SPORTON International Inc.
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FCC RADIO TEST REPORT

Applicant's company	**Belkin International, Inc.**
Applicant Address	12045 East Waterfront Drive, Playa Vista, CA 90094
FCC ID	**K7SF9K1105V3**

Product Name	N450 DB Wireless N Router
Brand Name	belkin
Model No.	F9K1105v5
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5725 ~ 5850 MHz
Received Date	Feb. 24, 2016
Final Test Date	May 21, 2016
Submission Type	Class II Change

Statement

Test result included is for the IEEE 802.11n and IEEE 802.11a of the product.

The test result in this report refers exclusively to the presented test model / sample.

Without written approval of SPORTON International Inc., the test report shall not be reproduced except in full.

The measurements and test results shown in this test report were made in accordance with the procedures and found in compliance with the limit given in **ANSI C63.10-2013**, **47 CFR FCC Part 15 Subpart E, KDB789033 D02 v01r02, KDB662911 D01 v02r01, ET Docket No. 13–49; FCC 16–24.**

The test equipment used to perform the test is calibrated and traceable to NML/ROC.

Testing Laboratory
1190

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History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR4N1172-25AC	Rev. 01	Initial issue of report	Jun. 21, 2016

1. VERIFICATION OF COMPLIANCE

Product Name	:	N450 DB Wireless N Router
Brand Name	:	belkin
Model No.	:	F9K1105v5
Applicant	:	Belkin International, Inc.
Test Rule Part(s)	:	47 CFR FCC Part 15 Subpart E § 15.407

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Feb. 24, 2016 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.

Sam Chen

SPORTON INTERNATIONAL INC.

2. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart E			
Part	**Rule Section**	**Description of Test**	**Result**
4.1	15.407(a)	26dB Spectrum Bandwidth and 99% Occupied Bandwidth	Complies
4.2	15.407(e)	6dB Spectrum Bandwidth	Complies
4.3	15.407(a)	Maximum Conducted Output Power	Complies
4.4	15.407(a)	Power Spectral Density	Complies
4.5	15.407(b)	Radiated Emissions	Complies
4.6	15.407(b)	Band Edge Emissions	Complies
4.7	15.407(g)	Frequency Stability	Complies
4.8	15.203	Antenna Requirements	Complies

3. GENERAL INFORMATION

3.1. Product Details

Items	Description
Product Type	WLAN (2TX, 2RX)
Radio Type	Intentional Transceiver
Power Type	From power adapter
Modulation	IEEE 802.11a: OFDM IEEE 802.11n: see the below table
Data Modulation	OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	IEEE 802.11a: OFDM (6/9/12/18/24/36/48/54) IEEE 802.11n: see the below table
Frequency Range	5725 ~ 5850 MHz
Channel Number	5 for 20MHz bandwidth ; 2 for 40MHz bandwidth
Channel Band Width (99%)	IEEE 802.11a: 24.66 MHz IEEE 802.11n MCS0 (HT20): 25.53 MHz IEEE 802.11n MCS0 (HT40): 63.68 MHz
Maximum Conducted Output Power	IEEE 802.11a: 20.99 dBm IEEE 802.11n MCS0 (HT20): 20.79 dBm IEEE 802.11n MCS0 (HT40): 20.93 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Items	Description	
Communication Mode	☒ IP Based (Load Based)	☐ Frame Based
Beamforming Function	☐ With beamforming	☒ Without beamforming
Operate Condition	☒ Indoor	☐ Outdoor

Antenna and Band width

Antenna	Two (TX)	
Band width Mode	20 MHz	40 MHz
IEEE 802.11a	V	X
IEEE 802.11n	V	V

IEEE 11n Spec.

Protocol	Number of Transmit Chains (NTX)	Data Rate / MCS
802.11n (HT20)	2	MCS0-15
802.11n (HT40)	2	MCS0-15
Note 1: IEEE Std. 802.11n modulation consists of HT20 and HT40 (HT: High Throughput). Then EUT supports HT20 and HT40. Note 2: Modulation modes consist of below configuration: HT20/HT40: IEEE 802.11n		

3.2. Accessories

Power	Brand	Model No.	Rating
Adapter	LEI	MT12-Y120100-A1	INPUT: 100-120Vac, 60Hz, 0.3A OUTPUT: 12Vdc, 1A

3.3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	
					2.4GHz	5GHz
1	Arcadyan	N/A	PCB Antenna	N/A	3.43	-
2	Arcadyan	N/A	PCB Antenna	N/A	3.31	-
3	Arcadyan	N/A	PCB Antenna	N/A	-	3.06
4	Arcadyan	N/A	PCB Antenna	N/A	-	2.81

Note: The EUT has four antennas.

For 2.4GHz:

For IEEE 802.11b/g/n mode (1TX/1RX):

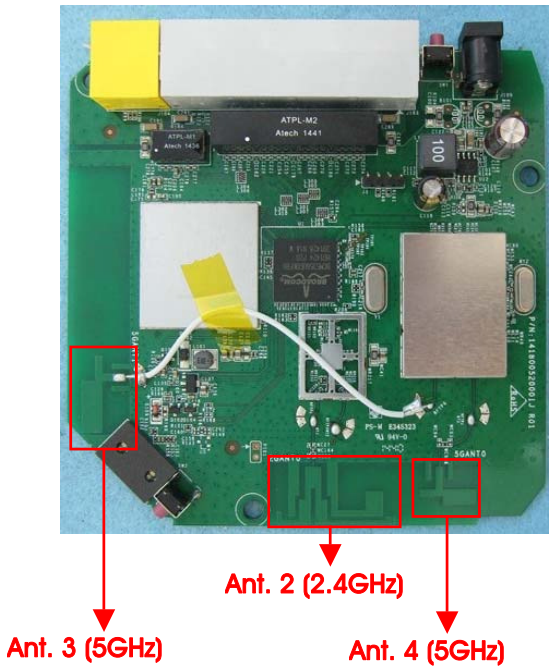
The EUT supports the antenna with TX/RX diversity function.

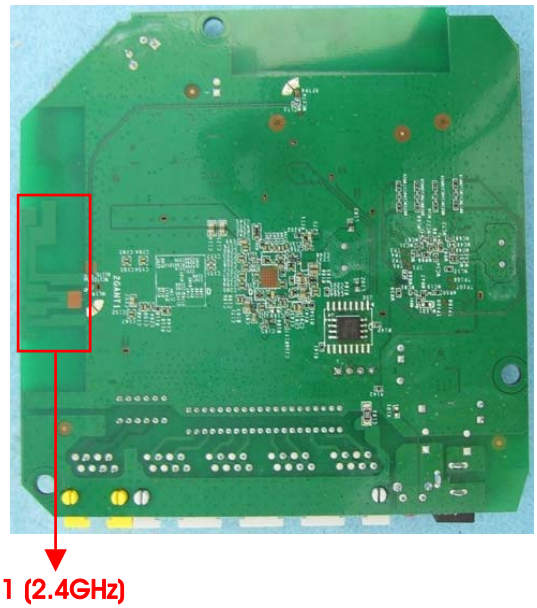
Both Ant. 1 and Ant. 2 can be used as transmitting/receiving antenna, but only one antenna can transmit/receive at the same time.

For 5GHz:

For IEEE 802.11a/n mode (2TX/2RX):

Ant. 3 and Ant. 4 could both transmit/receive simultaneously.





3.4. Table for Carrier Frequencies

There are three bandwidth systems.

For 20MHz bandwidth systems, use Channel 149, 153, 157, 161, 165.

For 40MHz bandwidth systems, use Channel 151, 159.

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5725~5850 MHz Band 4	149	5745 MHz	159	5795 MHz
	151	5755 MHz	161	5805 MHz
	153	5765 MHz	165	5825 MHz
	157	5785 MHz	-	-

3.5. Table for Test Modes

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode		Data Rate	Channel	Ant.
Max. Conducted Output Power	11a/BPSK	Band 4	6Mbps	149/157/165	3+4
	11n HT20	Band 4	MCS0	149/157/165	3+4
	11n HT40	Band 4	MCS0	151/159	3+4
Power Spectral Density	11a/BPSK	Band 4	6Mbps	149/157/165	3+4
	11n HT20	Band 4	MCS0	149/157/165	3+4
	11n HT40	Band 4	MCS0	151/159	3+4
26dB Spectrum Bandwidth & 99% Occupied Bandwidth Measurement	11a/BPSK	Band 4	6Mbps	149/157/165	3+4
	11n HT20	Band 4	MCS0	149/157/165	3+4
	11n HT40	Band 4	MCS0	151/159	3+4
6dB Spectrum Bandwidth Measurement	11a/BPSK	Band 4	6Mbps	149/157/165	3+4
	11n HT20	Band 4	MCS0	149/157/165	3+4
	11n HT40	Band 4	MCS0	151/159	3+4
Radiated Emission Above 1GHz	11a/BPSK	Band 4	6Mbps	149/157/165	3+4
	11n HT20	Band 4	MCS0	149/157/165	3+4
	11n HT40	Band 4	MCS0	151/159	3+4
Band Edge Emission	11a/BPSK	Band 4	6Mbps	149/157/165	3+4
	11n HT20	Band 4	MCS0	149/157/165	3+4
	11n HT40	Band 4	MCS0	151/159	3+4
Frequency Stability	20 MHz	Band 4	-	157	3
	40 MHz	Band 4	-	151	3

Note: The EUT can only be used at Y axis position.

3.6. Table for Testing Locations

Test Site Location					
Address:	No.8, Lane 724, Bo-ai St., Jhubei City, Hsinchu County 302, Taiwan, R.O.C.				
TEL:	886-3-656-9065				
FAX:	886-3-656-9085				
Test Site No.	**Site Category**	**Location**	**FCC Designation No.**	**IC File No.**	**VCCI Reg. No**
03CH01-CB	SAC	Hsin Chu	TW0006	IC 4086D	-
TH01-CB	OVEN Room	Hsin Chu	-	-	-

Open Area Test Site (OATS); Semi Anechoic Chamber (SAC).

3.7. Table for Class II Change

This product is an extension of original one reported under Sporton project number: FR4N1172-25AB

Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
Updating test rule of 5GHz Band 4 (5725~5850MHz) to"15.407 (b)(4)(i) of New Rules (ET Docket No. 13–49; FCC 16–24)".	1. 26dB Spectrum Bandwidth and 99% Occupied Bandwidth. 2. 6dB Spectrum Bandwidth. 3. Maximum Conducted Output Power. 4. Power Spectral Density. 5. Radiated Emission Above 1GHz. 6. Band Edge Emissions. 7. Frequency Stability.

3.8. Table for Supporting Units

Support Unit	Brand	Model	FCC ID
NB	DELL	E4300	DoC

3.9. Table for Parameters of Test Software Setting

During testing, Channel and Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Test Software Version	Mtool 1.0.0.3		
Mode	Test Frequency (MHz)		
	NCB: 20MHz		
	5745 MHz	5785 MHz	5825 MHz
802.11a	100	100	100
802.11n MCS0 HT20	100	100	100
Mode	NCB: 40MHz		
802.11n MCS0 HT40	5755 MHz	5795 MHz	
	100	100	

3.10. EUT Operation during Test

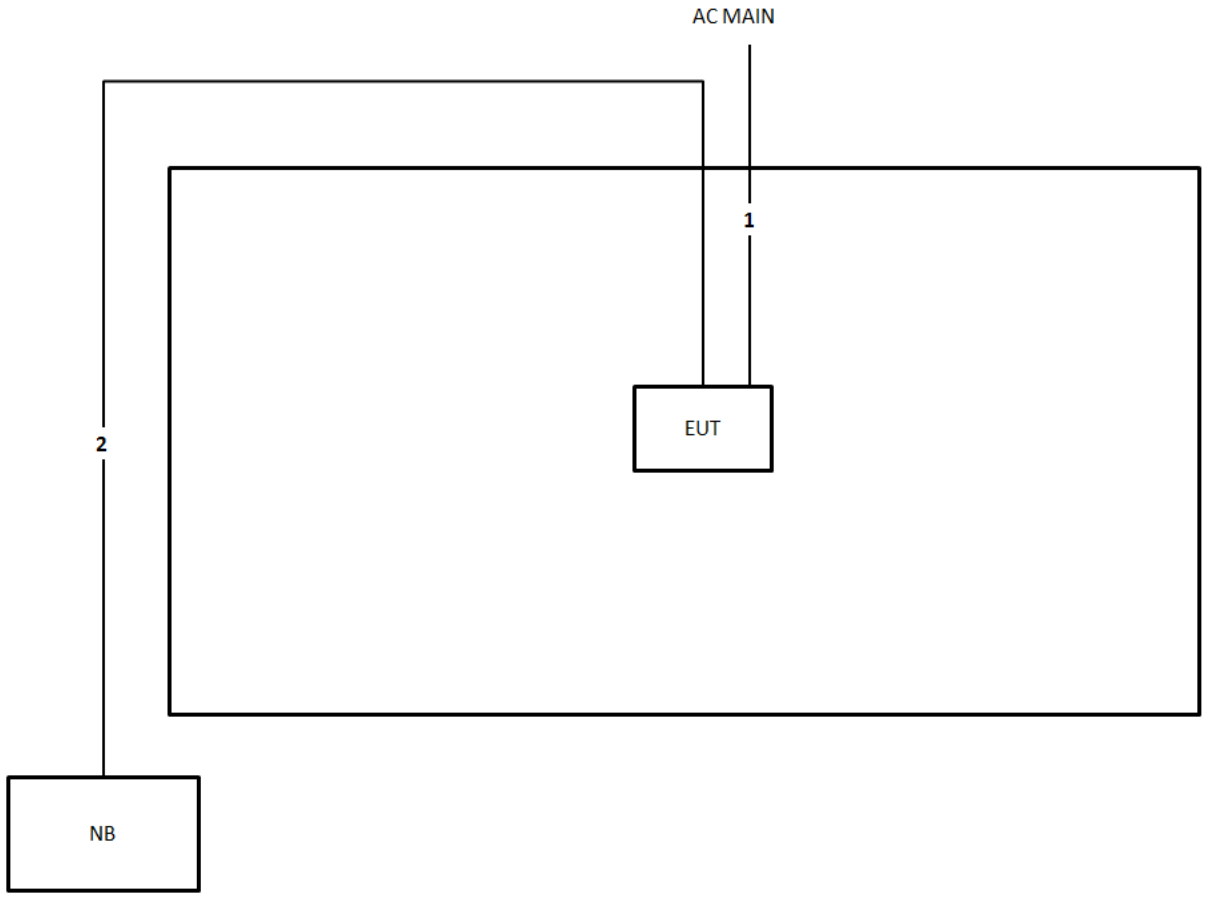
The EUT was programmed to be in continuously transmitting mode.

3.11. Duty Cycle

Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
802.11a	2.040	2.110	96.68	0.15	0.49
802.11n MCS0 HT20	1.870	1.950	95.90	0.18	0.53
802.11n MCS0 HT40	0.897	0.976	91.91	0.37	1.11

3.12. Test Configurations

3.12.1. Radiation Emissions Test Configuration



Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	RJ-45 cable	No	10m

4. TEST RESULT

4.1. 26dB Bandwidth and 99% Occupied Bandwidth Measurement

4.1.1. Limit

No restriction limits.

4.1.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

26dB Bandwidth	
Spectrum Parameters	**Setting**
Attenuation	Auto
Span Frequency	> 26dB Bandwidth
RBW	Approximately 1% of the emission bandwidth
VBW	VBW > RBW
Detector	Peak
Trace	Max Hold
Sweep Time	Auto
99% Occupied Bandwidth	
Spectrum Parameters	**Setting**
Span	1.5 times to 5.0 times the OBW
RBW	1 % to 5 % of the OBW
VBW	≥ 3 x RBW
Detector	Peak
Trace	Max Hold

4.1.3. Test Procedures

For Radiated 26dB Bandwidth and 99% Occupied Bandwidth Measurement:

1. The transmitter was radiated to the spectrum analyzer in peak hold mode.
2. 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%.

4.1.4. Test Setup Layout

For Radiated 26dB Bandwidth and 99% Occupied Bandwidth Measurement:

This test setup layout is the same as that shown in section 4.5.4.

4.1.5. Test Deviation

There is no deviation with the original standard.

4.1.6. EUT Operation during Test

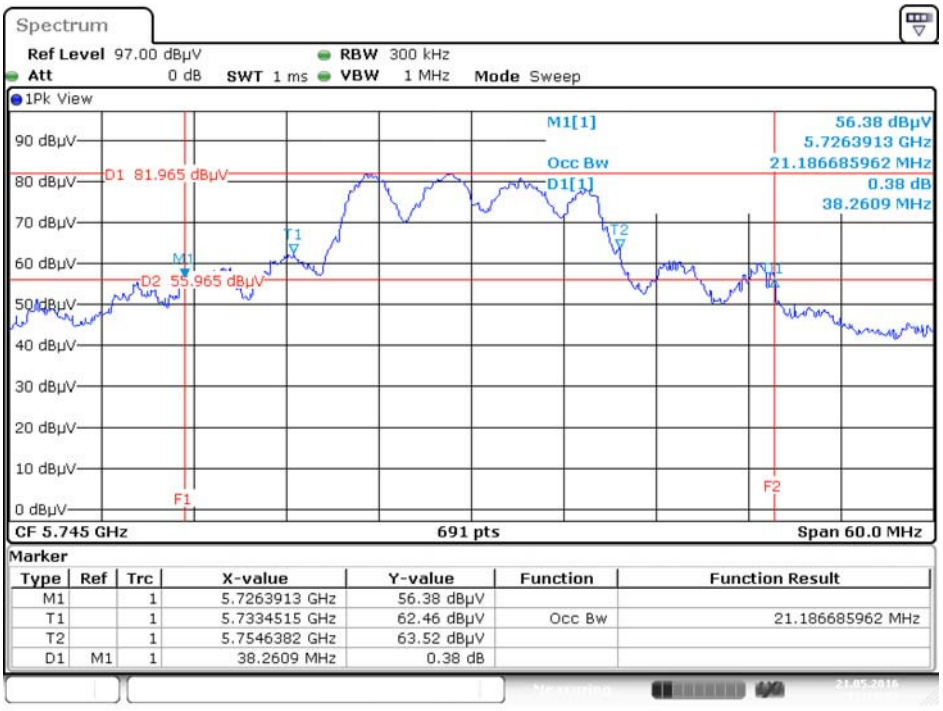
The EUT was programmed to be in continuously transmitting mode.

4.1.7. Test Result of 26dB Bandwidth and 99% Occupied Bandwidth

Temperature	24°C	Humidity	60%
Test Engineer	Clemens Fang		

Mode	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11a	5745 MHz	38.26	21.19
	5785 MHz	37.04	23.79
	5825 MHz	41.48	24.66
802.11n MCS0 HT20	5745 MHz	38.52	23.70
	5785 MHz	42.26	24.31
	5825 MHz	39.83	25.53
802.11n MCS0 HT40	5755 MHz	95.80	56.73
	5795 MHz	98.84	63.68

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 3 + Ant. 4 / 5745 MHz



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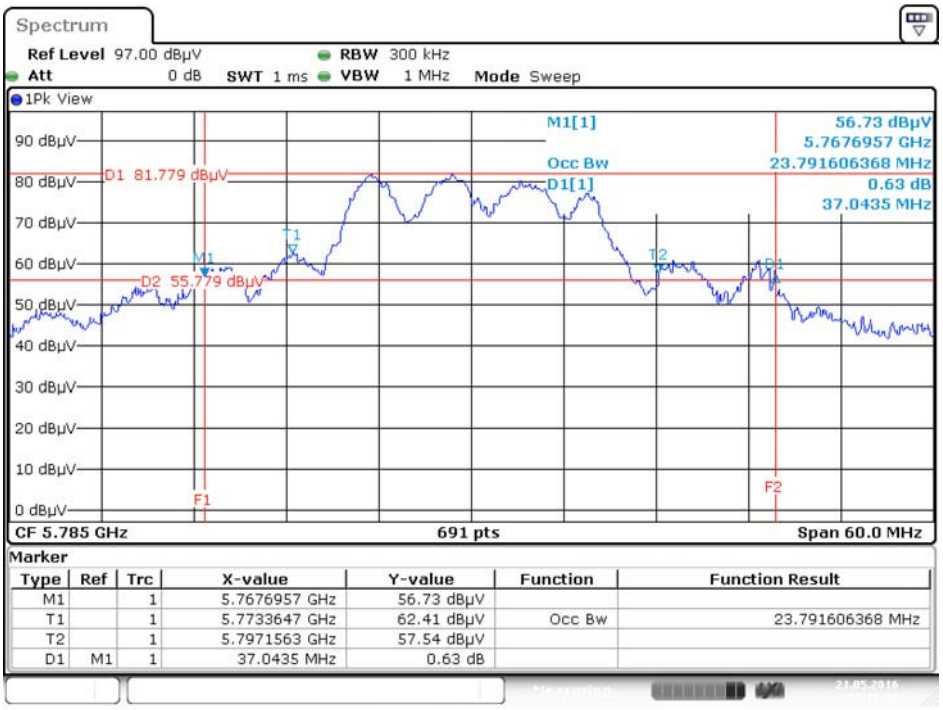
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 3 + Ant. 4 / 5785 MHz



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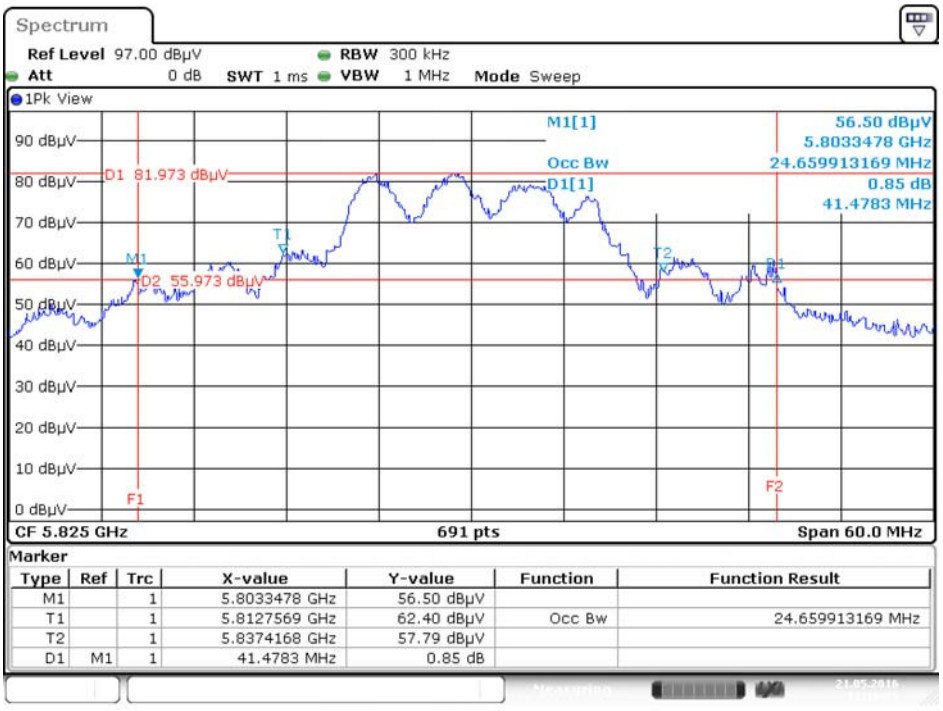
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 3 + Ant. 4 / 5825 MHz



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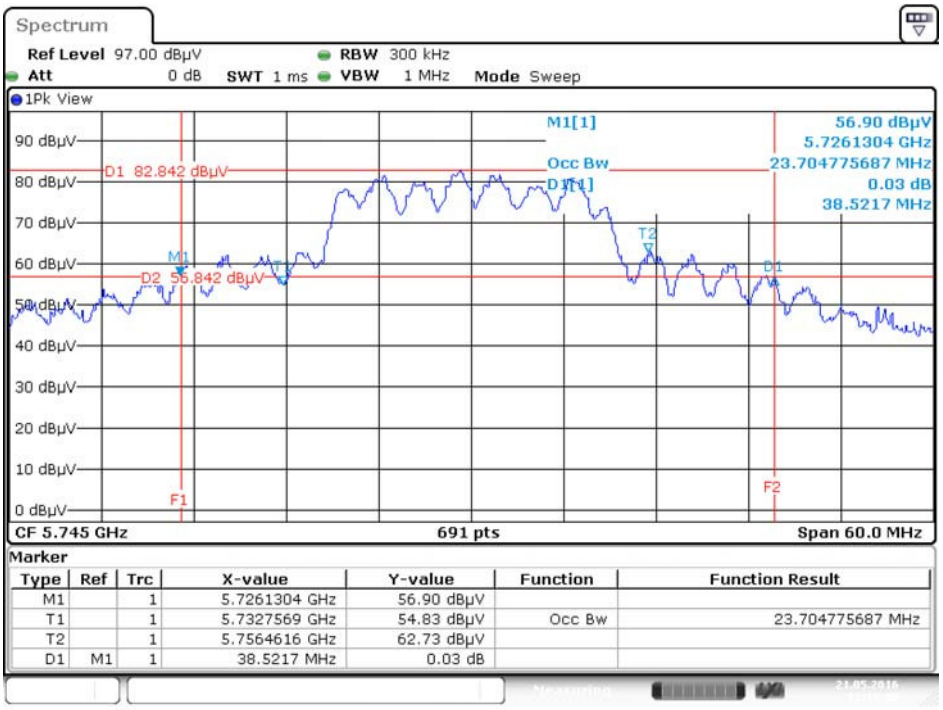
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT20 / Ant. 3 + Ant. 4 / 5745 MHz



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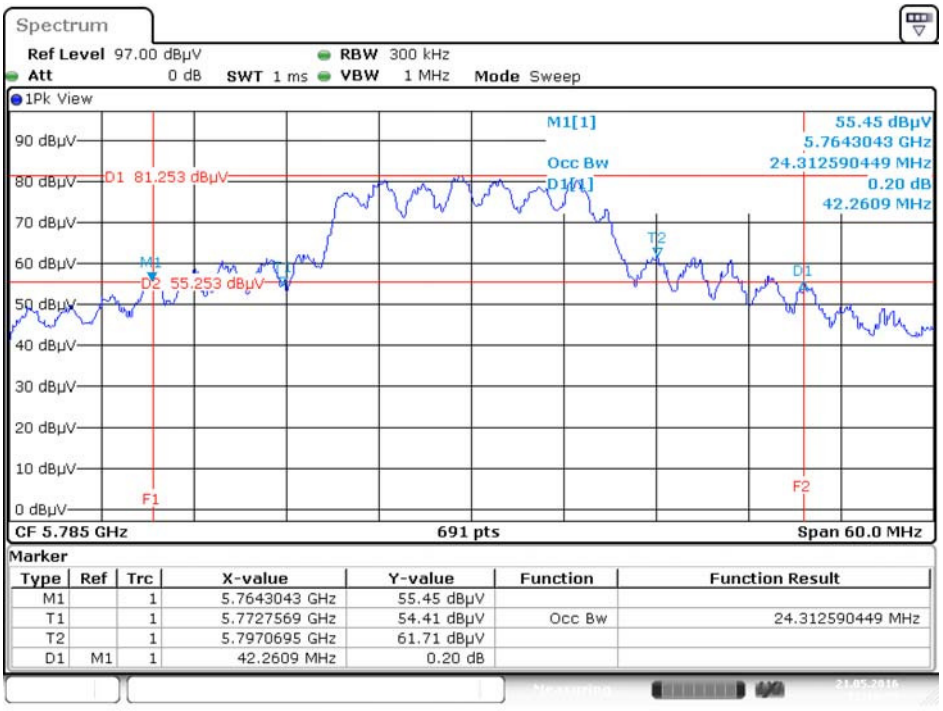
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT20 / Ant. 3 + Ant. 4 / 5785 MHz



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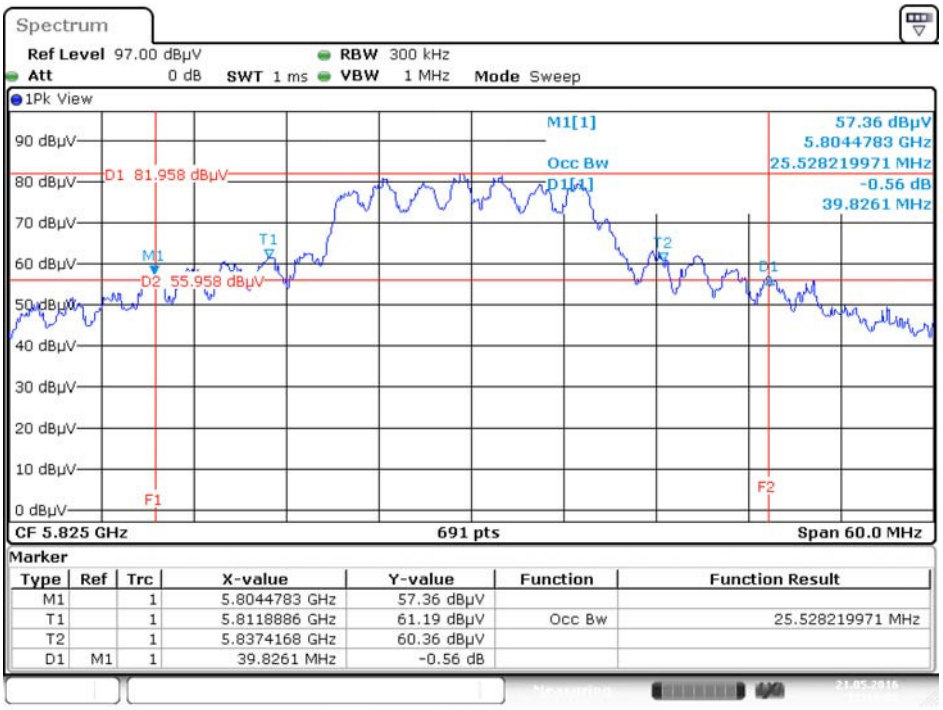
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT20 / Ant. 3 + Ant. 4 / 5825 MHz



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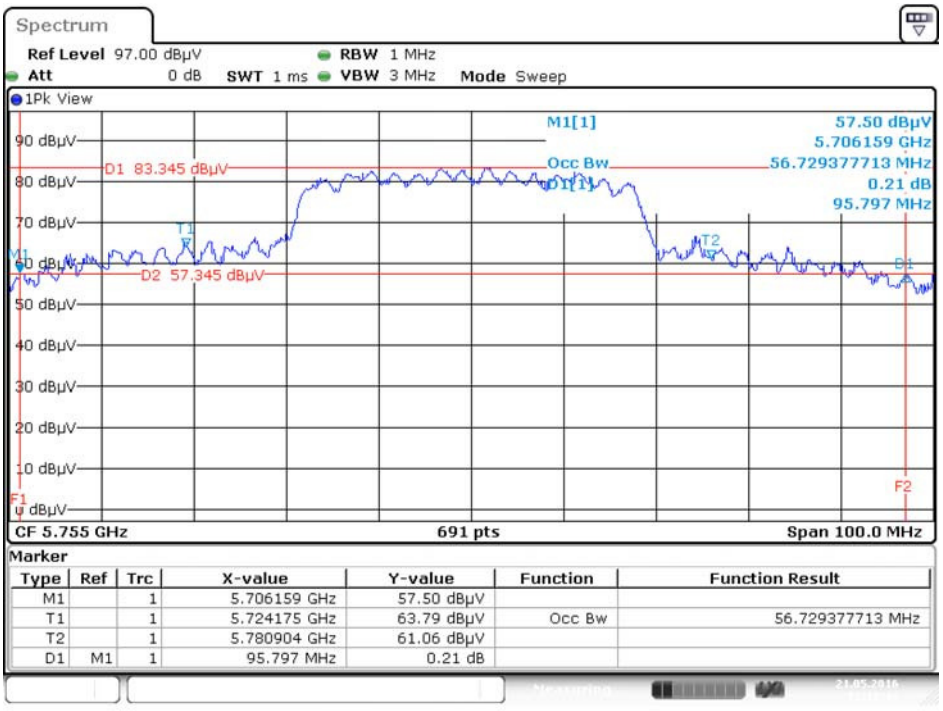
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT40 / Ant. 3 + Ant. 4 / 5755 MHz



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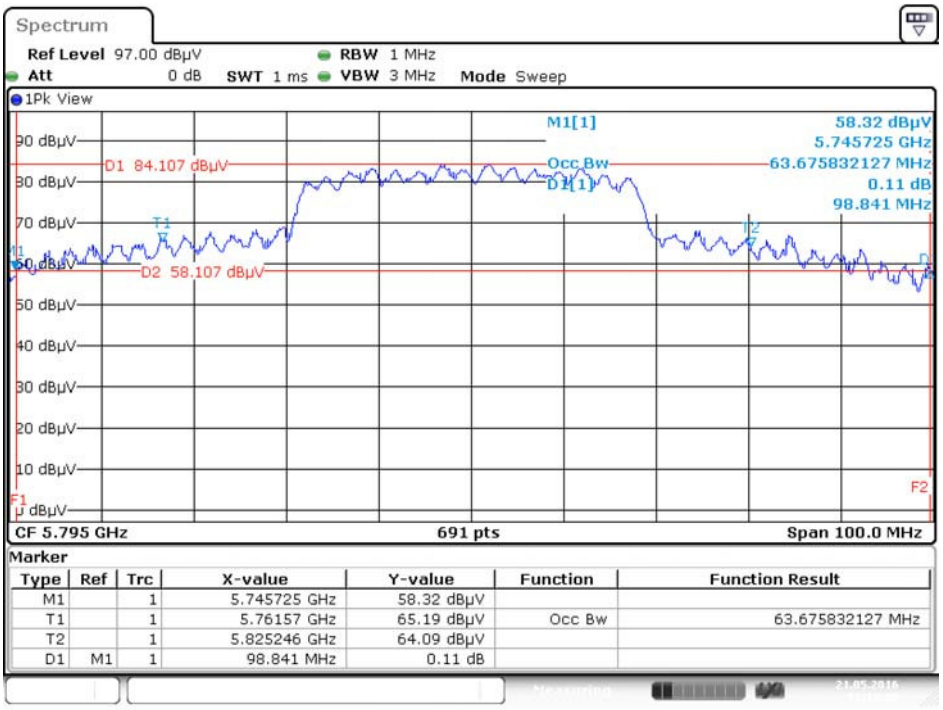
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT40 / Ant. 3 + Ant. 4 / 5795 MHz



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4.2. 6dB Spectrum Bandwidth Measurement

4.2.1. Limit

For digital modulation systems, the minimum 6dB bandwidth shall be at least 500 kHz.

4.2.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of spectrum analyzer.

6dB Spectrum Bandwidth	
Spectrum Parameters	**Setting**
Attenuation	Auto
Span Frequency	> 6dB Bandwidth
RBW	100kHz
VBW	≥ 3 x RBW
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.2.3. Test Procedures

For Radiated 6dB Bandwidth Measurement:

1. The transmitter was radiated to the spectrum analyzer in peak hold mode.
2. Test was performed in accordance with KDB789033 D02 v01r02 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - section (C) Emission Bandwidth.
3. Multiple antenna system was performed in accordance with KDB662911 D01 v02r01 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.
4. Measured the spectrum width with power higher than 6dB below carrier.

4.2.4. Test Setup Layout

For Radiated 6dB Bandwidth Measurement:

This test setup layout is the same as that shown in section 4.5.4.

4.2.5. Test Deviation

There is no deviation with the original standard.

4.2.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.2.7. Test Result of 6dB Spectrum Bandwidth

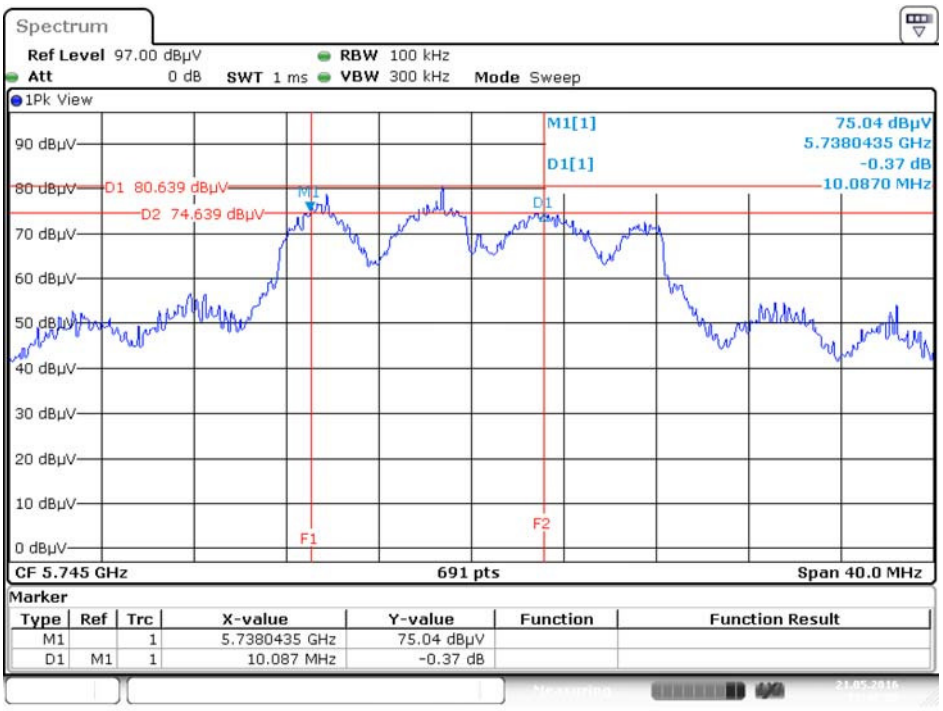
Temperature	24°C	Humidity	60%
Test Engineer	Clemens Fang		

Mode	Frequency	6dB Bandwidth (MHz)	Min. Limit (kHz)	Test Result
802.11a	5745 MHz	10.09	500	Complies
	5785 MHz	16.12	500	Complies
	5825 MHz	11.94	500	Complies
802.11n MCS0 HT20	5745 MHz	16.29	500	Complies
	5785 MHz	15.83	500	Complies
	5825 MHz	15.48	500	Complies
802.11n MCS0 HT40	5755 MHz	35.71	500	Complies
	5795 MHz	35.83	500	Complies

Note: All the test values were listed in the report.

For plots, only the channel with worse result was shown.

6 dB Bandwidth Plot on Configuration IEEE 802.11a / Ant. 3 + Ant. 4 / 5745 MHz



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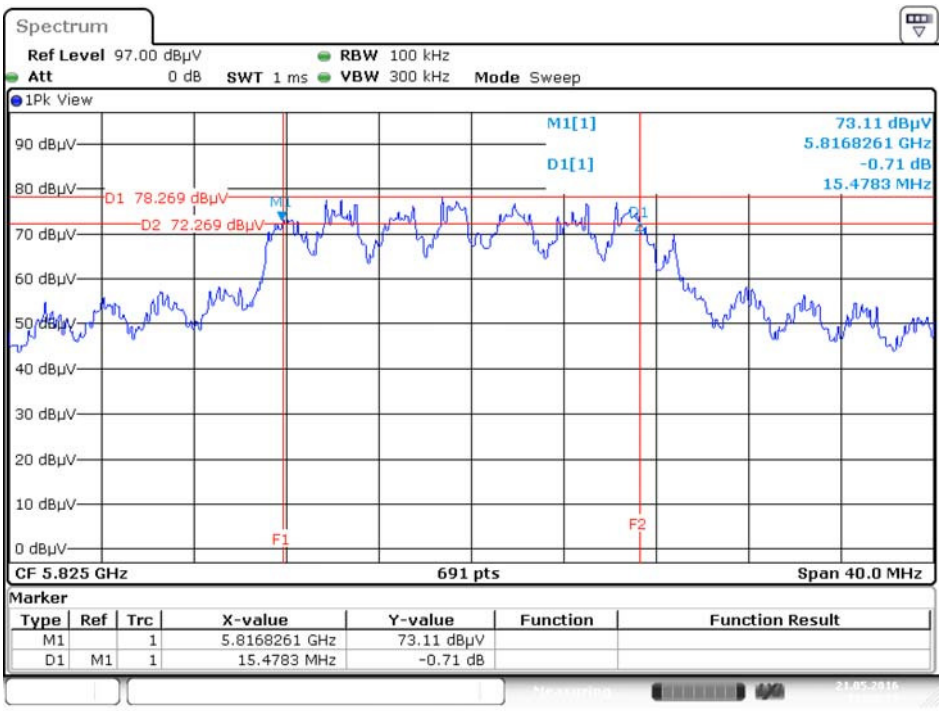
6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT20 / Ant. 3 + Ant. 4 / 5825 MHz



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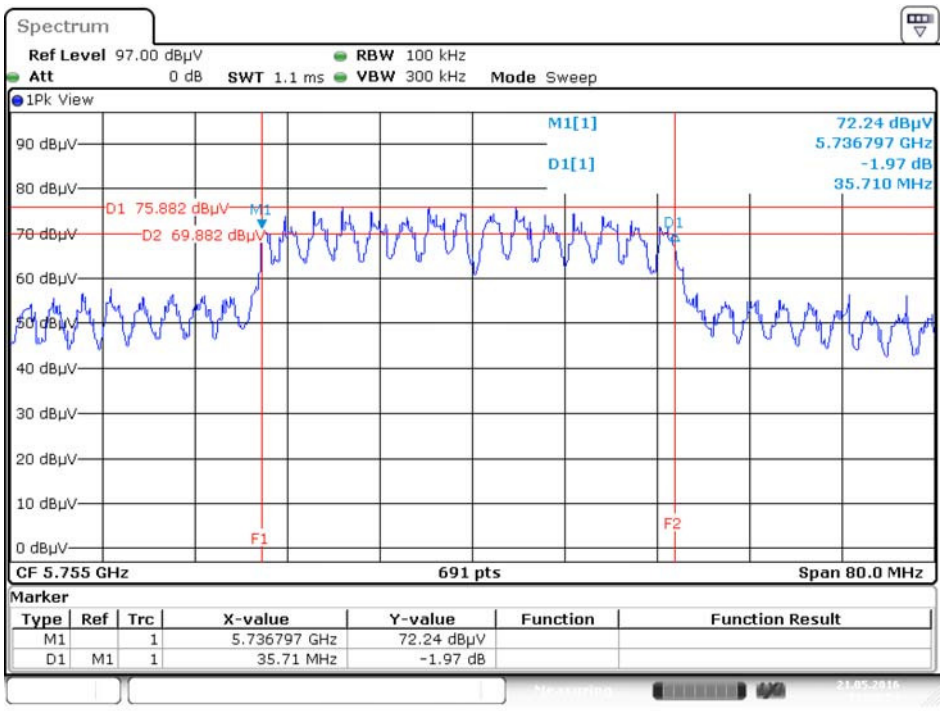
6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT40 / Ant. 3 + Ant. 4 / 5755 MHz



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4.3. Maximum Conducted Output Power Measurement

4.3.1. Limit

Frequency Band		Limit
☒	5.725~5.85 GHz	The maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm). If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power.

4.3.2. Measuring Instruments and Setting

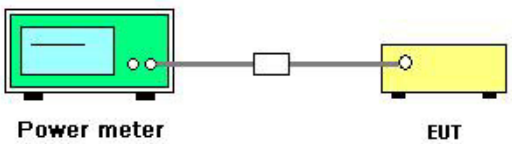
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

Power Meter Parameter	Setting
Detector	AVERAGE

4.3.3. Test Procedures

1. The transmitter output (antenna port) was connected to the power meter.
2. Test was performed in accordance with KDB789033 D02 v01r02 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - section (E) Maximum conducted output power =>3. Measurement using a Power Meter (PM) =>b) Method PM-G (Measurement using a gated RF average power meter).
3. Multiple antenna systems was performed in accordance with KDB662911 D01 v02r01 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.
4. When measuring maximum conducted output power with multiple antenna systems, add every result of the values by mathematic formula.

4.3.4. Test Setup Layout



4.3.5. Test Deviation

There is no deviation with the original standard.

4.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.3.7. Test Result of Maximum Conducted Output Power

Temperature	24°C	Humidity	60%
Test Engineer	Clemens Fang	Test Date	May 21, 2016

Mode	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Ant. 3	Ant. 4	Total		
802.11a	5745 MHz	17.54	18.37	20.99	30.00	Complies
	5785 MHz	17.24	18.09	20.70	30.00	Complies
	5825 MHz	17.25	17.98	20.64	30.00	Complies
802.11n MCS0 HT20	5745 MHz	17.31	18.21	20.79	30.00	Complies
	5785 MHz	17.23	18.01	20.65	30.00	Complies
	5825 MHz	17.19	17.95	20.60	30.00	Complies
802.11n MCS0 HT40	5755 MHz	17.56	18.25	20.93	30.00	Complies
	5795 MHz	17.22	18.24	20.77	30.00	Complies

4.4. Power Spectral Density Measurement

4.4.1. Limit

The following table is power spectral density limits and decrease power density limit rule refer to section 4.3.1.

Frequency Band		Limit
☒	5.725~5.85 GHz	30 dBm/500kHz

4.4.2. Measuring Instruments and Setting

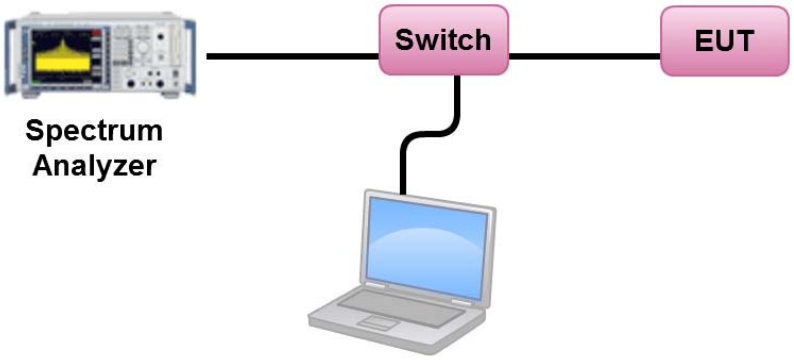
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Encompass the entire emissions bandwidth (EBW) of the signal
RBW	1000 kHz
VBW	3000 kHz
Detector	RMS
Trace	AVERAGE
Sweep Time	Auto
Trace Average	100 times
Note: If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10log(500kHz/RBW) to the measured result, whereas RBW (< 500 kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.	

4.4.3. Test Procedures

1. The transmitter output (antenna port) was connected RF switch to the spectrum analyzer.
2. Test was performed in accordance with KDB789033 D02 v01r02 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - section (F) Maximum Power Spectral Density (PSD).
3. Multiple antenna systems was performed in accordance KDB662911 D01 v02r01 in-Band Power Spectral Density (PSD) Measurements and sum the spectra across the outputs.
4. For 5.725~5.85 GHz, the measured result of PSD level must add 10log(500kHz/RBW) and the final result should ≤ 30 dBm.

4.4.4. Test Setup Layout



4.4.5. Test Deviation

There is no deviation with the original standard.

4.4.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.4.7. Test Result of Power Spectral Density

Temperature	24℃	Humidity	60%
Test Engineer	Clemens Fang	Test Date	May 21, 2016

Configuration IEEE 802.11a / Ant. 3 + Ant. 4

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	7.82	-3.01	4.81	30.00	Complies
157	5785 MHz	7.58	-3.01	4.57	30.00	Complies
165	5825 MHz	7.46	-3.01	4.45	30.00	Complies

Note: $Directional\ Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =5.95dBi <6dBi, so the limit doesn't reduce.

Configuration IEEE 802.11n MCS0 HT20 / Ant. 3 + Ant. 4

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	7.58	-3.01	4.57	30.00	Complies
157	5785 MHz	7.39	-3.01	4.38	30.00	Complies
165	5825 MHz	7.42	-3.01	4.41	30.00	Complies

Note: $Directional\ Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =5.95dBi <6dBi, so the limit doesn't reduce.

Configuration IEEE 802.11n MCS0 HT40 / Ant. 3 + Ant. 4

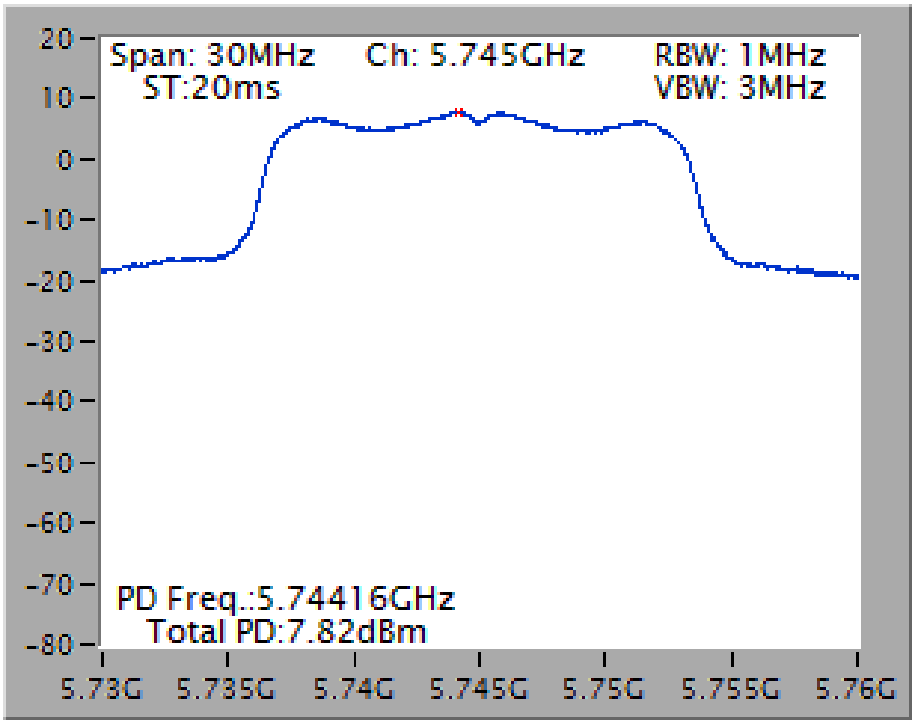
Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
151	5755 MHz	4.72	-3.01	1.71	30.00	Complies
159	5795 MHz	4.56	-3.01	1.55	30.00	Complies

Note: $Directional\ Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =5.95dBi <6dBi, so the limit doesn't reduce.

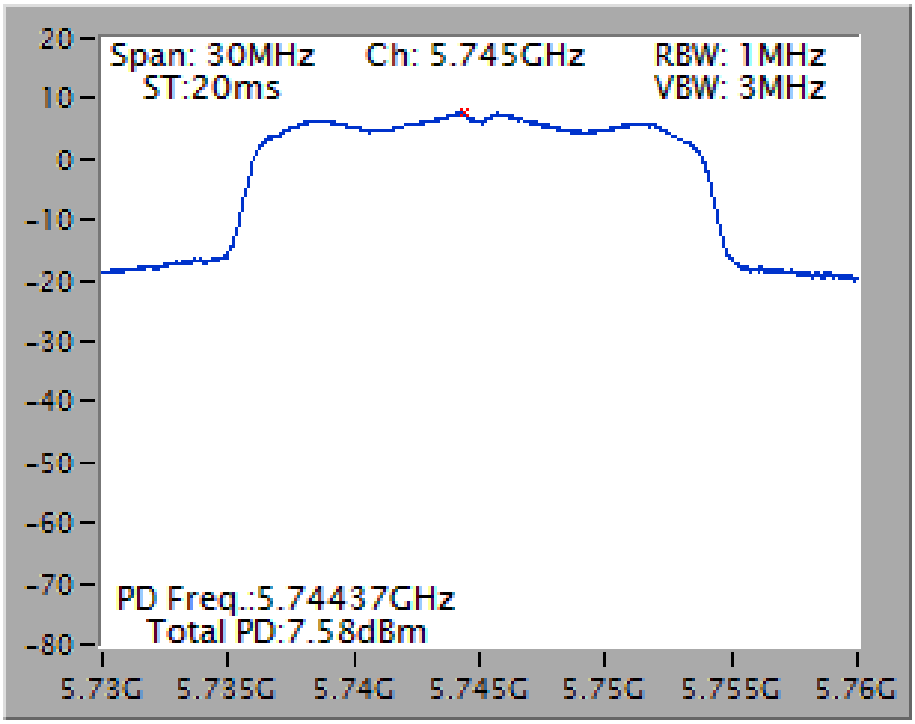
Note: All the test values were listed in the report.

For plots, only the channel with worse result was shown.

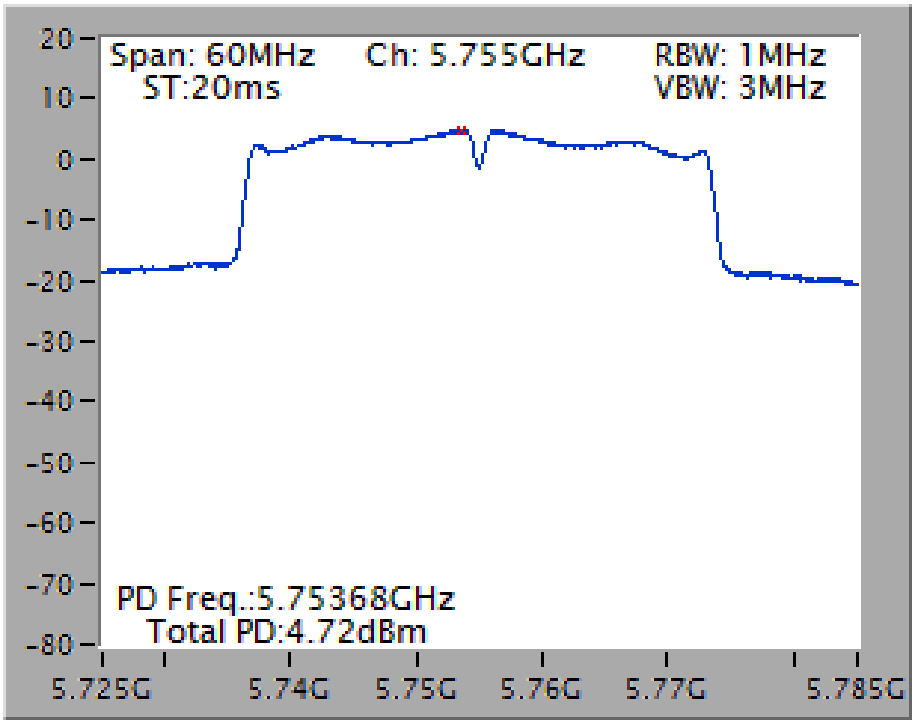
Power Density Plot on Configuration IEEE 802.11a / Ant. 3 + Ant. 4 / 5745 MHz



Power Density Plot on Configuration IEEE 802.11n MCS0 HT20 / Ant. 3 + Ant. 4 / 5745 MHz



Power Density Plot on Configuration IEEE 802.11n MCS0 HT40 / Ant. 3 + Ant. 4 / 5755 MHz



4.5. Radiated Emissions Measurement

4.5.1. Limit

For transmitters operating in the 5.725-5.85 GHz band: all emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

In addition, In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

4.5.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of spectrum analyzer and receiver.

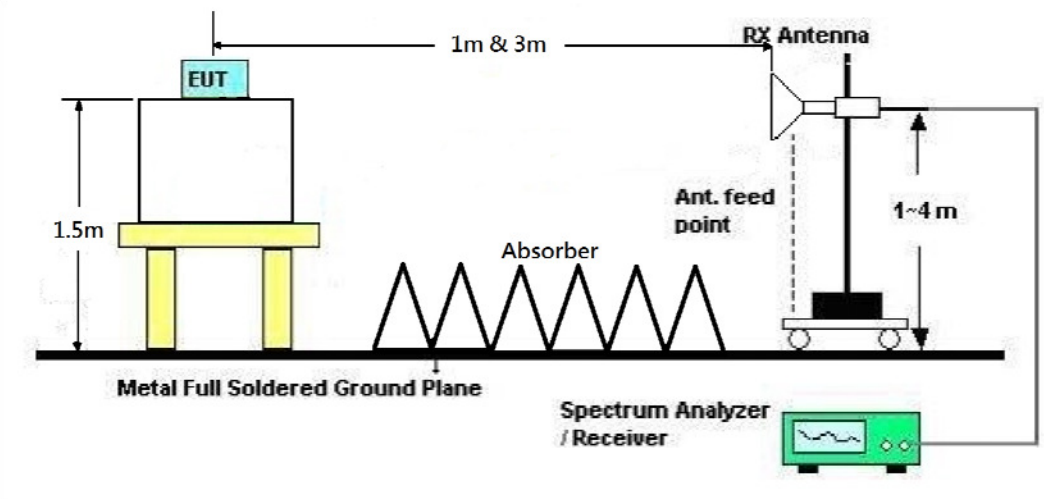
Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	40 GHz
RBW / VBW (Emission in restricted band)	1MHz / 3MHz for Peak, 1MHz / 1/T for Average
RBW / VBW (Emission in non-restricted band)	1MHz / 3MHz for peak

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RBW 120kHz for QP

4.5.3. Test Procedures

1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 1m & 3m far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and 3MHz RBW for peak reading. Then 1MHz RBW and 1/T VBW for average reading in spectrum analyzer.
7. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
8. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
9. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High – Low scan is not required in this case.

4.5.4. Test Setup Layout



4.5.5. Test Deviation

There is no deviation with the original standard.

4.5.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.5.7. Results for Radiated Emissions (1GHz~40GHz)

Temperature	22°C	Humidity	55%
Test Engineer	John Tang	Configurations	IEEE 802.11a CH 149 / Ant. 3 + Ant. 4
Test Date	May 15, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11486.30	62.07	74.00	-11.93	45.70	11.60	40.00	35.23	205	207	Peak	HORIZONTAL
2	11491.92	49.11	54.00	-4.89	32.74	11.60	40.00	35.23	205	207	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11486.28	64.74	74.00	-9.26	48.37	11.60	40.00	35.23	180	271	Peak	VERTICAL
2	11491.88	50.64	54.00	-3.36	34.27	11.60	40.00	35.23	180	271	Average	VERTICAL

Temperature	22°C	Humidity	55%
Test Engineer	John Tang	Configurations	IEEE 802.11a CH 157 / Ant. 3 + Ant. 4
Test Date	May 15, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11570.84	62.09	74.00	-11.91	45.81	11.64	39.87	35.23	212	195	Peak	HORIZONTAL
2	11571.92	48.57	54.00	-5.43	32.29	11.64	39.87	35.23	212	195	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11566.34	63.93	74.00	-10.07	47.65	11.64	39.87	35.23	198	275	Peak	VERTICAL
2	11571.52	49.75	54.00	-4.25	33.47	11.64	39.87	35.23	198	275	Average	VERTICAL

Temperature	22°C	Humidity	55%
Test Engineer	John Tang	Configurations	IEEE 802.11a CH 165 / Ant. 3 + Ant. 4
Test Date	May 15, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11646.38	63.18	74.00	-10.82	46.98	11.69	39.73	35.22	198	200	Peak	HORIZONTAL
2	11651.74	49.78	54.00	-4.22	33.62	11.71	39.67	35.22	198	200	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11646.48	64.41	74.00	-9.59	48.21	11.69	39.73	35.22	194	265	Peak	VERTICAL
2	11650.94	49.90	54.00	-4.10	33.74	11.71	39.67	35.22	194	265	Average	VERTICAL

Temperature	22°C	Humidity	55%
Test Engineer	John Tang	Configurations	IEEE 802.11n MCS0 HT20 CH 149 / Ant. 3 + Ant. 4
Test Date	May 15, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11490.82	62.23	74.00	-11.77	45.86	11.60	40.00	35.23	205	216	Peak	HORIZONTAL
2	11491.16	48.67	54.00	-5.33	32.30	11.60	40.00	35.23	205	216	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11488.18	50.10	54.00	-3.90	33.73	11.60	40.00	35.23	186	270	Average	VERTICAL
2	11491.02	63.57	74.00	-10.43	47.20	11.60	40.00	35.23	186	270	Peak	VERTICAL

Temperature	22°C	Humidity	55%
Test Engineer	John Tang	Configurations	IEEE 802.11n MCS0 HT20 CH 157 / Ant. 3 + Ant. 4
Test Date	May 15, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11571.12	48.79	54.00	-5.21	32.51	11.64	39.87	35.23	206	204	Average	HORIZONTAL
2	11573.48	63.65	74.00	-10.35	47.37	11.64	39.87	35.23	206	204	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11568.44	48.71	54.00	-5.29	32.43	11.64	39.87	35.23	214	205	Average	VERTICAL
2	11570.62	61.70	74.00	-12.30	45.42	11.64	39.87	35.23	214	205	Peak	VERTICAL

Temperature	22°C	Humidity	55%
Test Engineer	John Tang	Configurations	IEEE 802.11n MCS0 HT20 CH 165 / Ant. 3 + Ant. 4
Test Date	May 15, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11646.08	49.42	54.00	-4.58	33.22	11.69	39.73	35.22	208	200	Average	HORIZONTAL
2	11650.46	62.79	74.00	-11.21	46.59	11.69	39.73	35.22	208	200	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11650.56	49.90	54.00	-4.10	33.70	11.69	39.73	35.22	186	265	Average	VERTICAL
2	11650.60	63.35	74.00	-10.65	47.15	11.69	39.73	35.22	186	265	Peak	VERTICAL

Temperature	22°C	Humidity	55%
Test Engineer	John Tang	Configurations	IEEE 802.11n MCS0 HT40 CH 151 / Ant. 3 + Ant. 4
Test Date	May 15, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11510.80	47.24	54.00	-6.76	30.87	11.60	40.00	35.23	200	217	Average	HORIZONTAL
2	11511.06	60.80	74.00	-13.20	44.43	11.60	40.00	35.23	200	217	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11510.84	49.01	54.00	-4.99	32.64	11.60	40.00	35.23	193	272	Average	VERTICAL
2	11510.88	62.08	74.00	-11.92	45.71	11.60	40.00	35.23	193	272	Peak	VERTICAL

Temperature	22°C	Humidity	55%
Test Engineer	John Tang	Configurations	IEEE 802.11n MCS0 HT40 CH 159 / Ant. 3 + Ant. 4
Test Date	May 15, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11589.22	45.62	54.00	-8.38	29.37	11.67	39.80	35.22	184	106	Average	HORIZONTAL
2	11592.14	58.56	74.00	-15.44	42.31	11.67	39.80	35.22	184	106	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11588.86	60.56	74.00	-13.44	44.31	11.67	39.80	35.22	166	238	Peak	VERTICAL
2	11590.42	46.86	54.00	-7.14	30.61	11.67	39.80	35.22	166	238	Average	VERTICAL

Note:

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

4.6. Band Edge Emissions Measurement

4.6.1. Limit

For transmitters operating in the 5.725-5.85 GHz band: all emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

In addition, In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

4.6.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	100 MHz
RBW / VBW (Emission in restricted band)	1MHz / 3MHz for Peak, 1MHz / 1/T for Average
RBW / VBW (Emission in non-restricted band)	1MHz / 3MHz for Peak

4.6.3. Test Procedures

1. The test procedure is the same as section 4.5.3.

4.6.4. Test Setup Layout

This test setup layout is the same as that shown in section 4.5.4.

4.6.5. Test Deviation

There is no deviation with the original standard.

4.6.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.6.7. Test Result of Band Edge and Fundamental Emissions

Temperature	22°C	Humidity	55%
Test Engineer	John Tang	Configurations	IEEE 802.11a CH 149, 157, 165 / Ant. 3 + Ant. 4
Test Date	May 15, 2016		

Channel 149

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5570.00	57.85	68.20	-10.35	51.35	7.57	31.88	32.95	200	244	Peak	VERTICAL
2	5746.00	99.76			92.95	7.73	32.10	33.02	200	244	Average	VERTICAL
3	5746.00	109.26			102.45	7.73	32.10	33.02	200	244	Peak	VERTICAL
4	5932.00	57.80	68.20	-10.40	50.74	7.82	32.32	33.08	200	244	Peak	VERTICAL

Item 2, 3 are the fundamental frequency at 5745 MHz.

Channel 157

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5542.00	58.59	68.20	-9.61	52.15	7.54	31.84	32.94	247	211	Peak	HORIZONTAL
2	5782.84	100.02			93.15	7.76	32.14	33.03	247	211	Average	HORIZONTAL
3	5783.00	109.55			102.68	7.76	32.14	33.03	247	211	Peak	HORIZONTAL
4	5942.00	57.37	68.20	-10.83	50.30	7.82	32.34	33.09	247	211	Peak	HORIZONTAL

Item 2, 3 are the fundamental frequency at 5785 MHz.

Channel 165

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5612.00	57.45	68.20	-10.75	50.86	7.61	31.94	32.96	182	242	Peak	VERTICAL
2	5825.88	99.80			92.87	7.78	32.20	33.05	182	242	Average	VERTICAL
3	5826.00	109.07			102.14	7.78	32.20	33.05	182	242	Peak	VERTICAL
4	6065.00	58.53	68.20	-9.67	51.12	7.91	32.64	33.14	182	242	Peak	VERTICAL

Item 2, 3 are the fundamental frequency at 5825 MHz.

Temperature	22℃	Humidity	55%
Test Engineer	John Tang	Configurations	IEEE 802.11n MCS0 HT20 CH 149, 157, 165 / Ant. 3 + Ant. 4
Test Date	May 15, 2016		

Channel 149

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5564.00	57.97	68.20	-10.23	51.47	7.57	31.88	32.95	191	243	Peak	VERTICAL
2	5745.52	100.17			93.36	7.73	32.10	33.02	191	243	Average	VERTICAL
3	5746.00	108.52			101.71	7.73	32.10	33.02	191	243	Peak	VERTICAL
4	5971.00	57.30	68.20	-10.90	50.21	7.83	32.36	33.10	191	243	Peak	VERTICAL

Item 2, 3 are the fundamental frequency at 5745 MHz.

Channel 157

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5606.00	57.73	68.20	-10.47	51.17	7.60	31.92	32.96	195	240	Peak	VERTICAL
2	5785.44	99.60			92.73	7.76	32.14	33.03	195	240	Average	VERTICAL
3	5786.00	108.39			101.52	7.76	32.14	33.03	195	240	Peak	VERTICAL
4	6007.00	57.68	68.20	-10.52	50.55	7.84	32.40	33.11	195	240	Peak	VERTICAL

Item 2, 3 are the fundamental frequency at 5785 MHz.

Channel 165

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5587.00	57.63	68.20	-10.57	51.11	7.58	31.90	32.96	194	208	Peak	HORIZONTAL
2	5824.52	99.22			92.29	7.78	32.20	33.05	194	208	Average	HORIZONTAL
3	5827.00	108.14			101.21	7.78	32.20	33.05	194	208	Peak	HORIZONTAL
4	6070.00	58.57	68.20	-9.63	51.16	7.91	32.64	33.14	194	208	Peak	HORIZONTAL

Item 2, 3 are the fundamental frequency at 5825 MHz.

Temperature	22°C	Humidity	55%
Test Engineer	John Tang	Configurations	IEEE 802.11n MCS0 HT40 CH 151, 159 / Ant. 3 + Ant. 4
Test Date	May 15, 2016		

Channel 151

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5651.00	67.22	68.94	-1.72	60.58	7.64	31.98	32.98	199	253	Peak	VERTICAL
2	5753.00	105.51			98.70	7.73	32.10	33.02	199	253	Peak	VERTICAL
3	5753.16	96.26			89.45	7.73	32.10	33.02	199	253	Average	VERTICAL
4	6005.00	57.24	68.20	-10.96	50.11	7.84	32.40	33.11	199	253	Peak	LINE

Item 2, 3 are the fundamental frequency at 5755 MHz.

Channel 159

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5650.00	61.02	68.20	-7.18	54.38	7.64	31.98	32.98	240	251	Peak	HORIZONTAL
2	5792.28	97.92			91.02	7.77	32.16	33.03	240	251	Average	HORIZONTAL
3	5797.00	107.40			100.50	7.77	32.16	33.03	240	251	Peak	HORIZONTAL
4	5925.00	59.85	68.20	-8.35	52.79	7.82	32.32	33.08	240	251	Peak	HORIZONTAL

Item 2, 3 are the fundamental frequency at 5795 MHz.

Note:

Emission level (dBuV/m) = 20 log Emission level (uV/m)

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

4.7. Frequency Stability Measurement

4.7.1. Limit

In-band emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

The transmitter center frequency tolerance shall be ± 20 ppm maximum for the 5 GHz band (IEEE 802.11n specification).

4.7.2. Measuring Instruments and Setting

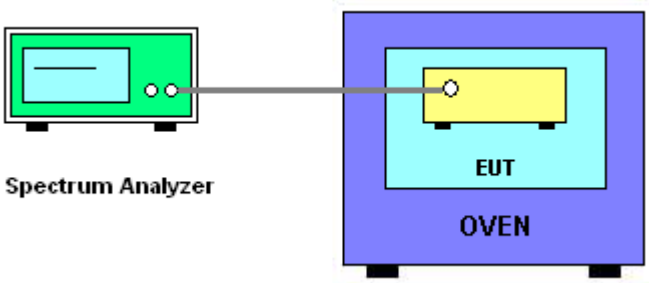
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Entire absence of modulation emissions bandwidth
RBW	10 kHz
VBW	10 kHz
Sweep Time	Auto

4.7.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. EUT have transmitted absence of modulation signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
4. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings.
5. fc is declaring of channel frequency. Then the frequency error formula is (fc-f)/fc × 10^6 ppm and the limit is less than ±20ppm (IEEE 802.11nspecification).
6. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
7. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
8. Extreme temperature is -30°C~50°C.

4.7.4. Test Setup Layout



4.7.5. Test Deviation

There is no deviation with the original standard.

4.7.6. EUT Operation during Test

The EUT was programmed to be in continuously un-modulation transmitting mode.

4.7.7. Test Result of Frequency Stability

Temperature	24℃	Humidity	60%
Test Engineer	Clemens Fang	Test Date	May 21, 2016

Mode: 20 MHz / Ant. 3

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5785 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5784.9812	5784.9801	5784.9786	5784.9766
110.00	5784.9800	5784.9787	5784.9771	5784.9752
93.50	5784.9786	5784.9777	5784.9763	5784.9745
Max. Deviation (MHz)	0.0214	0.0223	0.0237	0.0255
Max. Deviation (ppm)	3.69	3.85	4.09	4.40
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(℃)	5785 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
-30	5784.9872	5784.9856	5784.9841	5784.9817
-20	5784.9854	5784.9841	5784.9824	5784.9803
-10	5784.9839	5784.9827	5784.9811	5784.9792
0	5784.9825	5784.9811	5784.9792	5784.9770
10	5784.9812	5784.9799	5784.9784	5784.9766
20	5784.9800	5784.9787	5784.9771	5784.9752
30	5784.9786	5784.9775	5784.9761	5784.9745
40	5784.9771	5784.9758	5784.9742	5784.9723
50	5784.9754	5784.9742	5784.9728	5784.9700
Max. Deviation (MHz)	0.0246	0.0258	0.0273	0.0300
Max. Deviation (ppm)	4.25	4.45	4.71	5.18
Result	Complies			

Mode: 40 MHz / Ant. 3

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5755 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5754.9808	5754.9797	5754.9782	5754.9762
110.00	5754.9796	5754.9783	5754.9767	5754.9748
93.50	5754.9781	5754.9773	5754.9758	5754.9739
Max. Deviation (MHz)	0.0219	0.0227	0.0242	0.0261
Max. Deviation (ppm)	3.80	3.94	4.20	4.54
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5755 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
-30	5754.9868	5754.9852	5754.9837	5754.9813
-20	5754.9850	5754.9837	5754.9820	5754.9799
-10	5754.9835	5754.9823	5754.9807	5754.9788
0	5754.9821	5754.9807	5754.9788	5754.9766
10	5754.9808	5754.9795	5754.9780	5754.9762
20	5754.9796	5754.9783	5754.9767	5754.9748
30	5754.9782	5754.9771	5754.9757	5754.9741
40	5754.9767	5754.9754	5754.9738	5754.9719
50	5754.9752	5754.9733	5754.9729	5754.9703
Max. Deviation (MHz)	0.0248	0.0267	0.0271	0.0297
Max. Deviation (ppm)	4.30	4.65	4.72	5.17
Result	Complies			

4.8. Antenna Requirements

4.8.1. Limit

Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with any jacket for installing an antenna with extension cable. 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 the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

4.8.2. Antenna Connector Construction

Please refer to section 3.3 in this test report; antenna connector complied with the requirements.

5. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Horn Antenna	EMCO	3115	00075790	750MHz ~ 18GHz	Oct. 22, 2015	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jul. 21, 2015	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Jan. 18, 2016	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26GHz ~ 40GHz	Nov. 13, 2015	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Oct. 27, 2015	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16	N/A	1 GHz ~ 18 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-17	N/A	1 GHz ~ 18 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-1	N/A	18GHz ~ 40 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-2	N/A	18GHz ~ 40 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	Dec. 09, 2015	Conducted (TH01-CB)
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	Jun. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-6	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-7	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-8	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-9	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
Power Sensor	Agilent	U2021XA	MY53410001	50MHz~18GHz	Nov. 02, 2015	Conducted (TH01-CB)

Note: Calibration Interval of instruments listed above is one year.

6. MEASUREMENT UNCERTAINTY

Test Items	Uncertainty	Remark
Radiated Emission (1GHz ~ 18GHz)	3.7 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%
Conducted Emission	1.7 dB	Confidence levels of 95%