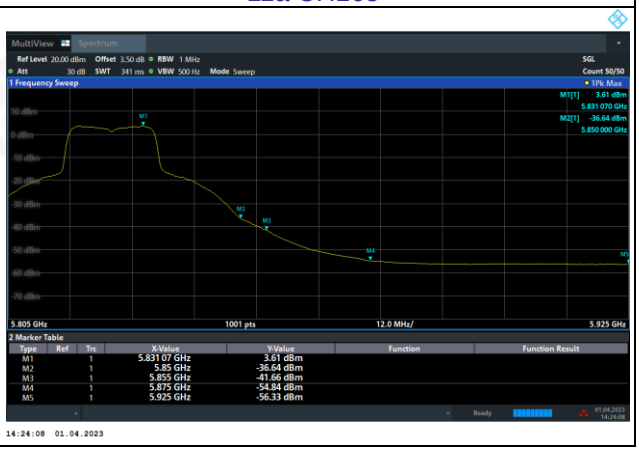
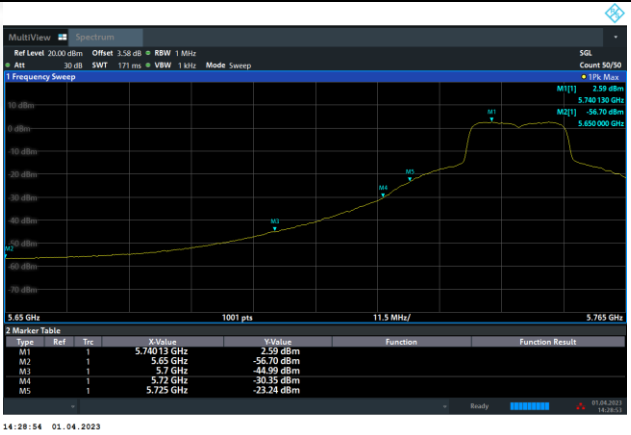
11a CH165

11a CH165



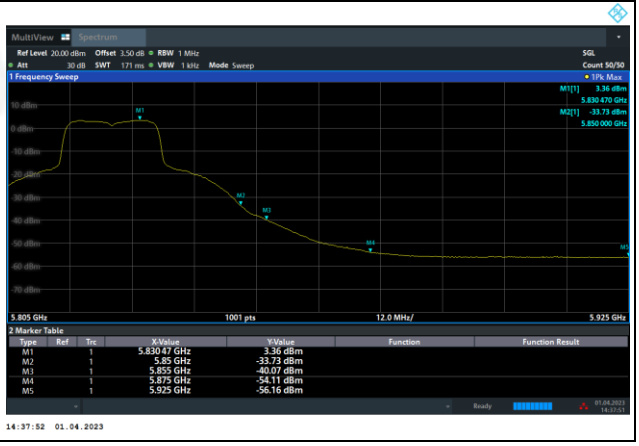
11n(HT20) CH149

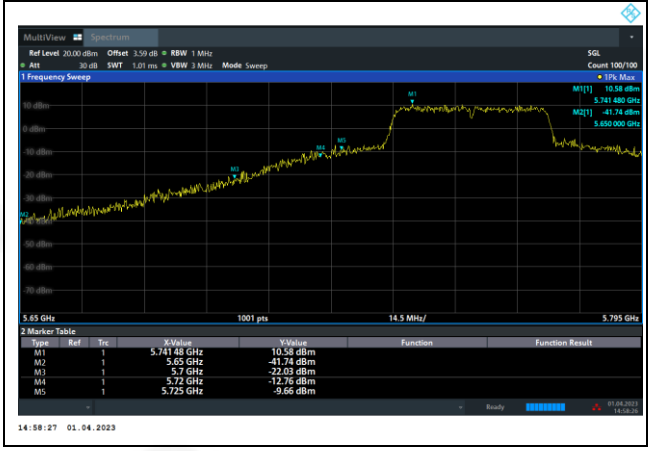
11n(HT20) CH149

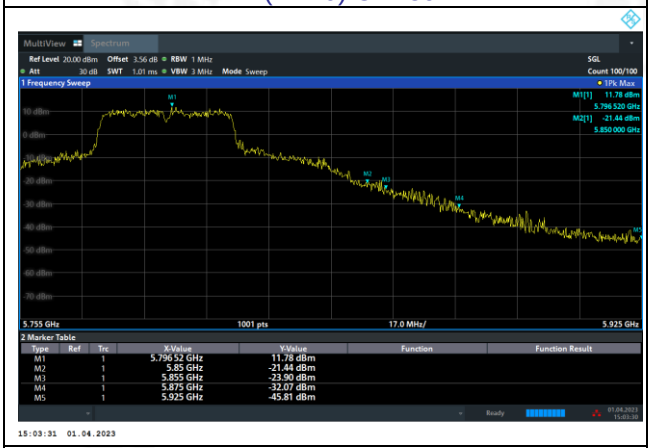


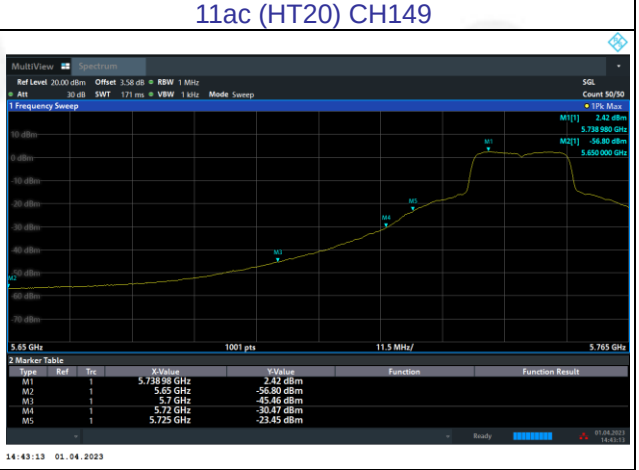
11n(HT20) CH165

11n(HT20) CH165



11n (HT40) CH151	11n (HT40) CH151
	

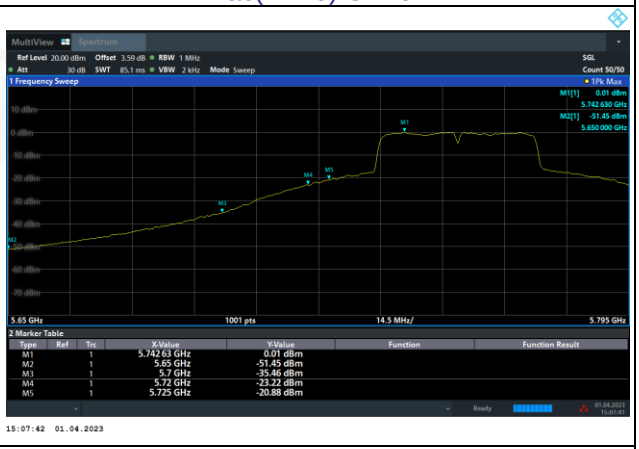
11n (HT40) CH159	11n (HT40) CH159
	

11ac (HT20) CH149	11ac (HT20) CH149
	

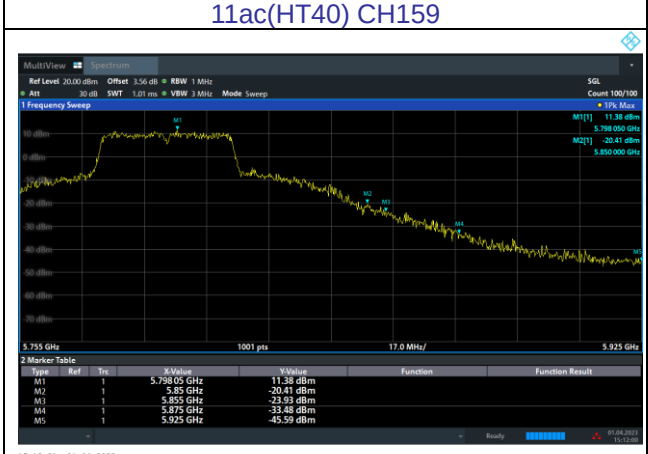
11ac (HT20) CH165	11ac (HT20) CH165

11ac(HT40) CH151

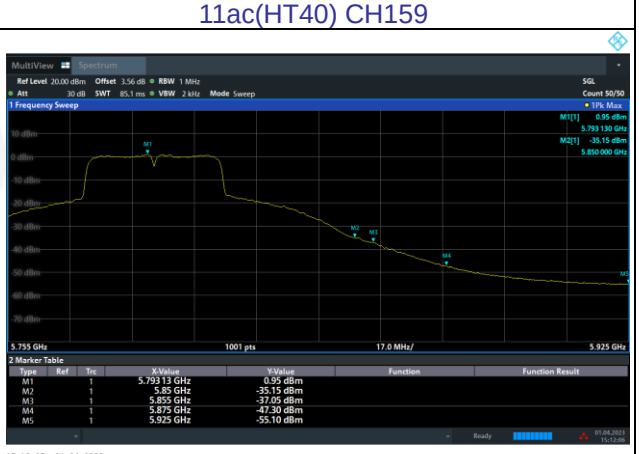
11ac(HT40) CH151

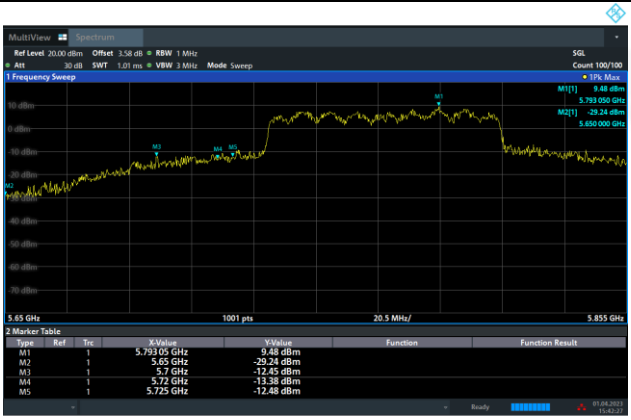
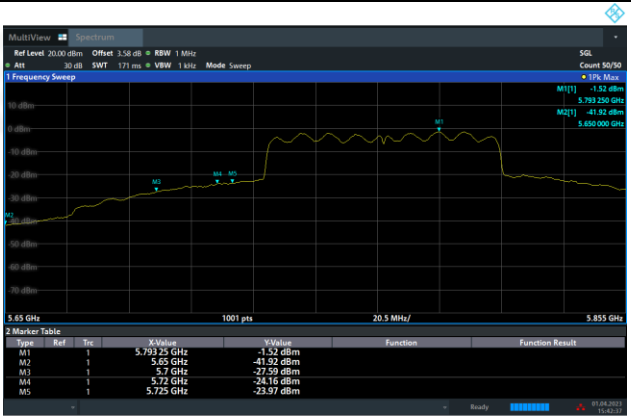


11ac(HT40) CH159



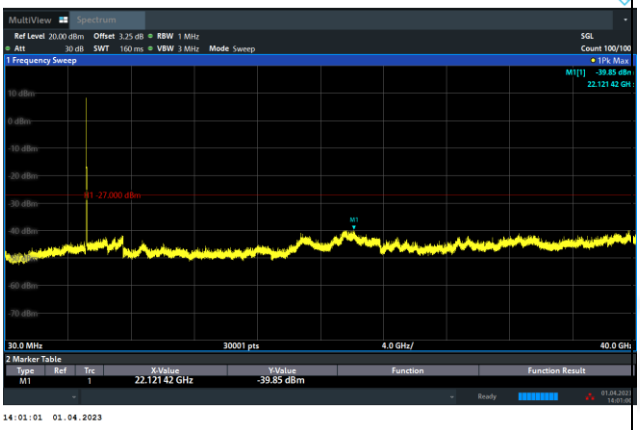
11ac(HT40) CH159



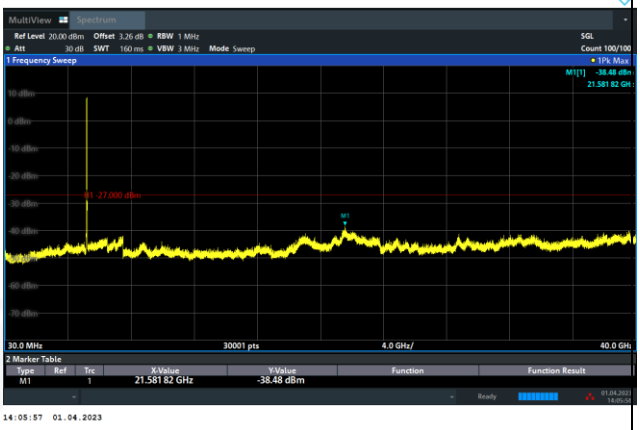
11ac (HT80) CH155	11ac (HT80) CH155
	

Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	101kPa	Test Voltage ：	DC 5V from adapter AC 120V/60Hz
Test Mode ：	ANT 2 U-NII-1 802.11a/n20/n40/ac20/ac40/ac80		

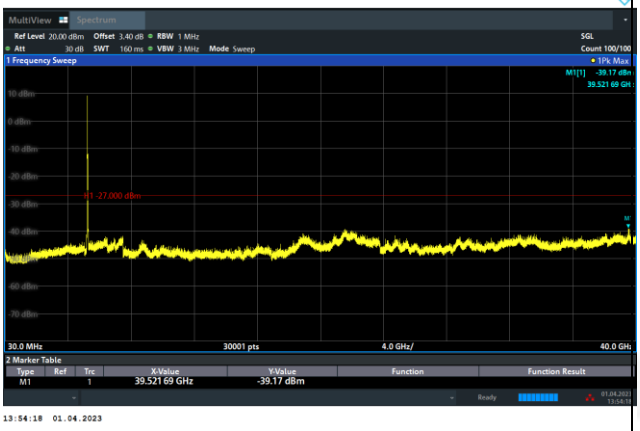
11a CH36



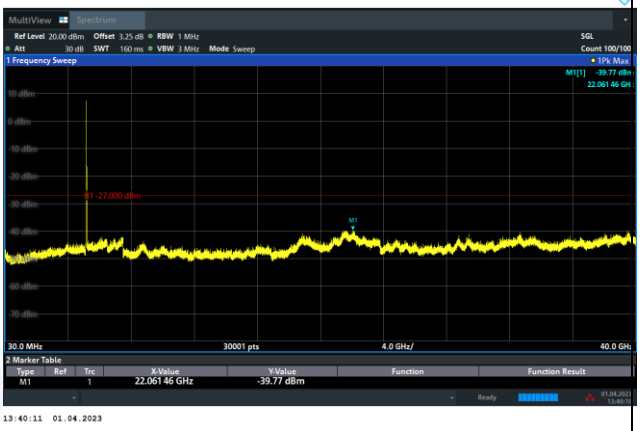
11a CH40



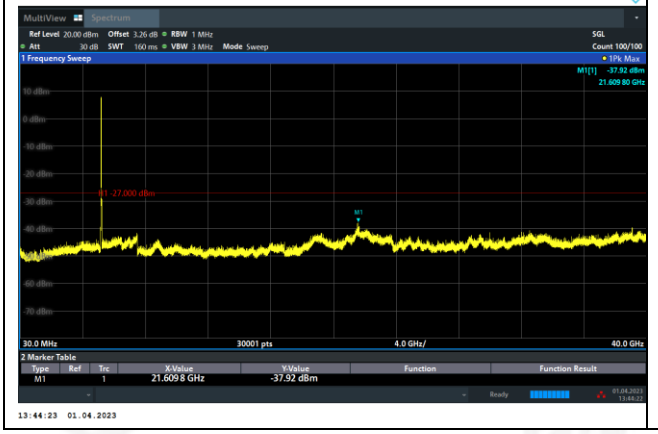
11a CH48



11n (HT20) CH36

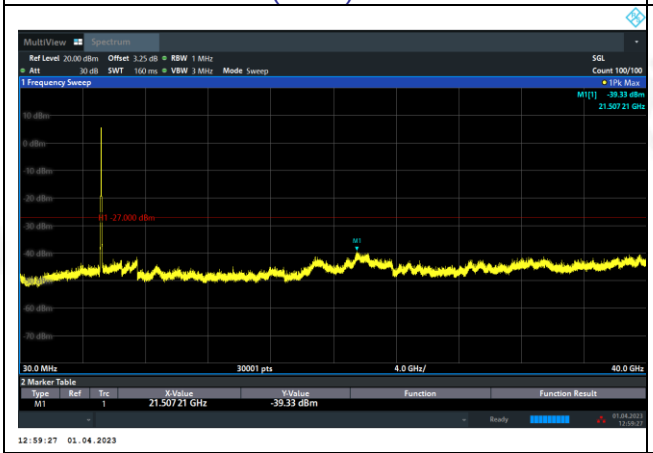


11n (HT20) CH40

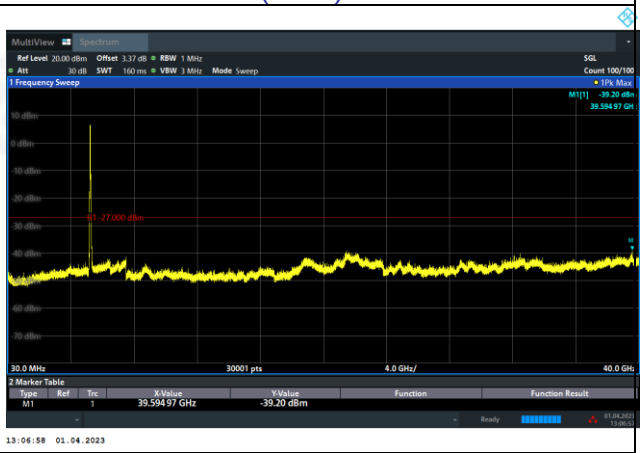


11n (HT20) CH48

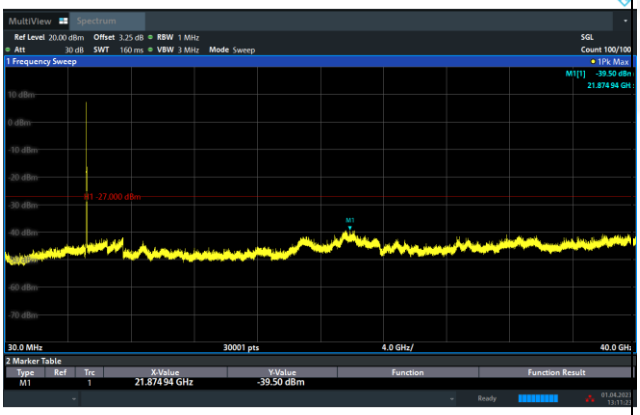
11n (HT40) CH38



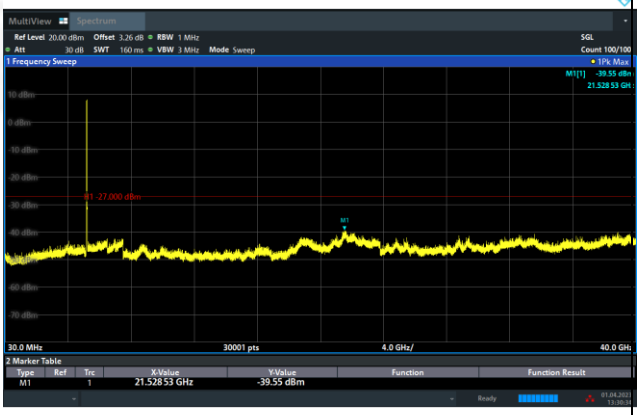
11n (HT40) CH46



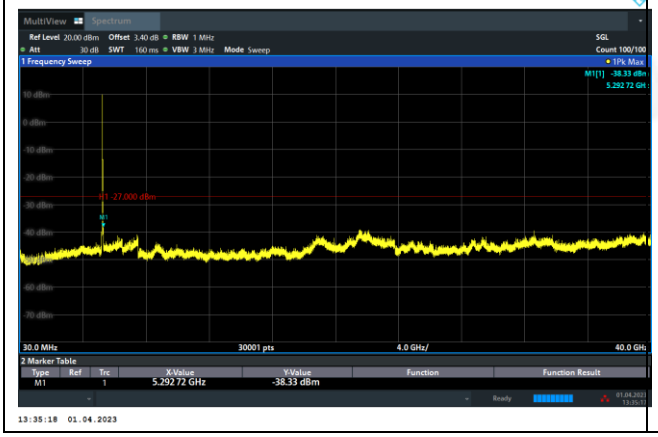
11ac (HT20) CH36



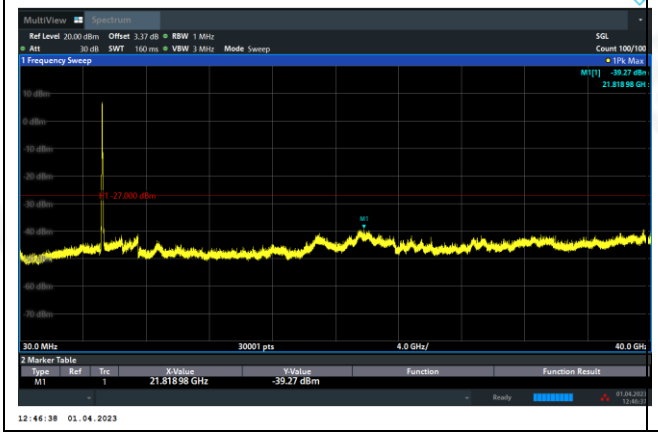
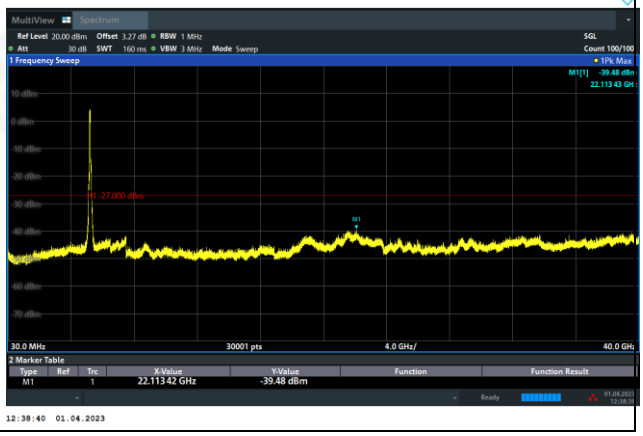
11ac (HT20) CH40



11ac (HT20) CH48

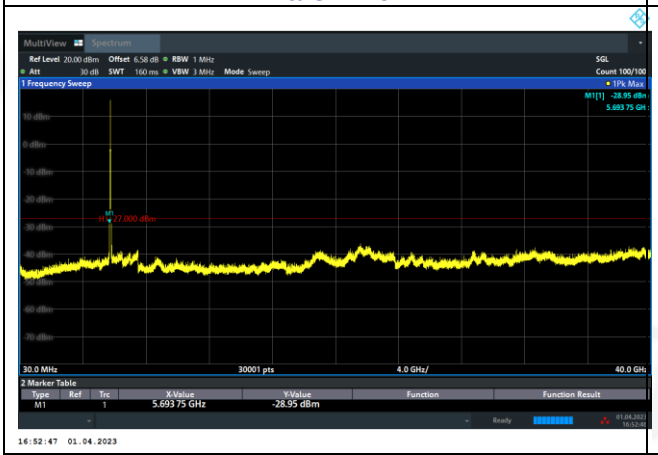


11ac (HT40) CH38

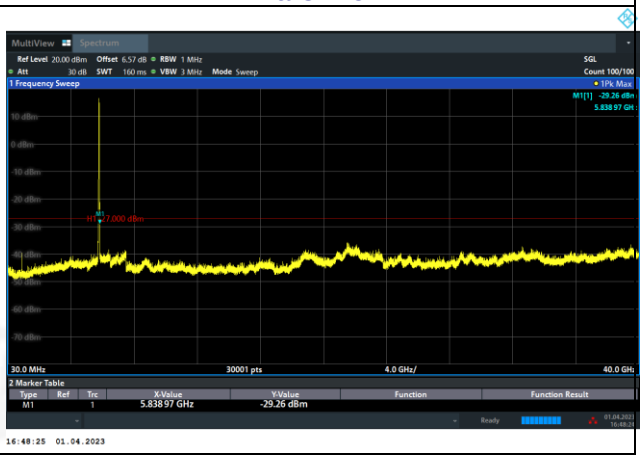
11ac (HT40) CH46	11ac (HT80) CH42
	

Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	101kPa	Test Voltage ：	DC 5V from adapter AC 120V/60Hz
Test Mode ：	ANT 2 U-NII-3 802.11a/n20/n40/ac20/ac40/ac80		

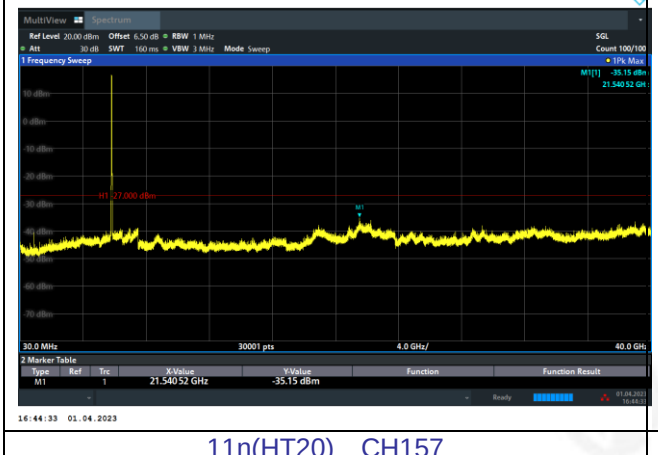
11a CH149



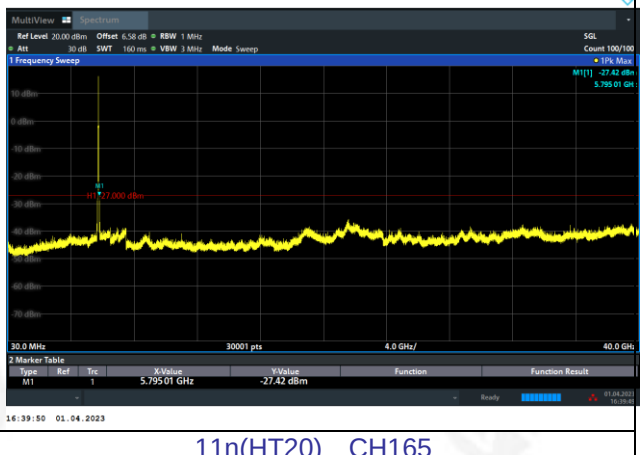
11a CH157



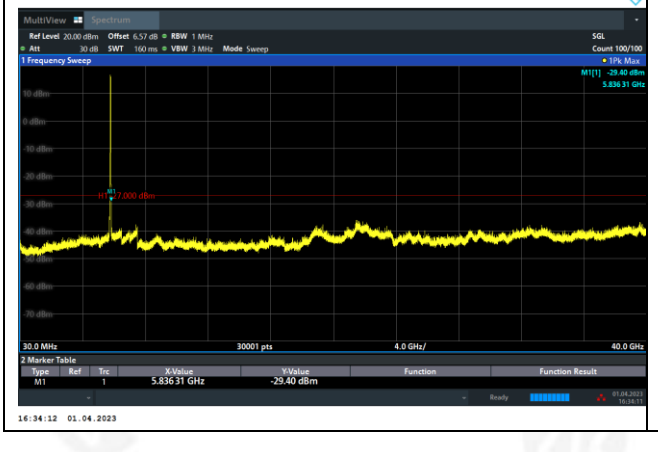
11a CH165



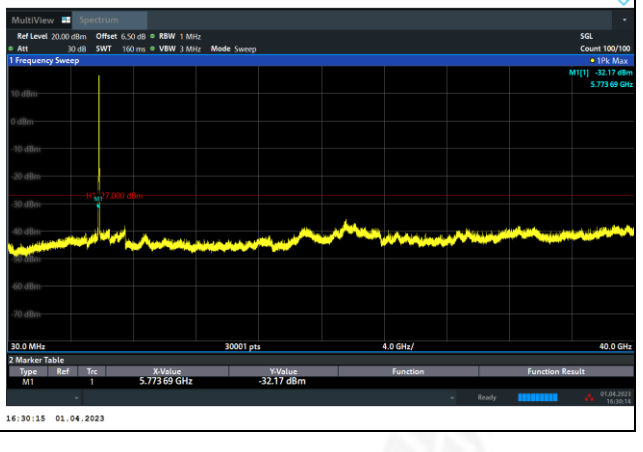
11n(HT20) CH149



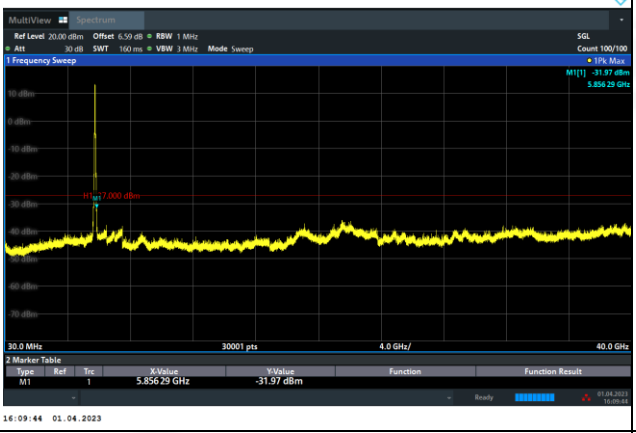
11n(HT20) CH157



11n(HT20) CH165

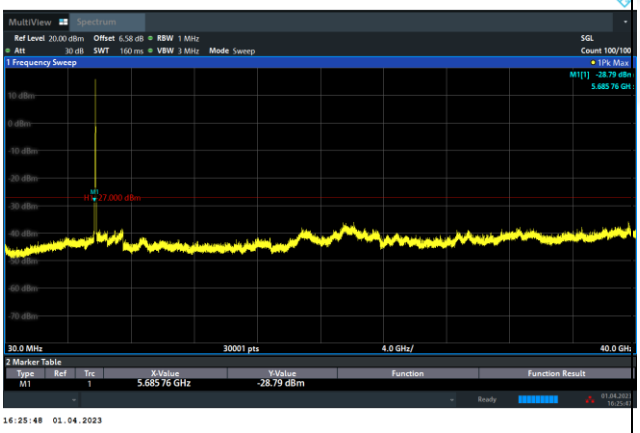


11n (HT40) CH151

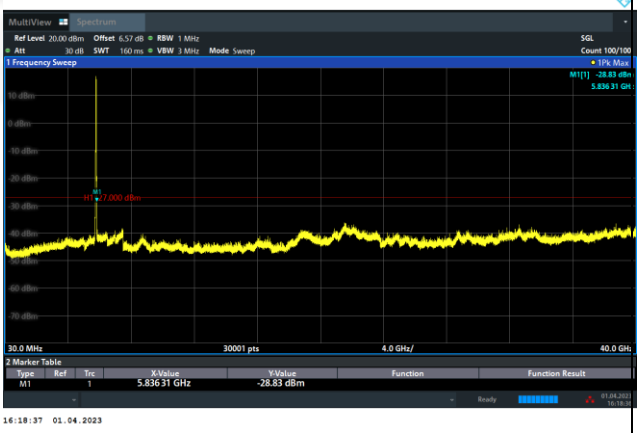


11n (HT40) CH159

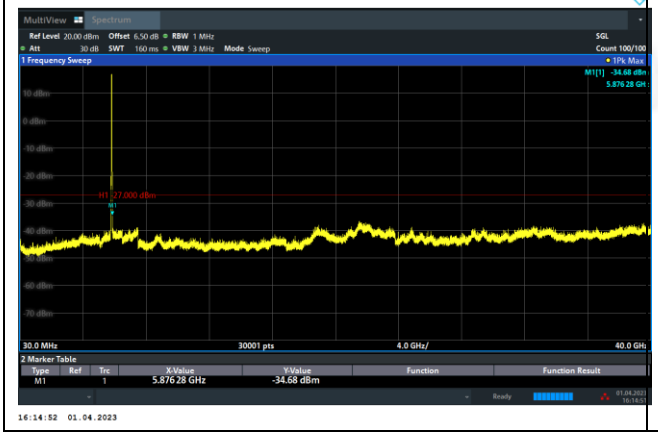
11ac (HT20) CH149



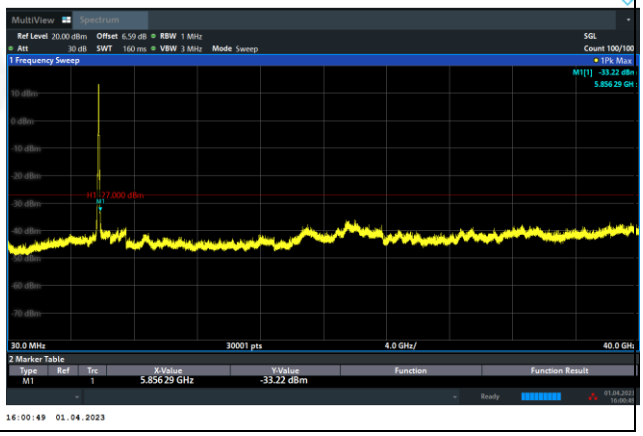
11ac (HT20) CH157

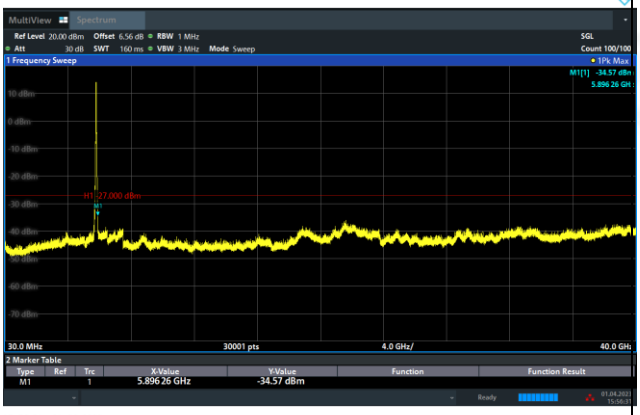
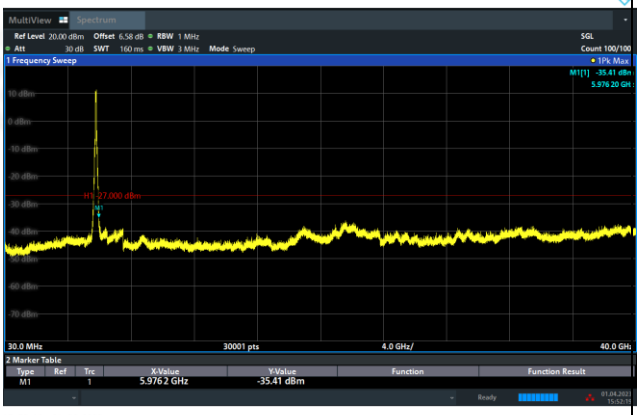


11ac(HT20) CH165



11ac(HT40) CH151

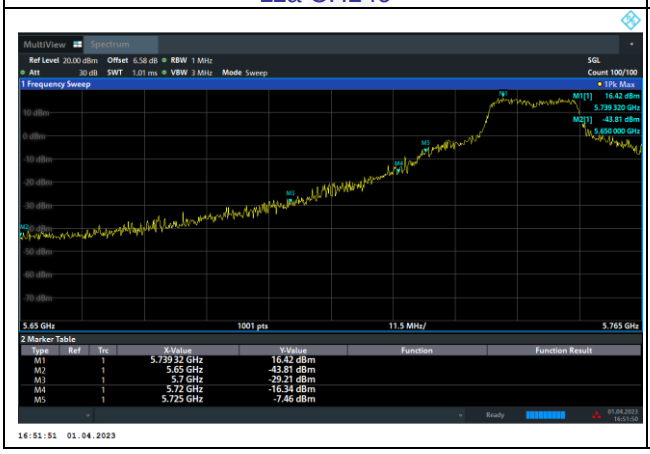


11ac(HT40) CH159	11ac (HT80) CH155
	

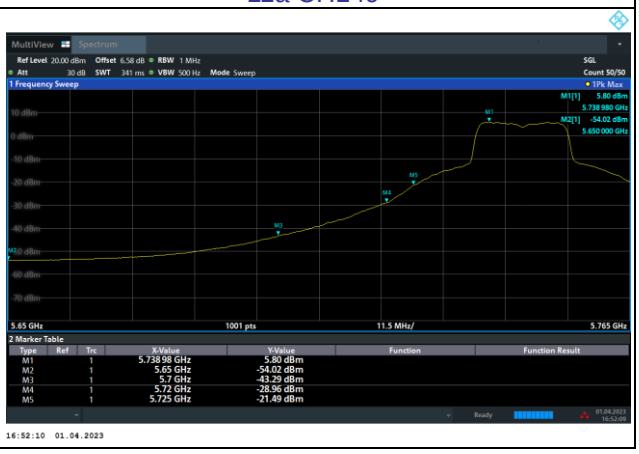
Mode	Frequency (MHz)	Antenna	Spur Freq (MHz)	Power (dBm)	Gain (dBi)	E (dBuV/m)	Detector	Limit (dBuV/m)	Verdict
a	5745	Ant1	5650	-43.8	3	-40.8	Peak	-27	Pass
a	5745	Ant1	5650	-54.02	3	-51.02	Average	-27	Pass
a	5745	Ant1	5700	-29.21	3	-26.21	Peak	10	Pass
a	5745	Ant1	5700	-43.29	3	-40.29	Average	10	Pass
a	5745	Ant1	5720	-16.33	3	-13.33	Peak	15.6	Pass
a	5745	Ant1	5720	-28.95	3	-25.95	Average	15.6	Pass
a	5745	Ant1	5725	-5.47	3	-2.47	Peak	27	Pass
a	5745	Ant1	5725	-21.36	3	-18.36	Average	27	Pass
a	5825	Ant1	5850	-16.57	3	-13.57	Peak	27	Pass
a	5825	Ant1	5850	-33.61	3	-30.61	Average	27	Pass
a	5825	Ant1	5855	-20.59	3	-17.59	Peak	15.6	Pass
a	5825	Ant1	5855	-38.72	3	-35.72	Average	15.6	Pass
a	5825	Ant1	5875	-39	3	-36	Peak	10	Pass
a	5825	Ant1	5875	-51.62	3	-48.62	Average	10	Pass
a	5825	Ant1	5925	-44.12	3	-41.12	Peak	-27	Pass
a	5825	Ant1	5925	-53.31	3	-50.31	Average	-27	Pass
n20	5745	Ant1	5650	-42.53	3	-39.53	Peak	-27	Pass
n20	5745	Ant1	5650	-53.74	3	-50.74	Average	-27	Pass
n20	5745	Ant1	5700	-30.06	3	-27.06	Peak	10	Pass
n20	5745	Ant1	5700	-41.88	3	-38.88	Average	10	Pass
n20	5745	Ant1	5720	-11.73	3	-8.73	Peak	15.6	Pass
n20	5745	Ant1	5720	-27.22	3	-24.22	Average	15.6	Pass
n20	5745	Ant1	5725	-6.27	3	-3.27	Peak	27	Pass
n20	5745	Ant1	5725	-19.86	3	-16.86	Average	27	Pass
n20	5825	Ant1	5850	-17.15	3	-14.15	Peak	27	Pass
n20	5825	Ant1	5850	-30.59	3	-27.59	Average	27	Pass
n20	5825	Ant1	5855	-21.71	3	-18.71	Peak	15.6	Pass
n20	5825	Ant1	5855	-36.97	3	-33.97	Average	15.6	Pass
n20	5825	Ant1	5875	-38.17	3	-35.17	Peak	10	Pass
n20	5825	Ant1	5875	-51.21	3	-48.21	Average	10	Pass
n20	5825	Ant1	5925	-43.25	3	-40.25	Peak	-27	Pass
n20	5825	Ant1	5925	-52.91	3	-49.91	Average	-27	Pass
n40	5755	Ant1	5650	-36.91	3	-33.91	Peak	-27	Pass
n40	5755	Ant1	5650	-48.05	3	-45.05	Average	-27	Pass
n40	5755	Ant1	5700	-20.85	3	-17.85	Peak	10	Pass
n40	5755	Ant1	5700	-32.23	3	-29.23	Average	10	Pass
n40	5755	Ant1	5720	-7.64	3	-4.64	Peak	15.6	Pass
n40	5755	Ant1	5720	-19.87	3	-16.87	Average	15.6	Pass
n40	5755	Ant1	5725	-6.9	3	-3.9	Peak	27	Pass
n40	5755	Ant1	5725	-17.47	3	-14.47	Average	27	Pass
n40	5795	Ant1	5850	-17.09	3	-14.09	Peak	27	Pass
n40	5795	Ant1	5850	-32.06	3	-29.06	Average	27	Pass
n40	5795	Ant1	5855	-18.43	3	-15.43	Peak	15.6	Pass
n40	5795	Ant1	5855	-34.6	3	-31.6	Average	15.6	Pass
n40	5795	Ant1	5875	-31.02	3	-28.02	Peak	10	Pass
n40	5795	Ant1	5875	-44.77	3	-41.77	Average	10	Pass
n40	5795	Ant1	5925	-43.25	3	-40.25	Peak	-27	Pass
n40	5795	Ant1	5925	-52.32	3	-49.32	Average	-27	Pass
ac20	5745	Ant1	5650	-43.05	3	-40.05	Peak	-27	Pass
ac20	5745	Ant1	5650	-53.89	3	-50.89	Average	-27	Pass
ac20	5745	Ant1	5700	-29.77	3	-26.77	Peak	10	Pass

ac20	5745	Ant1	5700	-41.98	3	-38.98	Average	10	Pass
ac20	5745	Ant1	5720	-14.05	3	-11.05	Peak	15.6	Pass
ac20	5745	Ant1	5720	-27.32	3	-24.32	Average	15.6	Pass
ac20	5745	Ant1	5725	-7.23	3	-4.23	Peak	27	Pass
ac20	5745	Ant1	5725	-19.65	3	-16.65	Average	27	Pass
ac20	5825	Ant1	5850	-15.28	3	-12.28	Peak	27	Pass
ac20	5825	Ant1	5850	-30.36	3	-27.36	Average	27	Pass
ac20	5825	Ant1	5855	-20.86	3	-17.86	Peak	15.6	Pass
ac20	5825	Ant1	5855	-36.56	3	-33.56	Average	15.6	Pass
ac20	5825	Ant1	5875	-38.76	3	-35.76	Peak	10	Pass
ac20	5825	Ant1	5875	-50.89	3	-47.89	Average	10	Pass
ac20	5825	Ant1	5925	-43.38	3	-40.38	Peak	-27	Pass
ac20	5825	Ant1	5925	-53.39	3	-50.39	Average	-27	Pass
ac40	5755	Ant1	5650	-36.9	3	-33.9	Peak	-27	Pass
ac40	5755	Ant1	5650	-48.03	3	-45.03	Average	-27	Pass
ac40	5755	Ant1	5700	-20.27	3	-17.27	Peak	10	Pass
ac40	5755	Ant1	5700	-31.76	3	-28.76	Average	10	Pass
ac40	5755	Ant1	5720	-8.58	3	-5.58	Peak	15.6	Pass
ac40	5755	Ant1	5720	-19.7	3	-16.7	Average	15.6	Pass
ac40	5755	Ant1	5725	-7.11	3	-4.11	Peak	27	Pass
ac40	5755	Ant1	5725	-17.73	3	-14.73	Average	27	Pass
ac40	5795	Ant1	5850	-19.63	3	-16.63	Peak	27	Pass
ac40	5795	Ant1	5850	-32.24	3	-29.24	Average	27	Pass
ac40	5795	Ant1	5855	-21.82	3	-18.82	Peak	15.6	Pass
ac40	5795	Ant1	5855	-34.87	3	-31.87	Average	15.6	Pass
ac40	5795	Ant1	5875	-29.6	3	-26.6	Peak	10	Pass
ac40	5795	Ant1	5875	-44.36	3	-41.36	Average	10	Pass
ac40	5795	Ant1	5925	-43.15	3	-40.15	Peak	-27	Pass
ac40	5795	Ant1	5925	-52.22	3	-49.22	Average	-27	Pass
ac80	5775	Ant1	5650	-30.17	3	-27.17	Peak	-27	Pass
ac80	5775	Ant1	5650	-42.77	3	-39.77	Average	-27	Pass
ac80	5775	Ant1	5700	-14.9	3	-11.9	Peak	10	Pass
ac80	5775	Ant1	5700	-26.96	3	-23.96	Average	10	Pass
ac80	5775	Ant1	5720	-12.1	3	-9.1	Peak	15.6	Pass
ac80	5775	Ant1	5720	-23.44	3	-20.44	Average	15.6	Pass
ac80	5775	Ant1	5725	-10.86	3	-7.86	Peak	27	Pass
ac80	5775	Ant1	5725	-23.41	3	-20.41	Average	27	Pass

11a CH149



11a CH149

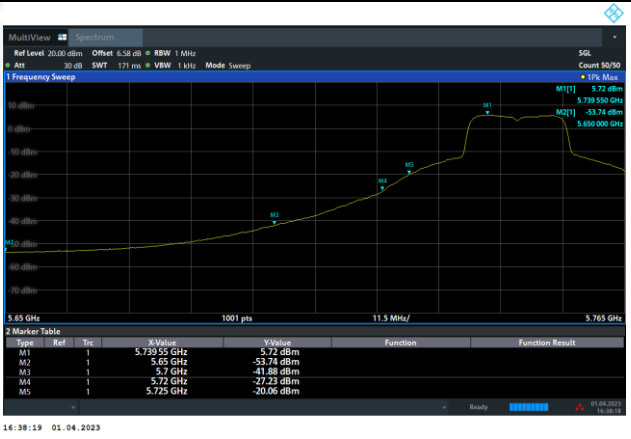


11a CH165

11a CH165

11n(HT20) CH149

11n(HT20) CH149



11n(HT20) CH165

11n(HT20) CH165

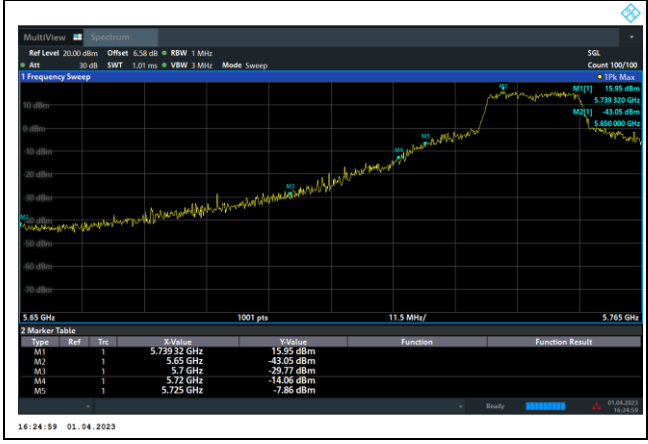
11n (HT40) CH151

11n (HT40) CH151

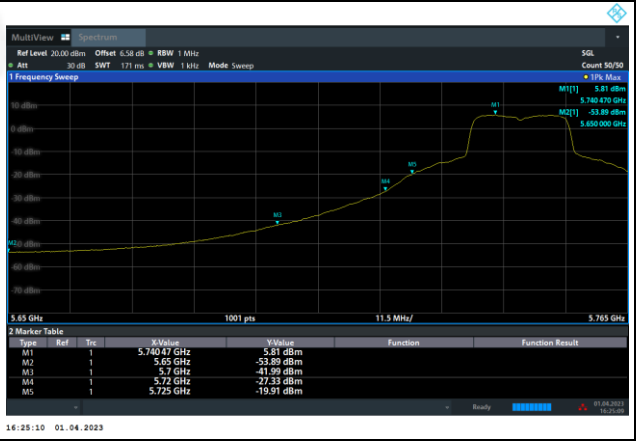
11n (HT40) CH159

11n (HT40) CH159

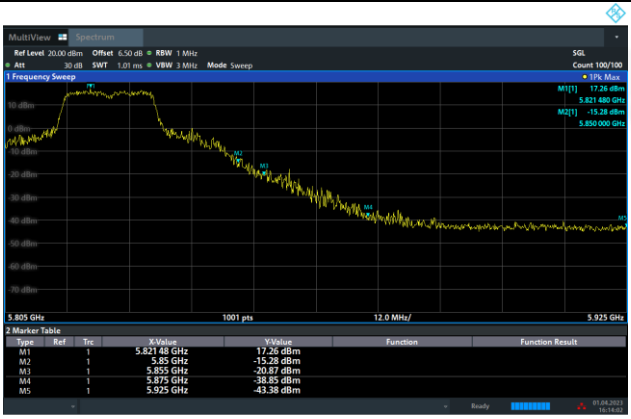
11ac (HT20) CH149



11ac (HT20) CH149



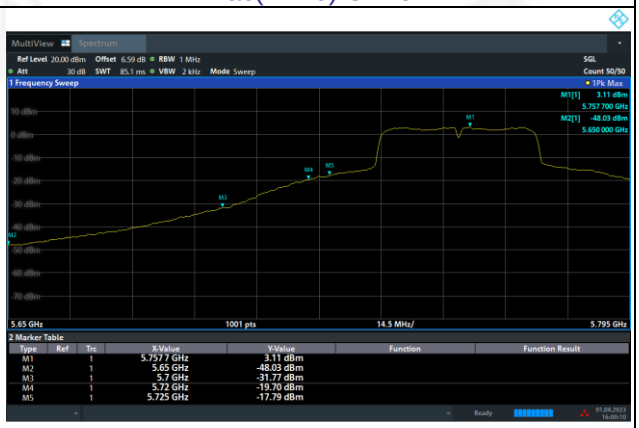
11ac (HT20) CH165



11ac (HT20) CH165

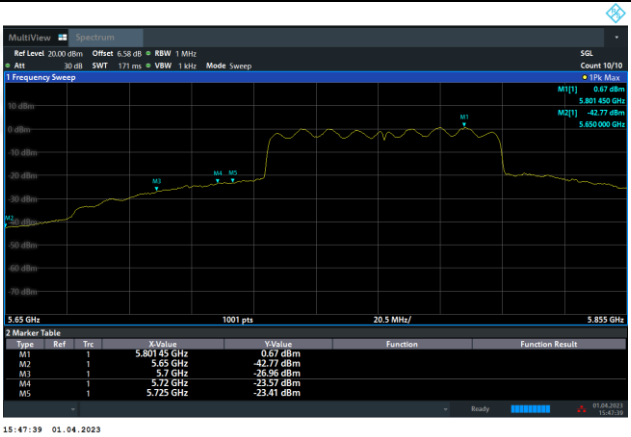
11ac(HT40) CH151

11ac(HT40) CH151



11ac(HT40) CH159

11ac(HT40) CH159

11ac (HT80) CH155	11ac (HT80) CH155
	

11.Frequency Stability Measurement

11.1 LIMIT

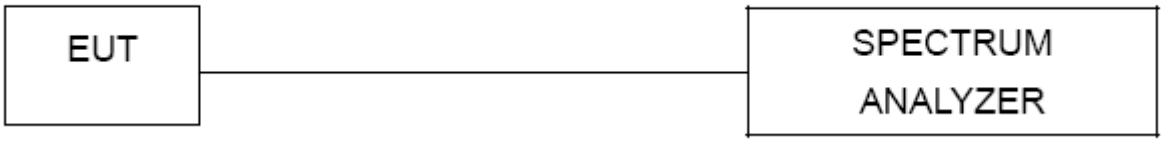
Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

The transmitter center frequency tolerance shall be ± 20 ppm maximum for the 5 GHz band (IEEE 802.11n specification).

11.2 TEST PROCEDURES

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. EUT have transmitted absence of modulation signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
4. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings.
5. fc is declaring of channel frequency. Then the frequency error formula is (fc-f)/fc × 106 ppm and the limit is less than ±20ppm (IEEE 802.11nspecification).
6. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
7. Extreme temperature is -20°C~70°C.

11.3 TEST SETUP LAYOUT



11.4 EUT OPERATION DURING TEST

The EUT was programmed to be in continuously un-modulation transmitting mode.

11.5 TEST RESULTS

Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	1012 hPa	Test Voltage ：	DC 5V from adapter AC 120V/60Hz
Test Mode ：	ANT 1 TX 5150-5250MHz		

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5180MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120.00	5180.0545	5180	0.0545	-10.5212
		V max (V)	138.00	5180.0374	5180	0.0374	-7.2201
		V min (V)	102.00	5180.0252	5180	0.0252	-4.8649
Limits				± 20 ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5180MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	-20	5180.0059	5180	0.0059	-1.1390
		T (°C)	-10	5180.0107	5180	0.0107	-2.0656
		T (°C)	0	5180.0325	5180	0.0325	-6.2741
		T (°C)	10	5180.0385	5180	0.0385	-7.4324
		T (°C)	20	5180.0298	5180	0.0298	-5.7529
		T (°C)	30	5180.0213	5180	0.0213	-4.1120
		T (°C)	40	5180.0123	5180	0.0123	-2.3745
		T (°C)	50	5180.0097	5180	0.0097	-1.8726
		T (°C)	60	5180.0417	5180	0.0417	-8.0502
		T (°C)	70	5180.0695	5180	0.0695	-13.4170
Limits				± 20 ppm			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5200MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120.00	5200.0547	5200	0.0547	-10.5192
		V max (V)	138.00	5200.0485	5200	0.0485	-9.3269
		V min (V)	102.00	5200.0754	5200	0.0754	-14.5000
Limits				± 20 ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5200MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	-20	5200.0752	5200	0.0752	-14.4615
		T (°C)	-10	5200.0577	5200	0.0577	-11.0962
		T (°C)	0	5200.0455	5200	0.0455	-8.7500
		T (°C)	10	5200.0823	5200	0.0823	-15.8269
		T (°C)	20	5200.0665	5200	0.0665	-12.7885
		T (°C)	30	5200.0424	5200	0.0424	-8.1538
		T (°C)	40	5200.0739	5200	0.0739	-14.2115
		T (°C)	50	5200.0854	5200	0.0854	-16.4231
		T (°C)	60	5200.0326	5200	0.0326	-6.2692
		T (°C)	70	5200.0451	5200	0.0451	-8.6731
Limits				± 20 ppm			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5240MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120.00	5240.0512	5240	0.0512	-9.7710
		V max (V)	138.00	5240.0417	5240	0.0417	-7.9580
		V min (V)	102.00	5240.0155	5240	0.0155	-2.9580
Limits				± 20 ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5240MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	-20	5240.0254	5240	0.0254	-4.8473
		T (°C)	-10	5240.0155	5240	0.0155	-2.9580
		T (°C)	0	5240.0162	5240	0.0162	-3.0916
		T (°C)	10	5240.0520	5240	0.0520	-9.9237
		T (°C)	20	5240.0421	5240	0.0421	-8.0344
		T (°C)	30	5240.0126	5240	0.0126	-2.4046
		T (°C)	40	5240.0058	5240	0.0058	-1.1069
		T (°C)	50	5240.0174	5240	0.0174	-3.3206
		T (°C)	60	5240.0058	5240	0.0058	-1.1069
		T (°C)	70	5240.0100	5240	0.0100	-1.9084
Limits				± 20 ppm			
Result				Complies			

Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	1012 hPa	Test Voltage ：	DC 5V from adapter AC 120V/60Hz
Test Mode ：	ANT 1 TX 5745-5850MHz		

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5745MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120.00	5745.00623	5745	0.00623	-1.0843
		V max (V)	138.00	5745.00098	5745	0.00098	-0.1706
		V min (V)	102.00	5745.00866	5745	0.00866	-1.5078
Limits				± 20 ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5745MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	-20	5745.00825	5745	0.00825	-1.4354
		T (°C)	-10	5745.00442	5745	0.00442	-0.7690
		T (°C)	0	5745.00656	5745	0.00656	-1.1425
		T (°C)	10	5745.00698	5745	0.00698	-1.2142
		T (°C)	20	5745.01275	5745	0.01275	-2.2190
		T (°C)	30	5745.00023	5745	0.00023	-0.0397
		T (°C)	40	5745.00181	5745	0.00181	-0.3152
		T (°C)	50	5745.01045	5745	0.01045	-1.8194
		T (°C)	60	5745.00038	5745	0.00038	-0.0664
		T (°C)	70	5745.00832	5745	0.00832	-1.4476
Limits				± 20 ppm			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5785MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120.00	5785.00776	5785	0.00776	-1.3416
		V max (V)	138.00	5785.00578	5785	0.00578	-1.0000
		V min (V)	102.00	5785.00877	5785	0.00877	-1.5151
Limits				± 20 ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5785MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	-20	5785.00164	5785	0.00164	-0.2831
		T (°C)	-10	5785.00464	5785	0.00464	-0.8013
		T (°C)	0	5785.00338	5785	0.00338	-0.5850
		T (°C)	10	5785.00938	5785	0.00938	-1.6211
		T (°C)	20	5785.00448	5785	0.00448	-0.7751
		T (°C)	30	5785.00718	5785	0.00718	-1.2415
		T (°C)	40	5785.00530	5785	0.00530	-0.9162
		T (°C)	50	5785.00296	5785	0.00296	-0.5123
		T (°C)	60	5785.01043	5785	0.01043	-1.8023
		T (°C)	70	5785.00796	5785	0.00796	-1.3756
Limits				± 20 ppm			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5825MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120.00	5825.01095	5825	0.01095	-1.8801
		V max (V)	138.00	5825.00419	5825	0.00419	-0.7187
		V min (V)	102.00	5825.00153	5825	0.00153	-0.2629
Limits				± 20 ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5825MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	-20	5825.00570	5825	0.00570	-0.9780
		T (°C)	-10	5825.01293	5825	0.01293	-2.2205
		T (°C)	0	5825.00684	5825	0.00684	-1.1738
		T (°C)	10	5825.00772	5825	0.00772	-1.3261
		T (°C)	20	5825.00006	5825	0.00006	-0.0102
		T (°C)	30	5825.01301	5825	0.01301	-2.2336
		T (°C)	40	5825.00715	5825	0.00715	-1.2278
		T (°C)	50	5825.00538	5825	0.00538	-0.9228
		T (°C)	60	5825.00561	5825	0.00561	-0.9638
		T (°C)	70	5825.00865	5825	0.00865	-1.4847
Limits				± 20 ppm			
Result				Complies			

12.ANTENNA REQUIREMENT

Standard requirement:	FCC Part15 C Section 15.203
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.	
EUT Antenna:	
The antenna 1 is PCB Antenna, the best case gain of the antenna is 3dBi, reference to the appendix II for details. The antenna 2 is PCB Antenna, the best case gain of the antenna is 3dBi, reference to the appendix II for details.	

13. TEST SETUP PHOTO

Reference to the appendix I for details.

14. EUT CONSTRUCTIONAL DETAILS

Reference to the appendix II for details.

※※※※※ END OF REPORT ※※※※※