

CERTIFICATION TEST REPORT

Report Number.: 12742213-E1V3

Applicant : SATELLITE TRACKING OF PEOPLE LLC

1212 NORTH POST OAK RD, SUITE 100,

HOUSTON, TX 77055, U.S.A.

Model: BluHome

FCC ID: S5EBHV40318

IC: 9086A-BHV40318

EUT Description : OFFENDER HOME MONITORING BASE STATION

Test Standard(s): FCC 47 CFR PART 15 SUBPART C

ISED RSS-247 ISSUE 2 ISED RSS-GEN ISSUE 5

Date Of Issue:

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Prepared by:

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REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	3/8/2019	Initial Issue	
V2	3/14/2019	Updated page 21 typo	Tina Chu
V3	3/20/2019	Updated page 37	Tina Chu

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SATELLITE TRACKING OF PEOPLE LLC

1212 NORTH POST OAK RD, SUITE 100,

HOUSTON, TX 77055, U.S.A.

EUT DESCRIPTION: OFFENDER HOME MONITORING BASE STATION

MODEL: BluHome

SERIAL NUMBER: 13-800024, 13-800028(RADIATED); 13-800030 (CONDUCTED)

DATE TESTED: FEBRUARY 28, 2019 –MARCH 05, 2019

APPLICABLE STANDARDS

STANDARD TEST RESULTS

CFR 47 Part 15 Subpart C Complies
ISED RSS-247 Issue 2 Complies
ISED RSS-GEN Issue 5 Complies

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of the U.S. government.

REPORT NO: 12742213-E1V3 FCC ID: S5EBHV40318

Approved & Released For UL Verification Services Inc. By:

Prepared By:

FRANCISCO DE ANDA OPERATIONS LEAD

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UL Verification Services Inc.

ERIC YU
TEST ENGINEER
UL Verification Services Inc.

DATE: 3/20/2019

IC: 9086A-BHV40318

Reviewed By:

TINA CHU SENIOR PROJECT ENGINEER UL Verification Services Inc.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2013, KDB 558074 D01 15.247 Meas Guidance v05, RSS-GEN Issue 5, and RSS-247 Issue 2.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, and 47658 Kato Road, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street	47658 Kato Rd
Chamber A (ISED:2324B-1)	Chamber D (ISED:22541-1)	Chamber I (ISED:2324A-5)
Chamber B (ISED:2324B-2)	Chamber E (ISED:22541-2)	Chamber J (ISED:2324A-6)
Chamber C (ISED:2324B-3)	Chamber F (ISED:22541-3)	Chamber K (ISED:2324A-1)
	Chamber G (ISED:22541-4)	Chamber L (ISED:2324A-3)
	Chamber H (ISED:22541-5)	

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers above are covered under Industry Canada company address and respective code

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided: Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) - Preamp Gain (dB) 36.5 dBuV + 18.7 dB/m + 0.6 dB - 26.9 dB = 28.9 dBuV/m

MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided: Final Voltage (dBuV) = Measured Voltage (dBuV) + Cable Loss (dB) + Limiter Factor (dB) + LISN Insertion Loss. 36.5 dBuV + 0 dB + 10.1 dB + 0 dB = 46.6 dBuV

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.84 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.65 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz	2.52 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	4.88 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.24 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.37 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.17 dB

Uncertainty figures are valid to a confidence level of 95%.

5. EQUIPMENT UNDER TEST

5.1. EUT DESCRIPTION

The EUT is an offender home monitoring base station. It is a desktop device that includes 915 MHz (LoRa) ISM Proximity application, Cellular/Wifi/PSTN support and location services based via GNSS.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted peak output power as follows:

Frequency Range	Mode	Output Power	Output Power
(MHz)		(dBm)	(mW)
	802.11b	21.38	137.40
2412 - 2462	802.11g	22.22	166.72
	802.11n HT20	22.03	159.59

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The EUT is using a PCB trace antenna with a peak gain of 1.95dBi in the 2.4 GHz band.

5.4. SOFTWARE AND FIRMWARE

The software used in the EUT during testing was version BluHome V4 UL Test Code V2_8.hex.

5.5. WORST-CASE CONFIGURATION AND MODE

Radiated emissions below 1GHz, above 18GHz, and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

Band edge and radiated emissions between 1GHz and 18GHz were performed with the EUT set to transmit at the highest power on low, middle and high channels.

The EUT is a desktop device (X-Orientation, Flatbed). Therefore, all final radiated testing was performed with the EUT in desktop orientation (X-Orientation, Flatbed).

Worst-case data rates as provided by the client were:

802.11b mode: 1 Mbps 802.11g mode: 6 Mbps 802.11n HT20mode: MCS0

915MHz, Wifi and cellular do not transmit simultaneously.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT & PERIPHERALS

N/A

I/O CABLES (CONDUCTED EMISSIONS)

	I/O CABLE LIST							
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks		
1	AC/DC	1	2-prong	Unshielded	1.5	Attached cable		
2	Antenna	1	SMA	Shielded	0.05			

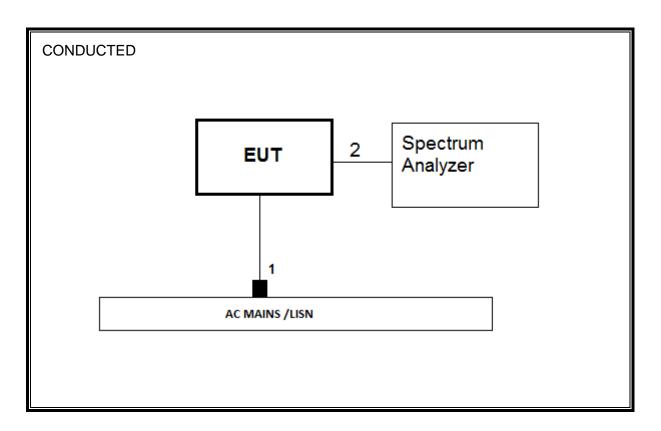
I/O CABLES (RADIATED EMISSIONS AND AC POWER LINE EMISSIONS)

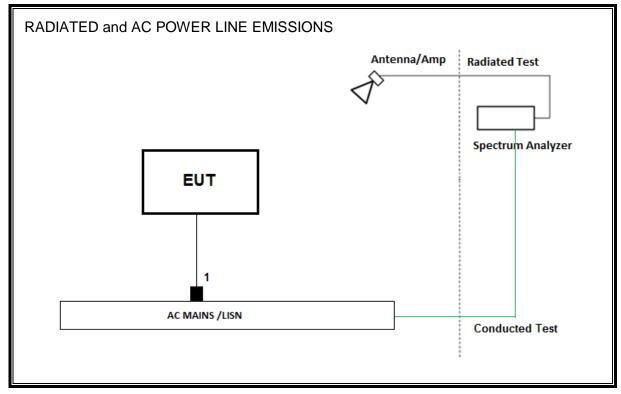
	I/O CABLE LIST							
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks		
1	AC/DC	1	2-prong	Unshielded	1.5	Attached cable		

TEST SETUP-CONDUCTED TEST

The EUT was installed in a typical configuration. Refer to the following diagram;

SETUP DIAGRAM





6. MEASUREMENT METHOD

6 dB BW: ANSI C63.10 Subclause -11.8.1

Output Power: ANSI C63.10 Subclause -11.9.1.3 Method PKPM1 Peak-reading power meter

<u>Average Output Power:</u>ANSI C63.10 Subclause -11.9.2.3.2 Method AVGPM-G (Measurement using a gated RF average-reading power meter)

PSD: ANSI C63.10 Subclause -11.10.2 Method PKPSD (peak PSD)

Radiated emissions non-restricted frequency bands: ANSI C63.10 Subclause -11.11

Radiated emissions restricted frequency bands: ANSI C63.10 Subclause -11.12.1

Conducted emissions in restricted frequency bands: ANSI C63.10 Subclause -11.12.2

<u>Band-edge:</u> ANSI C63.10 Subclause -11.13.3.4 Trace averaging across ON and OFF times of the EUT transmissions followed by duty cycle correction

AC Power Line Conducted Emissions: ANSI C63.10-2013, Section 6.2.

Radiated Spurious Emissions Below 30MHz: ANSI C63.10-2013 Section 6.4

7. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST								
Description	Manufacturer	Model	ID Num	Cal Due	Last Cal			
Power Meter, P-series single channel	Agilent (Keysight) Technologies	N1911A	T1271	07/26/2019	07/26/2018			
Power Sensor, P-series, 50MHz to 18GHz, Wideband	Agilent (Keysight) Technologies	N1921A	T1224	10/09/2019	10/09/2018			
Loop Antenna 30Hz-1MHz	Electro Metrics	EM-6871	PRE0179465	5/22/2019	05/22/2018			
Loop Antenna 100KHz-30MHz	Electro Metrics	EM-6872	PRE0179467	5/22/2019	05/22/2018			
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T344	04/30/2019	04/30/2018			
Amplifier, 1 to18GHz, 35dB	AMOLICAL	AMP1G18-35	T1569	06/03/2019	06/03/2018			
Antenna, Horn 1-18GHz	AR	AMPL- ATH1G18	PRE0189055	04/20/2019	04/20/2018			
Amplifier, 1 to 18GHz, 35dB	AMPLICAL	AMP1G18-35	T1571	07/30/2019	07/30/2018			
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	PRE0179367	04/25/2019	04/25/2018			
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	PRE0179375	05/08/2019	05/08/2018			
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	PRE0179372	05/04/2019	05/04/2018			
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T341	09/26/2019	09/26/2018			
Amplifier, 9KHz to 1GHz, 32dB	Sonoma Instrument	310	PRE0186650	12/13/2019	12/13/2018			
Hybrid Antenna, 30MHz to 3GHz	SunAR rf motion	JB3	PRE0184052	10/24/2019	10/24/2018			
Antenna Horn, 18 to 26.5GHz	ARA	MWH-1826/B	T448	03/13/2019	03/13/2018			
Pre-Amp 1-26.5 GHz	Agilent	8449B	T404	03/09/2019	03/09/2018			
	AC Line Co	nducted						
EMI Receiver	Rohde & Schwarz	ESR	T1436	02/14/2020	02/14/2019			
LISN for Conducted Emissions CISPR-16	FCC INC.	FCC LISN 50/250	T1310	06/15/2019	06/15/2018			
	Test Softw	are List						
Radiated Software	UL	UL EMC		Ver 9.5, June 22, 2018				
Antenna Port Software	UL	UL	UL RF Ver 9.4.1, Feb 19, 20		eb 19, 2019			
AC Line Conducted Software	UL	UL E	MC	Ver 9.5, May	/ 26, 2015			

8. ANTENNA PORT TEST RESULTS

8.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

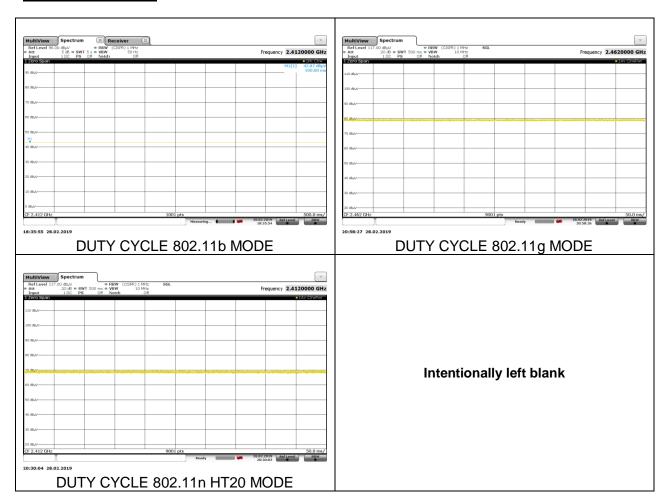
PROCEDURE

ANSI C63.10, Section 11.6: Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time	Period	Duty Cycle	Duty	Duty Cycle	1/B
	В		х	Cycle	Correction Factor	Minimum VBW
	(msec)	(msec)	(linear)	(%)	(dB)	(kHz)
2.4GHz Band						
802.11b 1TX	500.0	500.0	1.000	100.00%	0.00	0.010
802.11g 1TX	500.0	500.0	1.000	100.00%	0.00	0.010
802.11n HT20 1TX	500.0	500.0	1.000	100.00%	0.00	0.010

DUTY CYCLE PLOTS



8.2. 99% BANDWIDTH

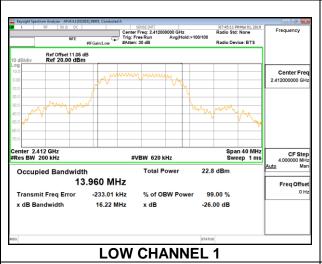
LIMITS

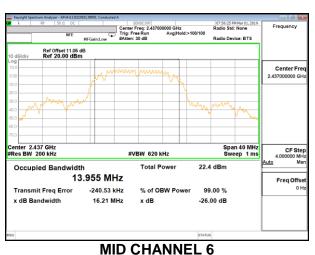
None; for reporting purposes only.

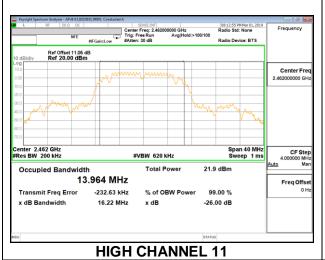
RESULTS

8.2.1. 802.11b MODE

Channel	Frequency	99% Bandwidth
	(MHz)	(MHz)
Low 1	2412	13.960
Mid 6	2437	13.955
High 11	2462	13.964



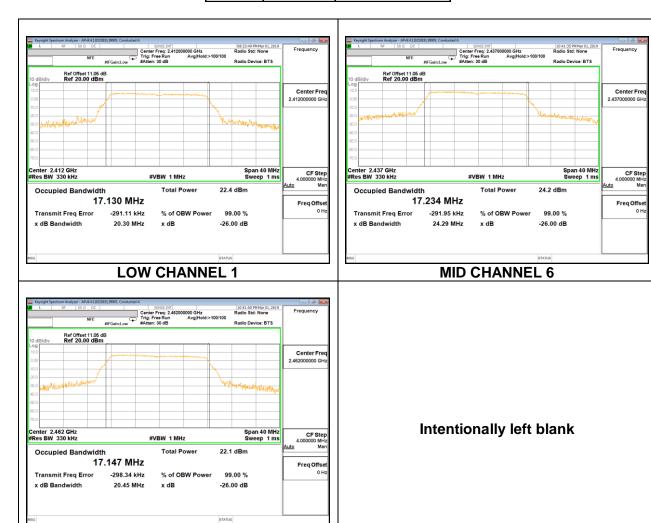




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8.2.2. 802.11g MODE

Channel	Frequency	99% Bandwidth
	(MHz)	(MHz)
Low 1	2412	17.130
Mid 6	2437	17.234
High 11	2462	17.147

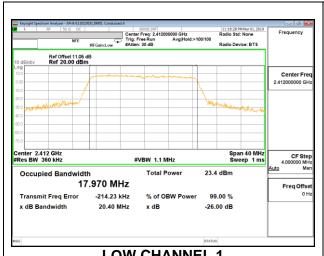


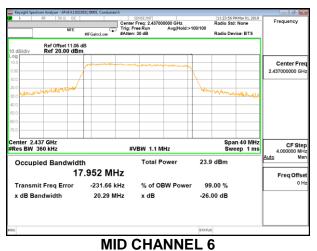
HIGH CHANNEL 11

REPORT NO: 12742213-E1V3 DATE: 3/20/2019 IC: 9086A-BHV40318 FCC ID: S5EBHV40318

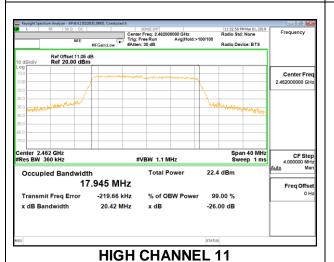
8.2.3. 802.11n HT20 MODE

Cha	nnel	Frequency	99% Bandwidth
		(MHz)	(MHz)
Lov	w 1	2412	17.970
Mi	d 6	2437	17.952
Hig	h 11	2462	17.945





LOW CHANNEL 1



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8.3. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

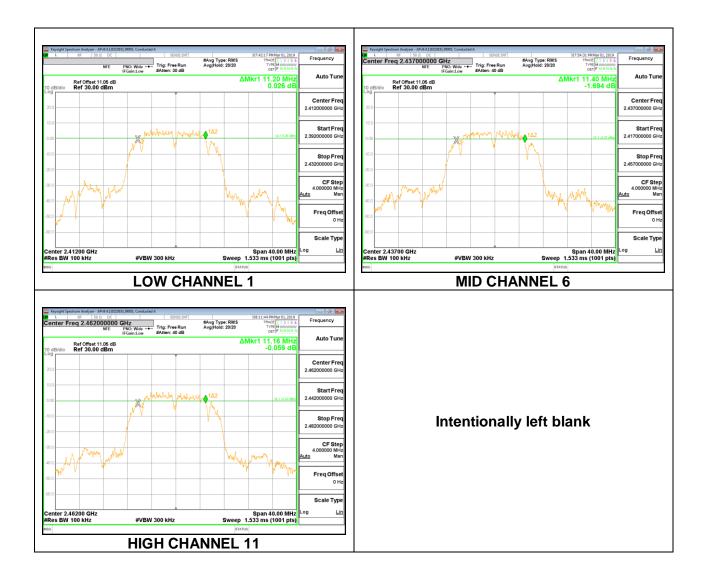
RSS-247 5.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

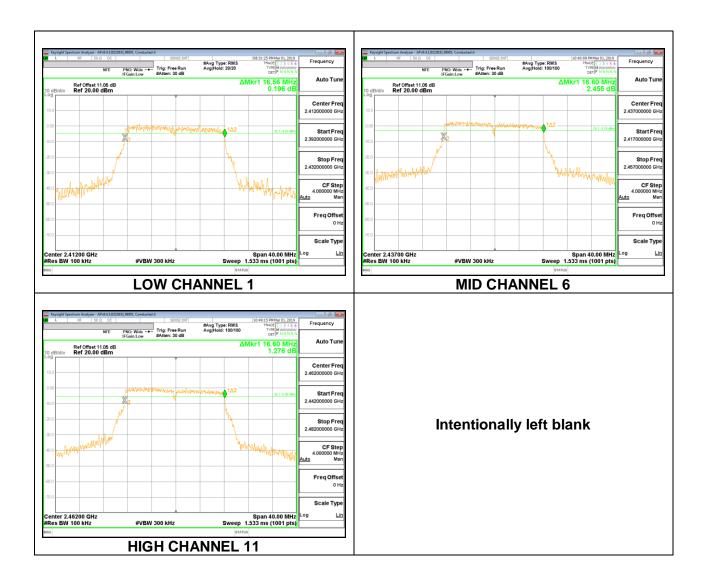
8.3.1. 802.11b MODE

Channel	Frequency	6 dB Bandwidth	Minimum Limit
	(MHz)	(MHz)	(MHz)
Low 1	2412	11.20	0.5
Mid 6	2437	11.40	0.5
High 11	2462	11.16	0.5



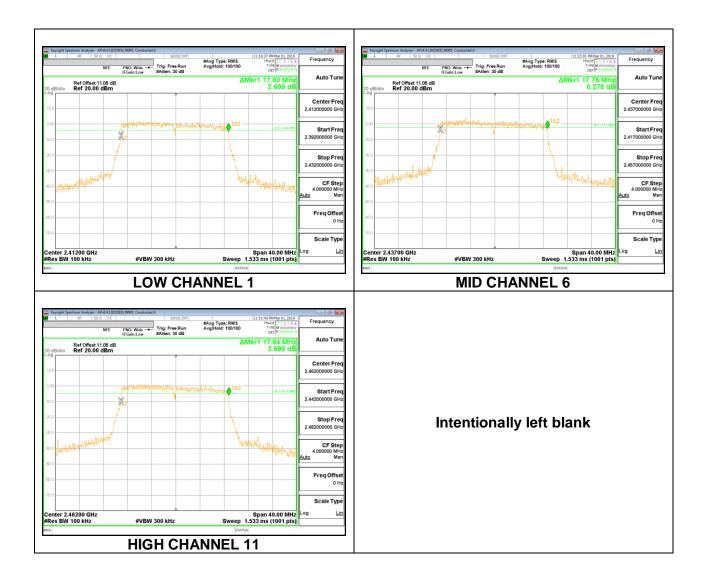
8.3.2. 802.11g MODE

Channel	Frequency	6 dB Bandwidth	Minimum Limit
	(MHz)	(MHz)	(MHz)
Low 1	2412	16.56	0.5
Mid 6	2437	16.60	0.5
High 11	2462	16.60	0.5



8.3.3. 802.11n HT20 MODE

Channel	Frequency	6 dB Bandwidth	Minimum Limit
	(MHz)	(MHz)	(MHz)
Low 1	2412	17.80	0.5
Mid 6	2437	17.76	0.5
High 11	2462	17.84	0.5



8.4. OUTPUT POWER

LIMITS

FCC §15.247 (b) (3)

RSS-247 5.4 (d)

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11.05 dB (including 10 dB pad and 1.05 dB cable) was entered as an offset in the power meter to allow for a gated peak reading of power.

DIRECTIONAL ANTENNA GAIN

For 1 TX:

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

RESULTS

Tested By:	29435 TC
Date:	3/5/2019

8.4.1. 802.11b MODE

Limits

Channel	Frequency	Directional	FCC	ISED	ISED	Max
		Gain	Power	Power	EIRP	Power
			Limit	Limit	Limit	
	(MHz)	(dBi)	(dBm)	(dBm)	(dBm)	(dBm)
Low 1	2412	1.95	30.00	30	36	30.00
Mid 6	2437	1.95	30.00	30	36	30.00
High 11	2462	1.95	30.00	30	36	30.00

Results

TTOOUTTO					
Channel	Frequency		Total	Power	Margin
		Meas	Corr'd	Limit	
		Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low 1	2412	21.38	21.38	30.00	-8.62
Mid 6	2437	20.86	20.86	30.00	-9.14
High 11	2462	20.65	20.65	30.00	-9.35

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8.4.2. 802.11g MODE

Limits

Channel	Frequency	Directional	FCC	ISED	ISED	Max
		Gain	Power	Power	EIRP	Power
			Limit	Limit	Limit	
	(MHz)	(dBi)	(dBm)	(dBm)	(dBm)	(dBm)
Low 1	2412	1.95	30.00	30	36	30.00
Mid 6	2437	1.95	30.00	30	36	30.00
High 11	2462	1.95	30.00	30	36	30.00

Results

Channel	Frequency		Total	Power	Margin
		Meas	Corr'd	Limit	
		Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low 1	2412	22.22	22.22	30.00	-7.78
Mid 6	2437	21.96	21.96	30.00	-8.04
High 11	2462	21.76	21.76	30.00	-8.24

8.4.3. 802.11n HT20 MODE

Limits

Channel	Frequency	Directional	FCC	ISED	ISED	Max	
		Gain	Power	Power	EIRP	Power	
			Limit	Limit	Limit		
	(MHz)	(dBi)	(dBm)	(dBm)	(dBm)	(dBm)	
Low 1	2412	1.95	30.00	30	36	30.00	
Mid 6	2437	1.95	30.00	30	36	30.00	
High 11	2462	1.95	30.00	30	36	30.00	

Results

11000110					
Channel	Frequency		Total	Power	Margin
		Meas	Corr'd	Limit	
		Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low 1	2412	21.36	21.36	30.00	-8.64
Mid 6	2437	21.10	21.10	30.00	-8.90
High 11	2462	22.03	22.03	30.00	-7.97

8.5. AVERAGE POWER

LIMITS

None; for reporting purposes only

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11.05 dB (including 10 dB pad and 1.05 dB cable) was entered as an offset in the power meter to allow for a gated average reading of power

RESULTS

Tested By:	29435 TC
Date:	3/5/2019

8.5.1. 802.11b MODE

Channel	Frequency	Chain 0
		Power
	(MHz)	(dBm)
Low 1	2412	18.64
Mid 6	2437	18.12
High 11	2462	17.78

8.5.2. 802.11g MODE

Channel	Frequency	Chain 0
		Power
	(MHz)	(dBm)
Low 1	2412	15.12
Mid 6	2437	15.37
High 11	2462	14.74

8.5.3. 802.11n HT20 MODE

Channel	Frequency	Chain 0
		Power
	(MHz)	(dBm)
Low 1	2412	15.25
Mid 6	2437	14.56
High 11	2462	14.97

8.6. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

RSS-247 (5.2) (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

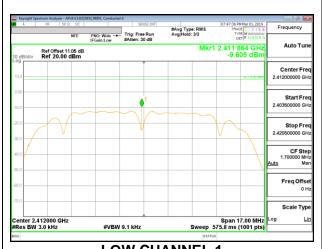
RESULTS

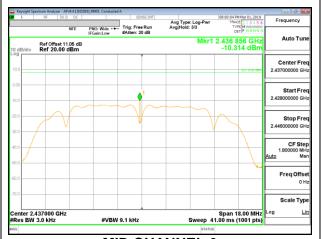
8.6.1. 802.11b MODE

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD

PSD Results

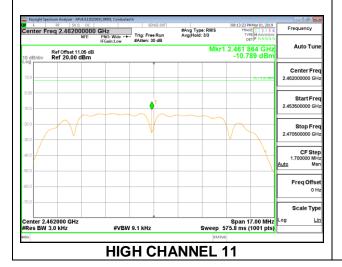
Channel	Frequency	Chain 0	Total	Limit	Margin
		Meas	Corr'd		
	(MHz)		PSD		
		(dBm/	(dBm/	(dBm/	
		3kHz)	3kHz)	3kHz)	(dB)
Low 1	2412	-9.61	-9.61	8.0	-17.6
Mid 6	2437	-10.31	-10.31	8.0	-18.3
High 11	2462	-10.79	-10.79	8.0	-18.8





LOW CHANNEL 1

MID CHANNEL 6



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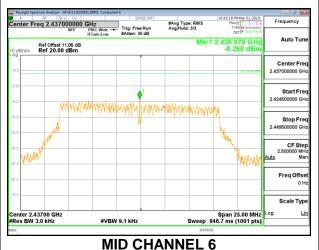
8.6.2. 802.11g MODE

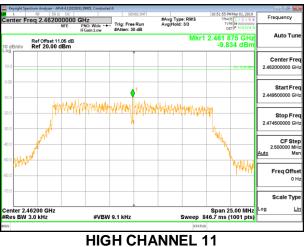
Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD

PSD Results

Channel	Frequency	Chain 0	Total	Limit	Margin
		Meas	Corr'd		
	(MHz)		PSD		
		(dBm/	(dBm/	(dBm/	
		3kHz)	3kHz)	3kHz)	(dB)
Low 1	2412	-8.33	-8.33	8.0	-16.3
Mid 6	2437	-8.27	-8.27	8.0	-16.3
High 11	2462	-9.83	-9.83	8.0	-17.8





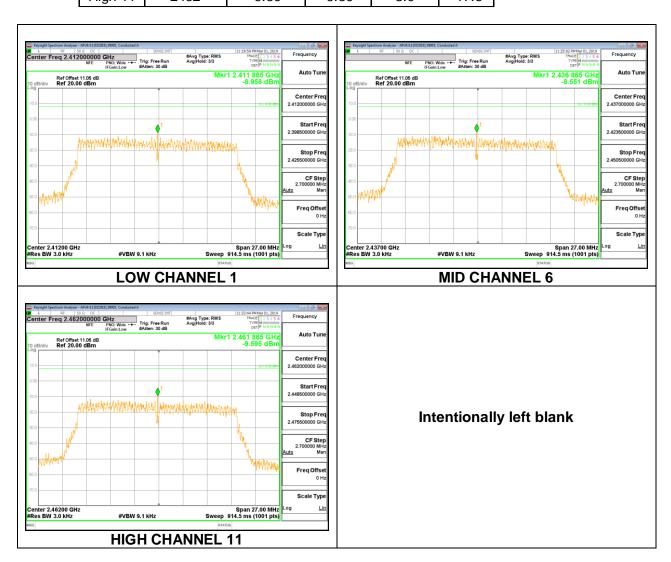


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8.6.3. 802.11n HT20 MODE

Duty Cycle CF (dB) 0.00		Included in Calculations of Corr'd PSD		
PSD Results				

1 3D Nesults							
Channel	Frequency	Chain 0	Total	Limit	Margin		
		Meas	Corr'd				
	(MHz)		PSD				
		(dBm/	(dBm/	(dBm/			
		3kHz)	3kHz)	3kHz)	(dB)		
Low 1	2412	-8.96	-8.96	8.0	-17.0		
Mid 6	2437	-8.55	-8.55	8.0	-16.6		
High 11	2462	-9.60	-9.60	8.0	-17.6		



8.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

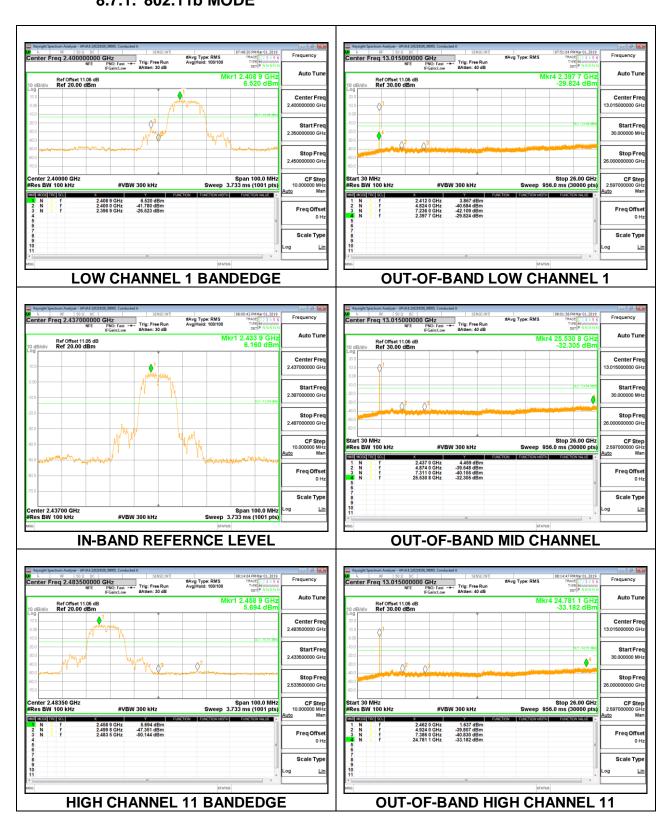
FCC §15.247 (d)

RSS-247 5.5

Output power was measured based on the use of peak measurement, therefore the required attenuation is 20 dB.

RESULTS

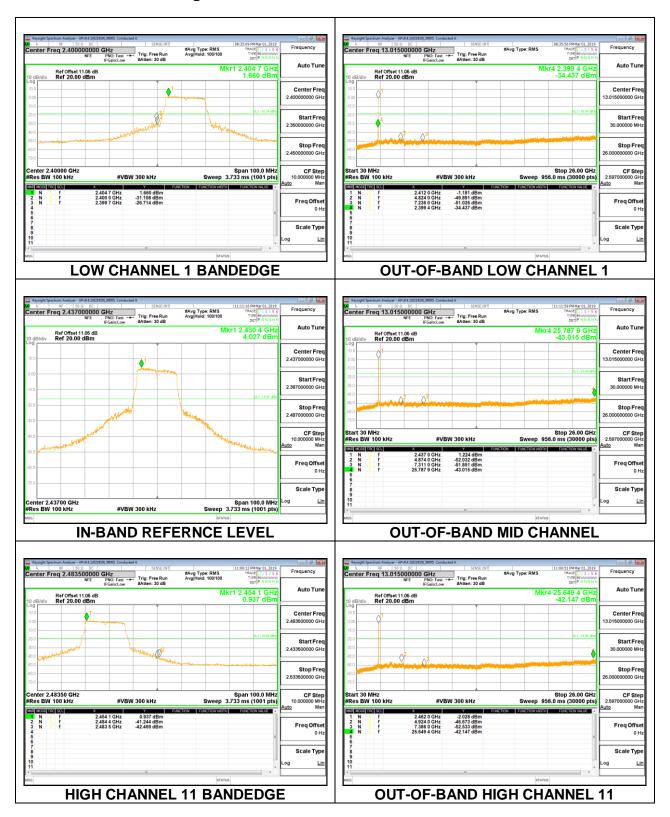
8.7.1. 802.11b MODE



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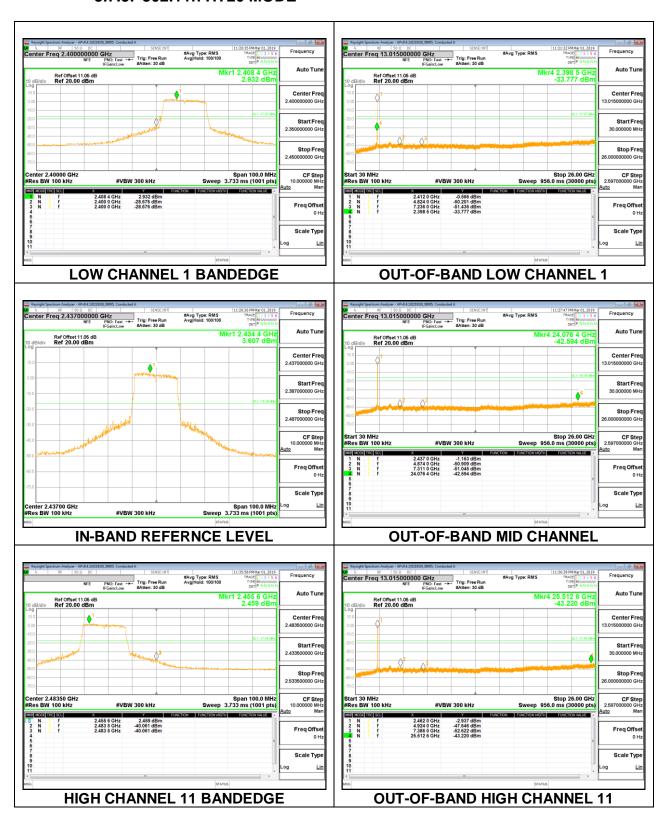
8.7.2. 802.11g MODE



DATE: 3/20/2019

IC: 9086A-BHV40318

8.7.3. 802.11n HT20 MODE



DATE: 3/20/2019

IC: 9086A-BHV40318