

**Test Report for FCC & ISED**

Report Number		ESTRGC2311-006		
Applicant	Company name	FCC : LG Electronics USA, Inc.		
		ISED : LG Electronics Inc.		
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		ISED : 222, LG-ro, Jinwi-myeon, Pyeongtaek-si, Gyeonggi-do, Republic of Korea		
Telephone	201-470-2696			
Product	Product name	NAD Module		
	Model No.	TM15FNNAHD0	Manufacturer	LG Electronics Inc.
	Serial No.	NONE	Country of origin	KOREA
Test date	20-Sep-23 ~ 22-Nov-23		Date of issue	23-Nov-23
Testing location	140-16, Eongmalli-ro, Majang-myeon, Icheon-si, Gyeonggi-do, Rep. of Korea			
FCC ID	BEJTM15FNNAHD0			
ISED ID	2703H-TM15FNNAHD0			
FCC Rule Part(s)	Part 22, Part 24, Part 27, Part 90			
ISED Rule Part(s)	RSS-Gen Issue 5, RSS-130 Issue 2, RSS-132 Issue 4, RSS-133 Issue 6, RSS-139 Issue 4			
Test result			Complied	
Measurement facility registration number	659627			
MRA Registration number	KR0019			
Tested by	Engineer H.G. Lee		(Signature)	
Reviewed by	Engineering Manager I.K. Hong		(Signature)	
Abbreviation	OK, Pass = Complied, Fail = Failed, N/A = not applicable			
<p>* Note</p> <ul style="list-style-type: none"> <li>- This test report is not permitted to copy partly without our permission</li> <li>- This test result is dependent on only equipment to be used</li> <li>- This test report is not related to KOLAS accreditation</li> <li>- This product is tested in a single channel at the request of the company.</li> <li>- This is the reissue report due to the change of the applicant</li> </ul>				

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## 1. LABORATORY INFORMATION

Corporation Name : ESTECH Co., Ltd.

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EMC/Telecom/Safety Test Lab : 140-16, Eongmalli-ro, Majang-myeon, Icheon-si, Gyeonggi-do, Rep.  
of Korea

Official Qualification(s)

MSIP : Granted Accreditation from Ministry of Information & Communication for EMC, Safety and  
Telecommunication

KOLAS : Accredited Lab By Korea Laboratory Accreditation Schema base on CENELEC

FCC : Filed Laboratory at Federal Communications Commission

VCCI : Granted Accreditation from Voluntary Control Council for Interference from ITE

ISED : Accredited Lab By Canada Laboratory Accreditation

## 2. EUT DESCRIPTION

### 2.1 GENERAL INFORMATION

Product : NAD Module  
FCC ID : BEJTM15FNNAHD0  
IC : 2703H-TM15FNNAHD0  
Model Number : TM15FNNAHD0  
Add Model Name : -  
Serial Number : NONE  
Hardware Version Id Number (HVIN): TM15FNNAHD0  
Firmware Version Id Number (FVIN): N/A  
Product Marketing Name (PMN): TM15FNNAHD0  
Manufacturer : LG Electronics Inc. :  
Country of origin : KOREA  
Modulation Type : QPSK, 16QAM, 64QAM, 256QAM  
Channel Bandwidth(MHz) : LTE Band 2 : 1.4, 3, 5, 10, 15, 20  
LTE Band 5:1.4, 3, 5, 10  
LTE Band 7: 5, 10, 15, 20  
LTE Band 12 : 1.4, 3, 5, 10  
LTE Band 66(4) : 1.4, 3, 5, 10, 15, 20

Supply Voltage to product:3.9 V  
Software version:V0.1  
Hardware version:V0.1

### 2.2 DESCRIPTION OF EUT

This device supports the following capabilities:  
Multi-Band LTE and 5G NR(FR1)  
5G NR supports SCS 15 kHz for FDD Band and SCS 30 kHz for TDD Band.

### 2.3 Antenna information

Antenna type	PIFA Antenna
Antenna gain	Ant Band 2 : 0.92 dBi
	Ant Band 5 : 0.49 dBi
	Ant Band 7 : 2.27 dBi
	Ant Band 12 : -1.52 dBi
	Ant Band 66(4) : 1.10 dBi

**2.4 Emission Designator and Max power**

band	Frequency	modulation	Emission Designator	Conducted Output Power		ERP/EIRP	
				Max power (dBm)	Max power (W)	Max power (dBm)	Max power (W)
Band 2	1850.7~1909.3	QPSK	1M23G7D	22.87	0.194	25.03	0.318
Band 2	1850.7~1909.3	16QAM	1M23W7D	22.32	0.171	24.25	0.266
Band 2	1850.7~1909.3	64QAM	1M21W7D	21.22	0.132	22.90	0.195
Band 2	1850.7~1909.3	256QAM	1M22W7D	18.31	0.068	20.38	0.109
Band 2	1851.5~1908.5	QPSK	2M9G7D	22.92	0.196	25.11	0.324
Band 2	1851.5~1908.5	16QAM	2M89W7D	22.42	0.175	24.47	0.280
Band 2	1851.5~1908.5	64QAM	2M91W7D	21.36	0.137	23.25	0.211
Band 2	1851.5~1908.5	256QAM	2M93W7D	18.55	0.072	20.74	0.119
Band 2	1852.5~1907.5	QPSK	4M79G7D	23.14	0.206	26.22	0.419
Band 2	1852.5~1907.5	16QAM	4M82W7D	22.37	0.173	25.56	0.360
Band 2	1852.5~1907.5	64QAM	4M8W7D	21.45	0.140	24.44	0.278
Band 2	1852.5~1907.5	256QAM	4M78W7D	18.65	0.073	21.87	0.154
Band 2	1855~1905	QPSK	9M51G7D	23.09	0.204	26.17	0.414
Band 2	1855~1905	16QAM	9M48W7D	22.36	0.172	25.71	0.372
Band 2	1855~1905	64QAM	9M44W7D	21.48	0.141	24.04	0.254
Band 2	1855~1905	256QAM	9M47W7D	18.47	0.070	21.50	0.141
Band 2	1857.5~1902.5	QPSK	14M3G7D	22.99	0.199	26.14	0.411
Band 2	1857.5~1902.5	16QAM	14M2W7D	22.29	0.169	25.41	0.348
Band 2	1857.5~1902.5	64QAM	14M2W7D	21.35	0.136	24.29	0.269
Band 2	1857.5~1902.5	256QAM	14M3W7D	18.28	0.067	21.74	0.149
Band 2	1860~1900	QPSK	18M7G7D	23.28	0.213	25.60	0.363
Band 2	1860~1900	16QAM	18M9W7D	22.54	0.179	24.93	0.311
Band 2	1860~1900	64QAM	18M8W7D	21.55	0.143	23.68	0.233
Band 2	1860~1900	256QAM	18M8W7D	18.55	0.072	21.47	0.140
Band 5	824.7~848.3	QPSK	1M23G7D	23.20	0.209	22.20	0.166
Band 5	824.7~848.3	16QAM	1M23W7D	22.54	0.179	21.51	0.142
Band 5	824.7~848.3	64QAM	1M21W7D	21.55	0.143	20.51	0.112

Band 5	824.7~848.3	256QAM	1M22W7D	18.48	0.070	17.64	0.058
Band 5	825.5~847.5	QPSK	2M9G7D	23.24	0.211	21.73	0.149
Band 5	825.5~847.5	16QAM	2M88W7D	22.50	0.178	20.74	0.119
Band 5	825.5~847.5	64QAM	2M88W7D	21.60	0.145	19.70	0.093
Band 5	825.5~847.5	256QAM	2M93W7D	18.56	0.072	17.59	0.057
Band 5	826.5~846.5	QPSK	4M77G7D	23.28	0.213	21.92	21.92
Band 5	826.5~846.5	16QAM	4M79W7D	22.74	0.188	21.24	21.24
Band 5	826.5~846.5	64QAM	4M8W7D	21.80	0.151	20.25	20.25
Band 5	826.5~846.5	256QAM	4M76W7D	18.77	0.075	17.43	17.43
Band 5	829~844	QPSK	9M53G7D	23.18	0.208	21.60	0.145
Band 5	829~844	16QAM	9M33W7D	22.69	0.186	20.88	0.122
Band 5	829~844	64QAM	9M42W7D	21.68	0.147	19.84	0.096
Band 5	829~844	256QAM	9M48W7D	18.59	0.072	17.01	0.050
Band 7	2502.5~2567.5	QPSK	4M82G7D	23.68	0.233	24.39	0.275
Band 7	2502.5~2567.5	16QAM	4M82W7D	23.27	0.212	23.75	0.237
Band 7	2502.5~2567.5	64QAM	4M83W7D	22.10	0.162	22.68	0.185
Band 7	2502.5~2567.5	256QAM	4M82W7D	19.34	0.086	19.62	0.092
Band 7	2505~2565	QPSK	9M51G7D	23.59	0.229	24.68	0.294
Band 7	2505~2565	16QAM	9M39W7D	23.15	0.207	24.09	0.256
Band 7	2505~2565	64QAM	9M54W7D	22.00	0.158	22.92	0.196
Band 7	2505~2565	256QAM	9M44W7D	19.17	0.083	19.84	0.096
Band 7	2507.5~2562.5	QPSK	14M2G7D	23.63	0.231	24.39	0.275
Band 7	2507.5~2562.5	16QAM	14M2W7D	23.03	0.201	23.67	0.233
Band 7	2507.5~2562.5	64QAM	14M2W7D	21.98	0.158	22.07	0.161
Band 7	2507.5~2562.5	256QAM	14M2W7D	19.01	0.080	19.59	0.091
Band 7	2510~2560	QPSK	18M7G7D	23.69	0.234	25.13	0.326
Band 7	2510~2560	16QAM	18M9W7D	23.11	0.205	24.43	0.277
Band 7	2510~2560	64QAM	18M8W7D	22.21	0.166	22.73	0.187
Band 7	2510~2560	256QAM	18M9W7D	19.11	0.081	20.27	0.106
Band 12	699.7~715.3	QPSK	1M22G7D	23.22	0.210	19.26	0.084

Band 12	699.7~715.3	16QAM	1M21W7D	22.66	0.185	18.21	0.066
Band 12	699.7~715.3	64QAM	1M22W7D	21.61	0.145	17.17	0.052
Band 12	699.7~715.3	256QAM	1M23W7D	18.56	0.072	13.99	0.025
Band 12	700.5~714.5	QPSK	2M9G7D	23.29	0.213	19.64	0.092
Band 12	700.5~714.5	16QAM	2M9W7D	22.60	0.182	18.78	0.076
Band 12	700.5~714.5	64QAM	2M89W7D	21.60	0.145	17.57	0.057
Band 12	700.5~714.5	256QAM	2M93W7D	18.60	0.072	14.50	0.028
Band 12	701.5~713.5	QPSK	4M81G7D	23.28	0.213	22.30	0.170
Band 12	701.5~713.5	16QAM	4M87W7D	22.62	0.183	21.53	0.142
Band 12	701.5~713.5	64QAM	4M82W7D	21.66	0.147	20.33	0.108
Band 12	701.5~713.5	256QAM	4M85W7D	18.58	0.072	17.33	0.054
Band 12	704~711	QPSK	9M39G7D	23.38	0.218	22.26	0.168
Band 12	704~711	16QAM	9M41W7D	22.68	0.185	21.64	0.146
Band 12	704~711	64QAM	9M48W7D	21.68	0.147	19.77	0.095
Band 12	704~711	256QAM	9M47W7D	18.71	0.074	17.36	0.054
Band 66	1710.7~1779.3	QPSK	1M09G7D	23.32	0.215	25.82	0.382
Band 66	1710.7~1779.3	16QAM	1M09W7D	22.60	0.182	24.90	0.309
Band 66	1710.7~1779.3	64QAM	1M09W7D	21.66	0.147	23.70	0.234
Band 66	1710.7~1779.3	256QAM	1M09W7D	18.64	0.073	20.68	0.117
Band 66	1711.5~1778.5	QPSK	2M88G7D	23.50	0.224	26.08	0.406
Band 66	1711.5~1778.5	16QAM	2M88W7D	22.59	0.182	25.10	0.324
Band 66	1711.5~1778.5	64QAM	2M89W7D	21.60	0.145	23.91	0.246
Band 66	1711.5~1778.5	256QAM	2M92W7D	18.55	0.072	20.88	0.122
Band 66	1712.5~1777.5	QPSK	4M89G7D	23.48	0.223	26.52	0.449
Band 66	1712.5~1777.5	16QAM	4M82W7D	22.66	0.185	25.64	0.366
Band 66	1712.5~1777.5	64QAM	4M77W7D	21.62	0.145	24.54	0.284
Band 66	1712.5~1777.5	256QAM	4M78W7D	18.64	0.073	21.35	0.136
Band 66	1715~1775	QPSK	9M6G7D	23.44	0.221	26.90	0.490
Band 66	1715~1775	16QAM	9M51W7D	22.60	0.182	26.05	0.403
Band 66	1715~1775	64QAM	9M44W7D	21.60	0.145	25.00	0.316



Band 66	1715~ 1775	256QAM	9M51W7D	18.56	0.072	21.89	0.155
Band 66	1717.5~ 1772.5	QPSK	14M3G7D	23.47	0.222	27.13	0.516
Band 66	1717.5~ 1772.5	16QAM	14M2W7D	22.64	0.184	26.46	0.443
Band 66	1717.5~ 1772.5	64QAM	14M4W7D	21.58	0.144	25.54	0.358
Band 66	1717.5~ 1772.5	256QAM	14M3W7D	18.63	0.073	22.48	0.177
Band 66	1720~ 1770	QPSK	18M9G7D	23.43	0.220	27.16	0.520
Band 66	1720~ 1770	16QAM	18M8W7D	22.62	0.183	26.47	0.444
Band 66	1720~ 1770	64QAM	18M7W7D	21.60	0.145	25.45	0.351
Band 66	1720~ 1770	256QAM	18M7W7D	18.65	0.073	22.49	0.177

### 3. INTRODUCTION

#### 3.1. EUT DESCRIPTION

Temperature : +21 °C ~ +24 °C

Humidity : 42 % ~ 46 %

Extreme Test Temperature : -10 °C ~ +55 °C

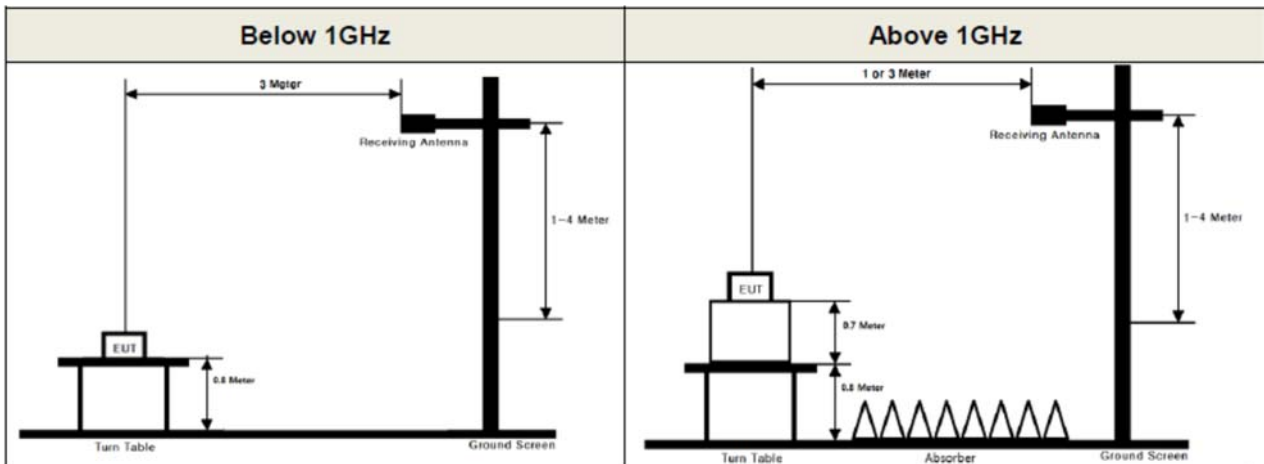
#### 3.2 Measurement Uncertainty

Item	Measurement Uncertainty
Conducted Output Power	±3.2 %
Occupied Channel Bandwidth	±0.87dB
Unwanted Emission, Conducted	±0.86dB
Emissions, Radiated (Below 1GHz)	±3.54dB
Emissions, Radiated (1GHz-18GHz)	±4.22dB
Emissions, Radiated (18GHz-25GHz)	±4.81dB

## 4. DESCRIPTION OF TESTS

### 4.1. ERP & EIRP (Effective Radiated Power & Equivalent Isotropic Radiated Power)

#### Test Set-up



These measurements were performed at 3 m test site. The equipment under test is placed on a non-conductive table 0.8 or 1.5-meters above a turntable which is flush with the ground plane and 3 meters from the receive antenna. For measurements above 1GHz absorbers are placed on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1 GHz, the absorbers are removed.

#### Test Procedure

- ANSI/TIA-603-E-2016 - Section 2.2.17
- KDB971168 D01v03 - Section 5.2.2
- ANSI C63.26-2015 – Section 5.2.4.4.1

#### Test setting

1. Set span to 2 x to 3 x the OBW.
2. Set RBW = 1 % to 5 % of the OBW.
3. Set VBW  $\geq$  3 x RBW.
4. Set number of points in sweep  $\geq$  2 x span / RBW.
5. Sweep time:
  - 1) Set = auto-couple, or
  - 2) Set  $\geq$  [10 x (number of points in sweep) x (transmission period)] for single sweep (automation-compatible)
 measurement. Transmission period is the on and off time of the transmitter.
6. Detector = power averaging (rms).
7. If the EUT can be configured to transmit continuously, then set the trigger to free run.

8. If the EUT cannot be configured to transmit continuously, then use a sweep trigger with the level set to enable triggering only on full power bursts and configure the EUT to transmit at full power for the entire duration of each sweep. Verify that the sweep time is less than or equal to the transmission burst duration. Time gating can also be used under similar constraints (i.e., configured such that measurement data is collected only during active fullpower transmissions).

9. Trace average at least 100 traces in power averaging (rms) mode if sweep is set to auto-couple. To accurately determine the average power over multiple symbols, it can be necessary to increase the number of traces to be averaged above 100 or, if using a manually configured sweep time, increase the sweep time.

10. Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band or channel power measurement function, with the band/channel limits set equal to the OBW band edges. If the instrument does not have a band or channel power function, then sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

The receiver antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer.

A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminal of the substitute antenna is measured.

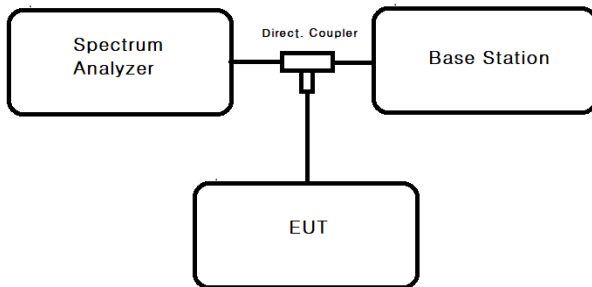
The ERP/EIRP is calculated using the following formula:

**ERP/EIRP = The conducted power at the substitute antenna's terminal [dBm] + Substitute Antenna gain [dBd for ERP , dBi for EIRP]**

For readings above 1 GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn antenna and an isotropic antenna are taken into consideration.

## 4.2. PEAK TO AVERAGE RATIO

### Test set-up



### Test Procedure

- KDB971168 D01v03 - Section 5.7.2
- ANSI C63.26-2015 – Section 5.2.3.4

A peak to average ratio measurement is performed at the conducted port of the EUT. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The present of time the signal spends at or above the level defines the probability for that particular power level.

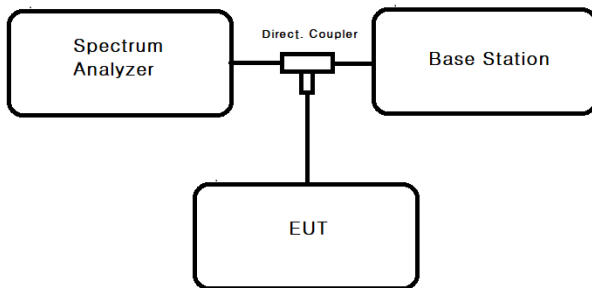
#### Test setting

The spectrum Analyzer's CCDF measurement function is enabled.

1. Set resolution/measurement bandwidth  $\geq$  OBW or specified reference bandwidth.
2. Set the number of counts to a value that stabilizes the measured CCDF curve.
3. Set the measurement interval as follows:
  - 1) For continuous transmissions, set to the greater of  $[10 \times (\text{number of points in sweep}) \times (\text{transmission symbol period})]$  or 1 ms.
  - 2) For burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize. Set the measurement interval to a time that is less than or equal to the burst duration.
  - 3) If there are several carriers in a single antenna port, the peak power shall be determined for each individual carrier (by disabling the other carriers while measuring the required carrier) and the total peak power calculated from the sum of the individual carrier peak powers.
4. Record the maximum PAPR level associated with a probability of 0.1 %.
5. The peak power level is calculated from the sum of the PAPR value from step d) to the measured average power

### 4.3. OCCUPIED BANDWIDTH

#### Test set-up



#### Test Procedure

- KDB971168 D01v03 - Section 4.3
- ANSI C63.26-2015 – Section 5.4.4

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power of a given emission.

#### Test setting

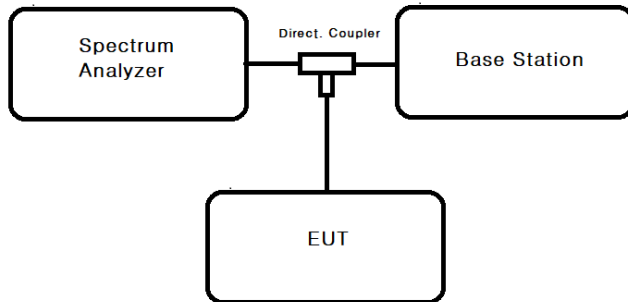
1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99 % occupied bandwidth and the 26 dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 % ~ 5 % of the expected OBW & VBW  $\geq$  3 X RBW
3. Detector = Peak
4. Trance mode = Max hold
5. Sweep = Auto couple
6. The trace was allowed to stabilize
7. If necessary, step 2 ~ 6 were repeated after changing the RBW such that it would be within 1 % ~ 5 % of the 99 % occupied bandwidth observed in step 6.

#### Test Note

All modes of operation were investigated, and the worst-case configuration results are reported in this section.

#### 4.4. BAND EDGE EMISSIONS AT ANTENNA TERMINAL

##### Test Setup



##### Test Procedure

- KDB971168 D01v03 – section 6
- ANSI C63.26-2015 – Section 5.7

All out of band emissions are measured by means of a calibrated spectrum analyzer. The EUT was setup to maximum output power at its lowest and highest channel with all bandwidths, modulations and RB configurations.

The power of any spurious emission shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log(P)$  dB.

##### Test settings

- Start and stop frequency were set such that the band edge would be placed in the center of the plot
- Span was set large enough so as to capture all out of band emissions near the band edge
- RBW  $\geq 1\%$  of the emission bandwidth or Specified bandwidth
- VBW  $\geq 3 \times$  RBW
- Detector = RMS & Trace mode = Max hold
- Sweep time = Auto couple or 1 s for band edge
- Number of sweep point  $\geq 2 \times$  span / RBW
- The trace was allowed to stabilize

##### Test Note

All modes of operation were investigated, and the worst-case configuration results are reported in this section.

Note 1: Per Part 22.917(b)(1) / 24.238(b) / 27.53(h) in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to demonstrate compliance with the out-of-band emissions limit.

The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

Note 2: Per Part 27.53(g) for operations in the 600 MHz band and the 698-746 MHz band, 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.

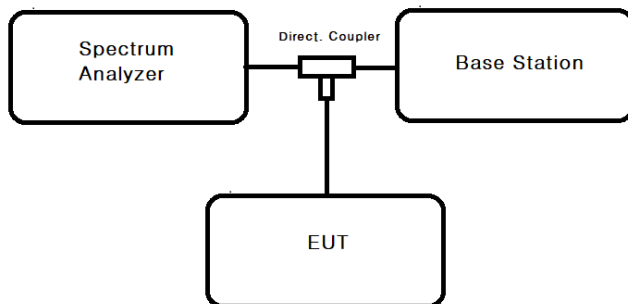
Note 3: Per Part 90.543(e) for operations in the 758-768 MHz and the 788-798 MHz bands, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

- (1) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than  $76 + 10 \log (P)$  dB in a 6.25 kHz band segment, for base and fixed stations.
- (2) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than  $65 + 10 \log (P)$  dB in a 6.25 kHz band segment, for mobile and portable stations.
- (3) On any frequency between 775-788 MHz, above 805 MHz, and below 758 MHz, by at least  $43 + 10 \log (P)$  dB.
- (4) Compliance with the provisions of paragraphs (e)(1) and (2) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.
- (5) Compliance with the provisions of paragraph (e)(3) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of 30 kHz may be employed.



#### 4.5. SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL

##### Test Setup



##### Test Procedure

- KDB971168 D01v03 - Section 6
- ANSI C63.26-2015 – Section 5.7

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The EUT was setup to maximum output power at its low, middle, high channel with all bandwidths, modulations and RB configurations. The spectrum is scanned from 9 kHz up to a frequency including its 10<sup>th</sup> harmonic.

The power of any spurious emission shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log(P)$  dB.

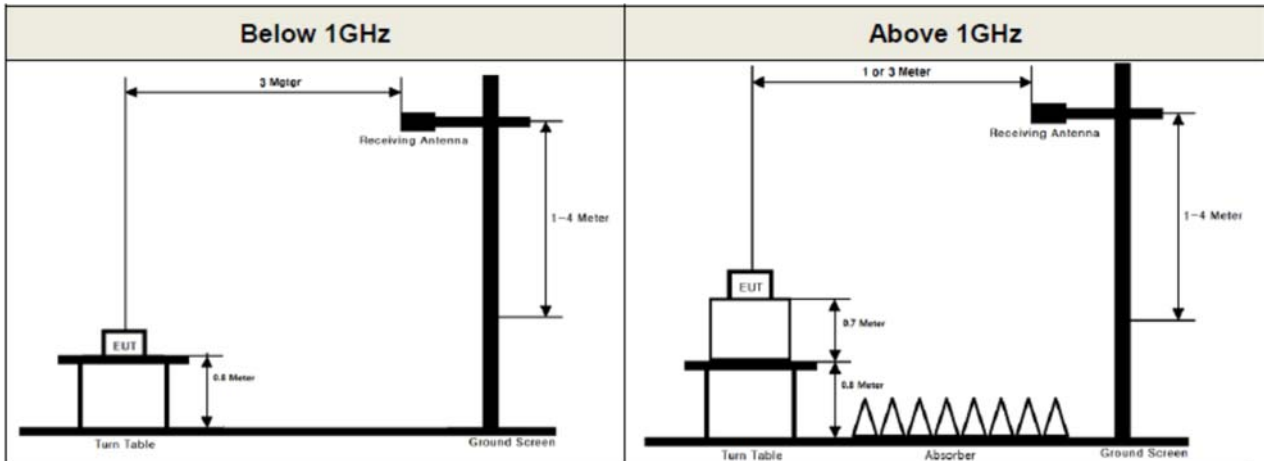
##### Test setting

1. RBW = 100 kHz(Below 1 GHz) or 1 MHz(Above 1 GHz) & VBW  $\geq 3 \times$  RBW ( Refer to Note 1)
2. Detector = RMS & Trace mode = Max hold
3. Sweep time = Auto couple
4. Number of sweep point  $\geq 2 \times$  span / RBW
5. The trace was allowed to stabilize

Note 1: Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1 GHz and 1 MHz or greater for frequencies greater than 1GHz.

#### 4.6. UNDESIRABLE EMISSIONS

##### Test Set-up



These measurements were performed at 3 m test site. The equipment under test is placed on a non-conductive table 0.8 or 1.5-meters above a turntable which is flush with the ground plane and 3 meters from the receive antenna. For measurements above 1GHz absorbers are placed on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1 GHz, the absorbers are removed.

##### Test Procedure

- ANSI/TIA-603-E-2016 - Section 2.2.12
- KDB971168 D01v03 - Section 6
- ANSI C63.26-2015 – Section 5.5

##### Test setting

1. RBW = 100 kHz for below 1 GHz and 1 MHz for above 1 GHz / VBW  $\geq$  3 X RBW
2. Detector = RMS & Trace mode = Max hold
3. Sweep time = Auto couple
4. Number of sweep point  $\geq$  2 X span / RBW
5. The trace was allowed to stabilize

The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer.

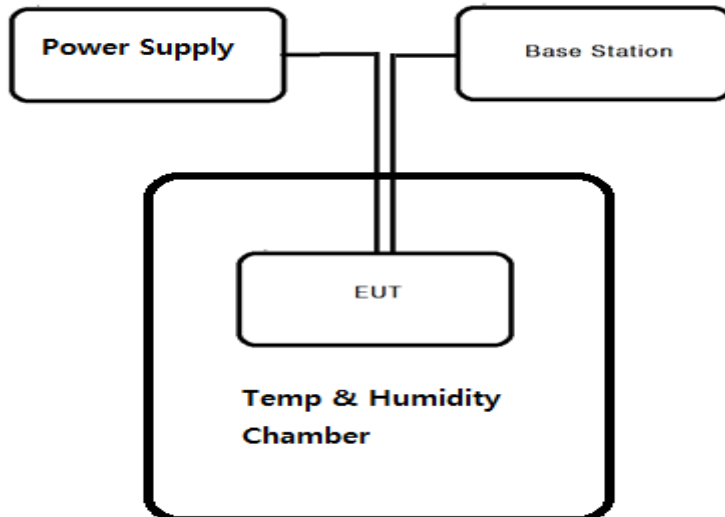
For radiated power measurements below 1 GHz, a half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading.

For radiated power measurements above 1 GHz, a Horn antenna was substituted in place of the EUT. This Horn antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading. The difference between the gain of the horn and an isotropic antenna are taken into consideration.

This measurement was performed with the EUT oriented in 3 orthogonal axis.

#### 4.7. FREQUENCY STABILITY

##### Test Set-up



##### Test Procedure

- ANSI/TIA-603-E-2016
- KDB971168 D01v03 - Section 9

The frequency stability of the transmitter is measured by:

- Temperature:**  
The temperature is varied from -30 °C to +50 °C using an environmental chamber.
- Primary Supply Voltage:**  
The primary supply voltage is varied from 85 % to 115 % of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

##### Specification:

Part 24.235, Part 27.54, RSS-130[4.5], RSS-132[5.4], RSS-139[5.4], RSS-140[4.2]: The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.  
Part 22.355: The frequency stability of the transmitter shall be maintained within  $\pm 0.00025\%$  ( $\pm 2.5$  ppm) of the center frequency.

RSS-133[4.5]: The carrier frequency shall not depart from the reference frequency, in excess of  $\pm 2.5$  ppm for mobile stations and  $\pm 1.0$  ppm for base stations.

Part 90.539(e): The frequency stability of mobile, portable and control transmitters operating in the wideband segment must be 1.25 parts per million or better when AFC is locked to a base station, and 5 parts per million or better when AFC is not locked.

**Time Period and Procedure:**

1. The carrier frequency of the transmitter is measured at room temperature.  
(20 °C to provide a reference)
2. The equipment is turned on in a “standby” condition for one minute before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3. Frequency measurements are made at 10 °C intervals ranging from -30 °C to +50 °C.  
A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

**4.8 Worst Case (RADIATED TEST)**

- Waveform : All Waveform of operation were investigated and the worst case configuration results are reported.  
(Worst case: DFT-S-OFDM)

- The EUT was tested in three orthogonal planes(X, Y, Z) and in all possible test configurations and positioning.

- The EUT was tested in three modes(Open, Half-open, Closed), the worst case configuration results are reported.  
Worst case: Open mode.

- All modes of operation were investigated and the worst case configuration results are reported.

Mode: NSA

Mode : Stand alone, Stand alone + External accessories (Earphone, AC adapter, etc)

Worst case : Stand alone

- We were performed the RSE test in condition of co-location.

Mode : Stand alone, Simultaneous transmission scenarios

Worst case : Stand alone

- We were performed the RSE test in condition of co-location.

Mode : Stand alone, Simultaneous transmission scenarios

Worst case : Stand alone

- Radiated Spurious emissions are measured while operating in EN-DC mode with Sub 6 NR carrier as well as an LTE carrier (anchor).

All EN-DC mode of operation were investigated and the worst case configuration results are reported.

(Worst case: LTE (20 MHz))

- All RB sizes, offsets of operation were investigated and the worst case configuration results are reported.

Please refer to the table below.

- In the case of radiated spurious emissions, all bandwidth of operation were investigated and the worst case bandwidth results are reported.

(Worst case : 20 MHz)

[ Worst case ]

Test Description	Modulation	RB size	RB offset
Effective Radiated Power	QPSK, 16QAM, 64QAM, 256QAM	See Section 8.1	
Radiated Spurious Emissions	QPSK, 16QAM, 64QAM, 256QAM	See Section 8.1	

**WORST CASE(CONDUCTED TEST)**

- Waveform : All Waveform of operation were investigated and the worst case configuration results are reported.  
(Worst case: DFT-S-OFDM)

- Modulation : All Modulation of operation were investigated and the worst case configuration results are reported.  
(Worst case: QPSK)

All modes of operation were investigated and the worst case configuration results are reported.  
Mode: NSA

- All RB sizes, offsets of operation were investigated and the worst case configuration results are reported.  
Please refer to the table below.

[ Worst case ]

Test Description	Modulation	Bandwidth (MHz)	Frequency	RB size	RB offset
Occupied Bandwidth Peak- to- Average Ratio	QPSK, 16QAM, 64QAM, 256QAM	1.4, 3, 5, 10, 15, 20	Mid	Full RB	0
Band Edge	QPSK,	1.4	Low	1	0
	QPSK,	1.4	High	1	5
	QPSK,	3	Low	1	0
	QPSK,	3	High	1	14
	QPSK,	5	Low	1	0
	QPSK,	5	High	1	24
	QPSK,	10	Low	1	0
	QPSK,	10	High	1	49
	QPSK,	15	Low	1	0
	QPSK,	15	High	1	74
Spurious and Harmonic Emissions at Antenna Terminal	QPSK,	1.4, 3, 5, 10, 15, 20	Low	Full RB	0
	QPSK,	1.4, 3, 5, 10, 15, 20	Mid	Full RB	0
	QPSK,	1.4, 3, 5, 10, 15, 20	High	Full RB	0

## 5. TEST EQUIPMENT

### 5.1 Measurement equipment

Equipment Name	Type	Manufacturer	Serial No.	Cal. Date	Cal. Due Date
Radio Communication Test Station	MT8000A	Anritsu	6261867318	2022-11-30	2023-11-30
Radio Communication Analyzer	MT8821C	Anritsu	6262116716	2022-11-29	2023-11-29
UXA Signal Analyzer	N9040B	Keysight	US57212216	2022-11-29	2023-11-29
Power divider	K240C	Anritsu	2143005	2023-03-13	2024-03-13
UXA Signal Analyzer	N9040B	Keysight	US57212216	2022-11-29	2023-11-29
SPECTRUM ANALYZER	MS2840A	Anritsu	MS2840A	2023-04-19	2024-04-19
Attenuator	A-4010.2902.2	ACE RF COMM	A-1	2023-04-17	2024-04-17
Power Meter	N1912A	Agilent	MY45100570	2022-11-28	2023-11-28
Power Sensor	A1921A	Agilent	MY45240427	2022-11-28	2023-11-28
TEST Receiver	ESCI7	ROHDE & SCHWARZ	100916	2023-06-12	2024-06-12
LOOP Antenna	HFH2-Z2	ROHDE & SCHWARZ	100188	2023-08-24	2024-08-24
Logbicon Antenna	VULB 9168	SCHWARZBECK	193	2022-12-09	2023-12-09
Turn Table	DT3000-2t	Innco System GmbH	N/A	-	-
Antenna Mast	MA4000-EP	Innco System GmbH	N/A	-	-
PREAMPLIFIER	8449B	HP	3008A00581	2023-06-12	2024-06-12
Horn Antenna	LB-42-15-C-SF	A-INFOMF	J2020079000055	2022-11-11	2023-11-11
Horn Antenna	BBHA9120D	SCHWARZBECK	469	2022-11-08	2023-11-08
TEST Receiver	ESU	ROHDE & SCHWARZ	100529	2023-06-12	2024-06-12
Turn Table	DT1500-S	Innco System GmbH	N/A	-	-
Antenna Mast	MA4000-EP	Innco System GmbH	N/A	-	-
Antenna Mast	SW-AM-EMF	SIWON	-	-	-
Antenna Master & Turn table controller	CO2000-P	Innco System GmbH	CO2000/642 /28051111/L	-	-
TEST Receiver	ESHS 30	Rohde & Schwarz	828765/002	2023-06-28	2024-06-28
Log-Periodic Antenna	UHALP9107	SCHWARZBECK	1562	2023-05-19	2024-05-19

Signal Generator	SMB 100A	ROHDE & SCHWARZ	177653	2022-11-29	2023-11-29
Horn Antenna	BBHA 9170	SCHWARZBECK	732	2023-06-15	2024-06-15
AMPLIFER	TK-PA1840H	TESTEK	N/A	2023-06-15	2024-06-15
DC Power supply	AK3010	VUPOWER	01020516	2022-11-28	2023-11-28
DC Power supply	HMP2020	ROHDE & SCHWARZ	120957	2023-08-18	2024-08-18
Temp./Humidity Chamber	SH-642	ESPEC	93016326	2022-11-28	2023-11-28
Radio Communication Test Station	MT8000A	Anritsu	6272354124	2023-10-17	2024-10-17
Radio Communication Analyzer	MT8821C	Anritsu	6272348668	2022-11-29	2023-11-29

## 6. Summary of Test Results

Test Description	FCC Part Section(s)	ISED Part Section(s)	Test Limit	Test Condition	Test Result
Conducted Output Power	2.1046		N/A	Conducted	<b>C</b>
Occupied Bandwidth	2.1049	RSS-Gen[6.7]	N/A		<b>C</b>
Peak to Average Ratio	24.232(d) 27.50(c) 27.50(d.5)	RSS-130 [4.6] RSS-132 [5.4] RSS-133 [6.4] RSS-139 [5.5]	< 13 dB		<b>C</b>
Band Edge / Conducted Spurious Emissions	2.1051 22.917(a) 24.238(a) 27.53(g) 27.53(h)	RSS-130 [4.7] RSS-132 [5.5] RSS-133 [6.5] RSS-139 [5.6]	> 43 + 10log10 (P) dB at Band edge and for all out-of-band emissions		<b>C</b>
Frequency Stability	2.1055 22.355 24.235 27.54 90.539(e)	RSS-130 [4.5] RSS-132 [5.3] RSS-133 [6.3] RSS-139 [5.4] RSS-140 [4.2]	Refer to section 3.7 of this report.		<b>C</b>
Radiated Output Power (B2)	24.232(c)	RSS-133 [6.4]	For mobile equipment: < 2 Watts max. EIRP	Radiated	<b>C Note2</b>
Radiated Output Power (B5)	22.913(a.5)	RSS-132 [5.4]	For mobile equipment: < 7 Watts max. EIRP		
Radiated Output Power (B7)	27.50(h)	RSS-132 [5.4]	For mobile equipment: < 2 Watts max. EIRP		
Radiated Output Power (B 12)	27.50(c.9)	RSS-130 [4.6]	For mobile equipment: < 3 Watts max. ERP		<b>C Note2</b>
Radiated Output Power (B66(4))	27.50(d.4)	RSS-139 [5.5]	For mobile equipment: < 1 Watts max. EIRP		<b>C Note2</b>
Undesirable Emissions	2.1053 22.917(a) 24.238(a) 27.53(g) 27.53(h) 90.543(e)	RSS-130 [4.7] RSS-132 [5.5] RSS-133 [6.5] RSS-139 [5.6] RSS-140 [4.4]	> 43 + 10log10 (P) dB for all out-of-band emissions		<b>C Note2</b>

Note 1: **C**=Comply **NC**=Not Comply **NT**=Not Tested **NA**=Not Applicable

Note 2: This test item was performed in three orthogonal EUT positions and the worst case data was reported. This device has the antenna switch that allows for radiated transmission from one of two antennas for the LTE FDD Band. Radiated emissions were performed on both antenna and the worst case data was reported.



## 7 SAMPLE CALCULATION

LTE Band 66(4) (QPSK)  
Emission Designator = 18M9G7D  
OBW = 18.87 MHz  
G = Phase Modulation  
7 = Quantized/Digital Info  
D = Data Transmission

LTE Band 66(4) (16QAM)  
Emission Designator = 18M8W7D  
OBW = 18.75 MHz  
W = Amplitude/Angle Modulated  
7 = Quantized/Digital Info  
D = Data Transmission

LTE Band 66(4) (64QAM)  
Emission Designator = 18M7W7D  
OBW = 18.69 MHz  
W = Amplitude/Angle Modulated  
7 = Quantized/Digital Info  
D = Data Transmission

LTE Band 66(4)(256QAM)  
Emission Designator = 18M7W7D  
OBW = 18.69 MHz  
W = Amplitude/Angle Modulated  
7 = Quantized/Digital Info  
D = Data Transmission

For substitution method

- 1) The EUT was placed on a turntable with 0.8 meter height for frequency below 1GHz and 1.5 meter height for frequency above 1 GHz respectively above ground.
- 2) The EUT was set 3 meters from the receiving antenna mounted on the antenna tower.
- 3) During the test, the turn table is rotated until the maximum signal is found.
- 4) Record the field strength meter's level.
- 5) Replace the EUT with dipole/Horn antenna that is connected to a calibrated signal generator.
- 6) Increase the signal generator output till the field strength meter's level is equal to the item (4).
- 7) The gain of the cable and amplifier between the signal generator and terminals of substituted antenna is 46.92 dB at test frequency.
- 8) Record the level at substituted antenna terminal.
- 9) The result is calculated as below;

$EIRP(dBm) = LEVLE@ANTENNA\ TERMINAL + TX\ Antenna\ Gain\ (dBi)$

$ERP(dBm) = LEVLE@ANTENNA\ TERMINAL + TX\ Antenna\ Gain\ (dBd)$

Where,  $TX\ Antenna\ Gain\ (dBd) = TX\ Antenna\ Gain\ (dBi) - 2.15\ dB$

## TEST DATA

### 8.1 CONDUCTED OUTPUT POWER

- All modes of operation were investigated, and the worst-case configuration results are reported in this section

LTE Band 2

Conducted Power [dBm]									
B.W (MHz)	Frequency (MHz)	Modulation	1RB			MID RB			Full RB
			Low	Mid	High	Low	Mid	High	
20	1 860 (18700)	QPSK	23.28	23.18	23.17	22.25	22.23	22.25	22.23
		16QAM	22.54	22.41	22.45	21.30	21.25	21.27	21.22
		64QAM	21.55	21.50	21.15	20.31	20.34	20.30	20.25
		256QAM	18.45	18.55	18.52	18.35	18.31	18.30	18.36
	1 880 (18900)	QPSK	23.22	23.11	23.11	22.19	22.33	22.29	22.24
		16QAM	22.54	22.48	22.58	21.21	21.34	21.27	21.25
		64QAM	21.42	21.42	21.45	20.35	20.31	20.34	20.29
		256QAM	18.33	18.57	18.48	18.36	18.34	18.24	18.28
	1 900 (19100)	QPSK	22.75	22.70	22.62	21.79	21.87	21.84	21.84
		16QAM	22.12	22.22	22.00	20.79	20.85	20.81	20.85
		64QAM	21.11	20.84	20.91	19.84	19.83	19.87	19.85
		256QAM	18.15	17.99	18.12	17.85	17.95	17.92	17.87
15	1 857.5 (18675)	QPSK	22.87	22.93	22.95	22.04	22.05	22.01	21.99
		16QAM	22.29	22.29	22.27	21.05	21.05	21.01	21.08
		64QAM	21.34	21.29	20.90	20.01	20.07	20.08	20.02
		256QAM	18.26	18.24	18.22	18.11	18.11	18.05	18.04
	1 880 (18900)	QPSK	22.92	22.89	22.89	22.02	22.00	22.02	22.02
		16QAM	22.25	22.27	22.16	20.98	20.97	21.00	20.99
		64QAM	21.35	21.25	21.25	19.94	20.05	20.01	20.00
		256QAM	18.20	18.12	18.13	18.00	18.09	18.06	18.00
	1 902.5 (19125)	QPSK	22.99	22.85	22.93	21.99	21.99	22.01	21.95
		16QAM	22.20	22.27	22.22	20.97	20.94	21.04	21.05
		64QAM	21.00	21.23	21.21	20.07	20.02	20.03	20.02
		256QAM	18.21	18.28	18.21	18.02	18.02	19.98	18.01

10	1 855 (18650)	QPSK	23.09	23.04	22.97	22.03	22.07	22.09	22.07
		16QAM	22.36	22.16	22.22	21.02	21.12	21.11	21.11
		64QAM	21.48	21.24	21.06	20.01	20.08	20.06	20.08
		256QAM	18.44	18.26	18.29	18.06	18.07	18.05	18.06
	1 880 (18900)	QPSK	22.89	22.83	22.93	21.94	21.97	22.00	21.98
		16QAM	22.21	22.04	22.18	20.99	21.05	21.09	20.93
		64QAM	21.25	21.25	21.22	19.99	20.02	20.08	20.02
		256QAM	18.28	18.47	18.23	18.07	18.07	18.08	18.00
	1 905 (19150)	QPSK	23.09	22.89	23.08	21.98	22.02	22.00	22.03
		16QAM	22.24	22.20	22.31	21.03	21.01	21.07	21.01
		64QAM	21.03	21.01	21.25	20.02	20.02	20.00	20.00
		256QAM	18.46	18.18	18.32	18.03	18.03	18.03	18.07
5	1 852.5 (18625)	QPSK	22.94	23.14	22.94	22.01	22.05	22.08	21.97
		16QAM	22.30	22.37	22.28	21.00	21.11	21.05	21.05
		64QAM	21.32	21.45	21.29	20.06	20.16	20.05	20.06
		256QAM	18.30	18.65	18.24	18.06	18.14	18.12	18.06
	1 880 (18900)	QPSK	22.90	22.86	22.93	21.96	22.02	22.00	22.01
		16QAM	22.22	22.37	22.25	20.99	21.08	21.02	21.07
		64QAM	21.20	21.31	21.24	20.00	20.02	20.04	20.02
		256QAM	18.15	18.23	18.28	18.03	18.10	18.17	18.00
	1 907.5 (19175)	QPSK	22.84	22.91	22.92	21.93	22.01	22.00	21.96
		16QAM	22.21	22.22	22.25	21.00	21.08	21.06	20.96
		64QAM	21.28	21.30	21.20	20.07	20.08	20.06	20.05
		256QAM	18.11	18.32	18.13	18.05	18.15	18.04	18.01
3	1 851.5 (18615)	QPSK	22.87	22.85	22.88	21.96	22.01	22.00	21.97
		16QAM	22.37	22.39	22.12	20.93	21.06	21.05	21.02
		64QAM	21.36	21.30	21.14	20.04	20.06	20.05	19.98
		256QAM	18.31	18.55	18.23	18.08	18.06	18.07	17.99
	1 880 (18900)	QPSK	22.92	22.75	22.89	21.93	21.96	21.91	21.88
		16QAM	22.32	22.21	22.22	20.99	20.95	20.98	20.99
		64QAM	21.27	21.21	21.15	19.98	20.07	19.97	19.91
		256QAM	18.18	18.19	18.34	18.03	18.03	18.06	17.94
	1 908.5 (19185)	QPSK	22.87	22.84	22.86	21.91	21.95	21.92	21.93
		16QAM	22.42	22.24	22.30	20.99	20.89	20.99	20.95
		64QAM	21.32	21.28	21.25	19.99	19.97	19.92	19.99
		256QAM	18.34	18.25	18.15	18.04	18.08	18.00	18.10

1.4	1 850.7 (18607)	QPSK	22.72	22.87	22.73	22.75	22.76	22.76	21.73
		16QAM	22.31	22.24	22.15	22.04	22.01	22.08	21.06
		64QAM	21.13	21.22	21.08	21.08	21.07	21.12	19.94
		256QAM	18.31	18.30	18.15	18.12	18.16	18.06	18.14
	1 880 (18900)	QPSK	22.74	22.74	22.70	22.67	22.67	22.64	21.70
		16QAM	21.96	22.32	22.26	22.12	22.09	22.03	20.99
		64QAM	21.03	21.22	21.20	21.12	21.09	21.12	19.97
		256QAM	18.29	18.22	18.24	18.06	18.15	18.11	17.89
	1 909.3 (19193)	QPSK	22.67	22.82	22.69	22.64	22.75	22.76	21.71
		16QAM	22.09	22.17	21.99	21.98	21.94	21.86	20.92
		64QAM	20.99	20.99	21.11	20.98	20.96	20.95	19.97
		256QAM	18.05	18.11	18.12	18.03	18.03	18.01	17.89

Band 5

Conducted Power [dBm]									
B.W (MHz)	Frequency (MHz)	Modulation	1RB			MID RB			Full RB
10	829 (20450)	QPSK	23.18	23.10	23.10	22.26	22.21	22.28	22.29
		16QAM	22.69	22.41	22.52	21.26	21.24	21.29	21.32
		64QAM	21.68	21.52	21.46	20.28	20.28	20.28	20.30
		256QAM	18.59	18.41	18.53	18.26	18.27	18.29	18.25
	836.5 (20525)	QPSK	23.15	23.05	23.11	22.25	22.19	22.15	22.20
		16QAM	22.66	22.42	22.49	21.27	21.25	21.19	21.19
		64QAM	21.68	21.45	21.48	20.22	20.22	20.25	20.23
		256QAM	18.57	18.41	18.44	18.28	18.24	18.19	18.26
	844 (20600)	QPSK	23.06	22.90	22.91	22.14	22.09	22.10	22.09
		16QAM	22.59	22.28	22.31	21.14	21.06	21.14	21.13
		64QAM	21.55	21.33	21.35	20.08	20.12	20.09	20.16
		256QAM	18.51	18.28	18.31	18.15	18.18	18.19	18.16
5	826.5 (20425)	QPSK	23.28	23.11	23.14	22.27	22.24	22.21	22.32
		16QAM	22.69	22.42	22.58	21.37	21.32	21.30	21.38
		64QAM	21.73	21.48	21.69	20.43	20.36	20.32	20.31
		256QAM	18.77	18.49	18.69	18.36	18.38	18.32	18.34
	836.5 (20525)	QPSK	23.24	23.12	23.24	22.26	22.27	22.26	22.26
		16QAM	22.74	22.41	22.66	21.29	21.28	21.29	21.29
		64QAM	21.80	21.54	21.79	20.39	20.38	20.31	20.33
		256QAM	18.71	18.40	18.68	18.30	18.37	18.30	18.33
	846.5 (20625)	QPSK	23.12	23.00	22.98	22.09	22.11	22.15	22.14
		16QAM	22.63	22.50	22.52	21.15	21.13	21.12	21.19
		64QAM	21.62	21.50	21.58	20.11	20.15	20.11	20.19
		256QAM	18.61	18.53	18.57	18.15	18.17	18.20	18.11

Conducted Power [dBm]									
B.W (MHz)	Frequency (MHz)	Modulation	1RB			MID RB			Full RB
3	825.5 (20415)	QPSK	23.24	23.08	23.12	22.24	22.19	22.16	22.17
		16QAM	22.50	22.42	22.44	21.33	21.29	21.23	21.20
		64QAM	21.60	21.50	21.55	20.36	20.35	20.29	20.31
		256QAM	18.56	18.43	18.49	18.28	18.25	18.29	18.28
	836.5 (20525)	QPSK	23.19	23.15	23.12	22.15	22.19	22.15	22.19
		16QAM	22.44	22.41	22.40	21.17	21.19	21.24	21.29
		64QAM	21.58	21.47	21.51	20.25	20.27	20.28	20.26
		256QAM	18.48	18.40	18.47	18.20	18.24	18.24	18.28
	847.5 (20635)	QPSK	23.04	22.92	22.93	22.09	22.05	22.00	22.09
		16QAM	22.35	22.39	22.34	21.09	21.11	21.05	21.09
		64QAM	21.49	21.38	21.35	20.11	20.14	20.00	20.03
		256QAM	18.36	18.30	18.31	18.15	18.10	18.09	18.08
1.4	824.7 (20407)	QPSK	23.12	23.20	23.17	23.21	23.21	23.15	22.27
		16QAM	22.53	22.52	22.51	22.50	22.45	22.48	21.45
		64QAM	21.53	21.55	21.53	21.52	21.50	21.47	20.40
		256QAM	18.44	18.47	18.46	18.52	18.45	18.42	18.38
	836.5 (20525)	QPSK	23.01	23.12	23.12	23.16	23.17	23.14	22.23
		16QAM	22.44	22.51	22.54	22.42	22.44	22.41	21.35
		64QAM	21.44	21.45	21.51	21.38	21.39	21.38	20.41
		256QAM	18.40	18.37	18.44	18.47	18.42	18.47	18.35
	848.3 (20643)	QPSK	23.00	23.08	23.08	23.08	23.11	23.05	22.15
		16QAM	22.50	22.50	22.49	22.31	22.35	22.37	21.24
		64QAM	21.46	21.44	21.40	21.40	21.38	21.37	20.23
		256QAM	18.43	18.45	18.48	18.38	18.41	18.50	18.18

Band 7

Conducted Power [dBm]									
B.W (MHz)	Frequency (MHz)	Modulation	1RB			MID RB			Full RB
20	2 510 (20850)	QPSK	23.49	23.18	23.23	22.43	22.48	22.45	22.43
		16QAM	22.91	22.58	22.86	21.47	21.43	21.49	21.43
		64QAM	21.55	21.35	21.91	20.49	20.48	20.49	20.47
		256QAM	18.92	18.58	18.85	18.51	18.52	18.46	18.52
	2 535 (21100)	QPSK	23.49	23.29	23.69	22.57	22.54	22.56	22.58
		16QAM	23.01	22.78	23.05	21.54	21.59	21.62	21.68
		64QAM	22.02	21.97	22.09	20.53	20.55	20.64	20.68
		256QAM	18.98	18.83	19.05	18.55	18.53	18.63	18.67
	2 560 (21350)	QPSK	23.66	23.28	23.18	22.69	22.62	22.65	22.65
		16QAM	23.11	22.84	22.64	21.68	21.65	21.62	21.63
		64QAM	22.21	21.72	20.76	20.67	20.56	19.96	20.51
		256QAM	19.02	18.88	19.11	18.67	18.64	18.66	18.64
15	2 507.5 (20825)	QPSK	23.63	23.49	23.40	22.69	22.83	22.77	22.76
		16QAM	23.03	22.92	22.84	21.76	21.83	21.71	21.79
		64QAM	21.50	21.55	21.79	20.74	20.78	20.70	20.79
		256QAM	18.90	18.99	19.01	18.77	18.81	18.81	18.79
	2 535 (21100)	QPSK	23.29	23.25	23.34	22.53	22.58	22.53	22.54
		16QAM	22.76	22.72	22.80	21.54	21.51	21.59	21.48
		64QAM	21.85	21.90	21.98	20.52	20.57	20.52	20.59
		256QAM	18.78	18.79	18.80	18.50	18.56	18.55	18.53
	2 562.5 (21375)	QPSK	23.11	23.15	22.88	22.39	22.43	22.41	22.40
		16QAM	22.65	22.68	22.24	21.42	21.45	21.45	21.44
		64QAM	21.76	21.33	20.23	20.47	20.07	19.58	19.98
		256QAM	18.55	18.54	18.51	18.44	18.47	18.48	18.43

Conducted Power [dBm]									
B.W (MHz)	Frequency (MHz)	Modulation	1RB			MID RB			Full RB
10	2 505 (20800)	QPSK	23.47	23.55	23.59	22.77	22.79	22.78	22.74
		16QAM	23.04	23.12	23.15	21.87	21.77	21.73	21.75
		64QAM	21.85	21.93	22.00	20.88	20.81	20.83	20.86
		256QAM	19.07	19.05	19.17	18.87	18.79	18.75	18.81
	2 535 (21100)	QPSK	23.30	23.34	23.45	22.50	22.48	22.51	22.53
		16QAM	22.84	22.82	22.83	21.58	21.59	21.63	21.55
		64QAM	21.84	21.82	21.95	20.59	20.59	20.61	20.57
		256QAM	18.76	18.71	18.83	18.56	18.58	18.53	18.55
	2 565 (21400)	QPSK	23.29	23.35	22.96	22.39	22.47	22.37	22.36
		16QAM	22.78	22.79	22.17	21.43	21.42	21.45	21.47
		64QAM	21.80	21.19	20.43	20.07	19.74	19.52	19.74
		256QAM	18.83	18.74	18.76	18.44	18.55	18.47	18.47
5	2 502.5 (20775)	QPSK	23.61	23.42	23.68	22.83	22.73	22.79	22.73.
		16QAM	23.02	23.00	23.27	21.83	21.84	21.79	21.77
		64QAM	22.03	21.85	22.08	20.86	20.79	20.86	20.76
		256QAM	19.26	19.15	19.34	18.84	18.79	18.78	18.72
	2 535 (21100)	QPSK	23.34	23.29	23.39	22.51	22.44	22.46	22.49
		16QAM	22.88	22.79	22.94	21.59	21.48	21.54	21.44
		64QAM	21.94	21.90	22.10	20.53	20.45	20.59	20.50
		256QAM	18.85	18.85	19.00	18.50	18.41	18.56	18.47
	2 567.5 (21425)	QPSK	23.34	23.12	22.98	22.41	22.34	22.31	22.35
		16QAM	22.79	22.59	22.39	21.40	21.37	21.37	21.39
		64QAM	21.35	20.74	20.56	19.68	19.53	19.49	19.42
		256QAM	18.83	18.62	18.80	18.47	18.36	18.41	18.49



Band 12

Conducted Power [dBm]									
B.W (MHz)	Frequency (MHz)	Modulation	1RB			MID RB			Full RB
10	704 (23060)	QPSK	23.24	23.27	23.31	22.35	22.37	22.36	22.37
		16QAM	22.68	22.62	22.69	21.36	21.37	21.35	21.44
		64QAM	21.66	21.66	21.59	20.33	20.38	20.32	20.45
		256QAM	18.51	18.51	18.62	18.38	18.31	18.34	18.44
	707.5 (23095)	QPSK	23.32	23.29	23.20	22.34	22.37	22.35	22.39
		16QAM	22.68	22.60	22.66	21.37	21.35	21.38	21.35
		64QAM	21.64	21.65	21.67	20.36	20.39	20.35	20.36
		256QAM	18.50	18.57	18.64	18.32	18.35	18.35	18.41
	711 (23130)	QPSK	23.38	23.29	23.22	22.41	22.39	22.33	22.40
		16QAM	22.68	22.61	22.67	21.37	21.35	21.35	21.39
		64QAM	21.68	21.56	21.56	20.44	20.36	20.34	20.38
		256QAM	18.60	18.62	18.71	18.42	18.34	18.36	18.36
5	701.5 (23035)	QPSK	23.22	23.20	23.15	22.26	22.33	22.30	22.29
		16QAM	22.56	22.58	22.58	21.42	21.39	21.35	21.34
		64QAM	21.51	21.51	21.58	20.31	20.42	20.35	20.33
		256QAM	18.42	18.57	18.58	18.30	18.35	18.33	18.31
	707.5 (23095)	QPSK	23.25	23.28	23.25	22.35	22.43	22.32	22.37
		16QAM	22.54	22.62	22.54	21.38	21.38	21.36	21.43
		64QAM	21.55	21.56	21.66	20.45	20.46	20.34	20.41
		256QAM	18.47	18.55	18.56	18.44	18.46	18.33	18.42
	713.5 (23155)	QPSK	23.26	23.22	23.20	22.36	22.29	22.30	22.29
		16QAM	22.50	22.58	22.56	21.35	21.36	21.37	21.33
		64QAM	21.51	21.54	21.53	20.36	20.38	20.35	20.35
		256QAM	18.50	18.52	18.57	18.39	18.38	18.32	18.37

Conducted Power [dBm]									
B.W (MHz)	Frequency (MHz)	Modulation	1RB			MID RB			Full RB
3	700.5 (23025)	QPSK	23.17	23.15	23.18	22.26	22.23	22.27	22.27
		16QAM	22.48	22.53	22.55	23.30	21.32	21.31	21.33
		64QAM	21.55	21.49	21.60	20.31	20.42	20.33	20.37
		256QAM	18.48	18.45	18.57	18.31	18.32	18.29	18.36
	707.5 (23095)	QPSK	23.29	23.22	23.19	22.25	22.38	22.30	22.31
		16QAM	22.58	22.58	22.48	21.38	21.41	21.35	21.35
		64QAM	21.55	21.51	21.49	20.37	20.42	20.38	20.40
		256QAM	18.49	18.55	18.50	18.32	18.43	18.39	18.39
	714.5 (23165)	QPSK	23.23	23.22	23.18	22.29	22.32	22.23	22.25
		16QAM	22.48	22.60	22.59	21.36	21.41	21.29	21.40
		64QAM	21.53	21.44	21.41	20.36	20.37	20.29	20.35
		256QAM	18.60	18.51	18.46	18.32	18.44	18.35	18.37
1.4	699.7 (23017)	QPSK	23.06	23.15	23.02	23.16	23.16	23.06	22.19
		16QAM	22.50	22.56	22.38	22.38	22.48	22.35	21.22
		64QAM	21.50	21.55	21.41	21.37	21.44	21.25	20.27
		256QAM	18.28	18.41	18.38	18.35	18.24	18.41	18.14
	707.5 (23095)	QPSK	23.13	23.17	23.17	23.13	23.22	23.21	22.27
		16QAM	22.54	22.51	22.43	22.48	22.52	22.46	21.45
		64QAM	21.61	21.45	21.58	21.48	21.48	21.35	20.44
		256QAM	18.56	18.54	18.51	18.38	18.43	18.43	18.43
	715.3 (23173)	QPSK	23.10	23.20	23.13	23.14	23.22	23.12	22.25
		16QAM	22.51	22.66	22.50	22.54	22.40	22.44	21.27
		64QAM	21.45	21.47	21.19	21.40	21.45	21.47	20.33
		256QAM	18.48	18.38	18.39	18.42	18.55	18.45	18.25

Band 66(4)

Conducted Power [dBm]									
B.W (MHz)	Frequency (MHz)	Modulation	1RB			MID RB			Full RB
20	1 720 (132072)	QPSK	23.19	23.25	23.33	22.24	22.39	22.45	22.34
		16QAM	22.57	22.52	22.62	21.24	21.40	21.45	21.38
		64QAM	21.50	21.53	21.60	20.28	20.40	20.42	20.34
		256QAM	18.54	18.50	18.57	18.23	18.40	18.42	18.37
	1 745 (132322)	QPSK	23.34	23.36	23.43	22.41	22.41	22.47	22.41
		16QAM	22.59	22.52	22.61	21.39	21.41	21.47	21.40
		64QAM	21.53	21.46	21.55	20.37	20.41	20.41	20.41
		256QAM	18.61	18.62	18.59	18.34	18.43	18.47	18.38
	1 770 (132572)	QPSK	23.26	23.29	23.29	22.39	22.43	22.39	22.42
		16QAM	22.52	22.53	22.58	21.44	21.47	21.40	21.50
		64QAM	21.52	21.53	21.56	20.44	20.47	20.46	20.46
		256QAM	18.62	18.65	18.54	18.38	18.46	18.40	18.46
15	1 717.5 (132047)	QPSK	23.24	23.28	23.45	22.32	22.32	22.39	22.39
		16QAM	22.45	22.43	22.56	21.31	21.38	21.35	21.36
		64QAM	21.41	21.51	21.57	20.32	20.41	20.39	20.37
		256QAM	18.38	18.40	18.62	18.33	18.43	18.38	18.38
	1 745 (132322)	QPSK	23.38	23.45	23.47	22.44	22.43	22.36	22.41
		16QAM	22.55	22.58	22.64	21.38	21.47	21.45	21.46
		64QAM	21.55	21.56	21.57	20.50	20.44	20.46	20.42
		256QAM	18.43	18.56	18.63	18.44	18.45	18.48	18.44
	1 772.5 (132597)	QPSK	23.31	23.33	23.28	22.39	22.44	22.37	22.43
		16QAM	22.56	22.53	22.56	21.47	21.45	21.42	21.40
		64QAM	21.54	21.55	21.58	20.42	20.51	20.45	20.40
		256QAM	18.51	18.52	18.50	18.48	18.45	18.39	18.41

Conducted Power [dBm]									
B.W (MHz)	Frequency (MHz)	Modulation	1RB			MID RB			Full RB
10	1 715 (132022)	QPSK	23.08	23.18	23.24	22.32	22.35	22.34	22.34
		16QAM	22.51	22.54	22.51	21.36	21.37	21.38	21.36
		64QAM	21.54	21.46	20.47	20.35	20.38	20.39	20.37
		256QAM	18.51	18.50	18.54	18.39	18.40	18.36	18.34
	1 745 (132322)	QPSK	23.43	23.44	23.38	22.37	22.40	22.39	22.42
		16QAM	22.55	22.60	22.63	21.39	21.40	21.42	21.43
		64QAM	21.46	21.49	21.49	20.39	20.41	20.36	20.43
		256QAM	18.56	18.49	18.53	18.41	18.49	18.47	18.42
	1 775 (132622)	QPSK	23.34	23.21	23.25	22.38	22.38	22.41	22.39
		16QAM	22.50	22.52	22.54	21.42	21.39	21.41	21.45
		64QAM	21.60	21.57	21.57	20.37	20.42	20.39	20.47
		256QAM	18.54	18.53	18.46	18.44	18.39	18.32	18.38
5	1 712.5 (131997)	QPSK	23.18	23.26	23.19	22.36	22.37	22.35	22.37
		16QAM	22.50	22.57	22.57	21.39	21.44	21.45	21.39
		64QAM	21.57	21.50	21.62	20.47	20.47	20.41	20.41
		256QAM	18.46	18.50	18.58	18.46	18.46	18.41	18.40
	1 745 (132322)	QPSK	23.35	23.48	23.32	22.49	22.50	22.45	22.43
		16QAM	22.52	22.64	22.66	21.45	21.53	21.51	21.48
		64QAM	21.58	21.55	21.56	20.50	20.52	20.51	20.47
		256QAM	18.56	18.64	18.56	18.50	18.58	18.46	18.45
	1 777.5 (132647)	QPSK	23.21	23.31	23.25	22.43	22.41	22.42	22.37
		16QAM	22.54	22.51	22.53	21.44	21.44	21.52	21.39
		64QAM	21.53	21.60	21.51	20.52	20.47	20.43	20.49
		256QAM	18.53	18.54	18.47	18.50	18.50	18.43	18.42

Conducted Power [dBm]									
B.W (MHz)	Frequency (MHz)	Modulation	1RB			MID RB			Full RB
3	1 711.5 (131987)	QPSK	23.24	23.25	23.25	22.34	22.37	22.32	18.42
		16QAM	22.53	22.49	22.43	21.42	21.35	21.40	21.43
		64QAM	21.45	21.50	21.47	20.41	20.44	20.44	20.36
		256QAM	18.39	18.44	18.50	18.41	18.45	18.49	18.35
	1 745 (132322)	QPSK	23.44	23.50	23.45	22.51	22.52	22.44	22.44
		16QAM	22.51	22.50	22.59	21.55	21.58	21.43	21.52
		64QAM	21.45	21.51	21.60	20.59	20.65	20.49	20.50
		256QAM	18.54	18.54	18.48	18.52	18.58	18.44	18.50
	1 778.5 (132657)	QPSK	23.30	23.31	23.27	22.43	22.50	22.40	22.40
		16QAM	22.52	22.52	22.56	21.46	21.62	21.43	21.41
		64QAM	21.45	21.56	21.59	20.46	20.53	20.48	20.41
		256QAM	18.54	18.55	18.53	18.47	18.49	18.41	18.53
1.4	1 710.7 (131979)	QPSK	23.13	23.11	23.11	23.07	23.22	23.13	22.18
		16QAM	22.38	22.46	22.53	22.33	22.34	22.26	21.32
		64QAM	21.31	21.44	21.46	21.29	21.28	21.41	20.28
		256QAM	18.40	18.45	18.50	18.37	18.37	18.38	18.27
	1 745 (132322)	QPSK	23.31	23.26	23.23	23.26	23.24	23.32	22.37
		16QAM	22.57	22.60	22.59	22.59	22.56	22.50	21.51
		64QAM	21.64	21.53	21.55	21.56	21.48	21.43	20.54
		256QAM	18.57	18.57	18.64	18.55	18.57	18.46	18.39
	1 779.3 (132665)	QPSK	23.19	23.23	23.10	23.12	23.29	23.22	22.26
		16QAM	22.42	22.46	22.45	22.42	22.46	22.37	21.47
		64QAM	21.54	21.66	21.61	21.48	21.50	21.43	20.25
		256QAM	18.42	18.46	18.44	18.48	18.42	18.40	18.42

### 8.2 EFFECTIVE RADIATED POWER

#### LTE BAND 2

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBi)	EIRP (dBm)	EIRP (W)
20	1 860 (18700)	QPSK	1/99	H	15.34	10.26	25.60	0.363
		16QAM	1/99	H	14.67	10.26	24.93	0.311
		64QAM	1/99	H	13.42	10.26	23.68	0.233
		256QAM	1/99	H	10.90	10.26	21.16	0.131
	1 880 (18900)	QPSK	1/50	H	14.21	10.28	24.49	0.281
		16QAM	1/50	H	13.58	10.28	23.86	0.243
		64QAM	1/50	H	12.55	10.28	22.83	0.192
		256QAM	1/50	H	10.03	10.28	20.31	0.107
	1 900 (19100)	QPSK	1/50	H	15.23	10.30	25.53	0.357
		16QAM	1/50	H	14.96	10.30	25.26	0.336
		64QAM	1/50	H	13.94	10.30	24.24	0.265
		256QAM	1/50	H	11.17	10.30	21.47	0.140
15	1 857.5 (18675)	QPSK	1/36	H	15.64	10.25	25.89	0.388
		16QAM	1/36	H	15.06	10.25	25.31	0.340
		64QAM	1/36	H	13.97	10.25	24.22	0.264
		256QAM	1/36	H	11.43	10.25	21.68	0.147
	1 880 (18900)	QPSK	1/0	H	14.94	10.28	25.22	0.333
		16QAM	1/0	H	14.31	10.28	24.59	0.288
		64QAM	1/0	H	13.19	10.28	23.47	0.222
		256QAM	1/0	H	10.67	10.28	20.95	0.124
	1 902.5 (19125)	QPSK	1/74	H	15.84	10.30	26.14	0.411
		16QAM	1/74	H	15.11	10.30	25.41	0.348
		64QAM	1/74	H	13.99	10.30	24.29	0.269
		256QAM	1/74	H	11.44	10.30	21.74	0.149

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBi)	EIRP (dBm)	EIRP (W)
10	1 855 (18650)	QPSK	1/49	H	15.07	10.25	25.32	0.340
		16QAM	1/49	H	14.28	10.25	24.53	0.284
		64QAM	1/49	H	13.21	10.25	23.46	0.222
		256QAM	1/49	H	10.70	10.25	20.95	0.124
	1 880 (18900)	QPSK	1/0	H	15.09	10.28	25.37	0.344
		16QAM	1/0	H	14.14	10.28	24.42	0.277
		64QAM	1/0	H	13.23	10.28	23.51	0.224
		256QAM	1/0	H	10.67	10.28	20.95	0.124
	1 905 (19150)	QPSK	1/0	H	15.87	10.30	26.17	0.414
		16QAM	1/0	H	15.41	10.30	25.71	0.372
		64QAM	1/0	H	13.74	10.30	24.04	0.254
		256QAM	1/0	H	11.20	10.30	21.50	0.141
5	1 852.5 (18625)	QPSK	1/24	H	15.47	10.25	25.72	0.373
		16QAM	1/24	H	14.74	10.25	24.99	0.316
		64QAM	1/24	H	13.59	10.25	23.84	0.242
		256QAM	1/24	H	11.06	10.25	21.31	0.135
	1 880 (18900)	QPSK	1/12	H	14.56	10.28	24.84	0.305
		16QAM	1/12	H	13.82	10.28	24.10	0.257
		64QAM	1/12	H	12.74	10.28	23.02	0.200
		256QAM	1/12	H	10.22	10.28	20.50	0.112
	1 907.5 (19175)	QPSK	1/24	H	15.92	10.30	26.22	0.419
		16QAM	1/24	H	15.26	10.30	25.56	0.360
		64QAM	1/24	H	14.14	10.30	24.44	0.278
		256QAM	1/24	H	11.57	10.30	21.87	0.154

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBi)	EIRP (dBm)	EIRP (W)
3	1 851.5 (18615)	QPSK	1/14	H	14.86	10.25	25.11	0.324
		16QAM	1/14	H	14.22	10.25	24.47	0.280
		64QAM	1/14	H	13.00	10.25	23.25	0.211
		256QAM	1/14	H	10.49	10.25	20.74	0.119
	1 880 (18900)	QPSK	1/14	H	14.38	10.28	24.66	0.292
		16QAM	1/14	H	13.71	10.28	23.99	0.251
		64QAM	1/14	H	12.54	10.28	22.82	0.191
		256QAM	1/14	H	10.02	10.28	20.30	0.107
	1 908.5 (19185)	QPSK	1/14	H	13.97	10.30	24.27	0.267
		16QAM	1/14	H	13.45	10.30	23.75	0.237
		64QAM	1/14	H	12.19	10.30	22.49	0.177
		256QAM	1/14	H	9.69	10.30	19.99	0.100
1.4	1 850.7 (18607)	QPSK	1/0	H	14.78	10.25	25.03	0.318
		16QAM	1/0	H	14.00	10.25	24.25	0.266
		64QAM	1/0	H	12.65	10.25	22.90	0.195
		256QAM	1/0	H	10.13	10.25	20.38	0.109
	1 880 (18900)	QPSK	1/5	H	14.20	10.28	24.48	0.281
		16QAM	1/5	H	13.39	10.28	23.67	0.233
		64QAM	1/5	H	12.33	10.28	22.61	0.182
		256QAM	1/5	H	9.81	10.28	20.09	0.102
	1 909.3 (19193)	QPSK	1/3	H	13.66	10.30	23.96	0.249
		16QAM	1/3	H	13.13	10.30	23.43	0.220
		64QAM	1/3	H	11.97	10.30	22.27	0.169
		256QAM	1/3	H	9.47	10.30	19.77	0.095



## LTE BAND 5

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBi)	EIRP (dBm)	EIRP (W)
10	829 (20450)	QPSK	1/49	H	16.53	5.07	21.60	0.145
		16QAM	1/49	H	15.81	5.07	20.88	0.122
		64QAM	1/49	H	14.77	5.07	19.84	0.096
		256QAM	1/49	H	11.94	5.07	17.01	0.050
	836.5 (20525)	QPSK	1/49	H	16.53	5.03	21.56	0.143
		16QAM	1/49	H	15.77	5.03	20.80	0.120
		64QAM	1/49	H	14.76	5.03	19.79	0.095
		256QAM	1/49	H	11.67	5.03	16.70	0.047
	844 (20600)	QPSK	1/25	H	15.98	4.80	20.78	0.120
		16QAM	1/25	H	15.23	4.80	20.03	0.101
		64QAM	1/25	H	14.19	4.80	18.99	0.079
		256QAM	1/25	H	11.12	4.80	15.92	0.039
5	826.5 (20425)	QPSK	1/12	H	16.93	4.99	21.92	0.156
		16QAM	1/12	H	16.25	4.99	21.24	0.133
		64QAM	1/12	H	15.26	4.99	20.25	0.106
		256QAM	1/12	H	12.44	4.99	17.43	0.055
	836.5 (20525)	QPSK	1/12	H	16.70	5.03	21.73	0.149
		16QAM	1/12	H	16.01	5.03	21.04	0.127
		64QAM	1/12	H	14.63	5.03	19.66	0.092
		256QAM	1/12	H	12.02	5.03	17.05	0.051
	846.5 (20625)	QPSK	1/12	H	15.65	4.67	20.32	0.108
		16QAM	1/12	H	14.99	4.67	19.66	0.092
		64QAM	1/12	H	13.90	4.67	18.57	0.072
		256QAM	1/12	H	11.00	4.67	15.67	0.037

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBi)	EIRP (dBm)	EIRP (W)
3	825.5 (20415)	QPSK	1/7	H	16.53	4.96	21.49	0.141
		16QAM	1/7	H	15.78	4.96	20.74	0.119
		64QAM	1/7	H	14.84	4.96	19.80	0.095
		256QAM	1/7	H	11.97	4.96	16.93	0.049
	836.5 (20525)	QPSK	1/7	H	16.70	5.03	21.73	0.149
		16QAM	1/7	H	15.44	5.03	20.47	0.111
		64QAM	1/7	H	14.01	5.03	19.04	0.080
		256QAM	1/7	H	11.37	5.03	16.40	0.044
	847.5 (20635)	QPSK	1/7	H	16.93	4.62	21.55	0.143
		16QAM	1/7	H	15.91	4.62	20.53	0.113
		64QAM	1/7	H	15.08	4.62	19.70	0.093
		256QAM	1/7	H	12.97	4.62	17.59	0.057
1.4	824.7 (20407)	QPSK	1/0	H	17.26	4.94	22.20	0.166
		16QAM	1/0	H	16.57	4.94	21.51	0.142
		64QAM	1/0	H	15.57	4.94	20.51	0.112
		256QAM	1/5	H	12.70	4.94	17.64	0.058
	836.5 (20525)	QPSK	1/5	H	16.75	5.03	21.78	0.151
		16QAM	1/5	H	16.07	5.03	21.10	0.129
		64QAM	1/5	H	14.86	5.03	19.89	0.097
		256QAM	1/5	H	12.11	5.03	17.14	0.052
	848.3 (20643)	QPSK	1/3	H	16.13	4.58	20.71	0.118
		16QAM	1/3	H	15.43	4.58	20.01	0.100
		64QAM	1/3	H	14.43	4.58	19.01	0.080
		256QAM	1/3	H	11.51	4.58	16.09	0.041

## LTE BAND 7

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBi)	EIRP (dBm)	EIRP (W)
20	2 510 (20850)	QPSK	1/50	H	14.39	10.74	25.13	0.326
		16QAM	1/50	H	13.69	10.74	24.43	0.277
		64QAM	1/50	H	11.99	10.74	22.73	0.187
		256QAM	1/50	H	9.53	10.74	20.27	0.106
	2 535 (21100)	QPSK	1/50	H	14.09	10.84	24.93	0.311
		16QAM	1/50	H	13.34	10.84	24.18	0.262
		64QAM	1/50	H	12.29	10.84	23.13	0.206
		256QAM	1/50	H	9.12	10.84	19.96	0.099
	2 560 (21350)	QPSK	1/50	H	13.14	10.94	24.08	0.256
		16QAM	1/50	H	12.26	10.94	23.20	0.209
		64QAM	1/50	H	12.00	10.94	22.94	0.197
		256QAM	1/50	H	9.13	10.94	20.07	0.102
15	2 507.5 (20825)	QPSK	1/36	H	13.66	10.73	24.39	0.275
		16QAM	1/36	H	12.94	10.73	23.67	0.233
		64QAM	1/36	H	11.34	10.73	22.07	0.161
		256QAM	1/36	H	8.86	10.73	19.59	0.091
	2 535 (21100)	QPSK	1/36	H	13.42	10.84	24.26	0.267
		16QAM	1/36	H	12.95	10.84	23.79	0.239
		64QAM	1/36	H	11.83	10.84	22.67	0.185
		256QAM	1/36	H	8.76	10.84	19.60	0.091
	2 562.5 (21375)	QPSK	1/0	H	10.01	10.95	20.96	0.125
		16QAM	1/0	H	12.34	10.95	23.29	0.213
		64QAM	1/0	H	11.06	10.95	22.01	0.159
		256QAM	1/0	H	8.18	10.95	19.13	0.082

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBi)	EIRP (dBm)	EIRP (W)
10	2 505 (20800)	QPSK	1/25	H	13.91	10.72	24.63	0.290
		16QAM	1/25	H	13.41	10.72	24.13	0.259
		64QAM	1/25	H	11.59	10.72	22.31	0.170
		256QAM	1/25	H	9.04	10.72	19.76	0.095
	2 535 (21100)	QPSK	1/25	H	13.84	10.84	24.68	0.294
		16QAM	1/25	H	13.25	10.84	24.09	0.256
		64QAM	1/25	H	12.08	10.84	22.92	0.196
		256QAM	1/25	H	9.00	10.84	19.84	0.096
	2 565 (21400)	QPSK	1/0	H	12.39	10.96	23.35	0.216
		16QAM	1/0	H	11.76	10.96	22.72	0.187
		64QAM	1/0	H	10.74	10.96	21.70	0.148
		256QAM	1/0	H	7.70	10.96	18.66	0.073
5	2 502.5 (20775)	QPSK	1/24	H	13.60	10.71	24.31	0.270
		16QAM	1/24	H	12.91	10.71	23.62	0.230
		64QAM	1/24	H	11.15	10.71	21.86	0.153
		256QAM	1/24	H	8.83	10.71	19.54	0.090
	2 535 (21100)	QPSK	1/24	H	13.55	10.84	24.39	0.275
		16QAM	1/24	H	12.91	10.84	23.75	0.237
		64QAM	1/24	H	11.84	10.84	22.68	0.185
		256QAM	1/24	H	8.78	10.84	19.62	0.092
	2 567.5 (21425)	QPSK	1/24	H	11.71	10.97	22.68	0.185
		16QAM	1/24	H	11.08	10.97	22.05	0.160
		64QAM	1/24	H	9.17	10.97	20.14	0.103
		256QAM	1/24	H	7.54	10.97	18.51	0.071

LTE BAND 12

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBi)	EIRP (dBm)	EIRP (W)
10	704 (23060)	QPSK	1/25	H	18.04	4.22	22.26	0.168
		16QAM	1/25	H	17.42	4.22	21.64	0.146
		64QAM	1/25	H	15.55	4.22	19.77	0.095
		256QAM	1/25	H	13.14	4.22	17.36	0.054
	707.5 (23095)	QPSK	1/49	H	16.07	4.32	20.39	0.109
		16QAM	1/49	H	15.55	4.32	19.87	0.097
		64QAM	1/49	H	14.23	4.32	18.55	0.072
		256QAM	1/49	H	11.13	4.32	15.45	0.035
	711 (23130)	QPSK	1/25	H	17.04	4.38	21.42	0.139
		16QAM	1/25	H	16.05	4.38	20.43	0.110
		64QAM	1/25	H	15.04	4.38	19.42	0.087
		256QAM	1/25	H	12.02	4.38	16.40	0.044
5	701.5 (23035)	QPSK	1/24	H	16.87	4.14	21.01	0.126
		16QAM	1/24	H	16.01	4.14	20.15	0.104
		64QAM	1/24	H	15.01	4.14	19.15	0.082
		256QAM	1/24	H	11.84	4.14	15.98	0.040
	707.5 (23095)	QPSK	1/24	H	17.63	4.32	21.95	0.157
		16QAM	1/24	H	16.78	4.32	21.10	0.129
		64QAM	1/24	H	15.63	4.32	19.95	0.099
		256QAM	1/24	H	12.41	4.32	16.73	0.047
	713.5 (23155)	QPSK	1/0	H	17.97	4.33	22.30	0.170
		16QAM	1/0	H	17.20	4.33	21.53	0.142
		64QAM	1/0	H	16.00	4.33	20.33	0.108
		256QAM	1/0	H	13.00	4.33	17.33	0.054

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBi)	EIRP (dBm)	EIRP (W)
3	700.5 (23025)	QPSK	1/12	H	15.53	4.11	19.64	0.092
		16QAM	1/12	H	14.67	4.11	18.78	0.076
		64QAM	1/12	H	13.46	4.11	17.57	0.057
		256QAM	1/12	H	10.39	4.11	14.50	0.028
	707.5 (23095)	QPSK	1/12	H	14.75	4.32	19.07	0.081
		16QAM	1/12	H	13.88	4.32	18.20	0.066
		64QAM	1/12	H	12.85	4.32	17.17	0.052
		256QAM	1/12	H	9.65	4.32	13.97	0.025
	714.5 (23165)	QPSK	1/12	H	13.93	4.31	18.24	0.067
		16QAM	1/12	H	13.06	4.31	17.37	0.055
		64QAM	1/12	H	11.15	4.31	15.46	0.035
		256QAM	1/12	H	9.34	4.31	13.65	0.023
1.4	699.7 (23017)	QPSK	1/3	H	13.84	4.08	17.92	0.062
		16QAM	1/3	H	13.00	4.08	17.08	0.051
		64QAM	1/3	H	11.87	4.08	15.95	0.039
		256QAM	1/3	H	8.70	4.08	12.78	0.019
	707.5 (23095)	QPSK	1/3	H	14.94	4.32	19.26	0.084
		16QAM	1/3	H	13.89	4.32	18.21	0.066
		64QAM	1/3	H	12.85	4.32	17.17	0.052
		256QAM	1/3	H	9.67	4.32	13.99	0.025
	715.3 (23173)	QPSK	1/3	H	14.36	4.29	18.65	0.073
		16QAM	1/3	H	13.46	4.29	17.75	0.060
		64QAM	1/3	H	11.44	4.29	15.73	0.037
		256QAM	1/3	H	9.90	4.29	14.19	0.026

LTE BAND 66(4)

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBi)	EIRP (dBm)	EIRP (W)
20	1 720 (132072)	QPSK	1/50	H	17.30	9.96	27.26	0.532
		16QAM	1/50	H	17.35	9.96	27.31	0.538
		64QAM	1/50	H	15.53	9.96	25.49	0.354
		256QAM	1/50	H	12.50	9.96	22.46	0.176
	1 745 (132322)	QPSK	1/50	H	17.13	10.03	27.16	0.520
		16QAM	1/50	H	16.44	10.03	26.47	0.444
		64QAM	1/50	H	15.42	10.03	25.45	0.351
		256QAM	1/50	H	12.46	10.03	22.49	0.177
	1 770 (132572)	QPSK	1/50	H	15.82	10.11	25.93	0.392
		16QAM	1/50	H	15.02	10.11	25.13	0.326
		64QAM	1/50	H	14.02	10.11	24.13	0.259
		256QAM	1/50	H	11.13	10.11	21.24	0.133
15	1 717.5 (132047)	QPSK	1/36	H	16.86	9.95	26.81	0.480
		16QAM	1/36	H	16.07	9.95	26.02	0.400
		64QAM	1/36	H	15.14	9.95	25.09	0.323
		256QAM	1/36	H	11.42	9.95	21.37	0.137
	1 745 (132322)	QPSK	1/36	H	17.10	10.03	27.13	0.516
		16QAM	1/36	H	16.43	10.03	26.46	0.443
		64QAM	1/36	H	15.51	10.03	25.54	0.358
		256QAM	1/36	H	12.45	10.03	22.48	0.177
	1 772.5 (132597)	QPSK	1/36	H	15.97	10.11	26.08	0.406
		16QAM	1/36	H	15.23	10.11	25.34	0.342
		64QAM	1/36	H	14.13	10.11	24.24	0.265
		256QAM	1/36	H	11.33	10.11	21.44	0.139

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBi)	EIRP (dBm)	EIRP (W)
10	1 715 (132022)	QPSK	1/25	H	15.97	9.94	25.91	0.390
		16QAM	1/25	H	15.32	9.94	25.26	0.336
		64QAM	1/25	H	14.26	9.94	24.20	0.263
		256QAM	1/25	H	11.22	9.94	21.16	0.131
	1 745 (132322)	QPSK	1/25	H	16.87	10.03	26.90	0.490
		16QAM	1/25	H	16.02	10.03	26.05	0.403
		64QAM	1/25	H	14.97	10.03	25.00	0.316
		256QAM	1/25	H	11.86	10.03	21.89	0.155
	1 775 (132622)	QPSK	1/25	H	15.56	10.12	25.68	0.370
		16QAM	1/25	H	14.86	10.12	24.98	0.315
		64QAM	1/25	H	13.73	10.12	23.85	0.243
		256QAM	1/25	H	11.64	10.12	21.76	0.150
5	1 712.5 (131997)	QPSK	1/12	H	16.14	9.93	26.07	0.405
		16QAM	1/12	H	15.06	9.93	24.99	0.316
		64QAM	1/12	H	13.87	9.93	23.80	0.240
		256QAM	1/12	H	10.91	9.93	20.84	0.121
	1 745 (132322)	QPSK	1/12	H	16.49	10.03	26.52	0.449
		16QAM	1/12	H	15.61	10.03	25.64	0.366
		64QAM	1/12	H	14.51	10.03	24.54	0.284
		256QAM	1/12	H	11.32	10.03	21.35	0.136
	1 777.5 (132647)	QPSK	1/12	H	15.31	10.13	25.44	0.350
		16QAM	1/12	H	14.37	10.13	24.50	0.282
		64QAM	1/12	H	13.22	10.13	23.35	0.216
		256QAM	1/12	H	10.20	10.13	20.33	0.108



Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBi)	EIRP (dBm)	EIRP (W)
3	1 711.5 (131987)	QPSK	1/7	H	15.44	9.93	25.37	0.344
		16QAM	1/7	H	14.54	9.93	24.47	0.280
		64QAM	1/7	H	13.35	9.93	23.28	0.213
		256QAM	1/7	H	10.33	9.93	20.26	0.106
	1 745 (132322)	QPSK	1/7	H	16.05	10.03	26.08	0.406
		16QAM	1/7	H	15.07	10.03	25.10	0.324
		64QAM	1/7	H	13.88	10.03	23.91	0.246
		256QAM	1/7	H	10.85	10.03	20.88	0.122
	1 778.5 (132657)	QPSK	1/7	H	15.28	10.13	25.41	0.348
		16QAM	1/7	H	14.37	10.13	24.50	0.282
		64QAM	1/7	H	13.19	10.13	23.32	0.215
		256QAM	1/7	H	10.07	10.13	20.20	0.105
1.4	1 710.7 (131979)	QPSK	1/3	H	14.18	9.93	24.11	0.258
		16QAM	1/3	H	13.28	9.93	23.21	0.209
		64QAM	1/3	H	12.12	9.93	22.05	0.160
		256QAM	1/3	H	9.12	9.93	19.05	0.080
	1 745 (132322)	QPSK	1/3	H	15.79	10.03	25.82	0.382
		16QAM	1/3	H	14.87	10.03	24.90	0.309
		64QAM	1/3	H	13.67	10.03	23.70	0.234
		256QAM	1/3	H	10.65	10.03	20.68	0.117
	1 779.3 (132665)	QPSK	1/3	H	14.73	10.13	24.86	0.306
		16QAM	1/3	H	13.78	10.13	23.91	0.246
		64QAM	1/3	H	12.65	10.13	22.78	0.190
		256QAM	1/3	H	9.71	10.13	19.84	0.096

### 8.3 RADIATED SPURIOUS EMISSIONS

#### LTE Band 2

Channel Bandwidth (MHz)	Frequency (MHz)	RB Size/ Offset	Test mode	Measured Frequency (MHz)	PoI (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBi)	Result (dBm)	Limit (dBm)	Margin (dB)		
15	1 857.5 (18675)	1/36	QPSK	3702.20	H	-51.52	12.79	-38.73	-13.00	25.73		
				5553.30	H	-45.22	13.55	-31.67	-13.00	18.67		
			16QAM	3702.23	H	-51.11	12.79	-38.32	-13.00	25.32		
				5553.35	H	-45.12	13.55	-31.57	-13.00	18.57		
			64QAM	3702.22	H	-50.65	12.79	-37.86	-13.00	24.86		
				5553.25	H	-44.65	13.55	-31.10	-13.00	18.10		
			256QAM	3702.16	H	-51.45	12.79	-38.66	-13.00	25.66		
				5553.30	H	-45.11	13.55	-31.56	-13.00	18.56		
			1 880 (18900)	1/0	QPSK	3746.72	H	-50.22	12.75	-37.47	-13.00	24.47
						5619.84	H	-44.65	13.59	-31.06	-13.00	18.06
					16QAM	3746.74	H	-50.11	12.75	-37.36	-13.00	24.36
						5619.90	H	-44.12	13.59	-30.53	-13.00	17.53
	64QAM	3746.80			H	-50.03	12.75	-37.28	-13.00	24.28		
		5619.78			H	-44.22	13.59	-30.63	-13.00	17.63		
	256QAM	3746.69	H	-48.22	12.75	-35.47	-13.00	22.47				
		5619.70	H	-43.22	13.59	-29.63	-13.00	16.63				
	1 902.5 (19125)	1/74	QPSK	3818.36	H	-52.24	12.70	-39.54	-13.00	26.54		
				5673.24	H	-45.11	13.56	-31.55	-13.00	18.55		
			16QAM	3782.24	H	-51.23	12.71	-38.52	-13.00	25.52		
				5673.28	H	-44.65	13.56	-31.09	-13.00	18.09		
			64QAM	3782.24	H	-50.49	12.71	-37.78	-13.00	24.78		
				5673.32	H	-44.65	13.56	-31.09	-13.00	18.09		
			256QAM	3782.20	H	-48.21	12.71	-35.50	-13.00	22.50		
				5673.32	H	-43.25	13.56	-29.69	-13.00	16.69		

LTE Band 5

Channel Bandwidth (MHz)	Frequency (MHz)	RB Size/ Offset	Test mode	Measured Frequency (MHz)	Pol (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBd)	Result (dBm)	Limit (dBm)	Margin (dB)
5	826.5 (20425)	1/12	QPSK	1654.80	H	-46.35	7.52	-38.83	-13.00	25.83
				2480.16	H	-35.22	8.51	-26.71	-13.00	13.71
				3306.19	H	-35.11	10.46	-24.65	-13.00	11.65
			16QAM	1654.42	H	-46.54	7.52	-39.02	-13.00	26.02
				2482.30	H	-35.21	8.51	-26.70	-13.00	13.70
				3306.88	H	-33.21	10.47	-22.74	-13.00	9.74
			64QAM	1654.18	H	-45.55	7.52	-38.03	-13.00	25.03
				2481.69	H	-35.13	8.51	-26.62	-13.00	13.62
				3308.17	H	-35.11	10.47	-24.64	-13.00	11.64
			256QAM	1653.81	H	-43.56	7.51	-36.05	-13.00	23.05
				2480.97	H	-36.21	8.51	-27.70	-13.00	14.70
				3307.15	H	-34.20	10.47	-23.73	-13.00	10.73
	836.5 (20525)	1/12	QPSK	1671.36	H	-47.54	7.60	-39.94	-13.00	26.94
				2508.50	H	-35.14	8.58	-26.56	-13.00	13.56
				3345.84	H	-34.56	10.58	-23.98	-13.00	10.98
			16QAM	1671.24	H	-47.57	7.60	-39.97	-13.00	26.97
				2508.86	H	-36.93	8.58	-28.35	-13.00	15.35
				3344.40	H	-34.55	10.58	-23.97	-13.00	10.97
			64QAM	1672.32	H	-46.54	7.61	-38.93	-13.00	25.93
				2507.74	H	-36.27	8.58	-27.69	-13.00	14.69
				3344.48	H	-34.22	10.58	-23.64	-13.00	10.64
			256QAM	1673.11	H	-45.78	7.61	-38.17	-13.00	25.17
				2509.45	H	-35.69	8.58	-27.11	-13.00	14.11
				3345.87	H	-34.17	10.58	-23.59	-13.00	10.59

Channel Bandwidth (MHz)	Frequency (MHz)	RB Size/ Offset	Test mode	Measured Frequency (MHz)	Pol (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBd)	Result (dBm)	Limit (dBm)	Margin (dB)
5	846.5 (20625)	1/12	QPSK	1693.12	H	-46.14	7.71	-38.43	-13.00	25.43
				2539.69	H	-35.13	8.70	-26.43	-13.00	13.43
				3385.96	H	-34.58	10.70	-23.88	-13.00	10.88
			16QAM	1693.45	H	-46.25	7.71	-38.54	-13.00	25.54
				2539.75	H	-35.98	8.70	-27.28	-13.00	14.28
				3385.93	H	-34.11	10.70	-23.41	-13.00	10.41
			64QAM	1693.75	H	-45.25	7.71	-37.54	-13.00	24.54
				2539.42	H	-35.14	8.70	-26.44	-13.00	13.44
				3385.85	H	-34.52	10.70	-23.82	-13.00	10.82
			256QAM	1693.68	H	-45.01	7.71	-37.30	-13.00	24.30
				2539.77	H	-35.39	8.70	-26.69	-13.00	13.69
				3385.89	H	-34.30	10.70	-23.60	-13.00	10.60

LTE Band 7

Channel Bandwidth (MHz)	Frequency (MHz)	RB Size/ Offset	Test mode	Measured Frequency (MHz)	Pol (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBi)	Result (dBm)	Limit (dBm)	Margin (dB)
20	2 510 (20850)	1/50	QPSK	5020.20	H	-53.22	12.72	-40.50	-13.00	27.50
				7630.29	H	-38.22	11.93	-26.29	-13.00	13.29
			16QAM	5020.18	H	-52.12	12.72	-39.40	-13.00	26.40
				7530.26	H	-35.11	11.76	-23.35	-13.00	10.35
			64QAM	5020.16	H	-51.21	12.72	-38.49	-13.00	25.49
				7530.30	H	-35.14	11.76	-23.38	-13.00	10.38
	256QAM	5020.21	H	-49.55	12.72	-36.83	-13.00	23.83		
		7530.28	H	-34.56	11.76	-22.80	-13.00	9.80		
	2 535 (21100)	1/50	QPSK	5070.20	H	-53.24	12.77	-40.47	-13.00	27.47
				7605.27	H	-37.58	11.90	-25.68	-13.00	12.68
			16QAM	5070.18	H	-52.11	12.77	-39.34	-13.00	26.34
				7605.29	H	-36.45	11.90	-24.55	-13.00	11.55
			64QAM	5070.13	H	-50.65	12.77	-37.88	-13.00	24.88
				7605.29	H	-35.12	11.90	-23.22	-13.00	10.22
	256QAM	5070.17	H	-49.32	12.77	-36.55	-13.00	23.55		
		7605.25	H	-34.11	11.90	-22.21	-13.00	9.21		
	2 560 (21350)	1/50	QPSK	5120.17	H	-51.45	12.82	-38.63	-13.00	25.63
				7680.30	H	-35.65	11.98	-23.67	-13.00	10.67
			16QAM	5120.20	H	-50.45	12.82	-37.63	-13.00	24.63
				7680.30	H	-35.12	11.98	-23.14	-13.00	10.14
			64QAM	5120.16	H	-50.09	12.82	-37.27	-13.00	24.27
				7680.27	H	-34.95	11.98	-22.97	-13.00	9.97
	256QAM	5120.17	H	-48.76	12.82	-35.94	-13.00	22.94		
		7680.24	H	-34.18	11.98	-22.20	-13.00	9.20		

LTE Band 12

Channel Bandwidth (MHz)	Frequency (MHz)	RB Size/ Offset	Test mode	Measured Frequency (MHz)	Pol (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBd)	Result (dBm)	Limit (dBm)	Margin (dB)
10	704 (23060)	1/25	QPSK	1408.00	H	-48.52	5.89	-42.63	-13.00	29.63
				2112.02	H	-35.22	7.66	-27.56	-13.00	14.56
				2816.01	H	-34.11	8.99	-25.12	-13.00	12.12
			16QAM	1408.00	H	-48.11	5.89	-42.22	-13.00	29.22
				2112.03	H	-35.11	7.66	-27.45	-13.00	14.45
				2816.01	H	-34.22	8.99	-25.23	-13.00	12.23
			64QAM	1407.98	H	-47.54	5.88	-41.66	-13.00	28.66
				2112.02	H	-35.22	7.66	-27.56	-13.00	14.56
				2816.11	H	-34.01	8.99	-25.02	-13.00	12.02
	256QAM	1409.99	H	-46.03	5.89	-40.14	-13.00	27.14		
		2112.08	H	-35.11	7.66	-27.45	-13.00	14.45		
		2816.05	H	-33.95	8.99	-24.96	-13.00	11.96		
	707.5 (23095)	1/49	QPSK	1423.84	H	-47.56	5.96	-41.60	-13.00	28.60
				2135.76	H	-35.36	7.49	-27.87	-13.00	14.87
				2847.68	H	-33.69	9.09	-24.60	-13.00	11.60
			16QAM	1423.81	H	-47.98	5.96	-42.02	-13.00	29.02
				2135.88	H	-35.49	7.49	-28.00	-13.00	15.00
				2847.72	H	-34.11	9.09	-25.02	-13.00	12.02
64QAM			1423.75	H	-48.56	5.96	-42.60	-13.00	29.60	
			2135.81	H	-36.22	7.49	-28.73	-13.00	15.73	
			2847.69	H	-34.25	9.09	-25.16	-13.00	12.16	
256QAM	1423.72	H	-47.55	5.96	-41.59	-13.00	28.59			
	2135.74	H	-36.20	7.49	-28.71	-13.00	15.71			
	2847.71	H	-34.01	9.09	-24.92	-13.00	11.92			

Channel Bandwidth (MHz)	Frequency (MHz)	RB Size/ Offset	Test mode	Measured Frequency (MHz)	Pol (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBd)	Result (dBm)	Limit (dBm)	Margin (dB)
10	711 (23130)	1/25	QPSK	1422.01	H	-48.25	5.96	-42.29	-13.00	29.29
				2133.03	H	-36.54	7.51	-29.03	-13.00	16.03
				2844.31	H	-34.22	9.08	-25.14	-13.00	12.14
			16QAM	1422.05	H	-47.95	5.96	-41.99	-13.00	28.99
				2133.15	H	-35.69	7.51	-28.18	-13.00	15.18
				2844.24	H	-34.11	9.08	-25.03	-13.00	12.03
			64QAM	1422.03	H	-47.56	5.96	-41.60	-13.00	28.60
				2133.29	H	-36.54	7.51	-29.03	-13.00	16.03
				2844.56	H	-34.12	9.08	-25.04	-13.00	12.04
			256QAM	1422.08	H	-46.95	5.96	-40.99	-13.00	27.99
				2133.36	H	-35.26	7.51	-27.75	-13.00	14.75
				2844.49	H	-33.96	9.08	-24.88	-13.00	11.88

LTE Band 66(4)

Channel Bandwidth (MHz)	Frequency (MHz)	RB Size/ Offset	Test mode	Measured Frequency (MHz)	PoI (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBi)	Result (dBm)	Limit (dBm)	Margin (dB)
20	1 720 (132072)	1/50	QPSK	3440.20	H	-54.65	12.77	-41.88	-13.00	28.88
				5160.20	H	-46.22	12.86	-33.36	-13.00	20.36
			16QAM	3440.32	H	-53.21	12.77	-40.44	-13.00	27.44
				5160.12	H	-46.22	12.86	-33.36	-13.00	20.36
			64QAM	3440.20	H	-52.11	12.77	-39.34	-13.00	26.34
				5160.32	H	-43.20	12.86	-30.34	-13.00	17.34
	256QAM	3440.20	H	-53.22	12.77	-40.45	-13.00	27.45		
		5160.25	H	-42.21	12.86	-29.35	-13.00	16.35		
	1 745 (132322)	1/50	QPSK	3490.24	H	-55.22	12.62	-42.60	-13.00	29.60
				5235.32	H	-46.22	12.98	-33.24	-13.00	20.24
			16QAM	3490.33	H	-54.52	12.62	-41.90	-13.00	28.90
				5235.16	H	-45.84	12.98	-32.86	-13.00	19.86
			64QAM	3490.36	H	-53.69	12.62	-41.07	-13.00	28.07
				5235.32	H	-46.25	12.98	-33.27	-13.00	20.27
	256QAM	3490.16	H	-53.22	12.62	-40.60	-13.00	27.60		
		5235.04	H	-44.22	12.98	-31.24	-13.00	18.24		
	1 770 (132572)	1/99	QPSK	3507.84	H	-55.36	12.59	-42.77	-13.00	29.77
				5261.88	H	-46.22	13.05	-33.17	-13.00	20.17
			16QAM	3507.76	H	-55.45	12.59	-42.86	-13.00	29.86
				5261.68	H	-46.34	13.05	-33.29	-13.00	20.29
			64QAM	3507.76	H	-55.90	12.59	-43.31	-13.00	30.31
				5261.88	H	-46.01	13.05	-32.96	-13.00	19.96
	256QAM	3507.88	H	-55.60	12.59	-43.01	-13.00	30.01		
		5261.72	H	-45.20	13.05	-32.15	-13.00	19.15		



### 8.3 FREQUENCY STABILITY

LTE Band 2

Operating Frequency : 1 880 MHz

Reference Voltage : 3.90 Vd.c.

Deviation Limit : ± 0.000 25 %

Voltage (%)	Power (Vdc)	Temperature (°C)	Frequency (Hz)	Deviation (%)
100	3.90	+20 °C (Ref)	1,880,000,012	0.000001
100		-20	1,880,000,002	0.000000
100		-10	1,880,000,015	0.000001
100		0	1,879,999,969	-0.000002
100		10	1,880,000,014	0.000001
100		20	1,880,000,007	0.000000
100		30	1,879,999,991	0.000000
100		40	1,880,000,022	0.000001
100		50	1,880,000,006	0.000000
85		3.315	20	1,879,999,980
115	4.485	20	1,880,000,040	0.000002

LTE Band 5

Operating Frequency : 836.5 MHz

Reference Voltage : 3.90 Vd.c.

Deviation Limit : ± 0.000 25 %

Voltage (%)	Power (Vdc)	Temperature (°C)	Frequency (Hz)	Deviation (%)
100	3.90	+20 °C (Ref)	836,500,002	0.000001
100		-20	836,500,022	0.000003
100		-10	836,499,991	-0.000001
100		<b>0</b>	836,500,011	0.000001
100		10	836,500,102	0.000012
100		20	836,500,052	0.000006
100		30	836,500,002	0.000000
100		40	836,499,921	-0.000009
100		50	836,500,032	0.000004
85		3.315	20	836,499,971
115	4.485	20	836,500,072	0.000009

LTE Band 7

Operating Frequency : 2 535 MHz

Reference Voltage : 3.90 Vd.c.

Deviation Limit : ± 0.000 25 %

Voltage (%)	Power (Vdc)	Temperature (°C)	Frequency (Hz)	Deviation (%)
100	3.90	+20 °C (Ref)	2,535,000,021	0.0000008
100		-20	2,535,000,013	0.0000005
100		-10	2,534,999,971	-0.0000011
100		<b>0</b>	2,535,000,028	0.0000011
100		10	2,535,000,026	0.0000010
100		20	2,534,999,989	-0.0000004
100		30	2,535,000,011	0.0000004
100		40	2,535,000,051	0.0000020
100		50	2,534,999,912	-0.0000035
85		3.315	20	2,535,000,012
115	4.485	20	2,535,000,018	0.0000007

LTE Band 12

Operating Frequency : 707.5 MHz

Reference Voltage : 3.90 Vd.c.

Deviation Limit : ± 0.000 25 %

Voltage (%)	Power (Vdc)	Temperature (°C)	Frequency (Hz)	Deviation (%)
100	3.90	+20 °C (Ref)	7,075,000,007	0.0000001
100		-20	7,074,999,991	-0.0000001
100		-10	7,075,000,021	0.0000003
100		<b>0</b>	7,075,000,032	0.0000005
100		10	7,074,999,988	-0.0000002
100		20	7,075,000,002	0.0000000
100		30	7,075,000,057	0.0000008
100		40	7,075,000,014	0.0000002
100		50	7,074,999,998	0.0000000
85		3.315	20	7,075,000,022
115	4.485	20	7,074,999,986	-0.0000002

LTE Band 66(4)

Operating Frequency :

1 745 MHz

Reference Voltage :

3.90 Vd.c.

Deviation Limit :

± 0.000 25 %

Voltage (%)	Power (Vdc)	Temperature (°C)	Frequency (Hz)	Deviation (%)
100	3.90	+20 °C (Ref)	1,745,000,002	0.0000001
100		-20	1,745,000,004	0.0000002
100		-10	1,745,000,011	0.0000006
100		<b>0</b>	1,744,999,992	-0.0000005
100		10	1,745,000,021	0.0000012
100		20	1,744,999,972	-0.0000016
100		30	1,745,000,020	0.0000011
100		40	1,745,000,010	0.0000006
100		50	1,744,999,967	-0.0000019
85		3.315	20	1,745,000,025
115	4.485	20	1,744,999,985	-0.0000009

### 8.4 OCCUPIED BANDWIDTH

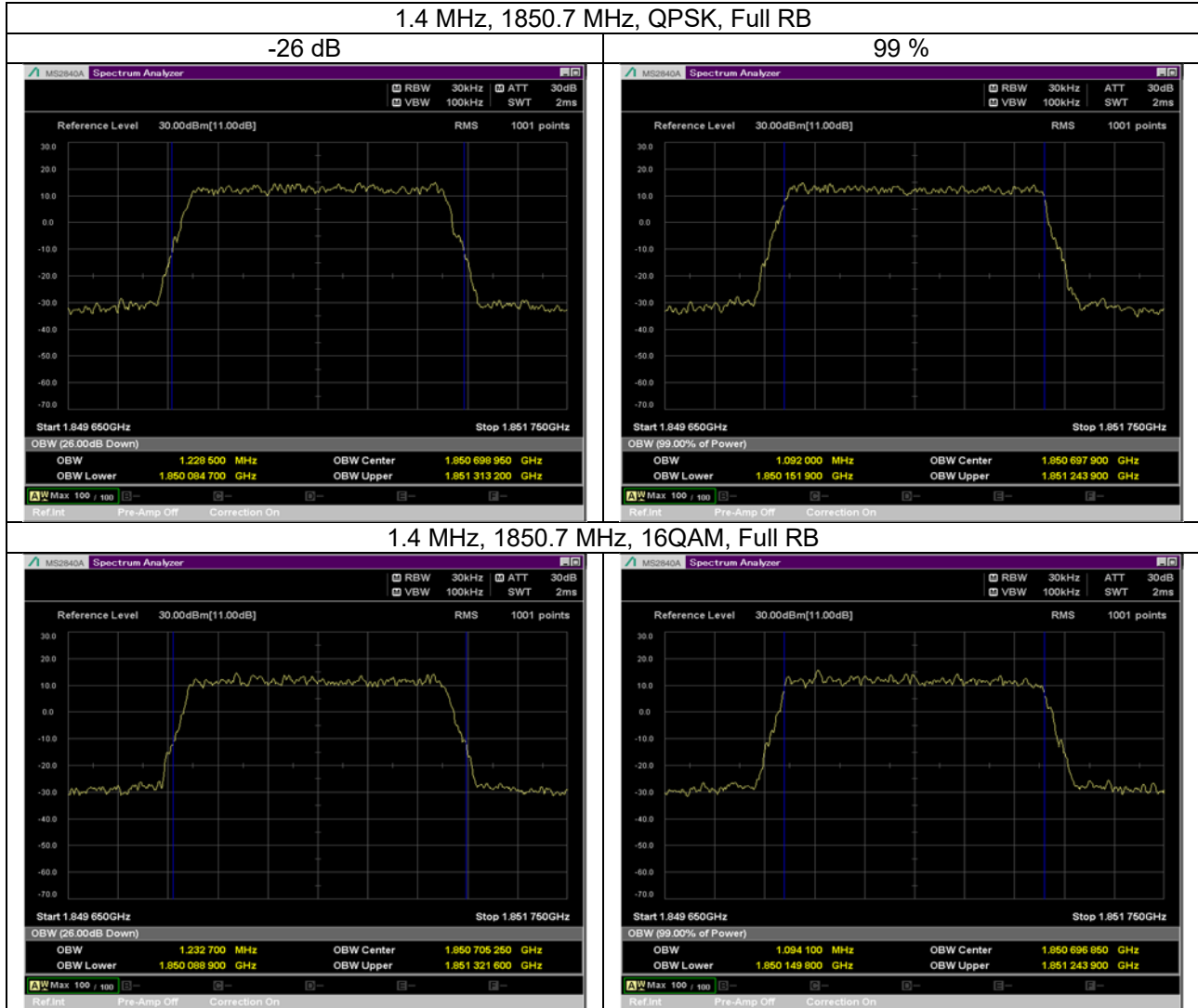
**- Test Notes:**

All bandwidths, RB configurations, and modulations were investigated. The worst case test results are reported.

#### LTE Band 2

Band	Bandwidth (MHz)	UL Channel	RB Size	RB Position	Modulation	-26 dB OBW (MHz)	99% OBW (MHz)	Verdict
Band 2	1.4	18607	6	#0	QPSK	1.23	1.09	PASS
Band 2		18607	6	#0	16QAM	1.23	1.09	PASS
Band 2		18607	6	#0	64QAM	1.21	1.09	PASS
Band 2		18607	6	#0	256QAM	1.22	1.08	PASS
Band 2	3	18615	15	#0	QPSK	2.90	2.70	PASS
Band 2		18615	15	#0	16QAM	2.89	2.69	PASS
Band 2		18615	15	#0	64QAM	2.91	2.68	PASS
Band 2		18615	15	#0	256QAM	2.93	2.68	PASS
Band 2	5	18900	25	#0	QPSK	4.79	4.47	PASS
Band 2		18900	25	#0	16QAM	4.82	4.49	PASS
Band 2		18900	25	#0	64QAM	4.80	4.46	PASS
Band 2		18900	25	#0	256QAM	4.78	4.46	PASS
Band 2	10	18650	50	#0	QPSK	9.51	8.91	PASS
Band 2		18650	50	#0	16QAM	9.48	8.90	PASS
Band 2		18650	50	#0	64QAM	9.44	8.94	PASS
Band 2		18650	50	#0	256QAM	9.47	8.91	PASS
Band 2	15	18900	75	#0	QPSK	14.27	13.41	PASS
Band 2		18900	75	#0	16QAM	14.22	13.39	PASS
Band 2		18900	75	#0	64QAM	14.18	13.41	PASS
Band 2		18900	75	#0	256QAM	14.29	13.43	PASS
Band 2	20	18900	100	#0	QPSK	18.69	17.85	PASS
Band 2		18900	100	#0	16QAM	18.87	17.88	PASS
Band 2		18900	100	#0	64QAM	18.84	17.85	PASS
Band 2		18900	100	#0	256QAM	18.81	17.85	PASS

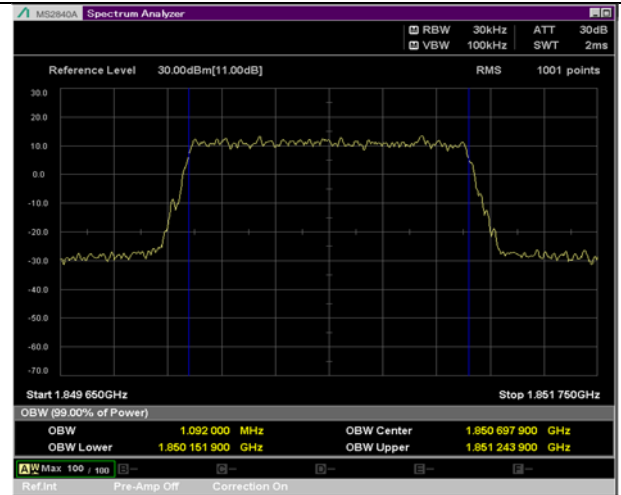
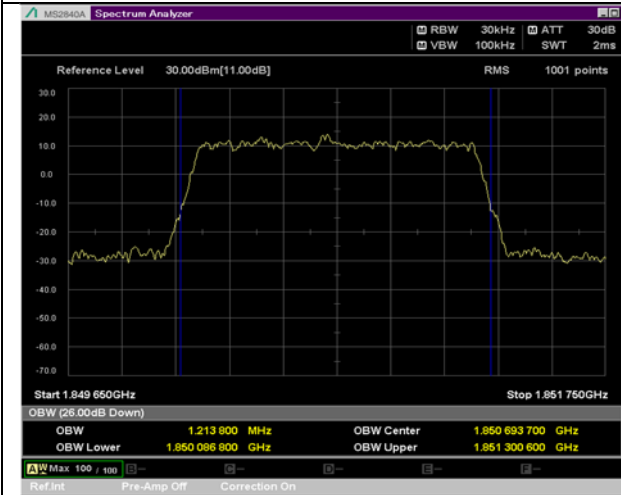
LTE BAND 2 Occupied Bandwidth Plot



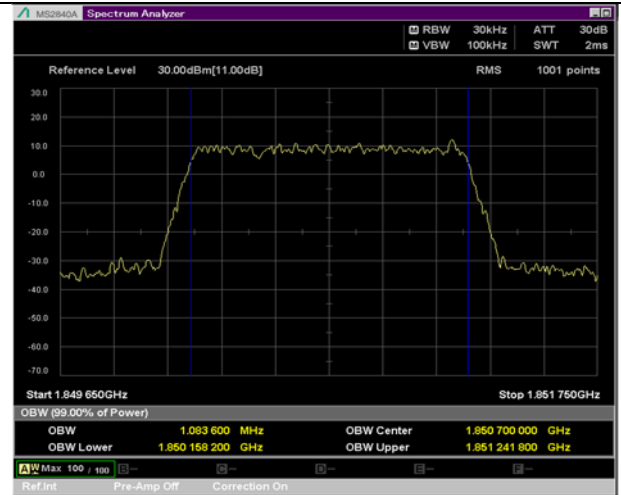
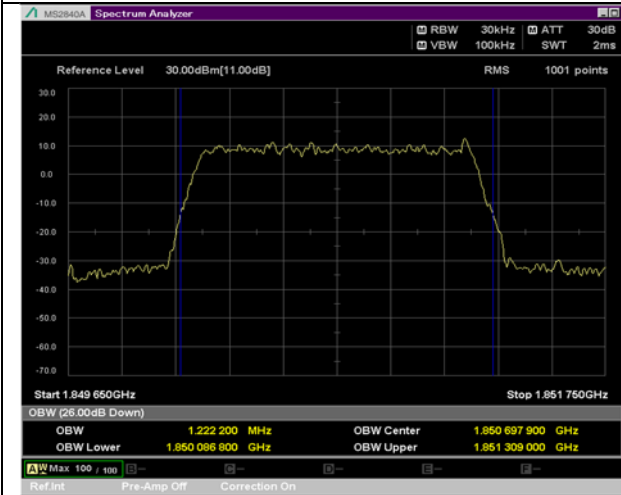
1.4 MHz, 1850.7 MHz, 64QAM, Full RB

-26 dB

99 %



1.4 MHz, 1850.7 MHz, 256QAM, Full RB

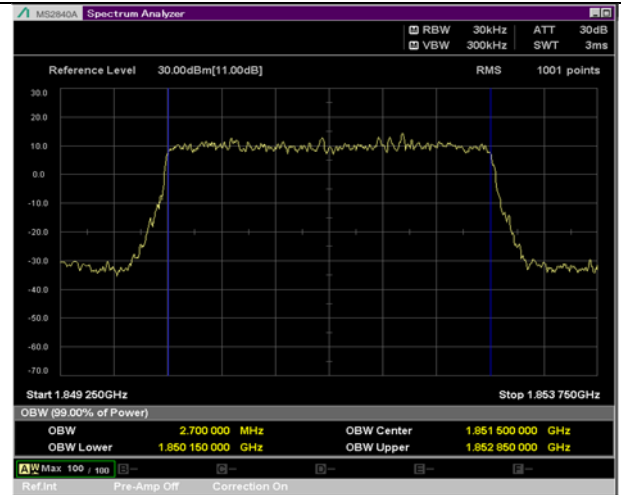
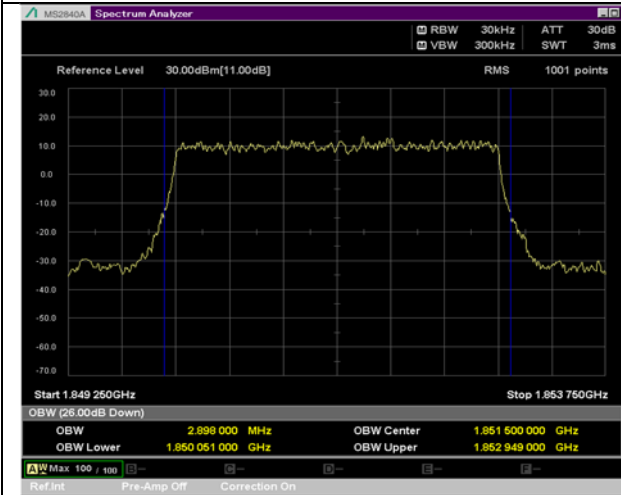




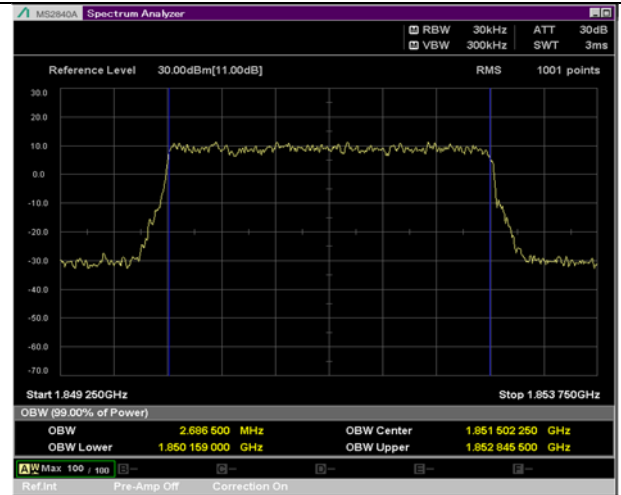
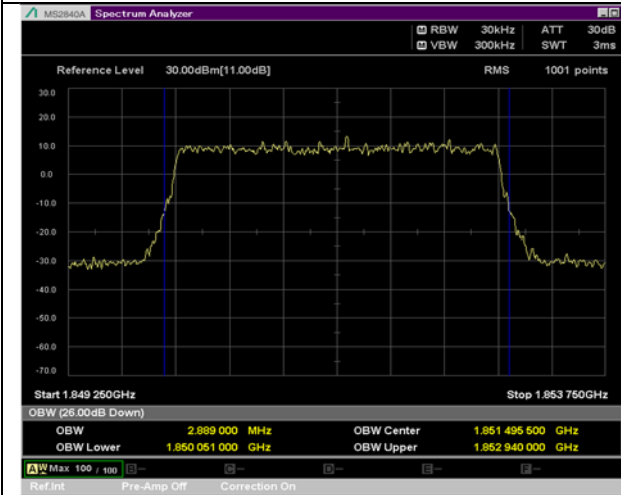
3 MHz, 1851.5 MHz, QPSK, Full RB

-26 dB

99 %



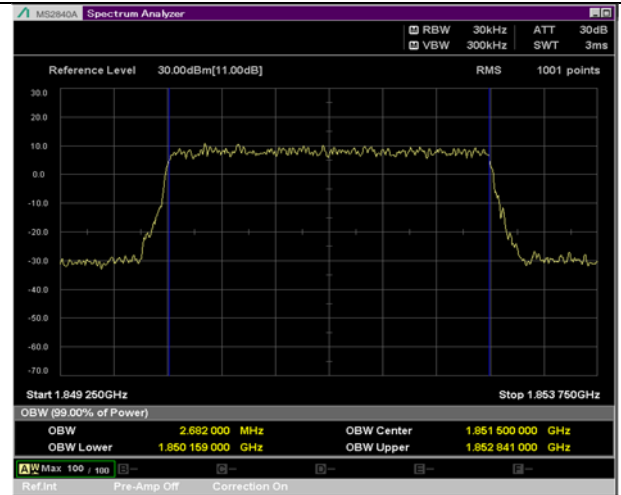
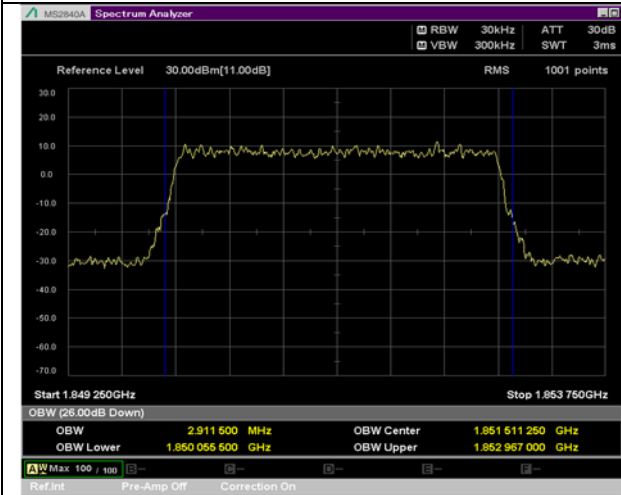
3 MHz, 1851.5 MHz, 16QAM, Full RB



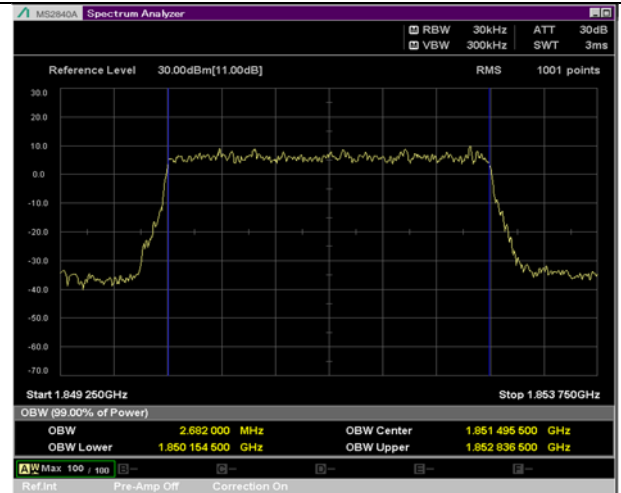
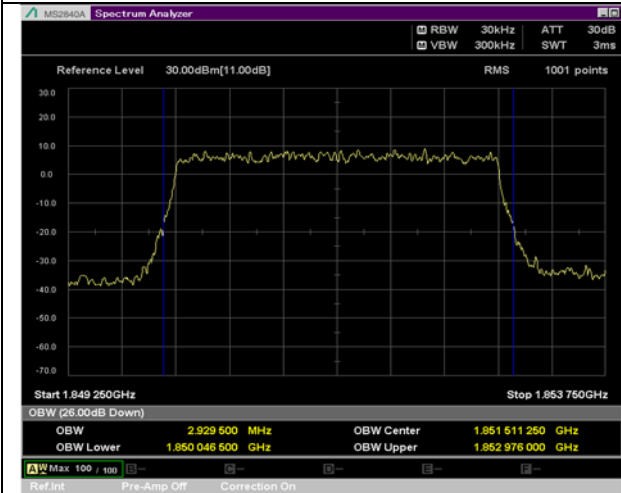
3 MHz, 1851.5 MHz, 64QAM, Full RB

-26 dB

99 %



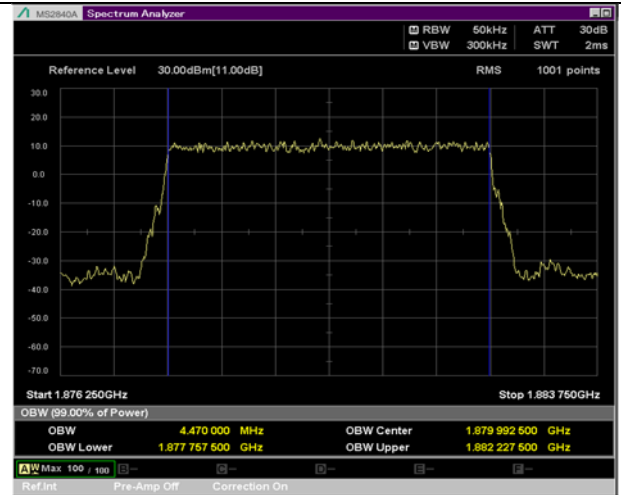
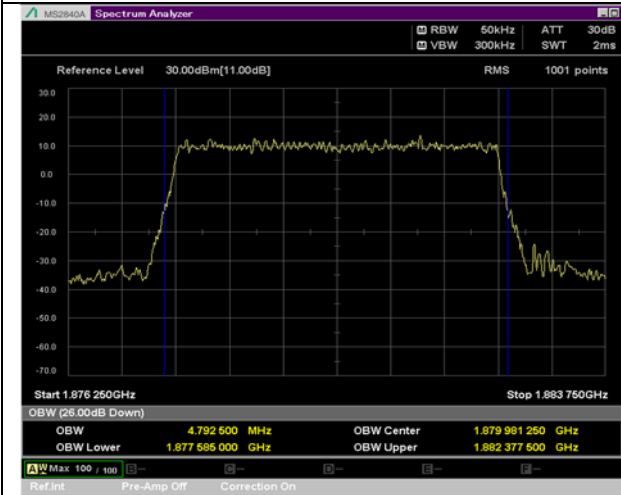
LTE Band 2 3 MHz, 1851.5 MHz, 256QAM, Full RB



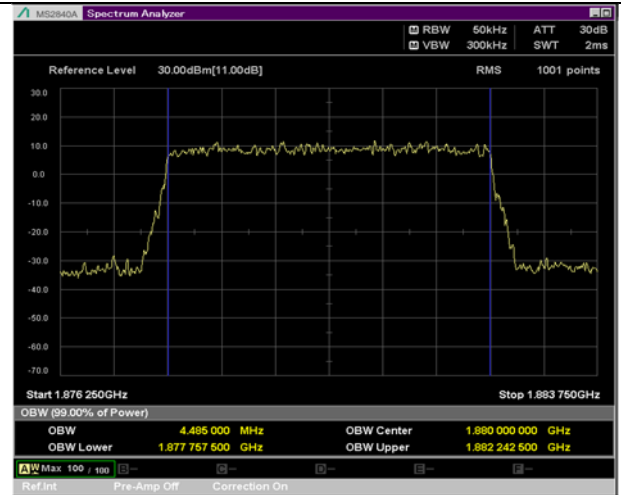
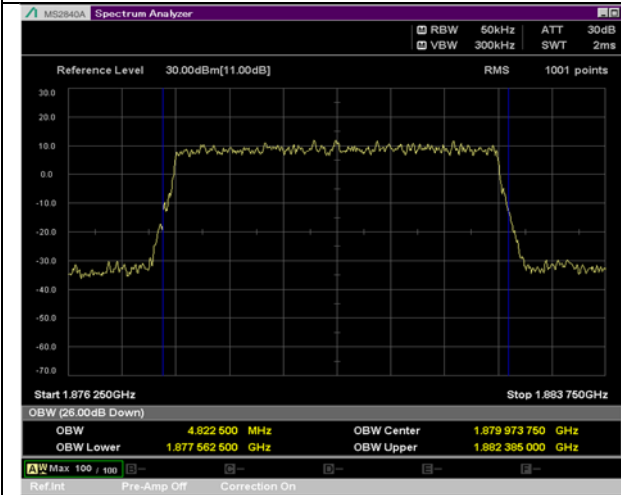
5 MHz, 1880 MHz, QPSK, Full RB

-26 dB

99 %



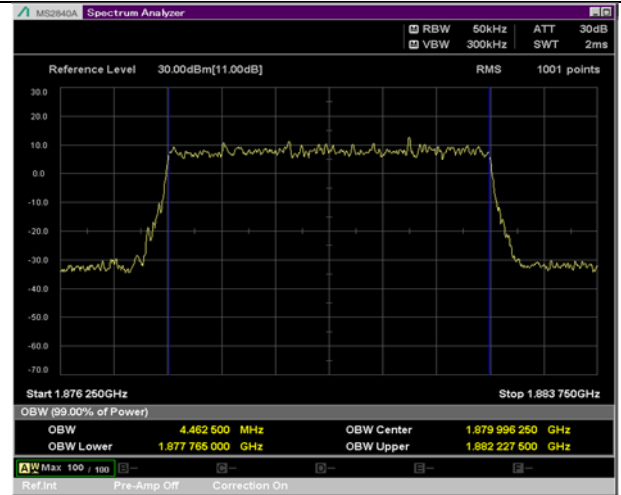
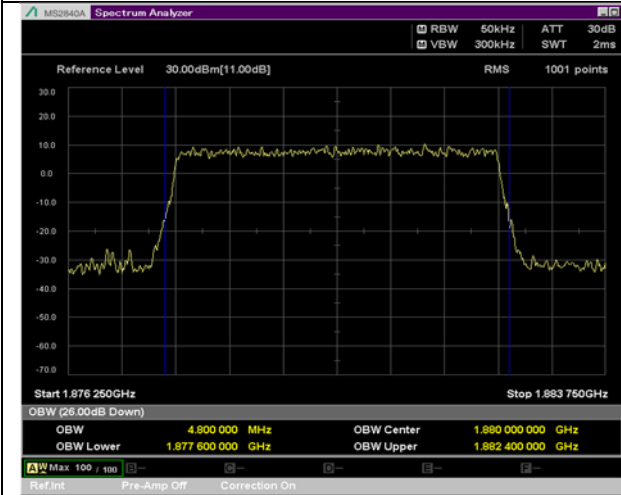
5 MHz, 1880 MHz, 16QAM, Full RB



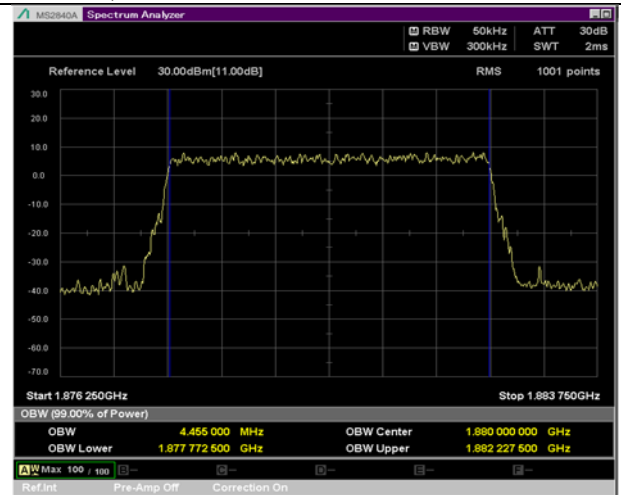
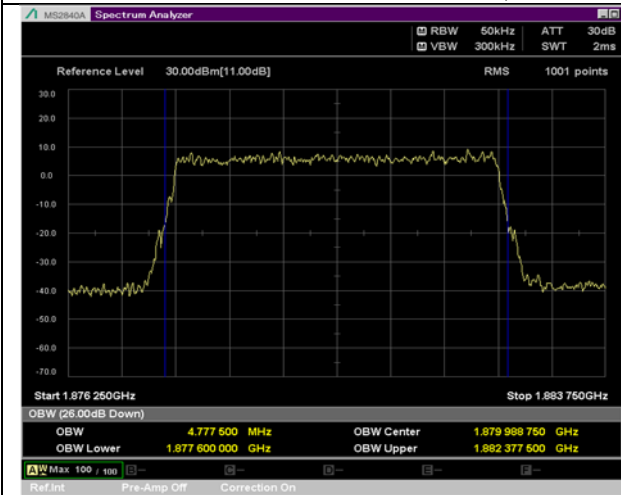
5 MHz, 1880 MHz, 64QAM, Full RB

-26 dB

99 %



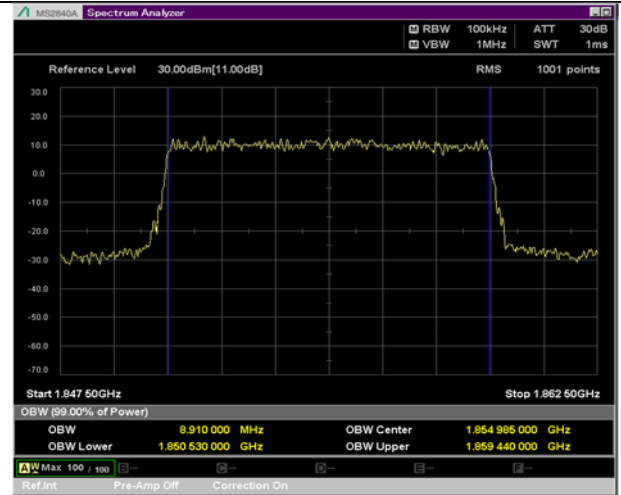
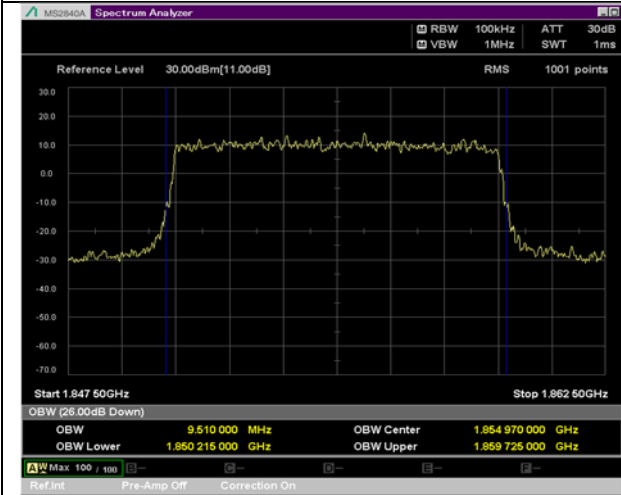
5 MHz, 1880 MHz, 256QAM, Full RB



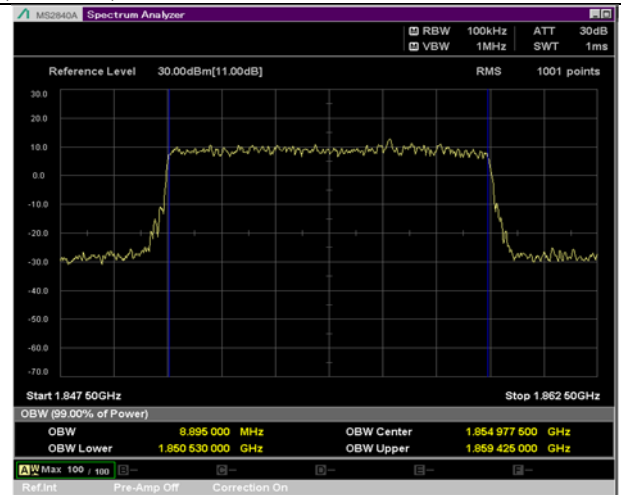
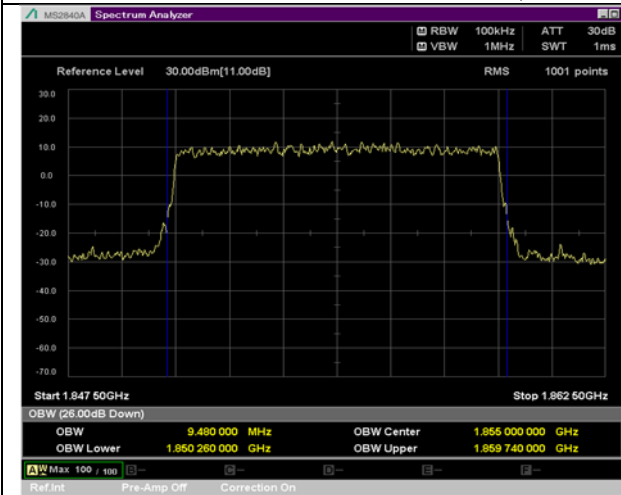
10 MHz, 1855 MHz, QPSK, Full RB

-26 dB

99 %



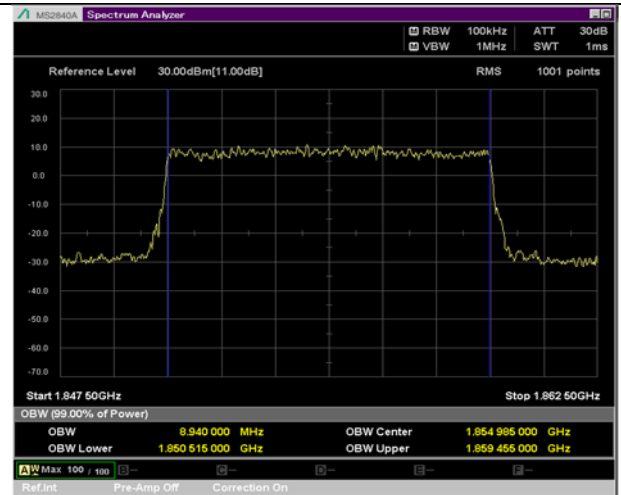
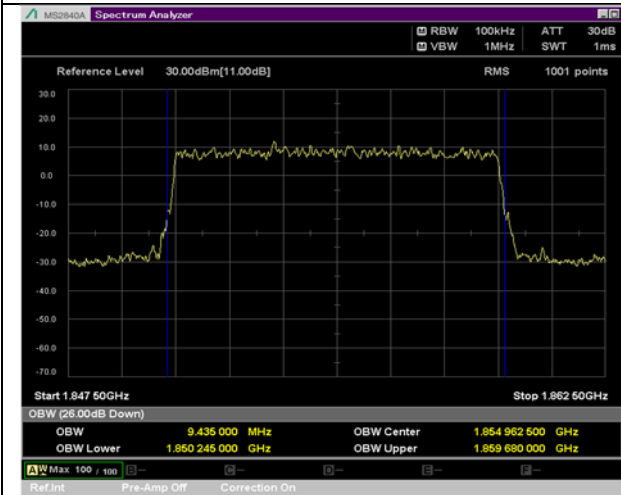
10 MHz, 1855 MHz, 16QAM, Full RB



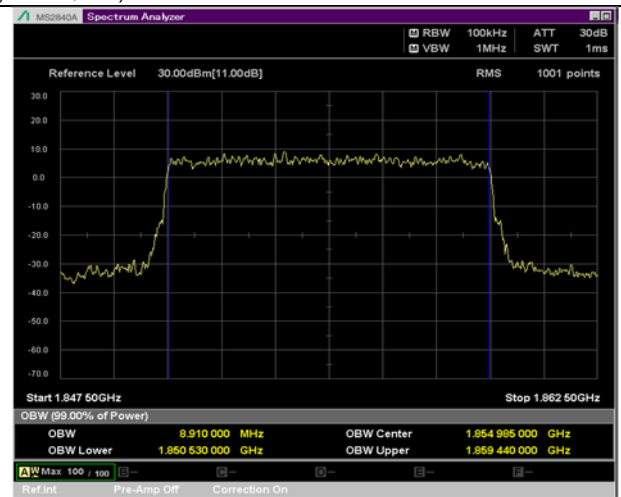
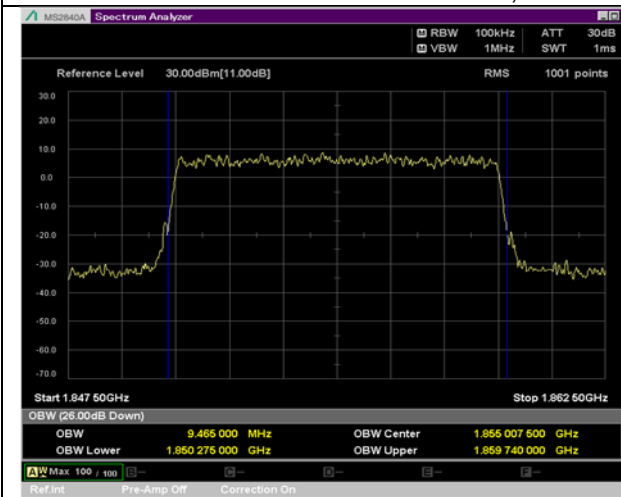
10 MHz, 1855 MHz, 64QAM, Full RB

-26 dB

99 %



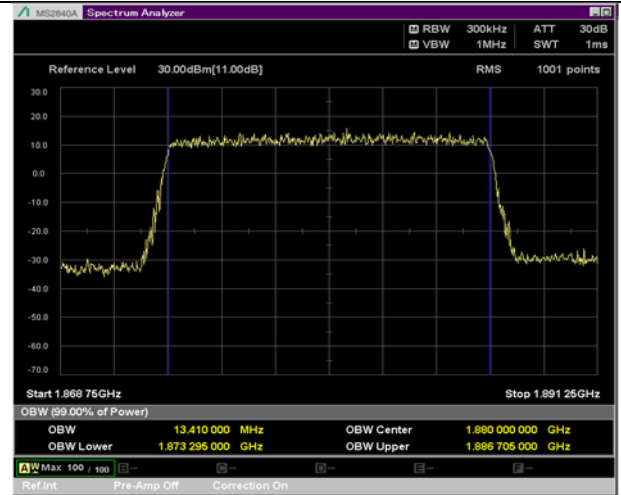
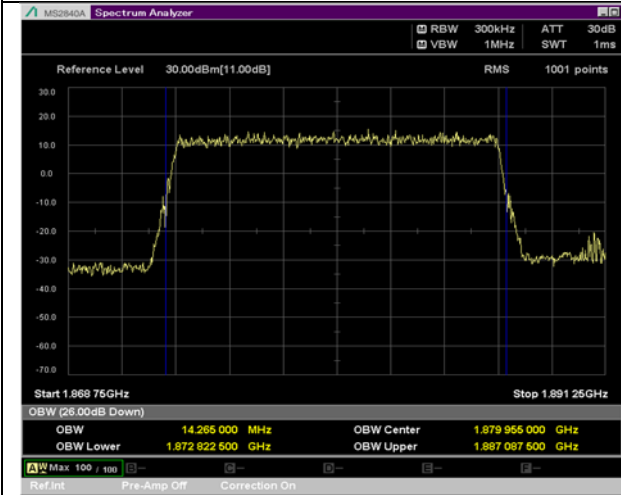
10 MHz, 1855 MHz, 256QAM, Full RB



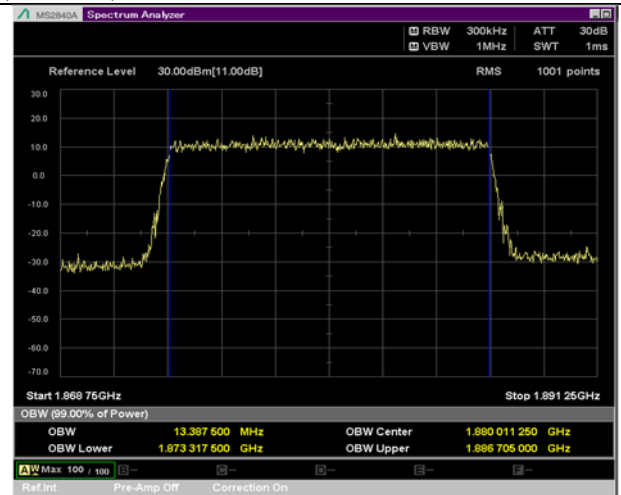
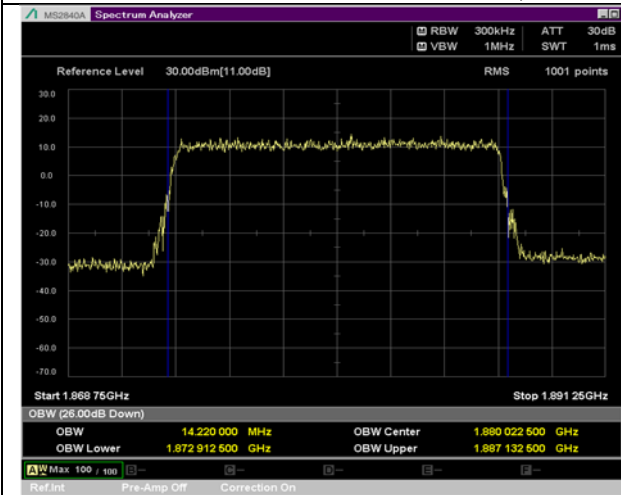
15 MHz, 1880 MHz, QPSK, Full RB

-26 dB

99 %



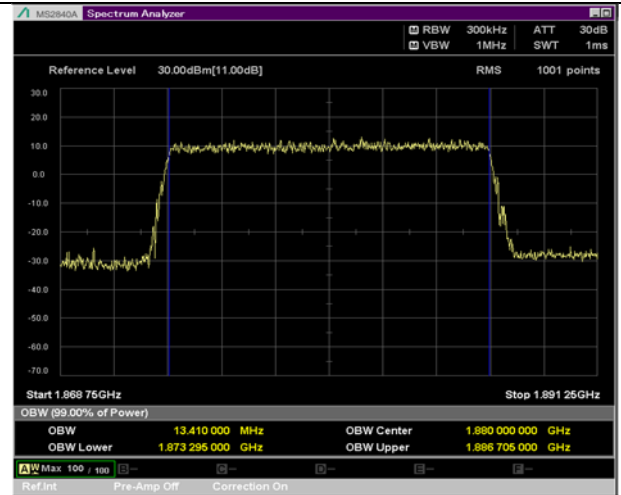
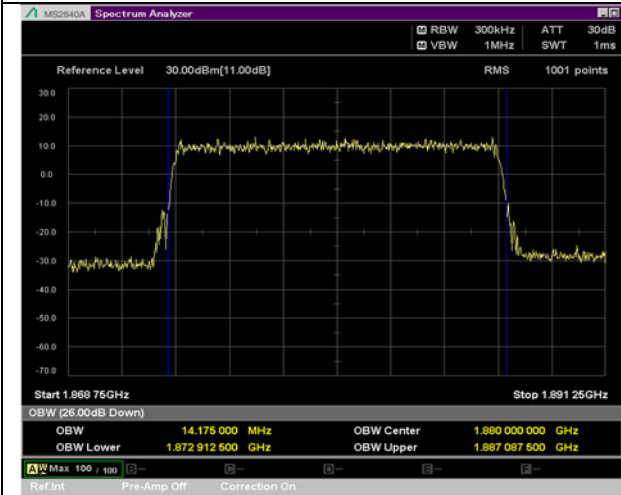
15 MHz, 1880 MHz, 16QAM, Full RB



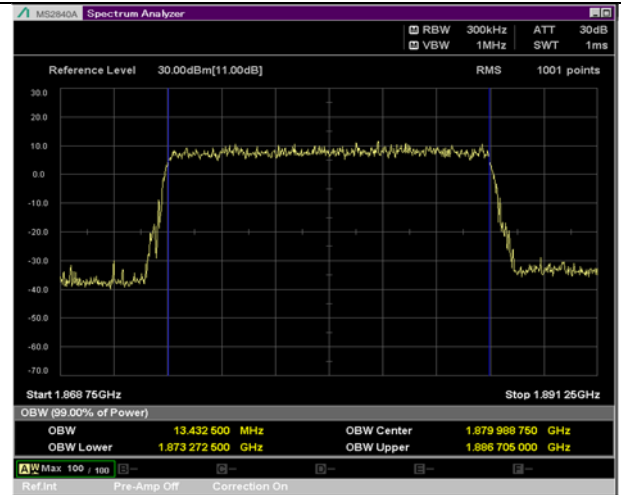
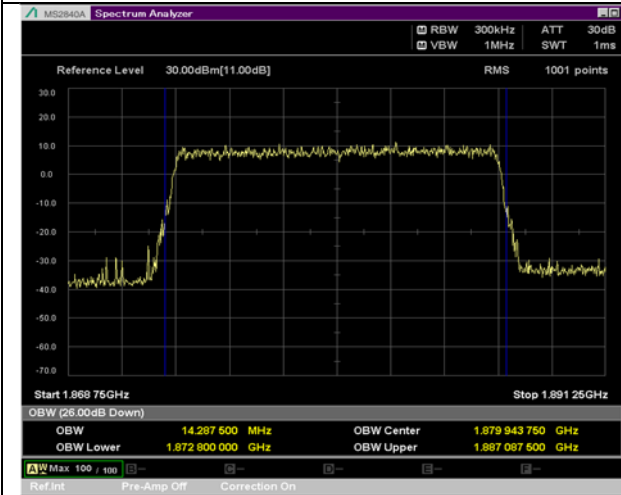
15 MHz, 1880 MHz, 64QAM, Full RB

-26 dB

99 %



15 MHz, 1880 MHz, 256QAM, Full RB

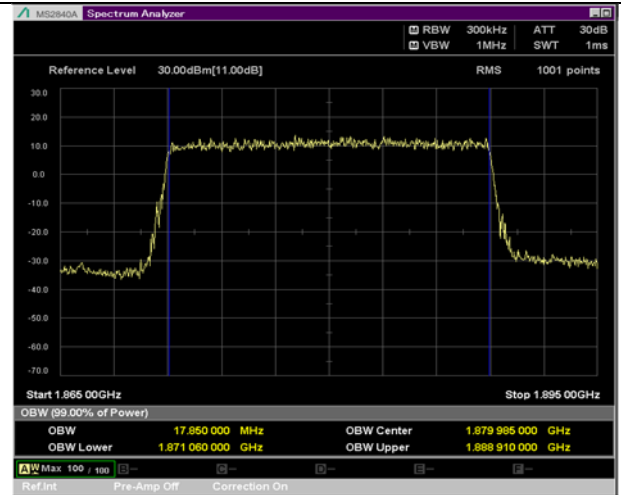
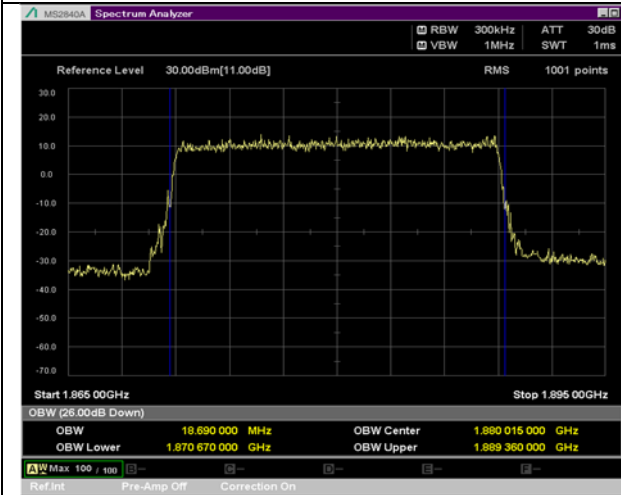




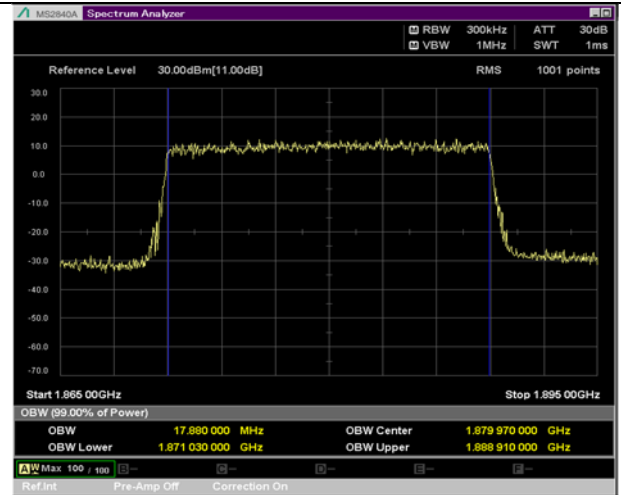
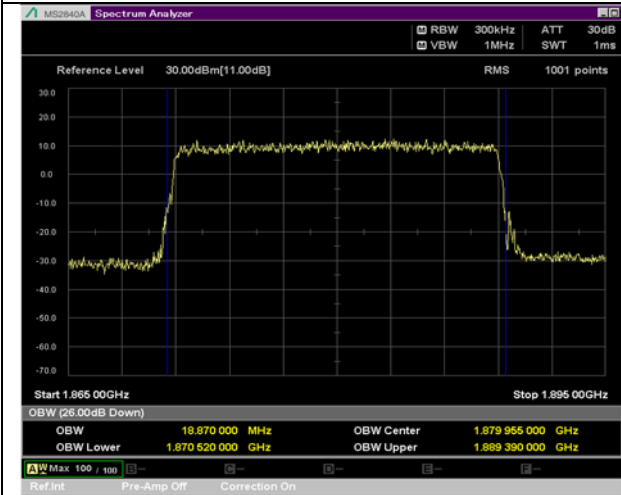
20 MHz, 1880 MHz, QPSK, Full RB

-26 dB

99 %



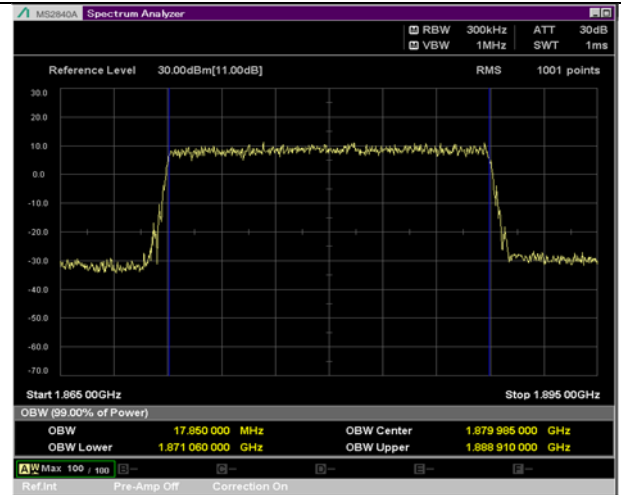
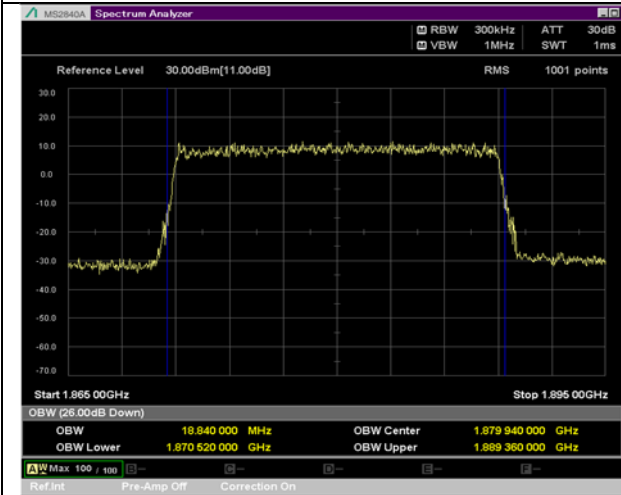
20 MHz, 1880 MHz, 16QAM, Full RB



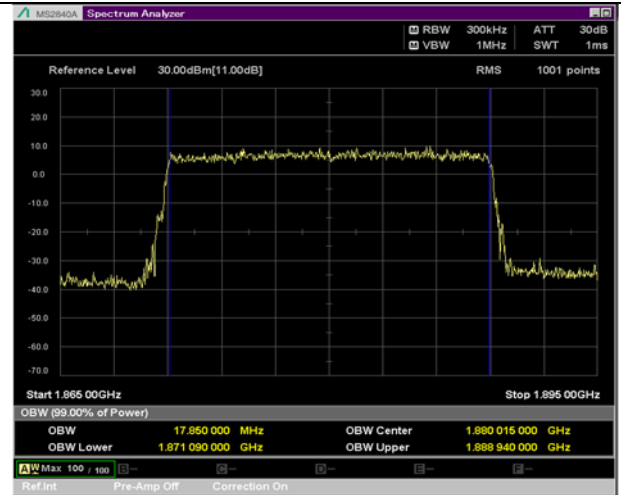
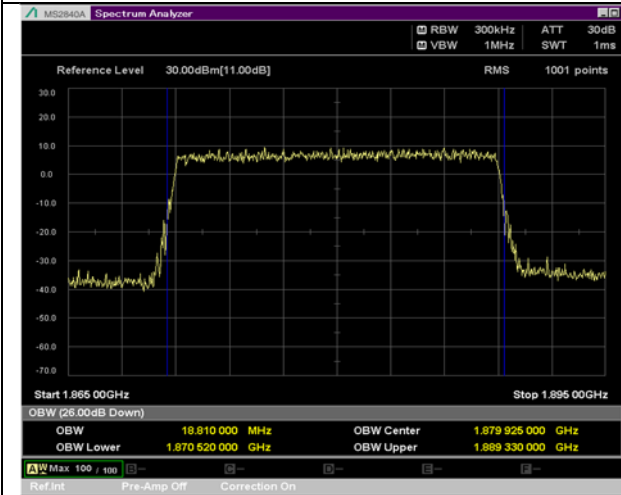
20 MHz, 1880 MHz, 64QAM, Full RB

-26 dB

99 %



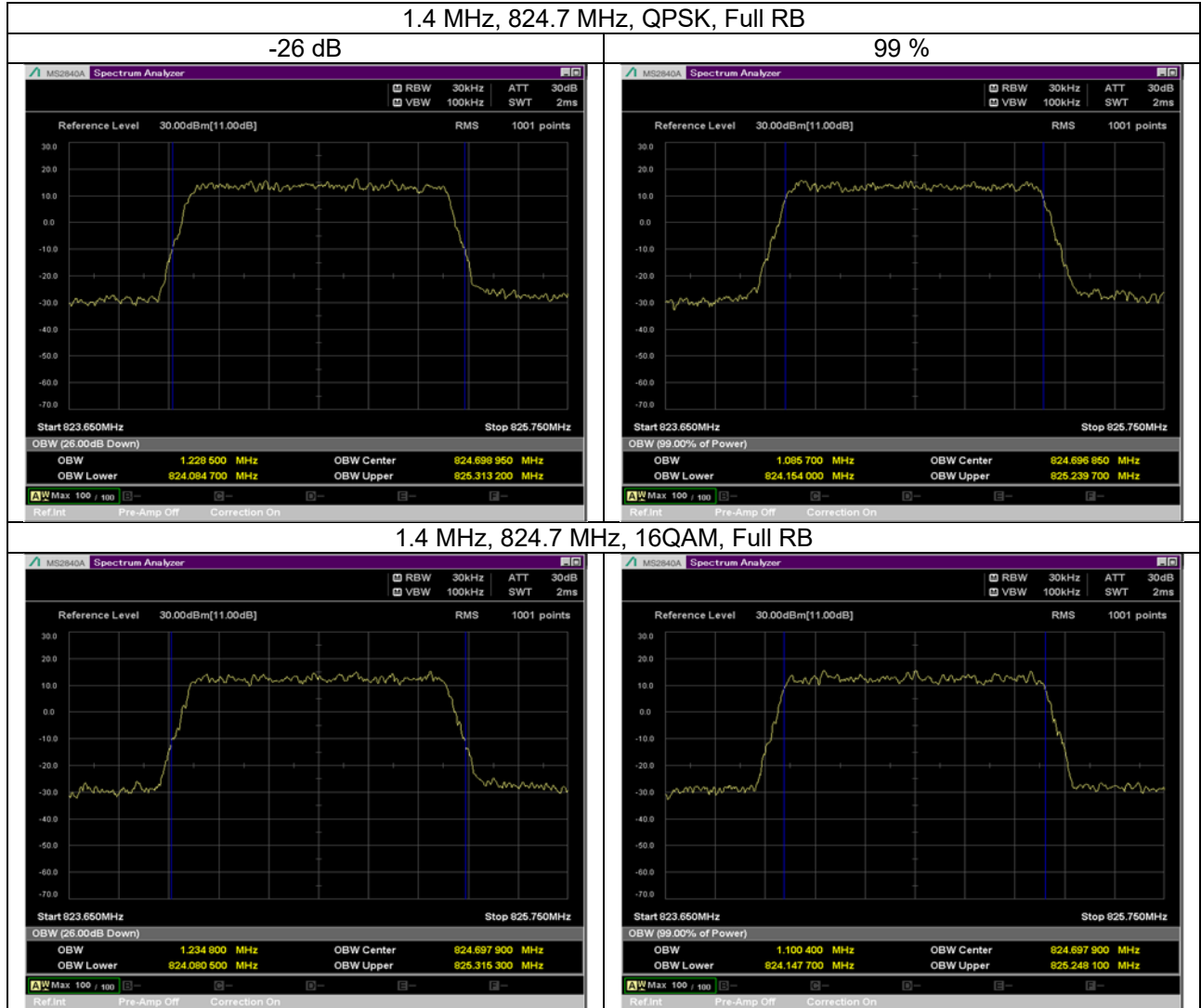
20 MHz, 1880 MHz, 256QAM, Full RB



**LTE Band 5**

Band	Bandwidth (MHz)	UL Channel	RB Size	RB Position	Modulation	-26 dB OBW (MHz)	99% OBW (MHz)	Verdict
Band 5	1.4	20407	6	#0	QPSK	1.23	1.09	PASS
Band 5		20407	6	#0	16QAM	1.23	1.10	PASS
Band 5		20407	6	#0	64QAM	1.21	1.09	PASS
Band 5		20407	6	#0	256QAM	1.22	1.08	PASS
Band 5	3	20525	15	#0	QPSK	2.90	2.69	PASS
Band 5		20525	15	#0	16QAM	2.88	2.68	PASS
Band 5		20525	15	#0	64QAM	2.88	2.68	PASS
Band 5		20525	15	#0	256QAM	2.93	2.68	PASS
Band 5	5	20425	25	#0	QPSK	4.77	4.46	PASS
Band 5		20425	25	#0	16QAM	4.79	4.47	PASS
Band 5		20425	25	#0	64QAM	4.80	4.47	PASS
Band 5		20425	25	#0	256QAM	4.76	4.48	PASS
Band 5	10	20450	50	#0	QPSK	9.53	8.94	PASS
Band 5		20450	50	#0	16QAM	9.33	8.91	PASS
Band 5		20450	50	#0	64QAM	9.42	8.88	PASS
Band 5		20450	50	#0	256QAM	9.48	8.94	PASS

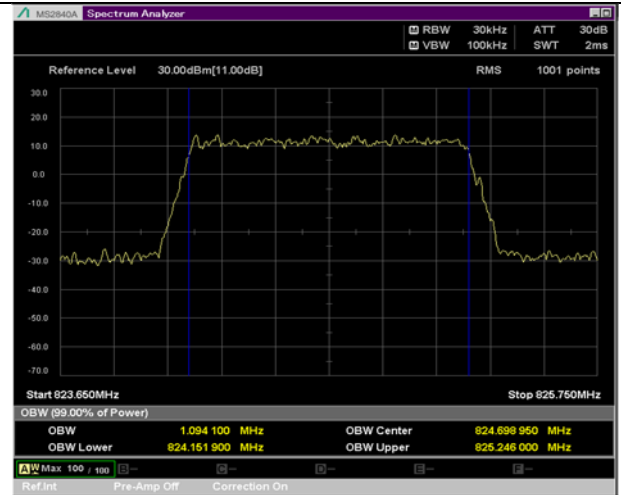
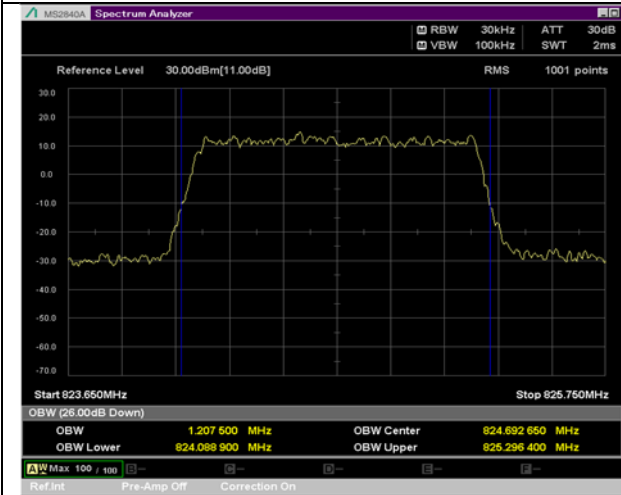
LTE BAND 5 Occupied Bandwidth Plot



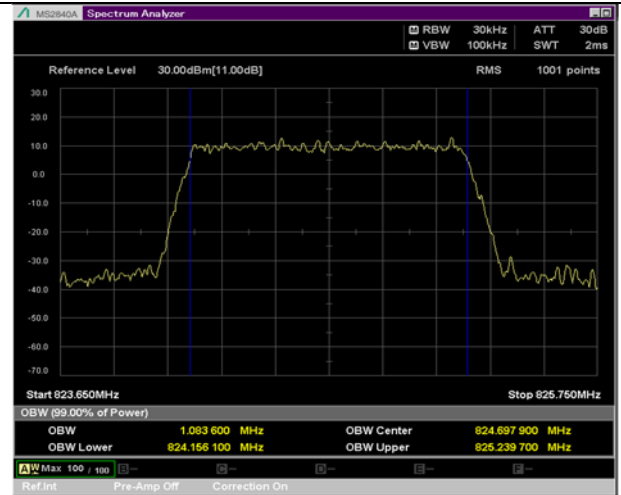
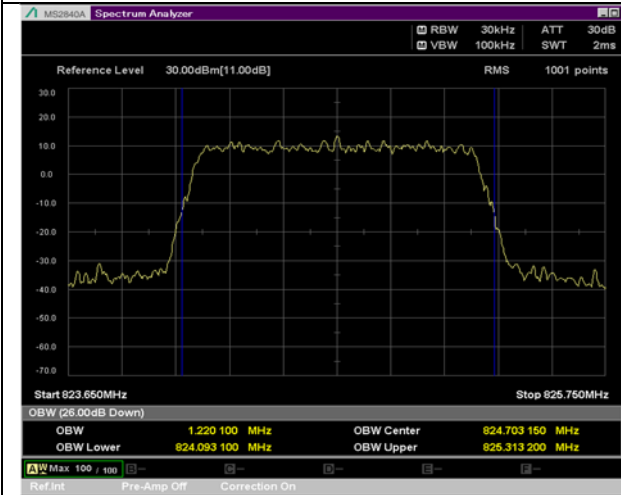
1.4 MHz, 824.7 MHz, 64QAM, Full RB

-26 dB

99 %



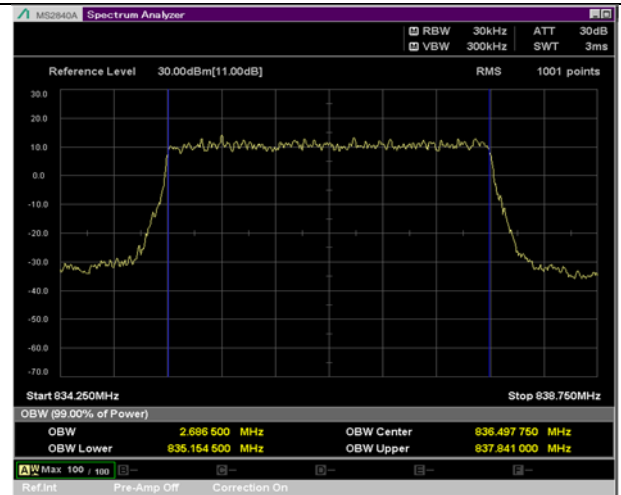
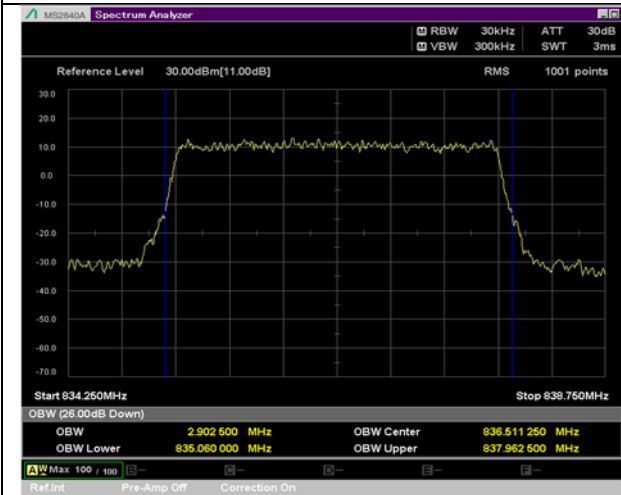
1.4 MHz, 824.7 MHz, 256QAM, Full RB



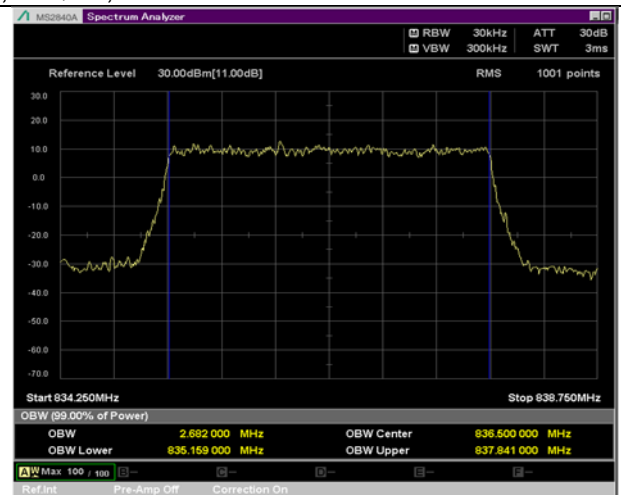
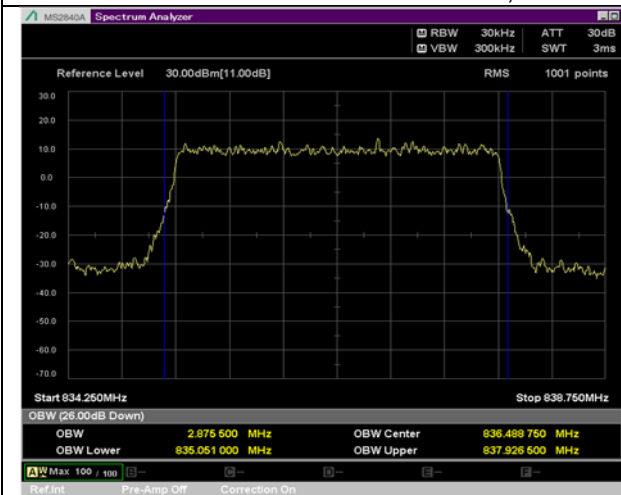
3 MHz, 836.5 MHz, QPSK, Full RB

-26 dB

99 %



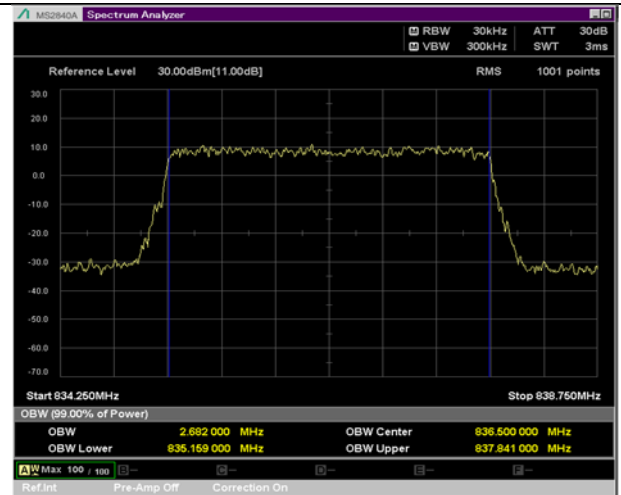
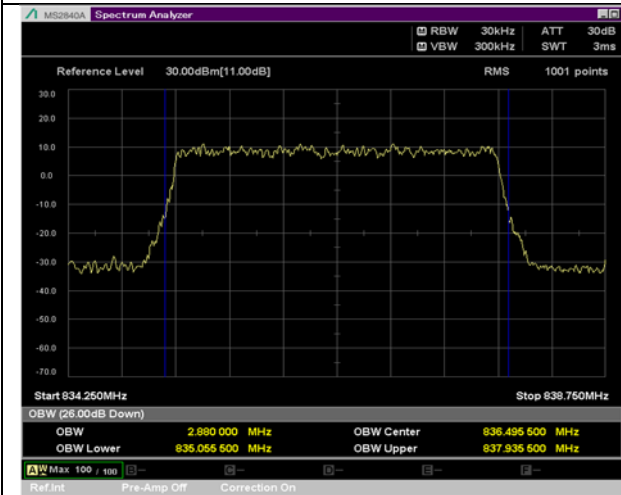
3 MHz, 836.5 MHz, 16QAM, Full RB



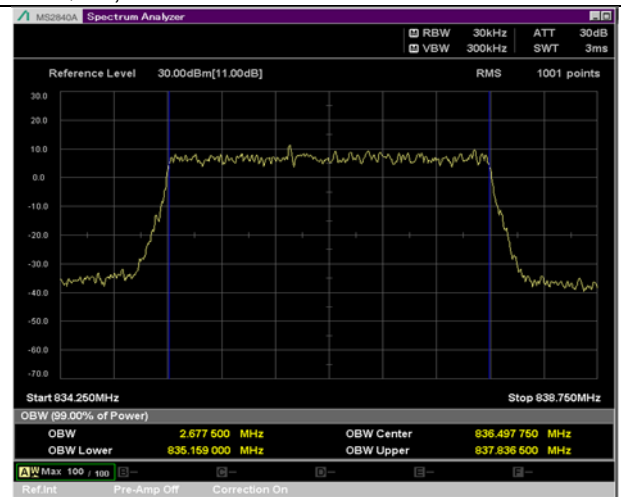
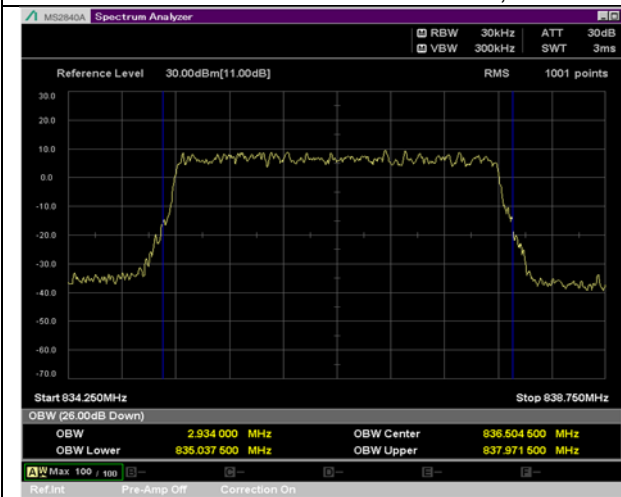
3 MHz, 836.5 MHz, 64QAM, Full RB

-26 dB

99 %



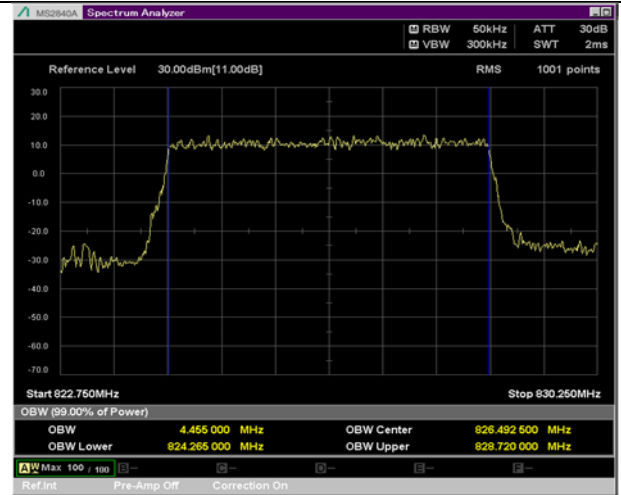
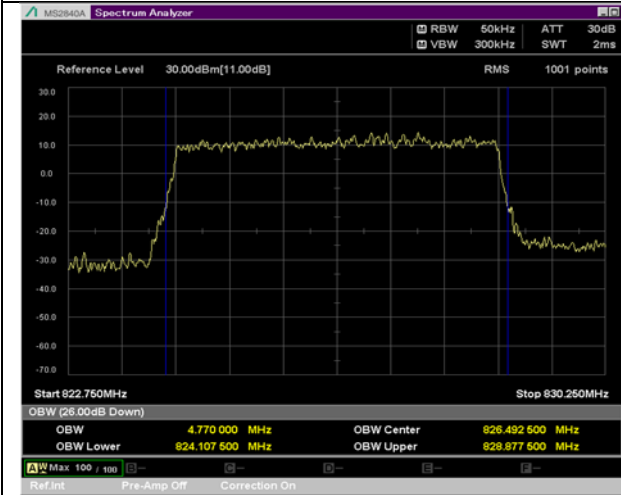
3 MHz, 836.5 MHz, 256QAM, Full RB



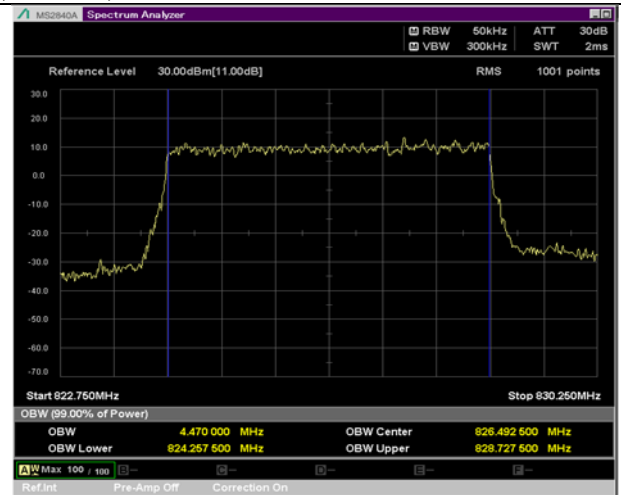
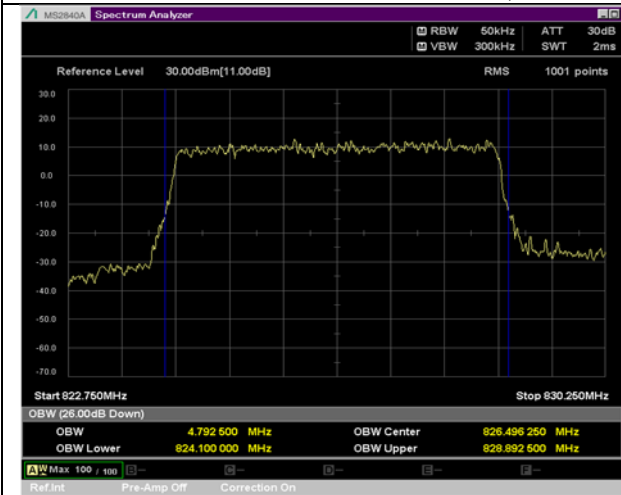
5 MHz, 826.5 MHz, QPSK, Full RB

-26 dB

99 %



5 MHz, 826.5 MHz, 16QAM, Full RB

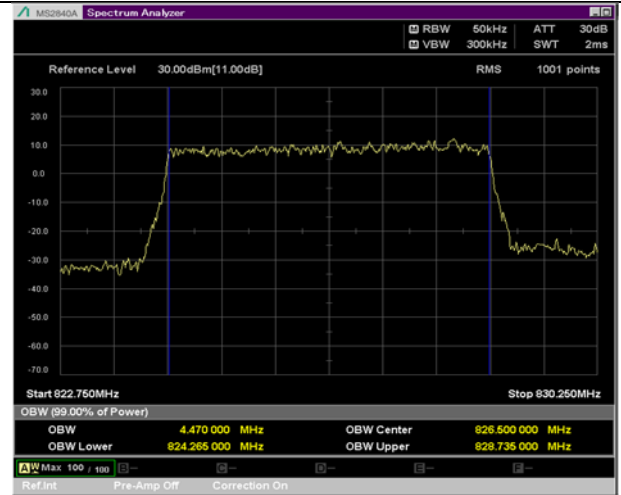
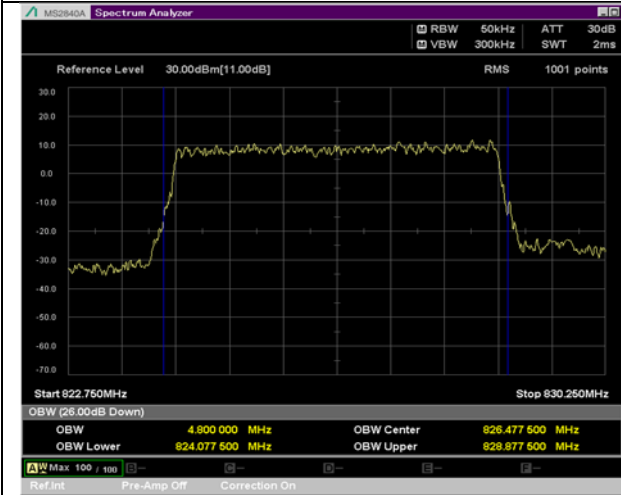




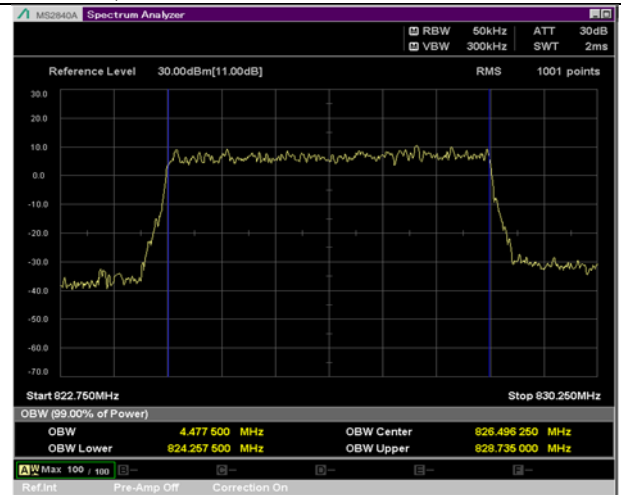
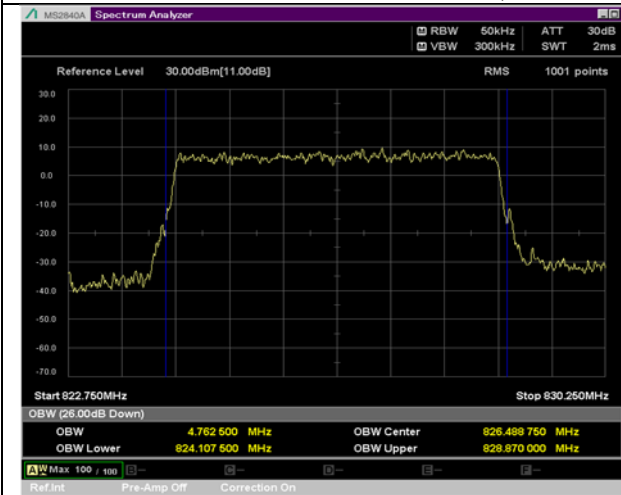
5 MHz, 826.5 MHz, 64QAM, Full RB

-26 dB

99 %



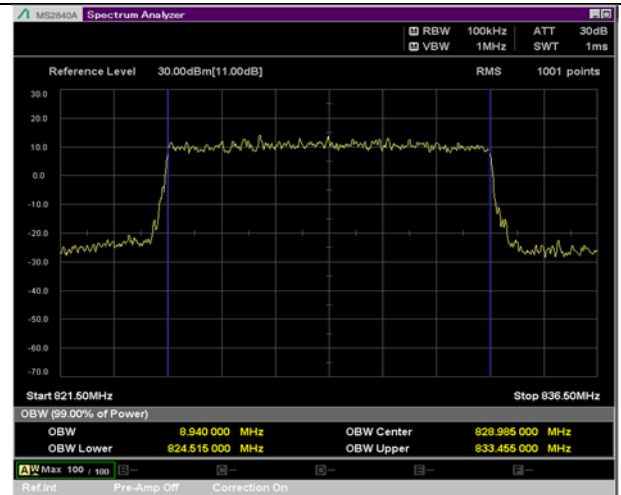
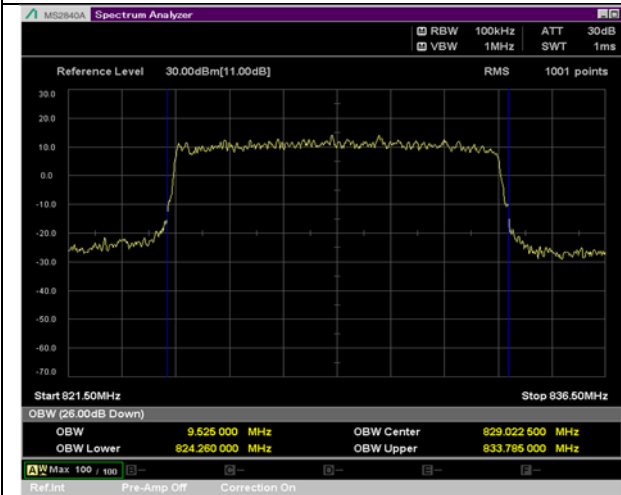
5 MHz, 826.5 MHz, 256QAM, Full RB



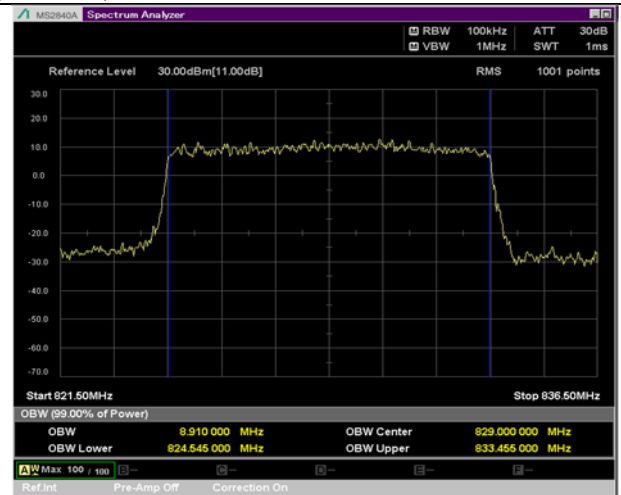
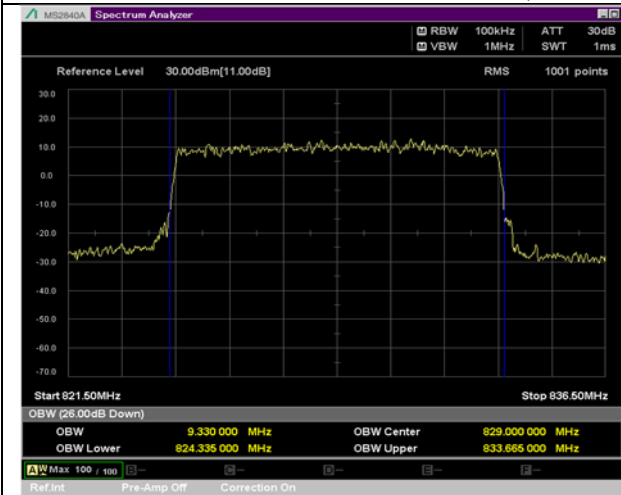
10 MHz, 829 MHz, QPSK, Full RB

-26 dB

99 %



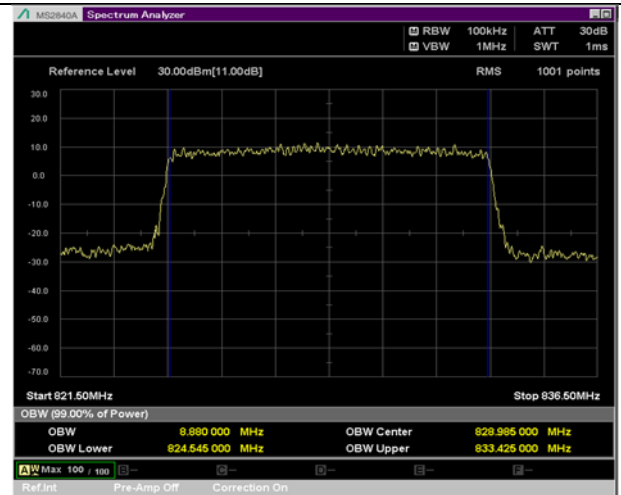
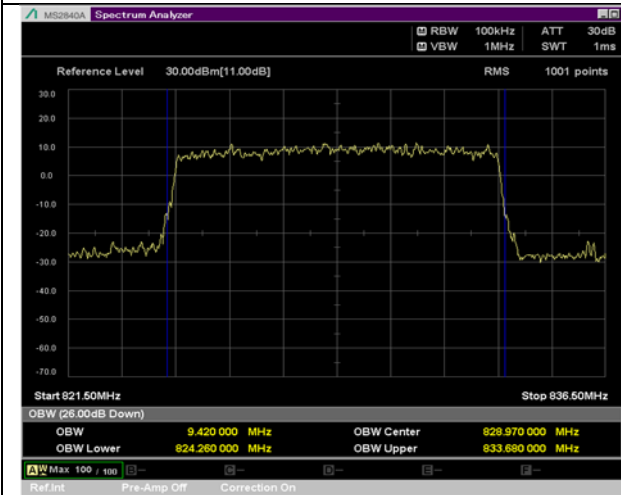
10 MHz, 829 MHz, 16QAM, Full RB



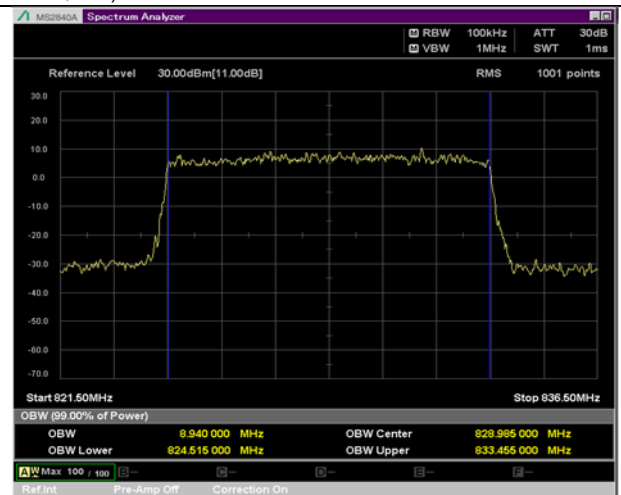
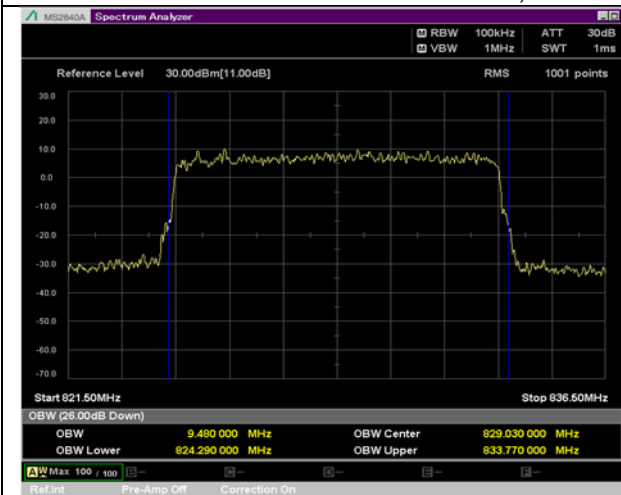
10 MHz, 829 MHz, 64QAM, Full RB

-26 dB

99 %



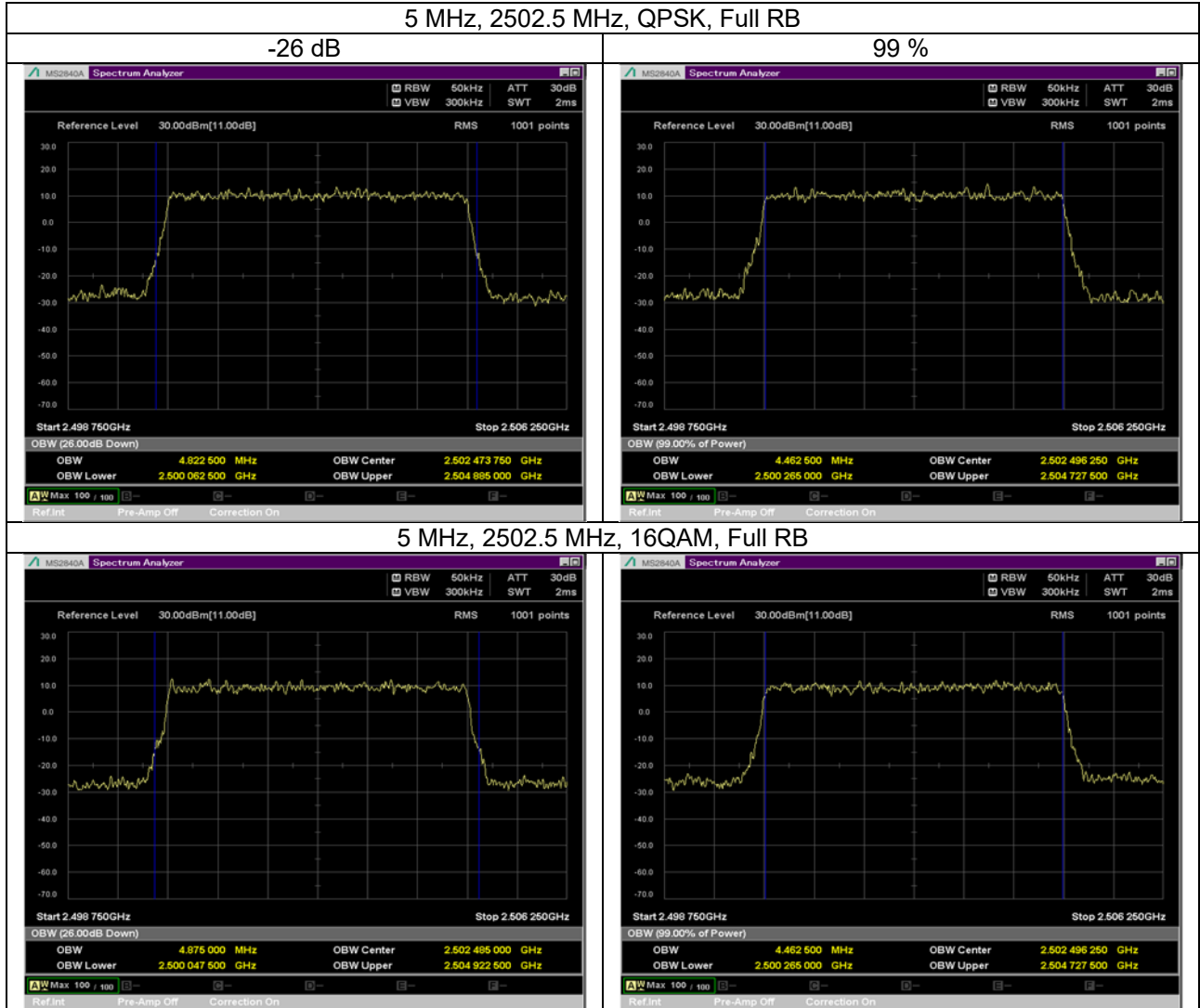
10 MHz, 829 MHz, 256QAM, Full RB



**LTE Band 7**

Band	Bandwidth (MHz)	UL Channel	RB Size	RB Position	Modulation	-26 dB OBW (MHz)	99% OBW (MHz)	Verdict
Band 7	5	20775	25	#0	QPSK	4.82	4.46	PASS
Band 7		20775	25	#0	16QAM	4.82	4.46	PASS
Band 7		20775	25	#0	64QAM	4.83	4.47	PASS
Band 7		20775	25	#0	256QAM	4.82	4.46	PASS
Band 7	10	20800	50	#0	QPSK	9.51	8.93	PASS
Band 7		20800	50	#0	16QAM	9.39	8.93	PASS
Band 7		20800	50	#0	64QAM	9.54	8.94	PASS
Band 7		20800	50	#0	256QAM	9.44	8.93	PASS
Band 7	15	20825	75	#0	QPSK	14.20	13.41	PASS
Band 7		20825	75	#0	16QAM	14.18	13.43	PASS
Band 7		20825	75	#0	64QAM	14.22	13.46	PASS
Band 7		20825	75	#0	256QAM	14.24	13.48	PASS
Band 7	20	21350	100	#0	QPSK	18.72	17.79	PASS
Band 7		21350	100	#0	16QAM	18.93	17.82	PASS
Band 7		21350	100	#0	64QAM	18.84	17.91	PASS
Band 7		21350	100	#0	256QAM	18.90	17.76	PASS

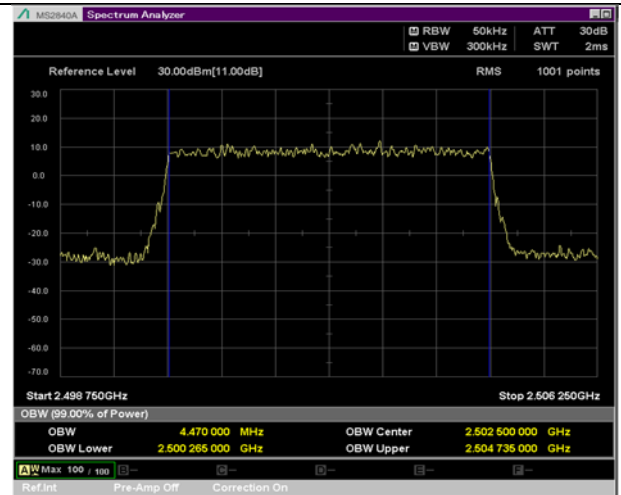
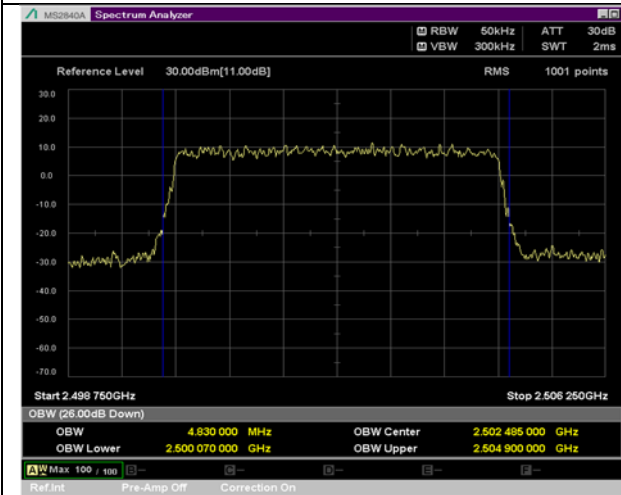
LTE BAND 7 Occupied Bandwidth Plot



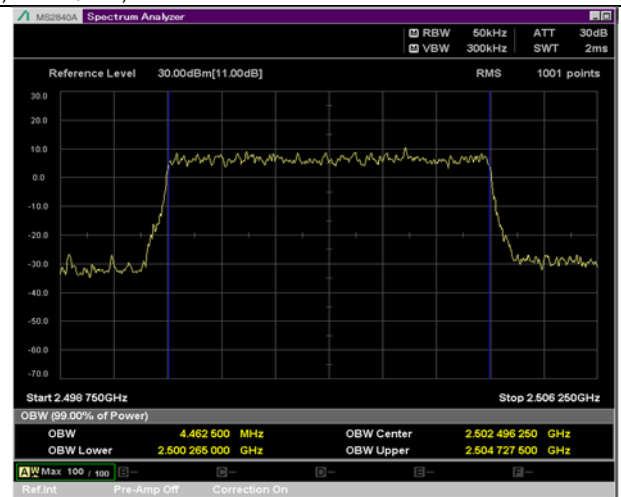
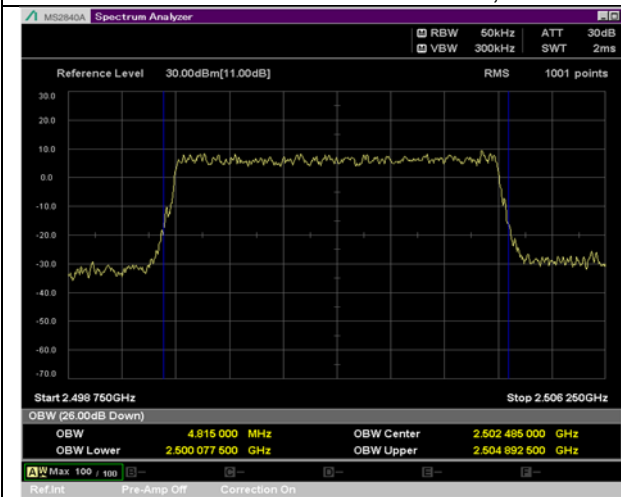
5 MHz, 2502.5 MHz, 64QAM, Full RB

-26 dB

99 %



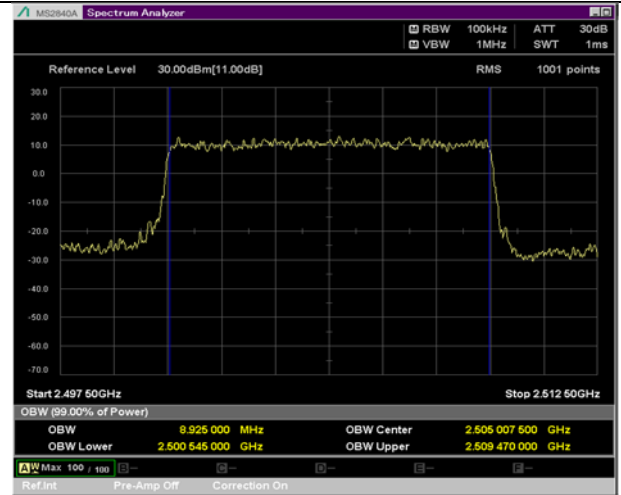
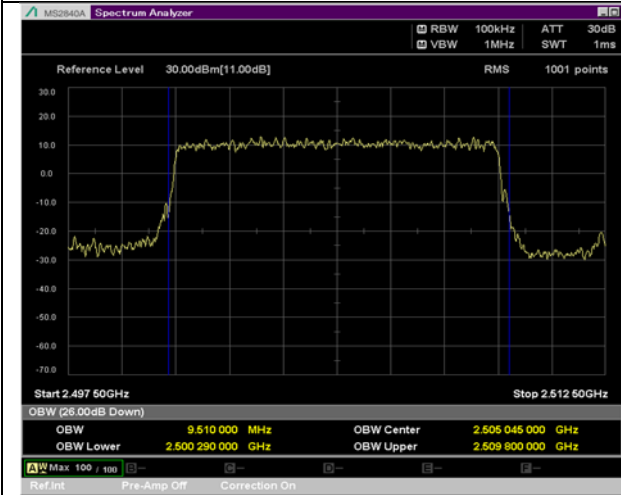
5 MHz, 2502.5 MHz, 256QAM, Full RB



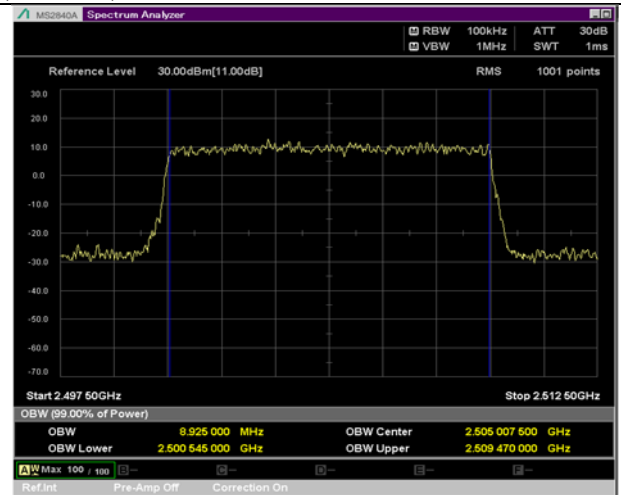
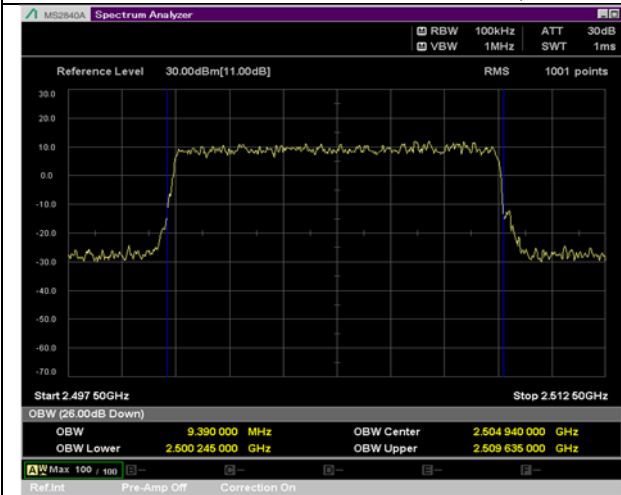
10 MHz, 2505 MHz, QPSK, Full RB

-26 dB

99 %



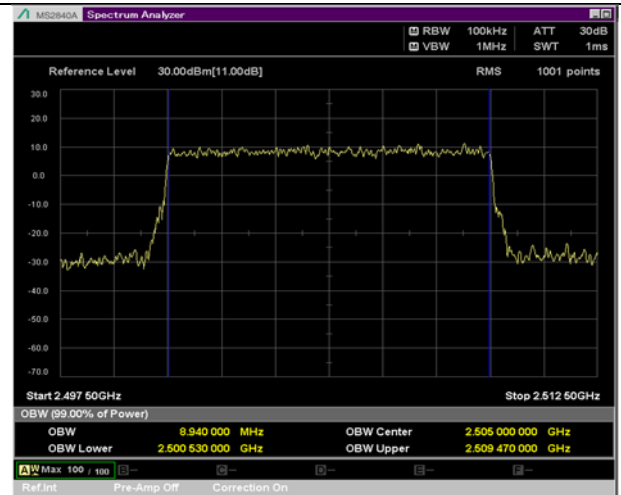
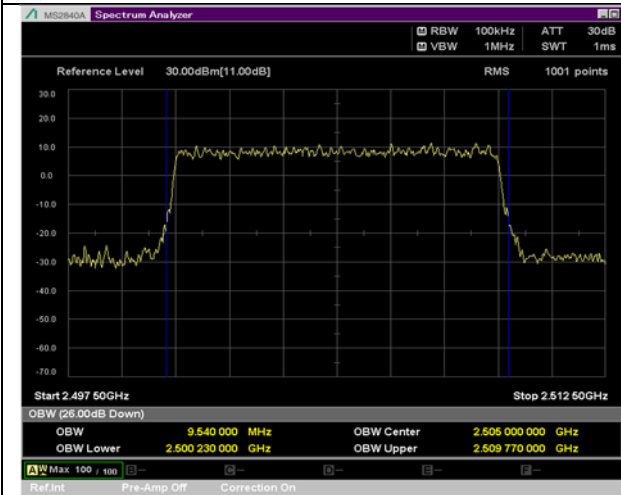
10 MHz, 2505 MHz, 16QAM, Full RB



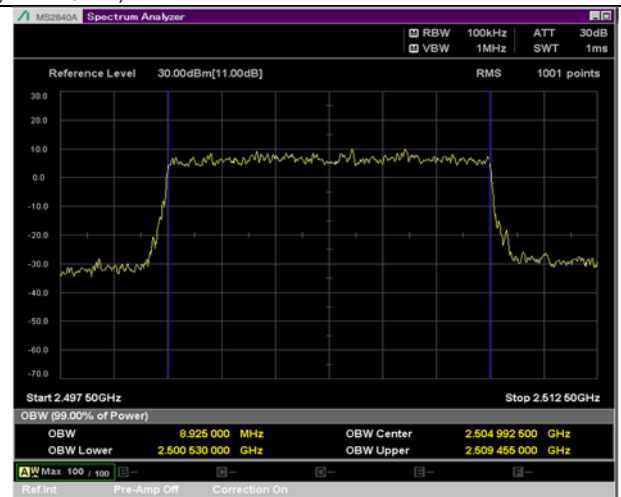
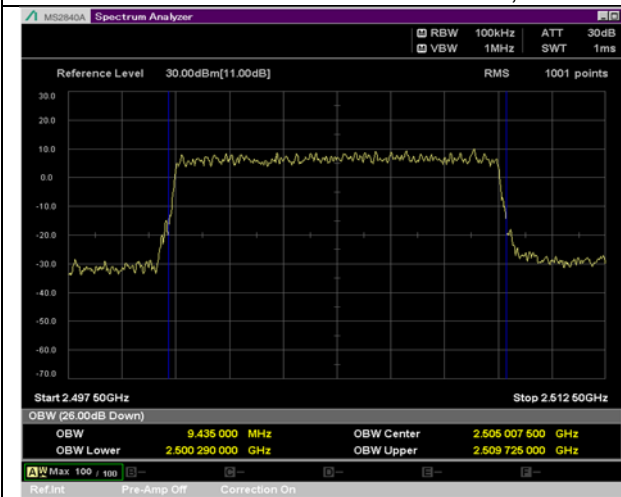
10 MHz, 2505 MHz, 64QAM, Full RB

-26 dB

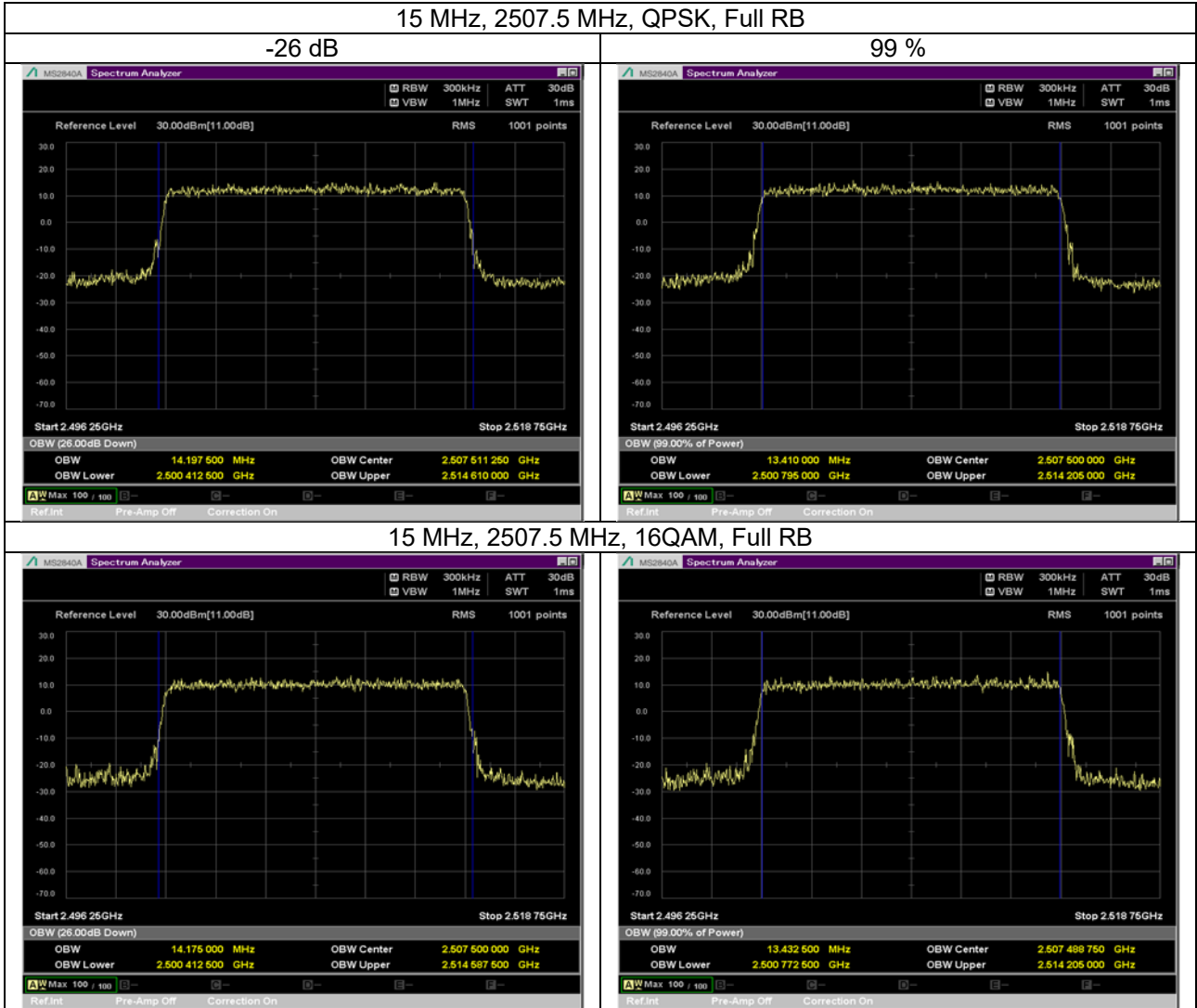
99 %



10 MHz, 2505 MHz, 256QAM, Full RB



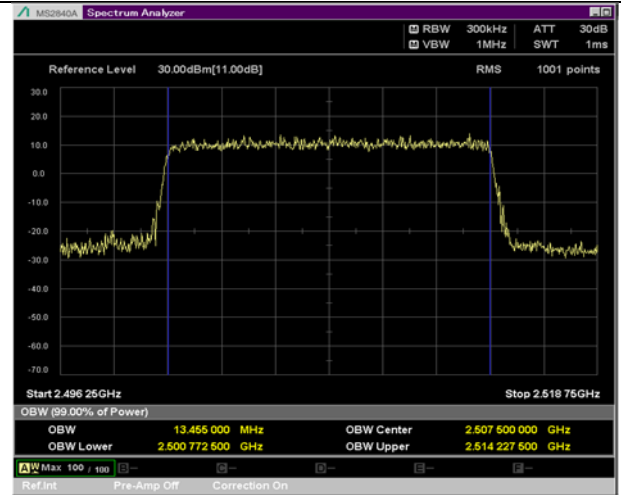
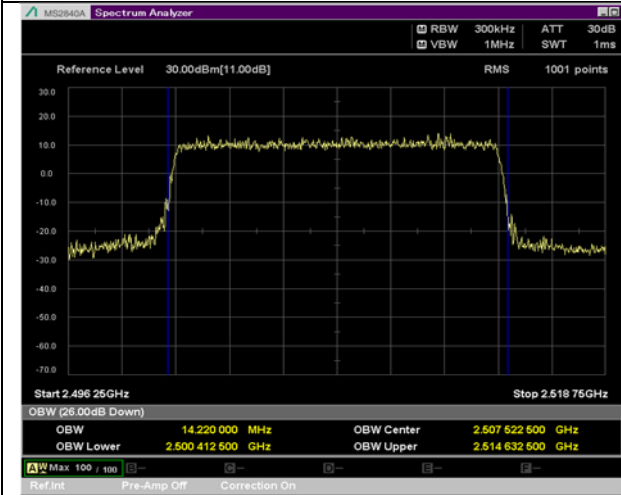




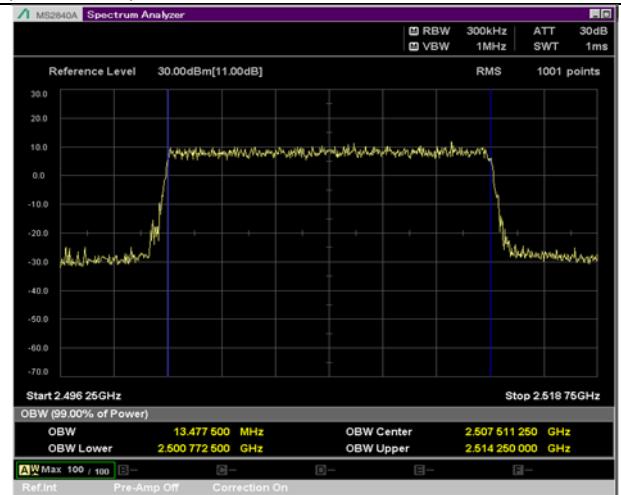
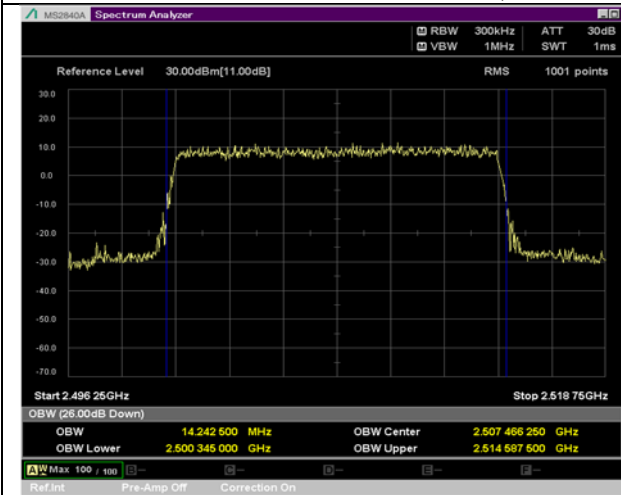
15 MHz, 2507.5 MHz, 64QAM, Full RB

-26 dB

99 %



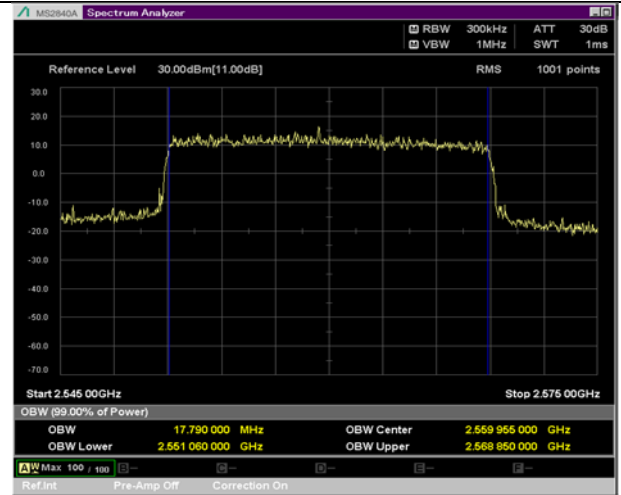
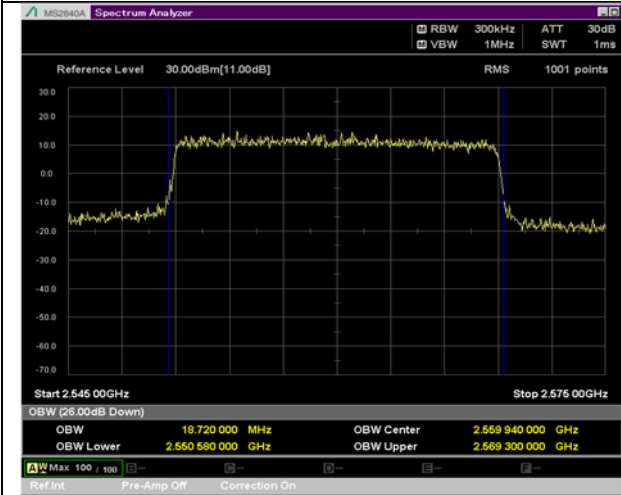
15 MHz, 2507.5 MHz, 256QAM, Full RB



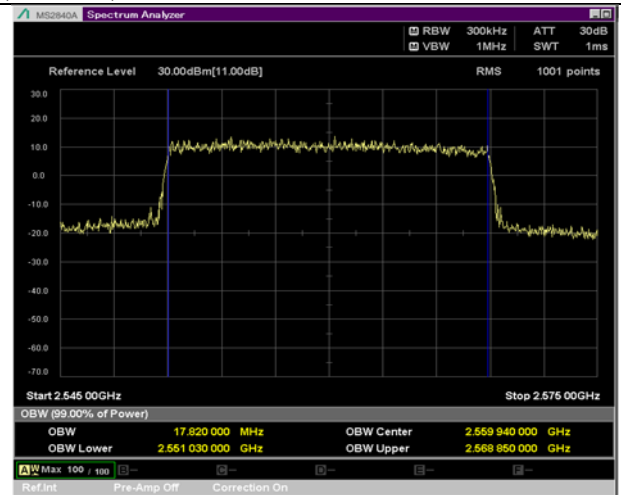
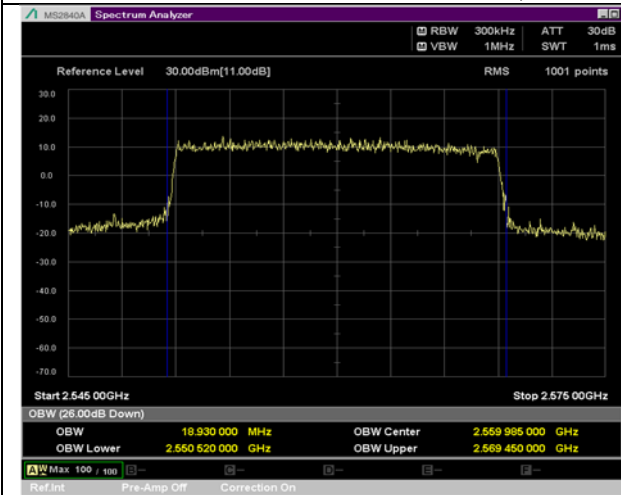
20 MHz, 2560 MHz, QPSK, Full RB

-26 dB

99 %



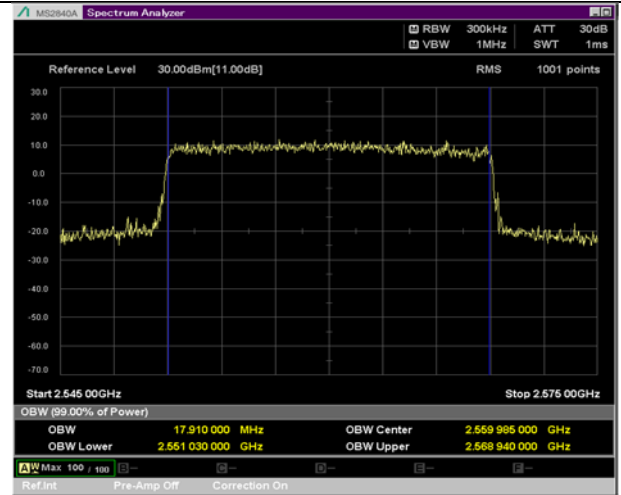
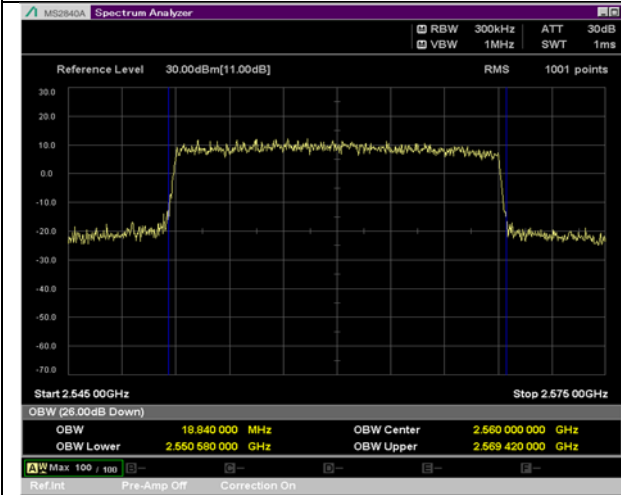
20 MHz, 2560 MHz, 16QAM, Full RB



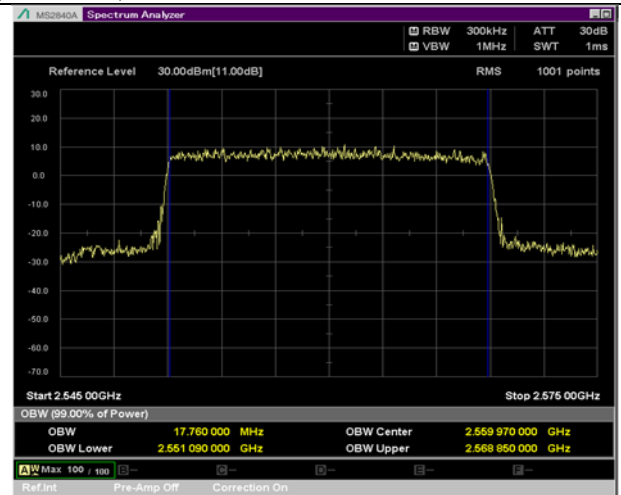
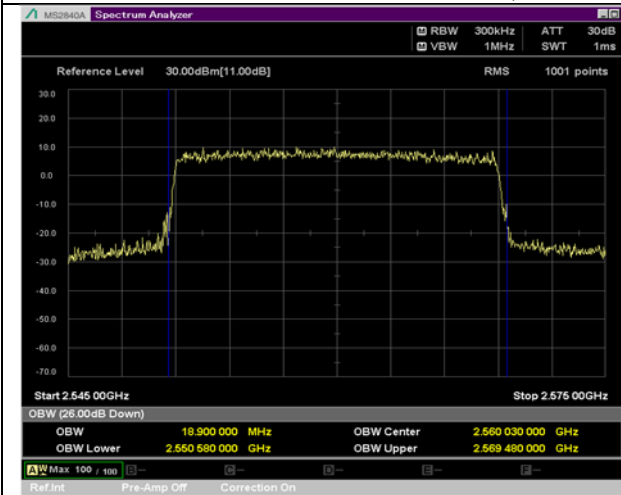
20 MHz, 2560 MHz, 64QAM, Full RB

-26 dB

99 %



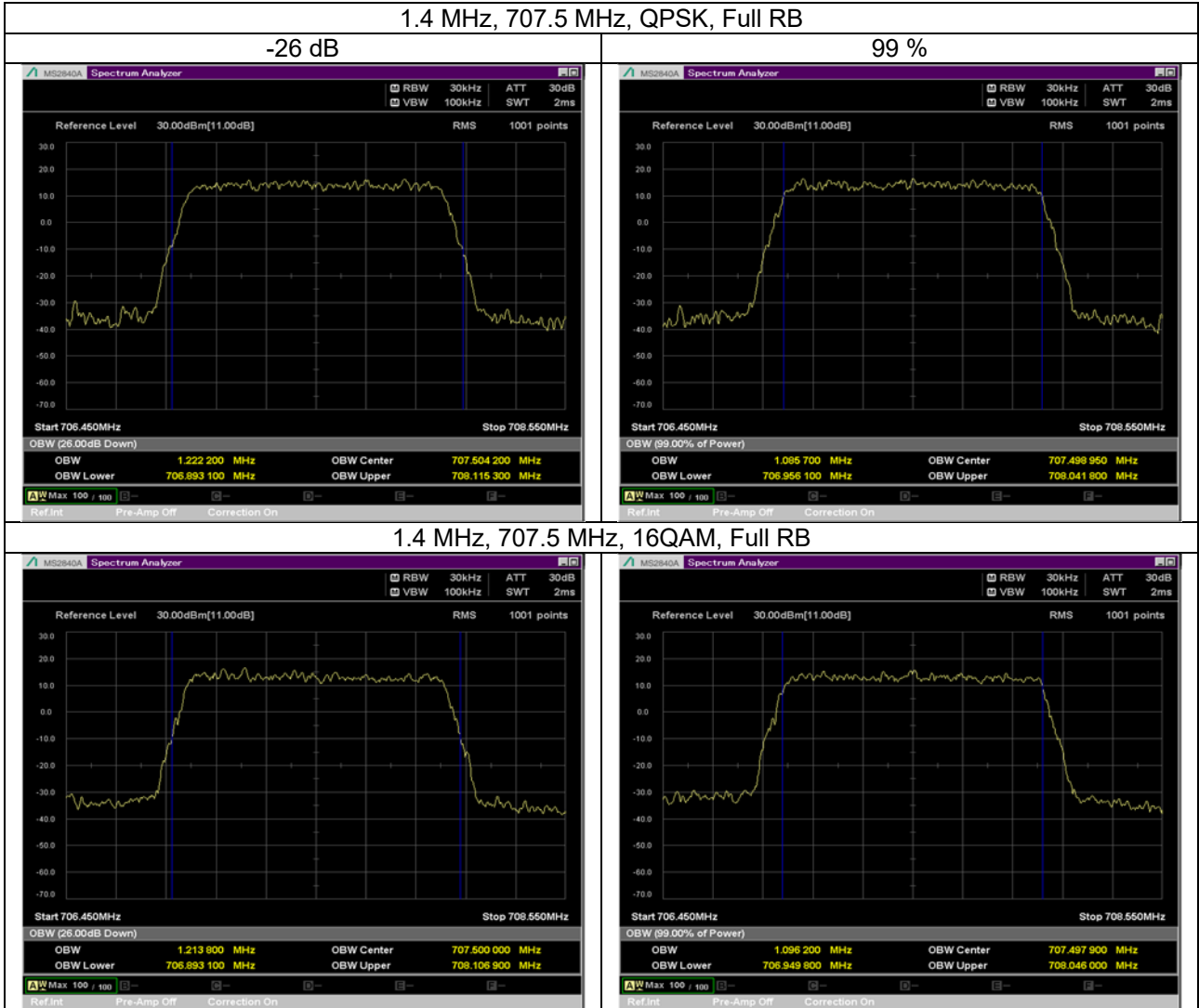
20 MHz, 2560 MHz, 256QAM, Full RB



**LTE Band 12**

Band	Bandwidth (MHz)	UL Channel	RB Size	RB Position	Modulation	-26 dB OBW (MHz)	99% OBW (MHz)	Verdict
Band 12	1.4	23095	6	#0	QPSK	1.22	1.09	PASS
Band 12		23095	6	#0	16QAM	1.21	1.10	PASS
Band 12		23095	6	#0	64QAM	1.22	1.09	PASS
Band 12		23095	6	#0	256QAM	1.23	1.09	PASS
Band 12	3	23095	15	#0	QPSK	2.90	2.67	PASS
Band 12		23095	15	#0	16QAM	2.90	2.67	PASS
Band 12		23095	15	#0	64QAM	2.89	2.67	PASS
Band 12		23095	15	#0	256QAM	2.93	2.68	PASS
Band 12	5	23095	25	#0	QPSK	4.81	4.46	PASS
Band 12		23095	25	#0	16QAM	4.87	4.48	PASS
Band 12		23095	25	#0	64QAM	4.82	4.48	PASS
Band 12		23095	25	#0	256QAM	4.85	4.48	PASS
Band 12	10	23130	50	#0	QPSK	9.39	8.90	PASS
Band 12		23130	50	#0	16QAM	9.41	8.88	PASS
Band 12		23130	50	#0	64QAM	9.48	8.93	PASS
Band 12		23130	50	#0	256QAM	9.47	8.91	PASS

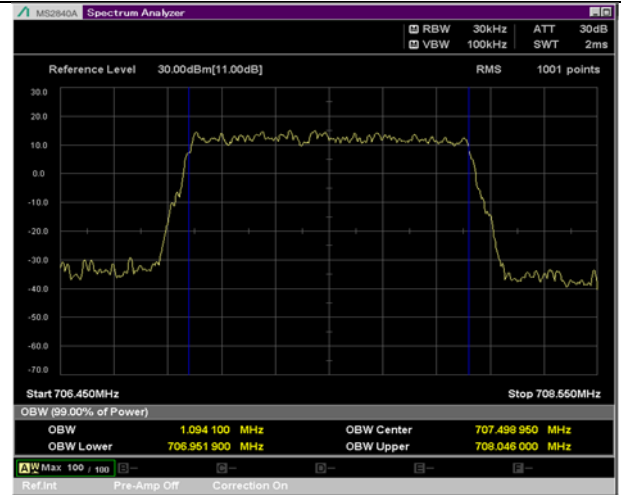
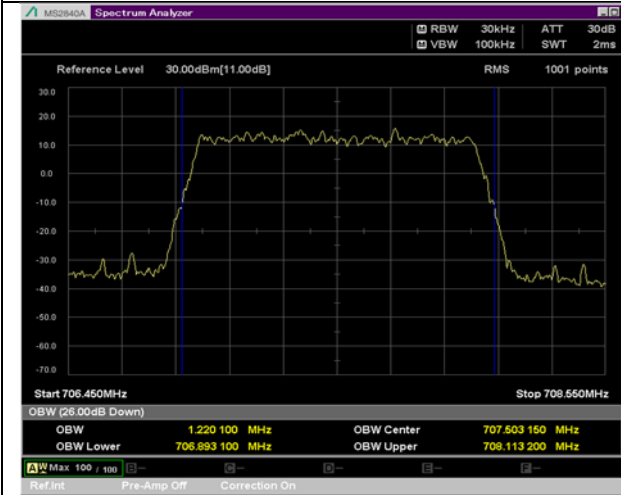
LTE BAND 12 Occupied Bandwidth Plot



1.4 MHz, 707.5 MHz, 64QAM, Full RB

-26 dB

99 %



1.4 MHz, 707.5 MHz, 256QAM, Full RB

