



FCC RADIO TEST REPORT

FCC ID : I28-WYSBHVDXP
Equipment : WLAN/BTLE module
Brand Name : ZEBRA
Model Name : WYSBHVDXP
Applicant : Zebra Technologies Corporation
3 Overlook Point, Lincolnshire, IL
60069, United States
Manufacturer : Zebra Technologies Corporation
3 Overlook Point, Lincolnshire, IL
60069, United States
Standard : FCC Part 15 Subpart C §15.247

The product was received on Jun. 24, 2021 and testing was started from Jul. 05, 2021 and completed on Jul. 14, 2021. 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 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.

Approved by: Louis Wu

Sporton International Inc. EMC & Wireless Communications Laboratory

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)



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History of this test report

Report No.	Version	Description	Issued Date
FR0D2423-01B	01	Initial issue of report	Jul. 22, 2021



Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
-	15.247(a)(2)	6dB Bandwidth	Not Required	-
-	2.1049	99% Occupied Bandwidth	Not Required	-
3.1	15.247(b)(3)	Output Power	Pass	-
-	15.247(e)	Power Spectral Density	Not Required	-
-	15.247(d)	Conducted Band Edges and Spurious Emission	Not Required	-
3.2	15.247(d)	Radiated Band Edges and Spurious Emission	Pass	Under limit 5.57 dB at 2337.825 MHz
-	15.207	AC Conducted Emission	Not Required	-
3.3	15.203 & 15.247(b)	Antenna Requirement	Pass	-

Note:

1. Not required means after assessing, test items are not necessary to carry out.
2. This is a variant report by changing Bluetooth RF trace. All the test cases were performed on original report which can be referred to Sporton Report Number FR0D2423B. Based on the original report, the test cases were verified.

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: Wei Chen
Report Producer: Ruby Zou



1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature	
Equipment	WLAN/BTLE module
Brand Name	ZEBRA
Model Name	WYSBHVDXP
FCC ID	I28-WYSBHVDXP
EUT supports Radios application	WLAN 11a/b/g/n HT20/HT40 WLAN 11ac VHT20/VHT40/VHT80 WLAN 11ax HE20/HE40/HE80 Bluetooth BR/EDR/LE
HW Version	Revision F
SW Version	17.68.01.p13
EUT Stage	Identical Prototype

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

Supported Unit Used in Test Configuration and System				
Printer	Brand Name	ZEBRA	Model Name	ZQ521
Battery	Brand Name	ZEBRA	Part Number	P1089503-003
AC Adapter	Brand Name	ZEBRA	Model Name	FSP025-DYAA3
Bluetooth Antenna 1	Brand Name	gigaAnt	Model Name	3030A5645-01
Bluetooth Antenna 2	Brand Name	TAIYO YUDEN	Model Name	AH 168M245001
Bluetooth Antenna 3	Brand Name	Johanson Technology	Model Name	2450AT07A0100
WLAN Antenna 1	Brand Name	Laird	Model Name	RD2458-5
WLAN Antenna 2	Brand Name	Pulse	Model Name	W3006
WLAN Antenna 3	Brand Name	Auden	Model Name	220370-09
WLAN Antenna 4	Brand Name	Auden	Model Name	B91882-30

1.2 Product Specification of Equipment Under Test

Product Specification subjective to this standard	
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	8.20 dBm (0.0066 W) for 1Mbps 8.20 dBm (0.0066 W) for 2Mbps
Antenna Type / Gain	<3030A5645-01>: Monopole Antenna with gain 2.7 dBi <AH 168M245001>: Monopole Antenna with gain 3.0 dBi <2450AT07A0100>: Monopole Antenna with gain 1.0 dBi
Type of Modulation	Bluetooth LE : GFSK

Remark: The above EUT's information was declared by manufacturer. Please refer to Comments and Explanations in report summary.



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. EMC & Wireless Communications Laboratory
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978
Test Site No.	Sporton Site No. TH02-HY

Test Site	Sporton International Inc. Wensan Laboratory
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	Sporton Site No. 03CH13-HY (TAF Code: 3786)
Remark	The Radiated Spurious Emission test item subcontracted to Sporton International Inc. Wensan Laboratory

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

FCC designation No.: TW1190 and TW3786

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 v05r02
- ♦ 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. The TAF code is not including all the FCC KDB listed without accreditation.



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	8.20 dBm	
Ch19	2440MHz	8.00 dBm	
Ch39	2480MHz	7.90 dBm	

Channel	Frequency	Bluetooth – LE RF Average Output Power	
		Data Rate / Modulation	
		GFSK	
		2Mbps	
Ch00	2402MHz	8.20 dBm	
Ch19	2440MHz	8.00 dBm	
Ch39	2480MHz	7.90 dBm	

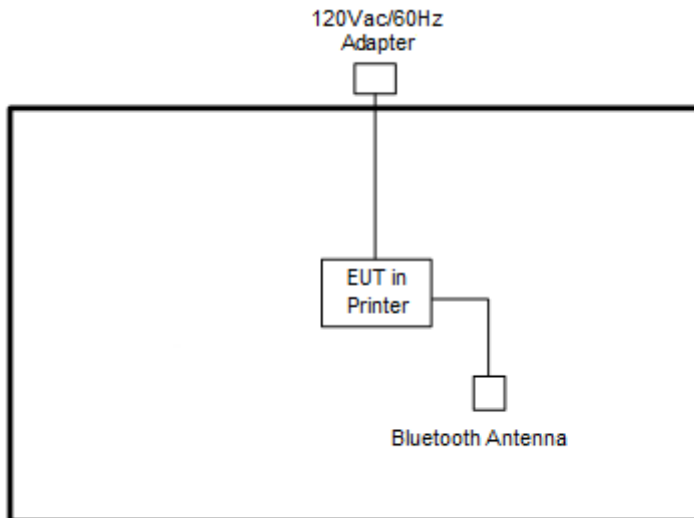
- a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). The measured emission level of the EUT was maximized by rotating the EUT on a turntable, adjusting the orientation of the EUT and EUT antenna in two antenna polarization (Horizontal and Vertical), and adjusting the measurement antenna orientation, following C63.10 exploratory test procedures and find Ant. Horizontal as worst plane.

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 Test Cases	Mode 1: Bluetooth Tx CH00_2402 MHz_1Mbps
	Mode 2: Bluetooth Tx CH19_2440 MHz_1Mbps
	Mode 3: Bluetooth Tx CH39_2480 MHz_1Mbps
	Mode 4: Bluetooth Tx CH00_2402 MHz_2Mbps
	Mode 5: Bluetooth Tx CH19_2440 MHz_2Mbps
	Mode 6: Bluetooth Tx CH39_2480 MHz_2Mbps
Remark: For Radiated Test Cases, the tests were performed with Bluetooth Antenna (AH 168M245001).	

2.3 Connection Diagram of Test System

<Bluetooth - LE Tx Mode>



2.4 EUT Operation Test Setup

The RF test items, utility "Toolbox_Version 1.84" 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 Output Power Measurement

3.1.1 Limit of Output Power

For systems using digital modulation in the 2400-2483.5 MHz, the limit for output power is 30 dBm. If transmitting antenna of directional gain greater than 6 dBi 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 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

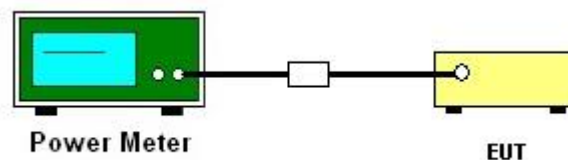
3.1.2 Measuring Instruments

See list of measuring equipment of this test report.

3.1.3 Test Procedures

1. For Average Power, the testing follows ANSI C63.10 Section 11.9.2.3.2 Method AVGP-M-G
2. The RF output of EUT was connected to the power meter by RF cable and attenuator.
3. The path loss was compensated to the results for each measurement.
4. Set the maximum power setting and enable the EUT to transmit continuously.
5. Measure the conducted output power and record the results in the test report.

3.1.4 Test Setup





3.1.5 Test Result of Average Output Power

Test Engineer :	Eason Huang	Temperature :	21~25°C
		Relative Humidity :	51~54%

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)	Pass /Fail
BLE	1Mbps	1	0	2402	8.20	Pass
BLE	1Mbps	1	19	2440	8.00	Pass
BLE	1Mbps	1	39	2480	7.90	Pass
BLE	2Mbps	1	0	2402	8.20	Pass
BLE	2Mbps	1	19	2440	8.00	Pass
BLE	2Mbps	1	39	2480	7.90	Pass



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.

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

See list of measuring equipment of this test report.

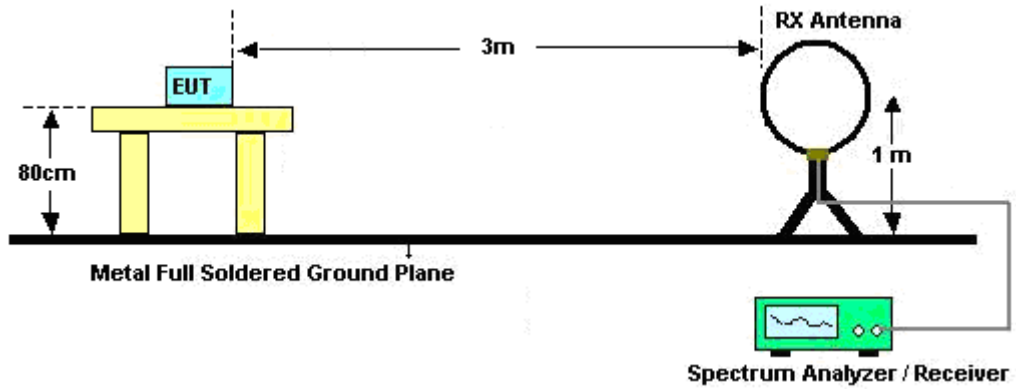


3.2.3 Test Procedures

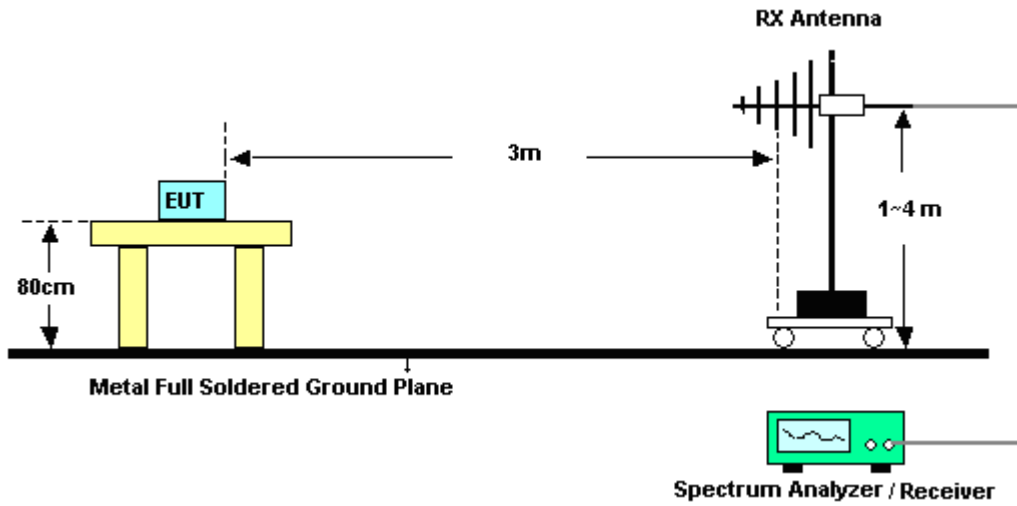
1. The testing follows the ANSI C63.10 Section 11.12.1 Radiated emission measurements.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter for frequency below 1 GHz and 1.5 meter for frequency above 1 GHz 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 testing below 1 GHz, 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 be reported.
7. For testing above 1 GHz, the emission level of the EUT in peak mode was 20 dB 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 be reported.
8. 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 = 3 MHz 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

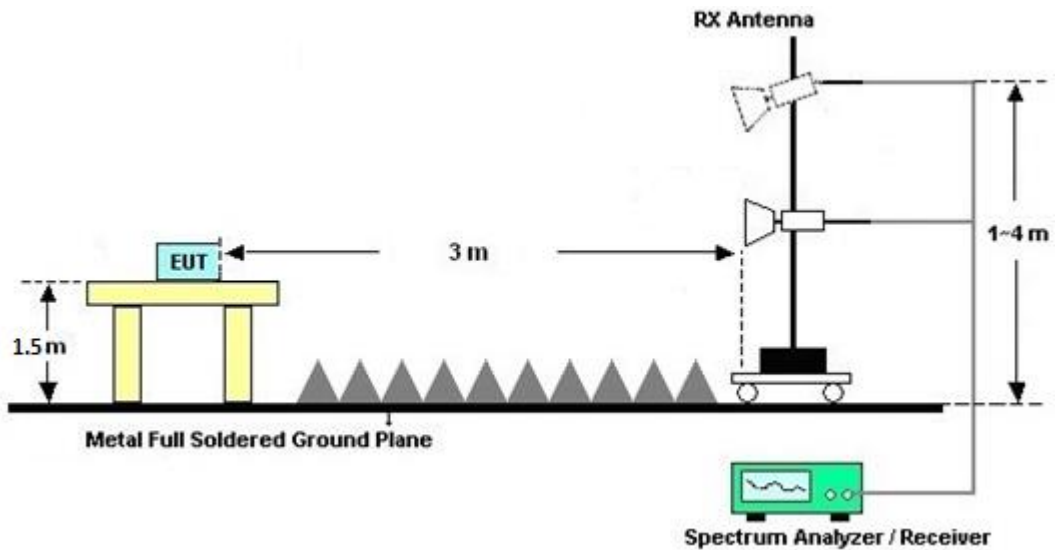
For radiated test below 30MHz



For radiated test from 30MHz to 1GHz



For radiated test 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.

There is adequate comparison measurement 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.

3.2.6 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 (30 MHz ~ 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 6 dBi, the power shall be reduced by the same level in dB comparing to gain minus 6 dBi. 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	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Jan. 04, 2021	Jul. 13, 2021~ Jul. 14, 2021	Jan. 03, 2022	Radiation (03CH13-HY)
Amplifier	Sonoma-Instrument	310 N	187282	9KHz~1GHz	Dec. 16, 2020	Jul. 13, 2021~ Jul. 14, 2021	Dec. 15, 2021	Radiation (03CH13-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-022 94	1GHz ~ 18GHz	Jun. 23, 2021	Jul. 13, 2021~ Jul. 14, 2021	Jun. 22, 2022	Radiation (03CH13-HY)
Preamplifier	MITEQ	AMF-7D-0010 1800-30-10P	1590074	1GHz~18GHz	May 18, 2021	Jul. 13, 2021~ Jul. 14, 2021	May 17, 2022	Radiation (03CH13-HY)
Preamplifier	Keysight	83017A	MY532701 47	1GHz~26.5GHz	Oct. 28, 2020	Jul. 13, 2021~ Jul. 14, 2021	Oct. 27, 2021	Radiation (03CH13-HY)
Signal Generator	Anritsu	MG3694C	163401	0.1Hz~40GHz	Jan. 31, 2021	Jul. 13, 2021~ Jul. 14, 2021	Jan. 30, 2022	Radiation (03CH13-HY)
Spectrum Analyzer	Keysight	N9010A	MY553705 26	10Hz~44GHz	Mar. 18, 2021	Jul. 13, 2021~ Jul. 14, 2021	Mar. 17, 2022	Radiation (03CH13-HY)
Controller	EMEC	EM1000	N/A	Control Turn table & Ant Mast	N/A	Jul. 13, 2021~ Jul. 14, 2021	N/A	Radiation (03CH13-HY)
Antenna Mast	EMEC	AM-BS-4500- B	N/A	1m~4m	N/A	Jul. 13, 2021~ Jul. 14, 2021	N/A	Radiation (03CH13-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	Jul. 13, 2021~ Jul. 14, 2021	N/A	Radiation (03CH13-HY)
Software	Audix	E3 6.2009-8-24	RK-00099 2	N/A	N/A	Jul. 13, 2021~ Jul. 14, 2021	N/A	Radiation (03CH13-HY)
Preamplifier	EMEC	EM18G40G	060715	18GHz ~ 40GHz	Dec. 11, 2020	Jul. 13, 2021~ Jul. 14, 2021	Dec. 10, 2021	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 126E	0030/126E	30M-18G	Feb. 10, 2021	Jul. 13, 2021~ Jul. 14, 2021	Feb. 09, 2022	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	804793/4	30M-18G	Feb. 10, 2021	Jul. 13, 2021~ Jul. 14, 2021	Feb. 09, 2022	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	505134/2	30M~40GHz	Feb. 22, 2021	Jul. 13, 2021~ Jul. 14, 2021	Feb. 21, 2022	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY4274/2	30MHz~40GHz	Mar. 11, 2021	Jul. 13, 2021~ Jul. 14, 2021	Mar. 10, 2022	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY24961/ 4	30M-18G	Feb. 10, 2021	Jul. 13, 2021~ Jul. 14, 2021	Feb. 09, 2022	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4 PE	9kHz~30MHz	Mar. 11, 2021	Jul. 13, 2021~ Jul. 14, 2021	Mar. 10, 2022	Radiation (03CH13-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170 584	18GHz- 40GHz	Dec. 11, 2020	Jul. 13, 2021~ Jul. 14, 2021	Dec. 10, 2021	Radiation (03CH13-HY)
Hygrometer	TECPEL	DTM-303B	TP200879	N/A	Oct. 22, 2020	Jul. 13, 2021~ Jul. 14, 2021	Oct. 21, 2021	Radiation (03CH13-HY)
Filter	Wainwright	WHKX8-5872. 5-6750-18000 -40ST	Sn5	6.75GHz High Pass Filter	Mar. 11, 2021	Jul. 13, 2021~ Jul. 14, 2021	Mar. 10, 2022	Radiation (03CH13-HY)
Filter	Wainwright	WHKX12-270 0-3000-18000 -60SS	SN2	3GHz High Pass Filter	Jul. 12, 2021	Jul. 13, 2021~ Jul. 14, 2021	Jul. 11, 2022	Radiation (03CH13-HY)



Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Hygrometer	Testo	608-H1	34893241	N/A	Mar. 02, 2021	Jul. 05, 2021	Mar. 01, 2022	Conducted (TH02-HY)
Power Sensor	DARE	RPR3006W	16I00054S NO12	10MHz~6GHz	Dec. 16, 2020	Jul. 05, 2021	Dec. 15, 2021	Conducted (TH02-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP40	100055	9kHz-40GHz	Jan. 21, 2021	Jul. 05, 2021	Jan. 20, 2022	Conducted (TH02-HY)
Switch Box & RF Cable	EM Electronics	EMSW18SE	SW200302	N/A	Mar. 17, 2021	Jul. 05, 2021	Mar. 16, 2022	Conducted (TH02-HY)



5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.3 dB
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.8 dB
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Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	3.9 dB
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Appendix A. Radiated Spurious Emission

Test Engineer :	Daniel Lee, Jacky Hung and Wilson Wu	Temperature :	20~25°C
		Relative Humidity :	50~60%

<1Mbps>

2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

BLE	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)	
BLE CH 00 2402MHz		2332.05	53.98	-20.02	74	40.67	27.1	14.06	27.85	215	280	P	H	
		2345.28	44.94	-9.06	54	31.61	27.1	14.08	27.85	215	280	A	H	
	*	2402	94.66	-	-	81.06	27.31	14.13	27.84	215	280	P	H	
	*	2402	94.43	-	-	80.83	27.31	14.13	27.84	215	280	A	H	
													H	
														H
			2344.86	53.89	-20.11	74	40.57	27.1	14.07	27.85	105	144	P	V
			2344.23	47.01	-6.99	54	33.69	27.1	14.07	27.85	105	144	A	V
	*		2402	98.16	-	-	84.56	27.31	14.13	27.84	105	144	P	V
	*		2402	97.98	-	-	84.38	27.31	14.13	27.84	105	144	A	V
														V
														V
BLE CH 19 2440MHz		2386.44	54.5	-19.5	74	40.97	27.25	14.12	27.84	146	267	P	H	
		2376.22	45.12	-8.88	54	31.65	27.2	14.11	27.84	146	267	A	H	
	*	2440	93.79	-	-	80	27.46	14.16	27.83	146	267	P	H	
	*	2440	93.77	-	-	79.98	27.46	14.16	27.83	146	267	A	H	
			2495.03	54.53	-19.47	74	40.46	27.68	14.21	27.82	146	267	P	H
			2497.97	44.59	-9.41	54	30.51	27.69	14.21	27.82	146	267	A	H
			2376.36	54.29	-19.71	74	40.81	27.21	14.11	27.84	104	143	P	V
			2376.08	47.07	-6.93	54	33.6	27.2	14.11	27.84	104	143	A	V
	*		2440	97.42	-	-	83.63	27.46	14.16	27.83	104	143	P	V
	*		2440	97.3	-	-	83.51	27.46	14.16	27.83	104	143	A	V
			2489.92	54.5	-19.5	74	40.46	27.66	14.2	27.82	104	143	P	V
			2490.48	44.58	-9.42	54	30.54	27.66	14.2	27.82	104	143	A	V



BLE CH 39 2480MHz	*	2480	91.88	-	-	77.89	27.62	14.19	27.82	176	273	P	H
	*	2480	91.66	-	-	77.67	27.62	14.19	27.82	176	273	A	H
		2499.96	54.3	-19.7	74	40.21	27.7	14.21	27.82	176	273	P	H
		2491.2	44.58	-9.42	54	30.54	27.66	14.2	27.82	176	273	A	H
													H
													H
	*	2480	95.4	-	-	81.41	27.62	14.19	27.82	124	141	P	V
	*	2480	95.22	-	-	81.23	27.62	14.19	27.82	124	141	A	V
		2496.4	55.23	-18.77	74	41.15	27.69	14.21	27.82	124	141	P	V
		2497.16	44.55	-9.45	54	30.47	27.69	14.21	27.82	124	141	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)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)	
BLE CH 00 2402MHz		4804	48.09	-25.91	74	66.48	32.22	6.48	57.09	100	0	P	H	
													H	
													H	
													H	
			4804	46.77	-27.23	74	65.16	32.22	6.48	57.09	100	0	P	V
														V
														V
BLE CH 19 2440MHz		4880	39.8	-34.2	74	57.38	32.58	6.8	56.96	100	0	P	H	
		7320	45.14	-28.86	74	56.65	36.76	8.65	56.92	100	0	P	H	
													H	
													H	
			4880	40.05	-33.95	74	57.63	32.58	6.8	56.96	100	0	P	V
			7320	44.79	-29.21	74	56.3	36.76	8.65	56.92	100	0	P	V
														V
BLE CH 39 2480MHz		4960	41.26	-32.74	74	57.91	33.02	7.14	56.81	100	0	P	H	
		7440	43.69	-30.31	74	56.02	36.22	8.62	57.17	100	0	P	H	
													H	
													H	
			4960	41.33	-32.67	74	57.98	33.02	7.14	56.81	100	0	P	V
			7440	44.26	-29.74	74	56.59	36.22	8.62	57.17	100	0	P	V
														V
Remark	1. No other spurious found.													
	2. All results are PASS against Peak and Average limit line.													



<2Mbps>

2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

BLE	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path 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 00 2402MHz		2337.93	56	-18	74	42.68	27.1	14.07	27.85	335	226	P	H	
		2337.51	48.4	-5.6	54	35.08	27.1	14.07	27.85	335	226	A	H	
	*	2402	96.78	-	-	83.18	27.31	14.13	27.84	335	226	P	H	
	*	2402	96.58	-	-	82.98	27.31	14.13	27.84	335	226	A	H	
													H	
													H	
			2338.77	55.76	-18.24	74	42.44	27.1	14.07	27.85	347	240	P	V
			2337.825	48.43	-5.57	54	35.11	27.1	14.07	27.85	347	240	A	V
	*		2402	94.8	-	-	81.2	27.31	14.13	27.84	347	240	P	V
	*		2402	94.67	-	-	81.07	27.31	14.13	27.84	347	240	A	V
													V	
												V		
BLE CH 19 2440MHz		2371.6	54.96	-19.04	74	41.52	27.19	14.1	27.85	363	227	P	H	
		2371.46	48.24	-5.76	54	34.8	27.19	14.1	27.85	363	227	A	H	
	*	2440	95.8	-	-	82.01	27.46	14.16	27.83	363	227	P	H	
	*	2440	95.66	-	-	81.87	27.46	14.16	27.83	363	227	A	H	
			2491.95	54.81	-19.19	74	40.76	27.67	14.2	27.82	363	227	P	H
			2484.39	44.69	-9.31	54	30.67	27.64	14.2	27.82	363	227	A	H
			2371.32	54.55	-19.45	74	41.11	27.19	14.1	27.85	331	240	P	V
			2371.46	48.3	-5.7	54	34.86	27.19	14.1	27.85	331	240	A	V
	*		2440	94.2	-	-	80.41	27.46	14.16	27.83	331	240	P	V
	*		2440	94.1	-	-	80.31	27.46	14.16	27.83	331	240	A	V
			2498.6	54.28	-19.72	74	40.2	27.69	14.21	27.82	331	240	P	V
		2492.93	44.66	-9.34	54	30.61	27.67	14.2	27.82	331	240	A	V	



BLE CH 39 2480MHz	*	2480	94.39	-	-	80.4	27.62	14.19	27.82	359	220	P	H
	*	2480	93.81	-	-	79.82	27.62	14.19	27.82	359	220	A	H
		2495.92	54.66	-19.34	74	40.59	27.68	14.21	27.82	359	220	P	H
		2497.28	44.79	-9.21	54	30.71	27.69	14.21	27.82	359	220	A	H
													H
													H
	*	2480	92.31	-	-	78.32	27.62	14.19	27.82	352	233	P	V
	*	2480	89.96	-	-	75.97	27.62	14.19	27.82	352	233	A	V
		2489.12	54.18	-19.82	74	40.14	27.66	14.2	27.82	352	233	P	V
		2492.6	44.67	-9.33	54	30.62	27.67	14.2	27.82	352	233	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)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)	
BLE CH 00 2402MHz		4804	39.93	-34.07	74	58.32	32.22	6.48	57.09	100	0	P	H	
													H	
													H	
													H	
			4804	40.47	-33.53	74	58.86	32.22	6.48	57.09	100	0	P	V
														V
														V
BLE CH 19 2440MHz		4880	39.97	-34.03	74	57.55	32.58	6.8	56.96	100	0	P	H	
		7320	44.49	-29.51	74	56	36.76	8.65	56.92	100	0	P	H	
													H	
													H	
			4880	39.42	-34.58	74	57	32.58	6.8	56.96	100	0	P	V
			7320	45.37	-28.63	74	56.88	36.76	8.65	56.92	100	0	P	V
														V
BLE CH 39 2480MHz		4960	41.37	-32.63	74	58.02	33.02	7.14	56.81	100	0	P	H	
		7440	43.65	-30.35	74	55.98	36.22	8.62	57.17	100	0	P	H	
													H	
													H	
			4960	40.97	-33.03	74	57.62	33.02	7.14	56.81	100	0	P	V
			7440	43.81	-30.19	74	56.14	36.22	8.62	57.17	100	0	P	V
														V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.													



Emission below 1GHz

2.4GHz BLE (LF)

BLE	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)	
2.4GHz BLE LF		104.69	28.84	-14.66	43.5	43.62	16.49	0.96	32.23	-	-	P	H	
		263.77	34.79	-11.21	46	45.6	19.71	1.49	32.01	-	-	P	H	
		344.28	34.21	-11.79	46	44.18	20.1	1.65	31.72	-	-	P	H	
		389.87	37.51	-8.49	46	46.03	21.31	1.74	31.57	100	0	P	H	
		593.57	35.9	-10.1	46	40.87	25.39	2.18	32.54	-	-	P	H	
		725.49	33.24	-12.76	46	36	26.71	2.42	31.89	-	-	P	H	
														H
														H
														H
														H
														H
														H
			30.97	25.78	-14.22	40	33.64	23.85	0.52	32.23	-	-	P	V
			120.21	27.01	-16.49	43.5	40.72	17.5	1.03	32.24	-	-	P	V
			395.69	30.59	-15.41	46	38.84	21.55	1.75	31.55	-	-	P	V
			445.16	30.7	-15.3	46	37.56	23.01	1.86	31.73	-	-	P	V
			593.57	34.34	-11.66	46	39.31	25.39	2.18	32.54	100	0	P	V
			957.32	33.21	-12.79	46	30.47	30.67	2.82	30.75	-	-	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	Peak or Average
H/V	Horizontal or Vertical



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

BLE	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BLE 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 :	Daniel Lee, Jacky Hung and Wilson Wu	Temperature :	20~25°C
		Relative Humidity :	50~60%

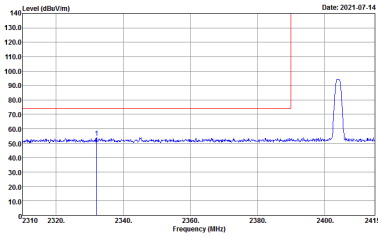
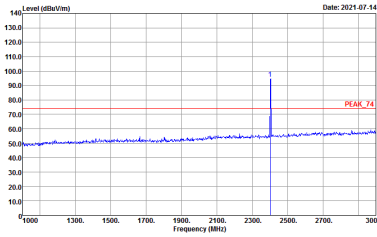
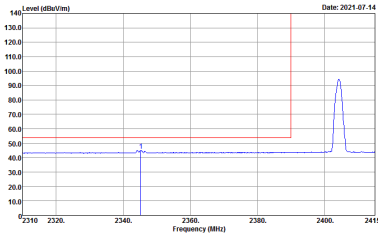
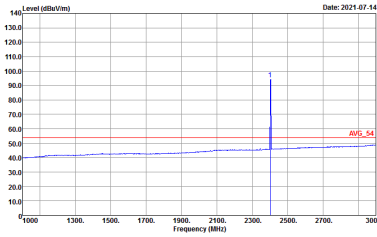
Note symbol

-L	Low channel location
-R	High channel location

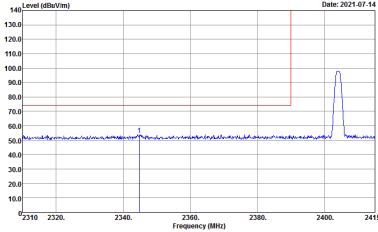
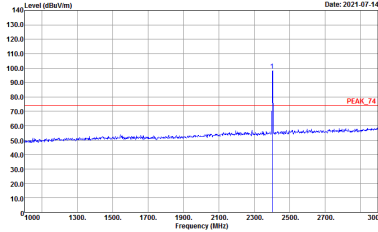
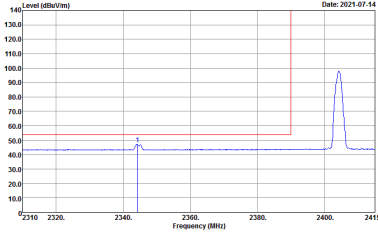
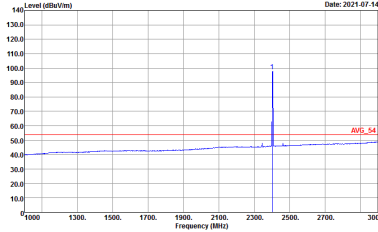


<1Mbps>

2.4GHz 2400~2483.5MHz
BLE (Band Edge @ 3m)

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH00 2402MHz		
Horizontal		Fundamental
Peak	 <p>Site : 03CH13-HY Condition : PEAK_BE_74 3m 91200-02294 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH13-HY Condition : PEAK_74 3m 91200-02294 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Site : 03CH13-HY Condition : AVG_BE_54 3m 91200-02294 HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto</p>	 <p>Site : 03CH13-HY Condition : AVG_54 3m 91200-02294 HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto</p>

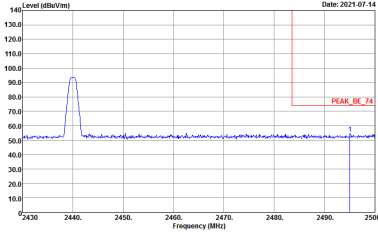
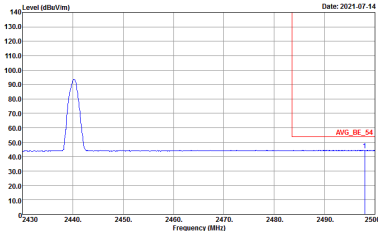


BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH00 2402MHz		
	Vertical	Fundamental
Peak	 <p>Site : 03CH13-HY Condition : PEAK_BE_74 3m 91200-02294 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH13-HY Condition : PEAK_74 3m 91200-02294 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg	 <p>Site : 03CH13-HY Condition : AV6_BE_54 3m 91200-02294 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto</p>	 <p>Site : 03CH13-HY Condition : AV6_54 3m 91200-02294 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto</p>

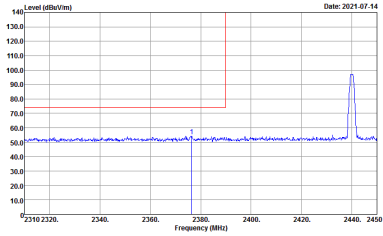
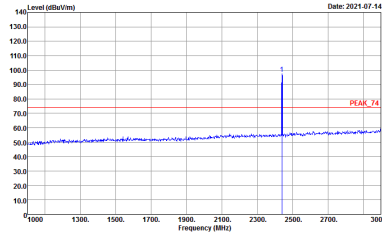
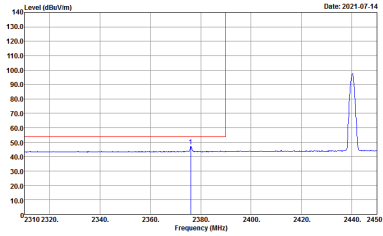
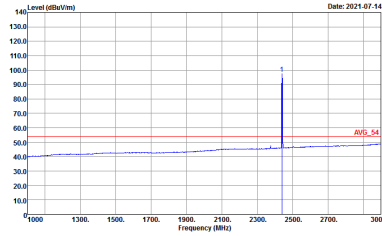


BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - L	
	Horizontal	Fundamental
Peak	<p>Site : 03CH13-HY Condition : PEAK_BE_74 3m 91200-02294 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	<p>Site : 03CH13-HY Condition : PEAK_74 3m 91200-02294 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	<p>Site : 03CH13-HY Condition : AVG_BE_54 3m 91200-02294 HORIZONTAL : RBW:1000.000KHz VBW:1000KHz SWT:Auto</p>	<p>Site : 03CH13-HY Condition : AVG_54 3m 91200-02294 HORIZONTAL : RBW:1000.000KHz VBW:1000KHz SWT:Auto</p>

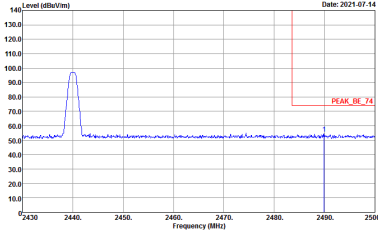
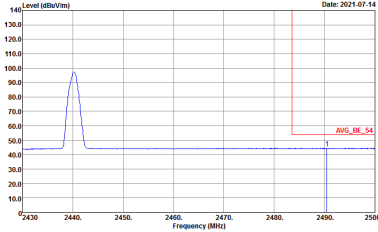


BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH19 2440MHz - R		
	Horizontal	Fundamental
Peak	 <p>Site : 03CH13-HY Condition : PEAK_BE_74 3m 91200-02294 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	Left blank
Avg.	 <p>Site : 03CH13-HY Condition : AVG_BE_54 3m 91200-02294 HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto</p>	Left blank

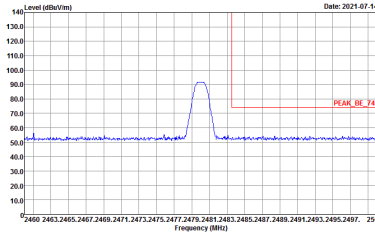
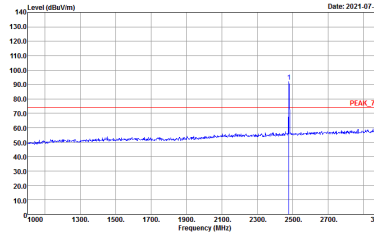
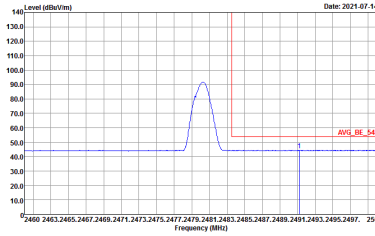
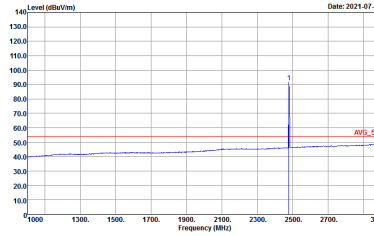


BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH19 2440MHz - L		
	Vertical	Fundamental
Peak	 <p>Site : 03CH13-HY Condition : PEAK_BE_74 3m 91200-02294 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH13-HY Condition : PEAK_74 3m 91200-02294 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Site : 03CH13-HY Condition : AVG_BE_54 3m 91200-02294 VERTICAL : RBW:1000.000KHz VBW:1000KHz SWT:Auto</p>	 <p>Site : 03CH13-HY Condition : AVG_54 3m 91200-02294 VERTICAL : RBW:1000.000KHz VBW:1000KHz SWT:Auto</p>

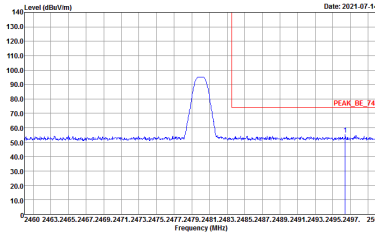
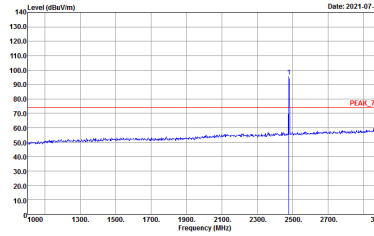
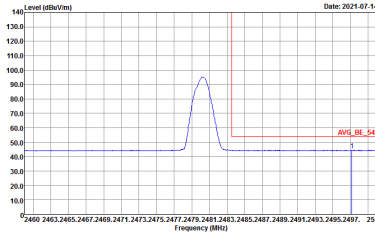
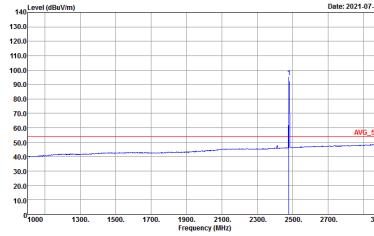


BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH19 2440MHz - R		
	Vertical	Fundamental
Peak	 <p>Site : 03CH13-HY Condition : PEAK_BE_74 3m 91200-02294 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	Left blank
Avg.	 <p>Site : 03CH13-HY Condition : AVG_BE_54 3m 91200-02294 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto</p>	Left blank



BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH39 2480MHz		
	Horizontal	Fundamental
Peak	 <p>Date: 2021-07-14</p> <p>Site : 03CH13-HY Condition : PEAK_BE_74 3m 91200-02294 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Date: 2021-07-14</p> <p>Site : 03CH13-HY Condition : PEAK_74 3m 91200-02294 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Date: 2021-07-14</p> <p>Site : 03CH13-HY Condition : AVG_BE_54 3m 91200-02294 HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto</p>	 <p>Date: 2021-07-14</p> <p>Site : 03CH13-HY Condition : AVG_54 3m 91200-02294 HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto</p>

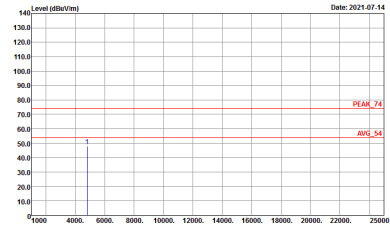
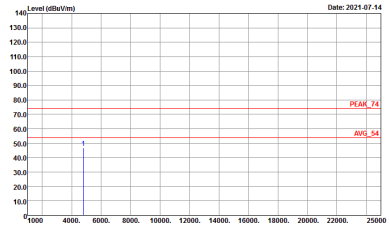


BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH39 2480MHz		
	Vertical	Fundamental
Peak	 <p>Date: 2021-07-14</p> <p>Site : 03CH13-HY Condition : PEAK_BE_74 3m 91200-02294 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Date: 2021-07-14</p> <p>Site : 03CH13-HY Condition : PEAK_74 3m 91200-02294 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Date: 2021-07-14</p> <p>Site : 03CH13-HY Condition : AV6_BE_54 3m 91200-02294 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto</p>	 <p>Date: 2021-07-14</p> <p>Site : 03CH13-HY Condition : AV6_54 3m 91200-02294 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto</p>



2.4GHz 2400~2483.5MHz

BLE (Harmonic @ 3m)

BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH00 2402MHz	
	Horizontal	Vertical
Peak Avg.	 <p>Site : 03CH13-HY Condition : PEAK_74 3m 91200-02294 HORIZONTAL Detector : Peak</p>	 <p>Site : 03CH13-HY Condition : PEAK_74 3m 91200-02294 VERTICAL Detector : Peak</p>



BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH19 2440MHz	
	Horizontal	Vertical
Peak Avg.	<p>Site : 03CH13-HY Condition : PEAK_74 3m 91200-02294 HORIZONTAL Detector : Peak</p>	<p>Site : 03CH13-HY Condition : PEAK_74 3m 91200-02294 VERTICAL Detector : Peak</p>

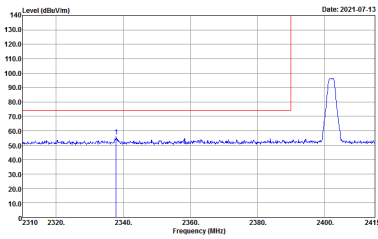
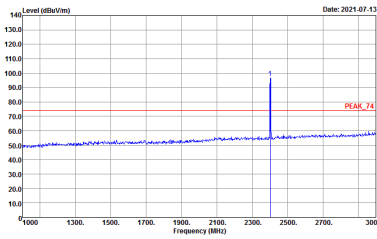
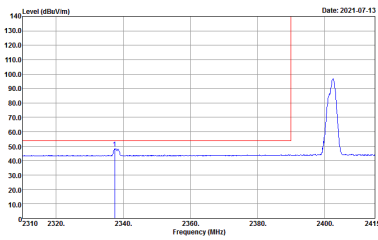
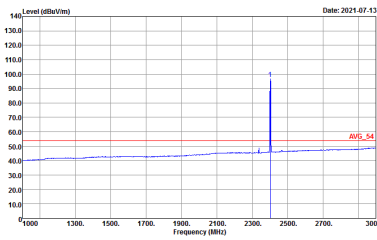


BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH39 2480MHz	
	Horizontal	Vertical
Peak	<p>Site : 03CH13-HY Condition : PEAK_74 3m 91200-02294 HORIZONTAL Detector : Peak</p>	<p>Site : 03CH13-HY Condition : PEAK_74 3m 91200-02294 VERTICAL Detector : Peak</p>

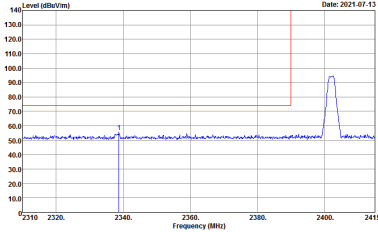
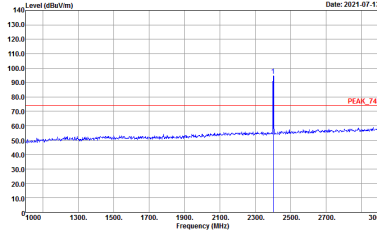
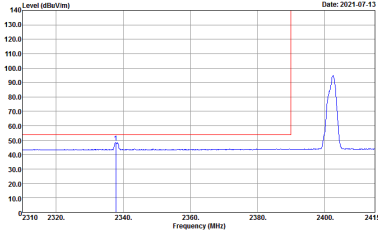
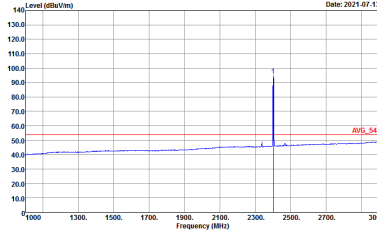


<2Mbps>

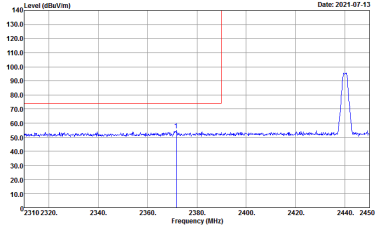
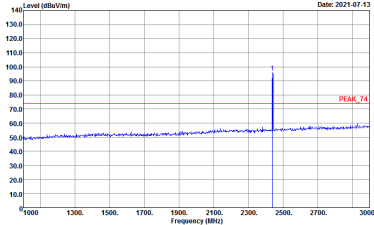
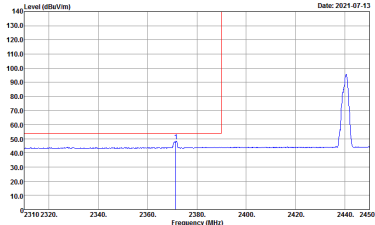
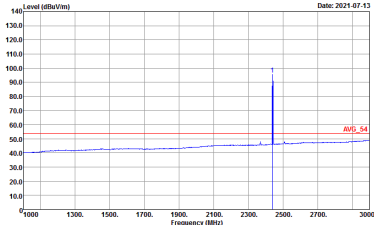
2.4GHz 2400~2483.5MHz
BLE (Band Edge @ 3m)

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH00 2402MHz		
Horizontal		Fundamental
Peak	 <p>Site Condition : 03CH13-HY : PEAK_BE_74 3m 91200-02294 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site Condition : 03CH13-HY : PEAK_74 3m 91200-02294 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Site Condition : 03CH13-HY : AVG_BE_54 3m 91200-02294 HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto</p>	 <p>Site Condition : 03CH13-HY : AVG_54 3m 91200-02294 HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto</p>

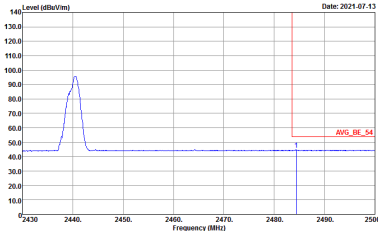


BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH00 2402MHz		
	Vertical	Fundamental
Peak	 <p>Site : 03CH13-HY Condition : PEAK_BE_74 3m 91200-02294 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH13-HY Condition : PEAK_74 3m 91200-02294 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg	 <p>Site : 03CH13-HY Condition : AV6_BE_54 3m 91200-02294 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto</p>	 <p>Site : 03CH13-HY Condition : AV6_54 3m 91200-02294 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto</p>

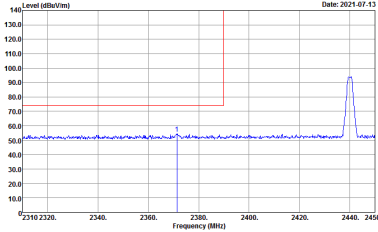
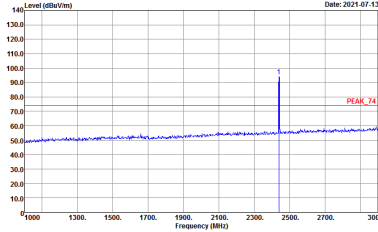
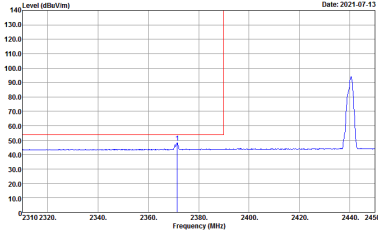
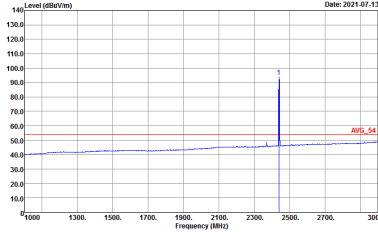


BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BLE CH19 2440MHz - L	
1	Horizontal	Fundamental
Peak	 <p>Level (dBm/1m) vs Frequency (MHz) plot for Horizontal orientation. The y-axis ranges from 10.0 to 140.0 dBm/1m, and the x-axis ranges from 2310 to 2450 MHz. A sharp peak is visible at approximately 2440 MHz, reaching a level of about 100 dBm/1m. A red vertical line is drawn at the peak frequency. The plot is dated 2021-07-13.</p> <p>Site : 03CH13-HY Condition : PEAK_BE_74 3m 91200-02294 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Level (dBm/1m) vs Frequency (MHz) plot for Fundamental orientation. The y-axis ranges from 10.0 to 140.0 dBm/1m, and the x-axis ranges from 1900 to 3000 MHz. A sharp peak is visible at approximately 2440 MHz, reaching a level of about 100 dBm/1m. A red vertical line is drawn at the peak frequency, labeled 'PEAK_74'. The plot is dated 2021-07-13.</p> <p>Site : 03CH13-HY Condition : PEAK_74 3m 91200-02294 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Level (dBm/1m) vs Frequency (MHz) plot for Horizontal orientation. The y-axis ranges from 10.0 to 140.0 dBm/1m, and the x-axis ranges from 2310 to 2450 MHz. A sharp peak is visible at approximately 2440 MHz, reaching a level of about 100 dBm/1m. A red vertical line is drawn at the peak frequency. The plot is dated 2021-07-13.</p> <p>Site : 03CH13-HY Condition : AVG_BE_54 3m 91200-02294 HORIZONTAL : RBW:1000.000KHz VBW:1000KHz SWT:Auto</p>	 <p>Level (dBm/1m) vs Frequency (MHz) plot for Fundamental orientation. The y-axis ranges from 10.0 to 140.0 dBm/1m, and the x-axis ranges from 1900 to 3000 MHz. A sharp peak is visible at approximately 2440 MHz, reaching a level of about 100 dBm/1m. A red vertical line is drawn at the peak frequency, labeled 'AVG_54'. The plot is dated 2021-07-13.</p> <p>Site : 03CH13-HY Condition : AVG_54 3m 91200-02294 HORIZONTAL : RBW:1000.000KHz VBW:1000KHz SWT:Auto</p>

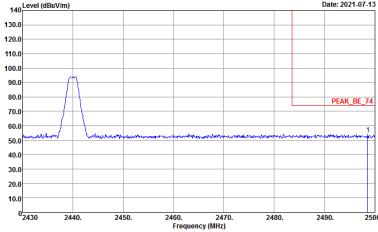
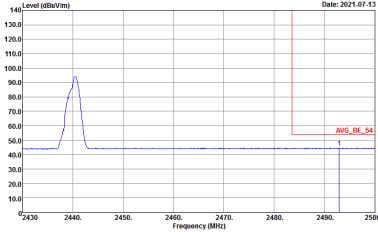


BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BLE CH19 2440MHz - R	
1	Horizontal	Fundamental
Peak	 <p>Site : 03CH13-HY Condition : PEAK_BE_74 3m 91200-02294 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	Left blank
Avg.	 <p>Site : 03CH13-HY Condition : AVG_BE_54 3m 91200-02294 HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto</p>	Left blank

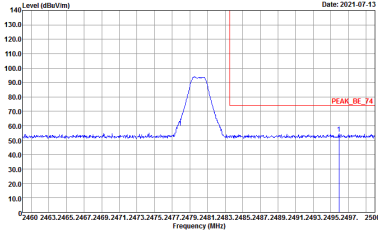
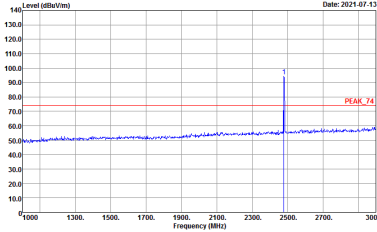
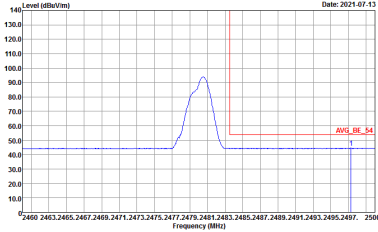
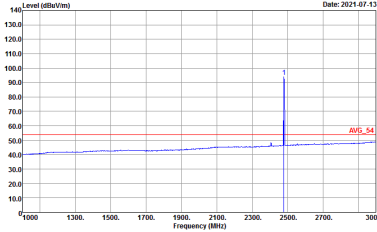


BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH19 2440MHz - L		
	Vertical	Fundamental
Peak	 <p>Site : 03CH13-HY Condition : PEAK_BE_74 3m 91200-02294 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH13-HY Condition : PEAK_74 3m 91200-02294 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Site : 03CH13-HY Condition : AV6_BE_54 3m 91200-02294 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto</p>	 <p>Site : 03CH13-HY Condition : AV6_54 3m 91200-02294 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto</p>

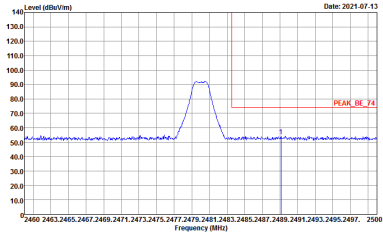
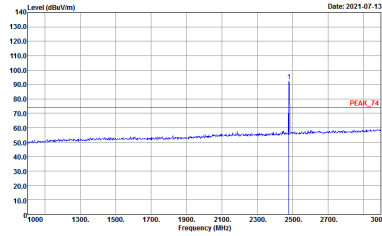
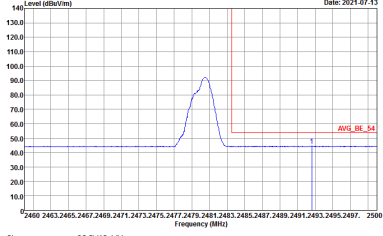
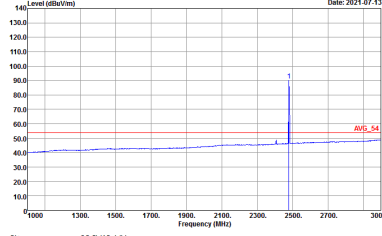


BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH19 2440MHz - R		
	Vertical	Fundamental
Peak	 <p>Site : 03CH13-HY Condition : PEAK_BE_74 3m 91200-02294 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	Left blank
Avg.	 <p>Site : 03CH13-HY Condition : AVG_BE_54 3m 91200-02294 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto</p>	Left blank



BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH39 2480MHz		
Horizontal		Fundamental
Peak	 <p>Level (dBuV/m) vs Frequency (MHz) plot showing a peak at 2480 MHz. The peak level is approximately 95 dBuV/m. The plot includes a red horizontal line labeled 'PEAK_BE_74' at the peak level.</p> <p>Date: 2021-07-13</p> <p>Site : 03CH13-HY Condition : PEAK_BE_74 3m 91200-02294 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Level (dBuV/m) vs Frequency (MHz) plot showing a sharp peak at 2480 MHz. The peak level is approximately 100 dBuV/m. The plot includes a red horizontal line labeled 'PEAK_74' at the peak level.</p> <p>Date: 2021-07-13</p> <p>Site : 03CH13-HY Condition : PEAK_74 3m 91200-02294 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Level (dBuV/m) vs Frequency (MHz) plot showing the average spectrum. A peak is visible at 2480 MHz. The plot includes a red horizontal line labeled 'AVG_BE_54' at the average peak level.</p> <p>Date: 2021-07-13</p> <p>Site : 03CH13-HY Condition : AVG_BE_54 3m 91200-02294 HORIZONTAL RBW:1000.000KHz VBW:1000KHz SWT:Auto</p>	 <p>Level (dBuV/m) vs Frequency (MHz) plot showing the average spectrum. A sharp peak is visible at 2480 MHz. The plot includes a red horizontal line labeled 'AVG_54' at the average peak level.</p> <p>Date: 2021-07-13</p> <p>Site : 03CH13-HY Condition : AVG_54 3m 91200-02294 HORIZONTAL RBW:1000.000KHz VBW:1000KHz SWT:Auto</p>

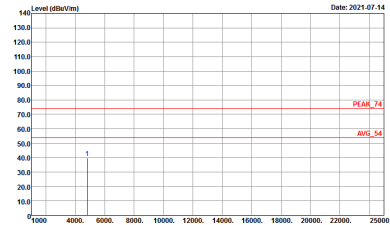
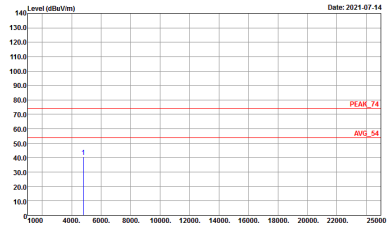


BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH39 2480MHz		
	Vertical	Fundamental
Peak	 <p>Date: 2021-07-13</p> <p>Site : 03CH13-HY Condition : PEAK_BE_74 3m 91200-02294 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Date: 2021-07-13</p> <p>Site : 03CH13-HY Condition : PEAK_74 3m 91200-02294 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Date: 2021-07-13</p> <p>Site : 03CH13-HY Condition : AVG_BE_54 3m 91200-02294 VERTICAL : RBW:1000.000KHz VBW:1000KHz SWT:Auto</p>	 <p>Date: 2021-07-13</p> <p>Site : 03CH13-HY Condition : AVG_54 3m 91200-02294 VERTICAL : RBW:1000.000KHz VBW:1000KHz SWT:Auto</p>

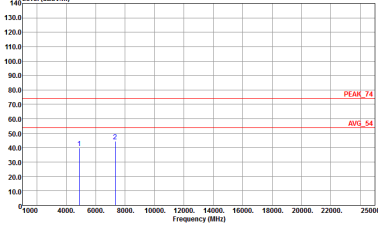
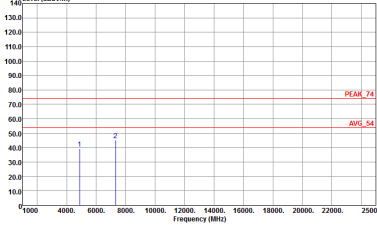


2.4GHz 2400~2483.5MHz

BLE (Harmonic @ 3m)

BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
BLE CH00 2402MHz		
Horizontal		Vertical
<p>Peak</p> <p>Avg.</p>	 <p>Site : 03CH13-HY Condition : PEAK_74 3m 91200-02294 HORIZONTAL Detector : Peak</p>	 <p>Site : 03CH13-HY Condition : PEAK_74 3m 91200-02294 VERTICAL Detector : Peak</p>



BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
BLE CH19 2440MHz		
	Horizontal	Vertical
Peak Avg.	<p data-bbox="432 472 810 479">Date: 2021-07-14</p>  <p data-bbox="432 707 675 741">Site : 03CH13-HY Condition : PEAK_74 3m 91200-02294 HORIZONTAL Detector : Peak</p>	<p data-bbox="906 472 1284 479">Date: 2021-07-14</p>  <p data-bbox="906 707 1133 741">Site : 03CH13-HY Condition : PEAK_74 3m 91200-02294 VERTICAL Detector : Peak</p>



BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH39 2480MHz	
	Horizontal	Vertical
Peak	<p>Site : 03CH13-HY Condition : PEAK_74 3m 91200-02294 HORIZONTAL Detector : Peak</p>	<p>Site : 03CH13-HY Condition : PEAK_74 3m 91200-02294 VERTICAL Detector : Peak</p>



Emission below 1GHz
2.4GHz BLE (LF)

Table with 2 columns: Horizontal and Vertical. Each column contains a spectral plot of Level (dBuV/m) vs Frequency (MHz) for 2.4GHz BLE (LF). The plots show emission levels with a red 'AVG 3dB' line and a blue signal trace. The left plot is for 'Horizontal' and the right for 'Vertical'. Both plots include site and condition details.

QP / Peak



Appendix C. Duty Cycle Plots

Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
Bluetooth –LE for 1Mbps	84.80	2120	0.47	1kHz
Bluetooth –LE for 2Mbps	42.80	1070	0.93	1kHz

