# **FCC RF Test Report**

APPLICANT : Aerohive networks Inc EQUIPMENT : wireless access point

BRAND NAME : Aerohive MODEL NAME : AP650X

FCC ID : WBV-AP650X

STANDARD : FCC Part 15 Subpart E §15.407

CLASSIFICATION : (NII) Unlicensed National Information Infrastructure

The product was received on Feb. 15, 2019 and testing was completed on Jul. 10, 2019. We, Sporton International (Kunshan) Inc., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International (Kunshan) Inc., the test report shall not be reproduced except in full.

Reviewed by: Jason Jia / Supervisor

JasonJia

Approved by: James Huang / Manager

## Sporton International (Kunshan) Inc.

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Sporton International (Kunshan) Inc.

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Report No.: FR921502C

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## **REVISION HISTORY**

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REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR921502C	Rev. 01	Initial issue of report	Aug. 12, 2019

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## **SUMMARY OF TEST RESULT**

Report Section	FCC Rule	Description	Limit	Result	Remark		
-	15.403(i)	6dB, 26dB and 99% Occupied Bandwidth	> 500kHz	Not Required	-		
3.1	15.407(a)	Maximum Conducted Output Power	≤ 30 dBm	Pass	-		
-	15.407(a)	Power Spectral Density	≤ 30 dBm/500kHz	Not Required	-		
3.2	15.407(b)	Unwanted Emissions	15.407(b)(4)(i) &15.209(a)	Pass	Under limit 3.70 dB at 55.220 MHz		
-	15.207	AC Conducted Emission	15.207(a)	Not Required	•		
3.3	15.407(c)	Automatically Discontinue Transmission	Discontinue Transmission	Pass	-		
3.4	15.203 & 15.407(a)	Antenna Requirement	N/A	Pass	-		
Remark: No	Remark: Not required means after assessing, test items are not necessary to carry out.						

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## 1 General Description

## 1.1 Applicant

#### Aerohive networks Inc

1011 McCarthy Boulevard, Milpitas, CA 95035, United States

## 1.2 Product Feature of Equipment Under Test

Product Feature					
Equipment	wireless access point				
Brand Name	Aerohive				
Model Name	AP650X				
FCC ID	WBV-AP650X				
	WLAN 2.4GHz 802.11b/g/n (HT20)				
	WLAN 2.4GHz 802.11ac (VHT20)				
	WLAN 2.4GHz 802.11ax (HE20)				
EUT supports Radios application	WLAN 5GHz 802.11a/n(HT20/HT40)				
	WLAN 5GHz 802.11ac (VHT20/VHT40/VHT80)				
	WLAN 5GHz 802.11ax (HE20/HE40/HE80/HE160)				
	Bluetooth v4.0 LE				
HW Version	1				
SW Version	10.0				
EUT Stage	Production Unit				

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#### Remark:

- **1.** The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
- 2. This is a C2PC report for AP650X For model change note, please refer the product equality declaration exhibit submitted separately. Based on the similarity between current and previous project, only the power, conducted band-edge and RSE from original test report (Report Number 1842039R-RF-US-P09V01, FCC ID WBV-AP650X) was verified for the differences.

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## 1.3 Product Specification of Equipment Under Test

Standards-related Product Specification						
Tx/Rx Channel Frequency Range	5725 MHz ~ 5850	MHz				
Type of Modulation	802.11a/n: OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac/ax: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM / 1024QAM)					
Antenna Type / Gain	<ant. 1="">: Internal bent metal Antenna with gain 5.00 dBi <ant. 2="">: Internal bent metal Antenna with gain 5.00 dBi <ant. 3="">: Internal bent metal Antenna with gain 5.00 dBi <ant. 4="">: Internal bent metal Antenna with gain 5.00 dBi Additional Beamforming Gain: 8.01 dB</ant.></ant.></ant.></ant.>				Bi Bi	
		Ant. 1	Ant. 2	Ant. 3	Ant. 4	
Antenna Function Description	802.11 a/n/ac/ax SISO	V	V	V	V	
	802.11 a/n/ac/ax SISO	V	V	V	V	

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#### Remark:

- 1. Support cross-polarization Antenna.
- 2. ETH6 module support WLAN 5G B1-4, ETH7 module support WLAN 2.4G and 5G B1-2.

## 1.4 Modification of EUT

No modifications are made to the EUT during all test items.

## 1.5 Testing Location

Sporton International (Kunshan) Inc. is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International (Kunshan) Inc.			
	No. 1098, Pengxi North Road, Kunshan Economic Development Zone			
Test Site Location	Jiangsu Province 215300 People's Republic of China			
rest one Location	TEL: +86-512-57900158			
	FAX: +86-512-57900958			
	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.	
Test Site No.	TH01-KS 03CH06-KS	CN1257	314309	

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#### 1.6 **Applicable Standards**

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

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- 47 CFR Part 15 Subpart E
- FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
- FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ANSI C63.10-2013

#### Remark:

- All test items were verified and recorded according to the standards and without any deviation 1. during the test.
- This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, 2. recorded in a separate test report.

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## 2 Test Configuration of Equipment Under Test

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Z plane) were recorded in this report.

## 2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
	149	5745	157	5785
5725-5850 MHz	151*	5755	159*	5795
Band 4 (U-NII-3)	153	5765	161	5805
(6 1411 6)	155#	5775	165	5825

#### Note:

- 1. The above Frequency and Channel in "\*" were 802.11n HT40 and 802.11ac VHT40.
- 2. The above Frequency and Channel in "#" were 802.11ac VHT80.

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## 2.2 Test Mode

Final test modes are considering the modulation and worse data rates as below table.

### **Single Mode**

Modulation	Data Rate
802.11a	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0
802.11ac VHT80	MCS0
802.11ax HE20	MCS0
802.11ax HE40	MCS0
802.11ax HE80	MCS0

### **MIMO Mode**

Modulation	Data Rate
802.11a	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0
802.11ac VHT80	MCS0
802.11ax HE20	MCS0
802.11ax HE40	MCS0
802.11ax HE80	MCS0

#### **TXBF Mode**

Modulation	Data Rate
802.11n HT40	MCS0
802.11ac VHT20	MCS0
802.11ac VHT80	MCS0
802.11ax HE20	MCS0
802.11ax HE40	MCS0
802.11ax HE80	MCS0

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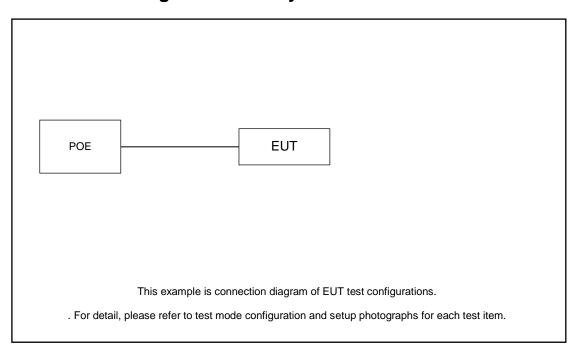
	Ch. #	Band IV:5725-5850 MHz			
	Cn. #	802.11a	802.11n HT20	802.11n HT40	802.11ac VHT80
L	Low	149	149	151	-
M	Middle	157	157	-	155
Н	High	165	165	159	-

Ch. #		Band IV:5725-5850 MHz			
		802.11ax HE20	802.11ax HE40	802.11ax HE80	
L	Low	149	151	-	
М	Middle	157	-	155	
Н	High	165	159	-	

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## 2.3 Connection Diagram of Test System



## 2.4 Support Unit used in test configuration and system

I	tem	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
	1.	POE	N/A	N/A	N/A	N/A	N/A

## 2.5 EUT Operation Test Setup

For WLAN RF test items, an engineering test program was provided and enabled to make EUT continuously transmit/receive.

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## 2.6 Measurement Results Explanation Example

#### For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

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#### Example:

The spectrum analyzer offset is derived from RF cable loss.

Offset = RF cable loss.

Following shows an offset computation example with cable loss 6.2 dB.

 $Offset(dB) = RF \ cable \ loss(dB).$ = 6.2 (dB)

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## 3 Test Result

## 3.1 Maximum Conducted Output Power Measurement

### 3.1.1 Limit of Maximum Conducted Output Power

For the band 5.725–5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

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

## 3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

#### 3.1.3 Test Procedures

The testing follows Method PM of FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

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

- 1. Measurement is performed using a wideband RF power meter.
- 2. The EUT is configured to transmit continuously with a consistent duty cycle at its maximum power control level.
- 3. Measure the average power of the transmitter, and the average power is corrected with duty factor,  $10 \log(1/x)$ , where x is the duty cycle.

#### <TXBF Modes>

The testing follows Method PM-G of FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01 for TXBF modes.

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

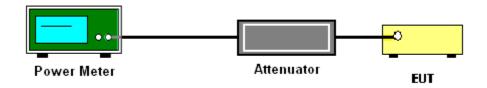
- 1. Measurement is performed using a wideband RF power meter.
- 2. The EUT is configured to transmit at its maximum power control level.
- 3. Measure the average power of the transmitter
- 4. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

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## 3.1.4 Test Setup



## 3.1.5 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.

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## 3.2 Unwanted Emissions Measurement

This section is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement.

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#### 3.2.1 Limit of Unwanted Emissions

- (1) For transmitters operating in the 5.725-5.85 GHz band: 15.407(b)(4)(i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.
- (2) Unwanted spurious emissions fallen in restricted bands shall comply with the general field strength limits as below table,

Frequency	Field Strength	Measurement Distance
(MHz)	(microvolts/meter)	(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

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EIRP (dBm)	Field Strength at 3m (dBµV/m)				
- 27	68.2				

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Note: The following formula is used to convert the EIRP to field strength.

$$EIRP = E_{Meas} + 20log (d_{Meas}) - 104.7$$

where

EIRP is the equivalent isotropically radiated power, in dBm

E<sub>Meas</sub> is the field strength of the emission at the measurement distance, in dB<sub>µ</sub>V/m

d<sub>Meas</sub> is the measurement distance, in m

### (3) ANSI C63.10-2013 clause 12.7.3 note 97

As specified by regulatory requirements, emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit. However, an out-of-band emission that complies with both the average and peak general regulatory limits is not required to satisfy the peak emission limit.

### 3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

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#### 3.2.3 Test Procedures

The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
Section G) Unwanted emissions measurement.

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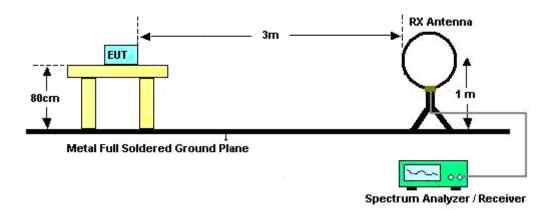
- (1) Procedure for Unwanted Emissions Measurements Below 1000MHz
  - RBW = 120 kHz
  - VBW = 300 kHz
  - Detector = Peak
  - Trace mode = max hold
- (2) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz
  - RBW = 1 MHz
  - VBW ≥ 3 MHz
  - Detector = Peak
  - Sweep time = auto
  - Trace mode = max hold
- (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz
  - RBW = 1 MHz
  - VBW = 10 Hz, when duty cycle is no less than 98 percent.
  - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
- 2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
- 3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- 4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
- 5. For each suspected emission, the EUT was arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
- 6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
- 7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

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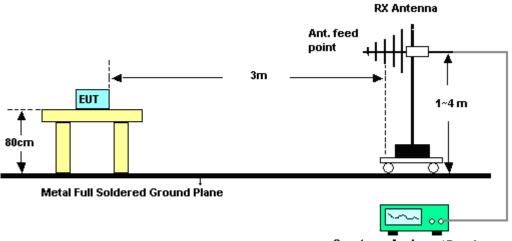
## 3.2.4 Test Setup

### For radiated emissions below 30MHz



or radiated emissions from 20MHz to 1CHz

# For radiated emissions from 30MHz to 1GHz <CDD Mode>

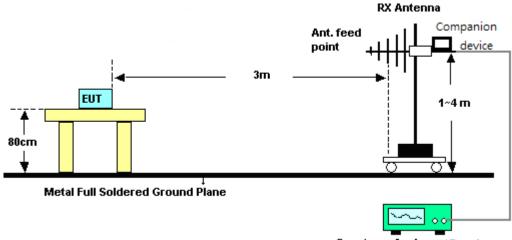


Spectrum Analyzer / Receiver

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## <TXBF Modes>

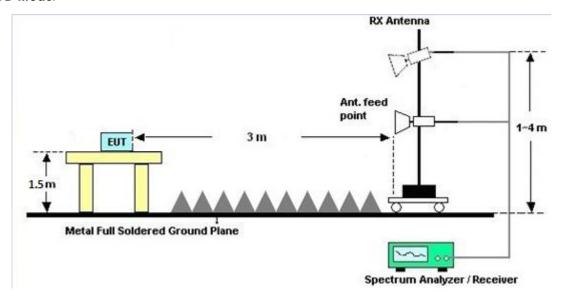


Spectrum Analyzer / Receiver

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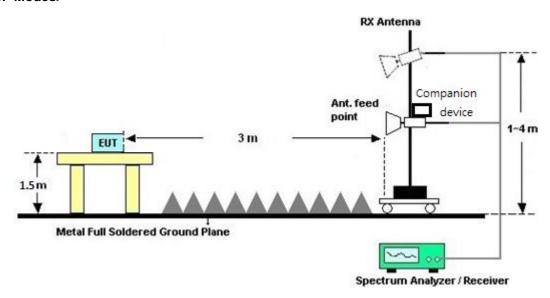
### For radiated emissions above 1GHz

#### <CDD Mode>



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#### <TXBF Modes>



## 3.2.5 Test Results of Radiated Emissions (9 kHz ~ 30 MHz)

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

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

### 3.2.6 Test Result of Conducted Spurious at Band Edges

Please refer to Appendix B.

## 3.2.7 Duty Cycle

Please refer to Appendix D.

### 3.2.8 Test Result of Unwanted Radiated Emission (30MHz ~ 10th Harmonic)

Please refer to Appendix C.

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## 3.3 Automatically Discontinue Transmission

### 3.3.1 Limit of Automatically Discontinue Transmission

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization to describe how this requirement is met.

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## 3.3.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

## 3.3.3 Test Result of Automatically Discontinue Transmission

While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission.

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## 3.4 Antenna Requirements

### 3.4.1 Standard Applicable

If transmitting antenna directional gain is greater than 6 dBi, both the peak transmit 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.

### 3.4.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

#### 3.4.3 Antenna Gain

<CDD Modes >

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

Directional gain = GANT + Array Gain, where Array Gain is as follows.

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

Array Gain = 10 log(NANT/NSS=1) dB.

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for NANT ≤ 4.

Directional gain may be calculated by using the formulas applicable to equal gain antennas with

GANT set equal to the gain of the antenna having the highest gain;

The EUT supports CDD mode.

For power, the directional gain  $G_{ANT}$  is set equal to the antenna having the highest gain, i.e., F(2)f(i).

For PSD, the directional gain calculation is following F)2)f)ii) of KDB 662911 D01 v02r01.

The power and PSD limit should be modified if the directional gain of EUT is over 6 dBi,

The directional gain "DG" is calculated as following table.

5.00	DG	DG	Power	PSD		
5.8G	for	for	Limit	Limit		
Band Antenna	Power	PSD	Reduction	Reduction		
Antenna	(dBi)	(dBi)	(dB)	(dB)		
1	5.00	5.00	0.00	0.00		
2	5.00	5.00	0.00	0.00		
3	5.00	5.00	0.00	0.00		
4	5.00	5.00	0.00	0.00		
1+2+3+4	5.00	11.02	0.00	5.02		

Power Limit Reduction = DG(Power) - 6dBi, (min = 0)

PSD Limit Reduction = DG(PSD) - 6dBi, (min = 0)

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#### **TXBF modes**

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

$$Directional Gain = 10 \cdot \log \left[ \frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^{2}}{N_{ANT}} \right]$$

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where

Each antenna is driven by no more than one spatial stream;

 $N_{SS}$  = the number of independent spatial streams of data;

 $N_{ANT}$  = the total number of antennas

 $g_{j,k} = 10^{G_k/20}$  if the kth antenna is being fed by spatial stream j, or zero if it is not;  $G_k$  is the gain in dBi of the kth antenna.

The EUT supports beamforming for 802.11ac modes.

The directional gain calculation is following F)2)e)ii) of KDB 662911 D01 v02r01.

The power and PSD limit should be modified if the directional gain of EUT is over 6 dBi,

The directional gain "DG" is calculated as following table.

F 00	DG	DG	Power	PSD		
5.8G Band	for	for	Limit	Limit		
Antenna	Power	PSD	Reduction	Reduction		
Antenna	(dBi)	(dBi)	(dB)	(dB)		
1	5.00	5.00	0.00	0.00		
2	5.00	5.00	0.00	0.00		
3	5.00	5.00	0.00	0.00		
4	5.00	5.00	0.00	0.00		
1+2+3+4	8.01	8.01	2.01	2.01		

Power Limit Reduction = DG(Power) - 6dBi, (min = 0)

 $PSD \ Limit \ Reduction = DG(PSD) - 6dBi, (min = 0)$ 

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## 4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Pulse Power Senor	Anritsu	MA2411B	0917070	300MHz~40GH z	Jan. 14, 2019	Jun. 28, 2019~ Jul. 10, 2019	Jan. 13, 2020	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 14, 2019	Jun. 28, 2019~ Jul. 10, 2019	Jan. 13, 2020	Conducted (TH01-KS)
EMI Test Receiver	Keysight	N9038A	MY564000 23	3Hz~8.5GHz;M ax 30dBm	Oct. 12, 2018	Jul. 01, 2019	Oct. 11, 2019	Radiation (03CH06-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY551502 08	10Hz-44GHz	Apr. 16, 2019	Jul. 01, 2019	Apt.18, 2020	Radiation (03CH06-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 19, 2018	Jul. 01, 2019	Oct. 18, 2019	Radiation (03CH06-KS)
Bilog Antenna	TeseQ	CBL6111D	44483	30MHz-1GHz	Dec. 28, 2018	Jul. 01, 2019	Dec. 27, 2019	Radiation (03CH06-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Oct. 20, 2018	Jul. 01, 2019	Oct. 19, 2019	Radiation (03CH06-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 05, 2019	Jul. 01, 2019	Jan. 04, 2020	Radiation (03CH06-KS)
Amplifier	SONOMA	310N	187289	9KHz ~1GHZ	Aug. 06, 2018	Jul. 01, 2019	Aug. 05, 2019	Radiation (03CH06-KS)
Amplifier	MITEQ	TTA1840-35- HG	2014749	18~40GHz	Jan. 14, 2019	Jul. 01, 2019	Jan.13, 2020	Radiation (03CH06-KS)
high gain Amplifier	MITEQ	AMF-7D-0010 1800-30-10P	2025788	1Ghz-18Ghz	Apr. 17, 2019	Jul. 01, 2019	Apr. 16, 2020	Radiation (03CH06-KS)
Amplifier	Keysight	83017A	MY532702 03	500MHz~26.5G Hz	Apr. 15, 2019	Jul. 01, 2019	Apr. 14, 2020	Radiation (03CH06-KS)
AC Power Source	Chroma	61601	F1040900 04	N/A	NCR	Jul. 01, 2019	NCR	Radiation (03CH06-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Jul. 01, 2019	NCR	Radiation (03CH06-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Jul. 01, 2019	NCR	Radiation (03CH06-KS)

NCR: No Calibration Required

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## 5 Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.10-2013. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

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### **Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)**

Measuring Uncertainty for a Level of Confidence	5.0dB
of 95% (U = 2Uc(y))	3.0 <b>0</b> B

### Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence	5.0dB
of 95% (U = 2Uc(y))	5.UGB

### Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence	
of 95% (U = 2Uc(y))	5.0dB

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## **Appendix A. Conducted Test Results**

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Test Engineer:	Aly Cao	Temperature:	21~25	ç
Test Date:	2019/6/28~2019/7/10	Relative Humidity:	51~54	%

### **CDD Mode**

# TEST RESULTS DATA Average Power Table

Band IV															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)		Average Conducted Powe with duty factor (dBm)		ower		FCC Conducted Power Limit (dBm)	DG (dBi)				Pass/ Fail
					Ant 1	Ant 2	Ant 3	Ant 4	SUM	` ,	Ant 1	Ant 2	Ant 3	Ant 4	
11a	6Mbps		149	5745	20.50				-	30.00	5.00	5.00	5.00	5.00	Pass
11a	6Mbps	1	157	5785	20.41				-	30.00	5.00	5.00	5.00	5.00	Pass
11a	6Mbps	1	165	5825	20.12				-	30.00	5.00	5.00	5.00	5.00	Pass
HT20	MCS0	1	149	5745	20.25				-	30.00	5.00	5.00	5.00	5.00	Pass Pass
HT20 HT20	MCS0	1	157 165	5785 5825	20.54				-	30.00 30.00	5.00	5.00	5.00	5.00	Pass
HT40	MCS0	1	151	5755	18.37				-	30.00	5.00	5.00	5.00	5.00	Pass
HT40	MCS0	1	159	5795	18.35				_	30.00	5.00	5.00	5.00	5.00	Pass
VHT20	MCS0	1	149	5745	20.44				_	30.00	5.00	5.00	5.00	5.00	Pass
VHT20		1	157	5785	20.38				_	30.00	5.00	5.00	5.00	5.00	Pass
VHT20		1	165	5825	20.33				-	30.00	5.00	5.00	5.00	5.00	Pass
VHT40		1	151	5755	15.88				-	30.00	5.00	5.00	5.00	5.00	Pass
VHT40		1	159	5795	15.80				-	30.00	5.00	5.00	5.00	5.00	Pass
VHT80		1	155	5775	19.53				-	30.00	5.00	5.00	5.00	5.00	Pass
AX20	MCS0	1	149	5745	20.51				-	30.00	5.00	5.00	5.00	5.00	Pass
AX20	MCS0	1	157	5785	20.91				-	30.00	5.00	5.00	5.00	5.00	Pass
AX20	MCS0	1	165	5825	20.71				-	30.00	5.00	5.00	5.00	5.00	Pass
AX40	MCS0	1	151	5755	20.33				-	30.00	5.00	5.00	5.00	5.00	Pass
AX40	MCS0	1	159	5795	20.68				-	30.00	5.00	5.00	5.00	5.00	Pass
AX80	MCS0	1	155	5775	18.94				-	30.00	5.00	5.00	5.00	5.00	Pass
11a	6Mbps	4	149	5745	18.15	18.03	18.81	18.84	24.49	30.00		5.0			Pass
11a	6Mbps	_	157	5785	18.64	18.50	18.9	18.92	24.76	30.00		5.0			Pass
11a	6Mbps	4	165	5825	18.58	18.42	18.6	18.50	24.55	30.00	-	5.0			Pass
HT20	MCS0	4	149	5745	17.68	18.16	18.19	18.51	24.17	30.00		5.0			Pass
HT20 HT20	MCS0	4	157 165	5785 5825	17.93 17.72	18.07 18.10	18.58 18.02	18.30 17.91	24.25 23.96	30.00 30.00		5.0			Pass Pass
HT40	MCS0	4	151	5755	18.34	18.54	18.72	18.91	24.65	30.00		5.0			Pass
HT40	MCS0	4	159	5795	19.98	19.15	19.94	19.93	25.78	30.00		5.0			Pass
VHT20		4	149	5745	17.85	17.42	18.27	18.32	24.00	30.00		5.0			Pass
VHT20		4	157	5785	17.94	17.65	18.22	18.14	24.01	30.00		5.0			Pass
	MCS0	4	165	5825	17.93	17.86	18.35	18.22	24.12	30.00		5.0			Pass
	MCS0	4	151	5755	18.43	18.51	19.59	19.06	24.94	30.00		5.0			Pass
	MCS0		159	5795			19.9			30.00		5.0			Pass
	MCS0	4	155	5775	14.29	14.51	15.26	15.17	20.85	30.00		5.			Pass
AX20	MCS0	4	149	5745	17.87	17.96	18.49	18.71	24.29	30.00	İ	5.0	00		Pass
AX20	MCS0	4	157	5785	17.75	17.58	17.72	17.79	23.73	30.00		5.	00		Pass
AX20	MCS0	4	165	5825	17.64	17.60	17.09	17.15	23.40	30.00		5.0	00		Pass
AX40	MCS0	4	151	5755	18.34	18.38	18.81	17.90	24.39	30.00		5.			Pass
AX40	MCS0	4	159	5795	19.18	19.17	19.72	19.63	25.45	30.00		5.0			Pass
AX80	MCS0	4	155	5775	14.26	13.92	15.29	15.27	20.75	30.00		5.	00		Pass

### **Beamforming Mode**

# TEST RESULTS DATA Average Power Table

	Band IV													
Mod.	Data Rate	NTX	CH.	Freq. (MHz)		Average Conducted Power with duty factor (dBm)				FCC Conducted Power Limit (dBm)	DG (dBi)	Pass/ Fail		
					Ant 1	Ant 2	Ant 3	Ant 4	SUM	(, ,	Ant 1 Ant 2 Ant 3 Ant 4			
HT20	MCS0	4	149	5745	16.76	16.51	16.66	17.19	22.81	27.99	8.01	Pass		
HT20	MCS0	4	157	5785	16.29	15.96	16.35	16.80	22.38	27.99	8.01	Pass		
HT20	MCS0	4	165	5825	15.79	15.83	15.97	16.53	22.06	27.99	8.01	Pass		
HT40	MCS0	4	151	5755	16.75	16.43	16.85	17.12	22.82	27.99	8.01	Pass		
HT40	MCS0	4	159	5795	16.46	16.22	16.95	16.89	22.66	27.99	8.01	Pass		
VHT20	MCS0	4	149	5745	16.52	16.99	16.82	17.18	22.90	27.99	8.01	Pass		
VHT20	MCS0	4	157	5785	16.41	16.10	16.35	16.23	22.29	27.99	8.01	Pass		
VHT20	MCS0	4	165	5825	15.89	15.54	15.96	16.37	21.97	27.99	8.01	Pass		
VHT40	MCS0	4	151	5755	15.99	16.26	16.17	16.22	22.18	27.99	8.01	Pass		
VHT40	MCS0	4	159	5795	15.84	15.36	15.96	15.70	21.74	27.99	8.01	Pass		
VHT80	MCS0	4	155	5775	13.53	13.10	14.08	13.26	19.53	27.99	8.01	Pass		
AX20	MCS0	4	149	5745	17.21	17.19	17.15	18.10	23.45	27.99	8.01	Pass		
AX20	MCS0	4	157	5785	17.33	16.98	17.39	17.78	23.40	27.99	8.01	Pass		
AX20	MCS0	4	165	5825	16.35	16.16	16.99	17.28	22.74	27.99	8.01	Pass		
AX40	MCS0	4	151	5755	16.97	16.88	17	17.05	23.00	27.99	8.01	Pass		
AX40	MCS0	4	159	5795	16.67	16.32	16.77	16.96	22.71	27.99	8.01	Pass		
AX80	MCS0	4	155	5775	13.53	13.13	13.92	14.29	19.76	27.99	8.01	Pass		

## **Appendix B. Conducted Spurious Emission Plots**

## **Note symbol**

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-L	Low channel location
-R	High channel location

#### Procedure for conducted measurements in restricted bands:

- a) Measure the conducted output power (in dBm) using the detector specified by the appropriate regulatory agency
- b) Add the maximum transmit antenna gain (in dBi) to the measured output power level to determine the EIRP (see 11.12.2.6 for guidance on determining the applicable antenna gain)
- c) Add the appropriate maximum ground reflection factor to the EIRP (6 dB for frequencies ≤30 MHz; 4.7 dB for frequencies between 30 MHz and 1000 MHz, inclusive; and 0 dB for frequencies > 1000 MHz).
- d) For MIMO devices, measure the power of each chain and sum the EIRP of all chains in linear terms
- e) Convert the resultant EIRP to an equivalent electric field strength using the following relationship:

E= EIRP -20 log d+ 104.8

where

E is the electric field strength in dBµV/m

EIRP is the equivalent isotropically radiated power in dBm

d is the specified measurement distance in m

f) Compare the resultant electric field strength level with the applicable regulatory limit.

Thus, the conducted limits for restricted bands can be converted:

#### For SISO mode (limit at restricted bands):

Conducted Peak limit=74dBuV/m - 95.2 - Antenna Gain (5dBi) - setup loss (3.01 dB) = -29.21dBm Conducted Average limit=54dBuV/m - 95.2 - Antenna Gain (5dBi) - setup loss (3.01 dB) = -49.21dBm

#### For SISO mode (limit at non-restricted bands):

Conducted Peak limit=68.3dBuV/m - 95.2 - Antenna Gain (5dBi) - setup loss (3.01 dB) = -34.91dBm

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#### For CDD (TX Ant=4) MIMO mode (limit at restricted bands):

Conducted Peak limit=74dBuV/m - 95.2- Directional Gain (8.01dBi) – 10 log(Nant)dB (6.02 dB) - setup loss (1dB) = -36.23dBm

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Conducted Average limit=54dBuV/m - 95.2 - Directional Gain (8.01dBi) - 10 log(Nant)dB (6.02 dB) - setup loss (1dB) = -56.23dBm

#### For CDD (TX Ant=4) MIMO mode (limit at non-restricted bands):

Conducted Peak limit=68.3 dBuV/m - 95.2- Directional Gain (8.01 dBi) - 10 log(NANT)dB (6.02 dB) - setup loss (0dB) = -40.93 dBm

#### For UNII-3C limit:

#### SISO mode:

(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) - Antenna Gain (5dBi)

#### MIMO mode:

(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) - Directional Gain For CDD(8.01dBi) - 10 log(NANT) dB(6.02dB)

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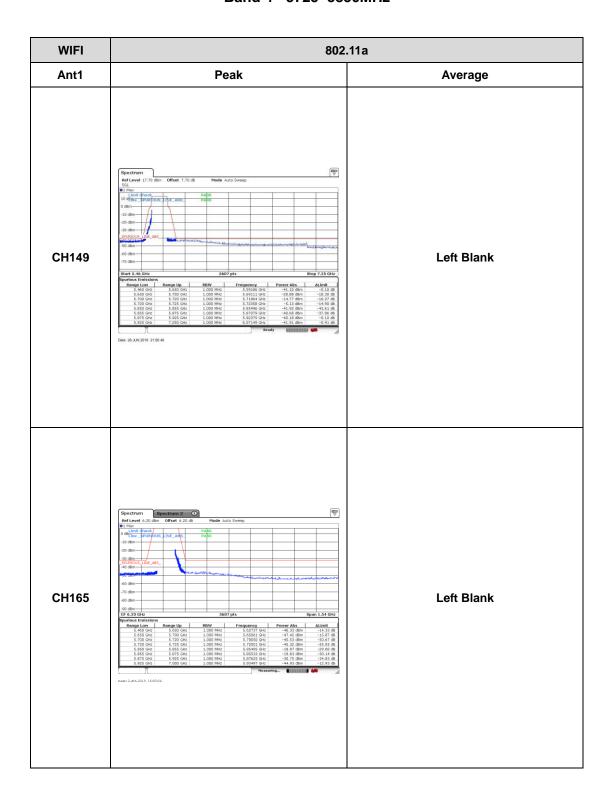
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### For ETH6 SISO mode:

Band 4 - 5725~5850MHz



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WIFI 802.11n HT20 Ant1 Peak **Average** CH149 Left Blank CH165 Left Blank

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WIFI 802.11n HT40 Ant1 Peak **Average** CH151 Left Blank CH159 Left Blank

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802.11ac VHT20 WIFI Ant1 Peak **Average** CH149 Left Blank CH165 Left Blank

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WIFI	802.11ac VHT40	
Ant1	Peak	Average
CH151	Spectrum	Left Blank
CH159	Spectrum   Spectrum   2	Left Blank



### Lend 128 3th Office 128 3th Nation 128 3th Nati

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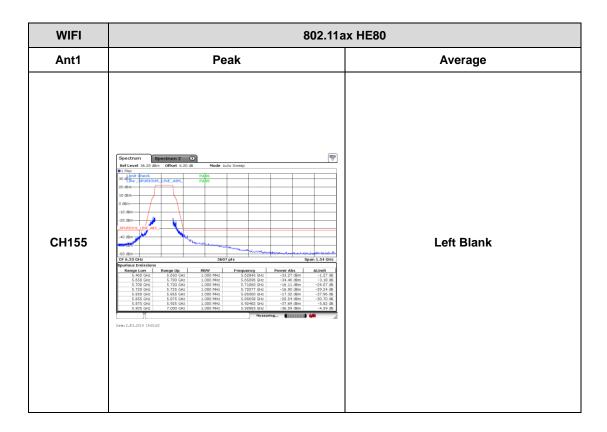
WIFI 802.11ax HE20 Ant1 Peak **Average** CH149 Left Blank CH165 Left Blank

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WIFI 802.11ax HE40 Ant1 Peak **Average** CH151 Left Blank CH159 Left Blank

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#### For ETH6 MIMO mode:

Band 4 - 5725~5850MHz

WIFI	802.	.11a
Ant1	Peak	Average
CH149	Spectrum	Left Blank
CH165	Spectrum	Left Blank

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WIFI 802.11n HT20 Ant1 Peak **Average** CH149 Left Blank CH165 Left Blank

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WIFI 802.11n HT40 Ant1 Peak **Average** CH151 Left Blank CH159 Left Blank

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802.11ac VHT20 WIFI Ant1 Peak **Average** CH149 Left Blank CH165 Left Blank

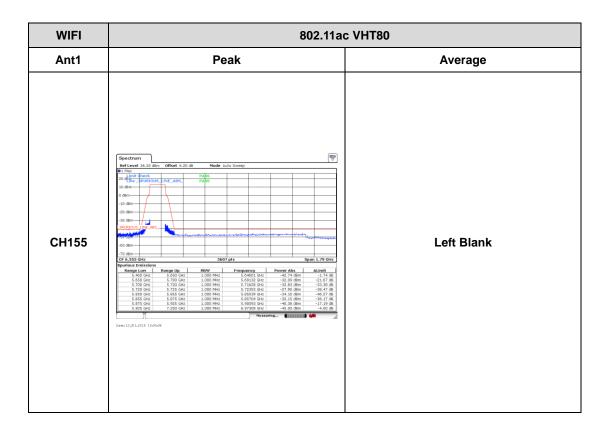
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802.11ac VHT40 WIFI Ant1 Peak **Average** CH151 Left Blank CH159 Left Blank

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WIFI 802.11ax HE20 Ant1 Peak **Average** CH149 Left Blank CH165 Left Blank

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WIFI 802.11ax HE40 Ant1 Peak **Average** CH151 Left Blank CH159 Left Blank

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# Appendix C. Radiated Spurious Emission

#### For ETH6 SISO mode:

#### Band 4 5725~5850MHz

### WIFI 802.11a (Harmonic @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant. 1		( MHz )	( dBµV/m )	Limit (dB)	Line ( dBµV/m )	Level ( dBµV )	Factor ( dB/m )	Loss (dB)	Factor (dB)	Pos ( cm )		Avg. (P/A)	(H/V)
802.11a		11490	42.64	-31.36	74	55.01	39.68	13.36	65.41	150	0	Р	Н
CH 149		17232	46.91	-21.39	68.3	50.83	42.68	16.03	62.63	150	360	Р	Н
5745MHz		11490	42.46	-31.54	74	54.83	39.68	13.36	65.41	150	360	Р	V
		17232	48.74	-19.56	68.3	52.66	42.68	16.03	62.63	150	0	Р	V
802.11a		11570	42.36	-31.64	74	54.82	39.49	13.44	65.39	150	0	Р	Н
CH 157		17352	48.7	-19.6	68.3	51.99	43.32	16.09	62.7	150	360	Р	Н
5785MHz		11570	44.19	-29.81	74	56.65	39.49	13.44	65.39	150	360	Р	V
07 00111112		17352	47.68	-20.62	68.3	50.97	43.32	16.09	62.7	150	0	Р	V
902 44 6		11650	42.38	-31.62	74	54.95	39.29	13.5	65.36	150	0	Р	Н
802.11a CH 165		17472	48.07	-20.23	68.3	50.72	43.96	16.16	62.77	150	360	Р	Н
5825MHz		11650	42.68	-31.32	74	55.25	39.29	13.5	65.36	150	360	Р	V
0020mii 12		17472	48.64	-19.66	68.3	51.29	43.96	16.16	62.77	150	0	Р	V

#### Remark

Sporton International (Kunshan) Inc.

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<sup>1.</sup> No other spurious found.

<sup>2.</sup> All results are PASS against Peak and Average limit line.

#### WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant. 1		( MHz )	( dBµV/m )	Limit (dB)	Line ( dBµV/m )	Level ( dBµV )	Factor ( dB/m )	Loss (dB)	Factor ( dB )	Pos ( cm )		Avg. (P/A)	
802.11n		11490	43.38	-30.62	74	55.75	39.68	13.36	65.41	150	0	Р	Н
HT20		17232	46.45	-21.85	68.3	50.37	42.68	16.03	62.63	150	360	Р	Н
CH 149		11490	42.88	-31.12	74	55.25	39.68	13.36	65.41	150	360	Р	V
5745MHz		17232	48.51	-19.79	68.3	52.43	42.68	16.03	62.63	150	0	Р	V
802.11n		11570	42.33	-31.67	74	54.79	39.49	13.44	65.39	150	0	Р	Н
HT20		17352	46.62	-21.68	68.3	49.91	43.32	16.09	62.7	150	360	Р	Н
CH 157		11570	42.17	-31.83	74	54.63	39.49	13.44	65.39	150	360	Р	V
5785MHz		17352	47.9	-20.4	68.3	51.19	43.32	16.09	62.7	150	0	Р	V
802.11n		11650	42.3	-31.7	74	54.87	39.29	13.5	65.36	150	0	Р	Н
HT20		17472	48.06	-20.24	68.3	50.71	43.96	16.16	62.77	150	360	Р	Н
CH 165		11650	42.26	-31.74	74	54.83	39.29	13.5	65.36	150	360	Р	V
5825MHz		17472	48.62	-19.68	68.3	51.27	43.96	16.16	62.77	150	0	Р	V

## Remark

Sporton International (Kunshan) Inc.

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Report Issued Date : Aug. 12, 2019
Report Version : Rev. 01

Report No.: FR921502C

<sup>1.</sup> No other spurious found.

<sup>2.</sup> All results are PASS against Peak and Average limit line.

#### WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos		Avg.	
1		(MHz)	( dBµV/m )	(dB)	( dBµV/m )	(dB <sub>µ</sub> V)	( dB/m )	( dB )	( dB )	(cm)	( deg )	(P/A)	(H/V)
802.11n		11510	42.4	-31.6	74	54.75	39.7	13.37	65.42	150	0	Р	Н
HT40		17268	45.86	-22.44	68.3	49.61	42.86	16.04	62.65	150	360	Р	Н
CH 151		11510	43.37	-30.63	74	55.72	39.7	13.37	65.42	150	360	Р	V
5755MHz		17268	46.2	-22.1	68.3	49.95	42.86	16.04	62.65	150	0	Р	V
802.11n		11590	42.49	-31.51	74	54.98	39.44	13.45	65.38	150	0	Р	Н
HT40		17388	46.61	-21.69	68.3	49.71	43.51	16.11	62.72	150	360	Р	Н
CH 159		11590	42.63	-31.37	74	55.12	39.44	13.45	65.38	150	360	Р	V
5795MHz		17388	46.34	-21.96	68.3	49.44	43.51	16.11	62.72	150	0	Р	V

#### Remark

. No other spurious found.

2. All results are PASS against Peak and Average limit line.

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## WIFI 802.11ac VHT80 (Harmonic @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	( dBµV/m )	(dB)	( dBµV/m )	(dB <sub>µ</sub> V)	( dB/m )	( dB )	( dB )	( cm )	(deg)	(P/A)	(H/V)
802.11ac		11550	43.29	-30.71	74	55.73	39.54	13.42	65.4	150	0	Р	Н
VHT80		17328	46.09	-22.21	68.3	49.56	43.14	16.07	62.68	150	360	Р	Н
CH 155		11550	43.01	-30.99	74	55.45	39.54	13.42	65.4	150	360	Р	٧
5775MHz		17328	46.17	-22.13	68.3	49.64	43.14	16.07	62.68	150	0	Р	V

#### Remark

1. No other spurious found.

2. All results are PASS against Peak and Average limit line.

Sporton International (Kunshan) Inc.

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#### WIFI 802.11ax HE 20(Harmonic @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant. 1		( MHz )	( dBµV/m )	Limit (dB)	Line ( dBµV/m )	Level ( dBµV )	Factor ( dB/m )	Loss (dB)	Factor ( dB )	Pos ( cm )		Avg. (P/A)	
802.11ax		11490	43.02	-30.98	74	55.39	39.68	13.36	65.41	150	0	Р	Н
HE 20		17232	47.41	-20.89	68.3	51.33	42.68	16.03	62.63	150	360	Р	Н
CH 149		11490	42.98	-31.02	74	55.35	39.68	13.36	65.41	150	360	Р	V
5745MHz		17232	47.83	-20.47	68.3	51.75	42.68	16.03	62.63	150	0	Р	V
802.11ax		11570	43.3	-30.7	74	55.76	39.49	13.44	65.39	150	0	Р	Н
HE 20		17352	48.27	-20.03	68.3	51.56	43.32	16.09	62.7	150	360	Р	Н
CH 157		11570	43.31	-30.69	74	55.77	39.49	13.44	65.39	150	360	Р	V
5785MHz		17352	50.15	-18.15	68.3	53.44	43.32	16.09	62.7	150	0	Р	V
802.11ax		11650	43.06	-30.94	74	55.63	39.29	13.5	65.36	150	0	Р	Н
HE 20		17472	48.38	-19.92	68.3	51.03	43.96	16.16	62.77	150	360	Р	Н
CH 165		11650	42.87	-31.13	74	55.44	39.29	13.5	65.36	150	360	Р	V
5825MHz		17472	50.2	-18.1	68.3	52.85	43.96	16.16	62.77	150	0	Р	V

## Remark

Sporton International (Kunshan) Inc.

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<sup>1.</sup> No other spurious found.

<sup>2.</sup> All results are PASS against Peak and Average limit line.

#### WIFI 802.11ax HE 40 (Harmonic @ 3m)

						•							
WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	( dBµV/m )	(dB)	( $dB\mu V/m$ )	(dB <sub>µ</sub> V)	( dB/m )	( dB )	( dB )	( cm )	(deg)	(P/A)	(H/V)
802.11ax		11510	42.7	-31.3	74	55.05	39.7	13.37	65.42	150	0	Р	Н
HE 40		17268	45.74	-22.56	68.3	49.49	42.86	16.04	62.65	150	360	Р	Н
CH 151		11510	43.61	-30.39	74	55.96	39.7	13.37	65.42	150	360	Р	V
5755MHz		17268	47.16	-21.14	68.3	50.91	42.86	16.04	62.65	150	0	Р	V
802.11ax		11590	42.43	-31.57	74	54.92	39.44	13.45	65.38	150	0	Р	Н
HE 40		17388	46.65	-21.65	68.3	49.75	43.51	16.11	62.72	150	360	Р	Н
CH 159		11590	42.61	-31.39	74	55.1	39.44	13.45	65.38	150	360	Р	V
5795MHz		17388	46.51	-21.79	68.3	49.61	43.51	16.11	62.72	150	0	Р	V

Remark

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<sup>.</sup> No other spurious found.

<sup>2.</sup> All results are PASS against Peak and Average limit line.

## WIFI 802.11ax HE 80 (Harmonic @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	( dBµV/m )	(dB)	( dBµV/m )	(dB <sub>µ</sub> V)	( dB/m )	( dB )	( dB )	( cm )	(deg)	(P/A)	(H/V)
802.11ax		11550	42.79	-31.21	74	55.23	39.54	13.42	65.4	150	0	Р	Н
HE 80		17328	46.39	-21.91	68.3	49.86	43.14	16.07	62.68	150	360	Р	Н
CH 155		11550	42.86	-31.14	74	55.3	39.54	13.42	65.4	150	360	Р	٧
5775MHz		17328	46.57	-21.73	68.3	50.04	43.14	16.07	62.68	150	0	Р	V

#### Remark

1. No other spurious found.

2. All results are PASS against Peak and Average limit line.

Sporton International (Kunshan) Inc.

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# For ETH6 MIMO mode: CDD Mode

#### Band 4 5725~5850MHz

### WIFI 802.11a (Harmonic @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant. 1+2+3+4		(MHz)	( dBµV/m )	Limit (dB)	Line ( dBµV/m )	Level ( dBµV )	Factor ( dB/m )	Loss (dB)	Factor (dB)	Pos (cm)	Pos ( deg )	Avg. (P/A)	
222.44		11490	43.06	-30.94	74	55.43	39.68	13.36	65.41	100	204	Р	Н
802.11a		17232	49.61	-18.09	68.3	53.05	42.68	16.03	62.63	300	0	Р	Н
CH 149		11490	44.12	-29.88	74	56.49	39.68	13.36	65.41	150	360	Р	٧
5745MHz		17232	55.99	-12.31	68.3	59.91	42.68	16.03	62.63	300	360	Р	V
222.44		11570	43.13	-30.87	74	55.59	39.49	13.44	65.39	100	245	Р	Н
802.11a		17352	49.67	-18.63	68.3	52.96	43.32	16.09	62.7	300	0	Р	Н
CH 157 5785MHz		11570	44.51	-29.49	74	56.97	39.49	13.44	65.39	300	5	Р	V
3/ 63IVITZ		17352	56.18	-12.12	68.3	59.47	43.32	16.09	62.71	200	160	Р	V
		11650	42.7	-31.3	74	55.27	39.29	13.5	65.36	258	360	Р	Н
802.11a		17472	50.46	-17.84	68.3	53.11	43.96	16.16	62.77	200	177	Р	Н
CH 165		11650	43.95	-30.05	74	56.52	39.29	13.5	65.36	200	360	Р	V
5825MHz		17472	53.51	-14.79	68.3	56.16	43.96	16.16	62.77	300	0	Р	V

#### Remark

Sporton International (Kunshan) Inc.

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<sup>1.</sup> No other spurious found.

<sup>2.</sup> All results are PASS against Peak and Average limit line.

### WIFI 802.11n HT20 (Harmonic @ 3m)

						•	-			-	,	-
Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
			Limit	Line	Level	Factor	Loss	Factor	Pos		i -	
	(MHz)	( dBµV/m )	(dB)	(dBµV/m)	(dB <sub>µ</sub> V)	( dB/m )	( dB )	( dB )	(cm)	( deg )	(P/A)	(H/V)
	11490	43.42	-30.58	74	55.79	39.68	13.36	65.41	150	0	Р	Н
	17232	-48.52	-19.78	68.3	52.44	42.68	16.03	62.63	150	360	Р	Н
	11490	44.53	-29.47	74	56.9	39.68	13.36	65.41	150	360	Р	V
	17232	50.19	-18.11	68.3	54.11	42.68	16.03	62.63	150	0	Р	V
	11570	43.12	-30.88	74	55.58	39.49	13.44	65.39	150	0	Р	Н
	17352	47.34	-20.96	68.3	50.63	43.32	16.09	62.7	150	360	Р	Н
	11570	42.13	-31.87	74	54.59	39.49	13.44	65.39	150	360	Р	V
	17352	49.08	-19.22	68.3	52.37	43.32	16.09	62.7	150	0	Р	V
	11650	42.11	-31.89	74	54.68	39.29	13.5	65.36	150	0	Р	Н
	17472	48.16	-20.14	68.3	50.81	43.96	16.16	62.77	150	360	Р	Н
	11650	43.64	-30.36	74	56.21	39.29	13.5	65.36	150	360	Р	V
	17472	49.22	-19.08	68.3	51.87	43.96	16.16	62.77	150	0	Р	V
	Note	(MHz) 11490 17232 11490 17232 11570 17352 11570 17352 11650 17472 11650	(MHz) (dBμV/m) 11490 43.42 17232 -48.52 11490 44.53 17232 50.19 11570 43.12 17352 47.34 11570 42.13 17352 49.08 11650 42.11 17472 48.16 11650 43.64	(MHz) (dBμV/m) (dB)  11490 43.42 -30.58  17232 -48.52 -19.78  11490 44.53 -29.47  17232 50.19 -18.11  11570 43.12 -30.88  17352 47.34 -20.96  11570 42.13 -31.87  17352 49.08 -19.22  11650 42.11 -31.89  17472 48.16 -20.14  11650 43.64 -30.36	(MHz)         (dBμV/m)         Limit (dB)         Line (dBμV/m)           11490         43.42         -30.58         74           17232         -48.52         -19.78         68.3           11490         44.53         -29.47         74           17232         50.19         -18.11         68.3           11570         43.12         -30.88         74           17352         47.34         -20.96         68.3           11570         42.13         -31.87         74           17352         49.08         -19.22         68.3           11650         42.11         -31.89         74           17472         48.16         -20.14         68.3           11650         43.64         -30.36         74	(MHz)         (dBμV/m)         Limit (dB)         Line (dBμV/m)         Level (dBμV)           11490         43.42         -30.58         74         55.79           17232         -48.52         -19.78         68.3         52.44           11490         44.53         -29.47         74         56.9           17232         50.19         -18.11         68.3         54.11           11570         43.12         -30.88         74         55.58           17352         47.34         -20.96         68.3         50.63           11570         42.13         -31.87         74         54.59           17352         49.08         -19.22         68.3         52.37           11650         42.11         -31.89         74         54.68           17472         48.16         -20.14         68.3         50.81           11650         43.64         -30.36         74         56.21	(MHz)         (dBμV/m)         Limit (dB)         Line (dBμV/m)         Level (dBμV)         Factor (dB/m)           11490         43.42         -30.58         74         55.79         39.68           17232         -48.52         -19.78         68.3         52.44         42.68           11490         44.53         -29.47         74         56.9         39.68           17232         50.19         -18.11         68.3         54.11         42.68           11570         43.12         -30.88         74         55.58         39.49           17352         47.34         -20.96         68.3         50.63         43.32           11570         42.13         -31.87         74         54.59         39.49           17352         49.08         -19.22         68.3         52.37         43.32           11650         42.11         -31.89         74         54.68         39.29           17472         48.16         -20.14         68.3         50.81         43.96           11650         43.64         -30.36         74         56.21         39.29	(MHz)         (dBμV/m)         Limit (dB)         Line (dBμV/m)         Level (dBμV)         Factor (dB/m)         Loss (dB)           11490         43.42         -30.58         74         55.79         39.68         13.36           17232         -48.52         -19.78         68.3         52.44         42.68         16.03           11490         44.53         -29.47         74         56.9         39.68         13.36           17232         50.19         -18.11         68.3         54.11         42.68         16.03           11570         43.12         -30.88         74         55.58         39.49         13.44           17352         47.34         -20.96         68.3         50.63         43.32         16.09           11570         42.13         -31.87         74         54.59         39.49         13.44           17352         49.08         -19.22         68.3         52.37         43.32         16.09           11650         42.11         -31.89         74         54.68         39.29         13.5           17472         48.16         -20.14         68.3         50.81         43.96         16.16           11650	(MHz)         (dBμV/m)         Limit (dB)         Line (dBμV/m)         Level (dBμV)         Factor (dB/m)         Loss (dB)         Factor (dB)           11490         43.42         -30.58         74         55.79         39.68         13.36         65.41           17232         -48.52         -19.78         68.3         52.44         42.68         16.03         62.63           11490         44.53         -29.47         74         56.9         39.68         13.36         65.41           17232         50.19         -18.11         68.3         54.11         42.68         16.03         62.63           11570         43.12         -30.88         74         55.58         39.49         13.44         65.39           17352         47.34         -20.96         68.3         50.63         43.32         16.09         62.7           11570         42.13         -31.87         74         54.59         39.49         13.44         65.39           17352         49.08         -19.22         68.3         52.37         43.32         16.09         62.7           11650         42.11         -31.89         74         54.68         39.29         13.5         65.36<	(MHz)         Limit (dBμV/m)         Line (dBμV/m)         Level (dBμV)         Factor (dB/m)         Loss (dB)         Factor (dB)         Pos (dB)           11490         43.42         -30.58         74         55.79         39.68         13.36         65.41         150           17232         -48.52         -19.78         68.3         52.44         42.68         16.03         62.63         150           11490         44.53         -29.47         74         56.9         39.68         13.36         65.41         150           17232         50.19         -18.11         68.3         54.11         42.68         16.03         62.63         150           11570         43.12         -30.88         74         55.58         39.49         13.44         65.39         150           17352         47.34         -20.96         68.3         50.63         43.32         16.09         62.7         150           11570         42.13         -31.87         74         54.59         39.49         13.44         65.39         150           17352         49.08         -19.22         68.3         52.37         43.32         16.09         62.7         150	(MHz)         (dBμV/m)         Limit (dB)         Line (dBμV/m)         Level (dBμV)         Factor (dB/m)         Loss (dB)         Factor (dB)         Pos (deg)           11490         43.42         -30.58         74         55.79         39.68         13.36         65.41         150         0           17232         -48.52         -19.78         68.3         52.44         42.68         16.03         62.63         150         360           11490         44.53         -29.47         74         56.9         39.68         13.36         65.41         150         360           17232         50.19         -18.11         68.3         54.11         42.68         16.03         62.63         150         0           11570         43.12         -30.88         74         55.58         39.49         13.44         65.39         150         0           17352         47.34         -20.96         68.3         50.63         43.32         16.09         62.7         150         360           17352         49.08         -19.22         68.3         52.37         43.32         16.09         62.7         150         0           11650         42.11         -31.89	(MHz)         (dBμV/m)         Limit (dB)         Livel (dBμV/m)         Factor (dB/m)         Loss (dB)         Factor (dB)         Pos (dB)         Avg. (P/A)           11490         43.42         -30.58         74         55.79         39.68         13.36         65.41         150         0         P           17232         -48.52         -19.78         68.3         52.44         42.68         16.03         62.63         150         360         P           11490         44.53         -29.47         74         56.9         39.68         13.36         65.41         150         360         P           17232         50.19         -18.11         68.3         54.11         42.68         16.03         62.63         150         0         P           11570         43.12         -30.88         74         55.58         39.49         13.44         65.39         150         0         P           17352         47.34         -20.96         68.3         50.63         43.32         16.09         62.7         150         360         P           17352         49.08         -19.22         68.3         52.37         43.32         16.09         62.7 <td< th=""></td<>

## Remark

Sporton International (Kunshan) Inc.

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<sup>1.</sup> No other spurious found.

<sup>2.</sup> All results are PASS against Peak and Average limit line.

### WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2+3+4		(MHz)	( dBµV/m )	(dB)	( $dB\mu V/m$ )	(dB <sub>µ</sub> V)	( dB/m )	( dB )	( dB )	( cm )	(deg)	(P/A)	(H/V)
802.11n		11510	42.1	-31.9	74	54.45	39.7	13.37	65.42	150	0	Р	Н
HT40		17268	47.11	-21.19	68.3	50.86	42.86	16.04	62.65	150	360	Р	Н
CH 151		11510	42.69	-31.31	74	55.04	39.7	13.37	65.42	150	360	Р	V
5755MHz		17268	49.13	-19.17	68.3	52.88	42.86	16.04	62.65	150	0	Р	V
802.11n		11590	42.27	-31.73	74	54.76	39.44	13.45	65.38	150	0	Р	Н
HT40		17388	47.22	-21.08	68.3	50.32	43.51	16.11	62.72	150	360	Р	Н
CH 159		11590	43.14	-30.86	74	55.63	39.44	13.45	65.38	150	360	Р	V
5795MHz		17388	49.48	-18.82	68.3	52.58	43.51	16.11	62.72	150	0	Р	V

Remark

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<sup>.</sup> No other spurious found.

<sup>2.</sup> All results are PASS against Peak and Average limit line.

#### WIFI 802.11ac VHT80 (Harmonic @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	( dBµV/m )	(dB)	(dBµV/m)	(dB <sub>µ</sub> V)	( dB/m )	( dB )	( dB )	( cm )	(deg)	(P/A)	(H/V)
802.11ac		11550	41.91	-32.09	74	54.35	39.54	13.42	65.4	150	0	Р	Н
VHT80		17328	47.79	-20.51	68.3	51.26	43.14	16.07	62.68	150	360	Р	Н
CH 155		11550	42.23	-31.77	74	54.67	39.54	13.42	65.4	150	360	Р	٧
5775MHz		17328	47.33	-20.97	68.3	50.8	43.14	16.07	62.68	150	0	Р	٧

## Remark

1. No other spurious found.

2. All results are PASS against Peak and Average limit line.

Sporton International (Kunshan) Inc.

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#### WIFI 802.11ax HE 20(Harmonic @ 3m)

Table         Peak           Pos         Avg.           ( deg )         (P/A)           0         P           360         P	
( deg ) (P/A) 0 P	( <b>H/V</b> )
0 P	Н
360 P	Н
360 P	V
0 P	V
0 P	Н
360 P	Н
360 P	V
0 P	V
0 P	Н
360 P	Н
360 P	V
0 P	V
	0 P 360 P 360 P 0 P 0 P 360 P

## Remark

Sporton International (Kunshan) Inc.

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<sup>1.</sup> No other spurious found.

<sup>2.</sup> All results are PASS against Peak and Average limit line.

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## WIFI 802.11ax HE 40 (Harmonic @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant. 1+2+3+4		(MHz)	( dBµV/m )	Limit (dB)	Line ( dBµV/m )	Level ( dBµV )	Factor ( dB/m )	Loss (dB)	Factor (dB)	Pos (cm)		Avg. (P/A)	
802.11ax		11510	42.67	-31.33	74	55.02	39.7	13.37	65.42	150	0	Р	Н
HE 40		17268	46.68	-21.62	68.3	50.43	42.86	16.04	62.65	150	360	Р	Н
CH151		11510	43.32	-30.68	74	55.67	39.7	13.37	65.42	150	360	Р	V
5755MHz		17268	48.07	-20.23	68.3	51.82	42.86	16.04	62.65	150	0	Р	V
802.11ax		11590	42.6	-31.4	74	55.09	39.44	13.45	65.38	150	0	Р	Н
HE 40		17388	47.49	-20.81	68.3	50.59	43.51	16.11	62.72	150	360	Р	Н
CH159		11590	42.28	-31.72	74	54.77	39.44	13.45	65.38	150	360	Р	V
5795MHz		17388	47.01	-21.29	68.3	50.11	43.51	16.11	62.72	150	0	Р	V

Remark

Sporton International (Kunshan) Inc.

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<sup>.</sup> No other spurious found.

<sup>2.</sup> All results are PASS against Peak and Average limit line.

## WIFI 802.11ax HE 80 (Harmonic @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2+3+4		(MHz)	( dBµV/m )	(dB)	( $dB\mu V/m$ )	(dB <sub>µ</sub> V)	( dB/m )	( dB )	( dB )	( cm )	(deg)	(P/A)	(H/V)
802.11ax		11550	42.2	-31.8	74	54.64	39.54	13.42	65.4	150	0	Р	Н
HE 80		17328	47.85	-20.45	68.3	51.32	43.14	16.07	62.68	150	360	Р	Н
CH155		11550	42.04	-31.96	74	54.48	39.54	13.42	65.4	150	360	Р	٧
5775MHz		17328	46.62	-21.68	68.3	50.09	43.14	16.07	62.68	150	0	Р	V

#### Remark

1. No other spurious found.

2. All results are PASS against Peak and Average limit line.

Sporton International (Kunshan) Inc.

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# For ETH6 MIMO mode: Beamforming Mode

#### Band 4 5725~5850MHz

#### WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2+3+4		(MHz)	$(dB\mu V/m)$	(dB)	( $dB\mu V/m$ )	( $dB\mu V$ )	( dB/m )	( dB )	(dB)	( cm )	( deg )	(P/A)	(H/V)
802.11n		11510	41.42	-32.58	74	53.77	39.7	13.37	65.42	100	360	Р	Н
HT40		11510	41.42	-32.30	74	55.11	39.7	13.37	05.42	100	300	Г	
CH 151		11510	41.83	-32.17	74	54.18	39.7	13.37	65.42	100	0	P	V
5755MHz		11310	41.03	-32.17	74	54.10	39.7	13.37	00.42	100	U	Г	V
802.11n		11590	41.86	-32.14	74	54.35	39.44	13.45	65.38	100	360	Р	Н
HT40		11000	41.00	52.14	, ,	J4.55	55.44	10.40	00.00	100	300	ı	11
CH 159		11590	42.81	-31.19	74	55.3	39.44	13.45	65.38	100	0	P	V
5795MHz		11390	42.01	-31.19	74	55.5	39.44	13.43	00.30	100	U		V

#### Remark

. No other spurious found.

2. All results are PASS against Peak and Average limit line.

Sporton International (Kunshan) Inc.

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## WIFI 802.11ac VHT20 (Harmonic @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant. 1+2+3+4		( MHz )	( dBµV/m )	Limit (dB)	Line ( dBµV/m )	Level ( dBµV )	Factor ( dB/m )	Loss (dB)	Factor (dB)	Pos ( cm )	Pos ( deg )	Avg. (P/A)	
802.11ac VHT20		11490	45.4	-28.6	74	57.77	39.68	13.36	65.41	100	360	Р	Н
CH 149 5745MHz		11490	43.97	-30.03	74	56.34	39.68	13.36	65.41	100	0	Р	V
802.11ac VHT20		11570	44.22	-29.78	74	56.68	39.49	13.44	65.39	100	360	Р	Н
CH 157 5785MHz		11570	43.43	-30.57	74	55.89	39.49	13.44	65.39	100	0	Р	V
802.11ac VHT20		11650	42.97	-31.03	74	55.54	39.29	13.5	65.36	100	360	Р	Н
CH 165 5825MHz		11650	42.09	-31.91	74	54.66	39.29	13.5	65.36	100	0	Р	V

#### Remark

Sporton International (Kunshan) Inc.

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<sup>1.</sup> No other spurious found.

<sup>2.</sup> All results are PASS against Peak and Average limit line.

## WIFI 802.11ac VHT80 (Harmonic @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.		( NALL - )	( -ID)// )	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2+3+4		(MHz)	( dBµV/m )	(dB)	( dBµV/m )	(dB <sub>µ</sub> V)	( dB/m )	( dB )	( dB )	(cm)	(deg)	(P/A)	(H/V)
802.11ac		11550	42.77	-31.23	74	55.21	39.54	13.42	65.4	100	360	P	Н
VHT80		11330	42.77	-31.23	74	33.21	39.34	13.42	05.4	100	300	Г	
CH 155		11550	42.67	-31.33	74	55.11	39.54	13.42	65.4	100	0	Þ	V
5775MHz		11330	42.07	-31.33	74	JJ.11	39.54	13.42	03.4	100	U	۲	V

## Remark

No other spurious found.

2. All results are PASS against Peak and Average limit line.

Sporton International (Kunshan) Inc.

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#### WIFI 802.11ax HE 20 (Harmonic @ 3m)

						(1.10.11)							
WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2+3+4		(MHz)	( dBµV/m )	(dB)	( dBµV/m )	(dB <sub>µ</sub> V)	( dB/m )	( dB )	( dB )	( cm )	(deg)	(P/A)	(H/V)
802.11ax		11490	43.18	-30.82	74	55.55	39.68	13.36	65.41	100	360	Р	Н
HE 20		11490	43.10	-30.62	74	55.55	39.00	13.30	05.41	100	300	Г	П
CH 149		44.400	44.00	00.04	7.4	50.40	20.00	40.00	05.44	400	0	_	
5745MHz		11490	44.06	-29.94	74	56.43	39.68	13.36	65.41	100	0	Р	V
802.11 ax		11570	42.24	-31.76	74	54.7	39.49	13.44	65.39	100	360	Р	Н
HE 20		11370	42.24	-31.70	74	54.7	39.49	13.44	05.59	100	300	Г	П
CH 157		11570	41.7	20.2	74	E4 16	20.40	10 11	65.39	100	0	Р	V
5785MHz		11570	41.7	-32.3	74	54.16	39.49	13.44	65.39	100	U	P	V
802.11 ax		11650	42.83	-31.17	74	55.4	39.29	13.5	65.36	100	360	Р	Н
HE 20		11030	42.03	-31.17	74	33.4	39.29	13.3	00.00	100	300	Г	- ' '
CH 165		11650	43.56	-30.44	74	56.13	39.29	13.5	65.36	100	0	Р	V
5825MHz		11000	43.30	-30.44	/4	30.13	39.29	13.5	05.30	100	U	P	V
			1	1				1	l	1	1	1	1

#### Remark

Sporton International (Kunshan) Inc.

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<sup>1.</sup> No other spurious found.

<sup>2.</sup> All results are PASS against Peak and Average limit line.

#### WIFI 802.11 ax HE 40 (Harmonic @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant. 1+2+3+4		(MHz)	( dBµV/m )	Limit (dB)	Line ( dBµV/m )	Level ( dBµV )	Factor ( dB/m )	Loss (dB)	Factor ( dB )	Pos ( cm )	Pos ( deg )	Avg.	
802.11 ax HE 40		11510	42.16	-31.84	74	54.51	39.7	13.37	65.42	100	360	P	Н
CH 151 5755MHz		11510	42.91	-31.09	74	55.26	39.7	13.37	65.42	100	0	Р	V
802.11 ax HE 40		11590	43.47	-30.53	74	55.96	39.44	13.45	65.38	100	0	Р	Н
CH 159 5795MHz		11590	42.42	-31.58	74	54.91	39.44	13.45	65.38	100	360	Р	V

# Remark

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<sup>.</sup> No other spurious found.

<sup>2.</sup> All results are PASS against Peak and Average limit line.

#### WIFI 802.11 ax HE 80 (Harmonic @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant. 1+2+3+4		(MHz)	( dBµV/m )	Limit (dB)	Line ( dBµV/m )	Level	Factor ( dB/m )	Loss (dB)	Factor ( dB )	Pos ( cm )	Pos ( deg )	Avg. (P/A)	
802.11 ax HE 80		11550	42.96	-31.04	,	55.4	39.54	13.42	65.4	100	0	Р	Н
CH 155 5775MHz		11550	42.48	-31.52	74	54.92	39.54	13.42	65.4	100	360	Р	V

#### Remark

1. No other spurious found.

2. All results are PASS against Peak and Average limit line.

Sporton International (Kunshan) Inc.

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#### 15E Emission below 1GHz

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant. 1		( MHz )	( dBµV/m )	Limit (dB)	Line ( dBµV/m )	Level ( dBµV )	Factor ( dB/m )	Loss (dB)	Factor (dB)	Pos (cm)		Avg. (P/A)	
		39.7	23.28	-16.72	40	34.84	19.7	0.7	31.96	-	-	Р	Н
		79.47	26.99	-13.01	40	44.24	13.62	1.06	31.93	-	-	Р	Н
		100.81	33.11	-10.39	43.5	47.66	16.22	1.16	31.93	100	0	Р	Н
		113.42	30.82	-12.68	43.5	45.05	16.47	1.23	31.93	-	-	Р	Н
		189.08	32.05	-11.45	43.5	46.83	15.55	1.58	31.91	-	-	Р	Н
		884.57	25.04	-20.96	46	23.95	29.23	3.42	31.56	-	-	Р	Н
LF		55.22	36.3	-3.7	40	54.4	13	0.85	31.95	100	0	Р	V
		74.62	31.71	-8.29	40	49.4	13.2	1.01	31.9	-	-	Р	V
		127	33.1	-10.4	43.5	47.02	16.74	1.28	31.94	-	-	Р	V
		176.47	27.86	-15.64	43.5	42.16	16.09	1.53	31.92	-	-	Р	V
		751.68	23.83	-22.17	46	24.44	28.49	3.15	32.25	-	-	Р	V
		930.16	25.47	-20.53	46	22.91	30.23	3.51	31.18	-	-	Р	V

# Remark

Sporton International (Kunshan) Inc.

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<sup>1.</sup> No other spurious found.

<sup>2.</sup> All results are PASS against Peak and Average limit line.

## Note symbol

*	Fundamental Frequency which can be ignored. However, the level of any
	unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is <b>over limit</b> line.
P/A	Peak or Average
H/V	Horizontal or Vertical

Sporton International (Kunshan) Inc.

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#### A calculation example for radiated spurious emission is shown as below:

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WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	( dBµV/m )	(dB)	(dBµV/m)	(dB <sub>µ</sub> V)	( dB/m )	( dB )	( dB )	( cm )	(deg)	(P/A)	(H/V)
802.11b		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	Р	Н
CH 01													
2412MHz		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	Α	Н

1. Level( $dB\mu V/m$ ) =

Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBµV) - Preamp Factor(dB)

2. Over Limit(dB) = Level(dB $\mu$ V/m) – Limit Line(dB $\mu$ V/m)

#### For Peak Limit @ 2390MHz:

- 1. Level(dBµV/m)
- = Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBµV) Preamp Factor(dB)
- $= 32.22(dB/m) + 4.58(dB) + 54.51(dB\mu V) 35.86 (dB)$
- $= 55.45 (dB\mu V/m)$
- 2. Over Limit(dB)
- = Level(dBµV/m) Limit Line(dBµV/m)
- $= 55.45(dB\mu V/m) 74(dB\mu V/m)$
- = -18.55(dB)

#### For Average Limit @ 2390MHz:

- 1. Level(dBµV/m)
- = Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBµV) Preamp Factor(dB)
- $= 32.22(dB/m) + 4.58(dB) + 42.6(dB\mu V) 35.86 (dB)$
- $= 43.54 (dB\mu V/m)$
- 2. Over Limit(dB)
- = Level( $dB\mu V/m$ ) Limit Line( $dB\mu V/m$ )
- $= 43.54(dB\mu V/m) 54(dB\mu V/m)$
- = -10.46(dB)

Both peak and average measured complies with the limit line, so test result is "PASS".

 Sporton International (Kunshan) Inc.
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Appendix D. Duty Cycle Plots

# **CDD Mode**

Antenna	Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
1	802.11a for ETH6	95.39	2.070	0.483	1kHz
1	802.11n HT20 for ETH6	95.07	1.930	0.518	1kHz
1	802.11n HT40 for ETH6	33.33	0.350	2.857	3kHz
1	802.11ac VHT20 for ETH6	98.48	-	-	10Hz
1	802.11ac VHT40 for ETH6	96.97	0.960	1.042	3kHz
1	802.11ac VHT80 for ETH6	94.69	0.464	2.155	3kHz
1	802.11ax HE20 for ETH6	98.29	-	-	10Hz
1	802.11ax HE40 for ETH6	96.29	0.778	1.285	3kHz
1	802.11ax HE80 for ETH6	92.20	0.402	2.488	3kHz
1	802.11ax HE160 for ETH6	87.00	0.252	3.966	10kHz
1+2+3+4	802.11a for ETH6	94.52	2.070	0.483	1kHz
1+2+3+4	802.11n HT20 for ETH6	95.07	1.930	0.518	1kHz
1+2+3+4	802.11n HT40 for ETH6	90.48	0.950	1.052	3kHz
1+2+3+4	802.11ac VHT20 for ETH6	98.47	-	-	10Hz
1+2+3+4	802.11ac VHT40 for ETH6	96.97	0.960	1.042	3kHz
1+2+3+4	802.11ac VHT80 for ETH6	94.69	0.464	2.155	3kHz
1+2+3+4	802.11ax HE20 for ETH6	98.29	-	-	10Hz
1+2+3+4	802.11ax HE40 for ETH6	96.07	0.782	1.279	3kHz
1+2+3+4	802.11ax HE80 for ETH6	92.69	0.406	2.463	3kHz
1+2+3+4	802.11ax HE160 for ETH6	86.14	0.252	3.966	10kHz

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# FCC RF Test Report

# **Beamforming Mode**

Antenna	Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
1+2+3+4	802.11n HT20 for ETH6	95.88	5.391	0.185	300Hz
1+2+3+4	802.11n HT40 for ETH6	95.38	5.391	0.185	300Hz
1+2+3+4	802.11ac VHT20 for ETH6	95.36	5.362	0.186	300Hz
1+2+3+4	802.11ac VHT40 for ETH6	94.45	5.420	0.184	300Hz
1+2+3+4	802.11ac VHT80 for ETH6	94.92	5.420	0.184	300Hz
1+2+3+4	802.11ax HE20 for ETH6	94.71	5.188	0.193	300Hz
1+2+3+4	802.11ax HE40 for ETH6	93.91	5.362	0.186	300Hz
1+2+3+4	802.11ax HE80 for ETH6	94.42	5.391	0.185	300Hz

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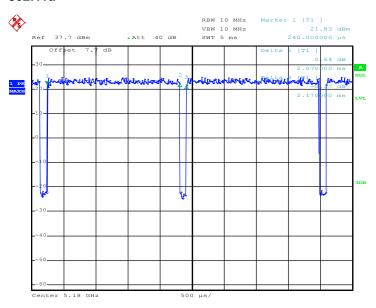
Report No.: FR921502C



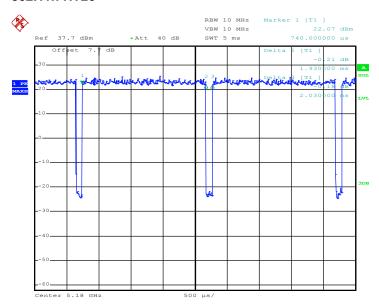
#### <ETH6>

# <Ant. 1>

#### 802.11a



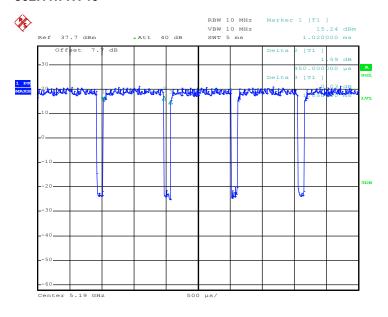
#### 802.11n HT20



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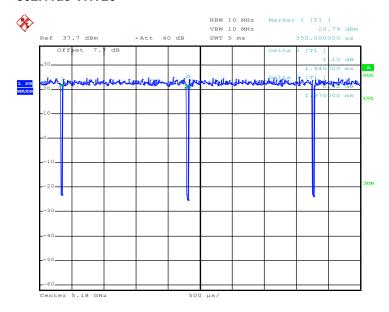
Report No.: FR921502C

# 802.11n HT40



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# 802.11ac VHT20

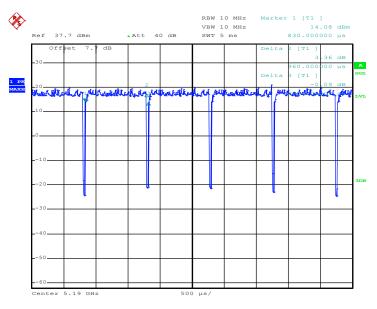


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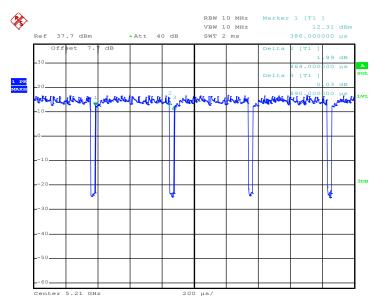
TEL: +86-512-57900158 FAX: +86-512-57900958 FCC ID: WBV-AP650X Page Number : D4 of D16
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# 802.11ac VHT40



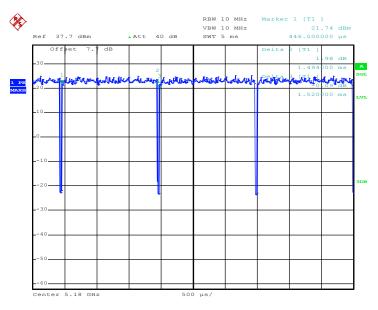
# 802.11ac VHT80



TEL: +86-512-57900158 FAX: +86-512-57900958 FCC ID: WBV-AP650X Page Number : D5 of D16
Report Issued Date : Aug. 12, 2019
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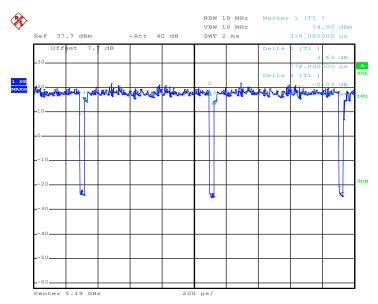


# 802.11ax HE20



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# 802.11ax HE40

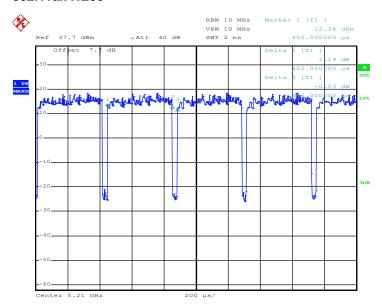


Sporton International (Kunshan) Inc.

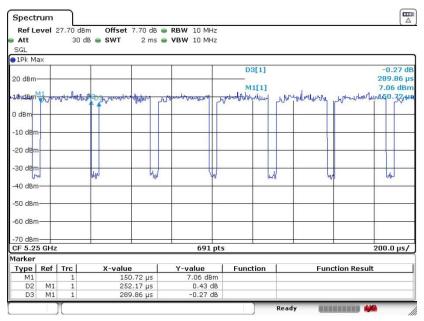
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# 802.11ax HE80



# 802.11ax HE160



Date: 9.JUL.2019 15:35:41

Sporton International (Kunshan) Inc.

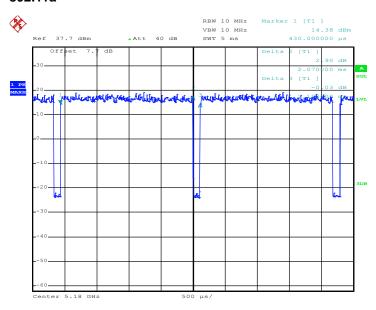
TEL: +86-512-57900158 FAX: +86-512-57900958 FCC ID: WBV-AP650X Page Number : D7 of D16
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FCC RF Test Report Report No.: FR921502C

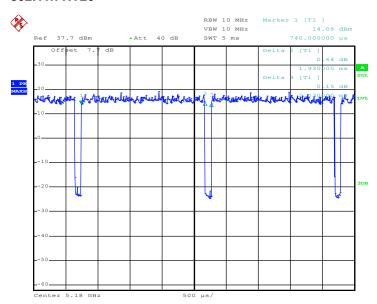
#### **CDD Mode**

# MIMO <Ant. 1+2+3+4>

#### 802.11a



#### 802.11n HT20

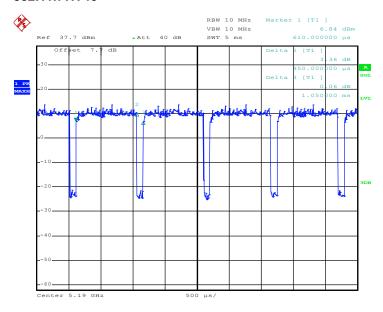


Sporton International (Kunshan) Inc.

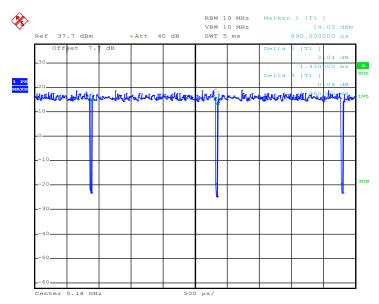
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# 802.11n HT40



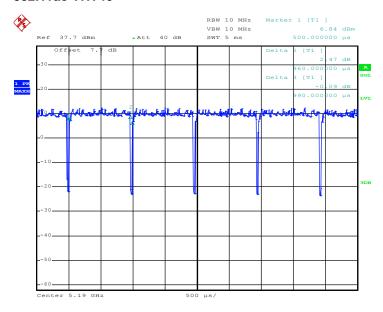
# 802.11ac VHT20



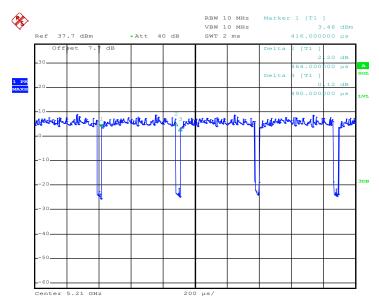
TEL: +86-512-57900158 FAX: +86-512-57900958 FCC ID: WBV-AP650X Page Number : D9 of D16
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# 802.11ac VHT40



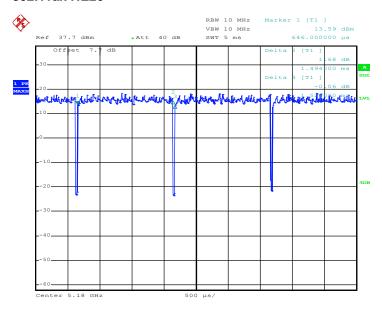
# 802.11ac VHT80



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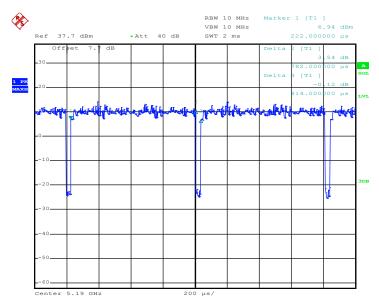


# 802.11ax HE20



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# 802.11ax HE40

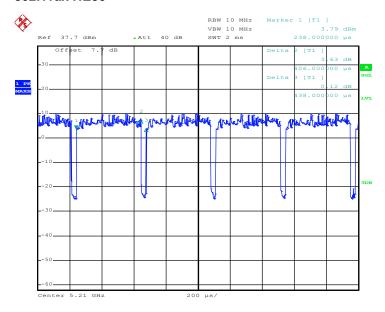


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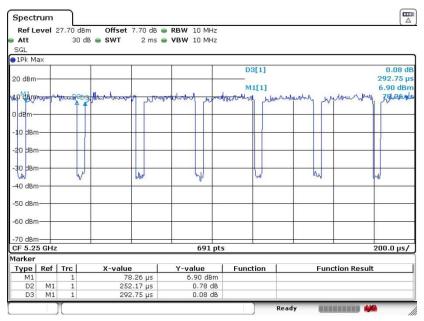
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# 802.11ax HE80



# 802.11ax HE160



Date: 9.JUL.2019 15:36:23

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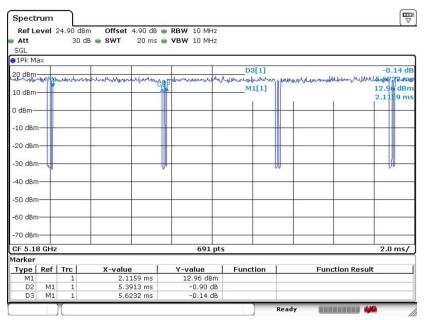


# **Beamforming Mode**

#### <ETH6>

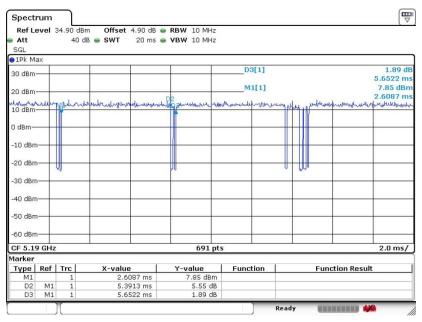
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#### 802.11n HT20



Date: 16.MAY.2019 22:34:35

#### 802.11n HT40



Date: 17.MAY.2019 10:36:23

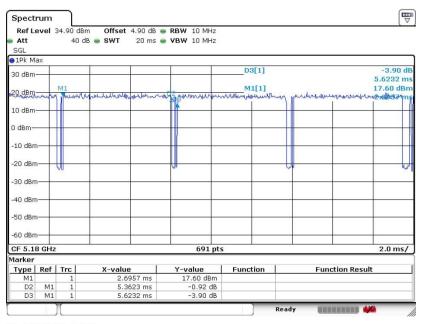
Sporton International (Kunshan) Inc.

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Page Number : D13 of D16 Report Issued Date : Aug. 12, 2019 Report Version : Rev. 01

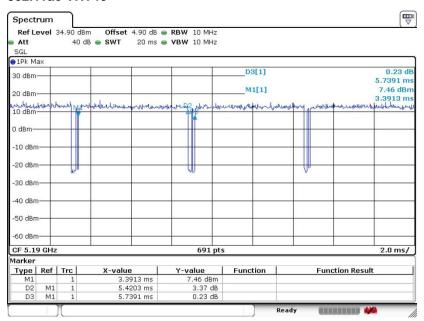


# 802.11ac VHT20



Date: 17.MAY.2019 10:40:10

#### 802.11ac VHT40



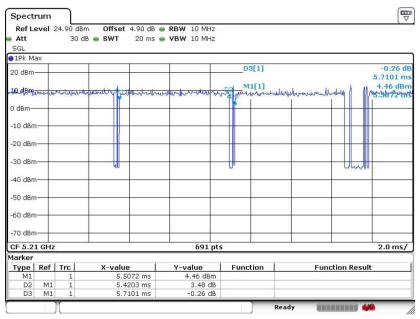
Date: 17.MAY.2019 10:44:05

Sporton International (Kunshan) Inc.

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Report Issued Date : Aug. 12, 2019
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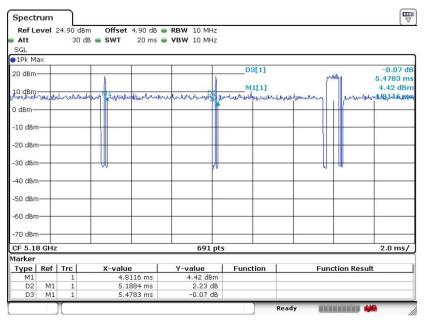


# 802.11ac VHT80



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# 802.11ax HE20



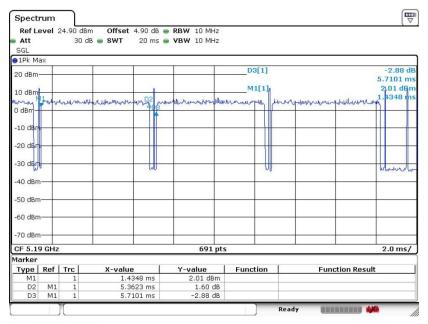
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Sporton International (Kunshan) Inc.

TEL: +86-512-57900158 FAX: +86-512-57900958 FCC ID: WBV-AP650X Page Number : D15 of D16
Report Issued Date : Aug. 12, 2019
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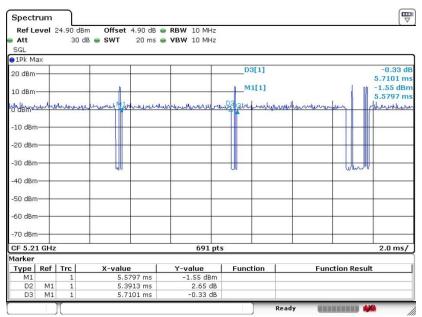


#### 802.11ax HE40



Date: 17.MAY.2019 14:28:59

#### 802.11ax HE80



Date: 17.MAY.2019 14:23:30

Sporton International (Kunshan) Inc.

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