



FCC RADIO TEST REPORT

Applicant : Pass & Seymour Inc., d/b/a Legrand
Address : 301 Fulling Mill Road, Suite G, Middletown,
Pennsylvania, United States
Equipment : 2.4GHz Band RF Lighting Controller
Module Model no. SA7529, SA75291A2
Host Model no. HKRP20, HKRP10
Trade Name : Legrand
FCC ID. : YV8-SA7529

I HEREBY CERTIFY THAT :

The sample was received on Sep. 14, 2018 and the testing was carried out on Sep. 27, 2018 at CerpPASS Technology Corp. The test result refers exclusively to the test presented test model / sample. Without written approval of CerpPASS Technology Corp., the test report shall not be reproduced except in full.

Approved by:

Mark Liao / Assistant Manager

Tested by:

Spree Yei / Engineer

Laboratory Accreditation:

CerpPASS Technology Corporation Test Laboratory





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History of this test report

Report No.	Issue Date	Description
TEF11806259	Oct. 02, 2018	Original



1. Summary of Test Procedure and Test Results

1.1 Applicable Standards

ANSI C63.4:2014

ANSI C63.10:2013

FCC Rules and Regulations Part 15 Subpart C §15.247

KDB558074

KDB662911

KDB447498

FCC Rule	Description of Test	Result
15.203	. Antenna Requirement	Pass
15.207	. AC Power Line Conducted Emission	Pass
15.209 15.205	. Radiated Spurious Emission	Pass
15.247(d)	. Conducted Spurious Emission	Pass
15.247(a)(2)	. 6dB Bandwidth	Pass
15.247(b)	. Maximum Peak and Average Output Power	Pass
15.247(e)	. Power Spectral Density	Pass
2.1091	. Radio Frequency Exposure	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

Equipment	2.4GHz Band RF Lighting Controller
Module Model No.	SA7529, SA75291A2
Host Model No.	HKRP20, HKRP10
Brand Name	Legrand
Product Description	Please refer to User's Manual.
Connecting I/O Port(s)	Please refer to User's Manual.
Frequency Range	2412MHz~2462MHz
Modulation Type	DSSS, OFDM
Data Rate	802.11b: 1, 2, 5.5, 11Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps 802.11n: MCS0 – MCS7, HT20
Antenna Type/ gain	PIFA antenna/ 4.17dBi

Note:

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

2.2 The Difference of Model No.

Model No.	Difference
SA75291A2	Marketing purpose.
SA7529	

Host Model No	Difference
HKRP20	Marketing purpose.
HKRP10	

2.3 Carrier Frequency of Channels

802.11b, 802.11g, 802.11n HT20 (2412MHz~2462MHz)

Channel	Frequency(MHz)	Channel	Frequency(MHz)
*01	2412	07	2442
02	2417	08	2447
03	2422	09	2452
04	2427	10	2457
05	2432	*11	2462
*06	2437	---	---

Note: Channels remarked * are selected to perform test.



2.4 Test Mode and Test Software

- a. During testing, the interface cables and equipment positions were varied according to ANSI C63.4.
- b. An executive program, " UI_mptool_1:V14" under WIN 7 was executed to transmit and receive data via WLAN.
- c. The following test modes were performed for the test:

Conducted Emissions from the AC power line and Radiated Spurious Emission (below 1GHz)	
Test Mode	Operating Description
1	802.11n HT20 (6.5Mbps)
Radiated Spurious Emission (above 1GHz)	
Test Mode	Operating Description
1	802.11b (1Mbps)
2	802.11g (6Mbps)
3	802.11n HT20 (6.5Mbps)
Conducted Spurious Emission, 6dB Bandwidth, Maximum Peak Output Power, Power Spectral Density	
Test Mode	Operating Description
1	802.11b (1Mbps)
2	802.11g (6Mbps)
3	802.11n HT20 (6.5Mbps)

2.5 Description of Test System

Device	Manufacturer	Model No.	Description
NB	ASUS	P2430U	Power Cable, Unshielding 1.8m



2.6 General Information of Test

Test Site	CerpPASS Technology Corporation Test Laboratory Address: No.10, Ln. 2, Lianfu St., Luzhu Dist., Taoyuan City 33848, Taiwan (R.O.C.) Tel:+886-3-3226-888 Fax:+886-3-3226-881 Address: No.68-1, Shihbachongsi, Shihding Township, New Taipei City 223, Taiwan, R.O.C. Tel: +886-2-2663-8582	
	FCC	TW1079, TW1061, TW1439
	IC	4934E-1, 4934E-2
	VCCI	T-2205 for Telecommunication Test C-4663 for Conducted emission test R-4399, R-4218 for Radiated emission test G-10812, G-10813 for radiated disturbance above 1GHz
Frequency Range Investigated:	Conducted: from 150kHz to 30 MHz Radiation: from 30 MHz to 25,000MHz	
Test Distance:	The test distance of radiated emission from antenna to EUT is 3 M.	

2.7 Measurement Uncertainty

Measurement Item	Uncertainty
Radiated Spurious Emission(9KHz~30MHz)	±5.007dB
Radiated Spurious Emission(30MHz~1GHz)	±5.157dB
Radiated Spurious Emission(1GHz~18GHz)	±6.383dB
Radiated Spurious Emission(18GHz~40GHz)	±6.648dB
Conducted Spurious Emission	±1.253dB
6dB Bandwidth	±6.89%
Power Spectral Density	±0.630dB
26 dB Occupied Bandwidth	±6.10%
Frequency Stability	±375KHz
Channel Frequencies Separation	±6.10%
20dB Bandwidth	±6.12%
Dwell Time	±1.34%
Peak Output Power(Conducted Power Meter)	±0.86dB
Temperature	±1.2oC
Humidity	±2.7%
Channel Move Time	±4.53%
Channel Closing Transmission Time	±6.61%
Threshold	±0.631dB
Non occupancy period	±1.17%



3. Test Equipment and Ancillaries Used for Tests

Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
EMI Receiver	R&S	ESCI3	100443	2018/03/15	2019/03/14
LISN	Schwarzbeck	NSLK 8127	8127-568	2018/02/26	2019/02/25
Pulse Limiter	R&S	ESH3-Z2	101934	2018/02/22	2019/02/21
Bilog Antenna	Schwarzbeck	VULB9168	275	2018/09/17	2019/09/16
Active Loop Antenna	EMCO	6507	40855	2018/05/22	2019/05/21
Horn Antenna	EMCO	3115	31589	2018/04/02	2019/04/01
Horn Antenna	EMCO	3116	31970	2018/03/23	2019/03/22
Preamplifier	EM	EM330	060660	2018/03/08	2019/03/07
Preamplifier	EMC INSTRUMENTS	EMC051845SE	980333	2018/09/18	2019/09/17
Preamplifier	EMC INSTRUMENTS	EMC184045	980065	2017/11/10	2018/11/09
MXG MW Analog Signal Generator	KEYSIGHT	N5183A	MY50142931	2018/04/10	2019/04/09
Spectrum Analyzer	R&S	FSP40	100219	2018/07/03	2019/07/02
BLUETOOTH TESTER	R&S	CBT	101133	2018/04/02	2019/04/01
Attenuator	KEYSIGHT	8491B	MY39250705	2018/09/04	2019/09/03
EXA Signal Analyzer	KEYSIGHT	N9010A	MY54200207	2018/03/29	2019/03/28
Rotary Attenuator	Agilent	8495B	MY42146680	2018/03/29	2019/03/28
Temp & Humi chamber	T-MACHINE	TMJ-9712	T-12-040111	2018/08/30	2019/08/29
Series Power Meter	Anritsu	ML2495A	1224005	2018/03/23	2019/03/22
Power Sensor	Anritsu	MA2411B	1207295	2018/03/23	2019/03/22
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	V3.0.0.0	N/A	N/A
Software	Keysight	Inservice MonitorUtility	N/A	N/A	N/A



4. Antenna Requirements

4.1 Antenna Construction and Directional Gain

Antenna Type	PIFA Antenna
Antenna Gain	4.17 dBi



5. Test of AC Power Line Conducted Emission

5.1 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

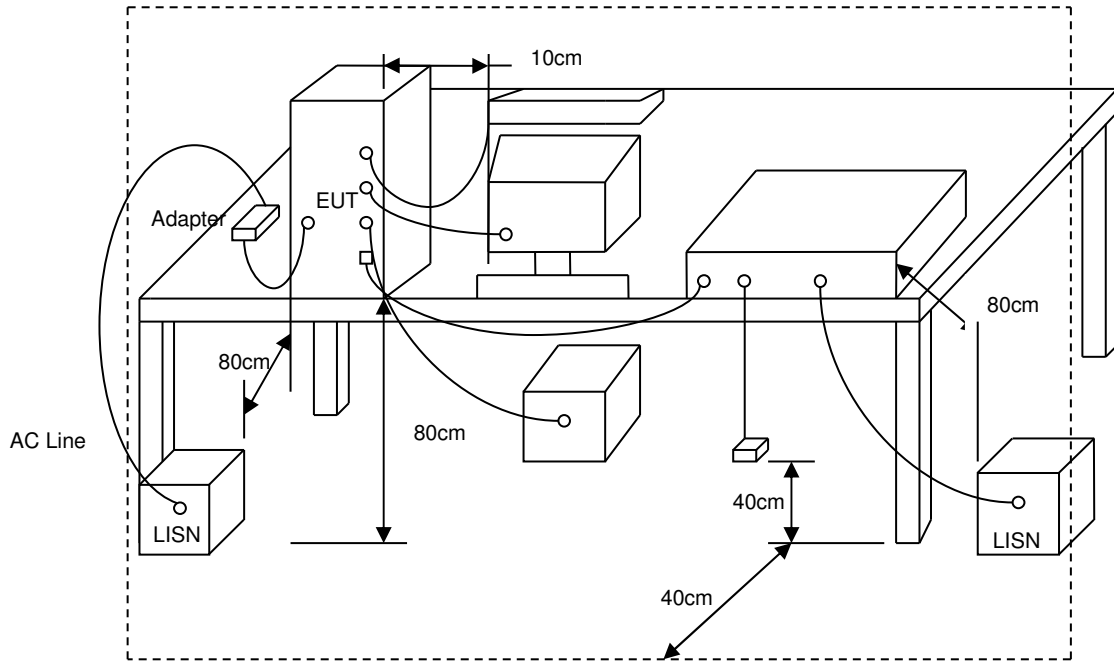
*Decreases with the logarithm of the frequency.

5.2 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.



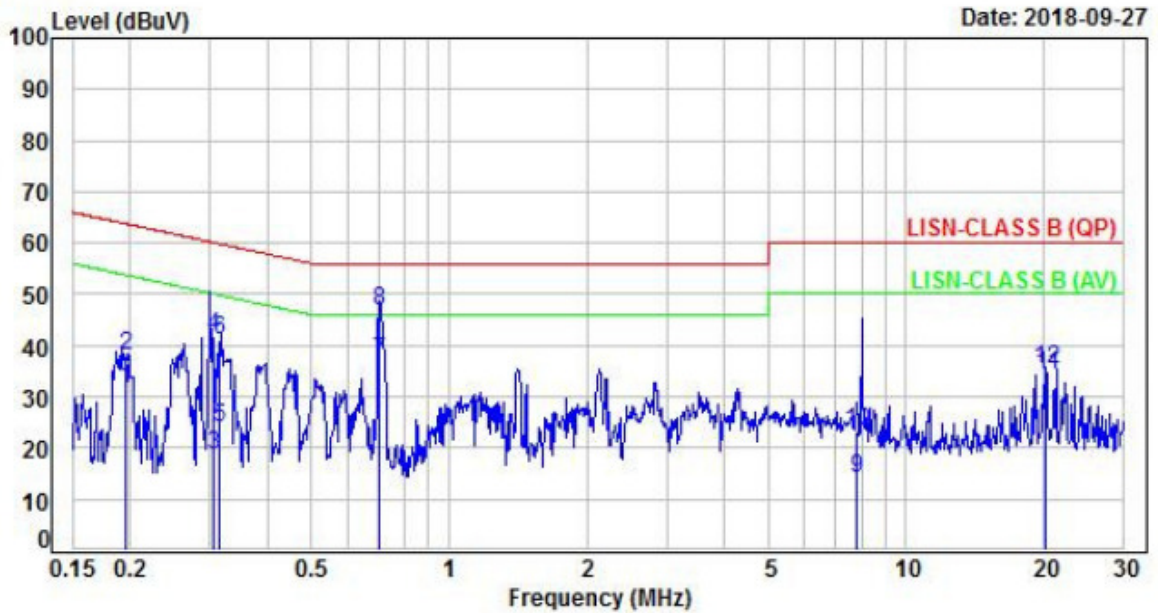
5.3 Typical Test Setup





5.4 Test Result and Data

Power	: AC 120V	Pol/Phase	: LINE
Test Mode	: Mode 1	Temperature	: 20 °C
Test date	: Sep. 27, 2018	Humidity	: 40 %

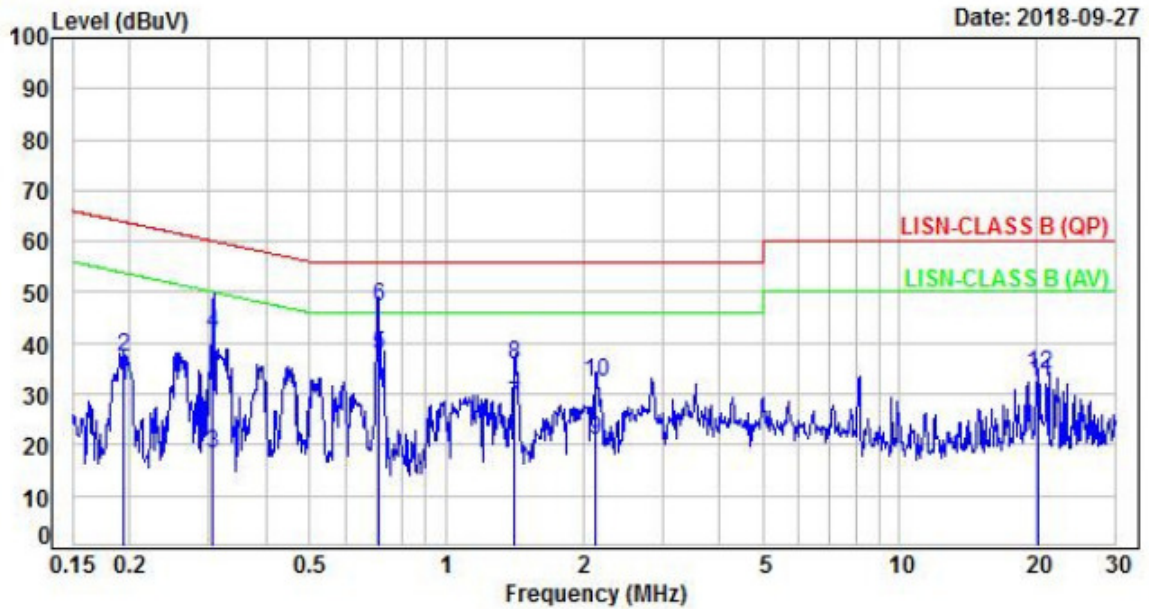


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.20	9.94	21.63	31.57	53.75	-22.18	Average	P
2	0.20	9.94	27.95	37.89	63.75	-25.86	QP	P
3	0.31	9.94	8.82	18.76	50.08	-31.32	Average	P
4	0.31	9.94	31.92	41.86	60.08	-18.22	QP	P
5	0.31	9.94	14.03	23.97	49.90	-25.93	Average	P
6	0.31	9.94	31.01	40.95	59.90	-18.95	QP	P
7	0.71	9.97	26.91	36.88	46.00	-9.12	Average	P
8	0.71	9.97	36.83	46.80	56.00	-9.20	QP	P
9	7.79	10.23	3.74	13.97	50.00	-36.03	Average	P
10	7.79	10.23	12.96	23.19	60.00	-36.81	QP	P
11	20.26	10.52	23.58	34.10	50.00	-15.90	Average	P
12	20.26	10.52	24.71	35.23	60.00	-24.77	QP	P

Note: Level = Reading + Factor
 Margin = Level – Limit
 Factor = (LISN, ISN, PLC or current probe) Factor + Cable Loss



Power	: AC 120V	Pol/Phase	: NEUTRAL
Test Mode	: Mode 1	Temperature	: 20 °C
Test date	: Sep. 27, 2018	Humidity	: 40 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBUV)	Level (dBUV)	Limit (dBUV)	Margin (dB)	Detector	P/F
1	0.19	9.94	21.56	31.50	53.82	-22.32	Average	P
2	0.19	9.94	27.47	37.41	63.82	-26.41	QP	P
3	0.31	9.94	8.23	18.17	50.08	-31.91	Average	P
4	0.31	9.94	31.74	41.68	60.08	-18.40	QP	P
5	0.71	9.97	27.61	37.58	46.00	-8.42	Average	P
6	0.71	9.97	37.35	47.32	56.00	-8.68	QP	P
7	1.42	10.01	17.77	27.78	46.00	-18.22	Average	P
8	1.42	10.01	25.65	35.66	56.00	-20.34	QP	P
9	2.12	10.03	10.76	20.79	46.00	-25.21	Average	P
10	2.12	10.03	22.39	32.42	56.00	-23.58	QP	P
11	20.26	10.48	21.85	32.33	50.00	-17.67	Average	P
12	20.26	10.48	23.41	33.89	60.00	-26.11	QP	P

Note: Level = Reading + Factor
 Margin = Level - Limit
 Factor = (LISN, ISN, PLC or current probe) Factor + Cable Loss



6. Test of Radiated Spurious Emission

6.1 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

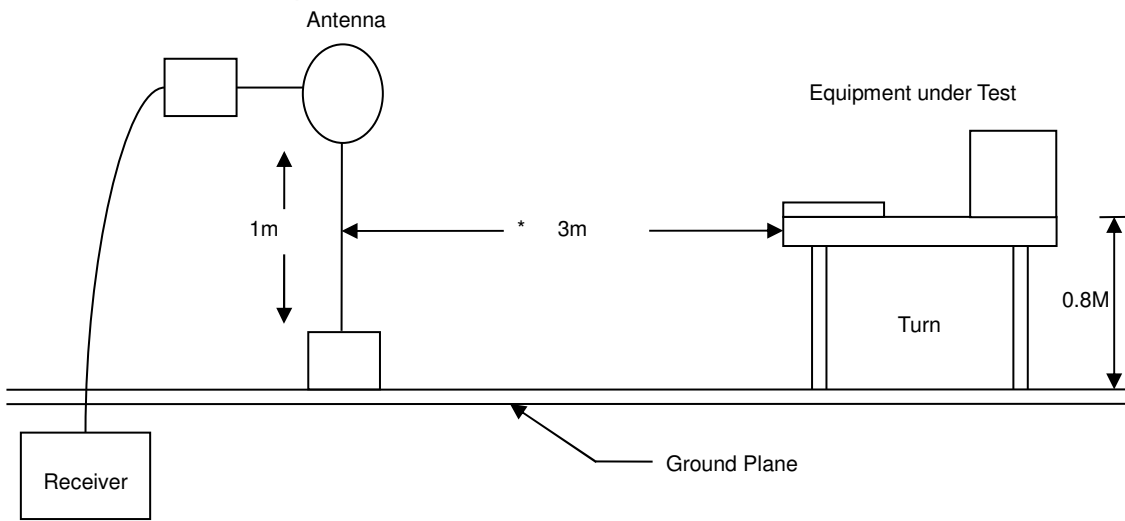
6.2 Test Procedures

- The EUT was placed on a rotatable table top 0.8 meter above ground.
- The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- The table was rotated 360 degrees to determine the position of the highest radiation.
- 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.
- 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.
- Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
- 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.
- 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.
- "Cone of radiation" has been considered to be 3dB bandwidth of the measurement antenna.

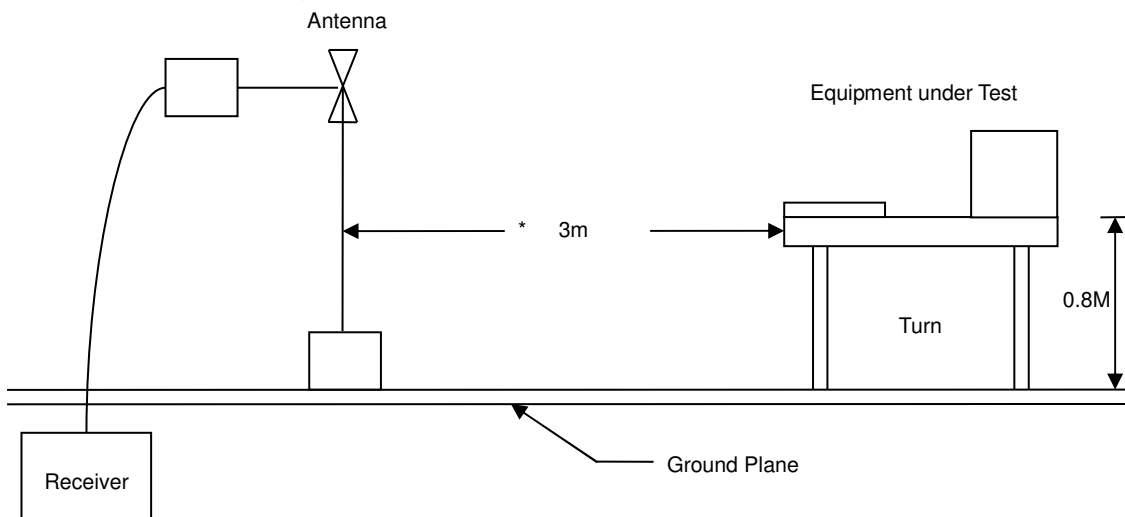


6.3 Typical Test Setup

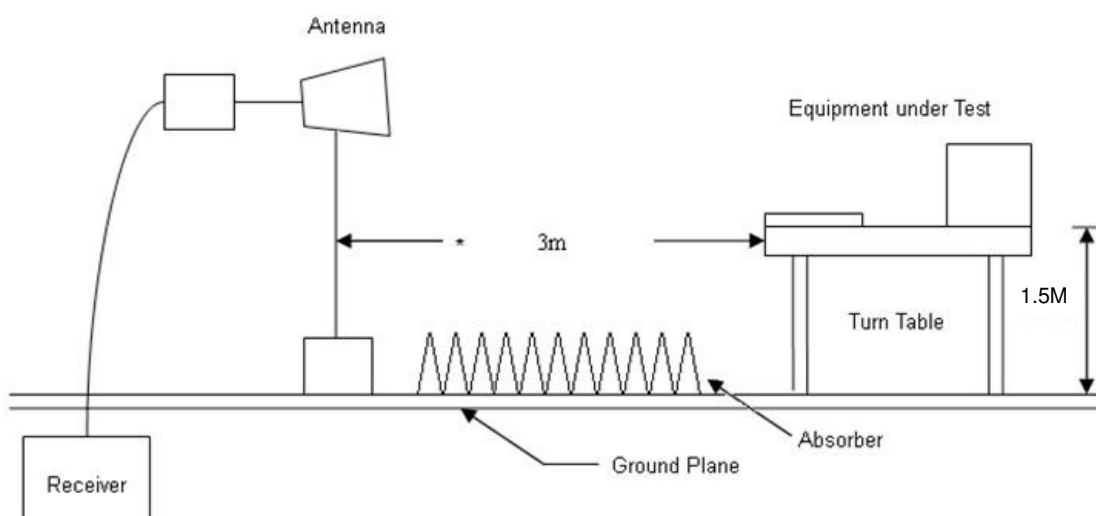
Below 30MHz test setup



30MHz- 1GHz Test Setup



Above 1GHz Test Setup



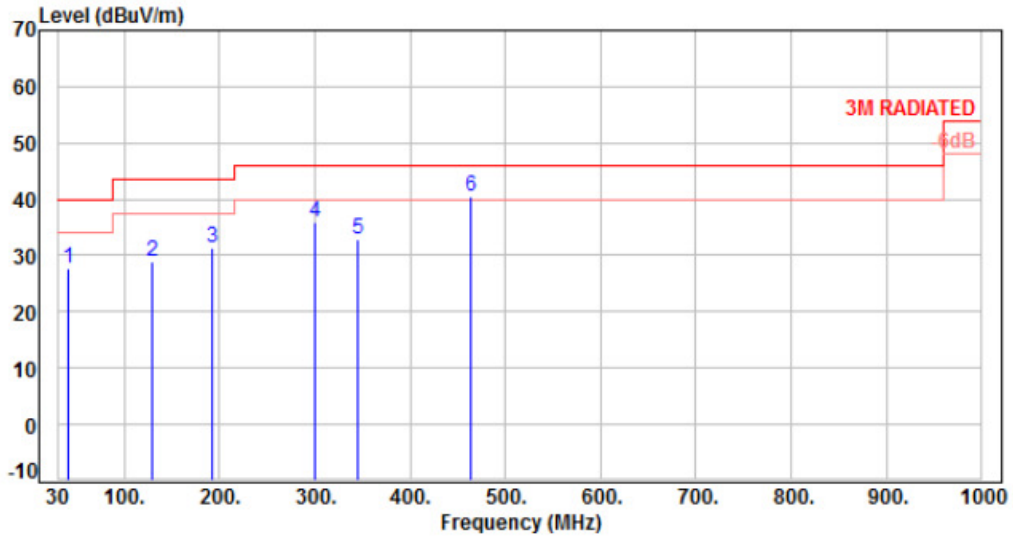


6.4 Test Result and Data (9KHz ~ 30MHz)

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

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

Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode	: Mode 1	Temperature	: 23 °C
Test Date	: Sep. 21, 2018	Humidity	: 61 %

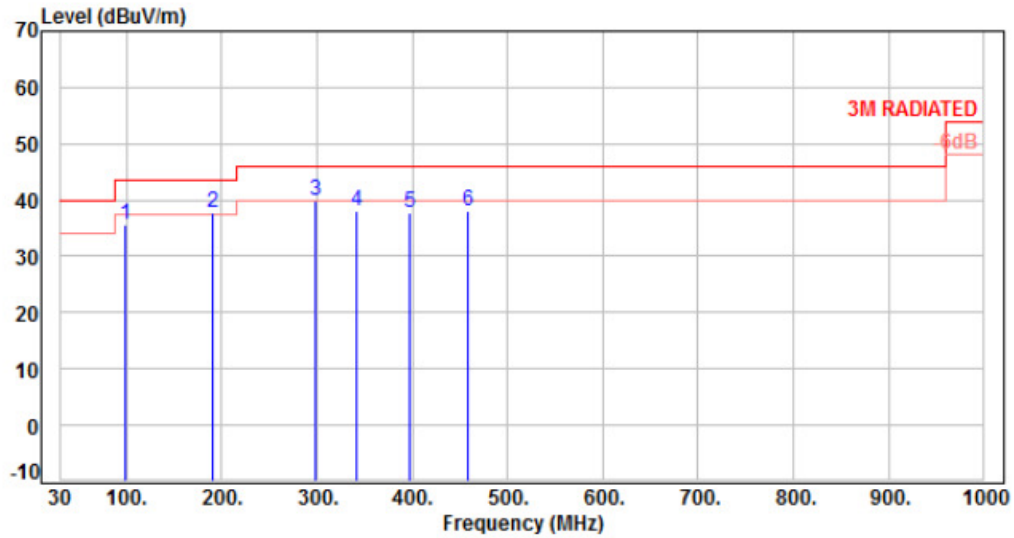


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	41.64	-11.02	38.74	27.72	40.00	-12.28	Peak	400	0	P
2	128.94	-12.47	41.44	28.97	43.50	-14.53	Peak	400	0	P
3	192.96	-12.82	44.10	31.28	43.50	-12.22	Peak	400	0	P
4	299.66	-9.69	45.76	36.07	46.00	-9.93	Peak	400	0	P
5	345.25	-8.50	41.30	32.80	46.00	-13.20	Peak	400	0	P
6	463.59	-5.37	45.94	40.57	46.00	-5.43	Peak	400	0	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 1	Temperature	: 23 °C
Test Date	: Sep. 21, 2018	Humidity	: 61 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	98.87	-16.01	51.55	35.54	43.50	-7.96	Peak	100	0	P
2	190.05	-12.77	50.43	37.66	43.50	-5.84	Peak	100	0	P
3	297.72	-9.76	49.55	39.79	46.00	-6.21	Peak	100	0	P
4	342.34	-8.59	46.72	38.13	46.00	-7.87	Peak	100	0	P
5	396.66	-6.98	44.81	37.83	46.00	-8.17	Peak	100	0	P
6	457.77	-5.48	43.60	38.12	46.00	-7.88	QP	200	270	P

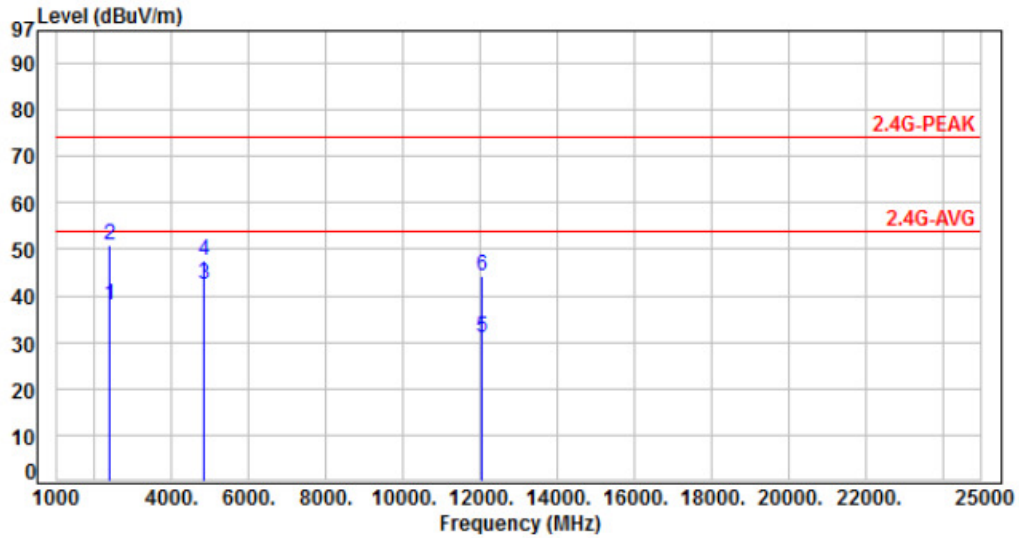
Note: Level=Reading+Factor
 Margin=Level-Limit
 Factor=Antenna Factor + cable loss - Amplifier Factor

Note: Level = Reading + Factor
 Margin = Level – Limit
 Factor = Antenna Factor + Cable loss - Amplifier Factor



6.6 Test Result and Data (1GHz ~ 25GHz)

Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode	: Mode 1, CH01	Temperature	: 23 °C
Test Date	: Sep. 21, 2018	Humidity	: 61 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-15.68	53.50	37.82	54.00	-16.18	Average	130	170	P
2	2390.00	-15.68	66.70	51.02	74.00	-22.98	Peak	130	170	P
3	4824.00	-8.47	51.00	42.53	54.00	-11.47	Average	100	55	P
4	4824.00	-8.47	55.90	47.43	74.00	-26.57	Peak	100	55	P
5	12060.00	1.79	29.11	30.90	54.00	-23.10	Average	100	78	P
6	12060.00	1.79	42.30	44.09	74.00	-29.91	Peak	100	78	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=Antenna Factor + cable loss - Amplifier Factor