

FCC RADIO TEST REPORT

Applicant	:	TRENDnet, Inc.
Address	:	20675 Manhattan Place, Torrance, CA 90501 U.S.A.
Equipment	:	(1)AC1200 Dual Band PoE Indoor Wireless Access Point (2)AC1200 Dual Band PoE+ Wireless Controller Kit
Model No.	:	(1)TEW-821DAP (2)TEW-821DAP2KAP
Trade Name	:	TRENDnet
FCC ID	:	XU8TEW821DAPV2

I HEREBY CERTIFY THAT :

The sample was received on Nov. 27, 2017 and the testing was carried out on Jan. 10, 2018 at Cerpass Technology Corp. The test result refers exclusively to the test presented test model / sample. Without written approval of Cerpass Technology Corp., the test report shall not be reproduced except in full.

Approved by:

Lava

Mark Liao / Assistant Manager

Laboratory Accreditation:

Cerpass Technology Corporation Test Laboratory

Tested by:

Spree Yei / Engineer



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History of this test report

Issue Date	Description
Jan. 24, 2018	Original



1. Summary of Test Procedure and Test Results

1.1 Applicable Standards

ANSI C63.4:2014

ANSI C63.10:2013

FCC Rule	. Description of Test	Result	
15.203	. CO-LOCATION	Pass	

This EUT has been also tested and compiled with the requirement of FCC Part 15, Subpart B, recorded in a separate test report.



2. Test Configuration of Equipment under Test

2.1 Feature of Equipment and Model Description

Equipment	(1) AC1200 Dual Band PoE Indoor Wireless Access Point
	(2) AC1200 Dual Band PoE+ Wireless Controller Kit
Model No.	(1) TEW-821DAP
	(2) TEW-821DAP2KAP
Brand Name	TRENDnet
Product Description	Please refer to User's Manual.
Connecting I/O Port(s)	Please refer to User's Manual.
AC ADAPTER	Adapter Brand: AMIGO Model No.: AMS135-1201000FU, AMS135-1201000FV AMS135-1201000FB, AMS135-1201000FS I/P: AC 100-240V~, 50/60Hz, 0.5A ; O/P: DC 12V, 1.0A
PoE	42.5-57Vdc/0.6A
Memo	V2.0R
Frequency Range	802.11b/g/n: 2412-2462 MHz 802.11a/ac: 5150MHz-5250MHz, 5725MHz -5850MHz
Modulation Type	OFDM, DSSS
Data Rate	802.11b: 1, 2, 5.5, 11Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps 802.11n: MCS0 – MCS23, HT20/40 802.11a: 6, 9, 12, 18, 24, 36, 48, 54Mbps 802.11ac: MCS0 – MCS9, VHT20/40/80
Antenna Type/ gain	PIFA Antenna 2412-2462MHz: ANT A, B: 3.0 dBi 5150MHz-5250MHz: ANT A, B: 4.0 dBi 5725MHz -5850MHz: ANT A, B: 4.0 dBi

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2. 802.11ac VHT20, VHT40 and VHT80 support beamforming.

2.2 The Difference of Model No.

The differences between all model numbers as below:

Model no.	Equipment	Remark
TEW-821DAP	AC1200 Dual Band PoE Indoor Wireless Access Point	The differences between these two model numbers are for
TEW-821DAP2KAP	AC1200 Dual Band PoE+ Wireless Controller Kit	marketing purpose, the circuit design and layout are the same.





2.3 Test Mode and Test Software

- a. During testing, the interface cables and equipment positions were varied according to ANSI C63.4.
- b. The complete test system included remote workstation and EUT for RF test. The remote workstation included Notebook.
- c. An executive program,"Art2 Command" under WIN 8 was executed to transmit and receive data via WLAN.
- d. The following test mode was performed for the test:

Conducted Emissions from the AC mains power ports			
Test Mode	Operating Description		
1	802.11n HT20 CH06 + 802.11ac VHT40 CH46		
Radiation E	missions (30MHz ~ 1GHz)		
Test Mode	Operating Description		
1	802.11n HT20 CH06 + 802.11ac VHT40 CH46, Power from Adapter		
2	802.11n HT20 CH06 + 802.11ac VHT40 CH46, Power from PoE		
Radiation Emissions (1GHz ~ 40GHz)			
Test Mode	Operating Description		
1	802.11n HT20 CH06 + 802.11ac VHT40 CH46, Power from Adapter		

2.4 Description of Test System

Device	Device Manufacturer Model No. Description					
Remote workstation						
Notebook DELL LatitudeE5450/5450 Power Cable, Unshielding, 1.8m						



2.5 General Information of Test

	Address Taiwan (Tel:+886 Fax:+88	Technology Corporation Test Laboratory No.10, Ln. 2, Lianfu St., Luzhu Dist., Taoyuan City 33848, R.O.C.) -3-3226-888 6-3-3226-881 No.68-1, Shihbachongsi, Shihding Township,		
Test Site		pei City 223, Taiwan, R.O.C. 6-2-2663-8582		
	FCC	TW1079, TW1061,TW1439		
	IC	4934E-1, 4934E-2		
	VCCI	T-2205 for Telecommunication Test C-4663 for Conducted emission test R-3428, R-4218 for Radiated emission test G-10812, G-10813 for radiated disturbance above 1GHz		
Frequency Range	Conducted: from 150kHz to 30 MHz			
Investigated:	Radiation: from 30 MHz to 40,000MHz			
Test Distance:	The test distance of radiated emission from antenna to EUT is 3 M.			

2.6 Measurement Uncertainty

Measurement Item	Measurement Frequency	Polarization	Uncertainty	
Conducted Emission	9 kHz ~ 30 MHz	Line / Neutral	<u>+</u> 2.9076 dB	
Radiated Emission	9 kHz ~ 25,000 MHz	Vertical / Horizontal	±0.948 dB	
Spurious Emission (Conducted)	-	-	±4.011 dB	
Maximum Peak and Average Output Power	-	-	±0.322 dB	
Power Spectral Density	-	-	±0.322 dB	
Bandwidth	-	-	74.224Hz	





3. Test Equipment and Ancillaries Used for Tests

Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
EMI Receiver	R&S	ESCI3	100443	2017/03/07	2018/03/06
LISN	Schwarzbeck	NSLK 8127	8127-568	2017/02/15	2018/02/14
Pulse Limiter	R&S	ESH3-Z2	101934	2017/02/14	2018/02/13
Bilog Antenna	Schwarzbeck	VULB9168	369	2017/03/15	2018/03/14
Active Loop Antenna	EMCO	6507	40855	2017/05/15	2018/05/14
Horn Antenna	EMCO	3115	31589	2017/02/18	2018/02/17
Horn Anrenna	EMCO	3116	31970	2017/03/29	2018/03/28
EXA Signal Analyzer	KEYSIGHT	N9010A	MY54200207	2017/03/17	2018/03/16
Preamplifier	EM	EM330	60660	2017/02/25	2018/02/24
Preamplifier	EMC INSTRUMENTS	EMC051845SE	980333	2017/09/20	2018/09/19
Preamplifier	Agilent	8449B	3008A01954	2017/02/09	2018/02/08
Preamplifier	EMC INSTRUMENTS	EMC184045	980065	2017/11/10	2018/11/09
MXG MW Analog Signal Generator	KEYSIGHT	N5183A	MY50142931	2017/03/17	2018/03/16
Spectrum Analyzer	R&S	FSP40	100219	2017/07/01	2018/06/30
BLUETOOTH TESTER	R&S	СВТ	101133	2017/03/10	2018/03/09
Attenuator	KEYSIGHT	8491B	MY39250703	2017/03/07	2018/03/06
Rotary Attenuator	Agilent	8495B	MY42146680	2017/03/13	2018/03/12
Temp & Humi chamber	T-MACHINE	TMJ-9712	T-12-040111	2017/09/04	2018/09/03
Series Power Meter	Anritsu	ML2495A	1224005	2017/03/01	2018/02/28
Power Sensor	Anritsu	MA2411B	1207295	2017/03/01	2018/02/28
Cable	HUBER SUHNER	SUCOFLEX 102	28422/2	2017/02/25	2018/02/24
Cable	HUBER SUHNER	SUCOFLEX 102	28418/2	2017/02/25	2018/02/24
Software	Farad	Ez-EMC	ver.ct3a1	N/A	N/A
Software	AUDIX	E3	V8.2014-8-6	N/A	N/A
Software	Keysight	N7607B Signal Studio	v2.0.0.1	N/A	N/A
Software	Keysight	Inservice MonitorUtility	N/A	N/A	N/A

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4. Test of AC Power Line Conducted Emission

4.1 Test Limit

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 KHz, according to the methods defined in ANSI C63.4-2014. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

Frequency (MHz)	Quasi Peak (dB µ V)	Average (dB μ V)
0.15 – 0.5	66-56*	56-46*
0.5 - 5.0	56	46
5.0 - 30.0	60	50

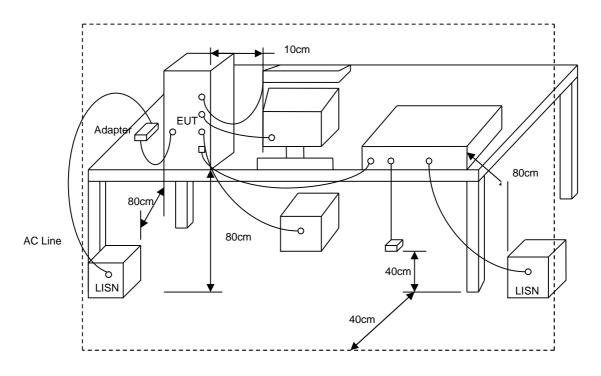
*Decreases with the logarithm of the frequency.

4.2 Test Procedures

- a. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
- b. Connect EUT to the power mains through a line impedance stabilization network (LISN).
- c. All the support units are connecting to the other LISN.
- d. The LISN provides 50 ohm coupling impedance for the measuring instrument.
- e. The FCC states that a 50 ohm, 50 micro-Henry LISN should be used.
- f. Both sides of AC line were checked for maximum conducted interference.
- g. The frequency range from 150 kHz to 30 MHz was searched.
- h. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.



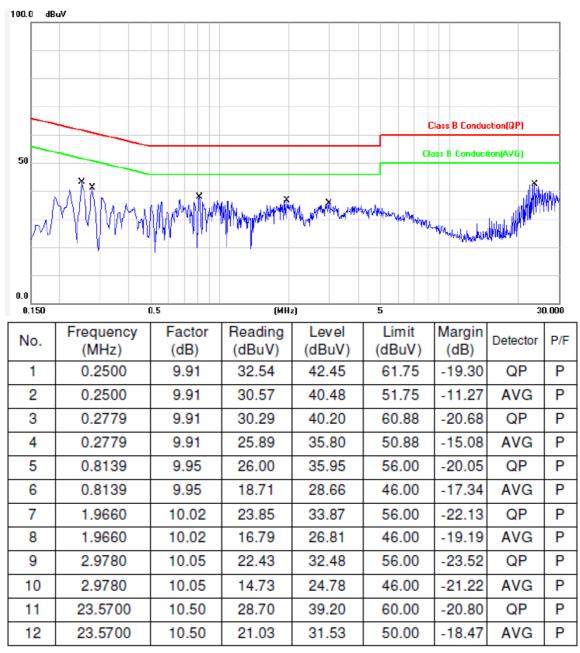
4.3 Typical Test Setup





4.4 Test Result and Data

Power	:	AC 120V	Pol/Phase :		LINE
Test Mode	:	Mode 1	Temperature :	:	24 °C
Test Date	:	Jan. 10, 2018	Humidity :		62 %



Note: Level = Reading + Factor

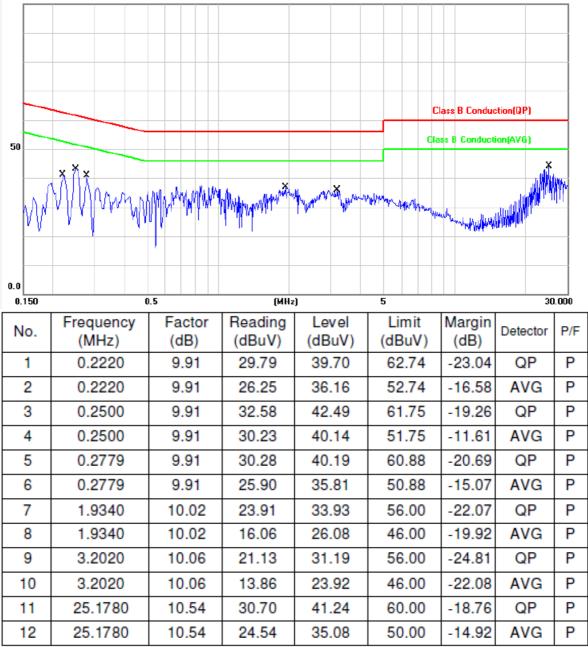
Margin = Level – Limit

Factor = (LISN, ISN, PLC or current probe) Factor + Cable Loss+ Attenuator



Power	:	AC 120V	Pol/Phase :	NEUTRAL
Test Mode	:	Mode 1	Temperature :	24 °C
Test Date	:	Jan. 10, 2018	Humidity :	62 %

100.0 dBuV



Note: Level = Reading + Factor

Margin = Level - Limit

Factor = (LISN, ISN, PLC or current probe) Factor + Cable Loss+ Attenuator



5. Test of Spurious Emission (Radiated)

5.1 Test Limit

In any 100kHz 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 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. If the transmitter measurement is based on the maximum conducted output power, the attenuation required under this paragraph shall be 30dB instead of 20dB. In addition, radiated emissions which fall in section 15.205(a) the restricted bands must also comply with the radiated emission limit specified in section 15.209(a).

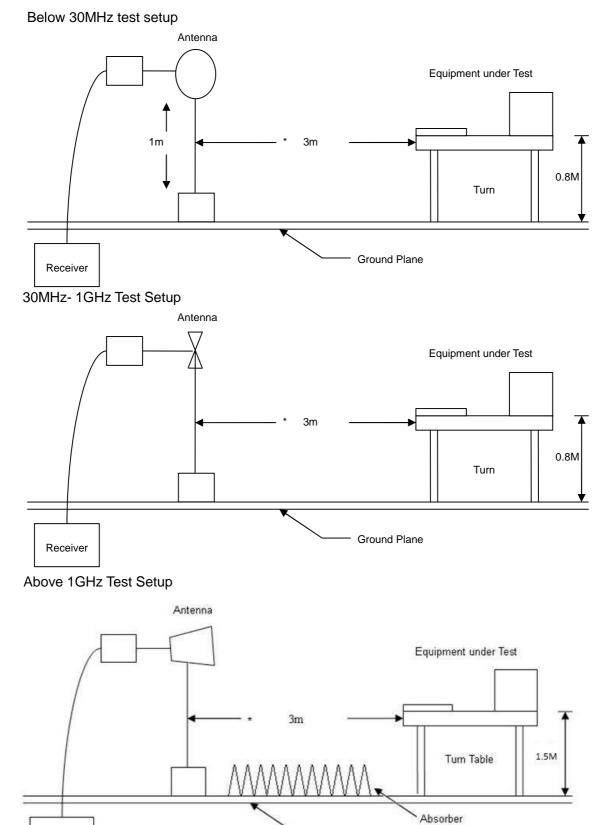
Frequency (MHz)	Field Strength (microvolt/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

5.2 Test Procedures

- a. The EUT was placed on a rotatable table top 0.8 meter above ground.
- b. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- c. The table was rotated 360 degrees to determine the position of the highest radiation.
- d. The antenna is a broadband antenna and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
- f. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.
- h. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
- i. "Cone of radiation" has been considered to be 3dB bandwidth of the measurement antenna.



5.3 Typical Test Setup



Ground Plane

Receiver

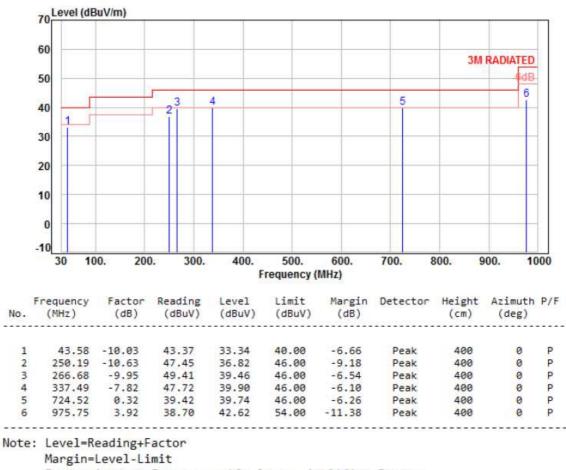


5.4 Test Result and Data (9kHz ~ 30MHz)

The 9kHz - 30MHz spurious emission is under limit 20dB more.

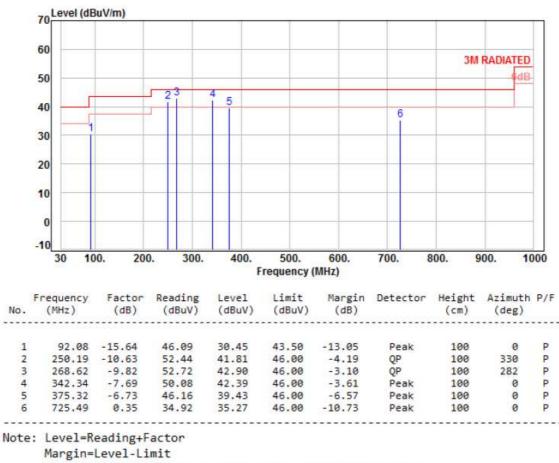
5.5 Test Result and Data (30MHz ~ 1GHz)

Power	:	AC 120V	Pol/Phase :	VERTICAL
Test Mode	:	Mode 1	Temperature :	23 °C
Test Date	:	Nov. 27, 2017	Humidity :	60 %





Power	:	AC 120V	Pol/Phase :	HORIZONTAL
Test Mode	:	Mode 1	Temperature :	23 °C
Test Date	:	Nov. 27, 2017	Humidity :	60 %





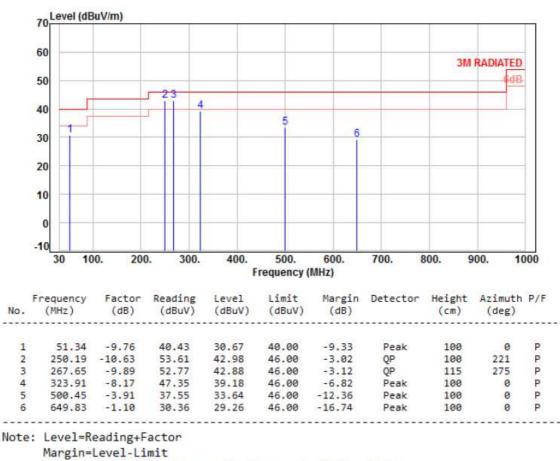
Power		PoE	Pol/Phase :	VERTICAL
Test Mode	•••	Mode 2	Temperature :	23 °C
Test Date	:	Nov. 27, 2017	Humidity :	60 %



Margin=Level-Limit



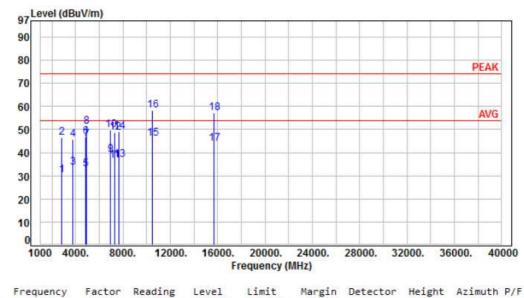
Power	:	PoE	Pol/Phase :	HORIZONTAL
Test Mode		Mode 2	Temperature :	23 °C
Test Date	:	Nov. 27, 2017	Humidity :	60 %





5.6 Test Result and Data (1GHz ~ 40GHz)

Power	:	AC 120V	Pol/Phase :	VERTICAL
Test Mode	•••	Mode 1	Temperature :	23 °C
Test Date		Nov. 27, 2017	Humidity :	60 %

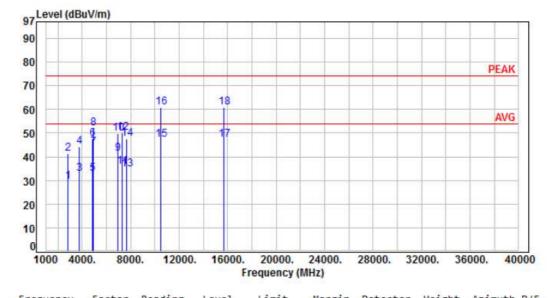


No.	(MHz)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dB)	Detector	(cm)	(deg)	
1	2793.00	-17.53	47.89	30.36	54.00	-23,64	Average	255	62	Ρ
2	2793.00	-17.53	63.84	46.31	74.00	-27.69	Peak	255	82	P
3	3750.00	-14.88	48.58	33.70	54.00	-20.30	Average	288	246	P
4	3750.00	-14.88	60.59	45.71	74.00	-28.29	Peak	288	246	P
5	4874.00	-13.11	45.88	32.77	54.00	-21.23	Average	105	67	P
6	4874.00	-13.11	59.77	46.66	74.00	-27.34	Peak	105	67	P
7	4910.00	-13.02	58.77	45.75	54.00	-8.25	Average	241	300	P
8	4910.00	-13.02	64.23	51.21	74.00	-22.79	Peak	241	300	P
9	6973.00	-11.00	50.16	39.16	54.00	-14.84	Average	105	322	P
10	6973.00	-11.00	60.76	49.76	74.00	-24.24	Peak	105	322	P
11	7311.00	-10.18	46.53	36.35	54.00	-17.65	Average	100	336	P
12	7311.00	-10.18	58.98	48.80	74.00	-25.20	Peak	100	336	P
13	7667.00	-9.76	46.78	37.02	54.00	-16.98	Average	181	266	P
14	7667.00	-9.76	58.81	49.05	74.00	-24.95	Peak	181	266	P
15	10460.00	-7.44	53.48	46.04	54.00	-7.96	Average	224	300	P
16	10460.00	-7.44	65.86	58.42	74.00	-15.58	Peak	224	300	P
17	15690.00	-3.73	47.77	44.04	54.00	-9.96	Average	215	301	P
18	15690.00	-3.73	60.74	57.01	74.00	-16.99	Peak	215	301	P

Note: Level=Reading+Factor Margin=Level-Limit



Power	:	AC 120V	Pol/Phase :	HORIZONTAL
Test Mode	:	Mode 1	Temperature :	23 °C
Test Date	:	Nov. 27, 2017	Humidity :	60 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/1
	(1412)		(0000)	(0000)	(abav)	(45)		(Cm)	(ucg)	
1	2793.00	-17.53	47.22	29.69	54.00	-24.31	Average	155	68	P
2	2793.00	-17.53	58.77	41.24	74.00	-32.76	Peak	155	68	P
з	3750.00	-14.88	47.66	32.78	54.00	-21.22	Average	100	133	P
4	3750.00	-14.88	58.99	44.11	74.00	-29.89	Peak	100	133	P
5	4874.00	-13.11	45.91	32.80	54.00	-21.20	Average	110	233	P
6	4874.00	-13.11	60.85	47.74	74.00	-26.26	Peak	110	233	P
7	4910.00	-13.02	56.88	43.86	54.00	-10.14	Average	100	45	P
8	4910.00	-13.02	65.11	52.09	74.00	-21.91	Peak	100	45	P
9	6973.00	-11.00	52.25	41.25	54.00	-12.75	Average	100	112	P
10	6973.00	-11.00	60.81	49.81	74.00	-24.19	Peak	100	112	P
11	7311.00	-10.18	46.04	35.86	54.00	-18.14	Average	252	107	P
12	7311.00	-10.18	60.46	50.28	74.00	-23.72	Peak	252	107	P
13	7667.00	-9.76	44.51	34.75	54.00	-19,25	Average	142	308	P
14	7667.00	-9.76	57.44	47.68	74.00	-26.32	Peak	142	308	P
15	10460.00	-7.44	54.55	47.11	54.00	-6.89	Average	100	345	P
16	10460.00	-7.44	68.19	60.75	74.00	-13.25	Peak	100	345	P
17	15690.00	-3.73	50.77	47.04	54.00	-6.96	Average	117	85	P
18	15690.00	-3.73	64.63	60.90	74.00	-13.10	Peak	117	85	P

Note: Level=Reading+Factor Margin=Level-Limit



5.7 Restricted Bands of Operation

Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz	
0.09000 - 0.11000	16.42000 – 16.42300	399.9 - 410.0	4.500 – 5.250	
0.49500 - 0.505**	16.69475 – 16.69525	608.0 - 614.0	5.350 - 5.460	
2.17350 - 2.19050	16.80425 – 16.80475	960.0 - 1240.0	7.250 – 7.750	
4.12500 - 4.12800	25.50000 - 25.67000	1300.0 – 1427.0	8.025 - 8.500	
4.17725 – 4.17775	37.50000 - 38.25000	1435.0 – 1626.5	9.000 - 9.200	
4.20725 – 4.20775	73.00000 - 74.60000	1645.5 – 1646.5	9.300 - 9.500	
6.21500 - 6.21800	74.80000 – 75.20000	1660.0 – 1710.0	10.600 - 12.700	
6.26775 – 6.26825	108.00000 - 121.94000	1718.8 – 1722.2	13.250 – 13.400	
6.31175 – 6.31225	123.00000 - 138.00000	2200.0 - 2300.0	14.470 – 14.500	
8.29100 - 8.29400	149.90000 - 150.05000	2310.0 – 2390.0	15.350 – 16.200	
8.36200 - 8.36600	156.52475 – 156.52525	2483.5 – 2500.0	17.700 – 21.400	
8.37625 - 8.38675	156.70000 - 156.90000	2655.0 – 2900.0	22.010 – 23.120	
8.41425 - 8.41475	162.01250 - 167.17000	3260.0 - 3267.0	23.600 - 24.000	
12.29000 - 12.29300	167.72000 - 173.20000	3332.0 – 3339.0	31.200 - 31.800	
12.51975 – 12.52025	240.00000 - 285.00000	3345.8 – 3358.0	36.430 - 36.500	
12.57675 – 12.57725	322.00000 - 335.40000	3600.0 - 4400.0	Above 38.6	
13.36000 - 13.41000				

**: Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz