



Band4_10MHz_QPSK_20350_1RB#0



Band4_10MHz_QPSK_20350_1RB#0



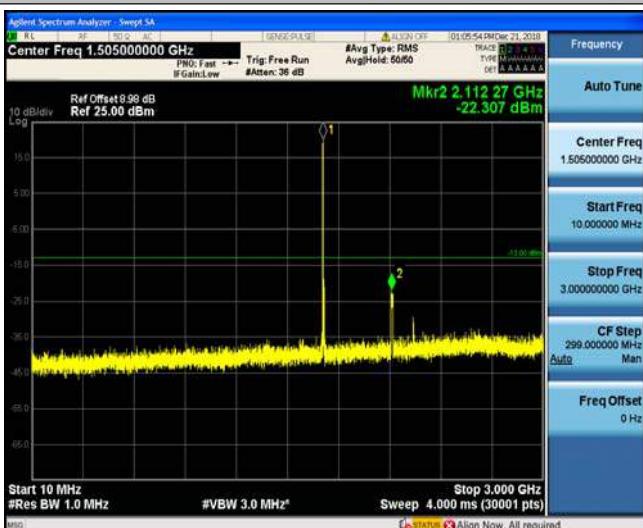
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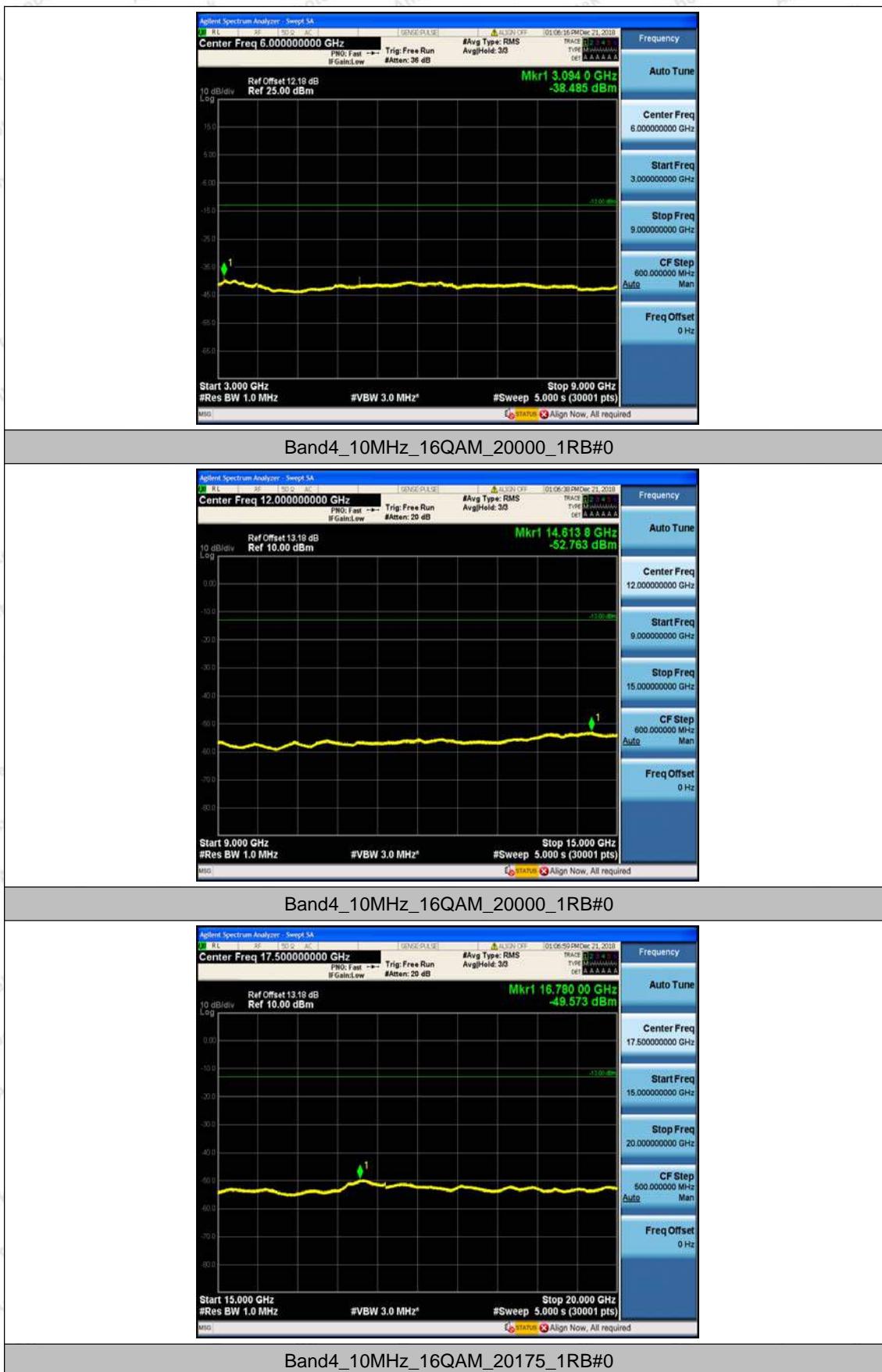
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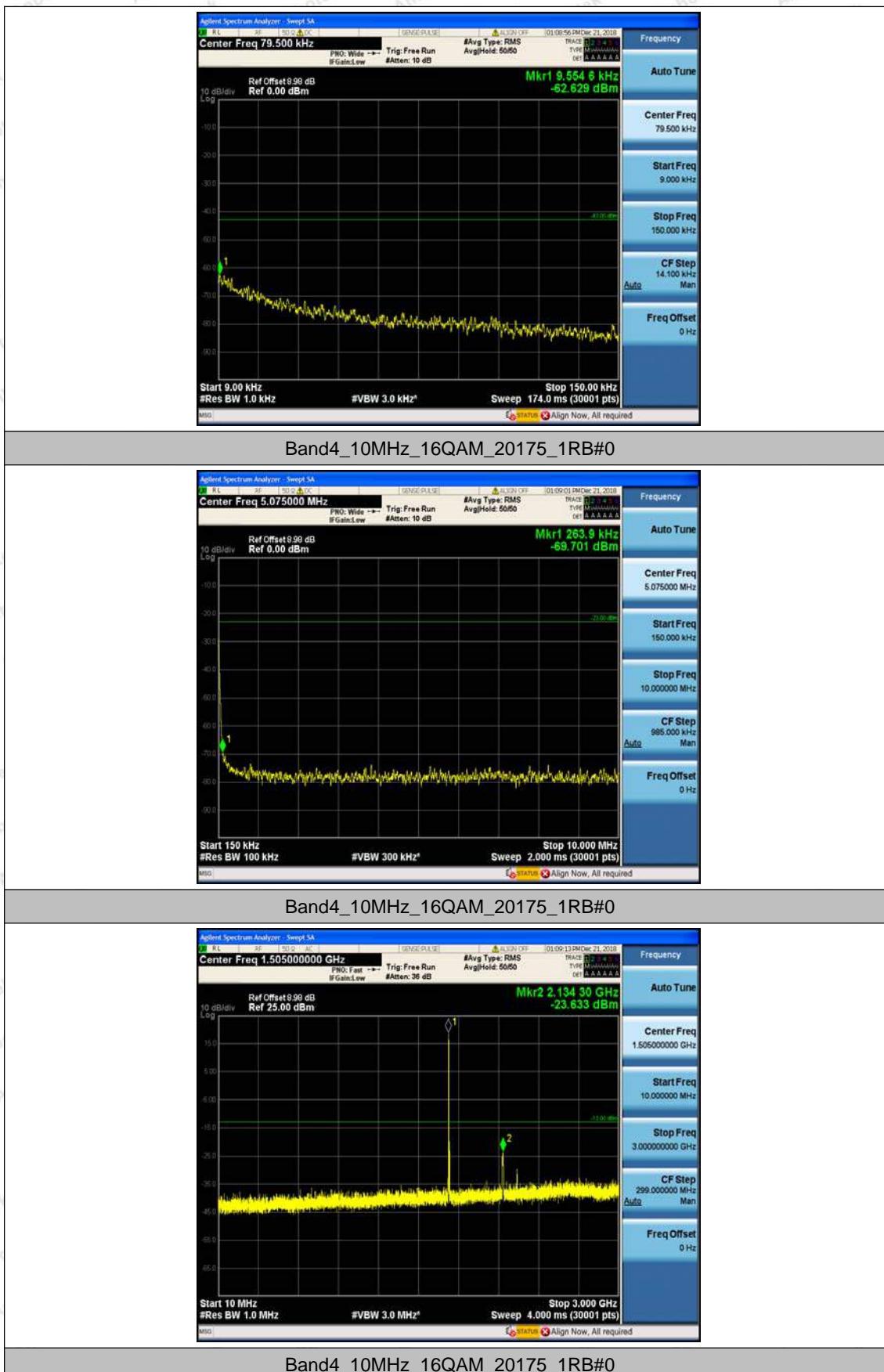


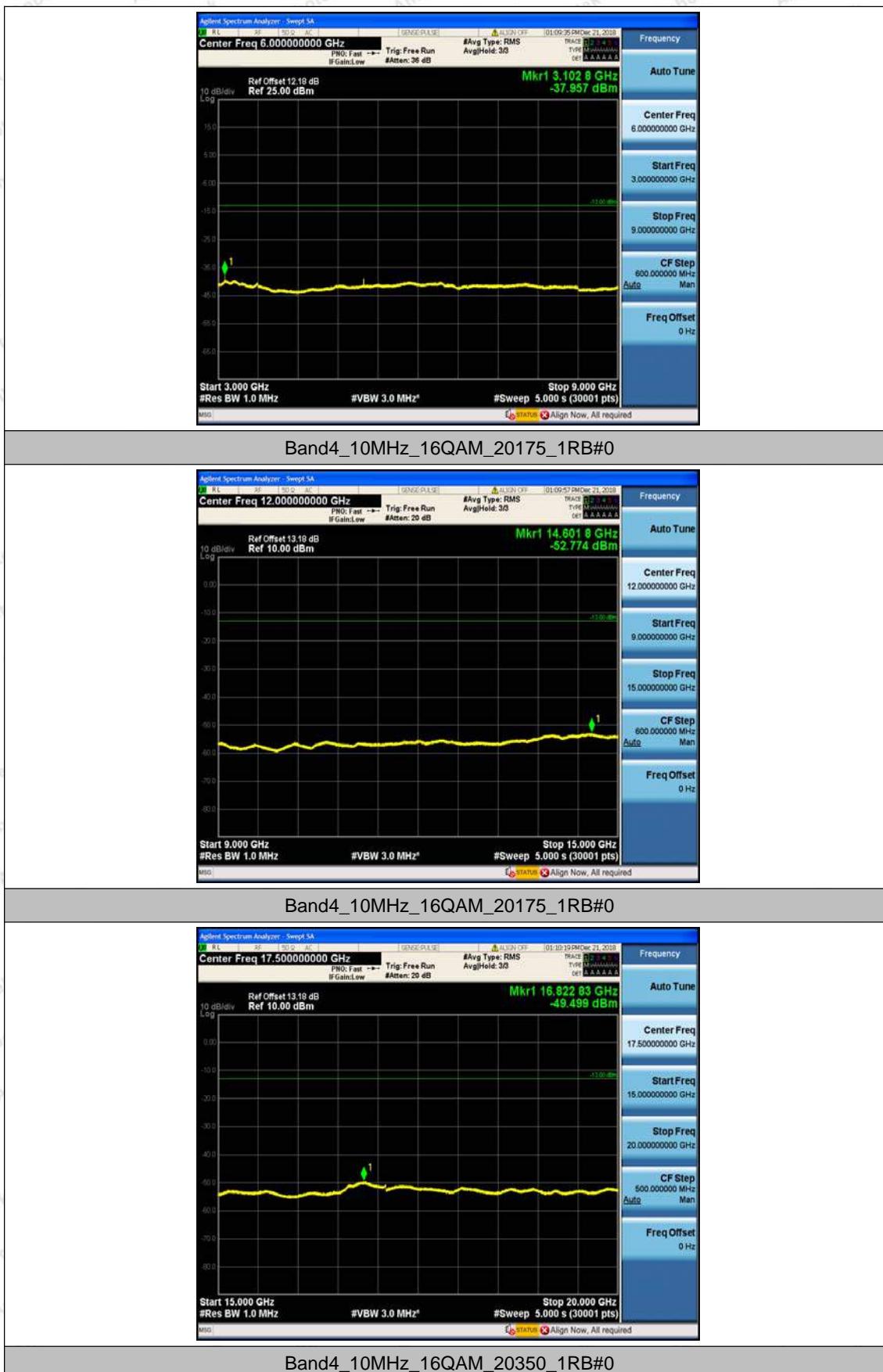
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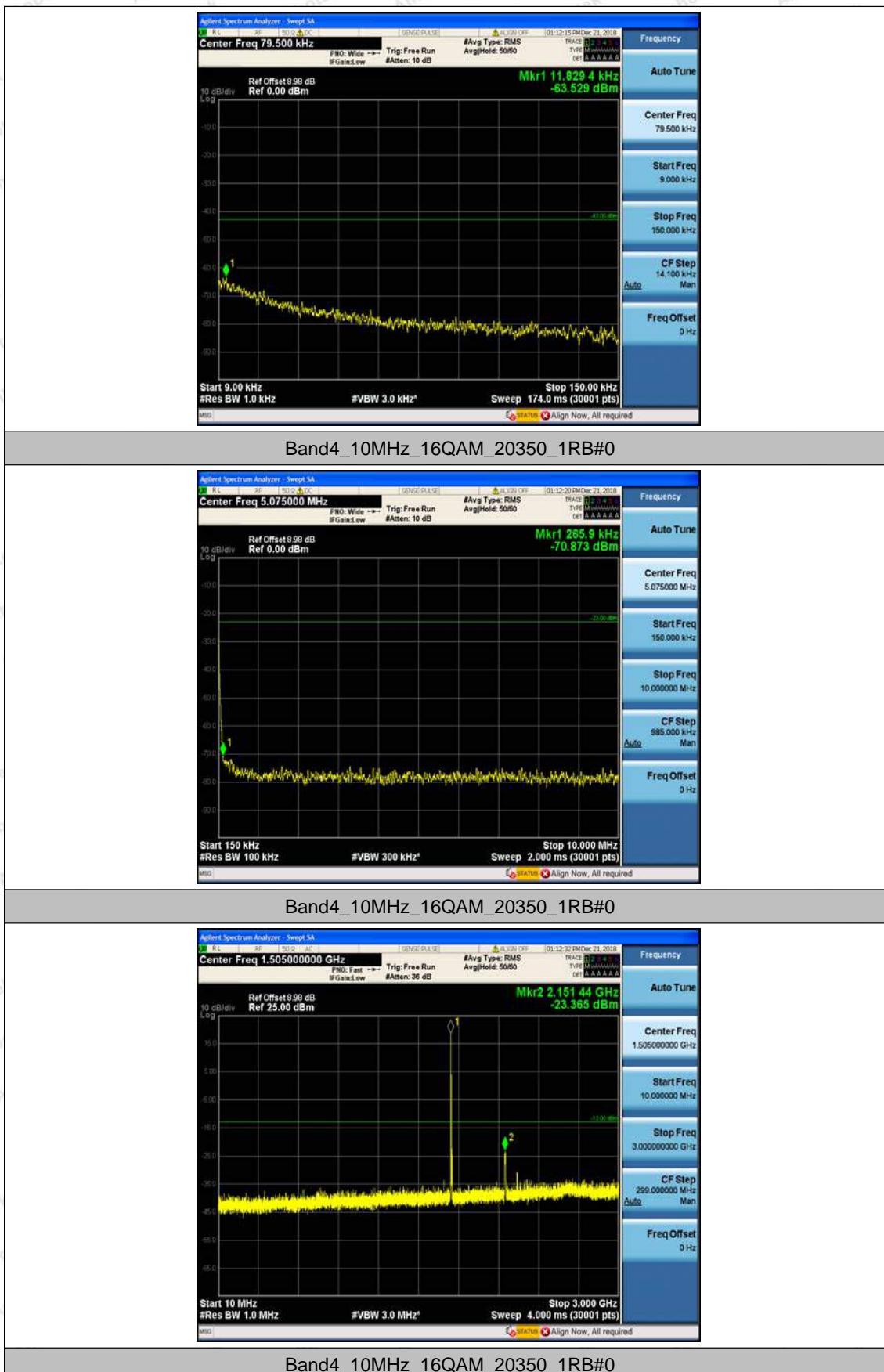


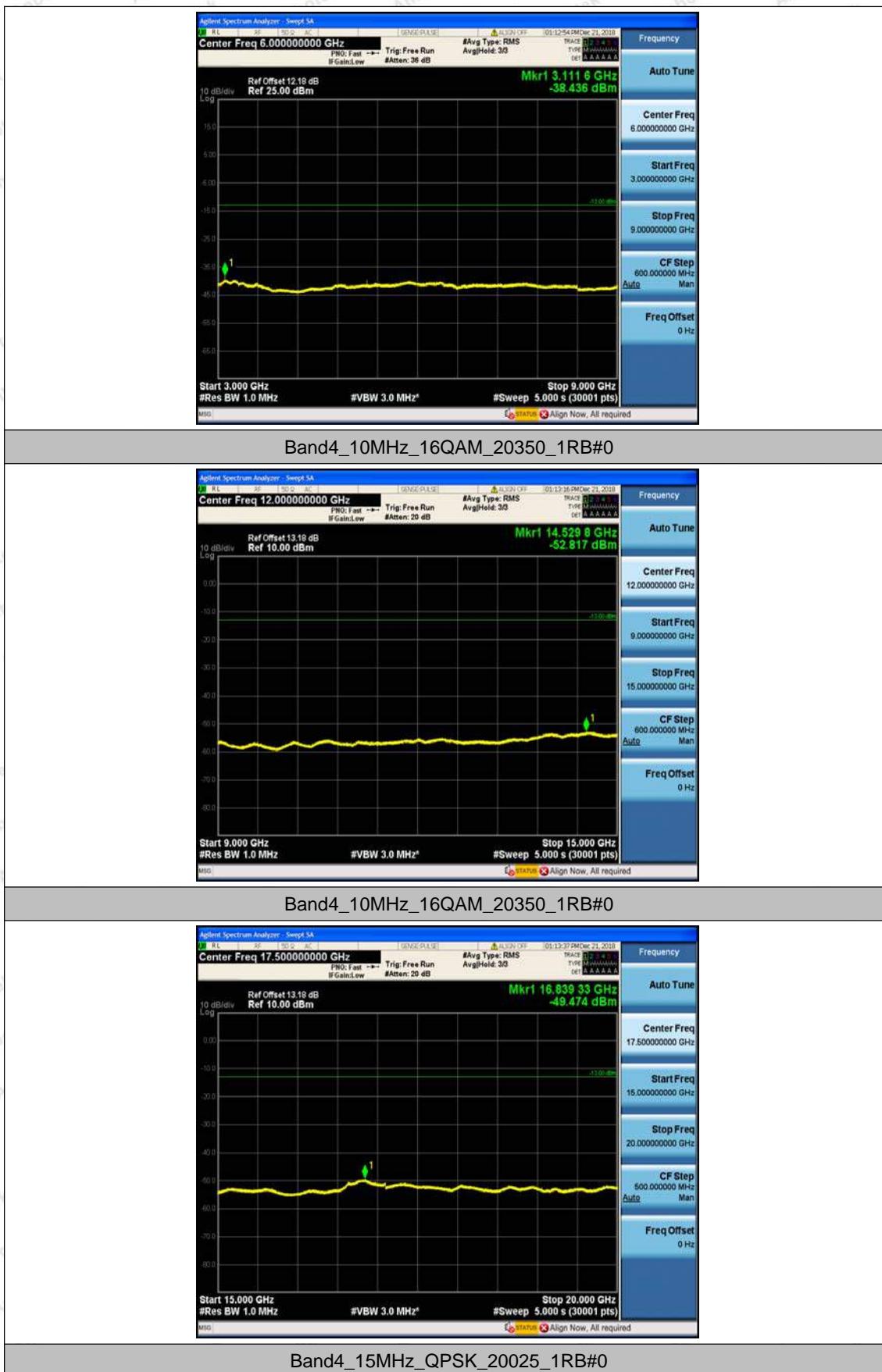
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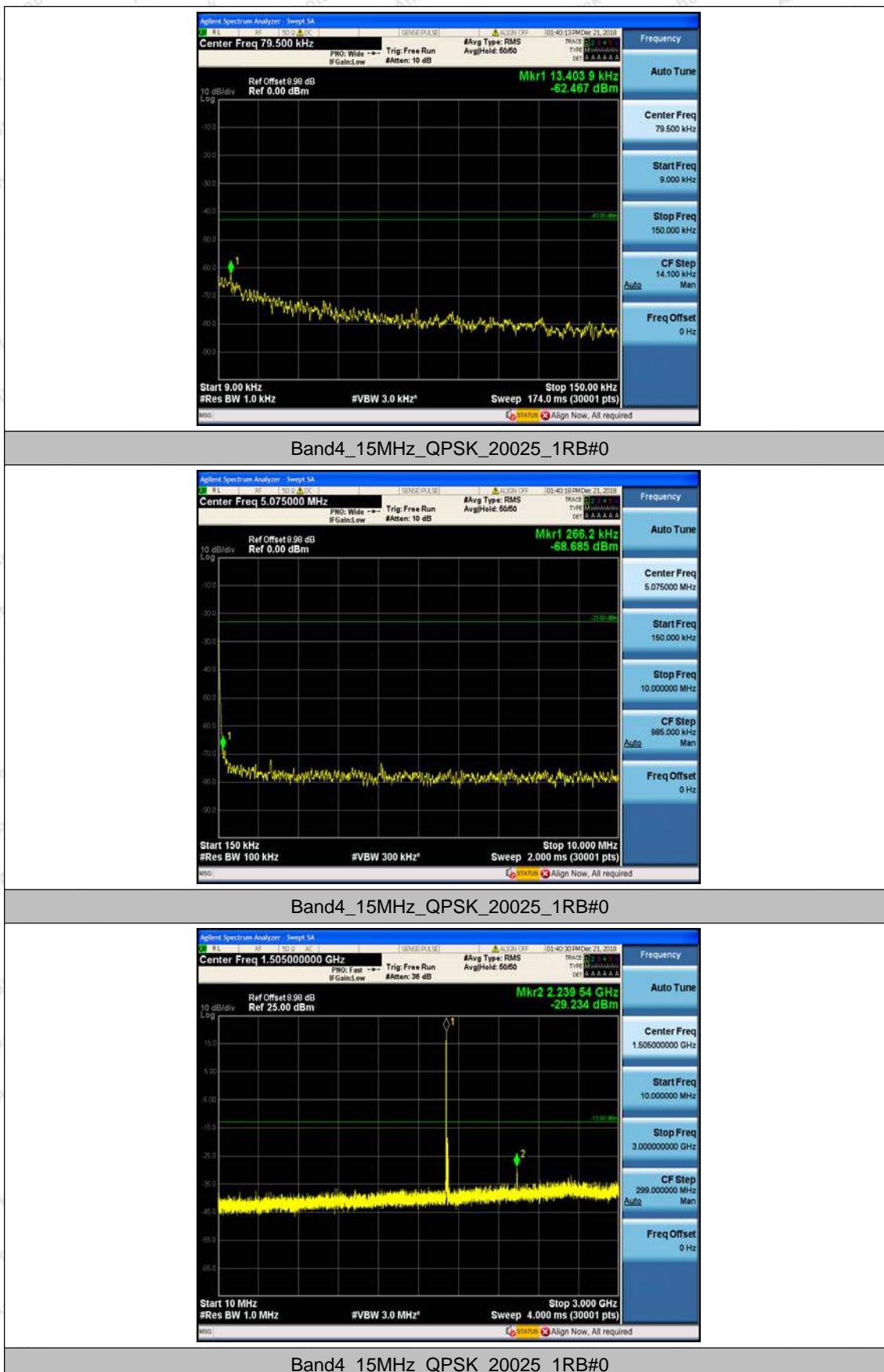


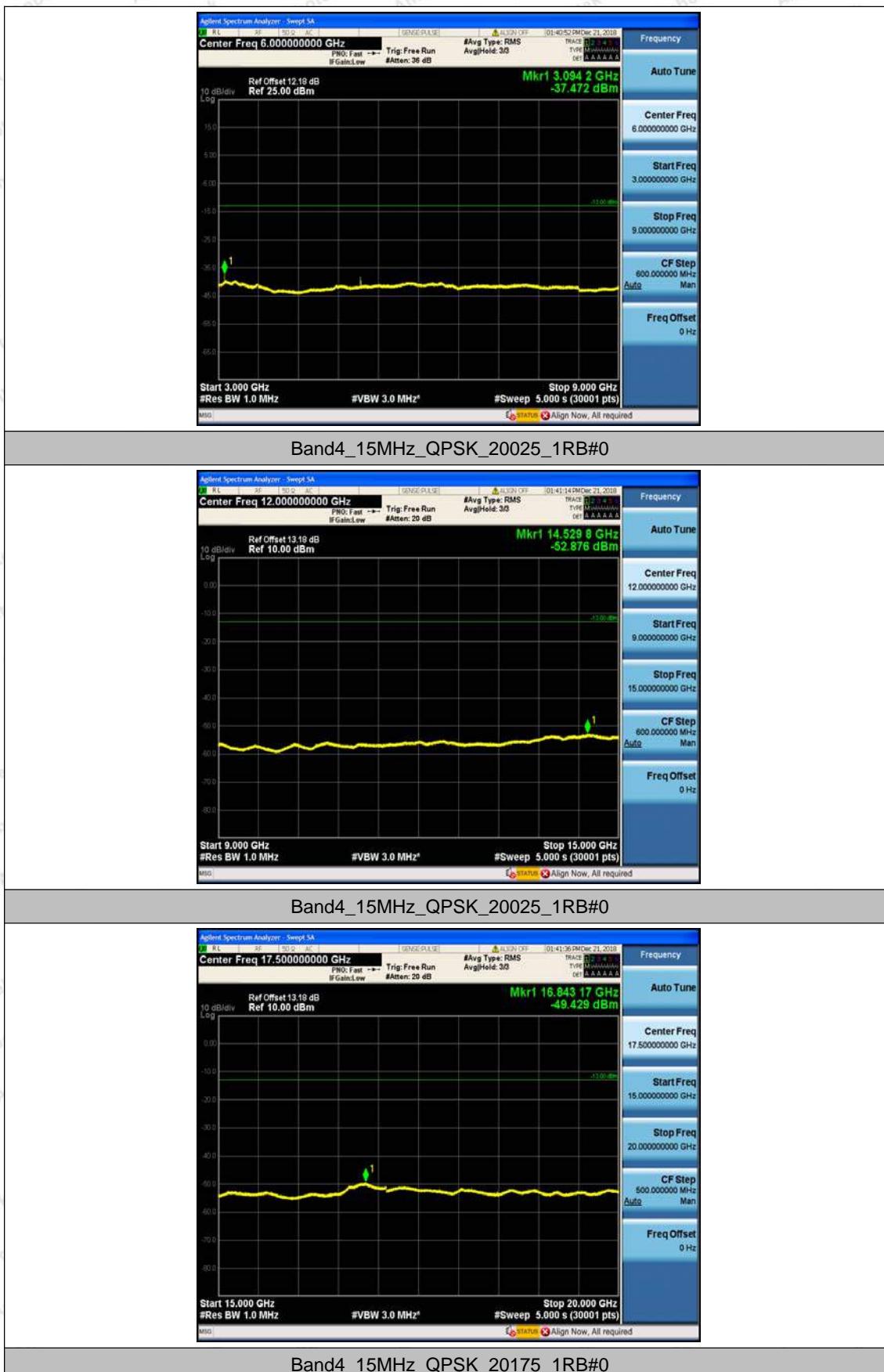


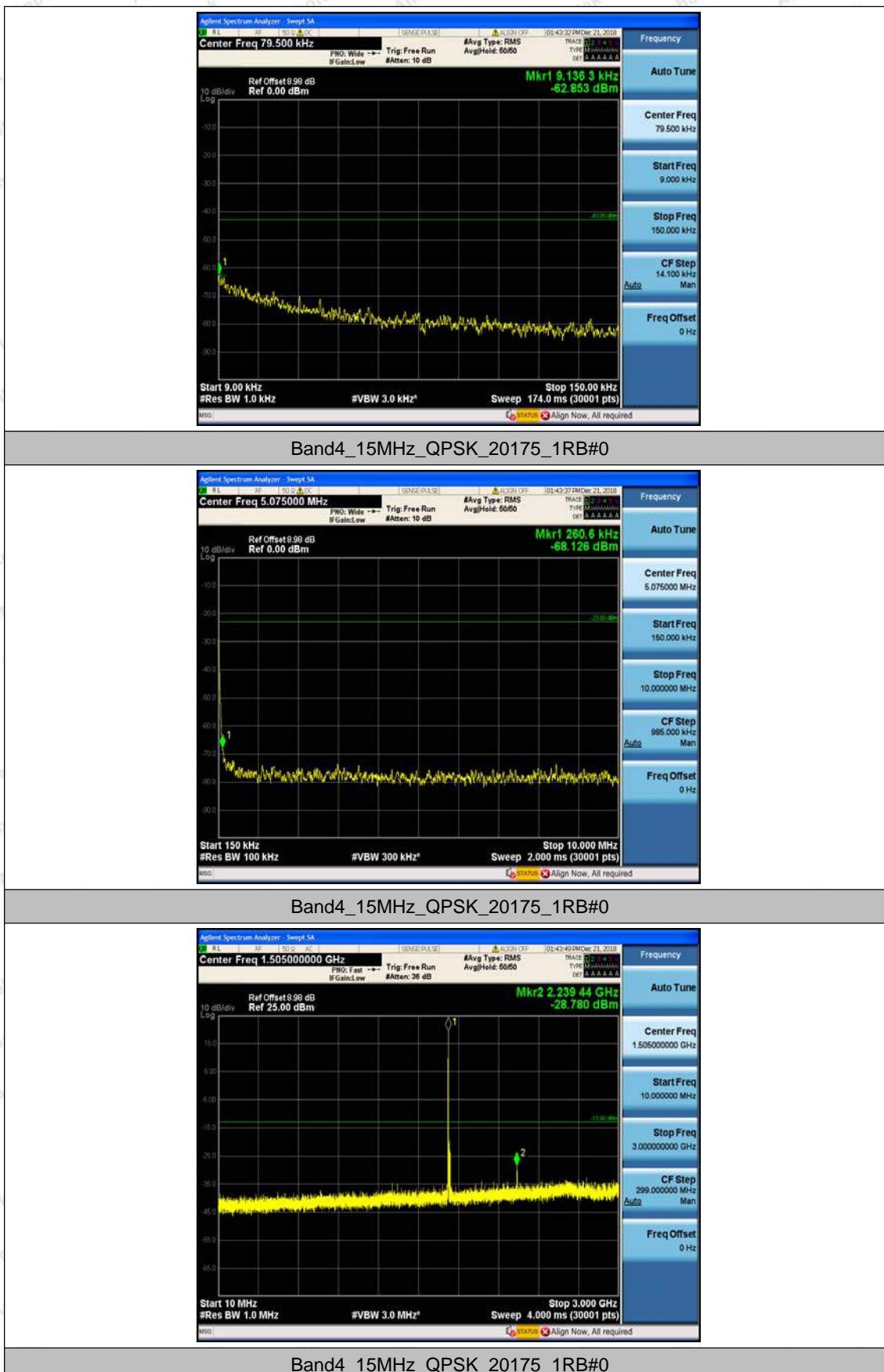


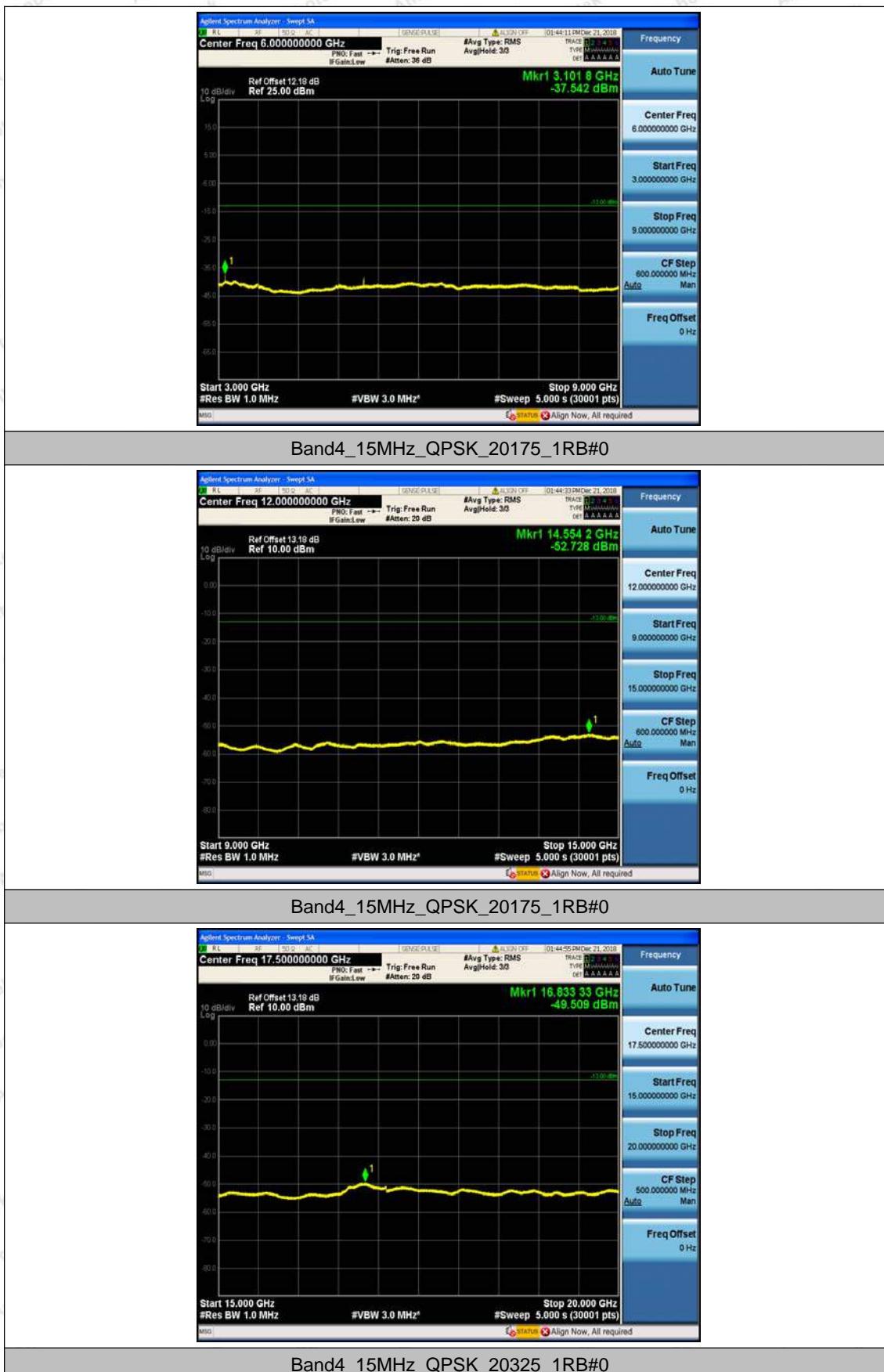


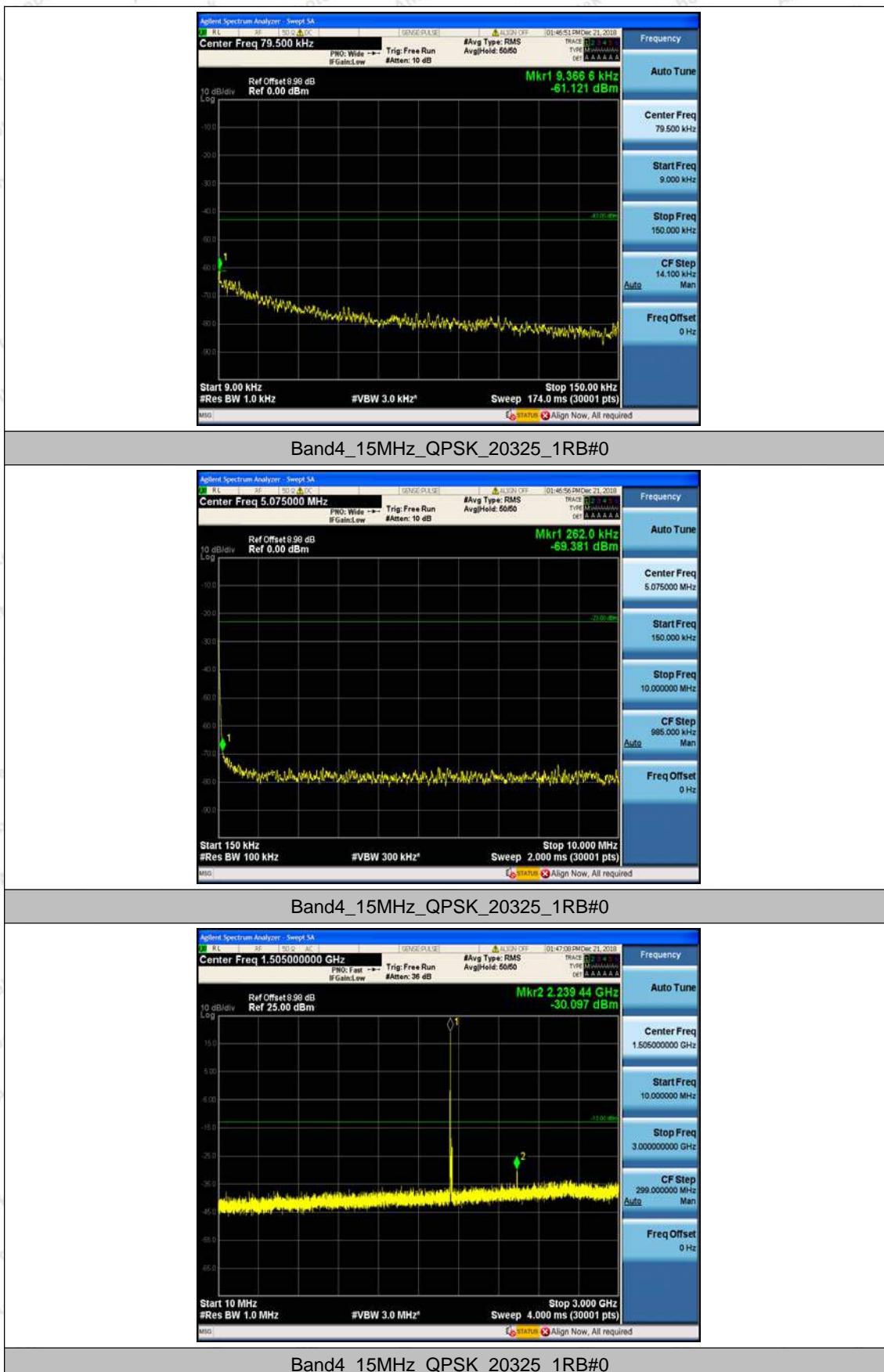














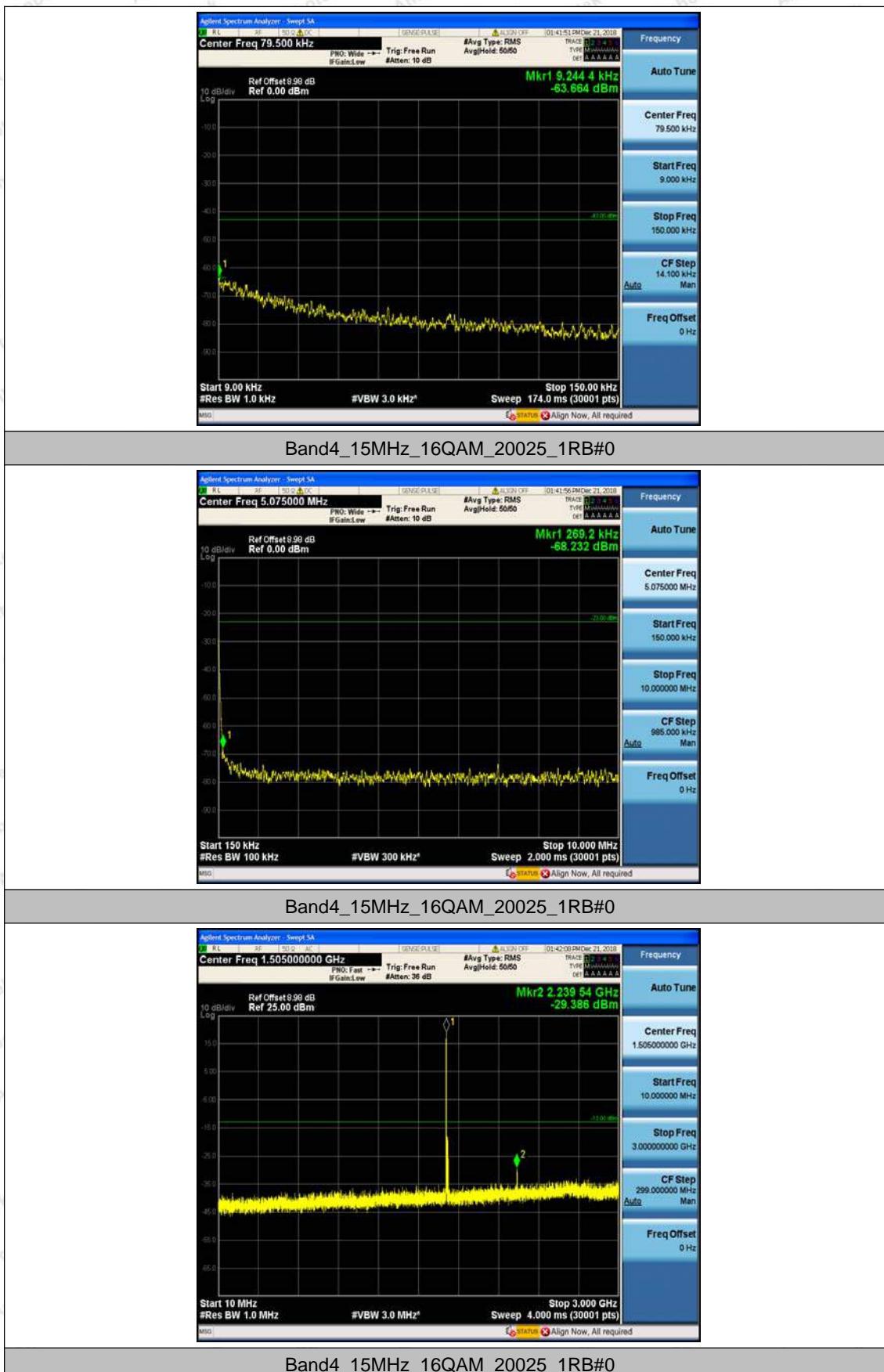
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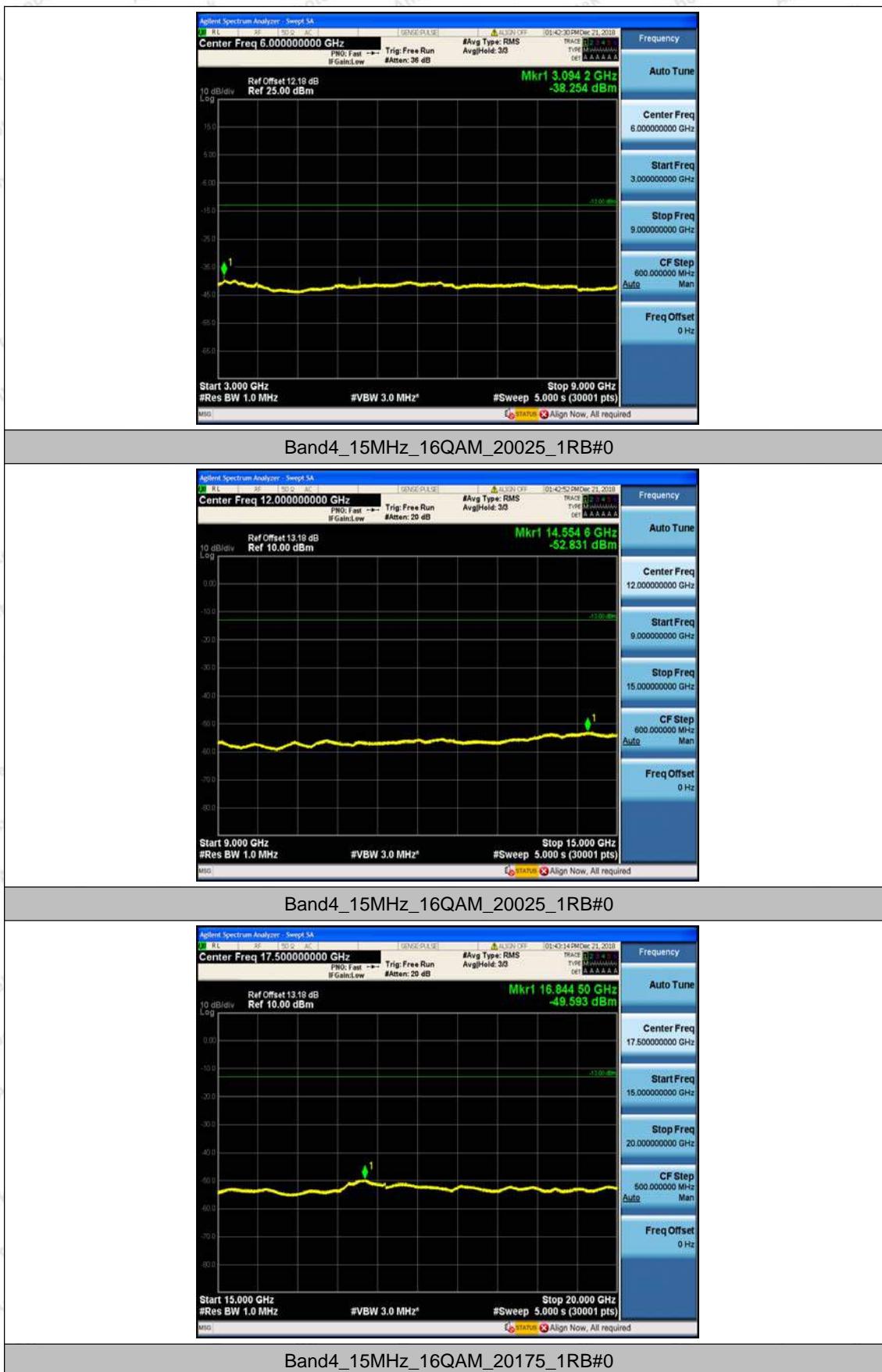


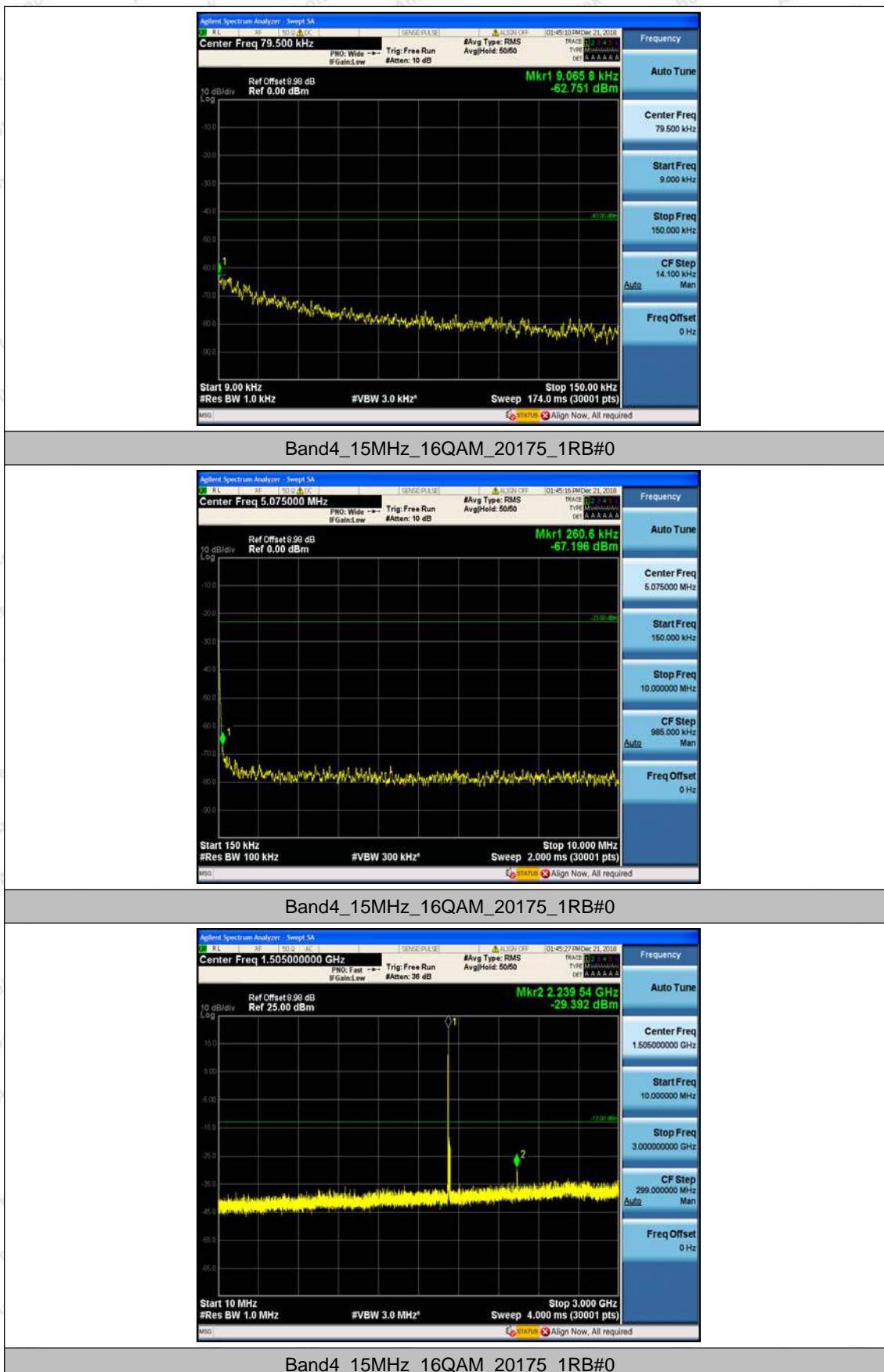
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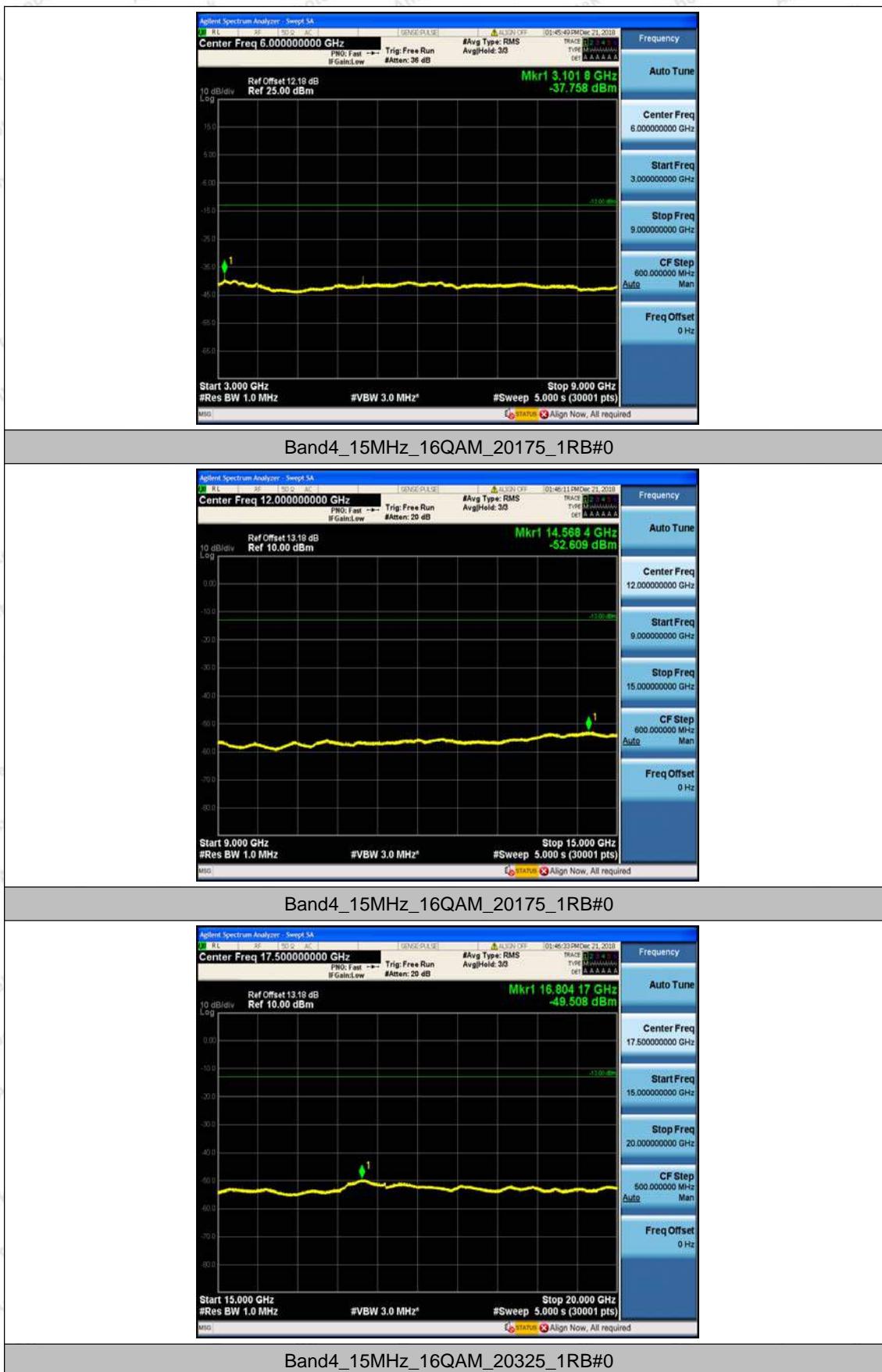


Band4_15MHz_16QAM_20025_1RB#0











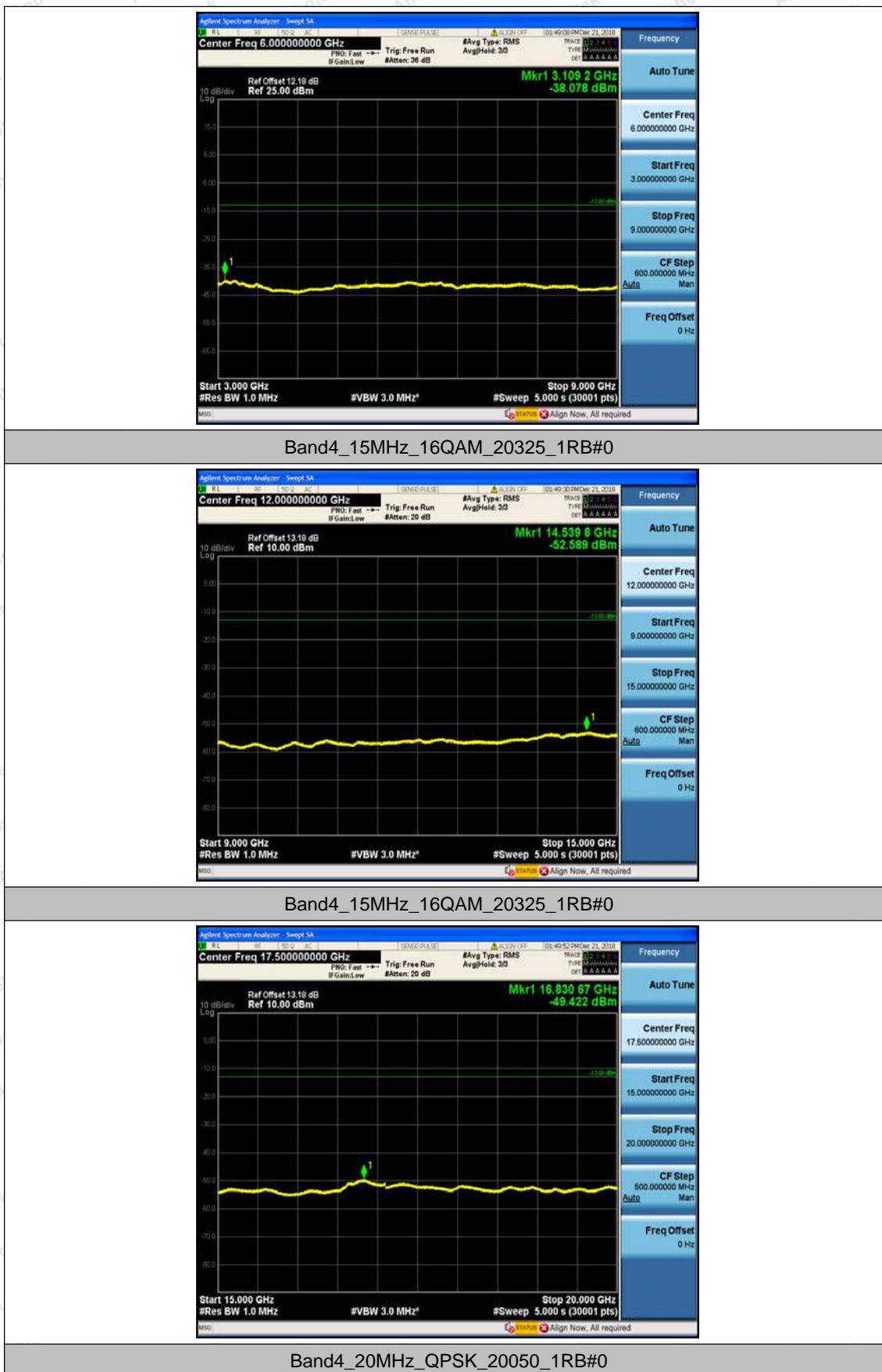
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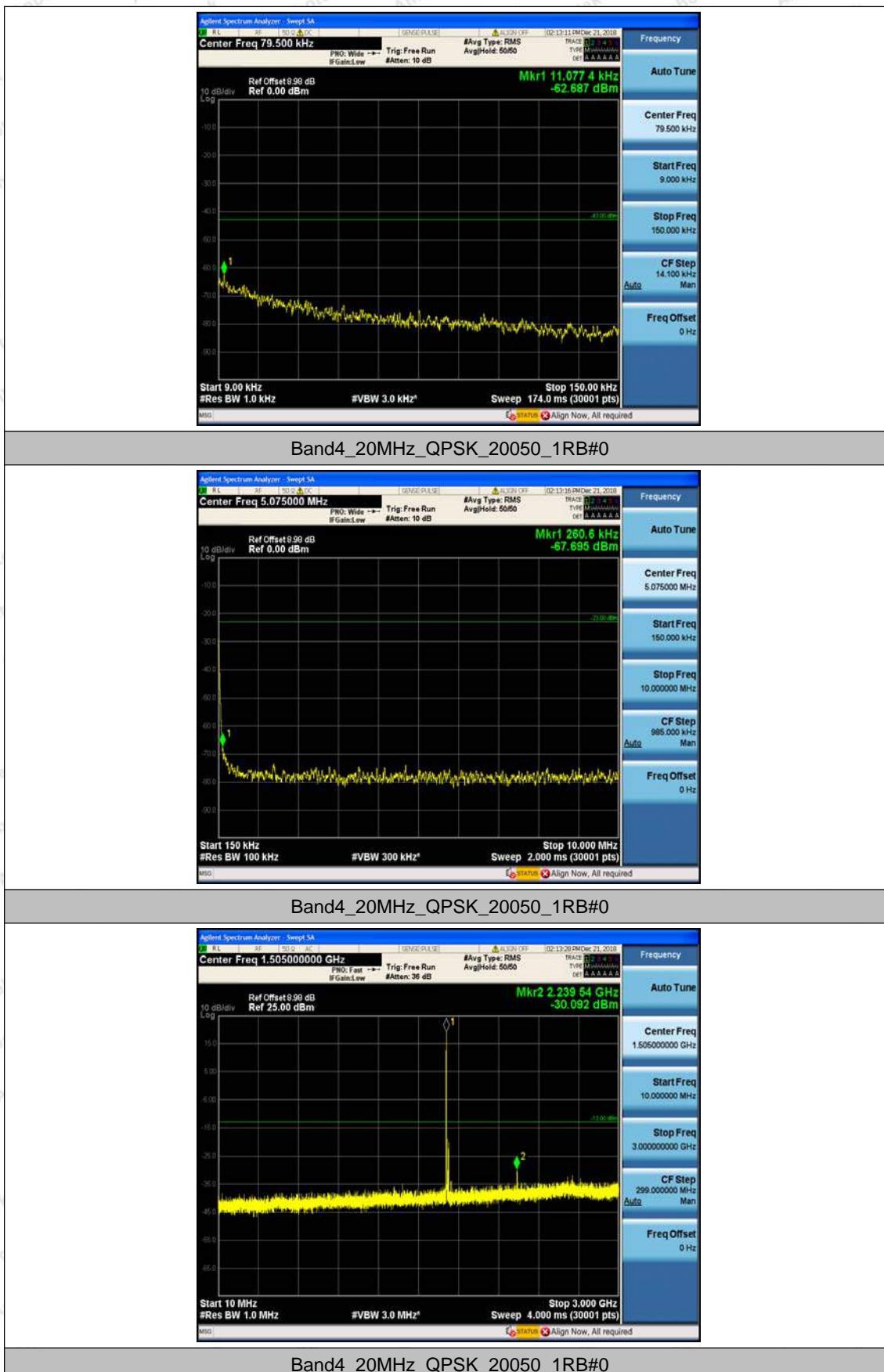


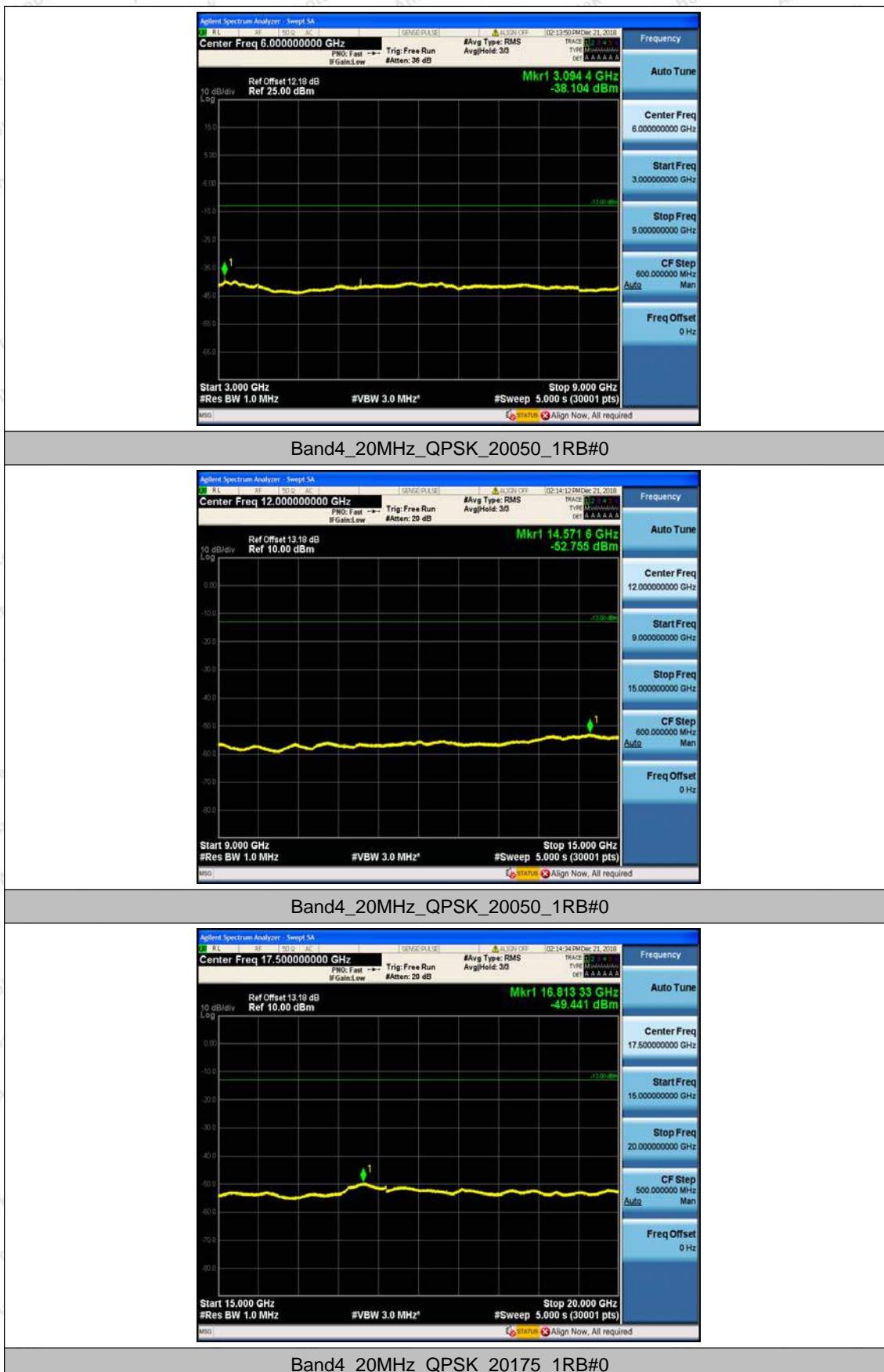
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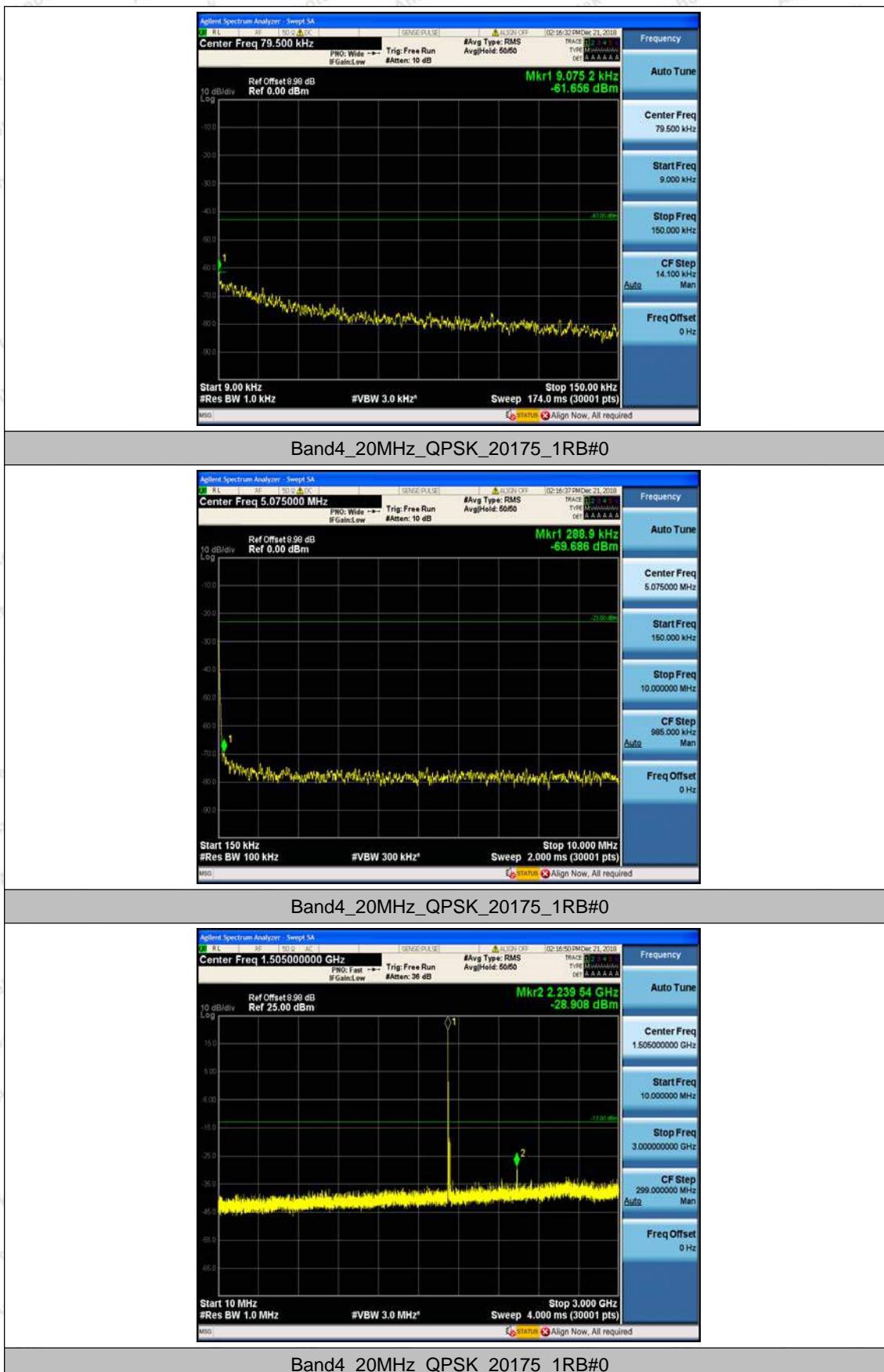


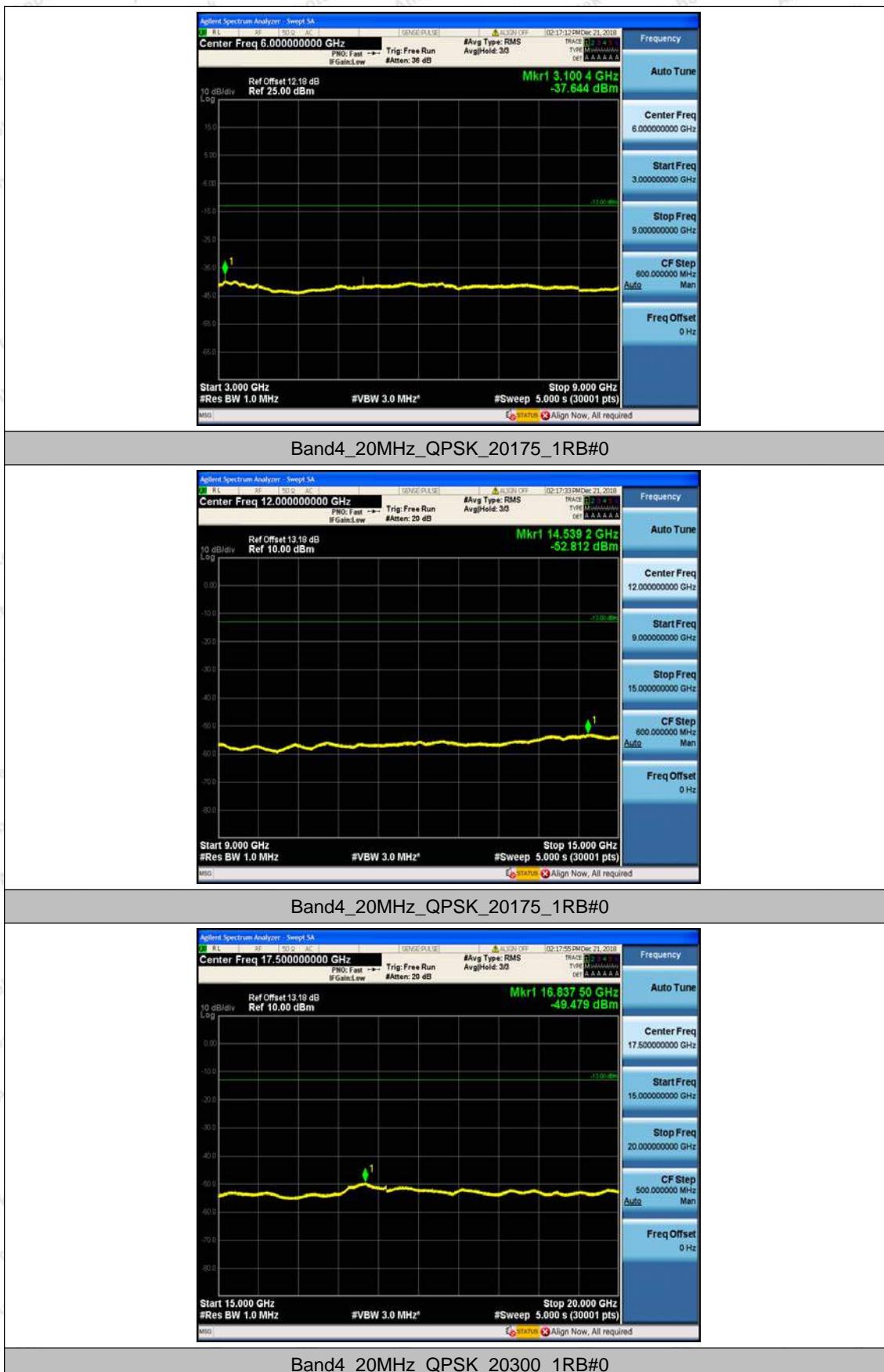
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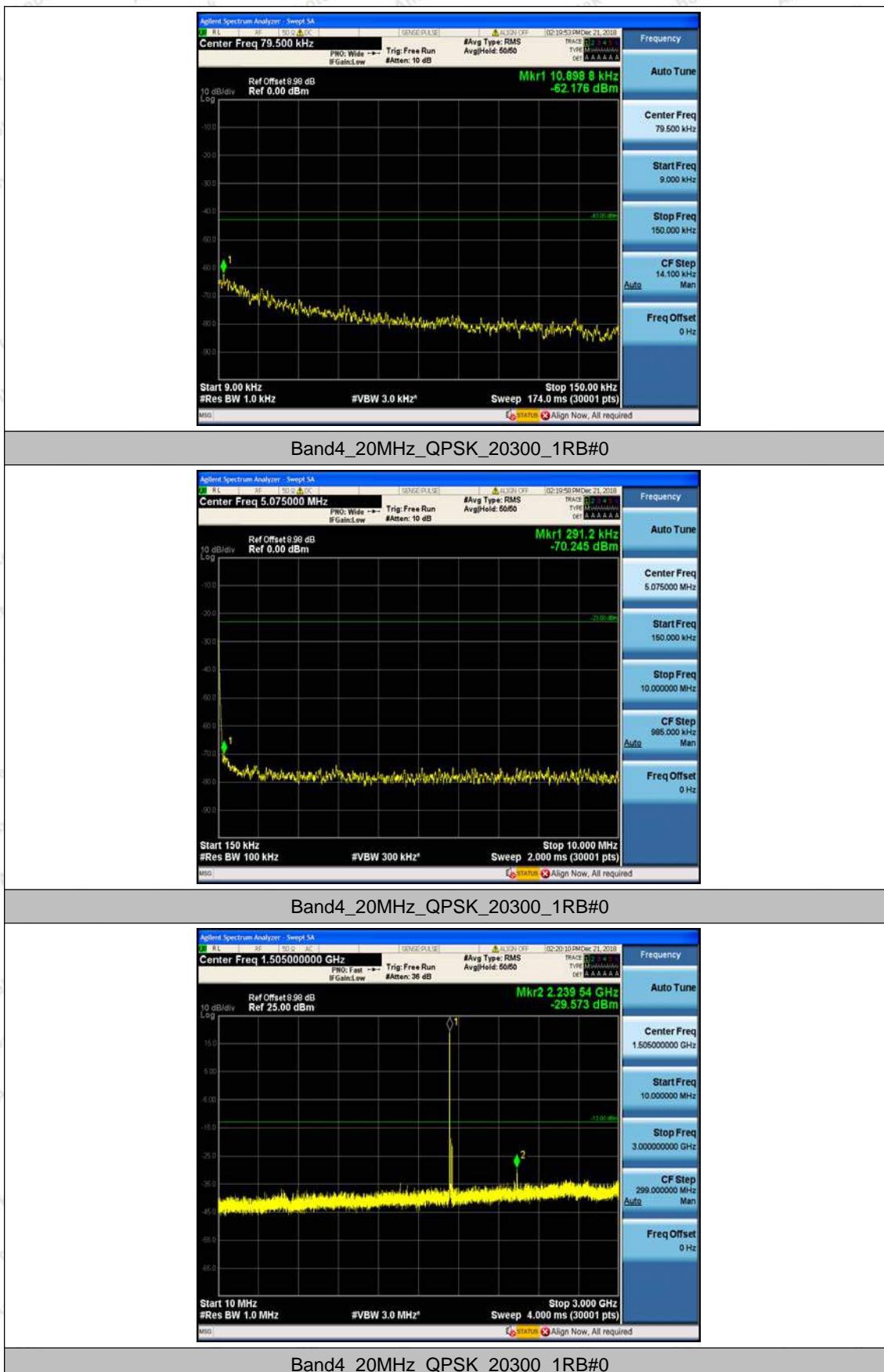


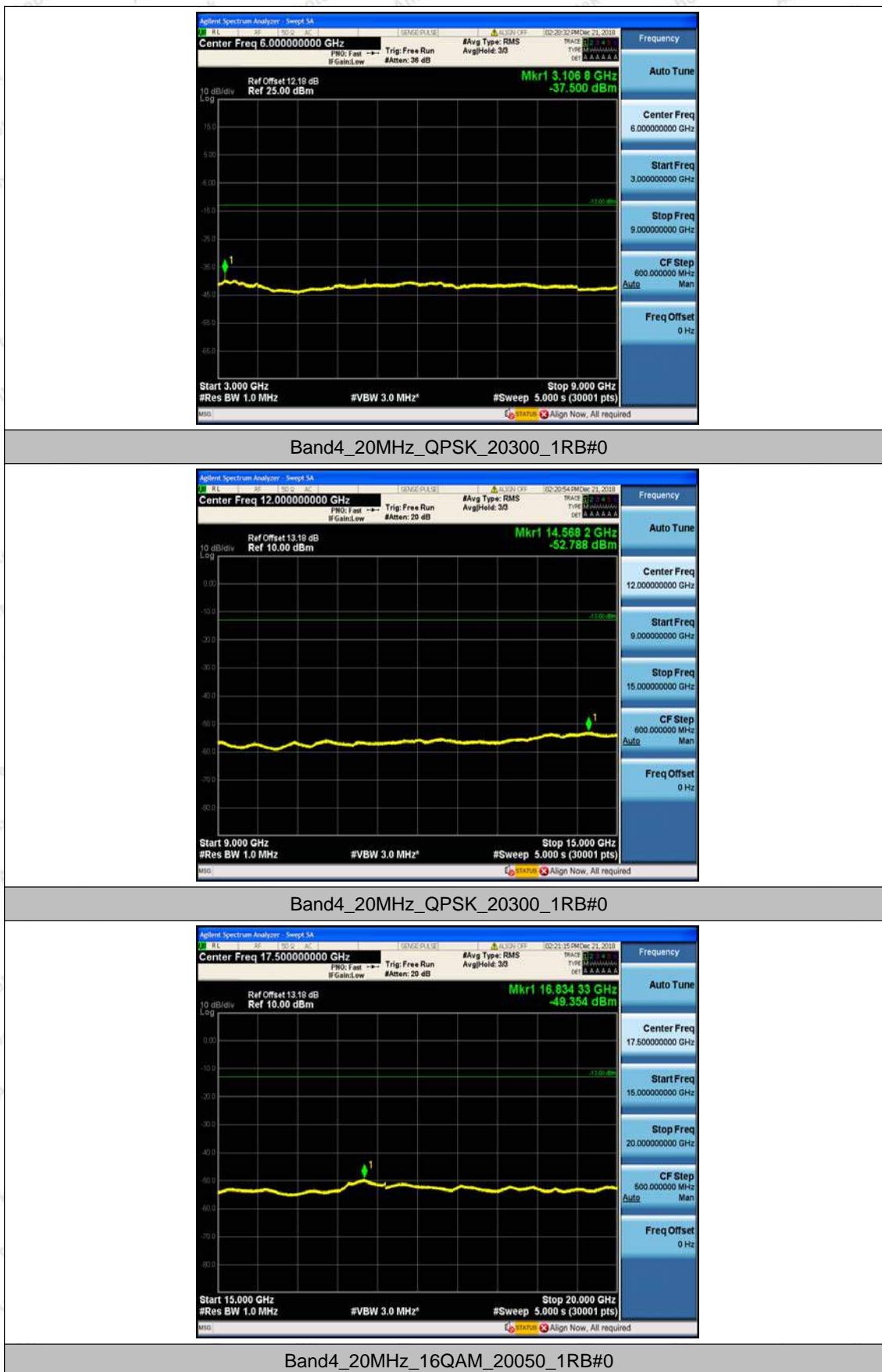


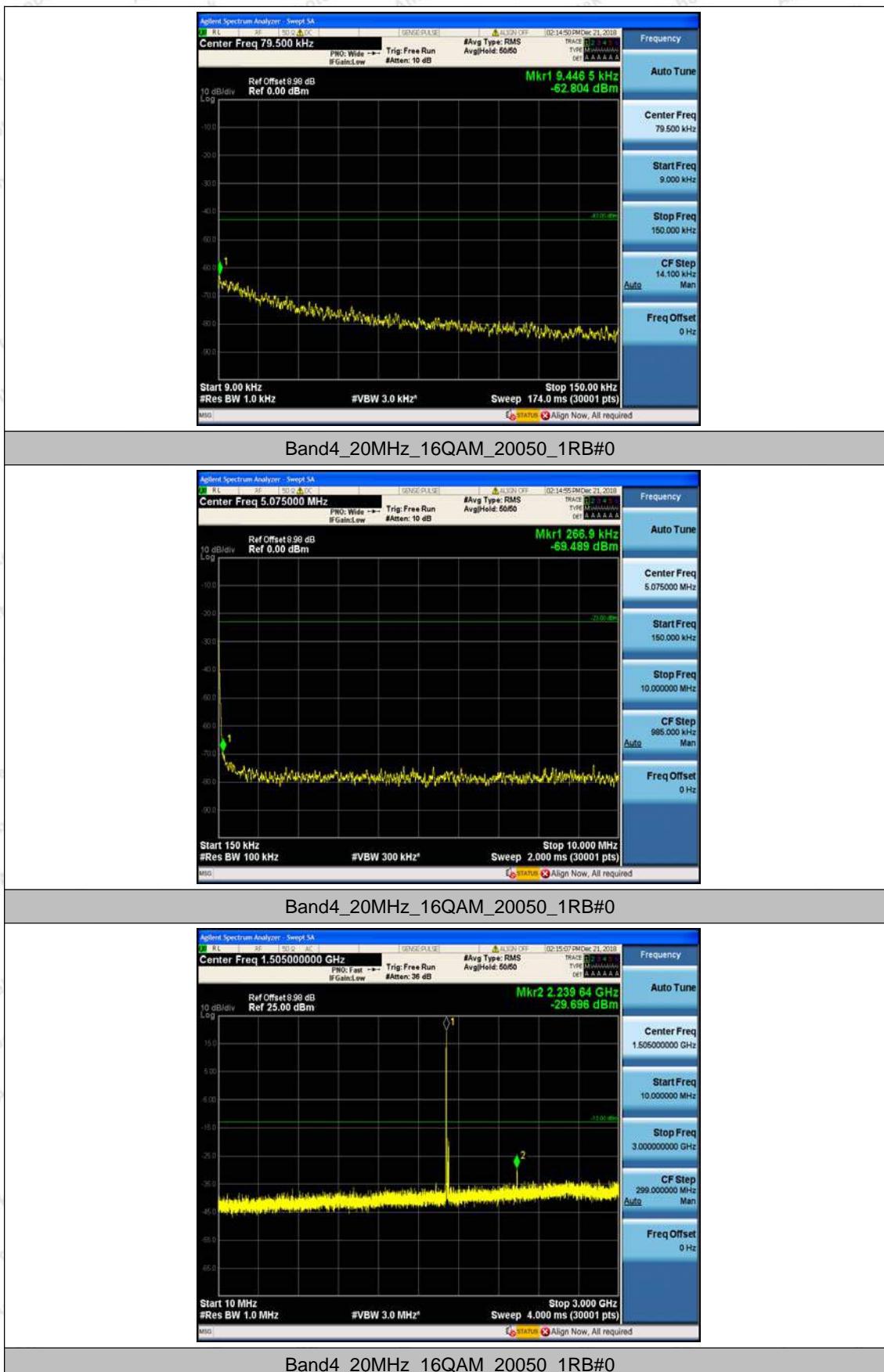


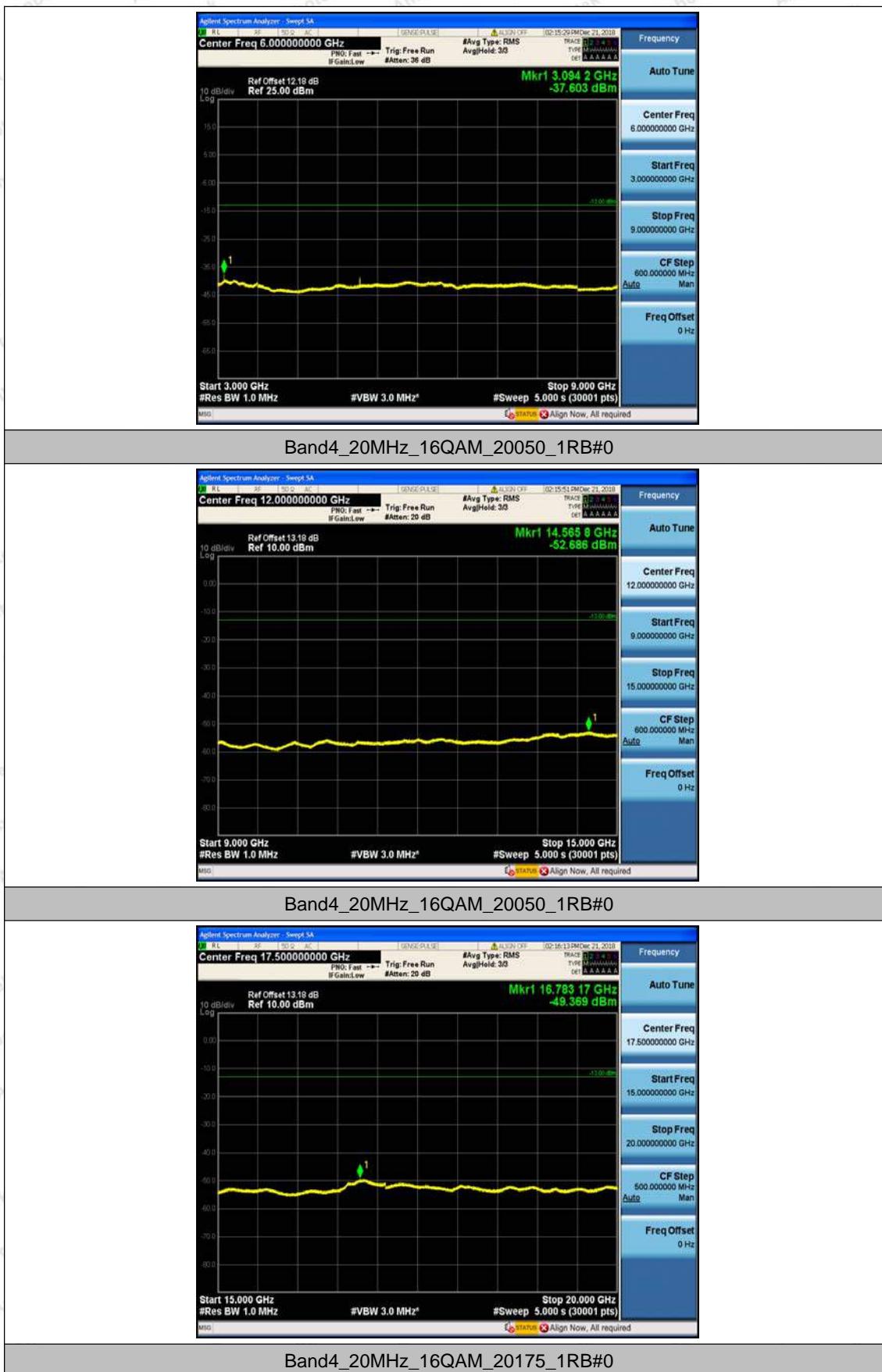


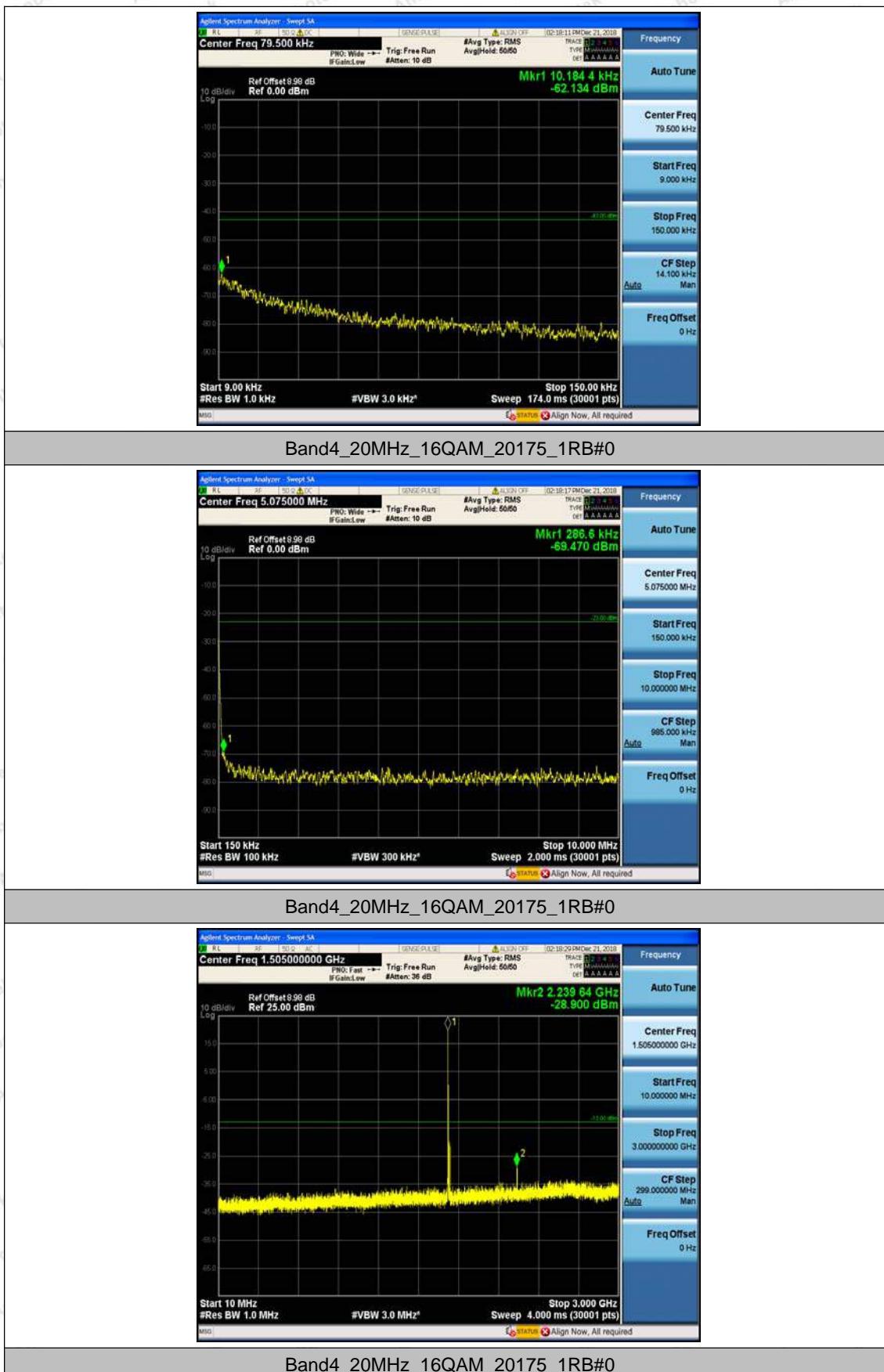


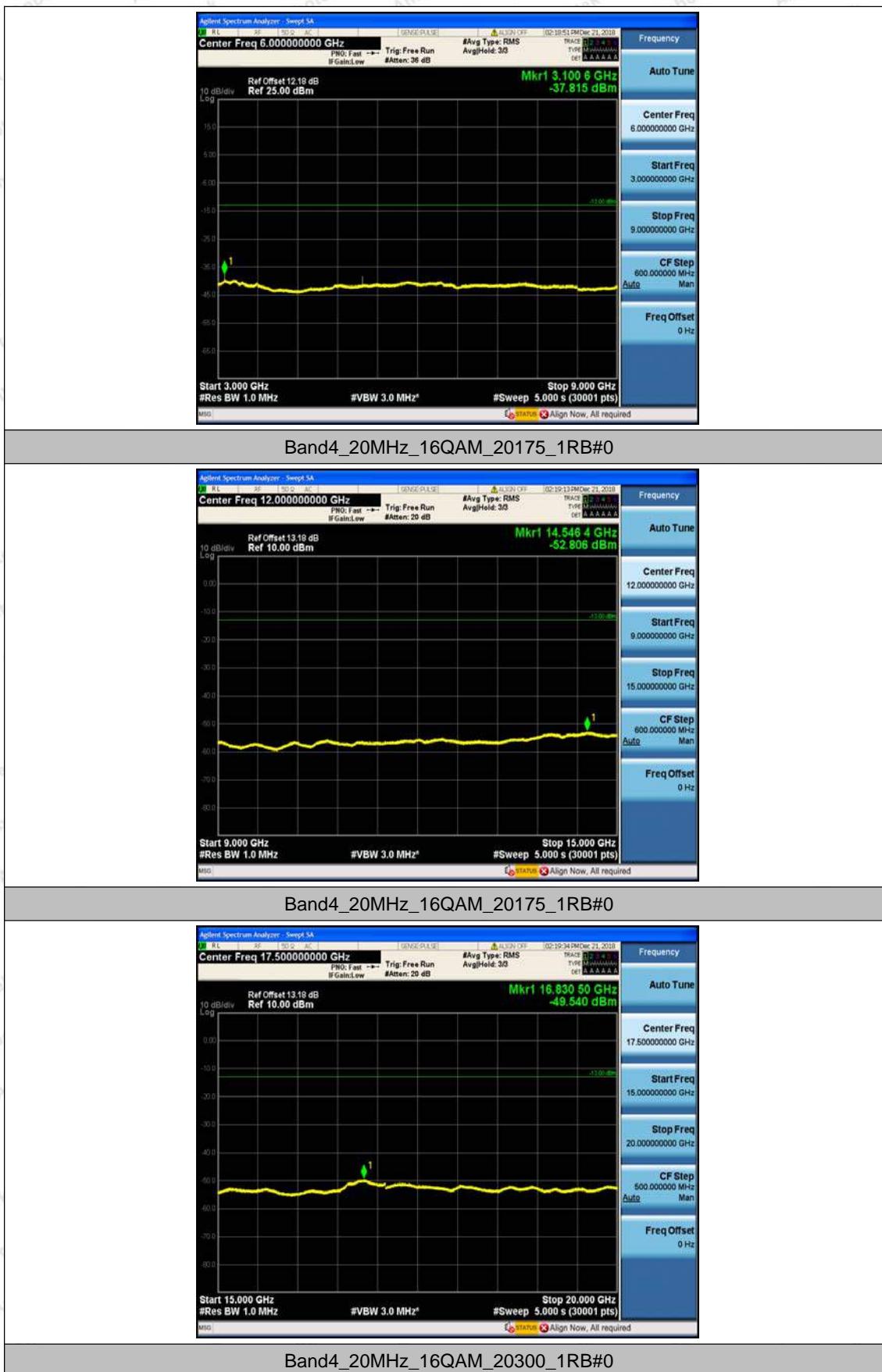


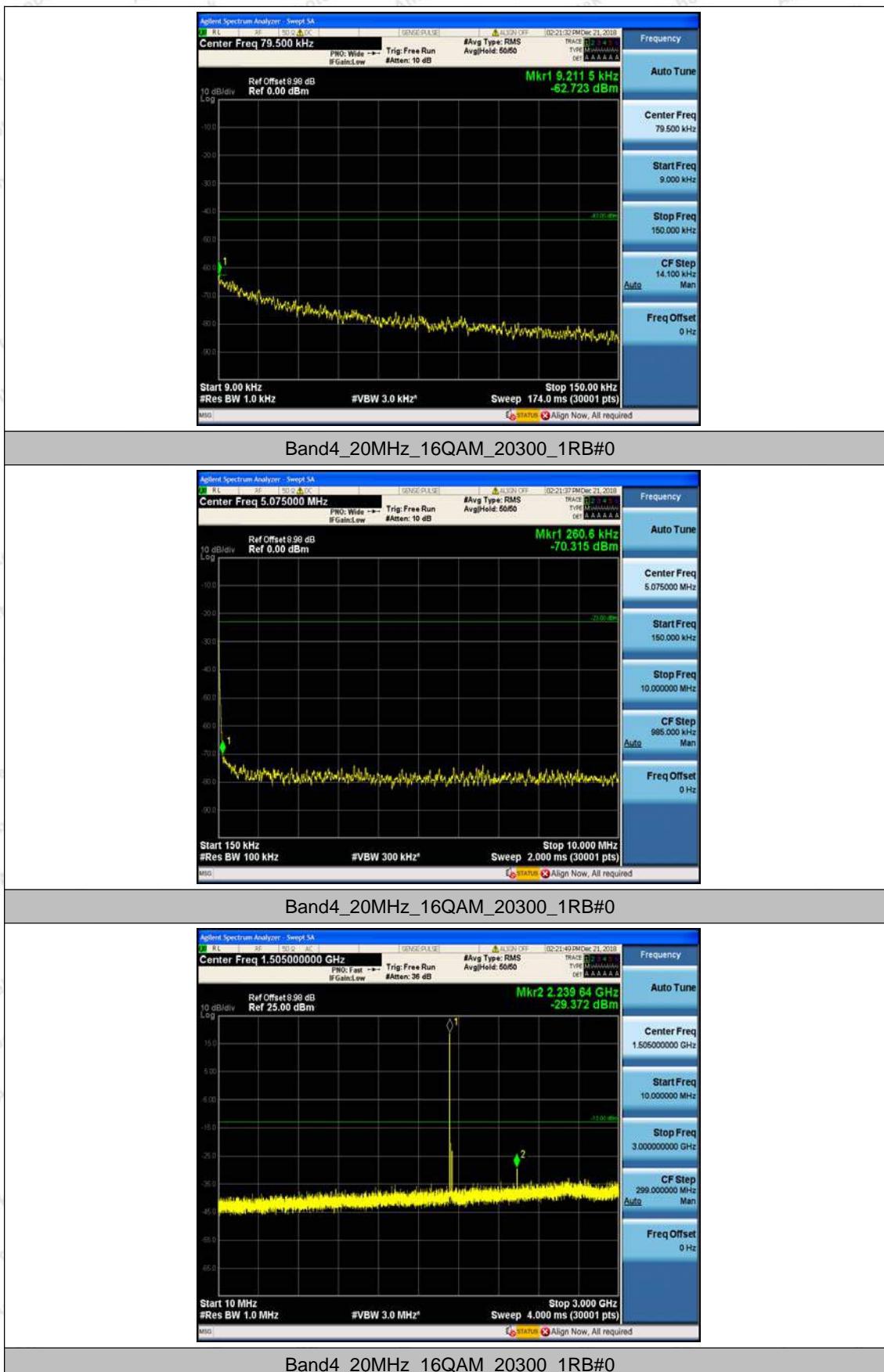


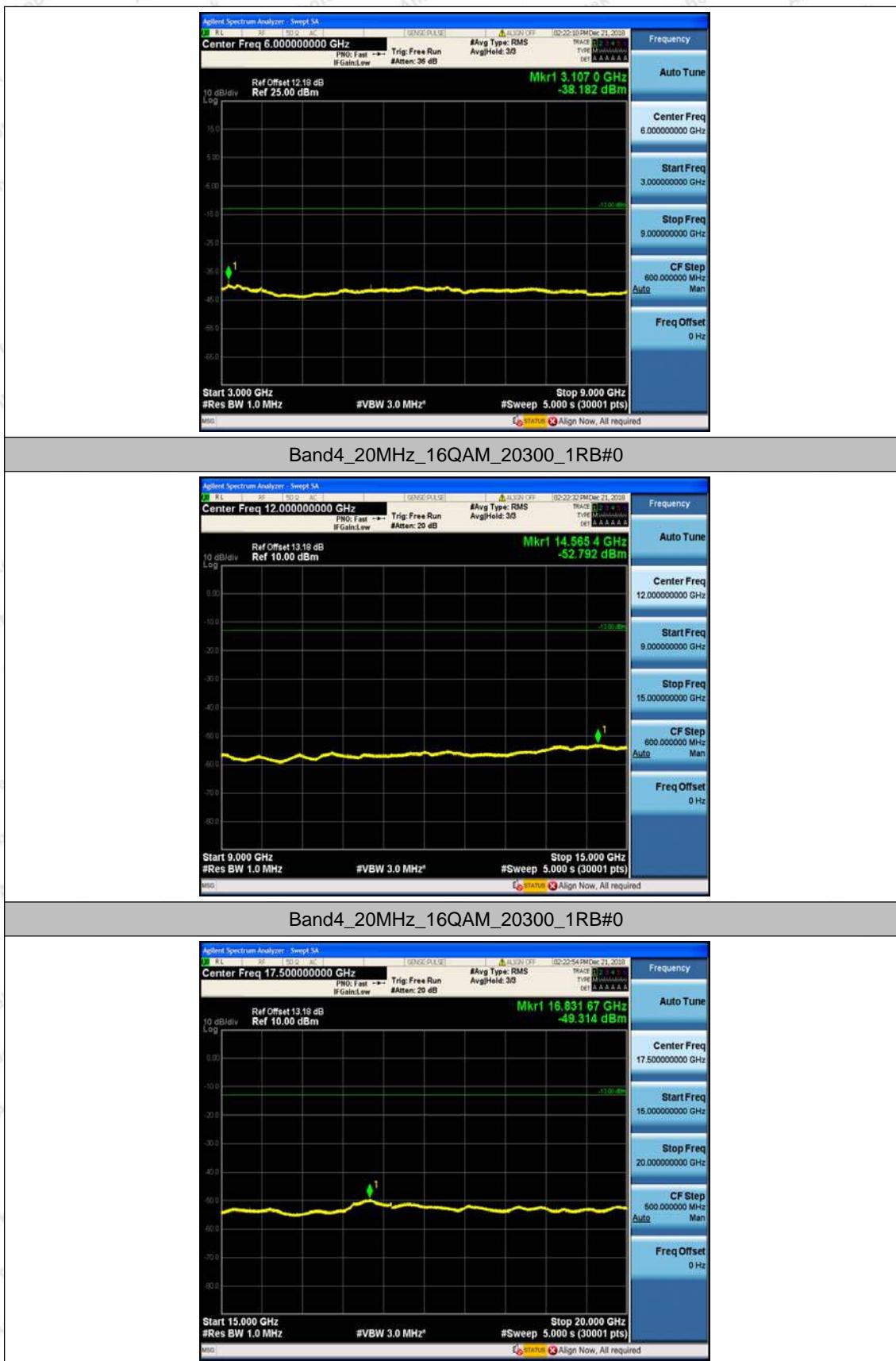










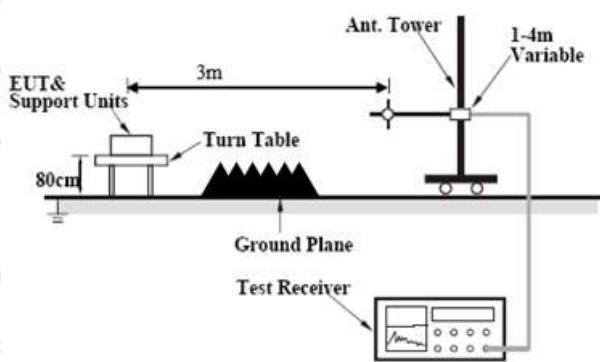


8. Spurious Radiated Emissions

8.1. Test Standard and Limit

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

8.2. Test Setup



8.3. Test Procedure

1. The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

3. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Sample Calculation:

EUT Field Strength = Raw Amplitude (dB μ V/m) – Amplifier Gain (dB) + Antenna Factor (dB) + Cable Loss (dB) + Filter Attenuation (dB, if used)

8.4. Test Data

Please to see the following pages

GSM 850,Middle Channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
278.8	-49.70	V	5.4	0.24	-44.54	-13	-31.54
278.8	-50.34	H	5.4	0.24	-45.18	-13	-32.18
1673.2	-49.13	V	7.95	0.78	-41.96	-13	-28.96
1673.2	-48.85	H	7.95	0.78	-41.68	-13	-28.68
2509.8	-43.58	V	9.89	2.39	-36.08	-13	-23.08
2509.8	-43.70	H	9.89	2.39	-36.20	-13	-23.20

PCS 1900 , Middle Channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
278.8	-50.19	V	5.4	0.24	-45.03	-13	-32.03
278.8	-49.25	H	5.4	0.24	-44.09	-13	-31.09
3760	-47.72	V	10.25	2.73	-40.20	-13	-27.20
3760	-48.12	H	10.25	2.73	-40.60	-13	-27.60

WCDMA Band V,Middle Channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
278.8	-50.02	V	5.4	0.24	-44.86	-13	-31.86
278.8	-49.91	H	5.4	0.24	-44.75	-13	-31.75
1673.2	-48.06	V	7.95	0.78	-40.89	-13	-27.89
1673.2	-48.70	H	7.95	0.78	-41.53	-13	-28.53
2509.8	-44.56	V	9.89	2.39	-37.06	-13	-24.06
2509.8	-44.59	H	9.89	2.39	-37.09	-13	-24.09

WCDMA Band II , Middle Channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
278.8	-50.58	V	5.4	0.24	-45.42	-13	-32.42
278.8	-50.13	H	5.4	0.24	-44.97	-13	-31.97
3760	-46.95	V	10.25	2.73	-39.43	-13	-26.43
3760	-48.62	H	10.25	2.73	-41.10	-13	-28.10

LTE Band II , Middle Channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
278.8	-55.65	V	5.4	0.24	-50.49	-13	-37.49
278.8	-50.20	H	5.4	0.24	-45.04	-13	-32.04
3760	-47.00	V	10.25	2.73	-39.48	-13	-26.48
3760	-43.22	H	10.25	2.73	-35.70	-13	-22.70

LTE Band IV , Middle Channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
278.8	-56.65	V	5.4	0.24	-51.49	-13	-38.49
278.8	-49.88	H	5.4	0.24	-44.72	-13	-31.72
3465	-46.23	V	10.09	2.52	-38.66	-13	-25.66
3465	-47.17	H	10.09	2.52	-39.60	-13	-26.60

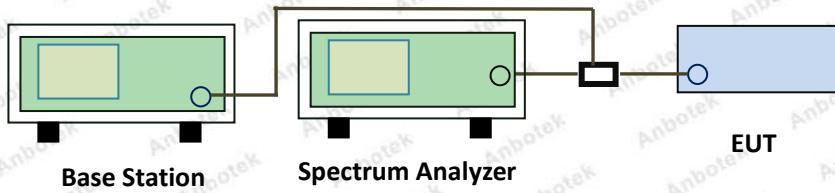
Note: The measurement have been performed for all mode, only report the worst case.

9. Band Edge Compliance

9.1. Test Standard and Limit

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB.

9.2. Test Setup



9.3. Test Procedure

1. The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.
2. For the bandedge: 2G: Set the RBW=5.1KHz, VBW = 10KHz, Sweep time= Auto

9.4. Test Data

Band	Channel	Value(dBm)	Limit(dBm)	Verdict
GSM850	128	-17.88	-13	PASS
GSM850	251	-17.93	-13	PASS
GPRS850	128	-17.67	-13	PASS
GPRS850	251	-17.58	-13	PASS
GSM1900	512	-22.41	-13	PASS
GSM1900	810	-22.32	-13	PASS
GPRS1900	512	-23.44	-13	PASS
GPRS1900	810	-22.58	-13	PASS

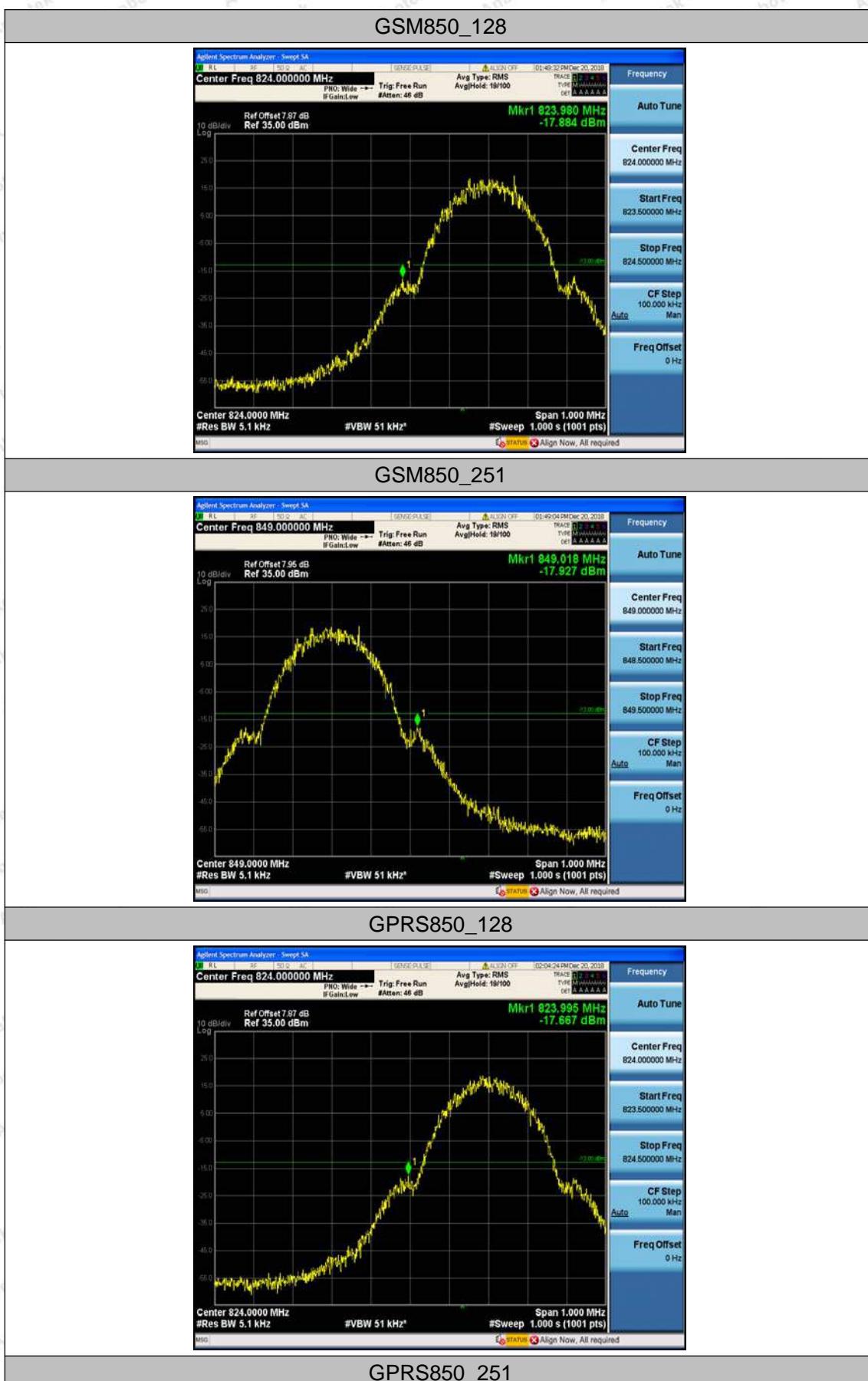
Band Edge only reflects the worst mode WCDMA data emissions.

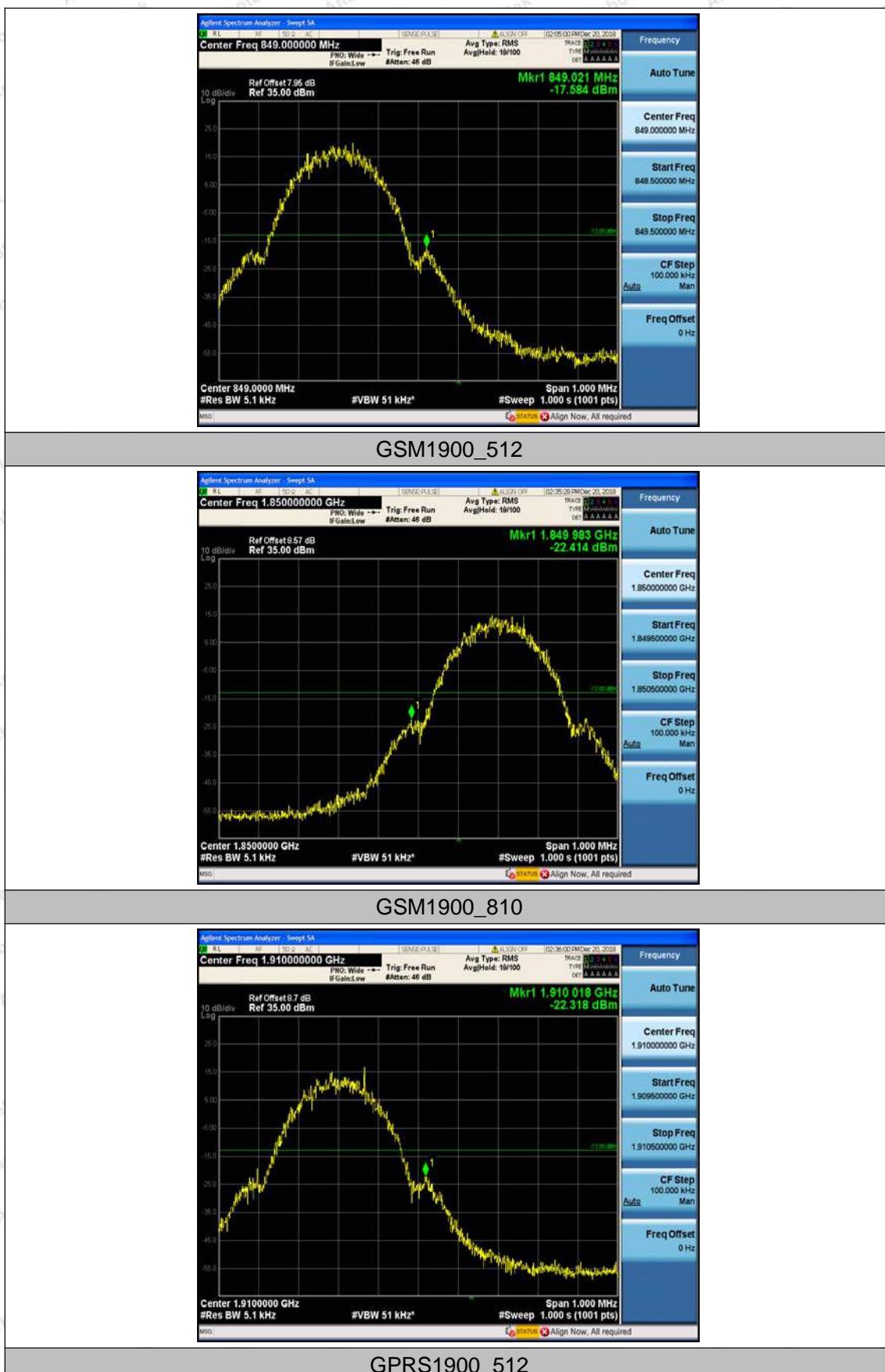
Band	Channel	Value(dBm)	Limit(dBm)	Verdict
Band II	9262	-24.55	-13	PASS
Band II	9538	-21.21	-13	PASS
Band V	4132	-27.55	-13	PASS
Band V	4233	-25.51	-13	PASS

Band	Bandwidth	Modulation	Channel	RB Configuration	Result(dBm)	Verdict
Band2	1.4MHz	QPSK	18607	6RB#0	-14.34	PASS
Band2	1.4MHz	QPSK	19193	6RB#0	-16.90	PASS
Band2	1.4MHz	16QAM	18607	6RB#0	-13.41	PASS
Band2	1.4MHz	16QAM	19193	6RB#0	-18.91	PASS
Band2	3MHz	QPSK	18615	15RB#0	-17.13	PASS
Band2	3MHz	QPSK	19185	15RB#0	-19.96	PASS
Band2	3MHz	16QAM	18615	15RB#0	-17.29	PASS
Band2	3MHz	16QAM	19185	15RB#0	-20.25	PASS
Band2	5MHz	QPSK	18625	25RB#0	-18.93	PASS
Band2	5MHz	QPSK	19175	25RB#0	-21.52	PASS
Band2	5MHz	16QAM	18625	25RB#0	-20.42	PASS
Band2	5MHz	16QAM	19175	25RB#0	-23.57	PASS
Band2	10MHz	QPSK	18650	50RB#0	-22.25	PASS
Band2	10MHz	QPSK	19150	50RB#0	-26.99	PASS
Band2	10MHz	16QAM	18650	50RB#0	-22.99	PASS
Band2	10MHz	16QAM	19150	50RB#0	-26.63	PASS
Band2	15MHz	QPSK	18675	75RB#0	-27.18	PASS
Band2	15MHz	QPSK	19125	75RB#0	-30.59	PASS
Band2	15MHz	16QAM	18675	75RB#0	-26.32	PASS
Band2	15MHz	16QAM	19125	75RB#0	-31.22	PASS
Band2	20MHz	QPSK	18700	100RB#0	-29.71	PASS
Band2	20MHz	QPSK	19100	100RB#0	-29.98	PASS
Band2	20MHz	16QAM	18700	100RB#0	-28.74	PASS
Band2	20MHz	16QAM	19100	100RB#0	-29.32	PASS
Band4	1.4MHz	QPSK	19957	6RB#0	-13.90	PASS
Band4	1.4MHz	QPSK	20393	6RB#0	-17.58	PASS
Band4	1.4MHz	16QAM	19957	6RB#0	-15.11	PASS
Band4	1.4MHz	16QAM	20393	6RB#0	-19.79	PASS
Band4	3MHz	QPSK	19965	15RB#0	-16.42	PASS
Band4	3MHz	QPSK	20385	15RB#0	-19.15	PASS
Band4	3MHz	16QAM	19965	15RB#0	-17.55	PASS
Band4	3MHz	16QAM	20385	15RB#0	-21.39	PASS
Band4	5MHz	QPSK	19975	25RB#0	-26.67	PASS
Band4	5MHz	QPSK	20375	25RB#0	-30.15	PASS
Band4	5MHz	16QAM	19975	25RB#0	-28.77	PASS
Band4	5MHz	16QAM	20375	25RB#0	-29.93	PASS
Band4	10MHz	QPSK	20000	50RB#0	-29.47	PASS
Band4	10MHz	QPSK	20350	50RB#0	-33.14	PASS
Band4	10MHz	16QAM	20000	50RB#0	-31.60	PASS
Band4	10MHz	16QAM	20350	50RB#0	-35.85	PASS
Band4	15MHz	QPSK	20025	75RB#0	-32.05	PASS
Band4	15MHz	QPSK	20325	75RB#0	-35.61	PASS

Band4	15MHz	16QAM	20025	75RB#0	-34.02	PASS
Band4	15MHz	16QAM	20325	75RB#0	-38.72	PASS
Band4	20MHz	QPSK	20050	100RB#0	-38.95	PASS
Band4	20MHz	QPSK	20300	100RB#0	-38.63	PASS
Band4	20MHz	16QAM	20050	100RB#0	-40.31	PASS
Band4	20MHz	16QAM	20300	100RB#0	-40.15	PASS

Test Plots



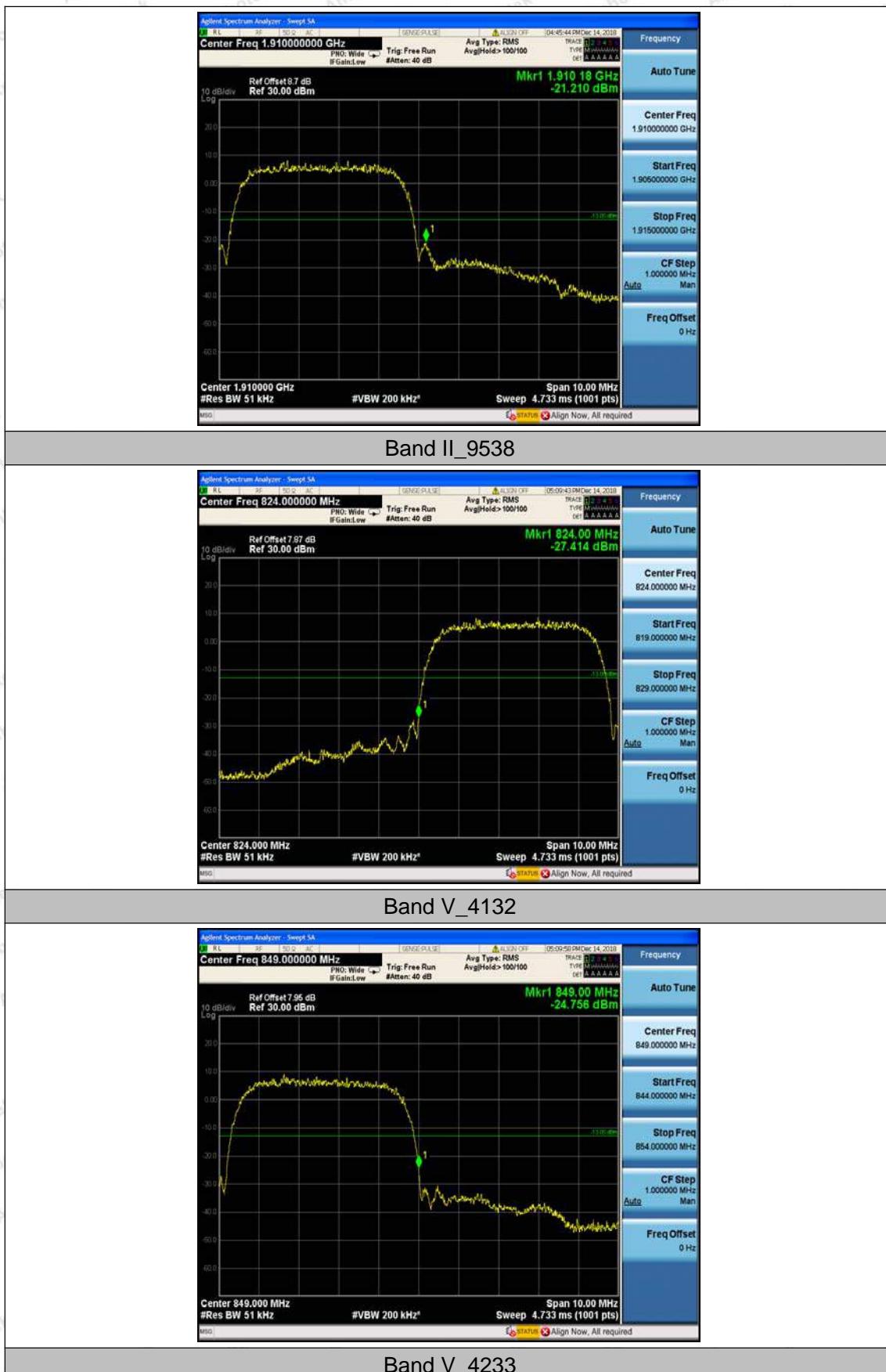


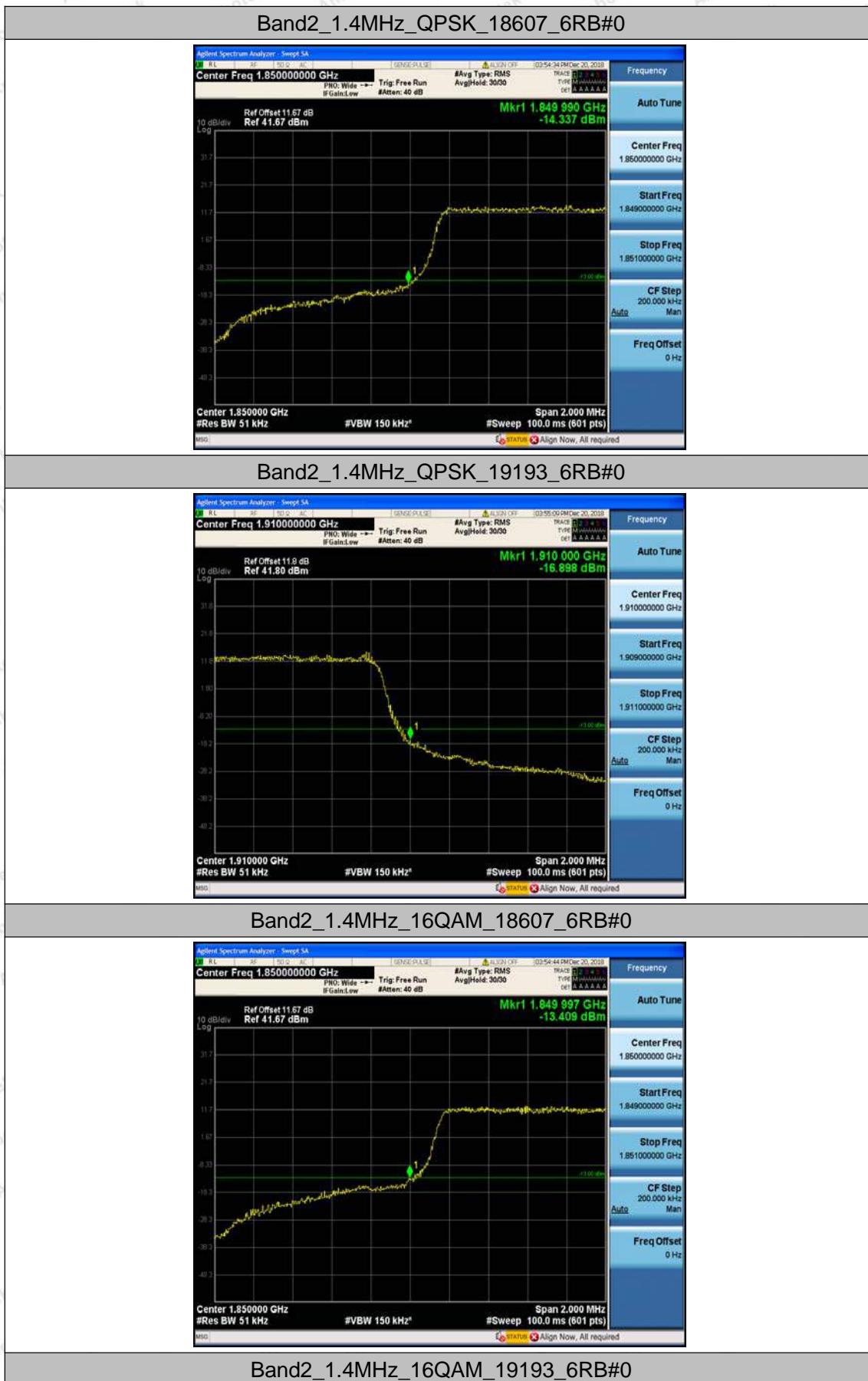


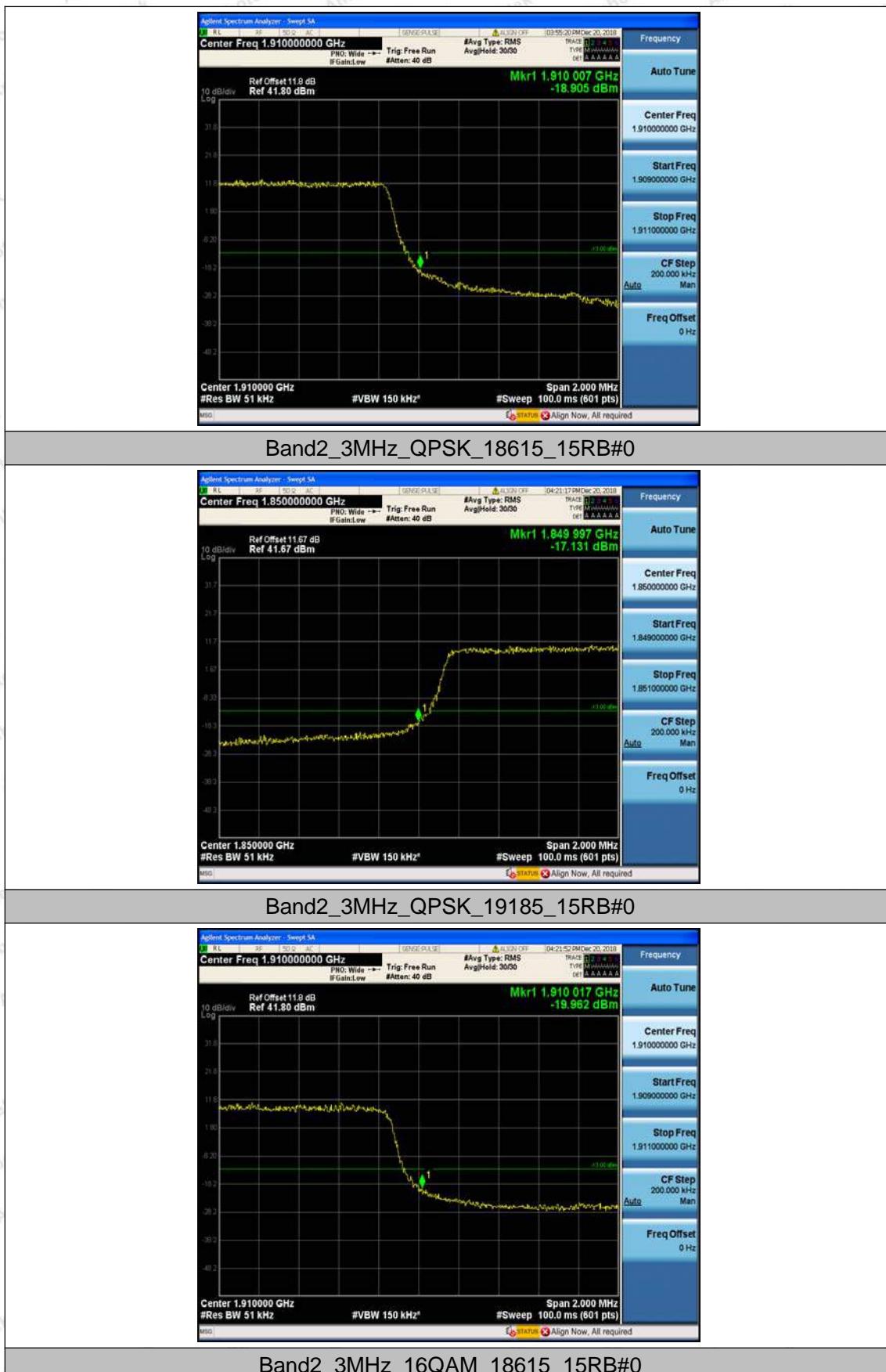
GPRS1900_810

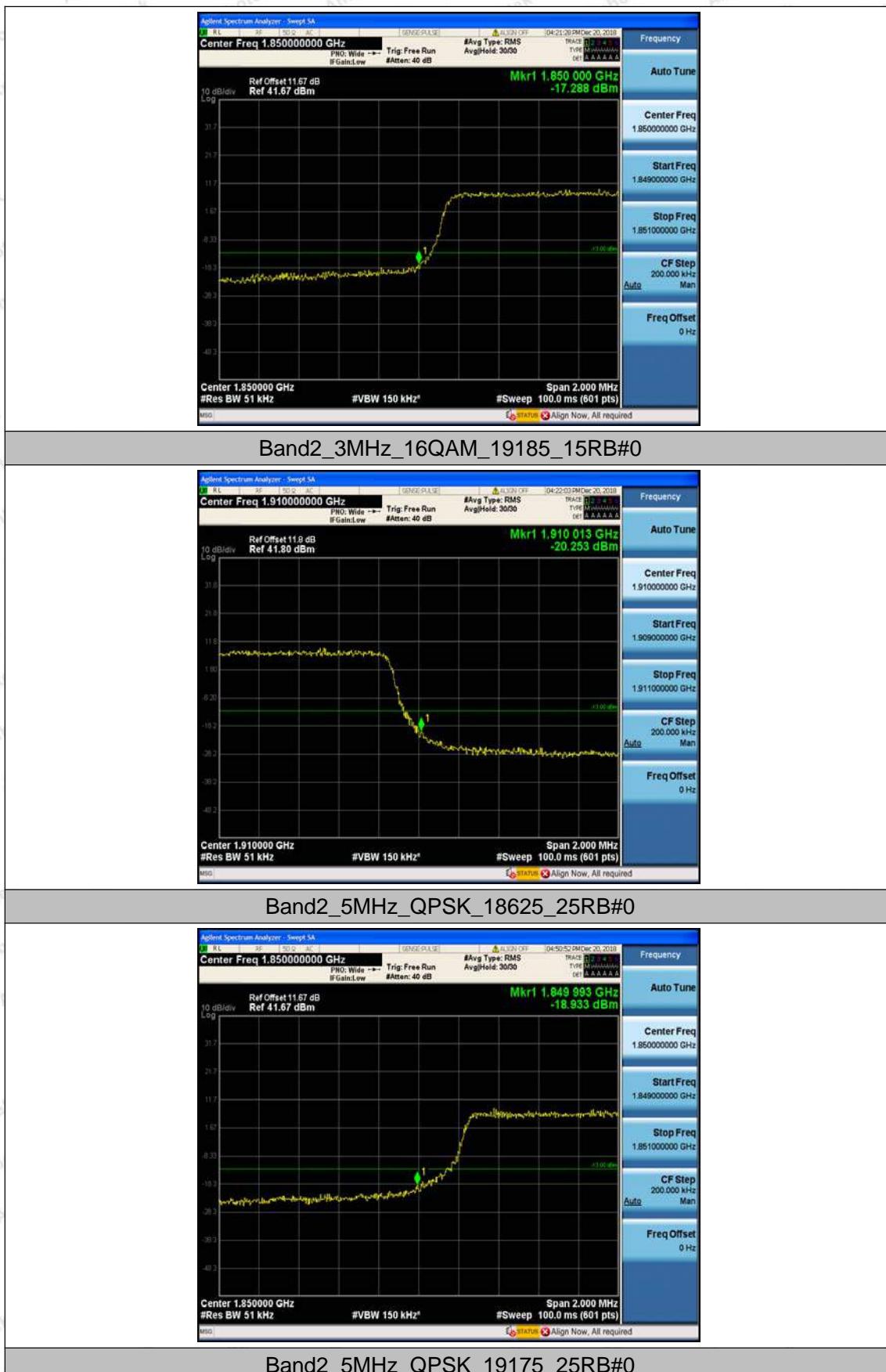


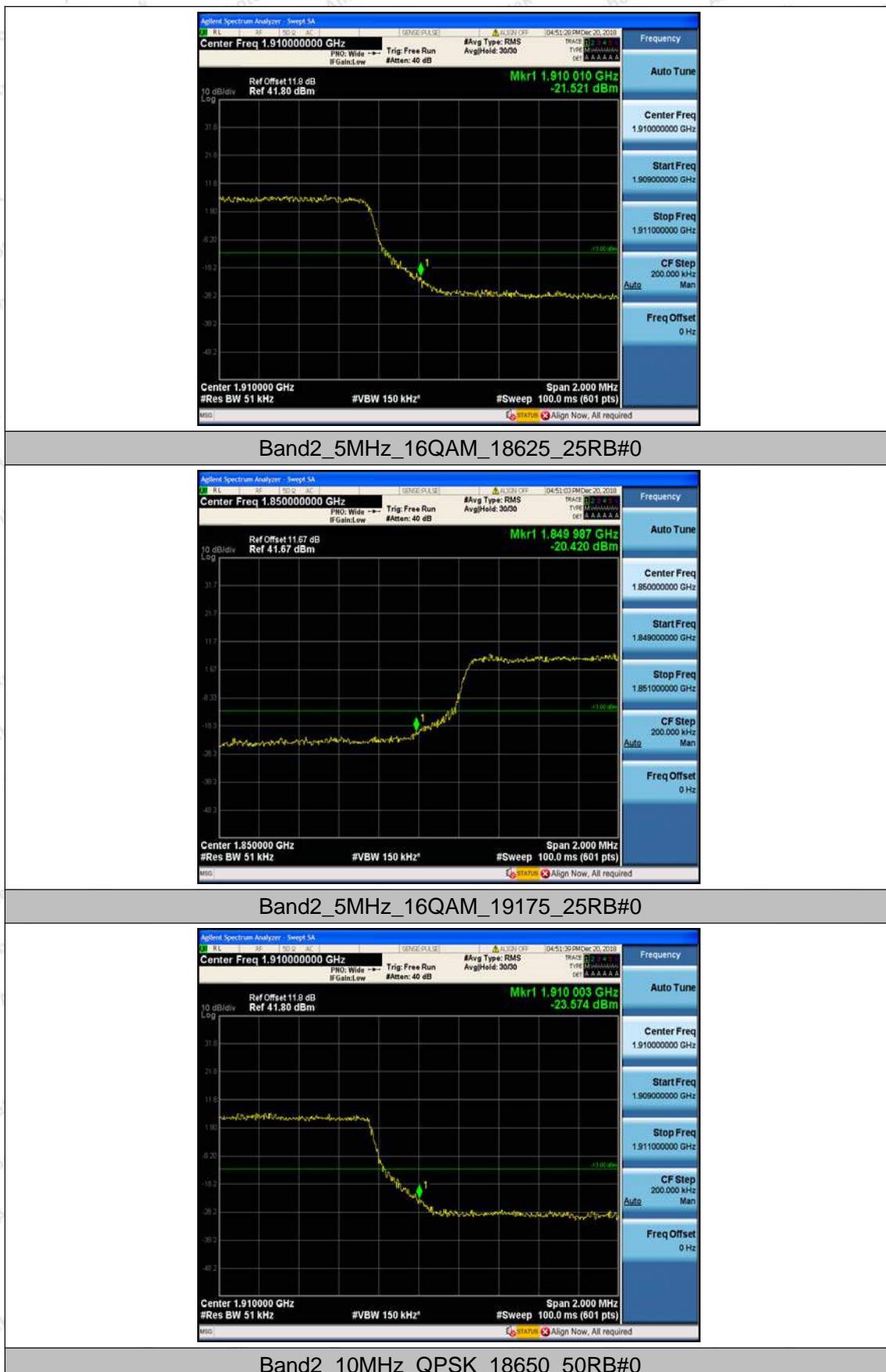
Band II_9262

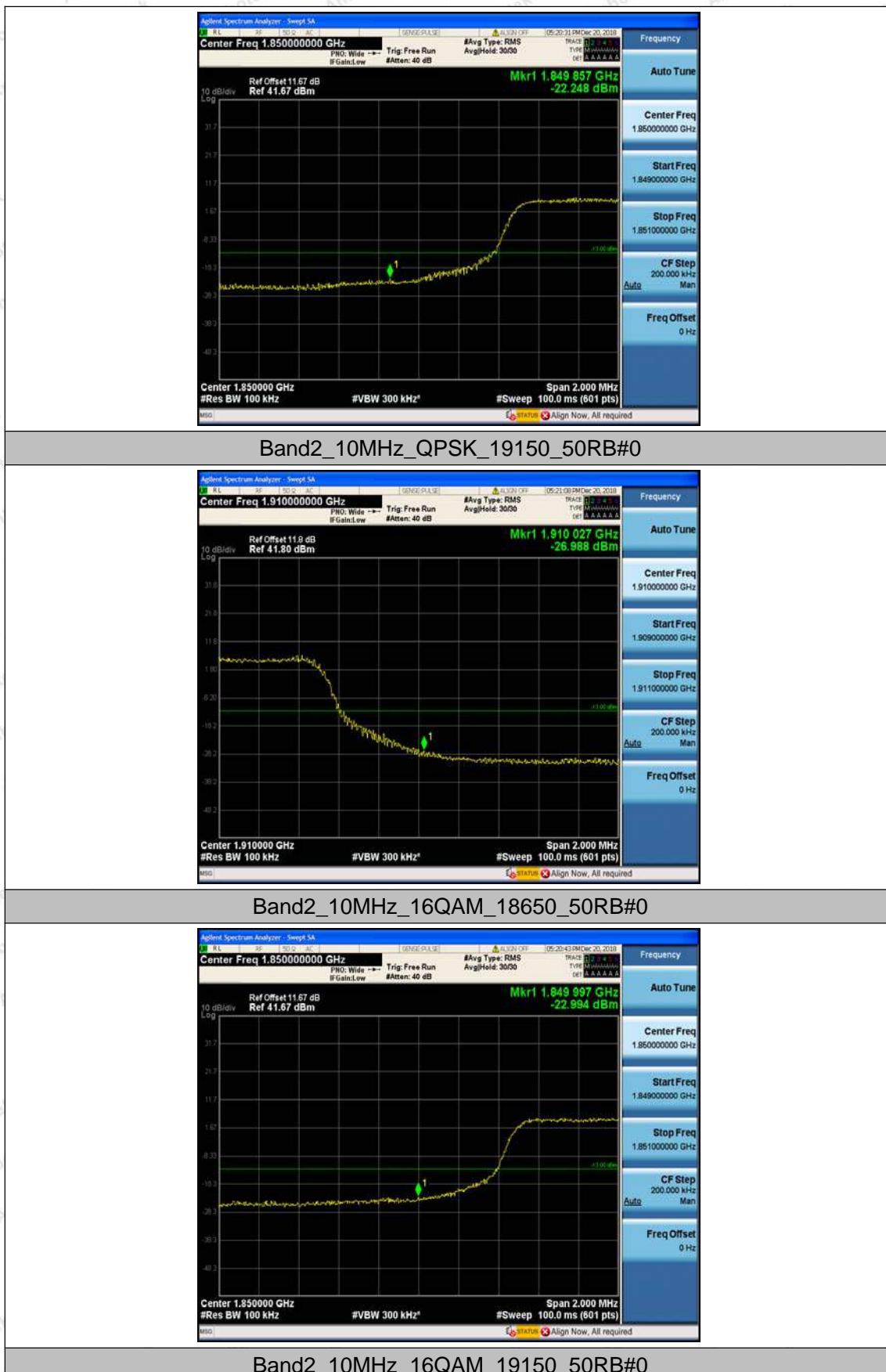


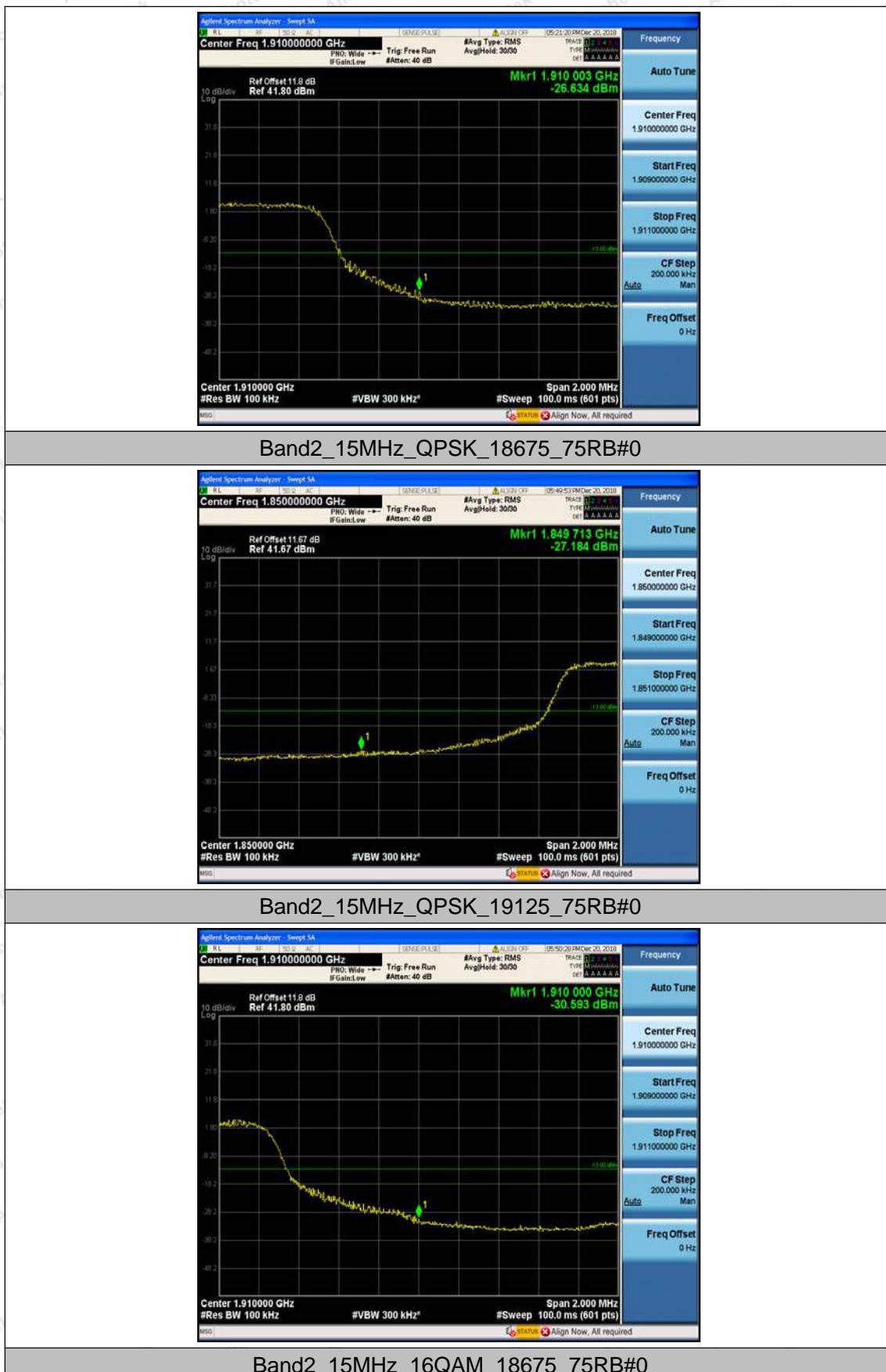


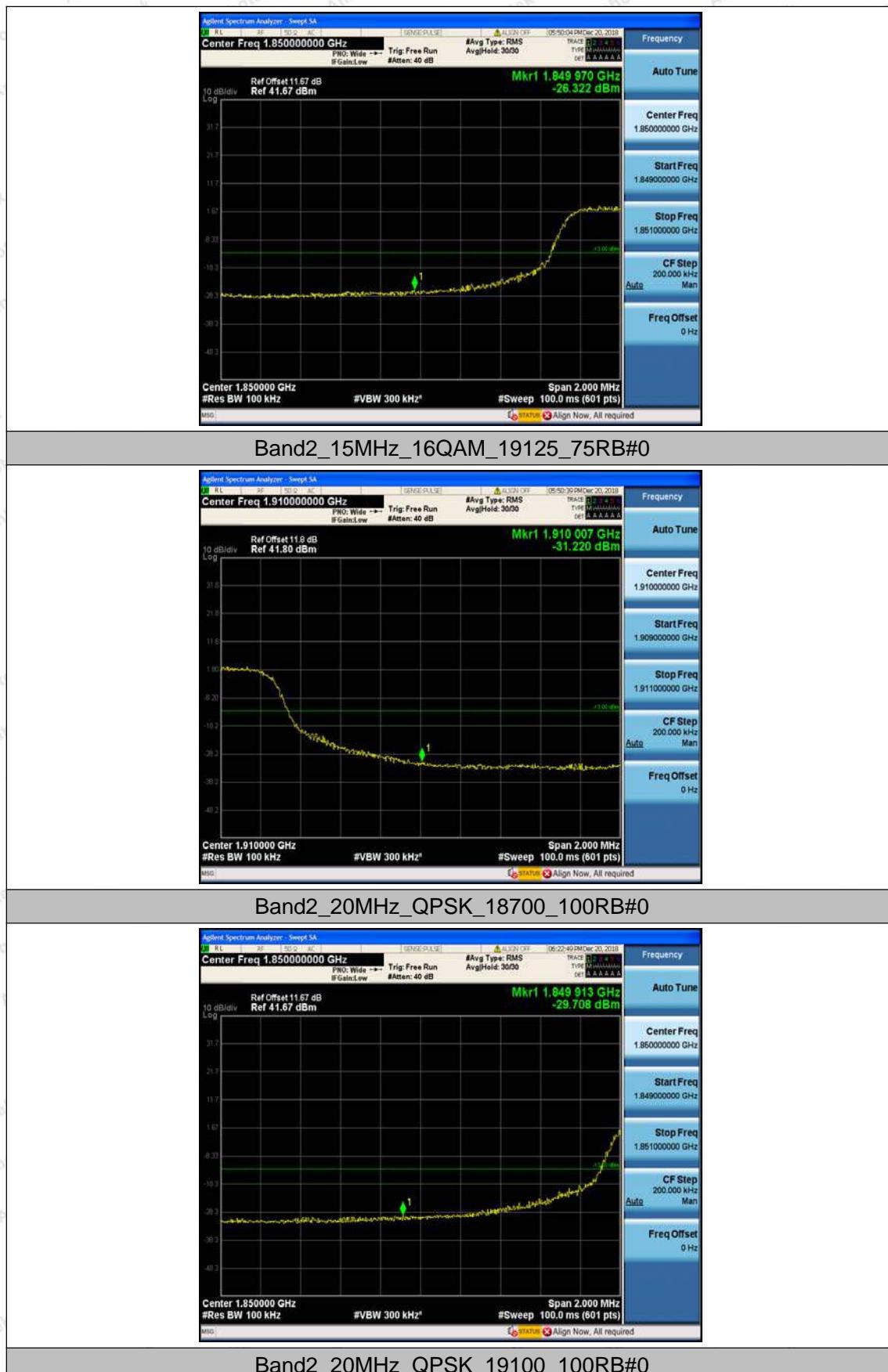


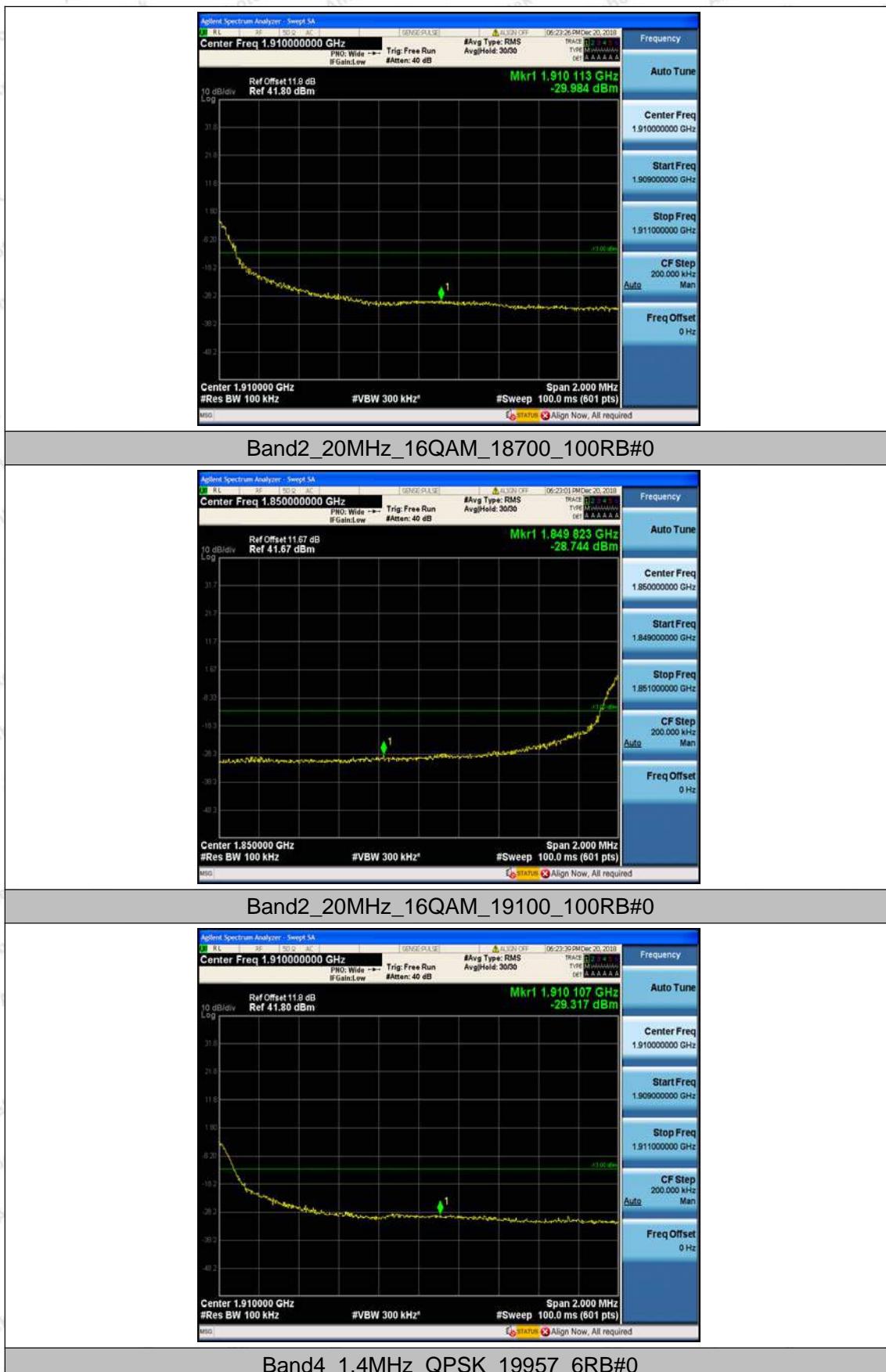


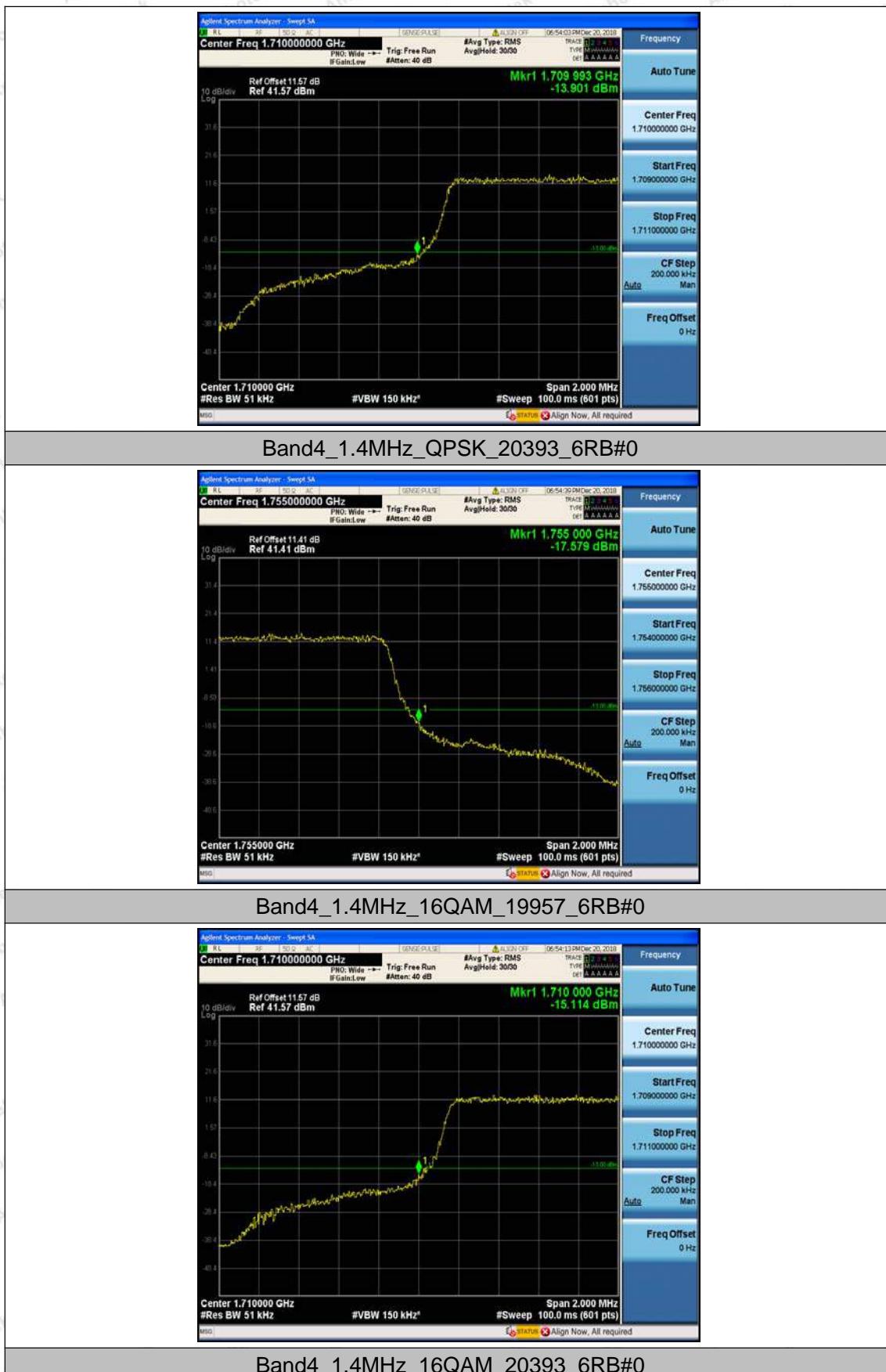


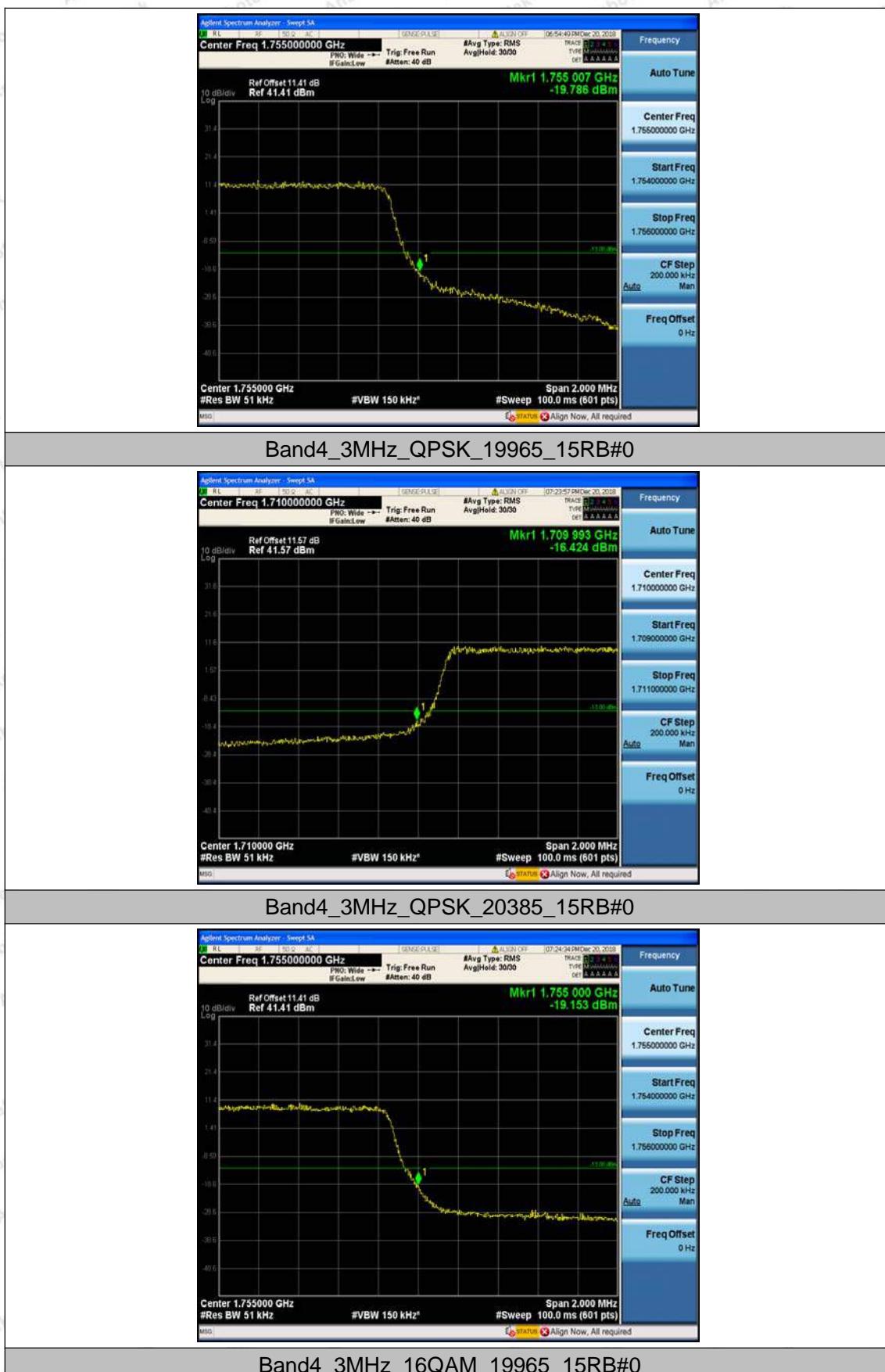


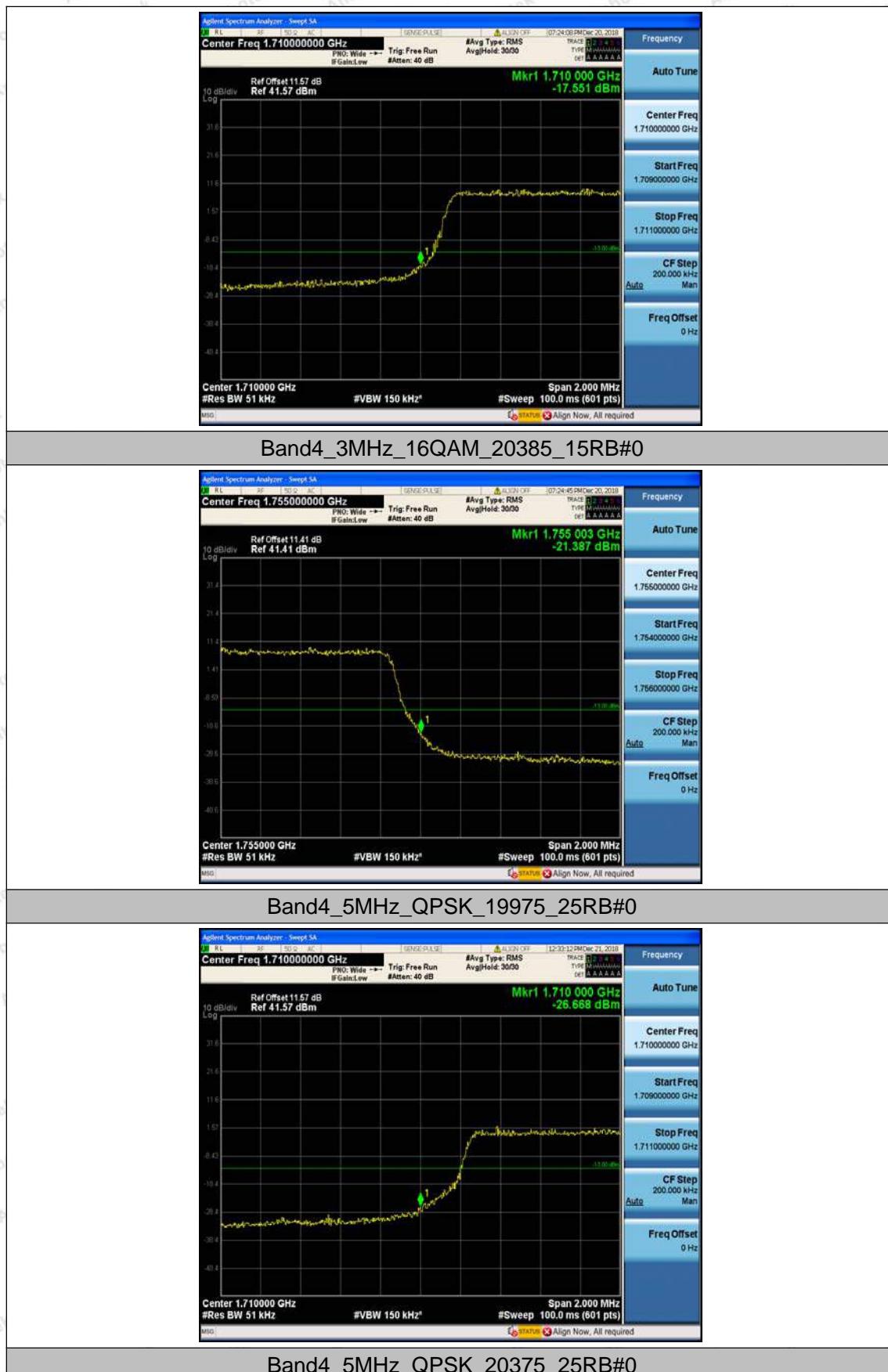


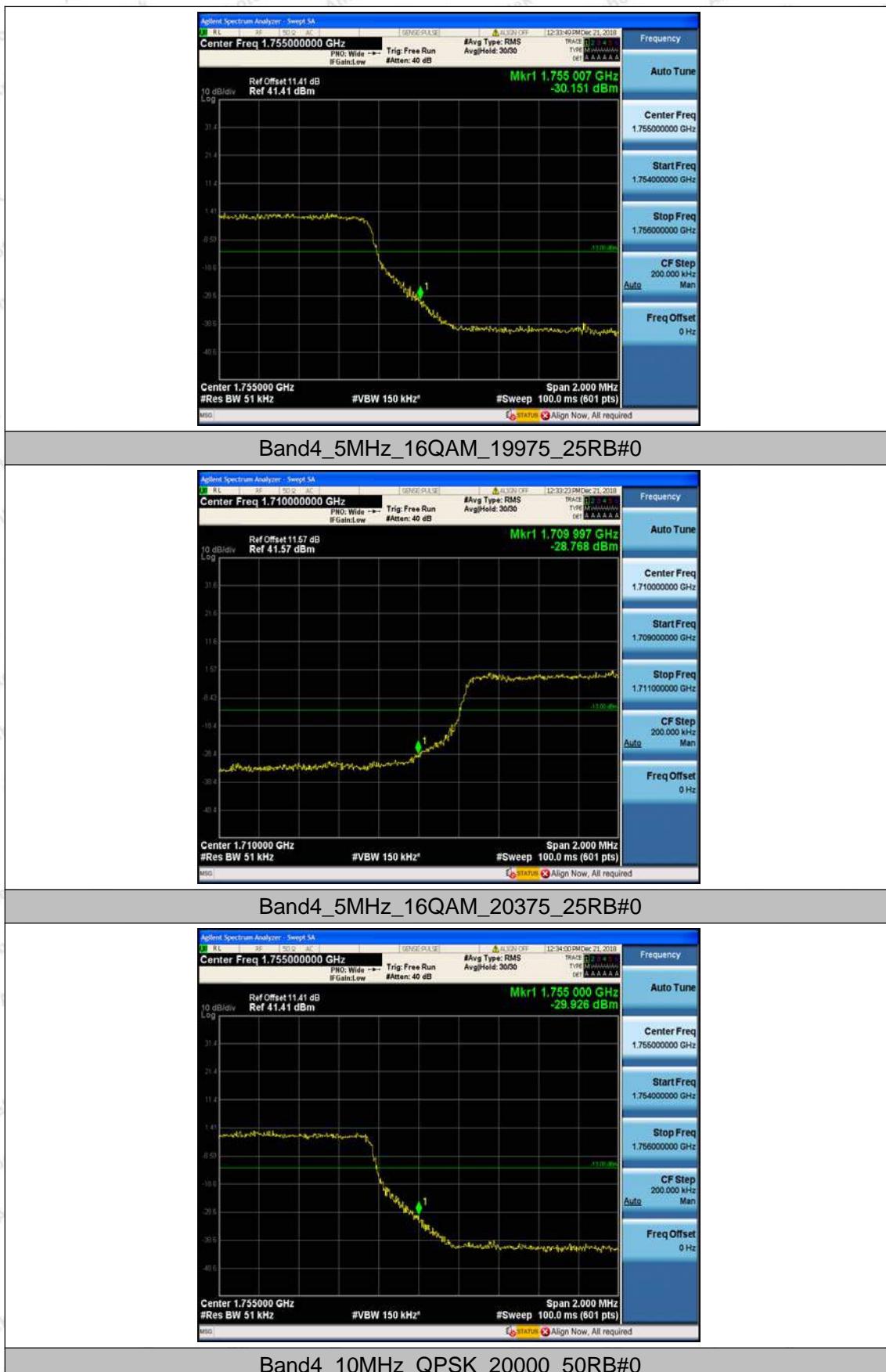


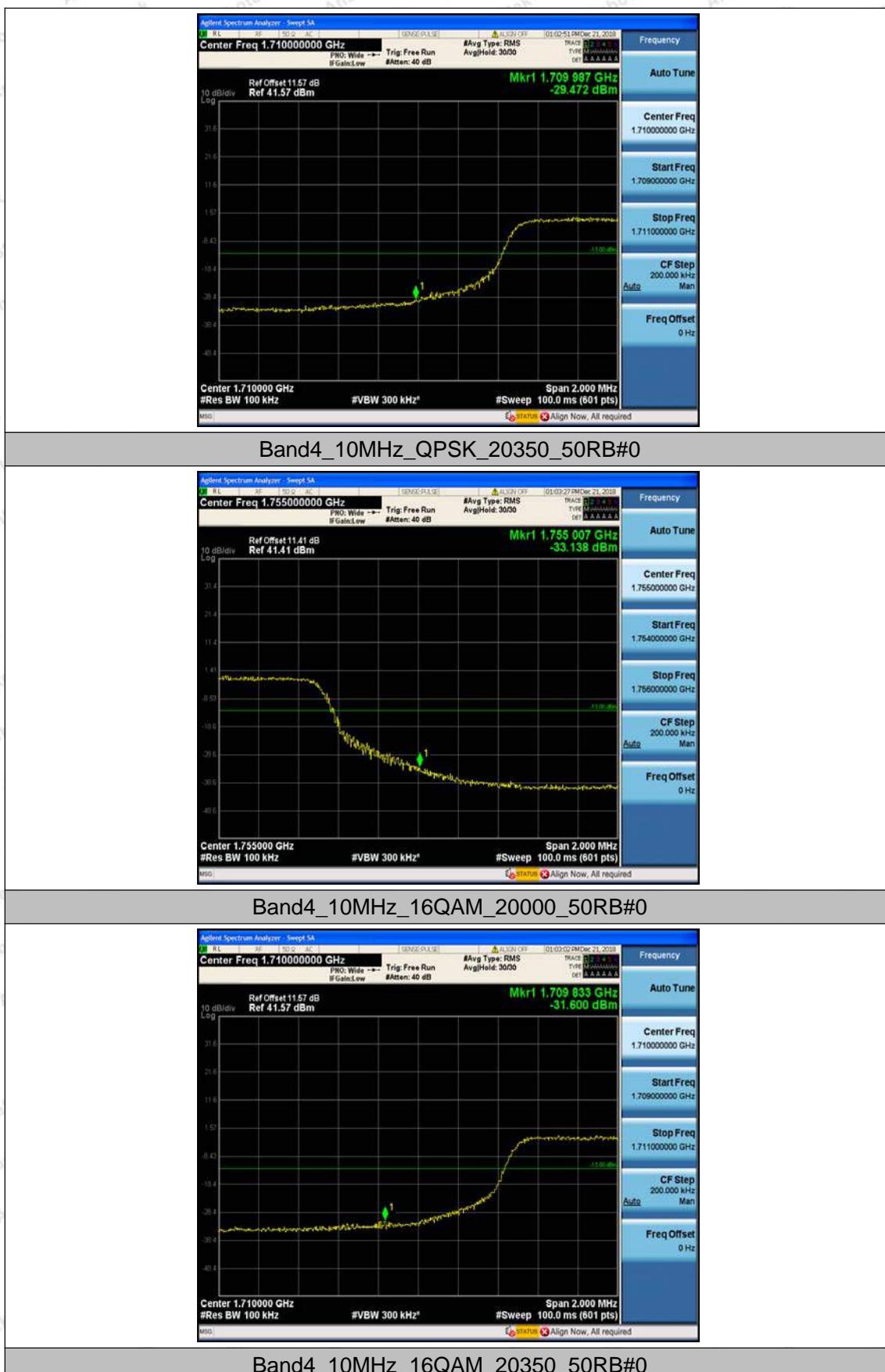


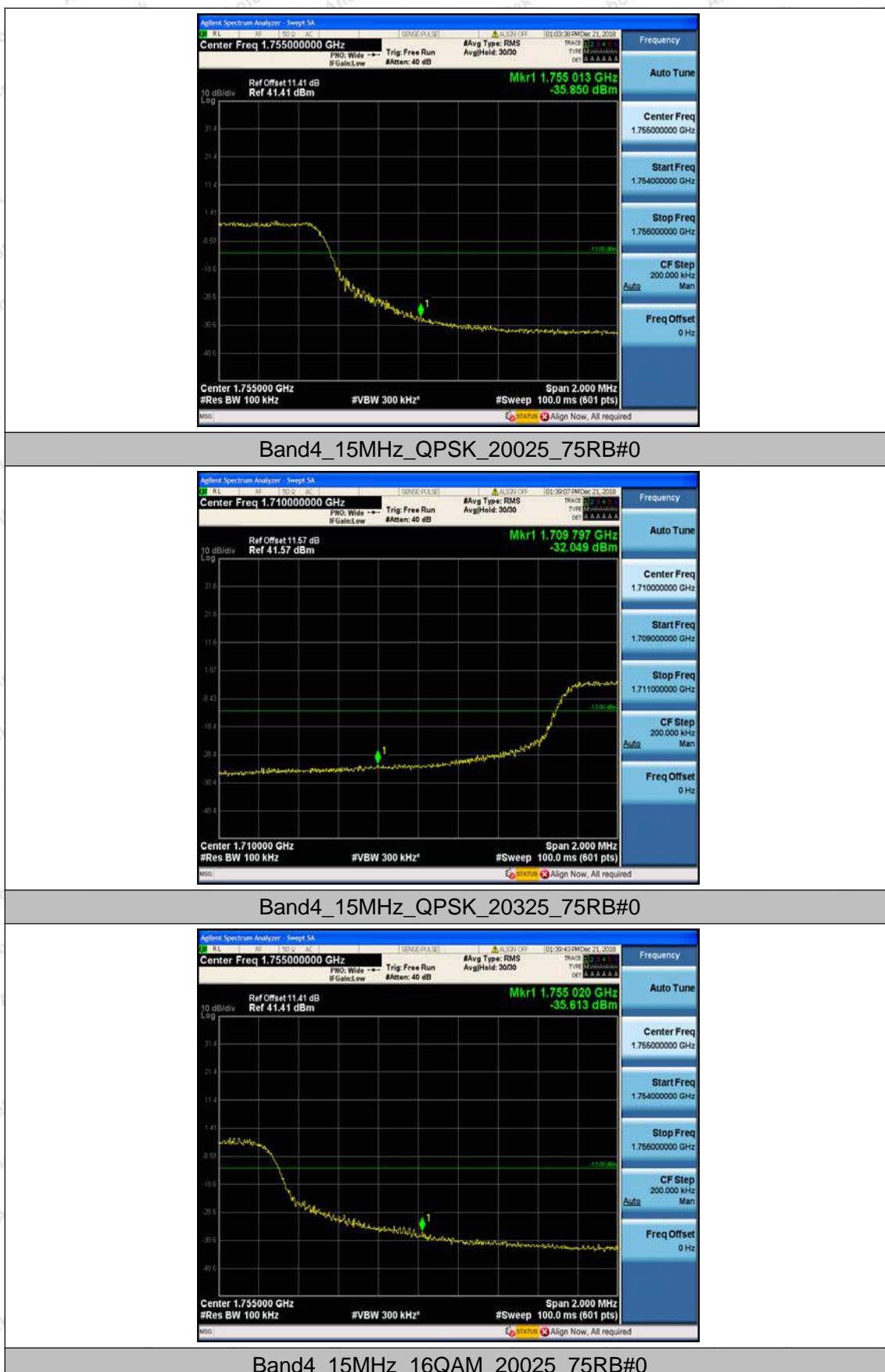


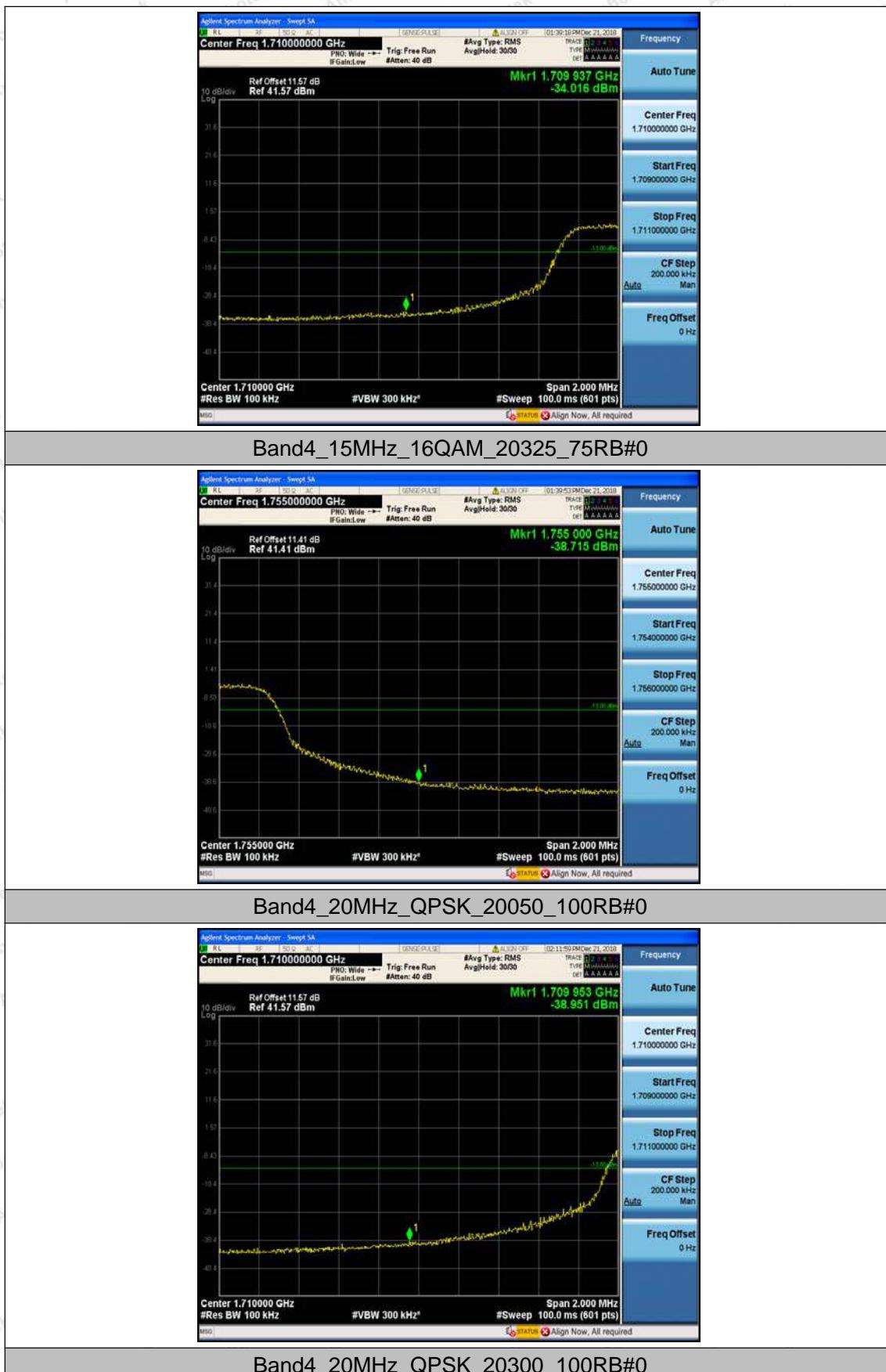


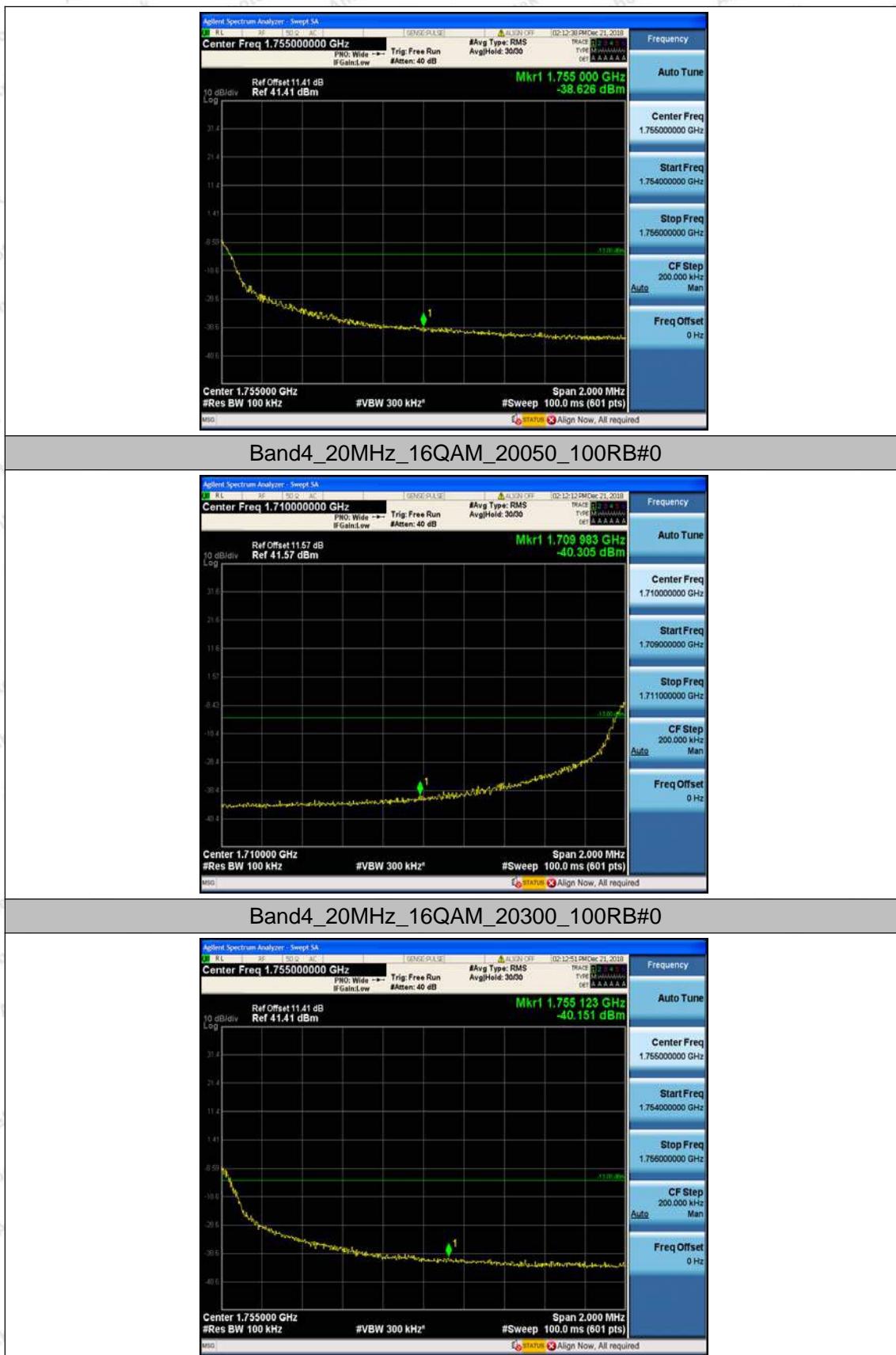












10. Frequency Stability

10.1. Test Standard and Limit

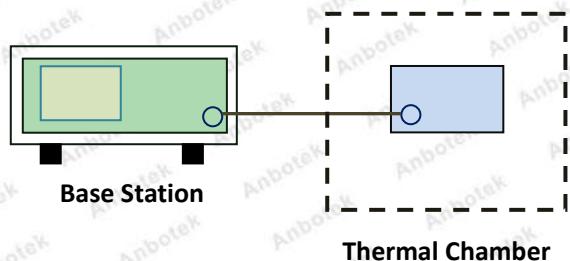
According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table below:

Frequency Tolerance for Transmitters in the Public Mobile Services

Frequency Range (MHz)	Base, fixed (ppm)	Mobile ≤ 3 watts (ppm)	Mobile ≤ 3 watts (ppm)
25 to 50	20.0	20.0	50.0
50 to 450	5.0	5.0	50.0
450 to 512	2.5	5.0	5.0
821 to 896	1.5	2.5	2.5
928 to 929.	5.0	N/A	N/A
929 to 960.	1.5	N/A	N/A
2110 to 2220	10.0	N/A	N/A

According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized frequency block.

10.2. Test Setup



10.3. Test Procedure

A communication link was established between EUT and base station. The frequency error was monitored and measured by base station under variation of ambient temperature and variation of primary supply voltage.

Limit: The frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ ($\pm 2.5\text{ppm}$) of the center frequency.

10.4. Test Data

GSM 850 Test Frequency: 836.6MHz				
Temperature(°C)	Power Supply (V ^{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.7	14	0.0167	2.5
-20		5	0.0060	2.5
-10		16	0.0191	2.5
0		8	0.0096	2.5
10		8	0.0096	2.5
20		4	0.0048	2.5
30		10	0.0120	2.5
40		4	0.0048	2.5
50		15	0.0179	2.5
20		5	0.0060	2.5
20	4.2	6	0.0072	2.5

GPRS 850 Test Frequency: 836.6MHz				
Temperature(°C)	Power Supply (V ^{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.7	11	0.0131	2.5
-20		11	0.0131	2.5
-10		12	0.0143	2.5
0		15	0.0179	2.5
10		13	0.0155	2.5
20		12	0.0143	2.5
30		14	0.0167	2.5
40		13	0.0155	2.5
50		12	0.0143	2.5
20		10	0.0120	2.5
20	4.2	11	0.0131	2.5

PCS 1900 Test Frequency: 1880MHz				
Temperature(°C)	Power Supply (V ^{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.7	-5	-0.0027	2.5
-20		-9	-0.0048	2.5
-10		-12	-0.0064	2.5
0		-2	-0.0011	2.5
10		-12	-0.0064	2.5
20		-9	-0.0048	2.5
30		-2	-0.0011	2.5
40		-1	-0.0005	2.5
50		-4	-0.0021	2.5
20	3.3	-2	-0.0011	2.5
20	4.2	-3	-0.0016	2.5

GPRS 1900 Test Frequency: 1880MHz				
Temperature(°C)	Power Supply (V ^{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.7	-1	-0.0005	2.5
-20		-6	-0.0032	2.5
-10		-1	-0.0005	2.5
0		-3	-0.0016	2.5
10		-1	-0.0005	2.5
20		-2	-0.0011	2.5
30		1	0.0005	2.5
40		-1	-0.0005	2.5
50		1	0.0005	2.5
20	3.3	-1	-0.0005	2.5
20	4.2	-2	-0.0011	2.5

WCDMA Band V Test Frequency: 836.6MHz				
Temperature(°C)	Power Supply (V ^{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.7	4	0.0048	2.5
-20		-1	-0.0012	2.5
-10		-1	-0.0012	2.5
0		4	0.0048	2.5
10		1	0.0012	2.5
20		1	0.0012	2.5
30		-1	-0.0012	2.5
40		-2	-0.0024	2.5
50		1	0.0012	2.5
20		-1	-0.0012	2.5
20	3.3	-4	-0.0048	2.5
20	4.2	-4	-0.0048	2.5

WCDMA Band II Test Frequency: 1880MHz				
Temperature(°C)	Power Supply (V ^{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.7	-1	-0.0005	2.5
-20		4	0.0021	2.5
-10		2	0.0011	2.5
0		-3	-0.0016	2.5
10		-4	-0.0021	2.5
20		-2	-0.0011	2.5
30		4	0.0021	2.5
40		2	0.0011	2.5
50		5	0.0027	2.5
20	3.3	-7	-0.0037	2.5
20	4.2	-3	-0.0016	2.5

LTE Band II Test Frequency: 1880MHz(QPSK)				
Temperature(°C)	Power Supply (V ^{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.7	-5	-0.0027	2.5
-20		-6	-0.0032	2.5
-10		-6	-0.0032	2.5
0		-4	-0.0021	2.5
10		-6	-0.0032	2.5
20		-3	-0.0016	2.5
30		5	0.0027	2.5
40		5	0.0027	2.5
50		-3	-0.0016	2.5
20		-7	-0.0037	2.5
20	4.2	-6	-0.0032	2.5

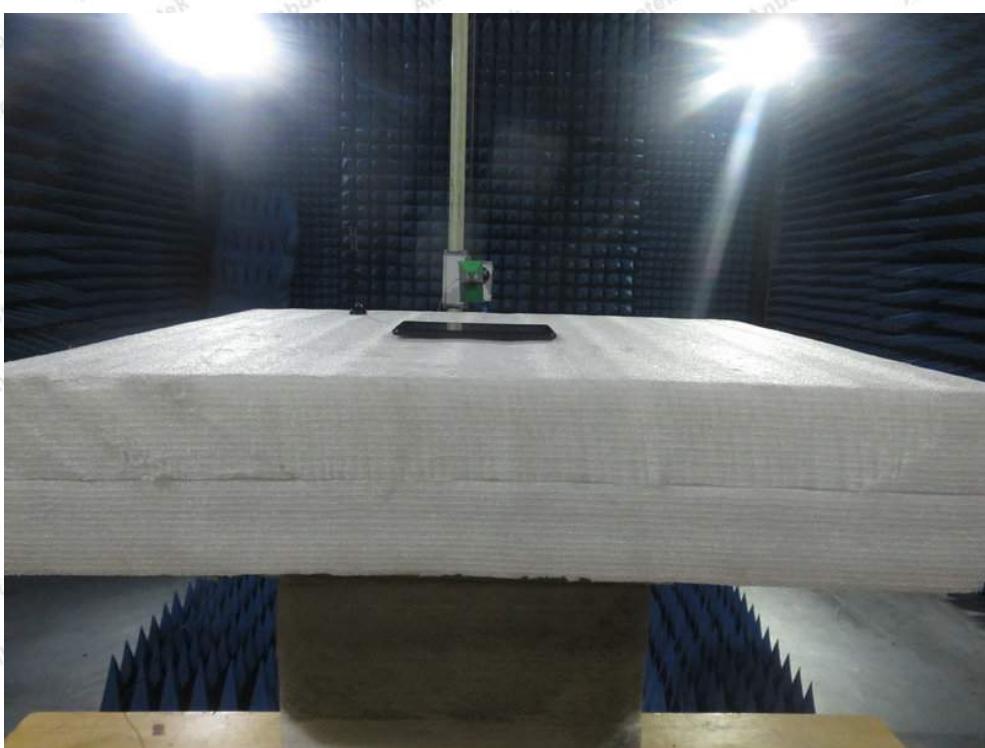
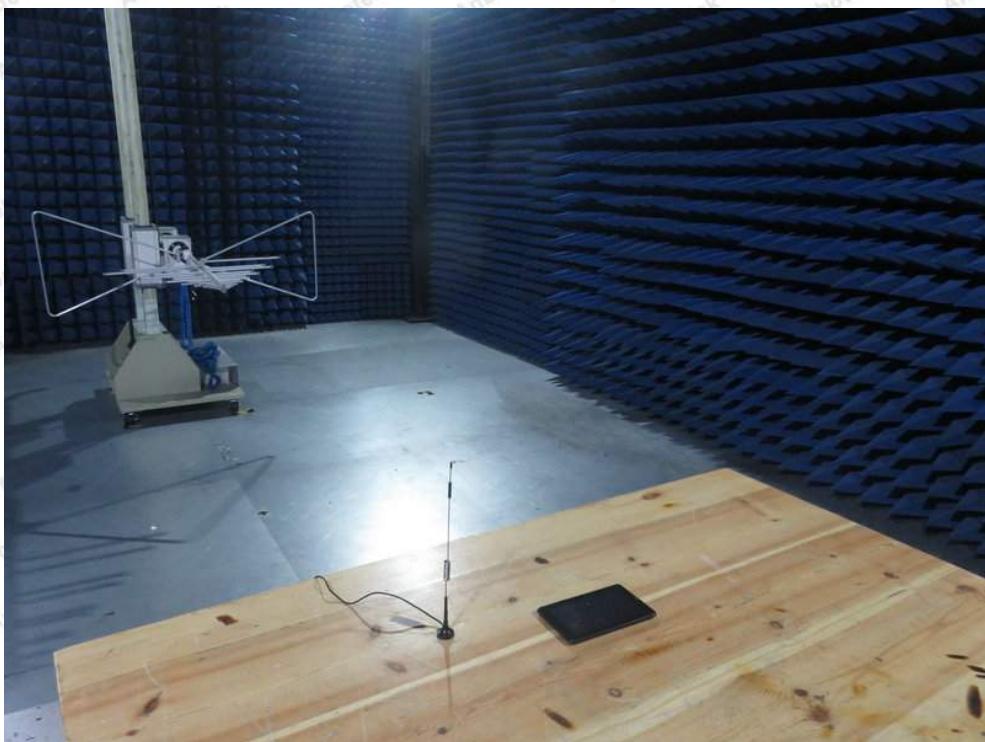
LTE Band II Test Frequency: 1880MHz(16QAM)				
Temperature(°C)	Power Supply (V ^{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.7	-6	-0.0032	2.5
-20		-9	-0.0048	2.5
-10		-7	-0.0037	2.5
0		-9	-0.0048	2.5
10		-6	-0.0032	2.5
20		-9	-0.0048	2.5
30		4	0.0021	2.5
40		-7	-0.0037	2.5
50		-7	-0.0037	2.5
20		-5	-0.0027	2.5
20	4.2	-6	-0.0032	2.5

LTE Band IV Test Frequency:1732.5MHz(QPSK)				
Temperature(°C)	Power Supply (V ^{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.7	-6	-0.0035	2.5
-20		5	0.0029	2.5
-10		7	0.0040	2.5
0		6	0.0035	2.5
10		6	0.0035	2.5
20		-3	-0.0017	2.5
30		3	0.0017	2.5
40		-6	-0.0035	2.5
50		-8	-0.0046	2.5
20		-5	-0.0029	2.5
20	4.2	-4	-0.0023	2.5

LTE Band IV Test Frequency:1732.5MHz(16QAM)				
Temperature(°C)	Power Supply (V ^{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.7	5	0.0029	2.5
-20		5	0.0029	2.5
-10		-3	-0.0017	2.5
0		-4	-0.0023	2.5
10		-5	-0.0029	2.5
20		-5	-0.0029	2.5
30		-7	-0.0040	2.5
40		-7	-0.0040	2.5
50		-5	-0.0029	2.5
20	3.3	-6	-0.0035	2.5
20	4.2	-6	-0.0035	2.5

APPENDIX I-- TEST SETUP PHOTOGRAPH

Photo of Radiation Emission Test



APPENDIX II -- PHOTOGRAPH

Reference to the test report SZAWW181206001-01

----- End of Report -----