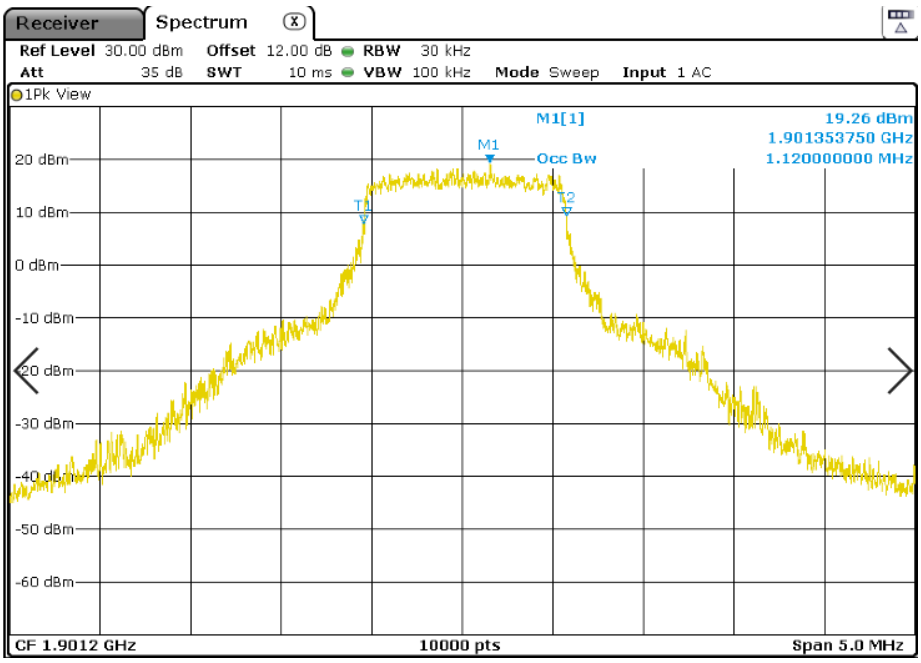
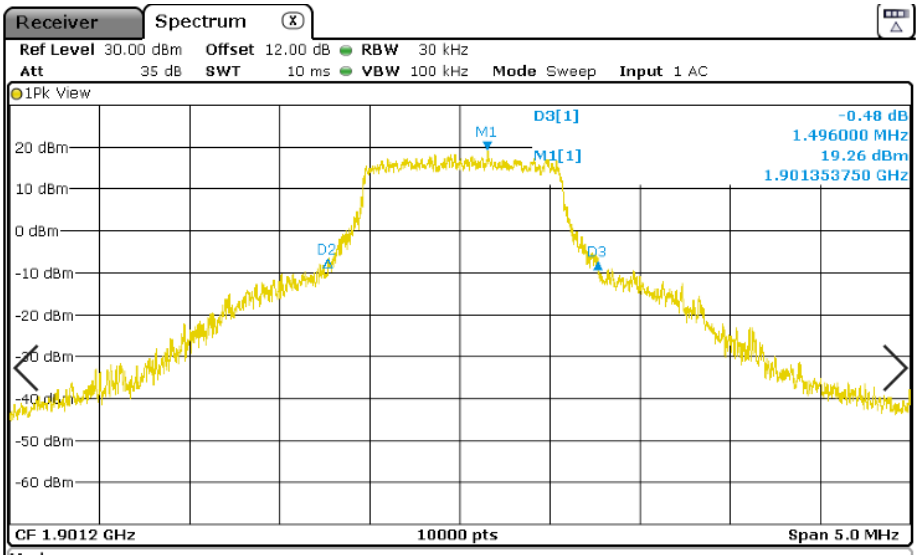
TEST RESULTS (Cont):	

Highest Channel 99% Occupied Bandwidth



Highest Channel -26dBc Bandwidth



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.90135375 GHz	19.26 dBm		
D2	M1	1	-885.0 kHz	-26.02 dB		
D3	D2	1	1.496 MHz	-0.48 dB		

TEST A.5: SPURIOUS EMISSIONS AT ANTENNA TERMINALS

LIMITS:	Product standard:	FCC Part 24 / IC RSS-133
	Test standard:	FCC §2.1051 and § 24.238/ RSS-133 Clause 6.5

LIMITS

According to specification, the power of emissions shall be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log (P) dB. P in watts.

At Po transmitting power of 2 watts (33 dBm), the specified minimum attenuation becomes 43+10log (Po). and the level in dBm relative to Po becomes:

Po (dBm) – [43 + 10 log (Po in watts)] = -13 dBm

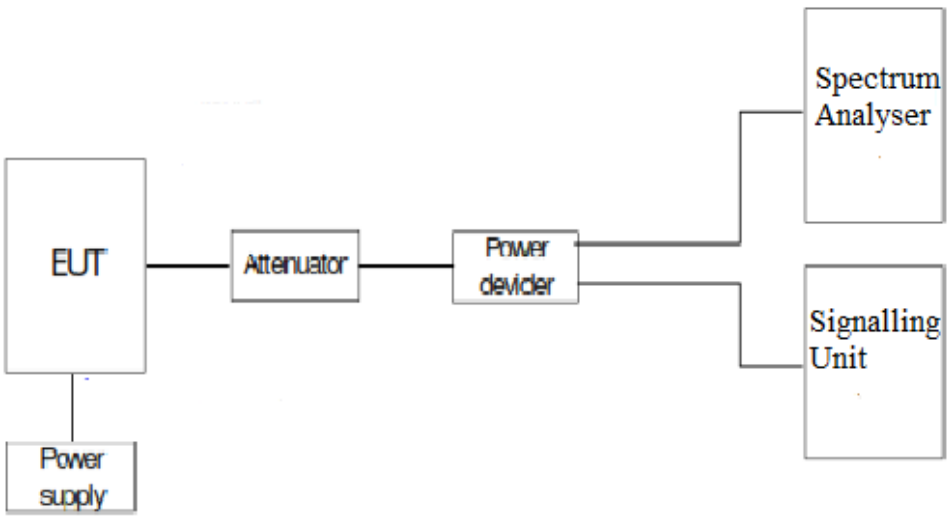
TEST SETUP

The EUT RF output connector was connected to a spectrum analyzer and to the Universal Radio Communication Tester R&S CMW500 (selecting maximum transmission power of the EUT and different modes of modulation) using a 50-ohm attenuator and a power splitter.

The spectrum was investigated from 9 kHz to 26 GHz for LTE Band 25.

The reading of the spectrum analyzer is corrected with the attenuation loss of connection between output terminal of EUT and input of the spectrum analyzer.

For LTE mode the configuration of Resource Blocks and modulation which is the worst case for conducted power was used.



TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#01
TEST RESULTS:	PASS

Frequency range 9 kHz – 26 GHz

LTE QPSK MODULATION. BW = 5 MHz

Lowest Channel

Spurious frequency (MHz)	Level (dBm)	Measurement uncertainty (dB)
1932.47	-28.98	< ± 1.20

Middle Channel

Spurious signal found in the frequency range Middle channel were shown below plots.

Highest Channel

Spurious signal found in the frequency range for Highest channel were shown in below plots.

LTE QPSK MODULATION. BW = 10 MHz

Spurious signal found in the frequency range for Lowest, Middle, and Highest channels were shown in the plots.

LTE QPSK MODULATION. BW = 15 MHz

Spurious signal found in the frequency range for Lowest, Middle, and Highest channels were shown in the plots.

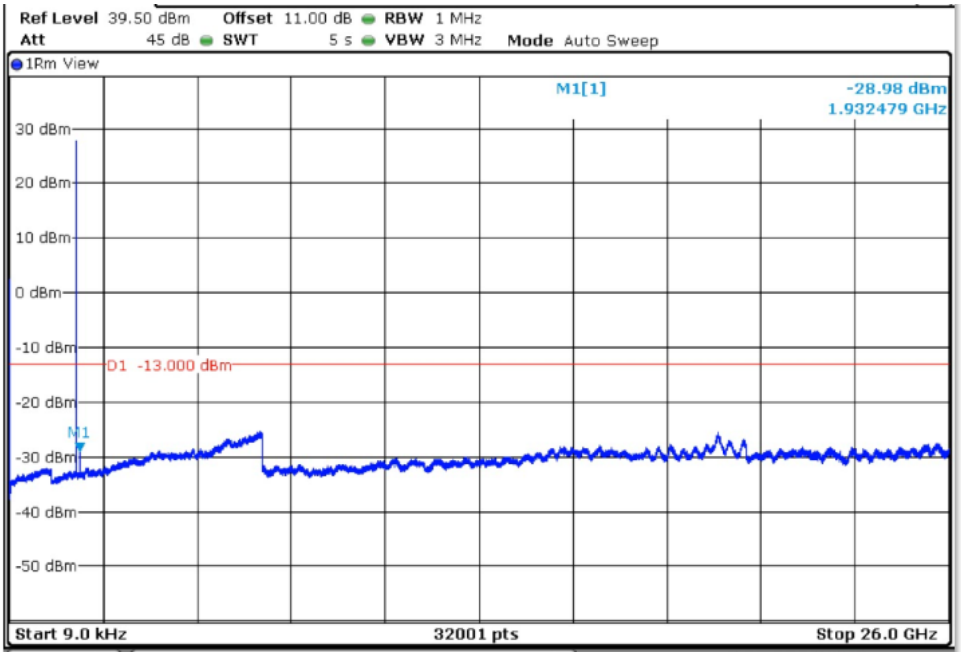
LTE QPSK MODULATION. BW = 20 MHz

Spurious signal found in the frequency range for Lowest, Middle, and Highest channels were shown in the plots.

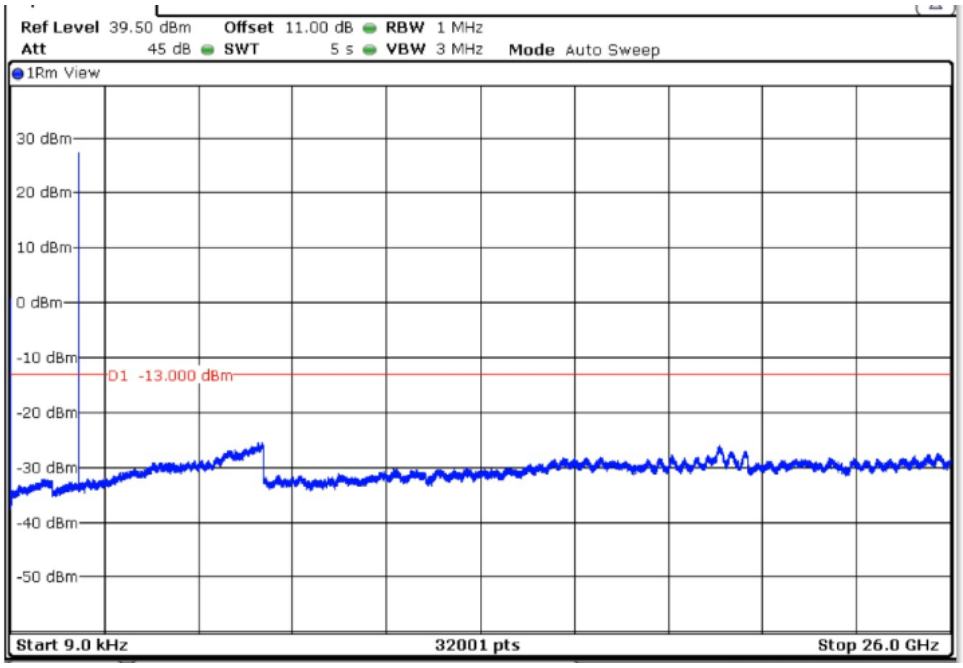
TEST RESULTS (Cont):	

LTE QPSK MODULATION. BW = 5 MHz

Lowest Channel

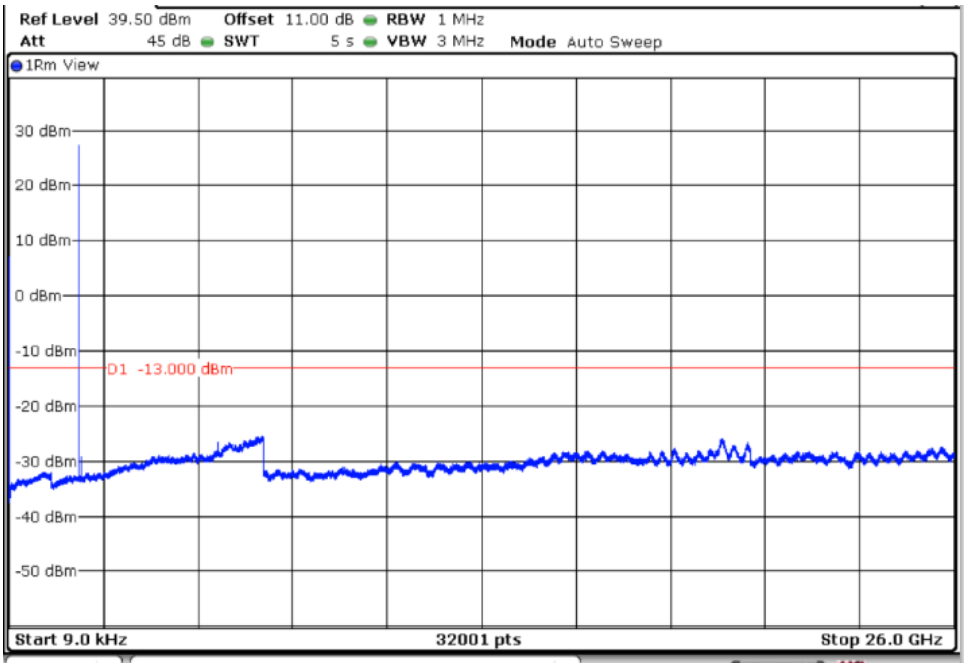


Middle Channel



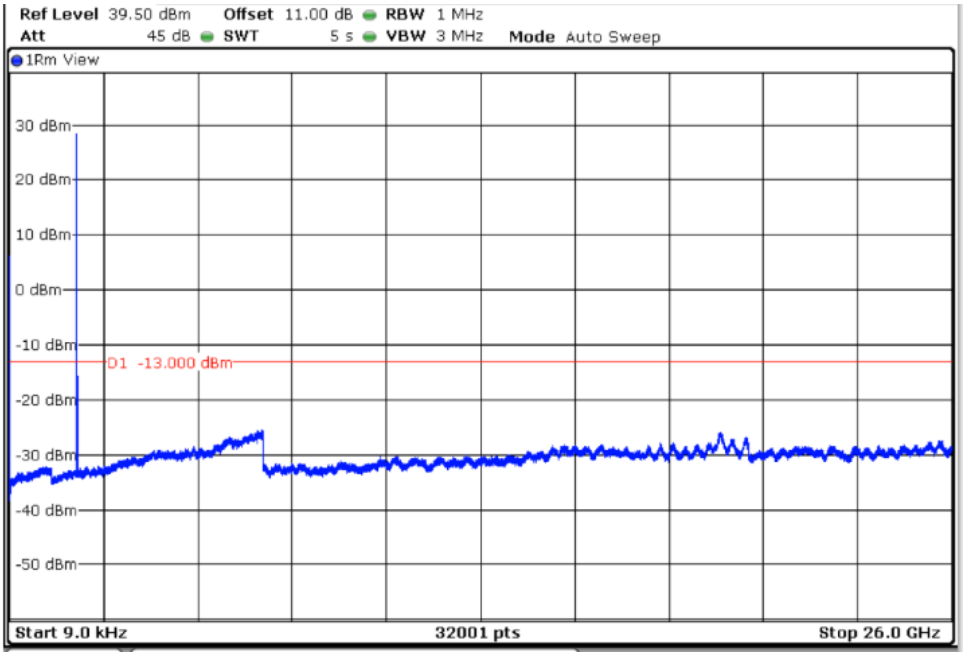
TEST RESULTS (Cont):	

Highest Channel



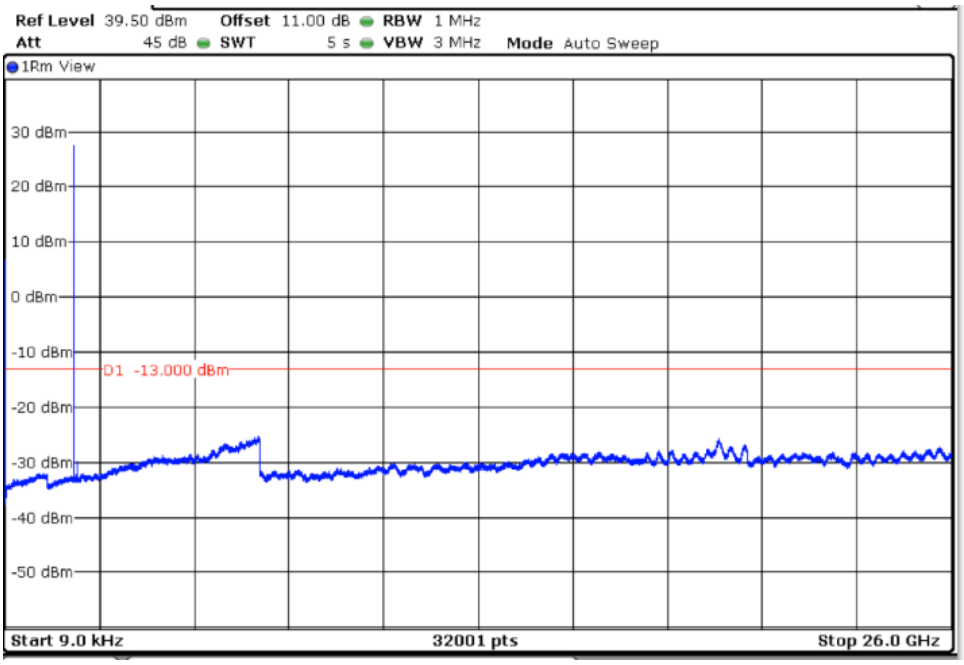
LTE QPSK MODULATION. BW = 10 MHz

Lowest Channel

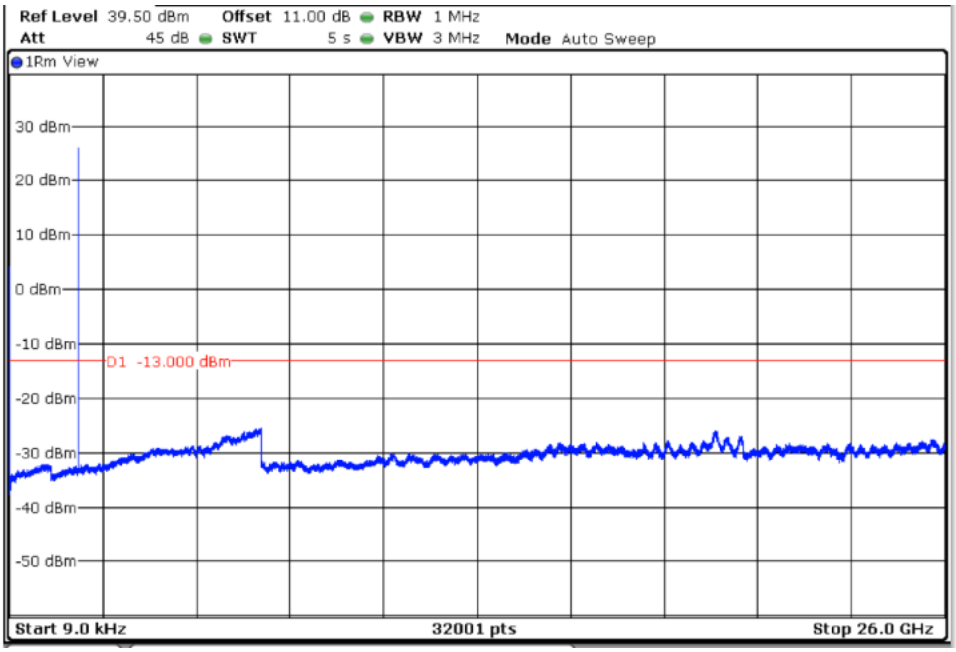


TEST RESULTS (Cont):	

Middle Channel



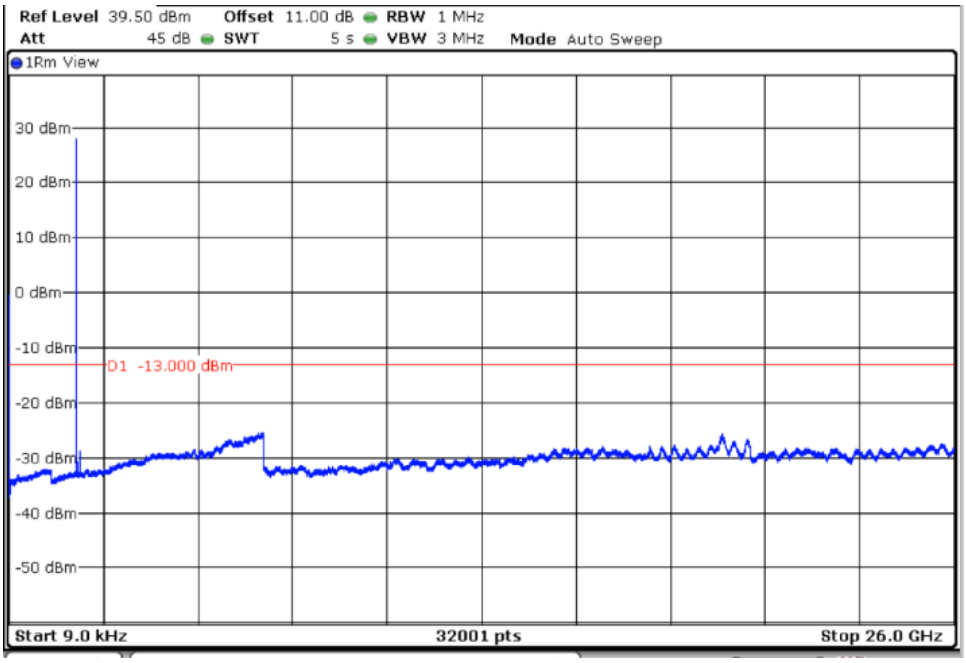
Highest Channel



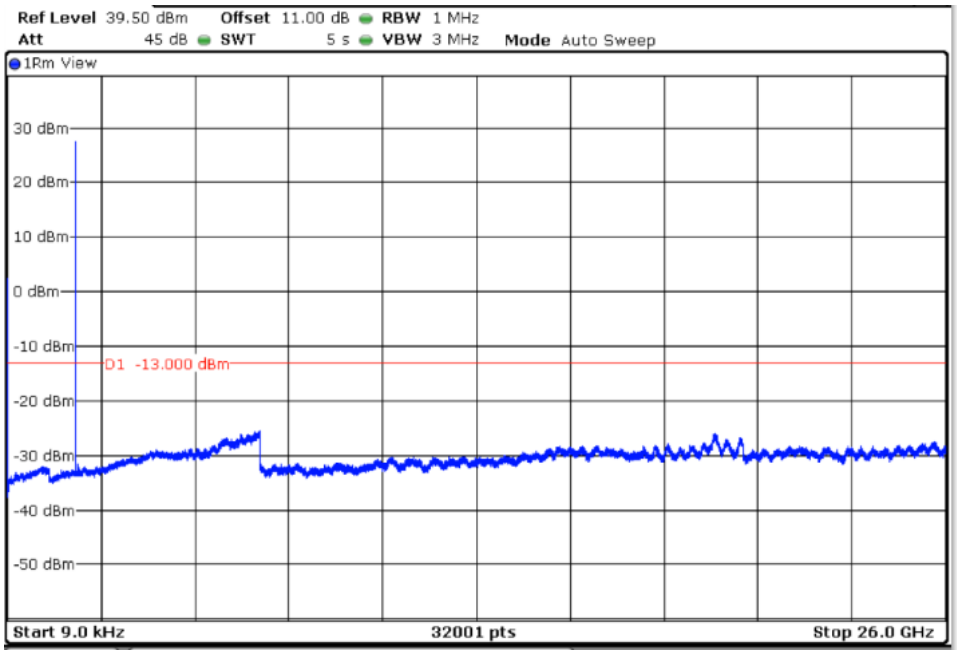
TEST RESULTS (Cont):	

LTE QPSK MODULATION. BW = 15 MHz

Lowest Channel

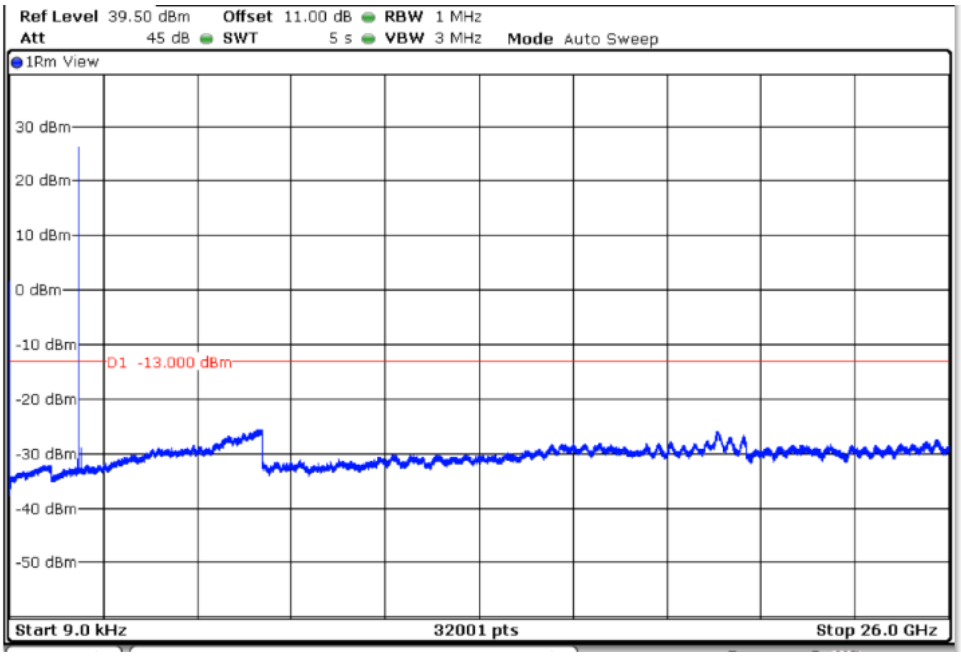


Middle Channel



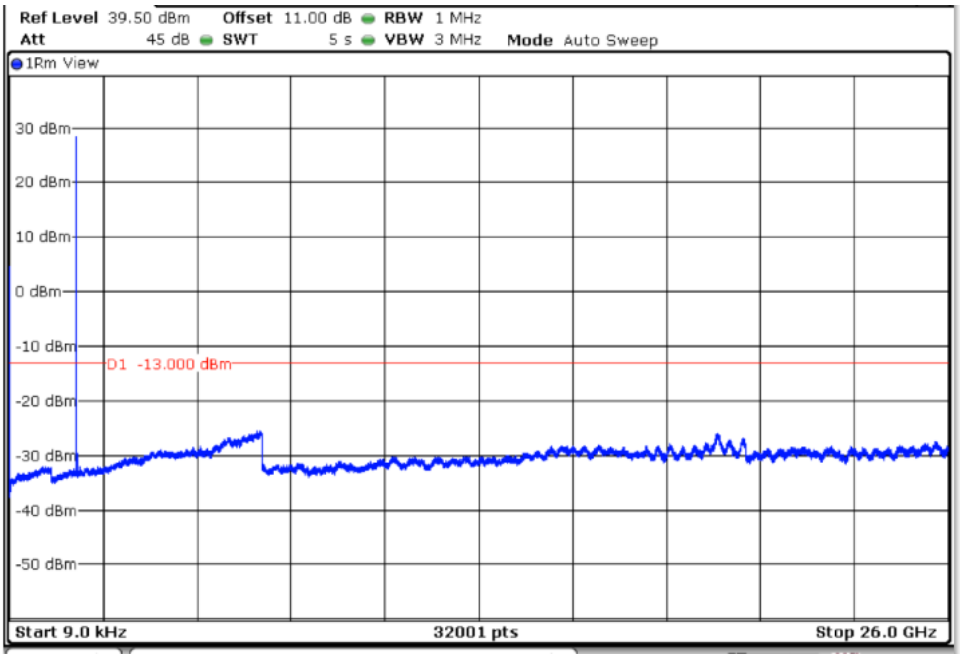
TEST RESULTS (Cont):	

Highest Channel



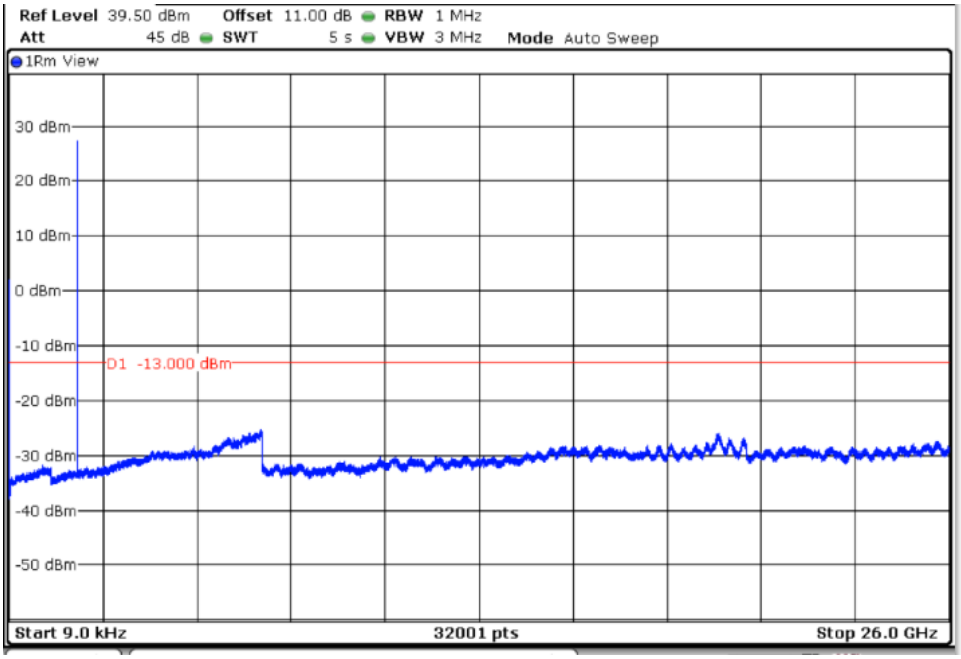
LTE QPSK MODULATION. BW = 20 MHz

Lowest Channel

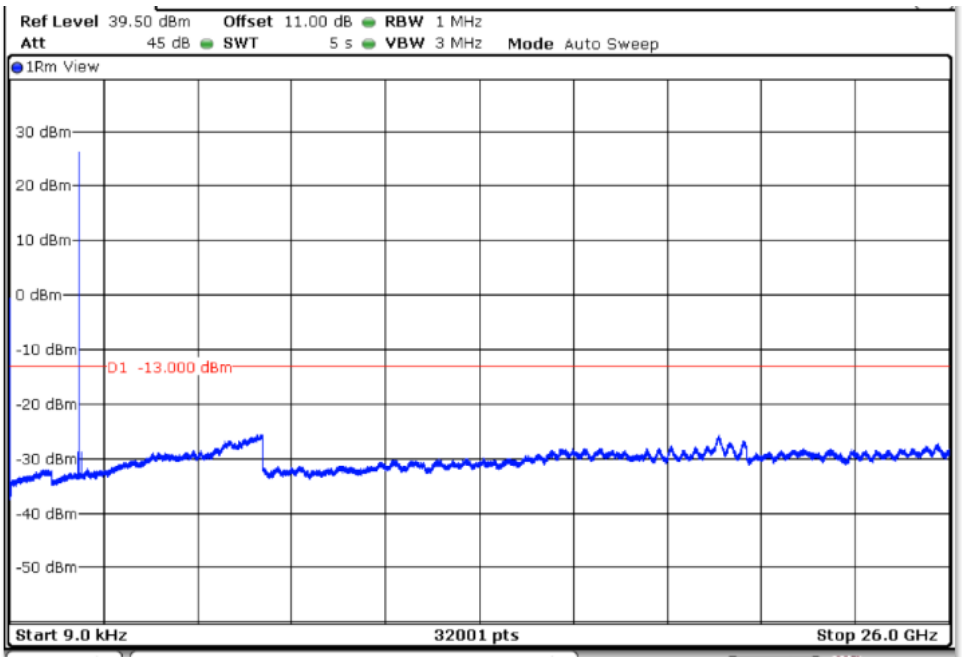


TEST RESULTS (Cont):	

Middle Channel



Highest Channel



TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#02
TEST RESULTS:	PASS

Frequency range 9 kHz – 26 GHz

LTE QPSK MODULATION. BW = 5 MHz

Spurious signal found in the frequency range for Lowest, Middle, and Highest channels were shown in the plots.

LTE QPSK MODULATION. BW = 10 MHz

Spurious signal found in the frequency range for Lowest, Middle, and Highest channels were shown in the plots.

LTE QPSK MODULATION. BW = 15 MHz

Spurious signal found in the frequency range for Lowest, Middle, and Highest channels were shown in the plots.

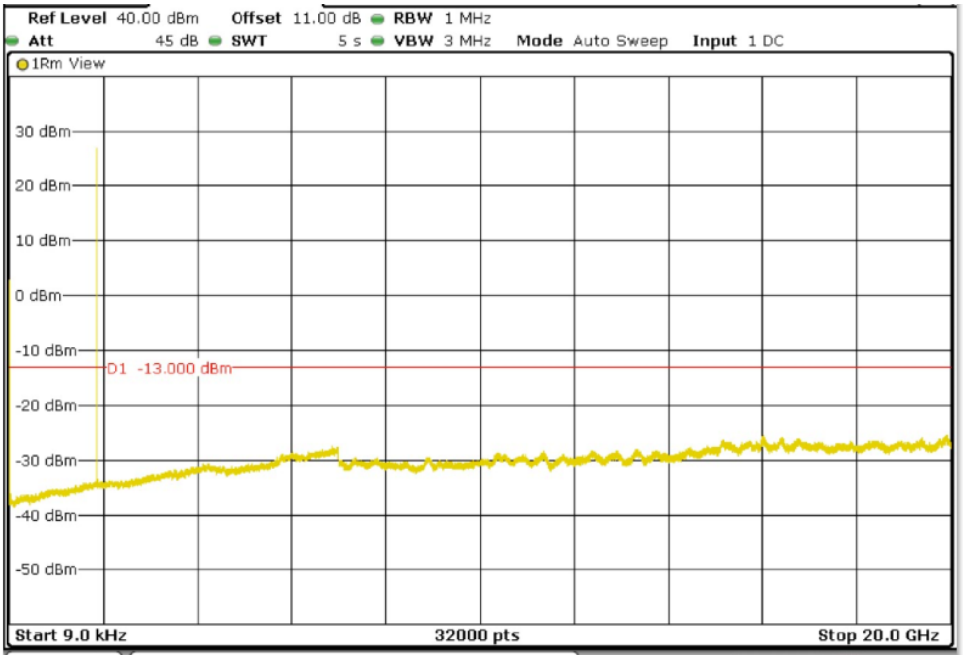
LTE QPSK MODULATION. BW = 20 MHz

Spurious signal found in the frequency range for Lowest, Middle, and Highest channels were shown in the plots.

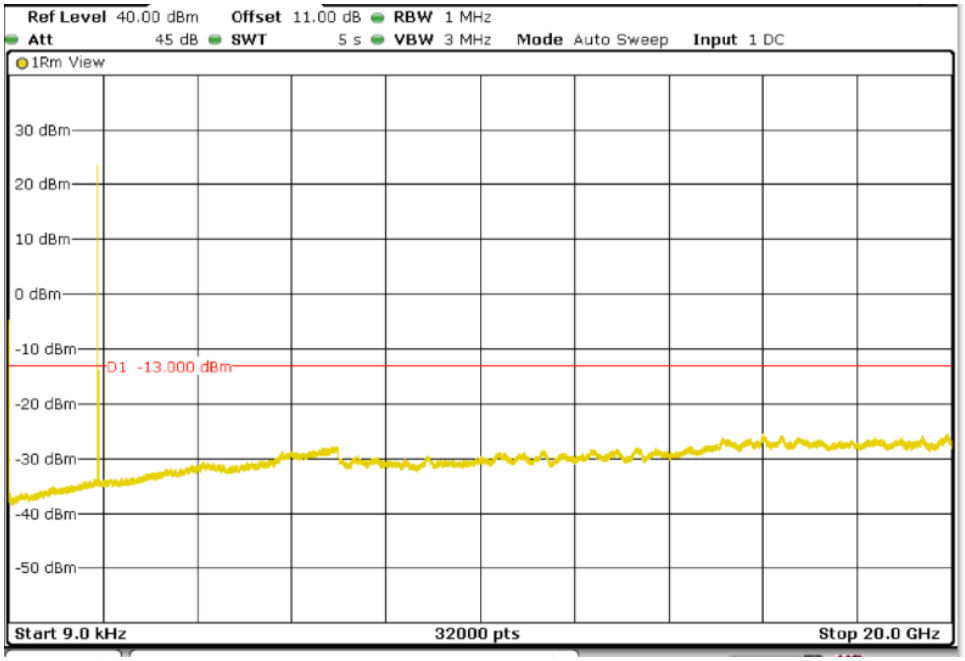
TEST RESULTS (Cont):	

LTE QPSK MODULATION. BW = 5 MHz

Lowest Channel

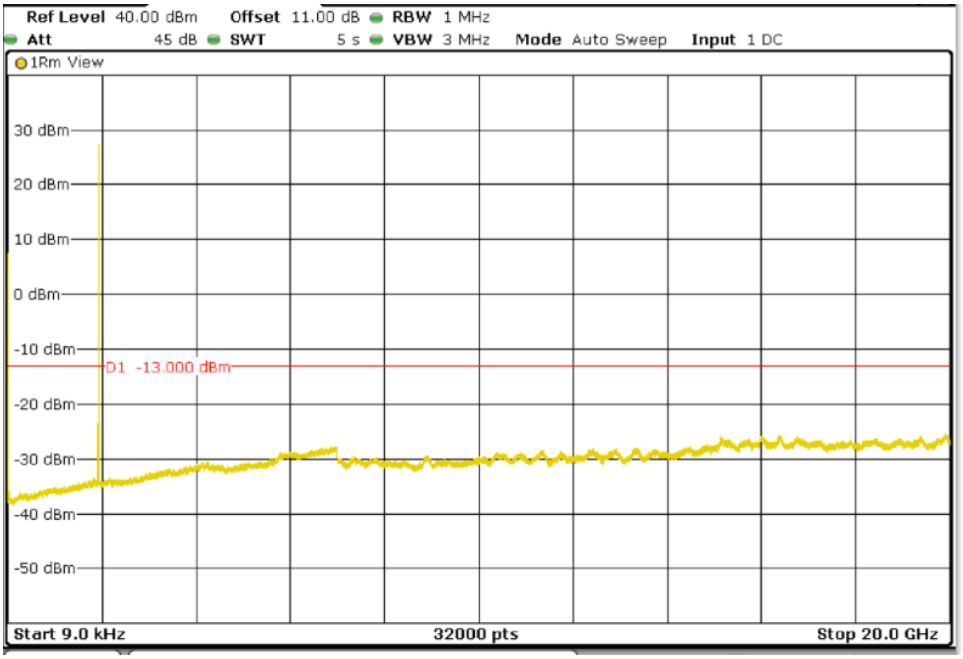


Middle Channel



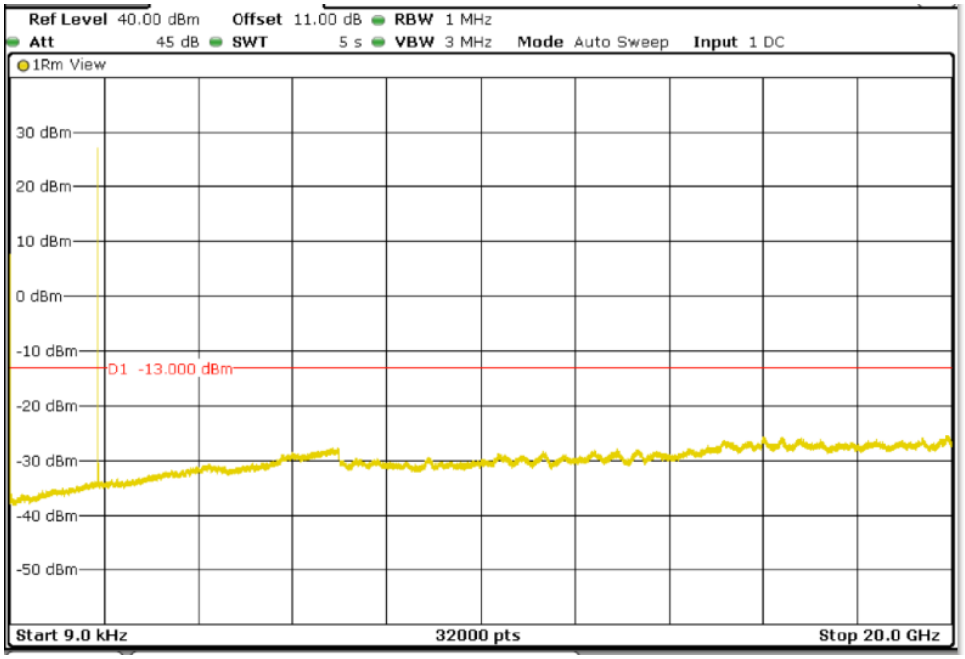
TEST RESULTS (Cont):	

Highest Channel



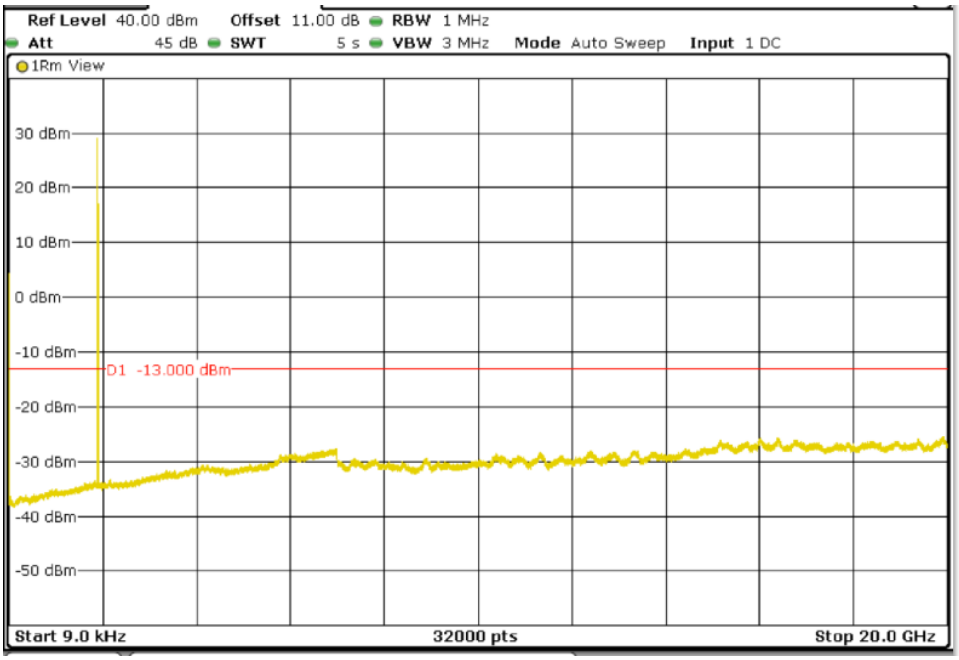
LTE QPSK MODULATION. BW = 10 MHz

Lowest Channel

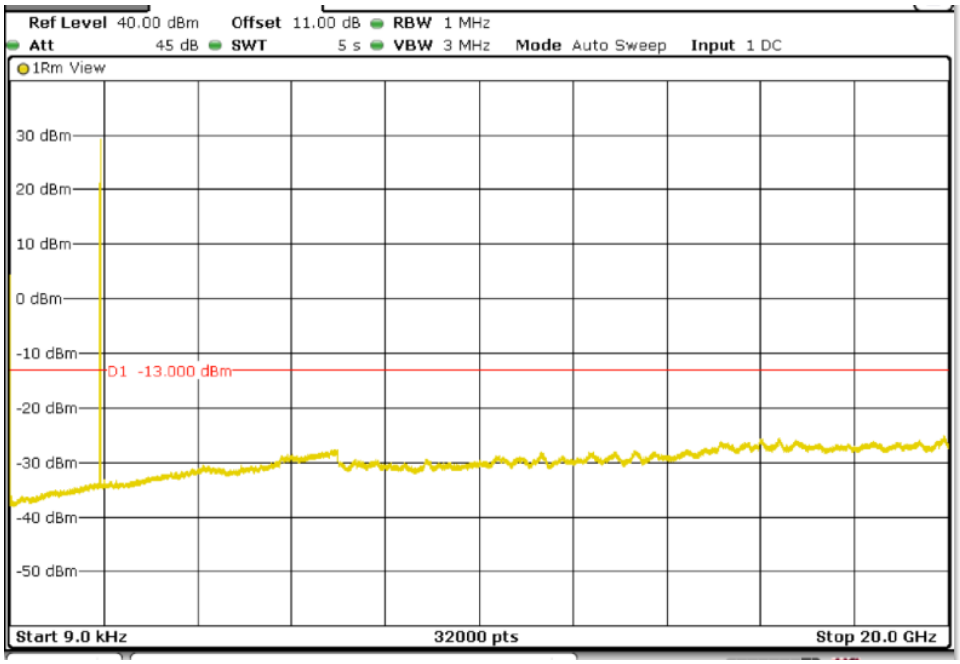


TEST RESULTS (Cont):	

Middle Channel



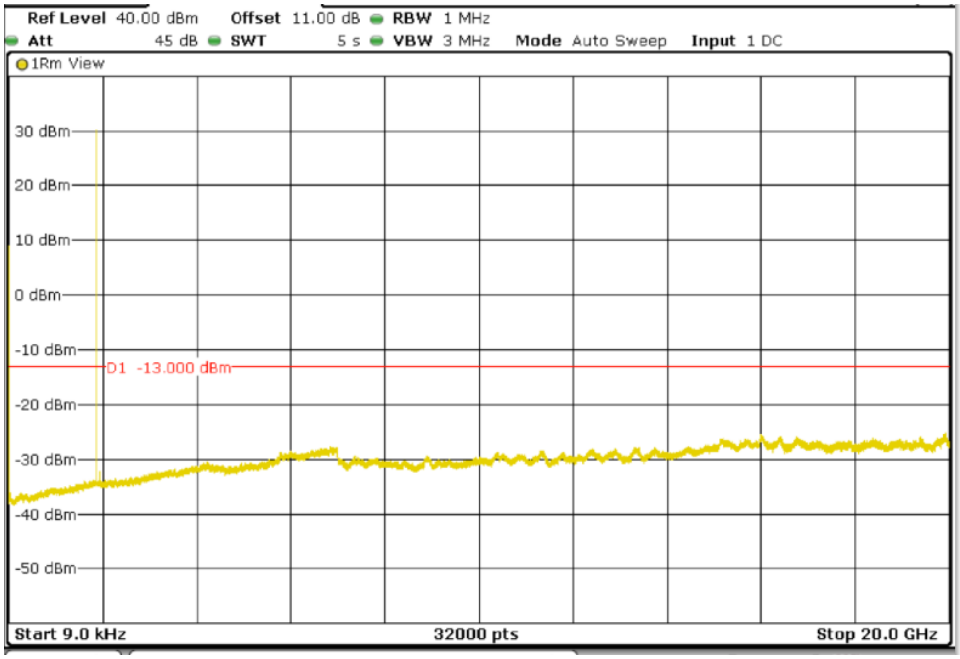
Highest Channel



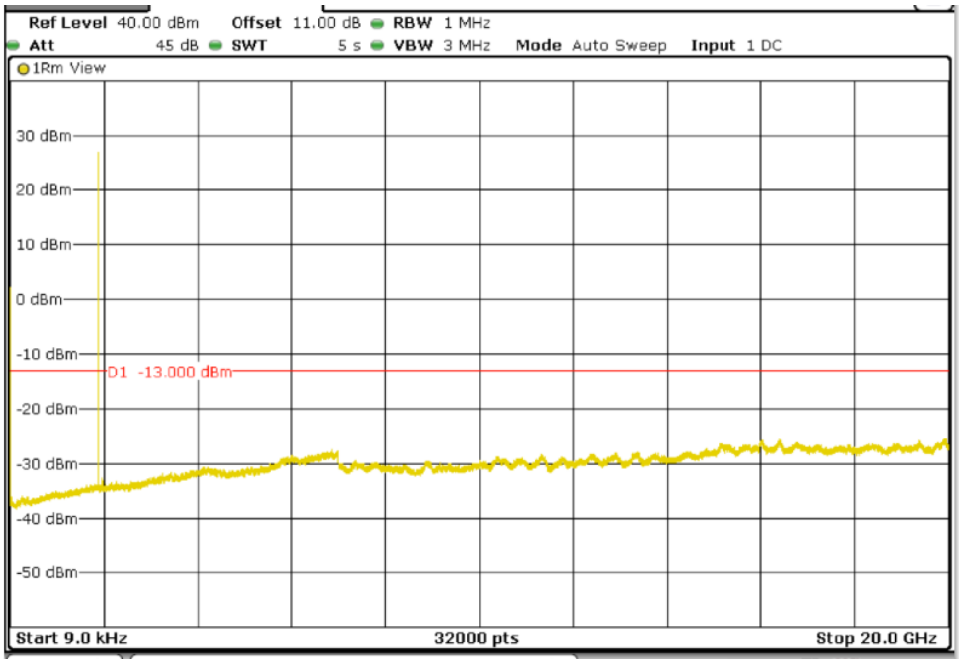
TEST RESULTS (Cont):	

LTE QPSK MODULATION. BW = 15 MHz

Lowest Channel

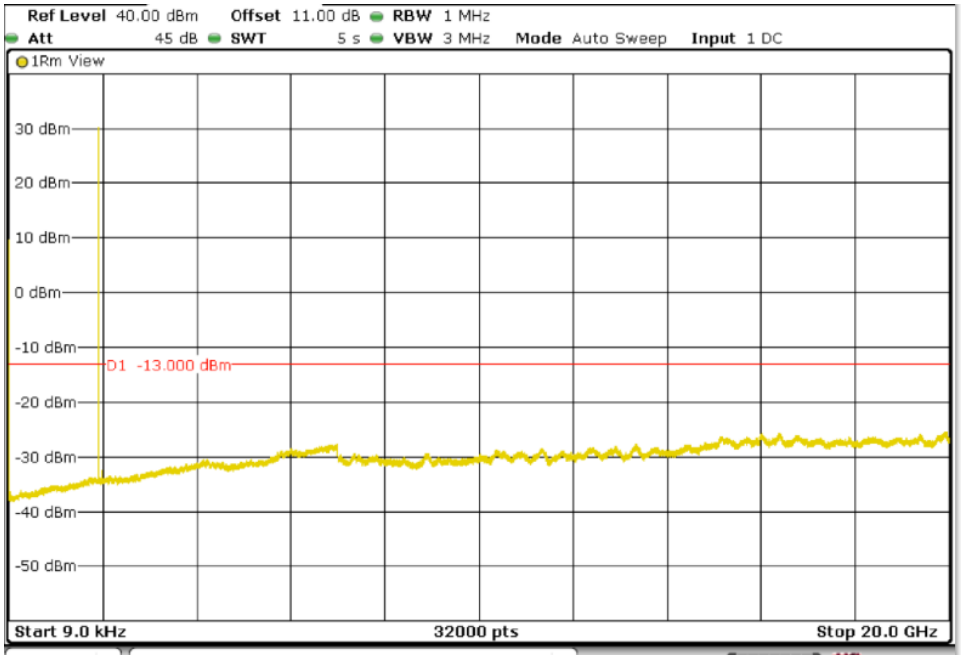


Middle Channel



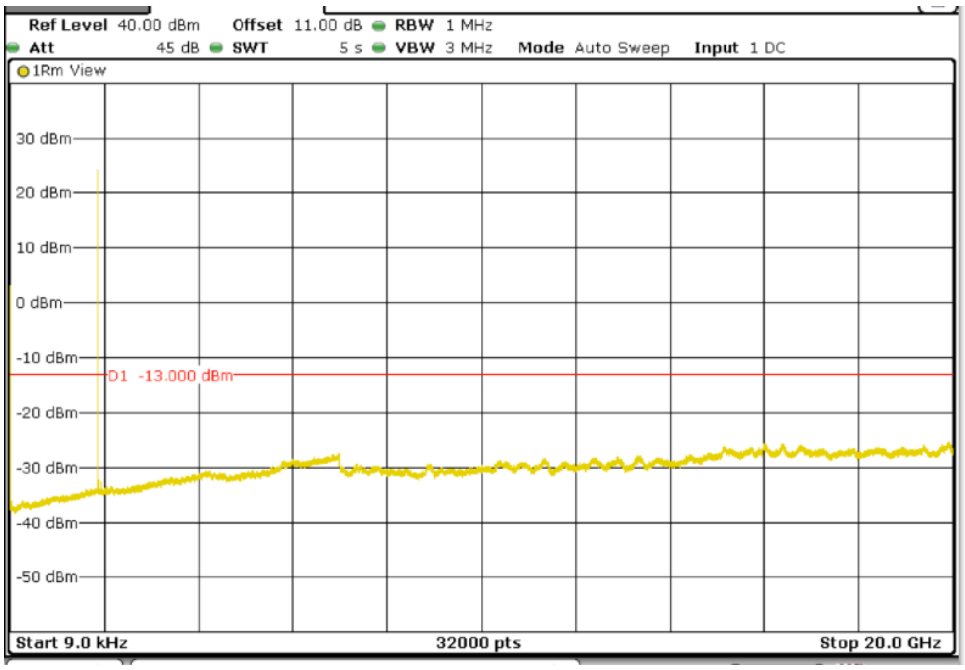
TEST RESULTS (Cont):	

Highest Channel



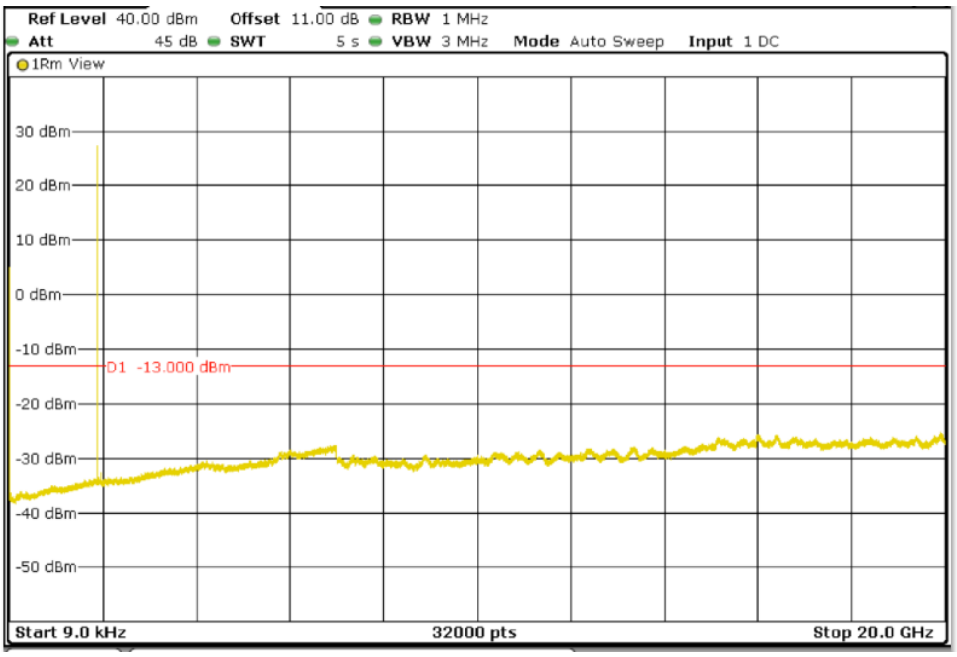
LTE QPSK MODULATION. BW = 20 MHz

Lowest Channel

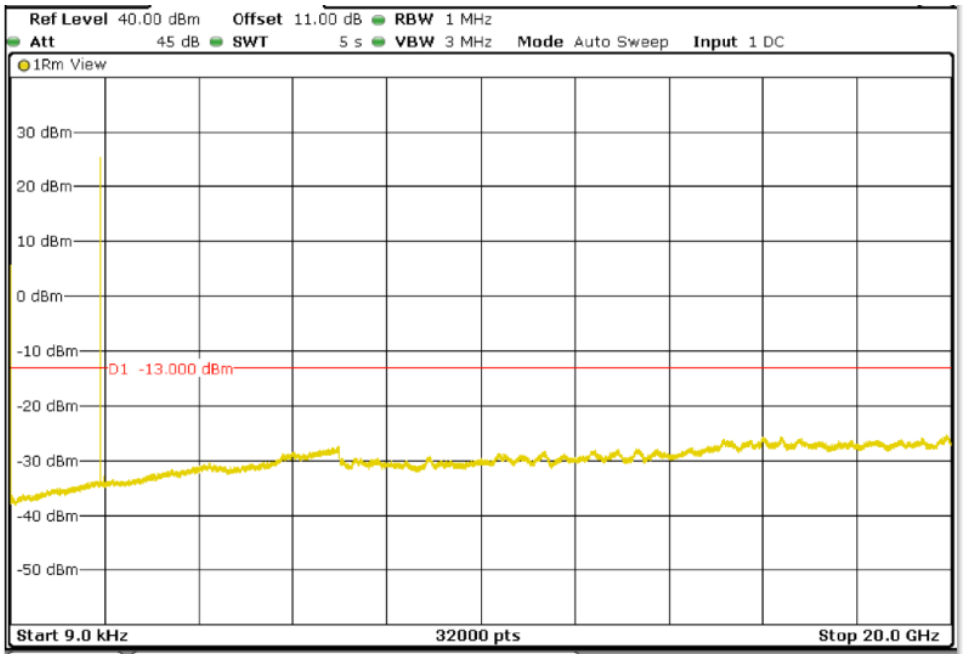


TEST RESULTS (Cont):	

Middle Channel



Highest Channel



TEST A.6: SPURIOUS EMISSIONS AT ANTENNA TERMINALS AT BLOCK EDGES

LIMITS:	Product standard:	FCC Part 24 / IC RSS-133
	Test standard:	FCC § 24.238 and FCC §2.1051 / RSS 133- Clause 6.6

LIMITS

According to specification, the power of emissions shall be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log (P) dB. P in watts.

At Po transmitting power of 2 watts (33 dBm), the specified minimum attenuation becomes 43+10log (Po). and the level in dBm relative to Po becomes:

Po (dBm) – [43 + 10 log (Po in watts)] = -13 dBm

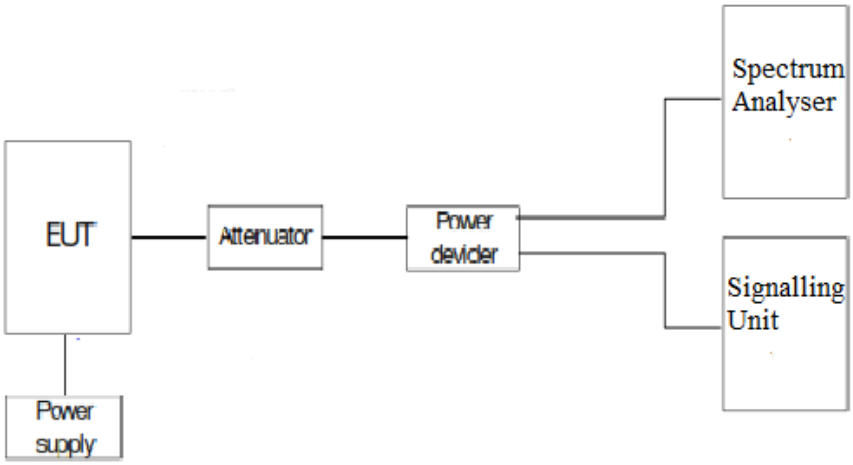
TEST SETUP

The EUT RF output connector was connected to a spectrum analyzer and to the Universal Radio Communication Tester R&S CMW500 (selecting maximum transmission power of the EUT and different modes of modulation) using a 50-ohm attenuator and a power splitter.

The reading of the spectrum analyzer is corrected with the attenuation loss of connection between output terminal of EUT and input of the spectrum analyzer.

For LTE mode the configuration of modulation which is the worst case for conducted power was used.

As indicated in FCC part 24, in the 1 MHz bands immediately outside and adjacent to the licensee's frequency block or band, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.



TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#01
TEST RESULTS:	PASS

LTE QPSK MODULATION	RB=1. Offset =0. BW = 5 MHz	RB=1. Offset =0. BW = 10 MHz	RB=1. Offset =0. BW = 15 MHz	RB=1. Offset =0. BW = 20 MHz
Maximum measured level at lowest Block Edge at antenna port (dBm)	-14.96	-29.67	-30.96	-37.23

LTE QPSK MODULATION:	RB= 6. Offset =0. BW = 5 MHz	RB= 6. Offset =0. BW = 10 MHz	RB= 6. Offset =0. BW = 15 MHz	RB= 6. Offset =0. BW = 20 MHz
Maximum measured level at lowest Block Edge at antenna port (dBm)	-16.88	-19.46	-21.85	-39.47

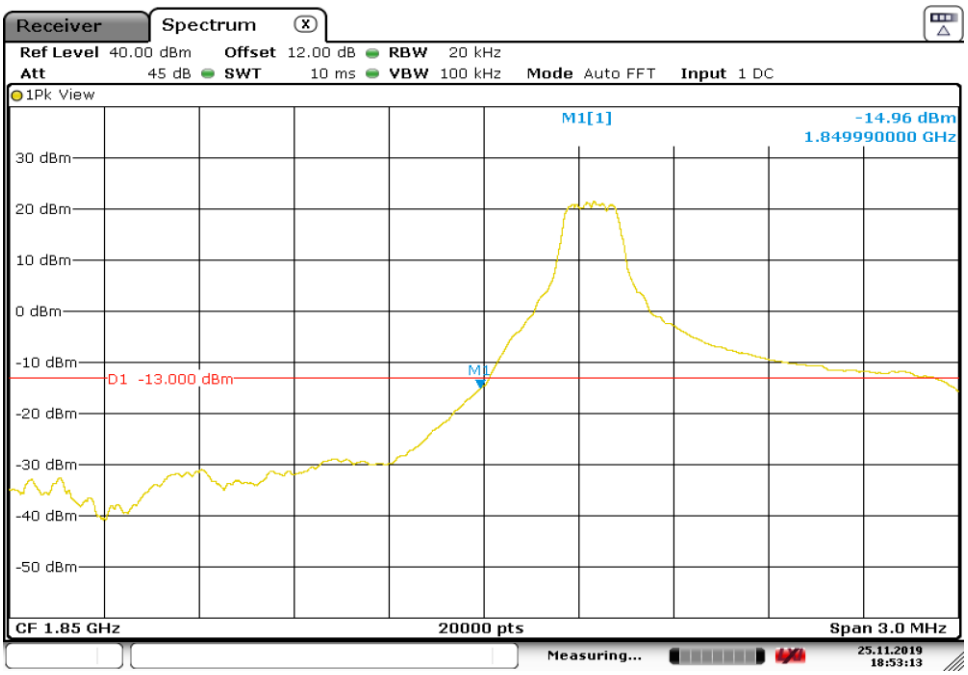
LTE QPSK MODULATION:	RB= 1. Offset=5. BW = 5 MHz	RB= 1. Offset=5. BW = 10 MHz	RB= 1. Offset=5. BW = 15 MHz	RB= 1. Offset=5. BW = 20 MHz
Maximum measured level at highest Block Edge at antenna port (dBm)	-16.62	-30.17	-32.96	-36.46

LTE QPSK MODULATION:	RB= 6. Offset =0. BW = 5 MHz	RB= 6. Offset =0. BW = 10 MHz	RB= 6. Offset =0. BW = 15 MHz	RB= 6. Offset =0. BW = 20 MHz
Maximum measured level at highest Block Edge at antenna port (dBm)	-16.97	-22.16	-22.03	-35.12

TEST RESULTS (Cont):	

LTE QPSK MODULATION. RB = 1. Offset = 0. BW = 5 MHz

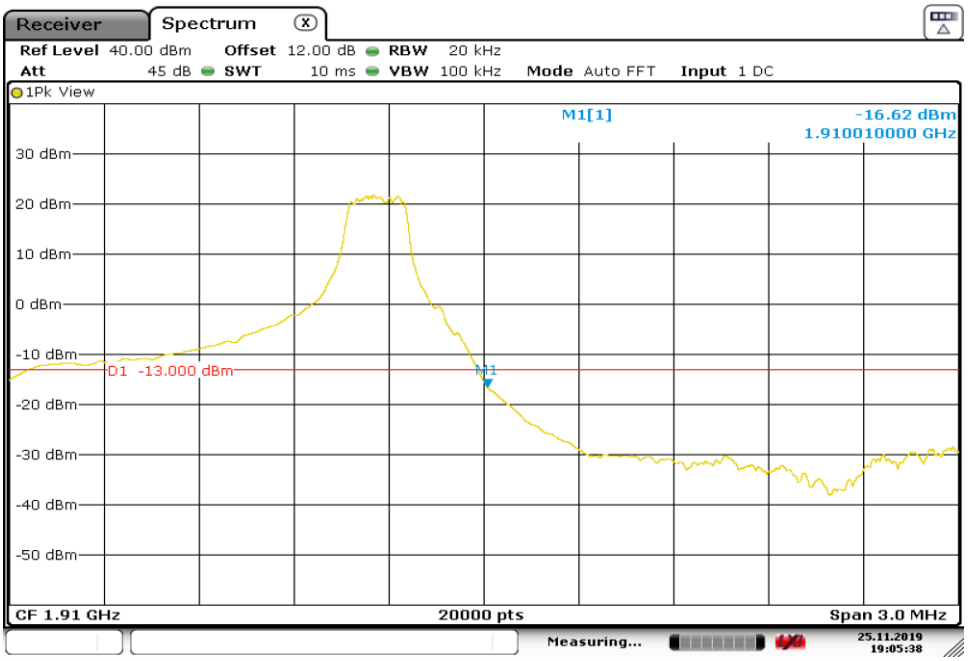
Lowest Channel



Date: 25.NOV.2019 18:53:13

LTE QPSK MODULATION. RB = 1. Offset = 5. BW = 5 MHz

Highest Channel

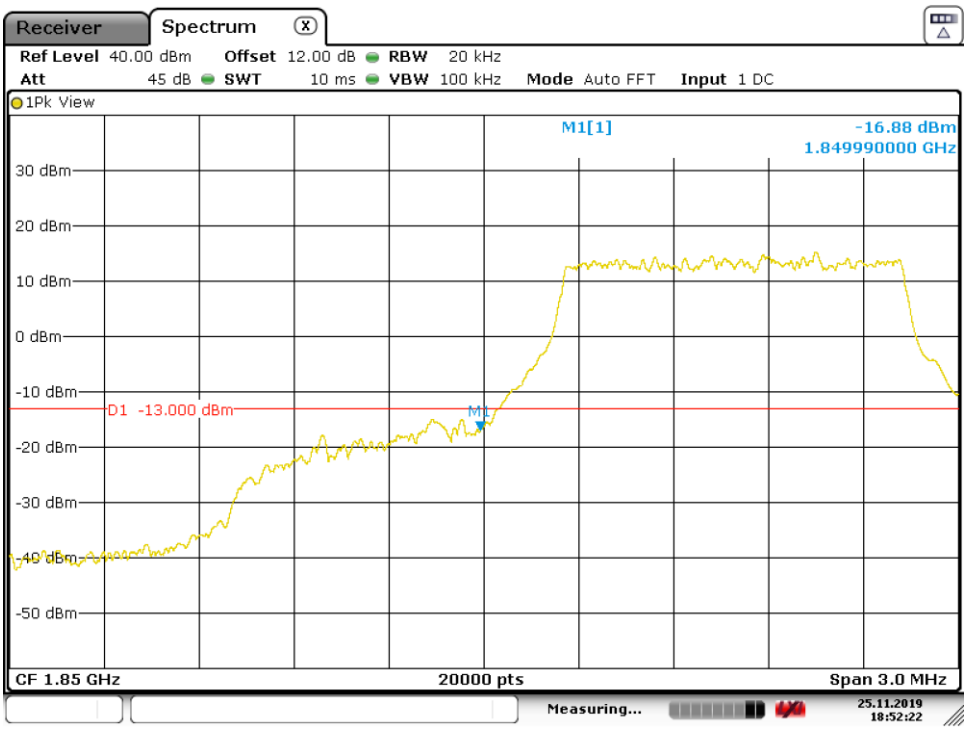


Date: 25.NOV.2019 19:05:39

TEST RESULTS (Cont):	

LTE QPSK MODULATION. RB = 6. Offset = 0. BW = 5 MHz

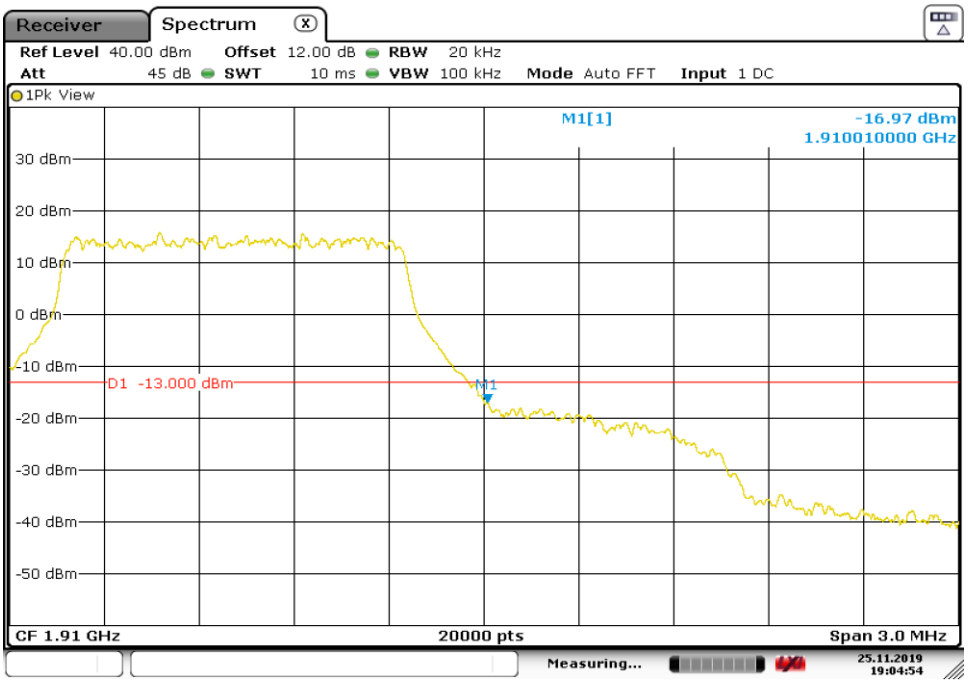
Lowest Channel



Date: 25.NOV.2019 18:52:22

LTE QPSK MODULATION. RB = 6. Offset = 0. BW = 5 MHz

Highest Channel

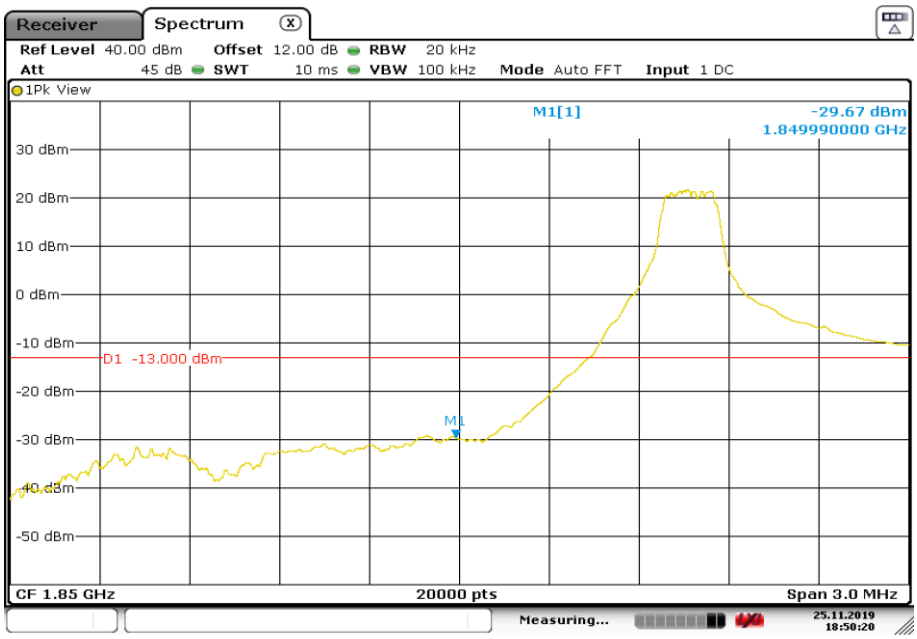


Date: 25.NOV.2019 19:04:54

TEST RESULTS (Cont):	

LTE QPSK MODULATION. RB = 1. Offset = 0. BW = 10 MHz

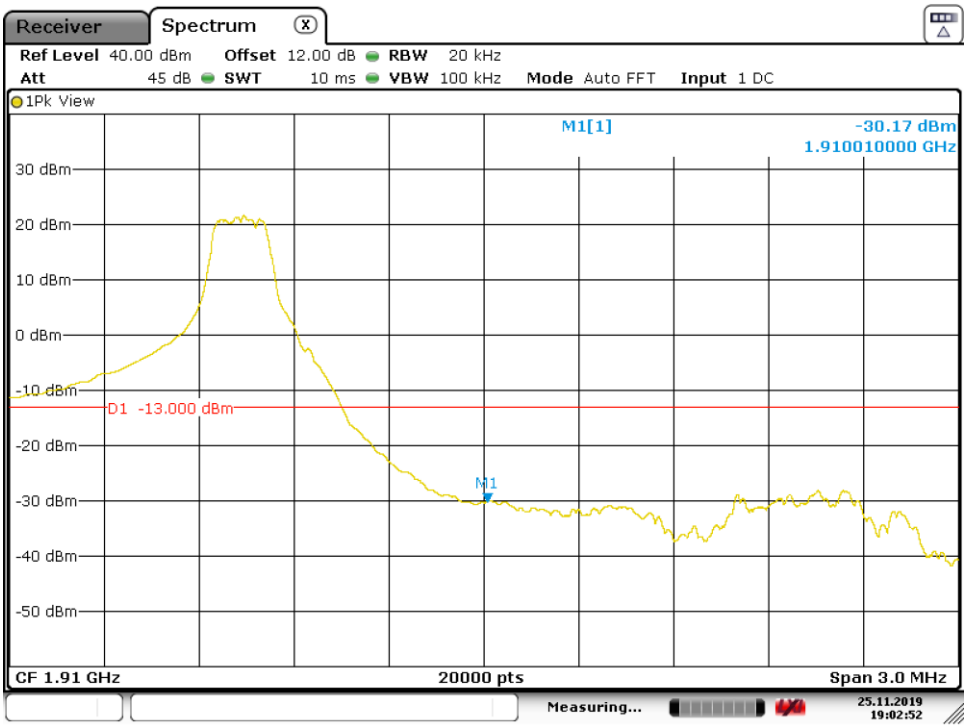
Lowest Channel



Date: 25.NOV.2019 18:50:20

LTE QPSK MODULATION. RB = 1. Offset = 5. BW = 10 MHz

Highest Channel

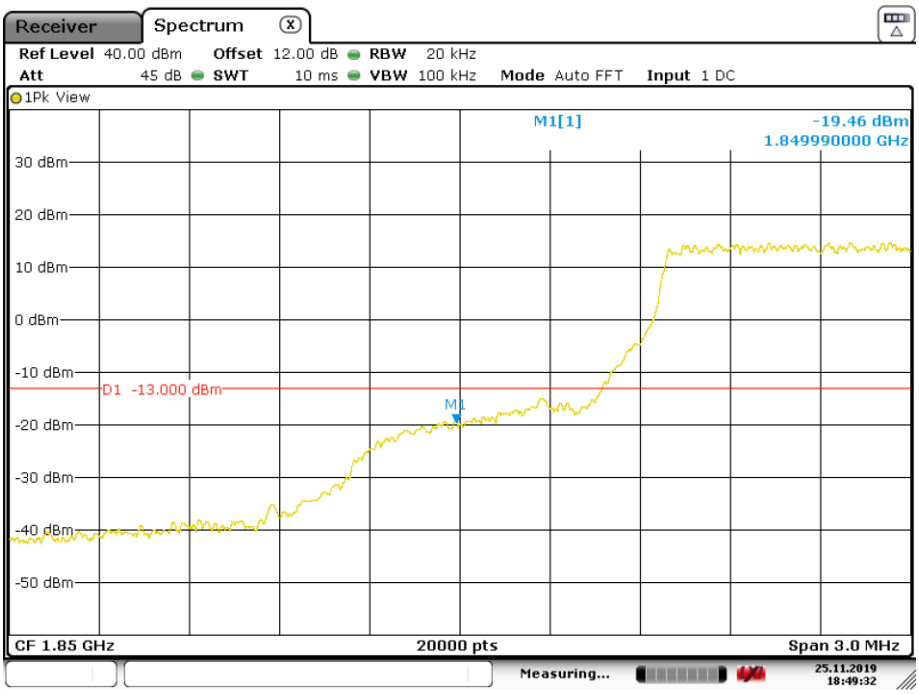


Date: 25.NOV.2019 19:02:53

TEST RESULTS (Cont):	

LTE QPSK MODULATION. RB = 6. Offset = 0. BW = 10 MHz

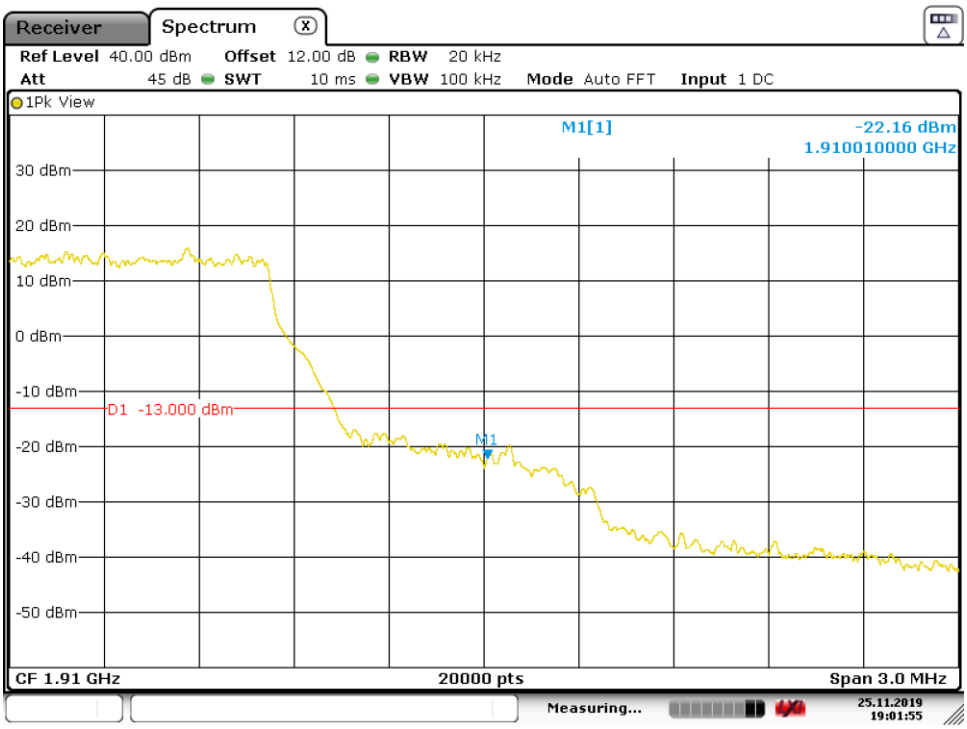
Lowest Channel



Date: 25.NOV.2019 18:49:32

LTE QPSK MODULATION. RB = 6. Offset = 0. BW = 10 MHz

Highest Channel

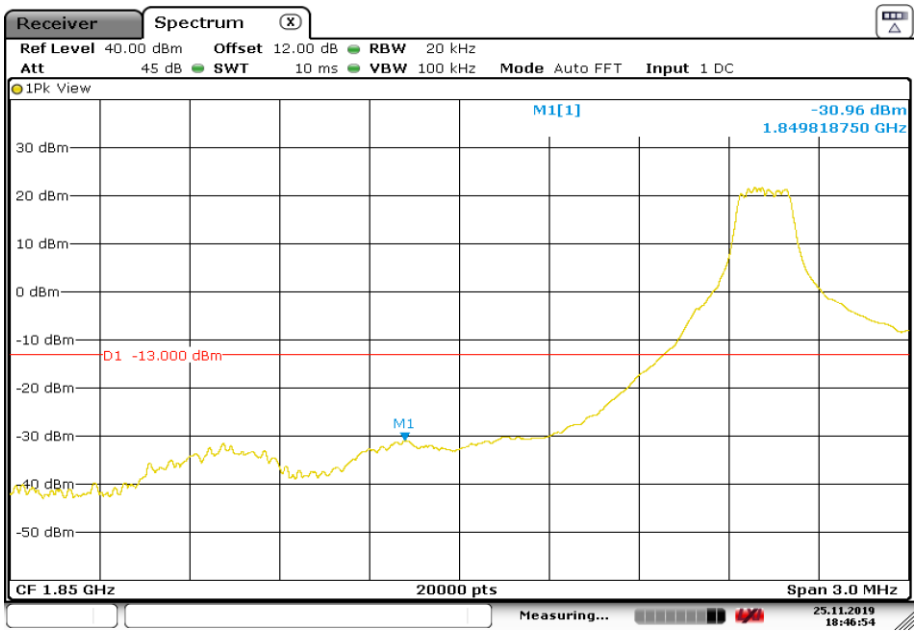


Date: 25.NOV.2019 19:01:55

TEST RESULTS (Cont):	

LTE QPSK MODULATION. RB = 1. Offset = 0. BW = 15 MHz

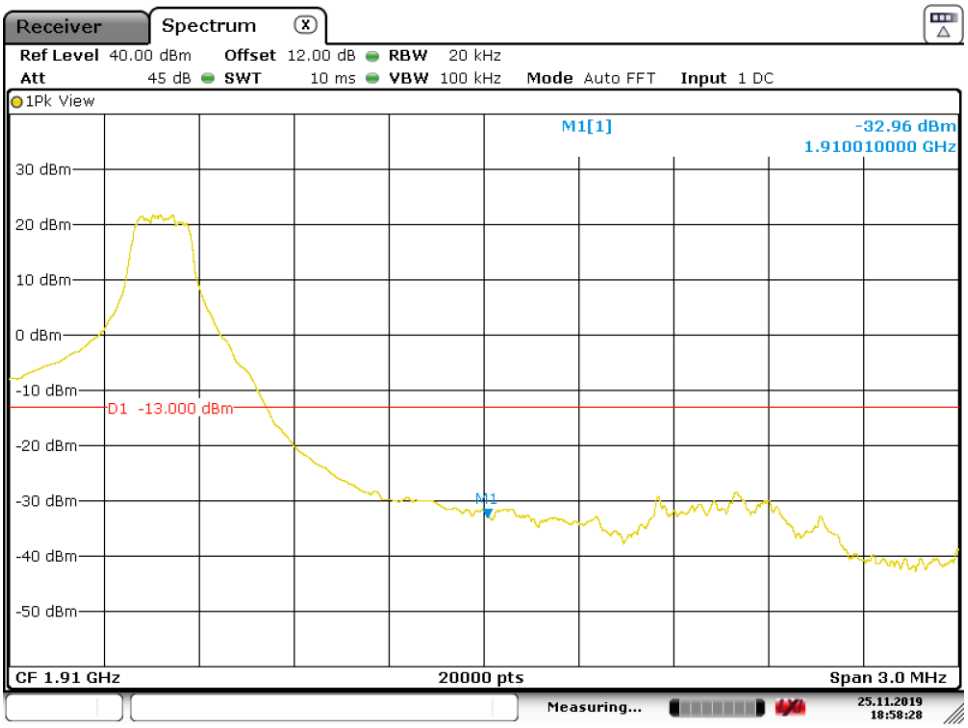
Lowest Channel



Date: 25.NOV.2019 18:46:54

LTE QPSK MODULATION. RB = 1. Offset = 5. BW = 15 MHz

Highest Channel

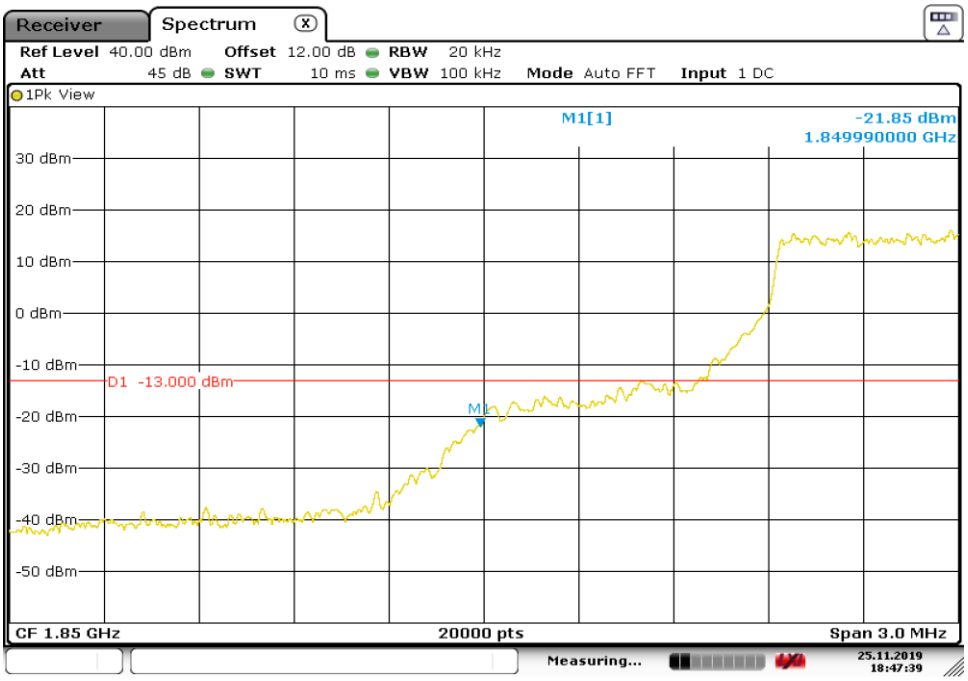


Date: 25.NOV.2019 18:58:28

TEST RESULTS (Cont):	

LTE QPSK MODULATION. RB = 6. Offset = 0. BW = 15 MHz

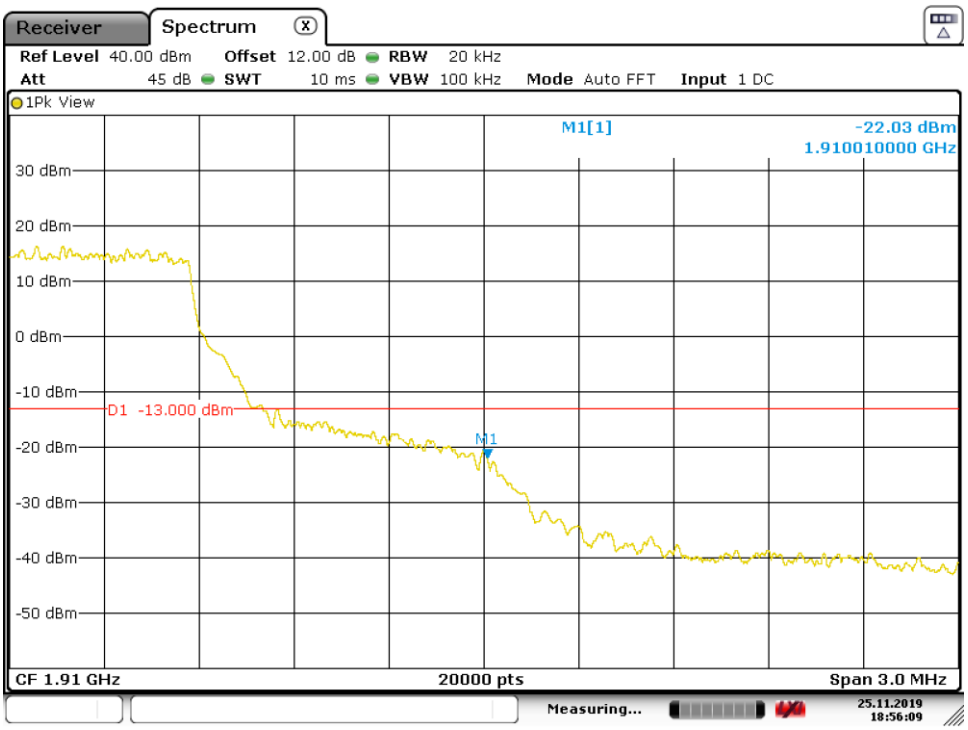
Lowest Channel



Date: 25.NOV.2019 18:47:40

LTE QPSK MODULATION. RB = 6. Offset = 0. BW = 15 MHz

Highest Channel

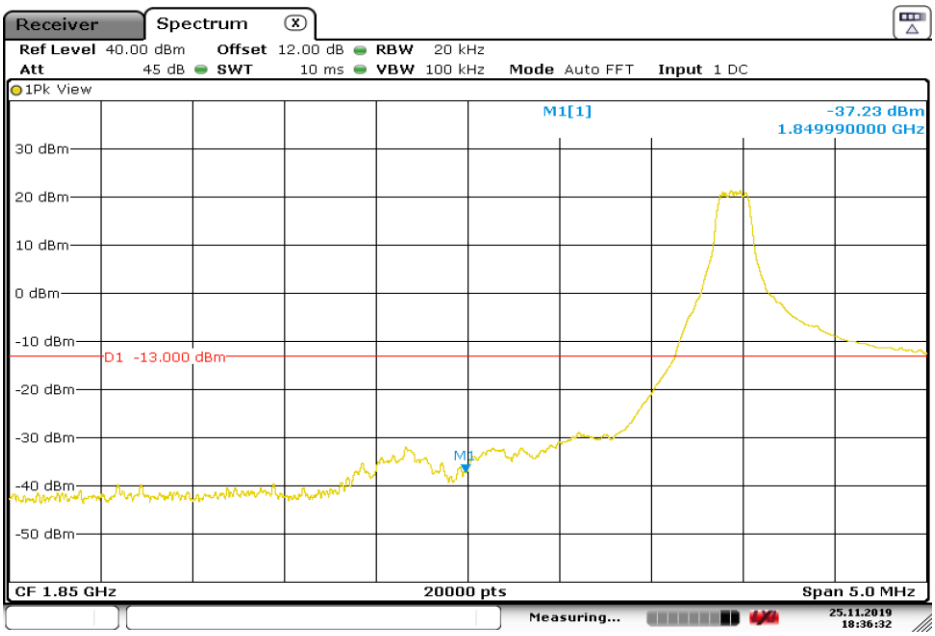


Date: 25.NOV.2019 18:56:09

TEST RESULTS (Cont):	

LTE QPSK MODULATION. RB = 1. Offset = 0. BW = 20 MHz

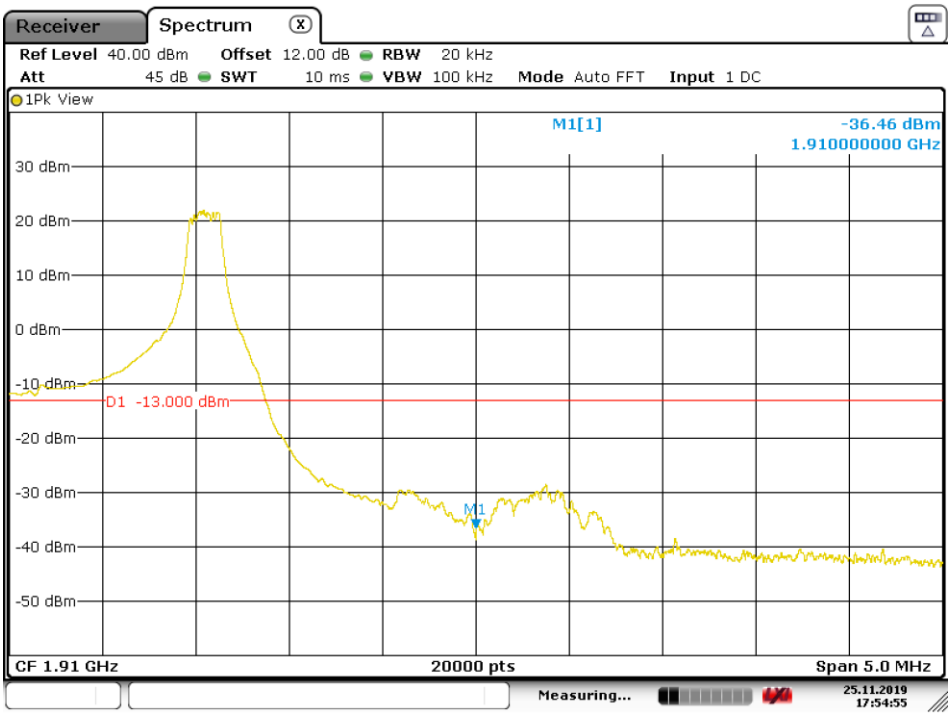
Lowest Channel



Date: 25.NOV.2019 18:36:32

LTE QPSK MODULATION. RB = 1. Offset = 5. BW = 20 MHz

Highest Channel

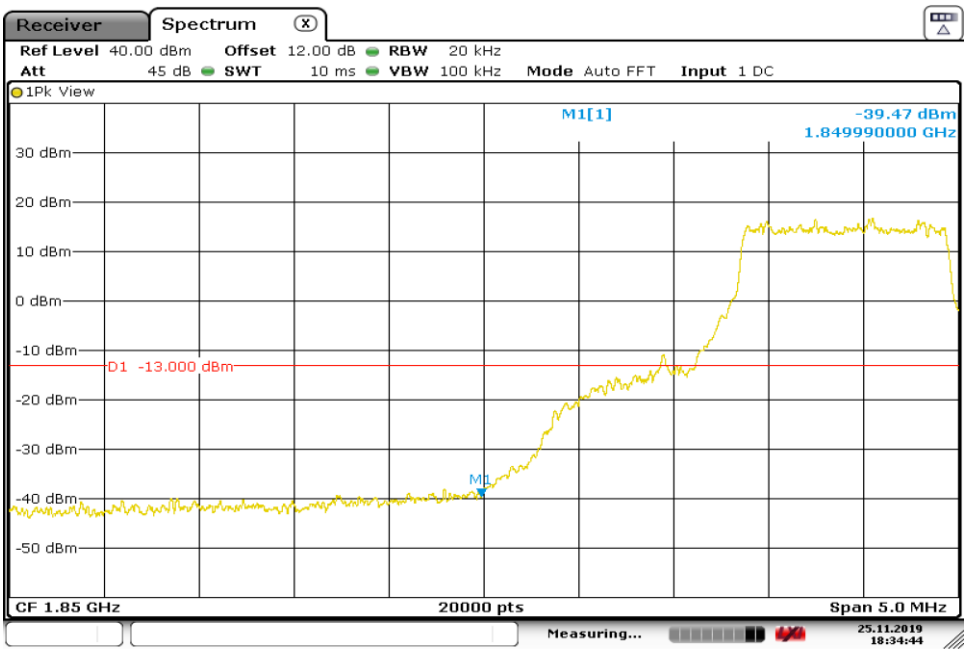


Date: 25.NOV.2019 17:54:55

TEST RESULTS (Cont):	

LTE QPSK MODULATION. RB = 6. Offset = 0. BW = 20 MHz

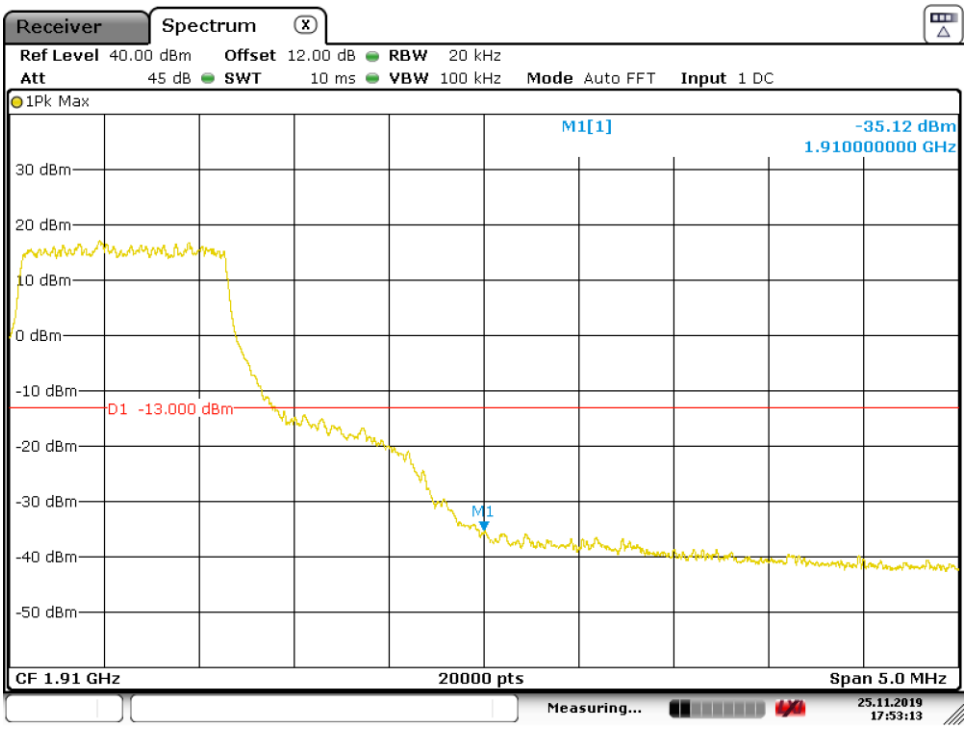
Lowest Channel



Date: 25.NOV.2019 18:34:44

LTE QPSK MODULATION. RB = 6. Offset = 0. BW = 20 MHz

Highest Channel



Date: 25.NOV.2019 17:53:14

TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#02
TEST RESULTS:	PASS

LTE QPSK MODULATION	RB=1. Offset =0. BW = 5 MHz	RB=1. Offset =0. BW = 10 MHz	RB=1. Offset =0. BW = 15 MHz	RB=1. Offset =0. BW = 20 MHz
Maximum measured level at lowest Block Edge at antenna port (dBm)	-15.39	-30.39	-32.67	-37.86

LTE QPSK MODULATION:	RB= All. Offset =0. BW = 5 MHz	RB= All. Offset =0. BW = 10 MHz	RB= All. Offset =0. BW = 15 MHz	RB= All. Offset =0. BW = 20 MHz
Maximum measured level at lowest Block Edge at antenna port (dBm)	-15.91	-19.65	-23.03	-38.99

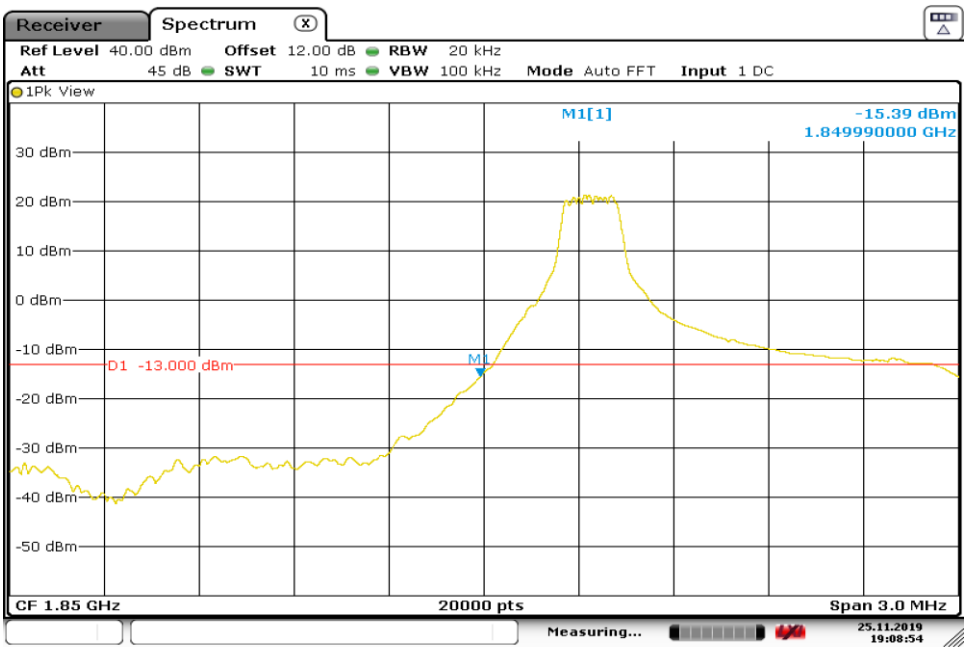
LTE QPSK MODULATION:	RB= 1. Offset=Max. BW = 5 MHz	RB= 1. Offset=Max. BW = 10 MHz	RB= 1. Offset=Max. BW = 15 MHz	RB= 1. Offset=Max. BW = 20 MHz
Maximum measured level at highest Block Edge at antenna port (dBm)	-16.13	-30.41	-32.90	-35.76

LTE QPSK MODULATION:	RB= All. Offset =0. BW = 5 MHz	RB= All. Offset =0. BW = 10 MHz	RB= All. Offset =0. BW = 15 MHz	RB= All. Offset =0. BW = 20 MHz
Maximum measured level at highest Block Edge at antenna port (dBm)	-18.64	-21.45	-23.28	-37.06

TEST RESULTS (Cont):	

LTE QPSK MODULATION. RB = 1. Offset = 0. BW = 5 MHz

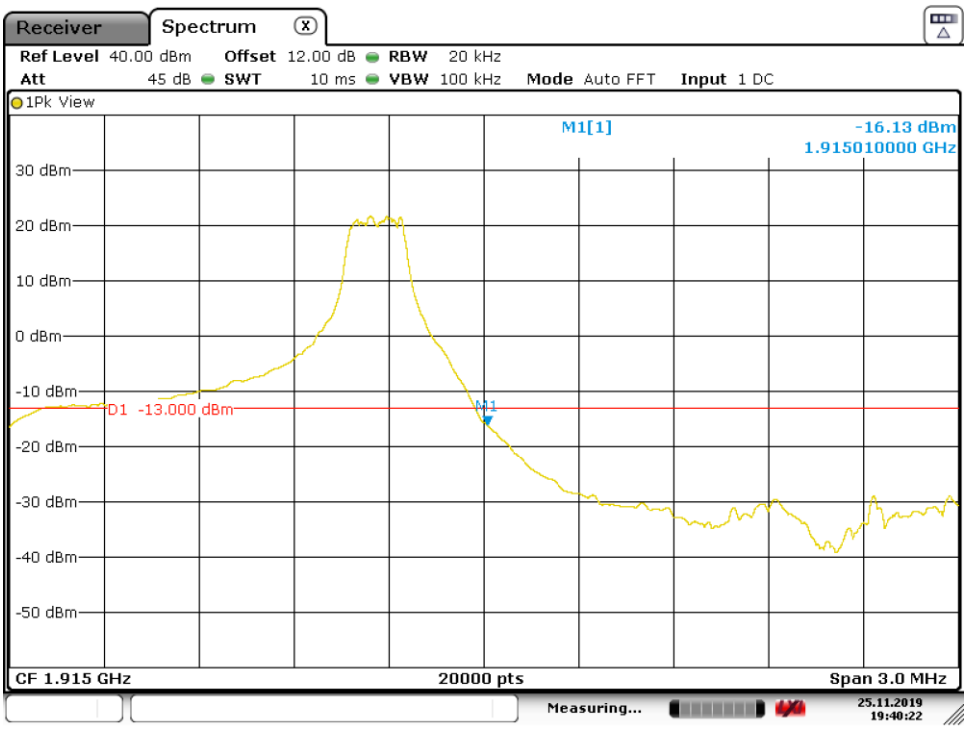
Lowest Channel



Date: 25.NOV.2019 19:08:54

LTE QPSK MODULATION. RB = 1. Offset = 5. BW = 5 MHz

Highest Channel

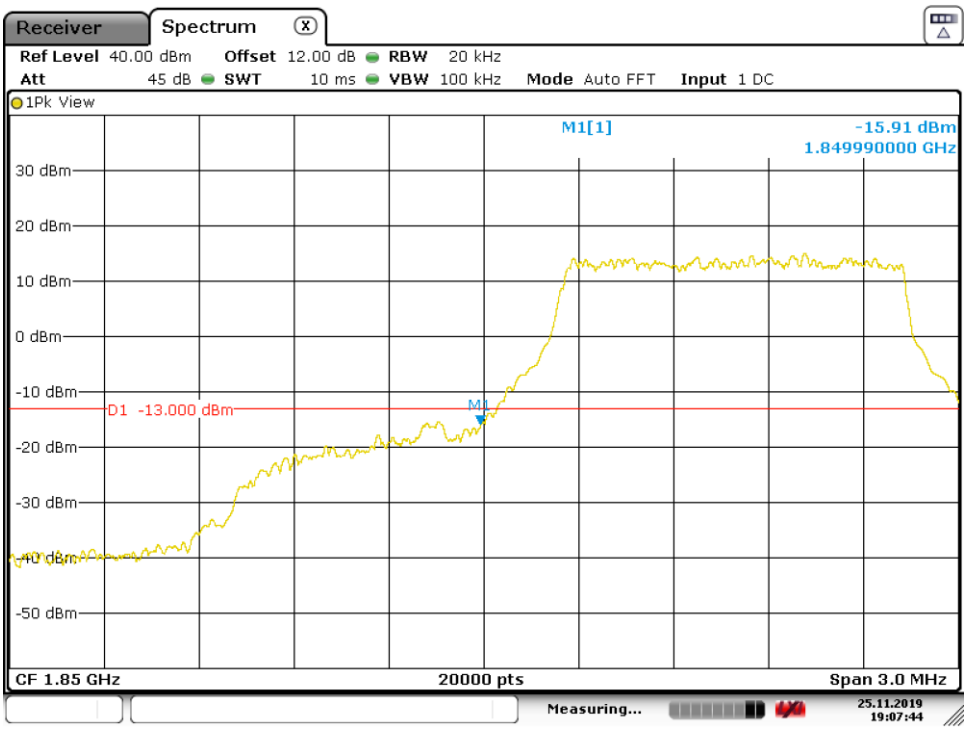


Date: 25.NOV.2019 19:40:23

TEST RESULTS (Cont):	

LTE QPSK MODULATION. RB = 6. Offset = 0. BW = 5 MHz

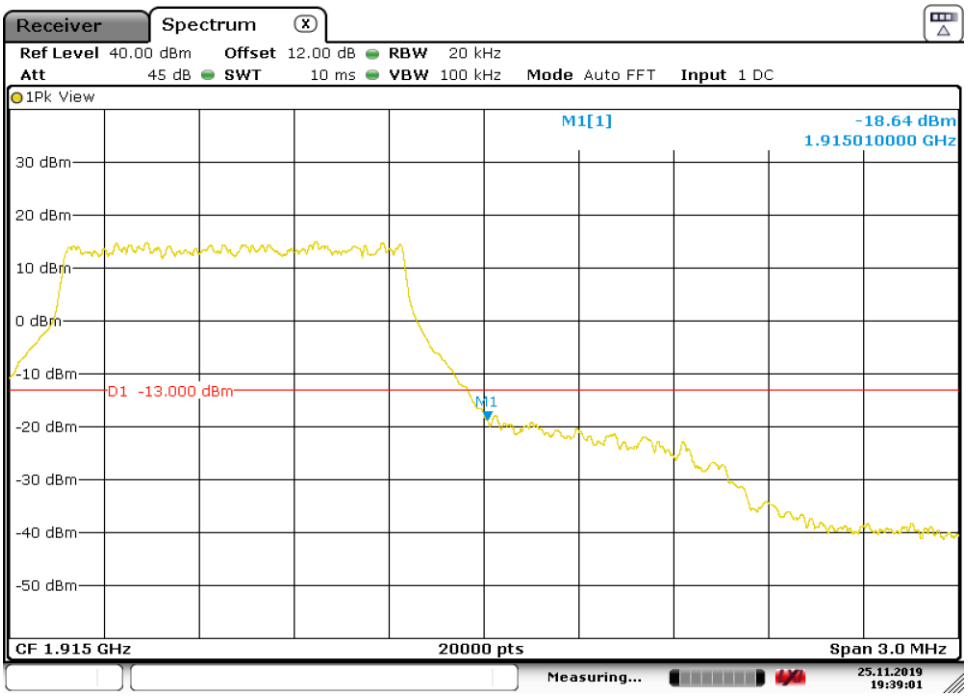
Lowest Channel



Date: 25.NOV.2019 19:07:44

LTE QPSK MODULATION. RB = 6. Offset = 0. BW = 5 MHz

Highest Channel

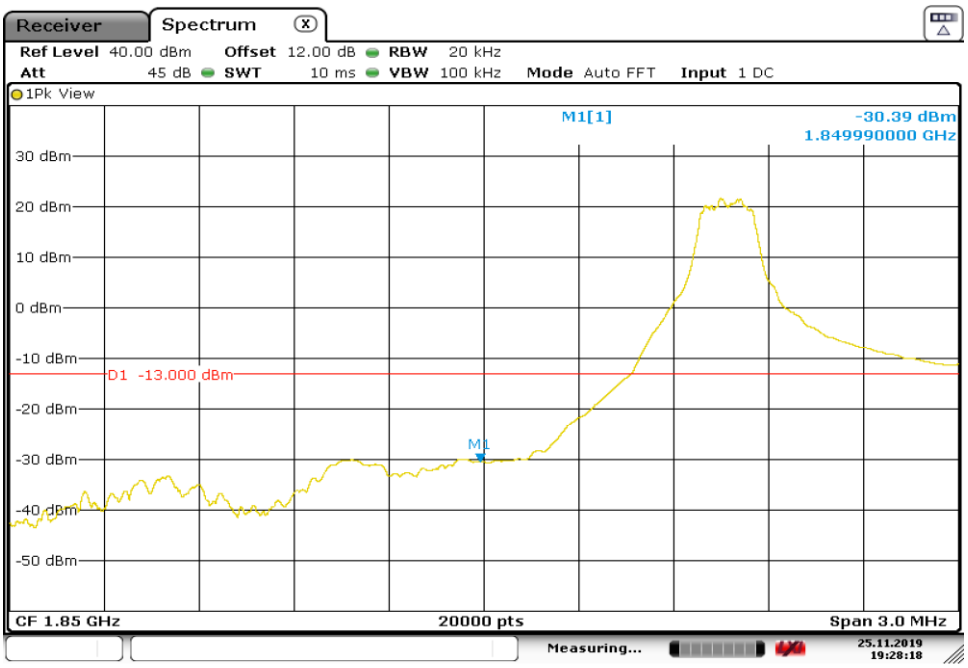


Date: 25.NOV.2019 19:39:01

TEST RESULTS (Cont):	

LTE QPSK MODULATION. RB = 1. Offset = 0. BW = 10 MHz

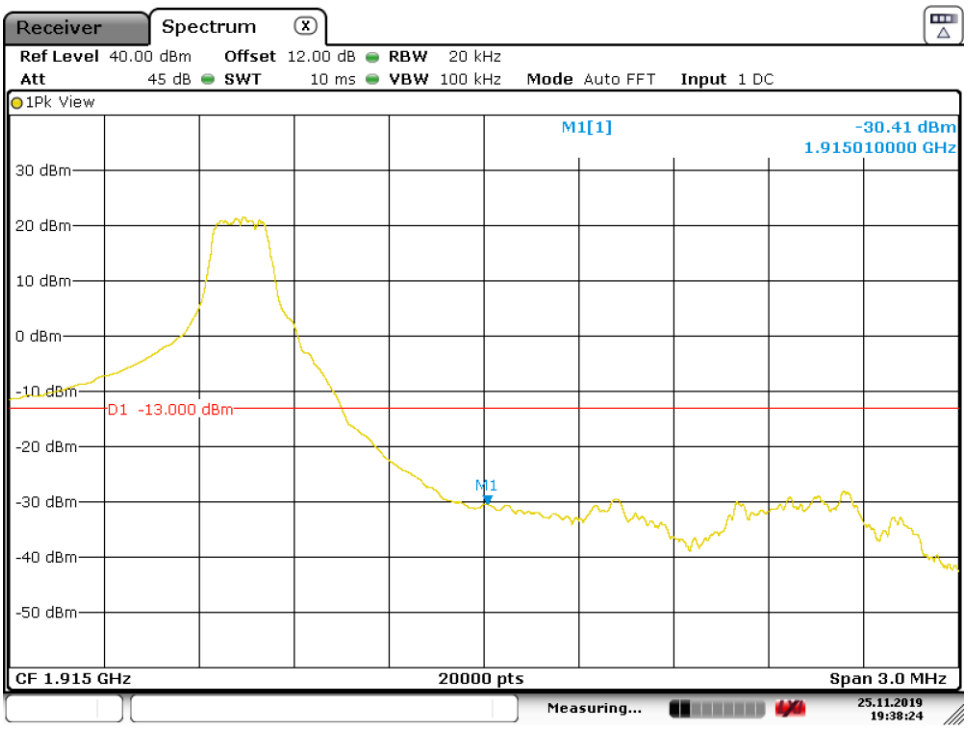
Lowest Channel



Date: 25.NOV.2019 19:28:19

LTE QPSK MODULATION. RB = 1. Offset = 5. BW = 10 MHz

Highest Channel

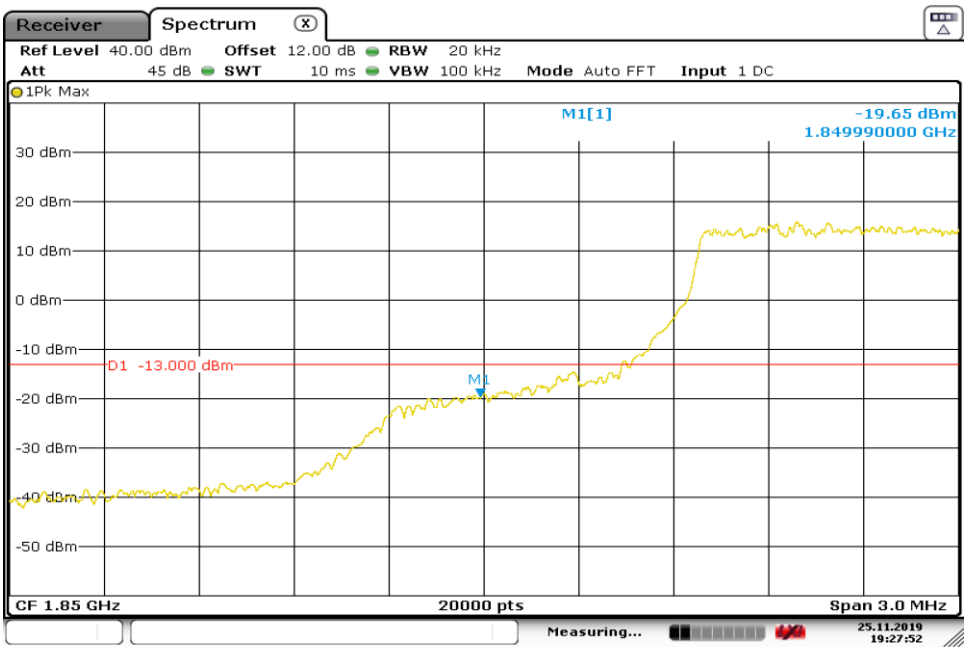


Date: 25.NOV.2019 19:38:25

TEST RESULTS (Cont):	

LTE QPSK MODULATION. RB = 6. Offset = 0. BW = 10 MHz

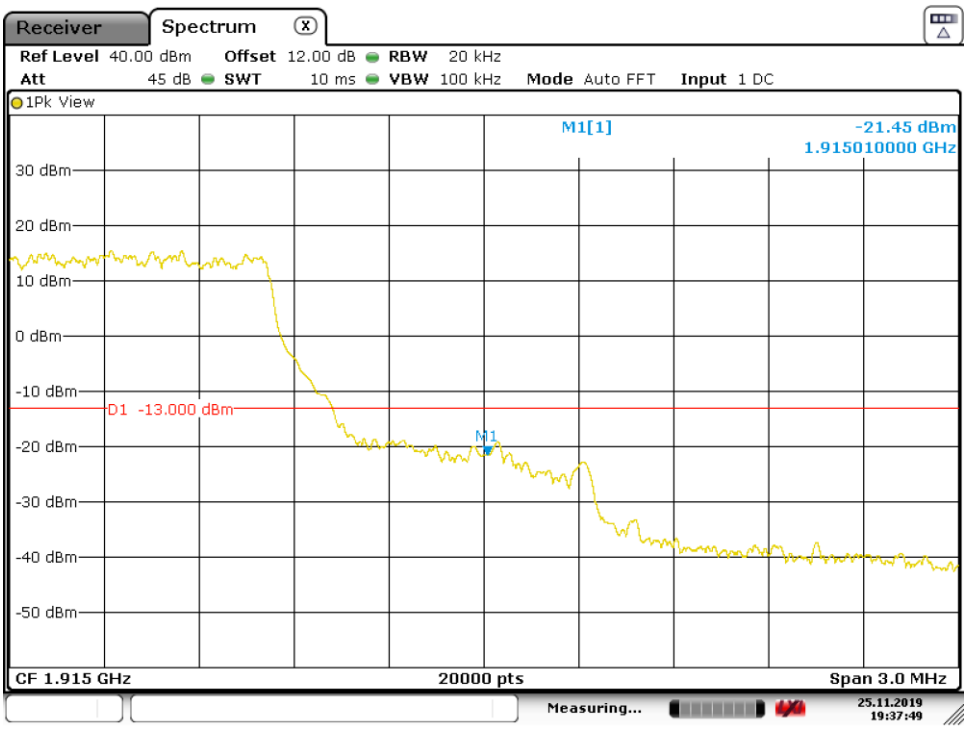
Lowest Channel



Date: 25.NOV.2019 19:27:52

LTE QPSK MODULATION. RB = 6. Offset = 0. BW = 10 MHz

Highest Channel

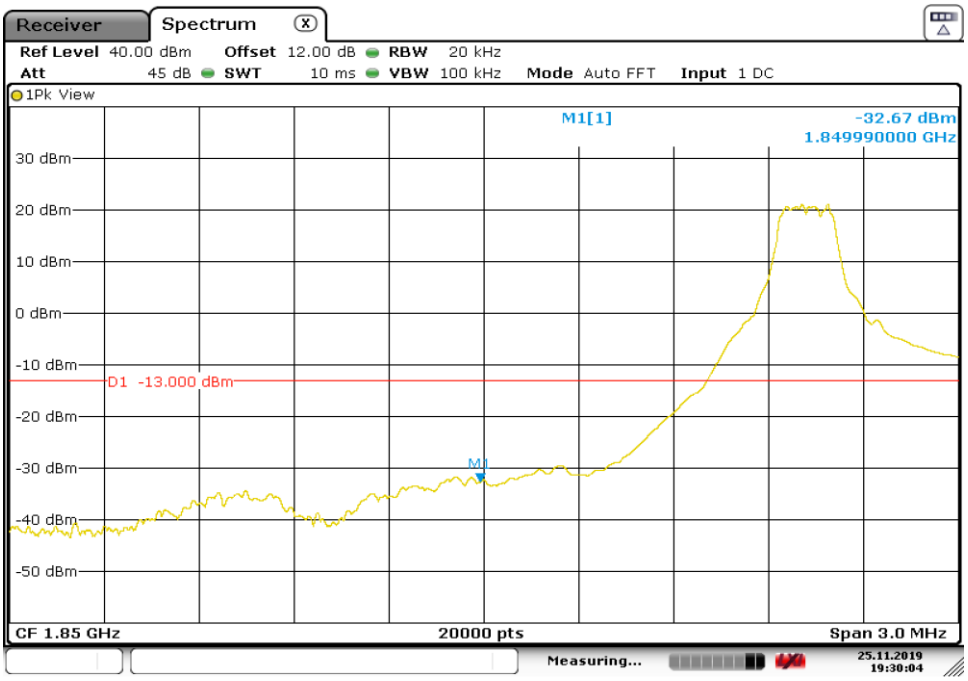


Date: 25.NOV.2019 19:37:49

TEST RESULTS (Cont):	

LTE QPSK MODULATION. RB = 1. Offset = 0. BW = 15 MHz

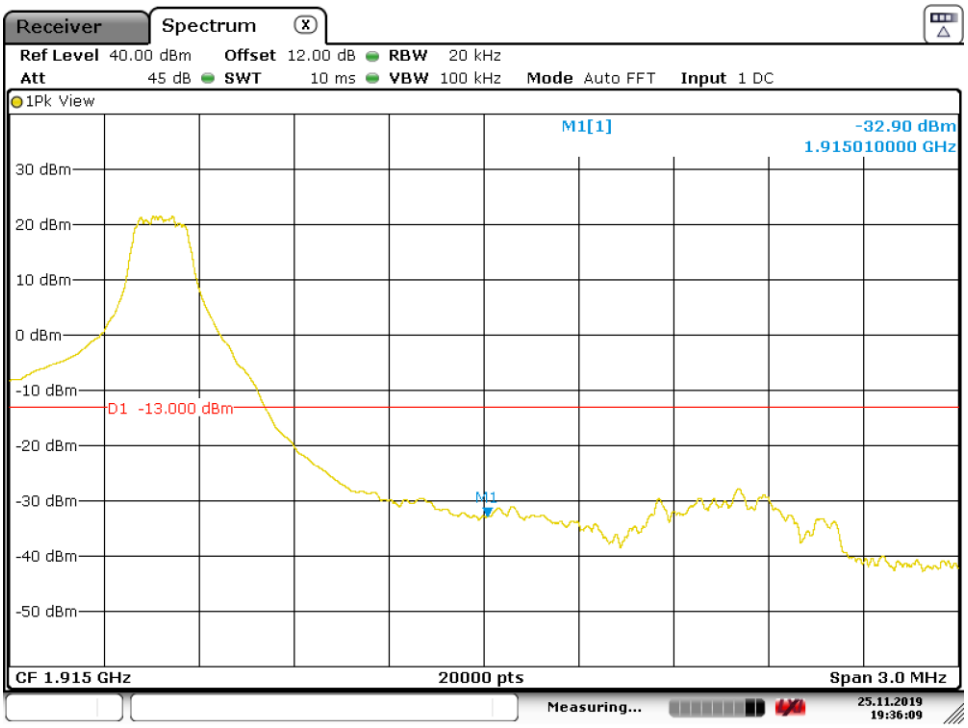
Lowest Channel



Date: 25.NOV.2019 19:30:05

LTE QPSK MODULATION. RB = 1. Offset = 5. BW = 15 MHz

Highest Channel

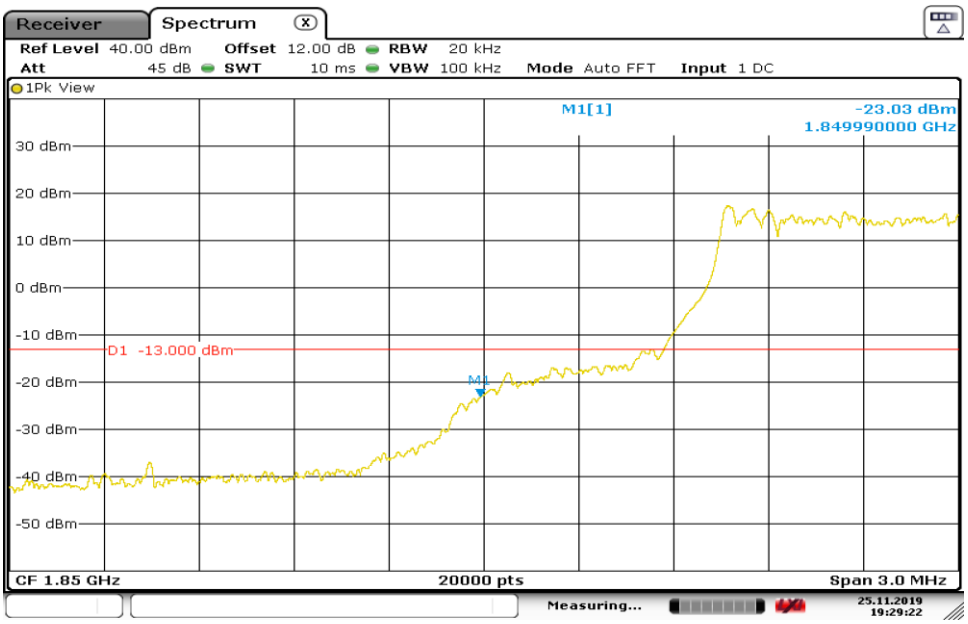


Date: 25.NOV.2019 19:36:09

TEST RESULTS (Cont):	

LTE QPSK MODULATION. RB = 6. Offset = 0. BW = 15 MHz

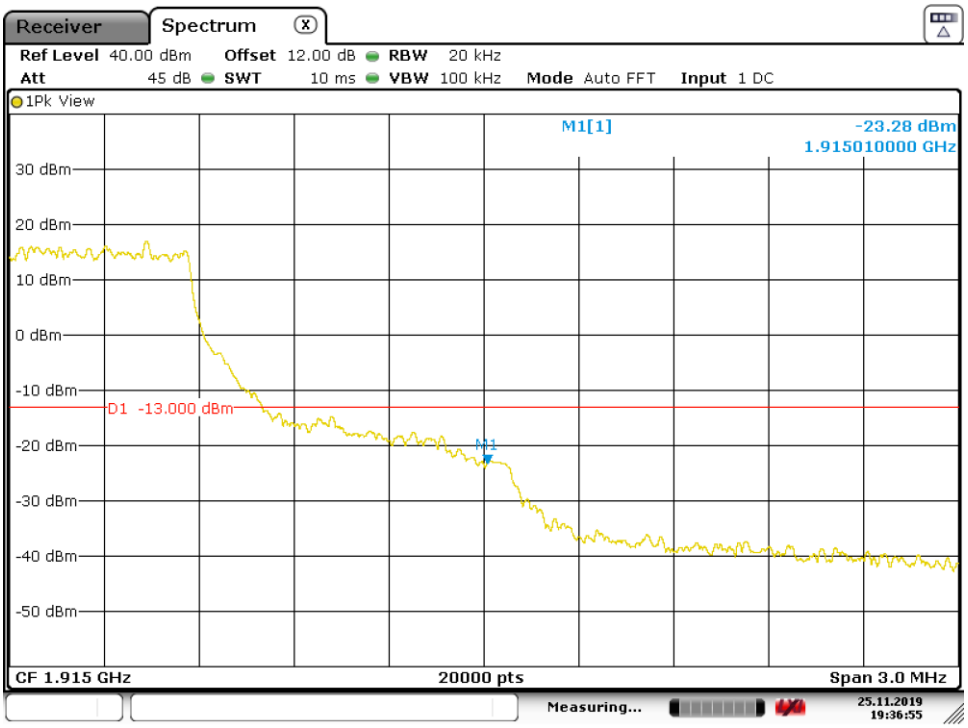
Lowest Channel



Date: 25.NOV.2019 19:29:22

LTE QPSK MODULATION. RB = 6. Offset = 0. BW = 15 MHz

Highest Channel

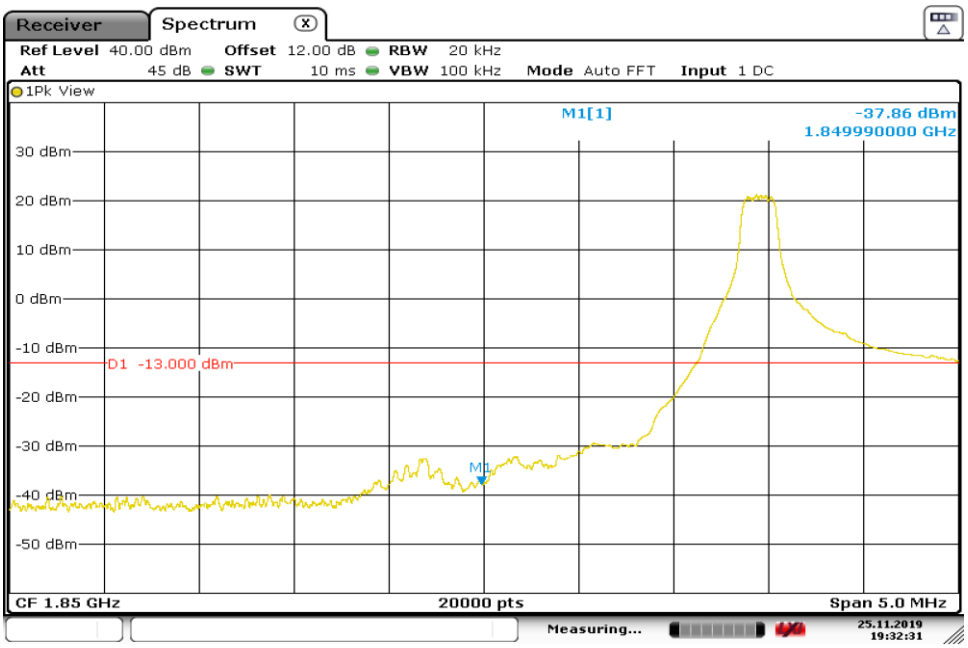


Date: 25.NOV.2019 19:36:55

TEST RESULTS (Cont):	

LTE QPSK MODULATION. RB = 1. Offset = 0. BW = 20 MHz

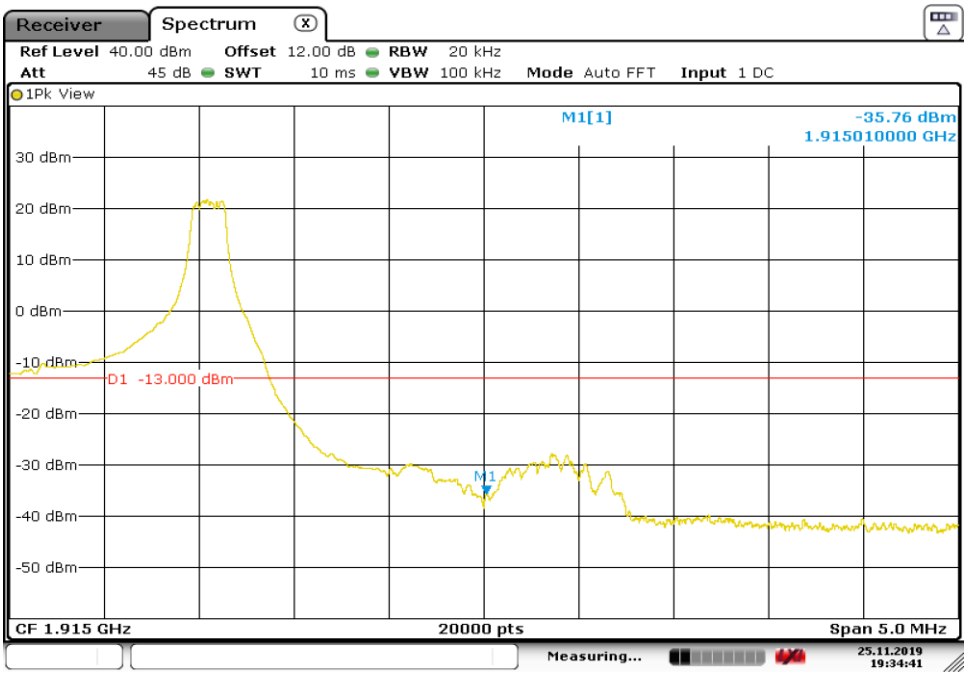
Lowest Channel



Date: 25.NOV.2019 19:32:31

LTE QPSK MODULATION. RB = 1. Offset = 5. BW = 20 MHz

Highest Channel

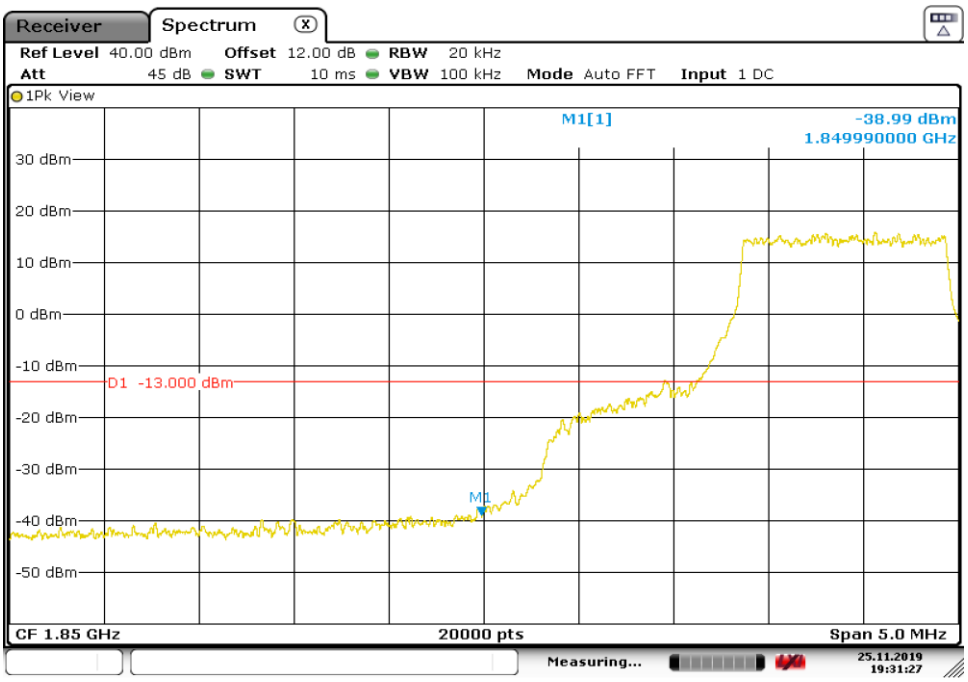


Date: 25.NOV.2019 19:34:42

TEST RESULTS (Cont):	

LTE QPSK MODULATION. RB = 6. Offset = 0. BW = 20 MHz

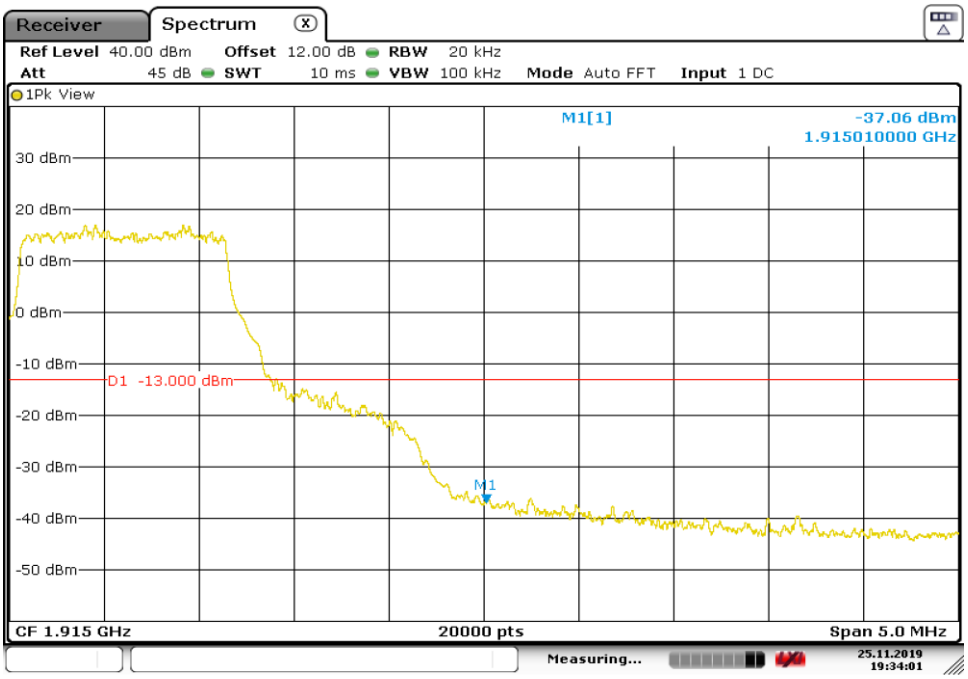
Lowest Channel



Date: 25.NOV.2019 19:31:27

LTE QPSK MODULATION. RB = 6. Offset = 0. BW = 20 MHz

Highest Channel



Date: 25.NOV.2019 19:34:00

TEST A.7: RADIATED EMISSIONS

LIMITS:	Product standard:	FCC Part 24 / IC RSS-133
	Test standard:	FCC §2.1053 and §24.238 /RSS-133 Clause 6.6

LIMITS

According to specification, the power of emissions shall be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log (P) dB. P in watts.

At Po transmitting power of 2 watts (33 dBm), the specified minimum attenuation becomes 43+10log (Po). and the level in dBm relative to Po becomes:

Po (dBm) – [43 + 10 log (Po in watts)] = -13 dBm

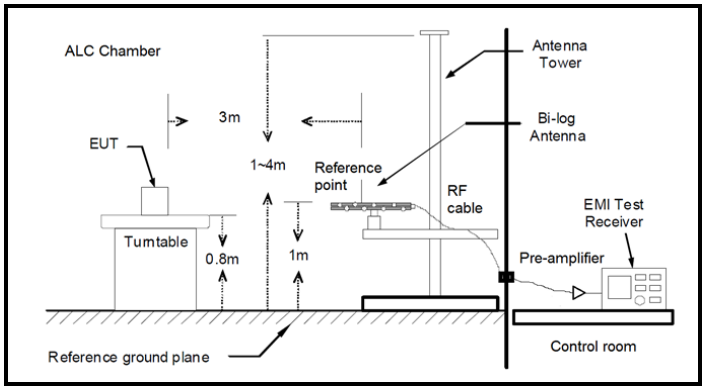
TEST SETUP

The measurement was performed with the EUT inside an anechoic chamber. The spectrum was scanned from 30 MHz to at least the 10th harmonic of the highest frequency generated within the equipment.

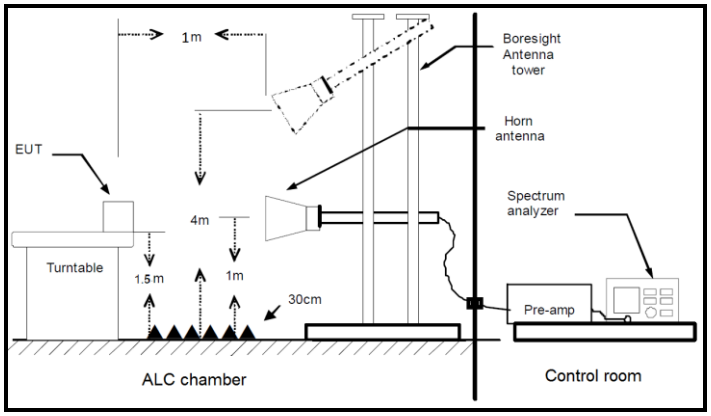
The EUT was placed on a non-conductive stand at a 3-meter distance from the measuring antenna for measurements below 1 GHz and at 1-meter distance for measurements above 1 GHz.

Detected emissions were maximized at each frequency by rotating the EUT and adjusting the measuring antenna height and polarization. The maximum reading was recorded.

Radiated measurements < 1GHz



Radiated measurements > 1GHz



TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#01
TEST RESULTS:	PASS

RESULTS

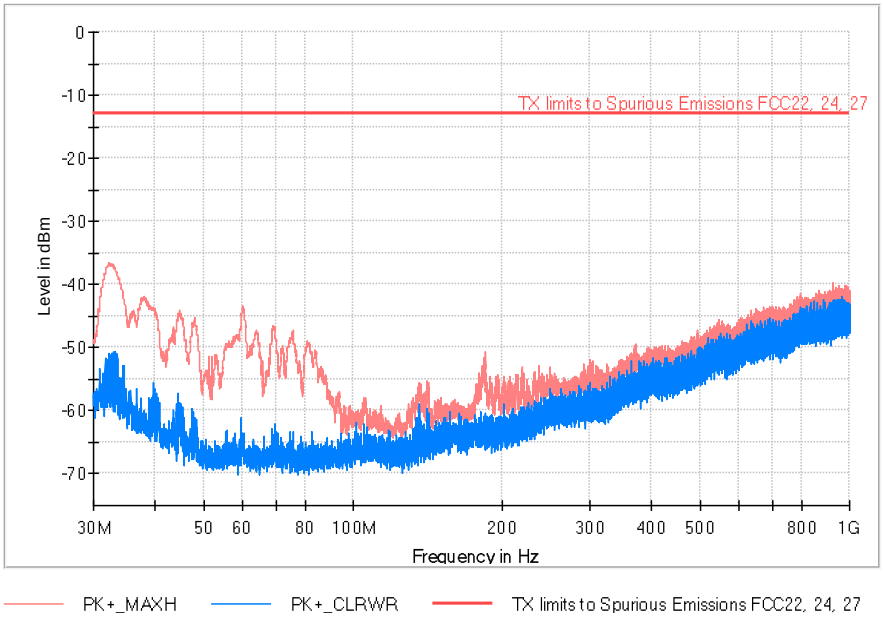
A preliminary scan determined the QPSK 15 MHz bandwidth as the worst case. The configuration of Resource Blocks which is the worst case for conducted power was used.

The following plots show the results for this configuration.

LTE QPSK MODULATION. RB = 1. Offset = 0. BW = 15 MHz

TEST RESULTS (Cont):	Low Channel

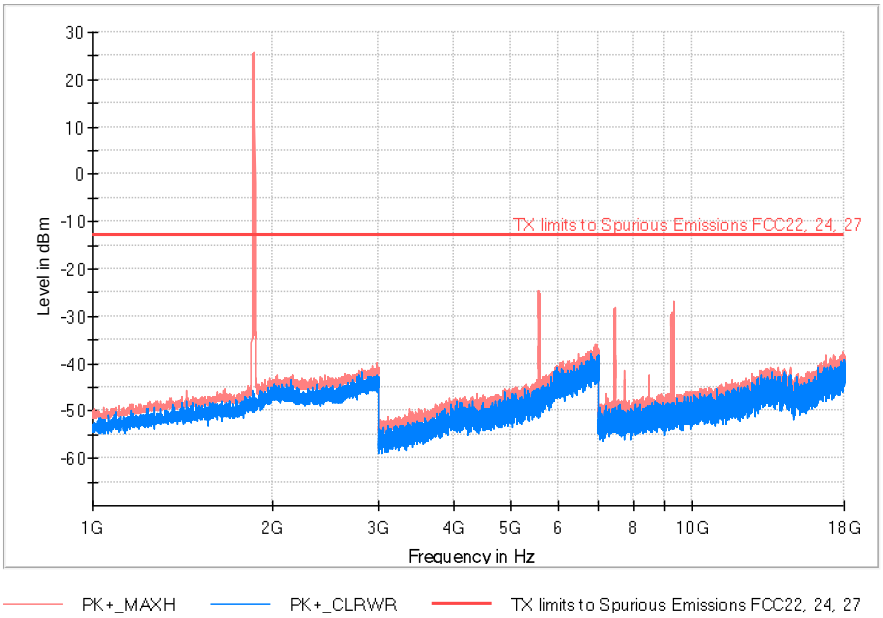
FREQUENCY RANGE: 30-1000 MHz



Frequency (MHz)	PK+_CLRWR (dBm)	PK+_MAXH (dBm)
32.295667	-53.57	-36.59
59.876000	-66.87	-43.32
184.165333	-64.49	-50.69

TEST RESULTS (Cont):	Low Channel

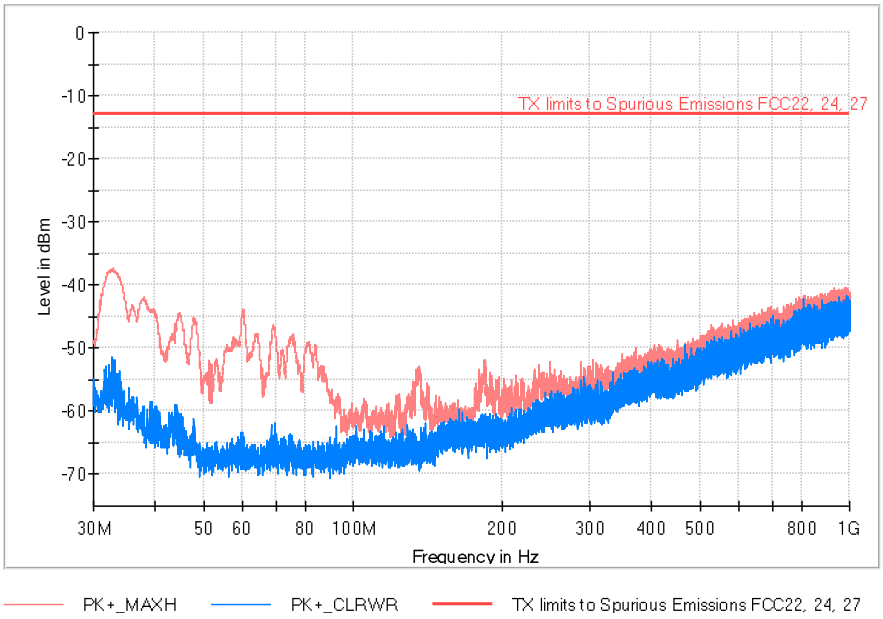
FREQUENCY RANGE: 1-18 GHz



Frequency (MHz)	PK+_CLRWR (dBm)	PK+_MAXH (dBm)	Comment
1864.000000	-46.25	25.67	Fundamental UL
5552.500000	-49.61	-24.39	
7456.500000	-53.49	-28.13	
7742.000000	-51.08	-41.44	
8473.500000	-51.85	-42.39	
9320.500000	-51.00	-26.95	

TEST RESULTS(Cont.):	Middle Channel

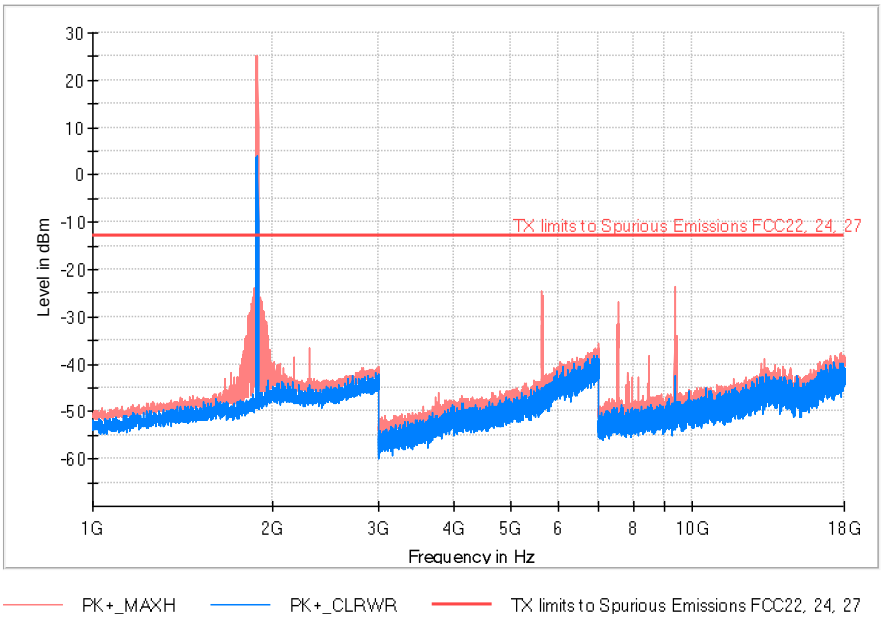
FREQUENCY RANGE: 30-1000 MHz



Frequency (MHz)	PK+_CLRWR (dBm)	PK+_MAXH (dBm)
32.813000	-54.84	-37.19
59.940667	-68.16	-44.28
183.001333	-60.63	-51.79

TEST RESULTS (Cont):	Middle Channel

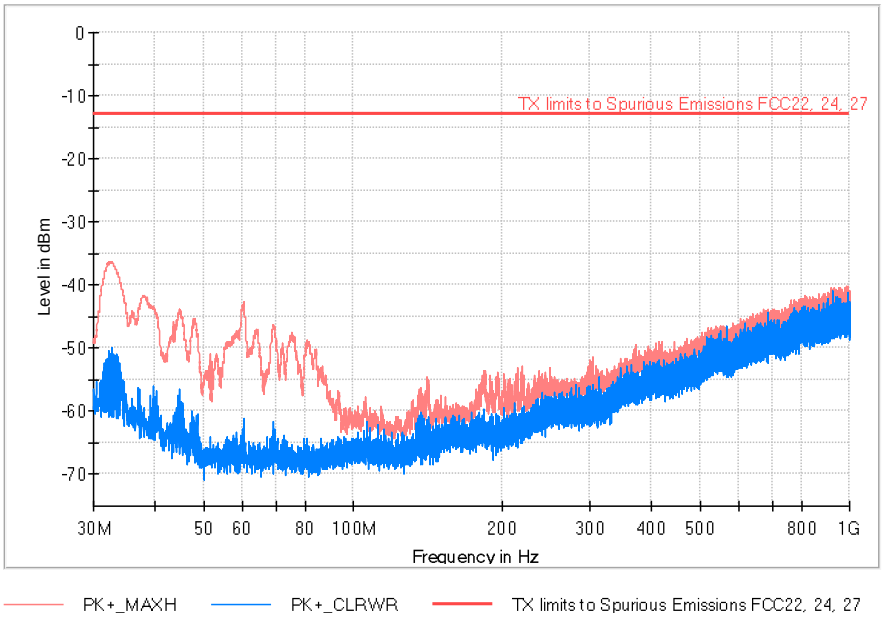
FREQUENCY RANGE: 1-18 GHz



Frequency (MHz)	PK+_CLRWR (dBm)	PK+_MAXH (dBm)	Comment
1886.500000	4.08	25.21	Fundamental UL
2295.000000	-48.21	-36.44	
3773.000000	-53.31	-46.29	
5622.000000	-46.44	-24.70	
7546.500000	-54.00	-26.69	
8472.500000	-53.15	-38.19	
9369.500000	-42.46	-23.43	

TEST RESULTS(Cont.):	High Channel

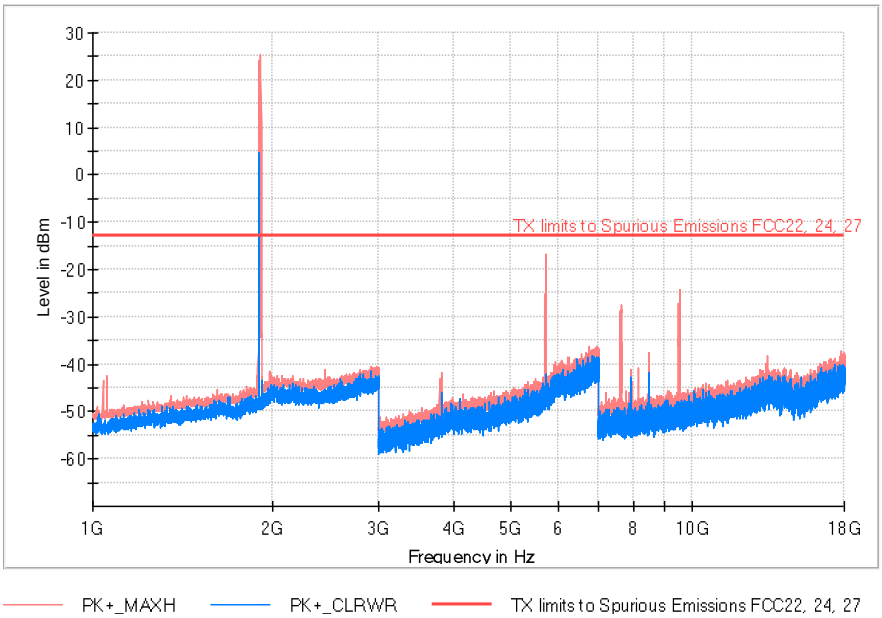
FREQUENCY RANGE: 30-1000 MHz



Frequency (MHz)	PK+_CLRWR (dBm)	PK+_MAXH (dBm)
32.198667	-60.85	-36.24
60.167000	-67.34	-42.61
304.316000	-59.61	-51.38

TEST RESULTS (Cont):	High Channel

FREQUENCY RANGE: 1-18 GHz



Frequency (MHz)	PK+_CLRWR (dBm)	PK+_MAXH (dBm)	Comment
1909.000000	-48.73	25.34	Fundamental UL
3818.000000	-47.68	-41.91	
5727.000000	-46.76	-16.82	
7636.500000	-52.61	-27.44	
8473.000000	-51.06	-37.55	
9481.500000	-51.03	-27.17	
9546.000000	-51.48	-24.25	

TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#02
TEST RESULTS:	PASS

RESULTS

A preliminary scan determined the QPSK 20 MHz bandwidth as the worst case. The configuration of Resource Blocks which is the worst case for conducted power was used.

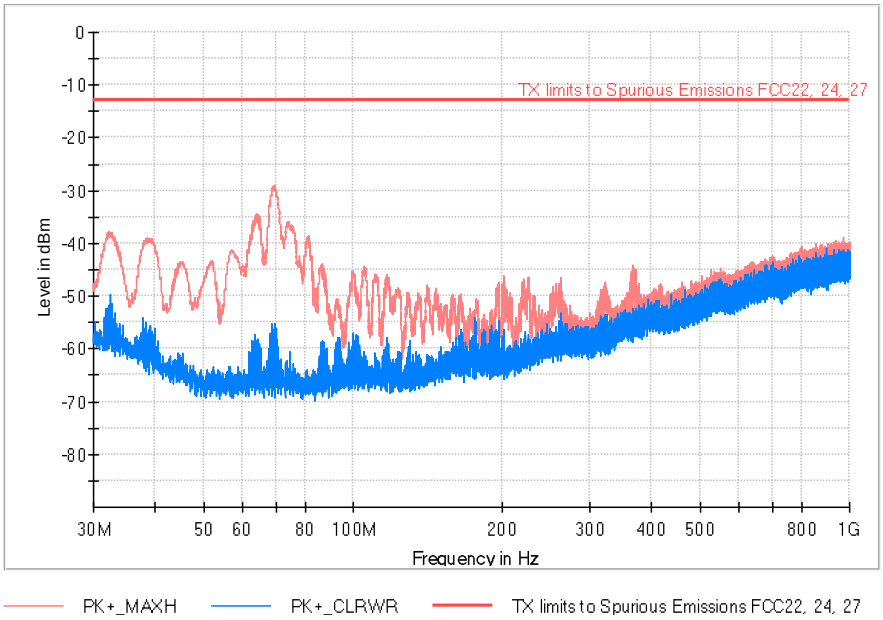
The following plots show the results for this configuration.

No spurious signal was found at less than 20dB respect to the limit in all the frequency ranges.

LTE QPSK MODULATION. RB = 6. Offset = 0. BW = 20 MHz

TEST RESULTS (Cont):	Low Channel

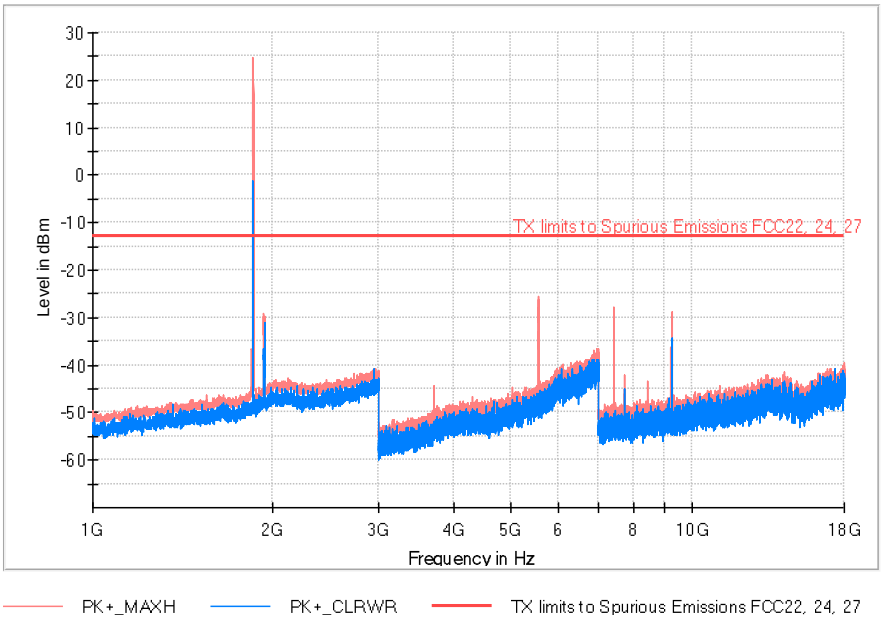
FREQUENCY RANGE: 30-1000 MHz



Frequency (MHz)	PK+_CLRWR (dBm)	PK+_MAXH (dBm)
32.134000	-51.76	-37.74
69.317333	-65.16	-29.00
200.946333	-63.61	-46.18
365.943333	-54.91	-44.16

TEST RESULTS (Cont):	Low Channel

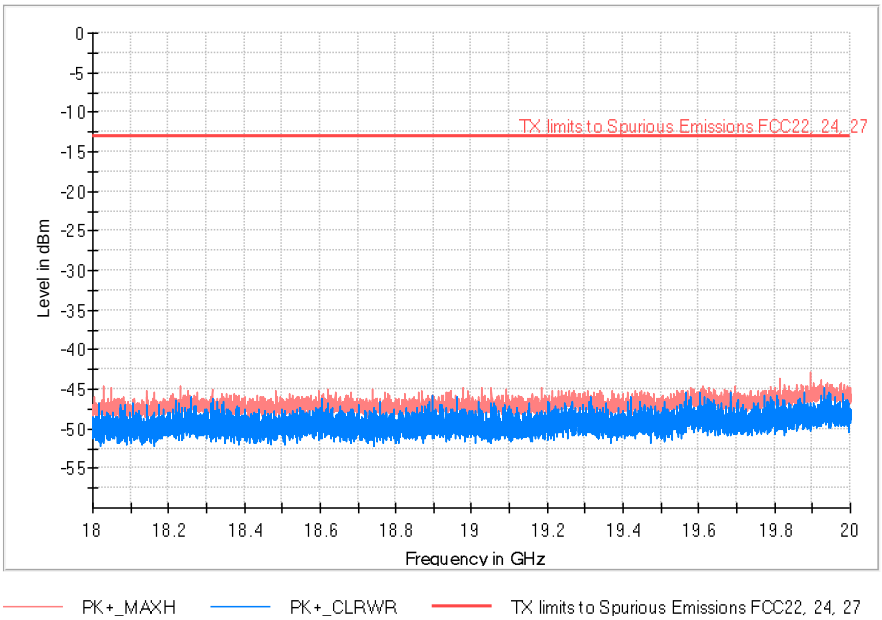
FREQUENCY RANGE: 1-18 GHz



Frequency (MHz)	PK+_CLRWR (dBm)	PK+_MAXH (dBm)	Comment
1854.000000	-1.01	24.80	Fundamental UL
1932.500000	-37.89	-28.99	Fundamental DL
3707.000000	-53.98	-44.47	
5551.500000	-47.36	-25.56	
7415.000000	-51.64	-27.85	
7733.500000	-44.96	-42.13	
8469.000000	-51.79	-43.27	
9269.000000	-34.46	-28.90	

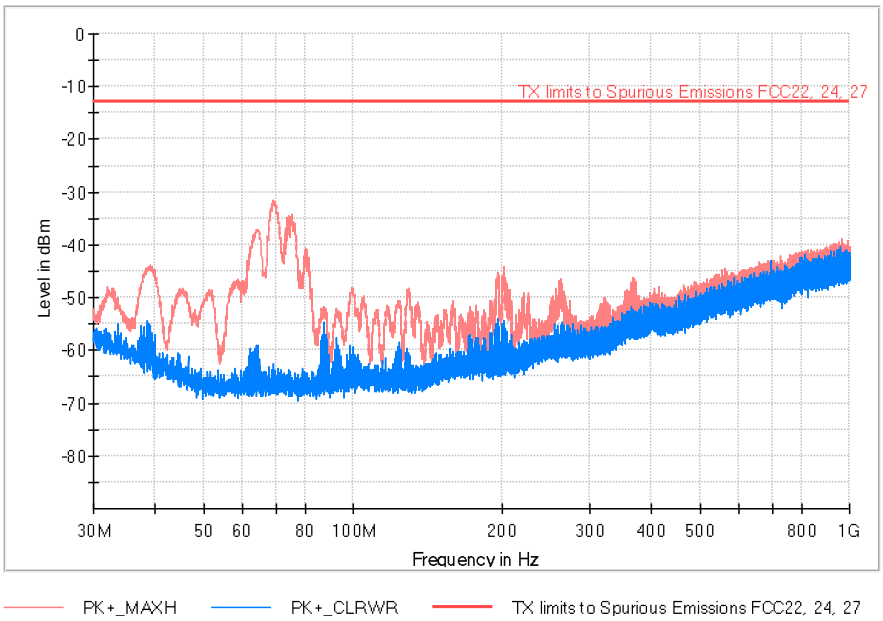
TEST RESULTS (Cont):	Low Channel

FREQUENCY RANGE: 18-20 GHz



TEST RESULTS(Cont.):	Middle Channel

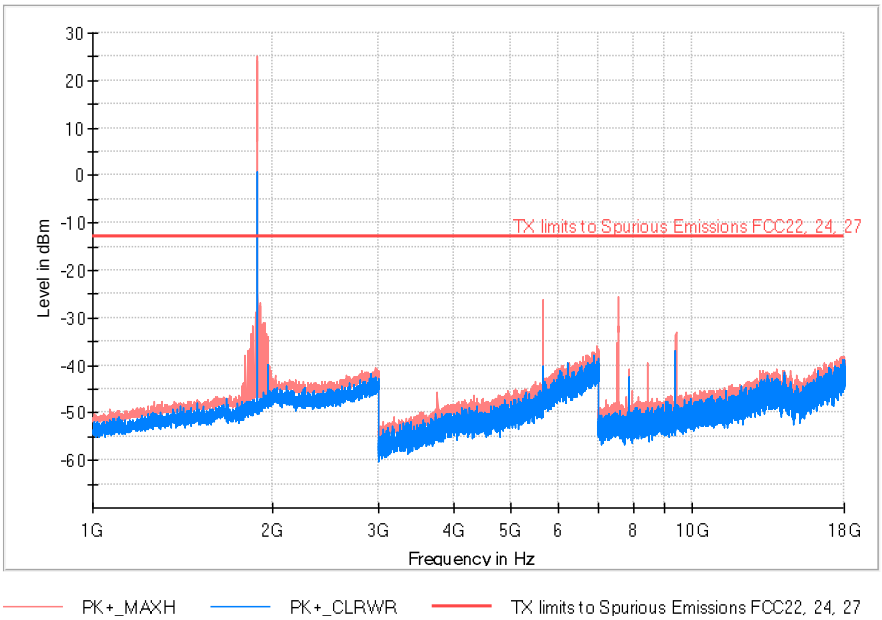
FREQUENCY RANGE: 30-1000 MHz



Frequency (MHz)	PK+_CLRWR (dBm)	PK+_MAXH (dBm)
38.697667	-55.03	-44.02
69.188000	-65.06	-31.61
129.134000	-66.44	-48.26
201.205000	-60.13	-44.20
261.312667	-59.01	-46.56
365.749333	-56.54	-46.27

TEST RESULTS (Cont):	Middle Channel

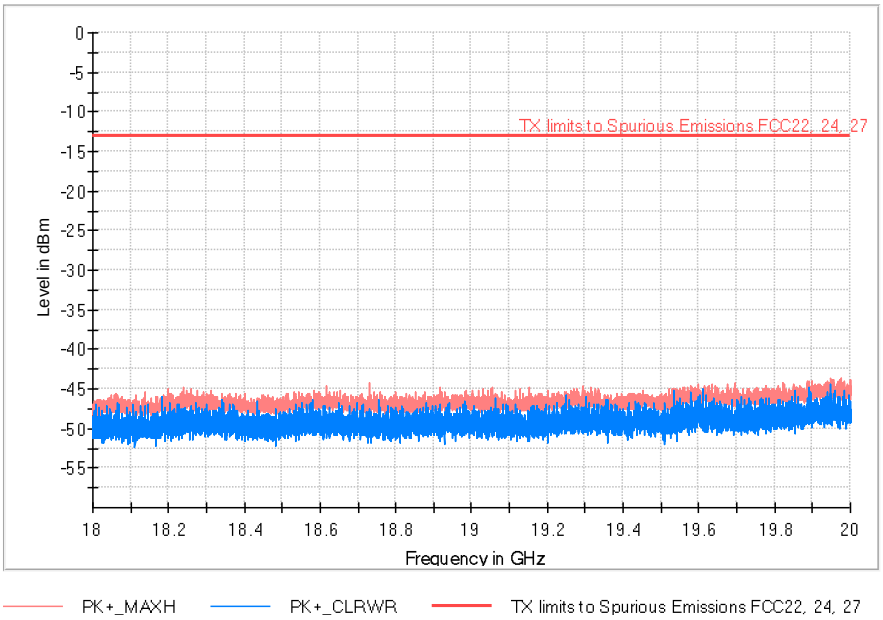
FREQUENCY RANGE: 1-18 GHz



Frequency (MHz)	PK+_CLRWR (dBm)	PK+_MAXH (dBm)	Comment
1884.500000	-48.36	25.01	Fundamental UL
1963.000000	-39.75	-33.94	Fundamental DL
3761.500000	-54.75	-45.68	
5654.000000	-47.38	-26.06	
7538.500000	-53.04	-25.41	
7853.500000	-42.41	-40.86	
8470.500000	-51.47	-39.61	
9423.000000	-51.05	-32.92	

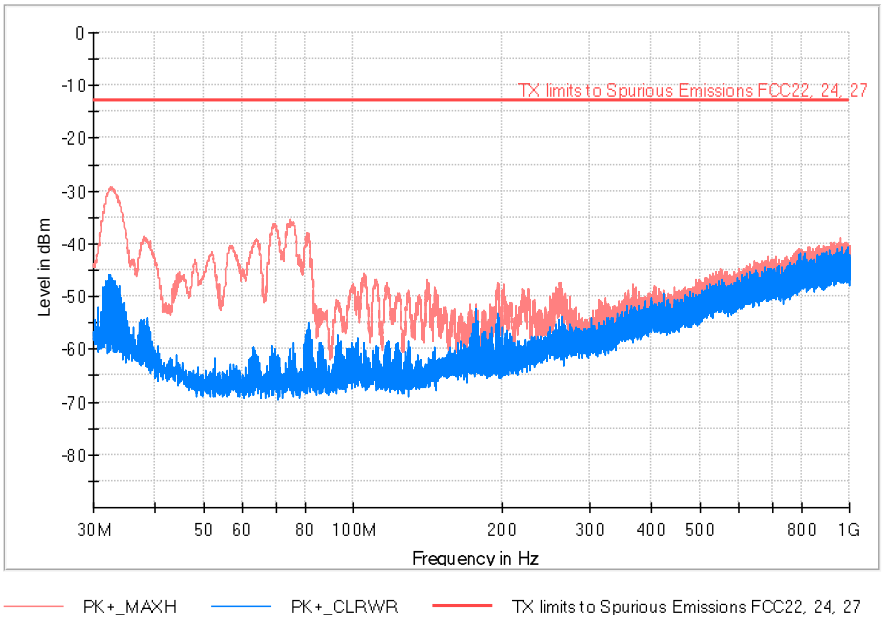
TEST RESULTS (Cont):	Middle Channel

FREQUENCY RANGE: 18-20 GHz



TEST RESULTS(Cont.):	High Channel

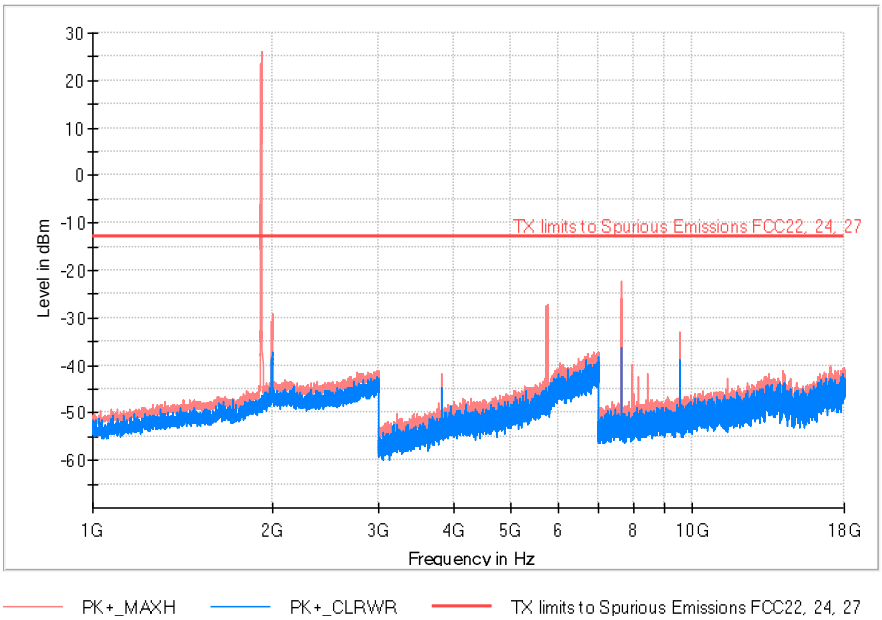
FREQUENCY RANGE: 30-1000 MHz



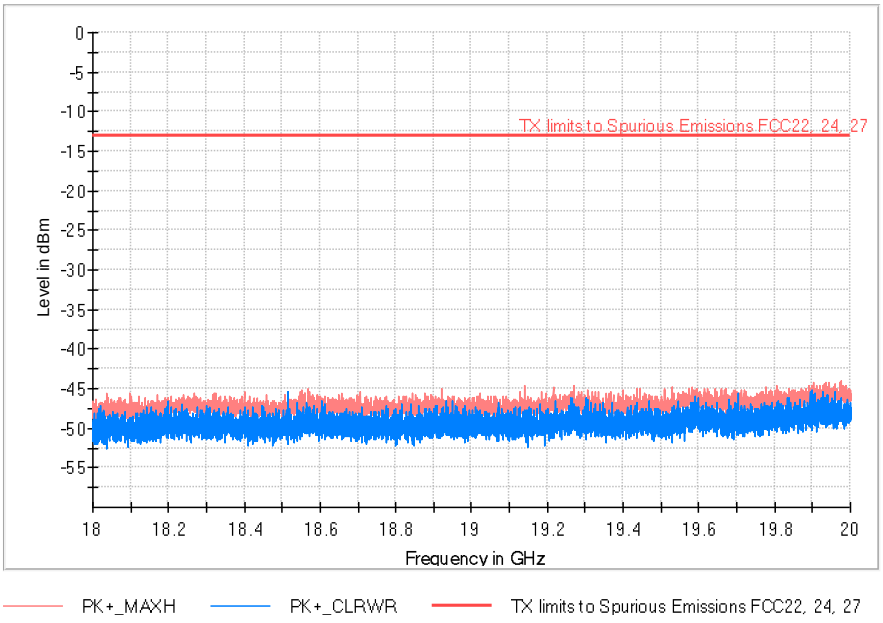
Frequency (MHz)	PK+_CLRWR (dBm)	PK+_MAXH (dBm)
32.489667	-45.98	-29.32
75.363667	-64.95	-35.80
105.304333	-63.44	-45.56
195.740667	-63.57	-47.26
261.377333	-58.75	-47.29

TEST RESULTS (Cont):	High Channel

FREQUENCY RANGE: 1-18 GHz



Frequency (MHz)	PK+_CLRWR (dBm)	PK+_MAXH (dBm)	Comment
1914.000000	-48.85	26.09	Fundamental UL
1993.000000	-38.82	-29.08	Fundamental DL
3827.500000	-44.60	-41.89	
5741.000000	-48.52	-27.09	
7655.000000	-36.29	-22.27	
7973.500000	-53.41	-39.89	
8149.000000	-53.17	-42.38	
8468.000000	-52.70	-41.61	
9569.500000	-47.13	-32.96	

TEST RESULTS (Cont):	High Channel

FREQUENCY RANGE: 18-20 GHz