FCC RADIO TEST REPORT

FCC ID	**:**	**UZ7MC930B**
Equipment	**:**	**Mobile computer**
Brand Name	**:**	**Zebra**
Model Name	**:**	**MC930B**
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 C §15.247**

The product was received on Nov. 26, 2018 and testing was started from Feb. 14, 2019 and completed on Mar. 07, 2019. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, 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 variant 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.

Reviewed by: Jones Tsai

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

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History of this test report

Report No.	Version	Description	Issued Date
FR8N2627A	01	Initial issue of report	Mar. 12, 2019

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
-	15.247(a)(1)	Number of Channels	Not Required	-
-	15.247(a)(1)	Hopping Channel Separation	Not Required	-
-	15.247(a)(1)	Dwell Time of Each Channel	Not Required	-
-	15.247(a)(1)	20dB Bandwidth	Not Required	-
-	2.1049	99% Occupied Bandwidth	Not Required	-
-	15.247(b)(1)	Peak Output Power	Not Required	-
-	15.247(d)	Conducted Band Edges	Not Required	-
-	15.247(d)	Conducted Spurious Emission	Not Required	-
3.1	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	Pass	Under limit 7.55 dB at 30.00 MHz
-	15.207	AC Conducted Emission	Not Required	-
-	15.203 & 15.247(b)	Antenna Requirement	Not Required	-

Remark:

1. Not required means after assessing, test items are not necessary to carry out.
2. This is a variant report which can be referred to Product Equality Declaration. Since the test result is not affected by the changes, all the test cases were performed on original report which can be referred to Sporton Report Number FR8N2626A.

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Wii Chang

Report Producer: Dara Chiu

1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile computer
Brand Name	Zebra
Model Name	MC930B
FCC ID	UZ7MC930B
Sample 1	EUT with SKU 1
Sample 2	EUT with SKU 2
Sample 3	EUT with SKU 3
Sample 4	EUT with SKU 4
Sample 5	EUT with SKU 5
Sample 6	EUT with SKU 6
Sample 7	EUT with SKU 7
EUT supports Radios application	WLAN 11a/b/g/n HT20/HT40 WLAN 11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE
HW Version	EV1
SW Version	01-14-11.00-OG
MFD	28OCT18
EUT Stage	Engineering Sample

Remark:

1. The above EUT's information was declared by manufacturer.
2. The tests were performed with Sample 1.

Specification of Accessories				
Adapter (5V/2.5A)	**Brand Name**	Zebra	**Part Number**	PWR-WUA5V12W0US
USB-C Adapter	**Brand Name**	Zebra	**Part Number**	CBL-MC93-USBCHG-01
USB-C cable	**Brand Name**	Zebra	**Part Number**	CBL-TC2X-USBC-01
Std Battery	**Brand Name**	Zebra	**Part Number**	BT-000370-00
Holster	**Brand Name**	Zebra	**Part Number**	051607-79N1-18

<Sample Information>

Model Name	MC930P					MC930B	
	SKU3	SKU4	SKU5	SKU6	SKU7	SKU1	SKU2
Organization / Function / Group	EV1a-G21	EV1a-G22	EV1a-G23	EV1a-F11	EV1a-F13	EV1a-G02	EV1a-G03
nm	G-2S-1D-53k	G-2S-2D-53k	G-2S-LRI-53k	G-1F-1D-53k	G-1F-LRI-53k	G-BS-2D-53k	G-BS-LRI-53k
Product Number	MC930P-GSBDG4NA	MC930P-GSDDG4NA	MC930P-GSFDG4NA	MC930P-GFADG4NA	MC930P-GFEDG4NA	MC930B-GSCDG4NA	MC930B-GSEDG4NA
Form factor	Gun	Gun	Gun	Gun	Gun	Gun	Gun
Package/Component Category	Pkg2	Pkg2	Pkg2	Pkg1 CS	Pkg 1 CS	Base	Base
NFC	YES	YES	YES	YES	YES	NO	NO
Vib	YES	YES	YES	YES	YES	NO	NO
Camera	YES	YES	YES	NO	NO	NO	NO
NI	NO	NO	NO	NO	NO	NO	NO
Side Trigger	NO	NO	NO	NO	NO	NO	NO
Display + TP Stackup	Option2	Option2	Option2	Option5	Option5	Option 2	Option 2
Scanner	SE965	SE4750SR	SE4850	SE965	SE4850	SE4750SR	SE4850
Battery	Std	Std	Std	Fzr	Fzr	Std	Std
Keyboard	53 Key	53 Key	53 Key	53 Key	53 Key	53 Key	53 Key
Build Date	Oct 2018	Oct 2018	Oct 2018	Nov 2018	Nov 2018	Oct 2018	Oct 2018

1.2 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Frequency Range	2402 MHz ~ 2480 MHz
Number of Channels	79
Carrier Frequency of Each Channel	2402+n*1 MHz; n=0~78
Antenna Type / Gain	Patch Antenna with gain 3.85 dBi
Type of Modulation	Bluetooth BR (1Mbps) : GFSK Bluetooth EDR (2Mbps) : π/4-DQPSK Bluetooth EDR (3Mbps) : 8-DPSK

1.3 Modification of EUT

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

1.4 Testing Location

Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978
Test Site No.	**Sporton Site No.**
	03CH07-HY

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

FCC Designation No. TW1190

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 C §15.247
- FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v05
- FCC KDB 414788 D01 Radiated Test Site v01r01.
- ANSI C63.10-2013

Remark:

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

2 Test Configuration of Equipment Under Test

2.1 Carrier Frequency Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
2400-2483.5 MHz	0	2402	27	2429	54	2456
	1	2403	28	2430	55	2457
	2	2404	29	2431	56	2458
	3	2405	30	2432	57	2459
	4	2406	31	2433	58	2460
	5	2407	32	2434	59	2461
	6	2408	33	2435	60	2462
	7	2409	34	2436	61	2463
	8	2410	35	2437	62	2464
	9	2411	36	2438	63	2465
	10	2412	37	2439	64	2466
	11	2413	38	2440	65	2467
	12	2414	39	2441	66	2468
	13	2415	40	2442	67	2469
	14	2416	41	2443	68	2470
	15	2417	42	2444	69	2471
	16	2418	43	2445	70	2472
	17	2419	44	2446	71	2473
	18	2420	45	2447	72	2474
	19	2421	46	2448	73	2475
	20	2422	47	2449	74	2476
	21	2423	48	2450	75	2477
	22	2424	49	2451	76	2478
	23	2425	50	2452	77	2479
	24	2426	51	2453	78	2480
	25	2427	52	2454	-	-
	26	2428	53	2455	-	-

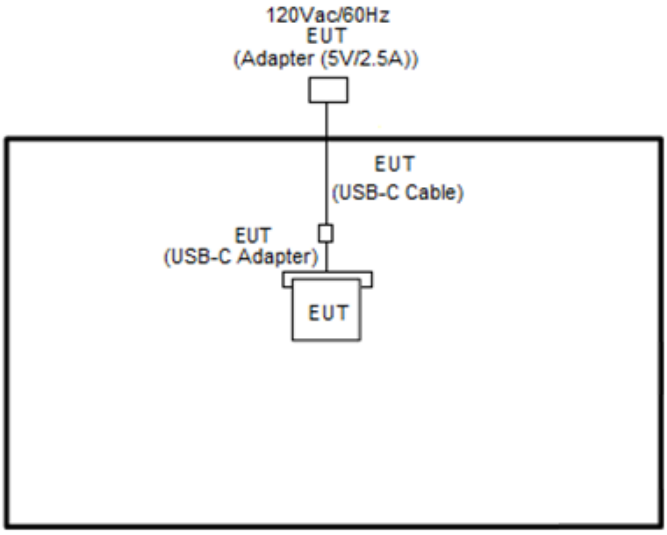
2.2 Test Mode

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 (X plane) were recorded in this report, and the worst mode of radiated spurious emissions is Bluetooth 1Mbps mode, and recorded in this report.

The following summary table is showing all test modes to demonstrate in compliance with the standard.

Summary table of Test Cases	
Test Item	**Data Rate / Modulation**
Radiated	**Bluetooth BR 1Mbps GFSK**
Test Cases	Mode 1: CH78_2480 MHz

2.3 Connection Diagram of Test System



2.4 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 Radiated Band Edges and Spurious Emission Measurement

3.1.1 Limit of Radiated Band Edges and Spurious Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. In addition, radiated emissions which fall in the restricted bands must also comply with the limits as below.

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

3.1.2 Measuring Instruments

See list of measuring equipment of this test report.

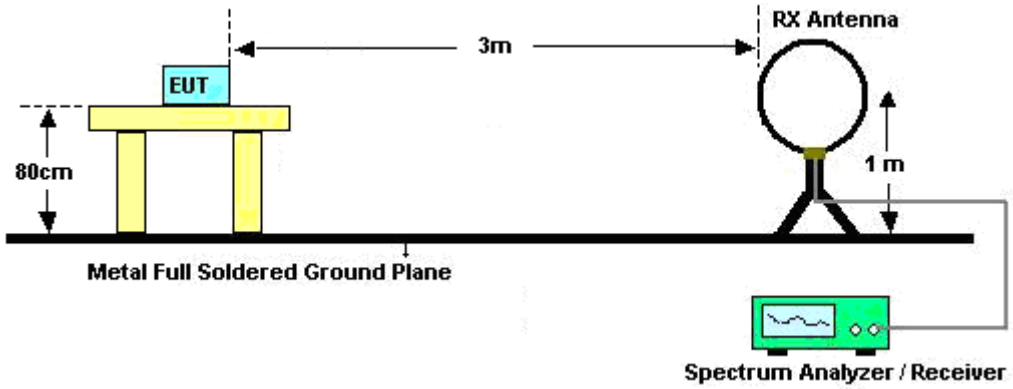
3.1.3 Test Procedures

1. 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.
1. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
2. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Use the following spectrum analyzer settings:
   (1) Span shall wide enough to fully capture the emission being measured;
   (2) Set RBW=100 kHz for f < 1 GHz, RBW=1MHz for f>1GHz ; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold for peak
   (3) For average measurement: use duty cycle correction factor method per 15.35(c).
   Duty cycle = On time/100 milliseconds
   On time = $N_1*L_1+N_2*L_2+...+N_{n-1}*LN_{n-1}+N_n*L_n$
   Where N_1 is number of type 1 pulses, L_1 is length of type 1 pulses, etc.
   Average Emission Level = Peak Emission Level + 20*log(Duty cycle)
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
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.

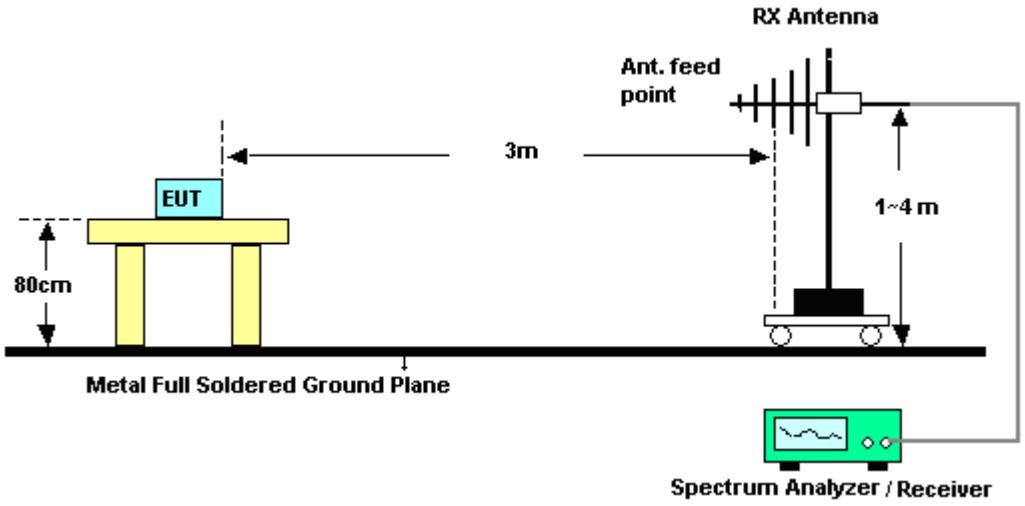
Note: The average levels were calculated from the peak level corrected with duty cycle correction factor (-24.79dB) derived from 20log (dwell time/100ms). This correction is only for signals that hop with the fundamental signal, such as band-edge and harmonic. Other spurious signals that are independent of the hopping signal would not use this correction.

3.1.4 Test Setup

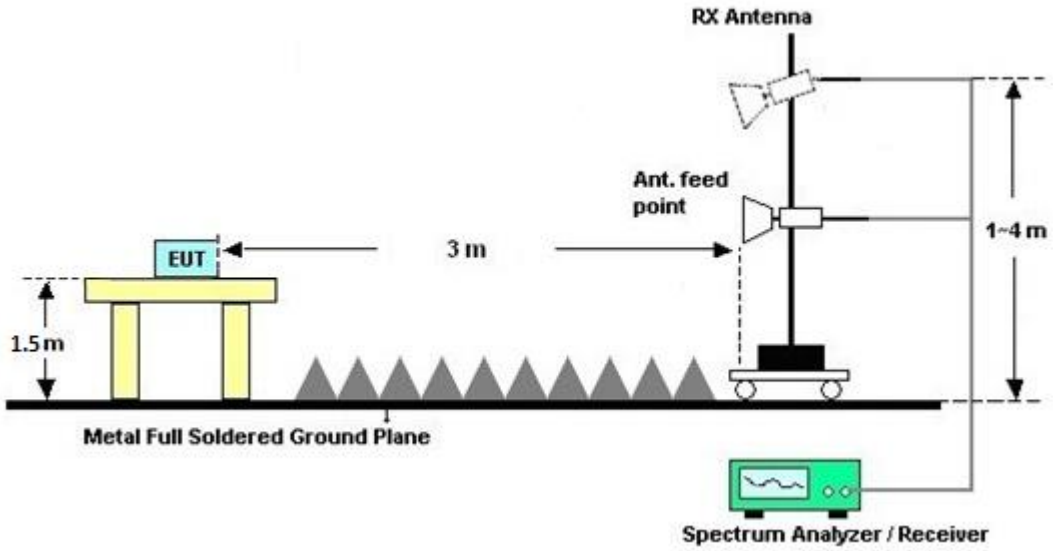
For radiated emissions below 30MHz



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 alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, 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 Emission (30MHz ~ 10th Harmonic)

Please refer to Appendix A and B.

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Preamplifier	Agilent	8449B	3008A01917	1GHz~26.5GHz	Apr. 23, 2018	Feb. 14, 2019 ~ Mar. 07, 2019	Apr. 22, 2019	Radiation (03CH07-HY)
Bilog Antenna	TESEQ	CBL 6111D&00800 N1D01N-06	35419&03	30MHz to 1GHz	Dec. 16, 2018	Feb. 14, 2019 ~ Mar. 07, 2019	Dec. 15, 2019	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Dec. 02, 2018	Feb. 14, 2019 ~ Mar. 07, 2019	Dec. 01, 2019	Radiation (03CH07-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	May 15, 2017	Feb. 14, 2019 ~ Mar. 07, 2019	May 14, 2019	Radiation (03CH07-HY)
Preamplifier	MITEQ	AMF-7D-0010 1800-30-10P	1590075	1GHz ~ 18GHz	Apr. 25, 2018	Feb. 14, 2019 ~ Mar. 07, 2019	Apr. 24, 2019	Radiation (03CH07-HY)
Preamplifier	COM-POWER	PA-103A	161241	10MHz-1GHz	May 21, 2018	Feb. 14, 2019 ~ Mar. 07, 2019	May 20, 2019	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY28655/4, MY24971/4, MY15682/4	30MHz~1GHz	Feb. 27, 2018	Feb. 14, 2019 ~ Feb. 23, 2019	Feb. 26, 2019	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY28655/4, MY24971/4, MY15682/4	30MHz~1GHz	Feb. 26, 2019	Mar. 07, 2019	Feb. 25, 2020	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SF102/2*11SK 252	MY4278/2	9kHz~40GHz	May 17, 2018	Feb. 14, 2019 ~ Feb. 23, 2019	May 16, 2019	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SF102/2*11SK 252	MY4278/2	9kHz~40GHz	Feb. 26, 2019	Mar. 07, 2019	Feb. 25, 2020	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY28655/4, MY24971/4, MY15682/4	1GHz~18GHz	Feb. 27, 2018	Feb. 14, 2019 ~ Feb. 23, 2019	Feb. 26, 2019	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY28655/4, MY24971/4, MY15682/4	1GHz~18GHz	Feb. 26, 2019	Mar. 07, 2019	Feb. 25, 2020	Radiation (03CH07-HY)
Antenna Mast	Max-Full	MFA520BS	N/A	1m~4m	N/A	Feb. 14, 2019 ~ Mar. 07, 2019	N/A	Radiation (03CH07-HY)
Turn Table	ChainTek	Chaintek 3000	N/A	0~360 Degree	N/A	Feb. 14, 2019 ~ Mar. 07, 2019	N/A	Radiation (03CH07-HY)
Amplifier	MITEQ	TTA1840-35-H G	1871923	18GHz~40GHz, VSWR : 2.5:1 max	Jul. 16, 2018	Feb. 14, 2019 ~ Mar. 07, 2019	Jul. 15, 2019	Radiation (03CH07-HY)
Software	Audix	E3 6.2009-8-24	RK-001042	N/A	N/A	Feb. 14, 2019 ~ Mar. 07, 2019	N/A	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	18GHz- 40GHz	Nov. 20, 2018	Feb. 14, 2019 ~ Mar. 07, 2019	Nov. 19, 2019	Radiation (03CH07-HY)
Spectrum Analyzer	Agilent	N9010A	MY53470118	10Hz~44GHz	Apr. 17, 2018	Feb. 14, 2019 ~ Mar. 07, 2019	Apr. 16, 2019	Radiation (03CH07-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))	**5.7**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.5**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.2**

Appendix A. Radiated Spurious Emission

Test Engineer :	Jesse Wang, Stan Hsieh, and Troye Hsieh	Temperature :	20~25°C
		Relative Humidity :	55~60%

2.4GHz 2400~2483.5MHz

BT_1Mbps (Band Edge @ 3m)

BT	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)
BT CH78 2480MHz	*	2480	103.51	-	-	98.15	32.2	7.84	34.68	267	359	P	H
	*	2480	78.72	-	-	-	-	-	-	-	-	A	H
		2483.52	49.4	-24.6	74	44.04	32.2	7.84	34.68	267	360	P	H
		2483.52	24.61	-29.39	54	-	-	-	-	-	-	A	H
													H
													H
	*	2480	96.34	-	-	90.98	32.2	7.84	34.68	100	320	P	V
	*	2480	71.55	-	-	-	-	-	-	-	-	A	V
		2499.56	46.55	-27.45	74	41.19	32.2	7.84	34.68	100	320	P	V
		2499.56	21.76	-32.24	54	-	-	-	-	-	-	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

BT_1Mbps (Harmonic @ 3m)

BT	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)
BT CH 78 2480MHz		4960	43.06	-30.94	74	56.52	34.13	11.48	59.07	100	0	P	H
		4960	18.27	-35.73	54	-	-	-	-	-	-	A	H
		7440	44.28	-29.72	74	53.02	35.5	14.09	58.33	100	0	P	H
		7440	19.49	-34.51	54	-	-	-	-	-	-	A	H
		4960	42.34	-31.66	74	55.8	34.13	11.48	59.07	100	0	P	V
		4960	17.55	-36.45	54	-	-	-	-	-	-	A	V
		7440	43.96	-30.04	74	52.7	35.5	14.09	58.33	100	0	P	V
		7440	19.17	-34.83	54	-	-	-	-	-	-	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

2.4GHz BT_1Mbps (LF)

BT	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz BT LF		30	29.37	-10.63	40	33.62	24.6	1.33	30.18	100	0	P	H
		47.01	25.23	-14.77	40	38.57	15.48	1.34	30.16	-	-	P	H
		127.47	27.71	-15.79	43.5	38.16	17.59	2.01	30.05	-	-	P	H
		417.6	29.02	-16.98	46	33.18	22.48	3.28	29.92	-	-	P	H
		857.2	32.4	-13.6	46	27.79	28.96	4.74	29.09	-	-	P	H
		967.1	34.45	-19.55	54	26.96	30.87	5.06	28.44	-	-	P	H
													H
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													H
		30	32.45	-7.55	40	36.7	24.6	1.33	30.18	100	0	P	V
		35.94	26.72	-13.28	40	34.05	21.51	1.33	30.17	-	-	P	V
		60.51	24.21	-15.79	40	40.75	11.89	1.7	30.13	-	-	P	V
		421.1	33.31	-12.69	46	37.18	22.58	3.47	29.92	-	-	P	V
		440	32.85	-13.15	46	36.45	22.83	3.48	29.91	-	-	P	V
		962.9	34.22	-19.78	54	26.74	30.89	5.06	28.47	-	-	P	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	**P**eak or **A**verage
H/V	**H**orizontal or **V**ertical

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

BT	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BT CH 00 2402MHz		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
		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)

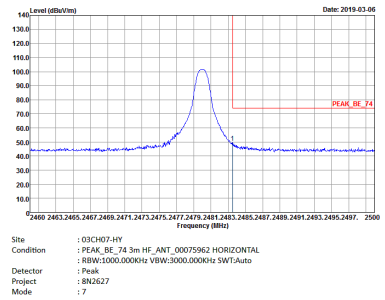
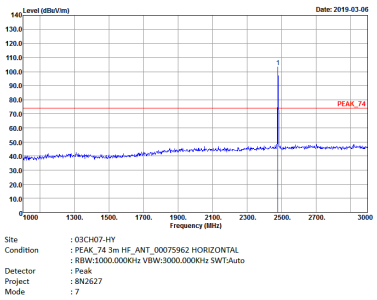
Both peak and average measured complies with the limit line, so test result is "PASS".

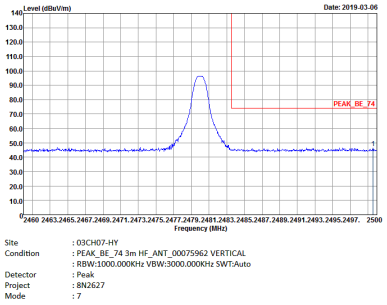
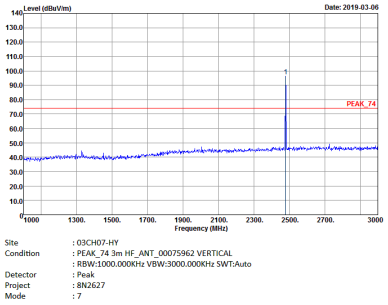
Appendix B. Radiated Spurious Emission Plots

Test Engineer :	Jesse Wang, Stan Hsieh, and Troye Hsieh	Temperature :	20~25°C
		Relative Humidity :	55~60%

2.4GHz 2400~2483.5MHz

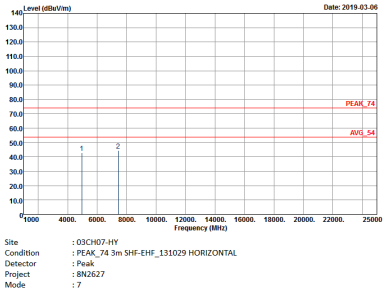
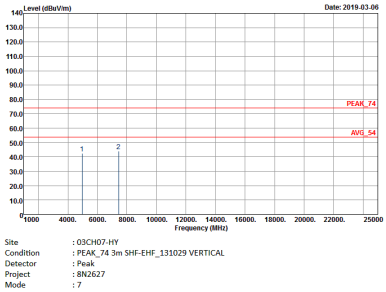
BT_1Mbps (Band Edge @ 3m)

BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH78 2480MHz	
	Horizontal	Fundamental
Peak		

BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH78 2480MHz	
	Vertical	Fundamental
Peak		

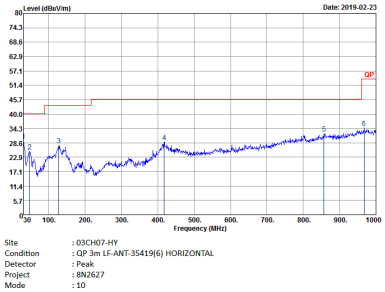
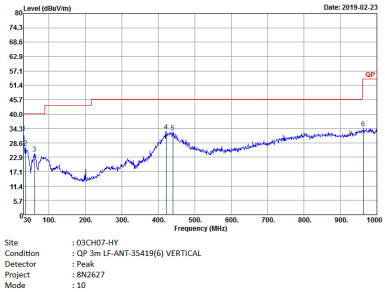
2.4GHz 2400~2483.5MHz

BT_1Mbps (Harmonic @ 3m)

BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BT CH78 2480MHz	
	Horizontal	Vertical
Peak Avg.		

Emission below 1GHz

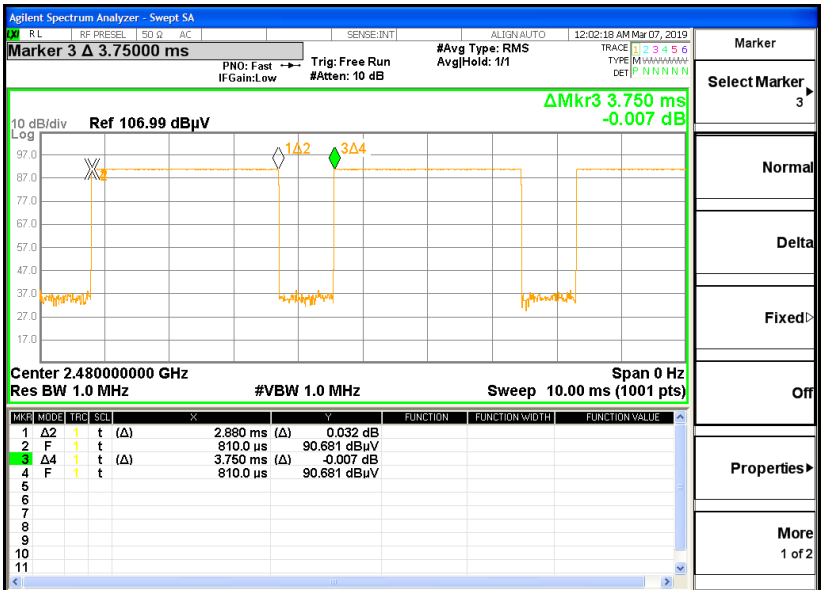
2.4GHz BT_1Mbps (LF)

BT	2.4GHz 2400~2483.5MHz	
	BT LF	
	Horizontal	Vertical
QP / Peak		

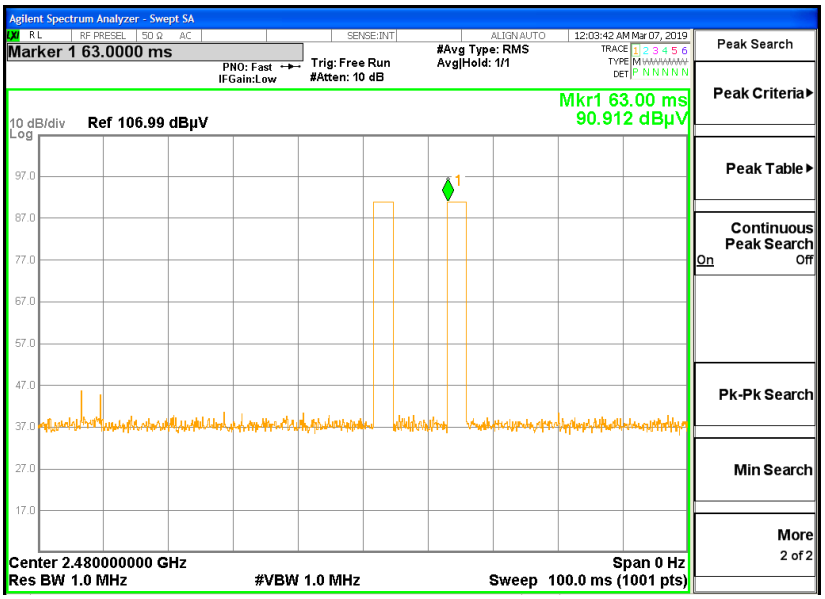
Appendix C. Duty Cycle Plots

<1Mbps>

DH5 on time (One Pulse) Plot on Channel 39



on time (Count Pulses) Plot on Channel 39



Note:

1. Worst case Duty cycle = on time/100 milliseconds = 2 * 2.88 / 100 = 5.76 %
2. Worst case Duty cycle correction factor = 20*log(Duty cycle) = -24.79 dB
3. DH5 has the highest duty cycle worst case and is reported.

Duty Cycle Correction Factor Consideration for AFH mode:

Bluetooth normal hopping rate is 1600Hz and reduced to 800Hz in AFH mode; due to the reduced number of hopping frequencies, with the same packet configuration the dwell time in each channel frequency within 100msec period is longer in AFH mode than normal mode.

In AFH mode, the minimum hopping frequencies are 20, to get the longest dwell time DH5 packet is observed; the period to have DH5 packet completing one hopping sequence is

2.88 ms x 20 channels = 57.6 ms

There cannot be 2 complete hopping sequences within 100ms period, considering the random hopping behavior, maximum 2 hops can be possibly observed within the period. [100ms / 57.6ms] = 2 hops

Thus, the maximum possible ON time:

2.88 ms x 2 = 5.76 ms

Worst case Duty Cycle Correction factor, which is derived from the maximum possible ON time,

20 x log(5.76 ms/100ms) = -24.79 dB