

















12. Frequency Stability Measurement

12.1. Block Diagram of Test Setup

Same as section 8.1

12.2. Limit of Frequency Stability

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

12.3. Test Procedures

(1) To ensure emission at the band edge is maintained within the authorized band, those values shall be measured by radiation emissions at upper and lower frequency points, and finally compensated by frequency deviation as procedures below.

(2) The EUT was operated at the maximum output power, and connected to the spectrum analyzer, which is set to maximum hold function and peak detector. The peak value of the power envelope was measured and noted. The upper and lower frequency points were respectively measured relatively 10 dB lower than the measured peak value.

(3) The frequency deviation was calculated by adding the upper frequency point and the lower frequency point divided by two. Those detailed values of frequency deviation are provided in table below.

12.4. Test Result

Voltage								
Test Mode	Ant.	Freq. (MHz)	Voltage (Vdc)	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
11AC20M IMO	Ant1	5180	NV	NT	14000.00	2.702703	20	PASS
			LV	NT	14000.00	2.702703	20	PASS
			HV	NT	15000.00	2.895753	20	PASS
		5200	NV	NT	9000.00	1.730769	20	PASS
			LV	NT	10000.00	1.923077	20	PASS
			HV	NT	11000.00	2.115385	20	PASS
		5240	NV	NT	3000.00	0.572519	20	PASS
			LV	NT	7000.00	1.335878	20	PASS
			HV	NT	8000.00	1.526718	20	PASS
		5260	NV	NT	14000.00	2.661597	20	PASS
			LV	NT	14000.00	2.661597	20	PASS
			HV	NT	14000.00	2.661597	20	PASS
		5280	NV	NT	14000.00	2.651515	20	PASS
			LV	NT	14000.00	2.651515	20	PASS
			HV	NT	14000.00	2.651515	20	PASS
		5320	NV	NT	14000.00	2.631579	20	PASS
			LV	NT	14000.00	2.631579	20	PASS
			HV	NT	15000.00	2.819549	20	PASS
		5500	NV	NT	6000.00	1.090909	20	PASS
			LV	NT	7000.00	1.272727	20	PASS
			HV	NT	8000.00	1.454545	20	PASS
		5580	NV	NT	8000.00	1.433692	20	PASS
			LV	NT	8000.00	1.433692	20	PASS
			HV	NT	9000.00	1.612903	20	PASS
		5700	NV	NT	7000.00	1.228070	20	PASS
			LV	NT	8000.00	1.403509	20	PASS
			HV	NT	8000.00	1.403509	20	PASS
		5720	NV	NT	6000.00	1.048951	20	PASS
			LV	NT	8000.00	1.398601	20	PASS
			HV	NT	8000.00	1.398601	20	PASS
		5745	NV	NT	7000.00	1.218451	20	PASS
			LV	NT	8000.00	1.392515	20	PASS
			HV	NT	9000.00	1.566580	20	PASS
		5785	NV	NT	8000.00	1.382887	20	PASS
			LV	NT	8000.00	1.382887	20	PASS

		5825	HV	NT	10000.00	1.728608	20	PASS
			NV	NT	8000.00	1.373391	20	PASS
			LV	NT	8000.00	1.373391	20	PASS
			HV	NT	9000.00	1.545064	20	PASS
11AC40M IMO	Ant1	5190	NV	NT	-5000.00	-0.963391	20	PASS
			LV	NT	-5000.00	-0.963391	20	PASS
			HV	NT	-6000.00	-1.156069	20	PASS
		5230	NV	NT	-2000.00	-0.382409	20	PASS
			LV	NT	-3000.00	-0.573614	20	PASS
			HV	NT	-2000.00	-0.382409	20	PASS
		5270	NV	NT	-2000.00	-0.379507	20	PASS
			LV	NT	-1000.00	-0.189753	20	PASS
			HV	NT	-1000.00	-0.189753	20	PASS
		5310	NV	NT	2000.00	0.376648	20	PASS
			LV	NT	1000.00	0.188324	20	PASS
			HV	NT	2000.00	0.376648	20	PASS
		5510	NV	NT	9000.00	1.633394	20	PASS
			LV	NT	8000.00	1.451906	20	PASS
			HV	NT	10000.00	1.814882	20	PASS
		5550	NV	NT	15000.00	2.702703	20	PASS
			LV	NT	15000.00	2.702703	20	PASS
			HV	NT	16000.00	2.882883	20	PASS
		5670	NV	NT	13000.00	2.292769	20	PASS
			LV	NT	15000.00	2.645503	20	PASS
			HV	NT	15000.00	2.645503	20	PASS
		5710	NV	NT	6000.00	1.050788	20	PASS
			LV	NT	5000.00	0.875657	20	PASS
			HV	NT	6000.00	1.050788	20	PASS
		5755	NV	NT	11000.00	1.911381	20	PASS
			LV	NT	11000.00	1.911381	20	PASS
			HV	NT	13000.00	2.258905	20	PASS
		5795	NV	NT	16000.00	2.761001	20	PASS
			LV	NT	18000.00	3.106126	20	PASS
			HV	NT	17000.00	2.933563	20	PASS
11AC80M IMO	Ant1	5210	NV	NT	10000.00	1.919386	20	PASS
			LV	NT	11000.00	2.111324	20	PASS
			HV	NT	12000.00	2.303263	20	PASS
		5290	NV	NT	9000.00	1.701323	20	PASS
			LV	NT	10000.00	1.890359	20	PASS
			HV	NT	11000.00	2.079395	20	PASS
		5530	NV	NT	10000.00	1.808318	20	PASS
			LV	NT	10000.00	1.808318	20	PASS
			HV	NT	11000.00	1.989150	20	PASS
		5610	NV	NT	13000.00	2.317291	20	PASS
			LV	NT	13000.00	2.317291	20	PASS
			HV	NT	14000.00	2.495544	20	PASS
		5690	NV	NT	17000.00	2.987698	20	PASS
			LV	NT	17000.00	2.987698	20	PASS
			HV	NT	17000.00	2.987698	20	PASS
		5775	NV	NT	10000.00	1.731602	20	PASS
			LV	NT	11000.00	1.904762	20	PASS
			HV	NT	12000.00	2.077922	20	PASS

Temperature								
Test Mode	Antenna	Frequency (MHz)	Voltage (Vdc)	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
11AC20MIMO	Ant1	5180	NV	-30	15000.00	2.895753	20	PASS
			NV	-20	16000.00	3.088803	20	PASS
			NV	-10	16000.00	3.088803	20	PASS
			NV	0	16000.00	3.088803	20	PASS
			NV	10	17000.00	3.281853	20	PASS
			NV	20	18000.00	3.474903	20	PASS
			NV	30	18000.00	3.474903	20	PASS
			NV	40	17000.00	3.281853	20	PASS
			NV	50	18000.00	3.474903	20	PASS
		5200	NV	-30	12000.00	2.307692	20	PASS

			NV	-20	12000.00	2.307692	20	PASS
			NV	-10	12000.00	2.307692	20	PASS
			NV	0	12000.00	2.307692	20	PASS
			NV	10	13000.00	2.500000	20	PASS
			NV	20	12000.00	2.307692	20	PASS
			NV	30	13000.00	2.500000	20	PASS
			NV	40	13000.00	2.500000	20	PASS
			NV	50	14000.00	2.692308	20	PASS
		5240	NV	-30	10000.00	1.908397	20	PASS
			NV	-20	11000.00	2.099237	20	PASS
			NV	-10	11000.00	2.099237	20	PASS
			NV	0	12000.00	2.290076	20	PASS
			NV	10	13000.00	2.480916	20	PASS
			NV	20	14000.00	2.671756	20	PASS
			NV	30	15000.00	2.862595	20	PASS
			NV	40	14000.00	2.671756	20	PASS
		5260	NV	50	15000.00	2.862595	20	PASS
			NV	-30	15000.00	2.851711	20	PASS
			NV	-20	14000.00	2.661597	20	PASS
			NV	-10	15000.00	2.851711	20	PASS
			NV	0	15000.00	2.851711	20	PASS
			NV	10	15000.00	2.851711	20	PASS
			NV	20	15000.00	2.851711	20	PASS
			NV	30	14000.00	2.661597	20	PASS
		5280	NV	40	14000.00	2.661597	20	PASS
			NV	50	15000.00	2.851711	20	PASS
			NV	-30	13000.00	2.462121	20	PASS
			NV	-20	14000.00	2.651515	20	PASS
			NV	-10	15000.00	2.840909	20	PASS
			NV	0	15000.00	2.840909	20	PASS
			NV	10	15000.00	2.840909	20	PASS
			NV	20	15000.00	2.840909	20	PASS
		5320	NV	30	15000.00	2.840909	20	PASS
			NV	40	15000.00	2.840909	20	PASS
			NV	50	15000.00	2.840909	20	PASS
			NV	-30	15000.00	2.819549	20	PASS
			NV	-20	14000.00	2.631579	20	PASS
			NV	-10	15000.00	2.819549	20	PASS
			NV	0	15000.00	2.819549	20	PASS
			NV	10	15000.00	2.819549	20	PASS
		5500	NV	20	16000.00	3.007519	20	PASS
			NV	30	15000.00	2.819549	20	PASS
			NV	40	16000.00	3.007519	20	PASS
			NV	50	15000.00	2.819549	20	PASS
			NV	-30	8000.00	1.454545	20	PASS
			NV	-20	10000.00	1.818182	20	PASS
			NV	-10	9000.00	1.636364	20	PASS
			NV	0	11000.00	2.000000	20	PASS
		5580	NV	10	11000.00	2.000000	20	PASS
			NV	20	11000.00	2.000000	20	PASS
			NV	30	12000.00	2.181818	20	PASS
			NV	40	11000.00	2.000000	20	PASS
			NV	50	11000.00	2.000000	20	PASS
			NV	-30	9000.00	1.612903	20	PASS
			NV	-20	10000.00	1.792115	20	PASS
			NV	-10	11000.00	1.971326	20	PASS
		5700	NV	0	11000.00	1.971326	20	PASS
			NV	10	12000.00	2.150538	20	PASS
			NV	20	12000.00	2.150538	20	PASS
			NV	30	12000.00	2.150538	20	PASS
			NV	40	12000.00	2.150538	20	PASS
			NV	50	12000.00	2.150538	20	PASS
			NV	-30	9000.00	1.578947	20	PASS
			NV	-20	10000.00	1.754386	20	PASS
			NV	-10	10000.00	1.754386	20	PASS
			NV	0	11000.00	1.929825	20	PASS
			NV	10	11000.00	1.929825	20	PASS

			NV	20	11000.00	1.929825	20	PASS
			NV	30	12000.00	2.105263	20	PASS
			NV	40	11000.00	1.929825	20	PASS
			NV	50	13000.00	2.280702	20	PASS
		5720	NV	-30	9000.00	1.573427	20	PASS
			NV	-20	9000.00	1.573427	20	PASS
			NV	-10	11000.00	1.923077	20	PASS
			NV	0	10000.00	1.748252	20	PASS
			NV	10	11000.00	1.923077	20	PASS
			NV	20	11000.00	1.923077	20	PASS
			NV	30	11000.00	1.923077	20	PASS
			NV	40	12000.00	2.097902	20	PASS
			NV	50	12000.00	2.097902	20	PASS
		5745	NV	-30	10000.00	1.740644	20	PASS
			NV	-20	11000.00	1.914708	20	PASS
			NV	-10	11000.00	1.914708	20	PASS
			NV	0	12000.00	2.088773	20	PASS
			NV	10	11000.00	1.914708	20	PASS
			NV	20	13000.00	2.262837	20	PASS
			NV	30	13000.00	2.262837	20	PASS
			NV	40	13000.00	2.262837	20	PASS
			NV	50	14000.00	2.436902	20	PASS
		5785	NV	-30	10000.00	1.728608	20	PASS
			NV	-20	11000.00	1.901469	20	PASS
			NV	-10	12000.00	2.074330	20	PASS
			NV	0	11000.00	1.901469	20	PASS
			NV	10	11000.00	1.901469	20	PASS
			NV	20	13000.00	2.247191	20	PASS
			NV	30	14000.00	2.420052	20	PASS
			NV	40	13000.00	2.247191	20	PASS
			NV	50	15000.00	2.592913	20	PASS
		5825	NV	-30	10000.00	1.716738	20	PASS
			NV	-20	10000.00	1.716738	20	PASS
			NV	-10	11000.00	1.888412	20	PASS
			NV	0	11000.00	1.888412	20	PASS
			NV	10	12000.00	2.060086	20	PASS
			NV	20	12000.00	2.060086	20	PASS
			NV	30	14000.00	2.403433	20	PASS
			NV	40	13000.00	2.231760	20	PASS
			NV	50	13000.00	2.231760	20	PASS
11AC40MIMO	Ant1	5190	NV	-30	-5000.00	-0.963391	20	PASS
			NV	-20	-6000.00	-1.156069	20	PASS
			NV	-10	-6000.00	-1.156069	20	PASS
			NV	0	-5000.00	-0.963391	20	PASS
			NV	10	-4000.00	-0.770713	20	PASS
			NV	20	-4000.00	-0.770713	20	PASS
			NV	30	-4000.00	-0.770713	20	PASS
			NV	40	-3000.00	-0.578035	20	PASS
			NV	50	-3000.00	-0.578035	20	PASS
		5230	NV	-30	-3000.00	-0.573614	20	PASS
			NV	-20	-3000.00	-0.573614	20	PASS
			NV	-10	-3000.00	-0.573614	20	PASS
			NV	0	-3000.00	-0.573614	20	PASS
			NV	10	-3000.00	-0.573614	20	PASS
			NV	20	-3000.00	-0.573614	20	PASS
			NV	30	-3000.00	-0.573614	20	PASS
			NV	40	-2000.00	-0.382409	20	PASS
			NV	50	-1000.00	-0.191205	20	PASS
		5270	NV	-30	-1000.00	-0.189753	20	PASS
			NV	-20	0.00	0.000000	20	PASS
			NV	-10	1000.00	0.189753	20	PASS
			NV	0	2000.00	0.379507	20	PASS
			NV	10	2000.00	0.379507	20	PASS
			NV	20	3000.00	0.569260	20	PASS
			NV	30	2000.00	0.379507	20	PASS
			NV	40	3000.00	0.569260	20	PASS
			NV	50	3000.00	0.569260	20	PASS

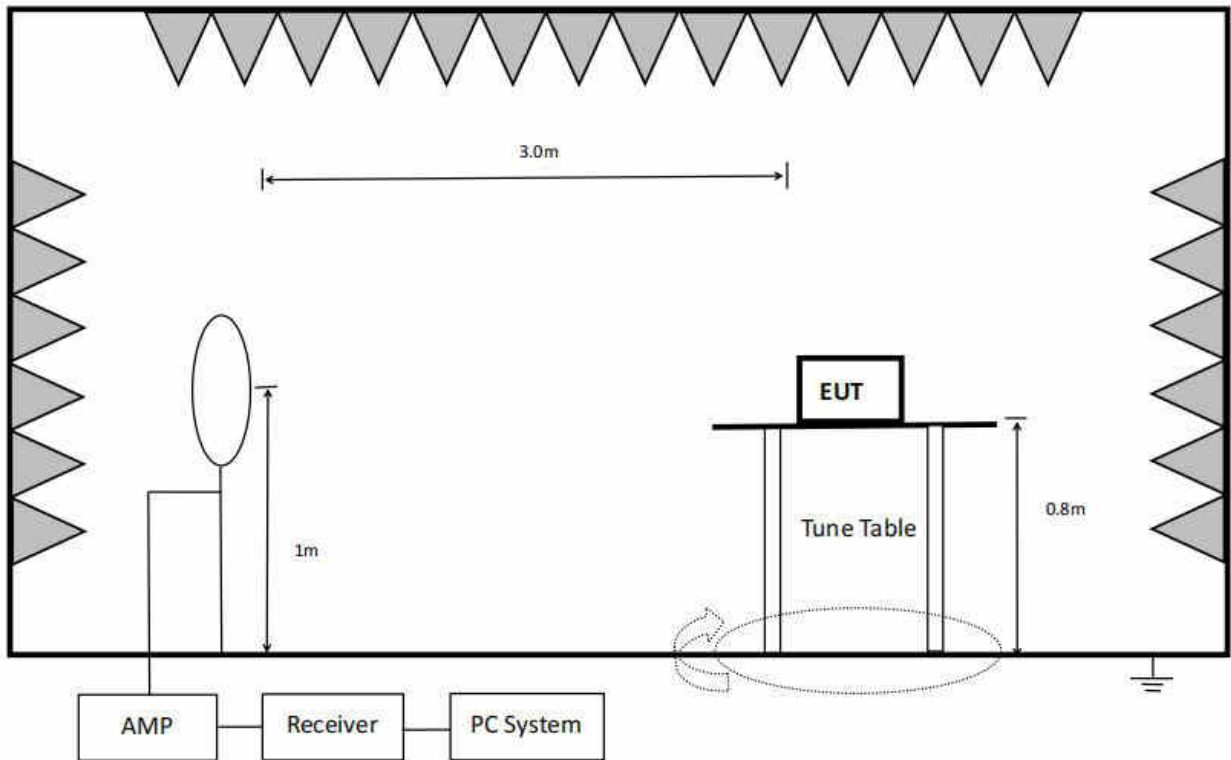
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			NV	-20	3000.00	0.564972	20	PASS
			NV	-10	3000.00	0.564972	20	PASS
			NV	0	4000.00	0.753296	20	PASS
			NV	10	5000.00	0.941620	20	PASS
			NV	20	5000.00	0.941620	20	PASS
			NV	30	5000.00	0.941620	20	PASS
			NV	40	6000.00	1.129944	20	PASS
			NV	50	5000.00	0.941620	20	PASS
			NV	-30	10000.00	1.814882	20	PASS
			NV	-20	11000.00	1.996370	20	PASS
			NV	-10	11000.00	1.996370	20	PASS
			NV	0	11000.00	1.996370	20	PASS
			NV	10	11000.00	1.996370	20	PASS
			NV	20	12000.00	2.177858	20	PASS
			NV	30	13000.00	2.359347	20	PASS
			NV	40	12000.00	2.177858	20	PASS
			NV	50	13000.00	2.359347	20	PASS
			NV	-30	17000.00	3.063063	20	PASS
			NV	-20	17000.00	3.063063	20	PASS
			NV	-10	18000.00	3.243243	20	PASS
			NV	0	18000.00	3.243243	20	PASS
			NV	10	18000.00	3.243243	20	PASS
			NV	20	19000.00	3.423423	20	PASS
			NV	30	18000.00	3.243243	20	PASS
			NV	40	18000.00	3.243243	20	PASS
			NV	50	19000.00	3.423423	20	PASS
			NV	-30	15000.00	2.645503	20	PASS
			NV	-20	15000.00	2.645503	20	PASS
			NV	-10	15000.00	2.645503	20	PASS
			NV	0	16000.00	2.821869	20	PASS
			NV	10	17000.00	2.998236	20	PASS
			NV	20	17000.00	2.998236	20	PASS
			NV	30	17000.00	2.998236	20	PASS
			NV	40	18000.00	3.174603	20	PASS
			NV	50	18000.00	3.174603	20	PASS
			NV	-30	6000.00	1.050788	20	PASS
			NV	-20	6000.00	1.050788	20	PASS
			NV	-10	6000.00	1.050788	20	PASS
			NV	0	8000.00	1.401051	20	PASS
			NV	10	9000.00	1.576182	20	PASS
			NV	20	8000.00	1.401051	20	PASS
			NV	30	9000.00	1.576182	20	PASS
			NV	40	8000.00	1.401051	20	PASS
			NV	50	10000.00	1.751313	20	PASS
			NV	-30	13000.00	2.258905	20	PASS
			NV	-20	14000.00	2.432667	20	PASS
			NV	-10	14000.00	2.432667	20	PASS
			NV	0	15000.00	2.606429	20	PASS
			NV	10	15000.00	2.606429	20	PASS
			NV	20	16000.00	2.780191	20	PASS
			NV	30	17000.00	2.953953	20	PASS
			NV	40	16000.00	2.780191	20	PASS
			NV	50	16000.00	2.780191	20	PASS
			NV	-30	17000.00	2.933563	20	PASS
			NV	-20	18000.00	3.106126	20	PASS
			NV	-10	18000.00	3.106126	20	PASS
			NV	0	19000.00	3.278689	20	PASS
			NV	10	20000.00	3.451251	20	PASS
			NV	20	19000.00	3.278689	20	PASS
			NV	30	19000.00	3.278689	20	PASS
			NV	40	19000.00	3.278689	20	PASS
			NV	50	19000.00	3.278689	20	PASS
11AC80MIMO	Ant1	5210	NV	-30	11000.00	2.111324	20	PASS
			NV	-20	12000.00	2.303263	20	PASS
			NV	-10	13000.00	2.495202	20	PASS
			NV	0	13000.00	2.495202	20	PASS

			NV	10	14000.00	2.687140	20	PASS
			NV	20	15000.00	2.879079	20	PASS
			NV	30	15000.00	2.879079	20	PASS
			NV	40	15000.00	2.879079	20	PASS
			NV	50	15000.00	2.879079	20	PASS
		5290	NV	-30	11000.00	2.079395	20	PASS
			NV	-20	12000.00	2.268431	20	PASS
			NV	-10	13000.00	2.457467	20	PASS
			NV	0	12000.00	2.268431	20	PASS
			NV	10	13000.00	2.457467	20	PASS
			NV	20	13000.00	2.457467	20	PASS
			NV	30	14000.00	2.646503	20	PASS
			NV	40	14000.00	2.646503	20	PASS
			NV	50	14000.00	2.646503	20	PASS
		5530	NV	-30	11000.00	1.989150	20	PASS
			NV	-20	12000.00	2.169982	20	PASS
			NV	-10	13000.00	2.350814	20	PASS
			NV	0	13000.00	2.350814	20	PASS
			NV	10	13000.00	2.350814	20	PASS
			NV	20	14000.00	2.531646	20	PASS
			NV	30	15000.00	2.712477	20	PASS
			NV	40	15000.00	2.712477	20	PASS
			NV	50	15000.00	2.712477	20	PASS
		5610	NV	-30	14000.00	2.495544	20	PASS
			NV	-20	15000.00	2.673797	20	PASS
			NV	-10	15000.00	2.673797	20	PASS
			NV	0	15000.00	2.673797	20	PASS
			NV	10	16000.00	2.852050	20	PASS
			NV	20	15000.00	2.673797	20	PASS
			NV	30	17000.00	3.030303	20	PASS
			NV	40	17000.00	3.030303	20	PASS
			NV	50	17000.00	3.030303	20	PASS
		5690	NV	-30	18000.00	3.163445	20	PASS
			NV	-20	18000.00	3.163445	20	PASS
			NV	-10	18000.00	3.163445	20	PASS
			NV	0	19000.00	3.339192	20	PASS
			NV	10	18000.00	3.163445	20	PASS
			NV	20	19000.00	3.339192	20	PASS
			NV	30	19000.00	3.339192	20	PASS
			NV	40	19000.00	3.339192	20	PASS
			NV	50	20000.00	3.514938	20	PASS
		5775	NV	-30	13000.00	2.251082	20	PASS
			NV	-20	13000.00	2.251082	20	PASS
			NV	-10	15000.00	2.597403	20	PASS
			NV	0	14000.00	2.424242	20	PASS
			NV	10	15000.00	2.597403	20	PASS
			NV	20	15000.00	2.597403	20	PASS
			NV	30	16000.00	2.770563	20	PASS
			NV	40	17000.00	2.943723	20	PASS
			NV	50	17000.00	2.943723	20	PASS

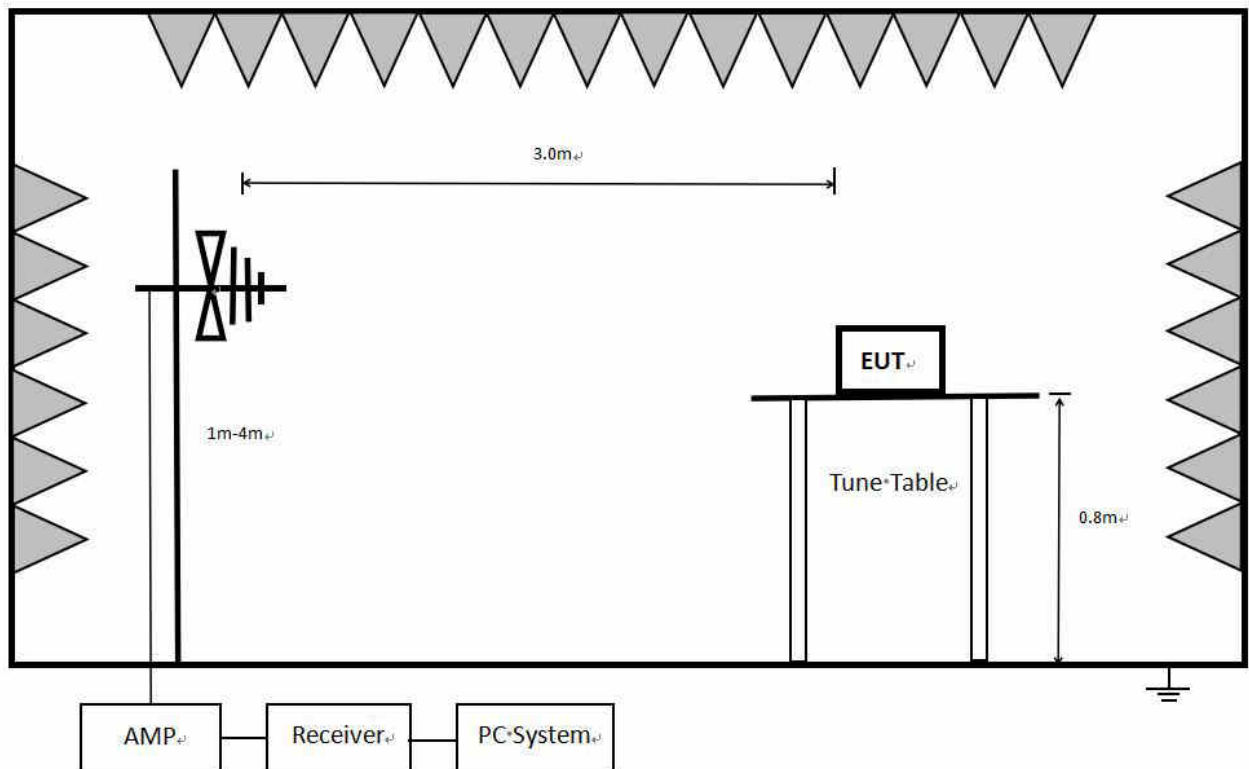
13. Radiated Emission

13.1. Block Diagram of Test Setup

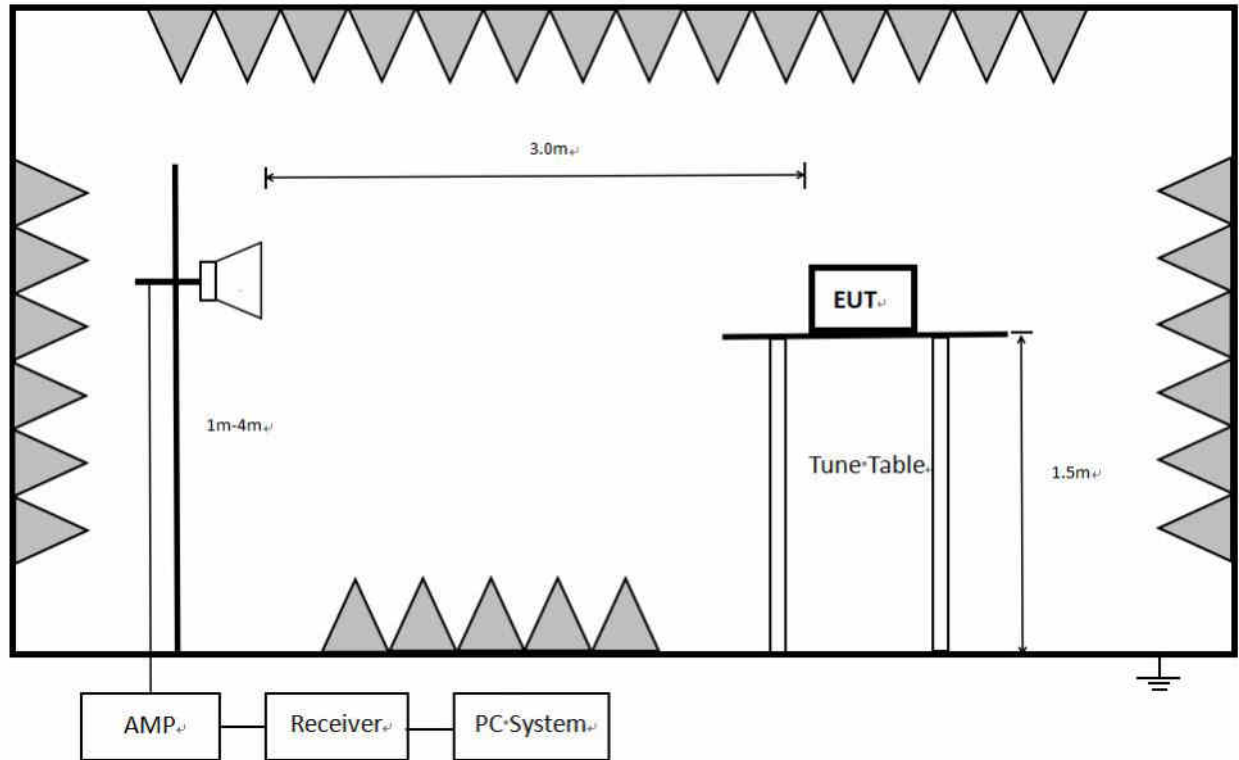
In 3 m Anechoic Chamber, test setup diagram for 9 kHz - 30 MHz:



In 3 m Anechoic Chamber, test setup diagram for 30 MHz - 1 GHz:



In 3 m Anechoic Chamber, test setup diagram for frequency above 1 GHz:



Note: For harmonic emissions test an appropriate high pass filter was inserted in the input port of AMP.

13.2. Limit

(1) FCC 15.205 Restricted frequency band

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
¹ 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.1772&4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.2072&4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(²)
13.36-13.41			

¹Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

²Above 38.6

(2) FCC 15.209 Limit.

Frequency MHz	Distance Meters	Field strengths limit	
		$\mu\text{V}/\text{m}$	$\text{dB}(\mu\text{V})/\text{m}$
0.009 ~ 0.490	300	2400/F(kHz)	67.6-20log(F)
0.490 ~ 1.705	30	24000/F(kHz)	87.6-20log(F)
1.705 ~ 30.0	30	30	29.54
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	

(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm / MHz.

(2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm / MHz.

(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm / MHz.

(4) For transmitters operating in the 5.725-5.85 GHz band: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of -17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of -27 dBm / MHz.

(5) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207.

(6) The provisions of §15.205 apply to intentional radiators operating under this section.

-27 dBm/MHz Limit=95.2+EIRP (dBm)=95.2-27=68.2 dB $\mu\text{V}/\text{m}$

Note:

(1) The emission limits shown in the above table are based on measurements employing a CISPR QP detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000MHz. Radiated emissions limits in these three bands are based on measurements employing an average detector.

(2) At frequencies below 30MHz, measurement may be performed at a distance closer than that specified, and the limit at closer measurement distance can be extrapolated by below formula:

$$\text{Limit}_{3\text{m}}(\text{dB}\mu\text{V}/\text{m}) = \text{Limit}_{30\text{m}}(\text{dB}\mu\text{V}/\text{m}) + 40\text{Log}(30\text{m}/3\text{m})$$

(3) Limit for this EUT

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions or comply with 15.209 limits.

13.3. Test Procedure

Below 30 MHz:

The setting of the spectrum Analyzer

RBW	200 Hz (From 9 kHz to 0.15 MHz)/ 9 kHz (From 0.15 MHz to 30 MHz)
VBW	200 Hz (From 9 kHz to 0.15 MHz)/ 9 kHz (From 0.15 MHz to 30 MHz)
Sweep	Auto
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013

2. The EUT was arranged to its worst case and then 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. Both Horizontal, Face-on and Face-off polarizations of the antenna are set to make the measurement.

3. The EUT was placed on a turntable with 80 cm meter above ground.

4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of 1 meter height antenna tower.

5. The radiated emission limits are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

6. For measurement below 1 GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

7. Although these tests were performed other than open field site, adequate comparison measurements were confirmed against 30m open field site. Therefore, sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field site based on KdB 414788.

Below 1 GHz and above 30 MHz:

The setting of the spectrum Analyzer

RBW	120 kHz
VBW	300 kHz
Sweep	Auto
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013.

2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

3. The EUT was placed on a turntable with 80 cm above ground.

4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

5. For measurement below 1GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

Above 1 GHz:

RBW	1 MHz
VBW	PEAK: 3 MHz AVG: see note 6
Sweep	Auto
Detector	Peak
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013.

2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

3. The EUT was placed on a turntable with 1.5m above ground.

4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

5. For measurement above 1GHz, the emission measurement will be measured by the peak detector. This peak level, once corrected, must comply with the limit specified in Section 15.209.

6. For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 1/T video

bandwidth with peak detector for AVG measurements. For the Duty Cycle please refer to clause 8.1.ON TIME AND DUTY CYCLE.

7. Restriction band: Investigated frequency range from 5.15-5.25 GHz, 5250-5350 GHz, 5470-5725 GHz, 5.725-5.85 GHz.

All restriction band should comply with 15.209, other emission should be at least 20 dB below the fundamental.

Note 1: For all radiated test, EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report.

Note 2: The EUT does not support simultaneous transmission.

Note 3: The EUT was fully exercised with external accessories during the test. In the case of multiple accessory external ports, an external accessory shall be connected to one of each type of port.

13.4. Test Result

PASS. (See below detailed test result)

All the emissions except fundamental emission from 9kHz to 40GHz were comply with 15.209 limit.

Note1: According exploratory test, the emission levels are 20 dB below the limit detected from 9 kHz to 30 MHz and 18 GHz to 40 GHz, so the final test was performed with frequency range from 30 MHz to 18 GHz and recorded in below.

Note2: For emissions below 1 GHz, according exploratory explorer test, when change Tx mode and channel, have no distinct influence on emissions level, so for emissions below 1 GHz, the final test was only performed with EUT working in 11a mode.

Note3: For below test data, when the limit tabular marked “/” means this frequency point is the fundamental emission and no need comply with this limit.

Note 4: As specified in 15.407(b), emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of -27 dBm/MHz (or -17 dBm/MHz as specified in 15.407(b)(4)). However, an out-of-band emission that complies with both the average and peak limits of 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz peak emission limit

Note 5: For emissions Above 1 GHz, all mode have been tested, 11a mode of ANT2 is worse case and recorded in report.

13.5. Original Test Data

Below 1 GHz and above 30 MHz test data Refer to appendix A

Above 1 GHz test data Refer to appendix B













