



731 Enterprise Drive
Lexington, KY 40510

Telephone: 859-226-1000
Facsimile: 859-226-1040
www.intertek-etlsemko.com

TEST REPORT

Report Number: 101078559LEX-009
Project Number: G101078559
Report Issue Date: 6/14/2013
Product Name: MC7750
Integrated into the iX101T1 Rugged Tablet
FCCID: Q2GMC7750
Standards: Title 47 CFR Part 27
Radio Under Test: LTE Band 13

Tested by:
Intertek Testing Services NA, Inc.
731 Enterprise Drive
Lexington, KY 40510

Client:
Xplore Technologies
14000 Summit Dr.
Austin, TX 78728

Report prepared by

Bryan Taylor, Team Leader

Report reviewed by

Jason Centers, Senior Project Engineer



This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.

TABLE OF CONTENTS

1 Introduction and Conclusion..... 3

2 Test Summary 3

3 Description of Equipment Under Test 4

4 Conducted Output Power..... Error! Bookmark not defined.

5 Occupied Bandwidth Error! Bookmark not defined.

6 Conducted Spurious Emissions at Antenna Terminals..... Error! Bookmark not defined.

7 Radiated Output Power Error! Bookmark not defined.

8 Radiated Spurious Emissions (Transmitter)..... 6

9 Frequency Stability..... Error! Bookmark not defined.

10 Measurement Uncertainty..... 10

11 Revision History 11

1 Introduction and Conclusion

The tests indicated in section 2 were performed on the product constructed as described in section 3. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test method, a list of the actual test equipment used, documentation photos, results and raw data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested complied with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested.

The INTERTEK-Lexington is located at 731 Enterprise Drive, Lexington Kentucky, 40510. The radiated emission test site is a 10-meter semi-anechoic chamber. The chamber meets the characteristics of CISPR 16-1 and ANSI C63.4. For measurements, a remotely controlled flush-mount metal-top turntable is used to rotate the EUT a full 360 degrees. A remote controlled non-conductive antenna mast is used to scan the antenna height from one to four meters. The test site is listed with the FCC under registration number 485103. The test site is listed with Industry Canada under site number IC 2042M-1.

2 Test Summary

Page	Test full name	FCC Reference	Result
6	Radiated Spurious Emissions (Transmitter)	§27.53(c) and §27.53 (f)	Pass

3 Description of Equipment Under Test

Equipment Under Test	
Manufacturer	Xplore Technologies
Model Number	iX101T1
Serial Number	Test Sample #2
FCC Identifier	Q2GMC7750
Receive Date	3/20/2013
Test Start Date	4/17/2013
Test End Date	4/26/2013
Device Received Condition	Good
Test Sample Type	Production
Frequency Band	777MHz - 787MHz
Modulation Type	QPSK and 16QAM
Transmission Control	Base Station Simulator
Maximum Output Power (Conducted)	QPSK: 23.75dBm 16QAM: 22.27dBm
Test Channels	782MHz
Emission Designators	QPSK: 8M94G7D 16QAM: 8M91D7W
Antenna Type	Internal PCB
Antenna Gain (Provided by Manufacturer)	0.6dBi
Operating Voltage	115VAC/60Hz (Via AC / DC Power Adapter)

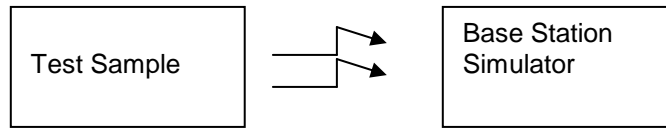
Description of Equipment Under Test
The iX101T1 is a wireless module being integrated into the Xplore Technologies iX101T1 Rugged Tablet

Operating modes of the EUT:

No.	Descriptions of EUT Exercising
1	Transmitting an LTE signal using either 16-QAM or QPSK modulation
2	

3.1 System setup including cable interconnection details, support equipment and simplified block diagram

3.2 EUT Block Diagram:



Block Diagram for Radiated Tests

3.3 Cables:

Cables					
Description	Length	Shielding	Ferrites	Connection	
				From	To
120 / 240Vac Power Cable	1m	No	No	120 / 240Vac Wall Supply	Xplore Tablet
Cat5e Ethernet Cable	1m	No	No	Netgear Ethernet / Wi-Fi Router	Xplore Tablet
HDMI Mini Cable	1m	Yes	No	Xplore Tablet	Unterminated
HDMI Cable	1m	Yes	No	Xplore Tablet	Unterminated
Micro USB Cable	1m	Yes	No	Xplore Tablet	Unterminated
USB Cable	1m	Yes	No	USB Mouse	Xplore Tablet

3.4 Support Equipment:

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
Wireless Router	Netgear	WNDR3700v4	311315801CC9

4 Radiated Spurious Emissions (Transmitter)

4.1 Test Limits

§27.53(c)(2) and §27.53 (f)

(c) For operations in the 746-758 MHz band and the 776-788 MHz band, 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 any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;

(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;

(3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $76 + 10 \log (P)$ dB in a 6.25 kHz band segment, for base and fixed stations;

(4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $65 + 10 \log (P)$ dB in a 6.25 kHz band segment, for mobile and portable stations;

(5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) 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 at least 30 kHz may be employed;

(6) Compliance with the provisions of paragraphs (c)(3) and (c)(4) 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.

(d) For operations in the 758-763 MHz and 788-793 MHz bands, the power of any emission outside the licensee's frequency bands 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 (d)(1) and (d)(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 (d)(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 at least 30 kHz may be employed.

(f) For operations in the 746-763 MHz, 775-793 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

4.2 Test Procedure

The EUT was placed on a non-conductive turntable. The measurement antenna was placed at a distance of 3 meters from the EUT. The EUT was forced to transmit at its maximum output power setting. During the tests, the antenna height and EUT azimuth were varied in order to identify the maximum level of emissions from the EUT.

The frequency range up to tenth harmonic was investigated in order to identify the spurious emission. Once the spurious emissions were identified, the power of the emission was determined using the substitution method described in TIA-603-C. The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and at the spurious emissions frequency.

4.3 Test Equipment Used:

Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
EMI Test Receiver	10887490.26	Rohde & Schwarz	ESI26	9/15/2012	9/14/2013
Preamplifier	987410	Miteq	AFS44-00102000-30-10P-44	9/4/2012	9/4/2013
Preamplifier	SF456200904	Mini-Circuits	ZX60-3018G-S+	9/4/2012	9/4/2013
Biconnilog Antenna	00051864	ETS	3142C	12/14/2012	12/14/2013
Bilog Antenna	2362	ETS	3142B	12/26/2012	12/26/2013
Horn Antenna	6556	ETS	3115	8/7/2012	8/7/2013
Horn Antenna	1096	Antenna Research	DRG-118/A	9/13/2012	9/13/2013
System Controller	121701-1	Sunol Sciences	SC99V	Time of Use	Time of Use
High Pass Filter	3986-01 DC0408	Microwave Circuits, Inc.	H3G020G2	Time of Use	Time of Use
Base Station	1065295	Rohde & Schwarz	CMW500	6/14/2012	6/14/2013

4.4 Results:

All radiated spurious emissions were attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB which is equivalent to -13dBm. Additionally, the spurious emissions located in the 1559 – 1610MHz band were below the wideband emission limit (-40dBm/MHz). Each operational mode was investigated the worst case data was reported below. Emissions not reported were below the measurement noise floor. The test sample was evaluated on three orthogonal axes since it was a hand held device and could be used in any orientation.

Worst Case Spurious Measurements for §27.53(c)(2)

Radiated Spurious Emissions Measurement								
Test Engineer: Bryan Taylor Test Date: 4/19/2013 Temp. / Humidity / Pressure: 22.5C / 51.6% / 990.3mBar Bandwidth Settings: RBW = VBW = 1MHz Notes: Spurious emissions not reported here were below the measurement noise floor.								
Band/Channel	Spurious Frequency (MHz)	Polarity	A Device Reading (dBm)	B Signal Generator Level (dBm)	C Cable Loss (dB)	D Tx Antenna Gain (dBd)	E Limit (dBm)	F Radiated Spurious Emission Level (dBm)
LTE Band 13, RB:50, QPSK	1564	H	-79.43	-40.78	2.75	3.15	-13	-40.38
	1564	V	-80.16	-41.39	2.75	3.15	-13	-40.99
	2346	H	-79.61	-36.13	3.61	2.85	-13	-36.89
	2346	V	-78.95	-33.48	3.61	2.85	-13	-34.24
	3128	H	-65.98	-53.43	4.33	7.19	-13	-50.57
	3128	V	-67.24	-63.01	4.33	7.19	-13	-60.15
	3910	H	-66.76	-52.73	5.07	6.98	-13	-50.81
	3910	V	-66.74	-51.35	5.07	6.98	-13	-49.43
	4692	H	-72.14	-53.12	5.96	9.00	-13	-50.08
	4692	V	-67.47	-50.93	5.96	9.00	-13	-47.89
	5474	H	-72.21	-53.06	6.69	8.37	-13	-51.38
	5474	V	-70.32	-52.74	6.69	8.37	-13	-51.06
	6256	H	-69.94	-47.17	7.01	9.13	-13	-45.06
	6256	V	-71.46	-49.32	7.01	9.13	-13	-47.21
	7038	H	-72.34	-42.13	7.77	9.61	-13	-40.29
	7038	V	-73.11	-45.24	7.77	9.61	-13	-43.40
7820	H	-72.99	-41.72	7.77	9.34	-13	-40.15	
7820	V	-73.42	-42.94	7.77	9.34	-13	-41.37	
LTE Band 13, RB 25, QPSK	1564	H	-79.51	-40.86	2.75	3.15	-13	-40.46
	1564	V	-80.16	-41.39	2.75	3.15	-13	-40.99
	2346	H	-78.02	-34.54	3.61	2.85	-13	-35.30
	2346	V	-79.21	-33.74	3.61	2.85	-13	-34.50
	3128	H	-65.46	-52.91	4.33	7.19	-13	-50.05
	3128	V	-70.82	-66.59	4.33	7.19	-13	-63.73
	3910	H	-67.11	-53.08	5.07	6.98	-13	-51.16
	3910	V	-66.89	-51.5	5.07	6.98	-13	-49.58
	4692	H	-73.59	-54.57	5.96	9.00	-13	-51.53
	4692	V	-66.49	-49.95	5.96	9.00	-13	-46.91
	5474	H	-71.47	-52.32	6.69	8.37	-13	-50.64
	5474	V	-69.78	-52.2	6.69	8.37	-13	-50.52
	6256	H	-70.68	-47.91	7.01	9.13	-13	-45.80
	6256	V	-71.42	-49.28	7.01	9.13	-13	-47.17
	7038	H	-71.67	-41.46	7.77	9.61	-13	-39.62
	7038	V	-73.44	-45.57	7.77	9.61	-13	-43.73
7820	H	-73.15	-41.88	7.77	9.34	-13	-40.31	
7820	V	-73.62	-43.14	7.77	9.34	-13	-41.57	
LTE Band 13, RB 1, QPSK	1564	H	-80.04	-41.39	2.75	3.15	-13	-40.99
	1564	V	-80.21	-41.44	2.75	3.15	-13	-41.04
	2346	H	-79.08	-35.6	3.61	2.85	-13	-36.36
	2346	V	-78.43	-32.96	3.61	2.85	-13	-33.72
	3128	H	-64.89	-52.34	4.33	7.19	-13	-49.48
	3128	V	-69.48	-65.25	4.33	7.19	-13	-62.39
	3910	H	-64.27	-50.24	5.07	6.98	-13	-48.32
	3910	V	-66.76	-51.37	5.07	6.98	-13	-49.45
	4692	H	-72.14	-53.12	5.96	9.00	-13	-50.08
	4692	V	-67.15	-50.61	5.96	9.00	-13	-47.57
	5474	H	-71.88	-52.73	6.69	8.37	-13	-51.05
	5474	V	-70.11	-52.53	6.69	8.37	-13	-50.85
	6256	H	-70.46	-47.69	7.01	9.13	-13	-45.58
	6256	V	-70.59	-48.45	7.01	9.13	-13	-46.34
	7038	H	-71.89	-41.68	7.77	9.61	-13	-39.84
	7038	V	-70.56	-42.69	7.77	9.61	-13	-40.85
7820	H	-71.68	-40.41	7.77	9.34	-13	-38.84	
7820	V	-72.56	-42.08	7.77	9.34	-13	-40.51	

F=B-C+D

Worst Case Spurious Measurements for §27.53(f)(1559MHz – 1610MHz Band)

Radiated Spurious Emissions Measurement								
Test Engineer: Bryan Taylor Test Date: 4/19/2013 Temp. / Humidity / Pressure: 22.5C / 51.6% / 990.3mBar Bandwidth Settings: RBW = VBW = 1MHz Notes: All spurious emissions in the 1559 - 1610MHz band were wideband.								
			A	B	C	D	E	F
Band/Channel	Spurious Frequency (MHz)	Polarity	Device Reading (dBm)	Signal Generator Level (dBm)	Cable Loss (dB)	Tx Antenna Gain (dBd)	Limit (dBm/MHz)	Radiated Spurious Emission Level (dBm)
LTE Band 13, RB:50, QPSK	1564	H	-79.43	-40.78	2.75	3.15	-40	-40.38
	1564	V	-80.16	-41.39	2.75	3.15	-40	-40.99
LTE Band 13, RB 25, QPSK	1564	H	-79.51	-40.86	2.75	3.15	-40	-40.46
	1564	V	-80.16	-41.39	2.75	3.15	-40	-40.99
LTE Band 13, RB 1, QPSK	1564	H	-80.04	-41.39	2.75	3.15	-40	-40.99
	1564	V	-80.21	-41.44	2.75	3.15	-40	-41.04
								F=B-C+D

5 Measurement Uncertainty

The measured value related to the corresponding limit will be used to decide whether the equipment meets the requirements.

The measurement uncertainty figures were calculated and correspond to a coverage factor of $k = 2$, providing a confidence level of respectively 95.45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian).

Measurement uncertainty Table

Parameter	Uncertainty	Notes
Radiated emissions, 30 to 1000 MHz	+3.9dB	
Radiated emissions, 1 to 18 GHz	+4.2dB	
Radiated emissions, 18 to 40 GHz	+4.3dB	
Power Port Conducted emissions, 150kHz to 30 MHz	+2.8dB	

6 Revision History

Revision Level	Date	Report Number	Notes
0	6/14/2013	101078559LEX-009	Original Issue