

### **FXCA A.303 Antenna Port Conducted Band Edge Measurements Performed at Nokia**

Antenna port conducted band edge measurements were performed at Nokia in Irving, Texas on October 18 & 19, 2016. The measurements were performed in response to the Nemko TCB email dated 11 October that requested additional lower band edge measurements to support FXCA A.303 class 2 permissive change. The FXCA downlink (transmit) frequency band for FCC part 90 Subpart S is being changed from 852- 869 MHz to 862-869 MHz from the original radio test report submittal. The original radio test report submittal was NTS Test Report No.PR045341 Rev 2 dated April 1, 2016.

EUT Hardware (Same as used for NTS tests):

<b>Company</b>	<b>Model</b>	<b>Description</b>	<b>Part/Serial Number</b>	<b>FCC ID/IC Number</b>
Nokia Solutions and Networks	FXCA	Flexi Multiradio BTS RFM	Part#: 472142A.303 Serial#: K9144520089	FCC ID: VBNFXCA-01 IC ID: 661W-FXCA

EUT Software (Same as used for NTS tests):

- (1) RFM Unit Software: MED 26.01.R07
- (2) System Module Software: FL16A\_FSM3\_9999\_160112\_027599

Test Measurement Equipment:

- 1) Agilent PSA Series Spectrum Analyzer E4440A 3Hz – 26.5GHz  
Serial number #US40420652, Firmware Revision: A.08.09 RELEASE  
Cal Lab Equip ID: 120194  
KEYSIGHT Calibration  
Cal Done: 29-Sep-2016  
Date Due: 29-Sep-2017  
Cert # 1-8115155114-71
- 2) Hewlett Packard 8753D 30kHz – 6Ghz Network Analyzer  
Cal Lab Equip ID: NM04755  
KEYSIGHT Calibration  
Cal Done: 26-Feb-2016  
Date Due: 26-Feb-2017  
Cert # 1-7628330457-94  
S/N: 3410A0431315

## FXCA A.303 Antenna Port Conducted Band Edge Measurements Performed at Nokia

The FXCA band edge downlink band edge LTE frequency channel table updated for the new 862 to 869 MHz range is provided below. The 10MHz and 15MHz LTE channel bandwidths are not available since the overall operating bandwidth is now 7MHz.

The 3GPP frequency band 27 (852 - 869 MHz) band edge downlink (BTS Transmit) EARFCNs for LTE channel bandwidths (1.4, 3.0, and 5 MHz) are provided in Table 1. The EARFCN is defined as E-UTRA Absolute Radio Frequency Channel Number. The channel spacing is 100 kHz between channel numbers.

	Downlink EARFCN Band 27	Downlink Frequency (MHz)	LTE Channel Bandwidth				
			1.4 MHz	3.0 MHz	5 MHz	10 MHz Not Allowed	15 MHz Not Allowed
Band 27 (FXCA Ant 1, 2, 3)	9140	862.0	Band Edge	Band Edge	Band Edge	Band Edge	Band Edge
	.....						
	9147	862.7	Bottom Ch				
	.....						
	9155	863.5		Bottom Ch			
	.....						
	9165	864.5			Bottom Ch		
	.....						
	.....						
	9185	866.5			Top Channel		
	.....						
	9195	867.5		Top Channel			
	.....						
	9203	868.3	Top Channel				
	.....						
	9210	869.0	Band Edge	Band Edge	Band Edge	Band Edge	Band Edge

Table 1: FXCA Band 27 Downlink Band Edge LTE Frequency Channels

Notes:

- (1) The bottom two LTE 1.4 MHz channels are EARFCN 9147 (862.7 MHz) and EARFCN 9161 (864.1 MHz) for two carrier operation.
- (2) One channel in from bottom band edge, the two LTE 1.4 MHz channels are EARFCN 9148 (862.8 MHz) and EARFCN 9162 (864.2 MHz) for two carrier operation.

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### Additional Antenna Port Conducted Band Edge Measurements:

(See page 133 of NTS report for original test information)

As requested in TCB email, the lower band edge (at 862 MHz) measurements were repeated for all available LTE channel bandwidths and modulation types. The same RF output power levels (as in original testing performed at NTS) were used for the testing. The same EUT RF port (Ant 1 as in original testing performed at NTS) was used for all measurements. Since the overall available bandwidth (862MHz to 869MHz) is 7 MHz, the 10 MHz and 15 MHz LTE channel bandwidths (used in the original testing) are not available.

The requested measurements were made between 861.9625MHz and 861.9875MHz using a RBW of 27kHz. The same limit (determined from FCC part 90.691 and FCC KDB 66291D01 v02r01 for four port MIMO) used in the original test was used (-26dBm) for this testing. The total RF path loss was determined to be -42.4 dB (using a network analyzer) and accounted for with the reference level offset setting of the spectrum analyzer. All measurements were performed with the spectrum analyzer in RMS average mode (100 traces were used for all measurements except for dual carrier case where 1000 traces were used).

### Results summary:

Lower Band Edge Measurement: 861.9625MHz to 851.9875MHz

LTE Bandwidth/Channel	Carrier Frequency	Carrier Power	Modulation Type			Limit
			LTE QPSK	LTE -16QAM	LTE -64QAM	
			Lower Band Edge	Lower Band Edge	Lower Band Edge	
LTE1.4/Bottom Channel	862.7 MHz	~ 8 Watts	-33.9dBm	-34.1dBm	-34.2dBm	-26dBm
LTE1.4/Bottom Channel +1	862.8 MHz	~ 8 Watts	-41.3dBm	-42.0dBm	-41.5dBm	-26dBm
LTE1.4/Bottom Channel +2	862.9 MHz	~ 8 Watts	-42.9dBm	-43.2dBm	-43.0dBm	-26dBm
LTE1.4/Bottom Channel +3	863.0 MHz	~ 8 Watts	-43.8dBm	-43.9dBm	-43.3dBm	-26dBm
LTE1.4/Bottom Channel +4	863.1 MHz	~ 8 Watts	-43.9dBm	-43.7dBm	-43.8dBm	-26dBm
LTE1.4/Bottom Channel +5	863.2 MHz	~ 8 Watts	-44.1dBm	-44.5dBm	-44.2dBm	-26dBm
LTE1.4/Bottom Channel +6	863.3 MHz	~ 60 Watts	-28.4dBm	-26.2dBm	-27.7dBm	-26dBm
LTE3/Bottom Channel	863.5 MHz	~ 8 Watts	-34.2dBm	-34.5dBm	-34.5dBm	-26dBm
LTE3/Bottom Channel +1	863.6 MHz	~ 60 Watts	-29.1dBm	-29.5dBm	-29.4dBm	-26dBm
LTE5/Bottom Channel	864.5 MHz	~ 60 Watts	-29.5dBm	-29.9dBm	-28.7dBm	-26dBm
LTE1.4 Dual Carrier/Bottom Channel	862.7 MHz & 864.1 MHz	~ 8 Watts/Carrier	-26.3dBm	-27.1dBm	-27.0dBm	-26dBm
LTE1.4 Dual Carrier/Bottom Channel +1	862.8 MHz & 864.2 MHz	~ 60 Watts (Total)	-27.6dBm	-28.1dBm	-28.2dBm	-26dBm

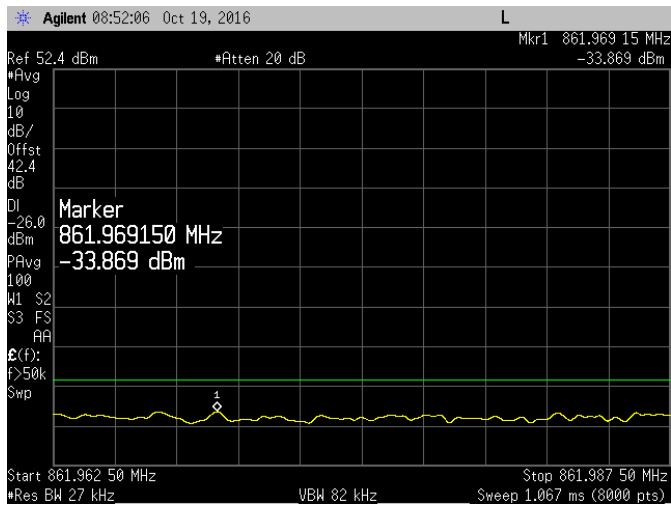
Note:

- To meet band edge requirements for the LTE1.4 and LTE3 bandwidths, the carrier power level was reduced as indicated (~ 8 Watts).
- The first full power channel that passes the band edge requirements is shown (~ 60 Watts).

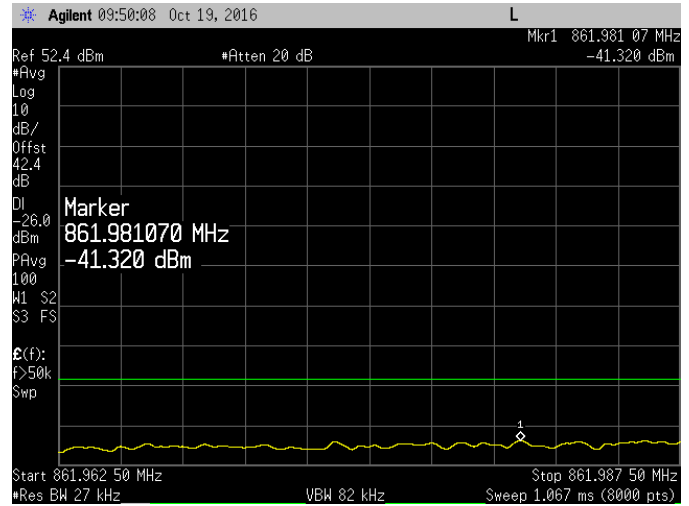
# FXCA A.303 Antenna Port Conducted Band Edge Measurements Performed at Nokia

Lower Band Edge Measurement Data/Plots:

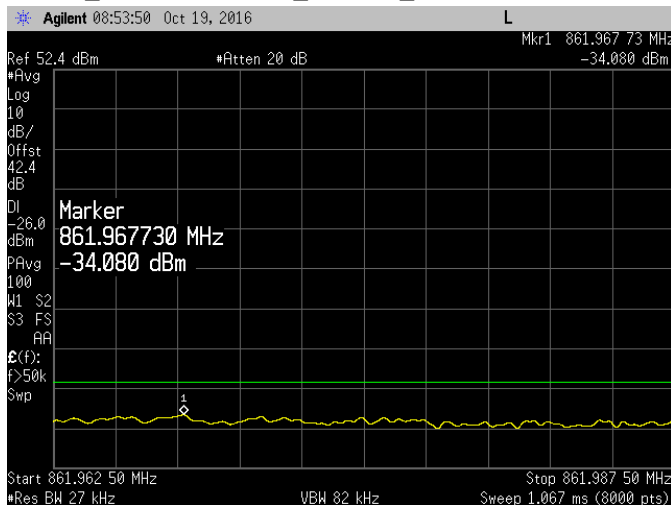
LTE1.4\_Bottom Channel\_QPSK\_8 Watts



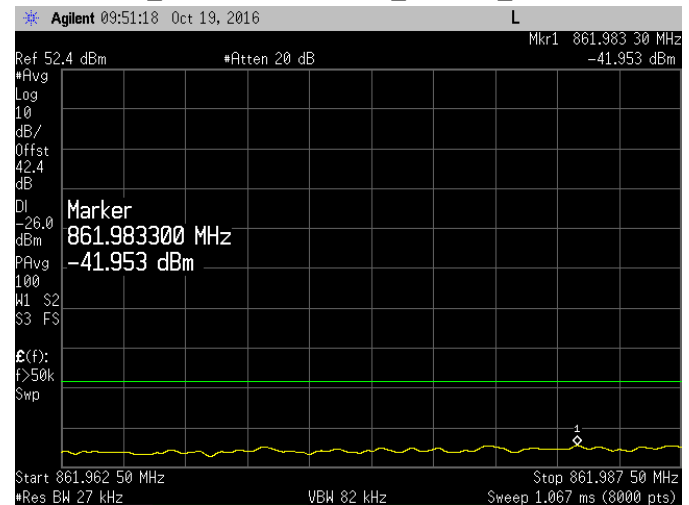
LTE1.4\_Bottom Channel +1\_QPSK\_8 Watts



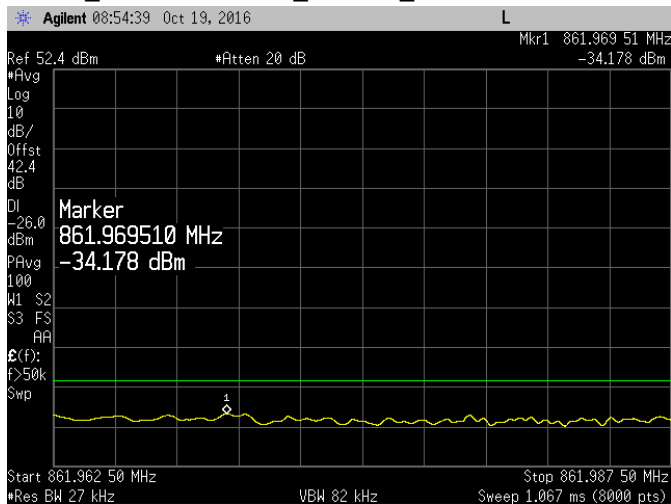
LTE1.4\_Bottom Channel\_16QAM\_8 Watts



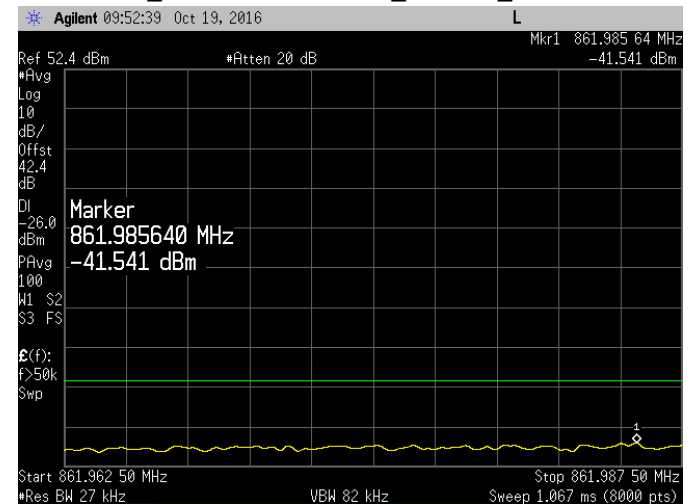
LTE1.4\_Bottom Channel +1\_16QAM\_8 Watts



LTE1.4\_Bottom Channel\_64QAM\_8 Watts

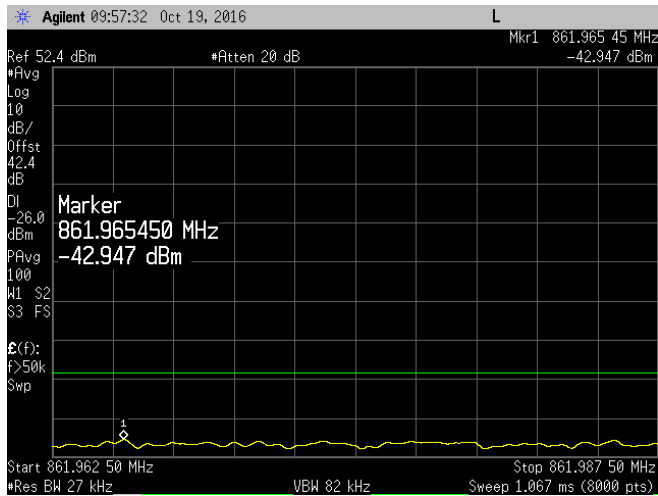


LTE1.4\_Bottom Channel +1\_64QAM\_8 Watts

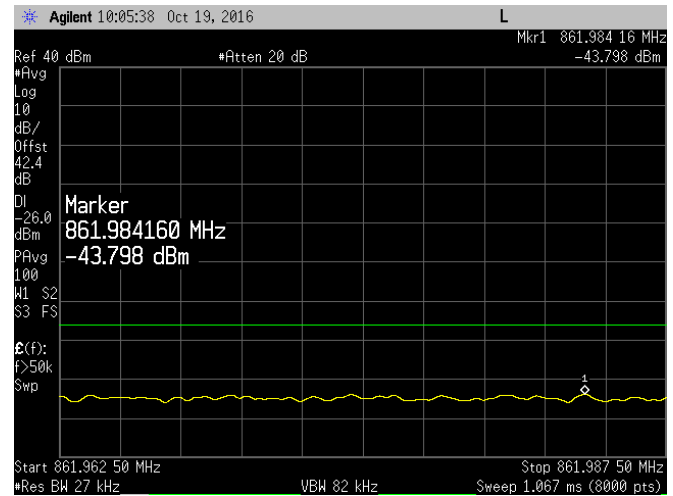


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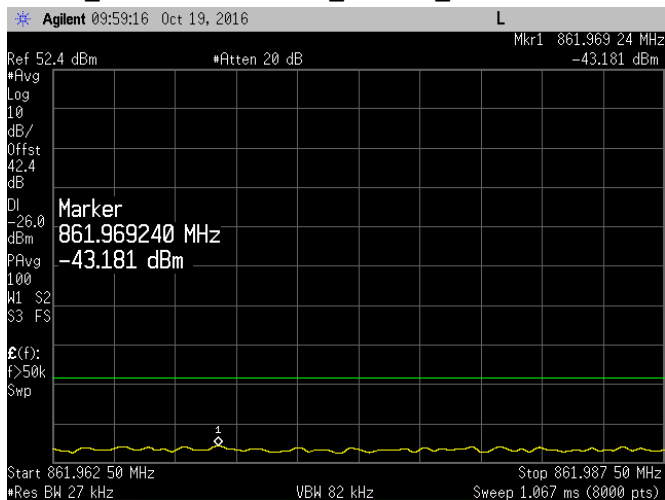
LTE1.4\_Bottom Channel +2\_QPSK\_8 Watts



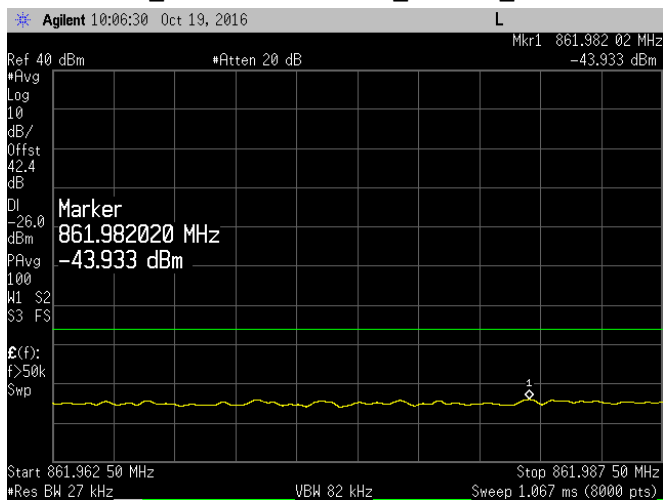
LTE1.4\_Bottom Channel +3\_QPSK\_8 Watts



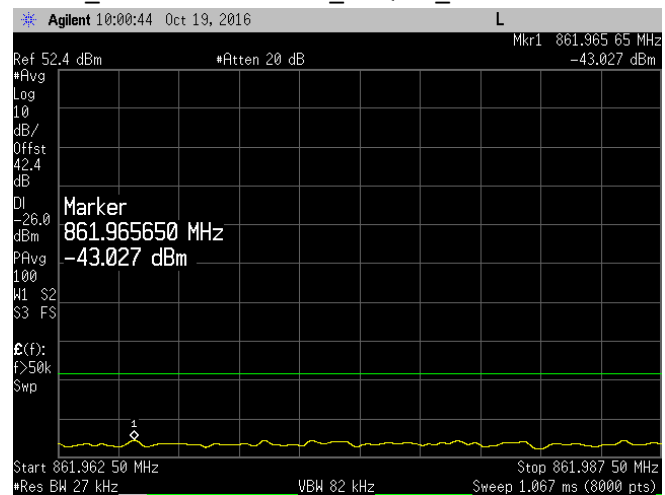
LTE1.4\_Bottom Channel +2\_16QAM\_8 Watts



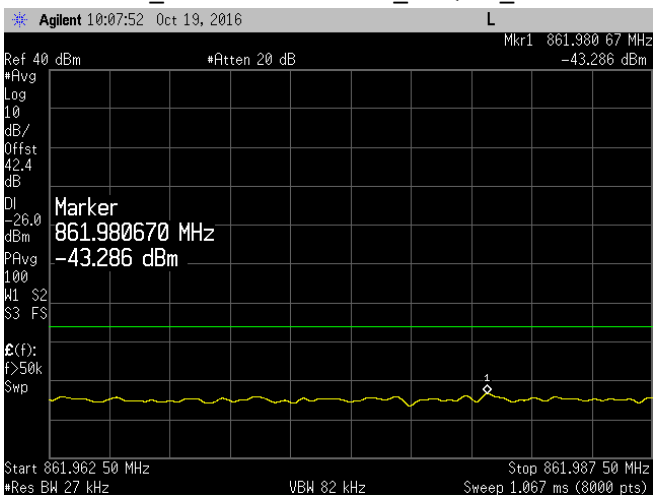
LTE1.4\_Bottom Channel +3\_16QAM\_8 Watts



LTE1.4\_Bottom Channel +2\_64QAM\_8 Watts

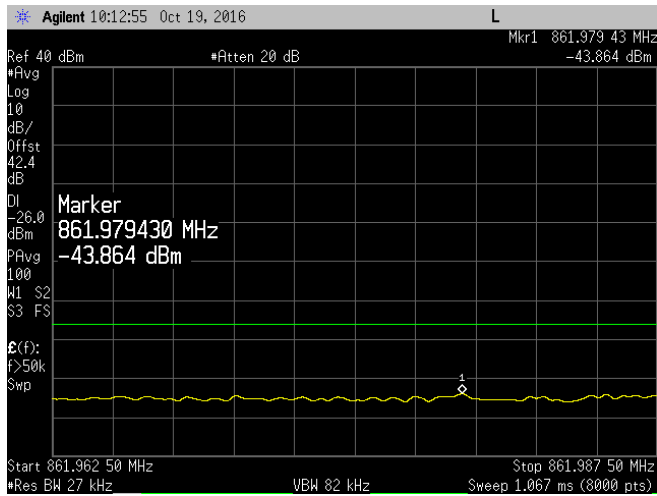


LTE1.4\_Bottom Channel +3\_64QAM\_8 Watts

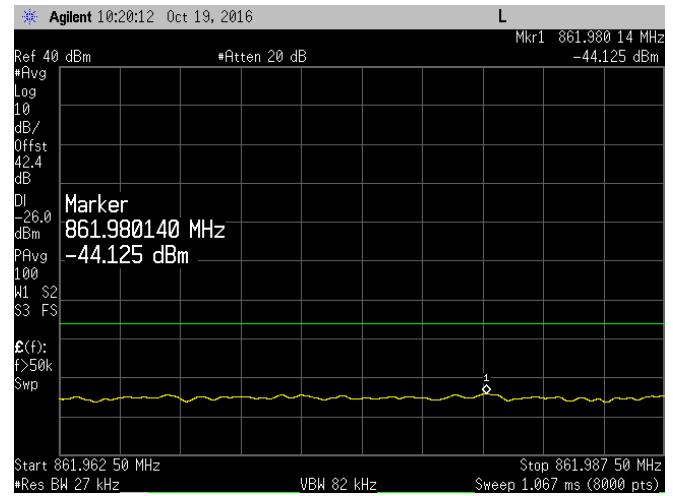


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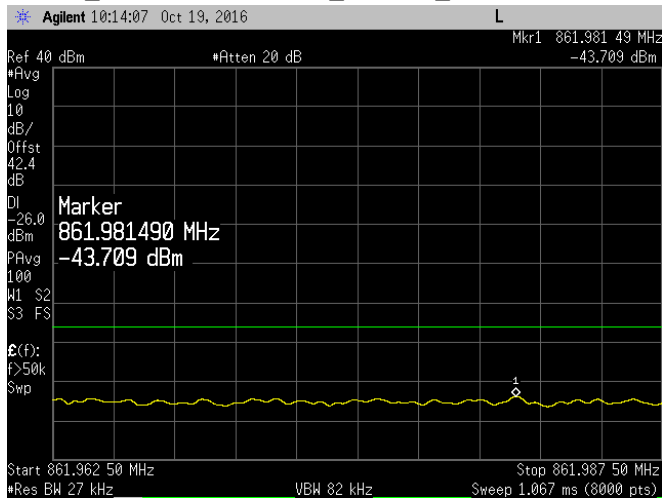
LTE1.4\_Bottom Channel +4\_QPSK\_8 Watts



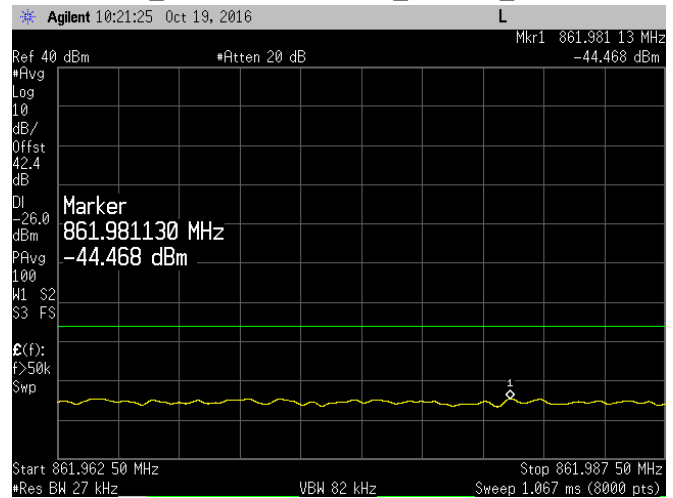
LTE1.4\_Bottom Channel +5\_QPSK\_8 Watts



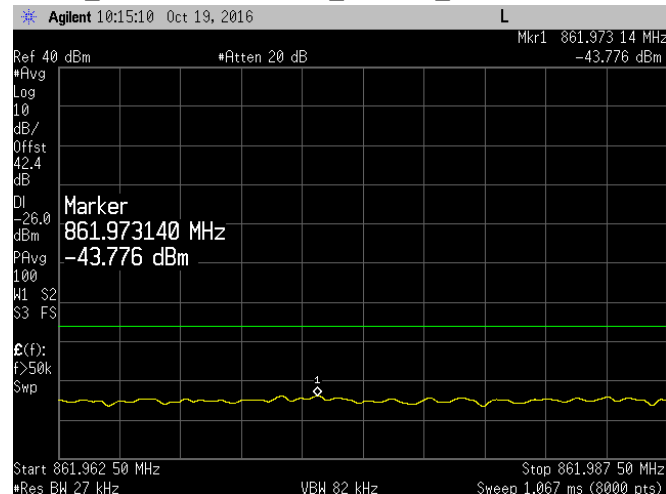
LTE1.4\_Bottom Channel +4\_16QAM\_8 Watts



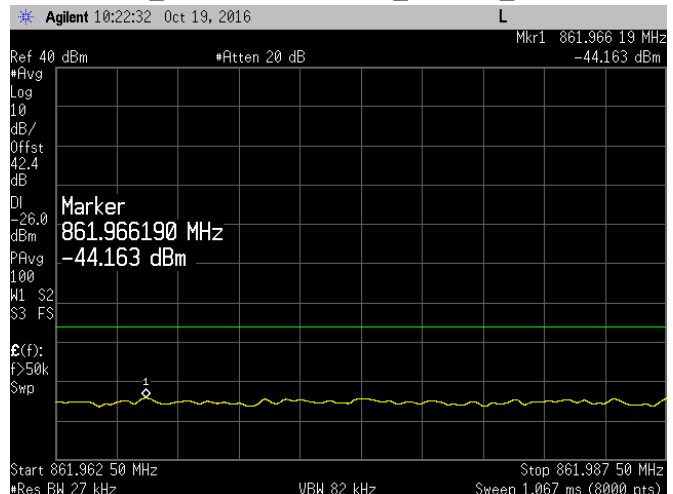
LTE1.4\_Bottom Channel +5\_16QAM\_8 Watts



LTE1.4\_Bottom Channel +4\_64QAM\_8 Watts

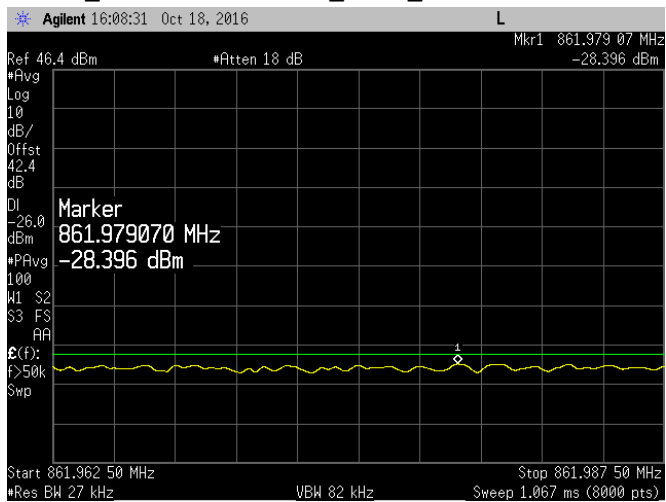


LTE1.4\_Bottom Channel +5\_64QAM\_8 Watts

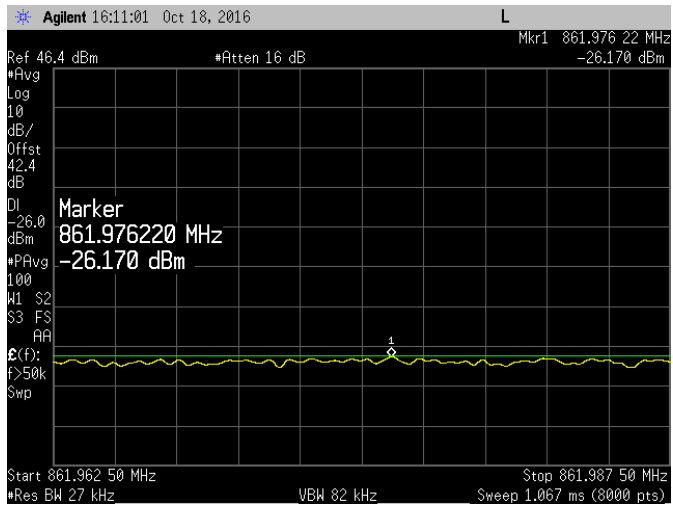


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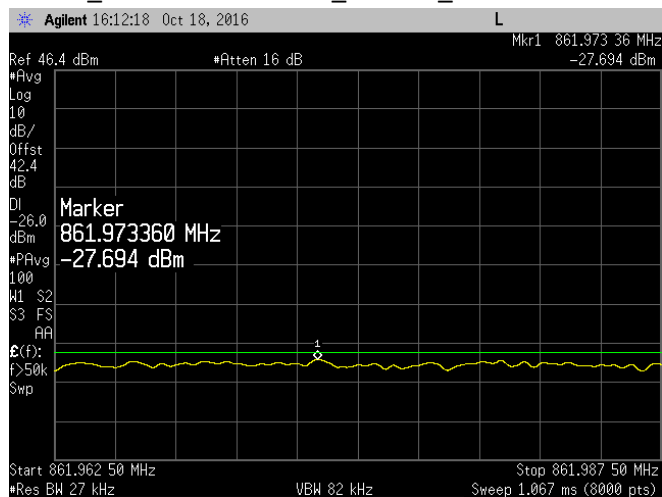
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### LTE1.4\_Bottom Channel +6\_16QAM\_60 Watts

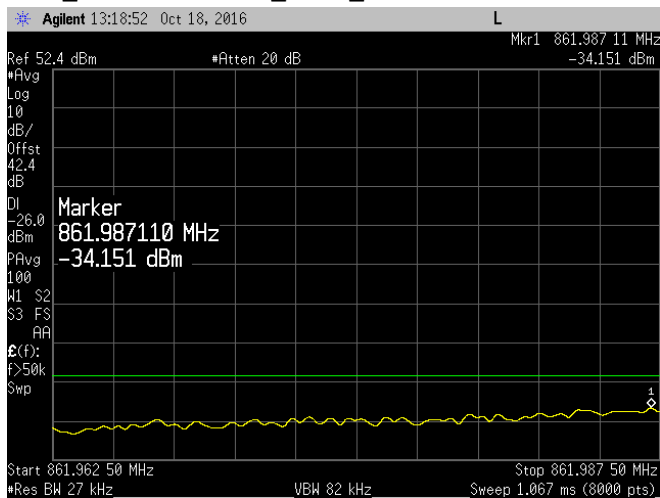


### LTE1.4\_Bottom Channel +6\_64QAM\_60 Watts

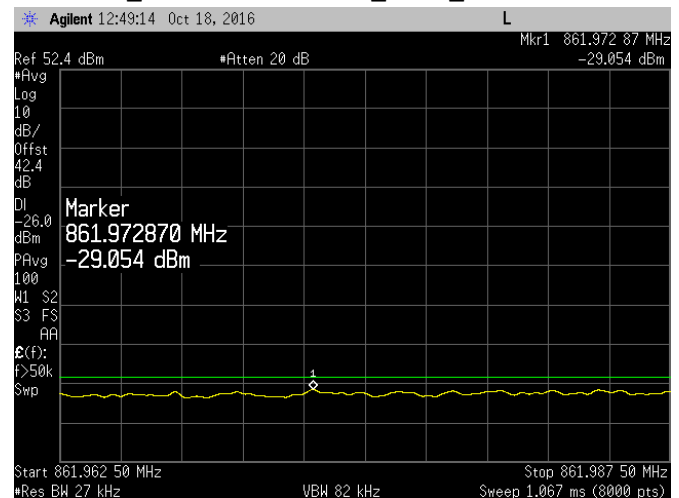


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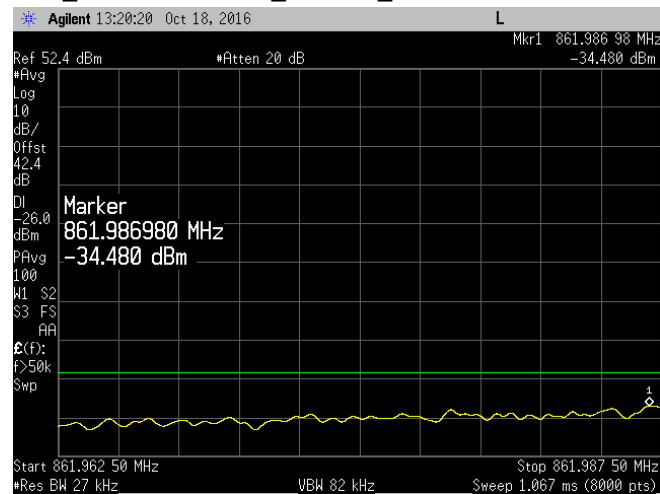
LTE3\_Bottom Channel\_QPSK\_8 Watts



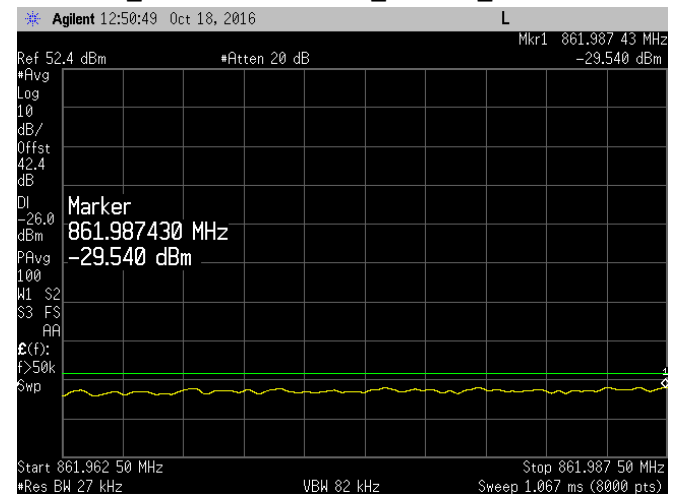
LTE3\_Bottom Channel +1\_QPSK\_60 Watts



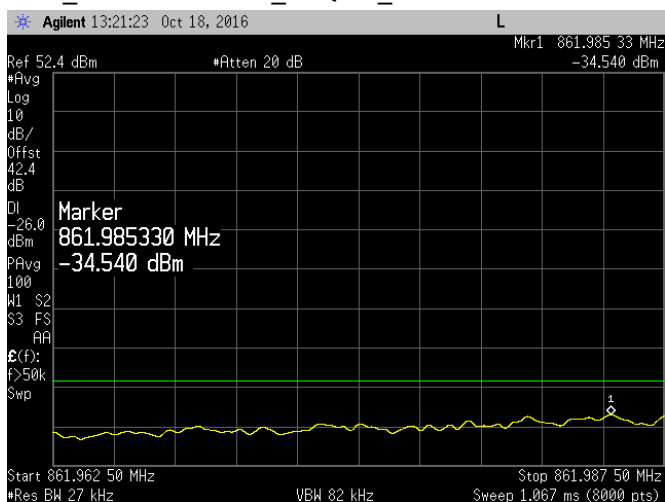
LTE3\_Bottom Channel\_16QAM\_8 Watts



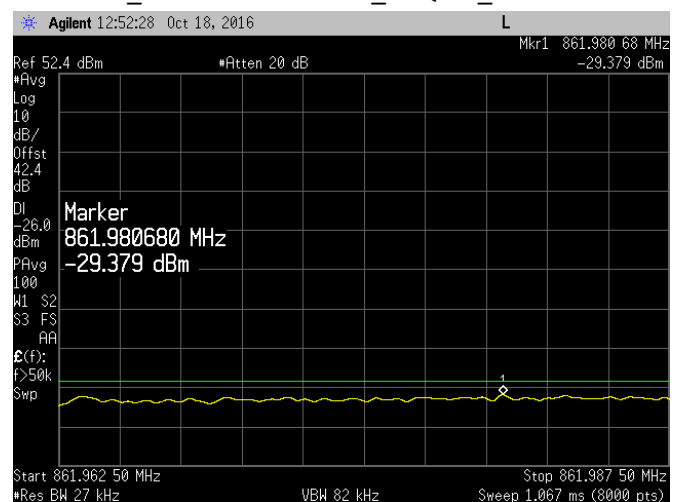
LTE3\_Bottom Channel +1\_16QAM\_60 Watts



LTE3\_Bottom Channel\_64QAM\_8 Watts



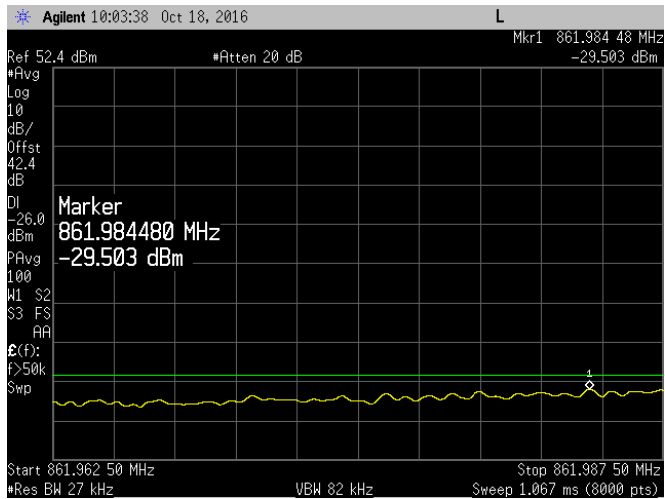
LTE3\_Bottom Channel +1\_64QAM\_60 Watts



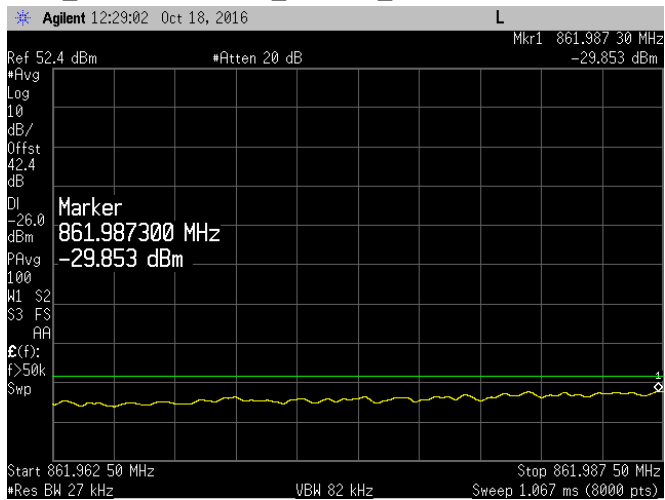


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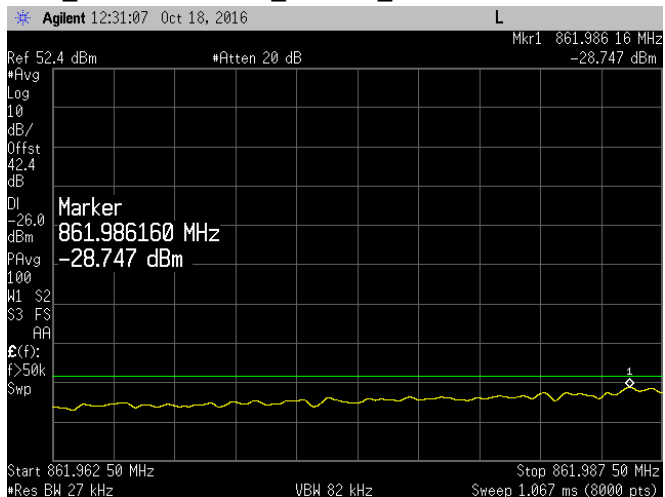
### LTE5\_Bottom Channel\_QPSK\_60 Watts



### LTE5\_Bottom Channel\_16QAM\_60 Watts

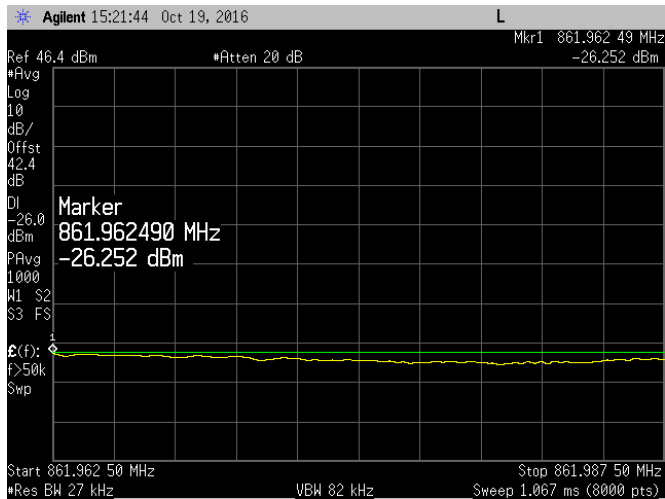


### LTE5\_Bottom Channel\_64QAM\_60 Watts

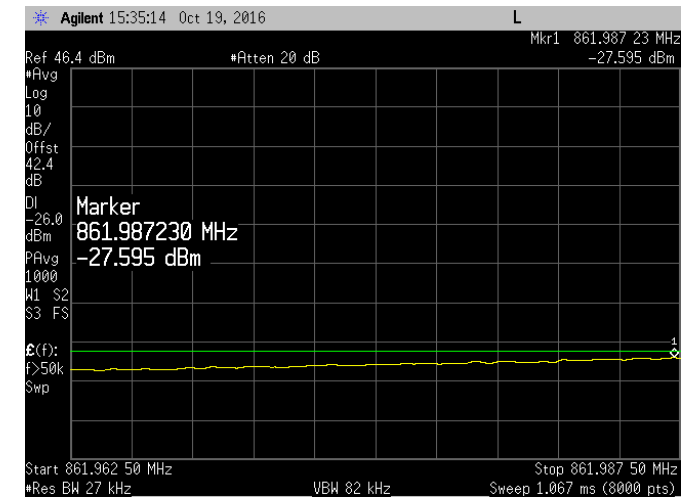


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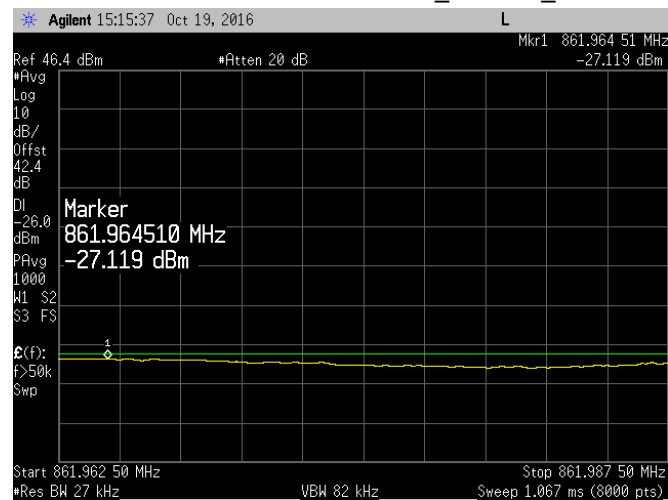
LTE1.4 Dual Carrier Bottom Channel\_QPSK\_8 Watts



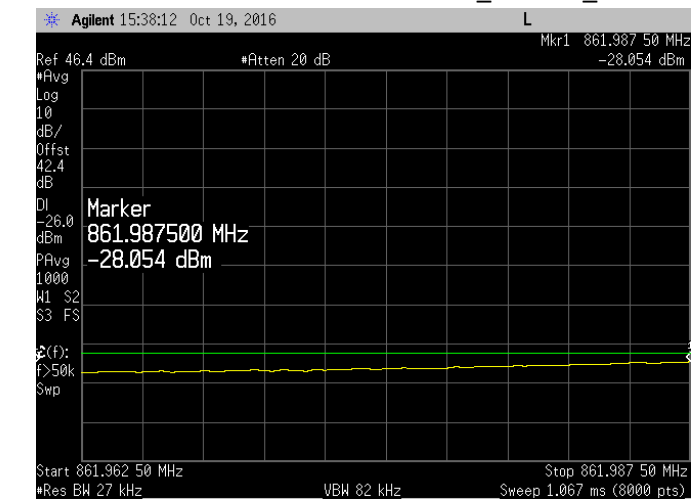
LTE1.4 Dual Carrier Bottom Channel +1\_QPSK\_60 Watts



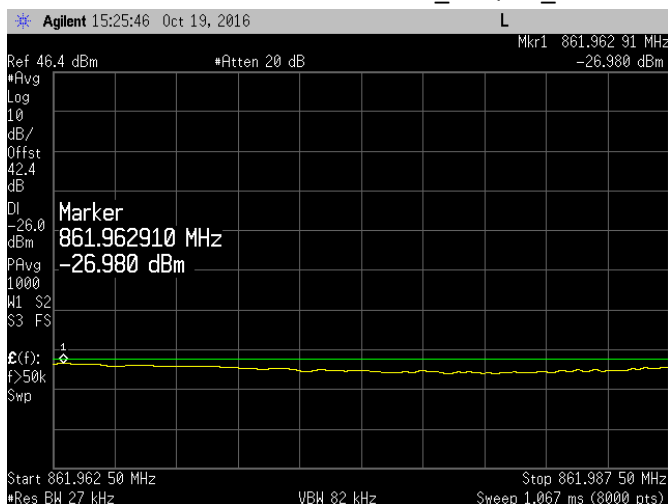
LTE1.4 Dual Carrier Bottom Channel\_16QAM\_8 Watts



LTE1.4 Dual Carrier Bottom Channel +1\_16QAM\_60 Watts



LTE1.4 Dual Carrier Bottom Channel\_64QAM\_8 Watts



LTE1.4 Dual Carrier Bottom Channel +1\_64QAM\_60 Watts

