

FCC TEST REPORT
for
WISNETWORKS

5GHz 300Mbps Outdoor Hi-Power Wireless WISP CPE
Model No.: WIS-Q5300

Prepared for : WISNETWORKS
Address : No.77, FuTe West 3 Road, Pilot Free Trade Zone, Shanghai,
China

Prepared By : Shenzhen Anbotek Compliance Laboratory Limited
Address : 1/F., Building 1, SEC Industrial Park, No.0409 Qianhai Road,
Nanshan District, Shenzhen, Guangdong, China
Tel: (86) 755-26066544
Fax: (86) 755-26014772

Report Number : 011406014E
Date of Test : Jun. 04~ Jul. 17, 2014
Date of Report : Jul. 18, 2014

TABLE OF CONTENT

Description

Page

Test Report

1. GENERAL INFORMATION	4
1.1. Description of Device (EUT)	4
1.2. Auxiliary Equipment Used during Test	5
1.3. Description of Test Facility	6
1.4. Measurement Uncertainty	6
2. TEST METHODOLOGY	7
2.1. Summary of Test Results	7
2.2. Description of Test Modes	7
3. CONDUCTED EMISSION TEST	8
3.1. Block Diagram of Test Setup	8
3.2. Power Line Conducted Emission Measurement Limits (15.207)	8
3.3. Configuration of EUT on Measurement	8
3.4. Operating Condition of EUT	8
3.5. Test Procedure	9
3.6. Test equipment	9
3.7. Power Line Conducted Emission Measurement Results	9
4. FCC PART 15.247 REQUIREMENTS FOR DSSS & OFDM MODULATION	12
4.1 Test Setup	12
4.2 6dB Bandwidth	12
4.3. Maximum Peak output power test	17
4.4. Band Edges Measurement	19
4.5. Peak Power Spectral Density	21
4.6. Radiated Emissions	25
5. PHOTOGRAPH	36
5.1. Photo of Conducted Emission Measurement	36
5.2. Photo of Radiation Emission Test	36
APPENDIX I (EXTERNAL PHOTOS)	38
APPENDIX II (INTERNAL PHOTOS)	40

TEST REPORT

Applicant : WISNETWORKS
Manufacturer : WISNETWORKS
EUT : 5GHz 300Mbps Outdoor Hi-Power Wireless WISP CPE
Model No. : WIS-Q5300
Serial No. : N.A.
Trade Mark :



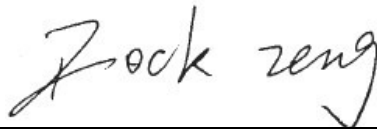
Rating : DC 24V, 0.75A

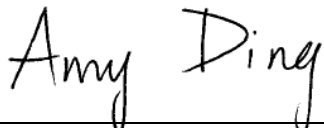
Measurement Procedure Used:
FCC Part15 Subpart C, Paragraph 15.247

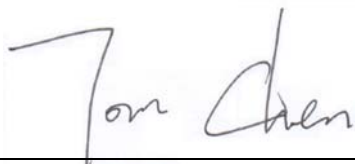
The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen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

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

Date of Test : Jun. 04~ Jul. 17, 2014

Prepared by : 
(Tested Engineer / Rock Zeng)

Reviewer : 
(Project Manager / Amy Ding)

Approved & Authorized Signer : 
(Manager / Tom Chen)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT : 5GHz 300Mbps Outdoor Hi-Power Wireless WISP CPE

Model Number : WIS-Q5300

Test Power Supply : AC 120V/60Hz for adapter

RF Transmission : 5745-5805MHz
Frequency

Channels : 4 Channels for 802.11a/n

Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	156	5765
157	5785	161	5805

Modulation : OFDM with BPSK, QPSK, 16QAM, 64QAM

Antenna Gain: : 16dBi (Directional Antenna)

Applicant : WISNETWORKS

Address : No.77, FuTe West 3 Road, Pilot Free Trade Zone, Shanghai, China

Manufacturer : WISNETWORKS

Address : No.77, FuTe West 3 Road, Pilot Free Trade Zone, Shanghai, China

Factory : WISNETWORKS

Address : No.77, FuTe West 3 Road, Pilot Free Trade Zone, Shanghai, China

Date of receipt : Jun. 04, 2014

Date of Test : Jun. 04~ Jul. 17, 2014

1.2. Auxiliary Equipment Used during Test

PC	: Manufacturer: DELL M/N: OPTIPLEX 380 S/N: 1J63X2X CE , FCC: DOC
MONITOR	: Manufacturer: DELL M/N: E170Sc S/N: CN-00V539-64180-055-0UPS CE , FCC: DOC
KEYBOARD	: Manufacturer: DELL M/N: SK-8115 S/N: CN-0DJ313-71616-06C-02XN CE , FCC: DOC Cable: 1m, unshielded
MOUSE	: Manufacturer: DELL M/N: M-UARDEL7 S/N: N/A CE , FCC: DOC Cable: 1m, unshielded
Adapter	: Model: GRT-POE15-240075A Input: AC100-240V, 50/60Hz Output: DC 24V, 750mA
Power Line	: Non-Shielded, 1.5m
HDMI Cable	: Non-Shielded, 1.5m
Network Cable	: Non-Shielded, 3.0m

1.3. Description of Test Facility

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

CNAS - LAB Code: L3503

Shenzhen Anbotek Compliance Laboratory Limited., Laboratory has been assessed and in compliance with CNAS/CL01: 2006 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of Testing Laboratories.

FCC-Registration No.: 752021

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 752021, July 10, 2013.

IC-Registration No.: 8058A-1

Shenzhen Anbotek Compliance Laboratory Limited., EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration 8058A, February 22, 2013.

Test Location

All Emissions tests were performed at
Shenzhen Anbotek Compliance Laboratory Limited. at 1/F., Building 1, SEC Industrial Park, No.0409 Qianhai Road, Nanshan District, Shenzhen, Guangdong, China

1.4. Measurement Uncertainty

Radiation Uncertainty : Ur = 4.3dB

Conduction Uncertainty : Uc = 3.4dB

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4: 2009 and FCC Part 15, Paragraph 15.247.

2.1. Summary of Test Results

The EUT has been tested according to the following specifications:

Standard	Test Type	Result	Notes
FCC Part 15, Paragraph 15.107, 15.207	Conducted Emission Test	PASS	Complies
FCC Part 15, Paragraph 15.247(b)(1)	Peak Output Power	PASS	Complies
FCC Part 15, Paragraph 15.247(a)(2)	6dB Bandwidth	PASS	Complies
FCC Part 15, Paragraph 15.247(c)	100kHz Bandwidth of Frequency Band Edges	PASS	Complies
FCC Part 15, Paragraph 15.209(a)(f)	Spurious Emission	PASS	Complies
FCC Part 15, Paragraph 15.247(a)(1)	Frequency Separation	-	N/A
FCC Part 15, Paragraph 15.247(a)(1)(iii)	Number of Hopping Frequency	-	N/A
FCC Part 15, Paragraph 15.247(a)(1)(iii)	Time of Occupancy	-	N/A
FCC Part 15, Paragraph 15.247(c)	Peak Power Density	PASS	Complies

2.2. Description of Test Modes

The EUT has been tested under operating condition.

Software used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

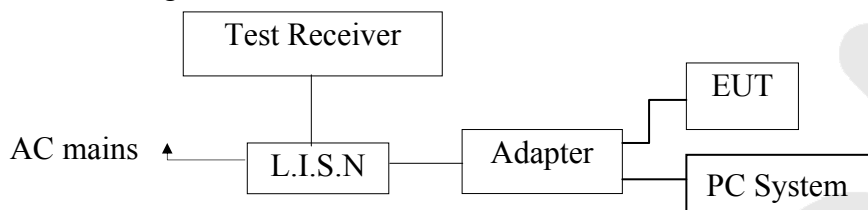
IEEE802.11a: Channel 149(5745MHz), Channel 153(5765MHz) and Channel 161(5805MHz) with MCS0 data rate (worst case) are chosen for the final testing.

IEEE802.11n: Channel 149(5745MHz), Channel 153(5765MHz) and Channel 161(5805MHz) with MCS0 data rate (worst case) are chosen for the final testing.

3. Conducted Emission Test

3.1. Block Diagram of Test Setup

3.1.1. Block diagram of connection between the EUT and simulators



3.2. Power Line Conducted Emission Measurement Limits (15.207)

Frequency MHz	Limits dB(μV)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66 ~ 56*	56 ~ 46*
0.50 ~ 5.00	56	46
5.00 ~ 30.00	60	50

Notes: 1. *Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

3.3. Configuration of EUT on Measurement

The following equipments are installed on Power Line Conducted Emission Measurement to meet the commission requirement and operating regulations in a manner which tends to maximize its emission characteristics in a normal application.

3.4. Operating Condition of EUT

- 3.4.1. Setup the EUT and simulator as shown as Section 3.1.
- 3.4.2. Turn on the power of all equipment.
- 3.4.3. Let the EUT work in test mode (ON) and measure it.

3.5. Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC ANSI C63.4-2003 on Conducted Emission Measurement.

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

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

The test results are reported on Section 3.6.

3.6. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Two-Line V-network	Rohde & Schwarz	ENV216	100055	Apr. 23, 2014	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Apr. 23, 2014	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Apr. 23, 2014	1 Year

3.7. Power Line Conducted Emission Measurement Results

PASS.

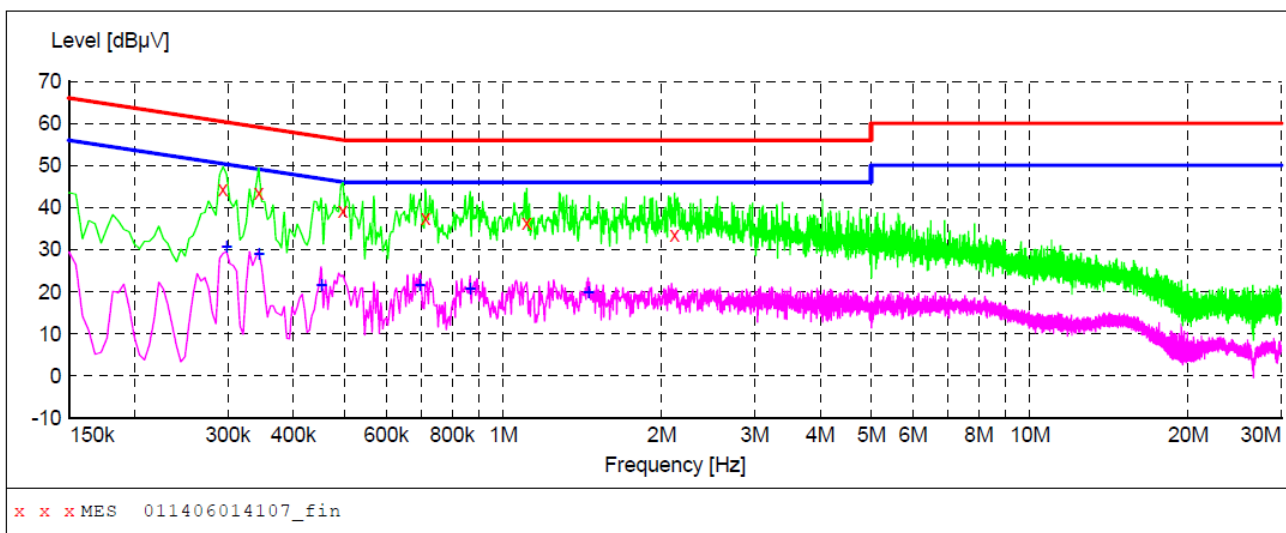
The frequency range from 150KHz to 30 MHz is investigated.

CONDUCTED EMISSION TEST DATA

Test Site: 1# Shielded Room
Operating Condition: ON
Test Specification: AC 120V/60Hz for Adapter
Comment: Live Line
Tem:25°C Hum:50%

SCAN TABLE: "Voltage (150K~30M) FIN"

Short Description: 150K-30M Disturbance Voltages



MEASUREMENT RESULT: "011406014107_fin"

6/6/2014 3:06PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.294000	44.40	10.2	60	16.0	QP	L1	GND
0.343500	43.50	10.2	59	15.6	QP	L1	GND
0.496500	39.20	10.2	56	16.9	QP	L1	GND
0.712500	37.60	10.2	56	18.4	QP	L1	GND
1.108500	36.50	10.3	56	19.5	QP	L1	GND
2.116500	33.40	10.4	56	22.6	QP	L1	GND

MEASUREMENT RESULT: "011406014107_fin2"

6/6/2014 3:06PM

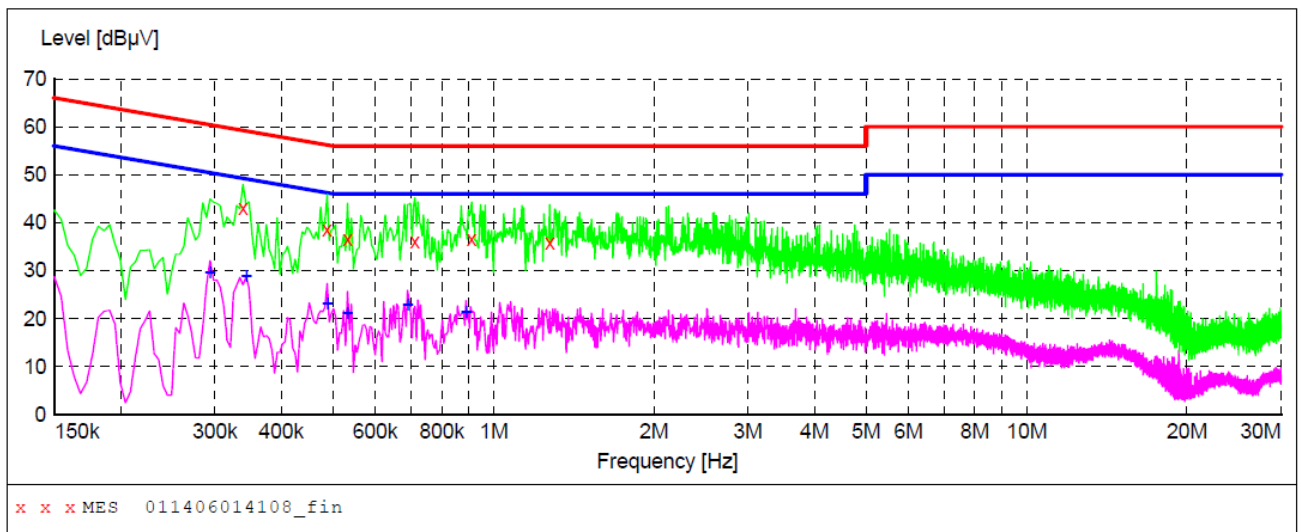
Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.298500	30.70	10.2	50	19.6	AV	L1	GND
0.343500	28.90	10.2	49	20.2	AV	L1	GND
0.451500	21.60	10.2	47	25.2	AV	L1	GND
0.694500	21.70	10.2	46	24.3	AV	L1	GND
0.865500	20.80	10.2	46	25.2	AV	L1	GND
1.450500	19.80	10.4	46	26.2	AV	L1	GND

CONDUCTED EMISSION TEST DATA

Test Site: 1# Shielded Room
Operating Condition: ON
Test Specification: AC 120V/60Hz for Adapter
Comment: Neutral Line
Tem:25°C Hum:50%

SCAN TABLE: "Voltage (150K~30M) FIN"

Short Description: 150K-30M Disturbance Voltages



MEASUREMENT RESULT: "011406014108_fin"

6/6/2014 3:09PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.339000	43.10	10.2	59	16.1	QP	N	GND
0.487500	38.60	10.2	56	17.6	QP	N	GND
0.532500	36.70	10.2	56	19.3	QP	N	GND
0.712500	36.10	10.2	56	19.9	QP	N	GND
0.910500	36.60	10.2	56	19.4	QP	N	GND
1.275000	35.70	10.3	56	20.3	QP	N	GND

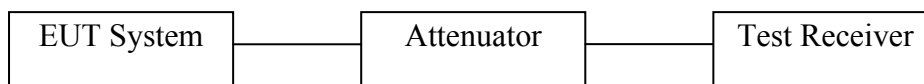
MEASUREMENT RESULT: "011406014108_fin2"

6/6/2014 3:09PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.294000	29.60	10.2	50	20.8	AV	N	GND
0.343500	28.90	10.2	49	20.2	AV	N	GND
0.487500	23.10	10.2	46	23.1	AV	N	GND
0.532500	21.10	10.2	46	24.9	AV	N	GND
0.690000	22.80	10.2	46	23.2	AV	N	GND
0.888000	21.30	10.2	46	24.7	AV	N	GND

4. FCC Part 15.247 Requirements for DSSS & OFDM Modulation

4.1 Test Setup



4.2 6dB Bandwidth

a. Limit

For the direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz.

b. Test Procedure

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as:
RBW = 100kHz, VBW \geq 3*RBW = 300kHz,
Detector= Peak
Trace mode= Max hold.
Sweep- auto couple.
4. Mark the peak frequency and -6dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

c. Test Setup See 4.1

d. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analysis	Agilent	E4407B	US39390582	Aug. 09, 2013	1 Year
2.	Preamplifier	Instruments corporation	EMC011830	980100	Aug. 09, 2013	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	Apr. 23, 2014	1 Year
4.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Aug. 09, 2013	3 Year
5.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A

e. Test Results

Pass.

f. Test Data

Test mode: IEEE 802.11a

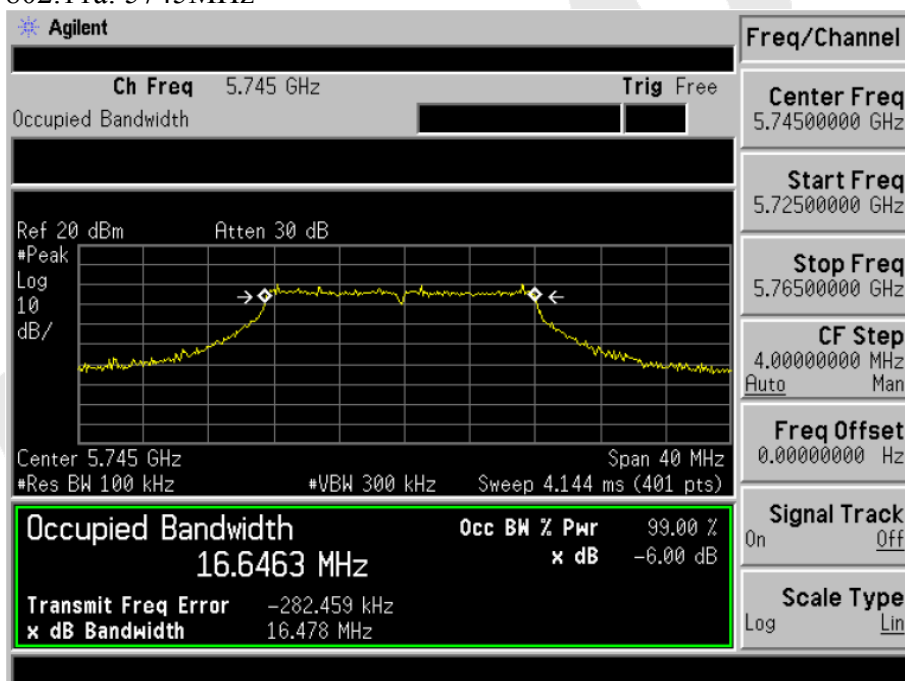
Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Results
149	5745	16.478		Pass
153	5765	16.578	>500	Pass
161	5805	16.449		Pass

Test mode: IEEE 802.11n

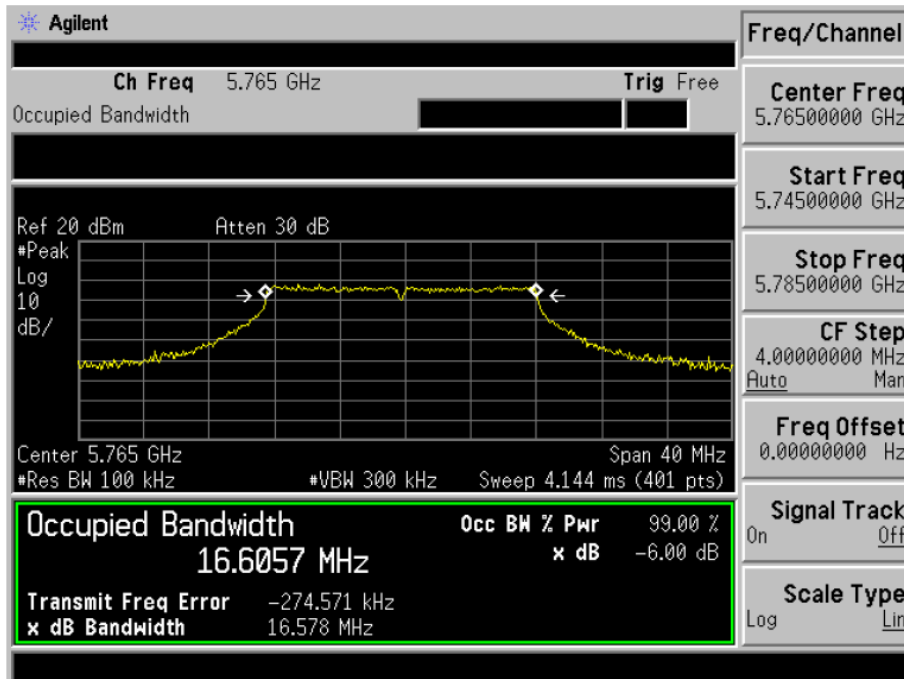
Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Results
149	5745	17.705		Pass
153	5765	17.675	>500	Pass
161	5805	17.671		Pass

Test Plots See the following page.

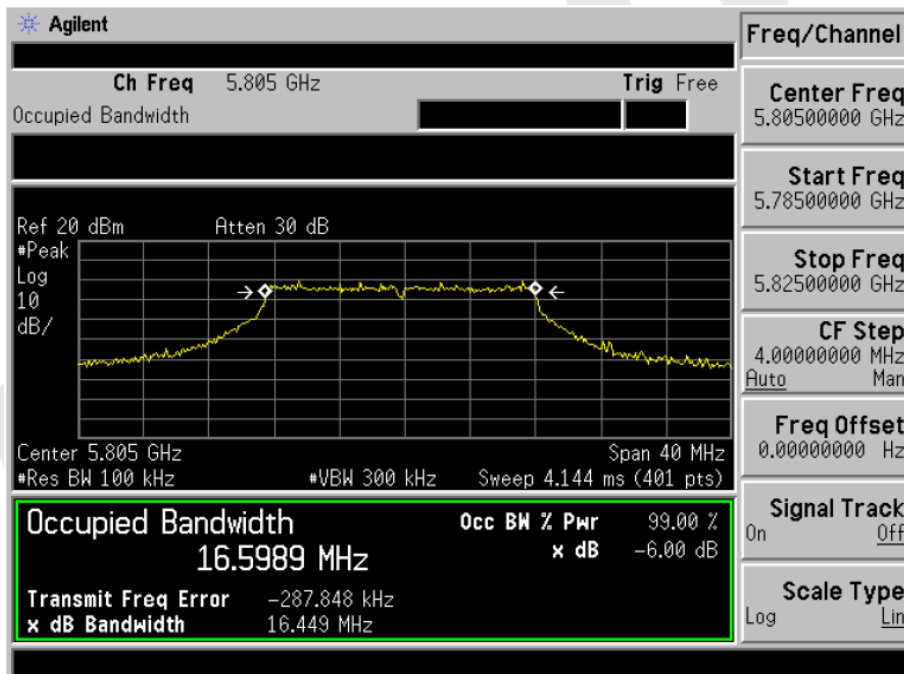
802.11a: 5745MHz



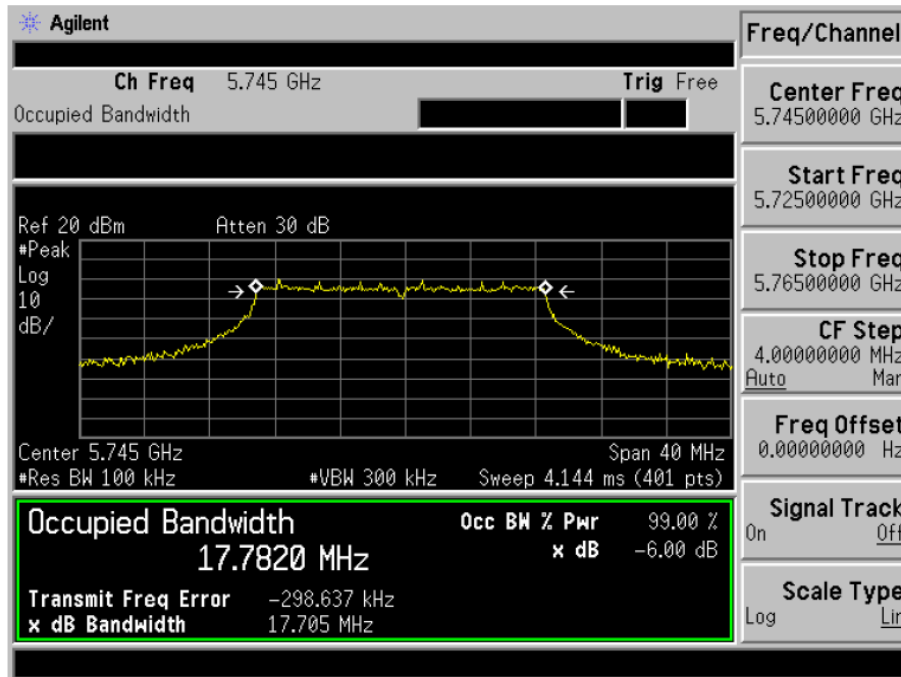
802.11a: 5765MHz



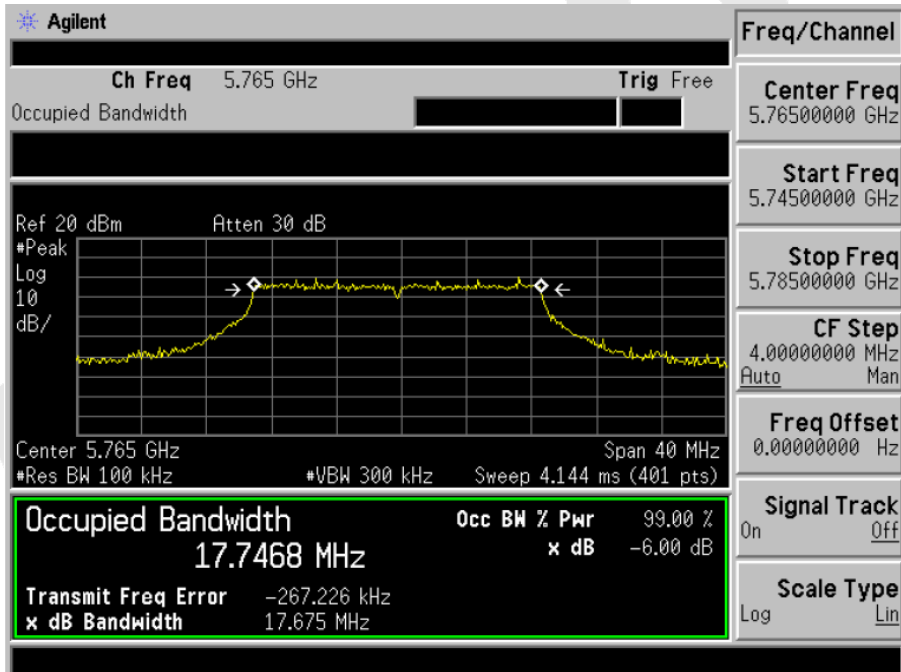
802.11n: 5805MHz



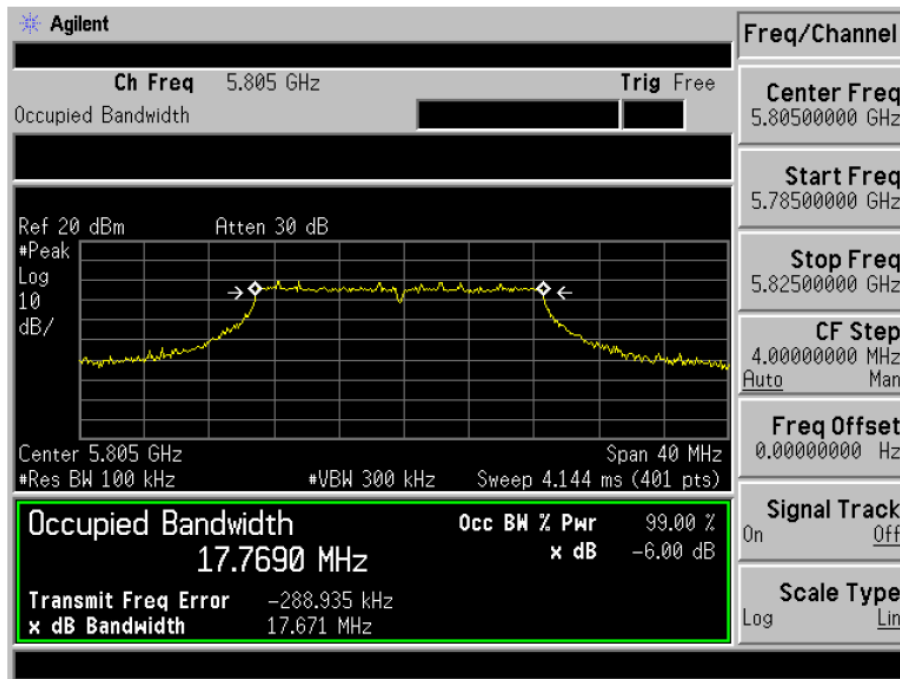
802.11n: 5745MHz



802.11n: 5765MHz



802.11n: 5805MHz



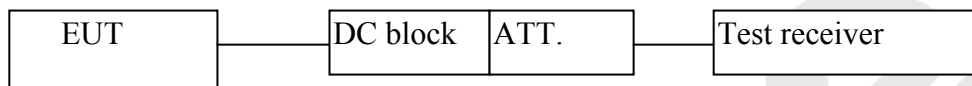
4.3. Maximum Peak output power test

a. Limit

The maximum peak output power of the intentional radiator shall not exceed the following:

1. For systems using digital modulation in the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz: 1 watt (30dBm).
2. Except as shown in paragraphs (b)(3) (i), (ii) and (iii) of this section, if transmitting antenna of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

b. Configuration of Measurement



c. Test Procedure

This test was according the kDB 558074 9.1.2:

1. This procedure may be used when the maximum available RBW of the measurement instrument is less than the DTS bandwidth.
2. Set the RBW = 1 MHz.
3. Set the VBW $\geq 3 \times \text{RBW} = 3 \text{ MHz}$.
4. Set the span $\geq 1.5 \times \text{DTS bandwidth}$.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the instrument's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges (for some instruments, this may require a manual override to select peak detector). If the instrument does not have a band power function, sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the DTS bandwidth.

d. Test Equipment

Same as the equipment listed in 4.2.

e. Test Results

Pass.

f. Test Data

Test mode: IEEE 802.11a

Channel	Frequency (MHz)	Maximum transmit power	Limit		Result
		(dBm)	(dBm)	(watts)	
149	5745	16.08	27.34	0.54	Pass
153	5765	15.52			Pass
161	5805	15.54			Pass

Test mode: IEEE 802.11n

Channel	Frequency (MHz)	Maximum transmit power	Limit		Result
		(dBm)	(dBm)	(watts)	
149	5745	15.93	27.34	0.54	Pass
153	5765	15.45			Pass
161	5805	15.48			Pass

Remark:

The antenna gain is 16dBi which is greater than 6dBi, according to the FCC rules, the limit reduced as follows:

Antenna Gain:

16dBi- 6dBi= 10dBi

$1+(10/6)=2.66$

Limit: 30dB- 2.66dB= 27.34dB= 0.54W

4.4. Band Edges Measurement

a. Limit

According to §15.247(c), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

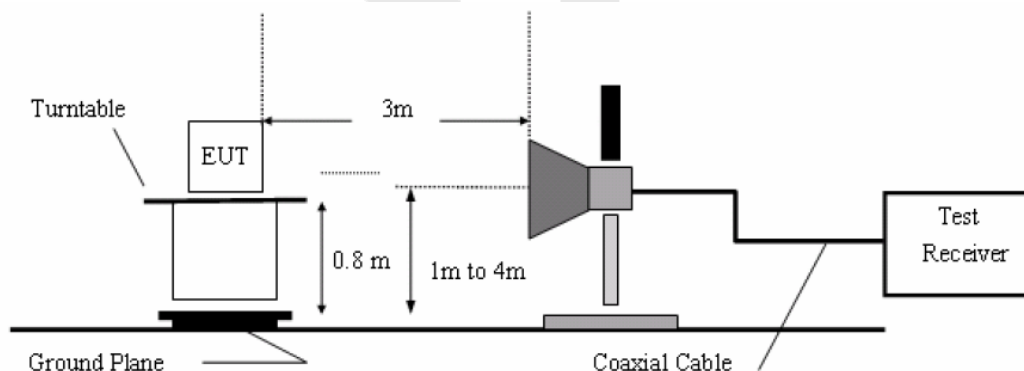
b. Test Procedure

1. Conducted Method:

- 1) Set RBW=100KHz, VBW=300KHz
- 2) Detector=peak
- 3) Sweep time= auto
- 4) Trace mode=max hold.

2. Radiated Method:

- 1) The EUT is placed on a turntable, which is 0.8m above the ground plane.
- 2) The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
- 3) EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
- 4) Peak detector: RBW=1MHz, VBW=3MHz, SWT=AUTO
Average detector: RBW=1MHz, VBW=10Hz, SWT=AUTO
The EUT is tested in 9*6*6 Chamber.
- 5) Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.



c. Test Equipment

Same as the equipment listed in 4.2.

d. Test Results

Pass.

e. Test Plots

See the following page.

802.11a:

Frequency (MHz)	Antenna polarization (H/V)	Emission (dBuV/m)		Band edge Limit (dBuV/m)	
		PK	AV	PK	AV
<2400	V	56.19	38.56	74.00	54.00
	H	57.31	38.44	74.00	54.00
>2483.5	V	52.03	37.07	74.00	54.00
	H	58.11	36.69	74.00	54.00

802.11n:

Frequency (MHz)	Antenna polarization (H/V)	Emission (dBuV/m)		Band edge Limit (dBuV/m)	
		PK	AV	PK	AV
<2400	V	57.22	37.38	74.00	54.00
	H	54.98	39.04	74.00	54.00
>2483.5	V	51.67	36.58	74.00	54.00
	H	53.73	36.25	74.00	54.00

4.5. Peak Power Spectral Density

a. Limit

1. For direct sequence systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.
2. The direct sequence operating of the hybrid system, with the frequency hopping operation turned off, shall comply with the power density requirements of paragraph (d) of this section.

b. Test Procedure

1. Place the EUT on the table and set it in transmitting mode. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set the spectrum analyzer as RBW = 3kHz, VBW = 10kHz, Span = 1.5MHz, Sweep=500s
3. Record the max. reading.
4. Repeat the above procedure until the measurements for all frequencies are completed.

c. Test Equipment

Same as the equipment listed in 4.2.

d. Test Setup

See 4.1

e. Test Results

Pass

f. Test Data

Please refer to the following data.

g. Test Plot

See the following pages

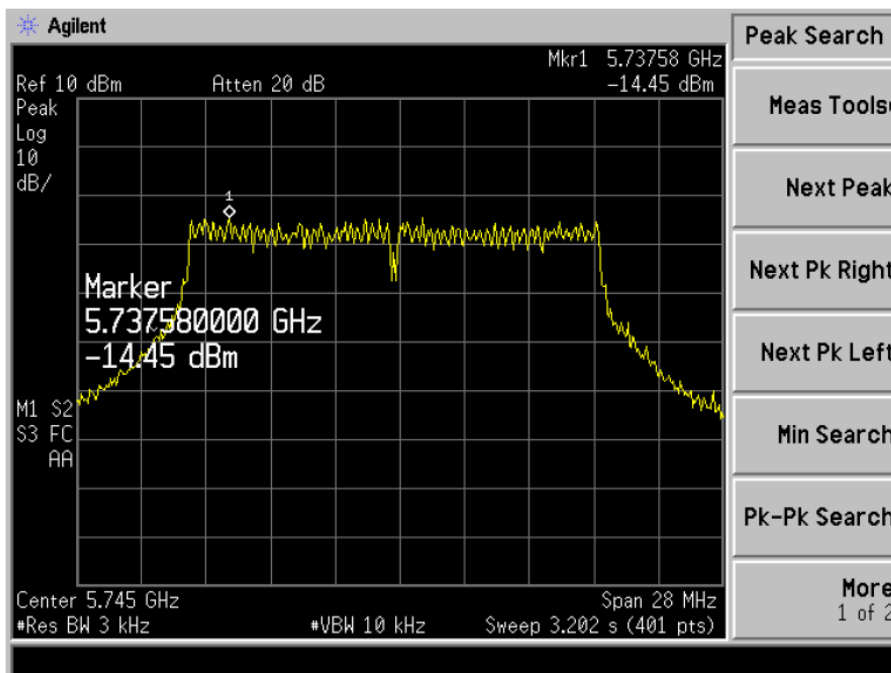
Test mode: IEEE 802.11b

Channel	Frequency (MHz)	PPSD (dBm/3KHz)	Σ PSD (dBm/3KHz)	Limit (dBm)	Result
149	5745	-14.45	-	8.00	Pass
153	5765	-13.72	-		Pass
161	5805	-13.39	-		Pass

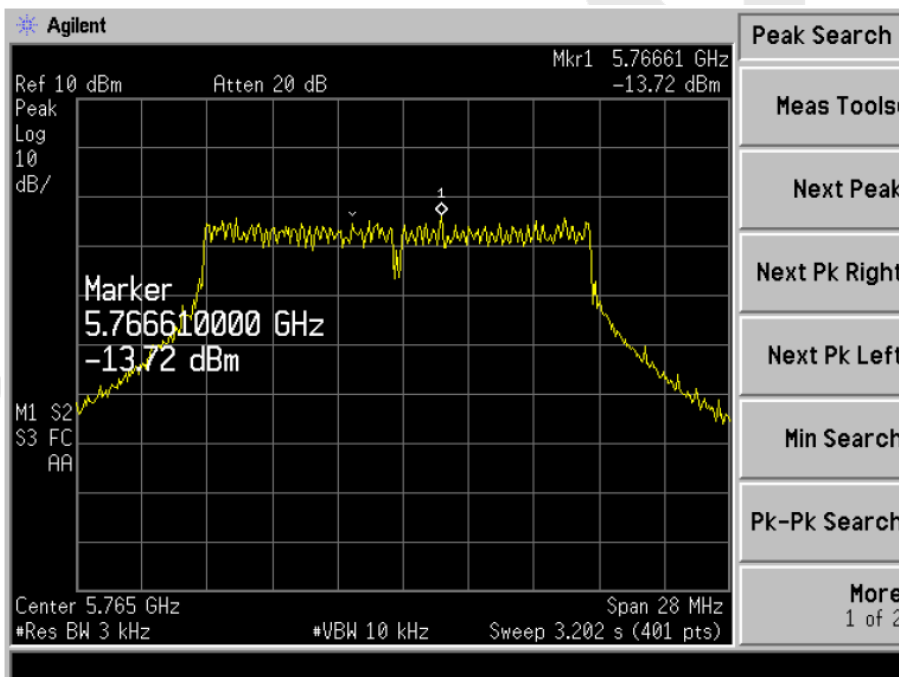
Test mode: IEEE 802.11g

Channel	Frequency (MHz)	PPSD (dBm)	Σ PSD (dBm)	Limit (dBm)	Result
149	5745	-13.98	-	8.00	Pass
153	5765	-13.56	-		Pass
161	5805	-14.11	-		Pass

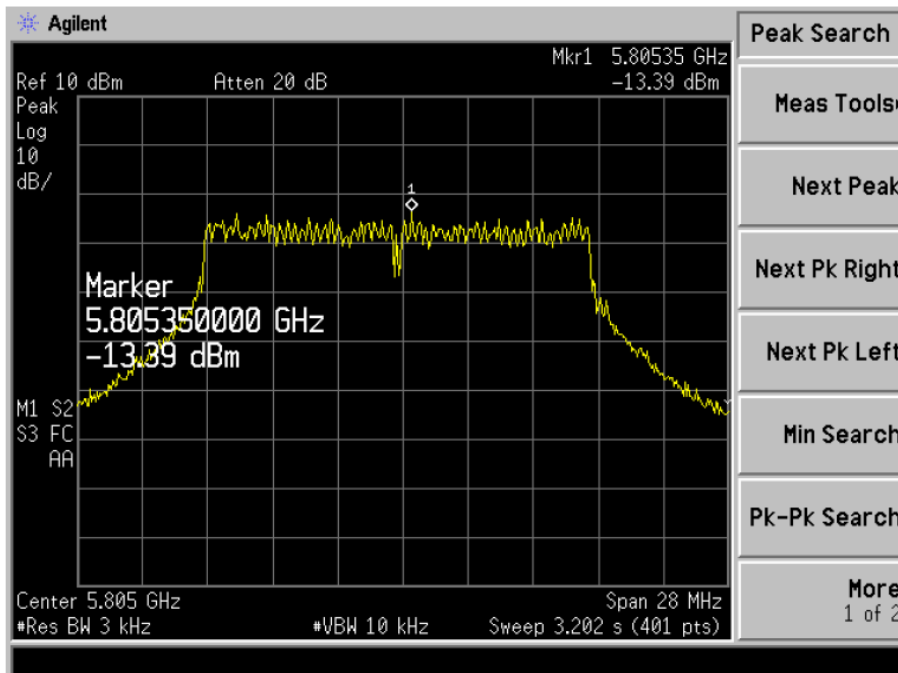
802.11a: 5745MHz



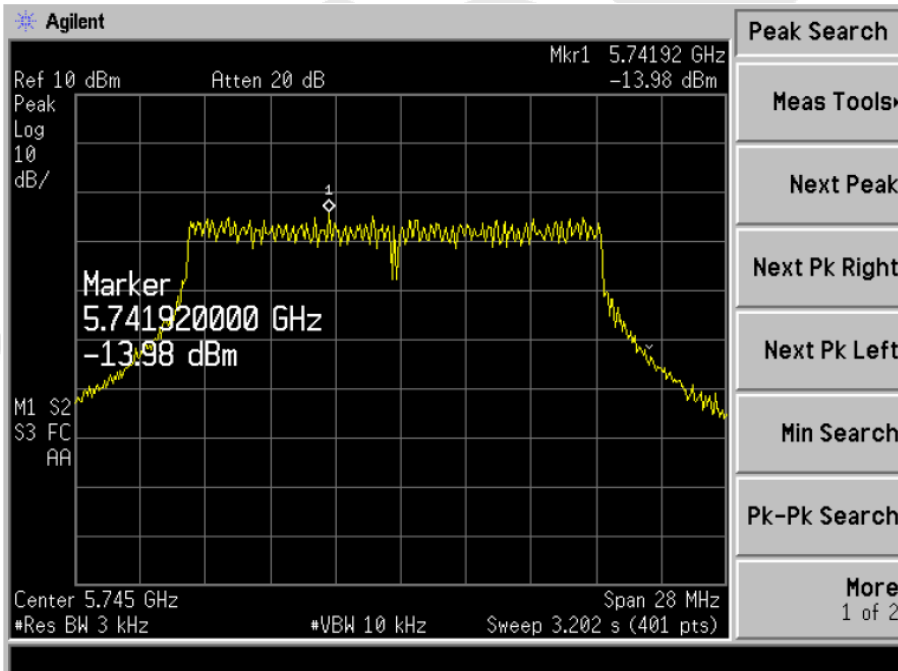
802.11a: 5765MHz



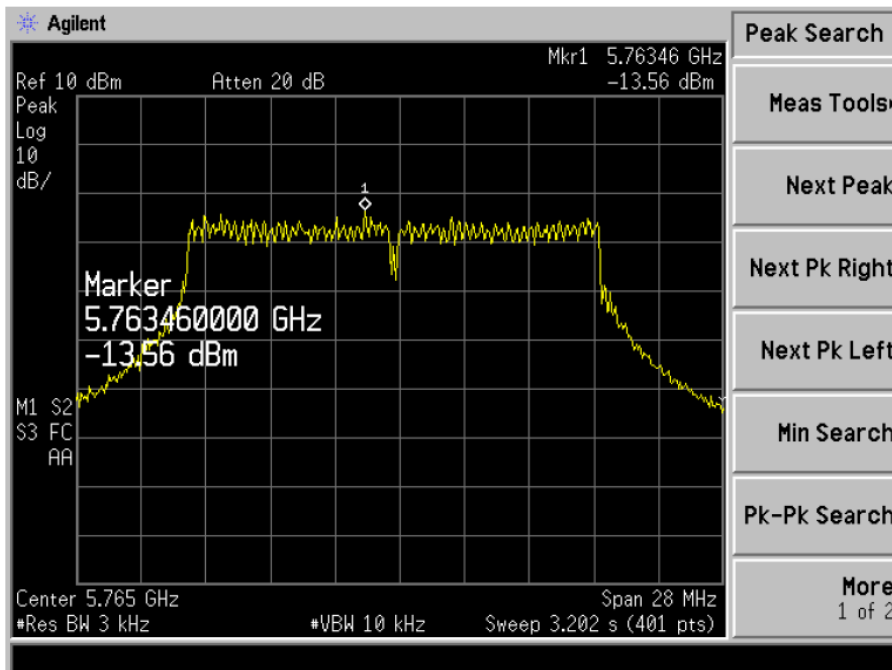
802.11a: 5805MHz



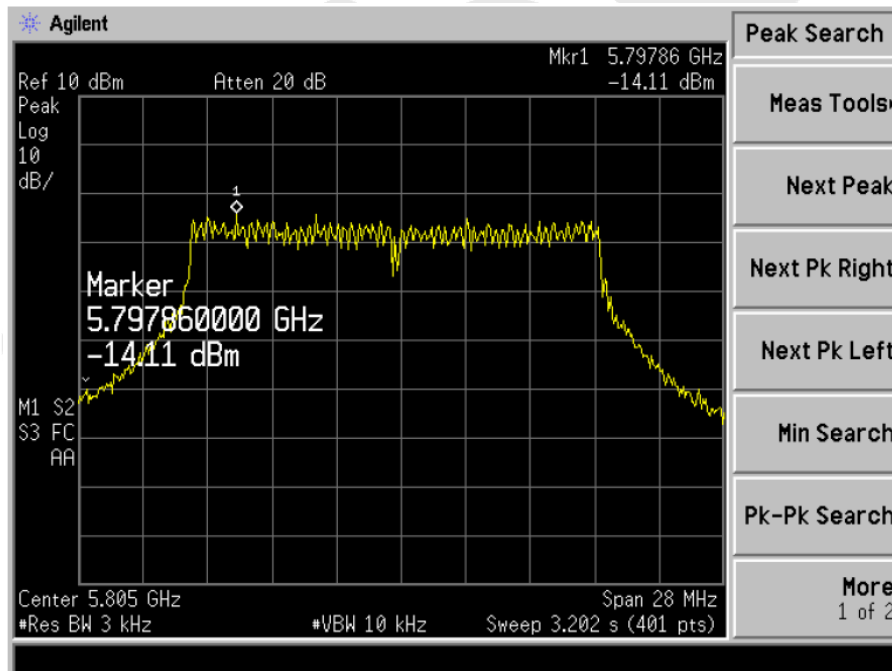
802.11n: 5745MHz



802.11n: 5765MHz



802.11n: 5805MHz



4.6. Radiated Emissions

4.6.1.1. Test Limits (< 30 MHZ)

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meter)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30

4.6.1.2. Test Limits (\geq 30 MHZ)

FIELD STRENGTH of Fundamental: @3M	FIELD STRENGTH of Harmonics	S15.209 30 - 88 MHz	40 dBuV/m
902-928 MHZ		88 - 216 MHz	43.5
2.4-2.4835 GHz		216 - 960 MHz	46
94 dBuV/m @3m	54 dBuV/m @3m	ABOVE 960 MHz	54dBuV/m

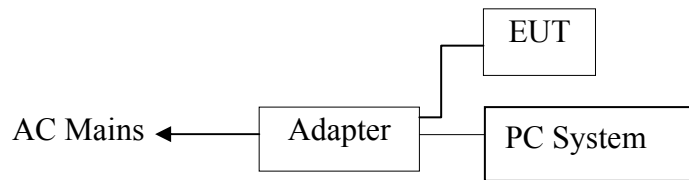
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

Test Equipment

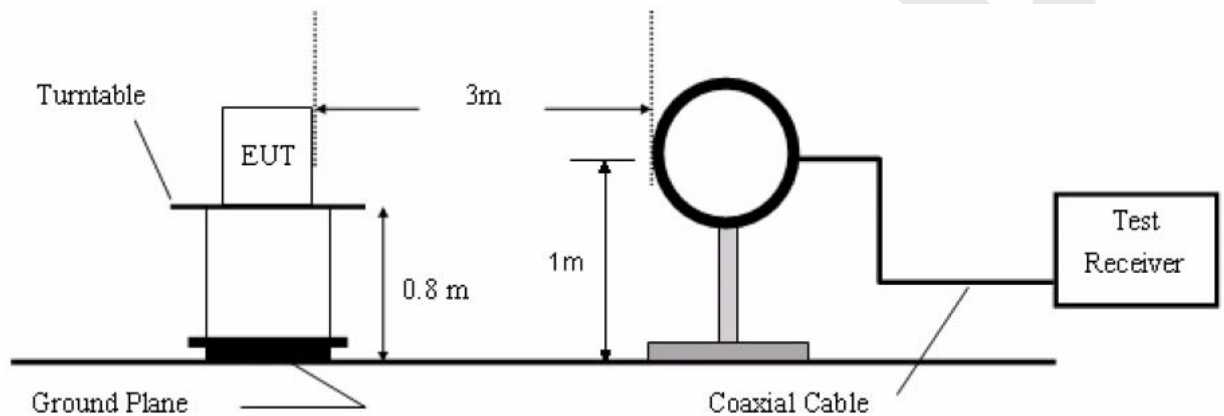
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Preamplifier	Instruments corporation	EMC011830	980100	Aug. 09, 2013	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	Apr. 23, 2014	1 Year
3.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Aug. 09, 2013	3 Year
4.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Apr. 23, 2014	3 Year
5.	Pre-amplifier	SONOMA	310N	186860	Apr. 23, 2014	1 Year
6.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A

4.6.2. Test Configuration:

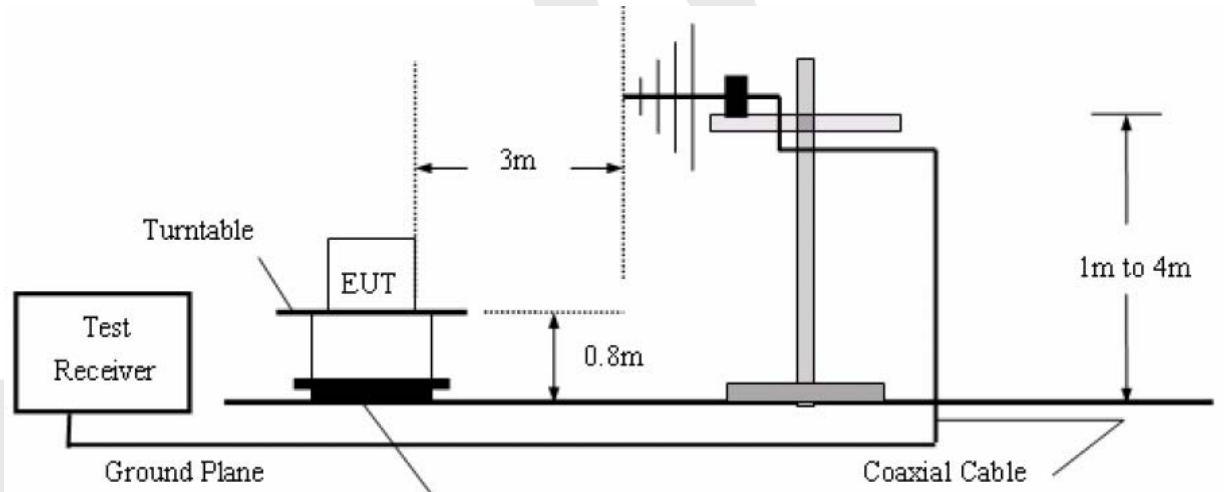
Block diagram of connection between the EUT and simulators



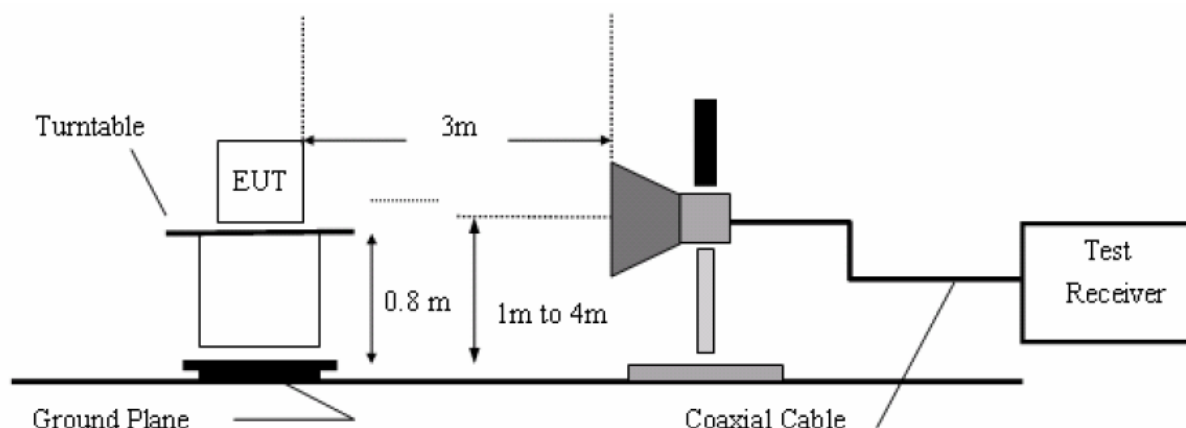
4.6.2.1. 9k to 30MHz emissions:



4.6.2.2. 30M to 1G emissions:



4.6.2.3. 1G to 40G emissions:



4.6.3. Test Procedure

The EUT is placed on a turn table which is 0.8 meter high above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.

Measurements are made on 9KHz to 30MHz and 30MHz to 26GHz range with the transmitter set to the lowest, middle, and highest channels.

All readings from 30MHz to 1GHz are quasi-peak values with a resolution bandwidth of 120kHz. All reading are above 1GHz, peak & average values with a resolution bandwidth of 1MHz.

The EUT is tested in 9*6*6 Chamber.

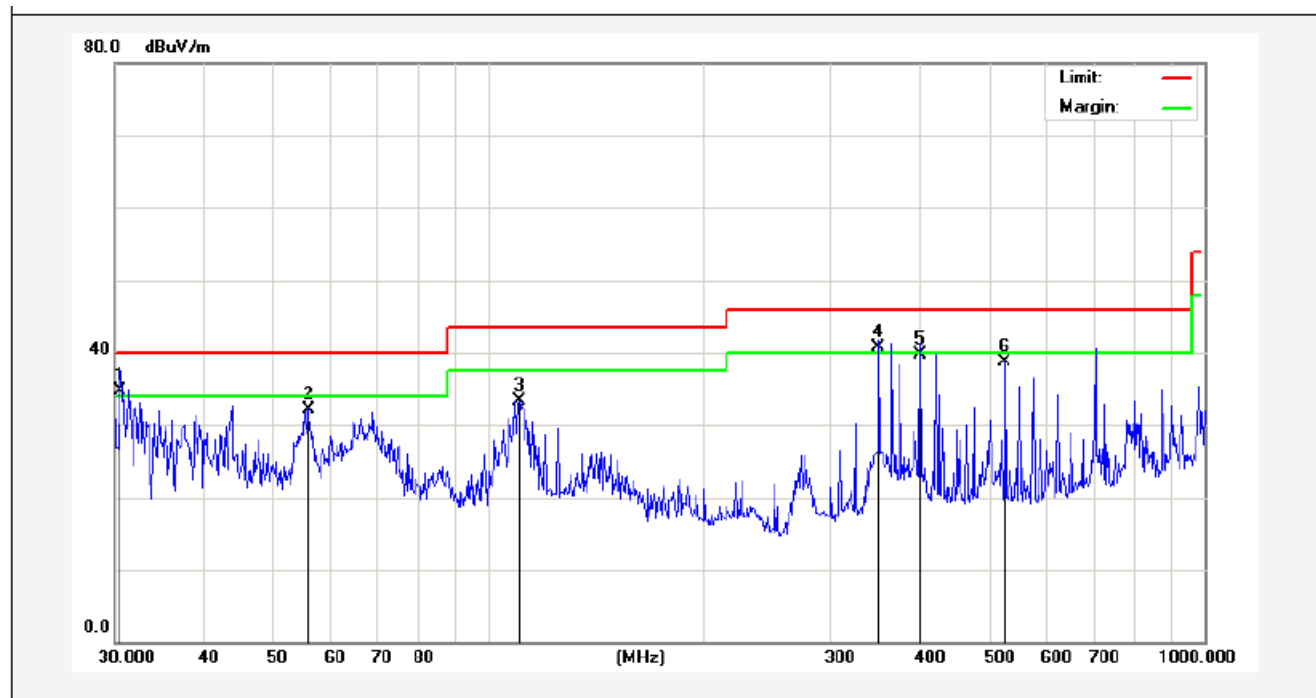
The test results are listed in Section 4.6.4.

4.6.4. Test Results

PASS.

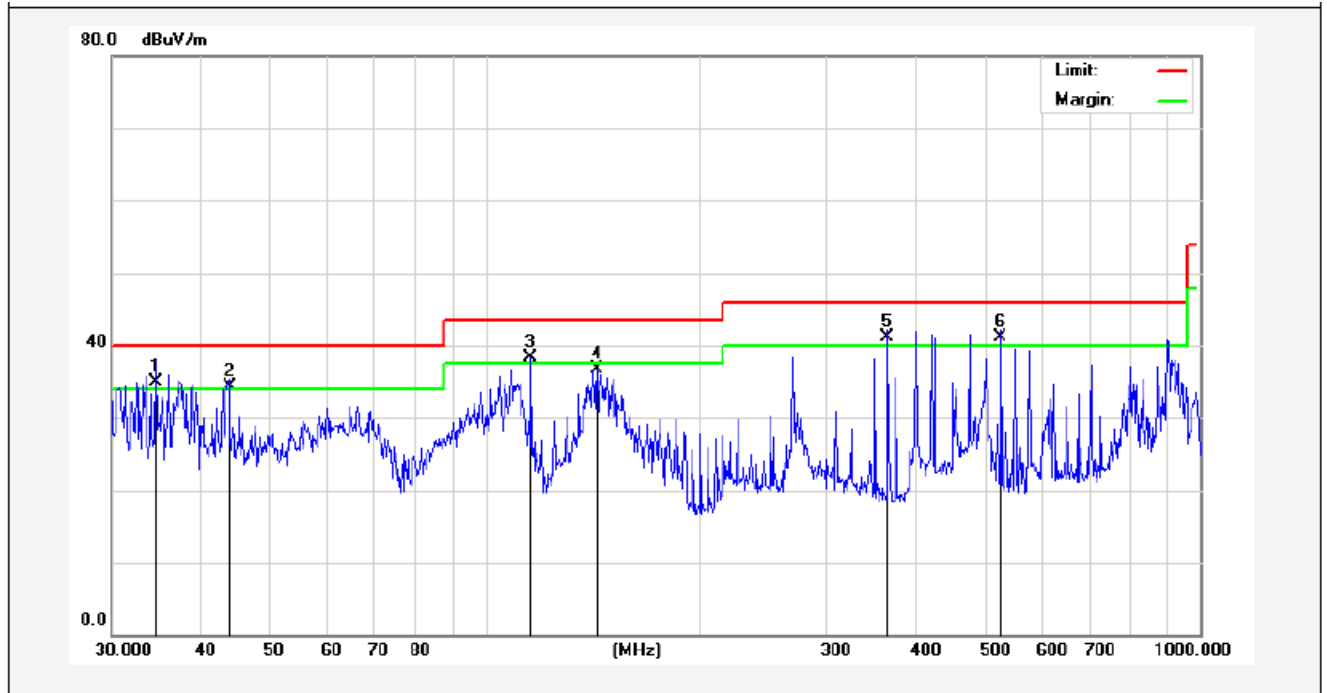
Please refer to the following pages.

Job No.:	011406014E	Polarization:	Horizontal
Standard:	(RE)FCC PART15 C _3m	Power Source:	AC 120V/60Hz for Adapter
Test item:	Radiation Test	Temp.(C)/Hum.(%RH):	24.3(C)/55%RH
Test Mode:	ON	Distance:	3m



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	30.5305	51.67	-16.88	34.79	40.00	-5.21	QP	300	360	
2	56.0007	47.16	-15.03	32.13	40.00	-7.87	peak			
3	110.1816	53.96	-20.63	33.33	43.50	-10.17	peak			
4	350.4768	54.68	-13.97	40.71	46.00	-5.29	QP	300	0	
5	400.4318	52.58	-12.86	39.72	46.00	-6.28	QP	300	360	
6	526.3967	49.81	-11.03	38.78	46.00	-7.22	peak			

Job No.:	011406014E	Polarization:	Vertical
Standard:	(RE)FCC PART15 C _3m	Power Source:	AC 120V/60Hz for Adapter
Test item:	Radiation Test	Temp.(C)/Hum.(%RH):	24.3(C)/55%RH
Test Mode:	ON	Distance:	3m



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	34.6385	51.18	-16.34	34.84	40.00	-5.16	QP	100	0	
2	43.8119	48.62	-14.34	34.28	40.00	-5.72	QP	100	360	
3	115.7256	54.42	-16.03	38.39	43.50	-5.11	QP	100	0	
4	143.3259	55.06	-18.44	36.62	43.50	-6.88	peak			
5	365.5391	53.61	-12.56	41.05	46.00	-4.95	QP	100	360	
6	526.3967	51.57	-10.51	41.06	46.00	-4.94	QP	100	0	

Operation Mode:	802.11a: 5745MHz	Temperature :	25 °C
Frequency Range:	1-25GHz	Humidity :	50 %
Test Result:	PASS	Measured Distance:	3m

Freq. (MHz)	Ant. Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
11490	V	45.02	32.93	74	54	-28.48	-21.07
13470	V	48.44	39.09	74	54	-25.56	-14.91
17235	V	50.08	40.00	74	54	-23.92	-14.00
24000	V	47.47	37.83	74	54	-26.53	-16.17
11490	H	48.40	34.13	74	54	-25.60	-19.87
13470	H	48.45	39.07	74	54	-25.55	-14.93
17235	H	50.09	40.03	74	54	-23.91	-13.97
24000	H	48.51	38.25	74	54	-25.49	-15.75
--	--	--	--	--	--	--	--

Other harmonics emissions are lower than 20dB below the allowable limit.

- Note:** (1) All Readings are Peak Value and AV.
 (2) Emission Level= Reading Level+ Probe Factor +Cable Loss.
 (3) The average measurement was not performed when the peak measured data under the limit of average detection.

Operation Mode:	802.11a: 5765MHz	Temperature :	25 °C
Frequency Range:	1-25GHz	Humidity :	50 %
Test Result:	PASS	Measured Distance:	3m

Freq. (MHz)	Ant. Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
11530	V	45.17	32.48	74	54	-28.83	-21.52
13750	V	48.09	38.64	74	54	-25.91	-15.36
17290	V	49.73	39.55	74	54	-24.27	-14.45
24000	V	47.12	37.38	74	54	-26.88	-16.62
11530	H	48.05	33.68	74	54	-25.95	-20.32
13750	H	48.10	38.62	74	54	-25.90	-15.38
17290	H	51.43	41.39	74	54	-22.57	-12.61
24000	H	45.22	32.46	74	54	-28.78	-21.54
--	--	--	--	--	--	--	--

Other harmonics emissions are lower than 20dB below the allowable limit.

Note: (1) All Readings are Peak Value and AV.

(2) Emission Level= Reading Level+ Probe Factor +Cable Loss.

(3) The average measurement was not performed when the peak measured data under the limit of average detection.

Operation Mode:	802.11a: 5805MHz	Temperature :	25 °C
Frequency Range:	1-25GHz	Humidity :	50 %
Test Result:	PASS	Measured Distance:	3m

Freq. (MHz)	Ant. Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
11610	V	45.10	32.61	74	54	-28.90	-21.39
13490	V	48.02	38.77	74	54	-25.98	-15.23
17850	V	49.66	39.68	74	54	-24.34	-14.32
24000	V	47.05	37.51	74	54	-26.95	-16.49
11610	H	47.98	33.81	74	54	-26.02	-20.19
13490	H	48.03	38.75	74	54	-25.97	-15.25
17850	H	49.67	39.71	74	54	-24.33	-14.29
24000	H	48.09	37.93	74	54	-25.91	-16.07
--	--	--	--	--	--	--	--

Other harmonics emissions are lower than 20dB below the allowable limit.

Note: (1) All Readings are Peak Value and AV.

(2) Emission Level= Reading Level+ Probe Factor +Cable Loss.

(3) The average measurement was not performed when the peak measured data under the limit of average detection.

Operation Mode: 802.11n: 5745MHz Temperature : 25 °C
Frequency Range: 1-25GHz Humidity : 50 %
Test Result: PASS Measured Distance: 3m

Freq. (MHz)	Ant. Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
11490	V	45.35	37.68	74	54	-28.65	-16.32
13470	V	48.01	36.22	74	54	-25.99	-17.78
17235	V	50.88	37.15	74	54	-23.12	-16.85
24000	V	47.74	37.11	74	54	-26.26	-16.89
11490	H	48.05	34.13	74	54	-25.95	-19.87
13470	H	48.31	39.76	74	54	-25.69	-14.24
17235	H	49.15	35.64	74	54	-24.85	-18.36
24000	H	48.84	32.79	74	54	-25.16	32.25
--	--	--	--	--	--	--	--

Other harmonics emissions are lower than 20dB below the allowable limit.

Note: (1) All Readings are Peak Value and AV.

(2) Emission Level= Reading Level+ Probe Factor +Cable Loss.

(3) The average measurement was not performed when the peak measured data under the limit of average detection.

Operation Mode: 802.11n: 5765MHz Temperature : 25 °C
Frequency Range: 1-25GHz Humidity : 50 %
Test Result: PASS Measured Distance: 3m

Freq. (MHz)	Ant. Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
11530	V	50.33	39.41	74	54	-23.67	-14.59
13750	V	48.12	38.02	74	54	-25.88	-15.98
17290	V	46.54	37.44	74	54	-27.46	-16.56
24000	V	47.21	37.51	74	54	-26.79	-16.49
11530	H	48.79	33.64	74	54	-25.21	-20.36
13750	H	48.04	38.60	74	54	-25.96	-15.40
17290	H	51.58	41.74	74	54	-22.42	-12.26
24000	H	45.77	32.22	74	54	-28.23	-21.78
--	--	--	--	--	--	--	--

Other harmonics emissions are lower than 20dB below the allowable limit.

Note: (1) All Readings are Peak Value and AV.

(2) Emission Level= Reading Level+ Probe Factor +Cable Loss.

(3) The average measurement was not performed when the peak measured data under the limit of average detection.

Operation Mode: 802.11n: 5805MHz Temperature : 25 °C
Frequency Range: 1-25GHz Humidity : 50 %
Test Result: PASS Measured Distance: 3m

Freq. (MHz)	Ant. Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
11610	V	51.41	41.54	74	54	-22.59	-12.46
13490	V	48.74	38.86	74	54	-25.26	-15.14
17850	V	49.82	37.64	74	54	-24.18	-16.36
24000	V	47.35	36.41	74	54	-26.65	-17.59
11610	H	47.46	35.81	74	54	-26.54	-18.19
13490	H	48.03	36.75	74	54	-25.97	-17.25
17850	H	49.25	35.41	74	54	-24.75	-18.59
24000	H	46.55	34.93	74	54	-27.45	-19.07
--	--	--	--	--	--	--	--

Other harmonics emissions are lower than 20dB below the allowable limit.

Note: (1) All Readings are Peak Value and AV.

(2) Emission Level= Reading Level+ Probe Factor +Cable Loss.

(3) The average measurement was not performed when the peak measured data under the limit of average detection.

5. PHOTOGRAPH

5.1. Photo of Conducted Emission Measurement



5.2. Photo of Radiation Emission Test





APPENDIX I (EXTERNAL PHOTOS)

Figure 1
The EUT-Front View



Figure 2
The EUT- Back View



Figure 3
The EUT- Side View



APPENDIX II (INTERNAL PHOTOS)

Figure 4
The EUT-Inside View



Figure 5
PCB of the EUT-Antenna View



Figure 6
PCB of the EUT-Front View

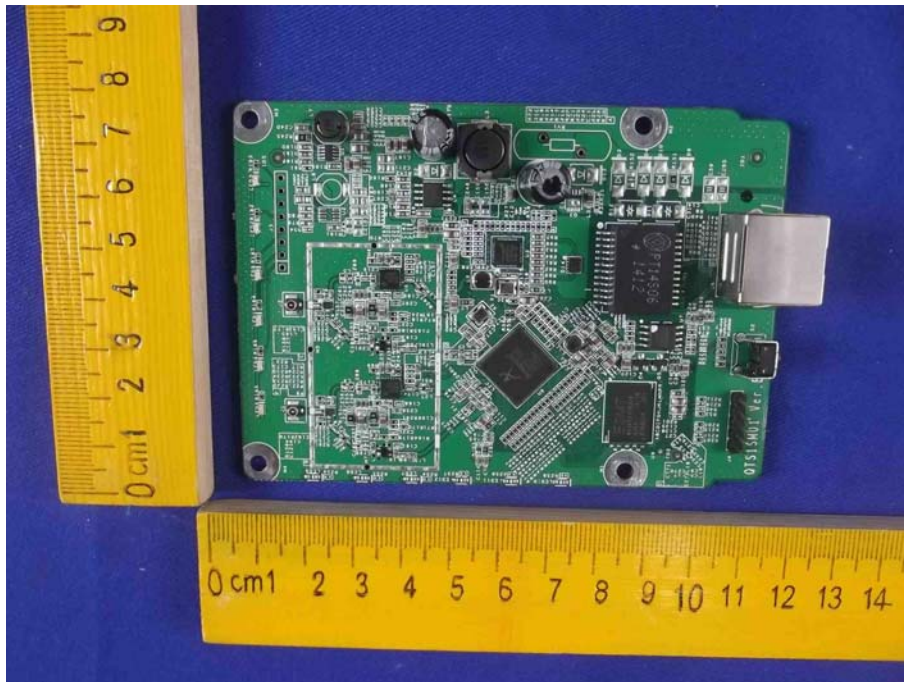


Figure 7
PCB of the EUT-Back View

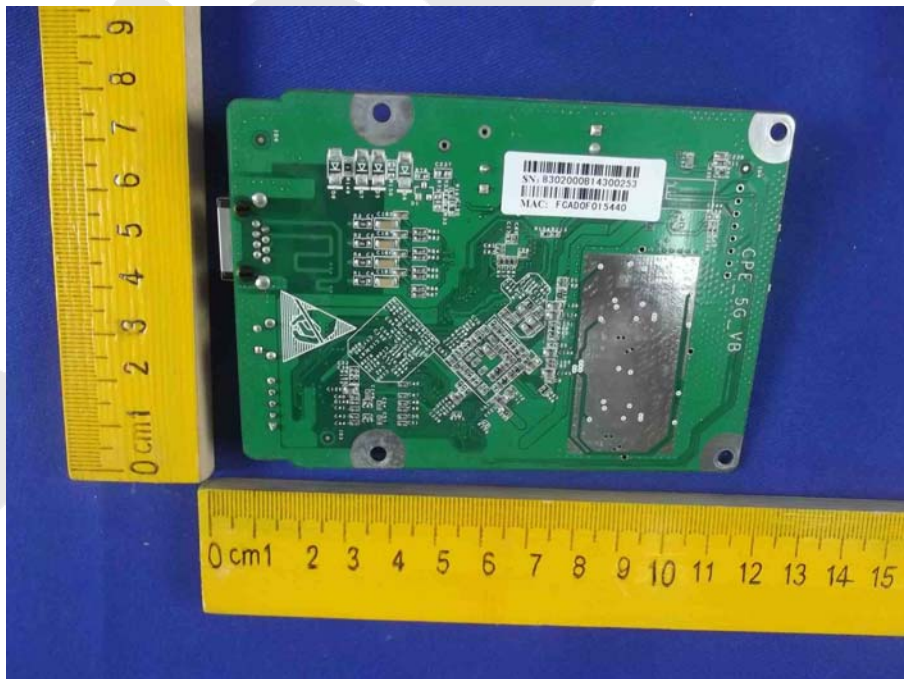


Figure 8
PCB of the EUT-Module View

