FCC PART 15.225

TEST REPORT

For

SDATAWAY SA.

Rte. de Pra de Plan 5, Post Office Box 68, 1618 Châtel-St-Denis, Switzerland

FCC ID: QFHB10READER

Report Type:	**Product Type:**
Original Report	B10 Reader

Test Engineer:	Leon Chen
Report Number:	R1XM121127051-00C
Report Date:	2012-12-21
Reviewed By:	Ivan Cao RF Leader
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *SDATAWAY SA.*'s product, model number: B10 Reader *(FCC ID: QFHB10READER) or* ("EUT") in this report is a B10 Reader, which was measured approximately: 23.0 cm (L) x11.0 cm (W) x8.4 cm (H), rated input voltage: DC 3.7V from lithium battery or DC 5V from adapter.

Adapter Information:
MODEL: KSAS0060500100D5D
INPUT: 100-240V, 50/60Hz, 0.18A
OUTPUT: 5.0V, 1.0A

** All measurement and test data in this report was gathered from production sample serial number: 121127051 (Assigned by BACL, Dongguan). The EUT was received on 2012-12-04.*

Objective

This Type approval report is prepared on behalf of *SDATAWAY SA.* in accordance with Part 2, Subpart J, and Part 15, Subparts A, B and C of the Federal Communication Commissions rules.

The objective is to determine the compliance of the EUT with FCC rules, sec 15.203, 15.205, 15.207, 15.209 and 15.225.

Related Submittal(s)/Grant(s)

FCC Part 15B JBP submissions with FCC ID: QFHB10READER
FCC Part 15C DXX submissions with FCC ID: QFHB10READER for Wi-Fi.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Lab Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China

Test site at Bay Area Compliance Laboratories Corp. (Dongguan) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 02, 2012. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 273710. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

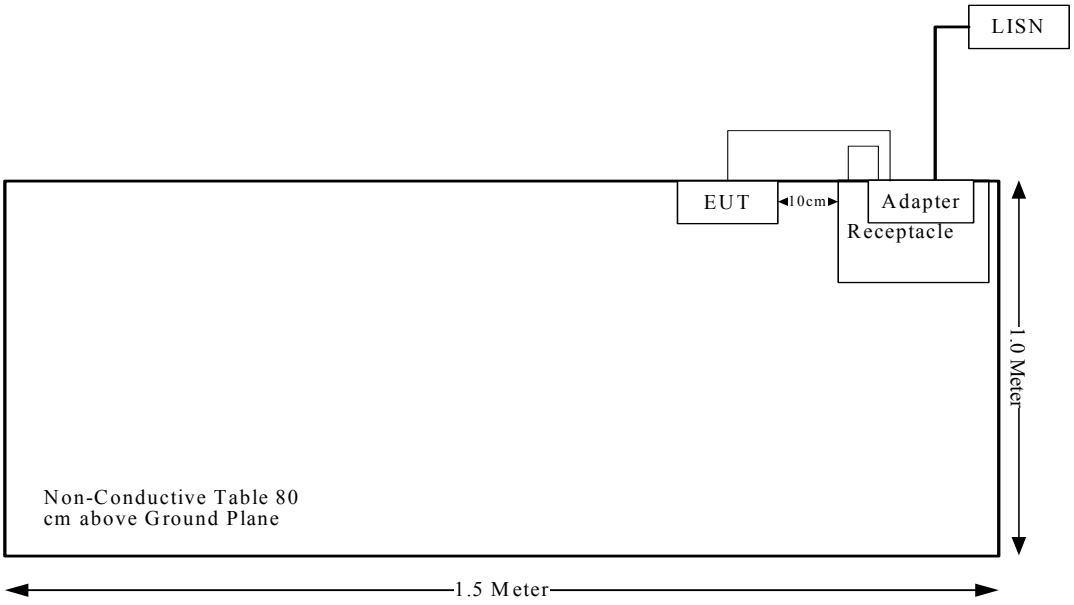
Justification

The system was configured for testing in a typical fashion (as normally used by a typical user).

EUT Exercise Software

No software was performed under test.

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliance
§15.207	AC Line Conducted Emission	Compliance
§15.225 §15.209 §15.205	Radiated Emission Test	Compliance
§15.225(e)	Frequency Stability	Compliance
§15.215(c)	20 dB Emission Bandwidth	Compliance

FCC§15.203 - ANTENNA REQUIREMENT

Applicable Standard

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 this section.

Antenna Connected Construction

This EUT has an integrated antenna arrangement which fulfills the requirement of this section, and please refer to the internal photos.

Result: Compliance.

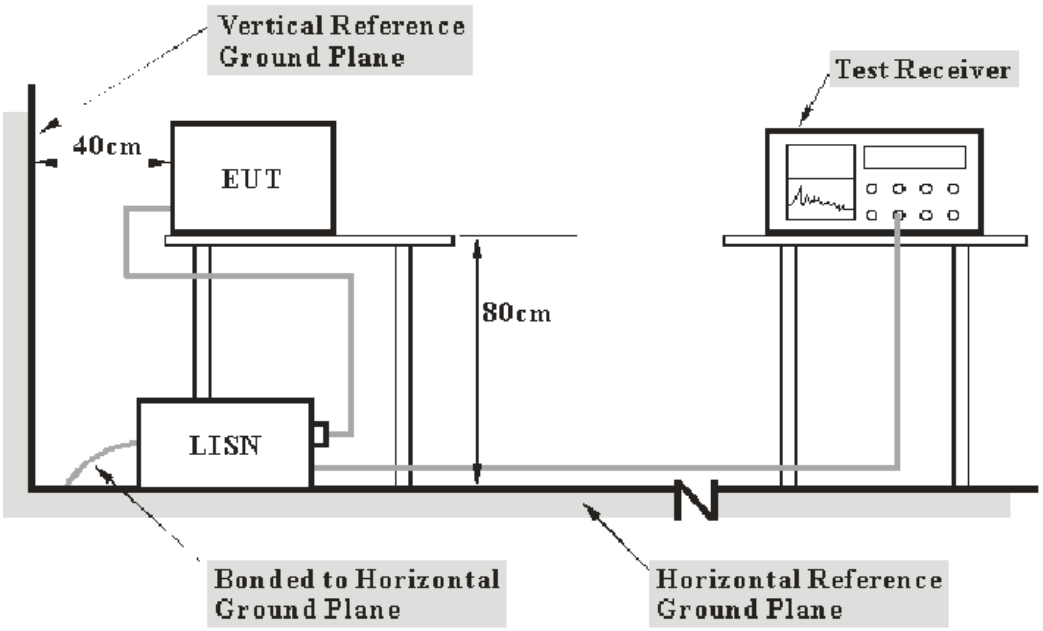
FCC §15.207 – AC LINE CONDUCTED EMISSION

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

Based on CISPR 16-4-4, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at Bay Area Compliance Lab Corp. (Shenzhen) is 2.4 dB(k=2, 95% level of confidence).

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.4-2009 measurement procedure. The specification used was with the FCC Part 15.207.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

The adapter was connected to a 120 VAC/60 Hz power source.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	***IF B/W***
150 kHz – 30 MHz	9 kHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCS 30	830245/006	2012-10-08	2013-10-07
R&S	LISN1	ESH3-Z5	843331/015	2012-09-17	2013-09-16
R&S	LISN2	ESH3-Z5	100113	2012-10-08	2013-10-07

Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

According FCC publication number 174176,for a device with a permanent antenna operating at or below 30 MHz, the measurements done with a suitable dummy load, in lieu of the permanent antenna under the following conditions: (1) perform the AC line conducted tests with the permanent antenna to determine compliance with the Section 15.207 limits outside the transmitter's fundamental emission band; (2) retest with a dummy load in lieu of the permanent antenna to determine compliance with the Section 15.207 limits within the transmitter's fundamental emission band.

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207, with the worst margin reading of:

19.72 dB at **1.270 MHz** in the **Neutral** conducted mode

Test Data

Environmental Conditions

Temperature:	23.8 °C
Relative Humidity:	52 %
ATM Pressure:	101.3 kPa

The testing was performed by Leon Chen on 2012-12-12.

Test Mode: Transmitting

with antenna：

AC 120V, 60 Hz, Line:

Frequency (MHz)	Cord. Reading (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/AV/QP)
0.610	33.37	0.22	56.00	22.63	QP
0.610	24.91	0.22	46.00	21.09	AV
0.950	34.36	0.23	56.00	21.64	QP
0.950	25.95	0.23	46.00	20.05	AV
1.295	33.05	0.24	56.00	22.95	QP
1.295	25.02	0.24	46.00	20.98	AV
1.740	34.69	0.25	56.00	21.31	QP
1.740	26.38	0.25	46.00	19.62	AV
13.560	71.76	1.00	60.00	-11.76	QP
13.560	65.28	1.00	50.00	-15.28	AV
27.120	48.56	2.36	60.00	11.44	QP
27.120	42.18	2.36	50.00	7.82	AV

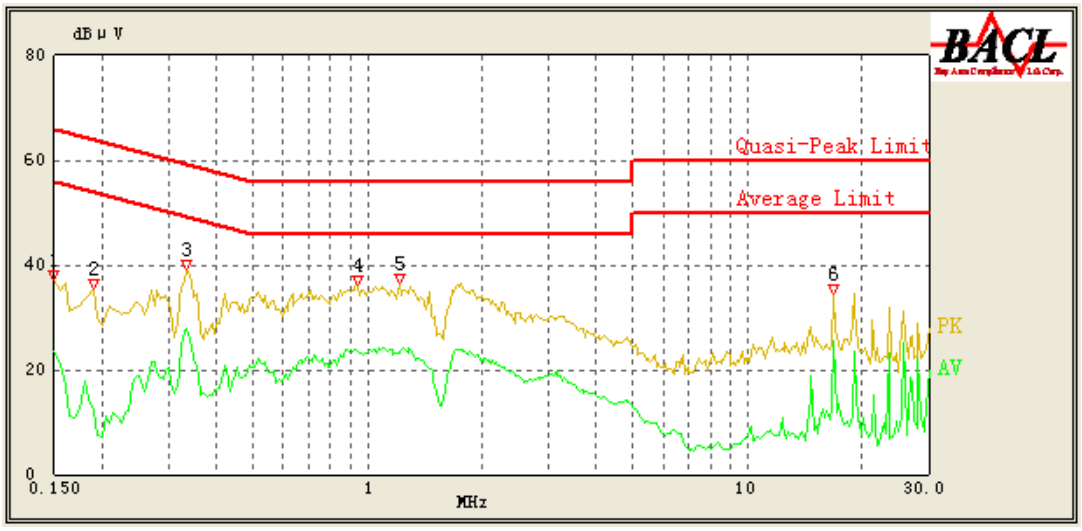
120 V, 60 Hz, Neutral:

Frequency (MHz)	Cord. Reading (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/AV/QP)
0.330	40.18	0.24	60.86	20.68	QP
0.330	29.34	0.24	50.86	21.52	AV
1.025	39.56	0.23	56.00	16.44	QP
1.035	28.33	0.23	46.00	17.67	AV
1.335	39.51	0.24	56.00	16.49	QP
1.335	29.83	0.24	46.00	16.17	AV
1.800	39.11	0.26	56.00	16.89	QP
1.805	27.85	0.26	46.00	18.15	AV
13.560	75.31	1.00	60.00	-15.31	QP
13.560	68.86	1.00	50.00	-18.86	AV
27.120	46.86	2.36	60.00	13.14	QP
27.115	38.28	2.36	50.00	11.72	AV

Test Mode: Transmitting

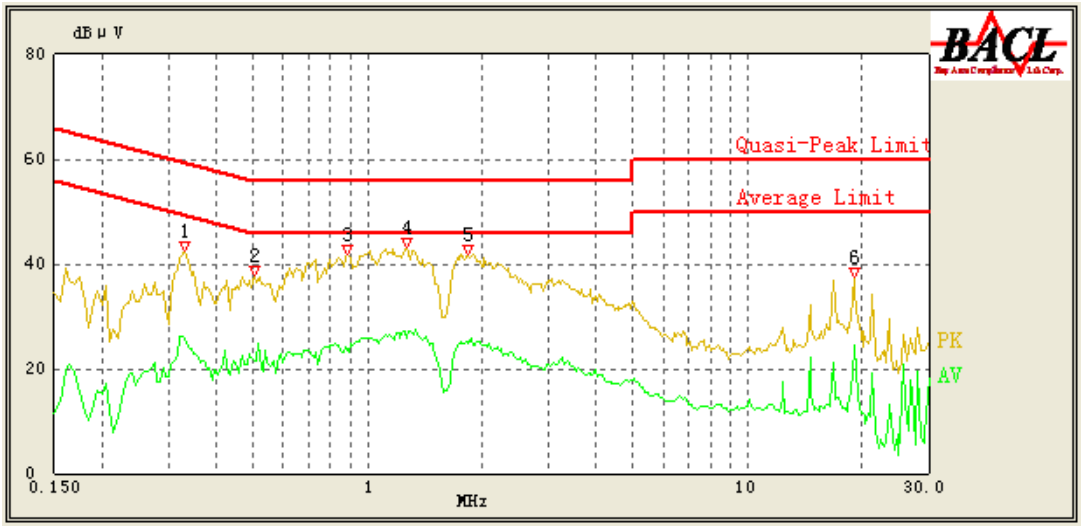
with a dummy load in lieu of the antenna

AC 120V, 60 Hz, Line:



Frequency (MHz)	Cord. Reading (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/AV/QP)
0.150	33.88	0.26	66.00	32.12	QP
0.150	23.45	0.26	56.00	32.55	AV
0.190	22.77	0.25	64.86	42.09	QP
0.190	12.06	0.25	54.86	42.80	AV
0.335	32.48	0.24	60.71	28.23	QP
0.335	27.88	0.24	50.71	22.83	AV
0.940	31.25	0.23	56.00	24.75	QP
0.940	23.38	0.23	46.00	22.62	AV
1.210	30.74	0.24	56.00	25.26	QP
1.210	23.28	0.24	46.00	22.72	AV
16.850	32.34	1.23	60.00	27.66	QP
16.850	25.61	1.23	50.00	24.39	AV

120 V, 60 Hz, Neutral:



Frequency (MHz)	Cord. Reading (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/AV/QP)
0.330	38.29	0.24	60.86	22.57	QP
0.330	25.89	0.24	50.86	24.97	AV
0.505	33.49	0.21	56.00	22.51	QP
0.505	21.53	0.21	46.00	24.47	AV
0.885	35.72	0.23	56.00	20.28	QP
0.890	23.07	0.23	46.00	22.93	AV
1.270	36.28	0.24	56.00	19.72	QP
1.275	25.93	0.24	46.00	20.07	AV
1.830	36.14	0.26	56.00	19.86	QP
1.830	25.20	0.26	46.00	20.80	AV
19.100	35.11	1.42	60.00	24.89	QP
19.100	23.65	1.42	50.00	26.35	AV

FCC§15.225, §15.205 & §15.209 - RADIATED EMISSIONS TEST

Applicable Standard

As per FCC Part 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.

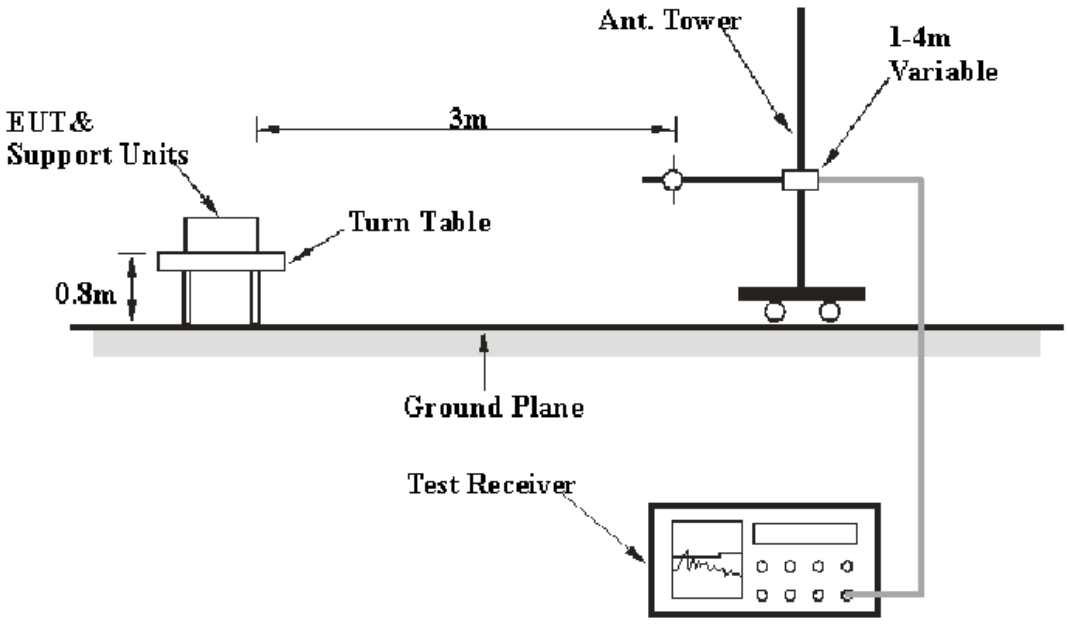
Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on CISPR 16-4-4, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Bay Area Compliance Lab Corp. (Shenzhen) is ±4.0 dB (k=2, 95% level of confidence).

The fundamental data was recorded in average detection mode: set the VBW AVE on, and then record the data.

EUT Setup



The radiated emission tests were performed in the 3-meter chamber a test site, using the setup accordance with the ANSI C63.4-2009. The specification used was the FCC Part Subpart C limits.

The spacing between the peripherals was 10 cm.

The adapter was connected to a 120 VAC/60 Hz power source.

EMI Test Receiver Setup

According to FCC Rules, 47 CFR 15.33, the EUT emissions were investigated up to 1000 MHz.

During the radiated emission test, the EMI test Receiver was set with the following configurations:

Frequency Range	***RBW***	***Video B/W***
9 kHz – 150 kHz	300 Hz	1 kHz
150 kHz – 30 MHz	10 kHz	30 kHz
30 – 1000 MHz	100 kHz	300 kHz

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Loss and Cable Loss, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Meter Reading + Antenna Loss+ Cable Loss - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the maximum limit. The equation for margin calculation is as follows:

Margin = Limit - Corr. Ampl.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2012-05-14	2013-05-13
HP	Pre-amplifier	8447E	2434A02181	2012-10-8	2013-10-7
Sunol Sciences	Hybrid Antennas	JB3	A060611-1	2011-9-6	2013-9-5
ETS-LINDGREN	Loop Antenna	6512	97061206	2011-11-30	2013-11-29

Test Results Summary

According to the data in the following table, the EUT complied with the FCC Part 15.209 with the worst margin reading of:

2.36 dB at **380.1700 MHz** in the **Horizontal** polarization

Test Data

Environmental Conditions

Temperature:	24.6 °C
Relative Humidity:	60 %
ATM Pressure:	101.7 kPa

The testing was performed by Leon Chen on 2012-12-18.

Test mode: Transmitting

1) Radiated Emissions (9 kHz~30 MHz):

Frequency	Receiver		Rx Antenna	Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude @ 3m (dBµV/m)	FCC 15.225	
(MHz)	Reading (dBµV)	Detector (PK/QP/AV)	Factor (dB(1/m))				Limit @ 3m (dBµV/m)	Margin (dB)
0.802	25.56	QP	48.10	0.76	21.50	52.92	69.50	16.58
6.08	20.73	QP	34.30	0.76	21.50	34.29	69.50	35.21
13.26	4.11	QP	32.10	0.76	21.50	15.47	80.50	65.03
13.553	19.3	QP	32.10	0.76	21.50	30.66	90.50	59.84
13.56	45.8	QP	32.10	0.76	21.50	57.16	124.00	66.84
13.572	18.81	QP	32.10	0.76	21.50	30.17	90.50	60.33
13.97	4.50	QP	32.10	0.76	21.50	15.86	80.50	64.64
22.06	4.22	QP	31.30	0.76	21.50	14.78	69.50	54.72

2) Radiated Emissions (30 MHz~1 GHz):

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	FCC 15.209	
(MHz)	Reading (dBµV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB(1/m))				Limit (dBµV/m)	Margin (dB)
35.82	38.72	QP	H	17.67	0.77	21.42	35.74	40.00	4.26
190.05	47.59	QP	H	11.48	1.63	21.45	39.25	43.50	4.25
236.24	46.92	QP	H	11.42	1.78	21.47	38.65	46.00	7.35
243.4	49.83	QP	H	12.25	1.88	21.49	42.47	46.00	3.53*
366.59	44.61	QP	H	15.69	2.32	21.69	40.93	46.00	5.07
380.17	48.14	QP	H	15.77	2.35	21.72	44.54	46.00	1.46*
35.82	40.59	QP	V	17.67	0.77	21.42	37.61	40.00	2.39*
71.71	48.71	QP	V	8.54	1.05	21.41	36.89	40.00	3.11*
190.05	41.46	QP	V	11.48	1.63	21.45	33.12	43.50	10.38
366.59	38.59	QP	V	15.69	2.32	21.69	34.91	46.00	11.09
380.17	44.54	QP	V	15.77	2.35	21.72	40.94	46.00	5.06
460.68	38.63	QP	V	17.52	2.61	21.92	36.84	46.00	9.16

*Within measurement uncertainty.

FCC§15.225(e) - FREQUENCY STABILITY

Applicable Standard

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.

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to PC, than to an external AC power supply and loop antenna was connected to a f Spectrum Analyzer. The EUT was placed inside the temperature chamber.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the Spectrum Analyzer.

Frequency Stability vs. Voltage: An external variable AC power supply Source. The voltage was set to 115% of the nominal value and was then decreased until the transmitter light no longer illuminated; i.e., the end point. The output frequency was recorded for each voltage.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSP38	100478	2012-5-14	2013-5-13
ESPEC	Humidity tester	ESX-4CA	018 463	2012-03-02	2013-03-01

Test Data

Environmental Conditions

Temperature:	24.2 °C
Relative Humidity:	57 %
ATM Pressure:	100.8 kPa

The testing was performed by Leon Chen on 2012-12-17.

Test Mode: Transmitting

Test Result: Pass

f_o = 13.56 MHz				
Temperature	**Voltage**	**Measured frequency**	**Frequency Error**	**Limit**
℃	**V_{DC}**	**MHz**		
-20	3.7	13.5592	-0.0059%	±0.01%
-10	3.7	13.56041	0.0030%	±0.01%
0	3.7	13.55912	-0.0065%	±0.01%
10	3.7	13.56094	0.0069%	±0.01%
20	3.7	13.55928	-0.0053%	±0.01%
30	3.7	13.55968	-0.0024%	±0.01%
40	3.7	13.56073	0.0054%	±0.01%
50	3.7	13.56019	0.0014%	±0.01%
25	3.4	13.55966	-0.0025%	±0.01%
25	4.2	13.56047	0.0035%	±0.01%

FCC §15.215(c) – 20 dB EMISSION BANDWIDTH

Applicable Standard

Per FCC §15.215 (c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §15.217 through § 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency banddesignated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects fromfrequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-ofband operation.

Test Procedure

1 Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2 Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3 Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2012-05-14	2013-05-13
HP	Pre-amplifier	8447E	2434A02181	2012-10-8	2013-10-7
ETS-LINDGREN	Loop Antenna	6512	97061206	2011-11-30	2013-11-29

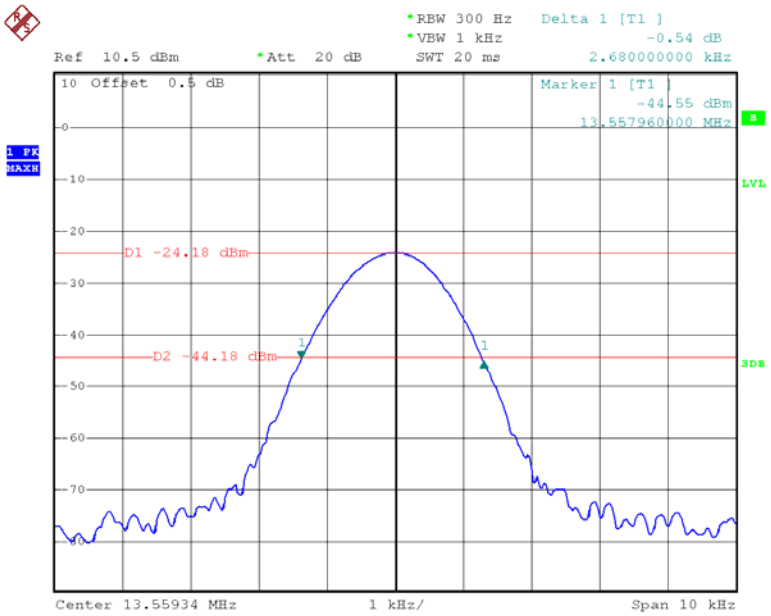
Test Data Environmental Conditions

Temperature:	24 °C
Relative Humidity:	59 %
ATM Pressure:	101 kPa

The testing was performed by Leon Chen on 2012-12-21.

Test Mode: Transmitting

20 dB Emission Bandwidth



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