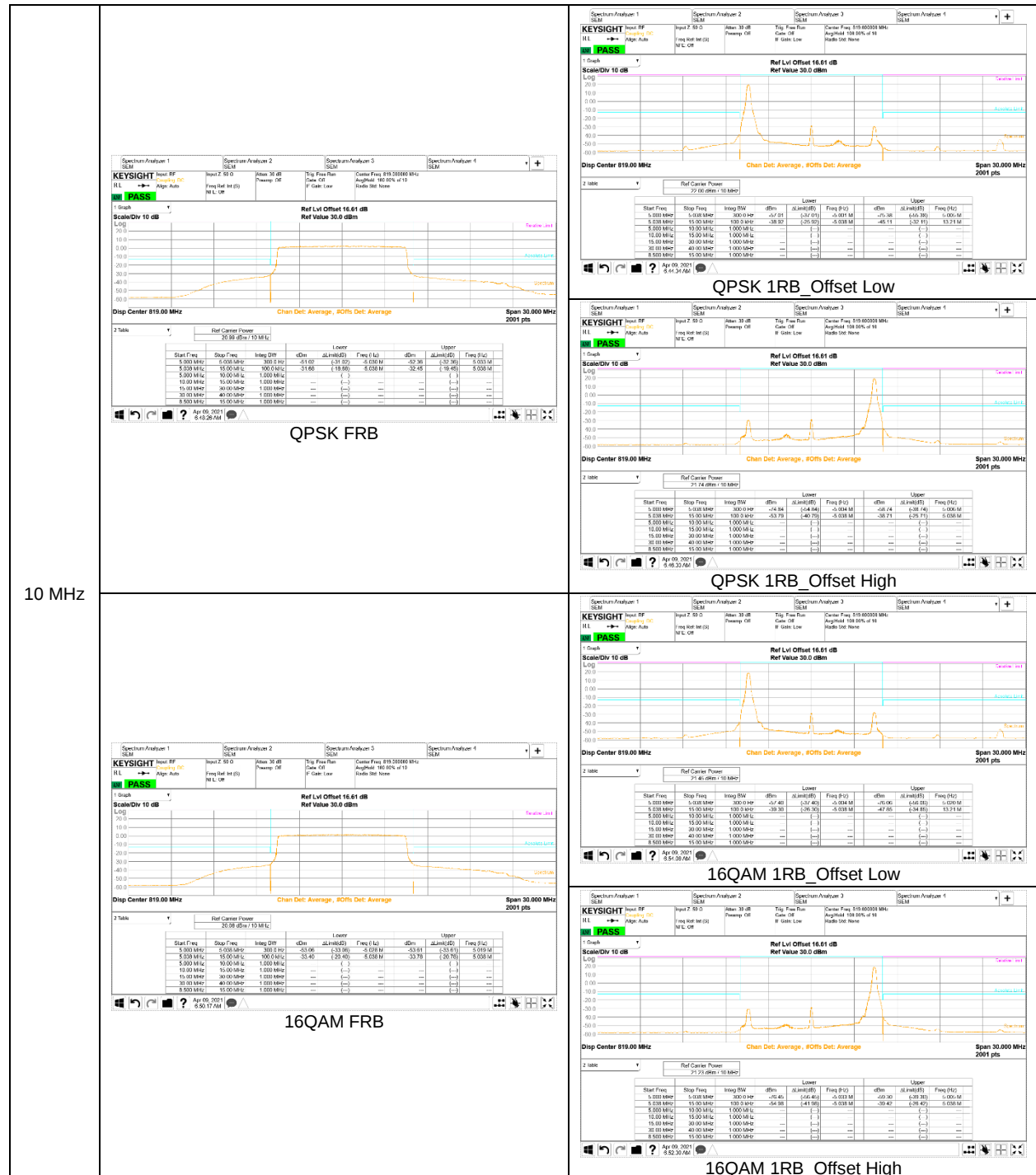
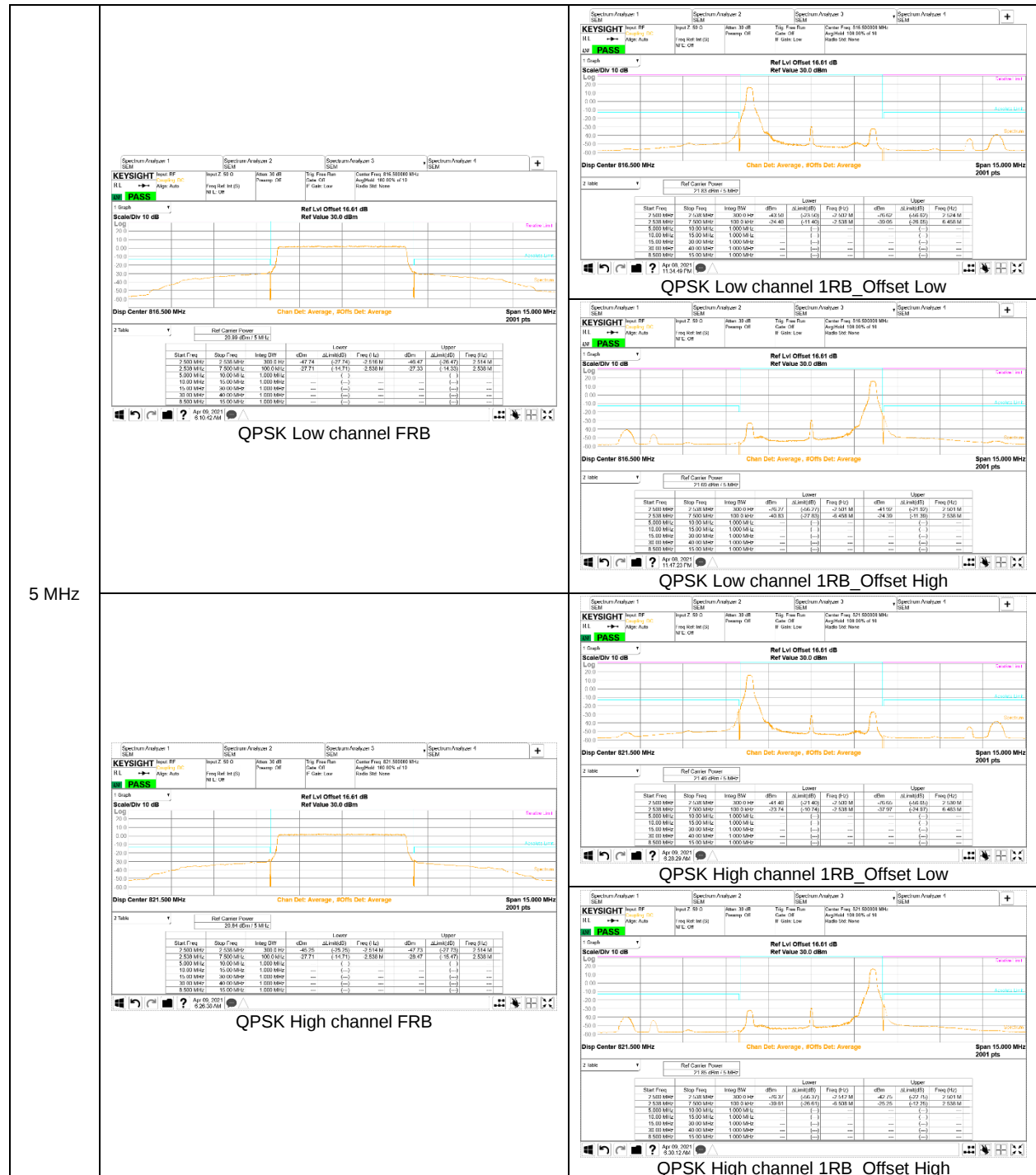
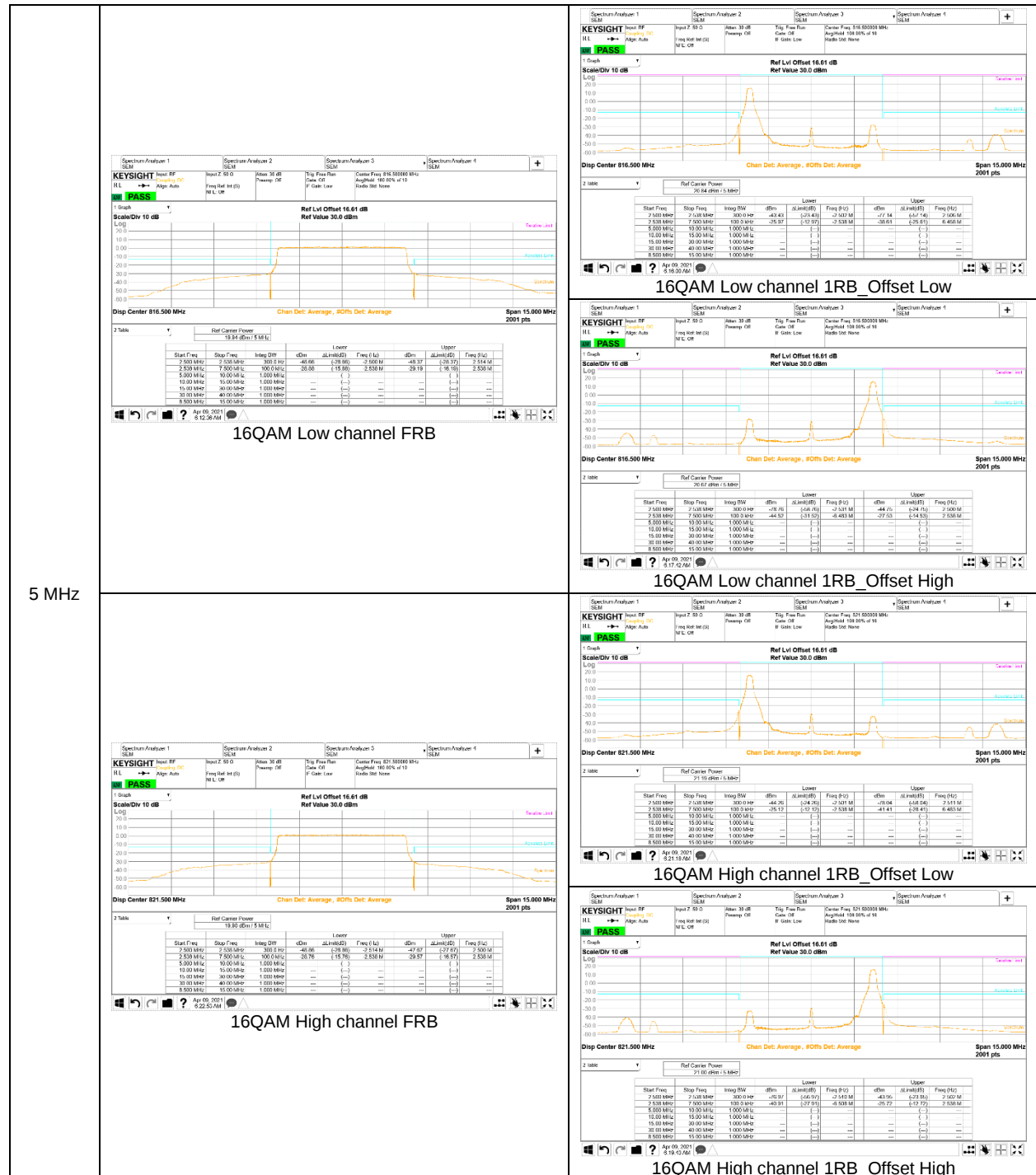
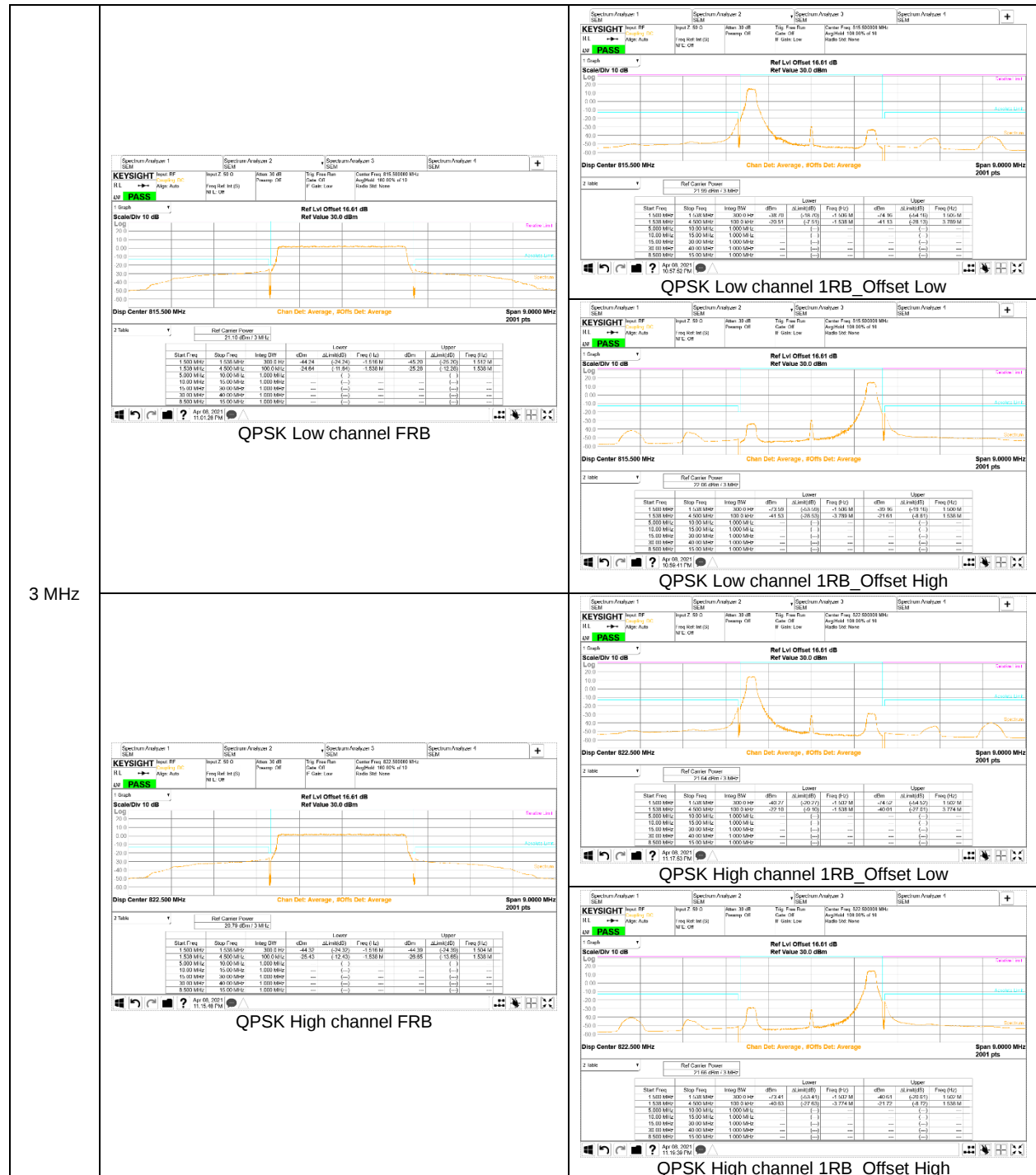


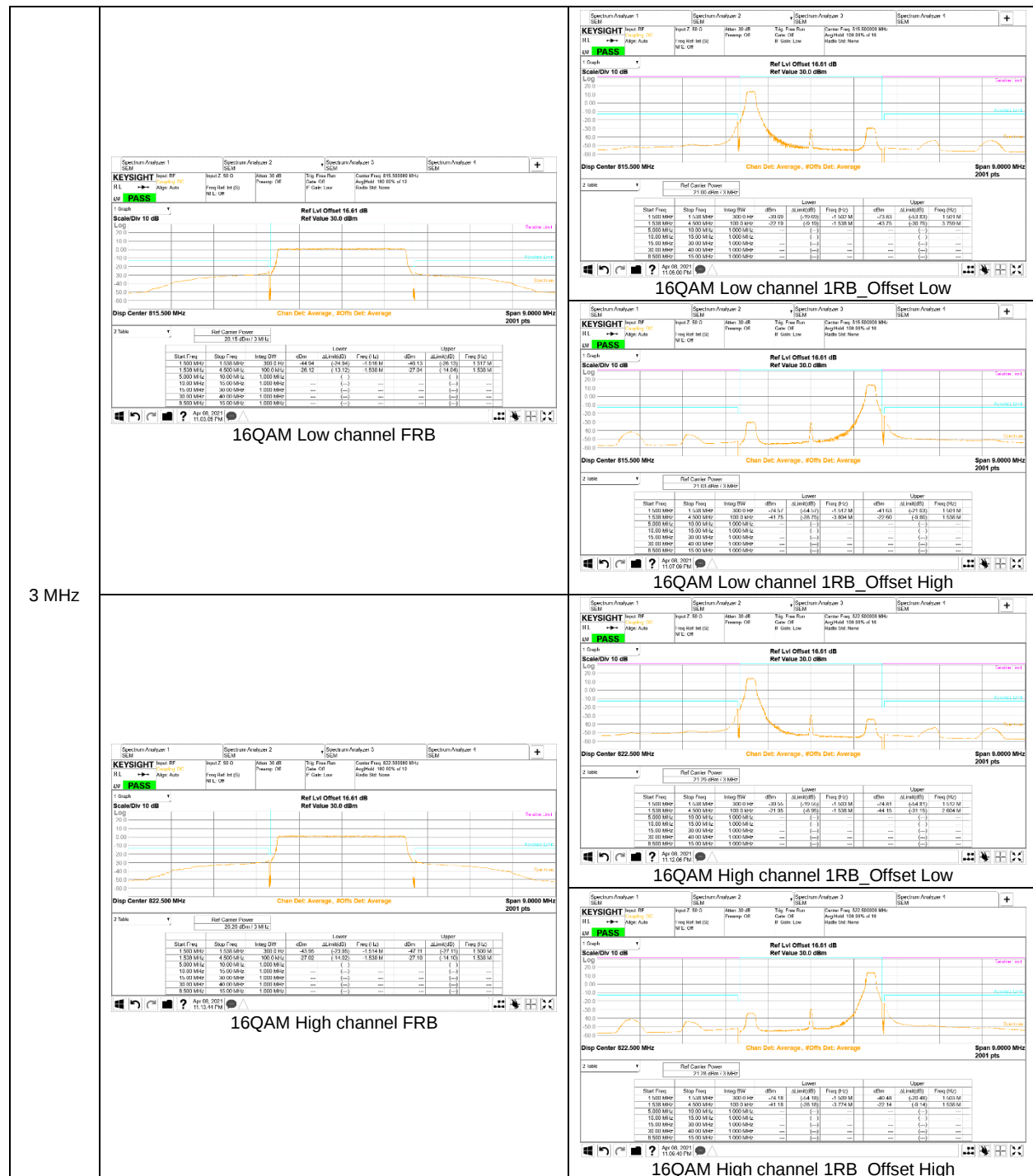


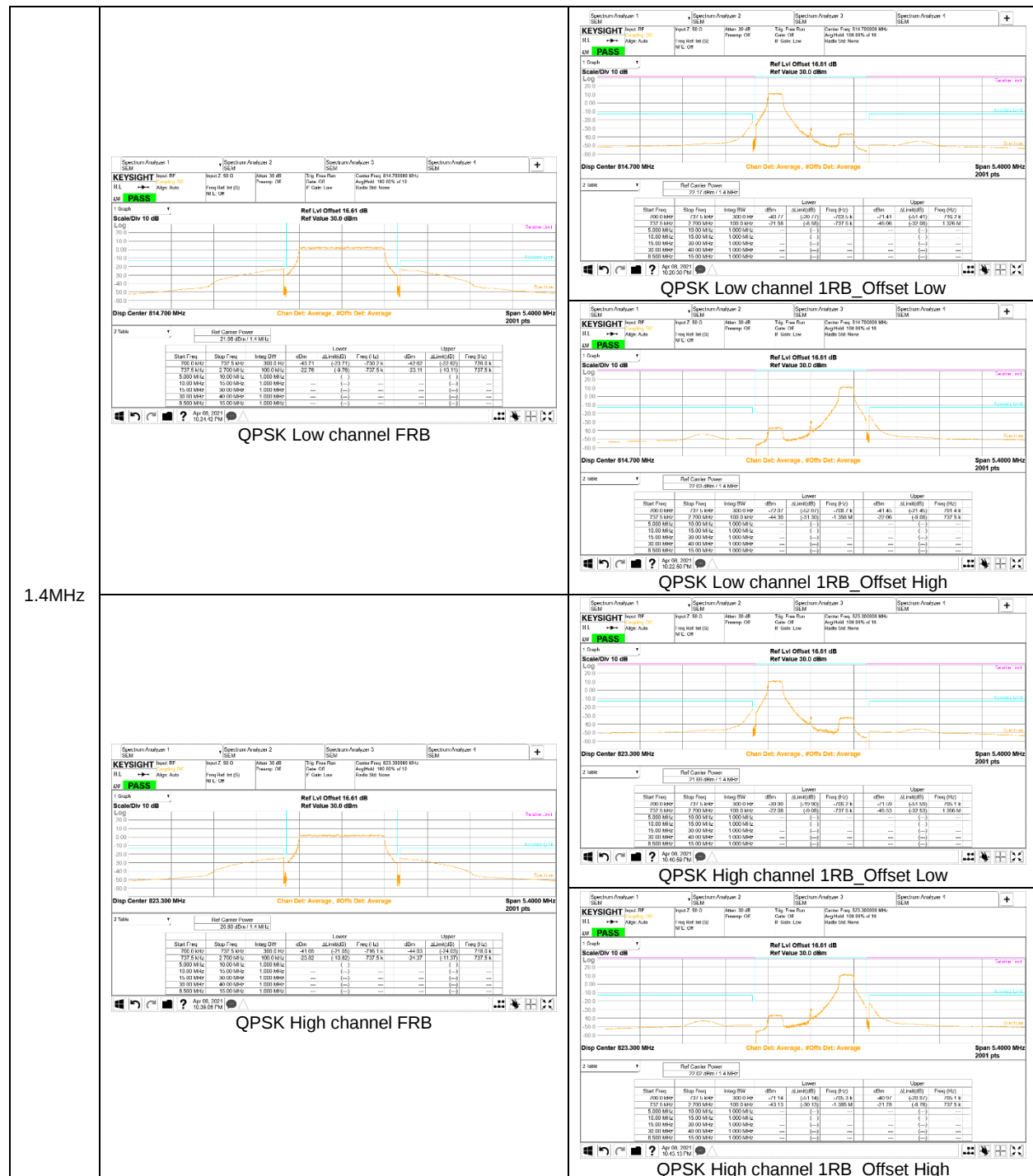
10 MHz

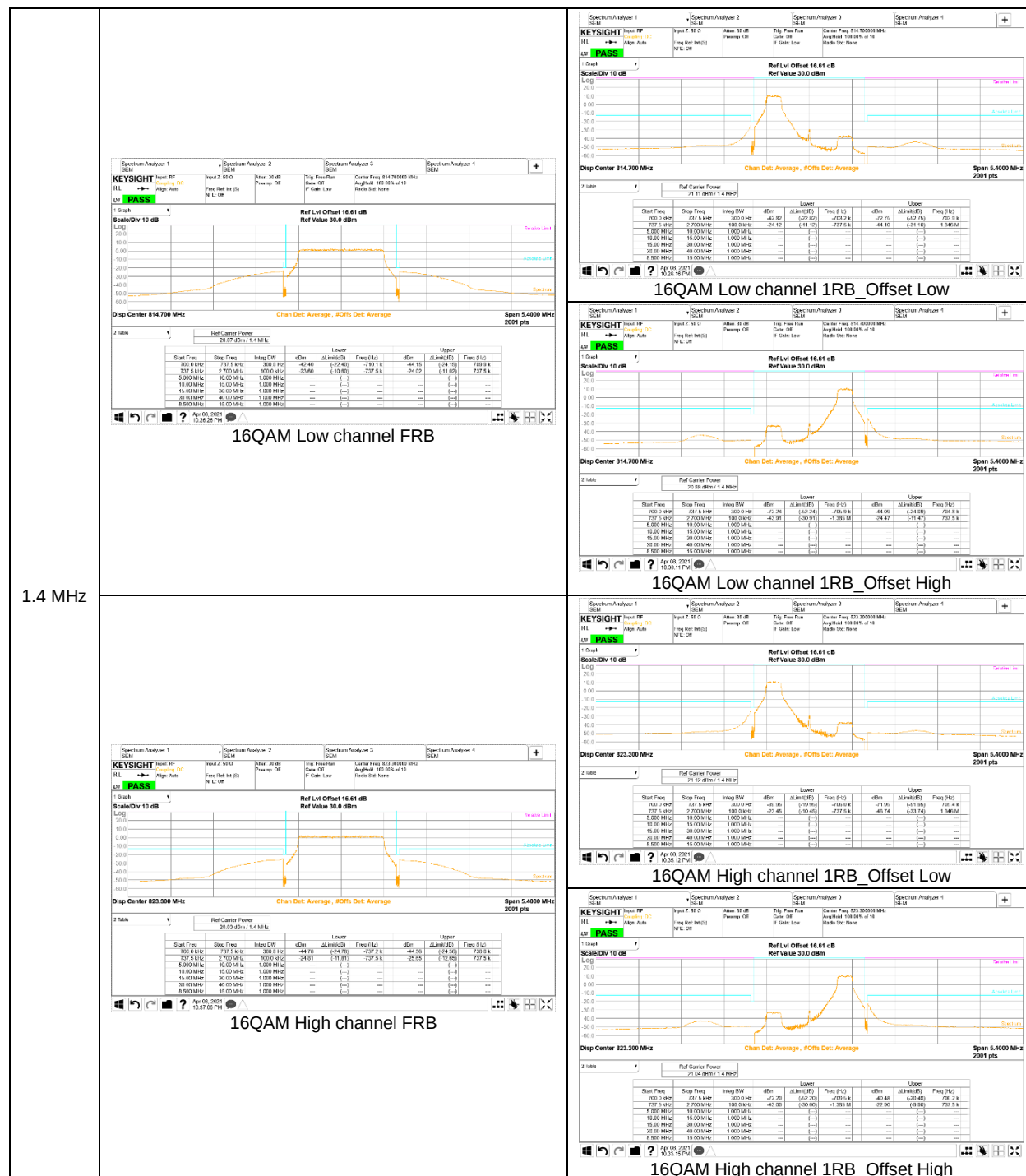




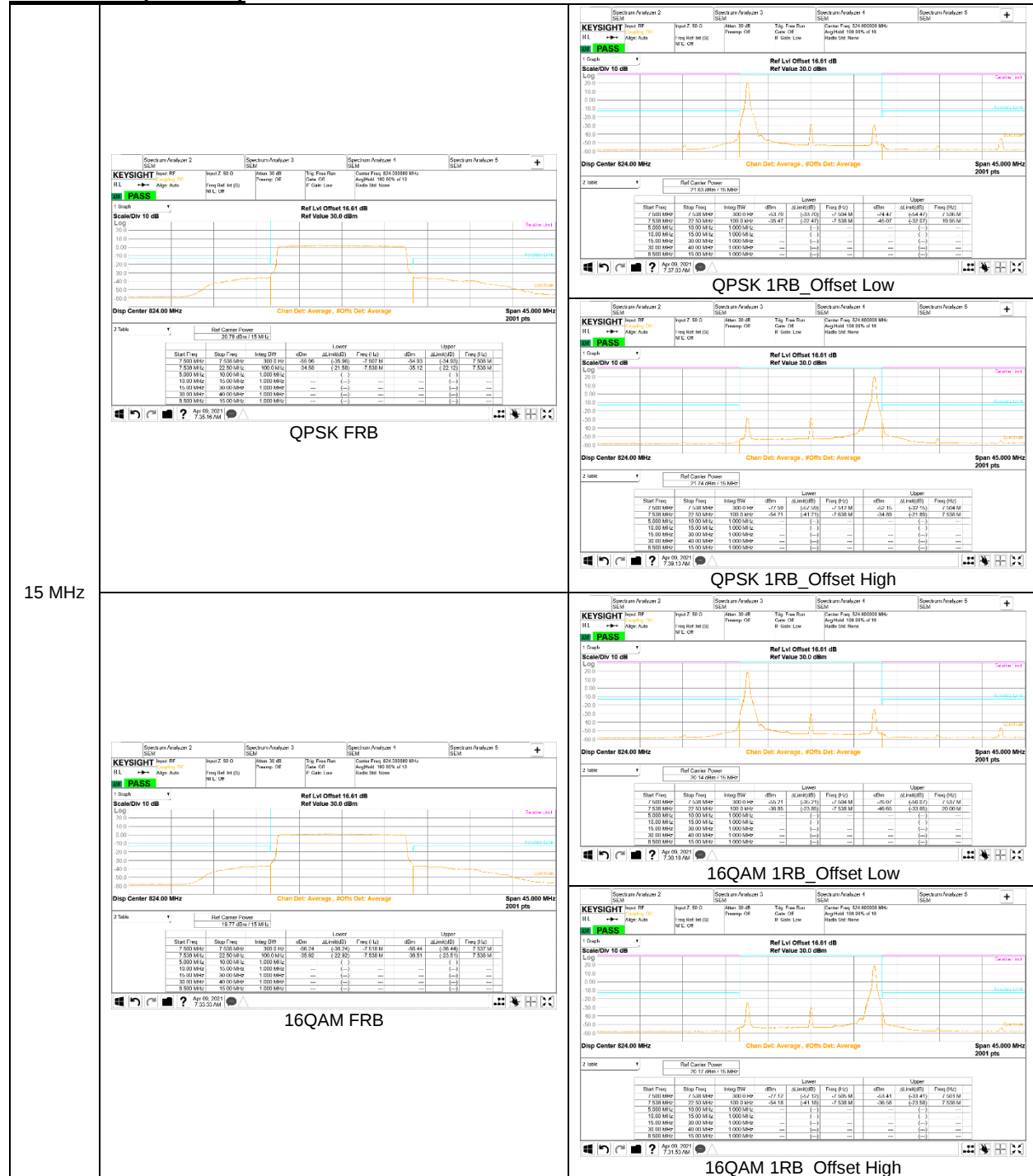


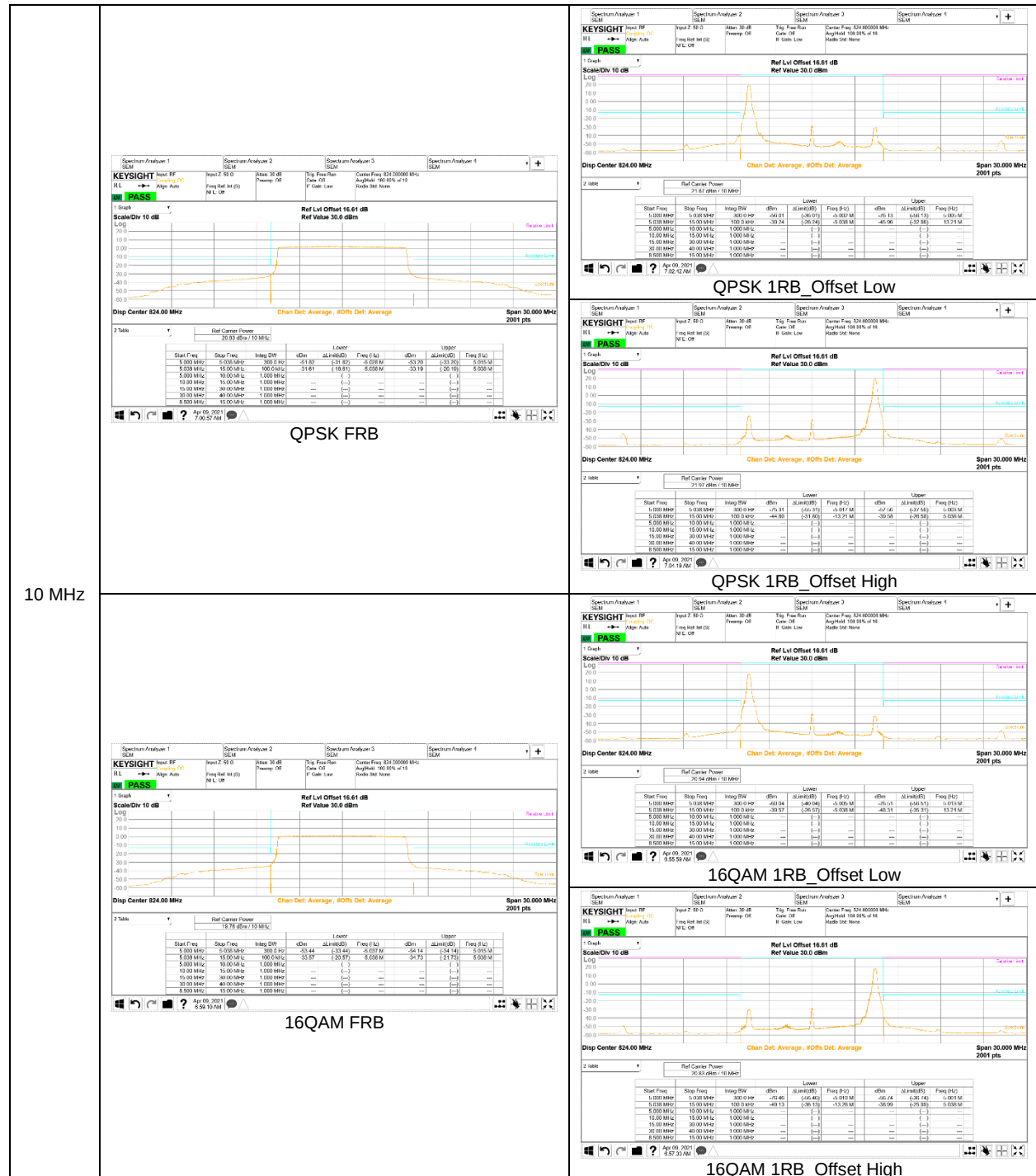


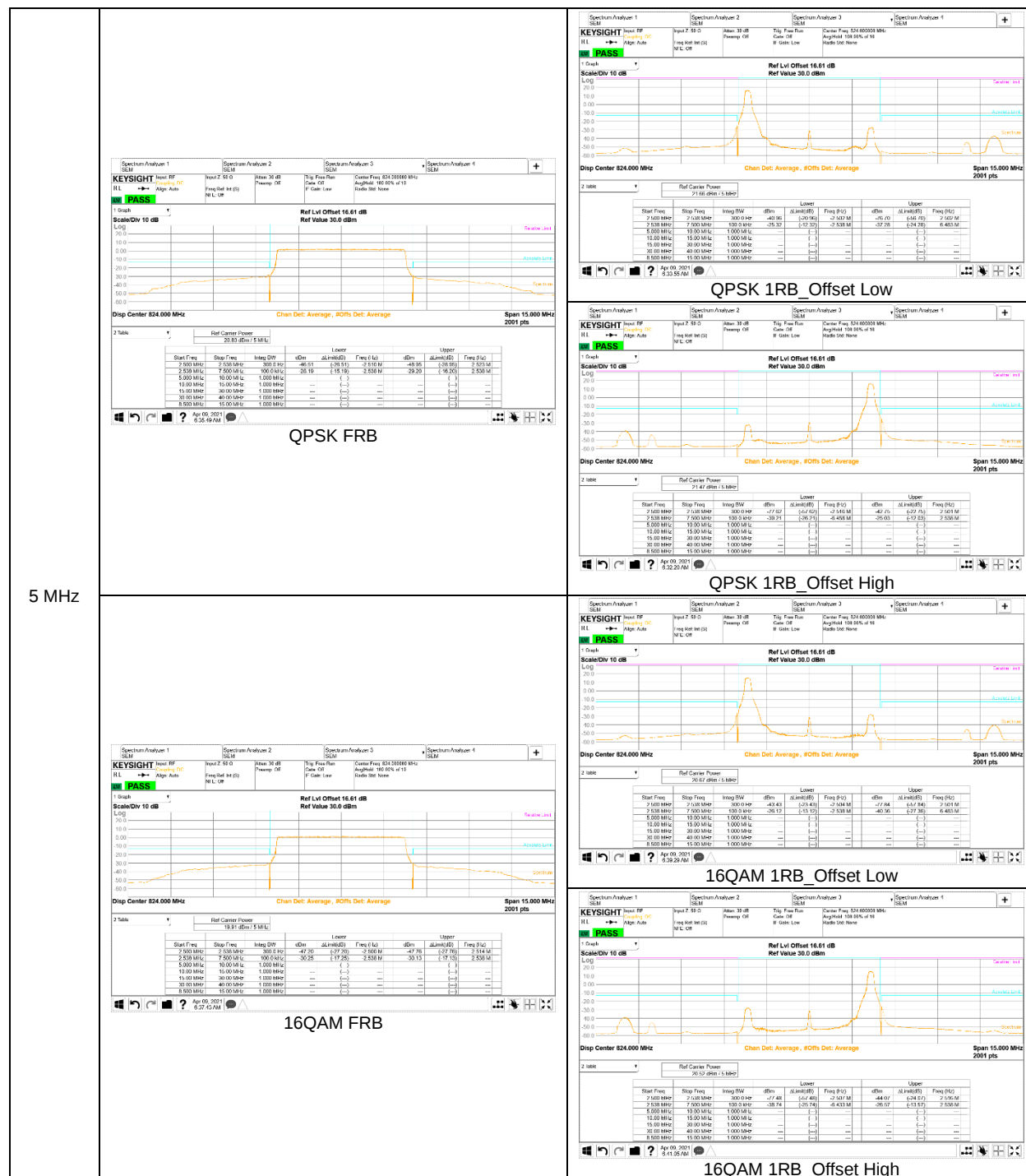


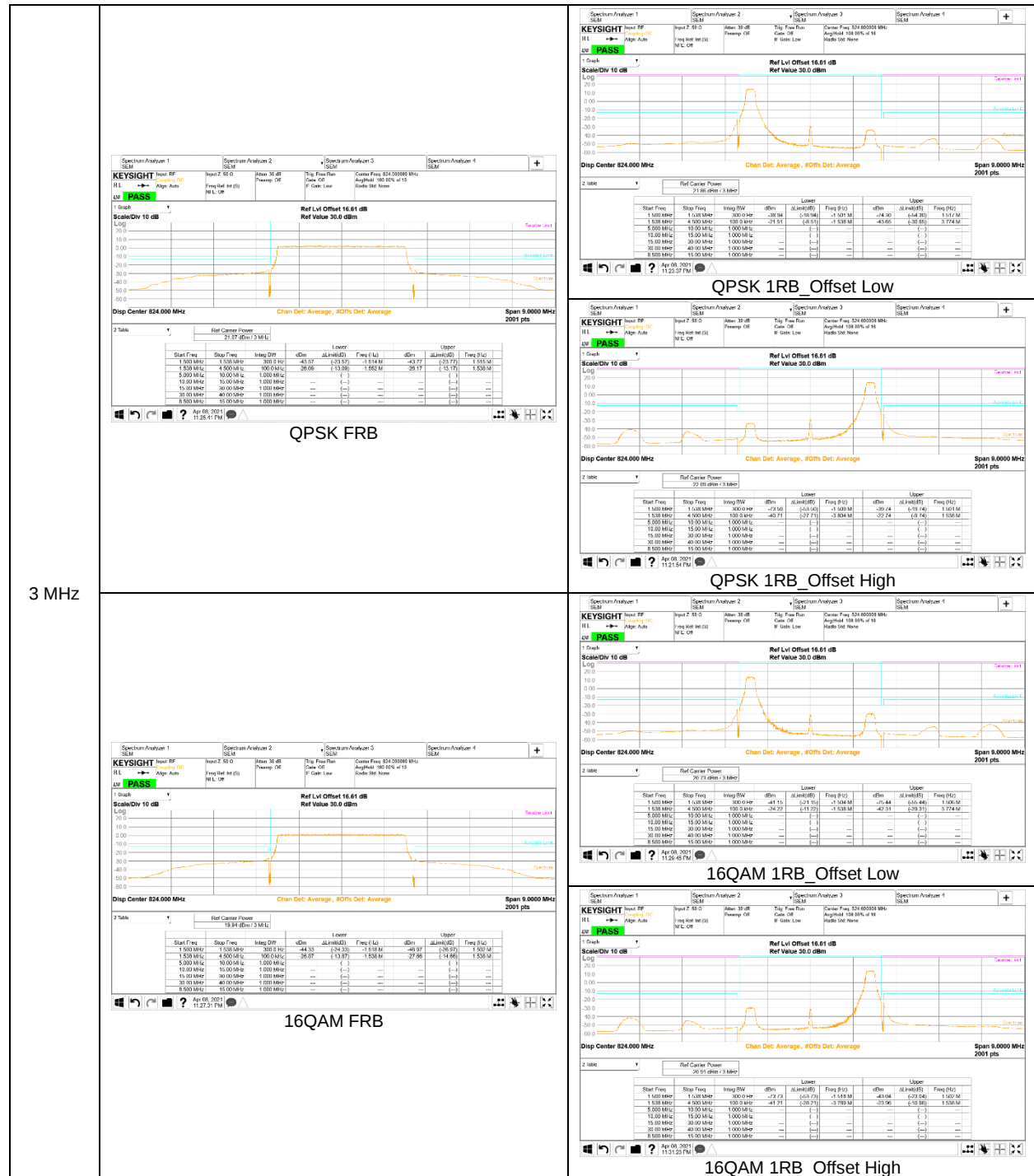


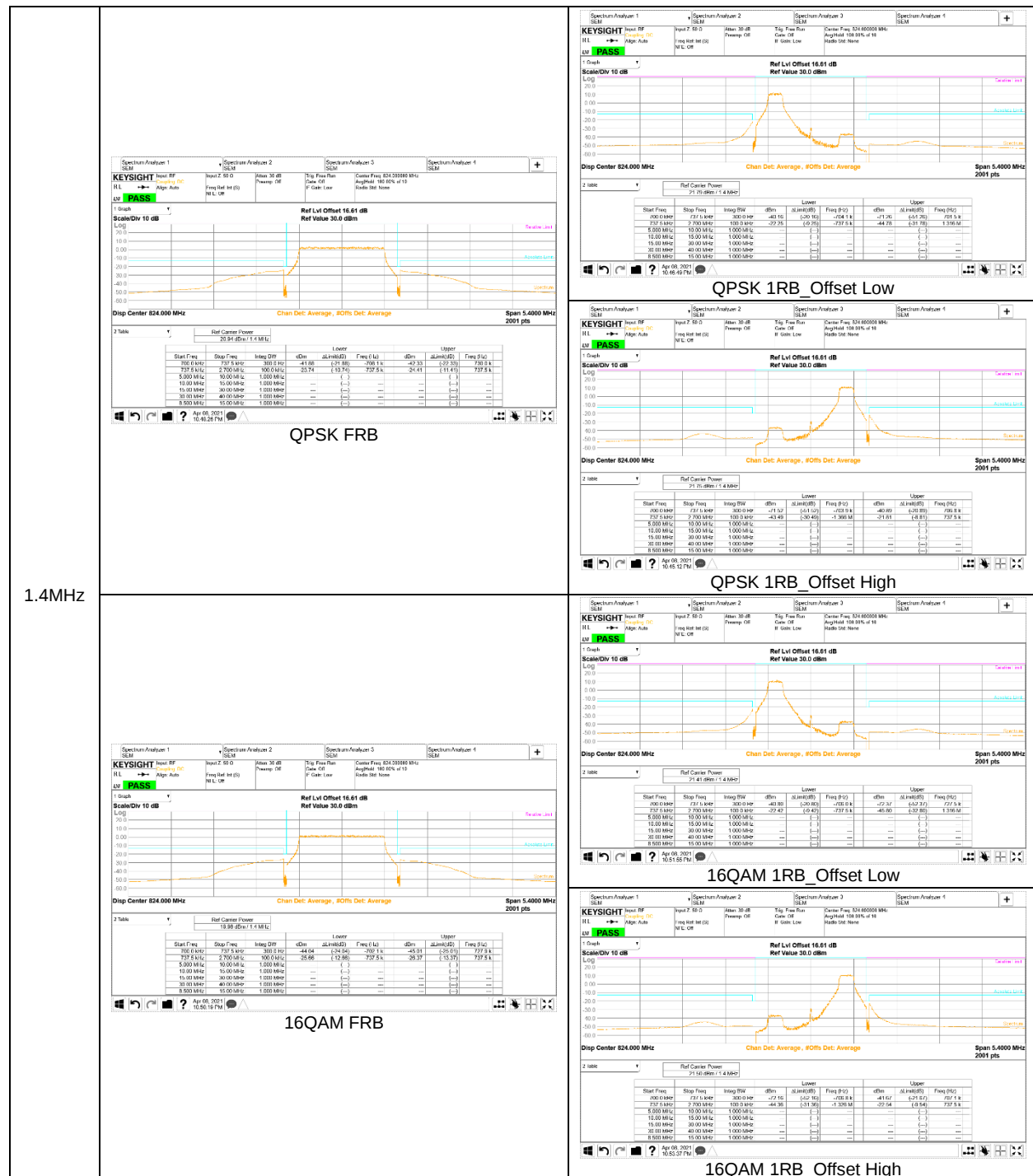
LTE Band 26(Straddle)











LTE Band 5

LTE Band 5 (Frequency range: 824-849 MHz) is covered by LTE Band 26 (Frequency range: 824-849 MHz under Part 22H) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

LTE Band 17

LTE Band 17 (Frequency range: 704-716 MHz) is covered by LTE Band 12 (Frequency range: 699-716 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

9.3. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.901, §22.917, §27.53 and 90.691

IC: RSS-130 (4.7), RSS-132 (5.5), RSS-133 (6.5), RSS-139 (6.6), RSS-199 (4.5)

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.

Part 27.53:

(g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB.

(h) The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10} (P)$ dB.

(m) (4) For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

Part 90.691(a):

(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $116 \log_{10}(f/6.1)$ decibels or $50 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz. (NOTE : Use 100kHz reference bandwidth)

(b) When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in this section.

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 = 100KHz for emission below 1GHz and 1MHz for emissions above 1GHz
(Tests were performed 1MHz [Worst case], to sweep 1 time for all frequency range)
- b) Set VBW $\geq 3 \times$ RBW;
- c) Set span ≥ 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), Maxhold(GSM);

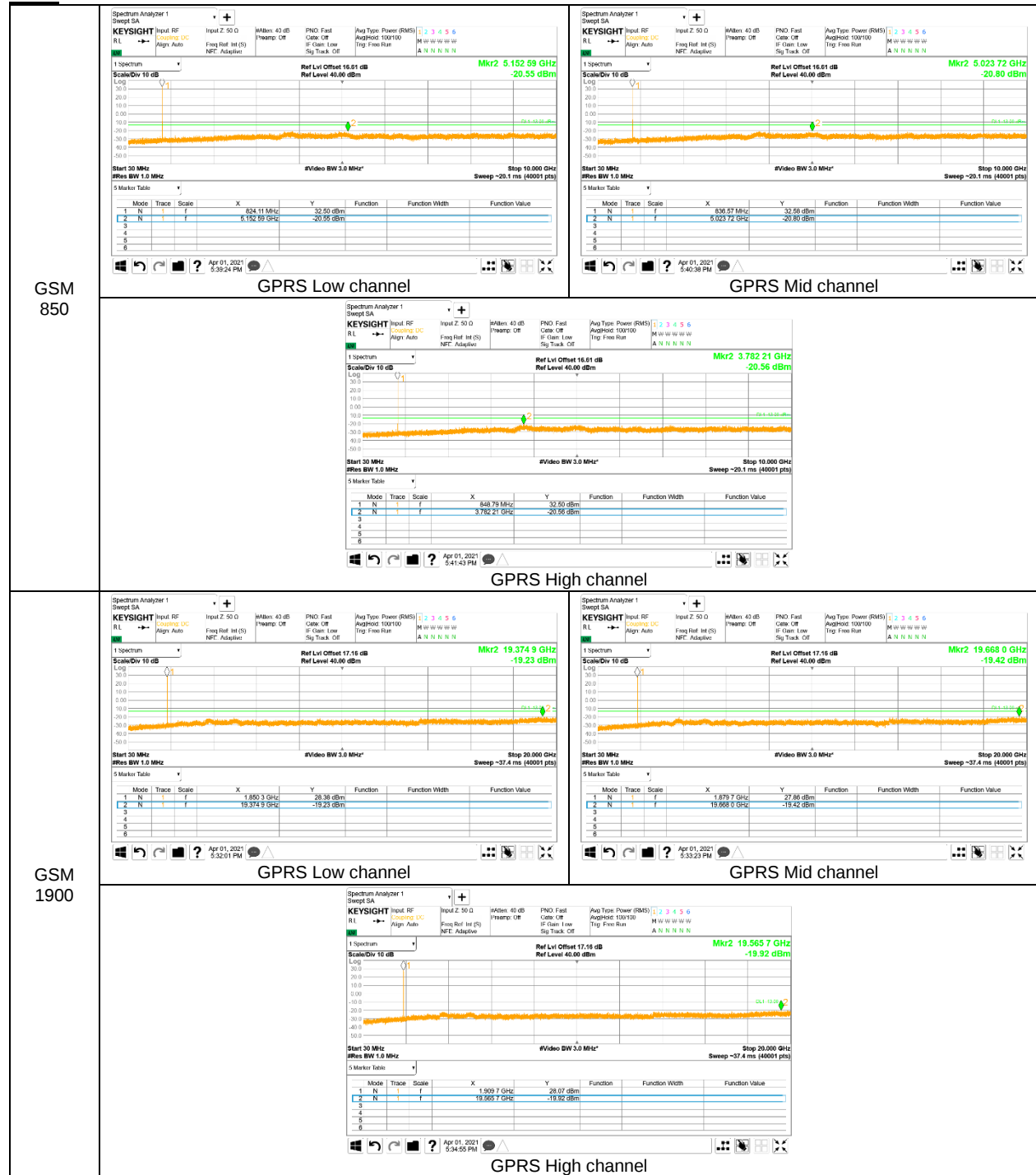
RESULTS

See the following pages.

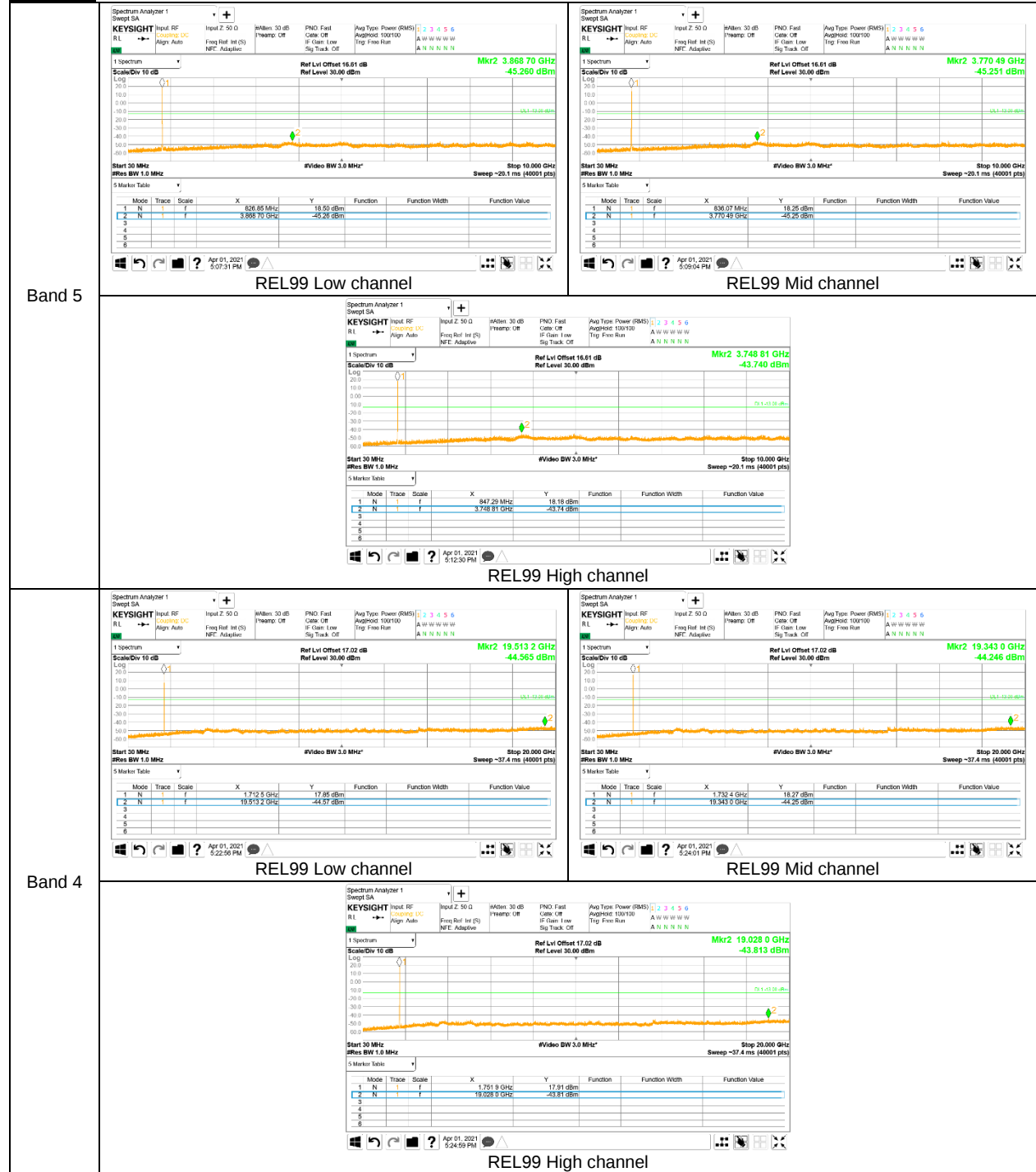
NOTE : Please refer to section 5.4 for bandwidth and RB setting about LTE bands.

9.3.1. OUT OF BAND EMISSIONS RESULT

GSM



WCDMA



Band 4

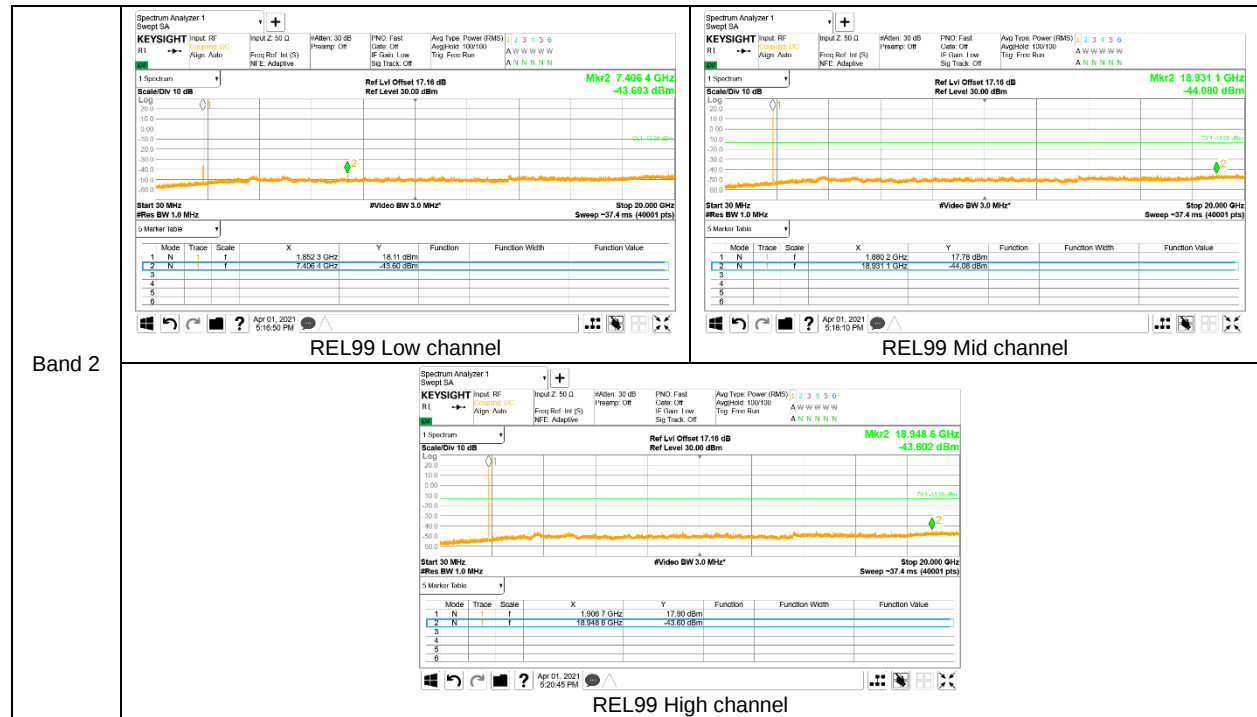
REL99 Low channel

REL99 Mid channel

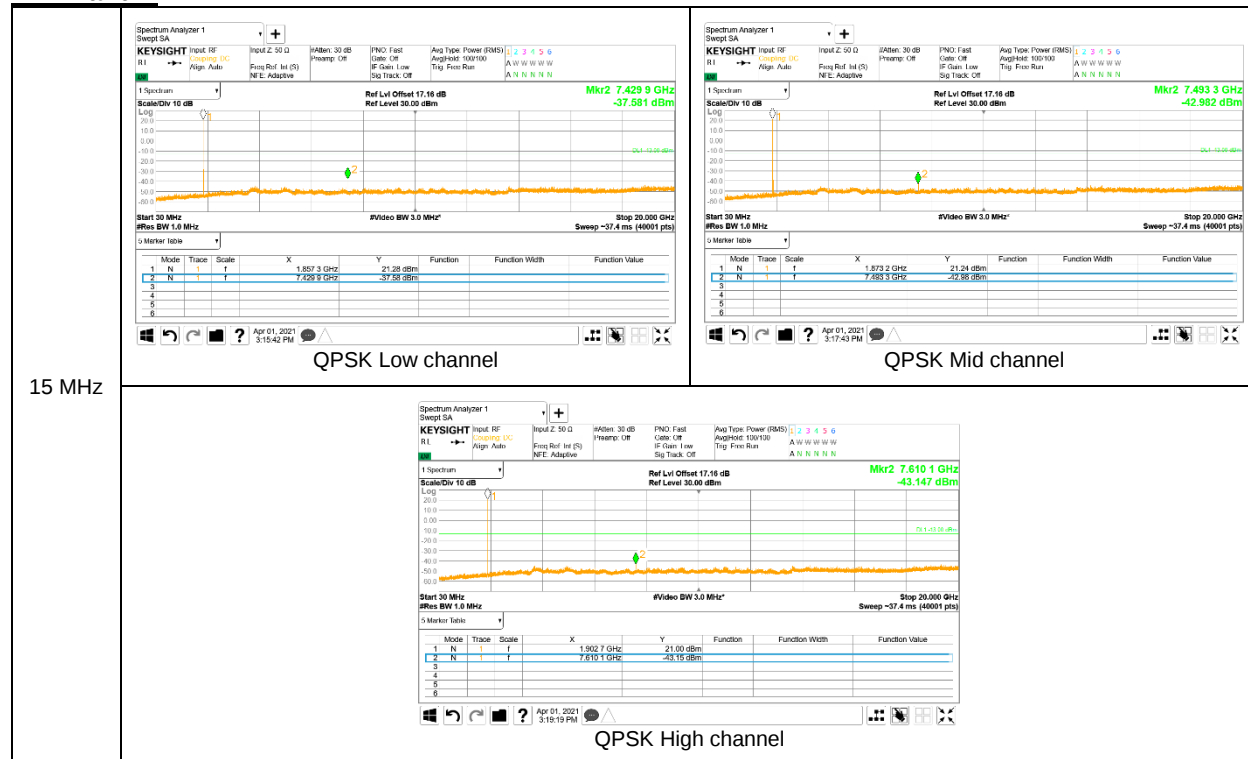
REL99 Mid channel

REL99 High channel

REL99 High channel



LTE Band 2



LTE Band 4



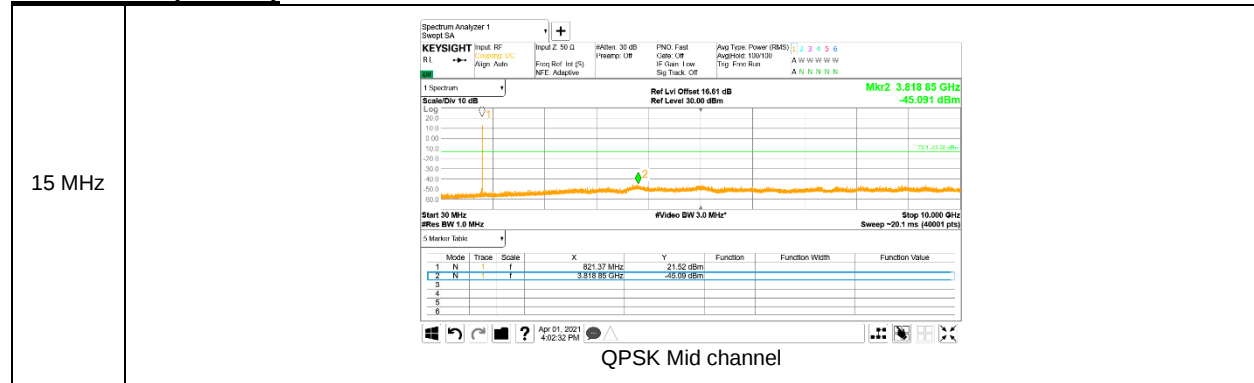
LTE Band 7



LTE Band 12



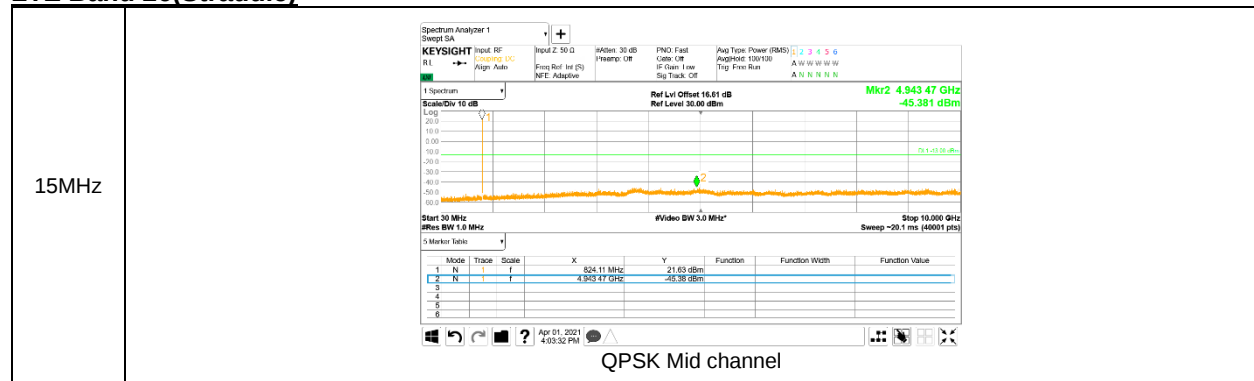
LTE Band 26(Part 90)



LTE Band 26(Part 22)



LTE Band 26(Straddle)



LTE Band 5

LTE Band 5 (Frequency range: 824-849 MHz) is covered by LTE Band 26 (Frequency range: 824-849 MHz under Part 22H) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

LTE Band 17

LTE Band 17 (Frequency range: 704-716 MHz) is covered by LTE Band 12 (Frequency range: 699-716 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

9.4. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §22.355, §24.235, §27.54 and §90.213

IC: RSS-130 (4.5), RSS-132 (5.3), RSS-133 (6.3), RSS-139 (6.4), RSS-199 (4.3)

LIMITS

§22.355 - The carrier frequency shall not depart from the reference frequency in excess of ± 2.5 ppm for mobile stations.

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

§27.54 - The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

§90.213 - The carrier frequency shall not depart from the reference frequency in excess of ± 2.5 ppm for mobile stations.

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v03r01

RESULTS

See the following pages.

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)

9.4.1. FREQUENCY STABILITY RESULTS

GSM 850, Frequency 824.2/848.8 MHz

Reference Frequency : GSM850 Low Channel 824.2 MHz / High Channel 848.8 MHz @ 20 °C						
Limit: +- 2.5 ppm =		Low Channel	2060.500	Hz	High Channel	2122.000
		Frequency Deviation Measured with Time Elapse				
Power Supply [Vdc]	Environment Temperature [°C]	Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.80	50	824.20003491	-0.008	848.80003412	-0.007	2.5
3.80	40	824.20003225	-0.005	848.80003267	-0.005	2.5
3.80	30	824.20002877	-0.001	848.80002843	0.000	2.5
3.80	20	824.20002791	0.000	848.80002812	0.000	2.5
3.80	10	824.20002755	0.000	848.80002762	0.001	2.5
3.80	0	824.20002706	0.001	848.80002804	0.000	2.5
3.80	-10	824.20002873	-0.001	848.80002884	-0.001	2.5
3.80	-20	824.20003068	-0.003	848.80003068	-0.003	2.5
3.80	-30	824.20003177	-0.005	848.80003156	-0.004	2.5

Reference Frequency : GSM850 Low Channel 824.2 MHz / High Channel 848.8 MHz @ 20 °C						
Limit: +- 2.5 ppm =		Low Channel	2060.500	Hz	High Channel	2122.000
		Frequency Deviation Measured with Time Elapse				
Power Supply [Vdc]	Environment Temperature [°C]	Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.80	20	824.20002791	0	848.80002812	0	2.5
4.20	20	824.20002747	0.001	848.80002686	0.001	2.5
3.40	20	824.20002711	0.001	848.80002738	0.001	2.5

GSM 1900, Frequency 1850.0/1910.0 MHz (Lowest Frequency:GPRS / Highest Frequency: GPRS)

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20 °C)	Normal	1850.0772	1909.9218		
Extreme (50 °C)		1850.0772	1909.9218	9.5	0.005
Extreme (40 °C)		1850.0772	1909.9218	8.8	0.005
Extreme (30 °C)		1850.0772	1909.9218	5.3	0.003
Extreme (10 °C)		1850.0772	1909.9218	2.9	0.002
Extreme (0 °C)		1850.0772	1909.9218	4.3	0.002
Extreme (-10 °C)		1850.0772	1909.9218	6.0	0.003
Extreme (-20 °C)		1850.0772	1909.9218	6.9	0.004
Extreme (-30 °C)		1850.0772	1909.9218	8.2	0.004
20 °C	15%	1850.0772	1909.9218	4.1	0.002
	-15%	1850.0772	1909.9218	3.6	0.002
	End Point	1850.0772	1909.9218	5.1	0.003

WCDMA Band 5

Reference Frequency : WCDMA Band 5 Low Channel 826.4 MHz / High Channel 846.6 MHz @ 20 °C						
Limit: +- 2.5 ppm =		Low Channel	2066.000	Hz	High Channel	2116.500
		Frequency Deviation Measured with Time Elapse				
Power Supply [Vdc]	Environment Temperature [°C]	Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.80	50	826.39999675	0.002	846.60001807	-0.025	2.5
3.80	40	826.39999704	0.002	846.59999516	0.002	2.5
3.80	30	826.39999790	0.001	846.59999641	0.000	2.5
3.80	20	826.39999850	0.000	846.59999675	0.000	2.5
3.80	10	826.39999871	0.000	846.59999698	0.000	2.5
3.80	0	826.39999898	-0.001	846.59999846	-0.002	2.5
3.80	-10	826.40000197	-0.004	846.60000242	-0.007	2.5
3.80	-20	826.40000238	-0.005	846.60000350	-0.008	2.5
3.80	-30	826.40000416	-0.007	846.60000619	-0.011	2.5

Reference Frequency : WCDMA Band 5 Low Channel 826.4 MHz / High Channel 846.6 MHz @ 20 °C						
Limit: +- 2.5 ppm =		Low Channel	2066.000	Hz	High Channel	2116.500
		Frequency Deviation Measured with Time Elapse				
Power Supply [Vdc]	Environment Temperature [°C]	Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.80	20	826.39999850	0	846.59999675	0	2.5
4.20	20	826.39999760	0.001	846.59999719	-0.001	2.5
3.40	20	826.39999735	0.001	846.59999594	0.001	2.5

WCDMA Band 4 (Lowest Frequency:HSDPA / Highest Frequency: Rel99)

Limit		1710	1755	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20 °C)	Normal	1712.4000	1754.6862	11.5	0.007
Extreme (50 °C)		1712.4000	1754.6862		
Extreme (40 °C)		1712.4000	1754.6862		
Extreme (30 °C)		1712.4000	1754.6862		
Extreme (10 °C)		1712.4000	1754.6862		
Extreme (0 °C)		1712.4000	1754.6862		
Extreme (-10 °C)		1712.4000	1754.6862		
Extreme (-20 °C)		1712.4000	1754.6862		
Extreme (-30 °C)		1712.4000	1754.6862		
20 °C	15%	1712.4000	1754.6862	2.8	0.002
	-15%	1712.4000	1754.6862	3.3	0.002
	End Point	1712.4000	1754.6862	4.9	0.003

WCDMA Band 2 (HSDPA)

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20 °C)	Normal	1850.3356	1909.6638		
Extreme (50 °C)		1850.3356	1909.6638	9.1	0.005
Extreme (40 °C)		1850.3356	1909.6638	8.3	0.004
Extreme (30 °C)		1850.3356	1909.6638	4.6	0.002
Extreme (10 °C)		1850.3356	1909.6638	3.1	0.002
Extreme (0 °C)		1850.3356	1909.6638	4.9	0.003
Extreme (-10 °C)		1850.3356	1909.6638	6.5	0.003
Extreme (-20 °C)		1850.3356	1909.6638	7.0	0.004
Extreme (-30 °C)		1850.3356	1909.6638	8.3	0.004
20 °C	15%	1850.3356	1909.6638	3.7	0.002
	-15%	1850.3356	1909.6638	2.3	0.001
	End Point	1850.3356	1909.6638	4.5	0.002

LTE Band 2 (Lowest Frequency:16QAM / Highest Frequency: QPSK)

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20 °C)	Normal	1850.1534	1909.8466		
Extreme (50 °C)		1850.1534	1909.8466	9.6	0.005
Extreme (40 °C)		1850.1534	1909.8466	8.5	0.004
Extreme (30 °C)		1850.1534	1909.8466	8.2	0.004
Extreme (10 °C)		1850.1534	1909.8466	7.6	0.004
Extreme (0 °C)		1850.1534	1909.8466	7.9	0.004
Extreme (-10 °C)		1850.1534	1909.8466	8.4	0.004
Extreme (-20 °C)		1850.1534	1909.8466	8.9	0.005
Extreme (-30 °C)		1850.1534	1909.8466	9.6	0.005
20 °C	15%	1850.1534	1909.8466	4.3	0.002
	-15%	1850.1534	1909.8466	3.5	0.002
	End Point	1850.1534	1909.8466	4.7	0.002

LTE Band 4 (Lowest Frequency:16QAM / Highest Frequency: QPSK)

Limit		1710	1755	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20 °C)	Normal	1710.1519	1754.8494		
Extreme (50 °C)		1710.1519	1754.8494	10.2	0.006
Extreme (40 °C)		1710.1519	1754.8494	8.7	0.005
Extreme (30 °C)		1710.1519	1754.8494	8.3	0.005
Extreme (10 °C)		1710.1519	1754.8494	7.7	0.004
Extreme (0 °C)		1710.1519	1754.8494	6.6	0.004
Extreme (-10 °C)		1710.1519	1754.8494	7.8	0.005
Extreme (-20 °C)		1710.1519	1754.8494	9.0	0.005
Extreme (-30 °C)		1710.1519	1754.8494	9.9	0.006
20 °C	15%	1710.1519	1754.8494	3.9	0.002
	-15%	1710.1519	1754.8494	4.1	0.002
	End Point	1710.1519	1754.8494	3.5	0.002

LTE Band 7 (Lowest Frequency:16QAM / Highest Frequency: QPSK)

Limit		2500	2570	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20 °C)	Normal	2500.2513	2569.7421		
Extreme (50 °C)		2500.2513	2569.7421	11.7	0.005
Extreme (40 °C)		2500.2513	2569.7421	10.7	0.004
Extreme (30 °C)		2500.2513	2569.7421	7.3	0.003
Extreme (10 °C)		2500.2513	2569.7421	7.1	0.003
Extreme (0 °C)		2500.2513	2569.7421	9.6	0.004
Extreme (-10 °C)		2500.2513	2569.7421	9.8	0.004
Extreme (-20 °C)		2500.2513	2569.7421	10.2	0.004
Extreme (-30 °C)		2500.2513	2569.7421	11.9	0.005
20 °C	15%	2500.2513	2569.7421	4.4	0.002
	-15%	2500.2513	2569.7421	3.6	0.001
	End Point	2500.2513	2569.7421	3.3	0.001

LTE Band 12 (Lowest Frequency:16QAM / Highest Frequency: QPSK)

Limit		699	716	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20 °C)	Normal	699.1507	715.8427		
Extreme (50 °C)		699.1507	715.8427	9.1	0.013
Extreme (40 °C)		699.1507	715.8427	8.3	0.012
Extreme (30 °C)		699.1507	715.8427	8.1	0.011
Extreme (10 °C)		699.1507	715.8427	8.0	0.011
Extreme (0 °C)		699.1507	715.8427	7.9	0.011
Extreme (-10 °C)		699.1507	715.8427	8.4	0.012
Extreme (-20 °C)		699.1507	715.8427	8.7	0.012
Extreme (-30 °C)		699.1507	715.8427	9.2	0.013
20 °C	15%	699.1507	715.8427	4.5	0.006
	-15%	699.1507	715.8427	3.7	0.005
	End Point	699.1507	715.8427	4.8	0.007

LTE Band 26

Reference Frequency : LTE Band 26 Low Channel 814.7 MHz / High Channel 848.3 MHz @ 20 °C						
Limit: +- 2.5 ppm =		Low Channel	2036.750	Hz	High Channel	2120.750
		Frequency Deviation Measured with Time Elapse				
Power Supply [Vdc]	Environment Temperature [°C]	Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.80	50	814.69999903	-0.001	848.29999931	-0.001	2.5
3.80	40	814.69999875	0.000	848.29999898	-0.001	2.5
3.80	30	814.69999805	0.000	848.29999852	0.000	2.5
3.80	20	814.69999838	0.000	848.29999825	0.000	2.5
3.80	10	814.69999876	0.000	848.29999941	-0.001	2.5
3.80	0	814.69999892	-0.001	848.30000028	-0.002	2.5
3.80	-10	814.69999939	-0.001	848.30000113	-0.003	2.5
3.80	-20	814.69999945	-0.001	848.30000136	-0.004	2.5
3.80	-30	814.69999753	0.001	848.30000205	-0.004	2.5

Reference Frequency : LTE Band 26 Low Channel 814.7 MHz / High Channel 848.3 MHz @ 20 °C						
Limit: +- 2.5 ppm =		Low Channel	2036.750	Hz	High Channel	2120.750
		Frequency Deviation Measured with Time Elapse				
Power Supply [Vdc]	Environment Temperature [°C]	Low Channel		High Channel		Limit [ppm]
		[MHz]	Delta [ppm]	[MHz]	Delta [ppm]	
3.80	20	814.69999838	0	848.29999825	0	2.5
4.20	20	814.69999812	0.000	848.29999867	0.000	2.5
3.40	20	814.69999875	0.000	848.29999840	0.000	2.5

LTE Band 5

LTE Band 5 (Frequency range: 824-849 MHz) is covered by LTE Band 26 (Frequency range: 824-849 MHz under Part 22H) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

LTE Band 17

LTE Band 17 (Frequency range: 704-716 MHz) is covered by LTE Band 12 (Frequency range: 699-716 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

9.5. ERP & EIRP POWER

RULE PART(S)

FCC: §2.1046, §22.913, §24.232, §27.50 and §90.635

IC: RSS-130 (4.6), RSS-132 (5.4), RSS-133 (6.4), RSS-139 (6.5), RSS-199 (4.4)

LIMITS

22.913(a) - The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

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.

27.50:

(c) (10) - Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

(d) (4) Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

(h) The following power limits shall apply in the BRS and EBS:

(2) Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

90.635(b) – The maximum output power of the transmitter for mobile stations is 100 watts (20dBw).

In addition, when the transmitter power is measured in terms of average value, the peak-to-average ratio of the power shall not exceed 13dB.

9.5.1. ERP/EIRP Results

ER / EI	Band	Frequency [MHz]	Max. Conducted Power [dBm]	Allowed Max. Antenna Gain [dBi]	Max. ERP / EIRP		Limit [W]
					[dBm]	[mW]	
ER	GSM850	824 ~ 849	33.3	5.60	36.75	4731.5	7
EI	GSM1900	1850 ~ 1910	28.2	3.50	31.70	1479.1	2
EI	WCDMA B2	1850 ~ 1910	23.4	3.50	26.90	489.8	2
EI	WCDMA B4	1710 ~ 1755	23.7	5.00	28.70	741.3	1
ER	WCDMA B5	824 ~ 849	23.7	5.60	27.15	518.8	7
EI	LTE 2	1850 ~ 1910	22.5	3.50	26.00	398.1	2
EI	LTE 4	1710 ~ 1755	22.8	5.00	27.80	602.6	1
EI	LTE 7	2500 ~ 2570	22.2	9.00	31.20	1318.3	2
ER	LTE 12/17	699 ~ 716	22.7	6.60	27.15	518.8	3
ER	LTE 5/26	814 ~ 849	23.1	5.60	26.55	451.9	7
EI	GSM850	824 ~ 849	33.3	5.60	38.90	7762.5	11.5
EI	WCDMA B5	824 ~ 849	23.7	5.60	29.30	851.1	11.5
EI	LTE 5/26	824 ~ 849	23.1	5.60	28.70	741.3	11.5

Note 1: **ER** - ERP / **EI** - EIRP

Note 2: Max. EIRP [dBm] = Max. Conducted Power [dBm] + Antenna Gain [dBi]

Note 3: Max. ERP [dBm] = Max. Conducted Power [dBm] + Antenna Gain [dBi] – 2.15 dB

9.6. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

FCC: §2.1053, §22.917, §24.238, §27.53 and §90.691

IC: RSS-130 (4.7), RSS-132 (5.5), RSS-133 (6.5), RSS-139 (6.6), RSS-199 (4.5)

LIMIT

Part 22.917(a) & Part 24.238(a) & Part 27.53(h) 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.

Part 27.53:

(g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB.

(h) The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10} (P)$ dB.

(m) (4) For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

Part 90.691(a):

(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $116 \log_{10}(f/6.1)$ decibels or $50 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz. (NOTE : Use 100kHz reference bandwidth)

(b) When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in this section.

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 1GHz and 1MHz for emissions above 1GHz
- b) Set VBW $\geq 3 \times$ RBW;
- c) Set span ≥ 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), Maxhold(GSM);

RESULTS

See the following pages.

NOTE : Please refer to section 5.4 for bandwidth and RB setting about LTE bands.

9.6.1. SPURIOUS RADIATION PLOTS

GSM850

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
Company:		AT Telecom							
Project #:		4789864400							
Date:		2021-03-30							
Test Engineer:		20881							
Configuration:		EUT, Y-Position							
Location:		Chamber 2							
Mode:		GPRS 850 MHz Harmonics							
Test Voltage:		DC 3.8 V							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 824.2MHz									
1648.40	-3.8	V	3.0	40.7	1.0	-43.5	-13.0	-30.5	
2472.60	-10.9	V	3.0	41.3	1.0	-51.2	-13.0	-38.2	
3296.80	-9.4	V	3.0	42.1	1.0	-50.4	-13.0	-37.4	
1648.40	-0.5	H	3.0	40.7	1.0	-40.2	-13.0	-27.2	
2472.60	-10.4	H	3.0	41.3	1.0	-50.7	-13.0	-37.7	
3296.80	-9.2	H	3.0	42.1	1.0	-50.2	-13.0	-37.2	
Mid Ch, 836.6MHz									
1673.20	-1.3	V	3.0	40.7	1.0	-41.0	-13.0	-28.0	
2509.80	-11.7	V	3.0	41.4	1.0	-52.1	-13.0	-39.1	
3346.40	-9.0	V	3.0	42.1	1.0	-50.1	-13.0	-37.1	
1673.20	2.7	H	3.0	40.7	1.0	-37.0	-13.0	-24.0	
2509.80	-11.4	H	3.0	41.4	1.0	-51.7	-13.0	-38.7	
3346.40	-9.0	H	3.0	42.1	1.0	-50.1	-13.0	-37.1	
High Ch, 848.8MHz									
1697.60	-4.8	V	3.0	40.7	1.0	-44.4	-13.0	-31.4	
2546.40	-11.9	V	3.0	41.4	1.0	-52.3	-13.0	-39.3	
3395.20	-9.0	V	3.0	42.1	1.0	-50.0	-13.0	-37.0	
1697.60	-2.7	H	3.0	40.7	1.0	-42.4	-13.0	-29.4	
2546.40	-11.5	H	3.0	41.4	1.0	-51.9	-13.0	-38.9	
3395.20	-8.7	H	3.0	42.1	1.0	-49.8	-13.0	-36.8	

GSM1900

GSM1900 GPRS	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement Company: AT Telecom Project #: 4789864400 Date: 2021-03-30 Test Engineer: 20881 Configuration: EUT, Y-Position Location: Chamber 2 Mode: GPRS 1900 MHz Harmonics Test Voltage: DC 3.8 V									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 1850.2MHz 3700.40 -11.0 V 3.0 42.1 1.0 -52.1 -13.0 -39.1 5550.60 -5.7 V 3.0 42.9 1.0 -47.7 -13.0 -34.7 7400.80 -3.5 V 3.0 42.5 1.0 -45.0 -13.0 -32.0 3700.40 -10.9 H 3.0 42.1 1.0 -52.0 -13.0 -39.0 5550.60 -7.0 H 3.0 42.9 1.0 -49.0 -13.0 -36.0 7400.80 0.3 H 3.0 42.5 1.0 -41.2 -13.0 -28.2 Mid Ch, 1880MHz 3760.00 -9.7 V 3.0 42.1 1.0 -50.8 -13.0 -37.8 5640.00 -7.1 V 3.0 42.9 1.0 -49.0 -13.0 -36.0 7520.00 -2.7 V 3.0 42.4 1.0 -44.1 -13.0 -31.1 3760.00 -7.9 H 3.0 42.1 1.0 -49.0 -13.0 -36.0 5640.00 -6.9 H 3.0 42.9 1.0 -48.8 -13.0 -35.8 7520.00 1.0 H 3.0 42.4 1.0 -40.5 -13.0 -27.5 High Ch, 1909.8MHz 3819.60 -10.8 V 3.0 42.1 1.0 -51.9 -13.0 -38.9 5729.40 -7.2 V 3.0 43.0 1.0 -49.2 -13.0 -36.2 7639.20 -4.7 V 3.0 42.4 1.0 -46.1 -13.0 -33.1 3819.60 -10.6 H 3.0 42.1 1.0 -51.7 -13.0 -38.7 5729.40 -7.1 H 3.0 43.0 1.0 -49.1 -13.0 -36.1 7639.20 -4.1 H 3.0 42.4 1.0 -45.4 -13.0 -32.4									

WCDMA Band 5

WCDMA Band 5 REL99	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
	Company: AT Telecom									
	Project #: 4789864400									
	Date: 2021-03-30									
	Test Engineer: 20881									
	Configuration: EUT, Y-Position									
	Location: Chamber 2									
	Mode: Rel99 Band 5 Harmonics									
	Test Votage: DC 3.8 V									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 826.4MHz									
	1652.80	-15.6	V	3.0	40.7	1.0	-55.3	-13.0	-42.3	
	2479.20	-12.7	V	3.0	41.3	1.0	-53.0	-13.0	-40.0	
	3305.60	-9.2	V	3.0	42.1	1.0	-50.2	-13.0	-37.2	
	1652.80	-15.6	H	3.0	40.7	1.0	-55.3	-13.0	-42.3	
	2479.20	-12.6	H	3.0	41.3	1.0	-53.0	-13.0	-40.0	
	3305.60	-8.6	H	3.0	42.1	1.0	-49.6	-13.0	-36.6	
	Mid Ch, 836.6MHz									
	1673.20	-15.6	V	3.0	40.7	1.0	-55.3	-13.0	-42.3	
2509.80	-12.5	V	3.0	41.4	1.0	-52.8	-13.0	-39.8		
3346.40	-9.3	V	3.0	42.1	1.0	-50.4	-13.0	-37.4		
1673.20	-15.6	H	3.0	40.7	1.0	-55.3	-13.0	-42.3		
2509.80	-12.6	H	3.0	41.4	1.0	-52.9	-13.0	-39.9		
3346.40	-8.4	H	3.0	42.1	1.0	-49.5	-13.0	-36.5		
High Ch, 846.6MHz										
1693.20	-15.3	V	3.0	40.7	1.0	-55.0	-13.0	-42.0		
2539.80	-12.4	V	3.0	41.4	1.0	-52.8	-13.0	-39.8		
3386.40	-9.0	V	3.0	42.1	1.0	-50.1	-13.0	-37.1		
1693.20	-15.2	H	3.0	40.7	1.0	-54.9	-13.0	-41.9		
2539.80	-12.1	H	3.0	41.4	1.0	-52.5	-13.0	-39.5		
3386.40	-8.7	H	3.0	42.1	1.0	-49.8	-13.0	-36.8		
WCDMA Band 5 HSDPA	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
	Company: AT Telecom									
	Project #: 4789864400									
	Date: 2021-03-31									
	Test Engineer: 20882									
	Configuration: EUT, Y-Position									
	Location: Chamber 2									
	Mode: HSDPA Band 5 Harmonics									
	Test Votage: DC 3.8 V									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 826.4MHz									
	1652.80	-15.6	V	3.0	40.7	1.0	-55.3	-13.0	-42.3	
	2479.20	-12.9	V	3.0	41.3	1.0	-53.2	-13.0	-40.2	
	3305.60	-10.2	V	3.0	42.1	1.0	-51.3	-13.0	-38.3	
	1652.80	-15.5	H	3.0	40.7	1.0	-55.2	-13.0	-42.2	
	2479.20	-12.5	H	3.0	41.3	1.0	-52.8	-13.0	-39.8	
	3305.60	-10.0	H	3.0	42.1	1.0	-51.1	-13.0	-38.1	
	Mid Ch, 836.6MHz									
	1673.20	-15.6	V	3.0	40.7	1.0	-55.3	-13.0	-42.3	
2509.80	-12.9	V	3.0	41.4	1.0	-53.3	-13.0	-40.3		
3346.40	-10.0	V	3.0	42.1	1.0	-51.0	-13.0	-38.0		
1673.20	-15.4	H	3.0	40.7	1.0	-55.1	-13.0	-42.1		
2509.80	-12.6	H	3.0	41.4	1.0	-53.0	-13.0	-40.0		
3346.40	-10.3	H	3.0	42.1	1.0	-51.3	-13.0	-38.3		
High Ch, 846.6MHz										
1693.20	-15.5	V	3.0	40.7	1.0	-55.2	-13.0	-42.2		
2539.80	-12.7	V	3.0	41.4	1.0	-53.1	-13.0	-40.1		
3386.40	-9.9	V	3.0	42.1	1.0	-50.9	-13.0	-37.9		
1693.20	-15.6	H	3.0	40.7	1.0	-55.3	-13.0	-42.3		
2539.80	-12.4	H	3.0	41.4	1.0	-52.8	-13.0	-39.8		
3386.40	-9.7	H	3.0	42.1	1.0	-50.8	-13.0	-37.8		

WCDMA Band 4

WCDMA Band 4 REL99	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement Company: AT Telecom Project #: 4789864400 Date: 2021-03-31 Test Engineer: 20882 Configuration: EUT, Z-Position Location: Chamber 2 Mode: Rel99 Band 4 Harmonics Test Voltage: DC 3.8 V									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamplifier (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 1712.4MHz									
	3424.80	-9.7	V	3.0	42.1	1.0	-50.8	-13.0	-37.8	
	5137.20	0.8	V	3.0	42.8	1.0	-41.0	-13.0	-28.0	
	6849.60	-6.2	V	3.0	42.7	1.0	-48.0	-13.0	-35.0	
	3424.80	-9.6	H	3.0	42.1	1.0	-50.6	-13.0	-37.6	
	5137.20	-4.1	H	3.0	42.8	1.0	-45.9	-13.0	-32.9	
	6849.60	-6.4	H	3.0	42.7	1.0	-48.1	-13.0	-35.1	
	Mid Ch, 1732.6MHz									
	3465.20	-9.2	V	3.0	42.1	1.0	-50.3	-13.0	-37.3	
	5197.80	1.8	V	3.0	42.8	1.0	-40.1	-13.0	-27.1	
	6930.40	-6.4	V	3.0	42.7	1.0	-48.2	-13.0	-35.2	
	3465.20	-9.1	H	3.0	42.1	1.0	-50.2	-13.0	-37.2	
	5197.80	-4.8	H	3.0	42.8	1.0	-46.6	-13.0	-33.6	
	6930.40	-6.5	H	3.0	42.7	1.0	-48.2	-13.0	-35.2	
	High Ch, 1752.6MHz									
	3505.20	-8.7	V	3.0	42.1	1.0	-49.8	-13.0	-36.8	
	5257.80	-1.1	V	3.0	42.8	1.0	-43.0	-13.0	-30.0	
	7010.40	-6.2	V	3.0	42.7	1.0	-47.8	-13.0	-34.8	
	3505.20	-8.7	H	3.0	42.1	1.0	-49.8	-13.0	-36.8	
	5257.80	-5.3	H	3.0	42.8	1.0	-47.2	-13.0	-34.2	
	7010.40	-6.2	H	3.0	42.7	1.0	-47.9	-13.0	-34.9	
WCDMA Band 4 HSDPA	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement Company: AT Telecom Project #: 4789864400 Date: 2021-03-31 Test Engineer: 20882 Configuration: EUT, Z-Position Location: Chamber 2 Mode: HSDPA Band 4 Harmonics Test Voltage: DC 3.8 V									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamplifier (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 1712.4MHz									
	3424.80	-9.7	V	3.0	42.1	1.0	-50.8	-13.0	-37.8	
	5137.20	-0.4	V	3.0	42.8	1.0	-42.2	-13.0	-29.2	
	6849.60	-6.4	V	3.0	42.7	1.0	-48.2	-13.0	-35.2	
	3424.80	-9.7	H	3.0	42.1	1.0	-50.8	-13.0	-37.8	
	5137.20	-5.2	H	3.0	42.8	1.0	-47.0	-13.0	-34.0	
	6849.60	-6.6	H	3.0	42.7	1.0	-48.3	-13.0	-35.3	
	Mid Ch, 1732.6MHz									
	3465.20	-9.3	V	3.0	42.1	1.0	-50.3	-13.0	-37.3	
	5197.80	-0.7	V	3.0	42.8	1.0	-42.5	-13.0	-29.5	
	6930.40	-6.5	V	3.0	42.7	1.0	-48.3	-13.0	-35.3	
	3465.20	-9.1	H	3.0	42.1	1.0	-50.2	-13.0	-37.2	
	5197.80	-6.0	H	3.0	42.8	1.0	-47.8	-13.0	-34.8	
	6930.40	-6.5	H	3.0	42.7	1.0	-48.2	-13.0	-35.2	
	High Ch, 1752.6MHz									
	3505.20	-8.8	V	3.0	42.1	1.0	-49.9	-13.0	-36.9	
	5257.80	-2.5	V	3.0	42.8	1.0	-44.4	-13.0	-31.4	
	7010.40	-6.3	V	3.0	42.7	1.0	-48.0	-13.0	-35.0	
	3505.20	-8.8	H	3.0	42.1	1.0	-49.8	-13.0	-36.8	
	5257.80	-6.0	H	3.0	42.8	1.0	-47.9	-13.0	-34.9	
	7010.40	-6.5	H	3.0	42.7	1.0	-48.2	-13.0	-35.2	

WCDMA
Band 2
REL99

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
Company:		AT Telecom							
Project #:		4789864400							
Date:		2021-03-30							
Test Engineer:		20881							
Configuration:		EUT, Y-Position							
Location:		Chamber 2							
Mode:		Rel99 Band 2 Harmonics							
Test Voltage:		DC 3.8 V							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.4MHz									
3704.80	-10.7	V	3.0	42.1	1.0	-51.8	-13.0	-38.8	
5557.20	1.2	V	3.0	42.9	1.0	-40.7	-13.0	-27.7	
7409.60	-6.1	V	3.0	42.5	1.0	-47.6	-13.0	-34.6	
3704.80	-11.8	H	3.0	42.1	1.0	-52.9	-13.0	-39.9	
5557.20	9.0	H	3.0	42.9	1.0	-32.9	-13.0	-19.9	
7409.60	-6.2	H	3.0	42.5	1.0	-47.7	-13.0	-34.7	
Mid Ch, 1880MHz									
3760.00	-10.7	V	3.0	42.1	1.0	-51.8	-13.0	-38.8	
5640.00	-1.2	V	3.0	42.9	1.0	-43.1	-13.0	-30.1	
7520.00	-5.6	V	3.0	42.4	1.0	-47.0	-13.0	-34.0	
3760.00	-10.3	H	3.0	42.1	1.0	-51.4	-13.0	-38.4	
5640.00	5.4	H	3.0	42.9	1.0	-36.5	-13.0	-23.5	
7520.00	-5.6	H	3.0	42.4	1.0	-47.1	-13.0	-34.1	
High Ch, 1907.6MHz									
3815.20	-11.7	V	3.0	42.1	1.0	-52.8	-13.0	-39.8	
5722.80	1.3	V	3.0	42.9	1.0	-40.7	-13.0	-27.7	
7630.40	-6.5	V	3.0	42.4	1.0	-47.9	-13.0	-34.9	
3815.20	-11.7	H	3.0	42.1	1.0	-52.8	-13.0	-39.8	
5722.80	7.3	H	3.0	42.9	1.0	-34.6	-13.0	-21.6	
7630.40	-6.6	H	3.0	42.4	1.0	-48.0	-13.0	-35.0	

WCDMA
Band 2
HSDPA

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
Company:		AT Telecom							
Project #:		4789864400							
Date:		2021-03-30							
Test Engineer:		20881							
Configuration:		EUT, Y-Position							
Location:		Chamber 2							
Mode:		HSDPA Band 2 Harmonics							
Test Votage:		DC 3.8 V							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.4MHz									
3704.80	-11.8	V	3.0	42.1	1.0	-52.8	-13.0	-39.8	
5557.20	-0.6	V	3.0	42.9	1.0	-42.5	-13.0	-29.5	
7409.60	-6.3	V	3.0	42.5	1.0	-47.8	-13.0	-34.8	
3704.80	-11.8	H	3.0	42.1	1.0	-52.9	-13.0	-39.9	
5557.20	7.1	H	3.0	42.9	1.0	-34.8	-13.0	-21.8	
7409.60	-6.5	H	3.0	42.5	1.0	-48.0	-13.0	-35.0	
Mid Ch, 1880MHz									
3760.00	-11.6	V	3.0	42.1	1.0	-52.7	-13.0	-39.7	
5640.00	-4.1	V	3.0	42.9	1.0	-46.0	-13.0	-33.0	
7520.00	-6.4	V	3.0	42.4	1.0	-47.9	-13.0	-34.9	
3760.00	-11.7	H	3.0	42.1	1.0	-52.8	-13.0	-39.8	
5640.00	2.5	H	3.0	42.9	1.0	-39.4	-13.0	-26.4	
7520.00	-6.6	H	3.0	42.4	1.0	-48.1	-13.0	-35.1	
High Ch, 1907.6MHz									
3815.20	-11.7	V	3.0	42.1	1.0	-52.7	-13.0	-39.7	
5722.80	0.0	V	3.0	42.9	1.0	-41.9	-13.0	-28.9	
7630.40	-6.5	V	3.0	42.4	1.0	-47.9	-13.0	-34.9	
3815.20	-11.7	H	3.0	42.1	1.0	-52.8	-13.0	-39.8	
5722.80	6.3	H	3.0	42.9	1.0	-35.7	-13.0	-22.7	
7630.40	-6.5	H	3.0	42.4	1.0	-47.8	-13.0	-34.8	

LTE Band 2

LTE Band 2 15MHz QPSK	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement Company: AM Telecom Project #: 4789864400 Date: 2021-03-29 Test Engineer: 20882 Configuration: EUT, Z-Position Location: Chamber 2 Mode: LTE_QPSK Band 2 Harmonics, 15MHz Bandwidth Test Voltage: DC 3.8 V									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 1857.5MHz									
	3715.00	-11.1	V	3.0	42.1	1.0	-52.2	-13.0	-39.2	
	5572.50	6.1	V	3.0	42.9	1.0	-35.8	-13.0	-22.8	
	7430.00	14.7	V	3.0	42.5	1.0	-26.8	-13.0	-13.8	
	3715.00	-11.4	H	3.0	42.1	1.0	-52.4	-13.0	-39.4	
	5572.50	4.9	H	3.0	42.9	1.0	-37.0	-13.0	-24.0	
	7430.00	13.3	H	3.0	42.5	1.0	-28.2	-13.0	-15.2	
	Mid Ch, 1880MHz									
	3760.00	-11.2	V	3.0	42.1	1.0	-52.2	-13.0	-39.2	
	5640.00	4.6	V	3.0	42.9	1.0	-37.3	-13.0	-24.3	
	7520.00	7.8	V	3.0	42.4	1.0	-33.7	-13.0	-20.7	
	3760.00	-9.8	H	3.0	42.1	1.0	-50.9	-13.0	-37.9	
	5640.00	2.5	H	3.0	42.9	1.0	-39.4	-13.0	-26.4	
	7520.00	10.2	H	3.0	42.4	1.0	-31.3	-13.0	-18.3	
	High Ch, 1902.5MHz									
	3805.00	-11.3	V	3.0	42.1	1.0	-52.4	-13.0	-39.4	
	5707.50	2.2	V	3.0	42.9	1.0	-39.8	-13.0	-26.8	
	7610.00	5.0	V	3.0	42.4	1.0	-36.4	-13.0	-23.4	
	3805.00	-11.5	H	3.0	42.1	1.0	-52.6	-13.0	-39.6	
	5707.50	-0.5	H	3.0	42.9	1.0	-42.4	-13.0	-29.4	
	7610.00	7.9	H	3.0	42.4	1.0	-33.5	-13.0	-20.5	

LTE Band 4

LTE

Band 4

15MHz

QPSK

UL Verification Services, Inc.

Above 1GHz High Frequency Substitution Measurement

Company:

Project #:

Date:

Test Engineer:

Configuration:

Location:

Mode:

Test Votage:

AT Telecom

4789864400

2021-03-29

20881

EUT, Z-Position

Chamber 2

LTE_QPSK Band 4 Harmonics, 15MHz Bandwidth

DC 3.8 V

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1717.5MHz									
3435.00	-9.7	V	3.0	42.1	1.0	-50.8	-13.0	-37.8	
5152.50	5.2	V	3.0	42.8	1.0	-36.6	-13.0	-23.6	
6870.00	5.5	V	3.0	42.7	1.0	-36.2	-13.0	-23.2	
3435.00	-9.8	H	3.0	42.1	1.0	-50.8	-13.0	-37.8	
5152.50	6.1	H	3.0	42.8	1.0	-35.7	-13.0	-22.7	
6870.00	3.4	H	3.0	42.7	1.0	-38.3	-13.0	-25.3	
Mid Ch, 1732.5MHz									
3465.00	-9.4	V	3.0	42.1	1.0	-50.5	-13.0	-37.5	
5197.50	8.0	V	3.0	42.8	1.0	-33.8	-13.0	-20.8	
6930.00	5.4	V	3.0	42.7	1.0	-36.4	-13.0	-23.4	
3465.00	-9.3	H	3.0	42.1	1.0	-50.4	-13.0	-37.4	
5197.50	2.1	H	3.0	42.8	1.0	-39.7	-13.0	-26.7	
6930.00	4.2	H	3.0	42.7	1.0	-37.5	-13.0	-24.5	
High Ch, 1747.5MHz									
3495.00	-9.1	V	3.0	42.1	1.0	-50.2	-13.0	-37.2	
5242.50	6.5	V	3.0	42.8	1.0	-35.4	-13.0	-22.4	
6990.00	6.3	V	3.0	42.7	1.0	-35.4	-13.0	-22.4	
3495.00	-9.1	H	3.0	42.1	1.0	-50.2	-13.0	-37.2	
5242.50	2.9	H	3.0	42.8	1.0	-39.0	-13.0	-26.0	
6990.00	6.0	H	3.0	42.7	1.0	-35.7	-13.0	-22.7	

LTE Band 7

LTE Band 7 10MHz QPSK	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Company: AT Telecom									
	Project #: 4789864400									
	Date: 2021-03-29									
	Test Engineer: 20881									
	Configuration: EUT, Z-Position									
	Location: Chamber 2									
	Mode: LTE_QPSK Band 7 Harmonics, 10MHz Bandwidth									
	Test Voltage: DC 3.8 V									
	Low Ch, 2505MHz									
	5010.00	-4.4	V	3.0	42.8	1.0	-46.2	-25.0	-21.2	
	7515.00	-6.1	V	3.0	42.4	1.0	-47.5	-25.0	-22.5	
	10020.00	-13.2	V	3.0	40.9	1.0	-53.1	-25.0	-28.1	
	5010.00	-7.1	H	3.0	42.8	1.0	-48.8	-25.0	-23.8	
	7515.00	-3.0	H	3.0	42.4	1.0	-44.5	-25.0	-19.5	
	10020.00	-16.1	H	3.0	40.9	1.0	-56.0	-25.0	-31.0	
	Mid Ch, 2535MHz									
	5070.00	-5.8	V	3.0	42.8	1.0	-47.6	-25.0	-22.6	
	7605.00	2.2	V	3.0	42.4	1.0	-39.2	-25.0	-14.2	
	10140.00	-12.1	V	3.0	40.9	1.0	-52.0	-25.0	-27.0	
	5070.00	-14.0	H	3.0	42.8	1.0	-55.8	-25.0	-30.8	
	7605.00	-1.1	H	3.0	42.4	1.0	-42.5	-25.0	-17.5	
	10140.00	-16.4	H	3.0	40.9	1.0	-56.3	-25.0	-31.3	
	High Ch, 2565MHz									
	5130.00	-7.6	V	3.0	42.8	1.0	-49.4	-25.0	-24.4	
	7695.00	-5.2	V	3.0	42.4	1.0	-46.5	-25.0	-21.5	
	10260.00	-13.0	V	3.0	41.0	1.0	-52.9	-25.0	-27.9	
	5130.00	-10.1	H	3.0	42.8	1.0	-51.9	-25.0	-26.9	
	7695.00	-3.2	H	3.0	42.4	1.0	-44.5	-25.0	-19.5	
	10260.00	-13.7	H	3.0	41.0	1.0	-53.7	-25.0	-28.7	

LTE Band 12

LTE

Band 12

10MHz

QPSK

UL Verification Services, Inc.

Above 1GHz High Frequency Substitution Measurement

Company:

Project #:

Date:

Test Engineer:

Configuration:

Location:

Mode:

Test Votage:

AT Telecom

4789864400

2021-03-30

20882

EUT, Y-Position

Chamber 2

LTE_QPSK Band 12 Harmonics, 10MHz Bandwidth

DC 3.8 V

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 704MHz									
1408.00	-16.7	V	3.0	40.7	1.0	-56.4	-13.0	-43.4	
2112.00	-14.1	V	3.0	40.8	1.0	-53.9	-13.0	-40.9	
2816.00	-10.4	V	3.0	41.8	1.0	-51.2	-13.0	-38.2	
1408.00	-16.7	H	3.0	40.7	1.0	-56.5	-13.0	-43.5	
2112.00	-13.8	H	3.0	40.8	1.0	-53.5	-13.0	-40.5	
2816.00	-6.2	H	3.0	41.8	1.0	-47.0	-13.0	-34.0	
Mid Ch, 707.5MHz									
1415.00	-16.2	V	3.0	40.7	1.0	-55.9	-13.0	-42.9	
2122.50	-14.2	V	3.0	40.8	1.0	-54.0	-13.0	-41.0	
2830.00	-11.0	V	3.0	41.8	1.0	-51.8	-13.0	-38.8	
1415.00	-16.6	H	3.0	40.7	1.0	-56.3	-13.0	-43.3	
2122.50	-13.4	H	3.0	40.8	1.0	-53.2	-13.0	-40.2	
2830.00	-7.2	H	3.0	41.8	1.0	-48.0	-13.0	-35.0	
High Ch, 711MHz									
1422.00	-12.5	V	3.0	40.7	1.0	-52.3	-13.0	-39.3	
2133.00	-14.1	V	3.0	40.8	1.0	-53.9	-13.0	-40.9	
2844.00	-10.4	V	3.0	41.8	1.0	-51.3	-13.0	-38.3	
1422.00	-14.1	H	3.0	40.7	1.0	-53.9	-13.0	-40.9	
2133.00	-13.9	H	3.0	40.8	1.0	-53.7	-13.0	-40.7	
2844.00	-7.2	H	3.0	41.8	1.0	-48.1	-13.0	-35.1	

LTE Band 26

LTE Band 26 15MHz QPSK	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement Company: AT Telecom Project #: 4789864400 Date: 2021-03-30 Test Engineer: 20882 Configuration: EUT, X-Position Location: Chamber 2 Mode: LTE_QPSK Band 26 Harmonics, 15MHz Bandwidth Test Votage: DC 3.8 V									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 821.5MHz									
	1643.00	-15.8	V	3.0	40.7	1.0	-55.5	-13.0	-42.5	
	2464.50	-12.9	V	3.0	41.3	1.0	-53.2	-13.0	-40.2	
	3286.00	-7.3	V	3.0	42.1	1.0	-48.3	-13.0	-35.3	
	1643.00	-15.8	H	3.0	40.7	1.0	-55.5	-13.0	-42.5	
	2464.50	-12.7	H	3.0	41.3	1.0	-53.0	-13.0	-40.0	
	3286.00	-9.5	H	3.0	42.1	1.0	-50.5	-13.0	-37.5	
	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement Company: AT Telecom Project #: 4789864400 Date: 2021-03-30 Test Engineer: 20882 Configuration: EUT, X-Position Location: Chamber 2 Mode: LTE_QPSK Band 26 Harmonics, 15MHz Bandwidth Test Votage: DC 3.8 V									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Mid Ch, 831.5MHz									
	1663.00	-15.1	V	3.0	40.7	1.0	-54.8	-13.0	-41.8	
	2494.50	-12.9	V	3.0	41.3	1.0	-53.2	-13.0	-40.2	
	3326.00	-7.2	V	3.0	42.1	1.0	-48.3	-13.0	-35.3	
	1663.00	-15.4	H	3.0	40.7	1.0	-55.1	-13.0	-42.1	
	2494.50	-12.3	H	3.0	41.3	1.0	-52.6	-13.0	-39.6	
	3326.00	-9.2	H	3.0	42.1	1.0	-50.3	-13.0	-37.3	
	High Ch, 841.5MHz									
	1683.00	-15.2	V	3.0	40.7	1.0	-54.9	-13.0	-41.9	
	2524.50	-12.2	V	3.0	41.4	1.0	-52.6	-13.0	-39.6	
	3366.00	-7.6	V	3.0	42.1	1.0	-48.7	-13.0	-35.7	
	1683.00	-15.5	H	3.0	40.7	1.0	-55.2	-13.0	-42.2	
	2524.50	-12.2	H	3.0	41.4	1.0	-52.5	-13.0	-39.5	
	3366.00	-8.1	H	3.0	42.1	1.0	-49.1	-13.0	-36.1	

LTE Band 26 (Straddle)

LTE Band 26 15MHz QPSK	UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement Company: AT Telecom Project #: 4789864400 Date: 2021-03-30 Test Engineer: 20881 Configuration: EUT, X-Position Location: Chamber 2 Mode: LTE_QPSK Band 26 Harmonics, 15MHz Bandwidth Test Voltage: DC 3.8 V									
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Straddle Ch, 824MHz									
	1648.00	-15.6	V	3.0	40.7	1.0	-55.3	-13.0	-42.3	
	2472.00	-13.0	V	3.0	41.3	1.0	-53.3	-13.0	-40.3	
	3296.00	-4.7	V	3.0	42.1	1.0	-45.8	-13.0	-32.8	
	1648.00	-15.5	H	3.0	40.7	1.0	-55.2	-13.0	-42.2	
	2472.00	-12.6	H	3.0	41.3	1.0	-52.9	-13.0	-39.9	
	3296.00	-7.8	H	3.0	42.1	1.0	-48.9	-13.0	-35.9	

LTE Band 5

LTE Band 5 (Frequency range: 824-849 MHz) is covered by LTE Band 26 (Frequency range: 824-849 MHz under Part 22H) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

LTE Band 17

LTE Band 17 (Frequency range: 704-716 MHz) is covered by LTE Band 12 (Frequency range: 699-716 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

END OF REPORT