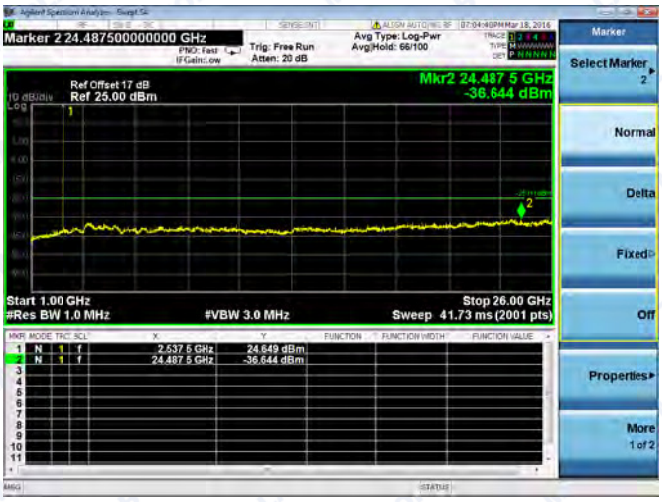
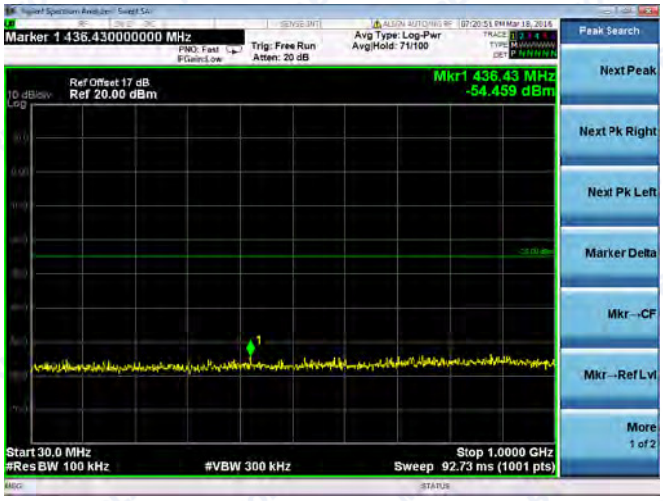
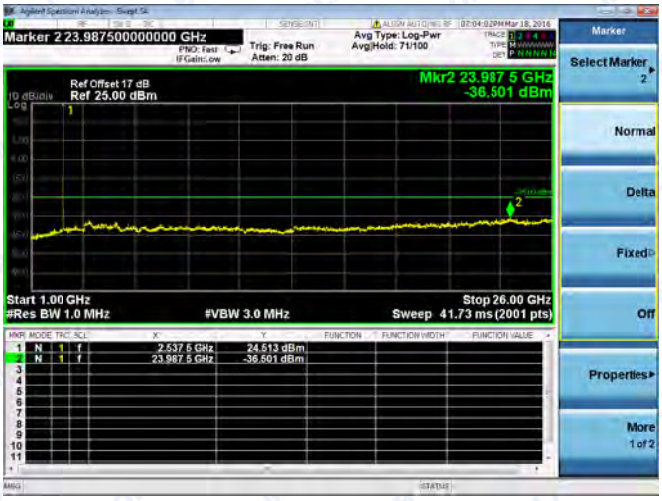
LTE Band 7 5MHz BW Low Channel

QPSK



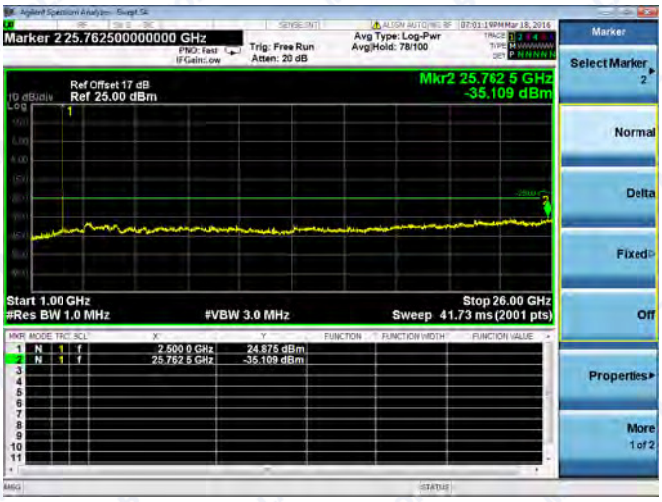
16QAM





LTE Band 7 10MHz BW Low Channel

QPSK



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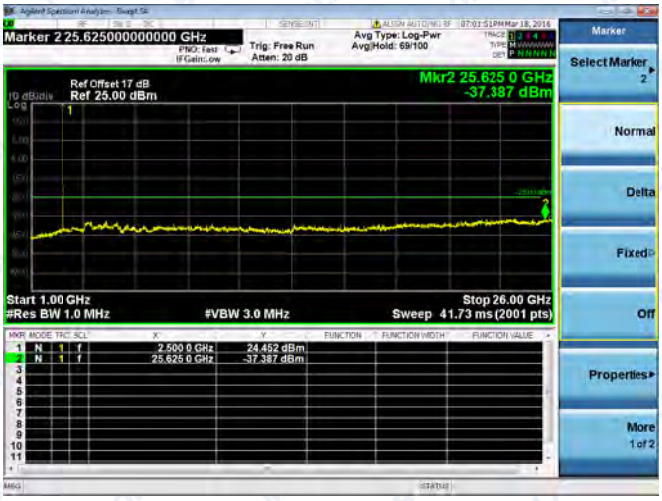
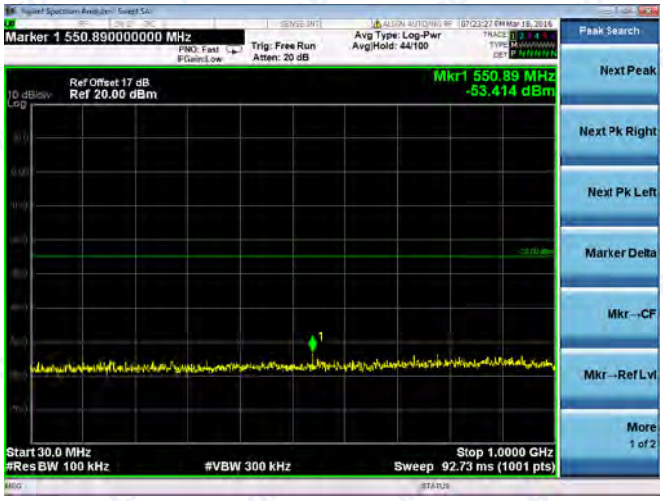
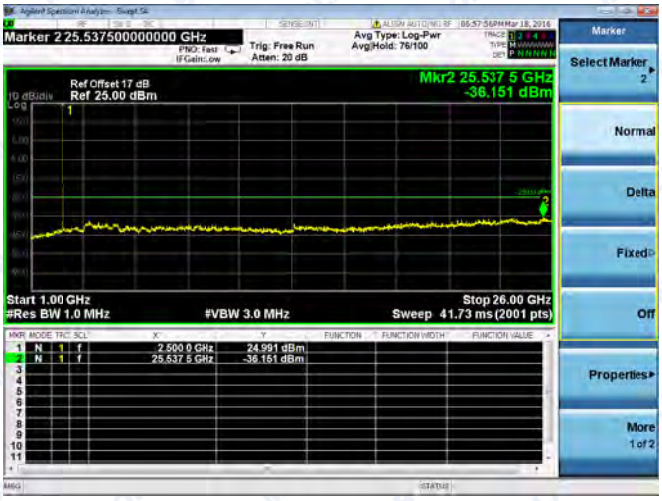


LTE Band 7 15MHz BW Low Channel

QPSK

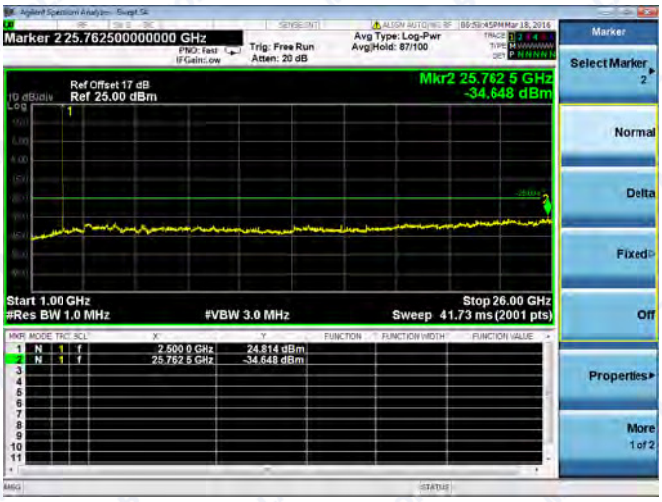
16QAM





LTE Band 7 20MHz BW Low Channel

QPSK



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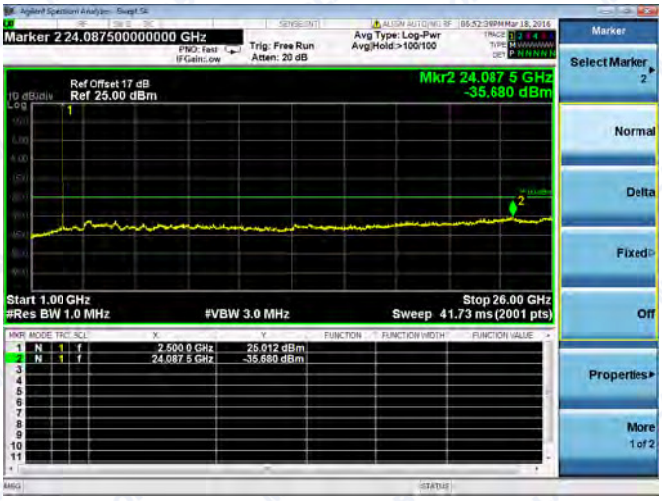
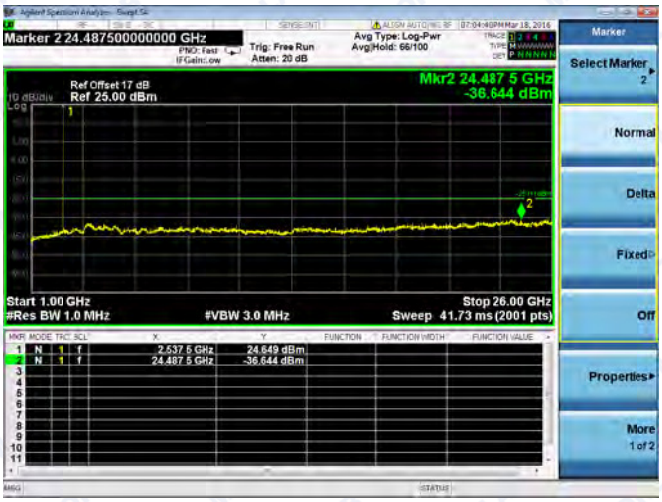


Middle channel:

LTE Band 7 5MHz BW Mid Channel	
QPSK	
	
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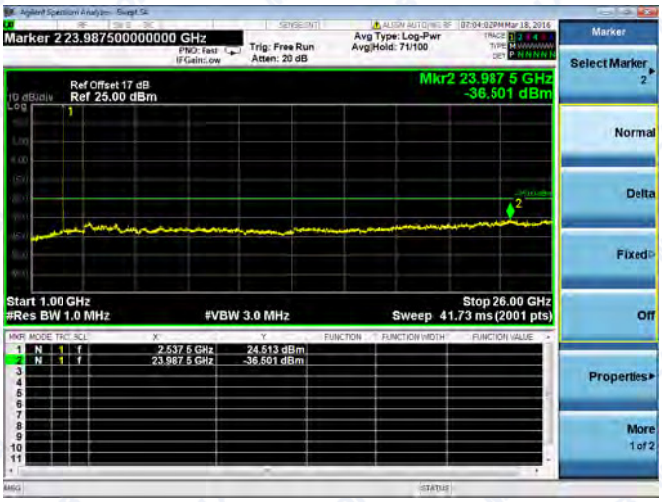
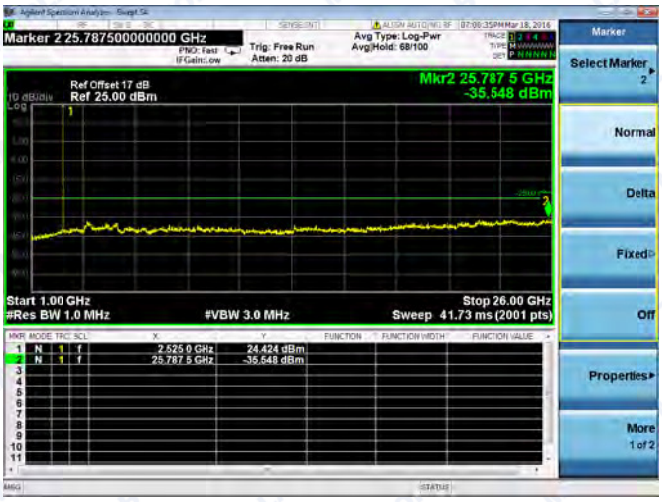
	

LTE Band 7 10MHz BW Mid Channel

QPSK



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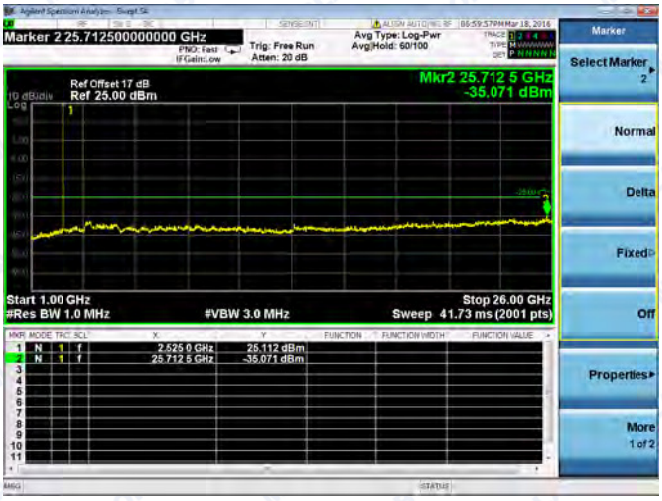
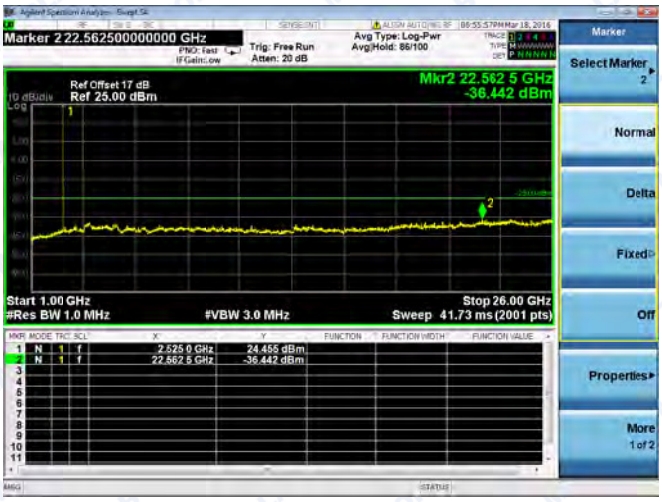


LTE Band 7 15MHz BW Mid Channel

QPSK



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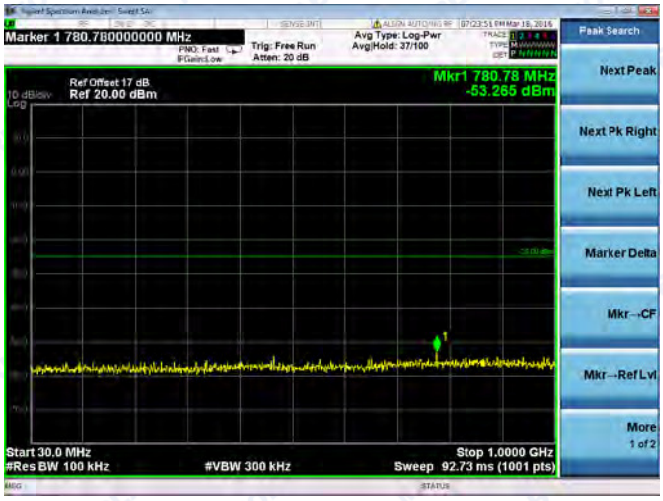
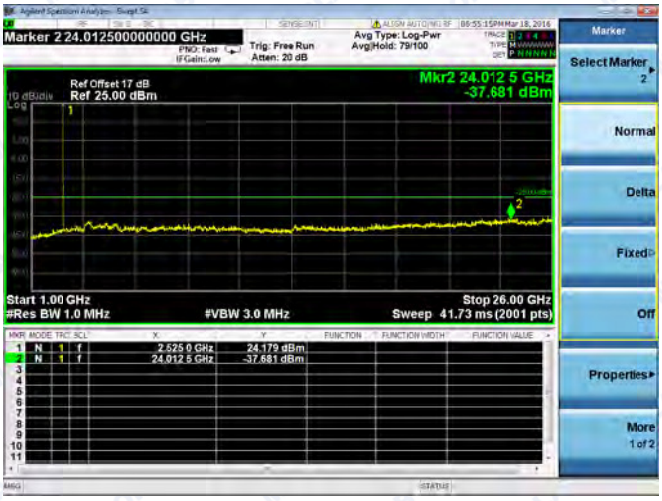
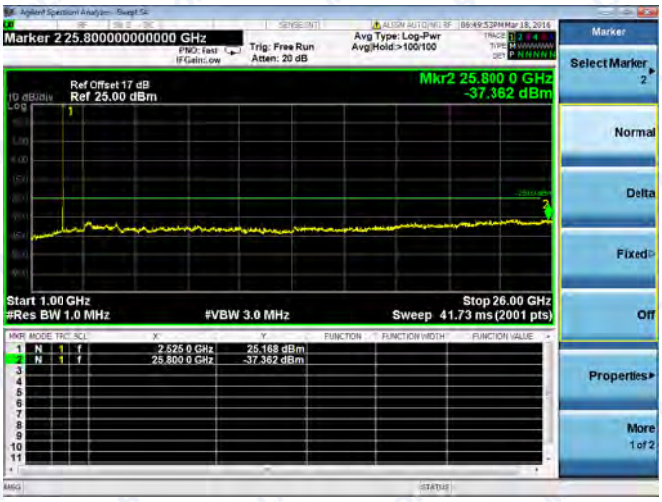




LTE Band 7 20MHz BW Mid Channel

QPSK



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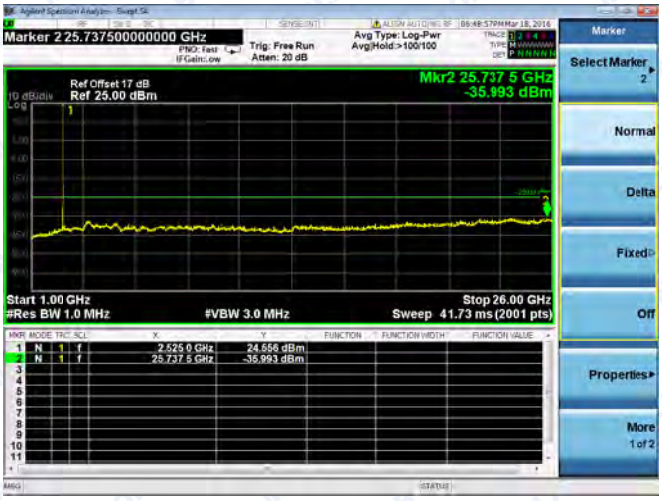
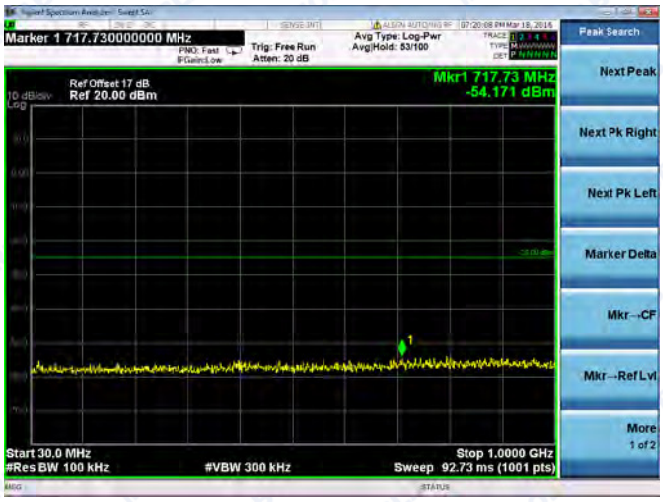
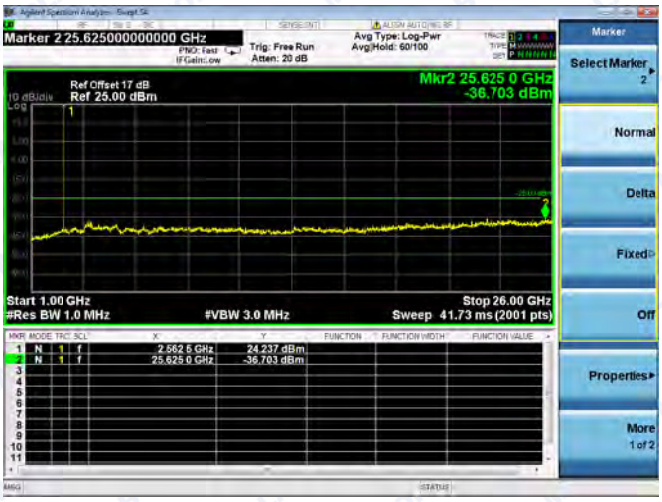


LTE Band 7 5MHz BW High Channel

QPSK





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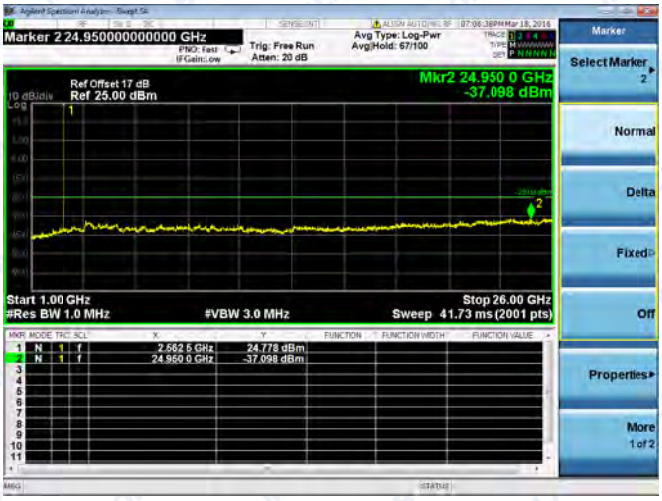
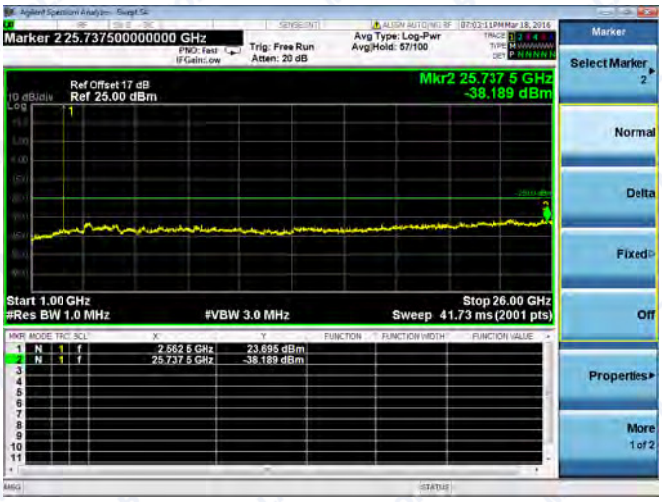


LTE Band 7 10MHz BW High Channel

QPSK



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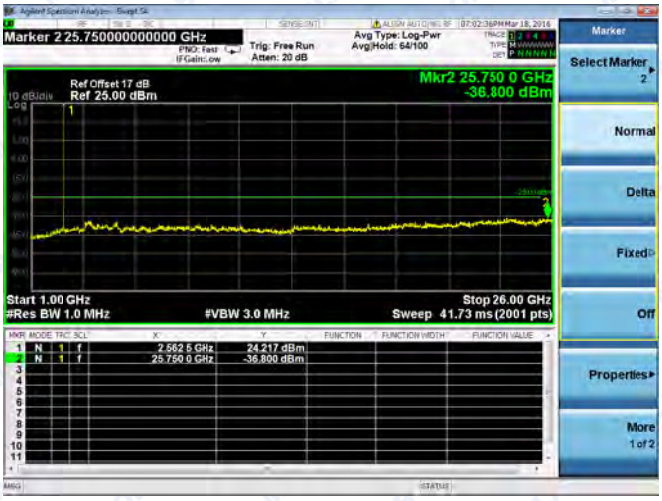
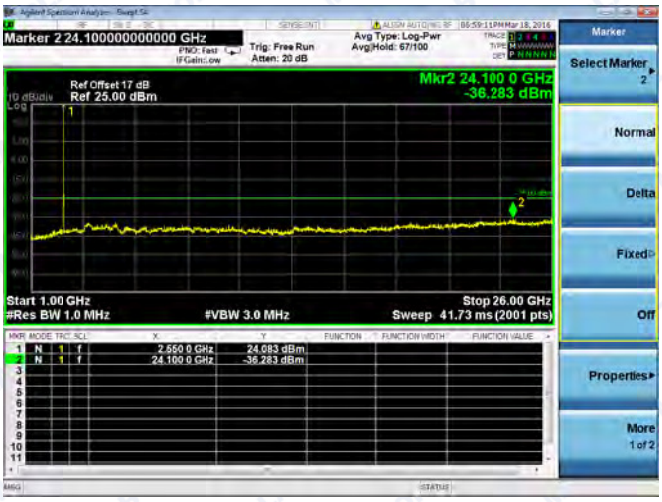


LTE Band 7 15MHz BW High Channel

QPSK



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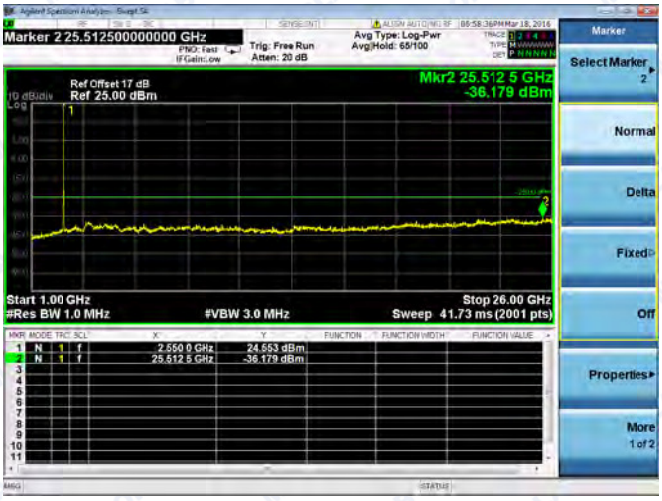
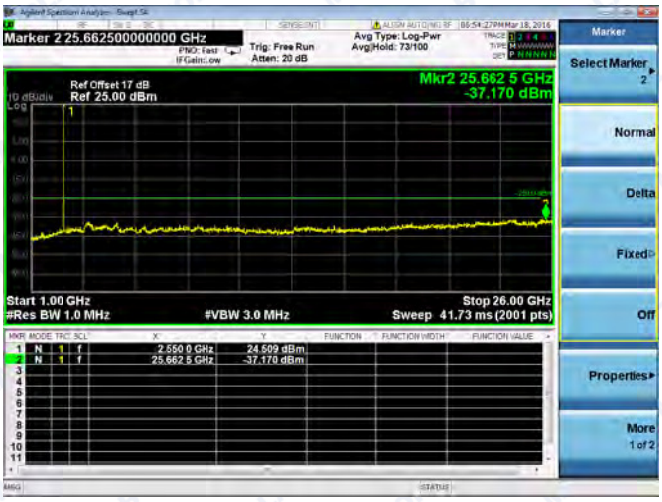


LTE Band 7 20MHz BW High Channel

QPSK



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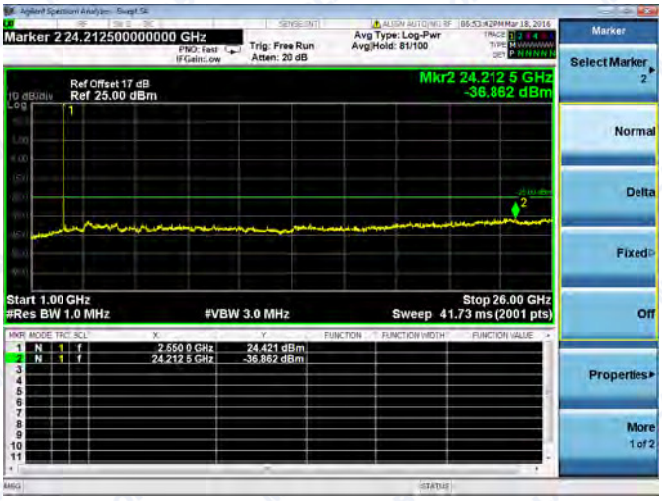
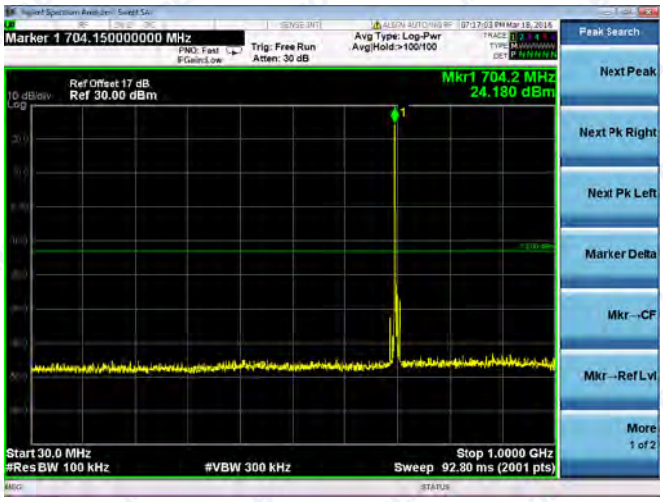


LTE Band 17 5MHz BW Low Channel

QPSK



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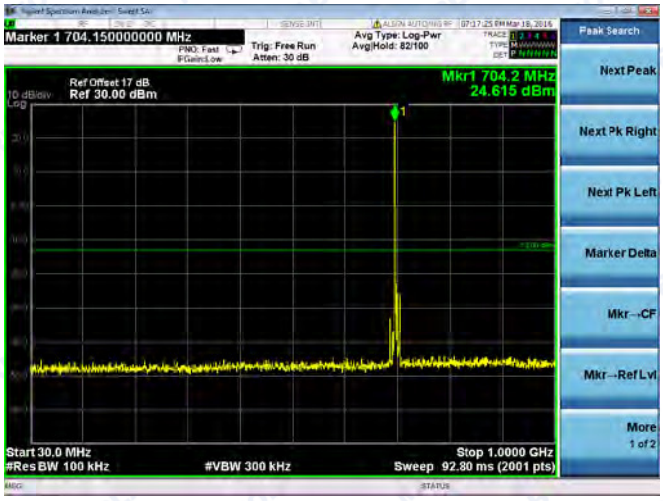
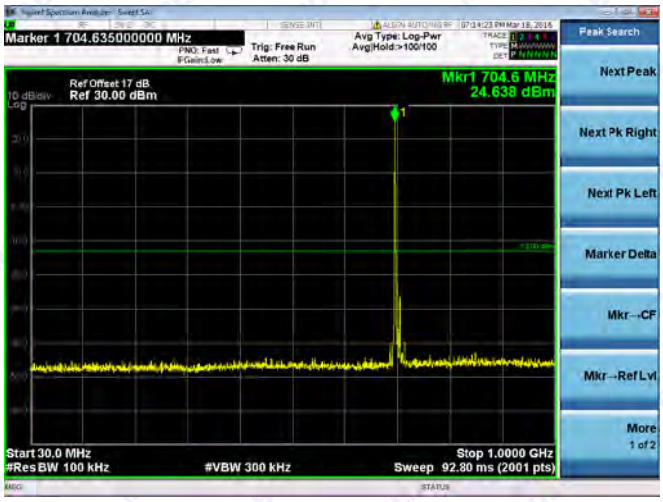


LTE Band 17 10MHz BW Low Channel	
QPSK	
	
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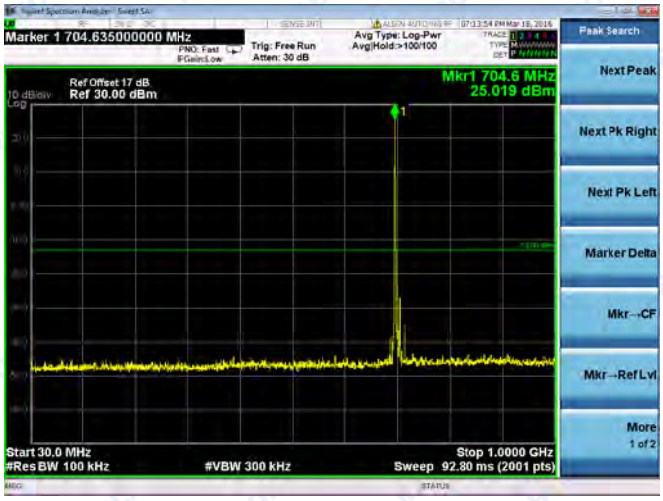
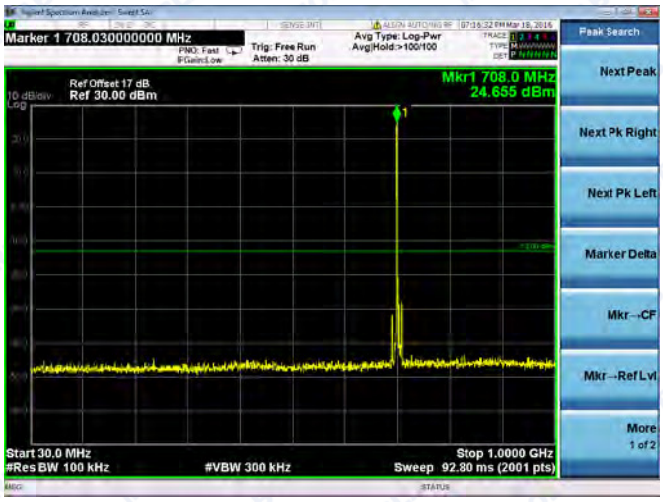
	

LTE Band 17 5MHz BW Mid Channel

QPSK



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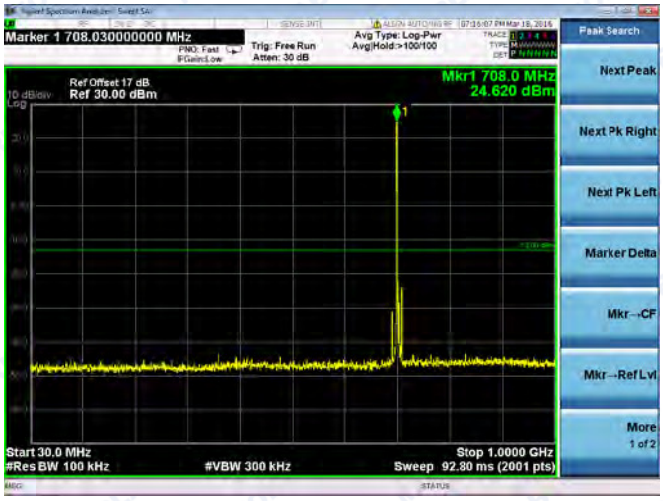

LTE Band 17 10MHz BW Mid Channel	
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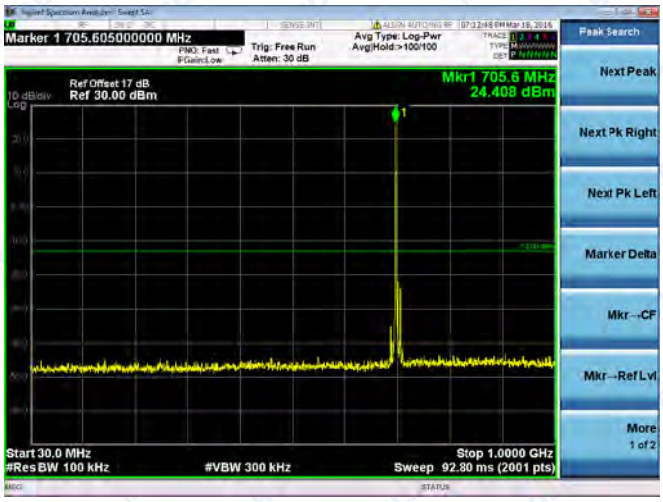	
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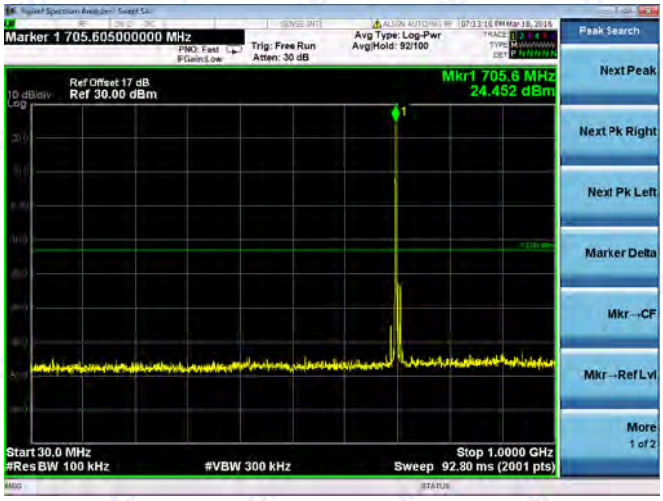
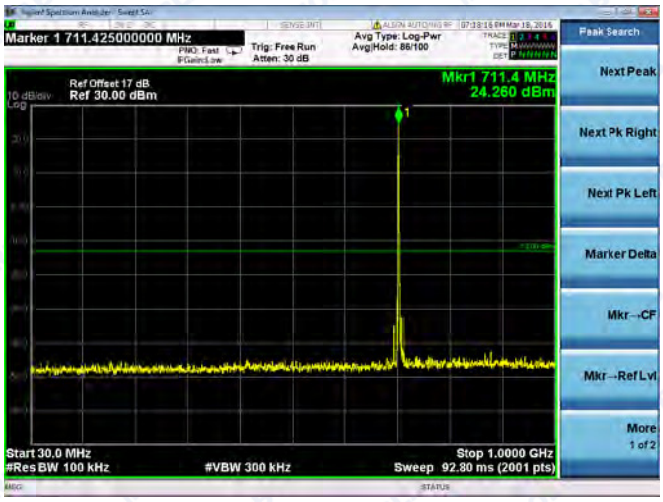
	

LTE Band 17 5MHz BW High Channel	
QPSK	
	
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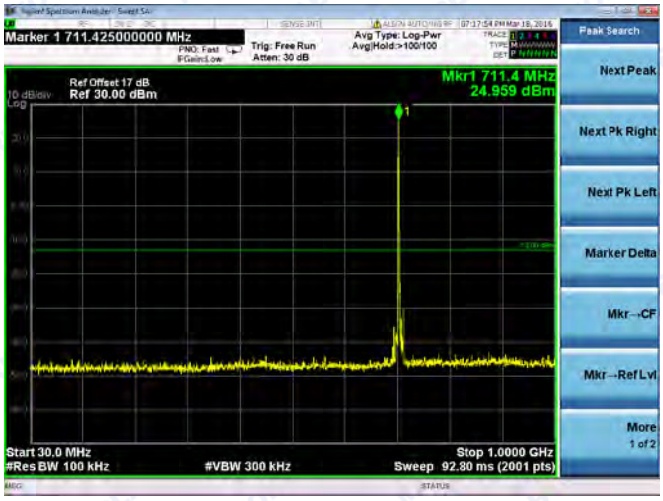
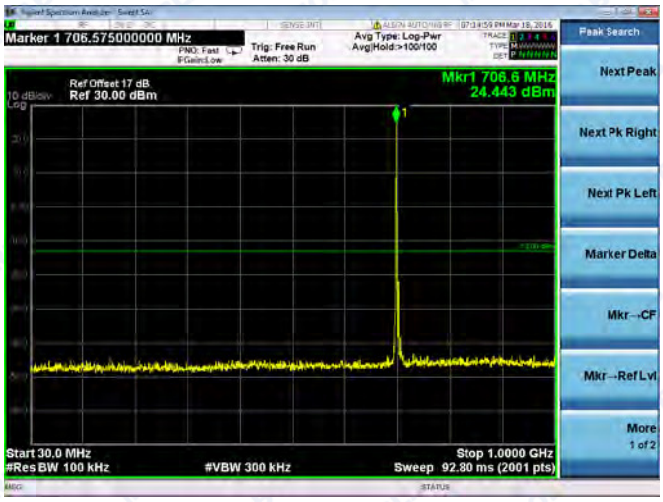
	

LTE Band 17 10MHz BW High Channel	
QPSK	
	
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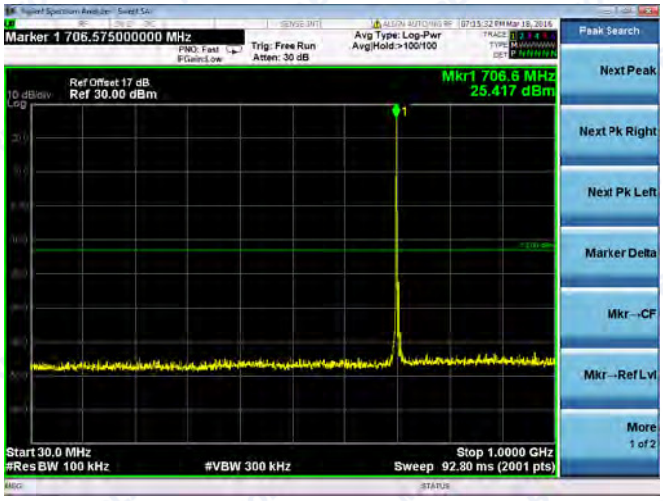
	

2.6 Band Edge

2.6.1 Requirement

According to FCC section 27.53(g) (h), (g) For operations in the 698–746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. 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 kHz may be employed.

(h) For operations in the 1710–1755 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 + 10 log10(P) dB.

According to FCC section 27.53(m) (4), (m) (4) For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees

2.6.2 Test Description

See section 2.1.2 of this report.

2.6.3 Test Result

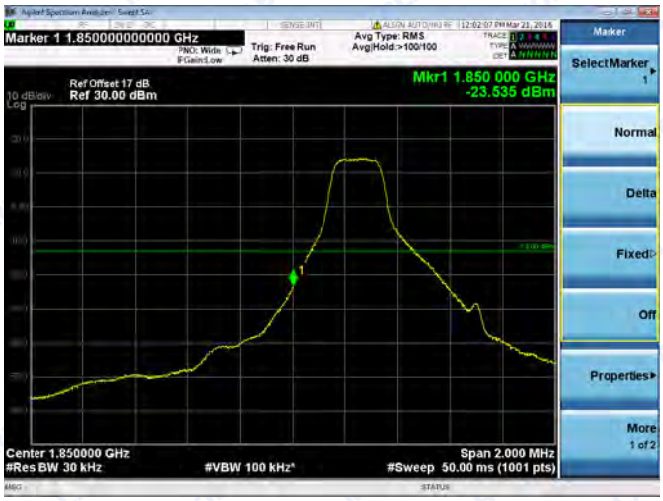
The center frequency of spectrum is the band edge frequency and span is 2MHz, Record the max trace into the test report.

PASS. See the attached plots.

LTE Band 2

Channel Bandwidth: 1.4MHz

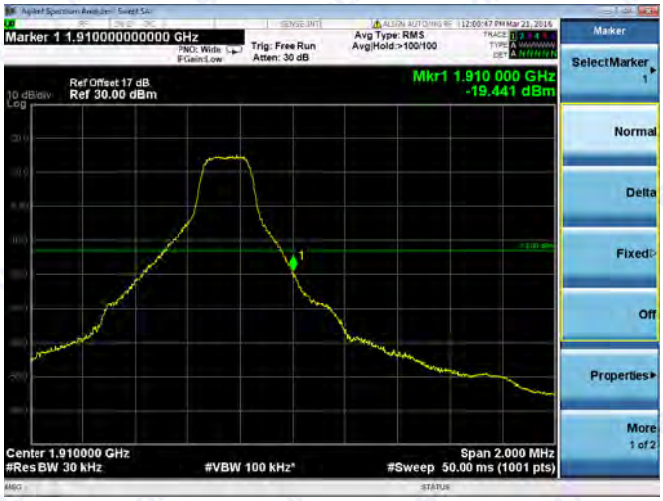
Channel	18607	RB Size 1	RB Offset 0



Channel	18607	RB Size 6	RB Offset 0

Channel Bandwidth: 1.4MHz

Channel	19192	RB Size 1	RB Offset 5

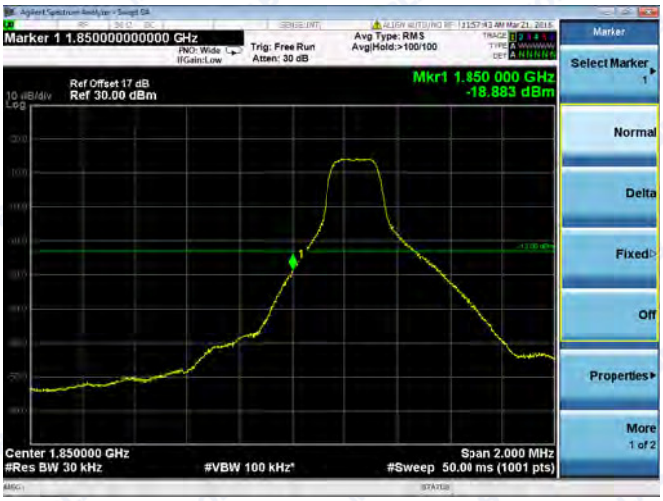


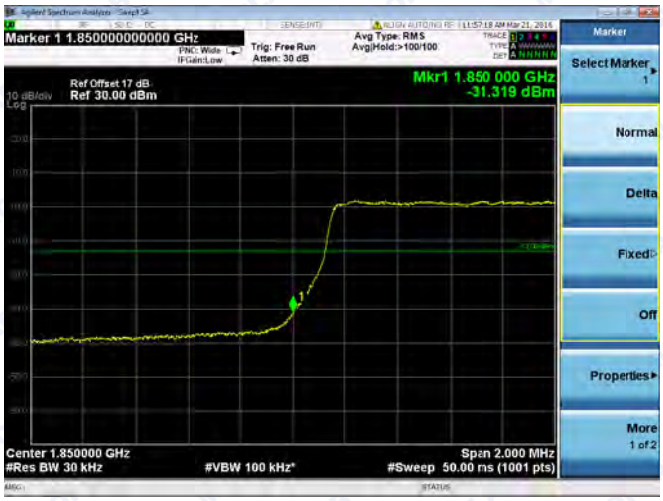
Channel	19192	RB Size 6	RB Offset 0

LTE Band 2

Channel Bandwidth: 3MHz

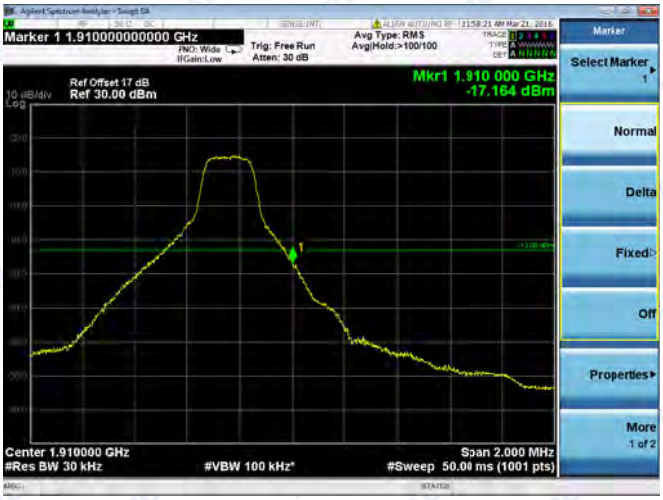
Channel	18165	RB Size 1	RB Offset 0	Channel	18165	RB Size 15	RB Offset 0





Channel Bandwidth: 3MHz

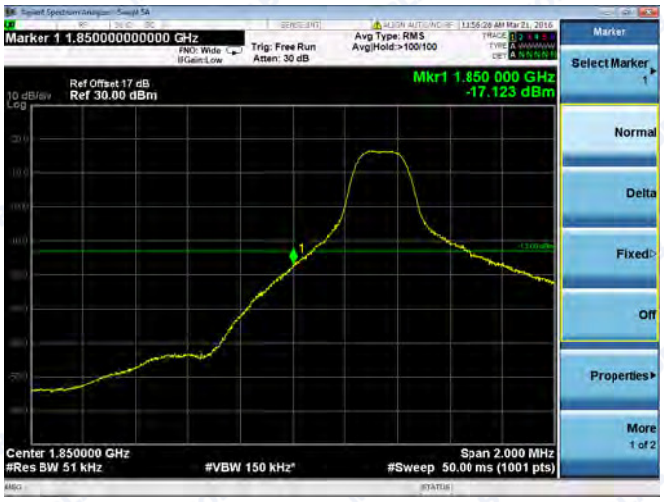
Channel	19184	RB Size 1	RB Offset 14	Channel	19184	RB Size 15	RB Offset 0



LTE Band 2

Channel Bandwidth: 5MHz

Channel	18625	RB Size 1	RB Offset 0



Channel	18625	RB Size 25	RB Offset 0

Channel Bandwidth: 5MHz

Channel	19175	RB Size 1	RB Offset 24

Channel	19175	RB Size 25	RB Offset 0

LTE Band 2

Channel Bandwidth: 10MHz

Channel	18650	RB Size 1	RB Offset 0	Channel	18650	RB Size 50	RB Offset 0

Channel Bandwidth: 10MHz

Channel	19150	RB Size 1	RB Offset 49	Channel	19150	RB Size 50	RB Offset 0

LTE Band 2

Channel Bandwidth: 15MHz

Channel	18675	RB Size 1	RB Offset 0	Channel	18675	RB Size 75	RB Offset 0

Channel Bandwidth: 15MHz

Channel	19125	RB Size 1	RB Offset 74	Channel	19125	RB Size 75	RB Offset 0

LTE Band 2

Channel Bandwidth: 20MHz

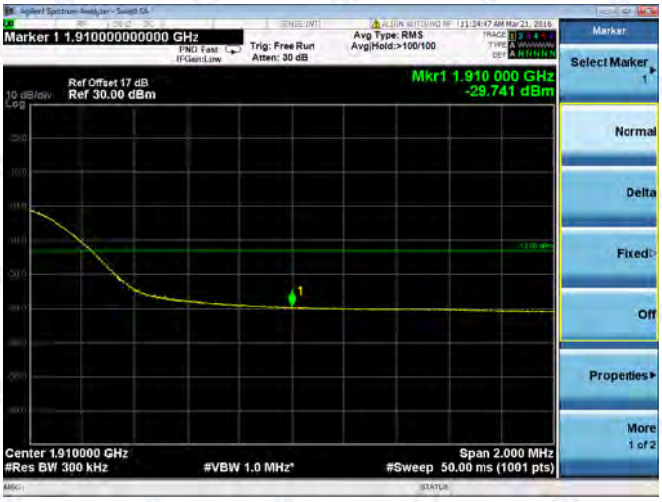
Channel	18700	RB Size 1	RB Offset 0

Channel	18700	RB Size 100	RB Offset 0

Channel Bandwidth: 20MHz

Channel	19100	RB Size 1	RB Offset 99

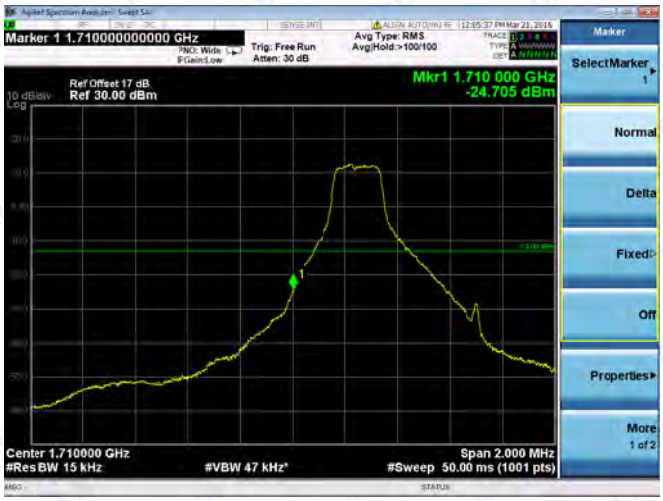
Channel	19100	RB Size 100	RB Offset 0



LTE Band 4

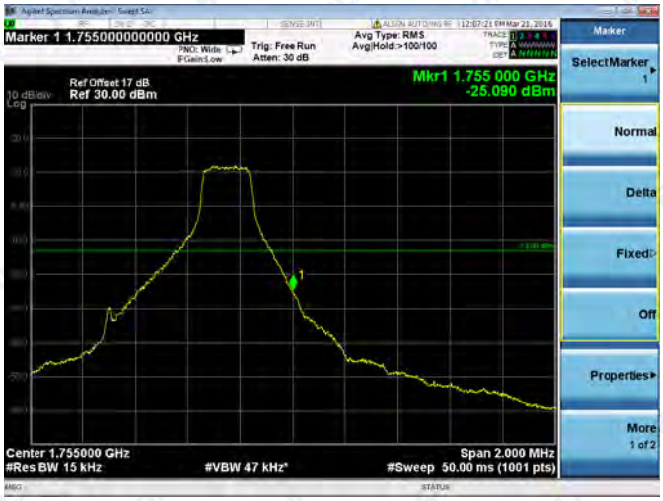
Channel Bandwidth: 1.4MHz

Channel	19957	RB Size 1	RB Offset 0	Channel	20393	RB Size 6	RB Offset 0



Channel Bandwidth: 1.4MHz

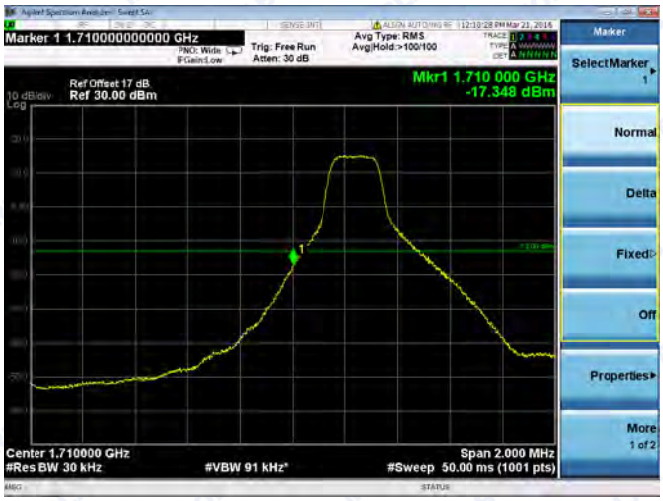
Channel	19957	RB Size 1	RB Offset 5	Channel	20393	RB Size 6	RB Offset 0



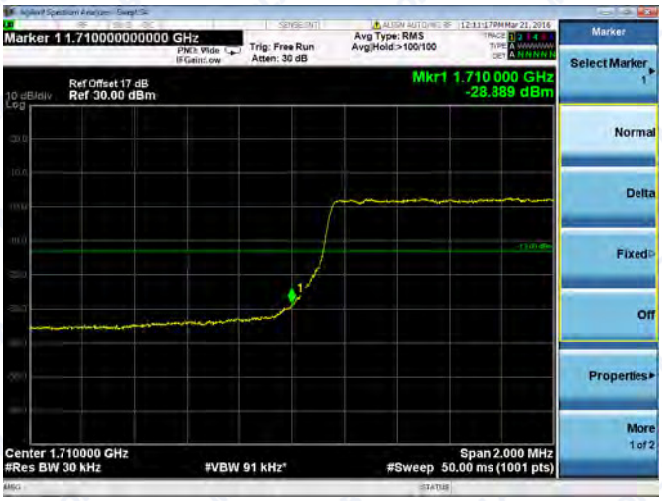
LTE Band 4

Channel Bandwidth: 3MHz

Channel	19965	RB Size 1	RB Offset 0

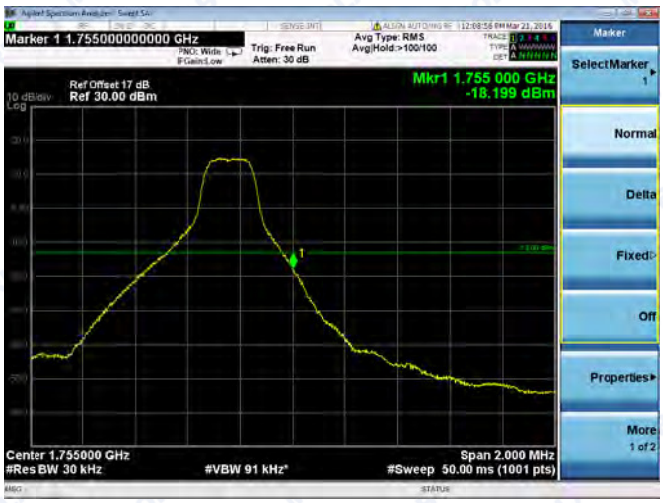


Channel	20385	RB Size 15	RB Offset 0



Channel Bandwidth: 3MHz

Channel	19965	RB Size 1	RB Offset 14

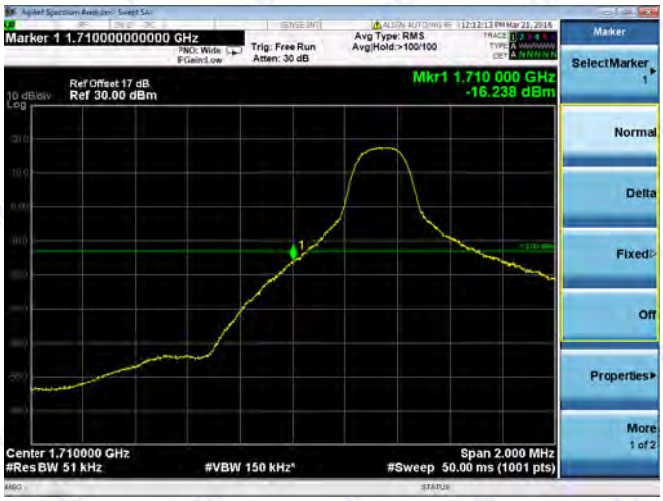


Channel	20385	RB Size 15	RB Offset 0

LTE Band 4

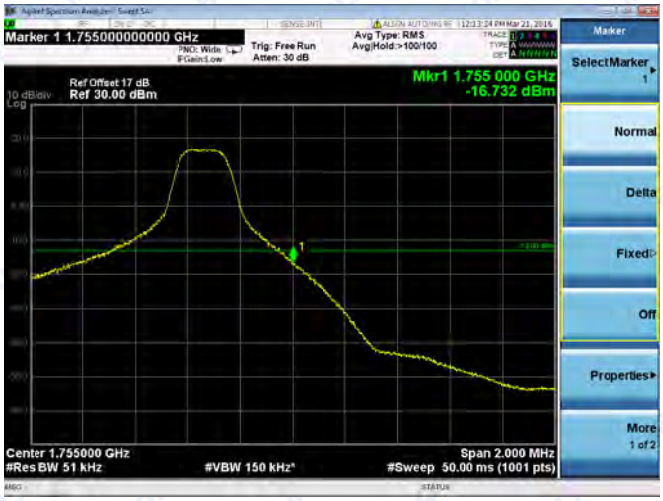
Channel Bandwidth: 5MHz

Channel	19975	RB Size 1	RB Offset 0	Channel	20375	RB Size 25	RB Offset 0



Channel Bandwidth: 5MHz

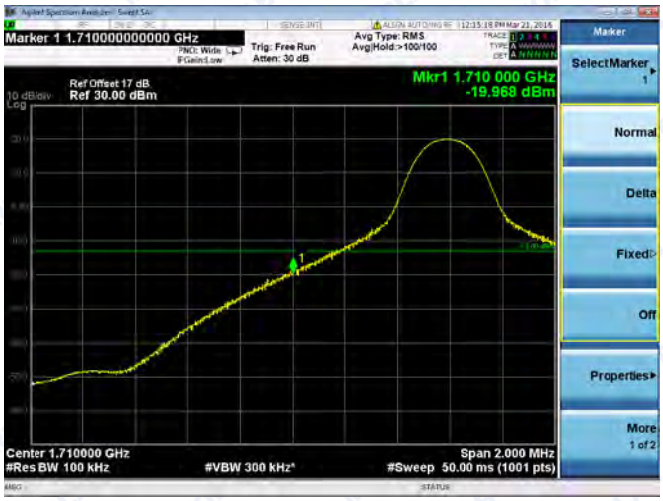
Channel	19975	RB Size 1	RB Offset 24	Channel	20375	RB Size 25	RB Offset 0



LTE Band 4

Channel Bandwidth: 10MHz

Channel	20000	RB Size 1	RB Offset 0	Channel	20350	RB Size 50	RB Offset 0



Channel Bandwidth: 10MHz

Channel	20000	RB Size 1	RB Offset 49	Channel	20350	RB Size 50	RB Offset 0

LTE Band 4

Channel Bandwidth: 15MHz

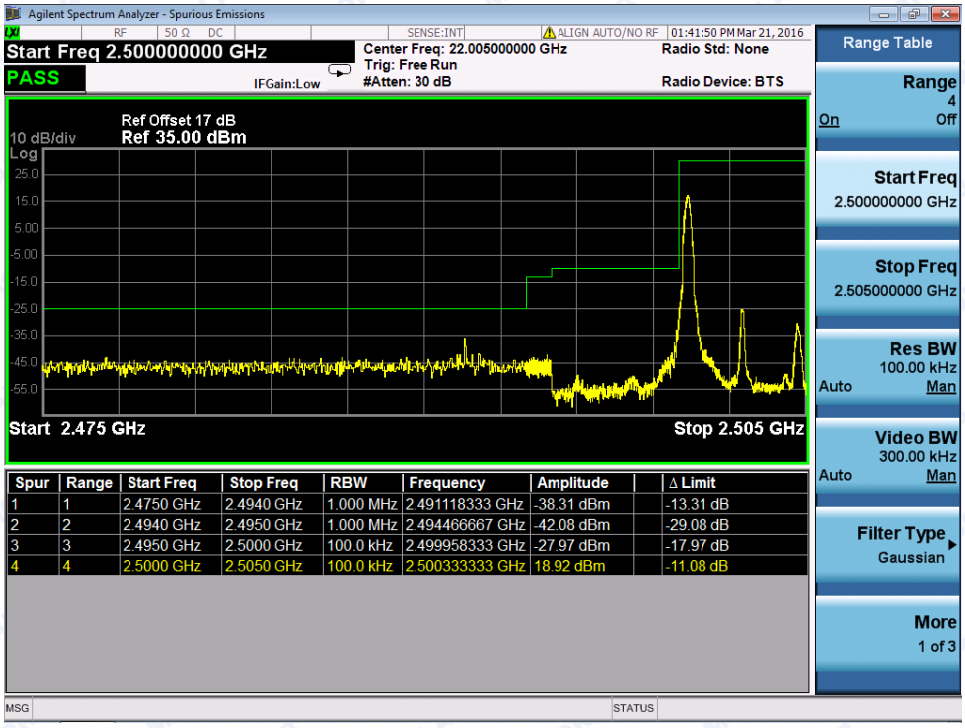
Channel	20025	RB Size 1	RB Offset 0	Channel	20325	RB Size 75	RB Offset 0

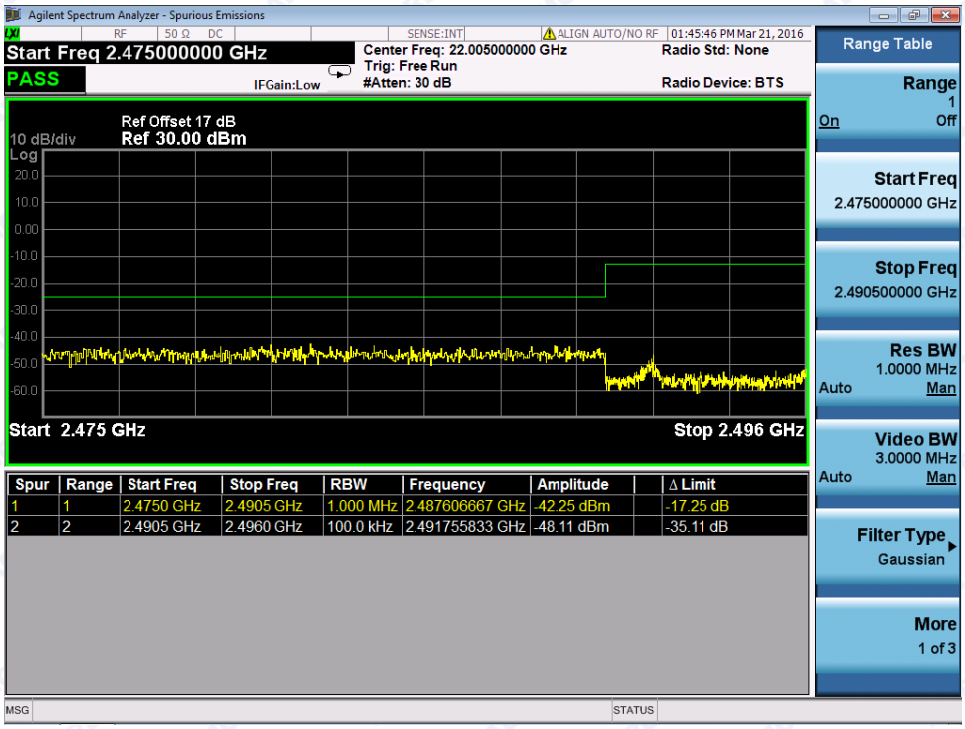
Channel Bandwidth: 15MHz

Channel	20025	RB Size 1	RB Offset 74	Channel	20325	RB Size 75	RB Offset 0

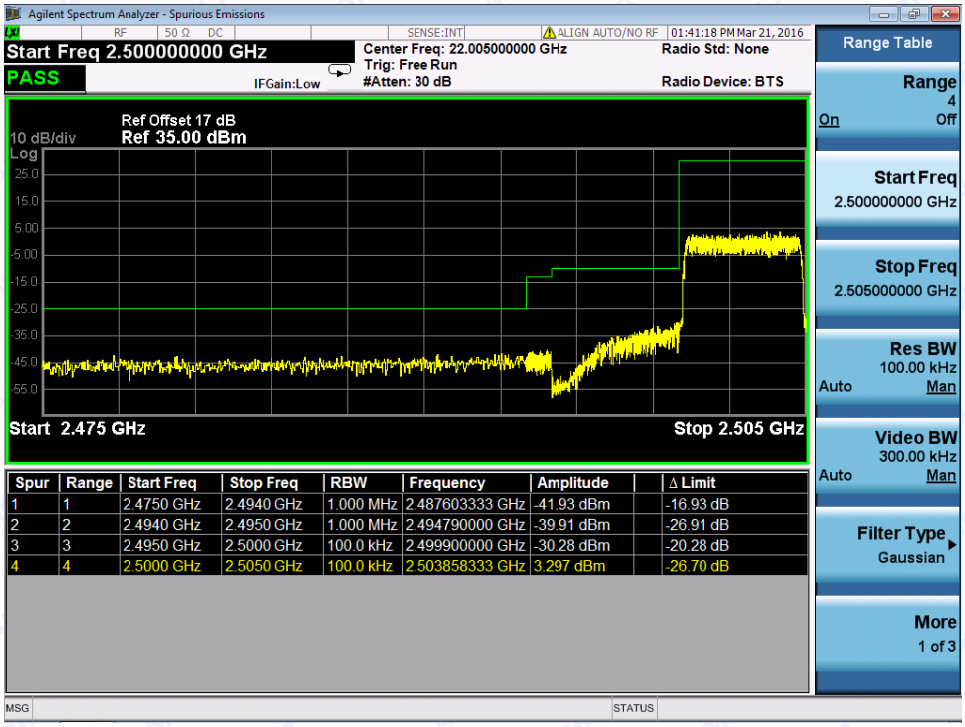
LTE Band 4							
Channel Bandwidth: 20MHz							
Channel	20050	RB Size 1	RB Offset 0	Channel	20300	RB Size 100	RB Offset 0
Channel Bandwidth: 20MHz							
Channel	20050	RB Size 1	RB Offset 99	Channel	20300	RB Size 100	RB Offset 0

LTE Band 7			
Channel Bandwidth: 5MHz X=5.082MHz			
Channel	20775	RB Size 1	RB Offset 0

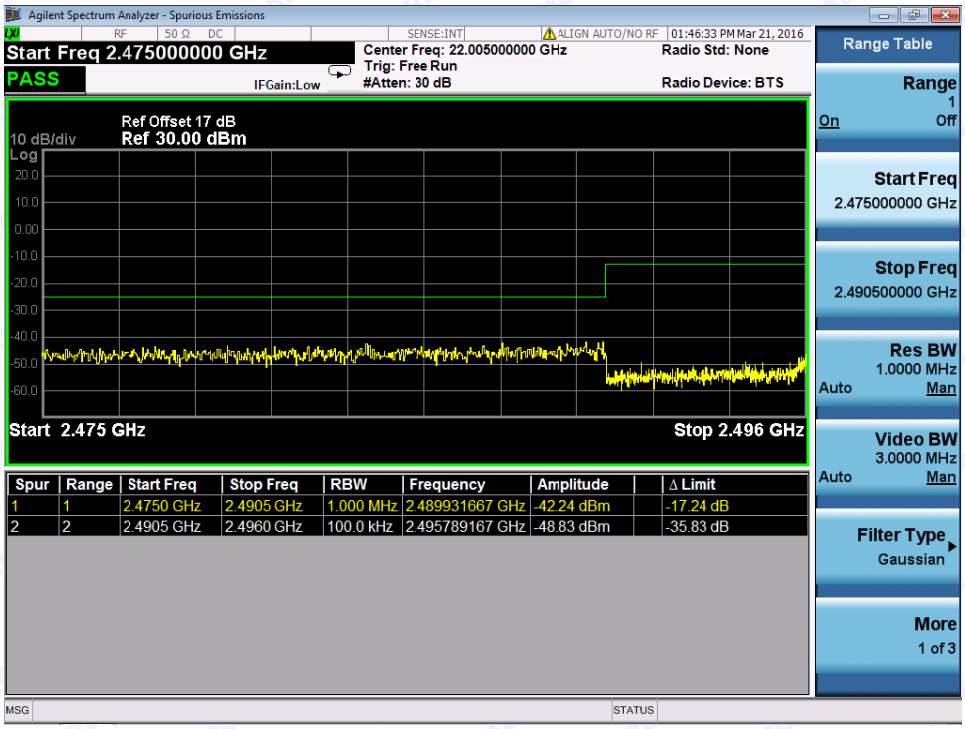




LTE Band 7			
Channel Bandwidth: 5MHz X=5.082MHz			
Channel	20775	RB Size 25	RB Offset 0



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4940 GHz	1.000 MHz	2.487603333 GHz	-41.93 dBm	-16.93 dB
2	2	2.4940 GHz	2.4950 GHz	1.000 MHz	2.494790000 GHz	-39.91 dBm	-26.91 dB
3	3	2.4950 GHz	2.5000 GHz	100.0 kHz	2.499900000 GHz	-30.28 dBm	-20.28 dB
4	4	2.5000 GHz	2.5050 GHz	100.0 kHz	2.503858333 GHz	3.297 dBm	-26.70 dB

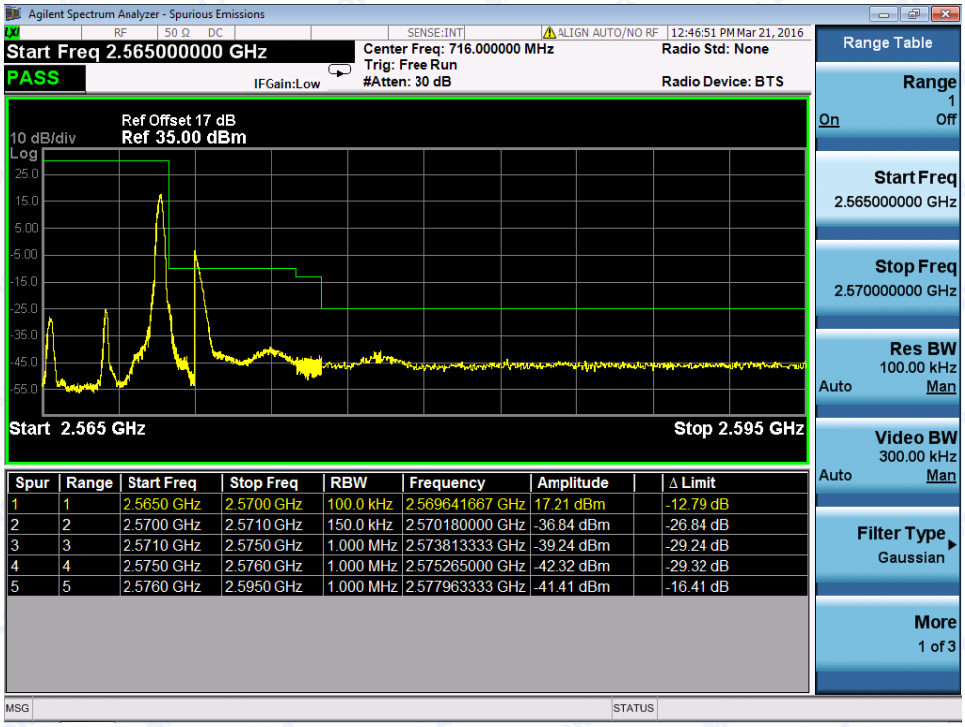


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.489931667 GHz	-42.24 dBm	-17.24 dB
2	2	2.4905 GHz	2.4960 GHz	100.0 kHz	2.495789167 GHz	-48.83 dBm	-35.83 dB

LTE Band 7

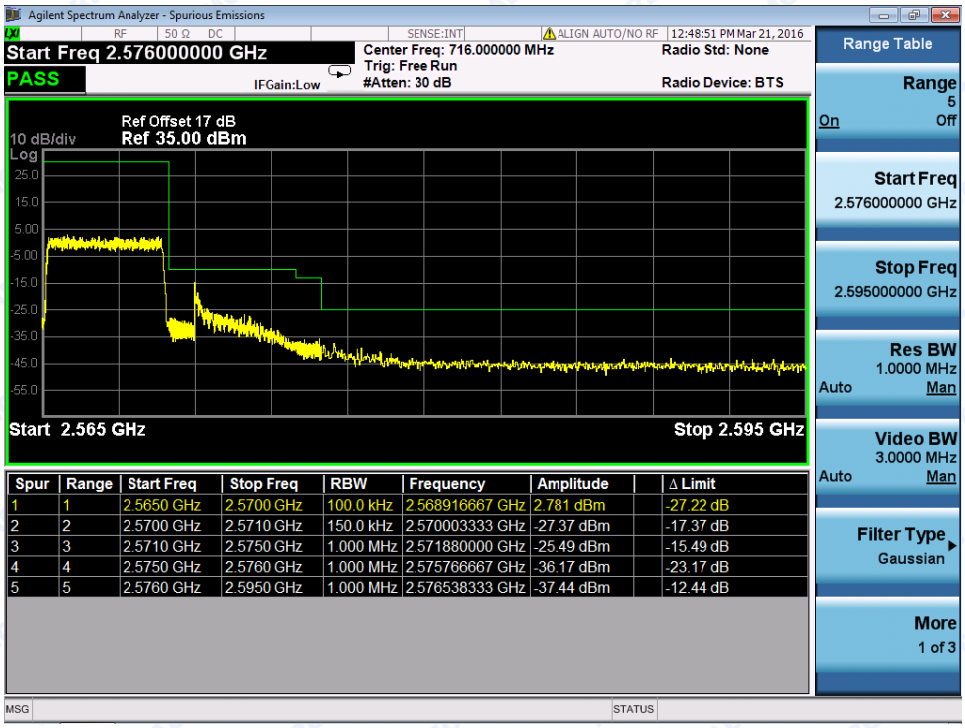
Channel Bandwidth: 5MHz X=5.018MHz

Channel	21425	RB Size 1	RB Offset 24



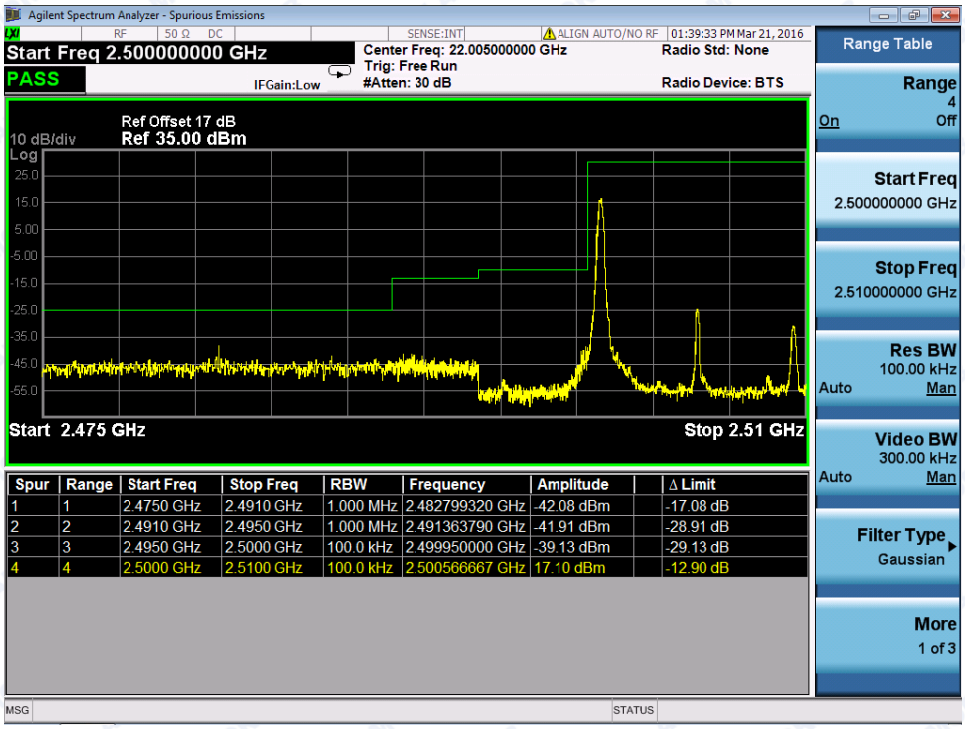
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.5650 GHz	2.5700 GHz	100.0 kHz	2.569641667 GHz	17.21 dBm	-12.79 dB
2	2	2.5700 GHz	2.5710 GHz	150.0 kHz	2.570180000 GHz	-36.84 dBm	-26.84 dB
3	3	2.5710 GHz	2.5750 GHz	1.000 MHz	2.573813333 GHz	-39.24 dBm	-29.24 dB
4	4	2.5750 GHz	2.5760 GHz	1.000 MHz	2.575265000 GHz	-42.32 dBm	-29.32 dB
5	5	2.5760 GHz	2.5950 GHz	1.000 MHz	2.577963333 GHz	-41.41 dBm	-16.41 dB

Channel	21425	RB Size 25	RB Offset 0

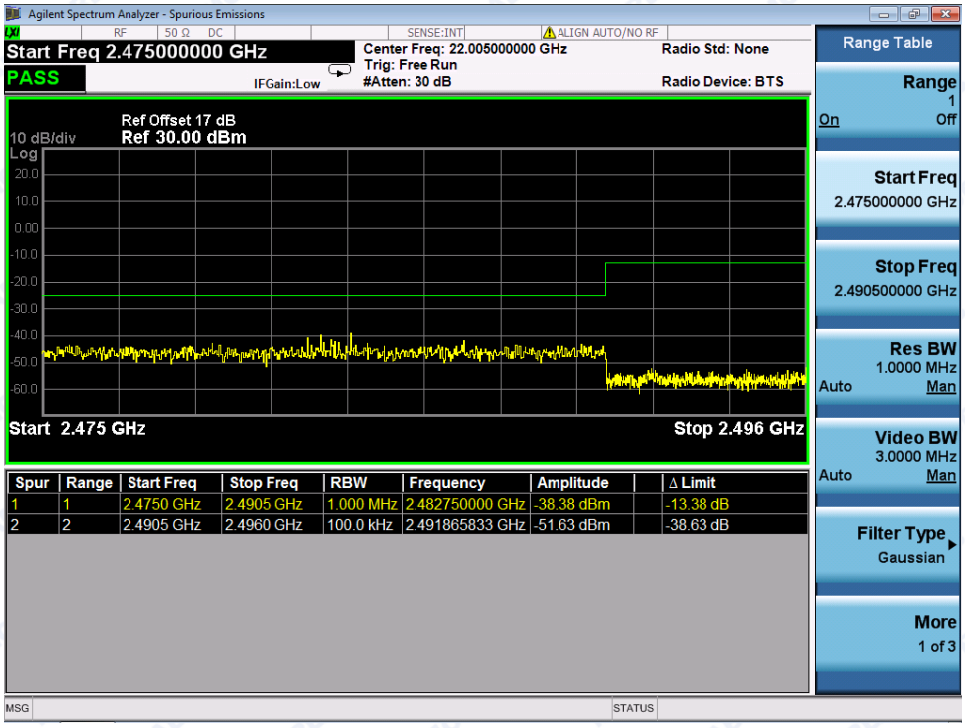


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.5650 GHz	2.5700 GHz	100.0 kHz	2.568916667 GHz	2.781 dBm	-27.22 dB
2	2	2.5700 GHz	2.5710 GHz	150.0 kHz	2.570003333 GHz	-27.37 dBm	-17.37 dB
3	3	2.5710 GHz	2.5750 GHz	1.000 MHz	2.571880000 GHz	-25.49 dBm	-15.49 dB
4	4	2.5750 GHz	2.5760 GHz	1.000 MHz	2.575766667 GHz	-36.17 dBm	-23.17 dB
5	5	2.5760 GHz	2.5950 GHz	1.000 MHz	2.576538333 GHz	-37.44 dBm	-12.44 dB

LTE Band 7			
Channel Bandwidth: 10MHz X=9.963MHz			
Channel	20800	RB Size 1	RB Offset 0

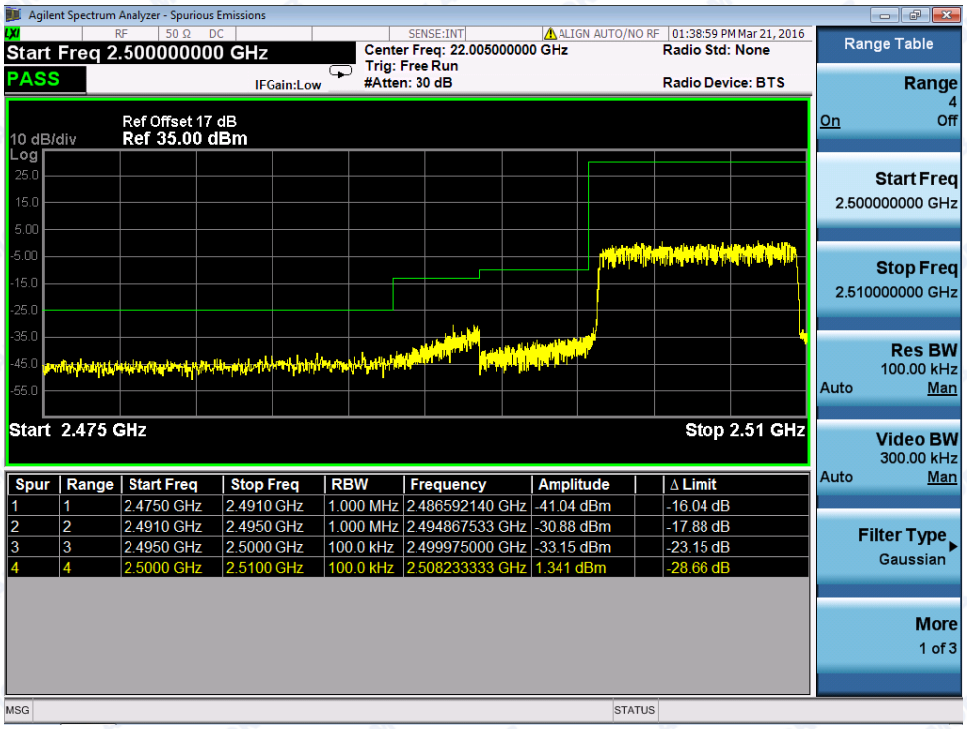


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4910 GHz	1.000 MHz	2.482799320 GHz	-42.08 dBm	-17.08 dB
2	2	2.4910 GHz	2.4950 GHz	1.000 MHz	2.491363790 GHz	-41.91 dBm	-28.91 dB
3	3	2.4950 GHz	2.5000 GHz	100.0 kHz	2.499950000 GHz	-39.13 dBm	-29.13 dB
4	4	2.5000 GHz	2.5100 GHz	100.0 kHz	2.500566667 GHz	17.10 dBm	-12.90 dB

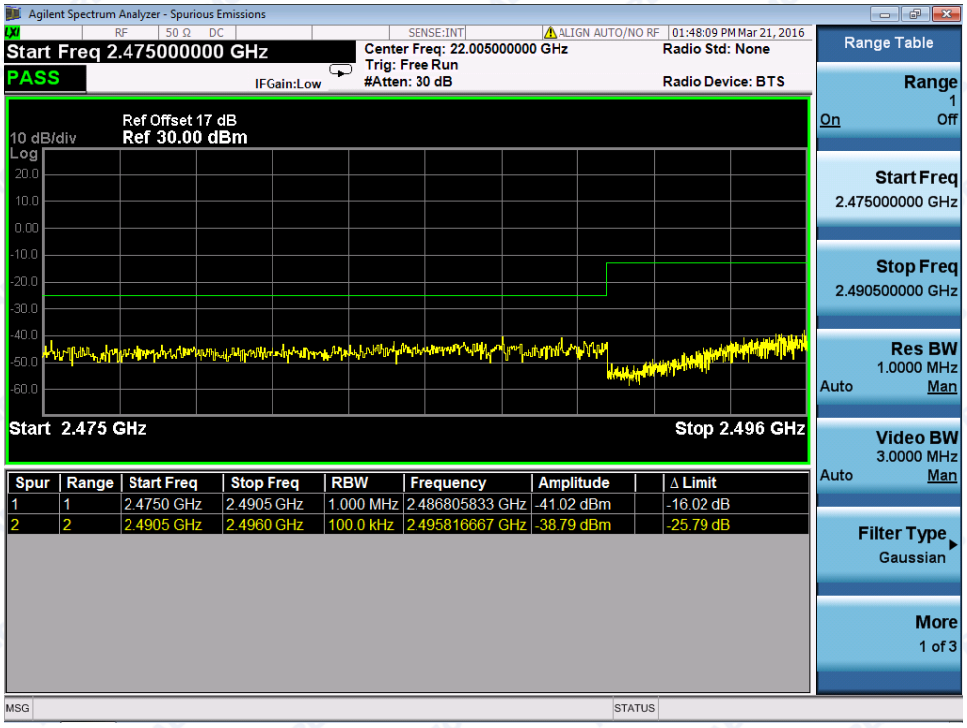


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.482750000 GHz	-38.38 dBm	-13.38 dB
2	2	2.4905 GHz	2.4960 GHz	100.0 kHz	2.491865833 GHz	-51.63 dBm	-38.63 dB

LTE Band 7			
Channel Bandwidth: 10MHz X=9.963MHz			
Channel	20800	RB Size 50	RB Offset 0

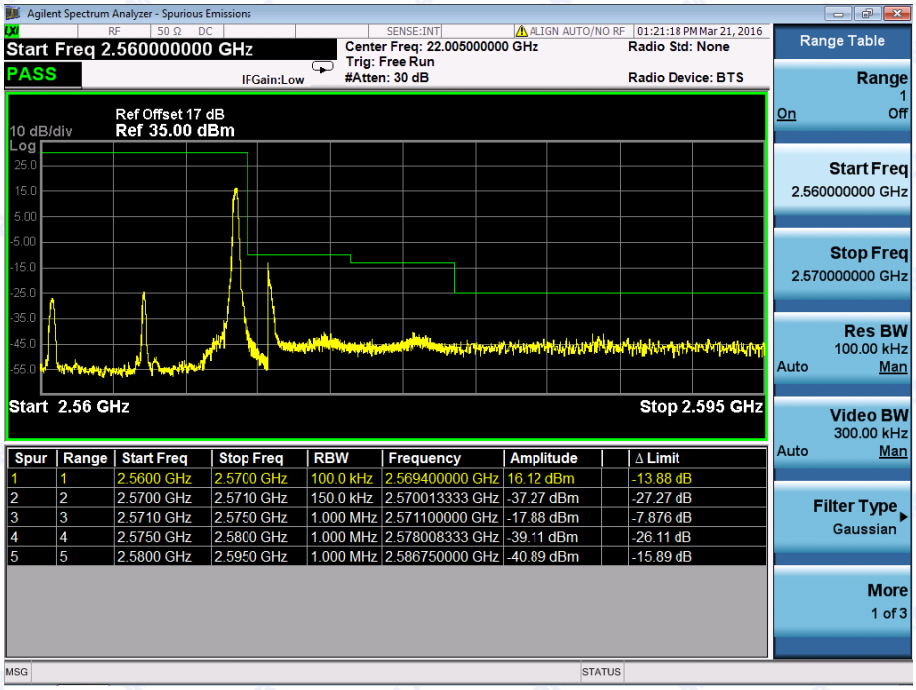


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4910 GHz	1.000 MHz	2.486592140 GHz	-41.04 dBm	-16.04 dB
2	2	2.4910 GHz	2.4950 GHz	1.000 MHz	2.494867533 GHz	-30.88 dBm	-17.88 dB
3	3	2.4950 GHz	2.5000 GHz	100.0 kHz	2.499975000 GHz	-33.15 dBm	-23.15 dB
4	4	2.5000 GHz	2.5100 GHz	100.0 kHz	2.508233333 GHz	1.341 dBm	-28.66 dB



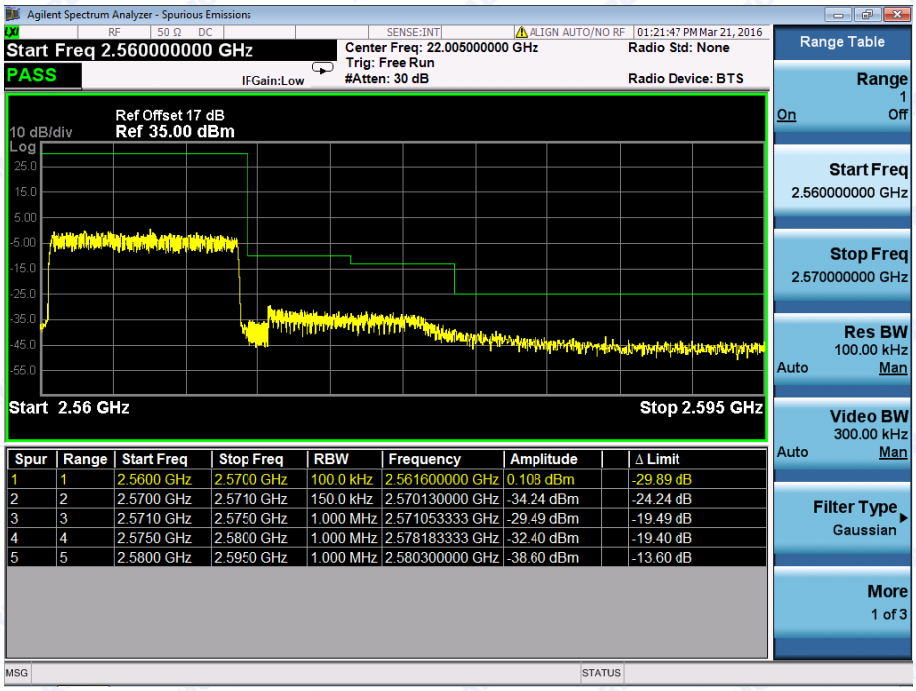
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.486805833 GHz	-41.02 dBm	-16.02 dB
2	2	2.4905 GHz	2.4960 GHz	100.0 kHz	2.495816667 GHz	-38.79 dBm	-25.79 dB

LTE Band 7			
Channel Bandwidth: 10MHz X=9.001 MHz			
Channel	21400	RB Size 1	RB Offset 49



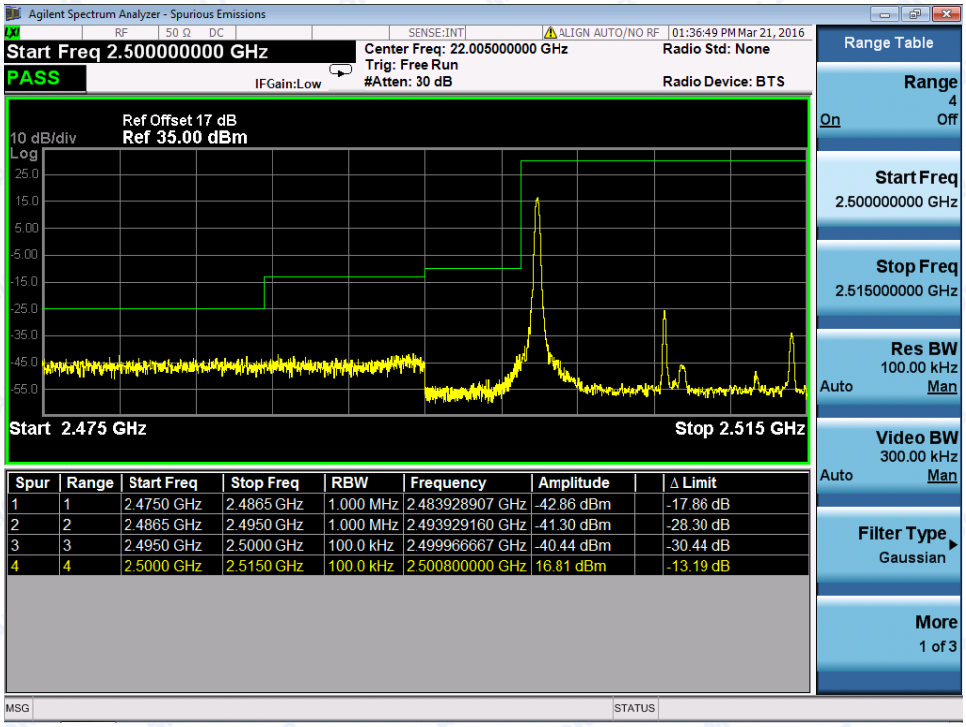
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.5600 GHz	2.5700 GHz	100.0 kHz	2.569400000 GHz	16.12 dBm	-13.88 dB
2	2	2.5700 GHz	2.5710 GHz	150.0 kHz	2.570013333 GHz	-37.27 dBm	-27.27 dB
3	3	2.5710 GHz	2.5750 GHz	1.000 MHz	2.571100000 GHz	-17.88 dBm	-7.876 dB
4	4	2.5750 GHz	2.5800 GHz	1.000 MHz	2.578008333 GHz	-39.11 dBm	-26.11 dB
5	5	2.5800 GHz	2.5950 GHz	1.000 MHz	2.586750000 GHz	-40.89 dBm	-15.89 dB

Channel	21400	RB Size 50	RB Offset 0

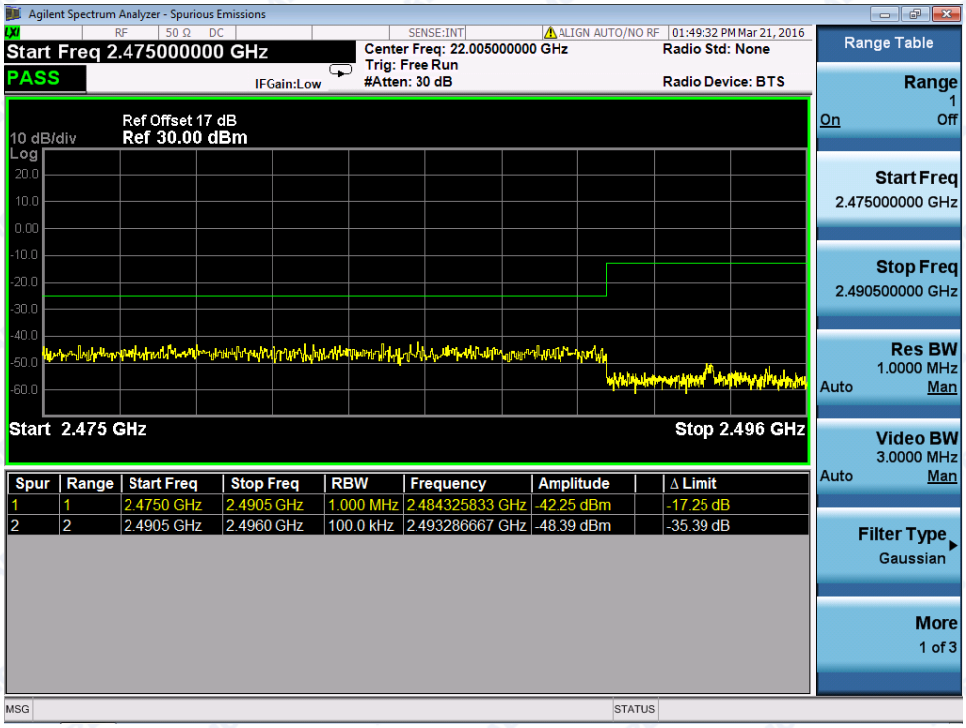


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.5600 GHz	2.5700 GHz	100.0 kHz	2.561600000 GHz	0.108 dBm	-29.89 dB
2	2	2.5700 GHz	2.5710 GHz	150.0 kHz	2.570130000 GHz	-34.24 dBm	-24.24 dB
3	3	2.5710 GHz	2.5750 GHz	1.000 MHz	2.571053333 GHz	-29.49 dBm	-19.49 dB
4	4	2.5750 GHz	2.5800 GHz	1.000 MHz	2.578183333 GHz	-32.40 dBm	-19.40 dB
5	5	2.5800 GHz	2.5950 GHz	1.000 MHz	2.580300000 GHz	-38.60 dBm	-13.60 dB

LTE Band 7			
Channel Bandwidth: 15MHz X=14.84MHz			
Channel	20825	RB Size 1	RB Offset 0

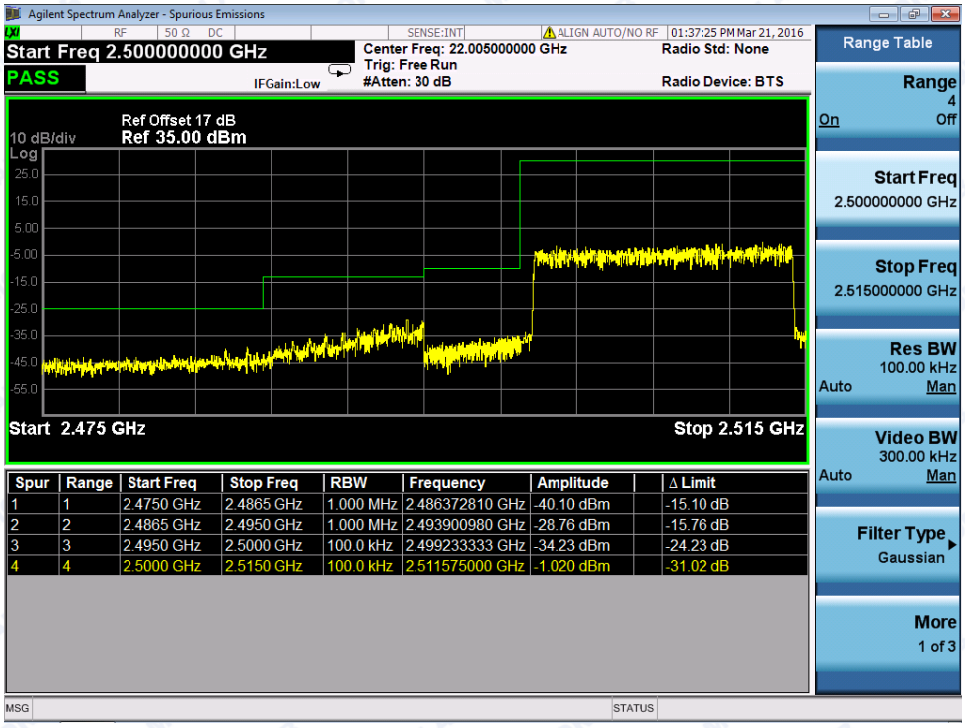


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4865 GHz	1.000 MHz	2.483928907 GHz	-42.86 dBm	-17.86 dB
2	2	2.4865 GHz	2.4950 GHz	1.000 MHz	2.493929160 GHz	-41.30 dBm	-28.30 dB
3	3	2.4950 GHz	2.5000 GHz	100.0 kHz	2.499966667 GHz	-40.44 dBm	-30.44 dB
4	4	2.5000 GHz	2.5150 GHz	100.0 kHz	2.500800000 GHz	16.81 dBm	-13.19 dB

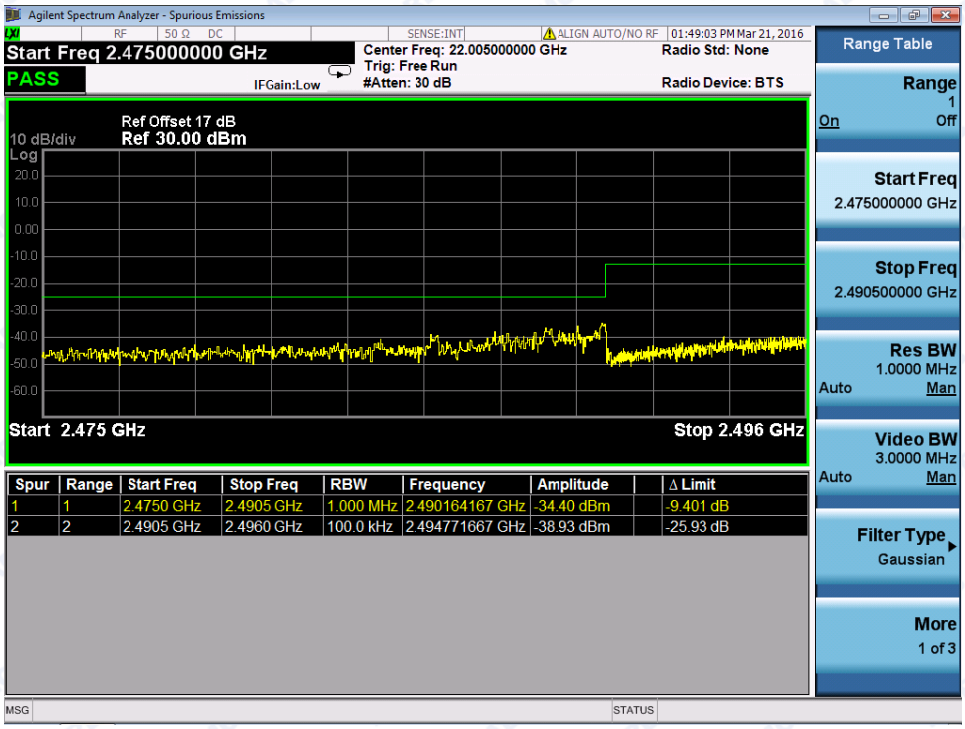


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.484325833 GHz	-42.25 dBm	-17.25 dB
2	2	2.4905 GHz	2.4960 GHz	100.0 kHz	2.493286667 GHz	-48.39 dBm	-35.39 dB

LTE Band 7			
Channel Bandwidth: 15MHz X=14.84MHz			
Channel	20825	RB Size 75	RB Offset 0



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4865 GHz	1.000 MHz	2.486372810 GHz	-40.10 dBm	-15.10 dB
2	2	2.4865 GHz	2.4950 GHz	1.000 MHz	2.493900980 GHz	-28.76 dBm	-15.76 dB
3	3	2.4950 GHz	2.5000 GHz	100.0 kHz	2.499233333 GHz	-34.23 dBm	-24.23 dB
4	4	2.5000 GHz	2.5150 GHz	100.0 kHz	2.511575000 GHz	-1.020 dBm	-31.02 dB

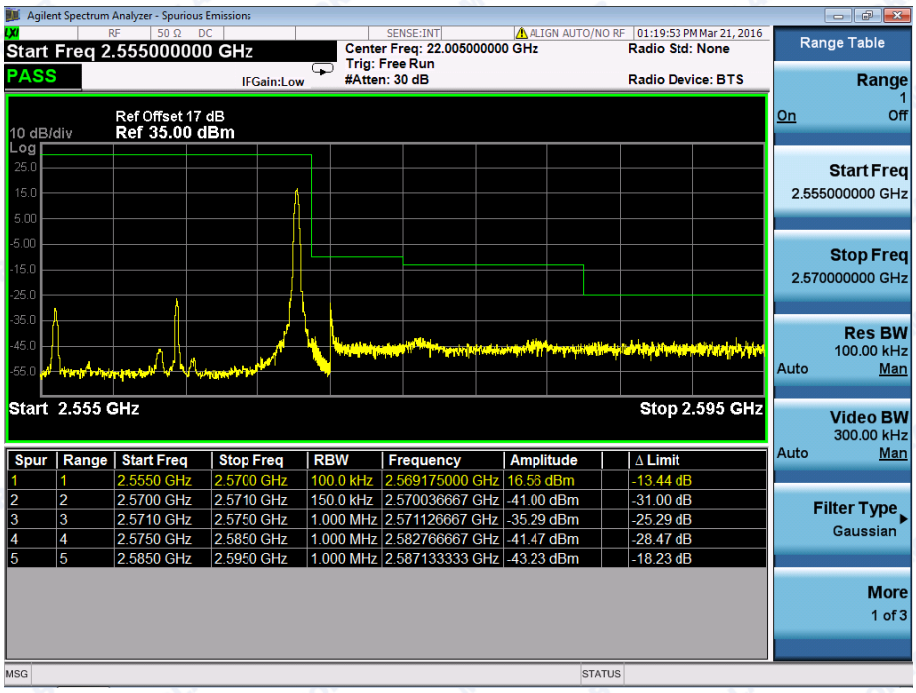


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.490164167 GHz	-34.40 dBm	-9.401 dB
2	2	2.4905 GHz	2.4960 GHz	100.0 kHz	2.494771667 GHz	-38.93 dBm	-25.93 dB

LTE Band 7

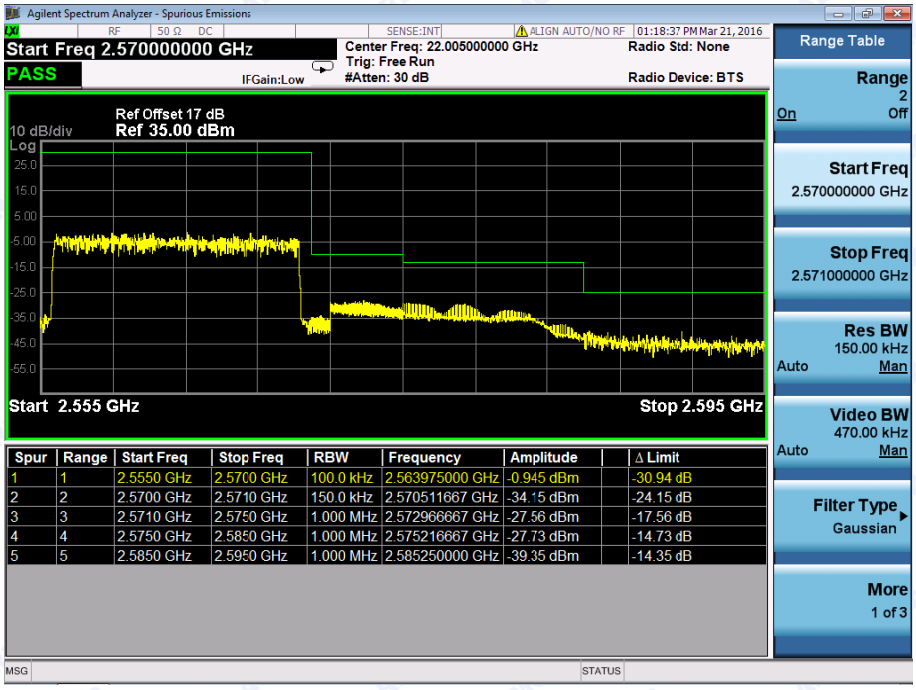
Channel Bandwidth: 15MHz X=14.90MHz

Channel	21375	RB Size 1	RB Offset 74



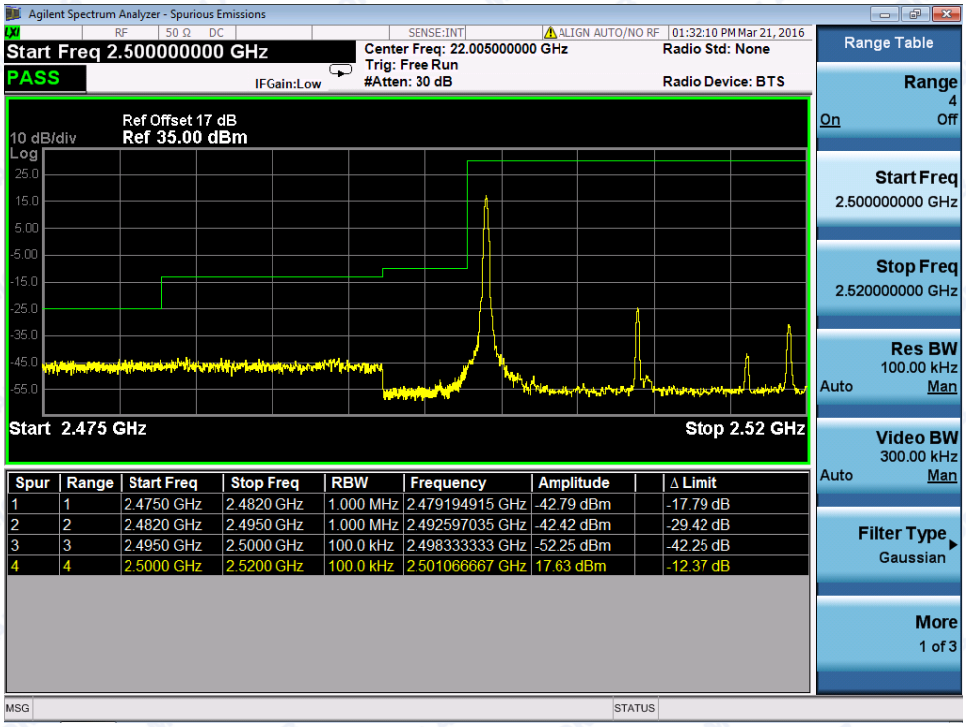
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.5550 GHz	2.5700 GHz	100.0 kHz	2.569175000 GHz	16.56 dBm	-13.44 dB
2	2	2.5700 GHz	2.5710 GHz	150.0 kHz	2.570036667 GHz	-41.00 dBm	-31.00 dB
3	3	2.5710 GHz	2.5750 GHz	1.000 MHz	2.571126667 GHz	-35.29 dBm	-25.29 dB
4	4	2.5750 GHz	2.5850 GHz	1.000 MHz	2.582766667 GHz	-41.47 dBm	-28.47 dB
5	5	2.5850 GHz	2.5950 GHz	1.000 MHz	2.587133333 GHz	-43.23 dBm	-18.23 dB

Channel	21375	RB Size 75	RB Offset 0

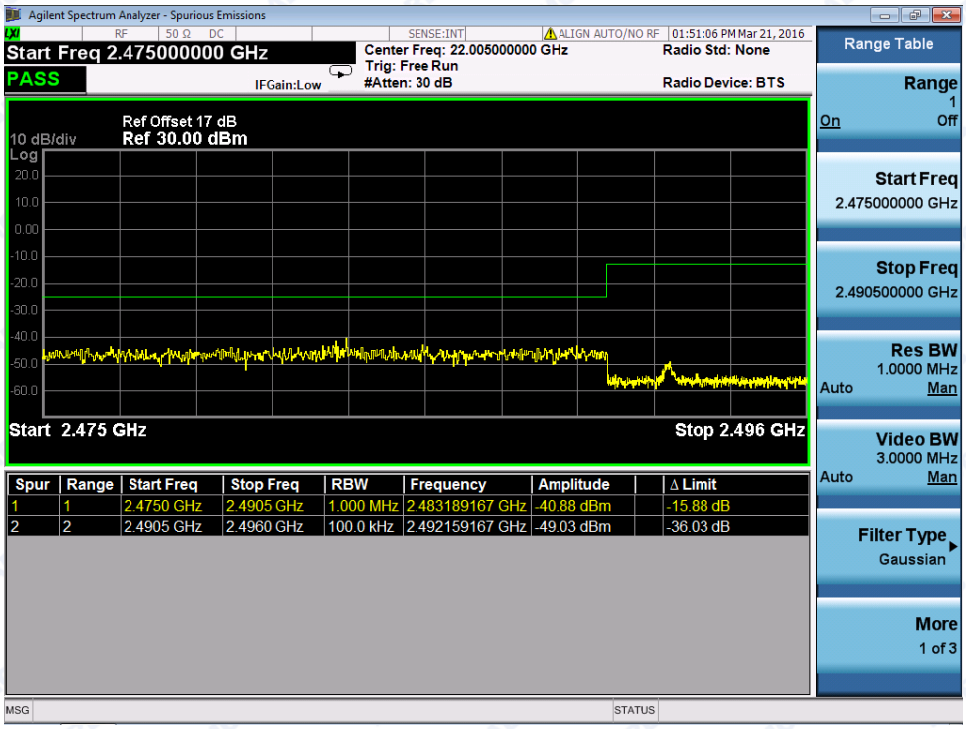


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.5550 GHz	2.5700 GHz	100.0 kHz	2.563975000 GHz	-0.945 dBm	-30.94 dB
2	2	2.5700 GHz	2.5710 GHz	150.0 kHz	2.570511667 GHz	-34.15 dBm	-24.15 dB
3	3	2.5710 GHz	2.5750 GHz	1.000 MHz	2.572966667 GHz	-27.56 dBm	-17.56 dB
4	4	2.5750 GHz	2.5850 GHz	1.000 MHz	2.575216667 GHz	-27.73 dBm	-14.73 dB
5	5	2.5850 GHz	2.5950 GHz	1.000 MHz	2.585250000 GHz	-39.35 dBm	-14.35 dB

LTE Band 7			
Channel Bandwidth: 20MHz X=19.63MHz			
Channel	20850	RB Size 1	RB Offset 0

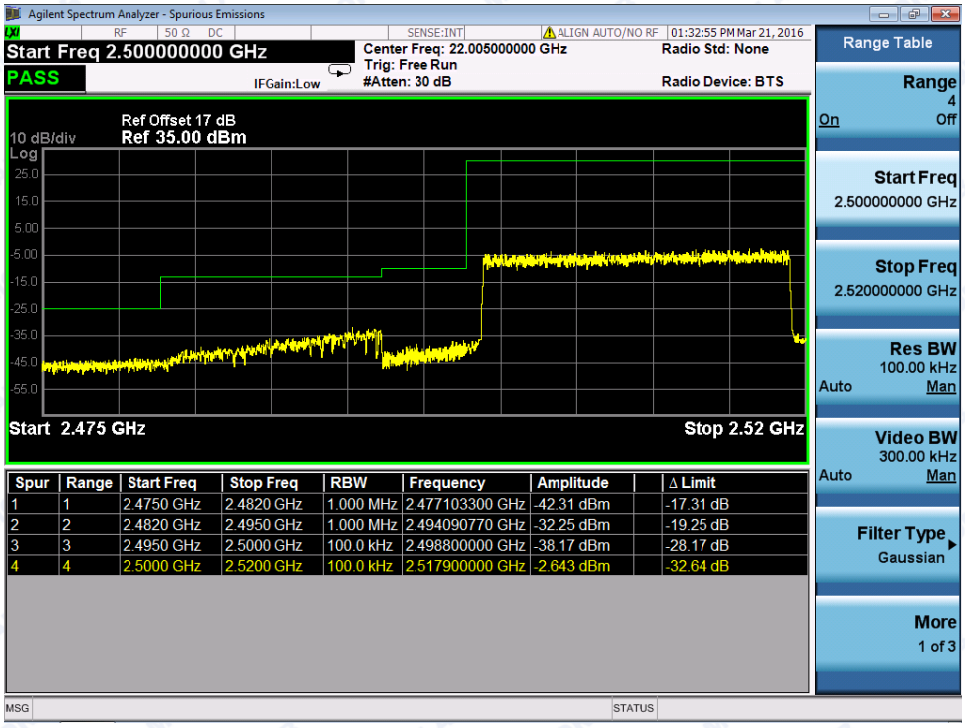


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4820 GHz	1.000 MHz	2.479194915 GHz	-42.79 dBm	-17.79 dB
2	2	2.4820 GHz	2.4950 GHz	1.000 MHz	2.492597035 GHz	-42.42 dBm	-29.42 dB
3	3	2.4950 GHz	2.5000 GHz	100.0 kHz	2.498333333 GHz	-52.25 dBm	-42.25 dB
4	4	2.5000 GHz	2.5200 GHz	100.0 kHz	2.501066667 GHz	17.63 dBm	-12.37 dB

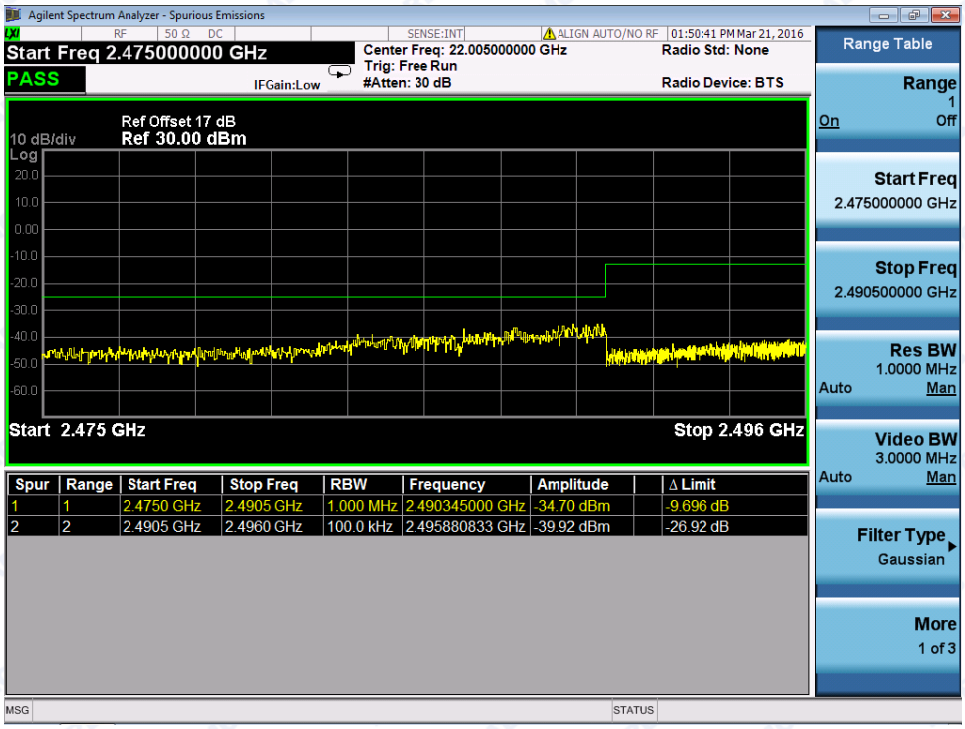


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.483189167 GHz	-40.88 dBm	-15.88 dB
2	2	2.4905 GHz	2.4960 GHz	100.0 kHz	2.492159167 GHz	-49.03 dBm	-36.03 dB

LTE Band 7			
Channel Bandwidth: 20MHz X=19.63MHz			
Channel	20850	RB Size 100	RB Offset 0



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4820 GHz	1.000 MHz	2.477103300 GHz	-42.31 dBm	-17.31 dB
2	2	2.4820 GHz	2.4950 GHz	1.000 MHz	2.494090770 GHz	-32.25 dBm	-19.25 dB
3	3	2.4950 GHz	2.5000 GHz	100.0 kHz	2.498800000 GHz	-38.17 dBm	-28.17 dB
4	4	2.5000 GHz	2.5200 GHz	100.0 kHz	2.517900000 GHz	-2.643 dBm	-32.64 dB

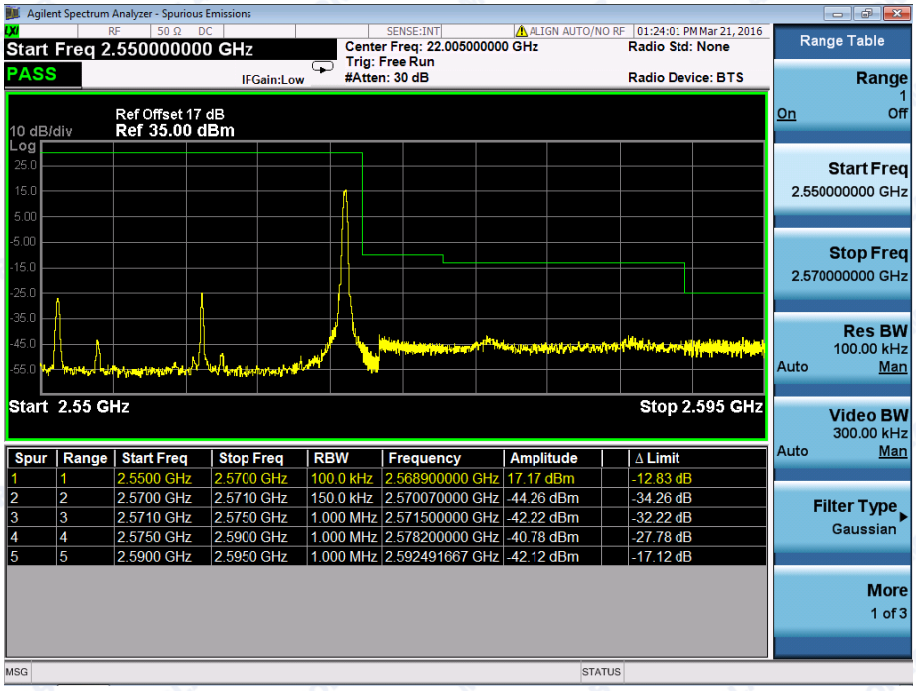


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.490345000 GHz	-34.70 dBm	-9.696 dB
2	2	2.4905 GHz	2.4960 GHz	100.0 kHz	2.495880833 GHz	-39.92 dBm	-26.92 dB

LTE Band 7

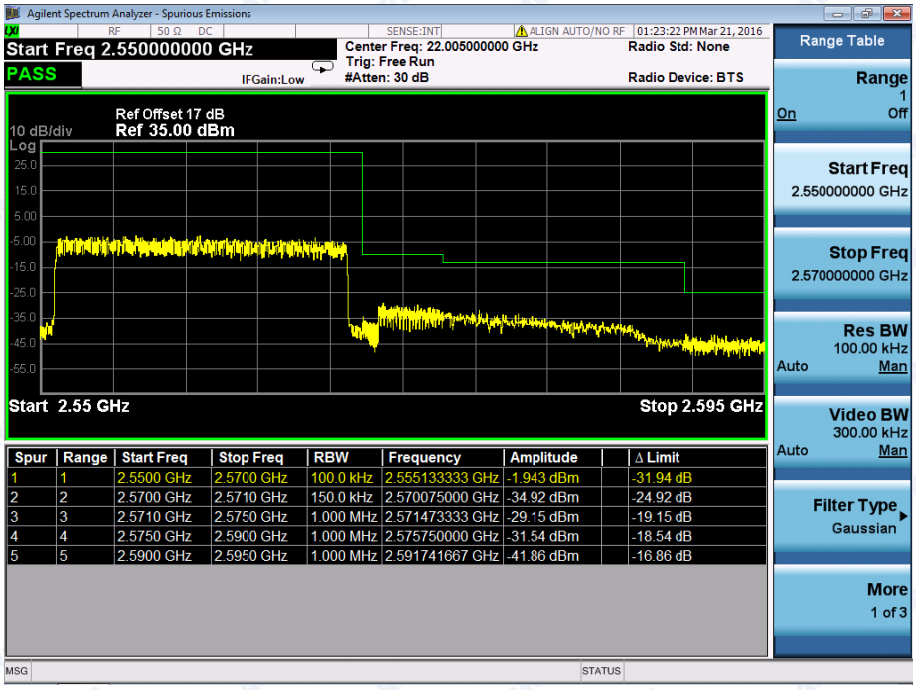
Channel Bandwidth: 20MHz X=19.58MHz

Channel	21350	RB Size 1	RB Offset 99



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.5500 GHz	2.5700 GHz	100.0 kHz	2.568900000 GHz	17.17 dBm	-12.83 dB
2	2	2.5700 GHz	2.5710 GHz	150.0 kHz	2.570070000 GHz	-44.26 dBm	-34.26 dB
3	3	2.5710 GHz	2.5750 GHz	1.000 MHz	2.571500000 GHz	-42.22 dBm	-32.22 dB
4	4	2.5750 GHz	2.5900 GHz	1.000 MHz	2.578200000 GHz	-40.78 dBm	-27.78 dB
5	5	2.5900 GHz	2.5950 GHz	1.000 MHz	2.592491667 GHz	-42.12 dBm	-17.12 dB

Channel	21350	RB Size 100	RB Offset 0



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.5500 GHz	2.5700 GHz	100.0 kHz	2.555133333 GHz	-1.943 dBm	-31.94 dB
2	2	2.5700 GHz	2.5710 GHz	150.0 kHz	2.570075000 GHz	-34.92 dBm	-24.92 dB
3	3	2.5710 GHz	2.5750 GHz	1.000 MHz	2.571473333 GHz	-29.15 dBm	-19.15 dB
4	4	2.5750 GHz	2.5900 GHz	1.000 MHz	2.575750000 GHz	-31.54 dBm	-18.54 dB
5	5	2.5900 GHz	2.5950 GHz	1.000 MHz	2.591741667 GHz	-41.86 dBm	-16.86 dB

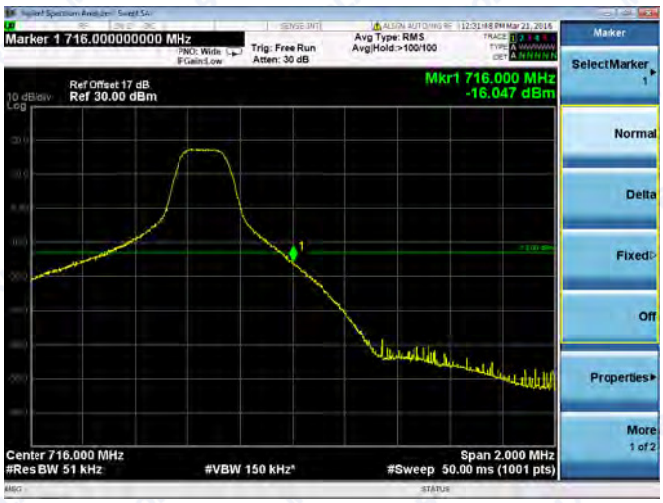
LTE Band 17

Channel Bandwidth: 5MHz

Channel	23755	RB Size 1	RB Offset 0	Channel	23755	RB Size 25	RB Offset 0

Channel Bandwidth: 5MHz

Channel	23825	RB Size 1	RB Offset 24	Channel	23825	RB Size 25	RB Offset 0



LTE Band 17

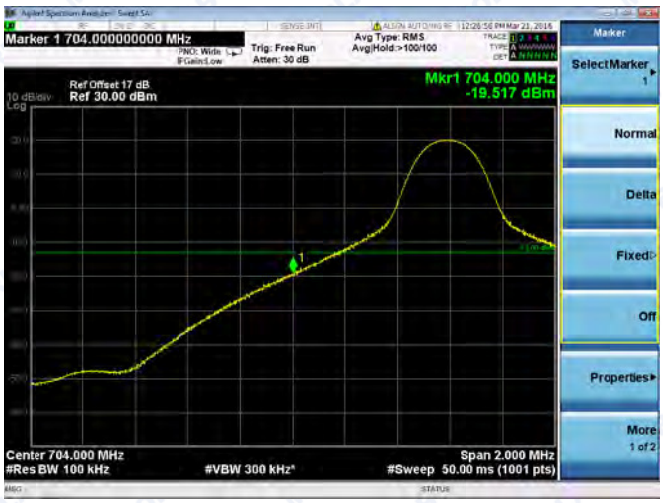
Channel Bandwidth: 10MHz

Channel	23780	RB Size 1	RB Offset 0

Channel	23780	RB Size 50	RB Offset 0

Channel Bandwidth: 10MHz

Channel	23800	RB Size 1	RB Offset 49



Channel	23800	RB Size 50	RB Offset 0

2.7 Transmitter Radiated Power (EIRP/ERP)

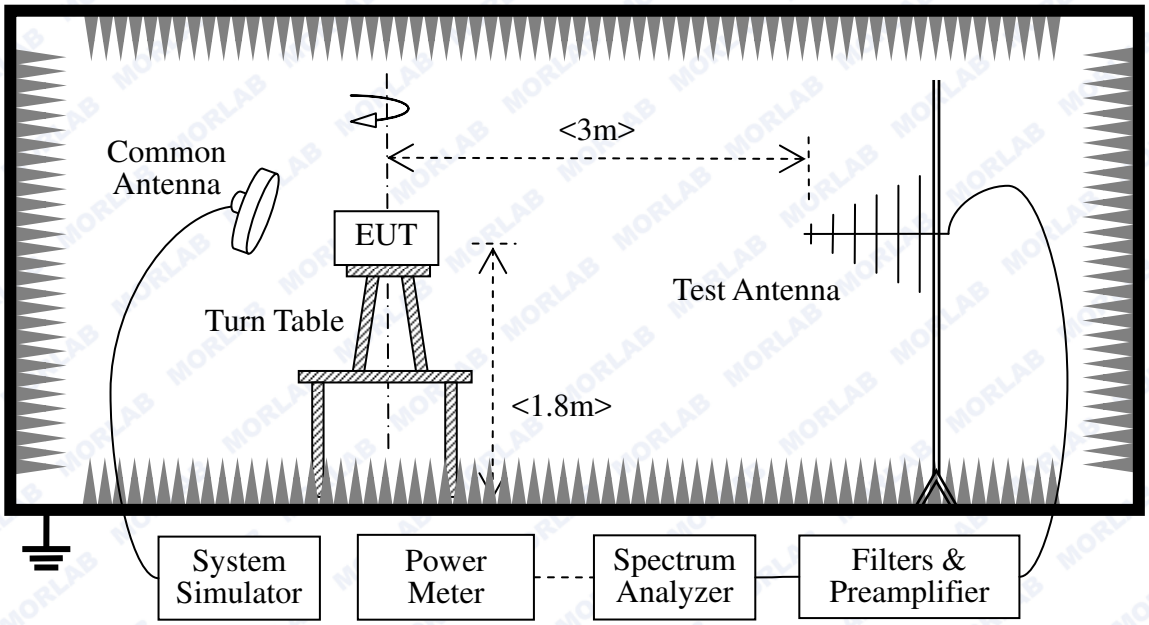
2.7.1 Requirement

According to FCC section 27.50 (d), fixed, mobile and portable (hand-held) stations in the 1710-1755MHz band are limited to 1wat EIRP.

Portable stations (hand-held devices) operating in the 704-716MHz band are limited to 3watts ERP.

2.7.2 Test Description

Test Setup:



The EUT, which is powered by the PC, is located in a 3m Full-Anechoic Chamber; the cable loss, air loss and so on of the site as factors are pre-calibrated using the "Substitution" method, and calculated to correct the reading.

A call is established between the EUT and the SS via a Common Antenna. The EUT is commanded by the SS to operate at the maximum and minimum output power, and only the test result of the maximum output power was recorded.

The Test Antenna is a Bi-Log one (used for 30MHz to 1GHz) or a Horn one (used for above 3GHz), and it's located at the same height as the EUT. The Filters consists of Notch Filters and High Pass Filter.

Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
System Simulator	Rohde& Schwarz	CMW500	1201.0002k50/ 124534/wk	2015.03.26	2016.03.25
Spectrum Analyzer	Rohde& Schwarz	FSL	10246	2015.03.26	2016.03.25
Spectrum Analyzer	Agilent	E4445A	MY44200685	2015.03.26	2016.03.25
Full-Anechoic Chamber	Albatross	9m*6m*6m	(n.a.)	2015.03.26	2016.03.25
Test Antenna - Bi-Log	Schwarzbeck	VULB 9163	9163-274	2015.03.26	2016.03.25
Test Antenna - Horn	Schwarzbeck	BBHA 9120C	9120C-384	2015.03.26	2016.03.25

2.7.3 Test Result

The EUT was verified under all configurations (RB size and offset) and the worst case radiated power reported for each modulation/channel bandwidth.

The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. The lowest, middle and highest channels are tested.

The substitution corrections are obtained as described below:

$A_{SUBST} = P_{SUBST_TX} - P_{SUBST_RX} - L_{SUBST_CABLES} + G_{SUBST_TX_ANT}$

$A_{TOT} = L_{CABLES} + A_{SUBST}$

Where A_{SUBST} is the final substitution correction including receive antenna gain.

P_{SUBST_TX} is signal generator level,

P_{SUBST_RX} is receiver level,

L_{SUBST_CABLES} is cable losses including TX cable,

$G_{SUBST_TX_ANT}$ is substitution antenna gain.

A_{TOT} is total correction factor including cable loss and substitution correction

During the test, the data of A_{TOT} was added in the Test Spectrum Analyze, so Spectrum Analyze reading is the final values which contain the data of A_{TOT}.

Band	Band Width	Channel	Freq.(MHz)	Modulation	RB Configuration		EIRP
					RB Size	RB Offset	(dBm)
LTE Band 2	20MHz	L 18700	1860	QPSK	1	0	23.52
					100	0	22.47
				16-QAM	1	0	22.51
					100	0	21.53
		M 18900	1880	QPSK	1	0	23.69
					100	0	22.60
				16-QAM	1	0	22.94
					100	0	21.72
		H 19100	1900	QPSK	1	0	23.62
					100	0	22.57
				16-QAM	1	0	23.07
					100	0	21.45
Band	Band Width	Channel	Freq.(MHz)	Modulation	RB Configuration		EIRP
					RB Size	RB Offset	(dBm)
LTE Band 2	15MHz	L 18675	1857.5	QPSK	1	0	23.47
					75	0	22.56
				16-QAM	1	0	22.51
					75	0	21.41
		M 18900	1880	QPSK	1	0	23.64
					75	0	22.70
				16-QAM	1	0	22.91
					75	0	21.48
		H 19125	1902.5	QPSK	1	0	23.68
					75	0	22.44
				16-QAM	1	0	22.59
					75	0	21.47
Band	Band Width	Channel	Freq.(MHz)	Modulation	RB Configuration		EIRP
					RB Size	RB Offset	(dBm)
LTE Band 2	10MHz	L 18650	1855	QPSK	1	0	23.41
					50	0	22.53
				16-QAM	1	0	22.51
					50	0	21.48
		M 18900	1880	QPSK	1	0	23.52
					50	0	22.70
				16-QAM	1	0	22.93
					50	0	20.72
		H 19150	1905	QPSK	1	0	23.21
					50	0	22.18
				16-QAM	1	0	22.04
					50	0	21.52

Band	Band Width	Channel	Freq.(MHz)	Modulation	RB Configuration		EIRP
					RB Size	RB Offset	(dBm)
LTE Band 2	5MHz	L 18625	1852.5	QPSK	1	0	23.72
					25	0	22.53
				16-QAM	1	0	22.90
					25	0	21.47
		M 18900	1880	QPSK	1	0	23.53
					25	0	22.61
				16-QAM	1	0	21.32
					25	0	21.77
		H 19175	1907.5	QPSK	1	0	23.28
					25	0	21.27
				16-QAM	1	0	22.49
					25	0	21.25
Band	Band Width	Channel	Freq.(MHz)	Modulation	RB Configuration		EIRP
					RB Size	RB Offset	(dBm)
LTE Band 2	3MHz	L 18615	1851.5	QPSK	1	0	23.46
					15	0	22.71
				16-QAM	1	0	22.76
					15	0	21.73
		M 18900	1880	QPSK	1	0	23.68
					15	0	22.88
				16-QAM	1	0	23.11
					15	0	21.92
		H 19185	1908.5	QPSK	1	0	23.54
					15	0	22.67
				16-QAM	1	0	22.03
					15	0	21.46
Band	Band Width	Channel	Freq.(MHz)	Modulation	RB Configuration		EIRP
					RB Size	RB Offset	(dBm)
LTE Band 2	1.4MHz	L 18607	1850.7	QPSK	1	0	23.27
					6	0	22.61
				16-QAM	1	0	22.74
					6	0	21.50
		18900	1880	QPSK	1	0	23.78
					6	0	22.82
				16-QAM	1	0	22.53
					6	0	21.84
		H 19193	1909.3	QPSK	1	0	23.41
					6	0	22.49
				16-QAM	1	0	22.27
					6	0	21.41

Band	Band Width	Channel	Freq.(MHz)	Modulation	RB Configuration		EIRP
					RB Size	RB Offset	(dBm)
LTE Band 4	20MHz	L 20050	1720.0	QPSK	1	0	23.62
					100	0	22.91
				16-QAM	1	0	23.19
					100	0	22.01
		M 20175	1732.5	QPSK	1	0	23.92
					100	0	22.43
				16-QAM	1	0	23.49
					100	0	22.11
		H 20300	1745.0	QPSK	1	0	24.01
					100	0	22.73
				16-QAM	1	0	23.52
					100	0	22.07
Band	Band Width	Channel	Freq.(MHz)	Modulation	RB Configuration		EIRP
					RB Size	RB Offset	(dBm)
LTE Band 4	15MHz	L 20025	1717.5	QPSK	1	0	24.03
					75	0	22.98
				16-QAM	1	0	23.14
					75	0	22.18
		M 20175	1732.5	QPSK	1	0	24.11
					75	0	22.37
				16-QAM	1	0	23.40
					75	0	22.11
		H 20325	1747.5	QPSK	1	0	24.10
					75	0	22.41
				16-QAM	1	0	23.17
					75	0	22.09
Band	Band Width	Channel	Freq.(MHz)	Modulation	RB Configuration		EIRP
					RB Size	RB Offset	(dBm)
LTE Band 4	10MHz	L 20000	1715.0	QPSK	1	0	23.91
					50	0	23.08
				16-QAM	1	0	23.17
					50	0	22.15
		M 20175	1732.5	QPSK	1	0	23.93
					50	0	22.08
				16-QAM	1	0	23.18
					50	0	22.12
		H 20350	1750.0	QPSK	1	0	24.03
					50	0	22.14
				16-QAM	1	0	22.81
					50	0	22.07

Band	Band Width	Channel	Freq.(MHz)	Modulation	RB Configuration		EIRP
					RB Size	RB Offset	(dBm)
LTE Band 4	5MHz	L 19975	1712.5	QPSK	1	0	24.12
					25	0	23.02
				16-QAM	1	0	23.42
					25	0	22.14
		M 20175	1732.5	QPSK	1	0	24.06
					25	0	23.08
				16-QAM	1	0	22.85
					25	0	22.07
		H 20375	1752.5	QPSK	1	0	24.15
					25	0	23.07
				16-QAM	1	0	23.14
					25	0	22.06
Band	Band Width	Channel	Freq.(MHz)	Modulation	RB Configuration		EIRP
					RB Size	RB Offset	(dBm)
LTE Band 4	3MHz	L 19965	1711.5	QPSK	1	0	23.94
					15	0	23.11
				16-QAM	1	0	23.00
					15	0	22.11
		M 20175	1732.5	QPSK	1	0	24.05
					15	0	22.18
				16-QAM	1	0	23.16
					15	0	22.17
		H 20385	1753.5	QPSK	1	0	24.13
					15	0	23.08
				16-QAM	1	0	22.77
					15	0	21.02
Band	Band Width	Channel	Freq.(MHz)	Modulation	RB Configuration		EIRP
					RB Size	RB Offset	(dBm)
LTE Band 4	1.4MHz	L 19957	1710.7	QPSK	1	0	24.09
					6	0	23.11
				16-QAM	1	0	23.26
					6	0	22.17
		M 20175	1732.5	QPSK	1	0	21.93
					6	0	24.05
				16-QAM	1	0	23.11
					6	0	22.79
		H 20393	1754.3	QPSK	1	0	22.01
					6	0	24.12
				16-QAM	1	0	23.27
					6	0	22.89

Band	Band Width	Channel	Freq.(MHz)	Modulation	RB Configuration		EIRP
					RB Size	RB Offset	(dBm)
LTE Band 7	20MHz	L 20850	2510	QPSK	1	0	23.14
					100	0	22.41
				16-QAM	1	0	21.56
					100	0	23.47
		M 21100	2535	QPSK	1	0	22.35
					100	0	22.49
				16-QAM	1	0	21.34
					100	0	23.48
		H 21350	2560	QPSK	1	0	22.07
					100	0	22.62
				16-QAM	1	0	21.47
					100	0	23.14
Band	Band Width	Channel	Freq.(MHz)	Modulation	RB Configuration		EIRP
					RB Size	RB Offset	(dBm)
LTE Band 7	15MHz	L 20825	2507.5	QPSK	1	0	22.67
					75	0	21.92
				16-QAM	1	0	21.83
					75	0	21.36
		M 21100	2535	QPSK	1	0	22.91
					75	0	21.97
				16-QAM	1	0	22.27
					75	0	21.32
		H 21375	2562.5	QPSK	1	0	22.84
					75	0	21.53
				16-QAM	1	0	21.74
					75	0	21.15
Band	Band Width	Channel	Freq.(MHz)	Modulation	RB Configuration		EIRP
					RB Size	RB Offset	(dBm)
LTE Band 7	10MHz	L 20800	2505	QPSK	1	0	23.16
					50	0	22.48
				16-QAM	1	0	22.25
					50	0	22.43
		M 21100	2535	QPSK	1	0	22.68
					50	0	21.75
				16-QAM	1	0	22.94
					50	0	21.67
		H 21400	2565	QPSK	1	0	22.87
					50	0	22.01
				16-QAM	1	0	21.75
					50	0	21.27

Band	Band Width	Channel	Freq.(MHz)	Modulation	RB Configuration		EIRP
					RB Size	RB Offset	(dBm)
LTE Band 7	5MHz	L 20775	2502.5	QPSK	1	0	23.67
					25	0	22.11
				16-QAM	1	0	22.96
					25	0	21.31
		M 21100	2535	QPSK	1	0	23.52
					25	0	22.17
				16-QAM	1	0	22.24
					25	0	21.30
		H 21425	2567.5	QPSK	1	0	22.96
					25	0	21.68
				16-QAM	1	0	22.37
					25	0	21.25

Band	Band Width	Channel	Freq.(MHz)	Modulation	RB Configuration		ERP
					RB Size	RB Offset	(dBm)
LTE Band 17	10MHz	L 23780	709	QPSK	1	0	23.96
					50	0	23.01
				16-QAM	1	0	23.46
					50	0	22.32
		M 23790	710	QPSK	1	0	24.17
					50	0	22.43
				16-QAM	1	0	23.72
					50	0	22.33
		H 23800	711	QPSK	1	0	24.29
					50	0	23.41
				16-QAM	1	0	23.12
					50	0	22.17
Band	Band Width	Channel	Freq.(MHz)	Modulation	RB Configuration		ERP
					RB Size	RB Offset	(dBm)
LTE Band 17	5MHz	L 23755	706.5	QPSK	1	0	24.52
					25	0	23.31
				16-QAM	1	0	23.84
					25	0	22.47
		M 23790	710	QPSK	1	0	24.12
					25	0	23.21
				16-QAM	1	0	23.15
					25	0	22.53
		H 23825	713.5	QPSK	1	0	24.20
					25	0	23.27
				16-QAM	1	0	23.46
					25	0	22.28

2.8 Radiated Spurious Emissions

2.8.1 Requirement

According to FCC section 2.1053 and section 27.53(g), 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. This calculated to be -13dBm.

2.8.2 Test Description

See section 2.7.2 of this report.

Note: when doing measurements above 1GHz, the EUT has been within the 3dB cone width of the horn antenna during horizontal antenna.

2.8.3 Test Result

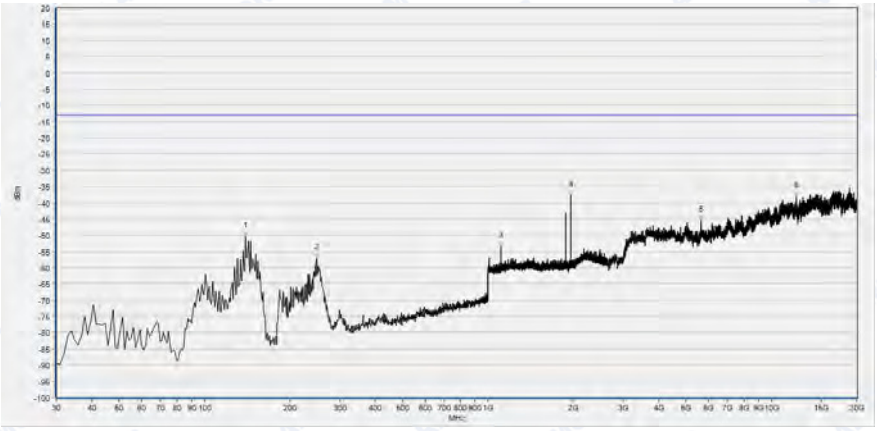
The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. Mid channels on all channel bandwidth verified. Only the worst RB size/offset presented.

Test Plots for the Whole Measurement Frequency Range:

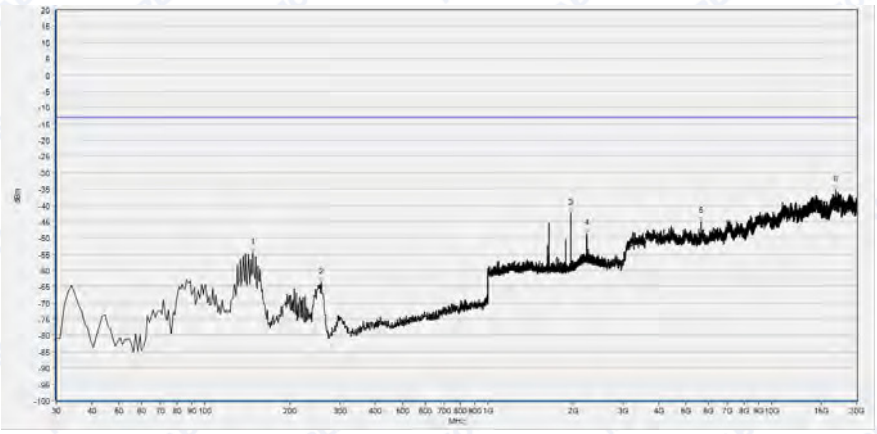
Note1: the power of the EUT transmitting frequency should be ignored.

Note2: All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

LTE Band 2 1.4MHz BW, Mid Channel, QPSK



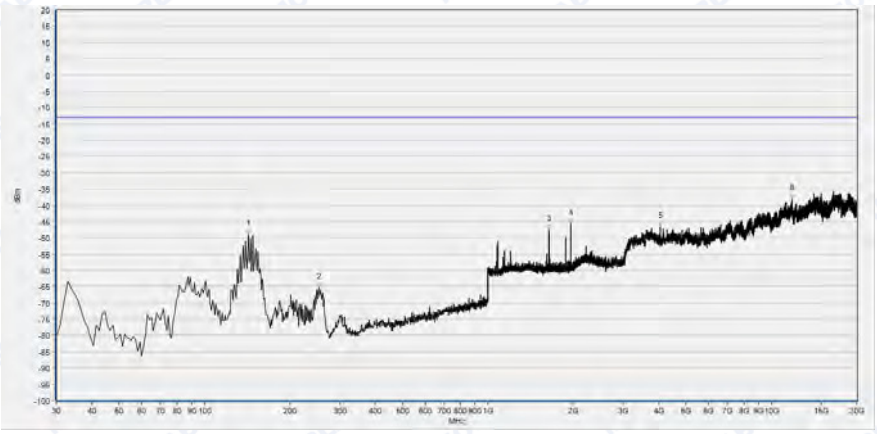
Num.	Fre. (MHz)	Peak	Limit(PK)	Antenna	Verdict
1	139.610	-50.37	-13.00	Horizontal	PASS
2	249.220	-57.01	-13.00	Horizontal	PASS
3	1110.764	-53.52	-13.00	Horizontal	PASS
4	1959.744	-37.59	-13.00	Horizontal	N.A
5	5640.807	-45.48	-13.00	Horizontal	PASS
6	12244.517	-38.00	-13.00	Horizontal	PASS



Num.	Freq(MHz)	Peak	limit PK	Antenna	Verdict
1	148.340	-54.72	-13.00	Vertical	PASS
2	257.950	-63.90	-13.00	Vertical	PASS
3	1959.744	-42.48	-13.00	Vertical	N.A
4	2236.335	-48.76	-13.00	Vertical	PASS
5	5637.643	-45.02	-13.00	Vertical	PASS
6	16880.087	-35.36	-13.00	Vertical	PASS

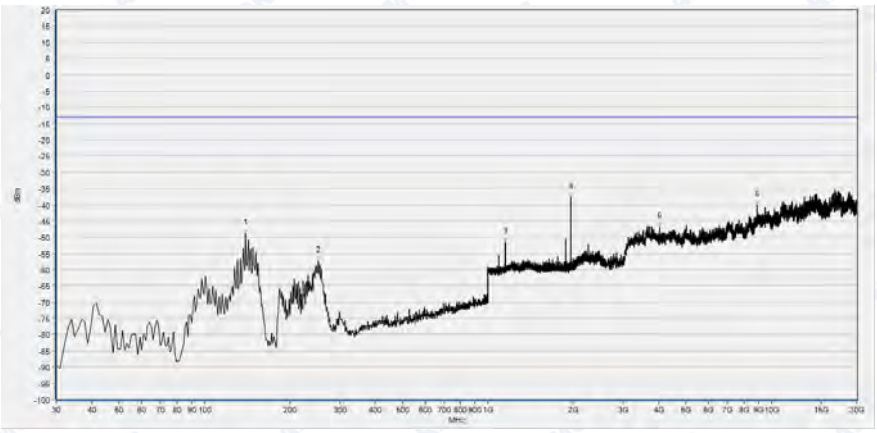
LTE Band 2 1.4MHz BW, Mid Channel, 16QAM

Num	Freq(MHz)	Peak	limit PK	Antenna	Verdict
1	139.610	-49.69	-13.00	Horizontal	PASS
2	248.250	-65.93	-13.00	Horizontal	PASS
3	1603.121	-53.44	-13.00	Horizontal	PASS
4	1959.744	-38.77	-13.00	Horizontal	N.A
5	3669.504	-46.39	-13.00	Horizontal	PASS
6	11722.422	-38.40	-13.00	Horizontal	PASS

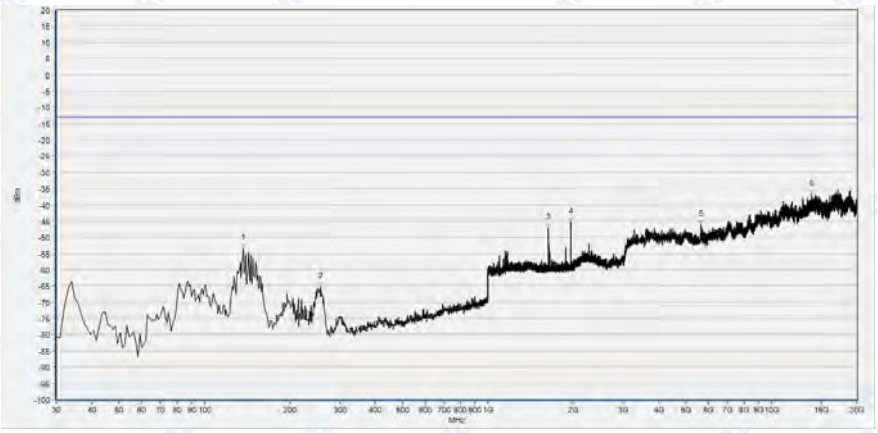


Num.	Fre. (MHz)	Peak	Limit(PK)	Antenna	Verdict
1	142.520	-48.96	-13.00	Vertical	PASS
2	253.100	-65.31	-13.00	Vertical	PASS
3	1637.695	-47.49	-13.00	Vertical	PASS
4	1959.744	-45.75	-13.00	Vertical	N.A
5	4042.881	-46.57	-13.00	Vertical	PASS
6	11823.677	-38.12	-13.00	Vertical	PASS

LTE Band 2 3MHz BW, Mid Channel, QPSK

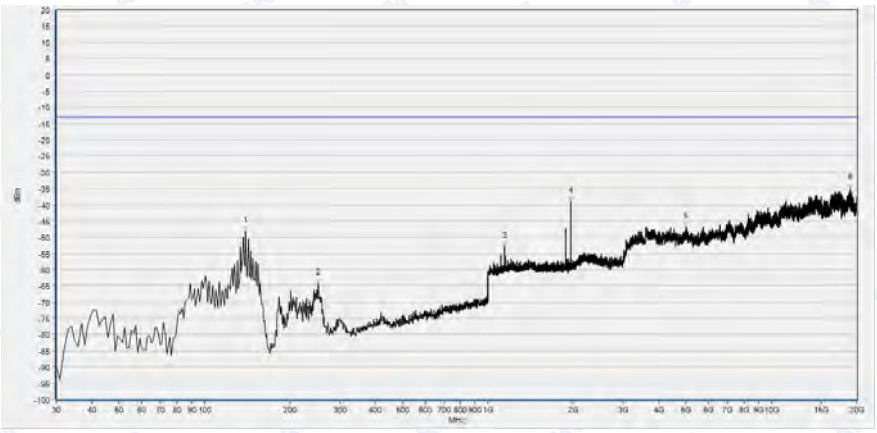


Num.	Fre. (MHz)	Peak	Limit(PK)	Antenna	Verdict
1	139.610	-48.93	-13.00	Horizontal	PASS
2	252.130	-57.39	-13.00	Horizontal	PASS
3	1153.021	-51.51	-13.00	Horizontal	PASS
4	1959.744	-37.58	-13.00	Horizontal	N.A
5	4039.716	-46.77	-13.00	Horizontal	PASS
6	8918.931	-40.00	-13.00	Horizontal	PASS

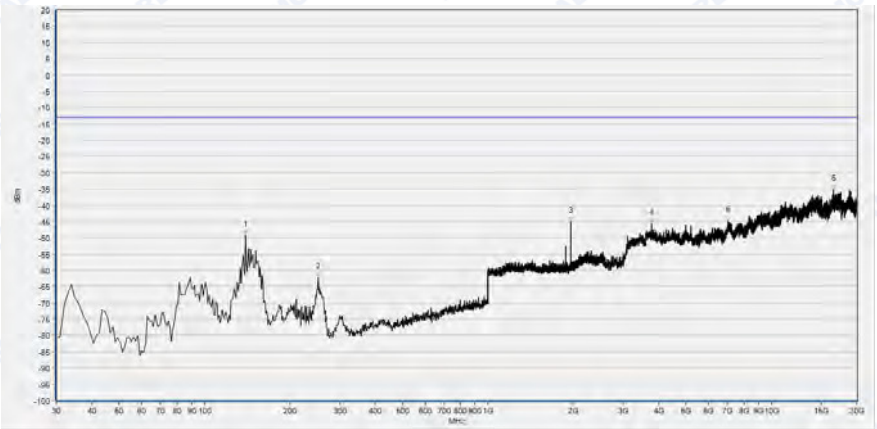


Num.	Fre. (MHz)	Peak	Limit(PK)	Antenna	Verdict
1	136.700	-53.54	-13.00	Vertical	PASS
2	256.980	-65.39	-13.00	Vertical	PASS
3	1635.134	-47.37	-13.00	Vertical	PASS
4	1959.104	-45.53	-13.00	Vertical	N.A
5	5640.807	-46.16	-13.00	Vertical	PASS
6	13848.773	-36.96	-13.00	Vertical	PASS

LTE Band 2 3MHz BW, Mid Channel, 16QAM

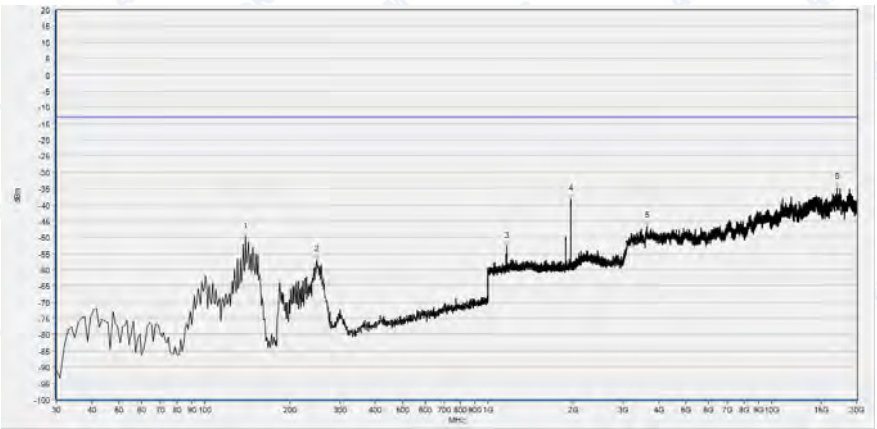


Num.	Fre. (MHz)	Peak	Limit(PK)	Antenna	Verdict
1	139.610	-48.07	-13.00	Horizontal	PASS
2	252.130	-64.26	-13.00	Horizontal	PASS
3	1146.619	-52.77	-13.00	Horizontal	PASS
4	1959.104	-38.89	-13.00	Horizontal	NA.
5	4998.472	-46.88	-13.00	Horizontal	PASS
6	19015.930	-34.92	-13.00	Horizontal	PASS

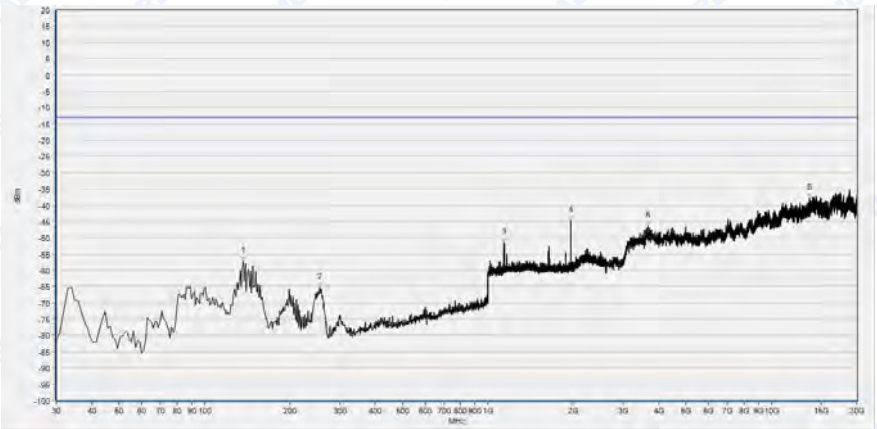


Num.	Fre. (MHz)	Peak	Limit(PK)	Antenna	Verdict
1	139.610	-49.19	-13.00	Vertical	PASS
2	252.130	-62.26	-13.00	Vertical	PASS
3	1961.024	-44.92	-13.00	Vertical	N.A
4	3777.087	-45.79	-13.00	Vertical	PASS
5	7033.061	-44.74	-13.00	Vertical	PASS
6	16566.830	-35.19	-13.00	Vertical	PASS

LTE Band 2 5MHz BW, Mid Channel, QPSK

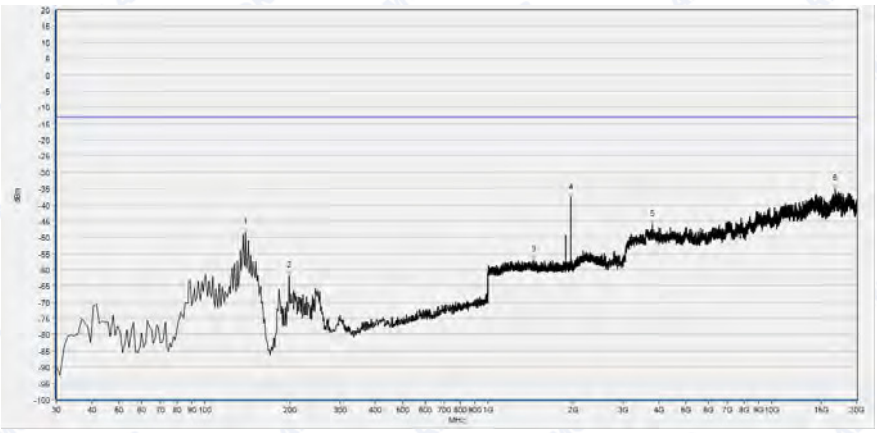


Mum.	Fre. (MHz)	Peak	Limit(PK)	Antenna	Verdict
1	139.610	-49.86	-13.00	Horizontal	PASS
2	249.220	-57.15	-13.00	Horizontal	PASS
3	1162.625	-52.94	-13.00	Horizontal	PASS
4	1961.665	-38.24	-13.00	Horizontal	PASS
5	3634.697	-46.57	-13.00	Horizontal	PASS
6	17098.418	-34.68	-13.00	Horizontal	PASS

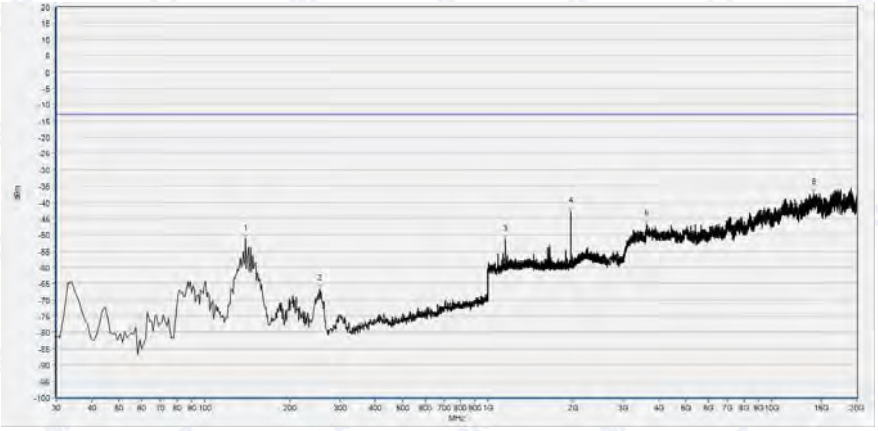


Mum.	Fre. (MHz)	Peak	Limit(PK)	Antenna	Verdict
1	136.700	-57.22	-13.00	Vertical	PASS
2	255.040	-65.37	-13.00	Vertical	PASS
3	1138.936	-51.55	-13.00	Vertical	PASS
4	1958.463	-44.75	-13.00	Vertical	PASS
5	3660.011	-46.37	-13.00	Vertical	PASS
6	13611.457	-37.88	-13.00	Vertical	PASS

LTE Band 2 5MHz BW, Mid Channel, 16QAM



Mum.	Fre. (MHz)	Peak	Limit(PK)	Antenna	Verdict
1	139.610	-48.62	-13.00	Horizontal	PASS
2	198.780	-61.95	-13.00	Horizontal	PASS
3	1447.539	-57.03	-13.00	Horizontal	PASS
4	1960.384	-37.97	-13.00	Horizontal	PASS
5	3789.744	-46.06	-13.00	Horizontal	PASS
6	16797.818	-35.27	-13.00	Horizontal	PASS



Mum.	Fre. (MHz)	Peak	Limit(PK)	Antenna	Verdict
1	139.610	-51.23	-13.00	Vertical	PASS
2	255.040	-66.69	-13.00	Vertical	PASS
3	1153.661	-51.42	-13.00	Vertical	PASS
4	1959.104	-42.79	-13.00	Vertical	PASS
5	3631.533	-46.77	-13.00	Vertical	PASS
6	14114.566	-37.27	-13.00	Vertical	PASS