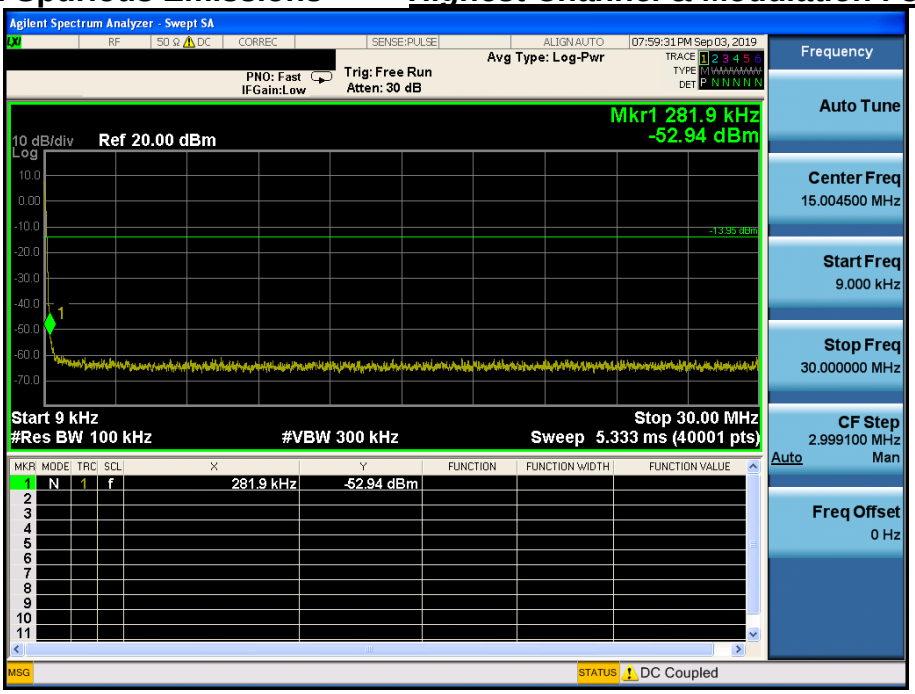
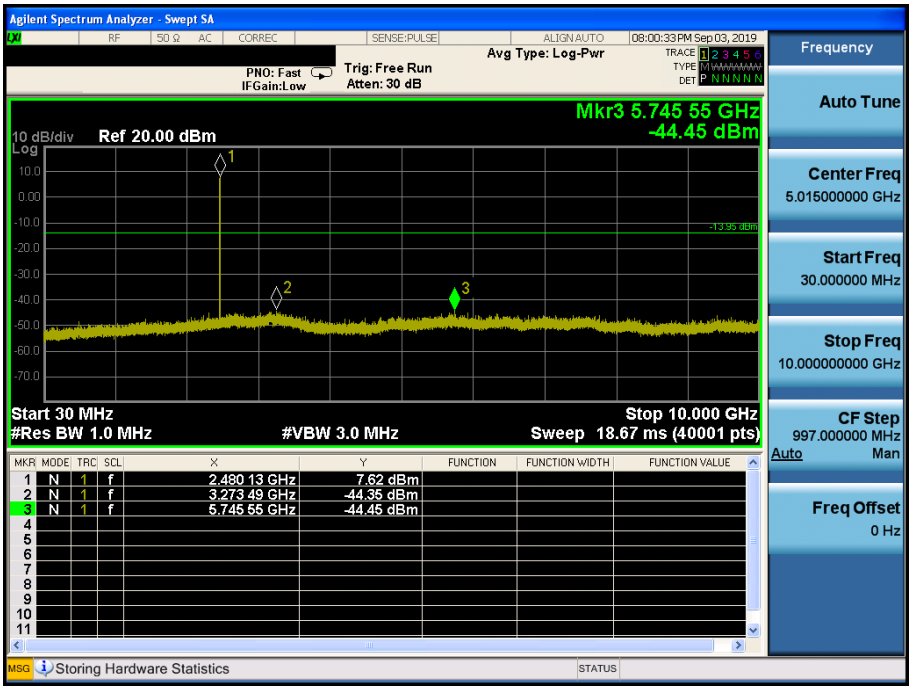
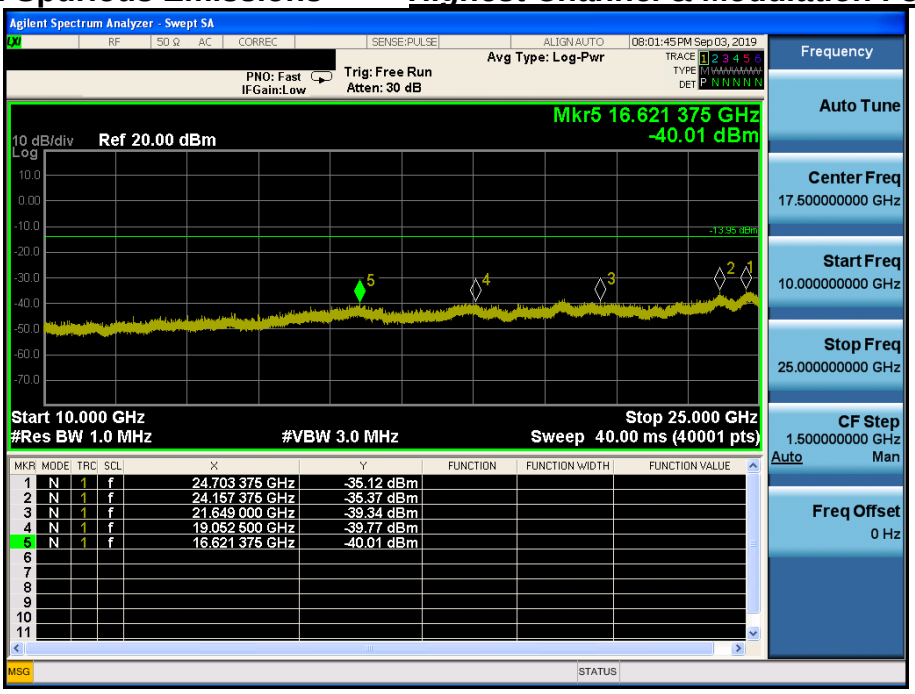
Conducted Spurious Emissions ***Highest Channel & Modulation : 8DPSK***





Conducted Spurious Emissions ***Highest Channel & Modulation : 8DPSK***



8. Transmitter AC Power Line Conducted Emission

8.1 Test Setup

See test photographs for the actual connections between EUT and support equipment.

8.2 Limit

According to §15.207(a) for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 uH/50 ohm line impedance stabilization network (LISN).

Compliance with the provision of this paragraph shall on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower applies at the boundary between the frequency ranges.

Frequency Range (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15 ~ 0.5	66 to 56 *	56 to 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50

* Decreases with the logarithm of the frequency

8.3 Test Procedures

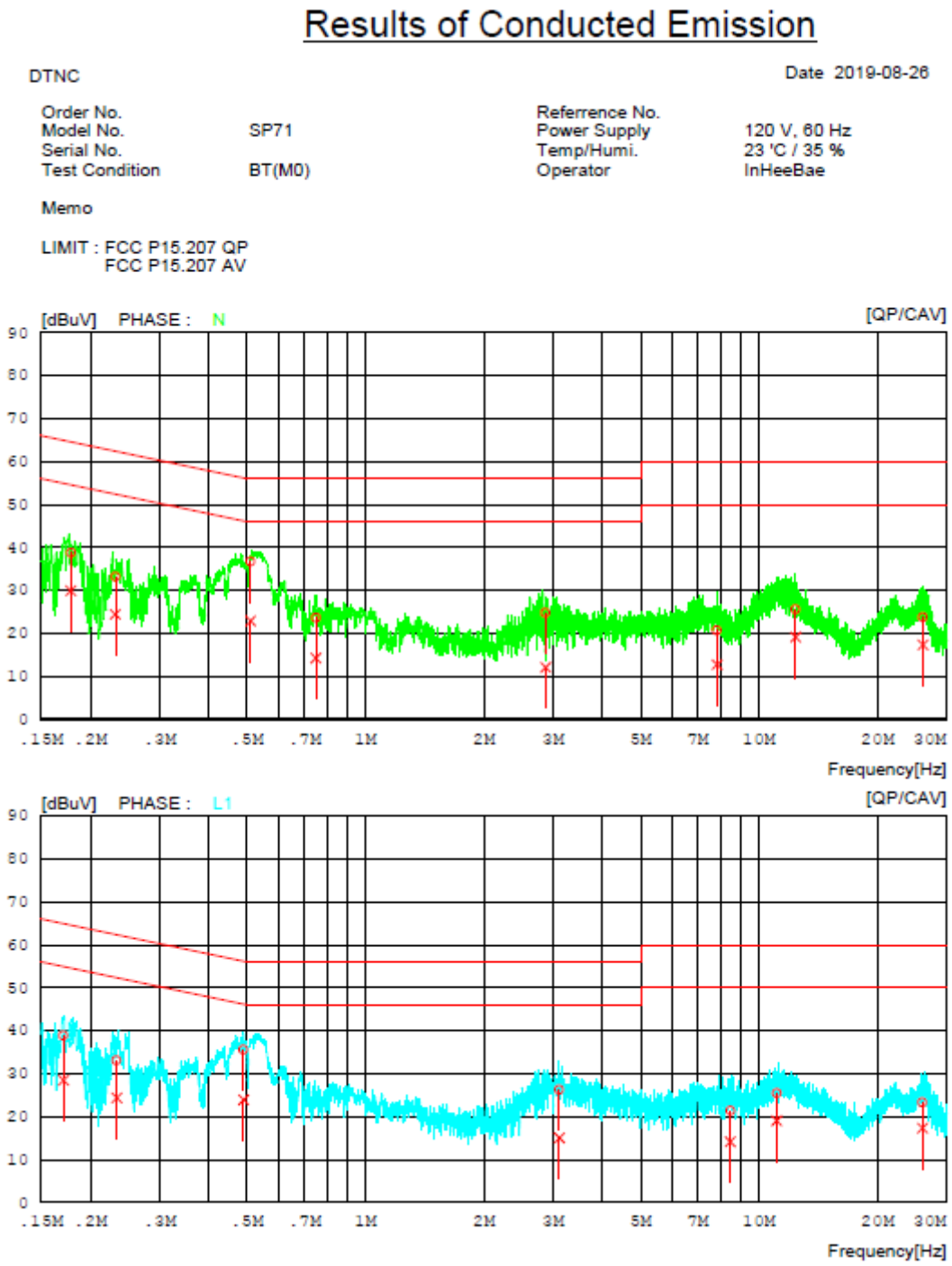
Conducted emissions from the EUT were measured according to the ANSI C63.10.

1. The test procedure is performed in a 6.5 m × 3.5 m × 3.5 m (L × W × H) shielded room. The EUT along with its peripherals were placed on a 1.0 m (W) × 1.5 m (L) and 0.8 m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.
2. The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room.
3. All peripherals were connected to the second LISN and the chassis ground also bounded to the horizontal ground plane of shielded room.
4. The excess power cable between the EUT and the LISN was bundled. The power cables of peripherals were unbundled. All connecting cables of EUT and peripherals were moved to find the maximum emission.

8.4 Test Results

Module 1

AC Line Conducted Emissions (Graph)



AC Line Conducted Emissions (List) = Modulation : ***8DPSK***

Results of Conducted Emission

DTNC

Date 2019-08-26

Order No.		Referrence No.	
Model No.	SP71	Power Supply	120 V, 60 Hz
Serial No.		Temp/Humi.	23 'C / 35 %
Test Condition	BT(M0)	Operator	InHeeBae

Memo

LIMIT : FCC P15.207 QP
FCC P15.207 AV

NO	FREQ	READING QP	READING CAV	C.FACTOR	RESULT QP	RESULT CAV	LIMIT QP	LIMIT CAV	MARGIN QP	MARGIN CAV	PHASE
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	
1	0.17844	28.84	19.99	9.94	38.78	29.93	64.56	54.56	25.78	24.63	N
2	0.23138	23.29	14.50	9.94	33.23	24.44	62.40	52.40	29.17	27.96	N
3	0.51073	26.80	12.92	9.95	36.75	22.87	56.00	46.00	19.25	23.13	N
4	0.74812	13.62	4.28	9.97	23.59	14.25	56.00	46.00	32.41	31.75	N
5	2.86920	14.71	1.99	10.07	24.78	12.06	56.00	46.00	31.22	33.94	N
6	7.81680	10.41	2.47	10.25	20.66	12.72	60.00	50.00	39.34	37.28	N
7	12.38320	15.22	8.77	10.41	25.63	19.18	60.00	50.00	34.37	30.82	N
8	26.12200	13.05	6.60	10.68	23.73	17.28	60.00	50.00	36.27	32.72	N
9	0.17082	28.84	18.46	9.94	38.78	28.40	64.92	54.92	26.14	26.52	L1
10	0.23314	23.13	14.38	9.94	33.07	24.32	62.34	52.34	29.27	28.02	L1
11	0.48976	25.60	13.91	9.95	35.55	23.86	56.17	46.17	20.62	22.31	L1
12	3.10920	16.17	4.96	10.06	26.23	15.02	56.00	46.00	29.77	30.98	L1
13	8.46120	11.01	3.83	10.27	21.28	14.10	60.00	50.00	38.72	35.90	L1
14	11.09660	15.07	8.58	10.37	25.44	18.95	60.00	50.00	34.56	31.05	L1
15	26.04420	12.64	6.60	10.65	23.29	17.25	60.00	50.00	36.71	32.75	L1

Module 2

AC Line Conducted Emissions (Graph)

Results of Conducted Emission

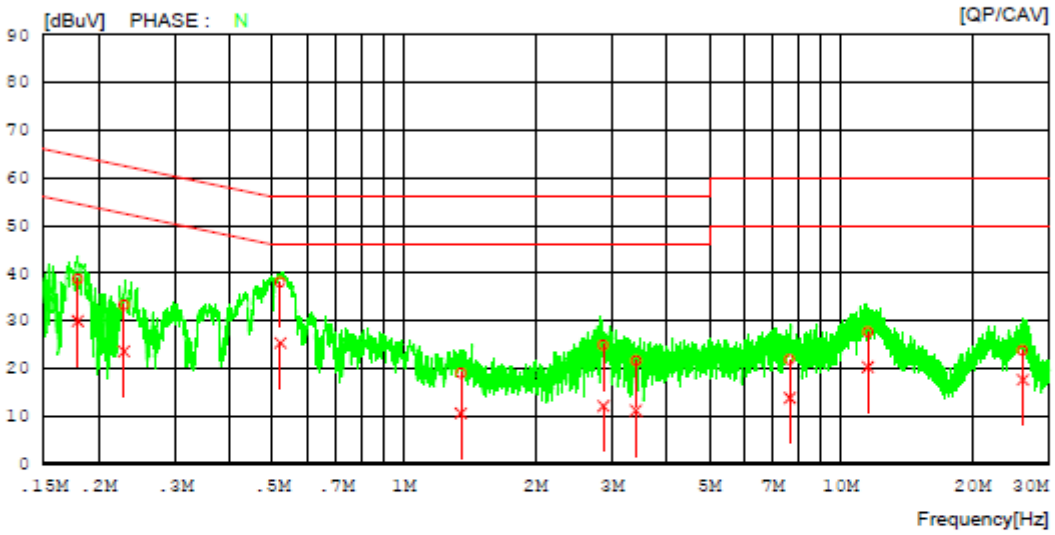
DTNC

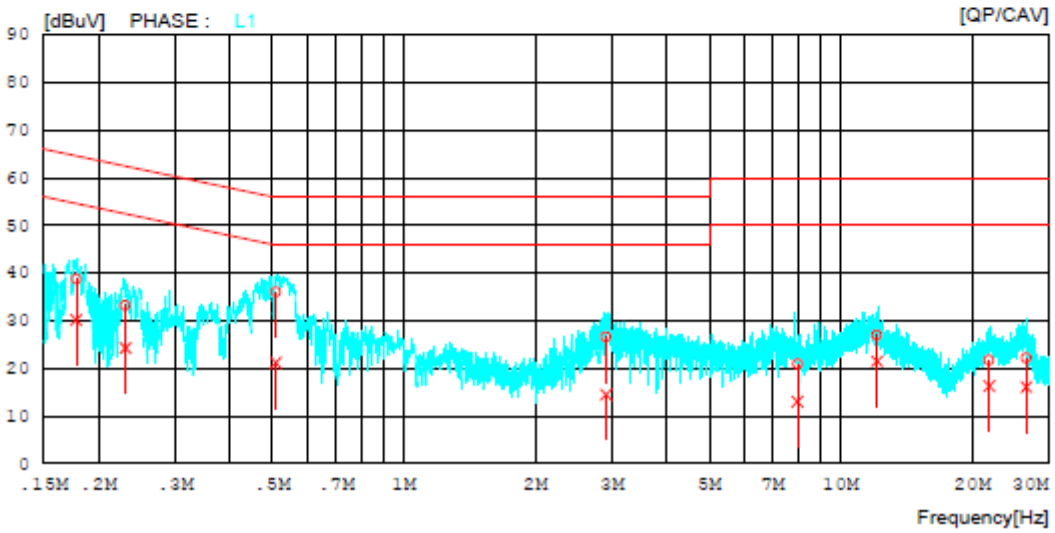
Date 2019-08-26

Order No.		Referrence No.	
Model No.	SP71	Power Supply	120 V, 60 Hz
Serial No.		Temp/Humi.	23 'C / 35 %
Test Condition	BT(M1)	Operator	InHeeBae

Memo

LIMIT : FCC P15.207 QP
FCC P15.207 AV





AC Line Conducted Emissions (List) = Modulation : ***8DPSK***

Results of Conducted Emission

DTNC

Date 2019-08-26

Order No.		Referrence No.	
Model No.	SP71	Power Supply	120 V, 60 Hz
Serial No.		Temp/Humi.	23 'C / 35 %
Test Condition	BT(M1)	Operator	InHeeBae

Memo

LIMIT : FCC P15.207 QP
FCC P15.207 AV

NO	FREQ	READING		C.FACTOR	RESULT		LIMIT		MARGIN		PHASE
		QP	CAV		QP	CAV	QP	CAV	QP	CAV	
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	
1	0.17947	28.86	19.98	9.94	38.80	29.92	64.51	54.51	25.71	24.59	N
2	0.22861	23.38	13.63	9.94	33.32	23.57	62.50	52.50	29.18	28.93	N
3	0.52183	28.14	15.40	9.95	38.09	25.35	56.00	46.00	17.91	20.65	N
4	1.35180	8.96	0.57	9.99	18.95	10.56	56.00	46.00	37.05	35.44	N
5	2.86040	14.78	2.05	10.07	24.85	12.12	56.00	46.00	31.15	33.88	N
6	3.40120	11.54	1.06	10.09	21.63	11.15	56.00	46.00	34.37	34.85	N
7	7.64940	11.62	3.57	10.24	21.86	13.81	60.00	50.00	38.14	36.19	N
8	11.54200	17.18	9.90	10.39	27.57	20.29	60.00	50.00	32.43	29.71	N
9	26.09820	13.02	6.94	10.68	23.70	17.62	60.00	50.00	36.30	32.38	N
10	0.17789	28.73	20.19	9.94	38.67	30.13	64.58	54.58	25.91	24.45	L1
11	0.23045	23.24	14.26	9.94	33.18	24.20	62.43	52.43	29.25	28.23	L1
12	0.50926	26.00	11.21	9.95	35.95	21.16	56.00	46.00	20.05	24.84	L1
13	2.90200	16.48	4.36	10.06	26.54	14.42	56.00	46.00	29.46	31.58	L1
14	7.96100	10.64	2.69	10.26	20.90	12.95	60.00	50.00	39.10	37.05	L1
15	12.10520	16.44	11.05	10.39	26.83	21.44	60.00	50.00	33.17	28.56	L1
16	21.85440	11.13	5.72	10.57	21.70	16.29	60.00	50.00	38.30	33.71	L1
17	26.60200	11.46	5.40	10.66	22.12	16.06	60.00	50.00	37.88	33.94	L1

9. Antenna Requirement

Describe how the EUT complies with the requirement that either its antenna is permanently attached, or that it employs a unique antenna connector, for every antenna proposed for use with the EUT.

Conclusion: Comply

The antenna is permanently printed. (Refer to Internal Photo file.)
Therefore this EUT complies with the requirement of §15.203.

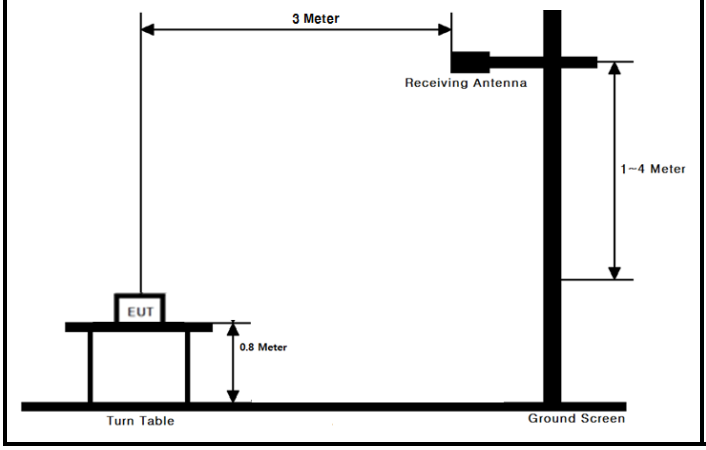
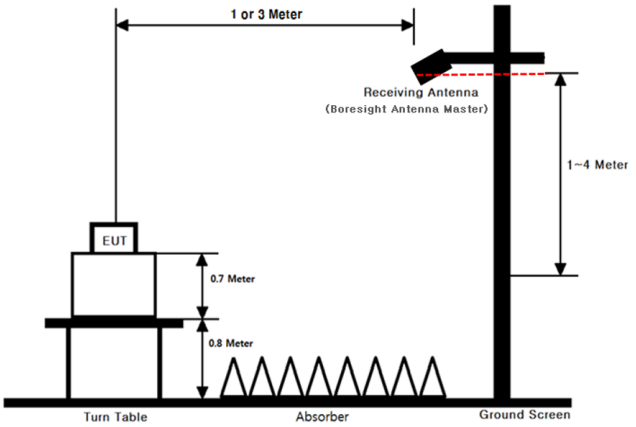
- **Minimum Standard :**

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions.

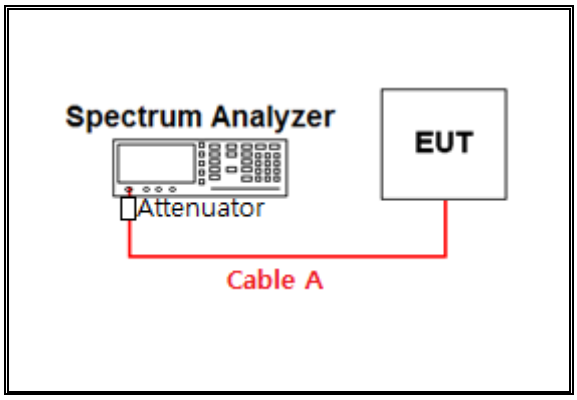
APPENDIX I

Test set up diagrams

▪ Radiated Measurement

Below 1GHz	Above 1GHz
	

▪ Conducted Measurement



Path loss information

Frequency (GHz)	Path Loss (dB)	Frequency (GHz)	Path Loss (dB)
0.03	3.21	15	4.67
1	3.53	20	5.28
2.402 & 2.441 & 2.480	4.05	25	5.8
5	4.17	-	-
10	4.5	-	-

Note 1 : The path loss from EUT to Spectrum analyzer were measured and used for test.

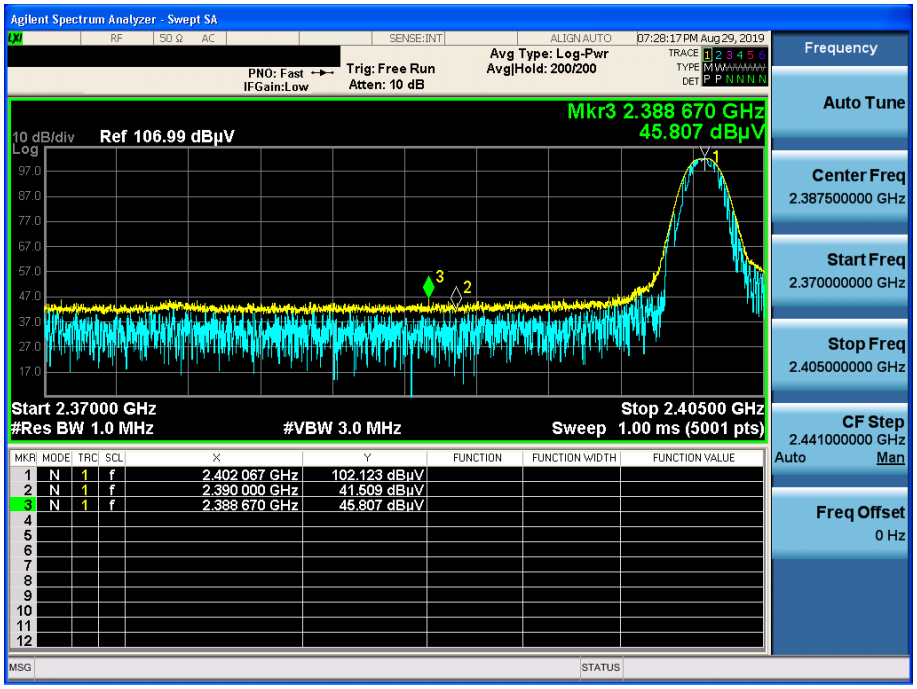
Path loss (S/A's Correction factor) = Cable A + Attenuator

APPENDIX II

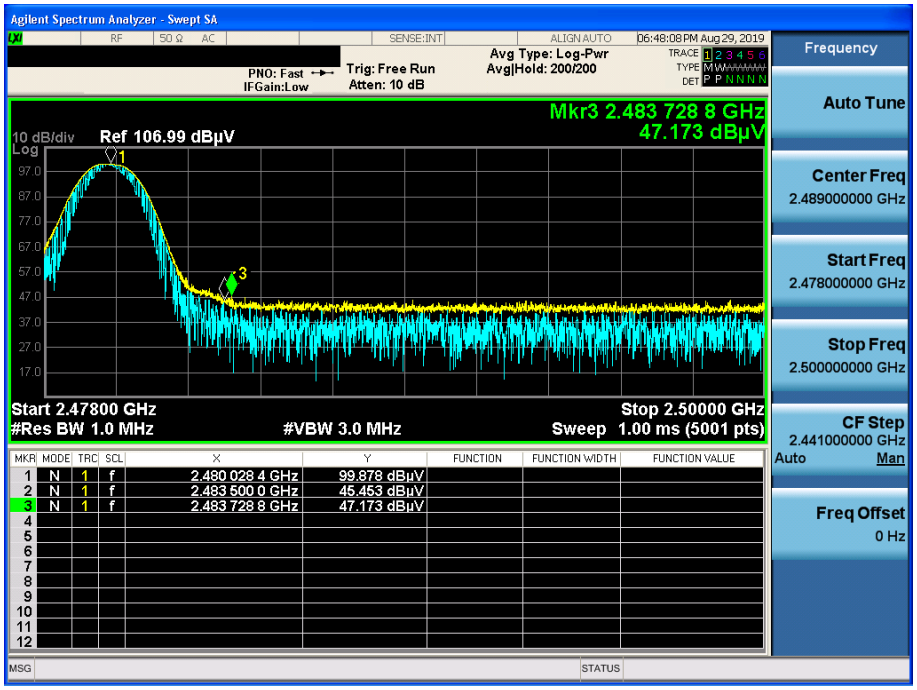
Unwanted Emissions (Radiated) Test Plot

Module 1

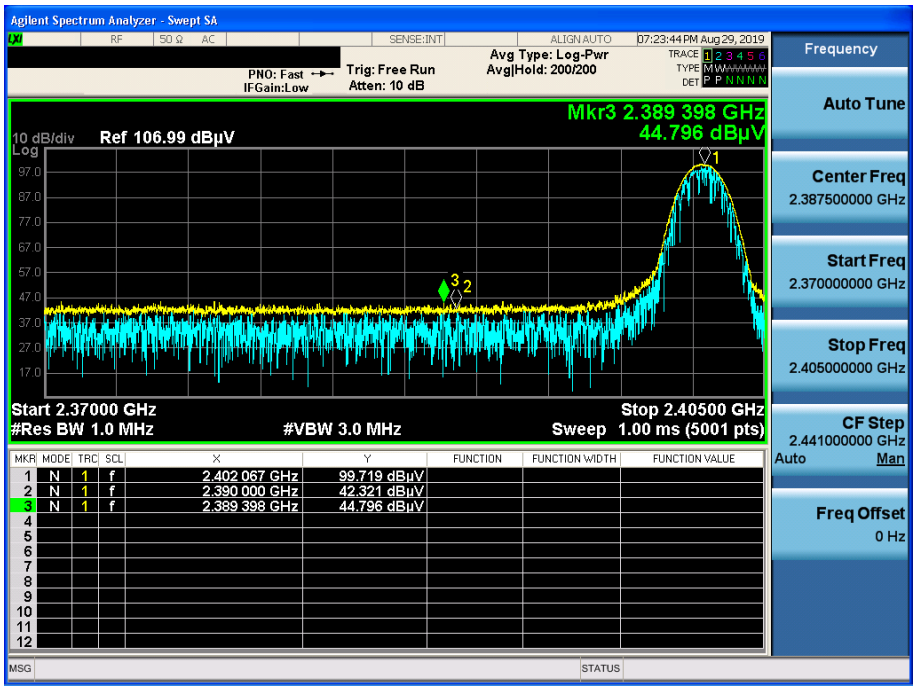
GFSK & Lowest & X & Hor — Detector Mode : PK



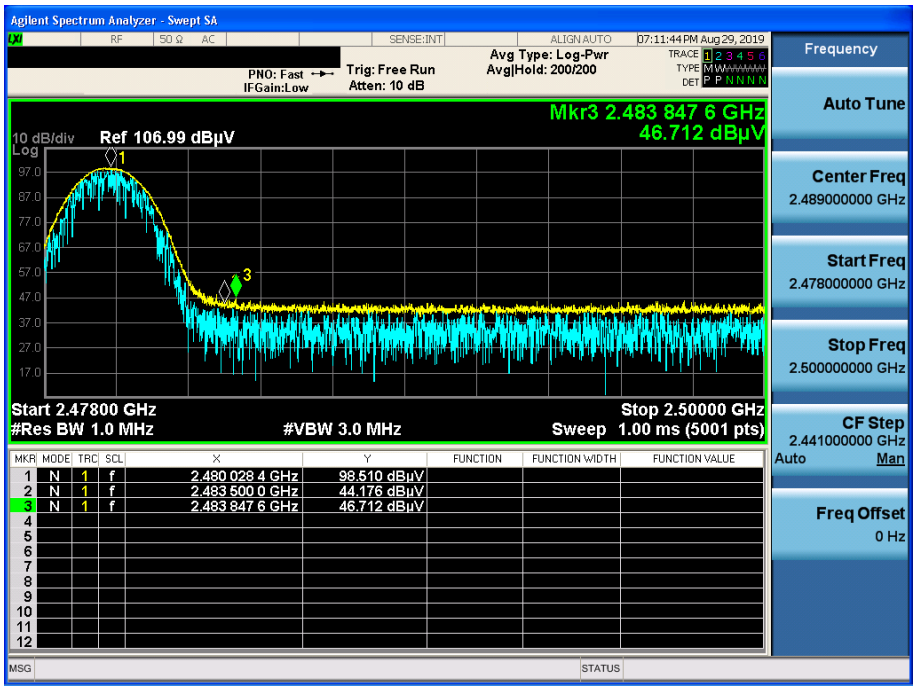
GFSK & Highest & X & Hor — Detector Mode : PK



π/4DQPSK & Lowest & X & Hor **Detector Mode : PK**

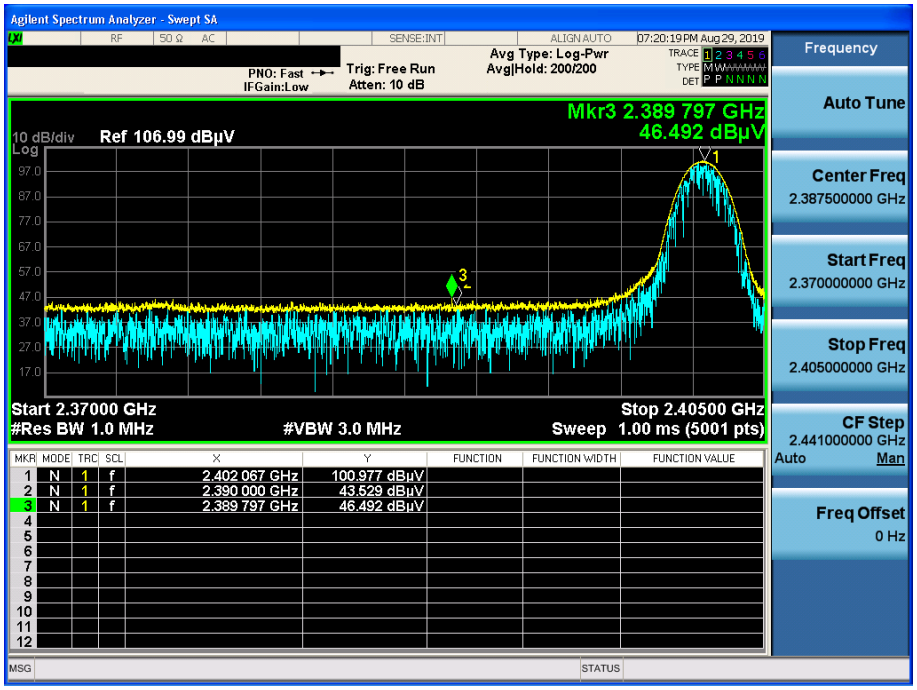


π/4DQPSK & Highest & X & Hor **Detector Mode : PK**



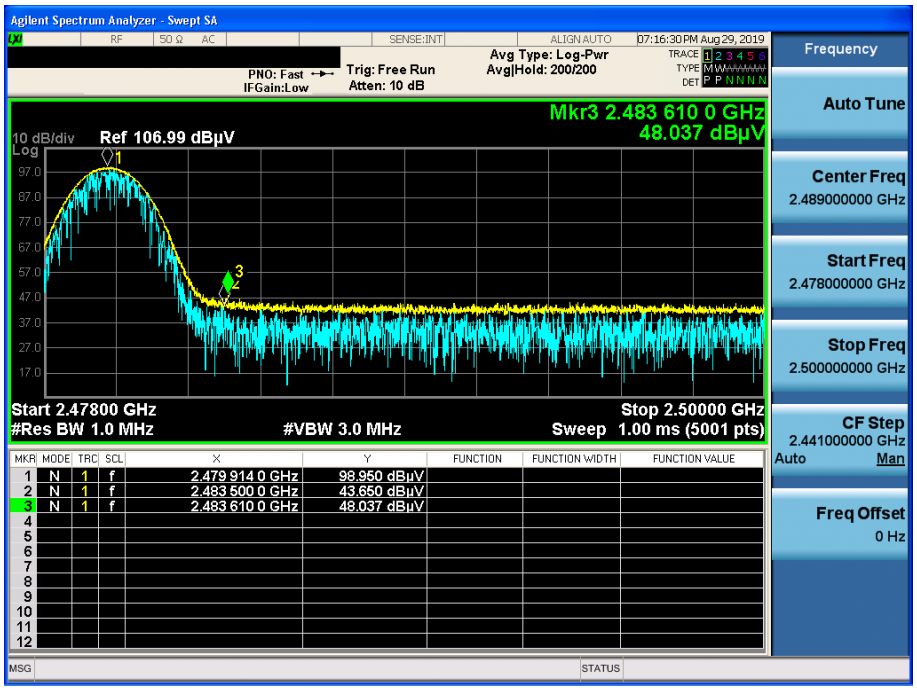
8DPSK & Lowest & X & Hor

Detector Mode : PK

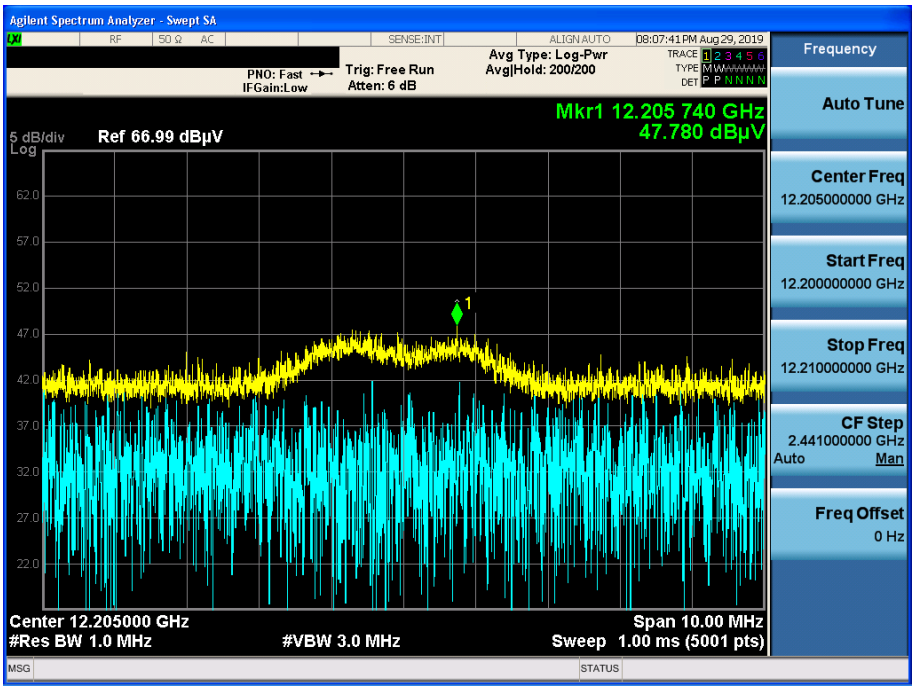


8DPSK & Highest & X & Hor

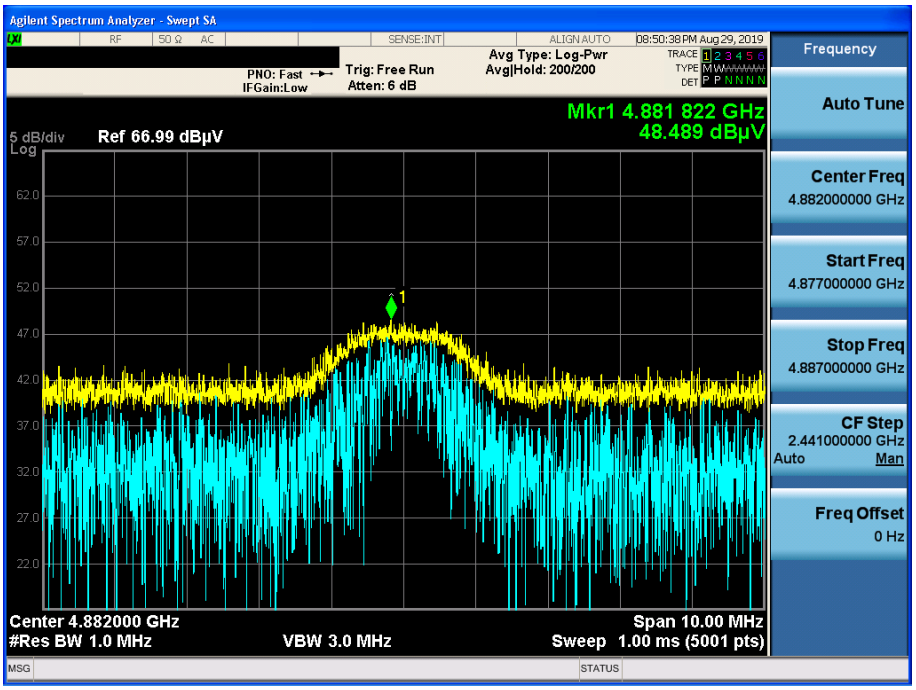
Detector Mode : PK



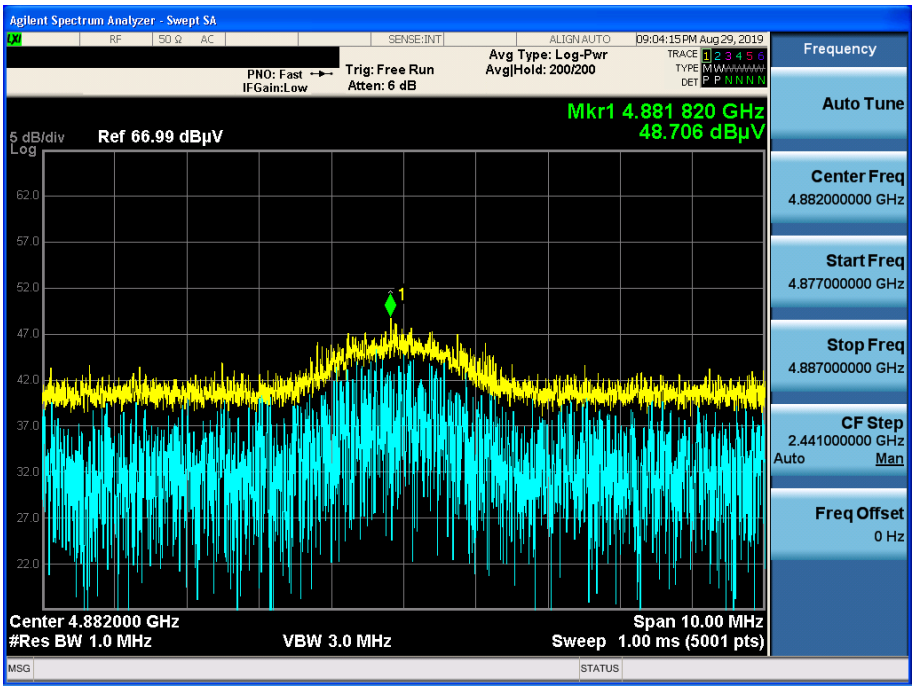
GFSK & Middle & Y & Hor **Detector Mode : PK**



π/4DQPSK & Middle & Z & Ver **Detector Mode : PK**

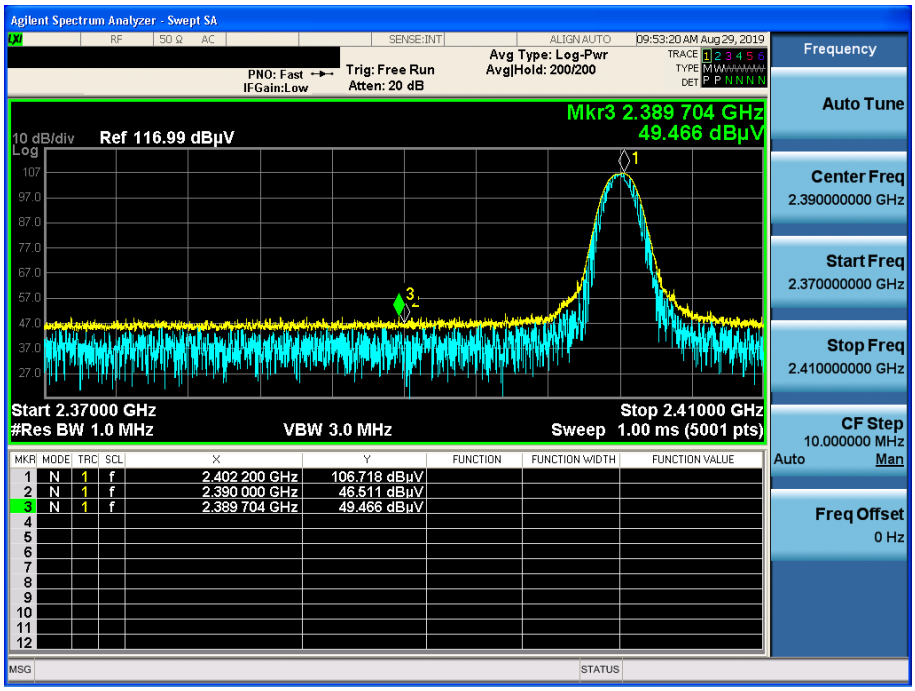


8DPSK & Middle & Z & Ver **Detector Mode : PK**

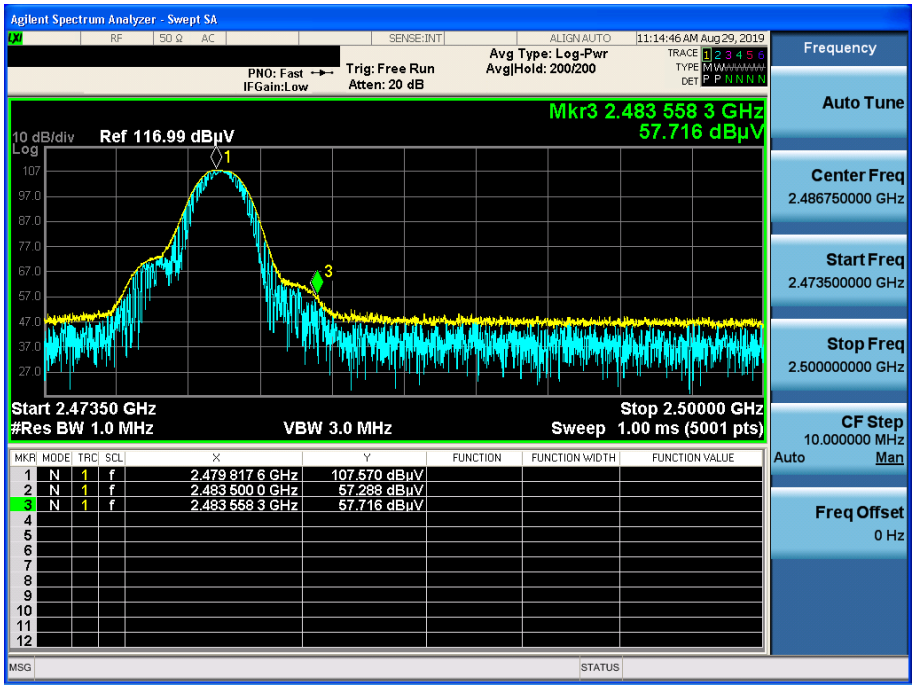


Module 2

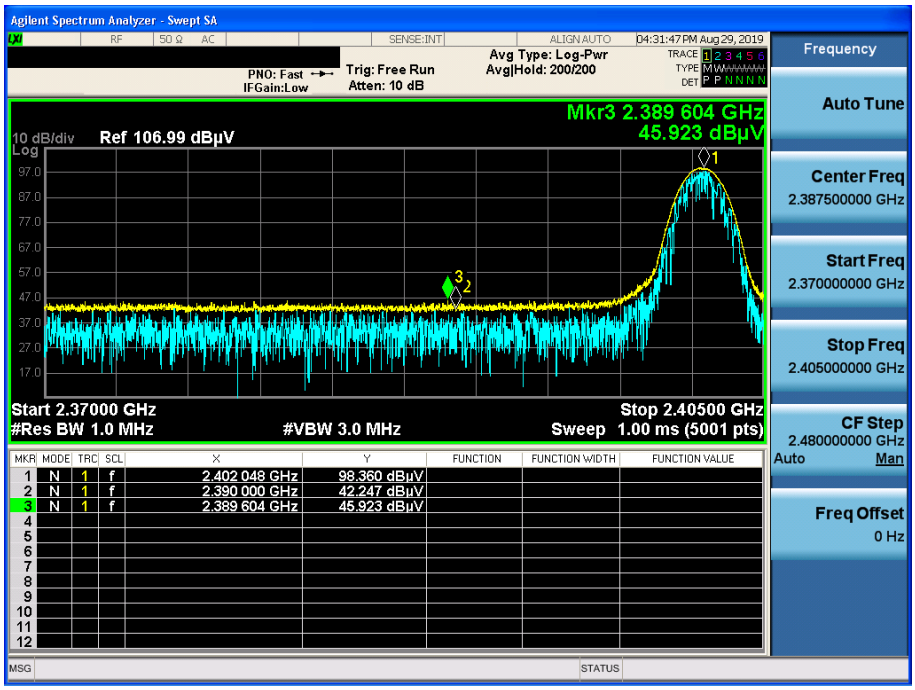
GFSK & Lowest & Y & Hor — Detector Mode : PK



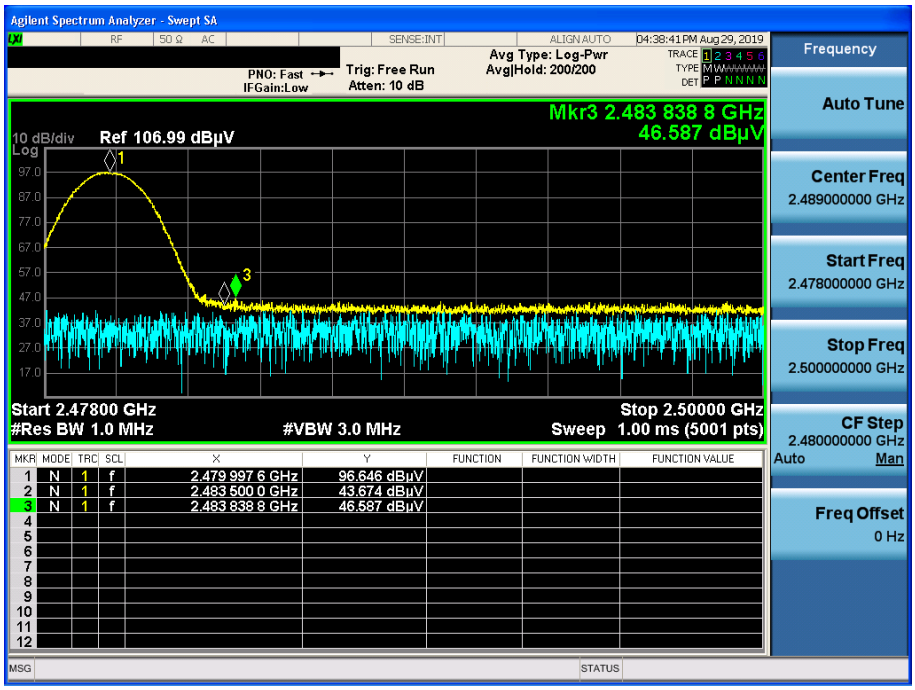
GFSK & Highest & Y & Hor — Detector Mode : PK



π/4DQPSK & Lowest & Y & Hor **Detector Mode : PK**

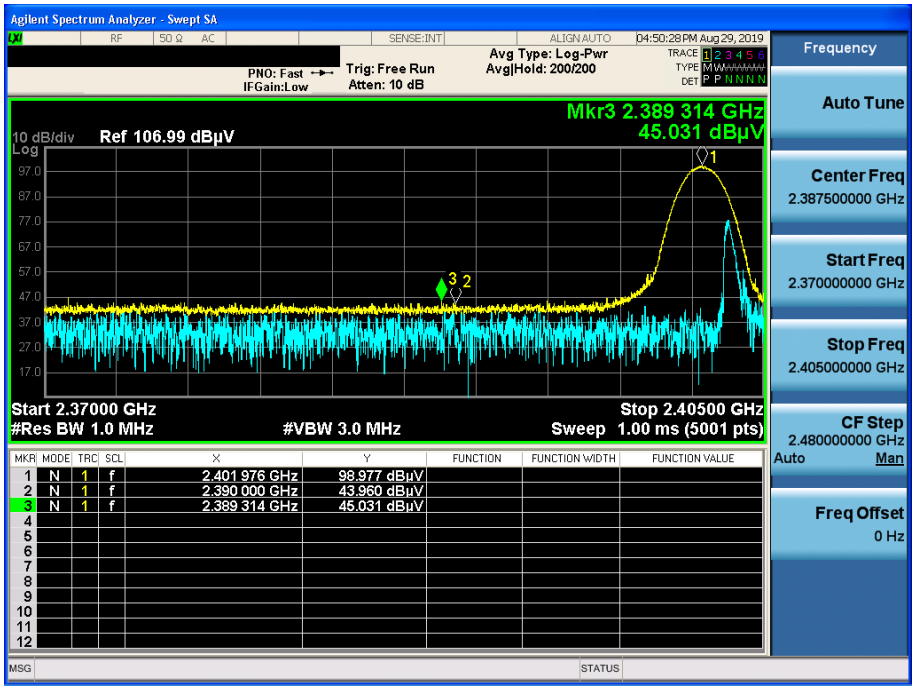


π/4DQPSK & Highest & Y & Hor **Detector Mode : PK**



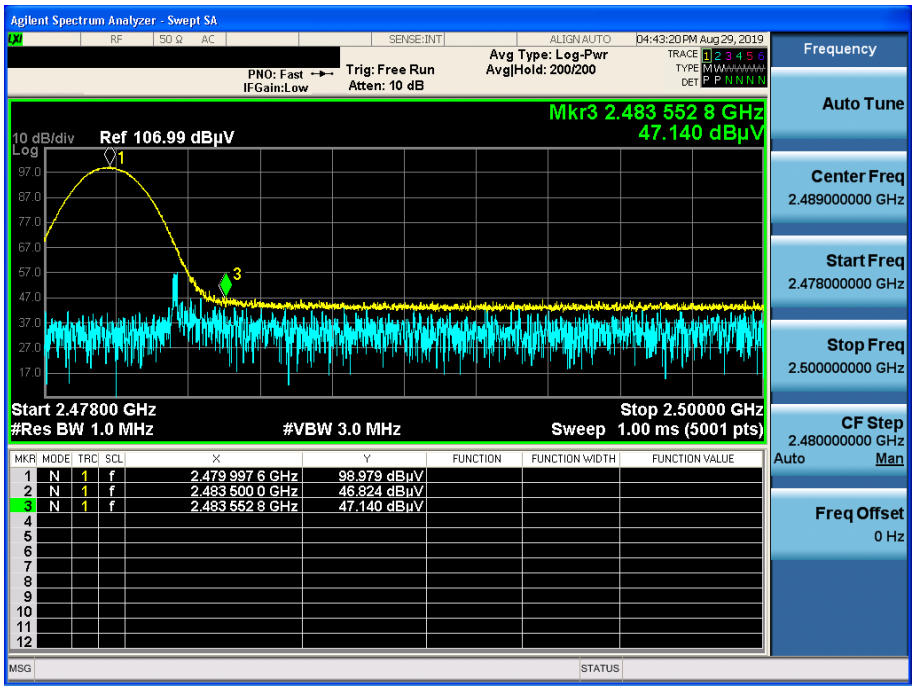
8DPSK & Lowest & Y & Hor

Detector Mode : PK

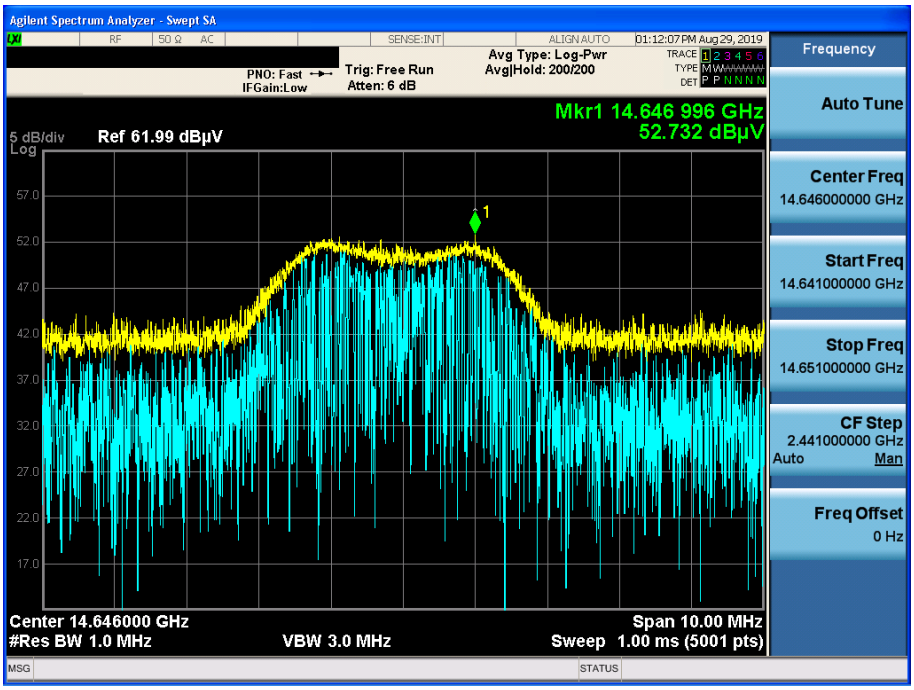


8DPSK & Highest & Y & Hor

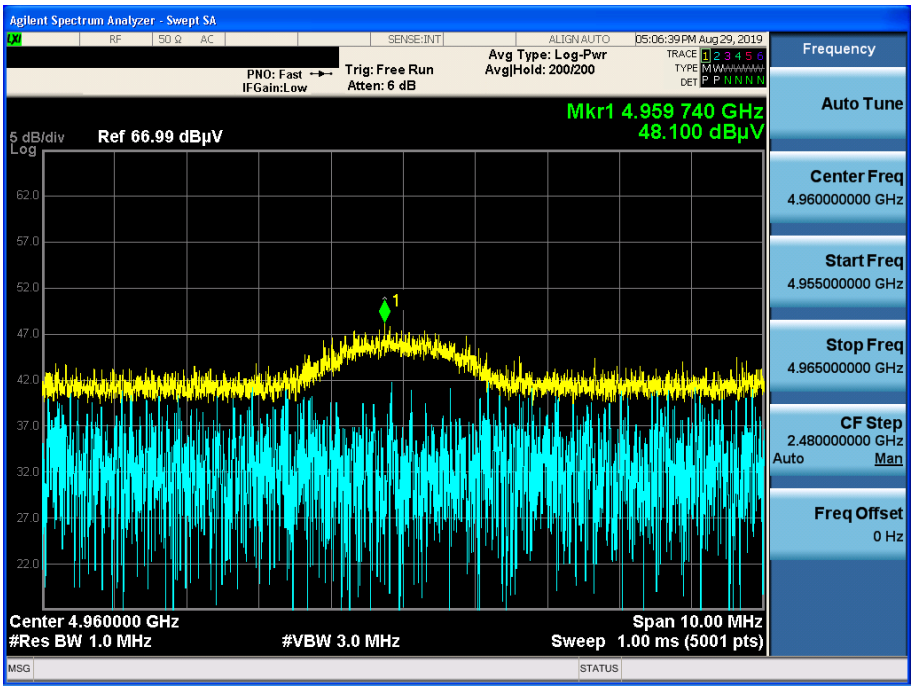
Detector Mode : PK



GFSK & Middle & Y & Hor **Detector Mode : PK**



π/4DQPSK & Highest & Y & Hor **Detector Mode : PK**



8DPSK & Highest & Y & Hor **Detector Mode : PK**