




**DATE: 07 September 2016**

**I.T.L. (PRODUCT TESTING) LTD.  
FCC Radio Test Report  
for  
Corning Optical Communication  
Wireless**

**Equipment under test:  
ONE- Optical Network Evolution Wireless  
Platform**

**MRU (Mid Power Remote Unit)  
(CELL/ESMR Section)**

Tested by:   
M. Zohar

Approved by:   
D. Shidlow

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This report relates only to items tested.



## Measurement/Technical Report for Corning Optical Communication Wireless ONE- Optical Network Evolution Wireless Platform

**FCC ID: OJF1MRU85CR**

This report concerns:

Original Grant: X

Class II change:

Class I change:

Equipment type:

B21 – Part 20 Industrial Booster (CMRS)

Limits used:

47CFR Parts 2, 22, 20, 90

Measurement procedure used is KDB 971168 D03 v01 and  
KDB 935210 D05 v01r01

Substitution Method used as in ANSI/TIA-603-D: 2010

Application for Certification

prepared by:

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Applicant for this device:

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# 1. General Information

## 1.1 Administrative Information

Manufacturer: Corning Optical Communication Wireless

Manufacturer's Address: 13221 Woodland Park Rd.,  
Suite #400  
Herndon, VA. 20171  
U.S.A.  
Tel: +1-541-758-2880  
Fax: +1-703-848-0260

Manufacturer's Representative: Habib Riazi

Equipment Under Test (E.U.T): ONE- Optical Network Evolution Wireless Platform

Equipment Model No.: MRU (Mid Power Remote Unit)

Equipment Serial No.: 05154901D3

Date of Receipt of E.U.T: July 3, 2016, September 6, 2016\*

Start of Test: July 3, 2016, September 6, 2016\*

End of Test: August 4, 2016

Test Laboratory Location: I.T.L (Product Testing) Ltd.  
1 Batsheva St,  
Lod,  
Israel 7116002

Test Specifications: FCC Parts 2, 22, 20, 90

\*Out-of-Band Rejection test performed on September 6, 2016.



## 1.2 **List of Accreditations**

The EMC laboratory of I.T.L. is accredited by/registered with the following bodies:

1. The American Association for Laboratory Accreditation (A2LA) (U.S.A.), Certificate No. 1152.01.
2. The Federal Communications Commission (FCC) (U.S.A.), FCC Designation Number IL1005.
3. The Israel Ministry of the Environment (Israel), Registration No. 1104/01.
4. The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) (Japan), Registration Numbers: C-3006, R-2729, T-1877, G-245.
5. Industry Canada (Canada), IC File No.: 46405-4025; Site No. IC 4025A-1, IC 4025A-2.

I.T.L. Product Testing Ltd. is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this test report have been determined in accordance with I.T.L.'s terms of accreditation unless stated otherwise in the report.



### 1.3 **Product Description**

Modular 7 band Enabled Mid Power Neutral Host Solution –  
Supported modular frequency bands

700, ESMR+CELL, PCS, AWS, WCS

Integrated 2.5 GHz expansion ready

Composite Output Power

AWS: 34dBm

PCS, WCS: 33dBm

700, ESMR & CELL: 30dBm

Specifications

100% Modularity

NEBS Class 2 Compliant

Small Footprint – 6 Rack Units

Highlights:

Extended ONE platform design Diversity

100% modular component design

Composite output power: 2W

Small Compact Form Factor (6U)

Non-Service Impacting Upgrades

Lower initial deployment costs

### 1.4 **Test Methodology**

Both conducted and radiated testing were performed according to the procedures in KDB 971168 D03 v01, KDB 935210 D05 v01r01 and ANSI/TIA-603-D: 2010. Radiated testing was performed at an antenna to EUT distance of 3 meters.

### 1.5 **Test Facility**

Both conducted and radiated emissions tests were performed at I.T.L.'s testing facility in Lod, Israel. I.T.L.'s EMC Laboratory is accredited by A2LA, certificate No. 1152.01 and its FCC Designation Number is IL1005.

### 1.6 **Measurement Uncertainty**

Conducted Emission (CISPR 11, EN 55011, CISPR 22, EN 55022, ANSI C63.4)

0.15 – 30 MHz:

Expanded Uncertainty (95% Confidence, K=2):

± 3.44 dB

Radiated Emission (CISPR 11, EN 55011, CISPR 22, EN 55022, ANSI C63.4)  
for open site 30-1000MHz:

Expanded Uncertainty (95% Confidence, K=2):

± 4.98 dB

## 2. System Test Configuration

### 2.1 *Justification*

The test setup was configured to closely resemble the standard installation. The EUT consists of the MRU (Mid-Power Remote Module) which is connected with the head-end ONE equipment using fiber optic cable.

The RF source signals are represented in the setup by appropriate signal generators.

An “Exercise” SW on the computer was used to enable / disable transmission of the EUT, while the EUT output was connected to the spectrum analyzer.

The system was tested under maximum gain conditions while input power level to the RIM is 0 dBm and output antenna port of MRU is 33dBm for PCS and WCS, 34dBm for AWS and 30dBm for low frequency bands. Testing was performed on the following configurations:

Frequency Range (MHz)		
Service/Band	Downlink (DL)	Technology
700 MHz	728-757	LTE
ESMR 800	862- 869	WCDMA, LTE, GSM
CELL 850	869-894	WCDMA, LTE, GSM
PCS + G 1900	1930-1995	WCDMA, LTE, GSM
AWS 2100	2110-2155	WCDMA, LTE, GSM
WCS	2350-2360	WCDMA, LTE, GSM

### 2.2 *EUT Exercise Software*

The Element Management System ver. 2.0 used for commands delivery. These commands are used to enable/disable the EUT transmission. EUT Embedded SW versions is mru\_da64\_20\_02.bin.

### 2.3 *Special Accessories*

No special accessories were needed in order to achieve compliance.

### 2.4 *Equipment Modifications*

No modifications were needed in order to achieve compliance.



## 2.5 Configuration of Tested System

Product Name	ONE Wireless Platform
Model Name	MRU (Mid Power Remote Unit)
Working voltage	115.0VAC/48.0VDC
Mode of operation	Industrial Booster for CELL & ESMR band
Modulations	WCDMA, LTE(64QAM), GSM
Assigned Frequency Range	CELL: 869.0MHz-894.0MHz ESMR:862.0MHz-869.0MHz
Transmit power	~30.0 dBm
Antenna Gain	12.5 dBi
DATA rate	N/A
Modulation BW	CELL: 0.5MHz(GSM), 10MHz(LTE), 5MHz(WCDMA) ESMR: 0.5MHz(GSM), 5MHz(LTE), 5MHz(WCDMA)

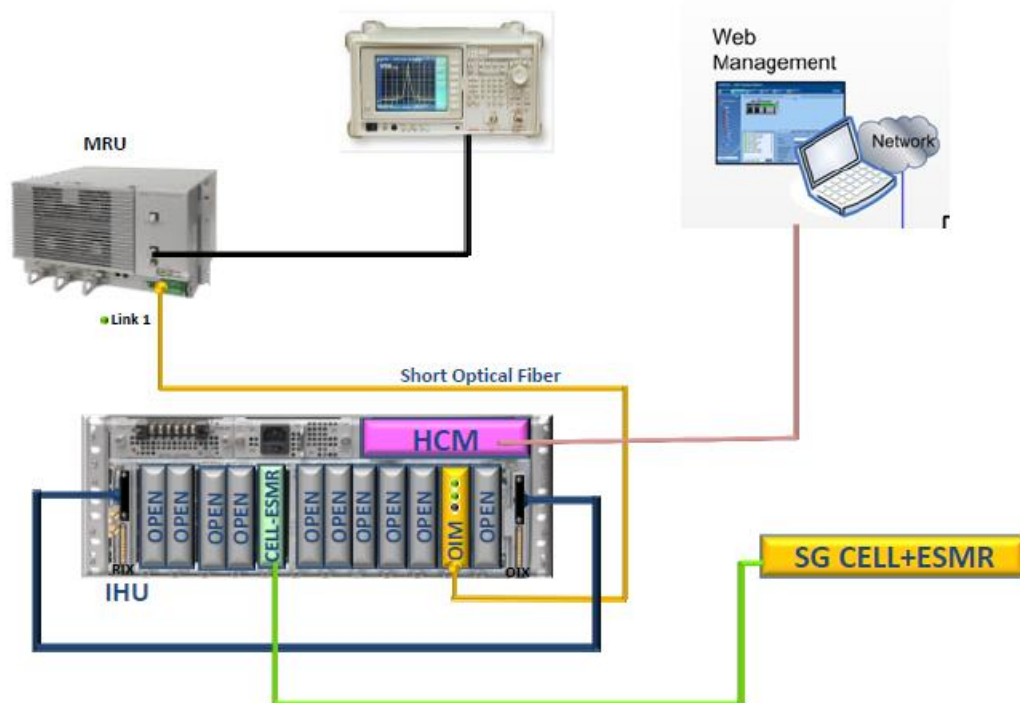


Figure 1. Test Set-Up Conducted

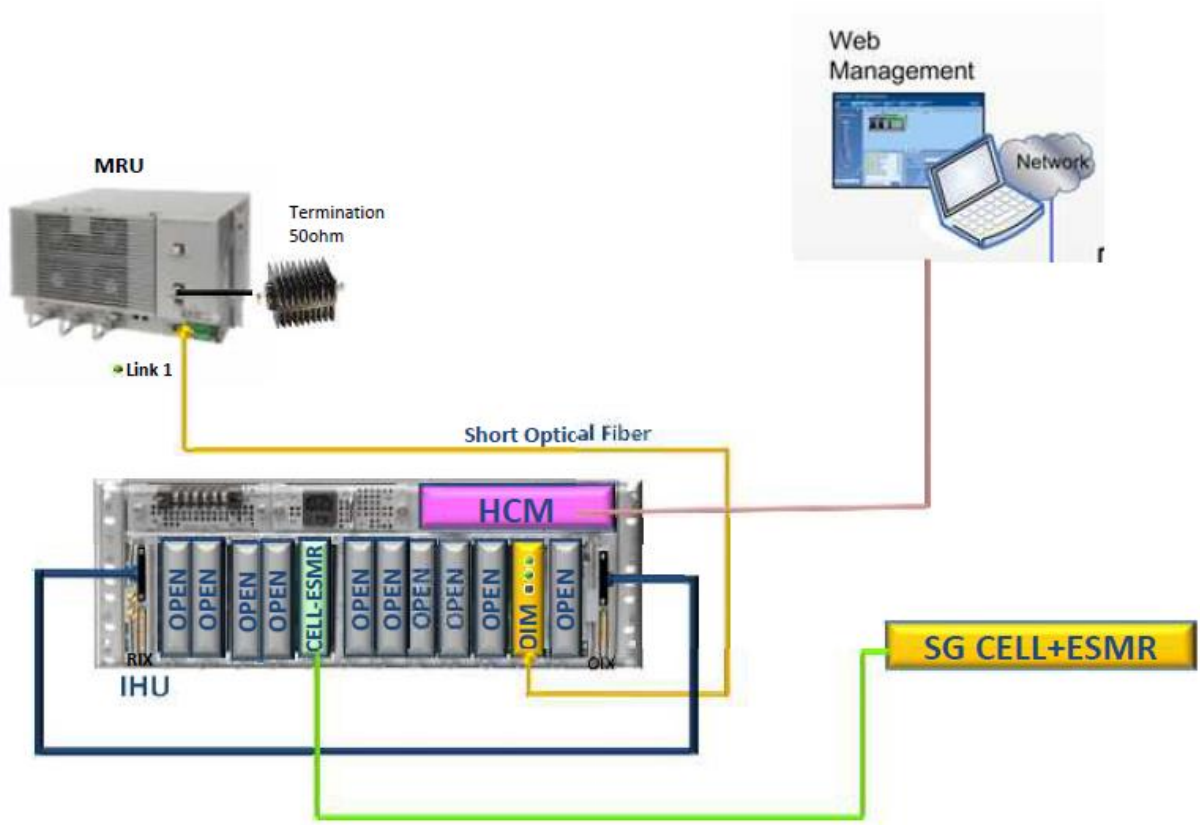


Figure 2. Test Set-Up Radiated

### 3. Test Set-up Photos

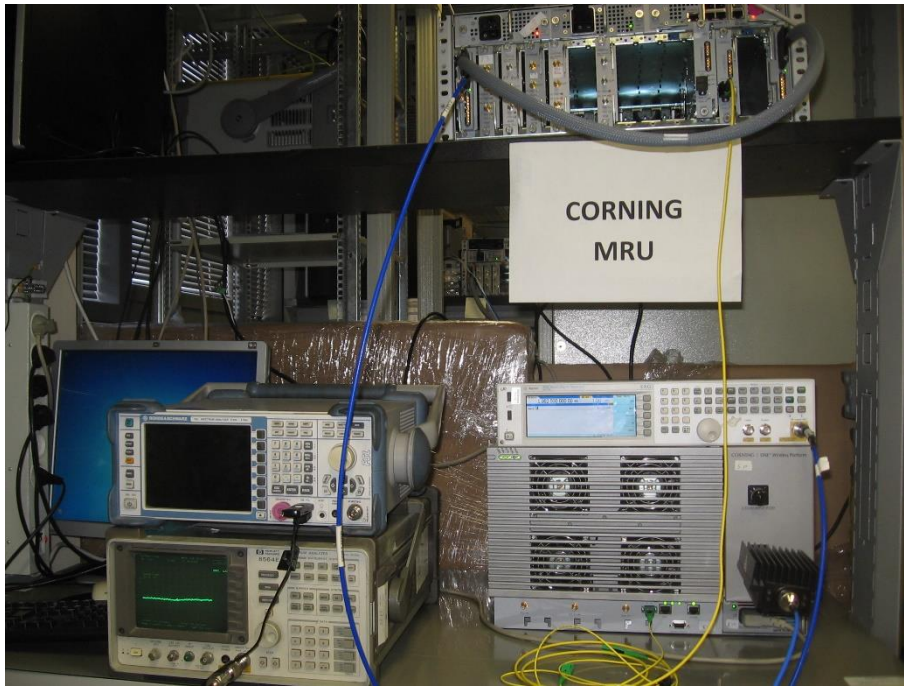


Figure 3. Conducted Emission From Antenna Port Tests

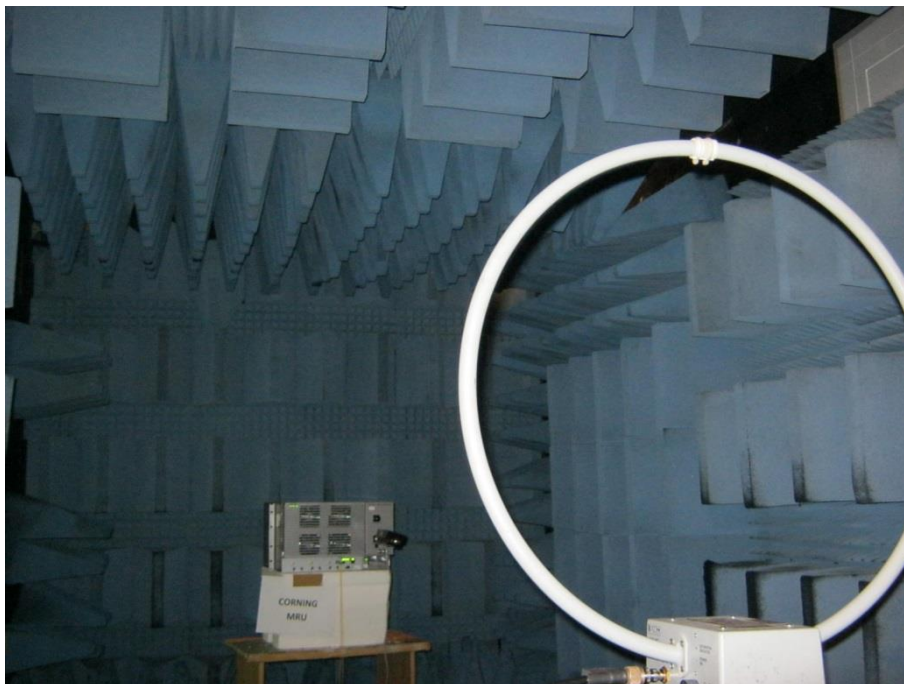


Figure 4. Radiated Emission Test

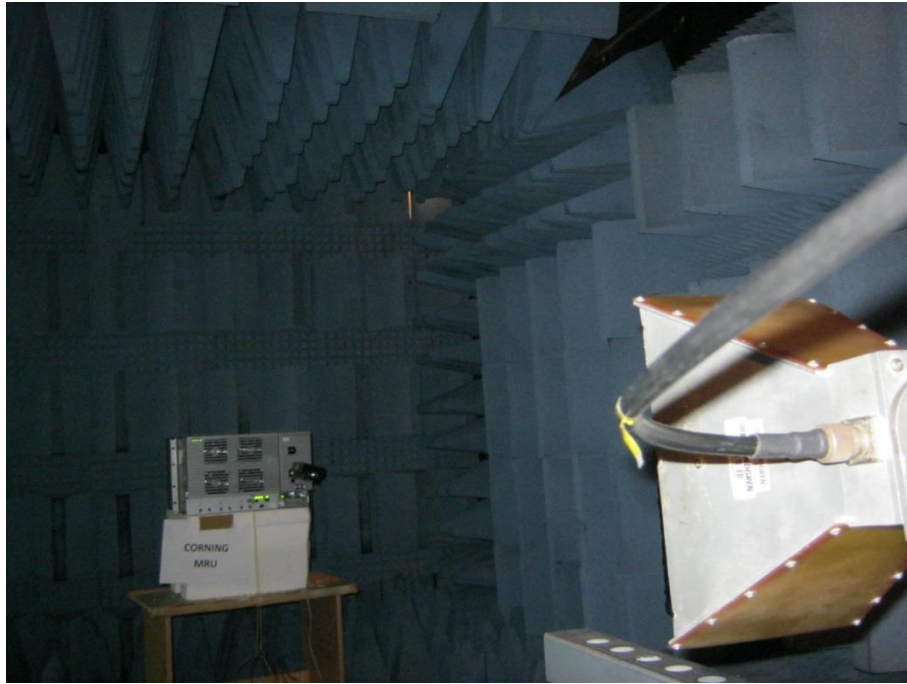


**Figure 5. Radiated Emission Test**

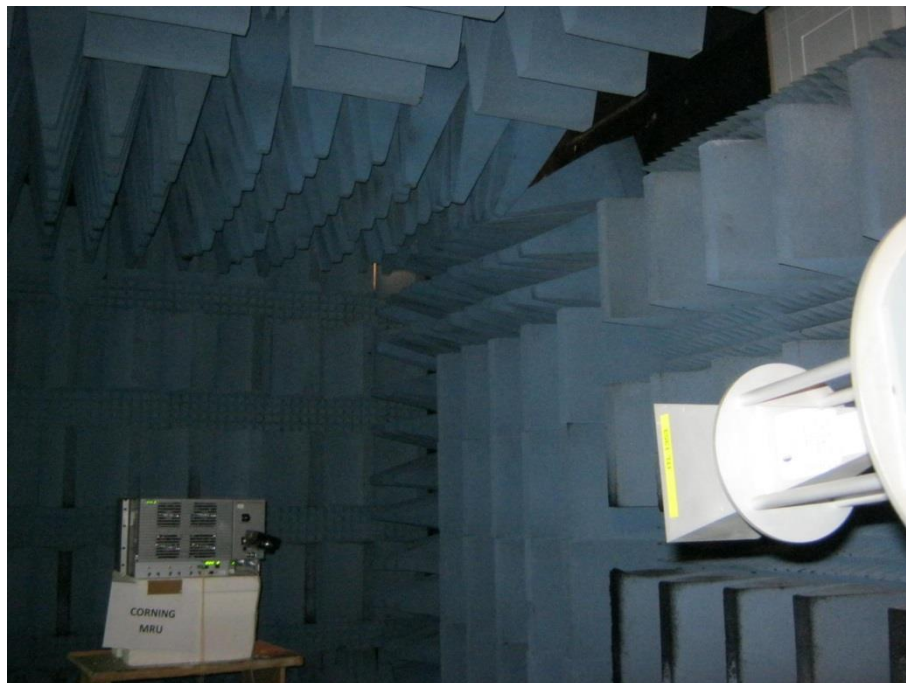


**Figure 6. Radiated Emission Test**

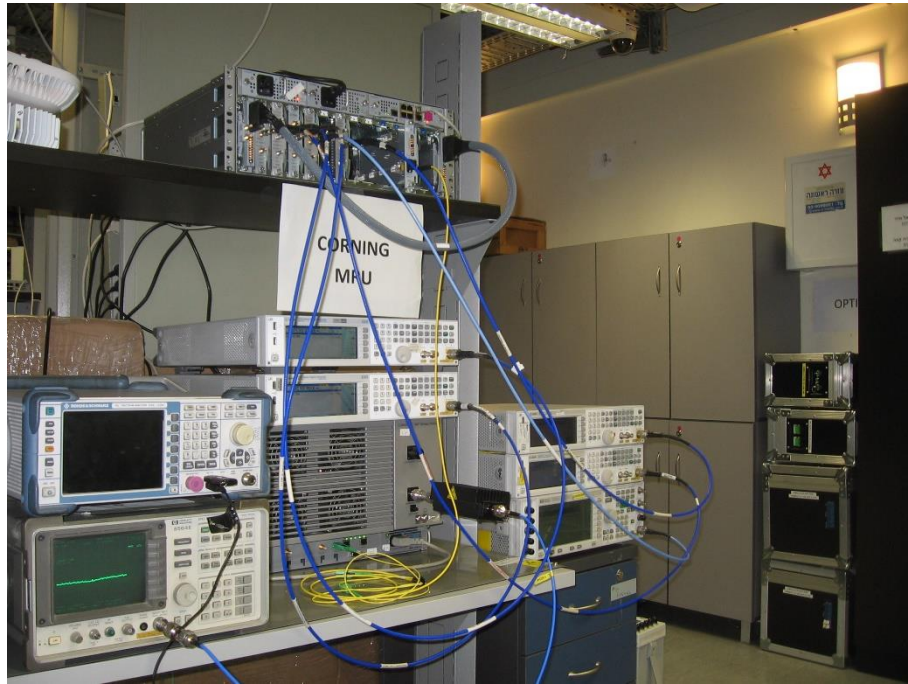




**Figure 7. Radiated Emission Test**



**Figure 8. Radiated Emission Test**



**Figure 9. Intermodulation Conducted Emission Test**

## 4. Peak Output Power (CELL)

### 4.1 Test Specification

FCC Part 22.913

### 4.2 Test Procedure

(Temperature (23°C)/ Humidity (35%RH))

The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator and an appropriate coaxial cable (loss = 41.3 dB). The E.U.T. RF output was modulated with W-CDMA, GSM and LTE 64QAM. Special attention was taken to prevent Spectrum Analyzer RF input overload.

### 4.3 Test Limit

Peak Power Output must not exceed 500 Watts (57dBm).

### 4.4 Test Results

Modulation	Operation Frequency	Reading	Antenna Gain	EIRP	Limit	Margin
	(MHz)	(dBm)	(dBi)	(dBm)	(dBm)	(dB)
LTE 64QAM	874.0	31.1	12.5	43.6	57.0	-13.4
	881.0	31.6	12.5	44.1	57.0	-12.9
	889.0	31.2	12.5	43.7	57.0	-13.3
GSM	870.2	32.3	12.5	44.8	57.0	-12.2
	881.0	30.4	12.5	42.9	57.0	-14.1
	892.8	31.0	12.5	43.5	57.0	-13.5
W-CDMA	871.5	31.4	12.5	43.9	57.0	-13.1
	881.0	31.0	12.5	43.5	57.0	-13.5
	891.5	30.8	12.5	43.3	57.0	-13.7

Figure 10 Peak Output Power CELL

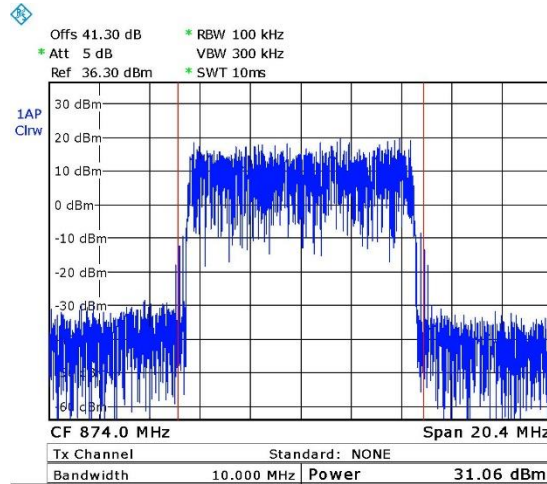
JUDGEMENT: Passed by 12.2 dB

See additional information in *Figure 11* to *Figure 19*.



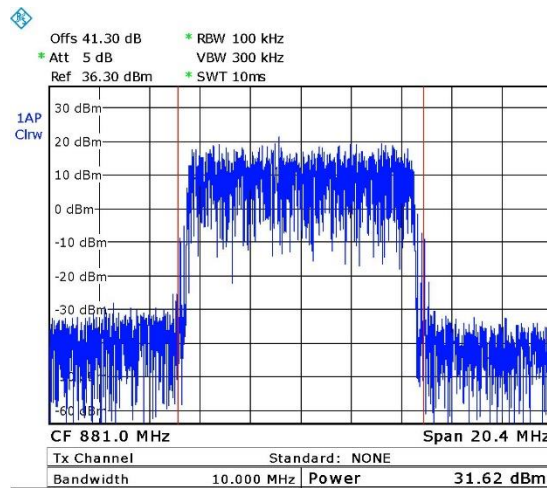
# Peak Output Power (CELL)

E.U.T Description      ONE- Optical Network Evolution  
Wireless Platform  
Type                      MRU (Mid Power Remote Unit)  
Serial Number:         05154901D3



Date: 4 JUL 2016 09:06:33

Figure 11. — LTE 64QAM - 874.0 MHz



Date: 4 JUL 2016 09:07:12

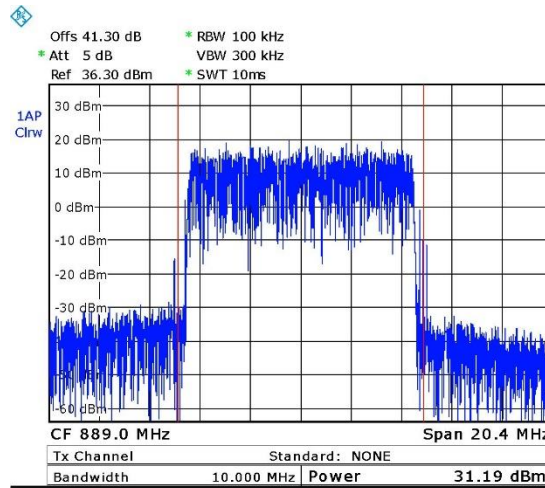
Figure 12. — LTE 64QAM - 881.0 MHz





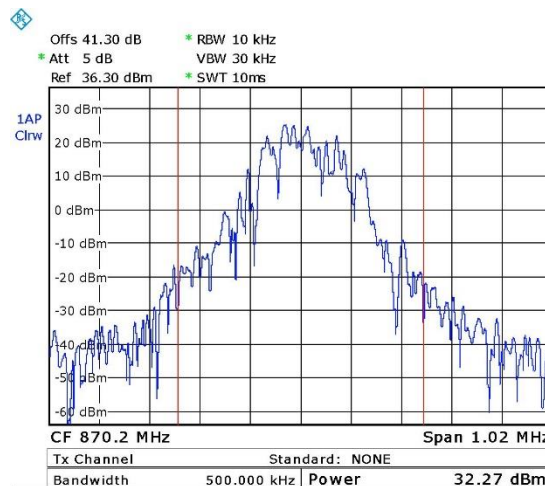
# Peak Output Power (CELL)

E.U.T Description ONE- Optical Network Evolution  
Wireless Platform  
Type MRU (Mid Power Remote Unit)  
Serial Number: 05154901D3



Date: 4.JUL.2016 09:10:08

Figure 13. — LTE 64QAM - 889.0 MHz



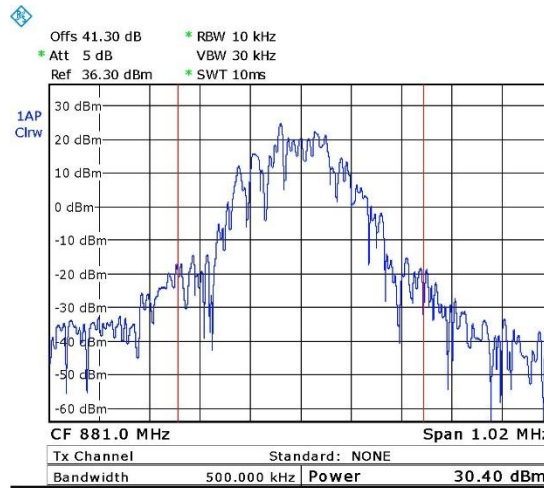
Date: 4.JUL.2016 09:19:49

Figure 14. — GSM - 870.2 MHz



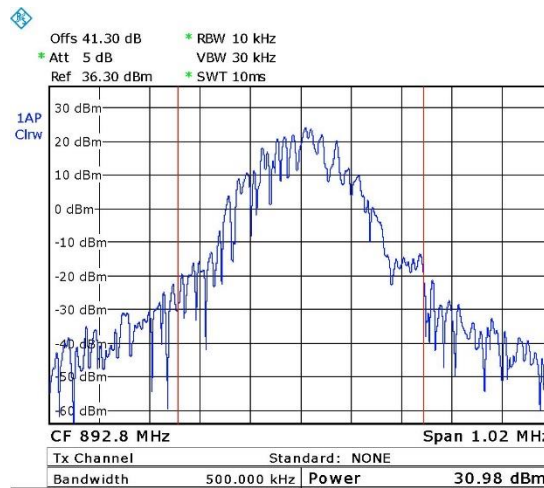
# Peak Output Power (CELL)

E.U.T Description ONE- Optical Network Evolution  
Wireless Platform  
Type MRU (Mid Power Remote Unit)  
Serial Number: 05154901D3



Date: 4.JUL.2016 09:20:37

Figure 15. — GSM - 881.0 MHz



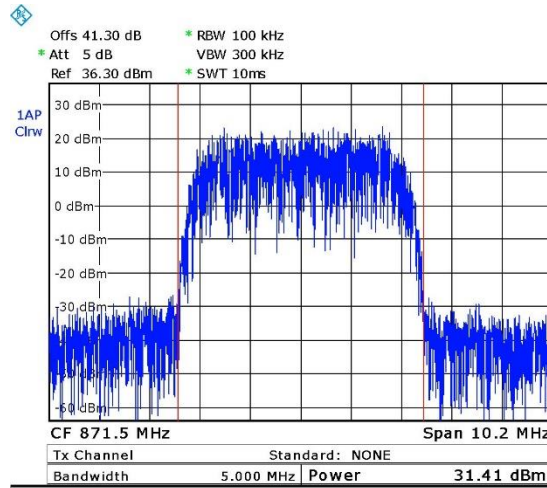
Date: 4.JUL.2016 09:21:24

Figure 16. — GSM - 892.8 MHz



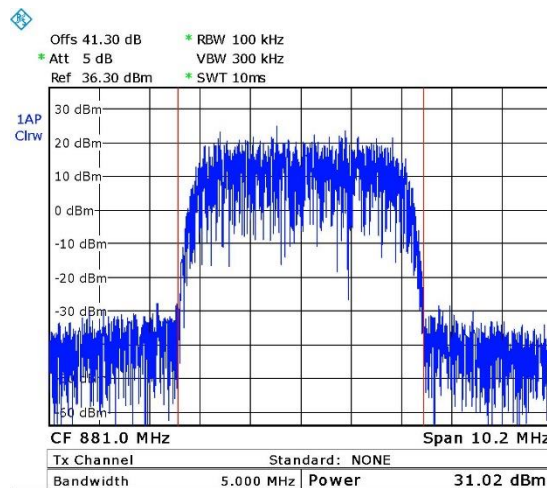
# Peak Output Power (CELL)

E.U.T Description ONE- Optical Network Evolution  
Wireless Platform  
Type MRU (Mid Power Remote Unit)  
Serial Number: 05154901D3



Date: 4.JUL.2016 09:12:41

Figure 17. — W-CDMA - 871.5 MHz



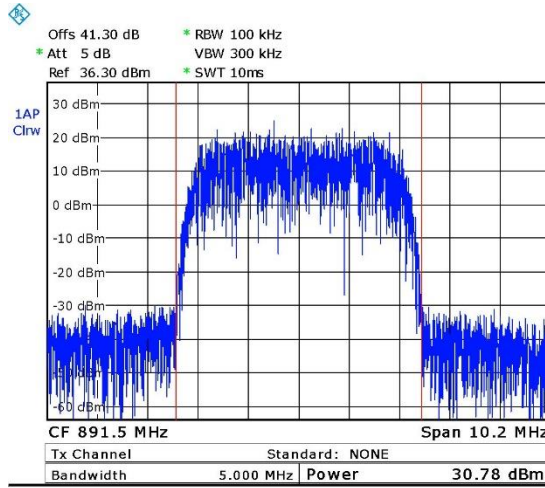
Date: 4.JUL.2016 09:15:40

Figure 18. — W-CDMA - 881.0 MHz



# Peak Output Power (CELL)

E.U.T Description      ONE- Optical Network Evolution  
Wireless Platform  
Type                      MRU (Mid Power Remote Unit)  
Serial Number:        05154901D3



Date: 4.JUL.2016 09:16:28

Figure 19. — W-CDMA - 891.5 MHz



#### 4.5 Test Equipment Used; Peak Output Power CELL

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibration Date	Next Calibration Date
Spectrum Analyzer	R&S	FSL6	100194	February 29, 2016	March 1, 2017
EXG Vector Signal Generator	Agilent	N5172B	MY51350584	July 1, 2016	July 1, 2017
40 dB Attenuator	Weinschel	WA 39-40-33	A1323	April 3, 2016	April 3, 2017

Figure 20 Test Equipment Used

## 5. Occupied Bandwidth (CELL)

### 5.1 Test Specification

FCC Part 2, Section 1049

### 5.2 Test Procedure

(Temperature (23°C)/ Humidity (34%RH))

The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator and an appropriate coaxial cable (loss=41.3 dB). The spectrum analyzer was set to proper resolution B.W.

OBW function (99%) was employed for these evaluation

Occupied bandwidth measured was repeated in the input terminal of the E.U.T.

### 5.3 Test Limit

N/A

### 5.4 Test Results

Modulation	Port	Operating Frequency	Reading
	(Input/Output)	(MHz)	(MHz)
LTE 64QAM	Input	874.0	8.9
	Output	874.0	8.9
	Input	881.0	8.9
	Output	881.0	8.9
	Input	889.0	8.9
	Output	889.0	8.9
GSM	Input	870.2	0.2
	Output	870.2	0.2
	Input	881.0	0.2
	Output	881.0	0.2
	Input	892.8	0.2
	Output	892.8	0.2
W-CDMA	Input	871.5	4.1
	Output	871.5	4.1
	Input	881.0	4.1
	Output	881.0	4.1
	Input	891.5	4.1
	Output	891.5	4.1

**Figure 21 Occupied Bandwidth CELL Test Results Table**

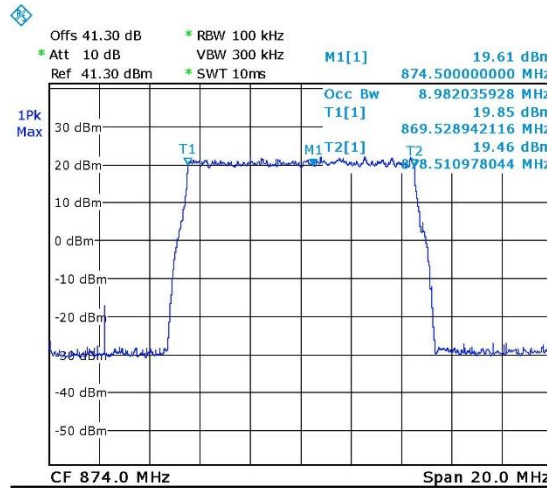
JUDGEMENT: Passed

See additional information in *Figure 22 to Figure 39*.



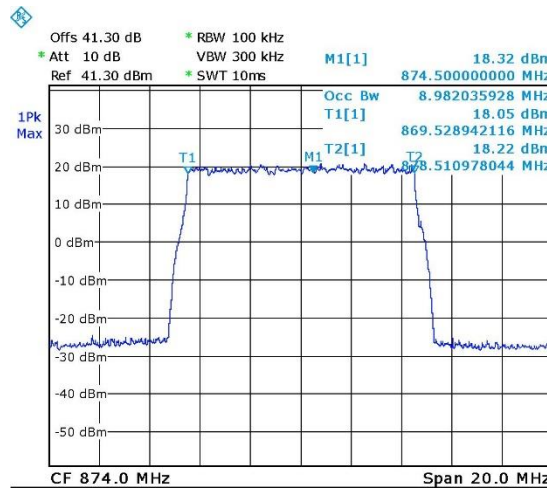
# Occupied Bandwidth (CELL)

E.U.T Description ONE- Optical Network Evolution  
Wireless Platform  
Type MRU (Mid Power Remote Unit)  
Serial Number: 05154901D3



Date: 4.JUL.2016 10:32:02

Figure 22. — LTE 64QAM Input 874.0MHz



Date: 4.JUL.2016 10:13:11

Figure 23. — LTE 64QAM Output 874.0MHz

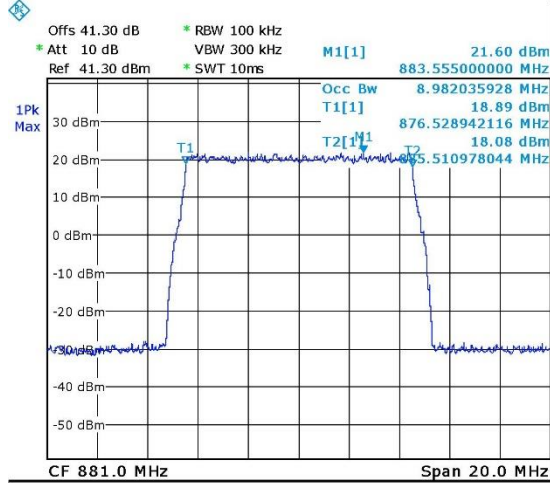


# Occupied Bandwidth (CELL)

E.U.T Description ONE- Optical Network Evolution  
Wireless Platform

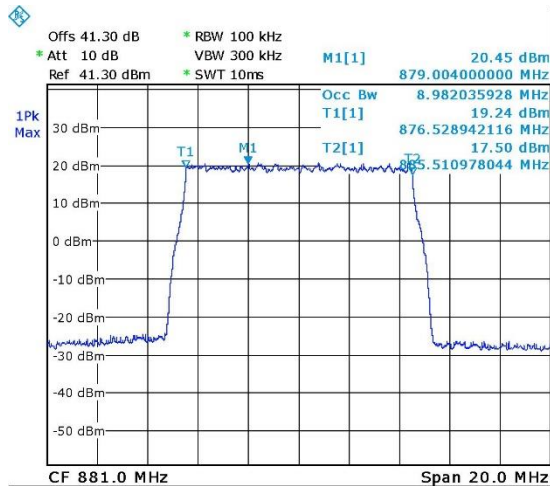
Type MRU (Mid Power Remote Unit)

Serial Number: 05154901D3



Date: 4.JUL.2016 10:32:26

Figure 24. — LTE 64QAM Input 881.0 MHz



Date: 4.JUL.2016 10:14:13

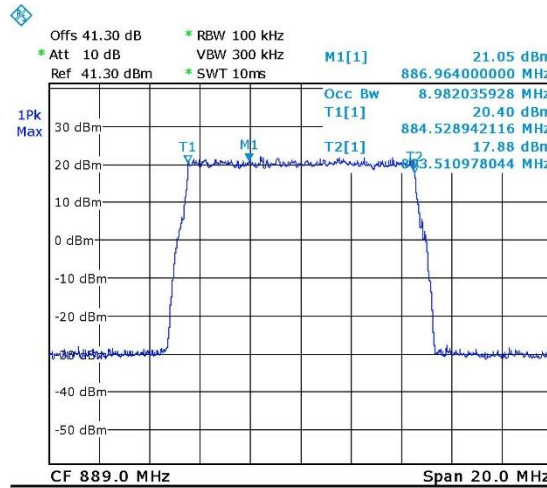
Figure 25. — LTE 64QAM Output 881.0MHz





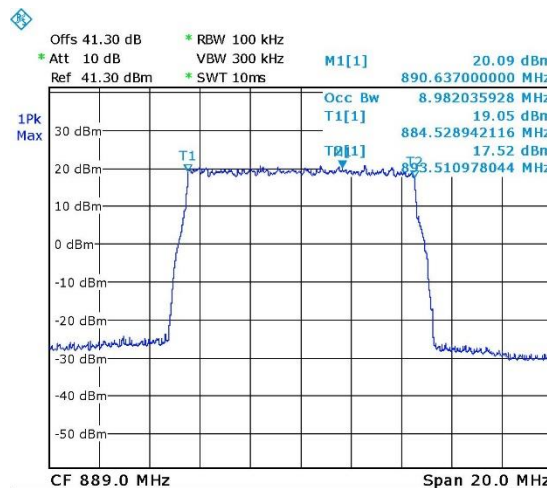
# Occupied Bandwidth (CELL)

E.U.T Description ONE- Optical Network Evolution  
Wireless Platform  
Type MRU (Mid Power Remote Unit)  
Serial Number: 05154901D3



Date: 4.JUL.2016 10:32:56

Figure 26. — LTE 64QAM Input 889.00 MHz



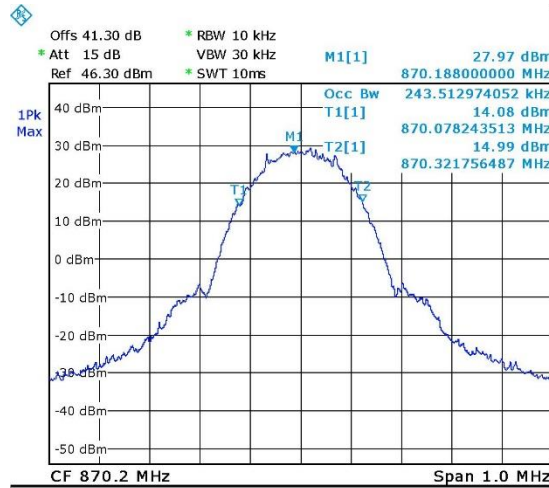
Date: 4.JUL.2016 10:15:04

Figure 27. — LTE 64QAM Output 889.0 MHz



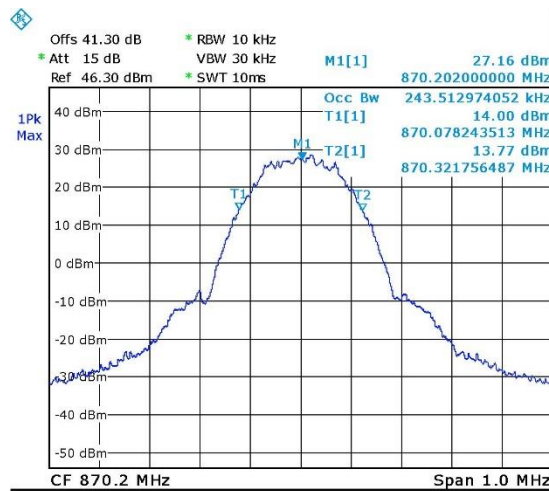
# Occupied Bandwidth (CELL)

E.U.T Description ONE- Optical Network Evolution  
Wireless Platform  
Type MRU (Mid Power Remote Unit)  
Serial Number: 05154901D3



Date: 4.JUL.2016 10:29:14

Figure 28. — GSM - Input 870.2MHz



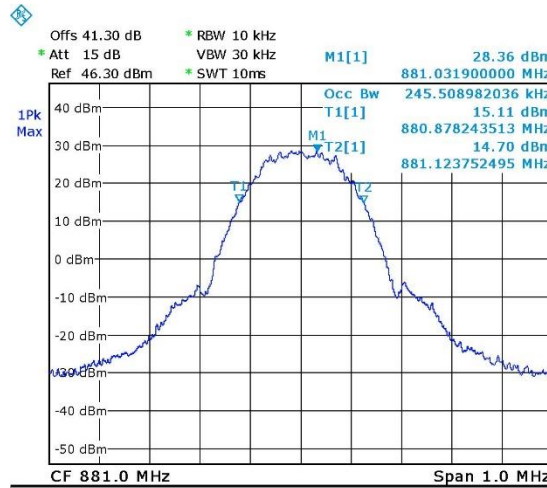
Date: 4.JUL.2016 10:09:29

Figure 29. — GSM - Output 870.2MHz



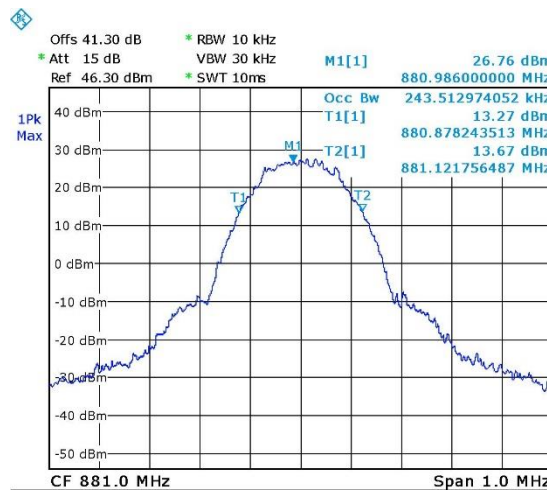
# Occupied Bandwidth (CELL)

E.U.T Description ONE- Optical Network Evolution  
Wireless Platform  
Type MRU (Mid Power Remote Unit)  
Serial Number: 05154901D3



Date: 4.JUL.2016 10:29:44

Figure 30. — GSM - Input 881.0 MHz



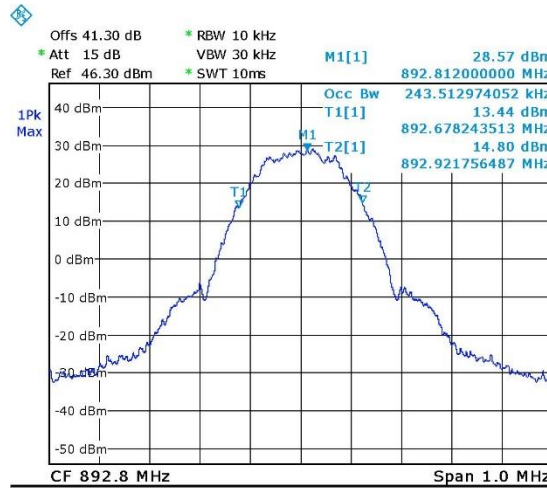
Date: 4.JUL.2016 10:10:13

Figure 31. — GSM - Output 881.0MHz



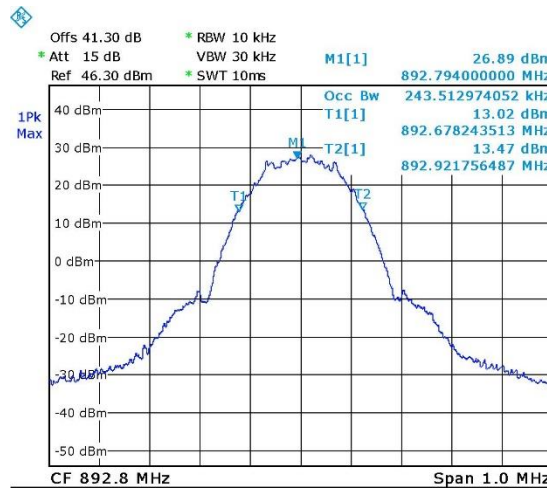
# Occupied Bandwidth (CELL)

E.U.T Description ONE- Optical Network Evolution  
Wireless Platform  
Type MRU (Mid Power Remote Unit)  
Serial Number: 05154901D3



Date: 4.JUL.2016 10:30:18

Figure 32. — GSM - Input 892.8 MHz



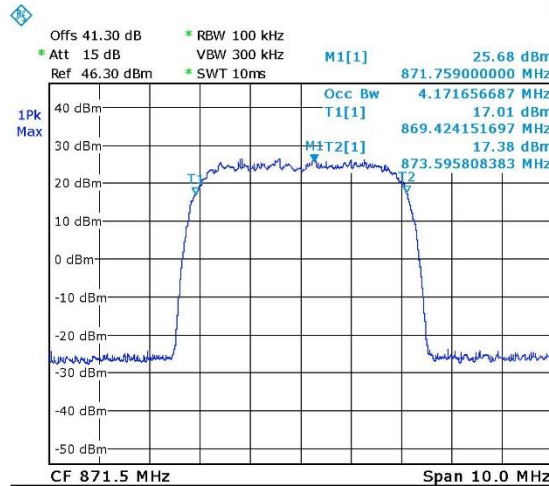
Date: 4.JUL.2016 10:11:25

Figure 33. — GSM - Output 892.8 MHz



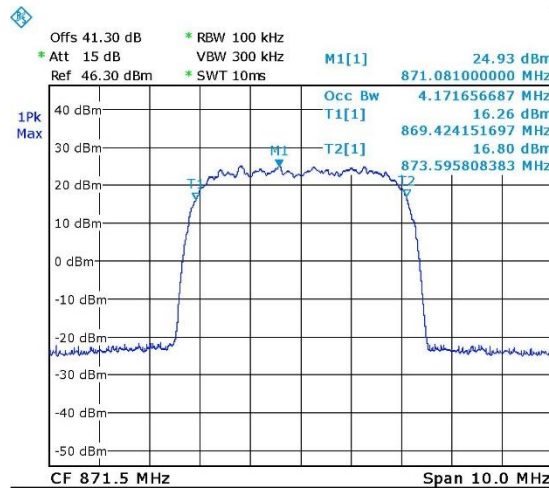
# Occupied Bandwidth (CELL)

E.U.T Description ONE- Optical Network Evolution  
Wireless Platform  
Type MRU (Mid Power Remote Unit)  
Serial Number: 05154901D3



Date: 4.JUL.2016 10:24:00

Figure 34. — W-CDMA - Input 871.5MHz



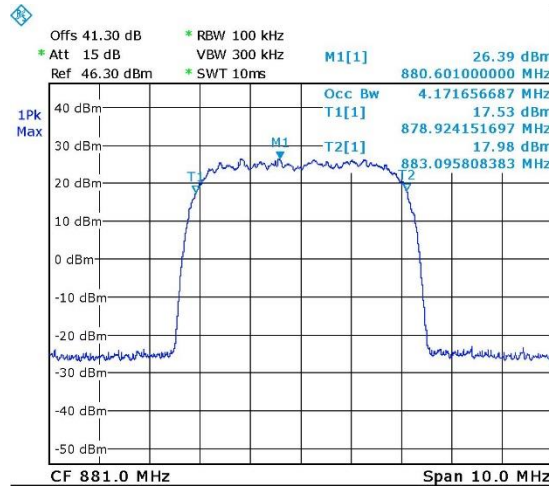
Date: 4.JUL.2016 10:18:44

Figure 35. — W-CDMA - Output 871.5MHz



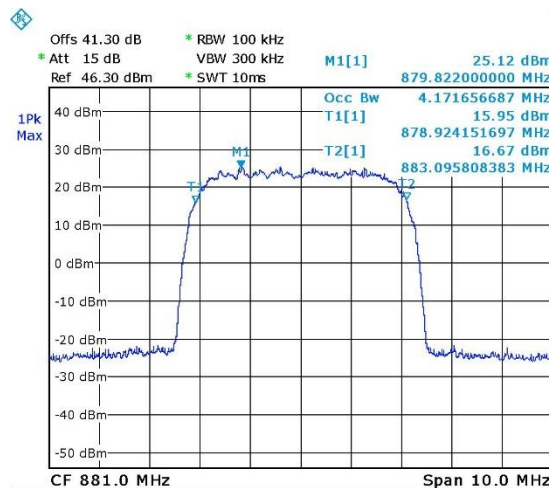
# Occupied Bandwidth (CELL)

E.U.T Description ONE- Optical Network Evolution  
Wireless Platform  
Type MRU (Mid Power Remote Unit)  
Serial Number: 05154901D3



Date: 4.JUL.2016 10:23:29

Figure 36. — W-CDMA - Input 881.0 MHz



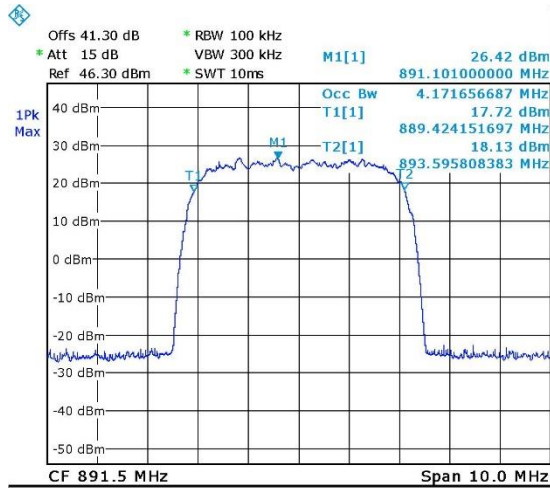
Date: 4.JUL.2016 10:19:23

Figure 37. — W-CDMA - Output 881.0MHz



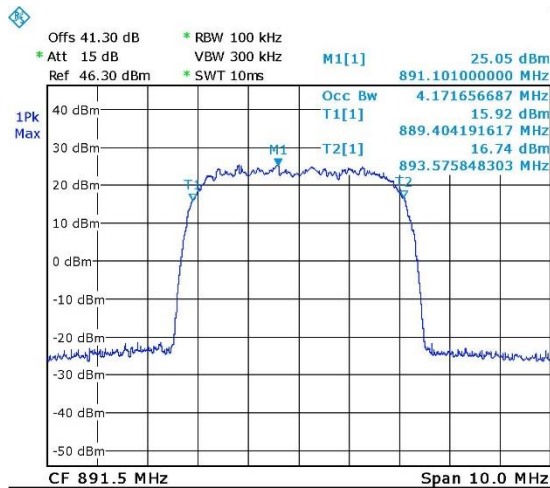
# Occupied Bandwidth (CELL)

E.U.T Description ONE- Optical Network Evolution  
Wireless Platform  
Type MRU (Mid Power Remote Unit)  
Serial Number: 05154901D3



Date: 4.JUL.2016 10:22:45

Figure 38. — W-CDMA - Input 891.5 MHz



Date: 4.JUL.2016 10:20:17

Figure 39. — W-CDMA - Output 891.50 MHz



**5.5 Test Equipment Used; Occupied Bandwidth CELL**

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibration Date	Next Calibration Date
Spectrum Analyzer	R&S	FSL6	100194	February 29, 2016	March 1, 2017
EXG Vector Signal Generator	Agilent	N5172B	MY51350584	July 1, 2016	July 1, 2017
40 dB Attenuator	Weinschel	WA 39-40-33	A1323	April 3, 2016	April 3, 2017

**Figure 40 Test Equipment Used**





## 6. Spurious Emissions at Antenna Terminals (CELL)

### 6.1 Test Specification

FCC Part 22, Section 917; FCC Part 2.1051

### 6.2 Test Procedure

(Temperature (24°C)/ Humidity (39%RH))

The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator and an appropriate coaxial cable (max loss=31.5dB).

The spectrum analyzer was set to 1 kHz R.B.W for the frequency range of 9 kHz – 1 MHz, 100 kHz for the frequency range of 1 – 30 MHz, and 1 MHz for the frequency range of 30 MHz – 10 GHz.

### 6.3 Test Limit

The power of any emission outside of the authorized operating frequency ranges(869 - 894 MHz) must be attenuated below the transmitting power (P) by a factor of at least  $43 + \log (P)$  dB, yielding  $-13\text{dBm}$ .

### 6.4 Test Results

JUDGEMENT: Passed

See additional information in *Figure 41* to *Figure 49*.

Note – The peaks appearing in the plots in the above mentioned figures relate to the transmission frequency.



# Spurious Emissions at Antenna Terminals (CELL)

E.U.T Description ONE- Optical Network Evolution  
Wireless Platform  
Type MRU (Mid Power Remote Unit)  
Serial Number: 05154901D3

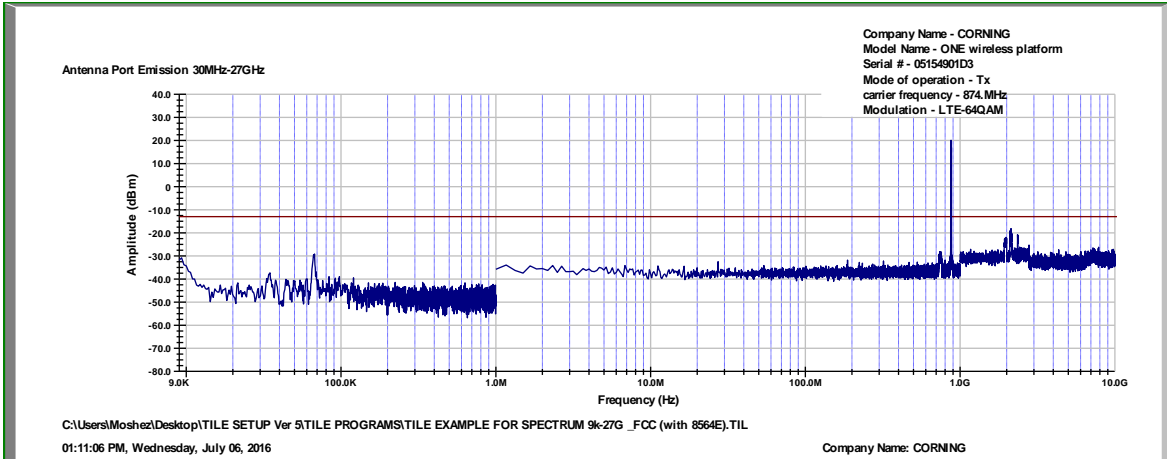


Figure 41. — LTE 64QAM - 874.0 MHz

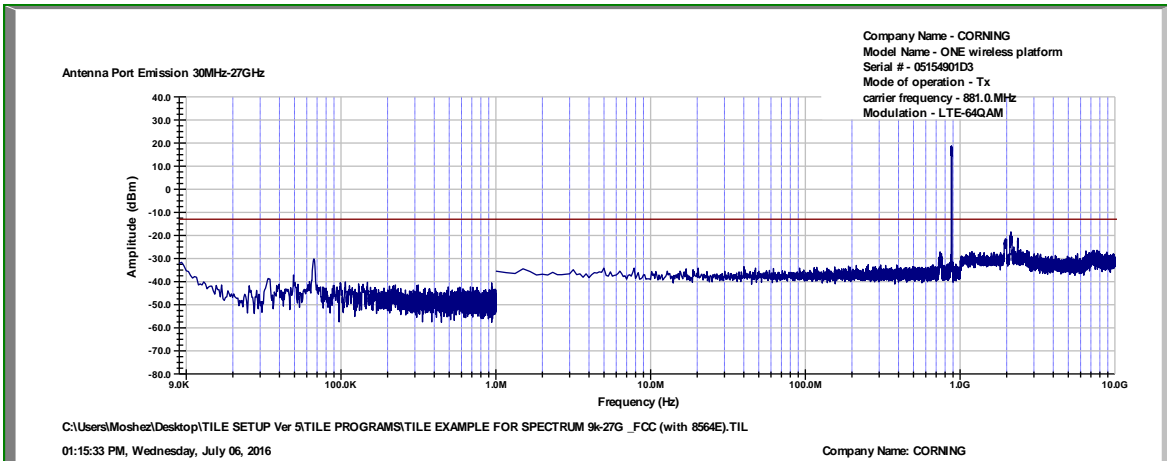


Figure 42. — LTE 64QAM - 881.0 MHz

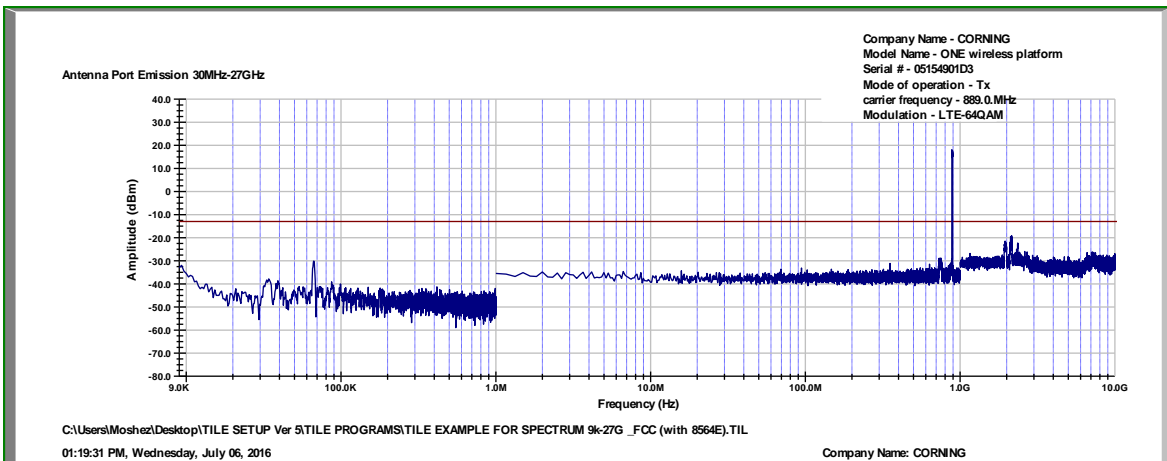


Figure 43. — LTE 64QAM - 889.0 MHz



# Spurious Emissions at Antenna Terminals (CELL)

E.U.T Description ONE- Optical Network Evolution  
Wireless Platform  
Type MRU (Mid Power Remote Unit)  
Serial Number: 05154901D3

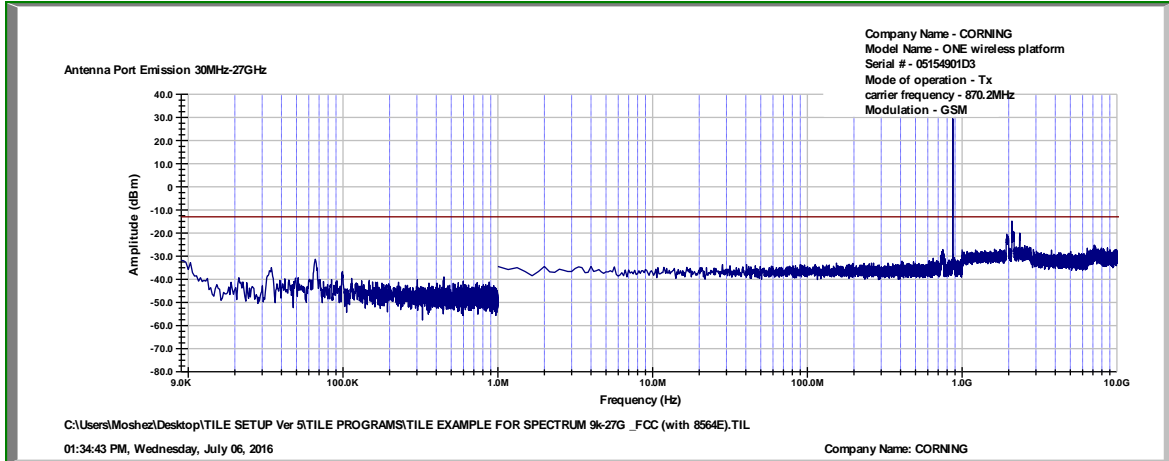


Figure 44. — GSM - 870.2 MHz

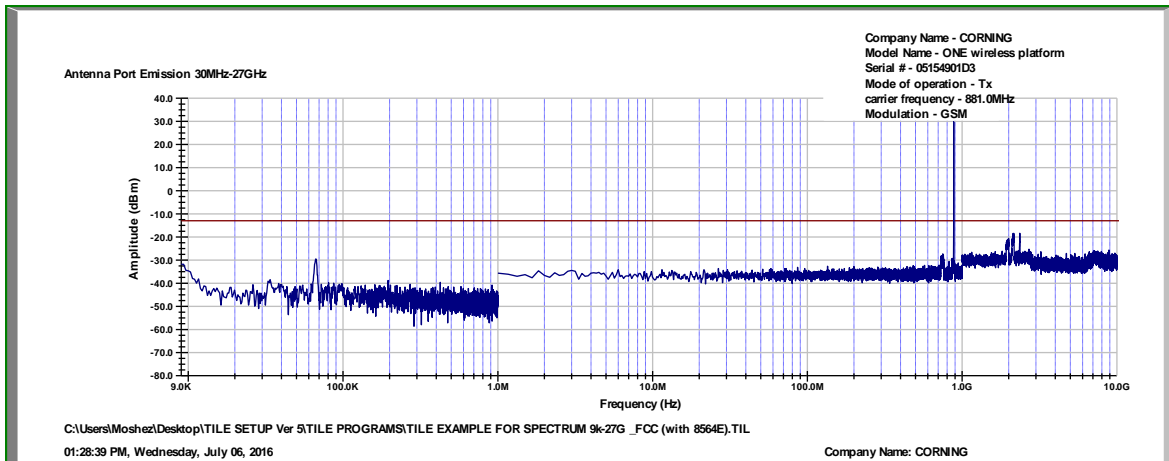


Figure 45. — GSM - 881.0 MHz

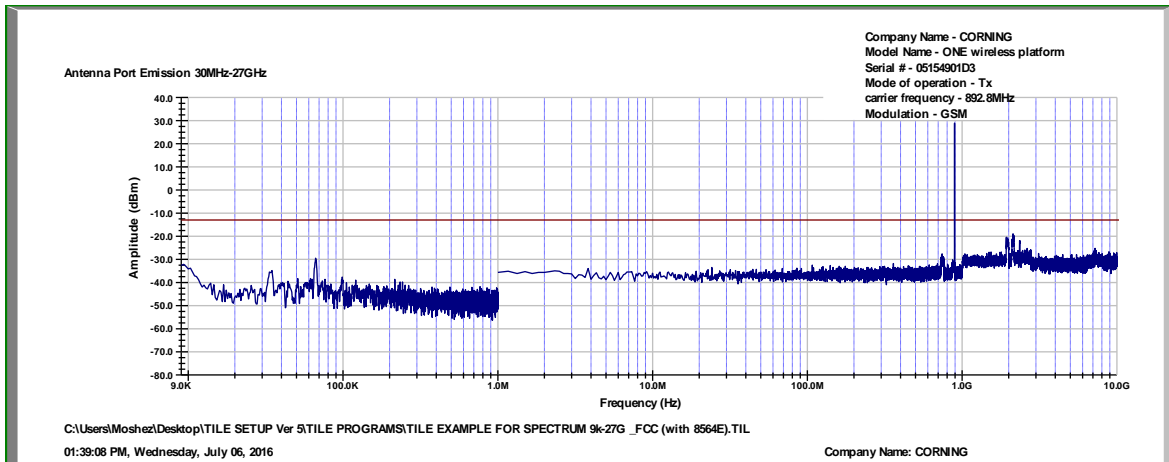


Figure 46. — GSM - 892.8 MHz



# Spurious Emissions at Antenna Terminals (CELL)

E.U.T Description ONE- Optical Network Evolution  
Wireless Platform  
Type MRU (Mid Power Remote Unit)  
Serial Number: 05154901D3

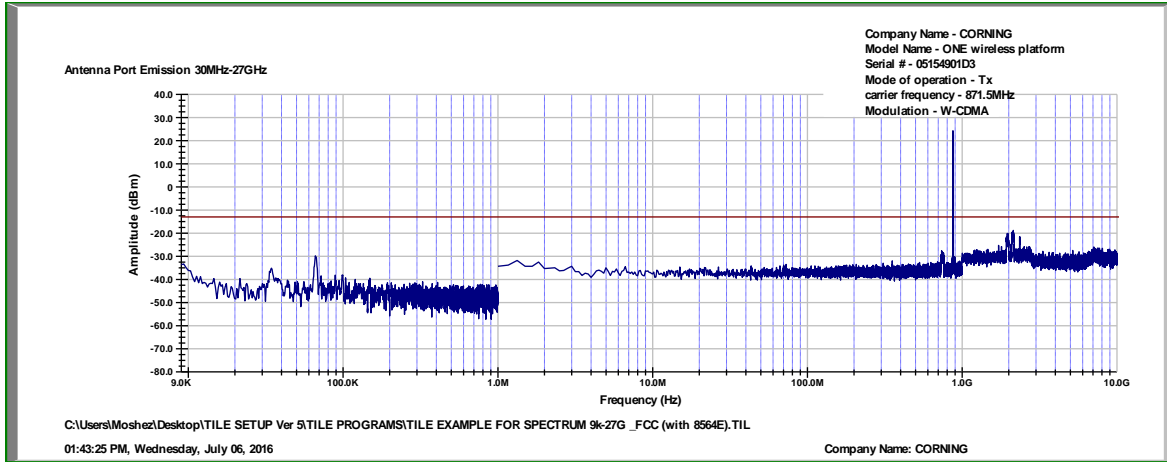


Figure 47. — W-CDMA - 871.5 MHz

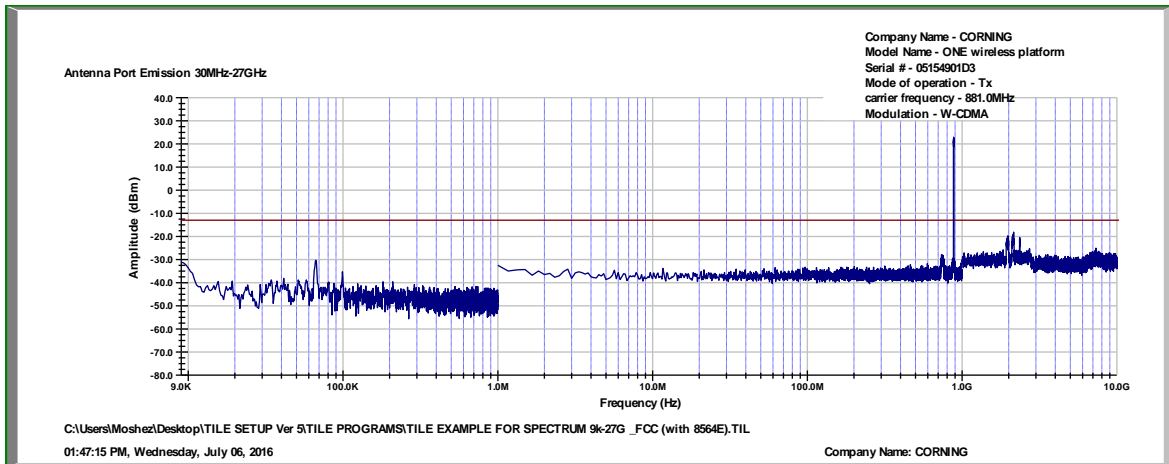


Figure 48. — W-CDMA - 881.0 MHz

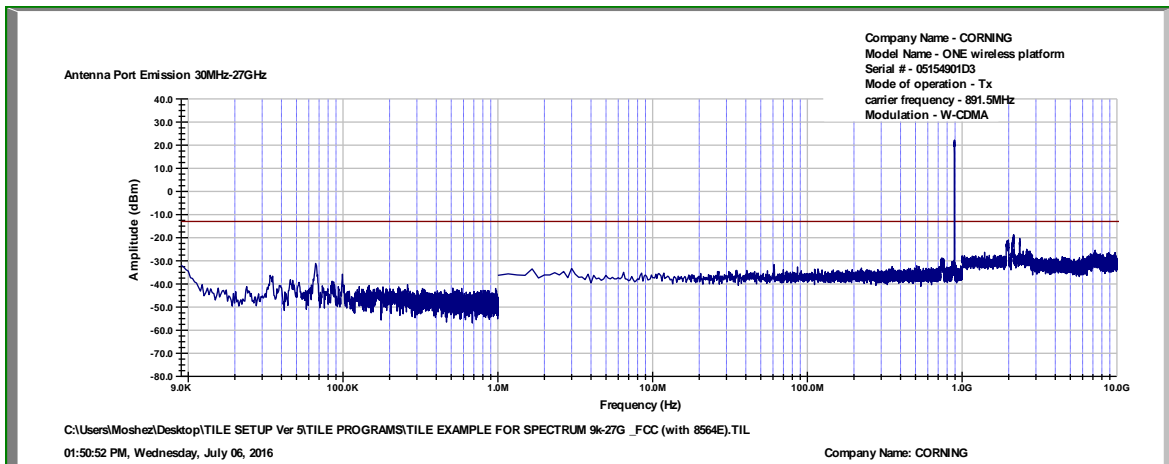


Figure 49. — W-CDMA - 891.5 MHz



**6.5 Test Equipment Used; Out of Band Emission at Antenna Terminals CELL**

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibration Date	Next Calibration Date
Spectrum Analyzer	HP	8564E	3442A00275	March 10, 2016	March 10, 2017
EXG Vector Signal Generator	Agilent	N5172B	MY51350584	July 1, 2016	July 1, 2017
30 dB Attenuator	MCL	BW-S30W5	533	July 5, 2016	July 5, 2017

**Figure 50 Test Equipment Used**

## 7. Band Edge Spectrum (CELL)

### 7.1 Test Specification

FCC Part 22, FCC Part 2.1051

### 7.2 Test Procedure

(Temperature (23°C)/ Humidity (34%RH))

The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator and an appropriate coaxial cable (41.3 dB).

The spectrum analyzer was set to 100 kHz R.B.W.

### 7.3 Test Limit

The power of any emission outside of the authorized operating frequency ranges (869 - 894 MHz) must be attenuated below the transmitting power (P) by a factor of at least  $43 + \log(P)$  dB, yielding -13dBm.

### 7.4 Test Results

Modulation	Operation Frequency	Band Edge Frequency	Reading	Limit	Margin
	(MHz)	(MHz)	(dBm)	(dBm)	(dB)
LTE 64QAM	874.0	869.0	-17.0	-13.0	-4.0
	889.0	894.0	-17.4	-13.0	-4.4
GSM	870.2	869.0	-26.8	-13.0	-13.8
	892.8	894.0	-27.2	-13.0	-14.2
W-CDMA	871.5	869.0	-22.5	-13.0	-9.5
	891.5	894.0	-23.4	-13.0	-10.4

**Figure 51 Band Edge Spectrum Results CELL**

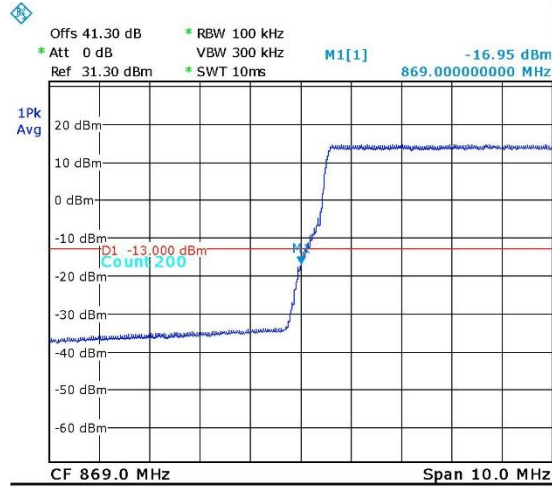
JUDGEMENT: Passed by 4.0 dB

See additional information in *Figure 52* to *Figure 57*.



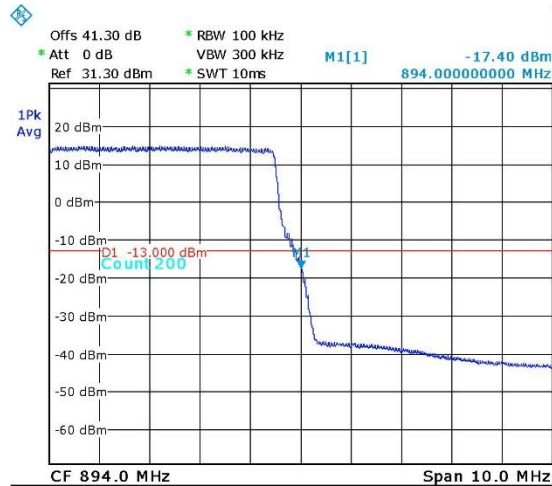
# Band Edge Spectrum (CELL)

E.U.T Description ONE- Optical Network Evolution  
Wireless Platform  
Type MRU (Mid Power Remote Unit)  
Serial Number: 05154901D3



Date: 4.JUL.2016 11:41:42

Figure 52. — LTE 64QAM 874.0 MHz



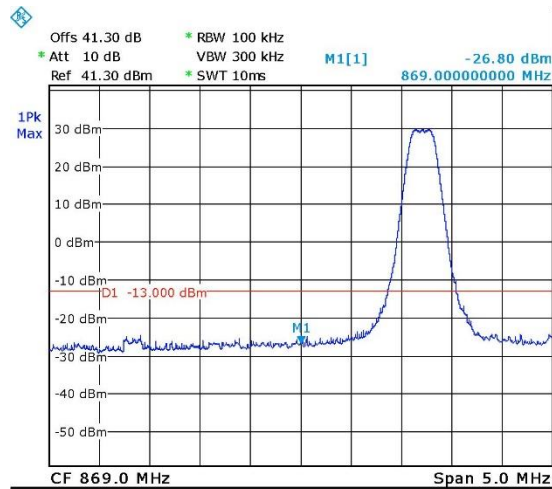
Date: 4.JUL.2016 11:42:59

Figure 53. — LTE 64QAM 889.0 MHz



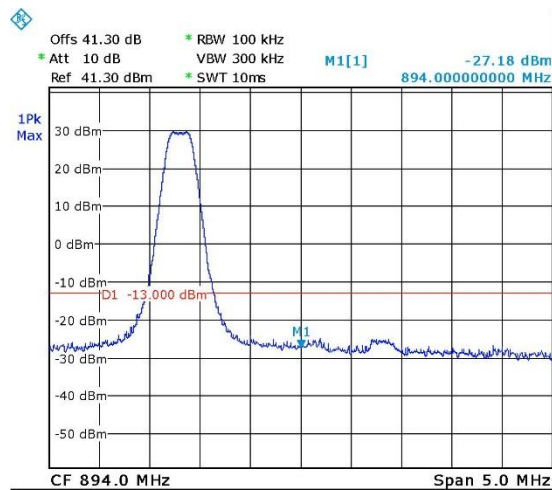
# Band Edge Spectrum (CELL)

E.U.T Description ONE- Optical Network Evolution  
Wireless Platform  
Type MRU (Mid Power Remote Unit)  
Serial Number: 05154901D3



Date: 4.JUL.2016 11:46:58

Figure 54. — GSM - 870.2 MHz



Date: 4.JUL.2016 11:48:09

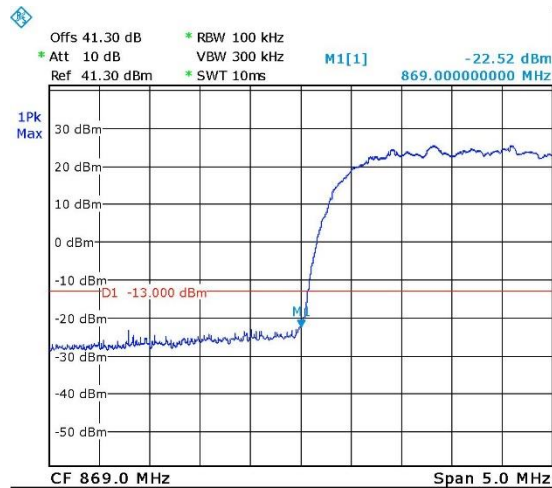
Figure 55. — GSM - 892.8 MHz





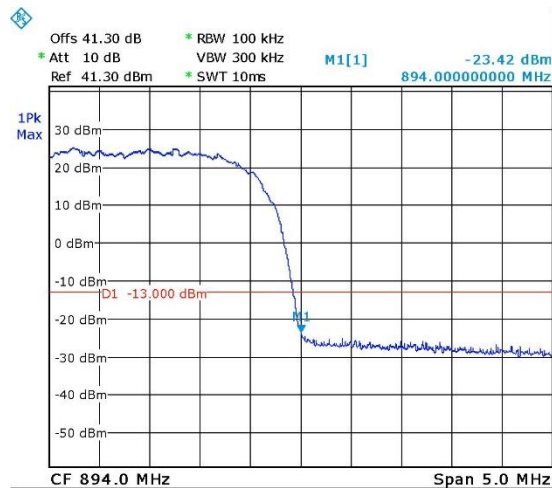
# Band Edge Spectrum (CELL)

E.U.T Description ONE- Optical Network Evolution  
Wireless Platform  
Type MRU (Mid Power Remote Unit)  
Serial Number: 05154901D3



Date: 4.JUL.2016 11:50:04

Figure 56. — W-CDMA - 871.5 MHz



Date: 4.JUL.2016 11:51:09

Figure 57. — W-CDMA - 891.5 MHz



**7.5 Test Equipment Used; Band Edge Spectrum CELL**

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibration Date	Next Calibration Date
Spectrum Analyzer	R&S	FSL6	100194	February 29, 2016	March 1, 2017
EXG Vector Signal Generator	Agilent	N5172B	MY51350584	July 1, 2016	July 1, 2017
40 dB Attenuator	Weinschel	WA 39-40-33	A1323	April 3, 2016	April 3, 2017

**Figure 58 Test Equipment Used**



## 8. Spurious Emissions (Radiated) (CELL)

### 8.1 Test Specification

FCC Part 22, Section 917; FCC Part 2.1053

### 8.2 Test Procedure

(Temperature (23°C)/ Humidity (53%RH))

The test method was based on ANSI/TIA-603-D: 2010, Section 2.2.12

Unwanted Emissions: Radiated Spurious.

#### **For measurements between 0.009MHz-30.0MHz:**

The E.U.T was tested inside the shielded room at a distance of 3 meters and the E.U.T was placed on a non-metallic table, 1.5 meters above the ground. The frequency range 0.009MHz-30MHz was scanned. The readings were maximized by the turntable azimuth between 0-360°, and the antenna polarization.

The emissions were measured at a distance of 3 meters.

#### **For measurements between 30.0MHz-1.0GHz:**

A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The frequency range 30.0MHz -1.0GHz was scanned and the list of the highest emissions was verified and updated accordingly.

The readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization.

The emissions were measured at a distance of 3 meters.

#### **For measurements between 1.0GHz-10.0GHz:**

The E.U.T was tested inside the shielded room at a distance of 3 meters and the E.U.T was placed on a non-metallic table, 1.5 meters above the ground. The frequency range 1.0GHz -10.0GHz was scanned. The readings were maximized by the turntable azimuth between 0-360°, and the antenna polarization.

The emissions were measured at a distance of 3 meters.

The E.U.T. was replaced by a substitution antenna (dipole 30MHz-1GHz, Horn Antenna above 1GHz) driven by a signal generator. The height was readjusted for maximum reading. The signal generator level was adjusted to obtain the same reading on the EMI receiver as in step (a).

The signals observed in step (a) were converted to radiated power using:

$$P_d(\text{dBm}) = P_g(\text{dBm}) - \text{Cable Loss (dB)} + \text{Substitution Antenna Gain (dBd)}$$

$P_d$  = Dipole equivalent power (result).

$P_g$  = Signal generator output level.



A Peak detector was used for this test.

The test was performed in 3 operational frequencies: low (870.2MHz) mid (881.0MHz) and high (892.8MHz) and each at 3 modulations: GSM, WCDMA and LTE 64QAM.

Testing was performed when the RF port was connected to 50 Ω termination.

The test results table below describes only results with the highest radiation.

### 8.3 Test Limit

The power of any emission outside of the authorized operating frequency ranges (869-894MHz) must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log (P)$  dB, yielding -13dBm.

### 8.4 Test Results

Carrier Channel	Freq.	Antenna Pol.	Maximum Peak Level	Signal Generator RF Output	Cable Loss	Antenna Gain	Effective Radiated Power Level	Limit	Margin
(MHz)	(MHz)	(V/H)	(dBμV/m)	(dBm)	(dB)	(dBd)	(dBm)	(dBm)	(dB)
870.2	2610.0	V	49.9	-54.9	0.5	7.9	-47.5	-13.0	-34.5
	2610.0	H	49.4	-51.0	0.5	4.9	-46.6	-13.0	-33.6
881.0	1762.0	V	51.0	-50.7	0.5	4.9	-46.3	-13.0	-33.3
	1762.0	H	50.3	-50.0	0.5	4.9	-45.6	-13.0	-32.6
892.8	1785.6	V	50.1	-51.7	0.5	4.9	-47.3	-13.0	-34.3
	1785.6	H	50.5	-50.0	0.5	4.9	-45.6	-13.0	-32.6

**Figure 59 Spurious Emission (Radiated) CELL**

The E.U.T met the requirements of the FCC Part 22, Section 917, FCC Part 2.1053 specifications.

JUDGEMENT;      Passed by 32.6 dB



**8.5 Test Instrumentation Used, Radiated Measurements CELL**

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibration Date	Next Calibration Due
EMI Receiver	HP	85422E	3906A00276	March 3, 2016	March 3, 2017
RF Filter Section	HP	85420E	3705A00248	March 3, 2016	March 3, 2017
EMI Receiver	R&S	ESCI7	100724	February 29, 2016	March 1, 2017
Spectrum Analyzer	HP	8593EM	3536A00120ADI	March 10, 2016	March 10, 2017
Active Loop Antenna	EMCO	6502	9506-2950	November 5, 2015	November 30, 2016
Antenna Biconical	EMCO	3110B	9912-3337	March 24, 2016	March 24, 2018
Antenna Log Periodic	EMCO	3146	9505-4081	April 23, 2016	April 23, 2017
Horn Antenna 1G-18G	ETS	3115	29845	May 19, 2015	May 19, 2018
40dB Attenuator	Weinschel Engineering	WA 39-40-33	A1323	April 3, 2016	April 3, 2017
MXG Vector Signal generator	Agilent	N5182A	MY49060440	July 1, 2016	July 1, 2017
Semi Anechoic Civil Chamber	ETS	S81	SL 11643	N/A	N/A
Antenna Mast	ETS	2070-2	-	N/A	N/A
Turntable	ETS	2087	-	N/A	N/A
Mast & Table Controller	ETS/EMCO	2090	9608-1456	N/A	N/A

**Figure 60 Test Equipment Used**



## 9. Peak Output Power (ESMR)

### 9.1 Test Specification

FCC Rule Part 20.21

### 9.2 Test Procedure

(Temperature (23°C)/ Humidity (34%RH))

The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator and an appropriate coaxial cable (loss = 41.3 dB). The E.U.T. RF output was modulated with W-CDMA, GSM and LTE 64QAM. Special attention was taken to prevent Spectrum Analyzer RF input overload.

### 9.3 Test Results

Modulation	Operation Frequency	Reading
	(MHz)	(dBm)
LTE 64QAM	864.5	30.2
	866.5	30.4
GSM	863.2	31.4
	867.8	30.8
W-CDMA	864.5	30.9
	866.5	30.4

**Figure 61 Peak Output Power ESMR**

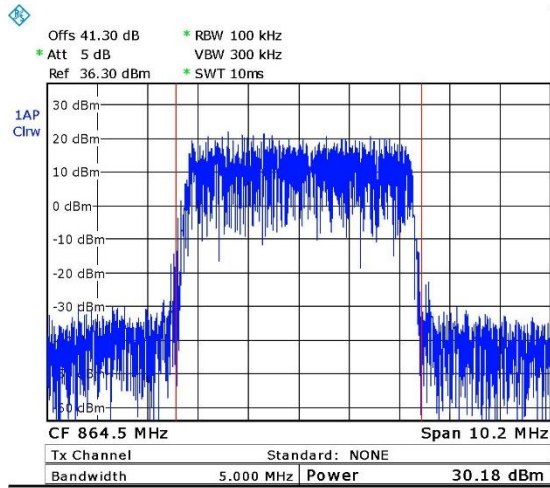
See additional information in *Figure 62* to *Figure 67*.

JUDGEMENT: Passed



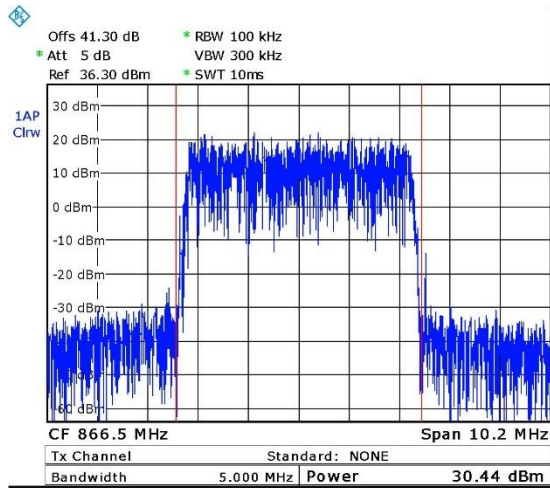
# Peak Output Power (ESMR)

E.U.T Description ONE- Optical Network Evolution  
Wireless Platform  
Type MRU (Mid Power Remote Unit)  
Serial Number: 05154901D3



Date: 4 JUL 2016 09:44:59

Figure 62. — 864.5 MHz – LTE 64QAM



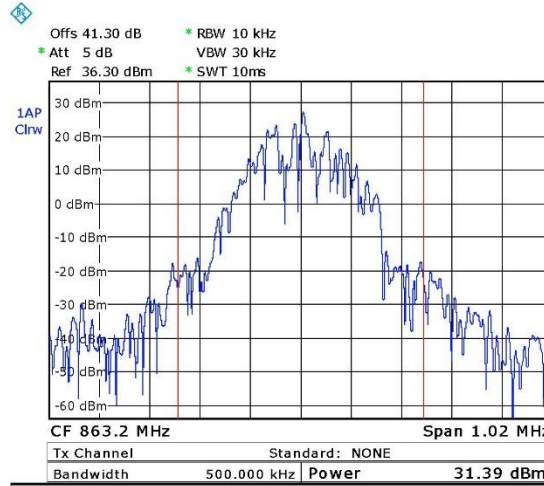
Date: 4 JUL 2016 09:45:45

Figure 63. — 866.5 MHz – LTE 64QAM



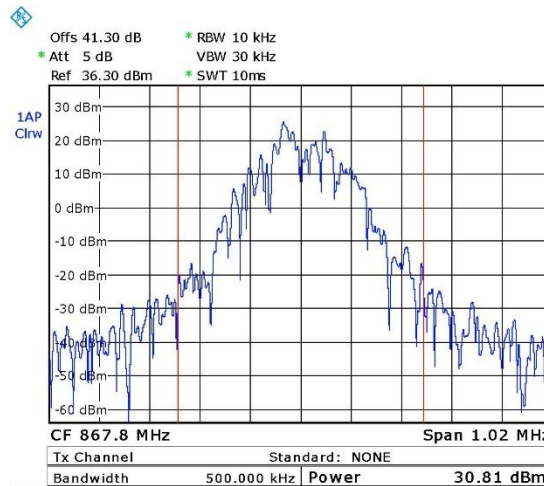
# Peak Output Power (ESMR)

E.U.T Description ONE- Optical Network Evolution  
Wireless Platform  
Type MRU (Mid Power Remote Unit)  
Serial Number: 05154901D3



Date: 4.JUL.2016 09:38:41

Figure 64. — 863.2 MHz – GSM



Date: 4.JUL.2016 09:40:47

Figure 65. — 867.8 MHz – GSM





# Peak Output Power (ESMR)

E.U.T Description      ONE- Optical Network Evolution  
Wireless Platform  
Type                      MRU (Mid Power Remote Unit)  
Serial Number:        05154901D3

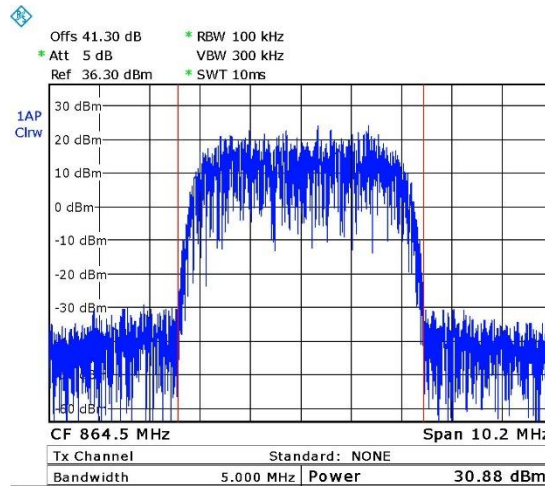


Figure 66.—864.5 MHz – WCDMA

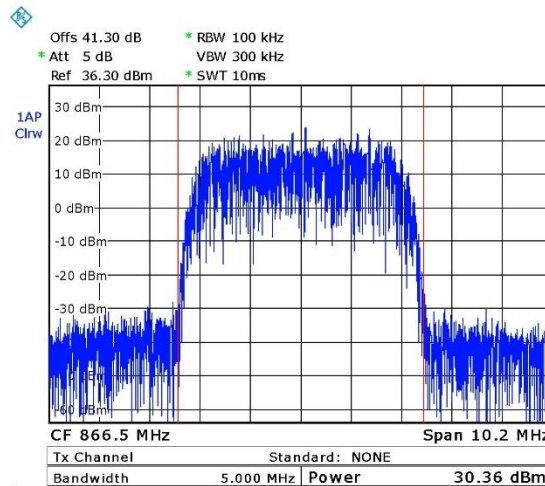


Figure 67.— 866.5 MHz – WCDMA



**9.4 Test Equipment Used; Peak Power ESMR**

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibration Date	Next Calibration Date
Spectrum Analyzer	R&S	FSL6	100194	February 29, 2016	March 1, 2017
EXG Vector Signal Generator	Agilent	N5172B	MY51350584	July 1, 2016	July 1, 2017
40 dB Attenuator	Weinschel	WA 39-40-33	A1323	April 3, 2016	April 3, 2017

**Figure 68 Test Equipment Used**