FCC 47 CFR PART 15 SUBPART E

Applicant	:	Hill-Rom Services Pte Ltd
Product Type	:	WIFI DONGLE , USB
Trade Name	:	HILL-ROM
Model Number	:	198658
Test Specification	:	FCC 47 CFR PART 15 SUBPART E ANSI C63.10:2013
Receive Date	:	Sep. 19, 2016
Test Period	:	Nov. 04 ~ Nov. 09, 2016
Issue Date	:	Nov. 23, 2016

Issue by

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Taiwan Accreditation Foundation accreditation number: 1330
FCC Accredited Test Site Number: 510205

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Revision History

Rev.	Issue Date	Revisions	Revised By
00	Nov. 23, 2016	Initial Issue	Snow Wang

Verification of Compliance

Issued Date: Nov. 23, 2016

Applicant	:	Hill-Rom Services Pte Ltd
Product Type	:	WIFI DONGLE , USB
Trade Name	:	HILL-ROM
Model Number	:	198658
FCC ID	:	2AJKO198658
EUT Rated Voltage	:	DC 5V, 2A
Test Voltage	:	120 Vac / 60 Hz
Applicable Standard	:	FCC 47 CFR PART 15 SUBPART E ANSI C63.10:2013
Test Result	:	Complied
Performing Lab.	:	A Test Lab Techno Corp. No. 140-1, Changan Street, Bade District, Taoyuan City 33465, Taiwan (R.O.C) Tel：+86-3-2710188 / Fax：+86-3-2710190 Taiwan Accreditation Foundation accreditation number: 1330 http://www.atl-lab.com.tw/e-index.htm

A Test Lab Techno Corp. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by A Test Lab Techno Corp. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Approved By :	Fly Lu	Reviewed By :	Eric Ou Yang
(Manager)	(Fly Lu)	(Testing Engineer)	(Eric Ou Yang)

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1 General Information

1.1. Summary of Test Result

Standard FCC	Item	Result	Remark
15.407(b)(6) 15.207	AC Power Conducted Emission	PASS	---
15.407(b) 15.205 / 15.209	Transmitter Radiated Emissions	PASS	---
15.407(a)	Maximum Conducted Output Power	PASS	---
15.407(a)	26dB RF Bandwidth	Reference	---
15.407(e)	6dB RF Bandwidth	PASS	-----
15.407(a)	Peak Power Spectral Density	PASS	---
15.407(g)	Frequency Stability	PASS	---
15.407(a) 15.203	Antenna Requirement	PASS	---

The test results of this report relate only to the tested sample(s) identified in this report. Manufacturer or whom it may concern should recognize the pass or fail of the test result.

1.2. Measurement Uncertainty

Test Item	Frequency Range	Uncertainty
Conducted Emission	9kHz ~ 150KHz	2.7 dB
	150kHz ~ 30MHz	2.7 dB
Radiated Emission	9kHz ~ 30MHz	1.7 dB
	30MHz ~ 1000MHz	5.7 dB
	1000MHz ~ 18000MHz	5.5 dB
	18000MHz ~ 26500MHz	4.8 dB
	26500MHz ~ 40000MHz	4.8 dB
Conducted Output Power		+0.27 dB / -0.28 dB
RF Bandwidth		4.96%
Power Spectral Density		+0.71 dB / -0.77 dB
Frequency Stability		+ 2.212 x 10-7% / - 2.170 x 10-7
Duty Cycle		1.06%
Time Occupancy		1.40%

2 EUT Description

Applicant	Hill-Rom Services Pte Ltd 1 Yishun Avenue 7 Singapore 768923			
Manufacturer	Hill-Rom Services Pte Ltd 1 Yishun Avenue 7 Singapore 768923			
Product Type	WIFI DONGLE , USB			
Trade Name	HILL-ROM			
Model No.	198658			
FCC ID	2AJKO198658			
Operate Frequency	Frequency Band		Frequency Range (MHz)	Number of Channels
	IEEE 802.11a	U-NII Band I	5180 – 5240	4
		U-NII Band II-A	5260 – 5320	4
		U-NII Band II-C	5500 – 5700	11
		U-NII Band III	5745 – 5825	5
	IEEE 802.11n 20 MHz	U-NII Band I	5180 – 5240	4
		U-NII Band II-A	5260 – 5320	4
		U-NII Band II-C	5500 – 5700	11
		U-NII Band III	5745 – 5825	5
Modulation Type	OFDM			
Equipment Type	Client devices			
Antenna information	Type		Max. Gain (dBi)	
	PCB antenna		4.42	
Antenna Delivery	See section 3.1			
Frequency stability specification	± 20 ppm			

Frequency Band		RF Output Power (W)
IEEE 802.11a	U-NII Band I	0.021
	U-NII Band II-A	0.022
	U-NII Band II-C	0.015
	U-NII Band III	0.009
IEEE 802.11n 20 MHz	U-NII Band I	0.015
	U-NII Band II-A	0.014
	U-NII Band II-C	0.012
	U-NII Band III	0.006

3 Test Methodology

3.1. Mode of Operation

Decision of Test ATL has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Test Mode
Mode 1: Continuous TX mode
Mode 2: IEEE 802.11a Link Mode
Mode 3: IEEE 802.11n 20MHz Link Mode

Software used to control the EUT for staying in continuous transmitting mode was programmed.
After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz and power line conducted emissions below 30MHz, which worst case was in normal link mode only.

Equipment Type	
Outdoor access point	---
Indoor access point	---
Fixed point-to-point access points	---
Client devices	V

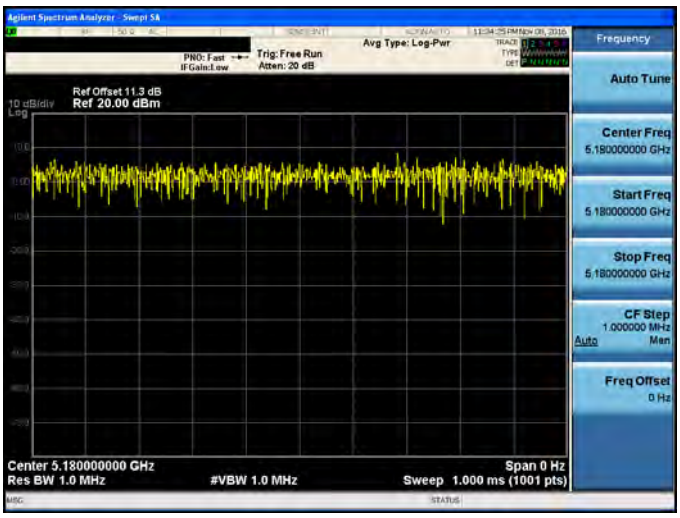
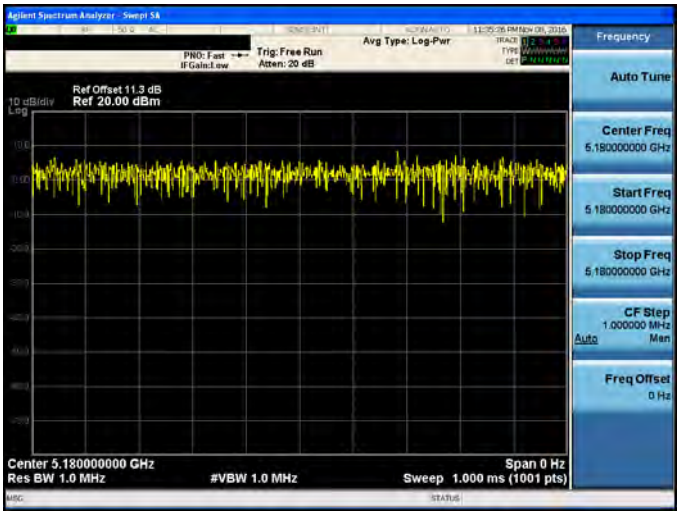
Test Mode	ANT-0
Mode 2	V
Mode 3	V

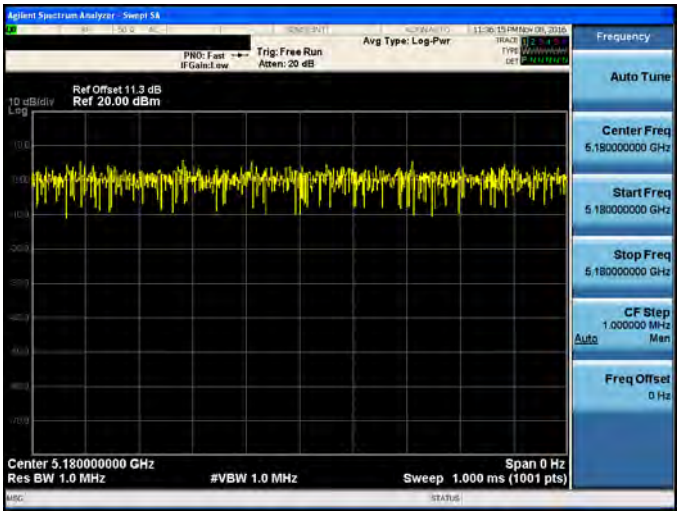
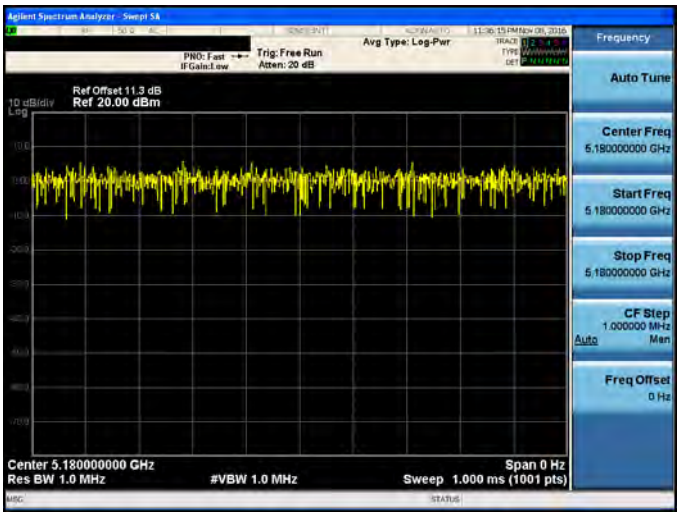
Test Mode	Band	Data Rate	Test Channel
Mode 2	U-NII Band I	6M	36, 40, 48
	U-NII Band II-A		52, 56, 64
	U-NII Band II-C		100, 112, 140
	U-NII Band III		149,157, 165
Mode 3	U-NII Band I	6.5M	36, 40, 48
	U-NII Band II-A		52, 56, 64
	U-NII Band II-C		100, 112, 140
	U-NII Band III		149,157, 165

Duty cycle

Test Mode	Frequency (MHz)	on time (ms)	on+off time (ms)	Duty cycle	Duty Factor (dB)	1/T Minimum VBW (kHz)
Mode 2: IEEE 802.11a Link Mode	5180.0	1.000	1.000	1.000	0.000	0.010
Mode 3: IEEE 802.11n 20MHz Link Mode	5180.0	1.000	1.000	1.000	0.000	0.010

Duty Cycle Graphs

Mode 2: IEEE 802.11a Link Mode	
On time	
On+off time	

Mode 3: IEEE 802.11n 20MHz Link Mode	
On time	
On+off time	

3.2. EUT Exercise Software

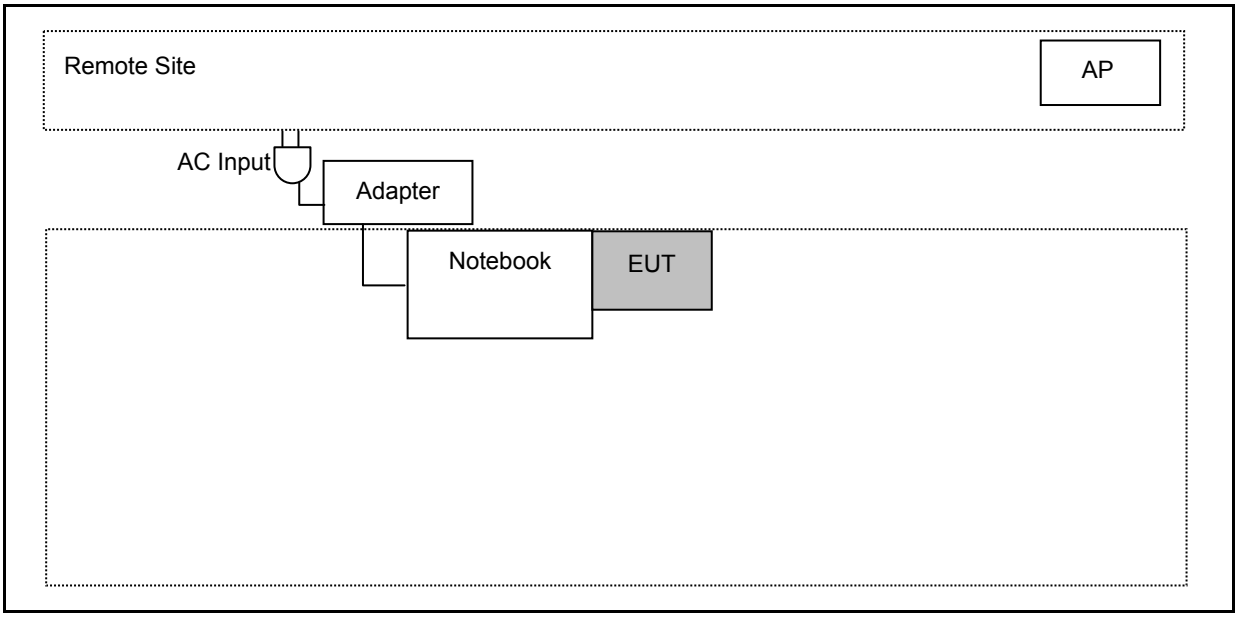
The EUT is operated in the engineering mode to fix the TX frequency for the purposes of measurement. According to its specifications, the EUT must comply with the requirements of Section 15.407 under the FCC Rules Part 15 Subpart E.

1.	Setup the EUT shown on 3.3.
2.	Turn on the power of all equipment.
3.	EUT run test program.

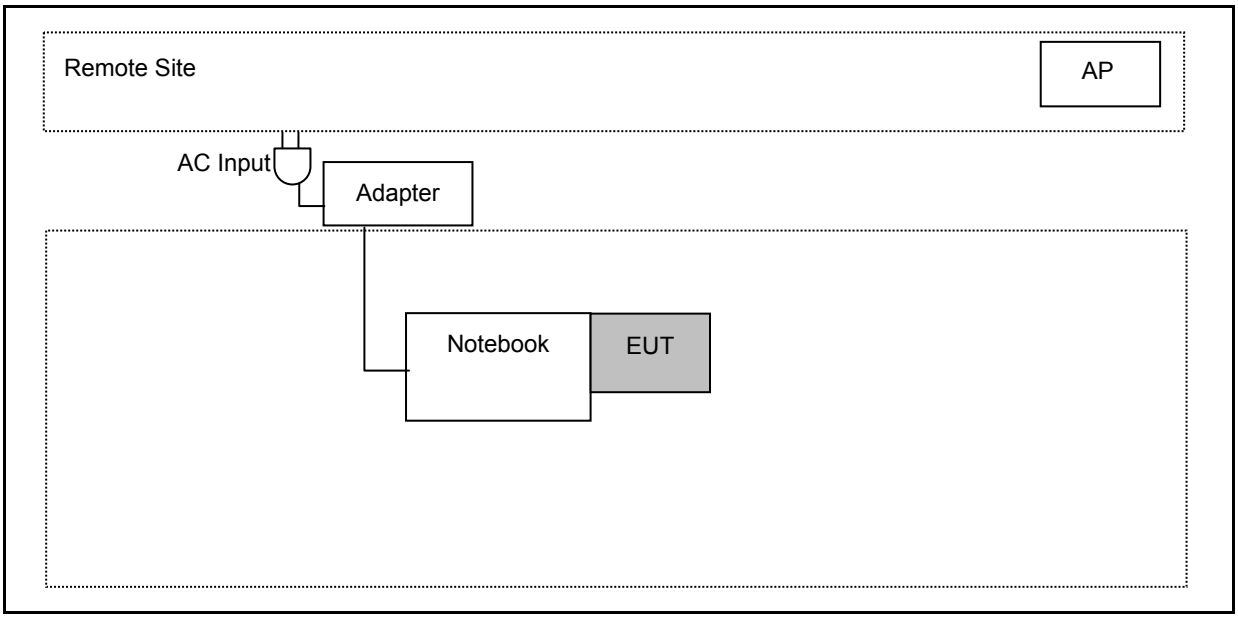
Measurement Software	
1	EZ-EMC Ver. ATL-03A1-1
2	EZ-EMC Ver ATL-ITC-3A1-1

3.3. Configuration of Test System Details

Conducted Emission



Radiated Emission



3.4. Test Site Environment

Items	Required (IEC 60068-1)	Actual
Temperature (°C)	15-35	26
Humidity (%RH)	25-75	60
Barometric pressure (mbar)	860-1060	950

4 Test Results

4.1. AC Power Conducted Emission Measurement

■ **Limit**

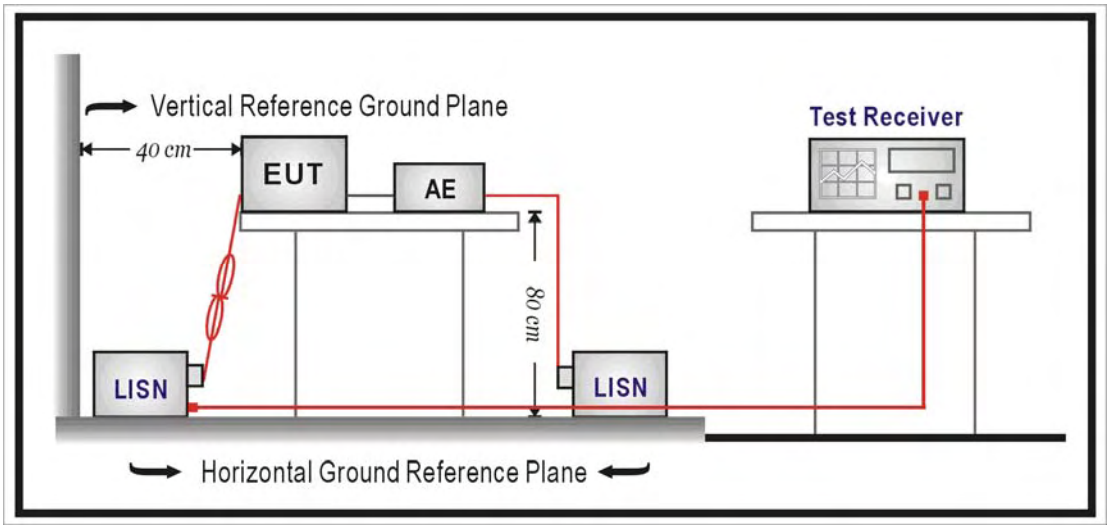
Frequency (MHz)	Quasi-peak	Average
0.15 - 0.5	66 to 56	56 to 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

■ **Test Instruments**

Describe	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Test Receiver	R&S	ESCI	100367	05/31/2016	1 year
LISN	R&S	ENV216	101040	03/15/2016	1 year
LISN	R&S	ENV216	101041	03/07/2016	1 year
RF Cable	Woken	00100D1380194M	TE-02-02	05/31/2016	1 year
Test Site	ATL	TE02	TE02	N.C.R.	-----

Note: N.C.R. = No Calibration Request.

■ **Test Setup**



4.2. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50Ω// 50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50Ω// 50uH coupling impedance with 50ohm termination.

Tabletop device shall be placed on a non-conducting platform, of nominal size 1 m by 1.5 m, raised 80 cm above the reference ground plane. The wall of screened room shall be located 40cm to the rear of the EUT. Other surfaces of tabletop or floor standing EUT shall be at least 80cm from any other ground conducting surface including one or more LISNs. For floor-standing device shall be placed under the EUT with a 12mm insulating material.

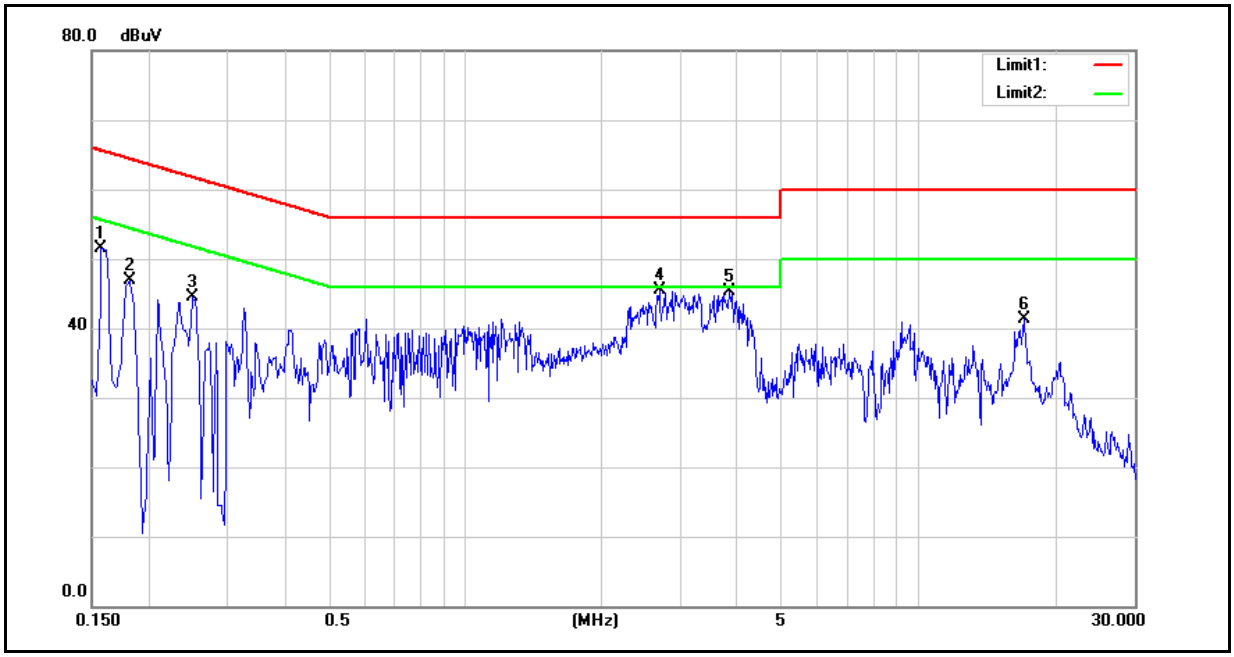
Conducted emissions were investigated over the frequency range from 0.15 MHz to 30 MHz using a resolution bandwidth of 9 kHz. The equipment under test (EUT) shall be meet the limits in section 4.1, as applicable, including the average limit and the quasi-peak limit when using respectively, an average detector and quasi-peak detector measured in accordance with the methods described of related standard. When all of peak value were complied with quasi-peak and average limit from 150kHz to 30MHz then quasi-peak and average measurement was unnecessary.

The AMN shall be placed 0,8 m from the boundary of the unit under test and bonded to a ground reference plane for AMNs mounted on top of the ground reference plane. This distance is between the closest points of the AMN and the EUT. All other units of the EUT and associated equipment shall be at least 0,8 m from the AMN. If the mains power cable is longer than 1m then the cable shall be folded back and forth at the centre of the lead to form a bundle no longer than 0.4m. All of interconnecting cables that hang closer than 40cm to the ground plane shall be folded back and forth in the center forming a bundle 30 cm to 40 cm long. All of EUT and AE shall be separate place more than 0.1m. All 50 Ω ports of the LISN shall be resistively terminated into 50 Ω loads when not connected to the measuring instrument.

If the reading of the measuring receiver shows fluctuations close to the limit, the reading shall be observed for at least 15 s at each measurement frequency; the higher reading shall be recorded with the exception of any brief isolated high reading which shall be ignored.

■ **Test Result**

Standard:	FCC Part 15E	Line:	L1
Test item:	Conducted Emission	Power:	AC 120V/60Hz
Model Number:	198658	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Test Mode:	Mode 1	Date:	11/02/2016
Description:			

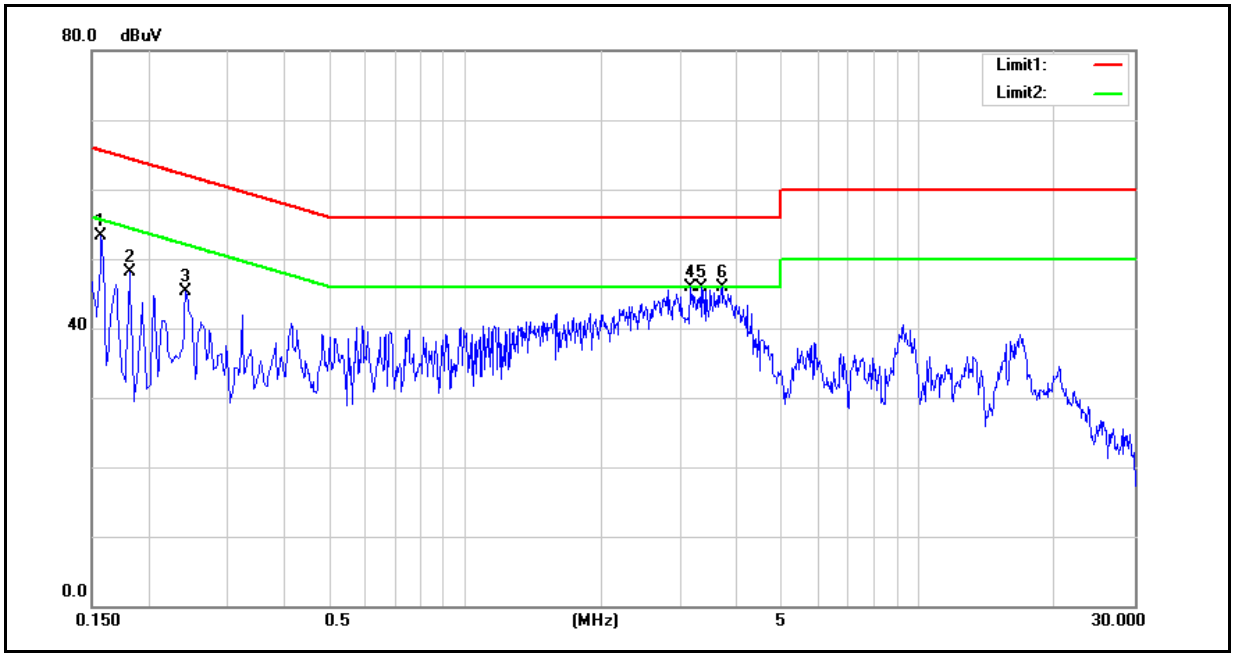


No.	Frequency (MHz)	QP reading (dBuV)	AVG reading (dBuV)	Correction factor (dB)	QP result (dBuV)	AVG result (dBuV)	QP limit (dBuV)	AVG limit (dBuV)	QP margin (dB)	AVG margin (dB)	Remark
1	0.1580	37.12	22.07	9.60	46.72	31.67	65.57	55.57	-18.85	-23.90	Pass
2	0.1820	33.43	13.65	9.59	43.02	23.24	64.39	54.39	-21.37	-31.15	Pass
3	0.2500	30.82	22.49	9.60	40.42	32.09	61.76	51.76	-21.34	-19.67	Pass
4	2.6900	30.77	22.98	9.71	40.48	32.69	56.00	46.00	-15.52	-13.31	Pass
5	3.8260	29.85	21.88	9.75	39.60	31.63	56.00	46.00	-16.40	-14.37	Pass
6	17.1580	22.52	16.05	9.95	32.47	26.00	60.00	50.00	-27.53	-24.00	Pass

Note: 1. Result = Correction factor + Reading

2. Correction factor = Antenna Factor + Cable loss – Pre-Amplifier gain.

Standard:	FCC Part 15E	Line:	N
Test item:	Conducted Emission	Power:	AC 120V/60Hz
Model Number:	198658	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Test Mode:	Mode 1	Date:	11/02/2016
Description:			



No.	Frequency (MHz)	QP reading (dBuV)	AVG reading (dBuV)	Correction factor (dB)	QP result (dBuV)	AVG result (dBuV)	QP limit (dBuV)	AVG limit (dBuV)	QP margin (dB)	AVG margin (dB)	Remark
1	0.1580	37.93	22.29	9.59	47.52	31.88	65.57	55.57	-18.05	-23.69	Pass
2	0.1820	32.81	12.18	9.58	42.39	21.76	64.39	54.39	-22.00	-32.63	Pass
3	0.2420	31.15	17.18	9.58	40.73	26.76	62.03	52.03	-21.30	-25.27	Pass
4	3.1540	31.11	23.88	9.72	40.83	33.60	56.00	46.00	-15.17	-12.40	Pass
5	3.3220	31.24	23.69	9.73	40.97	33.42	56.00	46.00	-15.03	-12.58	Pass
6	3.6820	30.33	22.80	9.74	40.07	32.54	56.00	46.00	-15.93	-13.46	Pass

Note: 1. Result = Correction factor + Reading

2. Correction factor = Antenna Factor + Cable loss – Pre-Amplifier gain.

4.3. Transmitter Radiated Emissions Measurement

■ **Limit**

(1)Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(a)For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(b)For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(c)For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(d)For transmitters operating in the 5.725-5.85 GHz band:

(i)All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

(2)Limits of Radiated Emission Measurement

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

Frequency Range (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	10	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

Note: 1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, 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.

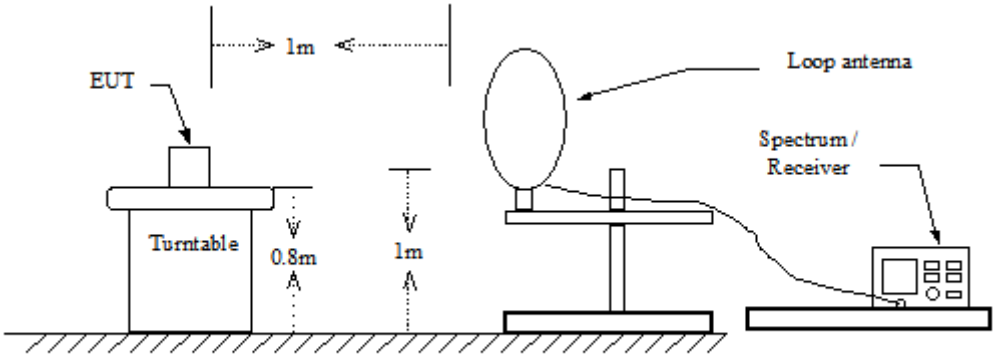
■ **Test Instruments**

3 Meter Chamber					
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
RF Pre-selector	Agilent	N9039A	MY46520256	01/08/2016	1 year
Spectrum Analyzer	Agilent	E4446A	MY46180578	01/08/2016	1 year
Pre Amplifier	Agilent	8449B	3008A02237	10/11/2016	1 year
Pre Amplifier	Agilent	8447D	2944A11119	01/11/2016	1 year
Broadband Antenna	Schwarzbeck	VULB9168	416	10/13/2016	1 year
Horn Antenna (1~18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	9120D-550	06/06/2016	1 year
Horn Antenna (18~40GHz)	ETS	3116	86467	09/05/2016	1 year
Loop Antenna	COM-POWER CORPORATION	AL-130	121014	02/01/2016	1 year
Microwave Cable	EMCI	EMC102-KM-KM-14000	151001	02/23/2016	1 year
Microwave Cable	EMCI	EMC-104-SM-SM-14000	140202	02/23/2016	1 year
Microwave Cable	EMCI	EMC104-SM-SM-600	140301	02/23/2016	1 year
Test Site	ATL	TE01	888001	08/29/2016	1 year

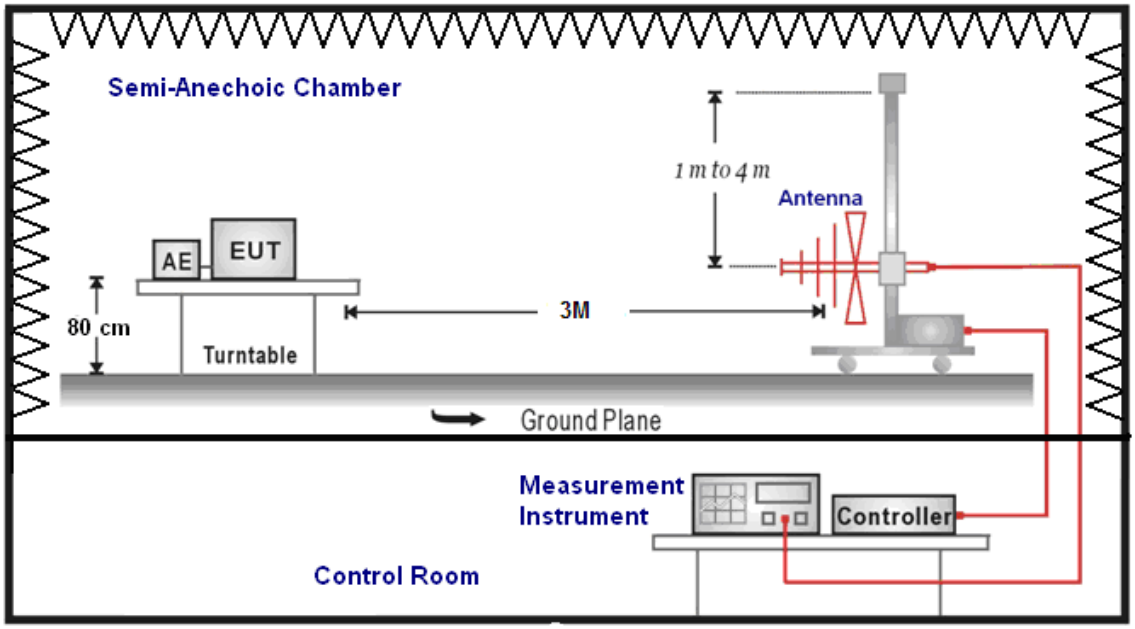
Note: N.C.R. = No Calibration Request.

■ **Setup**

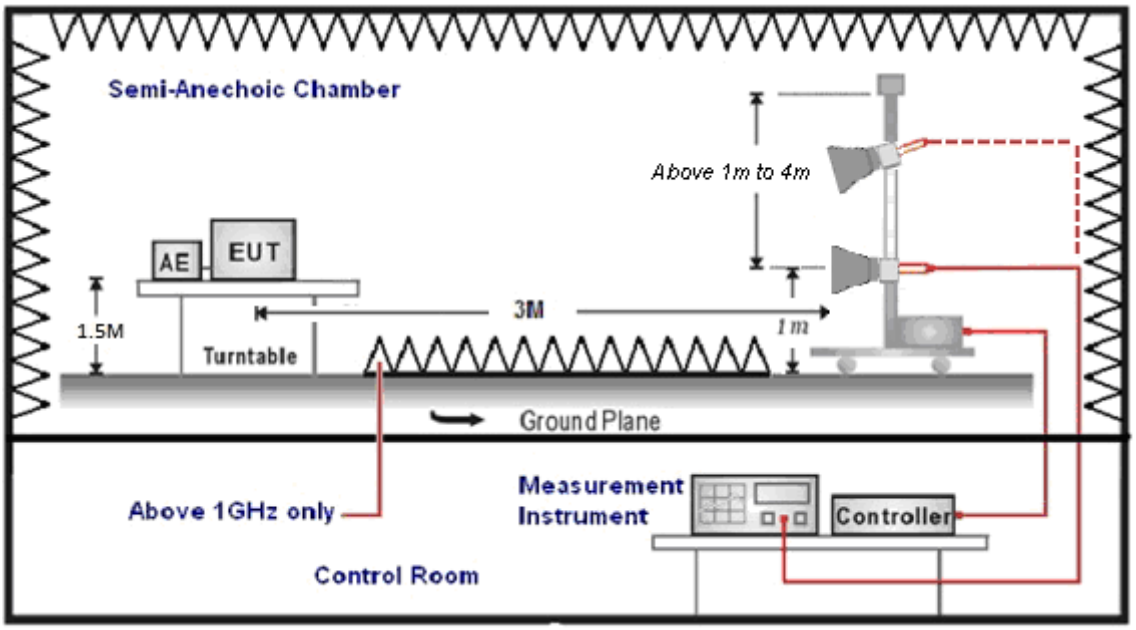
9kHz ~ 30MHz



30MHz ~ 1GHz



Above 1GHz



■ **Test Procedure**

Final radiation measurements were made on a three-meter, Semi Anechoic Chamber. The EUT system was placed on a nonconductive turntable which is 0.8 or 1.5 meters height(below 1GHz use 0.8m turntable / above 1GHz use 1.5m turntable), top surface 1.0 x 1.5 meter. The spectrum was examined from 250 MHz to 2.5 GHz in order to cover the whole spectrum below 10th harmonic which could generate from the EUT. During the test, EUT was set to transmit continuously & Measurements spectrum range from 9 kHz to 40 GHz is investigated.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For restricted measurements above 1 GHz the resolution bandwidth is set to 1 MHz, and then the video bandwidth is set to 3 MHz for peak measurements and 10 Hz for average measurements when Duty cycle > 0.98 / 1/T for average measurements when Duty cycle < 0.98.

For out of band measurements above 1 GHz the resolution bandwidth is set to 1 MHz, and then the video bandwidth is set to 3 MHz for peak measurements.

A nonconductive material surrounded the EUT to supporting the EUT for standing on tree orthogonal planes. At each condition, the EUT was rotated 360 degrees, and the antenna was raised and lowered from one to four meters to find the maximum emission levels. Measurements were taken using both horizontal and vertical antenna polarization.

SCHWARZBECK MESS-ELEKTRONIK Trilog-Broadband Antenna at 3 Meter and the ETS-Lindgren Double-Ridged Waveguide Horn antnna Schwarzbeck Mess-Elektronik Broadband Horn Antenna was used in frequencies 1 – 40 GHz at a distance of 3 meter. The antenna at an angle toward the source of the emission.All test results were extrapolated to equivalent signal at 3 meters utilizing an inverse linear distance extrapolation Factor (20dB/decade).

For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

Appropriate preamplifiers were used for improving sensitivity and precautions were taken to avoid overloading or desensitizing the spectrum analyzer. No post – detector video filters were used in the test.

The spectrum analyzer's 6 dB bandwidth was set to 1 MHz, and the analyzer was operated in the peak detection mode, for frequencies both below and up 1 GHz. The average levels were obtained by subtracting the duty cycle correction factor from the peak readings.

The following procedures were used to convert the emission levels measured in decibels referenced to 1 microvolt (dBuV) into field intensity in micro volts pre meter (uV/m).

The actual field intensity in decibels referenced to 1 microvolt in to field intensity in micro colts per meter (dBuV/m).

The actual field is intensity in referenced to 1 microvolt per meter (dBuV/m) is determined by algebraically adding the measured reading in dBuV, the antenna factor (dB), and cable loss (dB) and Subtracting the gain of preamplifier (dB) is auto calculate in spectrum analyzer.

(1) Amplitude (dBuV/m) = FI (dBuV) +AF (dBuV) +CL (dBuV)-Gain (dB)
FI= Reading of the field intensity.
AF= Antenna factor.
CL= Cable loss.
P.S Amplitude is auto calculate in spectrum analyzer.

(2) Actual Amplitude (dBuV/m) = Amplitude (dBuV)-Dis(dB)
The FCC specified emission limits were calculated according the EUT operating frequency and by following linear interpolation equations:
(a) For fundamental frequency : Transmitter Output < +30dBm
(b) For spurious frequency : Spurious emission limits = fundamental emission limit /10

Measuring Instruments and setting

The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000MHz
Stop Frequency	40GHz
RBW/VBW(Emission in restricted band)	1MHz / 3MHz for Peak 1MHz / (1/T) for Average
RBW/VBW(Emission in non-restricted band)	1MHz / 3MHz for Peak

■ **Test Result**

Below 1GHz

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	198658	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Test Mode:	Mode 1	Date:	11/05/2016

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
206.5000	26.25	-7.73	18.52	43.50	-24.98	QP	H
336.0000	26.72	-2.87	23.85	46.00	-22.15	QP	H
465.0000	26.93	0.10	27.03	46.00	-18.97	QP	H
623.5000	27.09	3.38	30.47	46.00	-15.53	QP	H
740.5000	26.29	5.77	32.06	46.00	-13.94	QP	H
860.0000	25.86	7.76	33.62	46.00	-12.38	QP	H
232.5000	31.73	-6.87	24.86	46.00	-21.14	QP	V
357.0000	26.59	-2.54	24.05	46.00	-21.95	QP	V
522.5000	27.97	1.06	29.03	46.00	-16.97	QP	V
678.5000	26.49	4.33	30.82	46.00	-15.18	QP	V
778.5000	26.56	6.41	32.97	46.00	-13.03	QP	V
903.5000	25.53	8.67	34.20	46.00	-11.80	QP	V

Note: 1. No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz).

2. Result = Correction factor + Reading

3. Correction factor = Antenna Factor + Cable loss – Pre-Amplifier gain.

Above 1GHz

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	198658	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Test Mode:	Mode 2	Date:	11/05/2016
Frequency:	5180MHz		

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
10360.000	45.91	4.97	50.88	68.20	-17.32	peak	H
10360.000	45.51	4.97	50.48	68.20	-17.72	peak	V

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	198658	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Test Mode:	Mode 2	Date:	11/05/2016
Frequency:	5200MHz		

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
10400.000	44.55	5.07	49.62	68.20	-18.58	peak	H
10400.000	45.73	5.07	50.80	68.20	-17.40	peak	V

Note: 1. Result = Correction factor + Reading

2. Correction factor = Antenna Factor + Cable loss – Pre-Amplifier gain.

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	198658	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Test Mode:	Mode 2	Date:	11/05/2016
Frequency:	5240MHz		

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
10480.000	44.02	5.25	49.27	68.20	-18.93	peak	H
10480.000	47.41	5.25	52.66	68.20	-15.54	peak	V

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Transmitter Radiated Emissions	Power:	AC 120V/60Hz
Model Number:	198658	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Test Mode:	Mode 2	Date:	11/05/2016
Frequency:	5260MHz		

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
10520.000	44.40	5.33	49.73	68.20	-18.47	peak	H
10520.000	44.89	5.33	50.22	68.20	-17.98	peak	V

Note: 1. Result = Correction factor + Reading

2. Correction factor = Antenna Factor + Cable loss – Pre-Amplifier gain.

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Transmitter Radiated Emissions	Power:	AC 120V/60Hz
Model Number:	198658	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Test Mode:	Mode 2	Date:	11/05/2016
Frequency:	5280MHz		

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
10560.000	45.64	5.37	51.01	68.20	-17.19	peak	H
10560.000	46.48	5.37	51.85	68.20	-16.35	peak	V

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Transmitter Radiated Emissions	Power:	AC 120V/60Hz
Model Number:	198658	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Test Mode:	Mode 2	Date:	11/05/2016
Frequency:	5320MHz		

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
10640.000	46.35	5.45	51.80	74.00	-22.20	peak	H
10640.000	45.59	5.45	51.04	74.00	-22.96	peak	V

Note: 1. Result = Correction factor + Reading

2. Correction factor = Antenna Factor + Cable loss – Pre-Amplifier gain.

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Transmitter Radiated Emissions	Power:	AC 120V/60Hz
Model Number:	198658	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Test Mode:	Mode 2	Date:	11/05/2016
Frequency:	5500MHz		

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
11000.000	45.73	5.78	51.51	74.00	-22.49	peak	H
11000.000	45.69	5.78	51.47	74.00	-22.53	peak	V

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Transmitter Radiated Emissions	Power:	AC 120V/60Hz
Model Number:	198658	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Test Mode:	Mode 2	Date:	11/05/2016
Frequency:	5560MHz		

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
11120.000	45.55	5.87	51.42	74.00	-22.58	peak	H
11120.000	45.21	5.87	51.08	74.00	-22.92	peak	V

Note: 1. Result = Correction factor + Reading

2. Correction factor = Antenna Factor + Cable loss – Pre-Amplifier gain.

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Transmitter Radiated Emissions	Power:	AC 120V/60Hz
Model Number:	198658	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Test Mode:	Mode 2	Date:	11/05/2016
Frequency:	5700MHz		

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
11400.000	45.28	6.07	51.35	74.00	-22.65	peak	H
11400.000	45.68	6.07	51.75	74.00	-22.25	peak	V

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	198658	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Test Mode:	Mode 2	Date:	11/05/2016
Frequency:	5745MHz		

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
11490.000	45.45	6.14	51.59	74.00	-22.41	peak	H
11490.000	45.18	6.14	51.32	74.00	-22.68	peak	V

Note: 1. Result = Correction factor + Reading

2. Correction factor = Antenna Factor + Cable loss – Pre-Amplifier gain.

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	198658	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Test Mode:	Mode 2	Date:	11/05/2016
Frequency:	5785MHz		

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
11570.000	43.82	6.35	50.17	74.00	-23.83	peak	H
11570.000	44.58	6.35	50.93	74.00	-23.07	peak	V

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	198658	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Test Mode:	Mode 2	Date:	11/05/2016
Frequency:	5825MHz		

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
11650.000	43.98	6.58	50.56	74.00	-23.44	peak	H
11650.000	45.12	6.58	51.70	74.00	-22.30	peak	V

Note: 1. Result = Correction factor + Reading

2. Correction factor = Antenna Factor + Cable loss – Pre-Amplifier gain.

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	198658	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Test Mode:	Mode 3	Date:	11/05/2016
Frequency:	5180MHz		

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
10360.000	45.92	4.97	50.89	68.20	-17.31	peak	H
10360.000	45.30	4.97	50.27	68.20	-17.93	peak	V

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	198658	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Test Mode:	Mode 3	Date:	11/05/2016
Frequency:	5200MHz		

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
10400.000	45.24	5.07	50.31	68.20	-17.89	peak	H
10400.000	44.16	5.07	49.23	68.20	-18.97	peak	V

Note: 1. Result = Correction factor + Reading

2. Correction factor = Antenna Factor + Cable loss – Pre-Amplifier gain.

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	198658	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Test Mode:	Mode 3	Date:	11/05/2016
Frequency:	5240MHz		

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
10480.000	45.31	5.25	50.56	68.20	-17.64	peak	H
10480.000	44.08	5.25	49.33	68.20	-18.87	peak	V

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Transmitter Radiated Emissions	Power:	AC 120V/60Hz
Model Number:	198658	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Test Mode:	Mode 3	Date:	11/05/2016
Frequency:	5260MHz		

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
10520.000	44.44	5.33	49.77	68.20	-18.43	peak	H
10520.000	44.11	5.33	49.44	68.20	-18.76	peak	V

Note: 1. Result = Correction factor + Reading

2. Correction factor = Antenna Factor + Cable loss – Pre-Amplifier gain.

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Transmitter Radiated Emissions	Power:	AC 120V/60Hz
Model Number:	198658	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Test Mode:	Mode 3	Date:	11/05/2016
Frequency:	5280MHz		

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
10560.000	45.92	5.37	51.29	68.20	-16.91	peak	H
10560.000	45.60	5.37	50.97	68.20	-17.23	peak	V

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Transmitter Radiated Emissions	Power:	AC 120V/60Hz
Model Number:	198658	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Test Mode:	Mode 3	Date:	11/05/2016
Frequency:	5320MHz		

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
10640.000	46.34	5.45	51.79	74.00	-22.21	peak	H
10640.000	45.20	5.45	50.65	74.00	-23.35	peak	V

Note: 1. Result = Correction factor + Reading

2. Correction factor = Antenna Factor + Cable loss – Pre-Amplifier gain.

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Transmitter Radiated Emissions	Power:	AC 120V/60Hz
Model Number:	198658	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Test Mode:	Mode 3	Date:	11/05/2016
Frequency:	5500MHz		

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
11000.000	44.60	5.78	50.38	74.00	-23.62	peak	H
11000.000	45.88	5.78	51.66	74.00	-22.34	peak	V

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Transmitter Radiated Emissions	Power:	AC 120V/60Hz
Model Number:	198658	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Test Mode:	Mode 3	Date:	11/05/2016
Frequency:	5560MHz		

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
11120.000	45.38	5.87	51.25	74.00	-22.75	peak	H
11120.000	45.49	5.87	51.36	74.00	-22.64	peak	V

Note: 1. Result = Correction factor + Reading

2. Correction factor = Antenna Factor + Cable loss – Pre-Amplifier gain.

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Transmitter Radiated Emissions	Power:	AC 120V/60Hz
Model Number:	198658	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Test Mode:	Mode 3	Date:	11/05/2016
Frequency:	5700MHz		

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
11400.000	45.09	6.07	51.16	74.00	-22.84	peak	H
11400.000	45.24	6.07	51.31	74.00	-22.69	peak	V

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	198658	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Test Mode:	Mode 3	Date:	11/05/2016
Frequency:	5745MHz		

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
11490.000	44.67	6.14	50.81	74.00	-23.19	peak	H
11490.000	44.70	6.14	50.84	74.00	-23.16	peak	V

Note: 1. Result = Correction factor + Reading

2. Correction factor = Antenna Factor + Cable loss – Pre-Amplifier gain.

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	198658	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Test Mode:	Mode 3	Date:	11/05/2016
Frequency:	5785MHz		

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
11570.000	44.42	6.35	50.77	74.00	-23.23	peak	H
11570.000	44.20	6.35	50.55	74.00	-23.45	peak	V

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	198658	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Test Mode:	Mode 3	Date:	11/05/2016
Frequency:	5825MHz		

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
11650.000	44.78	6.58	51.36	74.00	-22.64	peak	H
11650.000	44.90	6.58	51.48	74.00	-22.52	peak	V

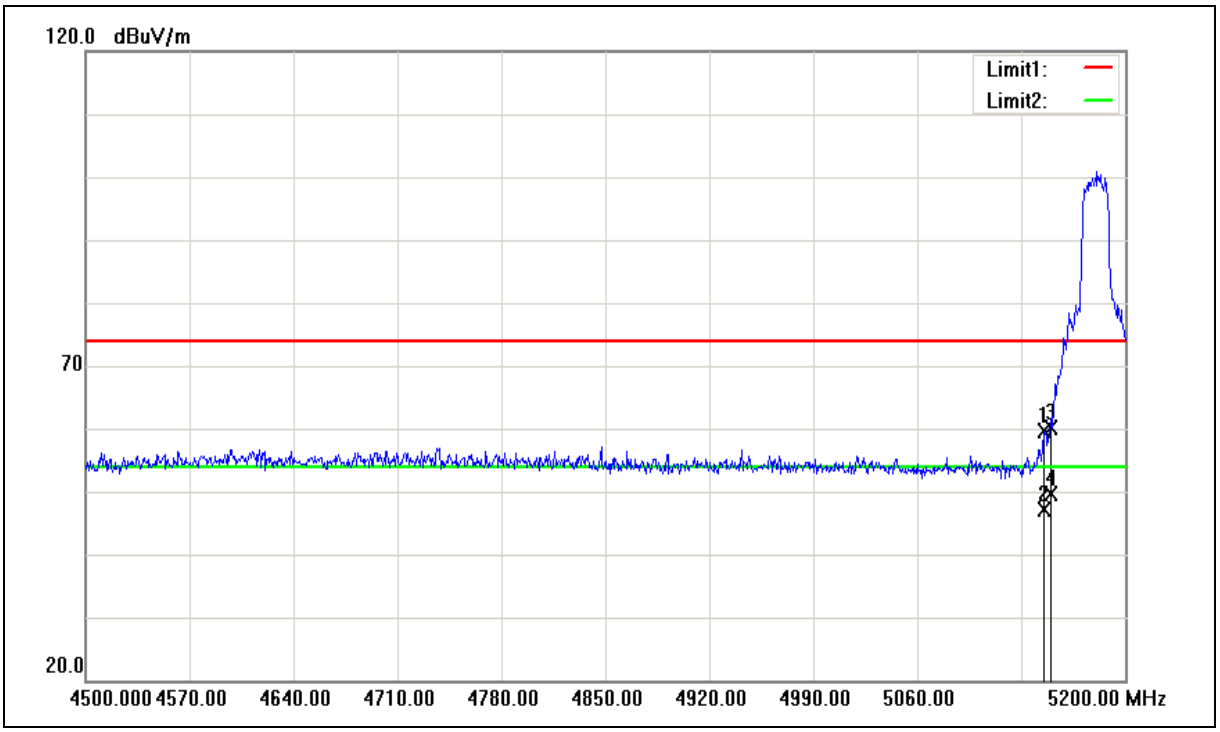
Note: 1. Result = Correction factor + Reading

2. Correction factor = Antenna Factor + Cable loss – Pre-Amplifier gain.

3. When the peak results are less than average limit, so not need to evaluate the average.

Band Edge

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Frequency:	5180MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 2	Date:	11/05/2016
Ant.Polar.:	Horizontal		
Description:			



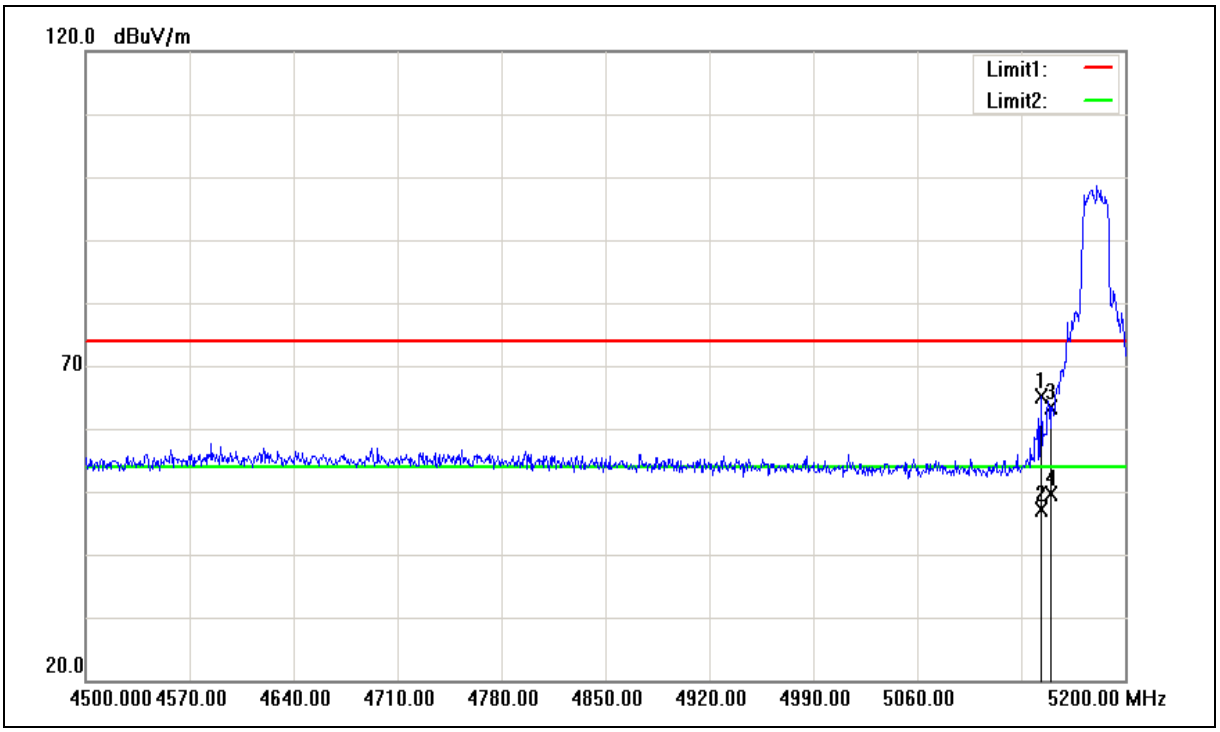
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5145.400	51.43	8.24	59.67	74.00	-14.33	peak
2	5145.400	38.81	8.24	47.05	54.00	-6.95	AVG
3	5150.000	52.00	8.25	60.25	74.00	-13.75	peak
4	5150.000	41.36	8.25	49.61	54.00	-4.39	AVG

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Frequency:	5180MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 2	Date:	11/05/2016
Ant.Polar.:	Vertical		
Description:			



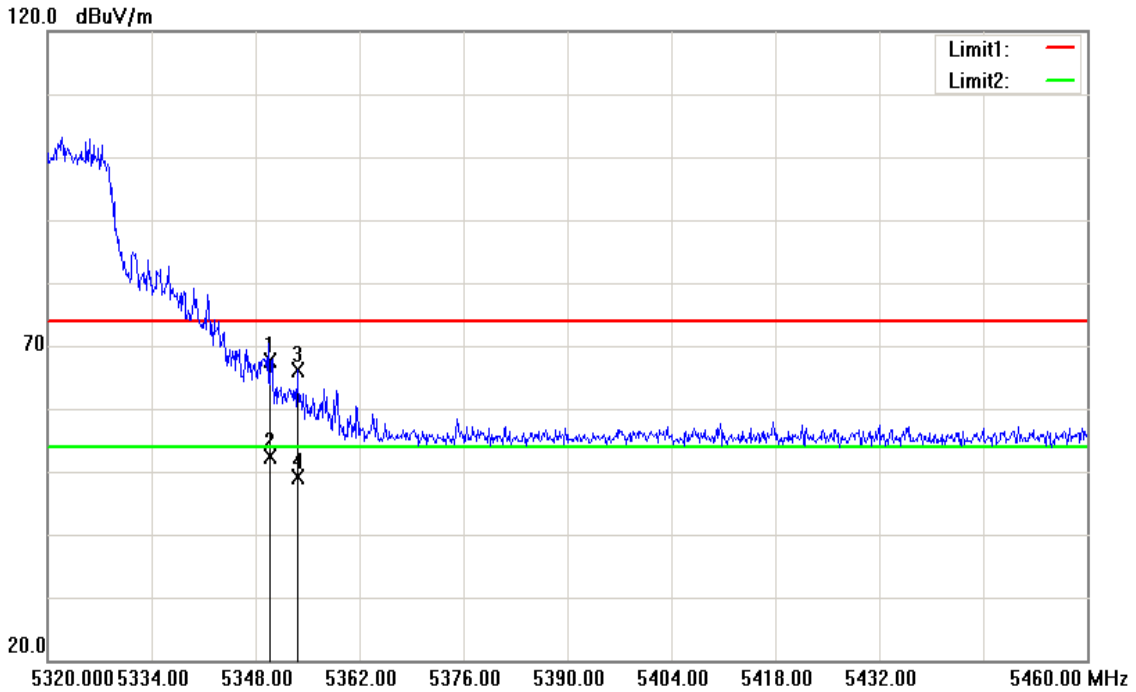
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5143.300	56.87	8.24	65.11	74.00	-8.89	peak
2	5143.300	38.98	8.24	47.22	54.00	-6.78	AVG
3	5150.000	55.07	8.25	63.32	74.00	-10.68	peak
4	5150.000	41.33	8.25	49.58	54.00	-4.42	AVG

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Frequency:	5320MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 2	Date:	11/05/2016
Ant.Polar.:	Horizontal		
Description:			



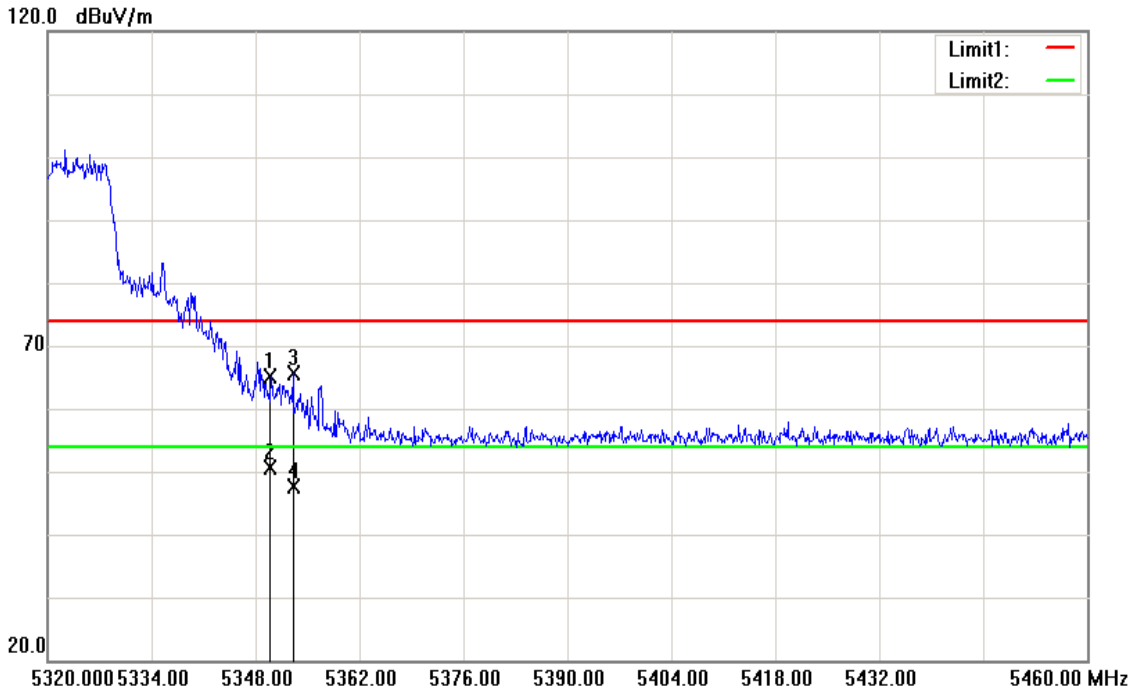
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5350.000	59.12	8.41	67.53	74.00	-6.47	peak
2	5350.000	44.01	8.41	52.42	54.00	-1.58	AVG
3	5353.600	57.64	8.42	66.06	74.00	-7.94	peak
4	5353.600	40.67	8.42	49.09	54.00	-4.91	AVG

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Frequency:	5320MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 2	Date:	11/05/2016
Ant.Polar.:	Vertical		
Description:			



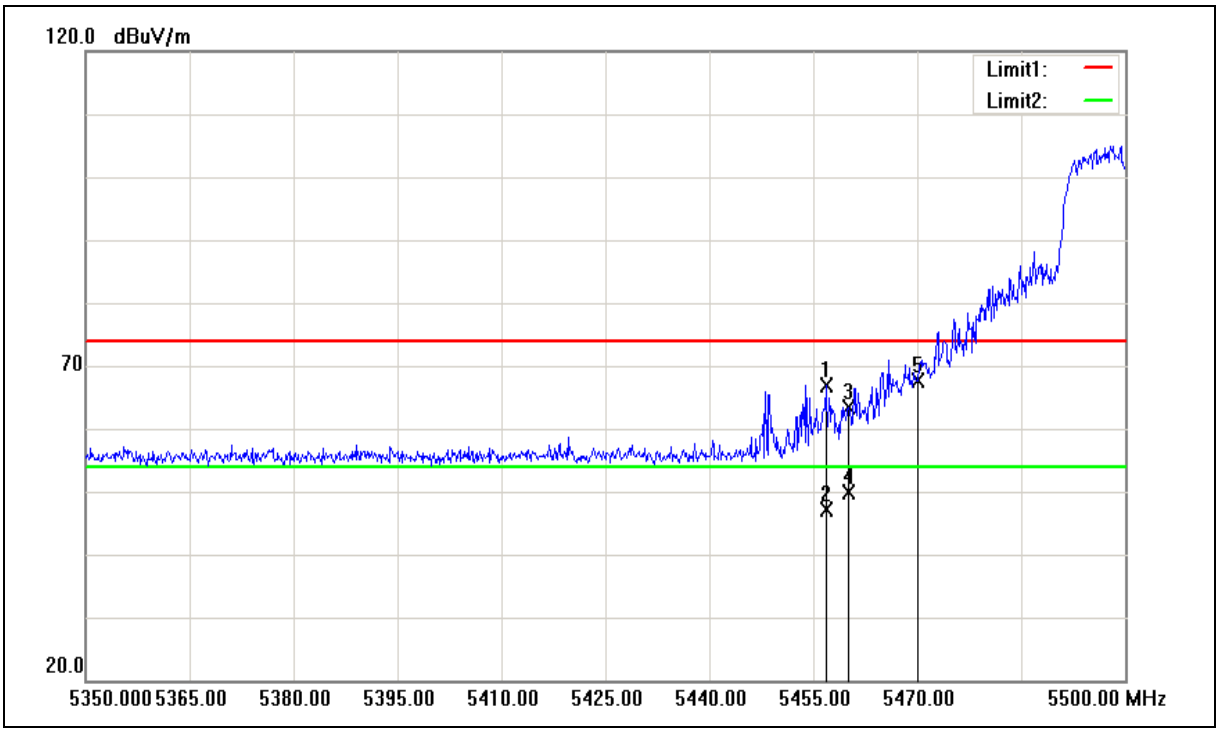
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5350.000	56.68	8.41	65.09	74.00	-8.91	peak
2	5350.000	42.22	8.41	50.63	54.00	-3.37	AVG
3	5353.040	57.20	8.42	65.62	74.00	-8.38	peak
4	5353.040	39.20	8.42	47.62	54.00	-6.38	AVG

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Frequency:	5500MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 2	Date:	11/05/2016
Ant.Polar.:	Horizontal		
Description:			



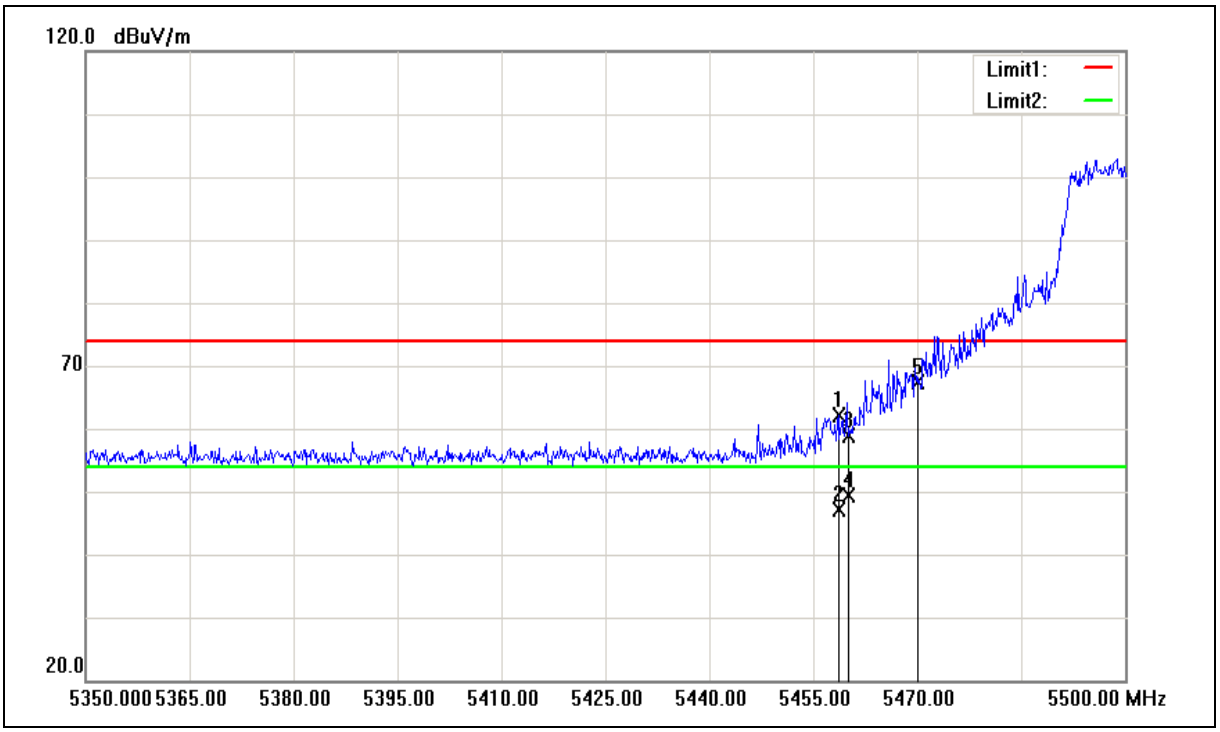
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5456.800	58.48	8.51	66.99	74.00	-7.01	peak
2	5456.800	38.74	8.51	47.25	54.00	-6.75	AVG
3	5460.000	54.98	8.51	63.49	74.00	-10.51	peak
4	5460.000	41.30	8.51	49.81	54.00	-4.19	AVG
5	5470.000	59.16	8.53	67.69	68.20	-0.51	peak

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Frequency:	5500MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 2	Date:	11/05/2016
Ant.Polar.:	Vertical		
Description:			



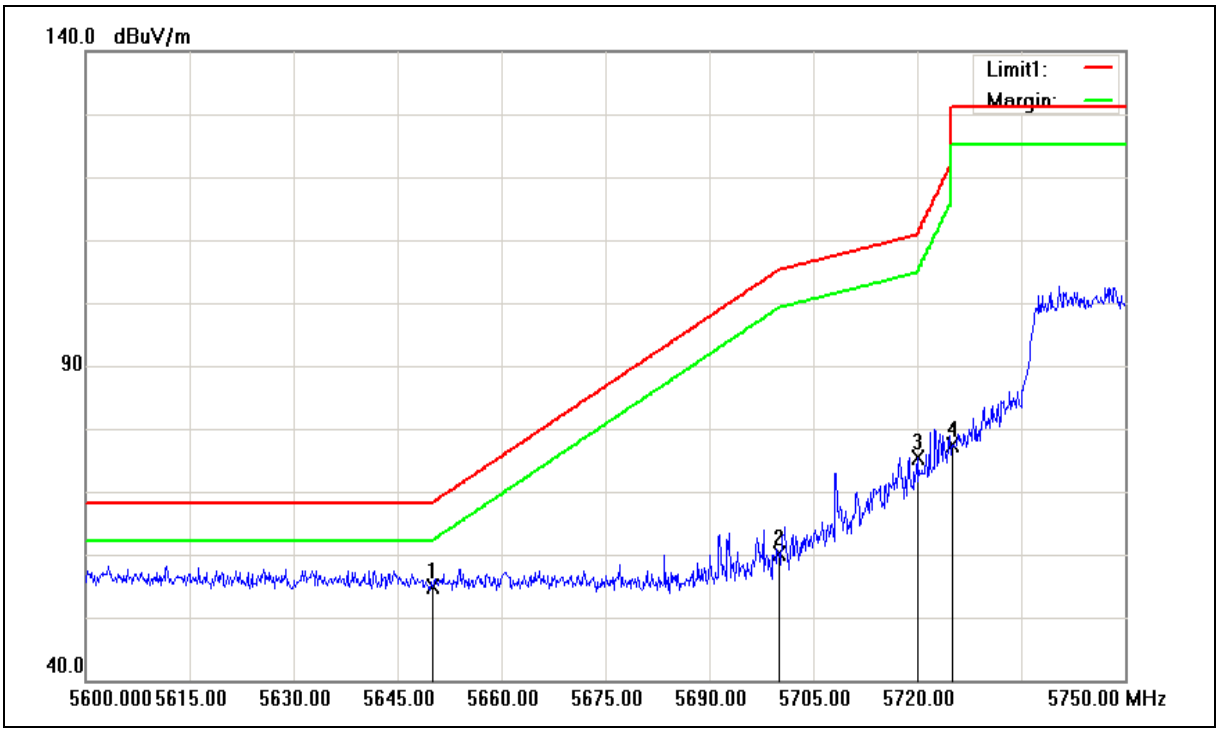
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5458.600	53.60	8.51	62.11	74.00	-11.89	peak
2	5458.600	38.60	8.51	47.11	54.00	-6.89	AVG
3	5460.000	50.25	8.51	58.76	74.00	-15.24	peak
4	5460.000	40.90	8.51	49.41	54.00	-4.59	AVG
5	5470.000	58.79	8.53	67.32	68.20	-0.88	peak

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Frequency:	5745MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 2	Date:	11/05/2016
Ant.Polar.:	Horizontal		
Description:			



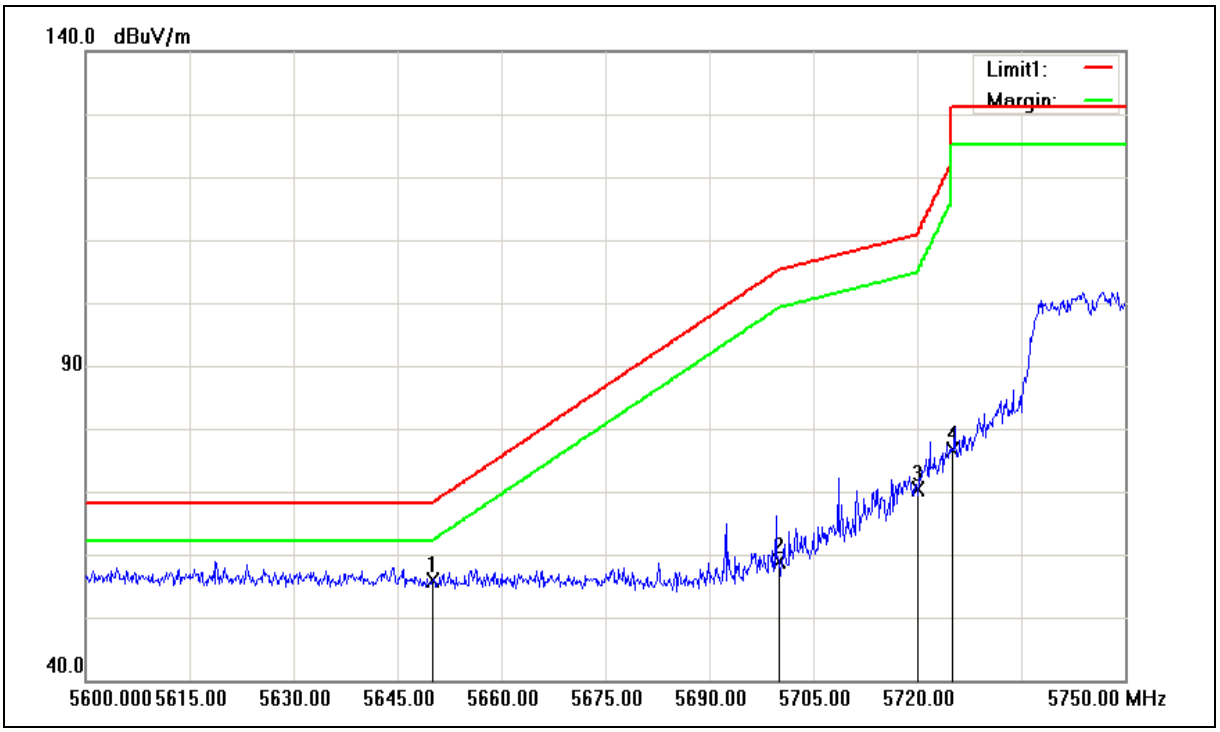
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5650.000	45.93	8.93	54.86	68.20	-13.34	peak
2	5700.000	51.15	9.05	60.20	105.20	-45.00	peak
3	5720.000	66.36	9.09	75.45	110.80	-35.35	peak
4	5725.000	68.33	9.11	77.44	122.20	-44.76	peak

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Frequency:	5745MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 2	Date:	11/05/2016
Ant.Polar.:	Vertical		
Description:			



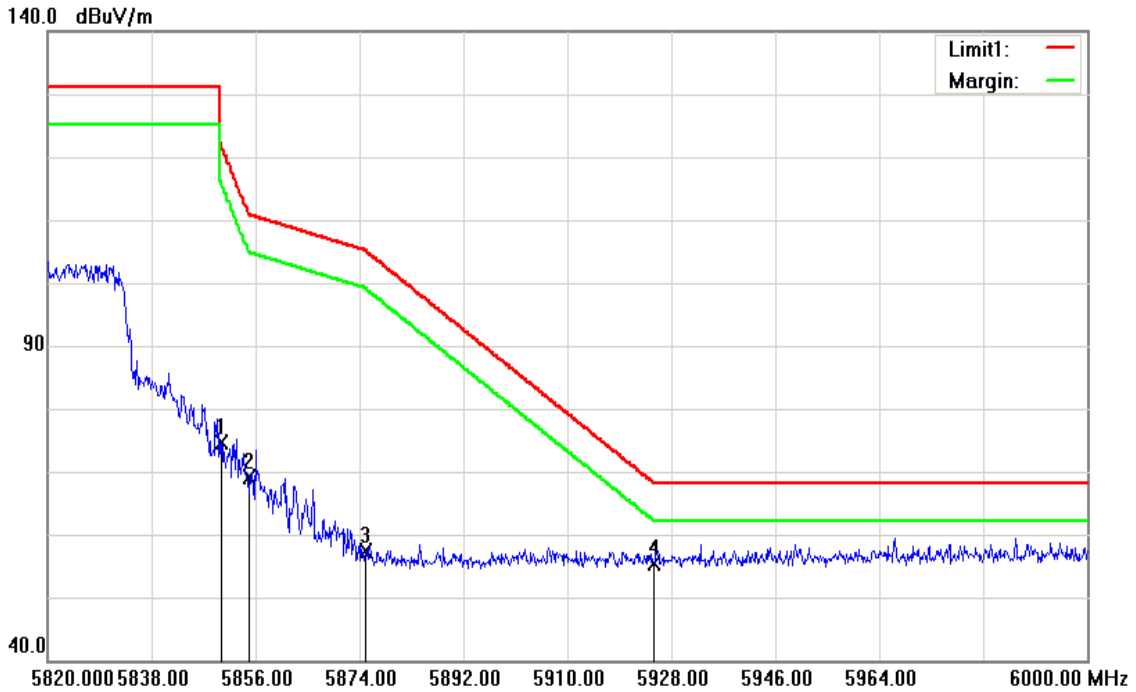
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5650.000	46.98	8.93	55.91	68.20	-12.29	peak
2	5700.000	49.74	9.05	58.79	105.20	-46.41	peak
3	5720.000	61.33	9.09	70.42	110.80	-40.38	peak
4	5725.000	67.41	9.11	76.52	122.20	-45.68	peak

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Frequency:	5825MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 2	Date:	11/05/2016
Ant.Polar.:	Horizontal		
Description:			



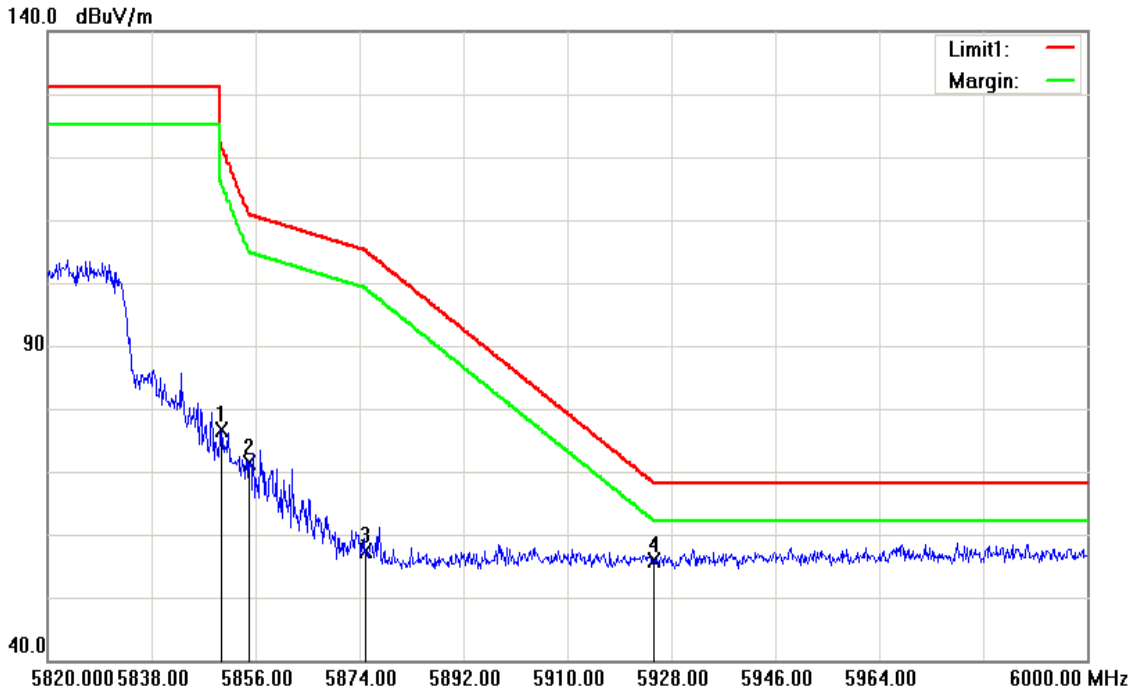
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5850.000	65.25	9.41	74.66	122.20	-47.54	peak
2	5855.000	59.78	9.43	69.21	110.80	-41.59	peak
3	5875.000	47.96	9.48	57.44	105.20	-47.76	peak
4	5925.000	45.70	9.61	55.31	68.20	-12.89	peak

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Frequency:	5825MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 2	Date:	11/05/2016
Ant.Polar.:	Vertical		
Description:			



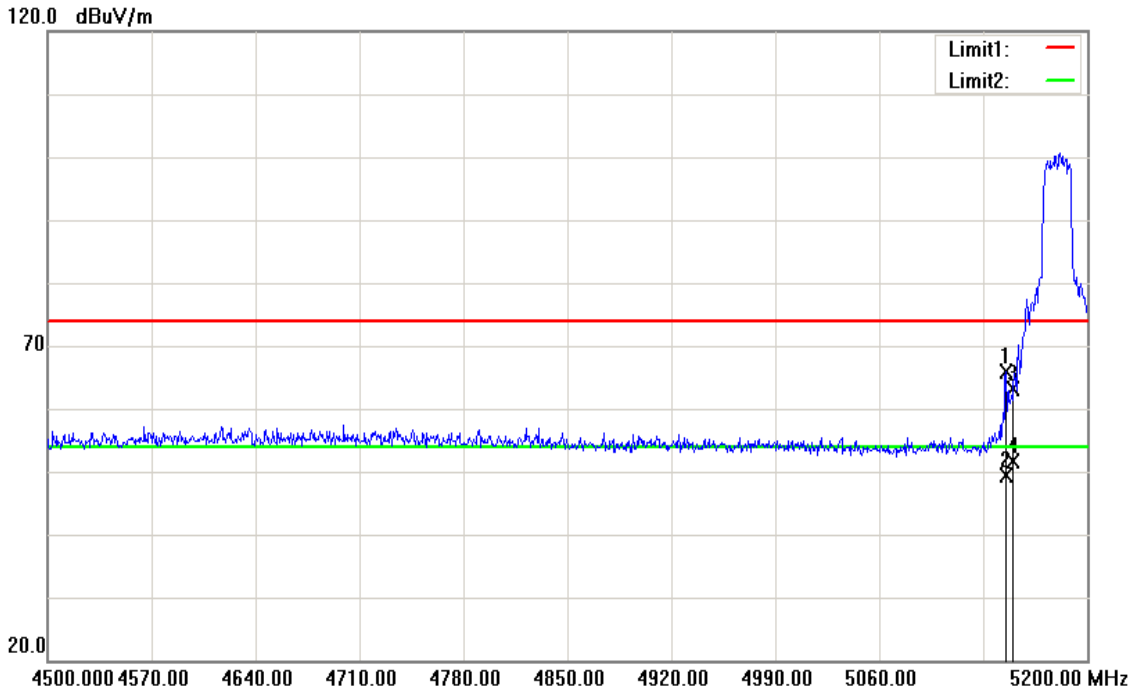
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5850.000	67.17	9.41	76.58	122.20	-45.62	peak
2	5855.000	61.88	9.43	71.31	110.80	-39.49	peak
3	5875.000	48.00	9.48	57.48	105.20	-47.72	peak
4	5925.000	46.31	9.61	55.92	68.20	-12.28	peak

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Frequency:	5180MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 3	Date:	11/05/2016
Ant.Polar.:	Horizontal		
Description:			



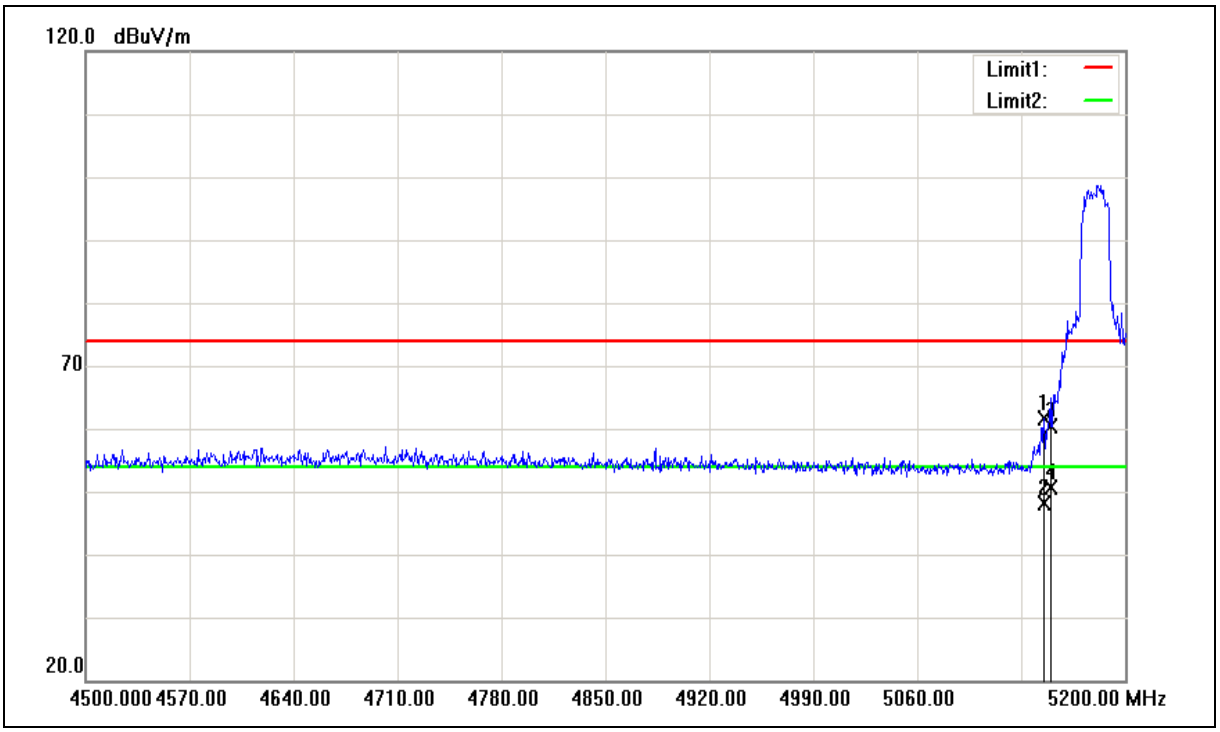
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5145.400	57.53	8.24	65.77	74.00	-8.23	peak
2	5145.400	41.14	8.24	49.38	54.00	-4.62	AVG
3	5150.000	54.96	8.25	63.21	74.00	-10.79	peak
4	5150.000	43.33	8.25	51.58	54.00	-2.42	AVG

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Frequency:	5180MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 3	Date:	11/05/2016
Ant.Polar.:	Vertical		
Description:			



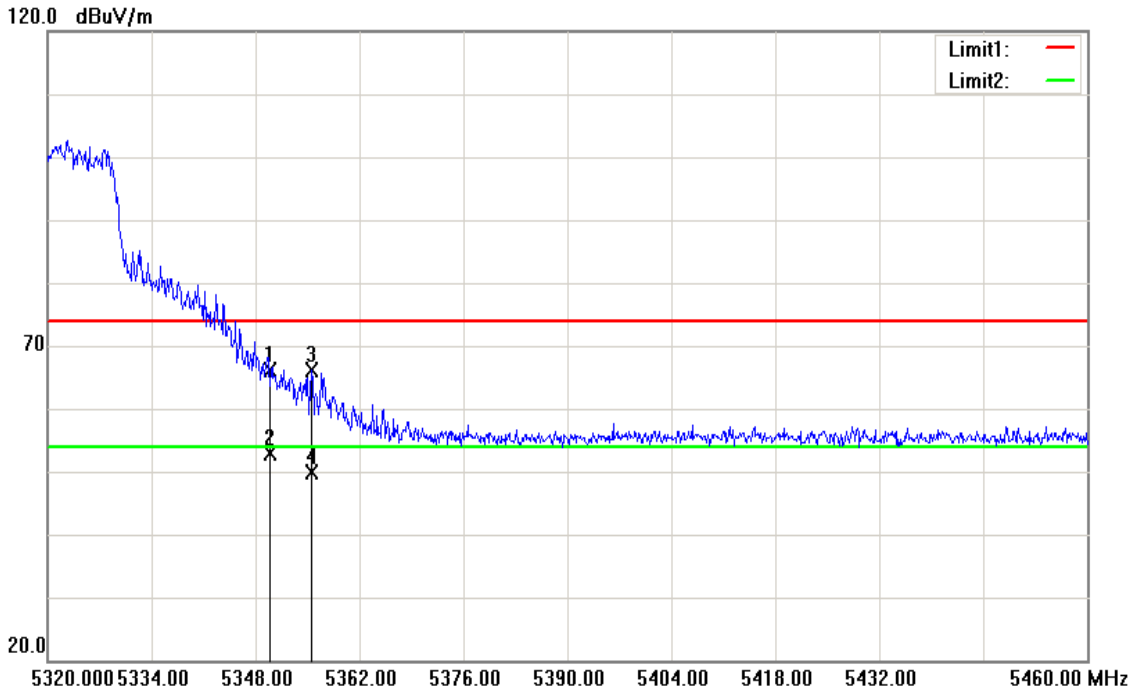
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5145.400	53.44	8.24	61.68	74.00	-12.32	peak
2	5145.400	39.88	8.24	48.12	54.00	-5.88	AVG
3	5150.000	52.10	8.25	60.35	74.00	-13.65	peak
4	5150.000	42.26	8.25	50.51	54.00	-3.49	AVG

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Frequency:	5320MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 3	Date:	11/05/2016
Ant.Polar.:	Horizontal		
Description:			



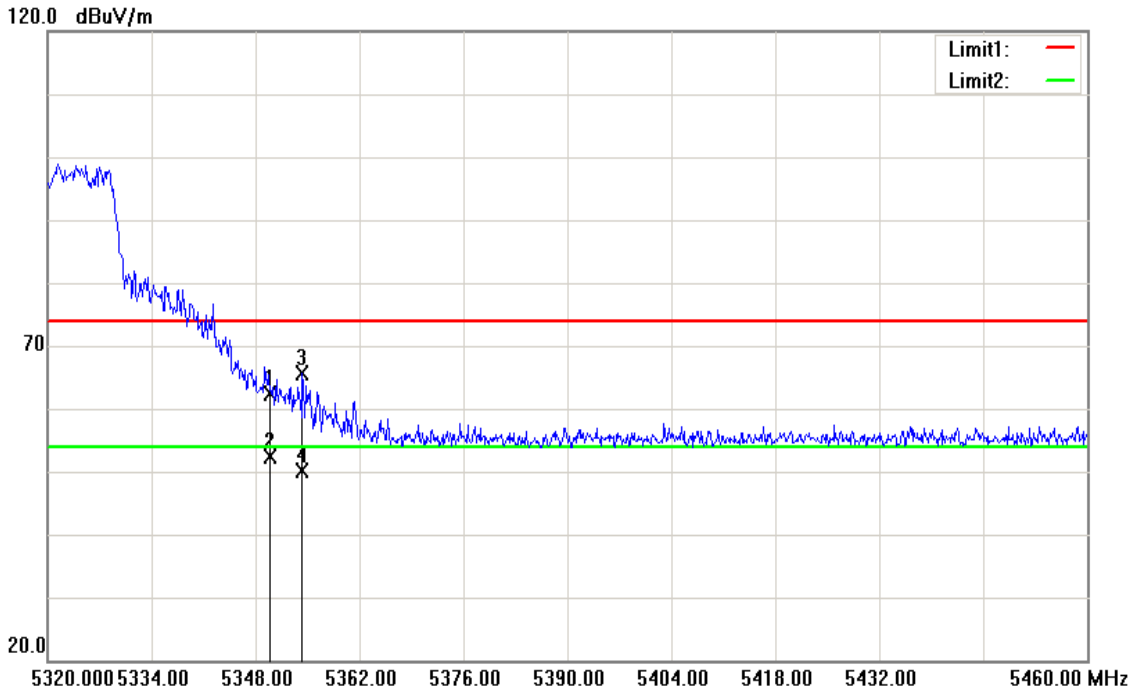
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5350.000	57.79	8.41	66.20	74.00	-7.80	peak
2	5350.000	44.37	8.41	52.78	54.00	-1.22	AVG
3	5355.560	57.75	8.42	66.17	74.00	-7.83	peak
4	5355.560	41.52	8.42	49.94	54.00	-4.06	AVG

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Frequency:	5320MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 3	Date:	11/05/2016
Ant.Polar.:	Vertical		
Description:			



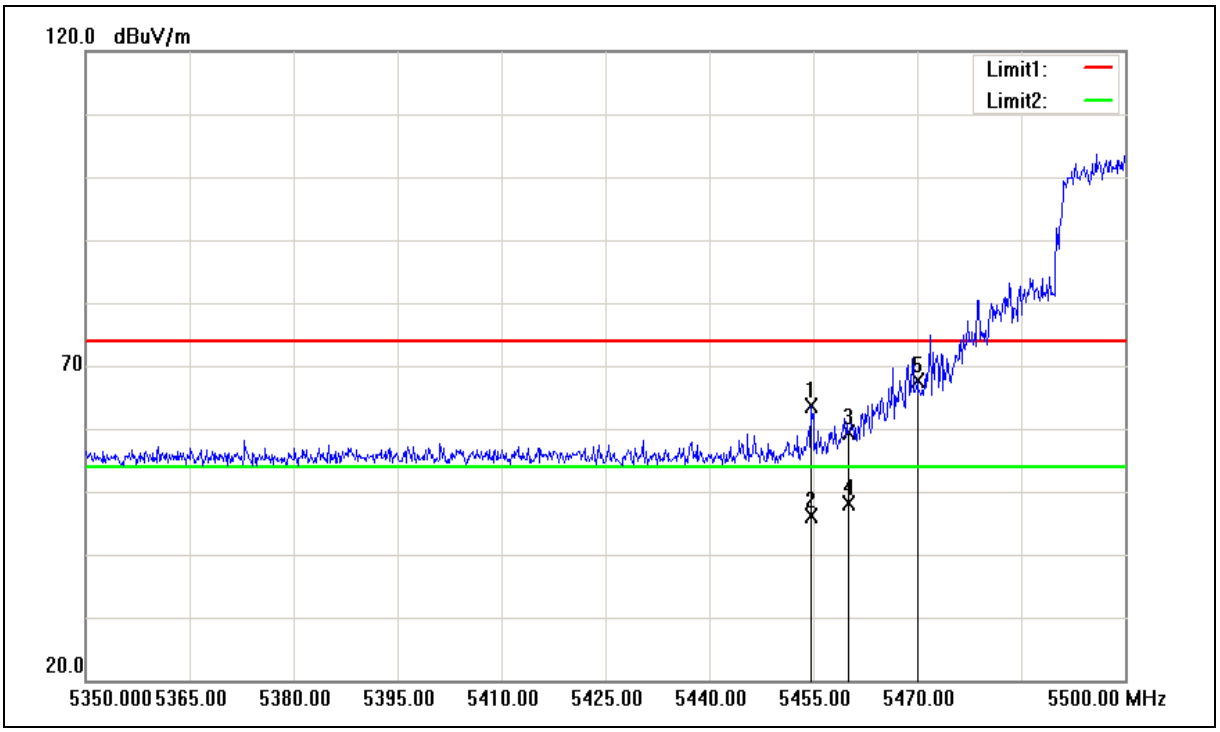
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5350.000	54.05	8.41	62.46	74.00	-11.54	peak
2	5350.000	43.89	8.41	52.30	54.00	-1.70	AVG
3	5354.300	57.26	8.42	65.68	74.00	-8.32	peak
4	5354.300	41.77	8.42	50.19	54.00	-3.81	AVG

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Frequency:	5500MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 3	Date:	11/05/2016
Ant.Polar.:	Horizontal		
Description:			



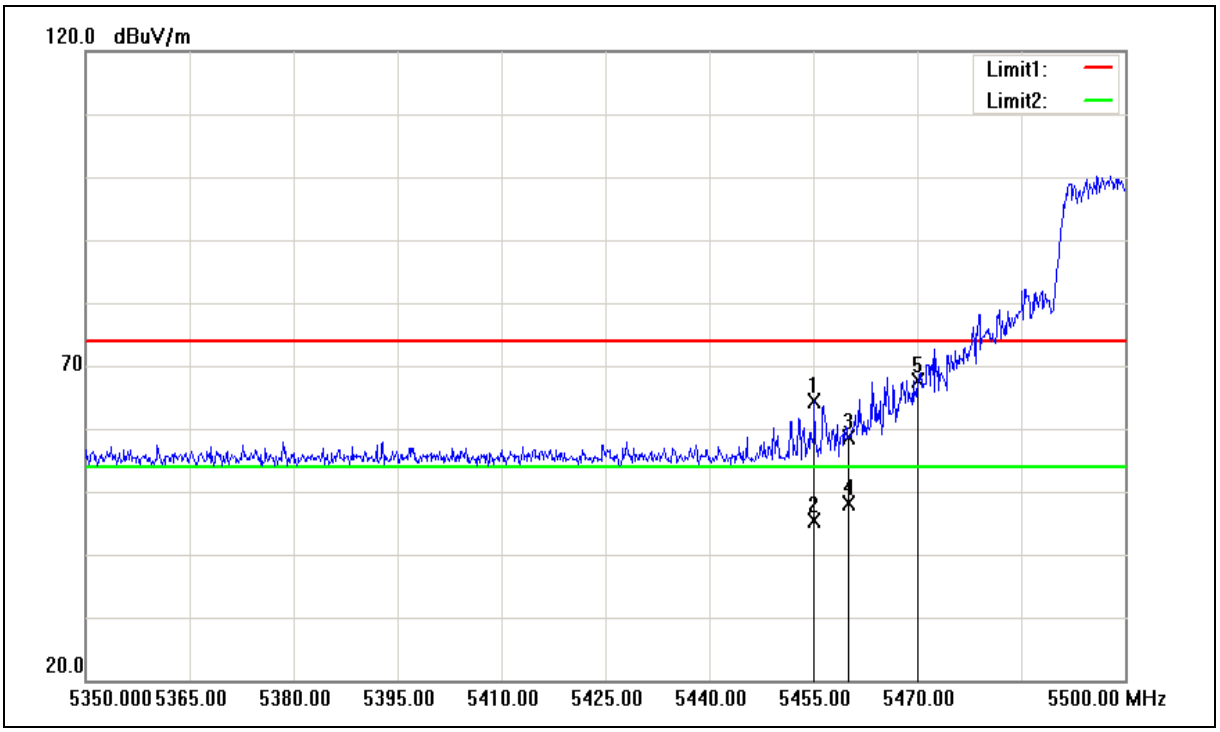
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5454.700	55.07	8.51	63.58	74.00	-10.42	peak
2	5454.700	37.72	8.51	46.23	54.00	-7.77	AVG
3	5460.000	50.78	8.51	59.29	74.00	-14.71	peak
4	5460.000	39.57	8.51	48.08	54.00	-5.92	AVG
5	5470.000	59.16	8.53	67.69	68.20	-0.51	peak

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Frequency:	5500MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 3	Date:	11/05/2016
Ant.Polar.:	Vertical		
Description:			



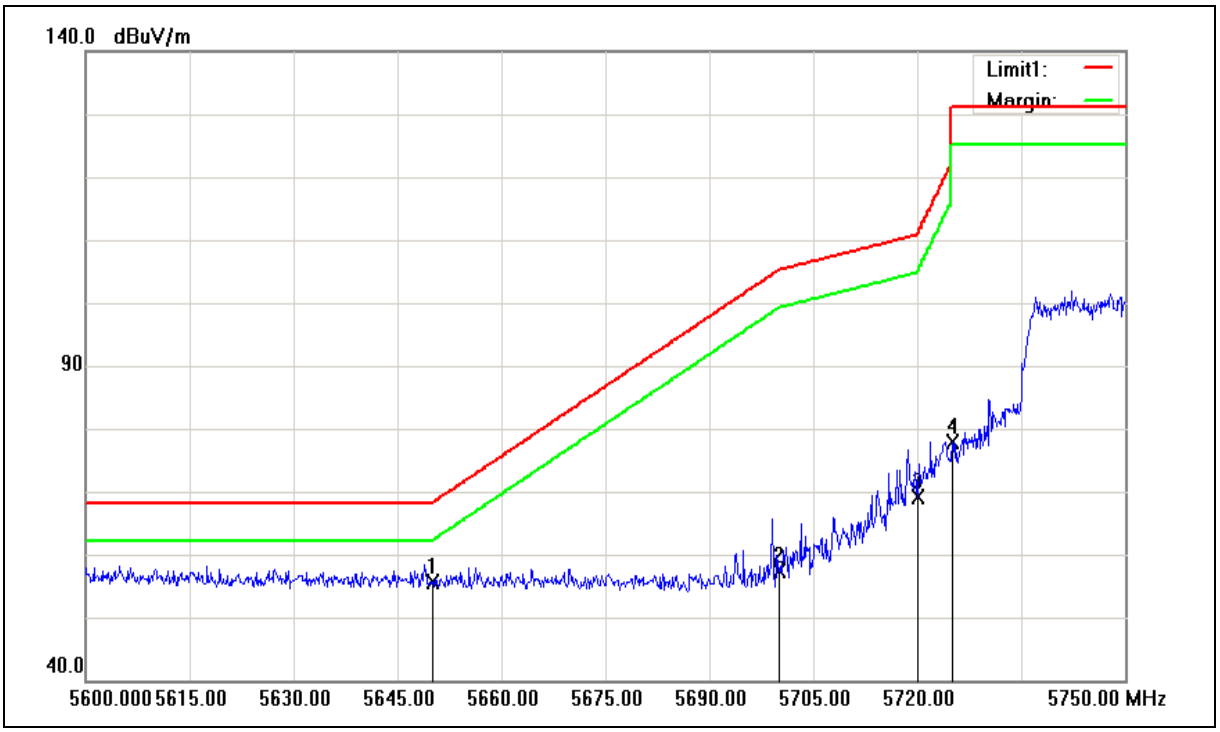
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5455.150	55.92	8.51	64.43	74.00	-9.57	peak
2	5455.150	36.95	8.51	45.46	54.00	-8.54	AVG
3	5460.000	50.04	8.51	58.55	74.00	-15.45	peak
4	5460.000	39.60	8.51	48.11	54.00	-5.89	AVG
5	5470.000	59.10	8.53	67.63	68.20	-0.57	peak

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Frequency:	5745MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 3	Date:	11/05/2016
Ant.Polar.:	Horizontal		
Description:			



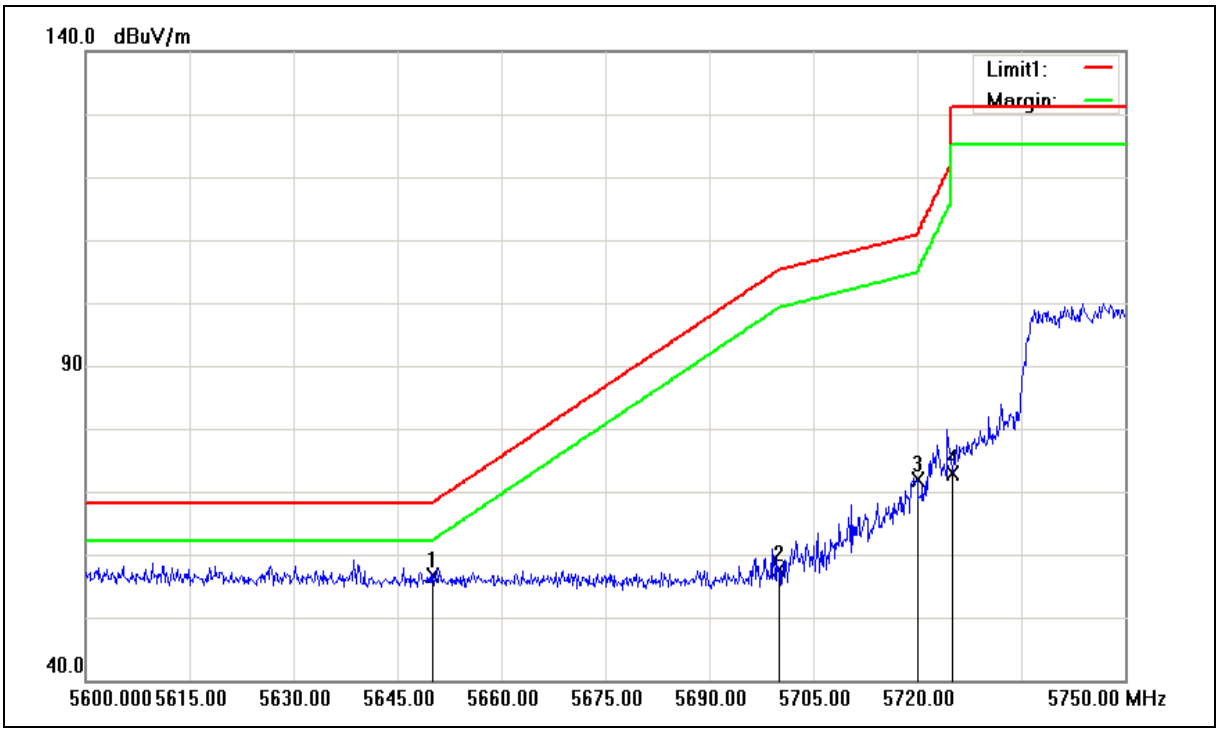
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5650.000	46.79	8.93	55.72	68.20	-12.48	peak
2	5700.000	48.41	9.05	57.46	105.20	-47.74	peak
3	5720.000	59.98	9.09	69.07	110.80	-41.73	peak
4	5725.000	68.76	9.11	77.87	122.20	-44.33	peak

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Frequency:	5745MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 3	Date:	11/05/2016
Ant.Polar.:	Vertical		
Description:			



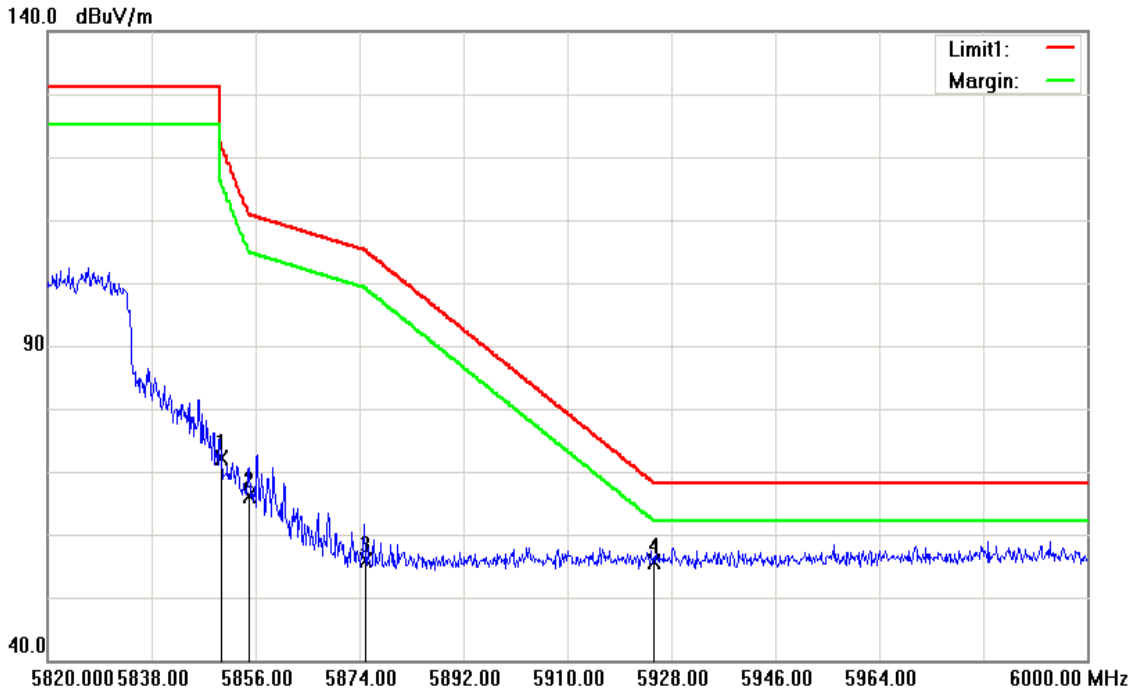
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5650.000	47.80	8.93	56.73	68.20	-11.47	peak
2	5700.000	48.60	9.05	57.65	105.20	-47.55	peak
3	5720.000	62.71	9.09	71.80	110.80	-39.00	peak
4	5725.000	63.89	9.11	73.00	122.20	-49.20	peak

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Frequency:	5825MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 3	Date:	11/05/2016
Ant.Polar.:	Horizontal		
Description:			



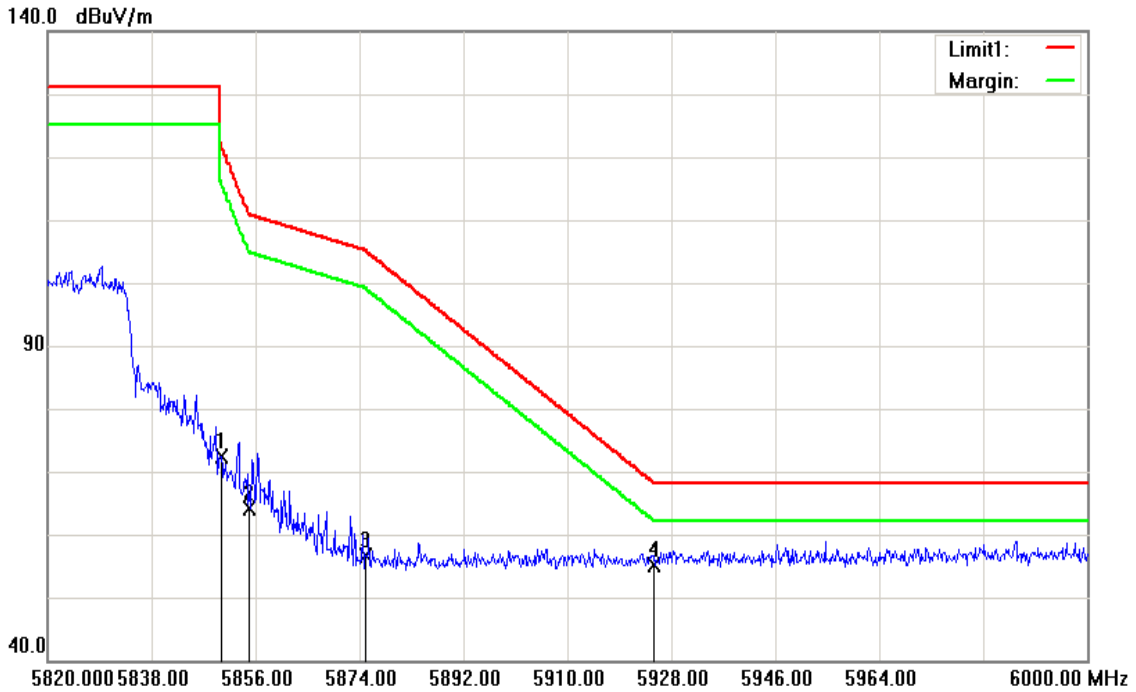
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5850.000	62.73	9.41	72.14	122.20	-50.06	peak
2	5855.000	56.75	9.43	66.18	110.80	-44.62	peak
3	5875.000	46.41	9.48	55.89	105.20	-49.31	peak
4	5925.000	46.13	9.61	55.74	68.20	-12.46	peak

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15E	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Frequency:	5825MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 3	Date:	11/05/2016
Ant.Polar.:	Vertical		
Description:			



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5850.000	62.95	9.41	72.36	122.20	-49.84	peak
2	5855.000	54.67	9.43	64.10	110.80	-46.70	peak
3	5875.000	47.21	9.48	56.69	105.20	-48.51	peak
4	5925.000	45.56	9.61	55.17	68.20	-13.03	peak

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

4.4. Maximum Conducted Output Power Measurement

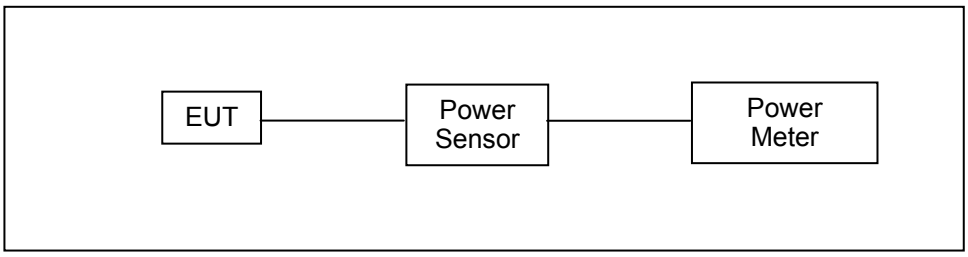
■ **Limit**

Frequency Range (MHz)	FCC Maximum Conducted Output Power Limit
	Client
5.150 ~ 5.250 GHz	The lesser of 250mW (24dBm)
5.250 ~ 5.350 GHz	The lesser of 250mW (24dBm) or 11dBm + 10log (B)
5.470 ~ 5.725 GHz	The lesser of 250mW (24dBm) or 11dBm + 10log (B)
5.725 ~ 5.850 GHz	The lesser of 1W (30dBm)

According FCC KDB 662911 D01 v02r01 – for power measurements on IEEE802.11 devices,

＊ SISO mode：Max. Gain = 4.42 dBi < 6dBi

■ **Test Setup**



■ **Test Instruments**

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Power Sensor	Anritsu	MA2411B	1126022	08/29/2016	1 year
Power Meter	Anritsu	ML2495A	1135009	08/29/2016	1 year
Microwave Cable	EMCI	EMC104-SM-SM-1 500	140303	02/23/2016	1 year
Test Site	ATL	TE05	TE05	N.C.R.	-----

Note: N.C.R. = No Calibration Request.

■ **Test Procedure**

The test is performed in accordance with KDB789033: D02 General UNII Test Procedures New Rules v01r02, Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices

Section (E) Maximum Conducted Output Power

3. Measurement using a Power Meter (PM)

b) Method PM-G (Measurement using a gated RF average power meter)

■ **Test Result**

Model Number	198658
Test Item	Maximum Conducted Output Power
Test Mode	Mode 2: IEEE 802.11a Link Mode
Date of Test	11/04/2016

Frequency (MHz)	Data Rate	ANT-0 Max. Output Power (dBm)	ANT-0 Max. Output Power (W)	FCC Limit (dBm)
5180	6M	13.13	0.021	≤ 24
5200		13.14	0.021	
5220		13.30	0.021	
5240		**13.32**	**0.021**	
5260		**13.42**	**0.022**	≤ 24
5280		13.40	0.022	
5300		11.53	0.014	
5320		11.68	0.015	
5500		7.07	0.005	≤ 24
5520		10.92	0.012	
5540		11.10	0.013	
5560		11.06	0.013	
5580		11.27	0.013	
5600		11.47	0.014	
5620		11.63	0.015	
5640		11.62	0.015	
5660		11.73	0.015	
5680		**11.74**	**0.015**	
5700		9.94	0.010	
5745		5.80	0.004	≤ 30
5765		8.71	0.007	
5785		8.92	0.008	
5805		9.33	0.009	
5825		**9.37**	**0.009**	

Note: The relevant measured result has the offset with cable loss already.

Model Number	198658			
Test Item	Maximum Conducted Output Power			
Test Mode	Mode 2: IEEE 802.11a Link Mode			
Date of Test	11/04/2016			
Frequency (MHz)	Data Rate	ANT-0		FCC Limit (dBm)
		Max. Output Power		
		(dBm)	(W)	
5180	54M	12.92	0.020	≤ 24
5200		12.90	0.019	
5220		13.13	0.021	
5240		13.18	0.021	
5260		13.30	0.021	≤ 24
5280		13.25	0.021	
5300		11.40	0.014	
5320		11.45	0.014	
5500		6.95	0.005	≤ 24
5520		10.78	0.012	
5540		10.92	0.012	
5560		10.95	0.012	
5580		11.13	0.013	
5600		11.29	0.013	
5620		11.35	0.014	
5640		11.31	0.014	
5660		11.45	0.014	
5680		11.50	0.014	
5700		9.83	0.010	
5745		5.68	0.004	≤ 30
5765		8.64	0.007	
5785		8.78	0.008	
5805		9.12	0.008	
5825		9.18	0.008	

Note: The relevant measured result has the offset with cable loss already.

Model Number	198658			
Test Item	Maximum Conducted Output Power			
Test Mode	Mode 3: IEEE 802.11n 20MHz Link Mode			
Date of Test	11/04/2016			
Frequency (MHz)	Data Rate	ANT-0		FCC Limit (dBm)
		Max. Output Power		
		(dBm)	(W)	
5180	13M	11.52	0.014	≤ 24
5200		11.59	0.014	
5220		**11.62**	**0.015**	
5240		11.61	0.014	
5260		**11.41**	**0.014**	≤ 24
5280		11.32	0.014	
5300		10.66	0.012	
5320		10.85	0.012	
5500		5.56	0.004	≤ 24
5520		10.36	0.011	
5540		10.32	0.011	
5560		10.34	0.011	
5580		10.52	0.011	
5600		10.55	0.011	
5620		10.46	0.011	
5640		**10.69**	**0.012**	
5660		10.46	0.011	
5680		10.51	0.011	
5700		6.54	0.005	
5745		4.36	0.003	≤ 30
5765		6.00	0.004	
5785		6.44	0.004	
5805		6.74	0.005	
5825		**7.81**	**0.006**	

Note: The relevant measured result has the offset with cable loss already.

Model Number	198658			
Test Item	Maximum Conducted Output Power			
Test Mode	Mode 3: IEEE 802.11n 20MHz Link Mode			
Date of Test	11/04/2016			
Frequency (MHz)	Data Rate	ANT-0		FCC Limit (dBm)
		Max. Output Power		
		(dBm)	(W)	
5180	65M	11.28	0.013	≤ 24
5200		11.38	0.014	
5220		11.45	0.014	
5240		11.40	0.014	
5260		11.12	0.013	≤ 24
5280		11.09	0.013	
5300		10.47	0.011	
5320		10.62	0.012	
5500		5.32	0.003	≤ 24
5520		10.08	0.010	
5540		10.02	0.010	
5560		10.09	0.010	
5580		10.38	0.011	
5600		10.31	0.011	
5620		10.25	0.011	
5640		10.37	0.011	
5660		10.19	0.010	
5680		10.37	0.011	
5700		6.41	0.004	
5745		4.15	0.003	≤ 30
5765		5.78	0.004	
5785		6.33	0.004	
5805		6.54	0.005	
5825		7.53	0.006	

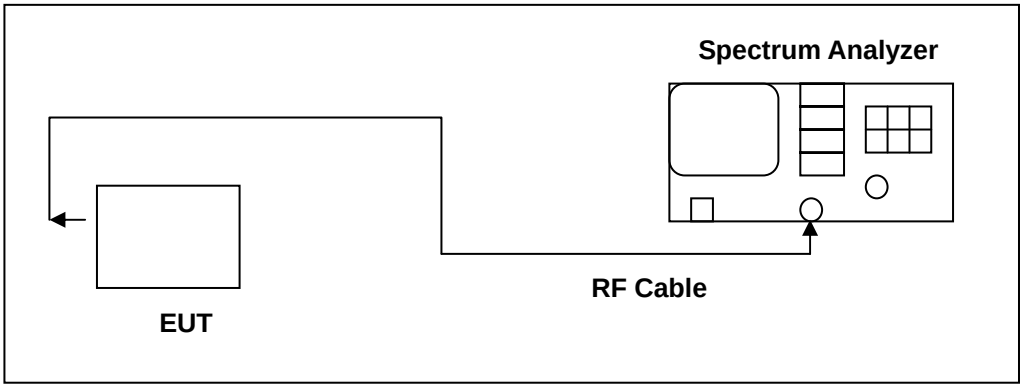
Note: The relevant measured result has the offset with cable loss already.

4.5. 26dB RF Bandwidth Measurement

■ **Limit**

N/A

■ **Test Setup**



■ **Test Instruments**

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Spectrum Analyzer	Agilent	E4445A	MY45300744	12/15/2015	1 year
Microwave Cable	EMCI	EMC104-SM-SM-1500	140303	02/23/2016	1 year
Test Site	ATL	TE05	TE05	N.C.R.	-----

Note: N.C.R. = No Calibration Request.

■ **Test Procedure**

The test is performed in accordance with KDB789033: D02 General UNII Test Procedures New Rules v01r02, Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	>26dB Bandwidth
RBW	Approximately 1% of the emission bandwidth
VBW	VBW > RBW
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

■ **Test Result**

Model Number	198658
Test Item	26dB RF Bandwidth Measurement
Test Mode	Mode 2: IEEE 802.11a Link Mode
Date of Test	11/09/2016
Frequency (MHz)	ANT-0
	26dB Bandwidth (MHz)
5180	36.920
5200	39.540
5240	39.600
5260	37.570
5280	37.700
5320	35.160
5500	30.600
5560	38.290
5700	35.590

Model Number	198658
Test Item	26dB RF Bandwidth Measurement
Test Mode	Mode 3: IEEE 802.11n 20MHz Link Mode
Date of Test	11/09/2016
Frequency (MHz)	ANT-0
	26dB Bandwidth (MHz)
5180	37.970
5200	37.660
5240	39.900
5260	39.660
5280	38.360
5320	38.060
5500	27.950
5560	39.320
5700	35.600

■ **Test Graphs**

Mode 2: IEEE 802.11a Link Mode_ ANT-0	
5180 MHz	
5200 MHz	
5240 MHz	

Mode 2: IEEE 802.11a Link Mode_ ANT-0	
5260 MHz	
5280 MHz	
5320 MHz	

Mode 2: IEEE 802.11a Link Mode_ ANT-0	
5500 MHz	
5560 MHz	
5700 MHz	

Mode 3: IEEE 802.11n 20MHz Link Mode_ ANT-0	
5180 MHz	
5200 MHz	
5240 MHz	

Mode 3: IEEE 802.11n 20MHz Link Mode_ ANT-0	
5260 MHz	
5280 MHz	
5320 MHz	

Mode 3: IEEE 802.11n 20MHz Link Mode_ ANT-0	
5500 MHz	
5560 MHz	
5700 MHz	

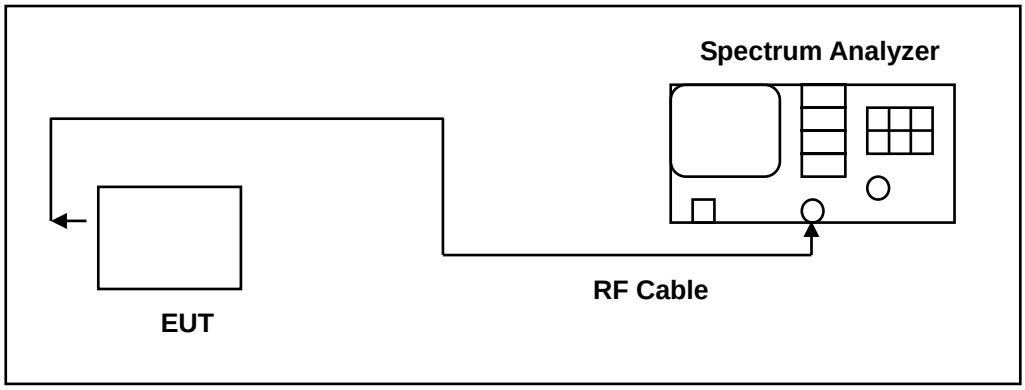
4.6. 6dB RF Bandwidth Measurement

■ **Limit**

6dB RF Bandwidth

Systems using digital modulation techniques may operate in the 5725~5850MHz bands. The minimum 6 dB band-width shall be at least 500 kHz.

■ **Test Setup**



■ **Test Instruments**

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Period
Spectrum Analyzer	Agilent	E4445A	MY45300744	12/15/2015	1 year
Test Site	ATL	TE05	TE05	N.C.R.	-----

Note: N.C.R. = No Calibration Request.

■ **Test Procedure**

6dB RF Bandwidth

The EUT tested to UNII test procedure of KDB789033 D02 for compliance to FCC 47CFR 15.407 requirements.

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RES BW was set to 100 kHz. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A peak output reading was taken, a DISPLAY line was drawn 6 dB lower than peak level. The 6 dB bandwidth was determined from where the channel output spectrum intersected the display line.

The test was performed at 3 channels.

■ **Test Result**

Model Number	198658	
Test Item	6dB RF Bandwidth	
Test Mode	Mode 2: IEEE 802.11a Link Mode	
Date of Test	11/09/2016	
Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)
	ANT-0	
5745	16570	> 500
5785	16570	> 500
5825	16560	> 500

Model Number	198658	
Test Item	6dB RF Bandwidth	
Test Mode	Mode 3: IEEE 802.11n 20MHz Link Mode	
Date of Test	11/09/2016	
Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)
	ANT-0	
5745	17740	> 500
5785	17780	> 500
5825	17750	> 500

■ **Test Graphs**

Mode 2: IEEE 802.11a Link Mode_ANT-0	
5745 MHz	
5785 MHz	
5825 MHz	

Mode 3: IEEE 802.11n 20MHz Link Mode_ANT-0	
5745 MHz	
5785 MHz	
5825 MHz	

4.7. Peak Power Spectral Density Measurement

■ **Limit**

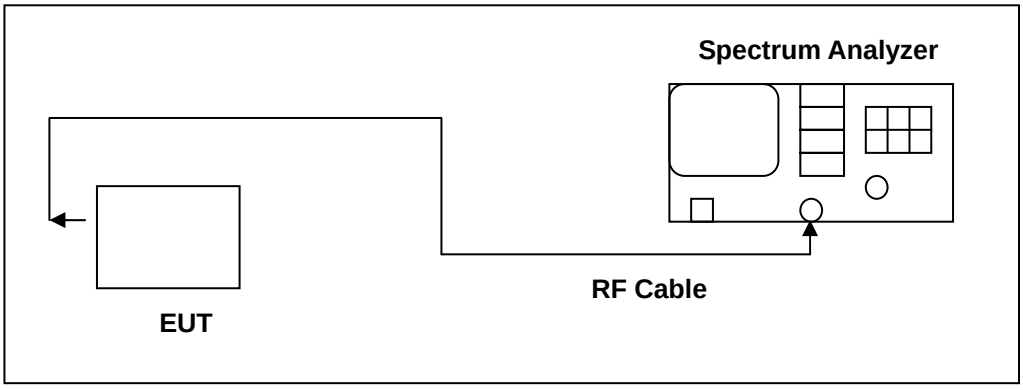
Conducted power spectral density

Frequency Range (MHz)	FCC Limit
	Client
5.150 ~ 5.250 GHz	11 dBm/MHz
5.250 ~ 5.350 GHz	11 dBm/MHz
5.470 ~ 5.725 GHz	11 dBm/MHz
5.725 ~ 5.850 GHz	30 dBm/500KHz

According FCC KDB 662911 D01 v02r01 – for power spectral density measurements on IEEE802.11 devices,

＊ SISO mode：Max. Gain = 4.42 dBi < 6dBi

■ **Test Setup**



■ **Test Instruments**

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Spectrum Analyzer	Agilent	E4445A	MY45300744	12/15/2015	1 year
Test Site	ATL	TE05	TE05	N.C.R.	-----

Note: N.C.R. = No Calibration Request.

■ **Test Procedure**

The test is performed in accordance with KDB789033: D02 General UNII Test Procedures New Rules v01r02, Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Encompass the entire emissions bandwidth (EBW) of the signal
RBW	1 MHz (5725 ~ 5850MHz use 100 kHz)
VBW	3 MHz (5725 ~ 5850MHz use 300 kHz)
Detector	RMS
Trace	AVERAGE
Sweep Time	Auto
Trace Average	100 times
Note: If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10log(500kHz/100kHz) to the measured result.	

■ **Test Result**

Model Number	198658			
Test Item	Conducted power spectral density			
Test Mode	Mode 2: IEEE 802.11a link mode			
Date of Test	11/09/2016			
Frequency (MHz)	ANT-0			
	Measurement (dBm/MHz)	Duty Factor (dB)	Calculated (dBm/MHz)	Limit (dBm/MHz)
5180	1.584	0.000	1.584	< 11
5200	1.895	0.000	1.895	
5240	2.027	0.000	2.027	
5260	1.366	0.000	1.366	< 11
5280	1.371	0.000	1.371	
5320	-0.344	0.000	-0.344	
5500	-4.554	0.000	-4.554	< 11
5560	-0.139	0.000	-0.139	
5700	-0.491	0.000	-0.491	

Note: Method SA-2, Power density = measured result + 10log(1/duty cycle) + Conversion ratio = measured result + duty factor.

Model Number	198658			
Test Item	Conducted power spectral density			
Test Mode	Mode 2: IEEE 802.11a link mode			
Date of Test	11/09/2016			
Frequency (MHz)	ANT-0			
	Measurement (dBm/100KHz)	Duty Factor (dB)	Calculated (dBm/500KHz)	Limit (dBm/500KHz)
5745	-15.77	0.000	-8.78	< 30
5785	-11.09	0.000	-4.10	
5825	-10.96	0.000	-3.97	

Note: Method SA-2, Power density = measured result + 10log(1/duty cycle) + Conversion ratio = measured result + duty factor.

Conversion ratio = 10*Log(500k/100k)

Model Number	198658			
Test Item	Conducted power spectral density			
Test Mode	Mode 3: IEEE 802.11n 20MHz Link Mode			
Date of Test	11/09/2016			
Frequency (MHz)	ANT-0			
	Measurement (dBm/MHz)	Duty Factor (dB)	Calculated (dBm/MHz)	Limit (dBm/MHz)
5180	0.377	0.000	0.377	< 11
5200	0.474	0.000	0.474	
5240	0.545	0.000	0.545	
5260	0.243	0.000	0.243	< 11
5280	0.145	0.000	0.145	
5320	-1.098	0.000	-1.098	
5500	-6.770	0.000	-6.770	< 11
5560	-1.431	0.000	-1.431	
5700	-4.649	0.000	-4.649	

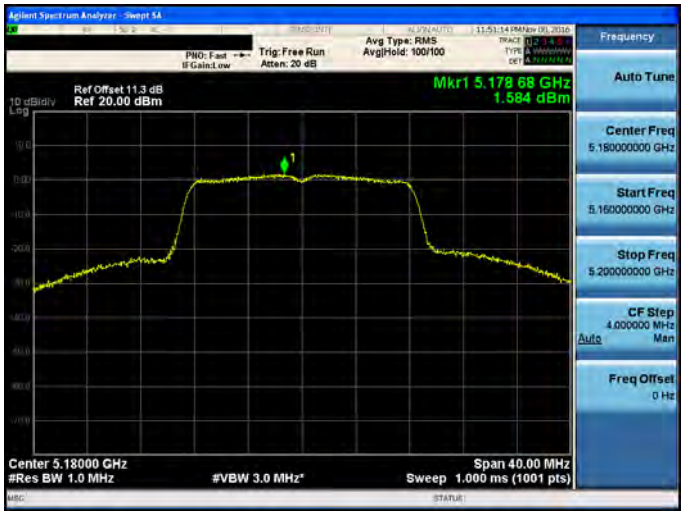
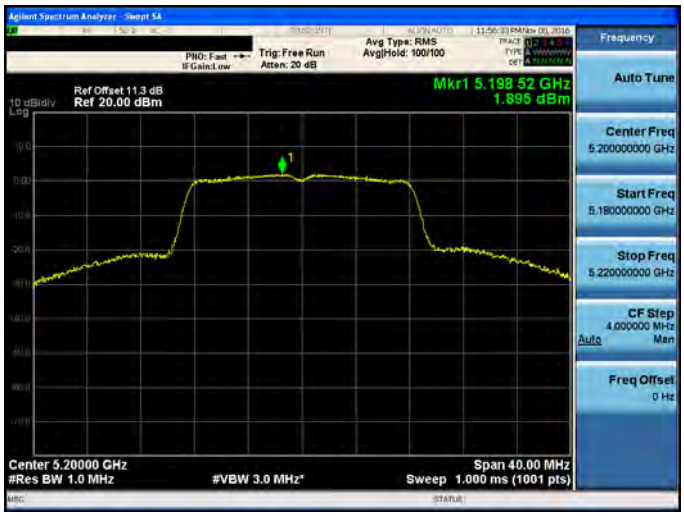
Note: Method SA-2, Power density = measured result + 10log(1/duty cycle) + Conversion ratio = measured result + duty factor.

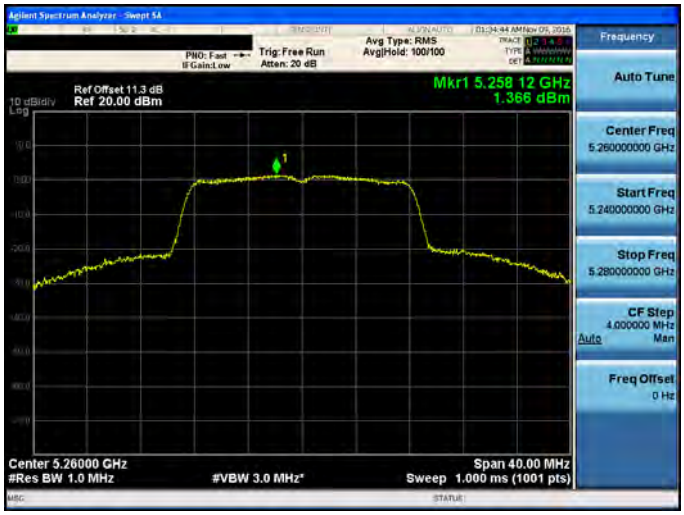
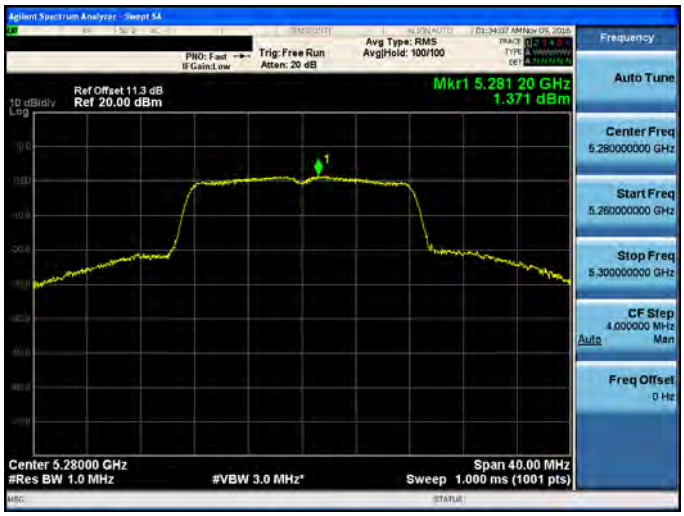
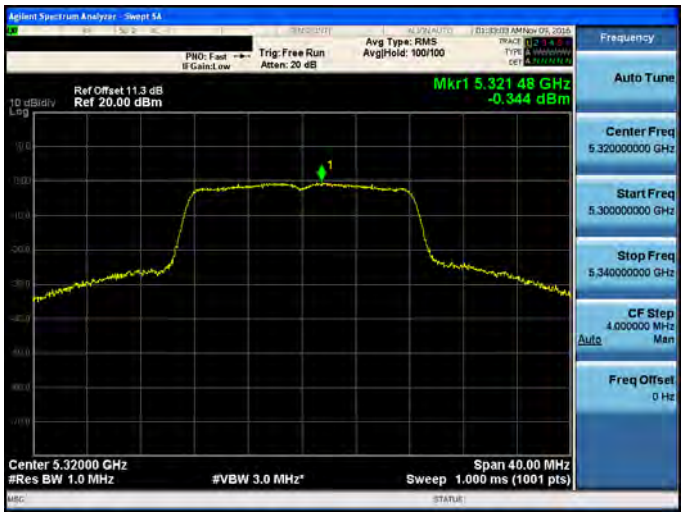
Model Number	198658			
Test Item	Conducted power spectral density			
Test Mode	Mode 3: IEEE 802.11n 20MHz Link Mode			
Date of Test	11/09/2016			
Frequency (MHz)	ANT-0			
	Measurement (dBm/100KHz)	Duty Factor (dB)	Calculated (dBm/500KHz)	Limit (dBm/500KHz)
5745	-16.18	0.000	-9.19	< 30
5785	-14.11	0.000	-7.12	
5825	-13.65	0.000	-6.66	

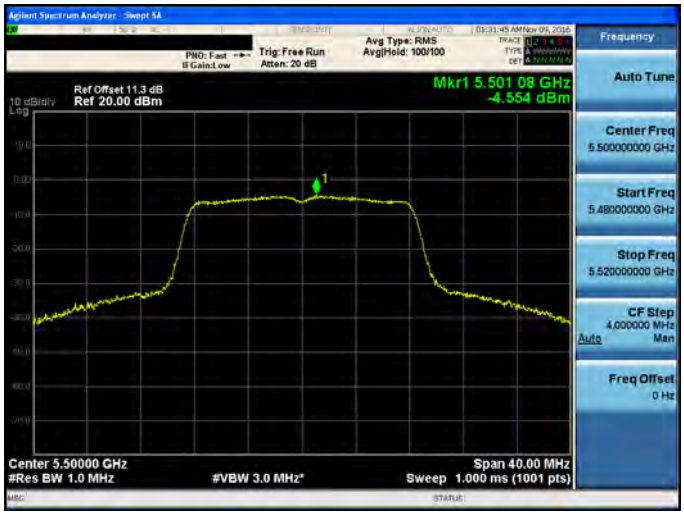
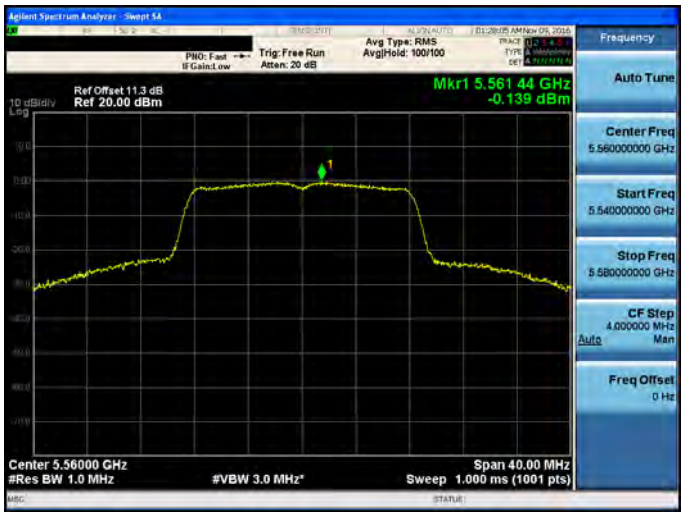
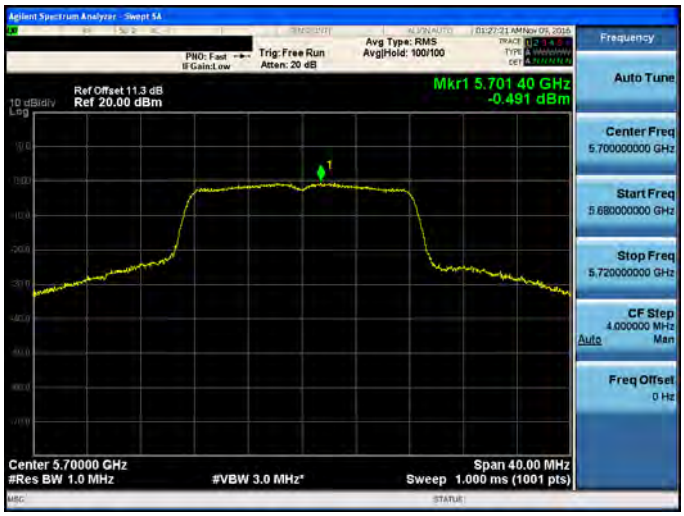
Note: Method SA-2, Power density = measured result + 10log(1/duty cycle) + Conversion ratio = measured result + duty factor.

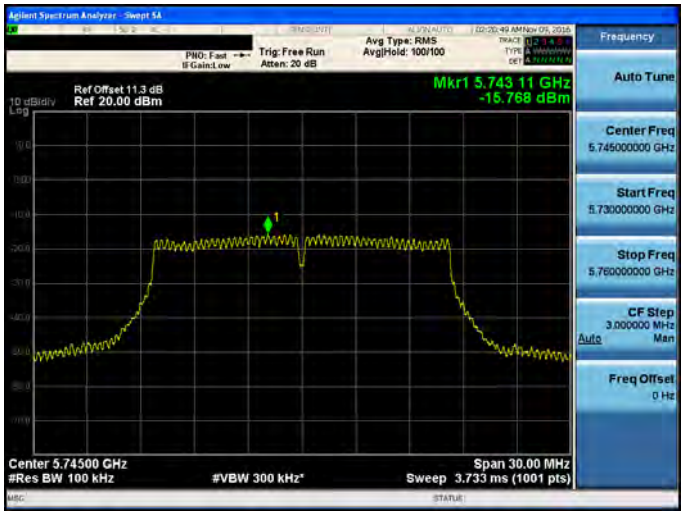
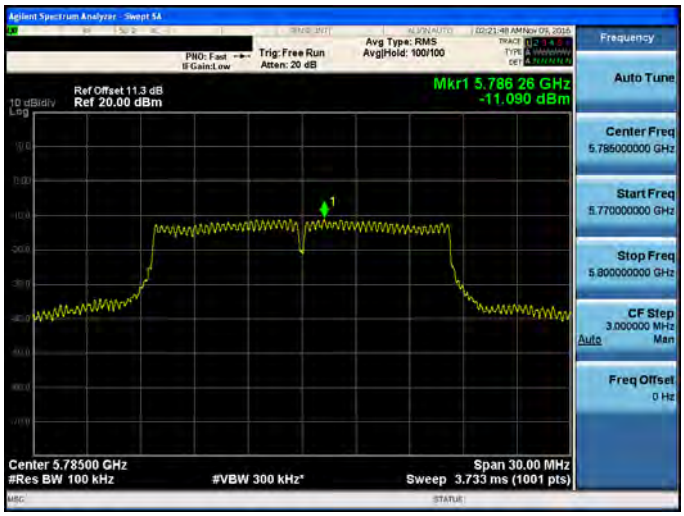
Conversion ratio = 10*Log(500k/100k)

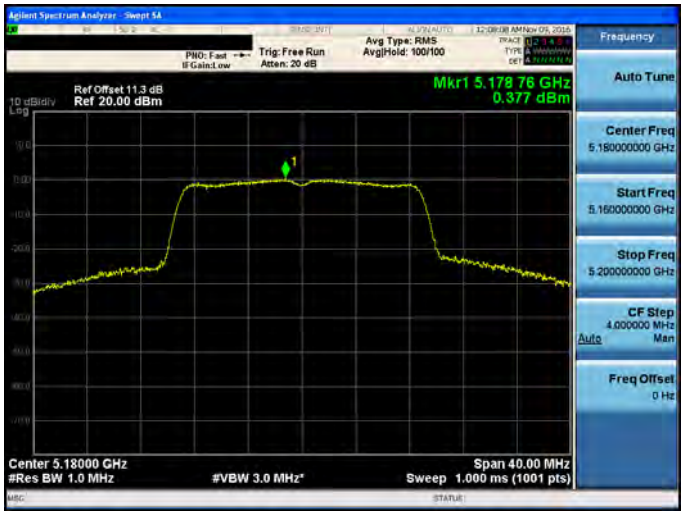
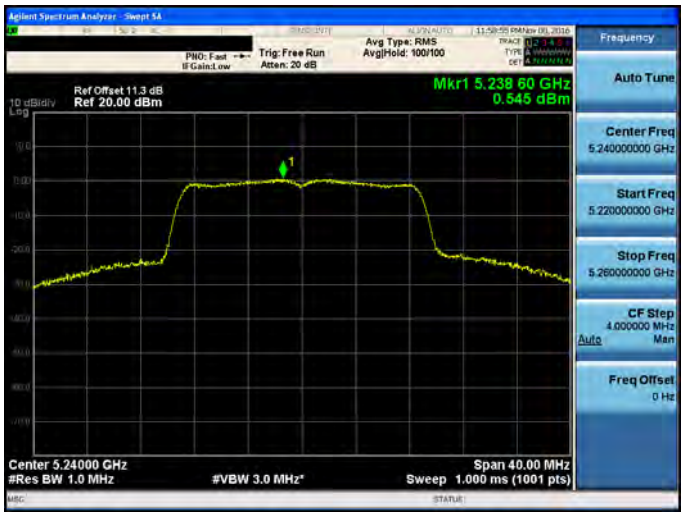
■ **Test Graphs**

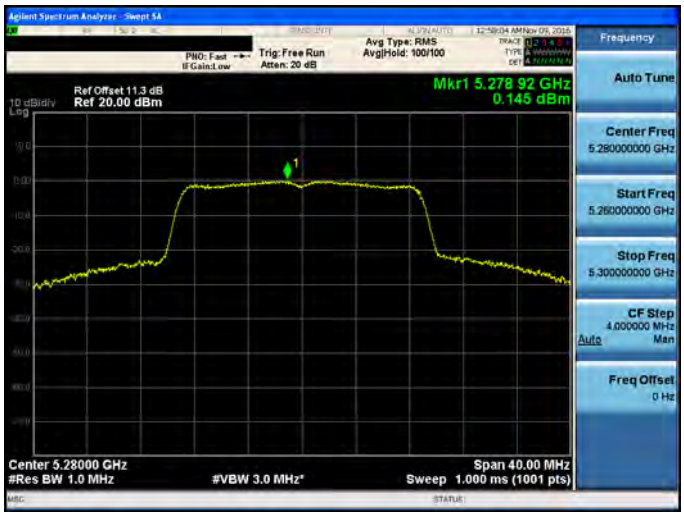
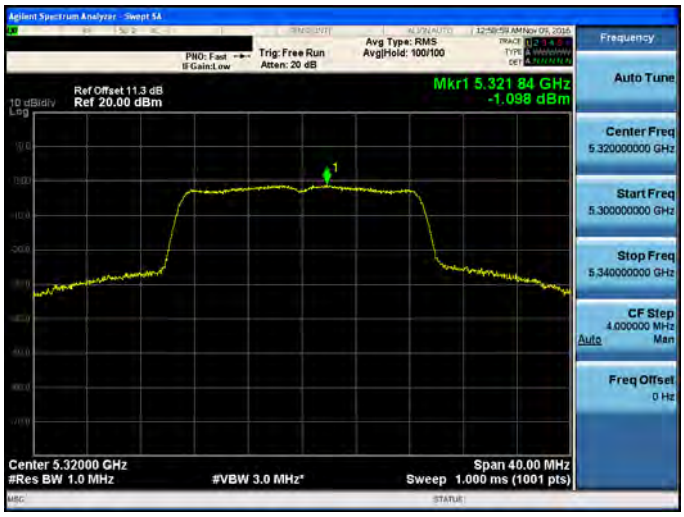
Mode 2: IEEE 802.11a Link Mode_ ANT-0	
5180 MHz	
5200 MHz	
5240 MHz	

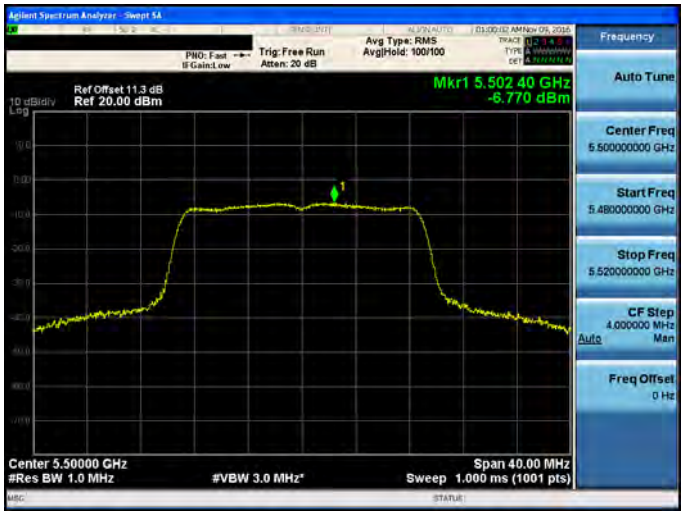
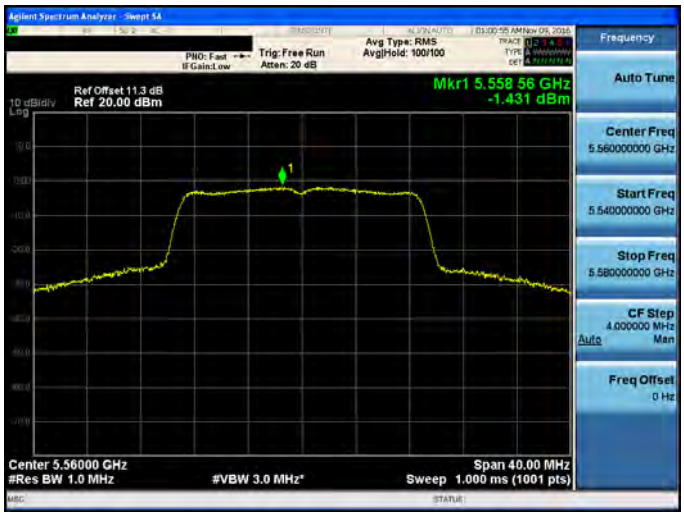
Mode 2: IEEE 802.11a Link Mode_ ANT-0	
5260 MHz	
5280 MHz	
5320 MHz	

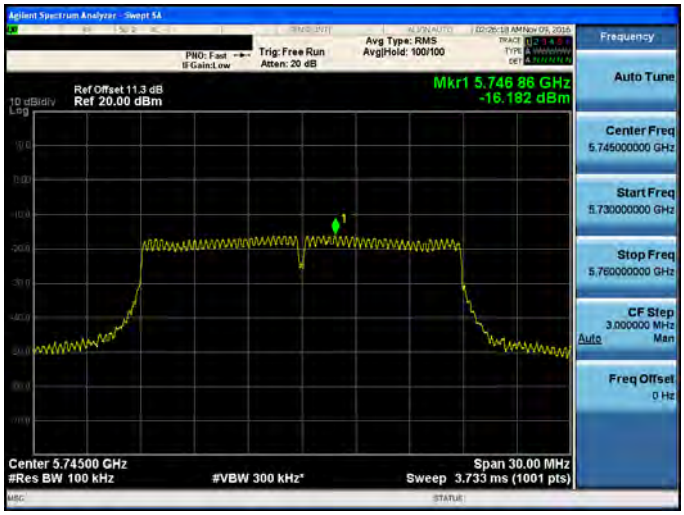
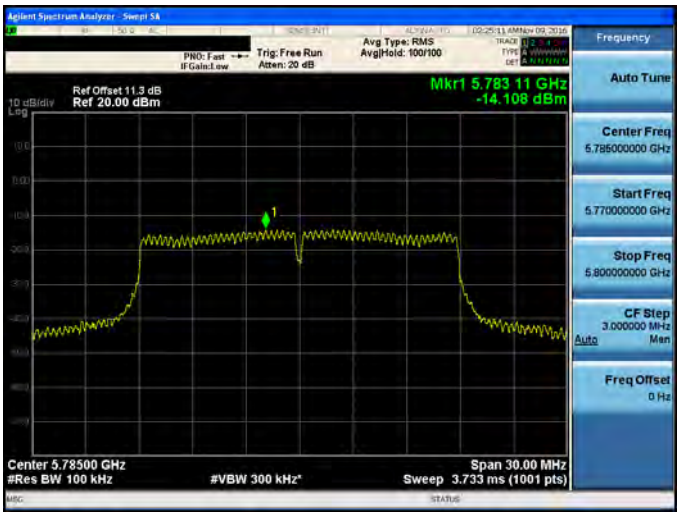
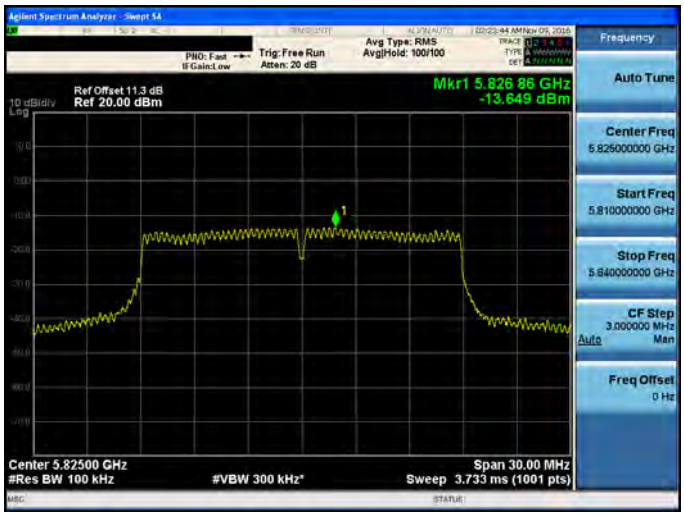
Mode 2: IEEE 802.11a Link Mode_ ANT-0	
5500 MHz	
5560 MHz	
5700 MHz	

Mode 2: IEEE 802.11a Link Mode_ ANT-0	
5745 MHz	
5785 MHz	
5825 MHz	

Mode 3: IEEE 802.11n 20MHz Link Mode _ ANT-0	
5180 MHz	
5200 MHz	
5240 MHz	

Mode 3: IEEE 802.11n 20MHz Link Mode _ ANT-0	
5260 MHz	
5280 MHz	
5320 MHz	

Mode 3: IEEE 802.11n 20MHz Link Mode _ ANT-0	
5500 MHz	
5560 MHz	
5700 MHz	

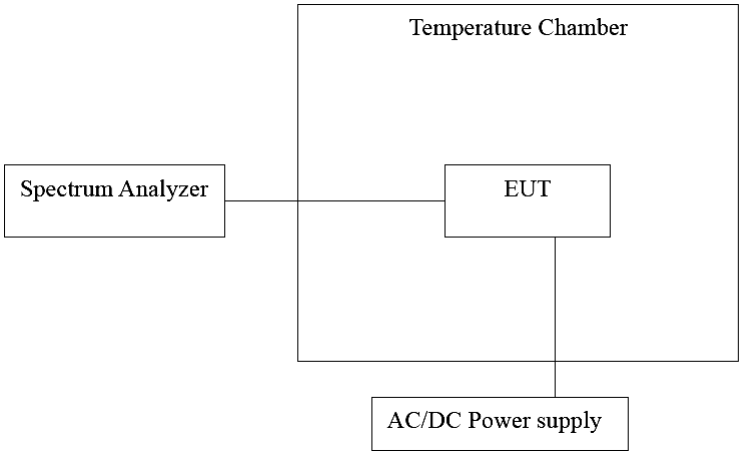
Mode 3: IEEE 802.11n 20MHz Link Mode _ ANT-0	
5745 MHz	
5785 MHz	
5825 MHz	

4.8. Frequency Stability Measurement

■ **Limit**

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual.

■ **Test Setup**



■ **Test Instruments**

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Spectrum Analyzer	Agilent	E4408B	MY45107753	08/08/2016	1 year
Temperature & Humidity Chamber	TAICHY	MHU-225LA	980729	04/18/2016	1 year
Test Site	ATL	TE05	TE05	N.C.R.	-----

Note: N.C.R. = No Calibration Request.

■ **Test Procedure**

1. The EUT was placed inside the environmental test chamber and powered by nominal AC/DC voltage.
2. Turn the EUT on and couple its output to a spectrum analyzer.
3. Turn the EUT off and set the chamber to the highest temperature specified.
4. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize.
5. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
6. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

■ **Test Result**

Temperature Variations

Model Number	198658					
Test Item	Frequency Stability					
Date of Test	11/04/2016					
Frequency	Temp. (°C)	Voltage (Vac)	Measured Freq. (MHz)	Delta Freq. (Hz)	Tolerance (ppm)	Result (Pass/Fail)
5200 MHz	0	120	5199.9625	-37500	-7.212	Pass
	10		5199.9708	-29200	-5.615	Pass
	20		5199.9886	-11400	-2.192	Pass
	30		5199.9914	-8600	-1.654	Pass
	40		5200.0087	8700	1.673	Pass
	50		5200.0205	20500	3.942	Pass
5280 MHz	0	120	5279.9691	-30900	-5.852	Pass
	10		5279.972	-28000	-5.303	Pass
	20		5279.9853	-14700	-2.784	Pass
	30		5279.9984	-1600	-0.303	Pass
	40		5280.0027	2700	0.511	Pass
	50		5280.0172	17200	3.258	Pass
5560 MHz	0	120	5559.9657	-34300	-6.169	Pass
	10		5559.9696	-30400	-5.468	Pass
	20		5559.9844	-15600	-2.806	Pass
	30		5559.995	-5000	-0.899	Pass
	40		5560.002	2000	0.360	Pass
	50		5560.0136	13600	2.446	Pass
5785 MHz	0	120	5784.9645	-35500	-6.137	Pass
	10		5784.9697	-30300	-5.238	Pass
	20		5784.9823	-17700	-3.060	Pass
	30		5785.0097	9700	1.677	Pass
	40		5785.0148	14800	2.558	Pass
	50		5785.0317	31700	5.480	Pass

Voltage Variations

Model Number	198658					
Test Item	Frequency Stability					
Date of Test	11/04/2016					
Frequency	Temp. (°C)	Voltage (Vac)	Measured Freq. (MHz)	Delta Freq. (Hz)	Tolerance (ppm)	Result (Pass/Fail)
5200 MHz	20	138.00	5199.979	-21000	-4.038	Pass
		120.00	5199.9886	-11400	-2.192	Pass
		102.00	5200.0088	8800	1.692	Pass
5280 MHz	20	138.00	5279.9694	-30600	-5.795	Pass
		120.00	5279.9853	-14700	-2.784	Pass
		102.00	5280.0374	37400	7.083	Pass
5560 MHz	20	138.00	5559.9694	-30600	-5.504	Pass
		120.00	5559.9844	-15600	-2.806	Pass
		102.00	5560.0217	21700	3.903	Pass
5785 MHz	20	138.00	5784.9651	-34900	-6.033	Pass
		120.00	5784.9823	-17700	-3.060	Pass
		102.00	5785.0132	13200	2.282	Pass

Note: The manufacturer's frequency stability specification is better then 20ppm.

4.9. Antenna Requirement

- **Limit**

For intentional device, according to 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.
And According to 15.407 (a), if transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

- **Antenna Connector Construction**

See section 2 – antenna information.