SK TECH CO., LTD.

TEST REPORT

Test Report No.:	**SKTRFC-110930-023**		
Applicant:	**Infopia Co.,Ltd**		
Applicant Address:	**891, Hogye-Dong, Dongan-Gu, Anyang, Kyunggi 431-080, Korea**		
Manufacturer:	**Infopia Co.,Ltd**		
Manufacturer Address:	**891, Hogye-Dong, Dongan-Gu, Anyang, Kyunggi 431-080, Korea**		
Equipment Under Test:	**Lipid profile and glucose measuring system for self testing**		
FCC ID:	**WSX-ILM-0001A-RF**	**Model No.:**	**ILM-0001A**
Brand/Trade Name:	**LipidPro™**		
Receipt No.:	SKTEU11-1003	**Date of receipt:**	August 31, 2011
Date of Issue:	September 30, 2011		
Location of Testing:	**SK TECH CO., LTD.** #820-2, Wolmoon-ri, Wabu-up, Namyangju-si, Kyunggi-do, 472-905 South Korea		
Test Procedure:	**ANSI C63.4-2003**		
Test Specification:	**47CFR, Part 15 Rules**		
Equipment Class:	**DXT - Part 15 Low Power Transceiver, Rx Verified**		
Test Result:	The above-mentioned device has been tested and passed.		

Tested & Reported by: *Jungtae Kim*

September 30, 2011

Signature *Date*

Approved by: *Jongsoo Yoon*

September 30, 2011

Signature *Date*

Other Aspects:	-
Abbreviations:	**· OK, Pass = passed · Fail = failed · N/A = not applicable**

☞
- **This test report is not permitted to copy partly and entirely without our permission.**
- **This test result is dependent on only equipment to be used.**
- **This test result is based on a single evaluation of submitted samples of the above mentioned.**

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1. GENERAL

These tests were performed using the test procedure outlined in ANSI C63.4-2003 for intentional radiators, and in accordance with the limits set forth in FCC Part 15.225. The EUT (Equipment Under Test) has been shown to be capable of compliance with the applicable technical standards.

We attest to the accuracy of data. All measurements reported herein were performed by SK TECH CO., LTD. and were made under Chief Engineer's supervision.
We assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

2. TEST SITE

SK TECH CO., LTD.

2.1 Location

#820-2, Wolmoon-ri, Wabu-up, Namyangju-si, Kyunggi-do, 472-905 South Korea
(FCC Registered Test Site Number: 938639)
(OPEN AREA TEST SITE INDUSTRY CANADA NUMBER: IC 5429A-1)

This test site is in compliance with ISO/IEC 17025 for general requirements for the competence of testing and calibration laboratories.
This laboratory is recognized as a Conformity Assessment Body (CAB) for CAB's Designation Number: KR0007 by FCC, is accredited by NVLAP for NVLAP Lab. Code: 200220-0.

2.2 List of Test and Measurement Instruments

No.	Description	Manufacturer	Model No.	Serial No.	Calibrated until	Used
1	Spectrum Analyzer	Agilent	E4405B	US40520856	2012.03	☒
2	Spectrum Analyzer	Agilent	E4440A	MY46186322	2012.05	☒
3	EMC Spectrum Analyzer	Agilent	E7405A	US40240203	2012.03	☒
4	EMI Test Receiver	Rohde&Schwarz	ESPI7	101206	2012.07	☒
5	EMI Test Receiver	Rohde&Schwarz	ESIB40	100277	2012.03	
6	EMI Test Receiver	Rohde&Schwarz	ESHS10	862970/019	2012.07	
7	Artificial Mains Network	Rohde&Schwarz	ESH3-Z5	836679/018	2012.07	
8	Pre-amplifier	HP	8447F	3113A05153	2012.07	☒
9	Pre-amplifier	MITEQ	AFS44	1116321	2011.12	
10	Pre-amplifier	MITEQ	AFS44	1116322	2012.07	
11	Power Meter	Agilent	E4417A	MY45100426	2012.07	
12	Power Meter	Agilent	E4418B	US39402176	2012.07	
13	Power Sensor	Agilent	E9327A	MY44420696	2012.07	
14	Power Sensor	Agilent	8482A	MY41094094	2012.07	
15	Power Sensor	Agilent	8485A	3318A13916	2012.07	
16	Attenuator (10dB)	HP	8491B	38067	2012.07	
17	Attenuator (20dB)	Weinschel	44	AH6967	2012.07	
18	High Pass Filter	Wainwright	WHKX3.0/18G	8	2012.07	
19	VHF Precision Dipole Antenna (TX/RX)	Schwarzbeck	VHAP	1014 / 1015	2012.05	
20	UHF Precision Dipole Antenna (TX/RX)	Schwarzbeck	UHAP	989 / 990	2012.05	
21	Loop Antenna	Schwarzbeck	HFH2-Z2	863048/019	2011.11	☒
22	TRILOG Broadband Antenna	Schwarzbeck	VULB9168	230	2012.07	☒
23	TRILOG Broadband Antenna	Schwarzbeck	VULB9168	189	2012.05	
24	Horn Antenna	AH Systems	SAS-200/571	304	N/A	
25	Horn Antenna	EMCO	3115	00040723	2012.04	
26	Horn Antenna	EMCO	3115	00056768	2012.10	
27	Horn Antenna	Schwarzbeck	BBHA9170	BBHA9170318	2013.09	
28	Vector Signal Generator	Agilent	E4438C	MY42080359	2012.07	
29	PSG analog signal generator	Agilent	E8257D-520	MY45141255	2012.07	
30	DC Power Supply	HP	6633A	3325A04972	2012.07	
31	DC Power Supply	HP	6622A	3348A03223	2012.07	☒
32	Temperature/Humidity Chamber	All Three	ATM-50M	20030425	2012.03	☒
33	Hygro/Thermo Graph	SATO	PC-5000TRH-II	-	2012.07	☒

2.3 Test Date

Date of Test: September 19, 2011 ~ September 21, 2011

2.4 Test Environment

See each test item's description.

3. DESCRIPTION OF THE EQUIPMENT UNDER TEST

The product specification described herein was obtained from the product data sheet or user's manual.

3.1 Rating and Physical Characteristics

Power source	3V (Alkaline Battery, 1.5V AAA Size × 2EA)	
Local Oscillator or X-Tal	X-Tal: 32.768 kHz,	
Tx Frequency	13.56 MHz	
Antenna Type	Internal PCB antenna	
Type of Modulation	ASK	
External Ports	Test strip port	for the Test Strip
	RS-232C (3.5 m Jack) **	DATA communication; transmits the stored information in it to a personal computer

**: Equipment authorization as a Class B digital device was processed with other EMI test report.

3.2 Equipment Modifications

The RF signals from the EUT are usually transmitted when pulling up the strip vial. The firmware on the EUT was modified to transmit RF signals periodically (Periodic was about 2 s, and the duration of the transmission was about 126 ms).

3.3 Submitted Documents

Block diagram

Schematic diagram

Part List

User manual

4. MEASUREMENT CONDITIONS

4.1 Description of test configuration

The measurements were taken in transmitting RF signals periodically.

4.2 List of Peripherals

Equipment Type	Manufacturer	Model	S/N
-	-	-	-

** The EUT was tested as a stand alone device

4.3 Type of Used Cables

#	START		END		CABLE	
	NAME	I/O PORT	NAME	I/O PORT	LENGTH(m)	SHIELDED

4.4 Uncertainty

Measurement Item	Combined Standard Uncertainty *Uc*	Expanded Uncertainty $U = k \times Uc$ ($k = 2$)
Radiated disturbance	± 2.30 dB	± 4.60 dB
Conducted disturbance	± 1.96 dB	± 3.92 dB

5. TEST AND MEASUREMENTS

Summary of Test Results

Requirement	FCC, 47CFR15	Report Section	Test Result
Antenna Requirement	15.203	5.1	PASS
Radiated Emissions Field Strength within the band 13.553-13.567 MHz	15.225(a)	5.2	PASS
Field Strength within the bands 13.410-13.553 MHz and 13.567-13.710 MHz 13.110-13.410 MHz and 13.710-14.010 MHz	15.225(b) & (c)	5.2	PASS
Radiated Harmonics and Spurious Emissions Outside of the 13.110 – 14.010 MHz	15.225(d) 15.209(a)	5.2	PASS
Frequency Tolerance of Carrier Signal	15.225(e)	5.3	PASS
AC Power Line Conducted Emissions	15.207(a)	N/A*	N/A*

* Not required, the EUT is only battery powered (3V Alkaline Battery).

5.1 ANTENNA REQUIREMENT

5.1.1 Regulation

FCC section 15.203, An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of Part 15C. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31 (d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

5.1.2 Result: PASS

The EUT has an integral PCB loop antenna, and meets the requirements of this section.

5.2 RADIATED EMISSIONS

5.2.1 Regulation

FCC 47CFR15 – 15.225

(a) The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

(b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

(c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

(d) The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.

Frequency (MHz)	Field strength limit (μV/m) @ 30 m	Field strength limit (dBμV/m) @ 30 m	Field strength limit (dBμV/m) @ 3 m
13.110 – 13.410	106	40.5	80.5
13.410 – 13.553	334	50.5	90.5
13.553 – 13.567	15,848	84.0	124.0
13.567 – 13.710	334	50.5	90.5
13.710 – 14.010	106	40.5	80.5

FCC 47CFR15 – 15.209

(a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field strength limit (μV/m)	Field strength limit (dBμV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F (kHz) = 266.7 – 4.9	48.5 – 13.8	300
0.490 – 1.705	24000/F (kHz) = 49.0 – 14.1	33.8 – 23.0	30
1.705 – 30.0	30	29.5	30
30 – 88	100	40.0	3
88 – 216	150	43.5	3
216 – 960	200	46.0	3
Above 960	500	54.0	3

* The emission limits shown in the above table are based on measurement instrumentation employing a CISPR quasi-peak detector. For the frequency bands 9 – 90 kHz, 110 – 490 kHz and above 1000 MHz, the radiated emission limits are based on measurements employing an average detector.

* The lower limit shall apply at the transition frequencies.

5.2.2 Measurement Procedure

Radiated Emissions Test, 9 kHz to 30 MHz (Magnetic Field Test)

1. The preliminary radiated measurements were performed to determine the frequency producing the maximum emissions at a distance of 1 meter or 3 meters according to Section 15.31(f)(2).
2. The EUT was placed on the top of the 0.8-meter height, 1 × 1.5 meter non-metallic table.
3. Emissions from the EUT are maximized by adjusting the orientation of the Loop antenna and rotating the EUT on the turntable. Manipulating the system cables also maximizes EUT emissions if applicable.
4. To obtain the final measurement data, each frequency found during preliminary measurements was re-examined and investigated. The test-receiver system was set up to average, peak, and quasi-peak detector function with specified bandwidth.

Radiated Emissions Test, above 30 MHz

1. The preliminary radiated measurements were performed to determine the frequency producing the maximum emissions in an anechoic chamber at a distance of 3 meters.
2. The EUT was placed on the top of the 0.8-meter height, 1 × 1.5 meter non-metallic table. To find the maximum emission levels, the height of a measuring antenna was changed and the turntable was rotated 360˚.
3. The antenna polarization was also changed from vertical to horizontal. The spectrum was scanned from 30 to 1000 MHz using the TRILOG broadband antenna and from 1000 MHz to 18000 MHz or to tenth harmonic of the highest fundamental frequency, whichever is higher, using the horn antenna.
4. To obtain the final measurement data, the EUT was arranged on a turntable situated on a 4 × 4 meter at the Open Area Test Site. The EUT was tested at a distance 3 meters.
5. Each frequency found during preliminary measurements was re-examined and investigated. The test-receiver system was set up to average, peak, and quasi-peak detector function with specified bandwidth.
6. The EUT is situated in three orthogonal planes (if appropriate)
7. The presence of ambient signals was verified by turning the EUT off. In case an ambient signal was detected, the measurement bandwidth was reduced temporarily and verification was made that an additional adjacent peak did not exist. This ensures that the ambient signal does not hide any emissions from the EUT.

5.2.3 Calculation of the field strength limits below 30 MHz

1. No special calculation for obtaining the field strength in dBμV/m is necessary, because the EMI receiver and the active loop antenna operate as a system, where the reading gives directly the field strength result (dBμV/m). The antenna factors and cable losses are already taken into consideration.
2. For test distance other than what is specified, but fulfilling the requirements of section 15.31 (f) (2) the field strength is calculated by adding additionally an extrapolation factor of 40dB/decade (inverse linear distance for field strength measurements).
3. All following emission measurements were performed using the test receiver's average, peak, and quasi-peak detector function with specified bandwidth.
4. The basic equation is as follows;

FS= RA + DF

Where

FS = Field strength in dBμV/m

RA = Receiver Amplitude in dBμV/m

DF = Distance Extrapolation Factor in dB

Where DF = $40\log(D_{TEST} / D_{SPEC})$ where D_{TEST} = Test Distance and D_{SPEC} = Specified Distance

DF = 40log(3m/300m) = -80dB, for frequency band: 0.009 to 0.490MHz

DF = 40log(3m/30m) = -40dB, for frequency band: 0.490 to 30MHz

5.2.4 Test Results: **PASS**

Table 1: Field strength below 30 MHz

Frequency [MHz]	RBW [kHz]	Reading [dB(μV/m)]	Cable Loss [dB]	Actual [dB(μV/m)]	Limit (at 3m) [dB(μV/m)]	Margin [dB]
Emissions Quasi-peak DATA under 15.225(a), (b)&(c)						
13.56	9	48.36	0.3	48.66	124.0	75.34
Emissions Quasi-peak DATA under 15.225(d), 15.209						

No Spurious emissions Found

Actual (dBμV/m) = Reading + Cable Loss

Margin (dB) = Limit – Actual

Remark:"---" means the emission level was too low to be measured or in the noise floor.

Table 2: Measured values of the Field strength (above 30 MHz)

Frequency [MHz]	RBW [kHz]	POL [V/H]	ANT [m]	Reading [dBμV]	AMP [dB]	AF [dB/m]	CL [dB]	Actual [dBμV/m]	Limit [dBμV/m]	Margin [dB]

No Spurious emissions Found

Margin (dB) = Limit – Actual

[Actual = Reading + AF + CL]

1. H = Horizontal, V = Vertical Polarization
2. AF/CL = Antenna Factor and Cable Loss

NOTE: 1. All emissions not reported were more than 20 dB below the specified limit or in the noise floor.

2. These test results of Table 1 and Table 2 were measured at the 3 m distance.

Figure 1. Plot of the Band edge (Preliminary measurement in the anechoic chamber at 3 m distance to find out the frequencies, at which the spurious emissions occur, with the peak detector function)

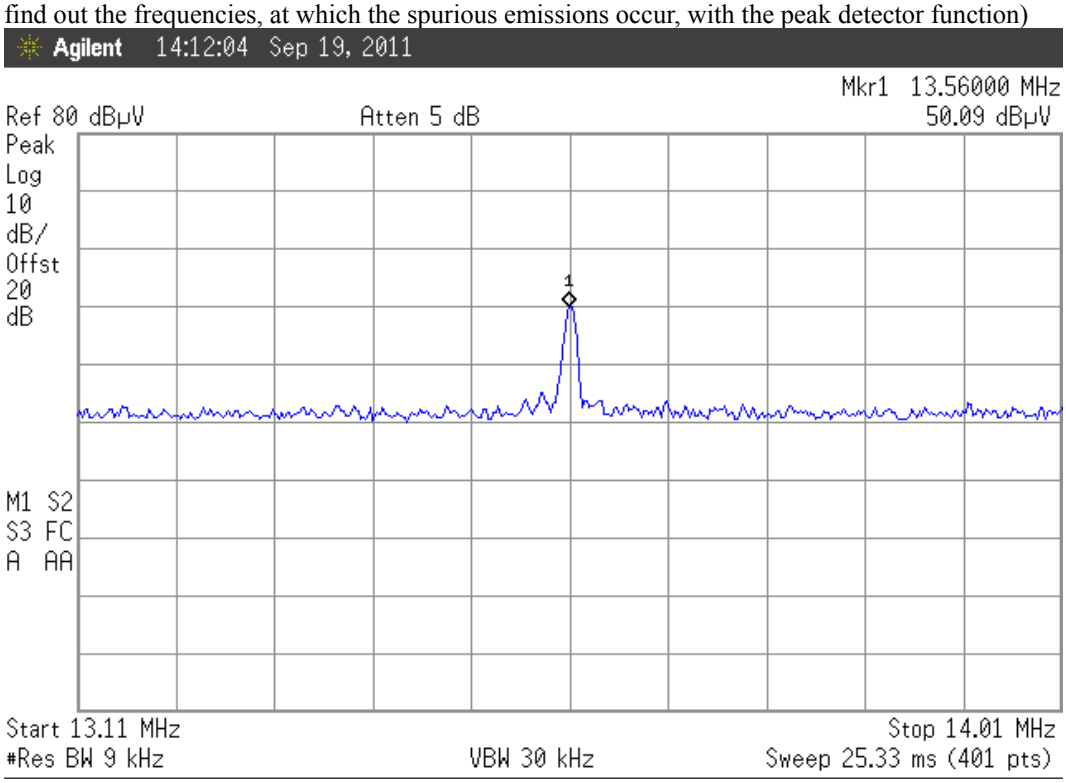


Figure 2. Plot of the 20 dB bandwidth

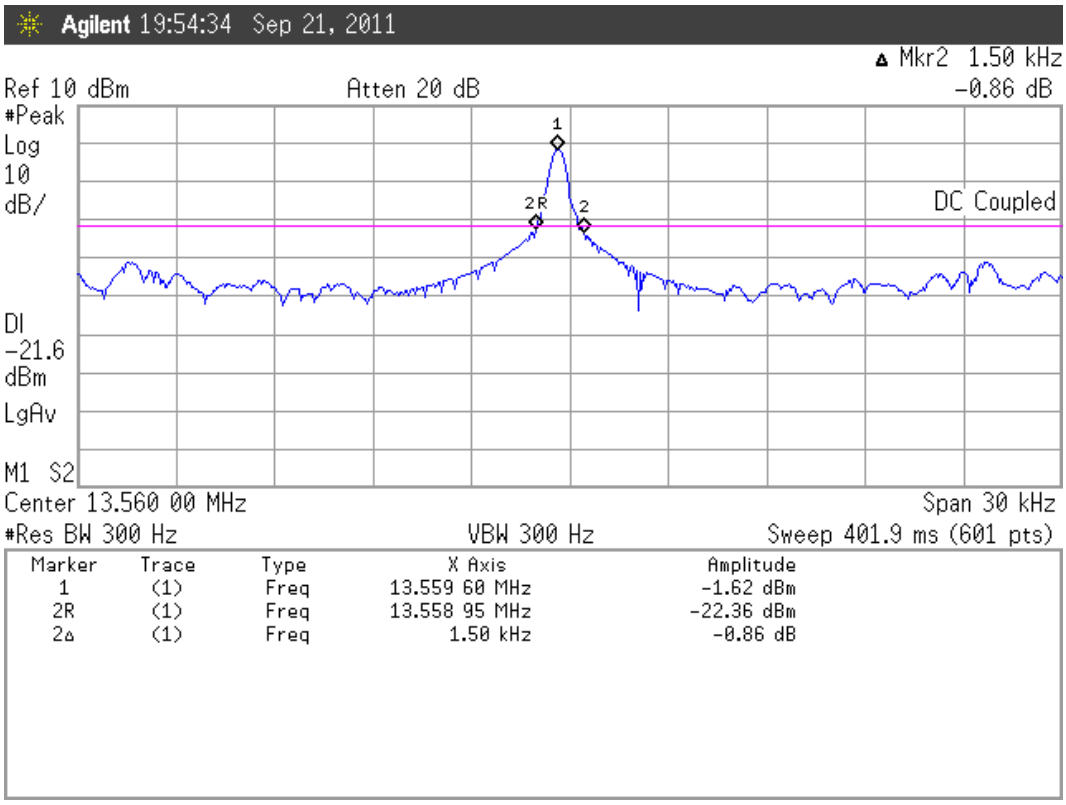
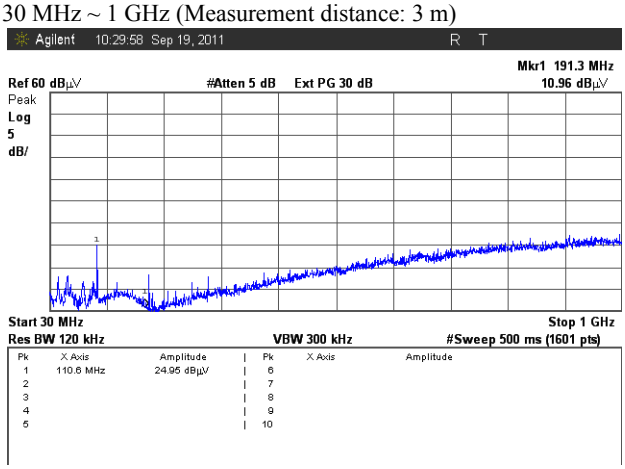
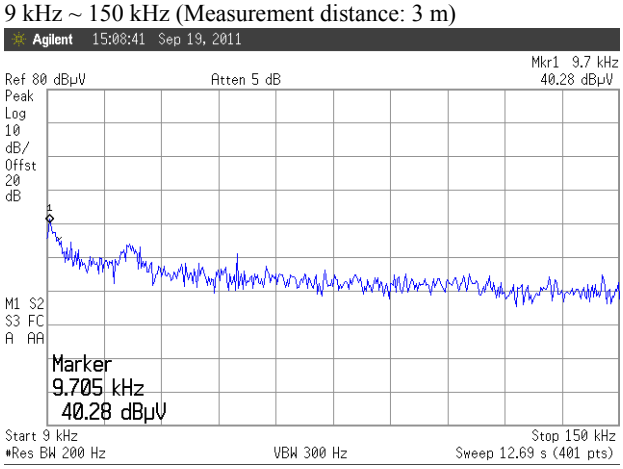


Figure 3. Emission plot for the preliminary radiated measurements

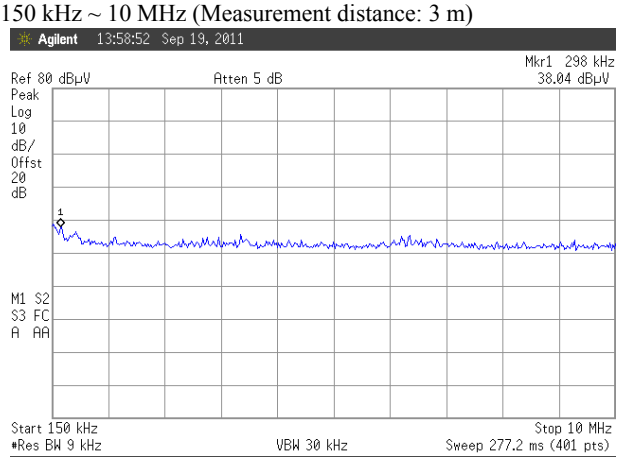
30 MHz ~ 1 GHz (Measurement distance: 3 m)



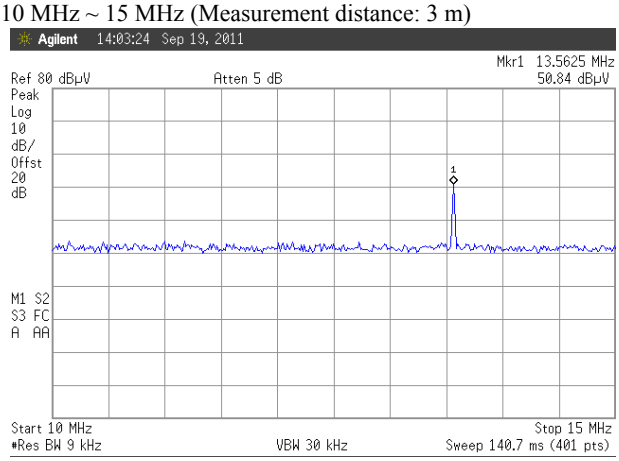
9 kHz ~ 150 kHz (Measurement distance: 3 m)



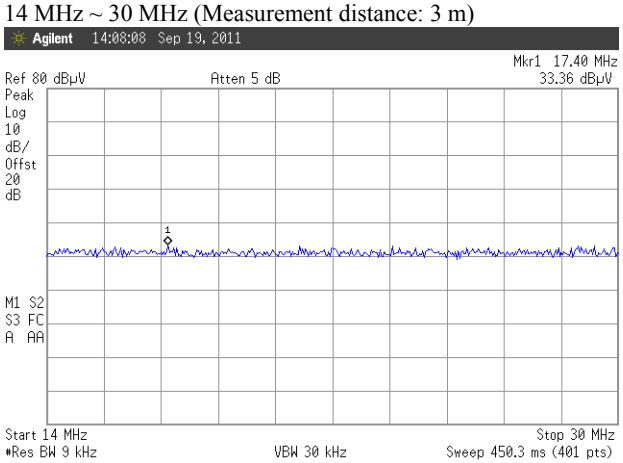
150 kHz ~ 10 MHz (Measurement distance: 3 m)



10 MHz ~ 15 MHz (Measurement distance: 3 m)



14 MHz ~ 30 MHz (Measurement distance: 3 m)



5.3 FREQUENCY TOLERANCE OF CARRIER SIGNAL

5.3.1 Regulation

FCC 47CFR15 – 15.225(e)

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of –20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery-operated equipment, the equipment tests shall be performed using a new battery.

5.3.2 Measurement Procedure

Frequency stability versus environmental temperature

1. Supply the EUT with nominal voltage. [*REMARK: DC 3.0 V*]
2. Turn the EUT off, and place it inside an environmental temperature chamber. For devices that are normally operated continuously, the EUT may be energized while inside the test chamber. For devices that have oscillator heaters, energize only the heater circuit while the EUT is inside the chamber.
3. RF output was connected to a frequency counter or other frequency-measuring instrument via feed through attenuators.
4. Set the temperature control on the chamber to the highest specified EUT operating temperature, and allow the temperature inside the chamber to stabilize at the set temperature before starting frequency measurements.
5. While maintaining a constant temperature inside the environmental chamber, turn the EUT on and record the operating frequency at startup and two, five, and ten minutes after the EUT is energized.
6. After all measurements have been made at the highest specified temperature turn the EUT off.
7. Repeat the above measurement process for the EUT with the test chamber set at the appropriate temperature.

Frequency Stability versus Input Voltage

1. At room temperature (20 ± 5) °C supply the EUT with nominal voltage. [*REMARK: new batteries*]
2. Couple RF output to a frequency counter or other frequency-measuring instrument.
3. Turn the EUT on, and measure the EUT operating frequency at startup and two, five, and ten minutes after startup.

5.3.3 Test Results: PASS

Table 3: Frequency Tolerance

Reference Frequency: 13.5600MHz, LIMIT: within ± 1 356 Hz									
Environment Temperature	Power Supplied	Carrier Frequency Measured with Time Elapsed							
		STARUP		2 minutes		5 minutes		10 minutes	
[°C]	[V_{DC}]	[MHZ]	Err [Hz]	[MHZ]	Err [Hz]	[MHZ]	Err [Hz]	[MHZ]	Err [Hz]
+50	3.0	13.559591	-409	13.559591	-409	13.559592	-408	13.559592	-408
+40	3.0	13.559601	-399	13.559601	-399	13.559600	-400	13.559598	-402
+30	3.0	13.559625	-375	13.559625	-375	13.559626	-374	13.559626	-374
+20	3.0	13.559654	-346	13.559654	-346	13.559655	-345	13.559652	-348
+10	3.0	13.559676	-324	13.559676	-324	13.559677	-323	13.559677	-323
0	3.0	13.559689	-311	13.559689	-311	13.559690	-310	13.559690	-310
-10	3.0	13.559679	-321	13.559679	-321	13.559681	-319	13.559681	-319
-20	3.0	13.559663	-337	13.559663	-337	13.559665	-335	13.559666	-334

Reference Frequency: 13.5600MHz, LIMIT: 100 PPM (within ± 1 356 Hz)								
Power Supplied	Carrier Frequency Measured with Time Elapsed							
	STARUP		2 minutes		5 minutes		10 minutes	
[V_{DC}]	[MHZ]	Err [Hz]	[MHZ]	Err [Hz]	[MHZ]	Err [Hz]	[MHZ]	Err [Hz]
New batteries	13.559653	-347	13.559653	-347	13.559654	-346	13.559654	-346

Err [Hz] = Measured carrier frequency (MHz) - Reference Frequency (13.56 MHz)