

## MEASUREMENT REPORT

### FCC PART15.407 / ISED RSS-247 WLAN(802.11n(20/40MHz)) – 5GHz Band

<b>Applicant Name:</b> Stem Innovation, LLC dBa Iconoscope, LLC 21 G Street, Salt Lake City, UT 84102 USA		<b>Date of Issue :</b> 11/27/2017 <b>Test Site/Location:</b> EMCE ENGINEERING 1726 Ringwood Avenue, San Jose, CA 95131 USA <b>Report No.:</b> 4325-3 <b>EMCE FRN:</b> 0007198120
<b>FCC ID :</b> <b>IC :</b>	<b>YM780-9500</b> <b>9637A-809500</b>	
<b>Application Type</b>	Certification	
<b>Model:</b>	80-9500	
<b>Additional Model(s):</b>	N/A	
<b>EUT Type:</b>	IP Camera	
<b>Max. RF Output Power:</b>	UNII-1 802.11n-20 MHz BW (7.12 dBm), UNII-1 802.11n-40 MHz BW 3.99 dBm) UNII-2A 802.11n-20 MHz BW (8.32 dBm), UNII-2A 802.11n-40 MHz BW (3.92 dBm), UNII-2C 802.11n-20 MHz BW (10.49 dBm), UNII-2C 802.11n-40 MHz BW (6.27 dBm), UNII-3 802.11n-20 MHz BW (10.89 dBm), UNII-3 802.11n-40 MHz BW (6.40 dBm)	
<b>Frequency Range:</b>	5180 MHz – 5240 MHz(UNII-1) / 5260 MHz – 5320 MHz(UNII-2A) / 5500 MHz – 5720 MHz(UNII-2C) / 5745 MHz – 5825 MHz(UNII-3)	
<b>Modulation type</b>	OFDM (802.11n(20/40MHz))	
<b>FCC Classification</b>	Unlicensed National Information Infrastructure (NII)	
<b>FCC Rule Part(s):</b> <b>ISED Rule Part(s):</b>	Part 15.407 RSS-247 Issue 2(Feb. 2017) / RSS-GEN Issue 4 (Nov. 2014)	
<b>Test Procedure(s):</b>	ANSI C63.10-2013 / KDB 789033 D02(05/02/2017)	
The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this Equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. <b>EMCE Engineering</b> Certifies that no party to this application has subject to a denial of Federal benefits that includes FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998,21 U.S. C.853(a)		
 Report prepared by : Amy Jones Administrative Assistant, <b>EMCE Engineering</b>		
 Approved by : Bob Cole <b>President</b> <b>EMCE Engineering</b>		
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FCC PT.15.407 TEST REPORT	FCC Part 15.407 WLAN(802.11n(20/40MHz)) – 5GHz Test Report	
Test Report No. 4325-3	Date of Issue: 11/27/2017	EUT : IP Camera
		IC : 9637A-809500

## Version

TEST REPORT NO.	DATE	DESCRIPTION
4325-3	11/27/17	- First Approval Report

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## 1. GENERAL INFORMATION

<b>Applicant</b>	Stem Innovation, LLC dBa Iconoscope, LLC
<b>Applicant Address</b>	21 G Street, Salt Lake City, UT 84102 USA
<b>FCC ID</b>	YM780-9500
<b>EUT Type</b>	IP Camera
<b>Model name(s)</b>	80-9500
<b>Additional Model name(s):</b>	N/A
<b>Date(s) of Tests:</b>	07/10/2017 – 10/05/2017
<b>Place of Tests:</b>	EMCE ENGINEERING 1726 Ringwood Avenue, San Jose, CA 95131 USA

## 2. EUT DESCRIPTION

<b>EUT Type</b>	IP Camera
<b>Model Name</b>	80-9500
<b>Additional Model Name(s)</b>	N/A
<b>Power Supply</b>	DC 5.0 vdc
<b>Battery type</b>	Li-ion Battery(Standard)
<b>Frequency Range(TX/RX)</b>	5180 - 5240 MHz (UNII-1 Band - 20 / 40 MHz), 5260 - 5320 MHz (UNII-2A Band - 20 / 40 MHz), 5500 - 5720 MHz (UNII-2C Band - 20 / 40 MHz), 5745 - 5825 MHz (UNII-3 Band - 20 / 40 MHz)
<b>Max. RF Output Power</b>	UNII-1 802.11n-20 MHz BW (5.62 dBm), UNII-1 802.11n-40 MHz BW (7.32 dBm) UNII-2A 802.11n-20 MHz BW (8.32 dBm), UNII-2A 802.11n-40 MHz BW (6.77 dBm), UNII-2C 802.11n-20 MHz BW (10.49 dBm), UNII-2C 802.11n-40 MHz BW (6.53 dBm), UNII-3 802.11n-20 MHz BW (10.89 dBm), UNII-3 802.11n-40 MHz BW (6.37 dBm)
<b>Modulation Type</b>	OFDM(802.11n(20/40MHz))
<b>Antenna Specification</b>	Manufacturer: MOLEX Antenna type : 5 GHz Balance Flex Antenna 1461530100 Peak Gain : 4.75 dBi

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## 3. TEST METHODOLOGY

The measurement procedure described in FCC KDB 789033 D02 General UNII Test Procedures v01r04 dated May 2, 2017 entitled “ Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part15, Subpart E” and ANSI C63.10-2013 ‘the American National Standard for Testing Unlicensed Wireless Devices’ were used in the measurement.

For 802.11ac, KDB644545 D03 v01 dated August 14, 2014 if applicable.

### 3.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

### 3.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.407 under the FCC Rules Part 15 Subpart E.

### 3.3 GENERAL TEST PROCEDURES

#### Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2 of ANSI C63.10. (Version : 2013) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

#### Radiated Emissions

The EUT is placed on the turntable which is 0.8 m height from the ground floor for below 1GHz. And the EUT is placed on the turntable which is 1.5m height from the ground floor for above 1GHz with absorbers between the EUT and receive antenna. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 8 of ANSI C63.10 (Version: 2013). To record the final measurements, the analyzer detector function was set to CISPR quasi-peak mode and the bandwidth of the spectrum analyzer was set to 120 kHz for frequencies below 1 GHz or 1 MHz for frequencies above 1 GHz. For average measurements above 1 GHz, the analyzer was set to peak detector with a reduced VBW setting(RBW = 1 MHz, VBW = 1/T Hz, where T = Pulse width).

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### Conducted Antenna Terminal

See Section from 8.1 to 8.4.(KDB 789033 D02 v01r04)

### 3.4 DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Channel low, mid and high with highest data rate (worst case) is chosen for full testing.

## 4. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipments, which is traceable to recognized national standards

## 5. FACILITIES AND ACCREDITATIONS

### 5.1 FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at 1726 Ringwood Avenue, San Jose, CA 95131 USA. The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2014) and CISPR Publication 22. Detailed description of test facility has been accredited by NVLAP, designated by NIST(US0125)

### 5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

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## 6. ANTENNA REQUIREMENTS

### According to FCC 47 CFR §15.203:

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can 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 antenna is a Flex Antenna attached to the PCB using a uFL connector and 4" cable.

\*The E.U.T Complies with the requirement of §15.203

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## 7. SUMMARY OF TEST RESULTS

[FCC Part]

Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
26 dB BW	15.407 (for Power Measurement)	N/A		
6 dB Bandwidth	§15.407(e)	> 500 kHz (5725 – 5850 MHz)		PASS
Maximum Conducted Output Power	§15.407(a)(1)	5150 – 5250MHz <250 mW, 5250 – 5350 MHz and 5470 – 5725 MHz <250 mW or $11 + 10 \log \log_{10}$ (BW)dBm, 5725 – 5850 MHz <1 W	CONDUCTED	PASS
Peak Power Spectral Density	§15.407(a)(1)(5)	5150-5250 MHz, 5250 – 5350 MHz, 5470 – 5725 MHz: -11 dBm / MHz 5725- 5850: <30 dBm / 500 kHz		PASS
Frequency Stability	§15.407(g)	N/A		PASS
AC Power line Conducted Emissions	§15.207	15.207 Limits		N/A
Undesirable Emissions	§15.407(b)	-27 dBm / MHz EIRP (UNII 1, 2A, 2C) Cf. Section 9.7.1(UNII 3)		PASS
General Field Strength Limits(Restricted Bands and Radiated Emissions)	§15.205, 15.407(b)(5)(6)	Emissions in the restricted band must meet the limits detailed in 15.209	RADIATED	PASS

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**[ISED Part]**

<b>Test Description</b>	<b>FCC Part Section(s)</b>	<b>Test Limit</b>	<b>Test Condition</b>	<b>Test Result</b>
99% Bandwidth	RSS-Gen, 6.6	N/A		PASS
6 dB Bandwidth	RSS-247, 6.2.4.1	> 500 kHz (5725 – 5850 MHz)		PASS
Maximum Conducted Output Power	RSS-247, 6.2	<250 mW or 11 + 10 log log <sub>10</sub> (BW)dBm (5250 – 5350MHz) <250 mW or 11 + 10 log log <sub>10</sub> (BW)dBm (5470 – 5600 MHz, 5650 – 5725 MHz) Whichever power is less		PASS
	RSS-247, 6.2.4.1	<1 W (5725 – 5850 MHz)		
Maximum e.i.r.p.	RSS-247, 6.2	<200 mW or 10 + 10 log log <sub>10</sub> (BW)dBm (5150 – 5250MHz) <1 W or 17 + 10 log log <sub>10</sub> (BW)dBm (5250 – 5350 MHz) <1 W or 17 + 10 log log <sub>10</sub> (BW)dBm (5470 – 5725 MHz) Whichever power is less	CONDUCTED	PASS
Peak Power Spectral Density	RSS-247, 6.2	<10 dBm / MHz(e.i.r.p.) (5150-5250 MHz) <11 dBm / MHz(Conducted) (5250-5350 MHz, 5470 – 5600 MHz, 5650 – 5725 MHz)		PASS
	RSS-247, 6.2.4.1	<30 dBm/500KHz(Conducted) (5725-5850 MHz)		
AC Power line Conducted Emissions	RSS-Gen, 8.8	RSS-Gen section 8.8 table 3		PASS
	RSS-247, 6.2.1.2	26 dBc at 5150-5350 MHz		PASS
Undesirable Emissions	RSS-247, 6.2	<-27 dBm / MHz EIRP (UNII 1, 2A, 2C)		PASS
	RSS-247, 6.2.4.2	Cf. Section 9.7.1(UNII 3)		PASS
General Field Strength Limits(Restricted Bands and Radiated Emissions)	RSS-Gen, 8.9 and 8.10	RSS-Gen section 8.9 table 4,5 and Section 8.10 table 6	RADIATED	PASS

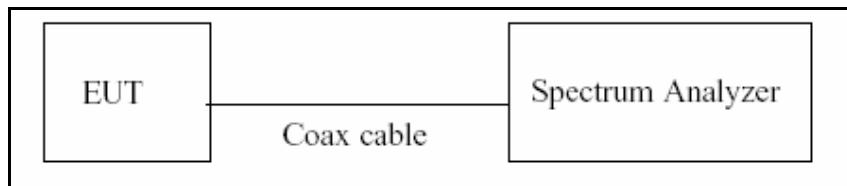
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## 8. TEST RESULT

### 8.1 DUTY CYCLE

The zero-span mode on a spectrum analyzer or EMI receiver ,if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set RBW  $\geq$  EBW if possible; otherwise, set RBW to the largest available value. Set VBW  $\geq$  RBW. Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are  $> 50/T$ , where  $T$  is defined in section B)1)a), and the number of sweep points across duration  $T$  exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if  $T \leq 16.7$  microseconds.)

#### ■ TEST CONFIGURATION



#### ■ TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer. We tested according to the zero-span measurement method, (B.2 in KDB 789033 D02 v01r04)

The largest available value of RBW is 8 MHz and VBW is 50 MHz. The zero-span method of measuring duty cycle shall not be used if  $T \leq 6.25$  microseconds. ( $50/6.25 = 8$ )

The zero-span method was used because all measured T data are  $> 6.25$  microseconds and both RBW and VBW are  $> 50/T$ .

1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz ( $\geq$  RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep  $> 100$
6. Trace mode = Clear write
7. Measure  $T_{total}$  and  $T_{on}$
8. Calculate Duty Cycle =  $T_{on}/ T_{total}$  and Duty Cycle Factor =  $10 * \log(1/\text{Duty Cycle})$

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**Duty Cycle Factor**

Mode	T <sub>on</sub> (ms)	T <sub>total</sub> (ms)	Duty Cycle	Duty Cycle Factor(dB)
<b>802.11n_20 MHz BW</b>	-	-	-	-
<b>802.11n_40 MHz BW</b>	-	-	-	-

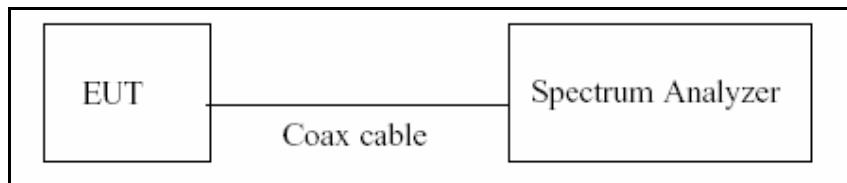
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## 8.2 EMISSION BANDWIDTH AND MINIMUM EMISSION BANDWIDTH MEASUREMENT

The bandwidth at 26 dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating at its maximum power control level, as defined in KDB 789033 D02 v01r04, at the appropriate frequencies. The spectrum analyzer's bandwidth measurement function is configured to measure the 26 dB bandwidth.

The 26 dB bandwidth is used to determine the conducted power limits.

### ■ TEST CONFIGURATION



### ■ TEST PROCEDURE (26dB Bandwidth)

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to( C.1 in KDB 789033 D02 v01r04)

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

Note : 1) We tested 26dB bandwidth using the automatic bandwidth measurement capability of a spectrum analyzer. X dB is set to 26dB.  
 2) In order to simplify the test report, attached plots were only for the widest channel.  
 3) DFS test channels should be defined. So we performed the OBW test to prove that no part of the fundamental emissions of any channels belong to UNII 1 and UNII 3 band for DFS.

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## █ TEST PROCEDURE (for the band 5.725 – 5.85 GHz, 6dB Bandwidth)

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to( C.1 in KDB 789033 D02 v01r04)

1. RBW = 100 kHz
2. VBW  $\geq$  3\*RBW
3. Detector = Peak
4. Trace mode = max hold
5. Allow the trace to stabilize
6. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Note : We tested 6dB bandwidth using the automatic bandwidth measurement capability of a spectrum analyzer. X dB is set to 6dB.

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## TEST RESULTS

20 MHz BW

Conducted 26 dB Bandwidth Measurements for 802.11n

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5180	36	18.89	N/A	Pass
5200	40	18.82	N/A	Pass
5240	48	18.87	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11n

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5260	52	18.77	N/A	Pass
5300	60	18.87	N/A	Pass
5320	64	18.72	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11n

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5500	100	18.77	N/A	Pass
5580	116	18.97	N/A	Pass
5700	144	18.92	N/A	Pass

Conducted 6 dB Bandwidth Measurements for 802.11n

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	17.62	N/A	Pass
5805	161	17.62	N/A	Pass
5825	165	17.60	N/A	Pass

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**40 MHz BW**
**Conducted 26 dB Bandwidth Measurements for 802.11n**

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5190	38	39.77	N/A	Pass
5230	46	39.51	N/A	Pass

**Conducted 26 dB Bandwidth Measurements for 802.11n**

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5270	54	39.43	N/A	Pass
5310	62	39.43	N/A	Pass

**Conducted 26 dB Bandwidth Measurements for 802.11n**

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5510	102	40.35	N/A	Pass
5550	110	40.59	N/A	Pass
5670	142	44.09	N/A	Pass

**Conducted 26 dB Bandwidth Measurements for 802.11n**

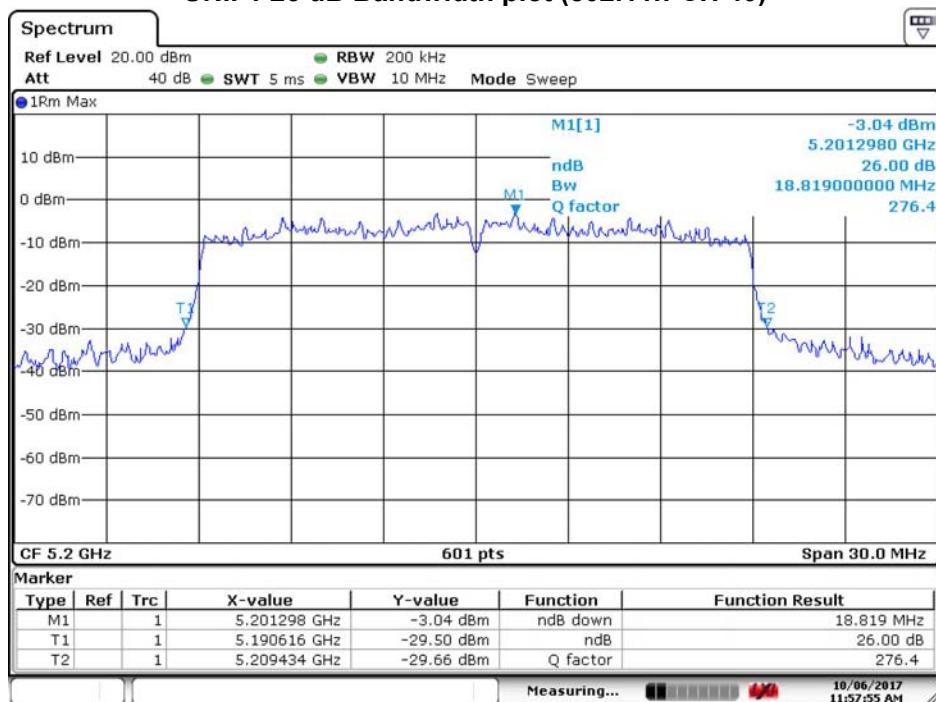
802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	42.76	N/A	Pass
5795	159	42.01	N/A	Pass

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□ RESULT PLOTS

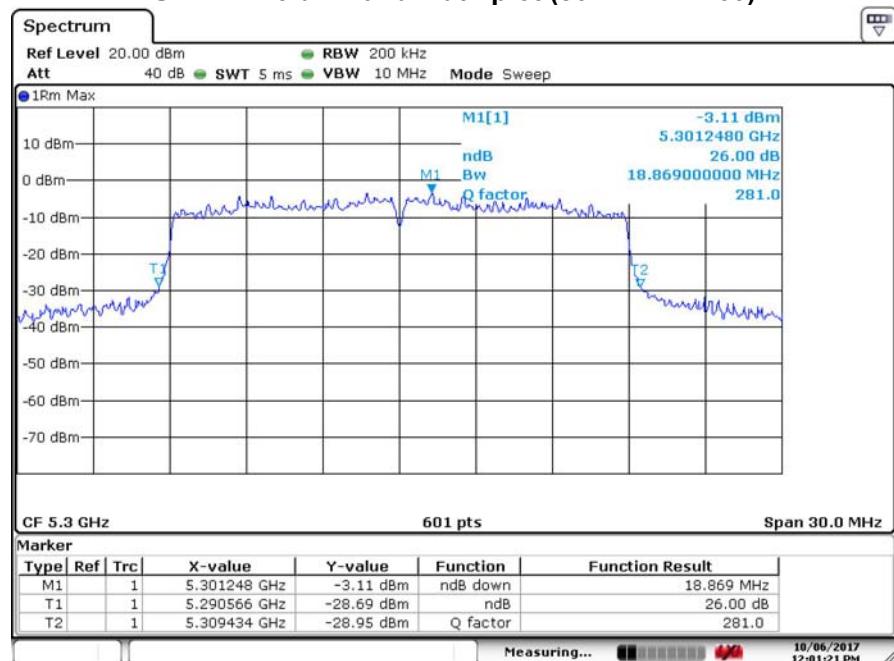
20 MHz BW

UNII-1 26 dB Bandwidth plot (802.11n-CH 40)



Date: 6.OCT.2017 11:57:56

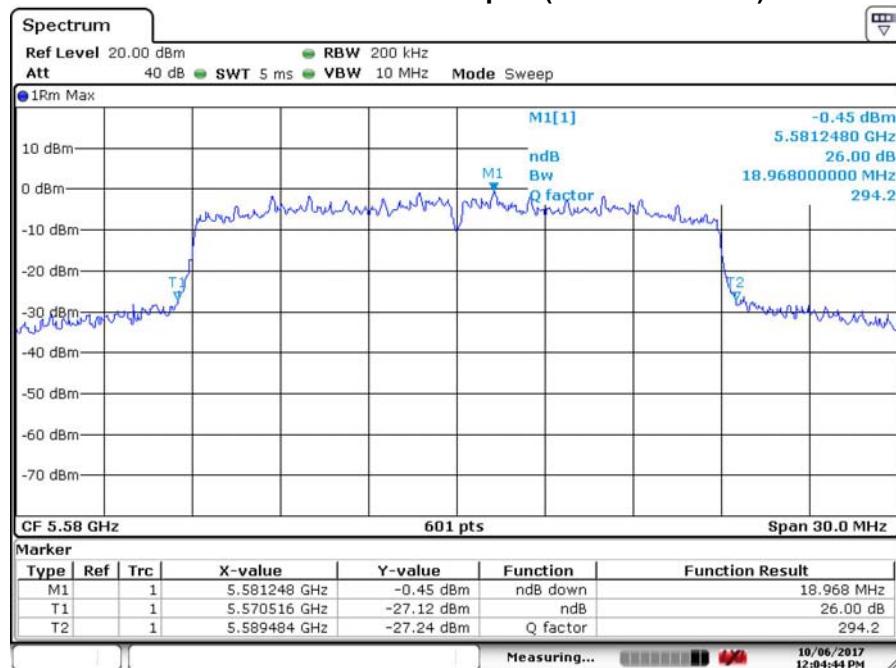
UNII-2A 26 dB Bandwidth plot (802.11n-CH 60)



Date: 6.OCT.2017 12:01:21

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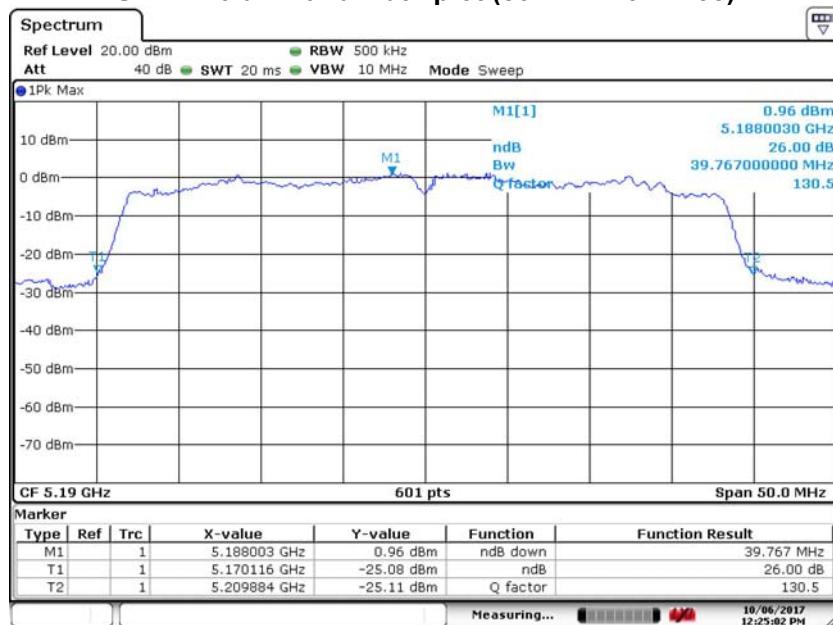
**UNII-2C 26 dB Bandwidth plot (802.11n-CH 116)**



Date: 6.OCT.2017 12:04:44

**40 MHz BW**

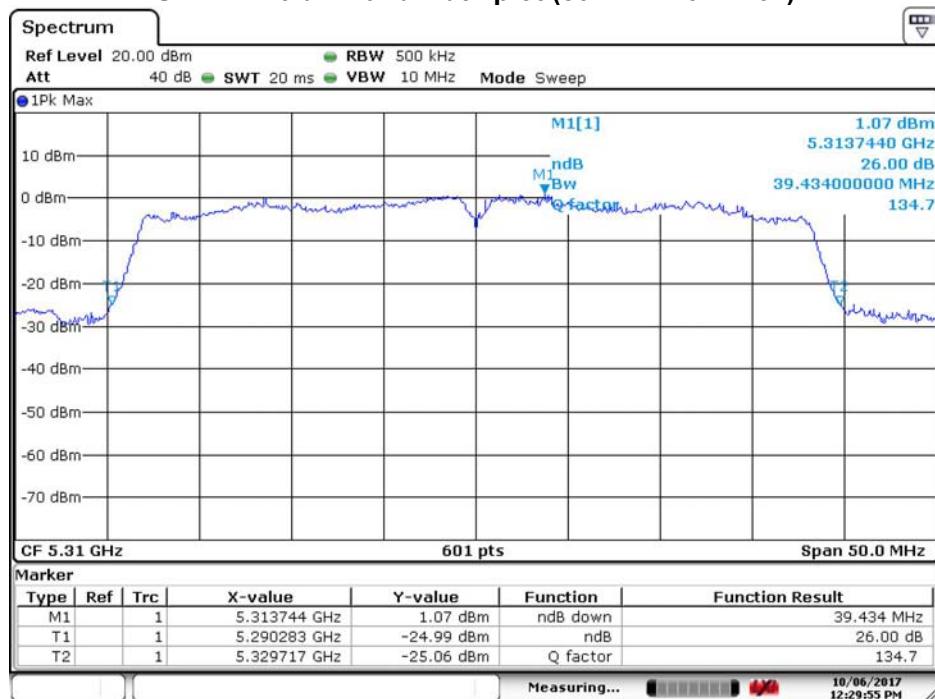
**UNII-1 26 dB Bandwidth plot (802.11n 40 CH 38)**



Date: 6.OCT.2017 12:25:02

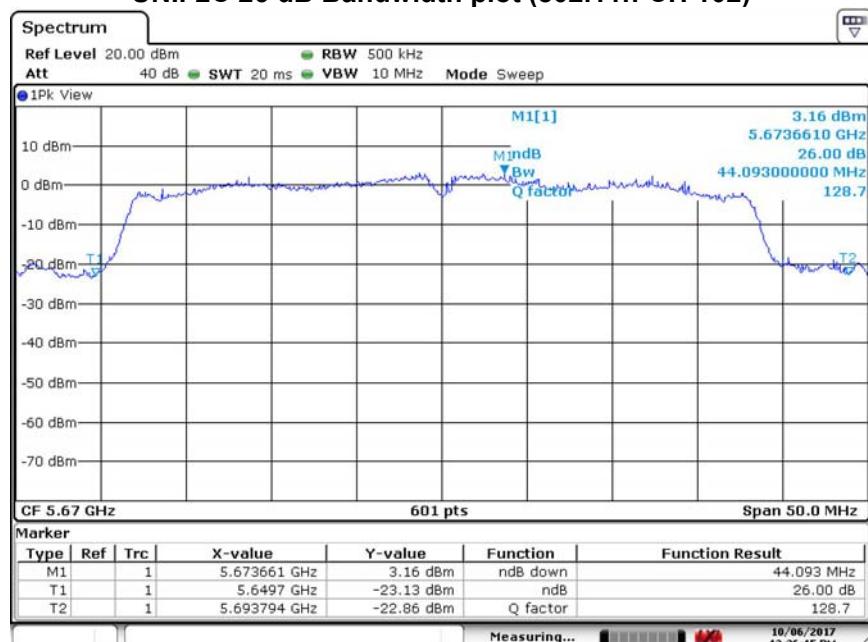
FCC PT.15.407 TEST REPORT	FCC Part 15.407 WLAN(802.11n(20/40MHz)) – 5GHz Test Report		FCC ID : YM780-9500
Test Report No. 4325-3	Date of Issue: 11/27/2017	EUT : IP Camera	IC : 9637A-809500

**UNII-2A 26 dB Bandwidth plot (802.11n 40 CH 62)**



Date: 6.OCT.2017 12:29:55

**UNII-2C 26 dB Bandwidth plot (802.11n-CH 102)**



Date: 6.OCT.2017 12:36:15

FCC PT.15.407 TEST REPORT	FCC Part 15.407 WLAN(802.11n(20/40MHz)) – 5GHz Test Report		FCC ID : YM780-9500
Test Report No. 4325-3	Date of Issue: 11/27/2017	EUT : IP Camera	IC : 9637A-809500

## █ TEST RESULTS

### 20 MHz BW

Conducted 6 dB Bandwidth Measurements for 802.11n

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	17.62	0.5	Pass
5785	157	17.67	0.5	Pass
5825	165	17.62	0.5	Pass

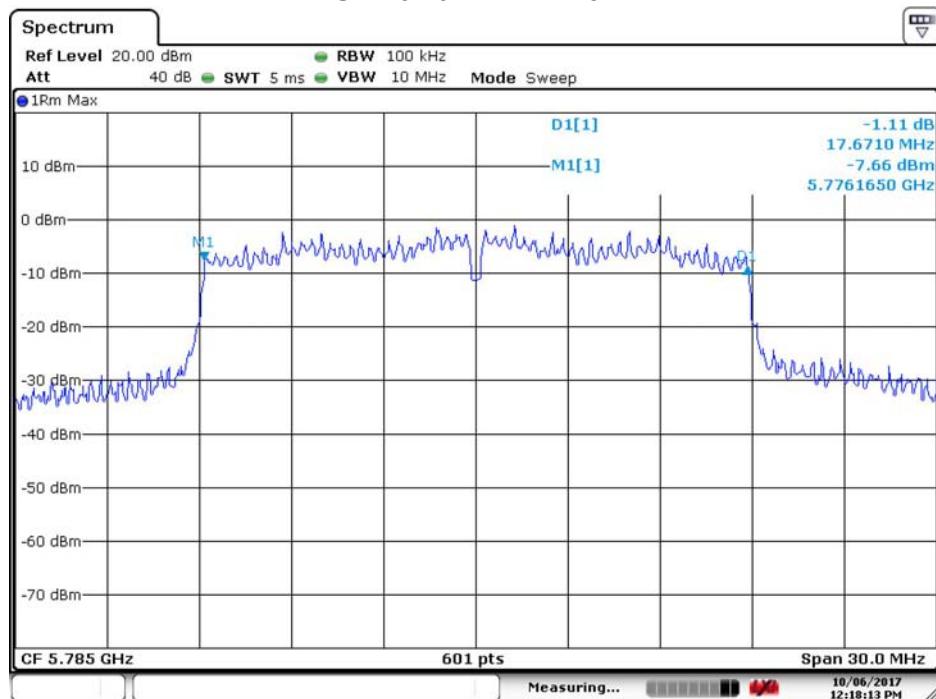
### 40 MHz BW

Conducted 6 dB Bandwidth Measurements for 802.11n

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	42.76	0.5	Pass
5795	159	42.01	0.5	Pass

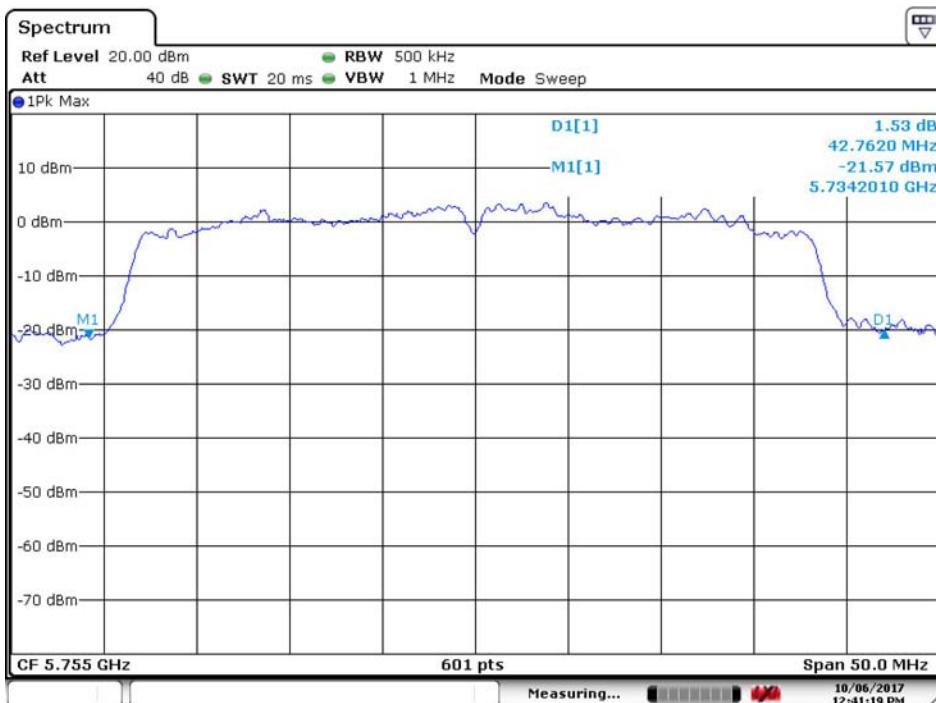
FCC PT.15.407 TEST REPORT	FCC Part 15.407 WLAN(802.11n(20/40MHz)) – 5GHz Test Report		FCC ID : YM780-9500
Test Report No. 4325-3	Date of Issue: 11/27/2017	EUT : IP Camera	IC : 9637A-809500

**UNII-3 20 MHz CH 157**



Date: 6.OCT.2017 12:18:13

**UNII-3 40 MHz CH 151**



Date: 6.OCT.2017 12:41:19

FCC PT.15.407 TEST REPORT	FCC Part 15.407 WLAN(802.11n(20/40MHz)) – 5GHz Test Report		FCC ID : YM780-9500
Test Report No. 4325-3	Date of Issue: 11/27/2017	EUT : IP Camera	IC : 9637A-809500

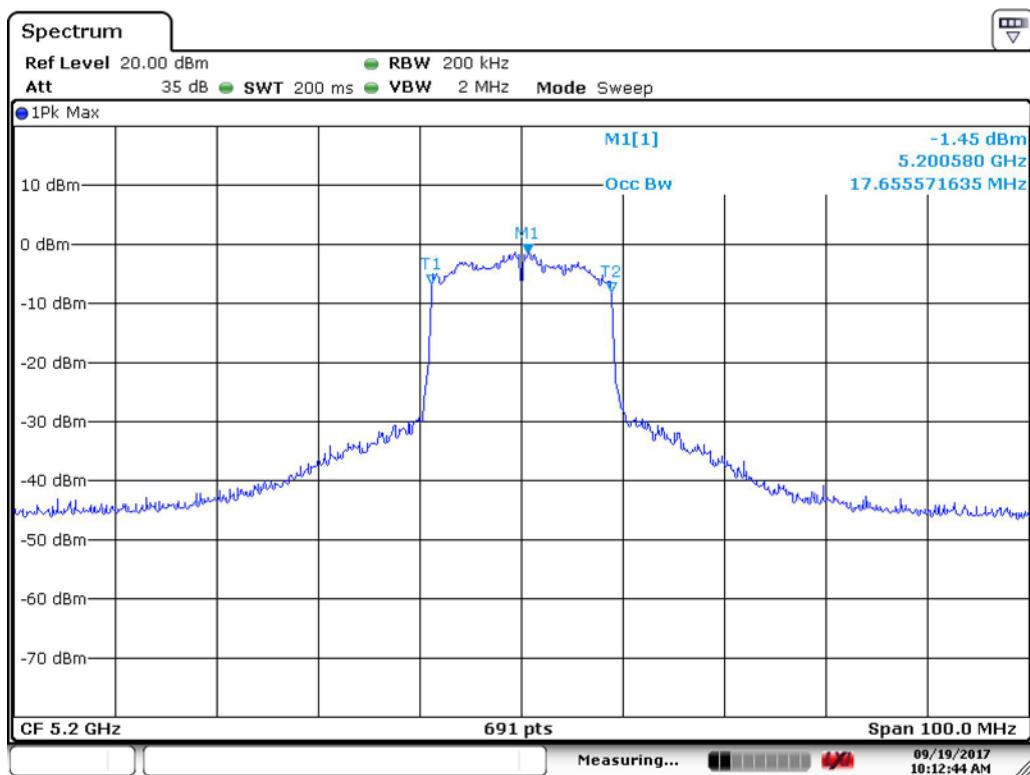
## TEST RESULTS

Note : In order to simplify the report, worst case plots for each mode are shown.

### 5 GHz Band

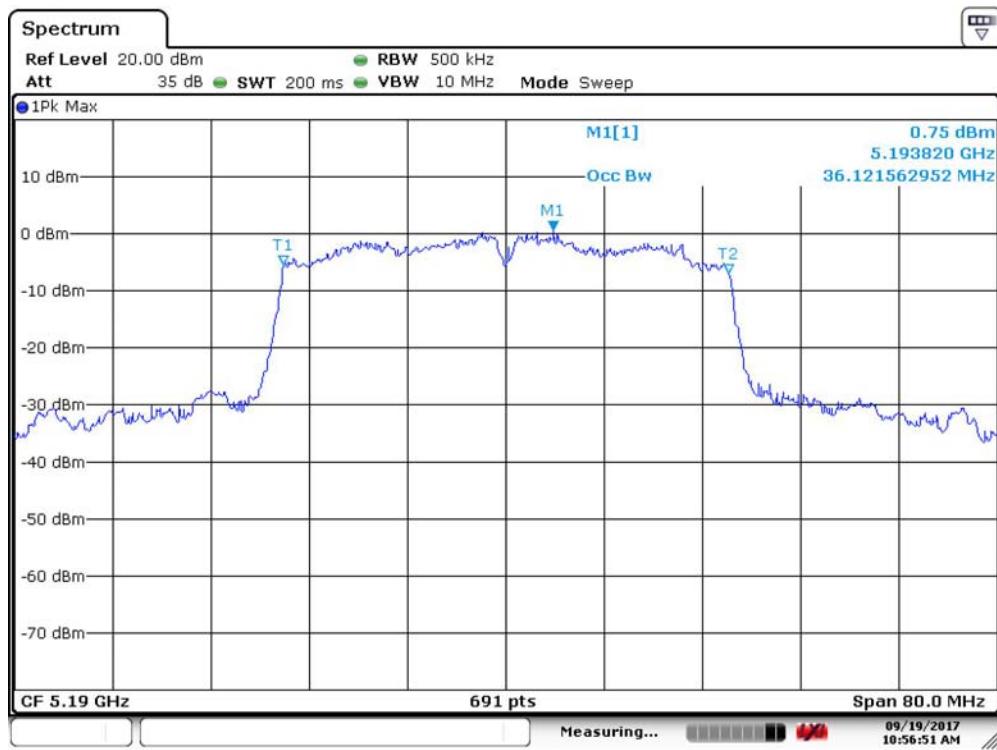
Conducted 99% Bandwidth Measurements

Frequency [MHz]	mode	Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
5200	802.11n(20M)	17.6555	-	-
5190	802.11n(40M)	36.1215	-	-
5300	802.11n(20M)	17.6555	-	-
5310	802.11n(40M)	36.2373	-	-
5580	802.11n(20M)	17.6555	-	-
5510	802.11n(40M)	36.3531	-	-
5785	802.11n(20M)	17.6555	-	-
5795	802.11n(40M)	36.5846	-	-

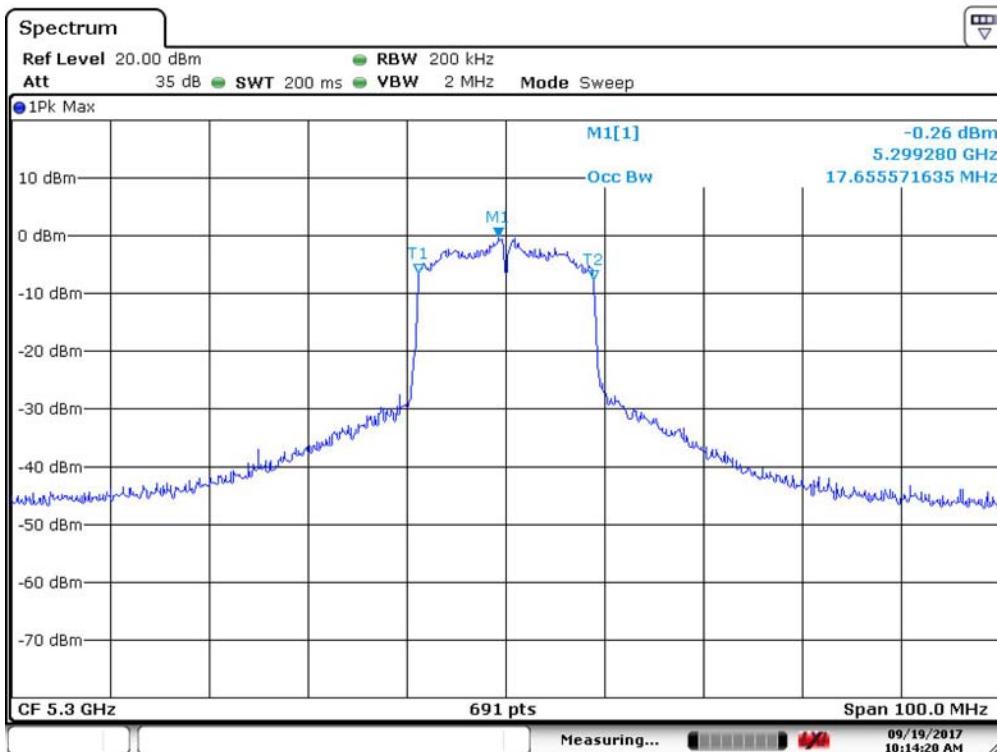


Date: 19.SEP.2017 10:12:45

FCC PT.15.407 TEST REPORT	FCC Part 15.407 WLAN(802.11n(20/40MHz)) – 5GHz Test Report		FCC ID : YM780-9500
Test Report No. 4325-3	Date of Issue: 11/27/2017	EUT : IP Camera	IC : 9637A-809500

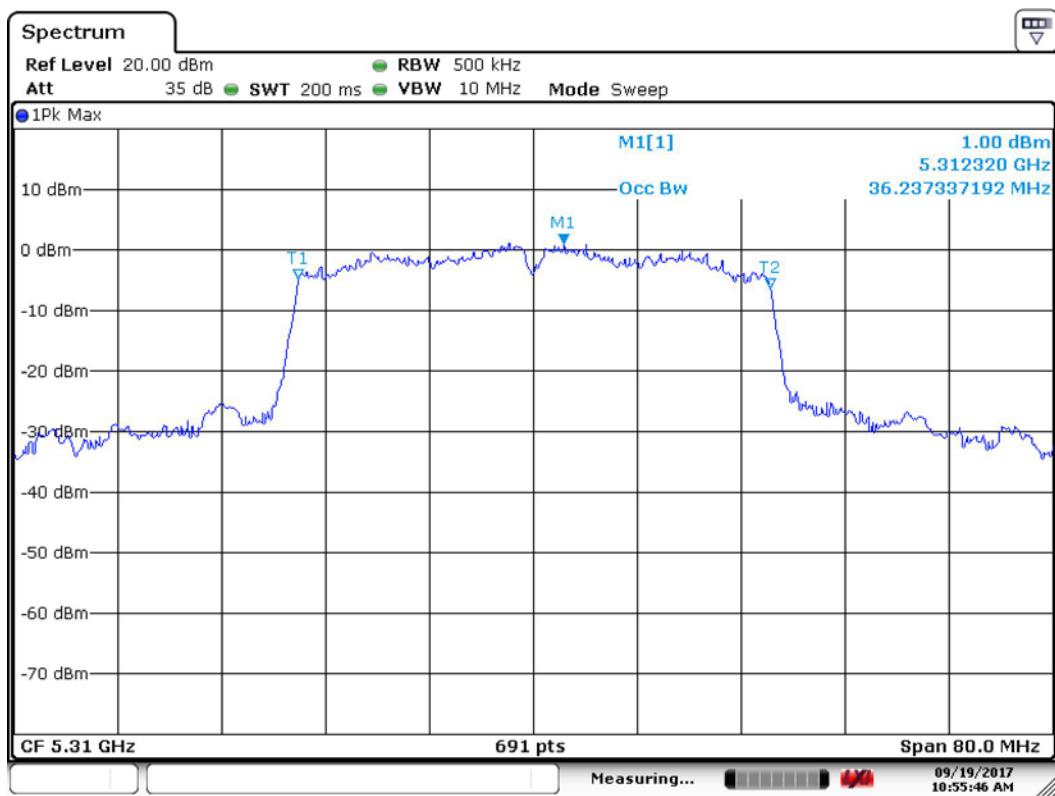


Date: 19.SEP.2017 10:56:51

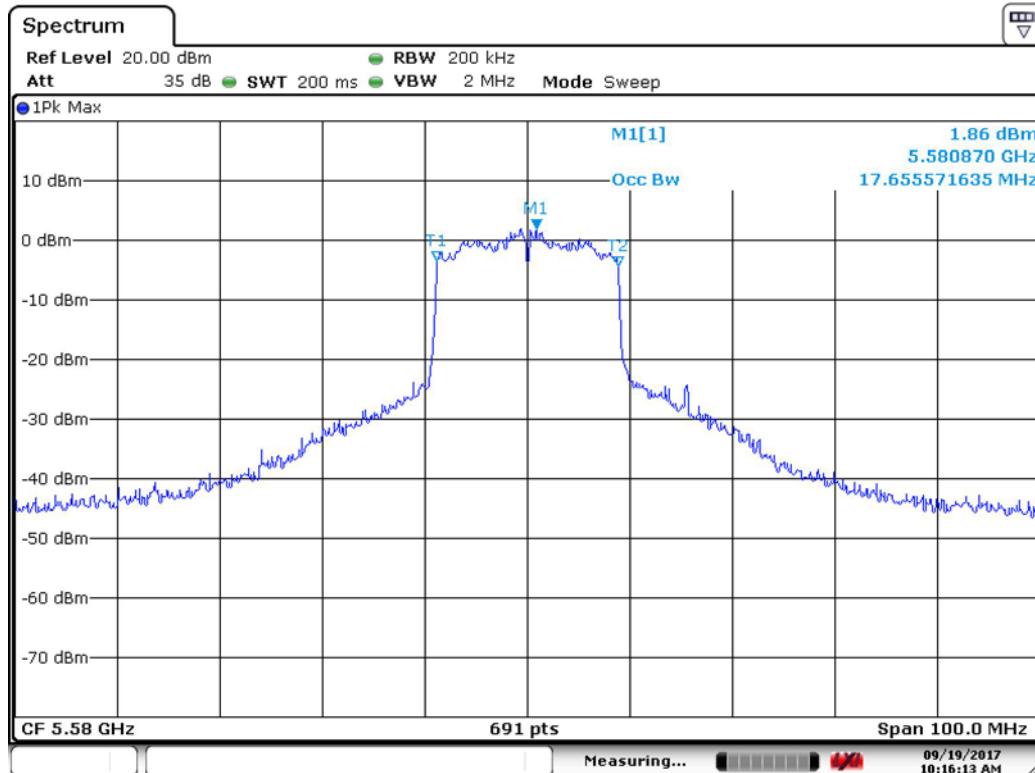


Date: 19.SEP.2017 10:14:20

FCC PT.15.407 TEST REPORT	FCC Part 15.407 WLAN(802.11n/20/40MHz) – 5GHz Test Report		FCC ID : YM780-9500
Test Report No. 4325-3	Date of Issue: 11/27/2017	EUT : IP Camera	IC : 9637A-809500

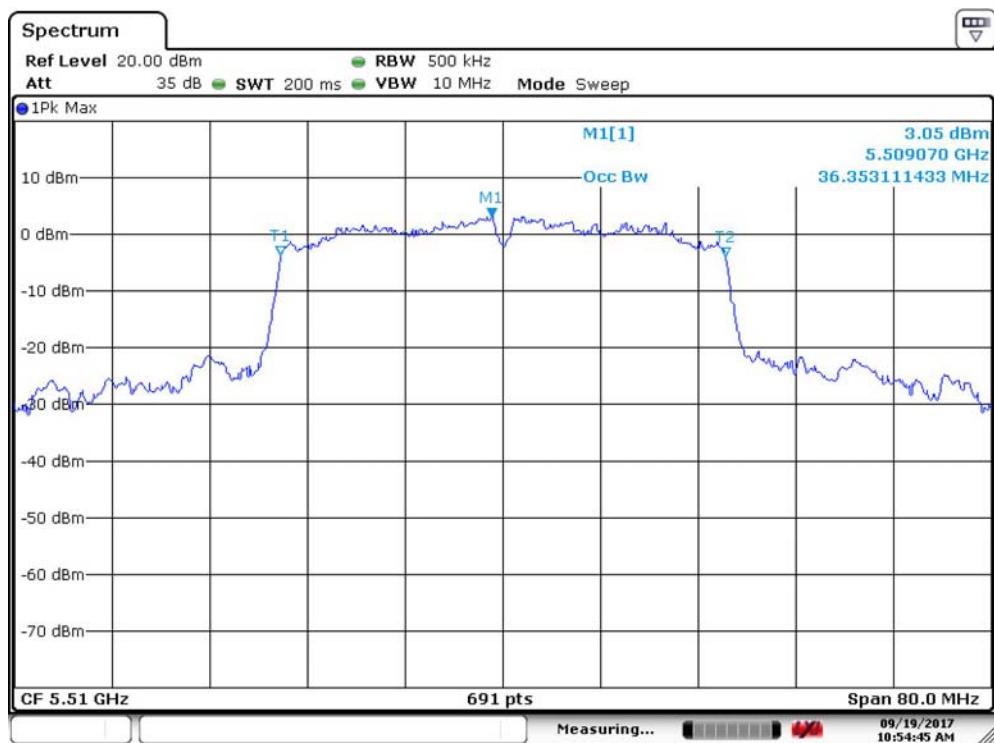


Date: 19.SEP.2017 10:55:46

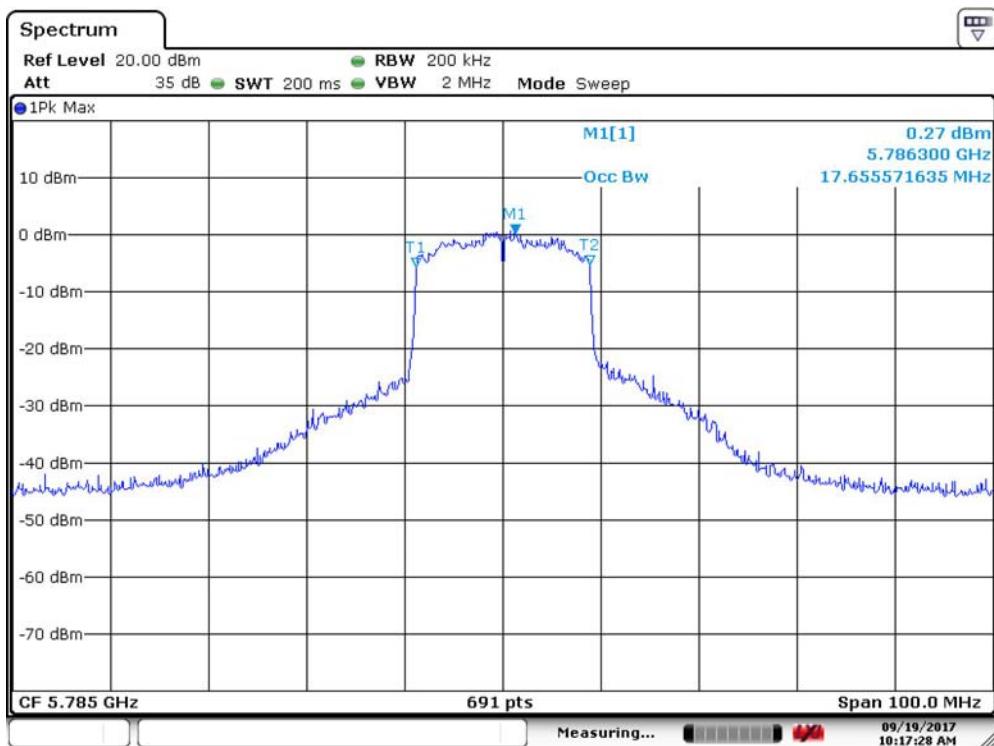


Date: 19.SEP.2017 10:16:13

FCC PT.15.407 TEST REPORT	FCC Part 15.407 WLAN(802.11n/20/40MHz) – 5GHz Test Report		FCC ID : YM780-9500
Test Report No. 4325-3	Date of Issue: 11/27/2017	EUT : IP Camera	IC : 9637A-809500

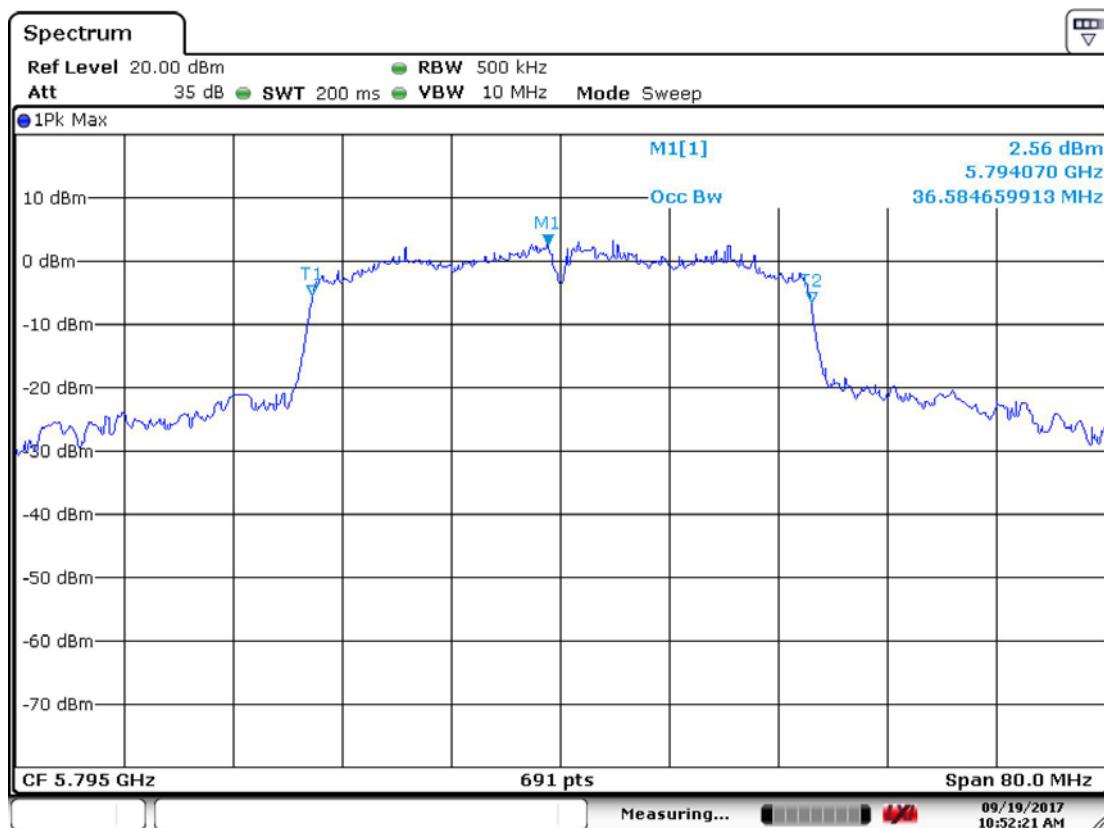


Date: 19.SEP.2017 10:54:45



Date: 19.SEP.2017 10:17:28

FCC PT.15.407 TEST REPORT	FCC Part 15.407 WLAN(802.11n/20/40MHz) – 5GHz Test Report		FCC ID : YM780-9500
Test Report No. 4325-3	Date of Issue: 11/27/2017	EUT : IP Camera	IC : 9637A-809500



Date: 19.SEP.2017 10:52:21

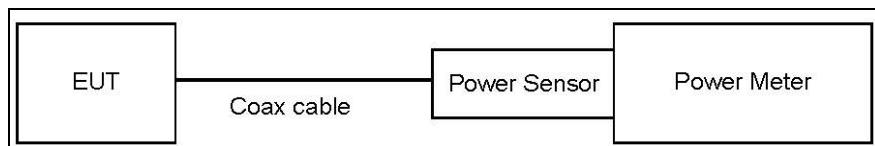
FCC PT.15.407 TEST REPORT	FCC Part 15.407 WLAN(802.11n(20/40MHz)) – 5GHz Test Report		FCC ID : YM780-9500
Test Report No. 4325-3	Date of Issue: 11/27/2017	EUT : IP Camera	IC : 9637A-809500

## 8.3 OUTPUT POWER MEASUREMENT

### Test Requirements and limit, §15.407(a)(1)

A transmitter antenna terminal of EUT is connected to the input of a Spectrum Analyzer. Measurement is made while the EUT is operating in transmission mode at the appropriate frequencies. In the 5.15 – 5.25 GHz band, the maximum permissible conducted output power is the lesser of 250 mW ((23.98 dBm)). In the 5.25 – 5.35 GHz band and 5.47 – 5.725 GHz band, the maximum permissible conducted output power is the lesser of 250 mW (23.98 dBm) or  $11 \text{ dBm} + 10 \log_{10} (26 \text{ dB BW})$ . In the 5.725 – 5.85 GHz band, the maximum permissible conducted output power is the lesser of 1 W ((30 dBm)).

### ■ TEST CONFIGURATION(20 MHz BW)

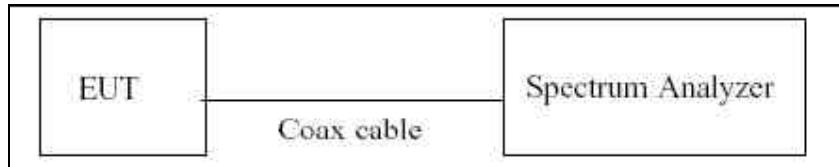


### ■ TEST PROCEDURE(20 MHz BW)

- Average Power (Procedure E.3.a in KDB 789033 D02 v01r04)

1. Measure the duty cycle.
2. Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
3. Add  $10 \log (1/x)$ , where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times.

### ■ TEST CONFIGURATION(40 MHz BW)



FCC PT.15.407 TEST REPORT	FCC Part 15.407 WLAN(802.11n(20/40MHz)) – 5GHz Test Report		FCC ID : YM780-9500
Test Report No. 4325-3	Date of Issue: 11/27/2017	EUT : IP Camera	IC : 9637A-809500

## ■ TEST PROCEDURE(40 MHz BW)

### ▪ Average Power

The transmitter output is connected to the Spectrum Analyzer. We use the spectrum analyzer's integrated band power measurement function. We tested according to Method SA-2 in KDB 789033 D02 v01r04.

The Spectrum Analyzer is set to

1. Measure the duty cycle.
2. Set span to encompass the 26 dB EBW of the signal.
3. RBW = 1 MHz.
4. VBW  $\geq$  3 MHz.
5. Number of points in sweep  $\geq 2^* \text{span}/\text{RBW}$ .
6. Sweep time = auto.
7. Detector = RMS.
8. Do not use sweep triggering. Allow the sweep to "free run".
9. Trace average at least 100 traces in power averaging(RMS) mode
10. Integrated bandwidth = OBW
11. Add  $10\log(1/x)$ , where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times.

## ■ Sample Calculation

Output Power = Reading Value + ATT loss + Cable loss(1 ea) + Duty Cycle Factor

Output Power = 10 dBm + 20 dB + 0.8 dB + 0.21 dB = 31.01 dBm

FCC PT.15.407 TEST REPORT	FCC Part 15.407 WLAN(802.11n(20/40MHz)) – 5GHz Test Report		FCC ID : YM780-9500
Test Report No. 4325-3	Date of Issue: 11/27/2017	EUT : IP Camera	IC : 9637A-809500

## TEST RESULTS

### 20 MHz BW

#### Conducted Output Power Measurements (802.11n Mode: 5180~5240)

802.11n Mode		Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.				
5180	36	6.87	-	5.25	23.98
5200	40	6.83	-	5.62	23.98
5240	48	6.56	-	7.12	23.98

#### Conducted Output Power Measurements (802.11n Mode: 5260~5320)

802.11n Mode		Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.				
5260	52	6.37	-	7.13	23.98
5300	60	6.03	-	7.45	23.98
5320	64	6.35	-	8.32	23.98

#### Conducted Output Power Measurements (802.11n Mode: 5500~5720)

802.11n Mode		Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.				
5500	100	8.28	-	9.94	23.98
5600	120	8.44	-	10.49	23.98
5700	144	8.35	-	10.24	23.98

#### Conducted Output Power Measurements (802.11n Mode: 5745~5825)

802.11n Mode		Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.				
5745	149	8.68	-	9.89	23.98
5785	157	8.79	-	10.45	23.98
5825	165	9.05	-	10.87	23.98

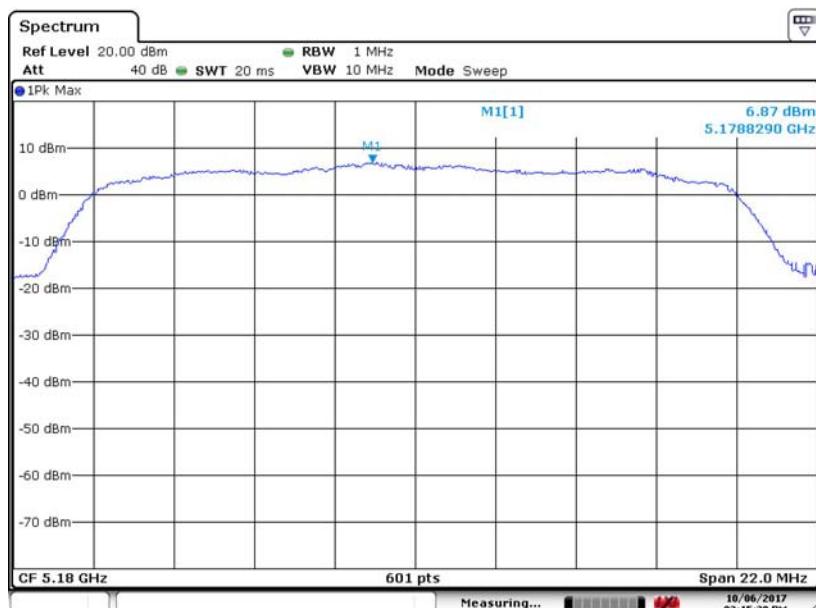
FCC PT.15.407 TEST REPORT	FCC Part 15.407 WLAN(802.11n(20/40MHz)) – 5GHz Test Report		FCC ID : YM780-9500
Test Report No. 4325-3	Date of Issue: 11/27/2017	EUT : IP Camera	IC : 9637A-809500

In order to simplify the test report, attached plots were only for the worst case channel in each band.

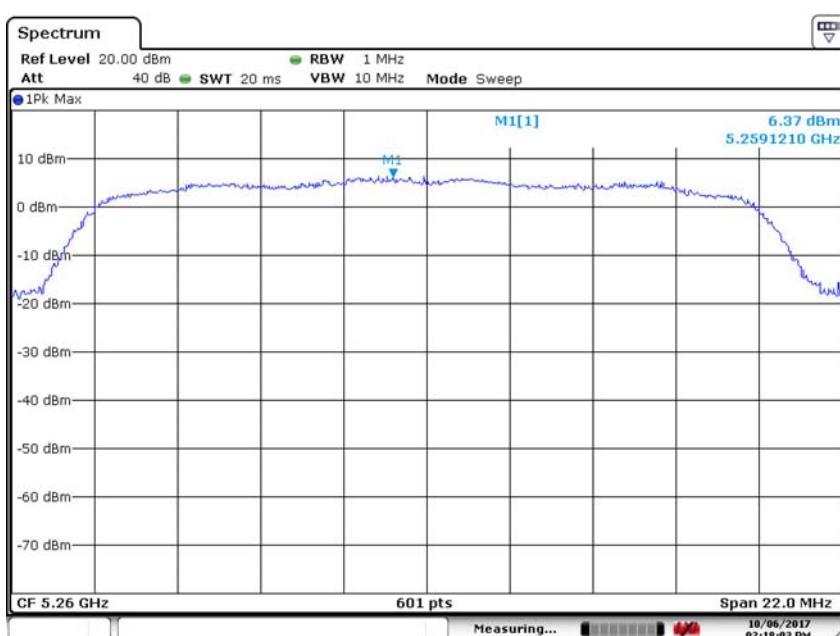
## 20 MHz BW

### RESULT PLOTS

#### UNII-1 Conducted Output Power (802.11n-CH 36) 20.0 Mbps

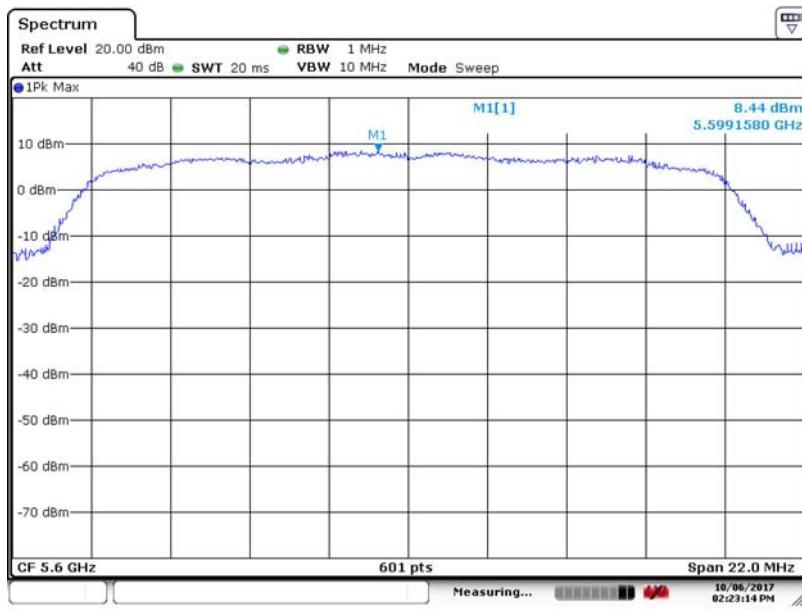


#### UNII-2A Conducted Output Power (802.11n-CH 52) 20.0 Mbps



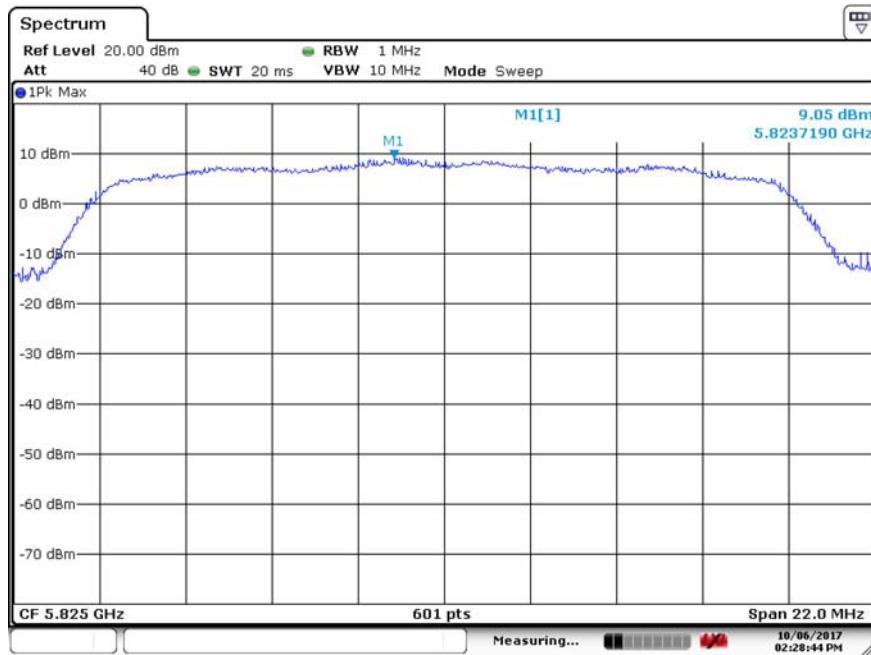
FCC PT.15.407 TEST REPORT	FCC Part 15.407 WLAN(802.11n(20/40MHz)) – 5GHz Test Report		FCC ID : YM780-9500
Test Report No. 4325-3	Date of Issue: 11/27/2017	EUT : IP Camera	IC : 9637A-809500

**UNII-2C Conducted Output Power (802.11n-CH 120) 20.0 Mbps**



Date: 6.OCT.2017 14:23:13

**UNII-3 Conducted Output Power (802.11n-CH 52) 20.0 Mbps**



Date: 6.OCT.2017 14:28:44

FCC PT.15.407 TEST REPORT	FCC Part 15.407 WLAN(802.11n(20/40MHz)) – 5GHz Test Report		FCC ID : YM780-9500
Test Report No. 4325-3	Date of Issue: 11/27/2017	EUT : IP Camera	IC : 9637A-809500

**40 MHz BW**
**Conducted Output Power Measurements (802.11n Mode: 5190~5230)**

802.11n Mode		Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.				
5190	38	3.99	-	3.99	16.99
5230	46	3.79	-	3.79	16.99

**Conducted Output Power Measurements (802.11n Mode: 5270~5310)**

802.11n Mode		Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.				
5270	54	3.92	-	3.92	23.98
5310	62	3.83	-	3.83	23.98

**Conducted Output Power Measurements (802.11n Mode: 5510~5710)**

802.11n Mode		Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.				
5510	102	6.27	-	6.27	23.98
5550	110	6.25	-	6.25	23.98
5710	142	N/A	-	N/A	23.98

**Conducted Output Power Measurements (802.11n Mode: 5755~5795)**

802.11n Mode		Measured Power(dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.				
5755	151	6.28	-	6.28	23.98
5795	159	6.40	-	6.40	23.98

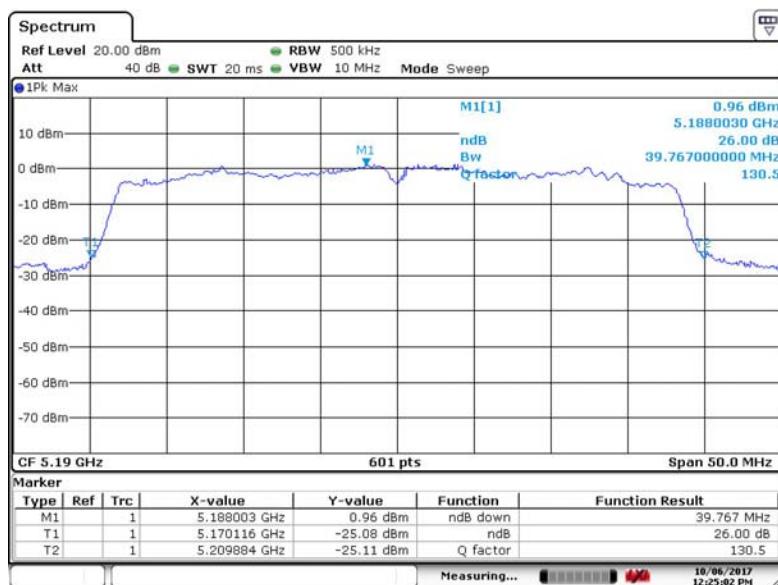
In order to simplify the test report, attached plots were only for the worst case channel in each band.

FCC PT.15.407 TEST REPORT	FCC Part 15.407 WLAN(802.11n(20/40MHz)) – 5GHz Test Report		FCC ID : YM780-9500
Test Report No. 4325-3	Date of Issue: 11/27/2017	EUT : IP Camera	IC : 9637A-809500

40 MHz BW

□ RESULT PLOTS

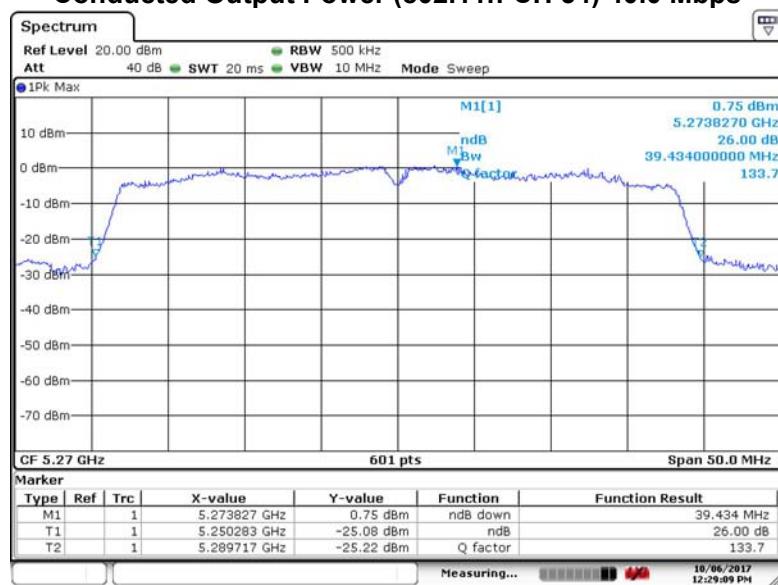
Conducted Output Power (802.11n-CH 38) 40.0 Mbps



Date: 6.OCT.2017 12:25:02

□ RESULT PLOTS (5270 MHz ~5310 MHz)

Conducted Output Power (802.11n-CH 54) 40.0 Mbps



Date: 6.OCT.2017 12:29:09

FCC PT.15.407 TEST REPORT	FCC Part 15.407 WLAN(802.11n(20/40MHz)) – 5GHz Test Report		FCC ID : YM780-9500
Test Report No. 4325-3	Date of Issue: 11/27/2017	EUT : IP Camera	IC : 9637A-809500

■ RESULT PLOTS (5510 MHz ~5710 MHz)

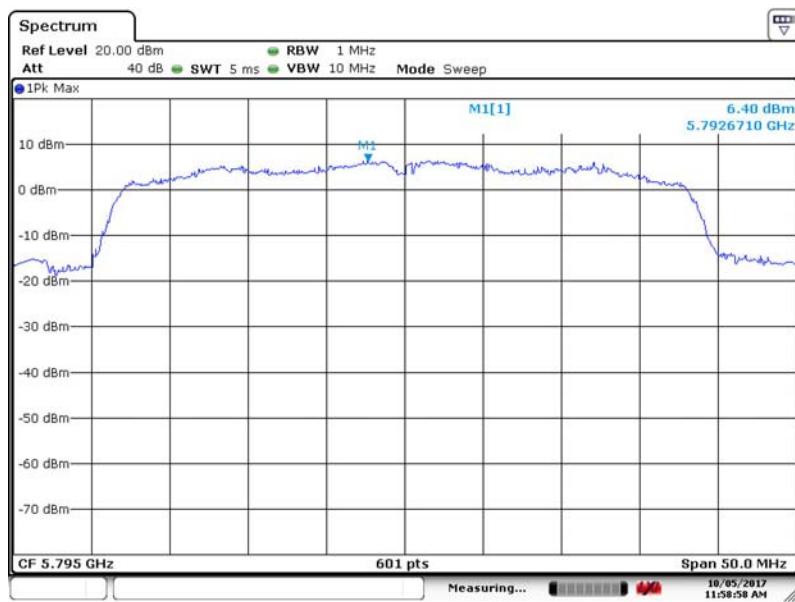
Conducted Output Power (802.11n-CH 102) 40.0 Mbps



Date: 5.OCT.2017 11:55:21

■ RESULT PLOTS (5510 MHz ~5710 MHz)

Conducted Output Power (802.11n-CH 159) 40.0 Mbps



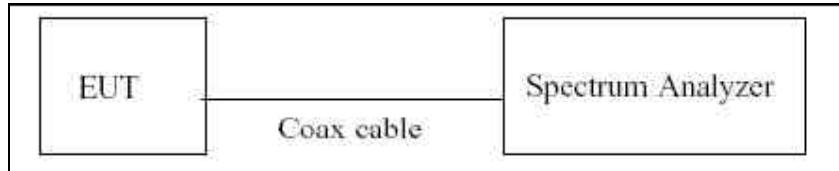
Date: 5.OCT.2017 11:58:59

FCC PT.15.407 TEST REPORT	FCC Part 15.407 WLAN(802.11n(20/40MHz)) – 5GHz Test Report		FCC ID : YM780-9500
Test Report No. 4325-3	Date of Issue: 11/27/2017	EUT : IP Camera	IC : 9637A-809500

## 8.4 POWER SPECTRAL DENSITY

The peak power density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating in transmission mode at the appropriate frequencies. The maximum permissible peak power spectral density is 11 dBm/ MHz in the 5.15 GHz – 5.25 GHz / 5.25 GHz – 5.35 GHz / 5.47 GHz – 5.725 GHz bands and 30 dBm/ 500 kHz in the 5.725 GHz – 5.85 GHz band.

### ■ TEST CONFIGURATION



### ■ TEST PROCEDURE

We tested according to Method in KDB 789033 D02 v01r04

The spectrum analyzer is set to :

1. Set span to encompass the entire emission bandwidth(EBW) of the signal.
2. RBW = 1 MHz.
3. VBW  $\geq$  3 MHz.
4. Number of points in sweep  $\geq$  2\*span/RBW.
5. Sweep time = auto.
6. Detector = RMS(i.e., power averaging), if available. Otherwise, use sample detector mode.
7. Do not use sweep triggering. Allow the sweep to “free run”.
8. Trace average at least 100 traces in power averaging(RMS) mode
9. Use the peak search function on the spectrum analyzer to find the peak of the spectrum.
10. If Method SA-2 was used, add  $10 \log(1/x)$ , where x is the duty cycle, to the peak of the spectrum.

### ■ Sample Calculation

PSD = Reading Value + ATT loss + Cable loss(1 ea) + Duty Cycle Factor

Output Power = -5 dBm + 10 dB + 0.8 dB + 0.21 dB = 16.01 dBm

FCC PT.15.407 TEST REPORT	FCC Part 15.407 WLAN(802.11n(20/40MHz)) – 5GHz Test Report		FCC ID : YM780-9500
Test Report No. 4325-3	Date of Issue: 11/27/2017	EUT : IP Camera	IC : 9637A-809500

■ TEST RESULTS

Conducted Power Density Measurements

Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5180	36	802.11n 20MHz BW	-2.60	-	N/A	11	Pass
5200	40		-2.56	-	N/A	11	Pass
5240	48		-3.02	-	N/A	11	Pass
5260	52		-3.01	-	N/A	11	Pass
5300	60		-3.04	-	N/A	11	Pass
5320	64		-3.01	-	N/A	11	Pass
5500	100		-0.65	-	N/A	11	Pass
5580	116		-0.50	-	N/A	11	Pass
5700	144		-1.09	-	N/A	11	Pass
5745	149		-0.38	-	N/A	30	Pass
5785	157		-0.19	-	N/A	30	Pass
5825	165		-0.17	-	N/A	30	Pass

FCC PT.15.407 TEST REPORT	FCC Part 15.407 WLAN(802.11n(20/40MHz)) – 5GHz Test Report		FCC ID : YM780-9500
Test Report No. 4325-3	Date of Issue: 11/27/2017	EUT : IP Camera	IC : 9637A-809500

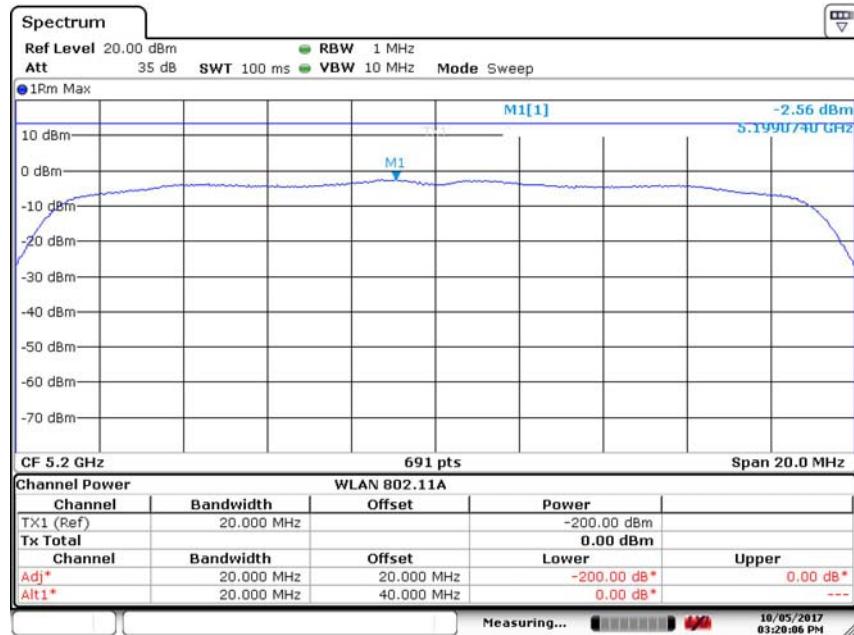
Conducted Power Density Measurements

Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5190	38	802.11n 40MHz BW	-5.94	-		11	Pass
5230	46		-6.22	-		11	Pass
5270	54		-6.69	-		11	Pass
5310	62		-6.70	-		11	Pass
5510	102		-4.10	-		11	Pass
5550	110		-4.33	-		11	Pass
5710	142		-4.27	-		11	Pass
5755	151		-3.90	-		30	Pass
5795	159		-3.88	-		30	Pass

1. In order to simplify the report, attached plots were only the highest PSD channel.

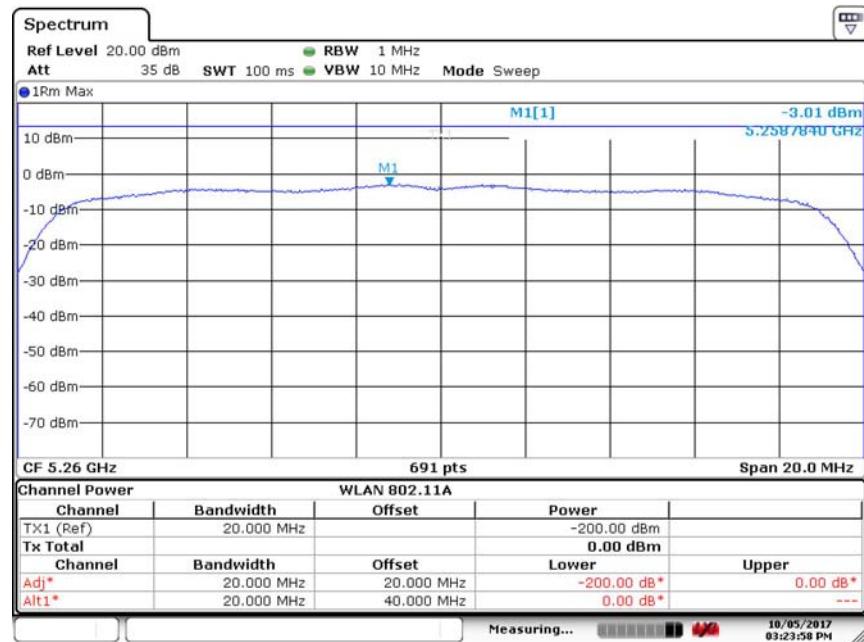
**RESULT PLOTS**

**UNII-1 Power Spectral Density (802.11n-CH 36) 20.0 Mbps**



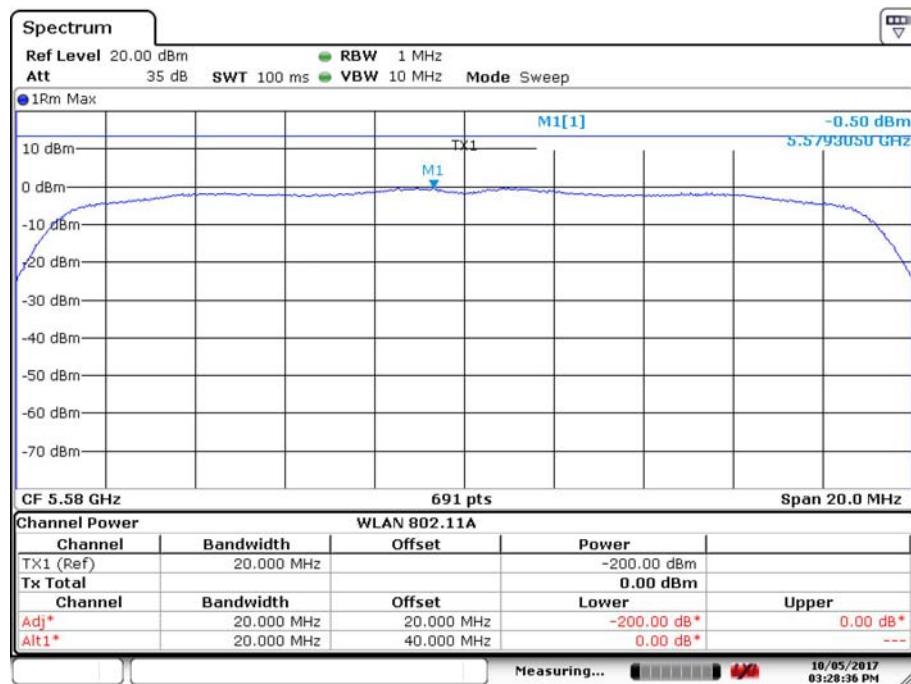
FCC PT.15.407 TEST REPORT	FCC Part 15.407 WLAN(802.11n(20/40MHz)) – 5GHz Test Report			FCC ID : YM780-9500
Test Report No. 4325-3	Date of Issue: 11/27/2017	EUT : IP Camera		IC : 9637A-809500

### UNII-2A Power Spectral Density (802.11n-CH 52) 20.0 Mbps



Date: 5.OCT.2017 15:23:58

### UNII-2C Power Spectral Density (802.11n-CH 116) 20.0 Mbps



Date: 5.OCT.2017 15:28:36

FCC PT.15.407 TEST REPORT	FCC Part 15.407 WLAN(802.11n(20/40MHz)) – 5GHz Test Report		FCC ID : YM780-9500
Test Report No. 4325-3	Date of Issue: 11/27/2017	EUT : IP Camera	IC : 9637A-809500

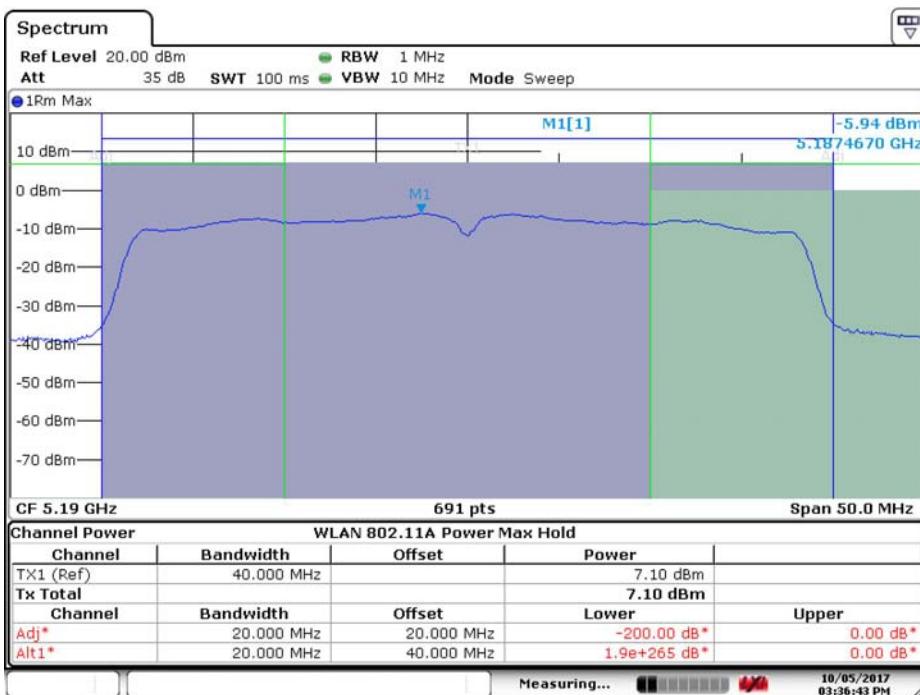
**UNII-3 Power Spectral Density (802.11n-CH 38) 20.0 Mbps**



Date: 5.OCT.2017 11:37:39

**40 MHz BW**

**UNII-1 Power Spectral Density (802.11n-CH 46)**



Date: 5.OCT.2017 15:36:44

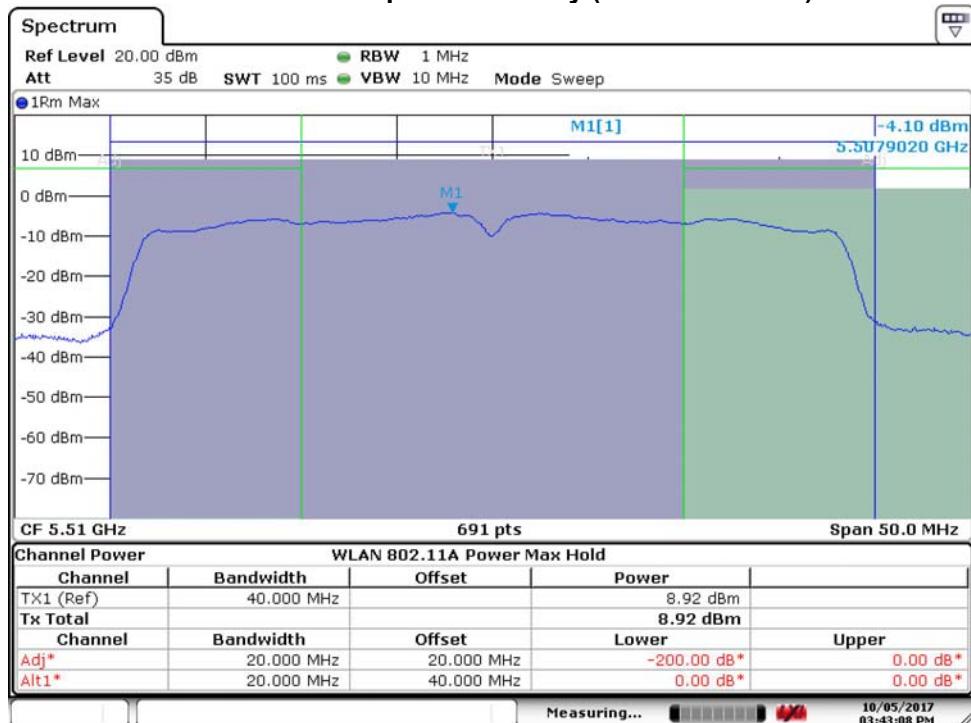
FCC PT.15.407 TEST REPORT	FCC Part 15.407 WLAN(802.11n(20/40MHz)) – 5GHz Test Report		FCC ID : YM780-9500
Test Report No. 4325-3	Date of Issue: 11/27/2017	EUT : IP Camera	IC : 9637A-809500

### UNII-2A Power Spectral Density (802.11n-CH 54)



Date: 5.OCT.2017 15:41:14

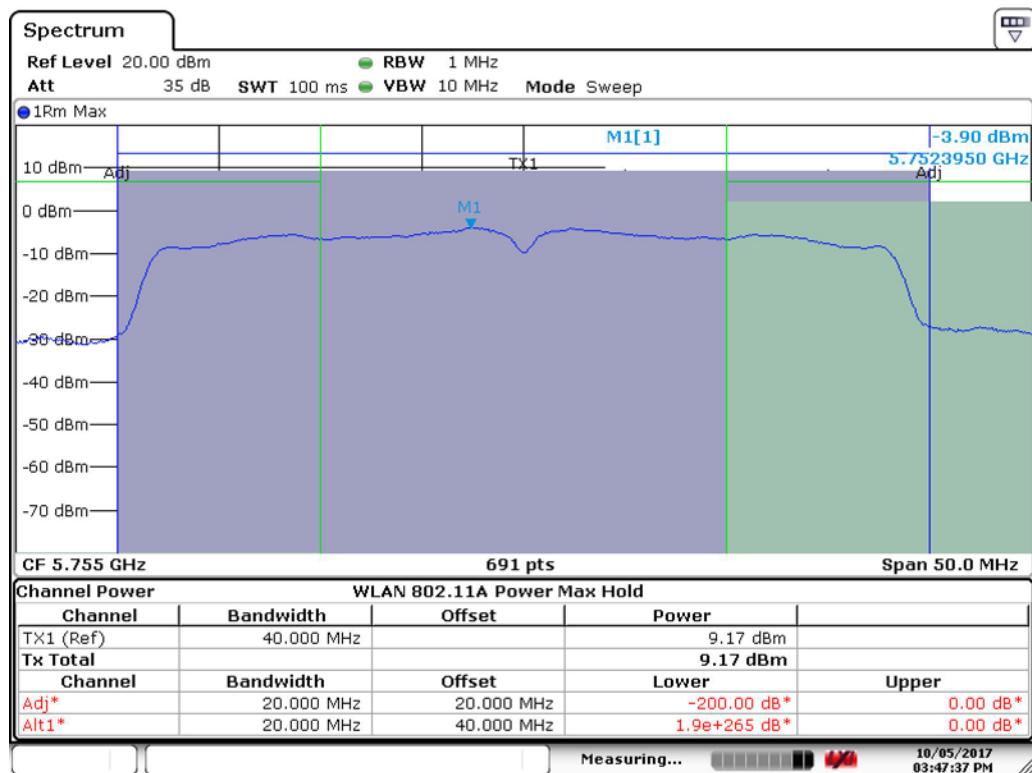
### UNII-2C Power Spectral Density (802.11n-CH 110)



Date: 5.OCT.2017 15:43:08

FCC PT.15.407 TEST REPORT	FCC Part 15.407 WLAN(802.11n(20/40MHz)) – 5GHz Test Report		FCC ID : YM780-9500
Test Report No. 4325-3	Date of Issue: 11/27/2017	EUT : IP Camera	IC : 9637A-809500

### Power Spectral Density (802.11n-CH 151)



Date: 5.OCT.2017 15:47:38

FCC PT.15.407 TEST REPORT	FCC Part 15.407 WLAN(802.11n(20/40MHz)) – 5GHz Test Report		FCC ID : YM780-9500
Test Report No. 4325-3	Date of Issue: 11/27/2017	EUT : IP Camera	IC : 9637A-809500

## 8.5 FREQUENCY STABILITY.

The EUT was placed inside an environmental chamber as the temperature in the chamber was varied between -30 °C and 50 °C. The temperature was incremented by 10 °C intervals and the unit was allowed to stabilize at each temperature before each measurement. The center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channel's center frequency was recorded.

### 20 MHz BW

OPERATING BAND:	UNII Band 1
OPERATING FREQUENCY:	5,180,000,000 Hz
CHANNEL:	36
REFERENCE VOLTAGE:	5.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	5.00	+20(Ref)	5 180 007.33	7.33
100%		-30	5 179 995.04	-4.96
100%		-20	5 179 994.57	-5.43
100%		-10	5 179 997.39	-2.61
100%		0	5 179 995.92	-4.08
100%		+10	5 180 002.44	2.44
100%		+30	5 180 003.55	3.55
100%		+40	5 179 997.09	-2.91
100%		+50	5 179 998.22	-1.78
115%	5.75	+20	5 180 004.99	4.99
Batt. Endpoint	4.70	+20	5 180005.57	5.57

### Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

FCC PT.15.407 TEST REPORT	FCC Part 15.407 WLAN(802.11n/20/40MHz) – 5GHz Test Report		FCC ID : YM780-9500
Test Report No. 4325-3	Date of Issue: 11/27/2017	EUT : IP Camera	IC : 9637A-809500

OPERATING BAND: UNII Band 2A  
 OPERATING FREQUENCY: 5,260,000,000 Hz  
 CHANNEL: 52  
 REFERENCE VOLTAGE: 5.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	5.00	+20(Ref)	5 260 007.11	7.11
100%		-30	5 259 994.70	-6.50
100%		-20	5 259 994.33	-5.67
100%		-10	5 259 994.19	-5.81
100%		0	5 259 999.11	-0.89
100%		+10	5 260 003.22	3.22
100%		+30	5 260 002.49	2.49
100%		+40	5 259 996.32	-3.68
100%		+50	5 259 996.38	-3.62
115%	5.75	+20	5 260 003.85	3.85
Batt. Endpoint	4.70	+20	5 260 005.72	5.72

**Note:**

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

FCC PT.15.407 TEST REPORT	FCC Part 15.407 WLAN(802.11n(20/40MHz)) – 5GHz Test Report		FCC ID : YM780-9500
Test Report No. 4325-3	Date of Issue: 11/27/2017	EUT : IP Camera	IC : 9637A-809500

OPERATING BAND: UNII Band 2C  
 OPERATING FREQUENCY: 5,500,000,000 Hz  
 CHANNEL: 100  
 REFERENCE VOLTAGE: 5.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	5.00	+20(Ref)	5 500 003.46	6.46
100%		-30	5 499 996.99	-2.01
100%		-20	5 499 995.83	-4.17
100%		-10	5 499 997.02	-2.98
100%		0	5 499 995.85	-4.15
100%		+10	5 500 002.87	2.87
100%		+30	5 500 002.62	2.62
100%		+40	5 499 001.94	1.94
100%		+50	5 499 999.01	-0.99
115%	5.75	+20	5 500 002.58	2.58
Batt. Endpoint	4.70	+20	5 500 003.27	3.27

**Note:**

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

FCC PT.15.407 TEST REPORT	FCC Part 15.407 WLAN(802.11n(20/40MHz)) – 5GHz Test Report		FCC ID : YM780-9500
Test Report No. 4325-3	Date of Issue: 11/27/2017	EUT : IP Camera	IC : 9637A-809500

OPERATING BAND: UNII Band 3  
 OPERATING FREQUENCY: 5,745,000,000 Hz  
 CHANNEL: 149  
 REFERENCE VOLTAGE: 5.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	5.00	+20(Ref)	5 500 002.77	2.77
100%		-30	5 499 996.83	-3.17
100%		-20	5 499 996.36	-3.64
100%		-10	5 499 997.87	-2.13
100%		0	5 499 998.01	-1.99
100%		+10	5 500 002.05	2.05
100%		+30	5 500 998.64	-1.36
100%		+40	5 499 995.88	-4.12
100%		+50	5 499 996.01	-3.99
115%	5.75	+20	5 500 002.22	2.22
Batt. Endpoint	4.70	+20	5 500 003.42	3.42

**Note:**

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

FCC PT.15.407 TEST REPORT	FCC Part 15.407 WLAN(802.11n(20/40MHz)) – 5GHz Test Report		FCC ID : YM780-9500
Test Report No. 4325-3	Date of Issue: 11/27/2017	EUT : IP Camera	IC : 9637A-809500

## 40 MHz BW

OPERATING BAND: UNII Band 1  
 OPERATING FREQUENCY: 5,190,000,000 Hz  
 CHANNEL: 38  
 REFERENCE VOLTAGE: 5.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	5.00	+20(Ref)	5 190 002.55	2.55
100%		-30	5 189 998.09	-1.91
100%		-20	5 189 996.35	-3.65
100%		-10	5 189 995.95	-4.05
100%		0	5 189 997.33	-2.67
100%		+10	5 190 001.58	1.58
100%		+30	5 190 002.44	2.44
100%		+40	5 189 997.17	-2.83
100%		+50	5 189 995.85	-4.15
115%	5.75	+20	5 190 003.33	3.33
Batt. Endpoint	4.70	+20	5 190 004.38	4.38

### Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

FCC PT.15.407 TEST REPORT	FCC Part 15.407 WLAN(802.11n(20/40MHz)) – 5GHz Test Report		FCC ID : YM780-9500
Test Report No. 4325-3	Date of Issue: 11/27/2017	EUT : IP Camera	IC : 9637A-809500

OPERATING BAND: UNII Band 2A  
 OPERATING FREQUENCY: 5,270,000,000 Hz  
 CHANNEL: 54  
 REFERENCE VOLTAGE: 5.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	5.00	+20(Ref)	5 270 -3.72	3.72
100%		-30	5 269 997.88	-2.12
100%		-20	5 269 995.80	-4.20
100%		-10	5 269 995.03	-4.97
100%		0	5 269 996.84	-3.16
100%		+10	5 270 003.19	3.19
100%		+30	5 270 003.01	3.01
100%		+40	5 269 996.47	-3.53
100%		+50	5 269 997.01	-2.99
115%	5.75	+20	5 270 004.45	4.45
Batt. Endpoint	4.70	+20	5 270 003.07	3.07

**Note:**

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

FCC PT.15.407 TEST REPORT	FCC Part 15.407 WLAN(802.11n(20/40MHz)) – 5GHz Test Report		FCC ID : YM780-9500
Test Report No. 4325-3	Date of Issue: 11/27/2017	EUT : IP Camera	IC : 9637A-809500

OPERATING BAND: UNII Band 2C  
 OPERATING FREQUENCY: 5,510,000,000 Hz  
 CHANNEL: 102  
 REFERENCE VOLTAGE: 5.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	5.00	+20(Ref)	5 510 001.69	1.69
100%		-30	5 510 002.56	2.56
100%		-20	5 509 997.36	-2.64
100%		-10	5 509 995.43	-4.57
100%		0	5 509 998.05	-1.95
100%		+10	5 510 004.31	4.31
100%		+30	5 510 005.27	5.27
100%		+40	5 510 003.92	3.92
100%		+50	5 510 001.81	1.81
115%	5.75	+20	5 510 005.21	5.21
Batt. Endpoint	4.70	+20	5 510 005.04	5.04

**Note:**

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

FCC PT.15.407 TEST REPORT	FCC Part 15.407 WLAN(802.11n(20/40MHz)) – 5GHz Test Report		FCC ID : YM780-9500
Test Report No. 4325-3	Date of Issue: 11/27/2017	EUT : IP Camera	IC : 9637A-809500

OPERATING BAND: UNII Band 3  
 OPERATING FREQUENCY: 5,755,000,000 Hz  
 CHANNEL: 151  
 REFERENCE VOLTAGE: 5.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	5.00	+20(Ref)	5 510 003.33	3.33
100%		-30	5 510 002.34	2.34
100%		-20	5 509 996.50	-3.50
100%		-10	5 509 995.91	-4.09
100%		0	5 509 998.18	-1.82
100%		+10	5 510 005.31	5.31
100%		+30	5 510 006.44	6.44
100%		+40	5 510 002.93	2.93
100%		+50	5 510 002.01	2.01
115%	5.75	+20	5 510 005.31	5.31
Batt. Endpoint	4.70	+20	5 510 006.33	6.33

**Note:**

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

FCC PT.15.407 TEST REPORT	FCC Part 15.407 WLAN(802.11n(20/40MHz)) – 5GHz Test Report		FCC ID : YM780-9500
Test Report No. 4325-3	Date of Issue: 11/27/2017	EUT : IP Camera	IC : 9637A-809500

## 8.6 RADIATED MEASUREMENT.

### 8.6.1 RADIATED SPURIOUS EMISSIONS.

Test Requirements and limit, §15.205, §15.209, §15.407

Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

#### ■ §15.407, KDB 789033 D02

All harmonics that do not lie in a restricted band are subject to a peak limit of -27 dBm/MHz. At a distance of 3 meters the field strength limit in dB $\mu$ V/m can be determined by adding a “conversion” factor of 95.2 dB to the EIRP limit of -27 dBm/MHz to obtain the limit for out of band spurious emissions of 68.2 dB $\mu$ V/m.

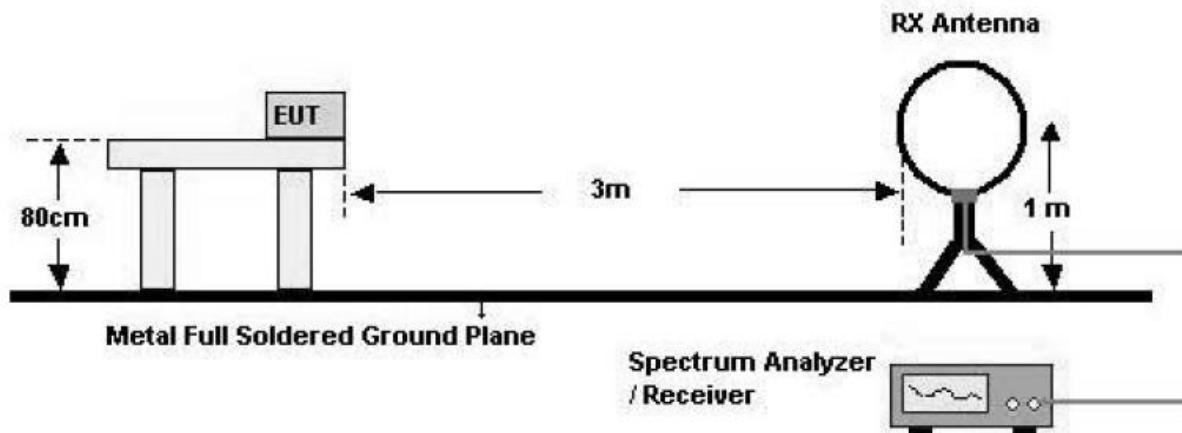
Especially, for transmitter operating in the 5725 MHz – 5850 MHz :

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 increasingly 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.

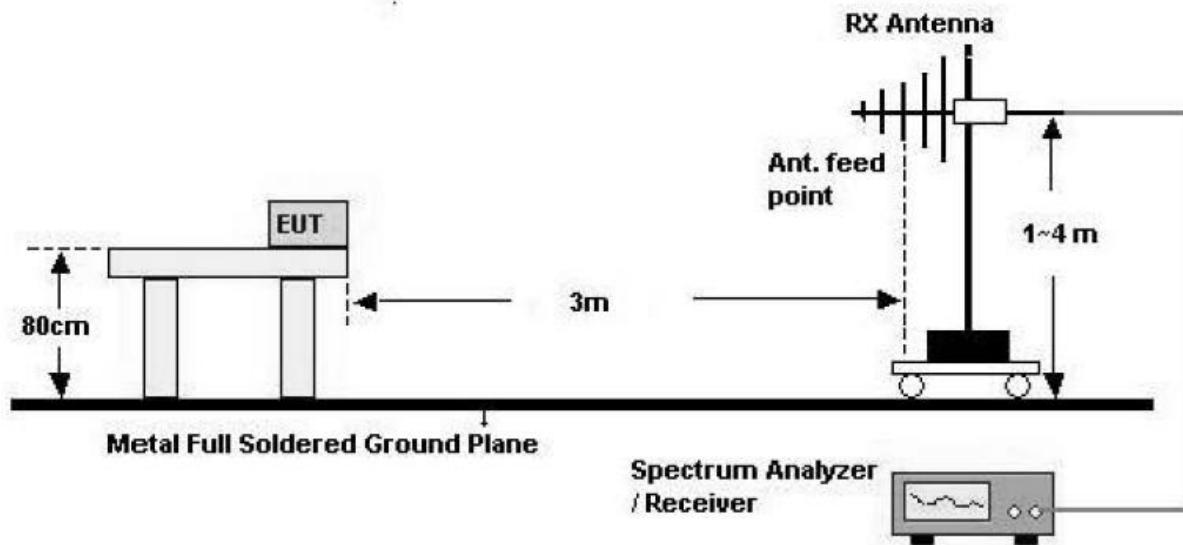
FCC PT.15.407 TEST REPORT	FCC Part 15.407 WLAN(802.11n(20/40MHz)) – 5GHz Test Report		FCC ID : YM780-9500
Test Report No. 4325-3	Date of Issue: 11/27/2017	EUT : IP Camera	IC : 9637A-809500

## Test Configuration

### Below 30 MHz

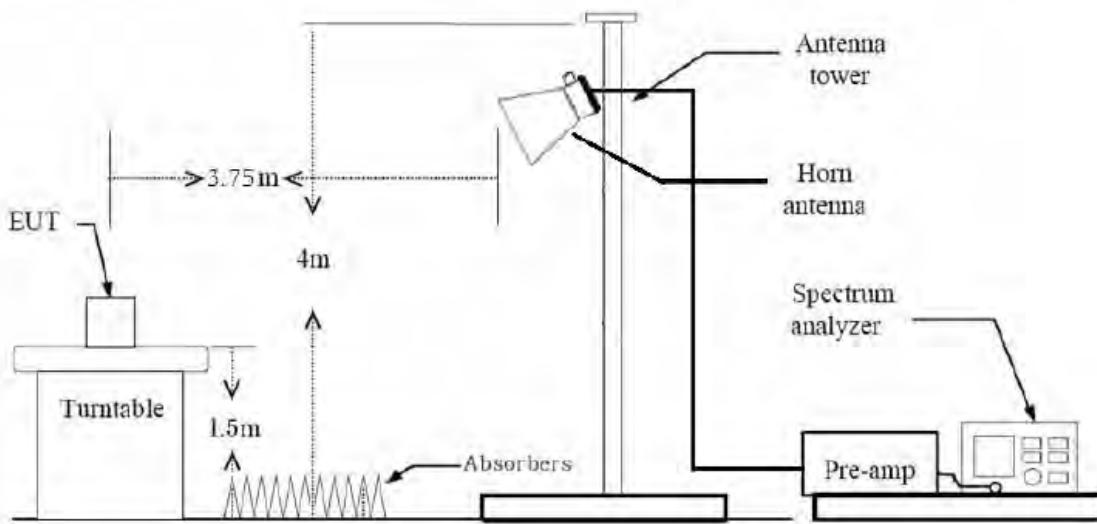


### 30 MHz - 1 GHz



FCC PT.15.407 TEST REPORT	FCC Part 15.407 WLAN(802.11n(20/40MHz)) – 5GHz Test Report	FCC ID : YM780-9500
Test Report No. 4325-3	Date of Issue: 11/27/2017	EUT : IP Camera

## Above 1 GHz



## TEST PROCEDURE USED

ANSI C63.10 - 2013

Method H)5) in KDB 789033 D02 v01r04 (Peak)

Method H)6)d) in KDB 789033 D02 v01r04 (Average)

### . Spectrum setting:

- Peak.
- 1. RBW = 1 MHz
- 2. VBW  $\geq$  3 MHz
- 3. Detector = Peak
- 4. Sweep Time = auto
- 5. Trace mode = max hold
- 6. Allow sweeps to continue until the trace stabilizes.
- 7. Note that if the transmission is not continuous, the time required for the trace to stabilize will increase by a factor of approximately  $1/x$ , where  $x$  is the duty cycle.

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- Average ( Method VB :Averaging using reduced video bandwidth)
- 1. RBW = 1 MHz
- 2. VBW
  - 2.1. If the EUT is configured to transmit with duty cycle  $\geq$  98 percent, set  $VBW \leq RBW/100$ (i.e., 10 kHz) but not less than 10 Hz.
  - 2.2. If the EUT duty cycle is  $<$  98 percent, set  $VBW \geq 1/T$ , where T is the minimum transmission duration.
- 3. The analyzer is set to linear detector mode.
- 4. Detector = Peak.
- 5. Sweep time = auto.
- 6. Trace mode = max hold.
- 7. Allow max hold to run for at least 50 traces if the transmitted signal is continuous or has at least 98 percent duty cycle. For lower duty cycles, increase the minimym number of traces by a factor of  $1/x$ , where x is the duty cycle.

**Note :**

1. We used the Method VB for 802.11n\_20/n\_40 to perform the average filed strength measurements.

FCC PT.15.407 TEST REPORT	FCC Part 15.407 WLAN(802.11n(20/40MHz)) – 5GHz Test Report		FCC ID : YM780-9500
Test Report No. 4325-3	Date of Issue: 11/27/2017	EUT : IP Camera	IC : 9637A-809500

## TEST RESULTS

9 kHz – 30MHz

**Operation Mode:** Normal Mode

Test Conditions:										
Frequency (MHz)	Meter dB $\mu$ V/m	Corr. Factor	Corr. Reading	Spec	Margin	Detector Type	Table Azimuth	Antenna Height	Polarity	Test Distance
No Signals Detected Within 10 dB of Limits										

### Notes:

1. Measuring frequencies from 9 kHz to the 30MHz.
2. The reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.
3. Distance extrapolation factor =  $40 \log (\text{specific distance} / \text{test distance})$  (dB)
4. Limit line = specific Limits (dB $\mu$ V) + Distance extrapolation factor
5. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

FCC PT.15.407 TEST REPORT	FCC Part 15.407 WLAN(802.11n(20/40MHz)) – 5GHz Test Report		FCC ID : YM780-9500
Test Report No. 4325-3	Date of Issue: 11/27/2017	EUT : IP Camera	IC : 9637A-809500

## TEST RESULTS

### Below 1 GHz

**Operation Mode:** Normal Mode

Test Conditions:										
Frequency (MHz)	Meter dB $\mu$ V/m	Corr. Factor	Corr. Reading	Spec	Margin	Detector Type	Table Azimuth	Antenna Height	Polarity	Test Distance
No Signals Detected Within 10 dB of Limits										

### Notes:

1. Measuring frequencies from 30 MHz to the 1 GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Quasi peak detector mode.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

FCC PT.15.407 TEST REPORT	FCC Part 15.407 WLAN(802.11n(20/40MHz)) – 5GHz Test Report		FCC ID : YM780-9500
Test Report No. 4325-3	Date of Issue: 11/27/2017	EUT : IP Camera	IC : 9637A-809500

## 1 GHz – 26.5 GHz

### Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. 5. We have done all data rate in 802.11n\_40 MHz BW. Worst case is 13.5 Mbps in 802.11n\_40 MHz BW.
6. 6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

4. To simplify report, worst case data for each UNII Band is shown here.

## 20 MHz Mode

### UNII-1

Test Conditions: UNII-1 802.11n 20 MHz 5180 CH 36

Frequency (MHz)	Meter dB <sub>P</sub> V/m	Corr. Factor	Corr. Reading	Spec	Margin	Detector Type	Table Azimuth	Antenna Height	Polarity	Test Distance
10360.00	34.50	23.27	57.77	74	16.23	PK	259	120	H	3 Meters
10360.00	23.60	23.27	46.87	54	7.13	AVE	162	119	H	3 Meters
7154.77	37.24	20.10	57.34	74	16.66	PK	201	125	V	3 Meters
7154.77	25.10	20.10	45.20	54	8.80	AVE	62	128	V	3 Meters
10360.00	33.56	23.27	56.83	74	17.17	PK	148	115	V	3 Meters
10360.00	24.56	23.27	47.83	54	6.17	AVE	141	120	V	3 Meters

### UNII-2A

Test Conditions: UNII-2A 802.11n 20 MHz 5300 CH 60

Frequency (MHz)	Meter dB <sub>P</sub> V/m	Corr. Factor	Corr. Reading	Spec	Margin	Detector Type	Table Azimuth	Antenna Height	Polarity	Test Distance
10600.00	39.19	23.52	62.71	74	11.29	PK	259	120	V	3 Meters
10600.00	24.11	23.52	47.63	54	6.37	AVE	162	119	V	3 Meters
1572.22	39.08	8.56	47.64	74	26.36	PK	201	125	H	3 Meters
1725.08	28.34	8.90	37.24	54	16.76	AVE	62	128	V	3 Meters
10600.00	35.40	23.52	58.92	74	15.08	PK	148	115	H	3 Meters
10600.00	25.51	23.52	49.03	54	4.97	AVE	141	120	H	3 Meters

FCC PT.15.407 TEST REPORT	FCC Part 15.407 WLAN(802.11n(20/40MHz)) – 5GHz Test Report			FCC ID : YM780-9500
Test Report No. 4325-3	Date of Issue: 11/27/2017		EUT : IP Camera	IC : 9637A-809500

**UNII-2C**

Test Conditions: UNII-2A 802.11n 20 MHz 5510 CH 102

Frequency (MHz)	Meter dB <sub>P</sub> V/m	Corr. Factor	Corr. Reading	Spec	Margin	Detector Type	Table Azimuth	Antenna Height	Polarity	Test Distance
11020.00	37.29	23.96	61.25	74	12.75	PK	119	283	V	3 Meters
11020.00	24.08	23.96	48.04	54	5.96	AVE	209	217	V	3 Meters
7726.27	36.22	20.63	56.85	74	17.15	PK	138	174	V	3 Meters
1594.38	35.68	8.61	44.29	74	29.71	PK	94	301	V	3 Meters
11020.00	35.40	23.96	59.36	74	14.64	PK	175	275	H	3 Meters
11020.00	25.51	23.96	49.47	54	4.53	AVE	117	240	H	3 Meters

**UNII-3**

Test Conditions: UNII-3 802.11n 20 MHz 5795 CH 159

Frequency (MHz)	Meter dB <sub>P</sub> V/m	Corr. Factor	Corr. Reading	Spec	Margin	Detector Type	Table Azimuth	Antenna Height	Polarity	Test Distance
11590.00	35.12	24.55	59.67	74	14.33	PK	216	192	V	3 Meters
11590.00	23.08	24.55	47.63	54	6.37	AVE	128	245	V	3 Meters
7270.94	34.78	20.20	20.20	74	53.80	PK	184	188	V	3 Meters
1554.88	34.12	8.52	42.64	74	31.36	PK	38	245	V	3 Meters
11590.00	35.11	24.55	59.66	74	14.34	PK	72	308	H	3 Meters
11590.00	24.35	24.55	48.90	54	5.10	AVE	155	250	H	3 Meters

**40 MHz Mode**
**UNII-1**

Test Conditions: UNII-1 802.11n 40 MHz 5510 CH 46

Frequency (MHz)	Meter dB <sub>P</sub> V/m	Corr. Factor	Corr. Reading	Spec	Margin	Detector Type	Table Azimuth	Antenna Height	Polarity	Test Distance
11020.00	37.82	23.96	61.78	74	12.22	PK	158	319	H	3 Meters
11020.00	25.44	23.96	49.40	54	4.60	AVE	174	257	H	3 Meters
2319.92	33.12	10.22	43.34	74	30.66	PK	92	158	V	3 Meters
1724.37	32.45	8.90	41.35	74	32.65	PK	308	184	H	3 Meters
11020.00	36.01	23.96	59.97	74	14.03	PK	188	246	V	3 Meters
11020.00	24.98	23.96	48.94	54	5.06	AVE	97	285	V	3 Meters

**UNII-2A**

Test Conditions: UNII-2A 802.11n 40 MHz 5270 CH 54

Frequency (MHz)	Meter dB <sub>P</sub> V/m	Corr. Factor	Corr. Reading	Spec	Margin	Detector Type	Table Azimuth	Antenna Height	Polarity	Test Distance
10540.00	35.61	23.46	59.07	74	14.93	PK	90	201	V	3 Meters
10540.00	24.23	23.46	47.69	54	6.31	AVE	212	249	V	3 Meters
9100.26	34.87	22.00	56.87	74	17.13	PK	188	172	H	3 Meters
7244.85	35.90	20.18	56.08	74	17.92	PK	164	257	H	3 Meters
10540.00	35.12	23.46	58.58	74	15.42	PK	92	290	H	3 Meters
10540.00	24.12	23.46	47.58	54	6.42	AVE	272	222	H	3 Meters

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**UNII-2C**

Test Conditions: UNII-2C 802.11n 40 MHz 5510 CH 110

Frequency (MHz)	Meter dB <sub>P</sub> V/m	Corr. Factor	Corr. Reading	Spec	Margin	Detector Type	Table Azimuth	Antenna Height	Polarity	Test Distance
11020.00	37.22	23.96	61.18	74	12.82	PK	90	201	H	3 Meters
11020.00	24.09	23.96	48.05	54	5.95	AVE	212	249	H	3 Meters
7124.11	36.72	20.07	56.79	74	17.21	PK	188	172	V	3 Meters
7124.11	24.93	20.07	45.00	54	9.00	AVE	164	257	V	3 Meters
11020.00	36.09	23.96	60.05	74	13.95	PK	92	290	V	3 Meters
11020.00	24.71	23.96	48.67	54	5.33	AVE	272	222	V	3 Meters

**UNII-3**

Test Conditions: UNII-3 802.11n 40 MHz 5755 CH 151

Frequency (MHz)	Meter dB <sub>P</sub> V/m	Corr. Factor	Corr. Reading	Spec	Margin	Detector Type	Table Azimuth	Antenna Height	Polarity	Test Distance
11510.00	37.31	24.47	61.78	74	12.22	PK	90	201	H	3 Meters
11510.00	24.59	24.47	49.06	54	4.94	AVE	212	249	H	3 Meters
1595.37	40.19	8.61	48.80	74	25.20	PK	188	172	V	3 Meters
1711.09	37.74	8.87	46.61	74	27.39	PK	164	257	H	3 Meters
11510.00	36.09	24.47	60.56	74	13.44	PK	92	290	V	3 Meters
11510.00	24.71	24.47	49.18	54	4.82	AVE	272	222	V	3 Meters

FCC PT.15.407 TEST REPORT	FCC Part 15.407 WLAN(802.11n(20/40MHz)) – 5GHz Test Report			FCC ID : YM780-9500
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## 8.6.2 RADIATED RESTRICTED BAND EDGE MEASUREMENTS

### Test Requirements and limit, §15.247(d) §15.205, §15.209

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

### 20 MHz Mode

UNII-1 5150 MHz CH 36

Test Conditions: UNII-1 802.11n 20 MHz 5150 CH 36								
Frequency (MHz)	Meter dB $\mu$ V/m	Corr. Factor	Corr. Reading	Spec	Margin	Detector Type	Polarity	Test Distance
5150.00	35.24	18.33	53.57	74	20.43	PK	V	3 Meters
5150.00	24.09	18.33	42.42	54	11.58	AVE	V	3 Meters
5150.00	32.77	18.33	51.10	74	22.90	PK	H	3 Meters
5150.00	24.89	18.33	43.22	54	10.78	AVE	H	3 Meters

UNII-1 5250 MHz CH 48

Test Conditions: UNII-1 802.11n 20 MHz 5250 CH 48								
Frequency (MHz)	Meter dB $\mu$ V/m	Corr. Factor	Corr. Reading	Spec	Margin	Detector Type	Polarity	Test Distance
5250.00	34.99	18.42	53.41	74	20.59	PK	V	3 Meters
5250.00	24.37	18.42	42.79	54	11.21	AVE	V	3 Meters
5250.00	33.75	18.42	52.17	74	21.83	PK	H	3 Meters
5250.00	25.01	18.42	43.43	54	10.57	AVE	H	3 Meters

UNII-2A 5250 MHz CH 52

Test Conditions: UNII-2A 802.11n 20 MHz 5250 CH 52								
Frequency (MHz)	Meter dB $\mu$ V/m	Corr. Factor	Corr. Reading	Spec	Margin	Detector Type	Polarity	Test Distance
5250.00	35.05	18.42	53.47	74	20.53	PK	V	3 Meters
5250.00	24.90	18.42	18.42	54	35.58	AVE	V	3 Meters
5250.00	34.78	18.42	53.20	74	20.80	PK	H	3 Meters
5250.00	24.39	18.42	42.81	54	11.19	AVE	H	3 Meters

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**UNII-2A 5350 CH 64**

Test Conditions: UNII-2A 802.11n 20 MHz 5350 CH 64								
Frequency (MHz)	Meter dB $\mu$ V/m	Corr. Factor	Corr. Reading	Spec	Margin	Detector Type	Polarity	Test Distance
5350.00	36.24	18.51	54.75	74	19.25	PK	V	3 Meters
5350.00	24.38	18.51	42.89	54	11.11	AVE	V	3 Meters
5350.00	35.50	18.51	54.01	74	19.99	PK	H	3 Meters
5350.00	24.84	18.51	43.35	54	10.65	AVE	H	3 Meters

**UNIII-2C 5470 CH 100**

Test Conditions: UNII-2C 802.11n 20 MHz 5470 CH 100								
Frequency (MHz)	Meter dB $\mu$ V/m	Corr. Factor	Corr. Reading	Spec	Margin	Detector Type	Polarity	Test Distance
5470.00	36.24	18.61	54.85	74	19.15	PK	V	3 Meters
5470.00	24.38	18.61	42.99	54	11.01	AVE	V	3 Meters
5470.00	35.50	18.61	54.11	74	19.89	PK	H	3 Meters
5470.00	24.84	18.61	43.45	54	10.55	AVE	H	3 Meters

**UNII-2C 5725 CH 144**

Test Conditions: UNII-2C 802.11n 20 MHz 5725 CH 144								
Frequency (MHz)	Meter dB $\mu$ V/m	Corr. Factor	Corr. Reading	Spec	Margin	Detector Type	Polarity	Test Distance
5725.00	36.22	18.84	55.06	74	18.94	PK	V	3 Meters
5725.00	24.41	18.84	43.25	54	10.75	AVE	V	3 Meters
5725.00	35.38	18.84	18.84	74	55.16	PK	H	3 Meters
5725.00	24.83	18.84	43.67	54	10.33	AVE	H	3 Meters

**UNII-3 5725 CH 149**

Test Conditions: UNII-2C 802.11n 20 MHz 5725 CH 149								
Frequency (MHz)	Meter dB $\mu$ V/m	Corr. Factor	Corr. Reading	Spec	Margin	Detector Type	Polarity	Test Distance
5725.00	35.47	18.84	54.31	74	19.69	PK	V	3 Meters
5725.00	23.98	18.84	42.82	54	11.18	AVE	V	3 Meters
5725.00	36.01	18.84	54.85	74	19.15	PK	H	3 Meters
5725.00	24.35	18.84	43.19	54	10.81	AVE	H	3 Meters

**UNII-3 5850 CH 165**

Test Conditions: UNII-3 802.11n 20 MHz 5850 CH 165								
Frequency (MHz)	Meter dB $\mu$ V/m	Corr. Factor	Corr. Reading	Spec	Margin	Detector Type	Polarity	Test Distance
5850.00	36.25	18.95	55.20	74	18.80	PK	V	3 Meters
5850.00	24.75	18.95	43.70	54	10.30	AVE	V	3 Meters
5850.00	35.22	18.95	54.17	74	19.83	PK	H	3 Meters
5850.00	25.09	18.95	44.04	54	9.96	AVE	H	3 Meters

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## 40 MHz MODE

UNII-1 5150 CH38

Test Conditions: UNII-1 802.11n 40 MHz 5150 CH 38								
Frequency (MHz)	Meter dB $\mu$ V/m	Corr. Factor	Corr. Reading	Spec	Margin	Detector Type	Polarity	Test Distance
5150.00	36.28	18.33	54.61	74	19.39	PK	V	3 Meters
5150.00	24.63	18.33	42.96	54	11.04	AVE	V	3 Meters
5150.00	36.44	18.33	54.77	74	19.23	PK	H	3 Meters
5150.00	25.12	18.33	43.45	54	10.55	AVE	H	3 Meters

UNII-1 5250 CH 46

Test Conditions: UNII-1 802.11n 40 MHz 5250 CH 46								
Frequency (MHz)	Meter dB $\mu$ V/m	Corr. Factor	Corr. Reading	Spec	Margin	Detector Type	Polarity	Test Distance
5250.00	34.89	18.42	53.31	74	20.69	PK	V	3 Meters
5250.00	23.59	18.42	42.01	54	11.99	AVE	V	3 Meters
5250.00	36.09	18.42	54.51	74	19.49	PK	H	3 Meters
5250.00	24.85	18.42	43.27	54	10.73	AVE	H	3 Meters

UNII-2A 5250 CH54

Test Conditions: UNII-1 802.11n 40 MHz 5250 CH 54								
Frequency (MHz)	Meter dB $\mu$ V/m	Corr. Factor	Corr. Reading	Spec	Margin	Detector Type	Polarity	Test Distance
5250.00	35.54	18.42	53.96	74	20.04	PK	V	3 Meters
5250.00	23.95	18.42	42.37	54	11.63	AVE	V	3 Meters
5250.00	35.70	18.42	54.12	74	19.88	PK	H	3 Meters
5250.00	24.49	18.42	42.91	54	11.09	AVE	H	3 Meters

UNII-2A 5350 CH62

Test Conditions: UNII-1 802.11n 40 MHz 5350 CH 62								
Frequency (MHz)	Meter dB $\mu$ V/m	Corr. Factor	Corr. Reading	Spec	Margin	Detector Type	Polarity	Test Distance
5350.00	36.45	18.51	54.96	74	19.04	PK	V	3 Meters
5350.00	25.11	18.51	43.62	54	10.38	AVE	V	3 Meters
5350.00	36.12	18.51	54.63	74	19.37	PK	H	3 Meters
5350.00	24.71	18.51	43.22	54	10.78	AVE	H	3 Meters

UNII-2C 5470 102

Test Conditions: UNII-2C 802.11n 40 MHz 5470 CH102								
Frequency (MHz)	Meter dB $\mu$ V/m	Corr. Factor	Corr. Reading	Spec	Margin	Detector Type	Polarity	Test Distance
5470.00	35.37	18.61	53.98	74	20.02	PK	V	3 Meters
5470.00	24.61	18.61	43.22	54	10.78	AVE	V	3 Meters
5470.00	35.60	18.61	54.21	74	19.79	PK	H	3 Meters
5470.00	23.98	18.61	42.59	54	11.41	AVE	H	3 Meters

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UNII-2C 5725 CH 142

Test Conditions: UNII-1 802.11n 40 MHz 5725 CH 142								
Frequency (MHz)	Meter dB $\mu$ V/m	Corr. Factor	Corr. Reading	Spec	Margin	Detector Type	Polarity	Test Distance
5725.00	37.39	18.84	56.23	74	17.77	PK	V	3 Meters
5725.00	26.03	18.84	44.87	54	9.13	AVE	V	3 Meters
5725.00	36.09	18.84	54.93	74	19.07	PK	H	3 Meters
5725.00	24.23	18.84	43.07	54	10.93	AVE	H	3 Meters

UNII-2C 5850 CH 159

Test Conditions: UNII-1 802.11n 40 MHz 5850 CH 159								
Frequency (MHz)	Meter dB $\mu$ V/m	Corr. Factor	Corr. Reading	Spec	Margin	Detector Type	Polarity	Test Distance
5725.00	38.51	18.84	57.35	74	16.65	PK	V	3 Meters
5725.00	26.52	18.84	45.36	54	8.64	AVE	V	3 Meters
5725.00	37.52	18.84	56.36	74	17.64	PK	H	3 Meters
5725.00	25.84	18.84	44.68	54	9.32	AVE	H	3 Meters

## 8.7 POWERLINE CONDUCTED EMISSIONS

### Test Requirements and limit, §15.207

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency Range (MHz)	Limits (dB $\mu$ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

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## Test Configuration

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

## TEST PROCEDURE

1. The EUT is placed on a wooden table 80 cm above the reference groundplane.
2. The EUT is connected via LISN to a test power supply.
3. The measurement results are obtained as described below:
4. Detectors – Quasi Peak and Average Detector.
5. We are performed the AC Power Line Conducted Emission test for 6 Mbps, Ch.52 and 802.11a mode in UNII 2. Because 802.11a mode in UNII 2 is worst case.

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## ■ RESULT DATA

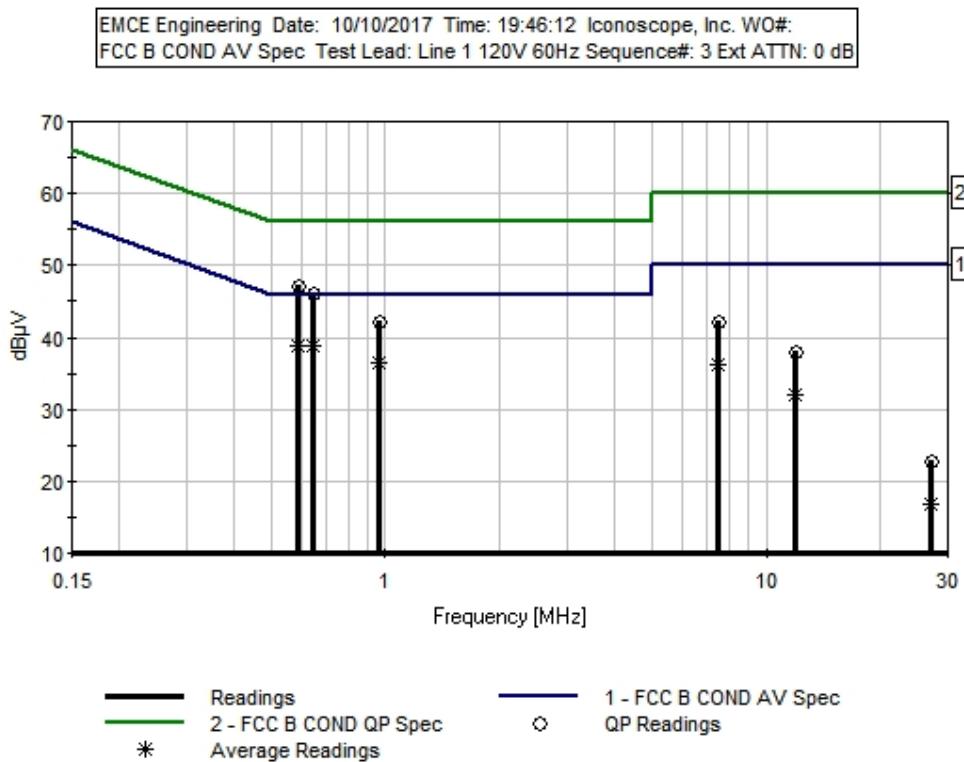
### Measurement Data:

Test Lead: Line 1

#	Freq MHz	Rdng dB $\mu$ V	T1 dB	T2 dB	Dist Table	Corr dB $\mu$ V	Spec dB $\mu$ V	Margin dB	Polar Ant
1	586.324k	46.4	+0.6	+0.1		+0.0	47.1	56.0	-8.9 Line
	QP								
2	586.324k	38.1	+0.6	+0.1		+0.0	38.8	46.0	-7.2 Line
	Ave								
3	647.974k	45.5	+0.6	+0.1		+0.0	46.2	56.0	-9.8 Line
	QP								
4	647.974k	38.0	+0.6	+0.1		+0.0	38.7	46.0	-7.3 Line
	Ave								
5	964.131k	41.6	+0.5	+0.1		+0.0	42.2	56.0	-13.8 Line
	QP								
6	964.131k	35.9	+0.5	+0.1		+0.0	36.5	46.0	-9.5 Line
	Ave								
7	7.490M	41.3	+0.7	+0.1		+0.0	42.1	60.0	-17.9 Line
	QP								
8	7.490M	35.5	+0.7	+0.1		+0.0	36.3	50.0	-13.7 Line
	Ave								
9	11.912M	37.2	+0.7	+0.1		+0.0	38.0	60.0	-22.0 Line
	QP								
10	11.912M	31.1	+0.7	+0.1		+0.0	31.9	50.0	-18.1 Line
	Ave								
11	27.120M	22.0	+0.8	+0.1		+0.0	22.9	60.0	-37.1 Line
	QP								
12	27.120M	16.0	+0.8	+0.1		+0.0	16.9	50.0	-33.1 Line
	Ave								

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## Conducted Emissions (Line 2)



### Measurement Data:

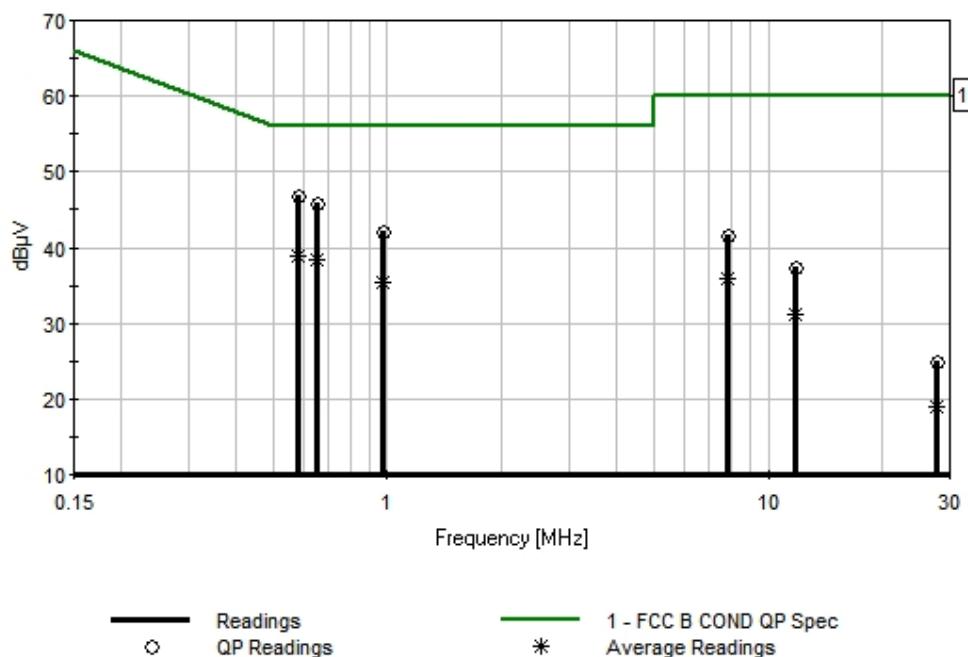
Test Lead: Line 2

#	Freq MHz	Rdng dB $\mu$ V	T1 dB	T2 dB	Dist Table	Corr dB $\mu$ V	Spec dB $\mu$ V	Margin dB	Polar Ant
1	584.009k QP	46.2	+0.6	+0.1	+0.0	46.9	56.0	-9.1	Line
2	584.009k Ave	38.3	+0.6	+0.1	+0.0	39.0	46.0	-7.0	Line
3	650.000k QP	45.1	+0.6	+0.1	+0.0	45.8	56.0	-10.2	Line
4	650.000k Ave	37.6	+0.6	+0.1	+0.0	38.3	46.0	-7.7	Line
5	975.615k QP	41.4	+0.5	+0.1	+0.0	42.0	56.0	-14.0	Line
6	975.615k Ave	34.7	+0.5	+0.1	+0.0	35.3	46.0	-10.7	Line

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7	7.837M	40.8	+0.7	+0.1		+0.0	41.6	60.0	-18.4	Line
	QP									
8	7.837M	35.0	+0.7	+0.1		+0.0	35.8	50.0	-14.2	Line
	Ave									
9	11.782M	36.7	+0.7	+0.1		+0.0	37.5	60.0	-22.5	Line
	QP									
10	11.782M	30.3	+0.7	+0.1		+0.0	31.1	50.0	-18.9	Line
	Ave									
11	27.679M	24.0	+0.8	+0.1		+0.0	24.9	60.0	-35.1	Line
	QP									
12	27.679M	18.0	+0.8	+0.1		+0.0	18.9	50.0	-31.1	Line
	Ave									

EMCE Engineering Date: 10/10/2017 Time: 20:01:38 Iconoscope, Inc. WO#:  
FCC B COND QP Spec Test Lead: Line 2 120V 60Hz Sequence#: 4 Ext ATTN: 0 dB



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## 9. LIST OF TEST EQUIPMENT

Manufacturer	Model / Equipment	Calibration Interval	Calibration Due	Serial No.
Omega	IBTHXBP / Temp & Humidity Meter	Annual	07/08/2018	14490199
Fluke	87 / DMM	Annual	07/28/2018	64920001
ETS	EmPower / Power Sensor	Annual	08/09/2018	141000-48SNO051
EMCO	3816-2 / LISN	Annual	08/12/2018	9809-1089
Rohde & Schwarz	FSV40 / Spectrum Analyzer	Annual	07/20/2018	101424
Sunol Sciences	JB6 / Bi-Conilog Antenna	Annual	07/08/2018	A042610
A.H. Systems	SAS- 571 / Horn Antenna	Annual	07/13/2018	236

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