TEST REPORT

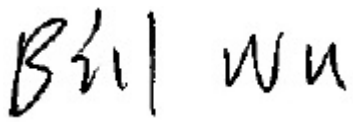
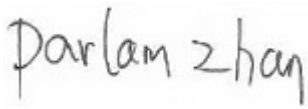
Application No.:	SHEM2007005982CR
FCC ID:	2AGOFRC421A
Applicant:	HCS (Suzhou) Limited
Address of Applicant:	19F-20F,Building B-3rd, No.209 Zhuyuan Road, New District, Suzhou, 215011,China
Factory:	WUJIANG CENTURY BILLION ELECTRONIC TECHNOLOGY CO., LTD
Address of Factory:	No.149 West Tun Cun Road Tongli Town Wujiang Suzhou Jiangsu People's Republic of China 215216
Equipment Under Test (EUT):	
EUT Name:	Remote Control
Model No.:	RC4213801/02BR, RC4213401/02BR,RC4213402/02BR, RC4213403/02BR,Babylon RCU,RC421XXXX/XXR,RC421XXXX/XXBR ("X"=0-9."B"means packed with battery) ¤
¤	Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
Standard(s) :	47 CFR Part 15, Subpart B
Date of Receipt:	2020-07-20
Date of Test:	2020-09-16 to 2020-11-26
Date of Issue:	2020-11-26
Test Result:	**Pass***

* In the configuration tested, the EUT 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.

Revision Record			
Version	**Description**	**Date**	**Remark**
00	Original	2020-11-26	/

Authorized for issue by:				
				
		Bill Wu / Project Engineer		
				
		Parlam Zhan / Reviewer		

2 Test Summary

Emission Part				
Item	**Standard**	**Method**	**Requirement**	**Result**
Radiated Emissions (30MHz-1GHz)	47 CFR Part 15, Subpart B	ANSI C63.4:2014	Class B	Pass
Radiated Emissions (above 1GHz)	47 CFR Part 15, Subpart B	ANSI C63.4:2014	Class B	Pass

InternalSource	UpperFrequency
Below 1.705MHz	30MHz
1.705MHz to 108MHz	1GHz
108MHz to 500MHz	2GHz
500MHz to 1GHz	5GHz
Above 1GHz	5th harmonic of the highest frequency or 40GHz, whichever is lower

Declaration of EUT Family Grouping:

Note: There are series models mentioned in this report, and they are the similar in electrical and electronic characters. Only the model RC4213403/02BR was tested since their differences were the model number , the cosmestic (color /painting/printed) and keys number.

3 Contents

Page

4 General Information

4.1 Details of E.U.T.

Power supply: DC 3.0V By 2*AAA size batteries
Test voltage: DC 3.0V

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Laptop	Lenavo	L440	/
Dongle	CSR	/	/
Gateway	HCS	/	/

4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Conducted Emission at mains port using AMN	2.6dB (9kHz to 150kHz)
		2.4dB (150kHz to 30MHz)
2	Conducted Emission at mains port using VP	1.8 dB (9kHz to 30MHz)
3	Conducted Emission at telecommunication port using AAN	4.2 dB (150kHz to 30MHz)
4	Radiated Power	3.2dB
5	Radiated Emission	4.5dB (30MHz-1GHz)
		5.1dB (1GHz-6GHz)
		5.4dB (6GHz-18GHz)
6	Radiated Disturbance (disturbance current in a LLAS)	2.4dB (9kHz to 30MHz)

Note: The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

4.4 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.

4.5 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 17025:2017 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 (LAB CODE: 201034-0)

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

• FCC (Designation Number: CN5033)

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

• ISED (CAB Identifier: CN0020)

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. EMC Laboratory has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory.

• 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-13868, C-14336, T-12221, G-10830 respectively.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None

5 Equipment List

Radiated Emissions (30MHz-1GHz)					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
EMI test receiver	Rohde & Schwarz	ESU40	SHEM051-1	2019-12-20	2020-12-19
CONTROLLER	INNCO	CO200	SHEM047-1	N/A	N/A
ANTENNA MAST	INNCO	MA400-EP	SHEM047-2	N/A	N/A
TURN DEVICE	INNCO	DE 3600-RH	SHEM047-3	N/A	N/A
Broadband UHF-VHF ANTENNA	SCHWARZBECK	VULB9168	SHEM048-1	2019-10-14	2021-10-13
Semi/Fully Anechoic	ST	11*6*6M	SHEM078-2	2020-05-25	2023-05-24
Low Amplifier	CLAVIIO	BDLNA-0001-412010	SHEM164-1	2020-08-13	2021-08-12

Radiated Emissions (above 1GHz)					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
EMI test receiver	Rohde & Schwarz	ESU40	SHEM051-1	2019-12-20	2020-12-19
CONTROLLER	INNCO	CO200	SHEM047-1	N/A	N/A
ANTENNA MAST	INNCO	MA400-EP	SHEM047-2	N/A	N/A
TURN DEVICE	INNCO	DE 3600-RH	SHEM047-3	N/A	N/A
Double ridged broadband horn ANTENNA	SCHWARZBECK	BBHA9120D	SHEM050-1	2019-10-14	2021-10-13
High-amplifier	SCHWARZBECK	SCU-F0118-G40-BZ4-CS	SHEM050-2	2019-12-20	2020-12-19
Semi/Fully Anechoic	ST	11*6*6M	SHEM078-2	2020-05-25	2023-05-24

General used equipment					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Digital pressure meter	YONGZHI	DYM3-01	SHEM082-1	2018-01-25	2021-01-24
Temperature&humidity recorder	ShangHai weather meter work	ZJ 1-2B	SHEM042-1~6	2020-09-11	2021-09-10
Digital Multimeter	FLUKE	17B	SHEM043-3	2020-09-09	2021-09-08
Autoformer regulator	Guangzhou bao de	TDGC2-5KVA	SHEM150-1	N/A	N/A
Multi-purpose tong tester	FLUKE	316	SHEM001-1	2019-12-20	2020-12-19

6 Emission Test Results

6.1 Radiated Emissions (30MHz-1GHz)

Test Requirement:	47 CFR Part 15, Subpart B
Test Method:	ANSI C63.4:2014
Frequency Range:	30MHz to 1GHz
Measurement Distance:	3m
Limit:	
30MHz -88MHz	40.0(dBμV/m) quasi-peak
88MHz-216MHz	43.5(dBμV/m) quasi-peak
216MHz-960MHz	46.0(dBμV/m) quasi-peak
960MHz-1000MHz	54.0(dBμV/m) quasi-peak
Detector:	Peak for pre-scan (120kHz resolution bandwidth) 30M to1000MHz

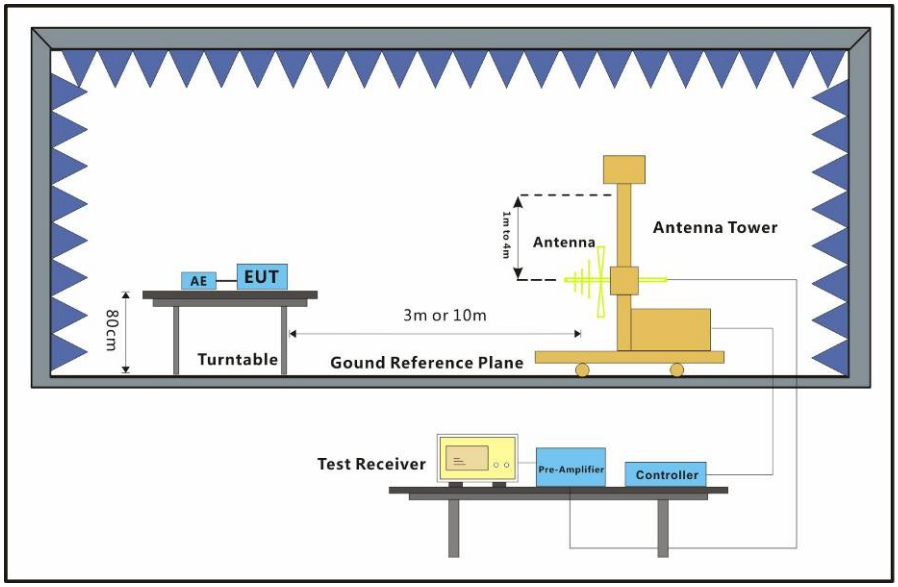
6.1.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1020 mbar

Pretest these mode to find the worst case:	a:BT mode_Keep the EUT paring with the Dongle via BT function,And then keep pressing the buttons of the EUT continuous. b:ZigBee mode_ Keep the EUT paring with the gateway via BT function,And then keep pressing the buttons of the EUT continuous. c:IR mode_Keep the EUT power on and press the IR buttons of the EUT continuous
The worst case for final test:	a:BT mode_Keep the EUT paring with the Dongle via BT function,And then keep pressing the buttons of the EUT continuous.

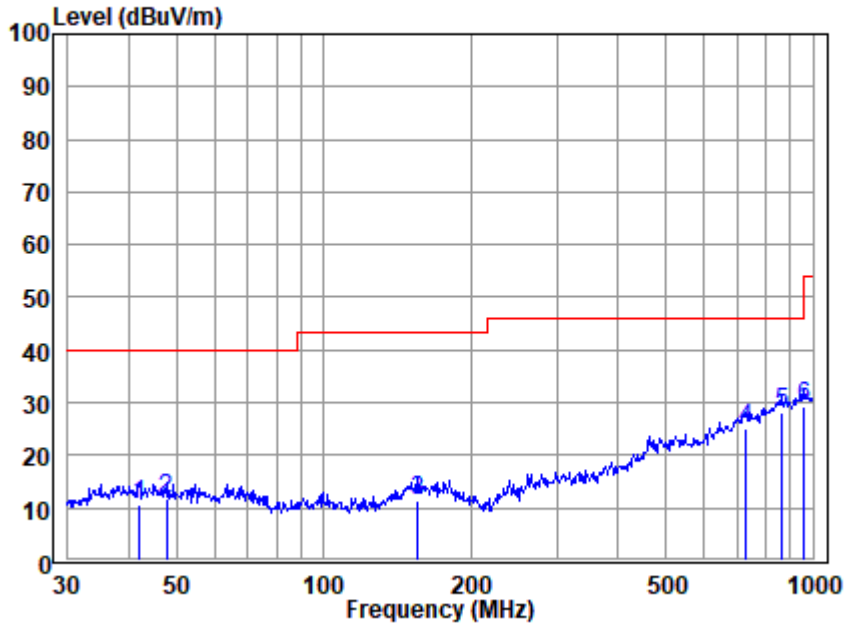
6.1.2 Test Setup Diagram



6.1.3 Measurement Data

An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by BiConiLog antenna with 2 orthogonal polarities.

Mode:a; Polarization:Horizontal

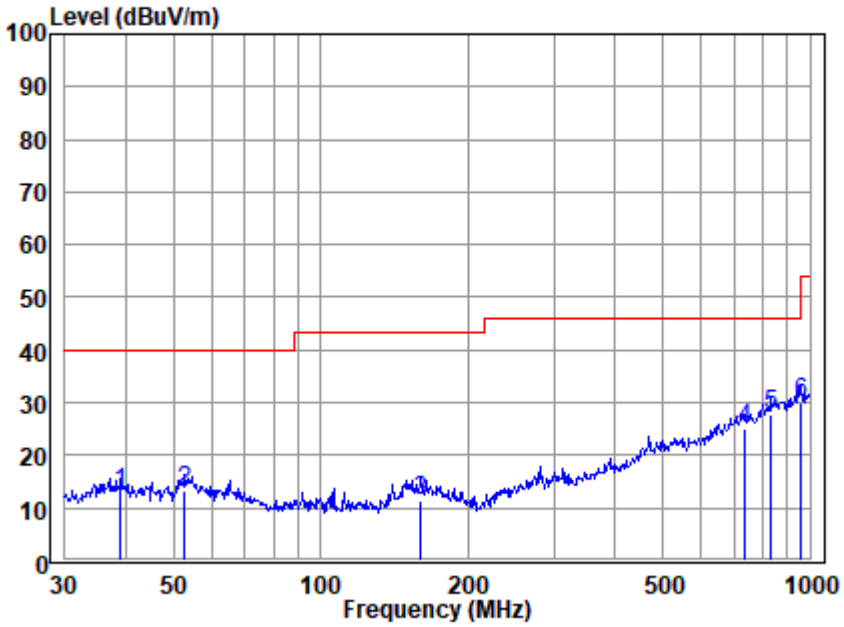


Antenna Polarity :Horizontal
EUT/Project :5982CR
Test mode :a

	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	41.96	23.06	13.80	1.09	27.14	10.81	40.00	-29.19	QP
2	47.64	24.45	13.22	1.21	27.12	11.76	40.00	-28.24	QP
3	154.88	22.77	13.40	2.18	26.85	11.50	43.50	-32.00	QP
4	729.73	24.06	23.08	5.87	28.03	24.98	46.00	-21.02	QP
5	862.97	25.25	24.27	6.26	27.74	28.04	46.00	-17.96	QP
6	960.16	25.91	24.40	6.57	27.53	29.35	54.00	-24.65	QP

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

Mode:a; Polarization:Vertical



Antenna Polarity :Vertical
EUT/Project :5982CR
Test mode :a

	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	39.07	24.87	13.98	1.02	27.13	12.74	40.00	-27.26	QP
2	52.74	26.35	12.73	1.30	27.09	13.29	40.00	-26.71	QP
3	160.49	22.83	13.36	2.22	26.84	11.57	43.50	-31.93	QP
4	737.18	24.55	22.53	5.91	28.05	24.94	46.00	-21.06	QP
5	832.81	25.93	23.42	6.23	27.78	27.80	46.00	-18.20	QP
6	955.29	26.75	24.45	6.55	27.52	30.23	46.00	-15.77	QP

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

6.2 Radiated Emissions (above 1GHz)

Test Requirement:	47 CFR Part 15, Subpart B
Test Method:	ANSI C63.4:2014
Frequency Range:	Above 1GHz
Measurement Distance:	3m
Limit:	
Above 1GHz	74(dBμV/m) peak, 54(dBμV/m) average
Detector:	Peak for pre-scan (1000kHz resolution bandwidth) 1000M to18000MHz

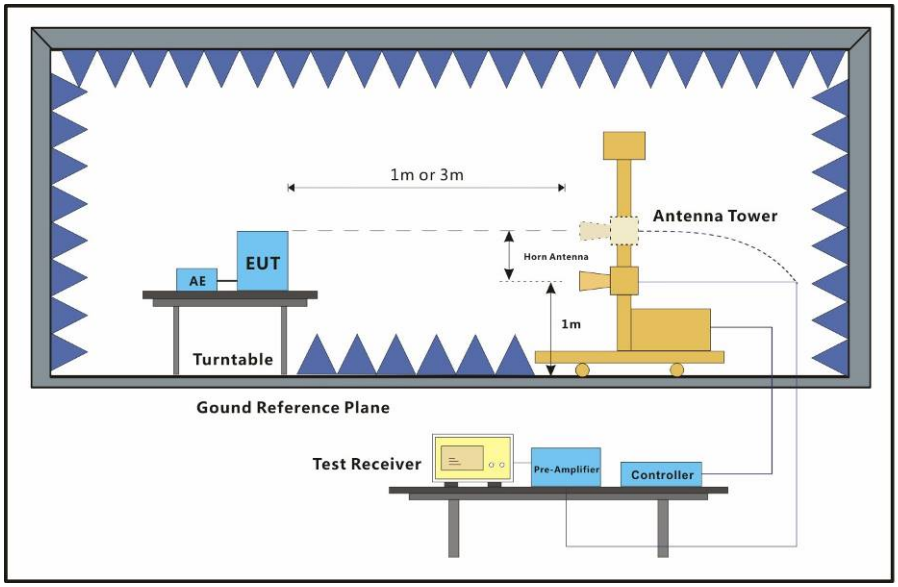
6.2.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1020 mbar

Pretest these mode to find the worst case:	a:BT mode_Keep the EUT paring with the Dongle via BT function,And then keep pressing the buttons of the EUT continuous. b:ZigBee mode_ Keep the EUT paring with the gateway via BT function,And then keep pressing the buttons of the EUT continuous. c:IR mode_Keep the EUT power on and press the IR buttons of the EUT continuous
The worst case for final test:	a:BT mode_Keep the EUT paring with the Dongle via BT function,And then keep pressing the buttons of the EUT continuous.

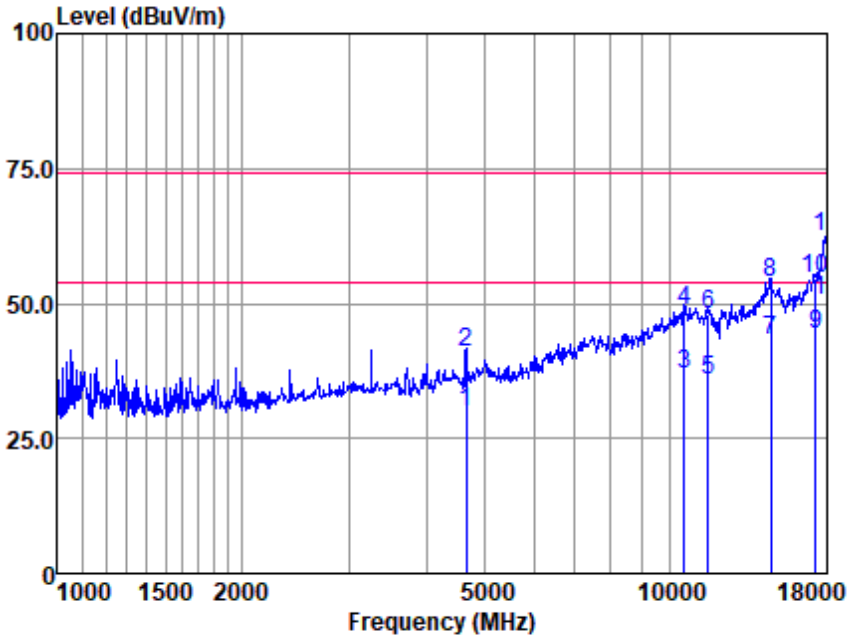
6.2.2 Test Setup Diagram



6.2.3 Measurement Data

An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Average measurements were conducted based on the peak sweep graph. The EUT was measured by Horn antenna with 2 orthogonal polarities.

Mode:a; Polarization:Horizontal

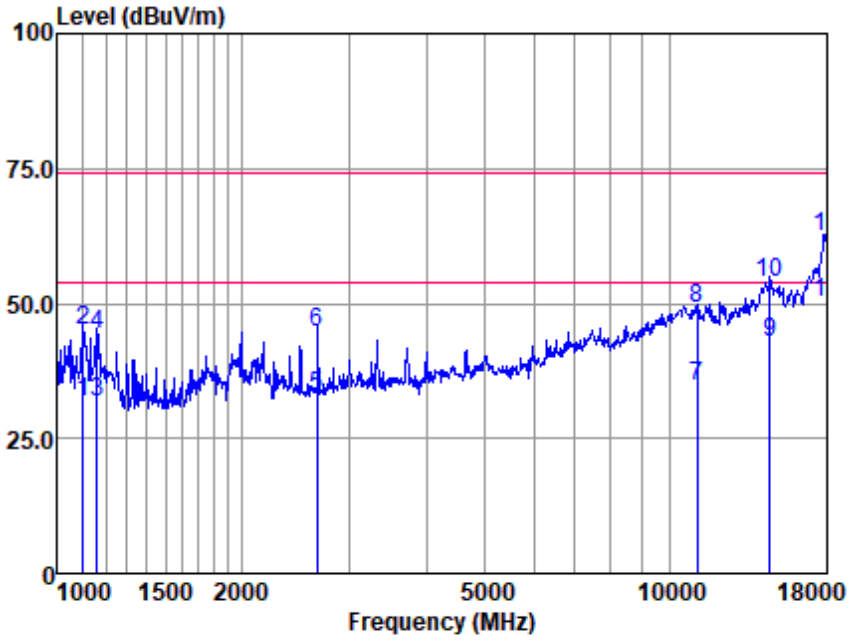


Antenna Polarity :HORIZONTAL
EUT/Project :5982CR
Test mode :a

	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	4653.771	31.84	30.92	9.52	42.47	29.81	54.00	-24.19	Average
2	4653.771	42.85	30.92	9.52	42.47	40.82	74.00	-33.18	Peak
3	10545.010	24.58	39.73	14.89	42.29	36.91	54.00	-17.09	Average
4	10545.010	36.50	39.73	14.89	42.29	48.83	74.00	-25.17	Peak
5	11533.480	23.67	39.75	15.25	42.74	35.93	54.00	-18.07	Average
6	11533.480	35.73	39.75	15.25	42.74	47.99	74.00	-26.01	Peak
7	14618.170	25.71	41.60	17.55	41.72	43.14	54.00	-10.86	Average
8	14618.170	36.30	41.60	17.55	41.72	53.73	74.00	-20.27	Peak
9	17286.170	24.25	41.70	18.83	40.59	44.19	54.00	-9.81	Average
10	17286.170	34.54	41.70	18.83	40.59	54.48	74.00	-19.52	Peak
11	18000.000	21.76	50.80	18.62	40.80	50.38	54.00	-3.62	Average
12	18000.000	33.91	50.80	18.62	40.80	62.53	74.00	-11.47	Peak

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

Mode:a; Polarization:Vertical



Antenna Polarity :VERTICAL
EUT/Project :5982CR
Test mode :a

	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	1100.079	45.56	24.18	4.33	42.48	31.59	54.00	-22.41	Average
2	1100.079	58.99	24.18	4.33	42.48	45.02	74.00	-28.98	Peak
3	1162.182	45.53	24.35	4.47	42.47	31.88	54.00	-22.12	Average
4	1162.182	57.88	24.35	4.47	42.47	44.23	74.00	-29.77	Peak
5	2656.331	40.31	27.93	6.88	42.32	32.80	54.00	-21.20	Average
6	2656.331	52.18	27.93	6.88	42.32	44.67	74.00	-29.33	Peak
7	11076.100	21.67	40.06	15.28	42.18	34.83	54.00	-19.17	Average
8	11076.100	35.82	40.06	15.28	42.18	48.98	74.00	-25.02	Peak
9	14575.970	25.38	41.70	17.40	41.72	42.76	54.00	-11.24	Average
10	14575.970	36.66	41.70	17.40	41.72	54.04	74.00	-19.96	Peak
11	18000.000	21.65	50.80	18.62	40.80	50.27	54.00	-3.73	Average
12	18000.000	33.58	50.80	18.62	40.80	62.20	74.00	-11.80	Peak

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