



3.11 AC Power Line Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.207		
Test Method:	ANSI C63.10: 2013		
Test Frequency Range:	150kHz to 30MHz		
Limit:	Frequency range (MHz)	Limit (dBuV)	
		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.		
Test Procedure:	1) The mains terminal disturbance voltage test was conducted in a shielded room. 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a $50\Omega/50\mu\text{H} + 5\Omega$ linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded. 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 2013 on conducted measurement.		
Test Setup:			
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates at lowest, middle and highest channel. Charge + Transmitting mode.		



Final Test Mode:	Through Pre-scan, find the the worst case.
Instruments Used:	Refer to section 2.9 for details
Test Results:	N/A

Note:The Bluetooth Mode does not work while the prototype is charging.



4 Appendix

Appendix A: 20dB Emission Bandwidth

Test Result

Test Mode	Antenna	Freq(MHz)	20dB EBW[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	Ant1	2402	0.960	2401.532	2402.492	---	---
		2441	0.954	2440.535	2441.489	---	---
		2480	0.954	2479.535	2480.489	---	---
2DH5	Ant1	2402	1.350	2401.325	2402.675	---	---
		2441	1.284	2440.370	2441.654	---	---
		2480	1.278	2479.382	2480.660	---	---



Test Graphs

DH5_Ant1_2402



DH5_Ant1_2441



DH5_Ant1_2480





2DH5_Ant1_2402



2DH5_Ant1_2441



2DH5_Ant1_2480





Appendix B: Maximum conducted output power

Test Result

Test Mode	Antenna	Freq(MHz)	Conducted Peak Power[dBm]	Conducted Limit[dBm]	Verdict
DH5	Ant1	2402	3.31	≤20.97	PASS
		2441	3.73	≤20.97	PASS
		2480	4.24	≤20.97	PASS
2DH5	Ant1	2402	3.9	≤20.97	PASS
		2441	4.42	≤20.97	PASS
		2480	4.9	≤20.97	PASS



Test Graphs

DH5_Ant1_2402



DH5_Ant1_2441



DH5_Ant1_2480





2DH5_Ant1_2402



2DH5_Ant1_2441



2DH5_Ant1_2480





Appendix C: Carrier frequency separation

Test Result

Test Mode	Antenna	Freq(MHz)	Result[MHz]	Limit[MHz]	Verdict
DH5	Ant1	Hop	0.986	≥0.960	PASS
2DH5	Ant1	Hop	1.01	≥0.900	PASS



Test Graphs

DH5 Ant1 Hop



2DH5 Ant1 Hop





Appendix D: Dwell Time

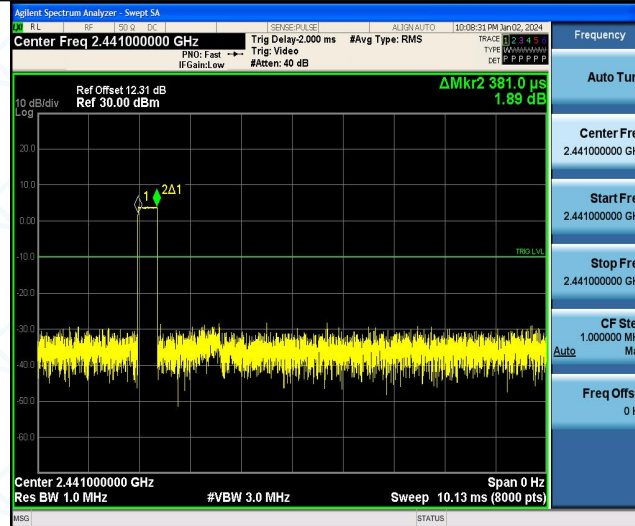
Test Result

Test Mode	Antenna	Freq(MHz)	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH1	Ant1	Hop	0.381	320	0.122	≤0.4	PASS
DH3	Ant1	Hop	1.637	160	0.262	≤0.4	PASS
DH5	Ant1	Hop	2.885	106.67	0.308	≤0.4	PASS
2DH1	Ant1	Hop	0.391	320	0.125	≤0.4	PASS
2DH3	Ant1	Hop	1.643	160	0.263	≤0.4	PASS
2DH5	Ant1	Hop	2.891	106.67	0.308	≤0.4	PASS

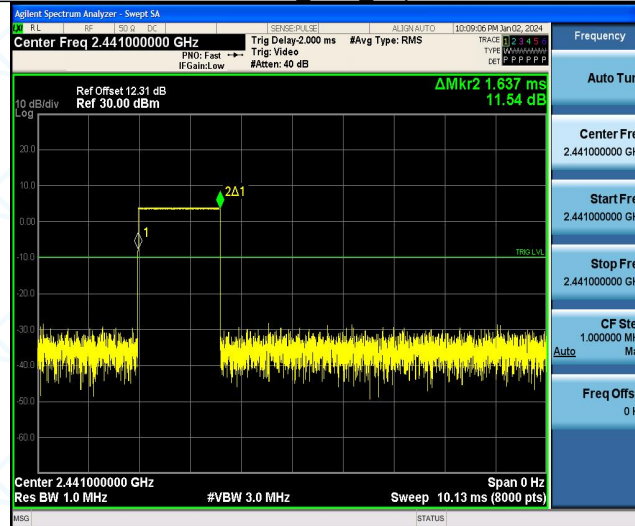


Test Graphs

DH1_Ant1_Hop



DH3_Ant1_Hop



DH5_Ant1_Hop





Appendix F: Number of hopping channels

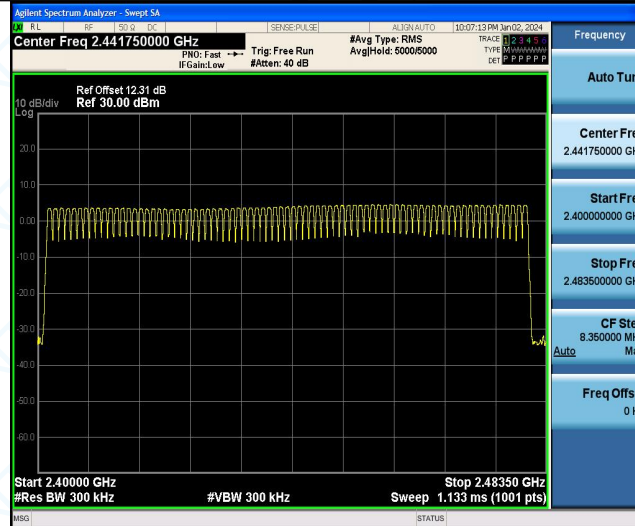
Test Result

TestMode	Antenna	Freq(MHz)	Result[Num]	Limit[Num]	Verdict
DH5	Ant1	Hop	79	≥15	PASS
2DH5	Ant1	Hop	79	≥15	PASS

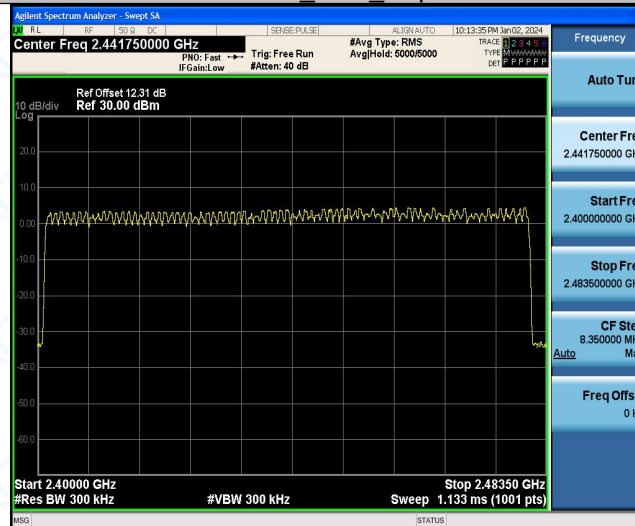


Test Graphs

DH5_Ant1_Hop



2DH5_Ant1_Hop





Appendix F: Band edge measurements

Test Result

Test Mode	Antenna	Ch Name	Freq(MHz)	Ref Level [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	Low	2402	0.51	-45.09	≤-19.49	PASS
		High	2480	1.55	-42.35	≤-18.45	PASS
		Low	Hop_2402	0.09	-51.49	≤-19.91	PASS
		High	Hop_2480	1.84	-50.32	≤-18.16	PASS
2DH5	Ant1	Low	2402	0.92	-44.67	≤-19.09	PASS
		High	2480	-1.10	-48.27	≤-21.1	PASS
		Low	Hop_2402	-5.15	-51.55	≤-25.15	PASS
		High	Hop_2480	2.09	-51.06	≤-17.91	PASS