

# FCC RF Test Report

**APPLICANT** : Zebra Technologies Corporation  
**EQUIPMENT** : Mobile Computer  
**BRAND NAME** : Zebra  
**MODEL NAME** : MC330M  
**FCC ID** : UZ7MC330M  
**STANDARD** : FCC Part 15 Subpart C §15.247  
**CLASSIFICATION** : (DTS) Digital Transmission System

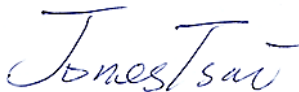
This is a variant report which is only valid together with the original test report. The product was received on Sep. 02, 2017 and testing was completed on Oct. 17, 2017. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

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



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Reviewed by: Joseph Lin / Supervisor



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Approved by: Jones Tsai / Manager



## **SPORTON INTERNATIONAL INC.**

**No. 52, Hwa Ya 1<sup>st</sup> Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C.**



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## REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR790120-02B	Rev. 01	Initial issue of report	Nov. 02, 2017
FR790120-02B	Rev. 02	Updating the description of Data Re-use in Summary of Test Result	Nov. 08, 2017



## SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
-	15.247(a)(2)	6dB Bandwidth	$\geq 0.5\text{MHz}$	Not Required	-
-	-	99% Bandwidth	-	Not Required	-
3.1	15.247(b)(3)	Peak Output Power	$\leq 30\text{dBm}$	Pass	-
-	15.247(e)	Power Spectral Density	$\leq 8\text{dBm}/3\text{kHz}$	Not Required	-
-	15.247(d)	Conducted Band Edges and Spurious Emission	$\leq 20\text{dBc}$	Not Required	-
3.2	15.247(d)	Radiated Band Edges and Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 11.93 dB at 2494.120 MHz
-	15.207	AC Conducted Emission	15.207(a)	Not Required	-
3.3	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-

**Note:**

- Not required means after assessing, test items are not necessary to carry out.
- The original model (FCC ID: UZ7MC330K) and the variant model (FCC ID: UZ7MC330M) have identical PCB layout, antenna, SW implementation for Bluetooth/Wi-Fi. Based on their similarity, the test reports of FCC Part 15C & 15E (equipment class: DTS, DSS, NII) for the original model represent compliance for the variant model, and are referenced into the FCC filing of the variant model.  
  
In this test report, performed conducted power measurement and BT/WLAN radiated spurious emission that based on the worst-case condition from the original model(FCC ID: UZ7MC330K) which can be referred to Sporton Report Number FR790120B.



# 1 General Description

## 1.1 Applicant

**Zebra Technologies Corporation**  
1 Zebra Plaza, Holtsville, NY 11742

## 1.2 Manufacturer

**Zebra Technologies Corporation**  
1 Zebra Plaza, Holtsville, NY 11742

## 1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Computer
Brand Name	Zebra
Model Name	MC330M
FCC ID	UZ7MC330M
EUT supports Radios application	WLAN 11a/b/g/n HT20/HT40 WLAN 11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE
HW Version	EV1b
SW Version	Android Version 7.1.2
FW Version	W10: Aug 4 2017 12:57:11 version 7.35.205.8 (r ) FWID 01-895bc792
Fusion Version	Fusion_BA_2.10.0.0.007_N-0809201717-N
MFD	30AUG17
EUT Stage	Engineering Sample

### <SKU List>

Standard					
SKU	Type-scanner	camera	Audio Jack	NFC	Speaker
1	GUN-SE4850	X	X	X	X
2	GUN-SE4750	X	X	X	X
3	GUN-SE965	X	X	X	X
4	Brick-SE4850	X	X	X	X
5	Brick-SE4750	X	X	X	X
6	Brick-SE965	X	X	X	X
7	Rotate	X	X	X	X

Specification of Accessories				
Sentry 1X Battery	Brand Name	Zebra	Part Number	BT-000338-01
Sentry 2X Battery	Brand Name	Zebra	Part Number	BT-000337-01
MC32 1X Battery	Brand Name	Symbol	Part Number	82-000011-01
MC32 2X Battery	Brand Name	Symbol	Part Number	82-000012-02
Wall wart power supply(18W)	Brand Name	Zebra	Part Number	PWR-WUA5V12W0US
Charge Cable for Wall wart power supply	Brand Name	Zebra	Part Number	PWRS-14000-249R
HS2100 Earphone	Brand Name	Symbol	Part Number	HS2100-OTH
Quick Disconnect cable for HS2100 Headset	Brand Name	Symbol	Part Number	CBL-HS2100-QDC1-01
RCH51 Earphone	Brand Name	Symbol	Part Number	RCH51
Cable for RCH51 earphone	Brand Name	Symbol	Part Number	25-124411-02R
U cable	Brand Name	Symbol	Part Number	CBL-MC33-USBCHG-01
Gun Holster MC3000	Brand Name	Symbol	Model Name	SG-MC3021212-01R
Holster MC30XX	Brand Name	Symbol	Model Name	11-69293-01R

## 1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Frequency Range	2402 MHz ~ 2480 MHz
Number of Channels	40
Carrier Frequency of Each Channel	40 Channel(37 hopping + 3 advertising channel)
Maximum Output Power to Antenna	3.88 dBm (0.0024 W)
Type of Modulation	Bluetooth LE : GFSK
Antenna Type / Gain	<Ant. 1>PIFA Antenna with gain 3.86 dBi <Ant. 2>PIFA Antenna with gain 3.63 dBi

## 1.5 Modification of EUT

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

## 1.6 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.

<b>Test Site</b>	SPORTON INTERNATIONAL INC.
<b>Test Site Location</b>	No. 52, Hwa Ya 1 <sup>st</sup> Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978
<b>Test Site No.</b>	<b>Sporton Site No.</b>
	TH05-HY

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

<b>Test Site</b>	SPORTON INTERNATIONAL INC.
<b>Test Site Location</b>	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
<b>Test Site No.</b>	<b>Sporton Site No.</b>
	03CH12-HY

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

## 1.7 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 v04
- ♦ 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)
2400-2483.5 MHz	0	2402	21	2444
	1	2404	22	2446
	2	2406	23	2448
	3	2408	24	2450
	4	2410	25	2452
	5	2412	26	2454
	6	2414	27	2456
	7	2416	28	2458
	8	2418	29	2460
	9	2420	30	2462
	10	2422	31	2464
	11	2424	32	2466
	12	2426	33	2468
	13	2428	34	2470
	14	2430	35	2472
	15	2432	36	2474
	16	2434	37	2476
	17	2436	38	2478
	18	2438	39	2480
	19	2440	-	-
	20	2442	-	-



## 2.2 Test Mode

Channel	Frequency	Bluetooth – LE RF Average Output Power
		Data Rate / Modulation
		GFSK
		1Mbps
Ch00	2402MHz	1.36 dBm
Ch19	2440MHz	<b>2.87</b> dBm
Ch39	2480MHz	1.89 dBm

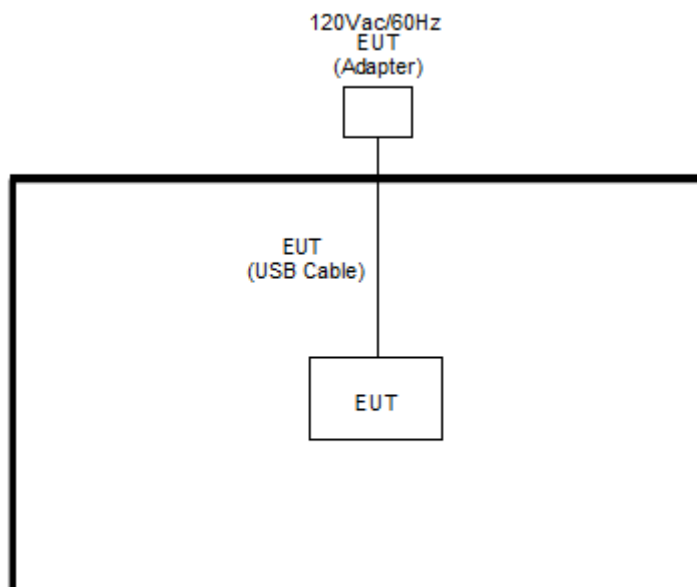
Channel	Frequency	Bluetooth – LE RF Peak Output Power
		Data Rate / Modulation
		GFSK
		1Mbps
Ch00	2402MHz	2.63 dBm
Ch19	2440MHz	<b>3.88</b> dBm
Ch39	2480MHz	2.98 dBm

- a. 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: conduction emission (150 kHz to 30 MHz), 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 (Y plane) were recorded in this report.
- b. AC power line Conducted Emission was tested under maximum output power.

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
	Bluetooth – LE / GFSK
Radiated TCs	Mode 1: Bluetooth Tx CH39_2480 MHz_1Mbps
<b>Remark:</b> For radiated test cases, the test was performed with SKU 7, Keypad (46), MC32 1X Battery, USB Link with Adapter, PWR-WUA5V12W0US(LV6).	

## 2.3 Connection Diagram of Test System



## 2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Notebook-40(Tx)	Lenovo	E335	N/A	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
2.	Notebook-53(Rx)	ASUS	K42J	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, programmed RF utility, "command" installed in the notebook make the EUT provide functions like channel selection and power level for continuous transmitting and receiving signals.

### 3 Test Result

#### 3.1 Peak Output Power Measurement

##### 3.1.1 Limit of Peak Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. If transmitting antenna of directional gain greater than 6dBi is used, the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

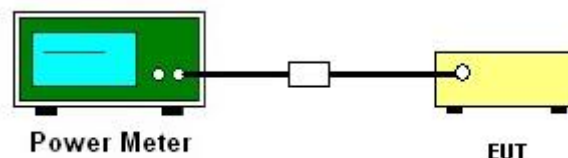
##### 3.1.2 Measuring Instruments

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

##### 3.1.3 Test Procedures

1. The testing follows the Measurement Procedure of FCC KDB No. 558074 DTS D01 Meas. Guidance v04 section 9.1.2 PKPM1 Peak power meter method.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power and record the results in the test report.

##### 3.1.4 Test Setup



##### 3.1.5 Test Result of Peak Output Power

Please refer to section 2.2 of the report.



## **3.2 Radiated Band Edges and Spurious Emission Measurement**

### **3.2.1 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. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the limits as below.

<b>Frequency (MHz)</b>	<b>Field Strength (microvolts/meter)</b>	<b>Measurement Distance (meters)</b>
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

### **3.2.2 Measuring Instruments**

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



### 3.2.3 Test Procedures

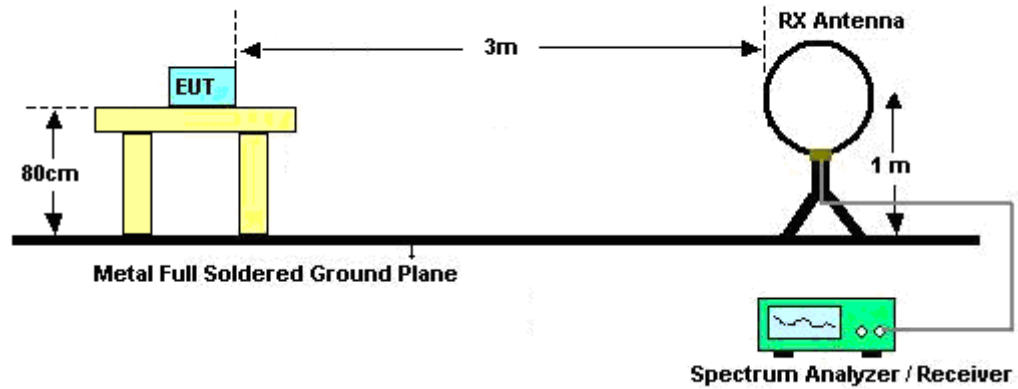
1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. 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.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
7. 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; VBW  $\geq$  RBW; Sweep = auto; Detector function = peak; Trace = max hold;
  - (3) Set RBW = 1 MHz, VBW= 3MHz for  $f \geq 1$  GHz for peak measurement.

For average measurement:

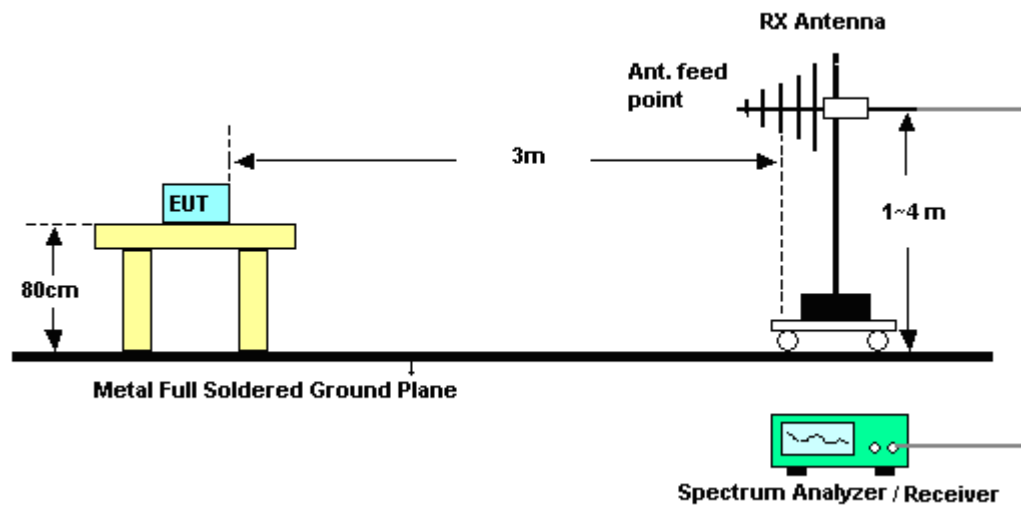
    - VBW = 10 Hz, when duty cycle is no less than 98 percent.
    - VBW  $\geq 1/T$ , when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

### 3.2.4 Test Setup

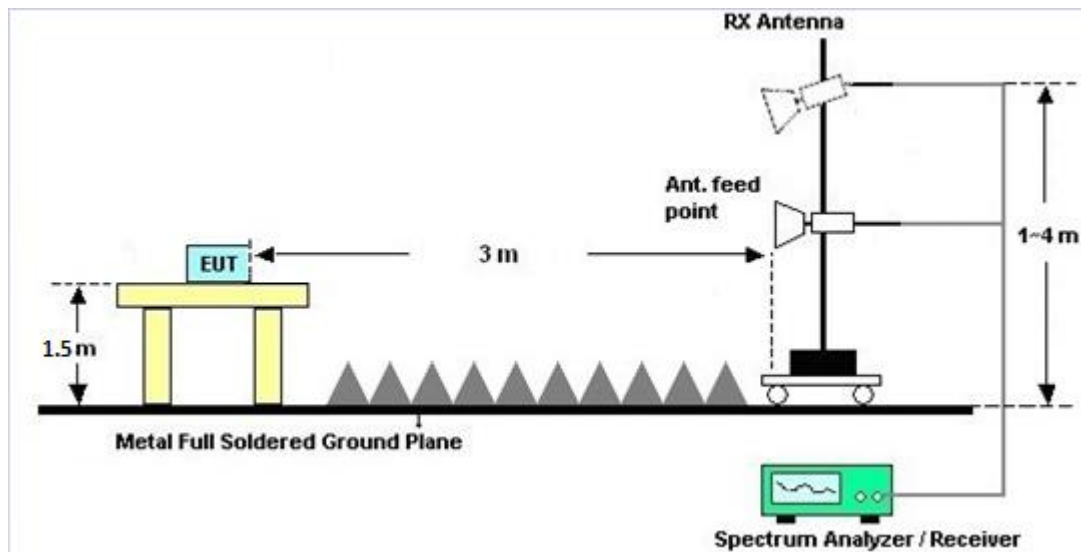
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



### 3.2.5 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.

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

Please refer to Appendix A and B.

### 3.2.7 Duty Cycle

Please refer to Appendix C.

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

Please refer to Appendix A and B.



### **3.3 Antenna Requirements**

#### **3.3.1 Standard Applicable**

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. 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 rule.

#### **3.3.2 Antenna Anti-Replacement Construction**

An embedded-in antenna design is used.

#### **3.3.3 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
Power Meter	Anritsu	ML2495A	0932001	N/A	Sep. 26, 2017	Oct. 04, 2017	Sep. 25, 2018	Conducted (TH05-HY)
Power Sensor	Anritsu	MA2411B	0846202	300MHz~40GHz	Sep. 26, 2017	Oct. 04, 2017	Sep. 25, 2018	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP30	101067	9kHz ~ 30GHz	Nov. 17, 2016	Oct. 04, 2017	Nov. 16, 2017	Conducted (TH05-HY)
Amplifier	SONOMA	310N	187312	9kHz~1GHz	Nov. 10, 2016	Oct. 13, 2017 ~ Oct. 17, 2017	Nov. 09, 2017	Radiation (03CH12-HY)
Bilog Antenna	TESEQ	CBL 6111D&00800 N1D01N-06	35413&02	30MHz~1GHz	Jan. 07, 2017	Oct. 13, 2017 ~ Oct. 17, 2017	Jan. 06, 2018	Radiation (03CH12-HY)
EMI Test Receiver	Rohde & Schwarz	ESU26	100390	20Hz~26.5GHz	Dec. 23, 2016	Oct. 13, 2017 ~ Oct. 17, 2017	Dec. 22, 2017	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1328	1GHz ~ 18GHz	Oct. 25, 2016	Oct. 13, 2017 ~ Oct. 17, 2017	Oct. 24, 2017	Radiation (03CH12-HY)
Preamplifier	MITEQ	AMF-7D-0010 1800-30-10P	1815698	1GHz~18GHz	Dec. 01, 2016	Oct. 13, 2017 ~ Oct. 17, 2017	Nov. 30, 2017	Radiation (03CH12-HY)
Preamplifier	Keysight	83017A	MY53270148	1GHz~26.5GHz	Jan. 12, 2017	Oct. 13, 2017 ~ Oct. 17, 2017	Jan. 11, 2018	Radiation (03CH12-HY)
Filter	Wainwright	WHKX12-270 0-3000-18000-60ST	SN2	3 GHz Highpass	Mar. 24, 2017	Oct. 13, 2017 ~ Oct. 17, 2017	Mar. 23, 2018	Radiation (03CH12-HY)
Filter	Wainwright	WLKS1200-12SS	SN2	1.2G Low Pass	Mar. 24, 2017	Oct. 13, 2017 ~ Oct. 17, 2017	Mar. 23, 2018	Radiation (03CH12-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1m~4m	N/A	Oct. 13, 2017 ~ Oct. 17, 2017	N/A	Radiation (03CH12-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	Oct. 13, 2017 ~ Oct. 17, 2017	N/A	Radiation (03CH12-HY)
Attenuator	Fairview Microwave	SA18S5W-10	n/a	10db	Mar. 24, 2017	Oct. 13, 2017 ~ Oct. 17, 2017	Mar. 23, 2018	Radiation (03CH12-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170576	18GHz ~ 40GHz	Apr. 27, 2017	Oct. 13, 2017 ~ Oct. 17, 2017	Apr. 26, 2018	Radiation (03CH12-HY)
Preamplifier	MITEQ	TTA1840-35-HG	1887435	18GHz~40GHz	Jul. 18, 2017	Oct. 13, 2017 ~ Oct. 17, 2017	Jul. 17, 2018	Radiation (03CH12-HY)



## 5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	5.10
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### Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	5.20
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### Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	4.70
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## Appendix A. Radiated Spurious Emission

Test Engineer :	Ray Chen, J.C. Liang and Nick Yu	Temperature :	23~25°C
		Relative Humidity :	59~63%

## 2.4GHz 2400~2483.5MHz

## BLE (Band Edge @ 3m)

BLE	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )
BLE CH 39 2480MHz	*	2480	91.3	-	-	81.01	27.64	4.09	31.47	370	30	P	H
	*	2480	90.47	-	-	80.18	27.64	4.09	31.47	370	30	A	H
		2487.88	53.07	-20.93	74	42.7	27.7	4.11	31.47	370	30	P	H
		2493.72	41.97	-12.03	54	31.59	27.7	4.11	31.46	370	30	A	H
													H
													H
	*	2480	101.4	-	-	91.11	27.64	4.09	31.47	195	326	P	V
	*	2480	100.58	-	-	90.29	27.64	4.09	31.47	195	326	A	V
		2491.24	52.68	-21.32	74	42.31	27.7	4.11	31.47	195	326	P	V
		2494.12	42.07	-11.93	54	31.69	27.7	4.11	31.46	195	326	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****BLE (Harmonic @ 3m)**

BLE	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
<b>BLE CH 39 2480MHz</b>		4960	39.29	-34.71	74	58.64	32.04	6.26	58.14	100	0	P	H
		7440	45.58	-28.42	74	59.12	37.56	7.75	59.17	100	0	P	H
													H
													H
		4960	39.53	-34.47	74	58.88	32.04	6.26	58.14	100	0	P	V
		7440	44.83	-29.17	74	58.37	37.56	7.75	59.17	100	0	P	V
													V
													V
<b>Remark</b>	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



**Note symbol**

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

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

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( 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. Level(dBμV/m) =

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

2. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

**For Peak Limit @ 2390MHz:**

1. Level(dBμV/m)

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

= 32.22(dB/m) + 4.58(dB) + 54.51(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) + Cable 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**

<b>Test Engineer :</b>	Ray Chen, J.C. Liang and Nick Yu	<b>Temperature :</b>	23~25°C
		<b>Relative Humidity :</b>	59~63%



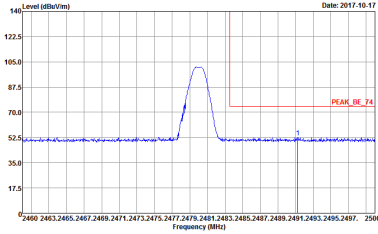
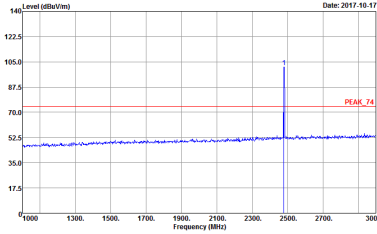
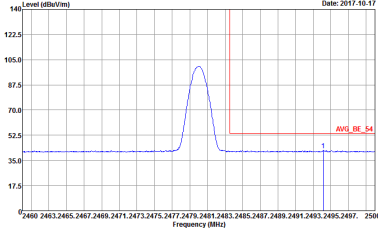
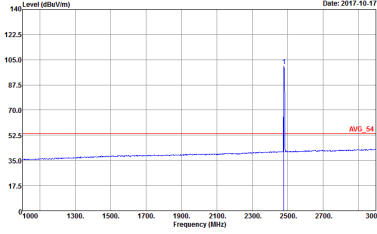
## 2.4GHz 2400~2483.5MHz

## BLE (Band Edge @ 3m)

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BLE CH39 2480MHz	
1	Horizontal	Fundamental
Peak	<p>Site : 03CH12-HY Condition : PEAK_BE_74 3m HORN_9120D_1328 HORIZONTAL Detector : REW:1000.000KHz YBW:3000.000KHz SWT:Auto Project : Peak Mode : 790120-02 12</p>	<p>Site : 03CH12-HY Condition : PEAK_74 3m HORN_9120D_1328 HORIZONTAL Detector : REW:1000.000KHz YBW:3000.000KHz SWT:Auto Project : Peak Mode : 790120-02 12</p>
Avg.	<p>Site : 03CH12-HY Condition : AVG_BE_54 3m HORN_9120D_1328 HORIZONTAL Detector : REW:1000.000KHz YBW:3.000KHz SWT:Auto Project : Peak Mode : 790120-02 12</p>	<p>Site : 03CH12-HY Condition : AVG_54 3m HORN_9120D_1328 HORIZONTAL Detector : REW:1000.000KHz YBW:3.000KHz SWT:Auto Project : Peak Mode : 790120-02 12</p>





BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BLE CH39 2480MHz	
1	Vertical	Fundamental
Peak	 <p>Site : 03CH12-HY Condition : PEAK_BE_74 3m HORN_9120D_1338 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 790120-02 12</p>	 <p>Site : 03CH12-HY Condition : PEAK_74 3m HORN_9120D_1338 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 790120-02 12</p>
Avg.	 <p>Site : 03CH12-HY Condition : AVG_BE_54 3m HORN_9120D_1338 VERTICAL Detector : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Project : Peak Mode : 790120-02 12</p>	 <p>Site : 03CH12-HY Condition : AVG_54 3m HORN_9120D_1338 VERTICAL Detector : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Project : Peak Mode : 790120-02 12</p>



2.4GHz 2400~2483.5MHz

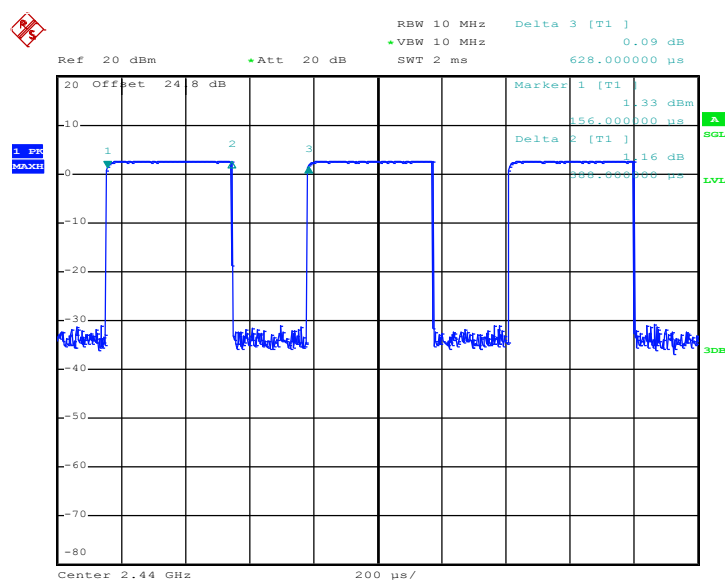
BLE (Harmonic @ 3m)

BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	BLE CH39 2480MHz	
1	Horizontal	Vertical
Peak	<p>Site : 03CH12-HY Condition : PEAK_74 3m HORN_9120D_1328 HORIZONTAL Detector : Peak Project : 790120-02 Mode : 12</p>	<p>Site : 03CH12-HY Condition : PEAK_74 3m HORN_9120D_1328 VERTICAL Detector : Peak Project : 790120-02 Mode : 12</p>

## Appendix C. Duty Cycle Plots

Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
Bluetooth - LE	61.78	388.00	2.58	3kHz

### Bluetooth - LE



Date: 4.OCT.2017 13:32:31