



FCC RADIO TEST REPORT

FCC ID : 2ADEFAT-CD1
Equipment : Airtame Radio Module
Brand Name : Airtame
Model Name : AT-CD1
Applicant : Airtame ApS
Danneskiold Samsoes Alle 24, 1sal
TV, Copenhagen K 1434, Denmark
Manufacturer : Airtame ApS
Danneskiold Samsoes Alle 24, 1sal
TV, Copenhagen K 1434, Denmark
Standard : FCC Part 15 Subpart C §15.247

The product was received on Apr. 25, 2022 and testing was performed from May 03, 2022 to Jul. 05, 2022. We, Sporton International (USA) Inc., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this partial report apply exclusively to the tested model / sample. Without written approval from Sporton International (USA) Inc. the test report shall not be reproduced except in full.

Approved by: Neil Kao

Sporton International (USA) Inc.
1175 Montague Expressway, Milpitas, CA 95035



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Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.247(b)(3)	Output Power	Pass	-
3.2	15.247(d)	Radiated Band Edges and Spurious Emission	Pass	6.83 dB under the limit at 330.700 MHz
3.2	15.207	AC Conducted Emission	Pass	1.14 dB under the limit at 12.588 MHz
3.4	15.203 & 15.247(b)	Antenna Requirement	Pass	-

Conformity Assessment Condition:

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. Please refer to the section " Uncertainty of Evaluation " for measurement uncertainty.

Comments and Explanations:

The product specifications of the EUT presented in the report are declared by the manufacturer who shall take full responsibility for the authenticity.



1 General Description

1.1 Product Feature of Equipment Under Test

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

Product Feature	
Antenna Type	WLAN: <Ant. 1>: PCB Dipole Antenna <Ant. 2>: PCB Dipole Antenna Bluetooth: PCB Dipole Antenna

Antenna information		
2400 MHz ~ 2483.5 MHz	Peak Gain (dBi)	3.0

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

1.2 Modification of EUT

No modifications made to the EUT during the testing.

1.3 Testing Location

Test Site	Sporton International (USA) Inc.
Test Site Location	1175 Montague Expressway, Milpitas, CA 95035 TEL : 408 9043300
Test Site No.	Sporton Site No. 03CH02-CA, TH01-CA, CO01-CA

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

FCC Designation No.: US1250

1.4 Applicable Standards

According to the specifications declared by 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 the test items were validated and recorded in accordance with the standards without any modification during the testing.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.



2 Test Configuration of Equipment Under Test

2.1 Carrier Frequency Channel

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



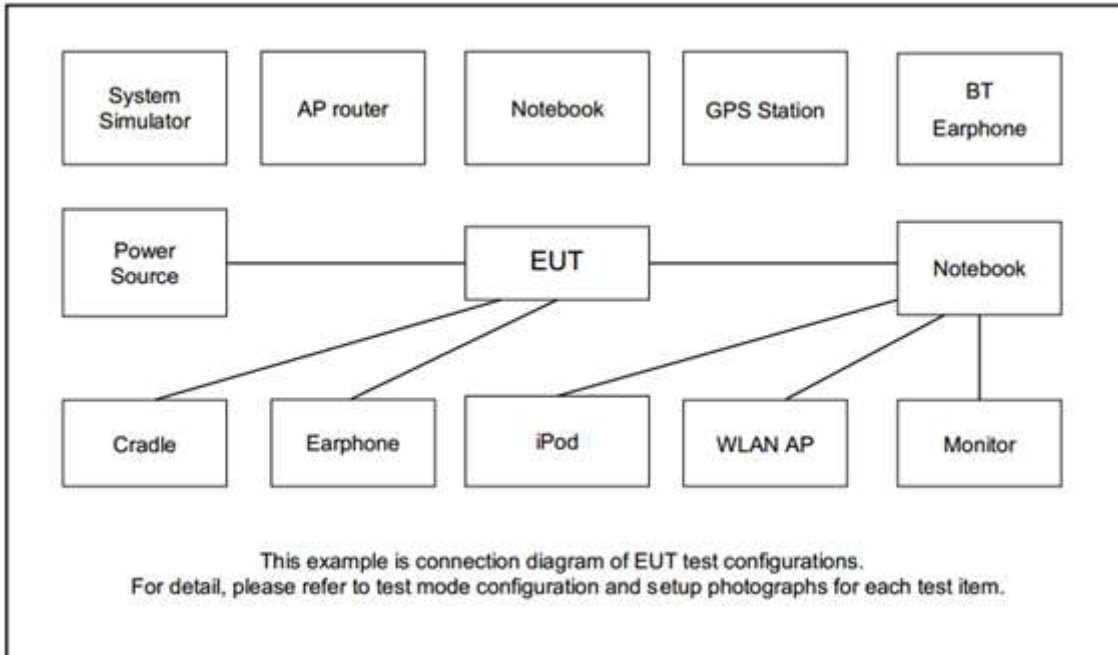
2.2 Test Mode

- a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, 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 three orthogonal axis (X: flat, Y: portrait, Z: landscape), and adjusting the measurement antenna orientation, following C63.10 exploratory test procedures and find Z plane as worst plane, and the worst mode of radiated spurious emissions is Bluetooth 1Mbps mode, and recorded in this report.

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

Summary table of Test Cases	
Test Item	Data Rate / Modulation
Radiated Test Cases	Bluetooth BR 1Mbps GFSK
	Mode 1: CH00_2402 MHz
	Mode 2: CH39_2441 MHz
	Mode 3: CH78_2480 MHz
AC Conducted Emission	Mode 1 : WLAN (2.4GHz) Link + Bluetooth Link + RJ45 Link (Charging from Adapter) + Play video with USB-C HDD + HDMI*2 connect to TV (TV Resolution: 1080p) + USB-A 3.0 Link to mouse + USB-A 3.0 connect to keyboard + USB-C 3.0 Link to HDD Mode 2 : WLAN (2.4GHz) Link + Bluetooth Link + RJ45 Link (Charging from PoE Adapter) + Play video with USB-C HDD + HDMI*2 connect to TV (TV Resolution: 4K 30Hz) + USB-A 3.0 Link to mouse + USB-A 3.0 connect to speaker + USB-C 3.0 Link to HDD
Remark: 1. For Radiated Test Cases, the worst mode data rate 1Mbps was reported only since the highest RF output power in the preliminary tests. 2. The worst case of Conducted Emission is mode 2; only the test data of it was reported. 3. HDMI Cable means media application transferred between EUT and external display.	

2.3 Connection Diagram of Test System



2.4 Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	WLAN AP	NETGEAR	R7800	PY315100319	N/A	Unshielded 1.2m
2.	PoE adapter	TYCON	TP-POE-HP-48G-RC	FCC DoC	N/A	Unshielded, 1.0m
3.	HDD	WD	WDBYNN0010BBL-0B	FCC DoC	N/A	Shielded, 0.5m
4.	Notebook	Acer	Altos PS548-G1	FCC DoC	N/A	AC I/P: Unshielded, 1.0m DC O/P: Shielded, 1.8m
5.	Monitor	Samsung	U28R552UQR	FCC DoC	Shielded, 1.2 m	Unshielded, 1.8 m
6.	Bluetooth Speaker	JBL	GO2J	CCAH18LP0030E4	N/A	N/A
7.	Keyboard	Lenovo	SK-8827	FCC DoC	N/A	Unshielded, 1.0m
8.	Mouse	HP	N910U	FCC DoC	N/A	Unshielded, 1.2m
9.	Speaker	Logitech	S150	FCC DoC	N/A	Unshielded, 1.0m

2.5 EUT Operation Test Setup

The RF test items, test scripts made by the manufacturer are installed in Notebook, programmed in order to make the EUT enter the engineering modes to provide channel selection, power level, data rate and the application type for continuous signals.

3 Test Result

3.1 Output Power Measurement

3.1.1 Limit of Output Power

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

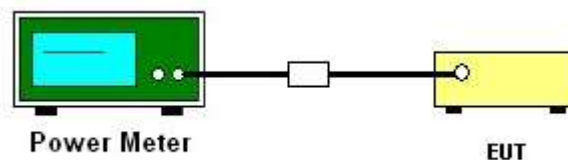
3.1.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.1.3 Test Procedures

1. The testing follows ANSI C63.10-2013 clause 7.8.5.
1. The RF output of EUT is connected to the power meter by RF cable and attenuator. The path loss is compensated to the results for each measurement.
2. Set the maximum power setting and enable the EUT to transmit continuously.
3. Measure the conducted output power with cable loss and record the results in the test report.
4. Measure and record the results in the test report.

3.1.4 Test Setup



3.1.5 Test Result of Average Output Power (Reporting Only)

Please refer to Appendix A.



3.2 Radiated Band Edges and Spurious Emission Measurement

3.2.1 Limit of Radiated Band Edges and Spurious Emission

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

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

3.2.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.



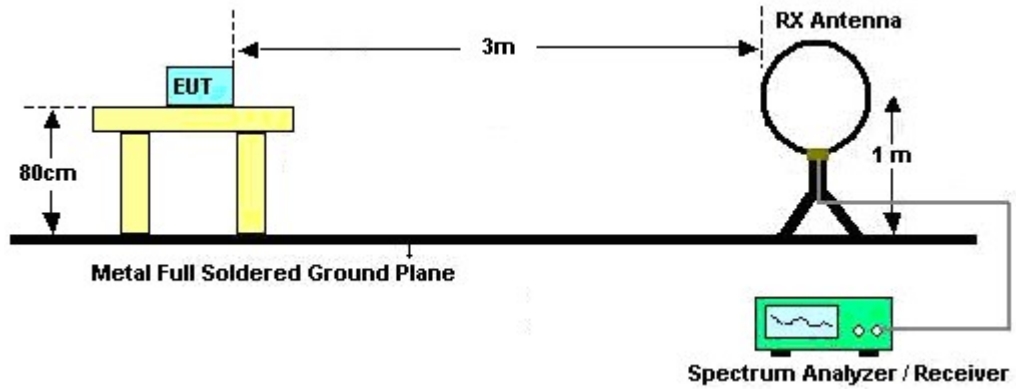
3.2.3 Test Procedures

1. The EUT is 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.
2. The EUT is set 3 meters away from the receiving antenna, which is mounted on the top of a variable height antenna tower.
3. For each suspected emission, the EUT is arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
4. Set the maximum power setting and enable the EUT to transmit continuously.
5. Use the following spectrum analyzer settings:
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Set RBW = 100 kHz for $f < 1$ GHz, RBW = 1 MHz for $f > 1$ GHz ; VBW \geq RBW; Sweep = auto; Detector function = peak; Trace = max hold for peak
 - (3) For average measurement: use duty cycle correction factor method per 15.35(c).
Duty cycle = On time/100 milliseconds
On time = $N_1 * L_1 + N_2 * L_2 + \dots + N_{n-1} * L_{n-1} + N_n * L_n$
Where N_1 is number of type 1 pulses, L_1 is length of type 1 pulses, etc.
Average Emission Level = Peak Emission Level + $20 * \log$ (Duty cycle)
6. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
7. Radiated testing below 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading. When there is no suspected emission found and the emission level is with at least 6 dB margin against QP limit line, the position is marked as "-".
8. Radiated testing above 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading for scanning all frequencies. When there is no suspected emission found and the harmonic emission level is with at least 6 dB margin against average limit line, the position is marked as "-".

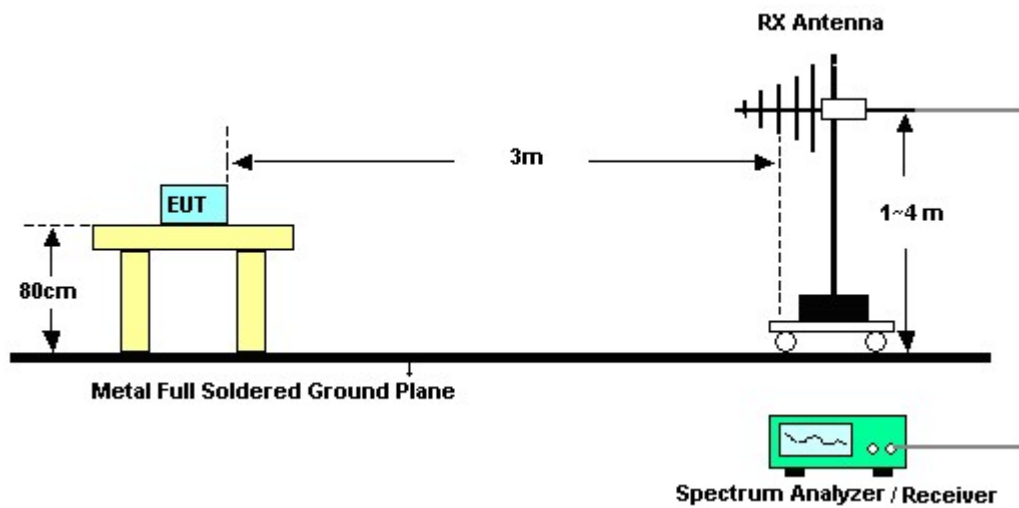
Note: The average levels are calculated from the peak level corrected with duty cycle correction factor (-42.16dB) derived from $20 \log$ (dwell time/100ms). This correction is only for signals that hop with the fundamental signal, such as band-edge and harmonic. Other spurious signals that are independent of the hopping signal would not use this correction.

3.2.4 Test Setup

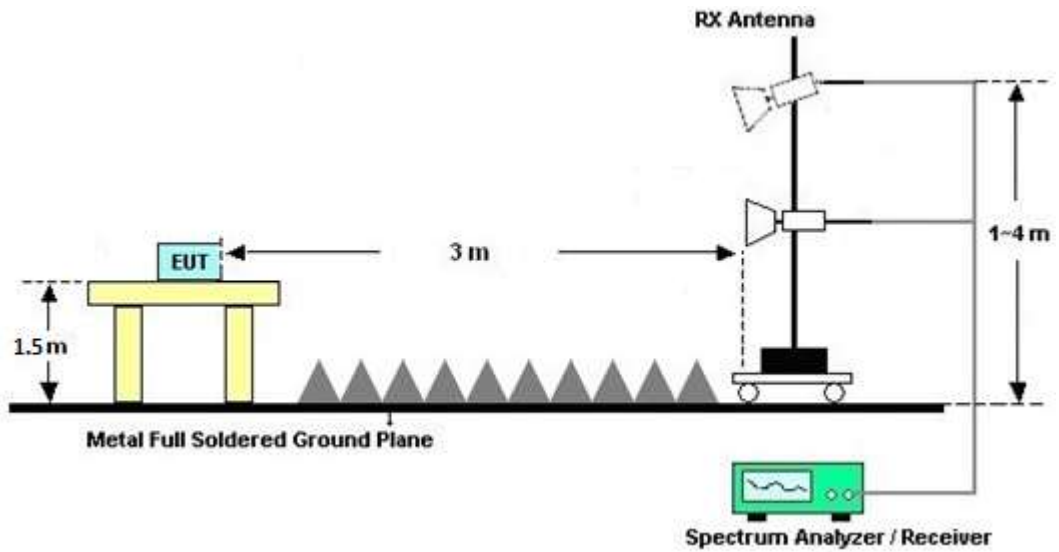
For radiated test below 30MHz



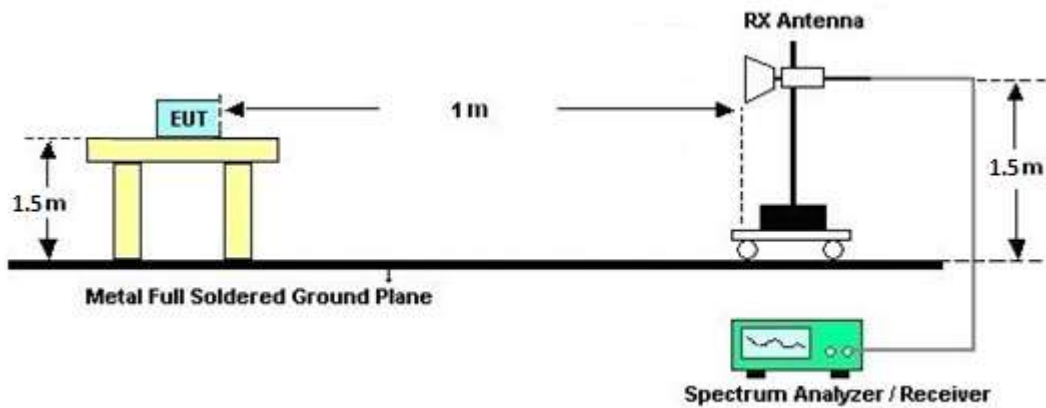
For radiated test from 30MHz to 1GHz



For radiated test from 1GHz to 18GHz



For radiated test above 18GHz



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

The low frequency, which starts from 9 kHz to 30 MHz, is pre-scanned and the result which is 20 dB lower than the limit line is 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 comes out very similar.



3.2.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C and D.

3.2.7 Duty Cycle

Please refer to Appendix E.

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

Please refer to Appendix C and D.

Note: When the scan with peak detector exceeds the limit associated with the average detector, additional scan with average detection was performed to show compliance with the average limit. The additional scan plot of the low channel is provided for justification.

3.3 AC Conducted Emission Measurement

3.3.1 Limit of AC Conducted Emission

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

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

*Decreases with the logarithm of the frequency.

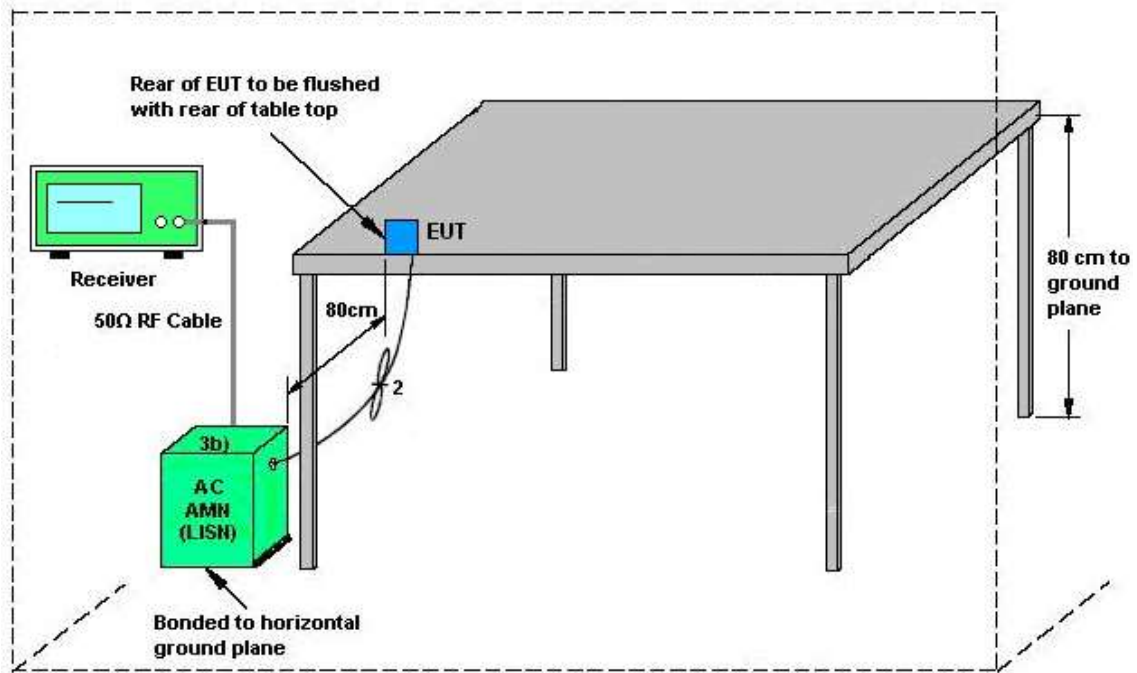
3.3.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.3.3 Test Procedures

1. The EUT is placed 0.4 meter away from the conducting wall of the shielding room, and is kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN shall be used.
6. Both Line and Neutral shall be tested in order to find out the maximum conducted emission.
7. The frequency range from 150 kHz to 30 MHz is scanned.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9 kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

3.3.4 Test Setup



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

3.3.5 Test Result of AC Conducted Emission

Please refer to Appendix B.



3.4 Antenna Requirements

3.4.1 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.

3.4.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.4.3 Antenna Gain

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



4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Hygrometer	Testo	608-H1	45142595	N/A	Aug. 30, 2021	May 03, 2022~ Jun. 16, 2022	Aug. 29, 2022	Conducted (TH01-CA)
Power Sensor	EM Electronics Corporation	RPR3006W	RPR6W-1901026	10MHz-6GHz	Jul. 26, 2021	May 03, 2022	Jul 25, 2022	Conducted (TH01-CA)
Power Sensor	EM Electronics Corporation	RPR3006W	RPR6W-1901026	10MHz-6GHz	May 10, 2022	Jun. 16, 2022	May 09, 2023	Conducted (TH01-CA)
Switch Box & RF Cable	EM Electronics	EMSW26	1090304	N/A	Mar. 30, 2022	May 03, 2022~ Jun. 16, 2022	Mar. 29, 2023	Conducted (TH01-CA)
Spectrum Analyzer	Rohde & Schwarz	FSV40	101089	10Hz-40GHz	Jun. 02, 2021	May 03, 2022	Jun. 01, 2022	Conducted (TH01-CA)
Spectrum Analyzer	Rohde & Schwarz	FSV40	101089	10Hz-40GHz	Jun. 01, 2022	Jun. 16, 2022	May 31, 2023	Conducted (TH01-CA)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9kHz~30MHz	Jan. 07, 2022	May 24, 2022~ Jul. 05, 2022	Jan. 06, 2023	Radiation (03CH02-CA)
Bilog Antenna	TESEQ	6111D	54683	30MHz~1GHz	Oct. 15, 2021	May 24, 2022~ Jul. 05, 2022	Oct. 14, 2022	Radiation (03CH02-CA)
Horn Antenna	SCHWARZBECK	BBHA 9120D	01895	1GHz~18GHz	Aug. 25, 2021	May 24, 2022~ Jul. 05, 2022	Aug. 24, 2022	Radiation (03CH02-CA)
Horn Antenna	SCHWARZBECK	BBHA 9170D	00842	18GHz~40GHz	Jul. 20, 2021	May 24, 2022~ Jul. 05, 2022	Jul. 19, 2022	Radiation (03CH02-CA)
Amplifier	SONOMA	310N	372240	N/A	May 10, 2022	May 24, 2022~ Jul. 05, 2022	May 09, 2023	Radiation (03CH02-CA)
Preamplifier	Keysight	83017A	MY53270323	1GHz~26.5GHz	May 11, 2022	May 24, 2022~ Jul. 05, 2022	May 10, 2023	Radiation (03CH02-CA)
Preamplifier	E-instrument	ERA-100M-18G-56-01-A70	EC1900251	1GHz~18GHz	May 12, 2022	May 24, 2022~ Jul. 05, 2022	May 09, 2023	Radiation (03CH02-CA)
Preamplifier	EMEC	EMC18G40G	060725	18GHz-40GHz	May. 10, 2022	May 24, 2022~ Jul. 05, 2022	May 09, 2023	Radiation (03CH02-CA)
RF Cable	HUBER+SUHNER	SUCOFLEX 102	8024032/2, 8024062/2, 802856/2	N/A	Jun. 23, 2021	May 24, 2022~ Jun 21, 2022	Jun. 22, 2022	Radiation (03CH02-CA)
RF Cable	HUBER+SUHNER	SUCOFLEX 102	8024032/2, 802406/2, 802875/2	N/A	Jun. 22, 2022	Jun 22, 2022~ Jul. 05, 2022	Jun. 21, 2023	Radiation (03CH02-CA)
Spectrum Analyzer	Keysight	N9010A	MY57420221	10Hz~44GHz	Sep. 22, 2021	May 24, 2022~ Jul. 05, 2022	Sep. 21, 2022	Radiation (03CH02-CA)
Filter	Wainwright	WHKX12-2700-3000-18000-60ST	SN10	3GHz High Pass Filter	Jul. 22, 2021	May 24, 2022~ Jul. 05, 2022	Jul. 21, 2022	Radiation (03CH02-CA)
Filter	Wainwright	WLK12-1200-1272-11000-40SS	SN1	1.2GHz Low Pass Filter	Jul. 22, 2021	May 24, 2022~ Jul. 05, 2022	Jul. 21, 2022	Radiation (03CH02-CA)
Hygrometer	TESEO	608-H1	45142602	N/A	Aug. 04, 2021	May 24, 2022~ Jul. 05, 2022	Aug. 03, 2022	Radiation (03CH02-CA)
Controller	ChainTek	EM-1000	060876	NA	N/A	May 24, 2022~ Jul. 05, 2022	N/A	Radiation (03CH02-CA)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	May 24, 2022~ Jul. 05, 2022	N/A	Radiation (03CH02-CA)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	May 24, 2022~ Jul. 05, 2022	N/A	Radiation (03CH02-CA)
Software	Audix	E3	N/A	N/A	N/A	May 24, 2022~ Jul. 05, 2022	N/A	Radiation (03CH02-CA)



Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
LISN	TESEQ	NNB51	47415	N/A	May 10, 2022	May 20, 2022~ Jun. 20, 2022	May 09, 2023	Conduction (CO01-CA)
LISN	TESEQ	NNB51	47407	N/A	May 10, 2022	May 20, 2022~ Jun. 20, 2022	May 09, 2023	Conduction (CO01-CA)
Pulse limiter with 10dB attenuation	SCHWARZBE CK	VTSD 9561-F N	9561-F- N00412	N/A	Jul. 10, 2021	May 20, 2022~ Jun. 20, 2022	Jul. 05, 2022	Conduction (CO01-CA)
EMI Test Receiver	R&S	ESR7	102177	7GHz	Jun. 02, 2021	May 20, 2022~ May 31, 2022	Jun. 01 2022	Conduction (CO01-CA)
EMI Test Receiver	R&S	ESR7	102177	7GHz	May 31, 2022	Jun. 01, 2022~ Jun. 20, 2022	May 30, 2023	Conduction (CO01-CA)
Software	R&S	EMC32	N/A	Version 10.30.00	N/A	May 20, 2022~ Jun 20, 2022	N/A	Conduction (CO01-CA)



5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.0 dB
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.7dB
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	6.2dB
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Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	6.4dB
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Appendix A. Test Result of Conducted Test Items

Test Engineer:	Liliana Gonzalez	Temperature:	22~23.9	°C
Test Date:	2022/6/16	Relative Humidity:	43.2~43.5	%

TEST RESULTS DATA
Average Power Table

Data Rate	CH.	NTX	Average Power Ant 1 (dBm)	Original report (dBm)
1Mbps	0	1	9.64	9.94
	39	1	9.87	
	78	1	9.44	
2Mbps	0	1	7.44	
	39	1	7.33	
	78	1	7.35	
3Mbps	0	1	7.40	
	39	1	7.32	
	78	1	7.33	



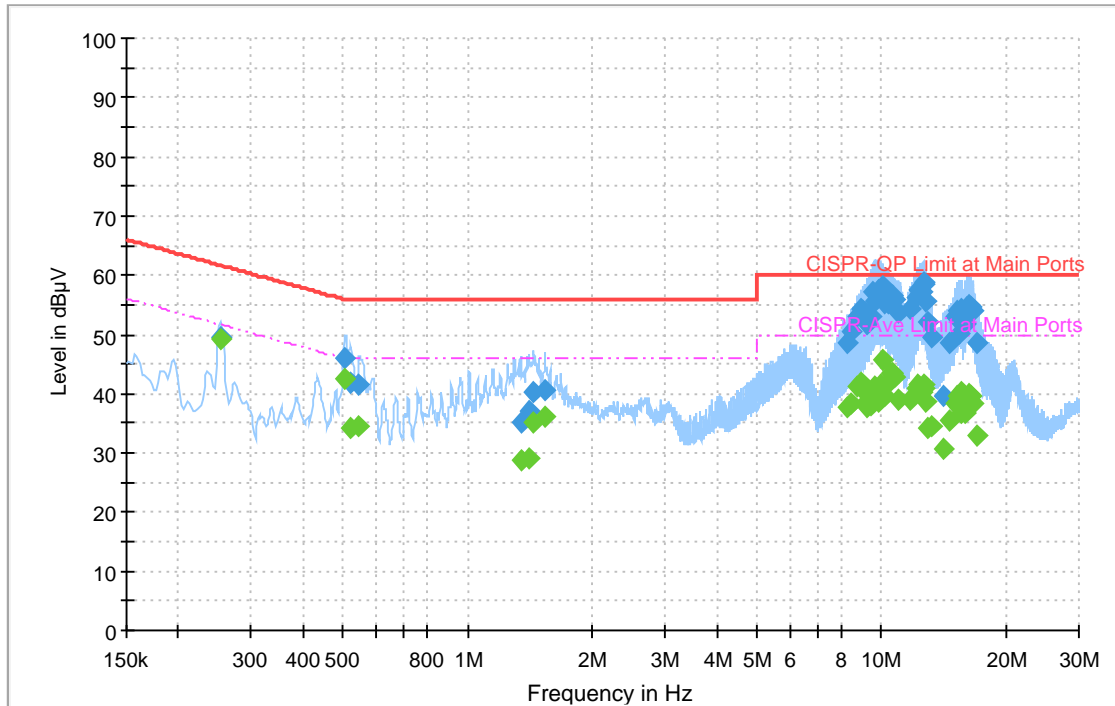
Appendix B. AC Conducted Emission Test Results

Test Engineer :	Yuan Lee	Temperature :	19~25°C
		Relative Humidity :	37~44%

EUT Information

Site: CO01-CA
 Power: 120Vac/60Hz
 Project: 210727003
 Mode: 2

Full Spectrum



Final Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.252168	---	49.08	51.69	2.61	L1	OFF	20.3
0.252168	49.60	---	61.69	12.09	L1	OFF	20.3
0.505941	---	42.50	46.00	3.50	L1	OFF	20.3
0.505941	45.87	---	56.00	10.13	L1	OFF	20.3
0.520962	---	34.09	46.00	11.91	L1	OFF	20.3
0.520962	41.88	---	56.00	14.12	L1	OFF	20.3
0.546567	---	34.58	46.00	11.42	L1	OFF	20.3
0.546567	41.68	---	56.00	14.32	L1	OFF	20.3
1.340970	---	28.77	46.00	17.23	L1	OFF	20.3
1.340970	35.14	---	56.00	20.86	L1	OFF	20.3
1.408479	---	29.11	46.00	16.89	L1	OFF	20.3
1.408479	37.18	---	56.00	18.82	L1	OFF	20.3
1.436937	---	35.00	46.00	11.00	L1	OFF	20.3
1.436937	40.12	---	56.00	15.88	L1	OFF	20.3
1.536738	---	36.24	46.00	9.76	L1	OFF	20.3
1.536738	40.63	---	56.00	15.37	L1	OFF	20.3
8.302722	---	37.80	50.00	12.20	L1	OFF	20.4
8.302722	48.71	---	60.00	11.29	L1	OFF	20.4
8.435661	---	38.31	50.00	11.69	L1	OFF	20.4
8.435661	50.42	---	60.00	9.58	L1	OFF	20.4
8.688804	---	41.10	50.00	8.90	L1	OFF	20.4

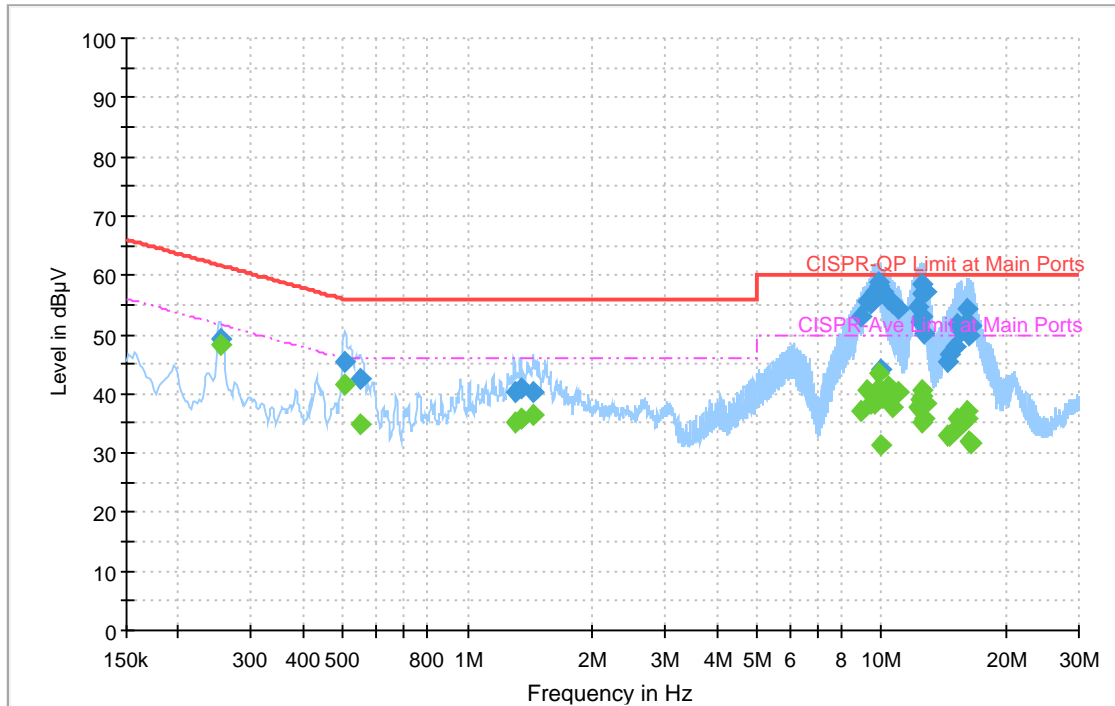
Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
8.688804	53.01	---	60.00	6.99	L1	OFF	20.4
8.880558	---	41.98	50.00	8.02	L1	OFF	20.4
8.880558	54.31	---	60.00	5.69	L1	OFF	20.4
9.009186	---	40.59	50.00	9.41	L1	OFF	20.4
9.009186	54.06	---	60.00	5.94	L1	OFF	20.4
9.140487	---	38.49	50.00	11.51	L1	OFF	20.4
9.140487	52.24	---	60.00	7.76	L1	OFF	20.4
9.257460	---	37.61	50.00	12.39	L1	OFF	20.4
9.257460	51.89	---	60.00	8.11	L1	OFF	20.4
9.385233	---	37.91	50.00	12.09	L1	OFF	20.4
9.385233	53.04	---	60.00	6.96	L1	OFF	20.4
9.513258	---	40.49	50.00	9.51	L1	OFF	20.4
9.513258	57.08	---	60.00	2.92	L1	OFF	20.4
9.643326	---	41.12	50.00	8.88	L1	OFF	20.5
9.643326	55.58	---	60.00	4.42	L1	OFF	20.5
9.831966	---	38.55	50.00	11.45	L1	OFF	20.5
9.831966	57.52	---	60.00	2.48	L1	OFF	20.5
9.962088	---	41.54	50.00	8.46	L1	OFF	20.5
9.962088	57.12	---	60.00	2.88	L1	OFF	20.5
10.094388	---	45.64	50.00	4.36	L1	OFF	20.5
10.094388	58.30	---	60.00	1.70	L1	OFF	20.5
10.215996	---	39.70	50.00	10.30	L1	OFF	20.5
10.215996	55.37	---	60.00	4.63	L1	OFF	20.5
10.347189	---	41.74	50.00	8.26	L1	OFF	20.5
10.347189	55.30	---	60.00	4.70	L1	OFF	20.5
10.478742	---	43.37	50.00	6.63	L1	OFF	20.5
10.478742	56.30	---	60.00	3.70	L1	OFF	20.5
10.604544	---	43.55	50.00	6.45	L1	OFF	20.5
10.604544	56.45	---	60.00	3.55	L1	OFF	20.5
10.735215	---	42.81	50.00	7.19	L1	OFF	20.5
10.735215	55.77	---	60.00	4.23	L1	OFF	20.5
10.925457	---	38.94	50.00	11.06	L1	OFF	20.5
10.925457	53.59	---	60.00	6.41	L1	OFF	20.5
11.757327	---	39.08	50.00	10.92	L1	OFF	20.5
11.757327	54.46	---	60.00	5.54	L1	OFF	20.5
12.076512	---	40.76	50.00	9.24	L1	OFF	20.5
12.076512	56.20	---	60.00	3.80	L1	OFF	20.5
12.202467	---	41.42	50.00	8.58	L1	OFF	20.5
12.202467	57.63	---	60.00	2.37	L1	OFF	20.5
12.330249	---	40.33	50.00	9.67	L1	OFF	20.5
12.330249	56.76	---	60.00	3.24	L1	OFF	20.5
12.460146	---	40.19	50.00	9.81	L1	OFF	20.5
12.460146	57.23	---	60.00	2.77	L1	OFF	20.5
12.588018	---	41.57	50.00	8.43	L1	OFF	20.5
12.588018	58.86	---	60.00	1.14	L1	OFF	20.5
12.713964	---	41.05	50.00	8.95	L1	OFF	20.5
12.713964	58.47	---	60.00	1.53	L1	OFF	20.5
12.842673	---	38.53	50.00	11.47	L1	OFF	20.5
12.842673	55.61	---	60.00	4.39	L1	OFF	20.5
12.972660	---	34.11	50.00	15.89	L1	OFF	20.5
12.972660	52.19	---	60.00	7.81	L1	OFF	20.5
13.159545	---	34.62	50.00	15.38	L1	OFF	20.5
13.159545	49.67	---	60.00	10.33	L1	OFF	20.5
14.170533	---	30.52	50.00	19.48	L1	OFF	20.5
14.170533	39.59	---	60.00	20.41	L1	OFF	20.5
14.631153	---	35.54	50.00	14.46	L1	OFF	20.5
14.631153	48.51	---	60.00	11.49	L1	OFF	20.5
15.134748	---	38.48	50.00	11.52	L1	OFF	20.5
15.134748	53.09	---	60.00	6.91	L1	OFF	20.5
15.265356	---	39.65	50.00	10.35	L1	OFF	20.5
15.265356	54.05	---	60.00	5.95	L1	OFF	20.5
15.389745	---	37.70	50.00	12.30	L1	OFF	20.5
15.389745	50.23	---	60.00	9.77	L1	OFF	20.5

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
15.515439	---	36.76	50.00	13.24	L1	OFF	20.5
15.515439	53.49	---	60.00	6.51	L1	OFF	20.5
15.644922	---	40.28	50.00	9.72	L1	OFF	20.5
15.644922	54.33	---	60.00	5.67	L1	OFF	20.5
15.975078	---	36.86	50.00	13.14	L1	OFF	20.5
15.975078	51.62	---	60.00	8.38	L1	OFF	20.5
16.100493	---	39.15	50.00	10.85	L1	OFF	20.5
16.100493	54.58	---	60.00	5.42	L1	OFF	20.5
16.230003	---	39.04	50.00	10.96	L1	OFF	20.5
16.230003	54.66	---	60.00	5.34	L1	OFF	20.5
16.355562	---	39.94	50.00	10.06	L1	OFF	20.5
16.355562	54.95	---	60.00	5.05	L1	OFF	20.5
16.482138	---	39.64	50.00	10.36	L1	OFF	20.5
16.482138	54.61	---	60.00	5.39	L1	OFF	20.5
16.610973	---	38.24	50.00	11.76	L1	OFF	20.5
16.610973	54.10	---	60.00	5.90	L1	OFF	20.5
17.060010	---	32.99	50.00	17.01	L1	OFF	20.5
17.060010	48.59	---	60.00	11.41	L1	OFF	20.5

EUT Information

Site: CO01-CA
 Power: 120Vac/60Hz
 Project: 210727003
 Mode: 2

Full Spectrum



Final Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.253329	---	48.39	51.65	3.26	N	OFF	20.3
0.253329	49.32	---	61.65	12.33	N	OFF	20.3
0.506409	---	41.54	46.00	4.46	N	OFF	20.3
0.506409	45.45	---	56.00	10.55	N	OFF	20.3
0.548565	---	34.86	46.00	11.14	N	OFF	20.3
0.548565	42.54	---	56.00	13.46	N	OFF	20.3
1.298085	---	35.29	46.00	10.71	N	OFF	20.3
1.298085	40.21	---	56.00	15.79	N	OFF	20.3
1.341951	---	35.85	46.00	10.15	N	OFF	20.3
1.341951	40.81	---	56.00	15.19	N	OFF	20.3
1.439997	---	36.44	46.00	9.56	N	OFF	20.3
1.439997	40.36	---	56.00	15.64	N	OFF	20.3
8.944080	---	37.03	50.00	12.97	N	OFF	20.4
8.944080	53.11	---	60.00	6.89	N	OFF	20.4
9.198969	---	40.51	50.00	9.49	N	OFF	20.4
9.198969	55.47	---	60.00	4.53	N	OFF	20.4
9.446181	---	38.47	50.00	11.53	N	OFF	20.4
9.446181	55.17	---	60.00	4.83	N	OFF	20.4
9.635109	---	38.42	50.00	11.58	N	OFF	20.4
9.635109	57.25	---	60.00	2.75	N	OFF	20.4
9.764367	---	39.40	50.00	10.60	N	OFF	20.4

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
9.764367	57.04	---	60.00	2.96	N	OFF	20.4
9.834126	---	43.32	50.00	6.68	N	OFF	20.4
9.834126	58.71	---	60.00	1.29	N	OFF	20.4
9.890898	---	40.93	50.00	9.07	N	OFF	20.4
9.890898	58.28	---	60.00	1.72	N	OFF	20.4
9.952026	---	31.24	50.00	18.76	N	OFF	20.4
9.952026	44.06	---	60.00	15.94	N	OFF	20.4
10.093776	---	39.40	50.00	10.60	N	OFF	20.5
10.093776	57.06	---	60.00	2.94	N	OFF	20.5
10.415238	---	41.36	50.00	8.64	N	OFF	20.5
10.415238	55.97	---	60.00	4.03	N	OFF	20.5
10.671594	---	37.80	50.00	12.20	N	OFF	20.5
10.671594	55.36	---	60.00	4.64	N	OFF	20.5
10.988844	---	40.17	50.00	9.83	N	OFF	20.5
10.988844	54.30	---	60.00	5.70	N	OFF	20.5
12.203457	---	37.68	50.00	12.32	N	OFF	20.5
12.203457	54.63	---	60.00	5.37	N	OFF	20.5
12.391179	---	39.05	50.00	10.95	N	OFF	20.5
12.391179	52.22	---	60.00	7.78	N	OFF	20.5
12.459867	---	35.29	50.00	14.71	N	OFF	20.5
12.459867	52.98	---	60.00	7.02	N	OFF	20.5
12.522813	---	40.57	50.00	9.43	N	OFF	20.5
12.522813	58.31	---	60.00	1.69	N	OFF	20.5
12.584679	---	39.56	50.00	10.44	N	OFF	20.5
12.584679	56.99	---	60.00	3.01	N	OFF	20.5
12.652035	---	35.68	50.00	14.32	N	OFF	20.5
12.652035	50.24	---	60.00	9.76	N	OFF	20.5
12.777594	---	38.49	50.00	11.51	N	OFF	20.5
12.777594	57.27	---	60.00	2.73	N	OFF	20.5
14.424414	---	32.85	50.00	17.15	N	OFF	20.5
14.424414	45.51	---	60.00	14.49	N	OFF	20.5
14.544141	---	32.76	50.00	17.24	N	OFF	20.5
14.544141	46.75	---	60.00	13.25	N	OFF	20.5
15.125820	---	33.78	50.00	16.22	N	OFF	20.5
15.125820	47.86	---	60.00	12.14	N	OFF	20.5
15.254988	---	35.78	50.00	14.22	N	OFF	20.5
15.254988	51.81	---	60.00	8.19	N	OFF	20.5
15.514413	---	34.85	50.00	15.15	N	OFF	20.5
15.514413	50.54	---	60.00	9.46	N	OFF	20.5
16.035909	---	35.74	50.00	14.26	N	OFF	20.5
16.035909	51.96	---	60.00	8.04	N	OFF	20.5
16.164987	---	37.06	50.00	12.94	N	OFF	20.5
16.164987	54.43	---	60.00	5.57	N	OFF	20.5
16.356714	---	32.05	50.00	17.95	N	OFF	20.5
16.356714	49.72	---	60.00	10.28	N	OFF	20.5
16.479564	---	31.70	50.00	18.30	N	OFF	20.5
16.479564	51.31	---	60.00	8.69	N	OFF	20.5



Appendix C. Radiated Spurious Emission

Test Engineer :	Michael Bui	Temperature :	20~24°C
		Relative Humidity :	42~48%

2.4GHz 2400~2483.5MHz

BT (Band Edge @ 3m)

BT	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.	
		(MHz)	(dBμV/m)	(dB)	Limit	Level	Factor	Loss	Factor	Pos	Pos	Avg.		
					Line	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)	
BT CH00 2402MHz		2352.105	45.71	-28.29	74	42.07	27.77	7.39	31.52	105	264	P	H	
		2352.105	3.55	-50.45	54	-	-	-	-	-	-	A	H	
	*	2402	105.92	-	-	102.28	27.66	7.47	31.49	105	264	P	H	
	*	2402	63.76	-	-	-	-	-	-	-	-	A	H	
													H	
														H
			2376.255	49.36	-24.64	74	45.62	27.83	7.43	31.52	135	17	P	V
			2376.255	7.2	-46.8	54	-	-	-	-	-	-	A	V
	*		2402	94.58	-	-	90.86	27.74	7.47	31.49	135	17	P	V
	*		2402	52.42	-	-	-	-	-	-	-	-	A	V
														V
														V
BT CH 39 2441MHz		2375.94	48.64	-25.36	74	45.01	27.72	7.43	31.52	321	177	P	H	
		2375.94	6.48	-47.52	54	-	-	-	-	-	-	A	H	
	*	2441	101.63	-	-	97.91	27.66	7.53	31.47	321	177	P	H	
	*	2441	59.47	-	-	-	-	-	-	-	-	A	H	
			2496.71	45.29	-28.71	74	41.52	27.61	7.61	31.45	321	177	P	H
			2496.71	3.13	-50.87	54	-	-	-	-	-	-	A	H
			2376.08	49.05	-24.95	74	45.31	27.83	7.43	31.52	384	360	P	V
			2376.08	6.89	-47.11	54	-	-	-	-	-	-	A	V
	*		2441	96.15	-	-	92.5	27.59	7.53	31.47	384	360	P	V
	*		2441	53.99	-	-	-	-	-	-	-	-	A	V
			2493.63	44.85	-29.15	74	41.22	27.49	7.6	31.46	384	360	P	V
			2493.63	2.69	-51.31	54	-	-	-	-	-	-	A	V



BT CH 78 2480MHz	*	2480	107.83	-	-	104.08	27.63	7.58	31.46	109	171	P	H
	*	2480	65.67	-	-	-	-	-	-	-	-	A	H
		2483.56	54.76	-19.24	74	51.01	27.62	7.59	31.46	109	171	P	H
		2483.56	12.6	-41.4	54	-	-	-	-	-	-	A	H
													H
													H
	*	2480	104.86	-	-	101.23	27.51	7.58	31.46	100	331	P	V
	*	2480	62.7	-	-	-	-	-	-	-	-	A	V
		2483.52	52.22	-21.78	74	48.58	27.51	7.59	31.46	100	331	P	V
		2483.52	10.06	-43.94	54	-	-	-	-	-	-	A	V
													V
													V
Remark	<ol style="list-style-type: none"> 1. No other spurious found. 2. All results are PASS against Peak and Average limit line. 												



2.4GHz 2400~2483.5MHz

BT (Harmonic @ 3m)

BT	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)	
BT CH 00 2402MHz		4804	41.05	-32.95	74	66.23	31.51	11.19	67.88	-	-	P	H	
		4804	-1.11	-55.11	54	-	-	-	-	-	-	A	H	
		11040	49.35	-24.65	74	60.53	40.11	16.87	68.16	-	-	P	H	
		11040	7.19	-46.81	54	-	-	-	-	-	-	A	H	
		14490	50.47	-23.53	74	56.91	41.94	19.6	67.98	-	-	P	H	
		14490	8.31	-45.69	54	-	-	-	-	-	-	A	H	
		18000	59.16	-14.84	74	57.62	48.82	22.44	69.72	-	-	P	H	
		18000	17	-37	54	-	-	-	-	-	-	A	H	
														H
														H
														H
														H
			4804	40.24	-33.76	74	65.39	31.54	11.19	67.88	-	-	P	V
			4804	-1.92	-55.92	54	-	-	-	-	-	-	A	V
			11730	48.72	-25.28	74	59.72	39.32	17.45	67.77	-	-	P	V
			11730	6.56	-47.44	54	-	-	-	-	-	-	A	V
			14490	50.38	-23.62	74	56.82	41.94	19.6	67.98	-	-	P	V
			14490	8.22	-45.78	54	-	-	-	-	-	-	A	V
			17985	59.37	-14.63	74	58.14	48.7	22.43	69.9	-	-	P	V
			17985	17.21	-36.79	54	-	-	-	-	-	-	A	V
													V	
													V	
													V	
													V	



BT	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)	
BT CH 39 2441MHz		4882	43.55	-30.45	74	68.66	31.45	11.36	67.92	-	-	P	H	
		4882	1.39	-52.61	54	-	-	-	-	-	-	A	H	
		7323	47.95	-26.05	74	64.94	36.33	13.78	67.1	-	-	P	H	
		7323	5.79	-48.21	54	-	-	-	-	-	-	A	H	
		11430	48.47	-25.53	74	59.15	40.07	17.2	67.95	-	-	P	H	
		11430	6.31	-47.69	54	-	-	-	-	-	-	A	H	
		14490	50.44	-23.56	74	56.88	41.94	19.6	67.98	-	-	P	H	
		14490	8.28	-45.72	54	-	-	-	-	-	-	A	H	
		18000	60.65	-13.35	74	59.11	48.82	22.44	69.72	-	-	P	H	
		18000	18.49	-35.51	54	-	-	-	-	-	-	A	H	
													H	
													H	
			4882	40.26	-33.74	74	65.45	31.37	11.36	67.92	-	-	P	V
			4882	-1.9	-55.9	54	-	-	-	-	-	-	A	V
			7323	48.49	-25.51	74	65.4	36.41	13.78	67.1	-	-	P	V
			7323	6.33	-47.67	54	-	-	-	-	-	-	A	V
			10815	48.89	-25.11	74	61.09	39.83	16.67	68.7	-	-	P	V
			10815	6.73	-47.27	54	-	-	-	-	-	-	A	V
			14490	50.71	-23.29	74	57.15	41.94	19.6	67.98	-	-	P	V
			14490	8.55	-45.45	54	-	-	-	-	-	-	A	V
		18000	60.29	-13.71	74	58.53	49.04	22.44	69.72	-	-	P	V	
		18000	18.13	-35.87	54	-	-	-	-	-	-	A	V	
													V	
													V	



BT	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)	
BT CH 78 2480MHz		4960	46.34	-27.66	74	71.38	31.51	11.51	68.06	-	-	P	H	
		4960	4.18	-49.82	54	-	-	-	-	-	-	A	H	
		7440	44.08	-29.92	74	60.91	36.49	13.91	67.23	-	-	P	H	
		7440	1.92	-52.08	54	-	-	-	-	-	-	A	H	
		11670	48.75	-25.25	74	59.34	39.62	17.4	67.61	-	-	P	H	
		11670	6.59	-47.41	54	-	-	-	-	-	-	A	H	
		14490	50.6	-23.4	74	57.04	41.94	19.6	67.98	-	-	P	H	
		14490	8.44	-45.56	54	-	-	-	-	-	-	A	H	
		18000	59.65	-14.35	74	58.11	48.82	22.44	69.72	-	-	P	H	
		18000	17.49	-36.51	54	-	-	-	-	-	-	A	H	
													H	
													H	
			4960	44.04	-29.96	74	69.13	31.46	11.51	68.06	-	-	P	V
			4960	1.88	-52.12	54	-	-	-	-	-	-	A	V
			7440	45.87	-28.13	74	62.72	36.47	13.91	67.23	-	-	P	V
			7440	3.71	-50.29	54	-	-	-	-	-	-	A	V
			11460	49.06	-24.94	74	59.61	40.07	17.22	67.84	-	-	P	V
			11460	6.9	-47.1	54	-	-	-	-	-	-	A	V
			14490	50.96	-23.04	74	57.4	41.94	19.6	67.98	-	-	P	V
			14490	8.8	-45.2	54	-	-	-	-	-	-	A	V
		17985	58.99	-15.01	74	57.76	48.7	22.43	69.9	-	-	P	V	
		17985	16.83	-37.17	54	-	-	-	-	-	-	A	V	
													V	
													V	
Remark	<ol style="list-style-type: none"> No other spurious found. All results are PASS against Peak and Average limit line. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only The emission level close to 18GHz is checked that the average emission level is noise floor only. 													



Emission above 18GHz

2.4GHz BT (SHF)

BT	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 BT SHF		23551	38.74	-35.26	74	36.57	38.87	15.2	51.9	-	-	P	H
													H
													H
													H
													H
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			23411	39.1	-34.9	74	36.99	38.9	15.13	51.92	-	-	P
													V
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													V
													V
													V
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													V
Remark	1. No other spurious found. 2. All results are PASS against limit line. 3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only												



Emission below 1GHz

2.4GHz BT (LF)

BT	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 BT LF		30	27.91	-12.09	40	34.32	25.1	0.92	32.43	-	-	P	H	
		330.7	39.17	-6.83	46	48.69	20.03	2.9	32.45	100	63	Q	H	
		453.89	35.27	-10.73	46	41.13	23.26	3.42	32.54	-	-	P	H	
		623.64	29.39	-16.61	46	32.08	25.95	3.97	32.61	-	-	P	H	
		742.95	39.45	-6.55	46	39.41	28.06	4.4	32.42	-	-	P	H	
		891.36	34.88	-11.12	46	32.51	29.23	4.83	31.69	-	-	P	H	
														H
														H
														H
														H
														H
														H
			43.58	33.78	-6.22	40	47.58	17.55	1.09	32.44	-	-	P	V
			81.41	28.07	-11.93	40	45.2	13.84	1.45	32.42	-	-	P	V
			329.73	35.29	-10.71	46	44.86	19.99	2.89	32.45	-	-	P	V
			439.34	34.57	-11.43	46	40.75	22.99	3.37	32.54	-	-	P	V
			754.59	39.71	-6.29	46	39.49	28.19	4.43	32.4	-	-	P	V
			891.36	37.65	-8.35	46	35.28	29.23	4.83	31.69	-	-	P	V
														V
														V
													V	
													V	
													V	

Remark

- No other spurious found.
- All results are PASS against limit line.
- The emission position marked as "-" means no suspected emission found and emission level has at least 6dB margin against limit or noise floor only.



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:

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

Peak measured complies with the limit line, so test result is “PASS”.



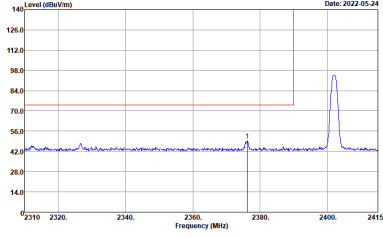
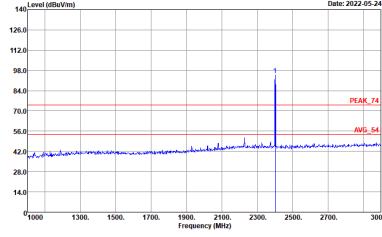
Appendix D. Radiated Spurious Emission Plots

2.4GHz 2400~2483.5MHz

BT (Band Edge @ 3m)

BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH00 2402MHz	
	Horizontal	Fundamental
Peak	<p>Site : 03CH02-CA Condition : PEAK_BE_74 3m HORN-HF_01895_2021 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>	<p>Site : 03CH02-CA Condition : PEAK_74 3m HORN-HF_01895_2021 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>



BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BT CH00 2402MHz		
	Vertical	Fundamental
Peak	 <p>Site : 03CH02-CA Condition : PEAK_SE_74 3m HORN-HF_01895_2021 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH02-CA Condition : PEAK_74 3m HORN-HF_01895_2021 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>



BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BT CH39 2441MHz		
	Horizontal	Fundamental
Peak	<p>Site : 03CH02-CA Condition : PEAK_BE_74 3m HORN-HF_01895_2021 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	<p>Site : 03CH02-CA Condition : PEAK_74 3m HORN-HF_01895_2021 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Peak	<p>Site : 03CH02-CA Condition : PEAK_BE_74 3m HORN-HF_01895_2021 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	Left blank

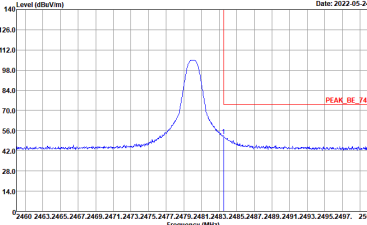
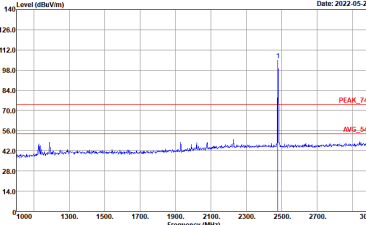


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BT CH39 2441MHz		
	Vertical	Fundamental
Peak	<p>Site : 03CH02-CA Condition : PEAK_BE_74 3m HORN-HF_01895_2021 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	<p>Site : 03CH02-CA Condition : PEAK_74 3m HORN-HF_01895_2021 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Peak	<p>Site : 03CH02-CA Condition : PEAK_BE_74 3m HORN-HF_01895_2021 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	Left blank



BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BT CH78 2480MHz		
	Horizontal	Fundamental
Peak	<p>Site : 05CH02-CA Condition : PEAK_86_74 3m HORN-HF_01895_2021 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	<p>Site : 05CH02-CA Condition : PEAK_74 3m HORN-HF_01895_2021 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>

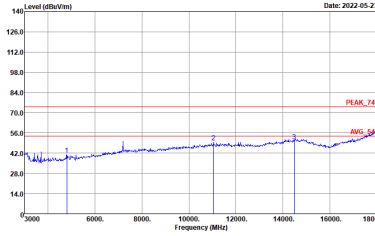
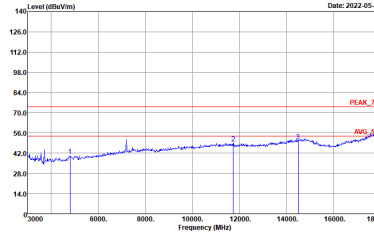
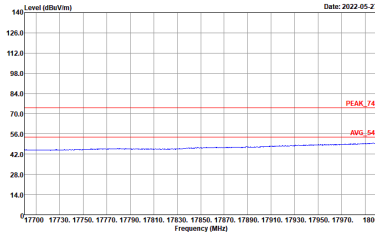
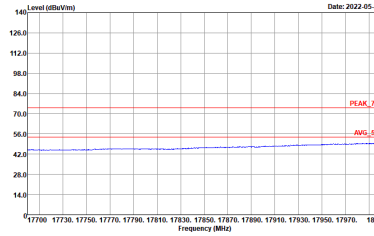


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BT CH78 2480MHz		
	Vertical	Fundamental
Peak	 <p>Site : 03CH02-CA Condition : PEAK_95_74 3m HORN-HF_01895_2021 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH02-CA Condition : PEAK_74 3m HORN-HF_01895_2021 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>

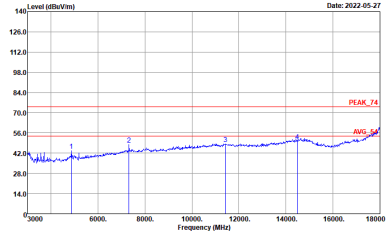
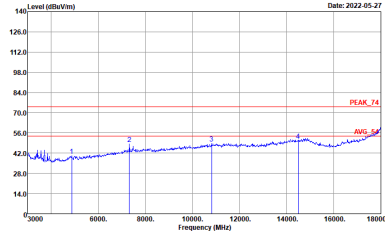


2.4GHz 2400~2483.5MHz

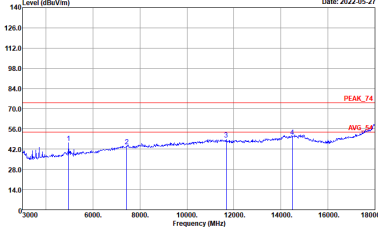
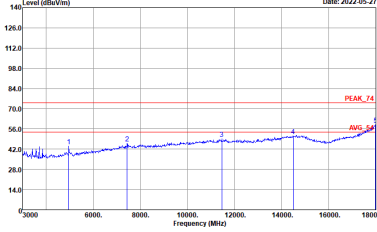
BT (Harmonic @ 3m)

BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
BT CH00 2402MHz		
	Horizontal	Vertical
Peak	 <p>Level (dBuV/m) vs Frequency (MHz) plot for Horizontal orientation. The y-axis ranges from 14.0 to 140.0 dBuV/m. The x-axis ranges from 5000 to 18000 MHz. A blue line shows the spectrum with a peak at approximately 2402 MHz. A red horizontal line labeled 'PEAK_74' is at approximately 75 dBuV/m, and another red line labeled 'AVG_54' is at approximately 55 dBuV/m. The plot date is 2022-05-27.</p> <p>Site : 03CH02-CA Condition : PEAK_74 3m HORN-HF_01895_2021 HORIZONTAL</p>	 <p>Level (dBuV/m) vs Frequency (MHz) plot for Vertical orientation. The y-axis ranges from 14.0 to 140.0 dBuV/m. The x-axis ranges from 5000 to 18000 MHz. A blue line shows the spectrum with a peak at approximately 2402 MHz. A red horizontal line labeled 'PEAK_74' is at approximately 75 dBuV/m, and another red line labeled 'AVG_54' is at approximately 55 dBuV/m. The plot date is 2022-05-27.</p> <p>Site : 03CH02-CA Condition : PEAK_74 3m HORN-HF_01895_2021 VERTICAL</p>
Avg	 <p>Level (dBuV/m) vs Frequency (MHz) plot for Horizontal orientation showing the average spectrum. The y-axis ranges from 14.0 to 140.0 dBuV/m. The x-axis ranges from 17700 to 18000 MHz. A blue line shows the average spectrum. A red horizontal line labeled 'PEAK_74' is at approximately 75 dBuV/m, and another red line labeled 'AVG_54' is at approximately 55 dBuV/m. The plot date is 2022-05-27.</p> <p>Site : 03CH02-CA Condition : PEAK_74 3m HORN-HF_01895_2021 HORIZONTAL</p>	 <p>Level (dBuV/m) vs Frequency (MHz) plot for Vertical orientation showing the average spectrum. The y-axis ranges from 14.0 to 140.0 dBuV/m. The x-axis ranges from 17700 to 18000 MHz. A blue line shows the average spectrum. A red horizontal line labeled 'PEAK_74' is at approximately 75 dBuV/m, and another red line labeled 'AVG_54' is at approximately 55 dBuV/m. The plot date is 2022-05-27.</p> <p>Site : 03CH02-CA Condition : PEAK_74 3m HORN-HF_01895_2021 VERTICAL</p>



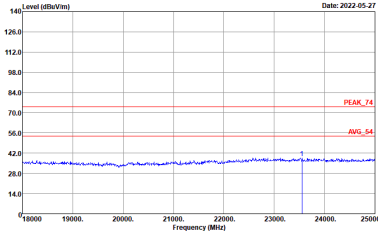
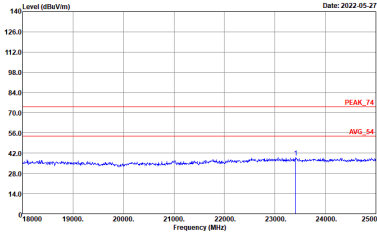
BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BT CH39 2441MHz	
	Horizontal	Vertical
Peak Avg.	 <p>Site : 03CH02-CA Condition : PEAK_74 3m HORN-HF_01895_2021 HORIZONTAL</p>	 <p>Site : 03CH02-CA Condition : PEAK_74 3m HORN-HF_01895_2021 VERTICAL</p>



BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
BT CH78 2480MHz		
	Horizontal	Vertical
Peak Avg.	 <p>Site : 03CH02-CA Condition : PEAK_74 3m HORN-HF_01895_2021 HORIZONTAL</p>	 <p>Site : 03CH02-CA Condition : PEAK_74 3m HORN-HF_01895_2021 VERTICAL</p>

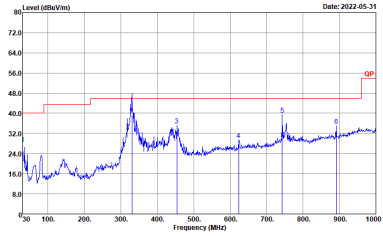
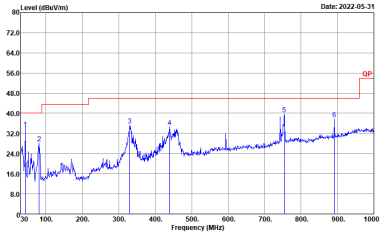


Emission above 18GHz
2.4GHz BT (SHF @ 1m)

BT	2.4GHz 2400~2483.5MHz	
	BT SHF	
	Horizontal	Vertical
Peak Avg.	 <p>Site : 03CH02-CA Condition : PEAK_74 1m SHF_HORN_00842_2021 HORIZONTAL</p>	 <p>Site : 03CH02-CA Condition : PEAK_74 1m SHF_HORN_00842_2021 VERTICAL</p>

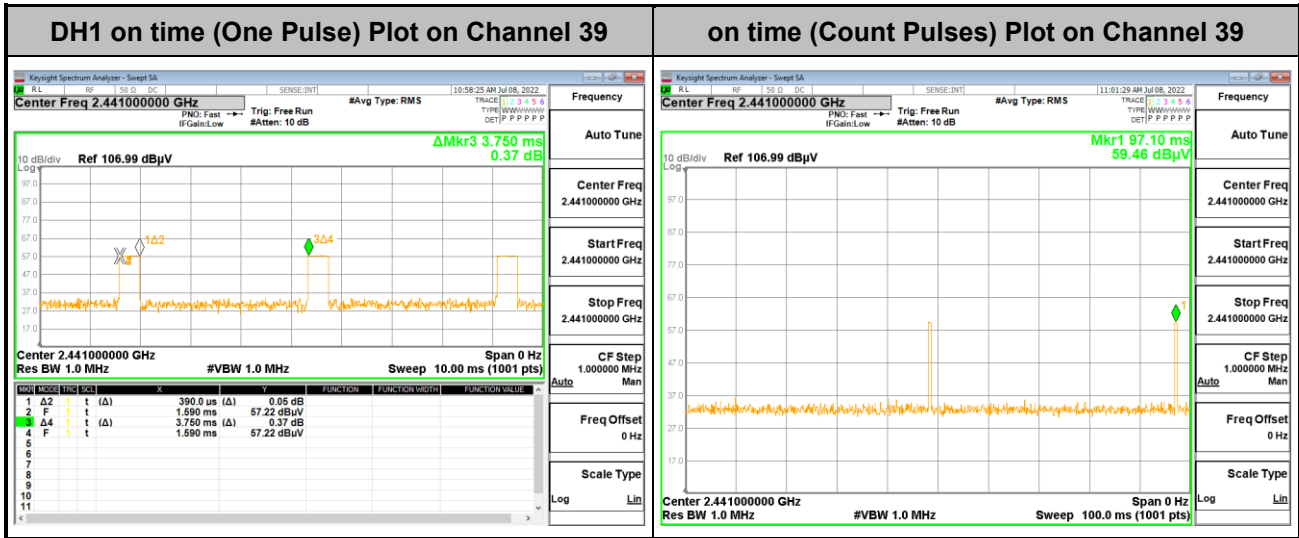


Emission below 1GHz
2.4GHz BT (LF)

BT	2.4GHz 2400~2483.5MHz	
BT LF		
Horizontal		Vertical
QP / Peak	 <p>Site : 03CH02-CA Condition : QP 3m BIL06_54683_2021 HORIZONTAL</p>	 <p>Site : 03CH02-CA Condition : QP 3m BIL06_54683_2021 VERTICAL</p>



Appendix E. Duty Cycle Plots



Note:

1. Worst case Duty cycle = on time/100 milliseconds = $2 * 0.39 / 100 = 0.78 \%$
2. Worst case Duty cycle correction factor = $20 * \log(\text{Duty cycle}) = -42.16 \text{ dB}$
3. DH1 has the highest duty cycle worst case and is reported.

Duty Cycle Correction Factor Consideration for AFH mode:

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

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

$$0.39 \text{ ms} \times 20 \text{ channels} = 7.8 \text{ ms}$$

There cannot be 2 complete hopping sequences within 100ms period, considering the random hopping behavior, maximum 2 hops can be possibly observed within the period. $[100 \text{ ms} / 7.8 \text{ ms}] = 2 \text{ hops}$

Thus, the maximum possible ON time:

$$0.39 \text{ ms} \times 2 = 0.78 \text{ ms}$$

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

$$20 \times \log(0.78 \text{ ms}/100 \text{ ms}) = -42.16 \text{ dB}$$