

TEST REPORT

Report Number: 3182340ATL-001

July 11, 2011

Product Designation: ILS_WLM/WWW

Standard: FCC 15.247 and RSS-210, Issue 8, December 2010
Frequency Hopping and Digital Modulation Systems operatin within the
bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

Tested by:

Intertek Testing Services NA Inc.
1950 Evergreen Blvd., Suite 100
Duluth, GA 30096

Client:

Onity
A UTC Fire & Security Company
2232 Northmont Parkway
Duluth, GA 30096
Contact: Silvia Leyva
Phone: 678.512.8074
Fax: 770.248.7544

Tests performed by:



Troy J. Ihle
EMC Project Engineer

Report reviewed by:



Jeremy O. Pickens
EMC Department Manager

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1.0 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 3.0. 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 complies with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested.

2.0 Test Summary

Section	Test Full Name	Test Date	Result
4.0	System setup including cable interconnection details, support equipment and simplified block diagram. (System Setup)		
5.0	FCC Part 15.247(a)(2) / RSS-210 A8.2(1) (6 dB Bandwidth)	06/08/2009	PASS
6.0	FCC Part 15.247(b)(3) / RSS-210 A8.4(4) (Peak Output Power)	06/05/2009	PASS
7.0	FCC Part 15.247(e) / RSS-210 A8.2(2) (Power Spectral Density)	06/05/2009	PASS
8.0	FCC Part 15.247(d) / RSS-210 A8.5 - Conducted (Conducted Spurious Emissions)	06/05/2009	PASS
9.0	FCC Part 15.205 / RSS-210 2.2 (Restricted Band Radiated)	06/08/2009	PASS
10.0	Revision History (Revision History)		

3.0 Description of Equipment Under Test

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
Electronic Locking Solutions	Onity	ILS_WLM/WWM	080314CN24E

EUT receive date:	June 5, 2009
EUT receive condition:	Good

Description of EUT provided by Client:

The electronic locking solution (ILS_WLM/WWM) has a radio module that will communicate with and update information from the door lock. Such information could be update software, program card, time and date. The ILS_WLM/WWM is sold with two different antennas. One is a dipole antenna with SMA connector and the other is a JJB antenna (ANT-2.4-JJB-ST).

Description of EUT exercising:

The EUT was powered by \new (3) AA Batteries. The EUT was continuously transmitting a modulated signal.

4.0 System setup including cable interconnection details, support equipment and simplified block diagram. (System Setup)

Method:

Record the details of EUT cabling, document the support equipment, and show the interconnections in a block diagram.

Drawing:



Block diagram of EUT

Data:

4.0 System setup including cable interconnection details, support equipment and simplified block diagram. (System Setup)

EUT Cabling						
ID	Description	Length	Shielding	Ferrites	Connection	
					From	To
None						

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
None			

5.0 FCC Part 15.247(a)(2) / RSS-210 A8.2(1) (6 dB Bandwidth)

Method:

TEST PROCEDURE REFERENCE

FCC's KDB Publication 558074, "Measurement of Digital Transmission Systems Operating under Section 15.247" March 23, 2005

TEST LIMIT

The minimum 6 dB bandwidth shall be at least 500 kHz.

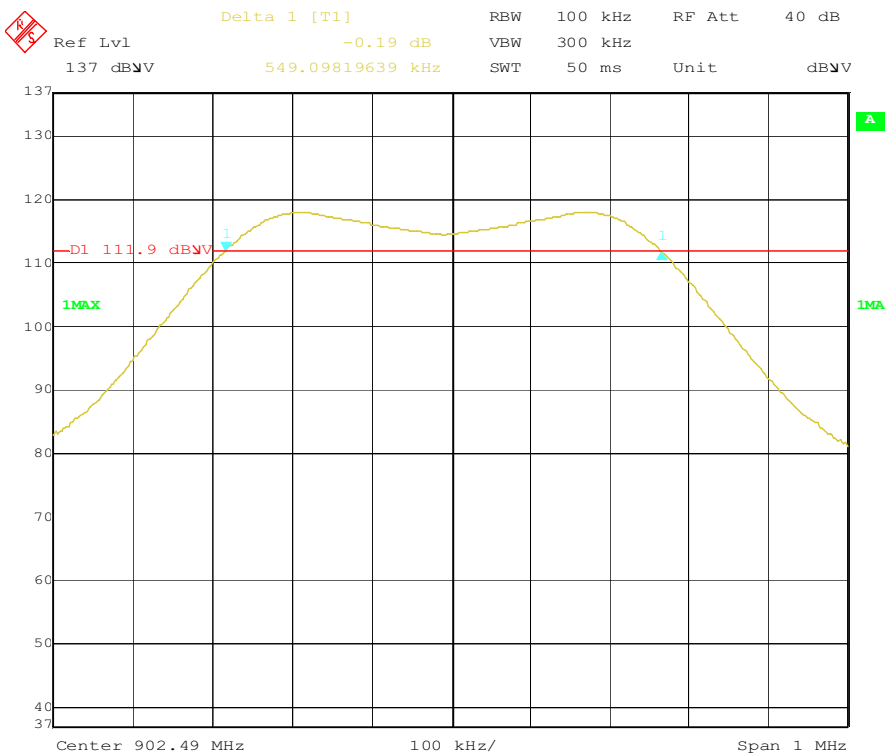
Connect the antenna port of the EUT to the input of a spectrum analyzer. Input a referency level offset into the spectrum analyzer to account for the associated cable loss. Set the analyzer resolution and video bandwidths to 100kHz and turn on the max hold function. Use the marker peak search on the resultant trace to find the peak amplitude. Positioned the markers on either side of the peak amplitude such that they were 6dB lower than the peak amplitude. The 6dB bandwidth is the frequency difference between the marker on the lower side and the marker on the higher side of the peak amplitude. The 6dB bandwidth shall be measured for the highest data rate for each possible modulation mode on the high, middle, and low channels.

Test Equipment Used:

Description:	Manufacturer:	Model:	Asset Number:	Cal Date:	Cal Due:
Cable E203, 18 GHz, N, 3M	Megaphase	TM18 NKNK 118	E203	05/12/2009	05/12/2010
Spectrum Analyzer, 20Hz-40GHz	Rohde & Schwarz	FSEK30	200062	10/10/2008	10/10/2009

Results: The sample tested was found to Comply.

Plot:

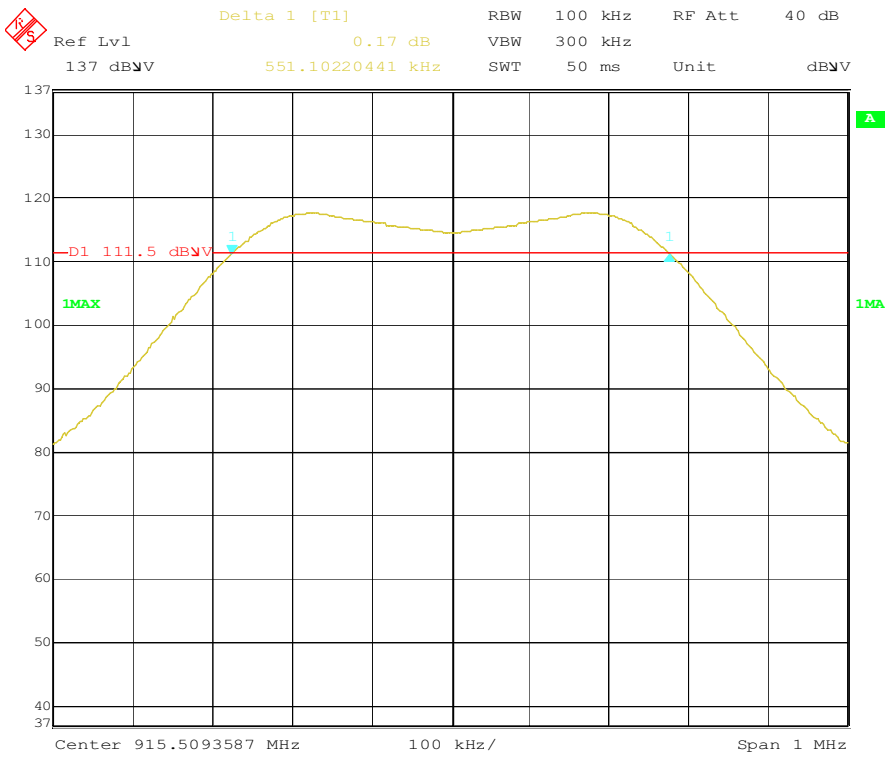


Date: 8.JUN.2009 14:40:51

BW Plot - Low Channel, FCC

5.0 FCC Part 15.247(a)(2) / RSS-210 A8.2(1) (6 dB Bandwidth)

Plot:

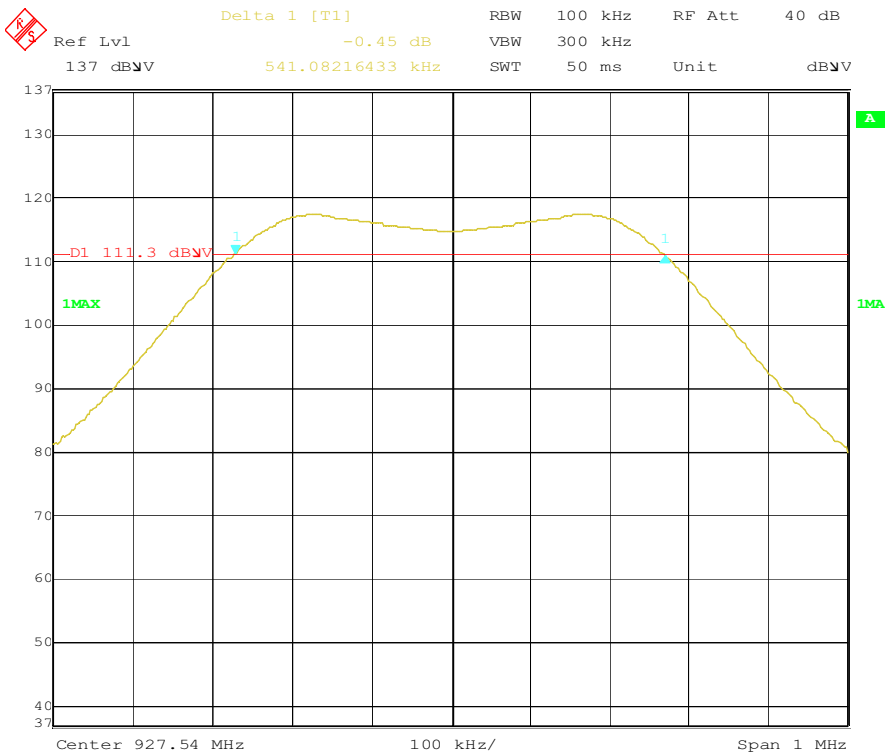


Date: 8 JUN. 2009 14:57:14

BW Plot - Mid Channel, FCC

5.0 FCC Part 15.247(a)(2) / RSS-210 A8.2(1) (6 dB Bandwidth)

Plot:



Date: 8 JUN. 2009 14:58:36

BW Plot - High Channel, FCC

Data:

5.0 FCC Part 15.247(a)(2) / RSS-210 A8.2(1) (6 dB Bandwidth)

Channel	6 dB Bandwidth kHz	RWB kHz	VWB kHz
Low	549	100	300
Mid	551	100	300
High	541	100	300

6.0 FCC Part 15.247(b)(3) / RSS-210 A8.4(4) (Peak Output Power)

Method:

TEST PROCEDURE REFERENCE

FCC's KDB Publication 558074, "Measurement of Digital Transmission Systems Operating under Section 15.247" March 23, 2005

TEST LIMIT

The maximum peak conducted output power of the intentional radiator shall not exceed the following: For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt.

As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level.

If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

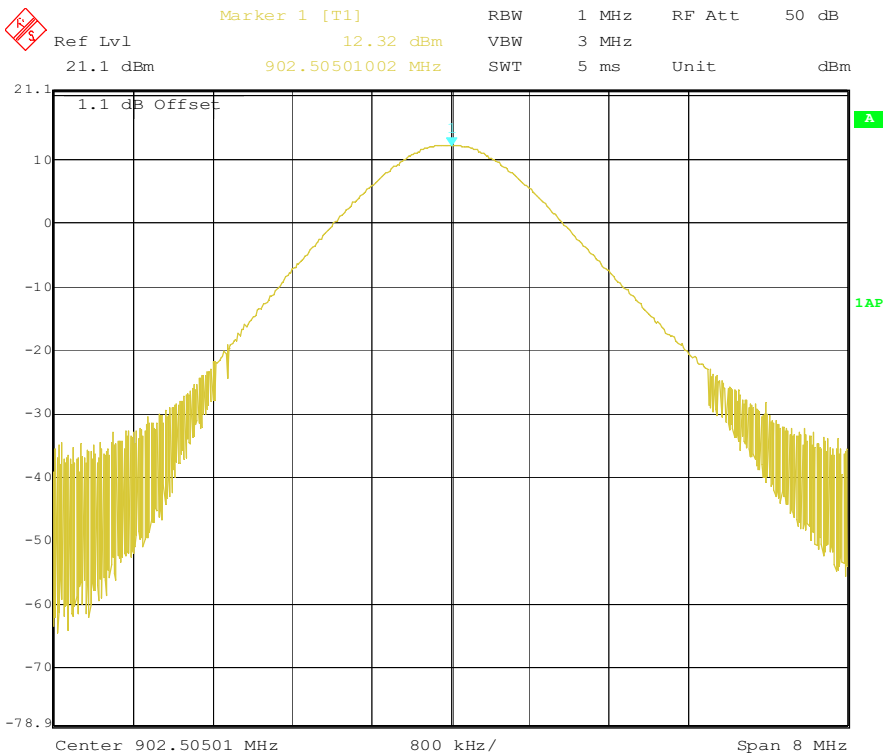
Connect the antenna port of the EUT to the input of a peak power meter (or spectrum analyzer with resolution bandwidth set greater than the emission bandwidth). Read the power directly from the power meter (or equivalent) that is corrected for cable loss to obtain the power at the antenna terminals. Measure the conducted power on the high, middle and low channels for all data rates and modulation modes.

Test Equipment Used:

Description:	Manufacturer:	Model:	Asset Number:	Cal Date:	Cal Due:
Cable E203, 18 GHz, N, 3M	Megaphase	TM18 NKNK 118	E203	05/12/2009	05/12/2010
Spectrum Analyzer, 20Hz-40GHz	Rohde & Schwarz	FSEK30	200062	10/10/2008	10/10/2009

Results: The sample tested was found to Comply.

Plot:

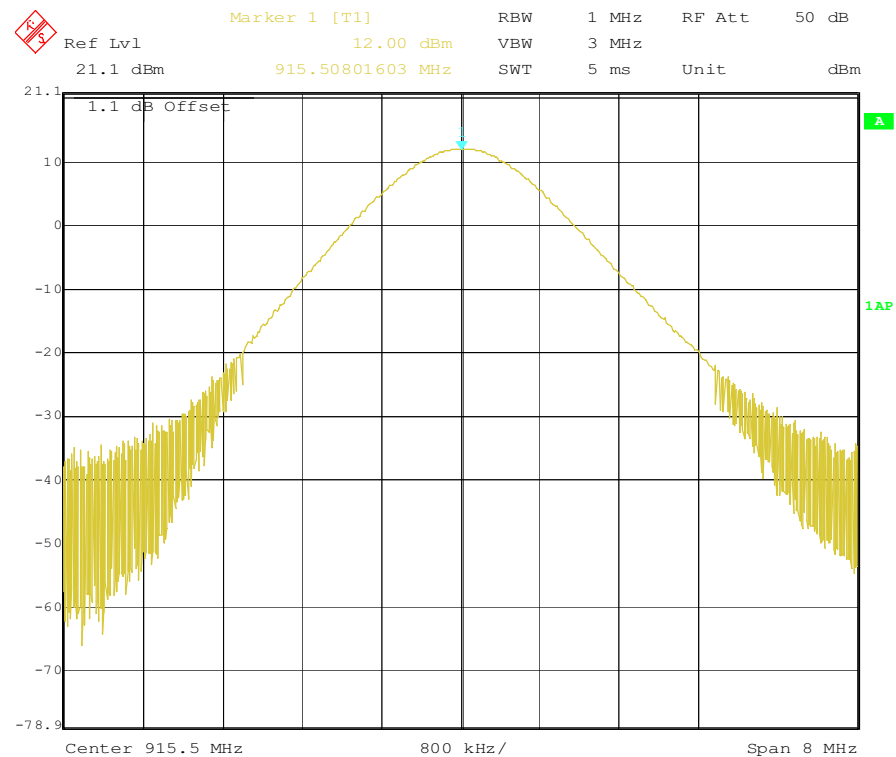


Date: 5 JUN 2009 07:50:55

Peak Power Lo ch.

6.0 FCC Part 15.247(b)(3) / RSS-210 A8.4(4) (Peak Output Power)

Plot:

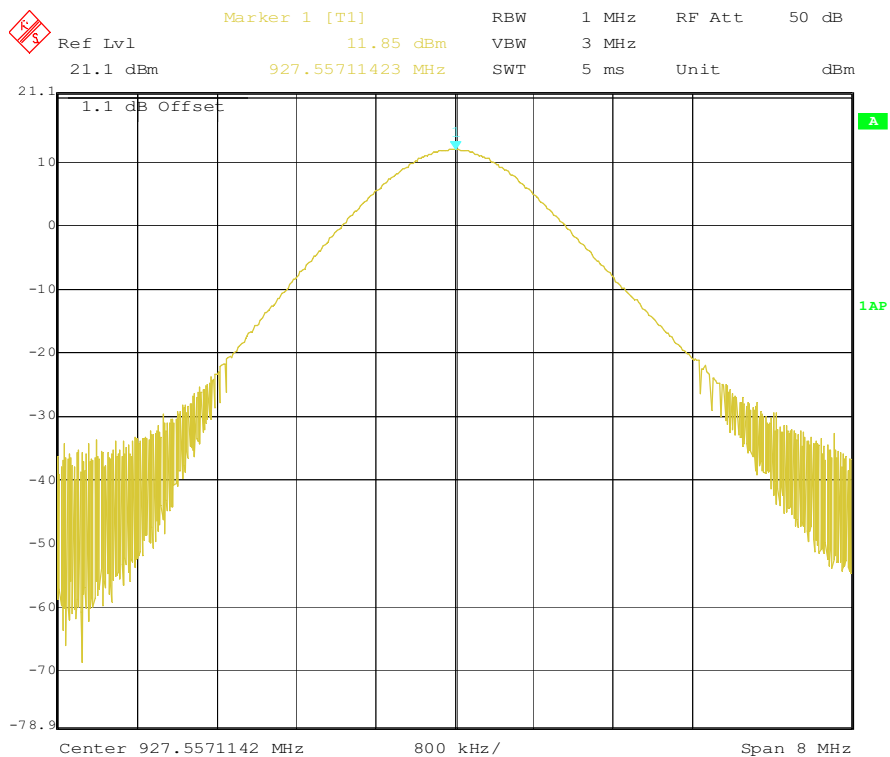


Date: 5 JUN. 2009 07:48:30

Peak Power Mid Ch.

6.0 FCC Part 15.247(b)(3) / RSS-210 A8.4(4) (Peak Output Power)

Plot:



Date: 5.JUN.2009 07:51:24

PeakPower High Ch.

Data:

6.0 FCC Part 15.247(b)(3) / RSS-210 A8.4(4) (Peak Output Power)

Channel	Peak Output Power (dBm)	RWB MHz	VWB MHz
Low	12.32	1	3
Mid	12.00	1	3
High	11.85	1	3

7.0 FCC Part 15.247(e) / RSS-210 A8.2(2) (Power Spectral Density)

Method:

TEST PROCEDURE REFERENCE

FCC's KDB Publication 558074, "Measurement of Digital Transmission Systems Operating under Section 15.247" March 23, 2005

TEST LIMIT

The peak level measured must be no greater than +8 dBm.

Connect the antenna port of the EUT to the input of a spectrum analyzer. Input an offset into the analyzer amplitude to account for the associated cable loss.

Set the span to cover the entire emission bandwidth. With a bandwidth of 100kHz or greater, set the marker to the peak emission and move that frequency to the center of the display. Set the analyzer resolution and video bandwidths to 3kHz and turn on the max hold function. Set the frequency span was set to 300kHz around the highest amplitude occurring in the peak emission envelope. The total sweep time was calculated as follows:

Sweep time (Sec.) = (Fstop - Fstart)/Resolution Bandwidth

Example:

Sweep time (Sec) = 300kHz / 3kHz

Sweep time (Sec) = 100 Seconds

Perform a peak search on the resultant trace. Record the amplitude of that peak as the maximum power density in dBm. Measure the power density for all data rates and modulation modes on the middle channel.

For the high and low channels, measure the power density at the data rate and modulation mode that resulted in the highest and lowest conducted power for that channel.


Test Equipment Used:

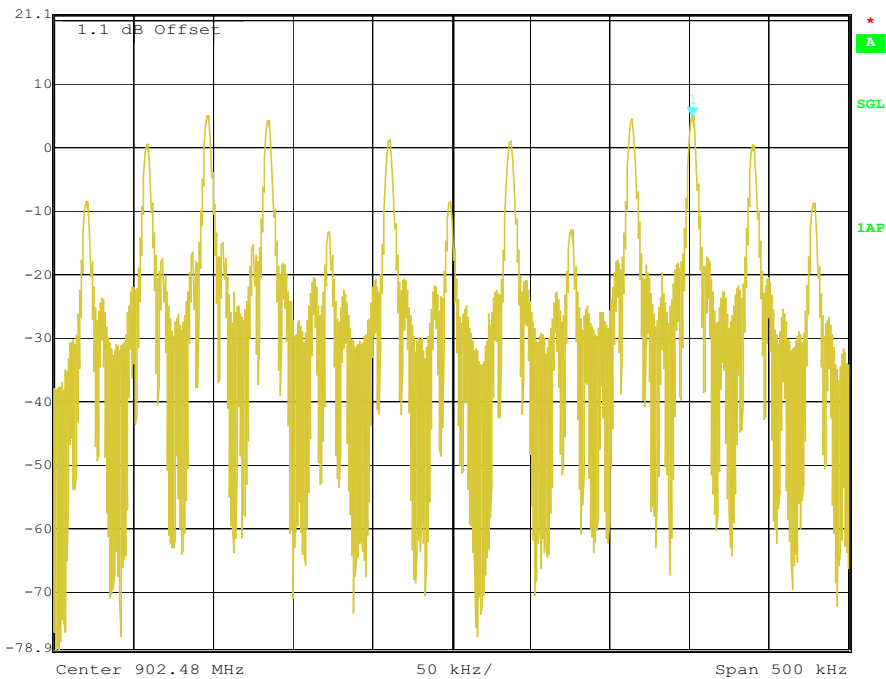
Description:	Manufacturer:	Model:	Asset Number:	Cal Date:	Cal Due:
Cable E203, 18 GHz, N, 3M	Megaphase	TM18 NKNK 118	E203	05/12/2009	05/12/2010
Spectrum Analyzer, 20Hz-40GHz	Rohde & Schwarz	FSEK30	200062	10/10/2008	10/10/2009

Results: The sample tested was found to Comply.

Plot:

7.0 FCC Part 15.247(e) / RSS-210 A8.2(2) (Power Spectral Density)

 Marker 1 [T1] RBW 3 kHz RF Att 50 dB
Ref Lvl 21.1 dBm 5.08 dBm VBW 10 kHz
21.1 dBm 902.63180361 MHz SWT 100 s Unit dBm

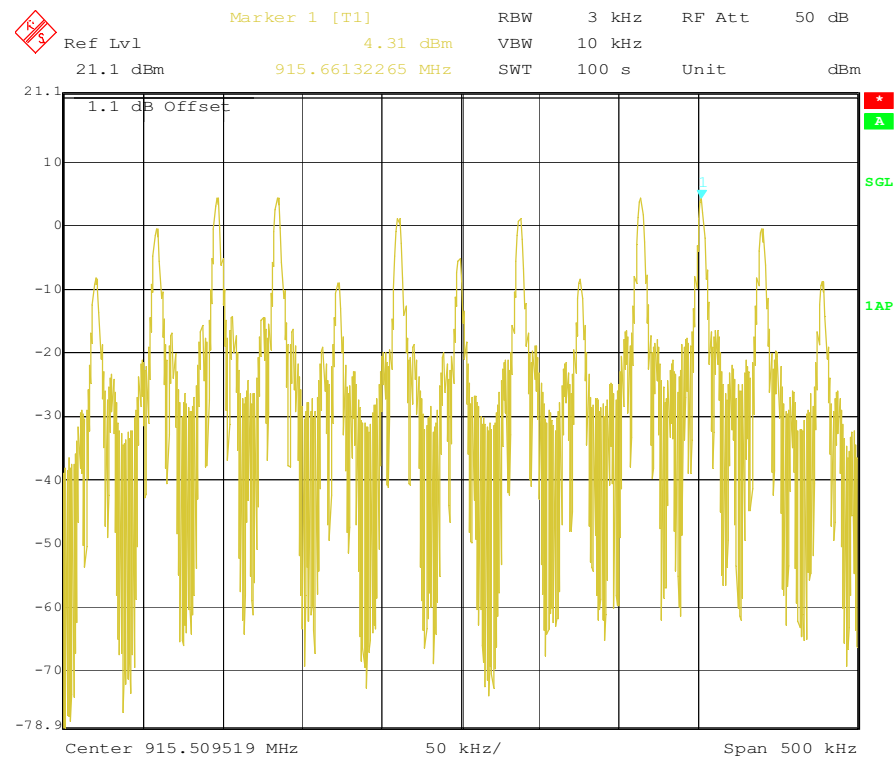


Date: 5 JUN. 2009 08:02:37

PSD Low Channel

7.0 FCC Part 15.247(e) / RSS-210 A8.2(2) (Power Spectral Density)

Plot:

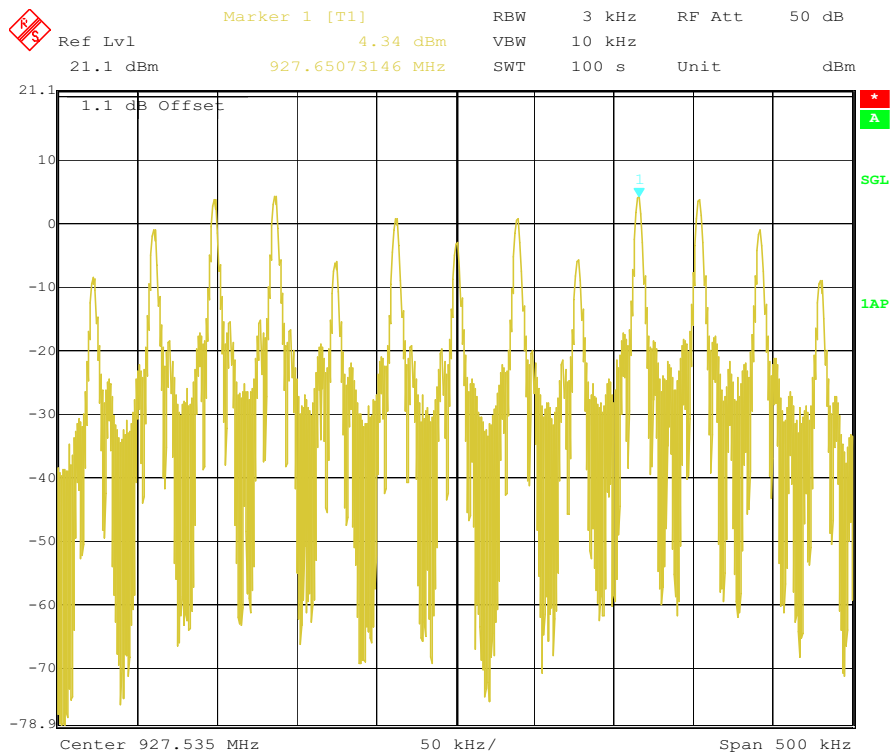


Date: 5 JUN 2009 07:55:46

PSD Mid Channel

7.0 FCC Part 15.247(e) / RSS-210 A8.2(2) (Power Spectral Density)

Plot:



Date: 5 JUN. 2009 08:06:14

PSD High Channel

Data:

7.0 FCC Part 15.247(e) / RSS-210 A8.2(2) (Power Spectral Density)

Channel	PSD (dBm)	RWB kHz	VWB kHz
Low	5.08	3	10
Mid	4.31	3	10
High	4.34	3	10

8.0 FCC Part 15.247(d) / RSS-210 A8.5 - Conducted (Conducted Spurious Emissions)

Method:

TEST PROCEDURE REFERENCE

FCC's KDB Publication 558074, "Measurement of Digital Transmission Systems Operating under Section 15.247" March 23, 2005

TEST LIMIT

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the radio frequency power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

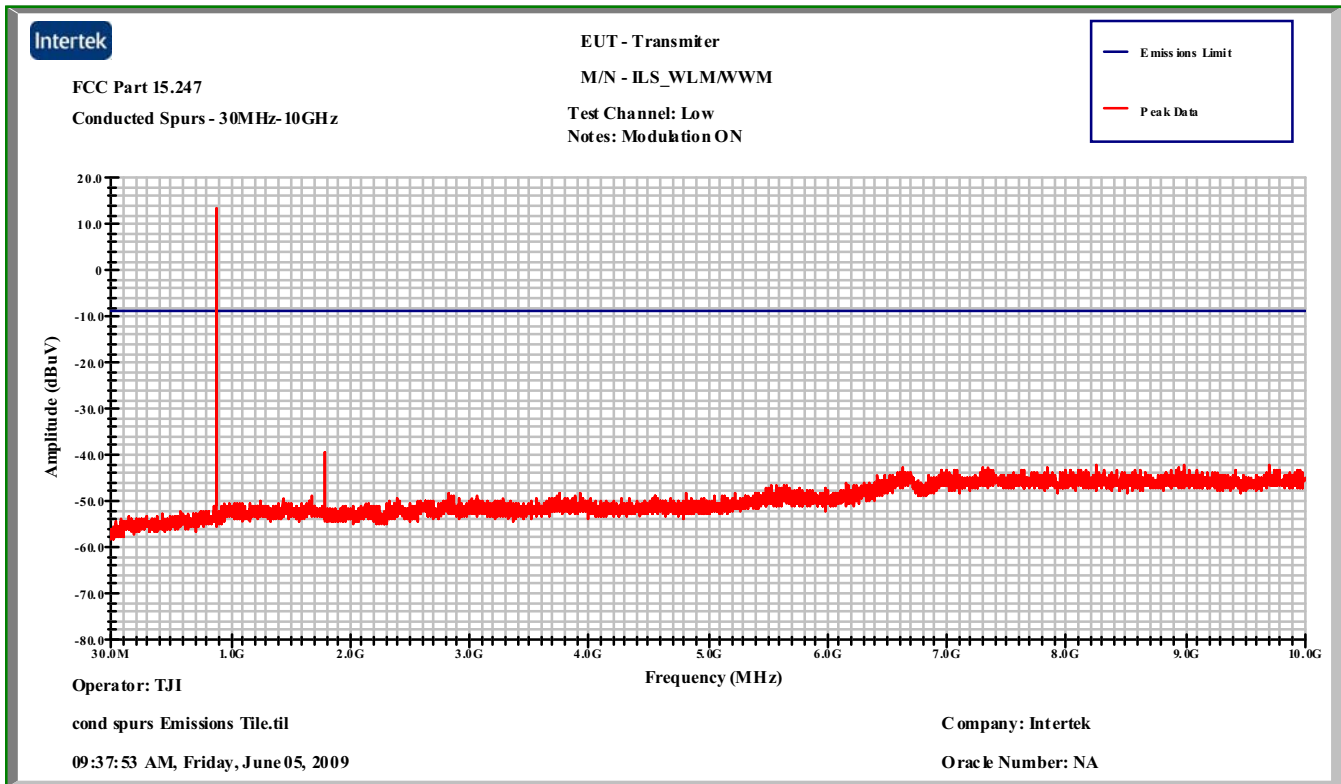
If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under section A8.4(4), the attenuation required shall be 30 dB instead of 20 dB.

Test Equipment Used:

Description:	Manufacturer:	Model:	Asset Number:	Cal Date:	Cal Due:
Cable E203, 18 GHz, N, 3M	Megaphase	TM18 NKNK 118	E203	05/12/2009	05/12/2010
Spectrum Analyzer, 20Hz-40GHz	Rohde & Schwarz	FSEK30	200062	10/10/2008	10/10/2009

Results: The sample tested was found to Comply.

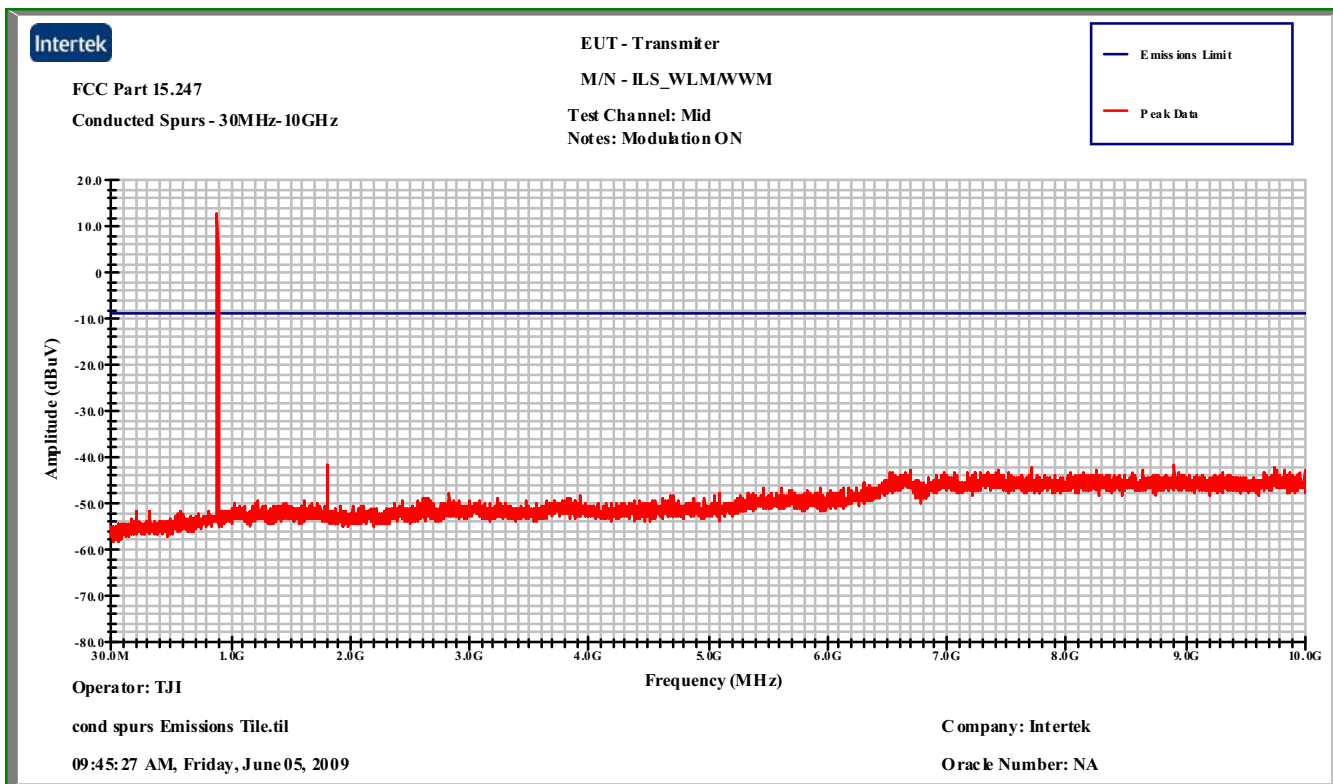
Plot:



Conducted Spurs Plot - Low Channel

8.0 FCC Part 15.247(d) / RSS-210 A8.5 - Conducted (Conducted Spurious Emissions)

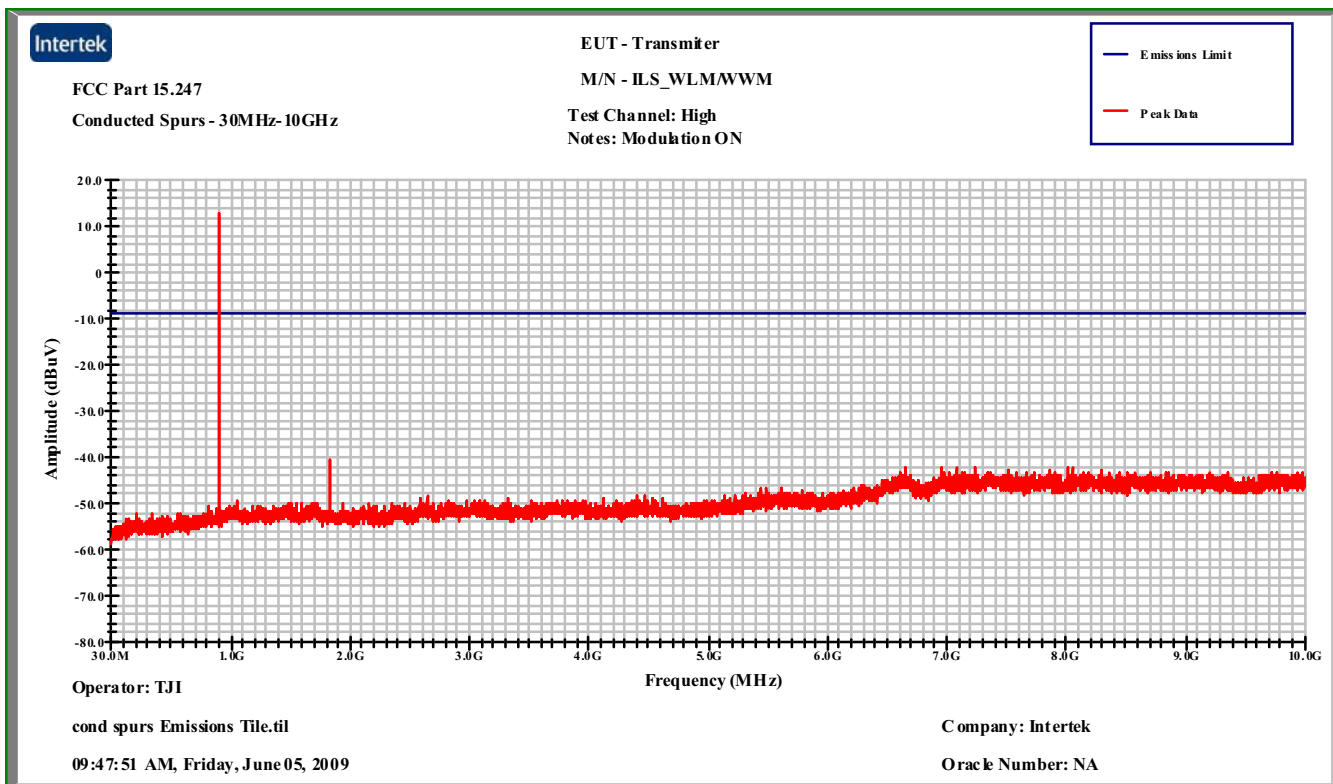
Plot:



Conducted Spurs Plot - Mid Channel

8.0 FCC Part 15.247(d) / RSS-210 A8.5 - Conducted (Conducted Spurious Emissions)

Plot:



Conducted Spurs Plot - High Channel

9.0 FCC Part 15.205 / RSS-210 2.2 (Restricted Band Radiated)**Method:**

TEST PROCEDURE REFERENCE

ANSI C63.4: 2003

TEST LIMIT

Unwanted emissions falling into restricted bands shall meet the general field strength limits. It should also be noted that unwanted emissions falling in non-restricted bands do not need to be suppressed to a level lower than the general field strength limits.

Specifically, at the restricted band frequency nearest the lowest and highest channel of each available band, the field strength shall meet the general field strength limits.

Test Equipment Used:

Description:	Manufacturer:	Model:	Asset Number:	Cal Date:	Cal Due:
Cable E01, <18GHz	Pasternack	RG214/U	E01	05/04/2009	05/04/2010
Cable E201, 18 GHz, N, 3m	Megaphase	TM18 NKNK 118	E201	01/29/2009	01/29/2010
Cable E203, 18 GHz, N, 3M	Megaphase	TM18 NKNK 118	E203	05/12/2009	05/12/2010
Cable MP3, 18 GHz, N, 10m	Megaphase	G919-NKNK-394	MP3	05/04/2009	05/04/2010
Cable ST1, 7m, N-N, 18 GHz	Storm Products Co.	PR90-206-7MTR	ST1	01/23/2009	01/23/2010
EMI Receiver	Hewlett Packard	8546A	211505	01/12/2009	01/12/2010
EMI Receiver, Preselector section	Hewlett Packard	85460A	015762	01/12/2009	01/12/2010
Preamplifier, 10 MHz to 2000 MHz, 27 dB gain	Mini-Circuits	ZKL-2	200074	10/20/2008	10/20/2009
Preamplifier, 20 MHz to 18 GHz, 40 dB	A.H. Systems	PAM-0118	200108	04/07/2009	04/07/2010
Spectrum Analyzer, 20Hz-40GHz	Rohde & Schwarz	FSEK30	200062	10/10/2008	10/10/2009

Results: The sample tested was found to Comply.

Photo:

9.0 FCC Part 15.205 / RSS-210 2.2 (Restricted Band Radiated)



Test Setup

9.0 FCC Part 15.205 / RSS-210 2.2 (Restricted Band Radiated)

Photo:



Test Setup

9.0 FCC Part 15.205 / RSS-210 2.2 (Restricted Band Radiated)

Photo:



Test Setup

9.0 FCC Part 15.205 / RSS-210 2.2 (Restricted Band Radiated)

Photo:



Test Setup

Data:

9.0 FCC Part 15.205 / RSS-210 2.2 (Restricted Band Radiated)

Frequency Range (MHz): 1000-10000

Test Distance (m): 3

Input power: battery

Limit: FCC15 Class B-3m

Modifications for compliance (y/n): n

A	B	C	D	E	F	G	H	I	J
Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Net dB(uV/m)	3m Limit dB(uV/m)	Margin dB	Detectors / Bandwidths Det/RBW/VBW
Dipole antenna									
v	1806.221	9.6	26.4	2.5	0.0	38.5	54.0	-15.5	AVG/1MHz/1Hz
v	2708.446	8.1	28.9	3.1	0.0	40.1	54.0	-13.9	AVG/1MHz/1Hz
v	3609.750	8.6	31.4	3.7	0.0	43.7	54.0	-10.3	AVG/1MHz/1Hz
v	4511.725	7.8	32.2	4.2	0.0	44.2	54.0	-9.8	AVG/1MHz/1Hz
v	5415.225	9.4	33.8	4.5	0.0	47.7	54.0	-6.3	AVG/1MHz/1Hz
JJB antenna									
v	1274.893	8.4	24.6	2.0	0.0	35.0	54.0	-19.0	AVG/1MHz/1Hz
v	1803.855	7.6	26.4	2.5	0.0	36.5	54.0	-17.5	AVG/1MHz/1Hz
v	2708.058	8.4	28.8	3.1	0.0	40.4	54.0	-13.6	AVG/1MHz/1Hz
v	3609.346	7.7	31.4	3.7	0.0	42.8	54.0	-11.2	AVG/1MHz/1Hz
v	4511.322	7.8	32.2	4.2	0.0	44.2	54.0	-9.8	AVG/1MHz/1Hz
v	5417.599	9.4	33.8	4.5	0.0	47.7	54.0	-6.3	AVG/1MHz/1Hz
Calculations		G=C+D+E-F			I=G-H				

Note: No other emissions were above noise floor.

Radiated emissions data

9.0 FCC Part 15.205 / RSS-210 2.2 (Restricted Band Radiated)

Data:

Frequency Range (MHz): 30-1000

Test Distance (m): 3

Input power: batteries

Limit: FCC15 Class B-3m

Modifications for compliance (y/n): n

A	B	C	D	E	F	G	H	I	J
Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Net dB(uV/m)	3m Limit dB(uV/m)	Margin dB	Detectors / Bandwidths Det/RBW/VBW
JJB Antenna									
h	886.490	24.1	21.8	6.6	27.3	25.1	77.4	-52.3	QP/120k/300k
h	890.103	23.4	21.8	6.6	27.3	24.4	77.4	-53.0	QP/120k/300k
v	895.225	20.5	21.6	6.6	27.3	21.3	77.4	-56.1	QP/120k/300k
h	897.275	24.8	21.8	6.6	27.3	25.9	77.4	-51.5	QP/120k/300k
h	899.705	32.7	21.8	6.6	27.3	33.8	77.4	-43.6	QP/120k/300k
h	904.528	55.5	21.8	6.6	27.3	56.6	77.4	-20.8	QP/120k/300k
h	907.001	37.3	21.8	6.6	27.3	38.4	77.4	-39.0	QP/120k/300k
h	908.505	34.1	21.8	6.6	27.3	35.2	77.4	-42.2	QP/120k/300k
h	915.545	23.1	21.8	6.7	27.3	24.3	77.4	-53.1	QP/120k/300k
Dipole Antenna									
v	901.130	53.1	21.6	6.6	27.3	53.9	77.8	-23.9	QP/120k/300k
v	903.898	52.4	21.6	6.6	27.3	53.3	77.8	-24.5	QP/120k/300k
Calculations		G=C+D+E-F			I=G-H				

Note: No other emissions were above noise floor

Radiated emissions data

10.0 Revision History (Revision History)**Method:**

Document the history of the report.

Data:

Revision Level	Date	Report Number	Notes
Original issue	June 19, 2009	3182340ATL-001	--
1	July 11, 2011	3182340ATL-001	Updated standard date references