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Report No.: SHEMA180300163202

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1 Cover Page

RF Test Report

Application No.:	SHEMA1803001632CR
Applicant:	Hangzhou Hikvision Digital Technology Co., Ltd
FCC ID:	2ADTD-K1T605EF
Equipment Under Test (EUT):	
NOTE: The following sample(s) was/were submitted and identified by the client as	
EUT Name:	Face Recognition Terminal
Model No.:	DS-K1T605EF, DS-K1T605E, DS-K1T605EF-B, DS-K1T605E-B, DS-K1T605XYZ-UVW, DS-K1T605XYZF-UVW <input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
Standards:	47 CFR Part 15, Subpart C 15.225
Date of Receipt:	2018-03-05
Date of Test:	2018-03-22
Date of Issue:	2018-03-27
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

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. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

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Revision Record			
Version	Description	Date	Remark
00	Original	2018-03-27	/

Authorized for issue by:			
		Vincent Zhu _____ Vincent Zhu /Project Engineer	
		Parlam zhan _____ Parlam Zhan /Reviewer	



2 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 (2013) Section 6.2	PASS
Radiated Emissions	47 CFR Part 15, Subpart C Section 15.209	ANSI C63.10 (2013) Section 6.4	PASS
20dB Bandwidth	47 CFR Part 15, Subpart C Section 15.215	ANSI C63.10 (2013) Section 6.8	PASS

Declaration of EUT Family Grouping:

There are series models mentioned in this report and they are the similar in electrical and electronic characters. Only the model DS-K1T605EF was tested since their differences are model number and appearance.

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4 General Information

4.1 Client Information

Applicant:	Hangzhou Hikvision Digital Technology Co., Ltd.
Address of Applicant:	No. 555 Qianmo Road, Binjiang District, Hangzhou 310052, China
Manufacturer:	Hangzhou Hikvision Digital Technology Co., Ltd.
Address of Manufacturer:	No. 555 Qianmo Road, Binjiang District, Hangzhou 310052, China
Factory:	1. Hangzhou Hikvision Technology Co., Ltd. 2. Hangzhou Hikvision Electronics Co., Ltd.
Address of Factory:	1. No.700, Dongliu Road, Binjiang District, Hangzhou City,Zhejiang, 310052, China 2. No.299, Qiushi Road,Tonglu Economic Development Zone,Tonglu County, Hangzhou,Zhejiang,310052,China.

4.2 General Description of E.U.T.

Product Description:	Fixed product with 125KHz RFID
Power supply:	DC 12V 2A by adapter Adapter: Model:ADS-24S-12 1224GPG INPUT:100-240V~50/60Hz max 0.7A OUTPUT:12V 2A
Test voltage:	AC 120V
Cable:	DC Cable 120cm

4.3 Technical Specifications

Operation Frequency:	125KHz
Modulation Type:	ASK
Antenna Type:	Integral Loop Antenna

4.4 Support Units / Associated Equipments

Description	Manufacturer	Model No.	Serial No.
Laptop	Lenovo	ThinkPad X100e	/
SecureCRT	VanDyke	V 6.2.0	/
Serial port adapter plate	/	Test Plate 3	/

4.5 E.U.T Operation Mode

Test Mode	Description of Test Mode
Engineering Mode	Keep EUT working in continuous transmitting mode.



4.6 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. E&E Lab
588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China

Tel: +86 21 6191 5666 Fax: +86 21 6191 5678

No tests were sub-contracted.

4.7 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.

- **NVLAP (Certificate No. 201034-0)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. is accredited by the National Voluntary Laboratory Accreditation Program(NVLAP). Certificate No. 201034-0.

- **FCC –Designation Number: CN5033**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been recognized as an accredited testing laboratory.

Designation Number: CN5033. Test Firm Registration Number: 479755.

- **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.

- **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-12221,G-10830 respectively.

4.8 Measurement Uncertainty

No.	Parameter	Measurement Uncertainty
1	Radio Frequency	< $\pm 1 \times 10^{-5}$
2	Total RF power, conducted	< ± 1.5 dB
3	RF power density, conducted	< ± 3 dB
4	Spurious emissions, conducted	< ± 3 dB
5	All emissions, radiated	< ± 6 dB (Below 1GHz) < ± 6 dB (Above 1GHz)
6	Temperature	< ± 1 °C
7	Humidity	< ± 5 %
8	DC and low frequency voltages	< ± 3 %



5 Equipments List

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Conducted Emission at AC Power Line					
EMI test receiver	R&S	ESR7	SHEM162-1	2017-12-20	2018-12-19
LISN	Schwarzbeck	NSLK8127	SHEM061-1	2017-12-20	2018-12-19
LISN	EMCO	3816/2	SHEM019-1	2017-12-20	2018-12-19
Pulse limiter	R&S	ESH3-Z2	SHEM029-1	2017-12-20	2018-12-19
CE test Cable	/	CE01	/	2017-12-26	2018-12-25
Conducted Test					
Spectrum Analyzer	R&S	FSP-30	SHEM002-1	2017-12-20	2018-12-19
Spectrum Analyzer	Agilent	N9020A	SHEM181-1	2017-09-26	2018-09-25
Power meter	R&S	NRP	SHEM057-1	2017-12-26	2018-12-25
Power Sensor	R&S	NRP-Z22	SHEM136-1	2017-07-22	2018-07-21
Power Sensor	R&S	NRP-Z91	SHEM057-2	2017-12-26	2018-12-25
Signal Generator	R&S	SMR40	SHEM058-1	2017-07-03	2018-07-02
Signal Generator	Agilent	N5182A	SHEM182-1	2017-09-26	2018-09-25
Communication Tester	R&S	CMW270	SHEM183-1	2017-10-22	2018-10-21
Switcher	Tonscend	JS0806	SHEM184-1	2017-09-26	2018-09-25
Splitter	Anritsu	MA1612A	SHEM185-1	/	/
Coupler	e-meca	803-S-1	SHEM186-1	/	/
High-low Temp Cabinet	Suzhou Zhihe	TL-40	SHEM087-1	2017-09-26	2018-09-25
AC Power Stabilizer	WOCEN	6100	SHEM045-1	2017-12-26	2018-12-25
DC Power Supply	QJE	QJ30003SII	SHEM046-1	2017-12-26	2018-12-25
Conducted test Cable	/	RF01, RF 02	/	2017-12-26	2018-12-25
Radiated Test					
EMI test receiver	R&S	ESU40	SHEM051-1	2017-12-20	2018-12-19
Spectrum Analyzer	R&S	FSP-30	SHEM002-1	2017-12-20	2018-12-19
Loop Antenna (9kHz-30MHz)	Schwarzbeck	FMZB1519	SHEM135-1	2017-04-10	2020-04-09
Antenna (25MHz-2GHz)	Schwarzbeck	VULB9168	SHEM048-1	2017-02-28	2020-02-27
Antenna (25MHz-3GHz)	Schwarzbeck	HL562	SHEM010-1	2017-02-28	2020-02-27
Horn Antenna (1-8GHz)	Schwarzbeck	HF906	SHEM009-1	2017-10-24	2020-10-23
Horn Antenna (1-18GHz)	Schwarzbeck	BBHA9120D	SHEM050-1	2017-01-14	2020-01-13
Horn Antenna (14-40GHz)	Schwarzbeck	BBHA 9170	SHEM049-1	2017-12-03	2020-12-02
Pre-amplifier (9KHz-2GHz)	CLAVIIO	BDLNA-0001-412010	SHEM164-1	2017-08-22	2018-08-21
Pre-amplifier (1-18GHz)	CLAVIIO	BDLNA-0118-352810	SHEM050-2	2017-08-22	2018-08-21
High-amplifier (14-40GHz)	Schwarzbeck	10001	SHEM049-2	2017-12-20	2018-12-19
Band filter	LORCH	9BRX-875/X150-SR	SHEM156-1	/	/
Band filter	LORCH	13BRX-1950/X500-SR	SHEM083-2	/	/
Band filter	LORCH	5BRX-2400/X200-SR	SHEM155-1	/	/
Band filter	LORCH	5BRX-5500/X1000-SR	SHEM157-2	/	/
High pass Filter	Wainwright	WHK3.0/18G-100SS	SHEM157-1	/	/
High pass Filter	Wainwright	WHKS1700-3SS	SHEM157-3	/	/
Semi/Fully Anechoic	ST	11*6*6M	SHEM078-2	2017-07-22	2020-07-21
RE test Cable	/	RE01, RE02, RE06	/	2017-12-26	2018-12-25

6 Test results and Measurement Data

6.1 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 loop antenna and no consideration of replacement.

Antenna Configuration:



6.2 Conducted Emissions

Frequency Range: 150 KHz to 30 MHz

Class/Severity: Class B

Limit:

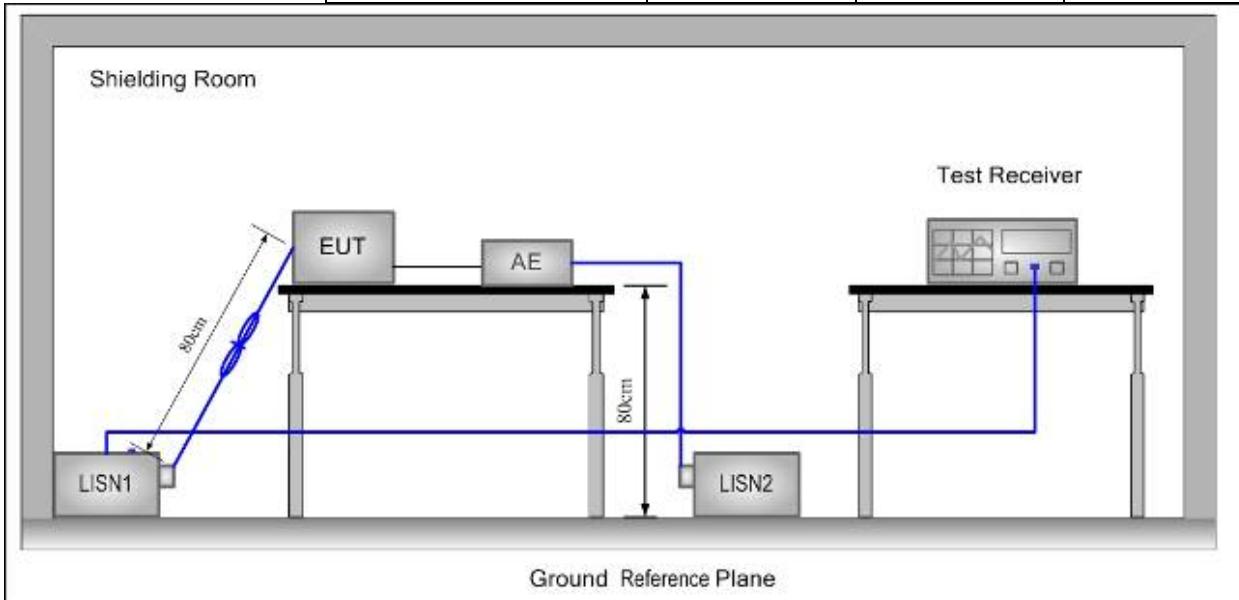
Frequency range MHz	Class B Limits: dB (μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

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.



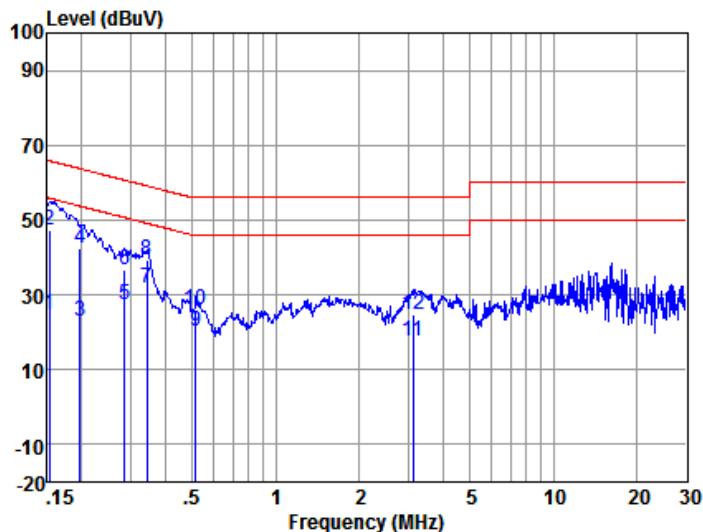
4. The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN was placed 0.8 m from the boundary of the unit under test and 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. Please see the attached Quasi-peak and Average test results.

Test Result: Pass

Test data:

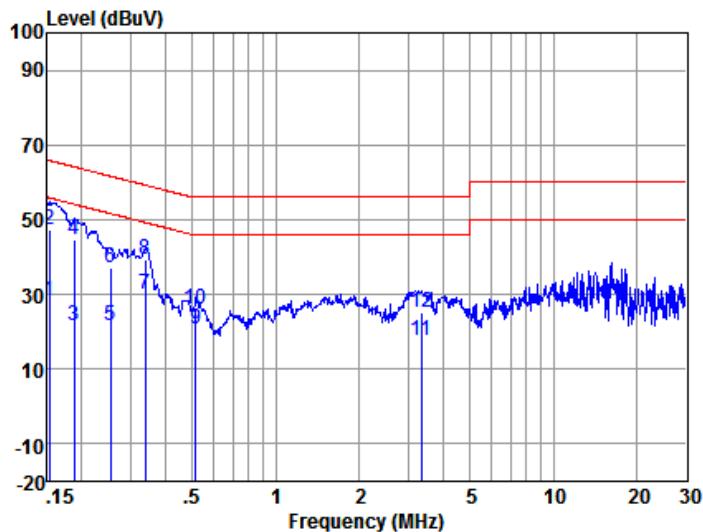
Live Line:



LISN : LINE
EUT/Project No : 1628CR
Test Mode : c

Freq (MHz)	Read level (dBuV)	LISN Factor (dB)	Cable Loss (dB)	Emission Level (dBuV)	Over Limit (dBuV)	Over Limit (dB)	Remark
1 0.15	14.61	0.11	9.81	24.53	55.87	-31.34	Average
2 0.15	37.27	0.11	9.81	47.19	65.87	-18.68	QP
3 0.20	13.25	0.11	9.81	23.17	53.71	-30.54	Average
4 0.20	32.59	0.11	9.81	42.51	63.71	-21.20	QP
5 0.28	17.27	0.11	9.81	27.19	50.68	-23.49	Average
6 0.28	26.60	0.11	9.81	36.52	60.68	-24.16	QP
7 0.34	22.09	0.11	9.81	32.01	49.13	-17.12	Average
8 0.34	29.29	0.11	9.81	39.21	59.13	-19.92	QP
9 0.52	10.49	0.11	9.82	20.42	46.00	-25.58	Average
10 0.52	16.05	0.11	9.82	25.98	56.00	-30.02	QP
11 3.12	7.80	0.12	9.85	17.77	46.00	-28.23	Average
12 3.12	14.97	0.12	9.85	24.94	56.00	-31.06	QP

Notes: Emission Level = Read Level +LISN Factor + Cable loss



LISN : NEUTRAL

EUT/Project No : 1628CR

Test Mode : C

	Freq (MHz)	Read level (dBuV)	LISN Factor (dB)	Cable Loss (dB)	Emission Level (dBuV)	Over Limit (dB)	Remark	
1	0.15	18.35	0.12	9.81	28.28	55.87	-27.59	Average
2	0.15	37.48	0.12	9.81	47.41	65.87	-18.46	QP
3	0.19	11.63	0.12	9.81	21.56	54.11	-32.55	Average
4	0.19	34.73	0.12	9.81	44.66	64.11	-19.45	QP
5	0.25	11.70	0.11	9.81	21.62	51.64	-30.02	Average
6	0.25	27.06	0.11	9.81	36.98	61.64	-24.66	QP
7	0.34	20.24	0.11	9.81	30.16	49.22	-19.06	Average
8	0.34	29.32	0.11	9.81	39.24	59.22	-19.98	QP
9	0.52	10.91	0.11	9.82	20.84	46.00	-25.16	Average
10	0.52	16.29	0.11	9.82	26.22	56.00	-29.78	QP
11	3.35	7.82	0.13	9.85	17.80	46.00	-28.20	Average
12	3.35	15.15	0.13	9.85	25.13	56.00	-30.87	QP

Notes: Emission Level = Read Level + LISN Factor + Cable loss

6.3 Radiated Emissions

Test frequency range: 9KHz – 1GHz

Test Site: Measurement Distance: 3m

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 ($\text{dB}\mu\text{V/m}$)
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 $40 \times \log(D_{\text{TEST}} / D_{\text{SPEC}})$ where D_{TEST} = Test Distance and D_{SPEC} = Specified Distance.

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

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

Limit:
(Fundamental signal)

Frequency	Limit ($\text{dB}\mu\text{V/m}$ @3m)	Remark
13.56MHz	124	Quasi-peak Value

Test Procedure:

- a. 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.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. 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.
- d. 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 X axis positioning which it is worse case, only the test worst case mode is recorded in the report.

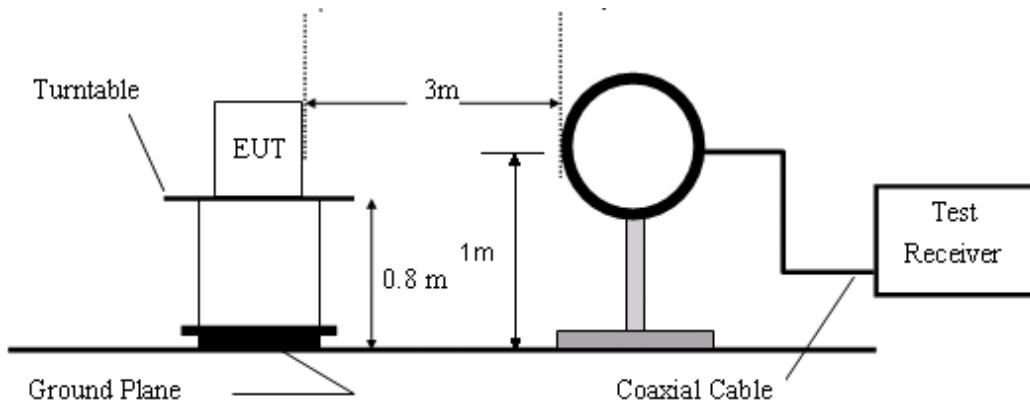
Test Setup:

Figure 1. Below 30MHz

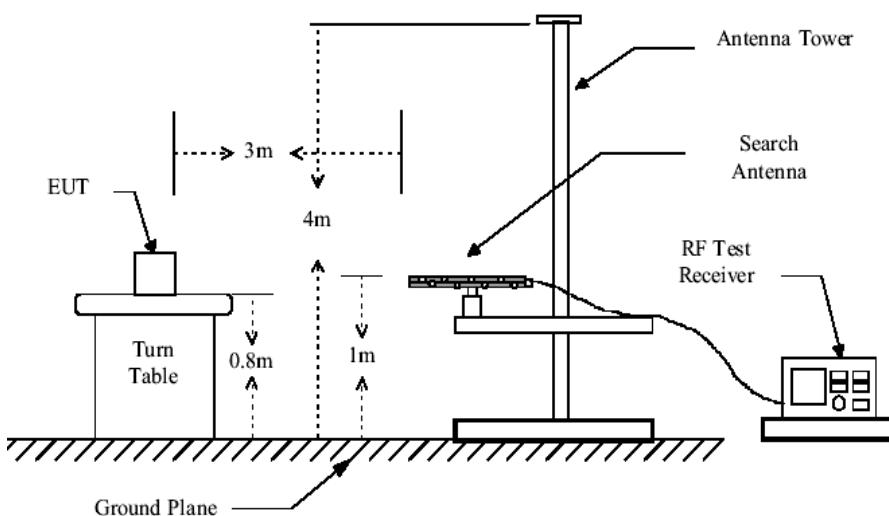


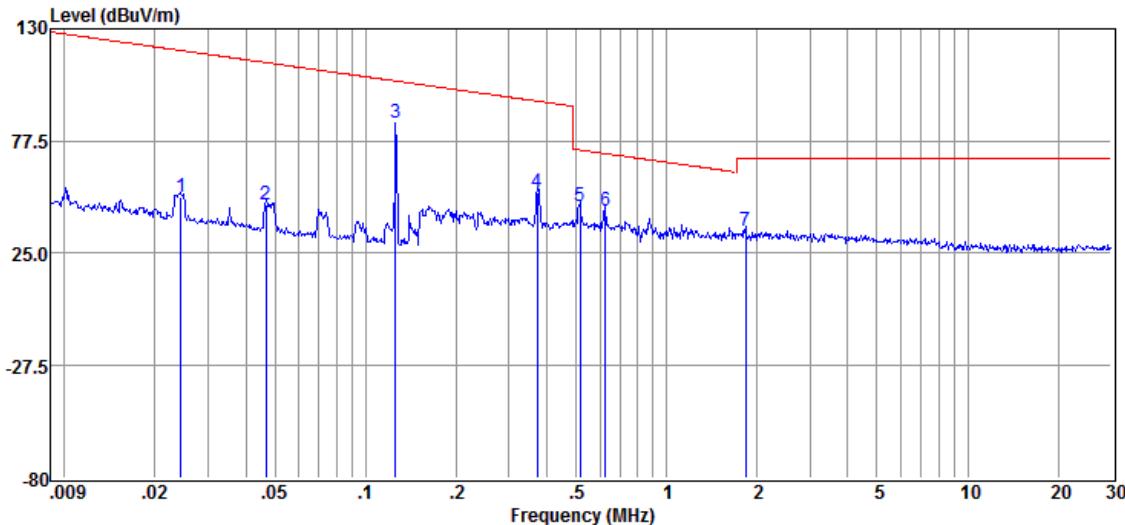
Figure 2. 30MHz to 1GHz

Test Results: Pass

Measurement Data

9kHz - 30MHz:

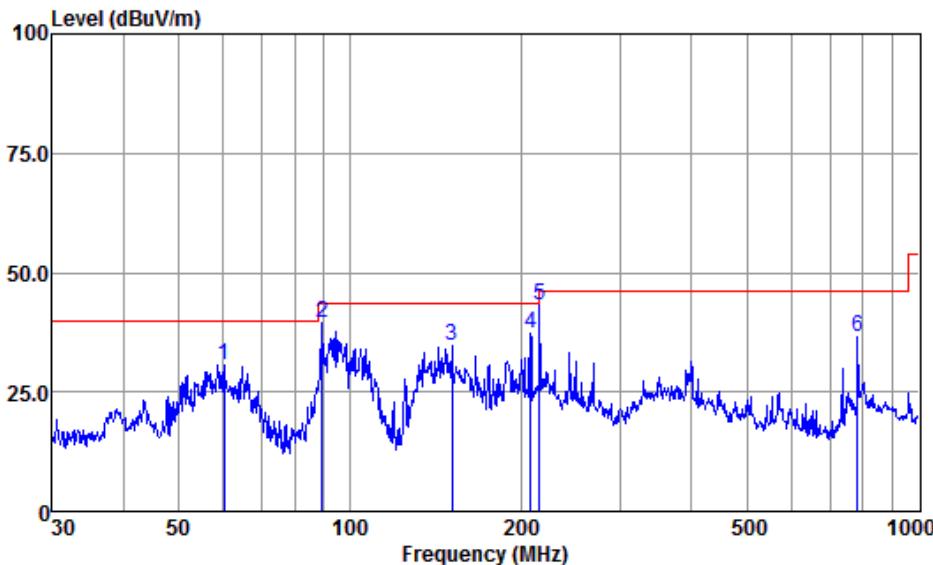
Z:



Item	Freq.	Read Level	Antenna Factor	Cable Loss	Result Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dB μ V)	(dB μ A/ μ Vm)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
1	0.02	30.77	20.39	0.03	51.19	119.84	-68.65	QP
2	0.05	27.62	20.04	0.04	47.70	114.20	-66.50	QP
3	0.13	66.05	19.91	0.05	86.01	105.61	-19.60	QP
4	0.37	33.74	19.80	0.06	53.60	96.18	-42.58	QP
5	0.52	27.22	19.78	0.07	47.07	73.36	-26.29	QP
6	0.63	25.40	19.63	0.07	45.10	71.68	-26.58	QP
7	1.83	15.89	19.39	0.08	35.36	69.50	-34.14	QP

30MHz-1GHz:

Vertical



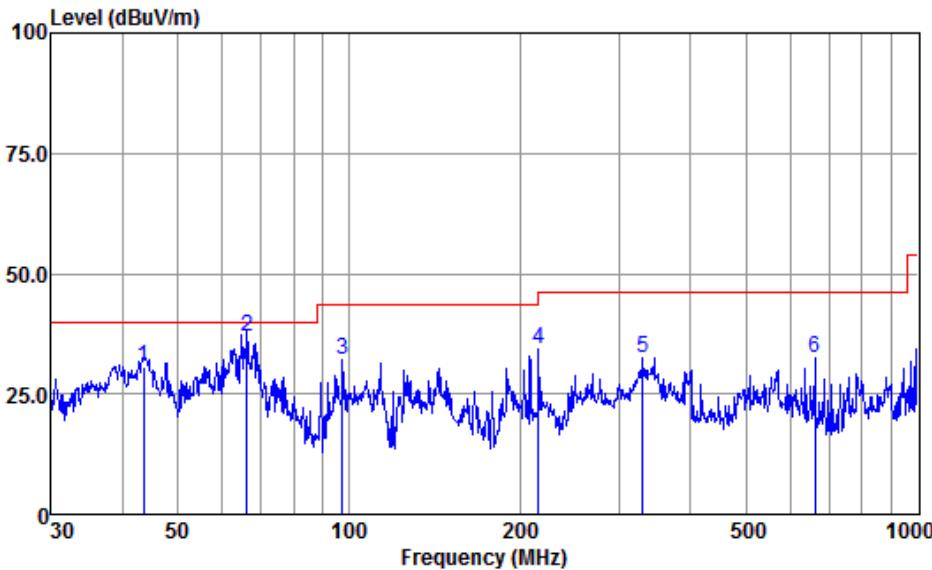
Antenna Polarity :HORIZONTAL

EUT/Project :1628CR

Test mode :c

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
1	60.07	60.30	12.60	0.30	42.65	30.55	40.00	-9.45	QP
2	89.59	73.71	8.10	0.42	42.68	39.55	43.50	-3.95	QP
3	151.60	64.43	12.10	0.62	42.61	34.54	43.50	-8.96	QP
4	208.58	69.36	9.79	0.71	42.51	37.35	43.50	-6.15	QP
5	216.02	74.80	10.12	0.72	42.50	43.14	46.00	-2.86	QP
6	782.35	55.39	21.63	2.01	42.50	36.53	46.00	-9.47	QP

Note: Emission Level=Read Level+Antenna Factor+Cable loss+Preamp Factor



Antenna Polarity : VERTICAL

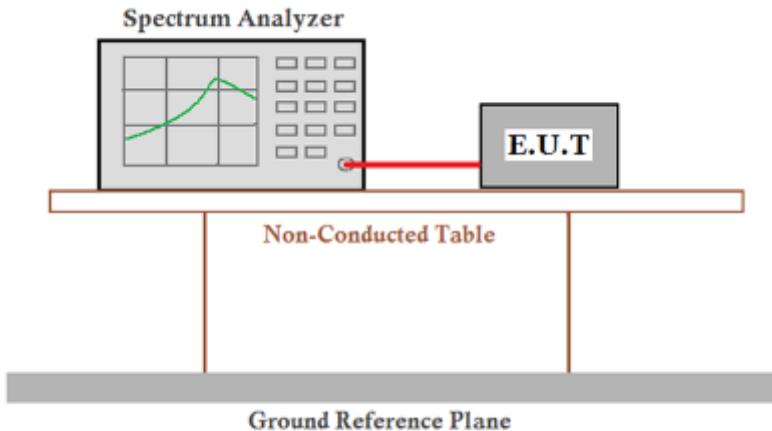
EUT/Project : 1628CR

Test mode : c

Freq	Read Level	Antenna			Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
		Factor	Loss	Level						
MHz dBuv dB/m dB dBuV/m dBuV/m dB										
1	43.66	58.93	14.07	0.23	42.63	30.60	40.00	-9.40	QP	
2	66.27	67.38	11.84	0.32	42.66	36.88	40.00	-3.12	QP	
3	97.46	65.28	9.17	0.44	42.69	32.20	43.50	-11.30	QP	
4	216.02	65.81	10.12	0.72	42.50	34.15	46.00	-11.85	QP	
5	329.04	60.07	13.80	0.89	42.30	32.46	46.00	-13.54	QP	
6	661.15	53.13	19.91	1.55	42.29	32.30	46.00	-13.70	QP	

Note: Emission Level=Read Level+Antenna Factor+Cable loss+Preamp Factor

6.4 20dB Bandwidth

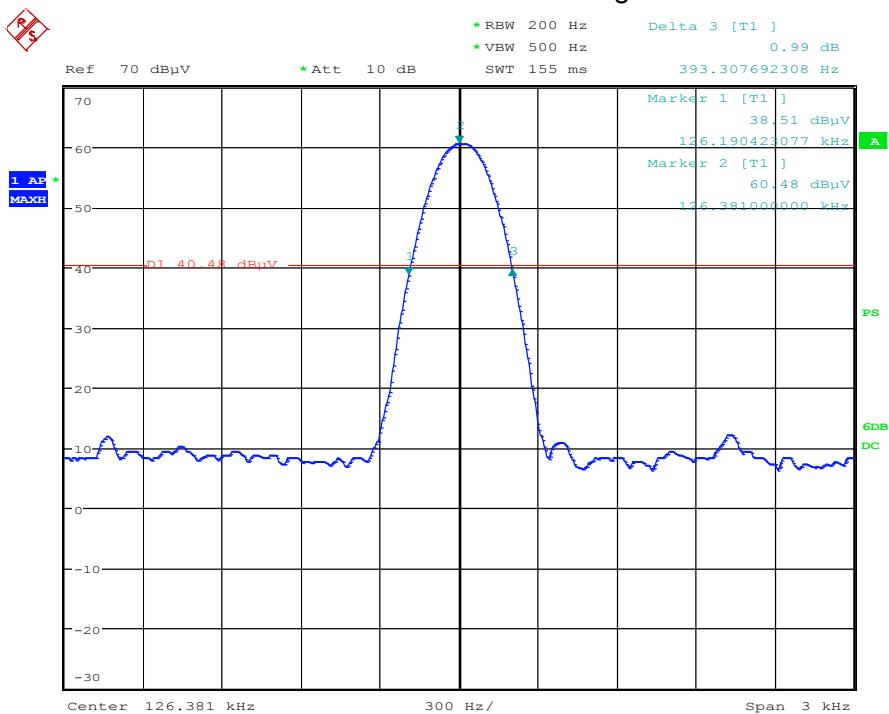
Test Setup:**Requirements:**

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 (Hz)	Result
393.31	Pass

Test plot as follows:





7 Test Setup Photographs

Refer to the < Test Setup Photos-FCC >

8 EUT Constructional Details

Refer to the < External Photos> & < Internal Photos>.

--End of the Report--