





















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
11AX20MI MO	Ant1	5180	NV	NT	-56000.00	-10.810811	20	PASS
			LV	NT	-56000.00	-10.810811	20	PASS
			HV	NT	-56000.00	-10.810811	20	PASS
		5200	NV	NT	-54000.00	-10.384615	20	PASS
			LV	NT	-56000.00	-10.769231	20	PASS
			HV	NT	-56000.00	-10.769231	20	PASS
		5240	NV	NT	-50000.00	-9.541985	20	PASS
			LV	NT	-52000.00	-9.923664	20	PASS
			HV	NT	-54000.00	-10.305344	20	PASS
		5260	NV	NT	-56000.00	-10.646388	20	PASS
			LV	NT	-56000.00	-10.646388	20	PASS
			HV	NT	-56000.00	-10.646388	20	PASS
		5280	NV	NT	-56000.00	-10.606061	20	PASS
			LV	NT	-58000.00	-10.984848	20	PASS
			HV	NT	-58000.00	-10.984848	20	PASS
		5320	NV	NT	-56000.00	-10.526316	20	PASS
			LV	NT	-58000.00	-10.902256	20	PASS
			HV	NT	-58000.00	-10.902256	20	PASS
		5500	NV	NT	-58000.00	-10.545455	20	PASS
			LV	NT	-58000.00	-10.545455	20	PASS
			HV	NT	-60000.00	-10.909091	20	PASS
		5580	NV	NT	-58000.00	-10.394265	20	PASS
			LV	NT	-60000.00	-10.752688	20	PASS
			HV	NT	-60000.00	-10.752688	20	PASS
		5700	NV	NT	-60000.00	-10.526316	20	PASS
			LV	NT	-60000.00	-10.526316	20	PASS
			HV	NT	-60000.00	-10.526316	20	PASS
		5720	NV	NT	-60000.00	-10.489510	20	PASS
			LV	NT	-60000.00	-10.489510	20	PASS
			HV	NT	-60000.00	-10.489510	20	PASS
		5745	NV	NT	-58000.00	-10.095735	20	PASS
			LV	NT	-60000.00	-10.443864	20	PASS
			HV	NT	-60000.00	-10.443864	20	PASS
		5785	NV	NT	-60000.00	-10.371651	20	PASS
			LV	NT	-62000.00	-10.717373	20	PASS

		5825	HV	NT	-62000.00	-10.717373	20	PASS
			NV	NT	-60000.00	-10.300429	20	PASS
			LV	NT	-62000.00	-10.643777	20	PASS
			HV	NT	-62000.00	-10.643777	20	PASS
11AX40MI MO	Ant1	5190	NV	NT	-52000.00	-10.019268	20	PASS
			LV	NT	-54000.00	-10.404624	20	PASS
			HV	NT	-56000.00	-10.789981	20	PASS
		5230	NV	NT	-54000.00	-10.325048	20	PASS
			LV	NT	-56000.00	-10.707457	20	PASS
			HV	NT	-56000.00	-10.707457	20	PASS
		5270	NV	NT	-56000.00	-10.626186	20	PASS
			LV	NT	-56000.00	-10.626186	20	PASS
			HV	NT	-56000.00	-10.626186	20	PASS
		5310	NV	NT	-56000.00	-10.546139	20	PASS
			LV	NT	-56000.00	-10.546139	20	PASS
			HV	NT	-58000.00	-10.922787	20	PASS
		5510	NV	NT	-58000.00	-10.526316	20	PASS
			LV	NT	-58000.00	-10.526316	20	PASS
			HV	NT	-60000.00	-10.889292	20	PASS
		5550	NV	NT	-58000.00	-10.450450	20	PASS
			LV	NT	-58000.00	-10.450450	20	PASS
			HV	NT	-58000.00	-10.450450	20	PASS
		5670	NV	NT	-60000.00	-10.582011	20	PASS
			LV	NT	-60000.00	-10.582011	20	PASS
			HV	NT	-60000.00	-10.582011	20	PASS
		5710	NV	NT	-58000.00	-10.157618	20	PASS
			LV	NT	-60000.00	-10.507881	20	PASS
			HV	NT	-60000.00	-10.507881	20	PASS
		5755	NV	NT	-58000.00	-10.078193	20	PASS
			LV	NT	-60000.00	-10.425717	20	PASS
			HV	NT	-60000.00	-10.425717	20	PASS
		5795	NV	NT	-60000.00	-10.353753	20	PASS
			LV	NT	-60000.00	-10.353753	20	PASS
			HV	NT	-62000.00	-10.698878	20	PASS
11AX80MI MO	Ant1	5210	NV	NT	-52000.00	-9.980806	20	PASS
			LV	NT	-54000.00	-10.364683	20	PASS
			HV	NT	-54000.00	-10.364683	20	PASS
		5290	NV	NT	-56000.00	-10.586011	20	PASS
			LV	NT	-56000.00	-10.586011	20	PASS
			HV	NT	-56000.00	-10.586011	20	PASS
		5530	NV	NT	-60000.00	-10.849910	20	PASS
			LV	NT	-60000.00	-10.849910	20	PASS
			HV	NT	-60000.00	-10.849910	20	PASS
		5610	NV	NT	-58000.00	-10.338681	20	PASS
			LV	NT	-58000.00	-10.338681	20	PASS
			HV	NT	-60000.00	-10.695187	20	PASS
		5690	NV	NT	-58000.00	-10.193322	20	PASS
			LV	NT	-60000.00	-10.544815	20	PASS
			HV	NT	-60000.00	-10.544815	20	PASS

Temperature								
Test Mode	Ant.	Freq. (MHz)	Voltage (Vdc)	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
11AX20M IMO	Ant1	5180	NV	-30	-56000.00	-10.810811	20	PASS
			NV	-20	-56000.00	-10.810811	20	PASS
			NV	-10	-56000.00	-10.810811	20	PASS
			NV	0	-56000.00	-10.810811	20	PASS
			NV	10	-56000.00	-10.810811	20	PASS
			NV	20	-58000.00	-11.196911	20	PASS
			NV	30	-58000.00	-11.196911	20	PASS
			NV	40	-56000.00	-10.810811	20	PASS
			NV	50	-58000.00	-11.196911	20	PASS
		5200	NV	-30	-56000.00	-10.769231	20	PASS
			NV	-20	-56000.00	-10.769231	20	PASS
			NV	-10	-56000.00	-10.769231	20	PASS

			NV	0	-58000.00	-11.153846	20	PASS
			NV	10	-58000.00	-11.153846	20	PASS
			NV	20	-58000.00	-11.153846	20	PASS
			NV	30	-58000.00	-11.153846	20	PASS
			NV	40	-58000.00	-11.153846	20	PASS
			NV	50	-58000.00	-11.153846	20	PASS
		5240	NV	-30	-54000.00	-10.305344	20	PASS
			NV	-20	-56000.00	-10.687023	20	PASS
			NV	-10	-56000.00	-10.687023	20	PASS
			NV	0	-56000.00	-10.687023	20	PASS
			NV	10	-56000.00	-10.687023	20	PASS
			NV	20	-56000.00	-10.687023	20	PASS
		5260	NV	30	-56000.00	-10.687023	20	PASS
			NV	40	-56000.00	-10.687023	20	PASS
			NV	50	-58000.00	-11.068702	20	PASS
			NV	-30	-58000.00	-11.026616	20	PASS
			NV	-20	-58000.00	-11.026616	20	PASS
			NV	-10	-58000.00	-11.026616	20	PASS
		5280	NV	0	-58000.00	-11.026616	20	PASS
			NV	10	-58000.00	-11.026616	20	PASS
			NV	20	-58000.00	-11.026616	20	PASS
			NV	30	-58000.00	-11.026616	20	PASS
			NV	40	-58000.00	-11.026616	20	PASS
			NV	50	-58000.00	-11.026616	20	PASS
		5320	NV	-30	-58000.00	-10.984848	20	PASS
			NV	-20	-58000.00	-10.984848	20	PASS
			NV	-10	-58000.00	-10.984848	20	PASS
			NV	0	-58000.00	-10.984848	20	PASS
			NV	10	-58000.00	-10.984848	20	PASS
			NV	20	-58000.00	-10.984848	20	PASS
		5320	NV	30	-58000.00	-10.984848	20	PASS
			NV	40	-58000.00	-10.984848	20	PASS
			NV	50	-58000.00	-10.984848	20	PASS
			NV	-30	-58000.00	-10.902256	20	PASS
			NV	-20	-58000.00	-10.902256	20	PASS
			NV	-10	-58000.00	-10.902256	20	PASS
		5500	NV	0	-58000.00	-10.902256	20	PASS
			NV	10	-58000.00	-10.902256	20	PASS
			NV	20	-58000.00	-10.902256	20	PASS
			NV	30	-58000.00	-10.902256	20	PASS
			NV	40	-58000.00	-10.902256	20	PASS
			NV	50	-58000.00	-10.902256	20	PASS
		5580	NV	-30	-60000.00	-10.909091	20	PASS
			NV	-20	-60000.00	-10.909091	20	PASS
			NV	-10	-60000.00	-10.909091	20	PASS
			NV	0	-60000.00	-10.909091	20	PASS
			NV	10	-60000.00	-10.909091	20	PASS
			NV	20	-60000.00	-10.909091	20	PASS
		5700	NV	30	-60000.00	-10.909091	20	PASS
			NV	40	-60000.00	-10.909091	20	PASS
			NV	50	-60000.00	-10.909091	20	PASS
			NV	-30	-60000.00	-10.752688	20	PASS
			NV	-20	-60000.00	-10.752688	20	PASS
			NV	-10	-60000.00	-10.752688	20	PASS
		5700	NV	0	-60000.00	-10.752688	20	PASS
			NV	10	-60000.00	-10.752688	20	PASS
			NV	20	-60000.00	-10.752688	20	PASS
			NV	30	-60000.00	-10.752688	20	PASS
			NV	40	-60000.00	-10.752688	20	PASS
			NV	50	-60000.00	-10.752688	20	PASS
		5700	NV	-30	-62000.00	-10.877193	20	PASS
			NV	-20	-62000.00	-10.877193	20	PASS
			NV	-10	-62000.00	-10.877193	20	PASS
			NV	0	-62000.00	-10.877193	20	PASS
			NV	10	-62000.00	-10.877193	20	PASS
			NV	20	-62000.00	-10.877193	20	PASS
		5700	NV	30	-62000.00	-10.877193	20	PASS
			NV	30	-62000.00	-10.877193	20	PASS

			NV	40	-62000.00	-10.877193	20	PASS
			NV	50	-62000.00	-10.877193	20	PASS
		5720	NV	-30	-62000.00	-10.839161	20	PASS
			NV	-20	-60000.00	-10.489510	20	PASS
			NV	-10	-62000.00	-10.839161	20	PASS
			NV	0	-62000.00	-10.839161	20	PASS
			NV	10	-62000.00	-10.839161	20	PASS
			NV	20	-62000.00	-10.839161	20	PASS
			NV	30	-62000.00	-10.839161	20	PASS
			NV	40	-62000.00	-10.839161	20	PASS
			NV	50	-62000.00	-10.839161	20	PASS
		5745	NV	-30	-62000.00	-10.791993	20	PASS
			NV	-20	-62000.00	-10.791993	20	PASS
			NV	-10	-62000.00	-10.791993	20	PASS
			NV	0	-62000.00	-10.791993	20	PASS
			NV	10	-62000.00	-10.791993	20	PASS
			NV	20	-62000.00	-10.791993	20	PASS
			NV	30	-62000.00	-10.791993	20	PASS
			NV	40	-62000.00	-10.791993	20	PASS
			NV	50	-62000.00	-10.791993	20	PASS
		5785	NV	-30	-62000.00	-10.717373	20	PASS
			NV	-20	-62000.00	-10.717373	20	PASS
			NV	-10	-62000.00	-10.717373	20	PASS
			NV	0	-62000.00	-10.717373	20	PASS
			NV	10	-62000.00	-10.717373	20	PASS
			NV	20	-62000.00	-10.717373	20	PASS
			NV	30	-62000.00	-10.717373	20	PASS
			NV	40	-62000.00	-10.717373	20	PASS
		5825	NV	-30	-62000.00	-10.643777	20	PASS
			NV	-20	-62000.00	-10.643777	20	PASS
			NV	-10	-62000.00	-10.643777	20	PASS
			NV	0	-62000.00	-10.643777	20	PASS
			NV	10	-62000.00	-10.643777	20	PASS
			NV	20	-62000.00	-10.643777	20	PASS
			NV	30	-62000.00	-10.643777	20	PASS
			NV	40	-62000.00	-10.643777	20	PASS
11AX40M IMO	Ant1	5190	NV	-30	-56000.00	-10.789981	20	PASS
			NV	-20	-56000.00	-10.789981	20	PASS
			NV	-10	-56000.00	-10.789981	20	PASS
			NV	0	-56000.00	-10.789981	20	PASS
			NV	10	-56000.00	-10.789981	20	PASS
			NV	20	-56000.00	-10.789981	20	PASS
			NV	30	-56000.00	-10.789981	20	PASS
			NV	40	-56000.00	-10.789981	20	PASS
		5230	NV	50	-56000.00	-10.789981	20	PASS
			NV	-30	-56000.00	-10.707457	20	PASS
			NV	-20	-56000.00	-10.707457	20	PASS
			NV	-10	-58000.00	-11.089866	20	PASS
			NV	0	-58000.00	-11.089866	20	PASS
			NV	10	-58000.00	-11.089866	20	PASS
			NV	20	-58000.00	-11.089866	20	PASS
			NV	30	-58000.00	-11.089866	20	PASS
		5270	NV	40	-58000.00	-11.089866	20	PASS
			NV	50	-58000.00	-11.089866	20	PASS
			NV	-30	-58000.00	-11.005693	20	PASS
			NV	-20	-56000.00	-10.626186	20	PASS
			NV	-10	-58000.00	-11.005693	20	PASS
			NV	0	-58000.00	-11.005693	20	PASS
			NV	10	-58000.00	-11.005693	20	PASS
			NV	20	-58000.00	-11.005693	20	PASS
		5310	NV	30	-58000.00	-11.005693	20	PASS
			NV	40	-58000.00	-11.005693	20	PASS
			NV	-30	-58000.00	-10.922787	20	PASS
			NV	-20	-58000.00	-10.922787	20	PASS

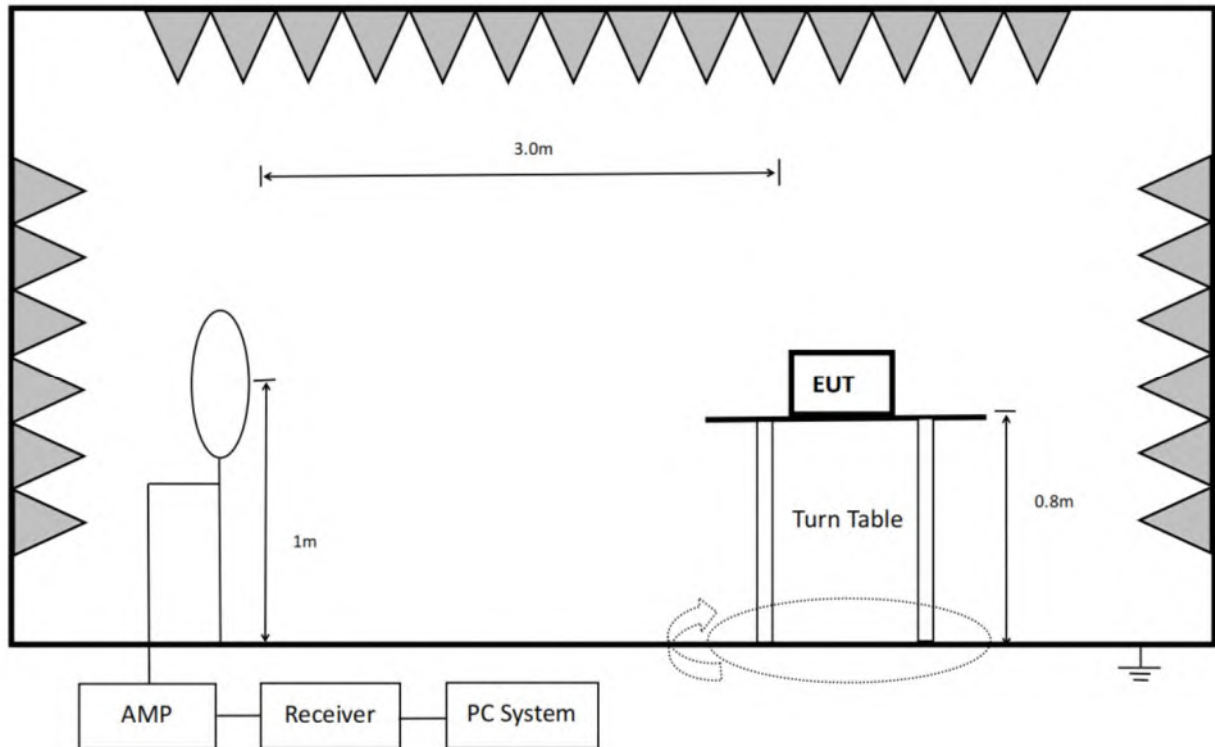
			NV	-10	-58000.00	-10.922787	20	PASS
			NV	0	-58000.00	-10.922787	20	PASS
			NV	10	-58000.00	-10.922787	20	PASS
			NV	20	-58000.00	-10.922787	20	PASS
			NV	30	-58000.00	-10.922787	20	PASS
			NV	40	-58000.00	-10.922787	20	PASS
			NV	50	-58000.00	-10.922787	20	PASS
		5510	NV	-30	-60000.00	-10.889292	20	PASS
			NV	-20	-60000.00	-10.889292	20	PASS
			NV	-10	-60000.00	-10.889292	20	PASS
			NV	0	-60000.00	-10.889292	20	PASS
			NV	10	-60000.00	-10.889292	20	PASS
			NV	20	-60000.00	-10.889292	20	PASS
			NV	30	-60000.00	-10.889292	20	PASS
		5550	NV	40	-60000.00	-10.889292	20	PASS
			NV	50	-60000.00	-10.889292	20	PASS
			NV	-30	-60000.00	-10.810811	20	PASS
			NV	-20	-60000.00	-10.810811	20	PASS
			NV	-10	-60000.00	-10.810811	20	PASS
			NV	0	-60000.00	-10.810811	20	PASS
			NV	10	-60000.00	-10.810811	20	PASS
		5670	NV	20	-60000.00	-10.810811	20	PASS
			NV	30	-60000.00	-10.810811	20	PASS
			NV	40	-60000.00	-10.810811	20	PASS
			NV	50	-60000.00	-10.810811	20	PASS
			NV	-30	-60000.00	-10.582011	20	PASS
			NV	-20	-60000.00	-10.582011	20	PASS
			NV	-10	-60000.00	-10.582011	20	PASS
		5710	NV	0	-62000.00	-10.934744	20	PASS
			NV	10	-60000.00	-10.582011	20	PASS
			NV	20	-62000.00	-10.934744	20	PASS
			NV	30	-62000.00	-10.934744	20	PASS
			NV	40	-62000.00	-10.934744	20	PASS
			NV	50	-62000.00	-10.934744	20	PASS
			NV	-30	-60000.00	-10.507881	20	PASS
		5755	NV	-20	-60000.00	-10.507881	20	PASS
			NV	-10	-60000.00	-10.507881	20	PASS
			NV	0	-60000.00	-10.507881	20	PASS
			NV	10	-60000.00	-10.507881	20	PASS
			NV	20	-60000.00	-10.507881	20	PASS
			NV	30	-60000.00	-10.507881	20	PASS
			NV	40	-60000.00	-10.507881	20	PASS
		5795	NV	50	-62000.00	-10.858144	20	PASS
			NV	-30	-60000.00	-10.425717	20	PASS
			NV	-20	-62000.00	-10.773241	20	PASS
			NV	-10	-62000.00	-10.773241	20	PASS
			NV	0	-62000.00	-10.773241	20	PASS
			NV	10	-62000.00	-10.773241	20	PASS
			NV	20	-62000.00	-10.773241	20	PASS
		5210	NV	30	-62000.00	-10.773241	20	PASS
			NV	40	-62000.00	-10.773241	20	PASS
			NV	50	-62000.00	-10.773241	20	PASS
			NV	-30	-62000.00	-10.698878	20	PASS
			NV	-20	-62000.00	-10.698878	20	PASS
			NV	-10	-62000.00	-10.698878	20	PASS
			NV	0	-62000.00	-10.698878	20	PASS
11AX80M IMO	Ant1	5210	NV	10	-62000.00	-10.698878	20	PASS
			NV	20	-62000.00	-10.698878	20	PASS
			NV	30	-62000.00	-10.698878	20	PASS
			NV	40	-62000.00	-10.698878	20	PASS
			NV	50	-62000.00	-10.698878	20	PASS
			NV	-30	-54000.00	-10.364683	20	PASS
			NV	-20	-54000.00	-10.364683	20	PASS
			NV	-10	-56000.00	-10.748560	20	PASS
			NV	0	-56000.00	-10.748560	20	PASS
			NV	10	-56000.00	-10.748560	20	PASS

			NV	30	-56000.00	-10.748560	20	PASS
			NV	40	-56000.00	-10.748560	20	PASS
			NV	50	-56000.00	-10.748560	20	PASS
		5290	NV	-30	-56000.00	-10.586011	20	PASS
			NV	-20	-56000.00	-10.586011	20	PASS
			NV	-10	-58000.00	-10.964083	20	PASS
			NV	0	-58000.00	-10.964083	20	PASS
			NV	10	-58000.00	-10.964083	20	PASS
			NV	20	-58000.00	-10.964083	20	PASS
			NV	30	-58000.00	-10.964083	20	PASS
			NV	40	-58000.00	-10.964083	20	PASS
			NV	50	-58000.00	-10.964083	20	PASS
		5530	NV	-30	-60000.00	-10.849910	20	PASS
			NV	-20	-60000.00	-10.849910	20	PASS
			NV	-10	-60000.00	-10.849910	20	PASS
			NV	0	-60000.00	-10.849910	20	PASS
			NV	10	-60000.00	-10.849910	20	PASS
			NV	20	-60000.00	-10.849910	20	PASS
			NV	30	-60000.00	-10.849910	20	PASS
			NV	40	-60000.00	-10.849910	20	PASS
		5610	NV	50	-60000.00	-10.849910	20	PASS
			NV	-30	-60000.00	-10.695187	20	PASS
			NV	-20	-60000.00	-10.695187	20	PASS
			NV	-10	-60000.00	-10.695187	20	PASS
			NV	0	-60000.00	-10.695187	20	PASS
			NV	10	-60000.00	-10.695187	20	PASS
			NV	20	-60000.00	-10.695187	20	PASS
			NV	30	-60000.00	-10.695187	20	PASS
		5690	NV	40	-60000.00	-10.695187	20	PASS
			NV	50	-60000.00	-10.695187	20	PASS
			NV	-30	-60000.00	-10.544815	20	PASS
			NV	-20	-60000.00	-10.544815	20	PASS
			NV	-10	-60000.00	-10.544815	20	PASS
			NV	0	-60000.00	-10.544815	20	PASS
			NV	10	-60000.00	-10.544815	20	PASS
			NV	20	-60000.00	-10.544815	20	PASS
			NV	30	-60000.00	-10.544815	20	PASS
			NV	40	-62000.00	-10.896309	20	PASS
			NV	50	-62000.00	-10.896309	20	PASS

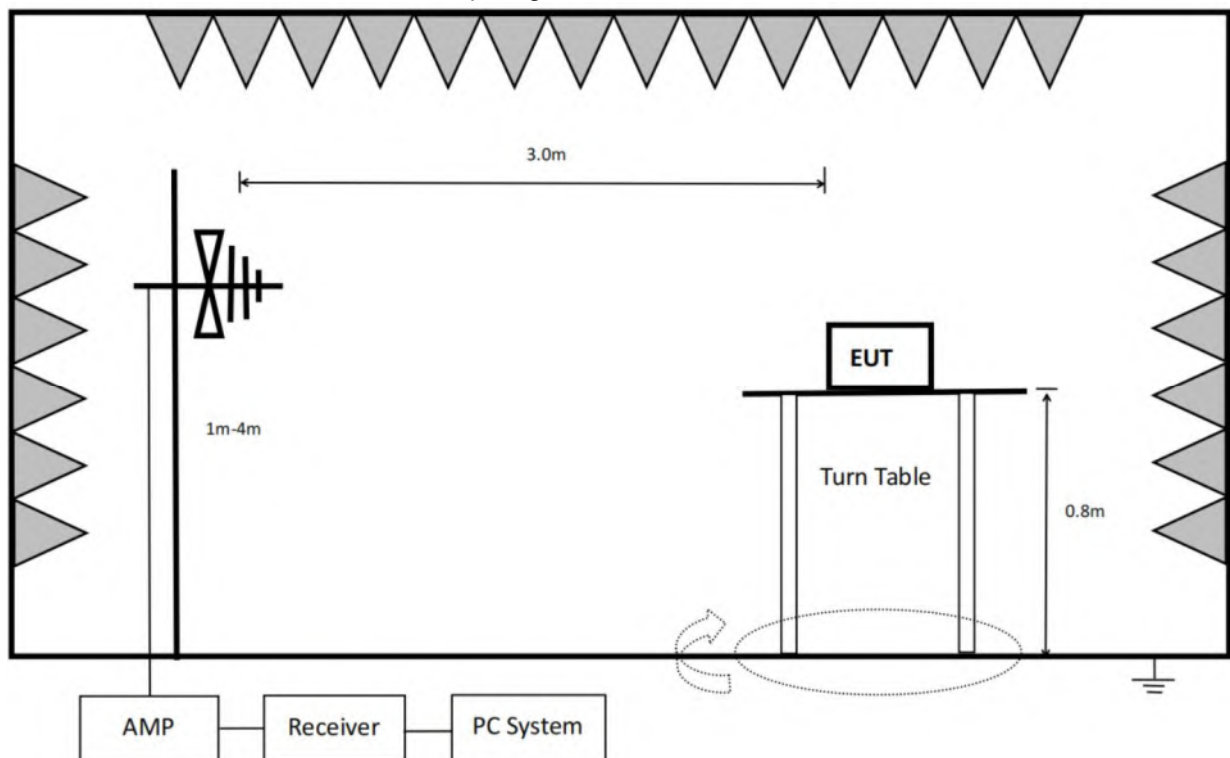
13. Radiated Emission

13.1. Block Diagram of Test Setup

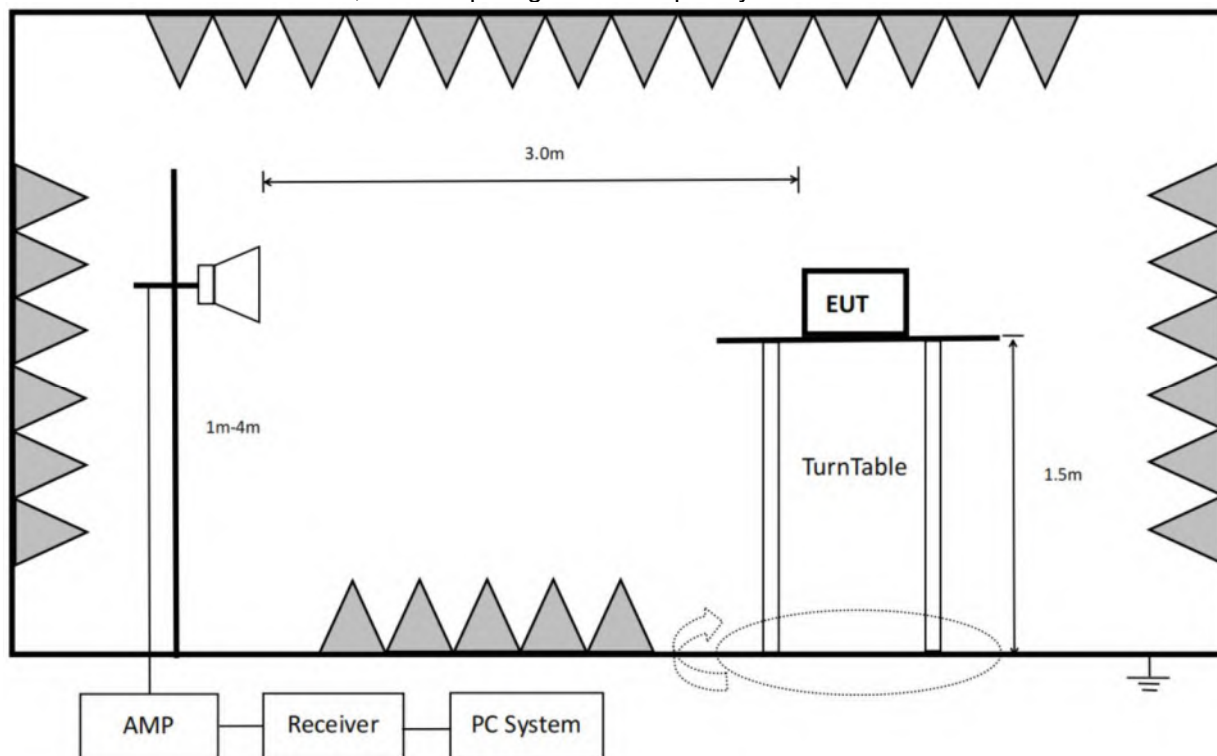
In 3 m Anechoic Chamber, test setup diagram for 9 kHz - 30 MHz:



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 a band rejection 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	$2400/\text{F}(\text{kHz})$	$67.6-20\log(\text{F})$
0.490 ~ 1.705	30	$24000/\text{F}(\text{kHz})$	$87.6-20\log(\text{F})$
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 $\text{dB}(\mu\text{V})/\text{m}$ (Peak) 54.0 $\text{dB}(\mu\text{V})/\text{m}$ (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 $-27 \text{ dBm} / \text{MHz}$.

(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 $-27 \text{ dBm} / \text{MHz}$.

(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 $-27 \text{ dBm} / \text{MHz}$.

(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 $-17 \text{ dBm}/\text{MHz}$; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of $-27 \text{ dBm} / \text{MHz}$.

(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.

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

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:

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

(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 C63.10-2020

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 C63.10-2020.

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 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 C63.10-2020.

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 band rejection 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, so the final test was performed with frequency range from 30 MHz to 40 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 ANT1 is worse case and recorded in report.

Note 6: For emissions Above 18 GHz, the all the emission is ambient noise, so only show the worse case channel and recorded in report.

For upper edge of the 26 dB bandwidth and 5350 MHz unwanted emission data reference bellow:

Test Mode	Ant.	Channel (MHz)	Power (dBm)	Frequency Range	Frequency (MHz)	Result (dBm)	Limit (dBm)	Verdict
11A	Ant1	5180	17.33	5193.2~5350	5193.46	-15.01	≤-8.67	PASS
	Ant2	5180	17.02	5193.2~5350	5193.75	-18.20	≤-8.98	PASS
	Ant1	5240	16.99	5249.84~5350	5249.86	-14.15	≤-9.01	PASS
	Ant2	5240	16.87	5249.84~5350	5249.89	-13.52	≤-9.13	PASS
11N20MIMO	Ant1	5180	12.17	5192.12~5350	5192.66	-18.03	≤-13.83	PASS
	Ant2	5180	12.22	5191.84~5350	5192.05	-21.65	≤-13.78	PASS
	Ant1	5240	12.78	5250.04~5350	5250.04	-16.96	≤-13.22	PASS
	Ant2	5240	13.09	5249.68~5350	5249.74	-16.18	≤-12.91	PASS
11N40MIMO	Ant1	5190	12.02	5209.6~5350	5209.60	-20.79	≤-13.98	PASS
	Ant2	5190	12.42	5209.36~5350	5209.36	-22.72	≤-13.58	PASS
	Ant1	5230	11.78	5250~5350	5250.03	-24.71	≤-14.22	PASS
	Ant2	5230	12.18	5249.36~5350	5249.42	-21.21	≤-13.82	PASS
11AC20MIMO	Ant1	5180	12.00	5193.16~5350	5193.77	-19.93	≤-14	PASS
	Ant2	5180	11.95	5191.92~5350	5192.15	-22.02	≤-14.05	PASS
	Ant1	5240	11.63	5249.96~5350	5250.02	-16.22	≤-14.37	PASS
	Ant2	5240	11.77	5249.84~5350	5249.95	-15.97	≤-14.23	PASS

				0				
11AC40MI MO	Ant1	5190	10.06	5209.92~5350	5209.99	-25.71	≤-15.94	PASS
	Ant2	5190	10.31	5209.52~5350	5209.81	-24.53	≤-15.69	PASS
	Ant1	5230	11.60	5250~5350	5250.13	-26.35	≤-14.4	PASS
	Ant2	5230	12.12	5249.52~5350	5249.68	-21.12	≤-13.88	PASS
11AC80MI MO	Ant1	5210	11.81	5250~5350	5250.05	-30.74	≤-14.19	PASS
	Ant2	5210	11.91	5249.36~5350	5249.46	-27.98	≤-14.09	PASS
11AX20MI MO	Ant1	5180	13.70	5190.76~5350	5190.91	-17.82	≤-12.3	PASS
	Ant2	5180	13.57	5190.76~5350	5191.03	-16.63	≤-12.43	PASS
	Ant1	5240	12.00	5249.88~5350	5249.98	-14.89	≤-14	PASS
	Ant2	5240	11.96	5249.88~5350	5249.92	-15.27	≤-14.04	PASS
11AX40MI MO	Ant1	5190	12.09	5209.6~5350	5209.60	-18.11	≤-13.91	PASS
	Ant2	5190	12.67	5209.6~5350	5209.63	-19.88	≤-13.33	PASS
	Ant1	5230	12.59	5249.6~5350	5249.70	-18.77	≤-13.41	PASS
	Ant2	5230	12.54	5250.16~5350	5250.85	-25.59	≤-13.46	PASS
11AX80MI MO	Ant1	5210	12.08	5252.24~5350	5253.02	-30.68	≤-13.92	PASS
	Ant2	5210	11.68	5252.72~5350	5253.17	-31.59	≤-14.32	PASS

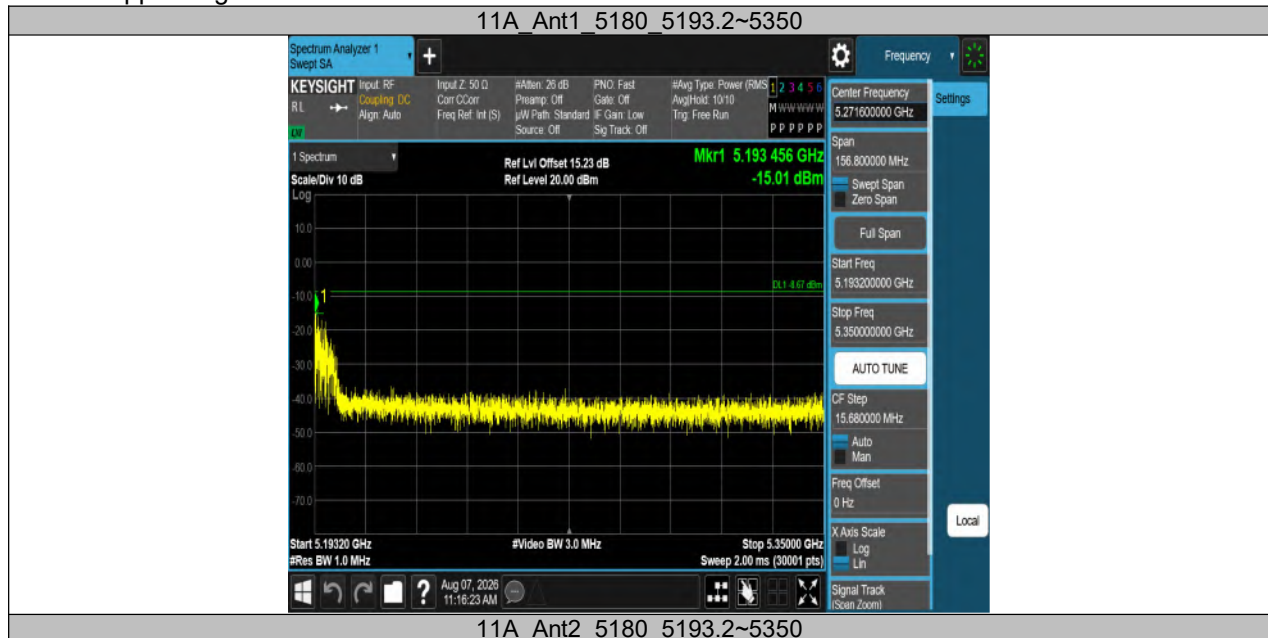
Note: This test only for 26dB bandwidth fall in 5250MHz ~ 5350MHz mode, So this is the conducted testing method used in this test and Diagram of test setup same as section 8.1.

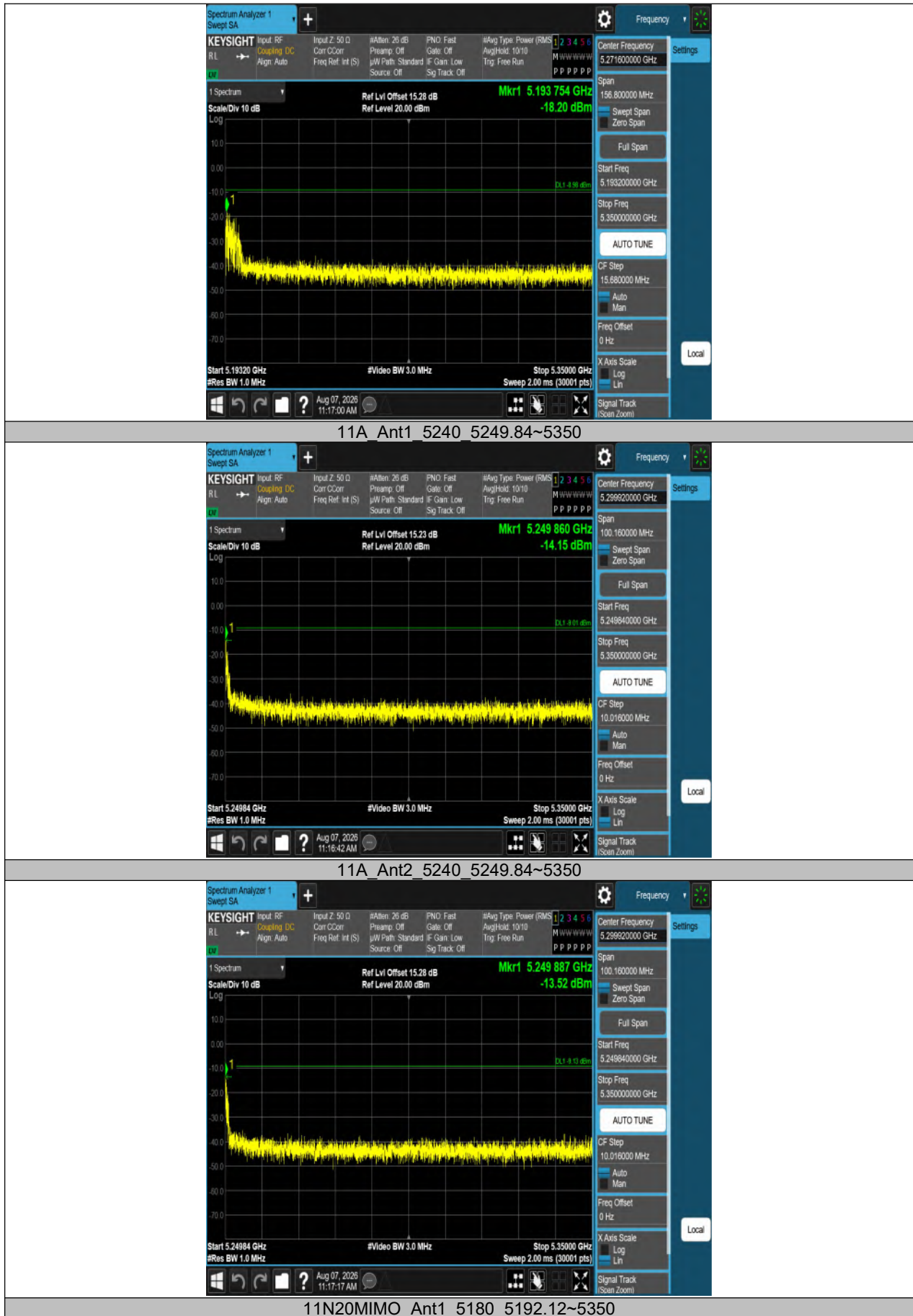
13.5. Original Test Data

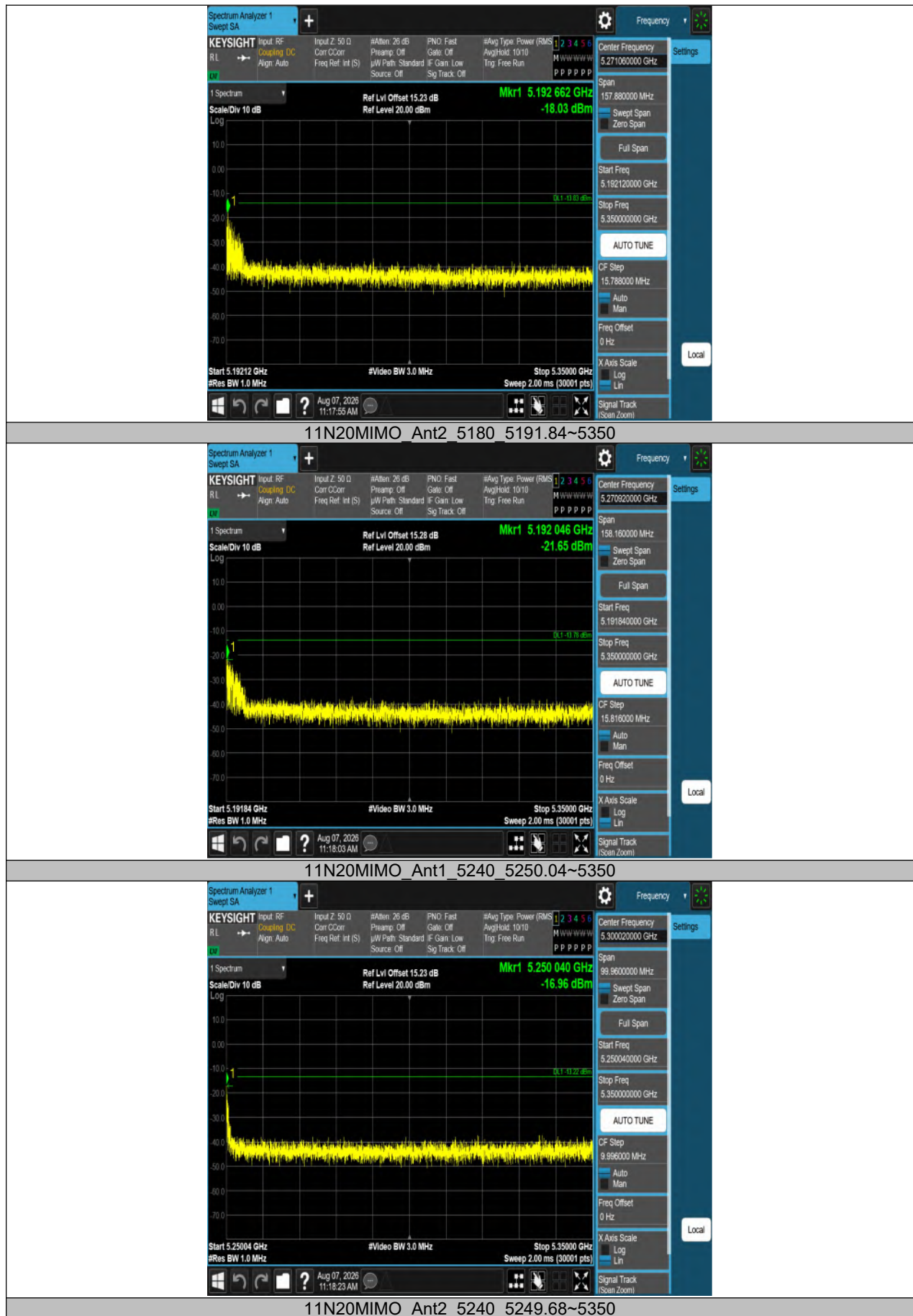
Below 1 GHz and above 30 MHz test data Refer to appendix A

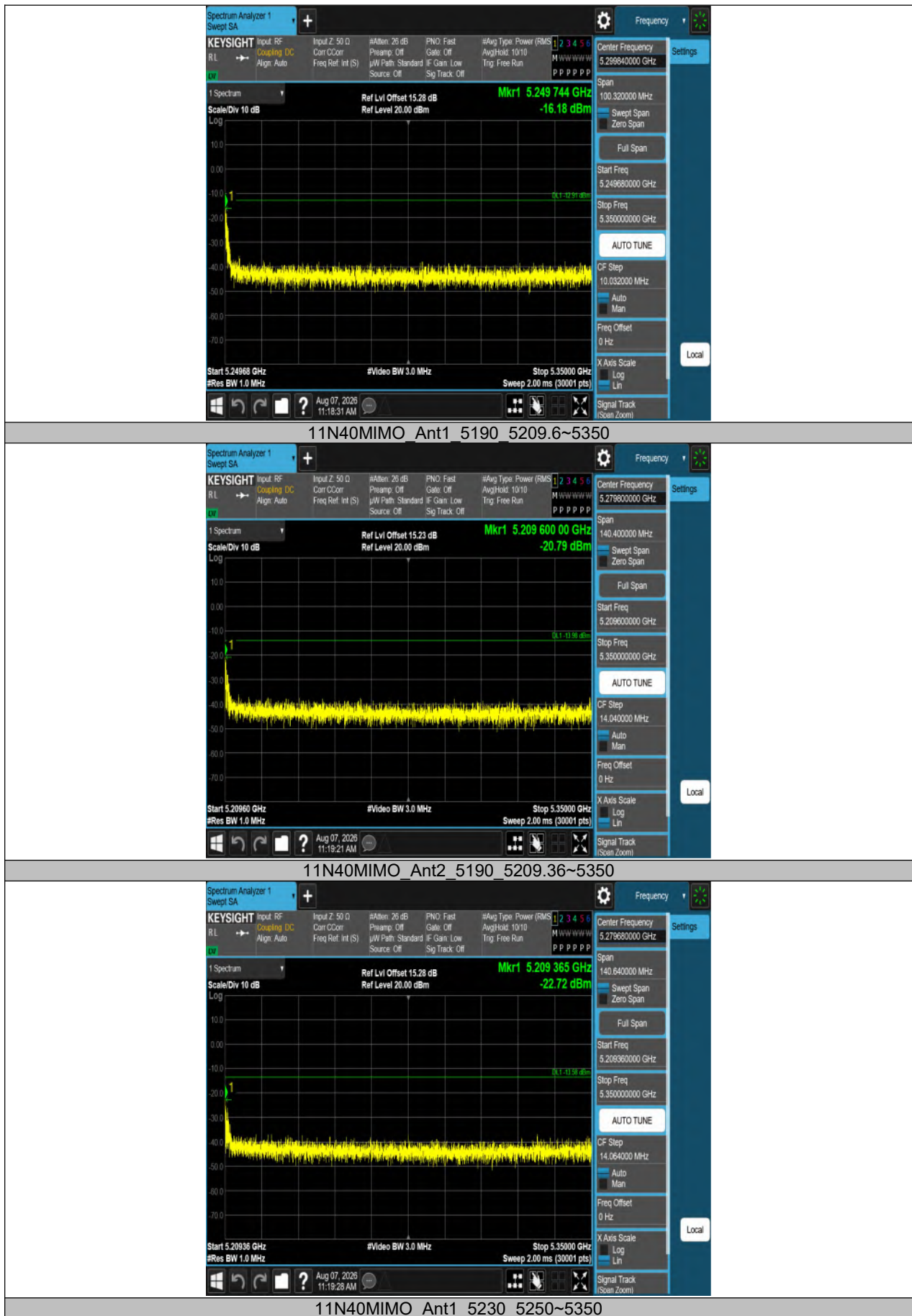
Above 1 GHz test data Refer to appendix B

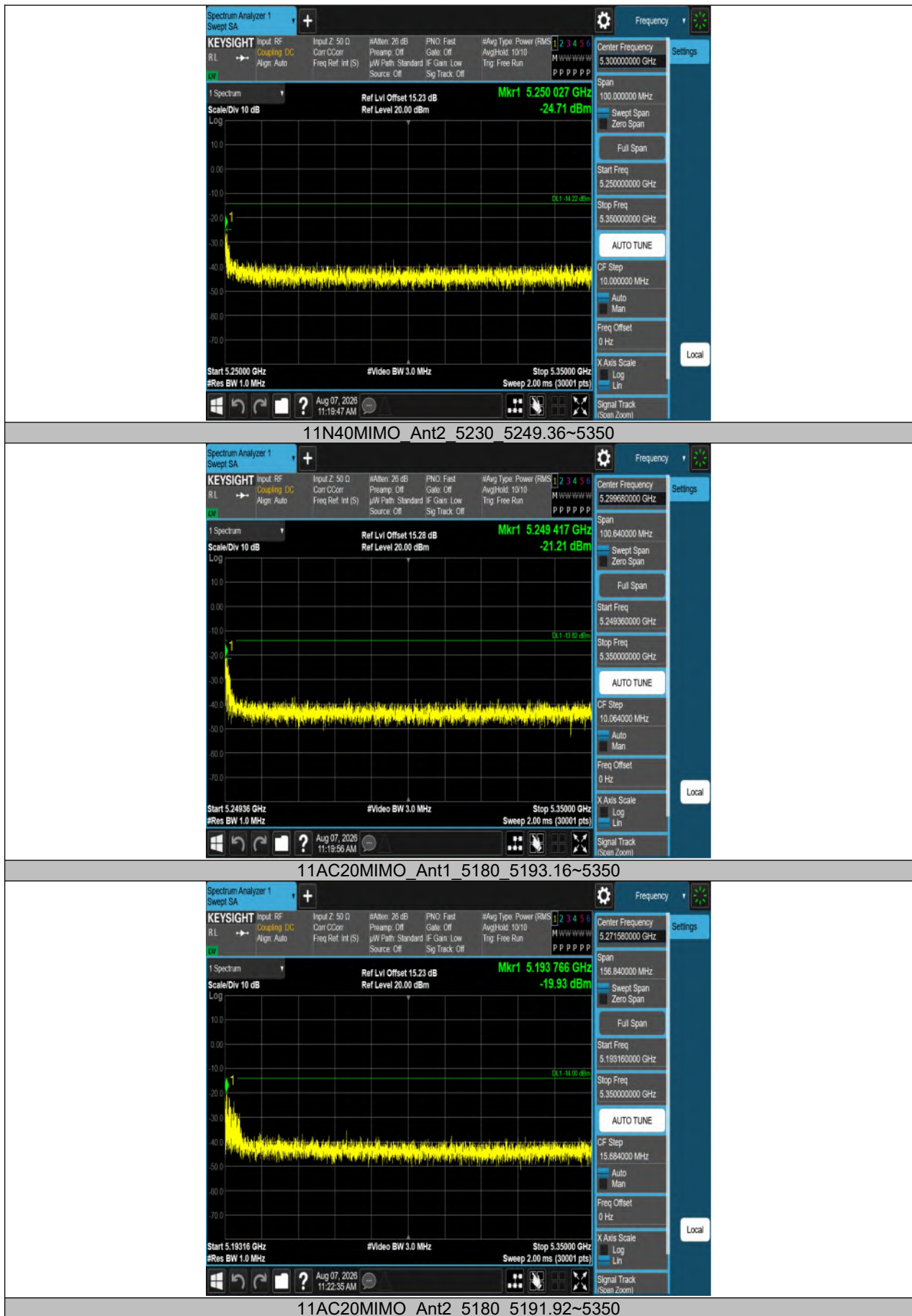
For upper edge of the 26 dB bandwidth and 5350 MHz unwanted emission reference below:

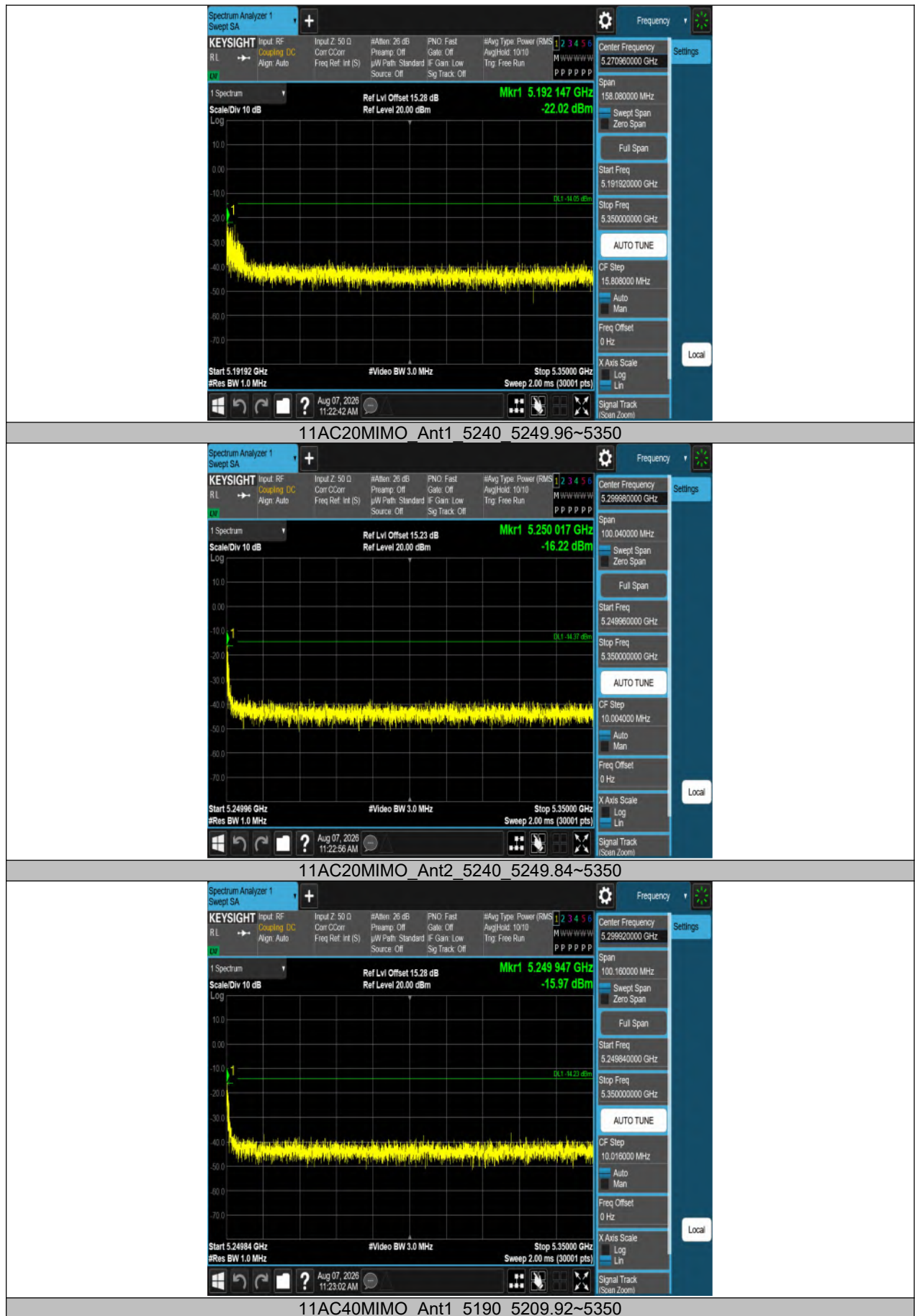


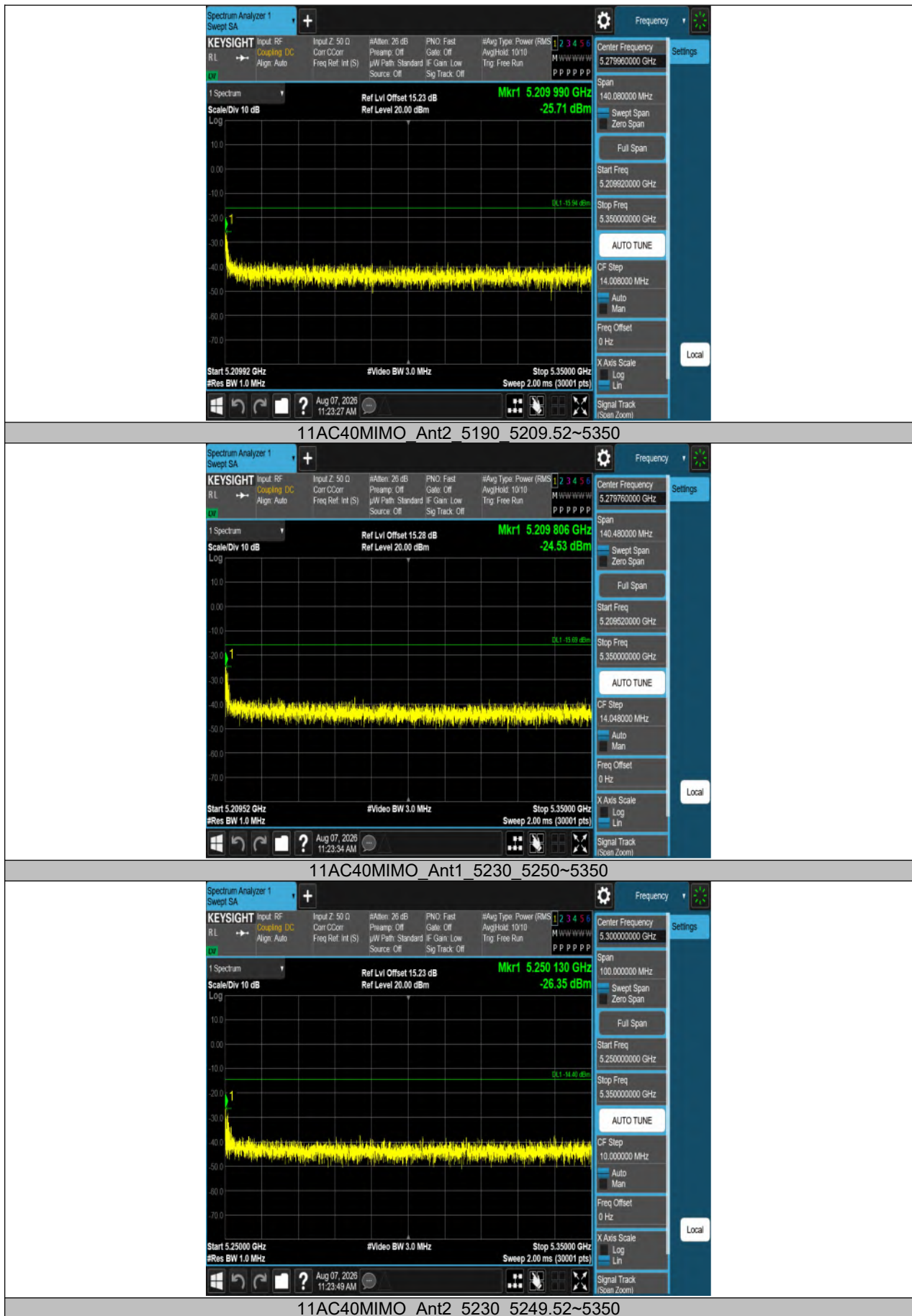




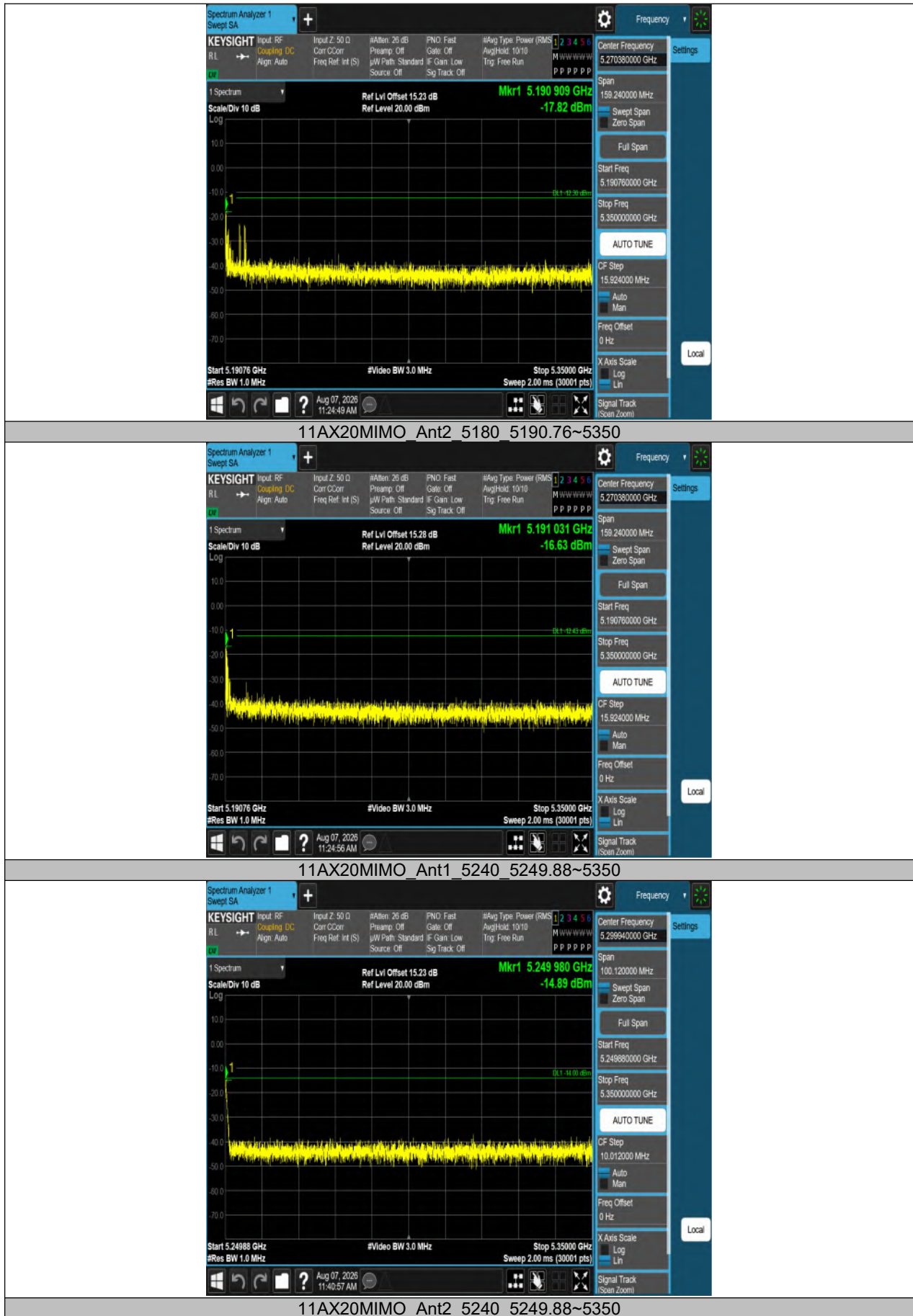


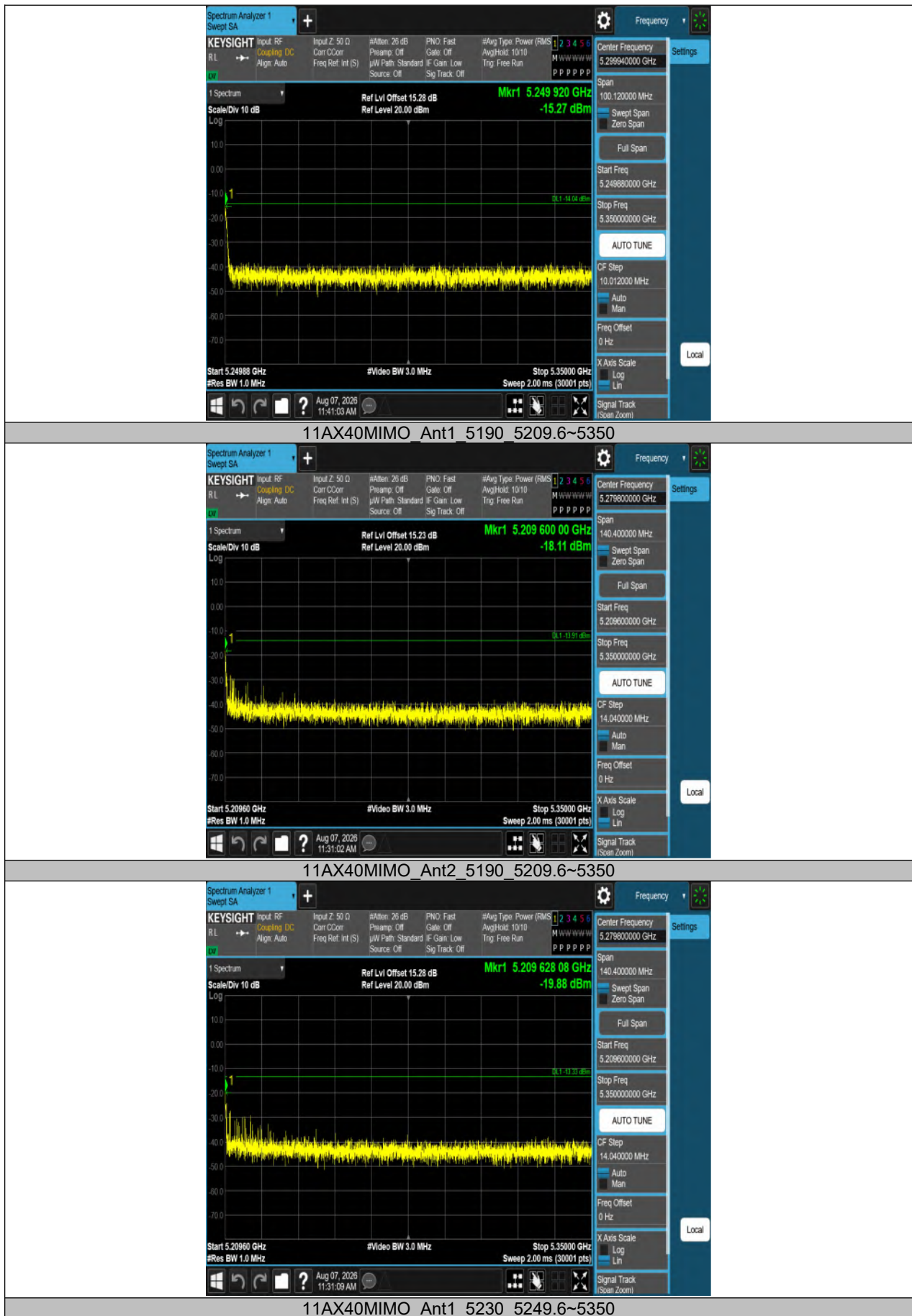










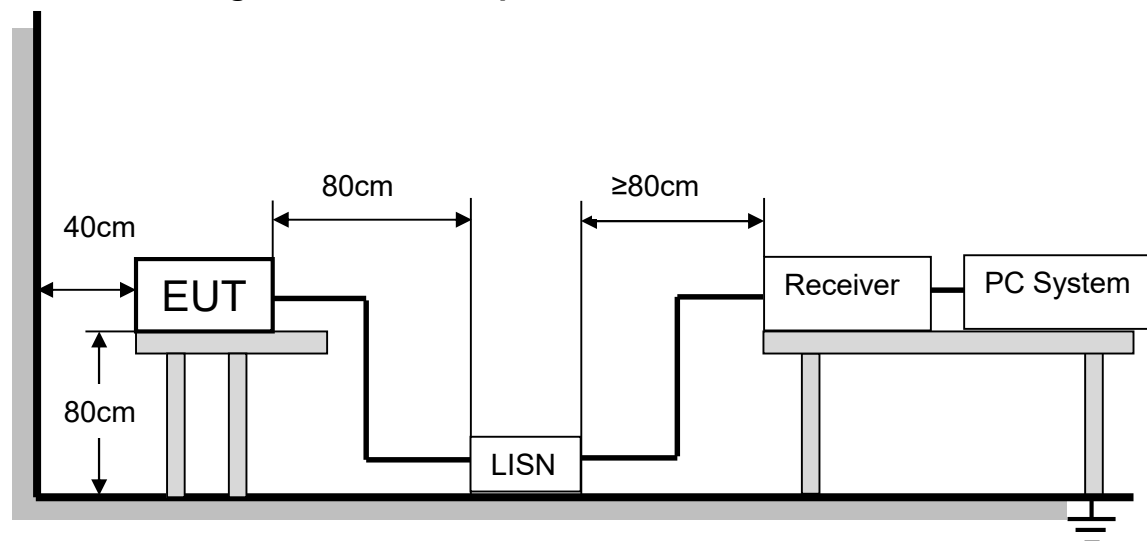






14. AC Power Line Conducted Emissions

14.1. Block Diagram of Test Setup



The EUT is put on a table of non-conducting material that is 80 cm high. The vertical conducting wall of shielding is located 40 cm to the rear of the EUT. The power line of the EUT is connected to the AC mains through an Artificial Mains Network (A.M.N.). A EMI Measurement Receiver (R&S Test Receiver ESR3) is used to test the emissions from both sides of AC line. According to the requirements in Section 6.2 of ANSI C63.10-2020. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode. The bandwidth of EMI test receiver is set at 9 kHz.

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application.

14.2. Limits

Please refer to CFR 47 FCC §15.207 (a) and ISED RSS-Gen Clause 8.8.

Frequency (MHz)	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

Note 1: * Decreasing linearly with logarithm of frequency.

Note 2: The lower limit shall apply at the transition frequencies.

14.3. Test Procedure

The EUT and Support equipment, if needed, were put placed on a non-metallic table, 80cm above the ground plane.

Configuration EUT to simulate typical usage as described in clause 2.4 and test equipment as described in clause 10.2 of this report.

All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.

All support equipment power received from a second LISN.

Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.

The Receiver scanned from 150 kHz to 30 MHz for emissions in each of the test modes.

During the above scans, the emissions were maximized by cable manipulation.

The test mode(s) described in clause 2.4 were scanned during the preliminary test.

After the preliminary scan, we found the test mode producing the highest emission level.

The EUT configuration and worse cable configuration of the above highest emission levels were recorded for reference of the final test.

EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test.

A scan was taken on both power lines, Neutral and Line, recording at least the six highest emissions.

Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.

The test data of the worst-case condition(s) was recorded.

The bandwidth of test receiver is set at 9 kHz.

14.4. Test Result

Pass. (See below detailed test result)

Note1: All emissions not reported below are too low against the prescribed limits.

Note2: Pre-test AC conducted emission at both voltage AC 120V/60Hz and AC 240V/50Hz, recorded worse case.

Note3: Measurement=Reading Level + Correct Factor

Over=Measurement - Limit

14.5. Original Test Data

AC Power Line Conducted Emission Test Data Refer to appendix C

15. Dynamic Frequency Selection

15.1. Applicability of DFS Requirements

A U-NII network will employ a DFS function to detect signals from radar systems and to avoid co-channel operation with these systems. This applies to the 5250-5350 MHz and/or 5470-5725 MHz bands.

Within the context of the operation of the DFS function, a U-NII device will operate in either Master Mode or Client Mode. U-NII devices operating in Client Mode can only operate in a network controlled by a U-NII device operating in Master Mode.

Table 1: Applicability of DFS Requirements Prior to Use of a Channel

Requirement	Operational Mode		
	☐ Master	☒ Client Without Radar Detection	☐ Client with Radar Detection
Non-Occupancy Period	Yes	Not required	Yes
DFS Detection Threshold	Yes	Not required	Yes
Channel Availability Check Time	Yes	Not required	Not required
U-NII Detection Bandwidth	Yes	Not required	Yes

Table 2: Applicability of DFS requirements during normal operation

Requirement	Operational Mode	
	☐ Master Device or Client with Radar Detection	☒ Client Without Radar Detection
DFS Detection Threshold	Yes	Not required
Channel Closing Transmission Time	Yes	Yes
Channel Move Time	Yes	Yes
U-NII Detection Bandwidth	Yes	Not required

Additional requirements for devices with multiple bandwidth modes	☐ Master Device or Client with Radar Detection	☒ Client Without Radar Detection
U-NII Detection Bandwidth and Statistical Performance Check	All BW modes must be tested	Not required
Channel Move Time and Channel Closing Transmission Time	Test using widest BW mode available	Test using the widest BW mode available for the link
All other tests	Any single BW mode	Not required

Note: Frequencies selected for statistical performance check should include several frequencies within the radar detection bandwidth and frequencies near the edge of the radar detection bandwidth. For 802.11 devices it is suggested to select frequencies in each of the bonded 20 MHz channels and the channel center frequency.

15.2. Limit

(1) DFS Detection Thresholds

Table 3: DFS Detection Thresholds for Master Devices and Client Devices with Radar Detection

Maximum Transmit Power	Value (See Notes 1, 2, and 3)
EIRP $\geq$ 200 milliwatt	-64 dBm
EIRP $<$ 200 milliwatt and power spectral density $<$ 10 dBm/MHz	-62 dBm
EIRP $<$ 200 milliwatt that do not meet the power spectral density requirement	-64 dBm

Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna.

Note 2: Throughout these test procedures an additional 1 dB has been added to the amplitude of the

test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response.

Note3: EIRP is based on the highest antenna gain. For MIMO devices refer to KdB Publication 662911 D01.

(2) DFS Response Requirements

Table 4: DFS Response Requirement Values

Parameter	Value
Non-occupancy period	Minimum 30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds See Note 1.
Channel Closing Transmission Time	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. See Notes 1 and 2.
U-NII Detection Bandwidth	Minimum 100% of the U-NII 99% transmission power bandwidth. See Note 3.

Note 1: Channel Move Time and the Channel Closing Transmission Time should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst.

Note 2: The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required facilitating a Channel move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.

Note 3: During the U-NII Detection Bandwidth detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.

For 5600-5650MHz:

IF Device with Radar Detection, the CAC need comply ETSI EN 301 893 V2.2.1 Annex D requirements.

Table D.1: DFS requirement values

Parameter	Value
Channel Availability Check (CAC) time	60 s (see note 1)
Minimum off-channel CAC time	6 minutes (see note 2)
Maximum off-channel CAC time	4 hours (see note 2)
Channel move time	10 s
Channel closing transmission time	1 s
Non-occupancy period	30 minutes
NOTE 1: For channels whose nominal channel bandwidth falls completely or partly within the band 5 600 MHz to 5 650 MHz, the CAC time shall be 10 minutes.	
NOTE 2: For channels whose nominal channel bandwidth falls completely or partly within the band 5 600 MHz to 5 650 MHz, the off-channel CAC time shall be within the range 1 hour to 24 hours.	

Table D.5: Detection probability

Parameter	Detection probability (P_d) (see note)	
	Channels whose nominal channel bandwidth falls partly or completely within the 5 600 MHz to 5 650 MHz band	Other channels
CAC, off-channel CAC	99,99 %	60 %
In-service monitoring	60 %	60 %
NOTE: P_d gives the probability of detection per radar test signal and represents a minimum level of detection performance under defined conditions.		