

#### LTE 16QAM MODULATION. BW = 3 MHz

Lowest Channel 99% Occupied Bandwidth

PS									
⊖1Pk Viev	N		T		M	1[1]			-23.85 dBn
						ILII			.00000 MH
30 dBm—			2		0	CC BW			000000 MH
20 dBm—									
			m	m	m	m	2		
10 dBm-	3		7	8	-% ->	1	F		
0 dBm									
		1					1		
-10 dBm-		+			a		1		-
							L'and		
1-20 dBm-	1 mon	Barr					ma		A
Property									- mar
-30 dBm-									
-40 dBm-									+
-50 dBm-					-				+
CF 815.5	5 MHz			1000	) pts			Spa	an 7.0 MHz
Ref Leve Att PS	Bandwic 1 40.00 dBm 45 dB		10.50 dB ● 1 s ●	<b>RBW</b> 100 k	Hz	Auto Swee	p Input 1		an 7.0 MHz
Ref Leve	Bandwic 1 40.00 dBm 45 dB	Offset :		<b>RBW</b> 100 k	Hz Hz <b>Mode</b>		p Input 1		
Ref Leve Att PS 91Pk View	Bandwic 1 40.00 dBm 45 dB	Offset :		<b>RBW</b> 100 k	Hz Hz <b>Mode</b>	Auto Swee	p Input 1	LAC	-0.17 d
-26dBc Ref Leve Att PS	Bandwic 1 40.00 dBm 45 dB	Offset :		<b>RBW</b> 100 k	Hz Hz Mode D		p Input 1	L AC	-0.17 d 3.0900 MH 17.72 dBr
Ref Leve Att PS 1Pk Viev 30 dBm-	Bandwic 1 40.00 dBm 45 dB	Offset :		<b>RBW</b> 100 k	Hz Hz Mode D	3[1]	p Input 1	L AC	-0.17 d 3.0900 MH
Ref Leve Att PS 91Pk View	Bandwic 1 40.00 dBm 45 dB	Offset :		<b>RBW</b> 100 k	Hz Hz Mode D	3[1]	p Input 1	L AC	-0.17 d 3.0900 MH 17.72 dBr
Ref Leve Att PS 1Pk Viev 30 dBm-	Bandwic 1 40.00 dBm 45 dB	Offset :		<b>RBW</b> 100 k	Hz Hz Mode D	3[1]	p Input 3	L AC	-0.17 d 3.0900 MH 17.72 dBr
Ref Leve Att PS IPk Viev 30 dBm- 20 dBm- 10 dBm-	Bandwic 1 40.00 dBm 45 dB	Offset :		<b>RBW</b> 100 k	Hz Hz Mode D	3[1]	p Input 3	L AC	-0.17 d 3.0900 MH 17.72 dBr
Ref Leve Att PS 1Pk Viev 30 dBm- 20 dBm-	Bandwic 1 40.00 dBm 45 dB	Offset : SWT		<b>RBW</b> 100 k	Hz Hz Mode D	3[1]		L AC	-0.17 d 3.0900 MH 17.72 dBr
-26dBc Att PS 10 dBm- 10 dBm-	Bandwic 1 40.00 dBm 45 dB	Offset :		<b>RBW</b> 100 k	Hz Hz Mode D	3[1]	p Input 1	L AC	-0.17 d 3.0900 MH 17.72 dBr

-30 dBm--40 dBm--50 dBm-

Marker

D3 D2 1

CF 815.5 MHz

 Type
 Ref
 Trc

 M1
 1

 D2
 M1
 1

X-value 816.432 MHz -2.462 MHz

3.09 MHz

691 pts

Function

Y-value 17.72 dBm -26.02 dB

-0.17 dB

Span 7.0 MHz

Function Result



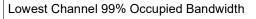




#### **TEST RESULTS (Cont):** Highest Channel 99% Occupied Bandwidth 45 dB 👄 SWT Att PS 1 s 👄 **VBW** 300 kHz Mode Sweep Input 1 AC 01Pk View M1[1] -30.37 dBm 819.00000 MHz 2.730000000 MHz 30 dBm-Occ Bw 20 dBm 10 dBm-0 dBm -10 dBm -20 dBm 0 dBm 40 dBm--50 dBm CF 822.5 MHz 1000 pts Span 7.0 MHz Highest Channel -26dBc Bandwidth Ref Level 40.00 dBm Offset 10.50 dB 👄 RBW 100 kHz 45 dB 👄 SWT 1 s 👄 VBW 300 kHz Mode Auto Sweep Input 1 AC Att PS ⊙1Pk View D3[1] 0.79 dB 3.0900 MHz 30 dBm-M1[1] 16.92 dBm 822.4590 MHz 20 dBm-10 dBm-0 dBm-DZ D3 -10 dBm -20 dBm -30 dBm--40 dBm -50 dBm-Span 7.0 MHz CF 822.5 MHz 691 pts Marker Type | Ref | Trc | X-value Y-value Function **Function Result** 822.459 MHz 16.92 dBm -27.04 dB M1 D2 M1 -1.52 MHz 1 D3 D2 3.09 MHz 0.79 dB 1



# TEST RESULTS (Cont): LTE QPSK MODULATION. BW = 5 MHz















#### **TEST RESULTS (Cont):** LTE 16QAM MODULATION. BW = 5 MHz Lowest Channel 99% Occupied Bandwidth Ref Level 40.00 dBm Offset 10.50 dB 👄 RBW 200 kHz Att 45 dB 👄 SWT 1 s 👄 VBW 1 MHz Mode Sweep Input 1 AC PS ∋1Pk View M1[1] -22.31 dBm 811.50000 MHz 30 dBm-Occ Bw 4.560000000 MHz 20 dBm T2 T1 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm--50 dBm CF 816.5 MHz 1000 pts Span 10.0 MHz Lowest Channel -26dBc Bandwidth Ref Level 40.00 dBm Offset 10.50 dB 👄 RBW 200 kHz 45 dB 👄 SWT 1 s 👄 VBW 1 MHz Mode Auto Sweep Input 1 AC Att PS ⊖1Pk View D3[1] 0.15 dB 5.1520 MHz 30 dBm-M1[1] 18.47 dBm 816.8470 MHz M1 20 dBm 10 dBm· 0 dBm D2 03 -10 dBm--20 dBm--30 dBm--40 dBm -50 dBm-

CF 816.5 MHz Marker

> M1 D2

D3 D2

Type | Ref | Trc |

M1

1

1

1

X-value

816.847 MHz

-2.923 MHz 5.152 MHz 691 pts

Function

Y-value 18.47 dBm

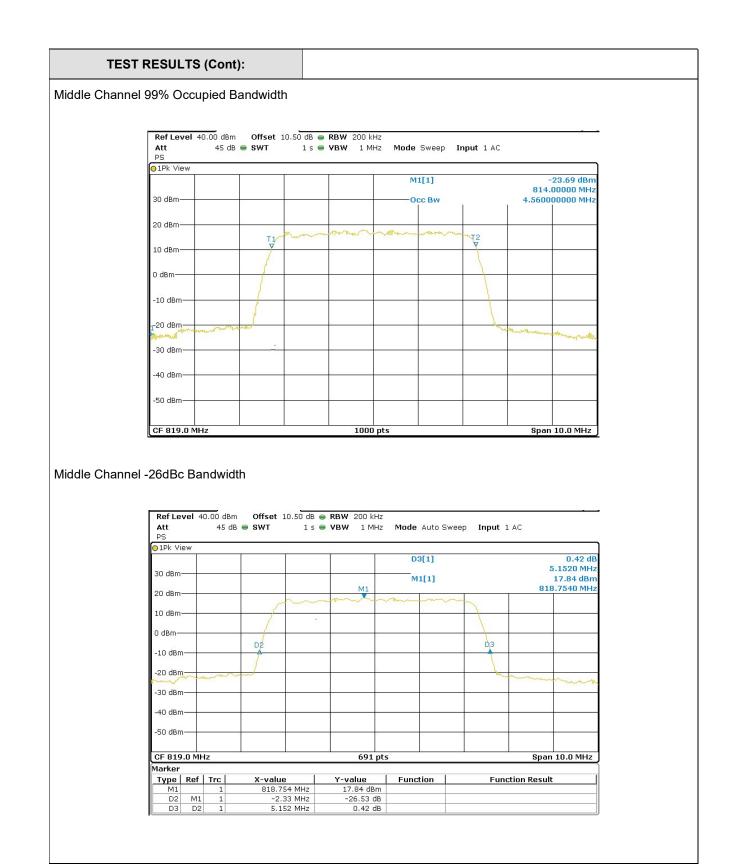
-27.02 dB

0.15 dB

Span 10.0 MHz

Function Result





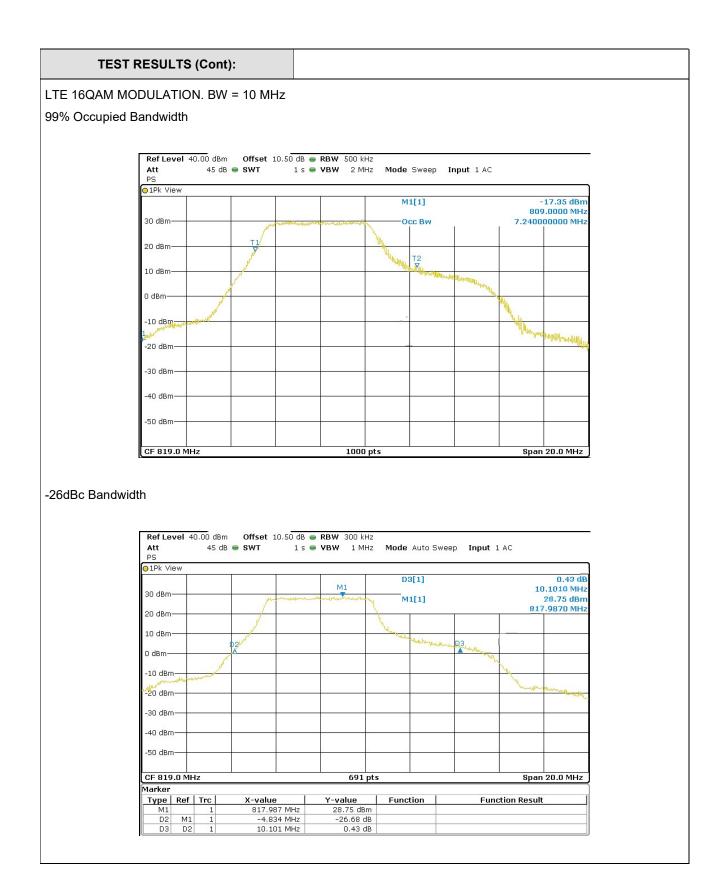




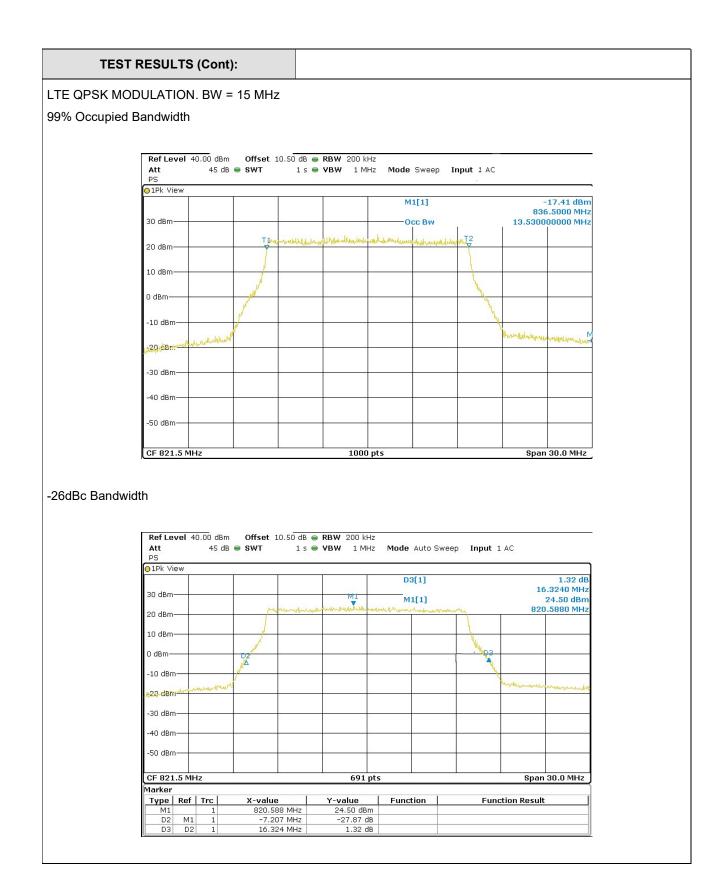




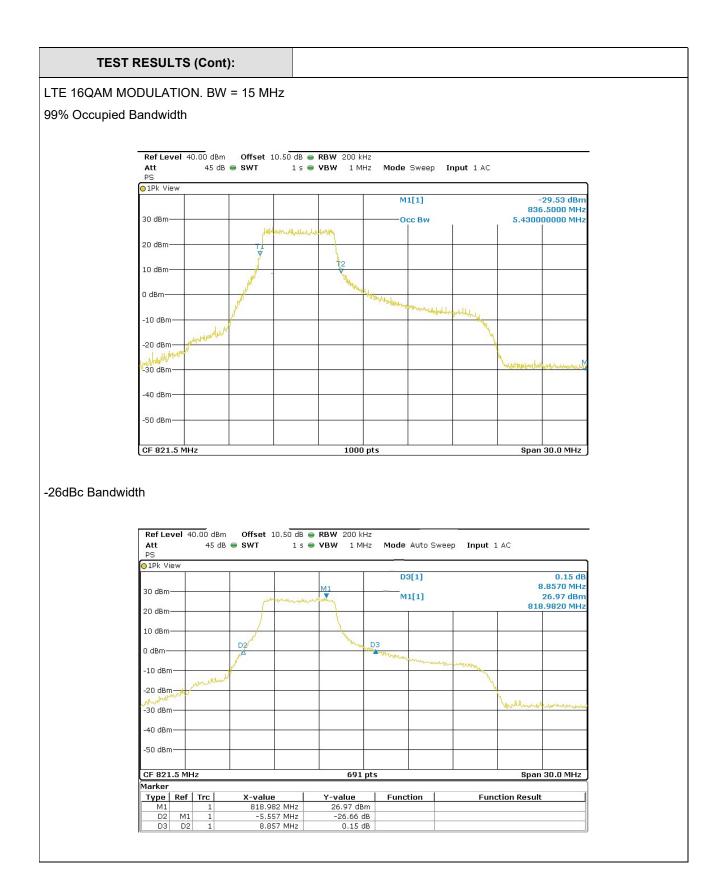














TESTED SAMP	LES:	S/01 TC#02		
TESTED CONDITION	IS MODES:			
TEST RESUL	TS:		PASS	
LTE QPSK MODULATION.	BW = 1.4 MHz			
	_			
			824.0 1.11	
	99% Occupied i	pandwidth (MHz)	1.11	
LTE 16QAM MODULATION	. BW = 1.4 MHz			
	Freq	uency	824.0	
	99% Occupied b	pandwidth (MHz)	1.11	
LTE QPSK MODULATION.	BW = 3 MHz			
			004.0	
	Freq	uency	824.0	
		oandwidth (MHz)	2.70	
LTE 16QAM MODULATION	99% Occupied b	-		
LTE 16QAM MODULATION	99% Occupied b	-		
LTE 16QAM MODULATION	99% Occupied b . BW = 3 MHz Freq	pandwidth (MHz)	2.70	
LTE 16QAM MODULATION	99% Occupied b . BW = 3 MHz Freq 99% Occupied b	uency	2.70 824.0	
	99% Occupied b . BW = 3 MHz Frequencies 99% Occupied b BW = 5 MHz	uency	2.70 824.0	
	99% Occupied b . BW = 3 MHz Frequ 99% Occupied b BW = 5 MHz Frequ	bandwidth (MHz)	2.70 824.0 2.70	
LTE QPSK MODULATION.	99% Occupied b BW = 3 MHz Frequ 99% Occupied b BW = 5 MHz Frequ 99% Occupied b	uency bandwidth (MHz)	2.70 824.0 2.70 824.0	
	99% Occupied b . BW = 3 MHz Frequ 99% Occupied b BW = 5 MHz Frequ 99% Occupied b	uency bandwidth (MHz)	2.70 824.0 2.70 824.0	



#### LTE QPSK MODULATION. BW = 10 MHz

Frequency	824.0
99% Occupied bandwidth (MHz)	8.96

#### LTE 16QAM MODULATION. BW = 10 MHz

Frequency	824.0
99% Occupied bandwidth (MHz)	8.94

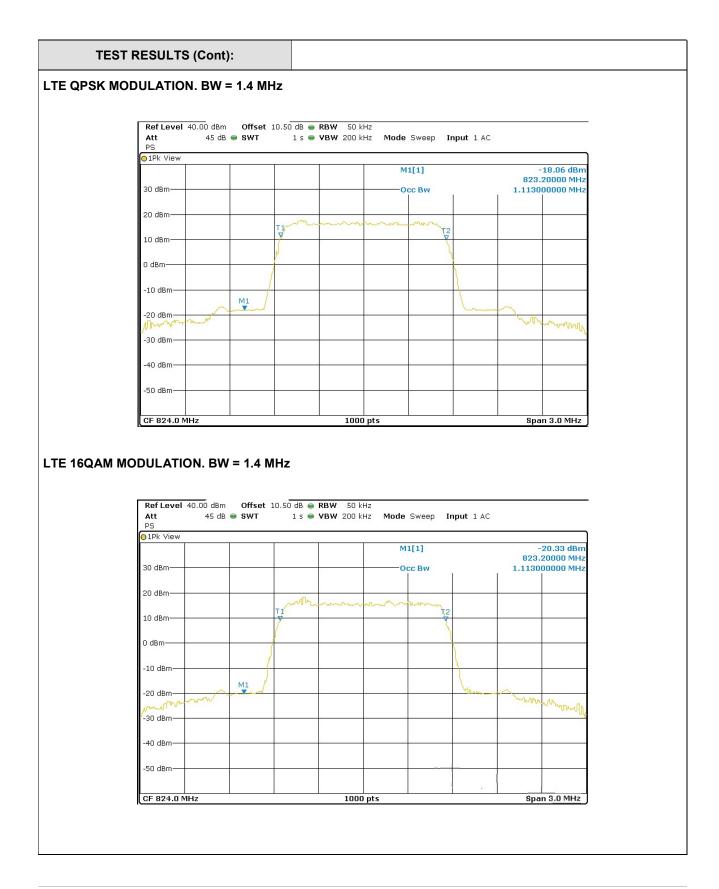
LTE QPSK MODULATION. BW = 15 MHz

Frequency	824.0
99% Occupied bandwidth (MHz)	13.44

#### LTE 16QAM MODULATION. BW = 15 MHz

Frequency	824.0
99% Occupied bandwidth (MHz)	13.41

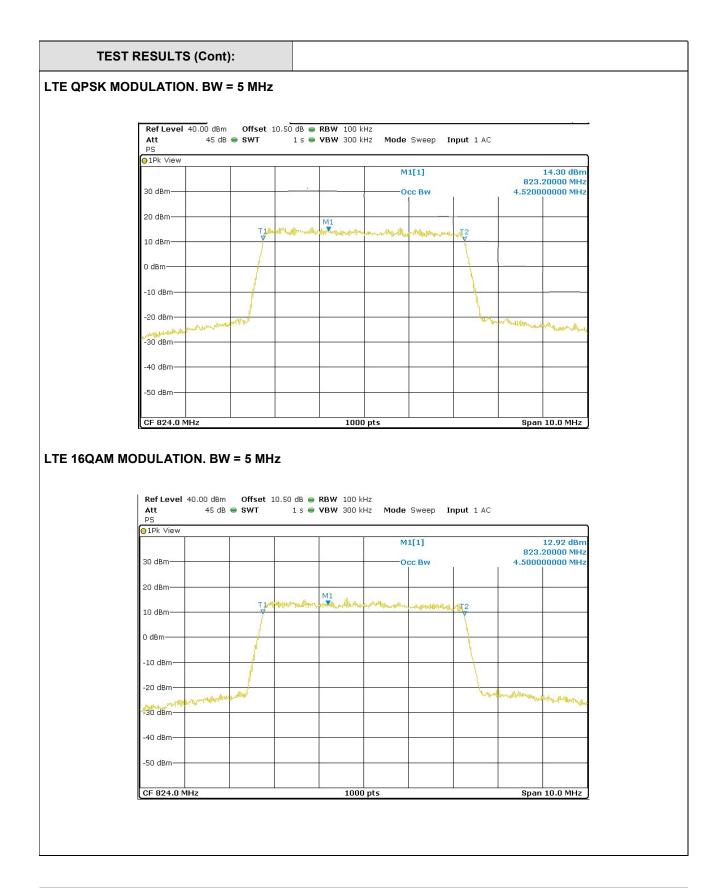




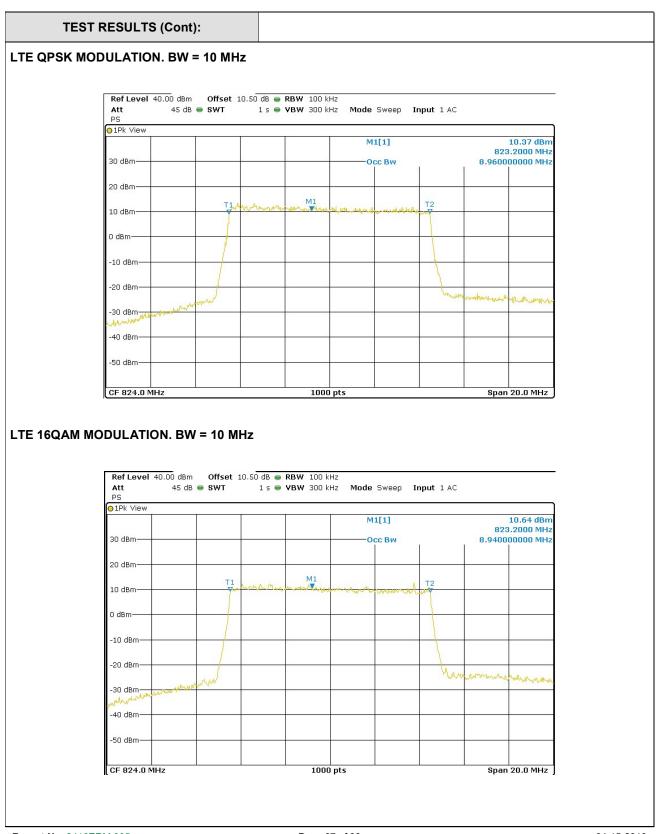




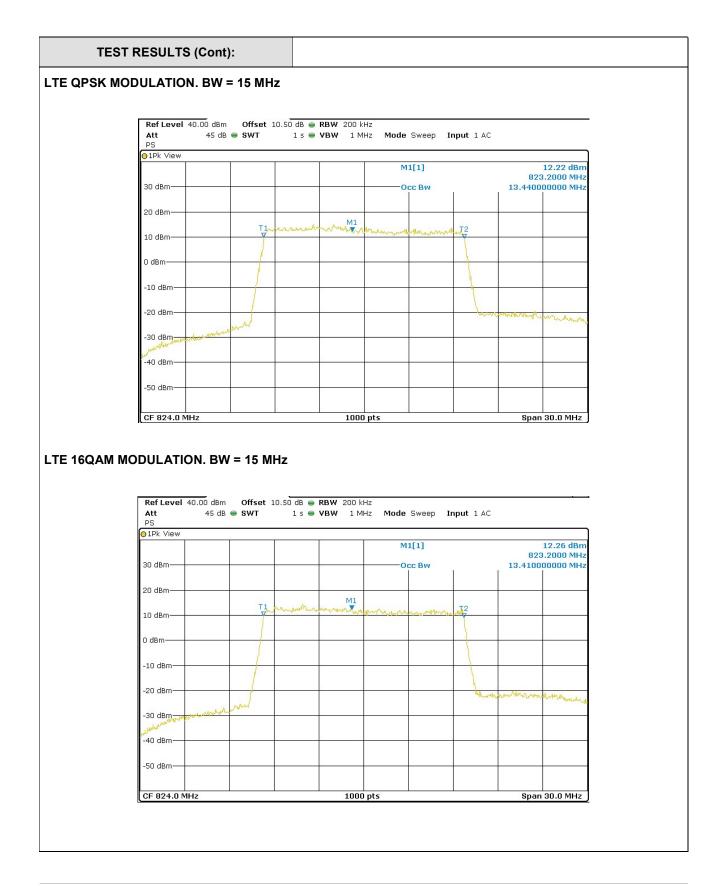














# **TEST A.4: SPURIOUS EMISSIONS AT ANTENNA TERMINALS** Product standard: FCC Part 90 LIMITS: Test standard: FCC §2.1051 and § 90.691. LIMITS According to specification, the power of emissions shall be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log (P) dB. P in watts. 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 18 GHz for LTE Band 26. 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. Spectrum Analyser Power EUT Attenuator devider Signalling Unit Power supply

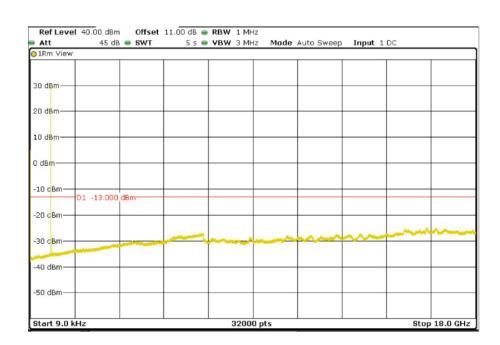


TESTED SAMPLES:	S/01						
TESTED CONDITIONS MODES:	TC#01						
TEST RESULTS:	PASS						
Frequency range 9 kHz – 18 GHz							
LTE QPSK MODULATION. BW = 1.4 MHz							
Lowest Channel No spurious signal was found at less than 20dB	B respect to the limit in the frequency range.						
Middle Channel No spurious signal was found at less than 20dB	B respect to the limit in the frequency range.						
Highest Channel No spurious signal was found at less than 20dE	3 respect to the limit in the frequency range.						
LTE QPSK MODULATION. BW = 3 MHz							
Lowest Channel No spurious signal was found at less than 20dB	3 respect to the limit in the frequency range.						
Middle Channel No spurious signal was found at less than 20dE	3 respect to the limit in the frequency range.						
Highest Channel No spurious signal was found at less than 20dB respect to the limit in the frequency range.							
LTE QPSK MODULATION. BW = 5 MHz							
Lowest Channel No spurious signal was found at less than 20dB	3 respect to the limit in the frequency range.						
Middle Channel No spurious signal was found at less than 20dE	3 respect to the limit in the frequency range.						
Highest Channel No spurious signal was found at less than 20dB	B respect to the limit in the frequency range.						
LTE QPSK MODULATION. BW = 10 MHz							
Lowest Channel No spurious signal was found at less than 20dB	3 respect to the limit in the frequency range.						
Middle Channel No spurious signal was found at less than 20dB respect to the limit in the frequency range.							
Highest Channel No spurious signal was found at less than 20dB respect to the limit in the frequency range.							
LTE QPSK MODULATION. BW = 15 MHz							
Lowest Channel No spurious signal was found at less than 20dB	3 respect to the limit in the frequency range.						
Middle Channel No spurious signal was found at less than 20dE	3 respect to the limit in the frequency range.						
Highest Channel No spurious signal was found at less than 20dB	3 respect to the limit in the frequency range.						



# LTE QPSK MODULATION. BW = 1.4MHz

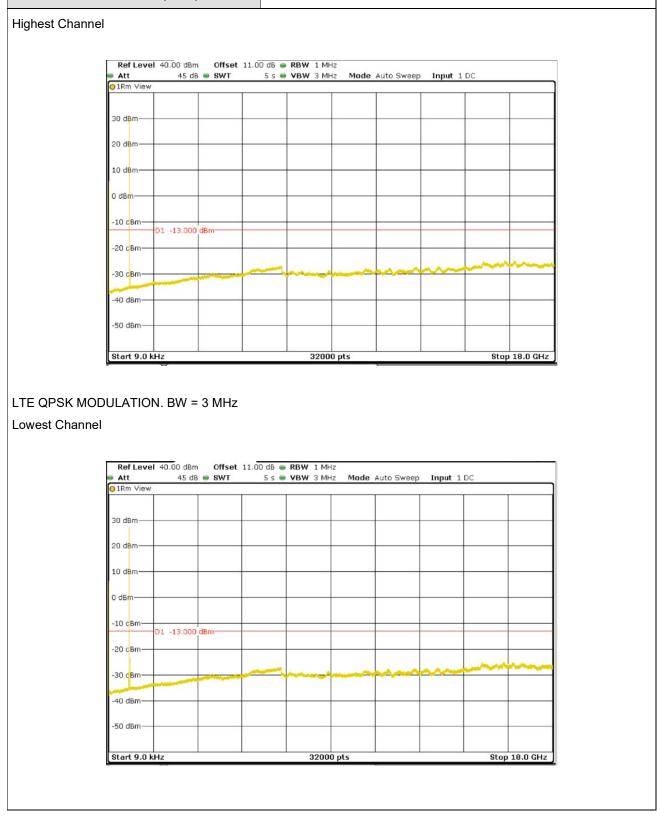
Lowest Channel



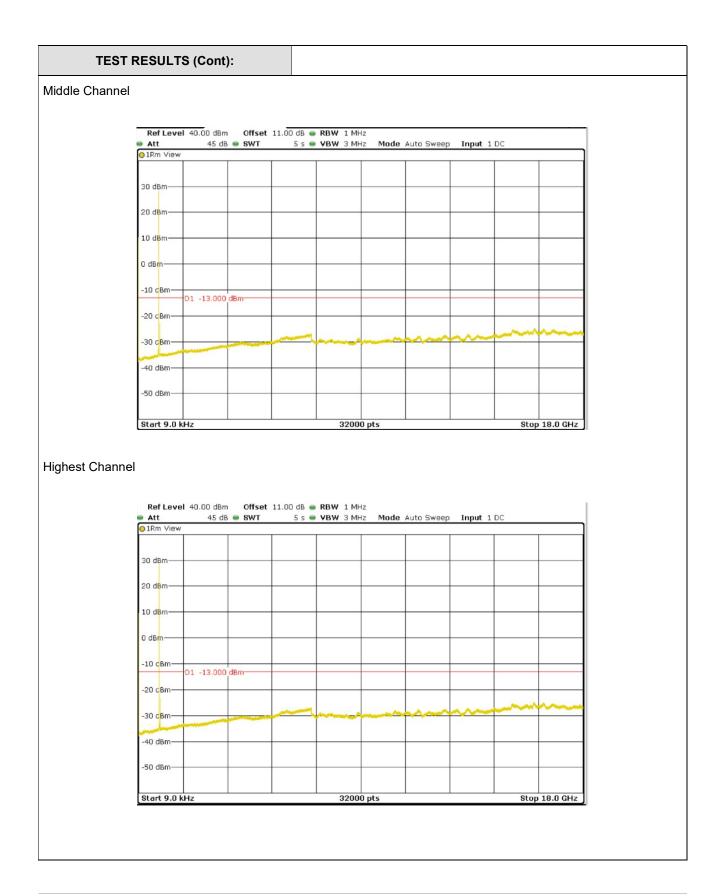
#### Middle Channel

Att 🗧	45 dB	SWT 🖷	5 s 🖷	VBW 3	MHz Mo	de Auto Sweep	Input	1 DC	
O1Rm View									
30 dBm									
20 dBm									
10 dBm									_
0 dBm									
-10 cBm	D1 -13.000	dBm							
-20 cBm			-						
-30 c <mark>B</mark> m					-		~~		<u> </u>
-40 dBm									
-50 dBm									
Start 9.0 ki	Hz			32	2000 pts			Sto	p 18.0 GH





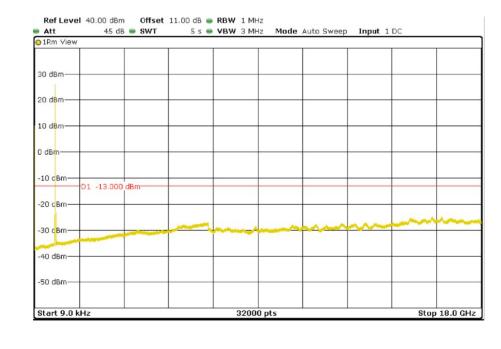






# LTE QPSK MODULATION. BW = 5 MHz

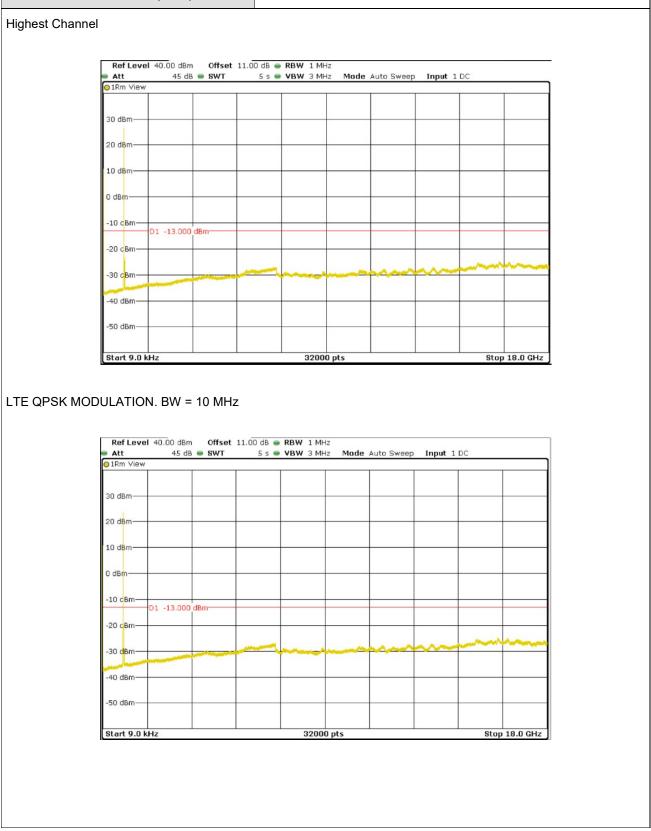
#### Lowest Channel



#### Middle Channel

	5 dB 🖷 SWT	5 s 🖷	VBW 3 MH	z Mode	Auto Sweep	Input 1	DC	
O1Rm View		1						
30 dBm								
20 dBm								
10 d8m								
0 dBm								
-10 cBm-01 -13	000 dBm							
-20 cBm								
-30 cBm			~~~~~			~~~		~
-40 dBm								
-50 dBm								
Start 9.0 kHz			32000	pts			Stop	) 18.0 Gł







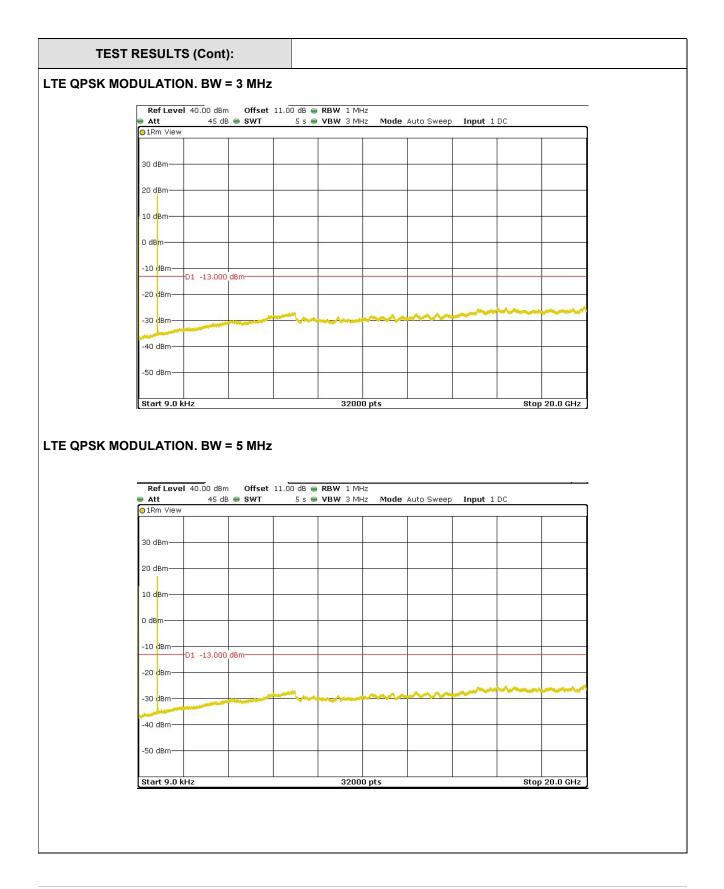
### LTE QPSK MODULATION. BW = 15 MHz

Att	45 dB		11.00 dB 👄 5 s 👄			Auto Sweep	Input	1 DC	
1Rm View					1	T T			-
30 dBm									
20 d <mark>8</mark> m									
10 dBm									
D dBm									
-10 cBm	01 -13.000	dBm							
-20 cBm									
-30 dBm							~~~		
40 dBm									
-50 dBm									
Start 9.0 kH	17			3200	10 pts			Stor	18.0 GHz

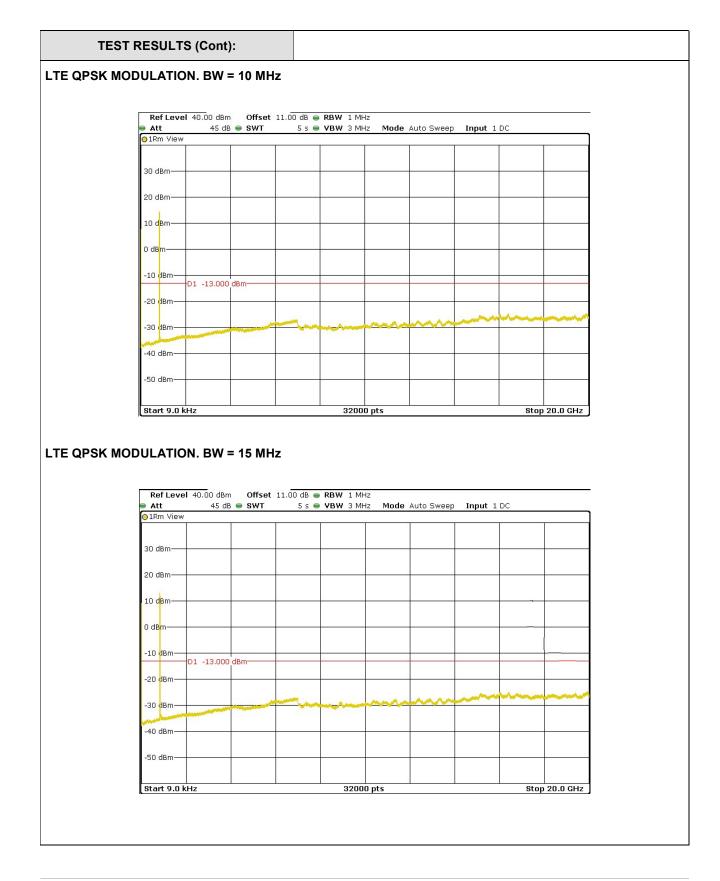


TEST	ED SAMPLES:	S/01				
TESTED CC	NDITIONS MODES:	TC#02				
TES	T RESULTS:	PASS				
TES Frequency range 9 LTE QPSK MODU The spurious signal LTE QPSK MODU The spurious signal	T RESULTS:         2 kHz – 18 GHz         LATION. BW = 1.4 MHz         als were detected more than         LATION. BW = 3 MHz         als were detected more than         LATION. BW = 5 MHz         als were detected more than         LATION. BW = 5 MHz         als were detected more than         LATION. BW = 10 MHz         als were detected more than         LATION. BW = 10 MHz         als were detected more than         LATION. BW = 15 MHz         als were detected more than         LATION. BW = 15 MHz         als were detected more than         MATION. BW = 15 MHz         als were detected more than					
4 4 4	dBm D1 -13.000 dBm 20 d	32000 pts Stop 20.0 GHz				











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

LIMITO.	Product standard:	FCC Part 90
LIMITS:	Test standard:	FCC §2.1051 and 90.691

#### 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

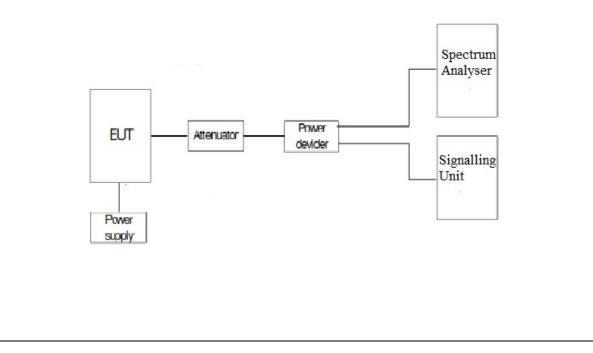
#### **TEST SETUP**

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 90, 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: TESTED CONDITIONS MODES: TEST RESULTS:			S/01 TC#01 PASS										
							RESULTS						
							LTE QPSK MODULATION	RB=1.	RB=1.		RB=1.	RB=1.	RB=1.
Offset=0.	Offset =0.		Offset =0.	Offset =0.	Offset =0.								
BW=1.4 MHz	BW = 3 MHz		BW = 5 MHz	BW = 10 MHz	BW = 15 MHz								
Maximum measured level at lowest Block Edge at antenna port (dBm)	-19.91	-17.86		-19.64	-16.79	-16.49							
LTE QPSK MODULATION:	RB= All.	RB= All.		RB= All.	RB= All.	RB= All.							
	Offset=0.	Offset =0.		Offset =0.	Offset =0.	Offset =0.							
	BW=1.4 MHz	BW =	= 3 MHz	BW = 5 MHz	BW = 10 MHz	BW = 15 MHz							
Maximum measured level at lowest Block Edge at antenna port (dBm)	-16.45	-19.12		-15.69	-17.44	-17.94							
LTE QPSK MODULATION:	RB= 1.	RB= 1.		RB= 1.	RB= 1.	RB= 1.							
	Offset=Max.	Offset=Max.		Offset=Max.	Offset=Max.	Offset=Max.							
	BW=1.4 MHz	BW = 3 MHz		BW = 5 MHz	BW = 10 MHz	BW = 15 MHz							
Maximum measured level at highest Block Edge at antenna port (dBm)	-22.27	-2	0.39	-18.63	-17.19	-24.02							
LTE QPSK MODULATION:	RB= All.	RB= All.		RB= All.	RB= All.	RB= All.							
	Offset=0.	Off	set =0.	Offset =0.	Offset =0.	Offset =0.							
	BW=1.4 MHz	BW = 3 MHz		BW = 5 MHz	BW = 10 MHz	BW = 15 MHz							
Maximum measured level at highest Block Edge at antenna port (dBm)	-19.03	-2	1.42	-15.45	-19.35	-26.91							

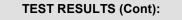


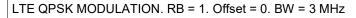
# **TEST RESULTS (Cont):** LTE QPSK MODULATION. RB = 1. Offset = 0. BW = 1.4 MHz Lowest Channel Ref Level 39.50 dBm Offset 11.00 dB - RBW 100 kHz 45 dB 👄 SWT Att 1 s 👄 VBW 300 kHz Mode Auto Sweep Input 1 AC PS 01Rm View M1[1] -19.91 dBm 813.79830 MHz 30 dBm-20 dBm 10 dBm-0 dBm--10 dBm-D1 -13.000 dBm-M -20 dBm--30 dBm -40 dBm -50 dBm CF 814.0 MHz 600 pts Span 2.0 MHz **Highest Channel** Ref Level 39.50 dBm Offset 11.00 dB - RBW 100 kHz 45 dB 👄 SWT Att 1 s 🖷 VBW 300 kHz Mode Auto Sweep Input 1 AC PS 01Rm View -22.27 dBm 824.21500 MHz M1[1] 30 dBm-20 dBm 10 dBm 0 dBm--10 dBm-D1 -13.000 dBm--20 dBm--30 dBm -40 dBm -50 dBm Span 2.0 MHz CF 824.0 MHz 600 pts



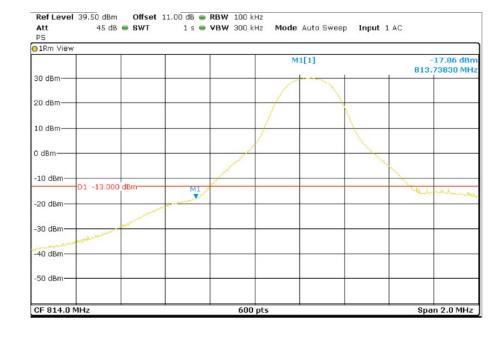




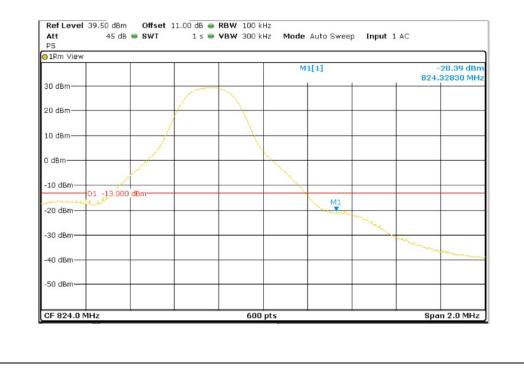




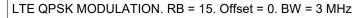
Lowest Channel



**Highest Channel** 







Lowest Channel

Ref Level 39.50 dBm Offset 11.00 dB - RBW 100 kHz 45 dB 🔵 SWT 1 s 👄 VBW 300 kHz Mode Auto Sweep Input 1 AC Att PS 01Rm View M1[1] -19.12 dBm 813.79830 MHz 30 dBm-20 dBm-10 dBm-0 dBm--10 dBm-D1 -13.000 dBm--20 dBm--30 dBm--40 dBm--50 dBm-CF 814.0 MHz 600 pts Span 2.0 MHz

**Highest Channel** 

