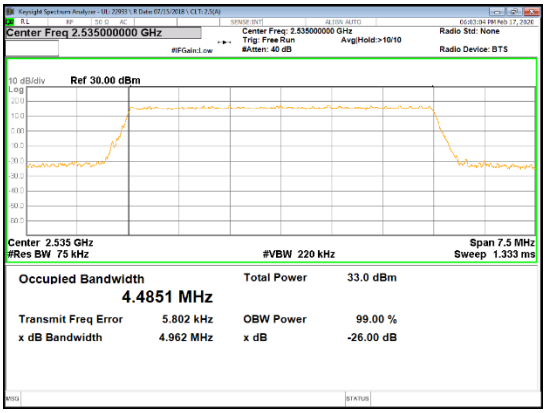
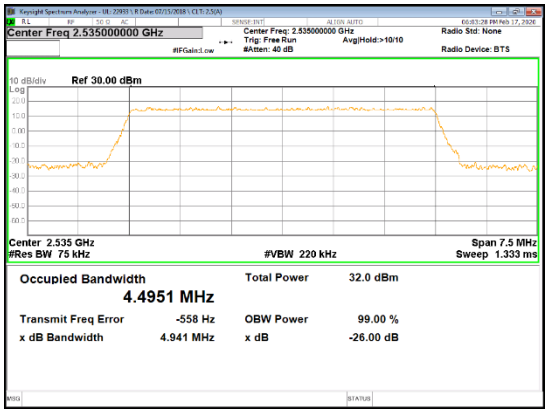
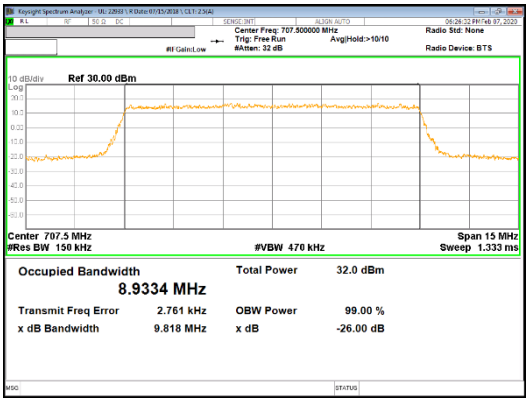
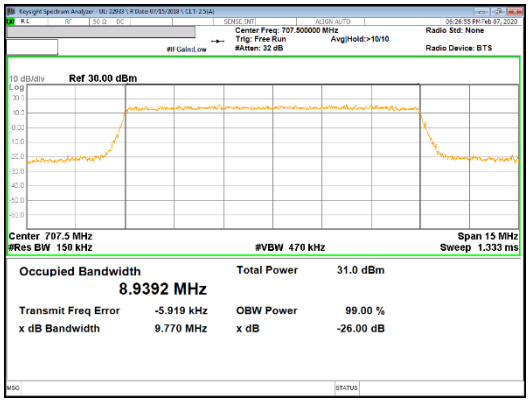
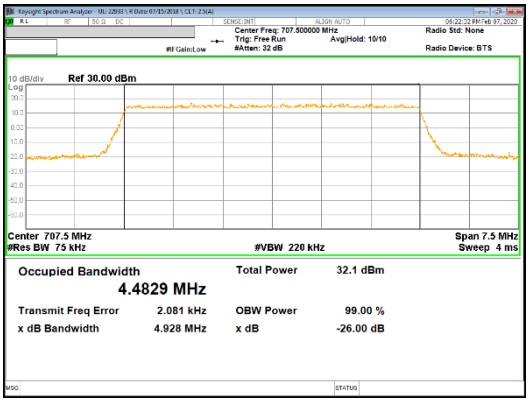
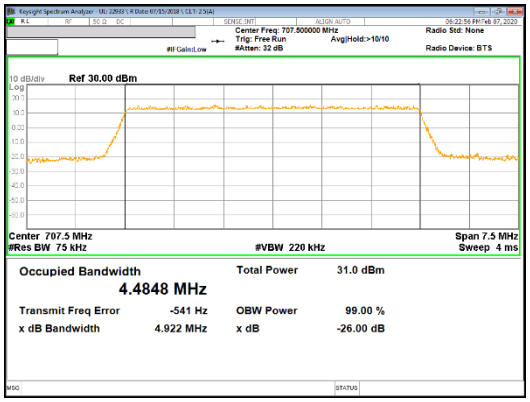
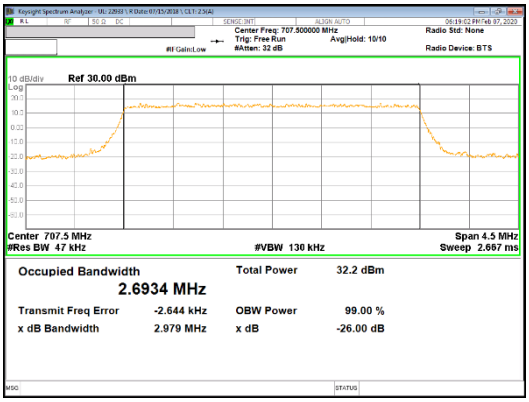
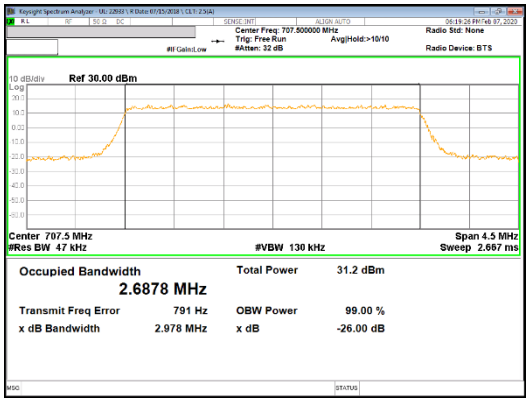
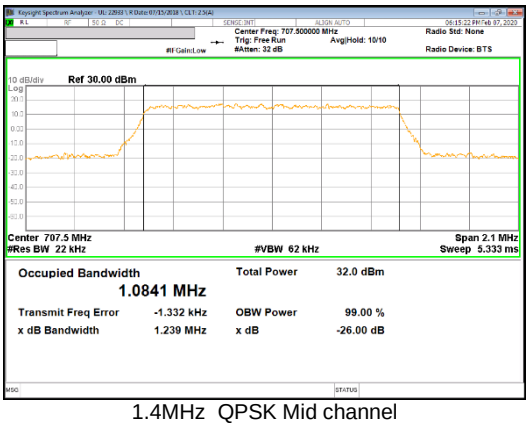
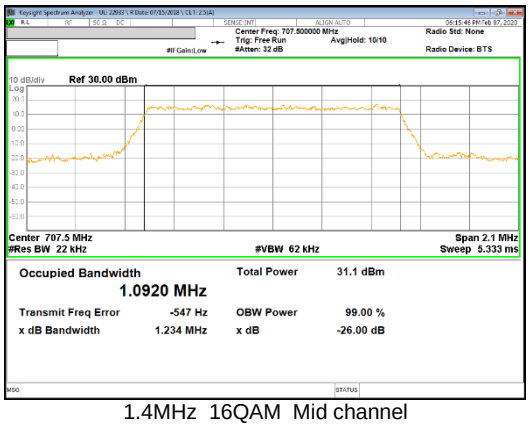
Band 7 5MHz	 5MHz QPSK Mid channel	 5MHz 16QAM Mid channel

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_22/24/27/90(03)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE Band 12

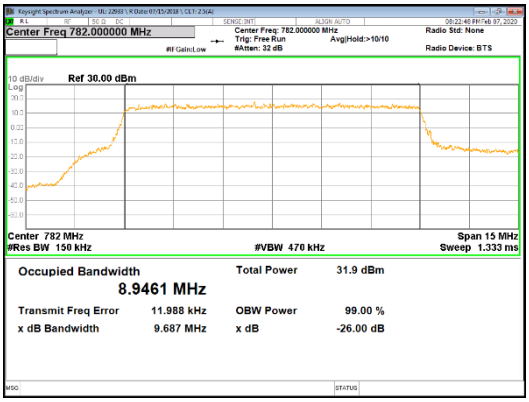
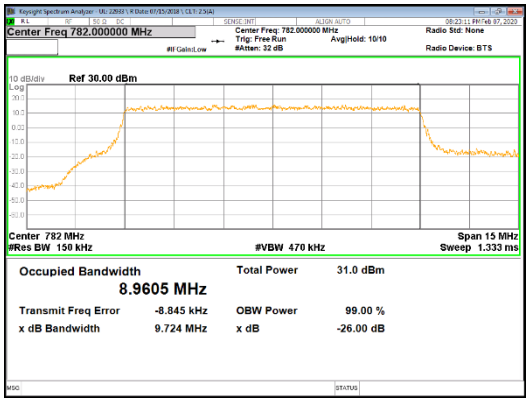
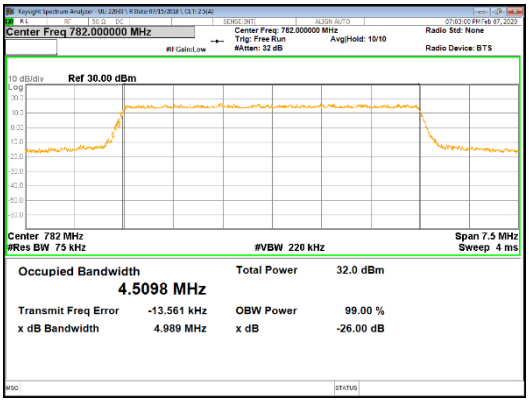
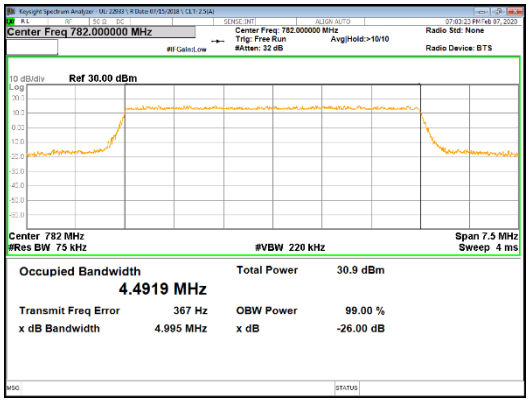
Band 12 10MHz	 10MHz QPSK Mid channel	 10MHz 16QAM Mid channel
Band 12 5MHz	 5MHz QPSK Mid channel	 5MHz 16QAM Mid channel
Band 12 3MHz	 3MHz QPSK Mid channel	 3MHz 16QAM Mid channel

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_22/24/27/90(03)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 12 1.4MHz	 1.4MHz QPSK Mid channel	 1.4MHz 16QAM Mid channel

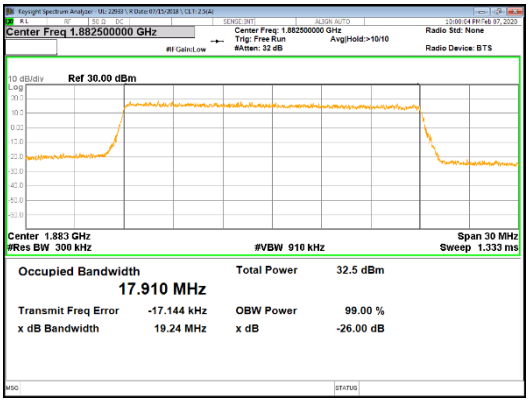
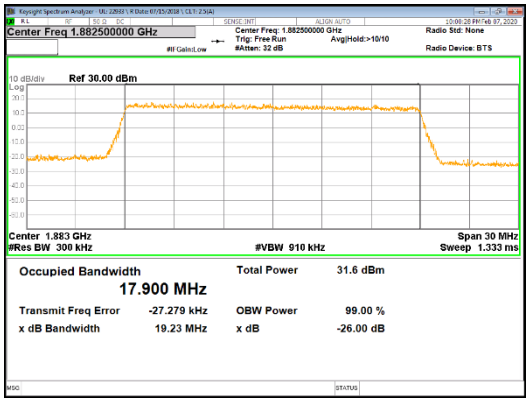
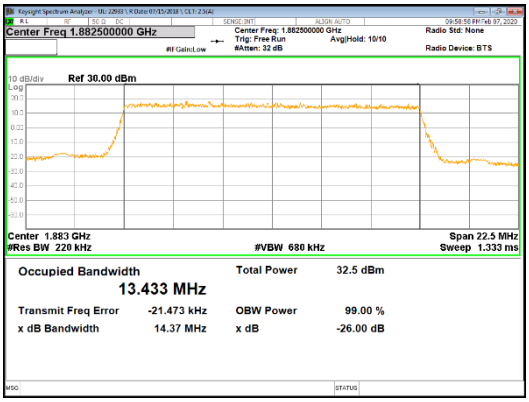
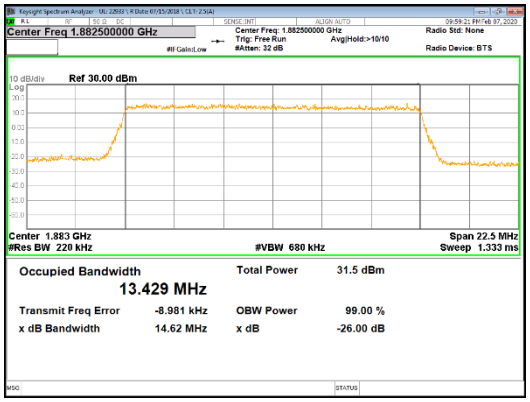
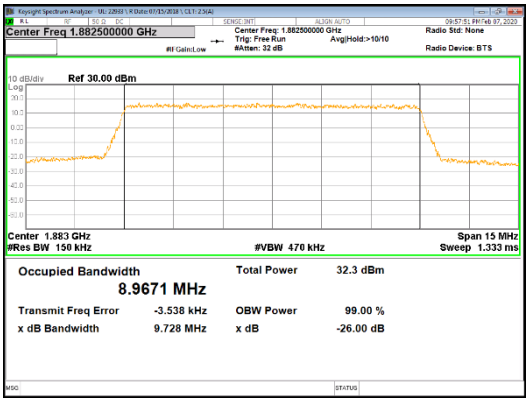
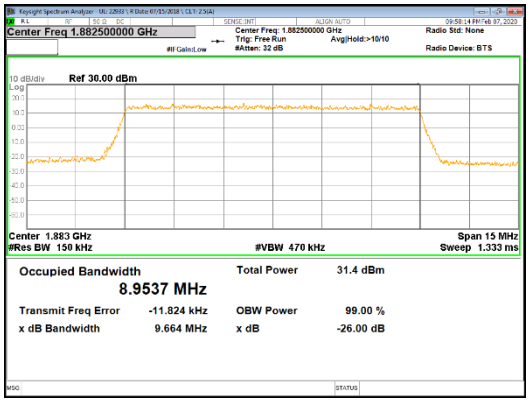
UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_22/24/27/90(03)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE Band 13

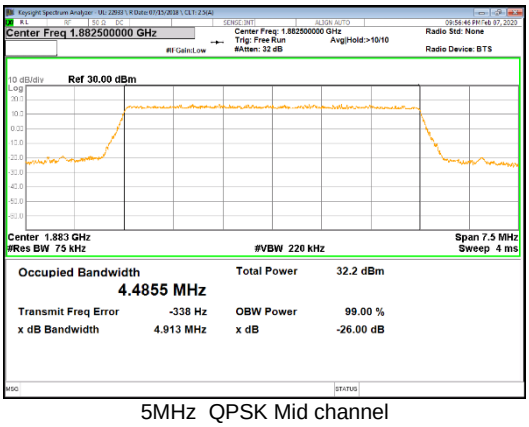
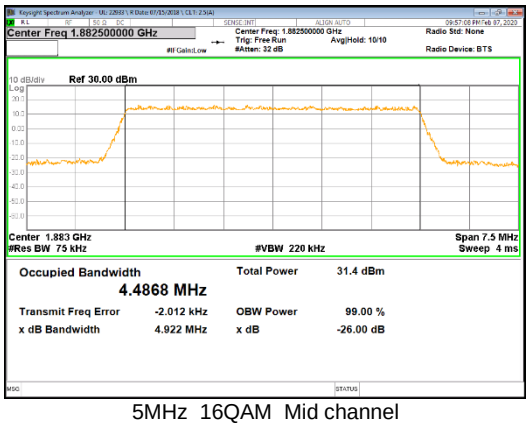
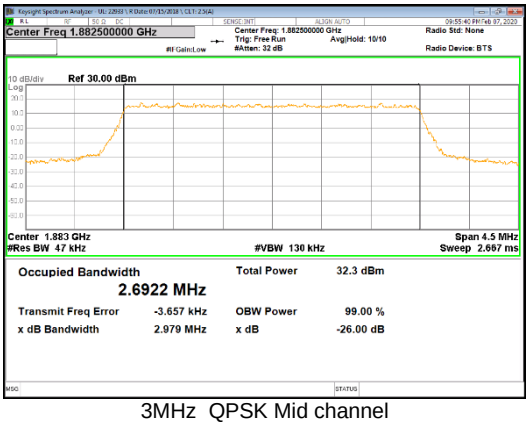
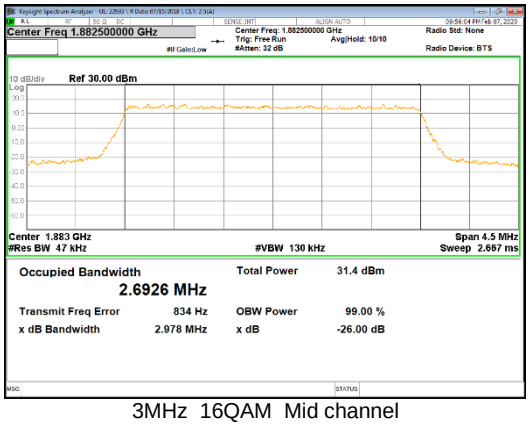
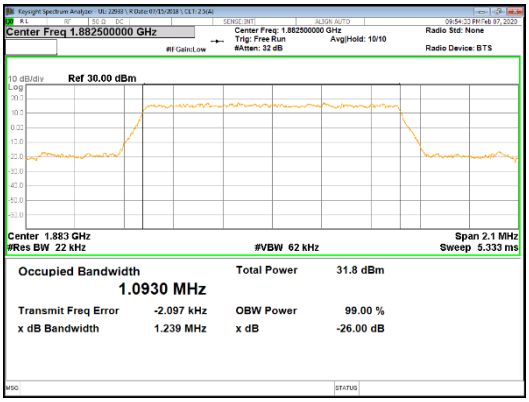
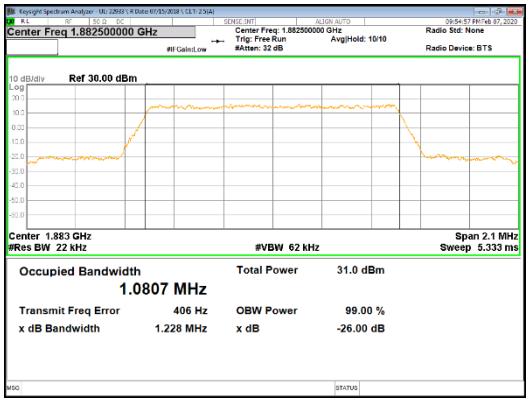
Band 13 10MHz	 10MHz QPSK Mid channel	 10MHz 16QAM Mid channel
Band 13 5MHz	 5MHz QPSK Mid channel	 5MHz 16QAM Mid channel

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_22/24/27/90(03)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE Band 25

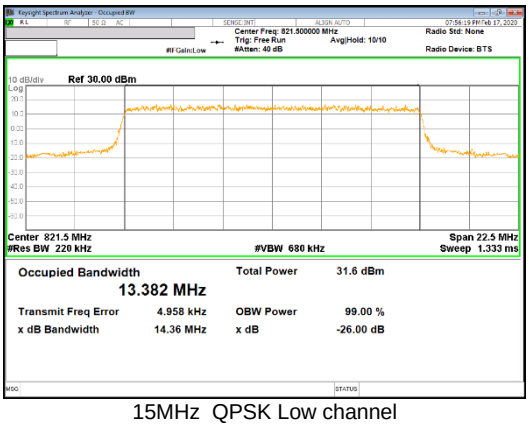
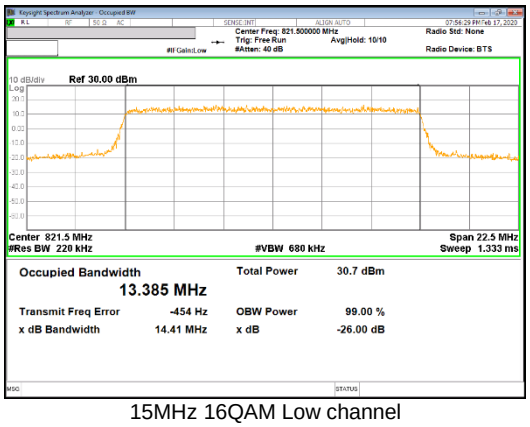
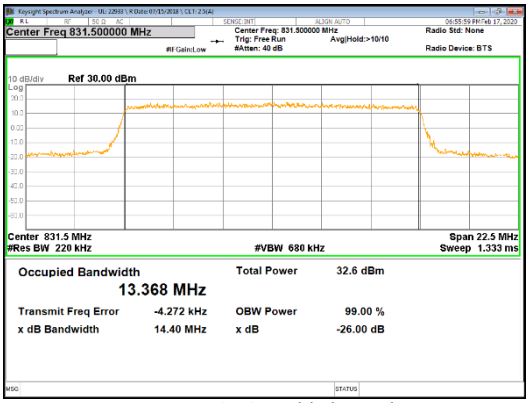
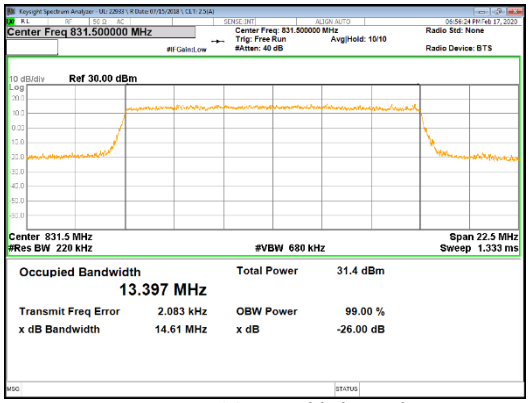
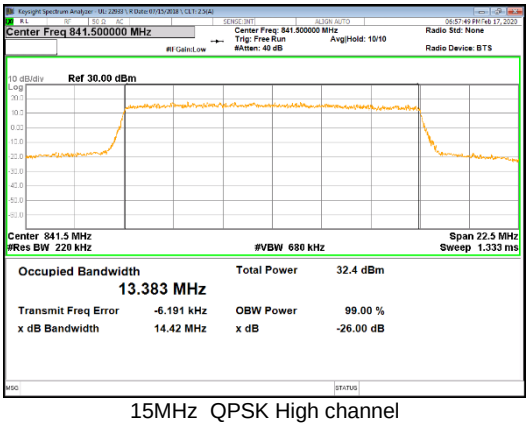
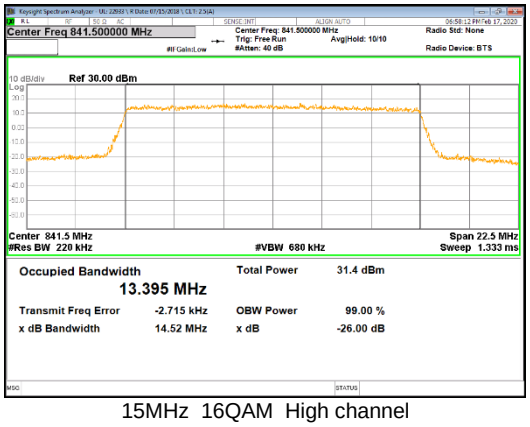
Band 25 20MHz	 20MHz QPSK Mid channel	 20MHz 16QAM Mid channel
Band 25 15MHz	 15MHz QPSK Mid channel	 15MHz 16QAM Mid channel
Band 25 10MHz	 10MHz QPSK Mid channel	 10MHz 16QAM Mid channel

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_22/24/27/90(03)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 25 5MHz	 5MHz QPSK Mid channel	 5MHz 16QAM Mid channel
Band 25 3MHz	 3MHz QPSK Mid channel	 3MHz 16QAM Mid channel
Band 25 1.4MHz	 1.4MHz QPSK Mid channel	 1.4MHz 16QAM Mid channel

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_22/24/27/90(03)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

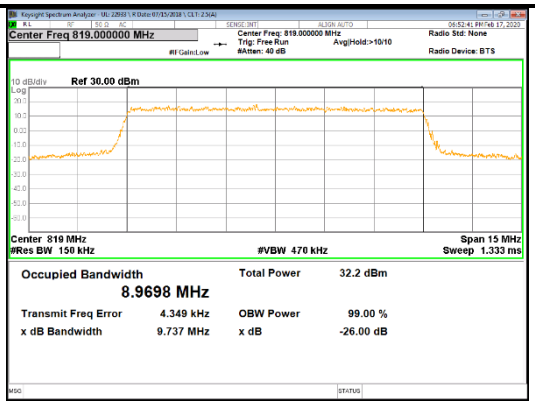
LTE Band 26

Band 26 15MHz	 15MHz QPSK Low channel	 15MHz 16QAM Low channel
	 15MHz QPSK Mid channel	 15MHz 16QAM Mid channel
	 15MHz QPSK High channel	 15MHz 16QAM High channel

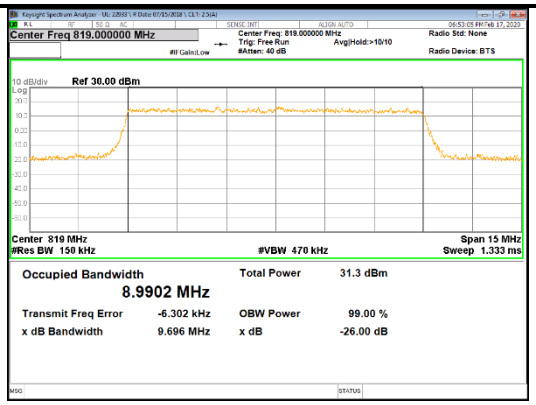
UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_22/24/27/90(03)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 26

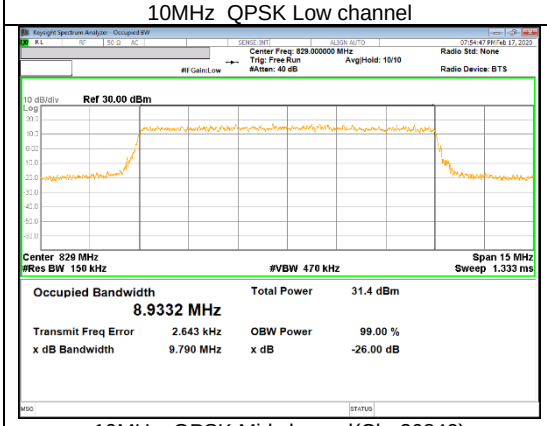
10MHz



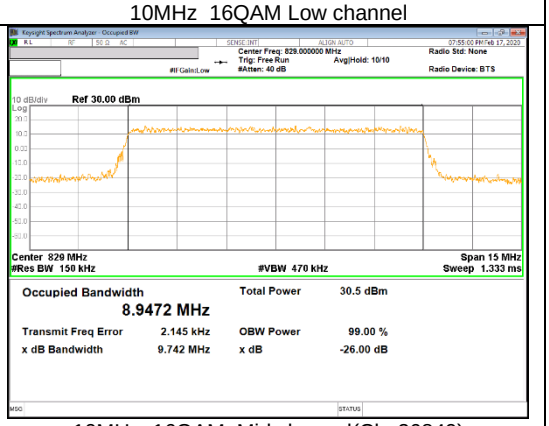
10MHz QPSK Low channel



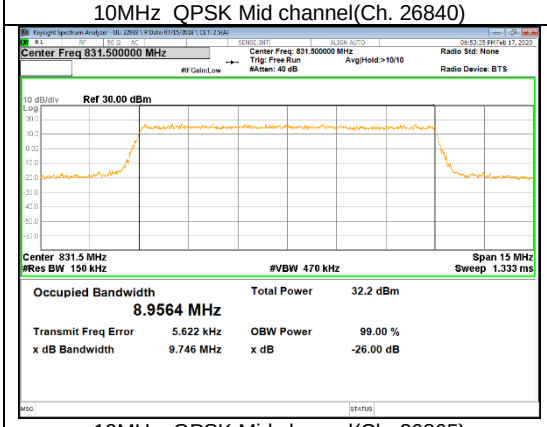
10MHz 16QAM Low channel



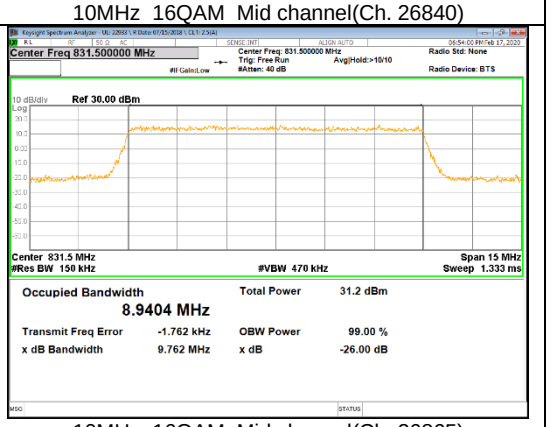
10MHz QPSK Mid channel(Ch. 26840)



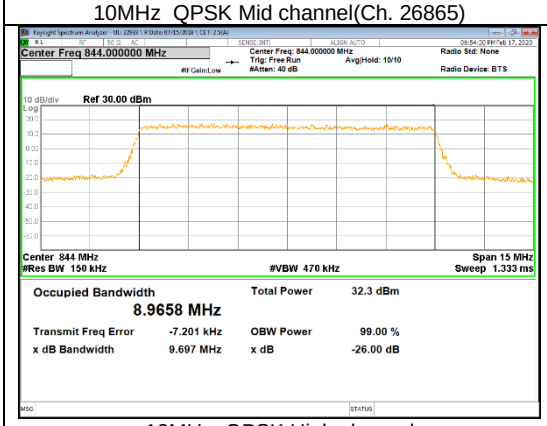
10MHz 16QAM Mid channel(Ch. 26840)



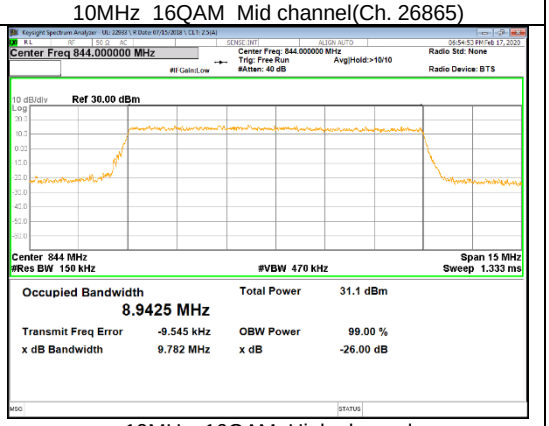
10MHz QPSK Mid channel(Ch. 26865)



10MHz 16QAM Mid channel(Ch. 26865)



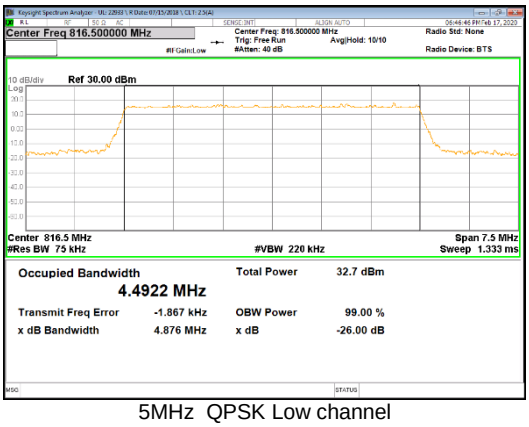
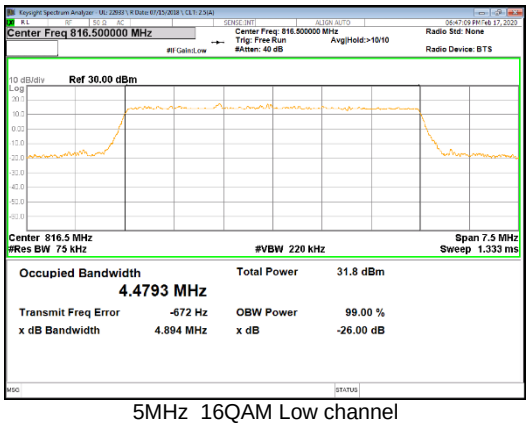
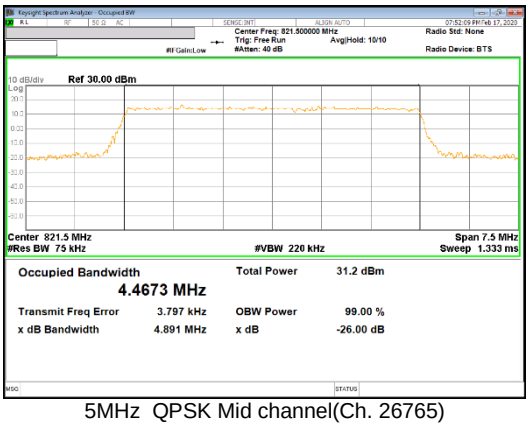
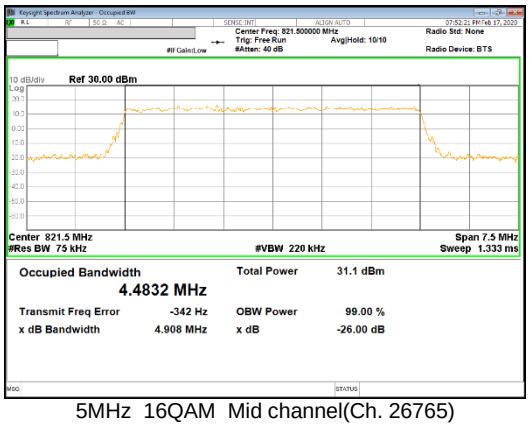
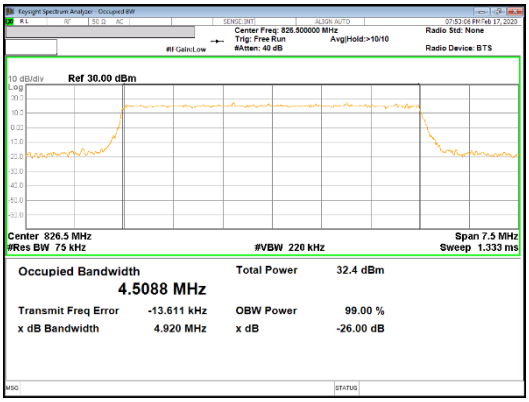
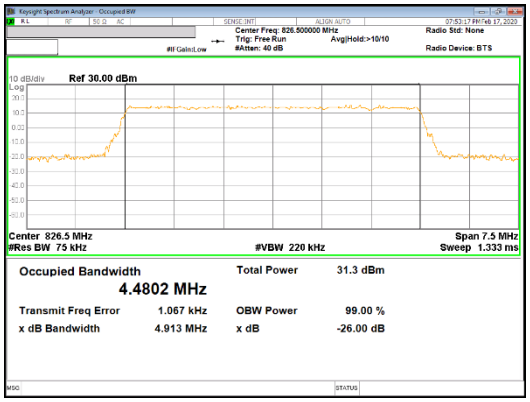
10MHz QPSK High channel



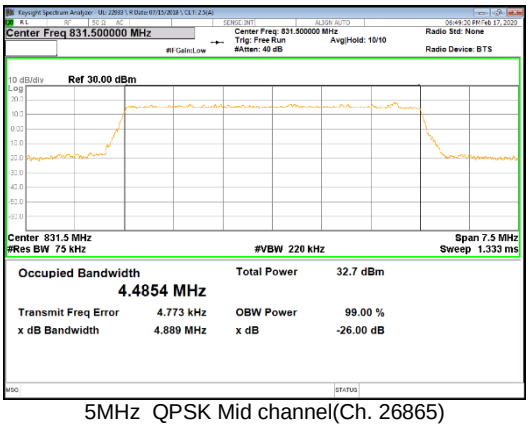
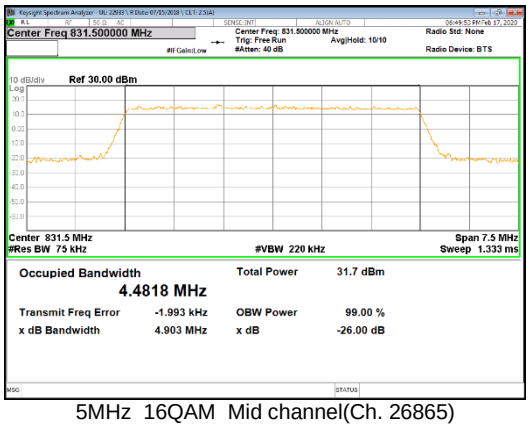
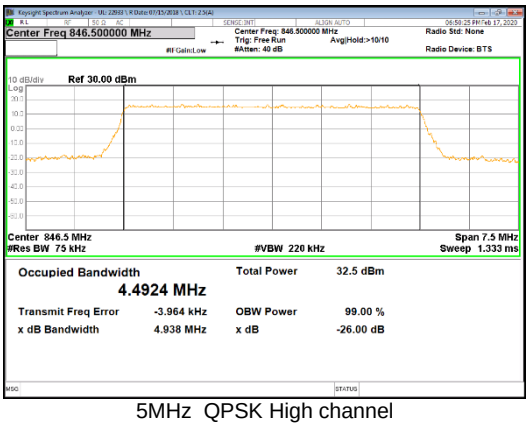
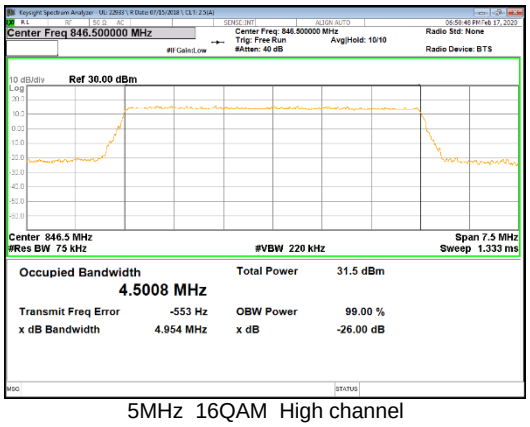
10MHz 16QAM High channel

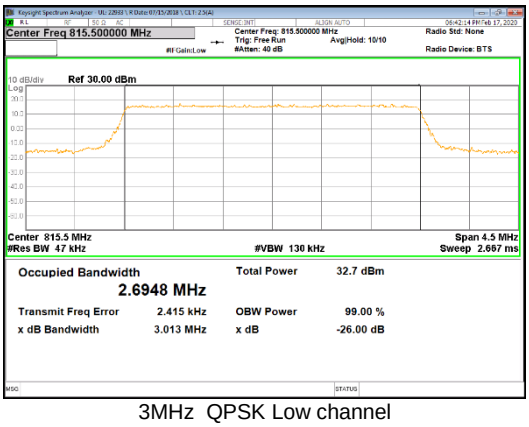
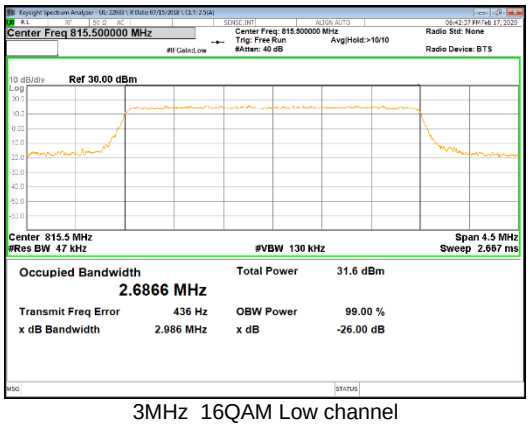
UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_22/24/27/90(03)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

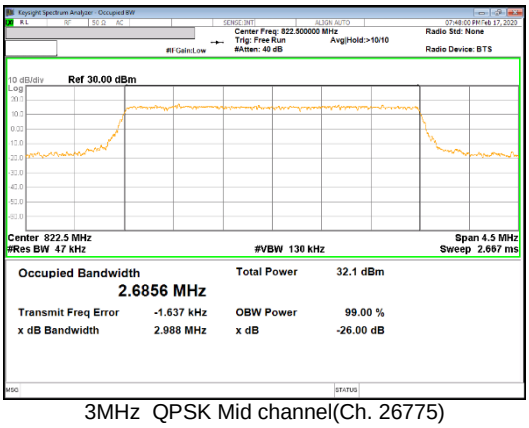
Band 26 5MHz	 5MHz QPSK Low channel	 5MHz 16QAM Low channel
	 5MHz QPSK Mid channel(Ch. 26765)	 5MHz 16QAM Mid channel(Ch. 26765)
	 5MHz QPSK Mid channel(Ch. 26815)	 5MHz 16QAM Mid channel(Ch. 26815)

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_22/24/27/90(03)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

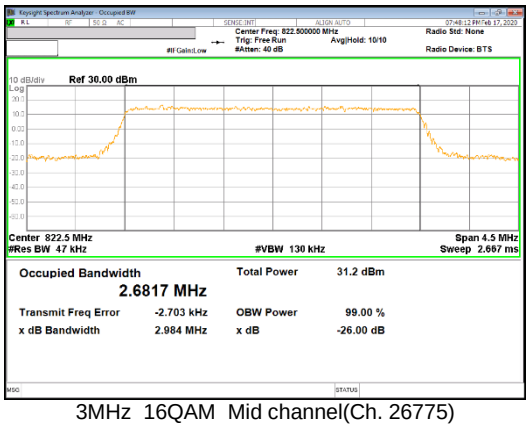
Band 26 5MHz	 5MHz QPSK Mid channel(Ch. 26865)	 5MHz 16QAM Mid channel(Ch. 26865)
	 5MHz QPSK High channel	 5MHz 16QAM High channel

Band 26 3MHz	 3MHz QPSK Low channel	 3MHz 16QAM Low channel

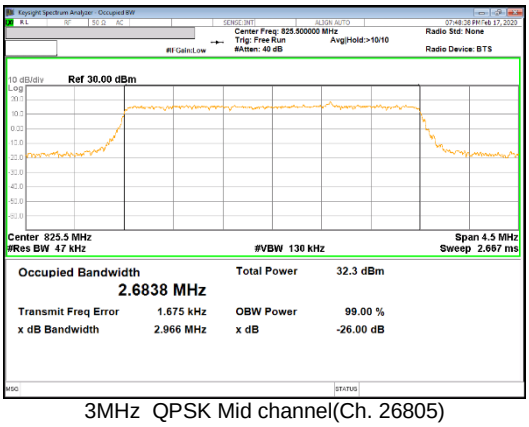
UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_22/24/27/90(03)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.



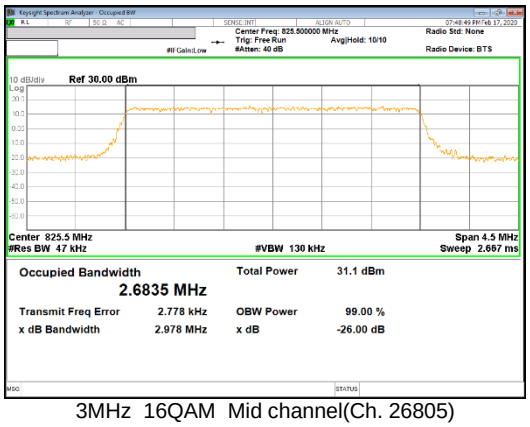
3MHz QPSK Mid channel(Ch. 26775)



3MHz 16QAM Mid channel(Ch. 26775)



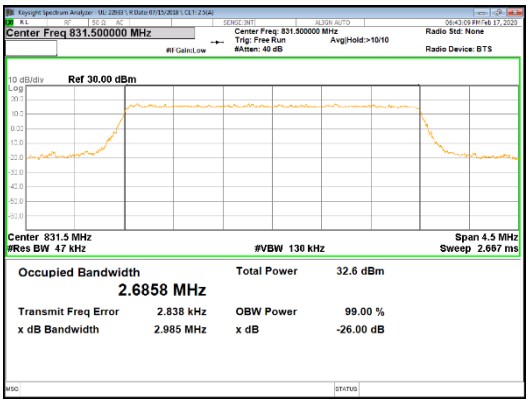
3MHz QPSK Mid channel(Ch. 26805)



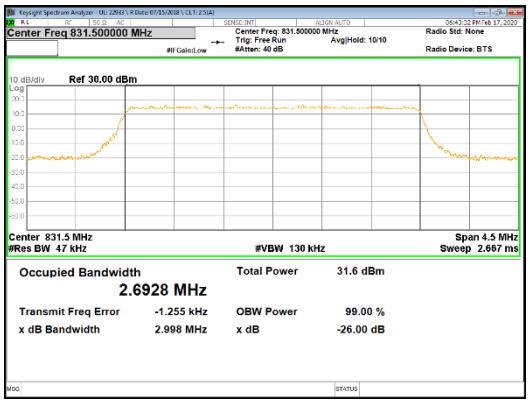
3MHz 16QAM Mid channel(Ch. 26805)

Band 26

3MHz

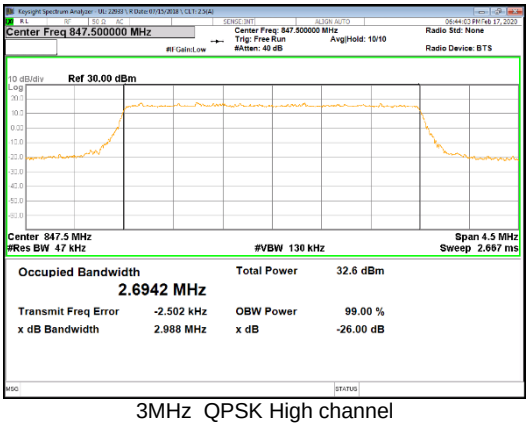


3MHz QPSK Mid channel(Ch. 26865)

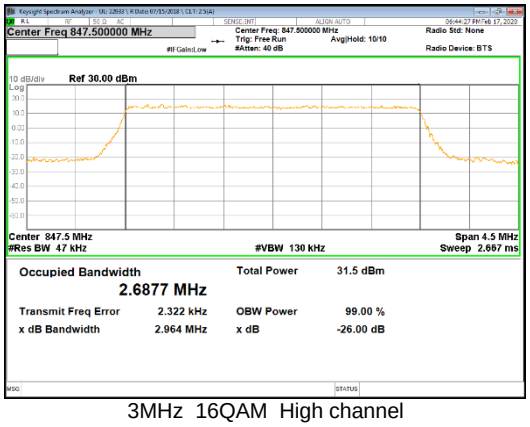


3MHz 16QAM Mid channel(Ch. 26865)

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.



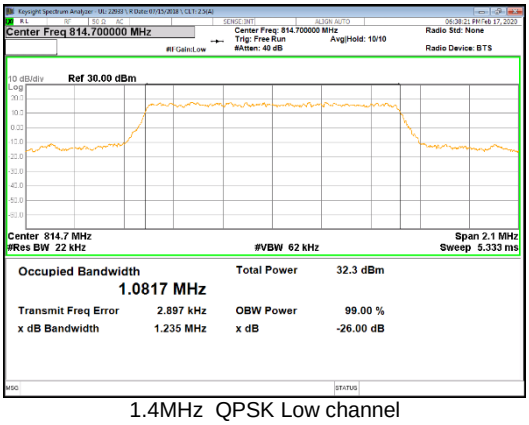
3MHz QPSK High channel



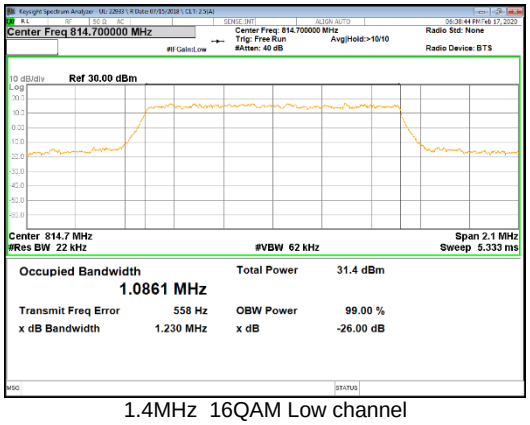
3MHz 16QAM High channel

Band 26

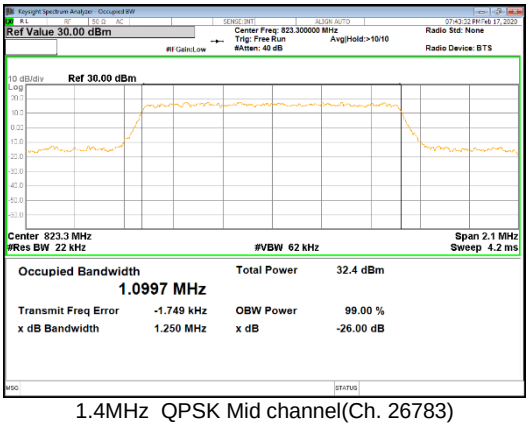
1.4MHz



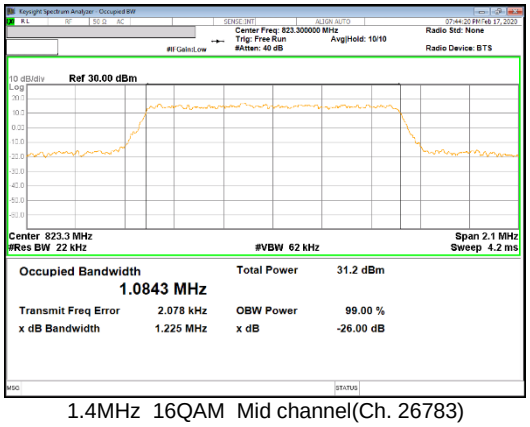
1.4MHz QPSK Low channel



1.4MHz 16QAM Low channel



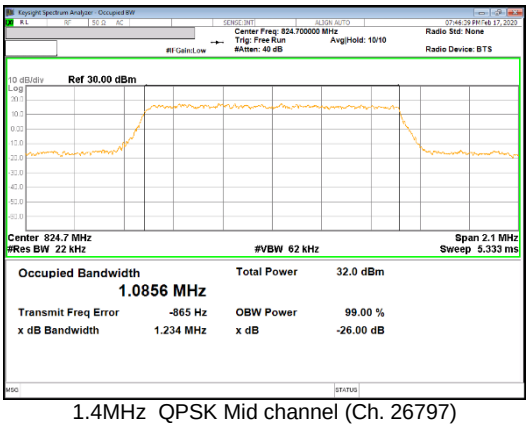
1.4MHz QPSK Mid channel(Ch. 26783)



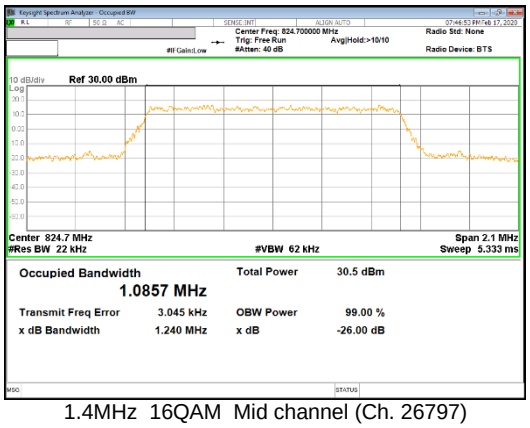
1.4MHz 16QAM Mid channel(Ch. 26783)

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_22/24/27/90(03)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.



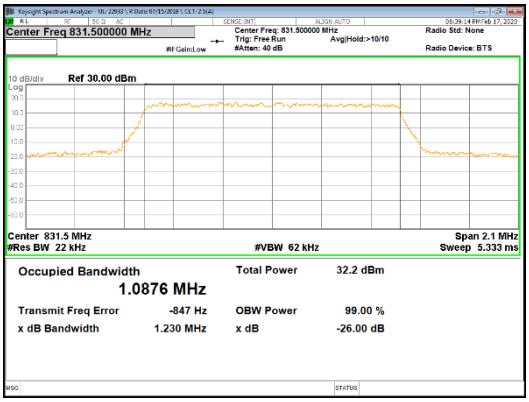
1.4MHz QPSK Mid channel (Ch. 26797)



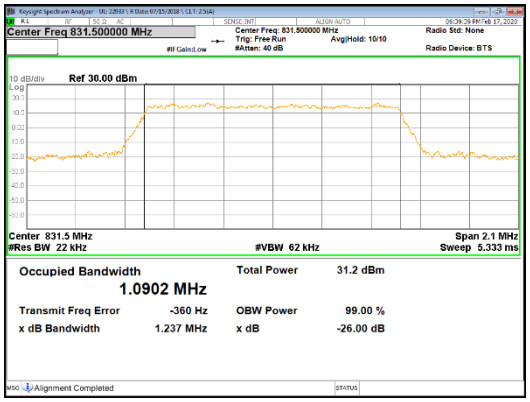
1.4MHz 16QAM Mid channel (Ch. 26797)

Band 26

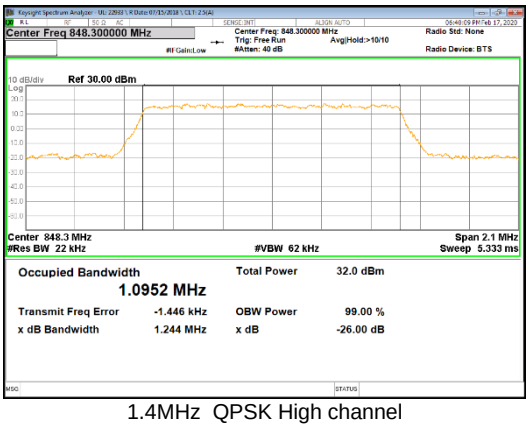
1.4MHz



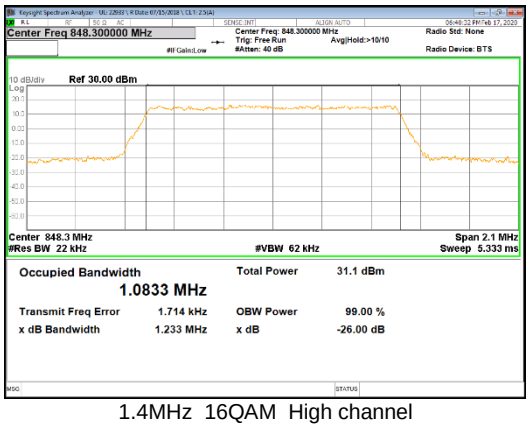
1.4MHz QPSK Mid channel(Ch. 26865)



1.4MHz 16QAM Mid channel(Ch. 26865)



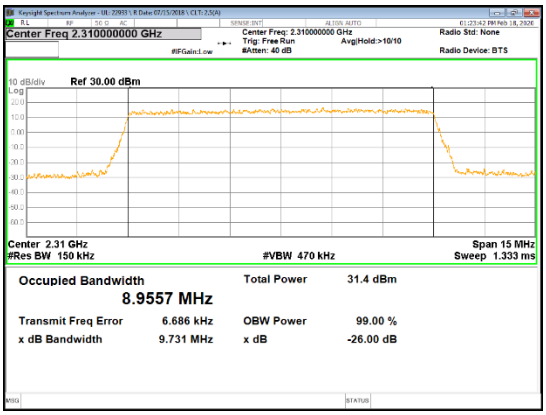
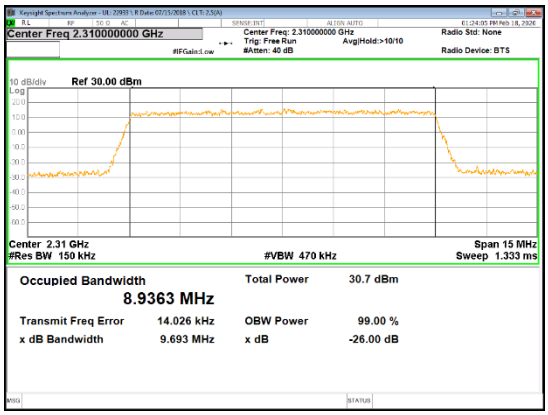
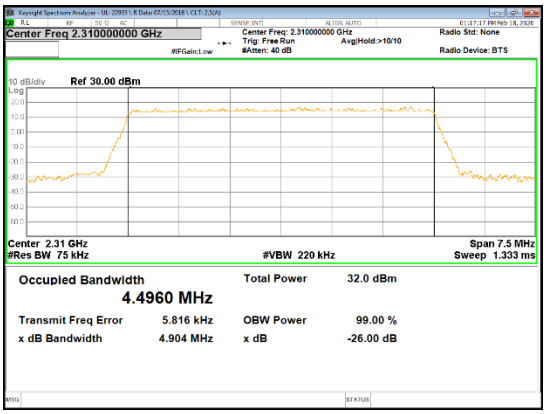
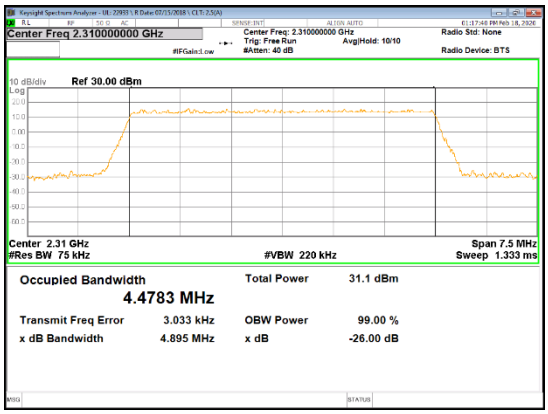
1.4MHz QPSK High channel



1.4MHz 16QAM High channel

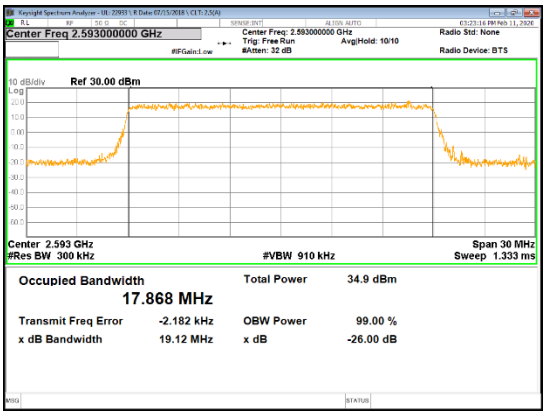
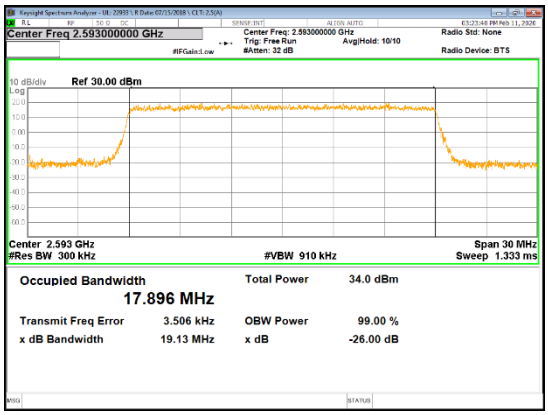
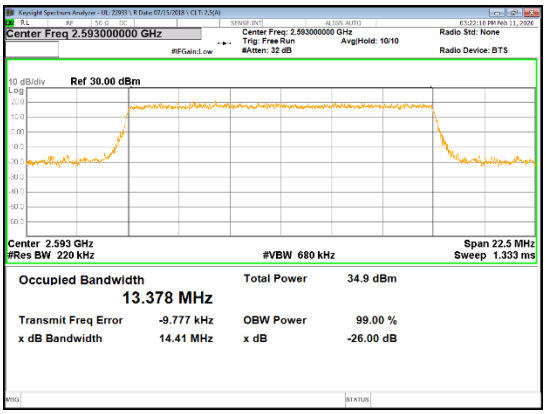
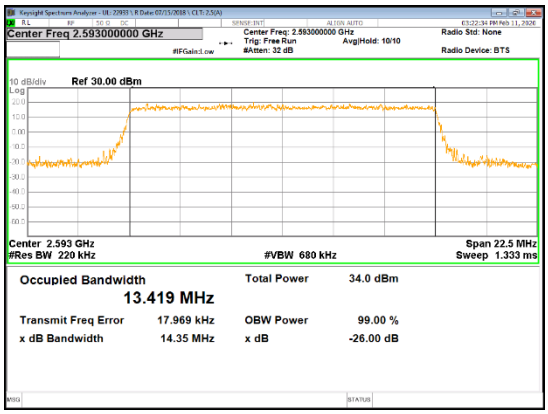
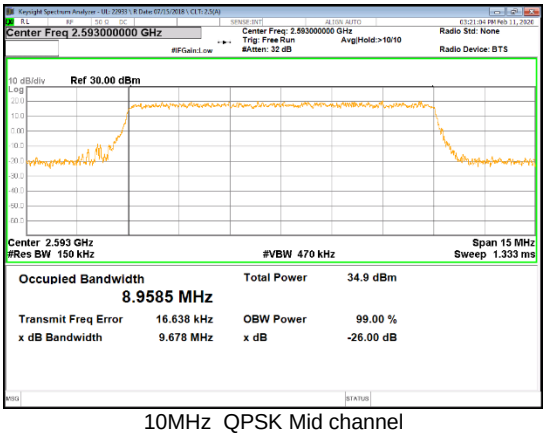
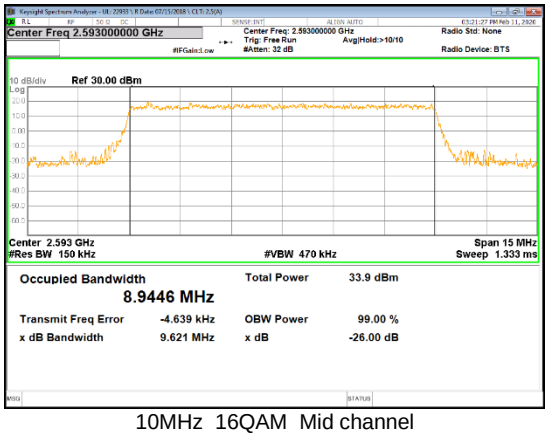
UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_22/24/27/90(03)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE Band 30

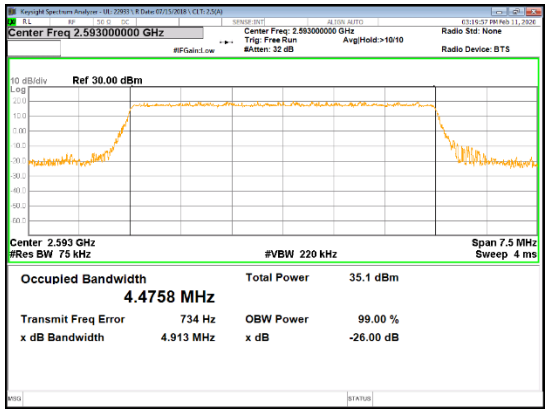
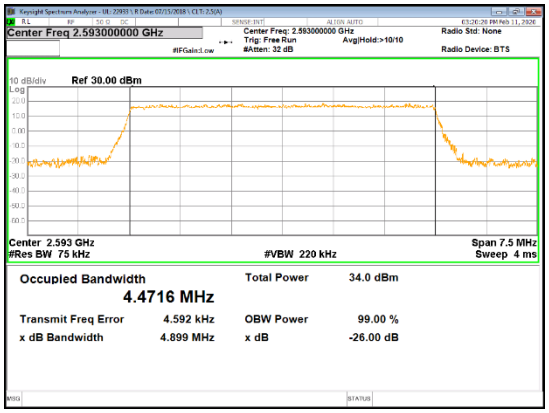
Band 30 10MHz	 10MHz QPSK Mid channel	 10MHz 16QAM Mid channel
Band 30 5MHz	 5MHz QPSK Mid channel	 5MHz 16QAM Mid channel

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_22/24/27/90(03)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE Band 41(PC2)

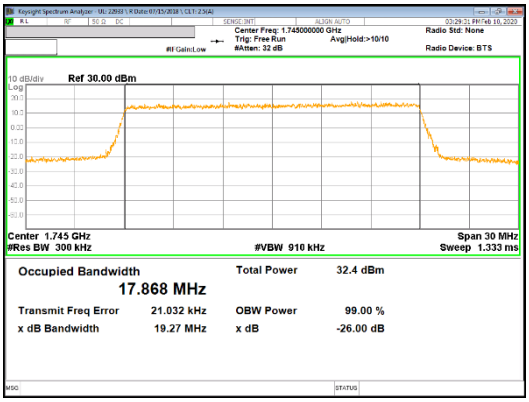
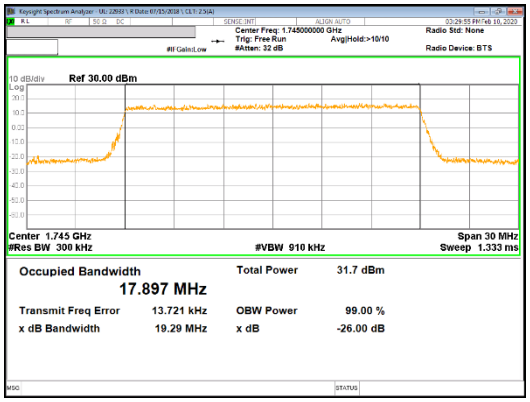
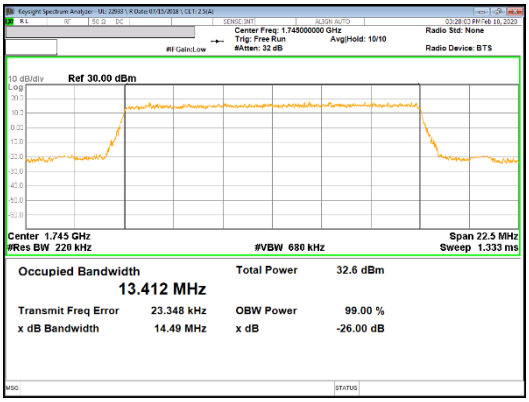
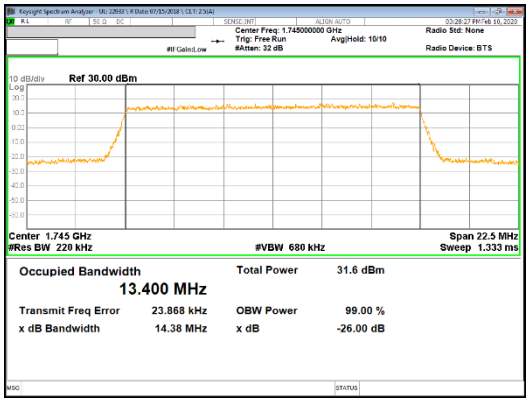
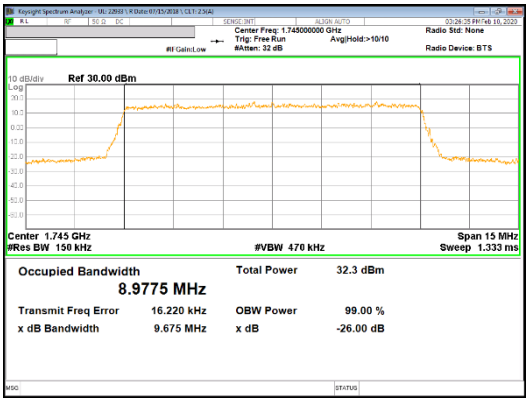
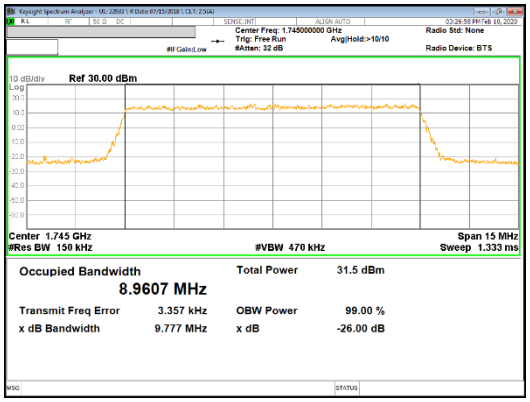
Band 41 20MHz	 20MHz QPSK Mid channel	 20MHz 16QAM Mid channel
Band 41 15MHz	 15MHz QPSK Mid channel	 15MHz 16QAM Mid channel
Band 41 10MHz	 10MHz QPSK Mid channel	 10MHz 16QAM Mid channel

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_22/24/27/90(03)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

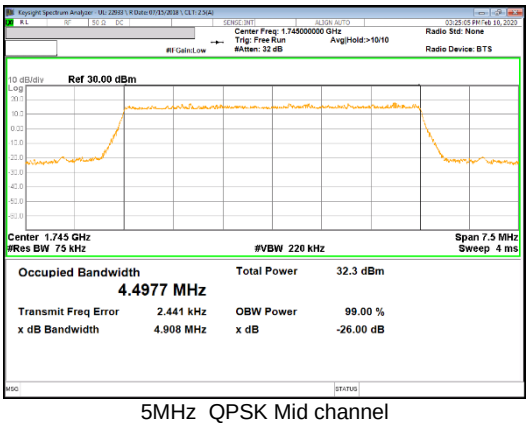
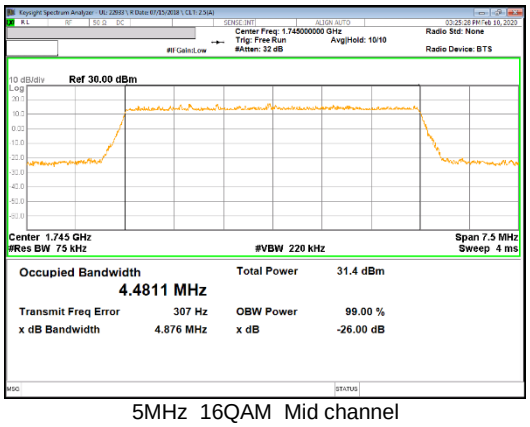
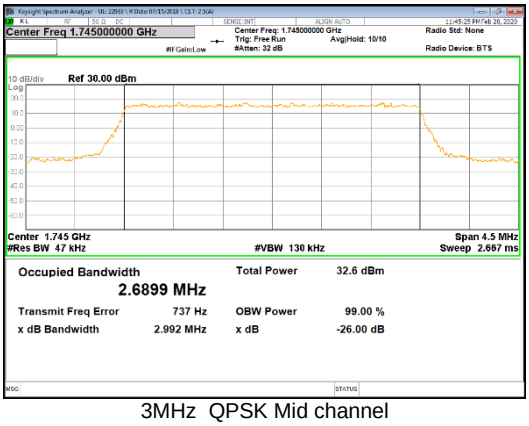
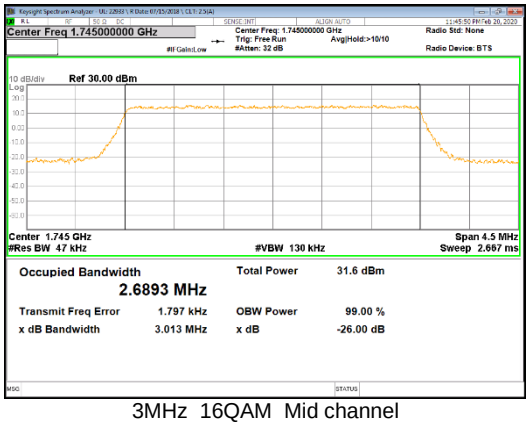
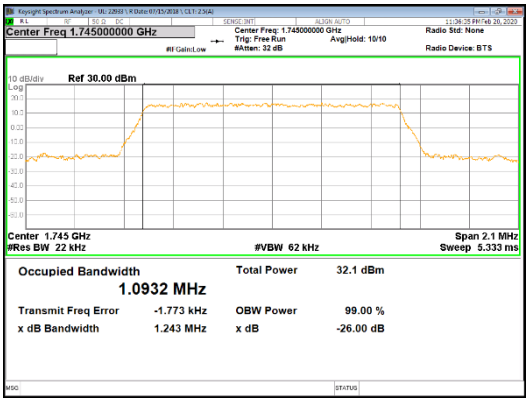
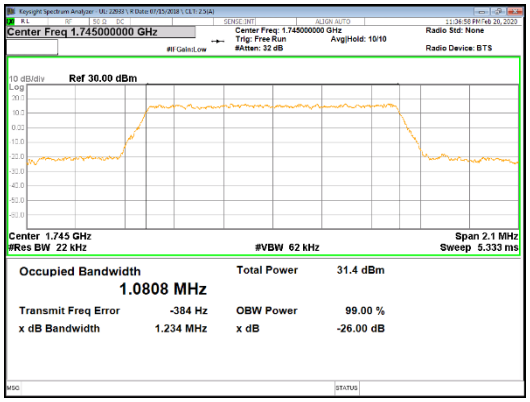
Band 41 5MHz	 5MHz QPSK Mid channel	 5MHz 16QAM Mid channel

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_22/24/27/90(03)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE Band 66

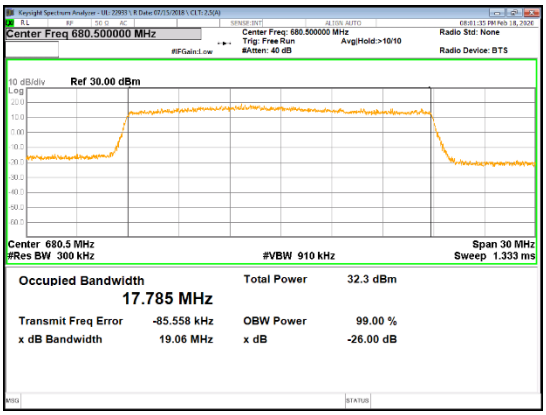
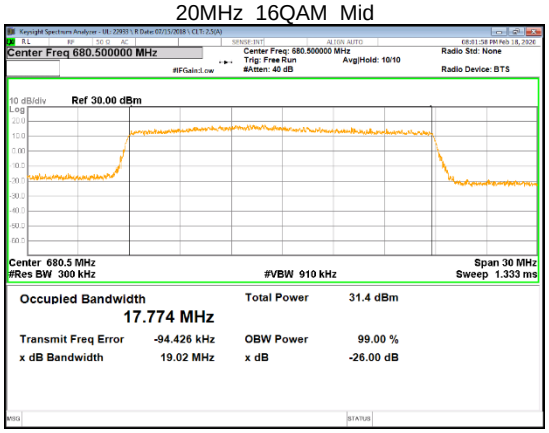
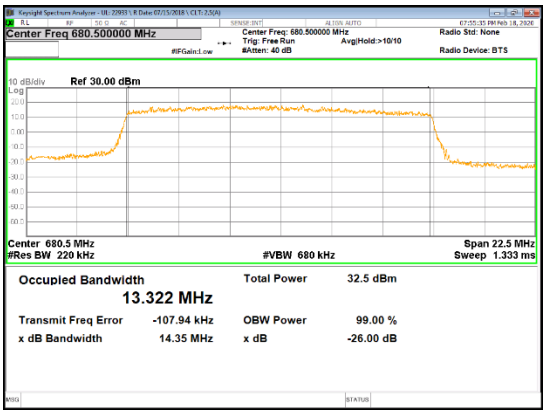
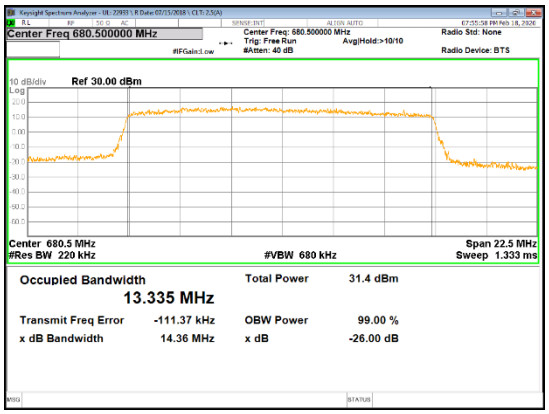
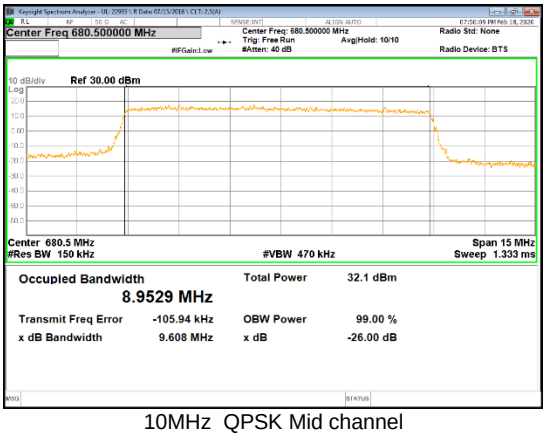
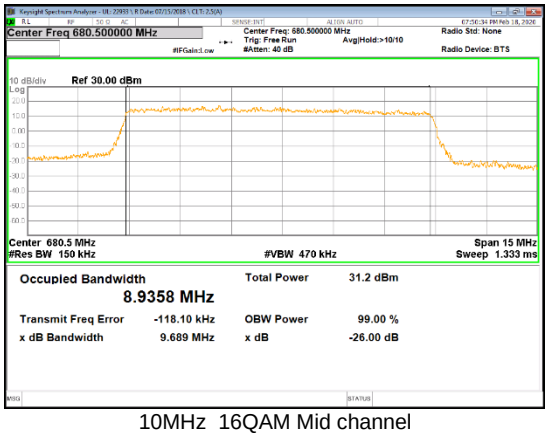
Band 66 20MHz	 20MHz QPSK Mid channel	 20MHz 16QAM Mid channel
Band 66 15MHz	 15MHz QPSK Mid channel	 15MHz 16QAM Mid channel
Band 66 10MHz	 10MHz QPSK Mid channel	 10MHz 16QAM Mid channel

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_22/24/27/90(03)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

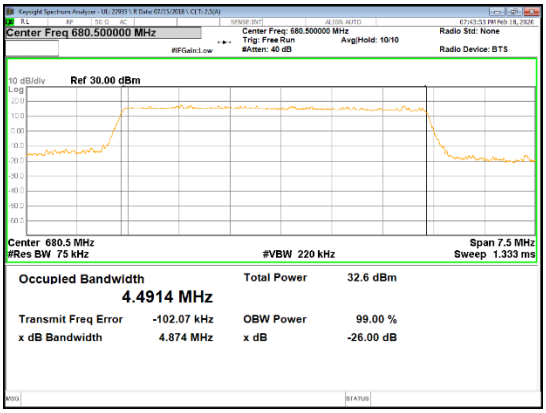
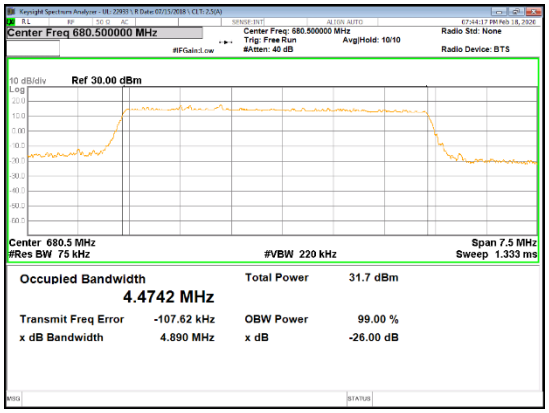
Band 66 5MHz	 5MHz QPSK Mid channel	 5MHz 16QAM Mid channel
Band 66 3MHz	 3MHz QPSK Mid channel	 3MHz 16QAM Mid channel
Band 66 1.4MHz	 1.4MHz QPSK Mid channel	 1.4MHz 16QAM Mid channel

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_22/24/27/90(03)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE Band 71

Band 71 20MHz	 20MHz QPSK Mid channel	20MHz 16QAM Mid  channel
Band 71 15MHz	 15MHz QPSK Mid channel	 15MHz 16QAM Mid channel
Band 71 10MHz	 10MHz QPSK Mid channel	 10MHz 16QAM Mid channel

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_22/24/27/90(03)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 71 5MHz	 5MHz QPSK Mid channel	 5MHz 16QAM Mid channel

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_22/24/27/90(03)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE Band 2

LTE Band 2(Frequency range: 1850-1910 MHz) is covered by LTE Band 25 (Frequency range: 1850-1915 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

LTE Band 4

LTE Band 4 (Frequency range: 1710-1755 MHz) is covered by LTE Band 66 (Frequency range: 1710-1780 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

LTE Band 5

LTE Band 5 (Frequency range: 824-849 MHz) is covered by LTE Band 26 (Frequency range: 814-849 MHz) 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.

LTE Band 38

LTE Band 38 (Frequency range: 2570-2620 MHz) is covered by LTE Band 41 (Frequency range: 2496-2690 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

LTE Band41(PC3)

LTE Band 41(PC3, Frequency range : 2496-2690 MHz) is covered by LTE Band 41(PC2) (Frequency range: 2496-2690 MHz) due to same frequency range, same channel bandwidth and maximum tune-up limit is higher than LTE Band41(PC3).

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_22/24/27/90(03)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

9.2. BAND EDGE EMISSIONS

RULE PART(S)

FCC: §22.359, §22.917, §24.238, §27. 53 and 90.691

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:
(c) For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the 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, in accordance with the following:

(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB;

(4) On all frequencies between 763-775 MHz and 793-806 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations;

(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 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.

Part 90.691:
(a) Out-of-band emission requirement shall apply only to the “outer” channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:

(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 Log10(f/6.1) decibels or 50 + 10 Log10(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 + 10Log10(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.

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_22/24/27/90(03)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v03r01
The transmitter output was connected to a CMW500 Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

CDMA

a) Set the RBW = 1 % of OBW; (13kHz)
b) Set VBW ≥ 3 × RBW;
c) Sweep time = Auto ;
d) Detector = RMS;
e) Trace mode = Average(100);
f) Using band integration method set marker to start and stop frequency.
(Set start or stop frequency to band edge, span – 15kHz)

GSM

a) Set the RBW = 1 ~ 5% of OBW(GSM850 – 8.2KHz, GSM1900 – 9.1KHz)
b) Set VBW ≥ 3 × RBW;
c) Set span ≥ 1.5 times the OBW;
d) Sweep time = 1S ;
e) Detector = RMS;
f) Ensure that the number of measurement points ≥ 2*Span/RBW;
g) Trace mode = Average(100);
h) Add duty cycle correction factor (9dB)

WCDMA/LTE

a) Set the RBW = 1 ~ 1.5 % of OBW(Typically limited to a minimum RBW of 1% of the OBW)
b) Set VBW ≥ 3 × RBW;
c) Set span ≥ 1.5 times the OBW;
d) Sweep time = Auto;
e) Detector = RMS;
f) Ensure that the number of measurement points ≥ 2*Span/RBW;
g) Trace mode = Average (100);

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_22/24/27/90(03)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

NOTE1: For frequency range of 763-775 MHz and 793-806 MHz.(LTE Band 13)

a) Set the RBW = 6.2kHz

b) Set VBW ≥ 3 × RBW;

c) Sweep time = 1 second ;

d) Detector = RMS;

e) Ensure that the number of measurement points ≥ 2*Span/RBW;

f) Trace mode = Average;

NOTE2

Note that the spurious emissions outside of the channel include narrowband signals. These signals are all below the -13dBm / -25dBm limits. Although the measurement bandwidth is less than the reference bandwidth of 1MHz no addental correction is applied as ANSI C63.26 section 4.2.3 only requires the correction to be applied when the OBW of the emission being measured is wider than the measurement bandwidth (Where the OBW of the signal under measurement is less than the RBW of the measuring instrument, no bandwidth correction or integration will be required.) Plots for low and high channels show the level of the emission measured with the reduced bandwidth and the level of the same emission measured using the integration method over the 1MHz reference bandwidth are very close, indicating the emissions are narrowband.

RESULTS

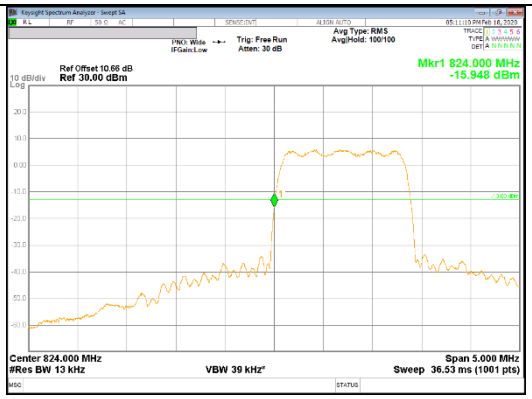
See the following pages.

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_22/24/27/90(03)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

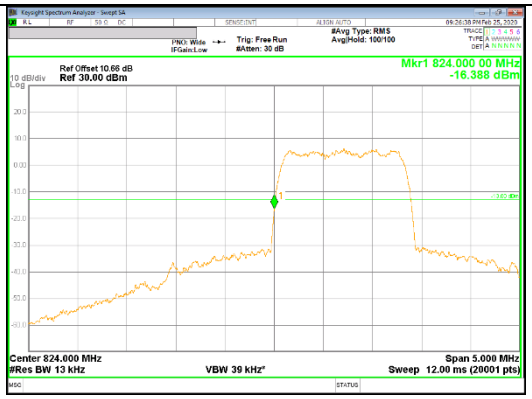
9.2.1. BAND EDGE RESULT

CDMA

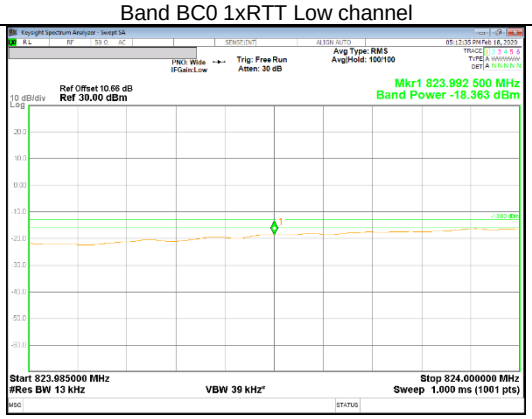
BC0



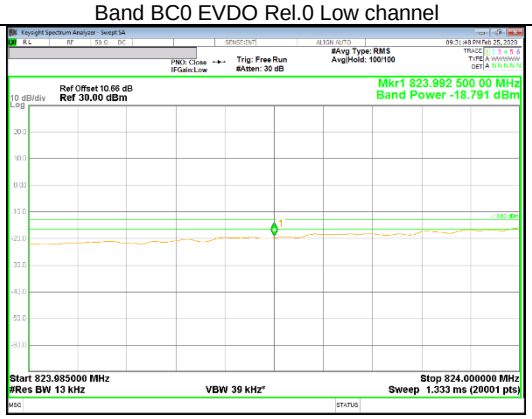
Band BC0 1xRTT Low channel



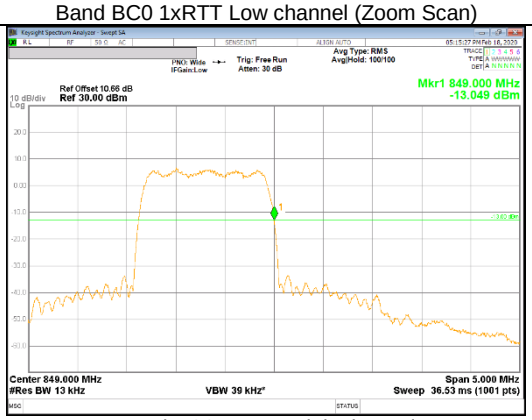
Band BC0 EVDO Rel.0 Low channel



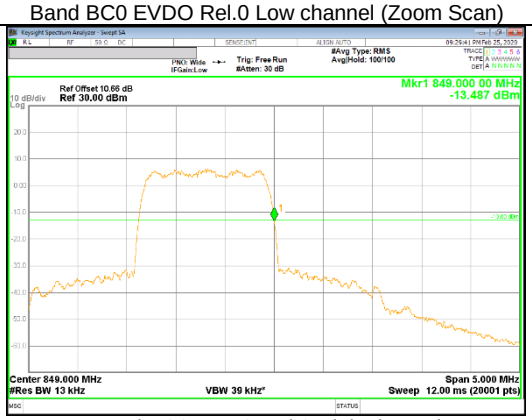
Band BC0 1xRTT Low channel (Zoom Scan)



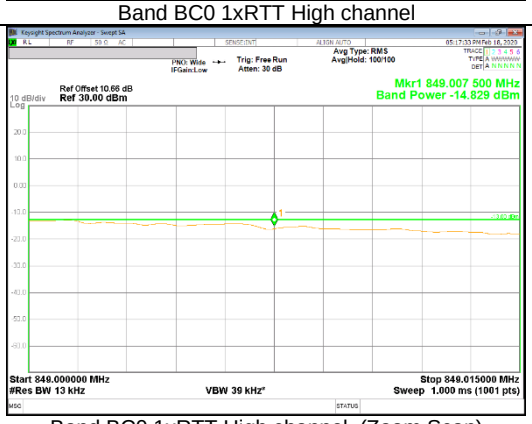
Band BC0 EVDO Rel.0 Low channel (Zoom Scan)



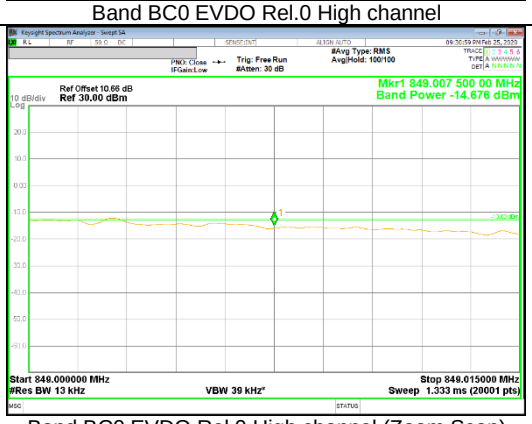
Band BC0 1xRTT High channel



Band BC0 EVDO Rel.0 High channel



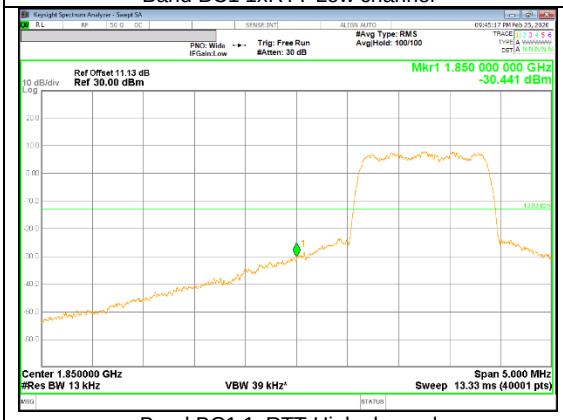
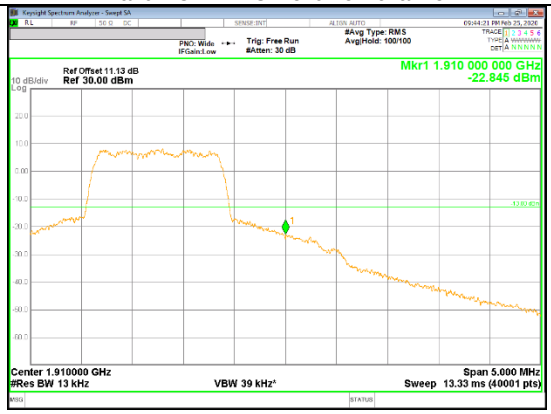
Band BC0 1xRTT High channel_(Zoom Scan)



Band BC0 EVDO Rel.0 High channel (Zoom Scan)

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_22/24/27/90(03)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

BC1	 Band BC1 1xRTT Low channel	 Band BC1 EVDO Rel.0 Low channel
	 Band BC1 1xRTT High channel	 Band BC1 EVDO Rel.0 High channel

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_22/24/27/90(03)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.