3 in ANSI C63.10.

Frequency Range	RBW	VBW	Detector	Duty cycle
30-1000 MHz	120 kHz	/	QP	
Above 1 GHz	1 MHz	3 MHz	PK	
	1 MHz	10 Hz	Ave	>98%
	1 MHz	1/T	Ave	<98%

6.5 Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All data was recorded in the Quasi-peak detector mode from 30 MHz to 1 GHz and PK and average detector modes for frequencies above 1 GHz.

6.6 Corrected Factor & Margin Calculation

The Correct Factor is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain + Attenuator

The "Margin" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

Margin = Result –Limit

6.7 Test Results Summary

According to the data in the following table, the EUT complied with the FCC §15.209 Limit. Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies with the limit if

$$Lm + U(Lm) \leq Llim + Ucispr$$

In BACL, U(Lm) is less than Ucispr, if Lm is less than Llim, it implies that the EUT complies with the limit.

6.8 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
966A Room					
Broadband Antenna	Sunol Sciences	JB6	A050115	2016/11/16	2017/11/15
Amplifier	Sonoma	310N	130602	2016/7/15	2017/7/14
EMI Test Receiver	Rohde & Schwarz	ESR7	101419	2016/11/3	2017/11/2
Mircoflex Cable	UTIFLEX	UFB311A-Q-1440-300300	220490-006	2016/11/2	2017/11/1
Mircoflex Cable	UTIFLEX	UFB197C-1-2362-70U-70U	225757-001	2016/7/15	2017/7/14
Mircoflex Cable	UTIFLEX	UFA210A-1-3149-300300	MFR64639 226389-001	2016/12/1	2017/11/30
Turn Table	Champro	TT-2000	060772-T	N.C.R	N.C.R
Antenna Tower	Champro	AM-BS-4500-B	060772-A	N.C.R	N.C.R
Controller	Champro	EM1000	060772	N.C.R	N.C.R
Software	Farad	EZ_EMC	BACL-03A1	N.C.R	N.C.R
Broadband Antenna	Sunol Sciences	JB6	A050115	2016/11/16	2017/11/15
Horn Antenna	EMCO	3115	9311-4158	2016/5/10	2017/5/9
Horn Antenna	ETS-Lindgren	3116	00062638	2016/9/5	2017/9/4
Preamplifier	EMEC	EM01G18G	060657	2016/12/13	2017/12/12
Preamplifier	EMEC	EM18G40G	060656	2016/12/13	2017/12/12
Spectrum Analyzer	Rohde & Schwarz	FSV40	101203	2016/07/13	2017/07/12
Mircoflex Cable	ROSNAL	K1K50-UP0264-K1K50-80CM	160309-2	2017/1/18	2018/1/17
Mircoflex Cable	ROSNAL	K1K50-UP0264-K1K50-450CM	160309-1	2017/3/24	2018/3/23

**** Statement of Traceability:*** BACL Corp. attests that all calibrations have been performed according to TAF requirements, traceable to the ETC.

6.9 Test Environmental Conditions

Temperature:	24 ° C
Relative Humidity:	57 %
ATM Pressure:	1020 hPa

The testing was performed by David Hsu on 2017-03-27.

6.10 Test Results

Below 1 GHz

Test Mode: *Transmitting Mode.*

Mode 1

Horizontal

Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
171.62	37.67	-12.44	25.23	43.50	-18.27	100	77	QP
399.57	36.36	-7.74	28.62	46.00	-17.38	100	87	QP
450.01	36.36	-6.54	29.82	46.00	-16.18	100	360	QP
616.85	27.95	-3.76	24.19	46.00	-21.81	100	57	QP
700.27	35.73	-2.83	32.90	46.00	-13.10	100	48	QP
750.71	41.93	-1.79	40.14	46.00	-5.86	100	43	QP

Vertical

Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
151.25	36.60	-11.22	25.38	43.50	-18.12	100	359	QP
263.77	29.32	-10.94	18.38	46.00	-27.62	100	350	QP
350.10	41.04	-8.78	32.26	46.00	-13.74	100	59	QP
419.94	36.89	-7.25	29.64	46.00	-16.36	100	127	QP
504.33	29.92	-5.66	24.26	46.00	-21.74	100	348	QP
594.54	28.32	-4.08	24.24	46.00	-21.76	100	208	QP

Mode 2

Horizontal

Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
219.15	41.99	-12.77	29.22	46.00	-16.78	100	94	QP
427.70	30.81	-7.07	23.74	46.00	-22.26	100	102	QP
652.74	28.24	-3.32	24.92	46.00	-21.08	100	30	QP
696.39	30.56	-2.87	27.69	46.00	-18.31	100	40	QP
781.75	28.54	-1.02	27.52	46.00	-18.48	100	52	QP
916.58	25.01	1.82	26.83	46.00	-19.17	100	324	QP

Vertical

Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
110.51	36.64	-11.90	24.74	43.50	-18.76	100	359	QP
344.28	32.21	-8.89	23.32	46.00	-22.68	100	61	QP
410.24	30.43	-7.48	22.95	46.00	-23.05	100	101	QP
583.87	29.82	-4.30	25.52	46.00	-20.48	100	26	QP
773.99	35.54	-1.21	34.33	46.00	-11.67	100	217	QP
900.09	29.43	1.40	30.83	46.00	-15.17	100	338	QP

Mode 3

Horizontal

Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
162.89	35.12	-11.58	23.54	43.50	-19.96	100	50	QP
249.22	51.78	-12.05	39.73	46.00	-6.27	100	80	QP
387.93	29.00	-7.98	21.02	46.00	-24.98	100	324	QP
536.34	29.00	-5.19	23.81	46.00	-22.19	100	204	QP
704.15	32.99	-2.74	30.25	46.00	-15.75	100	116	QP
805.03	35.31	-0.47	34.84	46.00	-11.16	100	348	QP

Vertical

Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
110.51	36.19	-11.90	24.29	43.50	-19.21	100	359	QP
232.73	36.41	-12.24	24.17	46.00	-21.83	100	72	QP
285.11	33.26	-9.97	23.29	46.00	-22.71	100	84	QP
423.82	32.17	-7.16	25.01	46.00	-20.99	100	104	QP
583.87	26.29	-4.30	21.99	46.00	-24.01	100	26	QP
793.39	28.63	-0.73	27.90	46.00	-18.10	100	263	QP

Mode 4

Horizontal

Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
182.29	38.77	-13.01	25.76	43.50	-17.74	100	69	QP
357.86	31.16	-8.61	22.55	46.00	-23.45	100	73	QP
462.62	29.88	-6.33	23.55	46.00	-22.45	100	353	QP
576.11	29.43	-4.46	24.97	46.00	-21.03	100	48	QP
700.27	36.07	-2.83	33.24	46.00	-12.76	100	48	QP
834.13	38.30	0.10	38.40	46.00	-7.60	100	325	QP

Vertical

Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
327.79	29.77	-9.25	20.52	46.00	-25.48	100	135	QP
365.62	26.81	-8.45	18.36	46.00	-27.64	100	65	QP
438.37	32.36	-6.81	25.55	46.00	-20.45	100	15	QP
540.22	35.86	-5.14	30.72	46.00	-15.28	100	15	QP
571.26	27.15	-4.55	22.60	46.00	-23.40	100	108	QP
720.64	32.48	-2.40	30.08	46.00	-15.92	100	133	QP

Mode 5

Horizontal

Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
59.10	45.87	-17.42	28.45	40.00	-11.55	100	345	QP
250.19	53.84	-12.06	41.78	46.00	-4.22	100	97	QP
413.15	30.39	-7.42	22.97	46.00	-23.03	100	75	QP
552.83	27.03	-4.93	22.10	46.00	-23.90	100	56	QP
684.75	35.47	-2.99	32.48	46.00	-13.52	100	38	QP
900.09	30.41	1.40	31.81	46.00	-14.19	100	171	QP

Vertical

Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
105.66	38.01	-13.06	24.95	43.50	-18.55	100	178	QP
263.77	29.06	-10.94	18.12	46.00	-27.88	100	350	QP
517.91	31.57	-5.46	26.11	46.00	-19.89	100	87	QP
684.75	28.90	-2.99	25.91	46.00	-20.09	100	258	QP
848.68	28.75	0.39	29.14	46.00	-16.86	100	332	QP
919.49	26.25	1.89	28.14	46.00	-17.86	100	5	QP

Above 1 GHz

Test Mode: *Transmitting Mode.*

Mode 1

Horizontal

Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
B Mode, Low Channel								
2390.00	29.71	32.82	62.53	74.00	-11.47	120	83	peak
2390.00	18.95	32.82	51.77	54.00	-2.23	120	83	AVG
2412.00	88.75	32.88	121.63	N/A	N/A	120	83	peak
2412.00	85.43	32.88	118.31	N/A	N/A	120	83	AVG
4824.00	55.03	1.05	56.08	74.00	-17.92	138	106	peak
4824.00	52.60	1.05	53.65	54.00	-0.35	138	106	AVG
B Mode, Middle Channel								
2390.00	30.84	32.82	63.66	74.00	-10.34	127	269	peak
2390.00	16.50	32.82	49.32	54.00	-4.68	127	269	AVG
2437.00	91.53	32.94	124.47	N/A	N/A	127	269	peak
2437.00	88.39	32.94	121.33	N/A	N/A	127	269	AVG
2483.50	28.05	33.05	61.10	74.00	-12.90	127	269	peak
2483.50	14.77	33.05	47.82	54.00	-6.18	127	269	AVG
4874.00	54.07	1.23	55.30	74.00	-18.70	133	285	peak
4874.00	51.95	1.23	53.18	54.00	-0.82	133	285	AVG
B Mode, High Channel								
2462.00	91.05	33.01	124.06	N/A	N/A	137	91	peak
2462.00	87.54	33.01	120.55	N/A	N/A	137	91	AVG
2483.50	29.61	33.05	62.66	74.00	-11.34	131	149	peak
2483.50	14.85	33.05	47.90	54.00	-6.10	131	149	AVG
4924.00	53.52	1.40	54.92	74.00	-19.08	125	86	peak
4924.00	51.74	1.40	53.14	54.00	-0.86	125	86	AVG

Note: Result = Reading + Correct Factor

Margin = Result – Limit

Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain

Spurious emissions more than 20 dB below the limit were not reported.

Vertical

Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
B Mode, Low Channel								
2390.00	28.00	32.82	60.82	74.00	-13.18	188	172	peak
2390.00	15.88	32.82	48.70	54.00	-5.30	188	172	AVG
2412.00	79.31	32.88	112.19	N/A	N/A	188	172	peak
2412.00	75.78	32.88	108.66	N/A	N/A	188	172	AVG
4824.00	52.05	1.05	53.10	74.00	-20.90	134	186	peak
4824.00	51.78	1.05	52.83	54.00	-1.17	134	186	AVG
7236.00	47.41	6.69	54.10	74.00	-19.90	144	36	peak
7236.00	44.11	6.69	50.80	54.00	-3.20	144	36	AVG
B Mode, Middle Channel								
2390.00	27.99	32.82	60.81	74.00	-13.19	172	193	peak
2390.00	14.91	32.82	47.73	54.00	-6.27	172	193	AVG
2437.00	82.01	32.94	114.95	N/A	N/A	172	193	peak
2437.00	79.68	32.94	112.62	N/A	N/A	172	193	AVG
2483.50	27.74	33.05	60.79	74.00	-13.21	172	193	peak
2483.50	14.39	33.05	47.44	54.00	-6.56	172	193	AVG
4874.00	53.26	1.23	54.49	74.00	-19.51	137	357	peak
4874.00	49.63	1.23	50.86	54.00	-3.14	137	357	AVG
7311.00	47.59	6.97	54.56	74.00	-19.44	128	280	peak
7311.00	41.87	6.97	48.84	54.00	-5.16	128	280	AVG
B Mode, High Channel								
2462.00	80.50	33.01	113.51	N/A	N/A	177	162	peak
2462.00	78.23	33.01	111.24	N/A	N/A	177	162	AVG
2483.50	27.00	33.05	60.05	74.00	-13.95	177	162	peak
2483.50	14.73	33.05	47.78	54.00	-6.22	177	162	AVG
4924.00	53.37	1.40	54.77	74.00	-19.23	136	357	peak
4924.00	51.34	1.40	52.74	54.00	-1.26	136	357	AVG
7386.00	45.61	7.28	52.89	74.00	-21.11	114	186	peak
7386.00	40.70	7.28	47.98	54.00	-6.02	114	186	AVG

Note: Result = Reading + Correct Factor

Margin = Result – Limit

Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain

Spurious emissions more than 20 dB below the limit were not reported.

Horizontal

Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
G Mode, Low Channel								
2390.00	37.60	32.82	70.42	74.00	-3.58	128	280	peak
2390.00	19.45	32.82	52.27	54.00	-1.73	128	280	AVG
2412.00	87.02	32.88	119.90	N/A	N/A	128	280	peak
2412.00	77.88	32.88	110.76	N/A	N/A	128	280	AVG
4824.00	56.89	1.05	57.94	74.00	-16.06	133	79	peak
4824.00	45.31	1.05	46.36	54.00	-7.64	133	79	AVG
7236.00	54.92	6.69	61.61	74.00	-12.39	153	107	peak
7236.00	42.67	6.69	49.36	54.00	-4.64	153	107	AVG
G Mode, Middle Channel								
2390.00	28.35	32.82	61.17	74.00	-12.83	151	269	peak
2390.00	17.30	32.82	50.12	54.00	-3.88	151	269	AVG
2437.00	86.22	32.94	119.16	N/A	N/A	151	269	peak
2437.00	78.34	32.94	111.28	N/A	N/A	151	269	AVG
2483.50	27.25	33.05	60.30	74.00	-13.70	151	269	peak
2483.50	17.64	33.05	50.69	54.00	-3.31	151	269	AVG
4874.00	52.98	1.23	54.21	74.00	-19.79	133	116	peak
4874.00	40.93	1.23	42.16	54.00	-11.84	133	116	AVG
7311.00	51.48	6.98	58.46	74.00	-15.54	147	329	peak
7311.00	41.61	6.98	48.59	54.00	-5.41	147	329	AVG
G Mode, High Channel								
2462.00	85.65	33.01	118.66	N/A	N/A	139	91	peak
2462.00	77.69	33.01	110.70	N/A	N/A	139	91	AVG
2483.50	37.06	33.05	70.11	74.00	-3.89	139	91	peak
2483.50	18.47	33.05	51.52	54.00	-2.48	139	91	AVG
4924.00	52.18	1.40	53.58	74.00	-20.42	125	27	peak
4924.00	41.41	1.40	42.81	54.00	-11.19	125	27	AVG

Note: Result = Reading + Correct Factor

Margin = Result – Limit

Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain

Spurious emissions more than 20 dB below the limit were not reported.

Vertical

Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
G Mode, Low Channel								
2390.00	30.88	32.82	63.70	74.00	-10.30	163	191	peak
2390.00	17.06	32.82	49.88	54.00	-4.12	163	191	AVG
2412.00	77.50	32.88	110.38	N/A	N/A	163	191	peak
2412.00	69.13	32.88	102.01	N/A	N/A	163	191	AVG
4824.00	60.21	1.05	61.26	74.00	-12.74	154	33	peak
4824.00	48.42	1.05	49.47	54.00	-4.53	154	33	AVG
7236.00	62.57	6.69	69.26	74.00	-4.74	141	98	peak
7236.00	46.37	6.69	53.06	54.00	-0.94	141	98	AVG
G Mode, Middle Channel								
2390.00	26.92	32.82	59.74	74.00	-14.26	185	197	peak
2390.00	14.50	32.82	47.32	54.00	-6.68	185	197	AVG
2437.00	78.64	32.94	111.58	N/A	N/A	185	197	peak
2437.00	69.60	32.94	102.54	N/A	N/A	185	197	AVG
2483.50	28.71	33.05	61.76	74.00	-12.24	185	197	peak
2483.50	14.83	33.05	47.88	54.00	-6.12	185	197	AVG
4874.00	55.96	1.23	57.19	74.00	-16.81	143	112	peak
4874.00	42.37	1.23	43.60	54.00	-10.40	143	112	AVG
7311.00	58.02	6.98	65.00	74.00	-9.00	147	196	peak
7311.00	43.93	6.98	50.91	54.00	-3.09	147	196	AVG
G Mode, High Channel								
2462.00	77.04	33.01	110.05	N/A	N/A	180	160	peak
2462.00	68.33	33.01	101.34	N/A	N/A	180	160	AVG
2483.50	28.63	33.05	61.68	74.00	-12.32	180	160	peak
2483.50	15.33	33.05	48.38	54.00	-5.62	180	160	AVG
4924.00	57.49	1.40	58.89	74.00	-15.11	152	220	peak
4924.00	44.31	1.40	45.71	54.00	-8.29	152	220	AVG
7386.00	57.76	7.28	65.04	74.00	-8.96	138	123	peak
7386.00	42.36	7.28	49.64	54.00	-4.36	138	123	AVG

Note: Result = Reading + Correct Factor

Margin = Result – Limit

Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain

Spurious emissions more than 20 dB below the limit were not reported.

Horizontal

Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
N20 Mode, Low Channel								
2390.00	35.65	32.82	68.47	74.00	-5.53	132	185	peak
2390.00	17.78	32.82	50.60	54.00	-3.40	132	185	AVG
2412.00	85.29	32.88	118.17	N/A	N/A	135	283	peak
2412.00	75.17	32.88	108.05	N/A	N/A	135	283	AVG
4824.00	55.51	1.05	56.56	74.00	-17.44	127	313	peak
4824.00	40.96	1.05	42.01	54.00	-11.99	127	313	AVG
7236.00	51.04	6.69	57.73	74.00	-16.27	134	149	peak
7236.00	38.69	6.69	45.38	54.00	-8.62	134	149	AVG
N20 Mode, Middle Channel								
2390.00	35.94	32.82	68.76	74.00	-5.24	139	84	peak
2390.00	20.04	32.82	52.86	54.00	-1.14	139	84	AVG
2437.00	88.38	32.94	121.32	N/A	N/A	139	84	peak
2437.00	77.17	32.94	110.11	N/A	N/A	139	84	AVG
2483.50	30.37	33.05	63.42	74.00	-10.58	139	84	peak
2483.50	15.03	33.05	48.08	54.00	-5.92	139	84	AVG
4874.00	48.82	1.23	50.05	74.00	-23.95	135	218	peak
4874.00	38.51	1.23	39.74	54.00	-14.26	135	218	AVG
7311.00	49.69	6.98	56.67	74.00	-17.33	146	354	peak
7311.00	37.11	6.98	44.09	54.00	-9.91	146	354	AVG
N20 Mode, High Channel								
2462.00	84.77	33.01	117.78	N/A	N/A	131	286	peak
2462.00	75.16	33.01	108.17	N/A	N/A	131	286	AVG
2483.50	33.63	33.05	66.68	74.00	-7.32	131	286	peak
2483.50	20.14	33.05	53.19	54.00	-0.81	131	286	AVG
4924.00	49.73	1.40	51.13	74.00	-22.87	135	146	peak
4924.00	39.32	1.40	40.72	54.00	-13.28	135	146	AVG

Note: Result = Reading + Correct Factor

Margin = Result – Limit

Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain

Spurious emissions more than 20 dB below the limit were not reported.

Vertical

Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
N20 Mode, Low Channel								
2390.00	29.57	32.82	62.39	74.00	-11.61	192	189	peak
2390.00	15.57	32.82	48.39	54.00	-5.61	192	189	AVG
2412.00	77.76	32.88	110.64	N/A	N/A	192	189	peak
2412.00	66.40	32.88	99.28	N/A	N/A	192	189	AVG
4824.00	59.22	1.05	60.27	74.00	-13.73	169	270	peak
4824.00	44.49	1.05	45.54	54.00	-8.46	169	270	AVG
7236.00	58.21	6.69	64.90	74.00	-9.10	153	326	peak
7236.00	45.96	6.69	52.65	54.00	-1.35	153	326	AVG
N20 Mode, Middle Channel								
2390.00	27.93	32.82	60.75	74.00	-13.25	179	170	peak
2390.00	14.76	32.82	47.58	54.00	-6.42	179	170	AVG
2437.00	80.01	32.94	112.95	N/A	N/A	185	197	peak
2437.00	68.93	32.94	101.87	N/A	N/A	185	197	AVG
2483.50	27.67	33.05	60.72	74.00	-13.28	182	161	peak
2483.50	14.72	33.05	47.77	54.00	-6.23	182	161	AVG
4874.00	55.70	1.23	56.93	74.00	-17.07	158	321	peak
4874.00	38.43	1.23	39.66	54.00	-14.34	158	321	AVG
7311.00	56.47	6.98	63.45	74.00	-10.55	144	55	peak
7311.00	43.12	6.98	50.10	54.00	-3.90	144	55	AVG
N20 Mode, High Channel								
2462.00	76.54	33.01	109.55	N/A	N/A	177	159	peak
2462.00	65.15	33.01	98.16	N/A	N/A	177	159	AVG
2483.50	28.80	33.05	61.85	74.00	-12.15	193	346	peak
2483.50	15.65	33.05	48.70	54.00	-5.30	193	346	AVG
4924.00	53.13	1.40	54.53	74.00	-19.47	156	113	peak
4924.00	42.19	1.40	43.59	54.00	-10.41	156	113	AVG
7386.00	52.46	7.28	59.74	74.00	-14.26	171	108	peak
7386.00	40.77	7.28	48.05	54.00	-5.95	171	108	AVG

Note: Result = Reading + Correct Factor

Margin = Result – Limit

Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain

Spurious emissions more than 20 dB below the limit were not reported.

Horizontal

Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
N40 Mode, Low Channel								
2390.00	31.81	32.82	64.63	74.00	-9.37	125	291	peak
2390.00	19.58	32.82	52.40	54.00	-1.60	125	291	AVG
2422.00	82.06	32.91	114.97	N/A	N/A	125	80	peak
2422.00	71.07	32.91	103.98	N/A	N/A	125	80	AVG
4844.00	48.24	1.12	49.36	74.00	-24.64	116	67	peak
4844.00	33.19	1.12	34.31	54.00	-19.69	116	67	AVG
N40 Mode, Middle Channel								
2390.00	29.47	32.82	62.29	74.00	-11.71	115	83	peak
2390.00	17.24	32.82	50.06	54.00	-3.94	115	83	AVG
2437.00	82.42	32.94	115.36	N/A	N/A	115	83	peak
2437.00	70.62	32.94	103.56	N/A	N/A	115	83	AVG
2483.50	34.86	33.05	67.91	74.00	-6.09	115	83	peak
2483.50	18.58	33.05	51.63	54.00	-2.37	115	83	AVG
4893.00	49.29	1.23	50.64	74.00	-23.36	111	184	peak
4893.00	34.50	1.23	35.85	54.00	-18.15	111	184	AVG
N40 Mode, High Channel								
2452.00	79.94	32.98	112.92	N/A	N/A	117	266	peak
2452.00	69.32	32.98	102.30	N/A	N/A	117	266	AVG
2483.50	34.99	33.05	68.04	74.00	-5.96	117	288	peak
2483.50	18.36	33.05	51.41	54.00	-2.59	117	288	AVG
4904.00	49.00	1.33	50.33	74.00	-23.67	123	248	peak
4904.00	36.41	1.33	37.74	54.00	-16.26	123	248	AVG

Note: Result = Reading + Correct Factor

Margin = Result – Limit

Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain

Spurious emissions more than 20 dB below the limit were not reported.

Vertical

Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
N40 Mode, Low Channel								
2390.00	28.24	32.82	61.06	74.00	-12.94	184	169	peak
2390.00	15.90	32.82	48.72	54.00	-5.28	184	169	AVG
2422.00	72.24	32.91	105.15	N/A	N/A	184	169	peak
2422.00	62.71	32.91	95.62	N/A	N/A	184	169	AVG
4844.00	51.55	1.12	52.67	74.00	-21.33	166	240	peak
4844.00	36.29	1.12	37.41	54.00	-16.59	166	240	AVG
7266.00	52.18	6.80	58.98	74.00	-15.02	123	211	peak
7266.00	39.97	6.80	46.77	54.00	-7.23	123	211	AVG
N40 Mode, Middle Channel								
2390.00	27.71	32.82	60.53	74.00	-13.47	144	201	peak
2390.00	14.87	32.82	47.69	54.00	-6.31	144	201	AVG
2437.00	74.11	32.94	107.05	N/A	N/A	165	197	peak
2437.00	63.22	32.94	96.16	N/A	N/A	165	197	AVG
2483.50	27.79	33.05	60.84	74.00	-13.16	172	356	peak
2483.50	15.52	33.05	48.57	54.00	-5.43	172	356	AVG
4874.00	49.66	1.23	50.89	74.00	-23.11	171	324	peak
4874.00	38.29	1.23	39.52	54.00	-14.48	171	324	AVG
7311.00	51.92	6.98	58.90	74.00	-15.10	168	202	peak
7311.00	41.84	6.98	48.82	54.00	-5.18	168	202	AVG
N40 Mode, High Channel								
2452.00	70.38	32.98	103.36	N/A	N/A	170	193	peak
2452.00	60.31	32.98	93.29	N/A	N/A	170	193	AVG
2483.50	27.69	33.05	60.74	74.00	-13.26	170	193	peak
2483.50	14.67	33.05	47.72	54.00	-6.28	170	193	AVG
4904.00	48.23	1.33	49.56	74.00	-24.44	122	182	peak
4904.00	37.11	1.33	38.44	54.00	-15.56	122	182	AVG

Note: Result = Reading + Correct Factor

Margin = Result – Limit

Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain

Spurious emissions more than 20 dB below the limit were not reported.

Test Mode: simultaneous transmissions (LTE+2.4G WIFI) was worst case

Mode 1

Horizontal

Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
319.06	36.21	-9.44	26.77	46.00	-19.23	100	90	QP
455.83	31.39	-6.44	24.95	46.00	-21.05	100	269	QP
587.75	26.86	-4.23	22.63	46.00	-23.37	100	39	QP
672.14	34.08	-3.12	30.96	46.00	-15.04	100	29	QP
790.48	32.85	-0.80	32.05	46.00	-13.95	100	357	QP
893.30	26.90	1.28	28.18	46.00	-17.82	100	318	QP
3760.00	32.12	-0.6	31.52	74.00	-42.48	100	222	peak
3760.00	30.81	-0.6	30.21	54.00	-23.79	100	222	AVG
4824.00	30.87	1.05	31.92	74.00	-42.08	100	179	peak
4824.00	29.19	1.05	30.24	54.00	-23.76	100	179	AVG

Vertical

Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
280.26	32.04	-10.08	21.96	46.00	-24.04	100	49	QP
475.23	34.11	-6.12	27.99	46.00	-18.01	100	139	QP
551.86	27.74	-4.95	22.79	46.00	-23.21	100	12	QP
674.08	28.46	-3.10	25.36	46.00	-20.64	100	266	QP
755.56	28.73	-1.67	27.06	46.00	-18.94	100	208	QP
950.53	26.24	2.68	28.92	46.00	-17.08	100	348	QP
3760.00	30.55	-0.6	29.95	74.00	-44.05	100	165	peak
3760.00	28.97	-0.6	28.37	54.00	-25.63	100	165	AVG
4824.00	29.74	1.05	30.79	74.00	-43.21	100	298	peak
4824.00	27.84	1.05	28.89	54.00	-25.11	100	298	AVG

Note: Result = Reading + Correct Factor

Margin = Result – Limit

Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain

Spurious emissions more than 20 dB below the limit were not reported.

7 DECLARATION OF SIMILARITY

Draytek Corporation
No. 26, Fu Shing Rd., Hukou County, Hsinchu
Industrial Park, Hsinchu 303 Taiwan

DECLARATION OF SIMILARITY

May 12, 2017

FEDERAL COMMUNICATIONS COMMISSIONS
Authorization and Evaluation Division
7435 Oakland Mills Road
Columbia, MD 21046

We Draytek Corporation hereby declare that product: VDSL2 & ADSL2+ Dual-WAN Security Router, model(s): Vigor2862BLgVn, Series Model: Vigor2862Ln, Vigor2862LVn, Vigor2862LFn, Vigor2862LFVn, Vigor2862Lgn, Vigor2862LgVn, Vigor2862LgFn, Vigor2862LgFVn, Vigor2862BLn, Vigor2862BLVn, Vigor2862BLFn, Vigor2862BLFVn, Vigor2862BLgn, Vigor2862BLgVn, Vigor2862BLgFn, Vigor2862BLgFVn, Vigor2926Ln, Vigor2926LVn, Vigor2926LFn, Vigor2926LFVn, Vigor2926Lgn, Vigor2926LgVn, Vigor2926LgFn, Vigor2926LgFVn, Vigor2860Ln, Vigor2860LVn, Vigor2860LFn, Vigor2860LFVn, Vigor2860Lgn, Vigor2860LgVn, Vigor2860LgFn, Vigor2860LgFVn, Vigor2860BLn, Vigor2860BLVn, Vigor2860BLFn, Vigor2860BLFVn, Vigor2860BLgn, Vigor2860BLgVn, Vigor2860BLgFn, Vigor2860BLgFVn, Vigor2925Ln, Vigor2925LVn, Vigor2925LFn, Vigor2925LFVn, Vigor2925Lgn, Vigor2925LgVn, Vigor2925LgFn, Vigor2925LgFVn, Vigor2862n, Vigor2862Vn, Vigor2862Fn, Vigor2862FVn, Vigor2862Bn, Vigor2862BVn, Vigor2862BFn, Vigor2862BFVn, Vigor2926n, Vigor2926Vn, Vigor2926Fn, Vigor2926FVn, Vigor2860n, Vigor2860Vn, Vigor2860Fn, Vigor2860FVn, Vigor2860Bn, Vigor2860BVn, Vigor2860BFn, Vigor2860BFVn, Vigor2925n, Vigor2925Vn, Vigor2925Fn, Vigor2925FVn, Vigor2832n, Vigor2832Vn are electrically identical with the same electromagnetic emissions and electromagnetic compatibility characteristics as model: Vigor2862BLgVn tested by BACL, the results of which are featured in BACL project: RTWA170214001.

A description of the differences between the tested model and those that are declared similar are as follows:

2862, 2860, 2832,has dsl function
2926, 2925 didn't has dsl function
2862, 2860, 2832 for different marketing
2926, 2925 for different marketing

n Only 2.4G Wi-fi function
F Fiber function
V VoIP function
L LTE function
B Bonding VDSL function
g GPS function

Please contact me should there be need for any additional clarification or information.
Best Regards,

Abbott Yu/ HW manager

No. 26, Fu Shing Rd., Hukou County, Hsinchu Industrial Park, Hsinchu 303 Taiwan

******* END OF REPORT *******