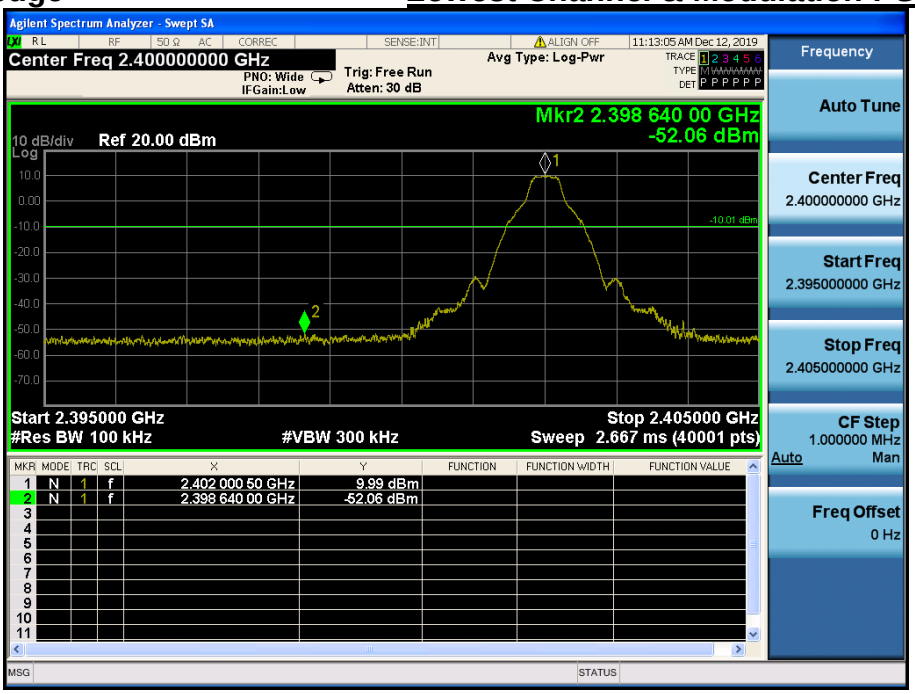
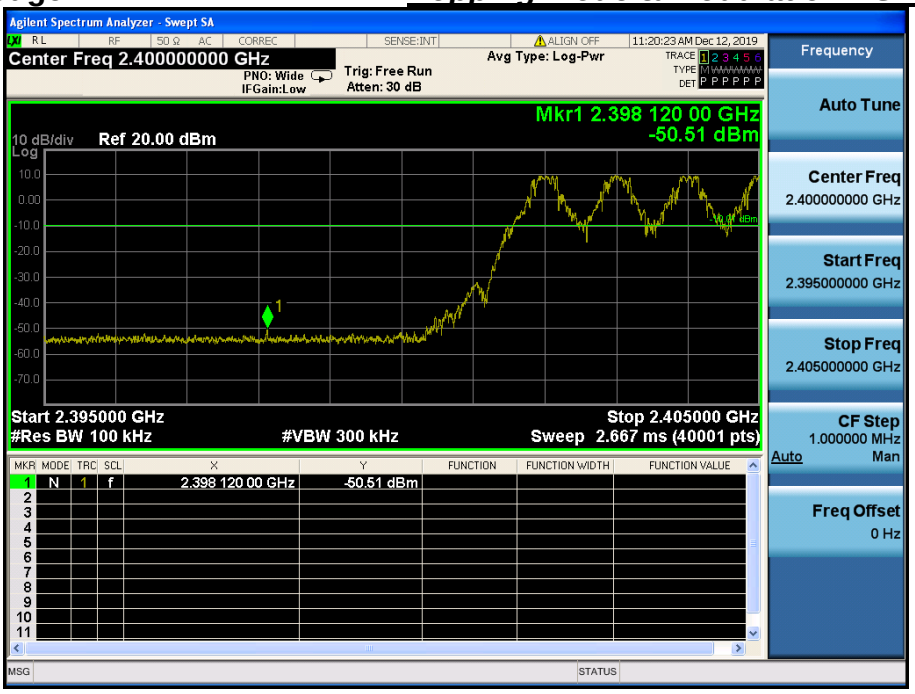
7.4.2. Conducted Spurious Emissions

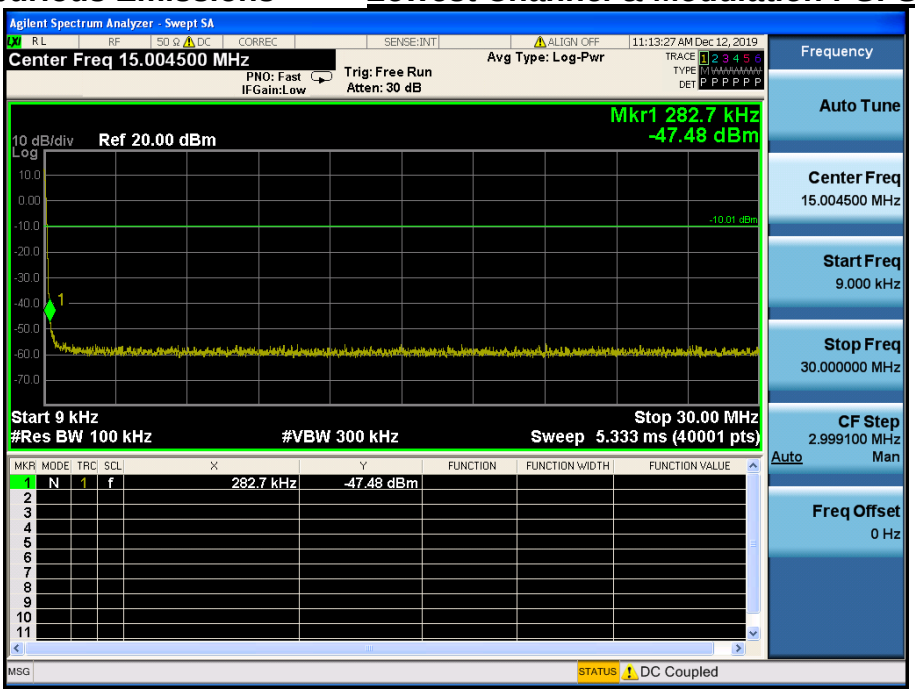
Low Band-edge ***Lowest Channel & Modulation : GFSK***

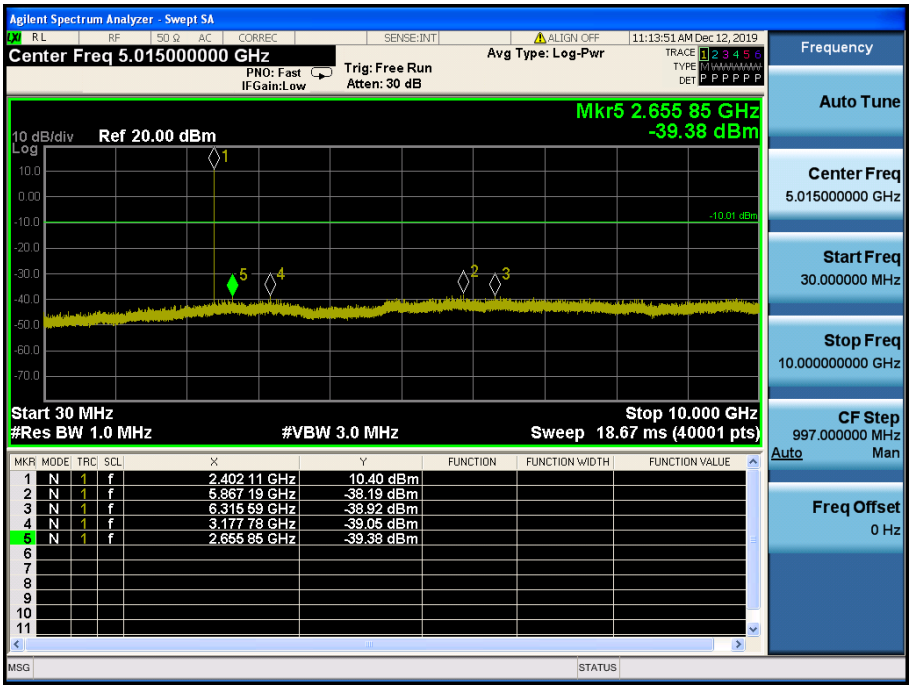


Low Band-edge ***Hopping mode & Modulation : GFSK***



Conducted Spurious Emissions ***Lowest Channel & Modulation : GFSK***





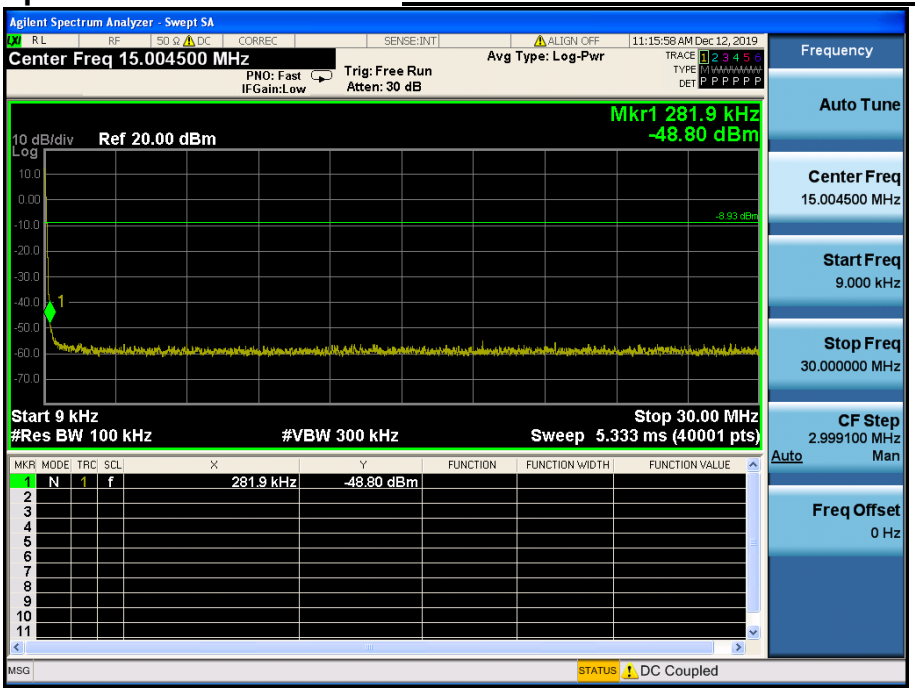
Conducted Spurious Emissions ***Lowest Channel & Modulation : GFSK***

Reference for limit

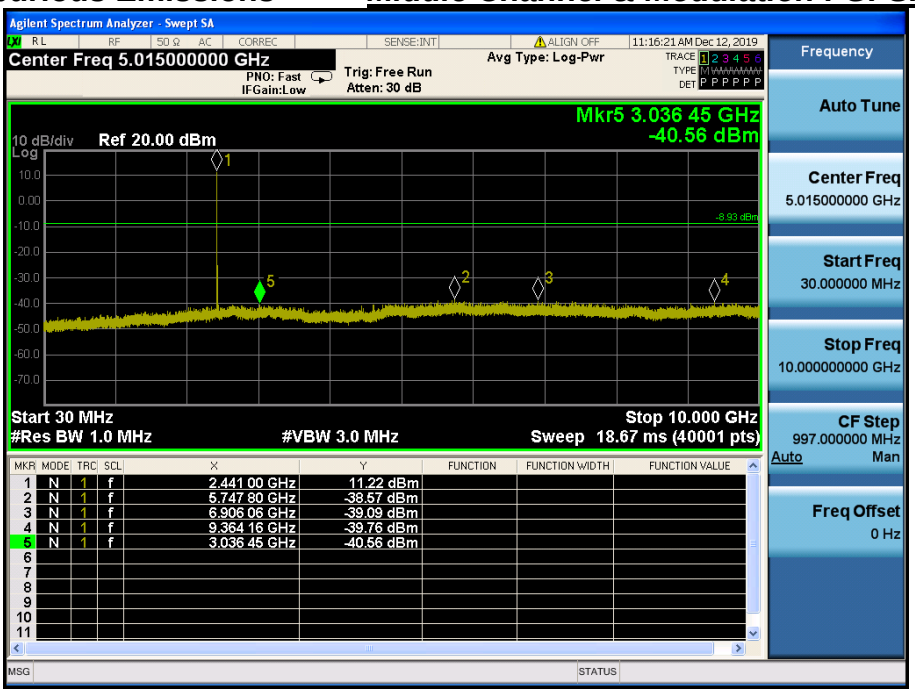
Middle Channel & Modulation : GFSK

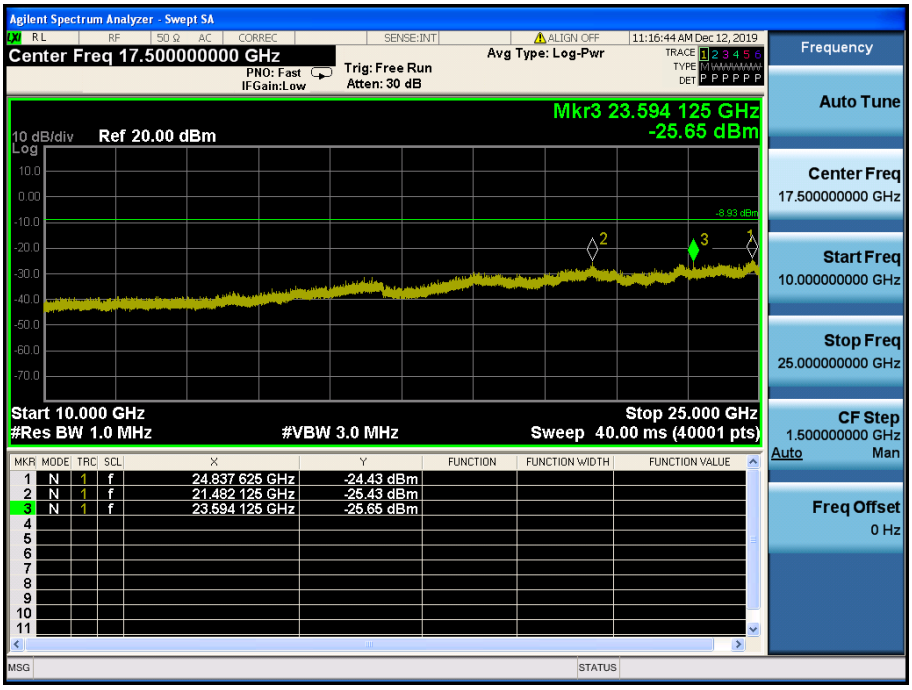
Conducted Spurious Emissions

Middle Channel & Modulation : GFSK

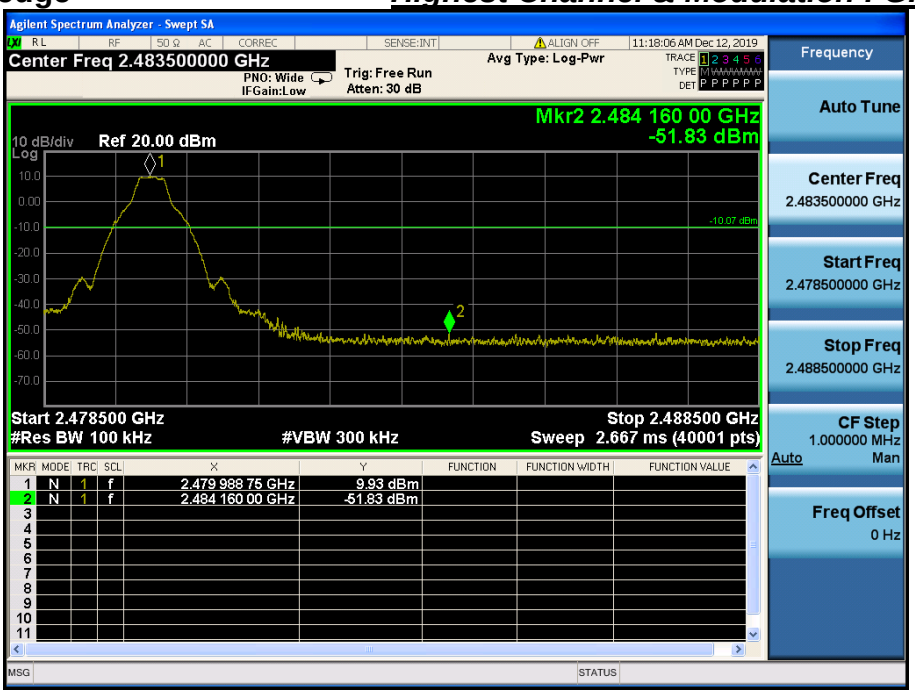


Conducted Spurious Emissions *Middle Channel & Modulation : GFSK*

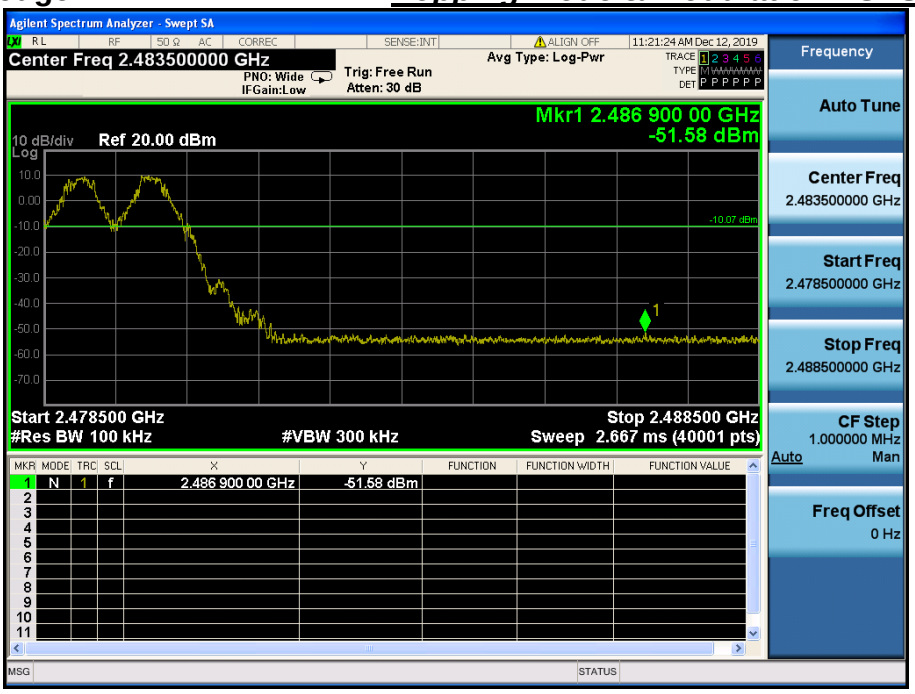




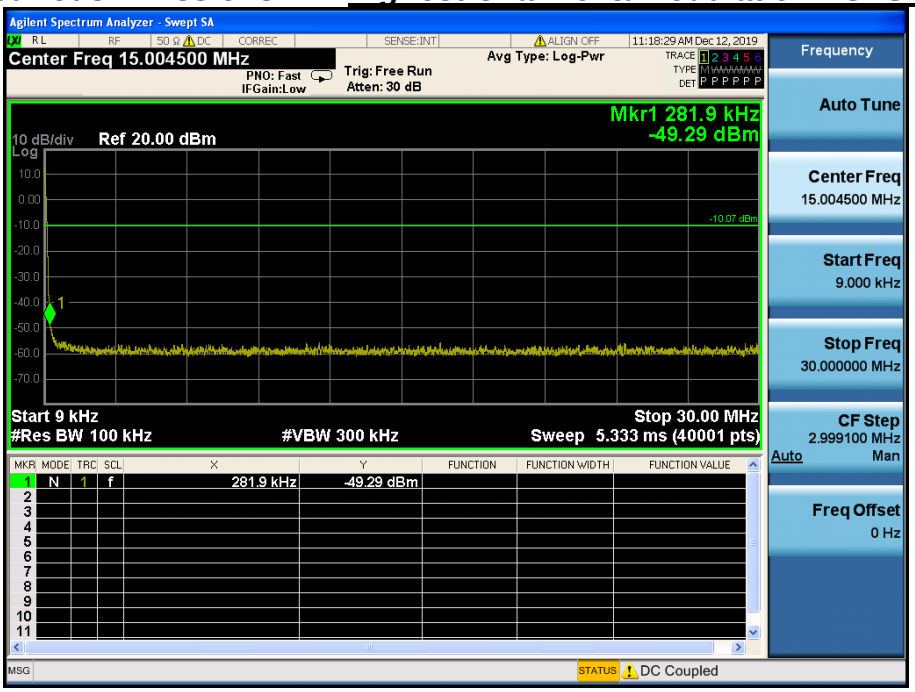
High Band-edge ***Highest Channel & Modulation : GFSK***

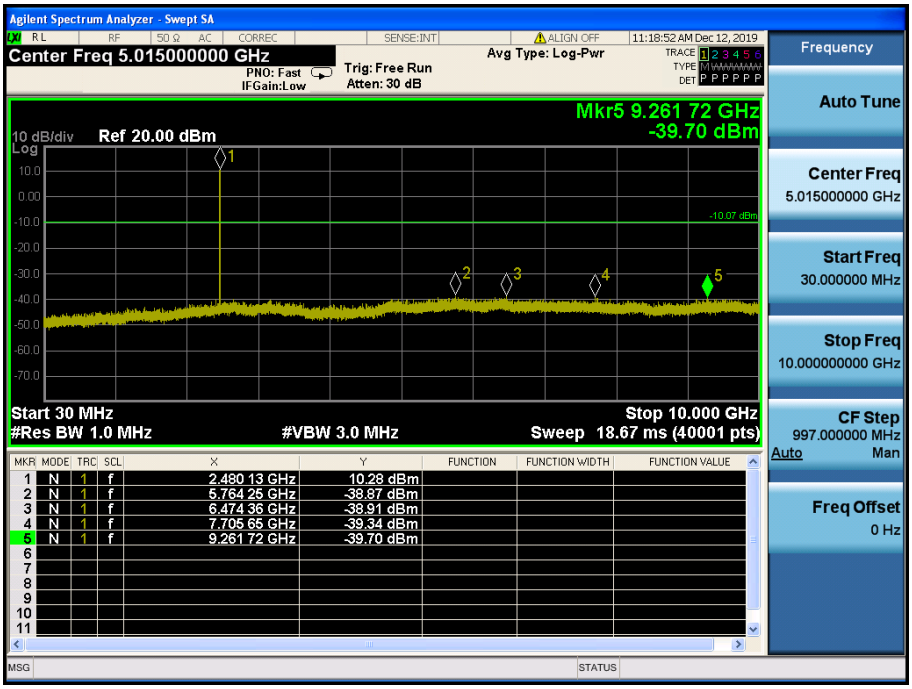


High Band-edge ***Hopping mode & Modulation : GFSK***



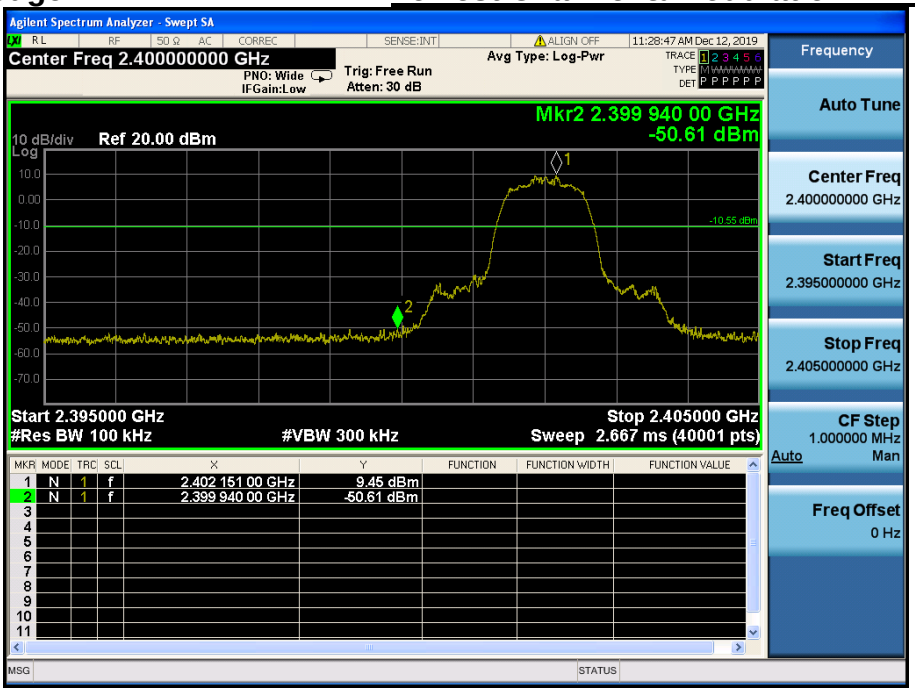
Conducted Spurious Emissions ***Highest Channel & Modulation : GFSK***



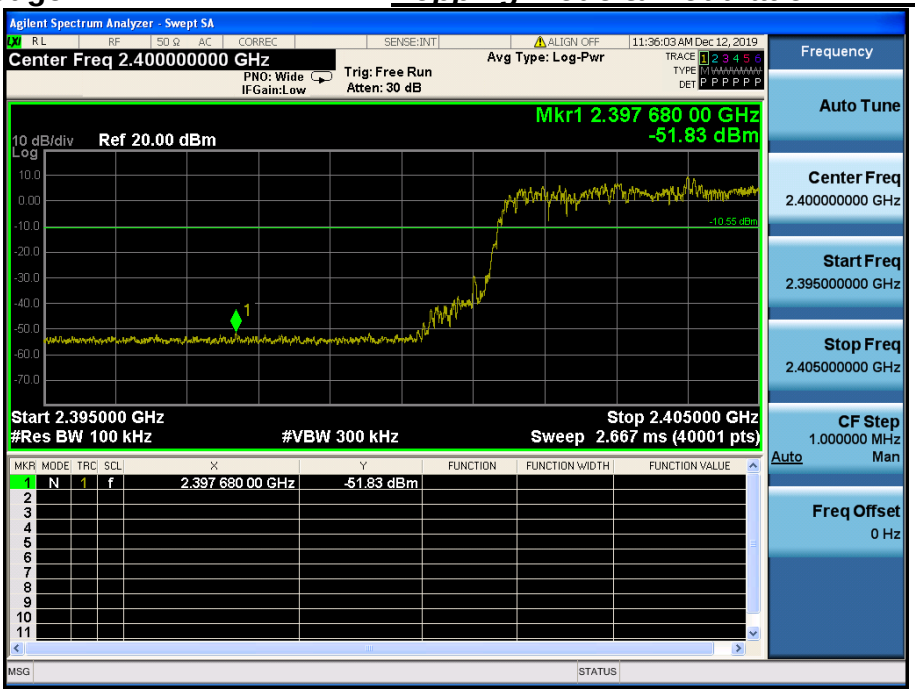


Conducted Spurious Emissions ***Highest Channel & Modulation : GFSK***

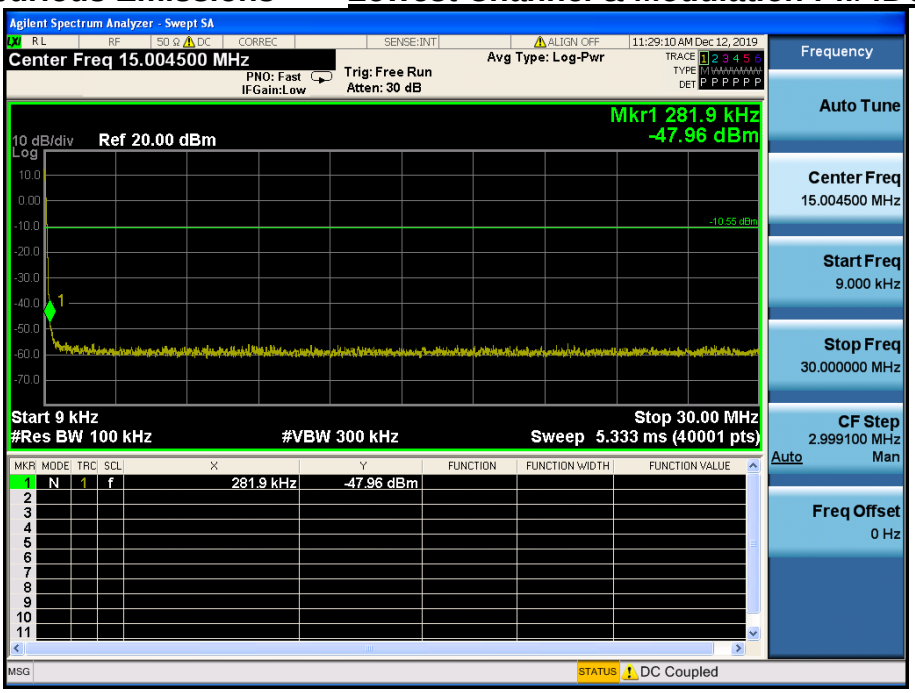
Low Band-edge ***Lowest Channel & Modulation : π/4DQPSK***

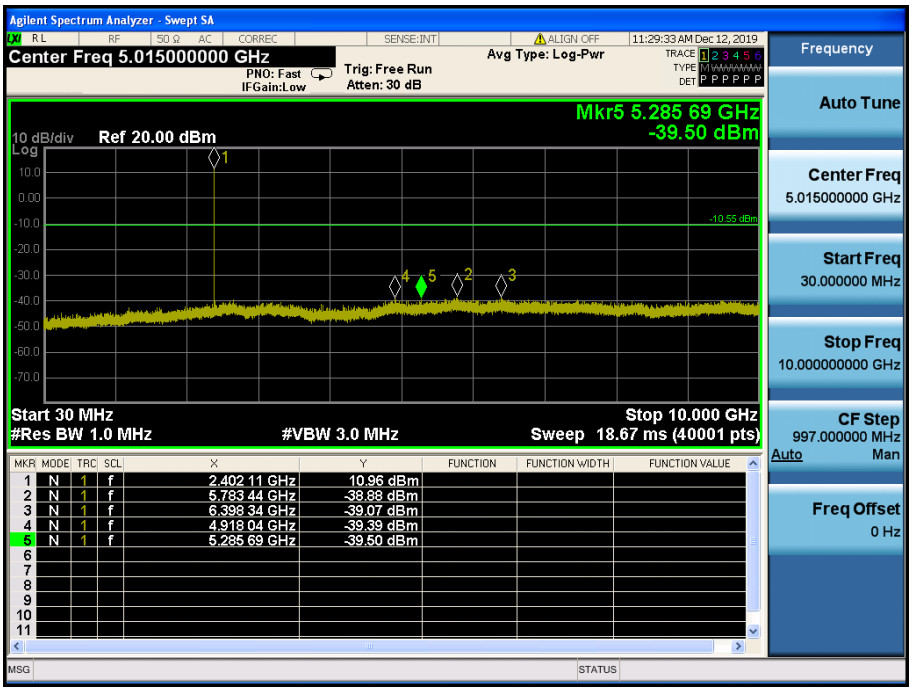


Low Band-edge ***Hopping mode & Modulation : π/4DQPSK***



Conducted Spurious Emissions ***Lowest Channel & Modulation : π/4DQPSK***

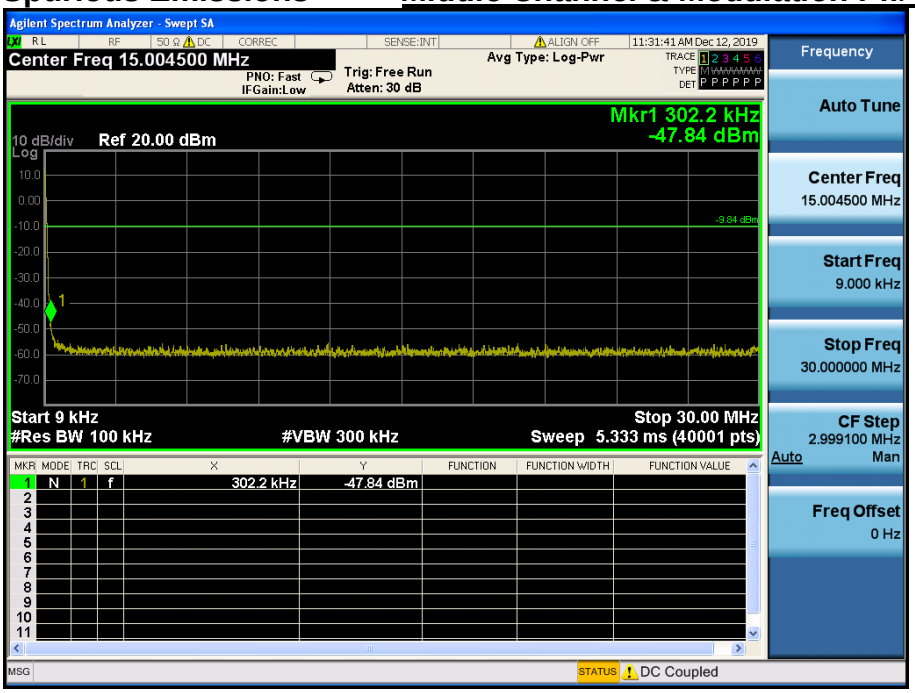




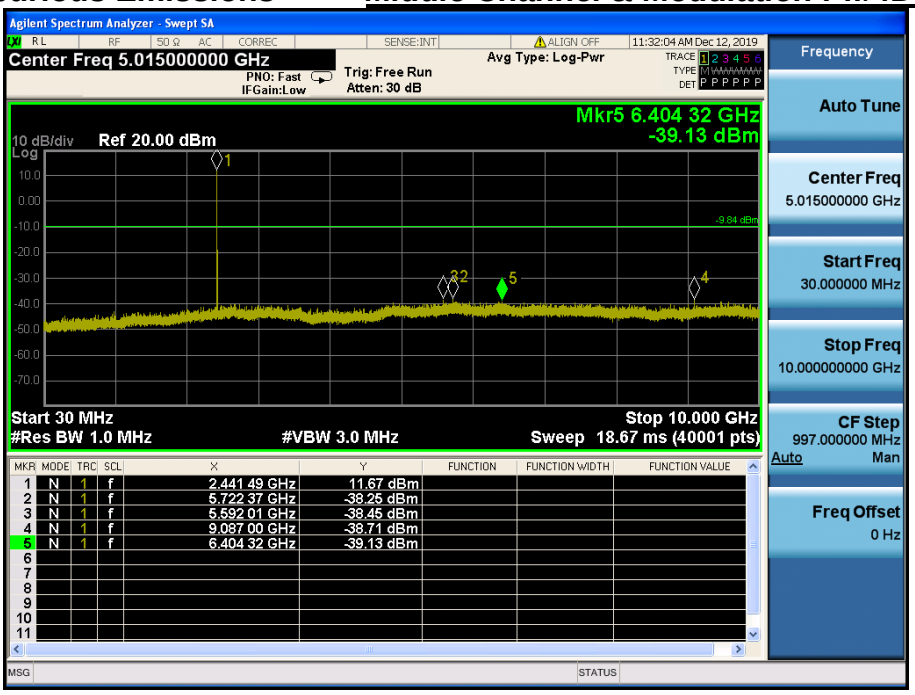
Conducted Spurious Emissions *Lowest Channel & Modulation : π/4DQPSK*

Reference for limit ***Middle Channel & Modulation : π/4DQPSK***

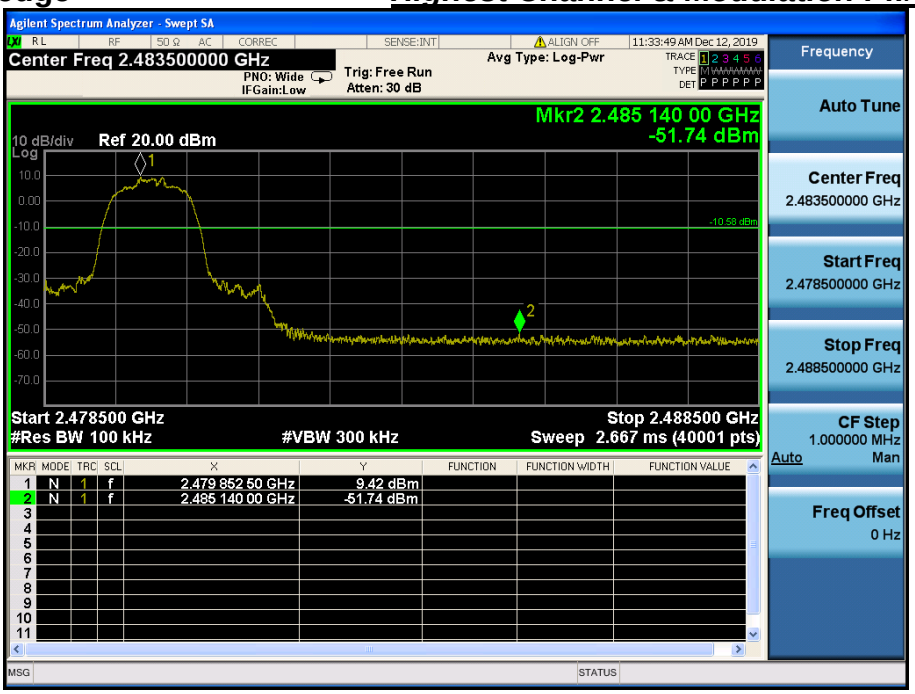
Conducted Spurious Emissions ***Middle Channel & Modulation : π/4DQPSK***



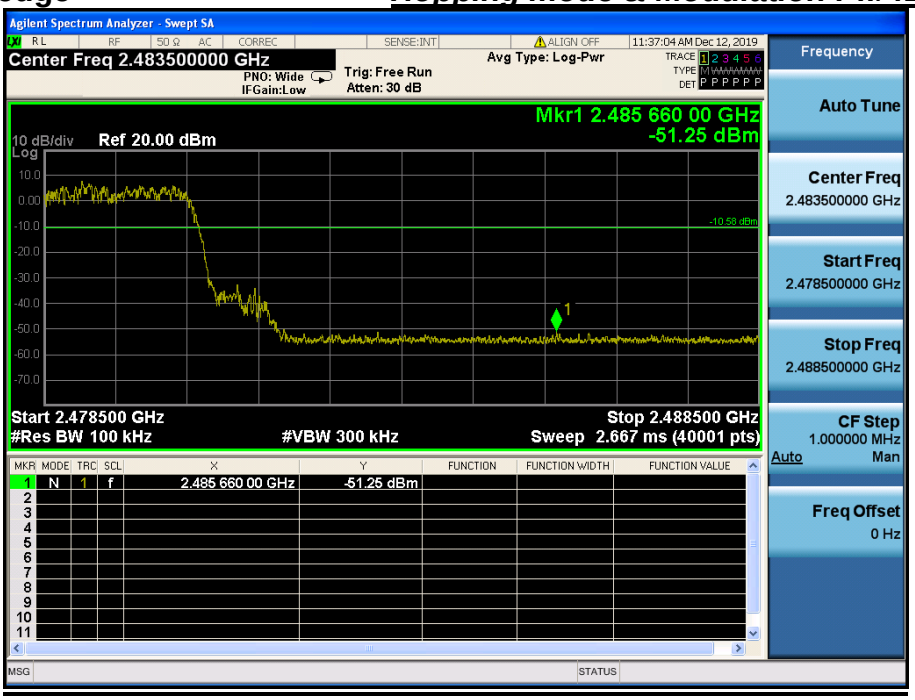
Conducted Spurious Emissions *Middle Channel & Modulation : π/4DQPSK*



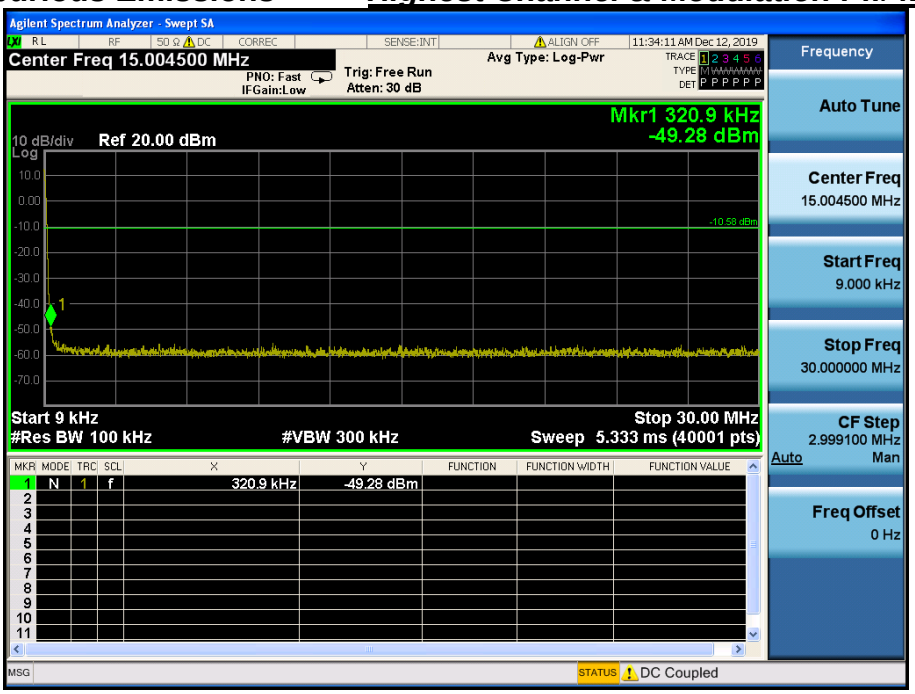
High Band-edge ***Highest Channel & Modulation : π/4DQPSK***

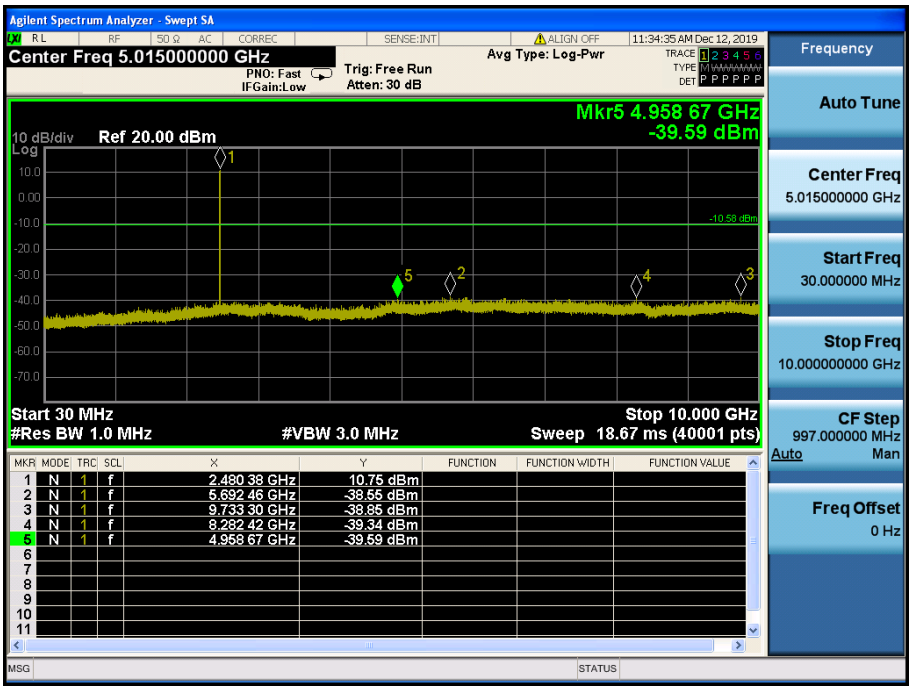


High Band-edge ***Hopping mode & Modulation : π/4DQPSK***



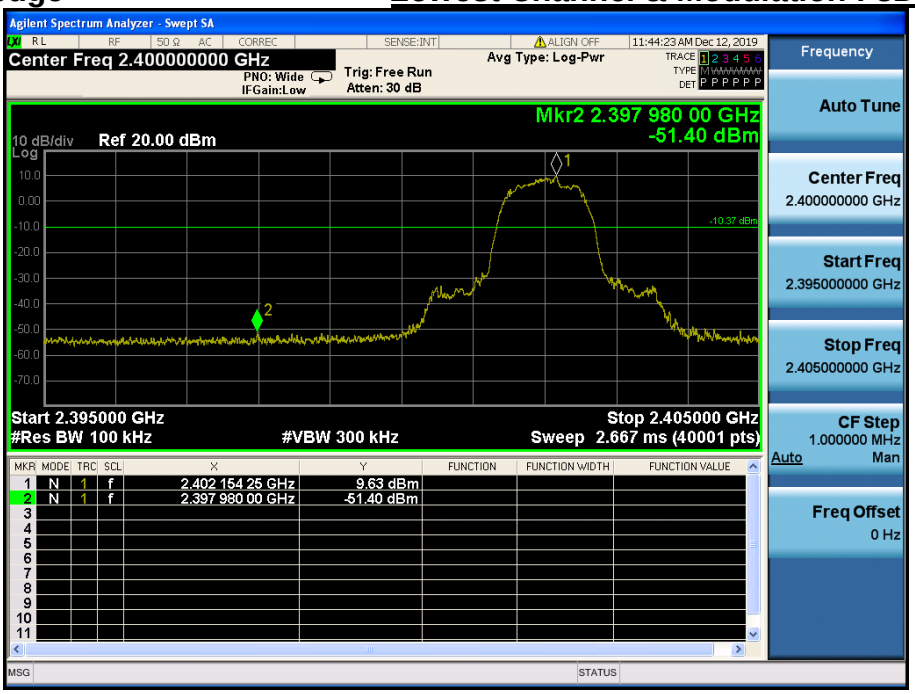
Conducted Spurious Emissions ***Highest Channel & Modulation : π/4DQPSK***



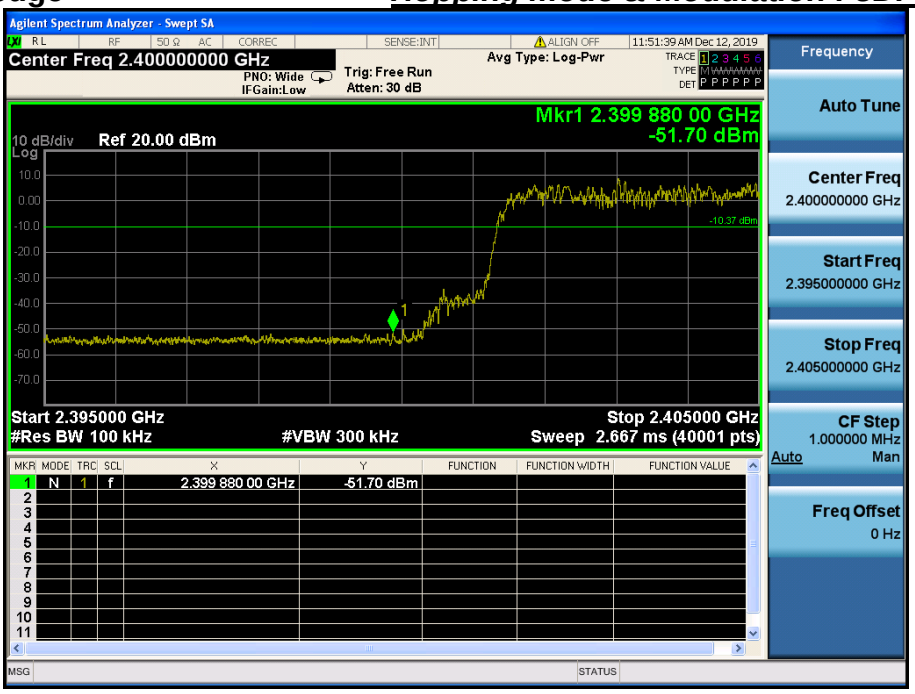


Conducted Spurious Emissions ***Highest Channel & Modulation : π/4DQPSK***

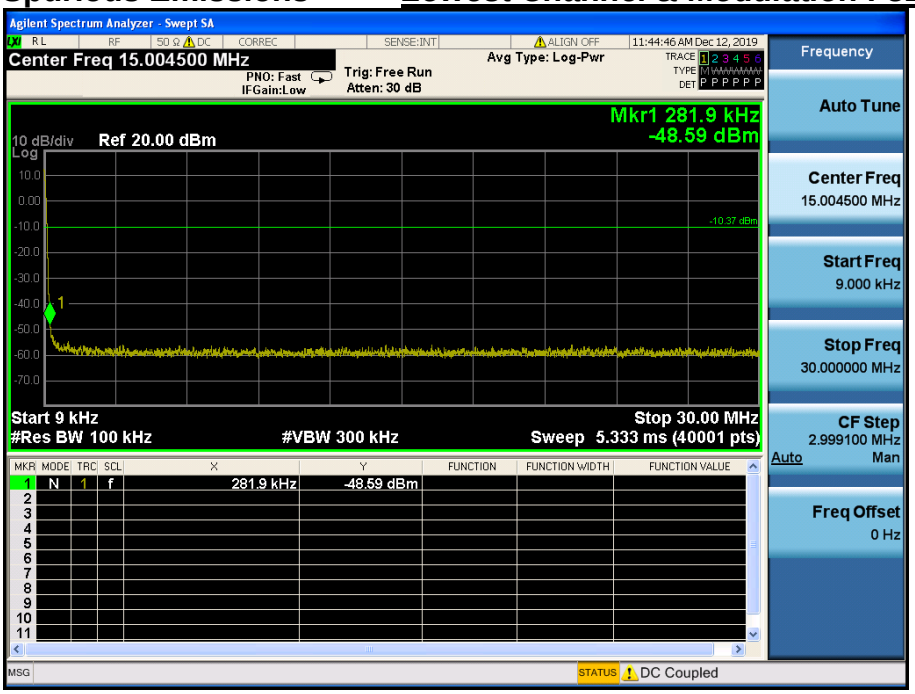
Low Band-edge ***Lowest Channel & Modulation : 8DPSK***

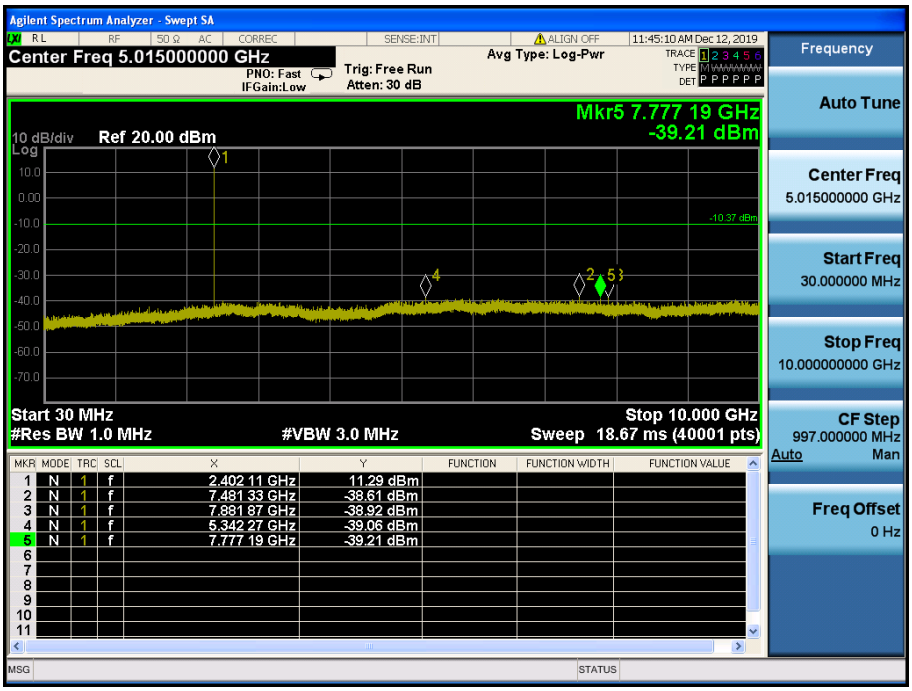


Low Band-edge ***Hopping mode & Modulation : 8DPSK***



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

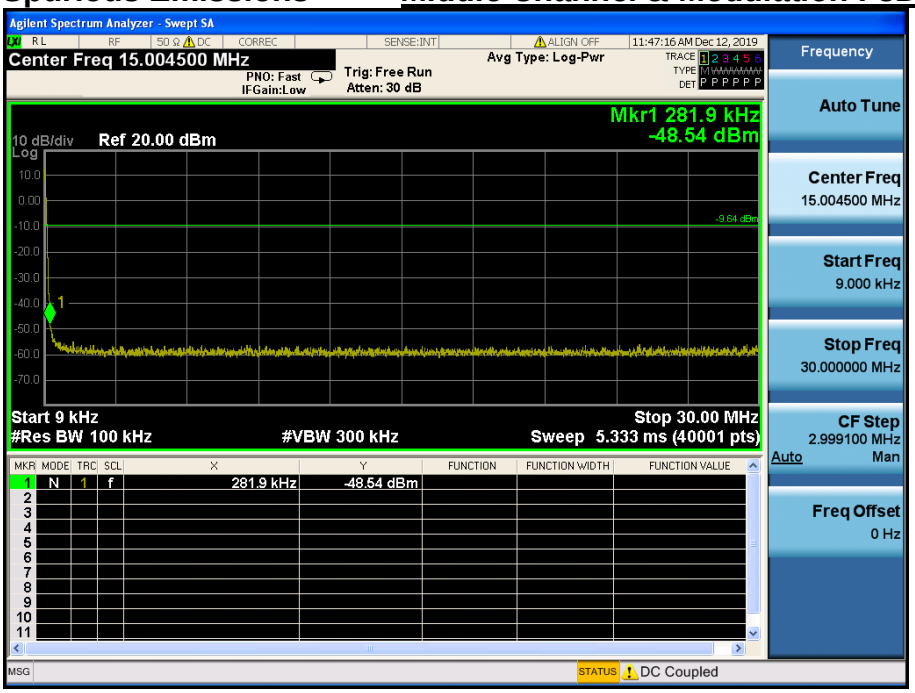




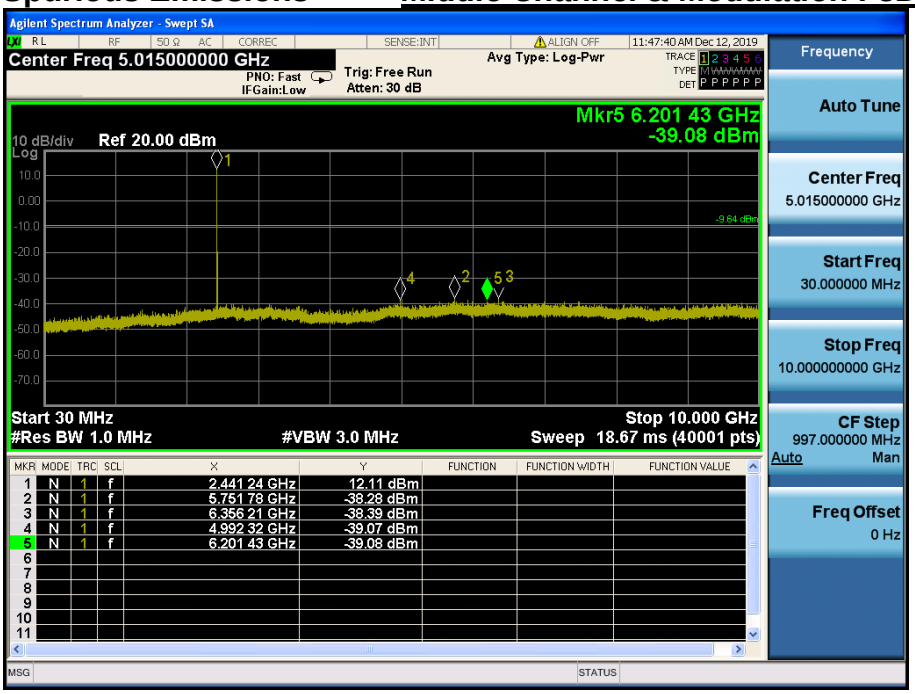
Conducted Spurious Emissions ***Lowest Channel & Modulation : 8DPSK***

Reference for limit ***Middle Channel & Modulation : 8DPSK***

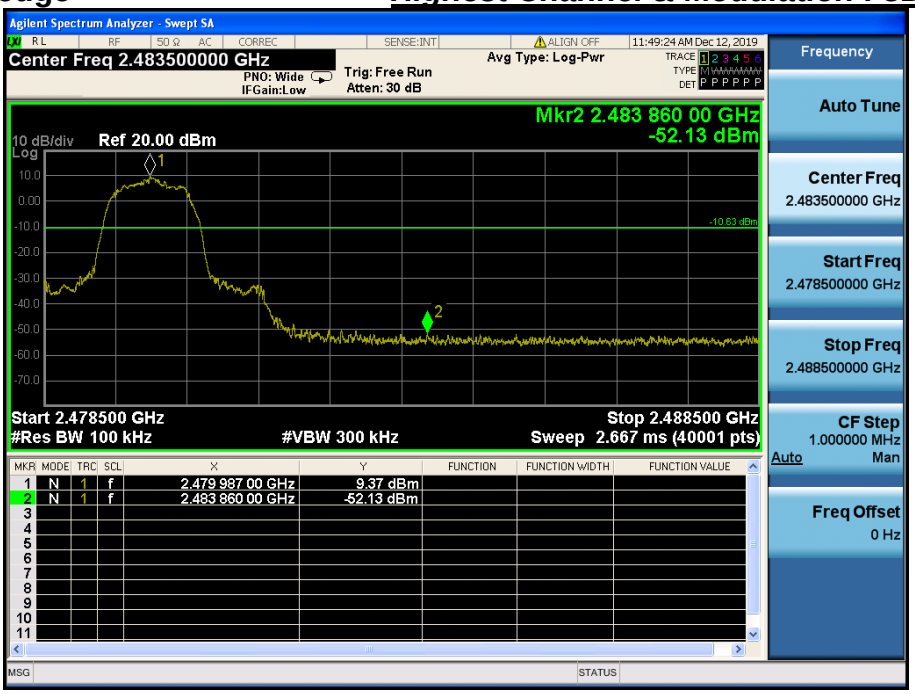
Conducted Spurious Emissions ***Middle Channel & Modulation : 8DPSK***



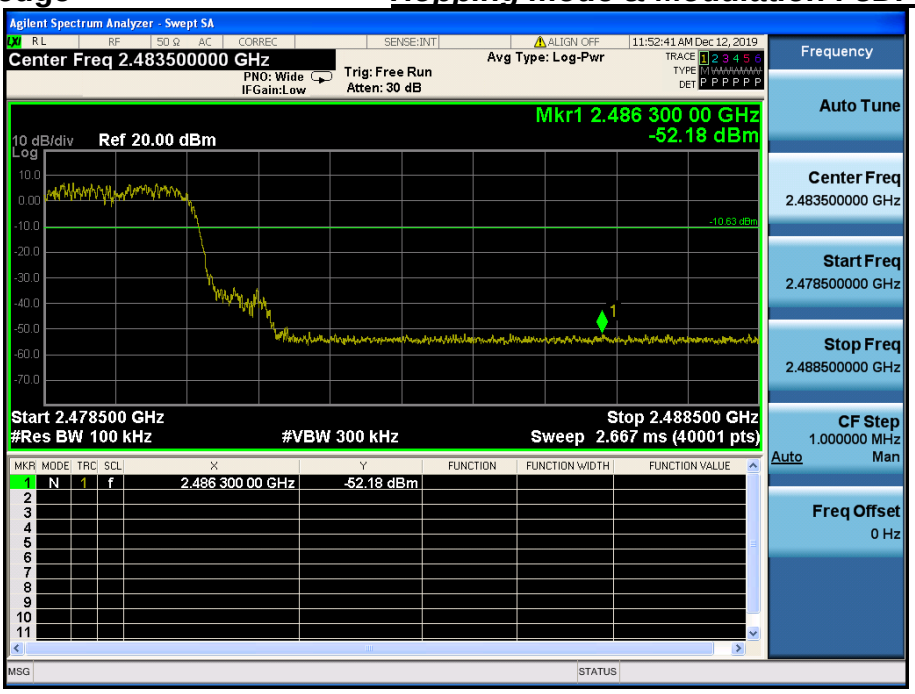
Conducted Spurious Emissions ***Middle Channel & Modulation : 8DPSK***



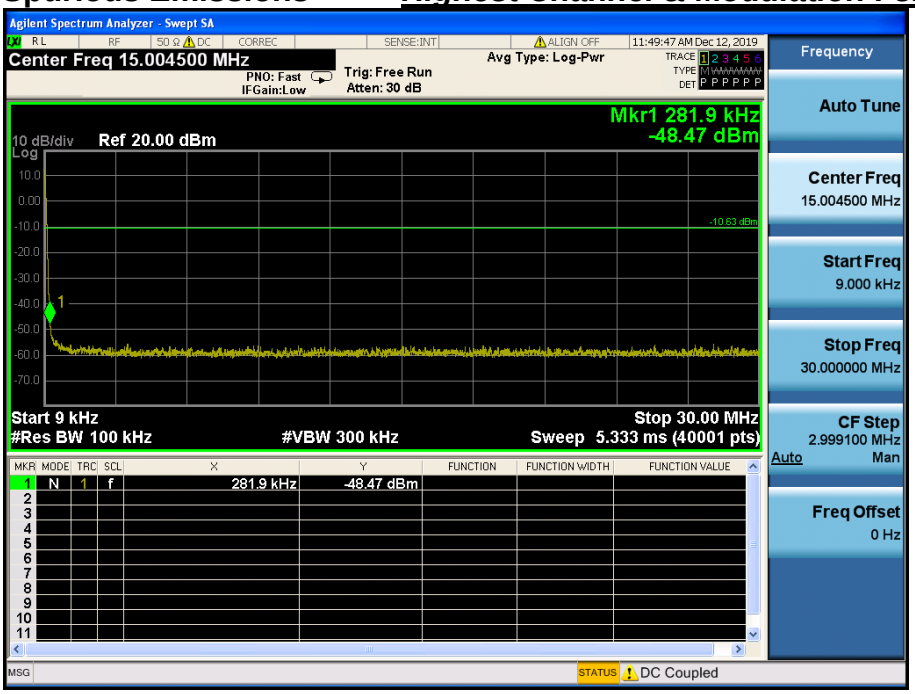
High Band-edge ***Highest Channel & Modulation : 8DPSK***

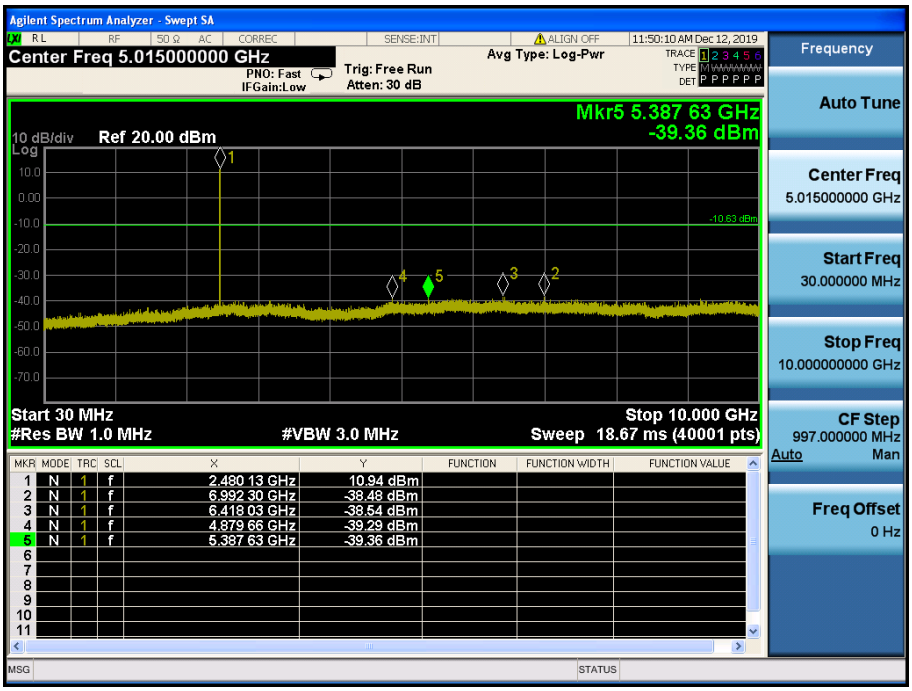


High Band-edge ***Hopping mode & Modulation : 8DPSK***



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

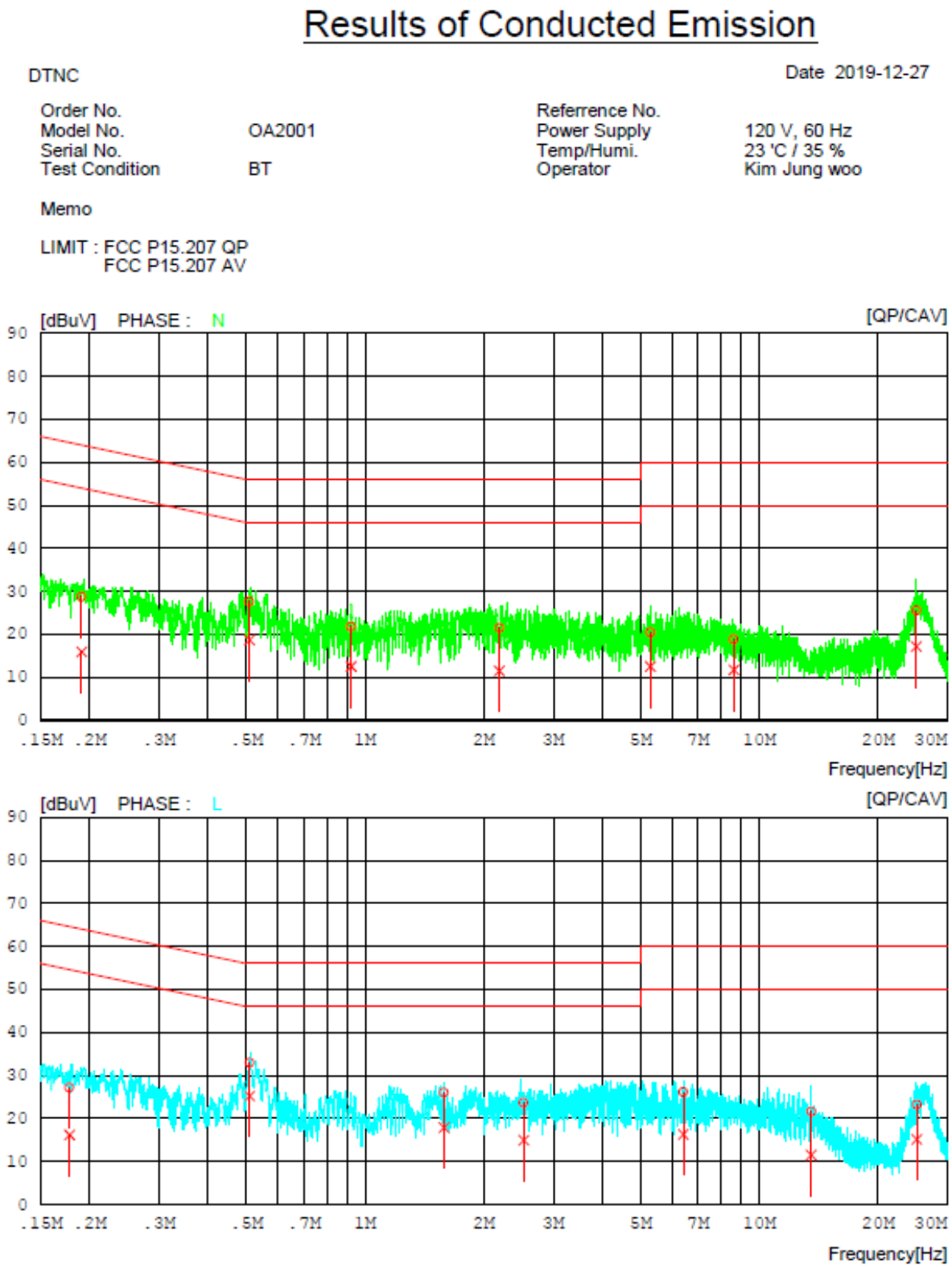
8.3 Test Procedures

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

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



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

Results of Conducted Emission

DTNC

Date 2019-12-27

Order No.		Referrence No.	
Model No.	OA2001	Power Supply	120 V, 60 Hz
Serial No.		Temp/Humi.	23 'C / 35 %
Test Condition	BT	Operator	Kim Jung woo

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	0.19089	18.79	6.06	9.94	28.73	16.00	64.00	54.00	35.27	38.00	N
2	0.50845	17.72	8.79	9.95	27.67	18.74	56.00	46.00	28.33	27.26	N
3	0.92050	11.85	2.59	9.97	21.82	12.56	56.00	46.00	34.18	33.44	N
4	2.18896	11.40	1.51	10.03	21.43	11.54	56.00	46.00	34.57	34.46	N
5	5.29036	10.29	2.40	10.16	20.45	12.56	60.00	50.00	39.55	37.44	N
6	8.61663	8.54	1.47	10.29	18.83	11.76	60.00	50.00	41.17	38.24	N
7	25.04751	14.87	6.54	10.66	25.53	17.20	60.00	50.00	34.47	32.80	N
8	0.17772	17.18	6.16	9.94	27.12	16.10	64.59	54.59	37.47	38.49	L
9	0.50924	23.01	15.23	9.95	32.96	25.18	56.00	46.00	23.04	20.82	L
10	1.58476	15.92	7.79	10.01	25.93	17.80	56.00	46.00	30.07	28.20	L
11	2.52415	13.50	4.85	10.04	23.54	14.89	56.00	46.00	32.46	31.11	L
12	6.41672	15.91	6.08	10.20	26.11	16.28	60.00	50.00	33.89	33.72	L
13	13.55013	11.08	1.01	10.42	21.50	11.43	60.00	50.00	38.50	38.57	L
14	25.09394	12.53	4.45	10.63	23.16	15.08	60.00	50.00	36.84	34.92	L

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 attached on the device by means of unique coupling method (Spring Tension). Therefore this E.U.T Complies with the requirement of §15.203

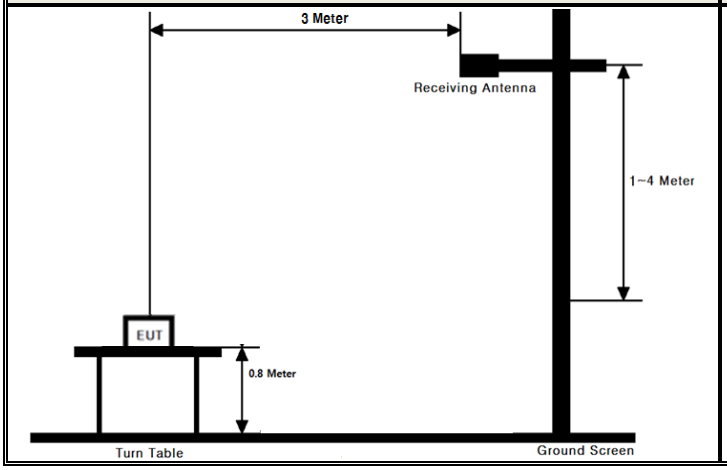
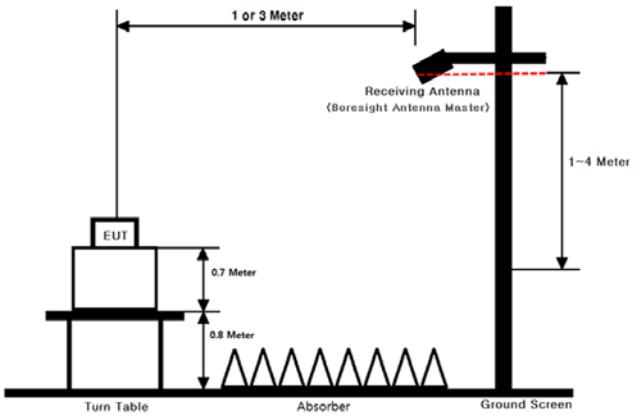
- **Minimum Standard :**

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.

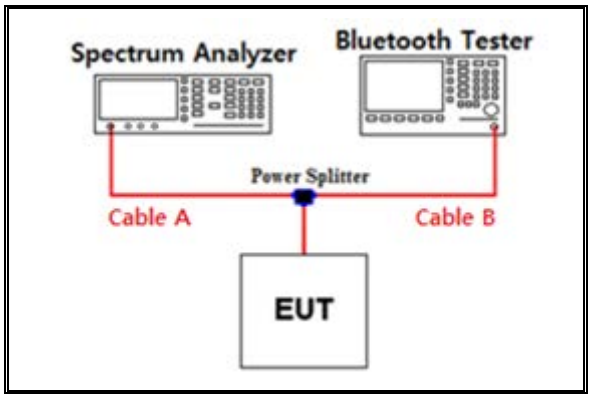
APPENDIX I

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	6.09	15	9.42
1	6.52	20	13.70
2.402 & 2.440 & 2.480	7.19	25	17.40
5	7.87	-	-
10	9.00	-	-

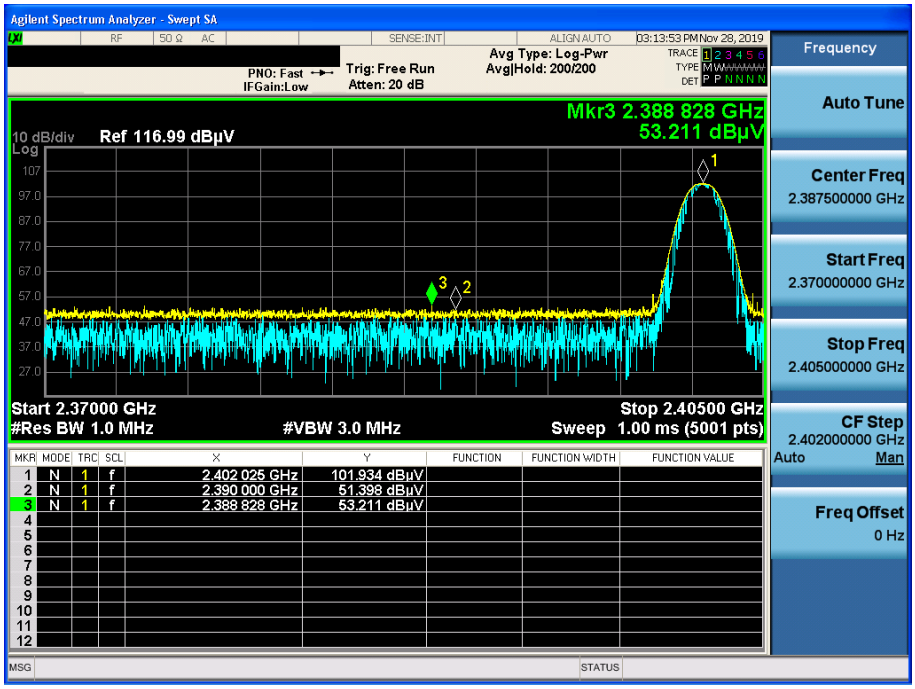
Note 1 : The path loss from EUT to Spectrum analyzer were measured and used for test.

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

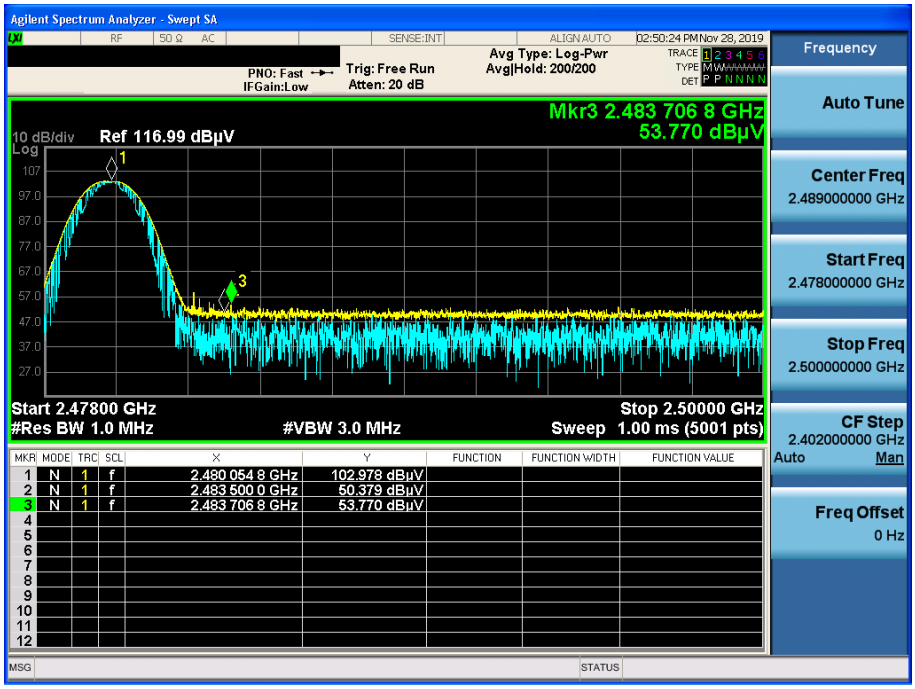
APPENDIX II

Unwanted Emissions (Radiated) Test Plot

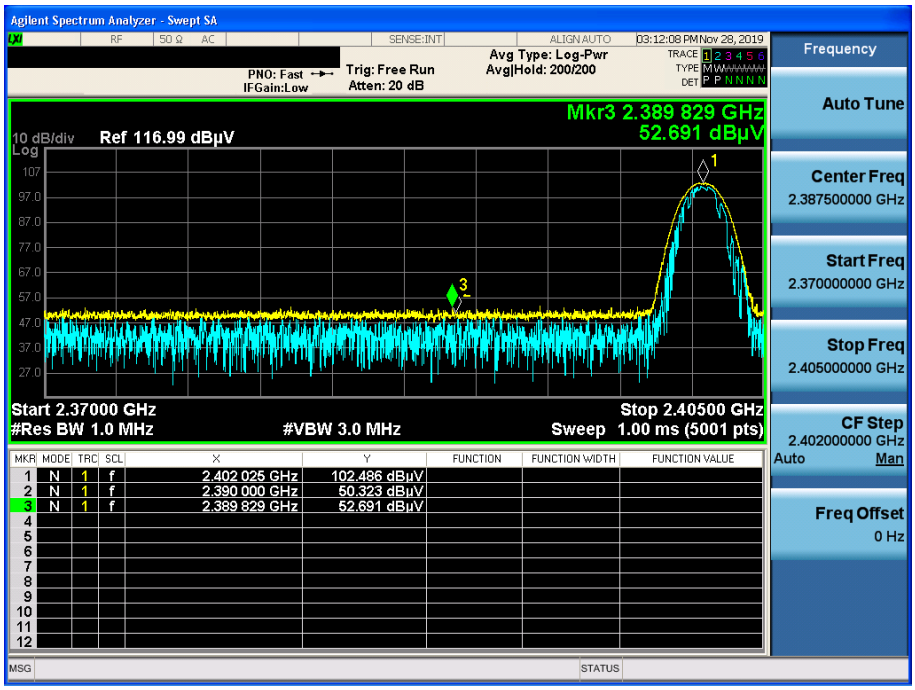
GFSK & Lowest & Z & Hor — Detector Mode : PK



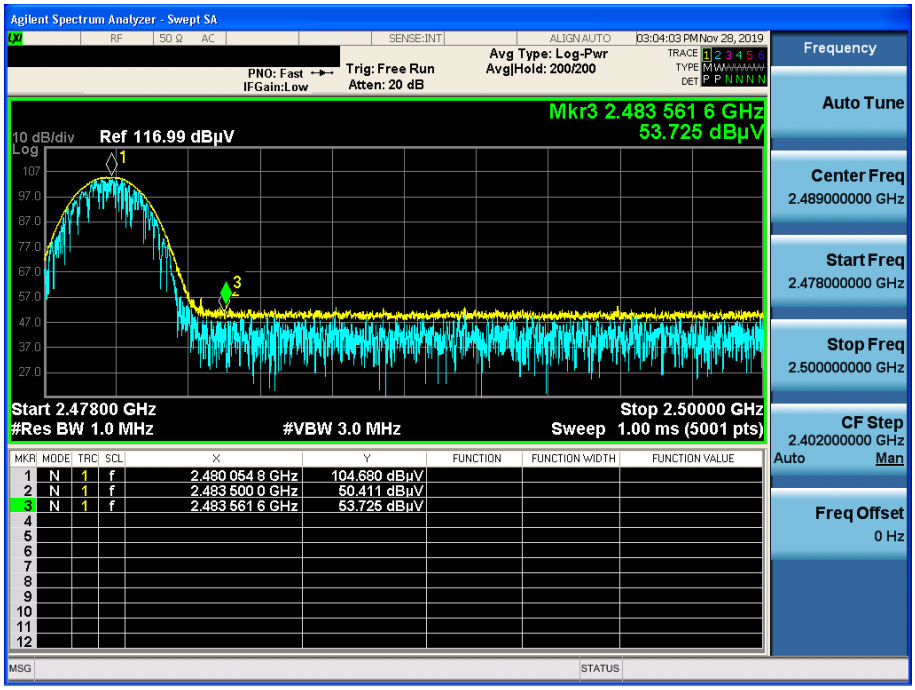
GFSK & Highest & Z & Hor — Detector Mode : PK



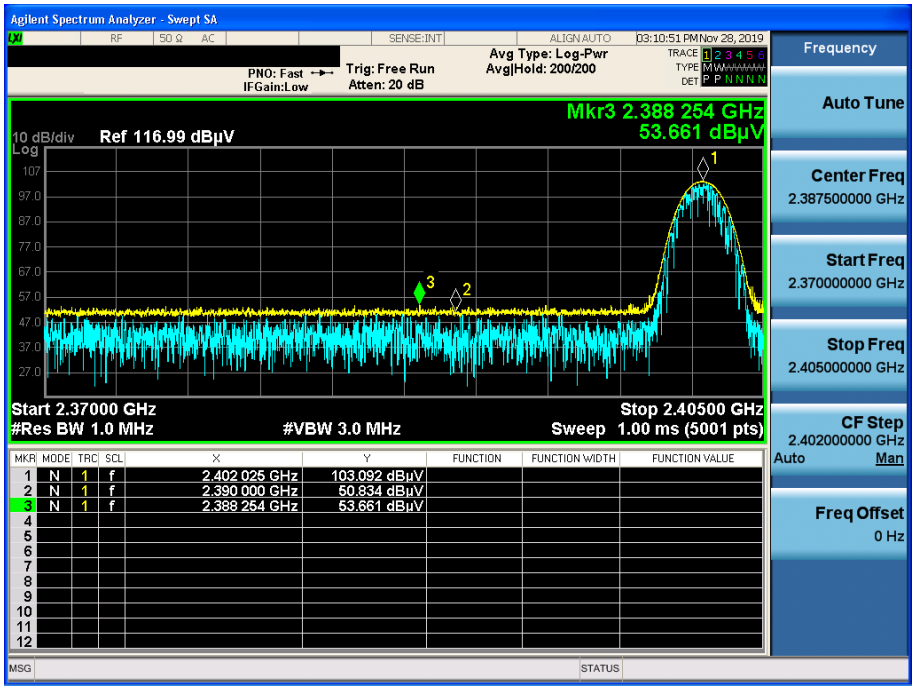
π/4DQPSK & Lowest & Z & Hor **Detector Mode : PK**



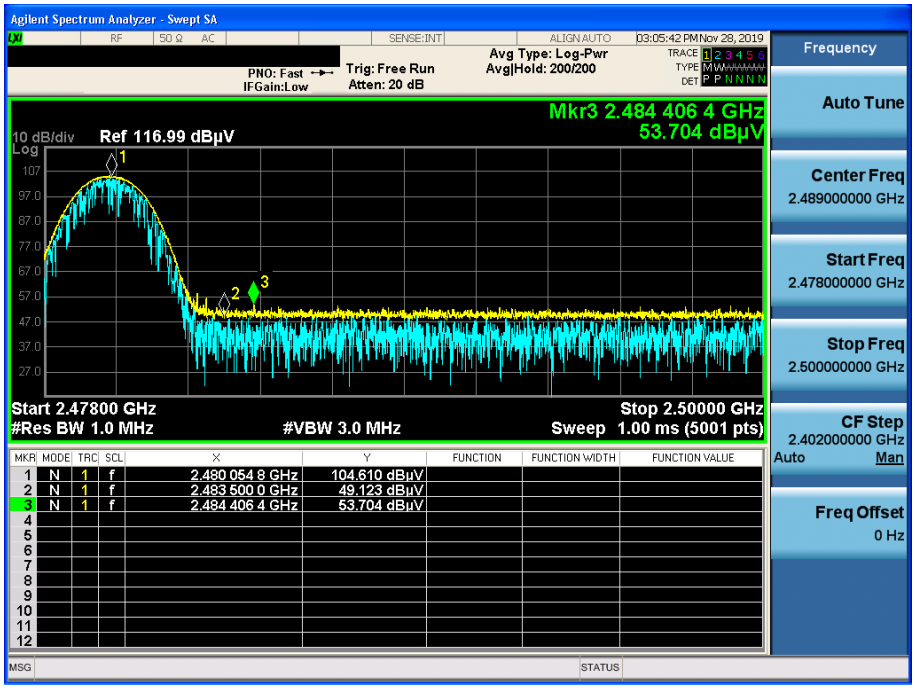
π/4DQPSK & Highest & Z & Hor **Detector Mode : PK**



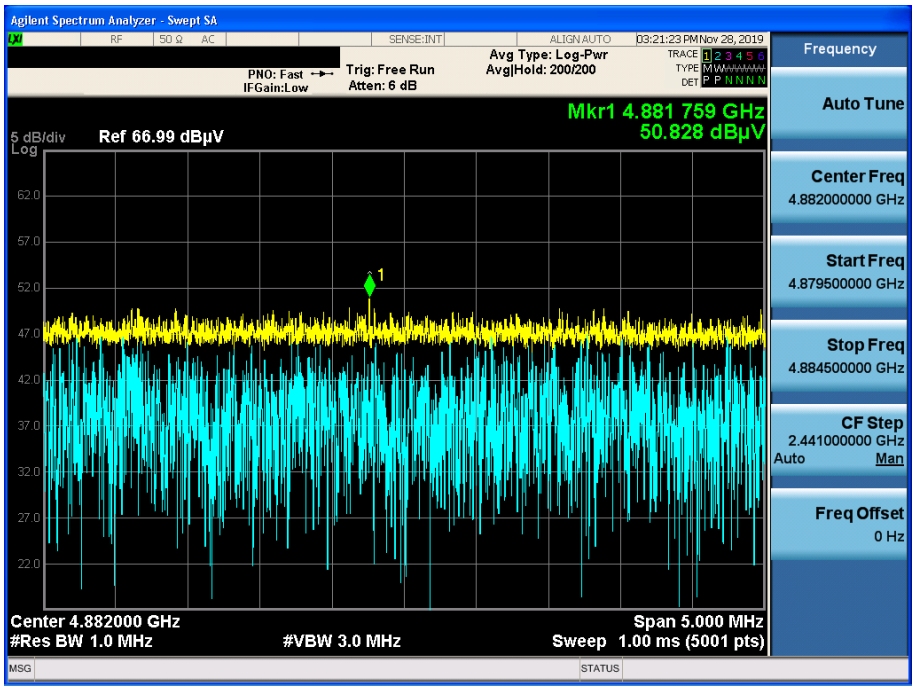
8DPSK & Lowest & Z & Hor — Detector Mode : PK



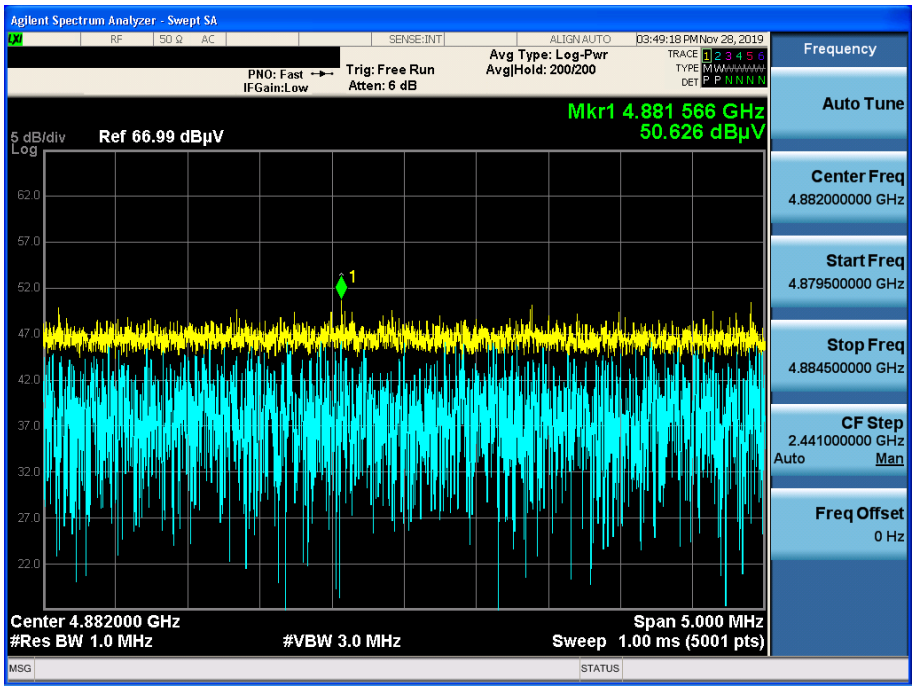
8DPSK & Highest & X & Hor — Detector Mode : PK



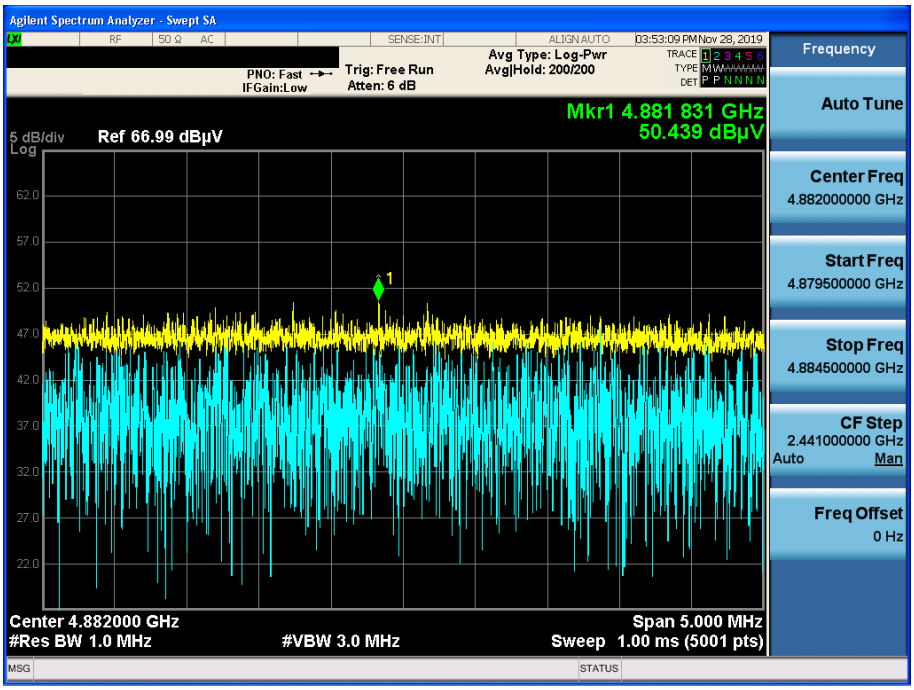
GFSK & Middle & X & Ver **Detector Mode : PK**



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

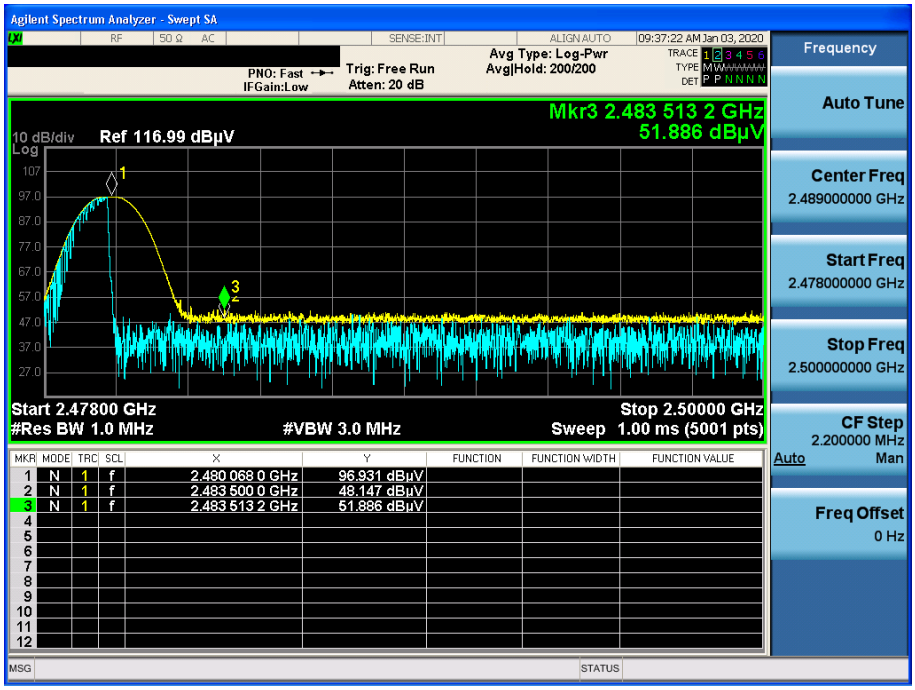


8DPSK & Middle & X & Ver **Detector Mode : PK**

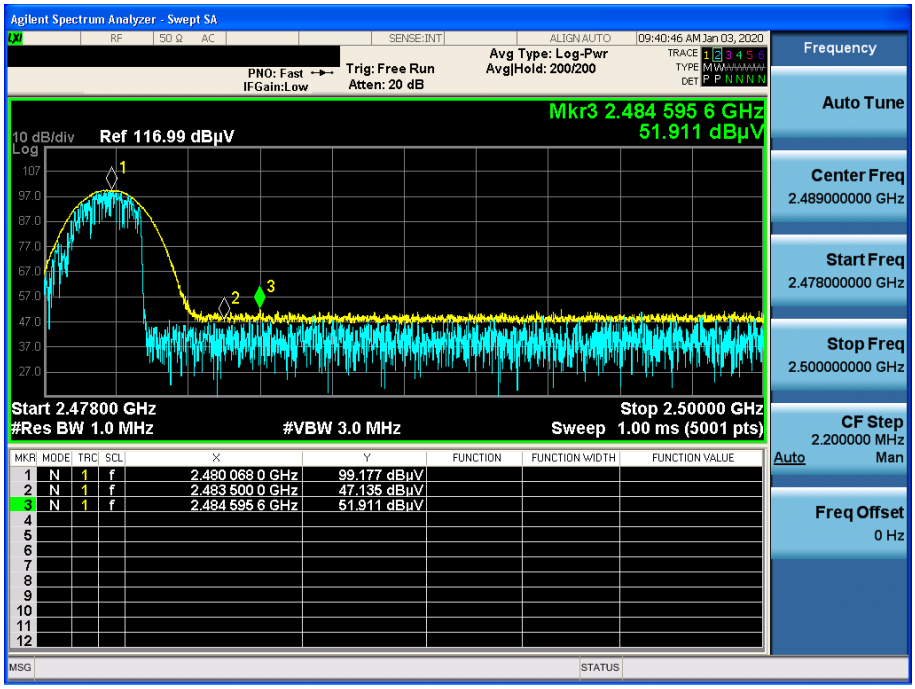


Unwanted Emissions (Radiated) Test Plot _ Wireless Charging

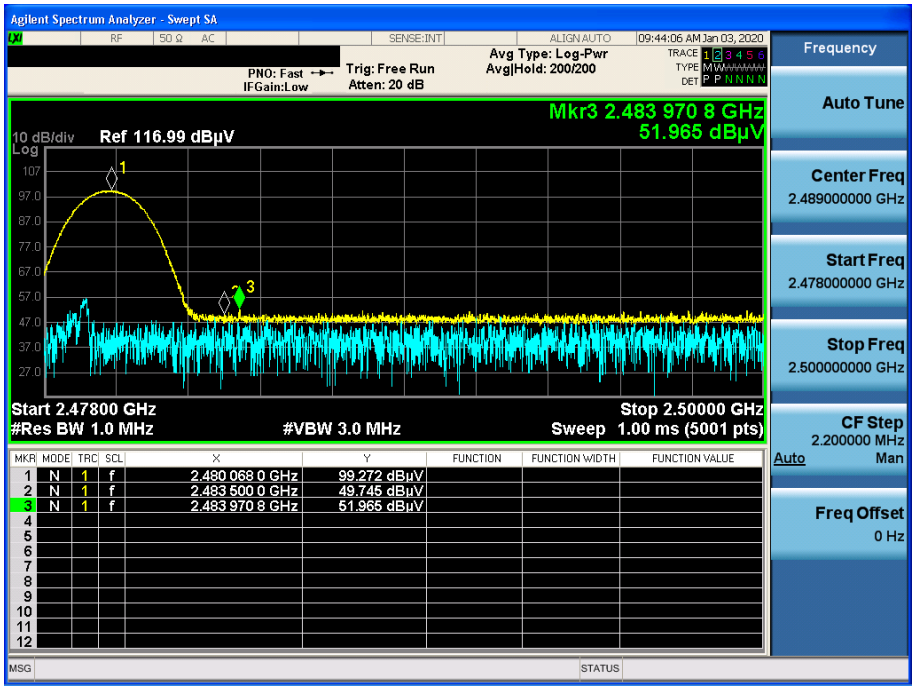
GFSK & Highest & X & Ver — Detector Mode : PK



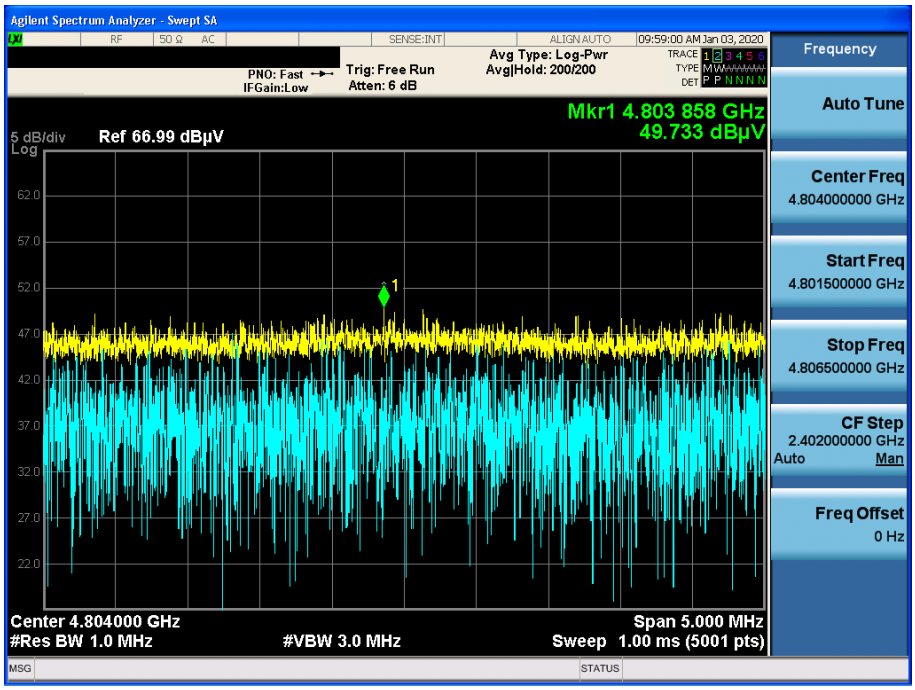
π/4DQPSK & Highest & X & Ver — Detector Mode : PK



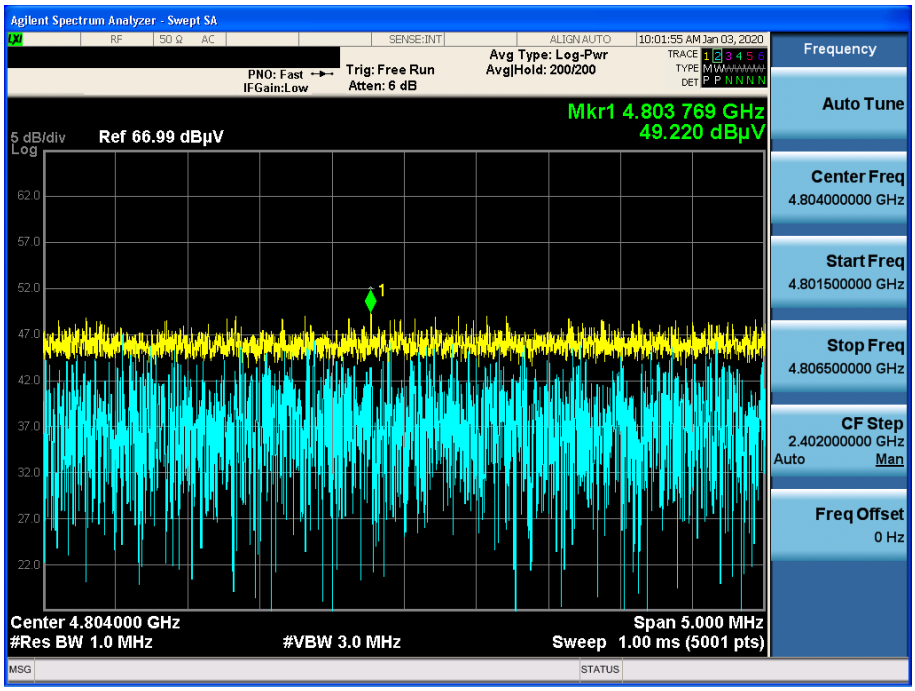
8DPSK & Highest & X & Ver **Detector Mode : PK**



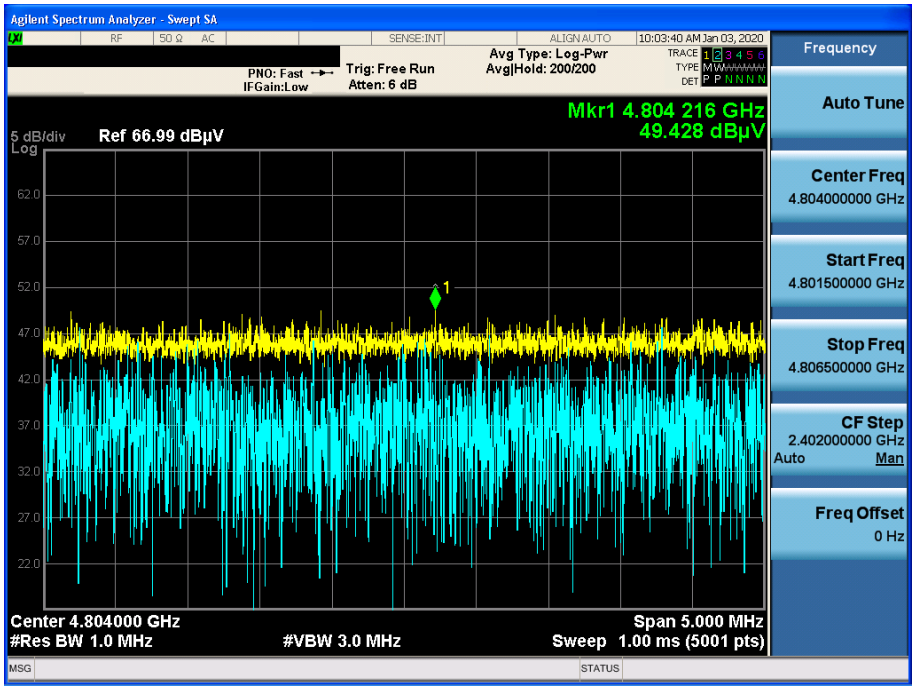
GFSK & Highest & X & Ver **Detector Mode : PK**



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

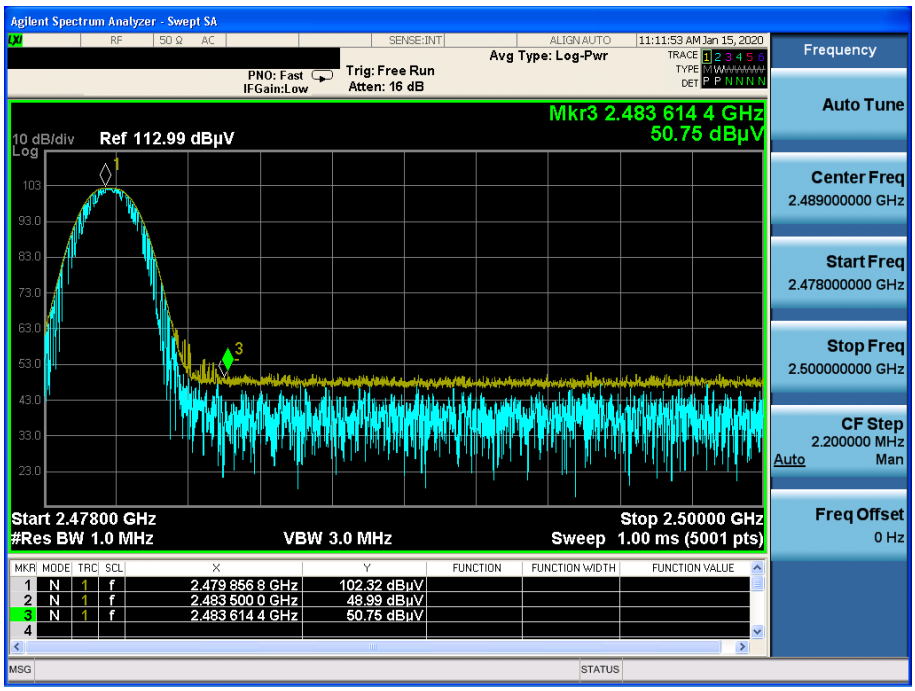


8DPSK & Highest & X & Ver **Detector Mode : PK**

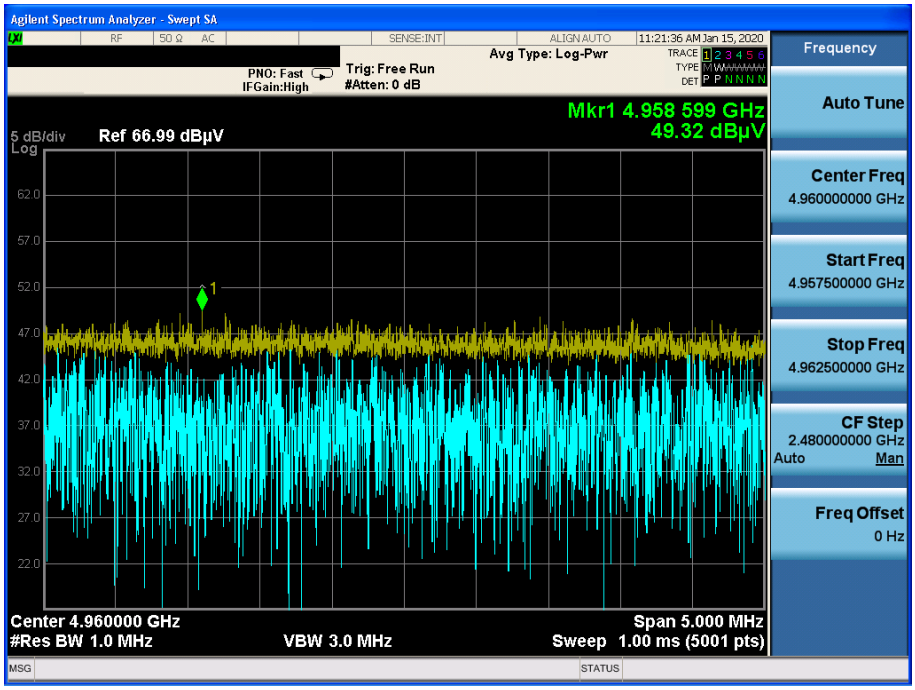


Unwanted Emissions (Radiated) Test Plot _ With Dual Display

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

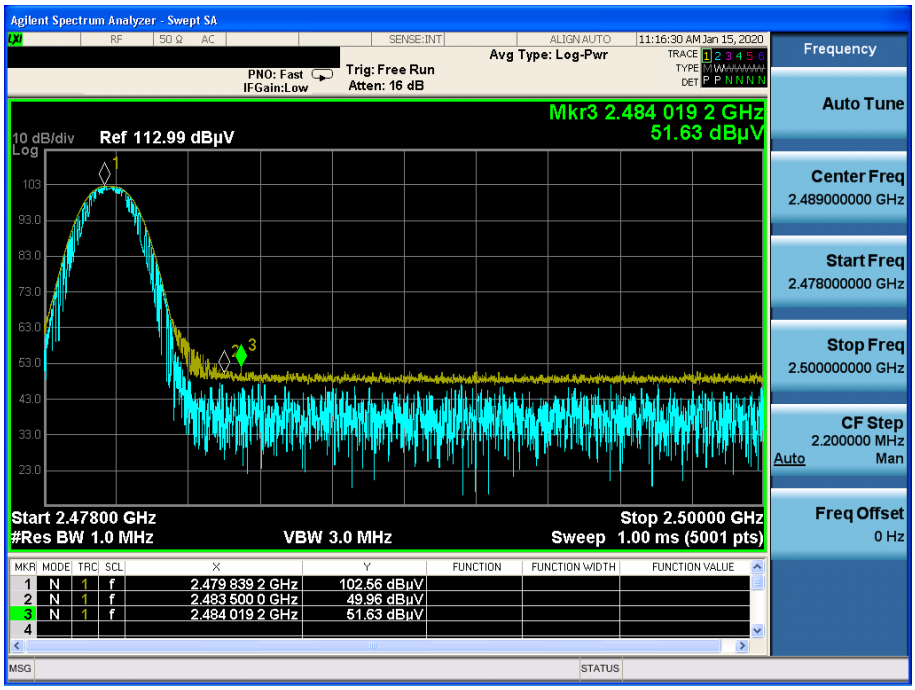


GFSK & Highest & X & Ver — Detector Mode : PK



Unwanted Emissions (Radiated) Test Plot _ With Dual Display+WPC

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



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