



REPORT No. : XM19090101W01

TEST REPORT

MANUFACTURER : LEEDARSON LIGHTING CO., LTD.

PRODUCT NAME : HIGH BAY

MODEL NAME : HLNHB270-NP09BM

BRAND NAME : LEEDARSON

FCC ID : 2AB2Q-NHB270NP09M

STANDARD(S) : 47 CFR Part 15 Subpart C

RECEIPT DATE : 2019-10-14

TEST DATE : 2019-10-15 to 2019-11-04

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Anne Liu (Supervisor)

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Change History		
Version	Date	Reason for change
1.0	2020-03-06	First edition



1. Technical Information

Note: Provide by applicant.

1.1. Applicant and Manufacturer Information

Applicant:	LEEDARSON LIGHTING CO., LTD.
Applicant Address:	Xingtai Industrial Zone, Economic Development Zone, Changtai County, Zhangzhou city, Fujian Province, P.R.China
Manufacturer:	LEEDARSON LIGHTING CO., LTD.
Manufacturer Address:	Xingtai Industrial Zone, Economic Development Zone, Changtai County, Zhangzhou city, Fujian Province, P.R.China

1.2. Equipment Under Test (EUT) Description

Product Name:	HIGH BAY
Serial No:	(N/A, marked #1 by test site)
Hardware Version:	A1
Software Version:	A0
Modulation Type:	FMCW
Operating Frequency Range:	5.815GHz
Channel Number:	Single
Antenna Type:	Planar Antenna
Antenna Gain:	5.42 dBi

Note 1: Test Frequency Range 5.815GHz.

Note 2: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.



1.3. The channel number and frequency of EUT

Channel	Frequency (MHz)
1	5815.0

1.4. Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart C for the EUT FCC ID Certification:

No	Identity	Document Title
1	47 CFR Part 15 (10-1-15 Edition)	Radio Frequency Devices

Test detailed items/section required by FCC rules and results are as below:

No.	Section	Description	Test Date	Test Engineer	Result	Method determination /Remark
1	15.203	Antenna Requirement	N/A	N/A	PASS	No deviation
2	15.215	Bandwidth	Oct 21, 2019	Lai Huihuang	PASS	No deviation
3	15.207	Conducted Emission	Nov 21, 2019	Qijie Xiao	PASS	No deviation
4	15.249	Field strength	Oct 23, 2019	Yaming Luo	PASS	No deviation
5	15.209, 15.249	Radiated Emission and field strength of harmonics	Oct 23, 2019	Hui Li	PASS	No deviation

Note 1: Additions to, deviation, or exclusions from the method should be judged in the "method determination" column of add, deviate or exclude from the specific method should be explained in the "Remark" of the above table.

1.5. Environmental Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15 - 35
Relative Humidity (%):	30 - 60
Atmospheric Pressure (kPa):	86 - 106



2. 47 CFR Part 15C Requirements

2.1. Antenna requirement

2.1.1. Applicable Standard

According to FCC 15.203, 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 shall be considered sufficient to comply with the provisions of this section.

2.1.2. Result: Compliant

The EUT has a permanently and irreplaceable attached antenna. Please refer to the EUT internal photos.

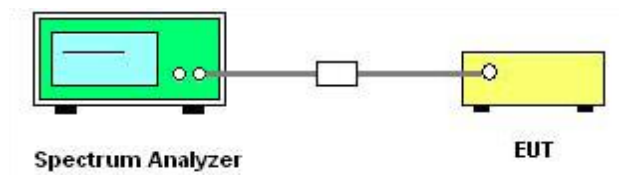
2.2. Bandwidth

2.2.1. Requirement

Refer to FCC 15.215

2.2.2. Test Description

A. Test Set:



The EUT is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading.

Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW.

B. Equipments List:

Please reference ANNEX A(1.5).

2.2.3. Test Result

A. Test Verdict:

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	Result
1	5815.0	1.744	PASS

**B. Test Plots:**

(Channel 1, 5815.0MHz)

2.3. Conducted Emission

2.3.1. Requirement

According to FCC section 15.207, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150kHz to 30MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 Ω line impedance stabilization network (LISN).

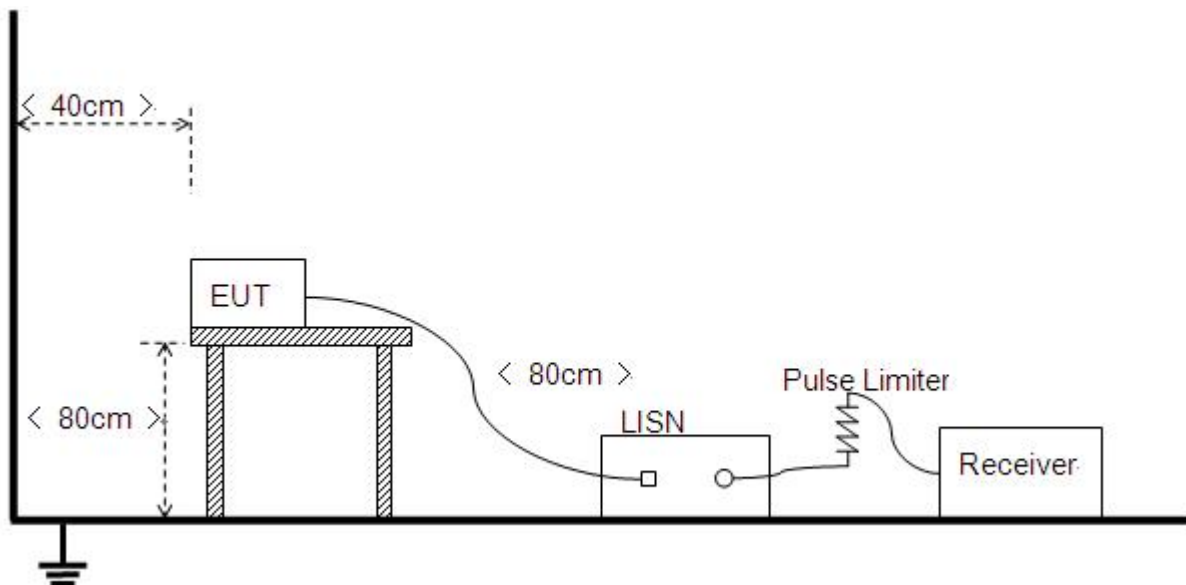
Frequency range (MHz)	Conducted Limit (dB μ V)	
	Quai-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

NOTE:

- (a) The lower limit shall apply at the band edges.
- (b) The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50MHz.

2.3.2. Test Description

A. Test Setup:

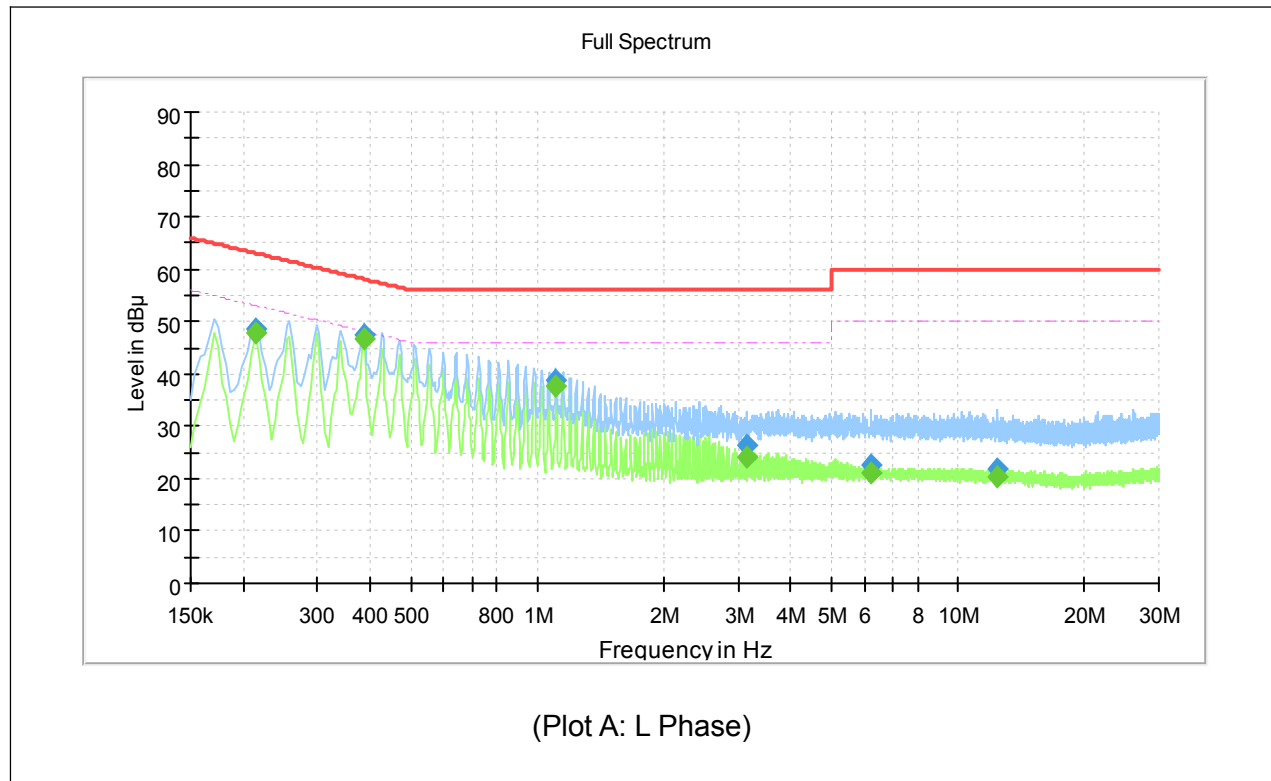


The Table-top EUT was placed upon a non-metallic table 0.8m above the horizontal metal reference ground plane. EUT was connected to LISN and LISN was connected to reference Ground Plane. EUT was 80cm from LISN. The set-up and test methods were according to ANSI C63.10: 2013.

B. Equipments List:

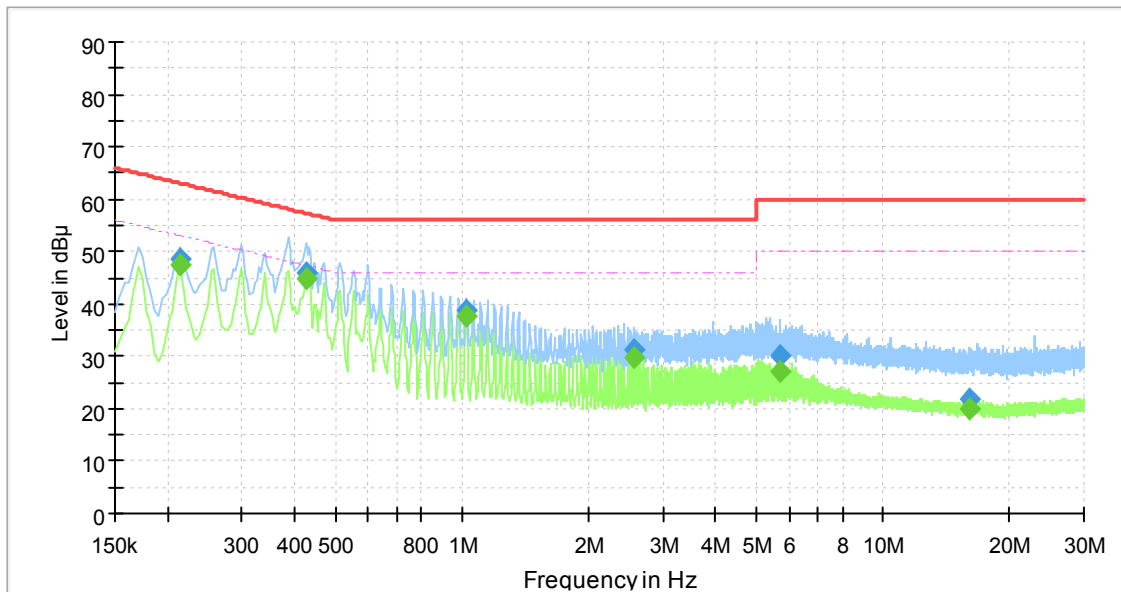
Please reference ANNEX A(1.5).

2.3.3. Test Result



Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)	Verdict
0.214000	---	47.67	53.05	5.38	L1	10.2	PASS
0.214000	48.72	---	63.05	14.33	L1	10.2	PASS
0.386000	---	46.52	48.15	1.63	L1	10.2	PASS
0.386000	47.46	---	58.15	10.69	L1	10.2	PASS
1.110000	---	37.62	46.00	8.38	L1	10.3	PASS
1.110000	38.61	---	56.00	17.39	L1	10.3	PASS
3.158000	26.39	---	56.00	29.61	L1	10.4	PASS
3.158000	---	24.03	46.00	21.97	L1	10.4	PASS
6.182000	22.77	---	60.00	37.23	L1	10.5	PASS
6.186000	---	21.19	50.00	28.81	L1	10.5	PASS
12.350000	---	20.46	50.00	29.54	L1	10.7	PASS
12.350000	21.69	---	60.00	38.31	L1	10.7	PASS

Full Spectrum



(Plot B: N Phase)

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)	Verdict
0.214000	---	47.29	53.05	5.76	N	10.2	PASS
0.214000	48.42	---	63.05	14.63	N	10.2	PASS
0.426000	---	44.77	47.33	2.56	N	10.2	PASS
0.426000	46.13	---	57.33	11.20	N	10.2	PASS
1.026000	---	37.80	46.00	8.20	N	10.3	PASS
1.026000	38.90	---	56.00	17.10	N	10.3	PASS
2.562000	31.30	---	56.00	24.70	N	10.3	PASS
2.562000	---	29.61	46.00	16.39	N	10.3	PASS
5.718000	30.14	---	60.00	29.86	N	10.5	PASS
5.718000	---	27.10	50.00	22.90	N	10.5	PASS
16.038000	---	20.03	50.00	29.97	N	10.7	PASS
16.038000	21.82	---	60.00	38.18	N	10.7	PASS

2.4. Field strength of fundamental

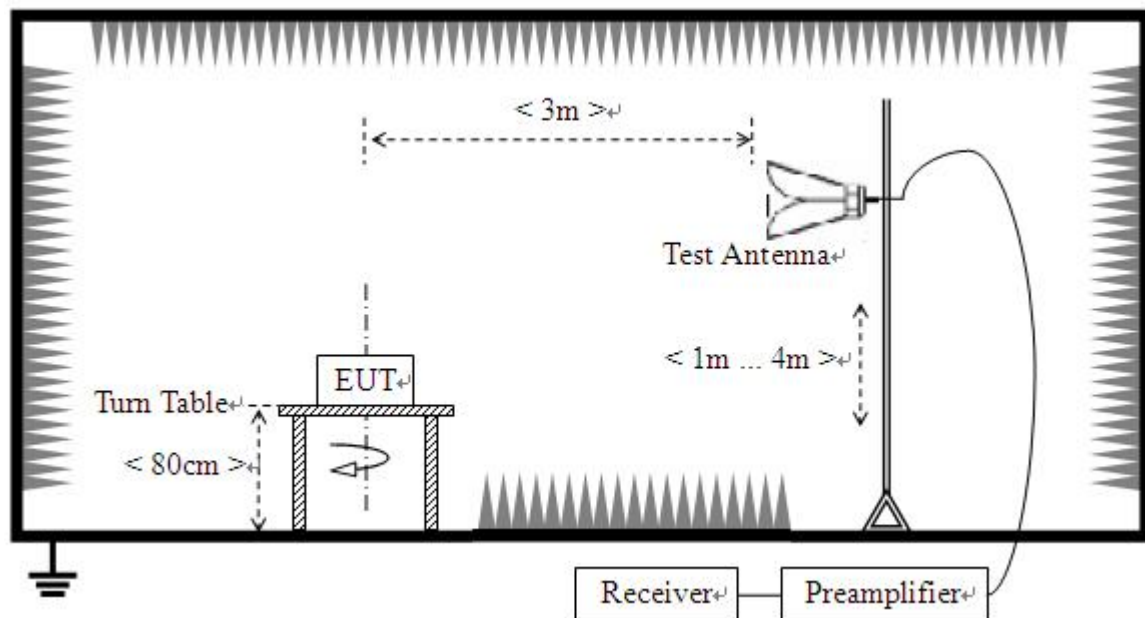
2.4.1. Requirement

According to FCC section 15.249(a), except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

2.4.2. Test Description

A. Test Setup:



The EUT is located in a 3m Semi-Anechoic Chamber; the antenna factors, cable loss and so on of the site as factors are calculated to correct the reading.

For the Test Antenna:

Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength.



B. Equipments List:

Please reference ANNEX B(4).

2.4.3. Test Procedure

The measurement results are obtained as below:

$$E \text{ [dB}\mu\text{V/m]} = U_R + A_T + A_{\text{Factor}} \text{ [dB]}; A_T = L_{\text{Cable loss}} \text{ [dB]} - G_{\text{preamp}} \text{ [dB]}$$

A_T : Total correction Factor except Antenna

U_R : Receiver Reading

G_{preamp} : Preamplifier Gain

A_{Factor} : Antenna Factor at 3m

During the test, the total correction Factor A_T and A_{Factor} were built in test software.

Note: All radiated emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report

For Radiated emission below 30MHz

- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

NOTE:

- The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz

- The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The height of antenna 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.

d. 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 rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

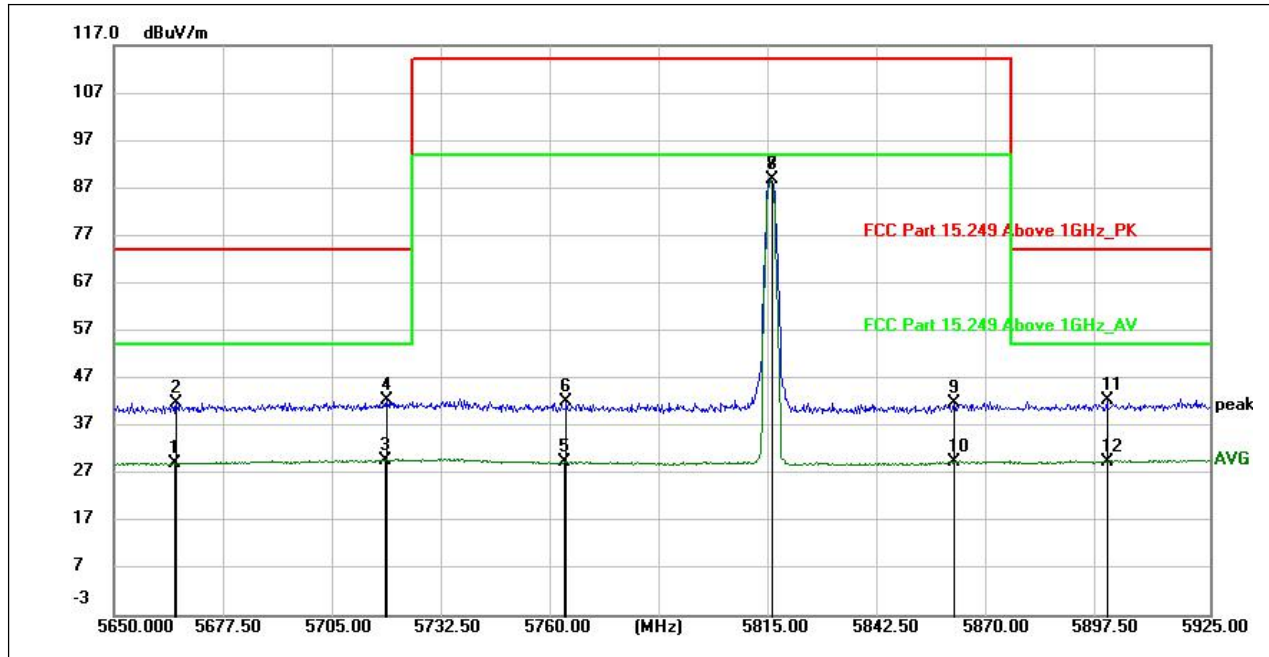
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasipeak detection (QP) at frequency below 1GHz.

2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.

3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.

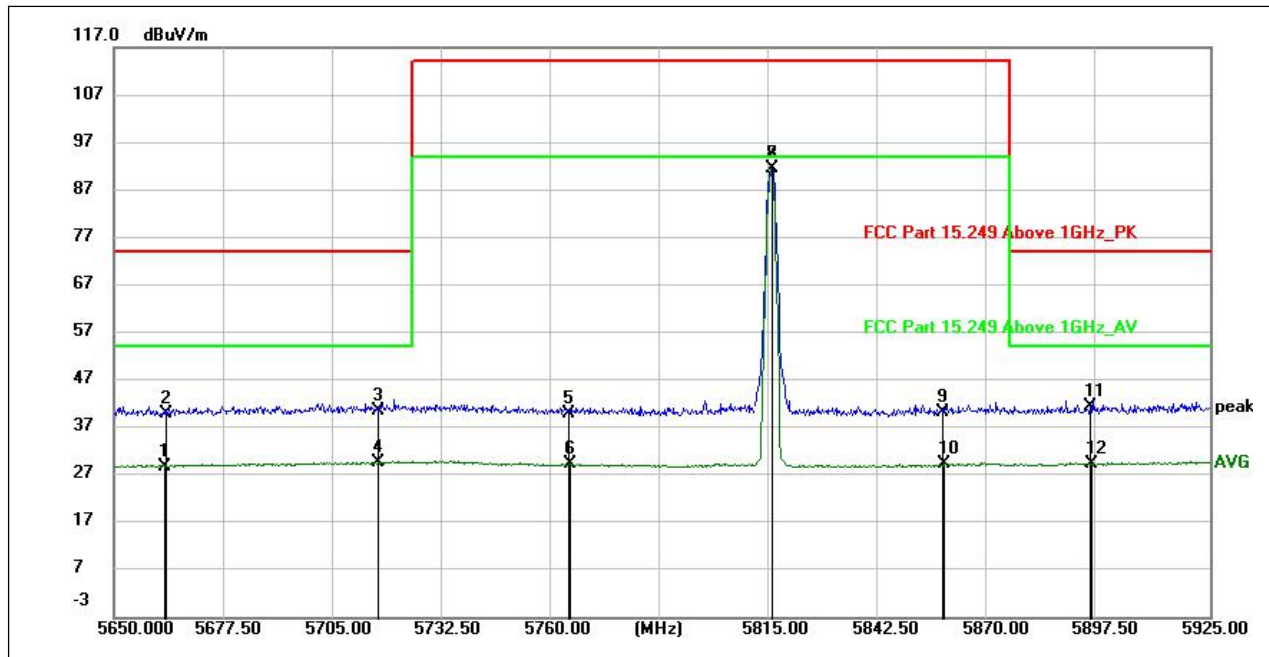
4. All modes of operation were investigated and the worst-case emissions are reported.

2.4.4. Test Result



(5815MHz, Antenna Horizontal)

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Verdict
5665.125	---	29.12	54.00	24.88	H	PASS
5665.675	41.70	---	74.00	32.30	H	PASS
5718.200	---	29.73	54.00	24.27	H	PASS
5718.475	42.47	---	74.00	31.53	H	PASS
5763.025	---	29.27	94.00	64.73	H	PASS
5763.575	42.11	---	114.00	71.89	H	PASS
5815.000	88.78	---	114.00	25.22	H	PASS
5815.000	---	88.65	94.00	5.35	H	PASS
5860.925	41.81	---	114.00	72.19	H	PASS
5860.925	---	29.31	94.00	64.69	H	PASS
5899.150	42.32	---	74.00	31.68	H	PASS
5899.150	---	29.49	54.00	24.51	H	PASS



(802.11b _2412MHz, Antenna Vertical)

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Verdict
5662.650	---	28.95	54.00	25.05	V	PASS
5663.200	39.97	---	74.00	34.03	V	PASS
5716.275	40.70	---	74.00	33.30	V	PASS
5716.275	---	29.69	54.00	24.31	V	PASS
5764.125	39.87	---	114.00	74.13	V	PASS
5764.400	---	29.31	94.00	64.69	V	PASS
5815.000	91.51	---	114.00	22.49	V	PASS
5815.000	---	91.37	94.00	2.63	V	PASS
5857.900	40.32	---	114.00	73.68	V	PASS
5858.175	---	29.39	94.00	64.61	V	PASS
5895.025	41.41	---	74.00	32.59	V	PASS
5895.300	---	29.31	54.00	24.69	V	PASS

2.5. Radiated Emission and field strength of harmonics

2.5.1. Requirement

According to section 15.249(a), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

According to section 15.249(d), Emission Radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in Section 15.209:

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)	Field Strength Limitation at 3m Measurement Distance	
			(uV/m)	(dBuV/m)
0.009 - 0.490	2400/F(kHz)	300	10000* 2400/F(KHz)	20log 2400/F(KHz) + 80
0.490 - 1.705	24000/F(kHz)	30	100* 2400/F(KHz)	20log 2400/F(KHz) + 40
1.705 - 30.0	30	30	100*30	20log 30 + 40
30 - 88	100	3	100	20log 100
88 - 216	150	3	150	20log 150
216 - 960	200	3	200	20log 200
Above 960	500	3	500	20log 500

According to section 15.249(e), for frequencies above 1000MHz, the above field strength limits are based on average limits. The peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20dB under any condition of modulation.

Note:

- 1) The tighter limit shall apply at the boundary between two frequency range.
- 2) Limitation expressed in dBuV/m is calculated by 20log Emission Level(uV/m).
- 3) If measurement is made at 3m distance, then F.S Limitation at 3m distance is adjusted by using the formula of $Ld1 = Ld2 * (d2/d1)^2$.

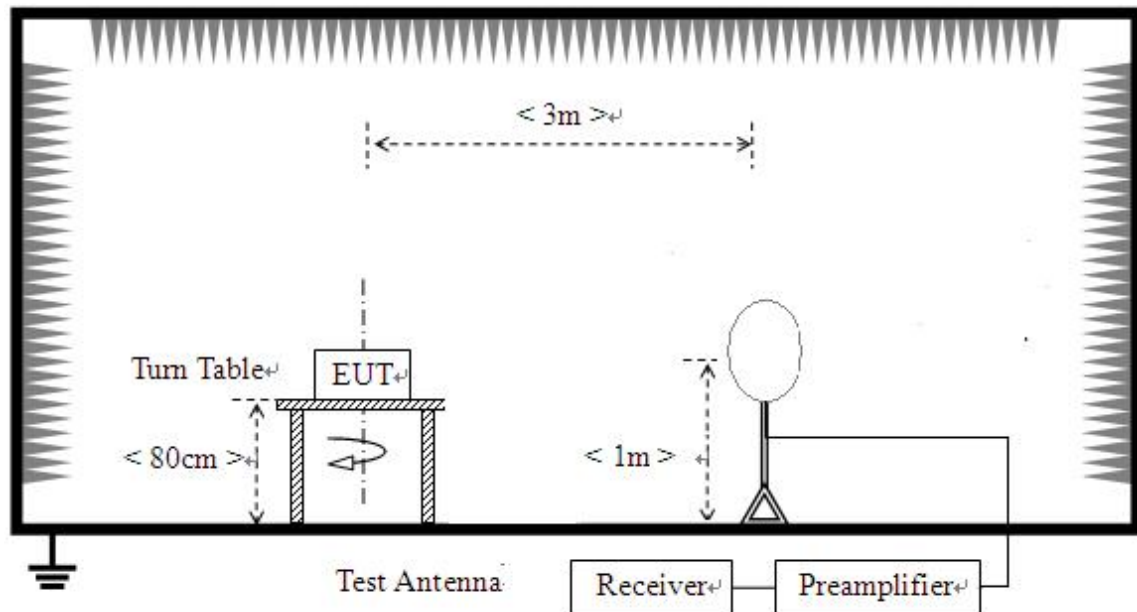
Example: F.S Limit at 30m distance is 30uV/m, then F.S Limitation at 3m distance is adjusted as

$$Ld1 = L1 = 30uV/m * (10)^2 = 100 * 30uV/m$$

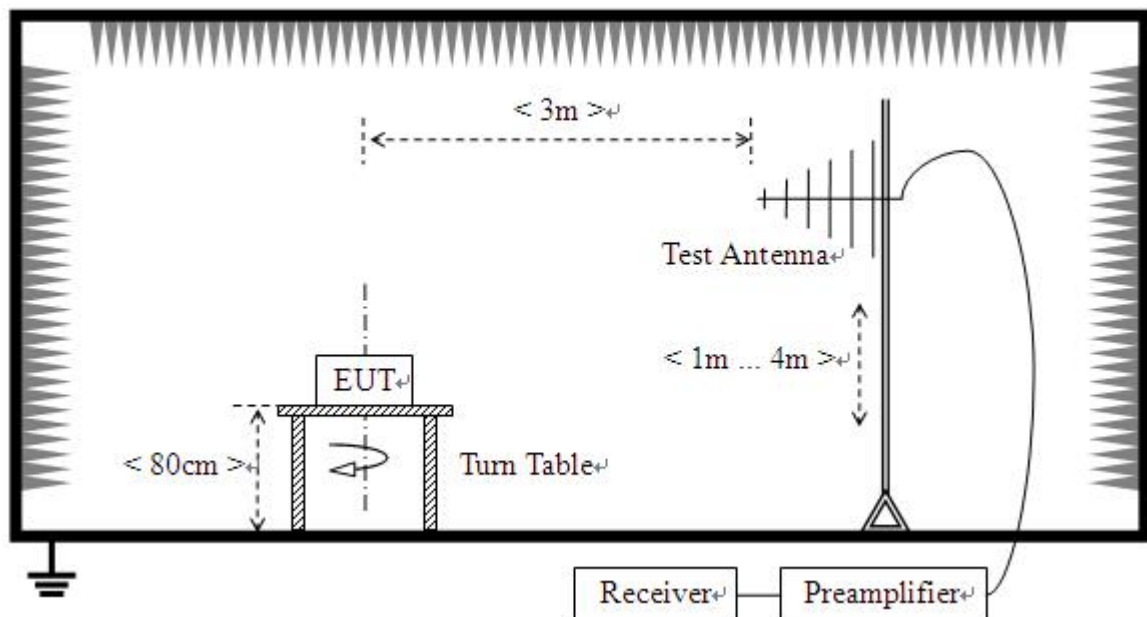
2.5.2. Test Description

A. Test Setup:

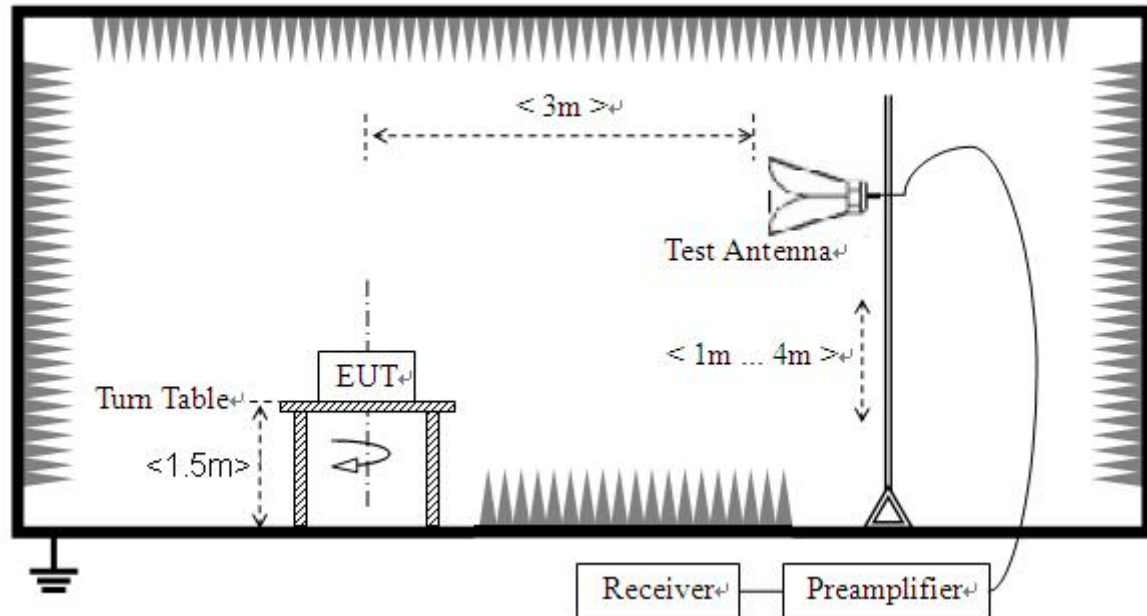
- 1) For radiated emissions from 9kHz to 30MHz



- 2) For radiated emissions from 30MHz to 1GHz



3) For radiated emissions above 1GHz



The RF absorbing material used on the reference ground plane and on the turntable have a maximum height (thickness) of 30 cm (12 in) and have a minimum-rated attenuation of 20 dB at all frequencies from 1 GHz to 18 GHz. Test site have a minimum area of the ground plane covered with RF absorbing material as specified in Figure 6 of ANSI C63.4: 2014.

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.10:2013. For radiated emissions below or equal to 1GHz, The EUT was set-up on insulator 80cm above the Ground Plane, For radiated emissions above 1GHz, The EUT was set-up on insulator 150cm above the Ground Plane. The set-up and test methods were according to ANSI C63.10:2013.

The EUT is located in a 3m Semi-Anechoic Chamber; the antenna factors, cable loss and so on of the site as factors are calculated to correct the reading.

For the Test Antenna:

- In the frequency range of 9 kHz to 30MHz, magnetic field is measured with Loop Test Antenna. The Test Antenna is positioned with its plane vertical at 1m distance from the EUT. The center of the Loop Test Antenna is 1m above the ground. During the measurement the Loop Test Antenna rotates about its vertical axis for maximum response at each azimuth about the EUT.
- In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) and Horn Test Antenna (above 1GHz) are used. Place the test antenna at 3m away from area of the EUT, while keeping the test antenna aimed at the source of emissions at each frequency of significant



emissions, with polarization oriented for maximum response. The test 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 test antenna elevation shall be that which maximizes the emissions. The test 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. The emission levels at both horizontal and vertical polarizations should be tested.

B. Equipments List:

Please reference ANNEX B(4).

2.5.3. Test Result

According to ANSI C63.10, because of peak detection will yield amplitudes equal to or greater than amplitudes measured with the quasi-peak (or average) detector, the measurement data from a spectrum analyzer peak detector will represent the worst-case results, if the peak measured value complies with the quasi-peak limit, it is unnecessary to perform an quasi-peak measurement.

The measurement results are obtained as below:

$$E \text{ [dB}\mu\text{V/m]} = U_R + A_T + A_{\text{Factor}} \text{ [dB]}; A_T = L_{\text{Cable loss}} \text{ [dB]} - G_{\text{preamp}} \text{ [dB]}$$

A_T : Total correction Factor except Antenna

U_R : Receiver Reading

G_{preamp} : Preamplifier Gain

A_{Factor} : Antenna Factor at 3m

During the test, the total correction Factor A_T and A_{Factor} were built in test software.

Note: All radiated emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

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

For Radiated emission below 30MHz

- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.



e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna 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.
- d. 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 rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

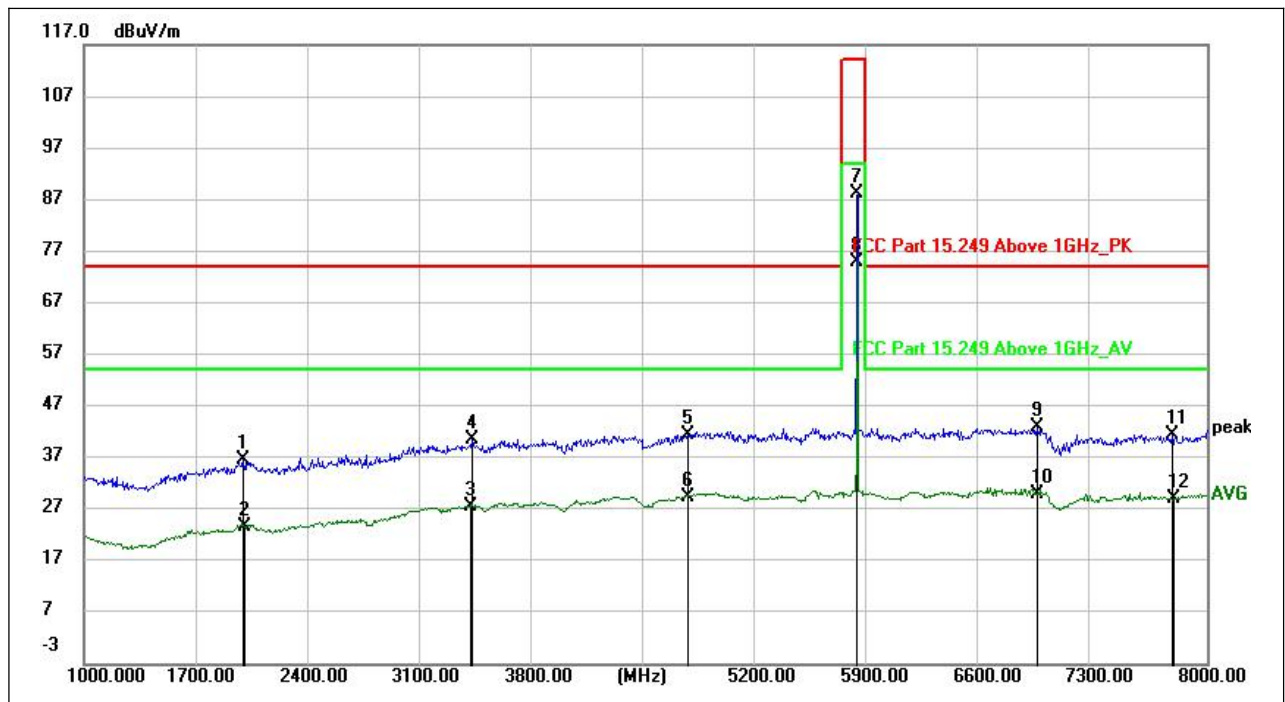
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasipeak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

2.5.4. Test Result



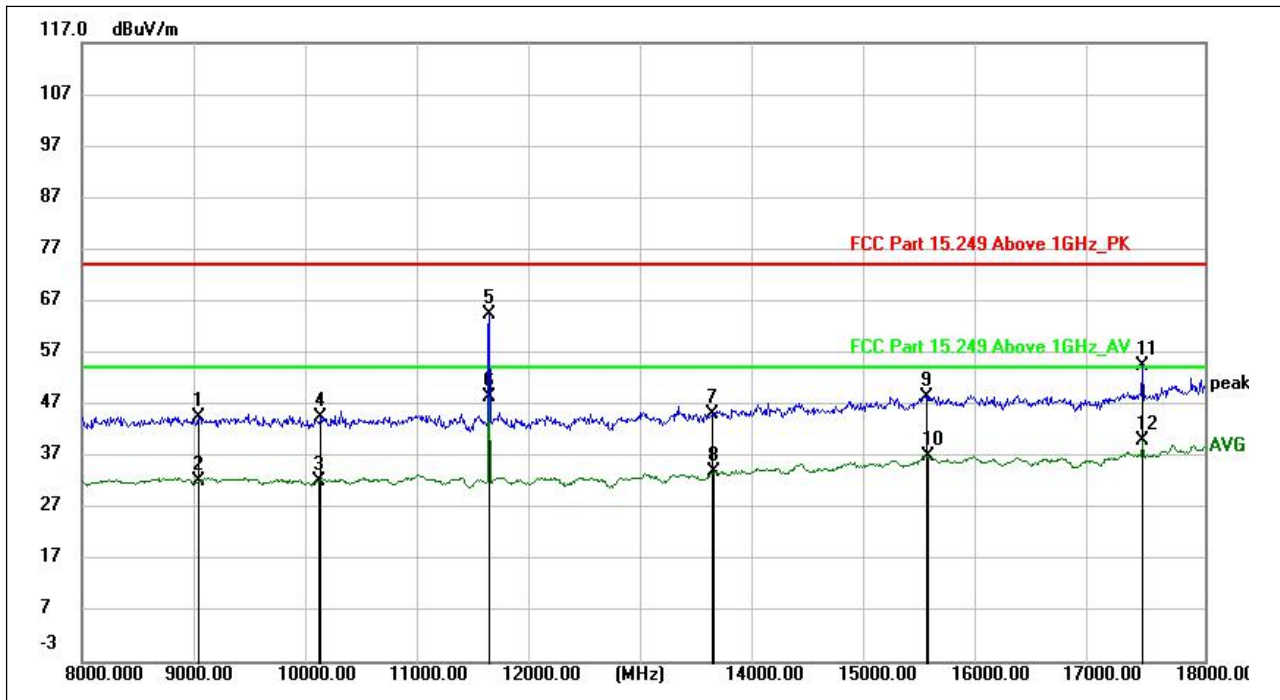
(5815MHz, Antenna Horizontal, 30MHz to 1GHz)

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Verdict
55.2207	26.52	40.00	13.48	H	PASS
77.0505	31.85	40.00	8.15	H	PASS
121.1231	34.05	43.50	9.45	H	PASS
195.8220	23.07	43.50	20.43	H	PASS
403.2500	24.57	46.00	21.43	H	PASS
896.9965	28.25	46.00	17.75	H	PASS



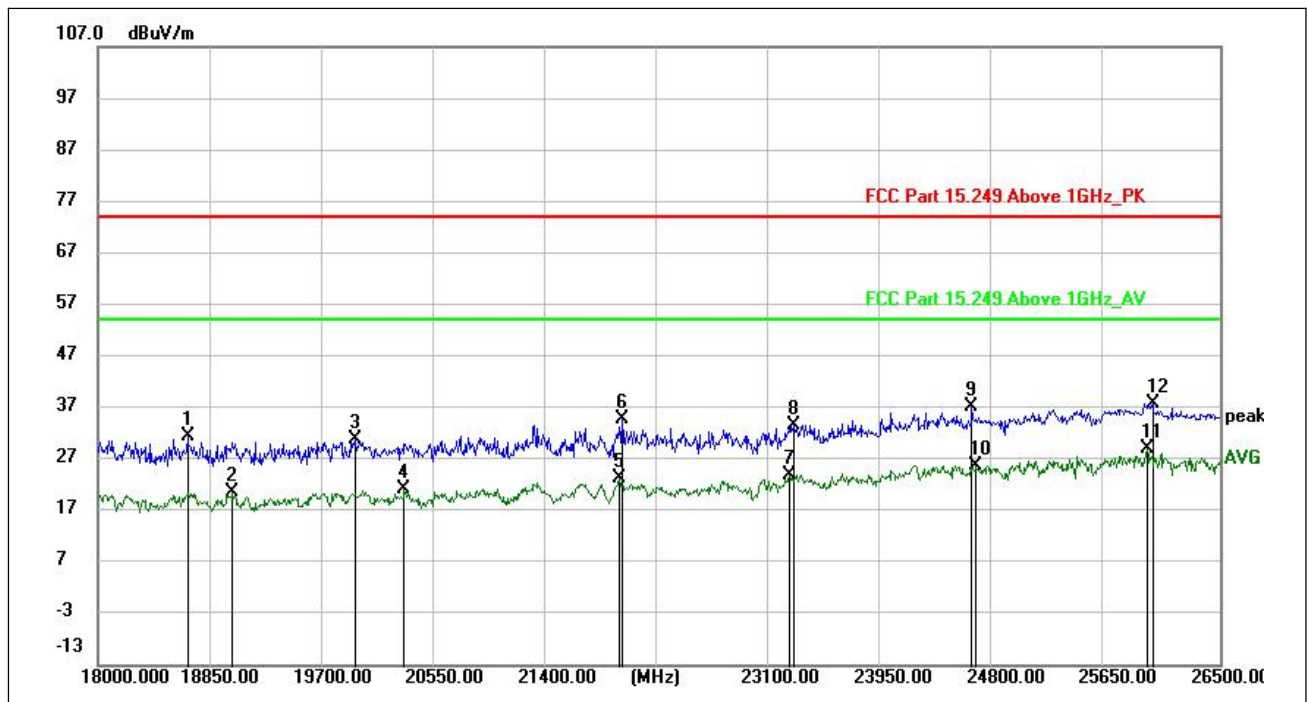
(5815MHz, Antenna Horizontal, 1GHz to 8GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Verdict
1994.000	36.71	---	74.00	37.29	H	PASS
2001.000	---	23.61	54.00	30.39	H	PASS
3408.000	---	27.59	54.00	26.41	H	PASS
3422.000	40.53	---	74.00	33.47	H	PASS
4766.000	41.59	---	74.00	32.41	H	PASS
4766.000	---	29.56	54.00	24.44	H	PASS
5815.000	88.17	---	114.00	25.83	H	PASS
5815.000	---	75.14	94.00	18.86	H	PASS
6943.000	42.85	---	74.00	31.15	H	PASS
6943.000	---	30.11	54.00	23.89	H	PASS
7783.000	41.43	---	74.00	32.57	H	PASS
7790.000	---	28.97	54.00	25.03	H	PASS



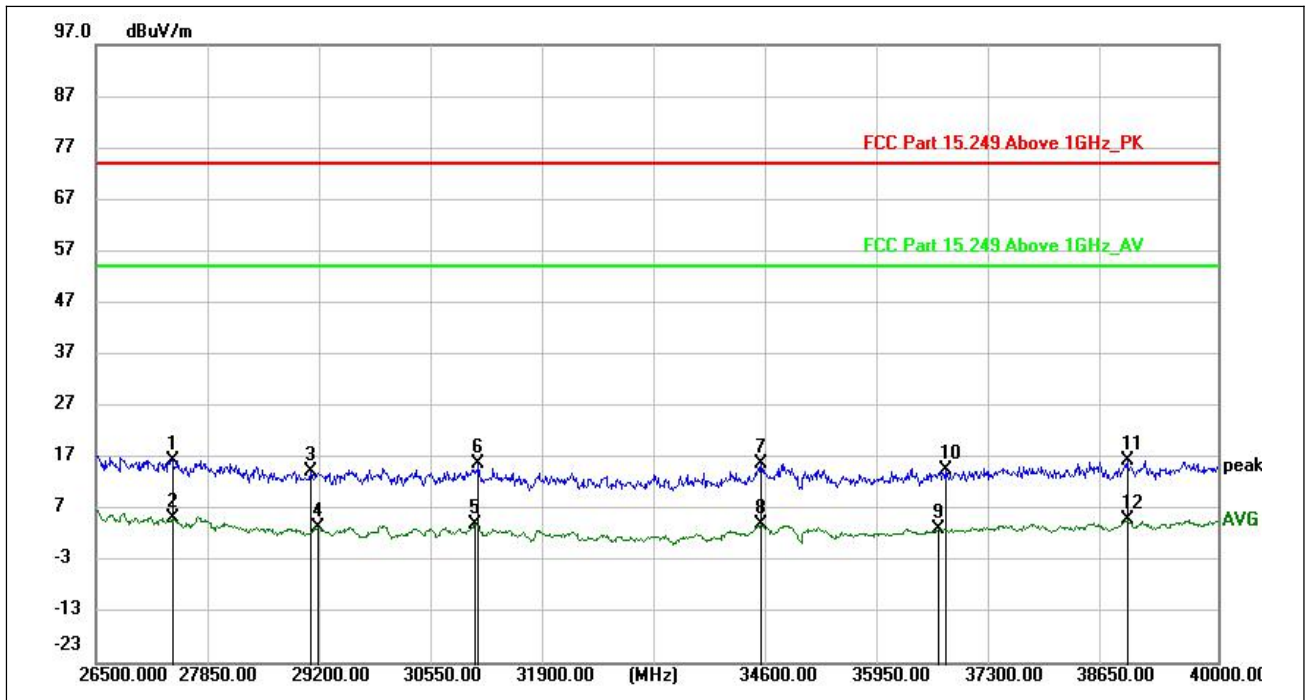
(5815MHz, Antenna Horizontal, 8GHz to 18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Verdict
9040.000	44.41	---	74.00	29.59	H	PASS
9040.000	---	32.00	54.00	22.00	H	PASS
10110.000	---	32.19	54.00	21.81	H	PASS
10130.000	44.63	---	74.00	29.37	H	PASS
11630.000	64.43	---	74.00	9.57	H	PASS
11630.000	---	48.38	54.00	5.62	H	PASS
13620.000	45.23	---	74.00	28.77	H	PASS
13630.000	---	33.93	54.00	20.07	H	PASS
15520.000	48.53	---	74.00	25.47	H	PASS
15530.000	---	36.92	54.00	17.08	H	PASS
17450.000	54.34	---	74.00	19.66	H	PASS
17450.000	---	39.91	54.00	14.09	H	PASS



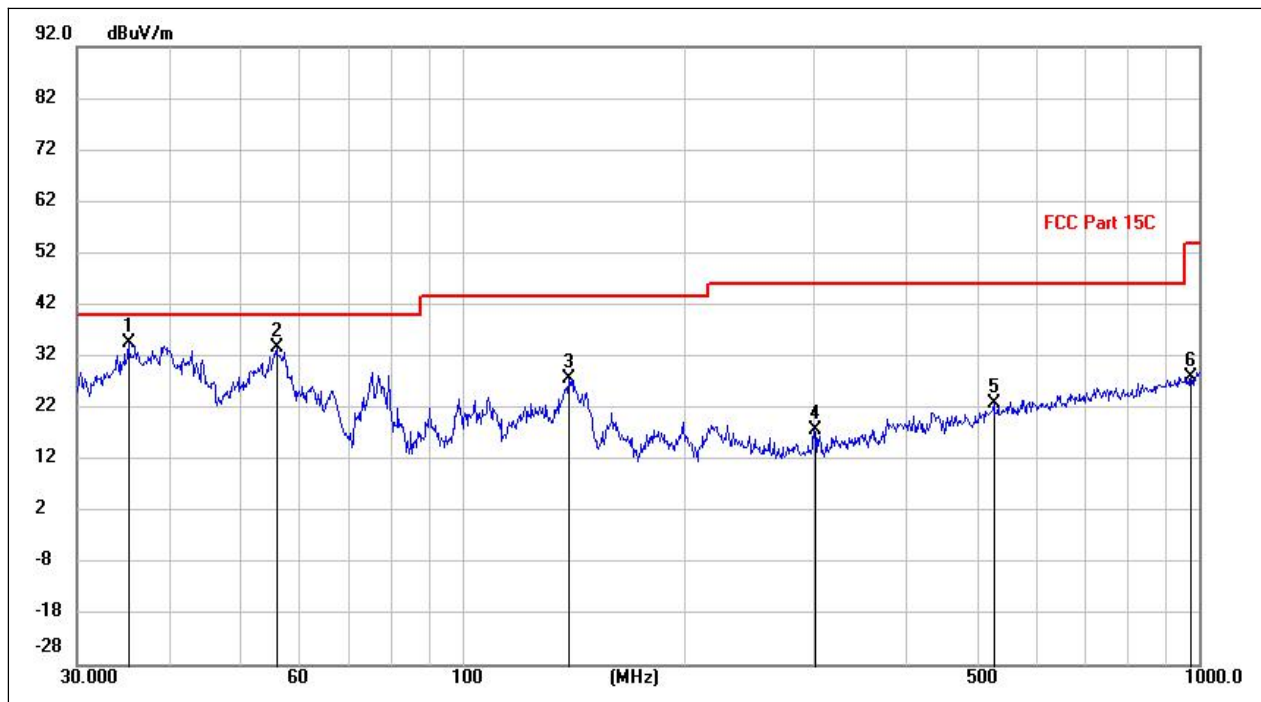
(5815MHz, Antenna Horizontal, 18GHz to 26.5GHz)

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Verdict
18680.000	31.52	---	74.00	42.48	H	PASS
19020.000	---	20.55	54.00	33.45	H	PASS
19946.500	30.91	---	74.00	43.09	H	PASS
20320.500	---	21.09	54.00	32.91	H	PASS
21952.500	---	23.48	54.00	30.52	H	PASS
21969.500	34.82	---	74.00	39.18	H	PASS
23236.000	---	23.96	54.00	30.04	H	PASS
23270.000	33.69	---	74.00	40.31	H	PASS
24621.500	37.35	---	74.00	36.65	H	PASS
24655.500	---	25.81	54.00	28.19	H	PASS
25947.500	---	28.91	54.00	25.09	H	PASS
25990.000	37.94	---	74.00	36.06	H	PASS



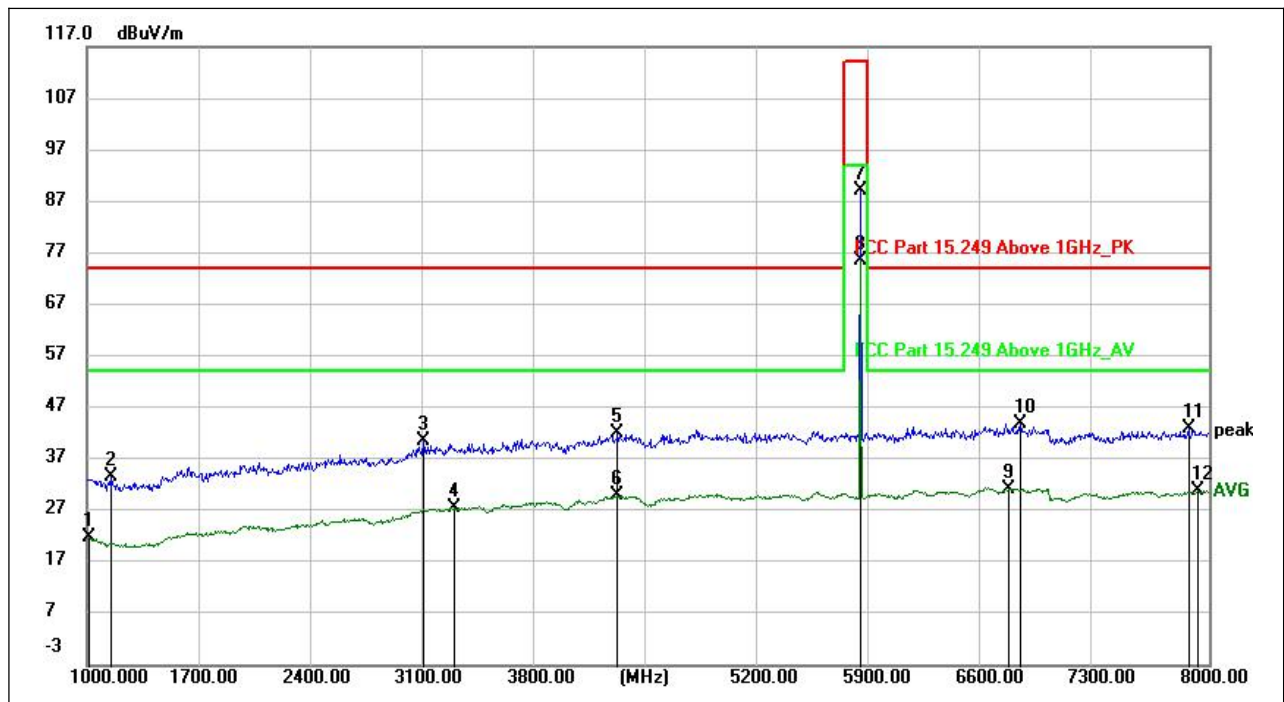
(5815MHz, Antenna Horizontal, 26.5GHz to 40GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Verdict
27418.000	16.41	---	74.00	57.59	H	PASS
27418.000	---	5.09	54.00	48.91	H	PASS
29092.000	14.29	---	74.00	59.71	H	PASS
29173.000	---	3.39	54.00	50.61	H	PASS
31063.000	---	4.02	54.00	49.98	H	PASS
31103.500	15.66	---	74.00	58.34	H	PASS
34505.500	15.89	---	74.00	58.11	H	PASS
34505.500	---	3.99	54.00	50.01	H	PASS
36638.500	---	3.15	54.00	50.85	H	PASS
36719.500	14.56	---	74.00	59.44	H	PASS
38906.500	16.34	---	74.00	57.66	H	PASS
38920.000	---	4.88	54.00	49.12	H	PASS



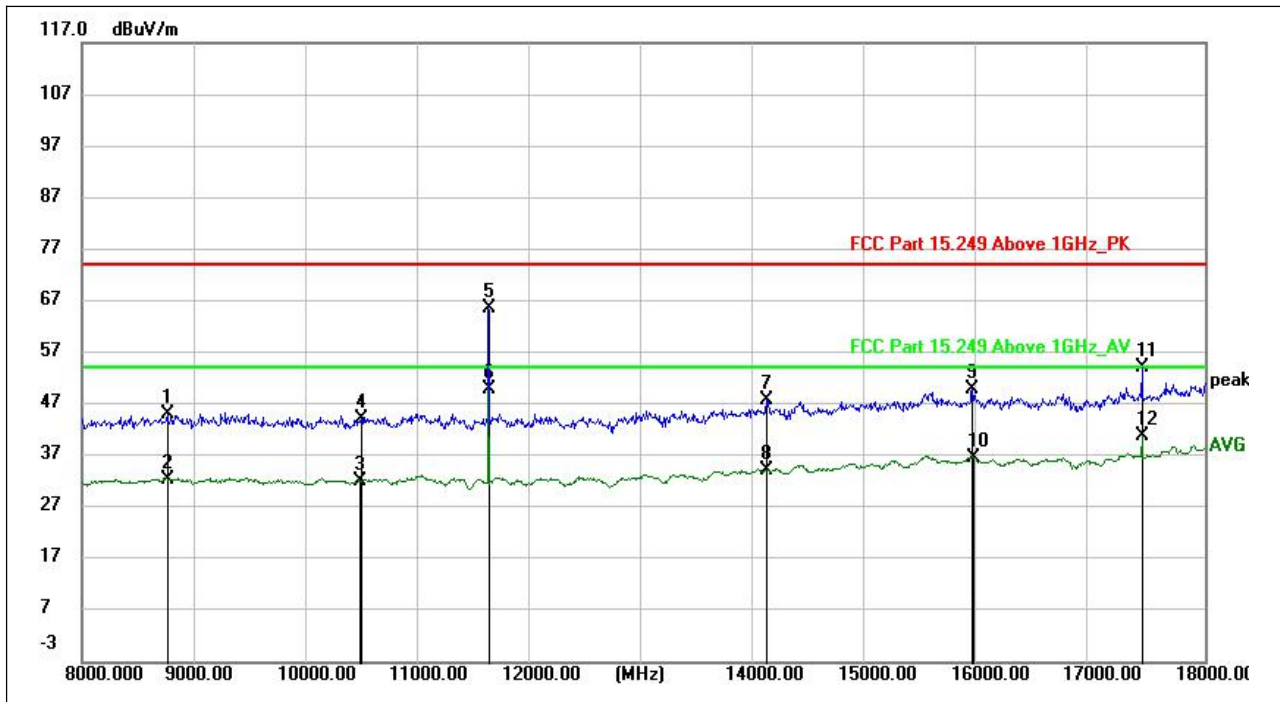
(5815MHz, Antenna Vertical, 30MHz to 1GHz)

Frequency (MHz)	QuasiPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Verdict
35.2512	34.70	40.00	5.30	V	PASS
56.0007	33.74	40.00	6.26	V	PASS
139.3613	27.71	43.50	15.79	V	PASS
300.3673	17.77	46.00	28.23	V	PASS
526.3967	22.73	46.00	23.27	V	PASS
975.7529	27.96	54.00	26.04	V	PASS



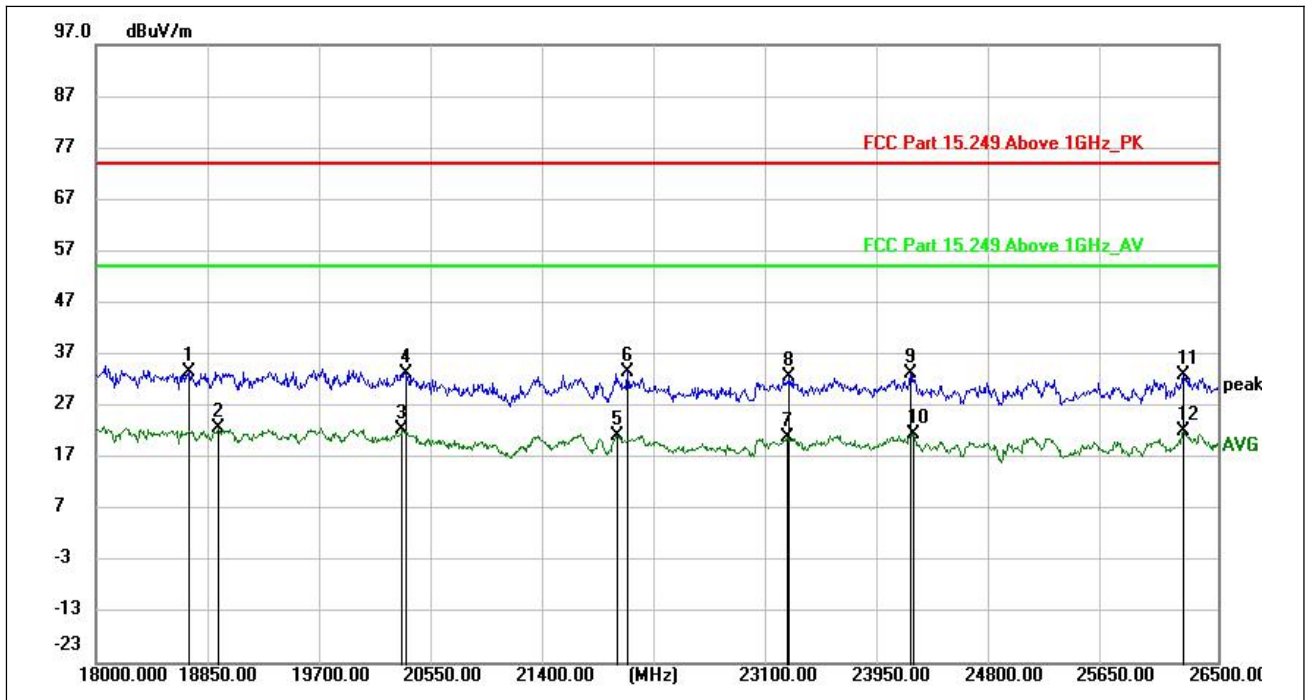
(5815MHz, Antenna Vertical, 1GHz to 8GHz)

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Verdict
1854.000	---	22.36	54.00	31.64	V	PASS
1861.000	33.59	---	74.00	39.37	V	PASS
3429.000	40.72	---	74.00	34.60	V	PASS
3436.000	---	27.25	54.00	26.75	V	PASS
4990.000	41.87	---	54.00	25.06	V	PASS
5004.000	---	42.24	74.00	31.76	V	PASS
5815.000	88.84	---	114.00	22.16	V	PASS
5815.000	---	75.68	94.00	18.32	V	PASS
6628.000	---	42.75	74.00	31.25	V	PASS
6628.000	43.79	---	54.00	23.22	V	PASS
7755.000	42.81	---	74.00	31.74	V	PASS
7769.000	---	29.16	54.00	24.84	V	PASS



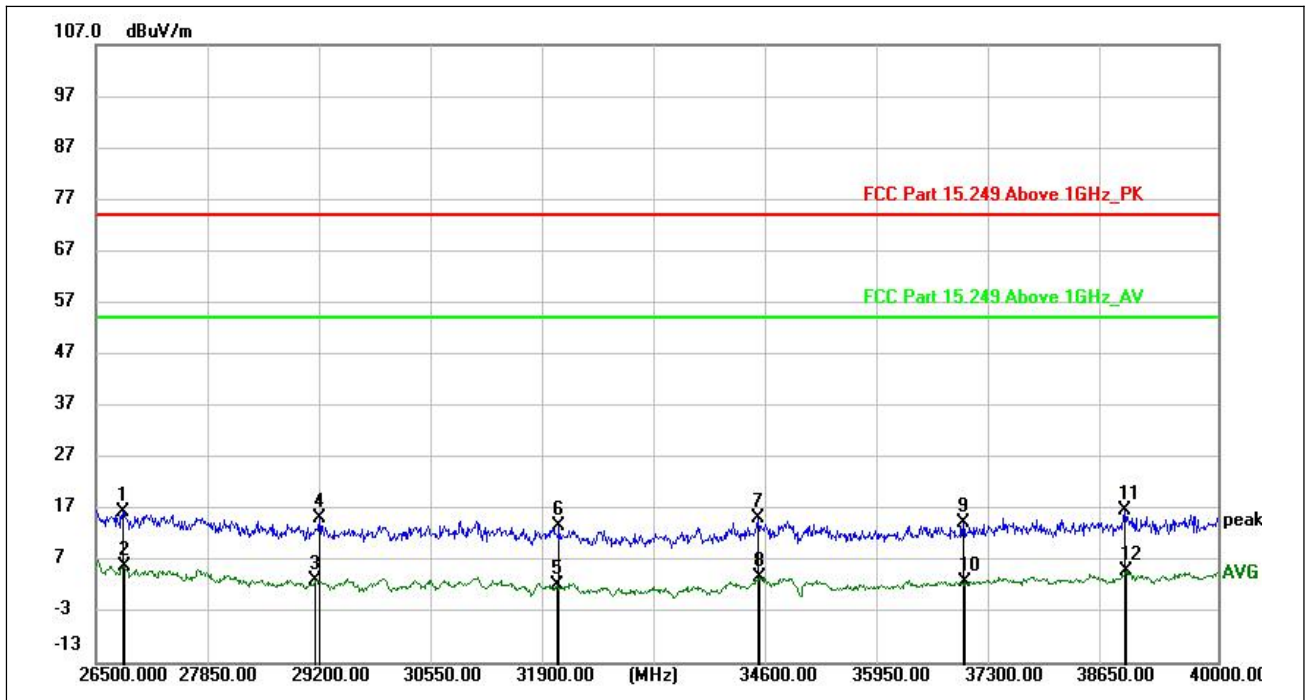
(5815MHz, Antenna Vertical, 8GHz to 18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Verdict
8760.000	45.05	---	74.00	28.95	V	PASS
8760.000	---	32.34	54.00	21.66	V	PASS
10480.000	---	32.21	54.00	21.79	V	PASS
10490.000	44.04	---	74.00	29.96	V	PASS
11630.000	65.36	---	74.00	8.64	V	PASS
11630.000	---	49.87	54.00	4.13	V	PASS
14100.000	47.94	---	74.00	26.06	V	PASS
14100.000	---	34.24	54.00	19.76	V	PASS
15930.000	49.82	---	74.00	24.18	V	PASS
15940.000	---	36.66	54.00	17.34	V	PASS
17450.000	54.11	---	74.00	19.89	V	PASS
17450.000	---	41.01	54.00	12.99	V	PASS



(5815MHz, Antenna Vertical, 18GHz to 26.5GHz)

Frequency (MHz)	MaxPeak (dB μ V/m)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Verdict
18705.500	33.55	---	74.00	40.45	V	PASS
18926.500	---	22.60	54.00	31.40	V	PASS
20320.500	---	22.32	54.00	31.68	V	PASS
20346.000	33.38	---	74.00	40.62	V	PASS
21952.500	---	21.27	54.00	32.73	V	PASS
22029.000	33.58	---	74.00	40.42	V	PASS
23236.000	---	20.77	54.00	33.23	V	PASS
23253.000	32.59	---	74.00	41.41	V	PASS
24171.000	33.12	---	74.00	40.88	V	PASS
24196.500	---	21.43	54.00	32.57	V	PASS
26236.500	32.93	---	74.00	41.07	V	PASS
26236.500	---	21.93	54.00	32.07	V	PASS



(5815MHz, Antenna Vertical, 26.5GHz to 40GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Verdict
26824.000	16.43	---	74.00	57.57	V	PASS
26837.500	---	5.93	54.00	48.07	V	PASS
29146.000	---	3.08	54.00	50.92	V	PASS
29186.500	15.15	---	74.00	58.85	V	PASS
32048.500	---	2.24	54.00	51.76	V	PASS
32075.500	13.56	---	74.00	60.44	V	PASS
34465.000	15.05	---	74.00	58.95	V	PASS
34478.500	---	3.63	54.00	50.37	V	PASS
36935.500	14.17	---	74.00	59.83	V	PASS
36949.000	---	2.90	54.00	51.10	V	PASS
38879.500	16.81	---	74.00	57.19	V	PASS
38893.000	---	4.96	54.00	49.04	V	PASS



Annex A Test Uncertainty

The uncertainty is calculated using the methods suggested in the "Guide to the Expression of Uncertainty in Measurement" (GUM) published by ISO.

Uncertainty of Conducted Emission Measurement

Measuring Uncertainty for a Level of Confidence of 95%(U=2Uc(y))	9kHz-150kHz	± 3.10 dB
	150kHz-30MHz	± 2.61 dB

Uncertainty of Radiated Emission Measurement

Measuring Uncertainty for a Level of Confidence of 95%(U=2Uc(y))	30MHz-200MHz	± 3.66 dB
	200MHz-1000MHz	± 3.87 dB
	1GHz-6GHz	± 4.50 dB
	6GHz-18GHz	± 5.17 dB



Annex B Testing Laboratory Information

1. Identification of the Responsible Testing Laboratory

Laboratory Name:	Kehu-Morlab Test Laboratory
Laboratory Address:	Unit 101, No.1732 Gangzhong Road, Xiamen Area, Pilot Free Trade Zone (Fujian) P.R. China
Telephone:	+86 592 5612050
Facsimile:	+86 592 5612095

2. Identification of the Responsible Testing Location

Name:	Kehu-Morlab Test Laboratory
Address:	Unit 101, No.1732 Gangzhong Road, Xiamen Area, Pilot Free Trade Zone (Fujian) P.R. China

3. Accreditation Certificate

Accredited Testing Laboratory:	The FCC designation number is CN1249. (Kehu-Morlab Test Laboratory)
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4. Test Equipments Utilized

4.1 Conducted Test Equipments

ECIT Eagle RF test system						
No.	Equipment Name	Serial No.	Model No.	Manufacturer	Cal.Date	Cal.Due Date
1	MXA Signal Analyzer	MY53421845	N9020A	Keysight	2017.11.30	2018.11.29
2	RF cable (30MHz-26.5GHz)	RF01	N/A	Morlab	N/A	N/A
3	Coaxial cable	RF02	N/A	Morlab	N/A	N/A
4	SMA connector	RF03	N/A	Xingbo	N/A	N/A
Software Version: Eagle 2.0						

4.2 Conducted Emission Test Equipments

No.	Equipment Name	Serial No.	Model No.	Manufacturer	Cal.Date	Cal.Due Date
1	EMI Receiver	102174	ESR3	ESR3	2019.01.08	2020.01.07
2	LISN	101338	ENV432	ENV432	2019.01.14	2020.01.13
3	Pulse Limiter (10dB)	317	VTSD 9561 F	VTSD 9561 F	2019.01.03	2020.01.02



4	Coaxial cable(BNC) (30MHz-3GHz)	EMC01	N/A	Morlab	N/A	N/A
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4.3 Auxiliary Test Equipment

No.	Equipment Name	Serial No.	Model No.	Manufacturer	Cal.Date	Cal. Due Date
1	AC Adapter	N/A	LTE05UW-S1-BS	L.T.E	N/A	N/A
2	Test jig	N/A	EXN-RF21-01 tool p6	Easy-Measure Co.,Ltd.	N/A	N/A

4.4 List of Software Used

No.	Model	Version Number	Producer	Test Item
1	EMC32	V10.00.00	Rode&Schwarz	RE
2	EMC32	V10.20.01	Rode&Schwarz	CE

4.5 Radiated Test Equipments

RSE Test System						
No.	Equipment Name	Serial No.	Model No.	Manufacturer	Cal. Date	Cal.Due Date
1	Anechoic Chamber	N/A	9m*6m*6m	ETS-Lindgren	2017.07.21	2020.07.20
2	Signal Analyzer	101294	FSV40	R&S	2019.01.04	2020.01.03
3	Active Ring Antenna	FMZB 1513 #269	FMZB 1513	Schwarzbeck	2019.01.12	2020.01.11
4	Linear Log Periodic Broad Band Antenna	949	VULB 9163	Schwarzbeck	2018.09.25	2021.09.24
5	Ultra-Wideband Horn Antenna	102615	HF907	R&S	2019.01.19	2020.01.18
6	Ultra-Wideband Horn Antenna	17868	QSH-18-26	R&S/DE	2019.01.12	2020.01.11
7	Ultra-Wideband Horn Antenna	17869	QSH-26-40	R&S/DE	2019.01.12	2020.01.11
8	RF Switch and Control Platform	N/A	RSC	CDSI	N/A	N/A
9	Coaxial cable (N male) (9kHz -3GHz)	EMC02	N/A	Morlab	N/A	N/A



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10	Coaxial cable (N male) (9kHz -3GHz)	EMC03	N/A	Morlab	N/A	N/A
11	Coaxial cable (N male) (1GHz-26.5GHz)	EMC04	N/A	Morlab	N/A	N/A
12	Coaxial cable (N male) (1GHz-26.5GHz)	EMC05	N/A	Morlab	N/A	N/A
13	Pre-amplifier (1GHz-18GHz)	8810011	PAP-1G18	CDSI	2019.01.04	2020.01.03
14	Pre-amplifier (18GHz-40GHz)	17021-17024	PAP-1840	CDSI	2019.01.29	2020.01.28

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