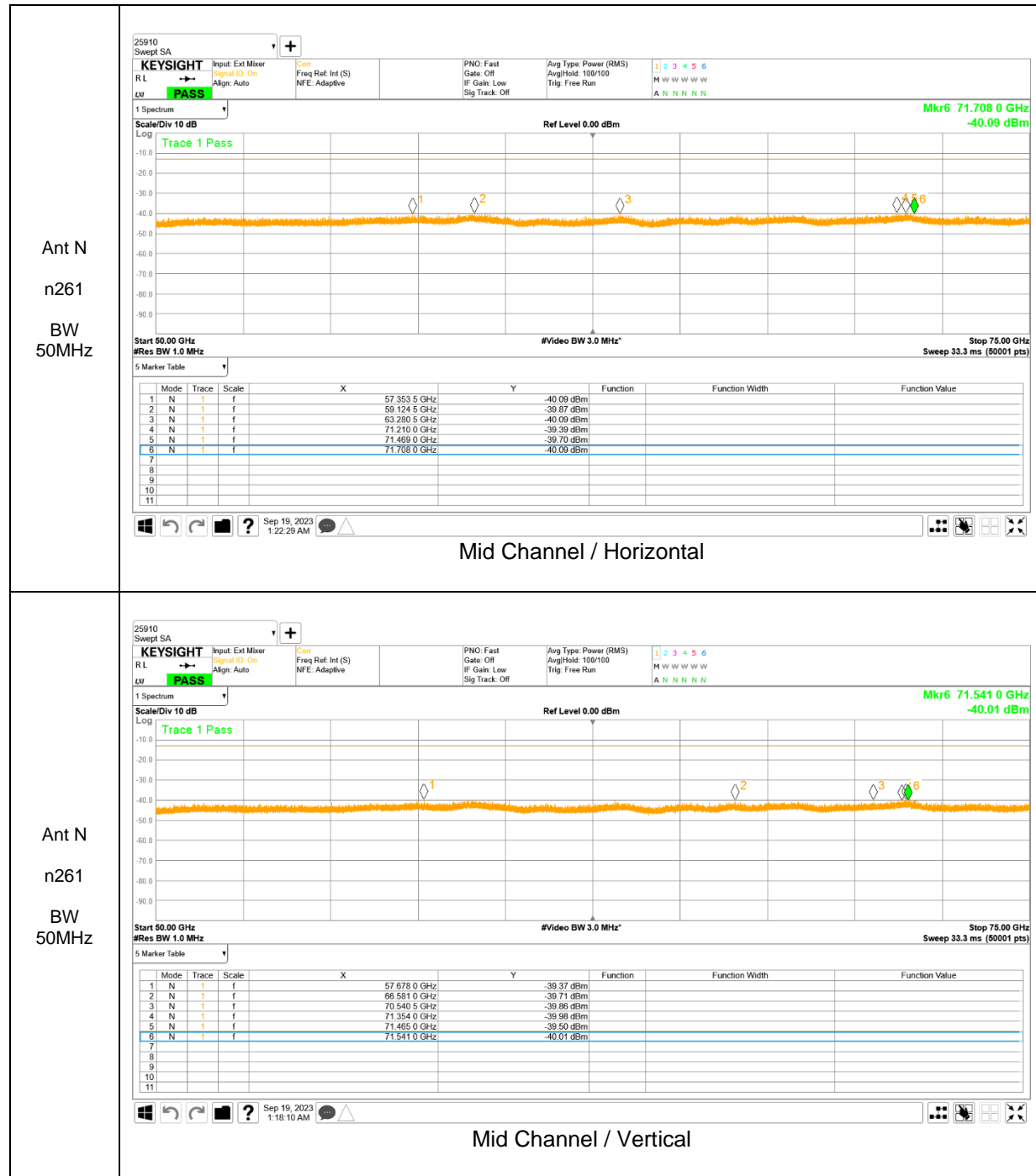
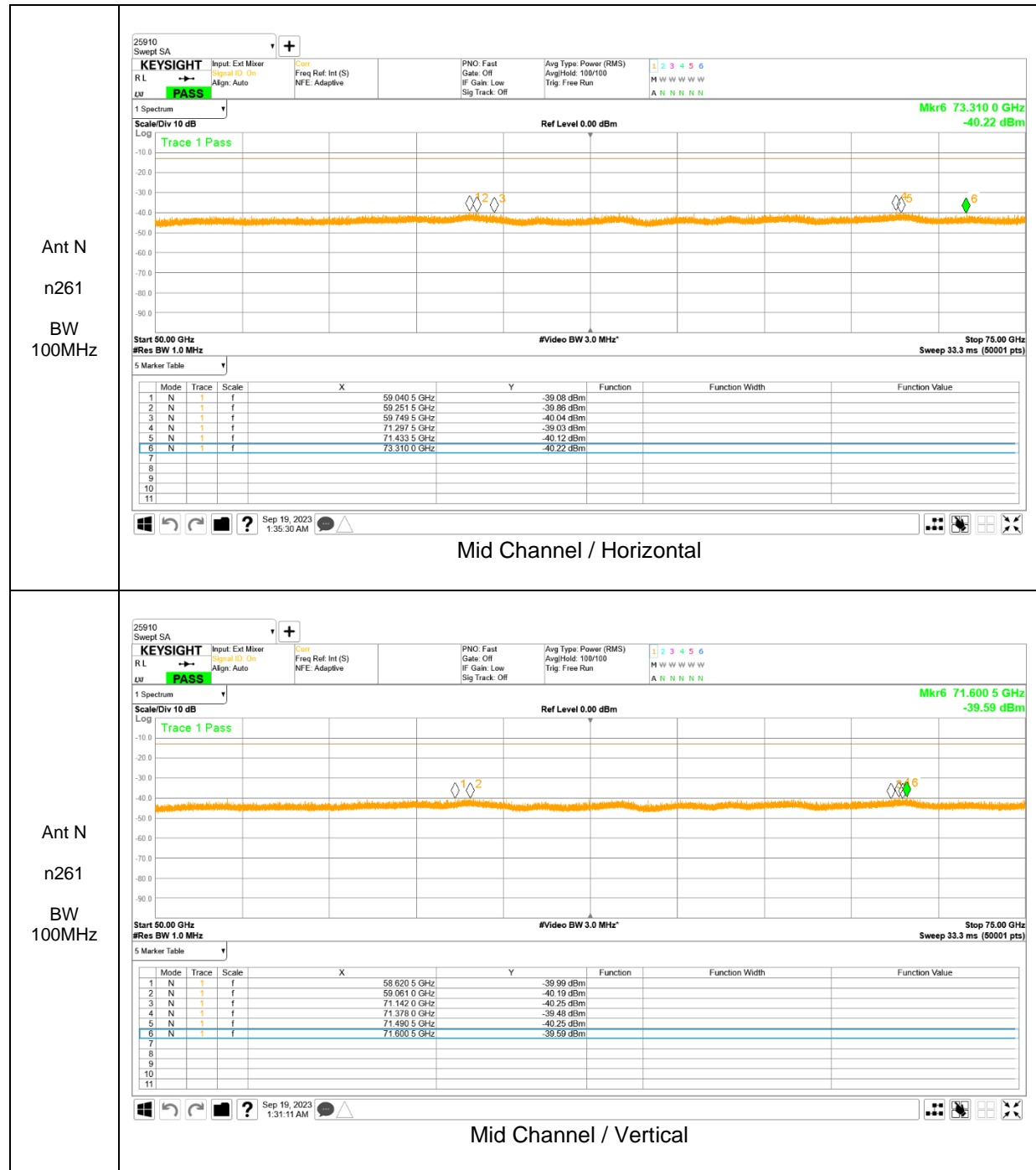


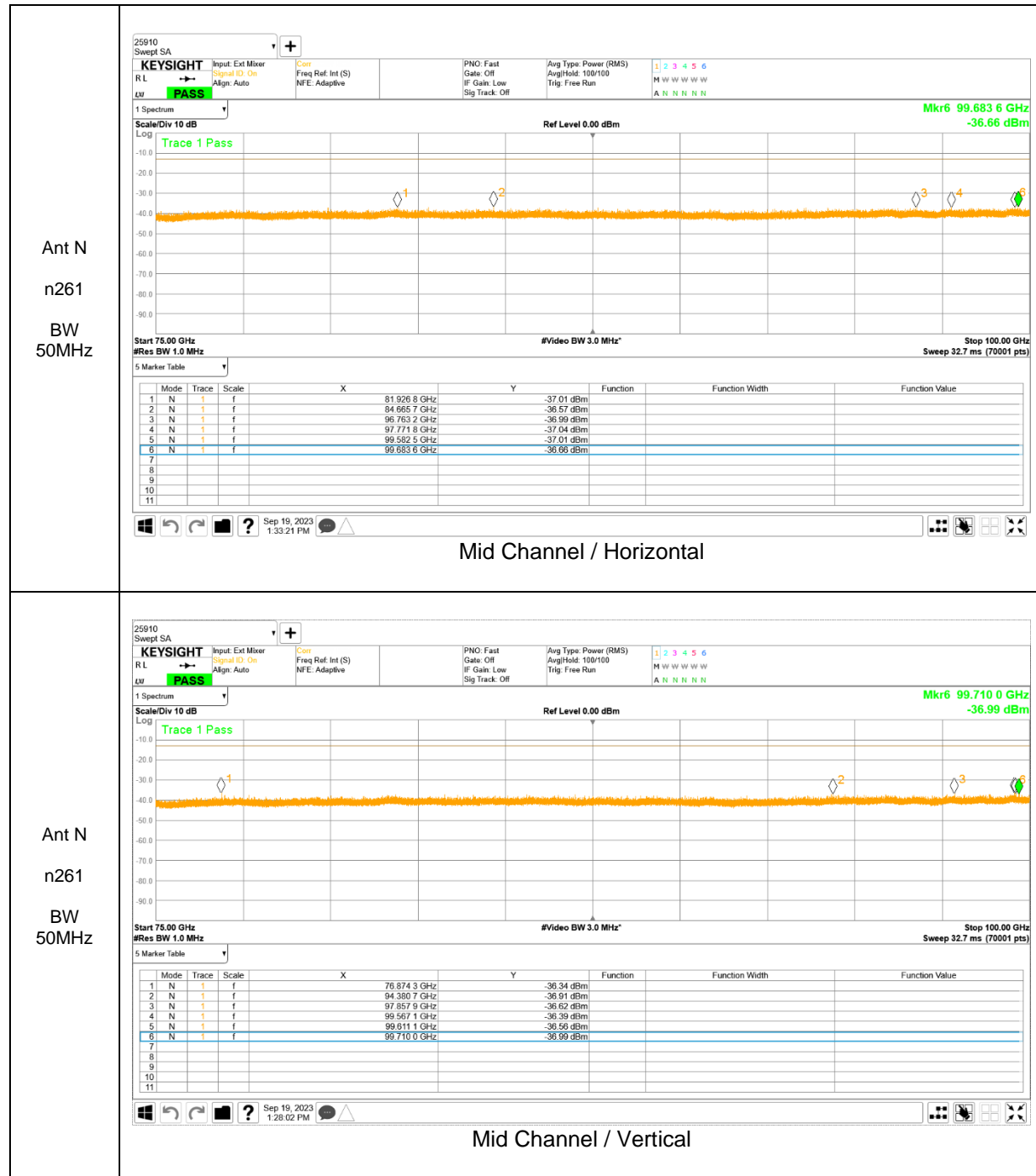
50 – 75 GHz Result



No emissions were detected above noise floor this antenna and band.



75 – 100 GHz Result

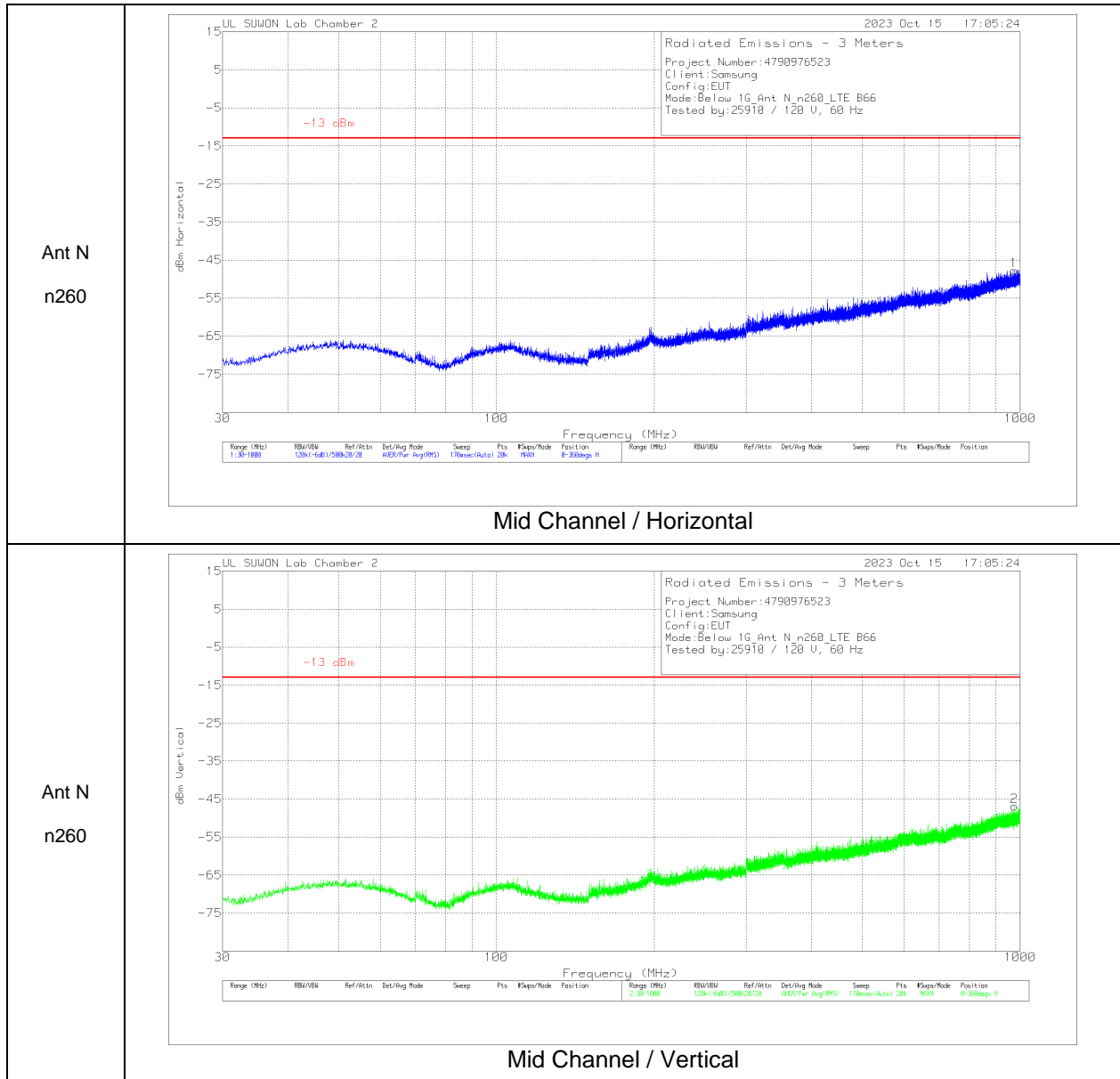




No emissions were detected above noise floor this antenna and band.

Antenna 2 / Ant N / n260

30 – 1000 MHz Result



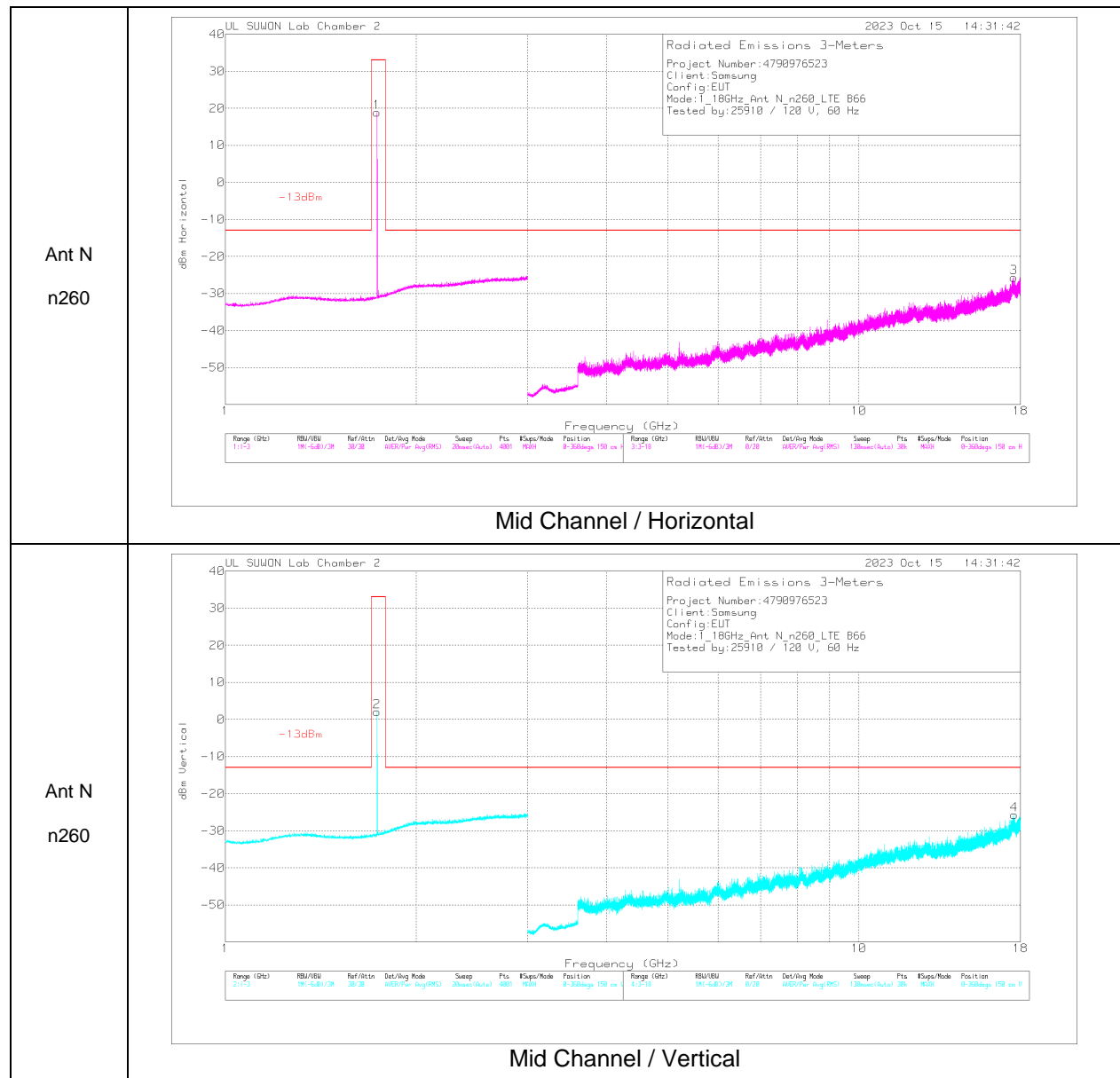
Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	VULB9163_749	Below_1G(dB)	Conversion Factor(dB)	Corrected Reading dBm	-13 dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	974.2076	-60.24	RMS	27.6	-26.9	11.8	-47.74	-13	-34.74	0-360	300	H
2	975.905	-59.53	RMS	27.6	-26.8	11.8	-46.93	-13	-33.93	0-360	200	V

RMS - RMS detection

No emissions were detected above noise floor this antenna and band.

1 – 18 GHz Result



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	3117_00168724	10dB_ATT(dB)	Conversion Factor(dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.736	-1.37	RMS	28.9	-20.5	11.8	18.83	33	-14.17	0-360	150	H
2	1.736	-18.19	RMS	28.9	-20.5	11.8	2.01	33	-30.99	0-360	150	V
3	17.565	-62.8	RMS	41.6	-16.3	11.8	-25.7	-13	-12.7	0-360	150	H
4	17.5895	-62.63	RMS	41.6	-16.5	11.8	-25.73	-13	-12.73	0-360	150	V

RMS - RMS detection

** Marker 1 and 2 were the fundamental signal of LTE Band 66 that was used as a representative anchor band for EN-DC investigations.
 No emissions were detected above the noise floor which was at least 20dB below the specification limit.

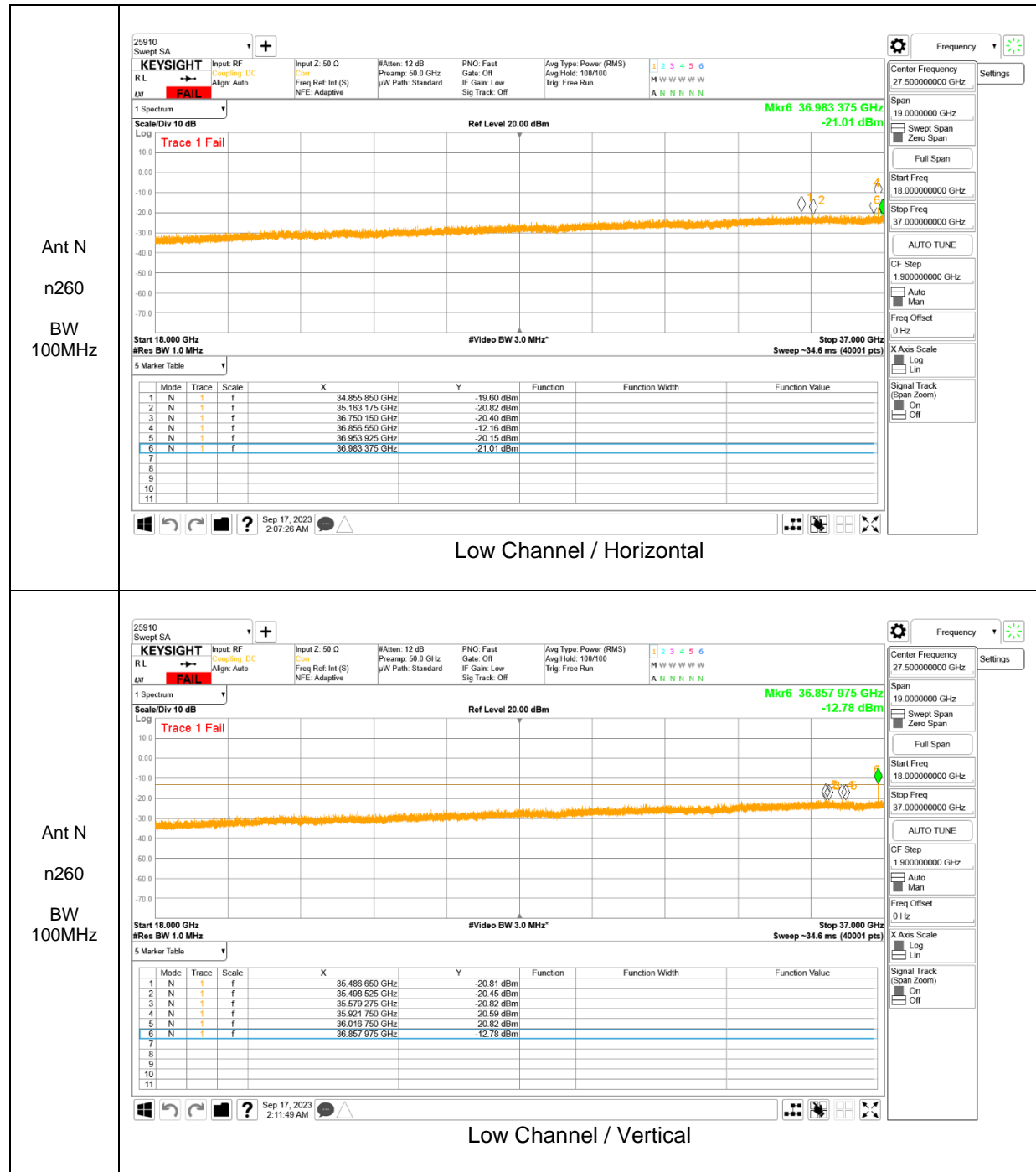
18 – 37 GHz Result



Note. After pre-scan, a zoom scan was performed on the identified spurious emissions.

Final Measurement Data Table

Frequency [GHz]	Bandwidth [MHz]	EUT Beam	Modulation	Ant pol [H/V]	X-Axis [degree]	Y-Axis [degree]	EIRP [dBm]	Limit [dBm]	Margin [dB]
36.93	50	SISO-Dual	QPSK	V	175.17	81.5	-23.47	-13	10.47
36.93	50	SISO-Dual	QPSK	H	175	118.0	-21.20	-13	8.20



Note. After pre-scan, a zoom scan was performed on the identified spurious emissions.

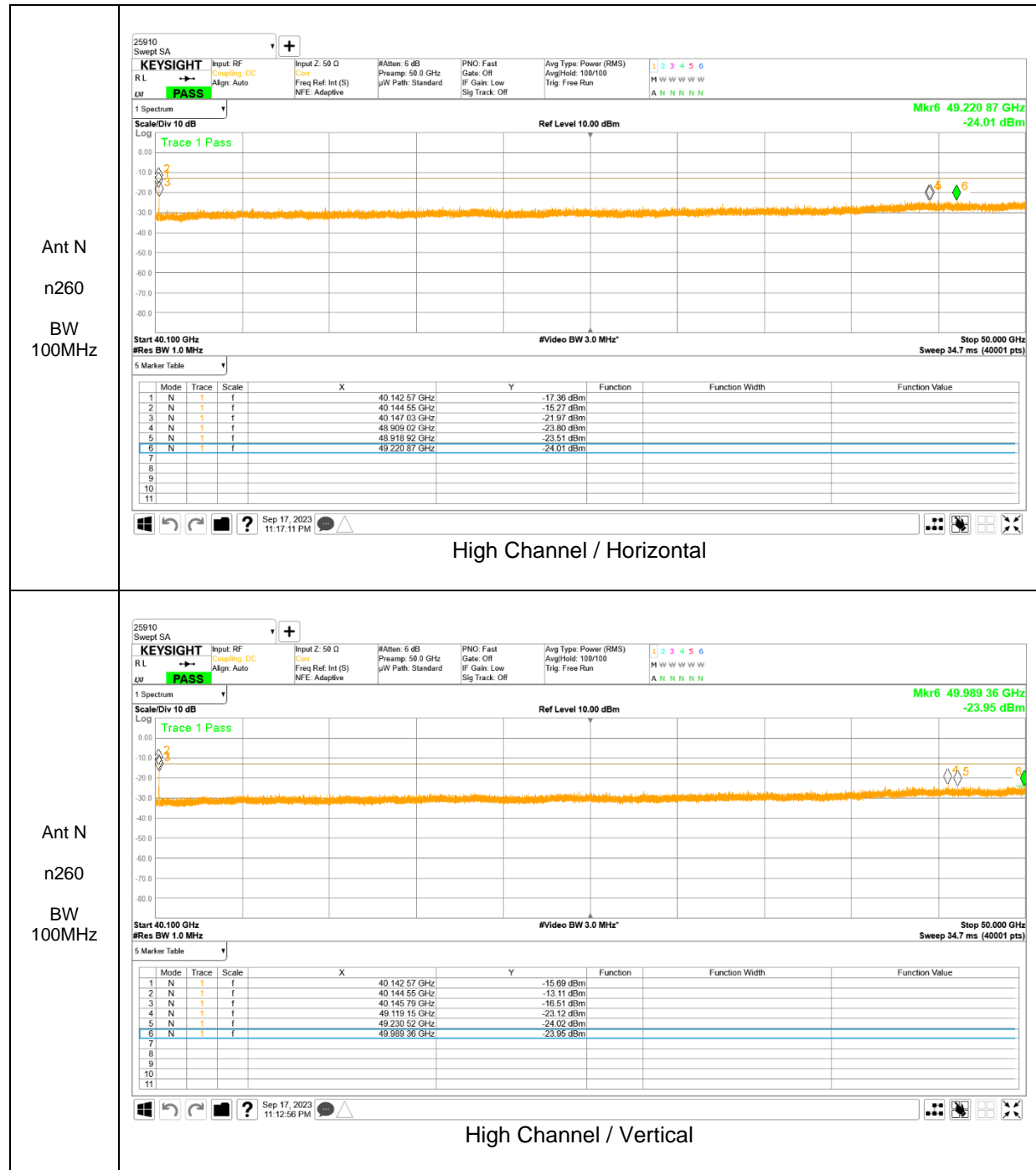
Final Measurement Data Table

Frequency [GHz]	Bandwidth [MHz]	EUT Beam	Modulation	Ant pol [H/V]	X-Axis [degree]	Y-Axis [degree]	EIRP [dBm]	Limit [dBm]	Margin [dB]
36.86	100	SISO-Dual	QPSK	V	176.58	73.0	-18.99	-13	5.99
36.86	100	SISO-Dual	QPSK	H	175.49	118.0	-18.86	-13	5.86

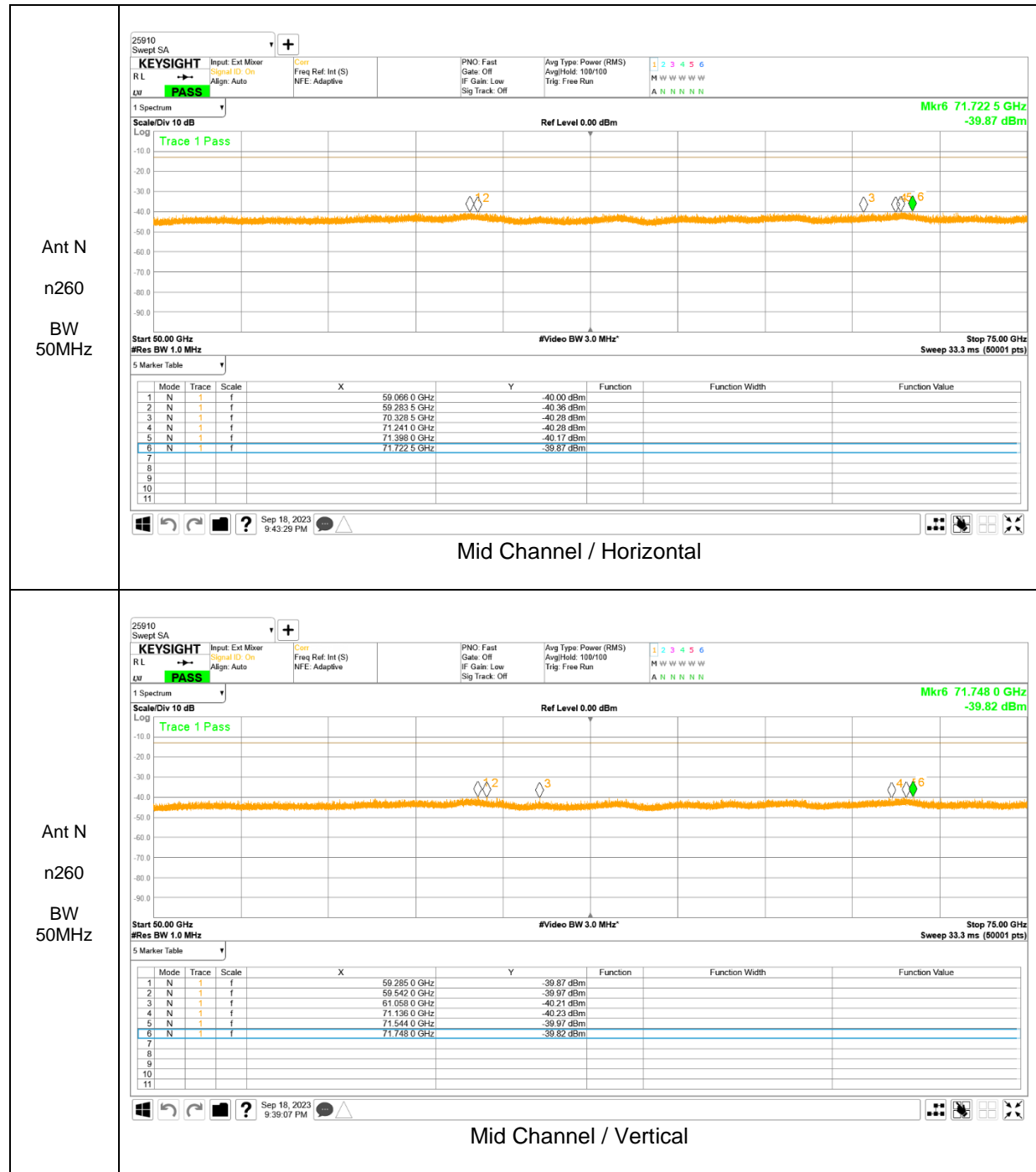
40.1 – 50 GHz Result



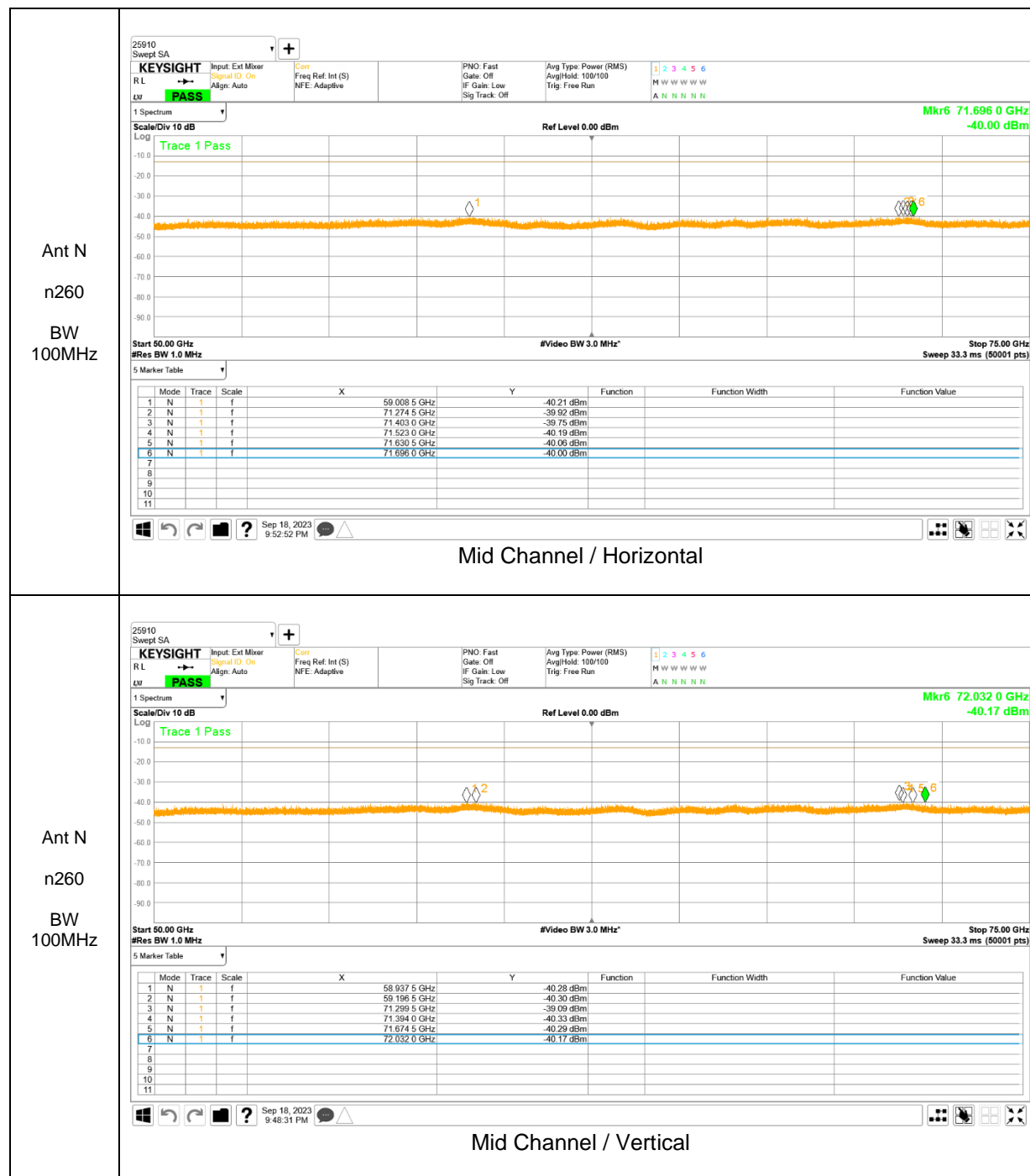
No emissions were detected above noise floor this antenna and band.



50 – 75 GHz Result

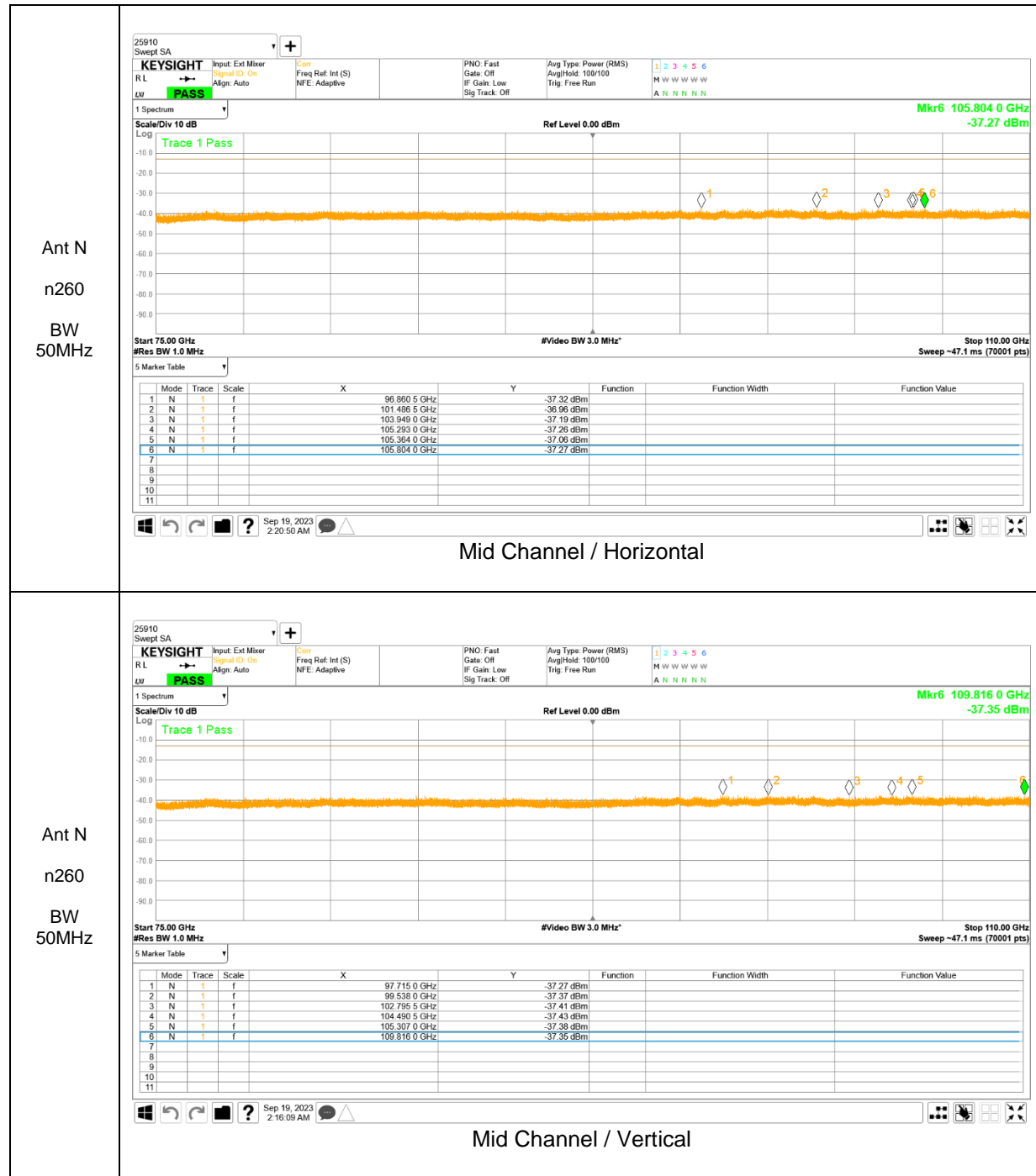


No emissions were detected above noise floor this antenna and band.

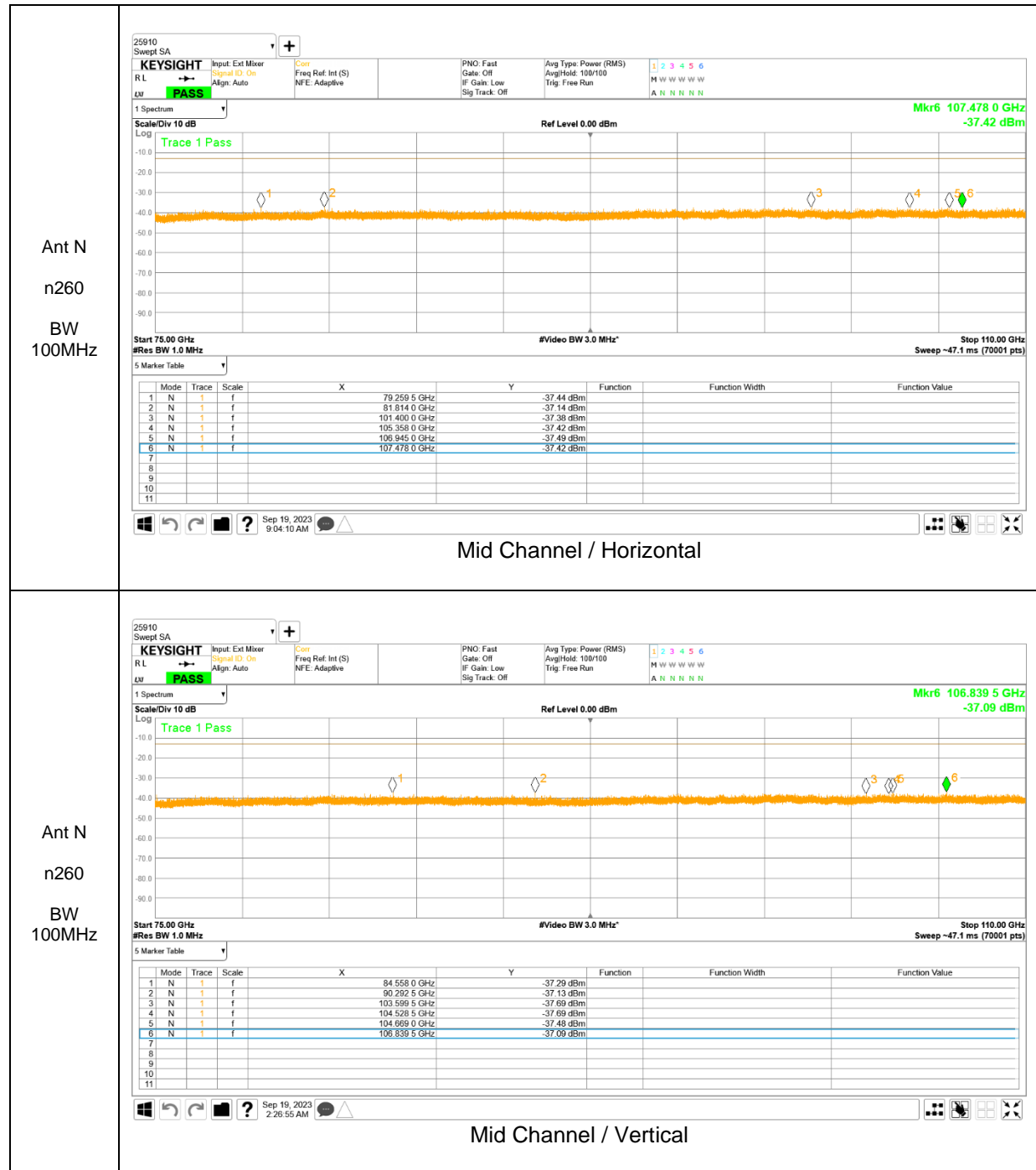


No emissions were detected above noise floor this antenna and band.

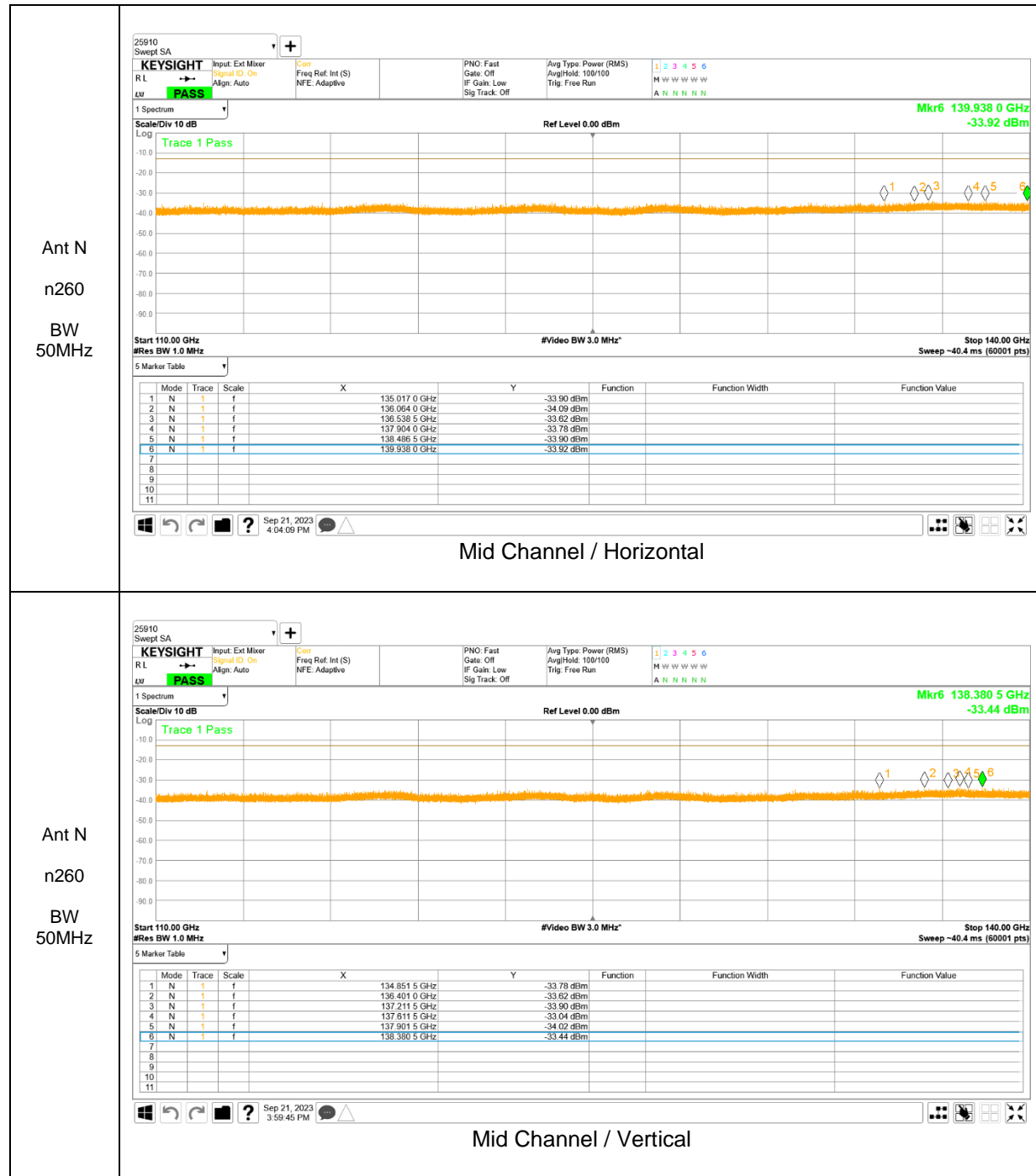
75 – 110 GHz Result



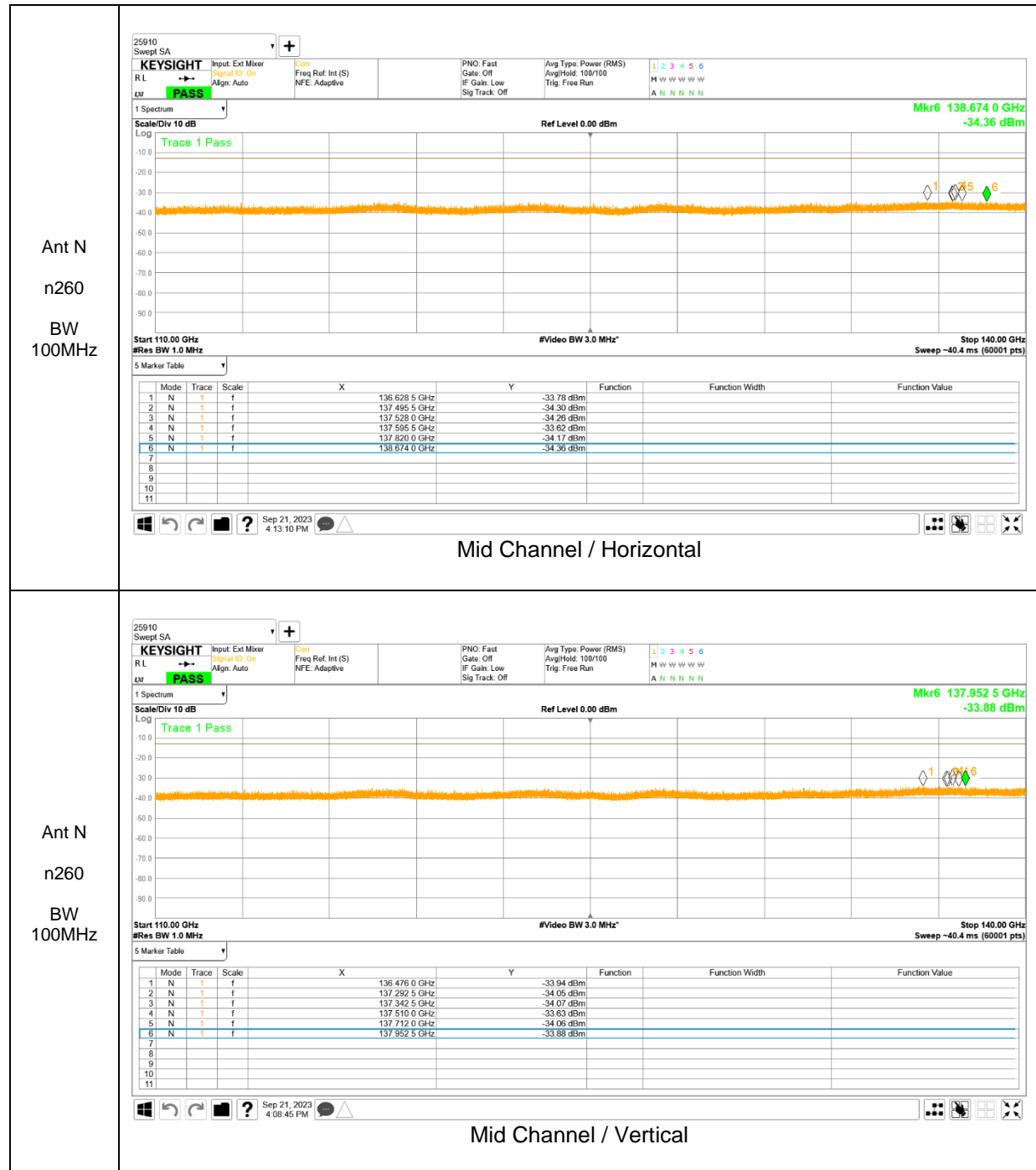
No emissions were detected above noise floor this antenna and band.



110 – 140 GHz Result

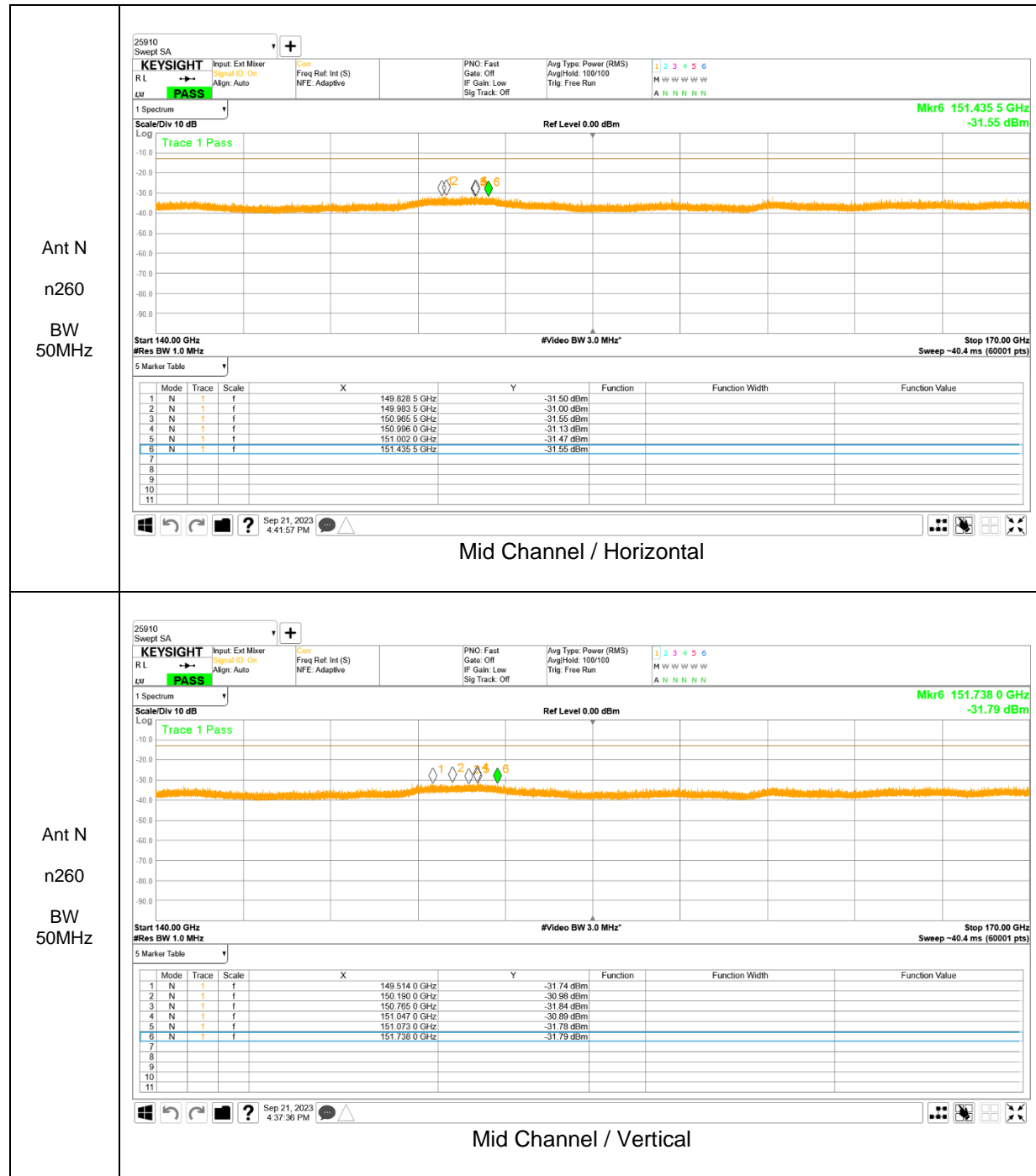


No emissions were detected above noise floor this antenna and band.

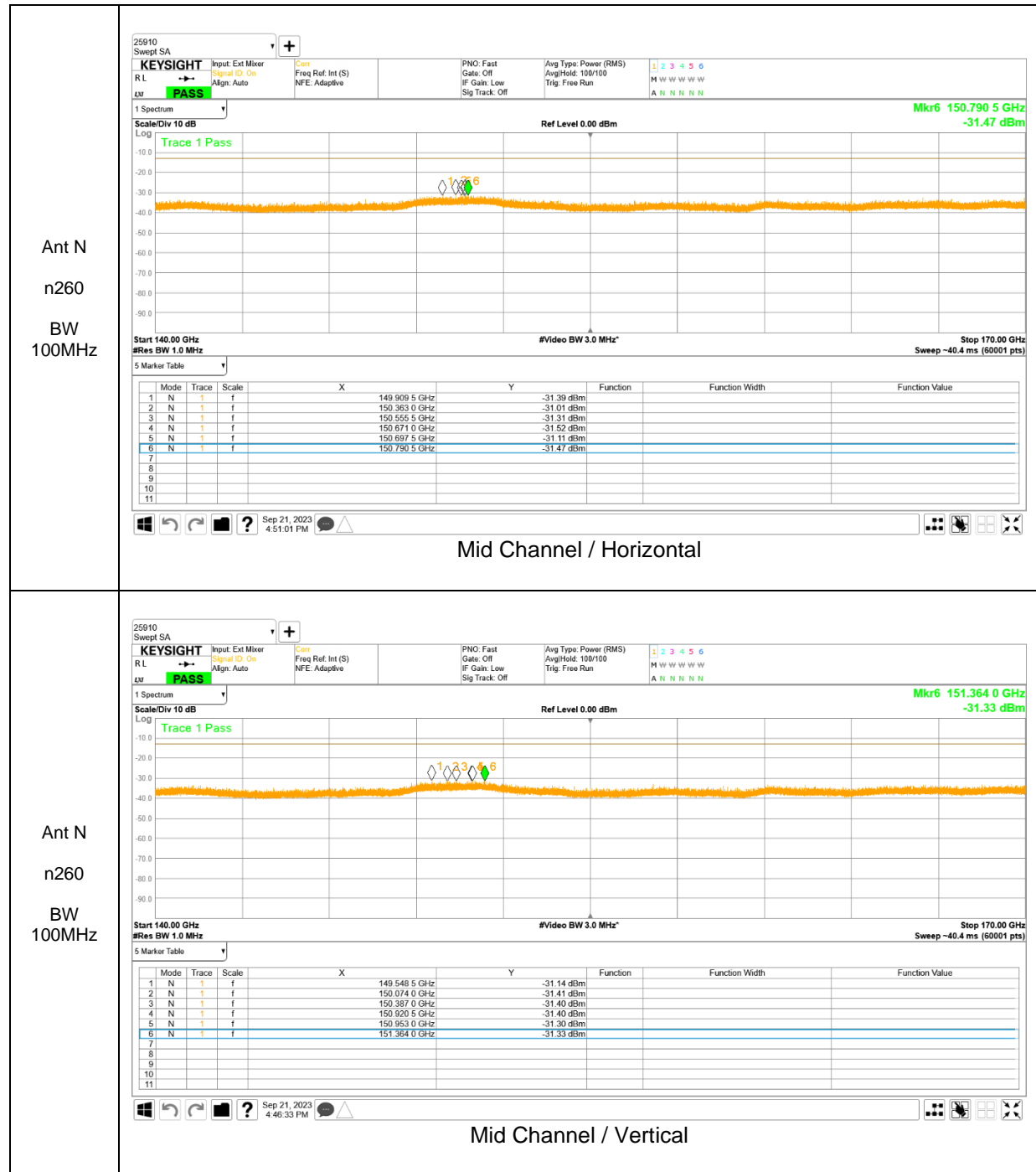


No emissions were detected above noise floor this antenna and band.

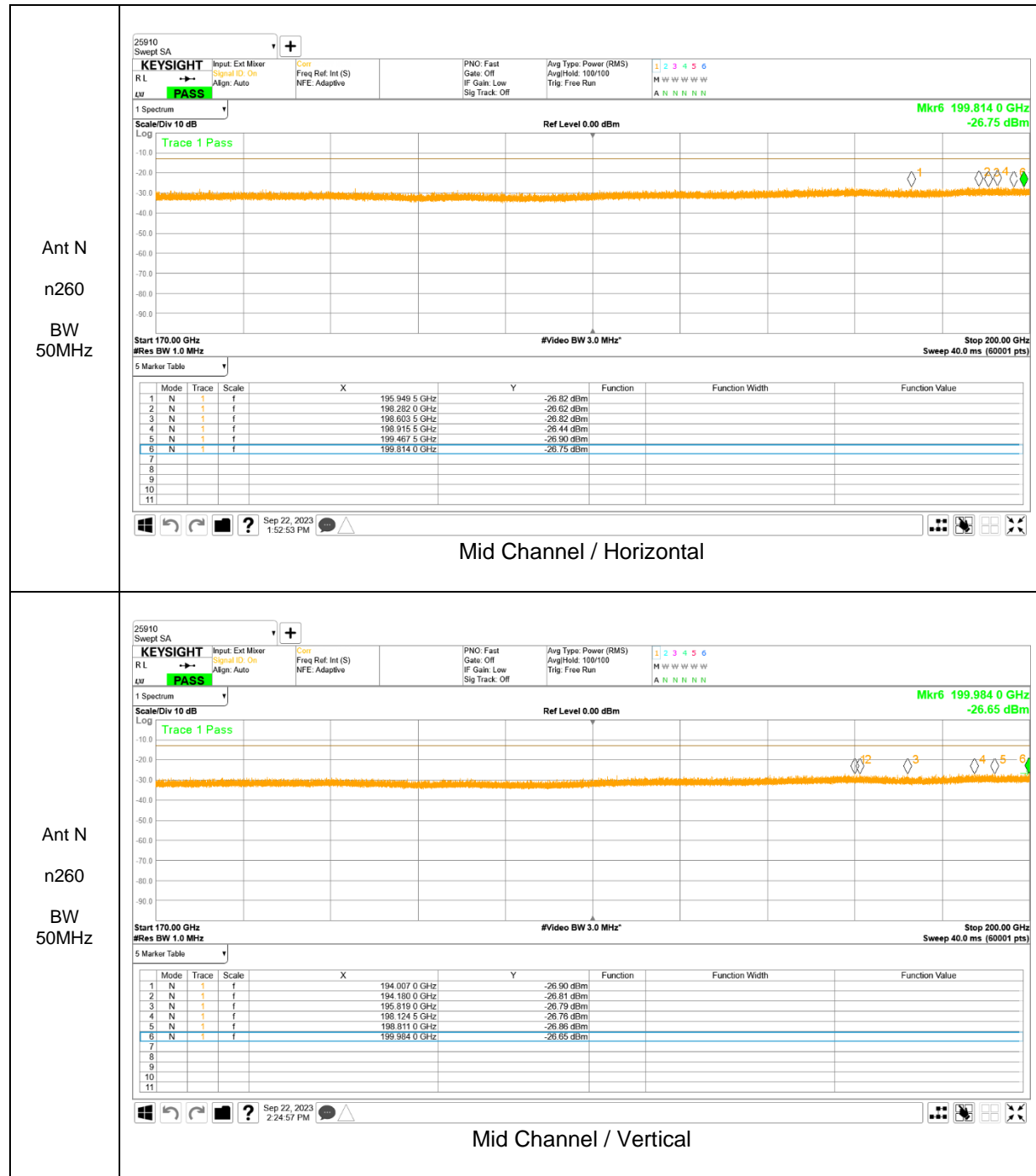
140 – 170 GHz Result

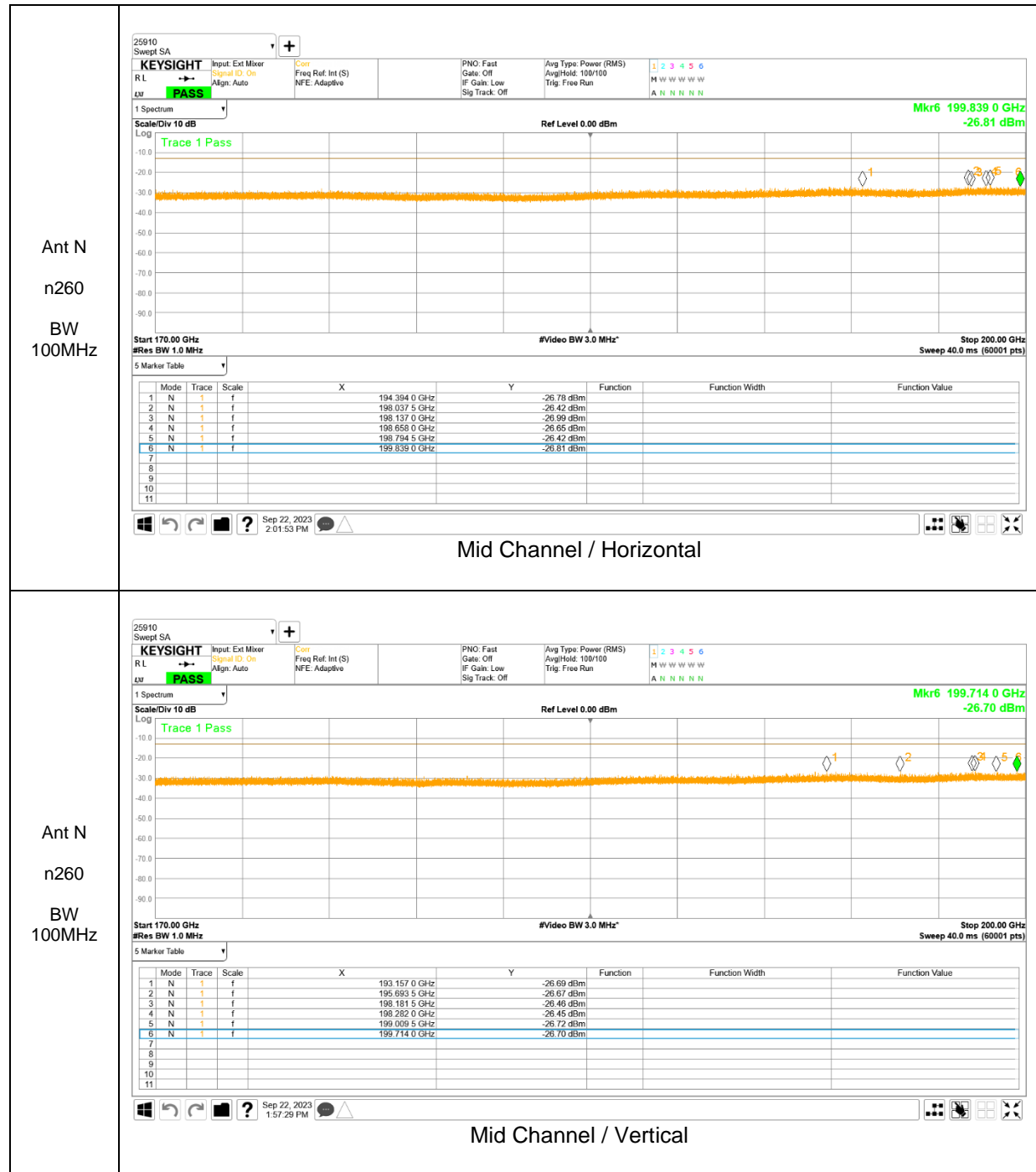


No emissions were detected above noise floor this antenna and band.



170 – 200 GHz Result





8.5. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055

LIMITS

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

TEST PROCEDURE

Test procedures for temperature variation

- a) Position the EUT in temperature/humidity chamber with power off.
- b) Set chamber temperature to -30°C and stabilize the EUT for at least 30 minutes.
- c) Record maximum change in frequency within one minute after powering the EUT.
- d) Increase chamber temperature at 10°C intervals from -30°C to 50°C. Record maximum change in frequency at each temperature.
- e) A period of at least 30 minutes is provided to allow stabilization of the equipment at each temperature level.

Test procedures for voltage variation

- a) Position the EUT in temperature/humidity chamber with power off.
- b) Set chamber temperature to 20°C.
- c) Record maximum frequency change within one minute after powering the EUT.
- d) The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

(KDB 842590 D01 Upper Microwave Flexible Use Service v01r02 Section 4.5)
(ANSI C63.26-2015 Section 5.6)

NOTE :

The Deviation column in the table below is the amount of deviation measured from the center frequency of the authorized bands of operation.

The measurement were performed with the DFT-s OFDM and SISO-Dual mode.

RESULTS

See the following pages.

8.5.1. FREQUENCY STABILITY RESULTS

Band n258 SB1

Limit (MHz)		24250			24450		
Condition		F low @ End of OBW	Delta (kHz)	Deviation (%)	F high @ End of OBW	Delta (kHz)	Deviation (%)
Temperature	Voltage	(MHz)			(MHz)		
Normal (20°C) (Ref)	Normal	24250.0400	0.000	0.000000	24450.0400	0.000	0.000000
Extreme (50°C)		24250.0400	-7.459	-0.000031	24450.0400	-18.851	-0.000077
Extreme (40°C)		24250.0399	-51.165	-0.000210	24450.0399	-77.314	-0.000318
Extreme (30°C)		24250.0400	-46.754	-0.000192	24450.0400	23.465	0.000096
Extreme (10°C)		24250.0400	3.072	0.000013	24450.0400	-15.923	-0.000065
Extreme (0°C)		24250.0400	14.456	0.000059	24450.0400	-23.122	-0.000095
Extreme (-10°C)		24250.0400	-23.538	-0.000097	24450.0400	-29.902	-0.000123
Extreme (-20°C)		24250.0400	-35.052	-0.000144	24450.0398	-151.890	-0.000624
Extreme (-30°C)		24250.0400	-38.183	-0.000157	24450.0399	-67.042	-0.000275
Normal (20°C)		15%	24250.0400	26.370	0.000108	24450.0401	99.975
	-15%	24250.0399	12.847	0.000053	24450.0401	119.030	0.000489
	End Point	24250.0400	22.260	0.000091	24450.0400	-30.094	-0.000124

Band n258 SB2

Limit (MHz)		24750			25250		
Condition		F low @ End of OBW	Delta (kHz)	Deviation (%)	F high @ End of OBW	Delta (kHz)	Deviation (%)
Temperature	Voltage	(MHz)			(MHz)		
Normal (20°C) (Ref)	Normal	24750.0800	0.000	0.000000	25249.9600	0.000	0.000000
Extreme (50°C)		24750.0800	-39.381	-0.000158	25249.9599	-57.971	-0.000232
Extreme (40°C)		24750.0800	32.879	0.000132	25249.9599	-89.698	-0.000359
Extreme (30°C)		24750.0800	-4.818	-0.000019	25249.9600	-45.793	-0.000183
Extreme (10°C)		24750.0800	-32.088	-0.000128	25249.9599	-97.463	-0.000390
Extreme (0°C)		24750.0800	2.047	0.000008	25249.9600	3.790	0.000015
Extreme (-10°C)		24750.0800	26.951	0.000108	25249.9600	-45.223	-0.000181
Extreme (-20°C)		24750.0801	52.861	0.000211	25249.9599	-98.123	-0.000392
Extreme (-30°C)		24750.0800	-10.401	-0.000042	25249.9600	22.272	0.000089
Normal (20°C)		15%	24750.0800	71.860	0.000287	25249.9600	-35.139
	-15%	24750.0800	42.142	0.000169	25249.9600	8.182	0.000033
	End Point	24750.0800	-22.031	-0.000088	25249.9599	-70.363	-0.000281

Band n261

Limit (MHz)		27500			28350		
Condition		F low @ End of OBW	Delta (kHz)	Deviation (%)	F high @ End of OBW	Delta (kHz)	Deviation (%)
Temperature	Voltage	(MHz)			(MHz)		
Normal (20°C) (Ref)	Normal	27500.0000	0.000	0.000000	28349.9200	0.000	0.000000
Extreme (50°C)		27499.9999	-122.720	-0.000439	28349.9200	-8.434	-0.000030
Extreme (40°C)		27500.0000	-22.133	-0.000079	28349.9200	-38.306	-0.000137
Extreme (30°C)		27499.9999	-85.308	-0.000305	28349.9200	-6.943	-0.000025
Extreme (10°C)		27500.0000	37.234	0.000133	28349.9200	-44.424	-0.000159
Extreme (0°C)		27500.0000	-10.042	-0.000036	28349.9200	-28.550	-0.000102
Extreme (-10°C)		27499.9999	-88.566	-0.000317	28349.9200	-15.601	-0.000056
Extreme (-20°C)		27500.0000	36.139	0.000129	28349.9200	27.109	0.000097
Extreme (-30°C)		27500.0000	-25.665	-0.000092	28349.9200	-31.230	-0.000112
Normal (20°C)		15%	27499.9999	45.496	0.000163	28349.9201	56.118
	-15%	27500.0000	-15.106	-0.000054	28349.9200	13.907	0.000050
	End Point	27499.9999	-91.311	-0.000327	28349.9200	-68.473	-0.000245

Band n260

Limit (MHz)		37000			40000		
Condition		F low @ End of OBW	Delta (kHz)	Deviation (%)	F high @ End of OBW	Delta (kHz)	Deviation (%)
Temperature	Voltage	(MHz)			(MHz)		
Normal (20°C) (Ref)	Normal	37000.0400	0.000	0.000000	39999.9000	0.000	0.000000
Extreme (50°C)		37000.0399	-79.166	-0.000206	39999.8999	-132.170	-0.000343
Extreme (40°C)		37000.0399	-114.590	-0.000298	39999.8999	-142.400	-0.000370
Extreme (30°C)		37000.0400	-32.077	-0.000083	39999.8999	-71.732	-0.000186
Extreme (10°C)		37000.0399	-69.431	-0.000180	39999.8999	-97.695	-0.000254
Extreme (0°C)		37000.0400	-28.275	-0.000073	39999.9000	29.869	0.000078
Extreme (-10°C)		37000.0400	11.416	0.000030	39999.8999	-72.182	-0.000187
Extreme (-20°C)		37000.0399	-85.178	-0.000221	39999.9000	-1.801	-0.000005
Extreme (-30°C)		37000.0400	-35.583	-0.000092	39999.8999	-76.286	-0.000198
Normal (20°C)		15%	37000.0399	-110.820	-0.000288	39999.9001	53.962
	-15%	37000.0399	-92.483	-0.000240	39999.9000	-15.717	-0.000041
	End Point	37000.0400	-17.563	-0.000046	39999.8999	-17.631	-0.000046

Appendix A

1. Accreditation Scope

A transmitter operating at 40 GHz requires spurious emissions to be investigated up to 200 GHz. In this case, the test laboratory scope should reflect that it has capability to measure up to 200 GHz.

UL KOREA LTD. test sites and facilities are covered under FCC test Firm Registrations #KR0161.

The scope of accreditation can be viewed at

https://apps.fcc.gov/oetcf/eas/reports/ViewTestFirmAccredScopes.cfm?calledFromFrame=N&RequestTimeout=500®num_specified=N&test_firm_id=7730

2. VDI Mixer Certificate Report

2.1. Model : N9029AV15, S/N : SAX693



교정성적서
 CALIBRATION CERTIFICATE
 경기도 이천시 마장면 서이천로 578번길 74
 TEL : 031-645-6900, FAX : 031-645-6969



성적서발급번호(Certificate No) : IC-2023-002048
 교정번호(Callibration No) : C-2023-002629

페이지(page) : 1 of 4

- 1. 의뢰자 (Client)**
 - 기관명 (Name) : 유엘코리아(주)
 - 주소 (Address) : 경기도 수원시 영통구 매영로 218
- 2. 측정기 (Calibration Subject)**
 - ◇ 등록번호 : 409611
 - 기기명 (Description) : SA EXTENSION MODULE
 - 제작회사 및 형식(Manufacturer and Model Name) : VDI / SAX WR15
 - 기기번호 (Serial Number) : SAX693
- 3. 교정일자 (Date of Calibration) : 2023.01.12** 차기교정예정일자 : 2024.01.12
 (The due date of next Calibration)
- 4. 교정환경 (Environment)**
 - 온도(Temperature) : (22.5 ± 0.2) °C - 습도(Humidity) : (45 ± 2) % R.H.
 - 교정장소 (Location) : 고정표준실(Permanent Calibration Lab)
 (주소: 경기도 이천시 마장면 서이천로 578번길 74)
- 5. 측정 표준의 소급성 (Traceability)** ◇Field code : 40641(RF SPECTRUM ANALYZER)
 교정방법 및 소급성 서술 (Calibration method and/or brief description)
 상기 기기는 고주파 스펙트럼 분석기의 교정절차(HCT-CS-125-40641)에 따라 국가측정표준기관으로부터 측정의 소급성이 확보된 아래의 표준장비를 이용하여 교정 되었음.

교정에 사용한 표준장비 명세 (List of used standards/specifications)

기기명 (Description)	제작회사 / 형식 (Manufacturer and Model Name)	기기번호 (Serial Number)	차기교정예정일자 (The due date of next Calibration)	교정기관 (Calibration laboratory)
PSG ANALOG SIGNAL GENERATOR	AGILENT/EB257D	MY46130629	2023/10/26	(주)에이치시티
EPM-P SERIES POWER METER	AGILENT/E4417A	GB41291582	2023/06/03	(주)에이치시티
POWER SENSOR	KEYSIGHT/V8486A	MY56330017	2023/12/13	Keysight Technologies
WR-12 MULTIPLIER SOURCE MODULE	OML/S12MS-A	160419-1	2023/07/19	(주)에이치시티
WR-19 MULTIPLIER SOURCE MODULE	OML/S19MS-A	160516-1	2023/07/19	(주)에이치시티

- 6. 교정결과 (Calibration result)** : 교정결과 참조 (Refer to attachment)
- 7. 측정불확도 (Measurement uncertainty)** : 교정결과 참조 (Refer to attachment)
 신뢰수준 약 95 %, k = 2 (Confidence level about 95 %, k = 2)

확인 (affirmation)	작성자 (Measurements performed by)		승인자 (Approved by)	
	성명 (Name) 고형재		직위 (Title) 기술책임자(Technical Cal. Manager)	
			성명 (Name) 김광철	

위 성적서는 국제시험기관인정협력체(International Laboratory Accreditation Cooperation) 상호인정협정(Mutual Recognition Arrangement)에 서명한 한국인정기구(KOLAS)로부터 공인 받은 분야의 교정결과입니다.

2023. 01. 12
 한국인정기구 인정 (주)에이치시티 대표이사
 Accredited by KOLAS, Republic of KOREA President, HCT Co., Ltd.



※ 위 성적서는 측정기의 정밀정확도에 영향을 미치는 요소(과부하, 온도, 습도 등)의 급격한 변화가 발생한 경우에는 무효가 됩니다.
 ※ 고객현장사이트(www.callab.co.kr)에서 성적서의 진위여부 확인이 가능합니다.
 ※ 성적서의 원본은 상단에 HCT 로고가 찍혀 있는 위변조 방지 용지에 인쇄되어 발급되며, 원본 복사시에는 복사본이라는 표시가 처리됩니다.
 ■고객사 관리번호: **SUW-E0250**

F-02P-02-008 (Rev.02)

교 정 결 과

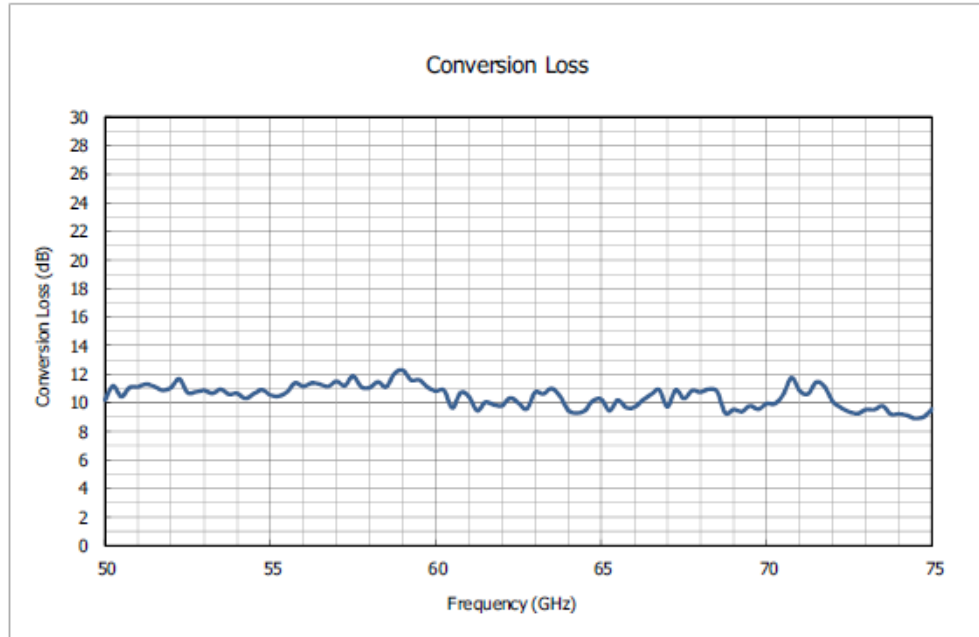
CALIBRATION RESULT



성적서발급번호(Certificate No) : IC-2023-002048
교 정 번 호(Calibration No) : C-2023-002629

페이지(page) : 2 of 4

1. Conversion Loss Graph



[Note]

1. Measurement Condition : RF = -30 dBm, Harmonic Order = 12, L.O. Level = 10 dBm, IF = 322.5 MHz, Bias Value = 0.00 mA
2. This is the result of measuring the requested equipment and Keysight N9040B (S/N : MY60080268) together.

F-02P-02-008 (Rev.02)

교 정 결 과

CALIBRATION RESULT



성적서발급번호(Certificate No) : IC-2023-002048
 교 정 번 호(Calibration No) : C-2023-002629

페이지(page) : 3 of 4

2. Conversion Loss Data

Frequency (GHz)	Conversion Loss (dB)	Measurement Uncertainty (dB)	Frequency (GHz)	Conversion Loss (dB)	Measurement Uncertainty (dB)
50.00	10.18	0.82	59.25	11.60	0.82
50.25	11.18	0.82	59.50	11.60	0.82
50.50	10.43	0.82	59.75	11.10	0.82
50.75	11.08	0.82	60.00	10.82	0.82
51.00	11.12	0.82	60.25	10.86	0.82
51.25	11.30	0.82	60.50	9.64	0.82
51.50	11.13	0.82	60.75	10.71	0.82
51.75	10.87	0.82	61.00	10.44	0.82
52.00	11.06	0.82	61.25	9.46	0.82
52.25	11.67	0.82	61.50	10.03	0.82
52.50	10.72	0.82	61.75	9.87	0.82
52.75	10.76	0.82	62.00	9.79	0.82
53.00	10.87	0.82	62.25	10.34	0.82
53.25	10.66	0.82	62.50	9.98	0.82
53.50	10.94	0.82	62.75	9.57	0.82
53.75	10.60	0.82	63.00	10.74	0.82
54.00	10.65	0.82	63.25	10.62	0.82
54.25	10.30	0.82	63.50	11.00	0.82
54.50	10.63	0.82	63.75	10.48	0.82
54.75	10.91	0.82	64.00	9.49	0.82
55.00	10.55	0.82	64.25	9.28	0.82
55.25	10.46	0.82	64.50	9.45	0.82
55.50	10.75	0.82	64.75	10.14	0.82
55.75	11.38	0.82	65.00	10.24	0.82
56.00	11.15	0.82	65.25	9.45	0.82
56.25	11.38	0.82	65.50	10.19	0.82
56.50	11.29	0.82	65.75	9.67	0.82
56.75	11.14	0.82	66.00	9.69	0.82
57.00	11.50	0.82	66.25	10.17	0.82
57.25	11.19	0.82	66.50	10.57	0.82
57.50	11.87	0.82	66.75	10.91	0.82
57.75	11.11	0.82	67.00	9.73	0.82
58.00	11.06	0.82	67.25	10.90	0.82
58.25	11.46	0.82	67.50	10.30	0.82
58.50	11.11	0.82	67.75	10.85	0.82
58.75	12.04	0.82	68.00	10.75	0.82
59.00	12.28	0.82	68.25	10.95	0.82

F-02 P-02-008 (Rev.02)

교 정 결 과

CALIBRATION RESULT



성적서발급번호(Certificate No) : IC-2023-002048
 교 정 번 호(Calibration No) : C-2023-002629

페이지(page) : 4 of 4

2. Conversion Loss Data (cont.)

Frequency (GHz)	Conversion Loss (dB)	Measurement Uncertainty (dB)	Frequency (GHz)	Conversion Loss (dB)	Measurement Uncertainty (dB)
68.50	10.80	0.82	72.00	10.09	0.82
68.75	9.29	0.82	72.25	9.65	0.82
69.00	9.53	0.82	72.50	9.36	0.82
69.25	9.39	0.82	72.75	9.24	0.82
69.50	9.79	0.82	73.00	9.52	0.82
69.75	9.55	0.82	73.25	9.52	0.82
70.00	9.93	0.82	73.50	9.79	0.82
70.25	9.94	0.82	73.75	9.20	0.82
70.50	10.56	0.82	74.00	9.23	0.82
70.75	11.76	0.82	74.25	9.11	0.82
71.00	10.83	0.82	74.50	8.89	0.82
71.25	10.62	0.82	74.75	9.03	0.82
71.50	11.44	0.82	75.00	9.56	0.82
71.75	11.12	0.82	-	-	-

끝.

F-02P-02-008 (Rev.02)

2.2. Model : N9029AV10, S/N : SAX597



교정성적서
 CALIBRATION CERTIFICATE
 경기도 이천시 마장면 서이천로 578번길 74
 TEL : 031-645-6900, FAX : 031-645-6969



성적서발급번호(Certificate No) : IC-2023-002058
 교 정 번 호(Callibration No) : C-2023-002639

페이지(page) : 1 of 4

1. 의뢰자 (Client)
 - 기관명 (Name) : 유엘코리아(주)
 - 주소 (Address) : 경기도 수원시 영통구 매영로 218
2. 측정기 (Calibration Subject) ◇ 등록번호 : 409626
 - 기기명 (Description) : SA EXTENSION MODULE
 - 제작회사 및 형식(Manufacturer and Model Name) : VDI / SAX WR10
 - 기기번호 (Serial Number) : SAX597
3. 교정일자 (Date of Calibration) : 2023.01.12 차기교정예정일자 : 2024.01.12
 (The due date of next Calibration)
4. 교정환경 (Environment)
 - 온도(Temperature) : (22.9 ± 0.4) ℃ 습도(Humidity) : (47 ± 2) % R.H.
 - 교정장소 (Location) : 고정표준실(Permanent Calibration Lab)
 (주소: 경기도 이천시 마장면 서이천로 578번길 74)
5. 측정 표준의 소급성 (Traceability) ◇Field code : 40641(RF SPECTRUM ANALYZER)
 교정방법 및 소급성 서술 (Calibration method and/or brief description)
 상기 기기는 고주파 스펙트럼 분석기의 교정절차(HCT-CS-125-40641)에 따라 국가측정표준기관으로부터 측정의 소급성이 확보된 아래의 표준장비를 이용하여 교정 되었음.

교정에 사용한 표준장비 명세 (List of used standards/specifications)

기기명 (Description)	제작회사 / 형식 (Manufacturer and Model Name)	기기번호 (Serial Number)	차기교정예정일자 (The due date of next Calibration)	교정기관 (Calibration laboratory)
PSG ANALOG SIGNAL GENERATOR	AGILENT/EB257D	MY46130629	2023/10/26	(주)에이치시티
EPM-P SERIES POWER METER	AGILENT/E4417A	GB41291582	2023/06/03	(주)에이치시티
THERMAL POWER SENSOR	ROHDE & SCHWARZ/NRP110T	101259	2023/06/27	ROHDE & SCHWARZ
WR-12 MULTIPLIER SOURCE MODULE	OML/S12MS-A	160419-1	2023/07/19	(주)에이치시티
WR-08 MULTIPLIER SOURCE MODULE	OML/S08MS-A	160419-1	2023/09/05	(주)에이치시티

6. 교정결과 (Calibration result) : 교정결과 참조 (Refer to attachment)
7. 측정불확도 (Measurement uncertainty) : 교정결과 참조 (Refer to attachment)
 신뢰수준 약 95 %, k = 2 (Confidence level about 95 %, k = 2)

확 인 (affirmation)	작성자 (Measurements performed by)	승인자 (Approved by)
	성명 (Name) 고형재	직위 (Title) 기술책임자(Technical Cal. Manager) 김광철 성명 (Name) 김광철

위 성적서는 국제시험기관인정협력체(International Laboratory Accreditation Cooperation) 상호인정협정(Mutual Recognition Arrangement)에 서명한 한국인정기구(KOLAS)로부터 공인 받은 분야의 교정결과입니다.

2023. 01. 12
 한국인정기구 인정 (주)에이치시티 대표이사
 Accredited by KOLAS, Republic of KOREA President, HCT Co., Ltd.



※ 이 성적서는 측정기의 정밀정확도에 영향을 미치는 요소(과부하, 온도, 습도 등)의 급격한 변화가 발생한 경우에는 무효가 됩니다.
 ※ 고객 전용사이트(www.callab.co.kr)에서 성적서의 진위 여부 확인이 가능합니다.
 ※ 성적서의 원본은 상단에 HCT 로고가 찍힌 워터마크 방지 용지에 인쇄되어 발급되며, 원본 복사시에는 복사본이라는 표시가 처리됩니다.
 ■ 고객사 관리번호 : SUW-E0252

F-02P-02-008 (Rev.02)

교 정 결 과

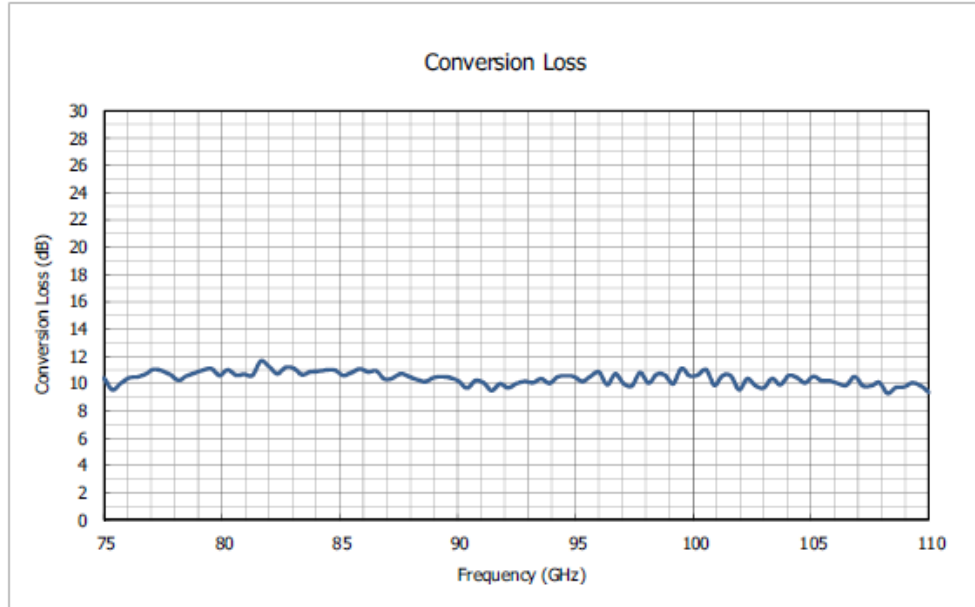
CALIBRATION RESULT



성적서발급번호(Certificate No) : IC-2023-002058
교 정 번 호(Calibration No) : C-2023-002639

페이지(page) : 2 of 4

1. Conversion Loss Graph



Note 1) Measurement Condition : RF = -30 dBm, Harmonic Order = 12, L.O. Level = 10 dBm, IF = 322.5 MHz, Bias Value = 0.00 mA
Note 2) This is the result of measuring the requested equipment and Keysight N9040B (S/N : MY60080268) together.

F-02P-02-008 (Rev.02)

교 정 결 과

CALIBRATION RESULT



성적서발급번호(Certificate No) : IC-2023-002058
 교 정 번 호(Calibration No) : C-2023-002639

페이지(page) : 3 of 4

2. Conversion Loss Data

Frequency (GHz)	Conversion Loss (dB)	Measurement Uncertainty (dB)	Frequency (GHz)	Conversion Loss (dB)	Measurement Uncertainty (dB)
75.0	10.40	0.82	88.0	10.49	0.82
75.4	9.54	0.82	88.3	10.27	0.82
75.7	9.99	0.82	88.7	10.14	0.82
76.1	10.41	0.82	89.0	10.44	0.82
76.4	10.47	0.82	89.4	10.51	0.82
76.8	10.68	0.82	89.7	10.42	0.82
77.1	11.03	0.82	90.1	10.16	0.82
77.5	10.92	0.82	90.4	9.65	0.82
77.8	10.66	0.82	90.8	10.20	0.82
78.2	10.23	0.82	91.1	10.06	0.82
78.5	10.56	0.82	91.5	9.48	0.82
78.9	10.78	0.82	91.8	9.98	0.82
79.2	10.98	0.82	92.2	9.68	0.82
79.6	11.10	0.82	92.5	9.99	0.82
79.9	10.59	0.82	92.9	10.16	0.82
80.3	11.00	0.82	93.2	10.05	0.82
80.6	10.61	0.82	93.6	10.35	0.82
81.0	10.67	0.82	93.9	10.01	0.82
81.3	10.59	0.82	94.3	10.48	0.82
81.7	11.65	0.82	94.6	10.57	0.82
82.0	11.24	0.82	95.0	10.49	0.82
82.4	10.72	0.82	95.3	10.15	0.82
82.7	11.19	0.82	95.7	10.53	0.82
83.1	11.11	0.82	96.0	10.83	0.82
83.4	10.65	0.82	96.4	9.91	0.82
83.8	10.86	0.82	96.7	10.71	0.82
84.1	10.90	0.82	97.1	9.99	0.82
84.5	10.99	0.82	97.4	9.83	0.82
84.8	10.98	0.82	97.8	10.79	0.82
85.2	10.59	0.82	98.1	10.03	0.82
85.5	10.80	0.82	98.5	10.66	0.82
85.9	11.07	0.82	98.8	10.62	0.82
86.2	10.85	0.82	99.2	9.98	0.82
86.6	10.92	0.82	99.5	11.10	0.82
86.9	10.32	0.82	99.9	10.56	0.82
87.3	10.40	0.82	100.2	10.63	0.82
87.6	10.71	0.82	100.6	11.01	0.82

F-02P-02-008 (Rev.02)

교 정 결 과

CALIBRATION RESULT



성적서발급번호(Certificate No) : IC-2023-002058
 교 정 번 호(Calibration No) : C-2023-002639

페이지(page) : 4 of 4

2. Conversion Loss Data (cont.)

Frequency (GHz)	Conversion Loss (dB)	Measurement Uncertainty (dB)	Frequency (GHz)	Conversion Loss (dB)	Measurement Uncertainty (dB)
100.9	9.88	0.82	105.8	10.20	0.82
101.3	10.59	0.82	106.2	10.00	0.82
101.6	10.55	0.82	106.5	9.86	0.82
102.0	9.54	0.82	106.9	10.50	0.82
102.3	10.35	0.82	107.2	9.83	0.82
102.7	9.83	0.82	107.6	9.82	0.82
103.0	9.68	0.82	107.9	10.07	0.82
103.4	10.36	0.82	108.3	9.27	0.82
103.7	9.91	0.82	108.6	9.70	0.82
104.1	10.58	0.82	109.0	9.75	0.82
104.4	10.43	0.82	109.3	10.05	0.82
104.8	10.04	0.82	109.7	9.83	0.82
105.1	10.52	0.82	110.0	9.35	0.82
105.5	10.20	0.82	-	-	-

끝.

F-02P-02-008 (Rev.02)

2.3. Model : N9029AV06, S/N : SAX789



Measurement Report

74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea 17383
 Tel : 82-31-645-8900, www.hct.co.kr

보고서번호(Report No) : IC-2023-002060
 측정 번호(Measurement No) : C-2023-002641

페이지(page) : 1 of 4

1. 의뢰자 (Client)

- 기관명 (Name) : 유엘코리아(주)
 - 주소 (Address) : 경기도 수원시 영통구 매영로 218

2. 대상 품목 (Measurement Item) ◇ HCT 등록번호 : 409608

- 기기명 (Description) : SA EXTENSION MODULE
 - 제작회사 및 형식 (Manufacturer and Model Name) : VDI / SAX WR6.5
 - 기기번호 (Serial Number) : SAX789

3. 측정일자 (Measurement date) : 2023.01.12

4. 측정환경 (Environment)

- 온도(Temperature) : (22.3 ± 0.3) °C - 습도(Humidity) : (45 ± 3) % R.H.

5. 측정방법 (Measurement method used)

상기기기는 고객의 요구사항에 따라 국가측정표준기관으로부터 측정의 소급성이 확보된 아래의 표준장비를 이용하여 점검되었음.

측정에 사용한 표준장비 명세 (List of used standards/specifications)

기기명 (Description)	제작회사 / 형식 (Manufacturer and Model Name)	기기번호 (Serial Number)	차기교정예정일자 (The due date of next Calibration)	교정기관 (Calibration laboratory)
PSG ANALOG SIGNAL GENERATOR	AGILENT/EB257D	MY46130629	2023/10/26	(주)에이치시티
ERICKSON POWER METER	VDI/PM5	394V	Not calibrated	(주)에이치시티
WR-05 MULTIPLIER SOURCE MODULE	OML/S05MS-A	160419-1	Not calibrated	(주)에이치시티
WR-08 MULTIPLIER SOURCE MODULE	OML/S08MS-A	160419-1	Not calibrated	(주)에이치시티

6. 측정결과 (Measurement result) : 측정결과 참조 (Refer to attachment)

주의 측정결과는 의뢰자가 제시한 시료 및 시료명에만 한정됩니다.
 The measurement results shown in this report refer only to the sample(s) measured unless otherwise stated.

확인 (Affirmation)	작성자 (Tested by)		승인자 (Approved by)	
	성명 (Name) : 고흥재		직위 (Title) 기술책임자(Technical Manager) 성명 (Name) 김광철	

이 성적서는 ILAC MRA 서명 기관인 KOLAS(Korea Laboratory Accreditation Scheme)와 A2LA (American Laboratory for Laboratory Accreditation)의 인정과 무관합니다. This calibration certificate is Not an accredited report by KOLAS(Korea Laboratory Accreditation Scheme) and A2LA(American Association for Laboratory Accreditation), a ILAC MRA signatory.

2023. 01. 12



(주)에이치시티 대표이사
 President, HCT Co., Ltd.



주의 측정결과는 측정기의 정밀정확도에 영향을 미치는 요소(과부하, 온도, 습도 등)의 급격한 변화가 발생한 경우에는 무효가 됩니다. If any significant instability or other adverse factor(overload, temperature, humidity etc.) manifests itself before, during or after calibration, and is likely to affect the validity of the calibration.

■고객사 관리번호 : SUW-E0253

F-02P-02-010 (Rev.01)

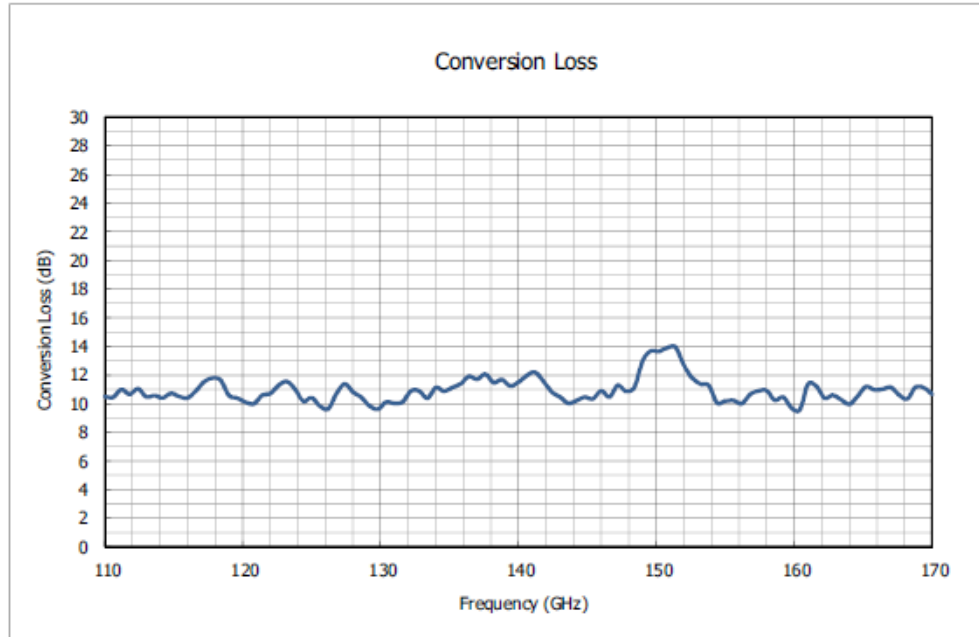
Measurement Result

보고서번호(Report No) : IC-2023-002060

페이지(page) : 2 of 4

측정번호(Measurement No) : C-2023-002641

1. Conversion Loss Graph



[Note]

1. Measurement Condition : RF = -30 dBm, Harmonic Order = 24, L.O. Level = 10 dBm, IF = 322.5 MHz, Bias Value = 0.00 mA
2. This is the result of measuring the requested equipment and Keysight N9040B (SN MY60080268) together.
3. In the absence of power standards above 110 GHz, power measurements above 110 GHz are to confirm operation functionality and traceable only to HCT.
4. The above results were measured at the request of the customer.

F-02P-02-010 (Rev.01)

Measurement Result

보고서번호(Report No) : IC-2023-002060

페이지(page) : 3 of 4

측정번호(Measurement No) : C-2023-002641

2. Conversion Loss Data

Frequency (GHz)	Conversion Loss (dB)	Frequency (GHz)	Conversion Loss (dB)
110.0	10.49	132.2	10.88
110.6	10.44	132.8	10.88
111.2	10.98	133.4	10.38
111.8	10.65	134.0	11.11
112.4	11.04	134.6	10.86
113.0	10.48	135.2	11.12
113.6	10.56	135.8	11.37
114.2	10.39	136.4	11.90
114.8	10.72	137.0	11.70
115.4	10.49	137.6	12.05
116.0	10.40	138.2	11.47
116.6	10.89	138.8	11.67
117.2	11.51	139.4	11.23
117.8	11.79	140.0	11.49
118.4	11.62	140.6	11.95
119.0	10.57	141.2	12.18
119.6	10.38	141.8	11.57
120.2	10.10	142.4	10.81
120.8	9.98	143.0	10.46
121.4	10.57	143.6	10.03
122.0	10.70	144.2	10.20
122.6	11.27	144.8	10.45
123.2	11.53	145.4	10.33
123.8	10.99	146.0	10.88
124.4	10.16	146.6	10.46
125.0	10.41	147.2	11.27
125.6	9.82	147.8	10.86
126.2	9.63	148.4	11.12
126.8	10.70	149.0	12.98
127.4	11.37	149.6	13.67
128.0	10.79	150.2	13.64
128.6	10.44	150.8	13.90
129.2	9.83	151.4	13.92
129.8	9.60	152.0	12.66
130.4	10.10	152.6	11.78
131.0	10.01	153.2	11.37
131.6	10.12	153.8	11.25

F-02P-02-010 (Rev.01)

Measurement Result

보고서번호(Report No) : IC-2023-002060

페이지(page) : 4 of 4

측정번호(Measurement No) : C-2023-002641

2. Conversion Loss Data (cont.)

Frequency (GHz)	Conversion Loss (dB)	Frequency (GHz)	Conversion Loss (dB)
154.4	10.05	162.8	10.58
155.0	10.18	163.4	10.27
155.6	10.21	164.0	9.95
156.2	10.00	164.6	10.51
156.8	10.64	165.2	11.19
157.4	10.89	165.8	10.96
158.0	10.90	166.4	11.01
158.6	10.23	167.0	11.13
159.2	10.45	167.6	10.61
159.8	9.70	168.2	10.32
160.4	9.55	168.8	11.14
161.0	11.35	169.4	11.09
161.6	11.21	170.0	10.65
162.2	10.38	-	-

끝.

F-02P-02-010 (Rev.01)

2.4. Model : N9029AV04, S/N : SAX791



Measurement Report

74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea 17383
 Tel : 82-31-645-6900, www.hct.co.kr

보고서번호(Report No) : IC-2023-002054
 측정번호(Measurement No) : C-2023-002635

페이지(page) : 1 of 4

1. 의뢰자 (Client)

- 기관명 (Name) : 유엘코리아(주)
 - 주소 (Address) : 경기도 수원시 영통구 매영로 218

2. 대상품목 (Measurement Item)

◇ HCT 등록번호 : 409612

- 기기명 (Description) : SA EXTENSION MODULE
 - 제작회사 및 형식(Manufacturer and Model Name) : VDI / SAX WR4.3
 - 기기번호 (Serial Number) : SAX791

3. 측정일자 (Measurement date) : 2023.01.11

4. 측정환경 (Environment)

- 온도(Temperature) : (23.6 ± 0.3) °C - 습도(Humidity) : (50 ± 2) % R.H.

5. 측정방법 (Measurement method used)

상기기기는 고객의 요구사항에 따라 국가측정표준기관으로부터 측정의 소급성이 확보된 아래의 표준장비를 이용하여 점검되었음.

측정에 사용한 표준장비 명세 (List of used standards/specifications)

기기명 (Description)	제작회사 / 형식 (Manufacturer and Model Name)	기기번호 (Serial Number)	차기교정예정일자 (The due date of next Calibration)	교정기관 (Calibration laboratory)
PSG ANALOG SIGNAL GENERATOR	AGILENT/E8257D	MY46130629	2023/10/26	(주)에이치시티
ERICKSON POWER METER	VDI/PM5	394V	Not calibrated	(주)에이치시티
WR-03 MULTIPLIER SOURCE MODULE	OML/S03MS-A	160419-1	Not calibrated	(주)에이치시티
WR-05 MULTIPLIER SOURCE MODULE	OML/S05MS-A	160419-1	Not calibrated	(주)에이치시티

6. 측정결과 (Measurement result)

: 측정결과 참조 (Refer to attachment)

주의 측정결과는 의뢰자가 제시한 시료 및 시료명에만 한정됩니다.

The measurement results shown in this report refer only to the sample(s) measured unless otherwise stated.

확인 (Affirmation)	작성자 (Tested by)	 서명 성명 (Name) : 고희재	승인자 (Approved by)	 서명 직위 (Title) : 기술책임자(Technical Manager) 성명 (Name) : 김광철

이 성적서는 ILAC MRA 서명 기관인 KOLAS(Korea Laboratory Accreditation Scheme)와 A2LA (American Laboratory for Laboratory Accreditation)의 인정과 무관합니다. This calibration certificate is Not an accredited report by KOLAS(Korea Laboratory Accreditation Scheme) and A2LA(American Association for Laboratory Accreditation), a ILAC MRA signatory.

2023. 01. 12



(주)에이치시티 대표이사
 President, HCT Co., Ltd.



(중측정결과는 측정기의 정밀정확도에 영향을 미치는 요소(과부하, 온도, 습도 등)의 급격한 변화가 발생한 경우에는 무효가 됩니다. If any significant instability or other adverse factor(overload, temperature, humidity etc.) manifests itself before, during or after calibration, and is likely to affect the validity of the calibration.

■고객사 관리번호 : SUW-E0254

F-02P-02-010 (Rev.01)

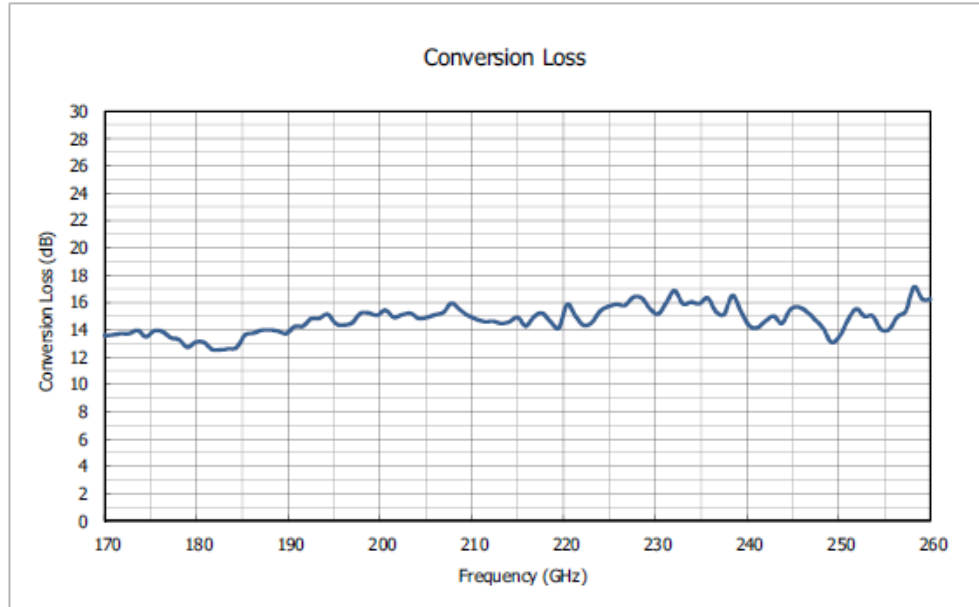
Measurement Result

보고서번호(Report No) : IC-2023-002054

페이지(page) : 2 of 4

측정번호(Measurement No) : C-2023-002635

1. Conversion Loss Graph



Note 1) Measurement Condition : RF = -30 dBm, Harmonic Order = 36, L.O. Level = 10 dBm, IF = 322.5 MHz, Bias Value = 0.00 mA

Note 2) This is the result of measuring the requested equipment and Keysight N9040B (SN MY60080268) together.

Note 3) In the absence of power standards above 110 GHz, power measurements above 110 GHz are to confirm operation functionality and traceable only to HCT.

Note 4) The above results were measured at the request of the customer.

F-02P-02-010 (Rev.01)

Measurement Result

보고서번호(Report No) : IC-2023-002054

페이지(page) : 3 of 4

측정번호(Measurement No) : C-2023-002635

2. Conversion Loss Data

Frequency (GHz)	Conversion Loss (dB)	Frequency (GHz)	Conversion Loss (dB)
170.0	13.58	203.3	15.21
170.9	13.63	204.2	14.84
171.8	13.71	205.1	14.89
172.7	13.72	206.0	15.09
173.6	13.96	206.9	15.26
174.5	13.49	207.8	15.94
175.4	13.92	208.7	15.46
176.3	13.86	209.6	15.04
177.2	13.41	210.5	14.77
178.1	13.28	211.4	14.59
179.0	12.72	212.3	14.62
179.9	13.08	213.2	14.47
180.8	13.09	214.1	14.58
181.7	12.56	215.0	14.90
182.6	12.53	215.9	14.27
183.5	12.60	216.8	14.97
184.4	12.70	217.7	15.21
185.3	13.62	218.6	14.58
186.2	13.75	219.5	14.13
187.1	13.96	220.4	15.86
188.0	13.99	221.3	15.01
188.9	13.89	222.2	14.33
189.8	13.72	223.1	14.54
190.7	14.24	224.0	15.38
191.6	14.27	224.9	15.70
192.5	14.80	225.8	15.87
193.4	14.84	226.7	15.79
194.3	15.14	227.6	16.38
195.2	14.44	228.5	16.33
196.1	14.34	229.4	15.56
197.0	14.52	230.3	15.15
197.9	15.21	231.2	15.98
198.8	15.22	232.1	16.86
199.7	15.06	233.0	15.90
200.6	15.42	233.9	16.03
201.5	14.91	234.8	15.91
202.4	15.09	235.7	16.33

F-02P-02-010 (Rev.01)

Measurement Result

보고서번호(Report No) : IC-2023-002054

페이지(page) : 4 of 4

측정번호(Measurement No) : C-2023-002635

2. Conversion Loss Data (cont.)

Frequency (GHz)	Conversion Loss (dB)	Frequency (GHz)	Conversion Loss (dB)
236.6	15.34	249.2	13.07
237.5	15.13	250.1	13.54
238.4	16.51	251.0	14.74
239.3	15.40	251.9	15.52
240.2	14.32	252.8	14.97
241.1	14.14	253.7	15.00
242.0	14.62	254.6	14.02
242.9	15.00	255.5	14.04
243.8	14.47	256.4	14.97
244.7	15.47	257.3	15.37
245.6	15.66	258.2	17.14
246.5	15.32	259.1	16.23
247.4	14.74	260.0	16.24
248.3	14.10	-	-

끝.

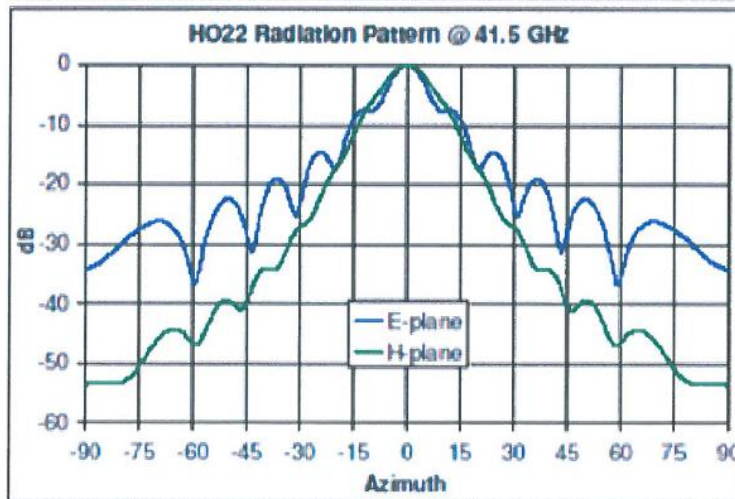
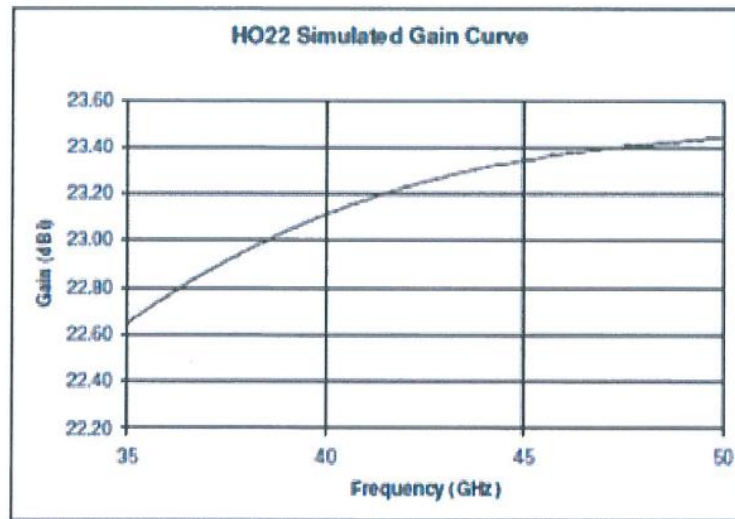
F-02P-02-010 (Rev.01)

3. CMI Horn Antenna gain

3.1. HO22R (33 GHz – 50 GHz)



24 Boston Court
Longmead, CO 01051
303 681-0707 (P)
303 681-0711 (F)
www.custommicrowave.com





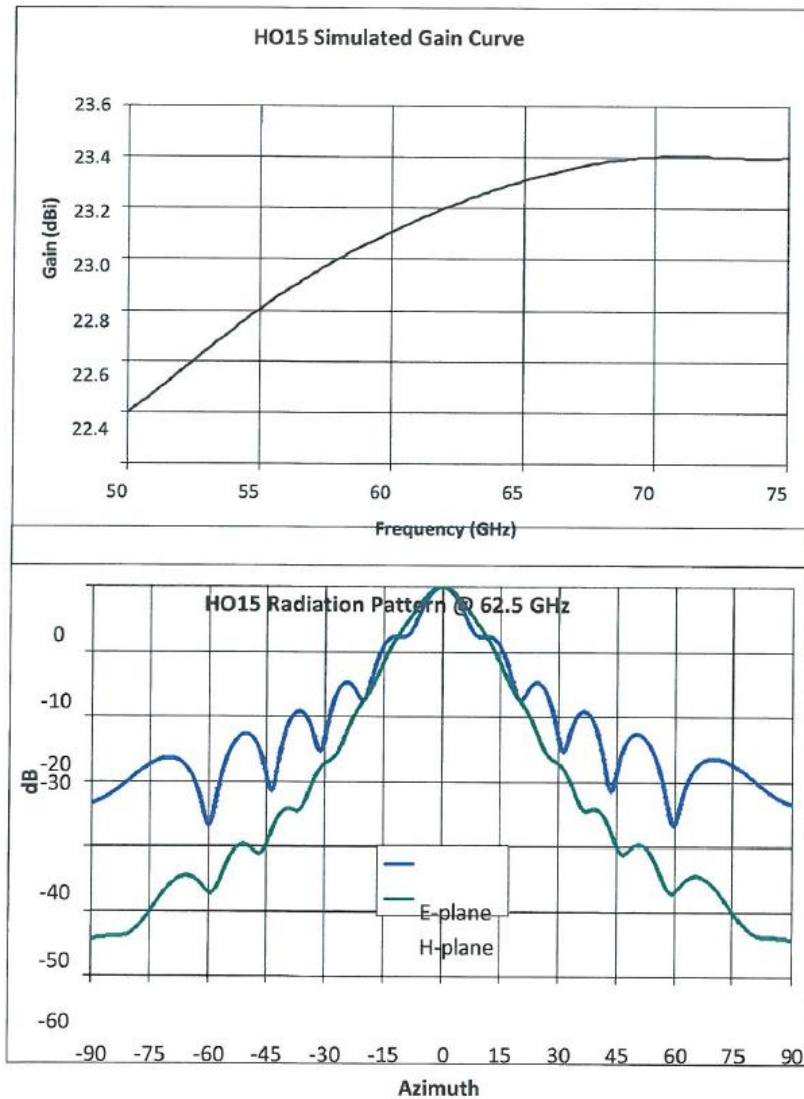
24 Boston Court
Longmont, CO 80501
303 651-0707(P)
303 651-0706(F)
www.custommicrowave.com

Model	HO22R
Frequency(GHz)	Gain(dBi)
33.00	22.40
33.85	22.50
34.70	22.60
35.55	22.70
36.40	22.80
37.25	22.90
38.10	23.00
38.95	23.05
39.80	23.10
40.65	23.15
41.50	23.20
42.35	23.25
43.20	23.27
44.05	23.30
44.90	23.35
45.75	23.37
46.60	23.39
47.45	23.41
48.30	23.42
49.15	23.43
50.00	23.44

3.1. HO15R (50 GHz – 75 GHz)



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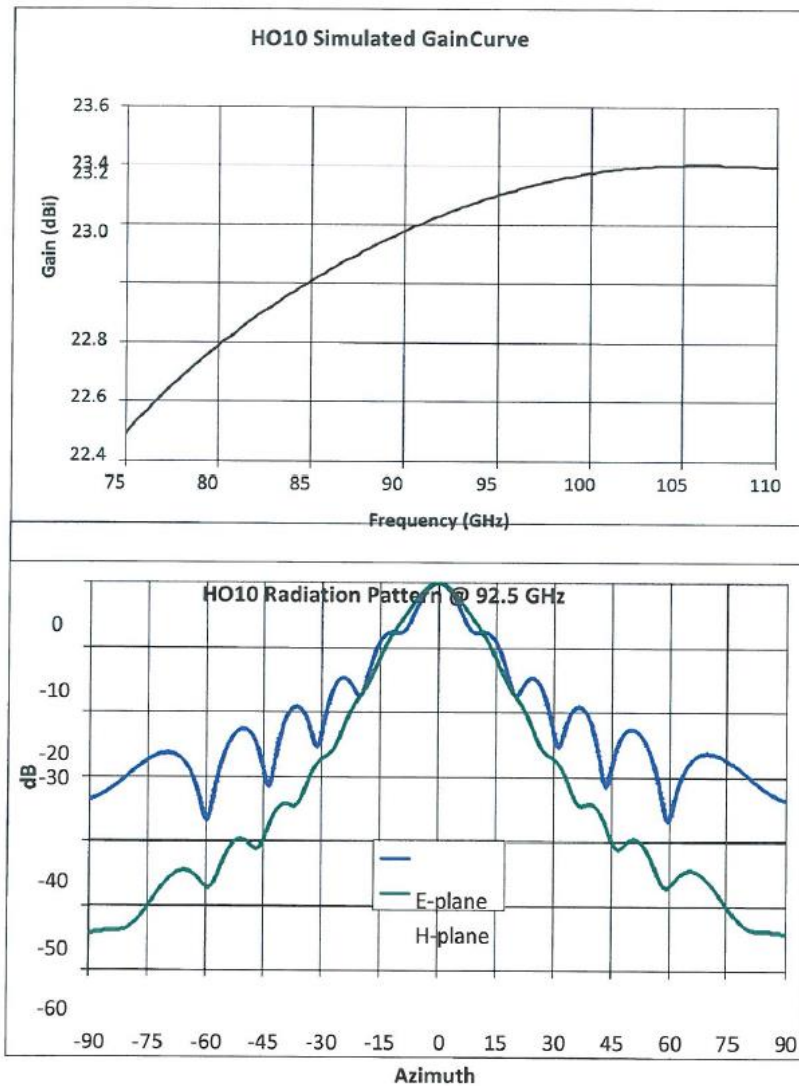
24 Boston Court
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303 651-0707(P)
303 651-0706(F)
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Model	HO15R
Frequency(GHz)	Gain(dBi)
50.00	22.4
51.25	22.5
52.50	22.6
53.75	22.7
55.00	22.8
56.25	22.9
57.50	23.0
58.75	23.0
60.00	23.1
61.25	23.2
62.50	23.2
63.75	23.3
65.00	23.3
66.25	23.3
67.50	23.4
68.75	23.4
70.00	23.4
71.25	23.4
72.50	23.4
73.75	23.4
75.00	23.4

3.2. HO10R (75 GHz – 110 GHz)



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303 651-0706(F)
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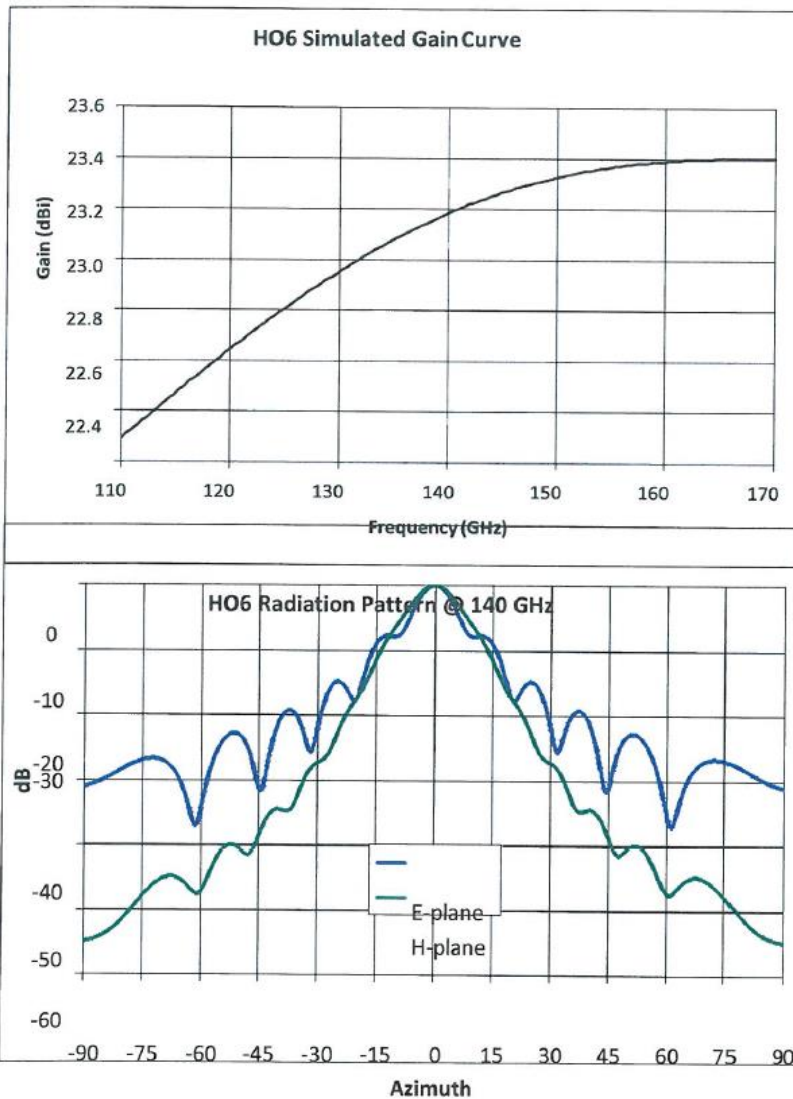
Model	HO10R
Frequency(GHz)	Gain(dBi)
75.00	22.5
76.75	22.6
78.50	22.7
80.25	22.8
82.00	22.9
83.75	23.0
85.50	23.0
87.25	23.1
89.00	23.1
90.75	23.2
92.50	23.3
94.25	23.3
96.00	23.3
97.75	23.3
99.50	23.4
101.25	23.4
103.00	23.4
104.75	23.4
106.50	23.4
108.25	23.4
110.00	23.4

3.3. HO06R (110 GHz – 170 GHz)



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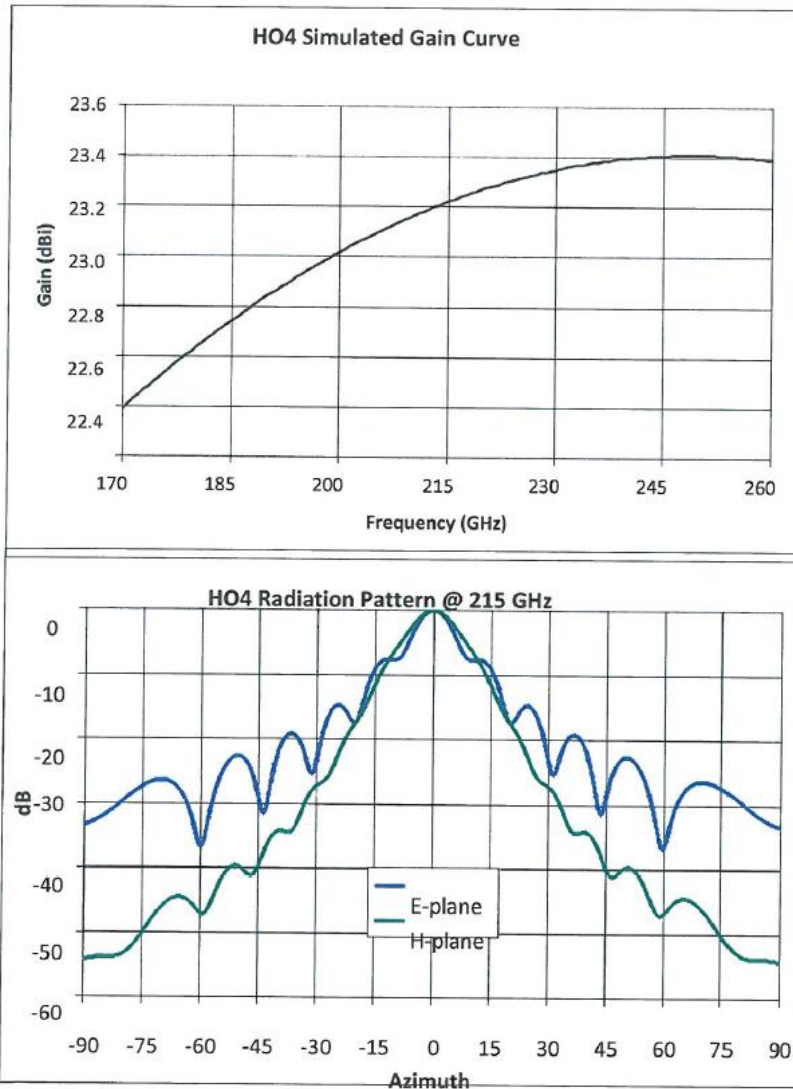
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Model	HO6R
Frequency(GHz)	Gain(dBi)
110.00	22.3
113.00	22.4
116.00	22.5
119.00	22.6
122.00	22.7
125.00	22.8
128.00	22.9
131.00	23.0
134.00	23.1
137.00	23.1
140.00	23.2
143.00	23.2
146.00	23.3
149.00	23.3
152.00	23.3
155.00	23.4
158.00	23.4
161.00	23.4
164.00	23.4
167.00	23.4
170.00	23.4

3.4. HO4R (170 GHz – 260 GHz)



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Model	HO4R
Frequency(GHz)	Gain(dBi)
170.00	22.4
174.50	22.5
179.00	22.6
183.50	22.7
188.00	22.8
192.50	22.9
197.00	23.0
201.50	23.0
206.00	23.1
210.50	23.2
215.00	23.2
219.50	23.3
224.00	23.3
228.50	23.3
233.00	23.4
237.50	23.4
242.00	23.4
246.50	23.4
251.00	23.4
255.50	23.4
260.00	23.4

END OF TEST REPORT