FCC TEST REPORT

Test report No.:	EMC- FCC- R0114
FCC ID:	2AAKFMWP1100A
Type of equipment:	WiFi Phone
Model Name:	MWP1100A
Applicant:	Moimstone.co.,Ltd
Max.RF Output Power:	14.86 dBm
FCC Rule Part(s):	FCC Part 15 Subpart C 15.407
Frequency Range:	5 180 MHz ~ 5 240 MHz 5 260 MHz ~ 5 320 MHz 5 500 MHz ~ 5 700 MHz
Test result:	Complied

The above equipment was tested by EMC compliance Testing Laboratory for compliance with the requirements of FCC Rules and Regulations.
The results of testing in this report apply to the product/system which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Date of test: June 24, 2013 ~ July 01, 2013

Issued date: July 02, 2013

Tested by: SON, MIN GI

Approved by: YU, SANG HOON

480-5 Shin-dong, Yeongtong-gu, Suwon-city, Gyunggi-do, 443-390, Korea
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1. Client information

Applicant:	Moimstone.co.,Ltd
Address:	65, Heungan-daero 439 beon-gil, Dongan-gu, Anyang-si, Gyeonggi-do, KOREA
Telephone number:	+82-70-7791-3750
Facsimile number :	+82-31-426-9539
Contact person:	Yoo Deok Jae / nunjoa@moimstone.com

Manufacturer :	Moimstone.co.,Ltd
Address:	65, Heungan-daero 439 beon-gil, Dongan-gu, Anyang-si, Gyeonggi-do, KOREA

2. Laboratory information

Address
EMC Compliance Ltd.
480-5 Shin-dong, Yeongtong-gu, Suwon-city, Gyunggi-do, 443-390, Korea
Telephone Number: 82 31 336 9919 Facsimile Number: 82 31 336 4767

Certificate
CBTL Testing Laboratory, KOLAS NO.: 231
FCC Filing No.: 508785
VCCI Registration No.: C-1713, R-1606, T-258
IC Recognition No.:8035A-2

SITE MAP

3. Description of E.U.T.

3.1 Basic description

Applicant :	Moimstone.co.,Ltd
Address of Applicant:	65, Heungan-daero 439 beon-gil, Dongan-gu, Anyang-si, Gyeonggi-do, KOREA
Manufacturer:	Moimstone.co.,Ltd
Address of Manufacturer:	65, Heungan-daero 439 beon-gil, Dongan-gu, Anyang-si, Gyeonggi-do, KOREA
Type of equipment:	WiFi Phone
Basic Model:	MWP1100A
Serial number:	Proto Type

3.2 General description

Communication	802.11a, an HT20
Frequency Range	5 180 ~ 5 240 MHz, 5 260 ~ 5 320 MHz, 5 500 ~ 5 700 MHz
Type of Modulation (Technologies)	64QAM, 16QAM, QPSK, BPSK(OFDM)
Channel capacity	5 180 ~ 5 240 MHz: 4 ch 5 260 ~ 5 320 MHz: 4 ch 5 500 ~ 5 700 MHz: 8 ch
Antenna Gain	5 180 ~ 5 240 MHz: 2.11 dBi 5 260 ~ 5 320 MHz: 2.03 dBi 5 500 ~ 5 700 MHz: 1.78 dBi
Type of Antenna	Inverted F ANTENNA
Power supply	DC 3.7 V
Operating temperature	-20 ~ 50 °C
Dimension	155 mm x 51 mm x 16 mm (W x D x H)

3.3 Test frequency

For all teset items, the low, middle and high channels of the modes were tested with above worst case data rate.

5150~5250 (MHz) : 802.11a, an HT20

	CH	Frequency
Low frequency	36	5 180 MHz
Middle frequency	40	5 200 MHz
High frequency	48	5 240 MHz

5250~5350 (MHz) : 802.11a, an HT20

	CH	Frequency
Low frequency	52	5 260 MHz
Middle frequency	56	5 280 MHz
High frequency	64	5 320 MHz

5470~5725 (MHz) : 802.11a, an HT20

	CH	Frequency
Low frequency	100	5 500 MHz
Middle frequency	116	5 580 MHz
High frequency	140	5 700 MHz

3.4 Test Voltage

mode	Voltage
Norminal voltage	DC 3.7V

4. Summary of test results

4.1 Standards & results

Rule Reference	Parameter	Report Section	Test Result
15.203 15.407(a)(1)(2)(3)	Antenna Requirement	5.1	C
N/A	26 dB Bandwidth	5.2	C
15.407(a)(1)(2)	Maximum Conducted Output Power	5.3	C
15.407(a)(1)(2)(5)	Peak Power Spectral Density	5.4	C
15.407(a)(6)	Peak Excursion	5.5	C
15.205(a), 15.209(a), 15.407(b)(1), 15.407(b)(2), 15.407(b)(3)	Spurious Emission, Band Edge, and Restricted bands	5.6	C
15.407(g)	Frequency Stability	5.7	C
15.207(a)	Conducted Emissions	5.8	C
15.407(h)	Dynamic Freqyency Selection	5.9	C (refer to DFS test report)
15.407(f), 1.1307(b)(1)	RF Exposure	5.10	C

Note: C = complies
NC = Not complies
NT = Not tested
NA = Not Applicable

4.2 Uncertainty

Measurement Item	Combined Standard Uncertainty Uc	Expanded Uncertainty U = KUc (K = 2)
Conducted RF power	± 0.29 dB	± 0.58 dB
Radiated disturbance	30 MHz ~ 300 MHz : + 2.43 dB, - 2.44 dB 300 MHz~1 000 MHz : + 2.49dB, - 2.50 dB 1 GHz ~ 6 GHz : + 3.10 dB, - 3.10 dB 6 GHz ~ 18 GHz : + 3.21 dB, - 3.27 dB	30 MHz ~ 300 MHz : + 4.86 dB, - 4.88 dB 300 MHz ~ 1 000 MHz + 4.98dB, - 4.99 dB 1 GHz ~ 6 GHz : + 6.19 dB, - 6.20 dB 6 GHz ~ 18 GHz : + 6.41 dB, - 6.53 dB

5. Test results

5.1 Antenna Requirement

5.1.1 Regulation

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. 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. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

And according to §15.407(a)(1)(2)(3), If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

5.1.2 Result

-Complied

The transmitter has an integral PCB antenna.
The total directional peak gain of the antenna does not exceed 6.0 dBi

	5 150~5 250 MHz	5 250~5 350 MHz	5 470~5 725 MHz
ANT Gain	2.11	2.03	1.78

According to KDB 662911 D01 Multiple Transmitter Output v01r02
- Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows.

For power spectral density (PSD) measurements on all devices,

Array Gain = 10 log(N_{ANT}/N_{SS}) dB.

For power measurements on IEEE 802.11 devices

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT};

Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

For power measurements on all other devices:

Array Gain = 10 log(N_{ANT}/N_{SS}) dB.

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5.2 26 dB Bandwidth

5.1.1 Regulation

According to §15.403,(i) *Emission bandwidth.* For purposes of this subpart the emission bandwidth shall be determined by measuring the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that are 26 dB down relative to the maximum level of the modulated carrier. Determination of the emissions bandwidth is based on the use of measurement instrumentation employing a peak detector function with an instrument resolution bandwidth approximately equal to 1.0 percent of the emission bandwidth of the device under measurement.

5.1.2 Measurement Procedure

These test measurement settings are specified in section D) of 789033 D01 General UNII Test Procedures.

1) Set RBW = approximately 1% of the emission bandwidth.
2) Set the VBW > RBW.
3) Detector = Peak.
4) Trace mode = max hold.
5) Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

Note: The automatic bandwidth measurement capability of a spectrum analyzer may be employed if it implements the functionality described above.

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5.4.3 Test Result

-Complied

802.11a
5 150 ~5 250 MHz

Channel	Frequency (MHz)	26 dB BW (MHz)
Low	5 180	20.03
Middle	5 200	19.95
High	5 240	19.87

802.11a
5 250 ~5 350 MHz

Channel	Frequency (MHz)	26 dB BW (MHz)
Low	5 260	19.87
Middle	5 280	20.11
High	5 320	20.03

802.11a
5 470 ~5 725 MHz

Channel	Frequency (MHz)	26 dB BW (MHz)
Low	5 500	19.95
Middle	5 580	19.95
High	5 700	19.95

-NOTE:
1. We took the insertion loss of the cable loss into consideration within the measuring instrument.

802.11an HT20
5 150 ~5 250 MHz

Channel	Frequency (MHz)	26 dB BW (MHz)
Low	5 180	20.35
Middle	5 200	20.35
High	5 240	20.43

802.11an HT20
5 250 ~5 350 MHz

Channel	Frequency (MHz)	26 dB BW (MHz)
Low	5 260	20.43
Middle	5 280	20.35
High	5 320	20.43

802.11an HT20
5 470 ~5 725 MHz

Channel	Frequency (MHz)	26 dB BW (MHz)
Low	5 500	20.35
Middle	5 580	20.35
High	5 700	20.35

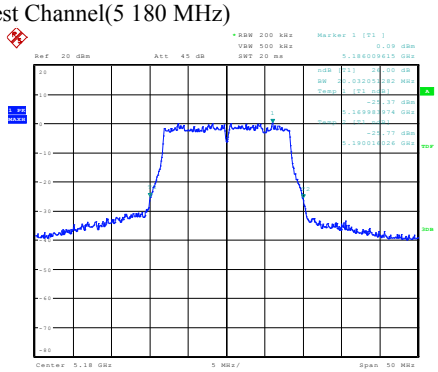
-NOTE:
2. We took the insertion loss of the cable loss into consideration within the measuring instrument.

5.2.4 Test Plot

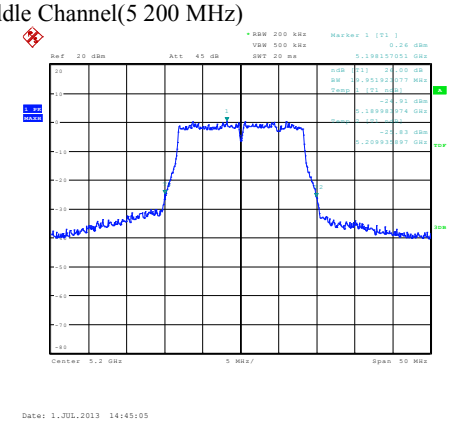
Figure 1. Plot of the 26 dB Bandwidth

802.11a (5 150 MHz ~ 5 250 MHz)

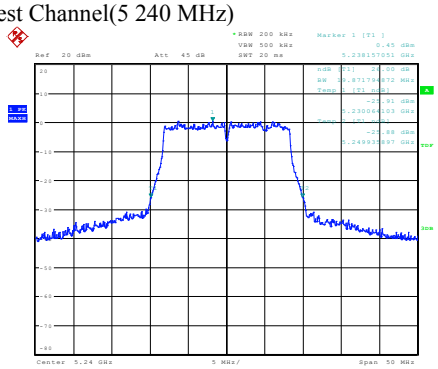
Lowest Channel(5 180 MHz)



Middle Channel(5 200 MHz)

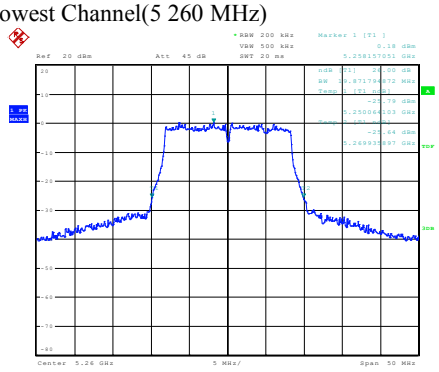


Highest Channel(5 240 MHz)

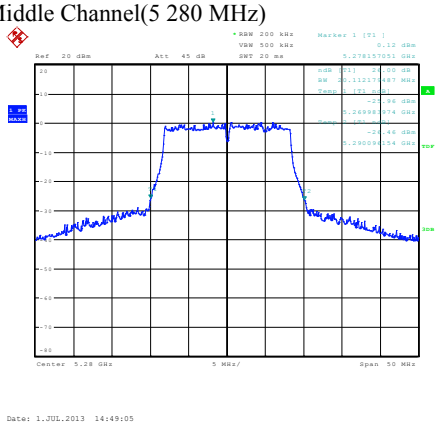


802.11a (5 250 MHz ~ 5 350 MHz)

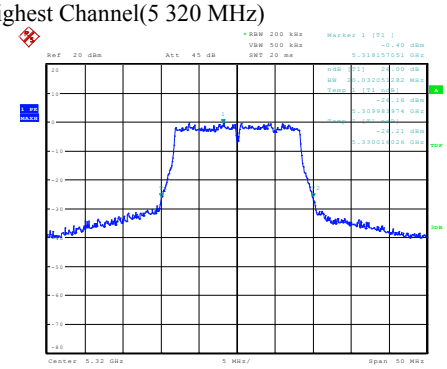
Lowest Channel(5 260 MHz)



Middle Channel(5 280 MHz)

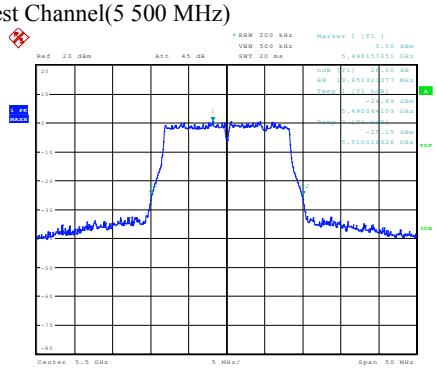


Highest Channel(5 320 MHz)



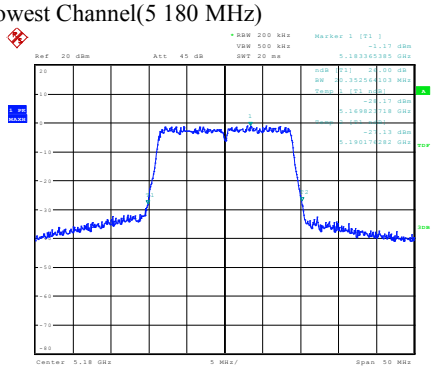
802.11a (5 470 MHz ~ 5 725 MHz)

Lowest Channel(5 500 MHz)

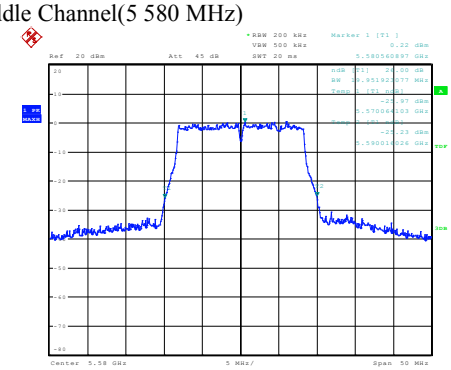


802.11an HT20 (5 150 MHz ~ 5 250 MHz)

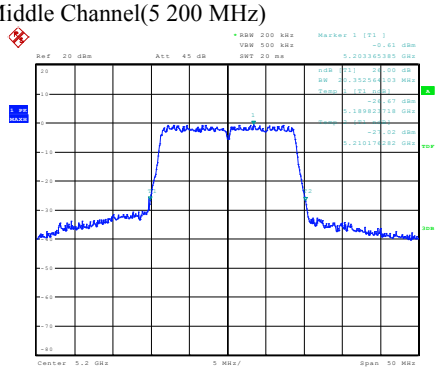
Lowest Channel(5 180 MHz)



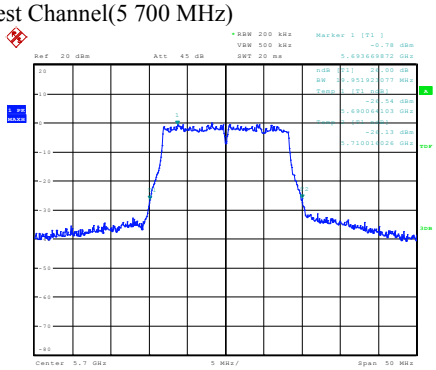
Middle Channel(5 580 MHz)



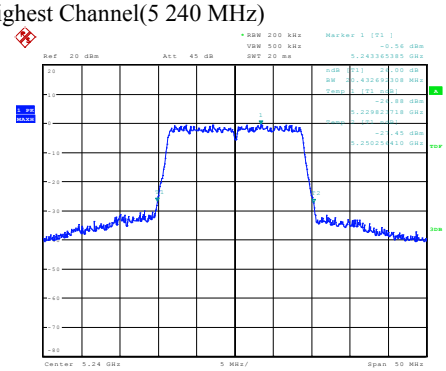
Middle Channel(5 200 MHz)



Highest Channel(5 700 MHz)

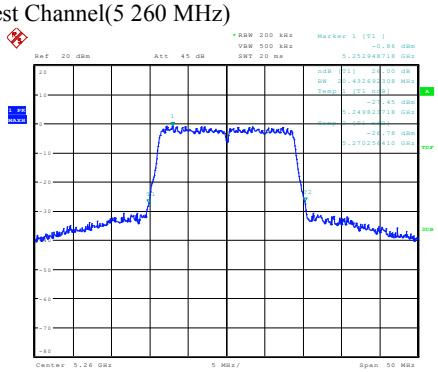


Highest Channel(5 240 MHz)

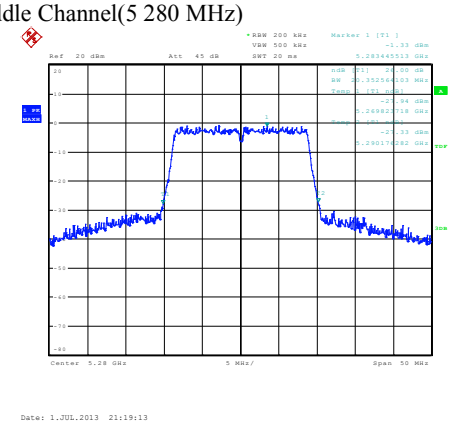


802.11an HT20 (5 250 MHz ~ 5 350 MHz)

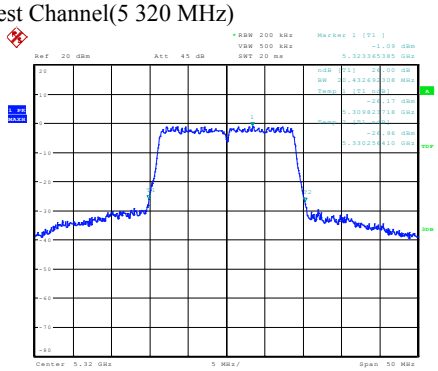
Lowest Channel(5 260 MHz)



Middle Channel(5 280 MHz)

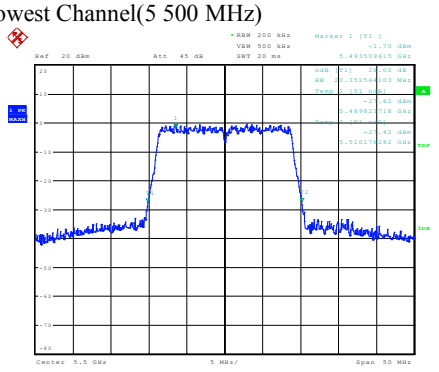


Highest Channel(5 320 MHz)

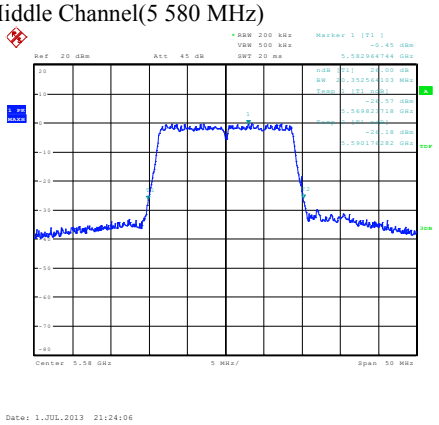


802.11an HT20 (5 470 MHz ~ 5 725 MHz)

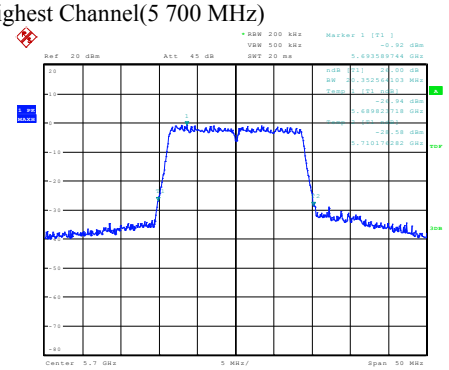
Lowest Channel(5 500 MHz)



Middle Channel(5 580 MHz)



Highest Channel(5 700 MHz)



5.3 Maximum Conducted Output Power

5.3.1 Regulation

According to §15.407(a) (1) For the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

According to §15.407(a) (2) For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

5.3.2 Measurement Procedure

These test measurement settings are specified in f) of section C of 789033 D01 General UNII Test Procedures.

5.3.2.1 Method PM (Measurement using an RF average power meter):

(1) As an alternative to spectrum analyzer measurements, measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied.
   (i) The EUT is configured to transmit continuously or to transmit with a consistent duty factor.
   (ii) At all times when the EUT is transmitting, it must be transmitting at its maximum power control level.
   (iii) The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.

(2) If the transmitter does not transmit continuously, measure the duty cycle, x, of the transmitter output signal as described in section B).
(3) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
(4) Adjust the measurement in dBm by adding 10 log(1/x) where x is the duty cycle (e.g., 10 log(1/0.25) if the duty cycle is 25 percent).

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5.3.4 Test Result

-Complied

802.11a

5 150 ~5 250 MHz

Frequency (MHz)	Average Power (dBm)	C.L (dB)	Duty cycle (dB)	result (dBm)	Limit (dBm)	Margin (dB)
5180	12.31	1.91	0.00	14.22	17.00	2.78
5200	12.37	1.91	0.00	14.28	17.00	2.72
5240	12.42	1.91	0.00	14.33	17.00	2.67

5 250 ~5 350 MHz

Frequency (MHz)	Average Power (dBm)	C.L (dB)	Duty cycle (dB)	result (dBm)	Limit (dBm)	Margin (dB)
5260	12.39	1.91	0.00	14.30	17.00	2.70
5280	12.82	1.91	0.00	14.73	17.00	2.27
5320	12.75	1.91	0.00	14.66	17.00	2.34

5 470 ~5 725 MHz

Frequency (MHz)	Average Power (dBm)	C.L (dB)	Duty cycle (dB)	result (dBm)	Limit (dBm)	Margin (dB)
5500	12.72	2.16	0.00	14.88	17.00	2.12
5580	12.52	2.16	0.00	14.68	17.00	2.32
5700	12.11	2.16	0.00	14.27	17.00	2.73

-NOTE:

1. Since the directional gain of the integral antenna declared by the manufacturer does not exceed 6.0 dBi, there was no need to reduce the output power.(This device is $N_{ANT} = 4$, Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$)
2. Duty cycle = 100 % = 0 dB

802.11an HT20
5 150 ~5 250 MHz

Frequency (MHz)	Average Power (dBm)	C.L (dB)	Duty cycle (dB)	result (dBm)	Limit (dBm)	Margin (dB)
5180	12.39	1.91	0.00	14.30	17.00	2.70
5200	12.48	1.91	0.00	14.39	17.00	2.61
5240	12.52	1.91	0.00	14.43	17.00	2.57

5 250 ~5 350 MHz

Frequency (MHz)	Average Power (dBm)	C.L (dB)	Duty cycle (dB)	result (dBm)	Limit (dBm)	Margin (dB)
5260	12.49	1.91	0.00	14.40	17.00	2.60
5280	12.95	1.91	0.00	14.86	17.00	2.14
5320	12.87	1.91	0.00	14.78	17.00	2.22

5 470 ~5 725 MHz

Frequency (MHz)	Average Power (dBm)	C.L (dB)	Duty cycle (dB)	result (dBm)	Limit (dBm)	Margin (dB)
5500	12.81	2.16	0.00	14.97	17.00	2.03
5580	12.63	2.16	0.00	14.79	17.00	2.21
5700	12.22	2.16	0.00	14.38	17.00	2.62

-NOTE:
1. Since the directional gain of the integral antenna declared by the manufacturer does not exceed 6.0 dBi, there was no need to reduce the output power.(This device is $N_{ANT} = 4$, Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$)
2. Duty cycle = 100 % = 0 dB

5.4 Peak Power Spectral Density

5.4.1 Regulation

According to §15.407(a)(1) For the band 5.15–5.25 GHz, the peak power spectral density shall not exceed 4 dBm in any 1–MHz band.

According to §15.407(a)(2) For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band.

If transmitting antennas of directional gain greater than 6 dBi are used, the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

5.4.2 Measurement Procedure

These test measurement settings are specified in section E of 789033 D01 General UNII Test Procedures.

5.4.2.1 Peak power spectral density (PPSD)

(1) Create an average power spectrum for the EUT operating mode being tested by following the instructions in section C)3) for measuring maximum conducted output power using a spectrum analyzer: select the appropriate test method (SA-1, SA-2, SA-3, or alternatives to each) and apply it up to, but not including, the step labeled, "Compute power…". (This procedure is required even if the maximum conducted output power measurement was performed using a power meter, method PM.)
(2) Use the peak search function on the spectrum analyzer to find the peak of the spectrum.
(3) Make the following adjustments to the peak value of the spectrum, if applicable:
  a) If Method SA-2 or SA-2 Alternative was used, add 10 log(1/x), where x is the duty cycle, to the peak of the spectrum.
  b) If Method SA-3 Alternative was used and the linear mode was used in step C)3)g)(viii), add 1 dB to the final result to compensate for the difference between linear averaging and power averaging.
(4) The result is the PPSD.
(5) The above procedure involves use of 1 MHz resolution bandwidth to satisfy the 1 MHz measurement bandwidth specified in the 15.407(a)(5). That rule section also permits use of resolution bandwidths less than 1 MHz "provided that the measured power is integrated to show the total power over the measurement bandwidth" (i.e., 1 MHz). If measurements are performed using a reduced resolution bandwidth and integrated over 1 MHz bandwidth, care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

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5.4.3 Test Result

-Complied

802.11a
5 150 ~5 250 MHz

Frequency (MHz)	Average Power (dBm)	C.L (dB)	Duty cycle (dB)	result (dBm)	Limit (dBm)	Margin (dB)
5180	-4.28	1.91	0.00	-2.37	17.00	19.37
5200	-3.75	1.91	0.00	-1.84	17.00	18.84
5240	-3.48	1.91	0.00	-1.57	17.00	18.57

5 250 ~5 350 MHz

Frequency (MHz)	Average Power (dBm)	C.L (dB)	Duty cycle (dB)	result (dBm)	Limit (dBm)	Margin (dB)
5260	-3.85	1.91	0.00	-1.94	17.00	18.94
5280	-3.62	1.91	0.00	-1.71	17.00	18.71
5320	-3.95	1.91	0.00	-2.04	17.00	19.04

5 470 ~5 725 MHz

Frequency (MHz)	Average Power (dBm)	C.L (dB)	Duty cycle (dB)	result (dBm)	Limit (dBm)	Margin (dB)
5500	-2.70	2.16	0.00	-0.54	17.00	17.54
5580	-2.50	2.16	0.00	-0.34	17.00	17.34
5700	-3.77	2.16	0.00	-1.61	17.00	18.61

-NOTE:

1. Since the directional gain of the integral antenna declared by the manufacturer does not exceed 6.0 dBi, there was no need to reduce the Peak Power Spectral Density. (This device is N_{SS} = 4, Array Gain = 10 log(N_{ANT}/N_{SS}) dB = 0.)
3. Duty cycle = 100% = 0 dB

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802.11an HT20
5 150 ~5 250 MHz

Frequency (MHz)	Average Power (dBm)	C.L (dB)	Duty cycle (dB)	result (dBm)	Limit (dBm)	Margin (dB)
5180	-4.22	1.91	0.00	-2.31	17.00	19.31
5200	-4.06	1.91	0.00	-2.15	17.00	19.15
5240	-3.60	1.91	0.00	-1.69	17.00	18.69

5 250 ~5 350 MHz

Frequency (MHz)	Average Power (dBm)	C.L (dB)	Duty cycle (dB)	result (dBm)	Limit (dBm)	Margin (dB)
5260	-3.81	1.91	0.00	-1.90	17.00	18.90
5280	-3.68	1.91	0.00	-1.77	17.00	18.77
5320	-3.96	1.91	0.00	-2.05	17.00	19.05

5 470 ~5 725 MHz

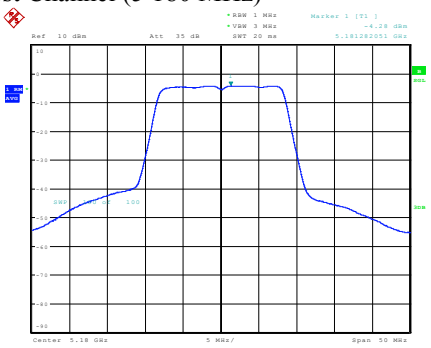
Frequency (MHz)	Average Power (dBm)	C.L (dB)	Duty cycle (dB)	result (dBm)	Limit (dBm)	Margin (dB)
5500	-3.03	2.16	0.00	-0.87	17.00	17.87
5580	-3.07	2.16	0.00	-0.91	17.00	17.91
5700	-4.12	2.16	0.00	-1.96	17.00	18.96

-NOTE:
1. Since the directional gain of the integral antenna declared by the manufacturer does not exceed 6.0 dBi, there was no need to reduce the Peak Power Spectral Density. (This device is N_{SS} = 4, Array Gain = 10 log(N_{ANT}/N_{SS}) dB = 0.)
2. Duty cycle = 100% = 0 dB

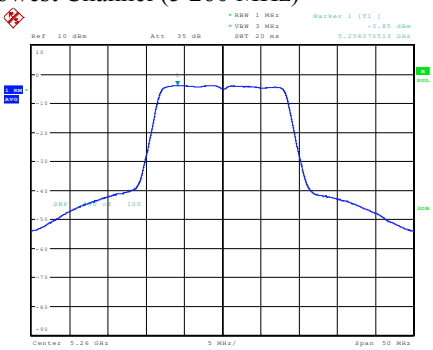
5.4.4 Test Plot

Figure 2. Plot of the Peak Power Spectral Density (Conducted)

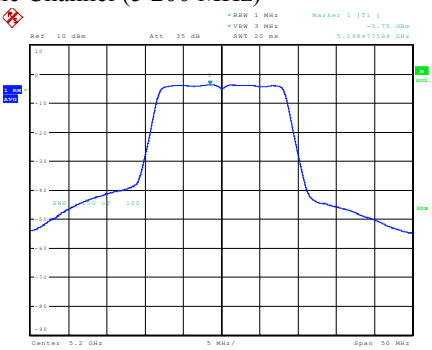
802.11a (5 150 MHz ~ 5 250 MHz)
Lowest Channel (5 180 MHz)



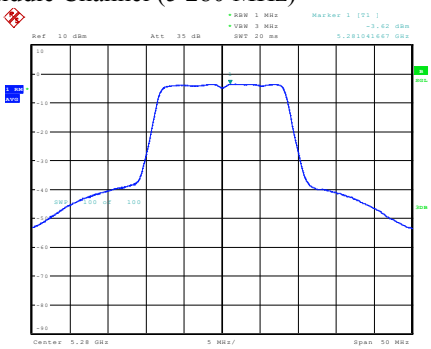
802.11a (5 250 MHz ~ 5 350 MHz)
Lowest Channel (5 260 MHz)



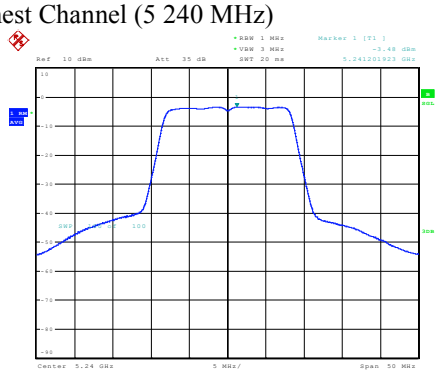
Middle Channel (5 200 MHz)



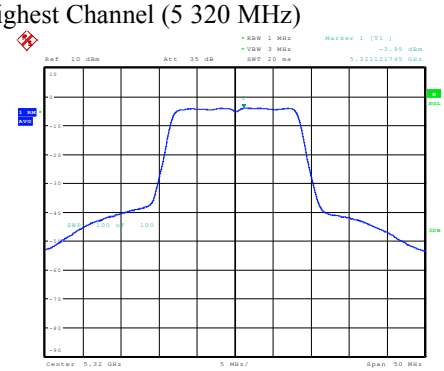
Middle Channel (5 280 MHz)



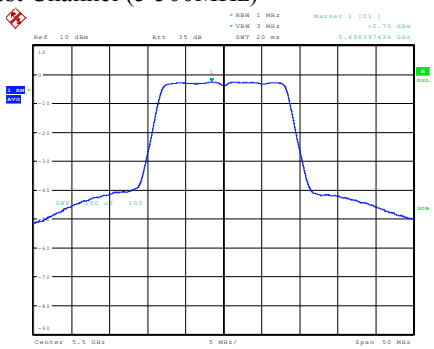
Highest Channel (5 240 MHz)



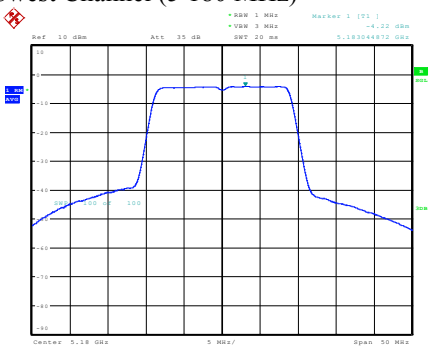
Highest Channel (5 320 MHz)



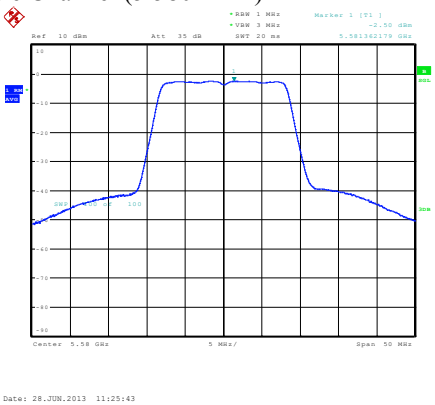
802.11a (5 470 MHz ~ 5 725 MHz)
Lowest Channel (5 500MHz)



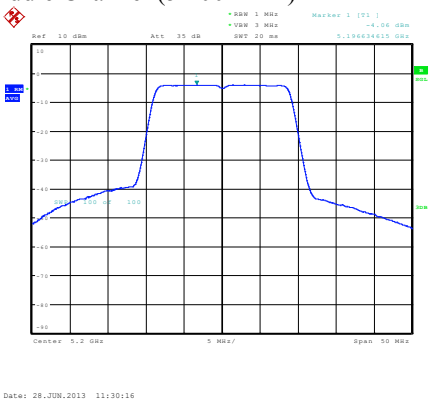
802.11an HT20 (5 150 MHz ~ 5 250 MHz)
Lowest Channel (5 180 MHz)



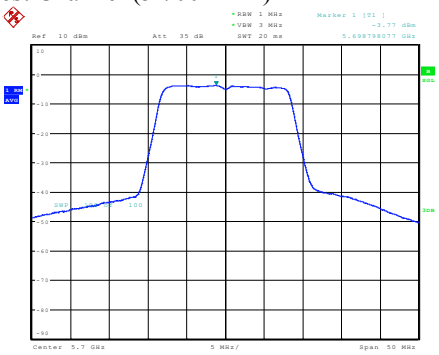
Middle Channel (5 580 MHz)



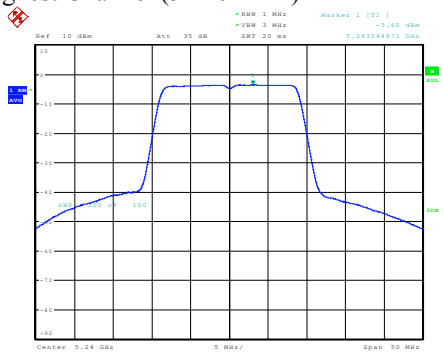
Middle Channel (5 200 MHz)



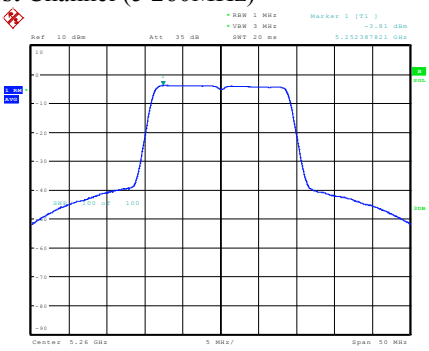
Highest Channel (5 700 MHz)



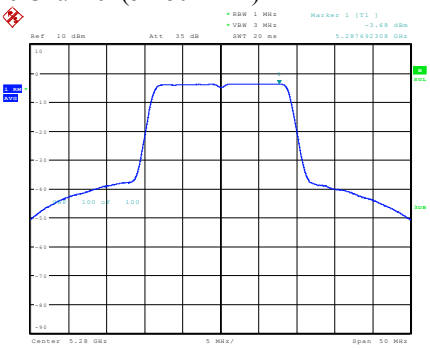
Highest Channel (5 240 MHz)



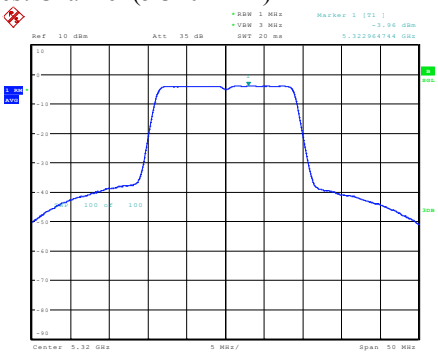
802.11an HT20 (5 250 MHz ~ 5 350 MHz)
Lowest Channel (5 260MHz)



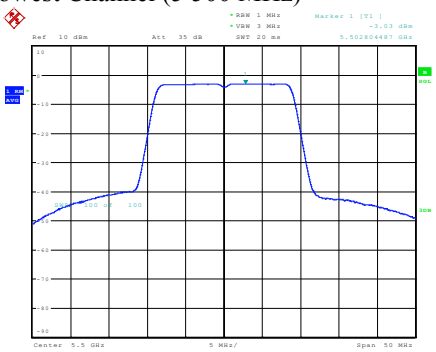
Middle Channel (5 280 MHz)



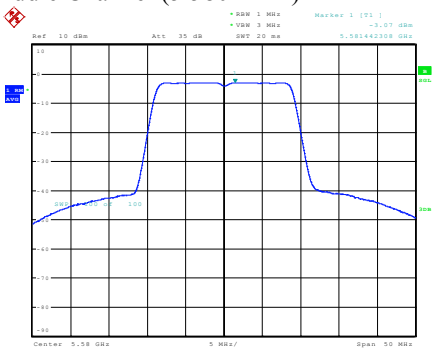
Highest Channel (5 320 MHz)



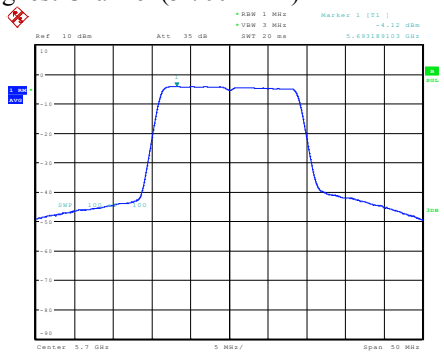
802.11an HT20 (5 470 MHz ~ 5 725 MHz)
Lowest Channel (5 500 MHz)



Middle Channel (5 580 MHz)



Highest Channel (5 700 MHz)



5.5 Peak excursion measurement

5.5.1 Regulation

According to §15.407(a)(6) The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

5.5.2 Measurement Procedure

These test measurement settings are specified in section F of 789033 D01 General UNII Test Procedures.

5.5.2.1 Peak excursion measurement

(1) Set the spectrum analyzer span to view the entire emission bandwidth.

(2) Find the maximum of the peak-max-hold spectrum.

a) Set RBW = 1 MHz.

b) VBW ≥ 3 MHz.

c) Detector = peak.

d) Trace mode = max-hold.

e) Allow the sweeps to continue until the trace stabilizes.

f) Use the peak search function to find the peak of the spectrum.

(3) Use the procedure found under E) to measure the PPSD.

(4) Compute the ratio of the maximum of the peak-max-hold spectrum to the PPSD.

5.5.3 Test Result
-Complied

802.11a

5 150 ~5 250 MHz

Frequency (MHz)	Average Power (dBm)	C.L (dB)	Duty cycle (dB)	result (dBm)	Limit (dBm)	Margin (dB)
5180	-4.22	1.91	0.00	-2.31	17.00	19.31
5200	-4.06	1.91	0.00	-2.15	17.00	19.15
5240	-3.60	1.91	0.00	-1.69	17.00	18.69

5 250 ~5 350 MHz

Frequency (MHz)	Average Power (dBm)	C.L (dB)	Duty cycle (dB)	result (dBm)	Limit (dBm)	Margin (dB)
5180	-4.22	1.91	0.00	-2.31	17.00	19.31
5200	-4.06	1.91	0.00	-2.15	17.00	19.15
5240	-3.60	1.91	0.00	-1.69	17.00	18.69

5 470 ~5 725 MHz

Frequency (MHz)	Average Power (dBm)	C.L (dB)	Duty cycle (dB)	result (dBm)	Limit (dBm)	Margin (dB)
5180	-4.22	1.91	0.00	-2.31	17.00	19.31
5200	-4.06	1.91	0.00	-2.15	17.00	19.15
5240	-3.60	1.91	0.00	-1.69	17.00	18.69

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802.11an HT20
5 150 ~5 250 MHz

Frequency (MHz)	Average Power (dBm)	C.L (dB)	Duty cycle (dB)	result (dBm)	Limit (dBm)	Margin (dB)
5180	-4.22	1.91	0.00	-2.31	17.00	19.31
5200	-4.06	1.91	0.00	-2.15	17.00	19.15
5240	-3.60	1.91	0.00	-1.69	17.00	18.69

5 250 ~5 350 MHz

Frequency (MHz)	Average Power (dBm)	C.L (dB)	Duty cycle (dB)	result (dBm)	Limit (dBm)	Margin (dB)
5180	-4.22	1.91	0.00	-2.31	17.00	19.31
5200	-4.06	1.91	0.00	-2.15	17.00	19.15
5240	-3.60	1.91	0.00	-1.69	17.00	18.69

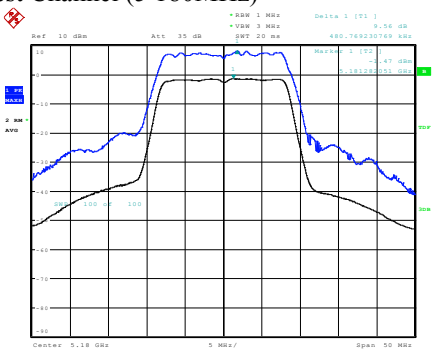
5 470 ~5 725 MHz

Frequency (MHz)	Average Power (dBm)	C.L (dB)	Duty cycle (dB)	result (dBm)	Limit (dBm)	Margin (dB)
5180	-4.22	1.91	0.00	-2.31	17.00	19.31
5200	-4.06	1.91	0.00	-2.15	17.00	19.15
5240	-3.60	1.91	0.00	-1.69	17.00	18.69

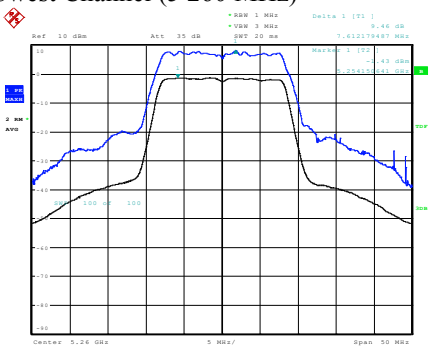
5.5.4 Test Plot

Figure 3. Plot of the Peak excursion

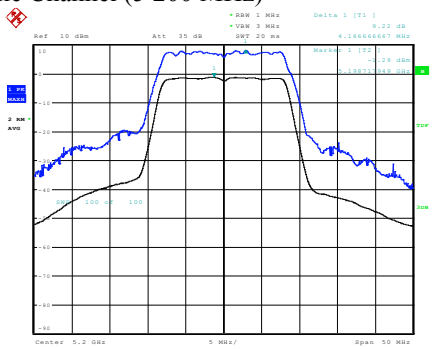
802.11a (5 150 MHz ~ 5 250 MHz)
Lowest Channel (5 180MHz)



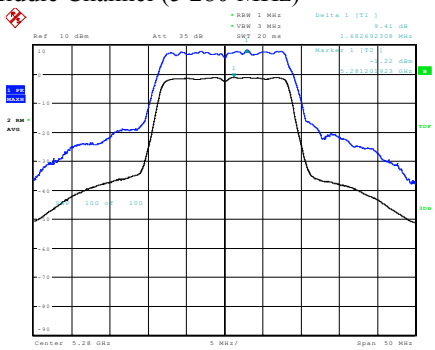
802.11a (5 250 MHz ~ 5 350 MHz)
Lowest Channel (5 260 MHz)



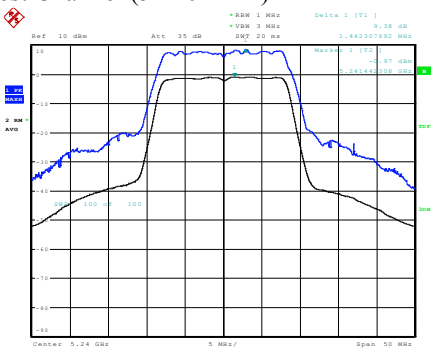
Middle Channel (5 200 MHz)



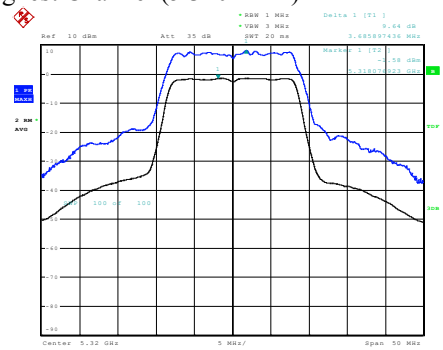
Middle Channel (5 280 MHz)



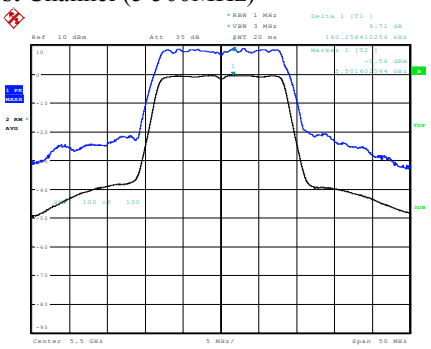
Highest Channel (5 240 MHz)



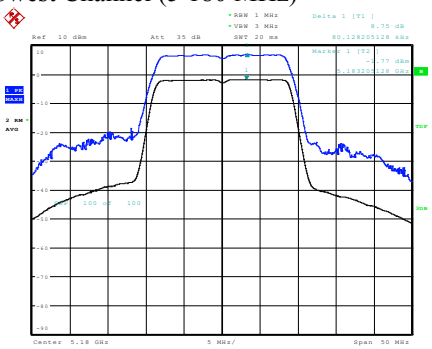
Highest Channel (5 320 MHz)



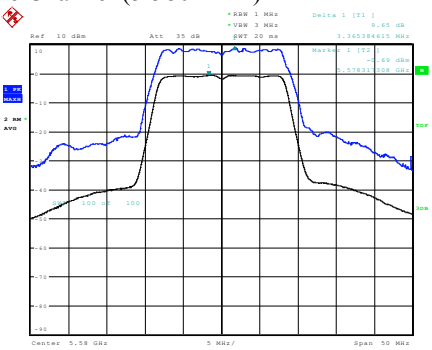
802.11a (5 470 MHz ~ 5 725 MHz)
Lowest Channel (5 500MHz)



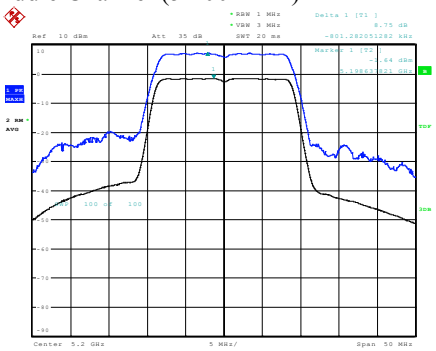
802.11an HT20 (5 150 MHz ~ 5 250 MHz)
Lowest Channel (5 180 MHz)



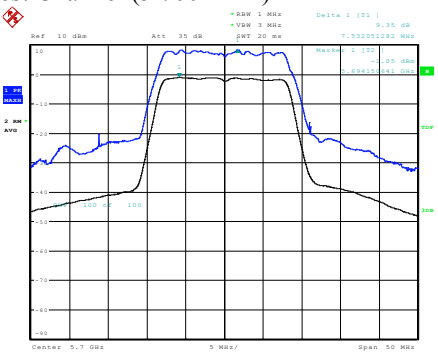
Middle Channel (5 580 MHz)



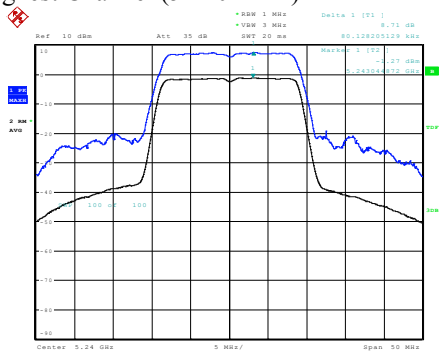
Middle Channel (5 200 MHz)



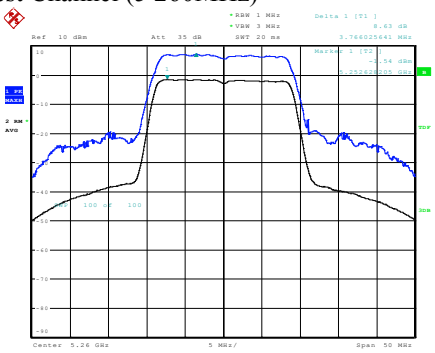
Highest Channel (5 700 MHz)



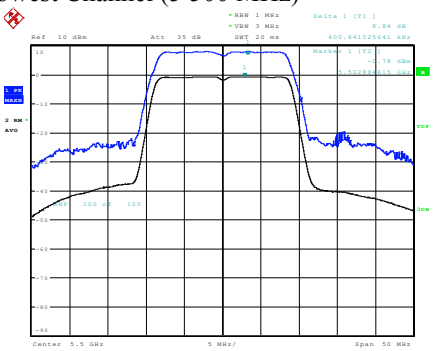
Highest Channel (5 240 MHz)



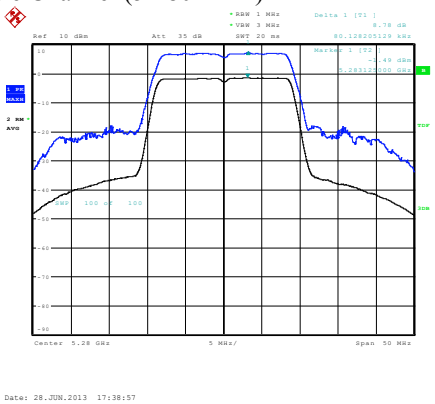
802.11an HT20 (5 250 MHz ~ 5 350 MHz)
Lowest Channel (5 260MHz)



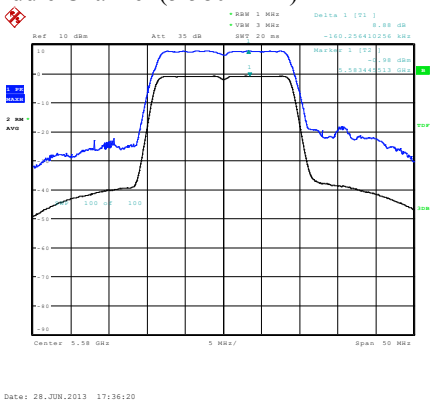
802.11an HT20 (5 470 MHz ~ 5 725 MHz)
Lowest Channel (5 500 MHz)



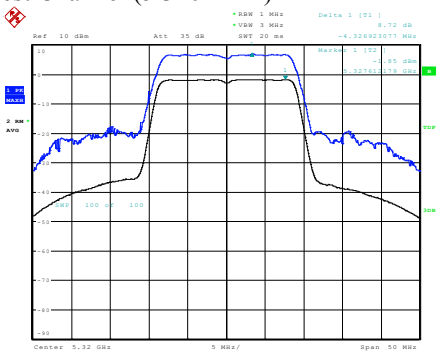
Middle Channel (5 280 MHz)



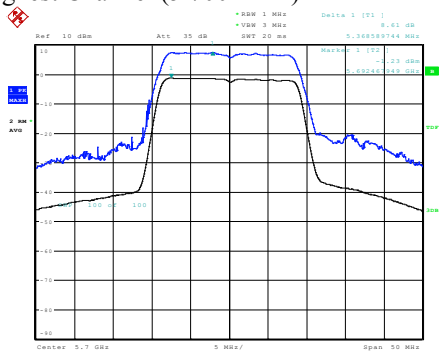
Middle Channel (5 580 MHz)



Highest Channel (5 320 MHz)



Highest Channel (5 700 MHz)



5.6 SPURIOUS EMISSION, BAND EDGE, AND RESTRICTED BANDS

5.6.1 Regulation

According to §15.407(b)(1) 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 EIRP of -27 dBm/MHz.

According to §15.407(b)(2) 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 EIRP of -27 dBm/MHz. Devices operating in the 5.25–5.35 GHz band that generate emissions in the 5.15–5.25 GHz band must meet all applicable technical requirements for operation in the 5.15–5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15–5.25 GHz band.

According to §15.407(b)(3) 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 EIRP of -27 dBm/MHz.

According to §15.407(b)(6) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209.

According to §15.209(a), Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall notexceed the field strength levels specified in the following table:

Frequency (MHz)	Field strength (μV/m)	Measurement distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 -1.705	24000/F(kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

** The emission limits shown in the above table are based on measurement instrumentation employing a CISPR quasi-peak detector and above 1000 MHz are based on the average value of measured emissions.

According to §15.407(b)(7) The provisions of §15.205 apply to intentional radiators operating under this section.
(8) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency block edges as the design of the equipment permits.

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5.6.2 Measurement Procedure

These test measurement settings are specified in section G of 789033 D01 General UNII Test Procedures.

For all radiated emissions tests, measurements must correspond to the direction of maximum emission level for each measured emission (see ANSI C63.10 for guidance).

5.6.2.1 Unwanted emissions measurement.

(1) Unwanted emissions in the restricted bands.

a) For all measurements, follow the requirements in section G)3),4),5),6)

(2) Unwanted emissions that fall outside of the restricted bands.

a) For all measurements, follow the requirements in section G)3), *"General Requirements for Unwanted Emissions Measurements"*.

b) At frequencies below 1000 MHz, use the procedure described in section G)4), *"Procedure for Unwanted Emissions Measurements Below 1000 MHz"*.

c) At frequencies above 1000 MHz, use the procedure for peak emissions described in section G)5), *"Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz"*.

(i) As specified in 15.407(b), emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of -27 dBm/MHz (or -17 dBm/MHz as specified in 15.407(b)(4)). However, an out-of-band emission that complies with both the average and peak limits of 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz peak emission limit.[2]
(or Limit of unwanted Emission out of the restricted bands shall apply to the radiated emission limit of 15.209 (a).)

d) If *radiated* measurements are performed, field strength is then converted to EIRP as follows:

(i) EIRP = ((E*d)^2) / 30

where: E is the field strength in V/m;
d is the measurement distance in meters;
EIRP is the equivalent isotropically radiated power in watts.

(ii) Working in dB units, the above equation is equivalent to:

EIRP[dBm] = E[dBµV/m] + 20 log(d[meters]) - 104.77

(iii) Or, if d is 3 meters: EIRP[dBm] = E[dBµV/m] - 95.2

(3) General Requirements for Unwanted Emissions Measurements.

The following requirements apply to all unwanted emissions measurements, both in and outside of the restricted bands:

a) EUT Duty Cycle

(i) The EUT shall be configured or modified to transmit continuously except as stated in (ii), below. The intent is to test at 100 percent duty cycle; however a small reduction in duty cycle (to no lower than 98 percent) is permitted if required by the EUT for amplitude control purposes. Manufacturers are expected to provide software to the test lab to permit such continuous operation.

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(ii) If continuous transmission (or at least 98 percent duty cycle) cannot be achieved due to hardware limitations of the EUT (e.g., overheating), the following additions to the measurement and reporting procedures are required:

- The EUT shall be configured to operate at the maximum achievable duty cycle.
- Measure the duty cycle, x, of the transmitter output signal as described in section B).
- Adjustments to measurement procedures (e.g., increasing test time and number of traces averaged) shall be performed as described in the procedures below.
- The test report shall include the following additional information:
  - The reason for the duty cycle limitation.
  - The duty cycle achieved for testing and the associated transmit duration and interval between transmissions.
  -The sweep time and the amount of time used for trace stabilization during max-hold measurements for peak emission measurements.

(iii) Reduction of the measured emission amplitude levels to account for operational duty factor is not permitted. Compliance is based on emission levels occurring during transmission - not on an average across on and off times of the transmitter.

(4) Procedure for Unwanted Emissions Measurements Below 1000 MHz.

a) Follow the requirements in section G)3).

b) Compliance shall be demonstrated using CISPR quasi-peak detection; however, peak detection is permitted as an alternative to quasi-peak detection.

(5) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz.

a) Follow the requirements in section G)3).

b) Peak emission levels are measured by setting the analyzer as follows:

(i) RBW = 1 MHz.

(ii) VBW ≥ 3 MHz.

(iii) Detector = Peak.

(iv) Sweep time = auto.

(v) Trace mode = max hold.

(vi) Allow sweeps to continue until the trace stabilizes. Note that if the transmission is not continuous, the time required for the trace to stabilize will increase by a factor of approximately 1/x, where x is the duty cycle. For example, at 50 percent duty cycle, the measurement time will increase by a factor of two relative to measurement time for continuous transmission.

(6) Procedures for Average Unwanted Emissions Measurements above 1000 MHz.

a) Follow the requirements in section G)3).

b) Average emission levels shall be measured using one of the following two methods.

c) **Method AD** (Average Detection): Primary method.

(i) RBW = 1 MHz.

(ii) VBW ≥ 3 MHz.

(iii) Detector = RMS, if span/(# of points in sweep) ≤ RBW/2. Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If the condition is not satisfied, the detector mode shall be set to peak.

(iv) Averaging type = power (i.e., RMS)

As an alternative, the detector and averaging type may be set for linear voltage averaging. Some analyzers require linear display mode in order to use linear voltage averaging. Log or dB averaging shall not be used.

(v) Sweep time = auto.

(vi) Perform a trace average of at least 100 traces if the transmission is continuous. If the transmission is not continuous, the number of traces shall be increased by a factor of 1/x, where x is the duty cycle. For example, with 50 percent duty cycle, at least 200 traces should be averaged.

(vii) If tests are performed with the EUT transmitting at a duty cycle less than 98 percent, a correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle.

- If power averaging (RMS) mode was used in step (iv) above, the correction factor is 10 log(1/x), where x is the duty cycle. For example, if the transmit duty cycle was 50 percent, then 3 dB must be added to the measured emission levels.
- If linear voltage averaging mode was used in step (iv) above, the correction factor is 20 log(1/x), where x is the duty cycle. For example, if the transmit duty cycle was 50 percent, then 6 dB must be added to the measured emission levels.

d) **Method VB** (Averaging using reduced video bandwidth): Alternative method.

(i) RBW = 1 MHz.

(ii) Video bandwidth.

- If the EUT is configured to transmit with duty cycle ≥ 98 percent, set VBW ≤ RBW/100 (i.e., 10 kHz) but not less than 10 Hz.
- If the EUT duty cycle is < 98 percent, set VBW ≥ 1/*T*, where *T* is defined in section B)1)a).

(iii) Video bandwidth mode or display mode

The analyzer shall be set to ensure that video filtering is applied in the power domain.

Typically, this requires setting the detector mode to RMS and setting the Average-VBW Type to Power (RMS).

As an alternative, the analyzer may be set to linear detector mode. Ensure that video filtering is applied in linear voltage domain (rather than in a log or dB domain). Some analyzers require linear display mode in order to accomplish this. Others have a setting for Average-VBW Type, which can be set to "Voltage" regardless of the display mode.

(iv) Detector = Peak.

(v) Sweep time = auto.

(vi) Trace mode = max hold.

(vii) Allow max hold to run for at least 50 traces if the transmitted signal is continuous or has at least 98 percent duty cycle. For lower duty cycles, increase the minimum number of traces by a factor of 1/x, where x is the duty cycle. For example, use at least 200 traces if the duty cycle is 25 percent.

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5.6.2.2 Spurious Radiated Emissions:

1. The preliminary and final rdiated measurements were performed to determine the frequency producing the maximum emissions in at a 10m anechoic chamber. The EUT was tested at a distance 3 meters.
2. The EUT was placed on the top of the 0.8-meter height, 1 × 1.5 meter non-metallic table. To find the maximum emission levels, the height of a measuring antenna was changed and the turntable was rotated 360˚.
3. The antenna polarization was also changed from vertical to horizontal. The spectrum was scanned from 9 kHz to 30 MHz using the loop antenna, and from 30 to 1000 MHz using the TRILOG broadband antenna, and from 1 000 MHz to 40 000 MHz using the horn antenna.
4. Each frequency found during preliminary measurements was re-examined and investigated. The test-receiver system was set up to average, peak, and quasi-peak detector function with specified bandwidth.

- Sample calculation

The field strength is calculated adding the antenna Factor, cable loss and, Antenna pad adding, subtracting the amplifier gain from the measured reading.

The sample calculation is as follow:

Result = M.R + C.F(A.F + C.L +3 dB Att − A.G)

M.R = Meter Reading
C.F = Correction Factor
A.F = Antenna Factor
C.L = Cable Loss
A.G = Amplifier Gain
3 dB Att = 3 dB Attenuator
If M.R is 30 dB, A.F 12 dB, C.L 5 dB, 3 dB, A.G 35 dB

The result is Peak and Quasi-peak: 30 + 12 + 5 + 3 − 35 = 15 dB(μV/m)

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5.6.3 Test Result
-complied

Measured value of the Field strength of spurious Emissions and outside of the restricted bands (Radiated).

- The Measuring below 30 MHz was detected too small. (More than 20 dB below the limit)

802.11a (5 150 ~ 5 250 MHz)

Low channel (5 180 MHz)

Frequency [MHz]	Receiver Bandwidth [kHz]	Pol. [V/H]	Reading [dB(μV)]	Factor [dB]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
Quasi-Peak DATA. Emissions below 30 MHz (3m Distance)							
below 30 MHz	**Not Detected**	-	-	-	-	-	-
Quasi-Peak DATA. Emissions below 1GHz							
357.254	120	H	36.8	-6.8	30.0	46.0	16.0
456.072	120	H	38.6	-3.9	34.7	46.0	11.3
880.084	120	H	26.8	5.5	32.3	46.0	13.7
Peak DATA. Emissions above 1GHz							
5 029. 100	1000	V	47.66	0.2	47.86	74.0	26.14
Above 6 GHz	**Not Detected**	-	-	-	-	-	-
Average DATA. Emissions above 1GHz							
5 083.700	1000	V	33.50	0.2	33.70	54.0	20.3
Above 6 GHz	**Not Detected**	-	-	-	-	-	-

Note:
1.This measurement was performed the worst case data were reported.

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802.11a (5 150 ~ 5 250 MHz)
Middl channel (5 200 MHz)

Frequency [MHz]	Receiver Bandwidth [kHz]	Pol. [V/H]	Reading [dB(μV)]	Factor [dB]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
Quasi-Peak DATA. Emissions below 30 MHz (3m Distance)							
below 30 MHz	**Not Detected**	-	-	-	-	-	-
Quasi-Peak DATA. Emissions below 1GHz							
349.13	120	H	42.3	-7.0	35.3	46.0	10.7
452.799	120	H	41.3	-4.0	37.3	46.0	8.7
880.084	120	H	29.6	5.5	35.1	46.0	10.9
Peak DATA. Emissions above 1GHz							
Not Detected	-	-	-	-	-	-	-
Average DATA. Emissions above 1GHz							
Not Detected	-	-	-	-	-	-	-

Note:
1.This measurement was performed the worst case data were reported.

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802.11a (5 150 ~ 5 250 MHz)
High channel (5 240 MHz)

Frequency [MHz]	Receiver Bandwidth [kHz]	Pol. [V/H]	Reading [dB(μV)]	Factor [dB]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
Quasi-Peak DATA. Emissions below 30 MHz (3m Distance)							
below 30 MHz	**Not Detected**	-	-	-	-	-	-
Quasi-Peak DATA. Emissions below 1GHz							
352.161	120	H	35.6	-7.0	28.6	46.0	17.4
451.586	120	H	40.3	-4.0	36.3	46.0	9.7
Peak DATA. Emissions above 1GHz							
Not Detected	-	-	-	-	-	-	-
Average DATA. Emissions above 1GHz							
Not Detected	-	-	-	-	-	-	-

Note:
1.This measurement was performed the worst case data were reported.

802.11a (5 250 ~ 5 350 MHz)
Low channel (5 260 MHz)

Frequency [MHz]	Receiver Bandwidth [kHz]	Pol. [V/H]	Reading [dB(μV)]	Factor [dB]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
Quasi-Peak DATA. Emissions below 30 MHz (3m Distance)							
below 30 MHz	**Not Detected**	-	-	-	-	-	-
Quasi-Peak DATA. Emissions below 1GHz							
361.861	120	H	40.1	-6.7	33.4	46.0	12.6
447.828	120	H	40.6	-4.1	36.5	46.0	9.5
Peak DATA. Emissions above 1GHz							
Not Detected	-	-	-	-	-	-	-
Average DATA. Emissions above 1GHz							
Not Detected	-	-	-	-	-	-	-

Note:
1.This measurement was performed the worst case data were reported.

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802.11a (5 250 ~ 5 350 MHz)
Middle channel (5 280 MHz)

Frequency [MHz]	Receiver Bandwidth [kHz]	Pol. [V/H]	Reading [dB(μV)]	Factor [dB]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
Quasi-Peak DATA. Emissions below 30 MHz (3m Distance)							
below 30 MHz	**Not Detected**	-	-	-	-	-	-
Quasi-Peak DATA. Emissions below 1GHz							
362.589	120	H	36.9	-6.7	30.2	46.0	15.8
449.646	120	H	34.8	-4.1	30.7	46.0	15.3
Peak DATA. Emissions above 1GHz							
Not Detected	-	-	-	-	-	-	-
Average DATA. Emissions above 1GHz							
Not Detected	-	-	-	-	-	-	-

Note:
1.This measurement was performed the worst case data were reported.

802.11a (5 250 ~ 5 350 MHz)
High channel (5 320 MHz)

Frequency [MHz]	Receiver Bandwidth [kHz]	Pol. [V/H]	Reading [dB(μV)]	Factor [dB]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
Quasi-Peak DATA. Emissions below 30 MHz (3m Distance)							
below 30 MHz	**Not Detected**	-	-	-	-	-	-
Quasi-Peak DATA. Emissions below 1GHz							
360.285	120	H	38.9	-6.7	32.2	46.0	13.8
448.070	120	H	37.9	-4.1	33.8	46.0	12.2
Peak DATA. Emissions above 1GHz							
5 390.040	1000	V	47.93	0.5	48.43	74.0	25.57
Above 6 GHz	**Not Detected**	-	-	-	-	-	-
Average DATA. Emissions above 1GHz							
5 398.840	1000	V	33.62	0.5	34.12	54.0	19.88
Above 6 GHz	**Not Detected**	-	-	-	-	-	-

Note:
1.This measurement was performed the worst case data were reported.

802.11a (5 470 ~ 5 725 MHz)

Low channel (5 500 MHz)

Frequency [MHz]	Receiver Bandwidth [kHz]	Pol. [V/H]	Reading [dB(μV)]	Factor [dB]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
Quasi-Peak DATA. Emissions below 30 MHz (3m Distance)							
below 30 MHz	**Not Detected**	-	-	-	-	-	-
Quasi-Peak DATA. Emissions below 1GHz							
320.030	120	H	38.4	-8.0	30.4	46.0	11.5
452.799	120	H	38.6	-4.0	34.6	46.0	11.4
Peak DATA. Emissions above 1GHz							
5 468.400	1000	V	39.08	0.9	39.98	68.4	28.42
5 394.220	1000	V	38.70	0.9	39.60	74.0	34.40
Above 6 GHz	**Not Detected**	-	-	-	-	-	-
Average DATA. Emissions above 1GHz							
5 402.360	1000	V	24.84	0.9	25.74	54.0	28.26
Above 6 GHz	**Not Detected**	-	-	-	-	-	-

Note:
1.This measurement was performed the worst case data were reported.

802.11a (5 470 ~ 5 725 MHz)

Middle channel (5 580 MHz)

Frequency [MHz]	Receiver Bandwidth [kHz]	Pol. [V/H]	Reading [dB(μV)]	Factor [dB]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
Quasi-Peak DATA. Emissions below 30 MHz (3m Distance)							
below 30 MHz	**Not Detected**	-	-	-	-	-	-
Quasi-Peak DATA. Emissions below 1GHz							
330.821	120	H	36.8	-7.6	29.2	46.0	16.8
451.465	120	H	34.7	-4.1	30.6	46.0	15.4
Peak DATA. Emissions above 1GHz							
Not Detected	-	-	-	-	-	-	-
Average DATA. Emissions above 1GHz							
Not Detected	-	-	-	-	-	-	-

Note:
1.This measurement was performed the worst case data were reported.

802.11a (5 470 ~ 5 725 MHz)
High channel (5 700 MHz)

Frequency [MHz]	Receiver Bandwidth [kHz]	Pol. [V/H]	Reading [dB(μV)]	Factor [dB]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
Quasi-Peak DATA. Emissions below 30 MHz (3m Distance)							
below 30 MHz	**Not Detected**	-	-	-	-	-	-
Quasi-Peak DATA. Emissions below 1GHz							
331.791	120	H	36.7	-7.6	29.1	46.0	16.9
451.708	120	H	38.6	-4.0	34.6	46.0	11.4
Peak DATA. Emissions above 1GHz							
5 725.800	1000	V	47.06	0.6	47.69	68.2	20.51
Above 6 GHz	**Not Detected**	-	-	-	-	-	-
Average DATA. Emissions above 1GHz							
Not Detected	-	-	-	-	-	-	-

Note:
1.This measurement was performed the worst case data were reported.

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802.11an HT20 (5 150 ~ 5 250 MHz)

Low channel (5 180 MHz)

Frequency [MHz]	Receiver Bandwidth [kHz]	Pol. [V/H]	Reading [dB(μV)]	Factor [dB]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
Quasi-Peak DATA. Emissions below 30 MHz (3m Distance)							
below 30 MHz	**Not Detected**	-	-	-	-	-	-
Quasi-Peak DATA. Emissions below 1GHz							
332.398	120	H	36	-7.6	28.4	46.0	17.6
452.677	120	H	39.6	-4.0	35.6	46.0	10.4
Peak DATA. Emissions above 1GHz							
5 150.000	1000	V	53.90	0.3	54.20	74.0	19.80
Above 6 GHz	**Not Detected**	-	-	-	-	-	-
Average DATA. Emissions above 1GHz							
5 150.000	1000	V	36.58	0.3	36.88	54.0	17.12
Above 6 GHz	**Not Detected**	-	-	-	-	-	-

Note:

1.This measurement was performed the worst case data were reported.

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802.11an HT20 (5 150 ~ 5 250 MHz)
High channel (5 200 MHz)

Frequency [MHz]	Receiver Bandwidth [kHz]	Pol. [V/H]	Reading [dB(μV)]	Factor [dB]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
Quasi-Peak DATA. Emissions below 30 MHz (3m Distance)							
below 30 MHz	**Not Detected**	-	-	-	-	-	-
Quasi-Peak DATA. Emissions below 1GHz							
333.246	120	H	36.8	-7.5	29.3	46.0	10.6
454.132	120	H	39.6	-4.0	35.6	46.0	13.5
Peak DATA. Emissions above 1GHz							
Not Detected	-	-	-	-	-	-	-
Average DATA. Emissions above 1GHz							
Not Detected	-	-	-	-	-	-	-

Note:
1.This measurement was performed the worst case data were reported.

802.11an HT20 (5 150 ~ 5 250 MHz)
High channel (5 240 MHz)

Frequency [MHz]	Receiver Bandwidth [kHz]	Pol. [V/H]	Reading [dB(μV)]	Factor [dB]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
Quasi-Peak DATA. Emissions below 30 MHz (3m Distance)							
below 30 MHz	**Not Detected**	-	-	-	-	-	-
Quasi-Peak DATA. Emissions below 1GHz							
320.030	120	H	36.6	-8.0	28.6	46.0	17.4
426.488	120	H	35.4	-4.8	30.6	46.0	15.4
Peak DATA. Emissions above 1GHz							
Not Detected	-	-	-	-	-	-	-
Average DATA. Emissions above 1GHz							
Not Detected	-	-	-	-	-	-	-

Note:
1.This measurement was performed the worst case data were reported.

802.11an HT20 (5 250 ~ 5 350 MHz)

Low channel (5 260 MHz)

Frequency [MHz]	Receiver Bandwidth [kHz]	Pol. [V/H]	Reading [dB(μV)]	Factor [dB]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
Quasi-Peak DATA. Emissions below 30 MHz (3m Distance)							
below 30 MHz	**Not Detected**	-	-	-	-	-	-
Quasi-Peak DATA. Emissions below 1GHz							
320.030	120	H	33.8	-8	25.8	46.0	16.9
456.557	120	H	38.6	-3.9	34.7	46.0	11.3
Peak DATA. Emissions above 1GHz							
Not Detected	-	-	-	-	-	-	-
Average DATA. Emissions above 1GHz							
Not Detected	-	-	-	-	-	-	-

Note:
1.This measurement was performed the worst case data were reported.

802.11an HT20 (5 250 ~ 5 350 MHz)
Middle channel (5 280 MHz)

Frequency [MHz]	Receiver Bandwidth [kHz]	Pol. [V/H]	Reading [dB(μV)]	Factor [dB]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
Quasi-Peak DATA. Emissions below 30 MHz (3m Distance)							
below 30 MHz	**Not Detected**	-	-	-	-	-	-
Quasi-Peak DATA. Emissions below 1GHz							
320.030	120	H	36.7	-7.6	29.1	46.0	16.9
450.738	120	H	38.6	-4.0	34.6	46.0	11.4
Peak DATA. Emissions above 1GHz							
Not Detected	-	-	-	-	-	-	-
Average DATA. Emissions above 1GHz							
Not Detected	-	-	-	-	-	-	-

Note:
1.This measurement was performed the worst case data were reported.

802.11an HT20 (5 250 ~ 5 350 MHz)

High channel (5 320 MHz)

Frequency [MHz]	Receiver Bandwidth [kHz]	Pol. [V/H]	Reading [dB(μV)]	Factor [dB]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
Quasi-Peak DATA. Emissions below 30 MHz (3m Distance)							
below 30 MHz	**Not Detected**	-	-	-	-	-	-
Quasi-Peak DATA. Emissions below 1GHz							
320.030	120	H	37.1	-8.0	29.1	46.0	16.9
449.768	120	H	40.2	-4.1	36.1	46.0	9.9
Peak DATA. Emissions above 1GHz							
5 352.200	1000	V	54.47	0.5	54.97	74.0	19.03
Above 6 GHz	**Not Detected**	-	-	-	-	-	-
Average DATA. Emissions above 1GHz							
5 350.000	1000	V	37.02	0.5	37.52	54.0	16.48
Above 6 GHz	**Not Detected**	-	-	-	-	-	-

Note:
1.This measurement was performed the worst case data were reported.

802.11an HT20 (5 470 ~ 5 725 MHz)

Low channel (5 500 MHz)

Frequency [MHz]	Receiver Bandwidth [kHz]	Pol. [V/H]	Reading [dB(μV)]	Factor [dB]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
Quasi-Peak DATA. Emissions below 30 MHz (3m Distance)							
below 30 MHz	**Not Detected**	-	-	-	-	-	-
Quasi-Peak DATA. Emissions below 1GHz							
320.030	120	H	37.4	-8.0	29.4	46.0	16.6
452.314	120	H	40.5	-4.0	36.5	46.0	9.5
Peak DATA. Emissions above 1GHz							
5 457.400	1000	V	51.66	0.9	52.56	74.0	21.44
5 467.600	1000	V	56.48	0.9	57.28	68.4	11.12
Above 6 GHz	**Not Detected**	-	-	-	-	-	-
Average DATA. Emissions above 1GHz							
5 460.000	1000	V	30.46	0.9	31.36	54.0	22.64
Above 6 GHz	**Not Detected**	-	-	-	-	-	-

Note:
1.This measurement was performed the worst case data were reported.

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802.11an HT20 (5 470 ~ 5 725 MHz)

Middle channel (5 580 MHz)

Frequency [MHz]	Receiver Bandwidth [kHz]	Pol. [V/H]	Reading [dB(μV)]	Factor [dB]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
Quasi-Peak DATA. Emissions below 30 MHz (3m Distance)							
below 30 MHz	**Not Detected**	-	-	-	-	-	-
Quasi-Peak DATA. Emissions below 1GHz							
346.463	120	H	37.1	-7.1	30.0	46.0	16.9
479.959	120	H	36.9	-3.3	33.6	46.0	12.4
Peak DATA. Emissions above 1GHz							
Not Detected	-	-	-	-	-	-	-
Average DATA. Emissions above 1GHz							
Not Detected	-	-	-	-	-	-	-

Note:
1.This measurement was performed the worst case data were reported.

802.11an HT20 (5 470 ~ 5 725 MHz)

High channel (5 700 MHz)

Frequency [MHz]	Receiver Bandwidth [kHz]	Pol. [V/H]	Reading [dB(μV)]	Factor [dB]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
Quasi-Peak DATA. Emissions below 30 MHz (3m Distance)							
below 30 MHz	**Not Detected**	-	-	-	-	-	-
Quasi-Peak DATA. Emissions below 1GHz							
368.409	120	H	41.2	-6.5	34.7	46.0	11.3
447.343	120	H	40.3	-4.2	36.1	46.0	9.9
Peak DATA. Emissions above 1GHz							
5 725.600	1000	V	60.74	0.6	61.34	68.2	6.86
Above 6 GHz	**Not Detected**	-	-	-	-	-	-
Average DATA. Emissions above 1GHz							
Not Detected	-	-	-	-	-	-	-

Note:
1.This measurement was performed the worst case data were reported.

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5.7 Frequency Stability

5.7.1 Regulation

According to §15.407 (g) 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.

5.7.2 Measurement Procedure

The frequency stability of the carrier frequency of the intentional radiator shall be maintained all conditions of normal operation as specified in the users manual. The frequency stability shall be maintained over a temperature variation of specified in the users manual at normal supply voltage, and over a variation in the primary supply voltage of specified in the users manual of the rated supply voltage at a temperature of 20 °C. For equipment that is capable only of operating from a battery, the frequency stability tests shall be performed using a new battery without any further requirement to vary supply voltage.

1. The EUT was placed inside the environmental test chamber.
2. The temperature was incremented by 10 °C intervals from lowest temperature.
3. Each increase step of temperature measured the frequency.
4. The test temperature was set 20℃ and the supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

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5.7.3 Test Result

-complied

- 5 150 ~ 5 250 MHz

Channel	Frequency (Hz)	Voltage (DC)
CH36(Low)	5 180 000 000	3.7

Voltage (%)	Power (VAC)	Temp. (°C)	Reading Frequency (Hz)	Frequency Error (Hz)	Frequency Error (%)
100	3.7	-20	5179997880	2120	0.00004
100		-10	5179998693	1307	0.00003
100		0	5179999196	804	0.00002
100		10	5179999043	957	0.00002
100		20	5179996760	3240	0.00006
100		30	5179997742	2258	0.00004
100		40	5179996996	3004	0.00006
100		50	5179997422	2578	0.00005
85	3.145	20	5179996762	3238	0.00006
115	4.255	20	5179996763	3237	0.00006

Channel	Frequency (Hz)	Voltage (AC)
CH40(Middle)	5 230 000 000	3.7

Voltage (%)	Power (VAC)	Temp. (°C)	Reading Frequency (Hz)	Frequency Error (Hz)	Frequency Error (%)
100	3.7	-20	5199997699	2301	0.00004
100		-10	5199998716	1284	0.00002
100		0	5199999181	819	0.00002
100		10	5199999030	970	0.00002
100		20	5199996756	3244	0.00006
100		30	5199997661	2339	0.00004
100		40	5199996852	3148	0.00006
100		50	5199997437	2563	0.00005
85	3.145	20	5199996754	3246	0.00006
115	4.255	20	5199996753	3247	0.00006

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Channel	Frequency (Hz)	Voltage (AC)
CH48(High)	5 240 000 000	3.7

Voltage (%)	Power (VAC)	Temp. (°C)	Reading Frequency (Hz)	Frequency Error (Hz)	Frequency Error (%)
100	120	-20	5239997724	2276	0.00004
100		-10	5239998850	1150	0.00002
100		0	5239999194	806	0.00002
100		10	5239998975	1025	0.00002
100		20	5239996742	3258	0.00006
100		30	5239997659	2341	0.00005
100		40	5239996781	3219	0.00006
100		50	5239997467	2533	0.00005
85	102	20	5239996739	3261	0.00006
115	138	20	5239996738	3262	0.00006

- 5 250 ~ 5 350 MHz

Channel	Frequency (Hz)	Voltage (AC)
CH52(Low)	5 260 000 000	3.7

Voltage (%)	Power (VAC)	Temp. (°C)	Reading Frequency (Hz)	Frequency Error (Hz)	Frequency Error (%)
100	3.7	-20	5259997716	2284	0.00004
100		-10	5259998739	1261	0.00002
100		0	5259999163	837	0.00002
100		10	5259998998	1002	0.00002
100		20	5259996732	3268	0.00006
100		30	5259997619	2381	0.00005
100		40	5259996781	3219	0.00006
100		50	5259997465	2535	0.00005
85	3.145	20	5259996732	3268	0.00006
115	4.255	20	5259996733	3267	0.00006

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Channel	Frequency (Hz)	Voltage (AC)
CH56(Middle)	5 280 000 000	3.7

Voltage (%)	Power (VAC)	Temp. (°C)	Reading Frequency (Hz)	Frequency Error (Hz)	Frequency Error (%)
100	3.7	-20	5279997599	2401	0.00005
100		-10	5279998893	1107	0.00002
100		0	5279999111	889	0.00002
100		10	5279998854	1146	0.00002
100		20	5279996696	3304	0.00006
100		30	5279997573	2427	0.00005
100		40	5279996709	3291	0.00006
100		50	5279997509	2491	0.00005
85	3.145	20	5279996694	3306	0.00006
115	4.255	20	5279996695	3305	0.00006

Channel	Frequency (Hz)	Voltage (AC)
CH64(High)	5 320 000 000	3.7

Voltage (%)	Power (VAC)	Temp. (°C)	Reading Frequency (Hz)	Frequency Error (Hz)	Frequency Error (%)
100	3.7	-20	5319997656	2344	0.00004
100		-10	5319998804	1196	0.00002
100		0	5319999155	845	0.00002
100		10	5319998903	1097	0.00002
100		20	5319996677	3323	0.00006
100		30	5319997452	2548	0.00005
100		40	5319996699	3301	0.00006
100		50	5319997608	2392	0.00005
85	3.145	20	5319996677	3323	0.00006
115	4.255	20	5319996679	3321	0.00006

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- 5 470 ~ 5 725 MHz

Channel	Frequency (Hz)	Voltage (AC)
CH100(Low)	5 500 000 000	3.7

Voltage (%)	Power (VAC)	Temp. (°C)	Reading Frequency (Hz)	Frequency Error (Hz)	Frequency Error (%)
100	3.7	-20	5499997691	2309	0.00004
100		-10	5499998816	1184	0.00002
100		0	5499999055	945	0.00002
100		10	5499998844	1156	0.00002
100		20	5499996561	3439	0.00006
100		30	5499997333	2667	0.00005
100		40	5499996518	3482	0.00006
100		50	5499997468	2532	0.00005
85	3.145	20	5499996561	3439	0.00006
115	4.255	20	5499996562	3438	0.00006

Channel	Frequency (Hz)	Voltage (AC)
CH116(Middle)	5 580 000 000	3.7

Voltage (%)	Power (VAC)	Temp. (°C)	Reading Frequency (Hz)	Frequency Error (Hz)	Frequency Error (%)
100	3.7	-20	5579997615	2385	0.00004
100		-10	5579998894	1106	0.00002
100		0	5579999133	867	0.00002
100		10	5579998839	1161	0.00002
100		20	5579996508	3492	0.00006
100		30	5579997257	2743	0.00005
100		40	5579996429	3571	0.00006
100		50	5579997563	2437	0.00004
85	3.145	20	5579996506	3494	0.00006
115	4.255	20	5579996505	3495	0.00006

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- 5 470 ~ 5 725 MHz

Channel	Frequency (Hz)	Voltage (AC)
CH140(High)	5 700 000 000	3.7

Voltage (%)	Power (VAC)	Temp. (°C)	Reading Frequency (Hz)	Frequency Error (Hz)	Frequency Error (%)
100	3.7	-20	5699997571	2429	0.00004
100		-10	5699998854	1146	0.00002
100		0	5699999035	965	0.00002
100		10	5699998735	1265	0.00002
100		20	5699996312	3688	0.00006
100		30	5699997180	2820	0.00005
100		40	5699996417	3583	0.00006
100		50	5699997467	2533	0.00004
85	3.145	20	5699996431	3569	0.00006
115	4.255	20	5699996440	3560	0.00006

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5.8 Conducted Emission

5.8.1 Regulation

According to §15.207(a), 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 or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50μH/50Ω line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Qausi-peak	Average
0.15 – 0.5	66 to 56 *	56 to 46 *
0.5 – 5	56	46
5 – 30	60	50

* Decreases with the logarithm of the frequency.

According to §15.107(a), for unintentional device, except for Class A digital devices, line conducted emission limits are the same as the above table.

5.8.2 Measurement Procedure

1. The EUT was placed on a wooden table of size, 1 m by 1.5 m, raised 80 cm in which is located 40 cm away from the vertical wall and 1.5m away from the side wall of the shielded room.
2. Each current-carrying conductor of the EUT power cord was individually connected through a 50Ω/50μH LISN, which is an input transducer to a Spectrum Analyzer or an EMI/Field Intensity Meter, to the input power source.
3. Exploratory measurements were made to identify the frequency of the emission that had the highest amplitude relative to the limit by operating the EUT in a range of typical modes of operation, cable position, and with a typical system equipment configuration and arrangement. Based on the exploratory tests of the EUT, the one EUT cable configuration and arrangement and mode of operation that had produced the emission with the highest amplitude relative to the limit was selected for the final measurement.
4. The final test on all current-carrying conductors of all of the power cords to the equipment that comprises the EUT (but not the cords associated with other non-EUT equipment is the system) was then performed over the frequency range of 0.15 MHz to 30 MHz.
5. The measurements were made with the detector set to PEAK amplitude within a bandwidth of 10 kHz or to QUASI-PEAK and AVERAGE within a bandwidth of 9 kHz. The EUT was in transmitting mode during the measurements.

5.8.3 Test Result

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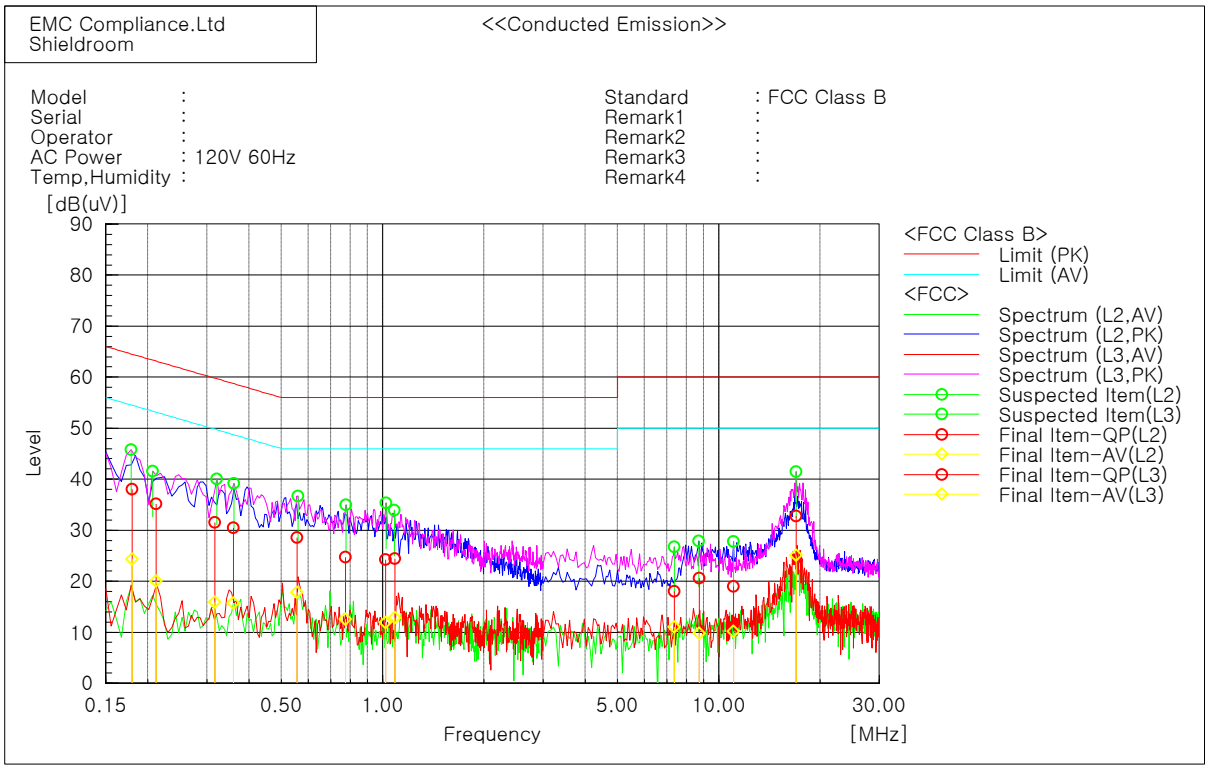
5.8.3 Test Result



Final Result

--- L2 Phase ---

No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]
1	8.72694	8.8	-2.0	11.8	20.6	9.8	60.0	50.0	39.4	40.2
2	11.04796	6.2	-2.6	12.7	18.9	10.1	60.0	50.0	41.1	39.9

--- L3 Phase ---

No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]
1	0.1798	27.6	13.9	10.4	38.0	24.3	64.5	54.5	26.5	30.2
2	0.21176	25.0	9.8	10.2	35.2	20.0	63.1	53.1	27.9	33.1
3	0.31688	21.3	5.7	10.2	31.5	15.9	59.8	49.8	28.3	33.9
4	0.35924	20.1	5.4	10.3	30.4	15.7	58.7	48.7	28.3	33.0
5	0.55586	18.2	7.5	10.3	28.5	17.8	56.0	46.0	27.5	28.2
6	0.77572	14.5	2.3	10.2	24.7	12.5	56.0	46.0	31.3	33.5
7	1.01936	14.0	1.7	10.2	24.2	11.9	56.0	46.0	31.8	34.1
8	1.08538	14.2	2.6	10.2	24.4	12.8	56.0	46.0	31.6	33.2
9	7.37298	6.6	-0.4	11.4	18.0	11.0	60.0	50.0	42.0	39.0
10	16.98548	18.1	10.4	14.6	32.7	25.0	60.0	50.0	27.3	25.0

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5.9 DFS(Dynamic Frequency Selection)

5.9.1 Regulation

According to §15.407(h)(2) Radar Detection Function of Dynamic Frequency Selection (DFS). U-NII devices operating in the 5.25–5.35 GHz and 5.47–5.725 GHz bands shall employ a DFS radar detection mechanism to detect the presence of radar systems and to avoid co-channel operation with radar systems. The minimum DFS detection threshold for devices with a maximum e.i.r.p. of 200 mW to 1 W is -64 dBm. For devices that operate with less than 200 mW e.i.r.p. the minimum detection threshold is -62 dBm. The detection threshold is the received power averaged over 1 microsecond referenced to a 0 dBi antenna. The DFS process shall be required to provide a uniform spreading of the loading over all the available channels.

(i) Operational Modes. The DFS requirement applies to the following operational modes:
(A) The requirement for channel availability check time applies in the master operational mode.
(B) The requirement for channel move time applies in both the master and slave operational modes.
(ii) Channel Availability Check Time. A U-NII device shall check if there is a radar system already operating on the channel before it can initiate a transmission on a channel and when it has to move to a new channel. The U-NII device may start using the channel if no radar signal with a power level greater than the interference threshold values listed in paragraph (h)(2) of this part, is detected within 60 seconds.
(iii) Channel Move Time. After a radar's presence is detected, all transmissions shall cease on the operating channel within 10 seconds. Transmissions during this period shall consist of normal traffic for a maximum of 200 ms after detection of the radar signal. In addition, intermittent management and control signals can be sent during the remaining time to facilitate vacating the operating channel.
(iv) Non-occupancy Period. A channel that has been flagged as containing a radar system, either by a channel availability check or in-service monitoring, is subject to a non-occupancy period of at least 30 minutes. The non-occupancy period starts at the time when the radar system is detected.

5.9.2 Measurement Procedure

The following table from FCC 06-96 lists the applicable requirements for the DFS testing.
The device evaluated in this report is considered a client device without radar detection capability.

5.9.3 Test Result

-Refer to DFS test report

5.10 RF Exposure

5.10.1 Regulation

According to §15.247(i), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. See § 1.1307(b)(1) of this Chapter.

Limits for Maximum Permissive Exposure: RF exposure is calculated.

Frequency Range	Electric Field Strength [V/m]	Magnetic Field Strength [A/m]	Power Density [mW/cm^2]	Averaging Time [minute]
Limits for General Population / Uncontrolled Exposure				
0.3 ~ 1.34	614	1.63	*(100)	30
1.34 ~ 30	824 /f	2.19/f	*(180/f^2)	30
30 ~ 300	27.5	0.073	0.2	30
300 ~ 1500	/	/	f/1500	30
1500 ~ 15000	/	/	1.0	30

*f=frequency in MHz, *= plane-wave equivalent power density*

MPE (Maximum Permissive Exposure) Prediction
Predication of MPE limit at a given distance: Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2 \quad \left(\Rightarrow R = \sqrt{PG/4\pi S}\right)$$

S=power density [mW/cm^2]
P=Power input to antenna [mW]
G=Power gain of the antenna in the direction of interest relative to an isotropic radiator
R= distance to the center of radiation of the antenna [cm]

5.10.2 RF Exposure Compliance Issue

The information should be included in the user's manual:
This appliance and its antenna must not be co-located or operation in conjunction with any other antenna or transmitter. A minimum separation distance of 20 cm must be maintained between the antenna and the person for this appliance to satisfy the RF exposure requirements.

5.10.3 Calculation Result of RF Exposure

802.11a 5 150 ~ 5 250 MHz

Channel	Frequency [MHz]	Ant Gain [mW]	power [dBm]	power [mW]	Power Density at 20 cm [mW/cm2]	Power Density at 2.5 cm [mW/cm2]
Lowest	2 412	1.63	12.31	17.02	0.00550	0.35230
Middle	2 437	1.63	12.37	17.26	0..00558	0.35720
Highest	2 462	1.63	12.42	17.46	0.00565	0.36134

802.11a 5 250 ~ 5 350 MHz

Channel	Frequency [MHz]	Ant Gain [mW]	power [dBm]	power [mW]	Power Density at 20 cm [mW/cm2]	Power Density at 2.5 cm [mW/cm2]
Lowest	2 412	1.60	12.39	17.34	0.00550	0.35230
Middle	2 437	1.60	12.82	19.14	0.00608	0.38896
Highest	2 462	1.60	12.75	18.84	0.00598	0.38275

802.11a 5 470 ~ 5 650 MHz

Channel	Frequency [MHz]	Ant Gain [mW]	power [dBm]	power [mW]	Power Density at 20 cm [mW/cm2]	Power Density at 2.5 cm [mW/cm2]
Lowest	2 412	1.51	12.72	18.71	0.00561	0.35885
Middle	2 437	1.51	12.52	17.86	0.00535	0.34270
Highest	2 462	1.51	12.11	16.26	0.00487	0.31182

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802.11an HT20 5 150 ~ 5 250 MHz

Channel	Frequency [MHz]	Ant Gain [mW]	power [dBm]	power [mW]	Power Density at 20 cm [mW/cm2]	Power Density at 2.5 cm [mW/cm2]
Lowest	2 412	1.63	12.39	17.34	0.00561	0.35885
Middle	2 437	1.63	12.48	17.70	0.00572	0.36636
Highest	2 462	1.63	12.52	17.86	0.00578	0.36975

802.11an HT20 5 250 ~ 5 350 MHz

Channel	Frequency [MHz]	Ant Gain [mW]	power [dBm]	power [mW]	Power Density at 20 cm [mW/cm2]	Power Density at 2.5 cm [mW/cm2]
Lowest	2 412	1.60	12.49	17.74	0.00563	0.36050
Middle	2 437	1.60	12.95	19.72	0.00626	0.40078
Highest	2 462	1.60	12.87	19.36	0.00615	0.39347

802.11an HT20 5 470 ~ 5 650 MHz

Channel	Frequency [MHz]	Ant Gain [mW]	power [dBm]	power [mW]	Power Density at 20 cm [mW/cm2]	Power Density at 2.5 cm [mW/cm2]
Lowest	2 412	1.51	12.81	19.10	0.00572	0.36636
Middle	2 437	1.51	12.63	18.32	0.00549	0.35149
Highest	2 462	1.51	12.22	16.67	0.00500	0.31982

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6. Test equipment used for test

	Description	Manufacture	Model No.	Serial No.	Next Cal Date.
□	Temp & humidity chamber	Taekwang	TK-04	TK001	13.12.07
□	Temp & humidity chamber	Taekwang	TK-500	TK002	13.09.03
□	Frequency Counter	HP	53150A	US39250565	13.09.04
□	Spectrum Analyzer	Agilent	E4440A	MY46186407	14.06.27
■	Spectrum Analyzer	R & S	FSG13	100051	13.10.23
■	Signal Generator	R & S	SMR40	100007	14.06.27
□	Vector Signal Generator	R & S	SMBV100A	257566	14.01.07
■	Wideband Power Sensor	R & S	NRP-Z81	100677	14.05.06
□	Modulation Analyzer	HP	8901B	3538A05527	13.10.25
□	Audio Analyzer	HP	8903B	3729A19213	13.10.23
□	AC Power Supply	Kikusui	PCR2000W	GB001619	13.10.23
■	DC Power Supply	Tektronix	PS2520G	TW50517	14.03.12
□	DC Power Supply	Tektronix	PS2521G	TW53135	13.10.23
□	Attenuator	HP	8494A	2631A09825	13.10.24
□	Attenuator	HP	8496A	3308A16640	13.10.24
□	Attenuator	BIRD	50-A-MFN-20	0403002	13.10.24
□	Power Divider	Weinschel	1580-1	NX375	13.10.23
□	Power Divider	Weinschel	1580-1	NX380	13.09.09
□	Power Divider	Weinschel	1594	671	13.09.10
□	Power Divider	Krytar	7005265	143244	13.09.03
■	EMI Test Receiver	R&S	ESCI	100710	13.11.06
■	LOOP Antenna	EMCO	EMCO6502	9205-2745	14.05.23
■	BILOG Antenna	Schwarzbeck	VULB 9168	9168-440	13.09.21
■	HORN Antenna	ETS	3115	00086706	13.11.21
■	HORN Antenna	ETS	3116	00086632	13.11.15
■	Amplifier	Sonoma	310N	293004	13.11.06
■	Amplifier	Agilent	8449B	3008A01802	14.05.06
■	Attenuator	HP	8491A	27444	13.11.06
■	Antenna Mast	Innco Systems	MA4000-EP	303	-
■	Turn Table	Innco Systems	DT2000S-1t	079	-
□	Highpass Filter	Wainwright	WHK2.5/ 18G-10SS	61	14.04.12
□	Highpass Filter	Wainwright	WHKX6.5/ 18G-8SS	2	14.06.05
■	Test Receiver	R & S	843276/003	ESHS10	14.06.15
■	LISN	R & S	100267	ESH3-Z5	13.07.05
■	LISN	Schwarzbeck	8121-472	NNLK8121	13.07.13

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