Test Report

Applicant:	Astera LED-Technology GmbH
Address of Applicant:	Stahlgruberring 36, 81829 Munich, Germany
Manufacturer:	Astera Manufacturing Limited
Address of Manufacturer:	Rm. 201, Huazhong Indutrial Park, No. 12 South Huancheng Road, Bantian Street, Longgang District, 518129 Shenzhen, China

Equipment Under Test (EUT)

Product Name:	Stage Luminaires
Model No.:	FP1, FP2
Trade Mark:	ASTERA
FCC ID:	X55FP
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.247
Date of sample receipt:	August 05, 2019
Date of Test:	August 05-October 10, 2019
Date of report issued:	December 12, 2019
Test Result :	PASS *

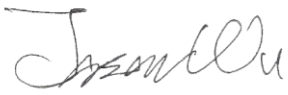
* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Robinson Lo
Laboratory Manager

2 Version

Version No.	Date	Description
00	*December 12, 2019*	*Original*

Prepared By:  ***Date:*** *December 12, 2019*

Project Engineer

Check By:  ***Date:*** *December 12, 2019*

Reviewer

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4 Test Summary

Test Item	Section in CFR 47	Result
Antenna Requirement	15.203	Pass
AC Power Line Conducted Emission	15.207	Pass
Conducted Peak Output Power	15.247 (b)(2)	Pass
20dB Occupied Bandwidth	15.247 (a)(1)(i)	Pass
Carrier Frequencies Separation	15.247 (a)(1)(i)	Pass
Hopping Channel Number	15.247 (a)(1)(i)	Pass
Dwell Time	15.247 (a)(1)(i)	Pass
Pseudorandom Frequency Hopping Sequence	15.247 (a)(1)(i)	Pass
Radiated Emission	15.205/15.209	Pass
Band Edge	15.247(d)	Pass

Remarks:

1. *Pass: The EUT complies with the essential requirements in the standard.*
2. *Test according to ANSI C63.10:2013*

Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	30MHz-200MHz	3.8039dB	(1)
Radiated Emission	200MHz-1GHz	3.9679dB	(1)
Radiated Emission	1GHz-18GHz	4.29dB	(1)
Radiated Emission	18GHz-40GHz	3.30dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	3.44dB	(1)
Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.			

5 General Information

5.1 General Description of EUT

Product Name:	Stage Luminaires
Model No.:	FP1, FP2
Serial No.:	N/A
Test sample(s) ID:	GTS201912000096-1
Sample(s) Status:	Engineer sample
Operation Frequency:	917.00MHz~922.20MHz
Channel numbers:	53
Channel separation:	0.1MHz
Modulation type:	GFSK
Antenna Type:	PIFA Antenna
Antenna gain:	2.0dBi(Declare by applicant)
Power supply:	DC 14.4V Adaptor: PS1065-240T2B250 Input: 100-240V~, 50-60Hz, 1.8A Output: DC 24V, 2.5A, 60W Max

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	**917.0MHz**	16	918.5MHz	31	920.0MHz	46	921.5MHz
2	917.1MHz	17	918.6MHz	32	920.1MHz	47	921.6MHz
3	917.2MHz	18	918.7MHz	33	920.2MHz	48	921.7MHz
4	917.3MHz	19	918.8MHz	34	920.3MHz	49	921.8MHz
5	917.4MHz	20	918.9MHz	35	920.4MHz	50	921.9MHz
6	917.5MHz	21	919.0MHz	36	920.5MHz	51	922.0MHz
7	917.6MHz	22	919.1MHz	37	920.6MHz	52	922.1MHz
8	917.7MHz	23	919.2MHz	38	920.7MHz	**53**	**922.2MHz**
9	917.8MHz	24	919.3MHz	39	920.8MHz		
10	917.9MHz	25	919.4MHz	40	920.9MHz		
11	918.0MHz	26	919.5MHz	41	921.0MHz		
12	918.1MHz	**27**	**919.6MHz**	42	921.1MHz		
13	918.2MHz	28	919.7MHz	43	921.2MHz		
14	918.3MHz	29	919.8MHz	44	921.3MHz		
15	918.4MHz	30	919.9MHz	45	921.4MHz		

Test CH

Channel	Frequency
The lowest channel	917.0MHz
The middle channel	919.6MHz
The Highest channel	922.2MHz

5.2 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode.
Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.	

5.3 Description of Support Units

None.

5.4 Deviation from Standards

None.

5.5 Abnormalities from Standard Conditions

None.

5.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

● **FCC —Registration No.: 381383**

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 381383.

● **IC —Registration No.: 9079A**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A

● **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). LAB CODE:600179-0

5.7 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.
Address: No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102
Tel: 0755-27798480
Fax: 0755-27798960

6 Test Instruments list

Radiated Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July. 03 2015	July. 02 2020
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June. 26 2019	June. 25 2020
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 26 2019	June. 25 2020
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 26 2019	June. 25 2020
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 26 2019	June. 25 2020
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 26 2019	June. 25 2020
9	Coaxial Cable	GTS	N/A	GTS211	June. 26 2019	June. 25 2020
10	Coaxial cable	GTS	N/A	GTS210	June. 26 2019	June. 25 2020
11	Coaxial Cable	GTS	N/A	GTS212	June. 26 2019	June. 25 2020
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 26 2019	June. 25 2020
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 26 2019	June. 25 2020
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 26 2019	June. 25 2020
15	Band filter	Amindeon	82346	GTS219	June. 26 2019	June. 25 2020
16	Power Meter	Anritsu	ML2495A	GTS540	June. 26 2019	June. 25 2020
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 26 2019	June. 25 2020
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 26 2019	June. 25 2020
19	Splitter	Agilent	11636B	GTS237	June. 26 2019	June. 25 2020
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 26 2019	June. 25 2020
21	Breitband hornantenne	SCHWARZBECK	BBHA 9170	GTS579	Oct. 20 2018	Oct. 19 2019
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 20 2018	Oct. 19 2019
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 20 2018	Oct. 19 2019
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June. 26 2019	June. 25 2020

Conducted Emission						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	May.15 2019	May.14 2022
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 26 2019	June. 25 2020
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June. 26 2019	June. 25 2020
4	Artificial Mains Network	SCHWARZBECK MESS	NSLK8127	GTS226	June. 26 2019	June. 25 2020
5	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Thermo meter	KTJ	TA328	GTS233	June. 26 2019	June. 25 2020
8	Absorbing clamp	Elektronik-Feinmechanik	MDS21	GTS229	June. 26 2019	June. 25 2020
9	ISN	SCHWARZBECK	NTFM 8158	GTD565	June. 26 2019	June. 25 2020

RF Conducted Test:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	MXA Signal Analyzer	Agilent	N9020A	GTS566	June. 26 2019	June. 25 2020
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 26 2019	June. 25 2020
3	Spectrum Analyzer	Agilent	E4440A	GTS533	June. 26 2019	June. 25 2020
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	June. 26 2019	June. 25 2020
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	June. 26 2019	June. 25 2020
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	June. 26 2019	June. 25 2020
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	June. 26 2019	June. 25 2020
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	June. 26 2019	June. 25 2020

General used equipment:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 26 2019	June. 25 2020
2	Barometer	ChangChun	DYM3	GTS255	June. 26 2019	June. 25 2020

7 Test results and Measurement Data

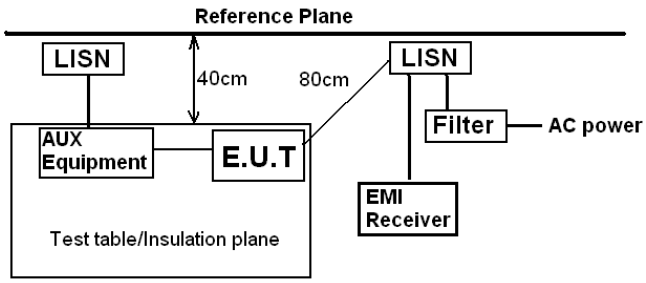
7.1 Antenna requirement

Standard requirement:	FCC Part15 C Section 15.203 /247(c)

15.203 requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

7.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.10:2013
Test Frequency Range:	150KHz to 30MHz
Class / Severity:	Class B
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto
Limit:	Frequency range (MHz) / Limit (dBuV): Quasi-peak / Average 0.15-0.5: 66 to 56* / 56 to 46* 0.5-5: 56 / 46 5-30: 60 / 50 * Decreases with the logarithm of the frequency.
Test setup:	 *Remark:* *E.U.T: Equipment Under Test* *LISN: Line Impedence Stabilization Network* *Test table height=0.8m*
Test procedure:	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. 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.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test environment:	Temp.: 24 °C / Humid.: 54% / Press.: 1012mbar
Test voltage:	AC 120V, 60Hz
Test results:	Pass

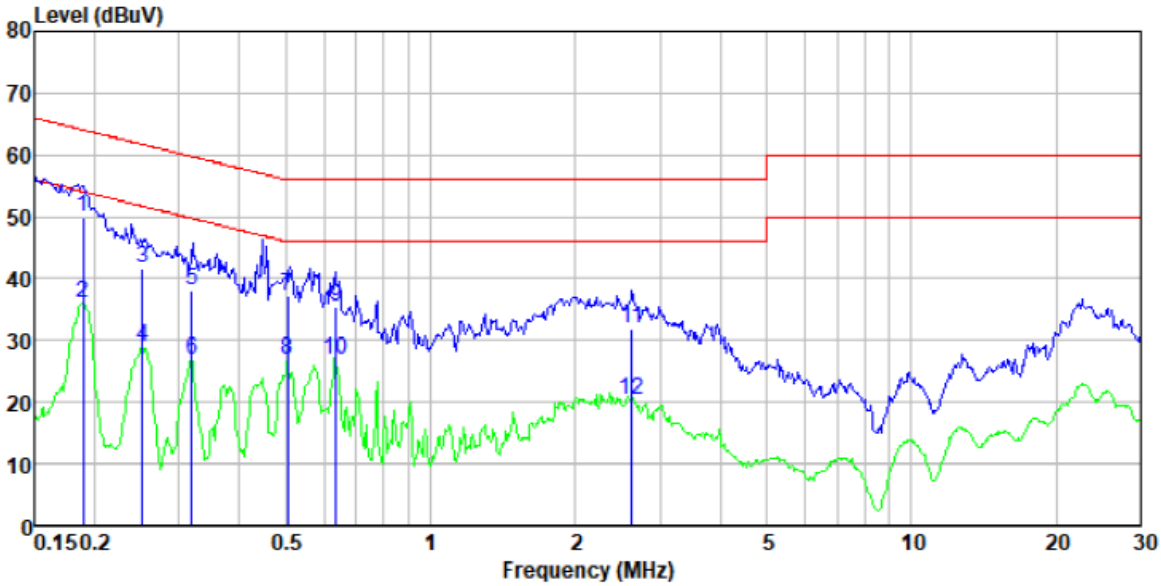
Remark: Both high and low voltages have been tested to show only the worst low voltage test data.

Pre-scan all channels, found worst case at 917MHz, and so only show the test result of 917MHz.

Measurement data:

FP1:

Test mode:	917MHz mode	Phase Polarity:	Line

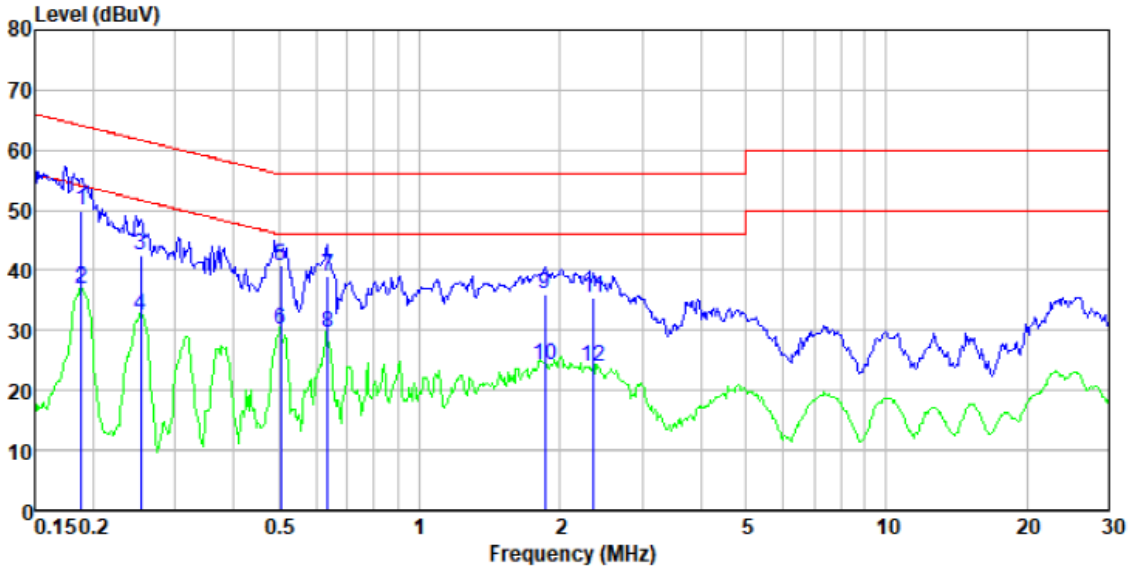


Condition : FCC PART15 CLASSB QP LINE

EUT name : Stage 1unminaires
Test Model : FP1
Test Mode : 900MHz
T & H : 24℃ 54%
Test Voltage: 120V/60Hz
Test Enginee: Sam
Remark :

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.189	49.35	0.40	0.10	49.85	64.06	-14.21	QP
2	0.189	35.44	0.40	0.10	35.94	54.06	-18.12	Average
3	0.252	40.98	0.40	0.10	41.48	61.69	-20.21	QP
4	0.252	28.35	0.40	0.10	28.85	51.69	-22.84	Average
5	0.318	37.49	0.39	0.10	37.98	59.75	-21.77	QP
6	0.318	26.34	0.39	0.10	26.83	49.75	-22.92	Average
7	0.505	36.77	0.31	0.11	37.19	56.00	-18.81	QP
8	0.505	26.54	0.31	0.11	26.96	46.00	-19.04	Average
9	0.637	35.10	0.28	0.12	35.50	56.00	-20.50	QP
10	0.637	26.50	0.28	0.12	26.90	46.00	-19.10	Average
11	2.622	31.60	0.20	0.19	31.99	56.00	-24.01	QP
12	2.622	20.04	0.20	0.19	20.43	46.00	-25.57	Average

Test mode:	917MHz mode	Phase Polarity:	Neutral



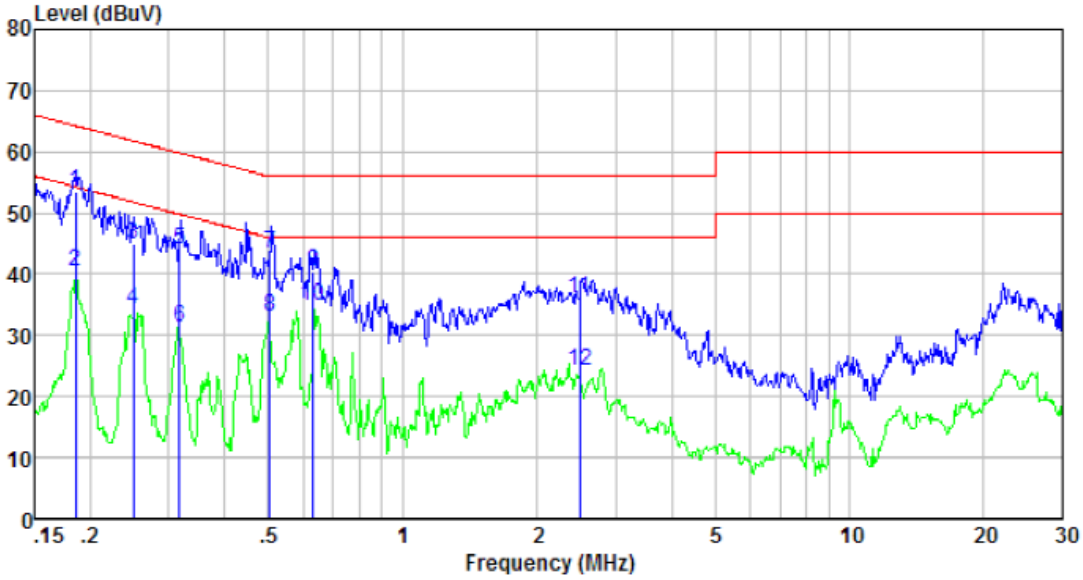
Condition : FCC PART15 CLASSB QP NEUTRAL

EUT name : Stage lunminaires
Test Model : FP1
Test Mode : 900MHz
T & H : 24℃ 54%
Test Voltage: 120V/60Hz
Test Enginee: Sam
Remark :

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.188	49.40	0.40	0.10	49.90	64.11	-14.21	QP
2	0.188	36.29	0.40	0.10	36.79	54.11	-17.32	Average
3	0.253	42.16	0.40	0.10	42.66	61.64	-18.98	QP
4	0.253	31.85	0.40	0.10	32.35	51.64	-19.29	Average
5	0.505	40.18	0.31	0.11	40.60	56.00	-15.40	QP
6	0.505	29.63	0.31	0.11	30.05	46.00	-15.95	Average
7	0.637	38.69	0.28	0.12	39.09	56.00	-16.91	QP
8	0.637	29.10	0.28	0.12	29.50	46.00	-16.50	Average
9	1.858	35.73	0.20	0.17	36.10	56.00	-19.90	QP
10	1.858	23.80	0.20	0.17	24.17	46.00	-21.83	Average
11	2.358	35.00	0.20	0.18	35.38	56.00	-20.62	QP
12	2.358	23.67	0.20	0.18	24.05	46.00	-21.95	Average

FP2:

Test mode:	917MHz mode	Phase Polarity:	Line

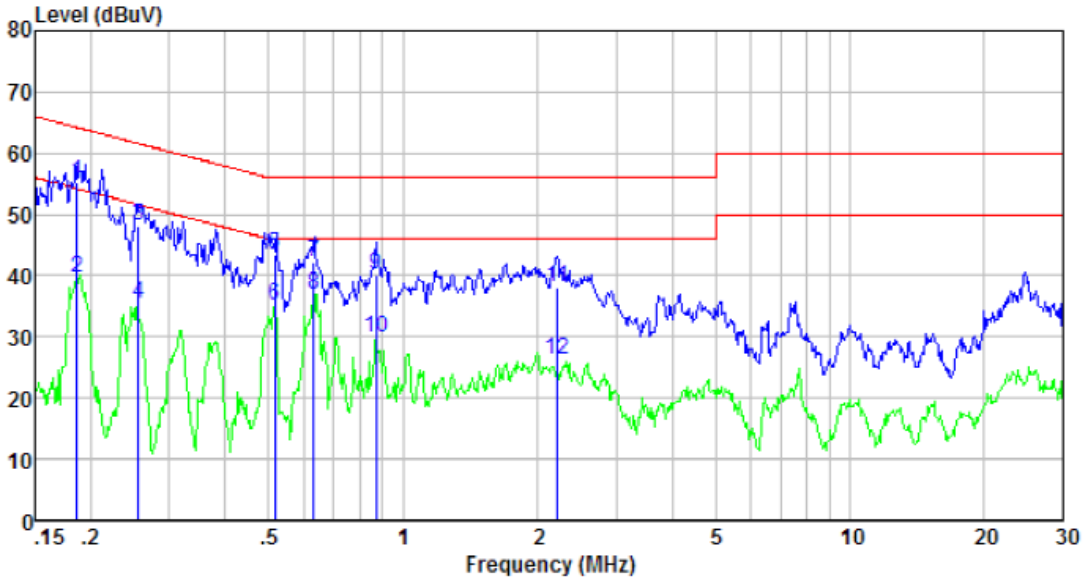


Condition : FCC PART15 CLASSB QP LISN-2017 LINE

EUT name : Stage lunminaires
Test Model : FP2
Test Mode : 900MHz
T & H : 24℃ 54%
Test Voltage: 120V/60Hz
Test Enginee: Sam
Remark :

	Freq	Read Level	Cable Loss	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.185	52.87	0.10	0.50	53.37	64.24	-10.87	QP
2	0.185	39.90	0.10	0.50	40.40	54.24	-13.84	Average
3	0.249	44.50	0.10	0.50	45.00	61.78	-16.78	QP
4	0.249	33.70	0.10	0.50	34.20	51.78	-17.58	Average
5	0.317	43.44	0.10	0.49	43.93	59.80	-15.87	QP
6	0.317	30.76	0.10	0.49	31.25	49.80	-18.55	Average
7	0.505	42.93	0.11	0.42	43.35	56.00	-12.65	QP
8	0.505	32.51	0.11	0.42	32.93	46.00	-13.07	Average
9	0.630	39.99	0.12	0.40	40.39	56.00	-15.61	QP
10	0.630	34.54	0.12	0.40	34.94	46.00	-11.06	Average
11	2.487	35.64	0.18	0.38	36.02	56.00	-19.98	QP
12	2.487	23.71	0.18	0.38	24.09	46.00	-21.91	Average

Test mode:	917MHz mode	Phase Polarity:	Neutral



Condition : FCC PART15 CLASSB QP LISN-2017 NEUTRAL

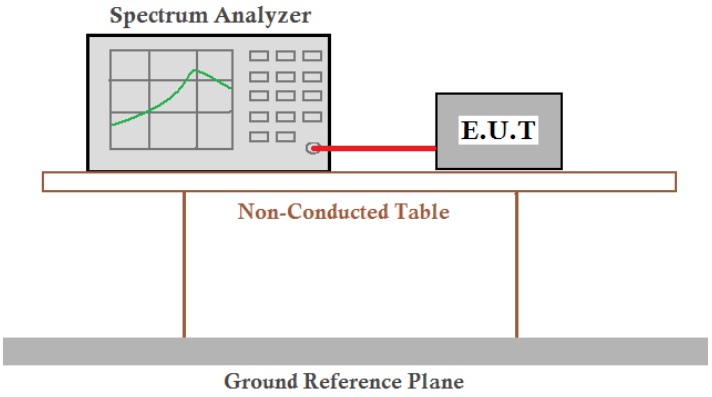
EUT name : Stage lunminaires
Test Model : FP2
Test Mode : 900MHz
T & H : 24℃ 54%
Test Voltage: 120V/60Hz
Test Enginee: Sam
Remark :

	Freq	Read Level	Cable Loss	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.186	54.82	0.10	0.50	55.32	64.20	-8.88	QP
2	0.186	38.98	0.10	0.50	39.48	54.20	-14.72	Average
3	0.256	47.63	0.10	0.50	48.13	61.56	-13.43	QP
4	0.256	35.06	0.10	0.50	35.56	51.56	-16.00	Average
5	0.516	42.99	0.11	0.42	43.41	56.00	-12.59	QP
6	0.516	34.61	0.11	0.42	35.03	46.00	-10.97	Average
7	0.630	41.79	0.12	0.40	42.19	56.00	-13.81	QP
8	0.630	36.46	0.12	0.40	36.86	46.00	-9.14	Average
9	0.871	39.79	0.14	0.36	40.15	56.00	-15.85	QP
10	0.871	29.41	0.14	0.36	29.77	46.00	-16.23	Average
11	2.213	37.67	0.18	0.38	38.05	56.00	-17.95	QP
12	2.213	25.81	0.18	0.38	26.19	46.00	-19.81	Average

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level =Receiver Read level + LISN Factor + Cable Loss

7.3 Conducted Peak Output Power

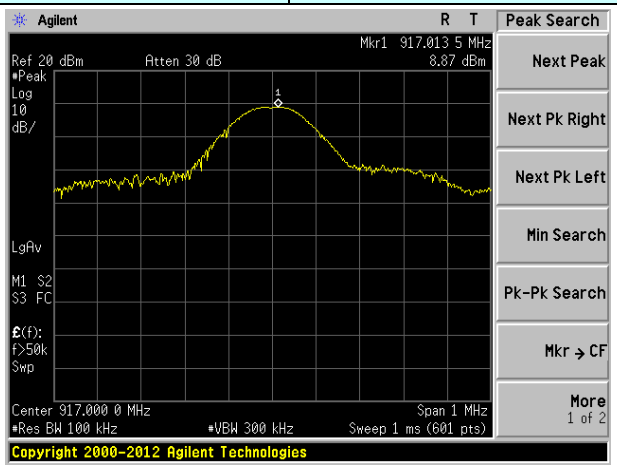
Test Requirement:	FCC Part15 C Section 15.247 (b)(2)
Test Method:	ANSI C63.10:2013
Limit:	30dBm(for GFSK)
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

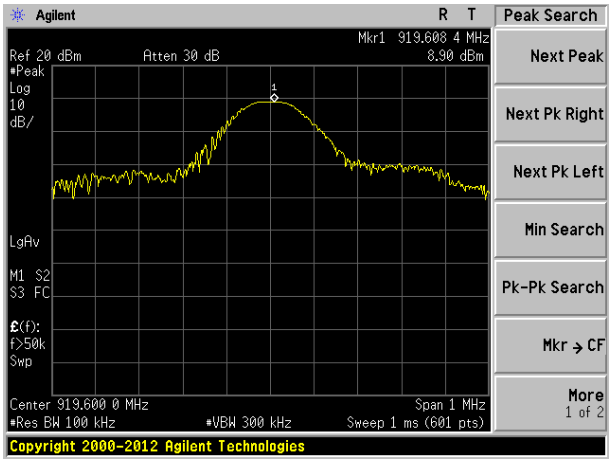
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	8.87	30.00	Pass
Middle	8.90		
Highest	8.90		

Test plot as follows:

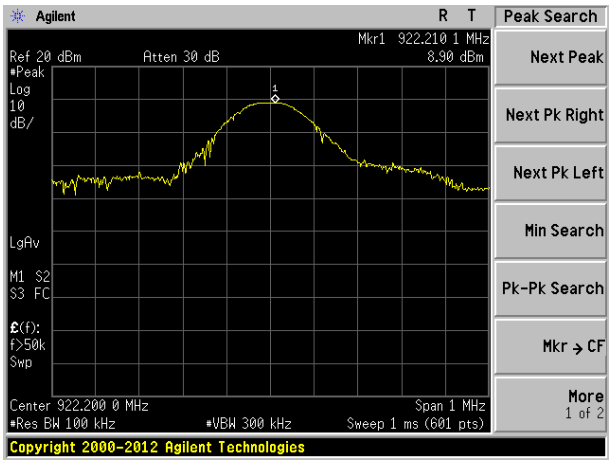
Test mode:	GFSK mode



Lowest channel

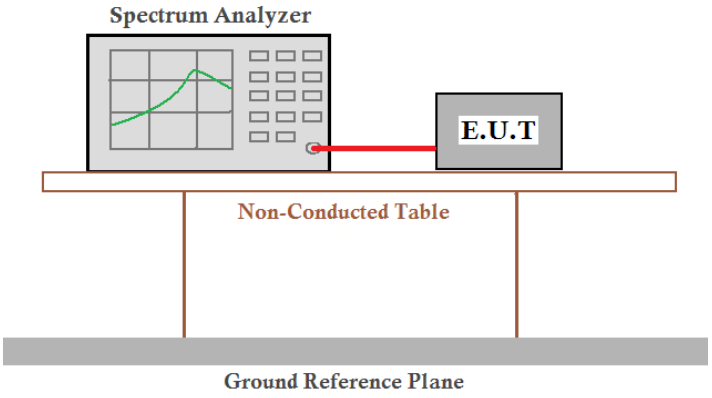


Middle channel



Highest channel

7.4 20dB Emission Bandwidth

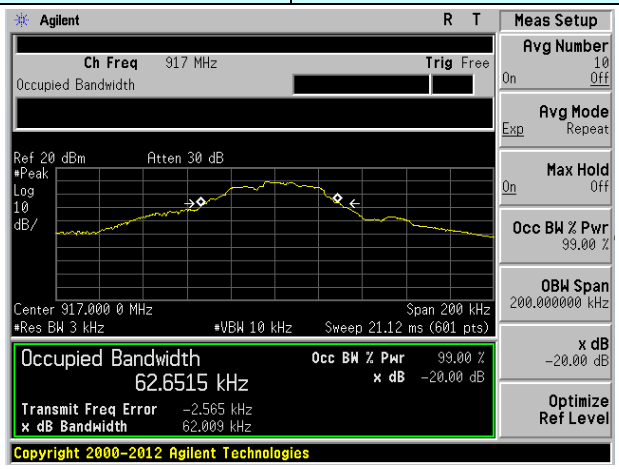
Test Requirement:	FCC Part15 C Section 15.247 (a)(1)(i)
Test Method:	ANSI C63.10:2013
Limit:	N/A
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

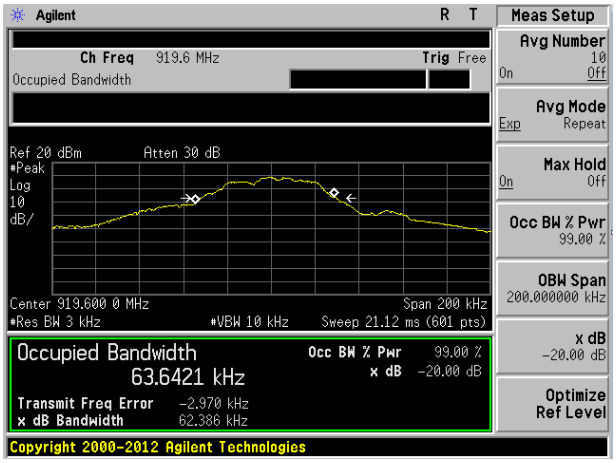
Test channel	20dB Emission Bandwidth (MHz)	Result
Lowest	0.062009	Pass
Middle	0.062386	
Highest	0.062049	

Test plot as follows:

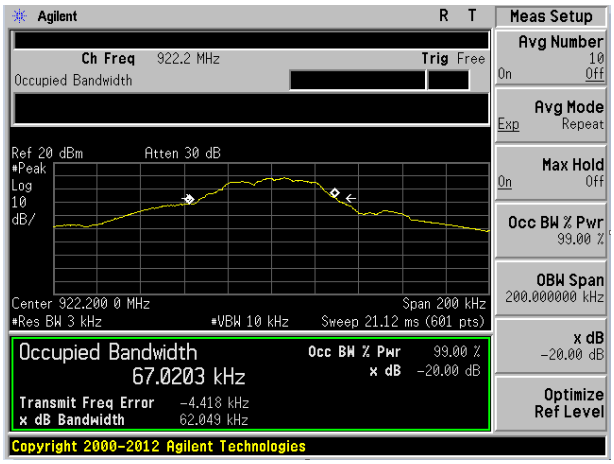
Test mode:	GFSK mode



Lowest channel

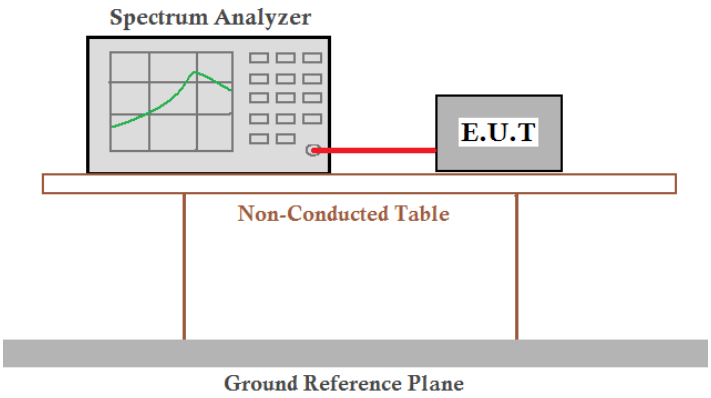


Middle channel



Highest channel

7.5 Carrier Frequencies Separation

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)(i)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=30KHz, VBW=100KHz, detector=Peak
Limit:	20dB bandwidth
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

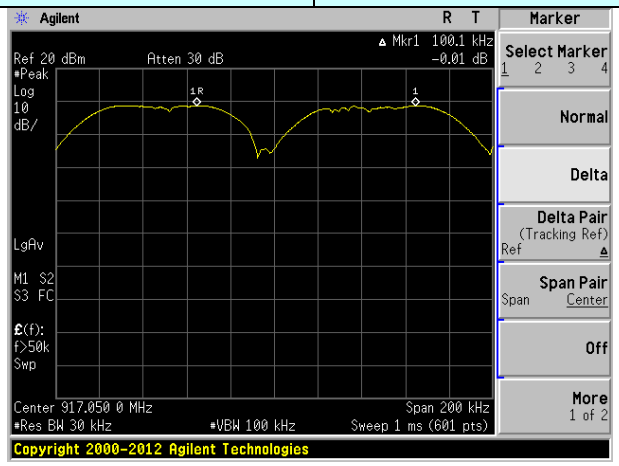
Test channel	Carrier Frequencies Separation (kHz)	Limit (kHz)	Result
Lowest	100.1	62.386	Pass
Middle	100.1	62.386	Pass
Highest	100.1	62.386	Pass

Note: According to section 7.4

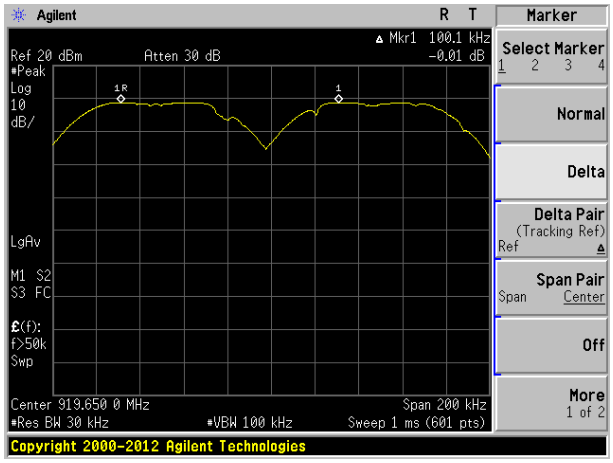
20dB bandwidth (kHz) (worse case)	Limit (kHz) (Carrier Frequencies Separation)
62.386	62.386

Test plot as follows:

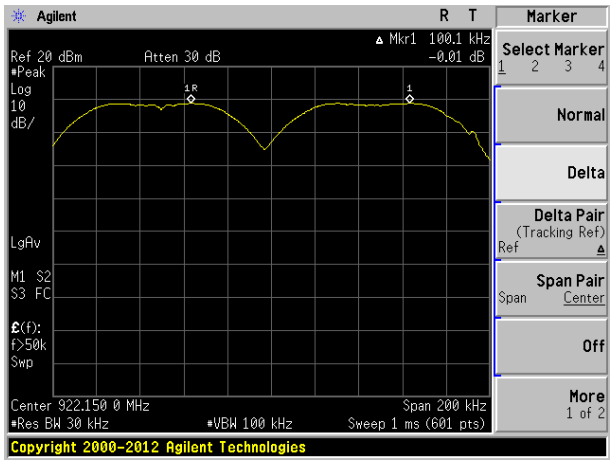
Modulation mode:	GFSK



Lowest channel

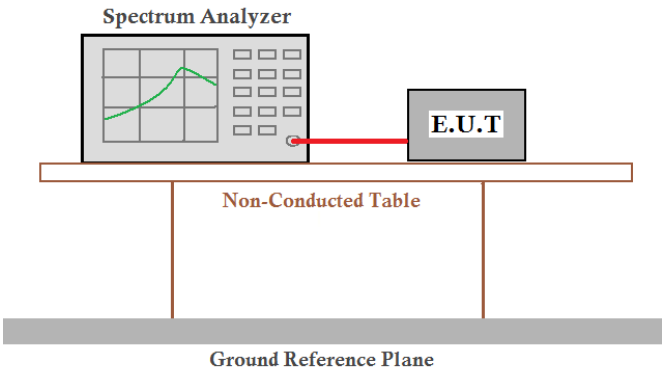


Middle channel



Highest channel

7.6 Hopping Channel Number

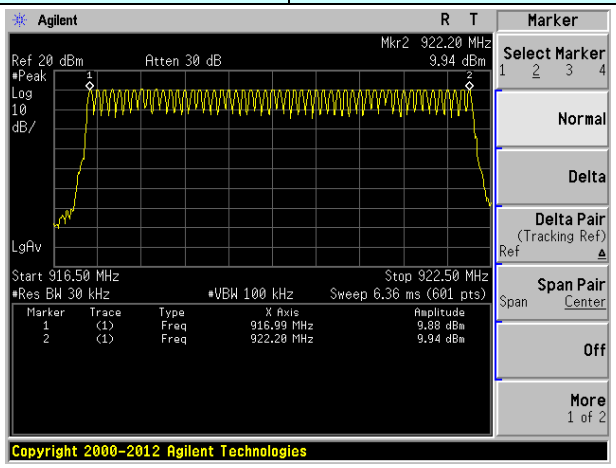
Test Requirement:	FCC Part15 C Section 15.247 (a)(1)(i)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=30kHz, VBW=100kHz, Frequency range=916.5MHz-922.5MHz, Detector=Peak
Limit:	50 channels
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data:

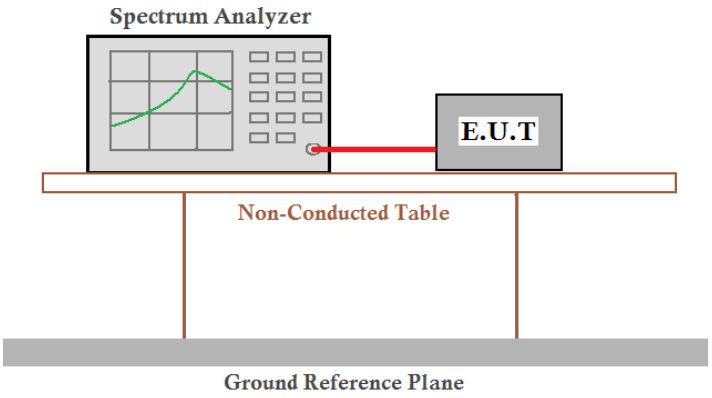
Mode	Hopping channel numbers	Limit	Result
GFSK	53	50	Pass

Test plot as follows:

Test mode:	GFSK



7.7 Dwell Time

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)(i)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=10kHz, VBW=30kHz, Span=0Hz, Detector=Peak
Limit:	0.4 Second
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

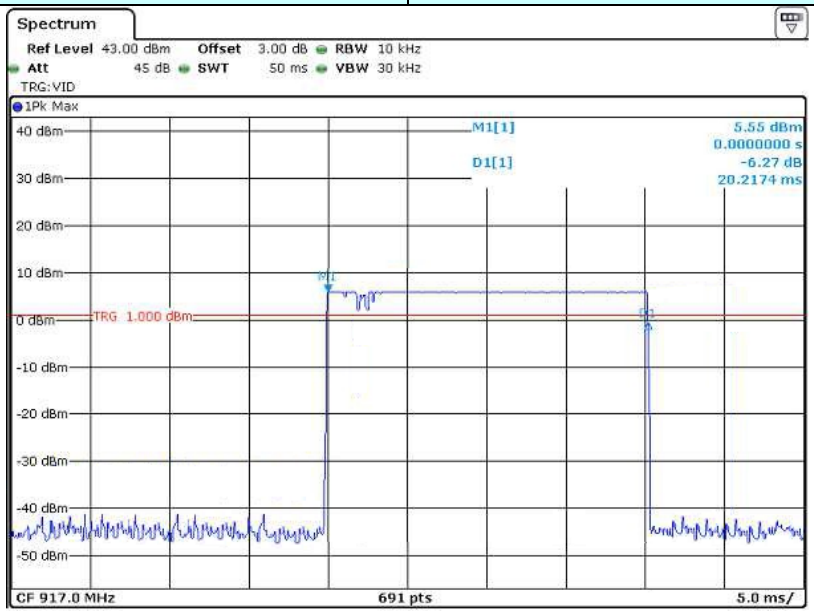
Measurement Data

Frequency(MHz)	Dwell time Per Hop (s)	Number of hopping channels in 20s	Dwell time (s)	Limit (s)
917.00	0.0202	14	0.28	0.4
919.60	0.0202	14	0.28	0.4
922.20	0.0202	13	0.26	0.4

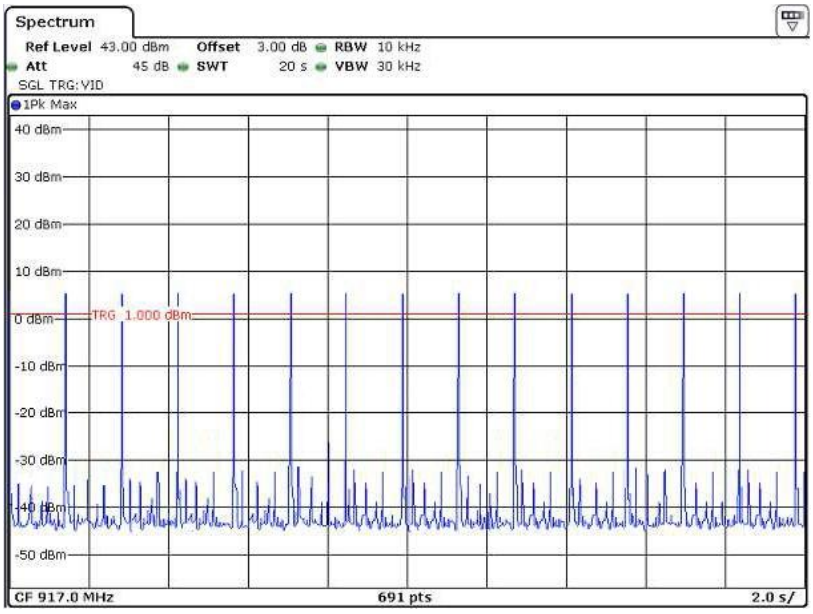
Note: For frequency hopping systems operating in the 902–928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period.

Test plot as follows:

Test channel	Lowest

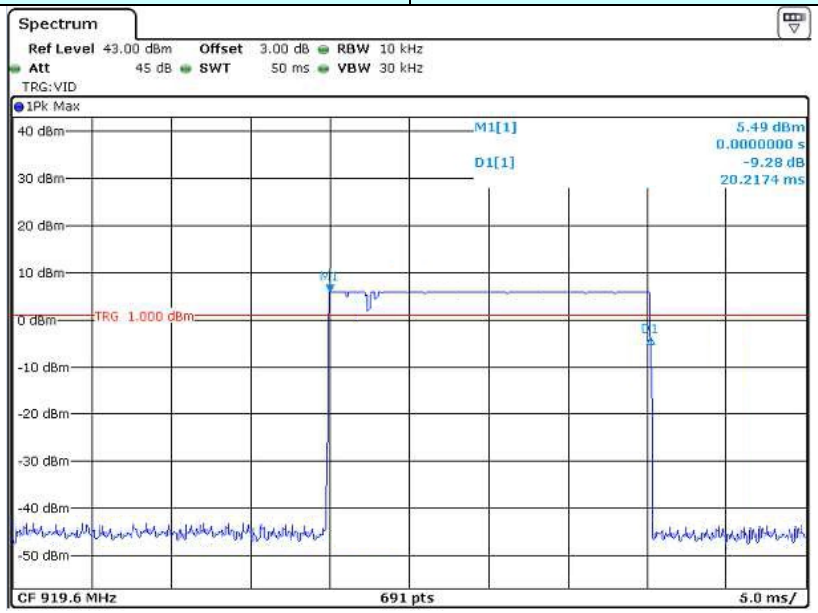


Ton

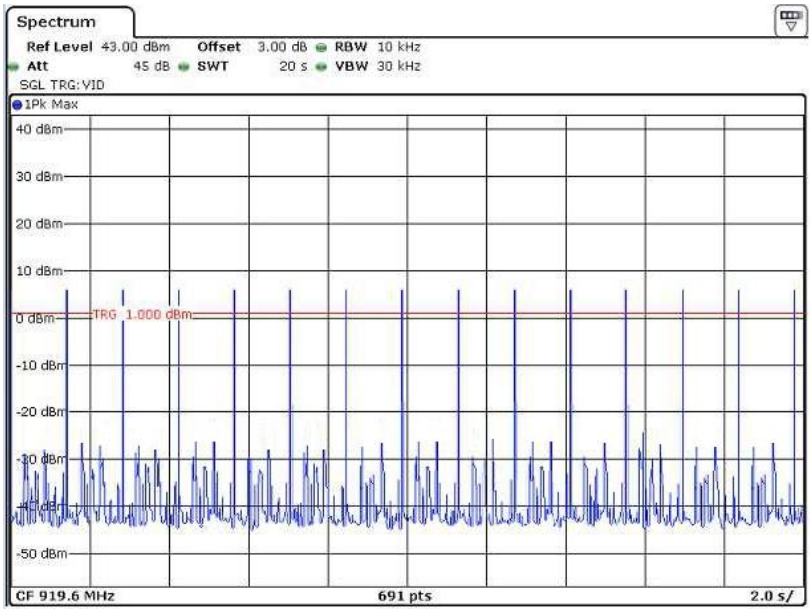


Ton times in 20s

Test channel	Middle

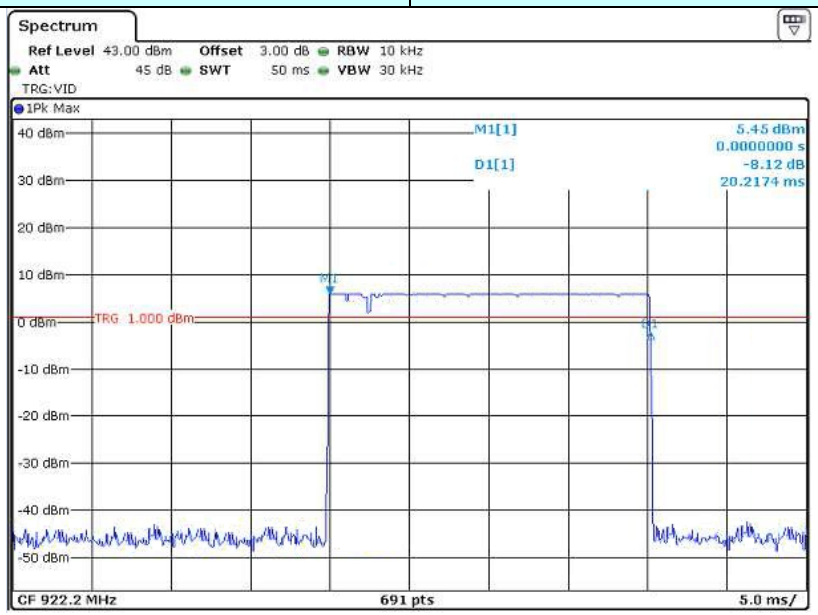


Ton

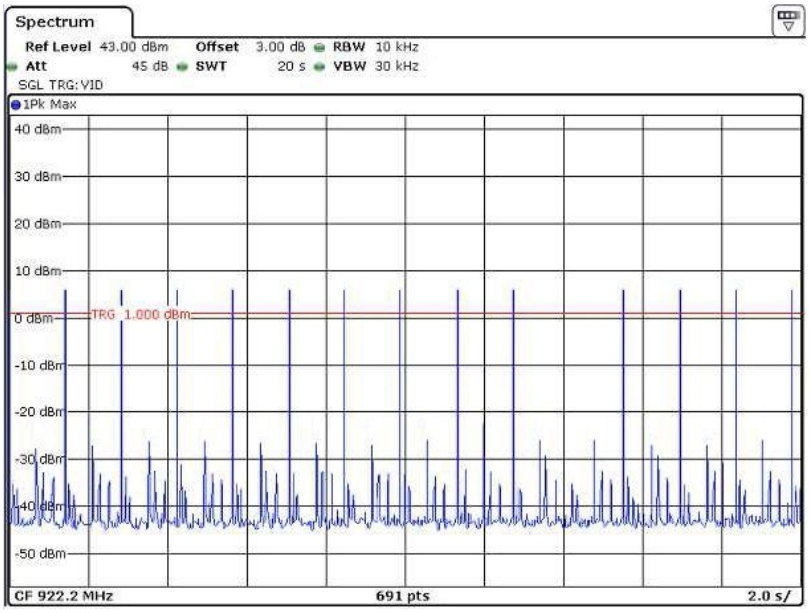


Ton times in 20s

Test channel	Highest



Ton



Ton times in 20s

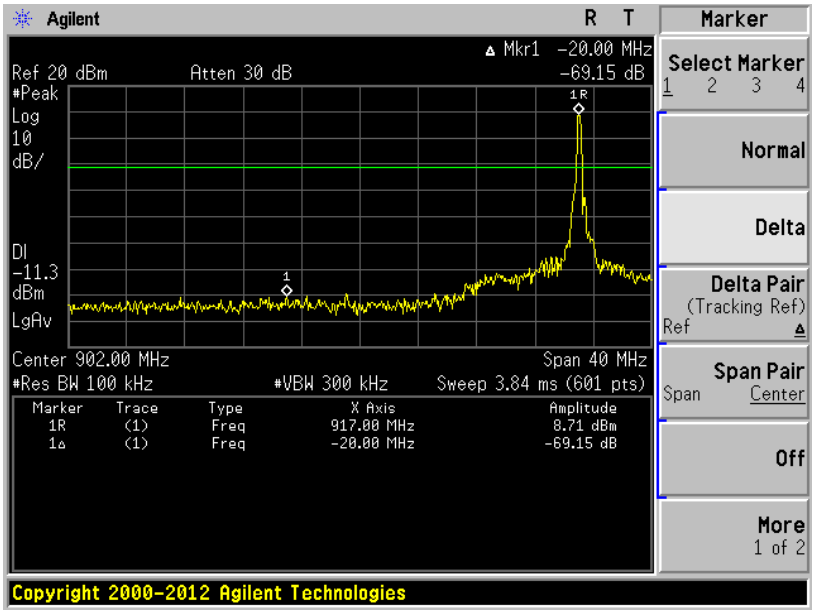
7.8 Band Edge

Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=100kHz, VBW=300kHz, Detector=Peak
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

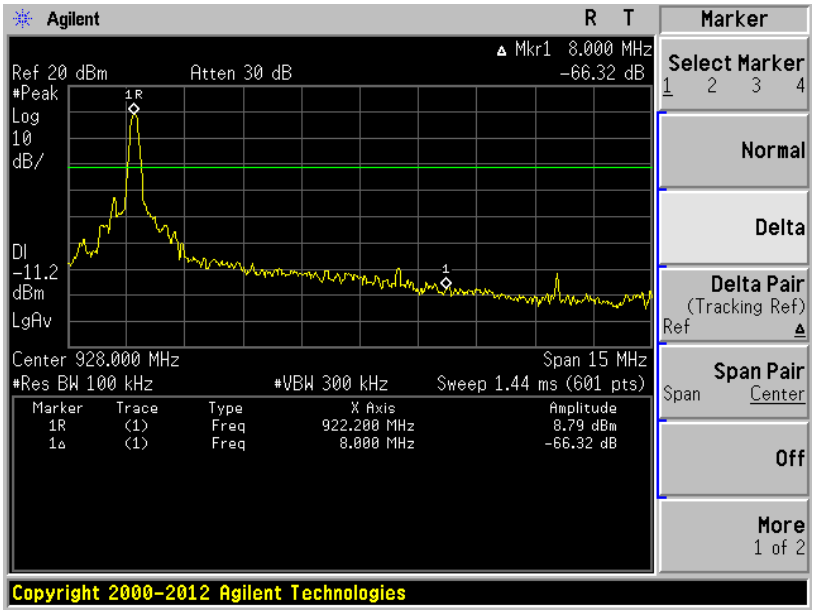
Out of Band Conducted Emissions, FCC Rule 15.247(d):

In any 100 KHz bandwidth outside the EUT passband, the RF power produced by the modulation products of the spreading sequence, the information sequence, and the carrier frequency shall be at least 20 dB below that of the maximum in-band 100 kHz emission.

Lower channel 917.00 MHz:

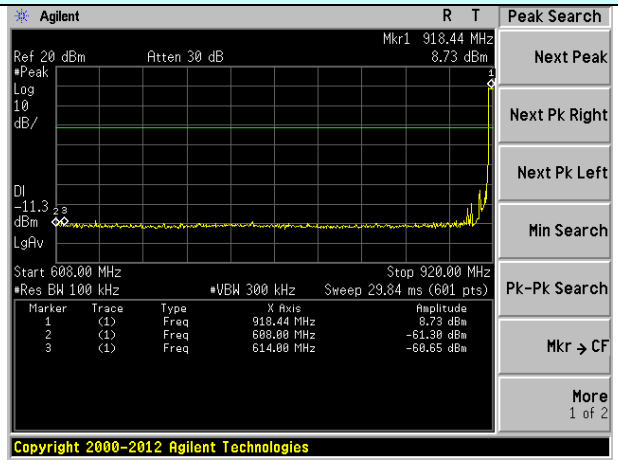


Upper channel 922.20 MHz:

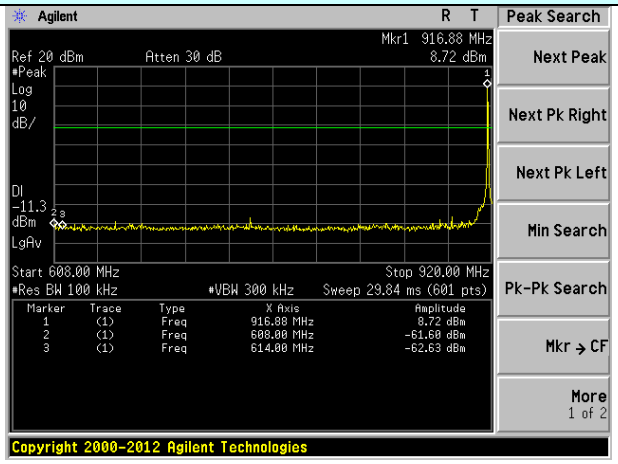


Test plot as follows:

Test channel:	Lowest channel

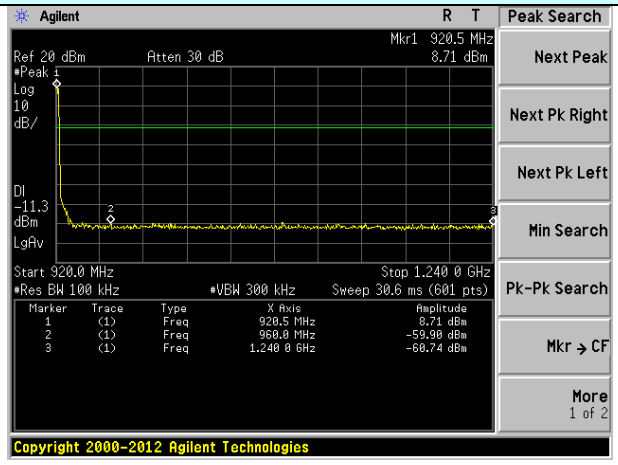


Hopping mode

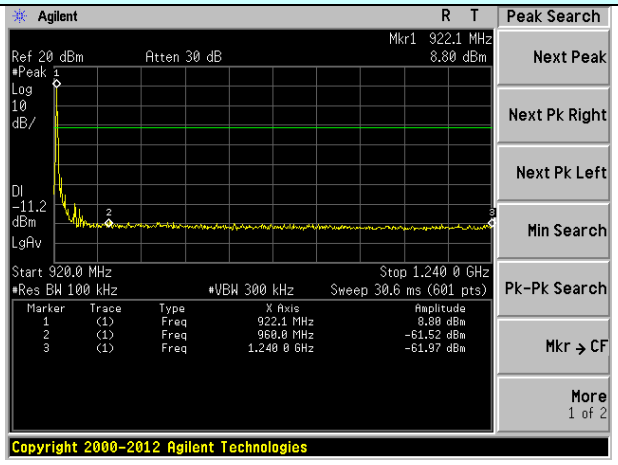


No-hopping mode

Test channel:	Highest channel



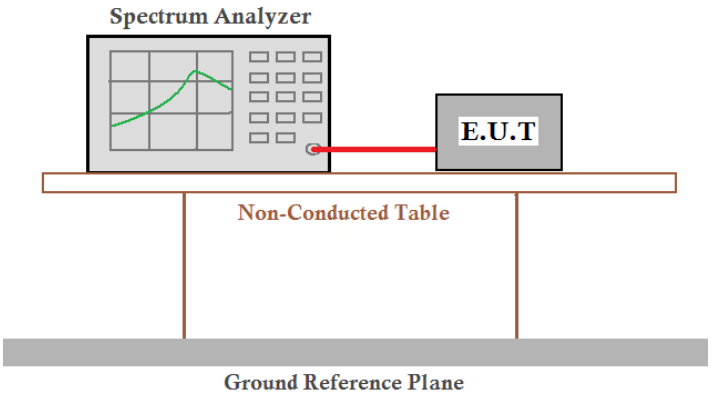
Hopping mode



No-hopping mode

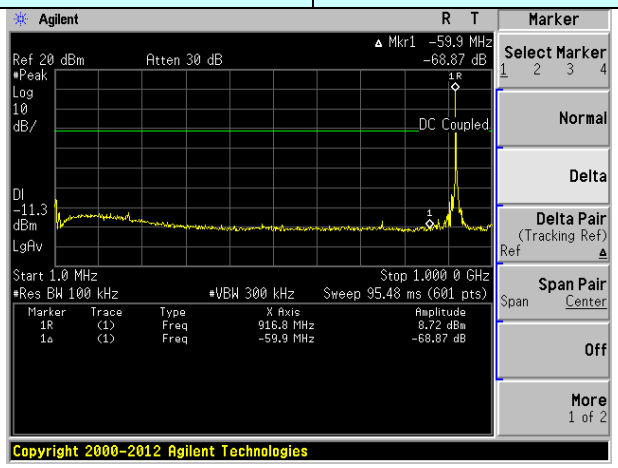
7.9 Spurious Emission

7.9.1 Conducted Emission Method

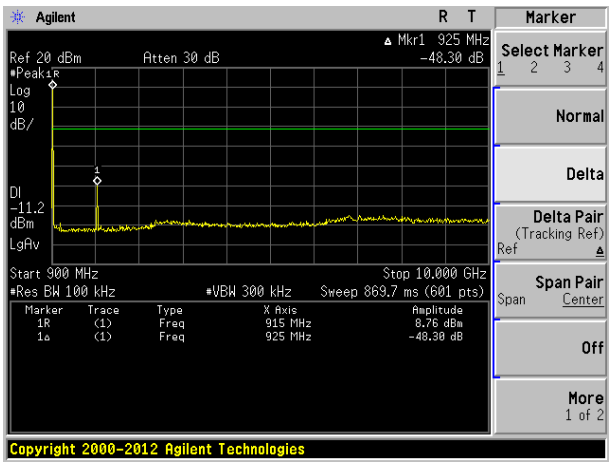
Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	ANSI C63.10:2013
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below 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.
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

All spurious emission and up to the tenth harmonic was measured and they were found to be at least 20 dB below the highest level of the desired power in the passband.

Test channel:	Lowest channel

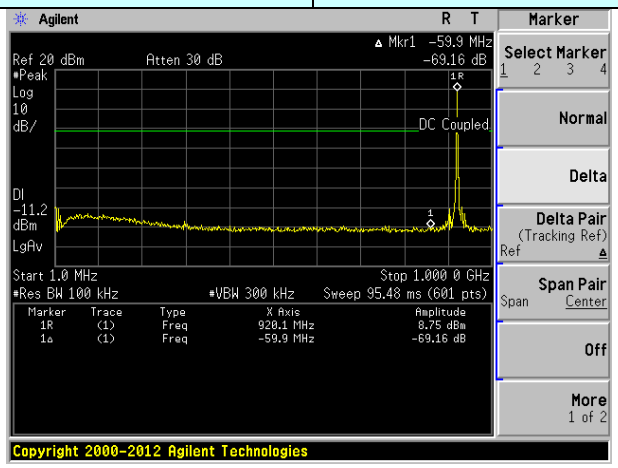


1M-1G

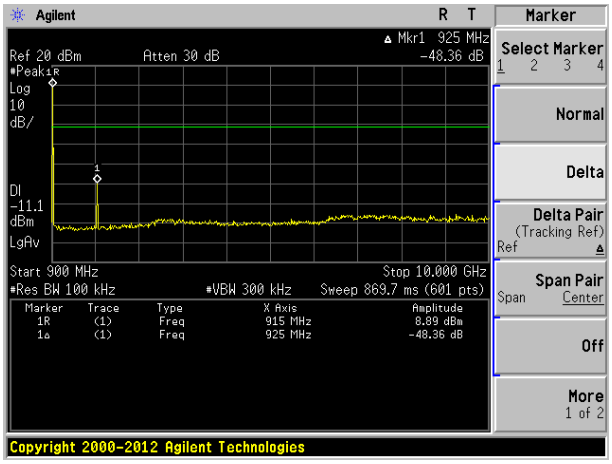


900M-10G

Test channel:	Middle channel

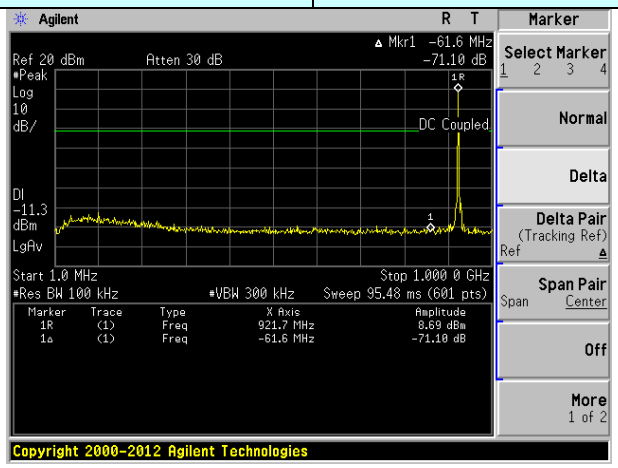


1M-1G

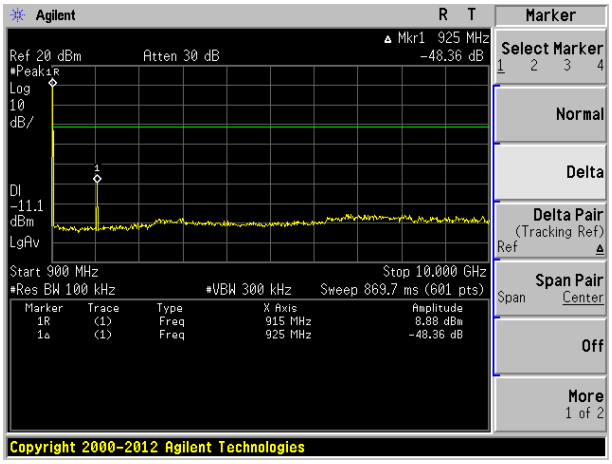


900M-10G

Test channel:	Highest channel

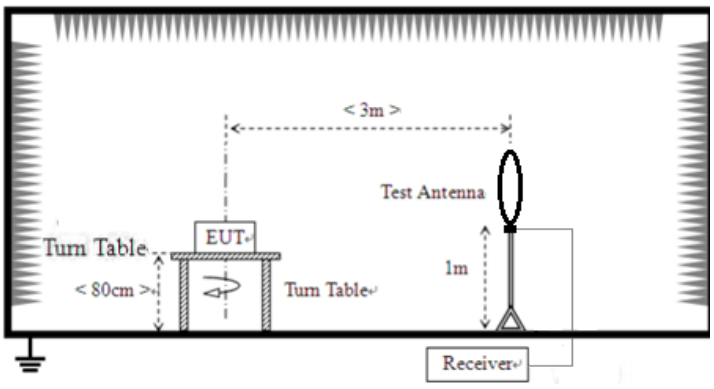


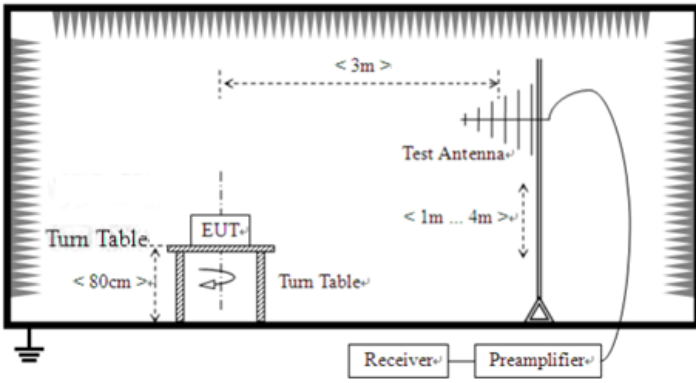
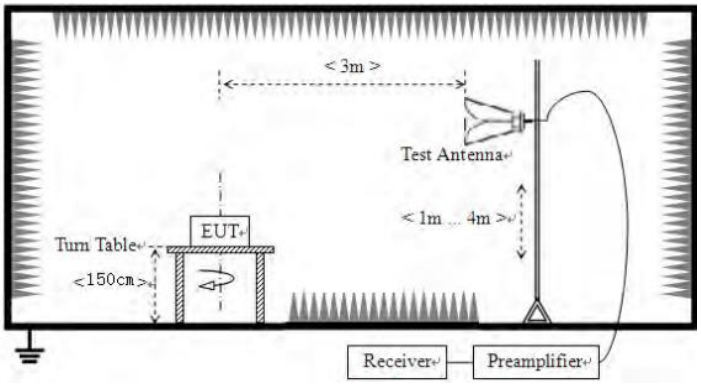
1M-1G



900M-10G

7.9.2 Radiated Emission Method

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.209</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10:2013</td></tr>
<tr><td>Test Frequency Range:</td><td>9kHz to 25GHz</td></tr>
<tr><td>Test site:</td><td>Measurement Distance: 3m</td></tr>
<tr><td>Receiver setup:</td><td>
<table>
<tr><th>Frequency</th><th>Detector</th><th>RBW</th><th>VBW</th><th>Value</th></tr>
<tr><td>9KHz-150KHz</td><td>Quasi-peak</td><td>200Hz</td><td>600Hz</td><td>Quasi-peak</td></tr>
<tr><td>150KHz-30MHz</td><td>Quasi-peak</td><td>9KHz</td><td>30KHz</td><td>Quasi-peak</td></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>120KHz</td><td>300KHz</td><td>Quasi-peak</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak</td></tr>
<tr><td>Peak</td><td>1MHz</td><td>10Hz</td><td>Average</td></tr>
</table>
</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><th>Frequency</th><th>Limit (uV/m)</th><th>Value</th><th>Measurement Distance</th></tr>
<tr><td>0.009MHz-0.490MHz</td><td>2400/F(KHz)</td><td>QP</td><td>300m</td></tr>
<tr><td>0.490MHz-1.705MHz</td><td>24000/F(KHz)</td><td>QP</td><td>30m</td></tr>
<tr><td>1.705MHz-30MHz</td><td>30</td><td>QP</td><td>30m</td></tr>
<tr><td>30MHz-88MHz</td><td>100</td><td>QP</td><td rowspan="6">3m</td></tr>
<tr><td>88MHz-216MHz</td><td>150</td><td>QP</td></tr>
<tr><td>216MHz-960MHz</td><td>200</td><td>QP</td></tr>
<tr><td>960MHz-1GHz</td><td>500</td><td>QP</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>500</td><td>Average</td></tr>
<tr><td>5000</td><td>Peak</td></tr>
</table>
</td></tr>
<tr><td>Test setup:</td><td>For radiated emissions from 9kHz to 30MHz
 
</td></tr>
</table>

	For radiated emissions from 30MHz to1GHz  For radiated emissions above 1GHz 
Test Procedure:	1. The EUT was placed on the top of a rotating table (0.8m for below 1G and 1.5m for above 1G) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details

Test environment:	Temp.:	24-25 °C	Humid.:	48-49%	Press.:	1012mbar
Test voltage:	AC 120V, 60Hz					
Test results:	Pass					

Measurement data:

Remarks:

1. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.

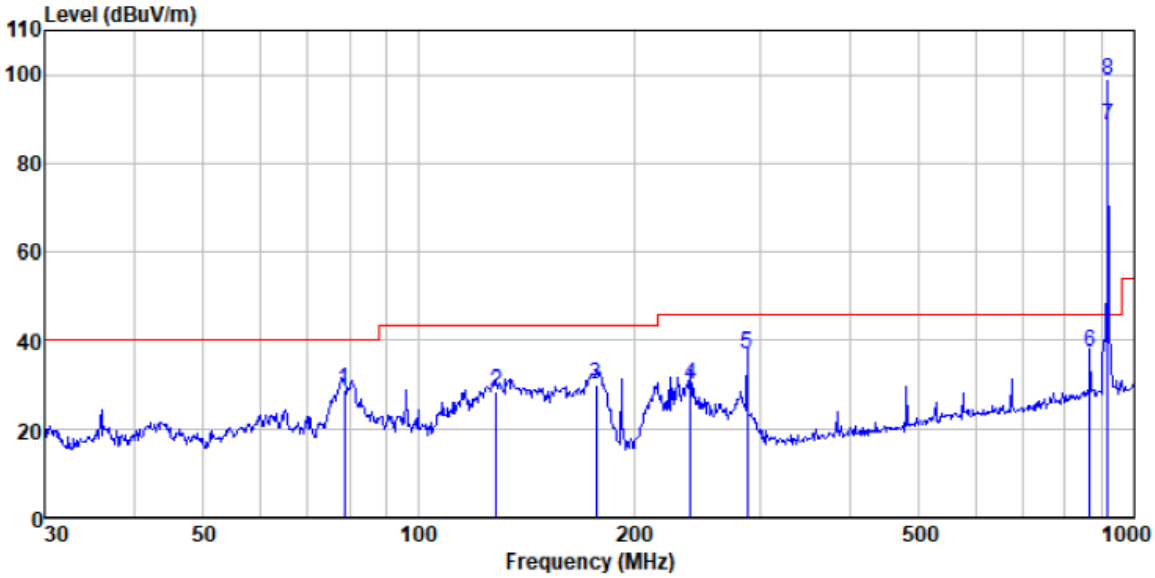
■ **9kHz~30MHz**

The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

FP1:

■ **Below 1GHz**

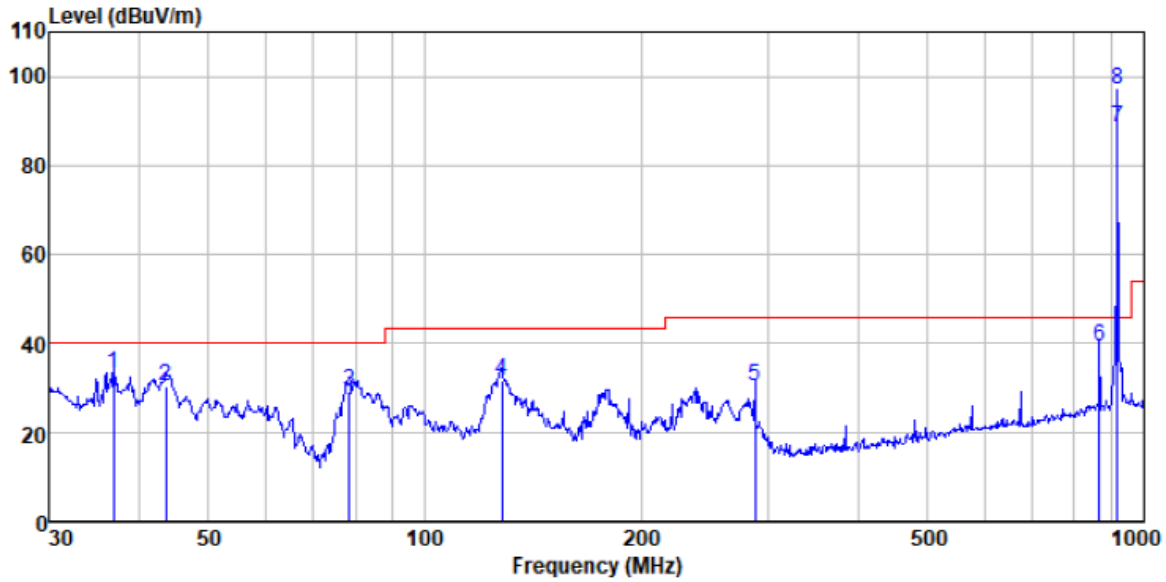
Antenna Polarity:	Horizontal	Test channel:	Lowest



Condition : FCC PART15 CLASS B 3m HORIZONTAL
EUT : Stage luminaires
Test Model : FP1
Test Mode : TX Mode
T&H : 25℃ 48%
Test Engineer: Bourne
Test Voltage : 120V/60Hz
CH : 917MHz

	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	78.689	56.97	7.33	36.53	1.02	28.79	40.00	-11.21	QP
2	128.563	55.53	8.43	36.94	1.43	28.45	43.50	-15.05	QP
3	176.888	57.06	8.60	37.22	1.72	30.16	43.50	-13.34	QP
4	239.987	53.92	11.56	37.37	2.07	30.18	46.00	-15.82	QP
5	287.990	59.04	13.11	37.41	2.31	37.05	46.00	-8.95	QP
6	866.088	48.13	21.91	37.61	4.73	37.16	46.00	-8.84	QP
7 *	917.000	99.03	22.31	37.58	4.91	88.67	46.00	42.67	Average
8 *	917.000	108.80	22.31	37.58	4.91	98.44	46.00	52.44	Peak

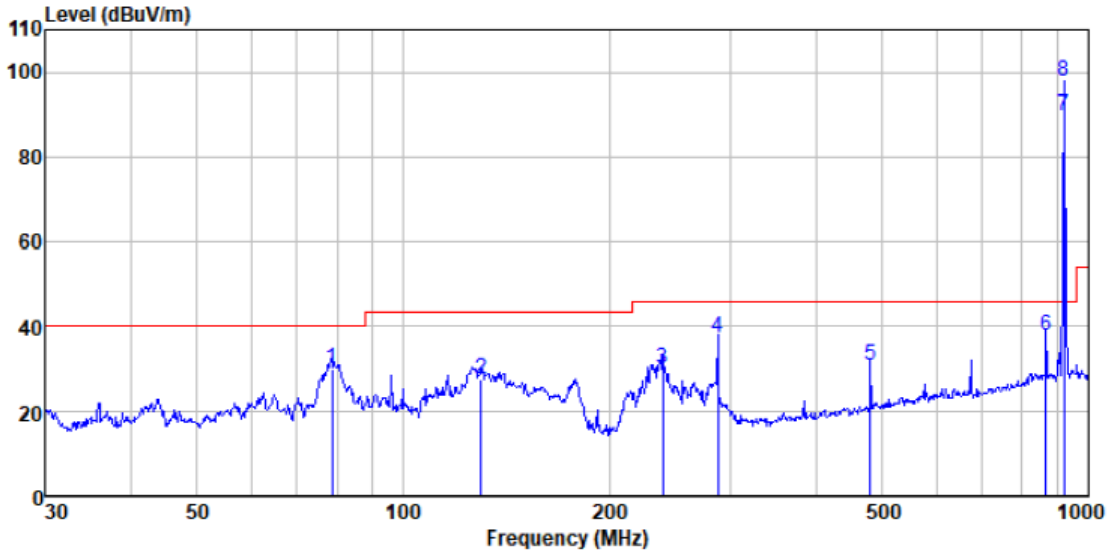
Antenna Polarity:	Vertical	Test channel:	Lowest



Condition : FCC PART15 CLASS B 3m VERTICAL
EUT : Stage luminaires
Test Model : FP1
Test Mode : TX Mode
T&H : 25℃ 48%
Test Engineer: Bourne
Test Voltage : 120V/60Hz
CH : 917MHz

		Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
		MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1		36.895	57.11	11.20	35.48	0.63	33.46	40.00	-6.54	QP
2		43.659	53.16	12.25	35.87	0.70	30.24	40.00	-9.76	QP
3		78.413	57.57	7.33	36.53	1.01	29.38	40.00	-10.62	QP
4		128.113	58.69	8.43	36.94	1.42	31.60	43.50	-11.90	QP
5		287.990	52.52	13.11	37.41	2.31	30.53	46.00	-15.47	QP
6		866.088	50.41	21.91	37.61	4.73	39.44	46.00	-6.56	QP
7	*	917.000	98.75	22.31	37.58	4.91	88.39	46.00	42.39	Average
8	*	917.000	107.57	22.31	37.58	4.91	97.21	46.00	51.21	Peak

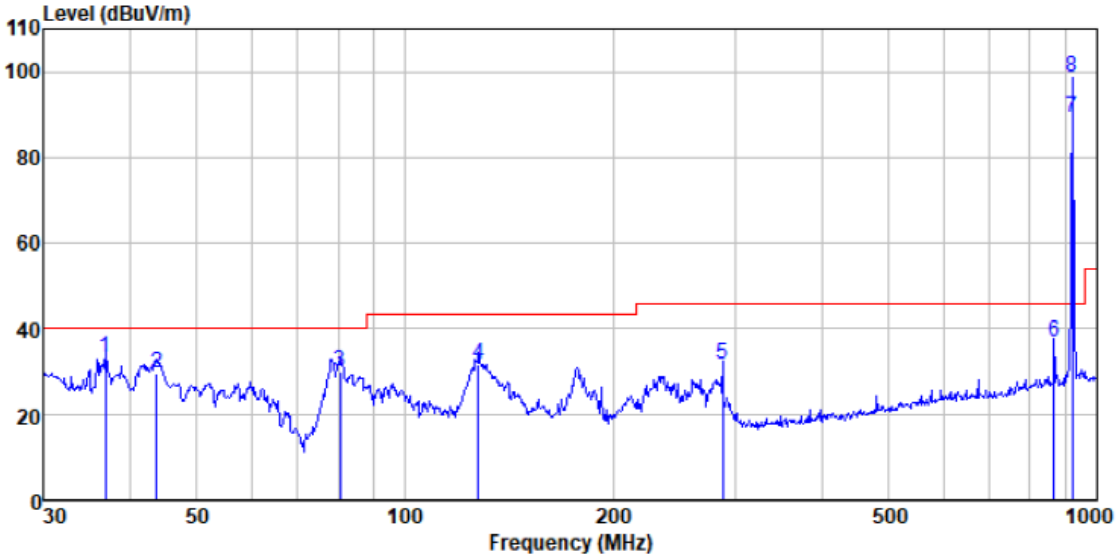
Antenna Polarity:	Horizontal	Test channel:	Middle



Condition : FCC PART15 CLASS B 3m HORIZONTAL
EUT : Stage luminaires
Test Model : FP1
Test Mode : TX Mode
T&H : 25℃ 48%
Test Engineer: Bourne
Test Voltage : 120V/60Hz
CH : 919.6MHz

	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	78.689	58.05	7.33	36.53	1.02	29.87	40.00	-10.13	QP
2	129.923	54.98	8.10	36.95	1.44	27.57	43.50	-15.93	QP
3	239.147	53.83	11.46	37.37	2.06	29.98	46.00	-16.02	QP
4	287.990	59.26	13.11	37.41	2.31	37.27	46.00	-8.73	QP
5	480.528	48.13	17.14	37.51	3.22	30.98	46.00	-15.02	QP
6	866.088	48.92	21.91	37.61	4.73	37.95	46.00	-8.05	QP
7 *	919.600	99.97	22.32	37.58	4.93	89.64	46.00	43.64	Average
8 *	919.600	108.20	22.32	37.58	4.93	97.87	46.00	51.87	Peak

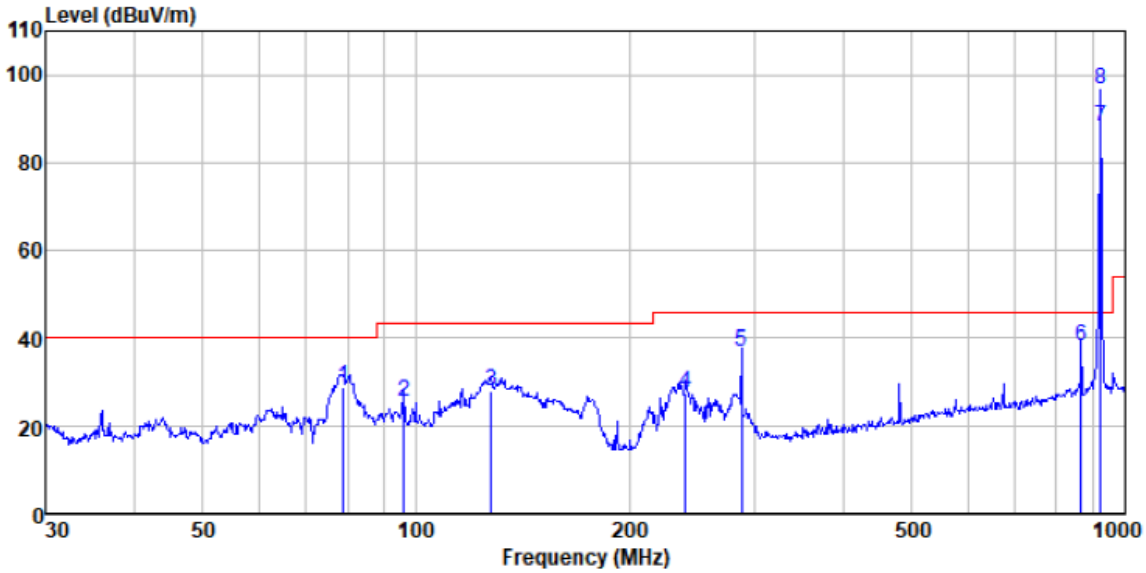
Antenna Polarity:	Vertical	Test channel:	Middle



Condition : FCC PART15 CLASS B 3m VERTICAL
EUT : Stage luminaires
Test Model : FP1
Test Mode : TX Mode
T&H : 25℃ 48%
Test Engineer: Bourne
Test Voltage : 120V/60Hz
CH : 919.6MHz

		Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
		MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1		36.895	56.83	11.20	35.48	0.63	33.18	40.00	-6.82	QP
2		43.812	52.72	12.25	35.87	0.71	29.81	40.00	-10.19	QP
3		80.644	58.26	7.30	36.55	1.03	30.04	40.00	-9.96	QP
4		127.665	58.66	8.43	36.93	1.42	31.58	43.50	-11.92	QP
5		287.990	53.56	13.11	37.41	2.31	31.57	46.00	-14.43	QP
6		866.088	47.86	21.91	37.61	4.73	36.89	46.00	-9.11	QP
7	*	919.600	99.55	22.32	37.58	4.93	89.22	46.00	43.22	Average
8	*	919.600	108.86	22.32	37.58	4.93	98.53	46.00	52.53	Peak

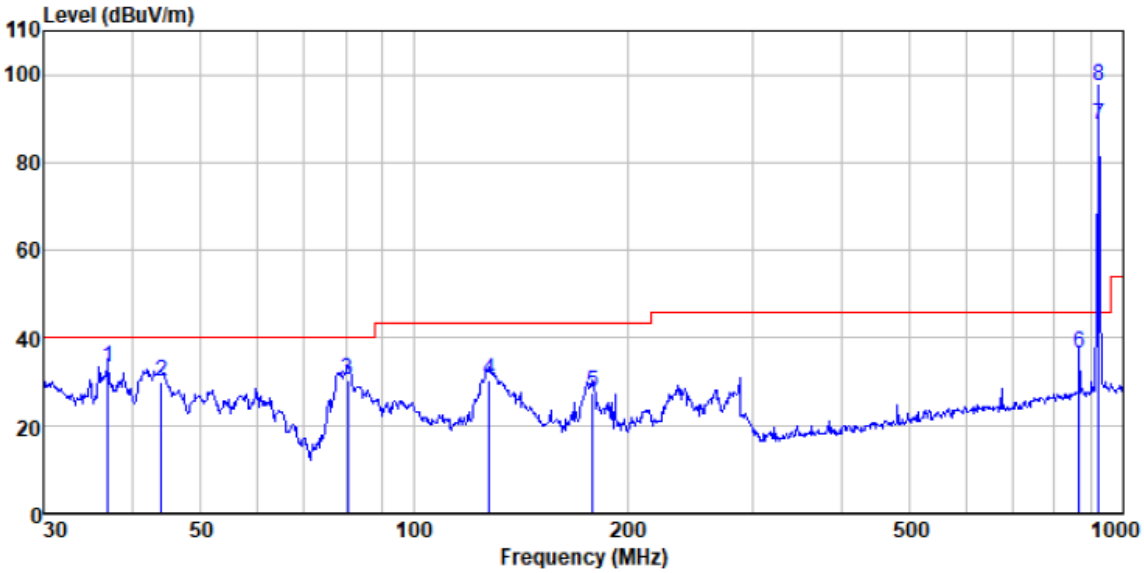
Antenna Polarity:	Horizontal	Test channel:	Highest



Condition : FCC PART15 CLASS B 3m HORIZONTAL
EUT : Stage luminaires
Test Model : FP1
Test Mode : TX Mode
T&H : 25℃ 48%
Test Engineer: Bourne
Test Voltage : 120V/60Hz
CH : 922.2MHz

		Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
		MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1		78.965	56.98	7.33	36.54	1.02	28.79	40.00	-11.21	QP
2		96.099	49.59	11.35	36.69	1.16	25.41	43.50	-18.09	QP
3		127.665	54.96	8.43	36.93	1.42	27.88	43.50	-15.62	QP
4		239.987	51.26	11.56	37.37	2.07	27.52	46.00	-18.48	QP
5		287.990	58.90	13.11	37.41	2.31	36.91	46.00	-9.09	QP
6		866.088	49.17	21.91	37.61	4.73	38.20	46.00	-7.80	QP
7	*	922.200	98.23	22.32	37.58	4.93	87.90	46.00	41.90	Average
8	*	922.200	106.93	22.32	37.58	4.93	96.60	46.00	50.60	Peak

Antenna Polarity:	Vertical	Test channel:	Highest

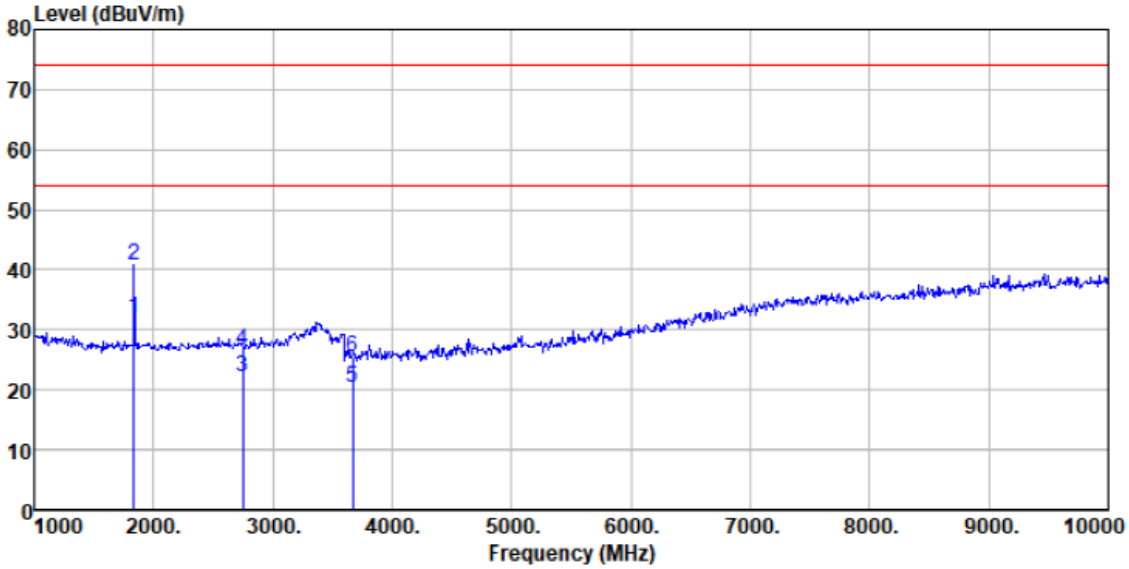


Condition : FCC PART15 CLASS B 3m VERTICAL
EUT : Stage luminaires
Test Model : FP1
Test Mode : TX Mode
T&H : 25℃ 48%
Test Engineer: Bourne
Test Voltage : 120V/60Hz
CH : 922.2MHz

	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	37.025	56.86	11.20	35.49	0.63	33.20	40.00	-6.80	QP
2	43.966	52.98	12.25	35.88	0.71	30.06	40.00	-9.94	QP
3	80.644	58.51	7.30	36.55	1.03	30.29	40.00	-9.71	QP
4	127.665	57.51	8.43	36.93	1.42	30.43	43.50	-13.07	QP
5	178.758	54.39	8.70	37.23	1.73	27.59	43.50	-15.91	QP
6	866.088	47.70	21.91	37.61	4.73	36.73	46.00	-9.27	QP
7 *	922.200	98.76	22.32	37.58	4.93	88.43	46.00	42.43	Average
8 *	922.200	107.88	22.32	37.58	4.93	97.55	46.00	51.55	Peak

■ **Above 1GHz**

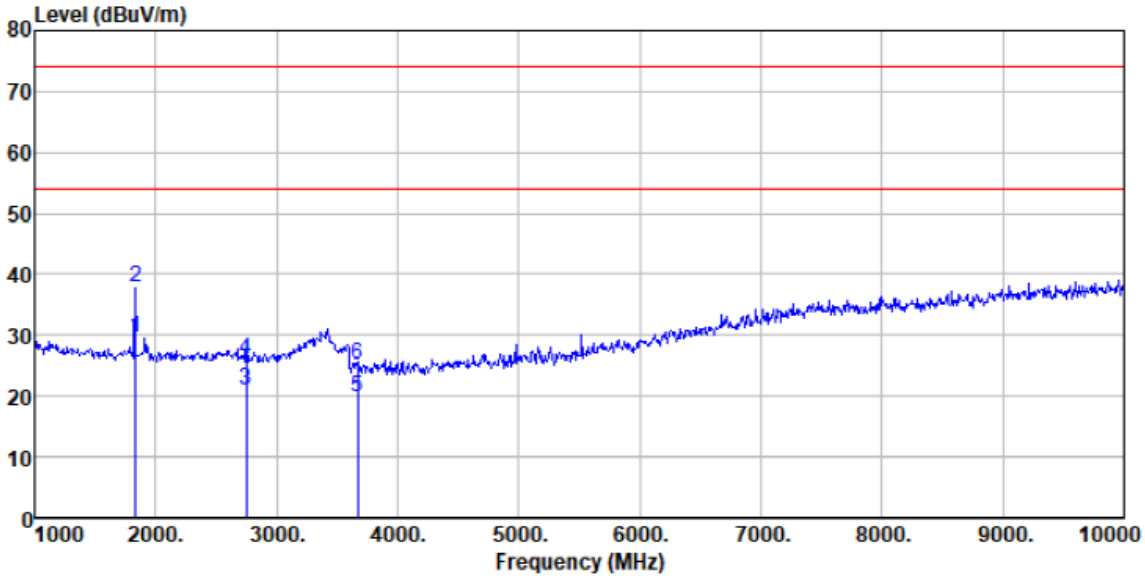
Antenna Polarity:	Horizontal	Test channel:	Lowest



Condition : FCC PART 15 (PK) 3m HORIZONTAL
EUT : Stage luminaires
Model : FP1
Test Mode : TX Mode
T&H : 25℃ 48%
Test Engineer: Bourne
Test Voltage : 120V/60Hz
CH : 917MHz

	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	1834.000	40.01	25.86	36.40	2.49	31.96	54.00	-22.04	Average
2	1834.000	48.73	25.86	36.40	2.49	40.68	74.00	-33.32	Peak
3	2751.000	28.00	28.07	37.13	3.18	22.12	54.00	-31.88	Average
4	2751.000	32.54	28.07	37.13	3.18	26.66	74.00	-47.34	Peak
5	3668.000	25.04	28.91	37.37	3.87	20.45	54.00	-33.55	Average
6	3668.000	30.09	28.91	37.37	3.87	25.50	74.00	-48.50	Peak

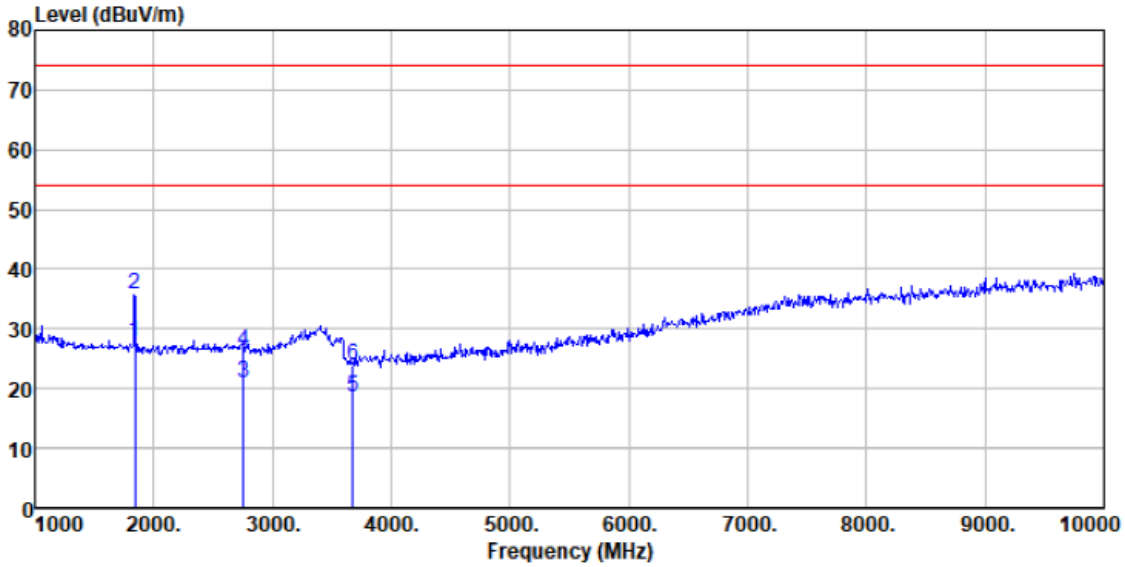
Antenna Polarity:	Vertical	Test channel:	Lowest



Condition : FCC PART 15 (PK) 3m VERTICAL
EUT : Stage luminaires
Model : FP1
Test Mode : TX Mode
T&H : 25℃ 48%
Test Engineer: Bourne
Test Voltage : 120V/60Hz
CH : 917MHz

	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	1834.000	37.67	25.86	36.40	2.49	29.62	54.00	-24.38	Average
2	1834.000	45.80	25.86	36.40	2.49	37.75	74.00	-36.25	Peak
3	2751.000	26.89	28.07	37.13	3.18	21.01	54.00	-32.99	Average
4	2751.000	31.78	28.07	37.13	3.18	25.90	74.00	-48.10	Peak
5	3668.000	24.39	28.91	37.37	3.87	19.80	54.00	-34.20	Average
6	3668.000	29.54	28.91	37.37	3.87	24.95	74.00	-49.05	Peak

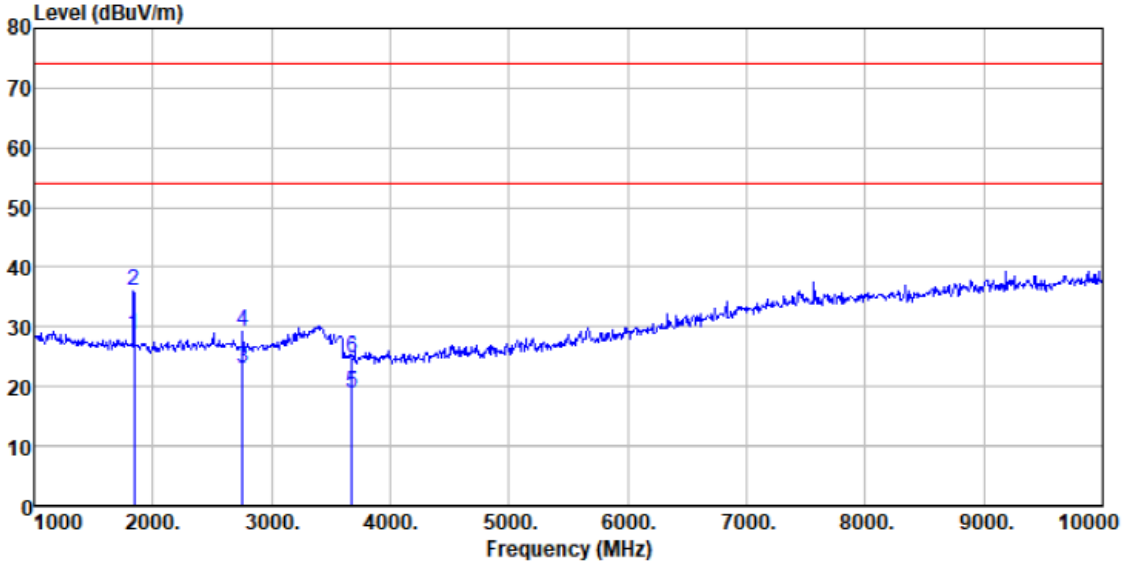
Antenna Polarity:	Horizontal	Test channel:	Middle



Condition : FCC PART 15 (PK) 3m HORIZONTAL
EUT : Stage luminaires
Model : FP1
Test Mode : TX Mode
T&H : 25℃ 48%
Test Engineer: Bourne
Test Voltage : 120V/60Hz
CH : 919.6MHz

	Freq	ReadLevel	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	1839.200	35.81	25.87	36.40	2.49	27.77	54.00	-26.23	Average
2	1839.200	43.62	25.87	36.40	2.49	35.58	74.00	-38.42	Peak
3	2758.800	26.89	28.08	37.13	3.18	21.02	54.00	-32.98	Average
4	2758.800	32.25	28.08	37.13	3.18	26.38	74.00	-47.62	Peak
5	3678.400	23.10	28.94	37.37	3.87	18.54	54.00	-35.46	Average
6	3678.400	28.49	28.94	37.37	3.87	23.93	74.00	-50.07	Peak

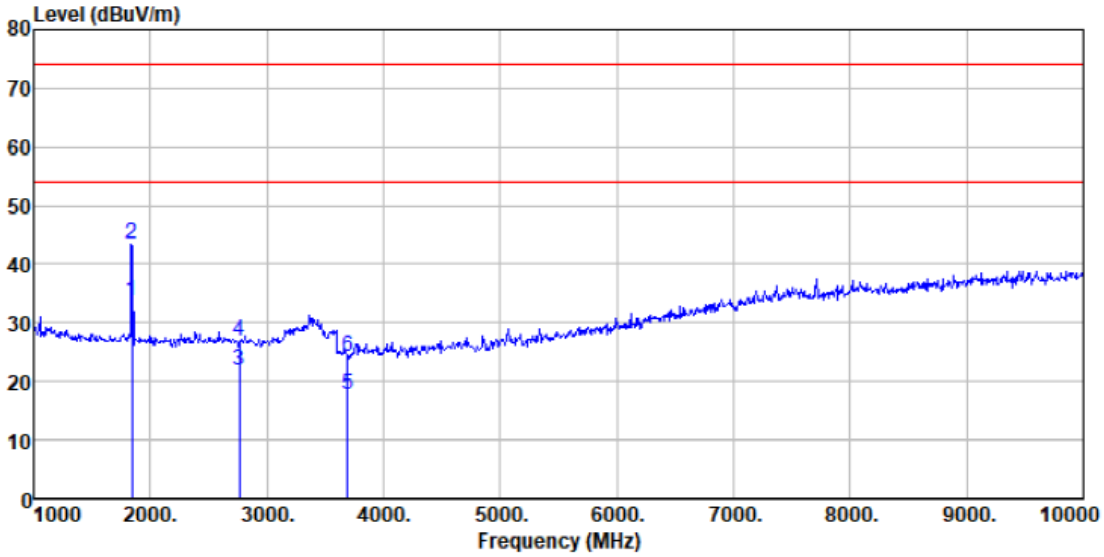
Antenna Polarity:	Vertical	Test channel:	Middle



Condition : FCC PART 15 (PK) 3m VERTICAL
EUT : Stage luminaires
Model : FP1
Test Mode : TX Mode
T&H : 25℃ 48%
Test Engineer: Bourne
Test Voltage : 120V/60Hz
CH : 919.6MHz

	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	1839.200	36.66	25.87	36.40	2.49	28.62	54.00	-25.38	Average
2	1839.200	44.01	25.87	36.40	2.49	35.97	74.00	-38.03	Peak
3	2758.800	28.82	28.08	37.13	3.18	22.95	54.00	-31.05	Average
4	2758.800	35.16	28.08	37.13	3.18	29.29	74.00	-44.71	Peak
5	3678.400	23.32	28.94	37.37	3.87	18.76	54.00	-35.24	Average
6	3678.400	29.26	28.94	37.37	3.87	24.70	74.00	-49.30	Peak

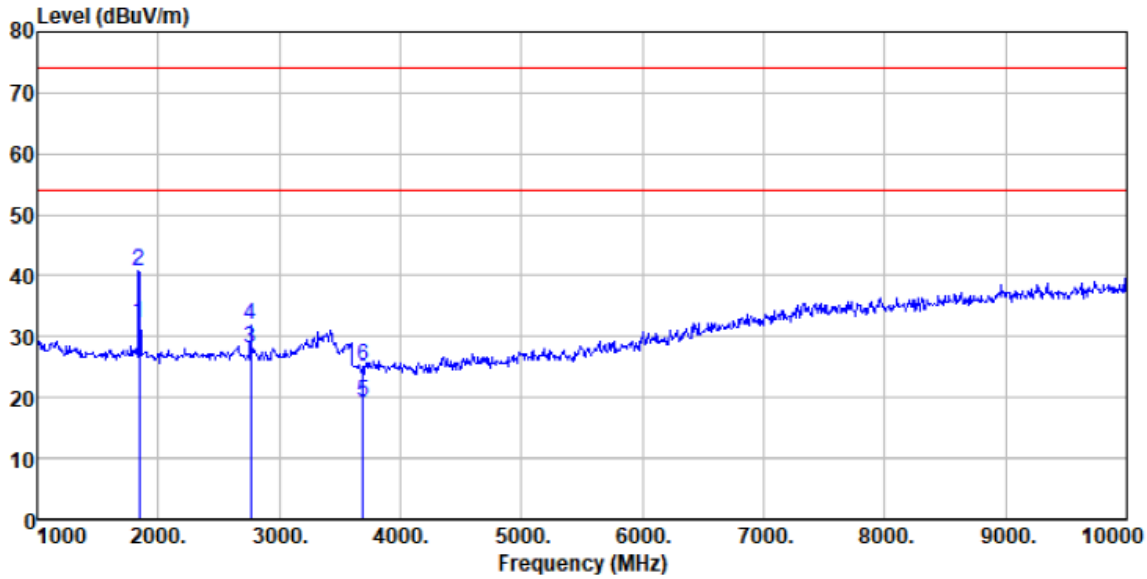
Antenna Polarity:	Horizontal	Test channel:	Highest



Condition : FCC PART 15 (PK) 3m HORIZONTAL
EUT : Stage luminaires
Model : FP1
Test Mode : TX Mode
T&H : 25℃ 48%
Test Engineer: Bourne
Test Voltage : 120V/60Hz
CH : 922.2MHz

	Freq	ReadAntenna Level	Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	1844.400	41.62	25.88	36.41	2.49	33.58	54.00	-20.42	Average
2	1844.400	51.53	25.88	36.41	2.49	43.49	74.00	-30.51	Peak
3	2766.600	27.77	28.09	37.14	3.19	21.91	54.00	-32.09	Average
4	2766.600	32.78	28.09	37.14	3.19	26.92	74.00	-47.08	Peak
5	3688.800	22.37	28.97	37.37	3.87	17.84	54.00	-36.16	Average
6	3688.800	28.73	28.97	37.37	3.87	24.20	74.00	-49.80	Peak

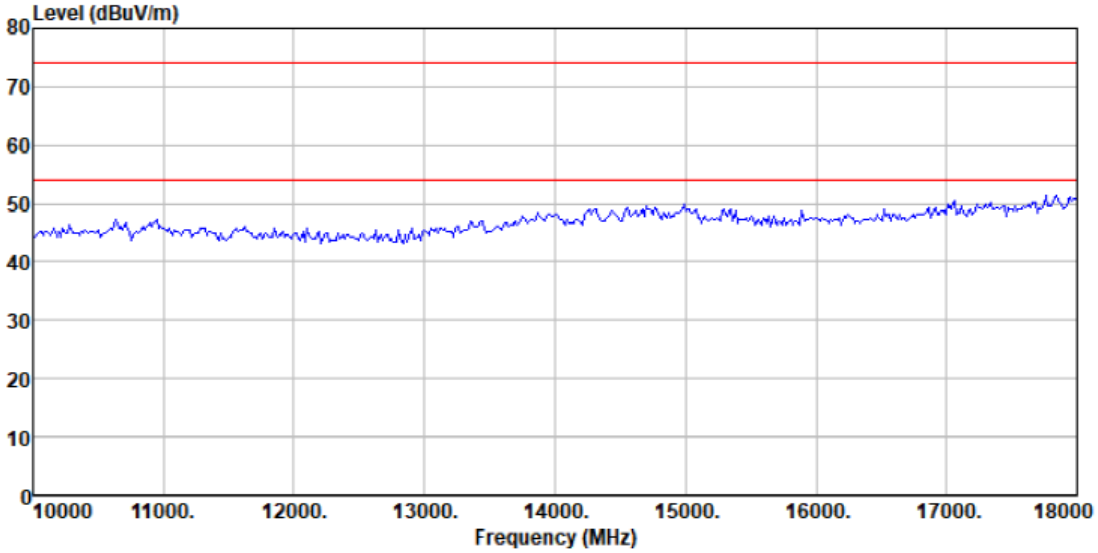
Antenna Polarity:	Vertical	Test channel:	Highest



Condition : FCC PART 15 (PK) 3m VERTICAL
EUT : Stage luminaires
Model : FP1
Test Mode : TX Mode
T&H : 25℃ 48%
Test Engineer: Bourne
Test Voltage : 120V/60Hz
CH : 922.2MHz

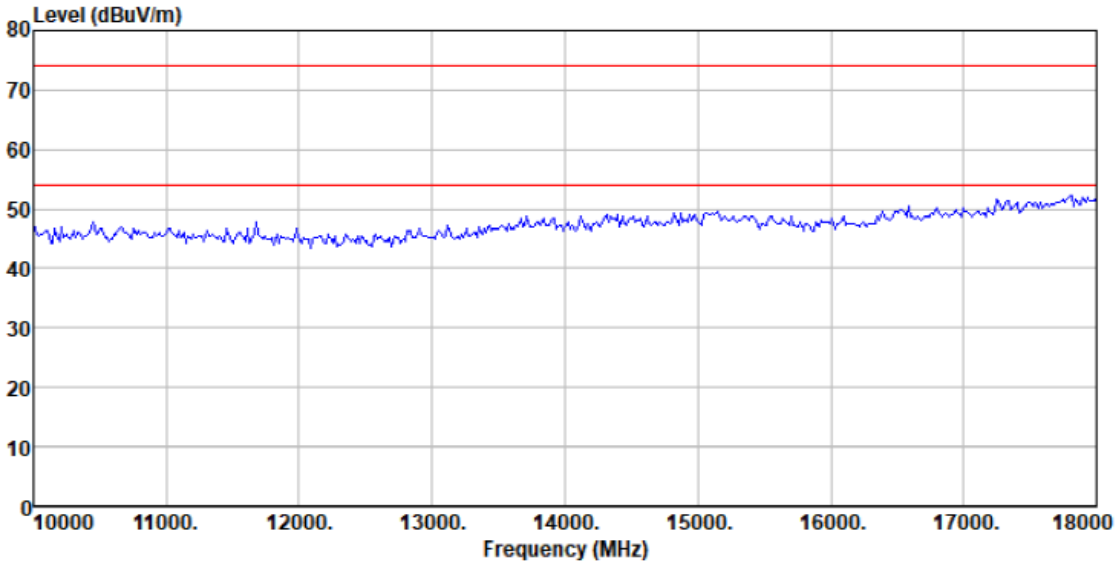
	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	1844.400	40.36	25.88	36.41	2.49	32.32	54.00	-21.68	Average
2	1844.400	48.82	25.88	36.41	2.49	40.78	74.00	-33.22	Peak
3	2766.600	33.88	28.09	37.14	3.19	28.02	54.00	-25.98	Average
4	2766.600	37.60	28.09	37.14	3.19	31.74	74.00	-42.26	Peak
5	3688.800	23.76	28.97	37.37	3.87	19.23	54.00	-34.77	Average
6	3688.800	29.69	28.97	37.37	3.87	25.16	74.00	-48.84	Peak

Antenna Polarity:	Horizontal	Test channel:	Lowest



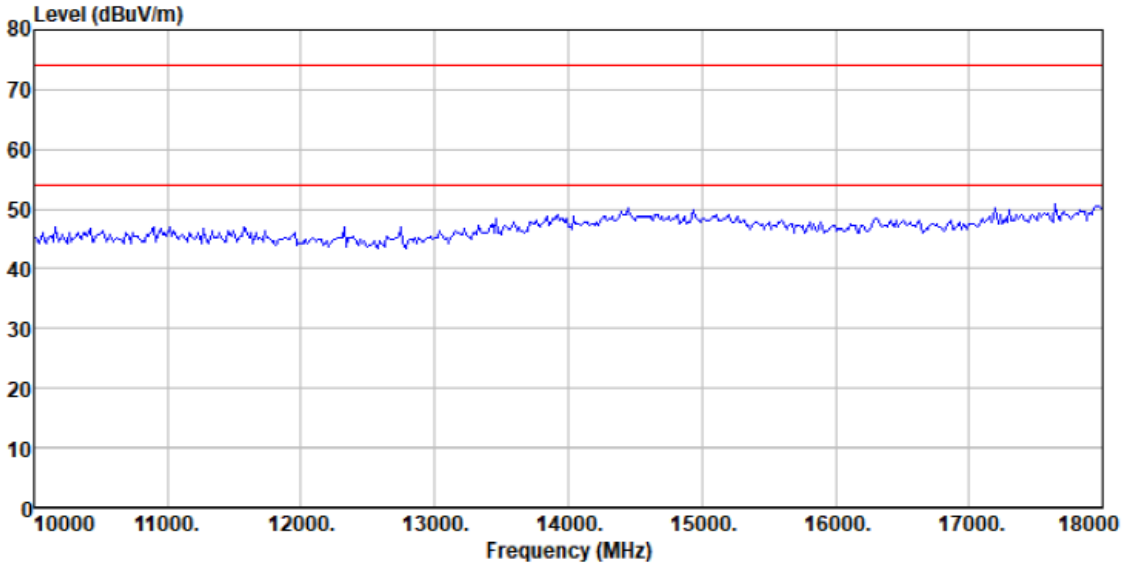
Condition : FCC PART 15 (PK) 3m HORIZONTAL
EUT : Stage luminaires
Test Mode : Charging + 920MHz TX mode
Test Engineer: Lee
Model : FP1
T&H : 24℃ 49%
Test voltage : AC120V 60Hz
CH : 917MHz

Antenna Polarity:	Vertical	Test channel:	Lowest



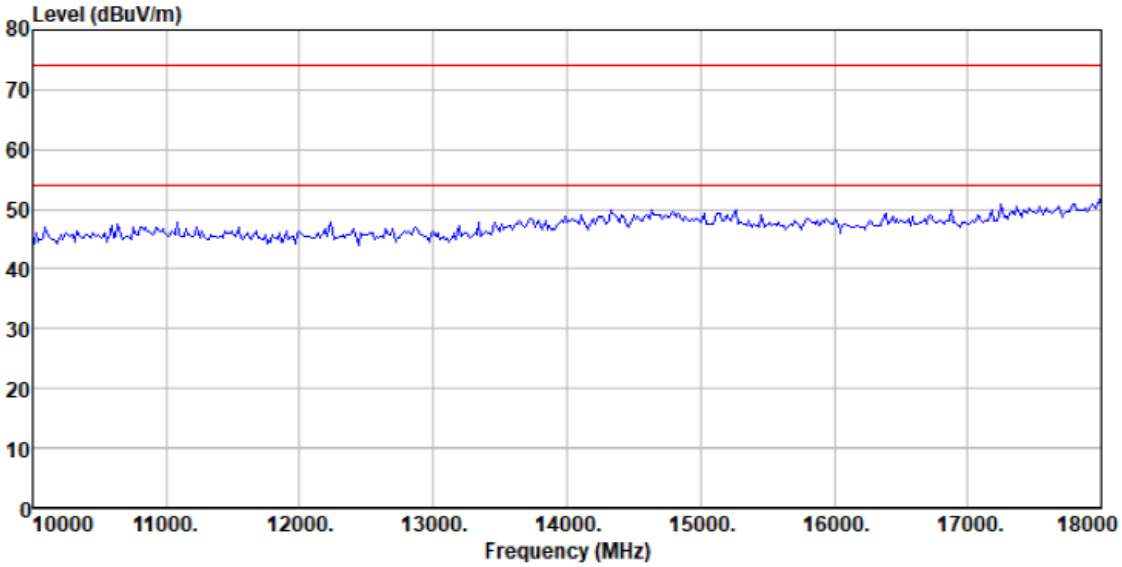
Condition : FCC PART 15 (PK) 3m VERTICAL
EUT : Stage luminaires
Test Mode : Charging + 920MHz TX mode
Test Engineer: Lee
Model : FP1
T&H : 24℃ 49%
Test voltage : AC120V 60Hz
CH : 917MHz

Antenna Polarity:	Horizontal	Test channel:	Middle



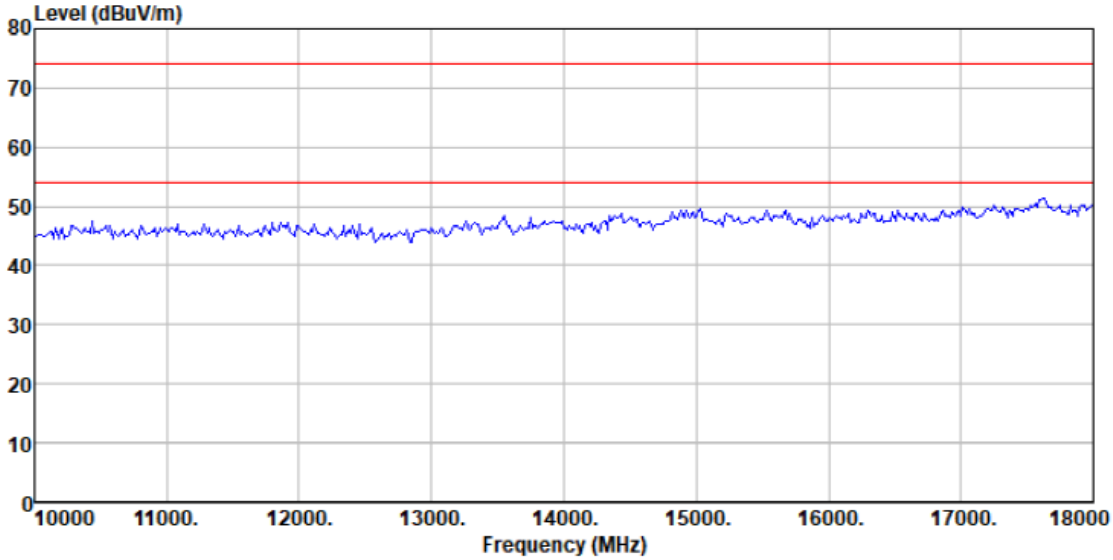
Condition : FCC PART 15 (PK) 3m HORIZONTAL
EUT : Stage luminaires
Test Mode : Charging + 920MHz TX mode
Test Engineer: Lee
Model : FP1
T&H : 24℃ 49%
Test voltage : AC120V 60Hz
CH : 919.6MHz

Antenna Polarity:	Vertical	Test channel:	Middle



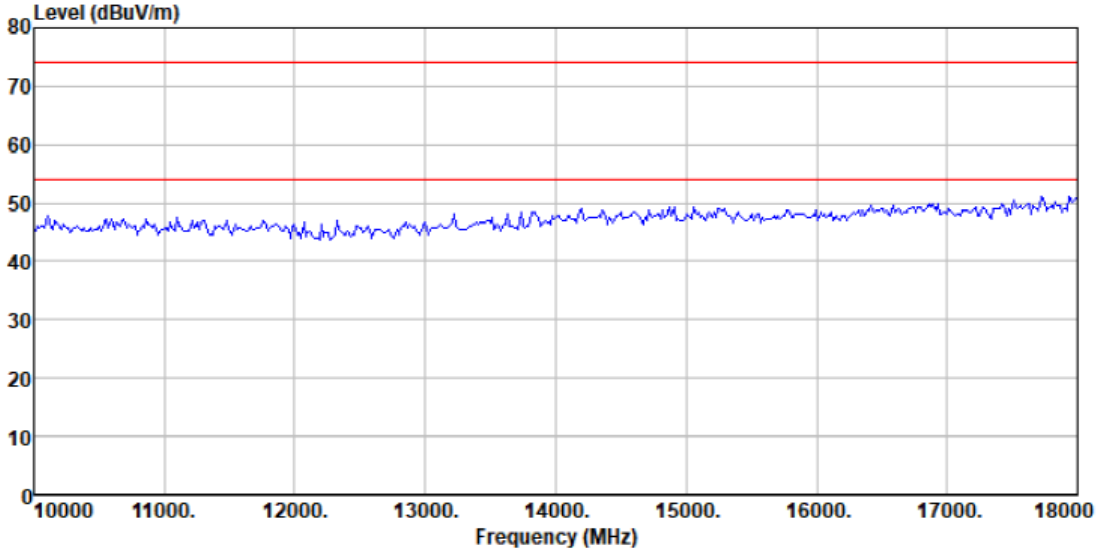
Condition : FCC PART 15 (PK) 3m VERTICAL
EUT : Stage luminaires
Test Mode : Charging + 920MHz TX mode
Test Engineer: Lee
Model : FP1
T&H : 24℃ 49%
Test voltage : AC120V 60Hz
CH : 919.6MHz

Antenna Polarity:	Horizontal	Test channel:	Highest



Condition : FCC PART 15 (PK) 3m HORIZONTAL
EUT : Stage luminaires
Test Mode : Charging + 920MHz TX mode
Test Engineer: Lee
Model : FP1
T&H : 24℃ 49%
Test voltage : AC120V 60Hz
CH : 922.2MHz

Antenna Polarity:	Vertical	Test channel:	Highest

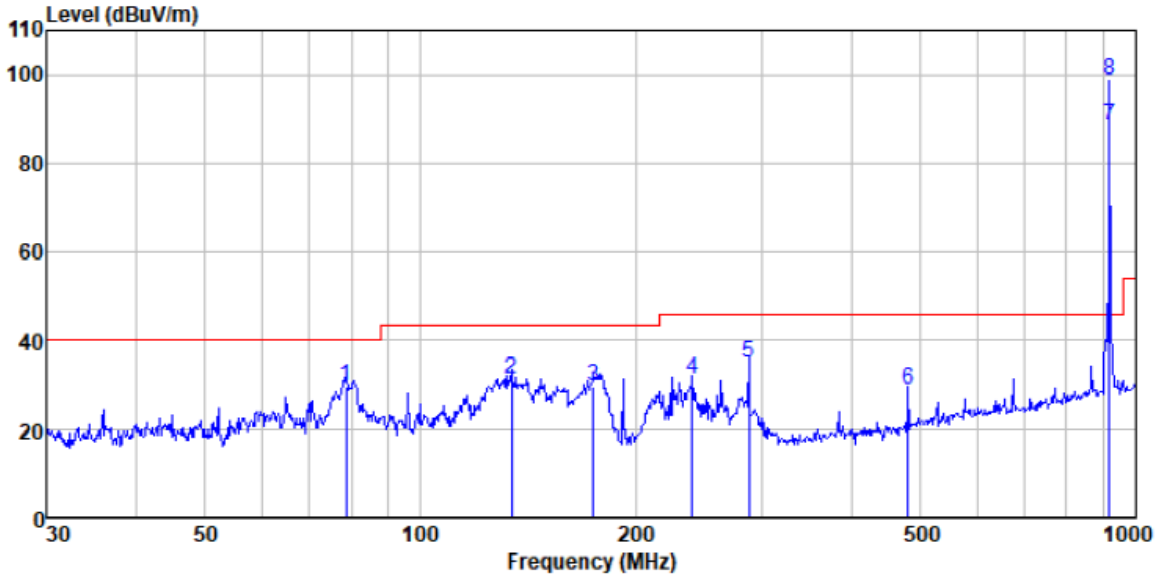


Condition : FCC PART 15 (PK) 3m VERTICAL
EUT : Stage luminaires
Test Mode : Charging + 920MHz TX mode
Test Engineer: Lee
Model : FP1
T&H : 24℃ 49%
Test voltage : AC120V 60Hz
CH : 922.2MHz

FP2:

■ **Below 1GHz**

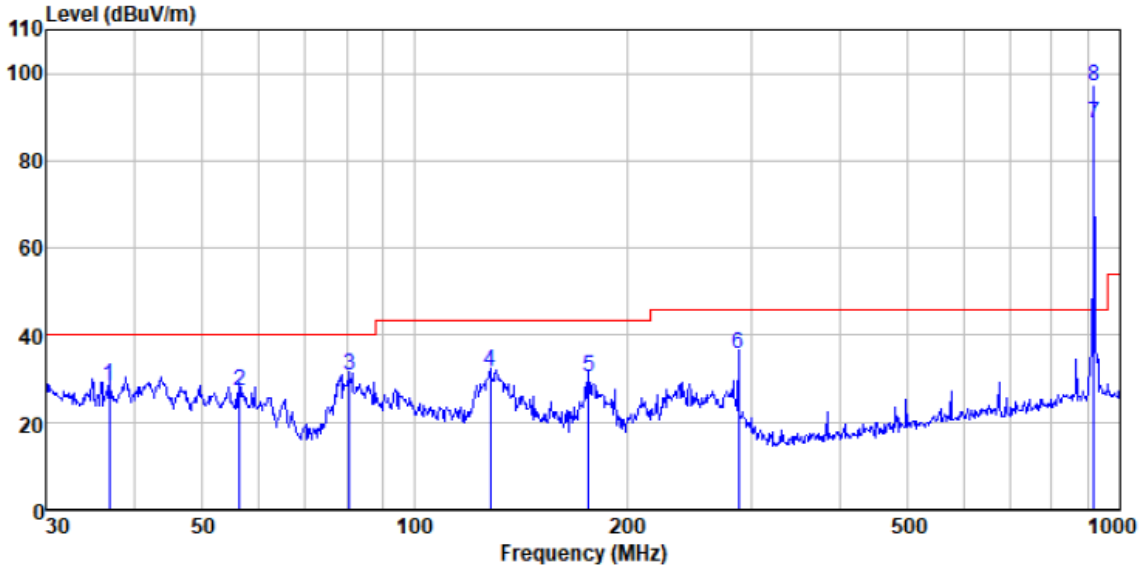
Antenna Polarity:	Horizontal	Test channel:	Lowest



Condition : FCC PART15 CLASS B 3m HORIZONTAL
EUT : Stage luminaires
Test Model : FP2
Test Mode : TX Mode
T&H : 25℃ 48%
Test Engineer: Bourne
Test Voltage : 120V/60Hz
CH : 917MHz

	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	78.689	57.97	7.33	36.53	1.02	29.79	40.00	-10.21	QP
2	134.088	58.82	7.83	36.98	1.47	31.14	43.50	-12.36	QP
3	174.424	56.39	8.60	37.21	1.71	29.49	43.50	-14.01	QP
4	239.987	54.92	11.56	37.37	2.07	31.18	46.00	-14.82	QP
5	287.990	57.04	13.11	37.41	2.31	35.05	46.00	-10.95	QP
6	480.528	45.86	17.14	37.51	3.22	28.71	46.00	-17.29	QP
7 *	917.000	99.01	22.31	37.58	4.91	88.65	46.00	42.65	Average
8 *	917.000	108.87	22.31	37.58	4.91	98.51	46.00	52.51	Peak

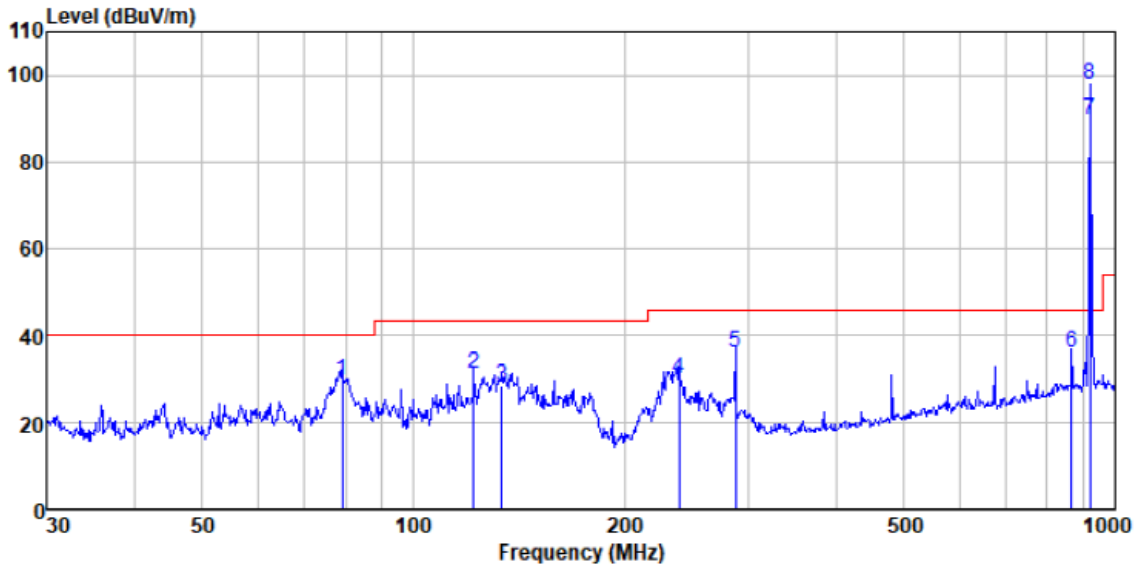
Antenna Polarity:	Vertical	Test channel:	Lowest



Condition : FCC PART15 CLASS B 3m VERTICAL
EUT : Stage luminaires
Test Model : FP2
Test Mode : TX Mode
T&H : 25℃ 48%
Test Engineer: Bourne
Test Voltage : 120V/60Hz
CH : 917MHz

	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	36.895	52.11	11.20	35.48	0.63	28.46	40.00	-11.54	QP
2	56.395	50.87	11.67	36.27	0.83	27.10	40.00	-12.90	QP
3	80.927	58.93	7.30	36.56	1.04	30.71	40.00	-9.29	QP
4	128.113	58.69	8.43	36.94	1.42	31.60	43.50	-11.90	QP
5	176.269	57.54	8.60	37.22	1.72	30.64	43.50	-12.86	QP
6	287.990	57.52	13.11	37.41	2.31	35.53	46.00	-10.47	QP
7 *	917.000	98.73	22.31	37.58	4.91	88.37	46.00	42.37	Average
8 *	917.000	107.51	22.31	37.58	4.91	97.15	46.00	51.15	Peak

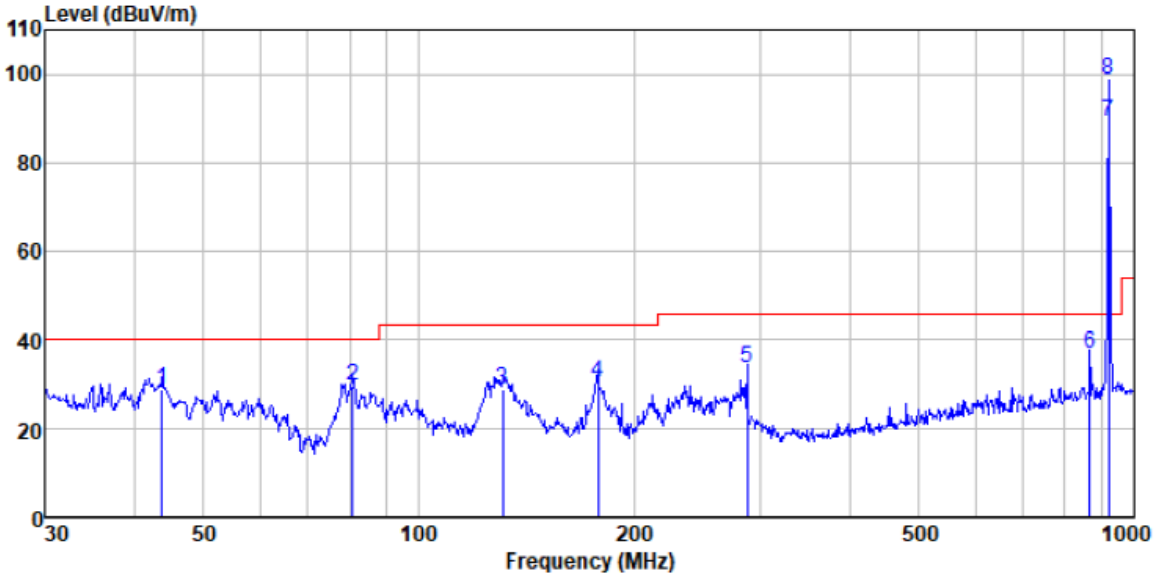
Antenna Polarity:	Horizontal	Test channel:	Middle



Condition : FCC PART15 CLASS B 3m HORIZONTAL
EUT : Stage luminaires
Test Model : FP2
Test Mode : TX Mode
T&H : 25℃ 48%
Test Engineer: Bourne
Test Voltage : 120V/60Hz
CH : 919.6MHz

		Freq	ReadLevel	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
		MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1		79.243	57.88	7.30	36.54	1.02	29.66	40.00	-10.34	QP
2		121.976	57.72	9.07	36.89	1.38	31.28	43.50	-12.22	QP
3		133.619	56.09	7.83	36.98	1.46	28.40	43.50	-15.10	QP
4		239.147	53.83	11.46	37.37	2.06	29.98	46.00	-16.02	QP
5		287.990	58.26	13.11	37.41	2.31	36.27	46.00	-9.73	QP
6		866.088	46.92	21.91	37.61	4.73	35.95	46.00	-10.05	QP
7	*	919.600	99.90	22.32	37.58	4.93	89.57	46.00	43.57	Average
8	*	919.600	108.15	22.32	37.58	4.93	97.82	46.00	51.82	Peak

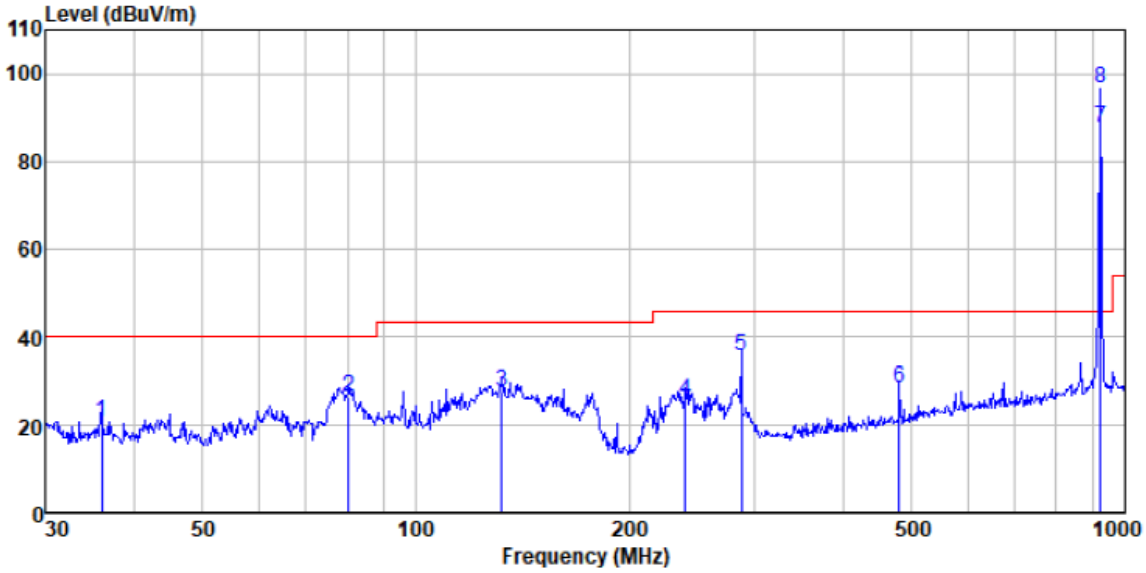
Antenna Polarity:	Vertical	Test channel:	Middle



Condition : FCC PART15 CLASS B 3m VERTICAL
EUT : Stage luminaires
Test Model : FP2
Test Mode : TX Mode
T&H : 25℃ 48%
Test Engineer: Bourne
Test Voltage : 120V/60Hz
CH : 919.6MHz

		Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
		MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1		43.812	51.72	12.25	35.87	0.71	28.81	40.00	-11.19	QP
2		80.927	57.81	7.30	36.56	1.04	29.59	40.00	-10.41	QP
3		130.837	56.22	8.10	36.96	1.44	28.80	43.50	-14.70	QP
4		178.133	57.15	8.70	37.23	1.73	30.35	43.50	-13.15	QP
5		287.990	55.56	13.11	37.41	2.31	33.57	46.00	-12.43	QP
6		866.088	47.86	21.91	37.61	4.73	36.89	46.00	-9.11	QP
7	*	919.600	99.46	22.32	37.58	4.93	89.13	46.00	43.13	Average
8	*	919.600	108.79	22.32	37.58	4.93	98.46	46.00	52.46	Peak

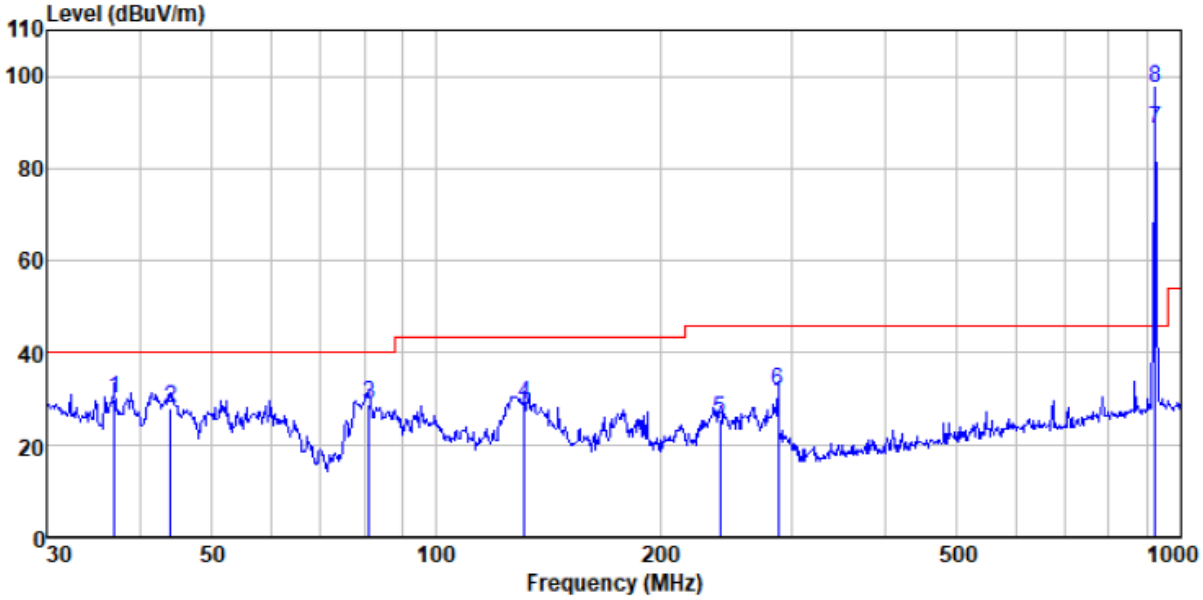
Antenna Polarity:	Horizontal	Test channel:	Highest



Condition : FCC PART15 CLASS B 3m HORIZONTAL
EUT : Stage luminaires
Test Model : FP2
Test Mode : TX Mode
T&H : 25℃ 48%
Test Engineer: Bourne
Test Voltage : 120V/60Hz
CH : 922.2MHz

		Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
		MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1		36.001	44.34	11.20	35.42	0.62	20.74	40.00	-19.26	QP
2		80.362	54.54	7.30	36.55	1.03	26.32	40.00	-13.68	QP
3		132.221	54.97	8.10	36.97	1.45	27.55	43.50	-15.95	QP
4		239.987	49.26	11.56	37.37	2.07	25.52	46.00	-20.48	QP
5		287.990	57.90	13.11	37.41	2.31	35.91	46.00	-10.09	QP
6		480.528	45.76	17.14	37.51	3.22	28.61	46.00	-17.39	QP
7	*	922.200	98.14	22.32	37.58	4.93	87.81	46.00	41.81	Average
8	*	922.200	106.88	22.32	37.58	4.93	96.55	46.00	50.55	Peak

Antenna Polarity:	Vertical	Test channel:	Highest

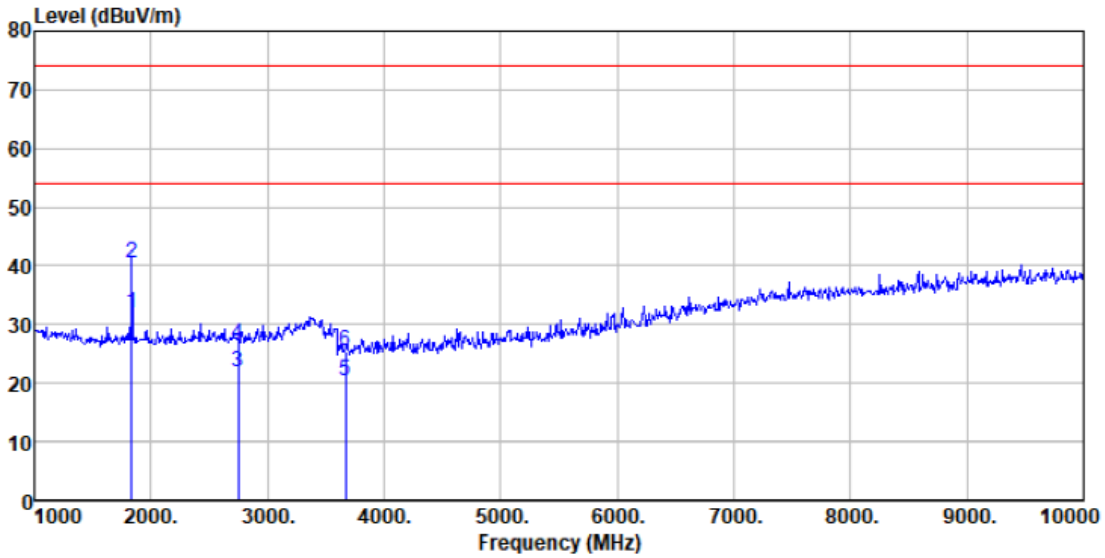


Condition : FCC PART15 CLASS B 3m VERTICAL
EUT : Stage luminaires
Test Model : FP2
Test Mode : TX Mode
T&H : 25℃ 48%
Test Engineer: Bourne
Test Voltage : 120V/60Hz
CH : 922.2MHz

		Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
		MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1		37.025	53.86	11.20	35.49	0.63	30.20	40.00	-9.80	QP
2		43.966	50.98	12.25	35.88	0.71	28.06	40.00	-11.94	QP
3		81.212	57.01	7.30	36.56	1.04	28.79	40.00	-11.21	QP
4		131.297	56.22	8.10	36.96	1.44	28.80	43.50	-14.70	QP
5		240.830	49.20	11.56	37.37	2.08	25.47	46.00	-20.53	QP
6		287.990	53.71	13.11	37.41	2.31	31.72	46.00	-14.28	QP
7	*	922.200	98.66	22.32	37.58	4.93	88.33	46.00	42.33	Average
8	*	922.200	107.77	22.32	37.58	4.93	97.44	46.00	51.44	Peak

■ **Above 1GHz**

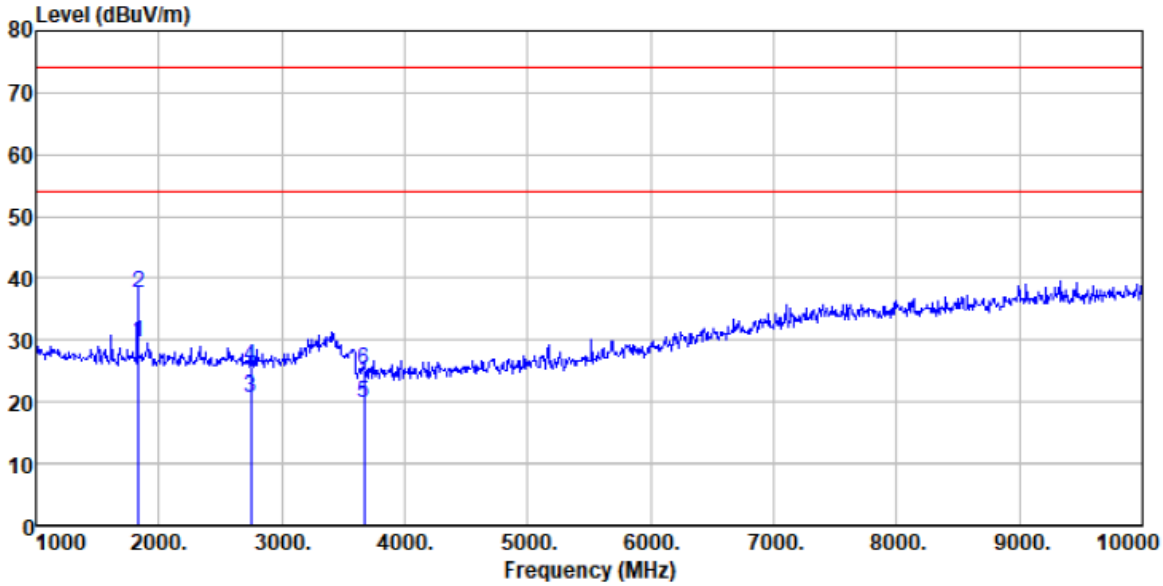
Antenna Polarity:	Horizontal	Test channel:	Lowest



Condition : FCC PART 15 (PK) 3m HORIZONTAL
EUT : Stage luminaires
Model : FP2
Test Mode : TX Mode
T&H : 25℃ 48%
Test Engineer: Bourne
Test Voltage : 120V/60Hz
CH : 917MHz

	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	1834.000	40.01	25.86	36.40	2.49	31.96	54.00	-22.04	Average
2	1834.000	48.53	25.86	36.40	2.49	40.48	74.00	-33.52	Peak
3	2751.000	27.60	28.07	37.13	3.18	21.72	54.00	-32.28	Average
4	2751.000	32.56	28.07	37.13	3.18	26.68	74.00	-47.32	Peak
5	3668.000	25.01	28.91	37.37	3.87	20.42	54.00	-33.58	Average
6	3668.000	30.12	28.91	37.37	3.87	25.53	74.00	-48.47	Peak

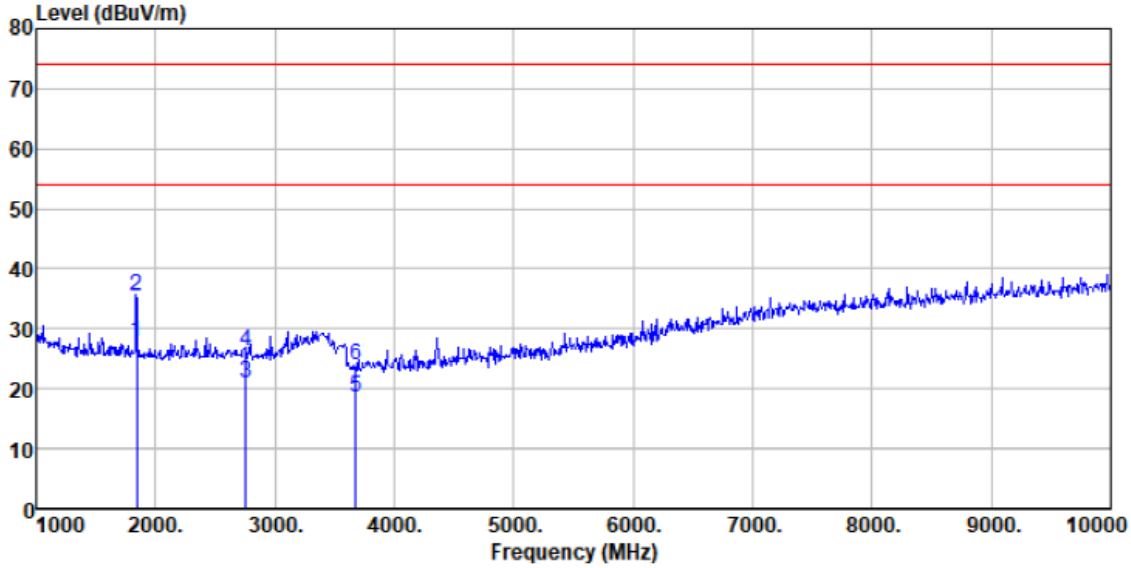
Antenna Polarity:	Vertical	Test channel:	Lowest



Condition : FCC PART 15 (PK) 3m VERTICAL
EUT : Stage luminaires
Model : FP2
Test Mode : TX Mode
T&H : 25℃ 48%
Test Engineer: Bourne
Test Voltage : 120V/60Hz
CH : 917MHz

	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	1834.000	37.69	25.86	36.40	2.49	29.64	54.00	-24.36	Average
2	1834.000	45.50	25.86	36.40	2.49	37.45	74.00	-36.55	Peak
3	2751.000	26.59	28.07	37.13	3.18	20.71	54.00	-33.29	Average
4	2751.000	31.68	28.07	37.13	3.18	25.80	74.00	-48.20	Peak
5	3668.000	24.23	28.91	37.37	3.87	19.64	54.00	-34.36	Average
6	3668.000	29.64	28.91	37.37	3.87	25.05	74.00	-48.95	Peak

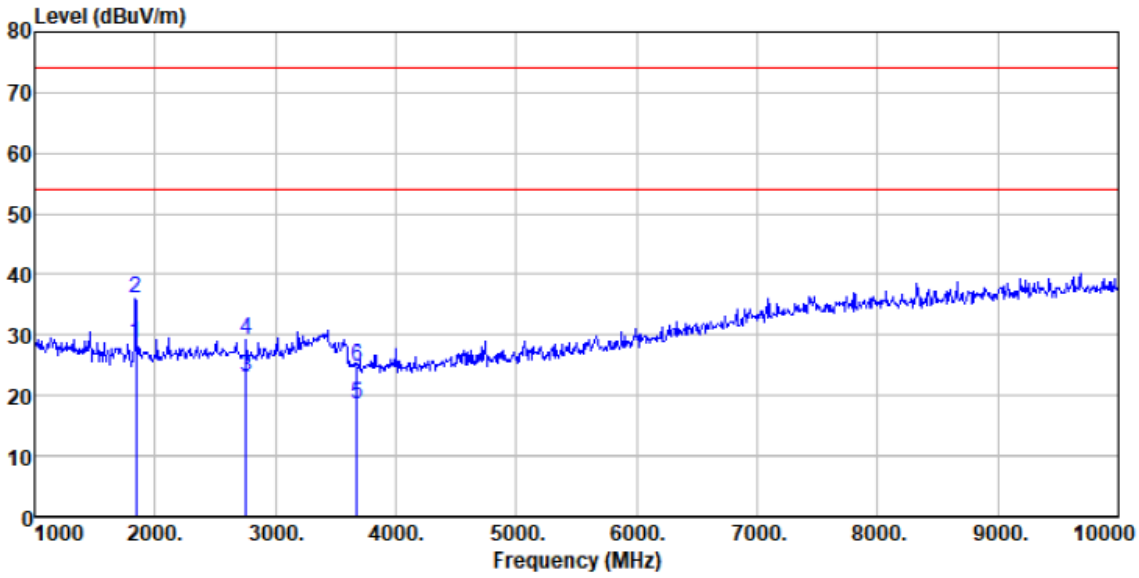
Antenna Polarity:	Horizontal	Test channel:	Middle



Condition : FCC PART 15 (PK) 3m HORIZONTAL
EUT : Stage luminaires
Model : FP2
Test Mode : TX Mode
T&H : 25℃ 48%
Test Engineer: Bourne
Test Voltage : 120V/60Hz
CH : 919.6MHz

	Freq	ReadLevel	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	1839.200	35.71	25.87	36.40	2.49	27.67	54.00	-26.33	Average
2	1839.200	43.55	25.87	36.40	2.49	35.51	74.00	-38.49	Peak
3	2758.800	26.69	28.08	37.13	3.18	20.82	54.00	-33.18	Average
4	2758.800	32.22	28.08	37.13	3.18	26.35	74.00	-47.65	Peak
5	3678.400	23.11	28.94	37.37	3.87	18.55	54.00	-35.45	Average
6	3678.400	28.44	28.94	37.37	3.87	23.88	74.00	-50.12	Peak

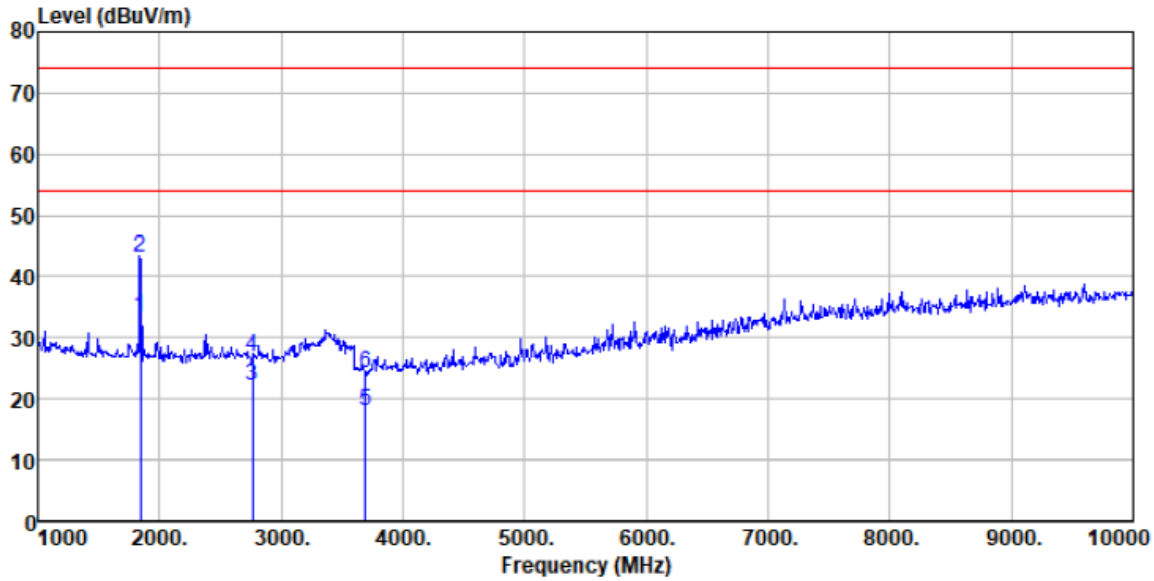
Antenna Polarity:	Vertical	Test channel:	Middle



Condition : FCC PART 15 (PK) 3m VERTICAL
EUT : Stage luminaires
Model : FP2
Test Mode : TX Mode
T&H : 25℃ 48%
Test Engineer: Bourne
Test Voltage : 120V/60Hz
CH : 919.6MHz

	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	1839.200	36.55	25.87	36.40	2.49	28.51	54.00	-25.49	Average
2	1839.200	44.00	25.87	36.40	2.49	35.96	74.00	-38.04	Peak
3	2758.800	28.78	28.08	37.13	3.18	22.91	54.00	-31.09	Average
4	2758.800	35.12	28.08	37.13	3.18	29.25	74.00	-44.75	Peak
5	3678.400	23.30	28.94	37.37	3.87	18.74	54.00	-35.26	Average
6	3678.400	29.28	28.94	37.37	3.87	24.72	74.00	-49.28	Peak

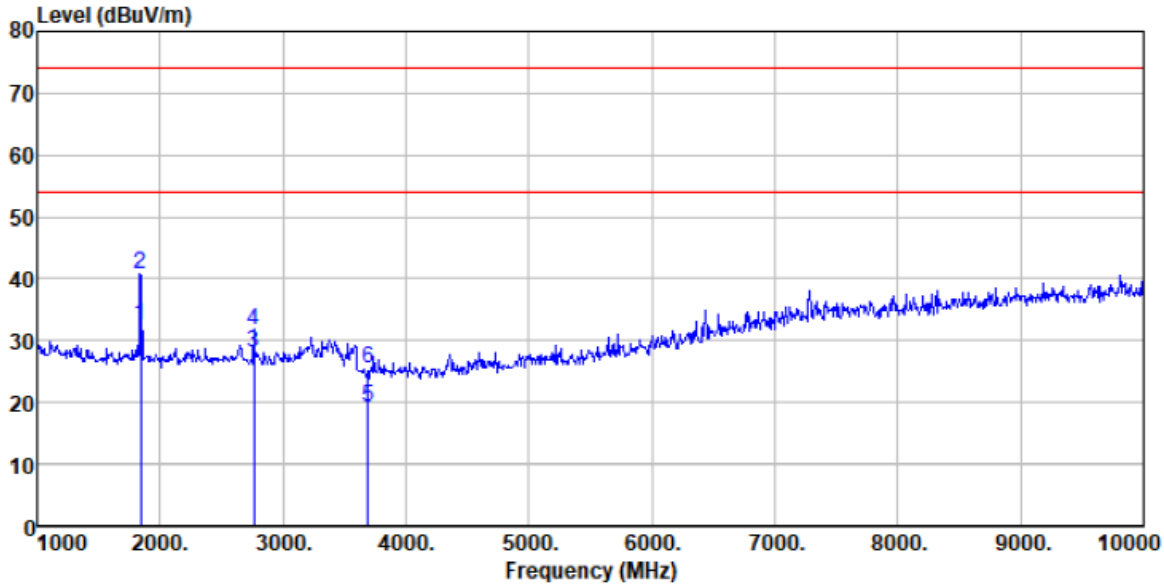
Antenna Polarity:	Horizontal	Test channel:	Highest



Condition : FCC PART 15 (PK) 3m HORIZONTAL
EUT : Stage luminaires
Model : FP2
Test Mode : TX Mode
T&H : 25℃ 48%
Test Engineer: Bourne
Test Voltage : 120V/60Hz
CH : 922.2MHz

	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	1844.400	41.34	25.88	36.41	2.49	33.30	54.00	-20.70	Average
2	1844.400	51.26	25.88	36.41	2.49	43.22	74.00	-30.78	Peak
3	2766.600	27.88	28.09	37.14	3.19	22.02	54.00	-31.98	Average
4	2766.600	32.76	28.09	37.14	3.19	26.90	74.00	-47.10	Peak
5	3688.800	22.43	28.97	37.37	3.87	17.90	54.00	-36.10	Average
6	3688.800	28.87	28.97	37.37	3.87	24.34	74.00	-49.66	Peak

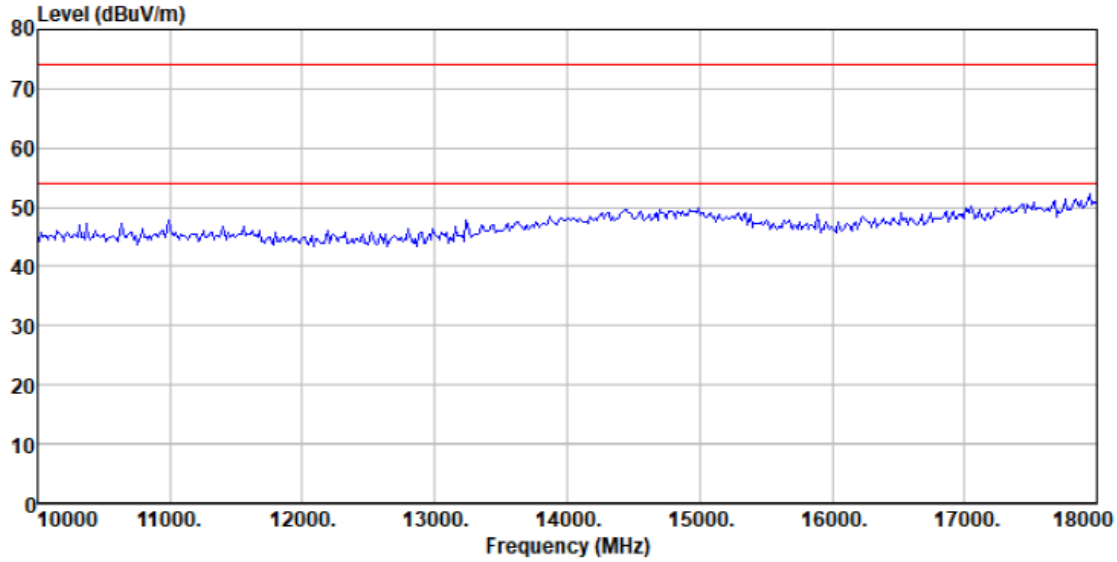
Antenna Polarity:	Vertical	Test channel:	Highest



Condition : FCC PART 15 (PK) 3m VERTICAL
EUT : Stage luminaires
Model : FP2
Test Mode : TX Mode
T&H : 25℃ 48%
Test Engineer: Bourne
Test Voltage : 120V/60Hz
CH : 922.2MHz

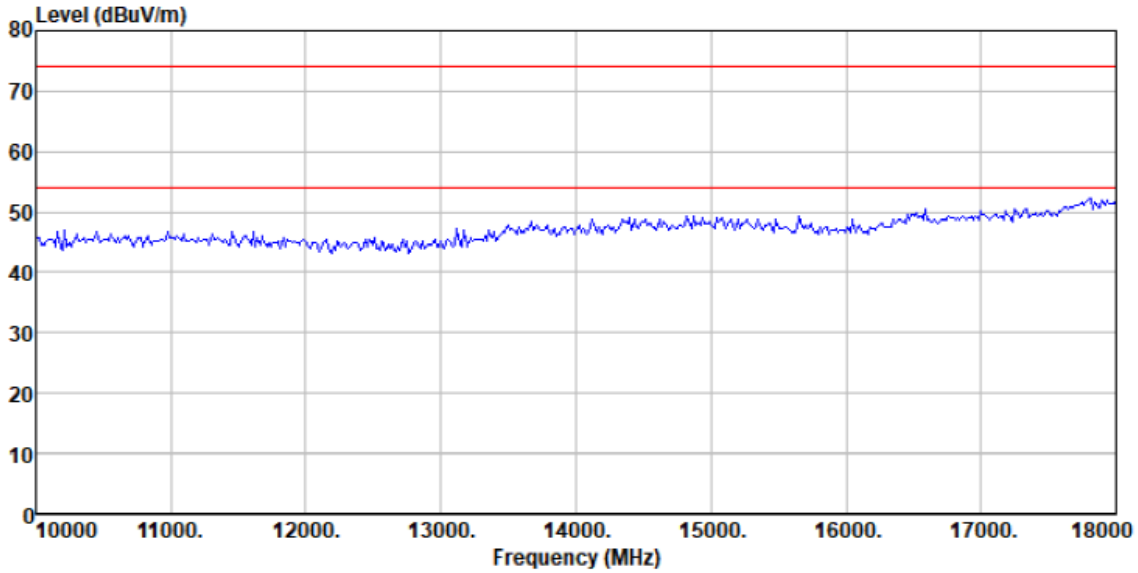
	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	1844.400	40.44	25.88	36.41	2.49	32.40	54.00	-21.60	Average
2	1844.400	48.86	25.88	36.41	2.49	40.82	74.00	-33.18	Peak
3	2766.600	33.84	28.09	37.14	3.19	27.98	54.00	-26.02	Average
4	2766.600	37.53	28.09	37.14	3.19	31.67	74.00	-42.33	Peak
5	3688.800	23.78	28.97	37.37	3.87	19.25	54.00	-34.75	Average
6	3688.800	29.79	28.97	37.37	3.87	25.26	74.00	-48.74	Peak

Antenna Polarity:	Horizontal	Test channel:	Lowest



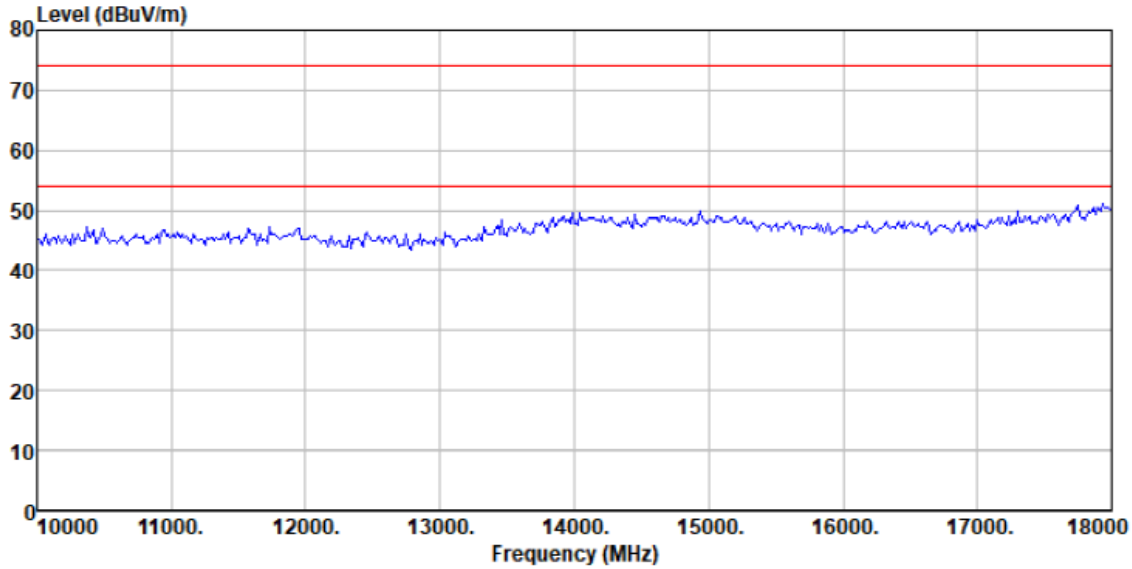
Condition : FCC PART 15 (PK) 3m HORIZONTAL
EUT : Stage luminaires
Test Mode : Charging + 920MHz TX mode
Test Engineer: Lee
Model : FP2
T&H : 24℃ 49%
Test voltage : AC120V 60Hz
CH : 917MHz

Antenna Polarity:	Vertical	Test channel:	Lowest



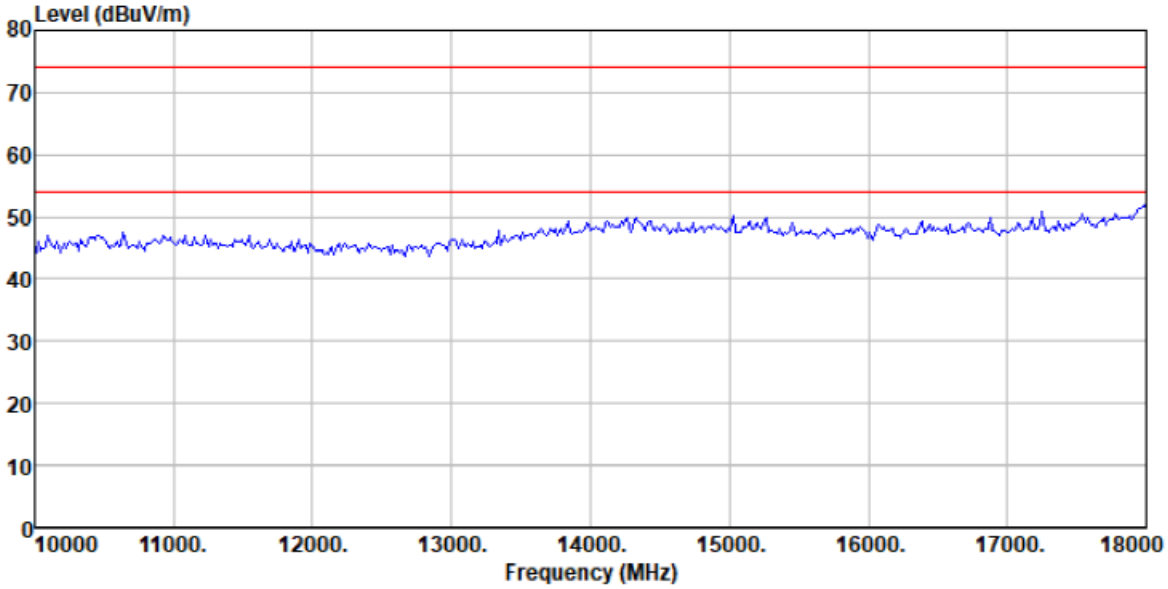
Condition : FCC PART 15 (PK) 3m VERTICAL
EUT : Stage luminaires
Test Mode : Charging + 920MHz TX mode
Test Engineer: Lee
Model : FP2
T&H : 24℃ 49%
Test voltage : AC120V 60Hz
CH : 917MHz

Antenna Polarity:	Horizontal	Test channel:	Middle



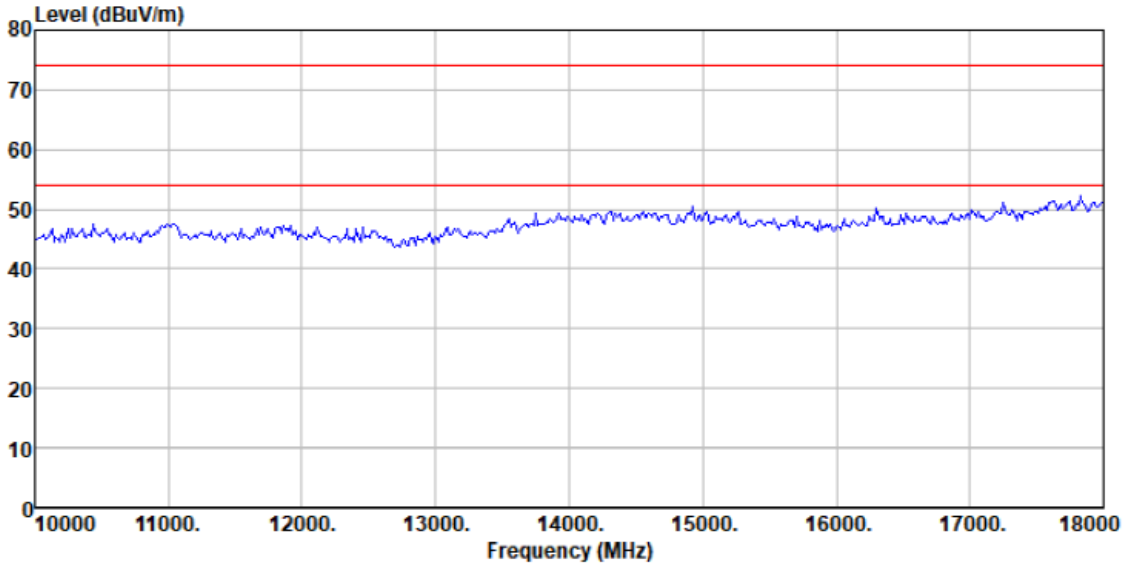
Condition : FCC PART 15 (PK) 3m HORIZONTAL
EUT : Stage luminaires
Test Mode : Charging + 920MHz TX mode
Test Engineer: Lee
Model : FP2
T&H : 24℃ 49%
Test voltage : AC120V 60Hz
CH : 919.6MHz

Antenna Polarity:	Vertical	Test channel:	Middle



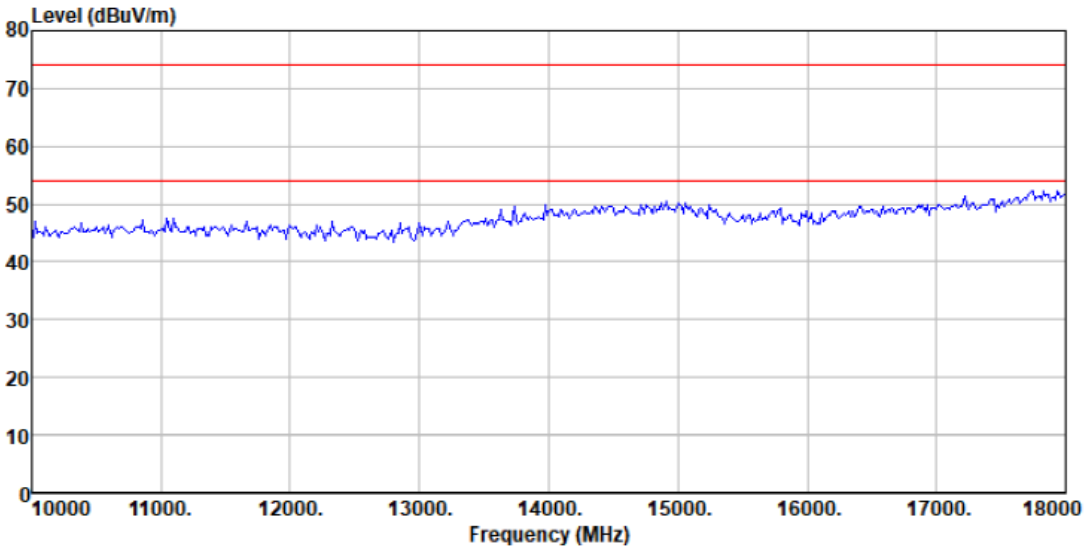
Condition : FCC PART 15 (PK) 3m VERTICAL
EUT : Stage luminaires
Test Mode : Charging + 920MHz TX mode
Test Engineer: Lee
Model : FP2
T&H : 24℃ 49%
Test voltage : AC120V 60Hz
CH : 919.6MHz

Antenna Polarity:	Horizontal	Test channel:	Highest



Condition : FCC PART 15 (PK) 3m HORIZONTAL
EUT : Stage luminaires
Test Mode : Charging + 920MHz TX mode
Test Engineer: Lee
Model : FP2
T&H : 24℃ 49%
Test voltage : AC120V 60Hz
CH : 922.2MHz

Antenna Polarity:	Vertical	Test channel:	Highest



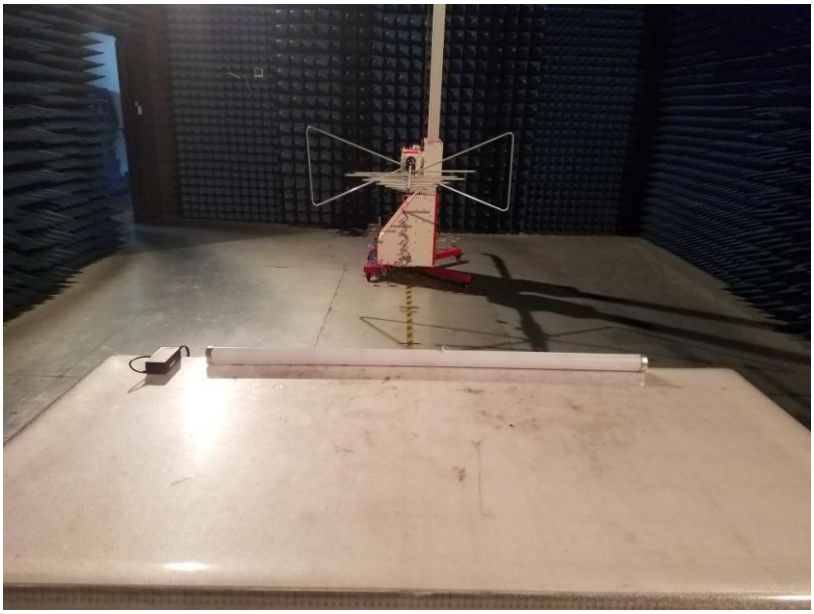
Condition : FCC PART 15 (PK) 3m VERTICAL
EUT : Stage luminaires
Test Mode : Charging + 920MHz TX mode
Test Engineer: Lee
Model : FP2
T&H : 24℃ 49%
Test voltage : AC120V 60Hz
CH : 922.2MHz

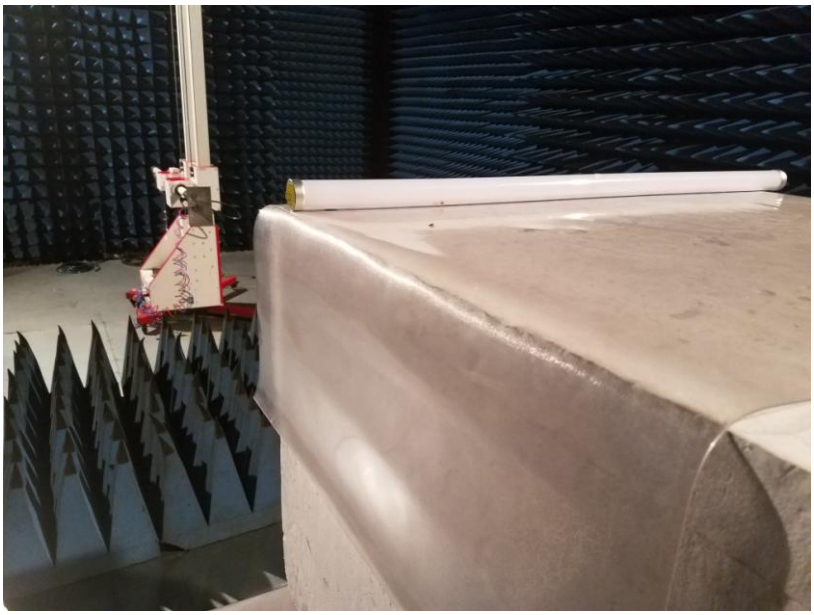
Remarks:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*
3. *There are measurements in 18~25GHz, but they are not recorded in the report due to only the bottom noise*

8 Test Setup Photo

Radiated Emission





Conducted Emission

9 EUT Constructional Details

Reference to External picture and Internal picture for details.

------End------