FCC Part 15.225
Measurement and Test Report

For

SHENZHEN KINGZONE COMMUNICATION TECHNOLOGY CO., LTD

RM2308, Block A, Electronics Science & Technology Building, NO.2070

Shennan Zhonglu, Shenzhen, China

FCC ID: 2AC57-K1

Test Rule(s):	FCC Part 15.225
Product Description:	KINGZONE K1
Tested Model:	K1
Report No.:	STR14088276I-5
Tested Date:	2014-08-26 to 2014-09-11
Issued Date:	2014-09-13
Tested By:	Silin Chen / 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:	SHENZHEN KINGZONE COMMUNICATION TECHNOLOGY CO., LTD
Address of applicant:	RM2308, Block A, Electronics Science & Technology Building, NO.2070 Shennan Zhonglu, Shenzhen, China
Manufacturer:	SHENZHEN KINGZONE COMMUNICATION TECHNOLOGY CO., LTD LONGHUA BRANCH
Address of manufacturer:	RM2308, Block A, Electronics Science & Technology Building, NO.2070 Shennan Zhonglu, Shenzhen, China

General Description of EUT	
Product Name:	KINGZONE K1
Brand Name:	KINGZONE, LEO
Model No.:	K1
Adding Model:	LFON3
Hardware Version:	E19_MAIN_PCBV1.0
Software Version:	0502L010_20140516
IMEI:	863811020013575/863811020013575
Rated Voltage:	DC 3.7V Battery
Battery:	K1 / 2500mAh
Adapter Model:	TC-G100
Device Category:	Portable Device
The EUT is GSM850/PCS1900, WCDMA Band II/ Band V smartphone. the smartphone is intended for speech and Multimedia Message Service (MMS) transmission. It is equipped with GPRS/EDGE class 12 for GSM850 and PCS1900 and Bluetooth, Wi-Fi, and camera functions. For more information see the following datasheet	
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 K1 without circuit and electronic construction changed, declared by the manufacturer.	

NFC	
Frequency:	13.56MHz
Radiated H-Field:	26.95dBuV/m
Type of Modulation:	ASK
No. of Channel	1
Type of Antenna:	Integral Loop Antenna
Receiver Class:	Class 3

1.2 Test Standards

The following report is prepared on behalf of the SHENZHEN KINGZONE COMMUNICATION TECHNOLOGY CO., LTD in accordance with Part 2, Subpart J, and FCC Part 15 Subpart C section 15.225, 15.207 and 15.209 of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15, Subpart C, and section 15.225, 15.207, and 15.209 rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, 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.

1.4 Test Facility

FCC – Registration No.: 934118

Shenzhen SEM.Test Technology 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 934118.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Shenzhen SEM.Test Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

CNAS Registration No.: L4062

Shenzhen SEM.Test Technology 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 1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road, Bao'an District, Shenzhen, P.R.C (518101).

1.5 EUT Setup and Operation Mode

The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted according to the operation manual for use, more detailed description as follows:

Test Mode List:

Test Mode	Description	Remark
TM1	Transmitting	/
TM2	/	/

Test Conditions					
	Normal	LTLV	LTHV	HTLV	HTHV
Temperature (℃)	20	-20	-20	50	50
Voltage (V)	3.7	3.3	4.2	3.3	4.2

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

Special Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
USB Cable	0.8	Unshielded	Without Core

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
Notebook Computer	Lenovo	20007	EB12648265

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§ 15.225&15.209	Radiated Spurious Emissions	Compliant
§ 15.225	Frequency Tolerance	Compliant
§ 2.1049 & § 15.215(c)	Bandwidth	Compliant
§ 15.207	Conducted Emissions	Compliant

N/A: not applicable

3. §15.203 - ANTENNA REQUIREMENT

3.1 Standard Applicable

According to FCC 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

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

4.2 Standard Applicable

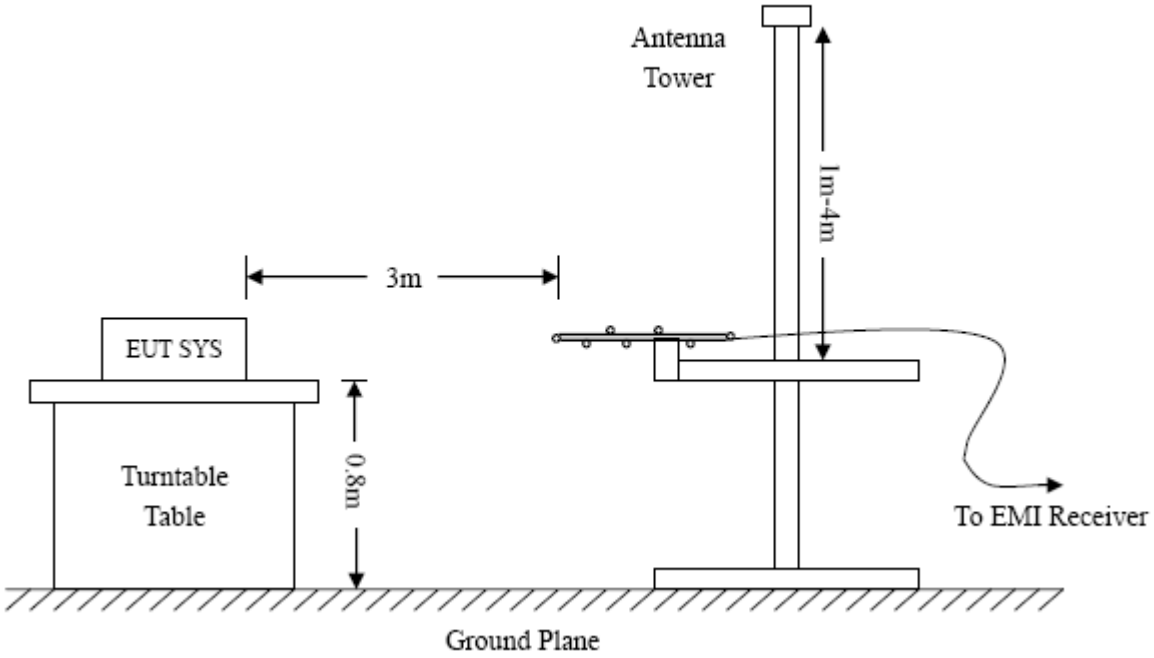
(a) The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.
(b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.
(c) Within the bands 13.110-13.410 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.

4.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2014-05-07	2015-05-06
EMI Test Receiver	R&S	ESVB	825471/005	2014-05-07	2015-05-06
Pre-amplifier	Agilent	8447F	3113A06717	2014-05-07	2015-05-06
Pre-amplifier	Compliance Direction	PAP-0118	24002	2014-05-07	2015-05-06
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2014-04-20	2015-04-19
Horn Antenna	ETS	3117	00086197	2014-04-20	2015-04-19
Loop Antenna	SCHWARZECK	HFRA 5165	9365	2014-04-20	2015-04-19

4.3 Test Procedure

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



4.4 Test Receiver Setup

Frequency :9kHz-30MHz	Frequency :30MHz-1GHz	Frequency :Above 1GHz
RBW=10KHz,	RBW=120KHz,	RBW=1MHz,
VBW =30KHz	VBW=300KHz	VBW=3MHz(Peak), 10Hz(AV)
Sweep time= Auto	Sweep time= Auto	Sweep time= Auto
Trace = max hold	Trace = max hold	Trace = max hold
Detector function = peak	Detector function = peak, QP	Detector function = peak, AV

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 a Class C device. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – FCC Part 15.209(a) or 15.225 Limit

4.6 Environmental Conditions

Temperature:	23 °C
Relative Humidity:	55 %
ATM Pressure:	1011 mbar

4.7 Summary of Test Results/Plots

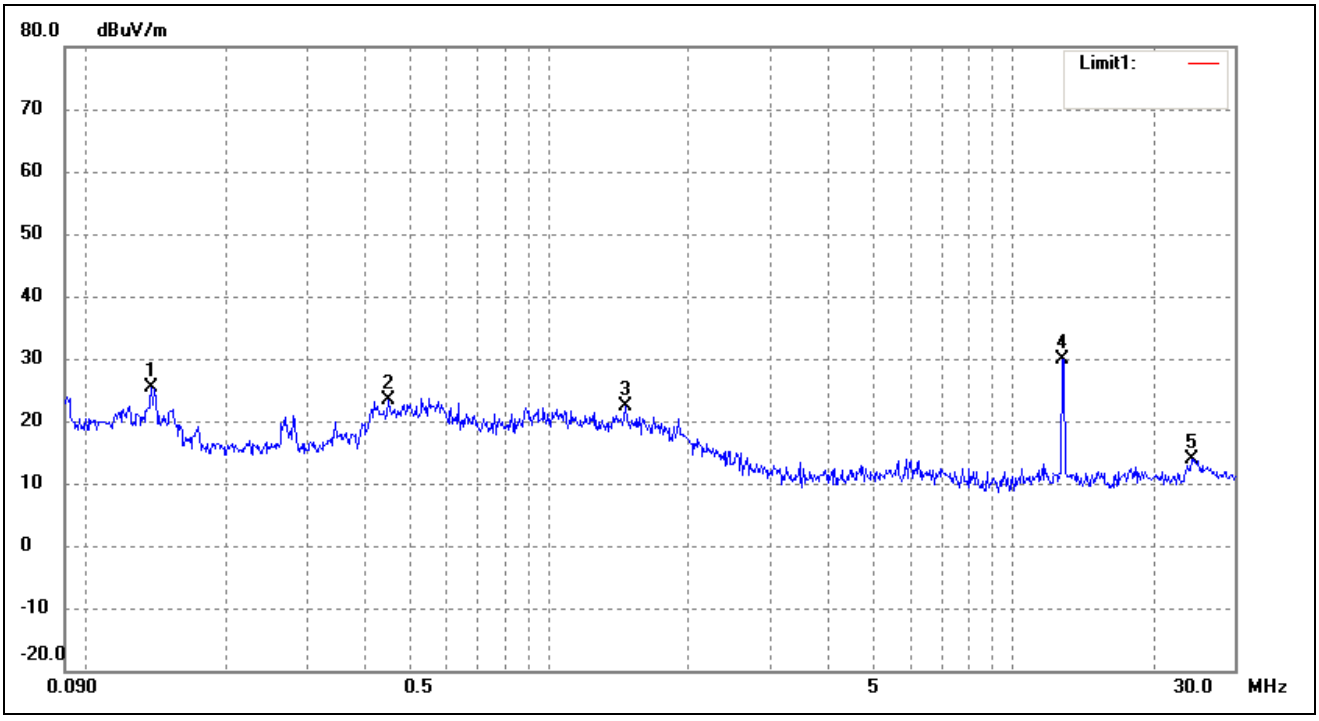
According to the data, the EUT complied with the FCC Part 15.209(a), 15.225 rule, and had the worst margin of:

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

Plot of Radiated Emissions Test Data (Below 30MHz)

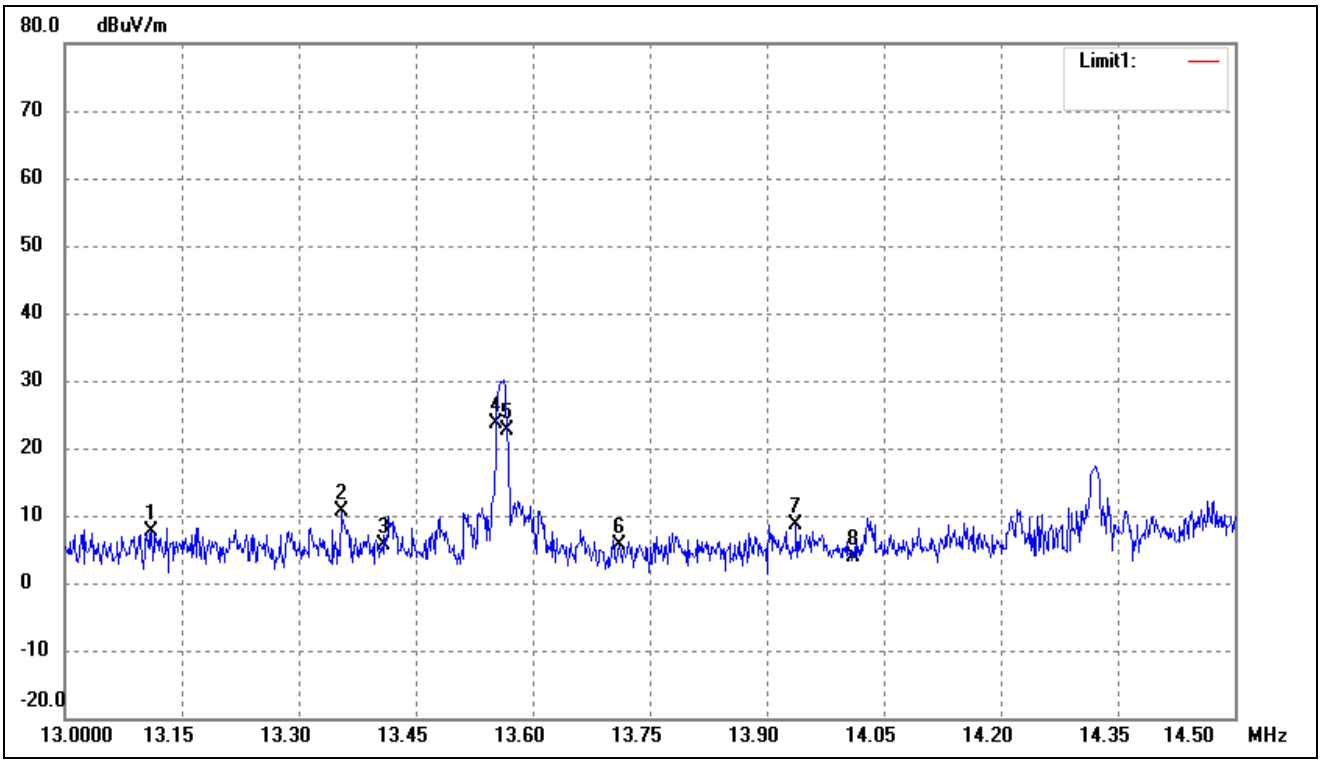
EUT: *KINGZONE K1*
Tested Model: *K1*
Operating Condition: *Transmitting*
Comment: *DC 3.7V*

Test Specification: *Horizontal*



No.	Frequency	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(°)	(cm)	
1	0.1383	25.35	64.79	-39.44	130	100	peak
2	0.4473	23.46	64.79	-41.33	130	100	peak
3	1.4545	22.26	44.35	-22.09	130	100	peak
4*	13.5600	29.91	124.00	-94.09	130	100	peak
5	24.1977	13.99	49.54	-35.55	130	100	peak

Mask



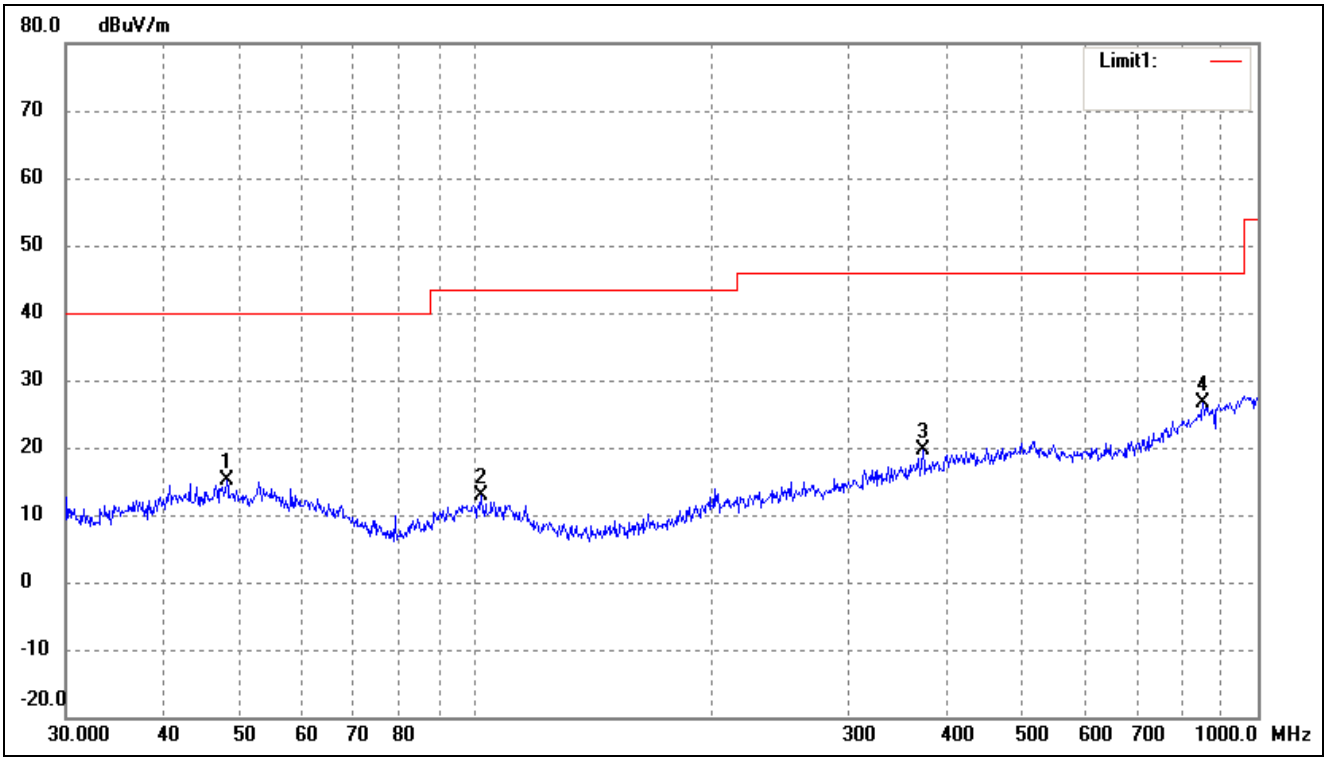
No.	Frequency	Reading	Result	Limit	Margin	Degree	Height	Detector
	(MHz)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	13.1100	7.62	7.62	60.50	-52.88	330	100	peak
2	13.3539	10.61	10.61	60.50	-49.89	330	100	peak
3	13.4100	5.70	5.70	70.47	-64.77	330	100	peak
4*	13.5530	23.72	23.72	104.00	-80.28	330	100	peak
5	13.5670	22.66	22.66	104.00	-81.34	330	100	peak
6	13.7100	5.52	5.52	70.47	-64.95	330	100	peak
7	13.9375	8.74	8.74	60.50	-51.76	330	100	peak
8	14.0100	4.00	4.00	60.50	-56.50	330	100	peak

Limit is converting to 3m

Plot of Radiated Emissions Test Data (Above 30MHz)

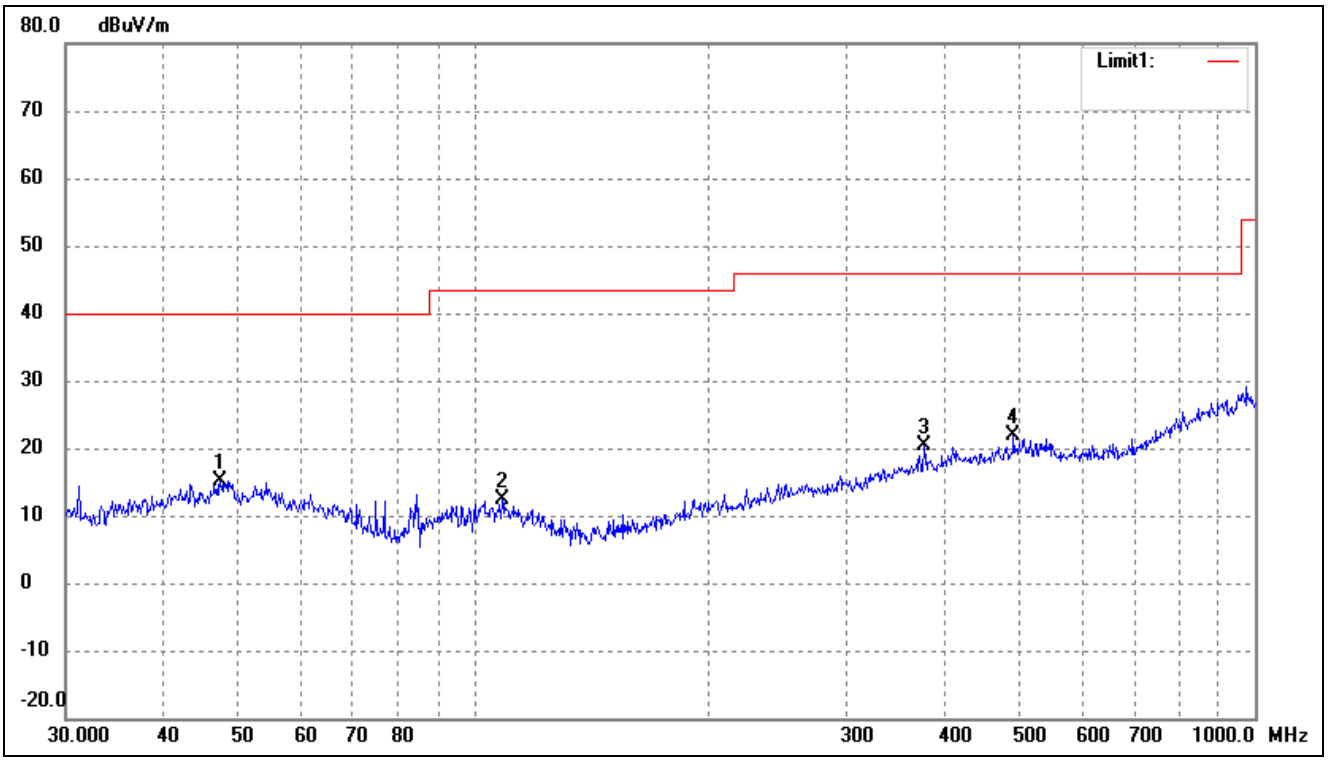
EUT: *KINGZONE K1*
Tested Model: *K1*
Operating Condition: *Transmitting*
Comment: *DC 3.7V*

Test Specification: *Horizontal*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	48.1626	22.60	-7.46	15.14	40.00	-24.86	14	100	peak
2	101.6443	22.32	-9.56	12.76	43.50	-30.74	14	100	peak
3	373.3112	23.32	-3.75	19.57	46.00	-26.43	14	100	peak
4*	851.0353	22.62	3.92	26.54	46.00	-19.46	14	100	peak

Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	47.3254	22.65	-7.45	15.20	40.00	-24.80	32	100	peak
2	108.6470	22.00	-9.60	12.40	43.50	-31.10	32	100	peak
3	377.2590	23.94	-3.66	20.28	46.00	-25.72	32	100	peak
4*	490.7447	23.13	-1.33	21.80	46.00	-24.20	32	100	peak

5. Frequency Tolerance

5.1 Standard Applicable

According to FCC Part 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.

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	Agilent	E4402B	US41192821	2014-05-28	2015-05-27
Attenuator	ATTEN	ATS100-4-20	/	2014-05-28	2015-05-27

5.3 Test Procedure

According to the DA 00-705, the test method as follows.

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
Set span = the frequency band of operation
RBW = 3kHz, VBW = 100kHz
Sweep = auto
Detector function = peak
Trace = max hold

5.4 Environmental Conditions

Temperature:	24 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

5.5 Summary of Test Results/Plots

Design Frequency: 13.56000MHz

Environment Temperature (°C)	Power Supplied (VDC)	Frequency (MHz)	Frequency Tolerance (MHz)	Tolerance (%)	Limit (% of the operating frequency)
50	3.7	13.56050	0.00050	0.00369	±0.01%
40	3.7	13.56063	0.00063	0.00465	±0.01%
30	3.7	13.56080	0.00080	0.00590	±0.01%
20	3.7	13.56032	0.00032	0.00236	±0.01%
10	3.7	13.56033	0.00033	0.00243	±0.01%
0	3.7	13.55985	-0.00015	-0.00111	±0.01%
-10	3.7	13.55979	-0.00021	-0.00155	±0.01%
-20	3.7	13.55976	-0.00024	-0.00177	±0.01%

Environment Temperature (°C)	Power Supplied (VDC)	Frequency (MHz)	Frequency Tolerance (MHz)	Tolerance (%)	Limit (%)
20	3.3	13.56047	0.00347	0.00047	±0.01%
	3.7	13.56032	0.00236	0.00032	±0.01%
	4.2	13.56037	0.00273	0.00037	±0.01%

6. Bandwidth

6.1 Standard Applicable

According to FCC Part 15.215 (c) (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 band designated in the rule section under which the equipment is operated.

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	Agilent	E4402B	US41192821	2014-05-28	2015-05-27
Attenuator	ATTEN	ATS100-4-20	/	2014-05-28	2015-05-27

6.3 Test Procedure

With the EUT's antenna attached, the EUT's 20dB Bandwidth power was received by the test antenna, which was connected to the spectrum analyzer with the START, and STOP frequencies set to the EUT's operation band.

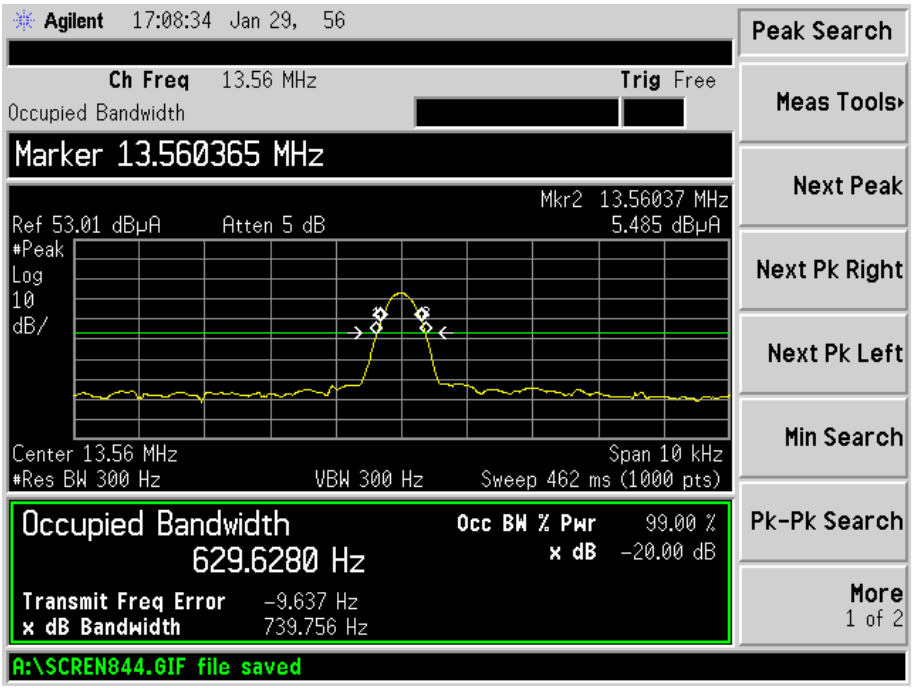
6.4 Environmental Conditions

Temperature:	21° C
Relative Humidity:	52%
ATM Pressure:	1011 mbar

6.5 Summary of Test Results/Plots

Test Frequency MHz	20dB Bandwidth Hz	99% Bandwidth Hz	Result
13.56	739.756	629.6280	Pass

20dB bandwidth fall in the 13.110-14.010MHz frequency range


Agilent 17:08:34 Jan 29, 56
Ch Freq 13.56 MHz
Trig Free
Occupied Bandwidth
Marker 13.560365 MHz
Mkr2 13.56037 MHz
Ref 53.01 dBµA
Atten 5 dB
5.485 dBµA
#Peak
Log
10
dB/
Center 13.56 MHz
Span 10 kHz
#Res BW 300 Hz
VBW 300 Hz
Sweep 462 ms (1000 pts)
Occupied Bandwidth
629.6280 Hz
Occ BW % Pwr 99.00 %
x dB -20.00 dB
Transmit Freq Error -9.637 Hz
x dB Bandwidth 739.756 Hz
A:\SCREN844.GIF file saved
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2

7. Conducted Emissions

7.1 Measurement Uncertainty

Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement is ± 2.88 dB.

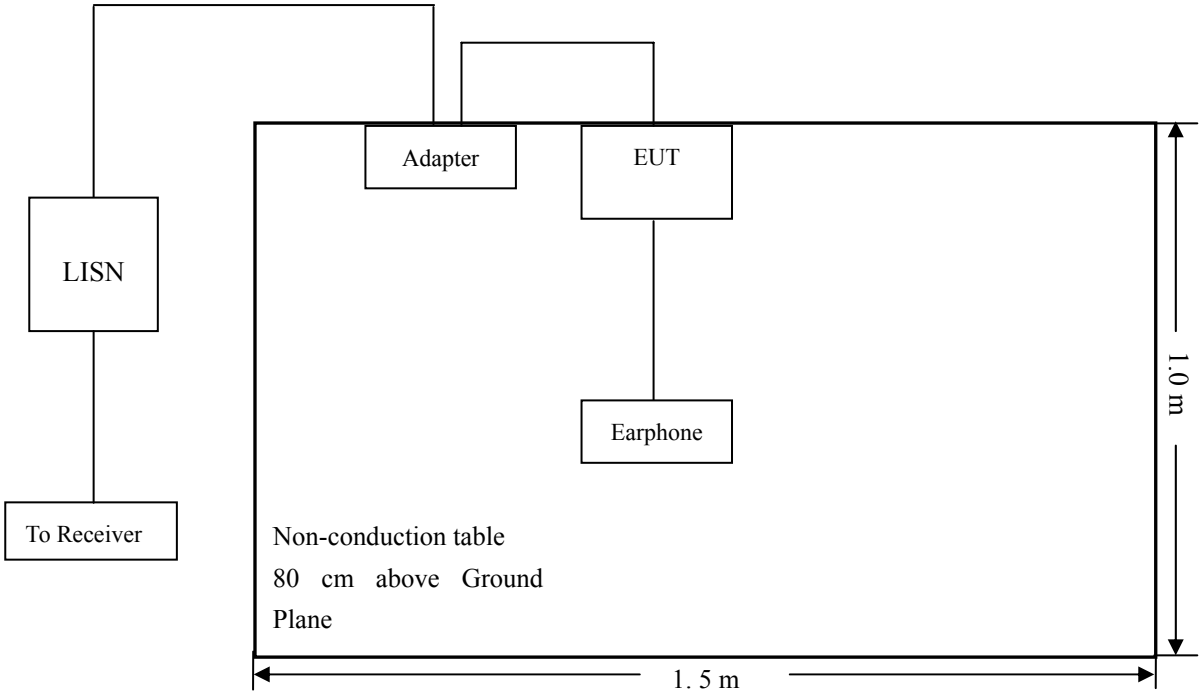
7.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2014-05-28	2015-05-27
L.I.S.N	Schwarz beck	NSLK8126	8126-224	2014-05-28	2015-05-27
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2014-05-28	2015-05-27

7.3 Test Procedure

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.207 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.
Note: Base on the calibrated result, for the impedance characteristic and insertion loss, the effect shall be ignored from the placed multiple outlet power strip between the device and LISN.

7.4 Basic Test Setup Block Diagram



7.5 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	52%
ATM Pressure:	1012 mbar

7.6 Test Receiver Setup

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

Start Frequency ..... 150 kHz
Stop Frequency..... 30 MHz
Sweep Speed ..... Auto
IF Bandwidth..... 10 kHz
Quasi-Peak Adapter Bandwidth ..... 9 kHz
Quasi-Peak Adapter Mode ..... Normal

7.7 Summary of Test Results/Plots

According to the data in section 12.8, the EUT complied with the FCC Part 15.207 Conducted margin for a Class B device, with the *worst* margin reading of:

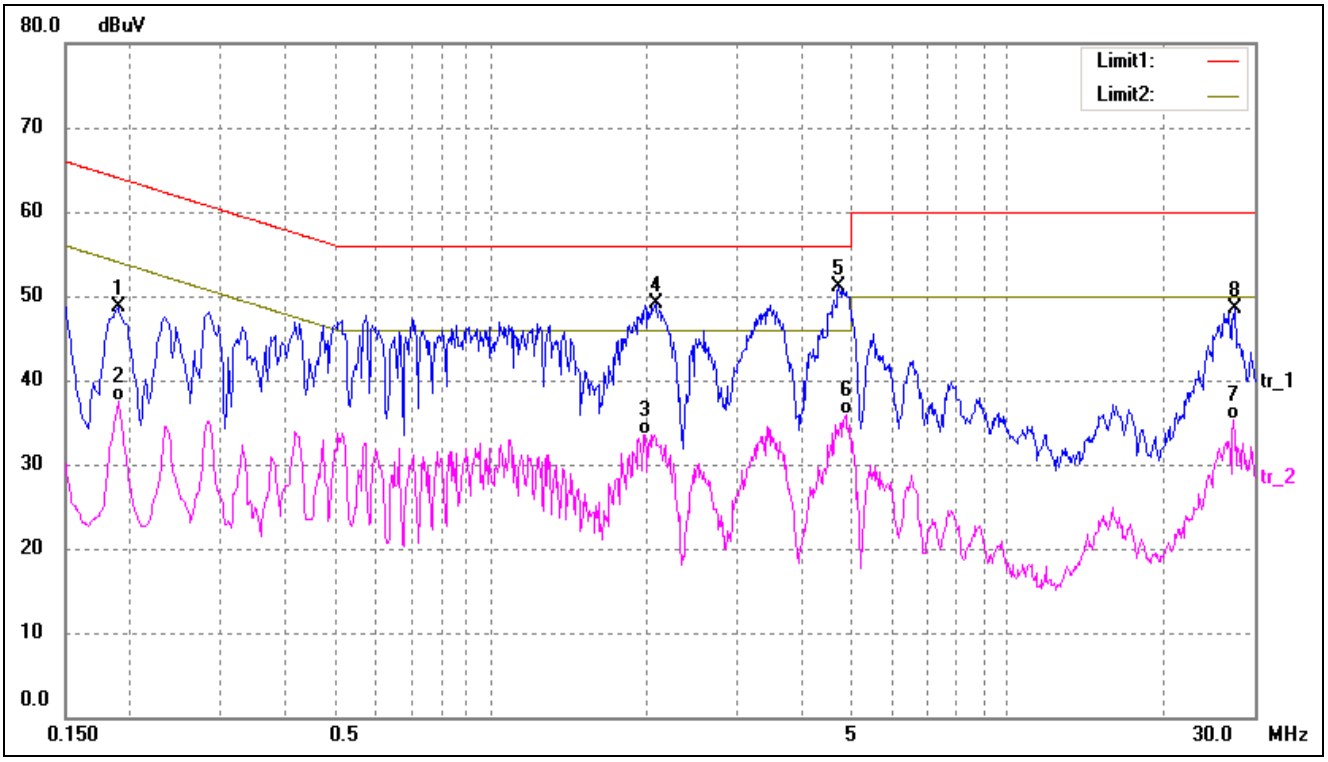
-4.96 dB at 4.7060 MHz in the **Lin, Peak** detector, 0.15-30MHz

7.8 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

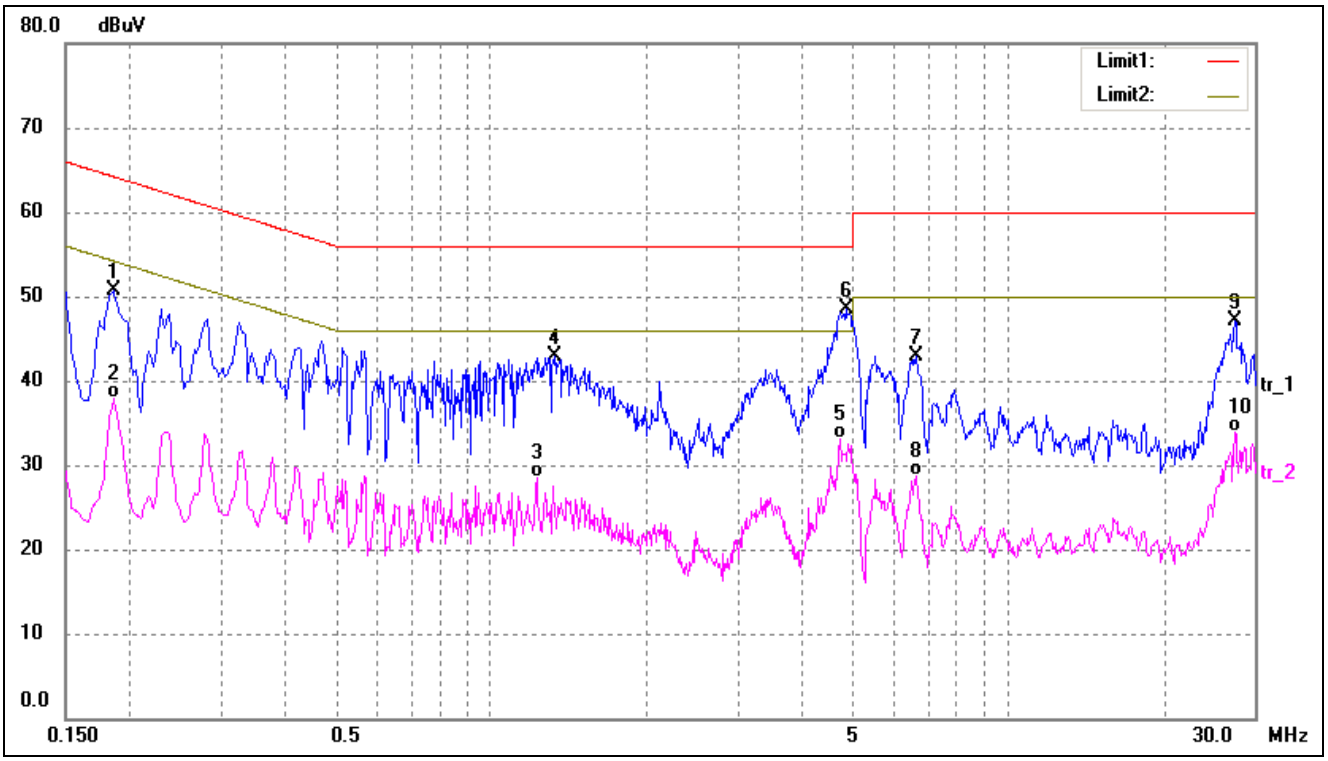
EUT: *KINGZONE K1*
Tested Model: *K1*
Operating Condition: *AC 120V/60Hz; Adapter DC 5V/2A*
Comment: *NFC Transmitting*

Test Specification: *Neutral*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV)	(dBuV)	(dB)	
1	0.1900	39.23	9.50	48.73	64.04	-15.31	peak
2	0.1900	28.07	9.50	37.57	54.04	-16.47	AVG
3	1.9860	23.56	10.00	33.56	46.00	-12.44	AVG
4	2.0780	39.01	10.00	49.01	56.00	-6.99	peak
5*	4.7060	41.04	10.00	51.04	56.00	-4.96	peak
6	4.8620	25.87	10.00	35.87	46.00	-10.13	AVG
7	27.3740	22.35	13.00	35.35	50.00	-14.65	AVG
8	27.4380	35.49	13.00	48.49	60.00	-11.51	peak

Test Specification: *Line*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV)	(dBuV)	(dB)	
1	0.1860	41.27	9.50	50.77	64.21	-13.44	peak
2	0.1860	28.44	9.50	37.94	54.21	-16.27	AVG
3	1.2260	18.46	10.00	28.46	46.00	-17.54	AVG
4	1.3300	32.90	10.00	42.90	56.00	-13.10	peak
5	4.7460	23.01	10.00	33.01	46.00	-12.99	AVG
6*	4.8540	38.45	10.00	48.45	56.00	-7.55	peak
7	6.6420	32.99	10.00	42.99	60.00	-17.01	peak
8	6.6420	18.72	10.00	28.72	50.00	-21.28	AVG
9	27.4780	34.08	13.00	47.08	60.00	-12.92	peak
10	27.4780	20.99	13.00	33.99	50.00	-16.01	AVG

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