FCC Part 15C
Measurement and Test Report

For

China Linkin Co., Ltd.

Room 502. Arion Centre, 2-12 Queen's Road West, Hong Kong.

China Linkin Co., Ltd.

FCC ID: OD3POS377

FCC Rules:	FCC Part 15.225
Product Description:	POS terminal
Tested Model:	DFW377
Report No.:	STR12058351I-4
Tested Date:	2012-06-01 to 2012-06-20
Issued Date:	2012-06-21
Tested By:	Seven Song / Engineer
Reviewed By:	Lahm Peng / EMC Manager
Approved & Authorized By:	Jandy so / PSQ Manager

Prepared By:

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant:	China Linkin Co., Ltd.
Address of applicant:	Room 502, Arion Centre, 2-12 Queen's Road West, Hong Kong.
Manufacturer:	Shenzhen Maxpad Technology Development Co., Ltd.
Address of manufacturer:	Room B04, 4/F, Bldg R2-B, No.20 Gaoxin Ave 7th, South, Shenzhen Hi-tech Industrial park, Nanshan, Shenzhen.

General Description of EUT	
Product Name:	POS terminal
Trade Name:	Maxpad
Model No.:	DFW377
Adding Model(s):	MX377
Rated Voltage:	Battery 7.4V
Power Adapter Model:	HKA02108525-8A (Input: AC 100-240V, Output: DC 9V)
Note: The test data is gathered from a production sample, provided by the manufacturer. The other model listed in the report has different appearance only of DFW377 without circuit and electronic construction changed, declared by the manufacturer	

Technical Characteristics of EUT	
Support Standards:	RFID
Frequency Range:	13.56MHz
Antenna Type:	Integral Antenna
Device Category:	Portable Device

1.2 Test Standards

The following report is prepared on behalf of the China Linkin Co., Ltd. in accordance with FCC Part 15, Subpart C, and section 15.203,15.205,15.209 and 15.225 of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15, Subpart C, and section 15.203,15.205,15.209 and 15.225 rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission/immunity, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, 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.

The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted accordingly in reference to the Operating Instructions.

1.4 Test Facility

- **FCC – Registration No.: 994117**
  SEM.Test Compliance Services Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files and the Registration is 994117.

- **Industry Canada (IC) Registration No.: 7673A**
  The 3m Semi-anechoic chamber of SEM.Test Compliance Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 7673A.

- **CNAS Registration No.: L4062**
  Shenzhen SEM.Test Electronics Service Co., Ltd. is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L4062. All measurement facilities used to collect the measurement data are located at 3/F, Jinbao Commerce Building, Xin'an Fanshen Road, Bao'an District, Shenzhen, P.R.C (518101)

1.5 EUT Setup and Test Mode

The EUT was operated in the continuous transmitting mode that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	Transmitting	13.56MHz

Special Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
USB Cable	1.0	Shielded	Without Ferrite
DC Power Cable	1.1	Unshielded	Without Ferrite

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
/	/	/	/

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§15.203	Antenna Requirement	Compliant
§15.205	Restricted Band of Operation	Compliant
§15.209	Radiated Emission Limit	Compliant
§15.225(a)	Field Strength	Compliant
§15.225(b)(c)	Out of Band Emission	Compliant
§15.225(e)	Frequency Stability	Compliant

N/A: not applicable

3. Antenna Requirement

3.1 Standard Applicable

According to FCC Part 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 this section.

3.2 Test Result

This product has an integral antenna, fulfill the requirement of this section.

4. Radiated Emissions

4.1 Measurement Uncertainty

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement is ±5.10 dB.

4.2 Standard Applicable

According to §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.

According to §15.225(d) The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in §15.209.

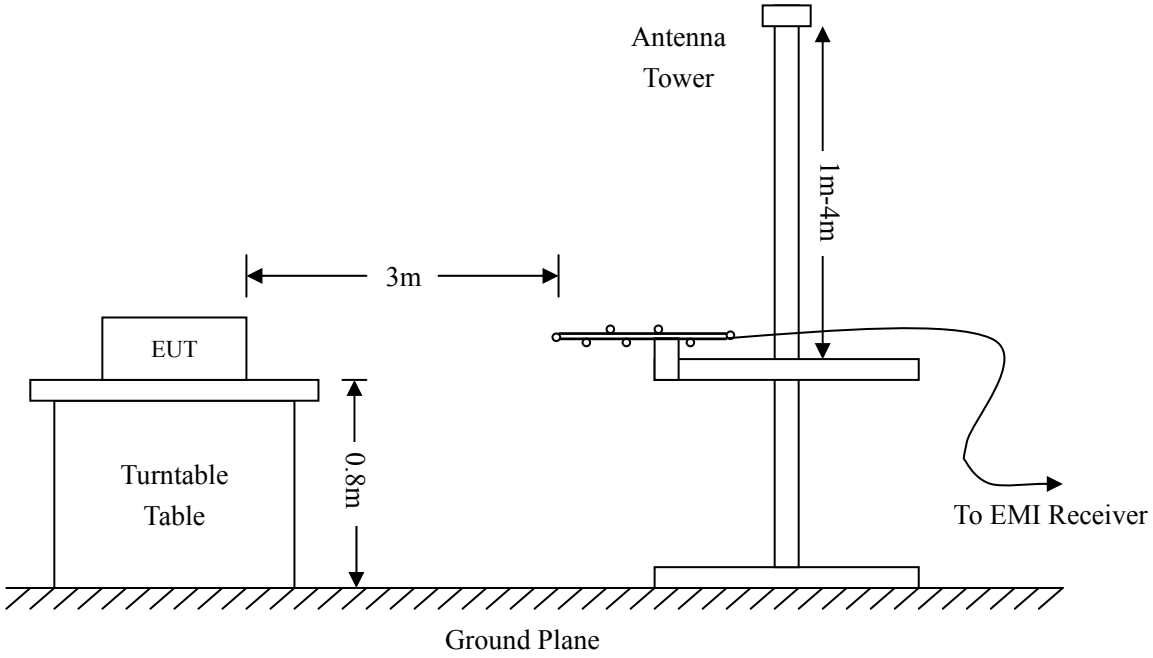
Note: Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

4.3 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2012-03-28	2013-03-27
EMI Test Receiver	R&S	ESVB	825471/005	2012-03-28	2013-03-27
Pre-amplifier	Agilent	8447F	3113A06717	2012-03-28	2013-03-27
Pre-amplifier	Compliance Direction	PAP-0118	24002	2012-03-28	2013-03-27
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2012-02-25	2013-02-24
Horn Antenna	ETS	3117	00086197	2012-02-25	2013-02-24
Loop Antenna	SCHWARZECK	HFRA 5165	9365	2012-02-25	2013-02-24

4.4 Test Procedure

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.205 15.225(d) and FCC Part 15.209 Limit.
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.



4.5 Corrected Amplitude & Margin Calculation

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

Corr. Ampl. = Indicated Reading – Corr. Factor

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dBμV means the emission is 6dBμV below the maximum limit for Class B. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – FCC Part 15 Limit

4.6 Environmental Conditions

Temperature:	26° C
Relative Humidity:	52%
ATM Pressure:	1022 mbar

4.7 Summary of Test Results/Plots

According to the data below, the FCC Part 15.205, 15.209 and 15.225 standards, and had the worst margin of:

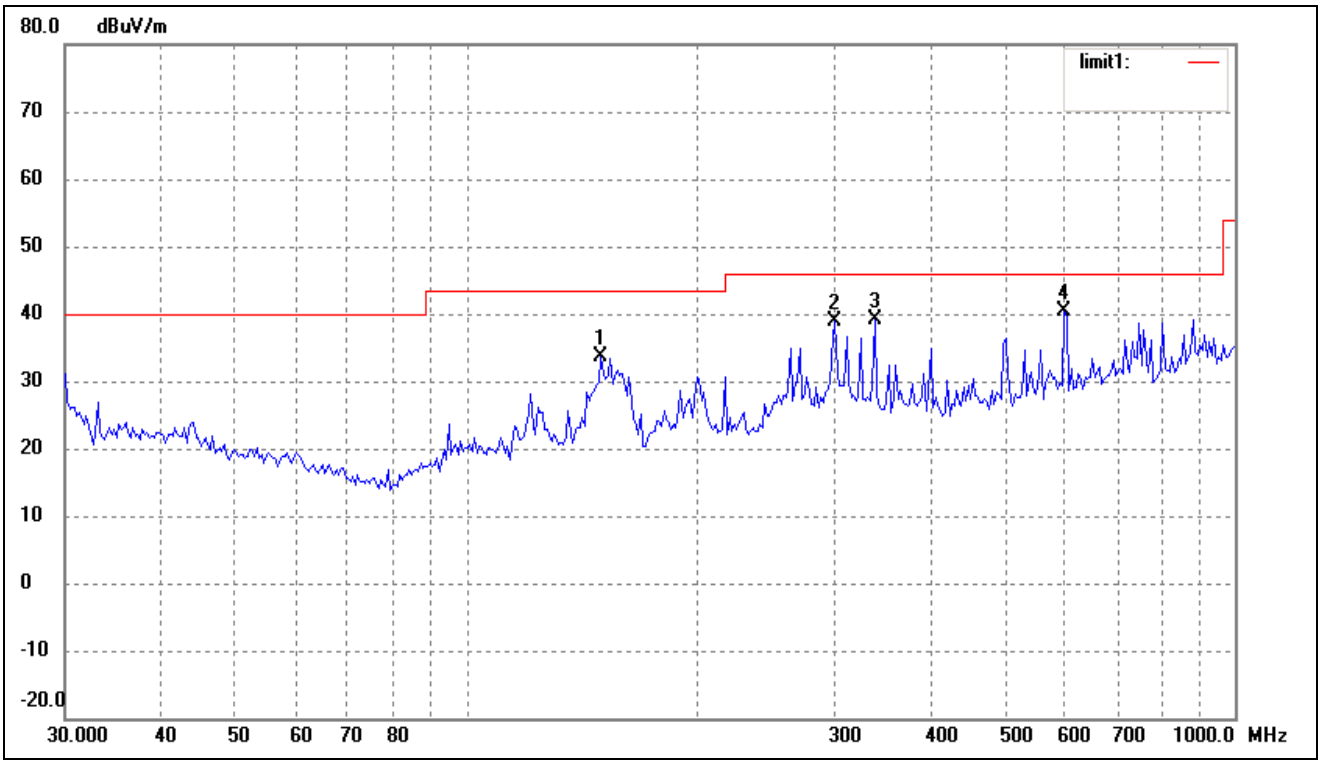
-3.34 dBμV at **27.1542 MHz** in the **Horizontal** polarization, **9 kHz to 1 GHz, 3Meters**

Note: *this EUT was tested in 3 orthogonal positions and the worst case position data was reported.*

Plot of Radiation Emissions Test

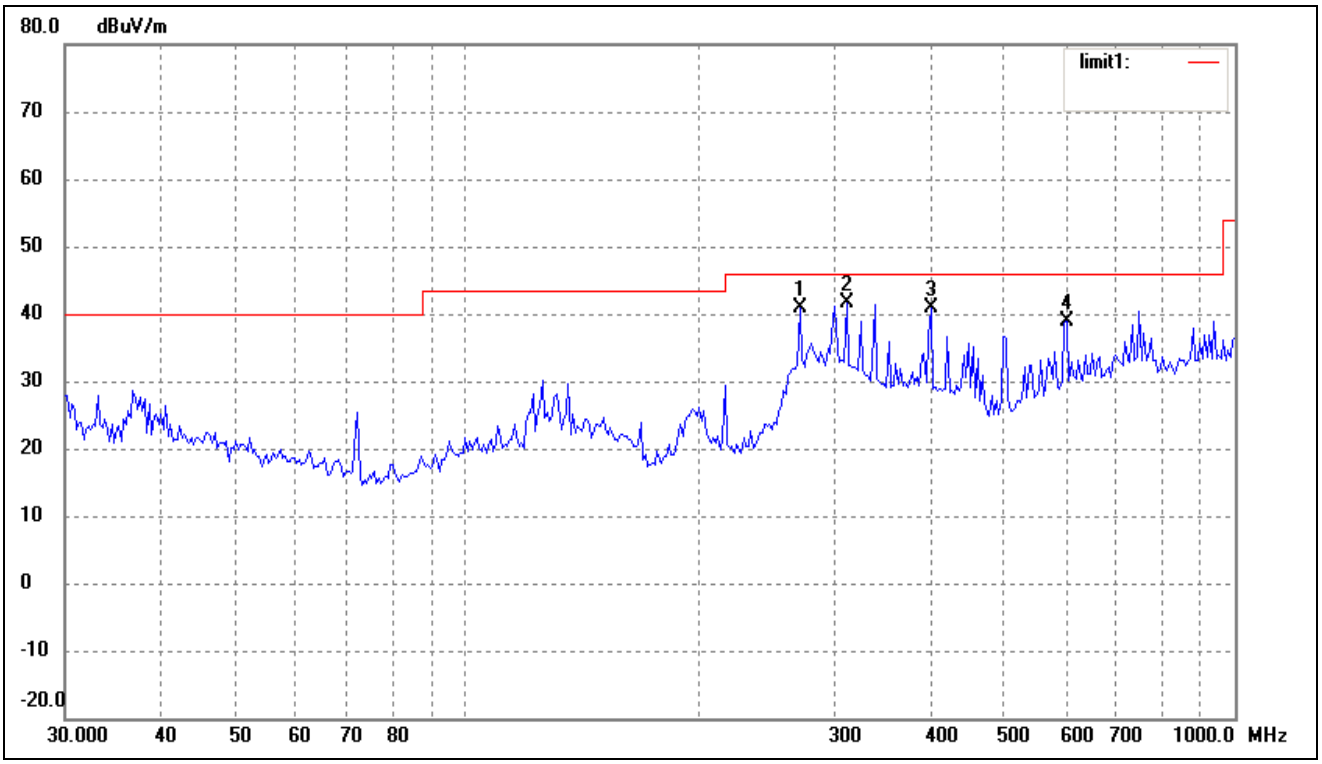
Test Mode: RFID Transmitting (13.56MHz)

Horizontal:



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	149.4857	30.05	3.55	33.60	43.50	-9.90	264	100	peak
2	301.4224	28.66	10.20	38.86	46.00	-7.14	180	100	peak
3	339.5888	29.08	10.10	39.18	46.00	-6.82	180	100	peak
4	599.3213	25.58	14.76	40.34	46.00	-5.66	360	100	peak
Fundamental	13.5600	77.73	-6.29	71.44	104.00	-32.56	270	100	peak
Spurious	27.1542	50.31	-3.65	46.66	50.00	-3.34	170	100	peak

Vertical:



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	271.3246	32.22	8.58	40.80	46.00	-5.20	360	100	peak
2	312.1794	31.15	10.36	41.51	46.00	-4.49	180	100	peak
3	401.8385	29.48	11.47	40.95	46.00	-5.05	116	100	peak
4	603.5392	24.30	14.62	38.92	46.00	-7.08	67	100	peak
Fundamental	13.5600	79.20	-6.29	72.91	104.00	-31.09	272	100	peak
Spurious	27.1542	48.22	-3.65	44.57	50.00	-5.43	120	100	peak

5. OUT OF BAND EMISSIONS

5.1 Standard Applicable

According to FCC 15.225 (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.

5.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2012-03-28	2013-03-27
EMI Test Receiver	R&S	ESVB	825471/005	2012-03-28	2013-03-27
Pre-amplifier	Agilent	8447F	3113A06717	2012-03-28	2013-03-27
Pre-amplifier	Compliance Direction	PAP-0118	24002	2012-03-28	2013-03-27
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2012-02-25	2013-02-24
Horn Antenna	ETS	3117	00086197	2012-02-25	2013-02-24
Loop Antenna	SCHWARZECK	HFRA 5165	9365	2012-02-25	2013-02-24

5.3 Test Procedure

As the radiation test, set the RBW=10kHz VBW=30kHz, observed the outside band of 13.11MHz to 14.01MHz, than mark the higher-level emission for comparing with the FCC rules.

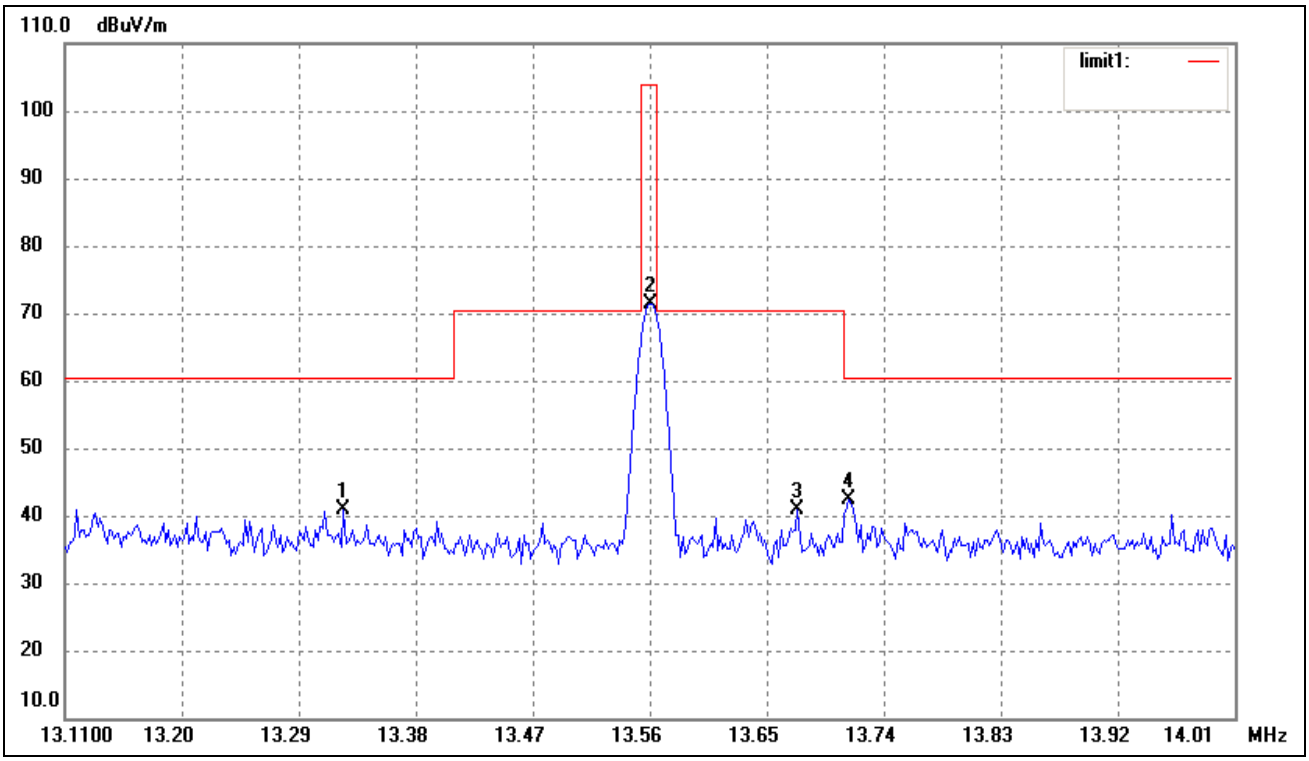
5.4 Environmental Conditions

Temperature:	26° C
Relative Humidity:	57%
ATM Pressure:	1022 mbar

5.5 Summary of Test Results/Plots

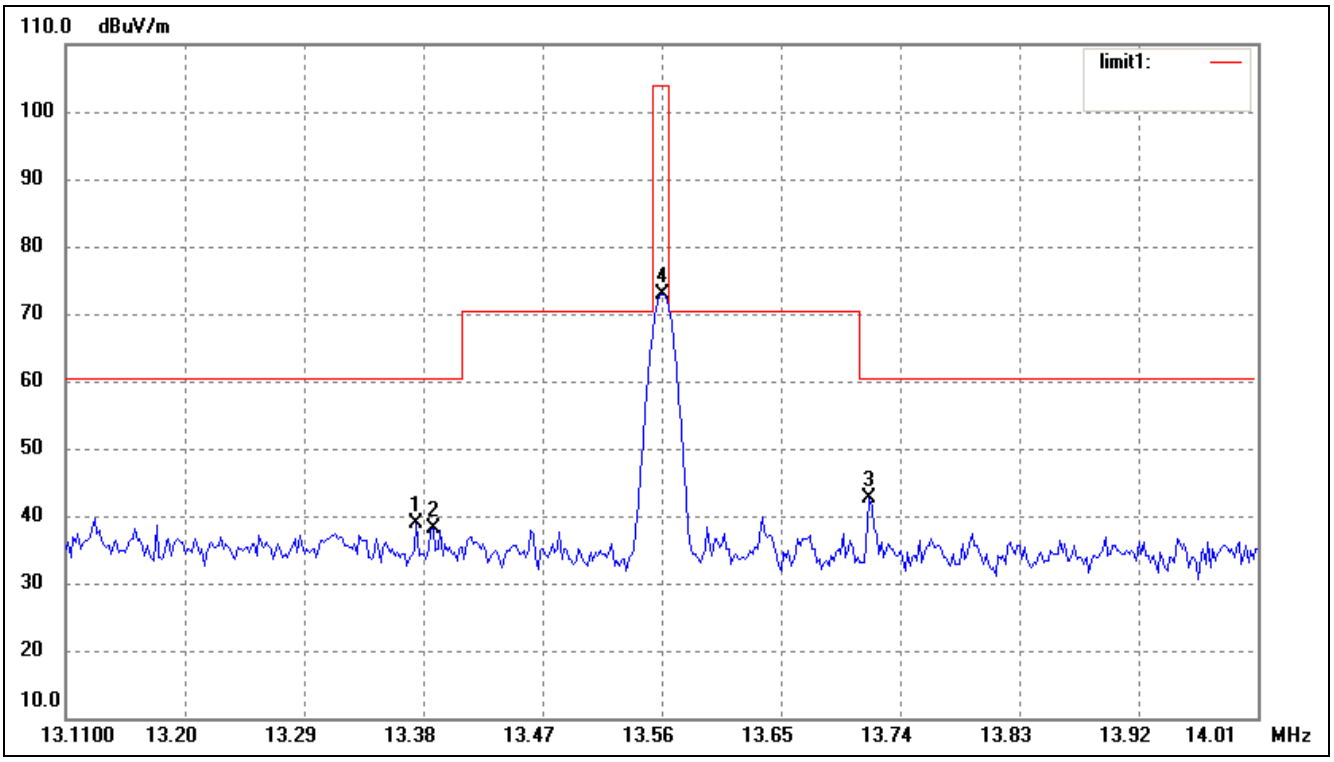
Out of band emission

Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	13.3242	47.18	-6.29	40.89	60.50	-19.61	270	100	peak
2	13.5600	77.73	-6.29	71.44	104.00	-32.56	270	100	peak
3	13.6734	47.10	-6.29	40.81	70.50	-29.69	270	100	peak
4	13.7130	48.78	-6.29	42.49	60.50	-18.01	270	100	peak

Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	13.3746	45.18	-6.29	38.89	60.50	-21.61	272	100	peak
2	13.3872	44.44	-6.29	38.15	60.50	-22.35	272	100	peak
3	13.7166	49.03	-6.29	42.74	60.50	-17.76	272	100	peak
4	13.5600	79.20	-6.29	72.91	104.00	-31.09	272	100	peak

6. Frequency Stability

6.1 Standard Applicable

According to 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.

6.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	Agilent	E4402B	US41192821	2012-03-28	2013-03-27
Attenuator	ATTEN	ATS100-4-20	/	2012-03-28	2013-03-27

6.3 Test Procedure

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure.

6.4 Environmental Conditions

Relative Humidity:	55%
ATM Pressure:	1015 mbar

6.5 Summary of Test Results/Plots

Reference Frequency: 13.56MHz, Limit: 100ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Error	
		Error (Hz)	Error (ppm)
50	7.4	167	12.32
40	7.4	140	10.32
30	7.4	125	9.22
20	7.4	102	7.52
10	7.4	90	6.64
0	7.4	76	5.60
-10	7.4	50	3.69
-20	7.4	24	1.77

Reference Frequency: 13.56MHz, Limit: 100ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Error	
		Error (Hz)	Error (ppm)
20	7.0	105	7.74
	7.4	102	7.52
	7.9	101	7.45

******* END OF REPORT *******