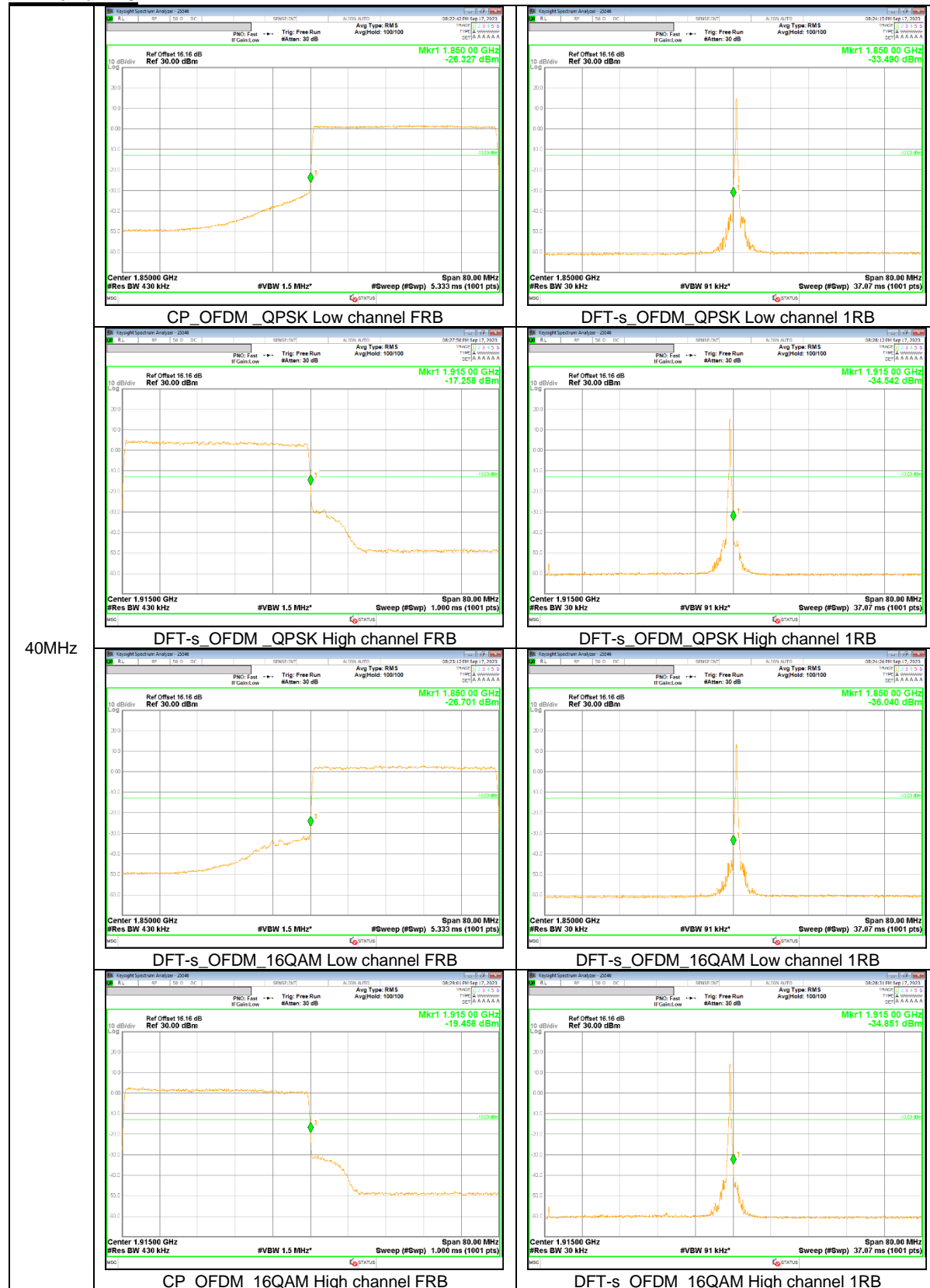
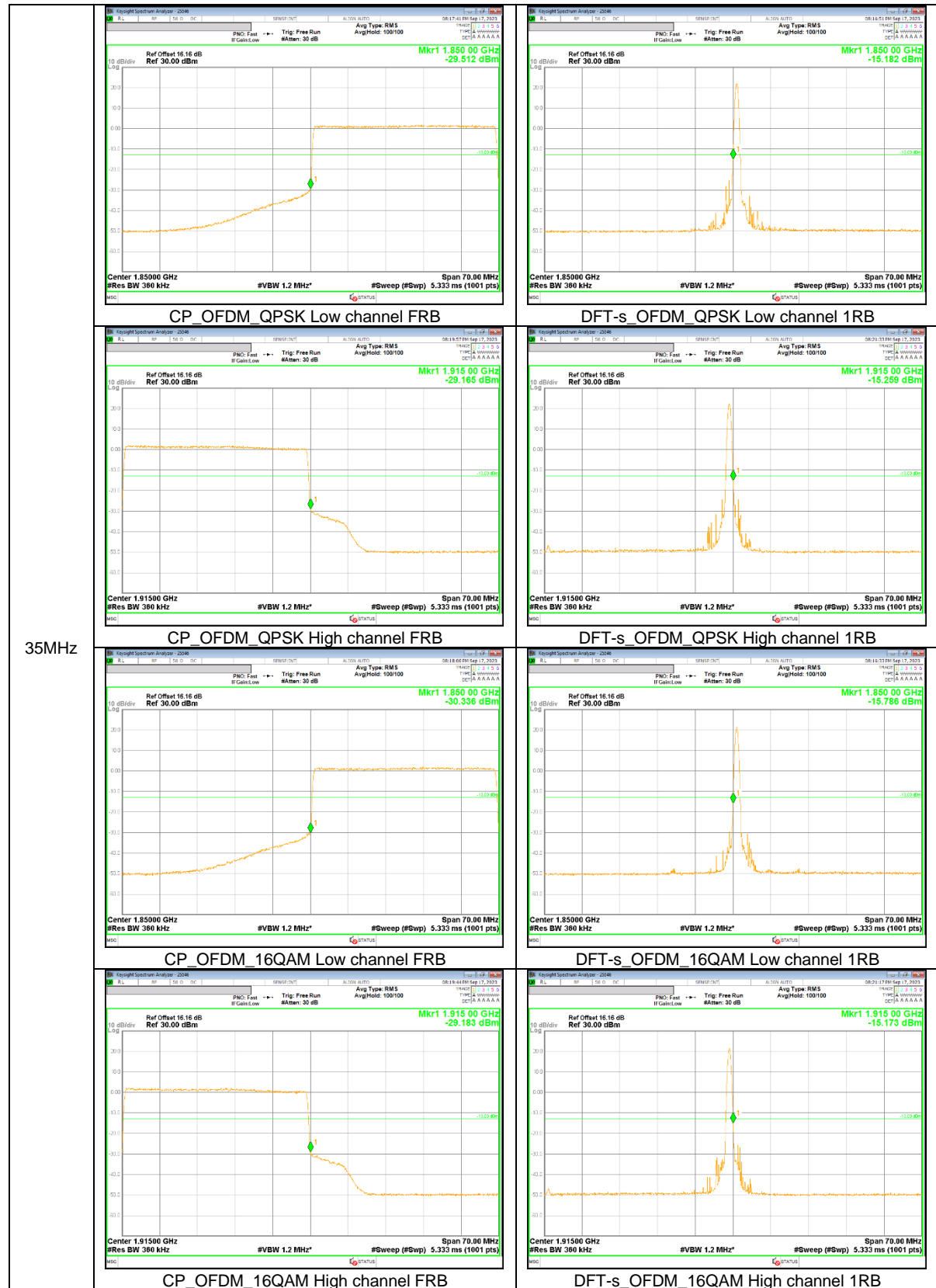
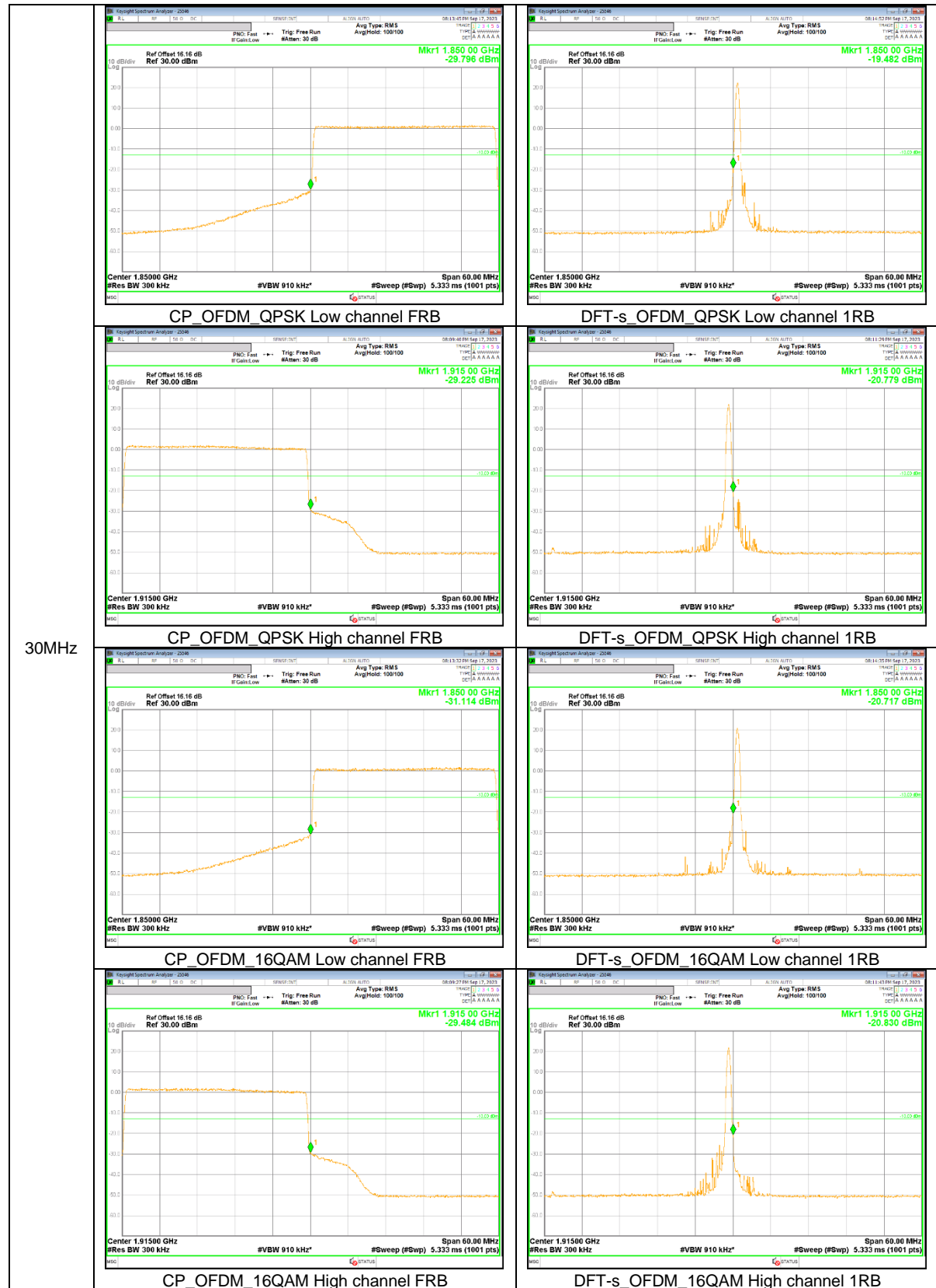


NR Band n25

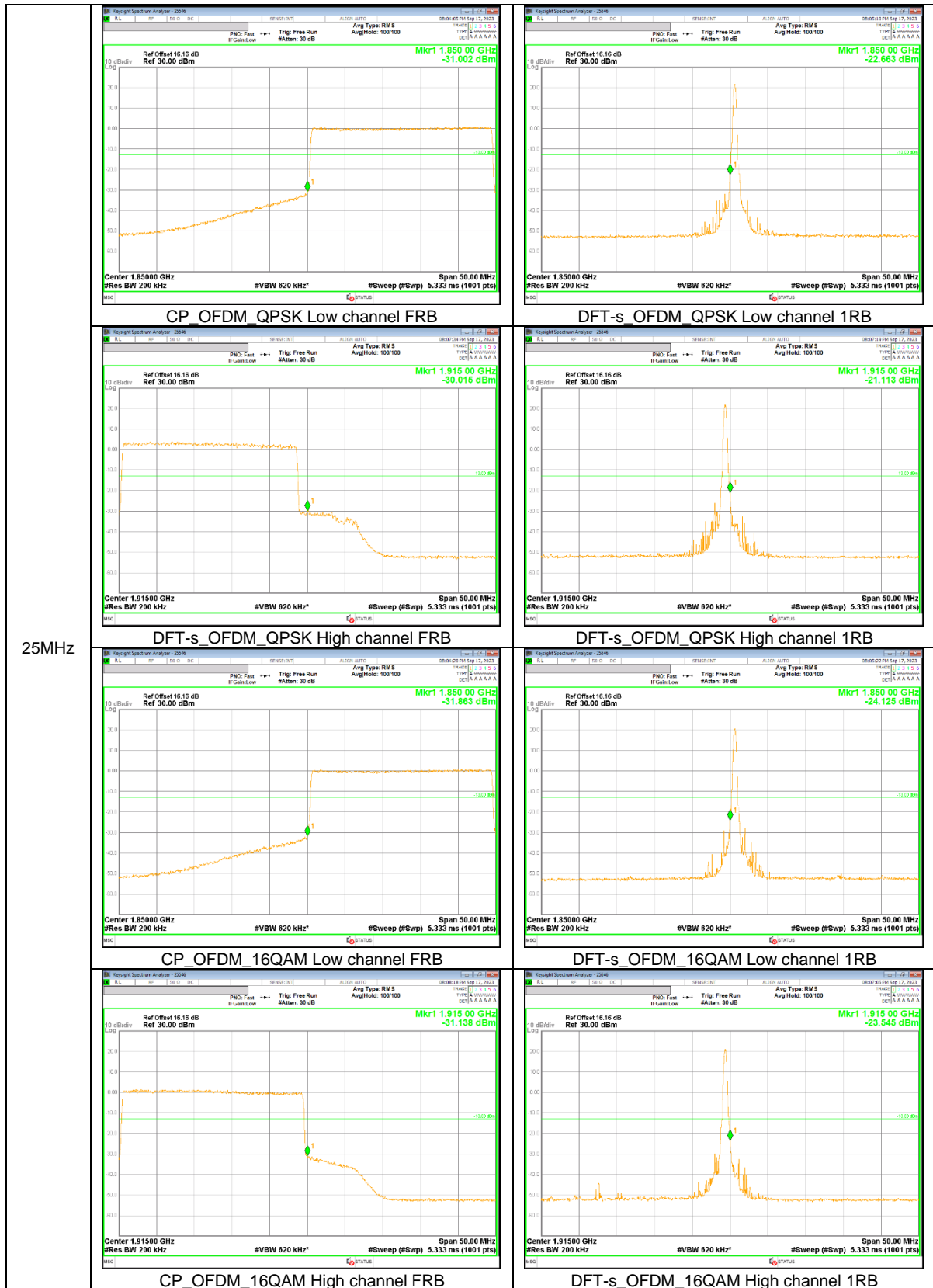


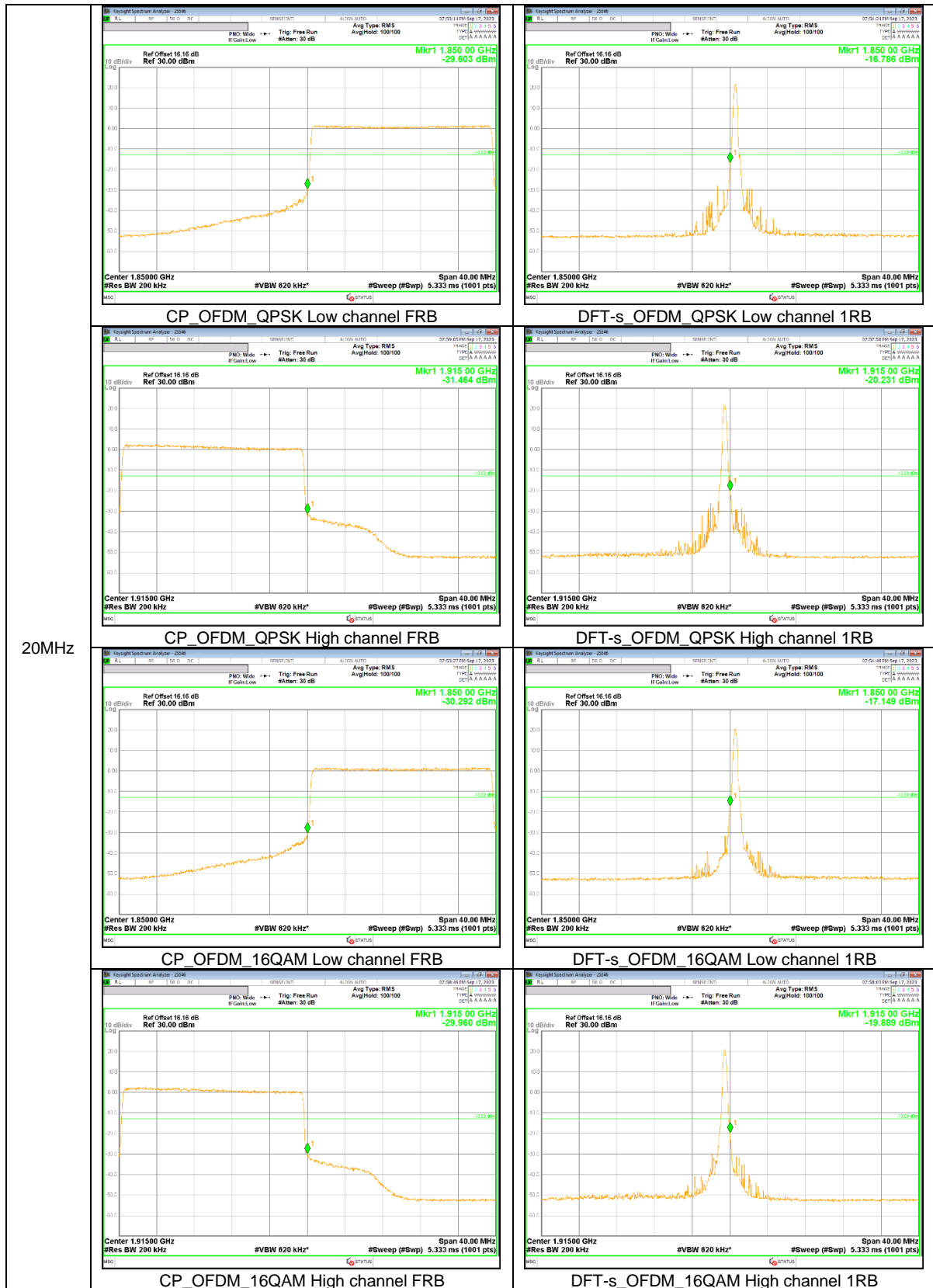
40MHz

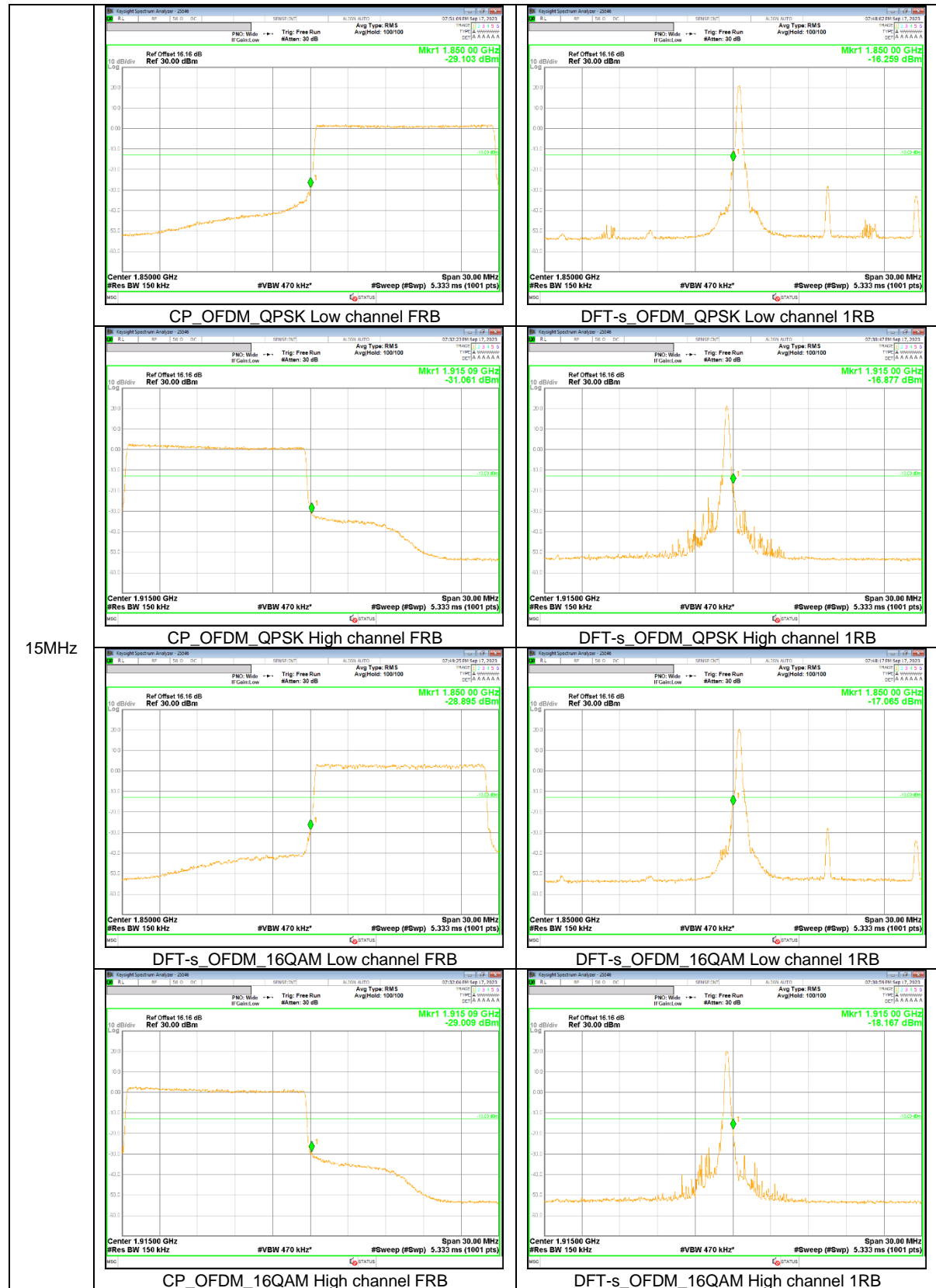




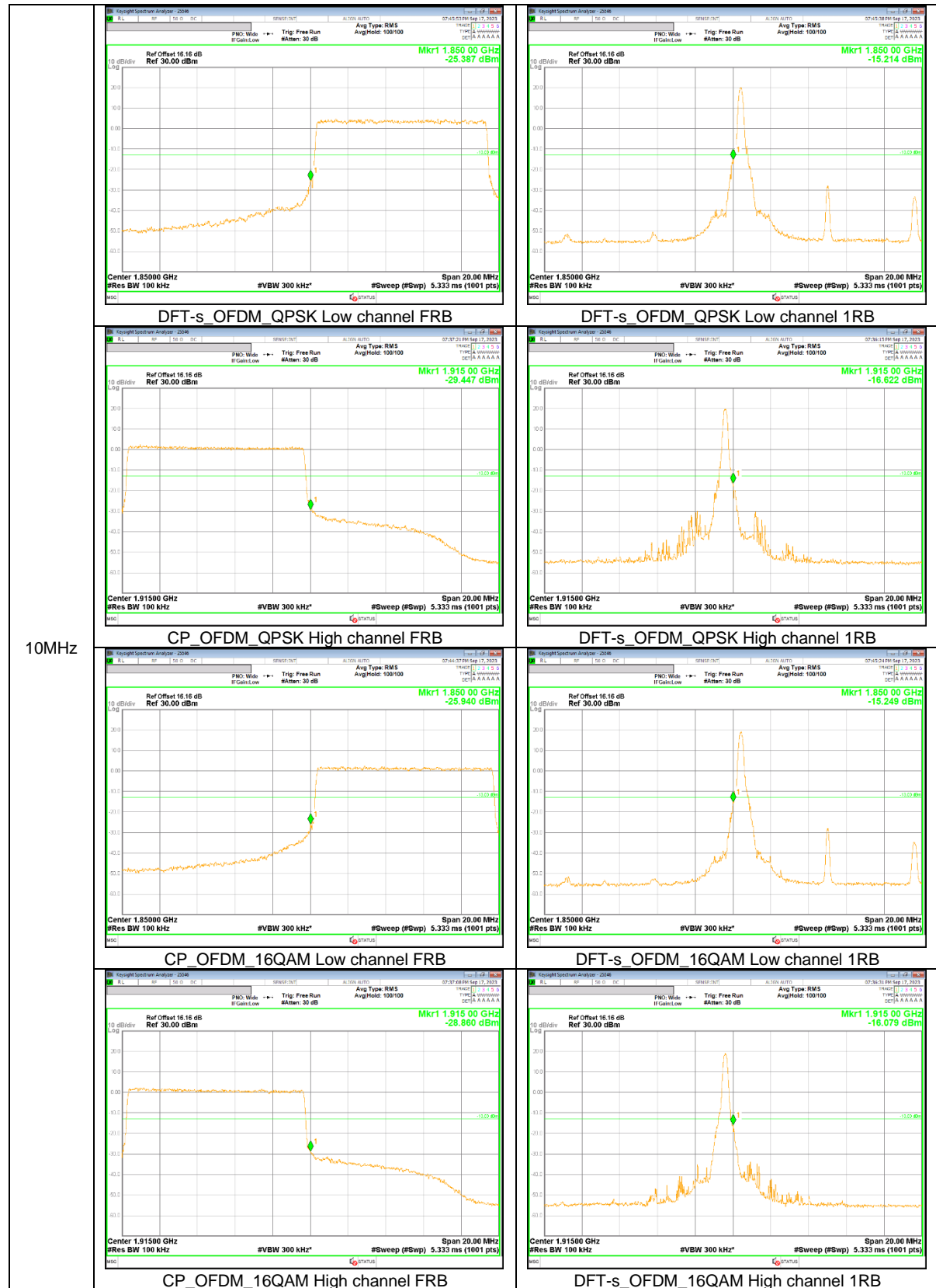
30MHz

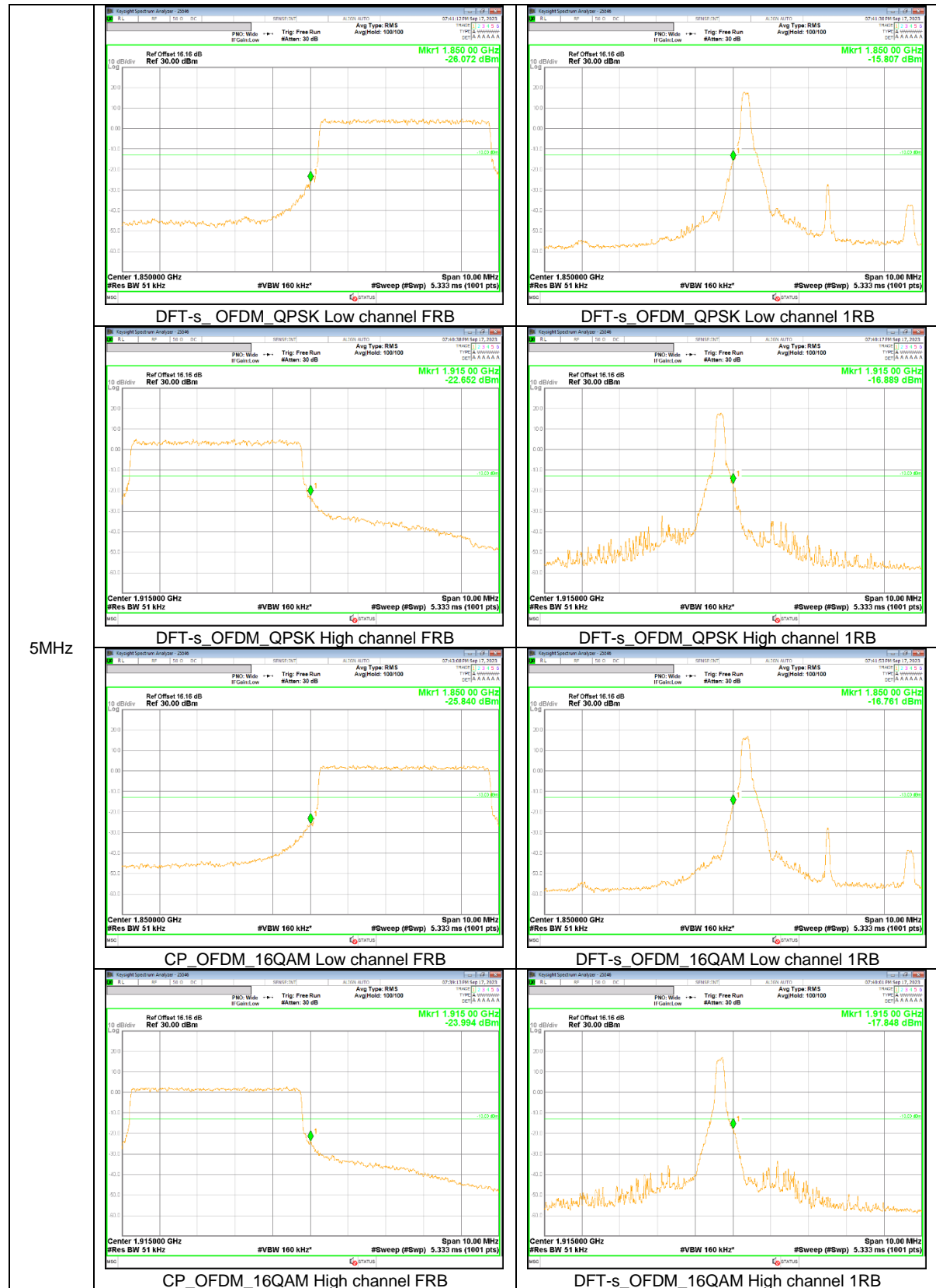






15MHz







## 8.5. CONDUCTED SPURIOUS EMISSIONS

### RULE PART(S)

FCC: §2.1051, §24.238

### LIMITS

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

### TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v03r01

The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold Mode using a peak detector to ensure that the worst-case emissions were caught.

- a) Set the RBW = 100 kHz for emission below 1 GHz and 1 MHz for emissions above 1 GHz  
(Tests were performed 1MHz [Worst case], to sweep 1 time for all frequency range)
- b) Set VBW  $\geq 3 \times$  RBW;
- c) Set span  $\geq 1.5$  times the OBW;
- d) Sweep time = auto couple;
- e) Detector = rms;
- f) Ensure that the number of measurement points = Max (40001);
- g) Trace Mode = average(WCDMA, LTE, 5G NR), Max hold(GSM);

### NOTE1

5G NR: All Waveforms (CP-OFDM vs DFT-s\_OFDM) and modulations ( $\pi/2$  BPSK, QPSK, 16QAM, 64QAM, 256QAM) were investigated to determine the worst case configuration. All Modes of operation were investigated and the worst case configuration results are reported in this section.

### NOTE2

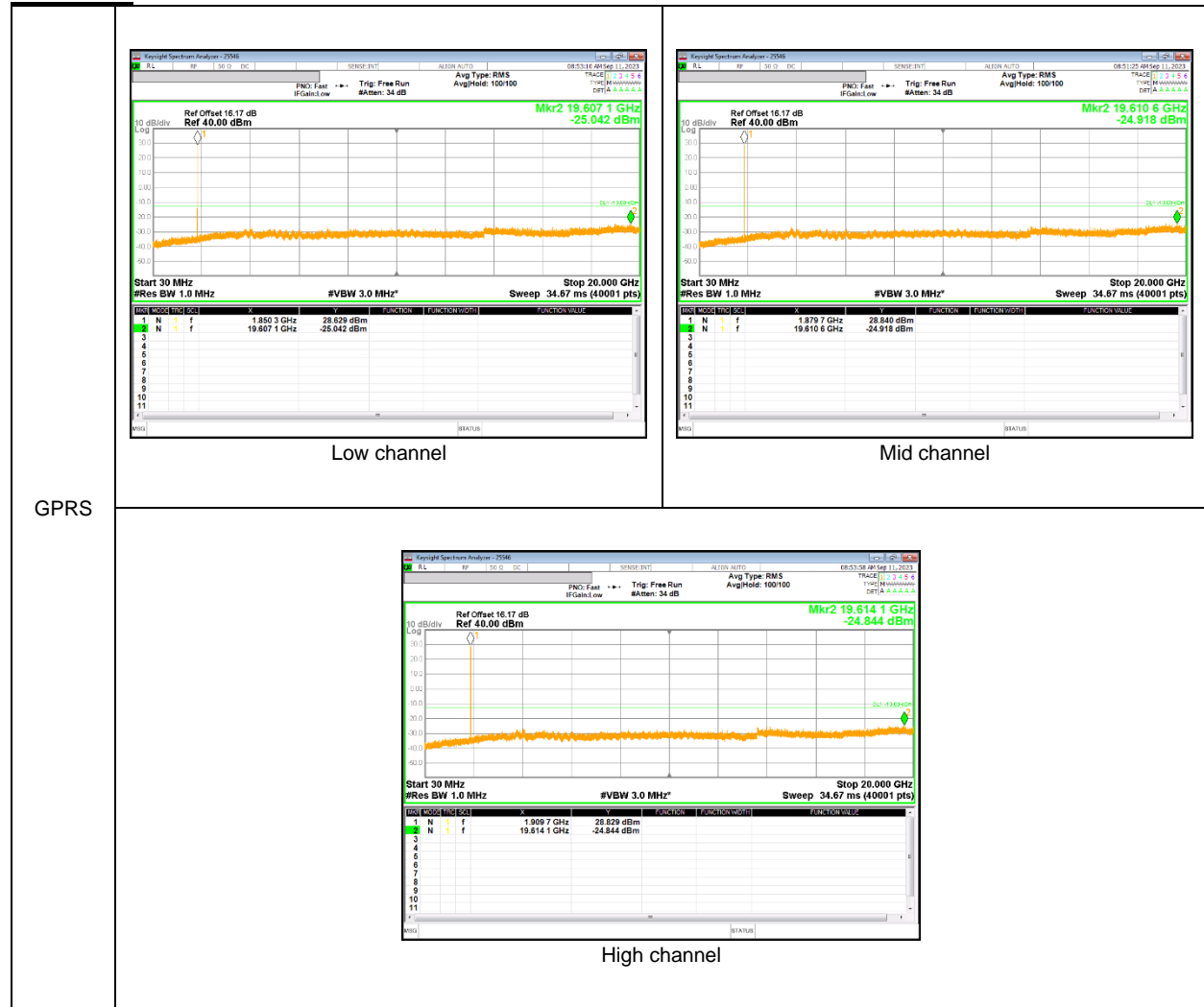
Please refer to section 5.4 for bandwidth and RB setting about LTE, 5G NR bands.

### RESULTS

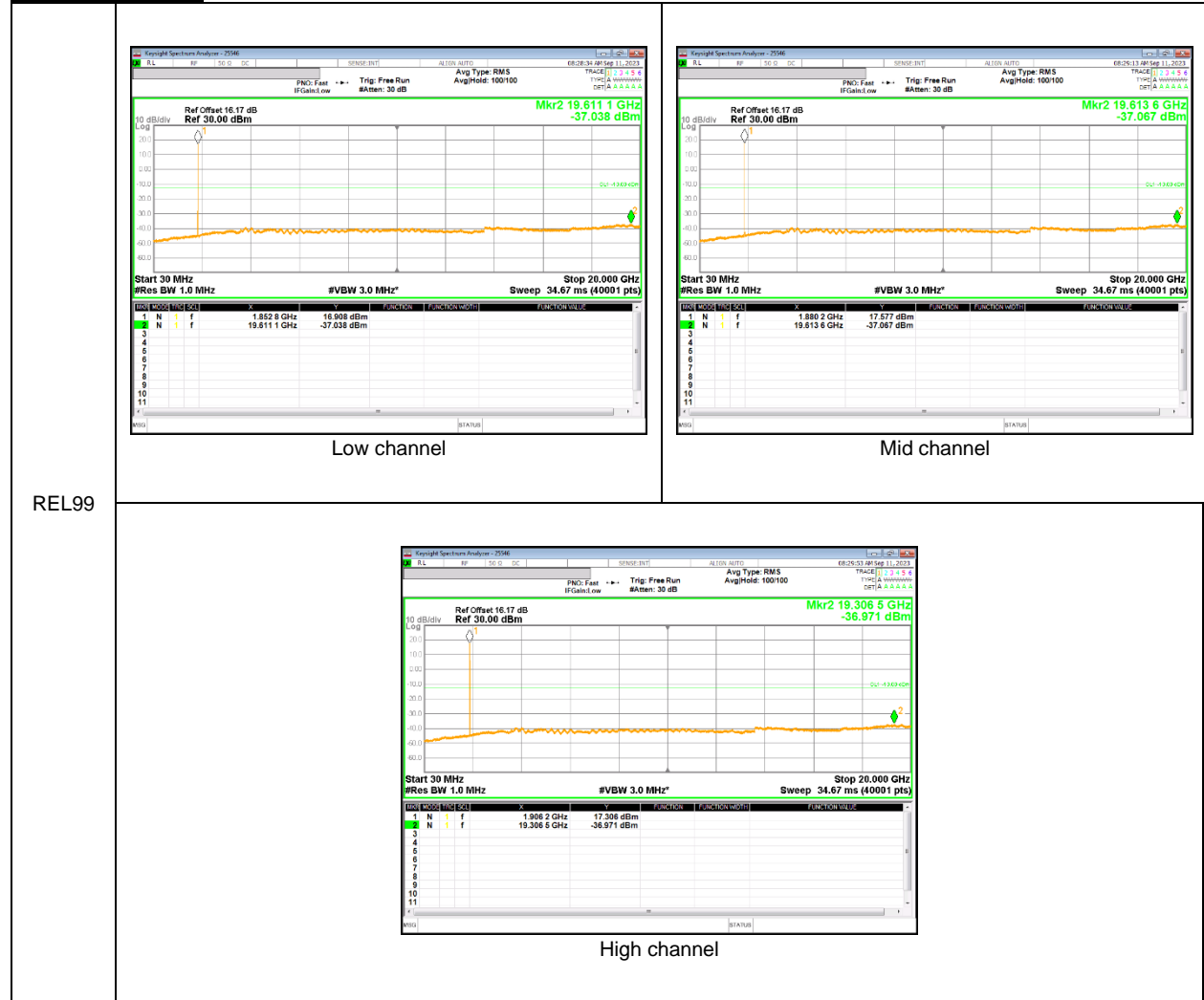
See the following pages.

### 8.5.1. OUT OF BAND EMISSIONS RESULT

#### GSM 1900



**WCDMA Band 2**



**LTE Band 25**



NR Band n25



## **8.6. FREQUENCY STABILITY**

### **RULE PART(S)**

FCC: §2.1055, §24.235

### **LIMITS**

24.235

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

### **TEST PROCEDURE**

Per KDB 971168 D01 Power Meas License Digital Systems v03r01

### **NOTE**

Test were performed each lowest or highest frequency on the modulation condition of more wide bandwidth.(Please refer to section 9.1.1 OBW results)

### **RESULTS**

See the following pages.

**8.6.1. FREQUENCY STABILITY RESULTS**

**GSM 1900, Channel 512/810, Frequency 1850.0/1910.0 MHz  
 (Lowest Frequency:EGPRS / Highest Frequency: GPRS)**

Test Date	2023-10-04
Test Engineer	31870

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW (MHz)	F high @ End of OBW (MHz)		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1850.0768	1909.9223		
Extreme (50C)		1850.0768	1909.9223	14.2	0.008
Extreme (40C)		1850.0768	1909.9223	16.8	0.009
Extreme (30C)		1850.0768	1909.9223	21.5	0.011
Extreme (10C)		1850.0768	1909.9223	6.8	0.004
Extreme (0C)		1850.0768	1909.9223	10.9	0.006
Extreme (-10C)		1850.0768	1909.9223	11.2	0.006
Extreme (-20C)		1850.0768	1909.9223	23.1	0.012
Extreme (-30C)		1850.0768	1909.9223	24.8	0.013
20C	15%	1850.0768	1909.9223	31.5	0.017
	-15%	1850.0768	1909.9223	22.1	0.012
	End Point	1850.0768	1909.9223	33.6	0.018

**WCDMA Band 2 (Lowest Frequency: Rel99 / Highest Frequency: HSDPA)**

Test Date	2023-10-04
Test Engineer	31870

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1850.3210	1909.6811		
Extreme (50C)		1850.3210	1909.6811	33.2	0.018
Extreme (40C)		1850.3210	1909.6811	41.5	0.022
Extreme (30C)		1850.3210	1909.6811	23.6	0.013
Extreme (10C)		1850.3210	1909.6811	15.6	0.008
Extreme (0C)		1850.3210	1909.6811	11.5	0.006
Extreme (-10C)		1850.3210	1909.6811	23.1	0.012
Extreme (-20C)		1850.3210	1909.6811	31.5	0.017
Extreme (-30C)		1850.3210	1909.6811	22.2	0.012
20C	15%	1850.3210	1909.6811	21.5	0.011
	-15%	1850.3210	1909.6811	16.8	0.009
	End Point	1850.3210	1909.6811	33.7	0.018



**LTE Band 25 (Lowest Frequency: 16QAM / Highest Frequency: 16QAM)**

Test Date	2023-10-06
Test Engineer	31870

Limit		1850	1915	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW (MHz)	F high @ End of OBW (MHz)		
Temperature	Voltage				
Normal (20C)	Normal	1850.1477	1914.8449		
Extreme (50C)		1850.1477	1914.8449	2.3	0.001
Extreme (40C)		1850.1477	1914.8449	1.9	0.001
Extreme (30C)		1850.1477	1914.8449	1.1	0.001
Extreme (10C)		1850.1477	1914.8449	2.5	0.001
Extreme (0C)		1850.1477	1914.8449	2.2	0.001
Extreme (-10C)		1850.1477	1914.8449	1.4	0.001
Extreme (-20C)		1850.1477	1914.8449	2.8	0.001
Extreme (-30C)		1850.1477	1914.8449	1.7	0.001
20C	15%	1850.1477	1914.8449	1.2	0.001
	-15%	1850.1477	1914.8449	2.6	0.001
	End Point	1850.1477	1914.8449	3.3	0.002

**5G NR Band n25 (Lowest Frequency: 16QAM / Highest Frequency: QPSK)**

Test Date	2023-10-11
Test Engineer	31870

Limit		1850	1915	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW (MHz)	F high @ End of OBW (MHz)		
Temperature	Voltage				
Normal (20C)	Normal	1850.2501	1914.7434		
Extreme (50C)		1850.2501	1914.7434	8.5	0.005
Extreme (40C)		1850.2501	1914.7434	5.8	0.003
Extreme (30C)		1850.2501	1914.7434	6.0	0.003
Extreme (10C)		1850.2501	1914.7434	6.0	0.003
Extreme (0C)		1850.2501	1914.7434	6.2	0.003
Extreme (-10C)		1850.2501	1914.7434	5.5	0.003
Extreme (-20C)		1850.2501	1914.7434	5.4	0.003
Extreme (-30C)		1850.2501	1914.7434	7.3	0.004
20C	15%	1850.2501	1914.7434	4.8	0.003
	-15%	1850.2501	1914.7434	4.5	0.002
	End Point	1850.2501	1914.7434	7.8	0.004

## 9. RADIATED RESULTS

### 9.1. RADIATED POWER (EIRP)

#### RULE PART(S)

FCC: §2.1046, §24.232

#### LIMITS

24.232(c)

Mobile/portable stations are limited to 2 watts e.i.r.p. peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

#### TEST PROCEDURE

ANSI / TIA / EIA 603 E Clause 2.2.17; ESU40 setting reference to 971168 D01 v03r01

For radiated output power measurement with a ESU40:

- a) Set the RBW  $\geq$  OBW;
- b) Set VBW  $\geq$  3  $\times$  RBW;
- c) Set span  $\geq$  2  $\times$  OBW;
- d) Sweep time = auto couple or 1 second;
- e) Detector = rms;
- f) Ensure that the number of measurement points  $\geq$  span/RBW;
- g) Trace Mode = max hold(GSM, WCDMA), average(LTE, 5G NR);

#### TEST RESULTS

See the following pages.

### 9.1.1. EIRP Results

#### GSM

Band	Mode	f (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	ERP (dBm)	EIRP (mW)	Limit (dBm)	Delta (dB)
GSM 1900_ANT A	GPRS	1850.20	22.51	H	4.48	9.52	27.55	568.85	33.00	-5.45
		1880.00	23.25	H	4.52	9.29	28.01	632.41	33.00	-4.99
		1909.80	24.04	H	4.55	9.00	28.49	706.32	33.00	-4.51
	EGPRS	1850.20	19.62	H	4.48	9.52	24.66	292.42	33.00	-8.34
		1880.00	20.92	H	4.52	9.29	25.68	369.83	33.00	-7.32
		1909.80	20.81	H	4.55	9.00	25.26	335.74	33.00	-7.74

#### WCDMA

Band	Mode	f (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	Limit (dBm)	Delta (dB)
Band 2_ANT A	REL99	1852.40	17.19	H	4.49	9.51	22.20	165.96	33.00	-10.80
		1880.00	18.30	H	4.52	9.29	23.06	202.30	33.00	-9.94
		1907.60	18.99	H	4.55	9.03	23.47	222.33	33.00	-9.53
	HSDPA	1852.40	16.08	H	4.49	9.51	21.09	128.53	33.00	-11.91
		1880.00	17.32	H	4.52	9.29	22.08	161.44	33.00	-10.92
		1907.60	17.98	H	4.55	9.03	22.46	176.20	33.00	-10.54

#### LTE Band 25 (ANT A)

BW (MHz)	Modulation	f (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	Limit (dBm)	Delta (dB)	RB
20	QPSK	1860.00	17.85	H	4.49	9.45	22.81	190.81	33.00	-10.19	1/0
		1882.50	18.21	H	4.52	9.27	22.96	197.65	33.00	-10.04	1/0
		1905.00	19.55	H	4.55	9.06	24.07	255.04	33.00	-8.93	1/0
	16-QAM	1860.00	17.47	H	4.49	9.45	22.43	174.83	33.00	-10.57	1/49
		1882.50	18.07	H	4.52	9.27	22.82	191.38	33.00	-10.18	1/49
		1905.00	19.02	H	4.55	9.06	23.54	225.74	33.00	-9.46	1/0
15	QPSK	1857.50	17.77	H	4.49	9.47	22.75	188.26	33.00	-10.25	1/0
		1882.50	19.08	H	4.52	9.27	23.83	241.48	33.00	-9.17	1/37
		1907.50	19.46	H	4.55	9.03	23.94	247.80	33.00	-9.06	1/37
	16-QAM	1857.50	16.88	H	4.49	9.47	21.86	153.37	33.00	-11.14	1/0
		1882.50	18.37	H	4.52	9.27	23.12	205.06	33.00	-9.88	1/37
		1907.50	18.71	H	4.55	9.03	23.19	208.50	33.00	-9.81	1/37
10	QPSK	1855.00	17.69	H	4.49	9.48	22.69	185.65	33.00	-10.31	1/0
		1882.50	19.22	H	4.52	9.27	23.97	249.39	33.00	-9.03	1/25
		1910.00	19.43	H	4.55	8.99	23.87	243.75	33.00	-9.13	1/49
	16-QAM	1855.00	16.82	H	4.49	9.48	21.82	151.94	33.00	-11.18	1/0
		1882.50	18.43	H	4.52	9.27	23.18	207.92	33.00	-9.82	1/25
		1910.00	18.72	H	4.55	8.99	23.16	206.99	33.00	-9.84	1/49
5	QPSK	1852.50	17.78	H	4.49	9.50	22.80	190.36	33.00	-10.20	1/12
		1882.50	19.11	H	4.52	9.27	23.86	243.16	33.00	-9.14	1/12
		1912.50	19.42	H	4.56	8.96	23.83	241.30	33.00	-9.17	1/24
	16-QAM	1852.50	17.02	H	4.49	9.50	22.04	159.80	33.00	-10.96	1/12
		1882.50	18.37	H	4.52	9.27	23.12	205.06	33.00	-9.88	1/12
		1912.50	18.45	H	4.56	8.96	22.86	193.00	33.00	-10.14	1/12
3	QPSK	1851.50	17.77	H	4.49	9.51	22.80	190.44	33.00	-10.20	1/8
		1882.50	18.95	H	4.52	9.27	23.70	234.36	33.00	-9.30	1/8
		1913.50	19.50	H	4.56	8.95	23.89	244.65	33.00	-9.11	1/8
	16-QAM	1851.50	16.99	H	4.49	9.51	22.02	159.14	33.00	-10.98	1/8
		1882.50	18.54	H	4.52	9.27	23.29	213.25	33.00	-9.71	1/8
		1913.50	18.83	H	4.56	8.95	23.22	209.67	33.00	-9.78	1/8
1.4	QPSK	1850.70	17.45	H	4.48	9.52	22.49	177.27	33.00	-10.51	1/3
		1882.50	19.33	H	4.52	9.27	24.08	255.79	33.00	-8.92	1/0
		1914.30	19.49	H	4.56	8.94	23.87	243.67	33.00	-9.13	1/0
	16-QAM	1850.70	16.58	H	4.48	9.52	21.62	145.09	33.00	-11.38	1/3
		1882.50	18.21	H	4.52	9.27	22.96	197.65	33.00	-10.04	1/0
		1914.30	18.48	H	4.56	8.94	22.86	193.11	33.00	-10.14	1/5

**LTE Band 25 (ANT F)**

BW (MHz)	Modulation	f (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	Limit (dBm)	Delta (dB)	RB
20	QPSK	1860.00	15.23	H	4.49	9.45	20.19	104.38	33.00	-12.81	1/50
		1882.50	14.69	H	4.52	9.27	19.44	87.88	33.00	-13.56	1/50
		1905.00	15.36	H	4.55	9.06	19.88	97.19	33.00	-13.12	1/0
	16-QAM	1860.00	13.87	H	4.49	9.45	18.83	76.32	33.00	-14.17	1/50
		1882.50	11.49	H	4.52	9.27	16.24	42.06	33.00	-16.76	1/50
		1905.00	14.32	H	4.55	9.06	18.84	76.49	33.00	-14.16	1/0
15	QPSK	1857.50	14.65	H	4.49	9.47	19.63	91.78	33.00	-13.37	1/37
		1882.50	13.57	H	4.52	9.27	18.32	67.90	33.00	-14.68	1/37
		1907.50	14.57	H	4.55	9.03	19.05	80.37	33.00	-13.95	1/37
	16-QAM	1857.50	13.62	H	4.49	9.47	18.60	72.40	33.00	-14.40	1/37
		1882.50	12.38	H	4.52	9.27	17.13	51.63	33.00	-15.87	1/37
		1907.50	13.93	H	4.55	9.03	18.41	69.36	33.00	-14.59	1/37
10	QPSK	1855.00	14.52	H	4.49	9.48	19.52	89.47	33.00	-13.48	1/25
		1882.50	13.73	H	4.52	9.27	18.48	70.45	33.00	-14.52	1/25
		1910.00	14.92	H	4.55	8.99	19.36	86.29	33.00	-13.64	1/25
	16-QAM	1855.00	13.87	H	4.49	9.48	18.87	77.03	33.00	-14.13	1/25
		1882.50	13.32	H	4.52	9.27	18.07	64.10	33.00	-14.93	1/25
		1910.00	14.27	H	4.55	8.99	18.71	74.29	33.00	-14.29	1/25
5	QPSK	1852.50	14.87	H	4.49	9.50	19.89	97.40	33.00	-13.11	1/12
		1882.50	13.94	H	4.52	9.27	18.69	73.94	33.00	-14.31	1/12
		1912.50	15.11	H	4.56	8.96	19.52	89.45	33.00	-13.48	1/12
	16-QAM	1852.50	13.78	H	4.49	9.50	18.80	75.78	33.00	-14.20	1/12
		1882.50	13.35	H	4.52	9.27	18.10	64.55	33.00	-14.90	1/12
		1912.50	14.55	H	4.56	8.96	18.96	78.63	33.00	-14.04	1/12
3	QPSK	1851.50	15.19	H	4.49	9.51	20.22	105.14	33.00	-12.78	1/8
		1882.50	14.99	H	4.52	9.27	19.74	94.16	33.00	-13.26	1/8
		1913.50	14.45	H	4.56	8.95	18.84	76.48	33.00	-14.16	1/8
	16-QAM	1851.50	13.76	H	4.49	9.51	18.79	75.64	33.00	-14.21	1/8
		1882.50	13.81	H	4.52	9.27	18.56	71.76	33.00	-14.44	1/8
		1913.50	13.72	H	4.56	8.95	18.11	64.65	33.00	-14.89	1/8
1.4	QPSK	1850.70	14.04	H	4.48	9.52	19.08	80.84	33.00	-13.92	1/3
		1882.50	13.91	H	4.52	9.27	18.66	73.43	33.00	-14.34	1/3
		1914.30	14.24	H	4.56	8.94	18.62	72.74	33.00	-14.38	1/3
	16-QAM	1850.70	13.70	H	4.48	9.52	18.74	74.75	33.00	-14.26	1/3
		1882.50	12.95	H	4.52	9.27	17.70	58.87	33.00	-15.30	1/3
		1914.30	13.70	H	4.56	8.94	18.08	64.24	33.00	-14.92	1/3

**5G NR n25 DFT-s OFDM (ANT A)**

BW (MHz)	Modulation	f (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	Limit (dBm)	Delta (dB)	RB
40	QPSK	1870.00	18.00	H	4.51	9.37	22.86	193.34	33.00	-10.14	1/1
		1882.50	19.46	H	4.52	9.27	24.21	263.56	33.00	-8.79	1/108
		1895.00	19.31	H	4.54	9.17	23.94	247.82	33.00	-9.06	1/108
	16-QAM	1870.00	17.11	H	4.51	9.37	21.97	157.52	33.00	-11.03	1/1
		1882.50	18.55	H	4.52	9.27	23.30	213.74	33.00	-9.70	1/108
		1895.00	18.72	H	4.54	9.17	23.35	216.34	33.00	-9.65	1/108
35	QPSK	1867.50	19.39	H	4.51	9.39	24.27	267.12	33.00	-8.73	1/93
		1882.50	19.12	H	4.52	9.27	23.87	243.72	33.00	-9.13	1/93
		1897.50	19.53	H	4.54	9.15	24.15	259.92	33.00	-8.85	1/93
	16-QAM	1867.50	18.59	H	4.51	9.39	23.47	222.18	33.00	-9.53	1/93
		1882.50	18.23	H	4.52	9.27	22.98	198.56	33.00	-10.02	1/93
		1897.50	18.96	H	4.54	9.15	23.58	227.95	33.00	-9.42	1/93
30	QPSK	1865.00	18.23	H	4.50	9.41	23.13	205.56	33.00	-9.87	1/1
		1882.50	19.17	H	4.52	9.27	23.92	246.54	33.00	-9.08	1/1
		1900.00	18.62	H	4.54	9.13	23.22	209.66	33.00	-9.78	1/158
	16-QAM	1865.00	17.20	H	4.50	9.41	22.10	162.16	33.00	-10.90	1/1
		1882.50	18.13	H	4.52	9.27	22.88	194.04	33.00	-10.12	1/1
		1900.00	17.92	H	4.54	9.13	22.52	178.45	33.00	-10.48	1/158
25	QPSK	1862.50	18.64	H	4.50	9.43	23.57	227.59	33.00	-9.43	1/67
		1882.50	18.95	H	4.52	9.27	23.70	234.36	33.00	-9.30	1/67
		1902.50	19.65	H	4.54	9.10	24.20	263.11	33.00	-8.80	1/67
	16-QAM	1862.50	17.97	H	4.50	9.43	22.90	195.05	33.00	-10.10	1/67
		1882.50	17.76	H	4.52	9.27	22.51	178.19	33.00	-10.49	1/67
		1902.50	18.65	H	4.54	9.10	23.20	209.00	33.00	-9.80	1/67
20	QPSK	1860.00	17.81	H	4.49	9.45	22.77	189.06	33.00	-10.23	1/1
		1882.50	18.65	H	4.52	9.27	23.40	218.72	33.00	-9.60	1/1
		1905.00	17.73	H	4.55	9.06	22.25	167.73	33.00	-10.75	1/104
	16-QAM	1860.00	17.05	H	4.49	9.45	22.01	158.71	33.00	-10.99	1/1
		1882.50	18.09	H	4.52	9.27	22.84	192.26	33.00	-10.16	1/1
		1905.00	17.35	H	4.55	9.06	21.87	153.67	33.00	-11.13	1/104
15	QPSK	1857.50	17.92	H	4.49	9.47	22.90	194.87	33.00	-10.10	1/1
		1882.50	18.64	H	4.52	9.27	23.39	218.22	33.00	-9.61	1/1
		1907.50	17.98	H	4.55	9.03	22.46	176.24	33.00	-10.54	1/77
	16-QAM	1857.50	17.15	H	4.49	9.47	22.13	163.21	33.00	-10.87	1/1
		1882.50	17.91	H	4.52	9.27	22.66	184.45	33.00	-10.34	1/1
		1907.50	17.29	H	4.55	9.03	21.77	150.35	33.00	-11.23	1/77
10	QPSK	1855.00	18.26	H	4.49	9.48	23.26	211.68	33.00	-9.74	1/26
		1882.50	18.75	H	4.52	9.27	23.50	223.81	33.00	-9.50	1/1
		1910.00	18.93	H	4.55	8.99	23.37	217.24	33.00	-9.63	1/26
	16-QAM	1855.00	17.02	H	4.49	9.48	22.02	159.11	33.00	-10.98	1/26
		1882.50	17.53	H	4.52	9.27	22.28	169.00	33.00	-10.72	1/1
		1910.00	18.24	H	4.55	8.99	22.68	185.33	33.00	-10.32	1/26
5	QPSK	1852.50	18.06	H	4.49	9.50	23.08	203.04	33.00	-9.92	1/1
		1882.50	18.59	H	4.52	9.27	23.34	215.72	33.00	-9.66	1/23
		1912.50	19.11	H	4.56	8.96	23.52	224.68	33.00	-9.48	1/1
	16-QAM	1852.50	17.09	H	4.49	9.50	22.11	162.39	33.00	-10.89	1/1
		1882.50	17.51	H	4.52	9.27	22.26	168.22	33.00	-10.74	1/23
		1912.50	18.10	H	4.56	8.96	22.51	178.06	33.00	-10.49	1/1

**5G NR n25 DFT-s OFDM (ANT F)**

BW (MHz)	Modulation	f (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	Limit (dBm)	Delta (dB)	RB
40	QPSK	1870.00	15.21	H	4.51	9.37	20.07	101.70	33.00	-12.93	1/108
		1882.50	16.17	H	4.52	9.27	20.92	123.56	33.00	-12.08	1/1
		1895.00	15.94	H	4.54	9.17	20.57	114.06	33.00	-12.43	1/1
	16-QAM	1870.00	14.26	H	4.51	9.37	19.12	81.72	33.00	-13.88	1/108
		1882.50	15.34	H	4.52	9.27	20.09	102.07	33.00	-12.91	1/1
		1895.00	14.96	H	4.54	9.17	19.59	91.02	33.00	-13.41	1/1
35	QPSK	1867.50	15.74	H	4.51	9.39	20.62	115.27	33.00	-12.38	1/93
		1882.50	15.14	H	4.52	9.27	19.89	97.47	33.00	-13.11	1/93
		1897.50	14.92	H	4.54	9.15	19.54	89.92	33.00	-13.46	1/93
	16-QAM	1867.50	14.64	H	4.51	9.39	19.52	89.48	33.00	-13.48	1/93
		1882.50	13.83	H	4.52	9.27	18.58	72.09	33.00	-14.42	1/93
		1897.50	13.92	H	4.54	9.15	18.54	71.42	33.00	-14.46	1/93
30	QPSK	1865.00	15.64	H	4.50	9.41	20.54	113.22	33.00	-12.46	1/1
		1882.50	15.64	H	4.52	9.27	20.39	109.37	33.00	-12.61	1/1
		1900.00	15.33	H	4.54	9.13	19.93	98.29	33.00	-13.07	1/158
	16-QAM	1865.00	14.68	H	4.50	9.41	19.58	90.77	33.00	-13.42	1/1
		1882.50	15.08	H	4.52	9.27	19.83	96.14	33.00	-13.17	1/1
		1900.00	14.26	H	4.54	9.13	18.86	76.83	33.00	-14.14	1/158
25	QPSK	1862.50	15.65	H	4.50	9.43	20.58	114.33	33.00	-12.42	1/67
		1882.50	14.84	H	4.52	9.27	19.59	90.97	33.00	-13.41	1/67
		1902.50	14.67	H	4.54	9.10	19.22	83.59	33.00	-13.78	1/131
	16-QAM	1862.50	14.68	H	4.50	9.43	19.61	91.44	33.00	-13.39	1/67
		1882.50	14.26	H	4.52	9.27	19.01	79.60	33.00	-13.99	1/67
		1902.50	13.27	H	4.54	9.10	17.82	60.55	33.00	-15.18	1/131
20	QPSK	1860.00	15.40	H	4.49	9.45	20.36	108.55	33.00	-12.64	1/1
		1882.50	15.29	H	4.52	9.27	20.04	100.90	33.00	-12.96	1/1
		1905.00	14.57	H	4.55	9.06	19.09	81.02	33.00	-13.91	1/104
	16-QAM	1860.00	14.57	H	4.49	9.45	19.53	89.66	33.00	-13.47	1/1
		1882.50	14.44	H	4.52	9.27	19.19	82.96	33.00	-13.81	1/1
		1905.00	13.69	H	4.55	9.06	18.21	66.16	33.00	-14.79	1/104
15	QPSK	1857.50	15.80	H	4.49	9.47	20.78	119.61	33.00	-12.22	1/1
		1882.50	15.11	H	4.52	9.27	19.86	96.80	33.00	-13.14	1/1
		1907.50	14.86	H	4.55	9.03	19.34	85.92	33.00	-13.66	1/77
	16-QAM	1857.50	14.61	H	4.49	9.47	19.59	90.94	33.00	-13.41	1/1
		1882.50	14.16	H	4.52	9.27	18.91	77.78	33.00	-14.09	1/1
		1907.50	14.02	H	4.55	9.03	18.50	70.81	33.00	-14.50	1/77
10	QPSK	1855.00	15.73	H	4.49	9.48	20.73	118.22	33.00	-12.27	1/1
		1882.50	14.53	H	4.52	9.27	19.28	84.70	33.00	-13.72	1/1
		1910.00	14.79	H	4.55	8.99	19.23	83.74	33.00	-13.77	1/50
	16-QAM	1855.00	14.37	H	4.49	9.48	19.37	86.43	33.00	-13.63	1/1
		1882.50	13.58	H	4.52	9.27	18.33	68.06	33.00	-14.67	1/1
		1910.00	13.90	H	4.55	8.99	18.34	68.23	33.00	-14.66	1/50
5	QPSK	1852.50	15.27	H	4.49	9.50	20.29	106.80	33.00	-12.71	1/1
		1882.50	14.53	H	4.52	9.27	19.28	84.70	33.00	-13.72	1/1
		1912.50	14.41	H	4.56	8.96	18.82	76.13	33.00	-14.18	1/13
	16-QAM	1852.50	14.56	H	4.49	9.50	19.58	90.69	33.00	-13.42	1/1
		1882.50	13.41	H	4.52	9.27	18.16	65.45	33.00	-14.84	1/1
		1912.50	13.70	H	4.56	8.96	18.11	64.65	33.00	-14.89	1/13

## 9.2. RADIATED SPURIOUS EMISSION

### RULE PART(S)

FCC: §2.1053, §24.238

### LIMIT

24.238(a)

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

### TEST PROCEDURE

ANSI / TIA / EIA 603 E Clause 2.2.12; ESU40 setting reference to 971168 D01 v03r01

For peak power measurement with a ESU40:

- a) Set the RBW = 100 kHz for emission below 1 GHz and 1 MHz for emissions above 1 GHz
- b) Set VBW  $\geq 3 \times$  RBW;
- c) Set span  $\geq 1.5$  times the OBW;
- d) Sweep time = auto couple;
- e) Detector = rms;
- f) Ensure that the number of measurement points  $\geq$  span/RBW;
- g) Trace Mode = average(WCDMA, LTE, 5G NR), Maxhold(GSM);

### NOTE1

5G NR: All Waveforms (CP-OFDM vs DFT-s\_OFDM) and modulations ( $\pi/2$  BPSK, QPSK, 16QAM, 64QAM, 256QAM) were investigated to determine the worst case configuration. All Modes of operation were investigated and the worst case configuration results are reported in this section.

### NOTE2

Please refer to section 5.4 for bandwidth and RB setting about LTE, 5G NR bands.

### RESULTS

See the following pages.



### 9.2.1. SPURIOUS RADIATION PLOTS

#### GSM1900

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement										
		<b>Company:</b>	Samsung							
		<b>Project #:</b>	4790976523							
		<b>Date:</b>	2023-09-05							
		<b>Test Engineer:</b>	24542							
		<b>Configuration:</b>	EUT / AC Adapter, X-Position							
		<b>Location:</b>	Chamber 2							
		<b>Mode:</b>	GPRS 1900 MHz Harmonics							
		<b>Test Voltage:</b>	AC 120 V, 60 Hz							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
<b>Low Ch, 1850.2MHz</b>										
3700.40	-7.6	V	3.0	42.2	1.0	-48.9	-13.0	-35.9		
5550.60	-3.4	V	3.0	43.0	1.0	-45.4	-13.0	-32.4		
7400.80	-3.0	V	3.0	42.6	1.0	-44.6	-13.0	-31.6		
3700.40	-7.9	H	3.0	42.2	1.0	-49.1	-13.0	-36.1		
5550.60	-3.9	H	3.0	43.0	1.0	-45.9	-13.0	-32.9		
7400.80	-3.4	H	3.0	42.6	1.0	-45.0	-13.0	-32.0		
<b>Mid Ch, 1880MHz</b>										
3760.00	-7.5	V	3.0	42.2	1.0	-48.7	-13.0	-35.7		
5640.00	-2.3	V	3.0	43.1	1.0	-44.3	-13.0	-31.3		
7520.00	-2.8	V	3.0	42.6	1.0	-44.4	-13.0	-31.4		
3760.00	-7.9	H	3.0	42.2	1.0	-49.1	-13.0	-36.1		
5640.00	-3.4	H	3.0	43.1	1.0	-45.5	-13.0	-32.5		
7520.00	-3.3	H	3.0	42.6	1.0	-44.8	-13.0	-31.8		
<b>High Ch, 1909.8MHz</b>										
3819.60	-7.3	V	3.0	42.2	1.0	-48.5	-13.0	-35.5		
5729.40	-2.1	V	3.0	43.1	1.0	-44.2	-13.0	-31.2		
7639.20	-2.5	V	3.0	42.5	1.0	-44.0	-13.0	-31.0		
3819.60	-7.8	H	3.0	42.2	1.0	-49.0	-13.0	-36.0		
5729.40	-3.2	H	3.0	43.1	1.0	-45.3	-13.0	-32.3		
7639.20	-3.2	H	3.0	42.5	1.0	-44.7	-13.0	-31.7		

GPRS

**WCDMA Band 2**

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement											
		<b>Company:</b>	Samsung								
		<b>Project #:</b>	4790976523								
		<b>Date:</b>	2023-09-11								
		<b>Test Engineer:</b>	24542								
		<b>Configuration:</b>	EUT / AC Adapter, Z-Position								
		<b>Location:</b>	Chamber 2								
		<b>Mode:</b>	Rel99 Band 2 Harmonics								
		<b>Test Voltage:</b>	AC 120 V, 60 Hz								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes		
<b>Low Ch, 1852.4MHz</b>											
3704.80	-10.7	V	3.0	42.2	1.0	-51.9	-13.0	-38.9			
5557.20	-7.5	V	3.0	43.0	1.0	-49.6	-13.0	-36.6			
7409.60	-5.4	V	3.0	42.6	1.0	-47.0	-13.0	-34.0			
3704.80	-10.8	H	3.0	42.2	1.0	-52.0	-13.0	-39.0			
5557.20	-7.5	H	3.0	43.0	1.0	-49.5	-13.0	-36.5			
7409.60	-6.0	H	3.0	42.6	1.0	-47.6	-13.0	-34.6			
<b>Mid Ch, 1880MHz</b>											
3760.00	-10.6	V	3.0	42.2	1.0	-51.8	-13.0	-38.8			
5640.00	-6.5	V	3.0	43.1	1.0	-48.6	-13.0	-35.6			
7520.00	-5.4	V	3.0	42.6	1.0	-46.9	-13.0	-33.9			
3760.00	-10.8	H	3.0	42.2	1.0	-52.0	-13.0	-39.0			
5640.00	-6.1	H	3.0	43.1	1.0	-48.2	-13.0	-35.2			
7520.00	-6.0	H	3.0	42.6	1.0	-47.6	-13.0	-34.6			
<b>High Ch, 1907.6MHz</b>											
3815.20	-10.5	V	3.0	42.2	1.0	-51.7	-13.0	-38.7			
5722.80	-7.1	V	3.0	43.1	1.0	-49.2	-13.0	-36.2			
7630.40	-5.2	V	3.0	42.5	1.0	-46.8	-13.0	-33.8			
3815.20	-10.8	H	3.0	42.2	1.0	-52.0	-13.0	-39.0			
5722.80	-6.8	H	3.0	43.1	1.0	-48.8	-13.0	-35.8			
7630.40	-5.8	H	3.0	42.5	1.0	-47.4	-13.0	-34.4			

REL99

**LTE Band 25**

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement										
Company: Samsung Project #: 4790976523 Date: 2023-09-12 Test Engineer: 24542 Configuration: EUT / AC Adapter, X-Position Location: Chamber 2 Mode: LTE_QPSK Band 25 Harmonics, 1.4MHz Bandwidth Test Votage: AC 120 V, 60 Hz										
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
1.4 MHz	Low Ch, 1850.7MHz									
QPSK	3701.40	-10.6	V	3.0	42.2	1.0	-51.8	-13.0	-38.8	
ANT A	5552.10	-6.7	V	3.0	43.0	1.0	-48.7	-13.0	-35.7	
	7402.80	-5.4	V	3.0	42.6	1.0	-47.1	-13.0	-34.1	
	3701.40	-10.6	H	3.0	42.2	1.0	-51.8	-13.0	-38.8	
	5552.10	-7.1	H	3.0	43.0	1.0	-49.1	-13.0	-36.1	
	7402.80	-5.8	H	3.0	42.6	1.0	-47.5	-13.0	-34.5	
	Mid Ch, 1882.5MHz									
	3765.00	-10.4	V	3.0	42.2	1.0	-51.7	-13.0	-38.7	
	5647.50	-4.9	V	3.0	43.1	1.0	-46.9	-13.0	-33.9	
	7530.00	-5.4	V	3.0	42.6	1.0	-47.0	-13.0	-34.0	
	3765.00	-10.7	H	3.0	42.2	1.0	-51.9	-13.0	-38.9	
	5647.50	-4.0	H	3.0	43.1	1.0	-46.0	-13.0	-33.0	
	7530.00	-6.0	H	3.0	42.6	1.0	-47.5	-13.0	-34.5	
	High Ch, 1914.3MHz									
	3828.60	-10.4	V	3.0	42.2	1.0	-51.6	-13.0	-38.6	
	5742.90	-5.8	V	3.0	43.1	1.0	-47.9	-13.0	-34.9	
	7657.20	-5.2	V	3.0	42.5	1.0	-46.7	-13.0	-33.7	
	3828.60	-10.4	H	3.0	42.2	1.0	-51.6	-13.0	-38.6	
	5742.90	-5.6	H	3.0	43.1	1.0	-47.6	-13.0	-34.6	
	7657.20	-5.8	H	3.0	42.5	1.0	-47.3	-13.0	-34.3	
UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement										
Company: Samsung Project #: 4790976523 Date: 2023-10-18 Test Engineer: 24542 Configuration: EUT / AC Adapter, Z-Position Location: Chamber 1 Mode: LTE_QPSK Band 25 Harmonics, 3MHz Bandwidth Test Votage: AC 120 V, 60 Hz										
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
3 MHz	Low Ch, 1851.5MHz									
QPSK	3703.00	-9.3	V	3.0	44.1	1.0	-52.4	-13.0	-39.4	
ANT F	5554.50	-6.4	V	3.0	45.0	1.0	-50.4	-13.0	-37.4	
	7406.00	-3.9	V	3.0	45.0	1.0	-47.9	-13.0	-34.9	
	3703.00	-9.0	H	3.0	44.1	1.0	-52.1	-13.0	-39.1	
	5554.50	-6.5	H	3.0	45.0	1.0	-50.5	-13.0	-37.5	
	7406.00	-3.8	H	3.0	45.0	1.0	-47.8	-13.0	-34.8	
	Mid Ch, 1882.5MHz									
	3765.00	-8.9	V	3.0	44.1	1.0	-52.1	-13.0	-39.1	
	5647.50	-6.3	V	3.0	45.0	1.0	-50.3	-13.0	-37.3	
	7530.00	-3.8	V	3.0	44.9	1.0	-47.7	-13.0	-34.7	
	3765.00	-8.6	H	3.0	44.1	1.0	-51.8	-13.0	-38.8	
	5647.50	-6.2	H	3.0	45.0	1.0	-50.2	-13.0	-37.2	
	7530.00	-3.7	H	3.0	44.9	1.0	-47.7	-13.0	-34.7	
	High Ch, 1913.5MHz									
	3827.00	-9.0	V	3.0	44.2	1.0	-52.2	-13.0	-39.2	
	5740.50	-6.4	V	3.0	45.0	1.0	-50.4	-13.0	-37.4	
	7654.00	-3.5	V	3.0	44.9	1.0	-47.4	-13.0	-34.4	
	3827.00	-8.4	H	3.0	44.2	1.0	-51.5	-13.0	-38.5	
	5740.50	-6.3	H	3.0	45.0	1.0	-50.4	-13.0	-37.4	
	7654.00	-3.4	H	3.0	44.9	1.0	-47.3	-13.0	-34.3	

**NR Band n25**

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
<b>Company:</b>		Samsung							
<b>Project #:</b>		4790976523							
<b>Date:</b>		2023-09-19							
<b>Test Engineer:</b>		26087							
<b>Configuration:</b>		EUT / AC Adapter, Y-Position							
<b>Location:</b>		Chamber 1							
<b>Mode:</b>		5G NR_QPSK NR n25 Harmonics, 35MHz Bandwidth							
<b>Test Voltage:</b>		AC 120 V, 60 Hz							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
<b>Low Ch, 1867.5MHz</b>									
3735.00	-8.7	V	3.0	44.1	1.0	-51.9	-13.0	-38.9	
5602.50	1.0	V	3.0	45.0	1.0	-43.0	-13.0	-30.0	
7470.00	-3.7	V	3.0	45.0	1.0	-47.7	-13.0	-34.7	
9337.50	-1.4	V	3.0	44.0	1.0	-44.4	-13.0	-31.4	
11205.00	0.9	V	3.0	43.4	1.0	-41.4	-13.0	-28.4	
3735.00	-8.4	H	3.0	44.1	1.0	-51.6	-13.0	-38.6	
5602.50	0.0	H	3.0	45.0	1.0	-44.0	-13.0	-31.0	
7470.00	-3.6	H	3.0	45.0	1.0	-47.6	-13.0	-34.6	
9337.50	-1.4	H	3.0	44.0	1.0	-44.4	-13.0	-31.4	
11205.00	1.2	H	3.0	43.4	1.0	-41.2	-13.0	-28.2	
<b>Mid Ch, 1882.5MHz</b>									
3765.00	-8.4	V	3.0	44.1	1.0	-51.5	-13.0	-38.5	
5647.50	3.3	V	3.0	45.0	1.0	-40.7	-13.0	-27.7	
7530.00	-3.8	V	3.0	44.9	1.0	-47.7	-13.0	-34.7	
9412.50	-1.0	V	3.0	44.0	1.0	-44.0	-13.0	-31.0	
11295.00	1.1	V	3.0	43.3	1.0	-41.2	-13.0	-28.2	
3765.00	-8.1	H	3.0	44.1	1.0	-51.2	-13.0	-38.2	
5647.50	0.5	H	3.0	45.0	1.0	-43.5	-13.0	-30.5	
7530.00	-3.7	H	3.0	44.9	1.0	-47.7	-13.0	-34.7	
9412.50	-0.9	H	3.0	44.0	1.0	-43.9	-13.0	-30.9	
11295.00	1.3	H	3.0	43.3	1.0	-41.1	-13.0	-28.1	
<b>High Ch, 1897.5MHz</b>									
3795.00	-8.5	V	3.0	44.2	1.0	-51.7	-13.0	-38.7	
5692.50	-0.9	V	3.0	45.0	1.0	-44.9	-13.0	-31.9	
7590.00	-3.4	V	3.0	44.9	1.0	-47.4	-13.0	-34.4	
9487.50	-1.4	V	3.0	43.9	1.0	-44.3	-13.0	-31.3	
11385.00	1.3	V	3.0	43.3	1.0	-41.0	-13.0	-28.0	
3795.00	-8.3	H	3.0	44.2	1.0	-51.4	-13.0	-38.4	
5692.50	2.0	H	3.0	45.0	1.0	-42.0	-13.0	-29.0	
7590.00	-3.3	H	3.0	44.9	1.0	-47.2	-13.0	-34.2	
9487.50	-1.4	H	3.0	43.9	1.0	-44.3	-13.0	-31.3	
11385.00	1.5	H	3.0	43.3	1.0	-40.9	-13.0	-27.9	

35 MHz  
 DFT-s\_OFDM  
 QPSK  
 ANT A

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement										
		<b>Company:</b>	Samsung							
		<b>Project #:</b>	4790976523							
		<b>Date:</b>	2023-10-19							
		<b>Test Engineer:</b>	26460							
		<b>Configuration:</b>	EUT / AC Adapter, Z-Position							
		<b>Location:</b>	Chamber 2							
		<b>Mode:</b>	5G NR_QPSK NR n25 Harmonics, 40MHz Bandwidth							
		<b>Test Voltage:</b>	AC 120 V, 60 Hz							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	
40 MHz										
DFT-s_OFDM										
QPSK										
ANT F										
Low Ch, 1870MHz										
3740.00	-10.6	V	3.0	42.2	1.0	-51.8	-13.0	-38.8		
5610.00	-7.6	V	3.0	43.0	1.0	-49.7	-13.0	-36.7		
7480.00	-5.3	V	3.0	42.6	1.0	-46.9	-13.0	-33.9		
Mid Ch, 1882.5MHz										
3765.00	-10.7	V	3.0	42.2	1.0	-51.9	-13.0	-38.9		
5647.50	-7.6	V	3.0	43.1	1.0	-49.7	-13.0	-36.7		
7530.00	-5.3	V	3.0	42.6	1.0	-46.9	-13.0	-33.9		
3765.00	-10.9	H	3.0	42.2	1.0	-52.1	-13.0	-39.1		
5647.50	-7.9	H	3.0	43.1	1.0	-50.0	-13.0	-37.0		
7530.00	-5.9	H	3.0	42.6	1.0	-47.5	-13.0	-34.5		
High Ch, 1895MHz										
3790.00	-10.6	V	3.0	42.2	1.0	-51.9	-13.0	-38.9		
5685.00	-7.5	V	3.0	43.1	1.0	-49.5	-13.0	-36.5		
7580.00	-5.2	V	3.0	42.5	1.0	-46.8	-13.0	-33.8		
3790.00	-10.9	H	3.0	42.2	1.0	-52.1	-13.0	-39.1		
5685.00	-7.6	H	3.0	43.1	1.0	-49.6	-13.0	-36.6		
7580.00	-5.8	H	3.0	42.5	1.0	-47.3	-13.0	-34.3		

## END OF REPORT