

FCC Test Report

FCC ID: 2ANR5-HAIKEY3000

Product: Bluetooth Key

Trade Mark: haitai

Model Number: Haikey3000

Serial Model: Haikey3000-BLDB

Report No.: NTEK-2017NT08225930F2

Prepared for

Beijing Haitai Fangyuan Technologies Co.,Ltd.
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Prepared by

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TEST RESULT CERTIFICATION

Applicant's name : Beijing Haitai Fangyuan Technologies Co.,Ltd.

Address..... : B1st&2nd floor, Unit E, NO.9 Building, Dongbeiwang West Road
8.Haidian District, Beijing(100094)

Manufacturer's Name : Beijing Haitai Fangyuan Technologies Co.,Ltd.

Address..... : B1st&2nd floor, Unit E, NO.9 Building, Dongbeiwang West Road
8.Haidian District, Beijing(100094)

Product description

Product name : Bluetooth Key

Model and/or type reference : Haikey3000

FCC Part15B

Standards : ANSI C63.4:2014

This device described above has been tested by NTEK, and the test results show that the equipment under test (EUT) is in compliance with Part 15 of FCC Rules. And it is applicable only to the tested sample identified in the report.

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Date of Test :

Date (s) of performance of tests.....: 22 Aug. 2017 ~ 12 Sep. 2017

Date of Issue : 12 Sep. 2017

Test Result : **Pass**

Testing Engineer :

Eileen Liu.

(Eileen Liu)

Technical Manager :

Jason chen

(Jason Chen)

Authorized Signatory :

Sam. chen

(Sam Chen)

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1. TEST SUMMARY

Test procedures according to the technical standards:

EMC Emission				
Standard	Test Item	Limit	Judgment	Remark
FCC Part15B ANSI C63.4: 2014	Conducted Emission	Class B	PASS	
	Radiated Emission	Class B	PASS	

NOTE:

- (1) 'N/A' denotes test is not applicable in this Test Report
- (2) For client's request and manual description, the test will not be executed.

1.1 TEST FACILITY

Shenzhen NTEK Testing Technology Co., Ltd

Add. : 1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street, Bao'an District, Shenzhen 518126 P.R. China.

FCC Registration Number:463705; IC Registration Number:9270A-1

CNAS Registration Number:L5516

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately **95** %.

A. Conducted Measurement :

Test Site	Method	Measurement Frequency Range	U, (dB)	NOTE
NTEKC01	ANSI	150 KHz ~ 30MHz	3.2	

B. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	U, (dB)	NOTE
NTEKA01	ANSI	30MHz ~ 1000MHz	4.7	
		1GHz ~12.4GHz	5.0	

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Bluetooth Key		
Trade Mark	haitai		
Model Name	Haikey3000		
Serial Model	Haikey3000-BLDB		
Model Difference	All the model are the same circuit and RF module, except the appearance.		
Product Description	The EUT is a Bluetooth Key.		
	Connecting I/O port:	USB, DC in	
	Operation Frequency:	BLE:2402~2480 MHz	
	Modulation Type:	GFSK	
Power Source	DC 3.7V/65mAh from Battery or DC 5V from USB Port.		
Adapter	N/A		
Battery	DC 3.7V/65mAh		
HW Version	N/A		
SW Version	N/A		

2.1.1 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possibly have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	Data Transmission
Mode 2	BT +Charging

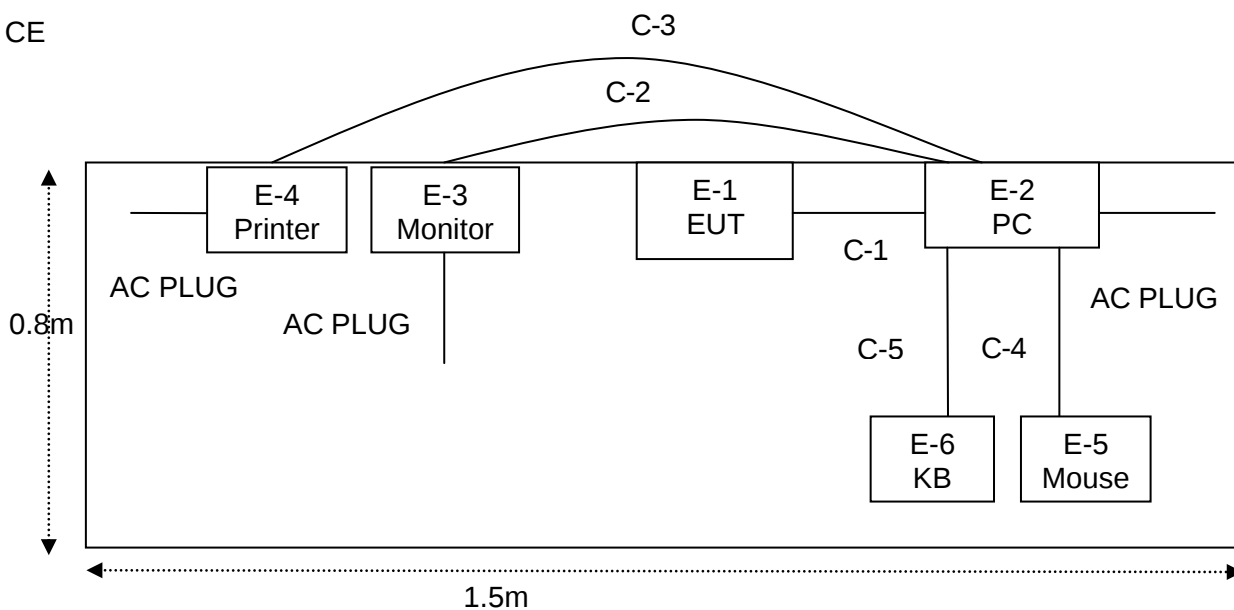
For Conducted Test	
Final Test Mode	Description
Mode 1	Data Transmission
Mode 2	BT +Charging

For Radiated Test	
Final Test Mode	Description
Mode 1	Data Transmission
Mode 2	BT +Charging

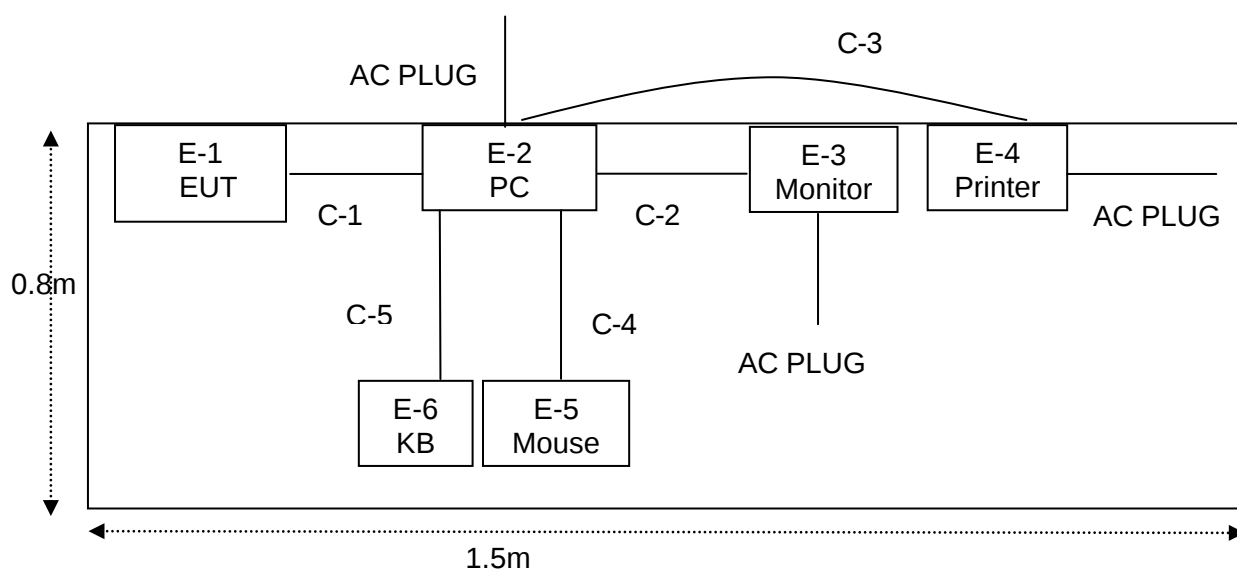
Note: Final Test Mode: Through Pre-scan, find the mode 1 is the worst case.
Only the worst case mode is recorded in the report.

2.1.2 DESCRIPTION OF TEST SETUP

CE



RE



2.2 DESCRIPTION TEST PERIPHERAL AND EUT PERIPHERAL

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Brand	Model/Type No.	Series No.	Note
E-1	Bluetooth Key	haitai	Haikey3000	N/A	EUT
E-2	Personal computer	DELL	FT4Y23X	34413561645	Peripherals
E-3	Monitor	SHARP	LCD-32MS46A	09426089241597	Peripherals
E-4	Printer	Canon	L11121E	LBP2900	Peripherals
E-5	Mouse	DELL	MS111-P	cn-011d3v-71581-11 e-1th7	Peripherals
E-6	Keyboard	DELL	SK-8185	OY526KUS	Peripherals

Item	Cable Type	Shielded Type	Ferrite Core	Length	Note
C-1	USB Cable	NO	NO	1.2m	
C-2	HDMI Cable	NO	NO	1.0m	
C-3	USB Cable	NO	NO	1.2m	
C-4	Mouse Cable	NO	NO	1.2m	
C-5	Keyboard Cable	NO	NO	1.0m	

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (3) “YES” means “shielded” “with core”; “NO” means “unshielded” “without core”.

2.3 MEASUREMENT INSTRUMENTS LIST

Radiation Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Spectrum Analyzer	Agilent	E4407B	MY45108040	2017.06.06	2018.06.05	1 year
2	Test Receiver	R&S	ESPI	101318	2017.06.06	2018.06.05	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2017.04.09	2018.04.08	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2017.06.06	2018.06.05	1 year
5	Spectrum Analyzer	ADVANTEST	R3132	150900201	2017.06.06	2018.06.05	1 year
6	Horn Antenna	EM	EM-AH-10180	2011071402	2017.04.09	2018.04.08	1 year
7	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2017.07.06	2018.07.05	1 year
8	Amplifier	EMC	EMC051835SE	980246	2017.08.09	2018.08.08	1 year
9	Loop Antenna	ARA	PLA-1030/B	1029	2017.06.06	2018.06.05	1 year
10	Power Meter	DARE	RPR3006W	15I00041S NO84	2017.08.09	2018.08.08	1 year
11	Power Sensor	R&S	URV5-Z4	0395.1619.05	2017.07.06	2018.07.05	1 year
12	Test Cable (30MHz-1GHz)	N/A	R-02	N/A	2017.04.21	2020.04.20	3 year
13	High Test Cable(1G-40 GHz)	N/A	R-03	N/A	2017.04.21	2020.04.20	3 year
14	High Test Cable(1G-40 GHz)	N/A	R-04	N/A	2017.04.21	2020.04.20	3 year

Conduction Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Test Receiver	R&S	ESCI	101160	2017.06.06	2018.06.05	1 year
2	LISN	R&S	ENV216	101313	2017.04.19	2018.04.18	1 year
3	LISN	SCHWARZBECK	NNLK 8129	8129245	2017.06.06	2018.06.05	1 year
4	50Ω Coaxial Switch	ANRITSU CORP	MP59B	6200983704	2017.06.06	2018.06.05	1 year
5	Test Cable (9KHz-30MHz)	N/A	C01	N/A	2017.04.21	2020.04.20	3 year
6	Test Cable (9KHz-30MHz)	N/A	C02	N/A	2017.04.21	2020.04.20	3 year
7	Test Cable (9KHz-30MHz)	N/A	C03	N/A	2017.04.21	2020.04.20	3 year

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *
0.50 -5.0	73.00	60.00	56.00	46.00
5.0 -30.0	73.00	60.00	60.00	50.00

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

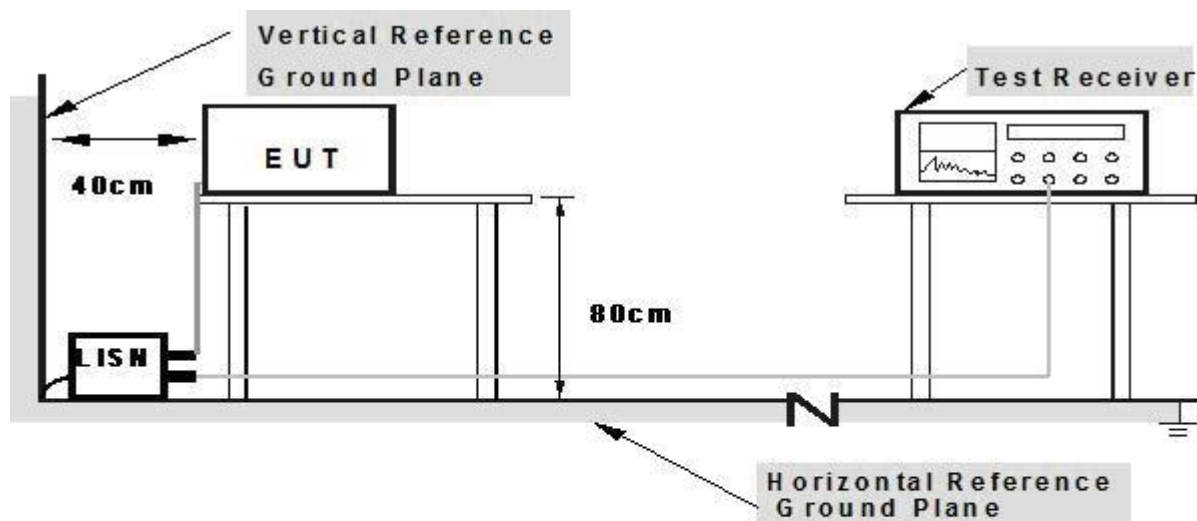
The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

3.1.2 TEST PROCEDURE

- The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 TEST SETUP



Note: 1. Support units were connected to second LISN.

2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.1.4 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

3.1.5 TEST RESULTS

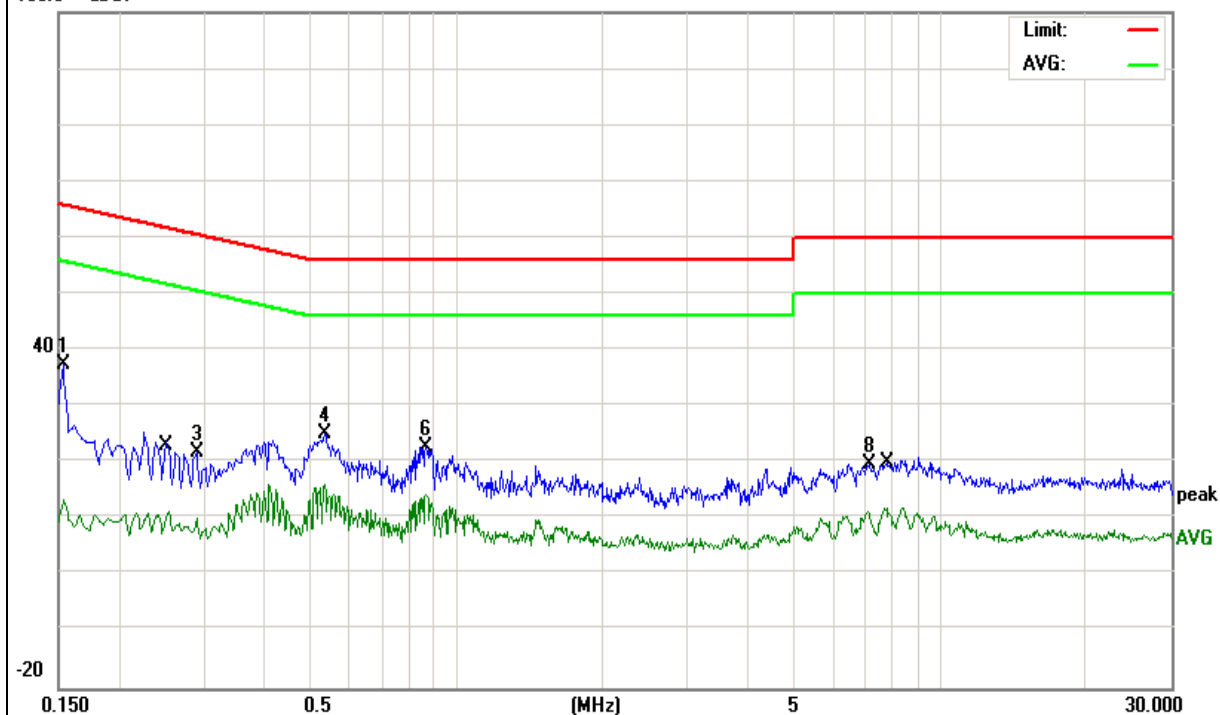
EUT:	Bluetooth Key	Model Name. :	Haikey3000
Temperature:	26 °C	Relative Humidity:	54%
Pressure:	1010hPa	Test Date:	2017-08-22
Test Mode:	Mode 1	Phase :	L
Test Voltage:	DC 5V from PC AC120V/60Hz		

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measure-ment (dBμV)	Limits (dBμV)	Margin (dB)	Remark
0.1539	27.59	9.82	37.41	65.78	-28.37	QP
0.2540	1.47	9.82	11.29	51.62	-40.33	AVG
0.2900	12.11	9.82	21.93	60.52	-38.59	QP
0.5340	15.21	9.83	25.04	56.00	-30.96	QP
0.5340	6.42	9.83	16.25	46.00	-29.75	AVG
0.8620	12.79	9.88	22.67	56.00	-33.33	QP
0.8620	4.44	9.88	14.32	46.00	-31.68	AVG
7.1500	9.88	9.97	19.85	60.00	-40.15	QP
7.6620	2.06	9.97	12.03	50.00	-37.97	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

100.0 dBμV



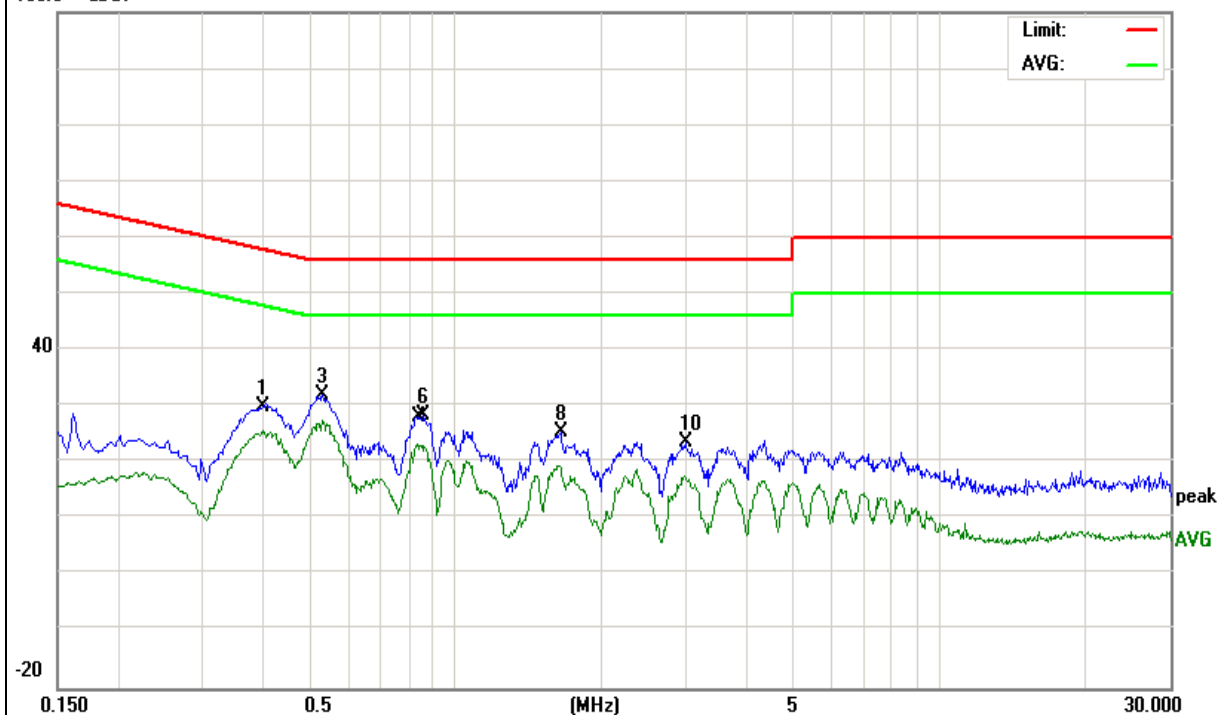
EUT:	Bluetooth Key	Model Name. :	Haikey3000
Temperature:	26 °C	Relative Humidity:	54%
Pressure:	1010hPa	Test Date:	2017-08-22
Test Mode:	Mode 1	Phase :	N
Test Voltage:	DC 5V from PC AC120V/60Hz		

Frequency	Reading Level	Correct Factor	Measure-ment	Limits	Margin	Remark
(MHz)	(dBμV)	(dB)	(dBμV)	(dBμV)	(dB)	
0.3980	19.90	9.93	29.83	57.89	-28.06	QP
0.3980	15.77	9.93	25.70	47.89	-22.19	AVG
0.5299	22.06	9.93	31.99	56.00	-24.01	QP
0.5299	17.48	9.93	27.41	46.00	-18.59	AVG
0.8340	13.27	9.93	23.20	46.00	-22.80	QP
0.8580	18.48	9.93	28.41	56.00	-27.59	AVG
1.6340	9.60	9.94	19.54	46.00	-26.46	QP
1.6460	15.49	9.94	25.43	56.00	-30.57	AVG
2.9700	7.64	9.95	17.59	46.00	-28.41	QP
2.9860	13.61	9.95	23.56	56.00	-32.44	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

100.0 dBμV

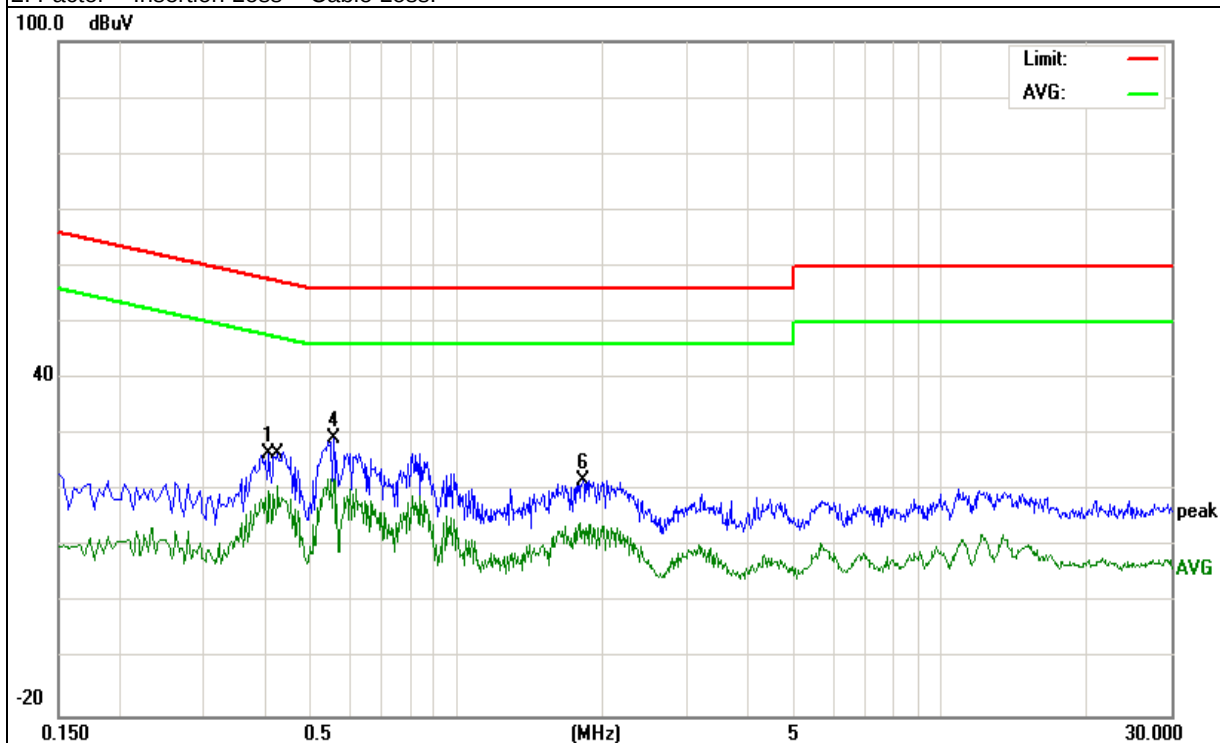


EUT:	Bluetooth Key	Model Name. :	Haikey3000
Temperature:	26 °C	Relative Humidity:	54%
Pressure:	1010hPa	Test Date:	2017-08-22
Test Mode:	Mode 1	Phase :	L
Test Voltage:	DC 5V from PC AC240V/60Hz		

Frequency	Reading Level	Correct Factor	Measure-ment	Limits	Margin	Remark
(MHz)	(dBμV)	(dB)	(dBμV)	(dBμV)	(dB)	
0.4100	16.91	9.83	26.74	57.65	-30.91	QP
0.4260	11.09	9.83	20.92	47.33	-26.41	AVG
0.5500	12.46	9.83	22.29	46.00	-23.71	AVG
0.5580	19.42	9.83	29.25	56.00	-26.75	QP
1.8060	4.34	9.86	14.20	46.00	-31.80	AVG
1.8220	12.12	9.86	21.98	56.00	-34.02	QP

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



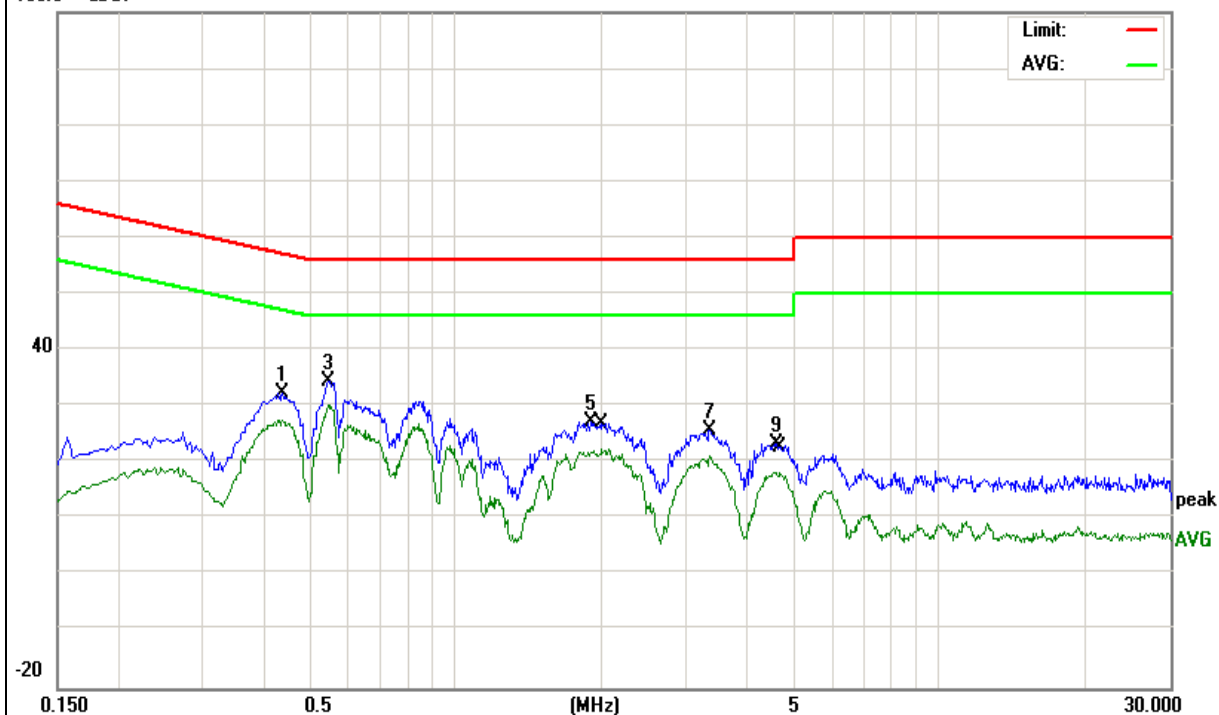
EUT:	Bluetooth Key	Model Name. :	Haikey3000
Temperature:	26 °C	Relative Humidity:	54%
Pressure:	1010hPa	Test Date:	2017-08-22
Test Mode:	Mode 1	Phase :	N
Test Voltage:	DC 5V from PC AC240V/60Hz		

Frequency	Reading Level	Correct Factor	Measure-ment	Limits	Margin	Remark
(MHz)	(dBμV)	(dB)	(dBμV)	(dBμV)	(dB)	
0.4380	22.45	9.93	32.38	57.10	-24.72	QP
0.4380	17.76	9.93	27.69	47.10	-19.41	AVG
0.5460	24.57	9.93	34.50	56.00	-21.50	QP
0.5460	20.27	9.93	30.20	46.00	-15.80	AVG
1.8980	17.19	9.94	27.13	56.00	-28.87	QP
2.0100	12.60	9.94	22.54	46.00	-23.46	AVG
3.3620	15.77	9.95	25.72	56.00	-30.28	QP
3.3620	11.19	9.95	21.14	46.00	-24.86	AVG
4.5980	13.32	9.96	23.28	56.00	-32.72	QP
4.6820	8.42	9.96	18.38	46.00	-27.62	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

100.0 dBμV



3.2 RADIATED EMISSION MEASUREMENT

3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

FREQUENCY (MHz)	Class A (at 10m)	Class B (at 3m)
	dBuV/m	dBuV/m
30 ~ 88	39.0	40.0
88 ~ 216	43.5	43.5
216 ~ 960	46.5	46.0
Above 960	49.5	54.0

Notes:

- (1) The limit for radiated test was performed according to as following:
FCC PART 15B /ICES-003.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

3.2.2 TEST PROCEDURE

Test Arrangement for Radiated Emissions up to 1 GHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at an accredited test facility. 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 is a broadband antenna, and its 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 and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

Note: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for quasi-peak detection (QP) at frequency below 1GHz.

Test Arrangement for Radiated Emissions above 1 GHz.

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at an accredited chamber room. 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 height of antenna can be varied from one meter to four meters, the height of adjustment depends on the EUT height and the antenna 3dB beamwidth both, to detect 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 and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

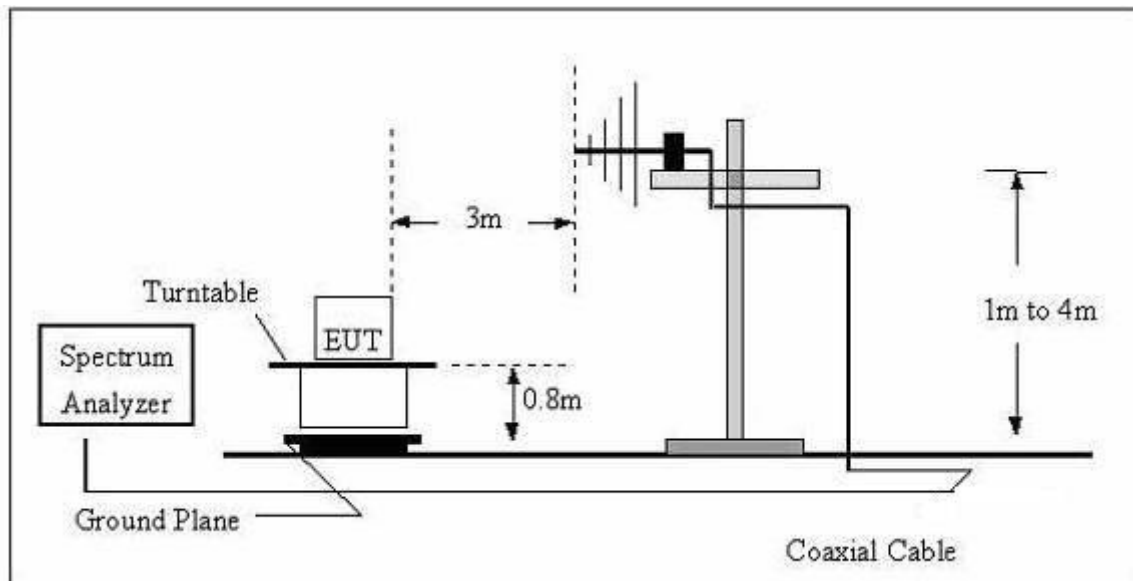
Note: For the hand-held device, the EUT should be measured for all 3 axes and only the worst case is recorded in the report

During the radiated emission test, the Spectrum Analyzer was set with the following configurations:

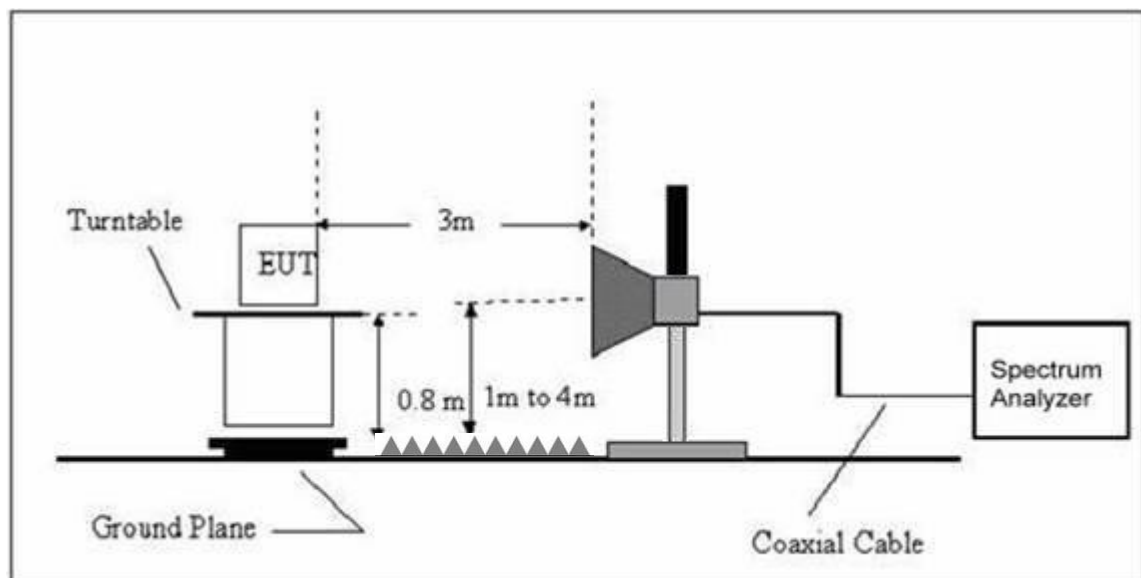
Frequency Band (MHz)	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	QP	120 kHz	300 kHz
Above 1000	Peak	1 MHz	1 MHz
	Avg	1 MHz	10 Hz

3.2.3 TEST SETUP

For Radiated Emission 30~1000MHz



(B) Radiated Emission Test Set-Up Frequency Above 1GHz



3.2.4 TEST RESULTS

TEST RESULTS (30~1000 MHz)

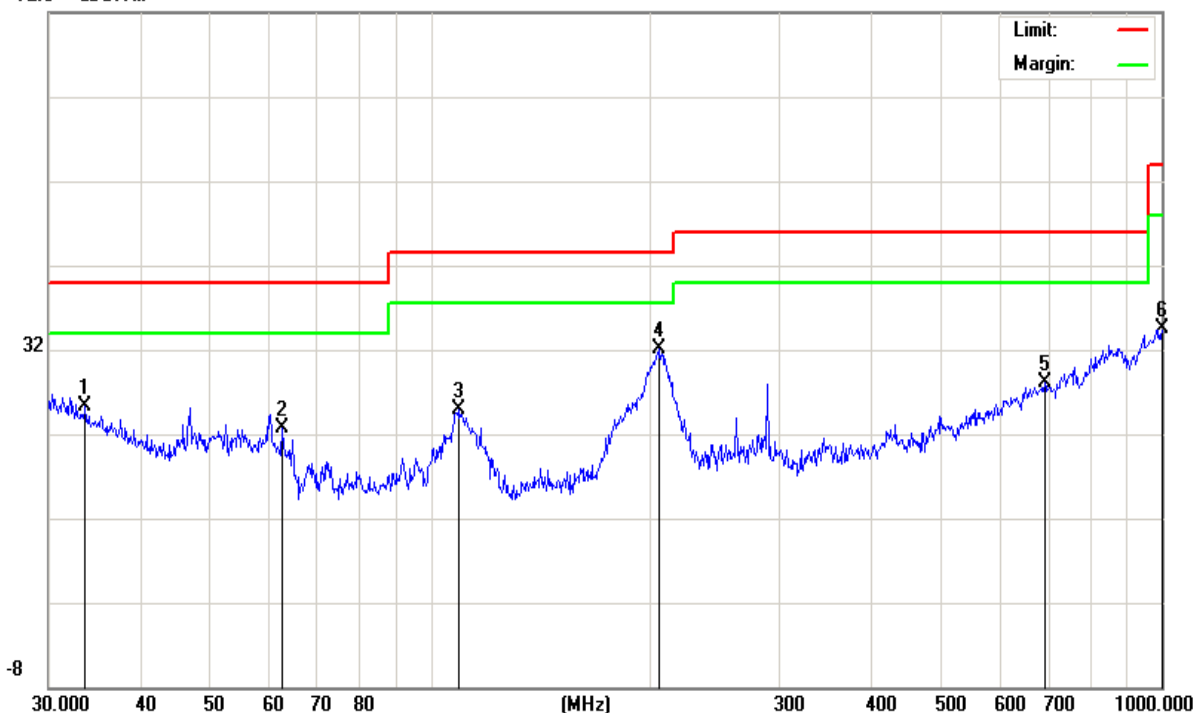
EUT:	Bluetooth Key	Model Name:	Haikey3000
Temperature:	24 °C	Relative Humidity:	54%
Pressure:	1010 hPa	Test Date :	2017-08-22
Test Mode :	Mode 1	Polarization :	Horizontal
Test Power :	DC 5V from PC AC120V/60Hz		

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
H	33.6802	5.81	19.53	25.34	40.00	-14.66	QP
H	62.6507	13.77	8.99	22.76	40.00	-17.24	QP
H	109.4116	14.73	10.23	24.96	43.50	-18.54	QP
H	205.6751	18.37	13.80	32.17	43.50	-11.33	QP
H	691.9867	6.98	21.09	28.07	46.00	-17.93	QP
H	1000.0000	6.25	28.25	34.50	54.00	-19.50	QP

Remark:

Factor = Antenna Factor + Cable Loss - Amplifier.

72.0 dBuV/m

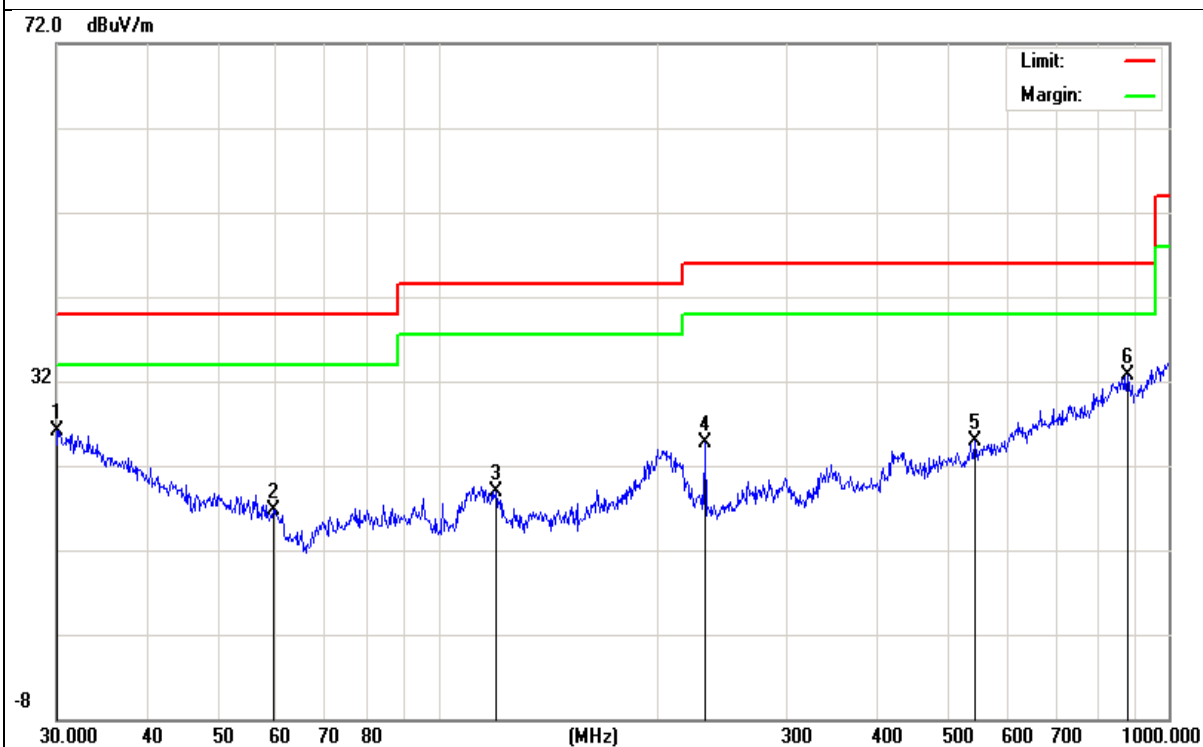


EUT:	Bluetooth Key	Model Name :	Haikey3000
Temperature:	24 °C	Relative Humidity:	54%
Pressure:	1010 hPa	Test Date :	2017-08-22
Test Mode :	Mode 1	Polarization :	Vertical
Test Power :	DC 5V from PC AC120V/60Hz		

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
V	30.0000	4.92	21.20	26.12	40.00	-13.88	QP
V	59.4405	5.11	11.55	16.66	40.00	-23.34	QP
V	119.8555	8.33	10.60	18.93	43.50	-24.57	QP
V	231.7178	12.61	12.06	24.67	46.00	-21.33	QP
V	543.2741	6.72	18.21	24.93	46.00	-21.07	QP
V	878.3214	6.72	25.92	32.64	46.00	-13.36	QP

Remark:

Factor = Antenna Factor + Cable Loss - Amplifier.



3.2.5 TEST RESULTS(1000~6000MHz)

EUT:	Bluetooth Key	Model Name :	Haikey3000
Temperature:	24 °C	Relative Humidity:	54%
Pressure:	1010 hPa	Test Date :	2017-08-22
Test Mode :	Mode 1		
Test Power :	DC 5V from PC AC120V/60Hz		

All the modulation modes have been tested, and the worst result was report as below:

Polar (H/V)	Frequency	Reading	Correct	Result	Limit	Over Limit	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
V	1129.573	43.08	-10.25	32.83	74.00	-41.17	Pk
V	1129.573	33.90	-10.25	23.65	54.00	-30.35	AV
V	1764.712	45.25	-8.37	36.88	74.00	-37.12	Pk
V	1764.712	30.22	-8.37	21.85	54.00	-32.15	AV
V	2832.082	42.25	-5.12	37.13	74.00	-36.87	Pk
V	2832.082	31.10	-5.12	25.98	54.00	-28.02	AV
V	4891.499	39.33	4.76	44.09	74.00	-29.91	Pk
V	4891.499	22.26	4.76	27.02	54.00	-26.98	AV
H	1596.237	45.87	-9.25	36.62	74.00	-37.38	Pk
H	1596.237	34.37	-9.25	25.12	54.00	-28.88	AV
H	2827.012	42.25	-5.11	37.14	74.00	-36.86	Pk
H	2827.012	26.59	-5.11	21.48	54.00	-32.52	AV
H	4744.751	39.28	4.44	43.72	74.00	-30.28	Pk
H	4744.751	19.10	4.44	23.54	54.00	-30.46	AV
H	4988.864	39.45	4.97	44.42	74.00	-29.58	Pk
H	4988.864	16.69	4.97	21.66	54.00	-32.34	AV

Remark:

Absolute Level= Reading Level+ Factor, Margin= Absolute Level - Limit

Note: Only the worst results data points are reported in the report.

END OF REPORT