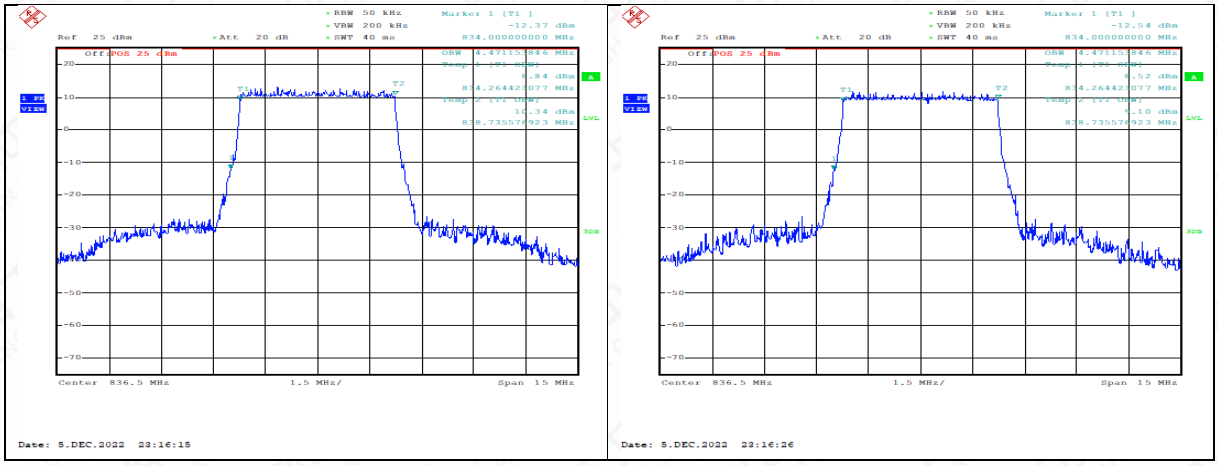
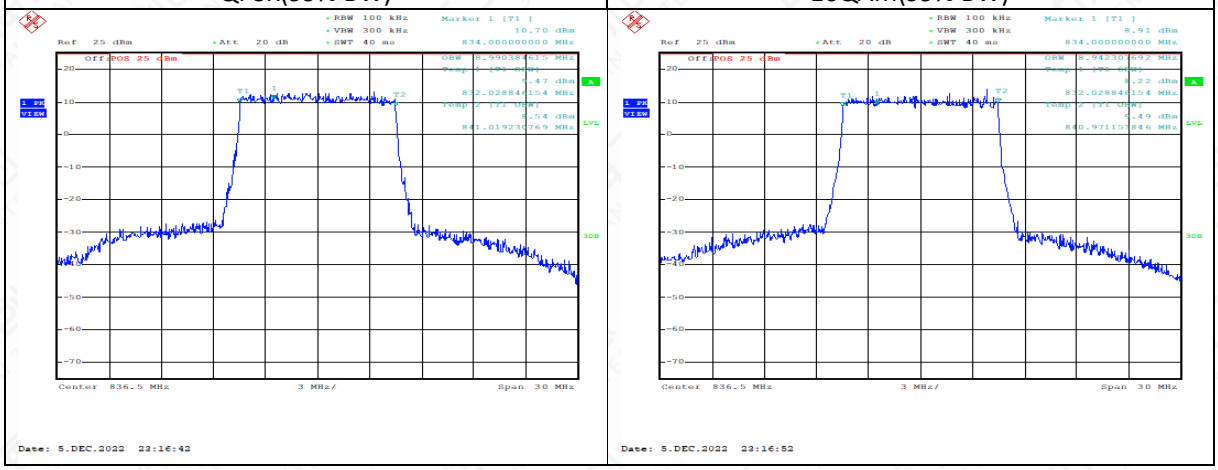


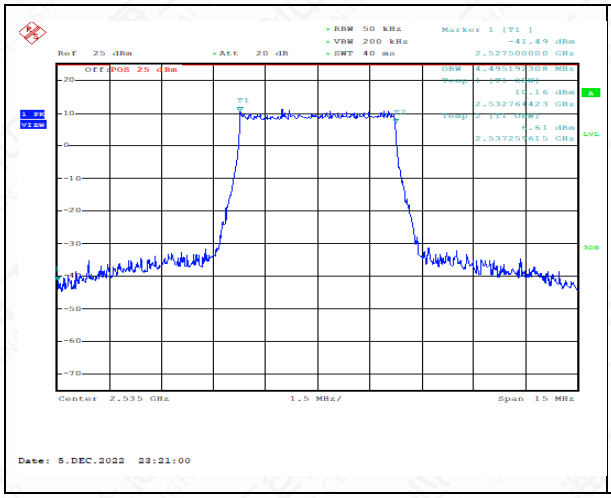
LTE band 5, 10MHz (99%)

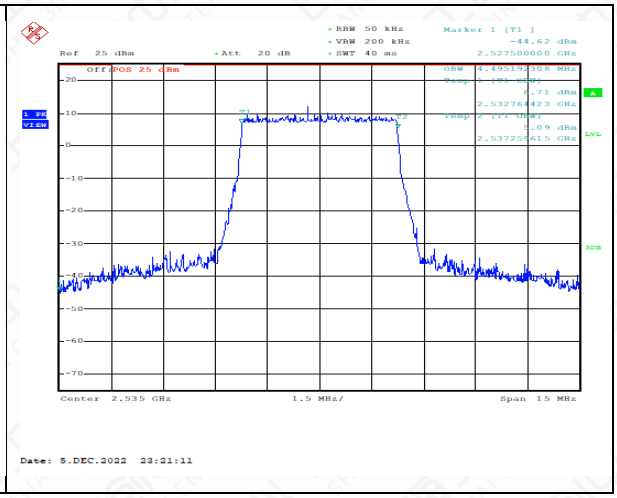
Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
836.5	QPSK	16QAM
	8.99	8.94
QPSK(99% BW)	16QAM(99% BW)	



LTE band 7, 5MHz (99%)

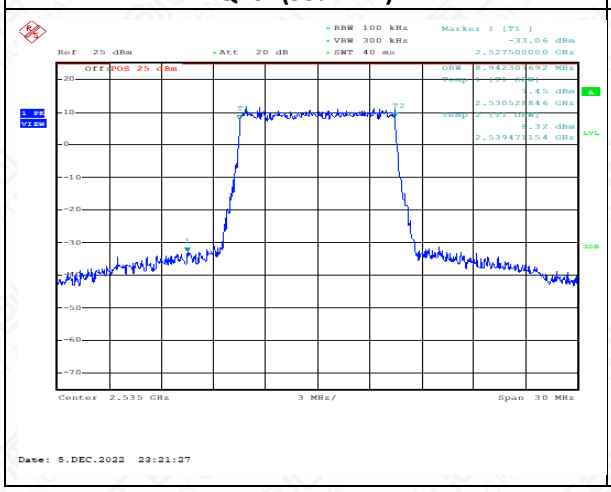
Frequency(MHz)	**Occupied Bandwidth (99%)(MHz)**	
2535	**QPSK**	**16QAM**
	4.5	4.5
QPSK(99% BW)	**16QAM(99% BW)**	

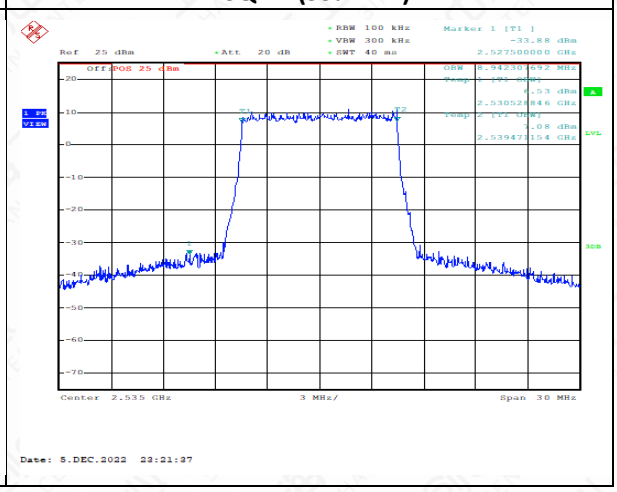




LTE band 7, 10MHz (99%)

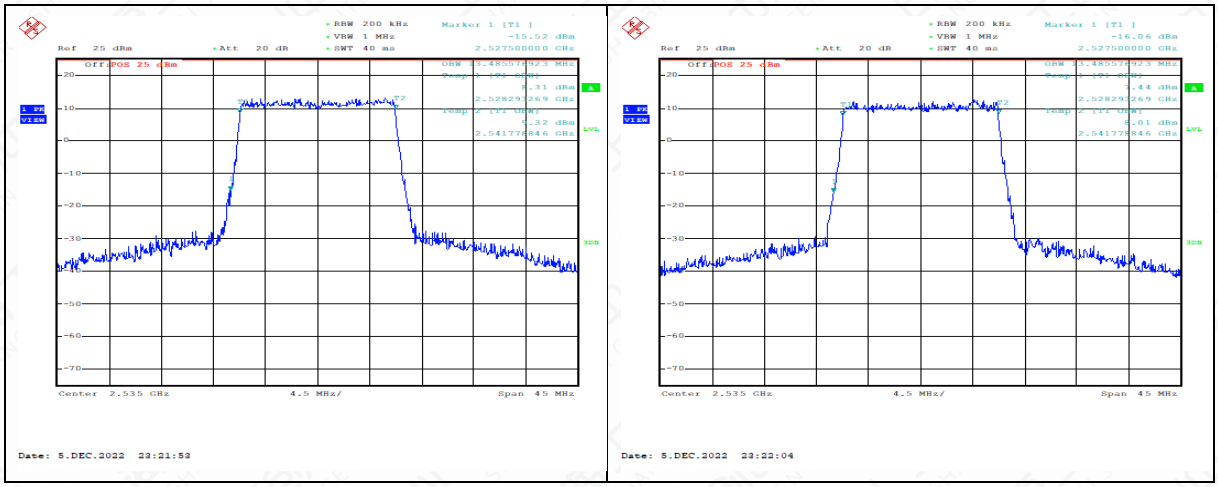
Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
2535	QPSK	16QAM
	8.94	8.94
QPSK(99% BW)	16QAM(99% BW)	





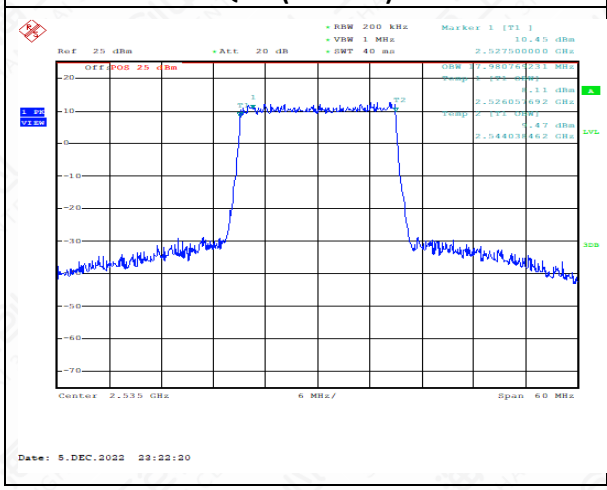
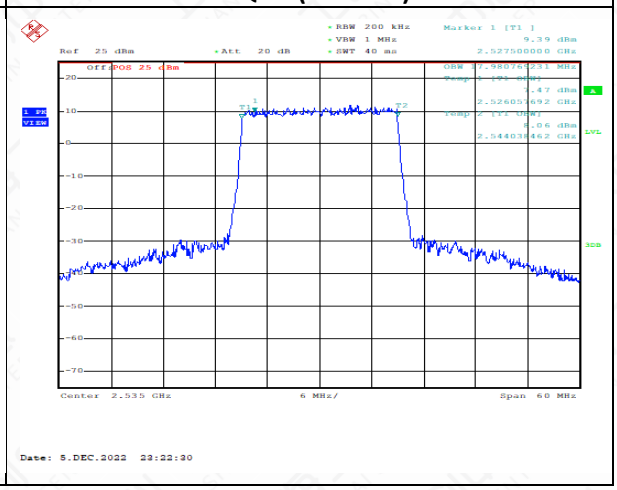
LTE band 7, 15MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
2535	QPSK	16QAM
	13.49	13.49
QPSK(99% BW)	16QAM(99% BW)	

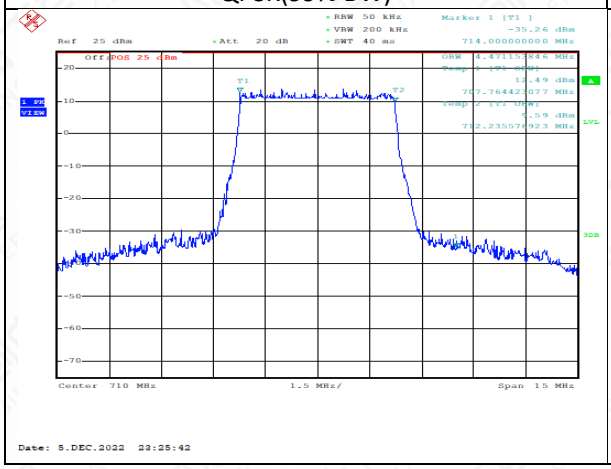
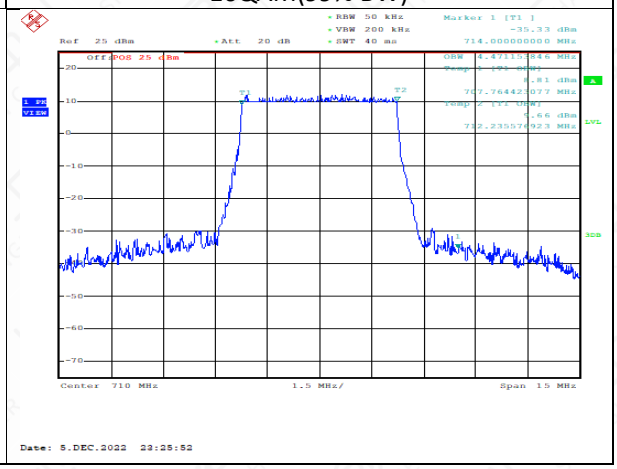


LTE band 7, 20MHz (99%)

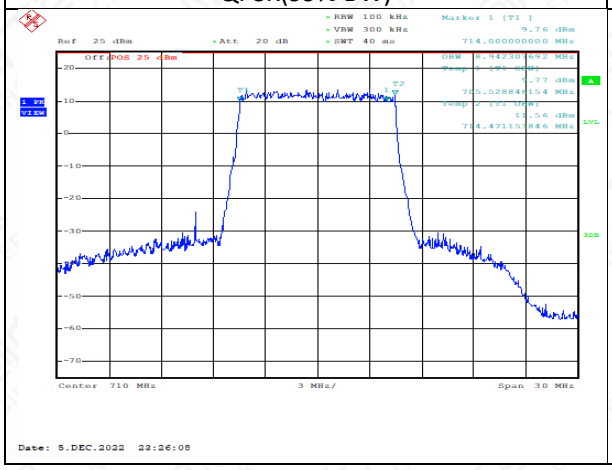
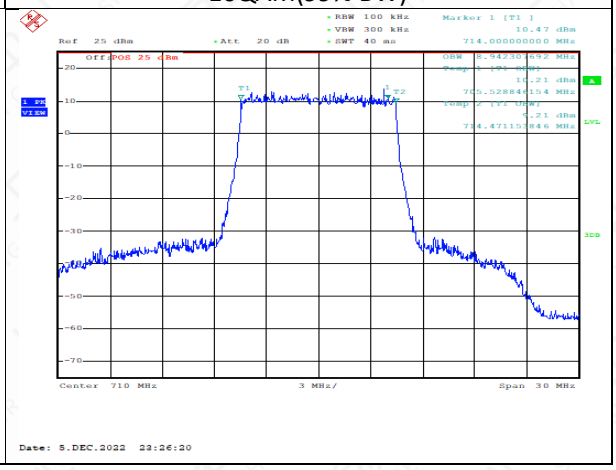
Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
2535	QPSK	16QAM
	17.98	17.98

QPSK(99% BW)	16QAM(99% BW)
	

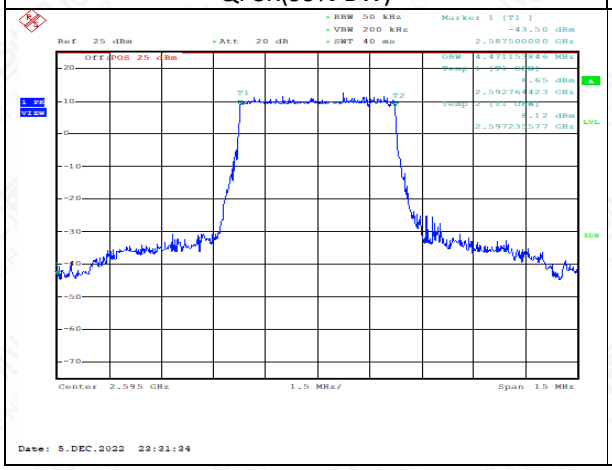
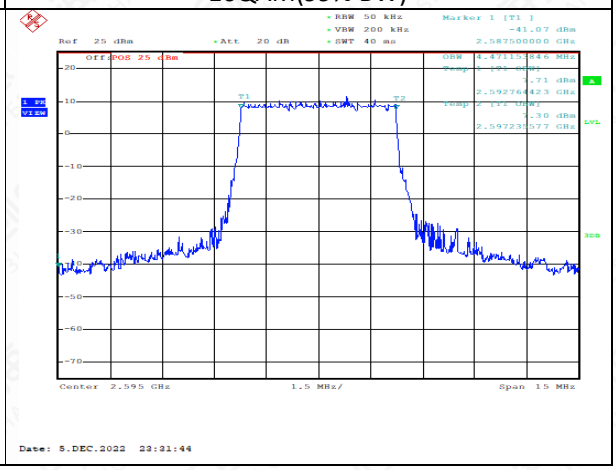
LTE band 17, 5MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
710.0	QPSK	16QAM
	4.47	4.47
QPSK(99% BW)	16QAM(99% BW)	
		

LTE band 17, 10MHz (99%)

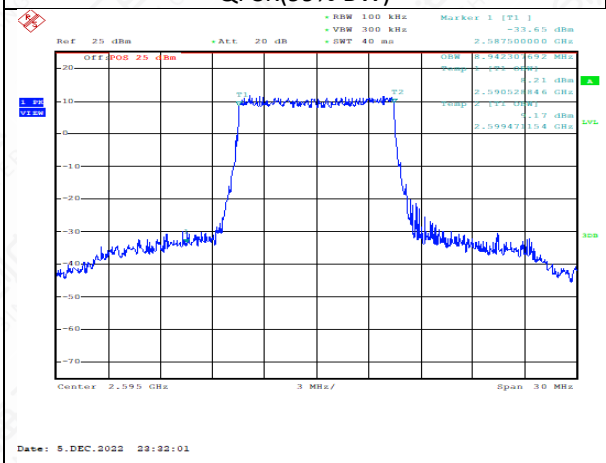
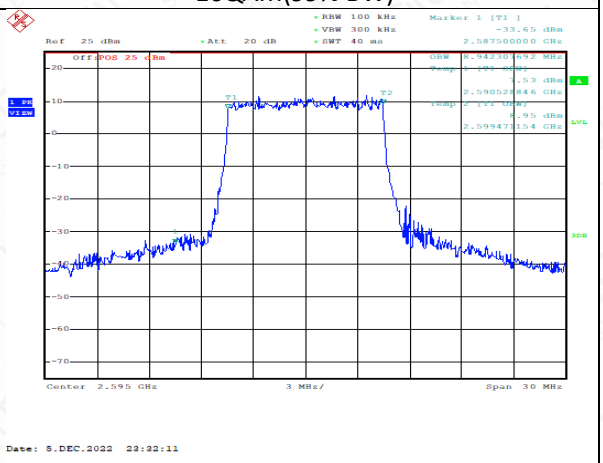
Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
707.5	QPSK	16QAM
	8.94	8.94
QPSK(99% BW)	16QAM(99% BW)	
		

LTE band 38, 5MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
2595.0	QPSK	16QAM
	4.47	4.47
QPSK(99% BW)	16QAM(99% BW)	
		

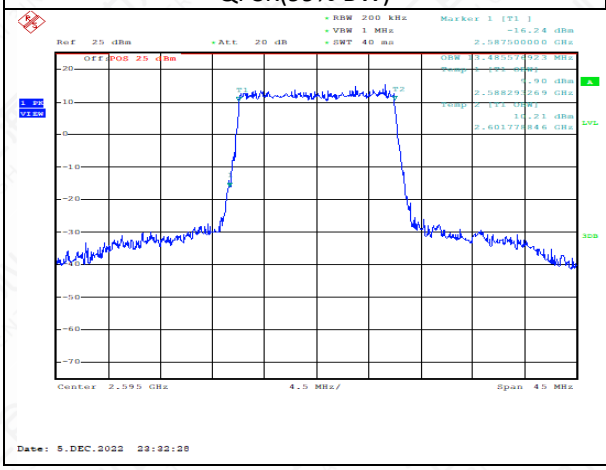
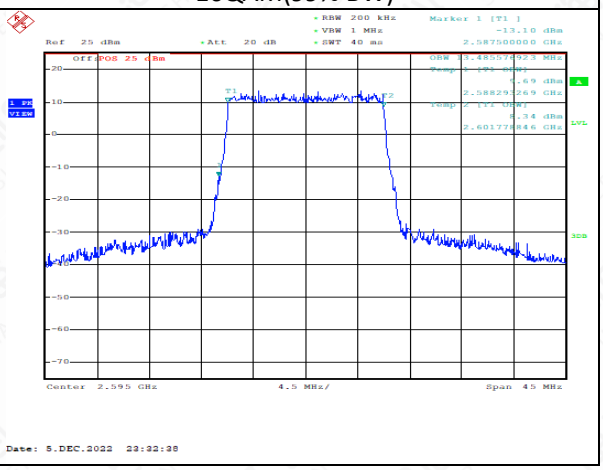
LTE band 38, 10MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
2595.0	QPSK	16QAM
	8.94	8.94

QPSK(99% BW)	16QAM(99% BW)
	

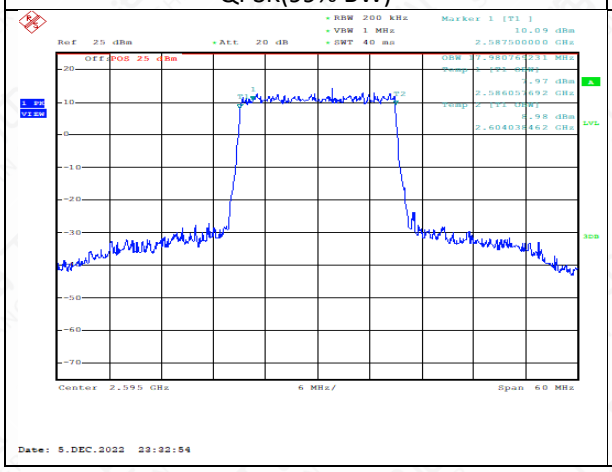
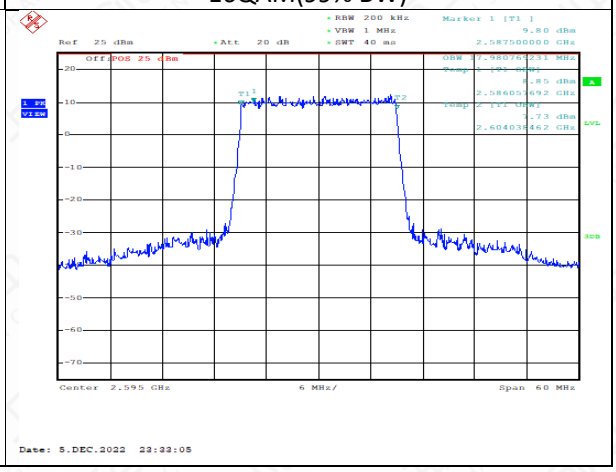
LTE band 38, 15MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
2595.0	QPSK	16QAM
	13.49	13.49

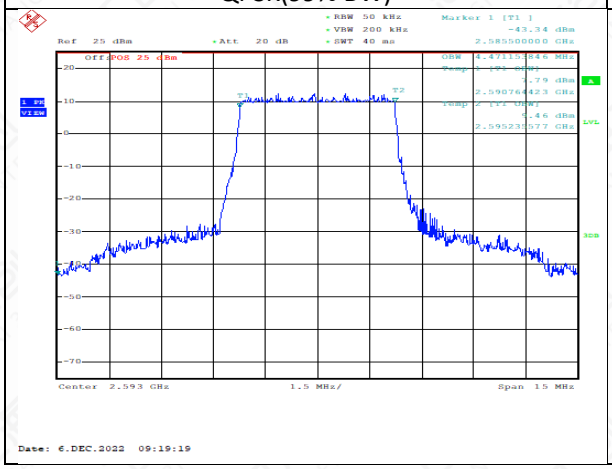
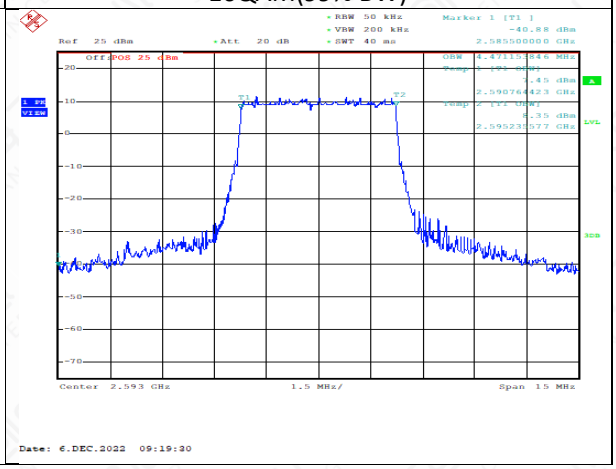
QPSK(99% BW)	16QAM(99% BW)
	

LTE band 38, 20MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
2595.0	QPSK	16QAM
	17.98	17.98

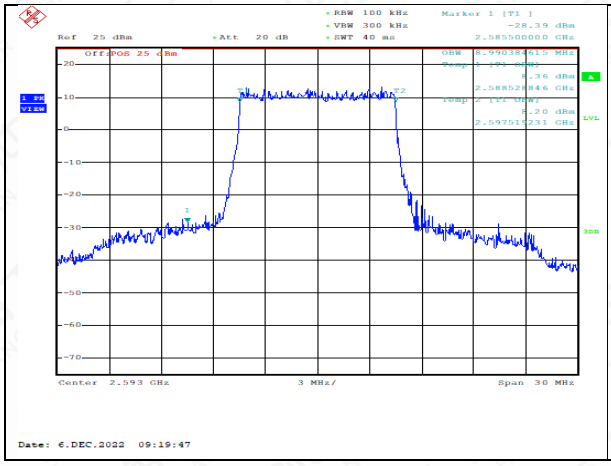
QPSK(99% BW)	16QAM(99% BW)
	

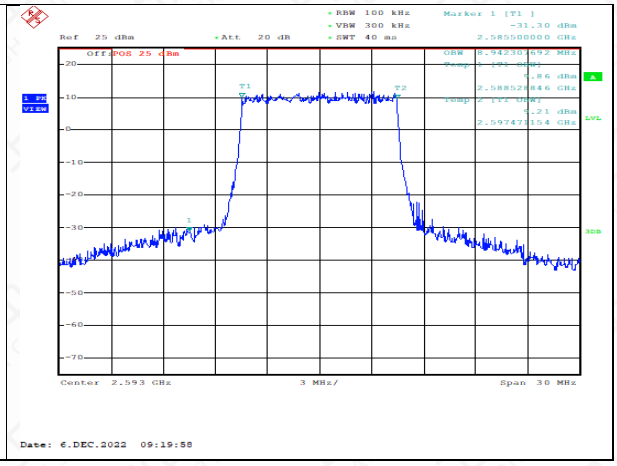
LTE band 41, 5MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
2593.0	QPSK	16QAM
	4.47	4.47
QPSK(99% BW)	16QAM(99% BW)	
		

LTE band 41, 10MHz (99%)

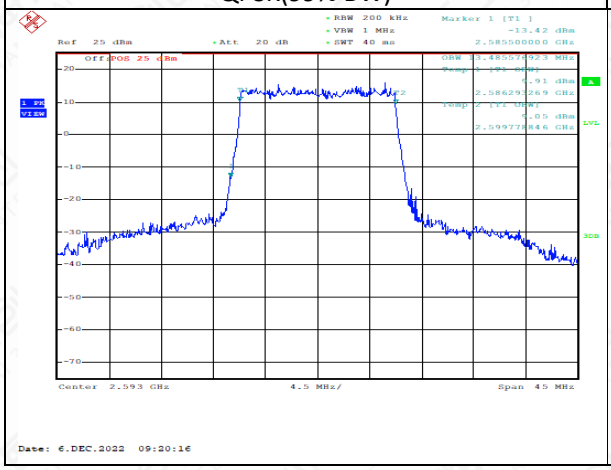
Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
2593.0	QPSK	16QAM
	8.99	8.94
QPSK(99% BW)	16QAM(99% BW)	

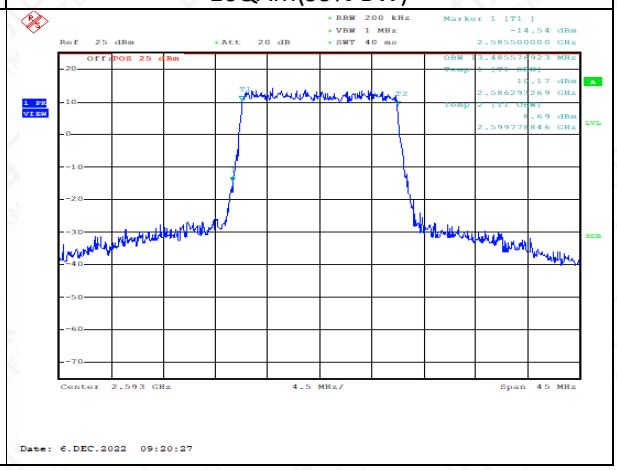




LTE band 41, 15MHz (99%)

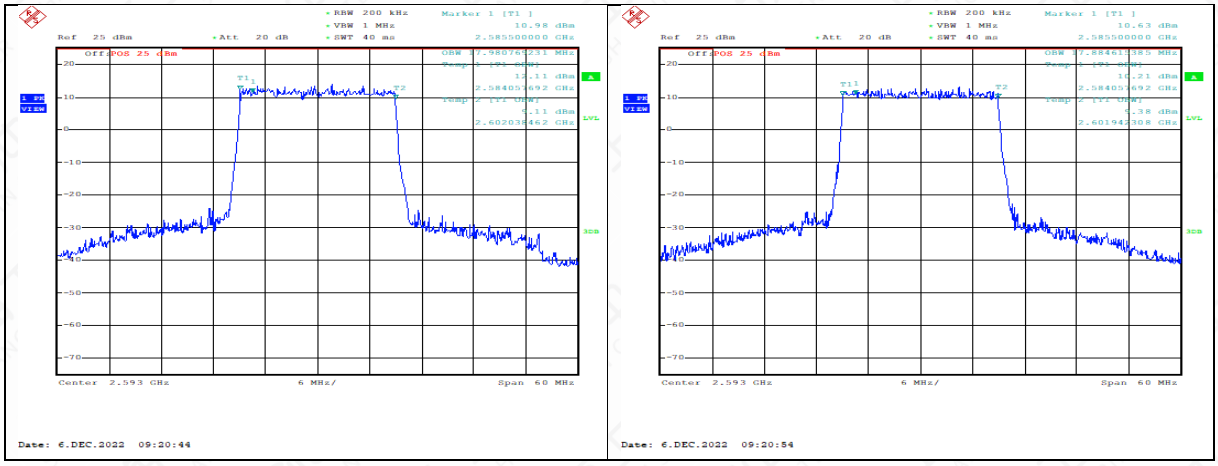
Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
2593.0	QPSK	16QAM
	13.49	13.49
QPSK(99% BW)	16QAM(99% BW)	





LTE band 41, 20MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
2593.0	QPSK	16QAM
	17.98	17.89
QPSK(99% BW)	16QAM(99% BW)	


RBW 200 kHz
VBW 1 MHz
SWT 40 ms
Marker 1 [T1]
10.98 dBm
2.585500000 GHz
Ref 25 dBm
Att 20 dB
Off POS 25 dBm
T1
T2
Center 2.593 GHz
6 MHz/
Span 60 MHz
Date: 6.DEC.2022 09:20:44
RBW 200 kHz
VBW 1 MHz
SWT 40 ms
Marker 1 [T1]
10.63 dBm
2.585500000 GHz
Ref 25 dBm
Att 20 dB
Off POS 25 dBm
T1
T2
Center 2.593 GHz
6 MHz/
Span 60 MHz
Date: 6.DEC.2022 09:20:54

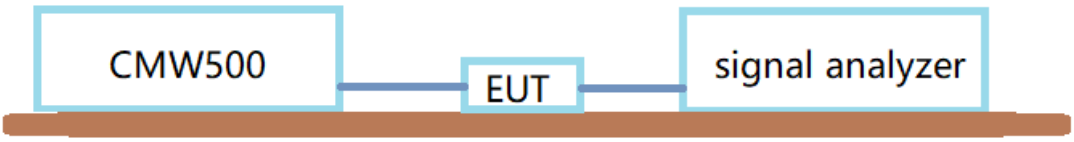
6.5 Emission Bandwidth

Reference

CFR Part 2.1049,22.917(b),24.238(a),27.53(g),27.53(h), 27.53(m),90.209(b)

No specific occupied bandwidth requirements in RSS-Gen: 6.7.

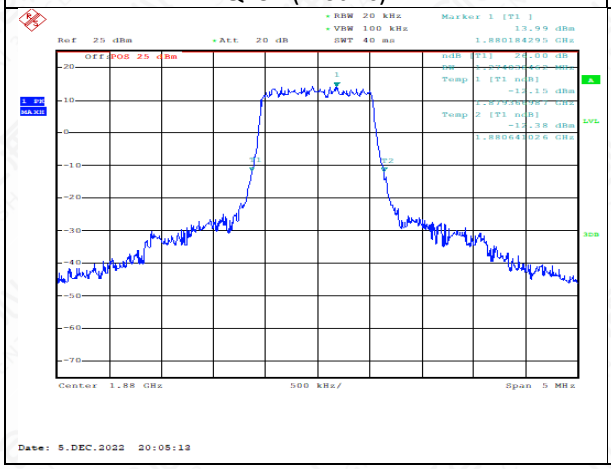
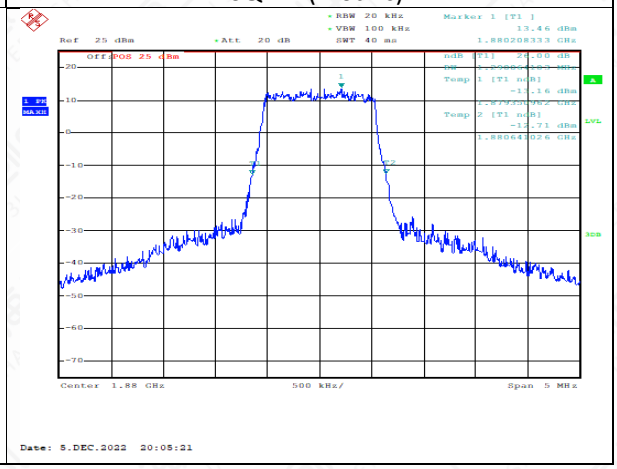
6.5.1 Test Setup



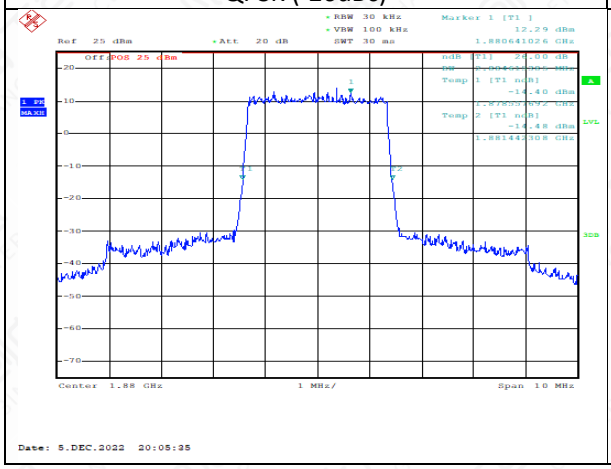
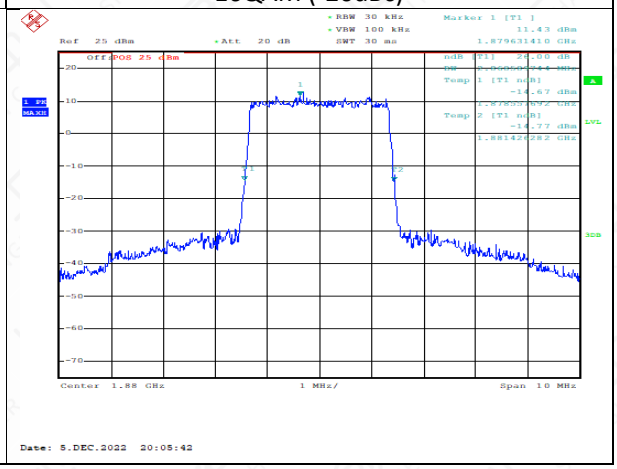
6.5.2 Emission Bandwidth Results

The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. Table below lists the measured -26dBc BW. Spectrum analyzer plots are included on the followinag pages.

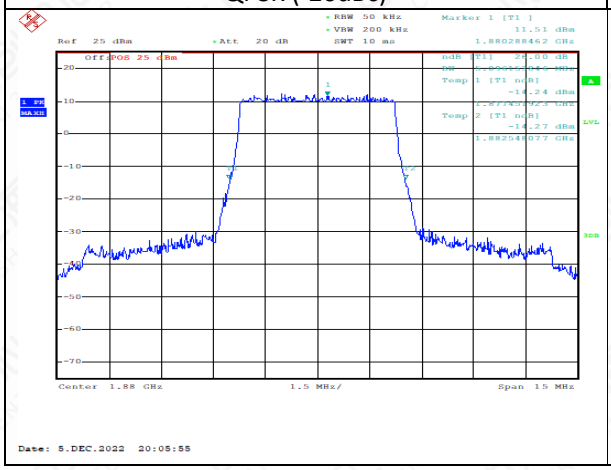
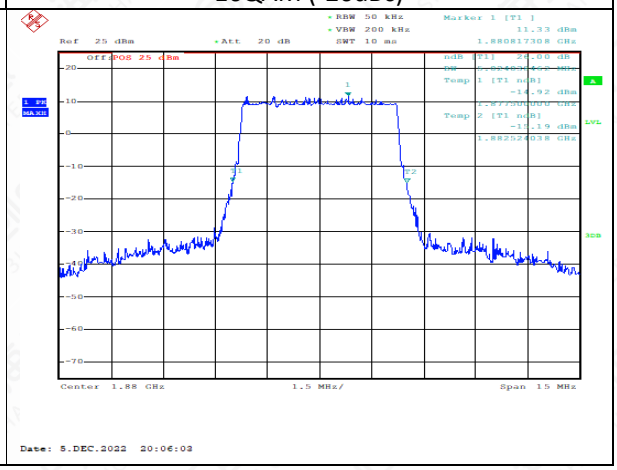
LTE band 2, 1.4MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
1880.0	QPSK	16QAM
	1.27	1.29
QPSK (-26dBc)	16QAM (-26dBc)	
		

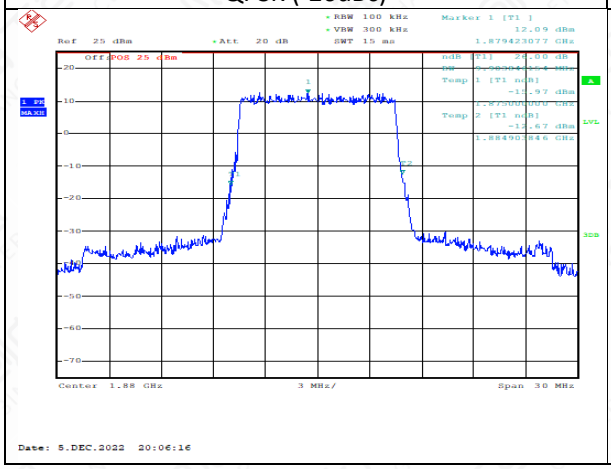
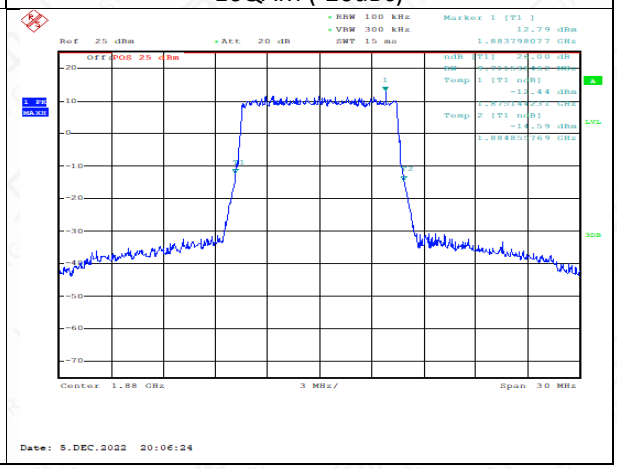
LTE band 2, 3MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
1880.0	QPSK	16QAM
	2.88	2.87
QPSK (-26dBc)	16QAM (-26dBc)	
		

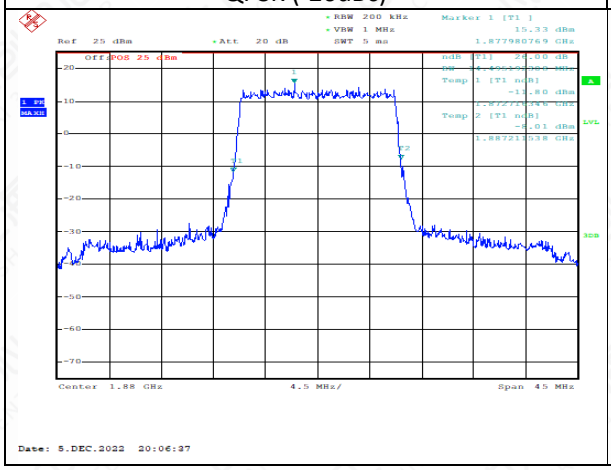
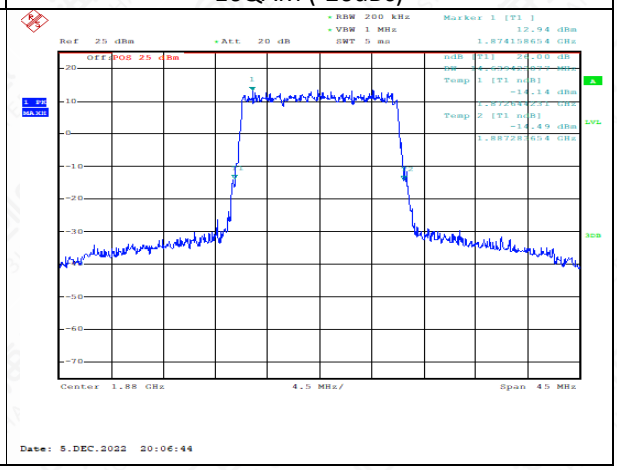
LTE band 2, 5MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
1880.0	QPSK	16QAM
	5.10	5.02
QPSK (-26dBc)	16QAM (-26dBc)	
		

LTE band 2, 10MHz (-26dBc)

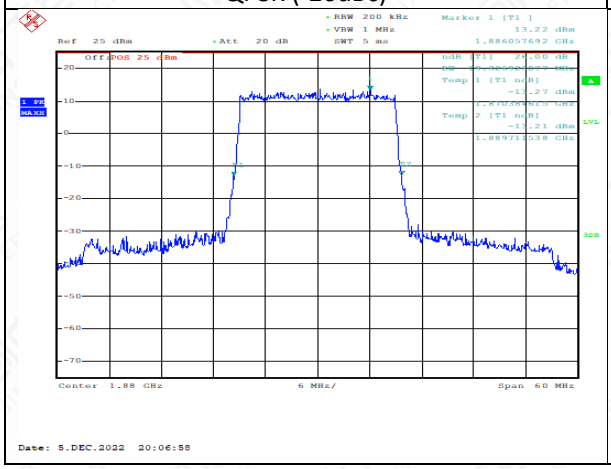
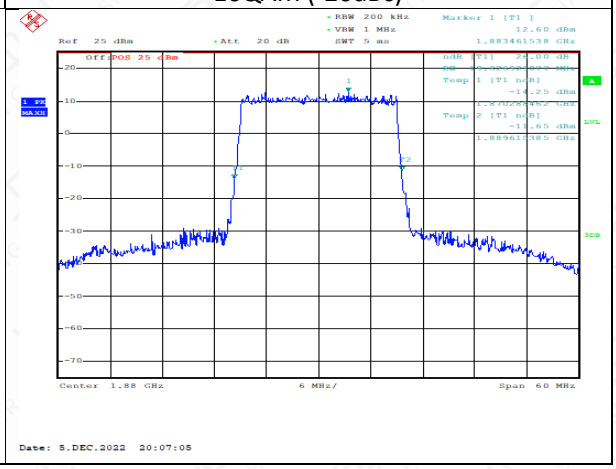
Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
1880.0	QPSK	16QAM
	9.90	9.71
QPSK (-26dBc)	16QAM (-26dBc)	
		

LTE band 2, 15MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
1880.0	QPSK	16QAM
	14.50	14.64
QPSK (-26dBc)	16QAM (-26dBc)	
		

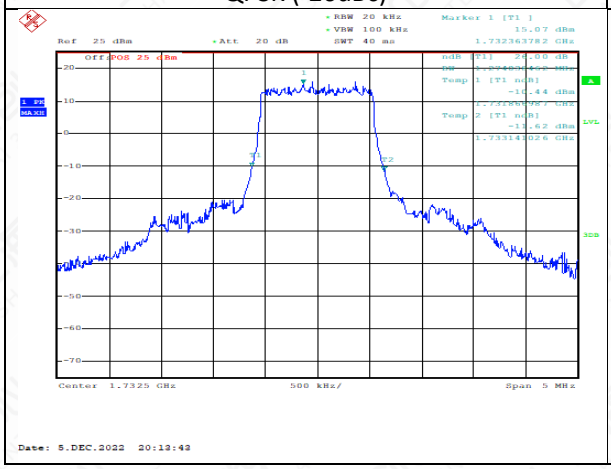
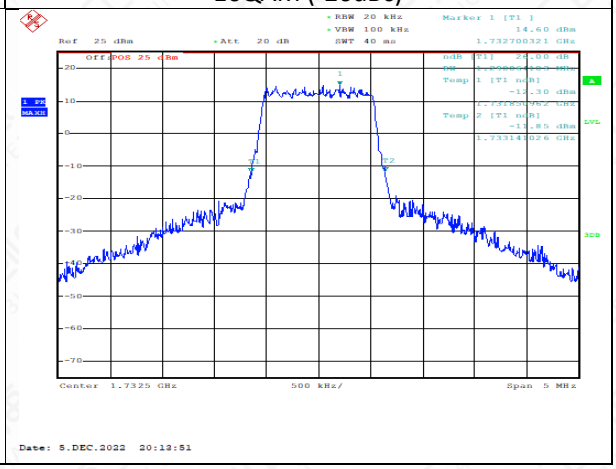
LTE band 2, 20MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
1880.0	QPSK	16QAM
	19.23	19.33

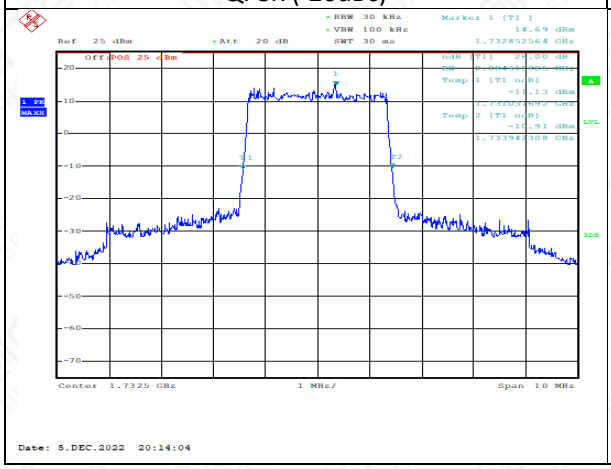
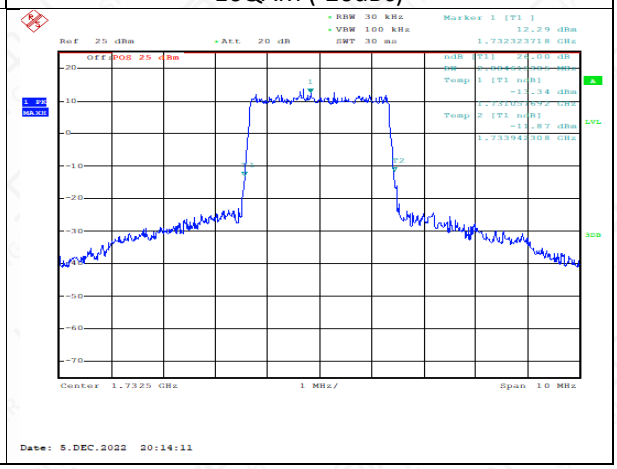
QPSK (-26dBc)	16QAM (-26dBc)
	

LTE band 4, 1.4MHz (-26dBc)

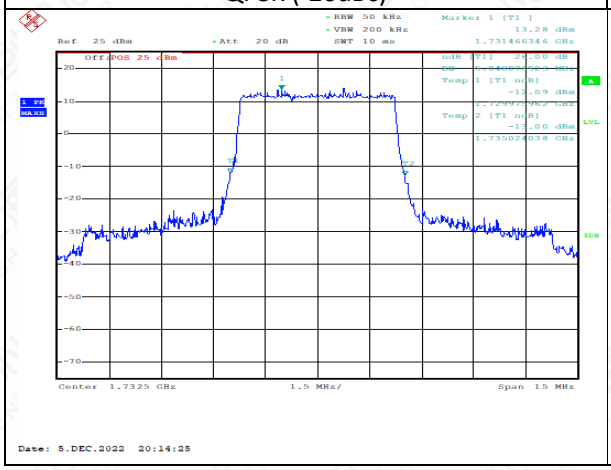
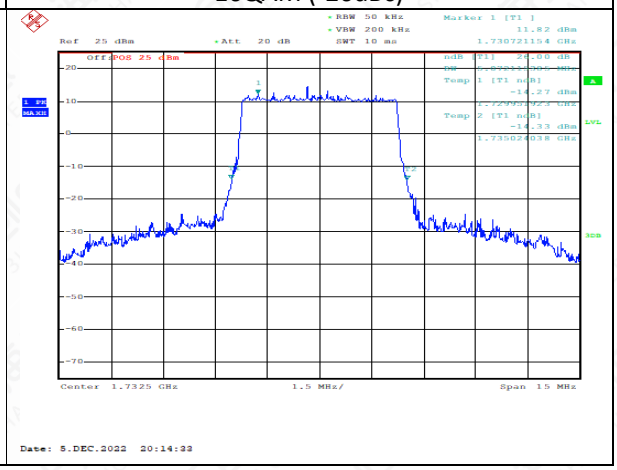
Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
1732.5	QPSK	16QAM
	1.27	1.27

QPSK (-26dBc)	16QAM (-26dBc)
	

LTE band 4, 3MHz (-26dBc)

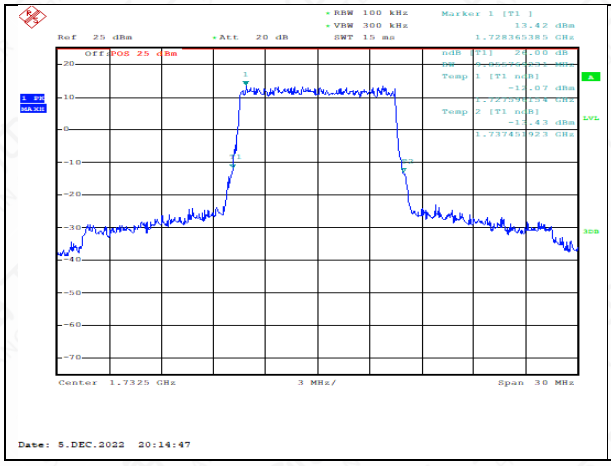
Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
1732.5	QPSK	16QAM
	2.88	2.88
QPSK (-26dBc)	16QAM (-26dBc)	
		

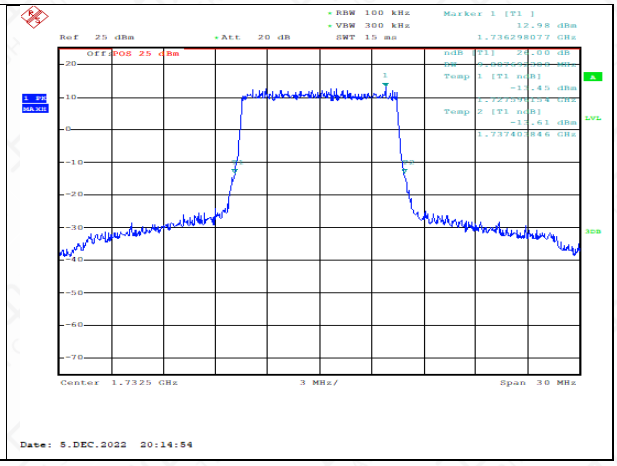
LTE band 4, 5MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
1732.5	QPSK	16QAM
	5.02	5.05
QPSK (-26dBc)	16QAM (-26dBc)	
		

LTE band 4, 10MHz (-26dBc)

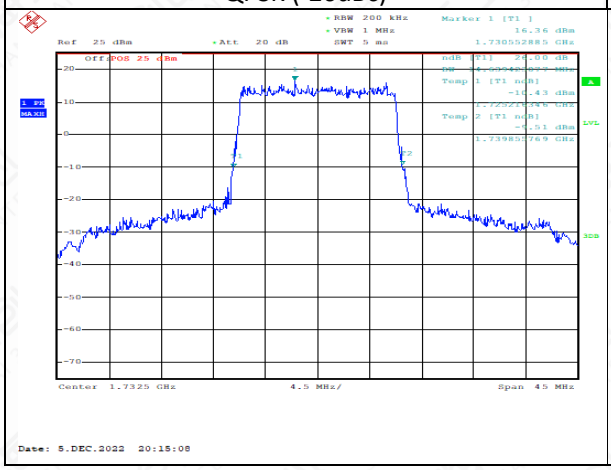
Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
1732.5	QPSK	16QAM
	9.86	9.81
QPSK (-26dBc)	16QAM (-26dBc)	

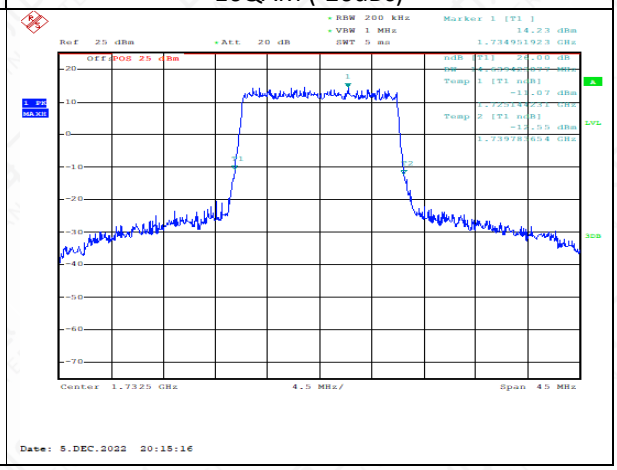




LTE band 4, 15MHz (-26dBc)

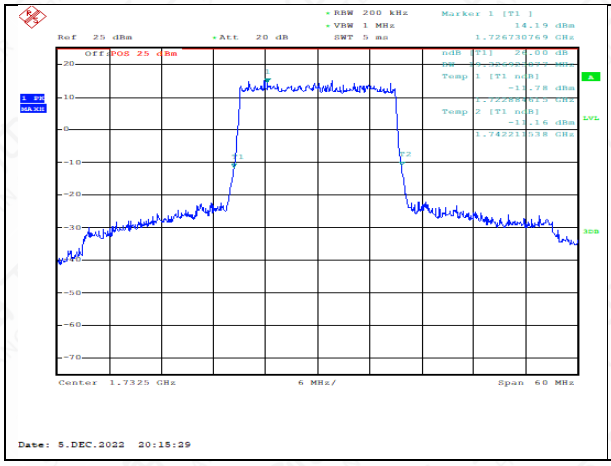
Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
1732.5	QPSK	16QAM
	14.64	14.64
QPSK (-26dBc)	16QAM (-26dBc)	

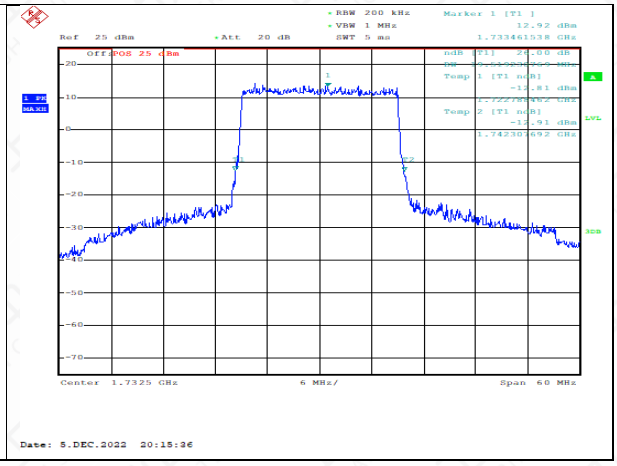




LTE band 4, 20MHz (-26dBc)

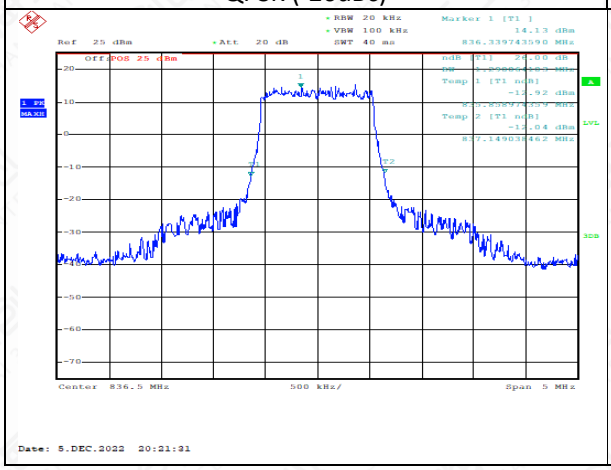
Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
1732.5	QPSK	16QAM
	19.23	19.52
QPSK (-26dBc)	16QAM (-26dBc)	

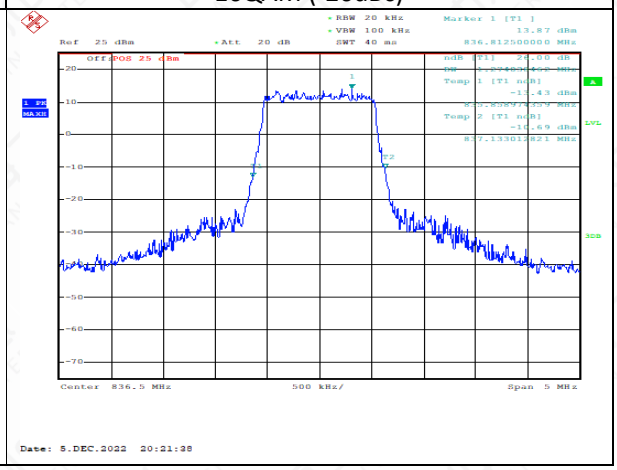




LTE band 5,1.4MHz (-26dBc)

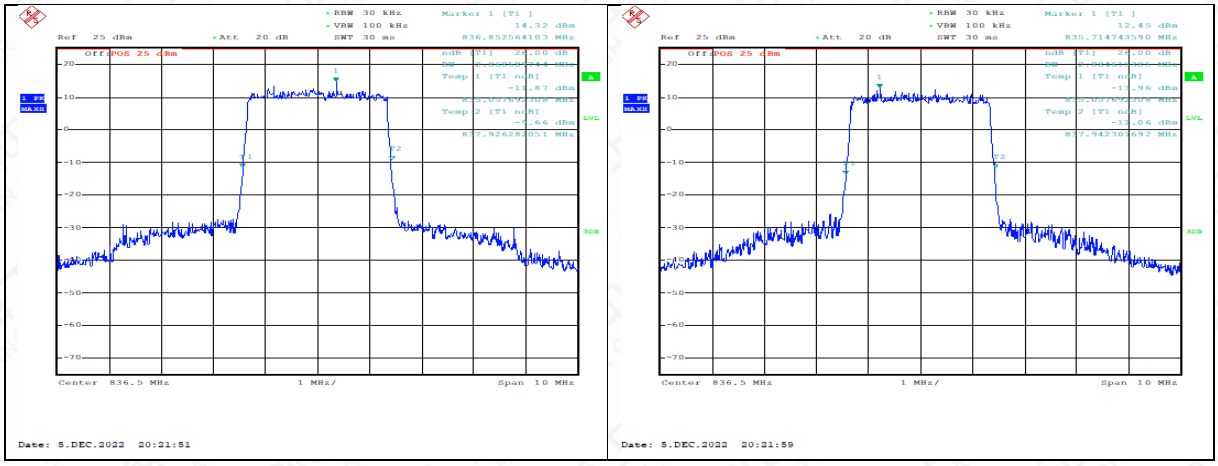
Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
836.5	QPSK	16QAM
	1.29	1.27
QPSK (-26dBc)	16QAM (-26dBc)	





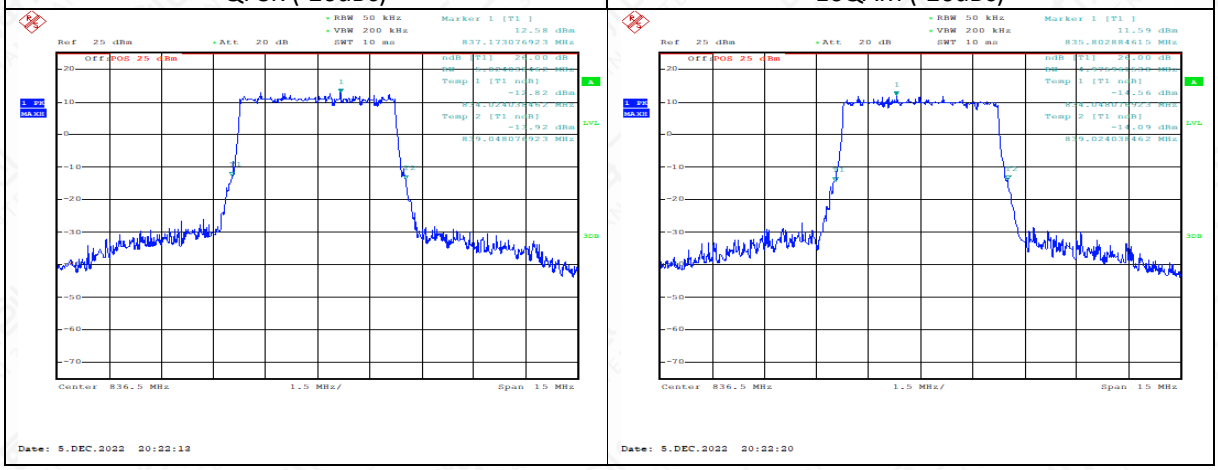
LTE band 5, 3MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
836.5	QPSK	16QAM
	2.87	2.88
QPSK (-26dBc)	16QAM (-26dBc)	



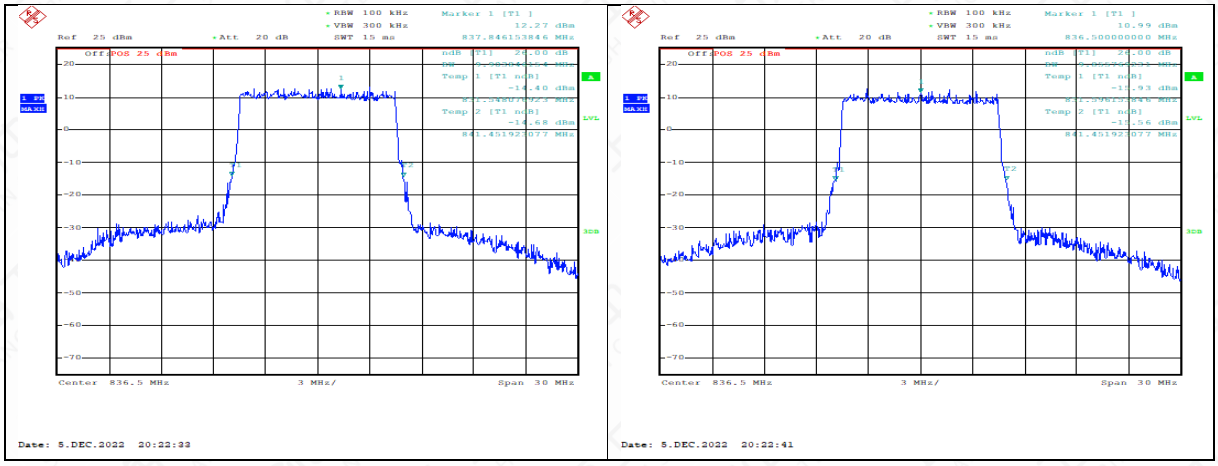
LTE band 5, 5MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
836.5	QPSK	16QAM
	5.00	4.98
QPSK (-26dBc)	16QAM (-26dBc)	



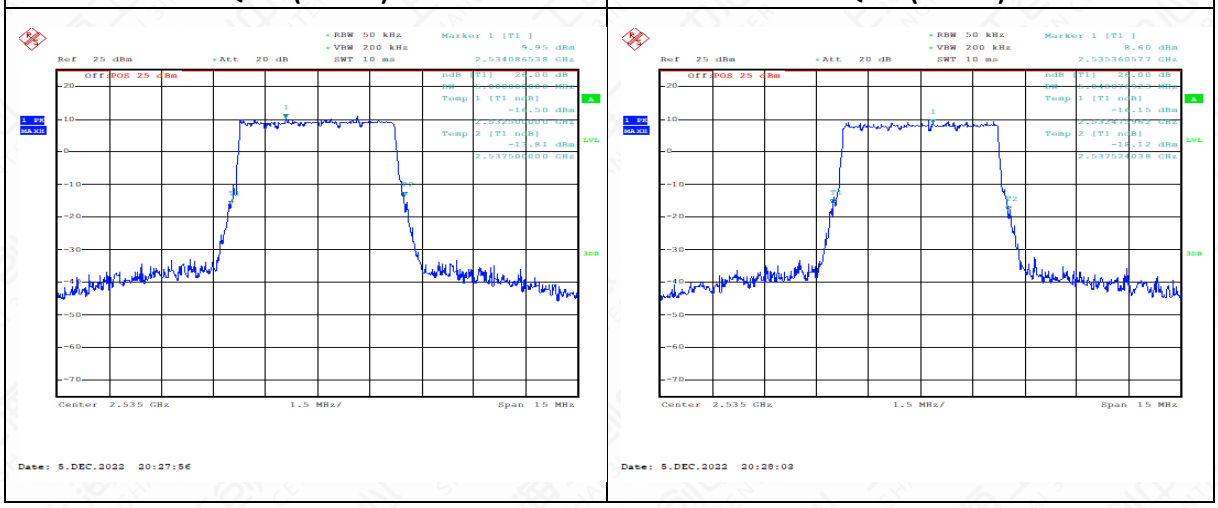
LTE band 5, 10MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
836.5	QPSK	16QAM
	9.86	9.86
QPSK (-26dBc)	16QAM (-26dBc)	



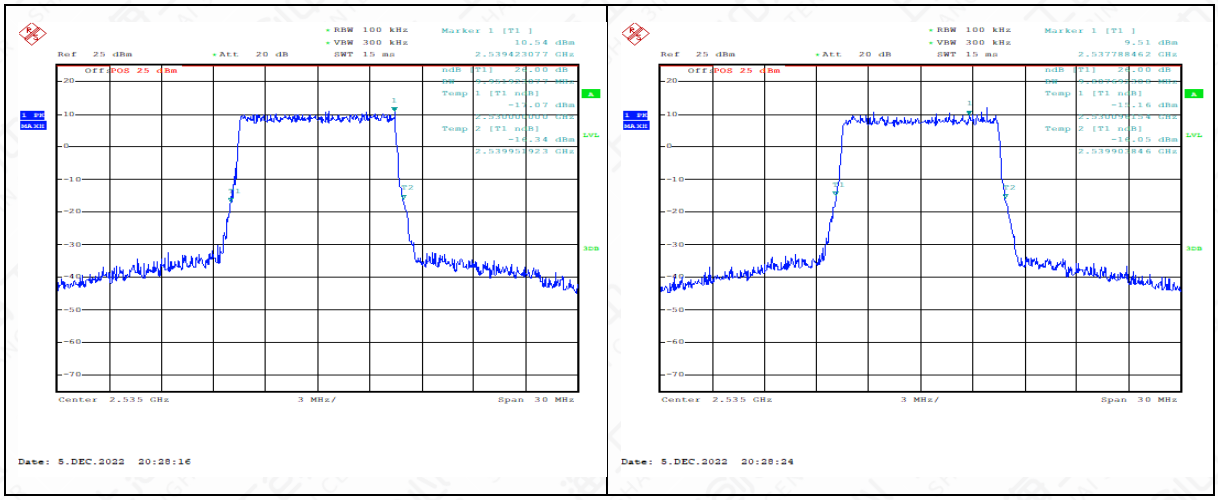
LTE band 7, 5MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
2535	QPSK	16QAM
	5.10	5.05
QPSK (-26dBc)	16QAM (-26dBc)	



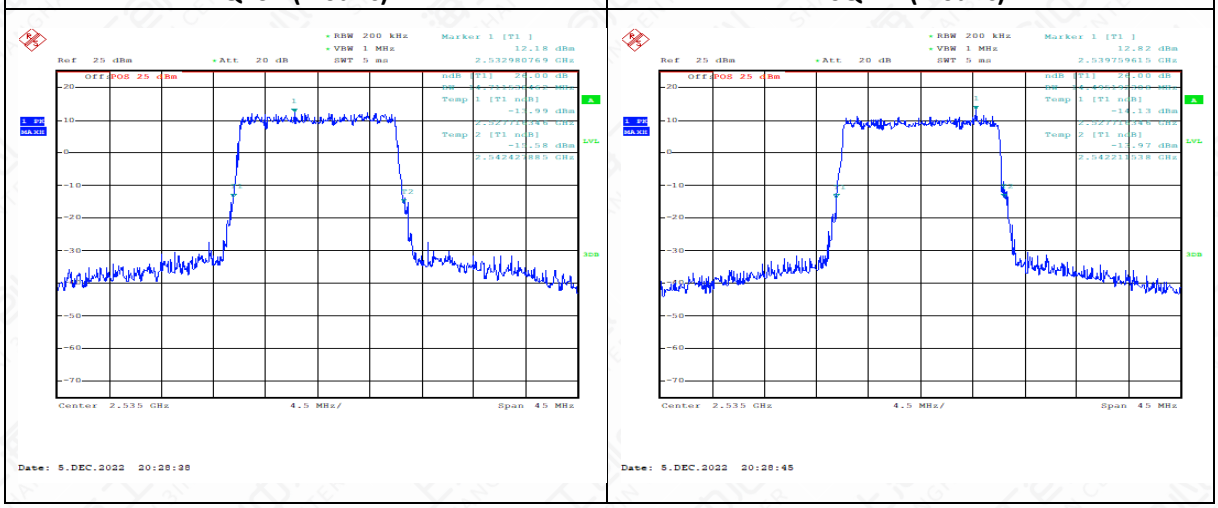
LTE band 7, 10MHz (-26dBc)mid

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
2535	QPSK	16QAM
	9.86	9.81
QPSK (-26dBc)	16QAM (-26dBc)	



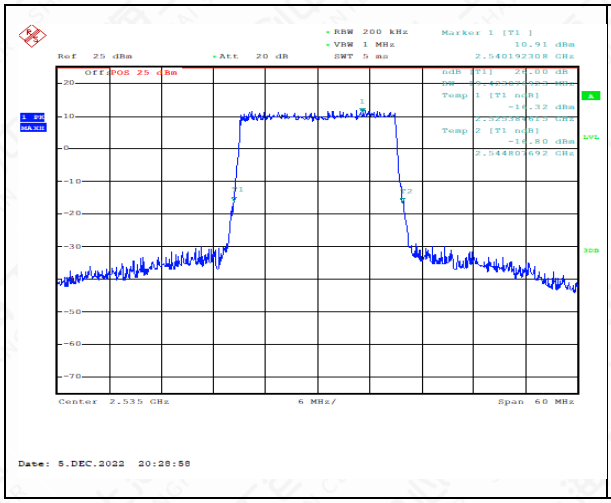
LTE band 7, 15MHz (-26dBc)mid

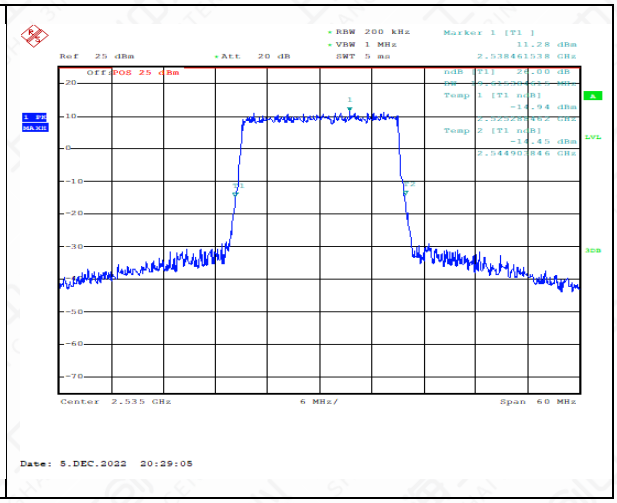
Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
2535	QPSK	16QAM
	14.41	14.50
QPSK (-26dBc)	16QAM (-26dBc)	



LTE band 7, 20MHz (-26dBc)mid

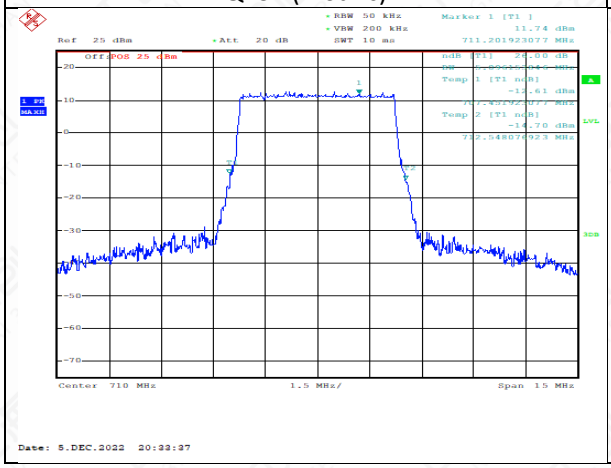
Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
2535	QPSK	16QAM
	19.42	19.52
QPSK (-26dBc)	16QAM (-26dBc)	

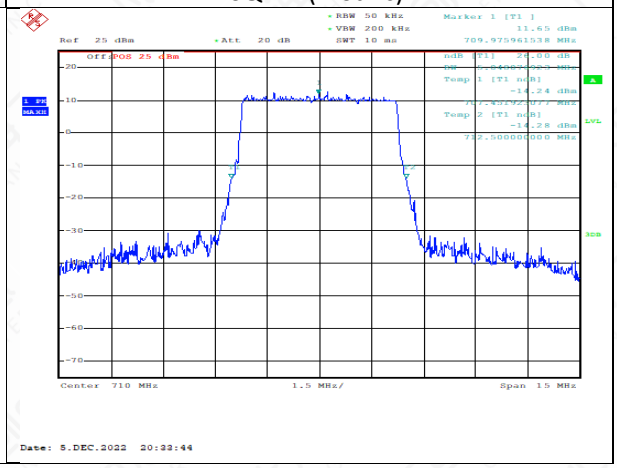




LTE band 17, 5MHz (-26dBc)

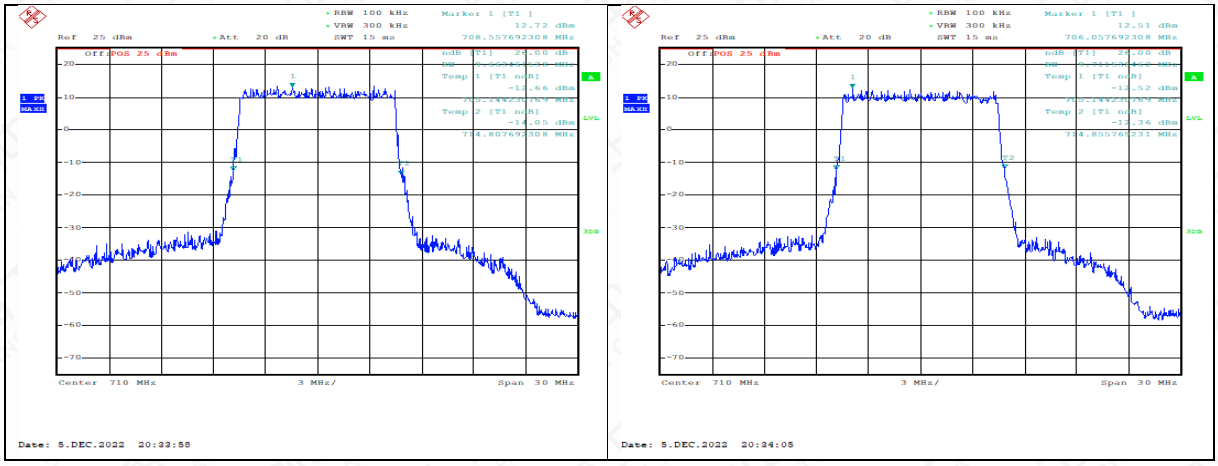
Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
710.0	QPSK	16QAM
	5.10	5.05
QPSK (-26dBc)	16QAM (-26dBc)	





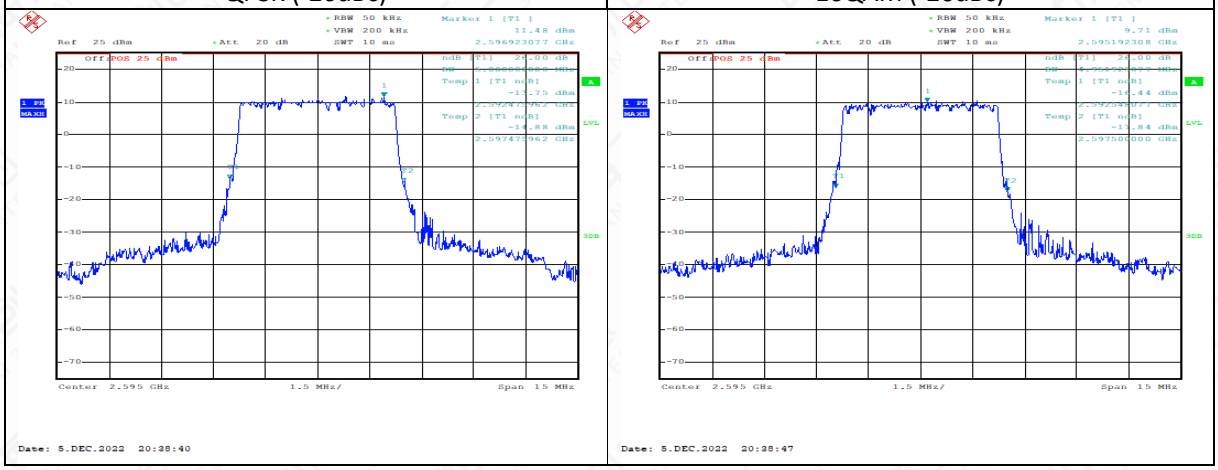
LTE band 17, 10MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
710.0	QPSK	16QAM
	9.66	9.71
QPSK (-26dBc)	16QAM (-26dBc)	



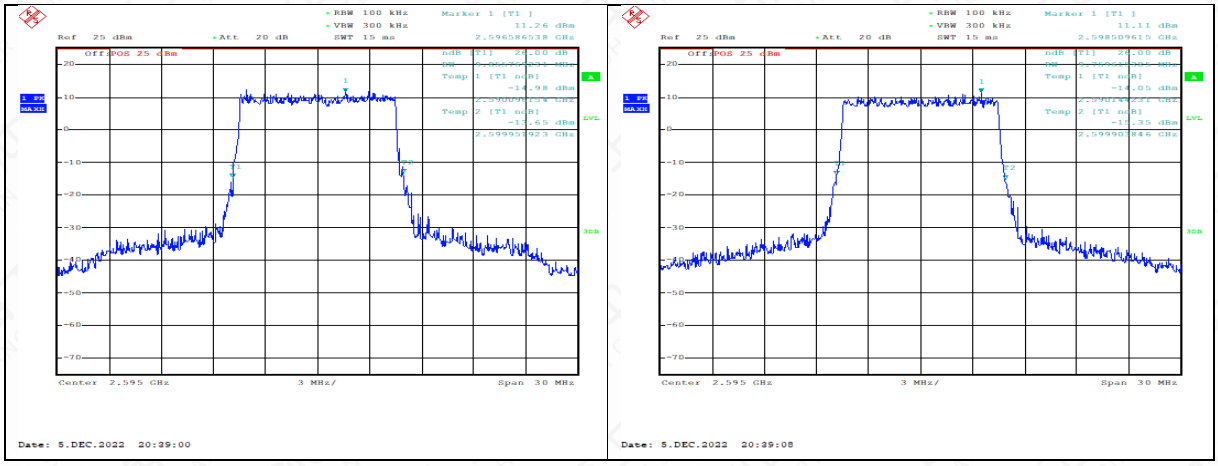
LTE band 38, 5MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
2595.0	QPSK	16QAM
	5.00	4.95
QPSK (-26dBc)	16QAM (-26dBc)	



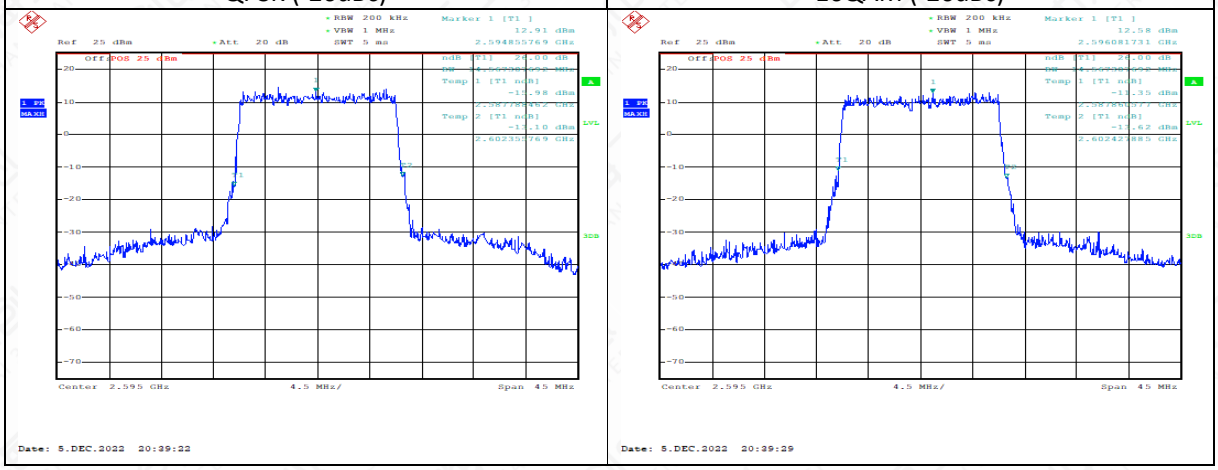
LTE band 38, 10MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
2595.0	QPSK	16QAM
	9.86	9.76
QPSK (-26dBc)	16QAM (-26dBc)	



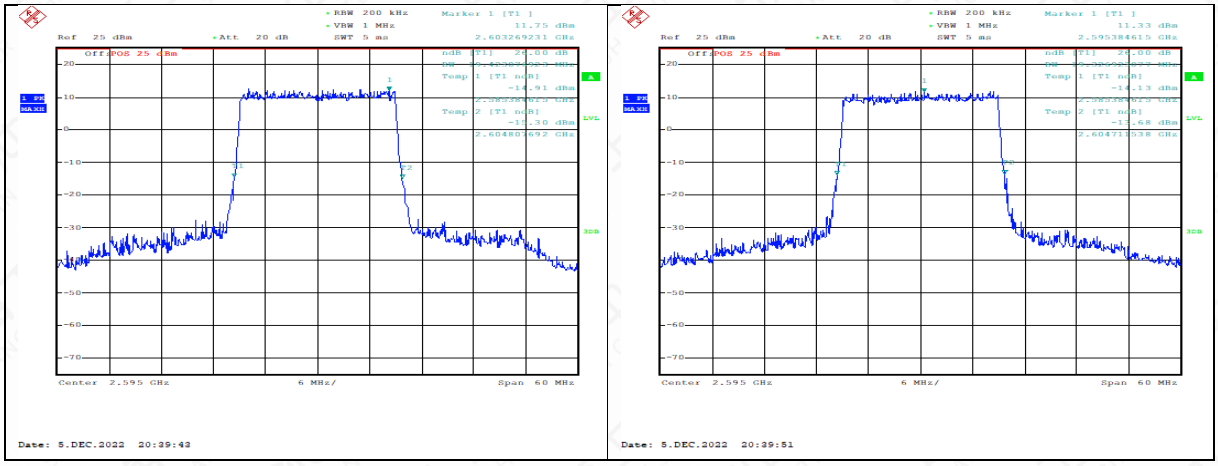
LTE band 38, 15MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
2595.0	QPSK	16QAM
	14.42	14.57
QPSK (-26dBc)	16QAM (-26dBc)	

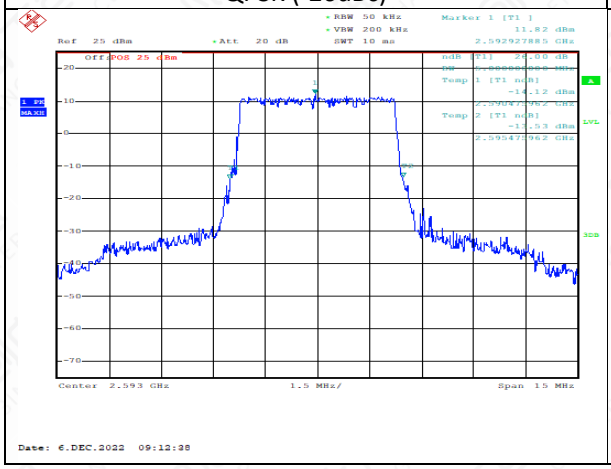
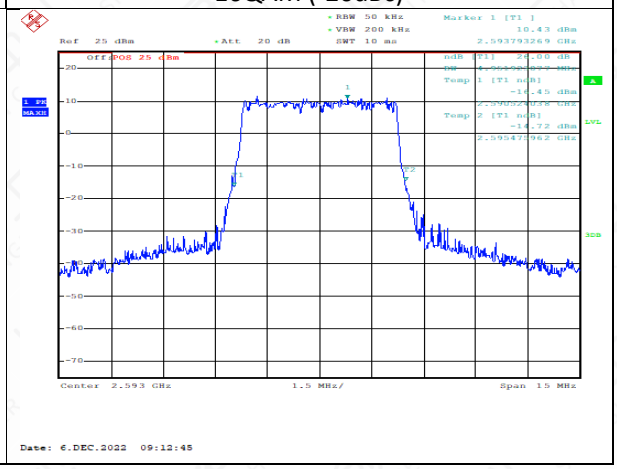


LTE band 38, 20MHz (-26dBc)

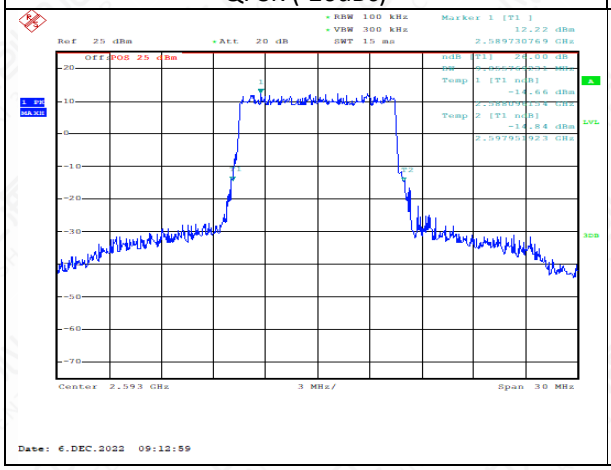
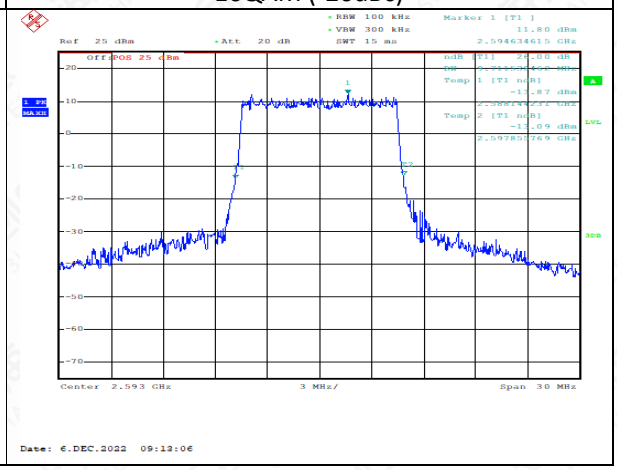
Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
2595.0	QPSK	16QAM
	19.42	19.33
QPSK (-26dBc)	16QAM (-26dBc)	


RBW 200 kHz
VBW 1 MHz
SWT 5 ms
Marker 1 [T1]
11.75 dBm
2.603269231 GHz
Ref 25 dBm
Att 20 dB
Off POS 25 dBm
ndB [T1] 20.00 dB
Temp 1 [T1 ndB]
-14.91 dBm
Temp 2 [T1 ndB]
-11.30 dBm
2.604807692 GHz
Center 2.595 GHz
6 MHz/
Span 60 MHz
Date: 5.DEC.2022 20:39:43
RBW 200 kHz
VBW 1 MHz
SWT 5 ms
Marker 1 [T1]
11.33 dBm
2.595384615 GHz
Ref 25 dBm
Att 20 dB
Off POS 25 dBm
ndB [T1] 20.00 dB
Temp 1 [T1 ndB]
-14.13 dBm
Temp 2 [T1 ndB]
-11.68 dBm
2.604711538 GHz
Center 2.595 GHz
6 MHz/
Span 60 MHz
Date: 5.DEC.2022 20:39:51

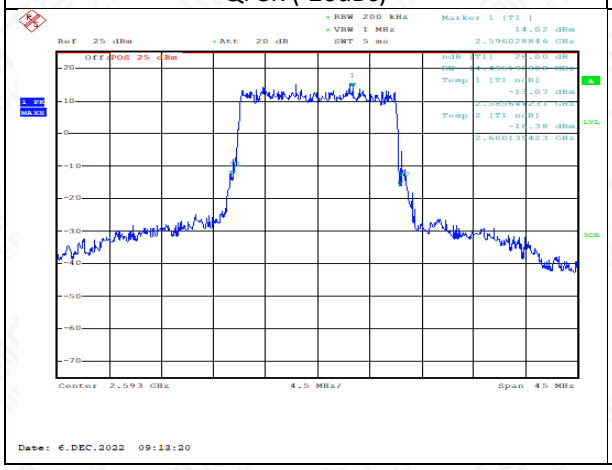
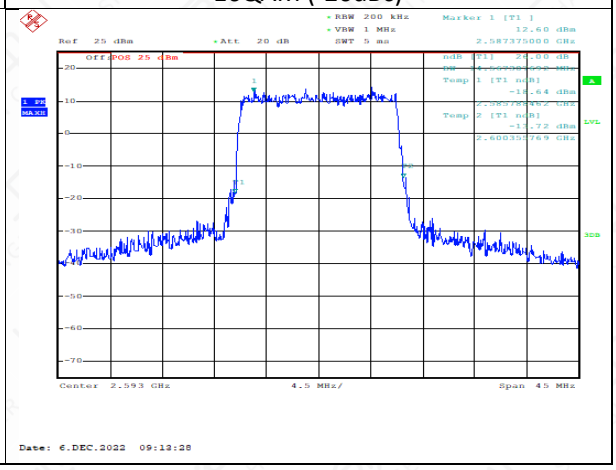
LTE band 41, 5MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
2593.0	QPSK	16QAM
	5.00	4.95
QPSK (-26dBc)	16QAM (-26dBc)	
		

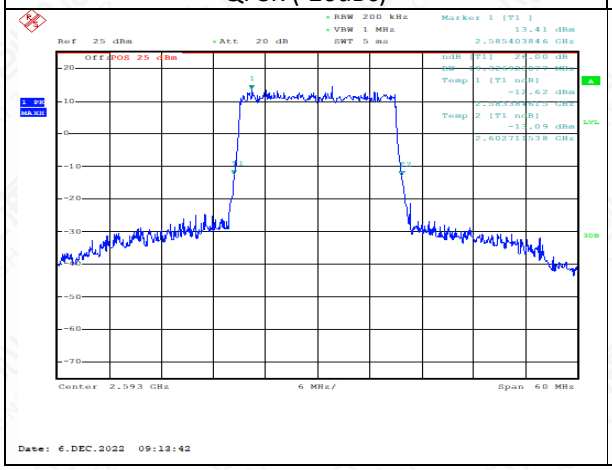
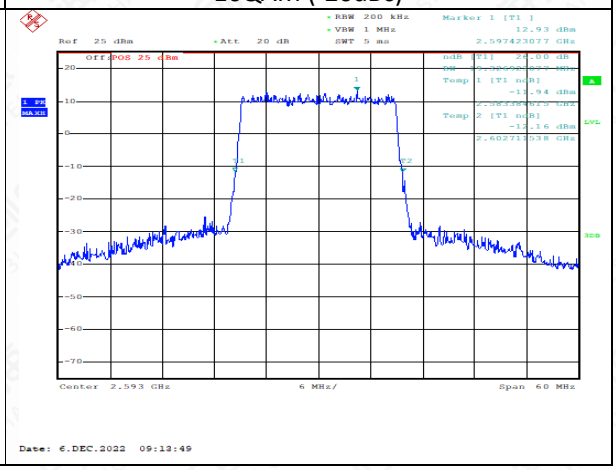
LTE band 41, 10MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
2593.0	QPSK	16QAM
	9.86	9.71
QPSK (-26dBc)	16QAM (-26dBc)	
		

LTE band 41, 15MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
2593.0	QPSK	16QAM
	14.50	14.50
QPSK (-26dBc)	16QAM (-26dBc)	
		

LTE band 41, 20MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
2593.0	QPSK	16QAM
	19.33	19.33
QPSK (-26dBc)	16QAM (-26dBc)	
		

6.6 Band Edge Compliance

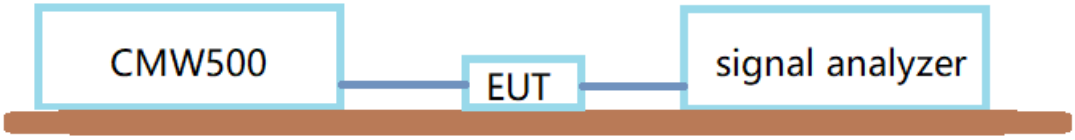
Reference

CFR Part 2.1049,22.917(b),24.238(a),27.53(g),27.53(h), 27.53(m),90.669
Rule RSS-130 4.7, Rule RSS-132 5.5 , Rule RSS-133 6.5, Rule RSS-139 6.6, Rule RSS-199 4.5

6.6.1 Measurement limit

Part 27.53(g),27.53(h), 27.53(m) state that on any frequency outside frequency band of the US Cellular/PCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least 43+10Log (P) dB. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dm.
According to KDB 971168 6, a relaxation of the reference bandwidth is often provided for measurements within a specified frequency range at the edge of the authorized frequency block/band. This is often implemented by permitting the use of a narrower RBW (typically limited to a minimum RBW of 1% of the OBW) for measuring the out-of-band emissions without a requirement to integrate the result over the full reference bandwidth.
Part 27.53(m) states that 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.
Rule RSS-132: 5.5: (i) In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1% of the occupied bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p (watts). (ii)After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p (watts). If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required. Limit -13 dBm
Rule RSS-133 6.5 specifies that " In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts).
After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required." Limit -13 dBm
Rule RSS-139 6.6 specifies that " In the first 1.0 MHz bands immediately outside and adjacent to the equipment's smallest operating frequency block,2 which can contain the equipment's occupied bandwidth, the emission power per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least 43 + 10 log10 p (watts) dB. (ii) After the first 1.0 MHz outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least 43 + 10 log10 p (watts) dB.".

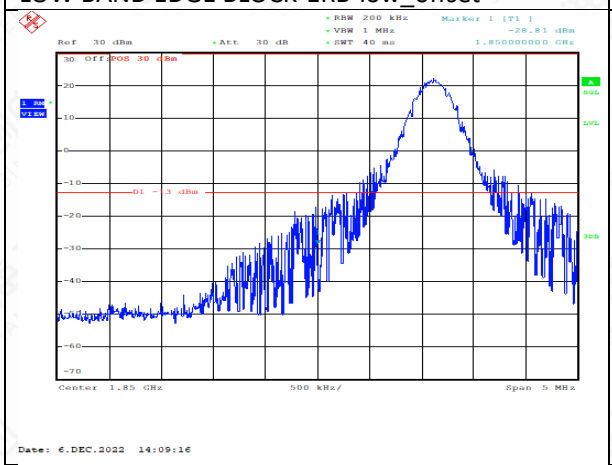
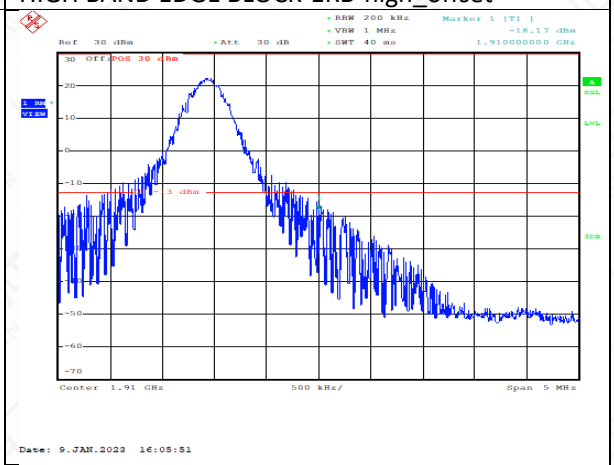
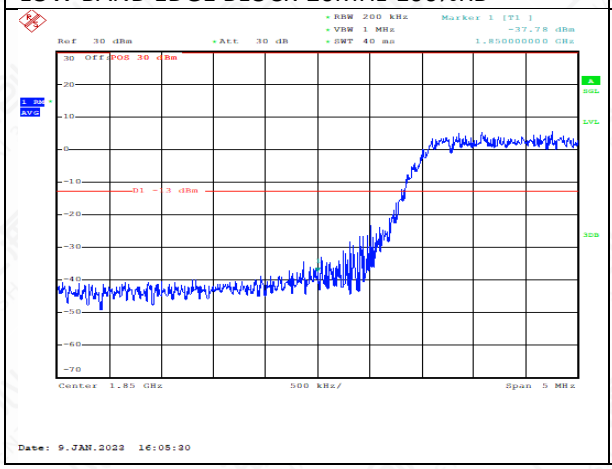
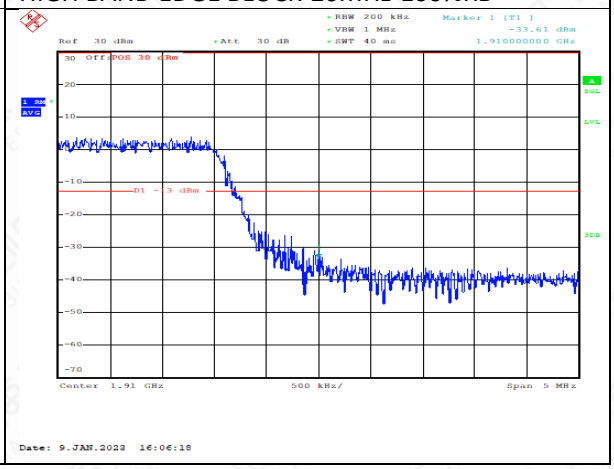
6.6.2 Test Setup



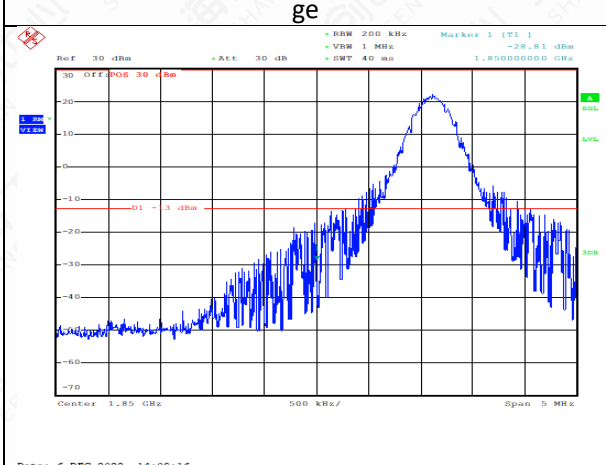
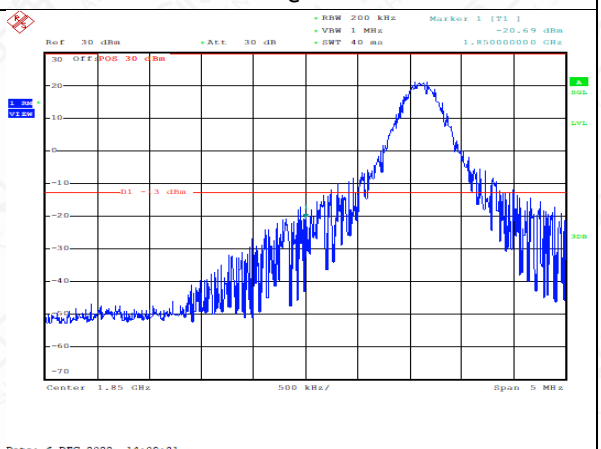
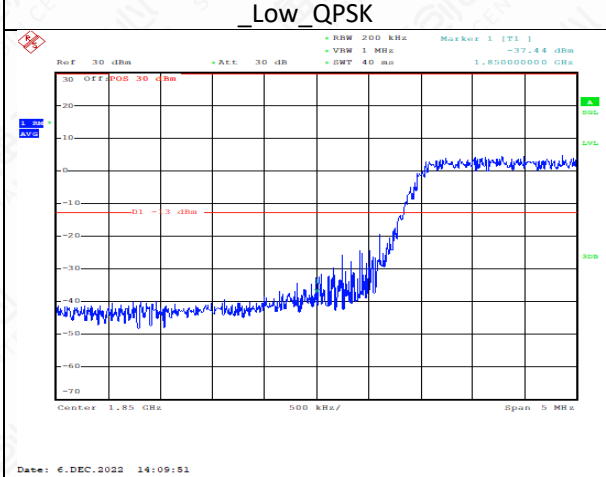
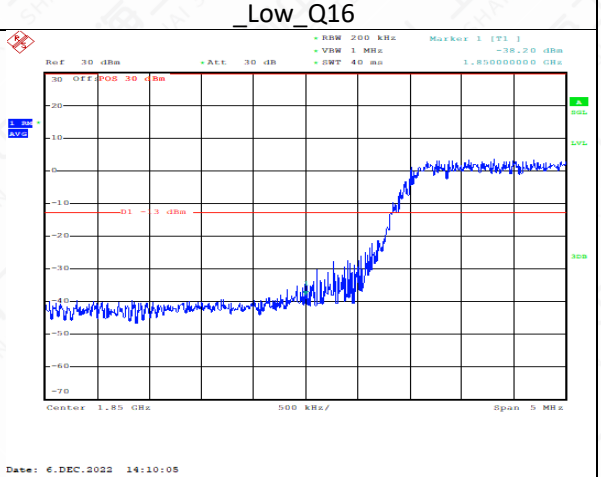
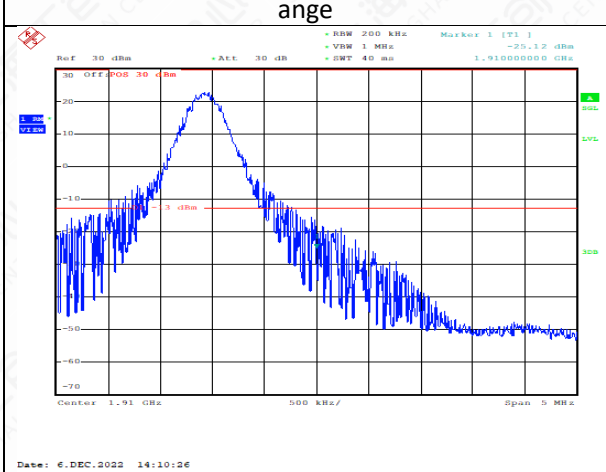
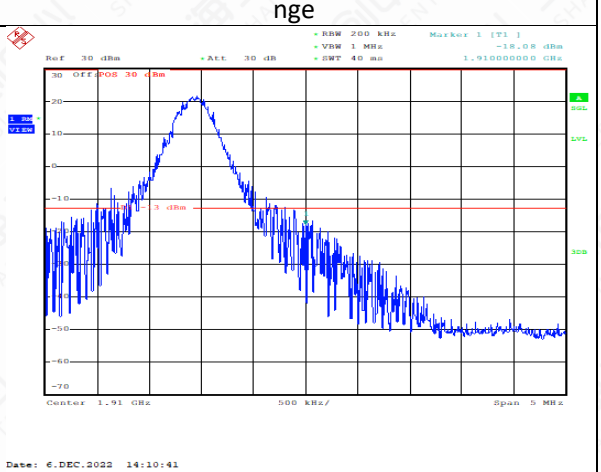
6.6.3 Measurement result

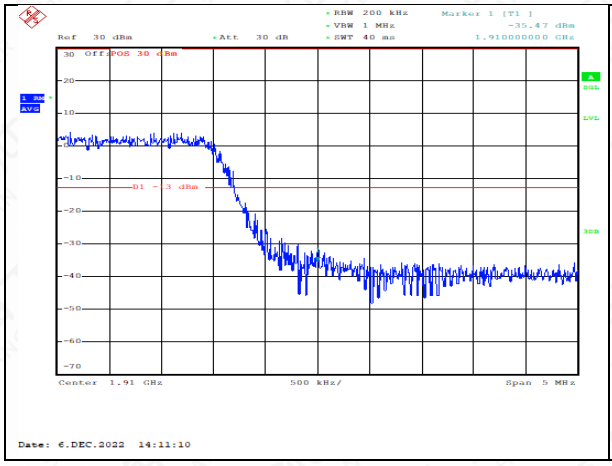
Only worst result is given below

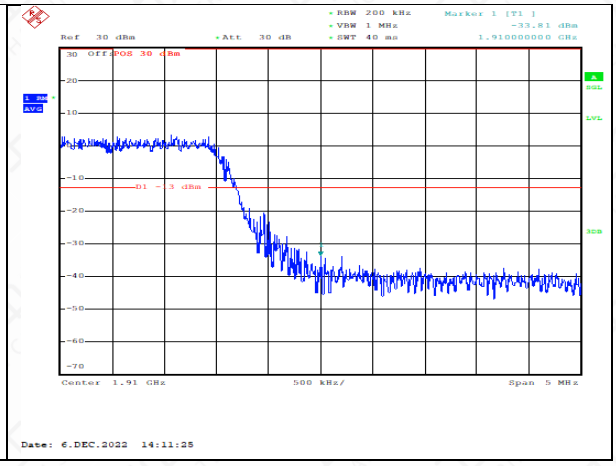
LTE band 2

LOW BAND EDGE BLOCK-1RB-low_offset	HIGH BAND EDGE BLOCK-1RB-high_offset
	
LOW BAND EDGE BLOCK-20MHz-100%RB	HIGH BAND EDGE BLOCK-20MHz-100%RB
	

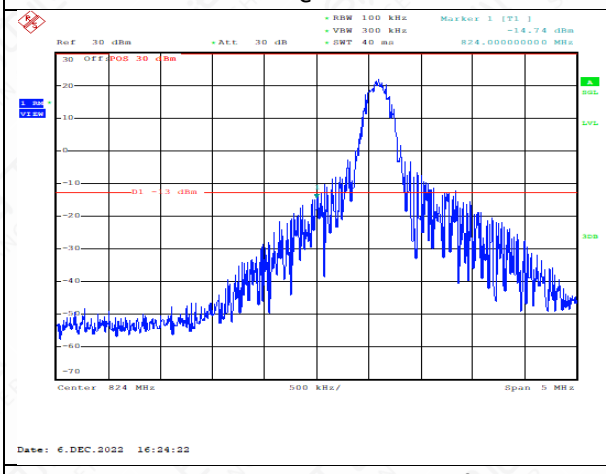
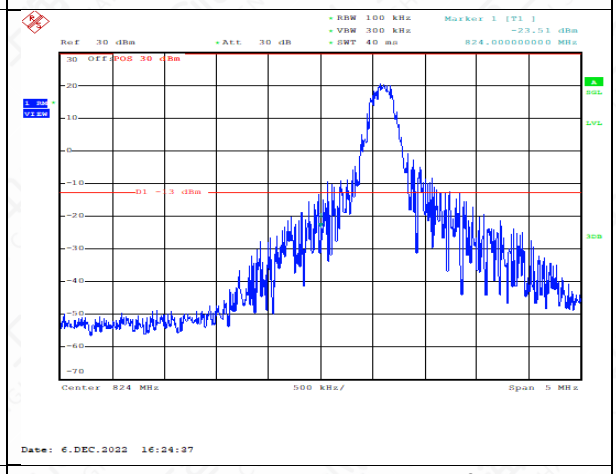
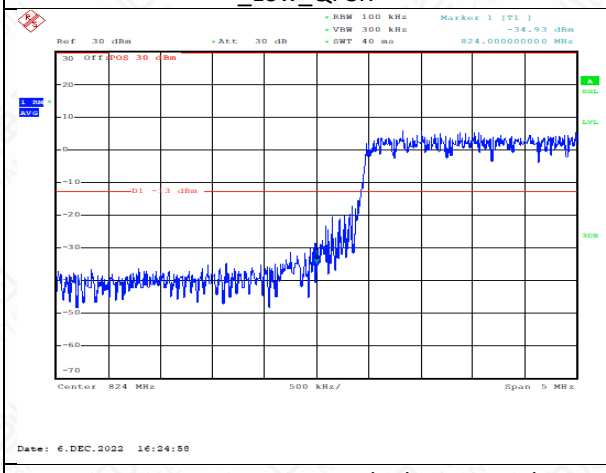
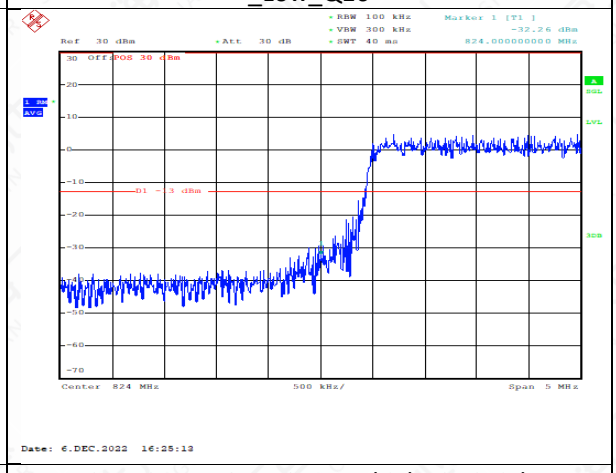
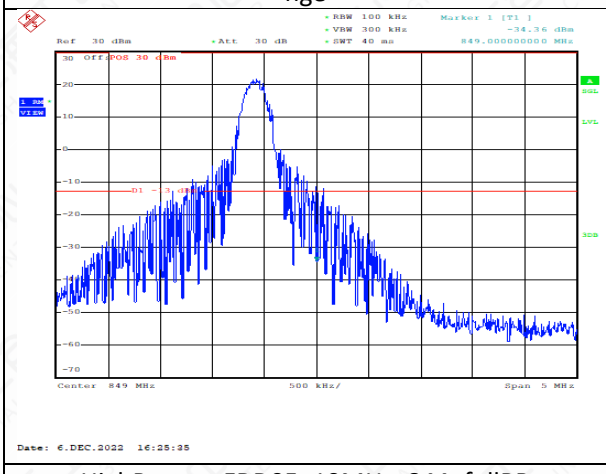
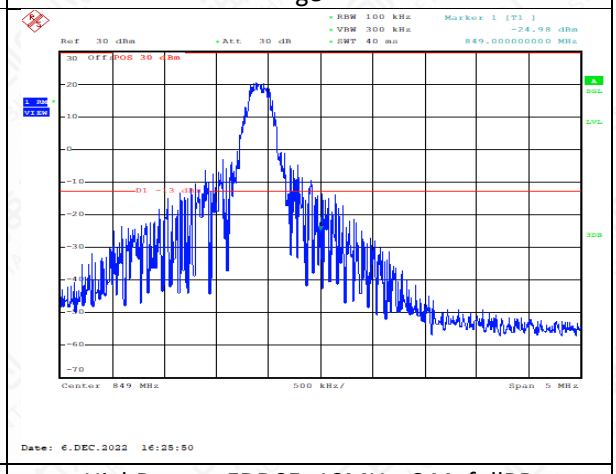
LTE band 4

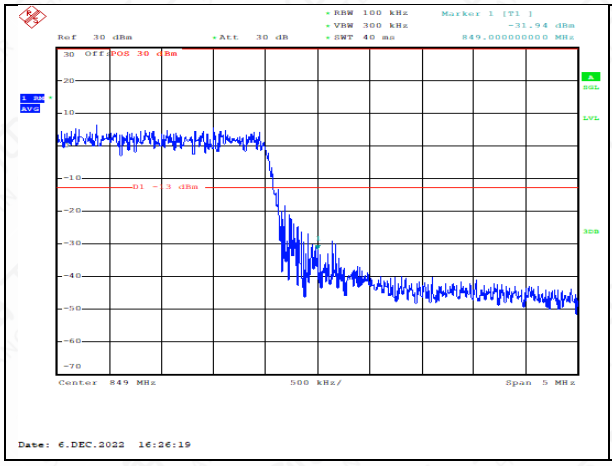
FDD02_20MHz_1860_OneRB_low_QPSKLowRange	FDD02_20MHz_1860_OneRB_low_Q16LowRange
	
LowRange_ FDD02_20MHz_1860_fullRB_Low_QPSK	LowRange_ FDD02_20MHz_1860_fullRB_Low_Q16
	
FDD02_20MHz_1900_OneRB_high_QPSKHighRange	FDD02_20MHz_1900_OneRB_high_Q16HighRange
	
HighRange_ FDD02_20MHz_1900_fullRB_High_QPSK	HighRange_ FDD02_20MHz_1900_fullRB_High_Q16

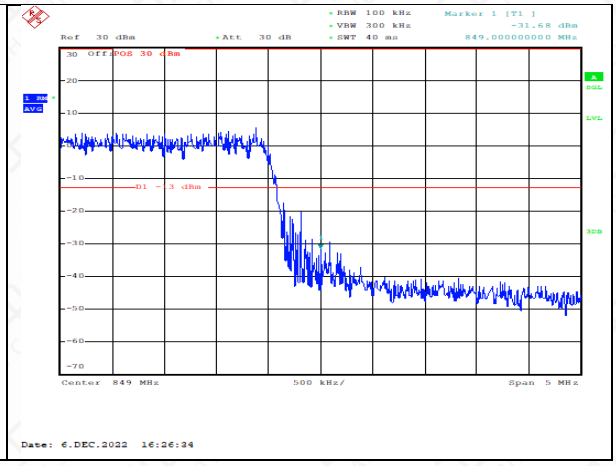

RBW 200 kHz
VBW 1 MHz
SWT 40 ms
Marker 1 [T1]
-35.47 dBm
1.910000000 GHz
Ref 30 dBm
Att 30 dB
Off POS 30 dBm
D1 -3 dBm
Center 1.91 GHz
500 kHz/
Span 5 MHz
Date: 6.DEC.2022 14:11:10


RBW 200 kHz
VBW 1 MHz
SWT 40 ms
Marker 1 [T1]
-33.81 dBm
1.910000000 GHz
Ref 30 dBm
Att 30 dB
Off POS 30 dBm
D1 -3 dBm
Center 1.91 GHz
500 kHz/
Span 5 MHz
Date: 6.DEC.2022 14:11:25

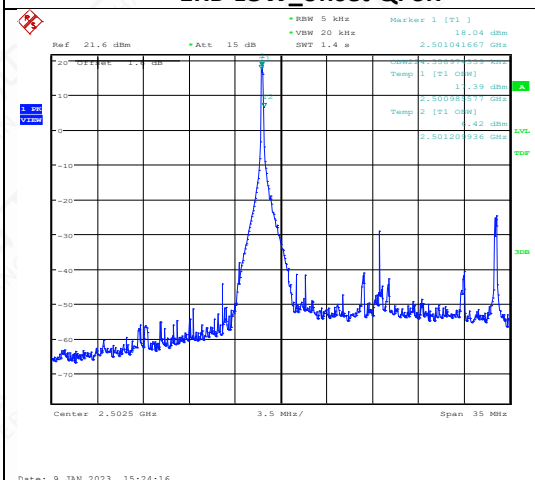
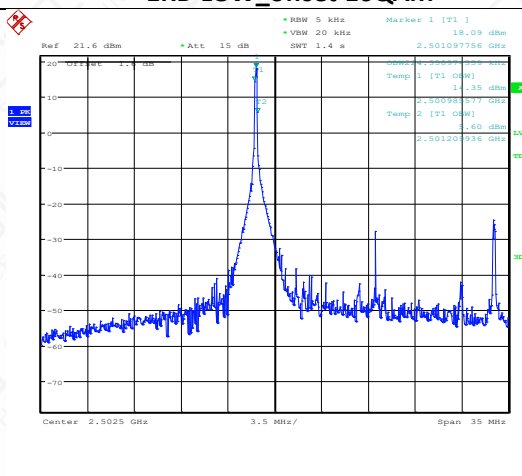
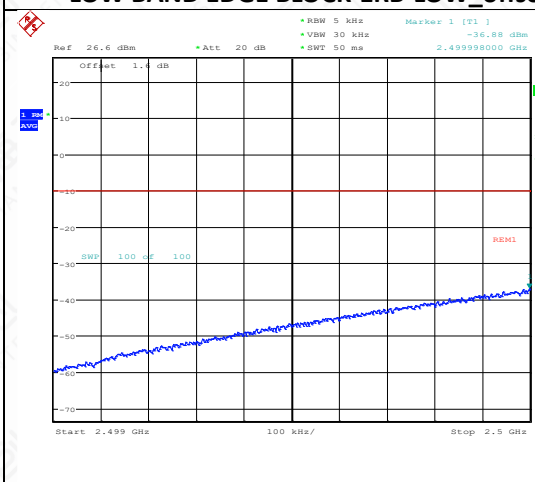
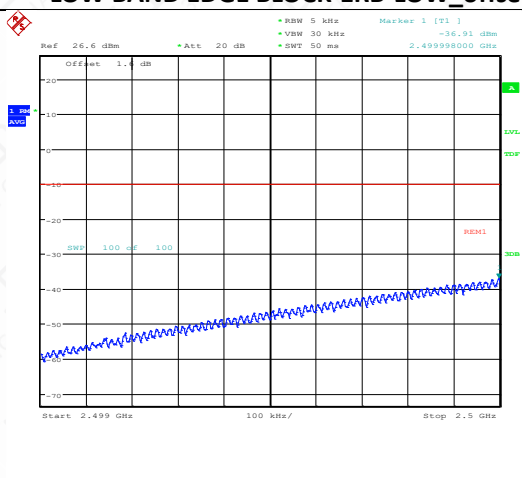
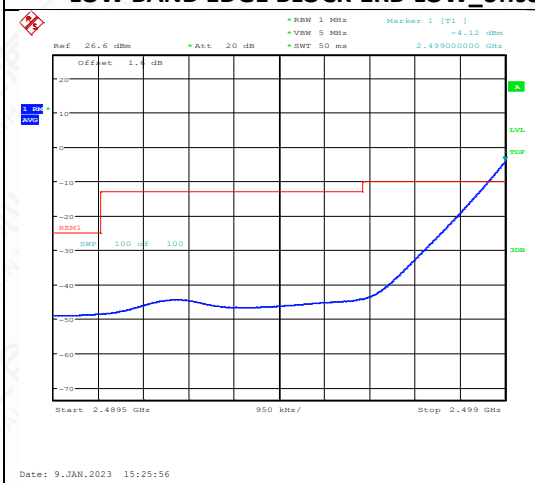
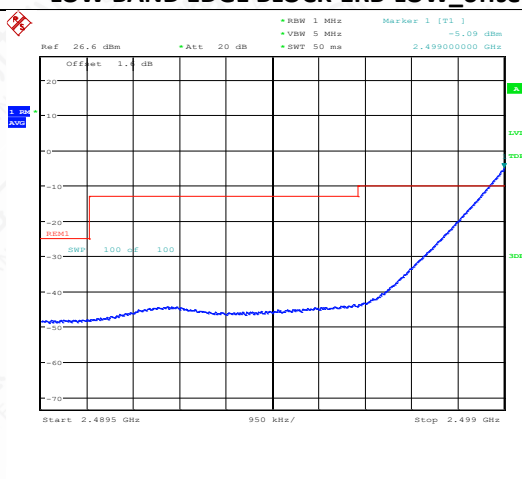
LTE band 5

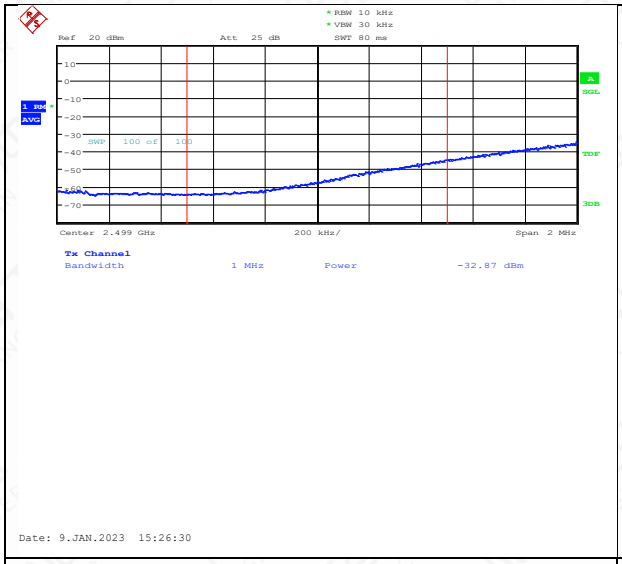
FDD05_10MHz_829_OneRB_low_QPSKLowRange	FDD05_10MHz_829_OneRB_low_Q16LowRange
	
LowRange_ FDD05_10MHz_829_fullRB_Low_QPSK	LowRange_ FDD05_10MHz_829_fullRB_Low_Q16
	
FDD05_10MHz_844_OneRB_high_QPSKHighRange	FDD05_10MHz_844_OneRB_high_Q16HighRange
	
HighRange_ FDD05_10MHz_844_fullRB_High_QPSK	HighRange_ FDD05_10MHz_844_fullRB_High_Q16


RBW 100 kHz
VBW 300 kHz
SWT 40 ms
Marker 1 [T1]
-31.94 dBm
849.000000000 MHz
Ref 30 dBm
Att 30 dB
Off POS 30 dBm
D1 -3 dBm
Center 849 MHz
500 kHz/
Span 5 MHz
Date: 6.DEC.2022 16:26:19

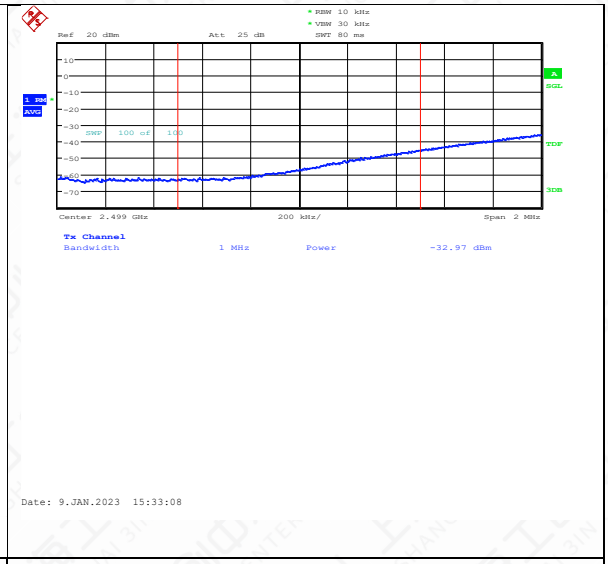

RBW 100 kHz
VBW 300 kHz
SWT 40 ms
Marker 1 [T1]
-31.68 dBm
849.000000000 MHz
Ref 30 dBm
Att 30 dB
Off POS 30 dBm
D1 -3 dBm
Center 849 MHz
500 kHz/
Span 5 MHz
Date: 6.DEC.2022 16:26:24

LTE band 7

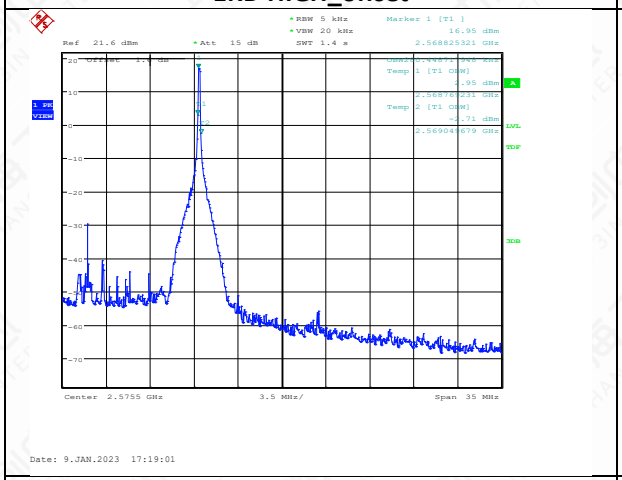
1RB-LOW_offset-QPSK	1RB-LOW_offset-16QAM
	
LOW BAND EDGE BLOCK-1RB-LOW_offset	LOW BAND EDGE BLOCK-1RB-LOW_offset
	
LOW BAND EDGE BLOCK-1RB-LOW_offset	LOW BAND EDGE BLOCK-1RB-LOW_offset
	
Out of limit Note: **Channal Power**	Out of limit Note: **Channal Power**



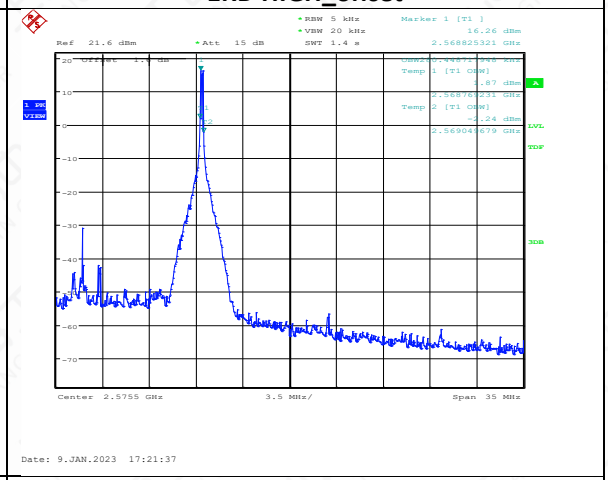
1RB-HIGH_offset



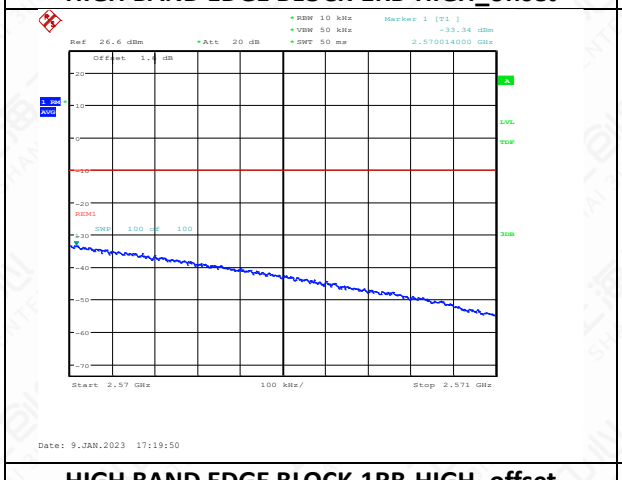
1RB-HIGH_offset



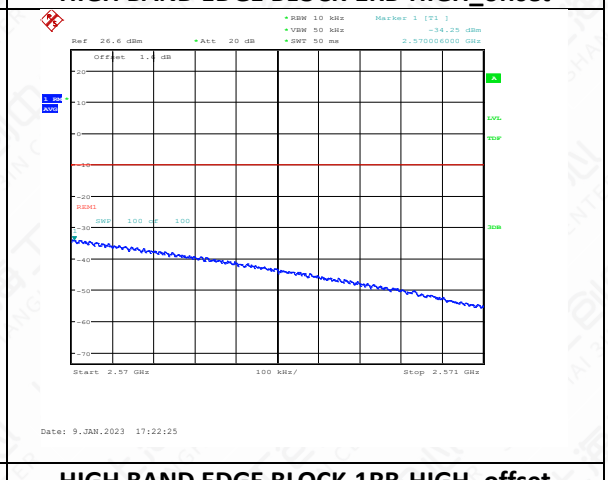
HIGH BAND EDGE BLOCK-1RB-HIGH_offset



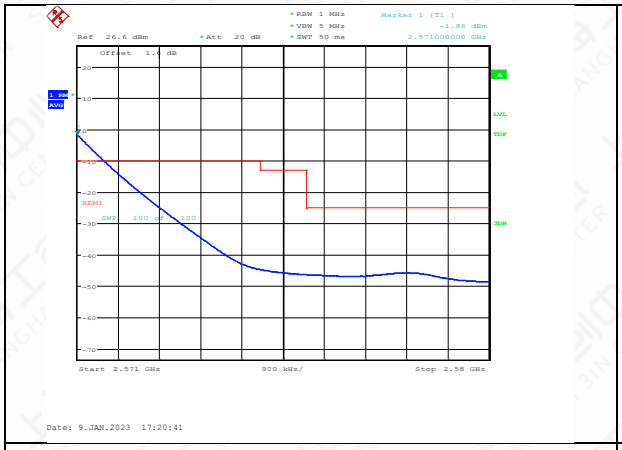
HIGH BAND EDGE BLOCK-1RB-HIGH_offset



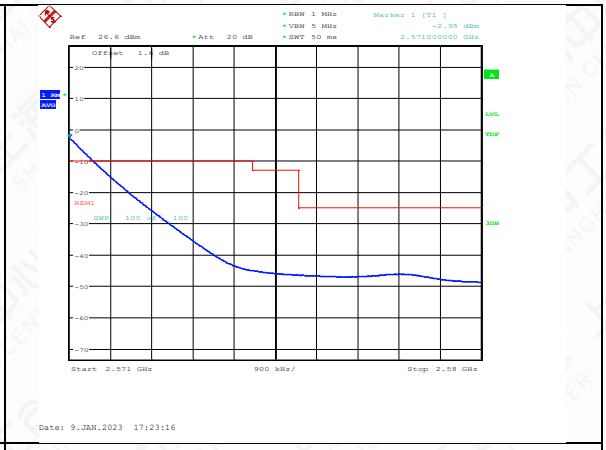
HIGH BAND EDGE BLOCK-1RB-HIGH_offset



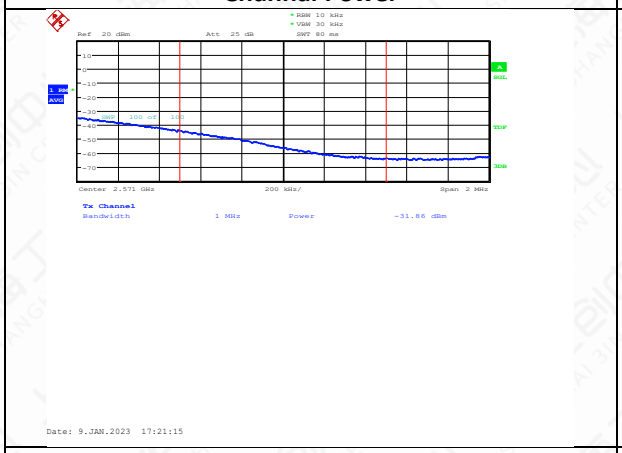
HIGH BAND EDGE BLOCK-1RB-HIGH_offset



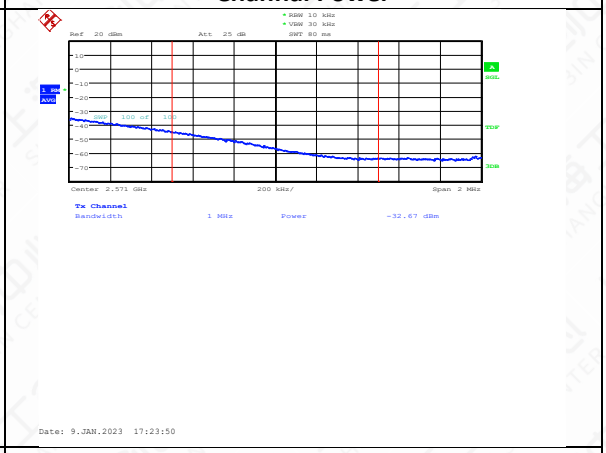
Channal Power



Channal Power

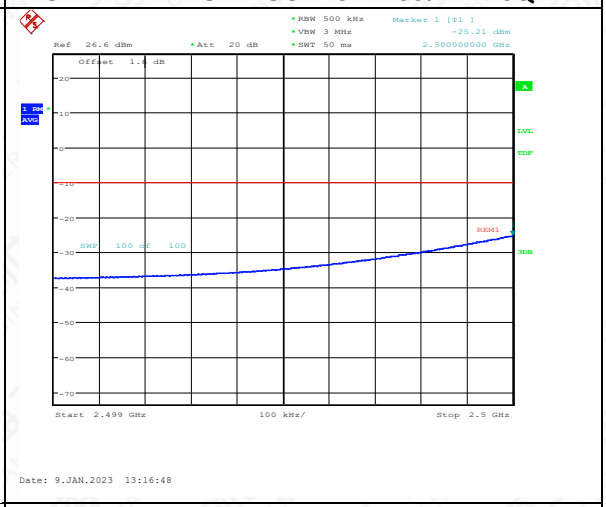


LOW BAND EDGE BLOCK-20M-100%RB-QPSK

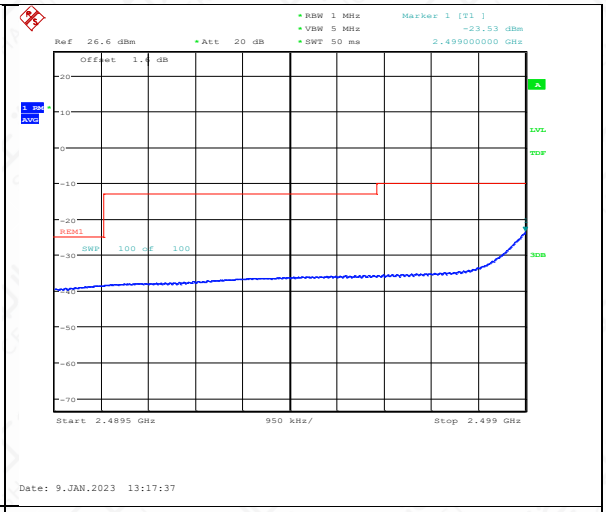


LOW BAND EDGE BLOCK-20M-100%RB-16QAM

LOW BAND EDGE BLOCK-20M-100%RB

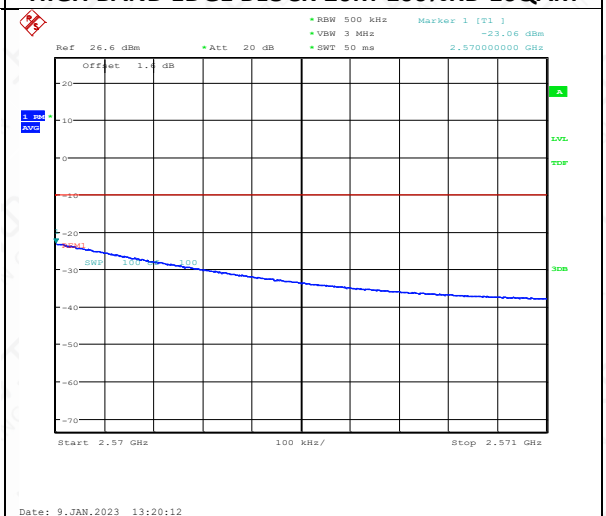


LOW BAND EDGE BLOCK-20M-100%RB



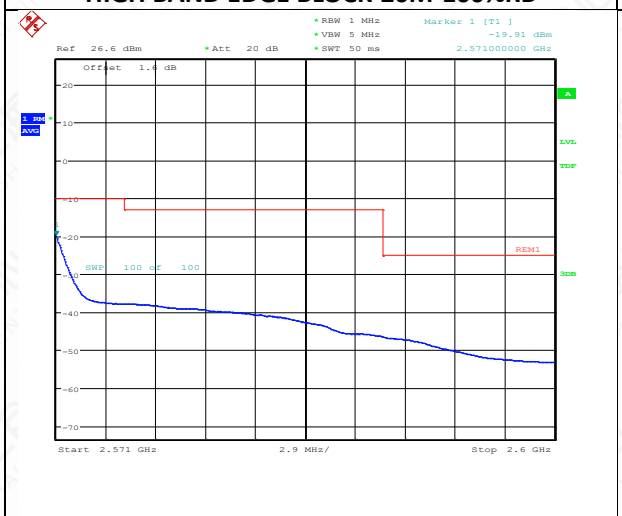
HIGH BAND EDGE BLOCK-20M-100%RB-QPSK

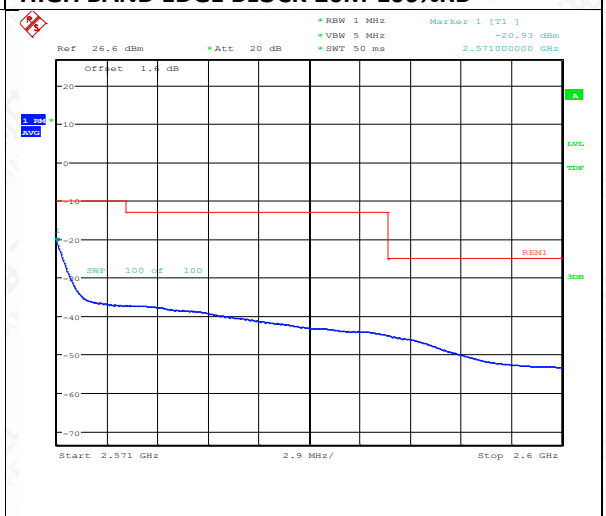
HIGH BAND EDGE BLOCK-20M-100%RB-16QAM



HIGH BAND EDGE BLOCK-20M-100%RB

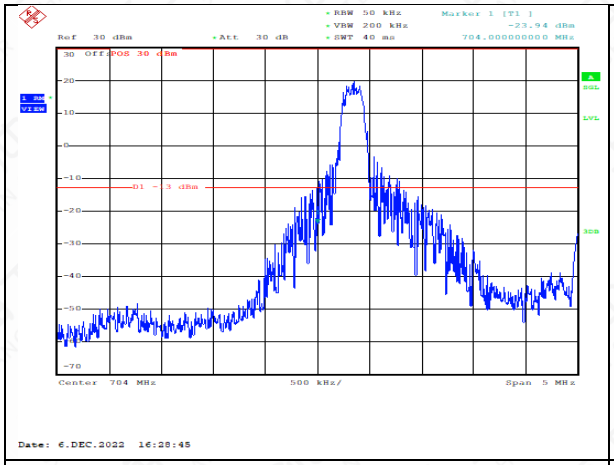
HIGH BAND EDGE BLOCK-20M-100%RB



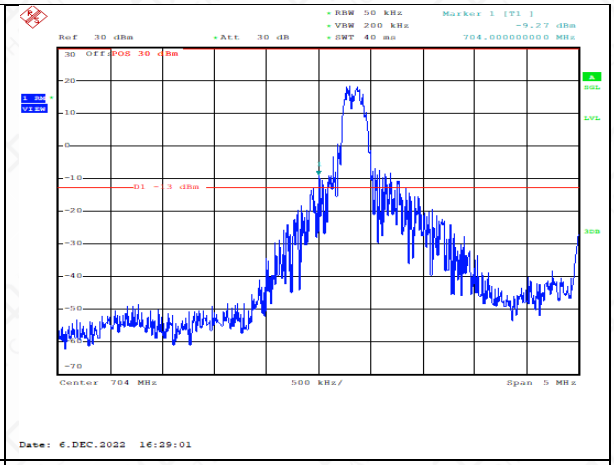


LTE band 17

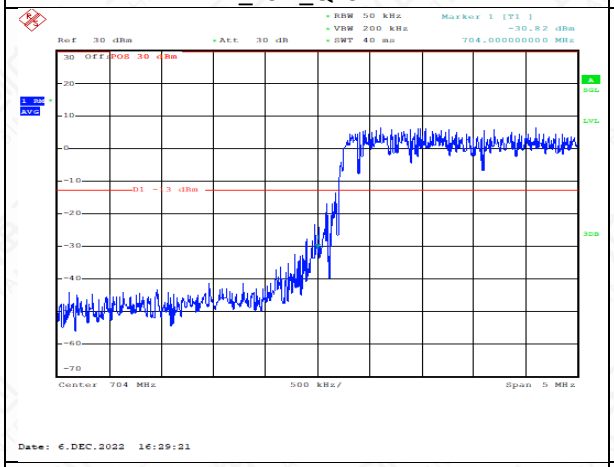
FDD17_5MHz_706.5_OneRB_low_QPSKLowRange	FDD17_5MHz_706.5_OneRB_low_Q16LowRange



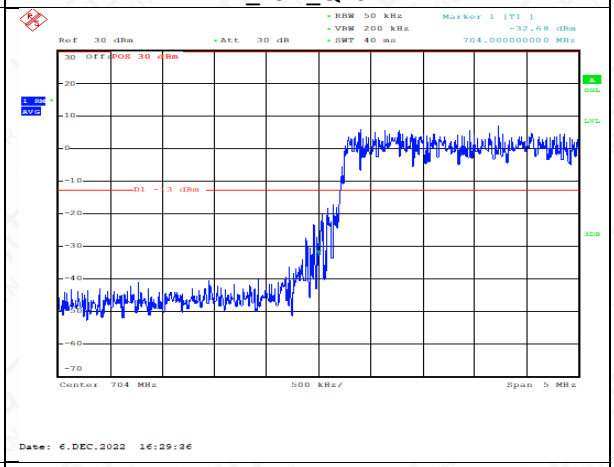
LowRange_ FDD17_5MHz_706.5_fullRB _Low_QPSK



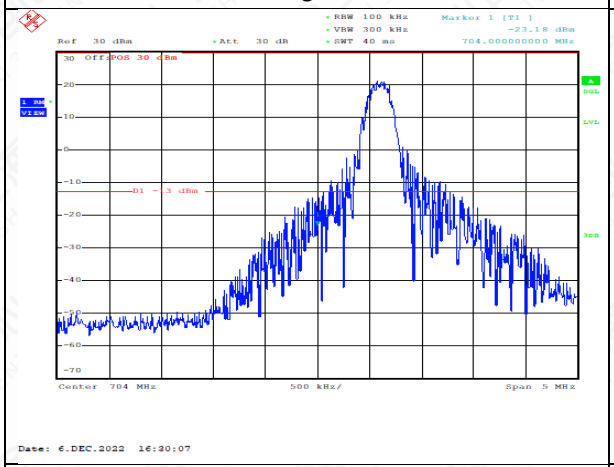
LowRange_ FDD17_5MHz_706.5_fullRB _Low_Q16



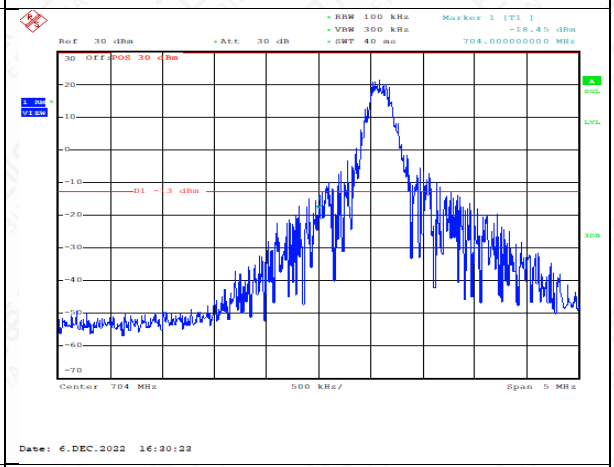
FDD17_10MHz_709_OneRB_low_QPSKLowRange



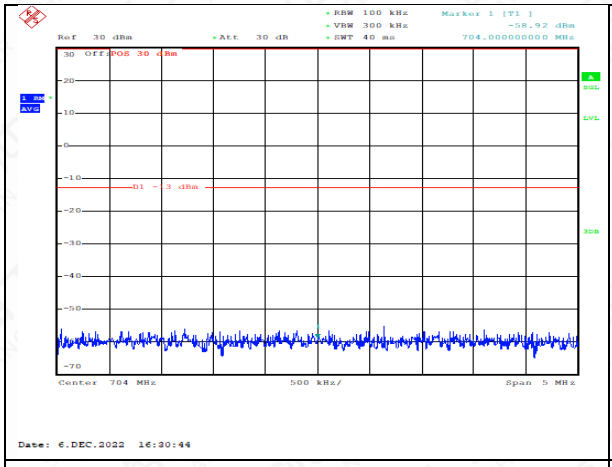
FDD17_10MHz_709_OneRB_low_Q16LowRange



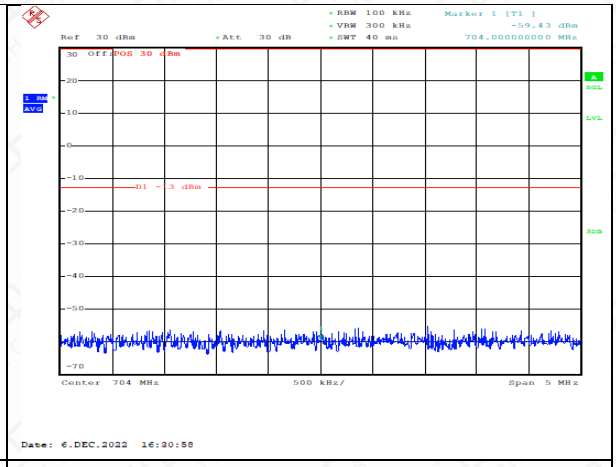
LowRange_ FDD17_10MHz_709_fullRB _Low_QPSK



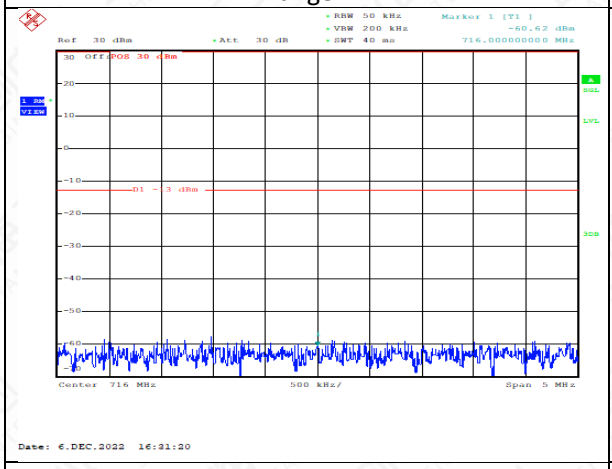
LowRange_ FDD17_10MHz_709_fullRB _Low_Q16



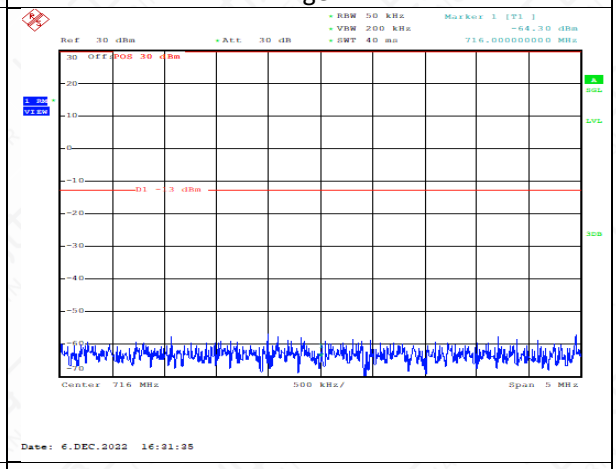
FDD17_5MHz_713.5_OneRB_high_QPSKHighRange



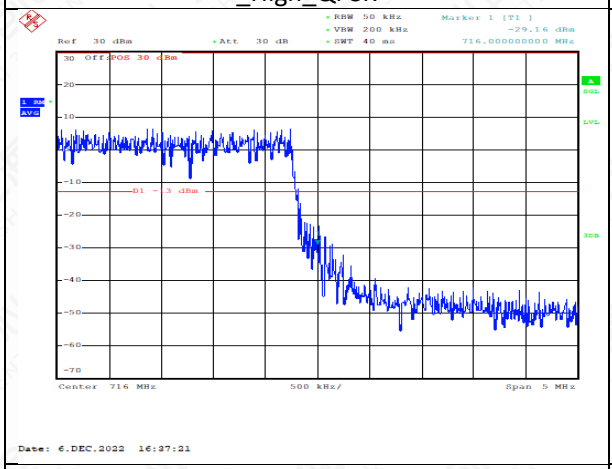
FDD17_5MHz_713.5_OneRB_high_Q16HighRange



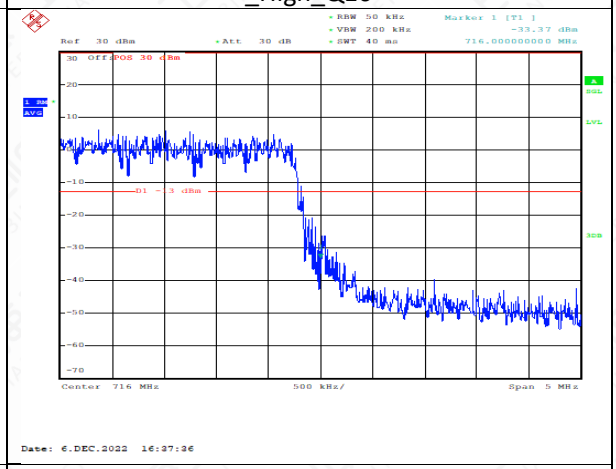
HighRange_ FDD17_5MHz_713.5_fullRB_High_QPSK



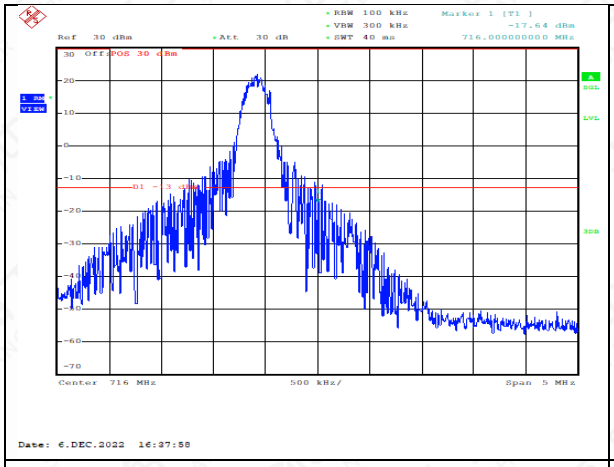
HighRange_ FDD17_5MHz_713.5_fullRB_High_Q16



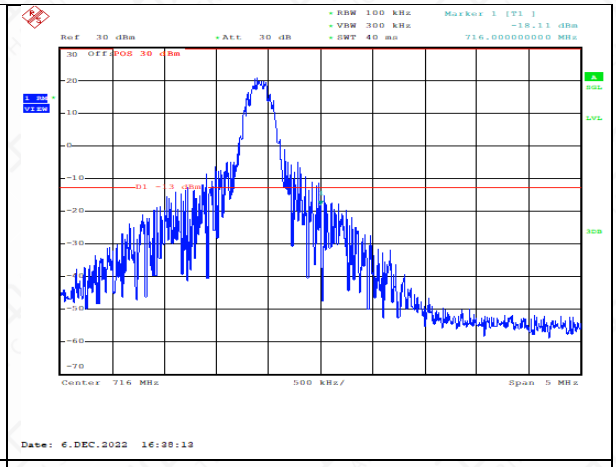
FDD17_10MHz_711_OneRB_high_QPSKHighRange



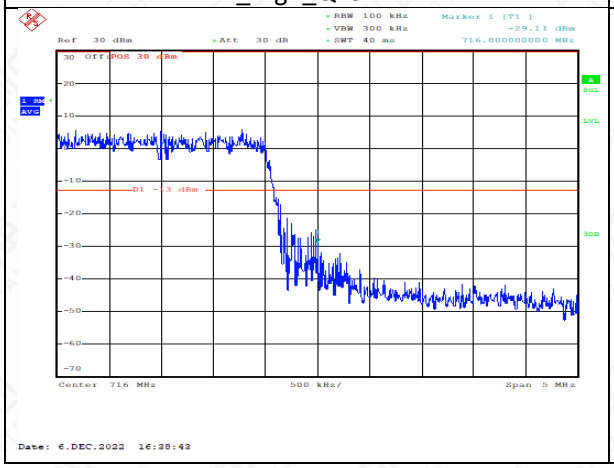
FDD17_10MHz_711_OneRB_high_Q16HighRange

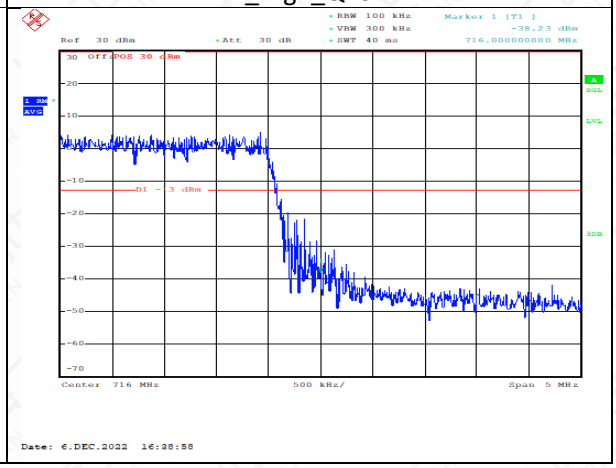


HighRange_ FDD17_10MHz_711_fullRB _High_QPSK



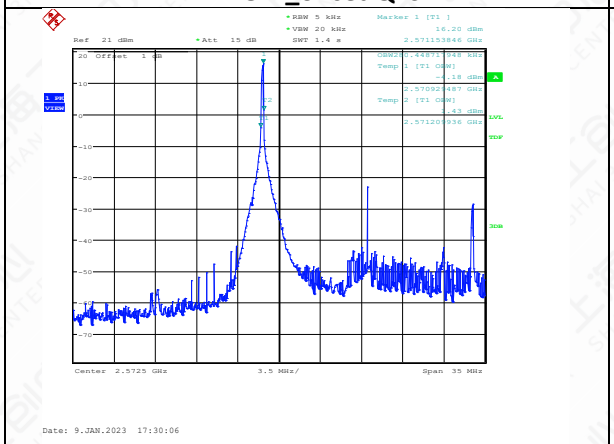
HighRange_ FDD17_10MHz_711_fullRB _High_Q16





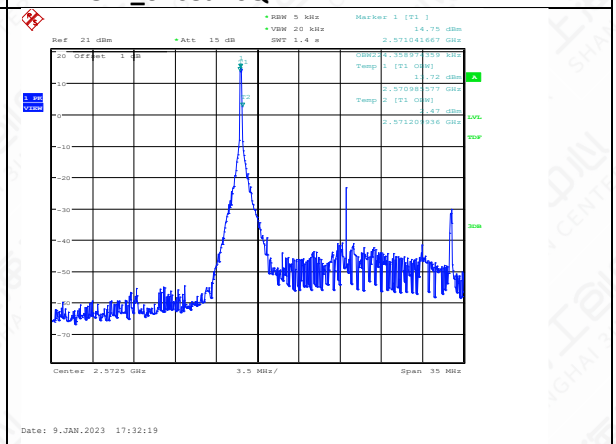
LTE band 38

1RB-LOW_offset-QPSK

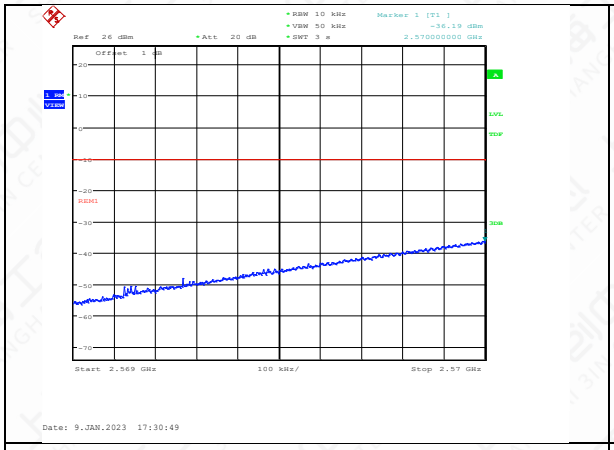


LOW BAND EDGE BLOCK-1RB-LOW_offset

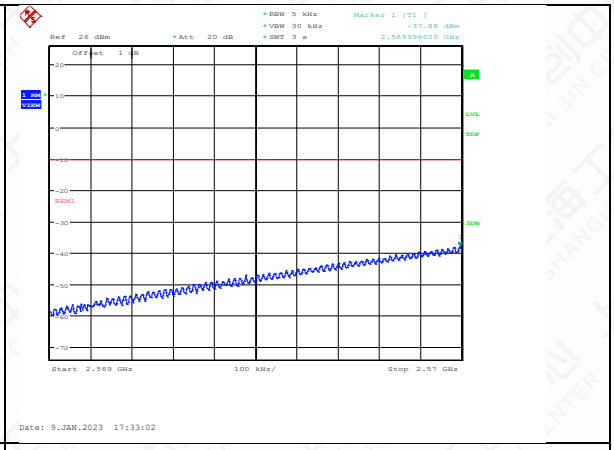
1RB-LOW_offset-16QAM



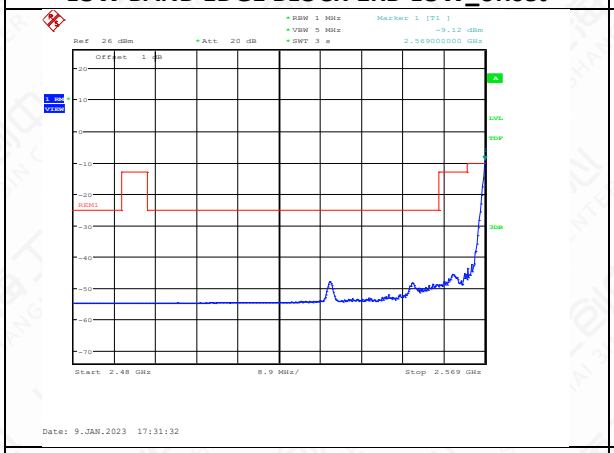
LOW BAND EDGE BLOCK-1RB-LOW_offset



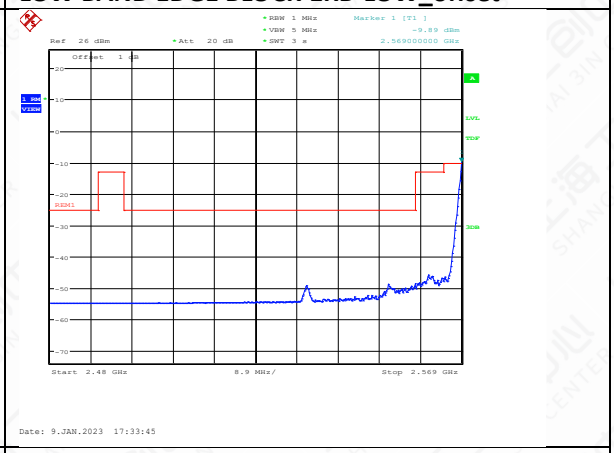
LOW BAND EDGE BLOCK-1RB-LOW_offset



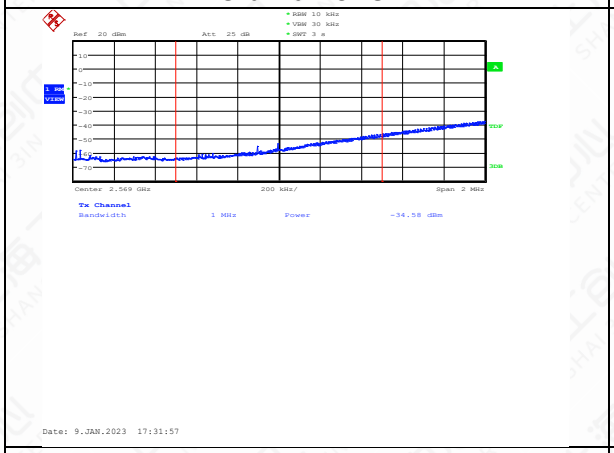
LOW BAND EDGE BLOCK-1RB-LOW_offset



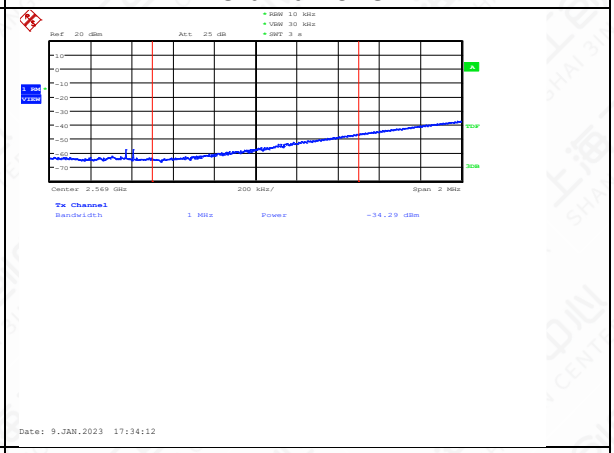
Channal Power



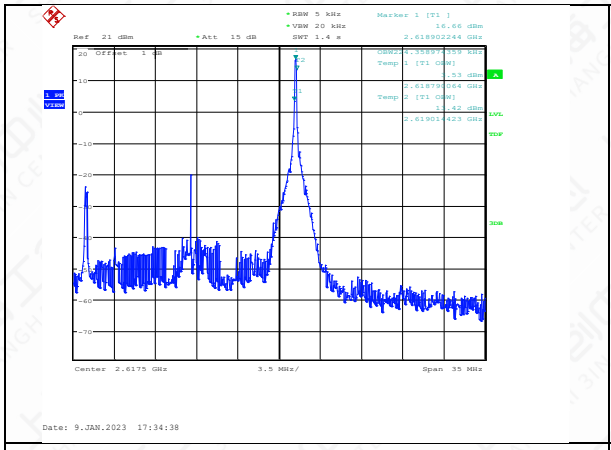
Channal Power



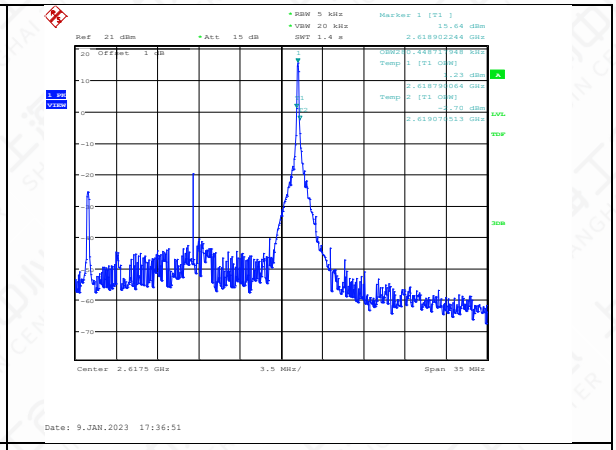
1RB-HIGH_offset



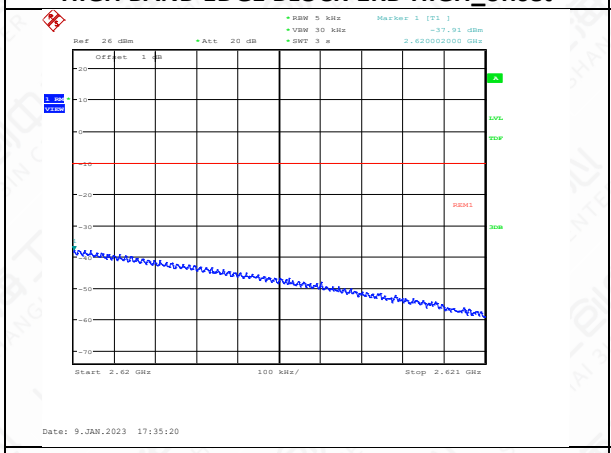
1RB-HIGH_offset



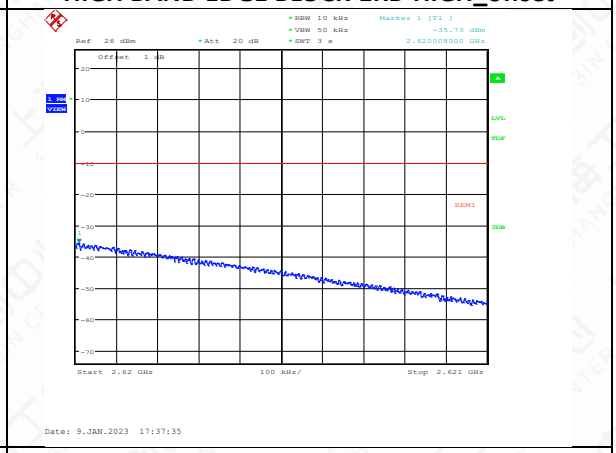
HIGH BAND EDGE BLOCK-1RB-HIGH_offset



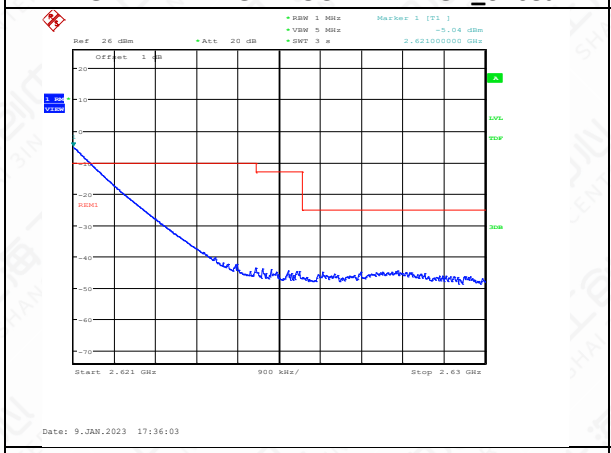
HIGH BAND EDGE BLOCK-1RB-HIGH_offset



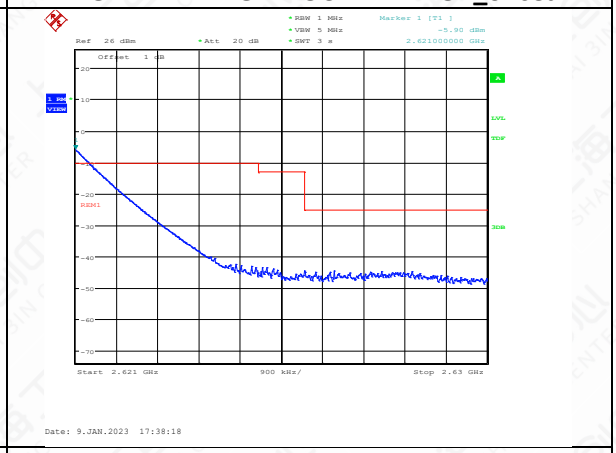
HIGH BAND EDGE BLOCK-1RB-HIGH_offset



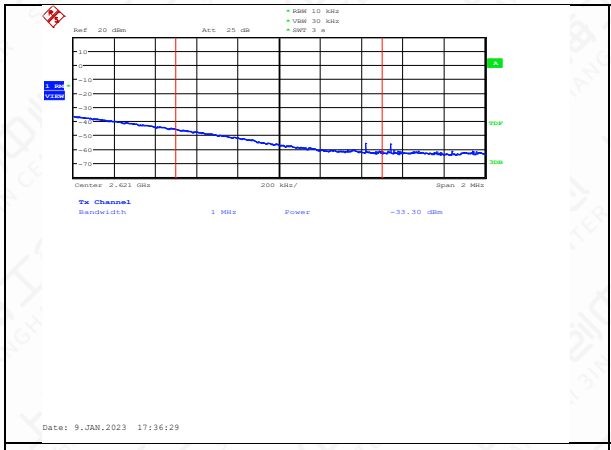
HIGH BAND EDGE BLOCK-1RB-HIGH_offset



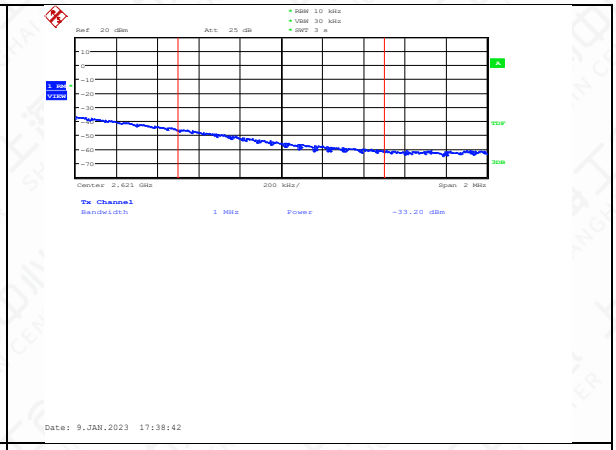
Channal Power



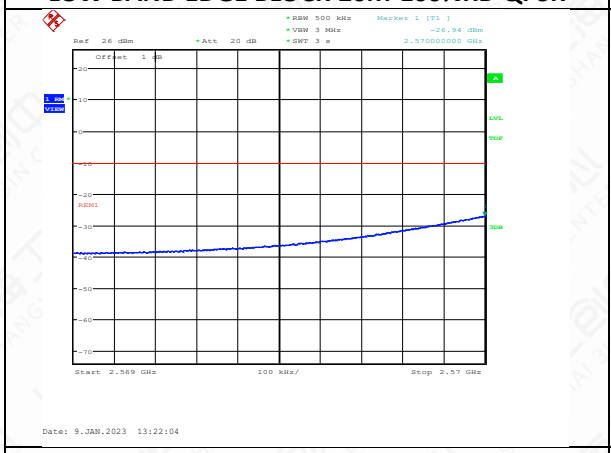
Channal Power



LOW BAND EDGE BLOCK-20M-100%RB-QPSK

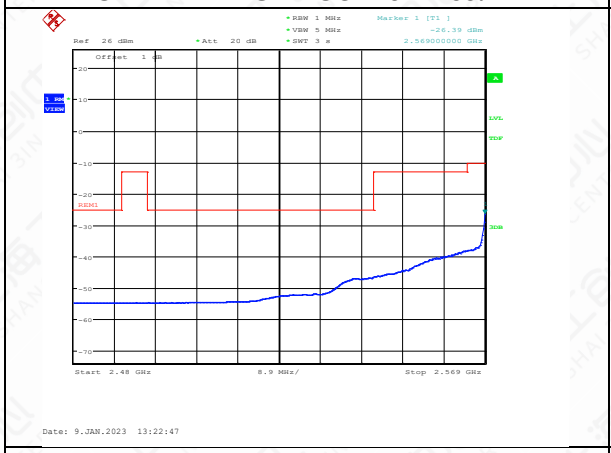


LOW BAND EDGE BLOCK-20M-100%RB-16QAM

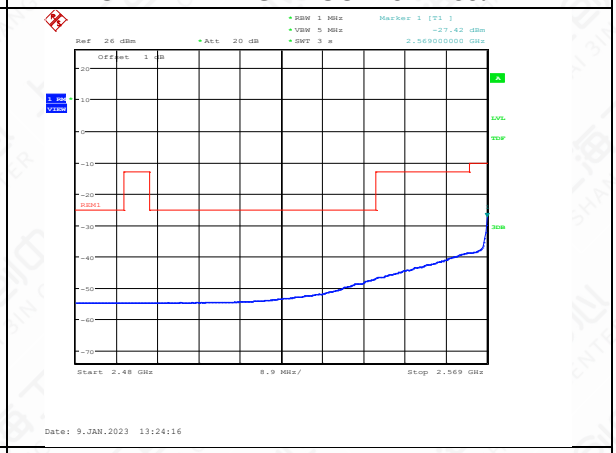


LOW BAND EDGE BLOCK-20M-100%RB

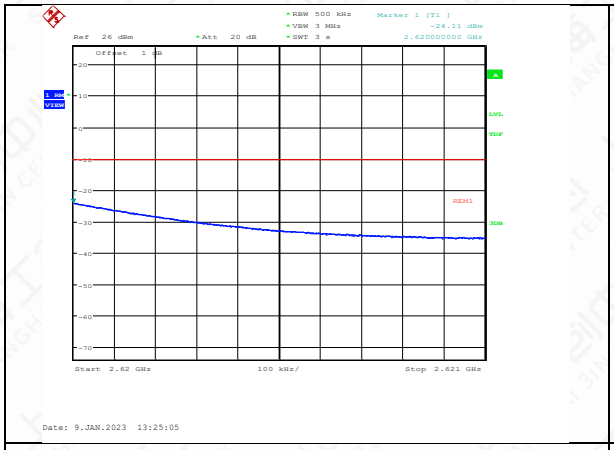
LOW BAND EDGE BLOCK-20M-100%RB



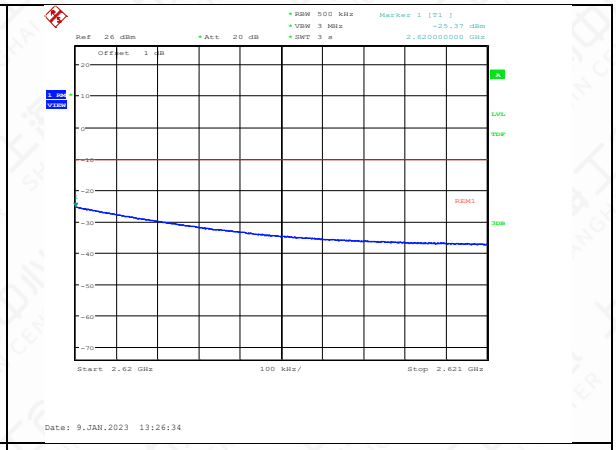
HIGH BAND EDGE BLOCK-20M-100%RB-QPSK



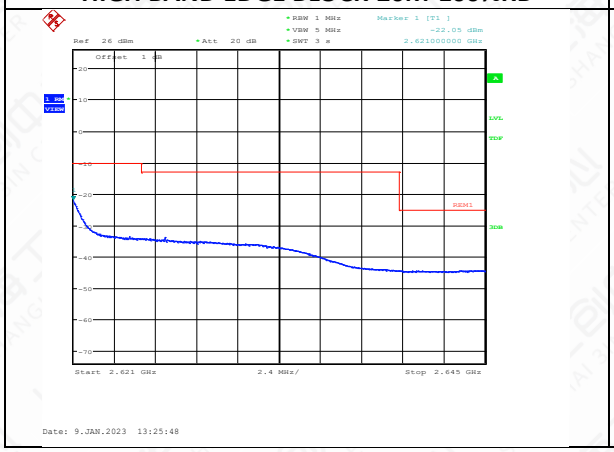
HIGH BAND EDGE BLOCK-20M-100%RB-16QAM

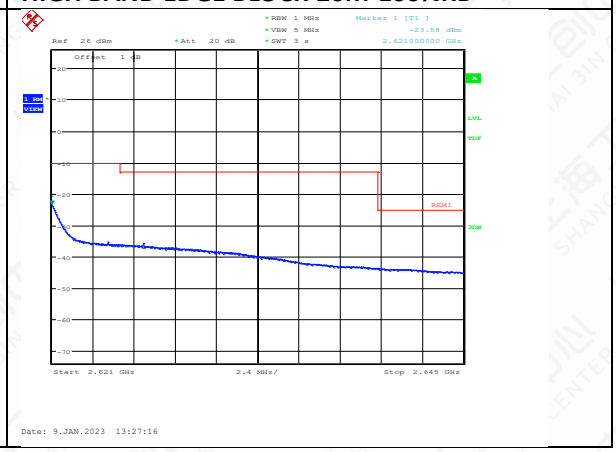


HIGH BAND EDGE BLOCK-20M-100%RB



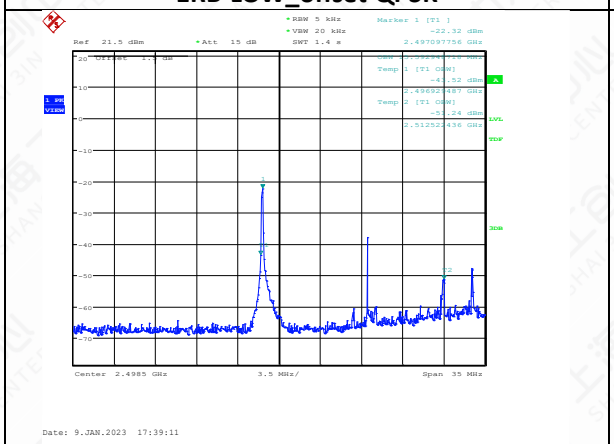
HIGH BAND EDGE BLOCK-20M-100%RB





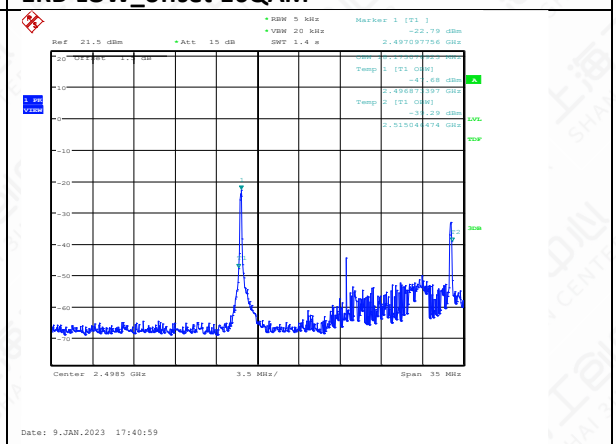
LTE band 41

1RB-LOW_offset-QPSK

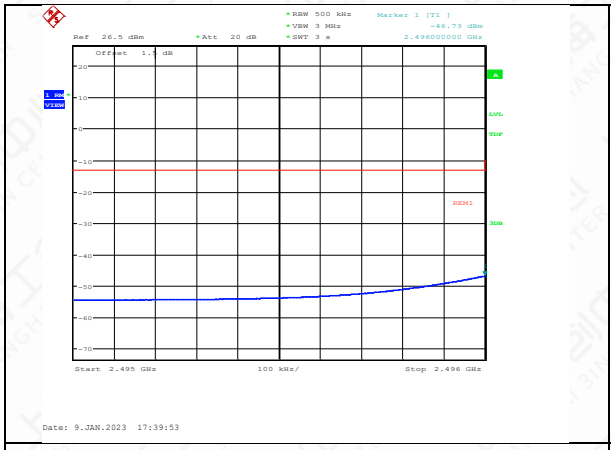


LOW BAND EDGE BLOCK-1RB-LOW_offset

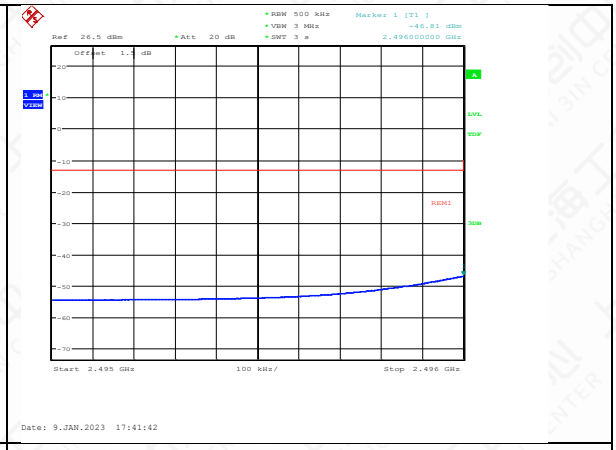
1RB-LOW_offset-16QAM



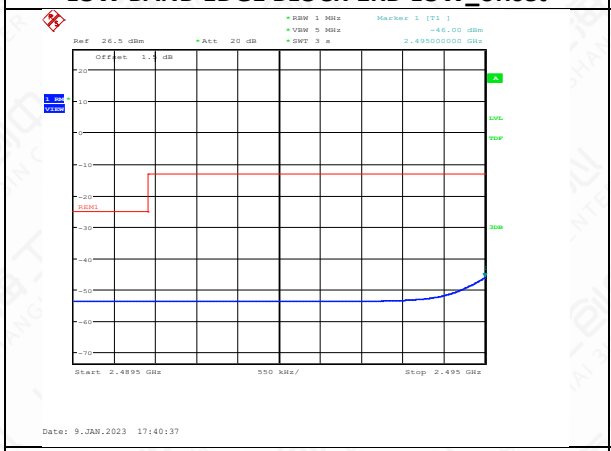
LOW BAND EDGE BLOCK-1RB-LOW_offset



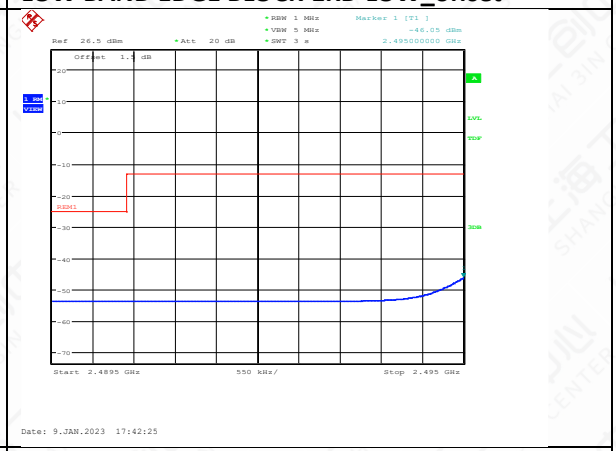
LOW BAND EDGE BLOCK-1RB-LOW_offset



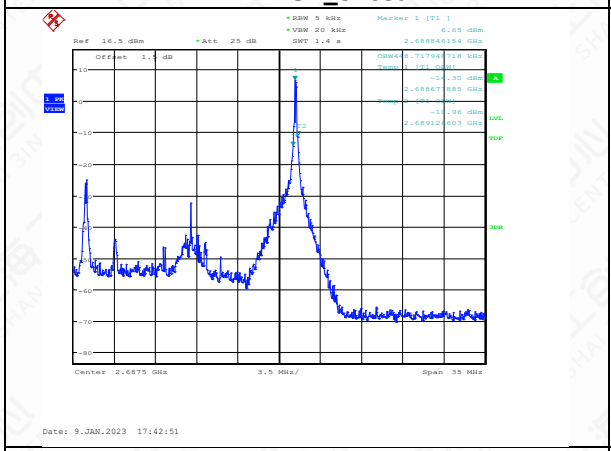
LOW BAND EDGE BLOCK-1RB-LOW_offset



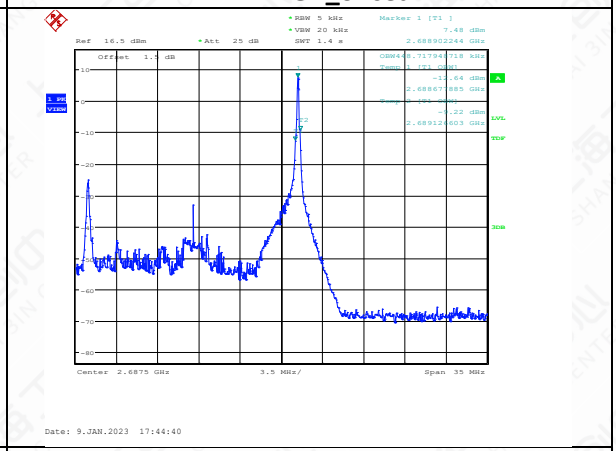
1RB-HIGH_offset



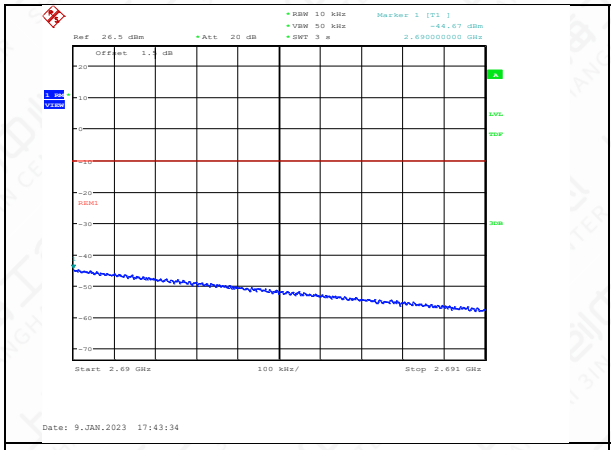
1RB-HIGH_offset



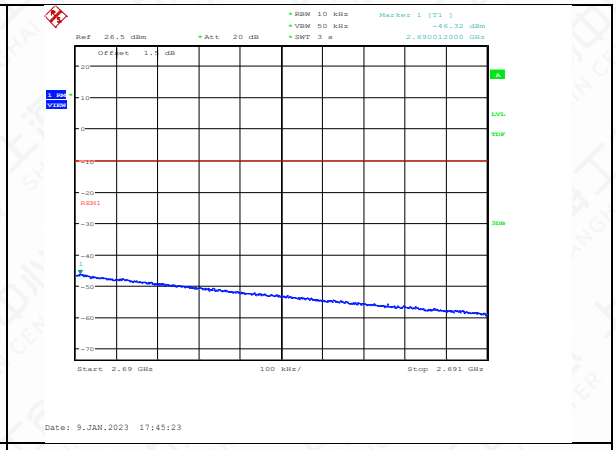
HIGH BAND EDGE BLOCK-1RB-HIGH_offset



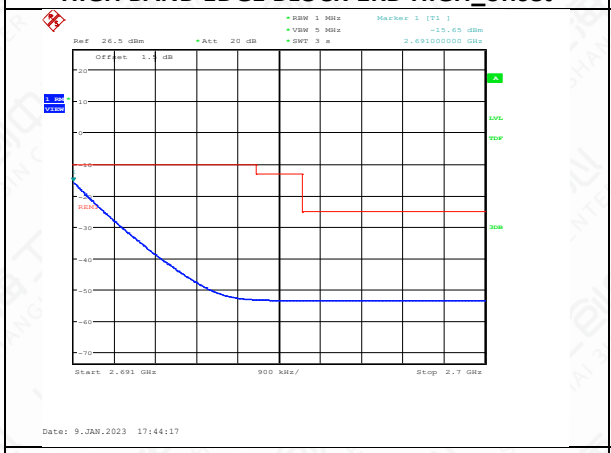
HIGH BAND EDGE BLOCK-1RB-HIGH_offset



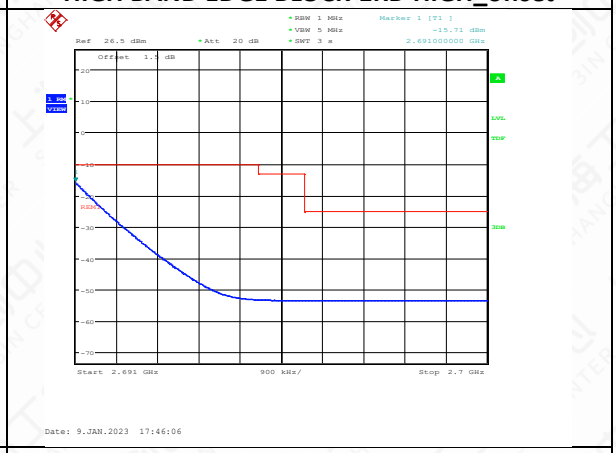
HIGH BAND EDGE BLOCK-1RB-HIGH_offset



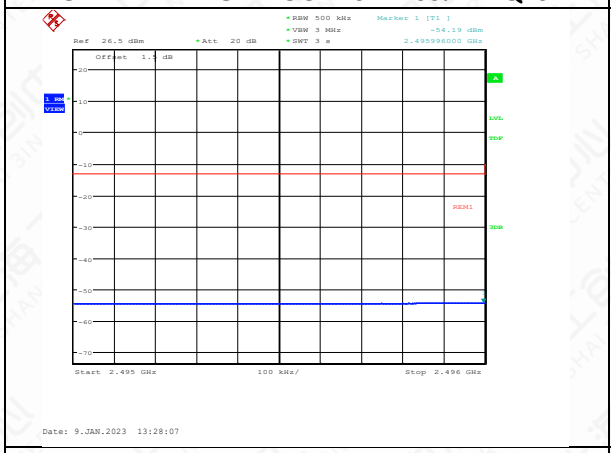
HIGH BAND EDGE BLOCK-1RB-HIGH_offset



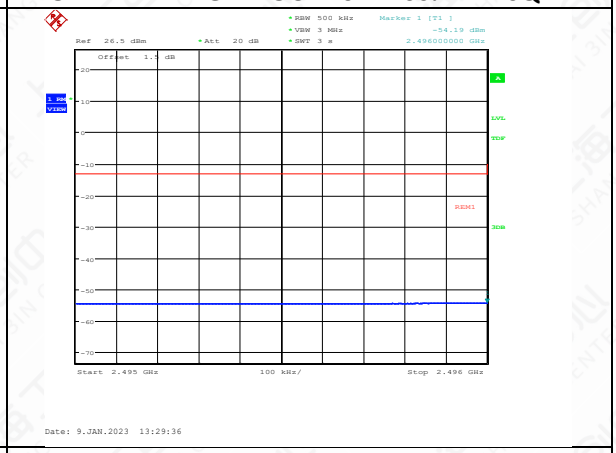
LOW BAND EDGE BLOCK-20M-100%RB-QPSK



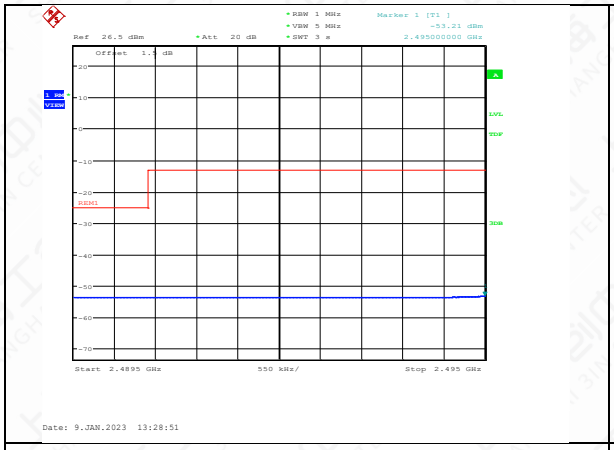
LOW BAND EDGE BLOCK-20M-100%RB-16QAM

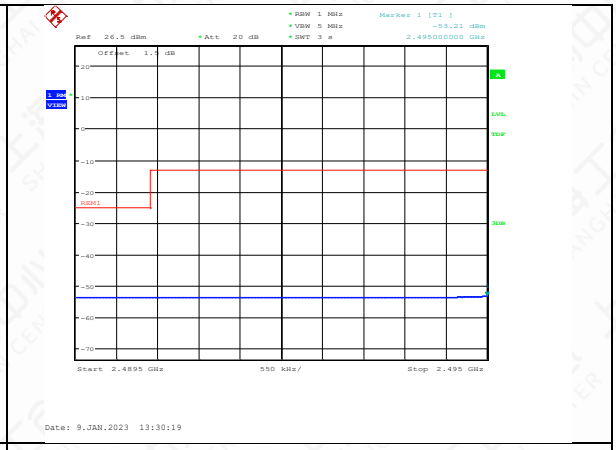


LOW BAND EDGE BLOCK-20M-100%RB

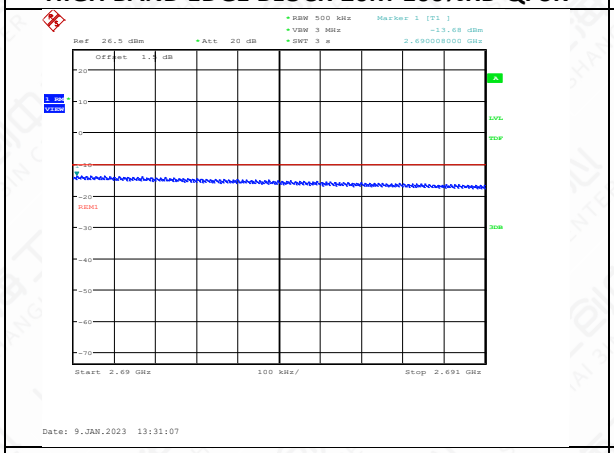


LOW BAND EDGE BLOCK-20M-100%RB

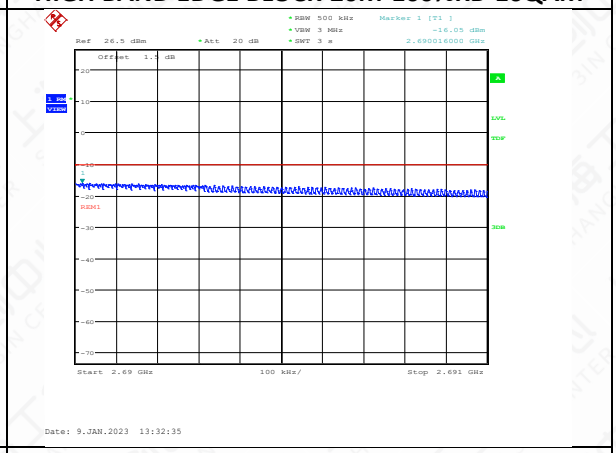




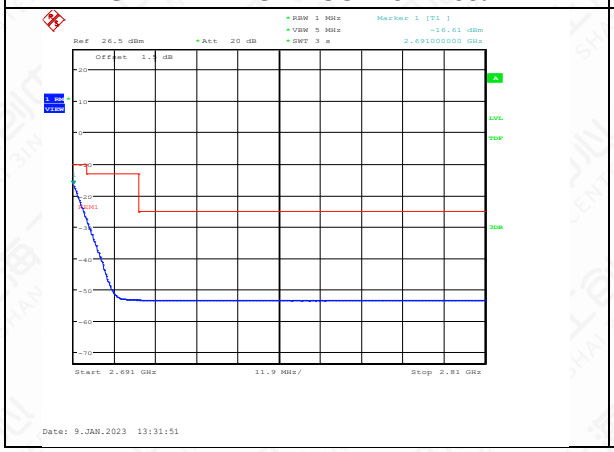
HIGH BAND EDGE BLOCK-20M-100%RB-QPSK



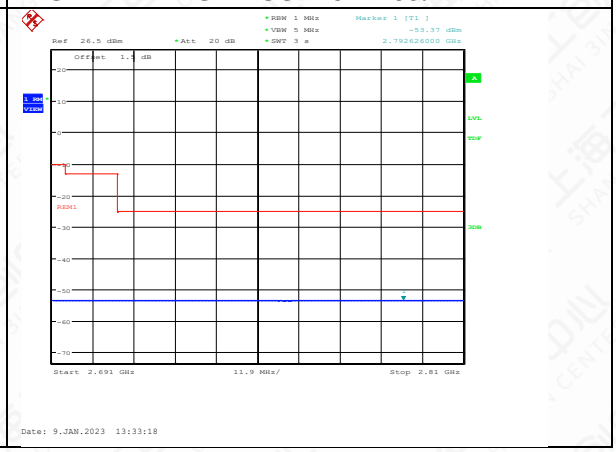
HIGH BAND EDGE BLOCK-20M-100%RB-16QAM



HIGH BAND EDGE BLOCK-20M-100%RB



HIGH BAND EDGE BLOCK-20M-100%RB



6.7 Conducted Spurious Emission

6.7.1 Measurement Method

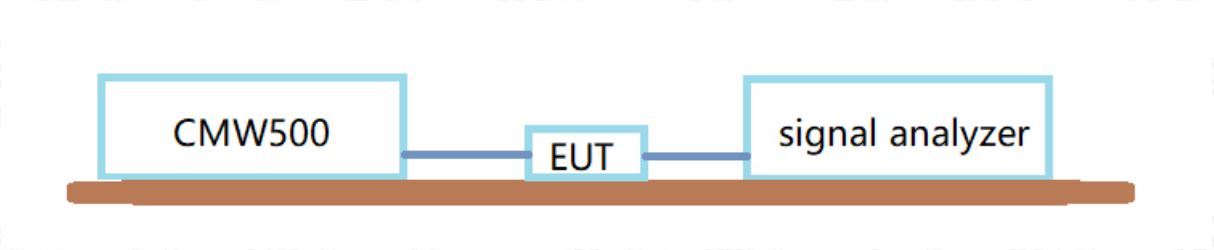
The following steps outline the procedure used to measure the conducted emissions from the EUT.
1.Determine frequency range for measurements: From CFR 2.1057 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency. For the mobile station equipment tested, this equates to a frequency range of 13 MHz to 9 GHz, data taken from 10 MHz to 25 GHz.
2.Determine EUT transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.
3.The number of sweep points of spectrum analyzer is set to 30001 which is greater than span/RBW.

6.7.2 Measurement Limit

Part 27.53(g),27.53(h), 27.53(m) specify that 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.
The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.
Part 27.53(m)(4) specifies 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.
Rule RSS-132 5.5 specifies that " In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1% of the occupied bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p (watts).
(ii) After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p (watts). If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required.” Limit -13 dBm
Rule RSS-133 6.5 specifies that " In the 1.0 MHz bands immediately outside and adjacent to the equipment’s operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts).
After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required.” Limit -13 dBm
Rule RSS-139 6.6 specifies that “ In the first 1.0 MHz bands immediately outside and adjacent to the equipment’s smallest operating frequency block,2 which can contain the equipment’s occupied

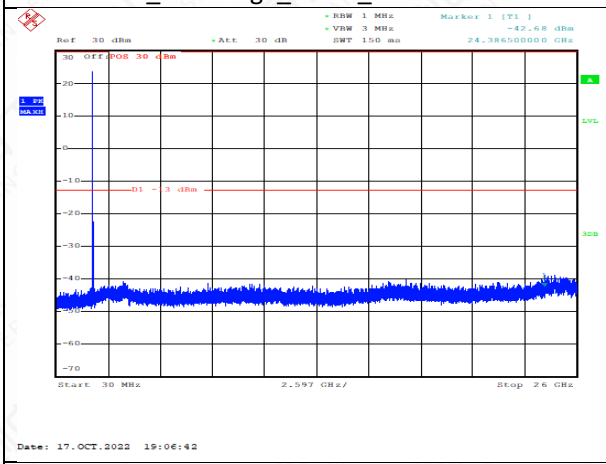
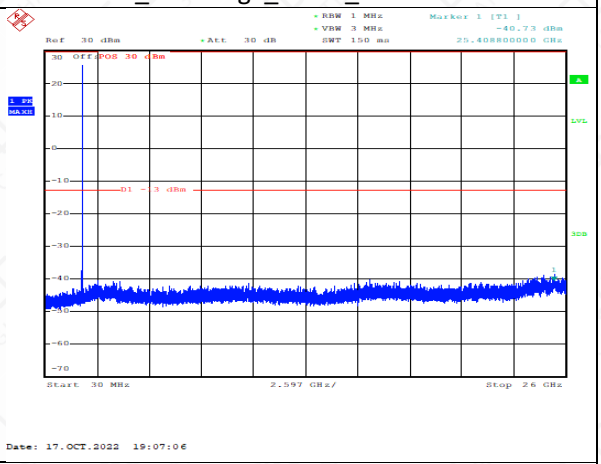
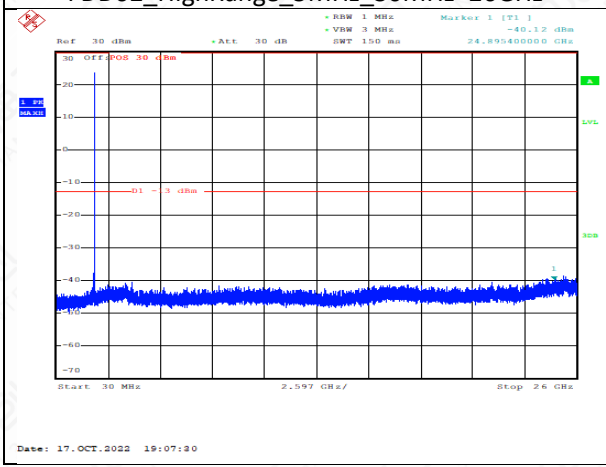
bandwidth, the emission power per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least 43 + 10 log10 p (watts) dB. (ii) After the first 1.0 MHz outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least 43 + 10 log10 p (watts) dB.

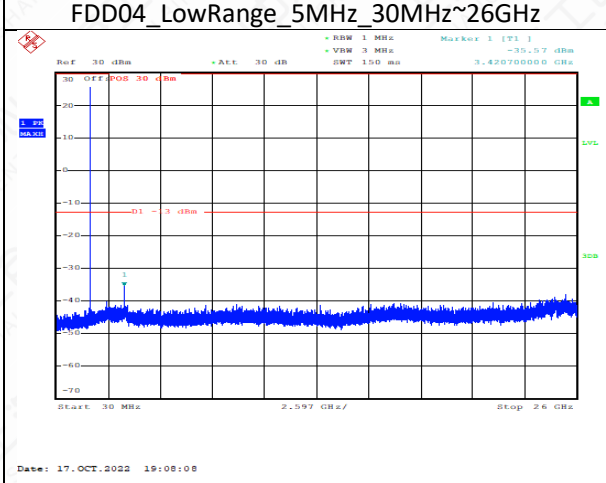
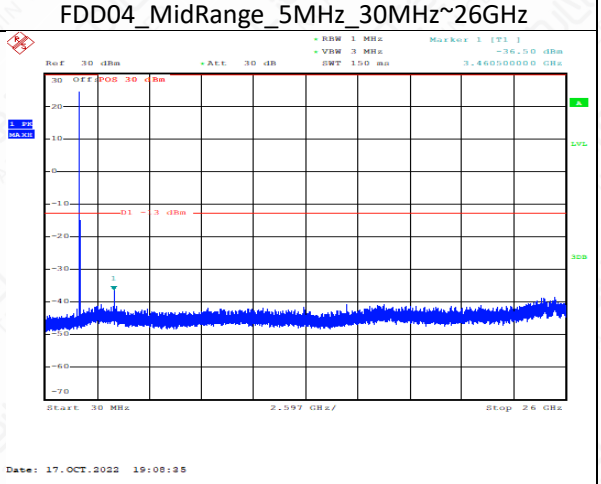
6.7.3 Test Setup

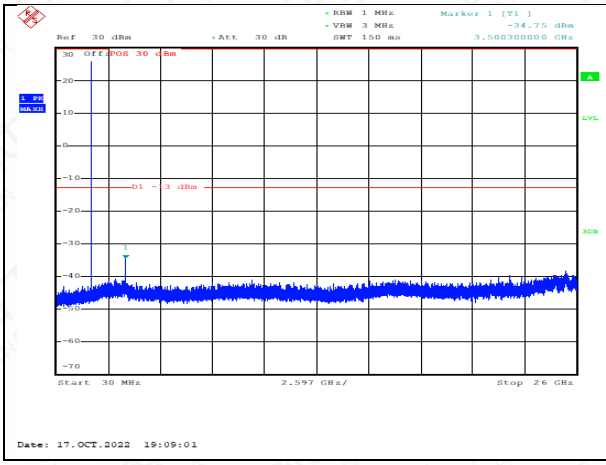


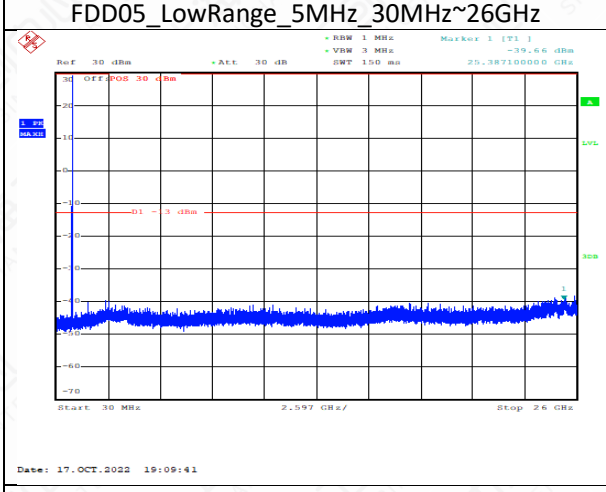
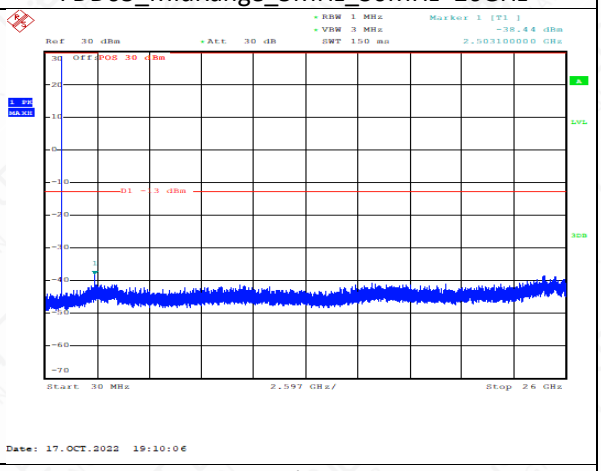
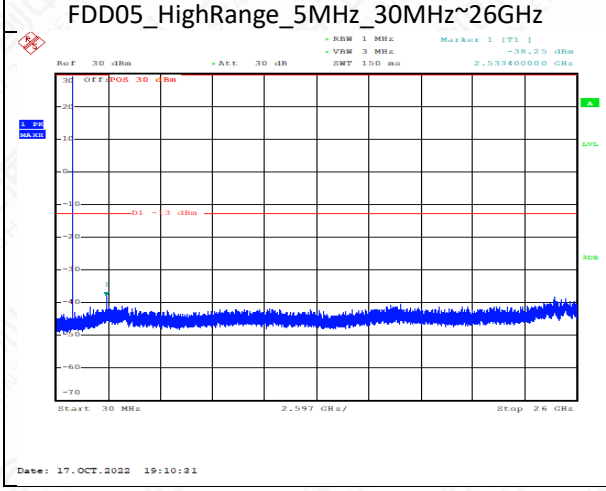
6.7.4 Measurement result

Only worst case result is given below

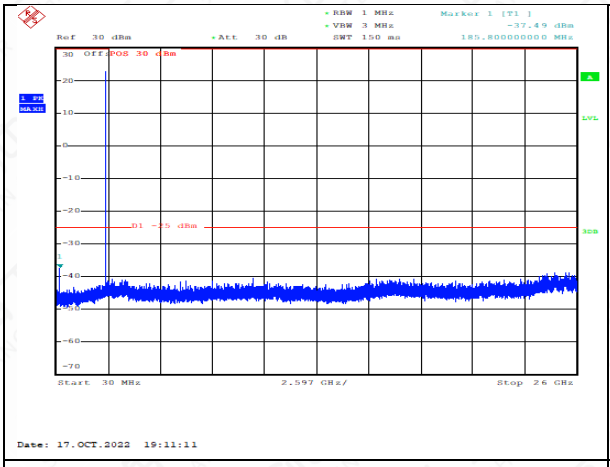
Spurious emission limit –13dBm.(30MHz – 26GHz)	
FDD02_LowRange_5MHz_30MHz~26GHz	FDD02_MidRange_5MHz_30MHz~26GHz
	
FDD02_HighRange_5MHz_30MHz~26GHz	/
	/

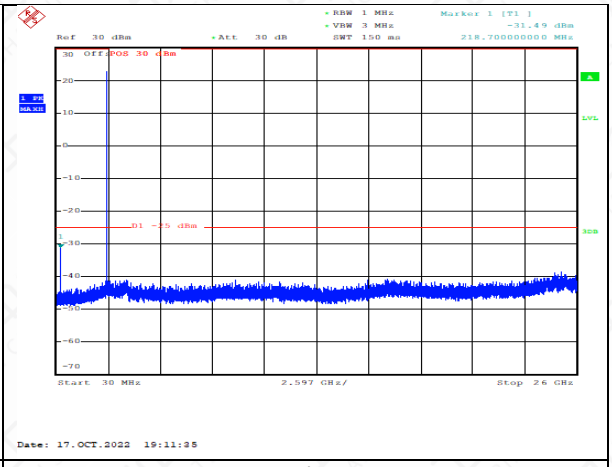
Spurious emission limit –13dBm.(30MHz – 26GHz)	
FDD04_LowRange_5MHz_30MHz~26GHz	FDD04_MidRange_5MHz_30MHz~26GHz
	
FDD04_HighRange_5MHz_30MHz~26GHz	/

	/

Spurious emission limit –13dBm.(30MHz – 26GHz)	
FDD05_LowRange_5MHz_30MHz~26GHz	FDD05_MidRange_5MHz_30MHz~26GHz
	
FDD05_HighRange_5MHz_30MHz~26GHz	/
	/

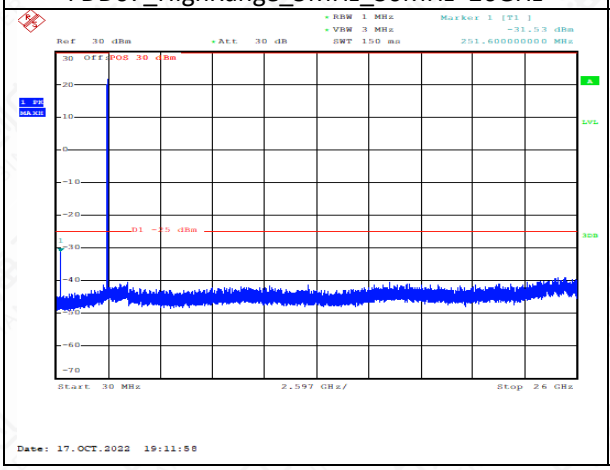
Spurious emission limit –13dBm.(30MHz – 26GHz)	
FDD07_LowRange_5MHz_30MHz~26GHz	FDD07_MidRange_5MHz_30MHz~26GHz





FDD07_HighRange_5MHz_30MHz~26GHz

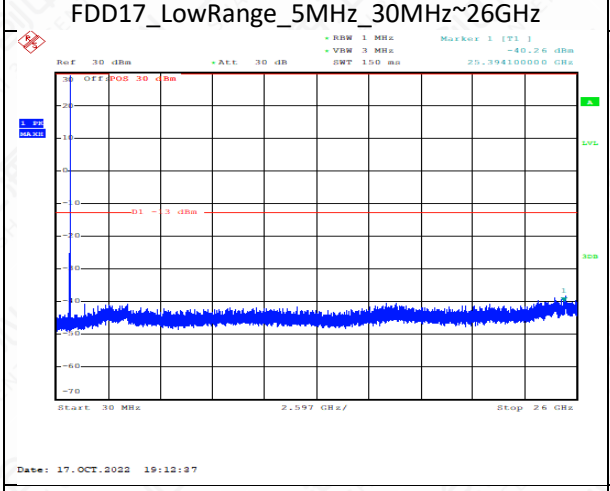
/



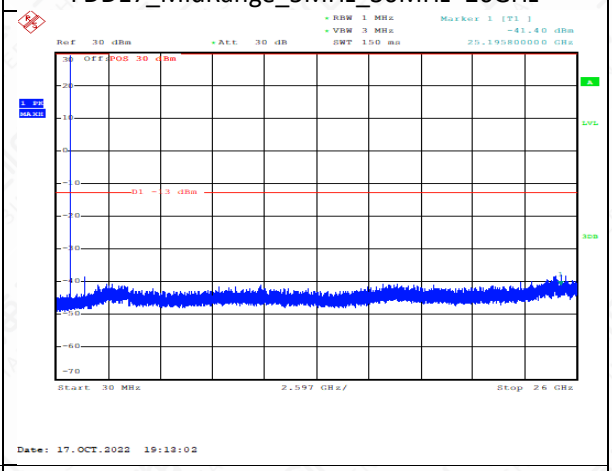
/

Spurious emission limit –13dBm.(30MHz – 26GHz)

FDD17_LowRange_5MHz_30MHz~26GHz

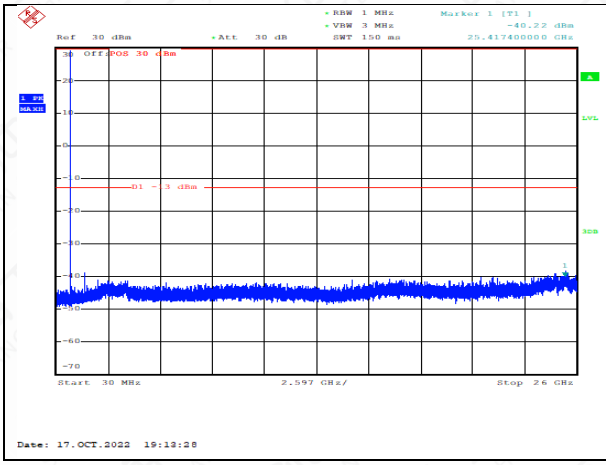


FDD17_MidRange_5MHz_30MHz~26GHz

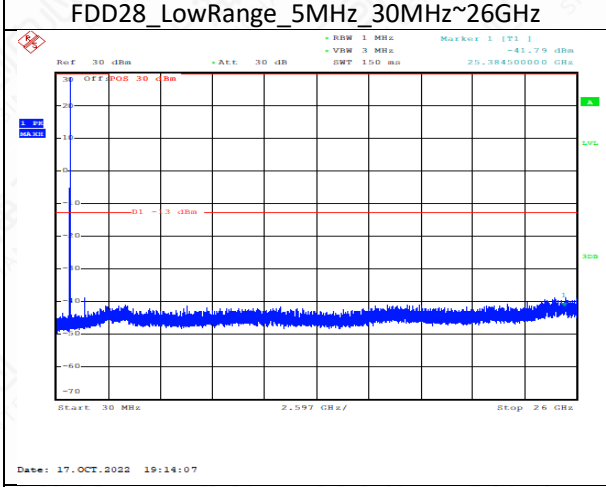
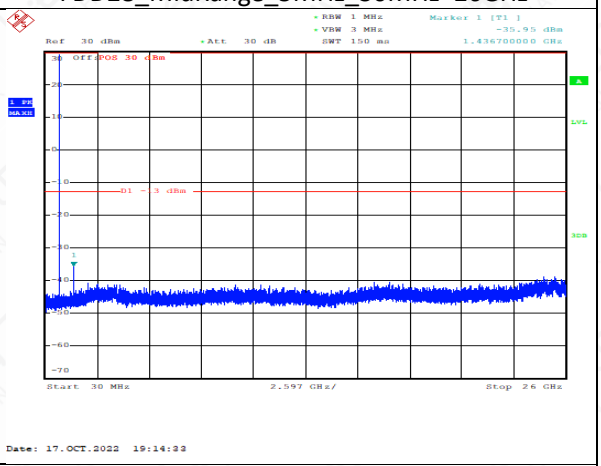
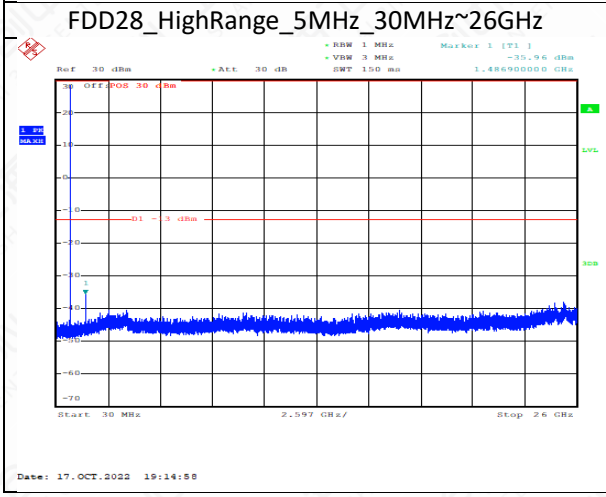


FDD17_HighRange_5MHz_30MHz~26GHz

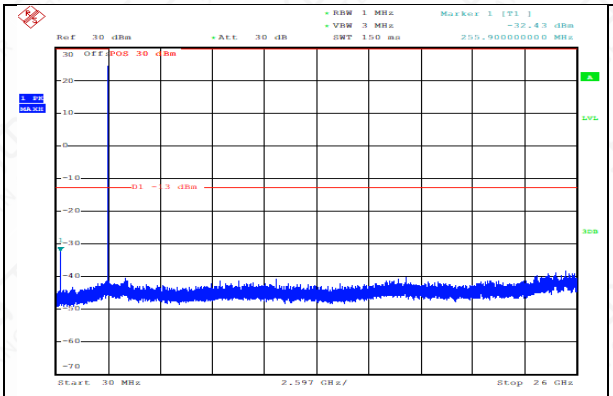
/

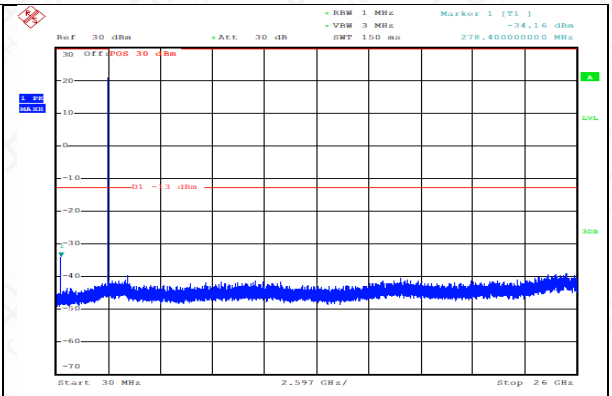


/

Spurious emission limit –13dBm.(30MHz – 26GHz)	
FDD28_LowRange_5MHz_30MHz~26GHz	FDD28_MidRange_5MHz_30MHz~26GHz
	
FDD28_HighRange_5MHz_30MHz~26GHz	/
	/

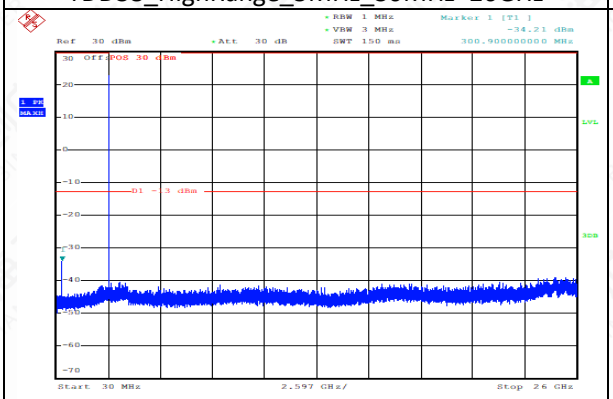
Spurious emission limit –13dBm.(30MHz – 26GHz)	
TDD38_LowRange_5MHz_30MHz~26GHz	TDD38_MidRange_5MHz_30MHz~26GHz





TDD38_HighRange_5MHz_30MHz~26GHz

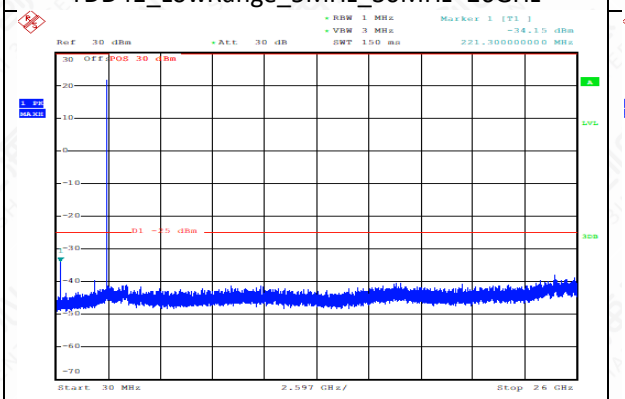
/



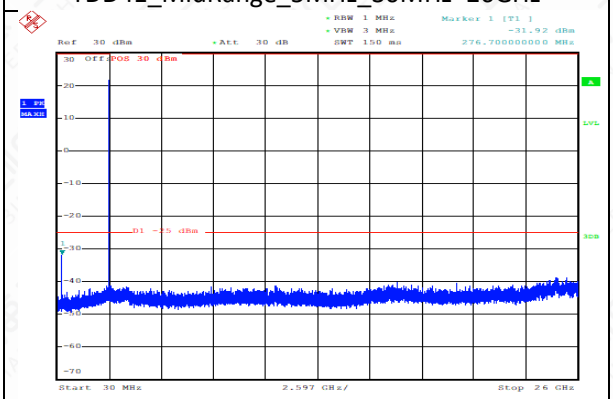
/

Spurious emission limit –13dBm.(30MHz – 26GHz)

TDD41_LowRange_5MHz_30MHz~26GHz

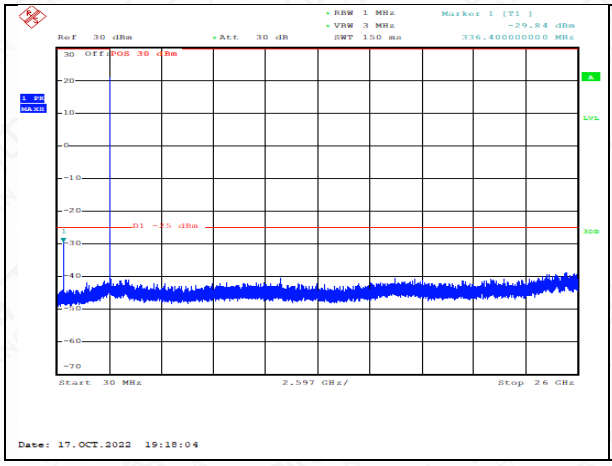


TDD41_MidRange_5MHz_30MHz~26GHz



TDD41_HighRange_5MHz_30MHz~26GHz

/

 RBW 1 MHz VBW 3 MHz SWT 150 ms Marker 1 [T1] -29.84 dBm 336.400000000 MHz Ref 30 dBm Att 30 dB Off POS 30 dBm D1 -25 dBm Start 30 MHz 2.597 GHz/ Stop 26 GHz Date: 17.OCT.2022 19:18:04	/

6.8 Peak-To-Average Power Ratio

Reference

CFR Part2.1049,24.238, 24.232 (d), 27.50(a)

Rule RSS 130 4.6,Rule RSS-132 5.4, Rule RSS-133 6.4, Rule RSS-139 6.5, Rule RSS-199 4.4

The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB. The PAPR measurements should be made using either an instrument with complementary cumulative distribution function (CCDF) capabilities to determine that PAPR will not exceed 13 dB for more than 0.1 percent of the time or other Commission approved procedure. The measurement must be performed using a signal corresponding to the highest PAPR expected during periods of continuous transmission.

According to KDB 971168 5.7:

a) Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;

b) Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;

c) Set the number of counts to a value that stabilizes the measured CCDF curve;

d) Set the measurement interval to 1 ms

e) Record the maximum PAPR level associated with a probability of 0.1%

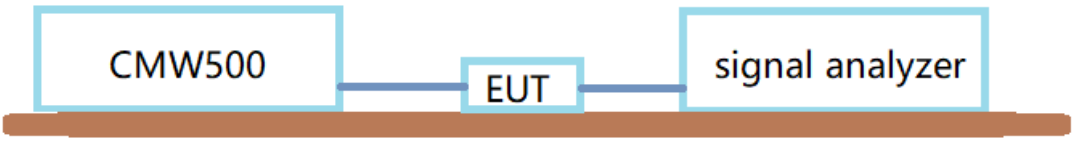
Rule RSS-132: 5.4: the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time using a signal corresponding to the highest PAPR during periods of continuous transmission. Limit ≤ 13dB

Rule RSS-133 6.4 specifies that " the transmitter's peak-to-average power ratio (PAPR) shall not exceed 13 dB for more than 0.1% of the time using a signal corresponding to the highest PAPR during periods of continuous transmission." Limit ≤ 13dB

Rule RSS-139 6.5 specifies that "In addition, the peak to average power ratio (PAPR) of the equipment shall not exceed 13 dB for more than 0.1% of the time, using a signal that corresponds to the highest PAPR during periods of continuous transmission."

Rule RSS-199 4.4 specifies that "In addition, the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time and shall use a signal corresponding to the highest PAPR during periods of continuous transmission.

6.8.1 Test Setup



6.8.2 Measurement results

Only worst result is given below

LTE band 2, 20MHz

Frequency(MHz)	PAPR(dB)	
1880.0	QPSK	16QAM
	4.94	6.31

LTE band 4, 20MHz

Frequency(MHz)	PAPR(dB)	
1732.5	QPSK	16QAM
	4.97	6.25

LTE band 5, 10MHz

Frequency(MHz)	PAPR(dB)	
836.5	QPSK	16QAM
	5.51	6.22

LTE band 7, 20MHz

Frequency(MHz)	PAPR(dB)	
2535	QPSK	16QAM
	4.97	6.28

LTE band 17,10MHz

Frequency(MHz)	PAPR(dB)	
710	QPSK	16QAM
	3.56	4.01

LTE band 38, 20MHz

Frequency(MHz)	PAPR(dB)	
2595	QPSK	16QAM
	7.60	10.74

LTE band 41, 20MHz

Frequency(MHz)	PAPR(dB)	
2593	QPSK	16QAM
	7.60	10.71

Annex A: Revised History

Version	Revised Content
V00	Initial
V01	Modify and update some data
V02	Changed the equipment information and reference standard version
V03	Modify equipment calibration date and test time

Annex B: Accreditation Certificate

ilac-MRA A2LA

Accredited Laboratory

A2LA has accredited

INDUSTRIAL INTERNET INNOVATION CENTER (SHANGHAI) CO., LTD.

Shanghai, People's Republic of China

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated April 2017*).

Presented this 12th day of April 2021.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 3682.01
Valid to February 28, 2023

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

END OF REPORT