



FCC RF CO-LOCATION TEST REPORT

FCC ID : UZ7PS20J
Equipment : PS20 Personal Shopper
Brand Name : ZEBRA
Model Name : PS20J
Applicant : Zebra Technologies Corporation
1 Zebra Plaza Holtsville, NY 11742
Manufacturer : Zebra Technologies Corporation
1 Zebra Plaza Holtsville, NY 11742
Standard : FCC Part 15 Subpart E §15.407

The product was received on Jun. 02, 2018 and testing was started from Aug. 18, 2018 and completed on Sep. 05, 2018. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: Joseph Lin

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



Table of Contents

History of this test report.....	3
Summary of Test Result.....	4
1 General Description	5
1.1 Product Feature of Equipment Under Test.....	5
1.2 Product Specification of Equipment Under Test.....	5
1.3 Modification of EUT	5
1.4 Testing Location	6
1.5 Applicable Standards.....	6
2 Test Configuration of Equipment Under Test	7
2.1 Carrier Frequency and Channel	7
2.2 Test Mode.....	7
2.3 Connection Diagram of Test System.....	8
2.4 Support Unit used in test configuration and system	8
2.5 EUT Operation Test Setup	8
3 Test Result	9
3.1 Unwanted Emissions Measurement.....	9
3.2 Antenna Requirements	13
4 List of Measuring Equipment.....	14
5 Uncertainty of Evaluation	15
Appendix A. Radiated Spurious Emission	
Appendix B. Radiated Spurious Emission Plots	
Appendix C. Duty Cycle Plots	
Appendix D. Setup Photographs	



History of this test report

Report No.	Version	Description	Issued Date
FR860204F	01	Initial issue of report	Sep. 13, 2018



Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.407(b)	Unwanted Emissions	Pass	Under limit 4.23 dB at 240.870 MHz
3.2	15.203 15.407(a)	Antenna Requirement	Pass	-

Reviewed by: Wii Chang

Report Producer: Yimin Ho



1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature	
Equipment	PS20 Personal Shopper
Brand Name	ZEBRA
Model Name	PS20J
FCC ID	UZ7PS20J
Sample 1	Plus SKU
Sample 2	Base SKU
EUT supports Radios application	WLAN 11a/b/g/n HT20/HT40 WLAN 11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE
HW Version	EV3
SW Version	91-09-06.00-ON-U00-STD
FW Version	91-09-06.00-ON-U00-STD
MFD	06JUL18
EUT Stage	Engineering Sample

Remark: The above EUT's information was declared by manufacturer.

Specification of Accessories				
Battery	Brand Name	Zebra	Part Number	BT-000351

Supported Unit Used in Test Configuration and System				
1-slot cradle	Brand Name	Symbol	Part Number	CRD-MC18-1SL
Adapter	Brand Name	Zebra	Part Number	PWR-BGA12V108W0WW
Programming USB cable	Brand Name	Zebra	Part Number	CBL-PS20-USBCHG-01

1.2 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Frequency Range	2400 MHz ~ 2483.5 MHz 5260 MHz ~ 5320 MHz
Antenna Type / Gain	<2400 MHz ~ 2483.5 MHz> Ant. 1 : PIFA Antenna type with gain 2.02 dBi Ant. 2 : PIFA Antenna type with gain 2.23 dBi <5260 MHz ~ 5320 MHz> Ant. 1 : PIFA Antenna type with gain 3.05 dBi Ant. 2 : PIFA Antenna type with gain 3.76 dBi
Type of Modulation	802.11n : OFDM (BPSK/QPSK/16QAM/64QAM) 802.11ac : OFDM (BPSK/QPSK/16QAM/64QAM/256QAM)

1.3 Modification of EUT

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



1.4 Testing Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW0007 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	Sporton Site No. 03CH13-HY

Note: The test site complies with ANSI C63.4 2014 requirement.

1.5 Applicable Standards

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

- ♦ FCC Part 15 Subpart E
- ♦ FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
- ♦ FCC KDB 414788 D01 Radiated Test Site v01r01.
- ♦ FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ♦ ANSI C63.10-2013

Remark: All test items were verified and recorded according to the standards and without any deviation during the test.



2 Test Configuration of Equipment Under Test

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

2.1 Carrier Frequency and Channel

2400-2483.5 MHz 802.11n HT40		5250-5350 MHz 802.11ac VHT80	
Channel	Channel	Channel	Freq. (MHz)
08	2447	58	5290

2.2 Test Mode

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

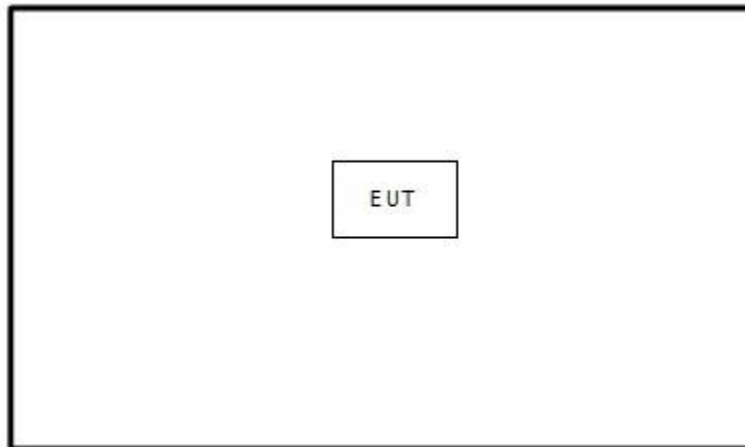
<Co-Location>

Modulation	Data Rate
802.11n HT40 for Ant. 1 + 802.11ac VHT80 for Ant. 2	MCS0 + MCS0

Remark: All tests were performed with sample 1

2.3 Connection Diagram of Test System

<Co-location Mode>



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Notebook	DELL	Latitude E3340	FCC DoC/ Contains FCC ID: PD97260NGU	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
2.	Notebook	Lenovo	E335	N/A	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m

2.5 EUT Operation Test Setup

The RF test items, utility “QRCT” was installed in Notebook which was programmed in order to make the EUT get into the engineering modes to provide channel selection, power level, data rate and the application type and for continuous transmitting signals.



3 Test Result

3.1 Unwanted Emissions Measurement

3.1.1 Limit of Unwanted Emissions

(1) Unwanted spurious emissions fallen in restricted bands shall comply with the general field strength limits as below table,

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

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

$$E = \frac{1000000\sqrt{30P}}{3} \text{ } \mu\text{V/m, where P is the eirp (Watts)}$$

EIRP (dBm)	Field Strength at 3m (dBμV/m)
- 27	68.3

(2) KDB789033 D02 v02r01 G)2)c)

- (i) Section 15.407(b)(1) to (b)(3) specify the unwanted emission limits for the U-NII-1 and U-NII-2 bands. As specified, emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of -27 dBm/MHz.³
- (ii) Section 15.407(b)(4) specifies the unwanted emission limit for the U-NII-3 band. A band emissions mask is specified in Section 15.407(b)(4)(i). The emission limits are in terms of a Peak detector. An alternative to the band emissions mask is specified in Section 15.407(b)(4)(ii). The alternative limits are based on the highest antenna gain specified in the filing. There are also marketing and importation restrictions for the devices using the alternative limit.⁴

Note 3: An out-of-band emission that complies with both the average and peak limits of Section 15.209 is not required to satisfy the -27 dBm/MHz peak emission limit.

Note 4: Only devices with antenna gains of 10 dBi or less may be approved using the emission limits specified in Section 15.247(d) till March 2, 2018; all other devices operating in this band must use the mask specified in Section 15.407(b)(4)(i).



3.1.2 Measuring Instruments

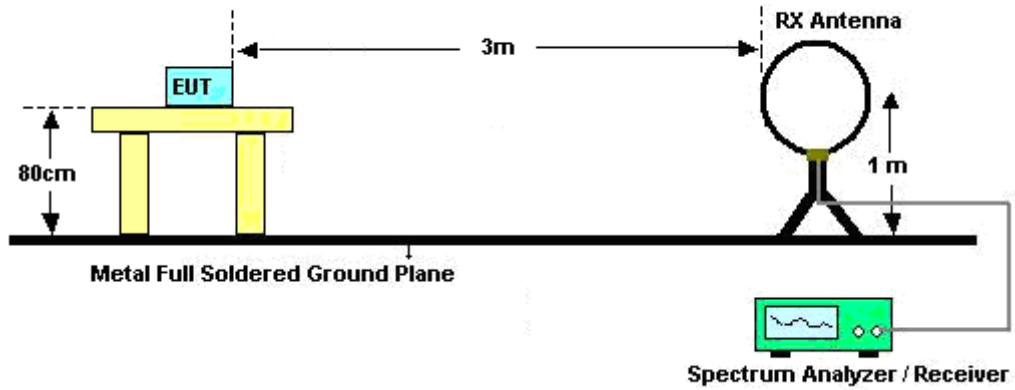
See list of measuring equipment of this test report.

3.1.3 Test Procedures

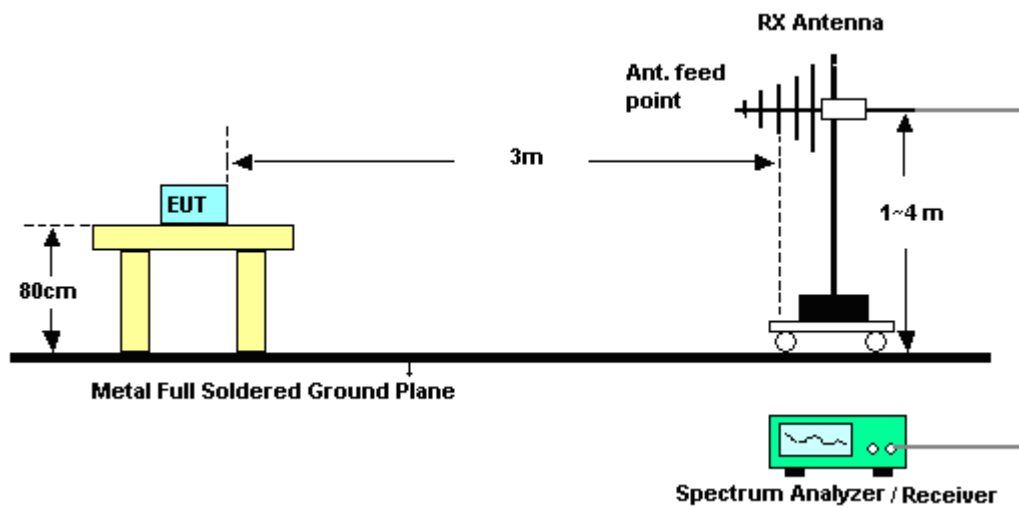
1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section G) Unwanted emissions measurement.
 - (1) Procedure for Unwanted Emissions Measurements Below 1000MHz
 - RBW = 120 kHz
 - VBW = 300 kHz
 - Detector = Peak
 - Trace mode = max hold
 - (2) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz
 - RBW = 1 MHz
 - VBW \geq 3 MHz
 - Detector = Peak
 - Sweep time = auto
 - Trace mode = max hold
 - (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz
 - RBW = 1 MHz
 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW \geq 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

3.1.4 Test Setup

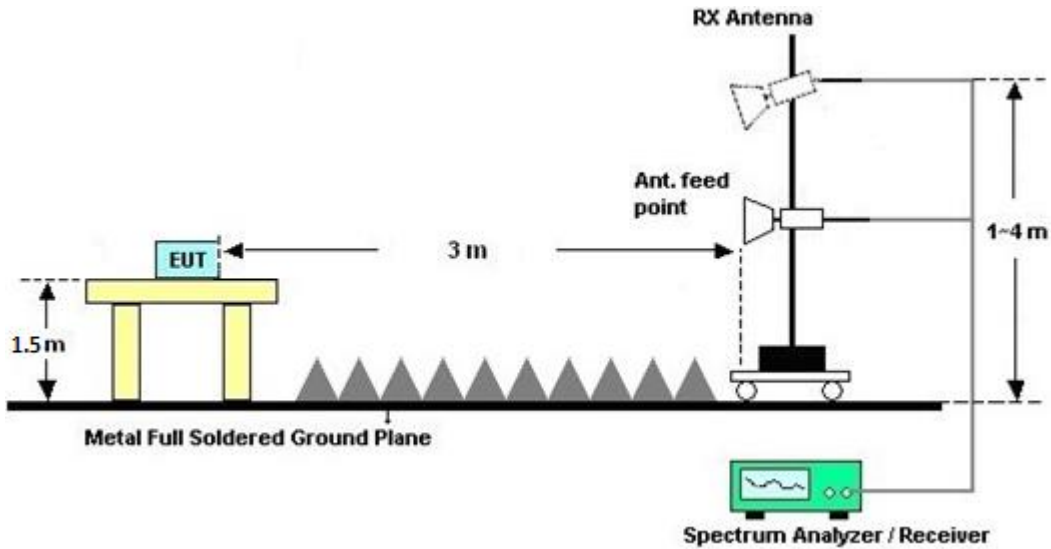
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.1.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

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

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

3.1.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix A and B.

3.1.7 Duty Cycle

Please refer to Appendix C.

3.1.8 Test Result of Radiated Spurious Emissions (30MHz ~ 10th Harmonic)

Please refer to Appendix A and B.



3.2 Antenna Requirements

3.2.1 Standard Applicable

If transmitting antenna directional gain is greater than 6 dBi, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.2.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.2.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1241	1GHz ~ 18GHz	Jun. 29, 2018	Aug. 18, 2018 ~ Sep. 05, 2018	Jun. 28, 2019	Radiation (03CH13-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Nov. 10, 2017	Aug. 18, 2018 ~ Sep. 05, 2018	Nov. 09, 2018	Radiation (03CH13-HY)
Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz, VSWR : 2.5:1 max	Jul. 16, 2018	Aug. 18, 2018 ~ Sep. 05, 2018	Jul. 15, 2019	Radiation (03CH13-HY)
Filter	Wainwright	WLK4-1000-1530-8000-40SS	SN1	1G Lowpass Filter	Sep. 18, 2017	Aug. 18, 2018 ~ Sep. 05, 2018	Sep. 17, 2018	Radiation (03CH13-HY)
Filter	Woken	WHKX8-5872.5-6750-18000-40ST	SN3	6.75G Highpass	Sep. 18, 2017	Aug. 18, 2018 ~ Sep. 05, 2018	Sep. 17, 2018	Radiation (03CH13-HY)
Filter	Wainwright	WHKX12-2700-3000-18000-60SS	SN2	3G High Pass	Sep. 18, 2017	Aug. 18, 2018 ~ Sep. 05, 2018	Sep. 17, 2018	Radiation (03CH13-HY)
Amplifier	Sonoma-Instrument	310 N	187282	9KHz~1GHz	Jan. 19, 2018	Aug. 18, 2018 ~ Sep. 05, 2018	Jan. 18, 2020	Radiation (03CH13-HY)
Bilog Antenna	TESEQ	CBL 6111D&00800 N1D01N-06	40103&07	30MHz to 1GHz	Jan. 10, 2018	Aug. 18, 2018 ~ Sep. 05, 2018	Jan. 09, 2019	Radiation (03CH13-HY)
Preamplifier	Jet-Power	JPA0118-55-303K	1710001800054002	1GHz~18GHz	Apr. 16, 2018	Aug. 18, 2018 ~ Sep. 05, 2018	Apr. 15, 2019	Radiation (03CH13-HY)
Preamplifier	Keysight	83017A	MY53270147	1GHz~26.5GHz	Feb. 02, 2018	Aug. 18, 2018 ~ Sep. 05, 2018	Feb. 01, 2019	Radiation (03CH13-HY)
Spectrum Analyzer	Keysight	N9010A	MY55370526	10Hz~44GHz	Mar. 15, 2018	Aug. 18, 2018 ~ Sep. 05, 2018	Mar. 14, 2019	Radiation (03CH13-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1m~4m	N/A	Aug. 18, 2018 ~ Sep. 05, 2018	N/A	Radiation (03CH13-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	Aug. 18, 2018 ~ Sep. 05, 2018	N/A	Radiation (03CH13-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170584	18GHz- 40GHz	Nov. 27, 2017	Aug. 18, 2018 ~ Sep. 05, 2018	Nov. 26, 2018	Radiation (03CH13-HY)
EMI Test Receiver	Agilent	N9038A (MXE)	MY53290053	20Hz to 26.5GHz	Jan. 16, 2018	Aug. 18, 2018 ~ Sep. 05, 2018	Jan. 15, 2019	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 126E	0030/126E	30M-18G	Jan. 22, 2018	Aug. 18, 2018 ~ Sep. 05, 2018	Jan. 21, 2019	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	335041/4	30M-18G	Jan. 22, 2018	Aug. 18, 2018 ~ Sep. 05, 2018	Jan. 21, 2019	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY24961/4	30M~18GHz	Jan. 22, 2018	Aug. 18, 2018 ~ Sep. 05, 2018	Jan. 21, 2019	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	505134/2	30M~40GHz	Oct. 17, 2017	Aug. 18, 2018 ~ Sep. 05, 2018	Oct. 16, 2018	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	800740/2	30M~40GHz	Oct. 17, 2017	Aug. 18, 2018 ~ Sep. 05, 2018	Oct. 16, 2018	Radiation (03CH13-HY)
Software	AUDIX	E3 6.2009-8-24c	RK-001124	N/A	N/A	Aug. 18, 2018 ~ Sep. 05, 2018	N/A	Radiation (03CH13-HY)



5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.9
---	-----

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.4
---	-----

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.3
---	-----



Appendix A. Radiated Spurious Emission

Test Engineer :	Fu Chen, Alex Jheng, and Wilson Wu	Temperature :	25~26°C
		Relative Humidity :	48~52%

Co-location Mode

WIFI 802.11b and WIFI 802.11a (Harmonic @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.	
Simultaneously		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)	
802.11n HT40 CH 08 2447MHz + 802.11ac VHT80 CH 58 5290MHz		4894	49.96	-24.04	74	40.45	31.39	7.66	29.54	100	0	P	H	
		7341	42.91	-31.09	74	51.79	36.26	11.05	56.19	100	0	P	H	
		10580	46.73	-21.47	68.2	54.75	40.09	12.4	60.51	100	0	P	H	
		15870	45.59	-28.41	74	50.62	37.79	14.75	57.57	100	0	P	H	
													H	
													H	
													H	
													H	
			4894	49.7	-24.3	74	40.19	31.39	7.66	29.54	100	0	P	V
			7341	43.27	-30.73	74	52.15	36.26	11.05	56.19	100	0	P	V
			10580	46.92	-21.28	68.2	54.94	40.09	12.4	60.51	100	0	P	V
			15870	45	-29	74	50.03	37.79	14.75	57.57	100	0	P	V
													V	
													V	
													V	
													V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.													



Emission below 1GHz
WIFI 802.11b and WIFI 802.11a (LF @ 3m)

WIFI Ant. Simultaneously	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)	
802.11n HT40 CH 08 2447MHz + 802.11ac VHT80 CH 58 5290MHz		65.37	28.79	-11.21	40	47.94	12.03	1.13	32.31	-	-	P	H	
		155.82	34.15	-9.35	43.5	48.02	16.85	1.56	32.28	-	-	P	H	
		240.87	41.77	-4.23	46	54.62	17.41	1.95	32.21	100	0	P	H	
		857.2	32.08	-13.92	46	31.18	29.1	3.52	31.72	-	-	P	H	
		885.9	33.22	-12.78	46	32.26	28.99	3.55	31.58	-	-	P	H	
		957.3	33.43	-12.57	46	29.7	31.01	3.71	30.99	-	-	P	H	
														H
														H
														H
														H
														H
														H
														H
														H
														H
	802.11n HT40 CH 08 2447MHz + 802.11ac VHT80 CH 58 5290MHz		30.81	29.36	-10.64	40	36.95	23.96	0.79	32.34	-	-	P	V
			59.97	27.42	-12.58	40	46.63	12.06	1.04	32.31	-	-	P	V
			241.41	37.41	-8.59	46	50.13	17.54	1.95	32.21	100	0	P	V
		399.4	31.08	-14.92	46	38.94	21.83	2.46	32.15	-	-	P	V	
		881	33.79	-12.21	46	32.89	28.97	3.53	31.6	-	-	P	V	
		955.9	34.09	-11.91	46	30.42	30.96	3.71	31	-	-	P	V	
														V
														V
														V
														V
														V
														V
														V
														V
														V
Remark		1. No other spurious found. 2. All results are PASS against limit line.												



Note symbol

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



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

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

1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)
2. Level(dBμV/m) =
Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
3. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

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

For Average Limit @ 2390MHz:

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

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



Appendix B. Radiated Spurious Emission Plots

Test Engineer :	Fu Chen, Alex Jheng, and Wilson Wu	Temperature :	25~26°C
		Relative Humidity :	48~52%

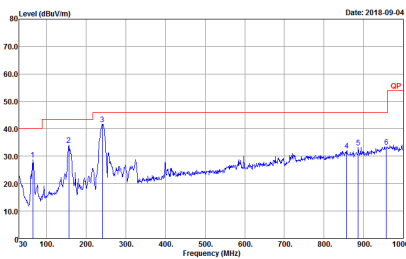
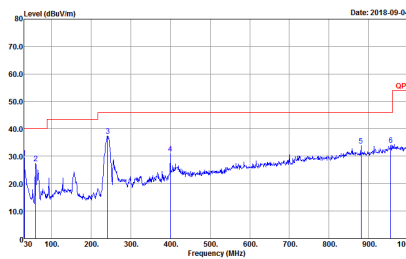
Co-location Mode

WIFI 802.11n HT40 and WIFI 802.11ac VHT80 (Harmonic @ 3m)

ANT	11n HT40_Tx_Ch08 + 11ac VHT80_Tx_Ch58	
Simultaneously	Horizontal	Vertical
<p>Peak</p> <p>Avg.</p>	<p>Site : 03CH13-1FY Condition : PEAK(UNII) 3m SHF_HORN_576 HORIZONTAL Detector : Peak Project : 860204 Mode : 156 : 11g(n40)_Tx_Ch08 (16.5)- : 11ac(80)_Tx_Ch58 (12.5)</p>	<p>Site : 03CH13-1FY Condition : PEAK(UNII) 3m SHF_HORN_576 VERTICAL Detector : Peak Project : 860204 Mode : 156 : 11g(n40)_Tx_Ch08 (16.5)- : 11ac(80)_Tx_Ch58 (12.5)</p>



Emission below 1GHz
WIFI 802.11n HT40 and WIFI 802.11ac VHT80 (LF)

ANT	11n HT40_Tx_Ch08 + 11ac VHT80_Tx_Ch58 LF	
Simultaneously	Horizontal	Vertical
<p>QP / Peak</p>	 <p>Site : 03CH13-HY Condition : QP 3m BILO6_40103 HORIZONTAL Detector : Peak Project : 860204 Mode : 15% : 11g(n40)_Tx_Ch08 (16.5)- : 11ac(80)_Tx_Ch58 (12.5)</p>	 <p>Site : 03CH13-HY Condition : QP 3m BILO6_40103 VERTICAL Detector : Peak Project : 860204 Mode : 15% : 11g(n40)_Tx_Ch08 (16.5)- : 11ac(80)_Tx_Ch58 (12.5)</p>

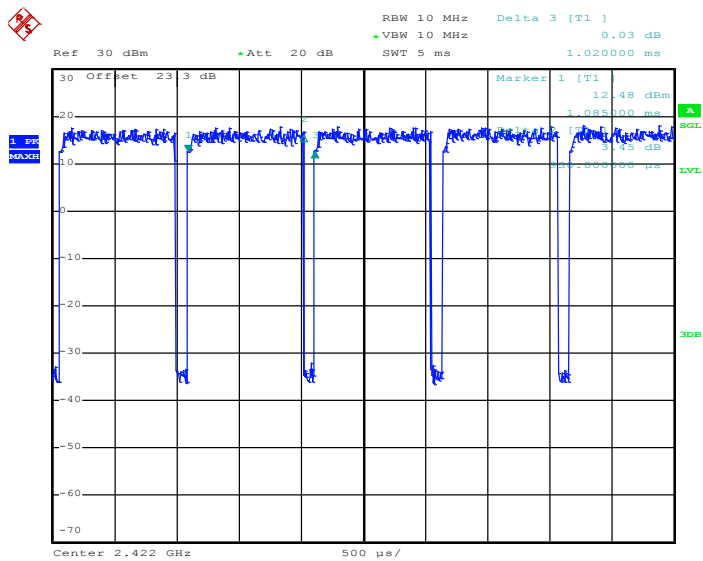


Appendix C. Duty Cycle Plots

Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting	Duty Factor(dB)
1	802.11n HT40	91.18	930.00	1.08	3kHz	0.40
2	802.11ac VHT80	90.24	740.00	1.35	3kHz	0.45

<Ant. 1>

802.11n HT40

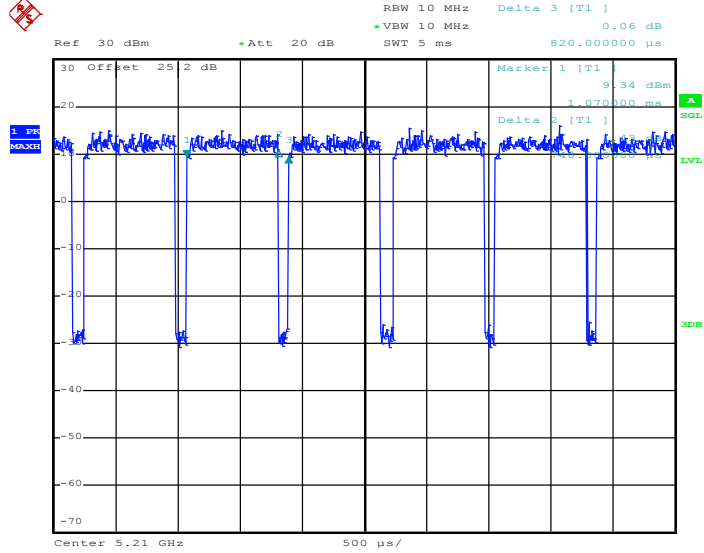


Date: 7.JUN.2018 00:31:45



<Ant. 2>

802.11ac VHT80



Date: 8.JUN.2018 00:07:45