

**DATE: 16 February 2010**

**I.T.L. (PRODUCT TESTING) LTD.**

**FCC Radio Test Report**

for

**Mobile Access Networks**

**Equipment under test:**

**Add-On LTE**

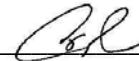
**700LTE-AO**

Written by:



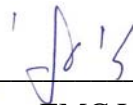
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Approved by:



A. Sharabi, Test Engineer

Approved by:



I. Raz, EMC Laboratory Manager

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This report relates only to items tested.

# Measurement/Technical Report for Mobile Access Networks

Add-On LTE

700LTE-AO

**FCC ID:OJFMA1200LTE700**

This report concerns:           Original Grant: X  
Class II change:  
Class I change:

Equipment type:               Licensed Non-Broadcast Transmitter

Limits used:  
47CFR Parts 2; 27

Measurement procedure used is ANSI C63.4-2003.

Substitution Method used as in ANSI/TIA-603-B: 2002

Application for Certification  
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# 1. General Information

## 1.1 Administrative Information

Manufacturer:	Mobile Access Networks
Manufacturer's Address:	8391 Old Courthouse Rd. Suite #300 Vienna, VA 22182 U.S.A. Tel: +1-541-758-2880 Fax: +1-703-848-0260
Manufacturer's Representative:	Steve Blum
Equipment Under Test (E.U.T):	Add-On LTE
Equipment Model No.:	700LTE-AO
Equipment Serial No.:	095225B
Date of Receipt of E.U.T:	18.01.10
Start of Test:	18.01.10
End of Test:	26.01.10
Test Laboratory Location:	I.T.L (Product Testing) Ltd. Kfar Bin Nun, ISRAEL 99780
Test Specifications:	FCC Parts 2; 27

## **1.2 List of Accreditations**

The EMC laboratory of I.T.L. is accredited by 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.), Registration No. 90715.
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-1350, R-1285.
5. Industry Canada (Canada), IC File No.: 46405-4025; Site No. IC 4025B-1.
6. TUV Product Services, England, ASLLAS No. 97201.
7. Nemko (Norway), Authorization No. ELA 207.

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**

The MobileAccess 700LTE-AO module is an Add-On module, supporting a single frequency band.

The product operates in the 728-749 MHz and 746-758 MHz bands.

It is designed to be integrated with a host (either RHU 1000 or 2000 modules).

The RHU 1000 / 2000 modules provide the following functionality for both units:

- Optical interface (to the BU) and conversion
- RF interface (to antennas) and conversion
- Control signals

### **1.4 Test Methodology**

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4: 2003. Radiated testing was performed at an antenna to EUT distance of 3 meters.

### **1.5 Test Facility**

The radiated emissions tests were performed at I.T.L.'s testing facility at Kfar Bin-Nun, Israel. This site is a FCC listed test laboratory (FCC Registration No. 90715, date of listing 03 September 2009).

I.T.L.'s EMC Laboratory is also accredited by A2LA, certificate No. 1152.01.

### **1.6 Measurement Uncertainty**

Radiated Emission

The Open Site complies with the  $\pm 4$  dB Normalized Site Attenuation requirements of ANSI C63.4-2003. In accordance with Paragraph 5.4.6.1 of this standard, this tolerance includes instrumentation calibration errors, measurement technique errors, and errors due to site anomalies.

## 2. System Test Configuration

### 2.1 *Justification*

The test setup was configured to closely resemble a standard installation.

### 2.2 *EUT Exercise Software*

Add-On S/W V3.6 B05, RHU S/W V3.9 B00, MCT S/W 10.26.01 was run.

### 2.3 *Special Accessories*

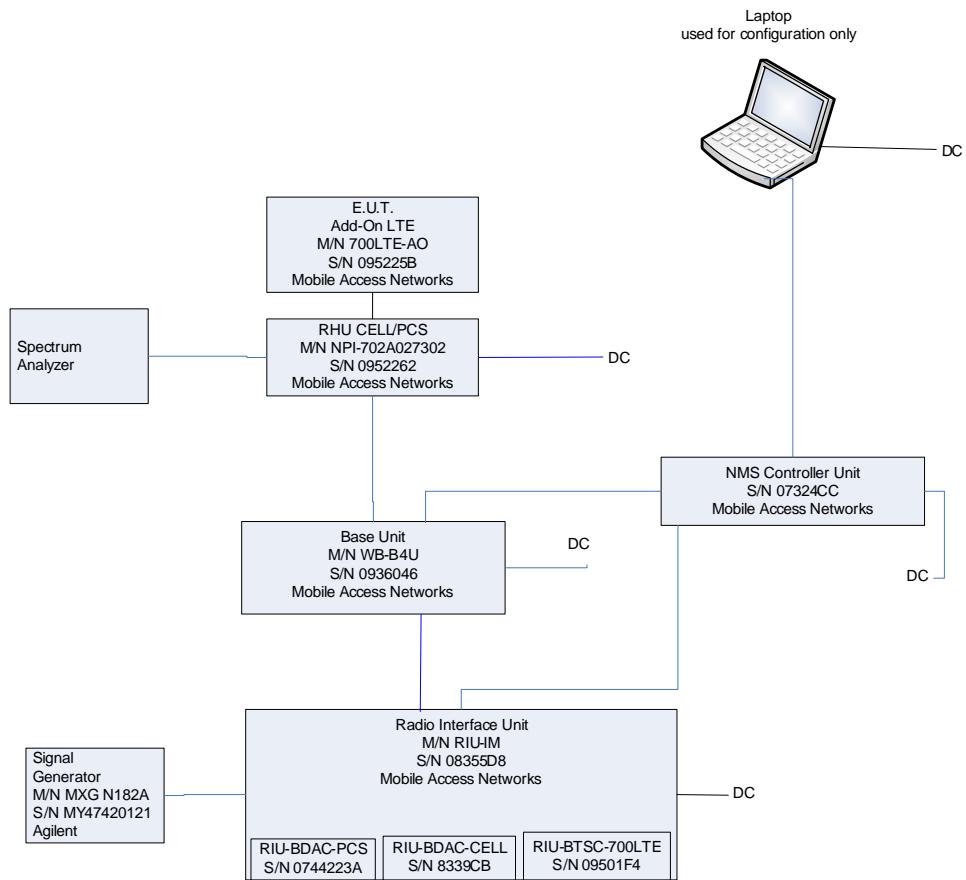
No special accessories were needed in order to achieve compliance.

### 2.4 *Equipment Modifications*

No modifications were necessary in order to achieve compliance.



## 2.5 Configuration of Tested System



**Figure 1. Test Set-up**

### 3. Test Set-up Photo



Figure 2

## 4. Maximum Peak Output Power 5 MHz Bandwidth

### 4.1 Test Specification

FCC Part 27, Subpart C (27.50(c)(3))

### 4.2 Test procedure

Peak Power Output must not exceed 1000 W. The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator (20.2 dB) and an appropriate coaxial cable. The E.U.T. RF output was OFDMA, 64QAM at 5MHz bandwidth at the 728-749 MHz bands. Special attention was taken to prevent Spectrum Analyzer RF input overload. The Spectrum Analyzer was set to 100kHz RBW.

Signal generator output power was 0dBm.

Antenna type :Dipole antenna with N type connector (Antenna Gain : 7dBi)

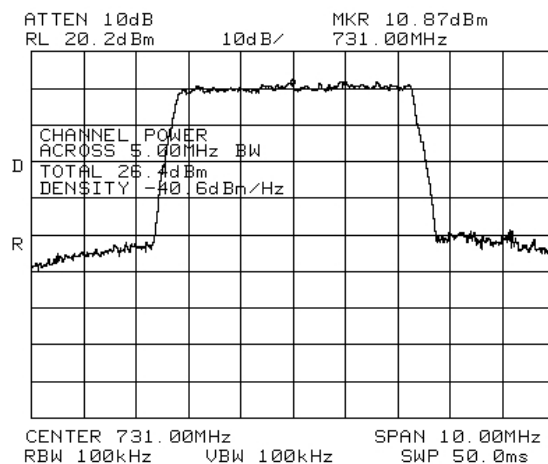


Figure 3.— 731 MHz

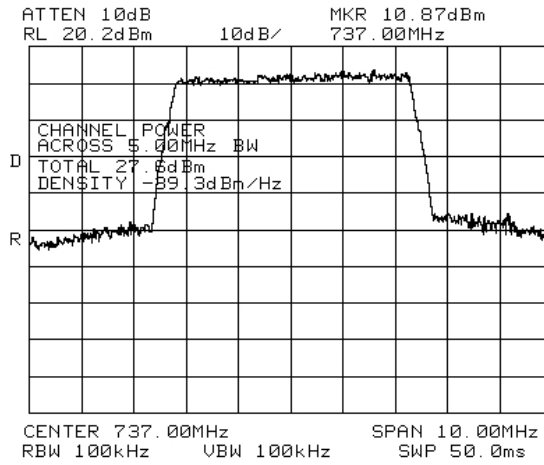


Figure 4.— 737 MHz

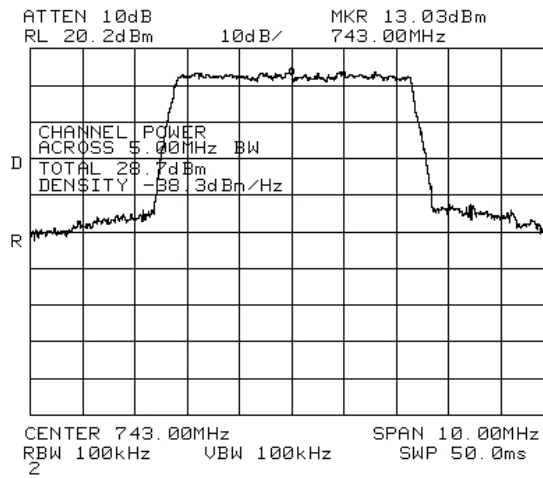


Figure 5.— 743 MHz

### 4.3 Results table

E.U.T. Description: Add-On LTE  
 Model No.: 700LTE-AO  
 Serial Number: 095225B  
 Specification: FCC Part 27, Subpart C (27.50(c)(3))

Operation Frequency (MHz)	Reading (dBm)	Antenna Gain (dB)	Specification (dBm)	Margin (dB)
731.00	26.4	7	60	-26.6
737.00	27.6	7	60	-25.4
743.00	28.7	7	60	-24.3

**Figure 6 Maximum Peak Power Output 5 MHz**

JUDGEMENT: Passed by 24.3 dB

TEST PERSONNEL:

Tester Signature:  \_\_\_\_\_

Date: 16.01.10

Typed/Printed Name: A. Sharabi

#### 4.4 Test Equipment Used.

Maximum Peak Output Power 5 MHz Bandwidth

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibration	Period
Spectrum Analyzer	HP	8564E	3442A00275	January 11, 2010	1 year
Signal Generator	Agilent	MXG N182A	MY47420121	August 2, 2009	2 year
Attenuator	Jyebao	-	FAT-AM5AF5G6G 2W20	October 19, 2009	1 year
Cable	TestLINE	18	11556	January 4, 2010	1 year

**Figure 7 Test Equipment Used**

## 5. Maximum Peak Output Power 10 MHz Bandwidth

### 5.1 Test Specification

FCC Part 27, Sub-part C (27.50(c)(3))

### 5.2 Test procedure

Peak Power Output must not exceed 1000W. The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator (20.2 dB) and an appropriate coaxial cable. The E.U.T. RF output was OFDMA, 64QAM at 10MHz bandwidth at the 746-758 MHz bands. Special attention was taken to prevent Spectrum Analyzer RF input overload. The Spectrum Analyzer was set to 100 kHz RBW.

Signal generator output power was 0dBm.

Antenna type :Dipole antenna with N type connector (Antenna Gain : 7dBi)

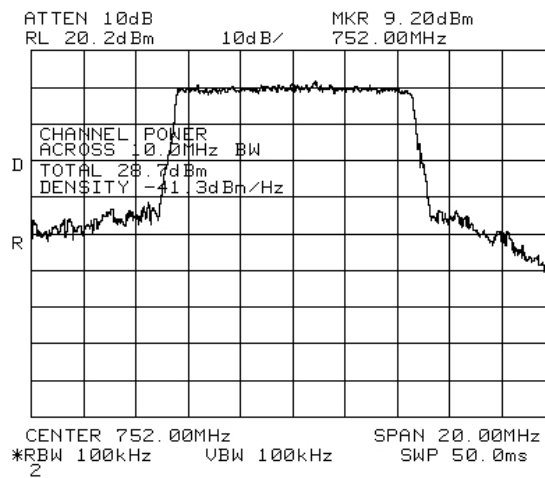


Figure 8.— 752 MHz

### 5.3 Results table

E.U.T. Description: Add-On LTE  
 Model No.: 700LTE-AO  
 Serial Number: 095225B  
 Specification: FCC Part 27, Subpart C (27.50(c)(3))

Modulation	Operation Frequency (MHz)	Reading (dBm)	Antenna Gain (dB)	Specification (dBm)	Margin (dB)
OFDM	752	28.7	7	60	-24.3

**Figure 9 Maximum Peak Power Output 10 MHz Bandwidth**

JUDGEMENT: Passed by 24.3 dB

TEST PERSONNEL:

Tester Signature: 

Date: 16.01.10

Typed/Printed Name: A. Sharabi

### 5.4 Test Equipment Used.

Maximum Peak Output Power 10 MHz Bandwidth

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibration	Period
Spectrum Analyzer	HP	8564E	3442A00275	January 11, 2010	1 year
Signal Generator	Agilent	MXG N182A	MY47420121	August 2, 2009	2 year
Attenuator	Jyebao	-	FAT-AM5AF5G6G 2W20	October 19, 2009	1 year
Cable	TestLINE	18	11556	January 4, 2010	1 year

**Figure 10 Test Equipment Used**



## 6. Occupied Bandwidth 5 MHz Bandwidth

### 6.1 Test Specification

FCC Part 2, Section 1049 (i)

### 6.2 Test Procedure

The E.U.T. was set to the applicable test frequency with OFDMA and 64QAM 5 MHz modulation in the 728-746 MHz band.

The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator (at the output test) and an appropriate coaxial cable (20.2dB). The spectrum analyzer was set to proper resolution B.W.

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

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

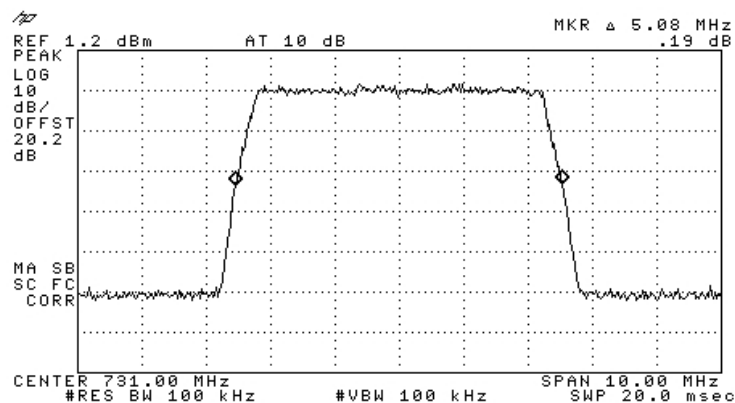


Figure 11.— 731 MHz IN

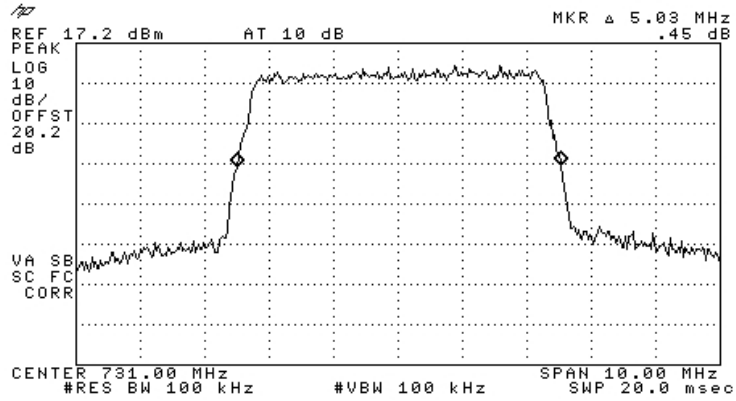


Figure 12.— 731 MHz OUT

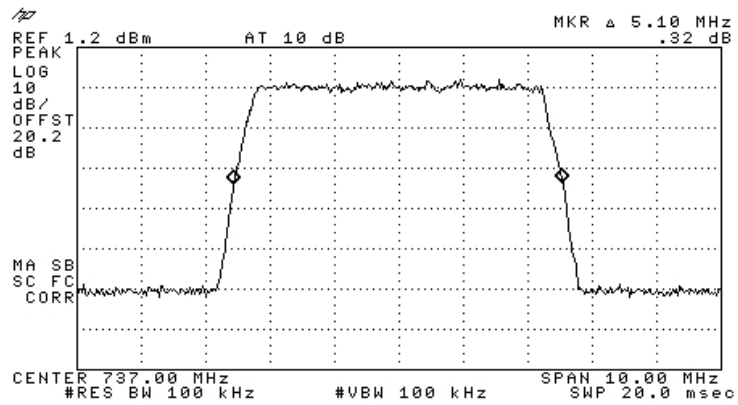


Figure 13.— 737 MHz IN

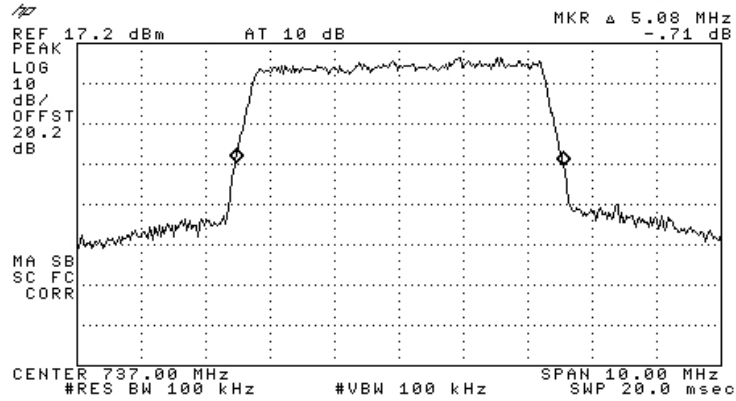


Figure 14.— 737 MHz OUT

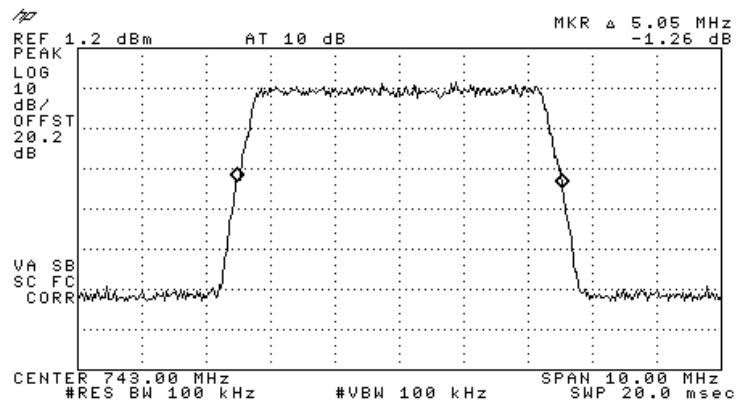


Figure 15.— 743 MHz IN

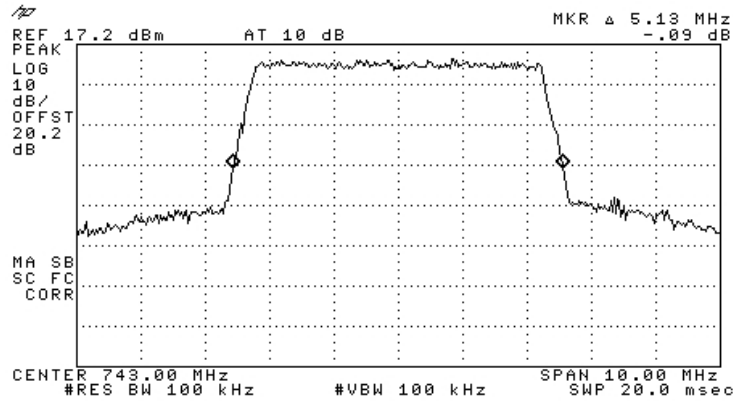


Figure 16.— 743 MHz OUT

### 6.3 Results Table


E.U.T. Description: Add-On LTE  
 Model No.: 700LTE-AO  
 Serial Number: 095225B  
 Specification: FCC Part 2, Section 1049 (i)

	Operating Frequency (MHz)	Reading (26dBc) (MHz)
Input	731.00	5.08
Output	731.00	5.03
Input	737.00	5.10
Output	737.00	5.08
Input	743.00	5.05
Output	743.00	5.13

Figure 17 Occupied Bandwidth 5 MHz Bandwidth

JUDGEMENT: Passed

TEST PERSONNEL:

Tester Signature: 

Date: 16.01.10

Typed/Printed Name: A. Sharabi

#### 6.4 Test Equipment Used.

Occupied Bandwidth 5 MHz Bandwidth

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibration	Period
Spectrum Analyzer	HP	8529L	3826A01204	March 17, 2009	1 year
Signal Generator	Agilent	MXG N182A	MY47420121	August 2, 2009	2 year
Attenuator	Jyebao	-	FAT-AM5AF5G6G 2W20	October 19, 2009	1 year
Cable	TestLINE	18	11556	January 4, 2010	1 year

**Figure 18 Test Equipment Used**

## 7. Occupied Bandwidth 10 MHz Bandwidth

### 7.1 Test Specification

FCC Part 2, Section 1049 (i)

### 7.2 Test Procedure

The E.U.T. was set to the applicable test frequency with OFDMA and 64QAM 10 MHz modulation in the 746-758MHz band.

The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator (at the output test) and an appropriate coaxial cable (20.2dB). The spectrum analyzer was set to proper resolution B.W.

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

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

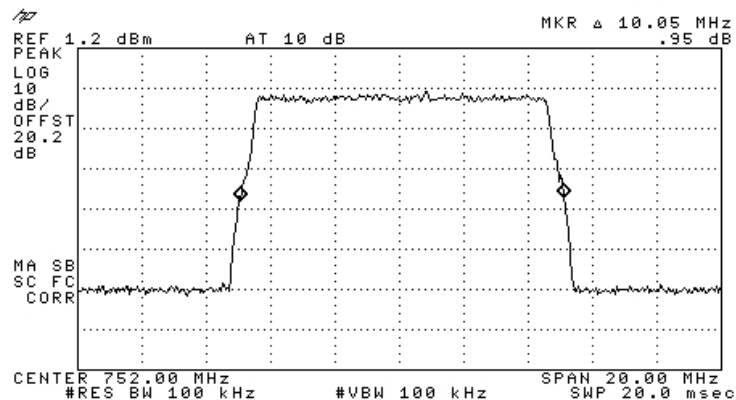


Figure 19.— 752 MHz IN

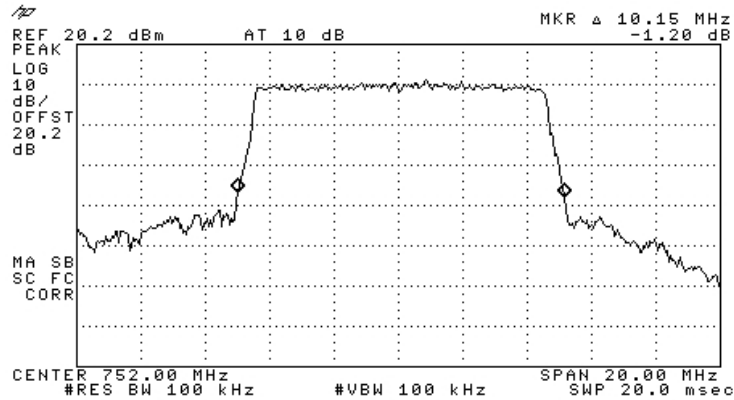


Figure 20.— 752 MHz OUT

### 7.3 Results Table

E.U.T. Description: Add-On LTE  
 Model No.: 700LTE-AO  
 Serial Number: 095225B  
 Specification: FCC Part 2, Section 1049 (i)

	Operating Frequency (MHz)	Reading (26dBc) (MHz)
Input	752.00	10.05
Output	752.00	10.15

Figure 21 Emission Bandwidth 10 MHz

JUDGEMENT: Passed

TEST PERSONNEL:

Tester Signature: 

Date: 16.01.10

Typed/Printed Name: A. Sharabi

### 7.4 Test Equipment Used.

Occupied Bandwidth 10 MHz Bandwidth

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibration	Period
Spectrum Analyzer	HP	8529L	3826A01204	March 17, 2009	1 year
Signal Generator	Agilent	MXG N182A	MY47420121	August 2, 2009	2 year
Attenuator	Jyebao	-	FAT-AM5AF5G6G 2W20	October 19, 2009	1 year
Cable	TestLINE	18	11556	January 4, 2010	1 year

**Figure 22 Test Equipment Used**



## 8. Conducted Spurious Emissions 5 MHz Bandwidth

### 8.1 Test Specification

FCC Part 27, Subpart C, Section 27.53 (g)

### 8.2 Test procedure

The power of any emission outside of the authorized operating frequency ranges 728 MHz-746 MHz must be attenuated below the transmitting power (P) by a factor of  $43 + 10 \log(P)$  dB. The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator and an appropriate coaxial cable (20.2dB).

The signal generator was configured for 0dBm output power and 5MHz LTE signal, modulated with 64QAM

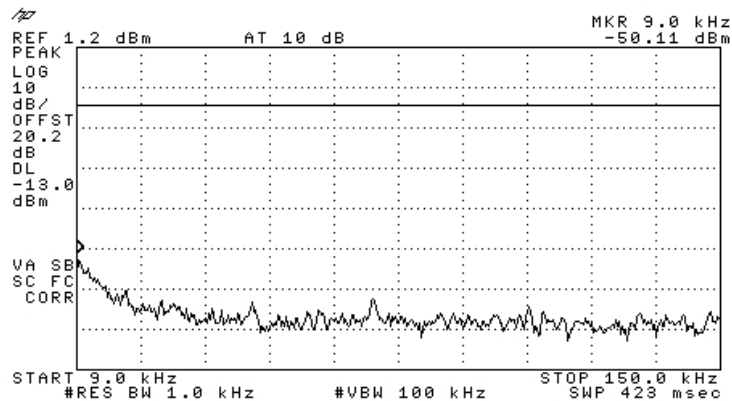


Figure 23.— 731 MHz Block A 728-734 MHz

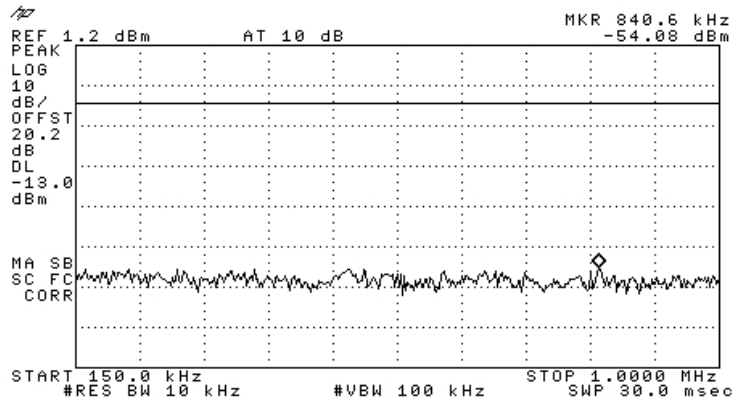


Figure 24.— 731 MHz Block A 728-734 MHz

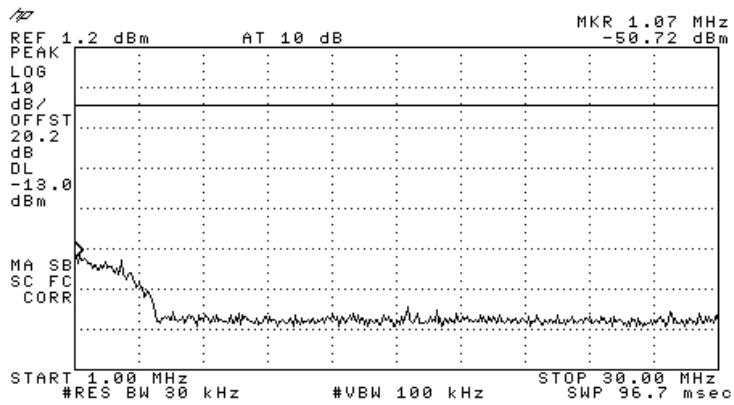


Figure 25.— 731 MHz Block A 728-734 MHz

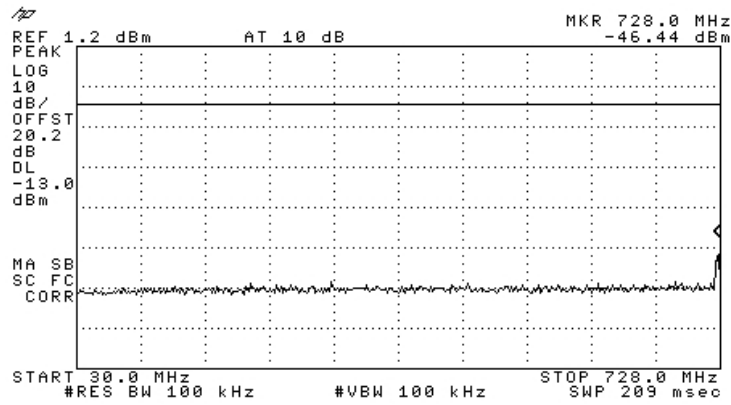


Figure 26.— 731 MHz Block A 728-734 MHz

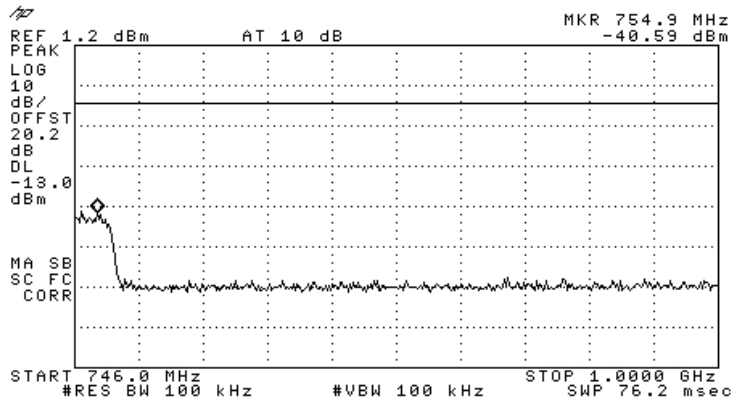


Figure 27.— 731 MHz Block A 728-734 MHz

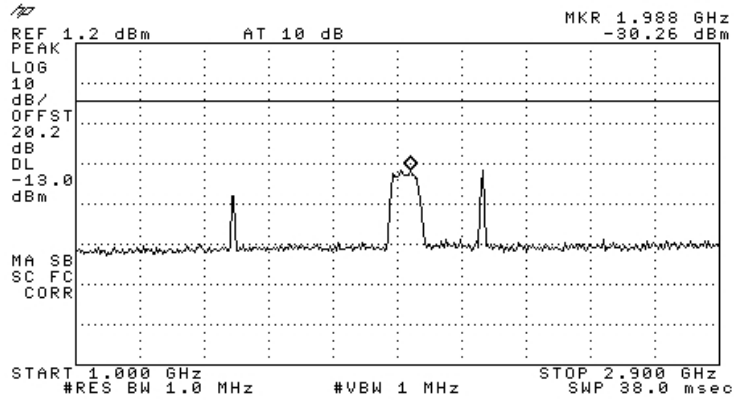


Figure 28.— 731 MHz Block A 728-734 MHz

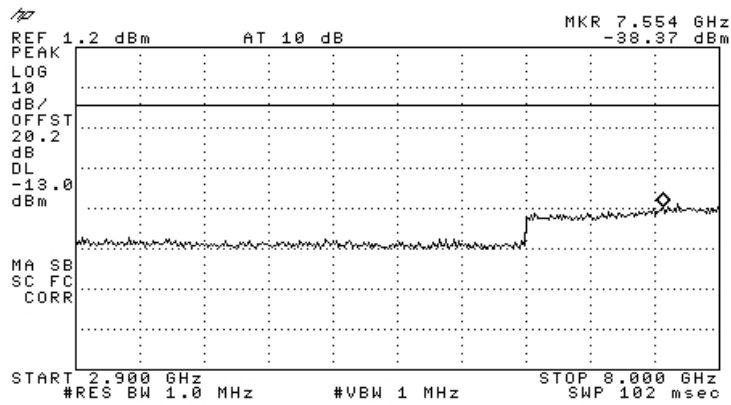
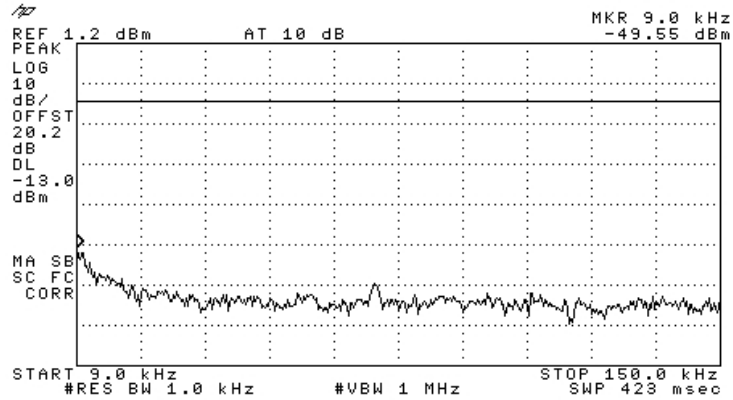
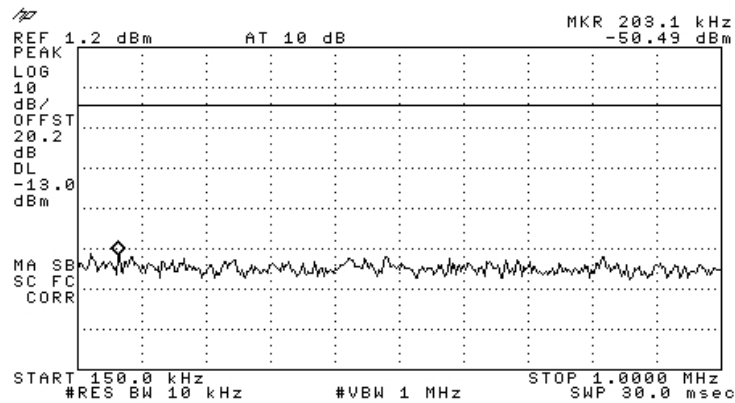


Figure 29.— 731 MHz Block A 728-734 MHz



**Figure 30.— 737 MHz Block B 734-740 MHz**



**Figure 31.— 737 MHz Block B 734-740 MHz**

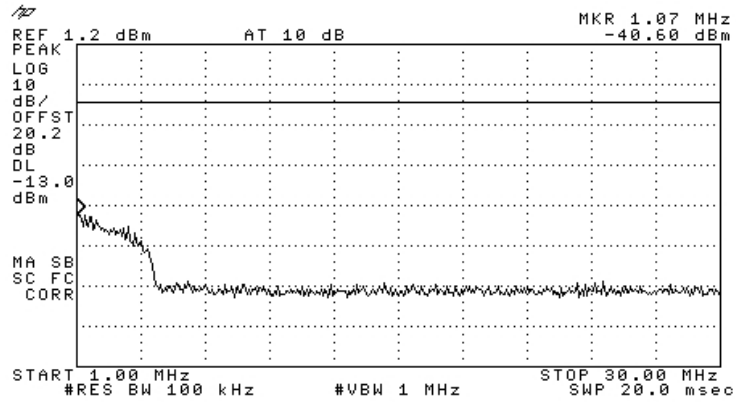


Figure 32.— 737 MHz Block B 734-740 MHz

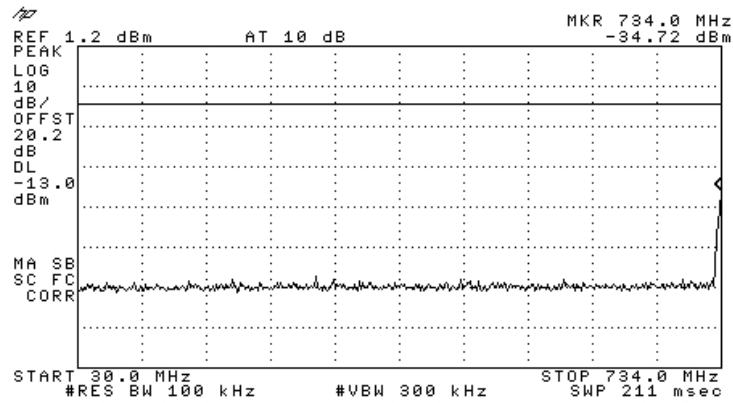


Figure 33.— 737 MHz Block B 734-740 MHz

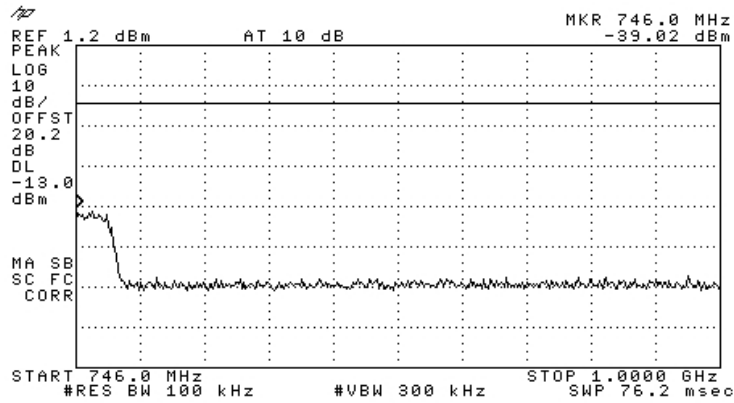


Figure 34.— 737 MHz Block B 734-740 MHz

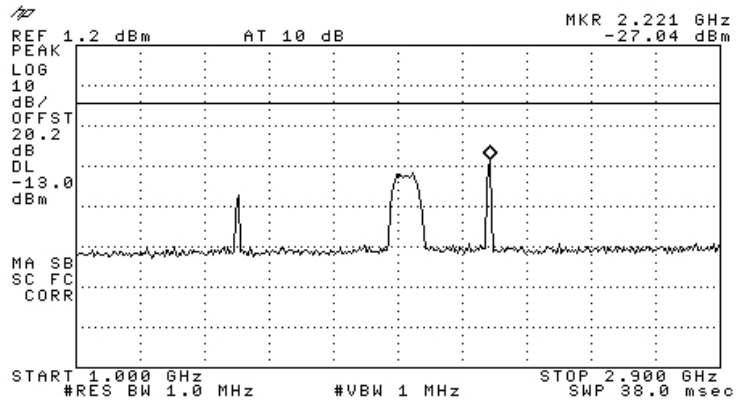


Figure 35.— 737 MHz Block B 734-740 MHz

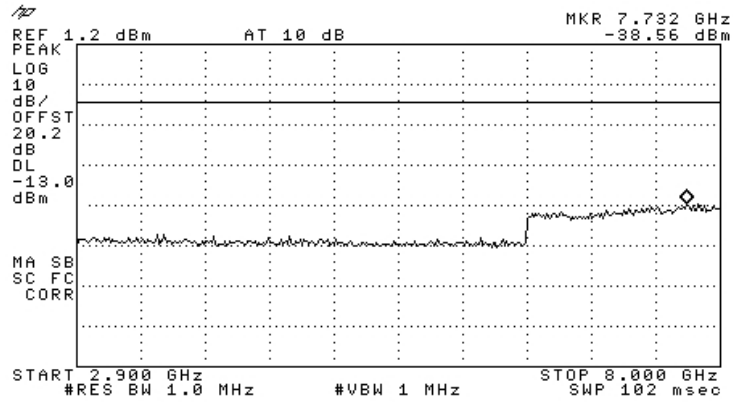


Figure 36.— 737 MHz Block B 734-740 MHz

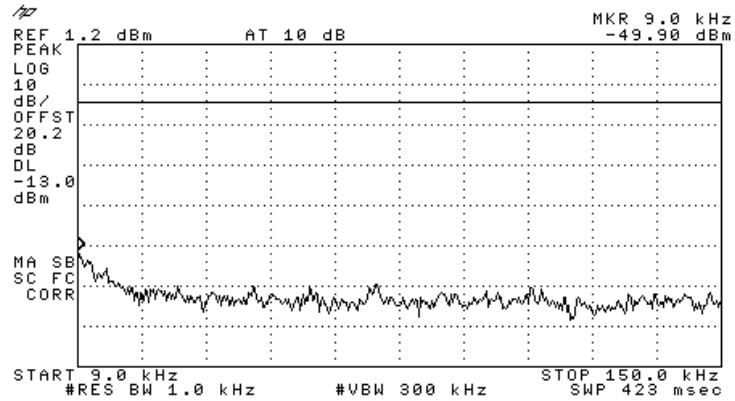
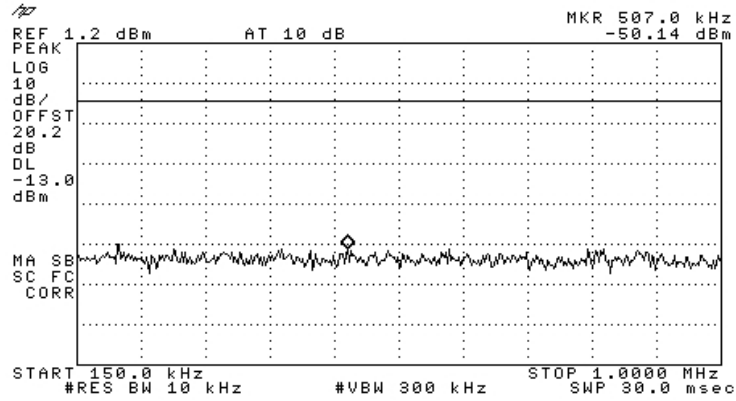
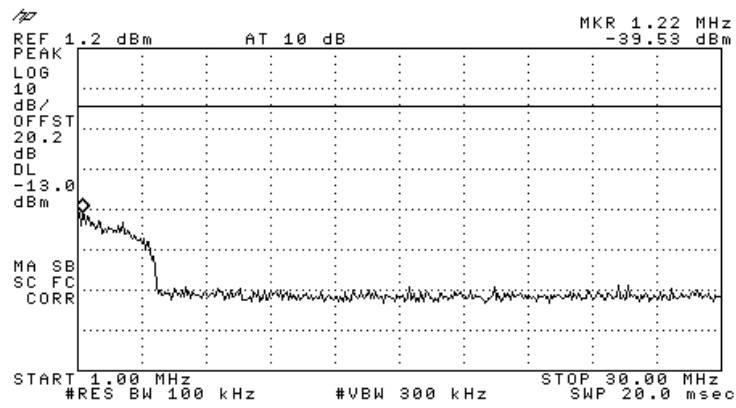


Figure 37.— 743 MHz Block C 740-746 MHz





**Figure 38.— 743 MHz Block C 740-746 MHz**



**Figure 39.— 743 MHz Block C 740-746 MHz**

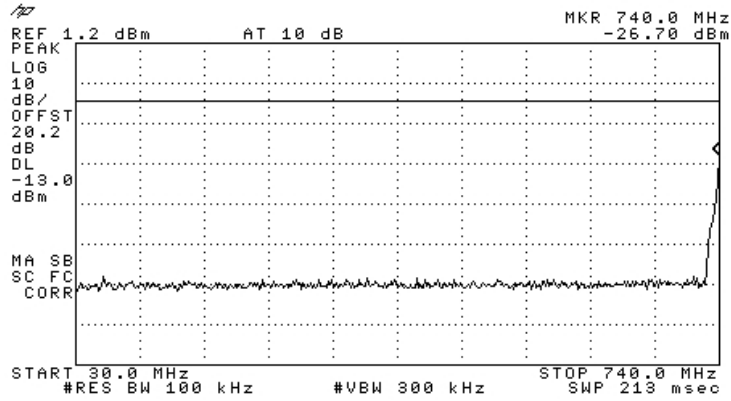


Figure 40.— 743 MHz Block C 740-746 MHz

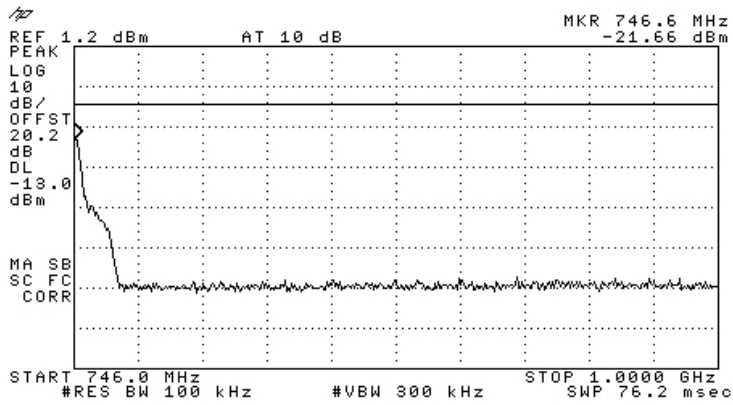


Figure 41.— 743 MHz Block C 740-746 MHz

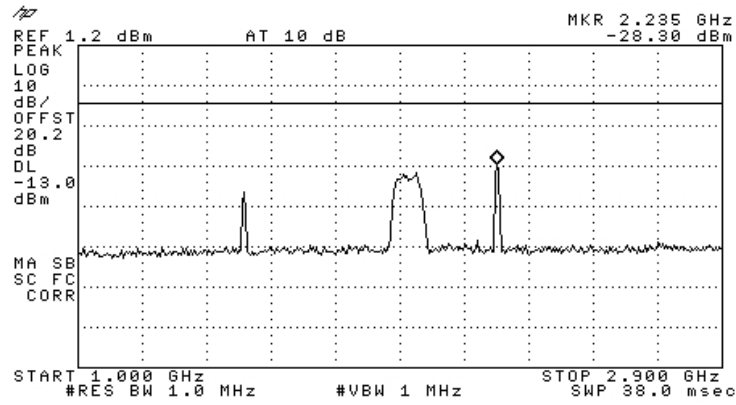


Figure 42.— 743 MHz Block C 740-746 MHz

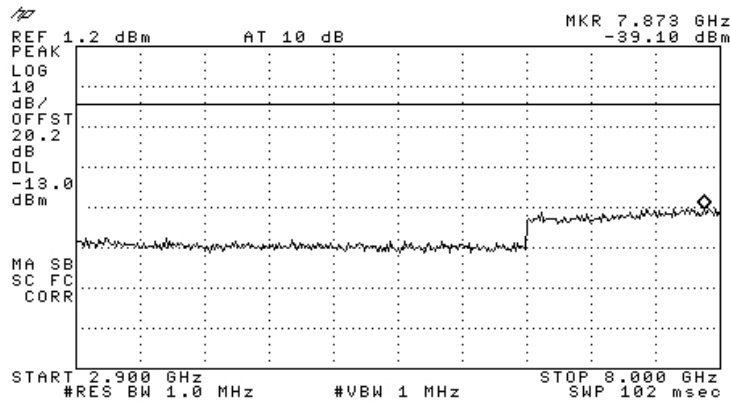


Figure 43.— 743 MHz Block C 740-746 MHz



#### 8.4 Test Equipment Used.

Conducted Spurious Emission 5 MHz Bandwidth

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibration	Period
Spectrum Analyzer	HP	8592L	3826A01204	March 17, 2009	1 year
Signal Generator	Agilent	MXG N182A	MY47420121	August 2, 2009	2 year
Attenuator	Jyebao	-	FAT-AM5AF5G6G 2W20	October 19, 2009	1 year
Cable	TestLINE	18	11556	January 4, 2010	1 year

**Figure 45 Test Equipment Used**

## 9. Conducted Spurious Emissions 10 MHz Bandwidth

### 9.1 Test Specification

FCC Part 27.53(c)(1), 27.53(c)(3)

### 9.2 Test procedure

The power of any emission outside of the authorized operating frequency ranges 746 MHz-757 MHz must be attenuated below the transmitting power (P) by a factor of  $43 + 10 \log (P)$  dB.

Inside the bands 763-775 MHz and 793-805 MHz attenuation by a factor of  $76 + 10 \log (P)$  dB in a 6.25 kHz band segment.

The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator and an appropriate coaxial cable (20.2dB).

The signal generator was configured for 0dBm output power and 10MHz LTE signal, modulated with 64QAM

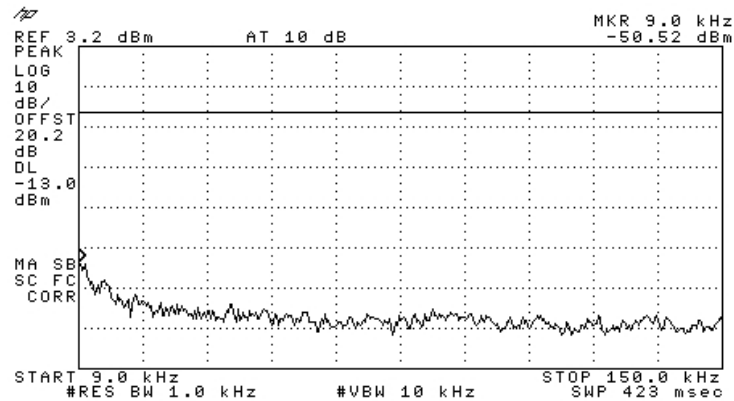


Figure 46.— 752 MHz

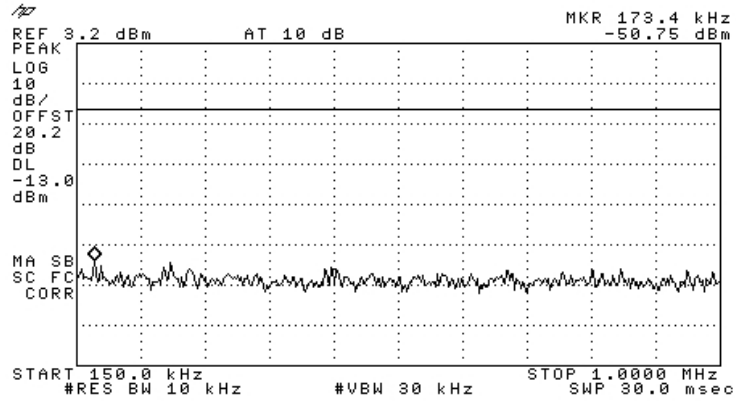


Figure 47.— 752 MHz

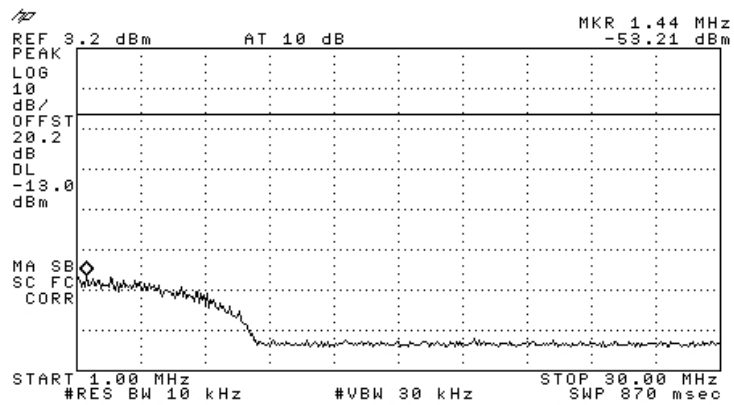


Figure 48.— 752 MHz

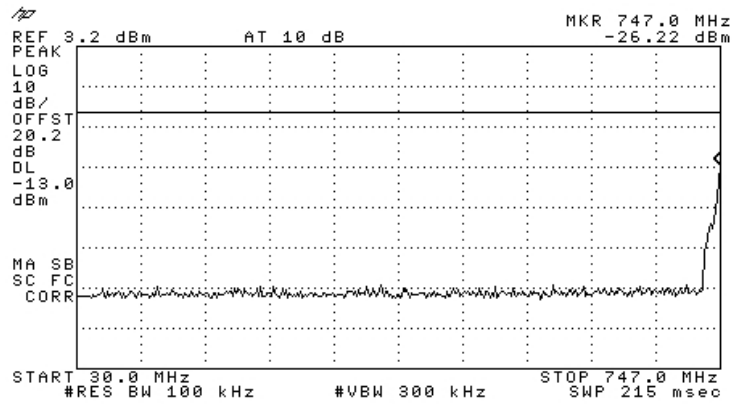


Figure 49.— 752 MHz

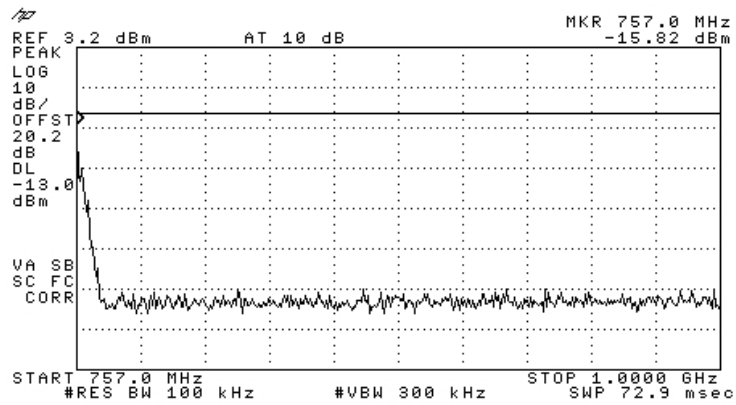


Figure 50.— 752 MHz



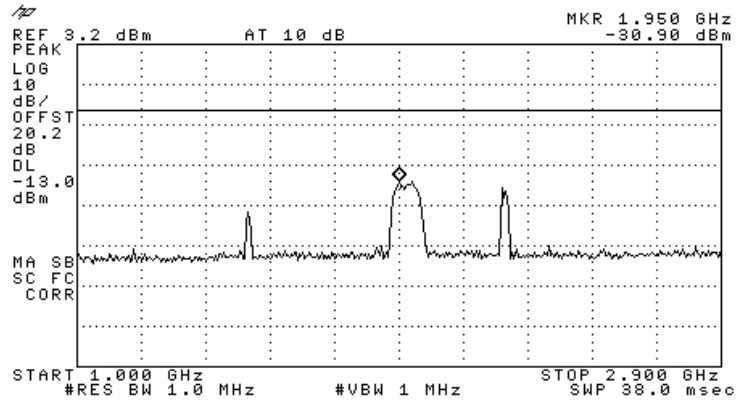


Figure 51.— 752 MHz

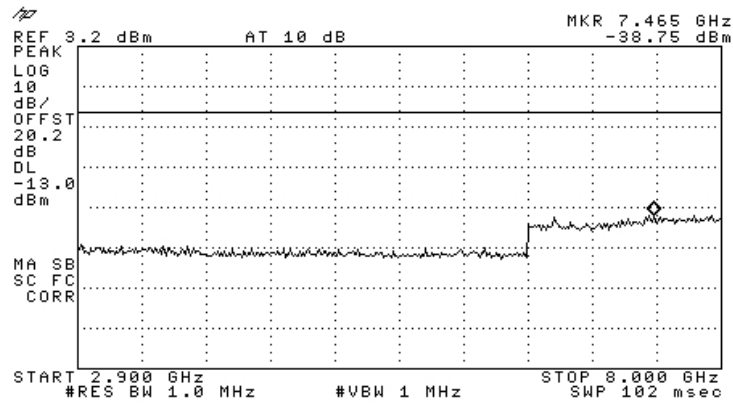


Figure 52.— 752 MHz

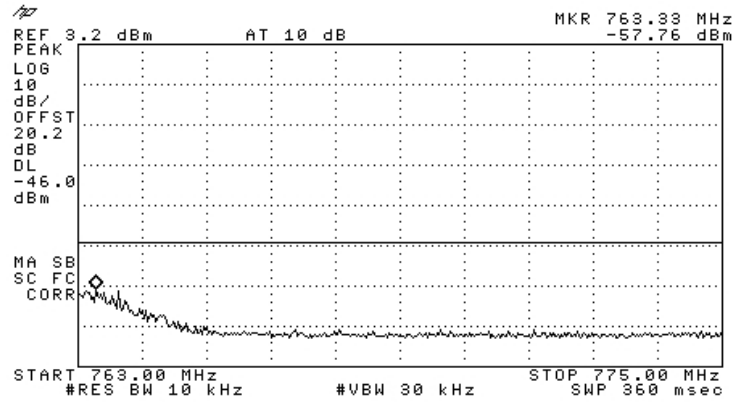


Figure 53.— 752 MHz

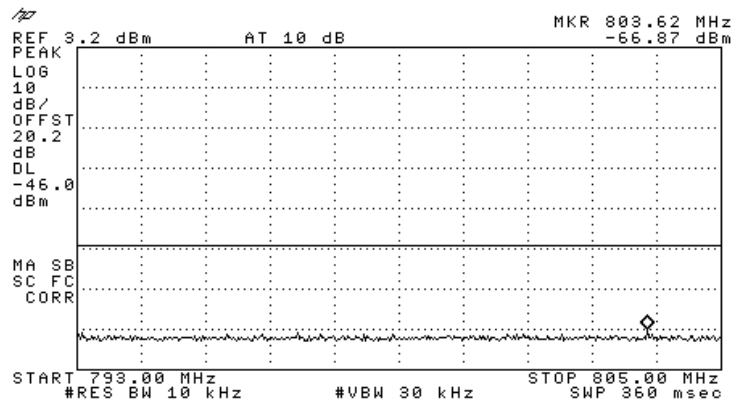


Figure 54.— 752 MHz

### 9.3 Results table

E.U.T. Description: Add-On LTE  
 Model No.: 700LTE-AO  
 Serial Number: 095225B  
 Specification: FCC Part 27.53(c)(1), 27.53(c)(3)

	Operation Frequency (MHz)	Reading (dBm)	Specification (dBm)	Margin (dB)
OFDMA	752	-15.82	-13.0	-2.82

**Figure 55 Conducted Spurious Emission Results 10 MHz Bandwith**

JUDGEMENT: Passed by 2.8 dB

TEST PERSONNEL:

Tester Signature: 

Date: 16.01.10

Typed/Printed Name: A. Sharabi

#### 9.4 Test Equipment Used.

Conducted Spurious Emissions 10 MHz Bandwidth

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibration	Period
Spectrum Analyzer	HP	8592L	3826A01204	March 17, 2009	1 year
Signal Generator	Agilent	MXG N182A	MY47420121	August 2, 2009	2 year
Attenuator	Jyebao	-	FAT-AM5AF5G6G 2W20	October 19, 2009	1 year
Cable	TestLINE	18	11556	January 4, 2010	1 year

**Figure 56 Test Equipment Used**

## 10. Band Edge Measurements 5 MHz Bandwidth

### 10.1 Test Specification

FCC Part 27, Subpart C, Section 27.53 (g)

### 10.2 Test procedure

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

The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator and an appropriate coaxial cable (20.2 dB).

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

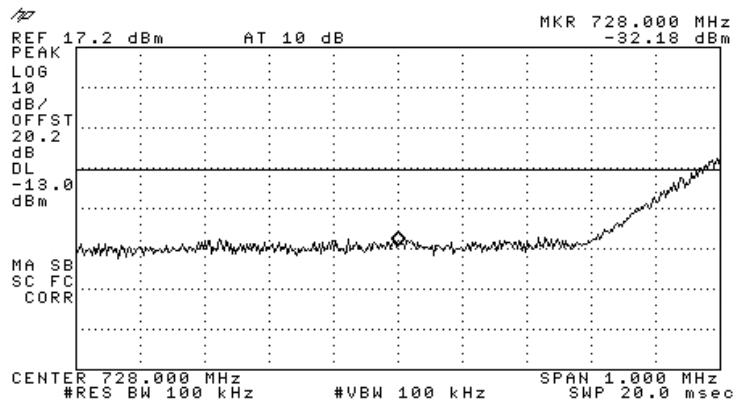


Figure 57.— 731 MHz

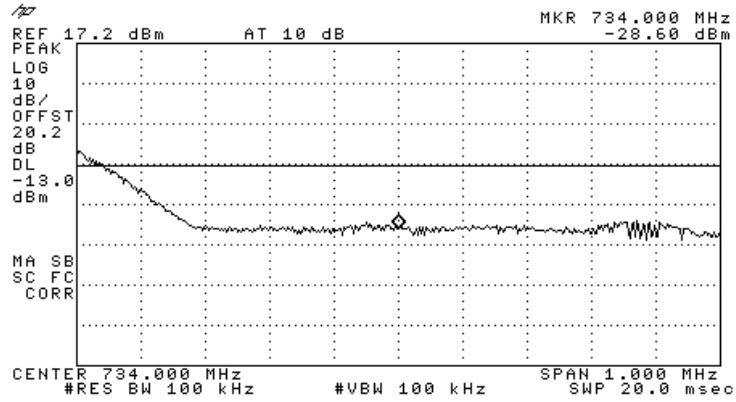


Figure 58.— 731 MHz

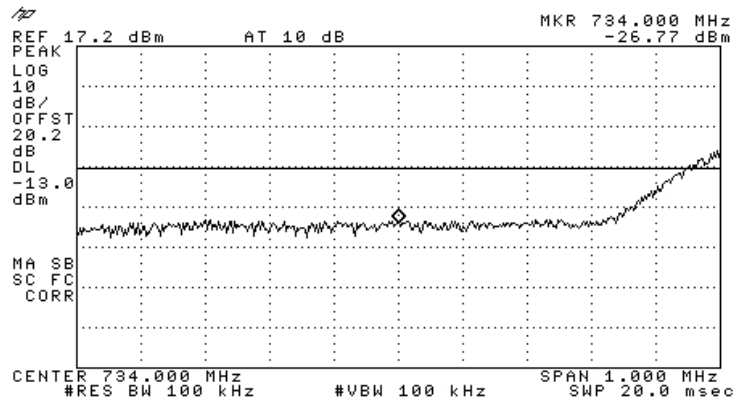


Figure 59.— 737 MHz

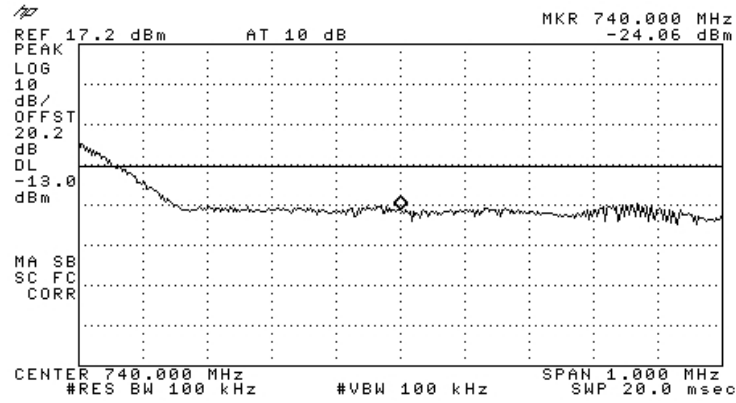


Figure 60.— 737 MHz

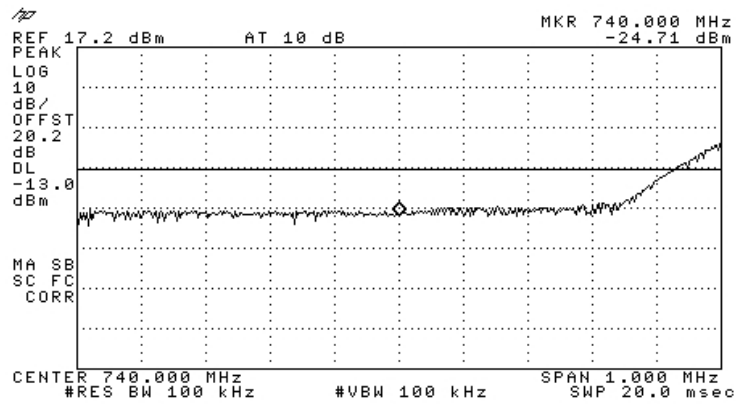


Figure 61.— 743 MHz

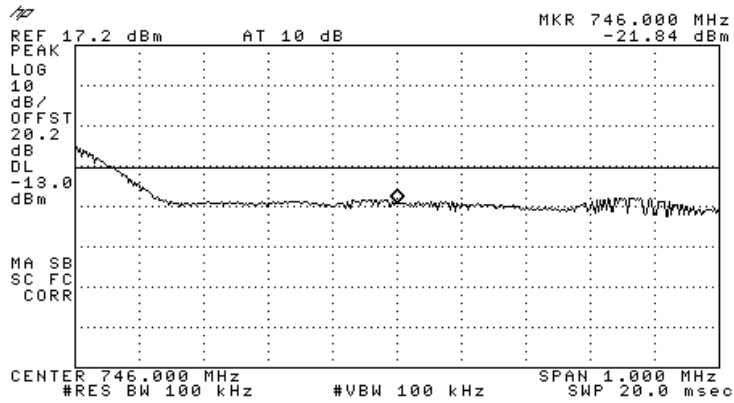


Figure 62.— 743 MHz

### 10.3 Results table

E.U.T. Description: Add-On LTE  
 Model No.: 700LTE-AO  
 Serial Number: 095225B  
 Specification: FCC Part 27, Subpart C, Section 27.53 (g)

Operation Frequency (MHz)	Frequency (MHz)	Reading (dBm)	Specification (dBm)	Margin (dB)
731	728	-32.18	-13.0	-19.18
731	734	-28.60	-13.0	-15.60
737	734	-26.77	-13.0	-13.77
737	740	-24.06	-13.0	-11.06
743	740	-24.71	-13.0	-11.71
74.	746	-21.84	-13.0	-8.84

Figure 63 Band Edge Measurements 5 MHz Bandwidth

JUDGEMENT: Passed

TEST PERSONNEL:

Tester Signature: 

Date: 16.01.10

Typed/Printed Name: A. Sharabi



#### 10.4 Test Equipment Used.

##### Band Edge Measurements 5 MHz Bandwidth

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibration	Period
Spectrum Analyzer	HP	8592L	3826A01204	March 17, 2009	1 year
Signal Generator	Agilent	MXG N182A	MY47420121	August 2, 2009	2 year
Attenuator	Jyebao	-	FAT-AM5AF5G6G 2W20	October 19, 2009	1 year
Cable	TestLINE	18	11556	January 4, 2010	1 year

**Figure 64 Test Equipment Used**

# 11. Band Edge Measurements 10 MHz Bandwidth

## 11.1 Test Specification

FCC Part 27, Sub-part C, Section 27.53(c)(1)

## 11.2 Test procedure

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

The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator and an appropriate coaxial cable (20.2 dB).

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

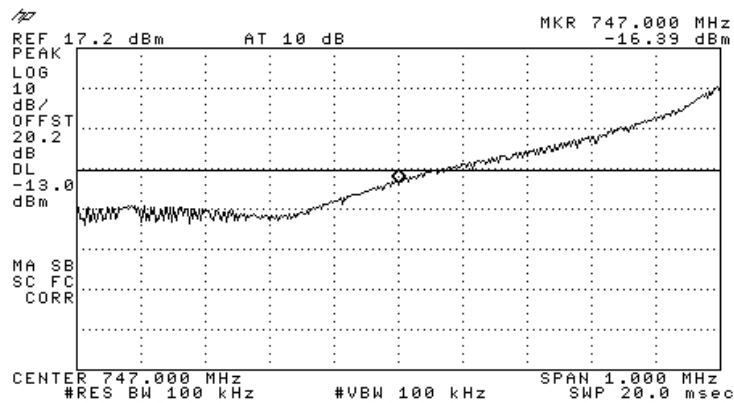


Figure 65.— 752 MHz

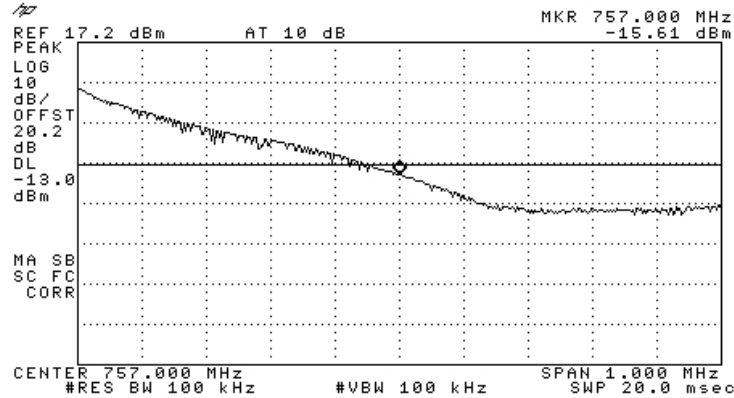


Figure 66.— 752 MHz

### 11.3 Results table

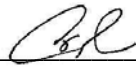
E.U.T. Description: Add-On LTE  
 Model No.: 700LTE-AO  
 Serial Number: 095225B  
 Specification: FCC Part 27, Sub-part C, Section 27.53 (m)

Operation Frequency (MHz)	Frequency (MHz)	Reading (dBm)	Specification (dBm)	Margin (dB)
752	747	-16.39	-13.0	-3.39
752	757	-15.61	-13.0	-2.61

Figure 67 Band Edge Measurements Results 10 MHz Bandwidth

JUDGEMENT: Passed

TEST PERSONNEL:

Tester Signature: 

Date: 16.01.10

Typed/Printed Name: A. Sharabi

#### 11.4 Test Equipment Used.

Band Edge Measurements 10 MHz Bandwidth

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibration	Period
Spectrum Analyzer	HP	8592L	3826A01204	March 17, 2009	1 year
Signal Generator	Agilent	MXG N182A	MY47420121	August 2, 2009	2 year
Attenuator	Jyebao	-	FAT-AM5AF5G6G 2W20	October 19, 2009	1 year
Cable	TestLINE	18	11556	January 4, 2010	1 year

**Figure 68 Test Equipment Used**

## 12. Spurious Radiated Emission

### 12.1 Test Specification

FCC, Part 27, Subpart C Section 27.53 (m)

### 12.2 Test Procedure

The test method was based on ANSI/TIA-603-B: 2002, Section 2.2.12

Unwanted Emissions: Radiated Spurious.

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

- (a) The E.U.T. operation mode and test set-up are as described in Section 3. 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 configuration tested is shown in Figure 1.

The frequency range 9 kHz-20 GHz 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  $0-360^\circ$ , and the antenna polarization. The emissions were measured at a distance of 3 meters.

- (b) 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:

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

$P_d$  = Dipole equivalent power (result).

$P_g$  = Signal generator output level.

The E.U.T. was operated at the frequency of 731.00, 737.00, 743.00 and 752.00 MHz.

2<sup>nd</sup> Harmonic CW:

Carrier Channel (MHz)	Freq. (MHz)	Antenna Pol.	Maximum Peak Level (dB $\mu$ V/m)	Signal Generator RF Output (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Effective Radiated Power Level (dBm)	Spec. (dBm)	Margin (dB)
731.00	1462	V	55.31	-43.4	4.9	8.0	-40.3	-13.0	-27.3
731.00	1462	H	53.94	-47.0	4.9	8.0	-43.9	-13.0	-30.9
737.00	1474	V	55.91	-43.1	4.9	8.0	-40.0	-13.0	-27.0
737.00	1474	H	53.87	-43.5	4.9	8.0	-40.4	-13.0	-27.4
743.00	1486	V	54.95	-42.3	4.9	8.0	-39.2	-13.0	-26.2
743.00	1486	H	56.42	-40.5	4.9	8.0	-37.4	-13.0	-24.4
752.00	1504	V	57.44	-40.2	4.9	8.0	-37.1	-13.0	-24.1
752.00	1504	H	55.77	-43.4	4.9	8.0	-40.3	-13.0	-27.3

3<sup>rd</sup> Harmonic CW

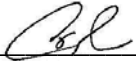
Carrier Channel (MHz)	Freq. (MHz)	Antenna Pol.	Maximum Peak Level (dB $\mu$ V/m)	Signal Generator RF Output (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Effective Radiated Power Level (dBm)	Spec. (dBm)	Margin (dB)
731.00	2193	V	62.42	-35.0	6.9	8.7	-33.2	-13.0	-20.2
731.00	2193	H	70.91	-28.5	6.9	8.7	-26.7	-13.0	-13.7
737.00	2211	V	67.06	-30.4	6.9	8.7	-28.6	-13.0	-15.6
737.00	2211	H	71.42	-28.0	6.9	8.7	-26.2	-13.0	-13.2
743.00	2229	V	66.02	-31.3	6.9	8.7	-29.5	-13.0	-16.5
743.00	2229	H	69.63	-28.0	6.9	8.7	-26.2	-13.0	-13.2
752.00	2256	V	63.56	-36.2	6.9	8.7	-34.4	-13.0	-21.4
752.00	2256	H	68.28	-27.4	6.9	8.7	-25.6	-13.0	-12.6

### 12.3 Test Results

JUDGEMENT: Passed by 12.6 dB

The E.U.T met the requirements of the FCC, Part 27, Subpart C, Section 27.53 specifications.

TEST PERSONNEL:

Tester Signature:  Date: 16.01.10

Typed/Printed Name: A. Sharabi

#### 12.4 Test Instrumentation Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3411A00102	November 08, 2009	1 year
RF Section	HP	85420E	3427A00103	November 08, 2009	1 year
Antenna Log Periodic	A.H. Systems	SAS-200/511	253	January 29, 2009	2 year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	ThinkJet 2225	2738508357.0	N/A	N/A
Spectrum Analyzer	HP	8592L	3826A01204	March 17, 2009	1 year
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS-0411N313	013	January 7, 2009	1 year
Low Noise Amplifier	Sophia Wireless	LNA 28-B	232	January 9, 2009	1 year
Signal Generator	HP	8648C	3623A04126	January 11, 2010	2 years
Double Ridged Waveguide Horn Antenna	EMCO	3115	29845	March 16, 2008	2 year



## 13. APPENDIX A - CORRECTION FACTORS

### 13.1 Correction factors for CABLE from EMI receiver to test antenna at 3 meter range.

FREQUENCY (MHz)	CORRECTION FACTOR (dB)	FREQUENCY (MHz)	CORRECTION FACTOR (dB)
10.0	0.3	1200.0	7.3
20.0	0.6	1400.0	7.8
30.0	0.8	1600.0	8.4
40.0	0.9	1800.0	9.1
50.0	1.1	2000.0	9.9
60.0	1.2	2300.0	11.2
70.0	1.3	2600.0	12.2
80.0	1.4	2900.0	13.0
90.0	1.6		
100.0	1.7		
150.0	2.0		
200.0	2.3		
250.0	2.7		
300.0	3.1		
350.0	3.4		
400.0	3.7		
450.0	4.0		
500.0	4.3		
600.0	4.7		
700.0	5.3		
800.0	5.9		
900.0	6.3		
1000.0	6.7		

**NOTES:**

1. The cable type is RG-214.
2. The overall length of the cable is 27 meters.
3. The above data is located in file 27MO3MO.CBL on the disk marked "Radiated Emission Tests EMI Receiver".

**13.2 Correction factors for CABLE**  
**from EMI receiver**  
**to test antenna**  
**at 3 meter range.**

<b>FREQUENCY</b> <b>(GHz)</b>	<b>CORRECTION</b> <b>FACTOR</b> <b>(dB)</b>
1.0	1.2
2.0	1.6
3.0	2.0
4.0	2.4
5.0	3.0
6.0	3.4
7.0	3.8
8.0	4.2
9.0	4.6
10.0	5.0
12.0	5.8

*NOTES:*

- 1. The cable type is RG-8.*
- 2. The overall length of the cable is 10 meters.*

**13.3 Correction factors for CABLE**  
**from spectrum analyzer**  
**to test antenna above 2.9 GHz**

FREQUENCY (GHz)	CORRECTION FACTOR (dB)	FREQUENCY (GHz)	CORRECTION FACTOR (dB)
1.0	1.9	14.0	9.1
2.0	2.7	15.0	9.5
3.0	3.5	16.0	9.9
4.0	4.2	17.0	10.2
5.0	4.9	18.0	10.4
6.0	5.5	19.0	10.7
7.0	6.0	20.0	10.9
8.0	6.5	21.0	11.2
9.0	7.0	22.0	11.6
10.0	7.5	23.0	11.9
11.0	7.9	24.0	12.3
12.0	8.3	25.0	12.6
13.0	8.7	26.0	13.0

*NOTES:*

- 1. The cable type is SUCOFLEX 104 E manufactured by SUHNER.*
- 2. The cable is used for measurements above 2.9 GHz.*
- 3. The overall length of the cable is 10 meters.*

**13.4 Correction factors for**

**LOG PERIODIC ANTENNA**

**Type SAS-200/511  
at 3 meter range.**

FREQUENCY (GHz)	ANTENNA FACTOR (dB)
1.0	24.9
1.5	27.8
2.0	29.9
2.5	31.2
3.0	32.8
3.5	33.6
4.0	34.3
4.5	35.2
5.0	36.2
5.5	36.7
6.0	37.2
6.5	38.1

FREQUENCY (GHz)	ANTENNA FACTOR (dB)
7.0	38.6
7.5	39.2
8.0	39.9
8.5	40.4
9.0	40.8
9.5	41.1
10.0	41.7
10.5	42.4
11.0	42.5
11.5	43.1
12.0	43.4
12.5	44.4
13.0	44.6

**NOTES:**

1. Antenna serial number is 253.
2. The above lists are located in file number SAS3M0.ANT for a 3 meter range.
3. The files mentioned above are located on the disk marked "Antenna Factors".

**13.5 Correction factors for Double-Ridged Waveguide Horn**

**Model: 3115, S/N 29845  
at 3 meter range.**

FREQUENCY (GHz)	ANTENNA FACTOR (dB 1/m)	ANTENN A Gain (dBi)	FREQUENCY (GHz)	ANTENNA FACTOR (dB 1/m)	ANTENNA Gain (dBi)
1.0	24.8	5.4	10.0	38.8	11.4
1.5	26.1	7.6	10.5	38.9	11.8
2.0	28.6	7.7	11.0	39.0	12.1
2.5	29.8	8.4	11.5	39.6	11.8
3.0	31.4	8.4	12.0	39.8	12.0
3.5	32.4	8.7	12.5	39.6	12.5
4.0	33.7	8.6	13.0	40.0	12.5
4.5	33.4	9.9	13.5	39.8	13.0
5.0	34.5	9.7	14.0	40.2	13.0
5.5	35.1	9.9	14.5	40.6	12.9
6.0	35.4	10.4	15.0	41.3	12.4
6.5	35.6	10.8	15.5	39.5	14.6
7.0	36.2	10.9	16.0	38.8	15.5
7.5	37.3	10.4	16.5	40.0	14.6
8.0	37.7	10.6	17.0	41.4	13.4
8.5	38.3	10.5	17.5	44.8	10.3
9.0	38.5	10.8	18.0	47.2	8.1
9.5	38.7	11.1			