FCC RF Test Report

APPLICANT	:	Lenovo (Shanghai) Electronics Technology Co., Ltd.
EQUIPMENT	:	802.11a/b/g/n/ac + BT 4.1 M.2 2230 Type Card
BRAND NAME	:	Lenovo
MODEL NAME	:	QCNFA344A
FCC ID	:	O57-QCNFA344AH
STANDARD	:	FCC Part 15 Subpart C §15.247
CLASSIFICATION	:	(DSS) Spread Spectrum Transmitter

The product was installed into Notebook Computer (Brand Name: Lenovo, Model Name: Lenovo YOGA 920-13IKBXXXXXX, 80Y7XXXXXX, Lenovo YOGA 920-13IKB GlassXXXXXX, 80Y8XXXXXX, Lenovo YOGA 6 ProXXXXXX (The"X"in model name can be 0 to 9,A to Z,a to z,"-"or blank), Marketing Name: Lenovo YOGA 920) during test.

The product was received on Jun. 02, 2017 and testing was completed on Jul. 04, 2017. We, Sporton International (KunShan) 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 (KunShan) INC., the test report shall not be reproduced except in full.

James Huang

Prepared by: James Huang / Manager

Jones Tsai

Approved by: Jones Tsai / Manager

Testing Laboratory 2627

Sporton International (KunShan) INC.
No.3-2, Pingxiang Road, Kunshan Development Zone, Jiangsu, China

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR760219A	Rev. 01	Initial issue of report	Aug. 03, 2017

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
-	15.247(a)(1)	Number of Channels	≥ 15Chs	Pass	1
-	15.247(a)(1)	Hopping Channel Separation	≥ 2/3 of 20dB BW	Pass	1
-	15.247(a)(1)	Dwell Time of Each Channel	≤ 0.4sec in 31.6sec period	Pass	1
-	15.247(a)(1)	20dB Bandwidth	NA	Pass	1
-	-	99% Bandwidth	-	Pass	1
3.1	15.247(b)(1)	Peak and Average Output Power	≤ 125 mW	Pass	-
-	15.247(d)	Conducted Band Edges	≤ 20dBc	Pass	1
-	15.247(d)	Conducted Spurious Emission	≤ 20dBc	Pass	1
3.2	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 7.23 dB at 32.910 MHz
3.3	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 10.5 dB at 0.198 MHz
3.4	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-

Remark:

1. All conducted test items were leverage from module RF report which can refer to Report No. “RF150107E06B-2”.

1 General Description

1.1 Applicant

Lenovo (Shanghai) Electronics Technology Co., Ltd.
NO.68 BUILDING, 199 FENJU RD, China (Shanghai) Pilot Free Trade Zone, 200131, CHINA

1.2 Product Feature of Equipment Under Test

Product Feature	
Equipment	802.11a/b/g/n/ac + BT 4.1 M.2 2230 Type Card
Brand Name	Lenovo
Model Name	QCNFA344A
FCC ID	O57-QCNFA344AH
EUT supports Radios application	WLAN 2.4GHz 802.11b/g/n/ac HT20/HT40/VHT20/VHT40 WLAN 5GHz 802.11a/n/ac HT20/HT40/VHT20/VHT40/VHT80 Bluetooth v3.0+EDR, Bluetooth v4.0 LE, Bluetooth v4.1 LE
EUT Stage	Identical Prototype

Host Product Feature	
Equipment	Notebook Computer
Brand Name	Lenovo
Model Name	Lenovo YOGA 920-13IKBXXXXXX, 80Y7XXXXXX, Lenovo YOGA 920-13IKB GlassXXXXXX, 80Y8XXXXXX, Lenovo YOGA 6 ProXXXXXX (The"X"in model name can be 0 to 9,A to Z,a to z,"-"or blank)
Marketing Name	Lenovo YOGA 920
Applicant	**Lenovo (Shanghai) Electronics Technology Co., Ltd.** NO.68 BUILDING, 199 FENJU RD, China (Shanghai) Pilot Free Trade Zone, Shanghai, 200131 China
Manufacturer	**Lenovo PC HK Limited** 23/F, Lincoln House, Taikoo Place, 979 King's Road, Quarry Bay Hong Kong

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.3 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
Maximum (Peak) Output Power to antenna	Bluetooth BR(1Mbps) : 7.72 dBm (0.0059 W) Bluetooth EDR (2Mbps) : 9.03 dBm (0.0080 W) Bluetooth EDR (3Mbps) : 9.29 dBm (0.0085 W)
Antenna Type / Gain	PIFA Antenna with gain 0.56 dBi
Type of Modulation	Bluetooth BR (1Mbps) : GFSK Bluetooth EDR (2Mbps) : π /4-DQPSK Bluetooth EDR (3Mbps) : 8-DPSK

1.4 Modification of EUT

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

1.5 Testing Location

Test Site	Sporton International (KunShan) INC.			
Test Site Location	No.3-2, Pingxiang Road, Kunshan Development Zone, Jiangsu, China TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958			
Test Site No.	**Sporton Site No.**			**FCC Registration No.**
	TH01-KS	CO01-KS	03CH03-KS	306251

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

1.6 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
- 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

2.1 Descriptions of Test Mode

Preliminary tests were performed in different data rates and recorded the RF output power in the following table:

Channel	Frequency	Bluetooth RF Peak Output Power		
		Data Rate / Modulation		
		GFSK	π/4-DQPSK	8-DPSK
		1Mbps	2Mbps	3Mbps
Ch00	2402MHz	6.63 dBm	8.18 dBm	8.50 dBm
Ch39	2441MHz	7.15 dBm	8.58 dBm	8.84 dBm
Ch78	2480MHz	7.72 dBm	9.03 dBm	**9.29 dBm**

Channel	Frequency	Bluetooth RF Average Output Power		
		Data Rate / Modulation		
		GFSK	π/4-DQPSK	8-DPSK
		1Mbps	2Mbps	3Mbps
Ch00	2402MHz	6.62 dBm	6.55 dBm	6.74 dBm
Ch39	2441MHz	6.95 dBm	6.75 dBm	6.67 dBm
Ch78	2480MHz	**7.39 dBm**	7.14 dBm	6.96 dBm

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 (150 kHz to 30 MHz), radiation (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). The worst mode of radiated spurious emissions is Bluetooth 3Mbps mode, and recorded in this report.

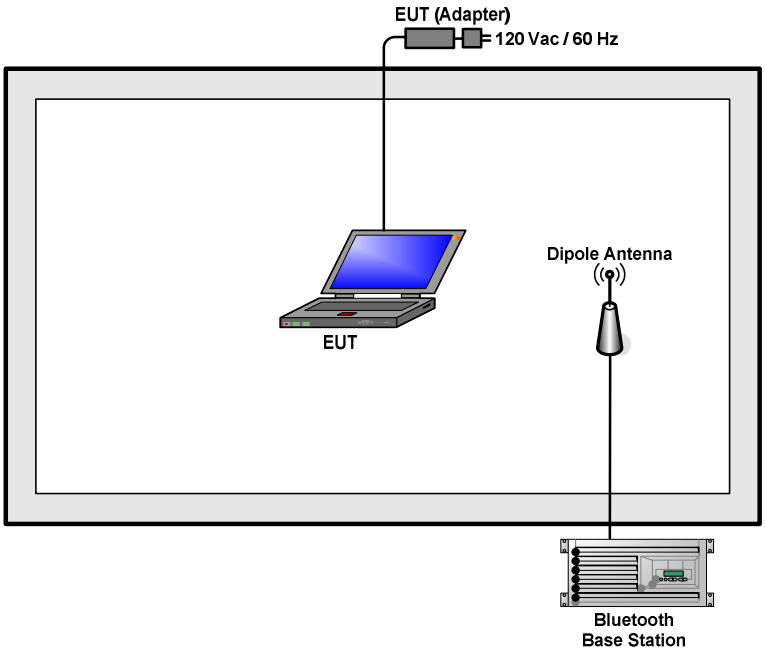
2.2 Test Mode

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

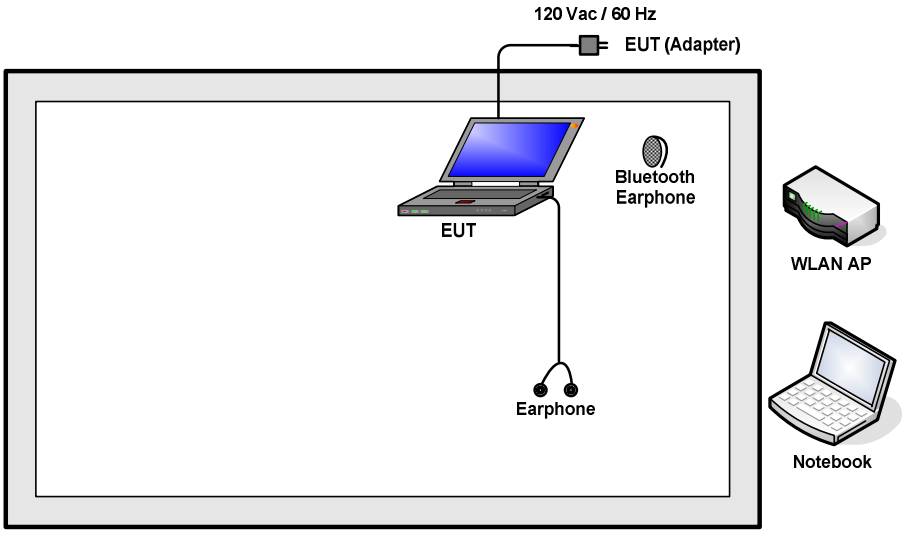
Summary table of Test Cases	
	Bluetooth BR 3Mbp 8-DPSK
Radiated Test Cases	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz
AC Conducted Emission	Mode 1 :Bluetooth Link + WLAN (2.4G) Link + Camera + Earphone + Battery 1 + USB Link with U Disk USB Port + Paly H Plane + Adapter 1 With Type C 1 + USB Link with Type C 2 for Sample 1 Mode 2 : Bluetooth Link + WLAN (2.4G) Link + Camera + Earphone + Battery 1 + USB Link with U Disk USB Port + MPEG4/Color Bar + Adapter 1 With Type C 1 + USB Link with Type C 2 for Sample 1 Mode 3 : **Bluetooth Link + WLAN (2.4G) Link + Camera + Earphone + Battery 2 + USB Link with U Disk USB Port + Adapter 2 With Type C 1 + USB Link with Type C 2 for Sample 2** Mode 4 : Bluetooth Link + WLAN (2.4G) Link + Camera + Earphone + Battery 3 + USB Link with U Disk USB Port + Adapter 3 With Type C 1 + USB Link with Type C 2 for Sample 3 Mode 5 : Bluetooth Link + WLAN (2.4G) Link + Camera + Earphone + Battery 4 + USB Link with U Disk USB Port + Adapter 4 With Type C 1 + USB Link with Type C 2 for Sample 4 Mode 6 : Bluetooth Link + WLAN (2.4G) Link + Camera + Earphone + Battery 5 + USB Link with U Disk USB Port + Adapter 1 With Type C 1 + USB Link with Type C 2 for Sample 5
Remark: 1. The worst case of conducted emission is mode 3; only the test data of it was reported. 2. Type C 1 is USB charging port, Type C 2 is USB link port.	

2.3 Connection Diagram of Test System

<Bluetooth Tx Mode>



<AC Conducted Emission Mode>



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Bluetooth Base Station	R&S	CBT	N/A	N/A	Unshielded, 1.8 m
2.	WLAN AP	D-Link	DIR-855	KA2DIR855A2	N/A	Unshielded, 1.8 m
3.	Notebook	Lenovo	G480	N/A	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
4.	Bluetooth Earphone	Nokia	BH-102	PYAHS-107W	N/A	N/A

2.5 EUT Operation Test Setup

For Bluetooth function, the engineering test program was provided and enabled to make EUT connect with Bluetooth base station to continuous transmit/receive.

For AC power line conducted emissions, the EUT was set to connect with the WLAN AP under large package sizes transmission.

3 Test Result

3.1 Peak and Average Output Power Measurement

3.1.1 Limit of Peak and Average Output Power

Section 15.247 (b) The maximum peak conducted output power of the intentional radiator shall not exceed the following: (1) For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band 0.125 watts.

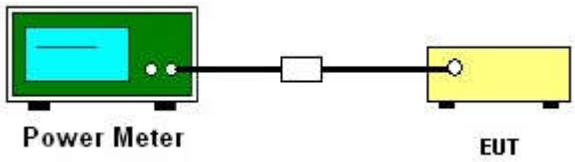
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

1. The testing follows ANSI C63.10-2013 clause 7.8.5.
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 with cable loss and record the results in the test report.
5. Measure and record the results in the test report.

3.1.4 Test Setup



3.1.5 Test Result of Peak Output Power

Test Mode :	1Mbps	Temperature :	21~25℃
Test Engineer :	Silent Hai	Relative Humidity :	51~55%

Channel	Frequency (MHz)	RF Power (dBm)		
		GFSK	Max. Limits (dBm)	Pass/Fail
		1 Mbps		
00	2402	6.63	20.97	Pass
39	2441	7.15	20.97	Pass
78	2480	7.72	20.97	Pass

Test Mode :	2Mbps	Temperature :	21~25℃
Test Engineer :	Silent Hai	Relative Humidity :	51~55%

Channel	Frequency (MHz)	RF Power (dBm)		
		π /4-DQPSK	Max. Limits (dBm)	Pass/Fail
		2 Mbps		
00	2402	8.18	20.97	Pass
39	2441	8.58	20.97	Pass
78	2480	9.03	20.97	Pass

Test Mode :	3Mbps	Temperature :	21~25℃
Test Engineer :	Silent Hai	Relative Humidity :	51~55%

Channel	Frequency (MHz)	RF Power (dBm)		
		8-DPSK	Max. Limits (dBm)	Pass/Fail
		3 Mbps		
00	2402	8.50	20.97	Pass
39	2441	8.84	20.97	Pass
78	2480	9.29	20.97	Pass

3.1.6 Test Result of Average Output Power (Report Only)

Test Mode :	1Mbps	Temperature :	21~25℃
Test Engineer :	Silent Hai	Relative Humidity :	51~55%

Channel	Frequency (MHz)	RF Power (dBm)		
		GFSK	Max. Limits (dBm)	Pass/Fail
		1 Mbps		
00	2402	6.62	-	-
39	2441	6.95	-	-
78	2480	7.39	-	-

Test Mode :	2Mbps	Temperature :	21~25℃
Test Engineer :	Silent Hai	Relative Humidity :	51~55%

Channel	Frequency (MHz)	RF Power (dBm)		
		π/4-DQPSK	Max. Limits (dBm)	Pass/Fail
		2 Mbps		
00	2402	6.55	-	-
39	2441	6.75	-	-
78	2480	7.14	-	-

Test Mode :	3Mbps	Temperature :	21~25℃
Test Engineer :	Silent Hai	Relative Humidity :	51~55%

Channel	Frequency (MHz)	RF Power (dBm)		
		8-DPSK	Max. Limits (dBm)	Pass/Fail
		3 Mbps		
00	2402	6.74	-	-
39	2441	6.67	-	-
78	2480	6.96	-	-

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. 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

3.2.2 Measuring Instruments

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

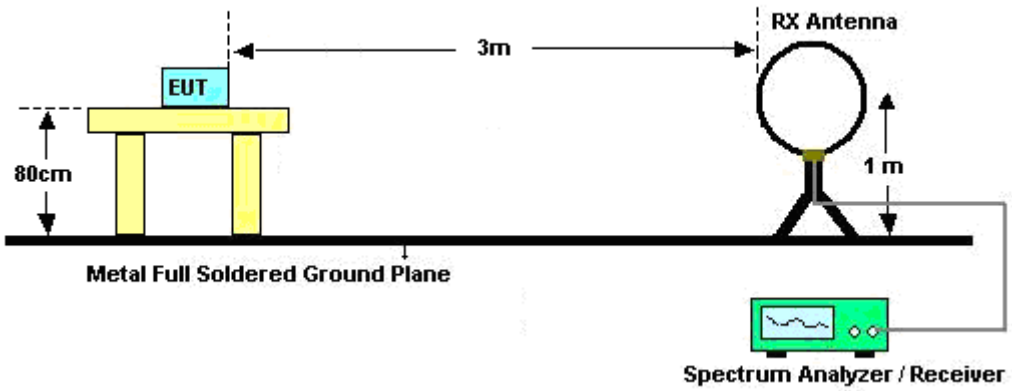
3.2.3 Test Procedures

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.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. 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.
4. Set to the maximum power setting and enable the EUT transmit continuously.
5. 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)
6. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

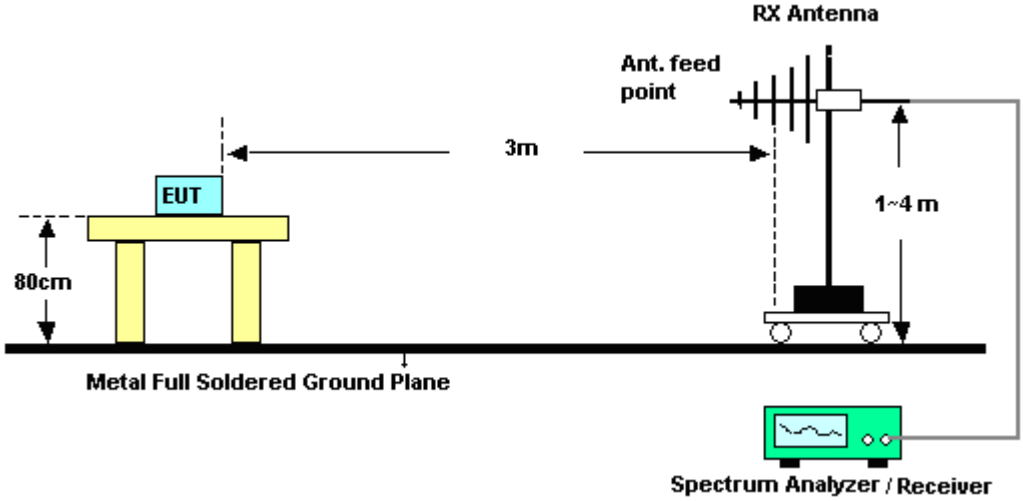
Note: The average levels were calculated from the peak level corrected with duty cycle correction factor (-24.76dB) derived from 20log (dwell time/100ms). This correction is only for signals that hop with the fundamental signal, such as band-edge and harmonic. Other spurious signals that are independent of the hopping signal would not use this correction.

3.2.4 Test Setup

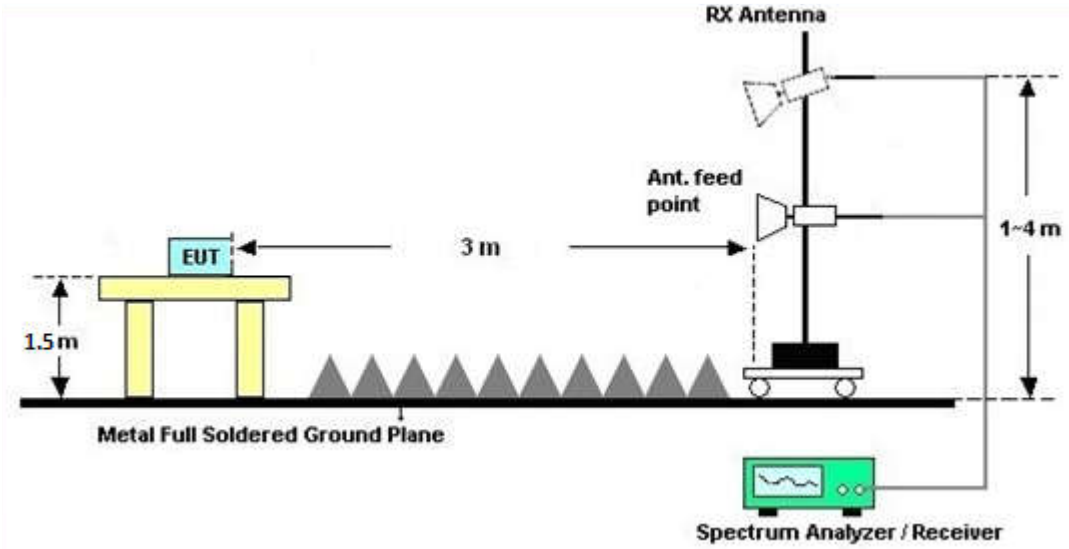
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz

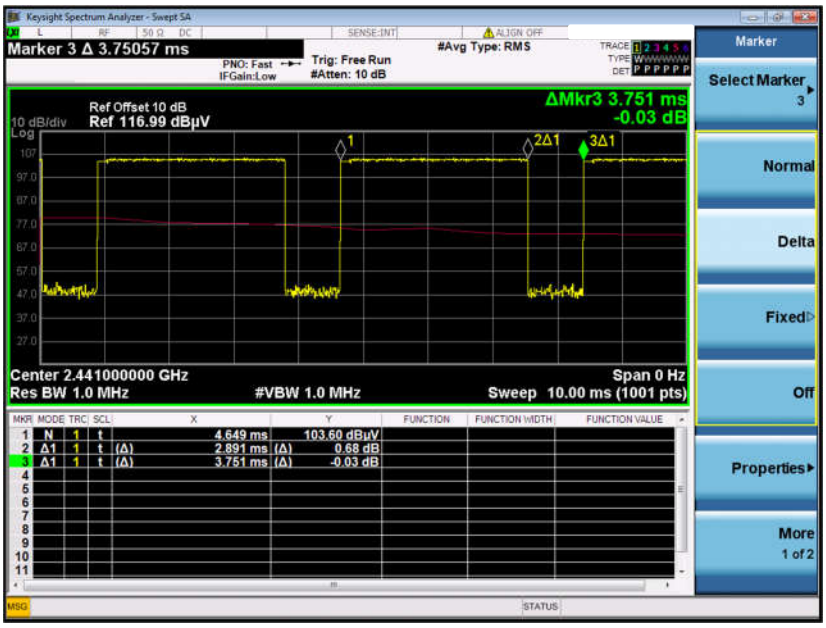


For radiated emissions above 1GHz

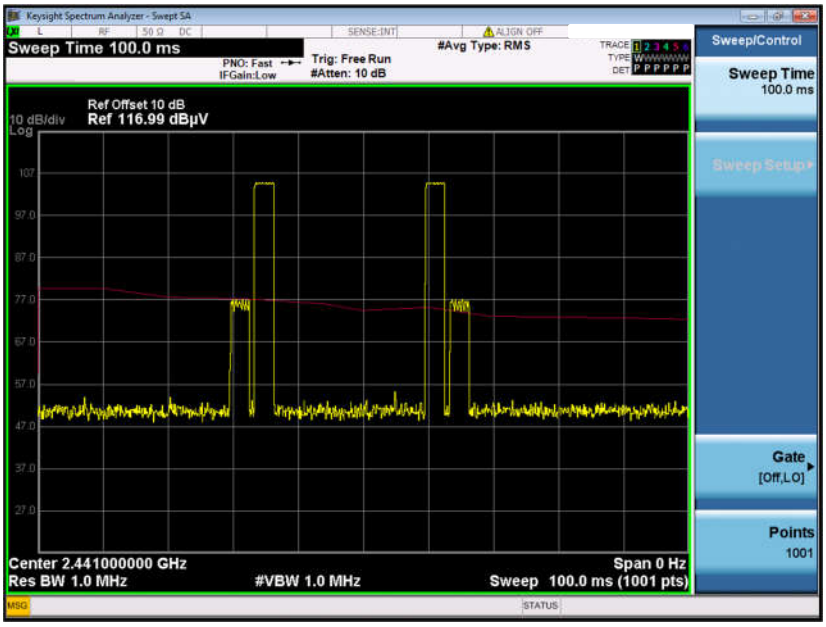


3.2.5 Duty cycle correction factor for average measurement

3DH5 on time (One Pulse) Plot on Channel 39



3DH5 on time (Count Pulses) Plot on Channel 39



Note:

1. Worst case Duty cycle = on time/100 milliseconds = 2 * 2.891 / 100 = 5.78 %
2. Worst case Duty cycle correction factor = 20*log(Duty cycle) = -24.76 dB
3. 3DH5 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

2.891 ms x 20 channels = 57.8 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:

2.891 ms x 2 = 5.78 ms

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

20 x log(5.78 ms/100ms) = -24.76 dB

3.2.6 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.

3.2.7 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix A and B.

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

Please refer to Appendix A and B.

3.3 AC Conducted Emission Measurement

3.3.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

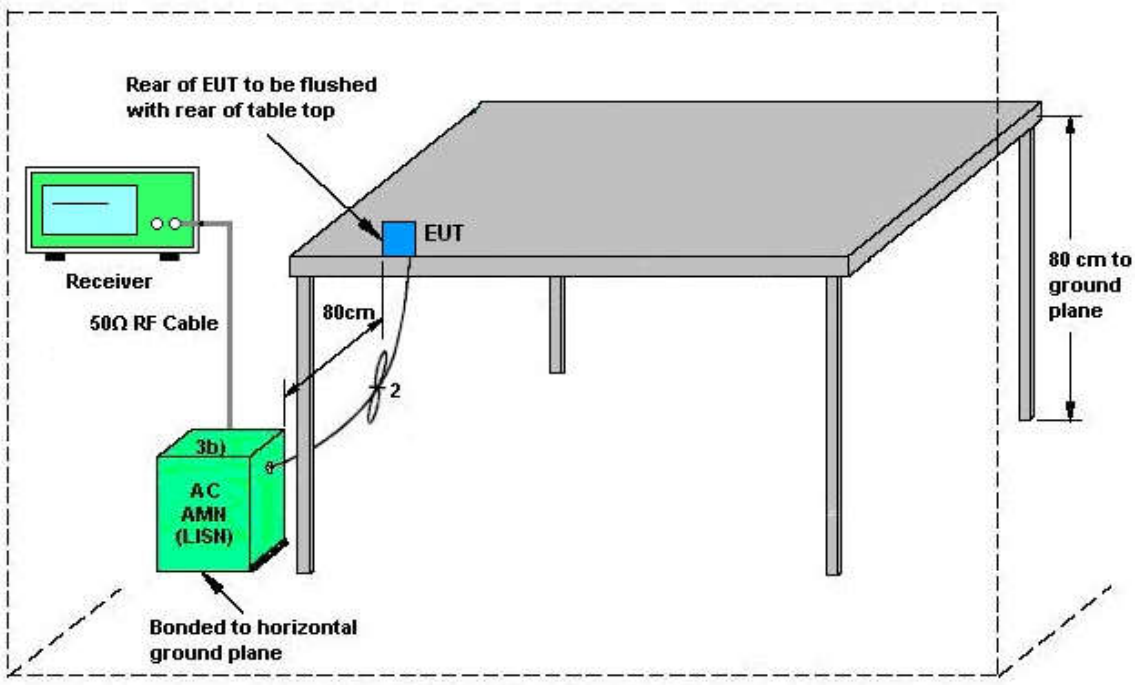
3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

7. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
8. Connect EUT to the power mains through a line impedance stabilization network (LISN).
9. All the support units are connecting to the other LISN.
10. The LISN provides 50 ohm coupling impedance for the measuring instrument.
11. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
12. Both sides of AC line were checked for maximum conducted interference.
13. The frequency range from 150 kHz to 30 MHz was searched.
14. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

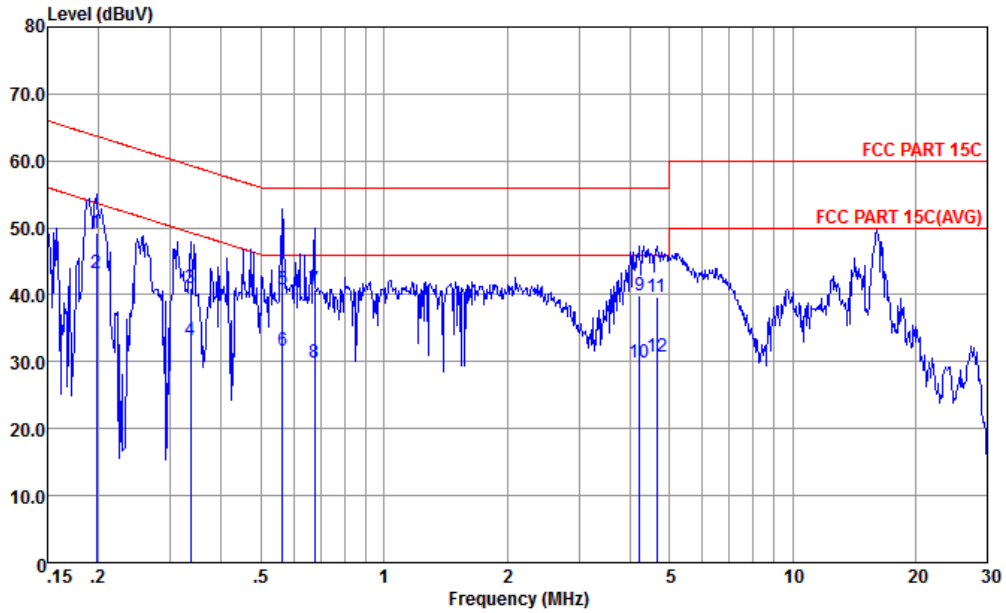
3.3.4 Test Setup



AMN = Artificial mains network (LISN)
AE = Associated equipment
EUT = Equipment under test
ISN = Impedance stabilization network

3.3.5 Test Result of AC Conducted Emission

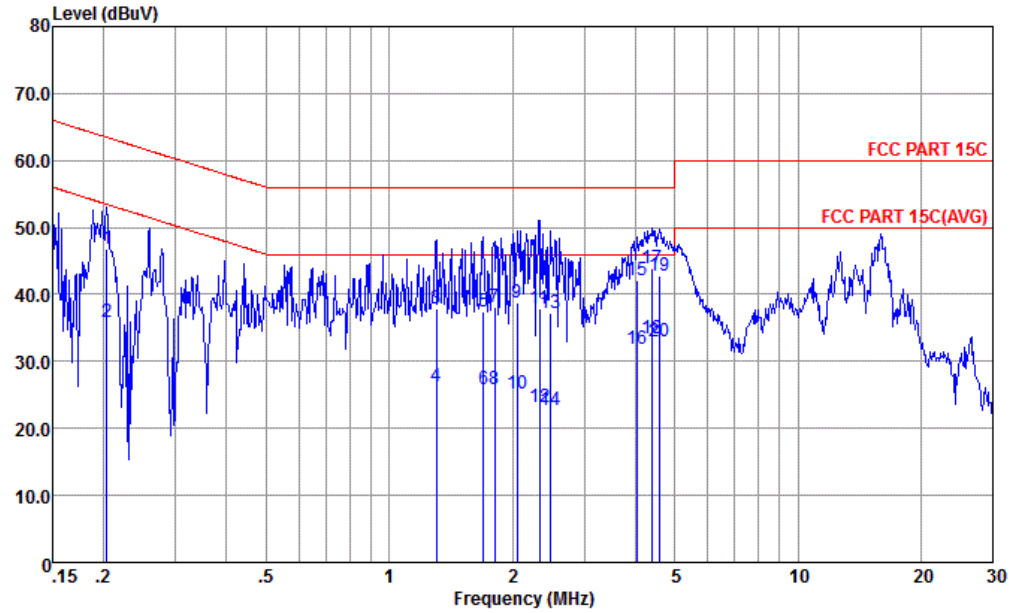
Test Mode :	Mode 3	**Temperature :**	22~24℃
Test Engineer :	Amos Zhang	**Relative Humidity :**	42~46%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Function Type :	Bluetooth Link + WLAN (2.4G) Link + Camera + Earphone + Battery 2 + USB Link with U Disk USB Port + Adapter 2 With Type C 1 + USB Link with Type C 2 for Sample 2		



Site : CO01-KS
Condition : FCC PART 15C LISN-L-161017-060103 LINE

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.198	49.21	-14.50	63.71	38.60	0.28	10.33	QP
2	*	0.198	43.21	-10.50	53.71	32.60	0.28	10.33	Average
3		0.336	41.10	-18.21	59.31	30.60	0.27	10.23	QP
4		0.336	33.10	-16.21	49.31	22.60	0.27	10.23	Average
5		0.564	40.75	-15.25	56.00	30.31	0.26	10.18	QP
6		0.564	31.75	-14.25	46.00	21.31	0.26	10.18	Average
7		0.675	40.73	-15.27	56.00	30.30	0.25	10.18	QP
8		0.675	29.93	-16.07	46.00	19.50	0.25	10.18	Average
9		4.224	39.95	-16.05	56.00	29.50	0.21	10.24	QP
10		4.224	29.75	-16.25	46.00	19.30	0.21	10.24	Average
11		4.647	39.65	-16.35	56.00	29.20	0.21	10.24	QP
12		4.647	30.75	-15.25	46.00	20.30	0.21	10.24	Average

Test Mode :	Mode 3	Temperature :	22~24℃
Test Engineer :	Amos Zhang	Relative Humidity :	42~46%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	Bluetooth Link + WLAN (2.4G) Link + Camera + Earphone + Battery 2 + USB Link with U Disk USB Port + Adapter 2 With Type C 1 + USB Link with Type C 2 for Sample 2		



Site : CO01-KS
Condition : FCC PART 15C LISN-N-161017-060103 NEUTRAL

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.204	46.86	-16.59	63.45	36.20	0.33	10.33	QP
2		0.204	35.96	-17.49	53.45	25.30	0.33	10.33	Average
3		1.303	37.79	-18.21	56.00	27.20	0.40	10.19	QP
4		1.303	26.19	-19.81	46.00	15.60	0.40	10.19	Average
5		1.698	37.50	-18.50	56.00	26.90	0.41	10.19	QP
6		1.698	25.90	-20.10	46.00	15.30	0.41	10.19	Average
7		1.810	38.20	-17.80	56.00	27.60	0.41	10.19	QP
8		1.810	25.80	-20.20	46.00	15.20	0.41	10.19	Average
9		2.055	38.80	-17.20	56.00	28.20	0.41	10.19	QP
10		2.055	25.20	-20.80	46.00	14.60	0.41	10.19	Average
11		2.334	37.80	-18.20	56.00	27.20	0.40	10.20	QP
12		2.334	23.20	-22.80	46.00	12.60	0.40	10.20	Average
13		2.474	37.21	-18.79	56.00	26.61	0.40	10.20	QP
14		2.474	22.81	-23.19	46.00	12.21	0.40	10.20	Average
15		4.027	42.13	-13.87	56.00	31.50	0.39	10.24	QP
16		4.027	31.93	-14.07	46.00	21.30	0.39	10.24	Average
17	*	4.407	43.83	-12.17	56.00	33.21	0.38	10.24	QP
18		4.407	33.53	-12.47	46.00	22.91	0.38	10.24	Average
19		4.598	42.83	-13.17	56.00	32.21	0.38	10.24	QP
20		4.598	32.93	-13.07	46.00	22.31	0.38	10.24	Average

3.4 Antenna Requirements

3.4.1 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.

3.4.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.4.3 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	1005002	50MHz Bandwidth	Jan. 19, 2017	Jun. 09, 2017	Jan. 18, 2018	Conducted (TH01-KS)
Pulse Power Senor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 19, 2017	Jun. 09, 2017	Jan. 18, 2018	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz; Max 30dBm	Aug. 09, 2016	Jun. 15, 2017	Aug. 08, 2017	Radiation (03CH03-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz~44GHz	Apr. 18, 2017	Jun. 15, 2017	Apr. 17, 2018	Radiation (03CH03-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Nov. 23, 2016	Jun. 15, 2017	Nov. 22, 2017	Radiation (03CH03-KS)
Bilog Antenna	TeseQ	CBL6112D	35406	25MHz~2GHz	Apr. 22, 2017	Jun. 15, 2017	Apr. 21, 2018	Radiation (03CH03-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1356	1GHz~18GHz	Apr. 22, 2017	Jun. 15, 2017	Apr. 21, 2018	Radiation (03CH03-KS)
SHF-EHF Horn	com-power	AH-840	101070	18GHz ~40GHz	Oct. 19, 2016	Jun. 15, 2017	Oct. 18, 2017	Radiation (03CH03-KS)
Amplifier	com-power	PA-103A	161069	1MHz ~1000MHz / 32 dB	Apr. 18, 2017	Jun. 15, 2017	Apr. 17, 2018	Radiation (03CH03-KS)
High Gain Amplifier	MITEQ	AMF-7D-00101800-30-10P	2025788	1GHz~18GHz	Apr. 18, 2017	Jun. 15, 2017	Apr. 17, 2018	Radiation (03CH03-KS)
Amplifier	Agilent	8449B	3008A02370	1GHz~26.5GHz	Oct. 13, 2016	Jun. 15, 2017	Oct. 12, 2017	Radiation (03CH03-KS)
Amplifier	MITEQ	TTA1840-35-HG	1887435	18GHz~40GHz	Oct. 13, 2016	Jun. 15, 2017	Oct. 12, 2017	Radiation (03CH03-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Jun. 15, 2017	NCR	Radiation (03CH03-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Jun. 15, 2017	NCR	Radiation (03CH03-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Jun. 15, 2017	NCR	Radiation (03CH03-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz	Apr. 20, 2017	Jul. 04, 2017	Apr. 19, 2018	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Oct. 13, 2016	Jul. 04, 2017	Oct. 12, 2017	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Oct. 13, 2016	Jul. 04, 2017	Oct. 12, 2017	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 13, 2016	Jul. 04, 2017	Oct. 12, 2017	Conduction (CO01-KS)

NCR: No Calibration Required

5 Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.3dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.6dB

Uncertainty of Radiated Emission Measurement (1GHz ~ 18GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.5dB

Uncertainty of Radiated Emission Measurement (18GHz ~ 40GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.7dB

Appendix A. Radiated Spurious Emission

2.4GHz 2400~2483.5MHz

BT (Band Edge @ 3m)

BT	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	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 CH00 2402MHz		2356.15	49.37	-24.63	74	54.9	25.55	5.43	36.51	313	223	P	H
		2356.15	24.61	-29.39	54	-	-	-	-	-	-	A	H
	*	2402	99.66	-	-	104.81	25.8	5.47	36.42	313	223	P	H
	*	2402	74.90	-	-	-	-	-	-	-	-	A	H
		2364.21	49.3	-24.7	74	54.83	25.55	5.43	36.51	395	64	P	V
		2364.21	24.54	-29.46	54	-	-	-	-	-	-	A	V
	*	2402	98.23	-	-	103.38	25.8	5.47	36.42	395	64	P	V
	*	2402	73.47	-	-	-	-	-	-	-	-	A	V
BT CH 39 2441MHz		2375.78	49.04	-24.96	74	54.38	25.67	5.45	36.46	321	160	P	H
		2375.78	24.28	-29.72	54	-	-	-	-	-	-	A	H
	*	2442	100.84	-	-	105.91	25.89	5.49	36.45	321	160	P	H
	*	2442	76.08	-	-	-	-	-	-	-	-	A	H
		2493.42	49.36	-24.64	74	54.35	25.97	5.52	36.48	321	160	P	H
		2493.42	24.60	-29.40	54	-	-	-	-	-	-	A	H
		2377.99	49.05	-24.95	74	54.39	25.67	5.45	36.46	380	57	P	V
		2377.99	24.29	-29.71	54	-	-	-	-	-	-	A	V
	*	2442	99.41	-	-	104.48	25.89	5.49	36.45	380	57	P	V
	*	2442	74.65	-	-	-	-	-	-	-	-	A	V
		2486.07	49.64	-24.36	74	54.66	25.94	5.51	36.47	380	57	P	V
		2486.07	24.88	-29.12	54	-	-	-	-	-	-	A	V

BT CH 78 2480MHz	*	2480	100.85	-	-	105.87	25.94	5.51	36.47	347	159	P	H
	*	2480	76.09	-	-	-	-	-	-	-	-	A	H
		2483.9	54.9	-19.1	74	59.92	25.94	5.51	36.47	347	159	P	H
		2483.9	30.14	-23.86	54	-	-	-	-	-	-	A	H
	*	2480	99.16	-	-	104.18	25.94	5.51	36.47	372	53	P	V
	*	2480	74.40	-	-	-	-	-	-	-	-	A	V
		2483.69	53.67	-20.33	74	58.69	25.94	5.51	36.47	372	53	P	V
		2483.69	28.91	-25.09	54	-	-	-	-	-	-	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

BT (Harmonic @ 3m)

BT	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)
BT CH 00 2402MHz		4806	41.49	-32.51	74	39.66	30.62	7.71	36.5	160	360	P	H
		4806	41.42	-32.58	74	39.59	30.62	7.71	36.5	160	0	P	V
BT CH 39 2441MHz		4884	41.19	-32.81	74	39.11	30.85	7.76	36.53	160	0	P	H
		7320	46.78	-27.22	74	38.4	34.85	9.78	36.25	160	0	P	H
		4884	42.05	-31.95	74	39.97	30.85	7.76	36.53	160	360	P	V
		7320	46.65	-27.35	74	38.27	34.85	9.78	36.25	160	360	P	V
BT CH 78 2480MHz		4962	43.59	-30.41	74	41.21	31.13	7.82	36.57	160	360	P	H
		7440	45.72	-28.28	74	36.97	35.17	9.87	36.29	160	360	P	H
		4960	41.89	-32.11	74	39.51	31.13	7.82	36.57	160	0	P	V
		7440	46.23	-27.77	74	37.48	35.17	9.87	36.29	160	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

2.4GHz BT (LF)

BT	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	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		34.85	32.58	-7.42	40	38.47	25.7	0.71	32.3	140	35	P	H
		95.96	25.34	-18.16	43.5	37.97	18.44	1.18	32.25	-	-	P	H
		153.19	26.55	-16.95	43.5	39.86	17.47	1.5	32.28	-	-	P	H
		202.66	33.88	-9.62	43.5	47.39	17.01	1.73	32.25	-	-	P	H
		353.01	26.42	-19.58	46	34.34	21.85	2.31	32.08	-	-	P	H
		701.24	29.14	-16.86	46	29.5	27.97	3.35	31.68	-	-	P	H
		32.91	32.77	-7.23	40	38.24	26.14	0.69	32.3	100	20	P	V
		46.49	32.04	-7.96	40	45.23	18.2	0.84	32.23	-	-	P	V
		93.05	27.44	-16.06	43.5	40.39	18.14	1.16	32.25	-	-	P	V
		323.91	27.07	-18.93	46	36.33	20.61	2.21	32.08	-	-	P	V
		476.2	26.94	-19.06	46	31.83	24.31	2.73	31.93	-	-	P	V
		709	28.87	-17.13	46	29.44	27.75	3.37	31.69	-	-	P	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:

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 CH 01 2412MHz		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. 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)

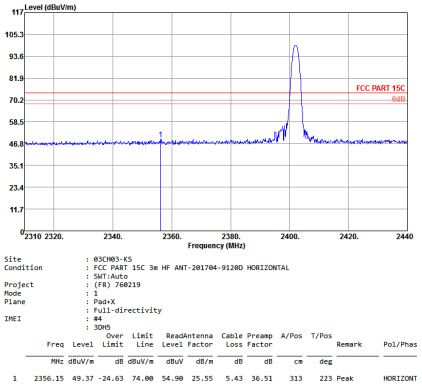
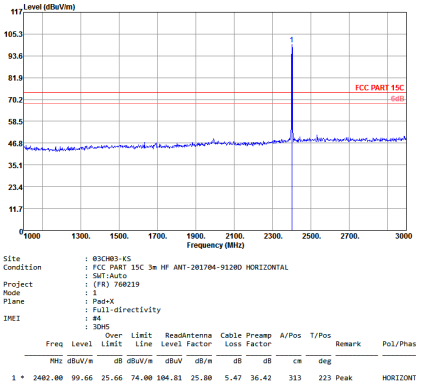
= -10.46(dB)

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

Appendix B. Radiated Spurious Emission Plots

2.4GHz 2400~2483.5MHz

BT (Band Edge @ 3m)

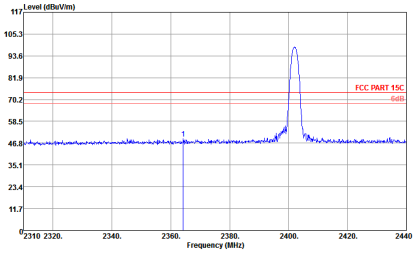
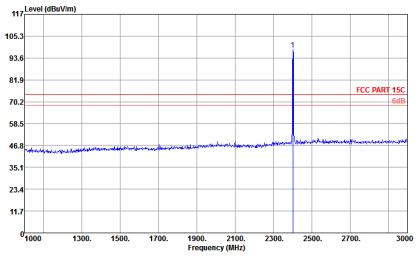
BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH00 2402MHz	
	Horizontal	Fundamental
Peak		

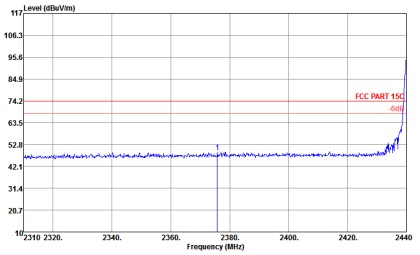
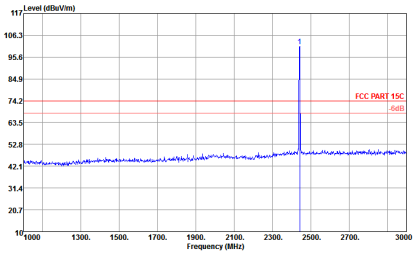
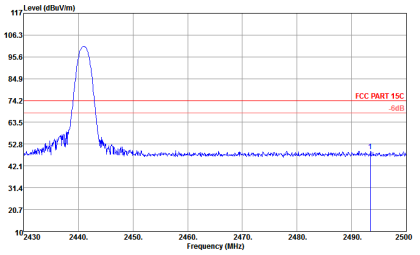
Site : 03CH03-KS
Condition : FCC PART 15C 3m HF ANT-201704-9120D HORIZONTAL
: SWT:Auto
Project : (FR) 760219
Mode : 1
Plane : Pad+X
: Full-directivity
IMEI : #4
: 3DH5

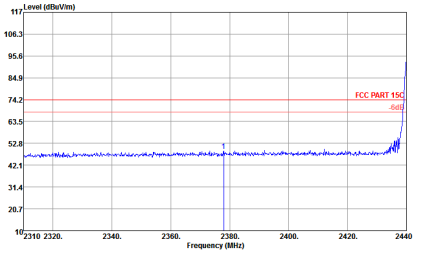
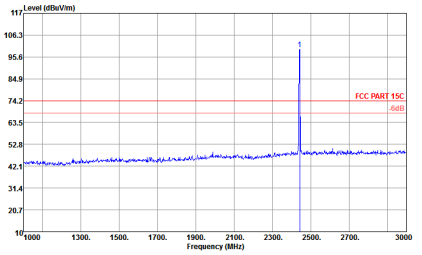
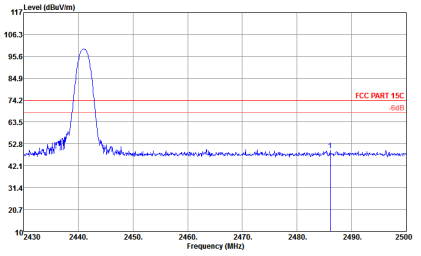
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Factor	Preamp Loss	A/Pos Factor	T/Pos	Remark	Pol/Phas
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	cm	deg		
1	2356.15	49.37	-24.63	74.00	54.90	25.55	5.43	36.51	313	223 Peak	HORIZONT

Site : 03CH03-KS
Condition : FCC PART 15C 3m HF ANT-201704-9120D HORIZONTAL
: SWT:Auto
Project : (FR) 760219
Mode : 1
Plane : Pad+X
: Full-directivity
IMEI : #4
: 3DH5

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Factor	Preamp Loss	A/Pos Factor	T/Pos	Remark	Pol/Phas
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	cm	deg		
1 *	2402.00	99.66	25.66	74.00	104.81	25.80	5.47	36.42	313	223 Peak	HORIZONT

BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH00 2402MHz	
	Vertical	Fundamental
Peak	 Site : 03CH03-KS Condition : FCC PART 15C 3m HF ANT-201704-9120D VERTICAL : SWT:Auto Project : (FR) 760219 Mode : 1 Plane : Pad+X : Full-directivity IMEI : #4 : 3DH5 Over Limit ReadAntenna Cable Preamp A/Pos T/Pos Freq Level Limit Line Level Factor Loss Factor Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 2364.21 49.30 -24.70 74.00 54.83 25.55 5.43 36.51 395 64 Peak VERTICAL	 Site : 03CH03-KS Condition : FCC PART 15C 3m HF ANT-201704-9120D VERTICAL : SWT:Auto Project : (FR) 760219 Mode : 1 Plane : Pad+X : Full-directivity IMEI : #4 : 3DH5 Over Limit ReadAntenna Cable Preamp A/Pos T/Pos Freq Level Limit Line Level Factor Loss Factor Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 * 2402.00 98.23 24.23 74.00 103.38 25.80 5.47 36.42 395 64 Peak VERTICAL

BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH39 2441MHz	
	Horizontal	Fundamental
Peak	 Site : 03CH03-KS Condition : FCC PART 15C 3m HF ANT-201704-9120D HORIZONTAL : SWT:Auto Project : (FR) 760219 Mode : 2 Plane : Pad+X : Full-directivity IMEI : #4 : 3DH5 Freq Level Over Limit Limit Line ReadAntenna Level Factor Cable Loss Factor Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 2375.78 49.04 -24.96 74.00 54.38 25.67 5.45 36.46 321 160 Peak HORIZONT	 Site : 03CH03-KS Condition : FCC PART 15C 3m HF ANT-201704-9120D HORIZONTAL : SWT:Auto Project : (FR) 760219 Mode : 2 Plane : Pad+X : Full-directivity IMEI : #4 : 3DH5 Freq Level Over Limit Limit Line ReadAntenna Level Factor Cable Loss Factor Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 * 2442.00 100.84 26.84 74.00 105.91 25.89 5.49 36.45 321 160 Peak HORIZONT
Peak	 Site : 03CH03-KS Condition : FCC PART 15C 3m HF ANT-201704-9120D HORIZONTAL : SWT:Auto Project : (FR) 760219 Mode : 2 Plane : Pad+X : Full-directivity IMEI : #4 : 3DH5 Freq Level Over Limit Limit Line ReadAntenna Level Factor Cable Loss Factor Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 2493.42 49.36 -24.64 74.00 54.35 25.97 5.52 36.48 321 160 Peak HORIZONT	

BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH39 2441MHz	
	Vertical	Fundamental
Peak		
Peak		

Site : 03CH03-KS
Condition : FCC PART 15C 3m HF ANT-201704-9120D VERTICAL
: SWT:Auto
Project : (FR) 760219
Mode : 2
Plane : Pad+X
: Full-directivity
IMEI : #4
: 3DH5

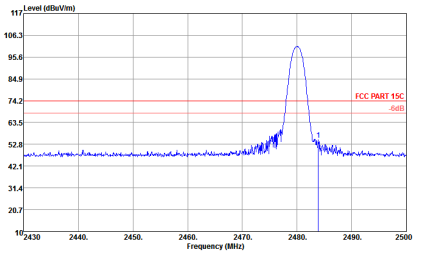
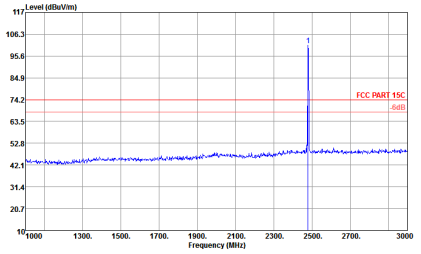
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Factor	Preamp Loss	A/Pos Factor	T/Pos	Remark	Pol/Phas
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	2377.99	49.05	-24.95	74.00	54.39	25.67	5.45	36.46	380	57	Peak VERTICAL

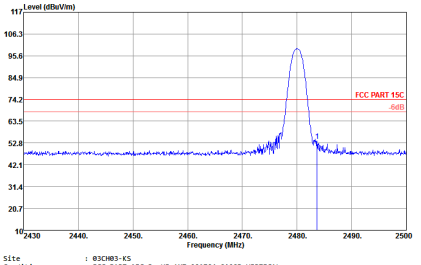
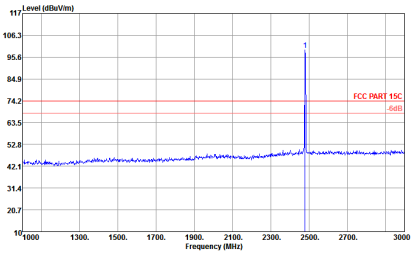
Site : 03CH03-KS
Condition : FCC PART 15C 3m HF ANT-201704-9120D VERTICAL
: SWT:Auto
Project : (FR) 760219
Mode : 2
Plane : Pad+X
: Full-directivity
IMEI : #4
: 3DH5

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Factor	Preamp Loss	A/Pos Factor	T/Pos	Remark	Pol/Phas
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 *	2442.00	99.41	25.41	74.00	104.48	25.89	5.49	36.45	380	57	Peak VERTICAL

Site : 03CH03-KS
Condition : FCC PART 15C 3m HF ANT-201704-9120D VERTICAL
: SWT:Auto
Project : (FR) 760219
Mode : 2
Plane : Pad+X
: Full-directivity
IMEI : #4
: 3DH5

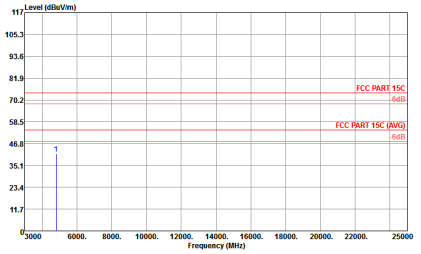
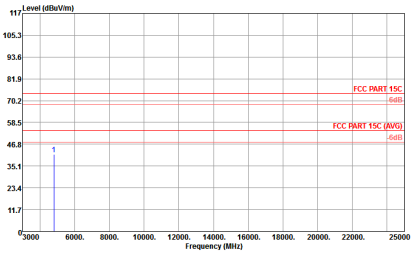
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Factor	Preamp Loss	A/Pos Factor	T/Pos	Remark	Pol/Phas
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	2486.07	49.64	-24.36	74.00	54.66	25.94	5.51	36.47	380	57	Peak VERTICAL

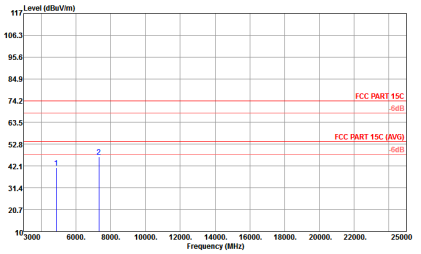
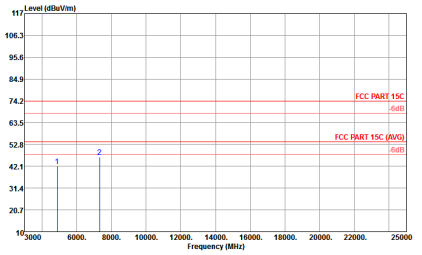
BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH78 2480MHz	
	Horizontal	Fundamental
Peak	 Site : 03CH03-KS Condition : FCC PART 15C 3m HF ANT-201704-9120D HORIZONTAL : SWT:Auto Project : (FR) 760219 Mode : 3 Plane : Pad+X : Full-directivity IMEI : #4 : 3OH5 Freq Level Over Limit Limit Line ReadAntenna Level Factor Cable Loss Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 2483.90 54.90 -19.10 74.00 59.92 25.94 5.51 36.47 347 159 Peak HORIZONT	 Site : 03CH03-KS Condition : FCC PART 15C 3m HF ANT-201704-9120D HORIZONTAL : SWT:Auto Project : (FR) 760219 Mode : 3 Plane : Pad+X : Full-directivity IMEI : #4 : 3OH5 Freq Level Over Limit Limit Line ReadAntenna Level Factor Cable Loss Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 * 2480.00 100.85 26.85 74.00 105.87 25.94 5.51 36.47 347 159 Peak HORIZONT

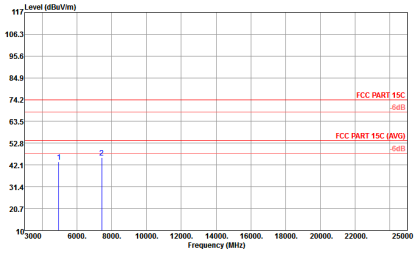
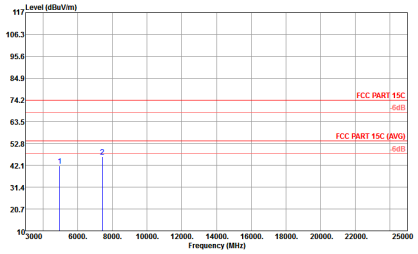
BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH78 2480MHz	
	Vertical	Fundamental
Peak	 Site : 03CH03-KS Condition : FCC PART 15C 3m HF ANT-201704-9120D VERTICAL : SWT:Auto Project : (FR) 760219 Mode : 3 Plane : Pad+X : Full-directivity IMEI : #4 : 3DH5 Freq Level Over Limit Limit Line ReadAntenna Level Factor Cable Preamp Loss Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 2483.69 53.67 -20.33 74.00 58.69 25.94 5.51 36.47 372 53 Peak VERTICAL	 Site : 03CH03-KS Condition : FCC PART 15C 3m HF ANT-201704-9120D VERTICAL : SWT:Auto Project : (FR) 760219 Mode : 3 Plane : Pad+X : Full-directivity IMEI : #4 : 3DH5 Freq Level Over Limit Limit Line ReadAntenna Level Factor Cable Preamp Loss Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 * 2480.00 99.16 25.16 74.00 104.18 25.94 5.51 36.47 372 53 Peak VERTICAL

2.4GHz 2400~2483.5MHz

BT (Harmonic @ 3m)

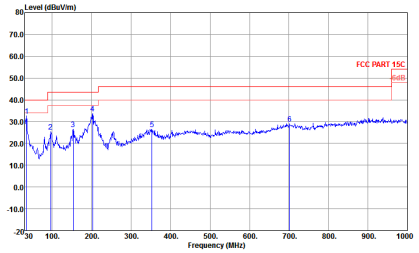
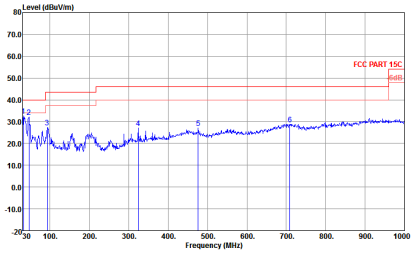
BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BT CH00 2402MHz	
	Horizontal	Vertical
Peak Avg.	 Site : 03CH03-KS Condition : FCC PART 15C 3m HF ANT-201704-9120D HORIZONTAL : SWT:Auto Project : (FR) 760219 Mode : 1 Plane : Pad+X : Full-directivity IMEI : #4 : 3DH5 Over Limit ReadAntenna Cable Preamp A/Pos T/Pos Freq Level Limit Line Level Factor Loss Factor Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 4806.00 41.49 -32.51 74.00 39.66 30.62 7.71 36.50 160 360 Peak HORIZONT	 Site : 03CH03-KS Condition : FCC PART 15C 3m HF ANT-201704-9120D VERTICAL : SWT:Auto Project : (FR) 760219 Mode : 1 Plane : Pad+X : Full-directivity IMEI : #4 : 3DH5 Over Limit ReadAntenna Cable Preamp A/Pos T/Pos Freq Level Limit Line Level Factor Loss Factor Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 4806.00 41.42 -32.58 74.00 39.59 30.62 7.71 36.50 160 0 Peak VERTICAL

BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BT CH39 2441MHz	
	Horizontal	Vertical
Peak Avg.	 Site : 03CH03-KS Condition : FCC PART 15C 3m HF ANT-201704-9120D HORIZONTAL : SWT:Auto Project : (FR) 760219 Mode : 2 Plane : Pad+X : Full-directivity IMEI : #4 : 3DH5 Freq Level Over Limit Limit Line ReadAntenna Level Factor Cable Preamp Loss Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 4884.00 41.19 -32.81 74.00 39.11 30.85 7.76 36.53 160 0 Peak HORIZONT 2 7320.00 46.78 -27.22 74.00 38.40 34.85 9.78 36.25 160 0 Peak HORIZONT	 Site : 03CH03-KS Condition : FCC PART 15C 3m HF ANT-201704-9120D VERTICAL : SWT:Auto Project : (FR) 760219 Mode : 2 Plane : Pad+X : Full-directivity IMEI : #4 : 3DH5 Freq Level Over Limit Limit Line ReadAntenna Level Factor Cable Preamp Loss Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 4884.00 42.05 -31.95 74.00 39.97 30.85 7.76 36.53 160 360 Peak VERTICAL 2 7320.00 46.65 -27.35 74.00 38.27 34.85 9.78 36.25 160 360 Peak VERTICAL

BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BT CH78 2480MHz	
	Horizontal	Vertical
Peak Avg.	 Site : 03CH03-KS Condition : FCC PART 15C 3m HF ANT-201704-9120D HORIZONTAL : SWT:Auto Project : (FR) 760219 Mode : 3 Plane : Pad+X : Full-directivity IMEI : #4 : 3DH5 Freq Level Over Limit Limit ReadAntenna Level Factor Cable Loss Factor Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 4962.00 43.59 -30.41 74.00 41.21 31.13 7.82 36.57 160 360 Peak HORIZONT 2 7440.00 45.72 -28.28 74.00 36.97 35.17 9.87 36.29 160 360 Peak HORIZONT	 Site : 03CH03-KS Condition : FCC PART 15C 3m HF ANT-201704-9120D VERTICAL : SWT:Auto Project : (FR) 760219 Mode : 3 Plane : Pad+X : Full-directivity IMEI : #4 : 3DH5 Freq Level Over Limit Limit ReadAntenna Level Factor Cable Loss Factor Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 4960.00 41.89 -32.11 74.00 39.51 31.13 7.82 36.57 160 0 Peak VERTICAL 2 7440.00 46.23 -27.77 74.00 37.48 35.17 9.87 36.29 160 0 Peak VERTICAL

Emission below 1GHz

2.4GHz BT (LF)

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


```
Site            : 03CH03-KS
Condition       : FCC PART 15C 3m LF ANT 6DB 201704 HORIZONTAL
                : SWT:Auto
Project         : (FR) 760219
Mode            : 3
Plane           : Pad+X
                : Full-directivity
IMEI            : #4
                : 3DH5
```

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Factor	Preamp Loss	A/Pos Factor	T/Pos	Remark	Pol/Phas
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	cm	deg		
1	34.85	32.58	-7.42	40.00	38.47	25.70	0.71	32.30	140	35 Peak	HORIZONT
2	95.96	25.34	-18.16	43.50	37.97	18.44	1.18	32.25	---	--- Peak	HORIZONT
3	153.19	26.55	-16.95	43.50	39.86	17.47	1.50	32.28	---	--- Peak	HORIZONT
4	202.66	33.88	-9.62	43.50	47.39	17.01	1.73	32.25	---	--- Peak	HORIZONT
5	353.01	26.42	-19.58	46.00	34.34	21.85	2.31	32.08	---	--- Peak	HORIZONT
6	701.24	29.14	-16.86	46.00	29.50	27.97	3.35	31.68	---	--- Peak	HORIZONT


```
Site            : 03CH03-KS
Condition       : FCC PART 15C 3m LF ANT 6DB 201704 VERTICAL
                : SWT:Auto
Project         : (FR) 760219
Mode            : 3
Plane           : Pad+X
                : Full-directivity
IMEI            : #4
                : 3DH5
```

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Factor	Preamp Loss	A/Pos Factor	T/Pos	Remark	Pol/Phas
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	cm	deg		
1	32.91	32.77	-7.23	40.00	38.24	26.14	0.69	32.30	100	20 Peak	VERTICAL
2	46.49	32.04	-7.96	40.00	45.23	18.20	0.84	32.23	---	--- Peak	VERTICAL
3	93.05	27.44	-16.06	43.50	40.39	18.14	1.16	32.25	---	--- Peak	VERTICAL
4	323.91	27.07	-18.93	46.00	36.33	20.61	2.21	32.08	---	--- Peak	VERTICAL
5	476.20	26.94	-19.06	46.00	31.83	24.31	2.73	31.93	---	--- Peak	VERTICAL
6	709.00	28.87	-17.13	46.00	29.44	27.75	3.37	31.69	---	--- Peak	VERTICAL