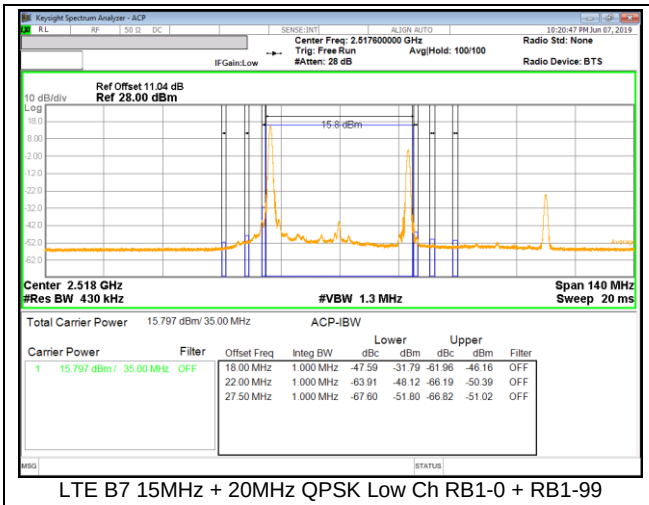
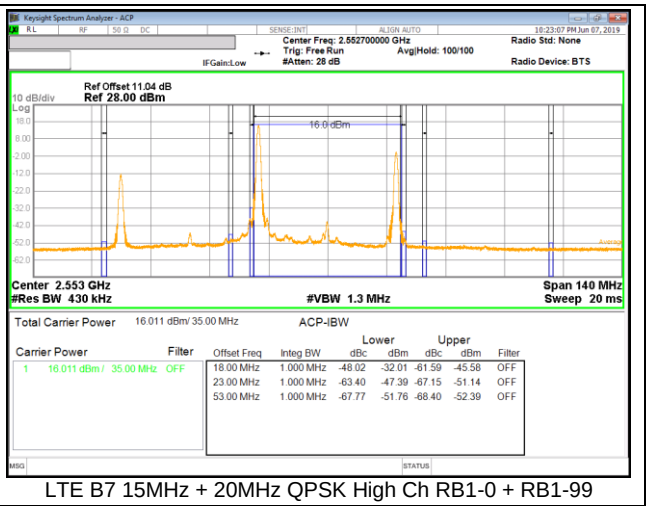
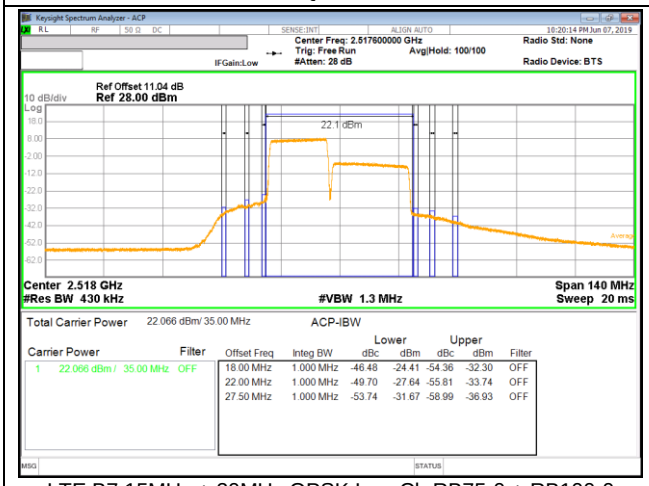


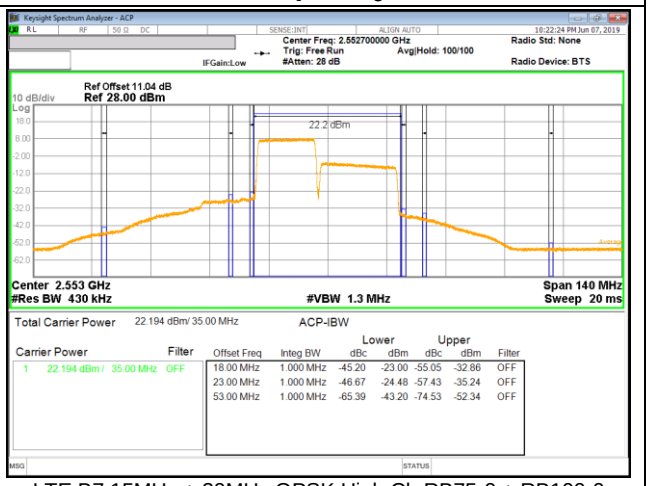
LTE B7 15MHz + 20MHz QPSK Low Ch RB1-0 + RB1-99



LTE B7 15MHz + 20MHz QPSK High Ch RB1-0 + RB1-99



LTE B7 15MHz + 20MHz QPSK Low Ch RB75-0 + RB100-0



LTE B7 15MHz + 20MHz QPSK High Ch RB75-0 + RB100-0

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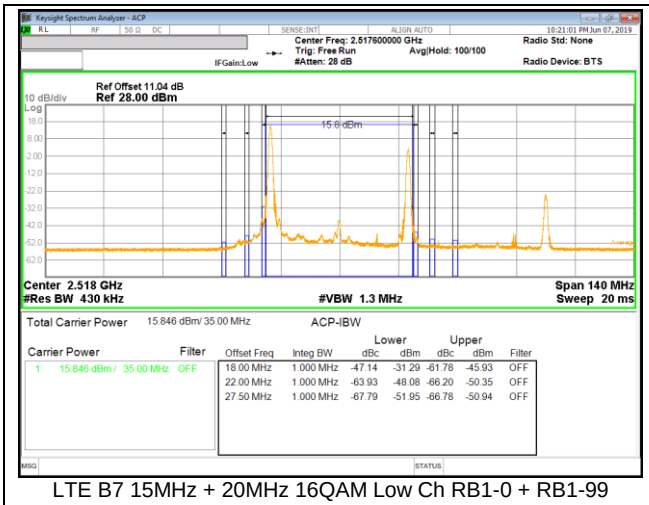
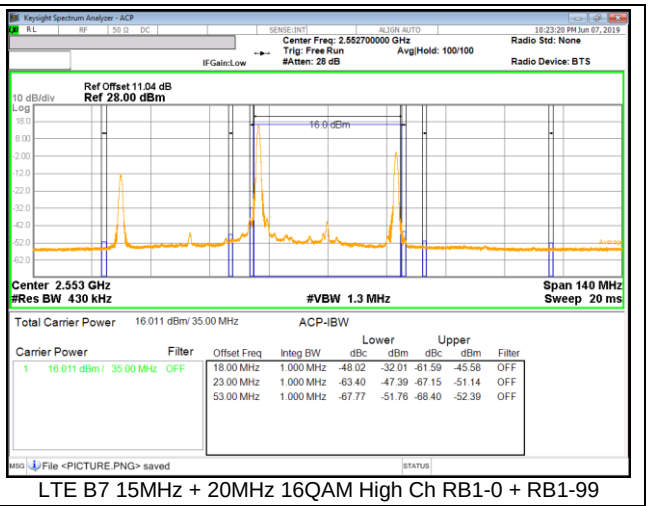
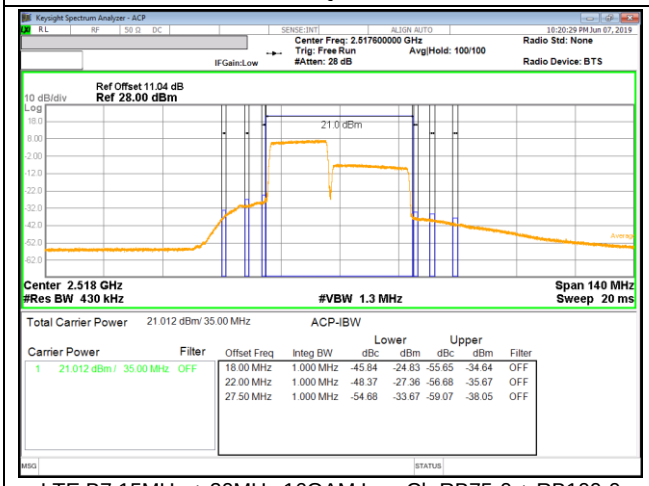


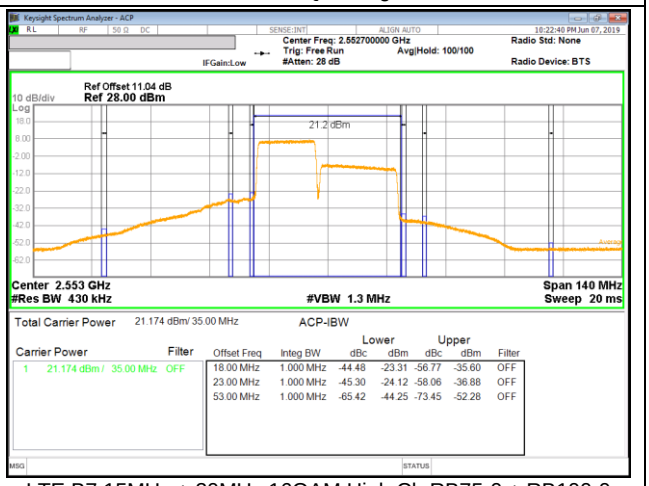
LTE B7 15MHz + 20MHz 16QAM Low Ch RB1-0 + RB1-99



LTE B7 15MHz + 20MHz 16QAM High Ch RB1-0 + RB1-99



LTE B7 15MHz + 20MHz 16QAM Low Ch RB75-0 + RB100-0



LTE B7 15MHz + 20MHz 16QAM High Ch RB75-0 + RB100-0

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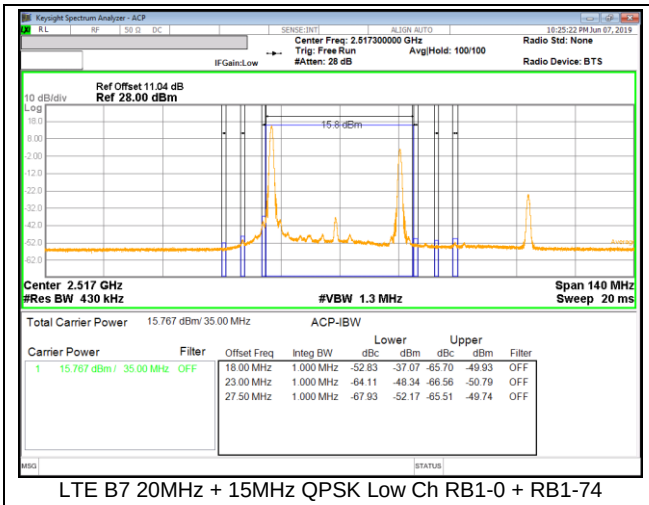
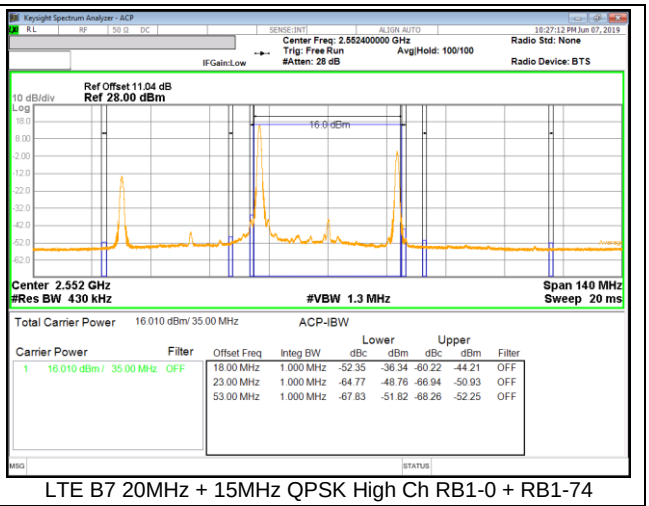
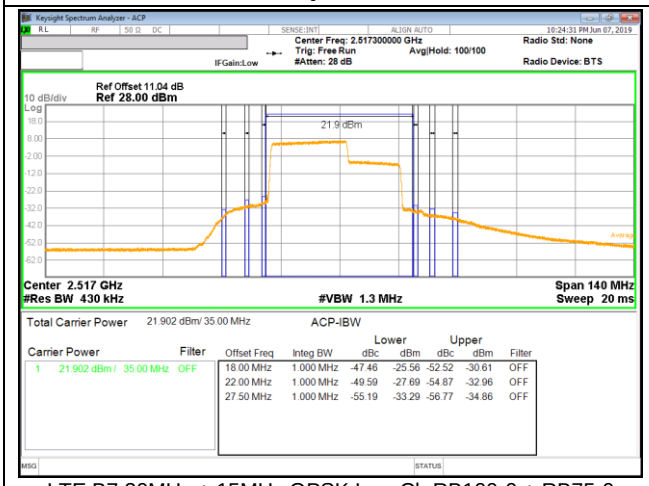


LTE B7 20MHz + 15MHz QPSK Low Ch RB1-0 + RB1-74



LTE B7 20MHz + 15MHz QPSK High Ch RB1-0 + RB1-74



LTE B7 20MHz + 15MHz QPSK Low Ch RB100-0 + RB75-0

LTE B7 20MHz + 15MHz QPSK High Ch RB100-0 + RB75-0

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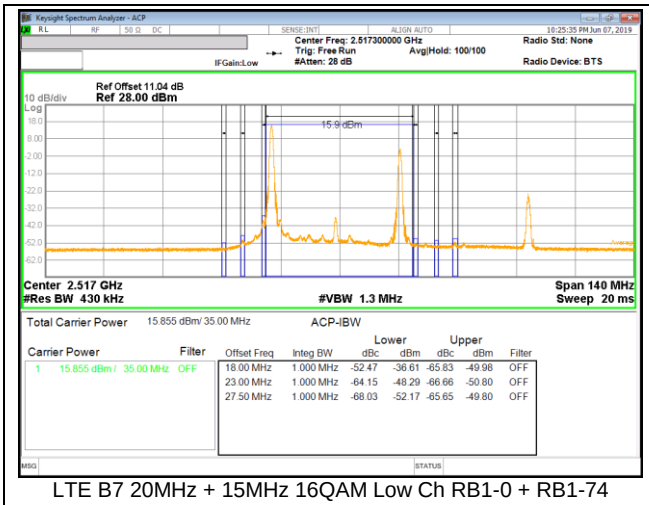
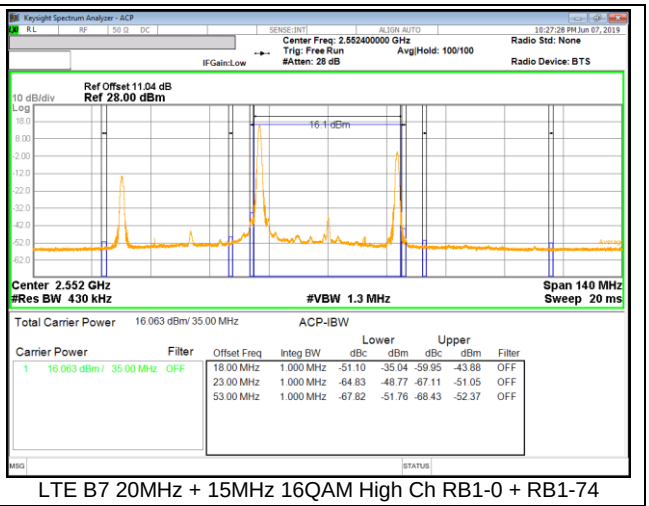
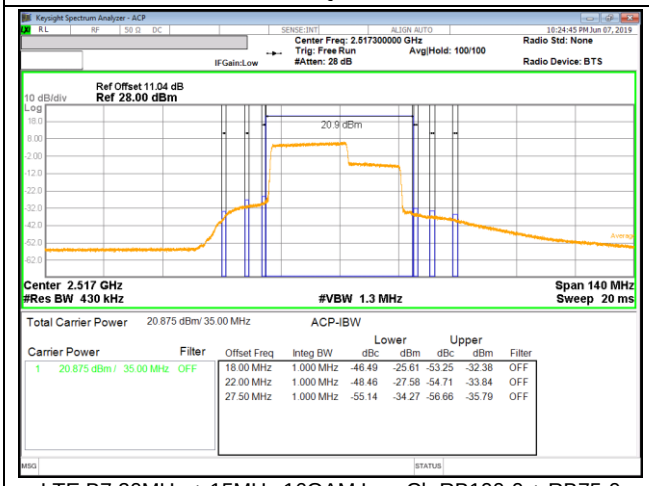


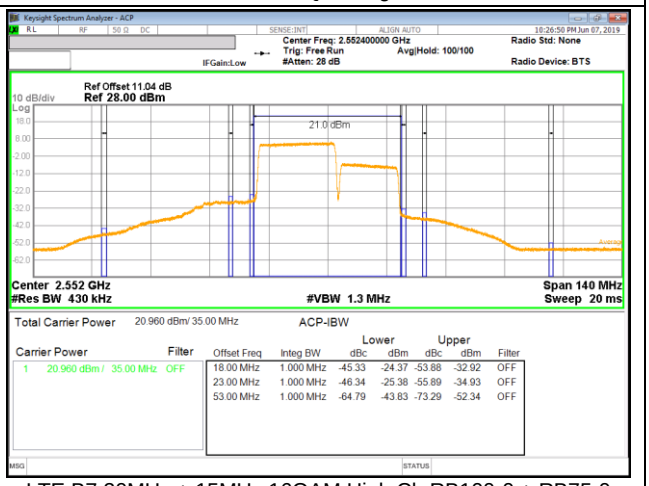
LTE B7 20MHz + 15MHz 16QAM Low Ch RB1-0 + RB1-74



LTE B7 20MHz + 15MHz 16QAM High Ch RB1-0 + RB1-74



LTE B7 20MHz + 15MHz 16QAM Low Ch RB100-0 + RB75-0



LTE B7 20MHz + 15MHz 16QAM High Ch RB100-0 + RB75-0

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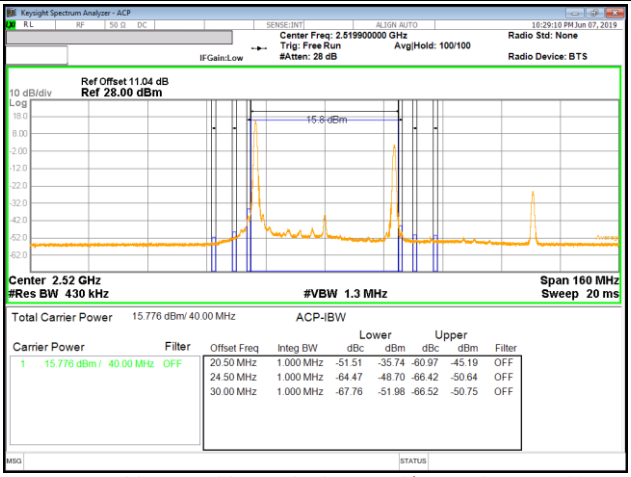
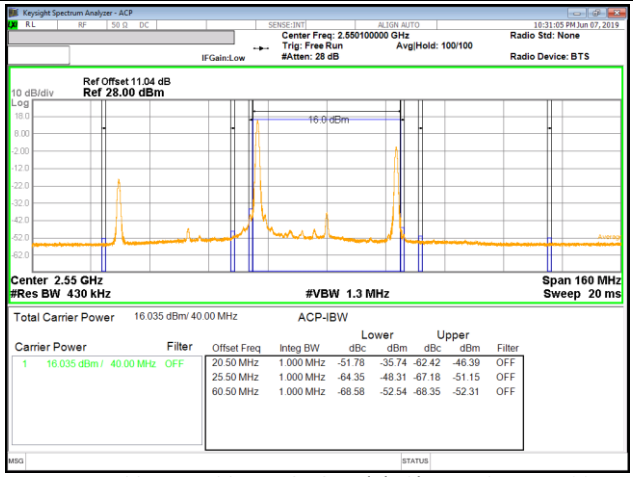
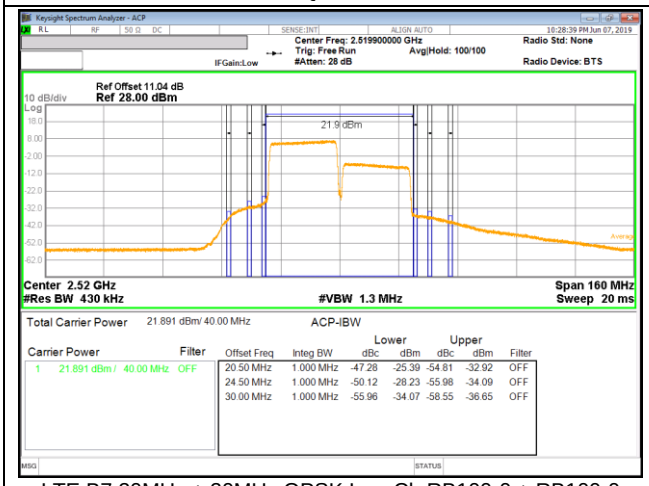


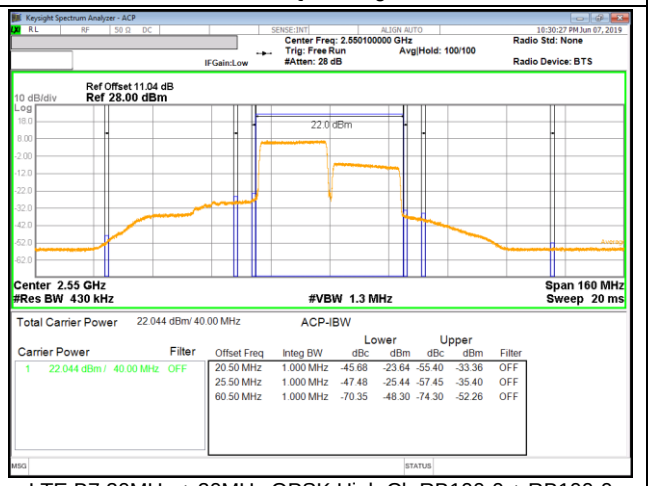
LTE B7 20MHz + 20MHz QPSK Low Ch RB1-0 + RB1-99



LTE B7 20MHz + 20MHz QPSK High Ch RB1-0 + RB1-99



LTE B7 20MHz + 20MHz QPSK Low Ch RB100-0 + RB100-0



LTE B7 20MHz + 20MHz QPSK High Ch RB100-0 + RB100-0

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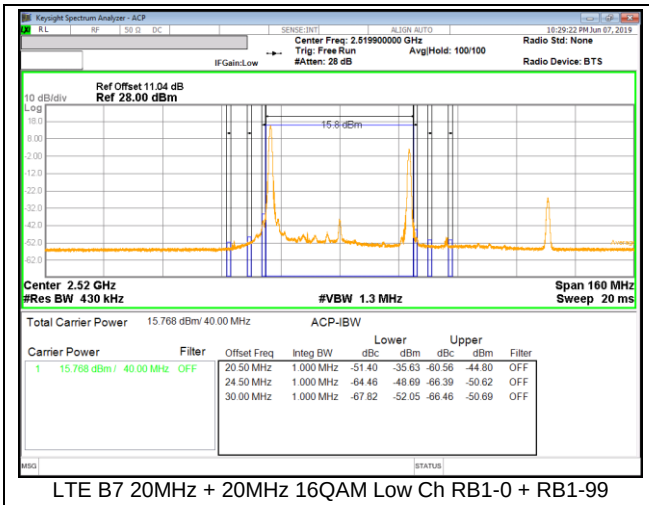
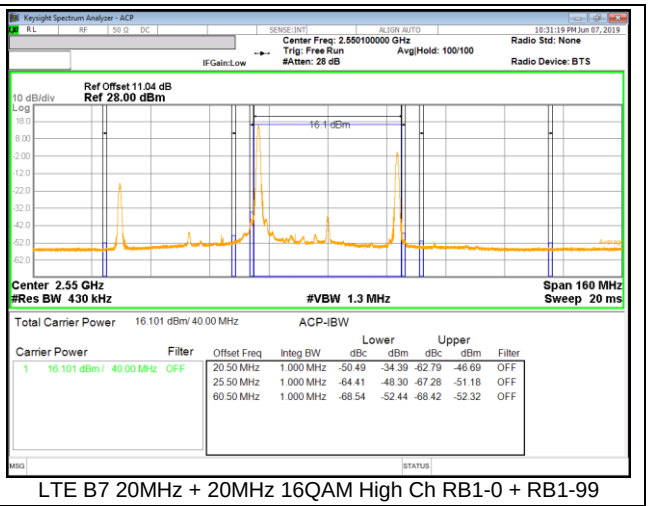
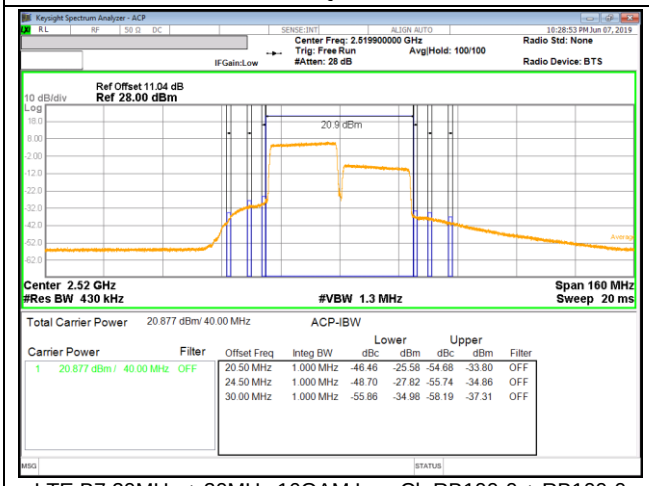


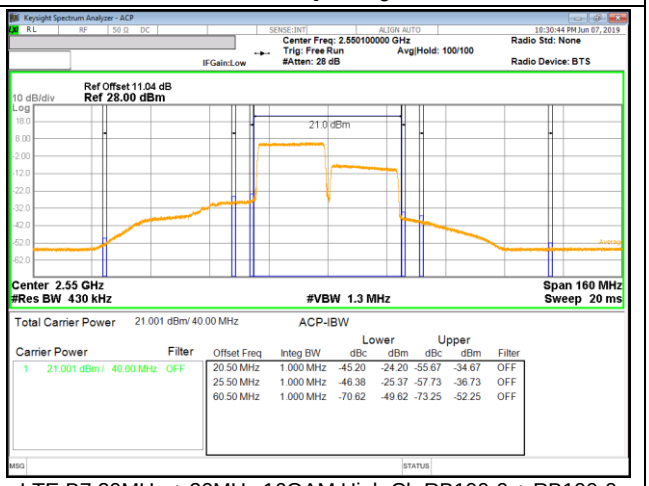
LTE B7 20MHz + 20MHz 16QAM Low Ch RB1-0 + RB1-99



LTE B7 20MHz + 20MHz 16QAM High Ch RB1-0 + RB1-99



LTE B7 20MHz + 20MHz 16QAM Low Ch RB100-0 + RB100-0



LTE B7 20MHz + 20MHz 16QAM High Ch RB100-0 + RB100-0

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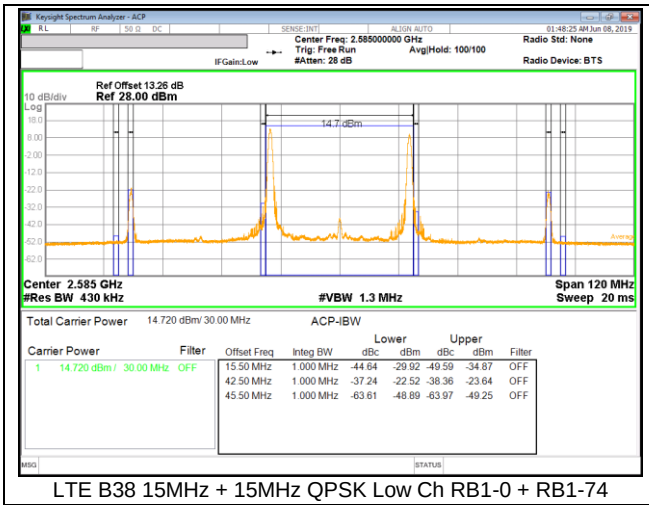
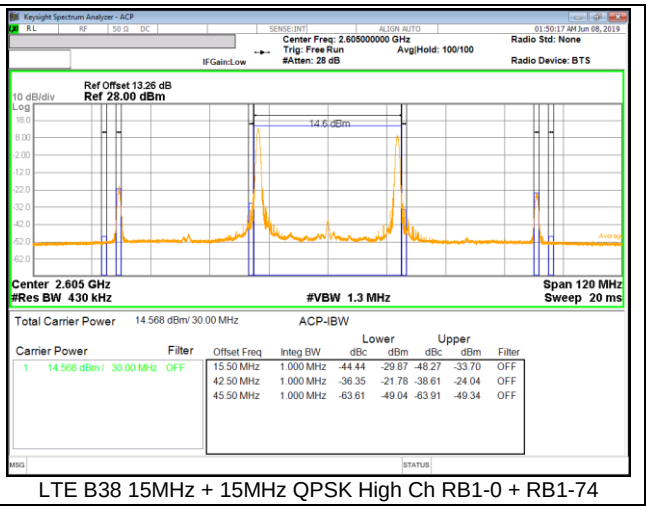
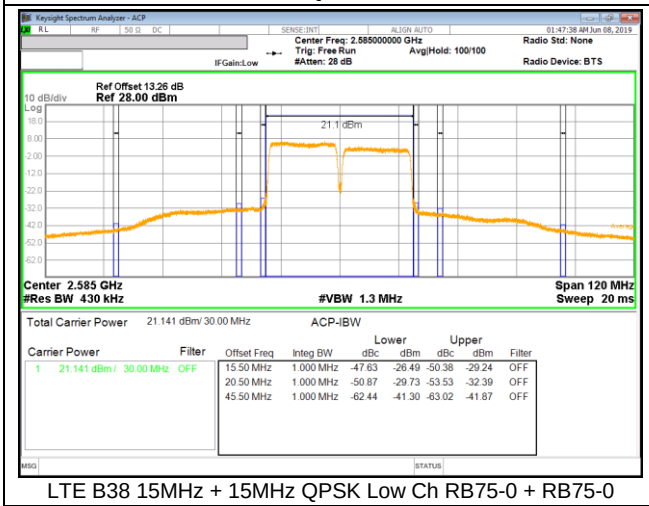
LTE Band 38C(UL CA)



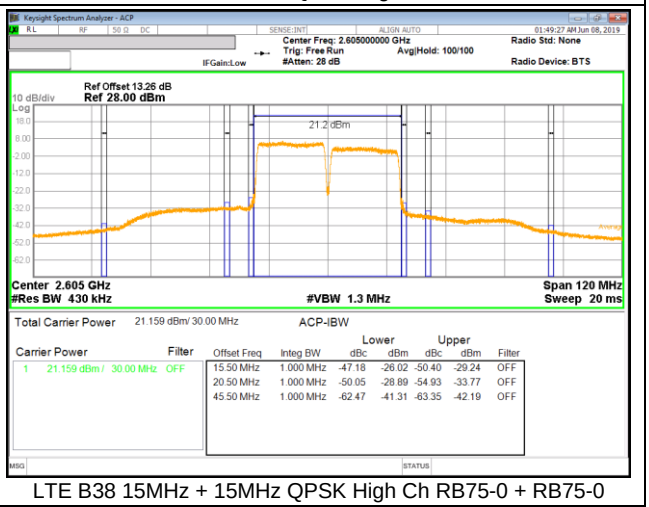
LTE B38 15MHz + 15MHz QPSK Low Ch RB1-0 + RB1-74



LTE B38 15MHz + 15MHz QPSK High Ch RB1-0 + RB1-74



LTE B38 15MHz + 15MHz QPSK Low Ch RB75-0 + RB75-0



LTE B38 15MHz + 15MHz QPSK High Ch RB75-0 + RB75-0

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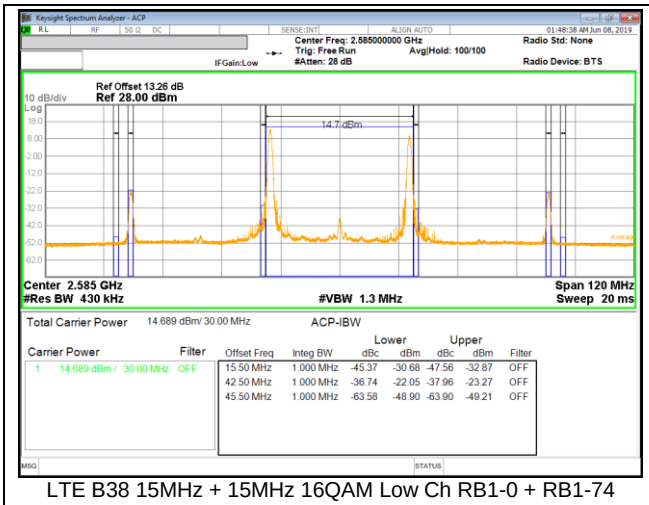
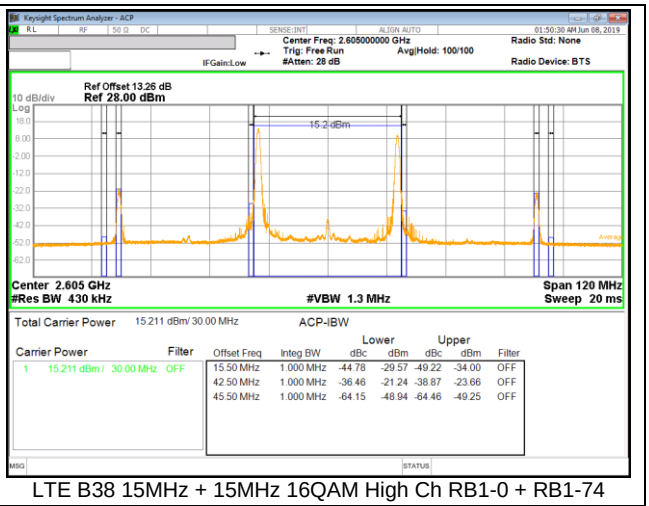
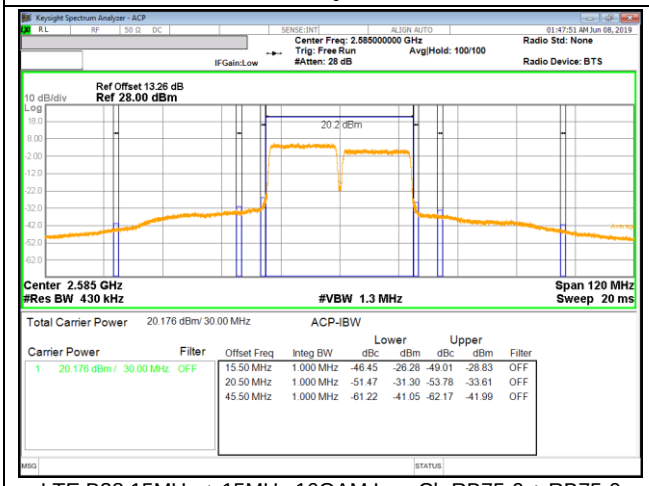


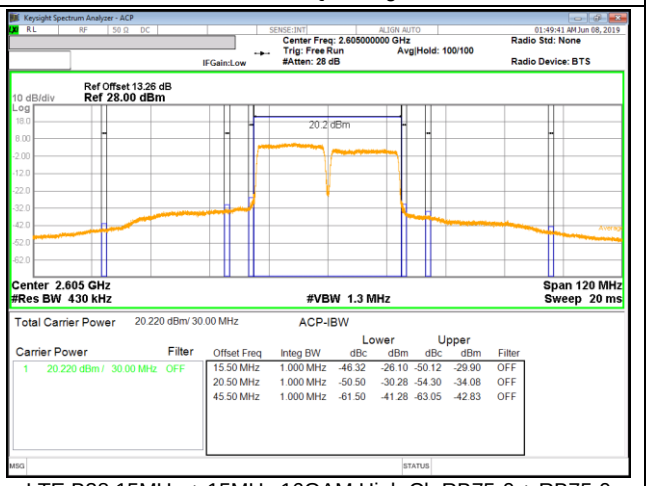
LTE B38 15MHz + 15MHz 16QAM Low Ch RB1-0 + RB1-74



LTE B38 15MHz + 15MHz 16QAM High Ch RB1-0 + RB1-74



LTE B38 15MHz + 15MHz 16QAM Low Ch RB75-0 + RB75-0



LTE B38 15MHz + 15MHz 16QAM High Ch RB75-0 + RB75-0

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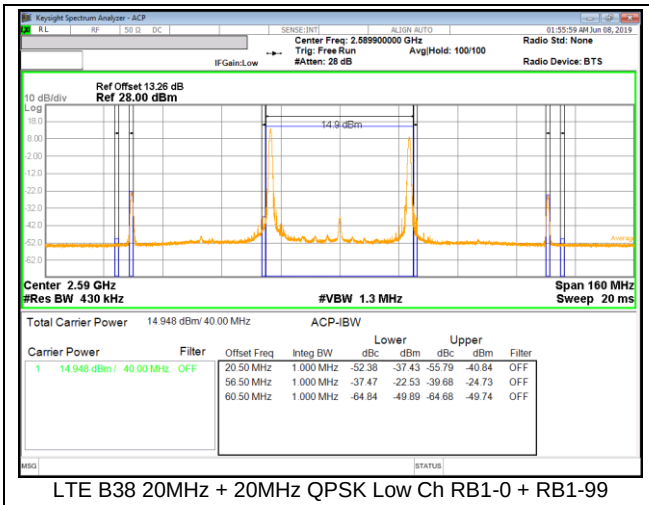
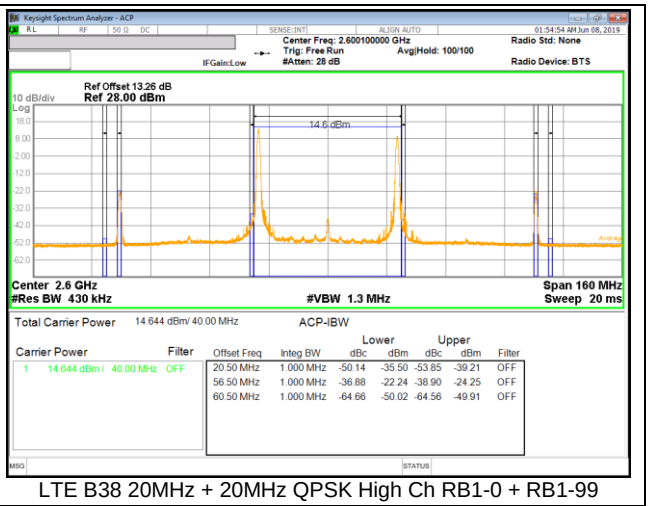
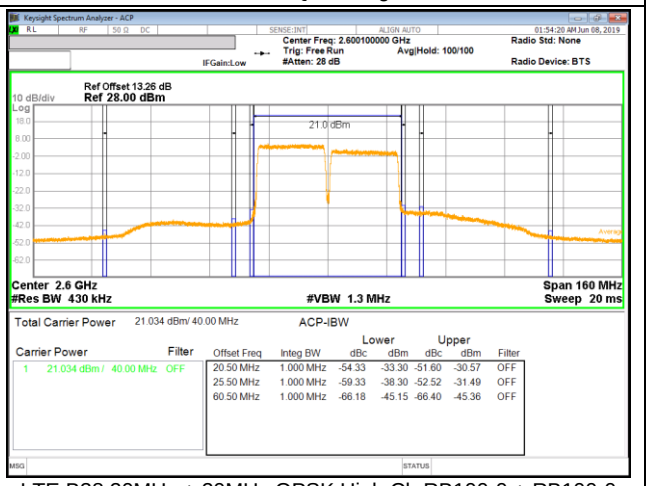


LTE B38 20MHz + 20MHz QPSK Low Ch RB1-0 + RB1-99



LTE B38 20MHz + 20MHz QPSK High Ch RB1-0 + RB1-99

LTE B38 20MHz + 20MHz QPSK Low Ch RB100-0 + RB100-0



LTE B38 20MHz + 20MHz QPSK High Ch RB100-0 + RB100-0

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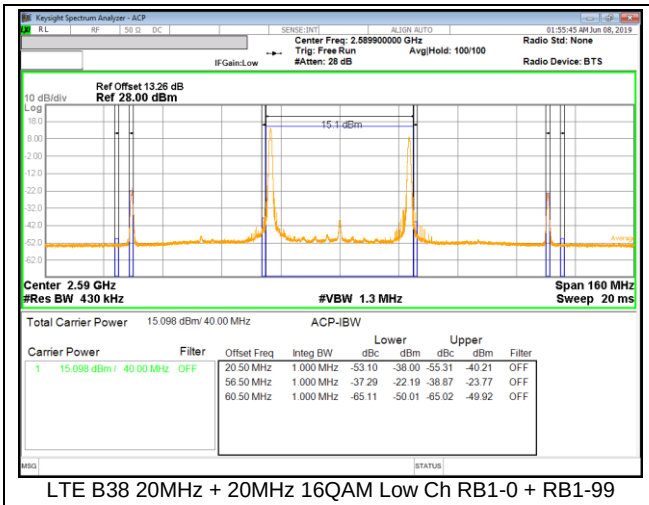
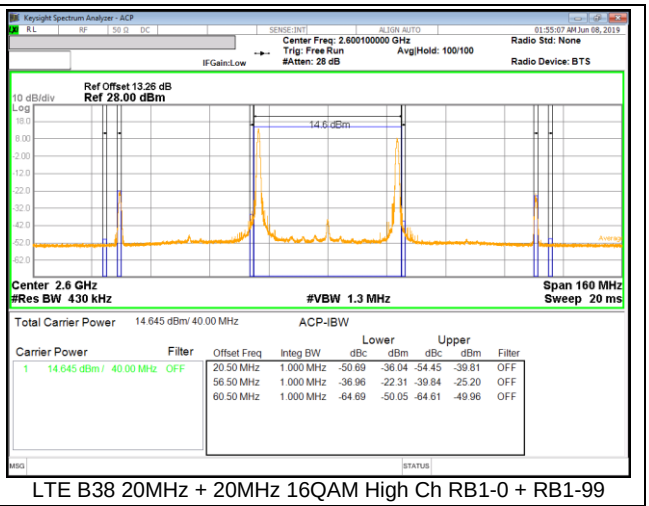
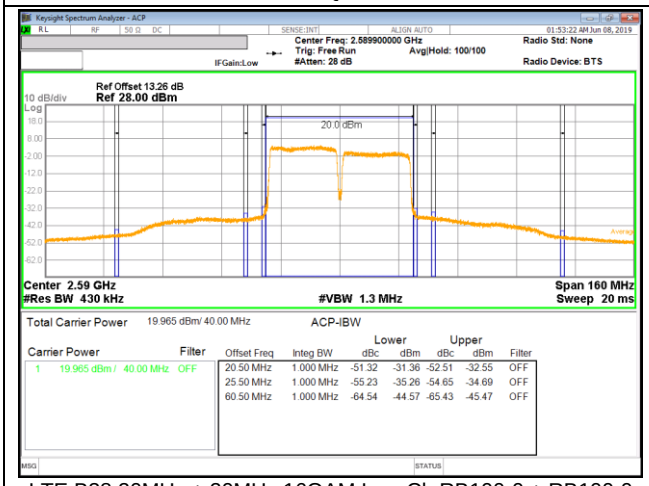


LTE B38 20MHz + 20MHz 16QAM Low Ch RB1-0 + RB1-99



LTE B38 20MHz + 20MHz 16QAM High Ch RB1-0 + RB1-99



LTE B38 20MHz + 20MHz 16QAM Low Ch RB100-0 + RB100-0

LTE B38 20MHz + 20MHz 16QAM High Ch RB100-0 + RB100-0

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7.3. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §27.53

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:
(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 that 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.

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 ≥ 3 × 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(LTE Band 7), Maxhold(LTE Band 38);

RESULTS

See the following pages.

NOTE : Please refer to section 5.5 for bandwidth and RB setting about LTE bands.

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7.3.1. OUT OF BAND EMISSIONS RESULT

LTE Band 7C(UL CA)

Band 7C 20MHz-20MHz	 LTE B7 20MHz + 20MHz QPSK Low Ch RB1-99 + RB1-0	 LTE B7 20MHz + 20MHz QPSK Mid Ch RB1-99 + RB1-0
	 LTE B7 20MHz + 20MHz QPSK High Ch RB1-99 + RB1-0	

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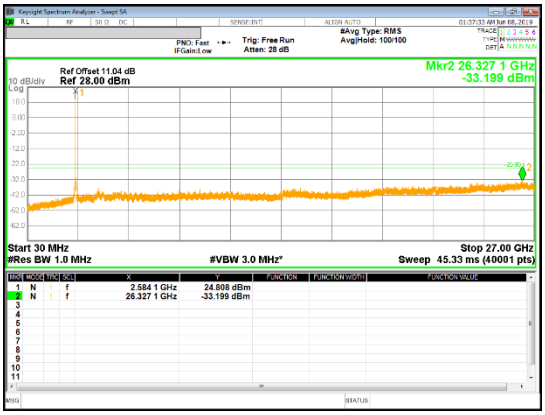
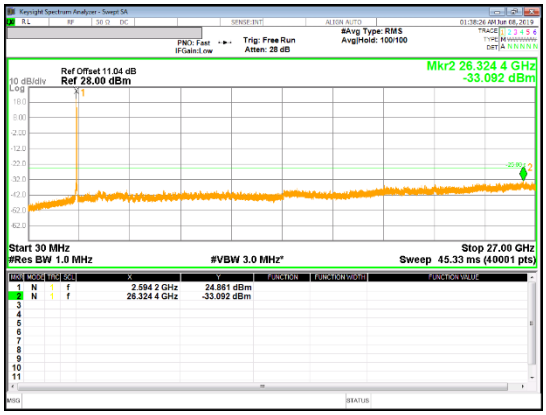
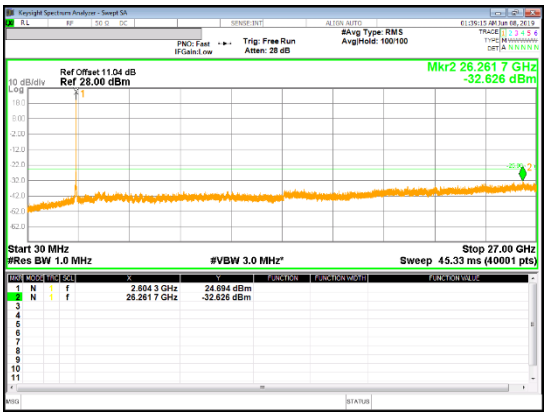
LTE Band 38C(UL CA)

Band 38C 15MHz-15MHz	 LTE B7 15MHz + 15MHz QPSK Low Ch RB1-49 + RB1-0	 LTE B7 15MHz + 15MHz QPSK Mid Ch RB1-49 + RB1-0
	 LTE B7 15MHz + 15MHz QPSK High Ch RB1-49 + RB1-0	

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8. RADIATED TEST RESULTS

8.1. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

FCC: §2.1053, §27. 53

LIMIT

Part 27.53:
(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 that 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.

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 ≥ 3 × 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 ≥ span/RBW;
g) Trace mode = average(LTE Band 7C), Maxhold(LTE Band 38C);;

RESULTS

See the following pages.

NOTE : Please refer to section 5.5 for bandwidth and RB setting about LTE bands.

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8.1.1. SPURIOUS RADIATION PLOTS

LTE Band 7C

LTE

Band 7C

20MHz - 20MHz

QPSK

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 4789009800
Date: 2019-06-17
Test Engineer: 45585
Configuration: EUT / AC Adpater, Y-Position
Location: Chamber 1
Mode: LTE_QPSK Band 7 Uplink CA Harmonics, 20MHz/20MHz Bandwidth

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, PCC : 2510MHz, SCC : 2529.8MHz									
5040.00	-1.5	V	3.0	43.8	1.0	-44.3	-25.0	-19.3	
7560.00	-12.1	V	3.0	42.4	1.0	-53.6	-25.0	-28.6	
10080.00	-11.3	V	3.0	40.6	1.0	-50.9	-25.0	-25.9	
5040.00	-4.5	H	3.0	43.8	1.0	-47.3	-25.0	-22.3	
7560.00	-12.3	H	3.0	42.4	1.0	-53.7	-25.0	-28.7	
10080.00	-12.9	H	3.0	40.6	1.0	-52.5	-25.0	-27.5	
Mid Ch, PCC : 2525.1MHz, SCC : 2544.9MHz									
5070.00	-1.8	V	3.0	43.8	1.0	-44.6	-25.0	-19.6	
7605.00	-9.0	V	3.0	42.4	1.0	-50.4	-25.0	-25.4	
10140.00	-11.9	V	3.0	40.6	1.0	-51.5	-25.0	-26.5	
5070.00	-3.5	H	3.0	43.8	1.0	-46.2	-25.0	-21.2	
7605.00	-12.6	H	3.0	42.4	1.0	-54.0	-25.0	-29.0	
10140.00	-13.3	H	3.0	40.6	1.0	-52.9	-25.0	-27.9	
High Ch, PCC : 2540.2MHz, SCC : 2560MHz									
5100.00	-4.2	V	3.0	43.8	1.0	-47.0	-25.0	-22.0	
7650.00	-10.2	V	3.0	42.4	1.0	-51.6	-25.0	-26.6	
10200.00	-10.3	V	3.0	40.6	1.0	-49.9	-25.0	-24.9	
5100.00	-6.4	H	3.0	43.8	1.0	-49.1	-25.0	-24.1	
7650.00	-13.6	H	3.0	42.4	1.0	-55.0	-25.0	-30.0	
10200.00	-12.6	H	3.0	40.6	1.0	-52.2	-25.0	-27.2	

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LTE Band 38C

LTE

Band 38C

15MHz - 15MHz

QPSK

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 4789009800
Date: 2019-06-17
Test Engineer: 45585
Configuration: EUT / AC Adpater, Z-Position
Location: Chamber 1
Mode: LTE_QPSK Band 38 Uplink CA Harmonics, 15MHz/15MHz Bandwidth

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, PCC : 2577.5MHz SCC : 2592.5MHz									
5170.00	-16.4	V	3.0	43.8	1.0	-59.2	-25.0	-34.2	
7755.00	-15.1	V	3.0	42.3	1.0	-56.4	-25.0	-31.4	
10340.00	-5.2	V	3.0	40.7	1.0	-44.8	-25.0	-19.8	
5170.00	-16.5	H	3.0	43.8	1.0	-59.3	-25.0	-34.3	
7755.00	-15.0	H	3.0	42.3	1.0	-56.3	-25.0	-31.3	
10340.00	1.2	H	3.0	40.7	1.0	-38.4	-25.0	-13.4	
Mid Ch, PCC : 2587.5MHz SCC : 2602.5MHz									
5190.00	-16.4	V	3.0	43.8	1.0	-59.2	-25.0	-34.2	
7785.00	-15.6	V	3.0	42.3	1.0	-56.9	-25.0	-31.9	
10380.00	-4.1	V	3.0	40.7	1.0	-43.8	-25.0	-18.8	
5190.00	-16.1	H	3.0	43.8	1.0	-58.9	-25.0	-33.9	
7785.00	-15.1	H	3.0	42.3	1.0	-56.5	-25.0	-31.5	
10380.00	1.2	H	3.0	40.7	1.0	-38.4	-25.0	-13.4	
High Ch, PCC : 2597.5MHz SCC : 2612.5MHz									
5210.00	-16.5	V	3.0	43.8	1.0	-59.3	-25.0	-34.3	
7815.00	-15.3	V	3.0	42.3	1.0	-56.6	-25.0	-31.6	
10420.00	-4.5	V	3.0	40.7	1.0	-44.1	-25.0	-19.1	
5210.00	-16.5	H	3.0	43.8	1.0	-59.3	-25.0	-34.3	
7815.00	-15.6	H	3.0	42.3	1.0	-56.9	-25.0	-31.9	
10420.00	0.4	H	3.0	40.7	1.0	-39.2	-25.0	-14.2	

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