

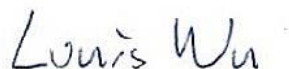


FCC CO-LOCATION RADIO TEST REPORT

FCC ID : 2AGOZ-H38W
Equipment : Portal Go
Brand Name : FACEBOOK
Model Name : TN49KC
Applicant : Facebook Technologies, LLC
1 Hacker Way, Menlo Park, CA 94025, USA
Standard : FCC Part 15 Subpart E §15.407

The product was received on May 04, 2021 and testing was started from May 07, 2021 and completed on May 26, 2021. We, Sporton International Inc. Wensan 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 report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. Wensan Laboratory, the test report shall not be reproduced except in full.



Approved by: Louis Wu

Sporton International Inc. Wensan Laboratory

No. 58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.)



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History of this test report

Report No.	Version	Description	Issued Date
FR131119-01F	01	Initial issue of report	Jun. 08, 2021



Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.407(b)	Unwanted Emissions	Pass	Under limit 2.76 dB at 5457.450 MHz
3.2	15.203 15.407(a)	Antenna Requirement	Pass	-

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: Danny Lee
Report Producer: Amy Chen

1 General Description

1.1 Product Feature of Equipment Under Test

Bluetooth, Wi-Fi 2.4GHz 802.11b/g/n and Wi-Fi 5GHz 802.11a/n/ac.

Product Specification subjective to this standard		
Antenna Type	WLAN: <Main>: Monopole Antenna <Aux.>: PIFA Antenna Bluetooth: PIFA Antenna	
Antenna information		
2400 MHz ~ 2483.5 MHz	Peak Gain (dBi)	Bluetooth: 3.53 WLAN Main: 3.69 Aux.: 2.96
5150 MHz ~ 5250 MHz	Peak Gain (dBi)	Main: 3.9 Aux.: 2.75
5470 MHz ~ 5725 MHz	Peak Gain (dBi)	Main: 3 Aux.: 3.58

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

1.2 Modification of EUT

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

1.3 Testing Location

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. 03CH11-HY

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

FCC designation No.: TW3786



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

Remark:

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.
3. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

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

2.1 Carrier Frequency and Channel

2400-2483.5 MHz	
Bluetooth-LE	
Channel	Freq. (MHz)
00	2402

<Ant. 2>

2400-2483.5 MHz	
802.11g	
Channel	Freq. (MHz)
11	2462

MIMO <Ant. 1+2>

5150-5250 MHz	
802.11ac VHT40	
Channel	Freq. (MHz)
46	5230

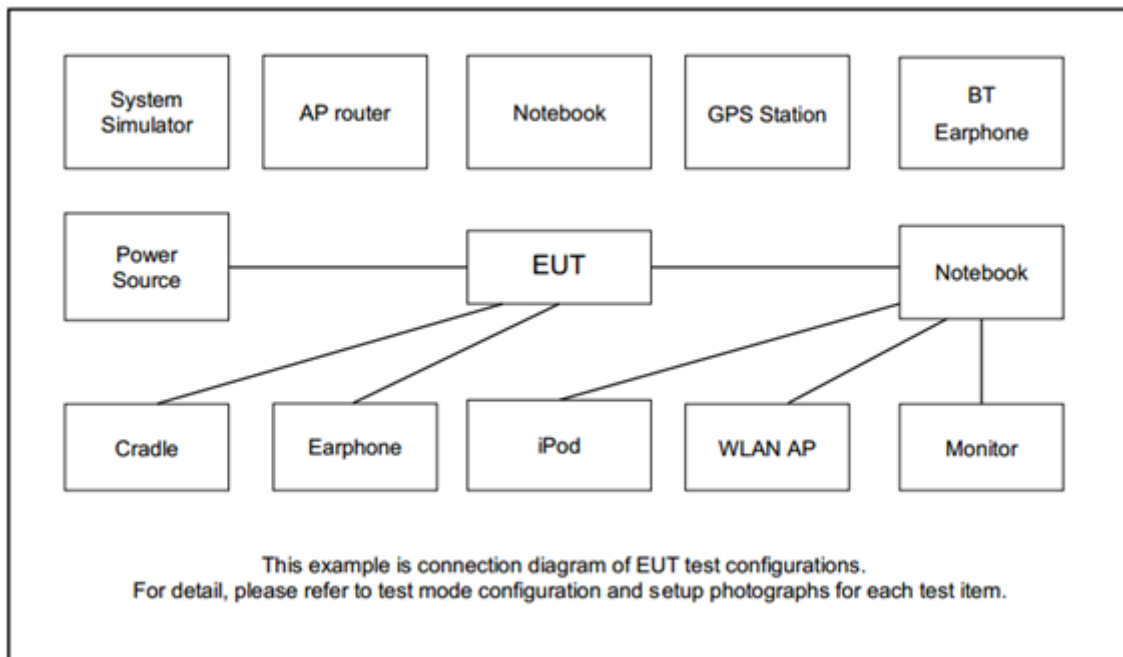
5470-5725 MHz	
802.11ac VHT80	
Channel	Freq. (MHz)
122	5610

2.2 Test Mode

<Co-Location>

Modulation	Data Rate
Bluetooth-LE + 5GHz 802.11ac VHT80 for MIMO Ant. 1+2	GFSK + MCS0
Bluetooth-LE + 2.4GHz 802.11g for Ant. 2	GFSK + 6 Mbps
Bluetooth-LE + 5GHz 802.11ac VHT40 for MIMO Ant. 1+2	GFSK + MCS0

2.3 Connection Diagram of Test System



2.4 EUT Operation Test Setup

The RF test items, utility "QRCT 4 V4.0-00182" was installed in Notebook which was programmed in order to make the EUT get into the engineering modes to provide channel selection, power level, data rate and the application type and for continuous transmitting signals.

3 Test Result

3.1 Unwanted Emissions Measurement

This section is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement.

3.1.1 Limit of Unwanted Emissions

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

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

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

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

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

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

- (i) Sections 15.407(b)(1-3) specifies the unwanted emissions limit for the U-NII-1 and U-NII-2 bands. As specified, emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of -27 dBm/MHz.
- (ii) Section 15.407(b)(4) specifies the unwanted emissions limit for the U-NII-3 band. A band emissions mask is specified in Section 15.407(b)(4)(i). The emission limits are based on the use of a peak detector.

3.1.2 Measuring Instruments

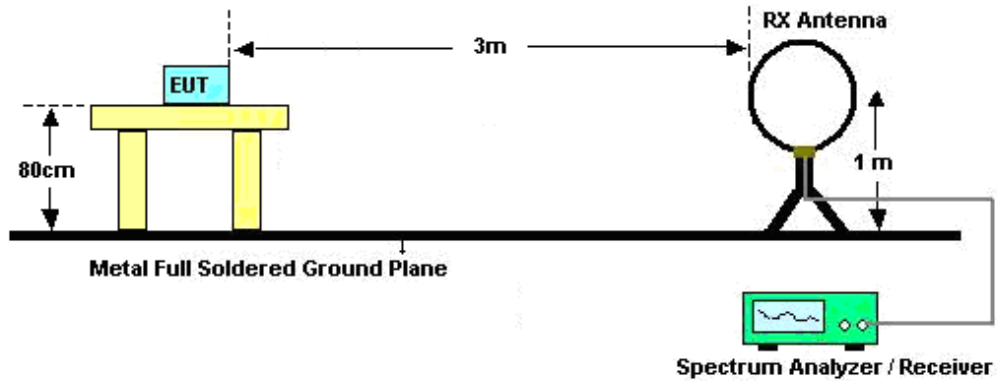
See list of measuring equipment of this test report.

3.1.3 Test Procedures

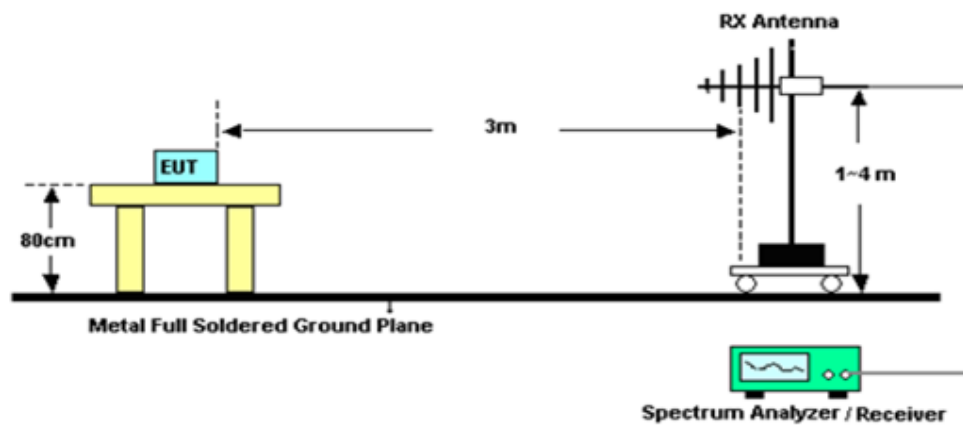
1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
Section G) Unwanted emissions measurement.
(1) Procedure for Unwanted Emissions Measurements Below 1000 MHz
 - RBW = 120 kHz
 - VBW = 300 kHz
 - Detector = Peak
 - Trace mode = max hold(2) Procedure for Peak Unwanted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

3.1.4 Test Setup

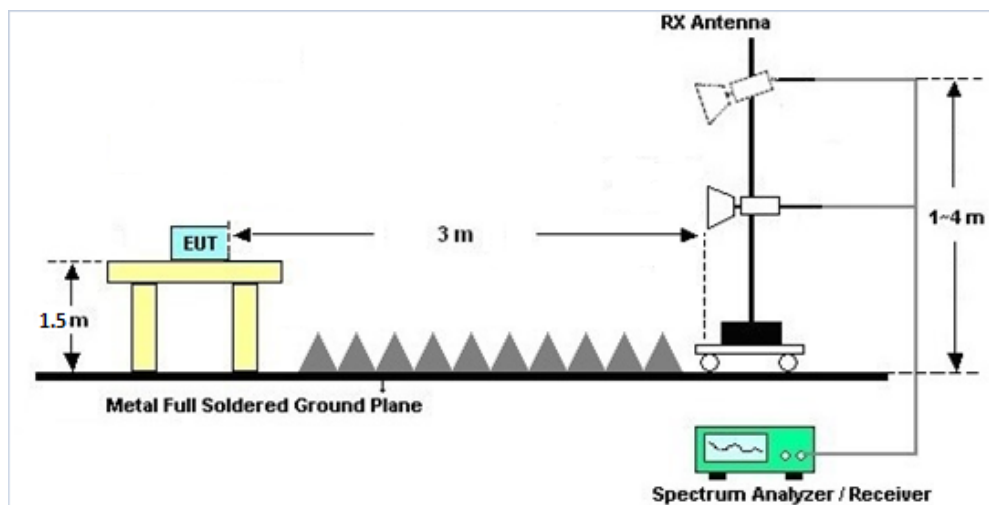
For radiated emissions below 30MHz



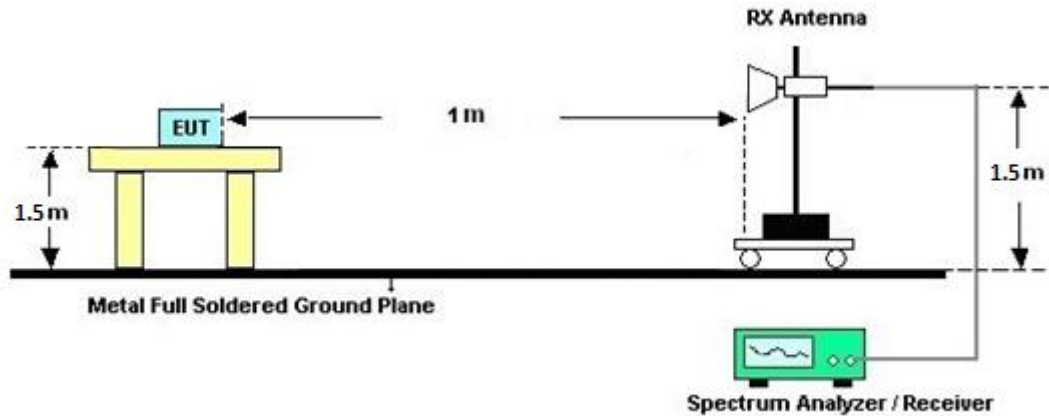
For radiated emissions from 30MHz to 1GHz



For radiated test from 1GHz to 18GHz



For radiated test above 18GHz



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

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

There is a comparison data of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.

3.1.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix A and B.

3.1.7 Duty Cycle

Please refer to Appendix C.

3.1.8 Test Result of Radiated Spurious Emissions

Please refer to Appendix A and B.



3.2 Antenna Requirements

3.2.1 Standard Applicable

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

3.2.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.2.3 Antenna Gain

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



4 List of Measuring Equipment

Instrument	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	May 07, 2021~ May 26, 2021	Jan. 03, 2022	Radiation (03CH11-HY)
Bilog Antenna	TESEQ	CBL 6111D & N-6-06	35414 & AT-N0602	30MHz~1GHz	Oct. 11, 2020	May 07, 2021~ May 26, 2021	Oct. 10, 2021	Radiation (03CH11-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1326	1GHz ~ 18GHz	Nov. 03, 2020	May 07, 2021~ May 26, 2021	Nov. 02, 2021	Radiation (03CH11-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA9170	00994	18GHz~40GHz	Nov. 19, 2020	May 07, 2021~ May 26, 2021	Nov. 18, 2021	Radiation (03CH11-HY)
Amplifier	SONOMA	310N	187312	9kHz~1GHz	Dec. 02, 2020	May 07, 2021~ May 26, 2021	Dec. 01, 2021	Radiation (03CH11-HY)
Preamplifier	EMEC	EM1G18G	060812	1GHz~18GHz	Oct. 27, 2020	May 07, 2021~ May 26, 2021	Oct. 26, 2021	Radiation (03CH11-HY)
Preamplifier	Keysight	83017A	MY53270080	1GHz~26.5GHz	Nov. 12, 2020	May 07, 2021~ May 26, 2021	Nov. 11, 2021	Radiation (03CH11-HY)
Preamplifier	EMEC	EM18G40G	060801	18GHz~40GHz	Jun. 15, 2020	May 07, 2021~ May 26, 2021	Jun. 14, 2021	Radiation (03CH11-HY)
Spectrum Analyzer	Keysight	N9010A	MY54200486	10Hz~44GHz	Oct. 23, 2020	May 07, 2021~ May 26, 2021	Oct. 22, 2021	Radiation (03CH11-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1~4m	N/A	May 07, 2021~ May 26, 2021	N/A	Radiation (03CH11-HY)
Turn Table	EMEC	TT 2000	N/A	0~360 Degree	N/A	May 07, 2021~ May 26, 2021	N/A	Radiation (03CH11-HY)
Software	Audix	E3 6.2009-8-24	RK-001053	N/A	N/A	May 07, 2021~ May 26, 2021	N/A	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4PE	9kHz-30MHz	Mar. 11, 2021	May 07, 2021~ May 26, 2021	Mar. 10, 2022	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY2859/2	30MHz-40GHz	Mar. 11, 2021	May 07, 2021~ May 26, 2021	Mar. 10, 2022	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4PE	30M-18G	Mar. 11, 2021	May 07, 2021~ May 26, 2021	Mar. 10, 2022	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY4274/2	30MHz-40GHz	Mar. 11, 2021	May 07, 2021~ May 26, 2021	Mar. 10, 2022	Radiation (03CH11-HY)
Filter	Wainwright	WLK4-1000-15 30-8000-40SS	SN11	1.53G Low Pass	Sep. 14, 2020	May 07, 2021~ May 26, 2021	Sep. 13, 2021	Radiation (03CH11-HY)
Filter	Wainwright	WHKX8-5872. 5-6750-18000- 40SS	SN3	6.75GHz High Pass Filter	Sep. 15, 2020	May 07, 2021~ May 26, 2021	Sep. 14, 2021	Radiation (03CH11-HY)
Filter	Wainwright	WHKX12-2700 -3000-18000-6 OSS	SN3	3GHz High Pass Filter	Sep. 14, 2020	May 07, 2021~ May 26, 2021	Sep. 13, 2021	Radiation (03CH11-HY)

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.4
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.2
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Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.1
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Appendix A. Radiated Spurious Emission

Test Engineer :	Harvey Guo, Bill Chang, Fu Chen, and Troye Hsieh	Temperature :	18.3~25.7°C
		Relative Humidity :	58.2~70.8%

Remark: For Radiated Spurious Emission Test Items, Ant. 1 means Aux. Antenna and Ant. 2 means Main Antenna.

2.4GHz 2400~2483.5MHz + Band 3 – 5470~5725MHz

BLE 1Mbps_Tx_Ch00 + WIFI 802.11ac VHT80_Tx_Ch122_MIMO Ant 1+2 (Band Edge @ 3m)

BLE+WIFI	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
Simultaneously		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BLE 1Mbps CH 00 2402MHz		2350.215	53.01	-20.99	74	41.85	27.6	17.03	33.47	250	80	P	H
		2345.805	43.93	-10.07	54	32.78	27.61	17.02	33.48	250	80	A	H
	*	2402	92.51	-	-	81.39	27.5	17.07	33.45	250	80	P	H
	*	2402	91.94	-	-	80.82	27.5	17.07	33.45	250	80	A	H
													H
													H
		2388.855	53.19	-20.81	74	42.07	27.52	17.06	33.46	250	10	P	V
		2379.825	44.23	-9.77	54	33.1	27.54	17.05	33.46	250	10	A	V
	*	2402	102.78	-	-	91.66	27.5	17.07	33.45	250	10	P	V
	*	2402	101.56	-	-	90.44	27.5	17.07	33.45	250	10	A	V
													V
													V



802.11ac VHT80 CH 122 5610MHz		5459.2	53.08	-20.92	74	43.29	31.62	11.13	32.96	250	320	P	H
		5463.75	56.64	-11.56	68.2	46.84	31.63	11.13	32.96	250	320	P	H
		5458.5	47.07	-6.93	54	37.28	31.62	11.13	32.96	250	320	P	H
	*	5610	106.27	-	-	96.37	31.72	11.14	32.96	250	320	P	H
	*	5610	99.4	-	-	89.5	31.72	11.14	32.96	250	320	P	H
		5727.375	62.29	-5.91	68.2	52.05	31.91	11.27	32.94	250	320	A	H
		5459.55	59.66	-14.34	74	49.87	31.62	11.13	32.96	200	3	P	V
		5463.75	56.68	-11.52	68.2	46.88	31.63	11.13	32.96	200	3	P	V
		5457.45	51.24	-2.76	54	41.46	31.61	11.13	32.96	200	3	P	V
	*	5610	110.8	-	-	100.9	31.72	11.14	32.96	200	3	P	V
	*	5610	103.78	-	-	93.88	31.72	11.14	32.96	200	3	P	V
		5727.375	61.42	-6.78	68.2	51.18	31.91	11.27	32.94	200	3	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



BLE 1Mbps_Tx_Ch00 + WIFI 802.11ac VHT80_Tx_Ch122_ MIMO Ant 1+2 (Harmonic @ 3m)

BLE+WIFI Simultaneously	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
Co-location		4804	51.74	-22.26	74	42.31	31	11.26	32.83	100	0	P	H
		4804	49.42	-24.58	74	39.99	31	11.26	32.83	100	0	A	H
		11220	48.32	-25.68	74	57.49	39.5	17.48	66.15	100	0	P	H
		16800	50.5	-17.7	68.2	54.74	39.8	22.34	66.38	100	0	P	H
		17945	57.27	-16.73	74	52.71	46.3	23.44	65.18	100	0	P	H
		17945	47.88	-6.12	54	43.32	46.3	23.44	65.18	100	0	A	H
		4804	54.16	-19.84	74	44.73	31	11.26	32.83	100	323	P	V
		4804	49.82	-4.18	54	40.39	31	11.26	32.83	100	323	A	V
		11220	46.48	-27.52	74	55.65	39.5	17.48	66.15	100	0	P	V
		16800	49.62	-18.58	68.2	53.86	39.8	22.34	66.38	100	0	P	V
		17956	58.15	-15.85	74	53.35	46.52	23.45	65.17	100	0	P	V
		17956	48.02	-5.98	54	43.22	46.52	23.45	65.17	100	0	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Emission above 18GHz

BLE 1Mbps_Tx_Ch00 + WIFI 802.11ac VHT80_Tx_Ch122_MIMO Ant 1+2 (SHF)

BLE+WIFI Simultaneously	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
Co-location SHF		37558	46.04	-22.16	68.2	61.48	43.18	-1.03	57.59	150	0	P	H
													H
													H
													H
													H
													H
													H
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													H
													H
													H
													H
		36304	44.92	-23.28	68.2	61.55	43.14	-1.25	58.52	150	0	P	V
													V
													V
													V
													V
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													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



Emission below 1GHz

BLE 1Mbps_Tx_Ch00 + WIFI 802.11ac VHT80_Tx_Ch122_MIMO Ant 1+2 (LF@3m)

BLE+WIFI Simultaneously	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
Co-location LF		54.25	26.8	-13.2	40	45.85	12.35	1.15	32.55	100	0	P	H
		105.66	28.68	-14.82	43.5	43.2	16.41	1.57	32.5	-	-	P	H
		155.13	28.36	-15.14	43.5	42.29	16.67	1.92	32.52	-	-	P	H
		871.96	30.86	-15.14	46	28.42	29.28	4.47	31.31	-	-	P	H
		937.92	31.12	-14.88	46	27.47	29.93	4.67	30.95	-	-	P	H
		959.26	31.93	-14.07	46	26.91	31.11	4.72	30.81	-	-	P	H
													H
													H
													H
													H
													H
													H
		38.73	31.22	-8.78	40	42.8	19.94	0.97	32.49	-	-	P	V
		54.25	33.22	-6.78	40	52.27	12.35	1.15	32.55	100	0	P	V
		106.63	28.49	-15.01	43.5	42.98	16.44	1.57	32.5	-	-	P	V
		869.05	31.01	-14.99	46	28.56	29.31	4.46	31.32	-	-	P	V
		890.39	30.82	-15.18	46	28.37	29.16	4.53	31.24	-	-	P	V
		935.98	30.81	-15.19	46	27.23	29.89	4.66	30.97	-	-	P	V
													V
													V
													V
													V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



2.4GHz 2400~2483.5MHz

BLE 1Mbps_Tx_Ch00 + WIFI 802.11g_Tx_Ch11_Ant 2 (Band Edge @ 3m)

BLE+WIFI Simultaneously	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
BLE 1Mbps CH 00 2402MHz		2357.04	53.75	-20.25	74	42.6	27.59	17.03	33.47	250	80	P	H
		2363.76	44.08	-9.92	54	32.94	27.57	17.04	33.47	250	80	A	H
	*	2402	96.45	-	-	85.33	27.5	17.07	33.45	250	80	P	H
	*	2402	95.59	-	-	84.47	27.5	17.07	33.45	250	80	A	H
													H
													H
		2389.695	54.32	-19.68	74	43.2	27.52	17.06	33.46	250	10	P	V
		2384.55	44.65	-9.35	54	33.52	27.53	17.06	33.46	250	10	A	V
	*	2402	103.39	-	-	92.27	27.5	17.07	33.45	250	10	P	V
	*	2402	102.78	-	-	91.66	27.5	17.07	33.45	250	10	A	V
													V
													V
802.11g CH 11 2462MHz	*	2462	107.65	-	-	96.42	27.48	17.17	33.42	300	330	P	H
	*	2462	99.88	-	-	88.65	27.48	17.17	33.42	300	330	A	H
		2483.68	58.1	-15.9	74	46.88	27.43	17.2	33.41	300	330	P	H
		2483.52	46.48	-7.52	54	35.26	27.43	17.2	33.41	300	330	A	H
												P	H
												A	H
	*	2462	109.84	-	-	98.61	27.48	17.17	33.42	100	15	P	V
	*	2462	101.91	-	-	90.68	27.48	17.17	33.42	100	15	A	V
		2483.8	61.54	-12.46	74	50.32	27.43	17.2	33.41	100	15	P	V
		2483.52	49.23	-4.77	54	38.01	27.43	17.2	33.41	100	15	A	V
												P	V
												A	V
Remark	1. No other spurious found.												
	2. All results are PASS against Peak and Average limit line.												



BLE 1Mbps_Tx_Ch00 + WIFI 802.11g_Tx_Ch11_ Ant 2 (Harmonic @ 3m)

BLE+WIFI Simultaneously	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
Co-location		4804	46.2	-27.8	74	70.19	31	11.18	66.17	100	0	P	H
		4924	39.73	-34.27	74	62.91	31.47	11.43	66.08	100	0	P	H
		7386	41.18	-32.82	74	57	36.4	13.54	65.76	100	0	P	H
		17970	58.13	-15.87	74	52.61	46.8	23.87	65.15	100	0	P	H
		17970	49.41	-4.59	54	43.89	46.8	23.87	65.15	100	0	A	H
												A	H
		4804	52.23	-21.77	74	76.22	31	11.18	66.17	400	317	P	V
		4804	48.7	-5.3	54	72.69	31	11.18	66.17	400	317	A	V
		4924	40.95	-33.05	74	64.13	31.47	11.43	66.08	100	0	P	V
		7386	40.49	-33.51	74	56.31	36.4	13.54	65.76	100	0	P	V
		17955	58.29	-15.71	74	53.1	46.5	23.86	65.17	100	0	P	V
		17955	49.41	-4.59	54	44.22	46.5	23.86	65.17	100	0	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission above 18GHz

BLE 1Mbps_Tx_Ch00 + WIFI 802.11g_Tx_Ch11_Ant 2 (SHF)

[illegible]



Emission below 1GHz

BLE 1Mbps_Tx_Ch00 + WIFI 802.11g_Tx_Ch11_Ant 2 (LF@ 3m)

BLE+WIFI Simultaneously	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
Co-location LF		54.25	26.93	-13.07	40	45.98	12.35	1.15	32.55	100	0	P	H
		105.66	28.58	-14.92	43.5	43.1	16.41	1.57	32.5	-	-	P	H
		154.16	27.78	-15.72	43.5	41.71	16.68	1.91	32.52	-	-	P	H
		885.54	30.41	-15.59	46	27.98	29.17	4.52	31.26	-	-	P	H
		910.76	31.01	-14.99	46	28.35	29.2	4.59	31.13	-	-	P	H
		957.32	31.63	-14.37	46	26.72	31.02	4.72	30.83	-	-	P	H
													H
													H
													H
													H
													H
													H
		39.7	33.32	-6.68	40	45.46	19.38	0.98	32.5	100	0	P	V
		54.25	31.81	-8.19	40	50.86	12.35	1.15	32.55	-	-	P	V
		107.6	29.75	-13.75	43.5	44.11	16.56	1.58	32.5	-	-	P	V
		835.1	30.69	-15.31	46	29.18	28.63	4.34	31.46	-	-	P	V
		861.29	31.33	-14.67	46	28.96	29.29	4.43	31.35	-	-	P	V
		948.59	31.19	-14.81	46	26.77	30.6	4.7	30.88	-	-	P	V
													V
													V
													V
													V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



2.4GHz 2400~2483.5MHz + Band 1 – 5150~5250MHz

BLE 1Mbps_Tx_Ch00 + WIFI 802.11ac VHT40_Tx_Ch46_ MIMO Ant 1+2 (Band Edge @ 3m)

BLE+WIFI Simultaneously	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
BLE 1Mbps CH 00 2402MHz		2310.105	53.6	-20.4	74	42.42	27.68	16.99	33.49	100	126	P	H
		2320.08	43.26	-10.74	54	32.09	27.66	17	33.49	100	126	A	H
	*	2402	95.3	-	-	84.18	27.5	17.07	33.45	100	126	P	H
	*	2402	94.4	-	-	83.28	27.5	17.07	33.45	100	126	A	H
													H
													H
		2340.345	53.31	-20.69	74	42.15	27.62	17.02	33.48	157	355	P	V
		2341.815	43.32	-10.68	54	32.16	27.62	17.02	33.48	157	355	A	V
	*	2402	101.61	-	-	90.49	27.5	17.07	33.45	157	355	P	V
	*	2402	101.03	-	-	89.91	27.5	17.07	33.45	157	355	A	V
													V
													V
802.11ac VHT40 CH 46 5230MHz		5115.44	51.64	-22.36	74	41.71	31.87	10.84	32.78	308	287	P	H
		5150	43.46	-10.54	54	33.58	31.8	10.88	32.8	308	287	A	H
	*	5230	108.54	-	-	99.08	31.32	10.98	32.84	308	287	P	H
	*	5230	100.72	-	-	91.26	31.32	10.98	32.84	308	287	P	H
		5452.72	50.74	-23.26	74	40.96	31.61	11.13	32.96	308	287	P	H
		5452.18	45.04	-8.96	54	35.27	31.6	11.13	32.96	308	287	A	H
		5150	51.24	-22.76	74	41.36	31.8	10.88	32.8	226	313	P	V
		5150	43.77	-10.23	54	33.89	31.8	10.88	32.8	226	313	A	V
	*	5230	111.38	-	-	101.92	31.32	10.98	32.84	226	313	P	V
	*	5230	100.6	-	-	91.14	31.32	10.98	32.84	226	313	P	V
		5454.34	55.56	-18.44	74	45.78	31.61	11.13	32.96	226	313	P	V
		5453.26	49.76	-4.24	54	39.98	31.61	11.13	32.96	226	313	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



BLE 1Mbps_Tx_Ch00 + WIFI 802.11ac VHT40_Tx_Ch46_ MIMO Ant 1+2 (Harmonic @ 3m)

BLE+WIFI Simultaneously	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
Co-location		4804	53.68	-20.32	74	44.12	31	11.39	32.83	350	76	P	H
		4804	45.36	-8.64	54	35.8	31	11.39	32.83	350	76	A	H
		10460	47.63	-20.57	68.2	57.69	39.92	16.76	66.74	100	0	P	H
		15690	47.92	-26.08	74	54.71	37.81	21.72	66.32	100	0	P	H
													H
													H
		4804	55.26	-18.74	74	45.7	31	11.39	32.83	400	47	P	V
		4804	48.55	-5.45	54	38.99	31	11.39	32.83	400	47	A	V
		10460	46.62	-21.58	68.2	56.68	39.92	16.76	66.74	100	0	P	V
		15690	46.95	-27.05	74	53.74	37.81	21.72	66.32	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission above 18GHz

BLE 1Mbps_Tx_Ch00 + WIFI 802.11ac VHT40_Tx_Ch46_ MIMO Ant 1+2 (SHF)

[illegible]



Emission below 1GHz

BLE 1Mbps_Tx_Ch00 + WIFI 802.11ac VHT40_Tx_Ch46_ MIMO Ant 1+2 (LF@3m)

BLE+WIFI Simultaneously	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
Co-location LF		54.25	28.03	-11.97	40	47.08	12.35	1.15	32.55	100	0	P	H
		105.66	29.68	-13.82	43.5	44.2	16.41	1.57	32.5	-	-	P	H
		155.13	29.36	-14.14	43.5	43.29	16.67	1.92	32.52	-	-	P	H
		871.96	30.86	-15.14	46	28.42	29.28	4.47	31.31	-	-	P	H
		937.92	31.12	-14.88	46	27.47	29.93	4.67	30.95	-	-	P	H
		959.26	31.93	-14.07	46	26.91	31.11	4.72	30.81	-	-	P	H
													H
													H
													H
													H
													H
													H
		38.73	30.22	-9.78	40	41.8	19.94	1	32.49	-	-	P	V
		54.25	32.22	-7.78	40	51.27	12.35	1.2	32.55	100	0	P	V
		106.63	27.49	-16.01	43.5	41.98	16.44	1.63	32.5	-	-	P	V
		856.44	29.62	-16.38	46	27.33	29.25	4.59	31.37	-	-	P	V
		869.05	31.01	-14.99	46	28.56	29.31	4.65	31.32	-	-	P	V
		890.39	30.82	-15.18	46	28.37	29.16	4.73	31.24	-	-	P	V
													V
													V
													V
													V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



Note symbol

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

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

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

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

For Peak Limit @ 2390MHz:

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

For Average Limit @ 2390MHz:

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

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



Appendix B. Radiated Spurious Emission Plots

Test Engineer :	Harvey Guo, Bill Chang, Fu Chen, and Troye Hsieh	Temperature :	18.3~25.7°C
		Relative Humidity :	58.2~70.8%

Remark: For Radiated Spurious Emission Test Items, Ant. 1 means Aux. Antenna and Ant. 2 means Main Antenna.

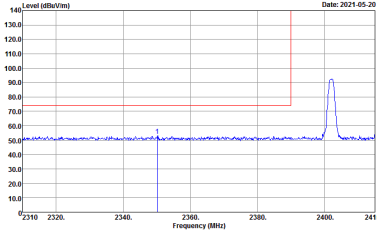
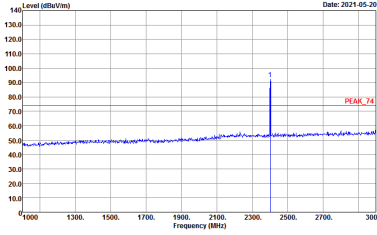
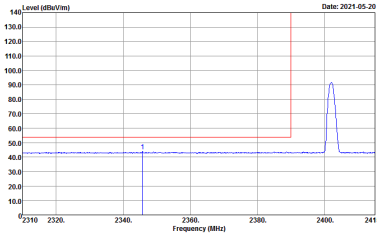
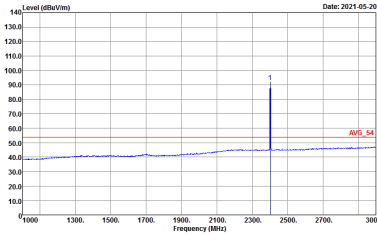
Note symbol

-L	Low channel location
-R	High channel location



2.4GHz 2400~2483.5MHz + Band 3 – 5470~5725MHz

BLE (Band Edge @ 3m)

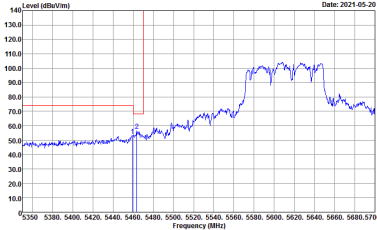
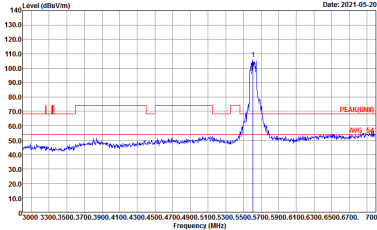
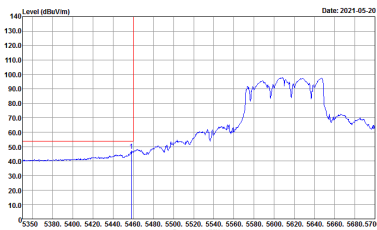
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE 1Mbps Ch00 2402MHz	
	Horizontal	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF_1326 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF_1326 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg.	 Site : 03CH11-HY Condition : AV6_BE_54 3m HORN 9120D-HF_1326 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH11-HY Condition : AV6_54 3m HORN 9120D-HF_1326 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto



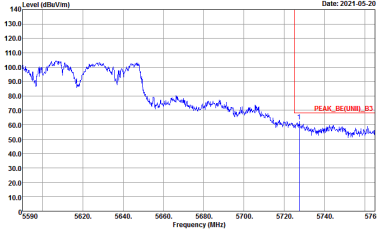
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE 1Mbps Ch00 2402MHz	
	Vertical	Fundamental
Peak	Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF_1326 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF_1326 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg.	Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF_1326 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Site : 03CH11-HY Condition : AVG_54 3m HORN 9120D-HF_1326 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto

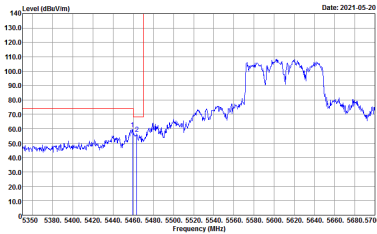
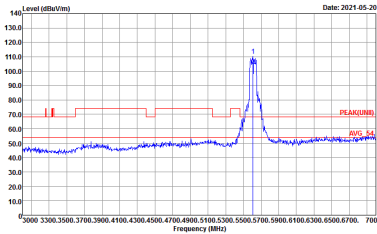
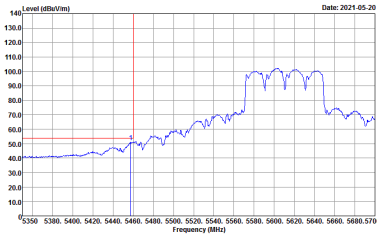


Band 3 – 5470~5725MHz
WIFI 802.11ac VHT80 (Band Edge @ 3m)

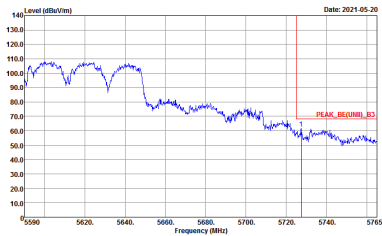
WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH122 5610MHz	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH11-HY Condition : : PEAK_BE(UNIT)_B3 3m HORN 9120D-HF_1326 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH11-HY Condition : : PEAK(UNIT) 3m HORN 9120D-HF_1326 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg.	 Site : 03CH11-HY Condition : : AVG_BE(UNIT)_B3 3m HORN 9120D-HF_1326 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Left blank



WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH122 5610MHz	
1+2	Horizontal	Fundamental
Peak	 Site : 09CH11-HV Condition : : PEAK_BC(UNIT)_B3 3m HORN 91200-HF_1326 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto	Left blank

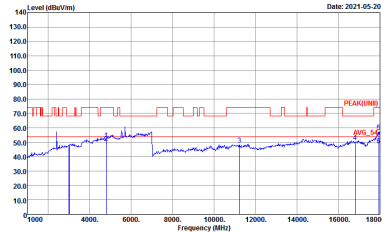
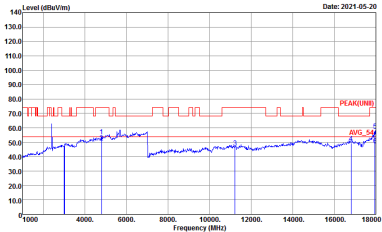
WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH122 5610MHz	
1+2	Vertical	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE(UNIT)_B3 3m HORN 9120D-HF_1326 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH11-HY Condition : PEAK(UNIT) 3m HORN 9120D-HF_1326 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg.	 Site : 03CH11-HY Condition : AVG_BE(UNIT)_B3 3m HORN 9120D-HF_1326 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Left blank



WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH122 5610MHz	
1+2	Vertical	Fundamental
Peak	 Site : 03CH11-HV Condition : PEAK_802.11ac_122 3m HORN 91200-HF_1326 VERTICAL RBW:1000.000kHz VBW:3000.000kHz SWT:Auto	Left blank



BLE 1Mbps_Tx_Ch00 + WIFI 802.11ac VHT80_Tx_Ch122_MIMO Ant 1+2 (Harmonic @ 3m)

BLE 1Mbps_Tx_Ch00 + WIFI 802.11ac VHT80_Tx_Ch122_MIMO Ant 1+2		
	Horizontal	Vertical
Peak Avg.	 Site : 03CH11-HY Condition : PEAK(UNII) 3m HORN 9120D-HF_1326 HORIZONTAL	 Site : 03CH11-HY Condition : PEAK(UNII) 3m HORN 9120D-HF_1326 VERTICAL



Emission above 18GHz

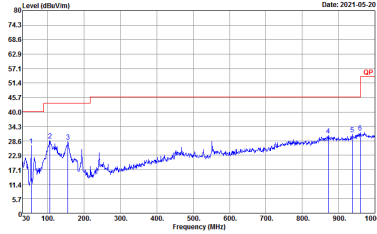
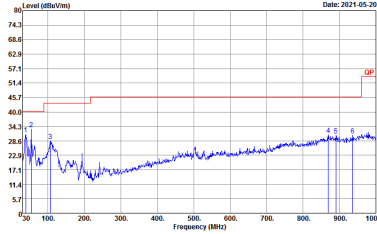
BLE 1Mbps_Tx_Ch00 + WIFI 802.11ac VHT80_Tx_Ch122_MIMO Ant 1+2 (SHF)

	Co-location SHF	
	Horizontal	Vertical
Peak Avg.	Level (dBm/100MHz) Date: 2021-05-12 Site : 03CH11-HY Condition : PEAK(UH1)_1M 1m SHF ANT_9170_00993 HORIZONTAL	Level (dBm/100MHz) Date: 2021-05-12 Site : 03CH11-HY Condition : PEAK(UH1)_1M 1m SHF ANT_9170_00993 VERTICAL



Emission below 1GHz

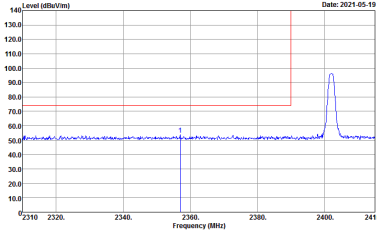
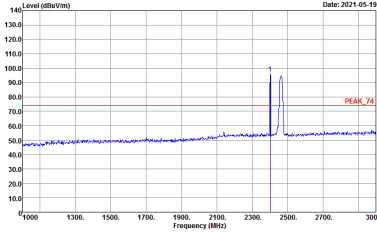
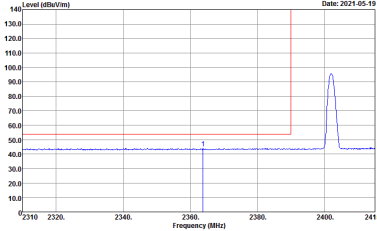
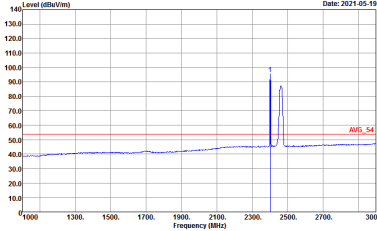
BLE 1Mbps_Tx_Ch00 + WIFI 802.11ac VHT80_Tx_Ch122_MIMO Ant 1+2 (LF@3m)

	Co-location LF	
	Horizontal	Vertical
QP / Peak	 Site : 03CH11-HY Condition : QP 3m BE-LOG 6111D-LF_ETC HORIZONTAL	 Site : 03CH11-HY Condition : QP 3m BE-LOG 6111D-LF_ETC VERTICAL



2.4GHz 2400~2483.5MHz

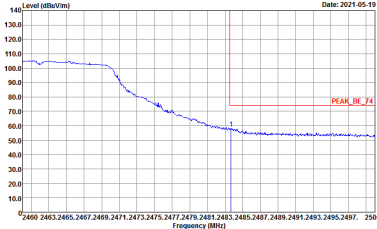
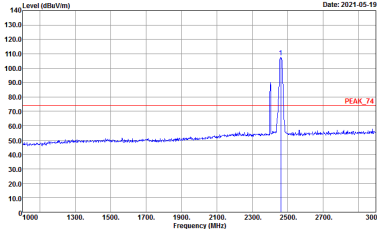
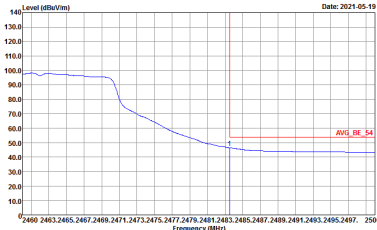
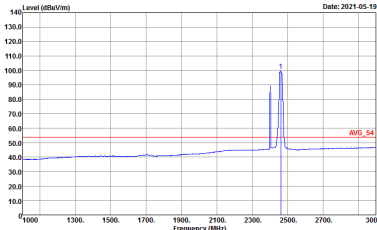
BLE 1M (Band Edge @ 3m)

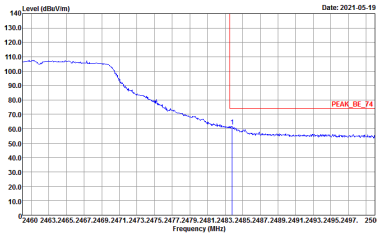
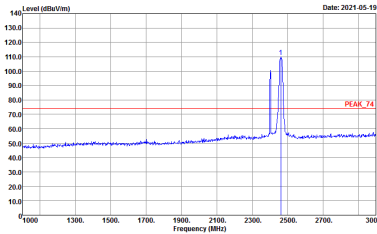
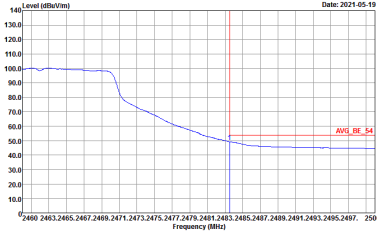
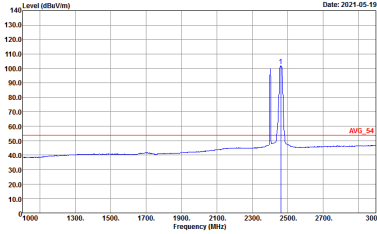
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE 1Mbps Ch00 2402MHz	
	Horizontal	Fundamental
Peak	 Site : 03CHI1-HY Condition : PEAK_BE_74 3m HORN 9120D-HF_1326 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CHI1-HY Condition : PEAK_74 3m HORN 9120D-HF_1326 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg.	 Site : 03CHI1-HY Condition : AVG_BE_54 3m HORN 9120D-HF_1326 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CHI1-HY Condition : AVG_54 3m HORN 9120D-HF_1326 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto



BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE 1Mbps Ch00 2402MHz	
	Vertical	Fundamental
Peak	Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF_1326 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF_1326 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg.	Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF_1326 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Site : 03CH11-HY Condition : AVG_54 3m HORN 9120D-HF_1326 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto

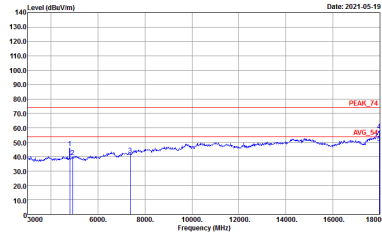
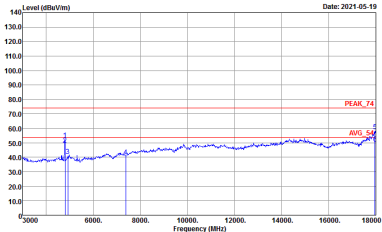
WIFI 802.11g (Band Edge @ 3m)

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH11 2462MHz	
2	Horizontal	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF_1326 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF_1326 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
	 Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 91200-HF_1326 HORIZONTAL RBW:1000.000KHz VBW:0.010KHz SWT:Auto	 Site : 03CH11-HY Condition : AVG_54 3m HORN 91200-HF_1326 HORIZONTAL RBW:1000.000KHz VBW:0.010KHz SWT:Auto
Avg.		

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH11 2462MHz	
2	Vertical	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF_1326 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF_1326 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
	 Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF_1326 VERTICAL RBW:1000.000KHz VBW:0.010KHz SWT:Auto	 Site : 03CH11-HY Condition : AVG_54 3m HORN 9120D-HF_1326 VERTICAL RBW:1000.000KHz VBW:0.010KHz SWT:Auto
Avg.		



BLE 1Mbps_Tx_Ch00 + WIFI 802.11g_Tx_Ch11_Ant 2 (Harmonic @ 3m)

BLE 1Mbps_Tx_Ch00 + Ant 2_11b_Tx_Ch11_Co-location		
	Horizontal	Vertical
Peak Avg.	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF_1326 HORIZONTAL	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF_1326 VERTICAL



Emission above 18GHz

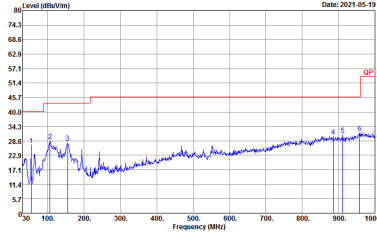
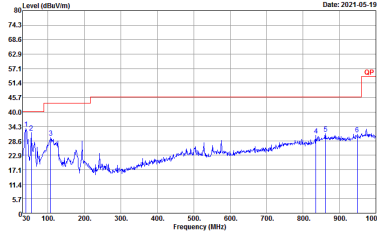
BLE 1Mbps_Tx_Ch00 + WIFI 802.11g_Tx_Ch11_Ant 2 (SHF)

	Co-location SHF	
	Horizontal	Vertical
Peak Avg.	Level (dBuV/m) Date: 2021-05-26 PEAK_74_1M Site : 03CH11-HY Condition : PEAK_74_1M 1m SHF ANT_9170_00993 HORIZONTAL	Level (dBuV/m) Date: 2021-05-12 PEAK_74_1M Site : 03CH11-HY Condition : PEAK_74_1M 1m SHF ANT_9170_00993 VERTICAL



Emission below 1GHz

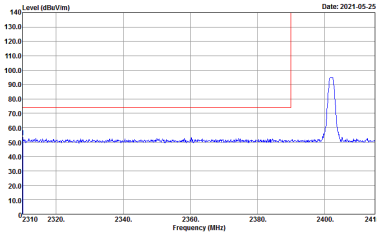
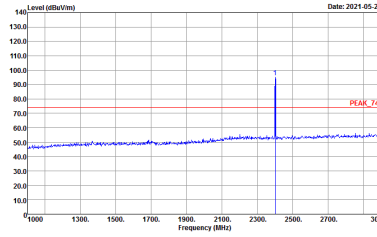
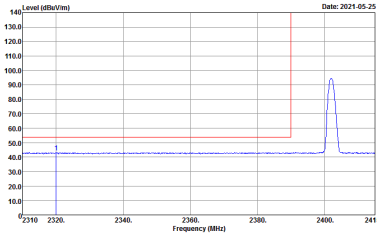
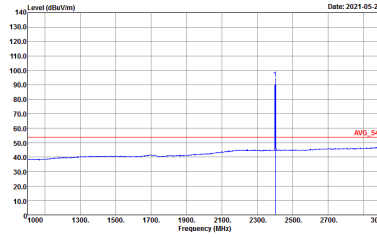
BLE 1Mbps_Tx_Ch00 + WIFI 802.11g_Tx_Ch11_Ant 2 (LF@3m)

	Co-location LF	
	Horizontal	Vertical
QP / Peak	 Site : 03CH11-HY Condition : QP 3m BE-LOG 6111D-LF_ETC HORIZONTAL	 Site : 03CH11-HY Condition : QP 3m BE-LOG 6111D-LF_ETC VERTICAL



2.4GHz 2400~2483.5MHz + Band 1 – 5150~5250MHz

BLE (Band Edge @ 3m)

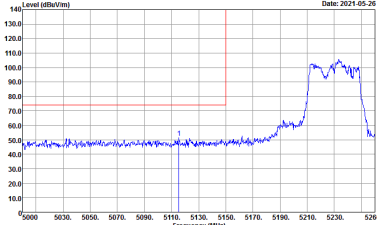
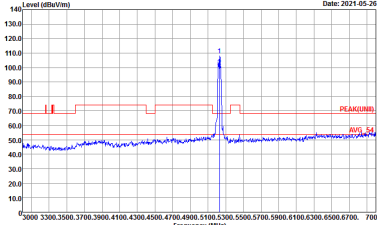
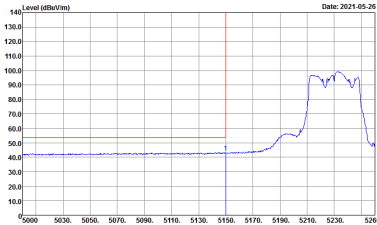
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE 1Mbps Ch00 2402MHz	
	Horizontal	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF_1326 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF_1326 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg.	 Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF_1326 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH11-HY Condition : AVG_54 3m HORN 9120D-HF_1326 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto



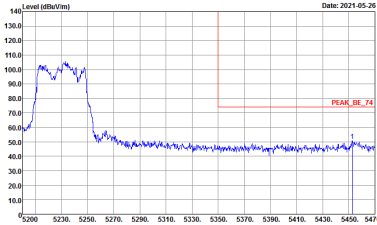
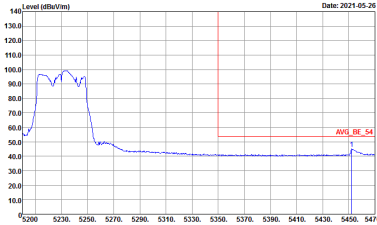
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE 1Mbps Ch00 2402MHz	
	Vertical	Fundamental
Peak	Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF_1326 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF_1326 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Avg.	Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF_1326 VERTICAL RBW:1000.000KHz VBW:3.000KHz SWT:Auto	Site : 03CH11-HY Condition : AVG_54 3m HORN 9120D-HF_1326 VERTICAL RBW:1000.000KHz VBW:3.000KHz SWT:Auto



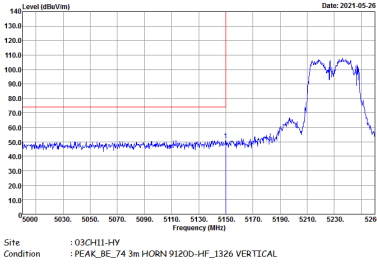
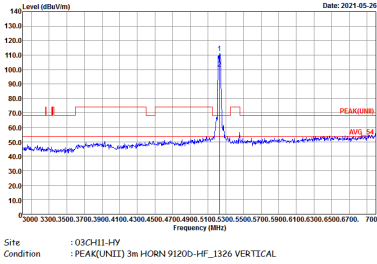
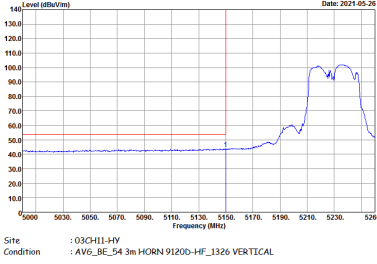
Band 1 – 5150~5250MHz
WIFI 802.11ac VHT40 (Band Edge @ 3m)

WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ac VHT40 CH46 5230MHz	
1+2	Horizontal	Fundamental
Peak	 Site : 03CHI1-HY Condition : PEAK_BE_74 3m HORN 9120D-HF_1326 HORIZONTAL	 Site : 03CHI1-HY Condition : PEAK(UNIT) 3m HORN 9120D-HF_1326 HORIZONTAL
Avg.	 Site : 03CHI1-HY Condition : AVG_BE_54 3m HORN 9120D-HF_1326 HORIZONTAL	Left blank



WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ac VHT40 CH46 5230MHz	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF_1326 HORIZONTAL	Left blank
Avg.	 Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF_1326 HORIZONTAL	Left blank



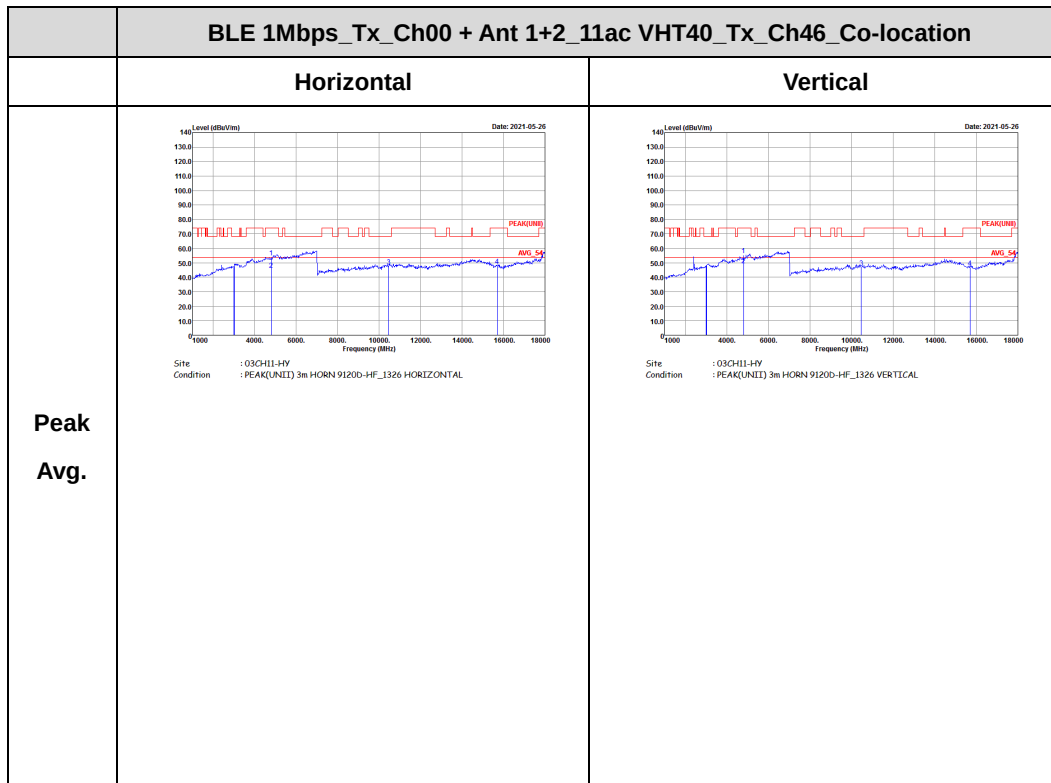
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ac VHT40 CH46 5230MHz	
1+2	Vertical	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF_1326 VERTICAL	 Site : 03CH11-HY Condition : PEAK(UNIT) 3m HORN 9120D-HF_1326 VERTICAL
Avg.	 Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF_1326 VERTICAL	Left blank



WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ac VHT40 CH46 5230MHz	
1+2	Vertical	Fundamental
Peak	Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF_1326 VERTICAL	Left blank
Avg.	Site : 03CH11-HY Condition : AVG_BE_54 3m HORN 9120D-HF_1326 VERTICAL	Left blank



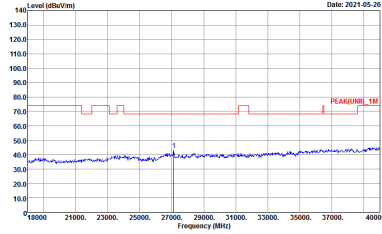
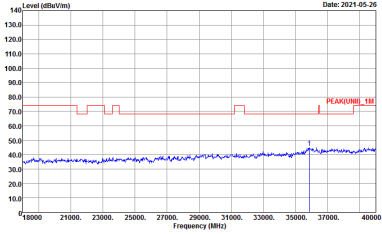
BLE 1Mbps_Tx_Ch00 + WIFI 802.11ac VHT40_Tx_Ch46_MIMO Ant 1+2 (Harmonic @ 3m)





Emission above 18GHz

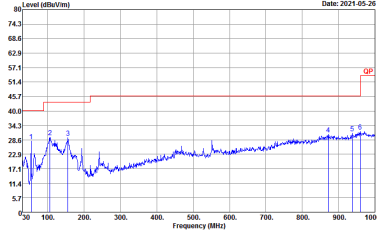
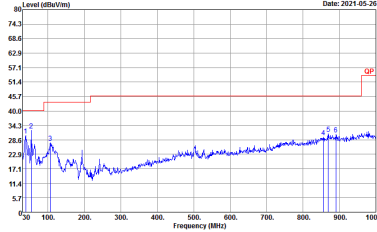
BLE 1Mbps_Tx_Ch00 + WIFI 802.11ac VHT40_Tx_Ch46_MIMO Ant 1+2 (SHF)

	Co-location SHF	
	Horizontal	Vertical
Peak Avg.	 Site : 03CH11-HY Condition : PEAK(UIN1)_1M 1m SHF ANT_9170_00993 HORIZONTAL	 Site : 03CH11-HY Condition : PEAK(UIN1)_1M 1m SHF ANT_9170_00993 VERTICAL



Emission below 1GHz

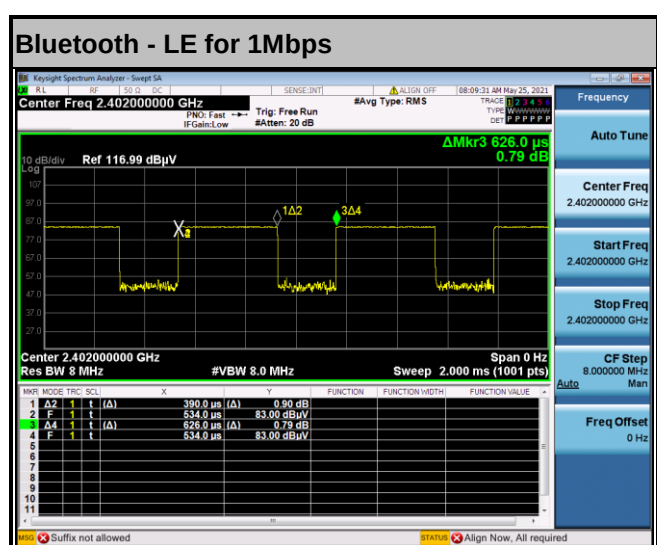
BLE 1Mbps_Tx_Ch00 + WIFI 802.11ac VHT40_Tx_Ch46_MIMO Ant 1+2 (LF@3m)

	Co-location LF	
	Horizontal	Vertical
QP / Peak	 Site : 03CH11-HY Condition : QP 3m BE-LOG 6111D-LF_ETC HORIZONTAL	 Site : 03CH11-HY Condition : QP 3m BE-LOG 6111D-LF_ETC VERTICAL



Appendix C. Duty Cycle Plots

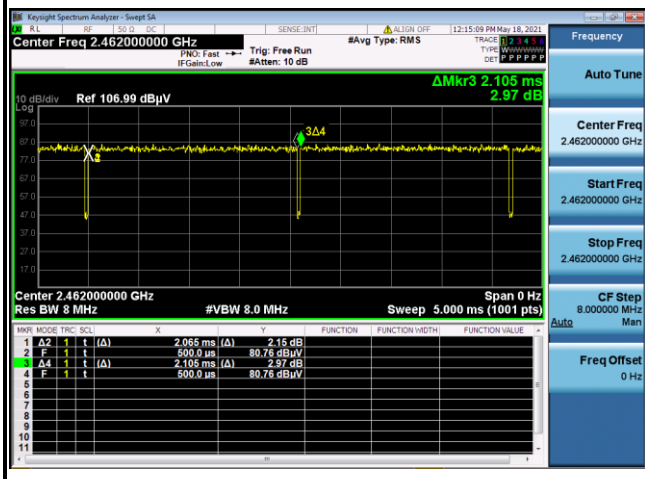
Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting	Duty Factor(dB)
-	Bluetooth - LE for 1Mbps	62.30	390	2.56	3kHz	2.06
2	802.11g	98.10	-	-	10Hz	0.08
1+2	5GHz 802.11ac VHT40	96.36	954	1.05	3kHz	0.16
1+2	5GHz 802.11ac VHT80	92.80	464	2.16	3kHz	0.32





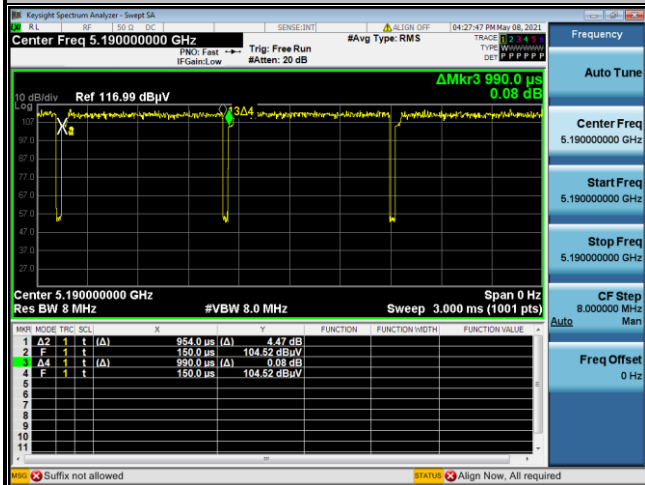
<Ant. 2>

802.11g



MIMO <Ant. 1+2>

802.11ac VHT40



802.11ac VHT80

