

# FCC Test Report

**Applicant** : Shenzhen Qianyan Technology LTD

**Address** : No.3301,Block C,Section 1,Chuangzhi  
Yuncheng Building,Liuxian Avenue,Xili  
Community, Xili Street, Nanshan District,  
Shenzhen, 518000, China

**Product Name** : Govee Outdoor Strip Light Evo

**Report Date** : Jan. 05, 2024



**Shenzhen Anbotek Compliance Laboratory Limited**

**Shenzhen Anbotek Compliance Laboratory Limited**

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# TEST REPORT

Applicant : Shenzhen Qianyan Technology LTD  
Manufacturer : Shenzhen Qianyan Technology LTD  
Product Name : Govee Outdoor Strip Light Evo  
Test Model No. : H616E  
Reference Model No. : H616C, H616D  
Trade Mark : Govee  
Rating(s) : Input: 24V=

**Test Standard(s) : FCC Part15 Subpart C, Section 15.247**

**Test Method(s) : ANSI C63.10: 2020, KDB 558074 D01 15.247 Meas Guidance v05r02**

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the FCC Part 15 Subpart C requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Date of Receipt

Nov. 24, 2023

Date of Test

Nov. 24 ~Dec. 23, 2023

Prepared By

*Nian xiu Chen*

(Nianxiu Chen)

Approved & Authorized Signer

*Edward Pan*

(Edward Pan)



**Revision History**

Report Version	Description	Issued Date
R00	Original Issue.	Jan. 05, 2024



## 1. General Information

### 1.1. Client Information

Applicant	:	Shenzhen Qianyan Technology LTD
Address	:	No.3301,Block C,Section 1,Chuangzhi Yuncheng Building,Liuxian Avenue,Xili Community, Xili Street, Nanshan District, Shenzhen, 518000, China
Manufacturer	:	Shenzhen Qianyan Technology LTD
Address	:	No.3301,Block C,Section 1,Chuangzhi Yuncheng Building,Liuxian Avenue,Xili Community, Xili Street, Nanshan District, Shenzhen, 518000, China

### 1.2. Description of Device (EUT)

Product Name	:	Govee Outdoor Strip Light Evo
Test Model No.	:	H616E
Reference Model No.	:	H616C, H616D (Note: According to the model differences on page 7, so we prepare both model for EMC test, and prepare "H616E" for RF test only.)
Trade Mark	:	Govee
Test Power Supply	:	AC 120V, 60Hz for Adapter
Test Sample No.	:	1-2-1(Normal Sample), 1-2-2(Engineering Sample)
Adapter 1	:	Manufacturer: ShenZhen SOY Technology Co.,Ltd Model: SOY-2400300US-306 Input: 100-240V~50/60Hz 1.8A Output: 24.0V= 3.0A 72.0W
Adapter 2	:	Manufacturer: Dong Guan Royal Intelligent Co.,Ltd Model: BI36L-240150-AdU(IP44) Input: 100-240V~50/60Hz 1.2A Output: 24.0V= 1.5A
Adapter 3	:	Manufacturer: Dong Guan Royal Intelligent Co.,Ltd Model: BI48L-240200-AdU(IP44) Input: 100-240V~50/60Hz 1.4A Output: 24.0V= 2A
<b>RF Specification</b>		
Operation Mode	:	<input checked="" type="checkbox"/> 802.11b <input checked="" type="checkbox"/> 802.11g <input checked="" type="checkbox"/> 802.11n(HT20) <input type="checkbox"/> 802.11n(HT40)
Operation Frequency	:	2412~2462MHz
Number of Channel	:	11 Channel for 20MHz bandwidth (2412~2462MHz)
Modulation Type	:	<input checked="" type="checkbox"/> 802.11b: DSSS (CCK, DQPSK, DBPSK)



	<input checked="" type="checkbox"/> 802.11g: OFDM (BPSK, QPSK, 16QAM, 64QAM) <input checked="" type="checkbox"/> 802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM)
Antenna Type	: PCB Antenna
Antenna Gain(Peak)	: 4.42 dBi
<b>Remark:</b> 1) All of the RF specification are provided by customer. 2) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.	

### Model differences:

Model No.	Length of light string	Adapter
H616E	10*2m	Model: SOY-2400300US-306 Input: 100-240V~50/60Hz 1.8A Output: 24.0V= 3.0A 72.0W
H616C	10m	Model: BI36L-240150-AdU(IP44) Input: 100-240V~50/60Hz 1.2A Output: 24.0V= 1.5A
H616D	7.5*2m	Model: BI48L-240200-AdU(IP44) Input: 100-240V~50/60Hz 1.4A Output: 24.0V= 2A

### 1.3. Auxiliary Equipment Used During Test

Description	Rating(s)
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### 1.4. Description of Test Configuration

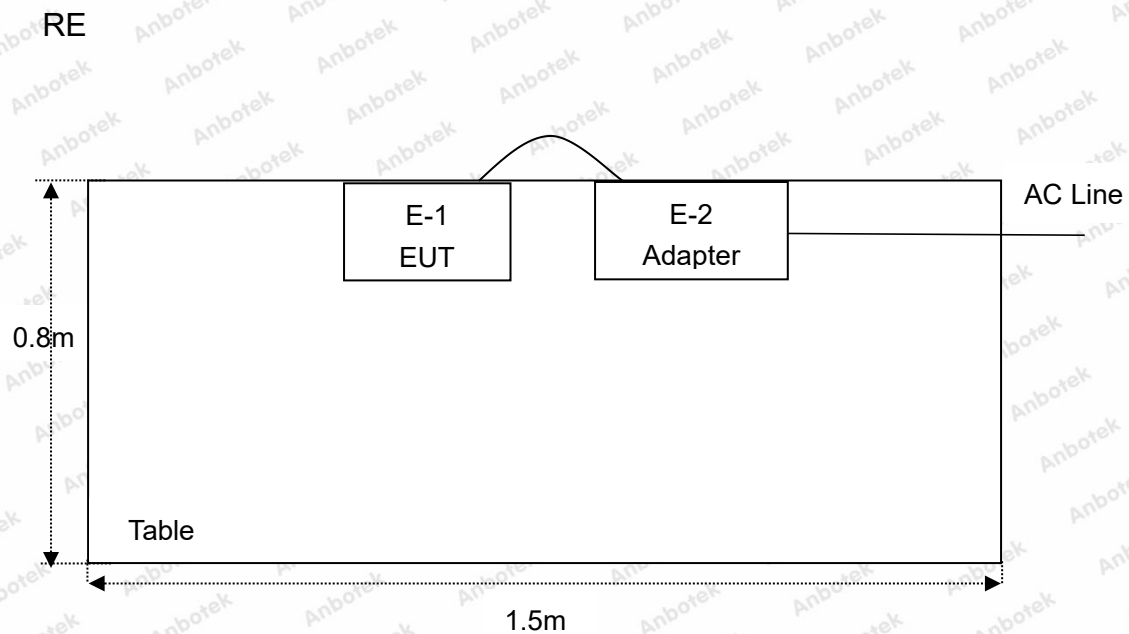
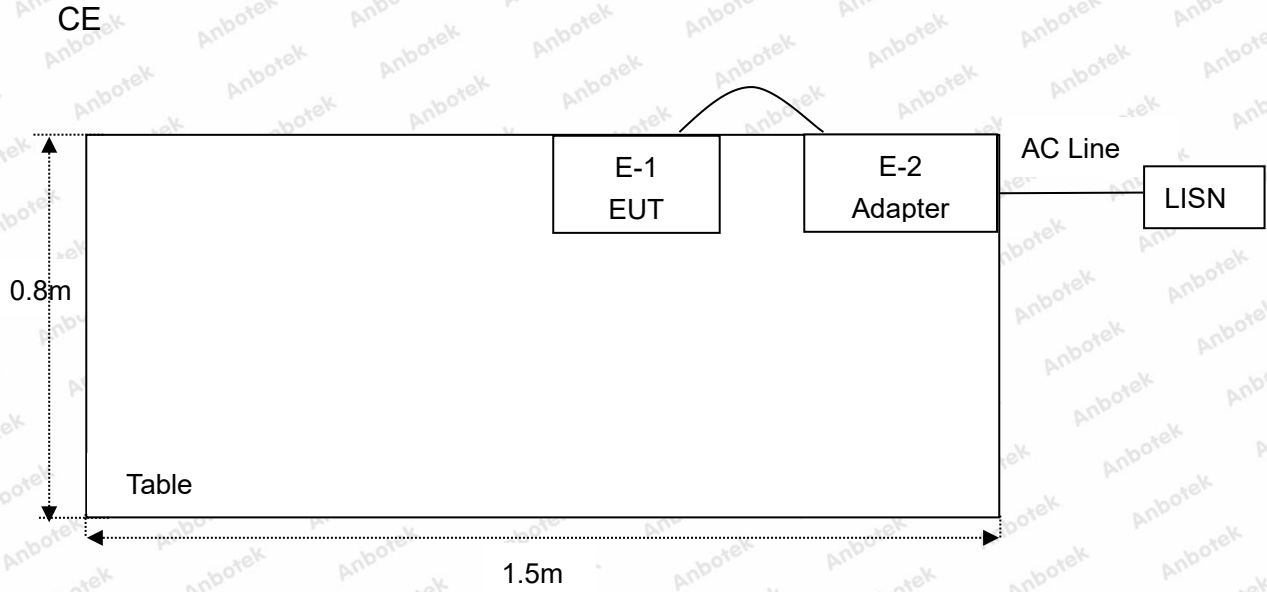
Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
01	2412	04	2427	07	2442	10	2457
02	2417	05	2432	08	2447	11	2462
03	2422	06	2437	09	2452		

**Note:**

1. The engineering test program was provided and the EUT was programmed to be in continuously transmitting mode.
2. For 802.11b, 802.11g, and 802.11n(HT20) modes were test with channel 1, 6, 11.



## 1.5. Description Of Test Setup





## 1.6. Test Equipment List

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N. Artificial Mains Network	Rohde & Schwarz	ENV216	100055	Oct. 12, 2023	1 Year
2.	Three Phase V-type Artificial Power Network	CYBERTEK	EM5040DT	E215040DT001	Jul. 05, 2023	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Oct. 12, 2023	1 Year
4.	EMI Test Receiver	Rohde & Schwarz	ESR26	101481	Oct. 12, 2023	1 Year
5.	MXA Spectrum Analysis	Agilent	N9020A	MY51170037	Oct. 12, 2023	1 Year
6.	EMI Preamplifier	SKET Electronic	LNPA-0118G -45	SKET-PA-002	Oct. 12, 2023	1 Year
7.	Double Ridged Horn Antenna	SCHWARZBECK	BBHA 9120D	02555	Oct. 16, 2022	3 Year
8.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	345	Oct. 23, 2022	3 Year
9.	Loop Antenna	Schwarzbeck	FMZB1519B	00053	Oct. 12, 2023	1 Year
10.	Horn Antenna	A-INFO	LB-180400- KF	J211060628	Oct. 12, 2023	1 Year
11.	Pre-amplifier	SONOMA	310N	186860	Oct. 12, 2023	1 Year
12.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A
13.	MXA Spectrum Analysis	KEYSIGHT	N9020A	MY53280032	Oct. 12, 2023	1 Year
14.	MXG RF Vector Signal Generator	Agilent	N5182A	MY48180656	Oct. 12, 2023	1 Year
15.	Signal Generator	Agilent	E4421B	MY41000743	Oct. 12, 2023	1 Year
16.	DC Power Supply	IVYTECH	IV3605	1804D360510	Oct. 20, 2023	1 Year
17.	Constant Temperature Humidity Chamber	ZHONGJIAN	ZJ-KHWS80 B	N/A	Oct. 16, 2023	1 Year
18.	Spectrum Analyzer	Rohde & Schwarz	FSV40-N	101792	May. 26, 2023	1 Year



### 1.7. Measurement Uncertainty

Parameter	Uncertainty
Conducted emissions (AMN 150kHz~30MHz)	3.8dB
Occupied Bandwidth	925Hz
Conducted Output Power	0.76dB
Power Spectral Density	0.76dB
Conducted Spurious Emission	1.24dB
Radiated spurious emissions (Below 30MHz)	3.53dB
Radiated spurious emissions (30MHz~1GHz)	Horizontal: 3.92dB; Vertical: 4.52dB
Radiated spurious emissions (above 1GHz)	1G-6GHz: 4.78dB; 6G-18GHz: 4.88dB 18G-40GHz: 5.68dB
The measurement uncertainty and decision risk evaluated according to AB/WI-RF-F-032. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

### 1.8. Description of Test Facility

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

#### FCC-Registration No.: 434132

Shenzhen Anbotek Compliance Laboratory Limited, 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 our files. Registration No. 434132.

#### ISED-Registration No.: 8058A

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (ISED) Innovation, Science and Economic Development Canada. The acceptance letter from the ISED is maintained in our files. Registration 8058A.

#### Test Location

Shenzhen Anbotek Compliance Laboratory Limited.

1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.



**1.9.Disclaimer**

1. The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
2. The test report is invalid if there is any evidence and/or falsification.
3. The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.
4. This document may not be altered or revised in any way unless done so by Anbotek and all revisions are duly noted in the revisions section.
5. Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.
6. The authenticity of the information provided by the customer is the responsibility of the customer and the laboratory is not responsible for its authenticity.

The laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant.



## 2. Summary of Test Results

Standard Section	Test Item	Result
15.203/15.247(c)	Antenna Requirement	PASS
15.207	Conducted Emission	PASS
15.205/15.209	Spurious Emission	PASS
15.247(b)(3)	Maximum Conducted Output Power	PASS
15.247(a)(2)	6dB Occupied Bandwidth	PASS
15.247(e)	Power Spectral Density	PASS
15.247(d)	Band Edge	PASS
<b>Remark:</b> "N/A" is an abbreviation for Not Applicable.		



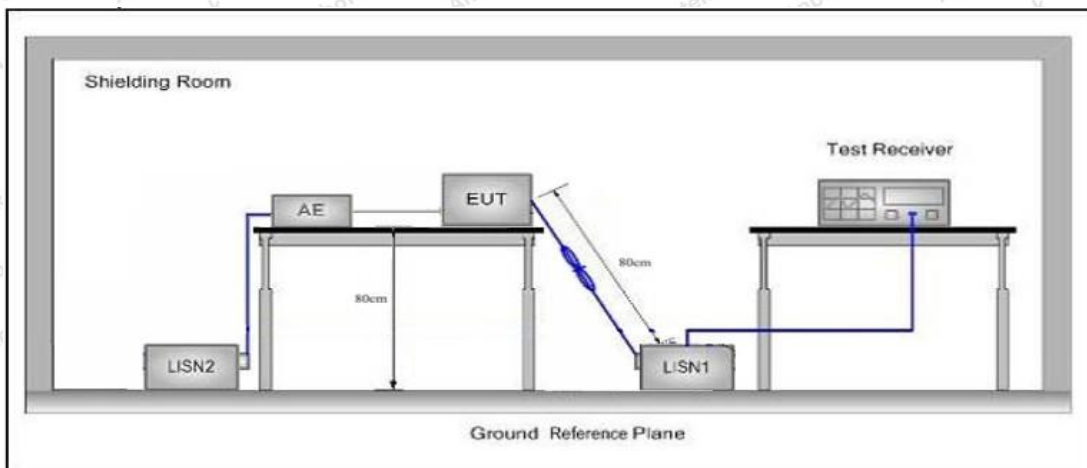
## 3. Conducted Emission Test

### 3.1. Test Standard and Limit

Test Standard	FCC Part15 Section 15.207		
Test Limit	Frequency	Maximum RF Line Voltage (dBuV)	
		Quasi-peak Level	Average Level
	150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
	500kHz~5MHz	56	46
5MHz~30MHz	60	50	

**Remark:** (1) \*Decreasing linearly with logarithm of the frequency.  
 (2) The lower limit shall apply at the transition frequency.

### 3.2. Test Setup



### 3.3. Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC ANSI C63.10: 2020 on Conducted Emission Measurement.

The bandwidth of test receiver (ESCI) set at 9kHz.

The frequency range from 150kHz to 30MHz is checked.

### 3.4. Test Data

During the test, pre-scan all modes, only the worst case is recorded in the report.

AC conducted emission pre-test at both at AC 120V/60Hz and AC 240V/60Hz modes, recorded worst case AC 120V/60Hz.

Please to see the following pages.



### Conducted Emission Test Data

**Model: H616E**

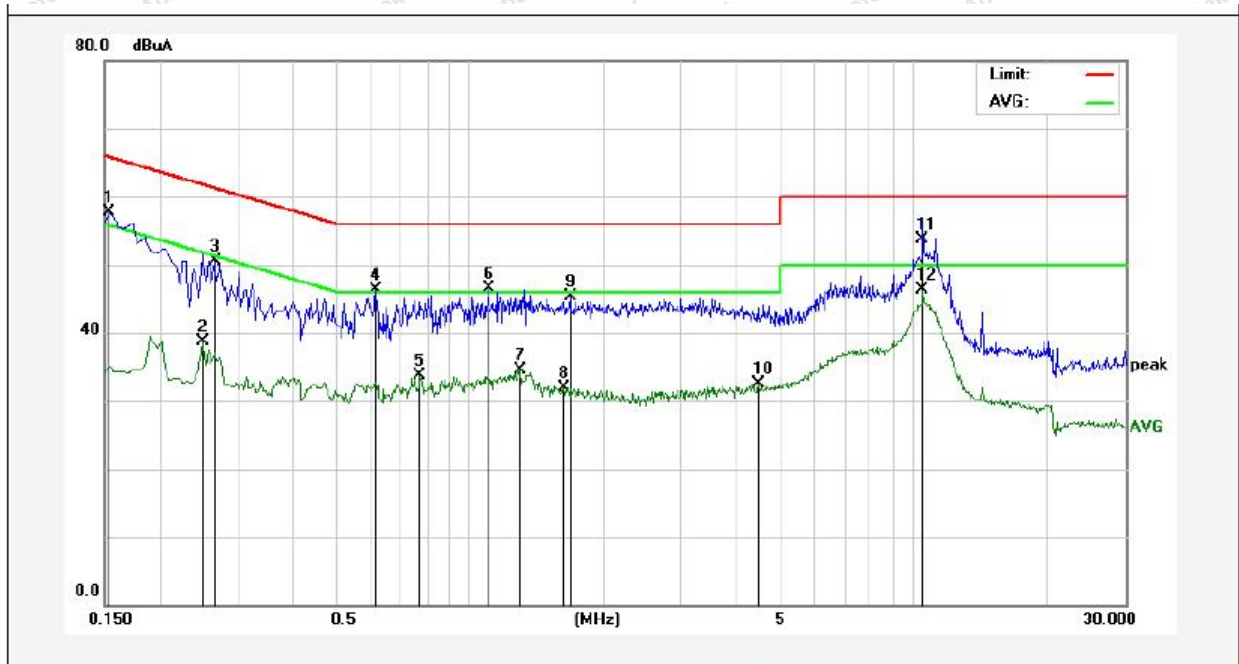
Test Site: 1# Shielded Room

Operating Condition: 802.11b 2462MHz

Test Specification: AC 120V, 60Hz for Adapter

Comment: Live Line

Temp.(°C)/Hum.(%RH): 23.5°C/65%RH



No.	Freq. (MHz)	Reading (dBuA)	Factor (dB)	Result (dBuA)	Limit (dBuA)	Over Limit (dB)	Detector	Remark
1	0.1539	37.78	19.83	57.61	65.78	-8.17	QP	
2	0.2500	18.80	19.82	38.62	51.75	-13.13	AVG	
3	0.2660	30.68	19.84	50.52	61.24	-10.72	QP	
4	0.6140	26.41	19.87	46.28	56.00	-9.72	QP	
5	0.7740	13.88	19.87	33.75	46.00	-12.25	AVG	
6	1.1019	26.60	19.86	46.46	56.00	-9.54	QP	
7	1.3020	14.73	19.86	34.59	46.00	-11.41	AVG	
8	1.6340	12.08	19.85	31.93	46.00	-14.07	AVG	
9	1.6860	25.43	19.85	45.28	56.00	-10.72	QP	
10	4.4699	12.56	19.85	32.41	46.00	-13.59	AVG	
11	10.4980	33.74	19.98	53.72	60.00	-6.28	QP	
12	10.4980	26.29	19.98	46.27	50.00	-3.73	AVG	



### Conducted Emission Test Data

**Model: H616E**

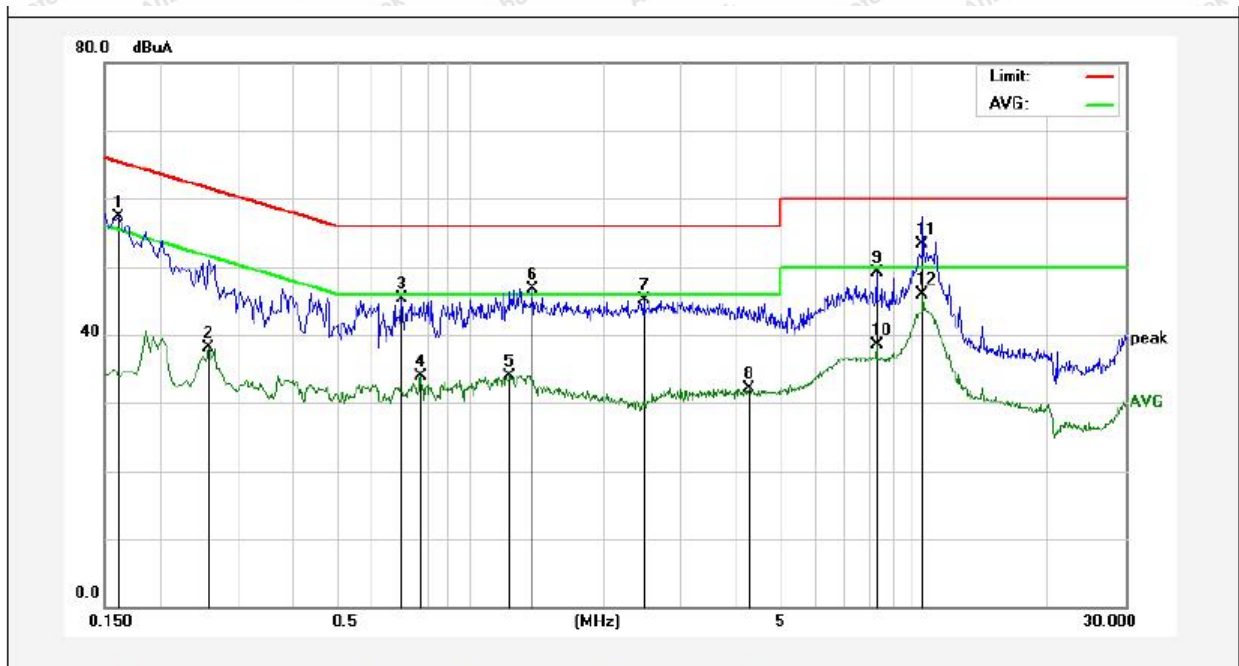
Test Site: 1# Shielded Room

Operating Condition: 802.11b 2462MHz

Test Specification: AC 120V, 60Hz for Adapter

Comment: Neutral Line

Temp.(°C)/Hum.(%RH): 23.5°C/65%RH



No.	Freq. (MHz)	Reading (dBuA)	Factor (dB)	Result (dBuA)	Limit (dBuA)	Over Limit (dB)	Detector	Remark
1	0.1620	37.44	19.83	57.27	65.36	-8.09	QP	
2	0.2580	18.31	19.84	38.15	51.49	-13.34	AVG	
3	0.7019	25.50	19.87	45.37	56.00	-10.63	QP	
4	0.7780	14.04	19.87	33.91	46.00	-12.09	AVG	
5	1.2340	14.15	19.85	34.00	46.00	-12.00	AVG	
6	1.3860	26.87	19.86	46.73	56.00	-9.27	QP	
7	2.4620	25.27	19.85	45.12	56.00	-10.88	QP	
8	4.2500	12.33	19.85	32.18	46.00	-13.82	AVG	
9	8.2500	29.25	19.93	49.18	60.00	-10.82	QP	
10	8.2500	18.66	19.93	38.59	50.00	-11.41	AVG	
11	10.5020	33.39	19.98	53.37	60.00	-6.63	QP	
12	10.5020	25.94	19.98	45.92	50.00	-4.08	AVG	



### Conducted Emission Test Data

**Model: H616C**

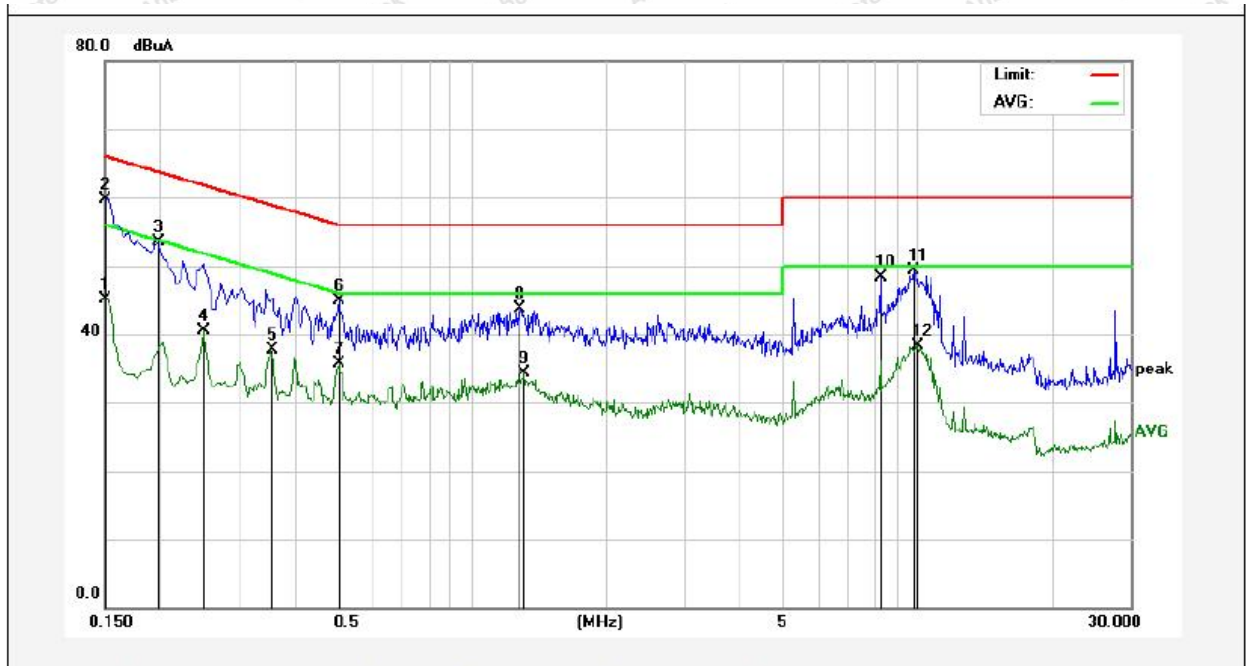
Test Site: 1# Shielded Room

Operating Condition: 802.11b 2462MHz

Test Specification: AC 120V, 60Hz for Adapter

Comment: Live Line

Temp.(°C)/Hum.(%RH): 23.5°C/65%RH



No.	Freq. (MHz)	Reading (dBuA)	Factor (dB)	Result (dBuA)	Limit (dBuA)	Over Limit (dB)	Detector	Remark
1	0.1499	25.36	19.82	45.18	56.00	-10.82	AVG	
2	0.1500	39.87	19.82	59.69	65.99	-6.30	QP	
3	0.1980	33.72	19.82	53.54	63.69	-10.15	QP	
4	0.2500	20.70	19.82	40.52	51.75	-11.23	AVG	
5	0.3540	17.92	19.82	37.74	48.87	-11.13	AVG	
6	0.5020	24.96	19.86	44.82	56.00	-11.18	QP	
7	0.5020	15.86	19.86	35.72	46.00	-10.28	AVG	
8	1.2860	23.94	19.86	43.80	56.00	-12.20	QP	
9	1.3099	14.41	19.86	34.27	46.00	-11.73	AVG	
10	8.2500	28.31	19.93	48.24	60.00	-11.76	QP	
11	9.7820	29.25	19.97	49.22	60.00	-10.78	QP	
12	9.9699	18.40	19.97	38.37	50.00	-11.63	AVG	





### Conducted Emission Test Data

**Model: H616C**

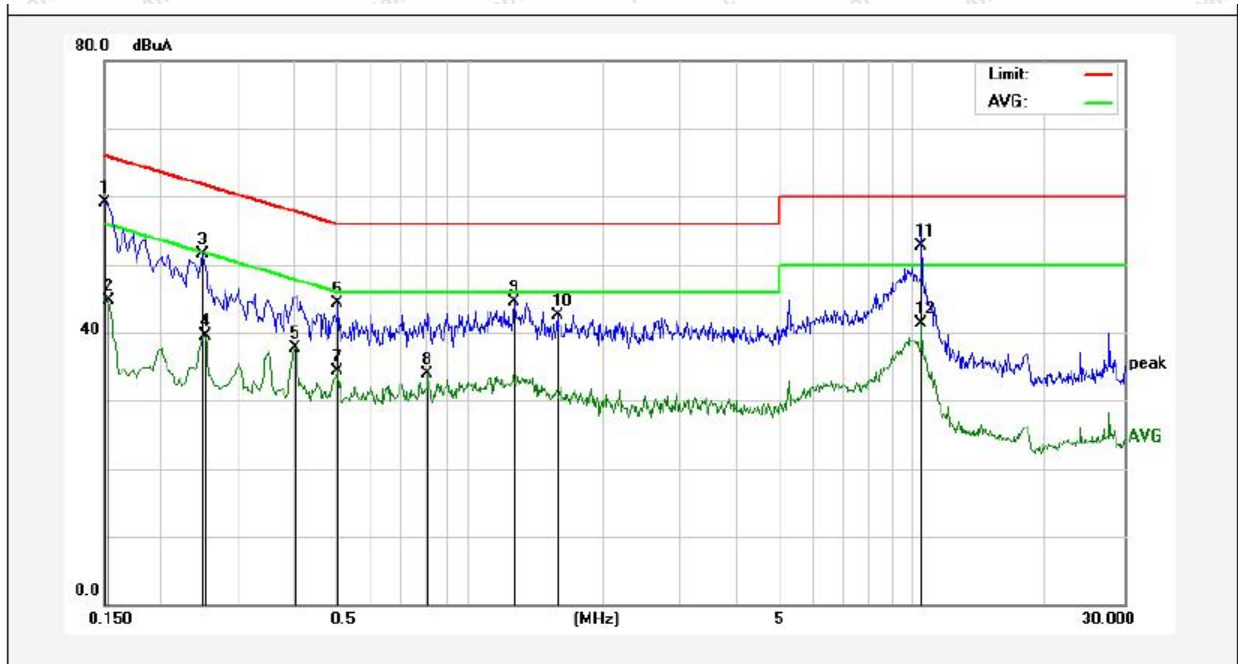
Test Site: 1# Shielded Room

Operating Condition: 802.11b 2462MHz

Test Specification: AC 120V, 60Hz for Adapter

Comment: Neutral Line

Temp.(°C)/Hum.(%RH): 23.5°C/65%RH



No.	Freq. (MHz)	Reading (dBUA)	Factor (dB)	Result (dBUA)	Limit (dBUA)	Over Limit (dB)	Detector	Remark
1	0.1500	39.22	19.82	59.04	65.99	-6.95	QP	
2	0.1539	24.81	19.83	44.64	55.78	-11.14	AVG	
3	0.2500	31.78	19.82	51.60	61.75	-10.15	QP	
4	0.2540	19.61	19.84	39.45	51.62	-12.17	AVG	
5	0.4060	17.86	19.81	37.67	47.73	-10.06	AVG	
6	0.5060	24.37	19.86	44.23	56.00	-11.77	QP	
7	0.5060	14.51	19.86	34.37	46.00	-11.63	AVG	
8	0.8059	14.01	19.87	33.88	46.00	-12.12	AVG	
9	1.2660	24.70	19.86	44.56	56.00	-11.44	QP	
10	1.5820	22.72	19.85	42.57	56.00	-13.43	QP	
11	10.5020	32.69	19.98	52.67	60.00	-7.33	QP	
12	10.5020	21.28	19.98	41.26	50.00	-8.74	AVG	



### Conducted Emission Test Data

**Model: H616D**

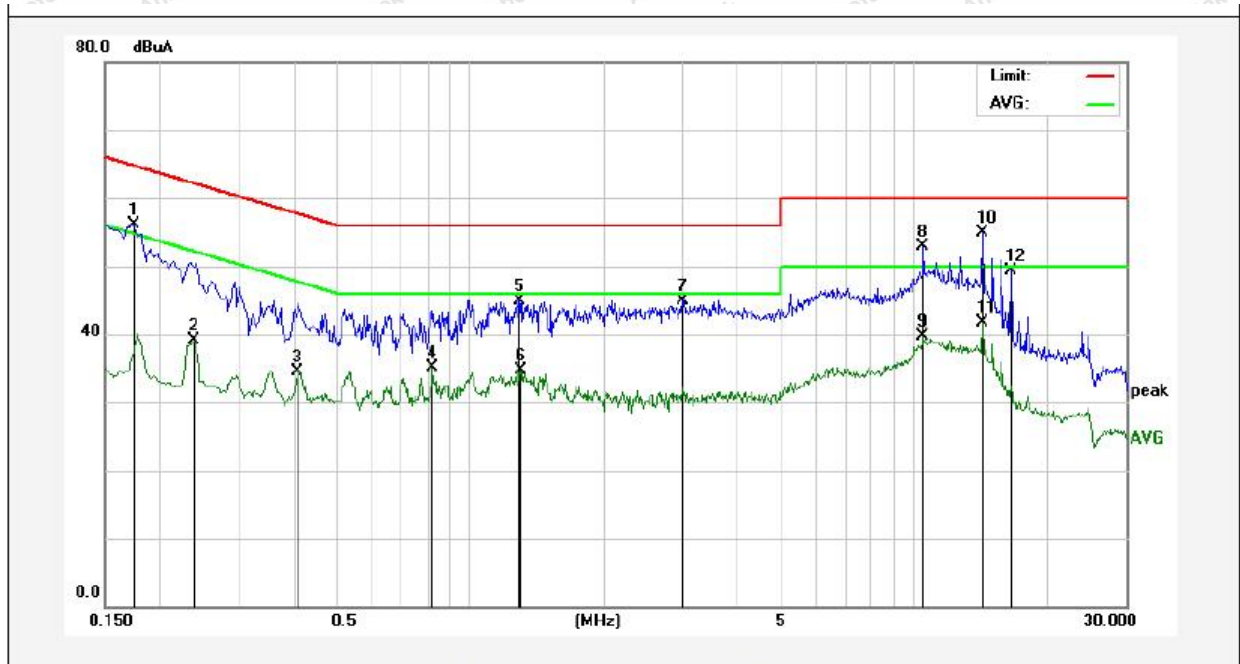
Test Site: 1# Shielded Room

Operating Condition: 802.11b 2462MHz

Test Specification: AC 120V, 60Hz for Adapter

Comment: Live Line

Temp.(°C)/Hum.(%RH): 23.5°C/65%RH



No.	Freq. (MHz)	Reading (dBuA)	Factor (dB)	Result (dBuA)	Limit (dBuA)	Over Limit (dB)	Detector	Remark
1	0.1740	36.29	19.83	56.12	64.76	-8.64	QP	
2	0.2380	19.28	19.82	39.10	52.16	-13.06	AVG	
3	0.4100	14.79	19.81	34.60	47.65	-13.05	AVG	
4	0.8220	15.16	19.87	35.03	46.00	-10.97	AVG	
5	1.2940	25.09	19.86	44.95	56.00	-11.05	QP	
6	1.3020	14.77	19.86	34.63	46.00	-11.37	AVG	
7	3.0100	25.12	19.85	44.97	56.00	-11.03	QP	
8	10.5020	32.85	19.98	52.83	60.00	-7.17	QP	
9	10.5020	19.75	19.98	39.73	50.00	-10.27	AVG	
10	14.2540	34.87	20.12	54.99	60.00	-5.01	QP	
11	14.2540	21.53	20.12	41.65	50.00	-8.35	AVG	
12	16.5020	29.10	20.19	49.29	60.00	-10.71	QP	



### Conducted Emission Test Data

**Model: H616D**

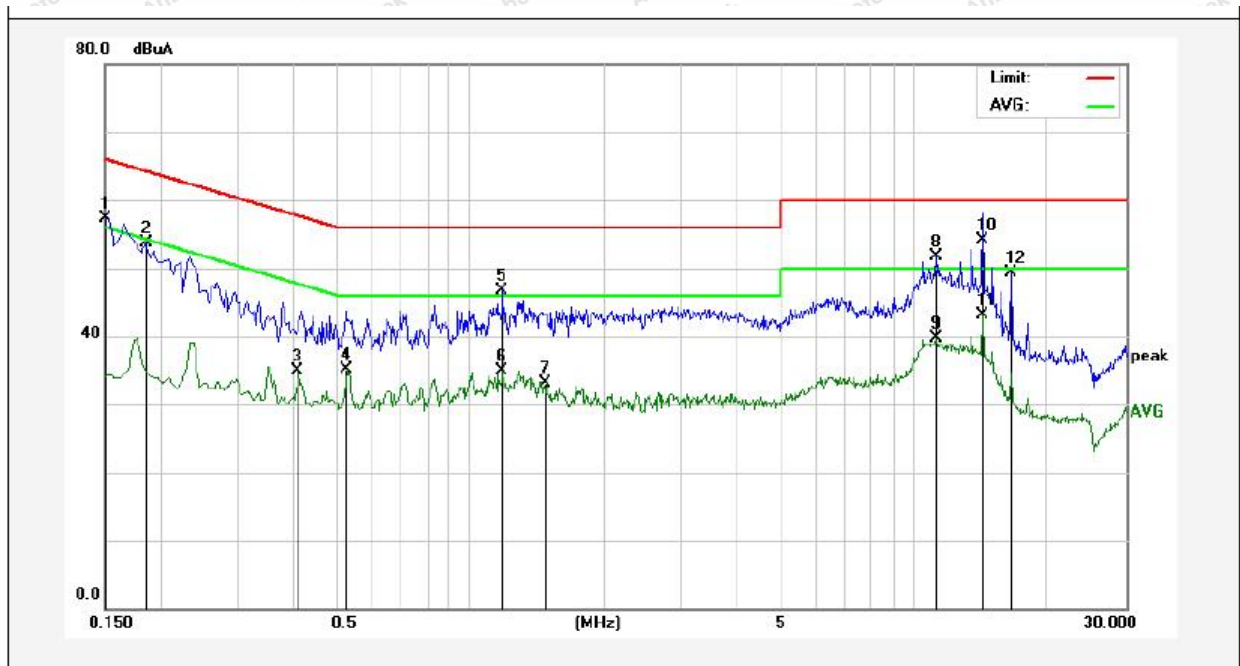
Test Site: 1# Shielded Room

Operating Condition: 802.11b 2462MHz

Test Specification: AC 120V, 60Hz for Adapter

Comment: Neutral Line

Temp.(°C)/Hum.(%RH): 23.5°C/65%RH



No.	Freq. (MHz)	Reading (dBuA)	Factor (dB)	Result (dBuA)	Limit (dBuA)	Over Limit (dB)	Detector	Remark
1	0.1500	37.48	19.82	57.30	65.99	-8.69	QP	
2	0.1860	33.84	19.82	53.66	64.21	-10.55	QP	
3	0.4100	15.15	19.81	34.96	47.65	-12.69	AVG	
4	0.5299	15.23	19.86	35.09	46.00	-10.91	AVG	
5	1.1820	26.83	19.85	46.68	56.00	-9.32	QP	
6	1.1820	15.09	19.85	34.94	46.00	-11.06	AVG	
7	1.4819	13.16	19.86	33.02	46.00	-12.98	AVG	
8	11.2460	31.66	20.01	51.67	60.00	-8.33	QP	
9	11.2460	19.69	20.01	39.70	50.00	-10.30	AVG	
10	14.2500	34.04	20.12	54.16	60.00	-5.84	QP	
11	14.2500	23.06	20.12	43.18	50.00	-6.82	AVG	
12	16.4980	29.20	20.19	49.39	60.00	-10.61	QP	



## 4. Radiation Spurious Emission and Band Edge

### 4.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.209 and 15.205				
Test Limit	Frequency (MHz)	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
	0.009MHz~0.490MHz	2400/F(kHz)	-	-	300
	0.490MHz~1.705MHz	24000/F(kHz)	-	-	30
	1.705MHz~30MHz	30	-	-	30
	30MHz~88MHz	100	40.0	Quasi-peak	3
	88MHz~216MHz	150	43.5	Quasi-peak	3
	216MHz~960MHz	200	46.0	Quasi-peak	3
	960MHz~1000MHz	500	54.0	Quasi-peak	3
	Above 1000MHz	500	54.0	Average	3
-		74.0	Peak	3	

**Remark:**

(1)The lower limit shall apply at the transition frequency.

(2) 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

### 4.2. Test Setup

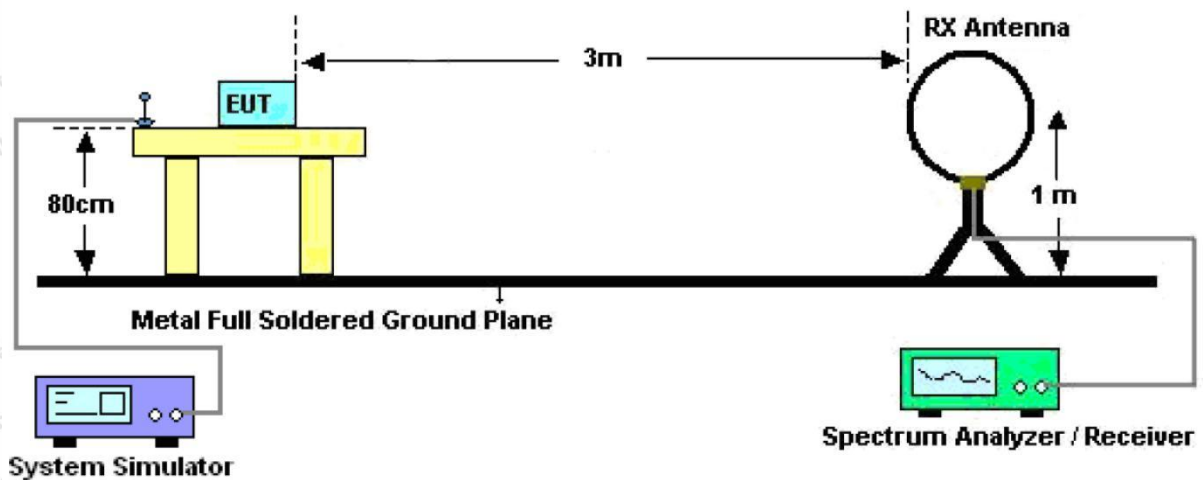


Figure 1. Below 30MHz



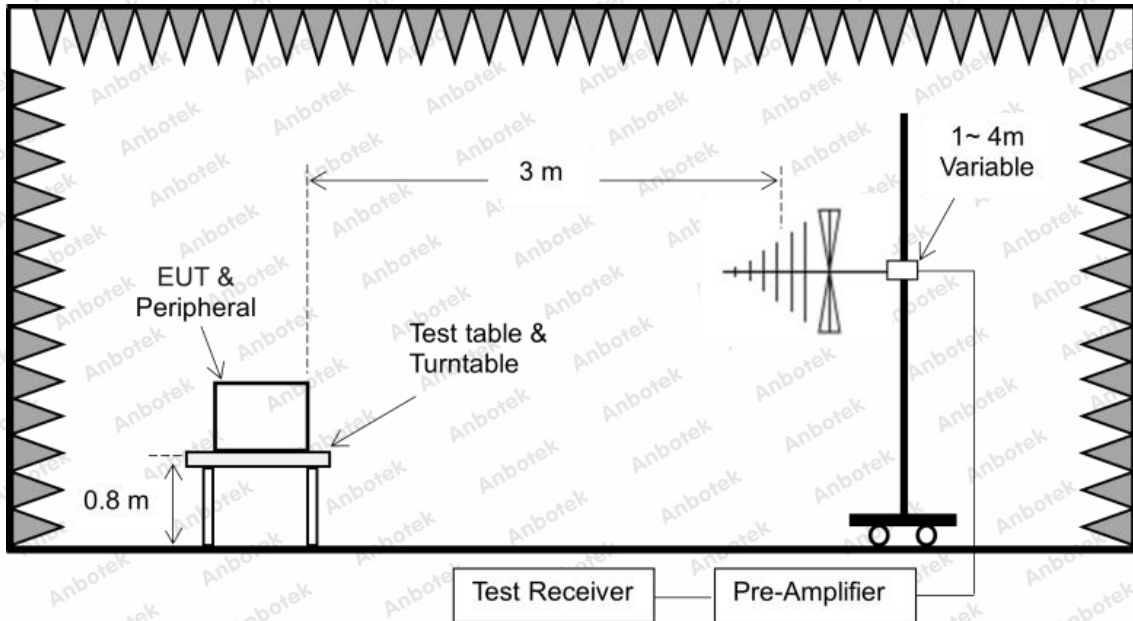


Figure 2. 30MHz to 1GHz

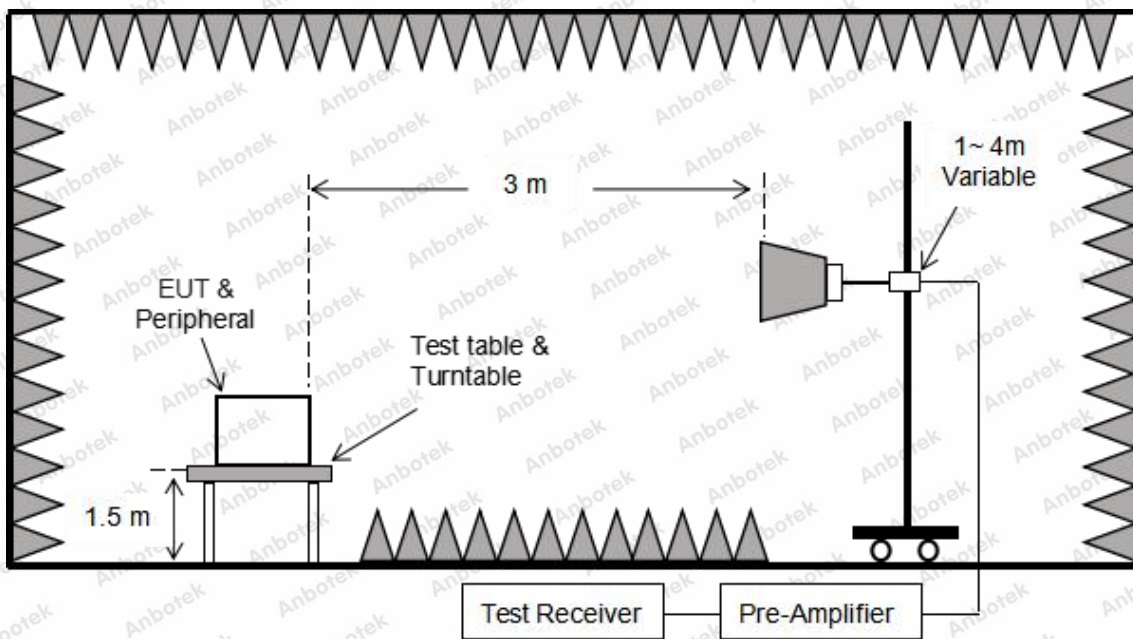


Figure 3. Above 1 GHz

### 4.3. Test Procedure

For below 1GHz: The EUT is placed on a turntable, which is 0.8m above the ground plane.

For above 1GHz: The EUT is placed on a turntable, which is 1.5m above the ground plane.

The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Rotated the EUT through three orthogonal axes to determine the maximum emissions, both horizontal



and vertical polarization of the antenna are set on test. The EUT is tested in 9\*6\*6 Chamber. The device is evaluated in xyz orientation.

For the radiated emission test above 1GHz:

Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

For 9kHz to 150kHz, Set the spectrum analyzer as:

RBW = 200Hz, VBW =1kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For 150kHz to 30MHz, Set the spectrum analyzer as:

RBW = 9KHz, VBW =30kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For 30MHz to 1000MHz, Set the spectrum analyzer as:

RBW = 100kHz, VBW =300kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For above 1GHz,Set the spectrum analyzer as:

RBW =1MHz, VBW =1MHz, Detector= Peak, Trace mode= Max hold, Sweep- auto couple.

For average measurement:

–VBW=10Hz, When duty cycle is no less than 98 percent

–VBW $\geq$ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation, so refer to this clause 5.4 duty cycle.

#### 4.4. Test Data

##### PASS

During the test, Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the X-axis is the worst case.

The test results of 9kHz-30MHz was attenuated more than 20dB below the permissible limits, so the results don't record in the report.

During the test, pre-scan all modes, only the worst case is recorded in the report.



**Test Results (30~1000MHz)**

**Model: H616E**

Test Mode: 802.11b 2462MHz  
 Power Source: AC 120V, 60Hz for Adapter  
 Polarization: Horizontal  
 Temp.(°C)/Hum.(%RH): 24.2°C/52%RH



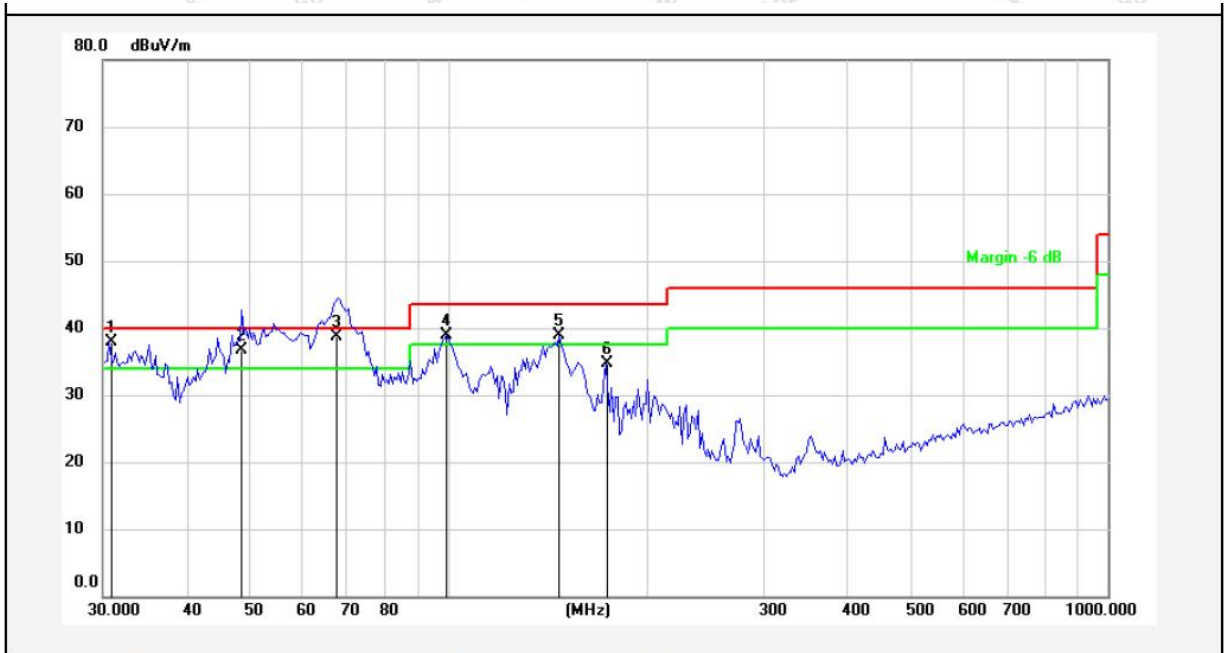
No.	Freq. (MHz)	Reading (dBuV)	Factor ( )	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	56.7917	48.92	-17.53	31.39	40.00	-8.61	QP			
2	70.4804	55.37	-21.65	33.72	40.00	-6.28	QP			
3	95.4270	57.13	-17.57	39.56	43.50	-3.94	QP			
4	146.3735	60.55	-21.20	39.35	43.50	-4.15	QP			
5	174.4241	60.66	-19.68	40.98	43.50	-2.52	QP			
6	221.3921	54.60	-17.27	37.33	46.00	-8.67	QP			



**Test Results (30~1000MHz)**

**Model: H616E**

Test Mode: 802.11b 2462MHz  
 Power Source: AC 120V, 60Hz for Adapter  
 Polarization: Vertical  
 Temp.(°C)/Hum.(%RH): 24.2°C/52%RH



No.	Freq. (MHz)	Reading (dBuV)	Factor ( )	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	30.6379	56.03	-18.04	37.99	40.00	-2.01	QP			
2	48.6719	53.87	-17.13	36.74	40.00	-3.26	QP			
3	67.5114	59.45	-20.66	38.79	40.00	-1.21	QP			
4	99.5281	55.87	-17.01	38.86	43.50	-4.64	QP			
5	147.4036	60.02	-21.18	38.84	43.50	-4.66	QP			
6	173.2051	54.39	-19.76	34.63	43.50	-8.87	QP			

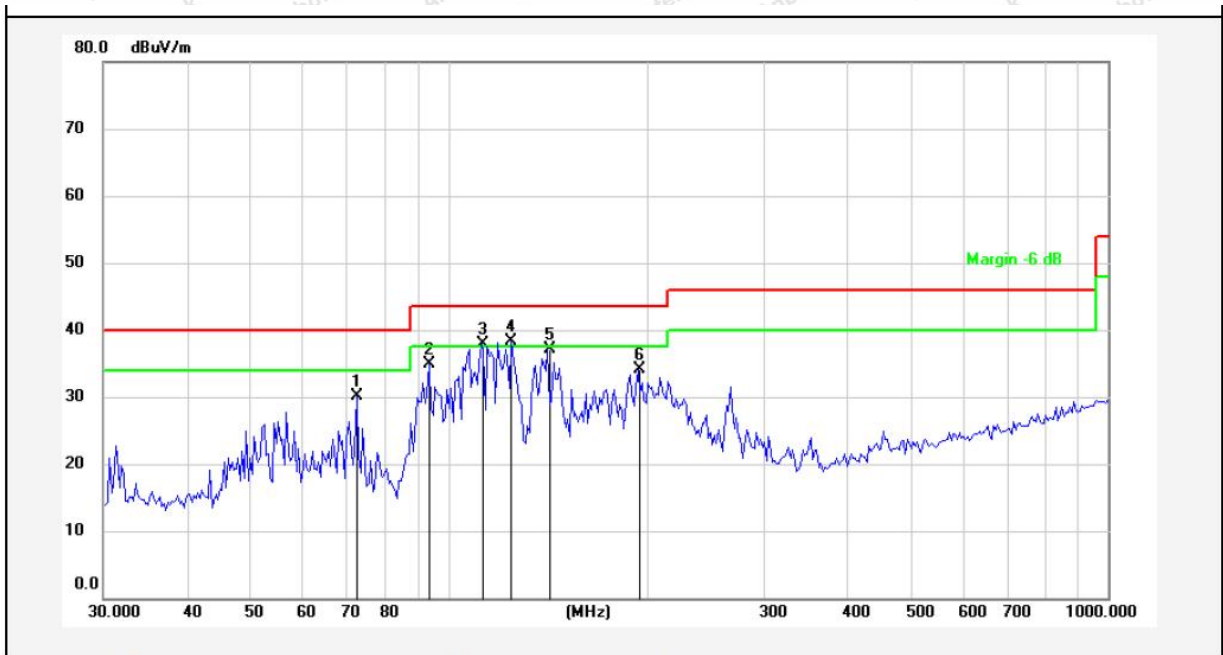




**Test Results (30~1000MHz)**

**Model: H616C**

Test Mode: 802.11b 2462MHz  
 Power Source: AC 120V, 60Hz for Adapter  
 Polarization: Horizontal  
 Temp.(°C)/Hum.(%RH): 24.2°C/52%RH



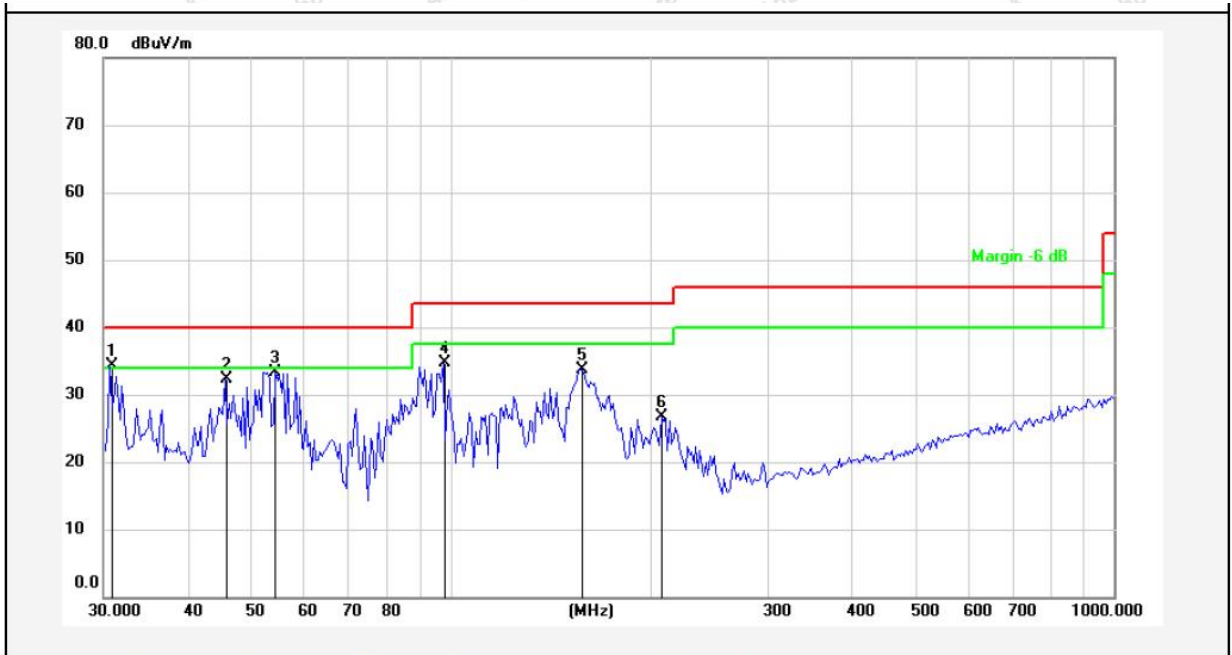
No.	Freq. (MHz)	Reading (dBuV)	Factor ( )	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	72.5916	51.86	-21.66	30.20	40.00	-9.80	QP			
2	93.4402	52.68	-17.85	34.83	43.50	-8.67	QP			
3	112.1305	56.37	-18.53	37.84	43.50	-5.66	QP			
4	124.5690	58.36	-20.12	38.24	43.50	-5.26	QP			
5	141.3298	58.39	-21.33	37.06	43.50	-6.44	QP			
6	193.7728	52.67	-18.55	34.12	43.50	-9.38	QP			



**Test Results (30~1000MHz)**

**Model: H616C**

Test Mode: 802.11b 2462MHz  
 Power Source: AC 120V, 60Hz for Adapter  
 Polarization: Vertical  
 Temp.(°C)/Hum.(%RH): 24.2°C/52%RH



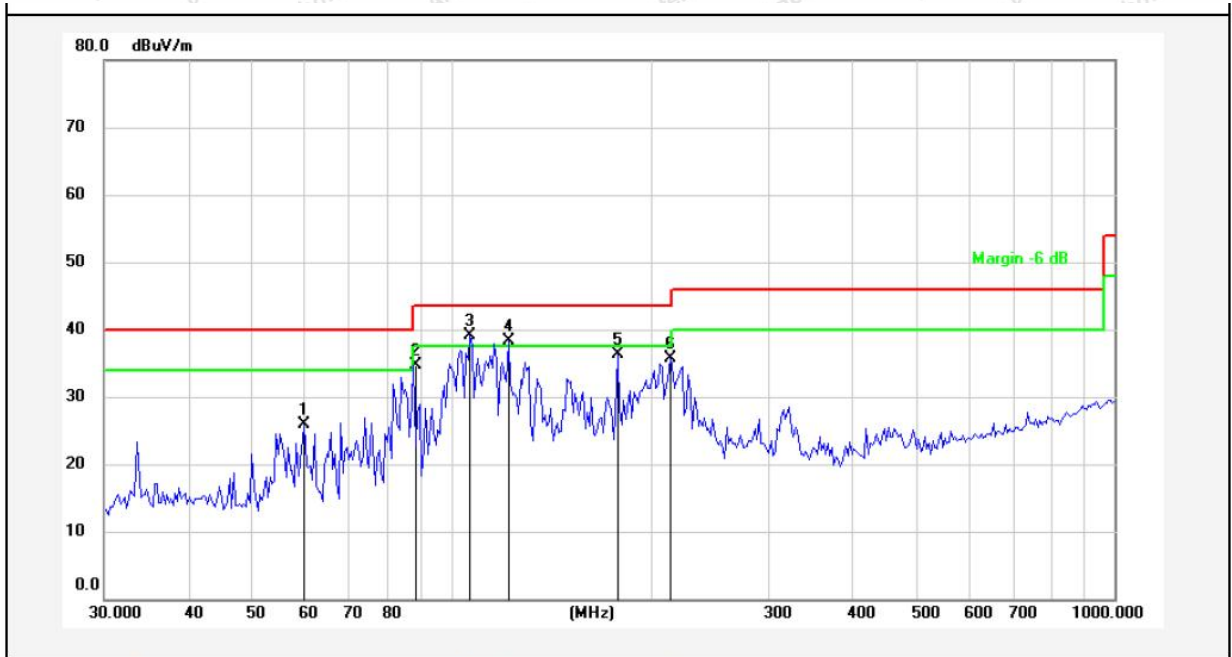
No.	Freq. (MHz)	Reading (dBuV)	Factor ( )	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	30.6379	52.39	-18.04	34.35	40.00	-5.65	QP			
2	45.6948	49.31	-17.03	32.28	40.00	-7.72	QP			
3	54.4516	50.75	-17.41	33.34	40.00	-6.66	QP			
4	97.4560	52.01	-17.30	34.71	43.50	-8.79	QP			
5	158.1123	54.32	-20.64	33.68	43.50	-9.82	QP			
6	207.8501	44.63	-17.85	26.78	43.50	-16.72	QP			



**Test Results (30~1000MHz)**

**Model: H616D**

Test Mode: 802.11b 2462MHz  
 Power Source: AC 120V, 60Hz for Adapter  
 Polarization: Horizontal  
 Temp.(°C)/Hum.(%RH): 24.2°C/52%RH



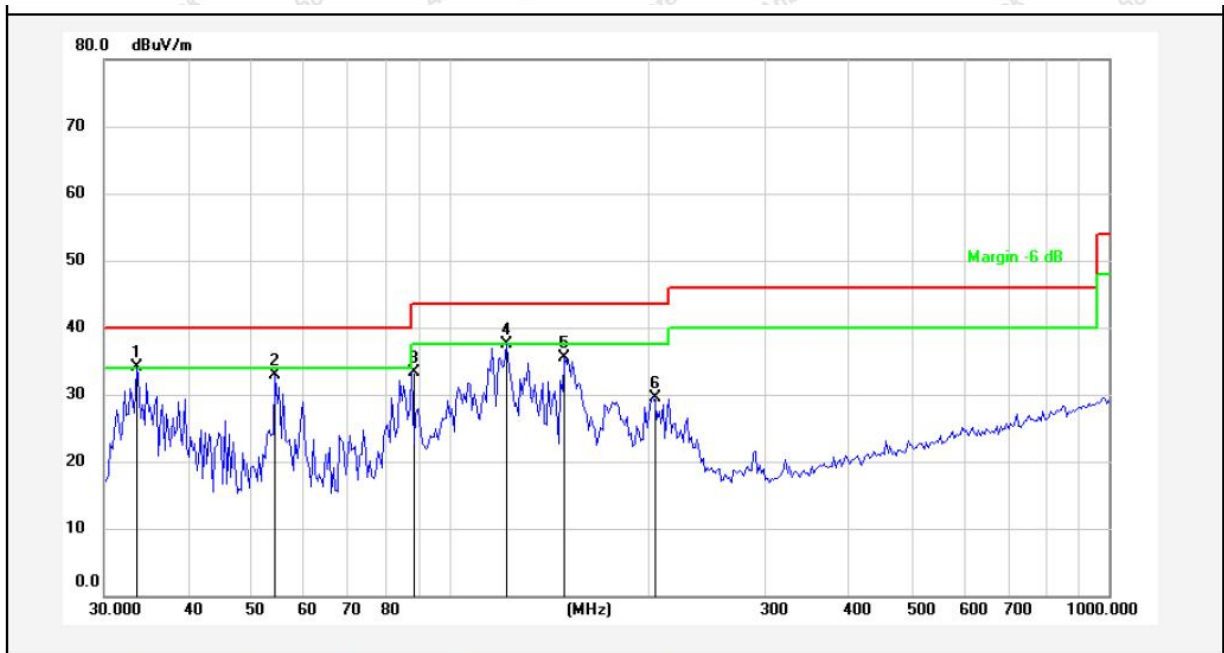
No.	Freq. (MHz)	Reading (dBuV)	Factor ( )	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	60.0691	43.67	-17.73	25.94	40.00	-14.06	QP			
2	87.7248	53.83	-19.09	34.74	40.00	-5.26	QP			
3	106.7587	56.88	-17.83	39.05	43.50	-4.45	QP			
4	121.9755	58.12	-19.81	38.31	43.50	-5.19	QP			
5	178.1327	55.74	-19.46	36.28	43.50	-7.22	QP			
6	213.7634	53.32	-17.60	35.72	43.50	-7.78	QP			



**Test Results (30~1000MHz)**

**Model: H616D**

Test Mode: 802.11b 2462MHz  
 Power Source: AC 120V, 60Hz for Adapter  
 Polarization: Vertical  
 Temp.(°C)/Hum.(%RH): 24.2°C/52%RH



No.	Freq. (MHz)	Reading (dBuV)	Factor ( )	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	33.5624	52.11	-18.05	34.06	40.00	-5.94	QP			
2	54.4516	50.23	-17.41	32.82	40.00	-7.18	QP			
3	87.7248	52.49	-19.09	33.40	40.00	-6.60	QP			
4	121.9755	57.26	-19.81	37.45	43.50	-6.05	QP			
5	149.4857	56.64	-21.13	35.51	43.50	-7.99	QP			
6	203.5228	47.63	-18.04	29.59	43.50	-13.91	QP			



**Test Results (Above 1000MHz)**

Test Mode: 802.11b Mode				Test channel: Lowest		
Peak value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4824.00	28.46	15.31	43.77	74.00	-30.23	Vertical
7236.00	29.98	18.06	48.04	74.00	-25.96	Vertical
9648.00	29.94	23.77	53.71	74.00	-20.29	Vertical
12060.00	*			74.00		Vertical
14472.00	*			74.00		Vertical
4824.00	27.89	15.31	43.20	74.00	-30.80	Horizontal
7236.00	30.25	18.06	48.31	74.00	-25.69	Horizontal
9648.00	28.20	23.77	51.97	74.00	-22.03	Horizontal
12060.00	*			74.00		Horizontal
14472.00	*			74.00		Horizontal
Average value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4824.00	20.48	15.31	35.79	54.00	-18.21	Vertical
7236.00	21.76	18.06	39.82	54.00	-14.18	Vertical
9648.00	21.84	23.77	45.61	54.00	-8.39	Vertical
12060.00	*			54.00		Vertical
14472.00	*			54.00		Vertical
4824.00	20.40	15.31	35.71	54.00	-18.29	Horizontal
7236.00	22.82	18.06	40.88	54.00	-13.12	Horizontal
9648.00	19.94	23.77	43.71	54.00	-10.29	Horizontal
12060.00	*			54.00		Horizontal
14472.00	*			54.00		Horizontal



**Test Results (Above 1000MHz)**

Test Mode: 802.11b Mode				Test channel: Middle		
Peak value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4874.00	28.41	15.41	43.82	74.00	-30.18	Vertical
7311.00	28.33	18.01	46.34	74.00	-27.66	Vertical
9748.00	29.88	23.79	53.67	74.00	-20.33	Vertical
12185.00	*			74.00		Vertical
14622.00	*			74.00		Vertical
4874.00	27.69	15.41	43.10	74.00	-30.90	Horizontal
7311.00	29.17	18.01	47.18	74.00	-26.82	Horizontal
9748.00	28.50	23.79	52.29	74.00	-21.71	Horizontal
12185.00	*			74.00		Horizontal
14622.00	*			74.00		Horizontal
Average value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4874.00	19.23	15.41	34.64	54.00	-19.36	Vertical
7311.00	19.23	18.01	37.24	54.00	-16.76	Vertical
9748.00	20.13	23.79	43.92	54.00	-10.08	Vertical
12185.00	*			54.00		Vertical
14622.00	*			54.00		Vertical
4874.00	18.79	15.41	34.20	54.00	-19.80	Horizontal
7311.00	19.25	18.01	37.26	54.00	-16.74	Horizontal
9748.00	19.21	23.79	43.00	54.00	-11.00	Horizontal
12185.00	*			54.00		Horizontal
14622.00	*			54.00		Horizontal



## Test Results (Above 1000MHz)

Test Mode: 802.11b Mode				Test channel: Highest		
Peak value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4924.00	28.27	15.51	43.78	74.00	-30.22	Vertical
7386.00	28.27	17.97	46.24	74.00	-27.76	Vertical
9848.00	29.32	23.82	53.14	74.00	-20.86	Vertical
12310.00	*			74.00		Vertical
14772.00	*			74.00		Vertical
4924.00	28.35	15.51	43.86	74.00	-30.14	Horizontal
7386.00	29.52	17.97	47.49	74.00	-26.51	Horizontal
9848.00	29.00	23.82	52.82	74.00	-21.18	Horizontal
12310.00	*			74.00		Horizontal
14772.00	*			74.00		Horizontal
Average value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4924.00	19.06	15.51	34.57	54.00	-19.43	Vertical
7386.00	18.67	17.97	36.64	54.00	-17.36	Vertical
9848.00	20.57	23.82	44.39	54.00	-9.61	Vertical
12310.00	*			54.00		Vertical
14772.00	*			54.00		Vertical
4924.00	18.60	15.51	34.11	54.00	-19.89	Horizontal
7386.00	19.63	17.97	37.60	54.00	-16.40	Horizontal
9848.00	19.44	23.82	43.26	54.00	-10.74	Horizontal
12310.00	*			54.00		Horizontal
14772.00	*			54.00		Horizontal

## Remark:

1. During the test, pre-scan the 802.11b,g,n(HT20) mode, and found the 802.11b mode is worse case , the report only record this mode.
2. During the test, pre-scan all models, only the worst case(model: H616E) is recorded in the report.
3. Result=Reading + Factor
4. "\*" means the test results were attenuated more than 20dB below the permissible limits, so the results don't record in the report.



**Radiated Band Edge:**

Test Mode: 802.11b Mode				Test channel: Lowest		
Peak value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	38.86	9.58	48.44	74.00	-25.56	Horizontal
2390.00	40.96	9.73	50.69	74.00	-23.31	Horizontal
2310.00	40.26	9.58	49.84	74.00	-24.16	Vertical
2390.00	46.65	9.73	56.38	74.00	-17.62	Vertical
Average value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	29.52	9.58	39.10	54.00	-14.90	Horizontal
2390.00	36.78	9.73	46.51	54.00	-7.49	Horizontal
2310.00	30.56	9.58	40.14	54.00	-13.86	Vertical
2390.00	39.14	9.73	48.87	54.00	-5.13	Vertical

Test Mode: 802.11b Mode				Test channel: Highest		
Peak value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	46.65	9.91	56.56	74.00	-17.44	Horizontal
2500.00	40.97	9.94	50.91	74.00	-23.09	Horizontal
2483.50	47.01	9.91	56.92	74.00	-17.08	Vertical
2500.00	40.68	9.94	50.62	74.00	-23.38	Vertical
Average value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	38.06	9.91	47.97	54.00	-6.03	Horizontal
2500.00	30.03	9.94	39.97	54.00	-14.03	Horizontal
2483.50	39.83	9.91	49.74	54.00	-4.26	Vertical
2500.00	30.27	9.94	40.21	54.00	-13.79	Vertical

**Remark:**

1. Result=Reading + Factor
2. During the test, pre-scan all models, only the worst case(model: H616E) is recorded in the report.





**Radiated Band Edge:**

Test Mode: 802.11g Mode				Test channel: Lowest		
Peak value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	37.48	9.58	47.06	74.00	-26.94	Horizontal
2390.00	41.40	9.73	51.13	74.00	-22.87	Horizontal
2310.00	40.03	9.58	49.61	74.00	-24.39	Vertical
2390.00	43.93	9.73	53.66	74.00	-20.34	Vertical
Average value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	30.25	9.58	39.83	54.00	-14.17	Horizontal
2390.00	36.95	9.73	46.68	54.00	-7.32	Horizontal
2310.00	30.93	9.58	40.51	54.00	-13.49	Vertical
2390.00	36.43	9.73	46.16	54.00	-7.84	Vertical

Test Mode: 802.11g Mode				Test channel: Highest		
Peak value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	46.69	9.91	56.60	74.00	-17.40	Horizontal
2500.00	41.04	9.94	50.98	74.00	-23.02	Horizontal
2483.50	46.84	9.91	56.75	74.00	-17.25	Vertical
2500.00	40.63	9.94	50.57	74.00	-23.43	Vertical
Average value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	36.23	9.91	46.14	54.00	-7.86	Horizontal
2500.00	29.13	9.94	39.07	54.00	-14.93	Horizontal
2483.50	38.78	9.91	48.69	54.00	-5.31	Vertical
2500.00	29.80	9.94	39.74	54.00	-14.26	Vertical

Remark:

1. Result=Reading + Factor
2. During the test, pre-scan all models, only the worst case(model: H616E) is recorded in the report.



**Radiated Band Edge:**

Test Mode: 802.11n (HT20) Mode				Test channel: Lowest		
Peak value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	35.48	9.58	45.06	74.00	-28.94	Horizontal
2390.00	39.40	9.73	49.13	74.00	-24.87	Horizontal
2310.00	39.03	9.58	48.61	74.00	-25.39	Vertical
2390.00	41.93	9.73	51.66	74.00	-22.34	Vertical
Average value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	28.93	9.58	38.51	54.00	-15.49	Horizontal
2390.00	34.37	9.73	44.10	54.00	-9.90	Horizontal
2310.00	28.54	9.58	38.12	54.00	-15.88	Vertical
2390.00	34.43	9.73	44.16	54.00	-9.84	Vertical

Test Mode: 802.11n (HT20) Mode				Test channel: Highest		
Peak value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	44.42	9.91	54.33	74.00	-19.67	Horizontal
2500.00	38.97	9.94	48.91	74.00	-25.09	Horizontal
2483.50	46.01	9.91	55.92	74.00	-18.08	Vertical
2500.00	40.68	9.94	50.62	74.00	-23.38	Vertical
Average value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	34.21	9.91	44.12	54.00	-9.88	Horizontal
2500.00	29.28	9.94	39.22	54.00	-14.78	Horizontal
2483.50	35.60	9.91	45.51	54.00	-8.49	Vertical
2500.00	29.94	9.94	39.88	54.00	-14.12	Vertical

**Remark:**

1. Result=Reading + Factor
2. During the test, pre-scan all models, only the worst case(model: H616E) is recorded in the report.

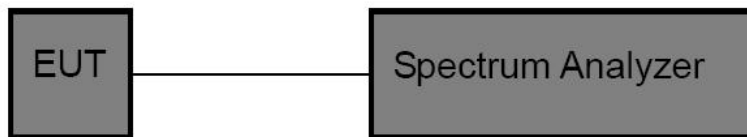


## 5. Maximum Conducted Output Power Test

### 5.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.247 (b)(3)
Test Limit	1W (30dBm)

### 5.2. Test Setup



### 5.3. Test Procedure

1. Measure the duty cycle D of the transmitter output signal.
2. Set span to at least 1.5 times the OBW.
3. Set RBW = 1% to 5% of the OBW, not to exceed 1 MHz.
4. Set VBW  $\geq [3 \times \text{RBW}]$ .
5. Number of points in sweep  $\geq [2 \times \text{span} / \text{RBW}]$ .
6. Sweep time = auto.
7. Detector = RMS
8. Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 as needed such that the average accurately represents the true average over the ON and OFF periods of the transmitter.
9. Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function with band limits set equal to the OBW band edges. If the instrument does not have a band power function, then sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.
10. Add  $[10 \log (1 / D)]$ , where D is the duty cycle, to the measured power to compute the average power during the actual transmission times.

Note: The cable loss and attenuator loss were offset into measure device as amplitude offset.

### 5.4. Test Data

Pass

Please refer to Appendix C of the Appendix Test Data.

#### Additional test for duty cycle.

Please refer to Appendix G of the Appendix Test Data.

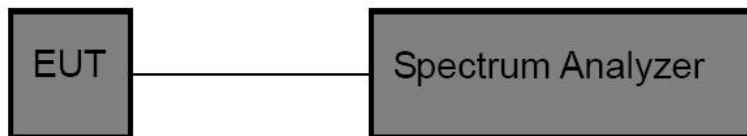


## 6. 6dB Occupy Bandwidth Test

### 6.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.247 (a)(2)
Test Limit	≥500kHz

### 6.2. Test Setup



### 6.3. Test Procedure

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as:
  - RBW= 100kHz, VBW≥3\*RBW
  - Detector= Peak
  - Trace mode= Max hold.
  - Sweep- auto couple.
4. Mark the peak frequency and -6dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

### 6.4. Test Data

Pass

Please refer to Appendix A of the Appendix Test Data.

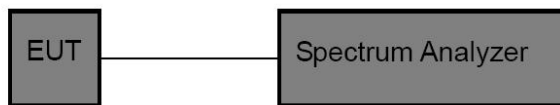


## 7. Power Spectral Density Test

### 7.1. Test Standard and Limit

Test Standard	FCC Part15 C Section15.247 (e)
Test Limit	8dBm/3kHz

### 7.2. Test Setup



### 7.3. Test Procedure

1. Place the EUT on the table and set it in transmitting mode. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set the spectrum analyzer as  $3\text{kHz} \leq \text{RBW} \leq 100\text{kHz}$ ,  $\text{VBW} \geq 3 \times \text{RBW}$ ,  $\text{Span} = 1.5 \times \text{DTS BW}$
3. Record the max. reading.
4. Repeat the above procedure until the measurements for all frequencies are completed.

### 7.4. Test Data

Pass

Please refer to Appendix D of the Appendix Test Data.

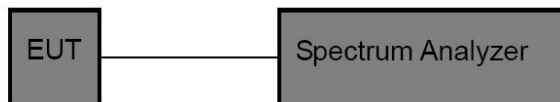


## 8. 100kHz Bandwidth of Frequency Band Edge Requirement

### 8.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.247 (d)
Test Limit	In any 100 kHz bandwidth outside the frequency bands in which the spread spectrum 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, In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a).

### 8.2. Test Setup



### 8.3. Test Procedure

Using the following spectrum analyzer setting:

1. Set the RBW = 100kHz.
2. Set the VBW = 300kHz.
3. Sweep time = auto couple.
4. Detector function = peak.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.

### 8.4. Test Data

Pass

Please refer to Appendix E & Appendix F of the Appendix Test Data.



## 9. Antenna Requirement

### 9.1. Test Standard and Requirement

Test Standard	FCC Part15 Section 15.203 /247(c)
Requirement	<p>1) 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.</p> <p>2) 15.247(c) (1)(i) requirement: Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.</p>

### 9.2. Antenna Connected Construction

The antenna is a PCB Antenna which permanently attached, and the best case gain of the antenna is 4.42dBi It complies with the standard requirement.



## **APPENDIX I -- TEST SETUP PHOTOGRAPH**

Please refer to separated files Appendix I -- Test Setup Photograph

## **APPENDIX II -- EXTERNAL PHOTOGRAPH**

Please refer to separated files Appendix II -- External Photograph

## **APPENDIX III -- INTERNAL PHOTOGRAPH**

Please refer to separated files Appendix III -- Internal Photograph

----- End of Report -----

