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Report No.: SHEM141200324402
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1 Cover Page

RF Test Report

Application No.:	SHEM1412003244RF
Applicant:	Hangzhou Hikvision Digital Technology Co., Ltd.
FCC ID:	2ADTD-DSKIR
Equipment Under Test (EUT):	
NOTE: The following sample(s) was/were submitted and identified by the client as	
Product Name:	Card Reader
Model No.(EUT):	DS-K1101CK
Add Model No.:	DS-K1101MK, DS-K1101M, DS-K1102MK, DS-K1102M, DS-K1103MK, DS-K1103M, DS-K1104MK, DS-K1104M, DS-K1101C, DS-K1102C, DS-K1102CK, DS-K1103C, DS-K1103CM, DS-K1104C, DS-K1104CK, DS-K11ABCDVWXY
Standards:	FCC PART 15 Subpart C: 2014
Date of Receipt:	December 17, 2014
Date of Test:	February 10, 2015 to March 30, 2015
Date of Issue:	April 08, 2015
Test Result:	Pass*

*In the configuration tested, the EUT detailed in this report complied with the standards specified above.



Parlam Zhan
E&E Section Manager
SGS-CSTC (Shanghai) Co., Ltd.

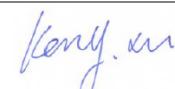
The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

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2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
00	/	April 08, 2015	/	Original

Authorized for issue by:			
Engineer		Eddy Zong	
Clerk		Susie Liu	
Reviewer		Keny Xu	

3 Test**Summary**

Test Item	Test Requirement	Test Method	Result
Antenna Requirement	47 CFR Part 15, Subpart C Section 15.203	/	PASS
AC Power Line Conducted Emission	47 CFR Part 15, Subpart C Section 15.207	ANSI C63.10:2009 Section 6.2	PASS
Emission Mask	47 CFR Part 15, Subpart C Section 15.225(a)/(b)/(c)	ANSI C63.10 (2009) Section 6.4&6.5&6.6	PASS*
Radiated Emissions	47 CFR Part 15, Subpart C Section 15.225(d)/15.209	ANSI C63.10 (2009) Section 6.4&6.5&6.6	PASS
Frequency tolerance	47 CFR Part 15, Subpart C Section 15.225(e)	ANSI C63.10:2009 Section 6.8	PASS
20dB Bandwidth	47 CFR Part 15, Subpart C Section 15.215	ANSI C63.10:2009 Section 6.9.1	PASS

Remark: * The test level of the fundamental signal is below the limit of general spurious emission, so the test no performs.

Note: 1. There are 17 models mentioned in this report, and they are the similar in electrical and electronic characters. Only the model DS-K1101MK was tested since their differences were the software version, their naming, color silk, and appearance. Model No. DS-K1101CK, DS-K1101C, DS-K1102C, DS-K1102CK, DS-K1103C, DS-K1103CK, DS-K1104C, DS-K1104CK with PSAM card slot; Model No. DS-K1101MK, DS-K1102MK, DS-K1103MK, DS-K1104MK, DS-K1101CK, DS-K1102CK, DS-K1103CK, DS-K1104CK with a keypad.

2. Note: The device has two types of connection, RS485 Communication mode and Wiegand Communication mode. They are difference in connection and cable. Pretest two modes on all test items and record the worst data of FR14B in the report.

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5 General Information

5.1 Client Information

Applicant: Hangzhou Hikvision Digital Technology Co., Ltd.
Address of Applicant: 700 Dongliu Road, Binjiang, Hangzhou, 310052 Zhejiang, China
Manufacturer: Hangzhou Hikvision Digital Technology Co., Ltd.
Address of Manufacturer: 700 Dongliu Road, Binjiang, Hangzhou, 310052 Zhejiang, China
Factory: Hangzhou Hikvision Digital Technology Co., Ltd.
Address of Factory: 700 Dongliu Road, Binjiang, Hangzhou, 310052 Zhejiang, China

5.2 General Description of E.U.T.

Product Description: Equipment for fixed use

5.3 Technical Specifications

Power Supply: DC 12V via controller
AC 120V for controller
Operation Frequency: 13.56MHz
Modulation Type: ASK
Antenna Type: Integral

5.4 E.U.T Operation Mode

Test Mode	Description of Test Mode
Engineering mode:	Keep EUT working in continuous transmitting and receiving, and select channel and modulation type.

5.5 Description of Support Units

The EUT has been tested with associated equipment below.

Description	Manufacturer	Model No.	Supplied by
Megcard	Hikvision	/	Client

Cables connect between Reader and Controller:

Type	Length, m	Shield	Metallic hood	Supplied by
RS-485	1.0	No	No	Client
Wiegand	1.2	No	No	SGS

5.6 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. E&E Lab

No.588 West Jindu Road, Songjiang District, Shanghai, China. 201612.

Tel: +86 21 6191 5666

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No tests were sub-contracted.

5.7 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L0599)**

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing. Date of expiry: 2017-07-14.

- **FCC – Registration No.: 402683**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered and fully described in a report filed with the Federal Communications Commission (FCC). The acceptance letter from the FCC is maintained in our files. Registration No.: 402683, Expiry Date: 2017-09-16.

- **Industry Canada (IC) – IC Assigned Code: 8617A**

The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 8617A-1. Expiry Date: 2017-06-18.

- **VCCI (Member No.: 3061)**

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-3868, C-4336, T-2221, G-830 respectively. Date of Expiry: 2017-11-16.

6 Equipments List

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due date
1	EMI test receiver	Rohde & Schwarz	ESCS30	100086	2015-01-22	2016-01-21
2	Line impedance stabilization network	SCHWARZBECK	NSLK8127	8127490	2015-01-22	2016-01-21
3	Line impedance stabilization network	ETS	3816/2	00034161	2015-01-22	2016-01-21
4	Spectrum Analyzer	Rohde & Schwarz	FSP-30	2705121009	2015-01-22	2016-01-21
5	EMI test receiver	Rohde & Schwarz	ESU40	100109	2015-02-13	2016-02-12
6	Active Loop Antenna (9kHz to 30MHz)	Schwarzbeck - Mess-Elektronik	FMZB 1519	1519-034	2015-02-07	2016-02-06
7	Broadband UHF-VHF ANTENNA (25MHz to 2GHz)	SCHWARZBECK	VULB9168	9168-313	2015-02-07	2016-02-06
8	Ultra broadband antenna (25MHz to 3GHz)	Rohde & Schwarz	HL562	100227	2014-08-30	2015-08-29
9	Horn Antenna (1GHz to 18GHz)	Rohde & Schwarz	HF906	100284	2015-02-07	2016-02-06
10	Horn Antenna (1GHz to 18GHz)	SCHWARZBECK	BBHA9120D	9120D-679	2015-02-07	2016-02-06
11	Horn Antenna (14GHz to 40GHz)	SCHWARZBECK	BBHA 9170	BBHA9170373	2015-02-13	2016-02-12
12	Pre-amplifier (9KHz – 2GHz)	LNA6900	TESEQ	71033	2014-12-27	2015-12-27
13	Pre-amplifier (1GHz – 26.5GHz)	Rohde & Schwarz	SCU-F0118-G40-BZ4-CSS(F)	10001	2015-01-22	2016-01-21
14	Pre-amplifier (14GHz – 40GHz)	Rohde & Schwarz	SCU-F1840-G35-BZ3-CSS(F)	10001	2015-01-22	2016-01-21
15	Tunable Notch Filter	Wainwright instruments GmbH	WRCT800.0/880.0-0.2/40-5SSK	9170397	/	/
16	High pass Filter	FSCW	HP 12/2800-5AA2	19A45-02	/	/
17	High-low temperature cabinet	Suzhou Zhihe	TL-40	50110050	2014-09-11	2015-09-10
18	AC power stabilizer	WOCEN	6100	51122	2015-01-02	2016-01-01
19	DC power	QJE	QJ30003SII	611145	2015-01-02	2016-01-01
20	Signal Generator (Interferer)	Agilent	SMR40	100555	2014-08-10	2015-08-09
21	Signal Generator (Blocker)	Rohde & Schwarz	SMJ100A	02.20.360.142	2015-01-22	2016-01-21
22	Splitter	Anritsu	MA1612A	M12265	/	/
23	Coupler	e-meca	803-S-1	900-M01	/	/

7 Test results and Measurement Data

7.1 Antenna Requirement

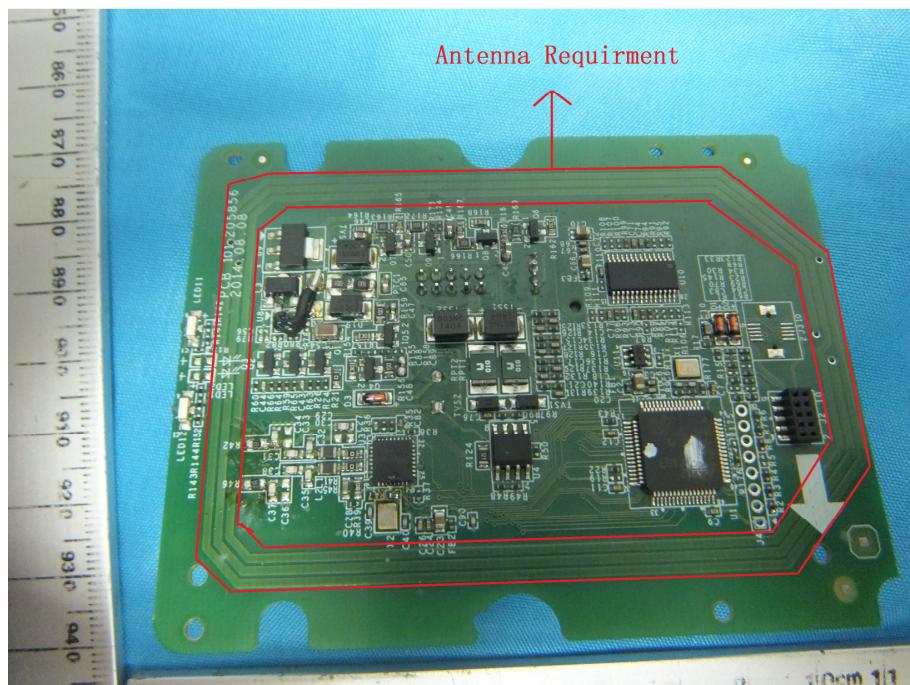
Standard requirement: 47 CFR Part 15C Section 15.203

15.203 Requirement: 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, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement.

Antenna Configuration:



7.2 Conducted Emissions

Frequency Range: 150 KHz to 30 MHz

Class/Severity: Class B

Limit:

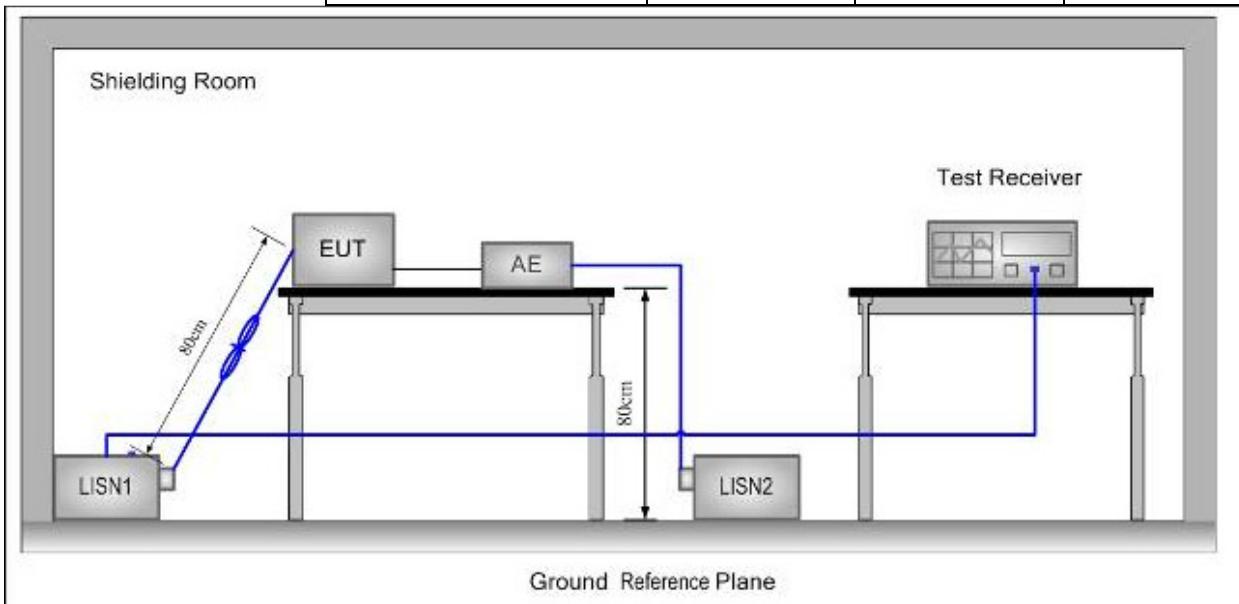
Frequency range MHz	Class B Limits: dB (μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Note1: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50MHz.
Note2: The lower limit is applicable at the transition frequency.

Test site/setup:

Test instrumentation set-up:

Frequency Range	Detector	RBW	VBW
9KHz to 150Hz	Quasi-peak	200Hz	500Hz
150KHz to 30MHz	Quasi-peak	9kHz	30kHz



Test Procedure:

1. The mains terminal disturbance voltage was measured with the EUT in a shielded room.
2. The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides $50\Omega/50\mu\text{H} + 5\Omega$ linear impedance. The power cables of all other units of the EUT were connected to a second LISN, which was bonded to the ground reference plane in the same way as the LISN for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded
3. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference

plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.

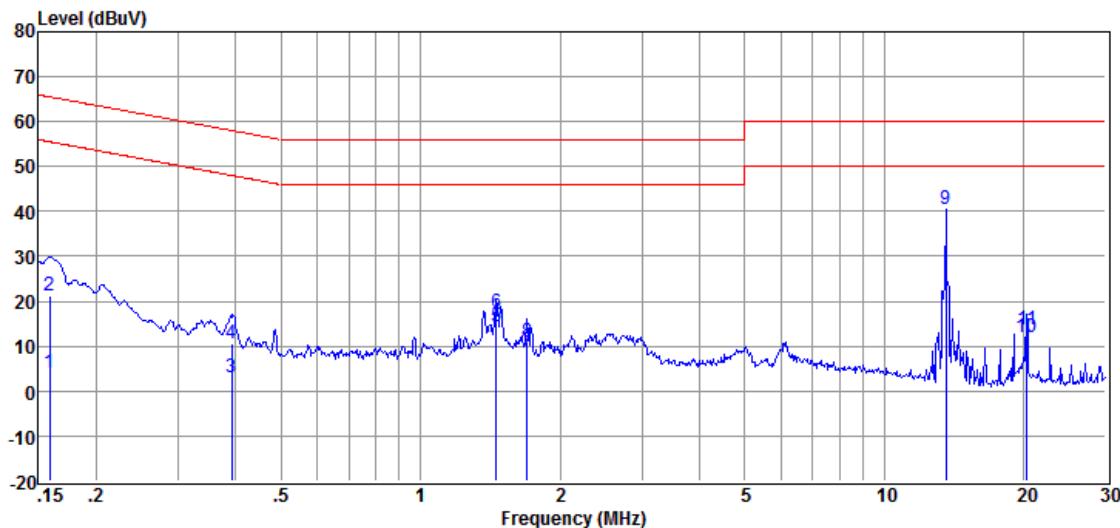
4. The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance was between the closest points of the LISN and the EUT. The mains lead of EUT excess 0.8m was folded back and forth parallel to the lead so as to form a horizontal bundle with a length between 0.3m and 0.4m. All other units of the EUT and associated equipment were at least 0.8 m from the LISN.

Remark: Pre-scan was performed with peak detected on all ports, Quasi-peak & average measurements were performed at the frequencies at which maximum peak emission level were detected. Pretest under all modes; choose the worst case mode (GFSK and Hopping enabled mode) record on the report. Please see the attached Quasi-peak and Average test results.

Test Result: Pass

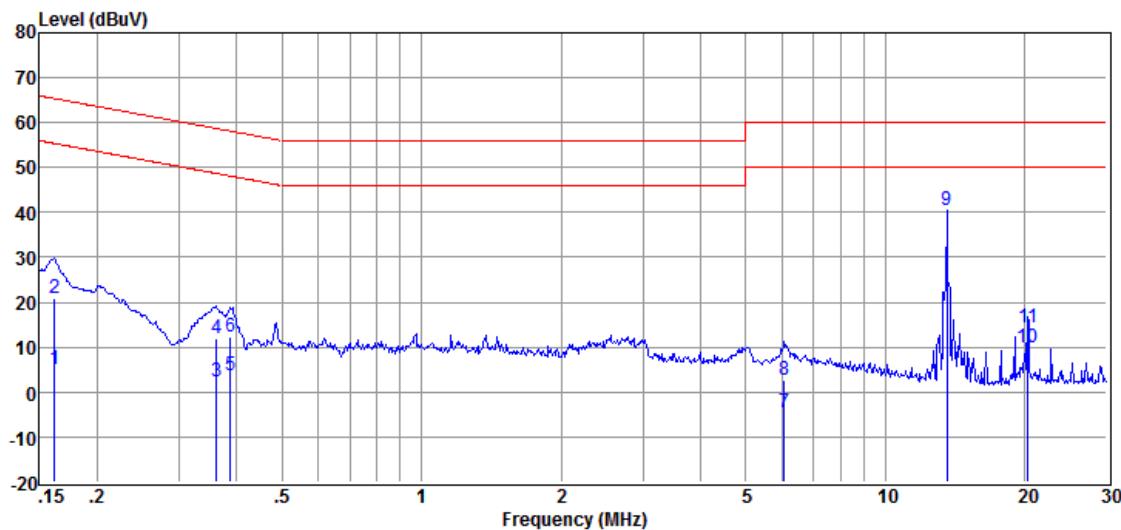
Test data:

Live Line:



Item	Freq.	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dB μ V)	(dB)	(dB)	(dB μ V)	(dB μ V)	(dB)	
1	0.159	3.76	0.32	0.10	4.18	55.52	-51.34	Average
2	0.159	20.83	0.32	0.10	21.25	65.52	-44.27	QP
3	0.391	2.85	0.25	0.10	3.20	48.03	-44.83	Average
4	0.391	10.18	0.25	0.10	10.53	58.03	-47.50	QP
5	1.456	14.14	0.27	0.10	14.51	46.00	-31.49	Average
6	1.456	17.10	0.27	0.10	17.47	56.00	-38.53	QP
7	1.698	8.28	0.32	0.10	8.70	46.00	-37.30	Average
8	1.698	10.55	0.32	0.10	10.97	56.00	-45.03	QP
9	13.551	40.09	0.34	0.10	40.53	60.00	-19.47	Peak
10	20.270	11.30	0.42	0.20	11.92	50.00	-38.08	Average
11	20.270	13.00	0.42	0.20	13.62	60.00	-46.38	QP

Neutral Line:



Item	Freq.	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dB μ V)	(dB)	(dB)	(dB μ V)	(dB μ V)	(dB)	
1	0.162	4.55	0.33	0.10	4.98	55.38	-50.40	Average
2	0.162	20.45	0.33	0.10	20.88	65.38	-44.50	QP
3	0.361	2.05	0.30	0.10	2.45	48.69	-46.24	Average
4	0.361	11.44	0.30	0.10	11.84	58.69	-46.85	QP
5	0.387	3.30	0.30	0.10	3.70	48.12	-44.42	Average
6	0.387	12.05	0.30	0.10	12.45	58.12	-45.67	QP
7	6.056	-5.12	0.44	0.20	-4.48	50.00	-54.48	Average
8	6.056	2.14	0.44	0.20	2.78	60.00	-57.22	QP
9	13.551	39.95	0.37	0.10	40.42	60.00	-19.58	Peak
10	20.270	9.28	0.45	0.20	9.93	50.00	-40.07	Average
11	20.270	13.74	0.45	0.20	14.39	60.00	-45.61	QP

Notes:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.

7.3 Radiated Emissions

Test frequency range: 9KHz – 1GHz

Test Site:

Measurement Distance: 3m (Semi-Anechoic Chamber)

Receiver Setup:

Frequency (MHz)	RBW	VBW	Detector
0.009-0.015	200Hz	1KHz	Quasi-peak
0.015-30	9kHz	30KHz	Quasi-peak
30-1000	120 kHz	300KHz	Quasi-peak

Note: 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.

Limit:

Frequency (MHz)	Field strength (μ V/m)	Measurement distance (m)	Limit @3m ($\text{dB}\mu$ V/m)
0.009-0.490	2400/F(kHz)	300	128.5 ~ 93.8
0.490-1.705	24000/F(kHz)	30	73.8 ~ 63.0
1.705-30	30	30	69.5
30-88	100	3	40.0
88-216	150	3	43.5
216-960	200	3	46.0
960-1000	500	3	54.0

NOTE:

(1) 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).

So the Distance Extrapolation Factor in dB is $40 * \log(D_{\text{TEST}} / D_{\text{SPEC}})$ where D_{TEST} = Test Distance and D_{SPEC} = Specified Distance.

Field strength limit ($\text{dB}\mu$ V/m)@test distance= Field strength limit ($\text{dB}\mu$ V/m)@specified distance -Distance Extrapolation Factor

(2) The lower limit shall apply at the transition frequencies.

Test Procedure:

- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360

degrees to find the maximum reading.

- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- g. The radiation measurements are performed in X, Y, Z axis positioning. And found the Z axis positioning which it is worse case, only the test worst case mode is recorded in the report.

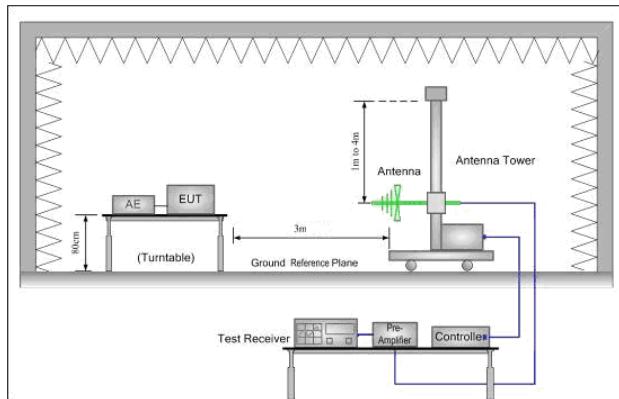
Test Setup:

Figure 1. Below 30MHz

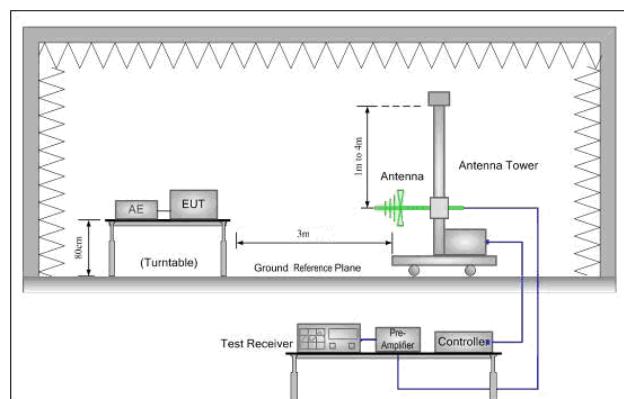
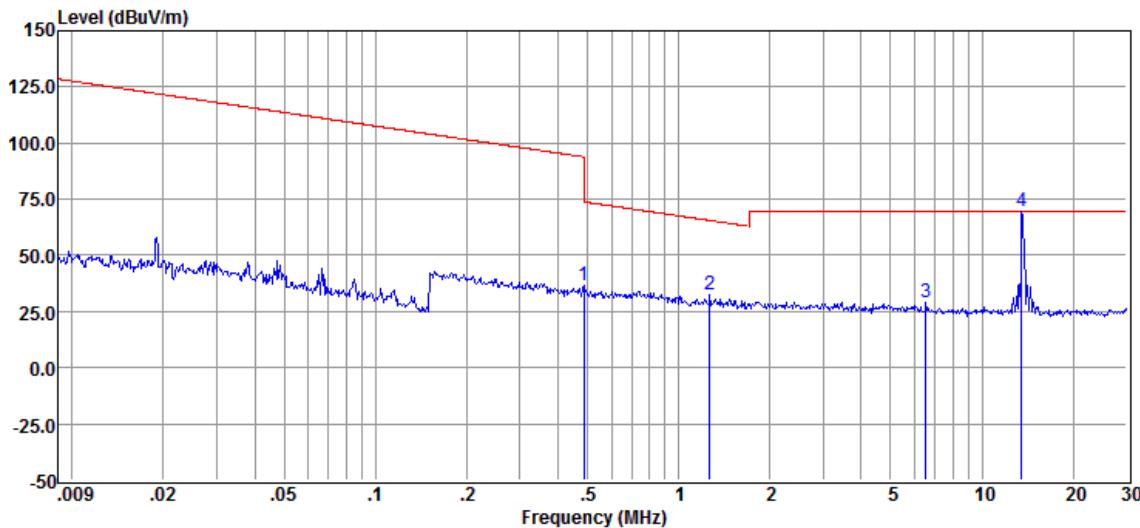
Test Results: Pass

Figure 2. 30MHz to 1GHz

Measurement Data

9kHz - 30MHz:

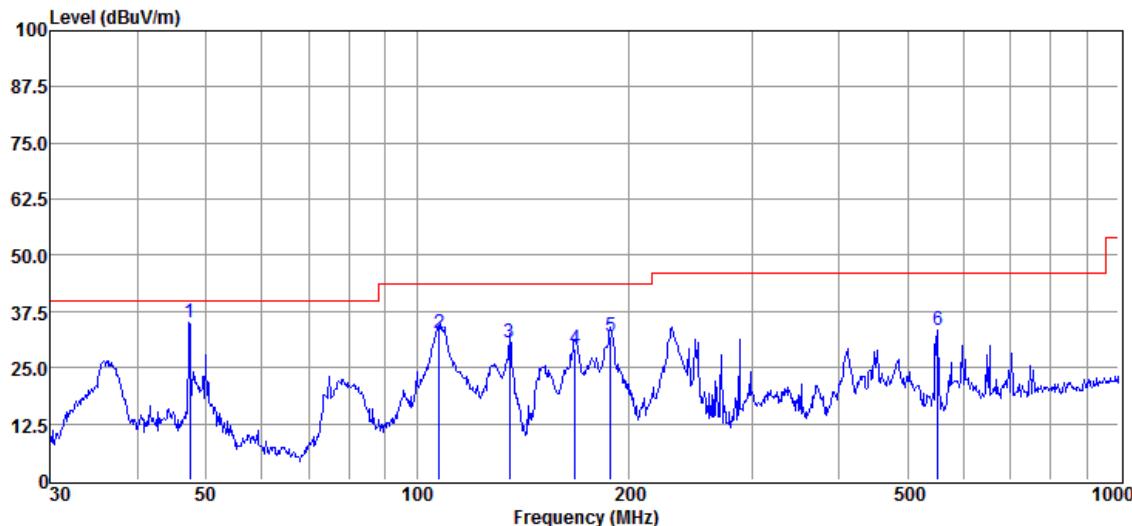
Z:



Item	Freq.	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Result Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dB μ V)	(dB/m)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	0.487	40.58	-31.66	23.77	-0.11	36.54	93.85	-57.31	QP
2	1.268	36.85	-31.57	23.83	-0.16	32.79	65.56	-32.77	QP
3	6.529	32.87	-31.52	23.78	0.07	29.14	69.50	-40.36	QP
4	13.548	73.09	-31.70	23.76	0.16	69.29	69.50	-0.21	Peak

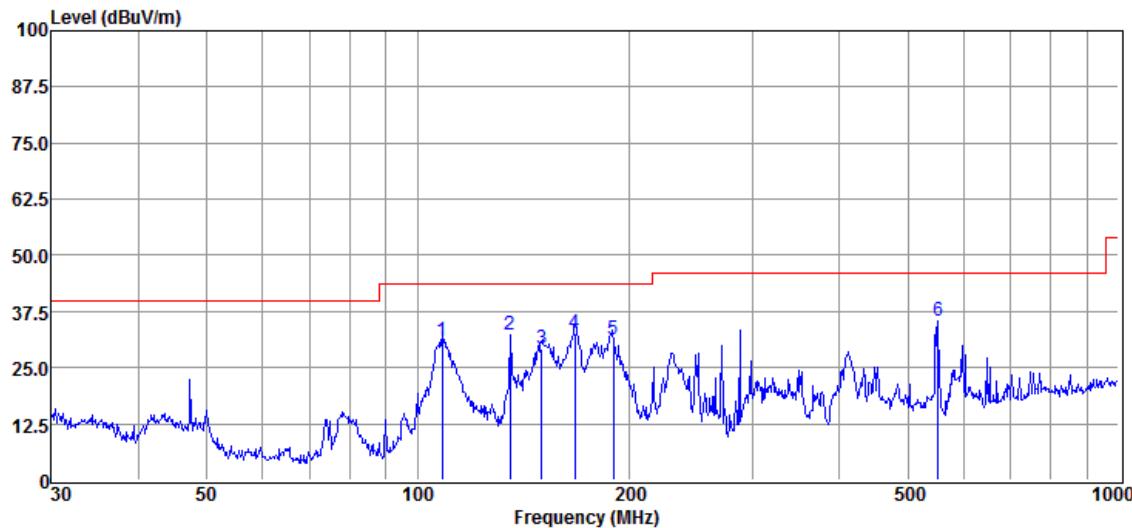
30MHz-1GHz:

Vertical



Item	Freq.	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Result Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dB μ V)	(dB/m)	(dB)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
1	47.384	64.69	12.91	42.80	0.37	35.17	40.00	-4.83	QP
2	107.578	64.29	10.20	42.80	0.96	32.65	43.50	-10.85	QP
3	135.435	60.97	11.43	42.80	1.10	30.70	43.50	-12.80	QP
4	168.142	58.53	12.22	42.80	1.27	29.22	43.50	-14.28	QP
5	188.660	61.93	11.51	42.80	1.36	32.00	43.50	-11.50	QP
6	552.566	56.10	17.38	42.80	2.59	33.27	46.00	-12.73	QP

Horizontal



Item	Freq.	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Result Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dB μ V)	(dB/m)	(dB)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
1	108.334	62.46	10.32	42.80	0.96	30.94	43.50	-12.56	QP
2	135.438	62.53	11.43	42.80	1.10	32.26	43.50	-11.24	QP
3	150.383	58.70	12.30	42.80	1.17	29.37	43.50	-14.13	QP
4	167.561	61.93	12.22	42.80	1.27	32.62	43.50	-10.88	QP
5	189.986	61.27	11.45	42.80	1.37	31.29	43.50	-12.21	QP
6	552.581	58.11	17.38	42.80	2.59	35.28	46.00	-10.72	QP

Remark:

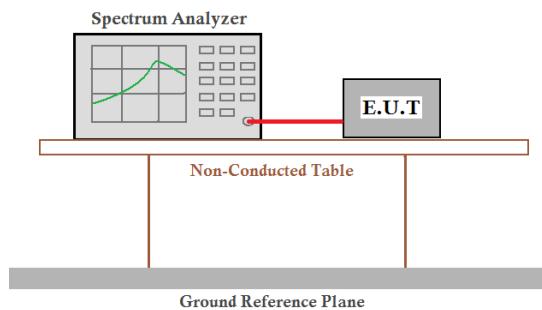
- 1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
- 2) Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

7.4 Frequency tolerance

Requirements: 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: The EUT was placed in an environmental test chamber and powered such that control element received normal voltage and the transmitter provided maximum RF output.

Test setup:



Frequency Range: Operation within the band 13.110-14.010 MHz

Test Result: Pass

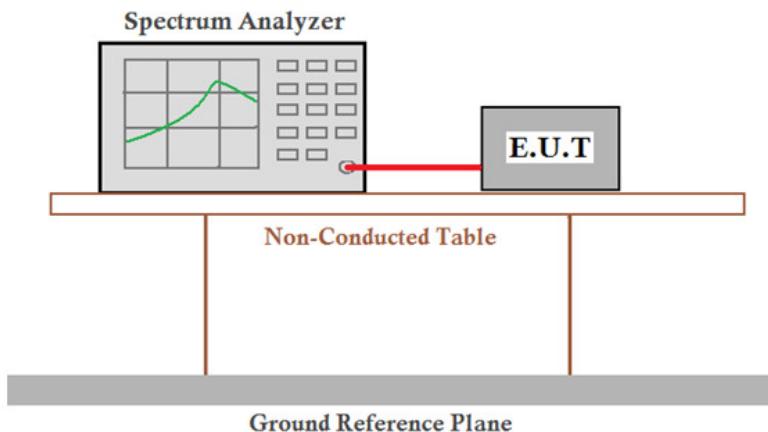
Test Data:

Nominal Operation Frequency: 13.56MHz

Test Conditions		Test Result (MHz)	Deviation (kHz)	Limit (kHz)	Result
Temp (°C)	Volt (V DC)				
T _{nom} (25)	V _{nom} (12)	13.56065	0.65	±0.01% (1.3560kHz)	Pass
T _{max} (50)	V _{min} (10.8)	13.56060	0.60		Pass
	V _{max} (13.2)	13.56068	0.68		Pass
T _{min} (-20)	V _{min} (10.8)	13.56064	0.64		Pass
	V _{max} (13.2)	13.56058	0.58		Pass

Note: Deviation (kHz) = (Test Result-13.56MHz)*1000

7.5 20dB Bandwidth

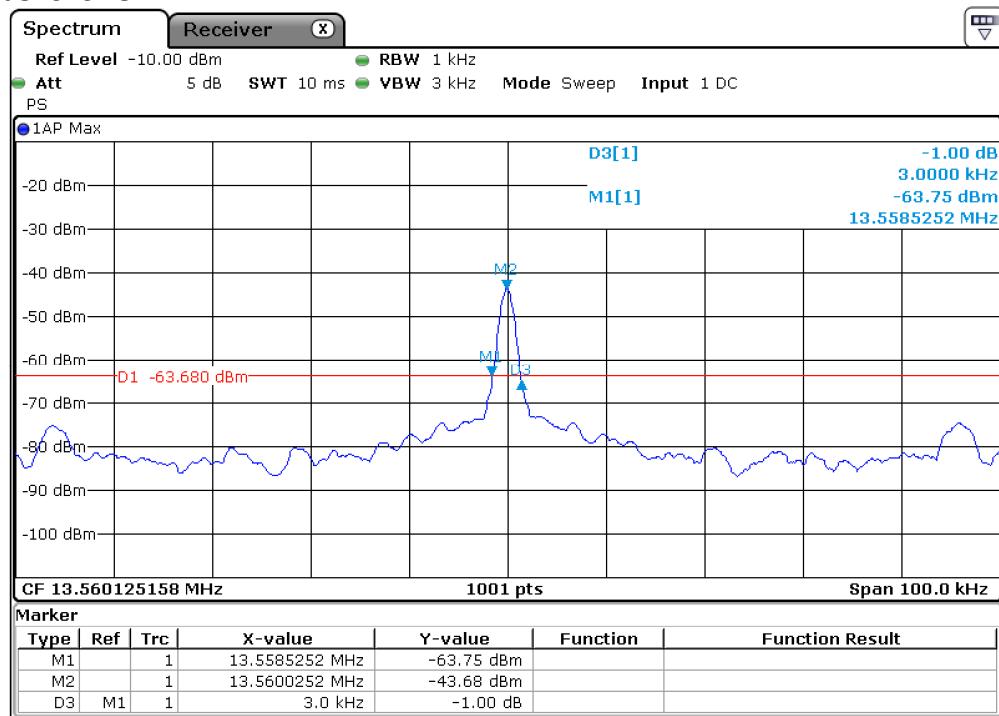
Test Setup:

Frequency Range: Operation within the band 13.110 – 14.010 MHz

Requirements: 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 is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the 20 dB bandwidth of the emission within the specified frequency band includes the effects from frequency 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 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-of-band operation.

Test Data:

20dB bandwidth (kHz)	F _L (MHz)	F _H (MHz)	Limit(MHz)	Result
3	13.5585	13.5600	13.110 – 14.010	Pass

Test plot as follows:

8 Test Setup Photographs

Refer to the < DS-K1101MK _ Test Setup Photos-FCC >

9 EUT Constructional Details

Refer to the < DS-K1101MK _ External Photos-FCC> & < DS-K1101MK _ Internal Photos-FCC>.

--End of the Report--