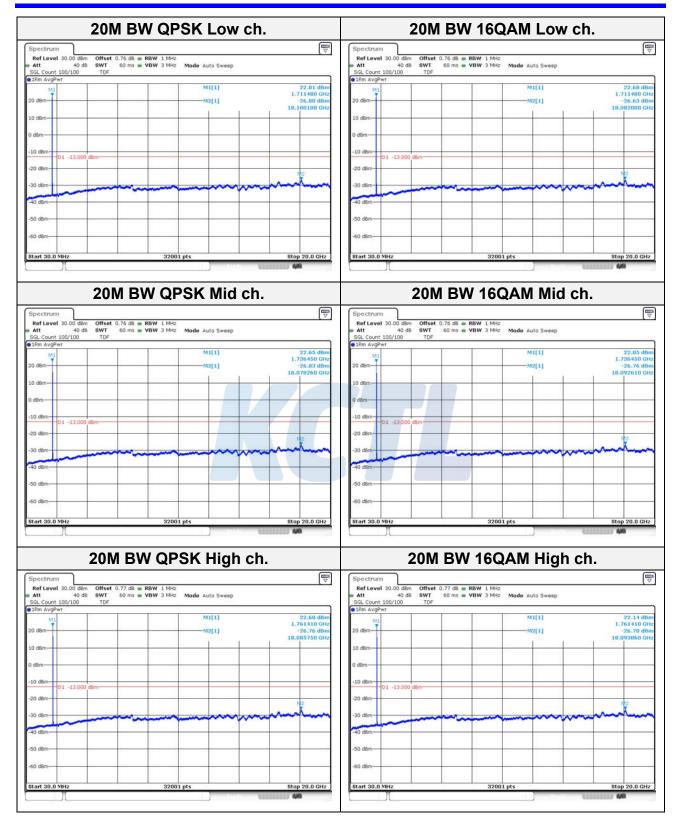
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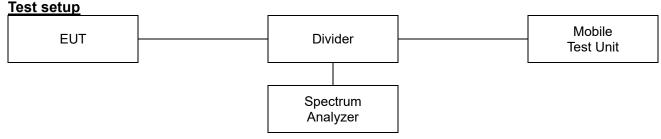


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7.4. Band Edge Emissions at Antenna Terminal



<u>Limit</u>

According to 22.917(a), 24.238(a), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + $10\log(P_{Watts})$ dB.

According to §27.53(g), for operations in the 600 Mb band and the 698-746 Mb 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 + $10\log(P_{[Watts]})$ dB.

According to 27.53(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 $43 + 10\log(P_{Watts})$ dB.

According to §27.53(m)(4), the attenuation factor shall be not less than 40 + 10log($P_{[Watts]}$) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10log($P_{[Watts]}$) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10log($P_{[Watts]}$) 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 + 10log($P_{[Watts]}$) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10log($P_{[Watts]}$) dB at or below 2490.5 MHz.

Test procedure

971168 D01 v03r01 - Section 6 ANSI C63.26-2015 – Section 5.7

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Test settings

- 1) Start frequency was set to 30 Mb and stop frequency was set to at least 10th the fundamental frequency.
- 2) Span was set large enough so as to capture all out of band emissions near the band edge.
- 3) Set the RBW > 1% of the emission bandwidth.
- 4) Set the VBW \geq 3 x RBW.
- 5) Set the number of sweep points $\ge 2 \times \text{Span/RBW}$
- 6) Detector = RMS
- 7) Trace mode = trace average
- 8) Sweep time should be auto for peak detection. For RMS detection the sweep time should be set as follows:
 - a) If the device can be configured to transmit continuously (duty cycle ≥ 98%), set the (sweep time) > (number of points in sweep) x (symbol period) (e.g., by a factor of 10 x symbol period x number of points) Increasing the sweep time (i.e., slowing the sweep speed) will allow for averaging over multiple symbols.
 - b) If the device cannot transmit continuously (duty cycle < 98%), a gated sweep shall be used when possible (i.e., gate triggered such that the analyzer only sweeps when the device is transmitting at full power), set the sweep time > (number of points in sweep) x (symbol period) but the sweep time shall always be maintained at a value that is less than or equal to the minimum transmission time
 - c) If the device cannot be configured to transmit continuously (duty cycle > 98%), and a free-running sweep must be used, set the sweep time so that the averaging is performed over multiple on/off cycles by setting the sweep time > (number of points in sweep) × (transmitter period) (i.e., the transmit on-time + the off-time). The spectrum analyzer readings shall subsequently be corrected by [10 log (1/duty cycle)]. This assumes that the transmission period and duty cycle is relatively constant (duty cycle variation ≤ ±2%).
 - d) If the device cannot be configured to transmit continuously and a free-running sweep must be used, and if the transmissions exhibit a non-constant duty cycle (duty cycle variations > ±2%), set the sweep time so that the averaging is performed over the on-period by setting the sweep time > (symbol period) × (number of points), while also maintaining the sweep time < (transmitter on-time). The trace mode shall be set to max hold, since not every display point will be averaged only over just the on-time. Thus, multiple sweeps (e.g., 100) in maximum hold art necessary to ensure that the maximum power is measured.
- 9) Allow trace to fully stabilize.

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Notes:

 Per 22.917(b), 24.238(b), 27.53(h)(3), compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 Mb or greater. however in the 1 Mb bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be may be employed. 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.

resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 klz segment.

- Per 27.25(g), compliance with this provision is based on the use of measurement Instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 km may be employed.
- 3. Per 27.53(m)(6), in the 1 megahertz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least two percent may be employed, except when the 1 megahertz band is 2495-2496 Mb, in which case a resolution bandwidth of at least one percent may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 megahertz or 1 percent of emission bandwidth, as specified; or 1 megahertz or 2 percent for mobile digital stations, except in the band 2495-2496 Mb).
- 4. The EUT was setup to maximum output power as its lowest and highest channel with all bandwidth, modulation and RB configurations.

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Ems ⊽

Ems ⊽

Ems ▽

time ∵

1.910

00.06 dBm 00001 GHz

1.910

-29.07 dB

28.23 dBr 1.9

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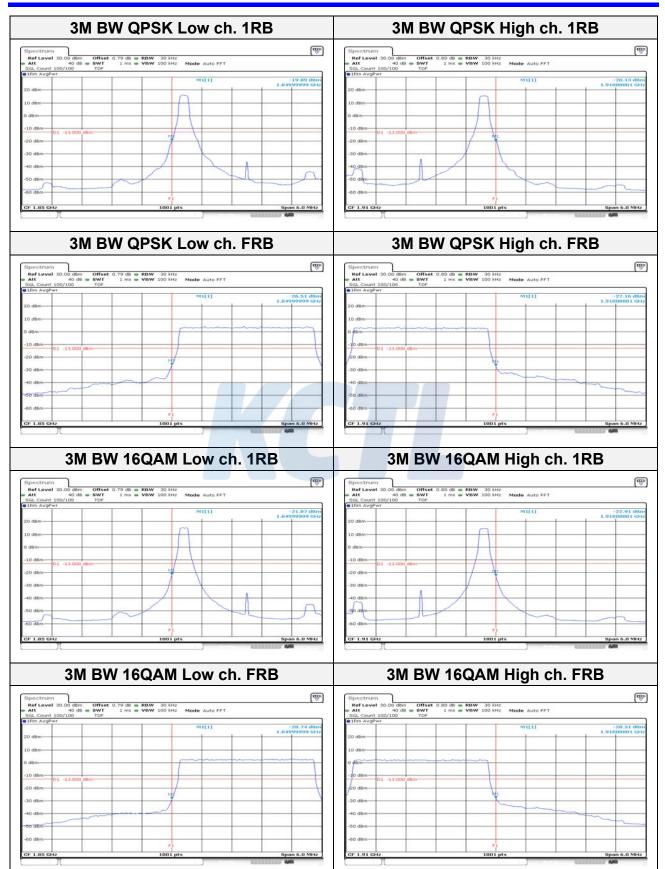


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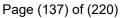




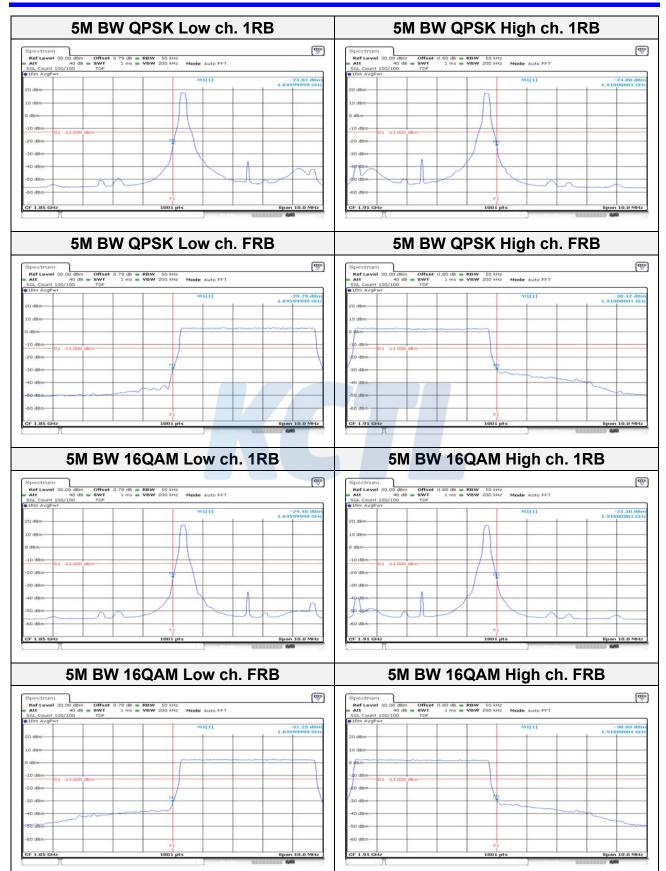
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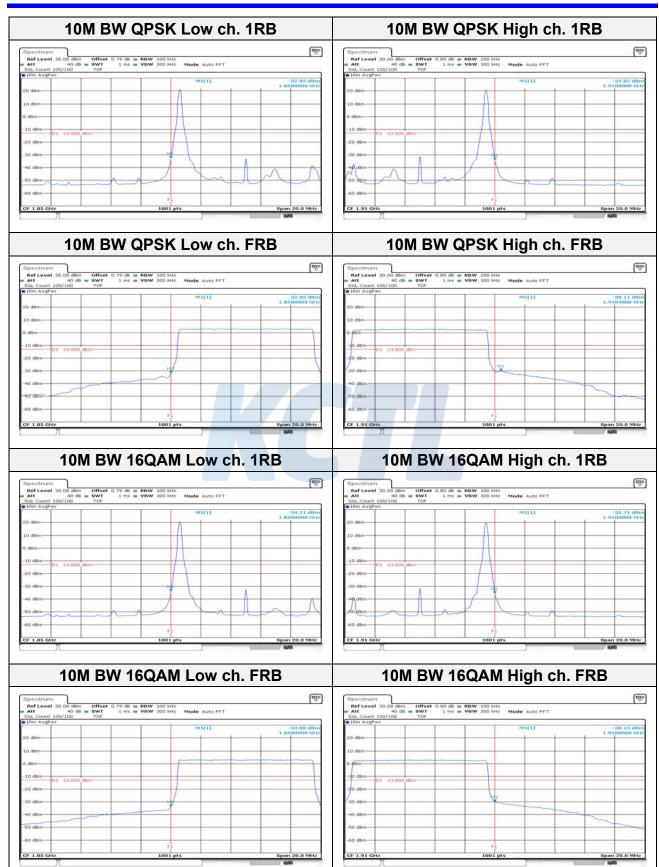




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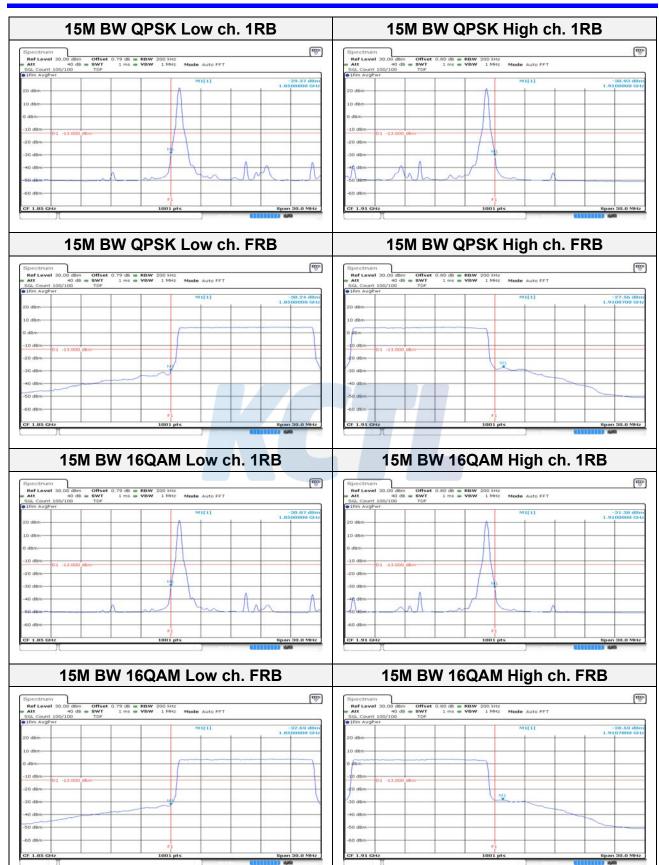
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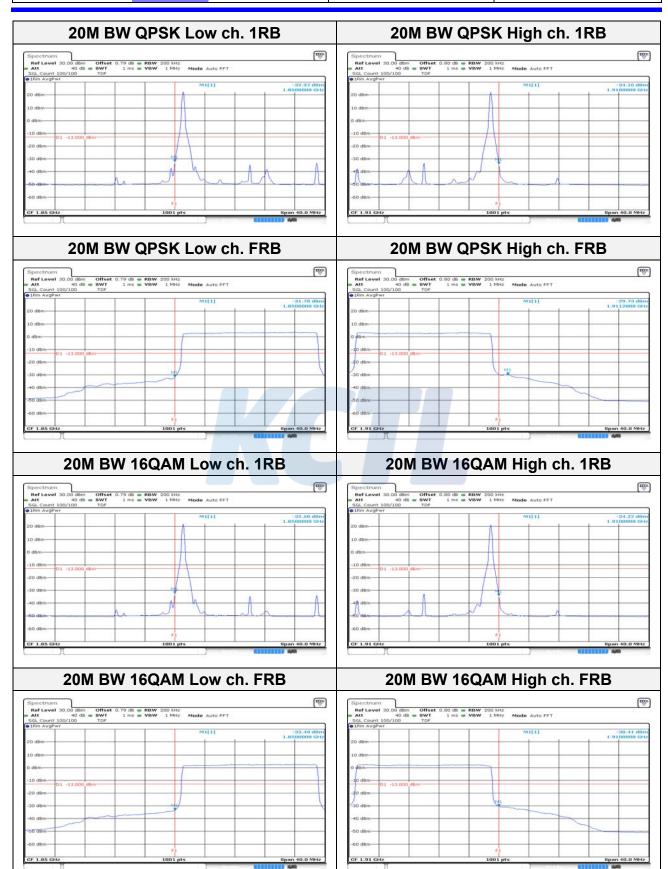


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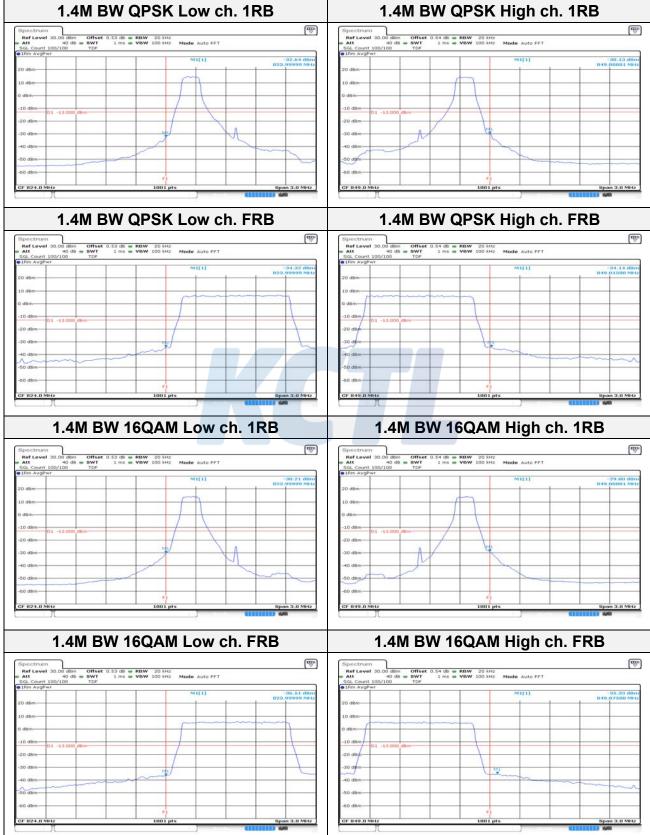
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1.4M BW QPSK Lower extended 1RB

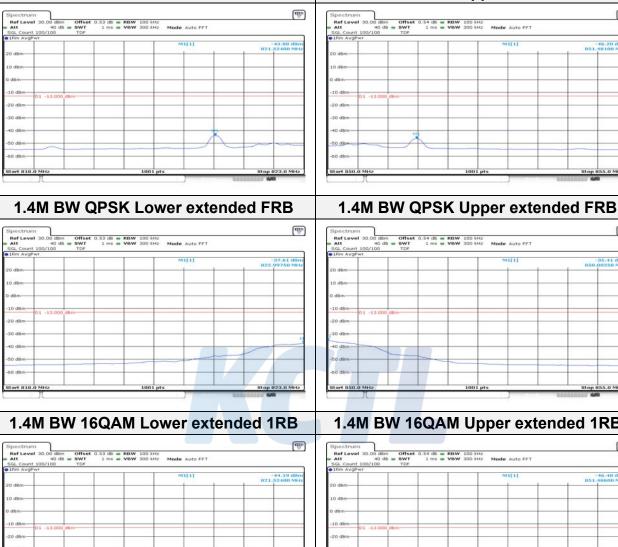
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time ♥

-46.20 dBn 851.40100 MH

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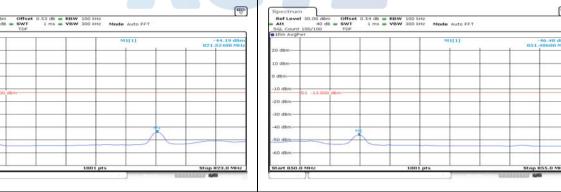


1.4M BW QPSK Upper extended 1RB

NULL 1

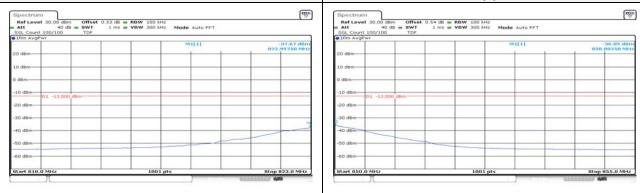


1.4M BW 16QAM Upper extended 1RB



1.4M BW 16QAM Lower extended FRB

1.4M BW 16QAM Upper extended FRB



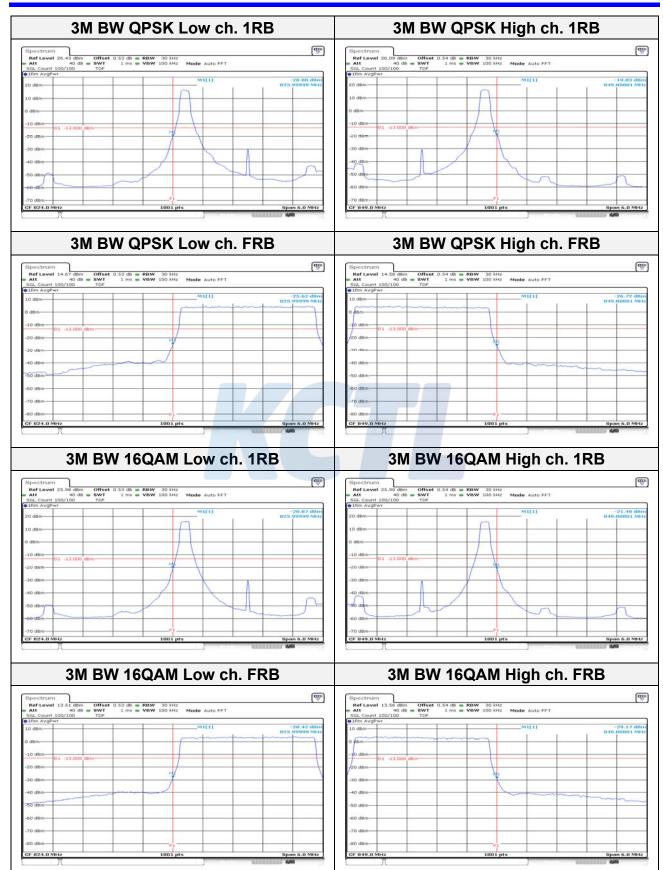
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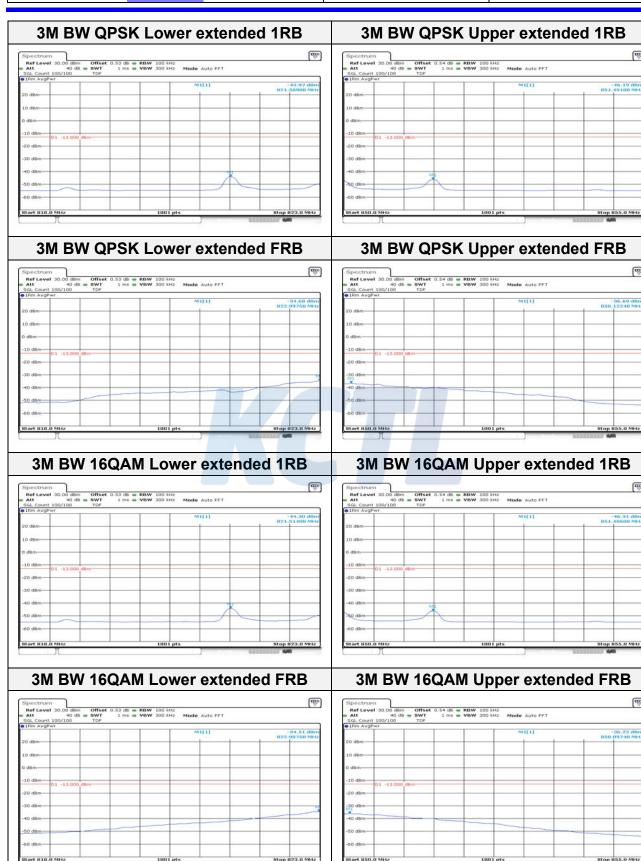
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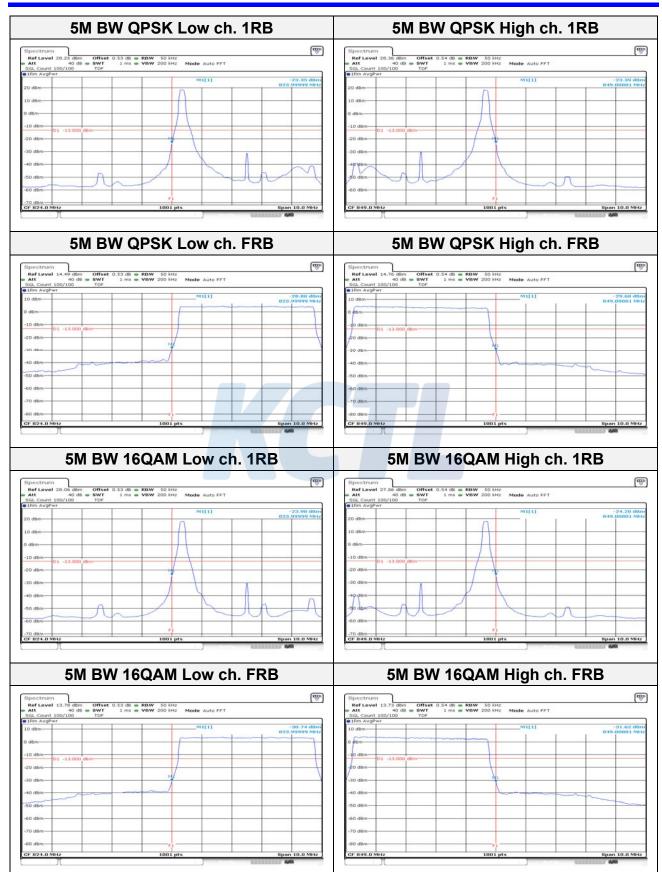
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ama ⊽

time ∵

5 0 MHz

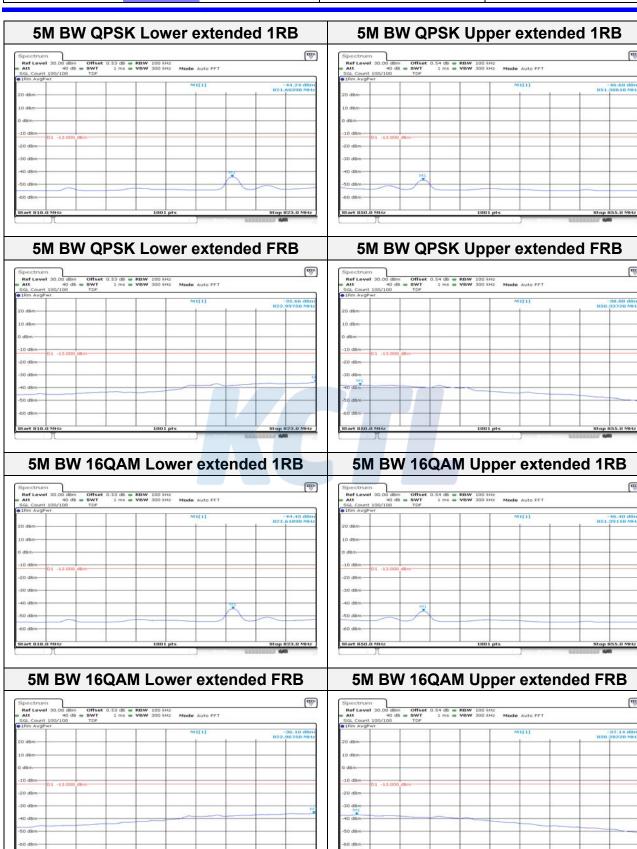
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55.0 MHz

terns ⊽

-37.14 dBm 28220 MHz

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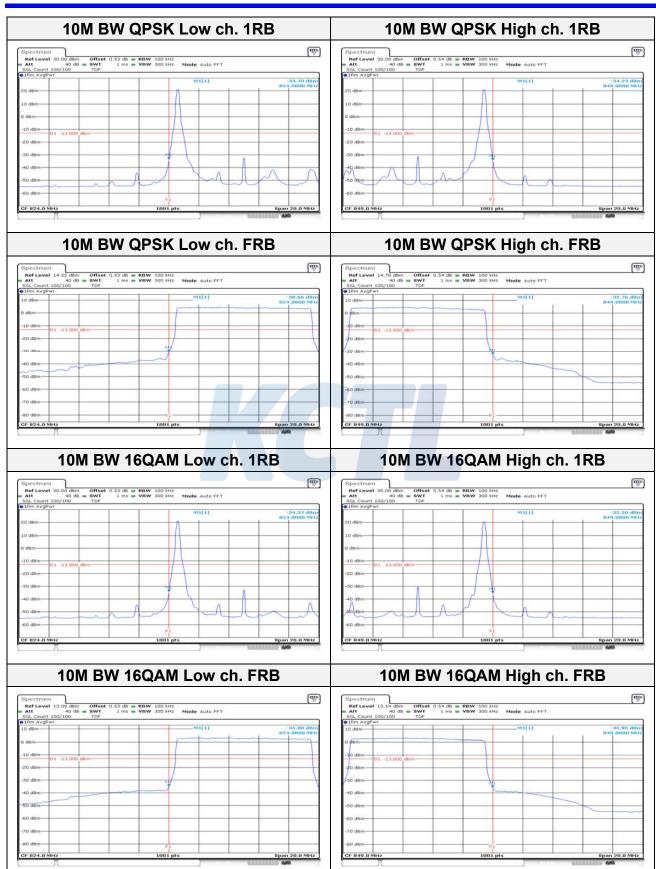
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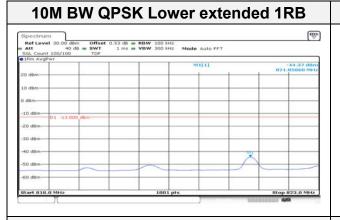
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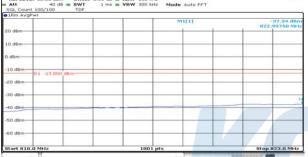


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IOM BW QPSK Upper extended 1RB Image: State of the state of

10M BW QPSK Lower extended FRB Spectrum Ref Level 30.00 dbm Offset 0.53 db = KBW 100 MHz Top Top Top Top

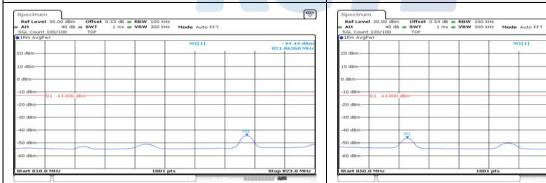


10M BW 16QAM Lower extended 1RB

10M BW QPSK Upper extended FRB

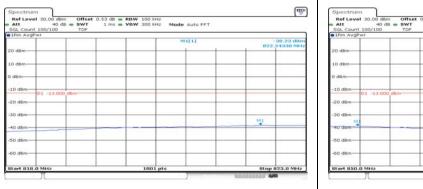


10M BW 16QAM Upper extended 1RB



10M BW 16QAM Lower extended FRB

10M BW 16QAM Upper extended FRB



Ref Level 30.00 dBm Offset 0.54 dB 0 Att 40 dB SWT 1 ms 1 iGL Count 100/100 TDF 1 1 1	VBW 300 kHz Mode Auto FFT	
1Rm AvgPwr	MILLI	-30.92 dbr
	SILLI	850.46200 MH
0 dBm		
d8m		
10 m		
0 d8m 01 -13.000 d8m		
D dBm		
) dBm		
Mi mab t		
) dBm		
) d8m		
art 850.0 MHz	1001 pts	Stop 055.0 MHz

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-46.55 dB 851.14140 M

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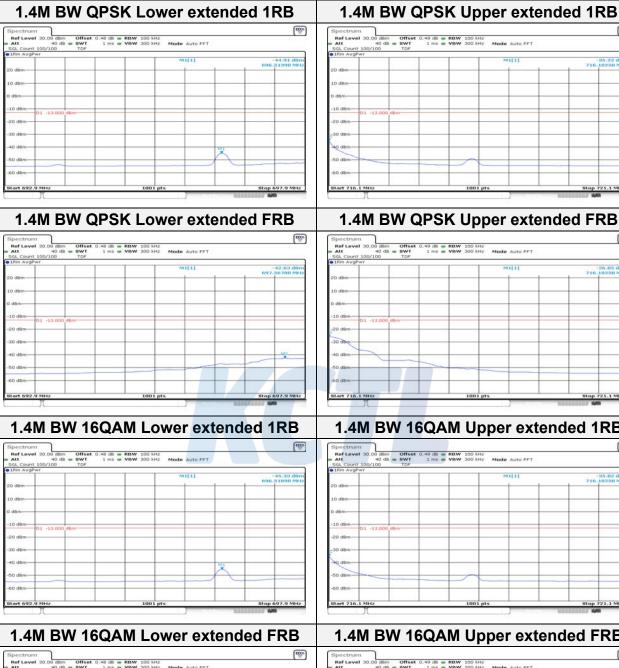
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di E E

-26.05 dBm 716.10250 MHz

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...... -05.22 dBr .10250 MH 716 1.4M BW QPSK Upper extended FRB

MILLI

20 dBm				-				-	
-30 dbm									
10000									
-40 d8m-									-
	-	-							
-50 dBm									-
2 para							-		-
-60 dBm									+
Start 716.1	MHz			100	1 pts			Stop	721.1 MHz
	10								68
		_							
4 4 8		AL 44							
1 4	лк	N 1	h(.)Δ	мп	pper	exte	anda	ר הנ	IRK.
					PPCI	UNIC	sinat		
	_								
Spectrum									1
	30.00 dBm		0.49 dB 🗰						
Att	40 dB	· SWT		VBW 300 k		Auto FFT			
SGL Count	40 d8					Auto FFT			
SGL Count	40 d8	· SWT			Hz Mode /				
SGL Count	40 d8	· SWT							-05.02 d0#
Att SGL Count : IRm AvgPw	40 d8	· SWT			Hz Mode /				-35.02 d0n 10250 MH
Att SGL Count : IRm AvgPw	40 d8	· SWT			Hz Mode /				
SGL Count : 1Rm AvgPw 20 dBm	40 d8	· SWT			Hz Mode /				
SGL Count : 1Rm AvgPw 20 dBm	40 d8	· SWT			Hz Mode /				
20 dBm	40 d8	· SWT			Hz Mode /				
20 dBm	40 d8	· SWT			Hz Mode /				
Att SGL Count : IRm AvgPw 20 dBm 10 dBm 0 dBm	40 d8	· SWT			Hz Mode /				
SGL Count 1 SGL Count 1 IRm AvgPw 20 dBm 10 dBm -10 dBm	40 d8	TDF			Hz Mode /				
Att SGL Count 1 SGL Count 2 IPm AvgPw 20 dBm 20 dBm 0 dBm -10 dBm (40 dB	TDF			Hz Mode /				
SGL Count 1 SGL Count 1 IRm AvgPw 20 dBm 10 dBm -10 dBm	40 dB	TDF			Hz Mode /				
Att SGL Count 1 S	40 dB	TDF			Hz Mode /				
Att SGL Count 1 SGL Count 2 IPm AvgPw 20 dBm 20 dBm 0 dBm -10 dBm (40 dB	TDF			Hz Mode /				
Att SGL Count 1 S	40 dB	TDF			Hz Mode /				
Att SGL Count 1 S	40 dB	TDF			Hz Mode /				
Att SGL Count SGL SGL Count SGL SGL Count SGL SGL Count SGL S	40 dB	TDF			Hz Mode /				
Att SGL Count 1 IPm AvgPw 20 dBm 0 dBm 0 dBm -10 dBm -20 dBm	40 dB	TDF			Hz Mode /				
Att SGL Count 1 SGL Count 1 IRm AvgPw 20 dBm 10 dBm 0 dBm -10 dBm -20 dBm -20 dBm -20 dBm -20 dBm	40 dB	TDF			Hz Mode /				
• Att • SGL Court 1 • IPm AvgPw 20 dBm 10 dBm -10 dBm -20 dBm -20 dBm -30 dBm -30 dBm -50 dBm	40 dB	TDF			Hz Mode /				
Att SGL Count 1 SGL Count 1 IRm AvgPw 20 dBm 10 dBm 0 dBm -10 dBm -20 dBm -20 dBm -20 dBm -20 dBm	40 dB	TDF			Hz Mode /				
• Att • SGL Court 1 • IPm AvgPw 20 dBm 20 dBm -10 dBm -20 dBm -20 dBm -20 dBm -30 dBm -50 dBm	40 dB	TDF			Hz Mode /				

 Spectrum
 Offset
 0.49 dB
 RBW 100 kHz

 Ref Level
 30,00 dBm
 Offset
 0.49 dB
 RBW 100 kHz

 Autor
 FT
 1 ms
 VBW 300 kHz
 Mode
 Auto FFT

 SQL Count 100/100
 TDF
 11m AvgPvr
 TDF
 TDF
 TDF
 MILLI -41.95 dB 697.89750 M 7 13 541.03

1.4M BW 16QAM Upper extended FRB

SGL Count 100/100 TDF IRm AvgPwr		
	MILLI	-26.91 dBm 216.10250 MHz
20 dBm		
0 d8m		
dBm	 	
10 d8m 01 -13.000 d8m	 	
20 dBm		
30 dBm	 	
40 dBm		_
50 dBm	 	
60 dBm		
	 	Stop 721.1 MHz

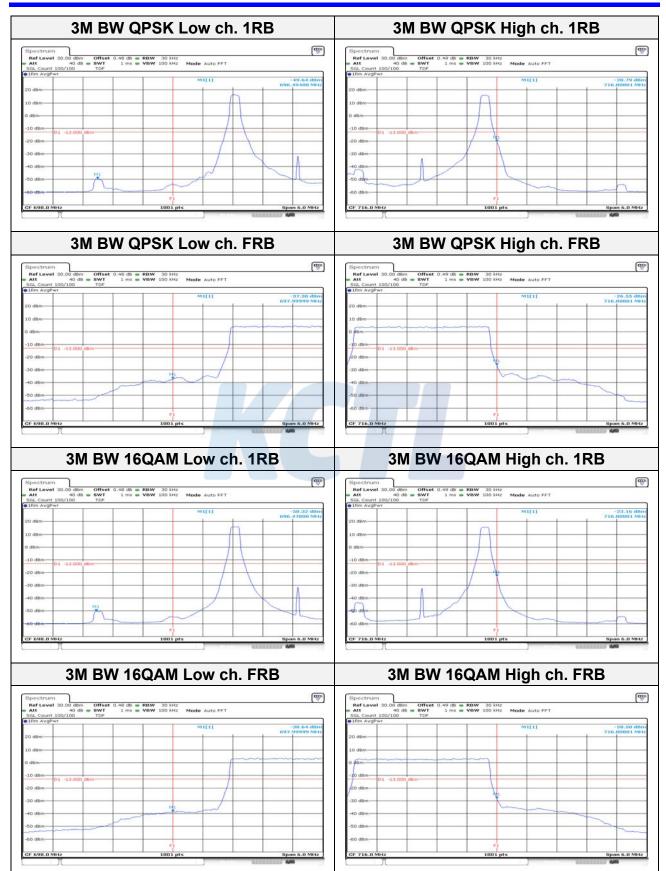
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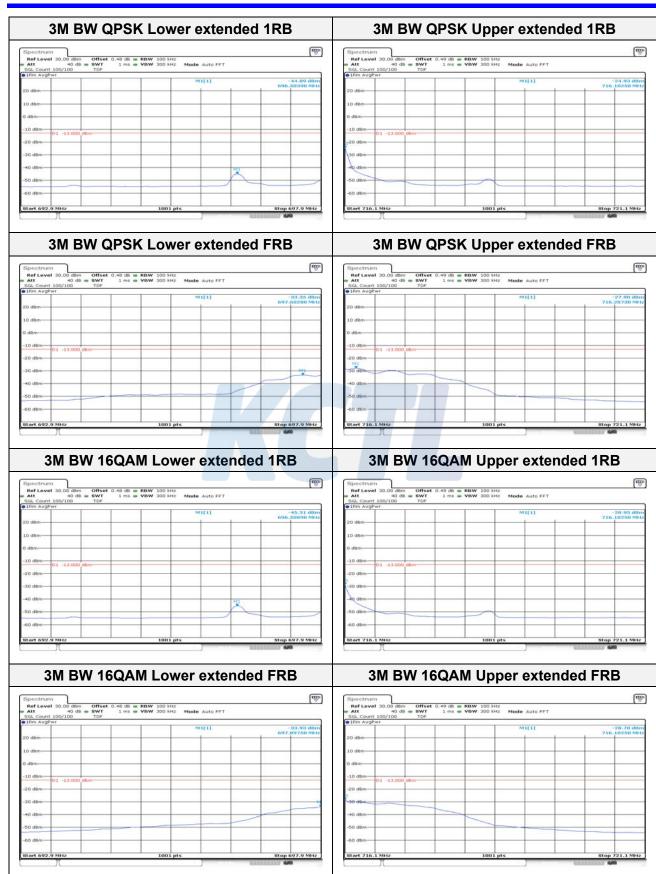




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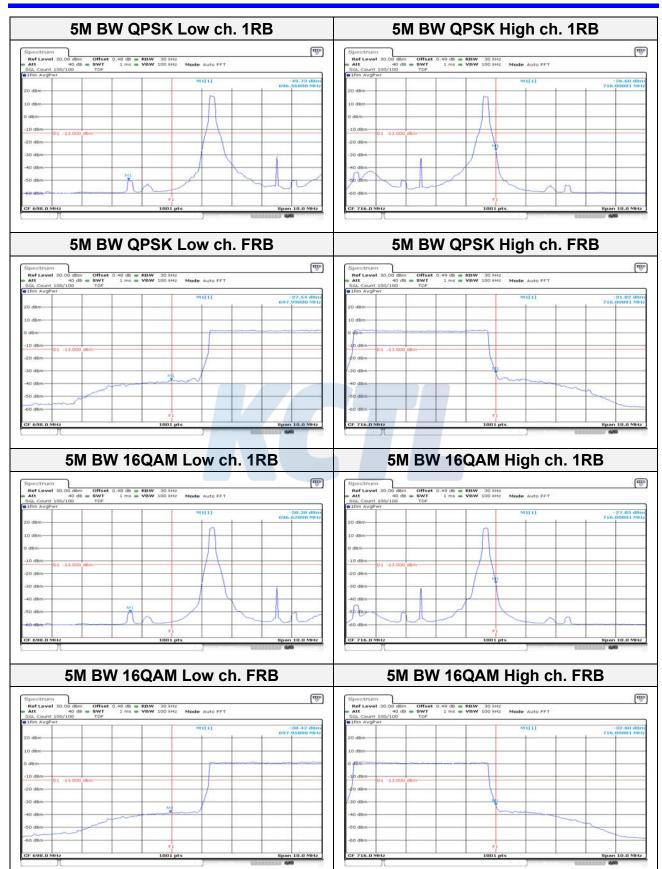
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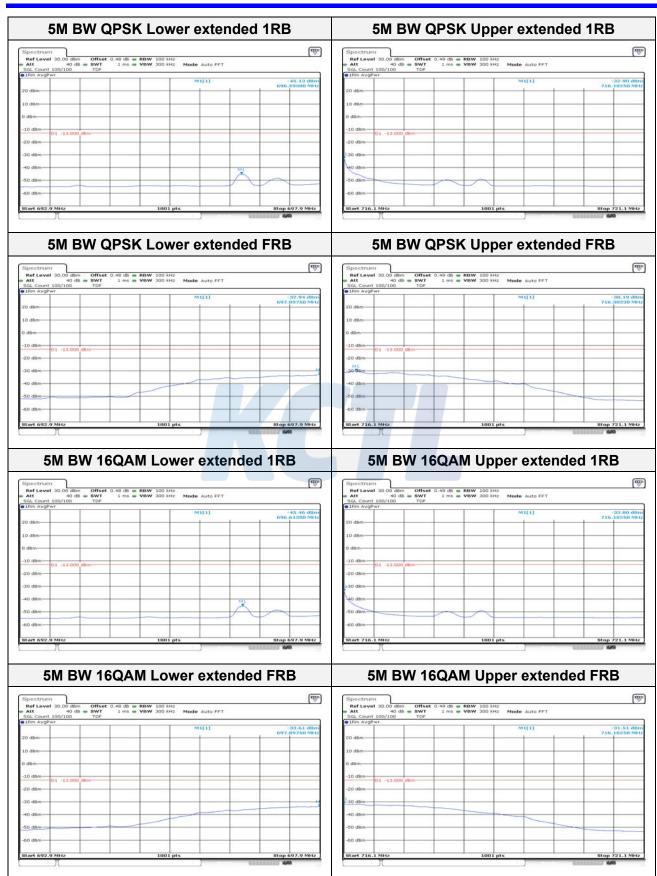
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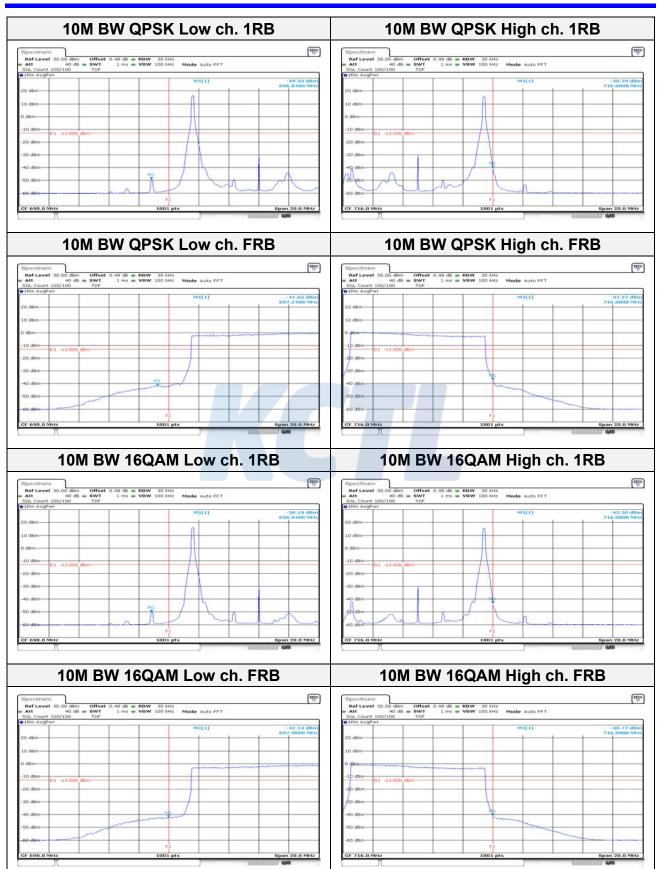
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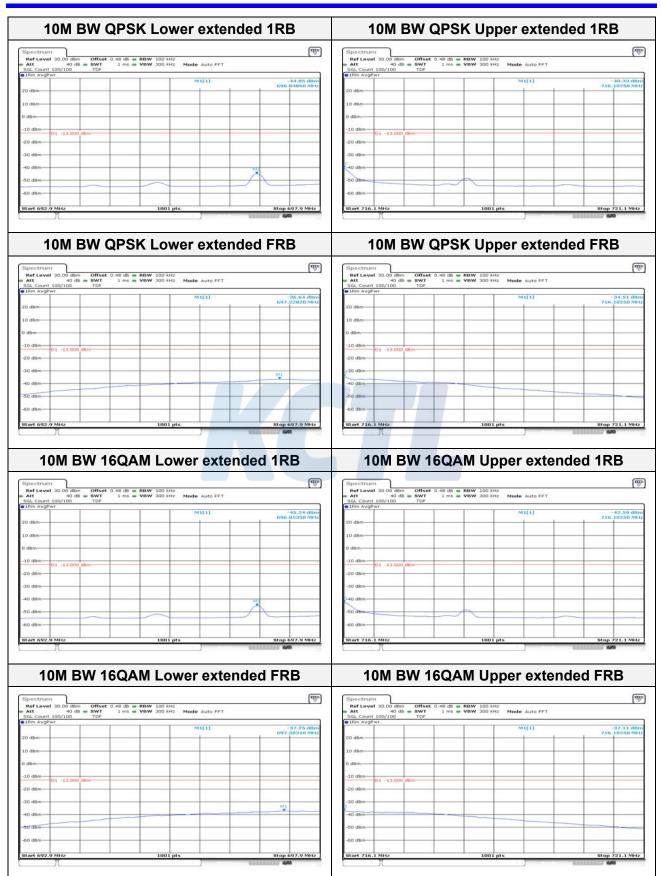
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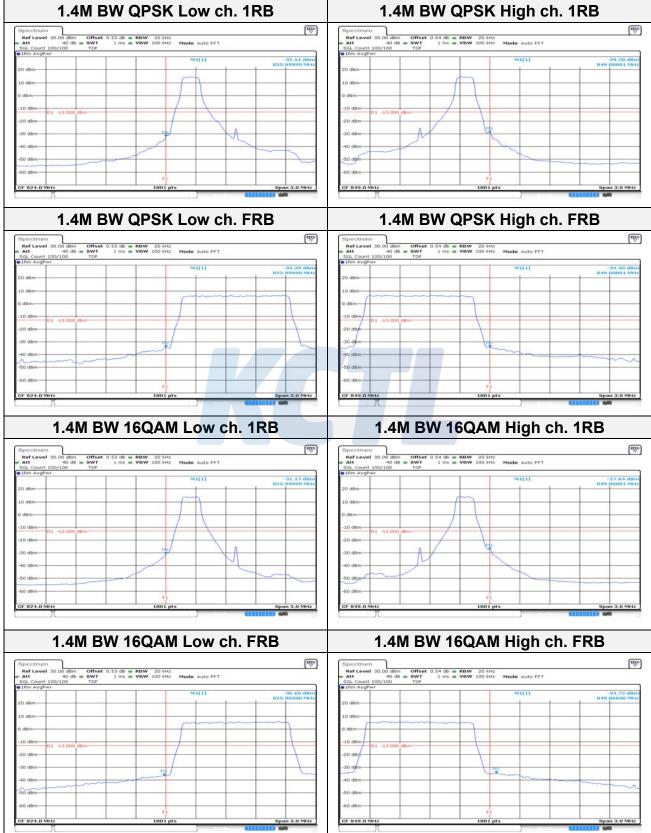
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Test mode: LTE Band 26

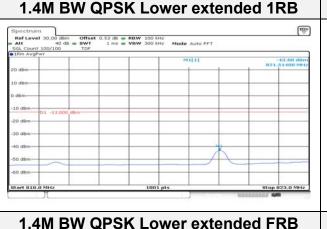


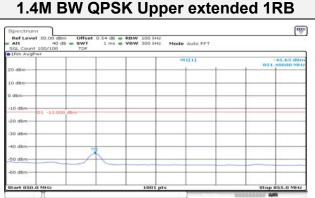
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1.4M BW QPSK Lower extended FRB Spectrum Image: Add B and B an

1.4M BW 16QAM Lower extended 1RB

1.4M BW QPSK Upper extended FRB



1.4M BW 16QAM Upper extended 1RB

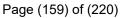


1.4M BW 16QAM Lower extended FRB

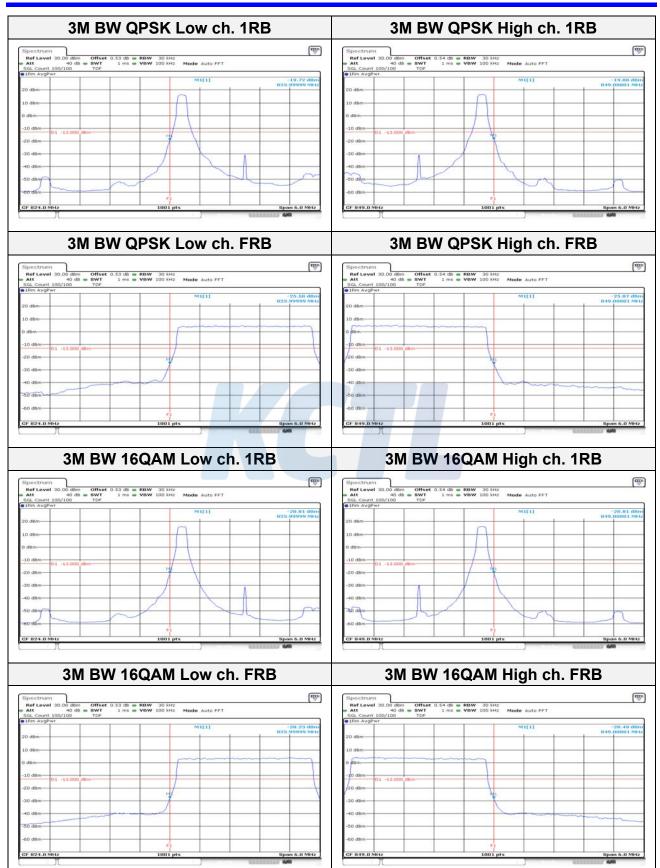
1.4M BW 16QAM Upper extended FRB



65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-31-285-0894 FAX: 82-505-299-8311 <u>www.kctl.co.kr</u> Report No.: KR20-SRF0181-B







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ama ⊽

time ∵

5.0 MHz

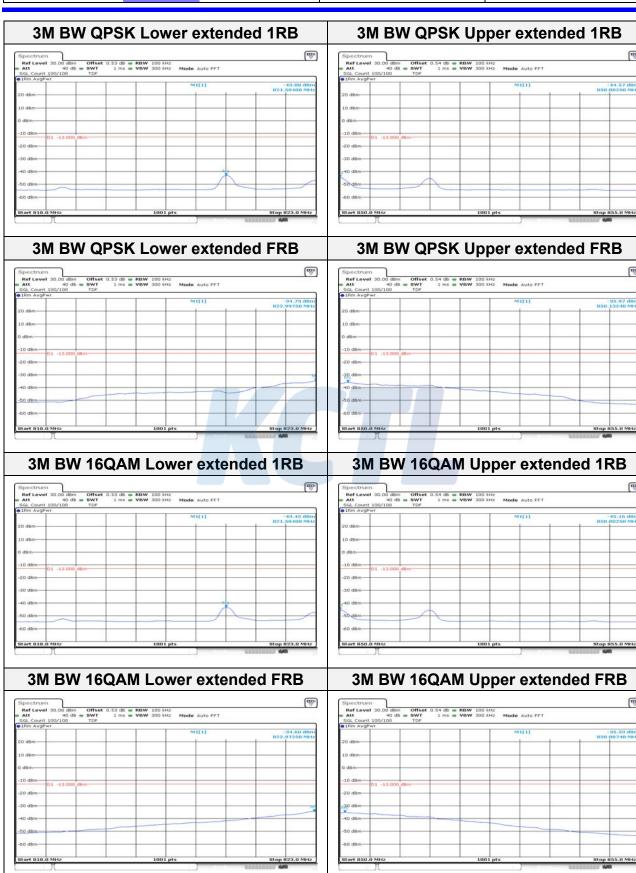
Email ▽

terns ⊽

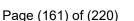
05.33 dBn 00740 MH

44.57 dBr 00250 MH

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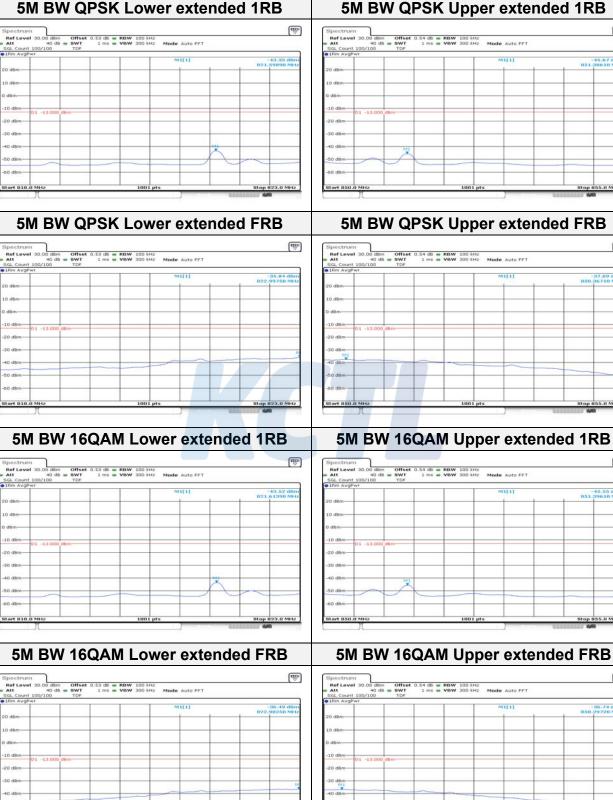
36.74 dBn 29720 MH

45.55 dt

851

-45.67 dBn 851.38610 MH

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5M BW QPSK Upper extended FRB

time ∵ -37.69 dbn 850.36710 MH 5.0 MHz

5M BW 16QAM Upper extended 1RB