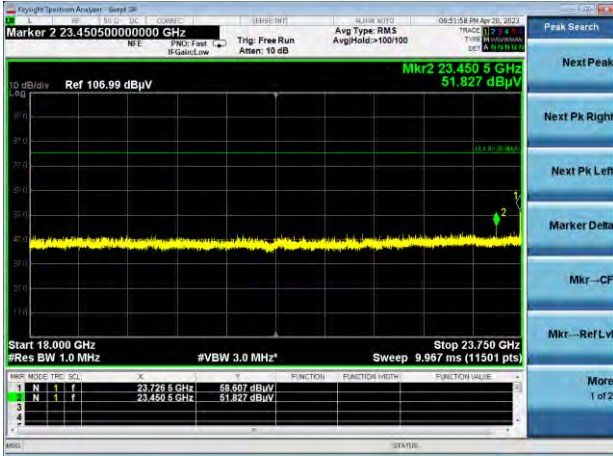
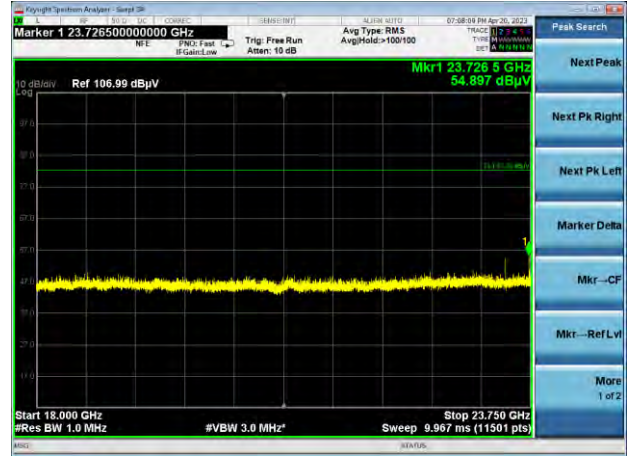


n258a, 18 GHz ~ 23.75 GHz

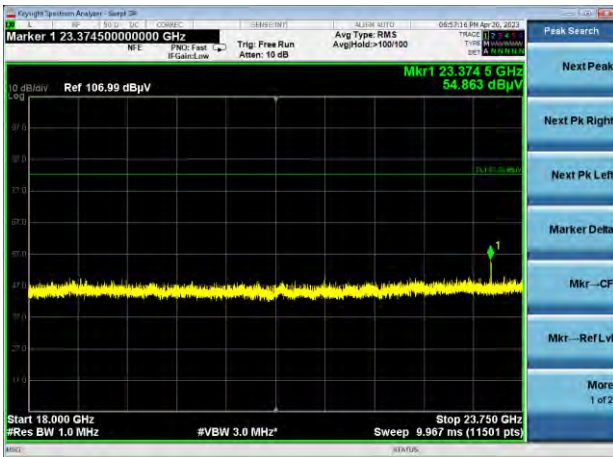
Antenna 0 (K patch)
Low Channel



Antenna 1 (L patch)
Low Channel



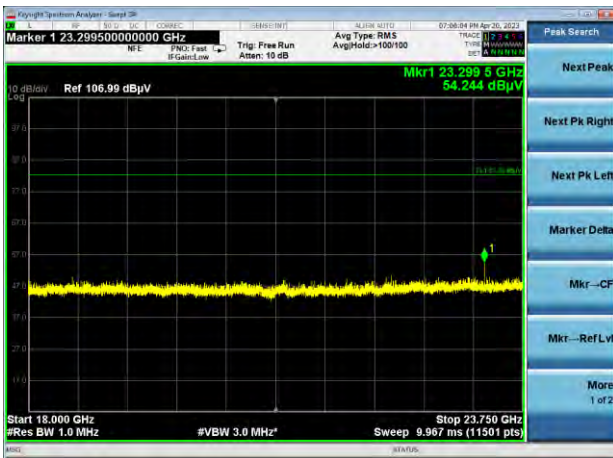
Middle Channel



Middle Channel



High Channel

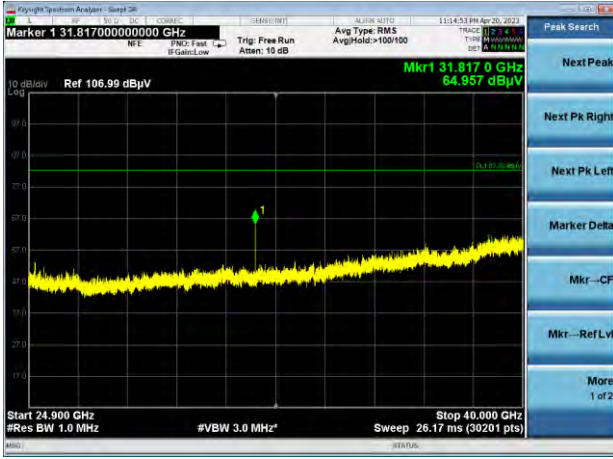


High Channel

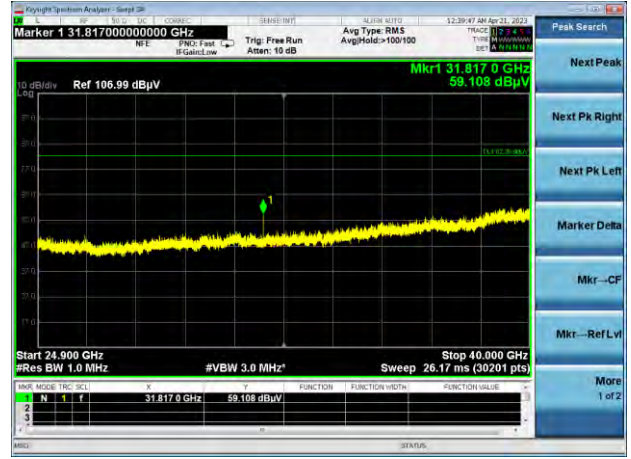


n258a, 24.90 GHz ~ 40 GHz

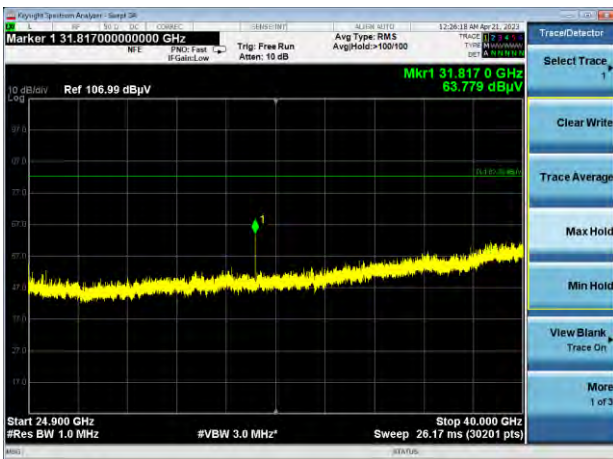
Antenna 0 (K patch)
Low Channel



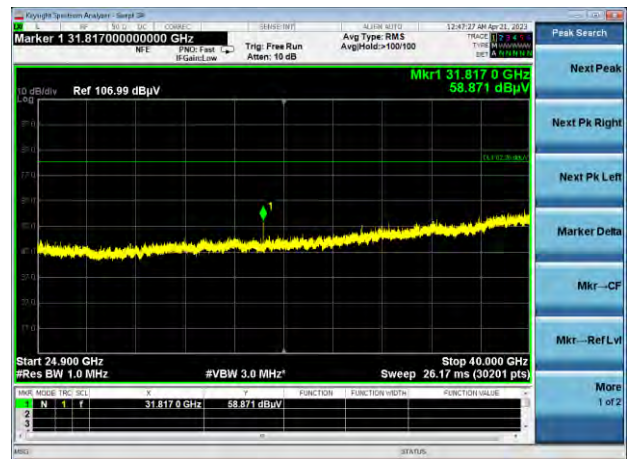
Antenna 1 (L patch)
Low Channel



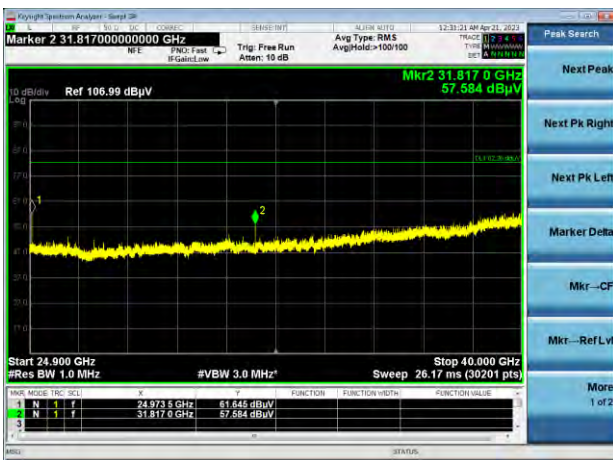
Middle Channel



Middle Channel



High Channel



High Channel

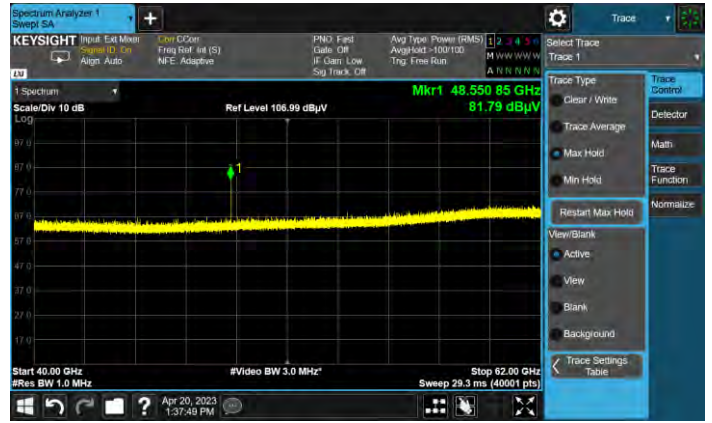


n258a, 40 GHz ~ 60 GHz

**Antenna 0 (K patch)
Low Channel**



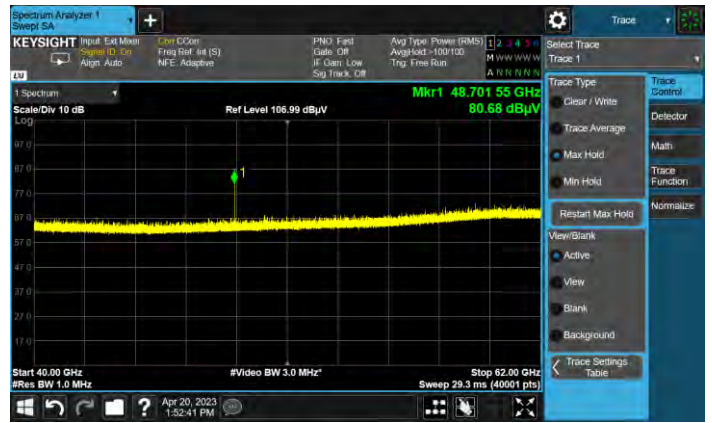
**Antenna 1 (L patch)
Low Channel**



Middle Channel



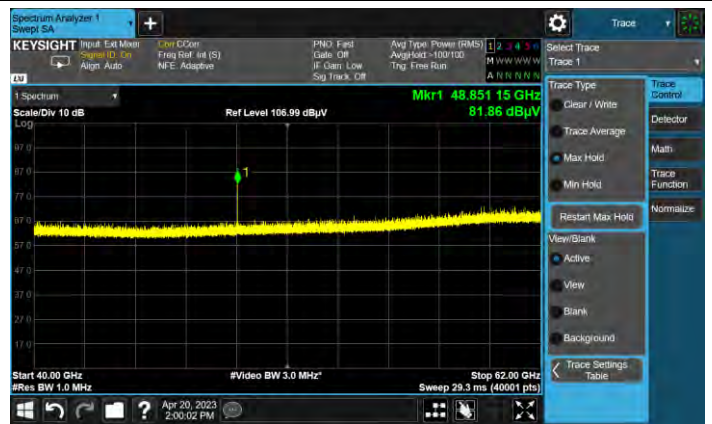
Middle Channel



High Channel

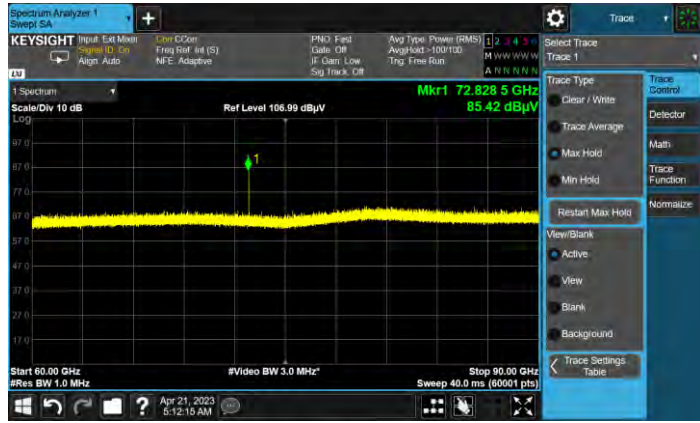


High Channel



n258a, 60 GHz ~ 90 GHz

Antenna 0 (K patch)
Low Channel



Antenna 1 (L patch)
Low Channel



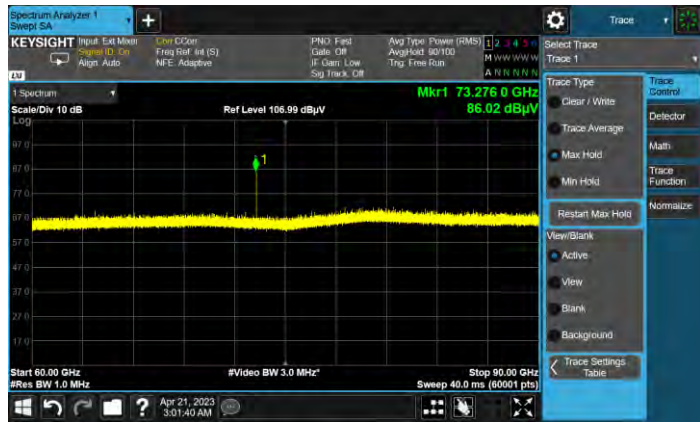
Middle Channel



Middle Channel



High Channel



High Channel



n258a, 90 GHz ~ 100 GHz

**Antenna 0 (K patch)
Low Channel**



**Antenna 1 (L patch)
Low Channel**



Middle Channel



Middle Channel



High Channel



High Channel



n258b, 30 MHz ~ 1 GHz

Antenna 0 (K patch)
Low Channel



Antenna 1 (L patch)
Low Channel



Middle Channel



Middle Channel



High Channel



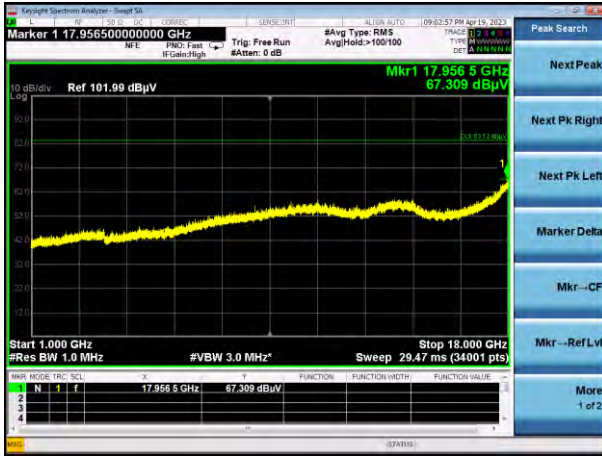
High Channel



n258b, 1 GHz ~ 18 GHz

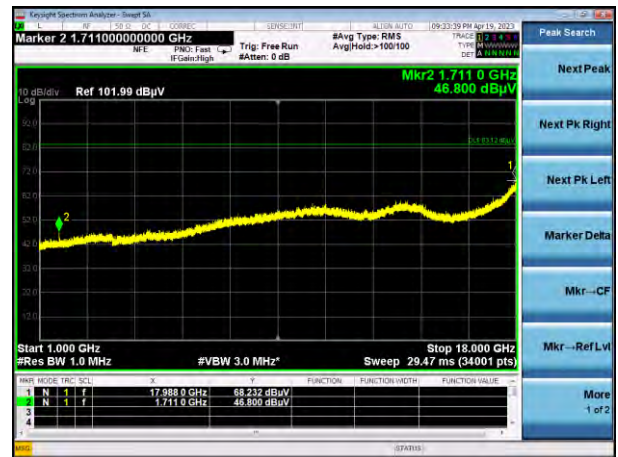
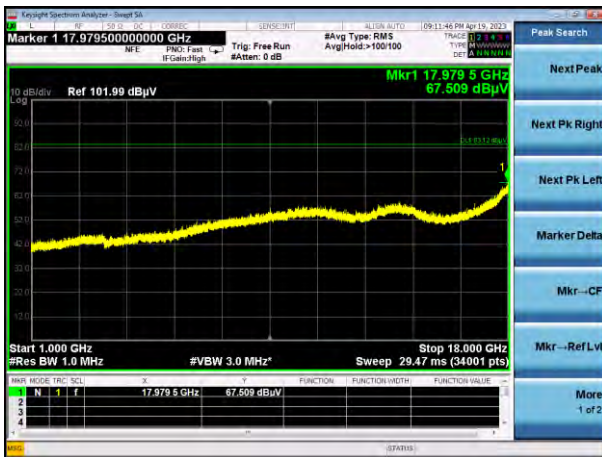
Antenna 0 (K patch)
Low Channel

Antenna 1 (L patch)
Low Channel



Middle Channel

Middle Channel



High Channel

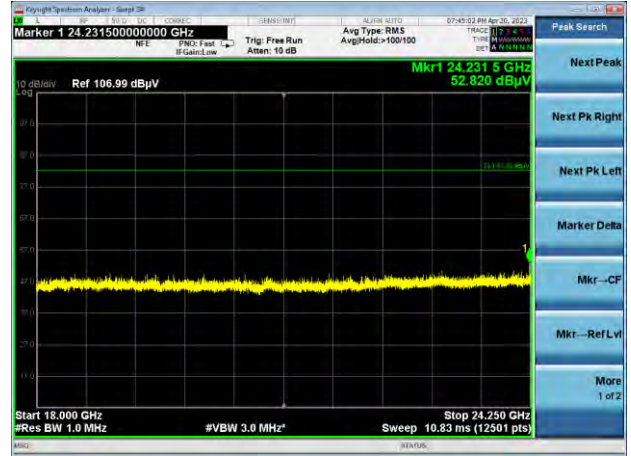
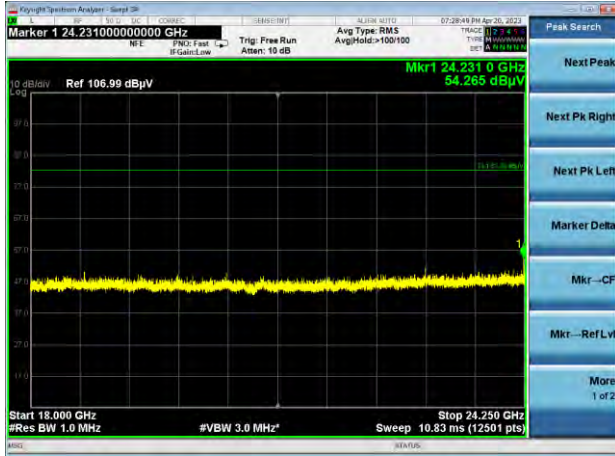
High Channel



n258b, 18 GHz ~ 24.25 GHz

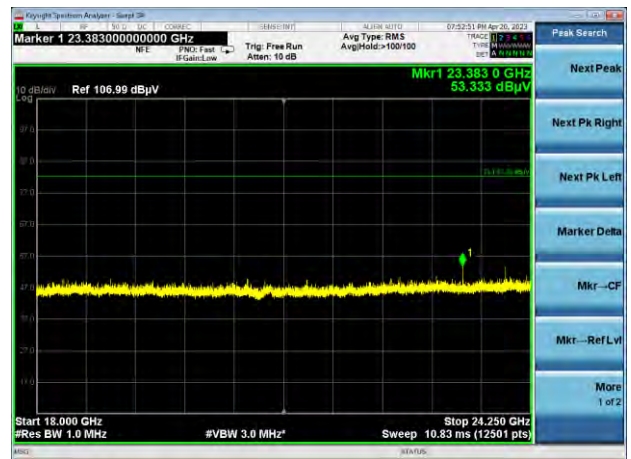
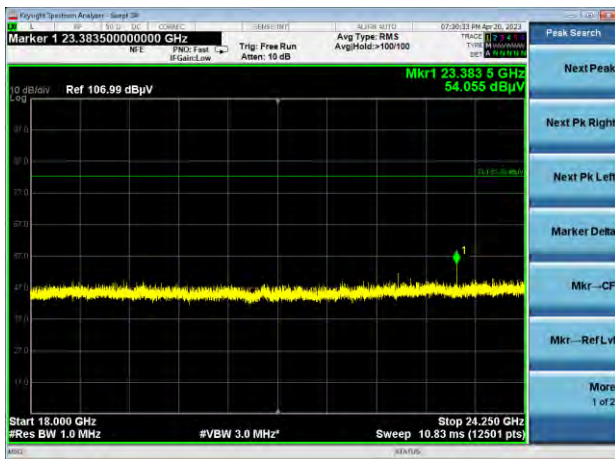
**Antenna 0 (K patch)
Low Channel**

**Antenna 1 (L patch)
Low Channel**



Middle Channel

Middle Channel



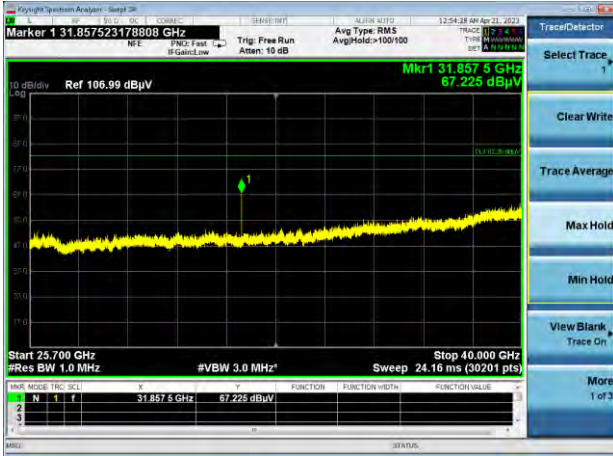
High Channel

High Channel

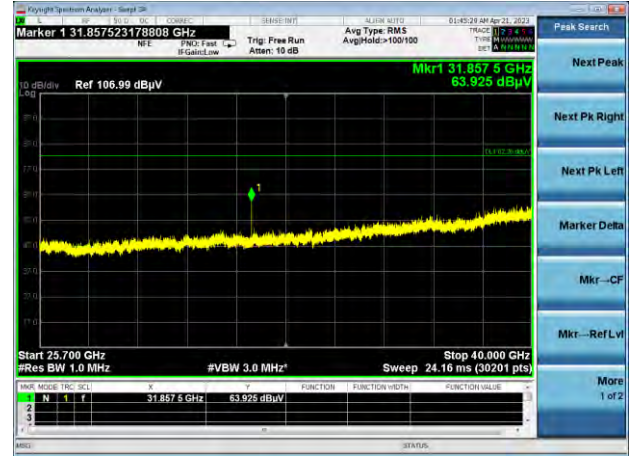


n258b, 25.70 GHz ~ 40 GHz

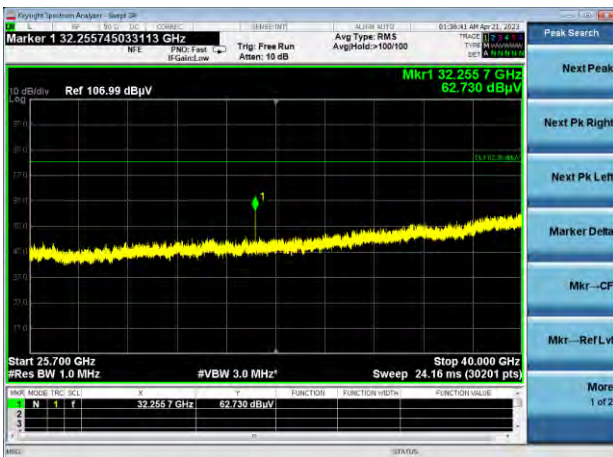
Antenna 0 (K patch)
Low Channel



Antenna 1 (L patch)
Low Channel



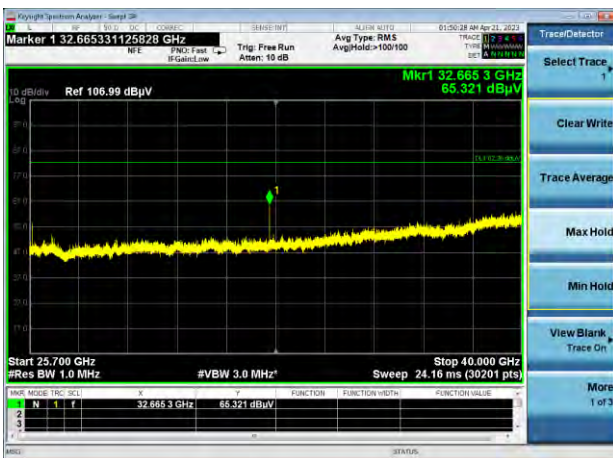
Middle Channel



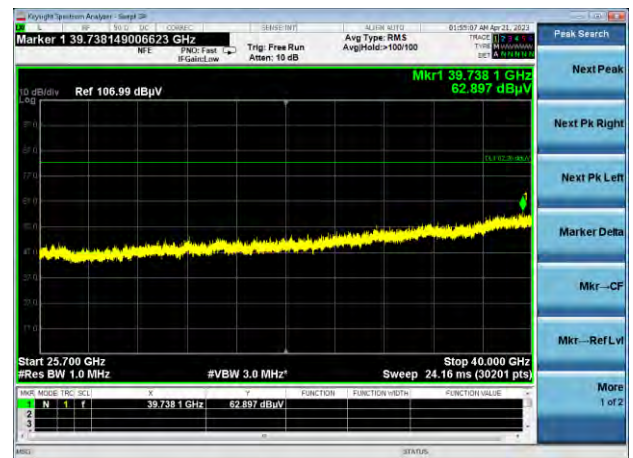
Middle Channel



High Channel

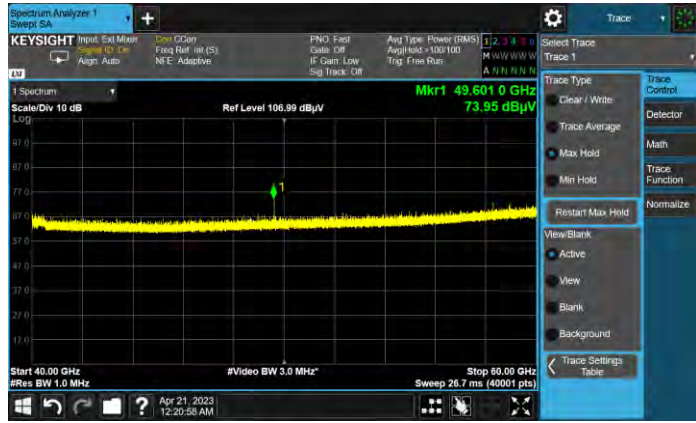


High Channel

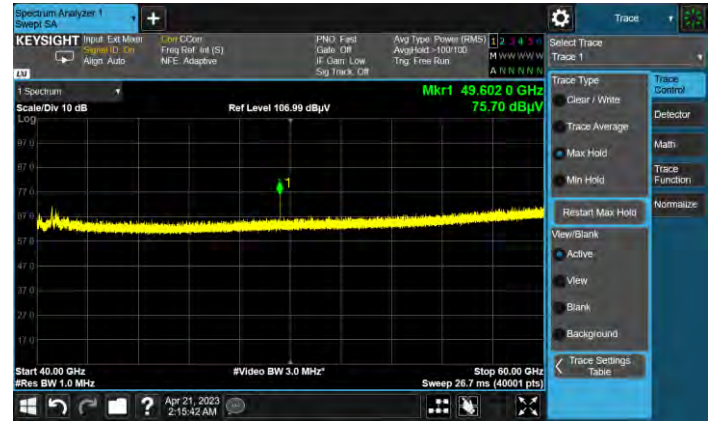


n258b, 40 GHz ~ 60 GHz

Antenna 0 (K patch)
Low Channel



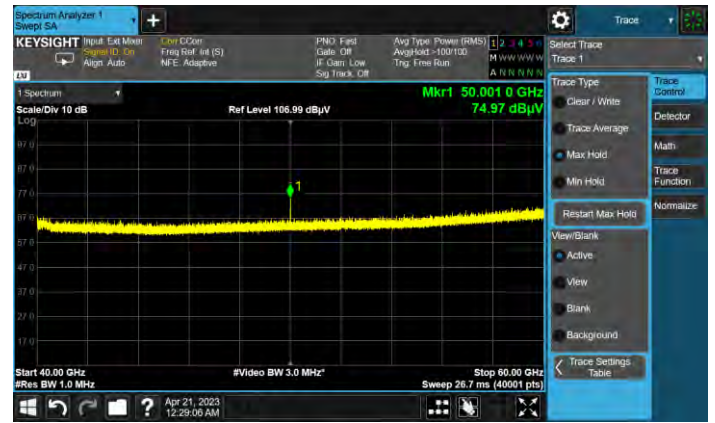
Antenna 1 (L patch)
Low Channel



Middle Channel



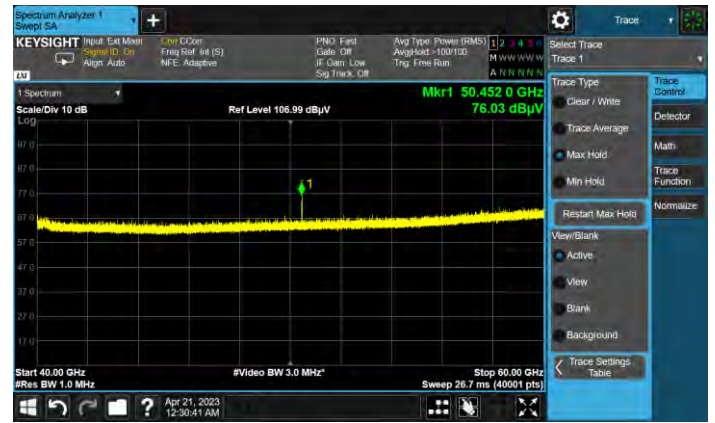
Middle Channel



High Channel



High Channel



n258b, 60 GHz ~ 90 GHz

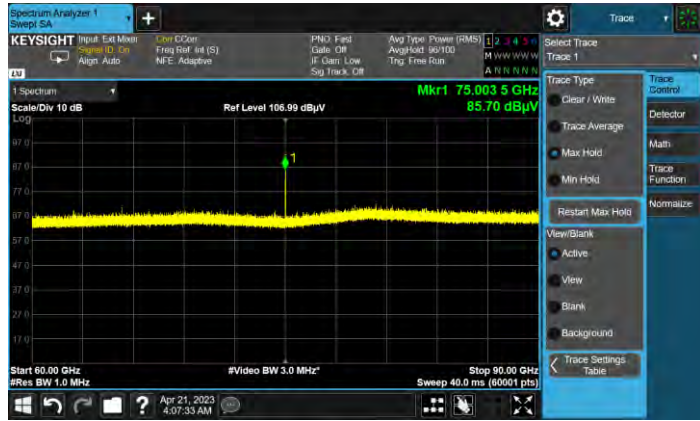
**Antenna 0 (K patch)
Low Channel**



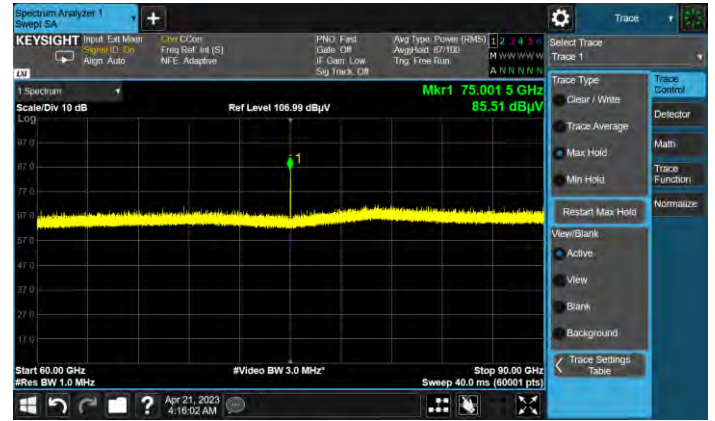
**Antenna 1 (L patch)
Low Channel**



Middle Channel



Middle Channel



High Channel



High Channel



n258b, 90 GHz ~ 100 GHz

Antenna 0 (K patch)
Low Channel



Antenna 1 (L patch)
Low Channel



Middle Channel



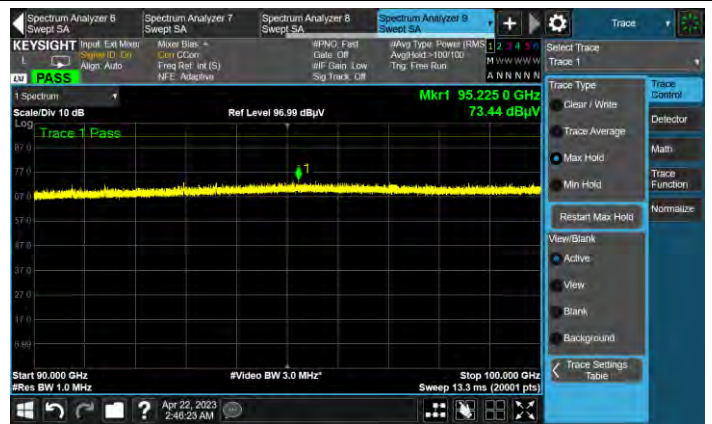
Middle Channel



High Channel



High Channel



n260, 30 MHz ~ 1 GHz

Antenna 0 (K patch)
Low Channel



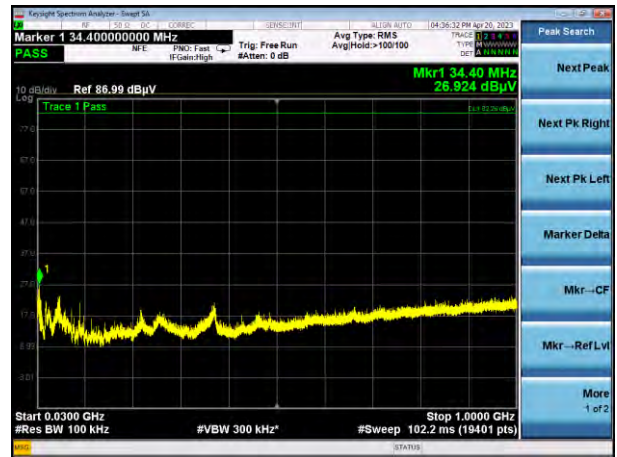
Antenna 1 (L patch)
Low Channel



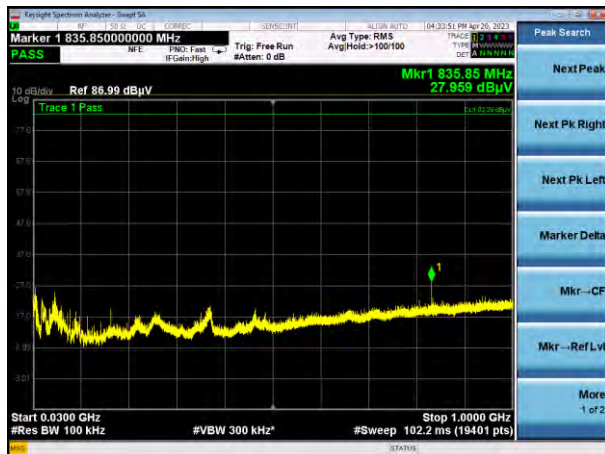
Middle Channel



Middle Channel



High Channel

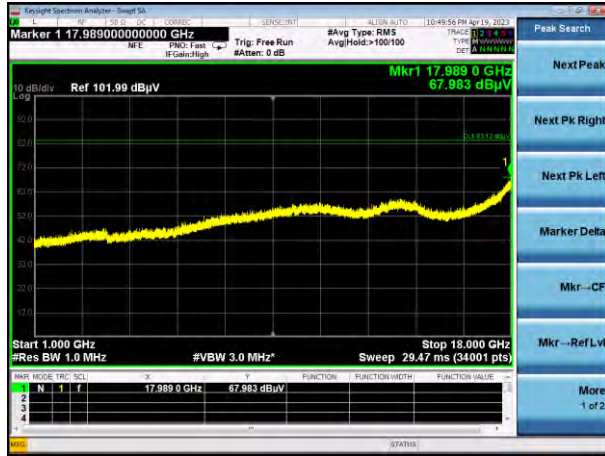


High Channel

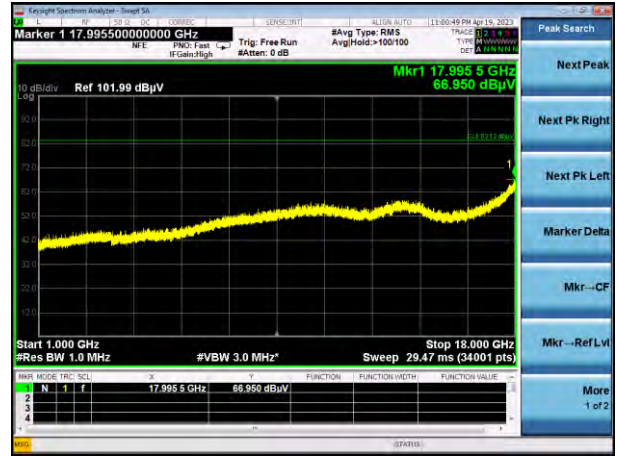


n260, 1 GHz ~ 18 GHz

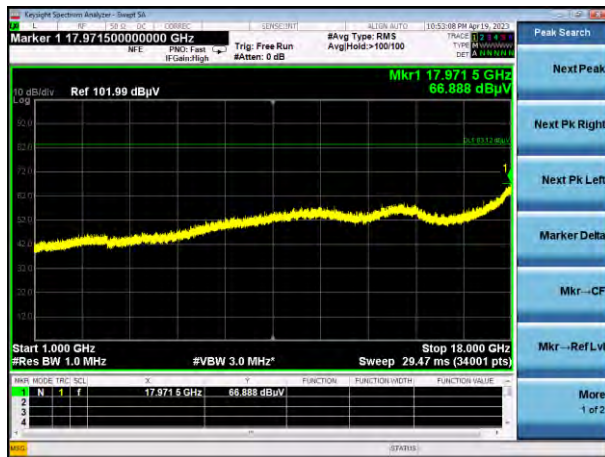
Antenna 0 (K patch)
Low Channel



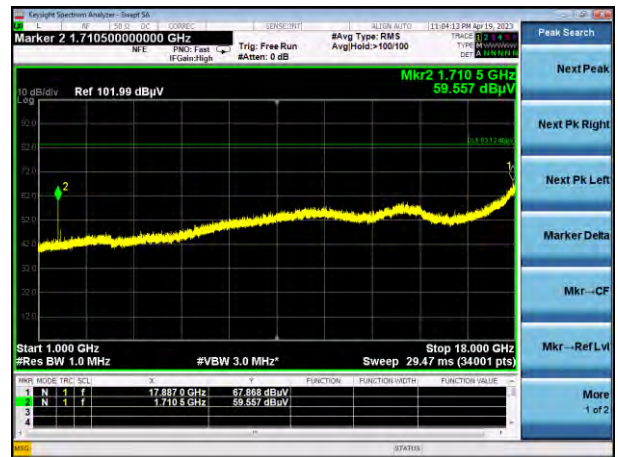
Antenna 1 (L patch)
Low Channel



Middle Channel



Middle Channel



High Channel



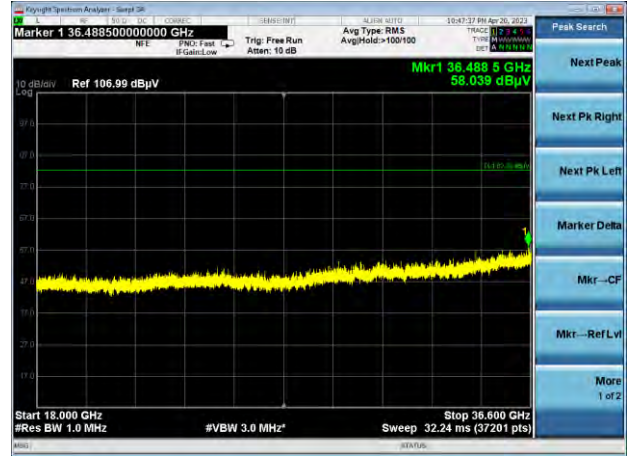
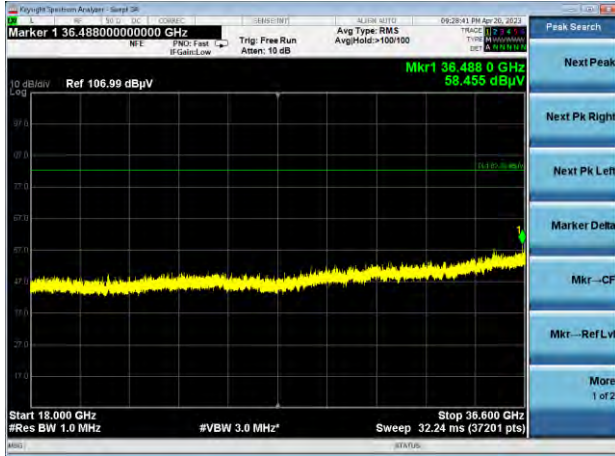
High Channel



n260, 18 GHz ~ 36.6 GHz

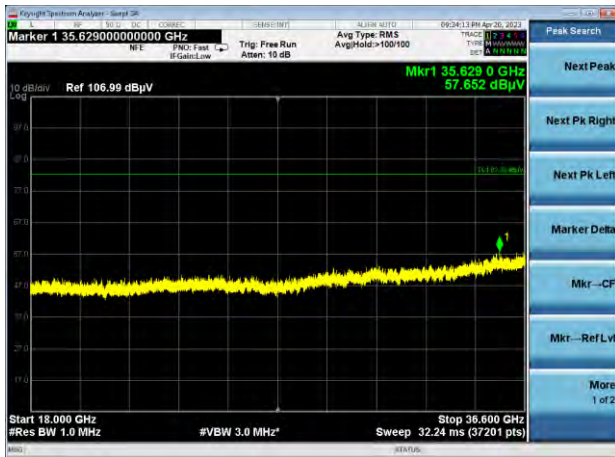
Antenna 0 (K patch)
Low Channel

Antenna 1 (L patch)
Low Channel



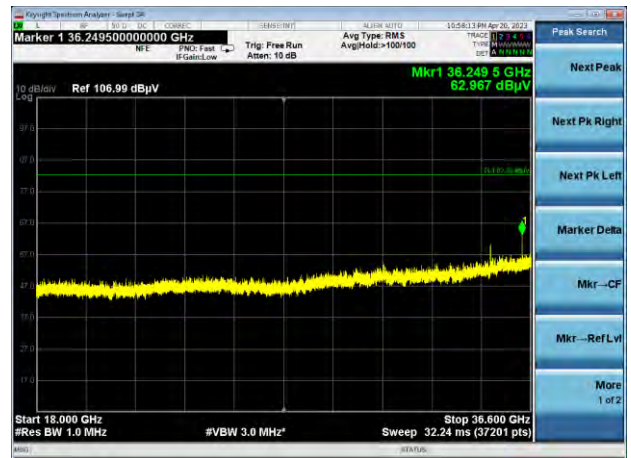
Middle Channel

Middle Channel



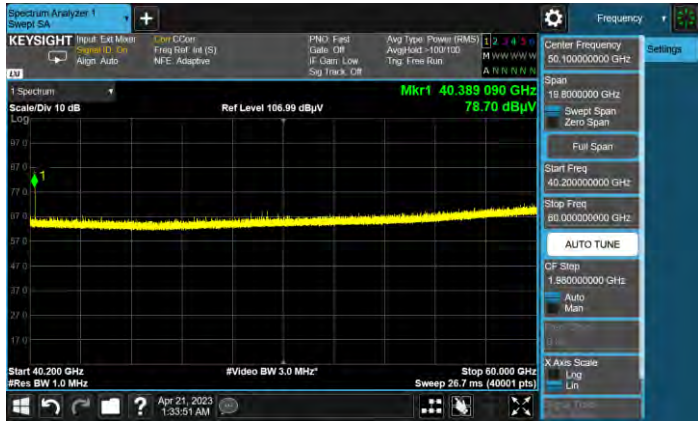
High Channel

High Channel



n260, 40.20 GHz ~ 60 GHz

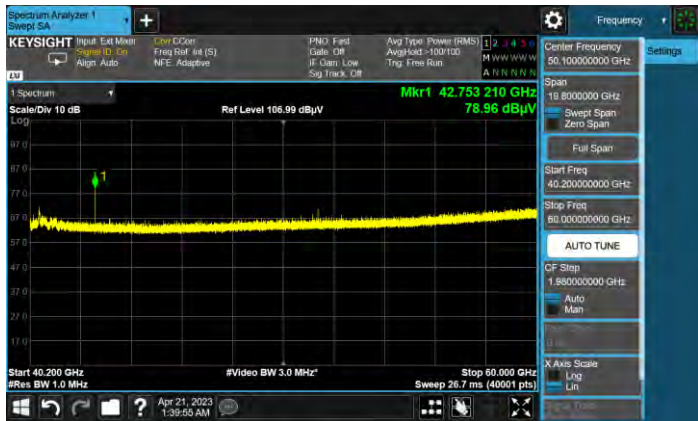
**Antenna 0 (K patch)
Low Channel**



**Antenna 1 (L patch)
Low Channel**



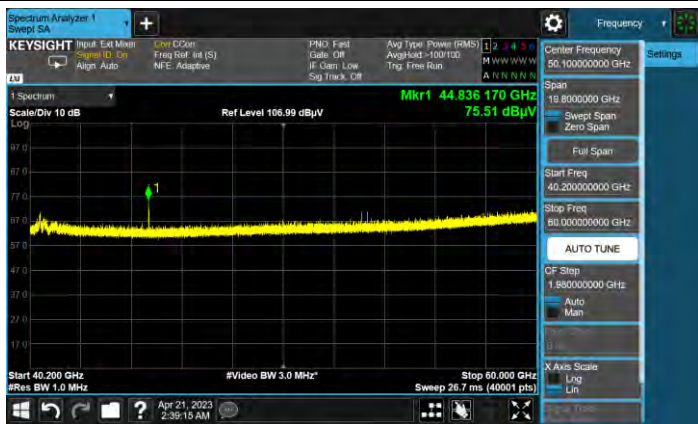
Middle Channel



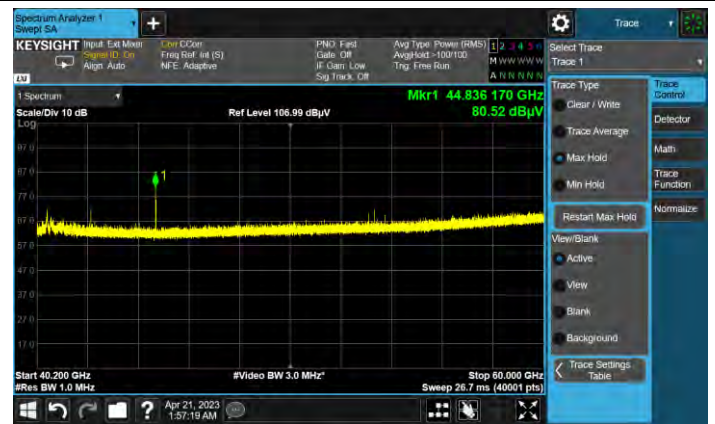
Middle Channel



High Channel



High Channel

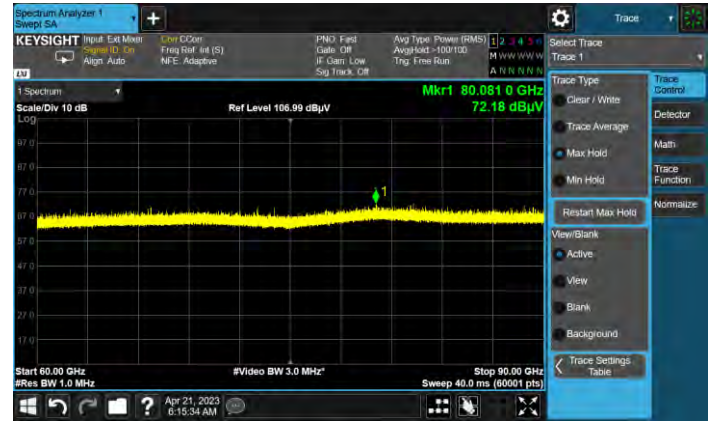


n260, 60 GHz ~ 90 GHz

Antenna 0 (K patch)
Low Channel



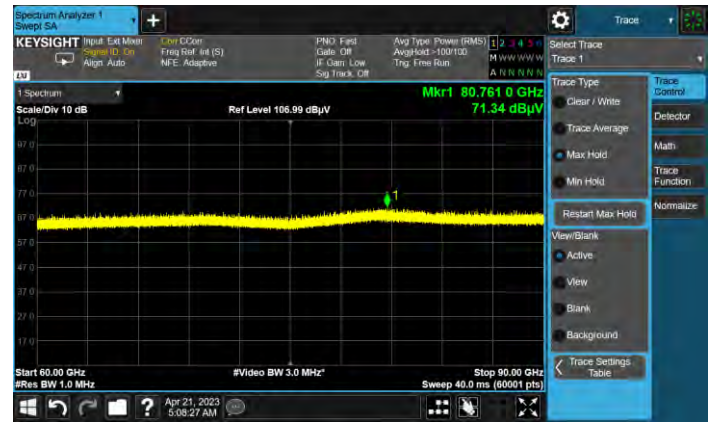
Antenna 1 (L patch)
Low Channel



Middle Channel



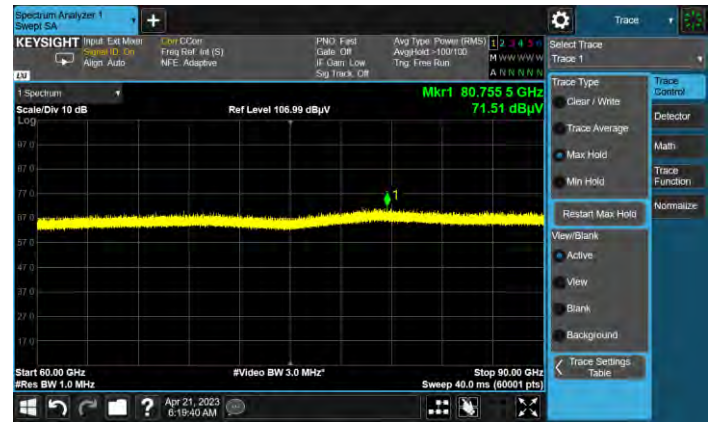
Middle Channel



High Channel



High Channel

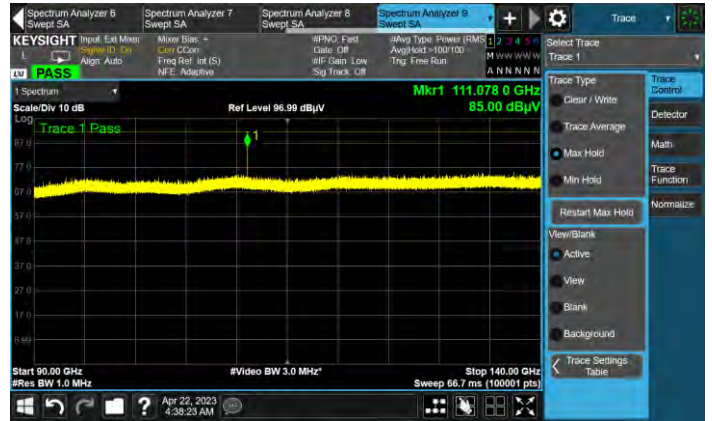


n260, 90 GHz ~ 140 GHz

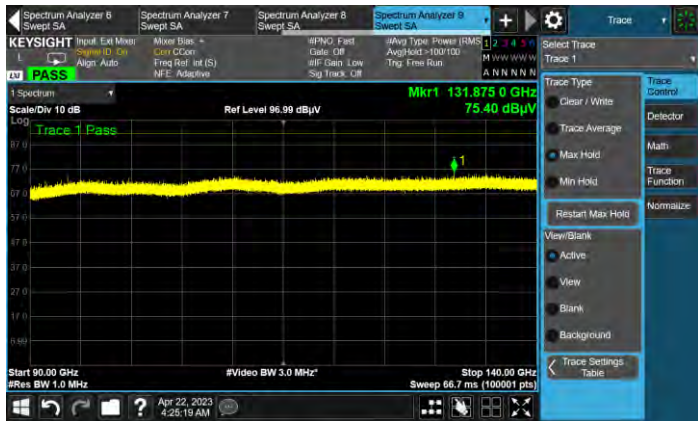
Antenna 0 (K patch)
Low Channel



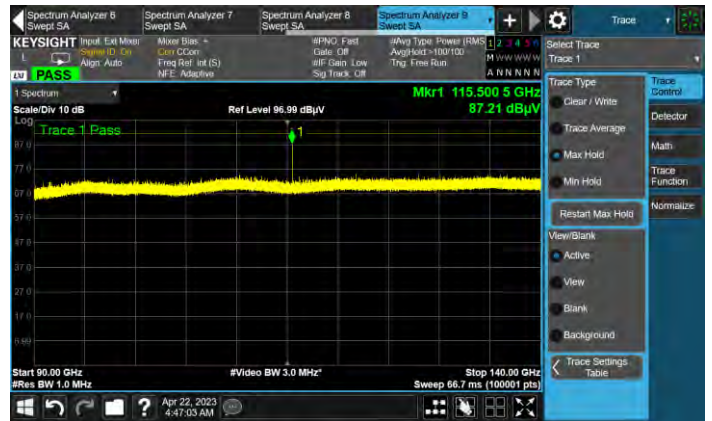
Antenna 1 (L patch)
Low Channel



Middle Channel



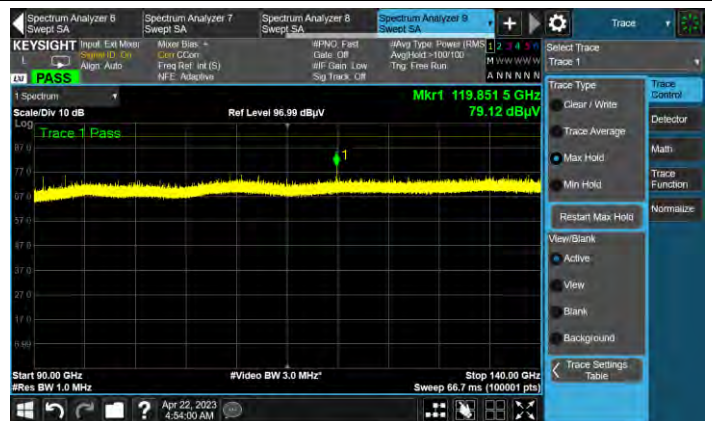
Middle Channel



High Channel



High Channel

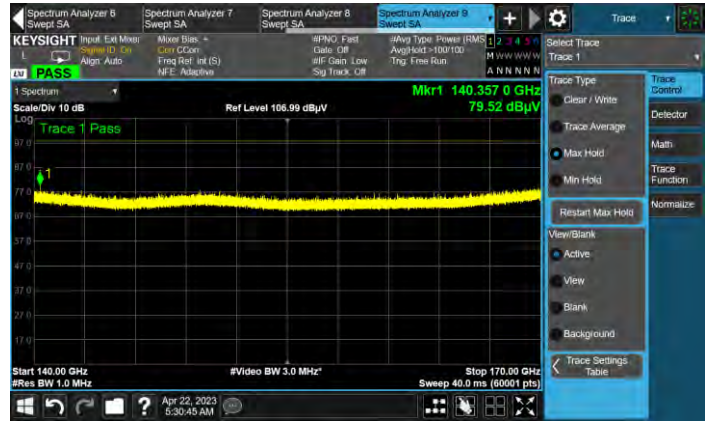


n260, 140 GHz ~ 170 GHz

Antenna 0 (K patch)
Low Channel



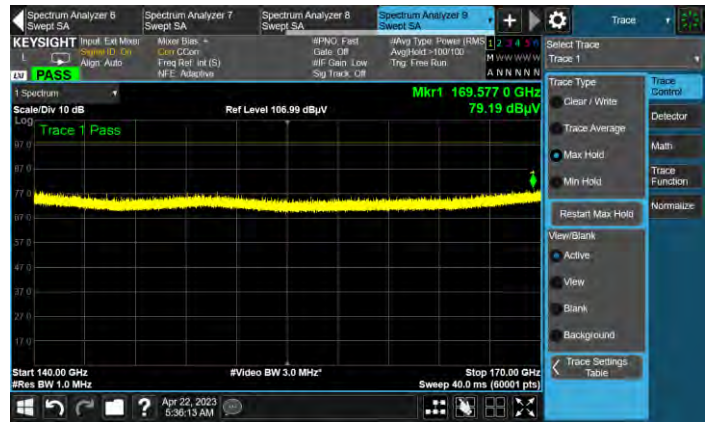
Antenna 1 (L patch)
Low Channel



Middle Channel



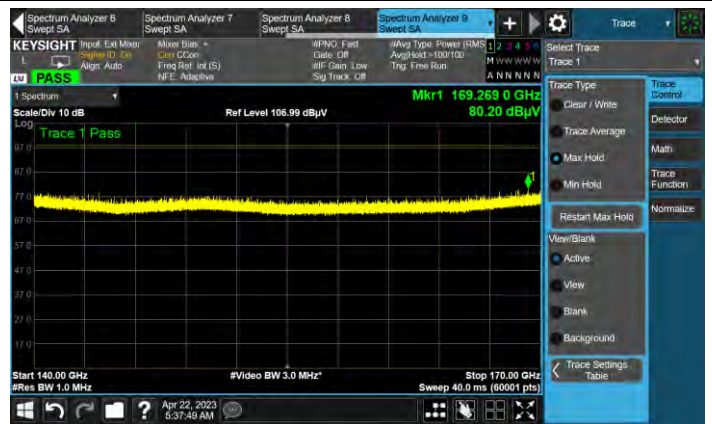
Middle Channel



High Channel

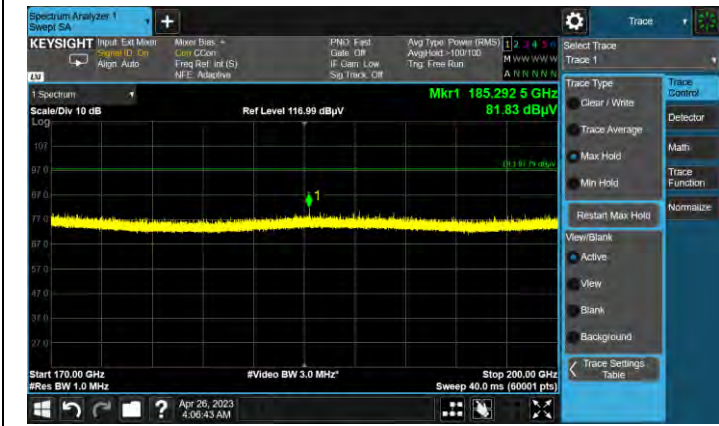


High Channel



n260, 170 GHz ~ 200 GHz

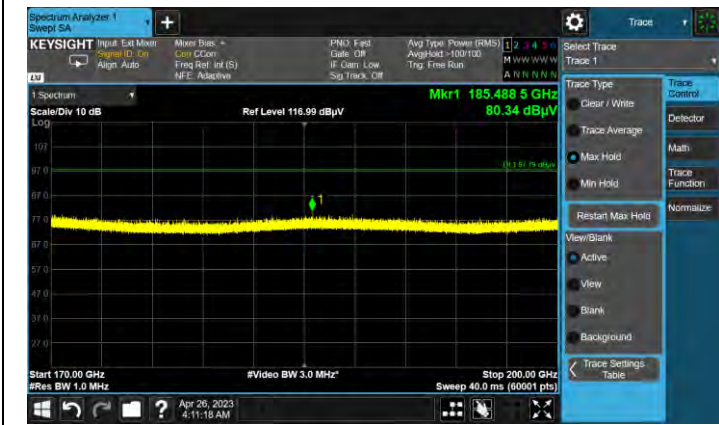
Antenna 0 (K patch)
Low Channel



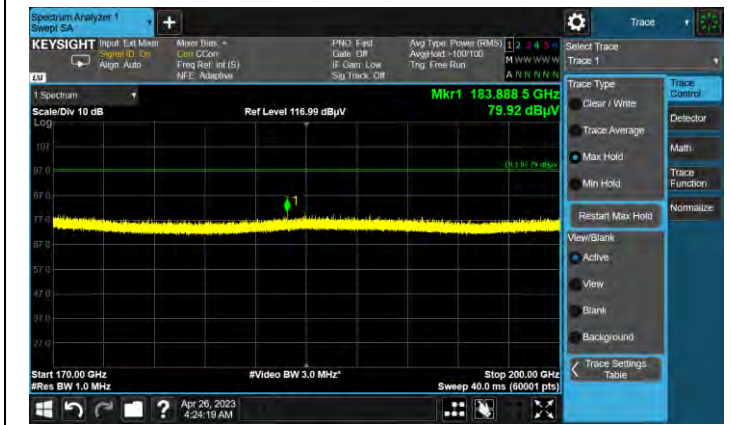
Antenna 1 (L patch)
Low Channel



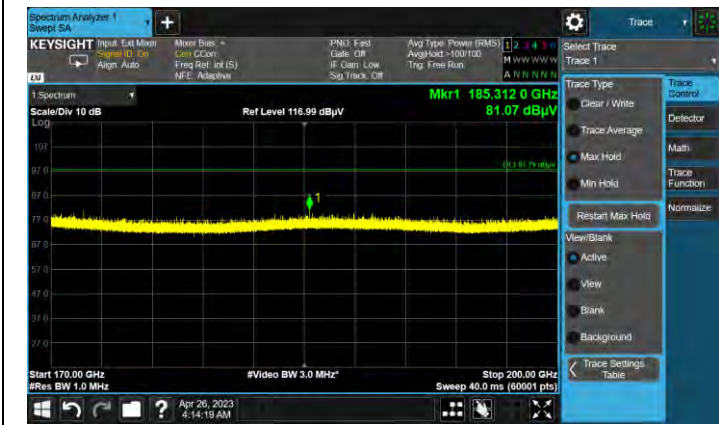
Middle Channel



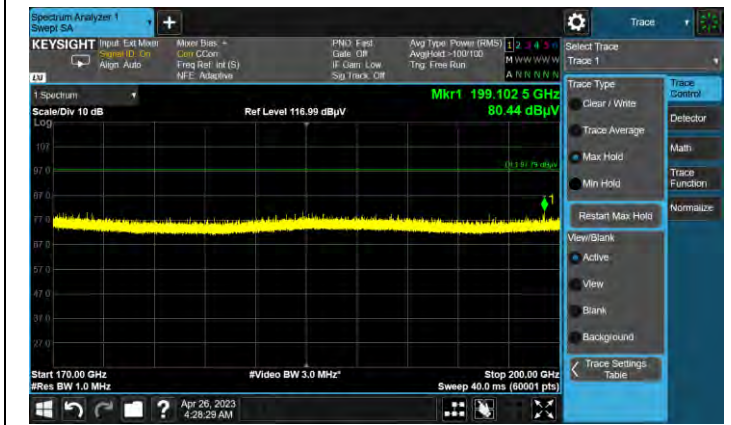
Middle Channel



High Channel



High Channel

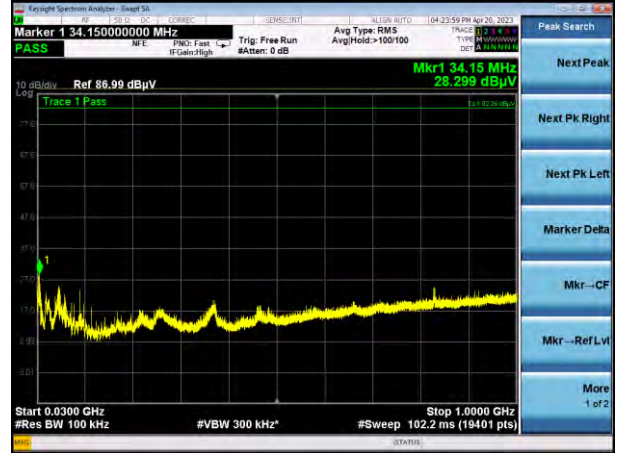


n261, 30 MHz ~ 1 GHz

Antenna 0 (K patch)
Low Channel



Antenna 1 (L patch)
Low Channel



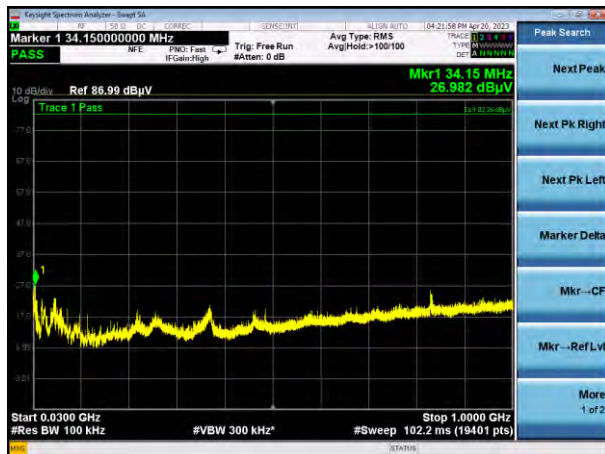
Middle Channel



Middle Channel



High Channel



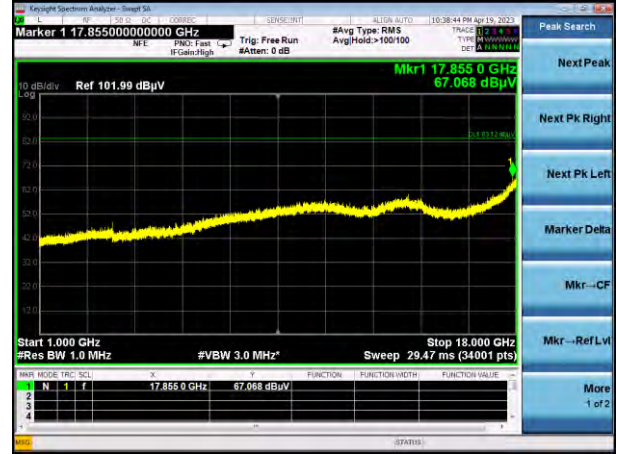
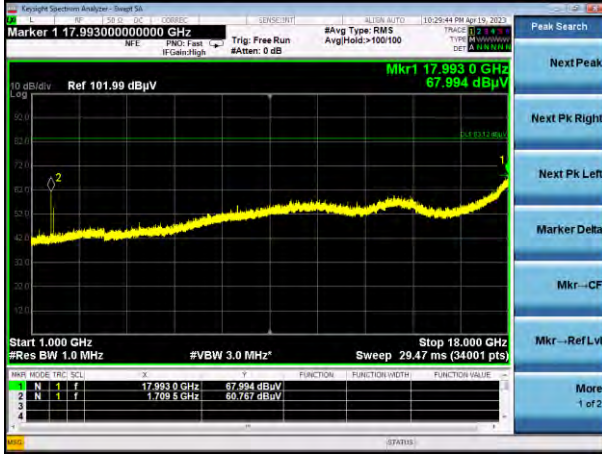
High Channel



n261, 1 GHz ~ 18 GHz

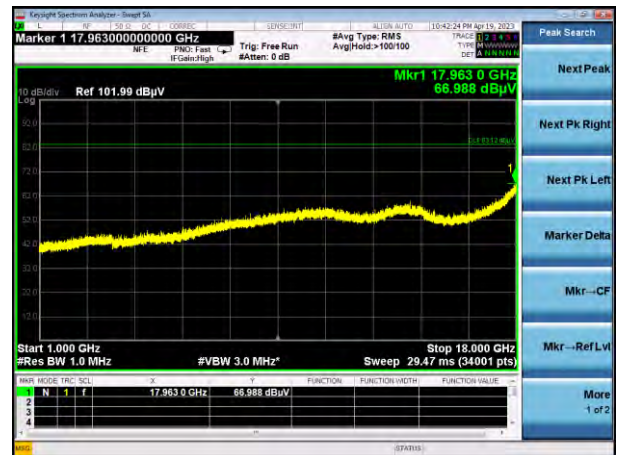
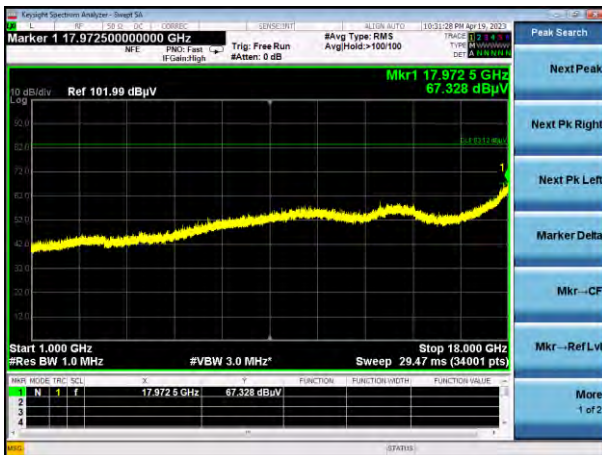
Antenna 0 (K patch)
Low Channel

Antenna 1 (L patch)
Low Channel



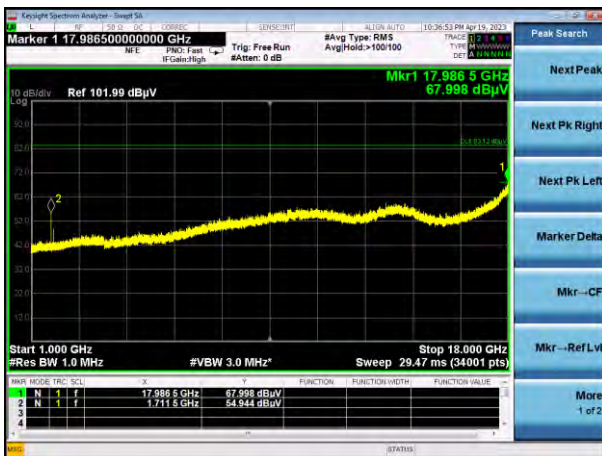
Middle Channel

Middle Channel



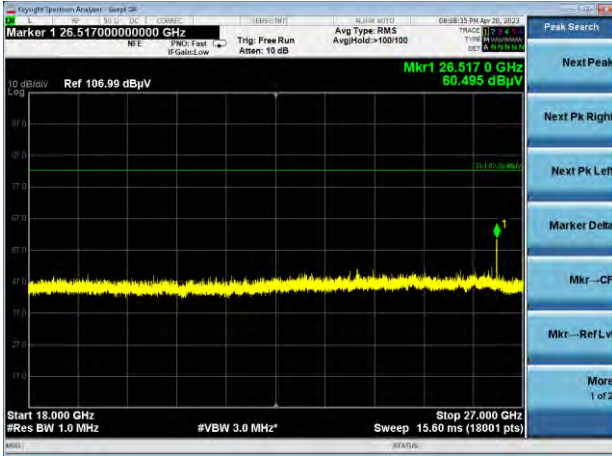
High Channel

High Channel

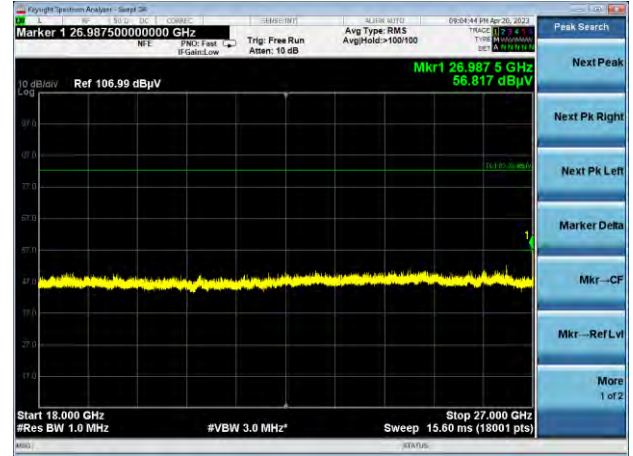


n261, 18 GHz ~ 27 GHz

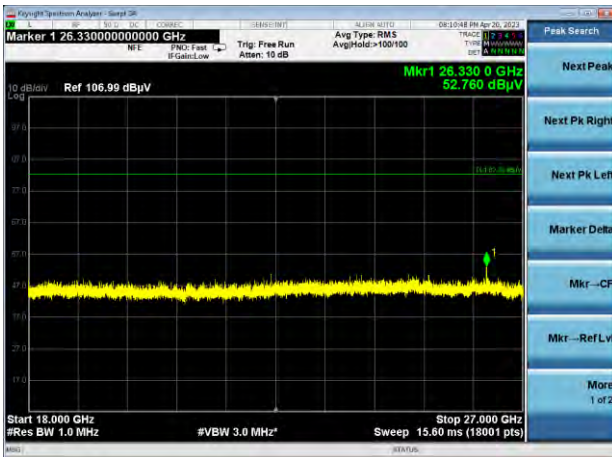
Antenna 0 (K patch)
Low Channel



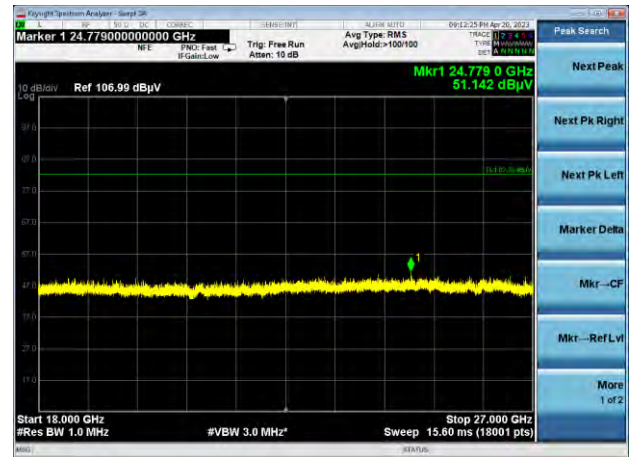
Antenna 1 (L patch)
Low Channel



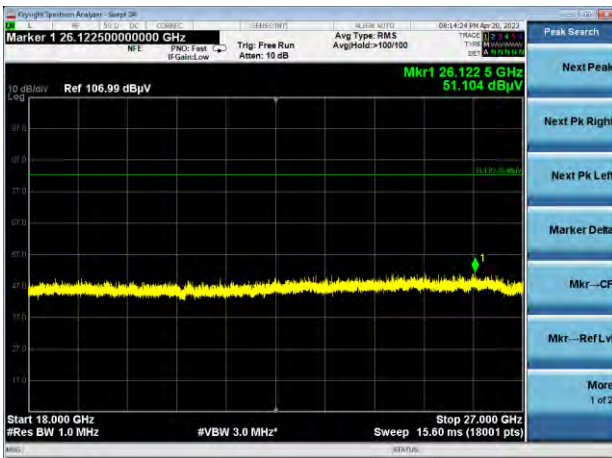
Middle Channel



Middle Channel



High Channel



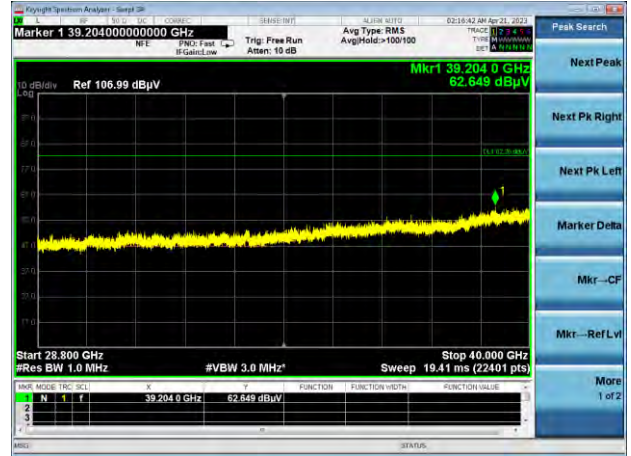
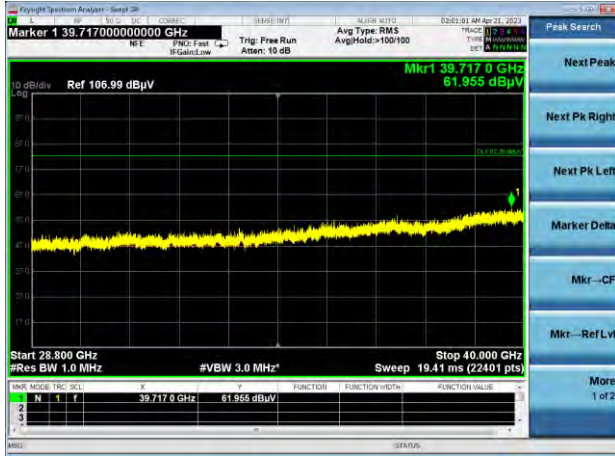
High Channel



n261, 28.8 GHz ~ 40 GHz

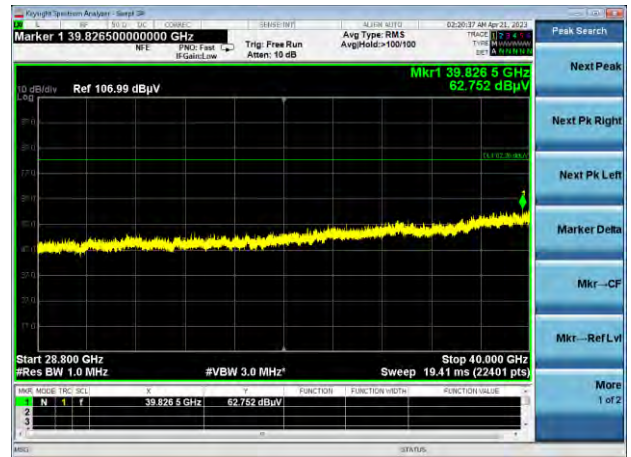
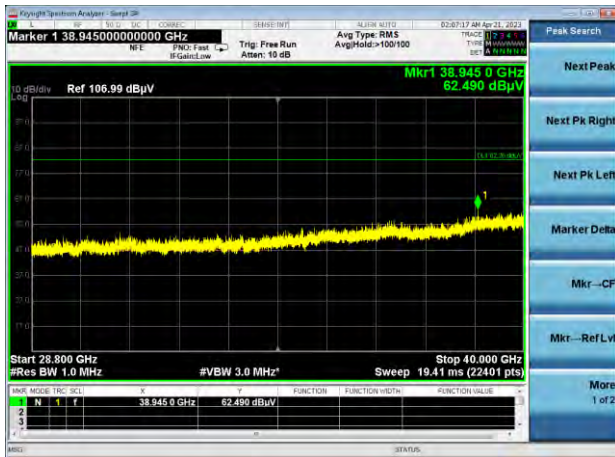
Antenna 0 (K patch)
Low Channel

Antenna 1 (L patch)
Low Channel



Middle Channel

Middle Channel



High Channel

High Channel

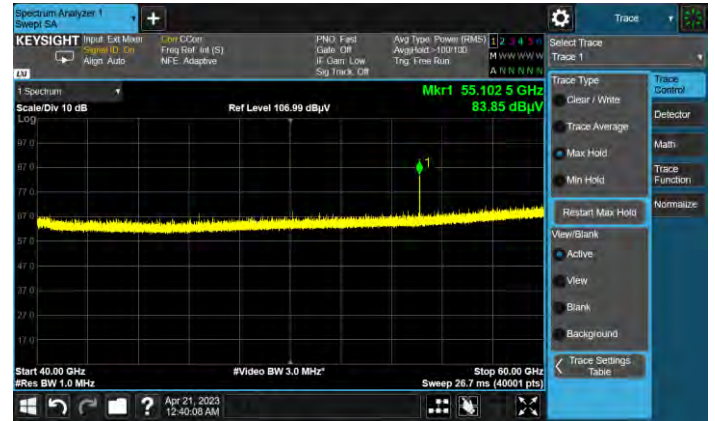


n261, 40 GHz ~ 60 GHz

Antenna 0 (K patch)
Low Channel



Antenna 1 (L patch)
Low Channel



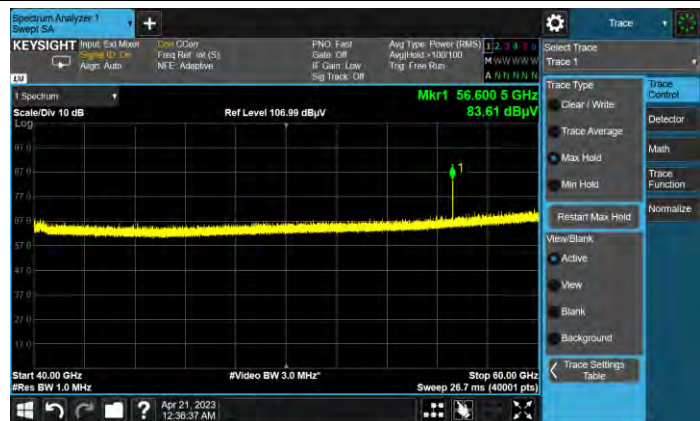
Middle Channel



Middle Channel



High Channel

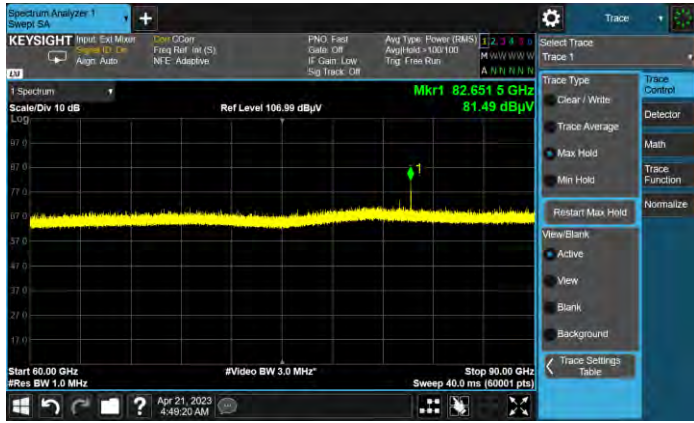


High Channel

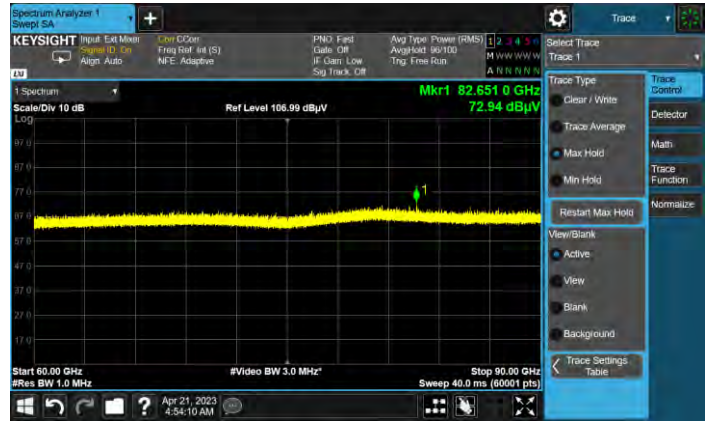


n261, 60 GHz ~ 90 GHz

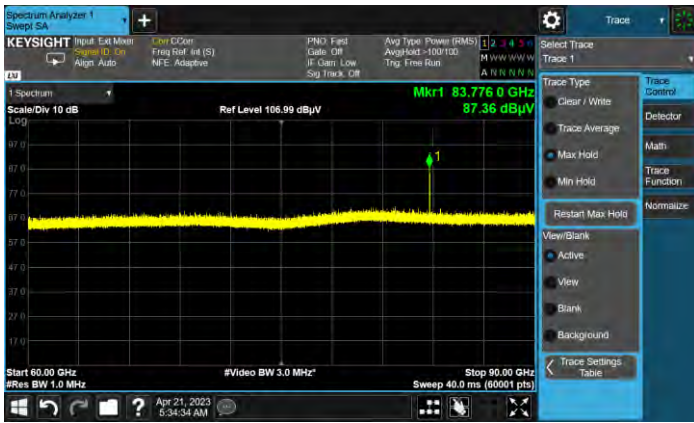
Antenna 0 (K patch)
Low Channel



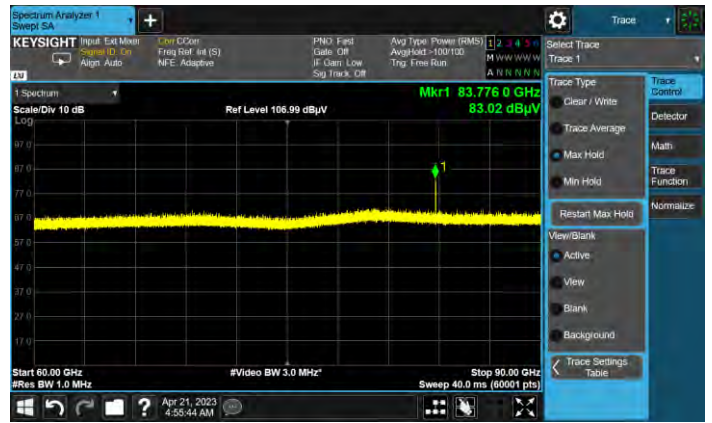
Antenna 1 (L patch)
Low Channel



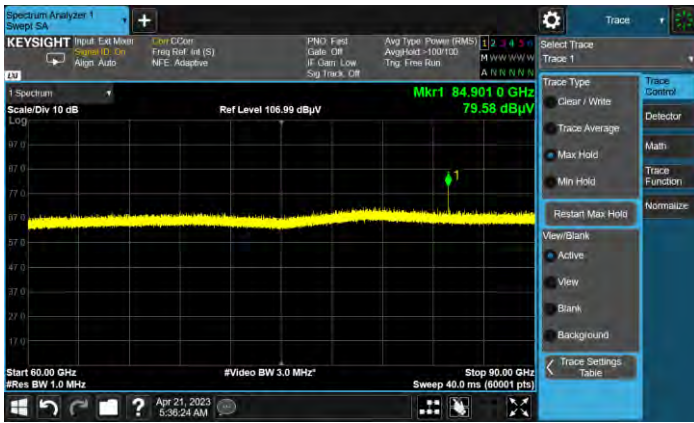
Middle Channel



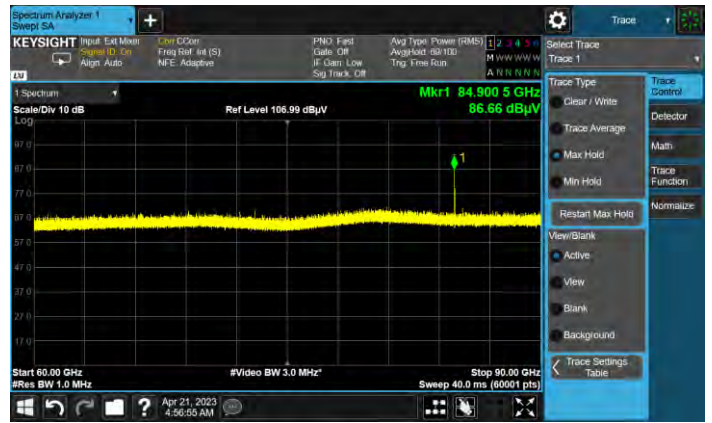
Middle Channel



High Channel



High Channel



n261, 90 GHz ~ 100 GHz

Antenna 0 (K patch)
Low Channel



Antenna 1 (L patch)
Low Channel



Middle Channel



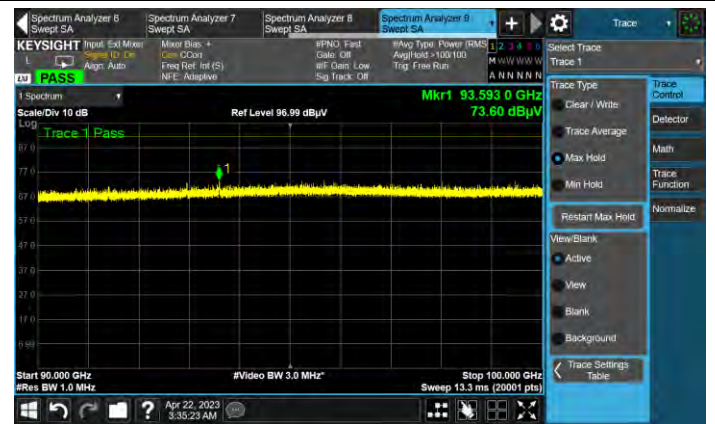
Middle Channel



High Channel



High Channel



5.5. FREQUENCY STABILITY

FCC Rules

Test Requirements:

§ 2.1055 Measurements required: Frequency stability.

(a) The frequency stability shall be measured with variation of ambient temperature as follows:

- (1) From -30° to $+50^{\circ}$ centigrade for all equipment except that specified in paragraphs (a) (2) and (3) of this section.

Test Procedures:

The measurement is performed in accordance with Section 5.6.4 and 5.6.5 of ANSI C63.26.

5.6.4 Frequency stability over variations in temperature

- a) Supply the EUT with a nominal 60 Hz ac voltage, dc voltage, or install a new or fully charged battery in the EUT.
- b) If possible a dummy load should be connected to the EUT because an antenna near the metallic walls of an environmental test chamber could affect the output frequency of the EUT. If the EUT is equipped with a permanently attached, adjustable-length antenna, the EUT should be placed in the center of the chamber with the antenna adjusted to the shortest length possible.
- c) Turn on the EUT, and tune it to the center frequency of the operating band.
- d) Couple the transmitter output to the measuring instrument through a suitable attenuator and coaxial cable. If connection to the EUT output is not possible, make the measurement by connecting an antenna to the measuring instrument with a suitable length of coaxial cable and placing the measuring antenna near the EUT (e.g., 15 cm away).

NOTE—An instrument that has an adequate level of accuracy as specified by the procuring or regulatory authority is the recommended measuring instrument.

- e) Adjust the location of the measurement antenna and the controls on the measurement instrument to obtain a suitable signal level (i.e., a level that will not overload the measurement instrument, but is strong enough to allow measurement of the operating or fundamental frequency of the EUT). Adjust the detector bandwidth and span settings to achieve a resolution capable of accurate frequency measurements over the applicable frequency stability limits.
- f) Turn the EUT off, and place it inside the environmental temperature chamber. For devices that have oscillator heaters, energize only the heater circuit.
- g) Set the temperature control on the chamber to the highest temperature specified in the regulatory requirements for the type of device, and allow the oscillator heater and the chamber temperature to stabilize. Unless otherwise instructed by the regulatory authority, this temperature should be 50°C .
- h) While maintaining a constant temperature inside the environmental chamber, turn on the EUT and allow sufficient time for the EUT temperature to stabilize.
- i) Measure the frequency.

- j) Switch off the EUT, but do not switch off the oscillator heater.
- k) Lower the chamber temperature to the next level that is required by the standard and allow the temperature inside the chamber to stabilize. Unless otherwise instructed by the regulators, this temperature step should be 10 °C.
- l) Repeat step h) through step k) down to the lowest specified temperature. Unless otherwise instructed by the regulators, this temperature should be -30 °C. When the frequency stability limit is stated as being sufficient such that the fundamental emissions stay within the authorized bands of operation, a reference point shall be established at the applicable unwanted emissions limit using a RBW equal to the RBW required by the unwanted emissions specification of the applicable regulatory standard. These reference points measured using the lowest and highest channel of operation shall be identified as f_L and f_H respectively. The worst-case frequency offset determined in the above methods shall be added or subtracted from the values of f_L and f_H and the resulting frequencies must remain within the band.
- m) Omitted

5.6.5 Frequency stability when varying supply voltage

- a) Couple the transmitter output to the measuring instrument through a suitable attenuator and coaxial cable. If connection to the EUT output is not possible make the measurement by connecting an antenna to the measuring instrument with a suitable length of coaxial cable and placing the measuring antenna near the EUT (e.g., 15 cm away)
- b) Supply the EUT with nominal ac or dc voltage. The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided. Effects on frequency of transmitter keying (except for broadcast transmitters) and any heating element cycling at the nominal supply voltage and at each extreme also shall be shown.
- c) Turn on the EUT, and couple its output to a frequency counter or other frequency-measuring instrument.
- d) Tune the EUT to the center frequency of the operating band. Adjust the location of the measurement antenna and the controls on the measurement instrument to obtain a suitable signal level (i.e., a level that will not overload the measurement instrument, but is strong enough to allow measurement of the operating or fundamental frequency of the EUT). Adjust the detector bandwidth and span settings to achieve a resolution capable of accurate frequency measurements over the applicable frequency stability limits.
NOTE—An instrument that has an adequate level of accuracy as specified by the procuring or regulatory authority is the recommended measuring instrument.
- e) Measure the frequency.
- f) Unless otherwise specified, vary primary supply voltage from 85% to 115% of the nominal value for other than hand carried battery equipment.
- g) For hand carried, battery powered equipment, reduce the primary ac or dc supply voltage to the battery operating end point, which shall be specified by the manufacturer.
- h) Repeat the frequency measurement.

NOTE—For band-edge compliance, it can be required to make these measurements at the low and high

channel of the operating band.

Note:

- 1) The results of the frequency stability test shown above the frequency deviation measured values are very small and similar trend for each path, so we are attached only the worst case data.
- 2) We were performed the test using call simulator

Test Results:

Reference: Voltage = DC 3.88 V

n258a Band Antenna 0 (K patch)

Low Frequency = 24 275.04 MHz

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (Hz)	ppm
100%	3.88	+20(Ref)	24275 040 000	7.845	0.000	0.00000
		-30	24275 040 001	1.178	-6.667	-0.00027
		-20	24275 040 008	8.356	0.511	0.00002
		-10	24275 040 009	9.281	1.436	0.00006
		0	24275 040 008	7.688	-0.157	-0.00001
		+10	24275 040 009	8.780	0.935	0.00004
		+30	24275 040 009	8.749	0.904	0.00004
		+40	24275 040 003	2.692	-5.153	-0.00021
		+50	24275 040 004	3.592	-4.252	-0.00018
HIGH	4.40	+20	24275 040 002	1.558	-6.287	-0.00026
LOW	3.70	+20	24275 040 004	3.923	-3.922	-0.00016

High Frequency = 24 424.92 MHz

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (Hz)	ppm
100%	3.88	+20(Ref)	24424 920 000	3.358	0.000	0.00000
		-30	24424 920 000	0.287	-3.071	-0.00013
		-20	24424 920 007	7.042	3.684	0.00015
		-10	24424 920 003	2.566	-0.792	-0.00003
		0	24424 920 010	9.909	6.550	0.00027
		+10	24424 920 003	3.236	-0.123	-0.00001
		+30	24424 920 009	8.818	5.459	0.00022
		+40	24424 920 005	5.389	2.031	0.00008
		+50	24424 920 009	8.554	5.196	0.00021
HIGH	4.40	+20	24424 920 008	8.041	4.683	0.00019
LOW	3.70	+20	24424 920 006	6.334	2.975	0.00012

n258a Band Antenna 1 (L patch)

Low Frequency = 24 275.04 MHz

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (Hz)	ppm
100%	3.88	+20(Ref)	24275 040 000	5.991	0.000	0.00000
		-30	24275 040 010	9.807	1.962	0.00008
		-20	24275 040 003	3.488	-4.357	-0.00018
		-10	24275 040 008	7.688	-0.157	-0.00001
		0	24275 040 002	1.624	-6.221	-0.00026
		+10	24275 040 005	5.315	-2.530	-0.00010
		+30	24275 040 010	9.999	2.154	0.00009
		+40	24275 040 007	7.062	-0.783	-0.00003
		+50	24275 040 005	4.531	-3.313	-0.00014
HIGH	4.40	+20	24275 040 009	9.260	1.416	0.00006
LOW	3.70	+20	24275 040 003	2.645	-5.200	-0.00021

High Frequency = 24 424.92 MHz

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (Hz)	ppm
100%	3.88	+20(Ref)	24424 920 000	5.042	0.000	0.00000
		-30	24424 920 003	3.222	-0.136	-0.00001
		-20	24424 920 003	2.928	-0.431	-0.00002
		-10	24424 920 004	4.346	0.988	0.00004
		0	24424 920 003	2.653	-0.706	-0.00003
		+10	24424 920 005	5.200	1.842	0.00008
		+30	24424 920 008	7.526	4.167	0.00017
		+40	24424 920 000	0.206	-3.152	-0.00013
		+50	24424 920 001	1.066	-2.293	-0.00009
HIGH	4.40	+20	24424 920 007	6.958	3.600	0.00015
LOW	3.70	+20	24424 920 009	9.072	5.714	0.00023

n258b Band Antenna 0 (K patch)

Low Frequency = 24 775.08 MHz

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (Hz)	ppm
100%	3.88	+20(Ref)	24775 080 000	2.078	0.000	0.00000
		-30	24775 080 004	3.682	1.604	0.00006
		-20	24775 080 006	6.253	4.174	0.00017
		-10	24775 080 001	1.329	-0.750	-0.00003
		0	24775 080 000	0.076	-2.002	-0.00008
		+10	24775 080 003	3.051	0.973	0.00004
		+30	24775 080 003	2.746	0.667	0.00003
		+40	24775 080 003	2.689	0.610	0.00002
		+50	24775 080 002	1.778	-0.301	-0.00001
HIGH	4.40	+20	24775 080 009	9.418	7.339	0.00030
LOW	3.70	+20	24775 080 002	1.963	-0.115	0.00000

High Frequency = 25 224.96 MHz

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (Hz)	ppm
100%	3.88	+20(Ref)	25224 960 000	9.646	0.000	0.00000
		-30	25224 960 000	0.263	-9.383	-0.00037
		-20	25224 960 007	7.333	-2.313	-0.00009
		-10	25224 960 002	1.606	-8.040	-0.00032
		0	25224 960 006	6.359	-3.286	-0.00013
		+10	25224 960 010	9.628	-0.018	0.00000
		+30	25224 960 003	2.750	-6.895	-0.00027
		+40	25224 960 010	9.933	0.287	0.00001
		+50	25224 960 009	8.505	-1.141	-0.00005
HIGH	4.40	+20	25224 960 009	9.178	-0.468	-0.00002
LOW	3.70	+20	25224 960 003	3.277	-6.368	-0.00025

n258b Band Antenna 1 (L patch)

Low Frequency = 24 775.08 MHz

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (Hz)	ppm
100%	3.88	+20(Ref)	24775 080 000	6.195	0.000	0.00000
		-30	24775 080 008	7.969	5.890	0.00024
		-20	24775 080 003	2.925	0.846	0.00003
		-10	24775 080 004	3.591	1.513	0.00006
		0	24775 080 009	8.550	6.472	0.00026
		+10	24775 080 005	5.189	3.110	0.00013
		+30	24775 080 008	8.093	6.015	0.00024
		+40	24775 080 006	5.735	3.657	0.00015
		+50	24775 080 001	0.624	-1.454	-0.00006
HIGH	4.40	+20	24775 080 005	4.548	2.469	0.00010
LOW	3.70	+20	24775 080 008	7.872	5.793	0.00023

High Frequency = 25 224.96 MHz

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (Hz)	ppm
100%	3.88	+20(Ref)	25224 960 000	3.808	0.000	0.00000
		-30	25224 960 002	2.359	-7.287	-0.00029
		-20	25224 960 002	2.010	-7.635	-0.00030
		-10	25224 960 009	8.948	-0.697	-0.00003
		0	25224 960 007	7.474	-2.172	-0.00009
		+10	25224 960 009	8.592	-1.054	-0.00004
		+30	25224 960 010	9.603	-0.043	0.00000
		+40	25224 960 000	0.205	-9.441	-0.00037
		+50	25224 960 007	7.052	-2.594	-0.00010
HIGH	4.40	+20	25224 960 007	7.365	-2.281	-0.00009
LOW	3.70	+20	25224 960 003	2.680	-6.966	-0.00028

n260 Band Antenna 0 (K patch)

Low Frequency = 37 025.04 MHz

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(Hz)	
100%	3.88	+20(Ref)	37025 040 000	1.622	0.000	0.00000
		-30	37025 040 002	2.323	0.702	0.00002
		-20	37025 040 009	8.533	6.912	0.00019
		-10	37025 040 001	1.213	-0.408	-0.00001
		0	37025 040 004	3.604	1.983	0.00005
		+10	37025 040 009	9.410	7.789	0.00021
		+30	37025 040 005	4.848	3.226	0.00009
		+40	37025 040 008	8.032	6.411	0.00017
		+50	37025 040 003	3.191	1.570	0.00004
HIGH	4.40	+20	37025 040 004	3.675	2.054	0.00006
LOW	3.70	+20	37025 040 010	9.798	8.177	0.00022

High Frequency = 39 975.00 MHz

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(Hz)	
100%	3.88	+20(Ref)	39975 000 000	1.005	0.000	0.00000
		-30	39975 000 010	9.712	8.707	0.00022
		-20	39975 000 007	6.664	5.659	0.00014
		-10	39975 000 004	4.109	3.104	0.00008
		0	39975 000 008	8.093	7.088	0.00018
		+10	39975 000 002	2.049	1.044	0.00003
		+30	39975 000 006	6.009	5.004	0.00013
		+40	39975 000 001	0.857	-0.148	0.00000
		+50	39975 000 004	4.489	3.484	0.00009
HIGH	4.40	+20	39975 000 010	9.875	8.870	0.00022
LOW	3.70	+20	39975 000 007	7.229	6.224	0.00016

n260 Band Antenna 1 (L patch)

Low Frequency = 37 025.04 MHz

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (Hz)	ppm
100%	3.88	+20(Ref)	37025 040 000	5.095	0.000	0.00000
		-30	37025 040 002	1.891	0.269	0.00001
		-20	37025 040 001	1.349	-0.273	-0.00001
		-10	37025 040 003	3.068	1.447	0.00004
		0	37025 040 008	8.492	6.871	0.00019
		+10	37025 040 004	3.582	1.960	0.00005
		+30	37025 040 004	3.899	2.277	0.00006
		+40	37025 040 004	3.959	2.337	0.00006
		+50	37025 040 007	7.111	5.489	0.00015
HIGH	4.40	+20	37025 040 008	7.876	6.254	0.00017
LOW	3.70	+20	37025 040 007	7.092	5.471	0.00015

High Frequency = 39 975.00 MHz

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (Hz)	ppm
100%	3.88	+20(Ref)	39975 000 000	6.562	0.000	0.00000
		-30	39975 000 002	2.426	1.421	0.00004
		-20	39975 000 007	7.361	6.356	0.00016
		-10	39975 000 003	2.709	1.704	0.00004
		0	39975 000 004	3.647	2.642	0.00007
		+10	39975 000 003	2.625	1.620	0.00004
		+30	39975 000 006	5.831	4.826	0.00012
		+40	39975 000 004	3.620	2.615	0.00007
		+50	39975 000 006	6.220	5.215	0.00013
HIGH	4.40	+20	39975 000 001	0.971	-0.034	0.00000
LOW	3.70	+20	39975 000 010	9.616	8.611	0.00022

n261 Band Antenna 0 (K patch)

Low Frequency = 27 525.00 MHz

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (Hz)	ppm
100%	3.88	+20(Ref)	27525 000 000	0.405	0.000	0.00000
		-30	27525 000 001	1.256	0.851	0.00003
		-20	27525 000 006	5.566	5.162	0.00019
		-10	27525 000 004	4.071	3.666	0.00013
		0	27525 000 008	8.055	7.651	0.00028
		+10	27525 000 005	5.057	4.652	0.00017
		+30	27525 000 006	6.075	5.670	0.00021
		+40	27525 000 003	3.360	2.955	0.00011
		+50	27525 000 004	3.932	3.528	0.00013
HIGH	4.40	+20	27525 000 001	0.996	0.592	0.00002
LOW	3.70	+20	27525 000 010	9.606	9.201	0.00033

High Frequency = 28 324.92 MHz

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (Hz)	ppm
100%	3.88	+20(Ref)	28324 920 000	2.609	0.000	0.00000
		-30	28324 920 003	2.841	0.232	0.00001
		-20	28324 920 008	7.941	5.332	0.00019
		-10	28324 920 002	1.893	-0.716	-0.00003
		0	28324 920 010	9.954	7.345	0.00026
		+10	28324 920 010	9.928	7.319	0.00026
		+30	28324 920 007	6.894	4.285	0.00015
		+40	28324 920 003	2.789	0.180	0.00001
		+50	28324 920 009	8.721	6.113	0.00022
HIGH	4.40	+20	28324 920 005	4.596	1.987	0.00007
LOW	3.70	+20	28324 920 008	8.161	5.552	0.00020

n261 Band Antenna 1 (L patch)

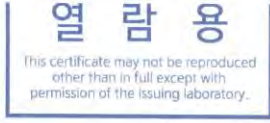
Low Frequency = 27 525.00 MHz

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(Hz)	
100%	3.88	+20(Ref)	27525 000 000	7.609	0.000	0.00000
		-30	27525 000 000	0.178	-0.226	-0.00001
		-20	27525 000 005	4.647	4.242	0.00015
		-10	27525 000 006	5.523	5.119	0.00019
		0	27525 000 008	8.224	7.819	0.00028
		+10	27525 000 003	3.336	2.931	0.00011
		+30	27525 000 004	4.087	3.682	0.00013
		+40	27525 000 006	5.804	5.399	0.00020
		+50	27525 000 003	2.672	2.267	0.00008
HIGH	4.40	+20	27525 000 007	6.917	6.512	0.00024
LOW	3.70	+20	27525 000 007	7.051	6.647	0.00024

High Frequency = 28 324.92 MHz

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(Hz)	
100%	3.88	+20(Ref)	28324 920 000	0.607	0.000	0.00000
		-30	28324 920 003	2.675	0.066	0.00000
		-20	28324 920 005	4.571	1.962	0.00007
		-10	28324 920 007	6.790	4.181	0.00015
		0	28324 920 003	3.014	0.405	0.00001
		+10	28324 920 008	8.458	5.849	0.00021
		+30	28324 920 010	9.839	7.230	0.00026
		+40	28324 920 002	1.943	-0.666	-0.00002
		+50	28324 920 005	5.148	2.539	0.00009
HIGH	4.40	+20	28324 920 000	0.070	-2.539	-0.00009
LOW	3.70	+20	28324 920 007	7.049	4.440	0.00016

6. SAX VERIFICATION CERTIFICATE & CHECK



교정성적서 CALIBRATION CERTIFICATE



성적서발급번호(Certificate No) : IC-2023-022668
교정번호(Calibration No) : C-2023-025661

페이지(page) : 1 of 3

- 1. 의뢰자 (Client)
- 기관명 (Name) : (주)에이치시티
- 주소 (Address) : 경기도 이천시 마장면 서이천로 578번길 74
2. 측정기 (Calibration Subject)
- 기기명 (Description) : SA EXTENSION MODULE
- 제작회사 및 형식 (Manufacturer and Model Name) : VDI / SAX WR19
- 기기번호 (Serial Number) : SAX 771
3. 교정일자 (Date of Calibration) : 2023.03.14
차기교정예정일자 : 2024.03.14
4. 교정환경 (Environment)
- 온도(Temperature) : (22.8 ± 0.1) °C
- 습도(Humidity) : (46 ± 3) % R.H.
- 교정장소 (Location) : 고정표준실(Permanent Calibration Lab)
5. 측정표준의 소급성 (Traceability)
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.

Table with 5 columns: 기기명 (Description), 제작회사 / 형식 (Manufacturer and Model Name), 기기번호 (Serial Number), 차기교정예정일자 (The due date of next Calibration), 교정기관 (Calibration laboratory). Rows include PSG ANALOG SIGNAL GENERATOR, EPM SERIES POWER METER, POWER SENSOR, KEYSIGHT/V8486A, WR-19 MULTIPLIER SOURCE MODULE, PAX SIGNAL ANALYZER.

- 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)

Table with 2 main columns: 측인자 (affirmation) and 승인자 (Approved by). Includes names and titles of measurement performers and the technical calibration manager.

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

한국인정기구 인정 Accredited by KOLAS, Republic of KOREA

2023. 03. 15
(주)에이치시티 대표이사
President, HCT Co., Ltd.



이 성적서는 측정기의 정밀정확도에 영향을 미치는 요소(과부하, 온도, 습도 등)의 급격한 변화가 발생한 경우에는 무효가 됩니다.
고객전용사이트(http://www.callab.co.kr)에서 성적서의 진위여부 확인이 가능합니다.
성적서의 원본은 상단에 HCT홀로그램이 들어간 위변조 방지 용지에 인쇄되어 발급되며, 원본 복사시에는 복사본이라는 표시가 처리됩니다.

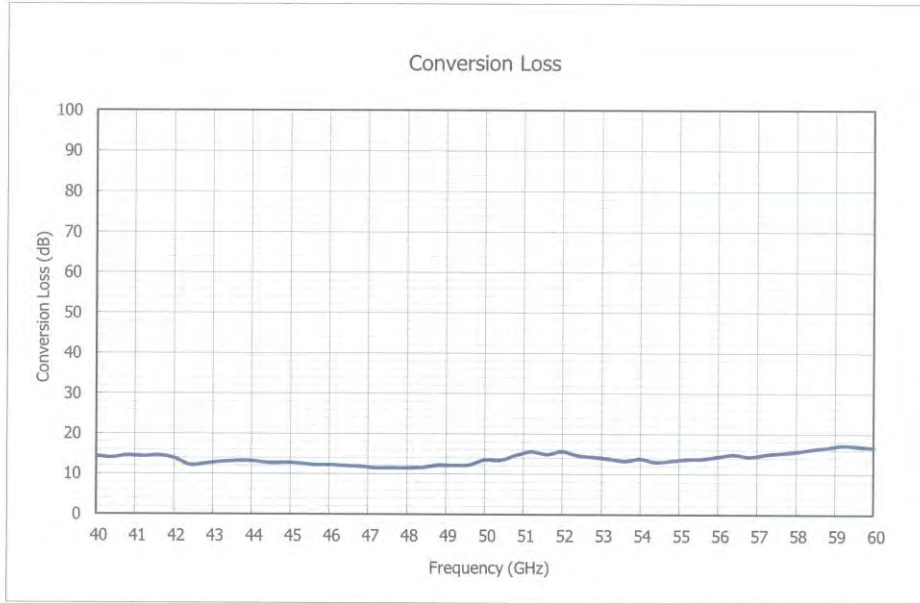
교 정 결 과
CALIBRATION RESULT



성적서발급번호(Certificate No) : IC-2023-022668
교 정 번 호(Calibration No) : C-2023-025661

페이지(page) : 2 of 3

1. Conversion Loss Graph



[Note]

1. Measurement Condition : RF = -30 dBm, Harmonic Order = 8, L.O. Level = 10 dBm, IF = 322.5 MHz, Bias Value = 0.00 mA

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

교 정 결 과
CALIBRATION RESULT



성적서발급번호(Certificate No) : IC-2023-022668
교 정 번 호(Calibration No) : C-2023-025661

페이지(page) : 3 of 3

2. Conversion Loss Data

Frequency (GHz)	Conversion Loss (dB)	Measurement Uncertainty (dB)	Frequency (GHz)	Conversion Loss (dB)	Measurement Uncertainty (dB)
40.0	14.38	0.82	50.4	13.38	0.82
40.4	13.98	0.82	50.8	14.61	0.82
40.8	14.58	0.82	51.2	15.51	0.82
41.2	14.32	0.82	51.6	14.85	0.82
41.6	14.53	0.82	52.0	15.57	0.82
42.0	13.87	0.82	52.4	14.53	0.82
42.4	12.20	0.82	52.8	14.17	0.82
42.8	12.49	0.82	53.2	13.75	0.82
43.2	12.94	0.82	53.6	13.23	0.82
43.6	13.17	0.82	54.0	13.76	0.82
44.0	13.16	0.82	54.4	12.94	0.82
44.4	12.72	0.82	54.8	13.30	0.82
44.8	12.72	0.82	55.2	13.63	0.82
45.2	12.63	0.82	55.6	13.76	0.82
45.6	12.21	0.82	56.0	14.29	0.82
46.0	12.23	0.82	56.4	14.83	0.82
46.4	11.96	0.82	56.8	14.26	0.82
46.8	11.84	0.82	57.2	14.85	0.82
47.2	11.43	0.82	57.6	15.20	0.82
47.6	11.50	0.82	58.0	15.56	0.82
48.0	11.47	0.82	58.4	16.15	0.82
48.4	11.58	0.82	58.8	16.58	0.82
48.8	12.14	0.82	59.2	17.15	0.82
49.2	12.07	0.82	59.6	16.86	0.82
49.6	12.23	0.82	60.0	16.57	0.82
50.0	13.46	0.82	-	-	-

끝.

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

성적서발급번호(Certificate No) : IC-2023-022667
교정번호(Calibration No) : C-2023-025660

페이지(page) : 1 of 4

1. 의뢰자 (Client)

- 기관명 (Name) : (주)에이치시티
- 주소 (Address) : 경기도 이천시 마장면 서이천로 578번길 74

2. 측정기 (Calibration Subject)

◇ 등록번호 : 415873

- 기기명 (Description) : SA EXTENSION MODULE
- 제작회사 및 형식(Manufacturer and Model Name) : VDI / SAX WR12
- 기기번호 (Serial Number) : SAX773

3. 교정일자 (Date of Calibration) : 2023.03.22

차기교정예정일자 : 2024.03.22
(The due date of next Calibration)

4. 교정환경 (Environment)

- 온도(Temperature) : (22.7 ± 0.4) °C - 습도(Humidity) : (46 ± 3) % R.H.
- 교정장소 (Location) : 고정표준실(Permanent Calibration Lab)
(주소: 경기도 이천시 마장면 서이천로 578번길 74)

5. 측정표준의 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/E8257D	MY46130629	2023/10/26	(주)에이치시티
EPM SERIES POWER METER	AGILENT/E4419B	GB42420565	2023/10/26	(주)에이치시티
POWER SENSOR	KEYSIGHT/V8486A	MY56330017	2023/12/13	Keysight Technologies
POWER SENSOR	KEYSIGHT/W8486A	MY56370005	2024/01/10	Keysight Technologies
WR-12 MULTIPLIER SOURCE MODULE	OML/S12MS-A	160419-1	2023/07/19	(주)에이치시티
PAX SIGNAL ANALYZER	AGILENT/N9030A	US51350310	2024/03/13	(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) 강석훈	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.

한국인정기구 인정
Accredited by KOLAS, Republic of KOREA

2023. 03. 22
주에이치시티 대표이사
President, HCT Co., Ltd.



이 성적서는 측정기의 정밀정확도에 영향을 미치는 요소(과부하, 온도, 습도 등)의 급격한 변화가 발생한 경우에는 무효가 됩니다.
※ 고객전용사이트(http://www.callab.co.kr)에서 성적서의 진위여부 확인이 가능합니다.
※ 성적서의 원본은 상단에 HCT홀로그램이 들어간 위변조 방지 용지에 인쇄되어 발급되며, 원본 복사시에는 복사본이라는 표시가 처리됩니다.

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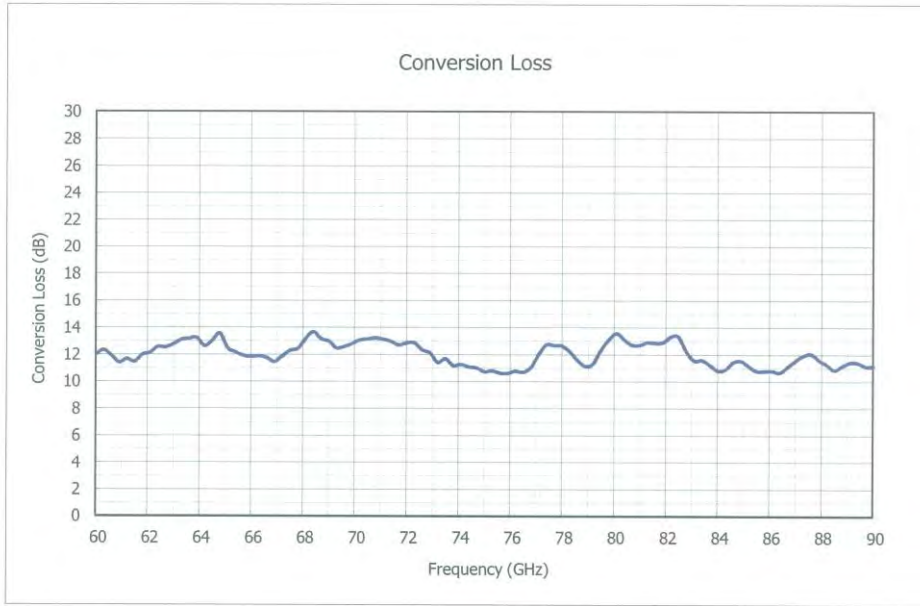
교 정 결 과
CALIBRATION RESULT



성적서발급번호(Certificate No) : IC-2023-022667
교 정 번 호(Calibration No) : C-2023-025660

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

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

교 정 결 과
CALIBRATION RESULT



성적서발급번호(Certificate No) : IC-2023-022667
교 정 번 호(Calibration No) : C-2023-025660

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)
60.0	11.98	0.82	71.1	13.13	0.82
60.3	12.32	0.82	71.4	12.97	0.82
60.6	11.91	0.82	71.7	12.70	0.82
60.9	11.41	0.82	72.0	12.85	0.82
61.2	11.66	0.82	72.3	12.85	0.82
61.5	11.46	0.82	72.6	12.34	0.82
61.8	11.97	0.82	72.9	12.11	0.82
62.1	12.13	0.82	73.2	11.41	0.82
62.4	12.56	0.82	73.5	11.68	0.82
62.7	12.53	0.82	73.8	11.18	0.82
63.0	12.76	0.82	74.1	11.27	0.82
63.3	13.08	0.82	74.4	11.08	0.82
63.6	13.16	0.82	74.7	11.02	0.82
63.9	13.23	0.82	75.0	10.72	0.82
64.2	12.63	0.82	75.3	10.80	0.82
64.5	13.00	0.82	75.6	10.61	0.82
64.8	13.55	0.82	75.9	10.60	0.82
65.1	12.46	0.82	76.2	10.77	0.82
65.4	12.16	0.82	76.5	10.69	0.82
65.7	11.91	0.82	76.8	11.03	0.82
66.0	11.84	0.82	77.1	11.99	0.82
66.3	11.87	0.82	77.4	12.72	0.82
66.6	11.74	0.82	77.7	12.67	0.82
66.9	11.46	0.82	78.0	12.64	0.82
67.2	11.85	0.82	78.3	12.20	0.82
67.5	12.28	0.82	78.6	11.55	0.82
67.8	12.43	0.82	78.9	11.13	0.82
68.1	13.14	0.82	79.2	11.34	0.82
68.4	13.65	0.82	79.5	12.33	0.82
68.7	13.15	0.82	79.8	13.08	0.82
69.0	12.98	0.82	80.1	13.56	0.82
69.3	12.47	0.82	80.4	13.09	0.82
69.6	12.58	0.82	80.7	12.71	0.82
69.9	12.79	0.82	81.0	12.70	0.82
70.2	13.07	0.82	81.3	12.90	0.82
70.5	13.13	0.82	81.6	12.85	0.82
70.8	13.21	0.82	81.9	12.89	0.82

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교 정 결 과
CALIBRATION RESULT



성적서발급번호(Certificate No) : IC-2023-022667
교 정 번 호(Calibration No) : C-2023-025660

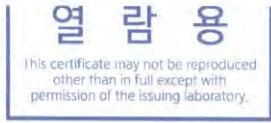
페이지(page) : 4 of 4

2. Conversion Loss Data (cont.)

Frequency (GHz)	Conversion Loss (dB)	Measurement Uncertainty (dB)	Frequency (GHz)	Conversion Loss (dB)	Measurement Uncertainty (dB)
82.2	13.32	0.82	86.4	10.67	0.82
82.5	13.29	0.82	86.7	11.09	0.82
82.8	12.19	0.82	87.0	11.55	0.82
83.1	11.55	0.82	87.3	11.92	0.82
83.4	11.59	0.82	87.6	12.03	0.82
83.7	11.22	0.82	87.9	11.58	0.82
84.0	10.81	0.82	88.2	11.25	0.82
84.3	10.90	0.82	88.5	10.86	0.82
84.6	11.43	0.82	88.8	11.16	0.82
84.9	11.53	0.82	89.1	11.42	0.82
85.2	11.13	0.82	89.4	11.40	0.82
85.5	10.78	0.82	89.7	11.13	0.82
85.8	10.77	0.82	90.0	11.13	0.82
86.1	10.78	0.82	-	-	-

끝.

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



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



성적서발급번호(Certificate No) : IC-2023-022665
교정번호(Calibration No) : C-2023-025658

페이지(page) : 1 of 3

- 1. 의뢰자 (Client)**
 - 기관명 (Name) : (주)에이치시티
 - 주소 (Address) : 경기도 이천시 마장면 서이천로 578번길 74
- 2. 측정기 (Calibration Subject)**
 - ◇ 등록번호 : 415877
 - 기기명 (Description) : SA EXTENSION MODULE
 - 제작회사 및 형식 (Manufacturer and Model Name) : VDI / SAX WR8.0
 - 기기번호 (Serial Number) : SAX779
- 3. 교정일자 (Date of Calibration) : 2023.03.14**
 - 차기교정예정일자 : 2024.03.14
(The due date of next Calibration)
- 4. 교정환경 (Environment)**
 - 온도(Temperature) : (22.9 ± 0.4) °C
 - 습도(Humidity) : (46 ± 2) % R.H.
 - 교정장소 (Location) : 교정표준실(Permanent Calibration Lab)
(주소: 경기도 이천시 마장면 서이천로 578번길 74)
- 5. 측정표준의 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/E8257D	MY46130629	2023/10/26	(주)에이치시티
EPM SERIES POWER METER	AGILENT/E4419B	GB42420565	2023/10/26	(주)에이치시티
POWER SENSOR	KEYSIGHT/W8486A	MY56370005	2024/01/10	Keysight Technologies
WR-08 MULTIPLIER SOURCE MODULE	OML/S08MS-A	160419-1	2023/09/05	(주)에이치시티
PAX SIGNAL ANALYZER	AGILENT/N9030A	US51350310	2024/03/13	(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 (서명)	직위 (Title) 기술책임자(Technical Cal. Manager) 김광철 (서명) 성명 (Name) 김광철

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

2023. 03. 15
한국인정기구 인정 Accredited by KOLAS, Republic of KOREA
주에이치시티 대표이사 President, HCT Co., Ltd.



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※ 고객연용사이트(http://www.callab.co.kr)에서 성적서의 진위여부 확인이 가능합니다.
※ 성적서의 원본은 상단에 HCT홀로그램이 들어간 위변조 방지 용지에 인쇄되어 발급되며, 원본 복사시에는 복사본이라는 표시가 처리됩니다.

교 정 결 과
CALIBRATION RESULT



성적서발급번호(Certificate No) : IC-2023-022665
교 정 번 호(Calibration No) : C-2023-025658

페이지(page) : 2 of 3

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

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

교 정 결 과
CALIBRATION RESULT



성적서발급번호(Certificate No) : IC-2023-022665
교 정 번 호(Calibration No) : C-2023-025658

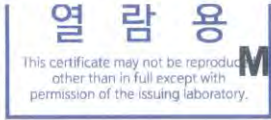
페이지(page) : 3 of 3

2. Conversion Loss Data

Frequency (GHz)	Conversion Loss (dB)	Measurement Uncertainty (dB)	Frequency (GHz)	Conversion Loss (dB)	Measurement Uncertainty (dB)
90.0	10.09	0.82	101.0	11.59	0.82
91.0	10.68	0.82	102.0	10.55	0.82
92.0	10.50	0.82	103.0	10.08	0.82
93.0	11.26	0.82	104.0	10.73	0.82
94.0	11.82	0.82	105.0	10.99	0.82
95.0	12.44	0.82	106.0	11.26	0.82
96.0	12.25	0.82	107.0	10.81	0.82
97.0	12.74	0.82	108.0	10.30	0.82
98.0	11.99	0.82	109.0	10.57	0.82
99.0	11.95	0.82	110.0	13.62	0.82
100.0	11.67	0.82	-	-	-

끝.

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



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-2023-022669
측정번호(Measurement No) : C-2023-025662

페이지(page) : 1 of 3



- 1. 의뢰자 (Client)**
 - 기관명 (Name) : (주)에이치시티
 - 주소 (Address) : 경기도 이천시 마장면 서이천로 578번길 74
- 2. 대상품목 (Measurement Item)** ◇ HCT 등록번호 : 416612
 - 기기명 (Description) : SA EXTENSION MODULE
 - 제작회사 및 형식 (Manufacturer and Model Name) : VDI / SAX WR8.0
 - 기기번호 (Serial Number) : SAX779
- 3. 측정일자 (Measurement date)** : 2023.03.14
- 4. 측정환경 (Environment)**
 - 온도(Temperature) : (22.7 ± 0.4) ℃ - 습도(Humidity) : (47 ± 4) % 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
PAX SIGNAL ANALYZER	AGILENT/N9030A	US51350310	2024/03/13	(주)에이치시티
ERICKSON POWER METER	VDI/PM5	394V	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)
 (주) 이 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) 성명 (Name) : 고형재		승인자 (Approved by) 직위 (Title) : 기술책임자(Technical Manager) 성명 (Name) : 김광철	
	(서명)			

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. 03. 15

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



⚠ 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.

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

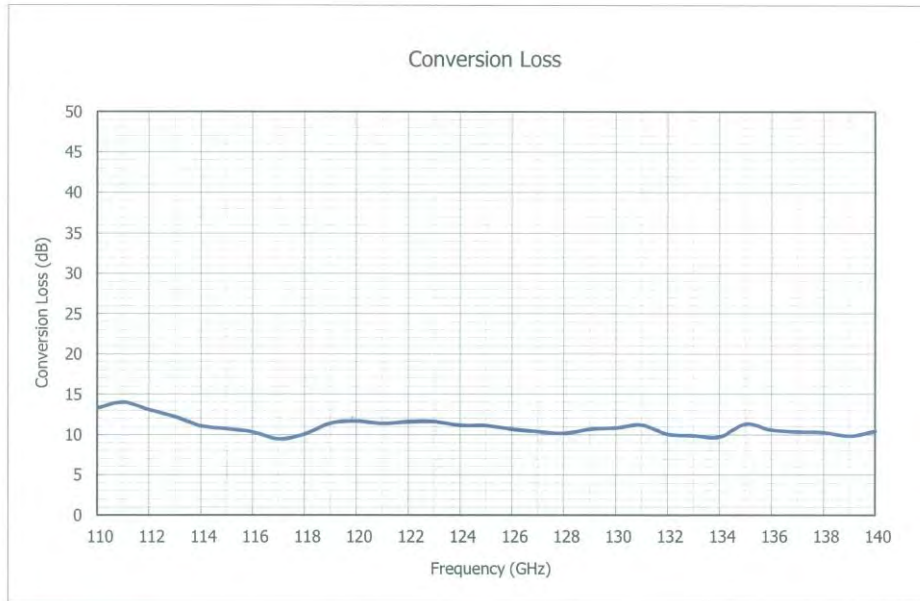
Measurement Result

보고서번호(Report No) : IC-2023-022669

페이지(page) : 2 of 3

측정번호(Measurement No) : C-2023-025662

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. In the absence of power standards above 110 GHz, power measurements above 110 GHz are to confirm operation functionality and traceable only to HCT.
3. The above results were measured at the request of the customer.

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

Measurement Result

보고서번호(Report No) : IC-2023-022669

페이지(page) : 3 of 3

측정번호(Measurement No) : C-2023-025662

2. Conversion Loss Data

Frequency (GHz)	Conversion Loss (dB)	Frequency (GHz)	Conversion Loss (dB)
110.0	13.28	126.0	10.68
111.0	13.99	127.0	10.38
112.0	13.05	128.0	10.16
113.0	12.18	129.0	10.68
114.0	11.10	130.0	10.84
115.0	10.74	131.0	11.19
116.0	10.34	132.0	10.05
117.0	9.47	133.0	9.87
118.0	10.07	134.0	9.72
119.0	11.41	135.0	11.31
120.0	11.67	136.0	10.58
121.0	11.39	137.0	10.36
122.0	11.58	138.0	10.29
123.0	11.60	139.0	9.84
124.0	11.15	140.0	10.41
125.0	11.12	-	-

끝.

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

열 램 용

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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-2023-022666 페이지(page) : 1 of 4
 측정 번호(Measurement No) : C-2023-025659

1. 의뢰자 (Client)
 - 기관명 (Name) : (주)에이치시티
 - 주소 (Address) : 경기도 이천시 마장면 서이천로 578번길 74
2. 대상품목 (Measurement Item) ◇ HCT 등록번호 : 415876
 - 기기명 (Description) : SA EXTENSION MODULE
 - 제작회사 및 형식(Manufacturer and Model Name) : VDI / SAX WR5.1
 - 기기번호 (Serial Number) : SAX774
3. 측정일자 (Measurement date) : 2023.03.14

4. 측정환경 (Environment)
 - 온도(Temperature) : (22.8 ± 0.4) °C - 습도(Humidity) : (49 ± 4) % 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
PAX SIGNAL ANALYZER	AGILENT/N9030A	US51350310	2024/03/13	(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


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

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

확 인 (Affirmation)	작성자 (Tested by) 성명 (Name) : 고형재		승인자 (Approved by) 직위 (Title) 기술책임자(Technical Manager) 성명 (Name) 김광철
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이 성적서는 ILAC MRA 시험 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. 03. 15



(주)에이치시티 대표이사

President, HCT Co., Ltd.



Ⓜ 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.

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

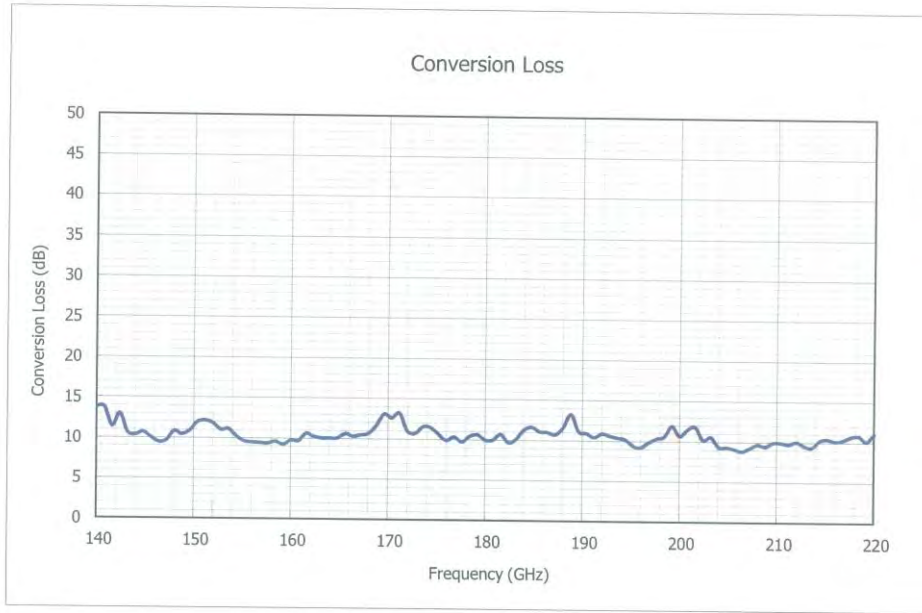
Measurement Result

보고서번호(Report No) : IC-2023-022666

페이지(page) : 2 of 4

측정번호(Measurement No) : C-2023-025659

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. In the absence of power standards above 110 GHz, power measurements above 110 GHz are to confirm operation functionality and traceable only to HCT.
3. The above results were measured at the request of the customer.

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

Measurement Result

보고서번호(Report No) : IC-2023-022666

페이지(page) : 3 of 4

측정번호(Measurement No) : C-2023-025659

2. Conversion Loss Data

Frequency (GHz)	Conversion Loss (dB)	Frequency (GHz)	Conversion Loss (dB)
140.0	13.81	169.6	13.06
140.8	13.76	170.4	12.60
141.6	11.41	171.2	13.19
142.4	12.96	172.0	11.02
143.2	10.62	172.8	10.72
144.0	10.37	173.6	11.55
144.8	10.70	174.4	11.44
145.6	10.05	175.2	10.63
146.4	9.46	176.0	9.88
147.2	9.65	176.8	10.33
148.0	10.81	177.6	9.71
148.8	10.43	178.4	10.42
149.6	10.89	179.2	10.64
150.4	11.94	180.0	9.98
151.2	12.12	180.8	9.97
152.0	11.82	181.6	10.70
152.8	11.02	182.4	9.66
153.6	11.13	183.2	10.12
154.4	10.22	184.0	11.28
155.2	9.61	184.8	11.61
156.0	9.47	185.6	11.08
156.8	9.41	186.4	11.01
157.6	9.35	187.2	10.70
158.4	9.58	188.0	11.55
159.2	9.23	188.8	13.22
160.0	9.74	189.6	11.12
160.8	9.69	190.4	10.90
161.6	10.62	191.2	10.42
162.4	10.21	192.0	10.89
163.2	10.04	192.8	10.60
164.0	10.04	193.6	10.37
164.8	10.06	194.4	10.17
165.6	10.62	195.2	9.39
166.4	10.29	196.0	9.21
167.2	10.48	196.8	9.82
168.0	10.65	197.6	10.30
168.8	11.64	198.4	10.56

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

Measurement Result

보고서번호(Report No) : IC-2023-022666

페이지(page) : 4 of 4

측정번호(Measurement No) : C-2023-025659

2. Conversion Loss Data (cont.)

Frequency (GHz)	Conversion Loss (dB)	Frequency (GHz)	Conversion Loss (dB)
199.2	11.87	210.4	9.88
200.0	10.64	211.2	9.72
200.8	11.46	212.0	10.02
201.6	11.79	212.8	9.54
202.4	10.17	213.6	9.36
203.2	10.55	214.4	10.21
204.0	9.34	215.2	10.38
204.8	9.31	216.0	10.11
205.6	9.08	216.8	10.28
206.4	8.81	217.6	10.69
207.2	9.23	218.4	10.80
208.0	9.66	219.2	10.12
208.8	9.44	220.0	11.02
209.6	9.90	-	-

끝.

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

열람용
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교정성적서
CALIBRATION CERTIFICATE



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

성적서발급번호(Certificate No) : IC-2022-065048
교정번호(Calibration No) : C-2022-077150

페이지(page) : 1 of 4

1. 의뢰자 (Client)
 - 기관명 (Name) : (주)에이치시티
 - 주소 (Address) : 경기도 이천시 마장면 서이천로 578번길 74
2. 측정기 (Calibration Subject) ◇ 등록번호 : 400353
 - 기기명 (Description) : AMPLIFIER
 - 제작회사 및 형식 (Manufacturer and Model Name) : T&M SYSTEM / Thru1 + LLAU1183540Q
 - 기기번호 (Serial Number) : NONE
3. 교정일자 (Date of Calibration) : 2022.08.23 차기교정예정일자 : 2023.08.23
(The due date of next Calibration)
4. 교정환경 (Environment)
 - 온도(Temperature) : (22.3 ± 0.3) °C - 습도(Humidity) : (45 ± 3) % R.H.
 - 교정장소 (Location) : 고정표준실(Permanent Calibration Lab)
(주소: 경기도 이천시 마장면 서이천로 578번길 74)
5. 측정표준의 소급성 (Traceability) ◇ Field code : 40601(RF AMPLIFIER)
교정방법 및 소급성 서술 (Calibration method and/or brief description)
상기 기기는 고주파 증폭기의 교정절차(HCT-CS-105-40601)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)
NETWORK ANALYZER	AGILENT/E5061B	MY49203861	2022/09/28	(주)에이치시티
CALIBRATION KIT	H.P/85054B	3106A01829	2023/02/17	한국표준과학연구원
NETWORK ANALYZER	AGILENT/N5230C	MY49001853	2022/09/28	(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) 유성노		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.

2022. 08. 23
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주에이치시티 대표이사 President, HCT Co., Ltd.



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※ 성적서의 원본은 상단에 HCT홀로그램이 들어간 위변조 방지 용지에 인쇄되어 발급되며, 원본 복사시에는 복사본이라는 표시가 처리됩니다.

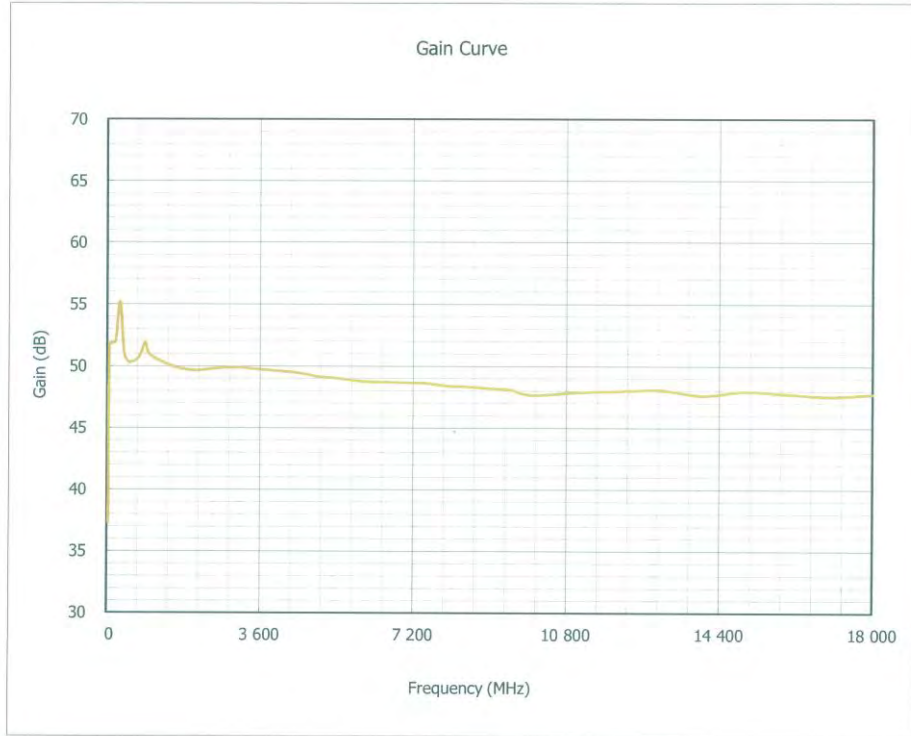
교 정 결 과
CALIBRATION RESULT



성적서발급번호(Certificate No) : IC-2022-065048
교 정 번 호(Calibration No) : C-2022-077150

페이지(page) : 2 of 4

※ Measurement Curve



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

교 정 결 과
CALIBRATION RESULT



성적서발급번호(Certificate No) : IC-2022-065048
교 정 번 호(Calibration No) : C-2022-077150

페이지(page) : 3 of 4

1. Gain Calibration

Frequency	Measured Value	Uncertainty
30 MHz	37.31 dB	0.11 dB
50 MHz	51.73 dB	0.11 dB
100 MHz	51.84 dB	0.11 dB
200 MHz	52.05 dB	0.11 dB
300 MHz	55.19 dB	0.11 dB
400 MHz	51.02 dB	0.11 dB
500 MHz	50.33 dB	0.11 dB
600 MHz	50.38 dB	0.11 dB
700 MHz	50.52 dB	0.11 dB
800 MHz	51.08 dB	0.11 dB
900 MHz	51.90 dB	0.11 dB
1.0 GHz	50.94 dB	0.11 dB
1.5 GHz	50.05 dB	0.11 dB
2.0 GHz	49.67 dB	0.11 dB
2.5 GHz	49.78 dB	0.11 dB
3.0 GHz	49.91 dB	0.14 dB
3.5 GHz	49.76 dB	0.14 dB
4.0 GHz	49.62 dB	0.14 dB
4.5 GHz	49.45 dB	0.14 dB
5.0 GHz	49.14 dB	0.14 dB
5.5 GHz	48.97 dB	0.14 dB
6.0 GHz	48.77 dB	0.14 dB
6.5 GHz	48.72 dB	0.14 dB
7.0 GHz	48.67 dB	0.14 dB
7.5 GHz	48.62 dB	0.14 dB
8.0 GHz	48.40 dB	0.14 dB
8.5 GHz	48.34 dB	0.14 dB
9.0 GHz	48.20 dB	0.14 dB
9.5 GHz	48.08 dB	0.14 dB
10.0 GHz	47.66 dB	0.14 dB
11.0 GHz	47.89 dB	0.23 dB
12.0 GHz	47.98 dB	0.23 dB
13.0 GHz	48.06 dB	0.23 dB
14.0 GHz	47.63 dB	0.23 dB
15.0 GHz	47.95 dB	0.23 dB
16.0 GHz	47.75 dB	0.23 dB

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

교정결과
CALIBRATION RESULT



성적서발급번호(Certificate No) : IC-2022-065048
교정번호(Calibration No) : C-2022-077150

페이지(page) : 4 of 4

1. Gain Calibration (cont.)

Frequency	Measured Value	Uncertainty	
17,0 GHz	47,55 dB	0,23 dB	끝
18,0 GHz	47,74 dB	0,23 dB	

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

7. Annex A_EUT AND TEST SETUP PHOTO

Please refer to test setup photo file no. as follows;

No.	Description
1	HCT-RF-2305-FC006-P