



# **RADIO TEST REPORT**

**Test Report No.: 11185297S-A**

**Applicant** : ALPHA Corporation  
**Type of Equipment** : Pocket Key  
**Model No.** : 1YH10-0000  
**FCC ID** : 2AHY8PWG71001  
**Test regulation** : FCC Part15 Subpart C: 2015  
**Test result** : Complied

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
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6. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
7. This test report covers Radio technical requirements. It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)


**Date of test:**

March 20, 2016

**Representative test engineer:**

  
Yosuke Ishikawa  
Engineer  
Consumer Technology Division

**Approved by :**

  
Toyokazu Imamura  
Leader  
Consumer Technology Division



- ☐ The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan.  
☒ There is no testing item of "Non-accreditation".

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13-EM-F0429

## REVISION HISTORY

# Original Test Report No.: 11185297S-A

[illegible]

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## **SECTION 1: Customer information**

Company Name : ALPHA Corporation  
Address : 1-6-8 Fukuura, Kanazawa-ku, Yokohama City, Kanagawa, 236-0004, Japan  
Telephone Number : +81-45-787-8416  
Facsimile Number : +81-45-787-8427  
Contact Person : Koichi Tsurumaki

## **SECTION 2: Equipment under test (E.U.T.)**

### **2.1 Identification of E.U.T.**

Type of equipment : Pocket Key  
Model No. : 1YH10-0000  
Serial No. : Refer to 4.2.  
Rating : DC 3 V  
Country of Mass-production : Thailand  
Condition of EUT : Production model  
Receipt Date of Sample : March 11, 2016  
Modification of EUT : No modification by the test lab.

### **2.2 Product description**

Model: 1YH10-0000 (referred to as the EUT in this report) is a Pocket Key.

Clock frequency(ies) in the system : 2 MHz

Radio part:

Equipment type : Transceiver  
Frequency of operation : 315 MHz  
Type of modulation : FSK  
Antenna type : Pattern  
Antenna connector type : None

FCC 15.31 (e)

The test was performed with a new battery. Therefore, this EUT complies with the requirement.

FCC 15.203

The antenna is not removable from the EUT. Therefore the EUT complies with the requirement.

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## SECTION 3: Test specification, procedures & results

### 3.1 Test specification

Test specification : FCC Part 15 Subpart C: 2015, final revised on November 23, 2015  
Title : FCC 47CFR Part15 Radio Frequency Device  
Subpart C Intentional Radiators  
Section 15.231 Periodic operation in the band 40.66 - 40.70MHz and above 70MHz

\*Some parts are effective on and after December 17, 2015 or December 23, 2015. The revision does not affect the test specification applied to the EUT.

### 3.2 Procedures & Results

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted emission	FCC: ANSI C63.10:2013 6 Standard test methods ----- IC: RSS-Gen 8.8	FCC: Section 15.207 ----- IC: RSS-Gen 8.8	N/A	N/A *1)	-
Automatically deactivate	FCC: ANSI C63.10:2013 6 Standard test methods ----- IC: -	FCC: Section 15.231(a)(1) ----- IC: RSS-210 A1.1.1	N/A	Complied	Radiated
Electric field strength of fundamental emission	FCC: ANSI C63.10:2013 6 Standard test methods ----- IC: RSS-Gen 6.12	FCC: Section 15.231(b) ----- IC: RSS-210 A1.1.2	18.6 dB 315 MHz Horizontal	Complied	Radiated
Electric field strength of spurious emission	FCC: ANSI C63.10:2013 6 Standard test methods ----- IC: RSS-Gen 6.13	FCC: Section 15.205 Section 15.209 Section 15.231(b) ----- IC: RSS-210 A1.1.2, 2.5.1 RSS-Gen 8.9	12.9 dB 2835 MHz Average detector Horizontal	Complied	Radiated
-20dB bandwidth	FCC: ANSI C63.10:2013 6 Standard test methods ----- IC: -	FCC: Section 15.231(c) ----- IC: Reference data	N/A	Complied	Radiated

Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422.

\*1) The test is not applicable since the EUT does not have AC Mains.

### 3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99 % occupied bandwidth	IC: RSS-Gen 6.6	IC: RSS-210 A1.1.3	N/A	Complied	Radiated

Other than above, no addition, exclusion nor deviation has been made from the standard.

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### 3.4 Uncertainty

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor  $k=2$ .  
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Item	Frequency range	Uncertainty (+/-)			
		No. 1 SAC / SR	No. 2 SAC / SR	No. 3 SAC / SR	No. 4 SAC / SR
Conducted emission (AC Mains) LISN	150 kHz-30 MHz	2.1 dB	2.1 dB	2.6 dB	2.2 dB
Radiated emission (Measurement distance: 3 m)	9 kHz-30 MHz	2.7 dB	2.7 dB	3.1 dB	-
	30 MHz-300 MHz	4.4 dB	4.4 dB	4.6 dB	-
	300 MHz-1 GHz	5.6 dB	5.5 dB	5.3 dB	-
	1 GHz-13 GHz	5.2 dB	5.2 dB	5.2 dB	-
Radiated emission (Measurement distance: 1 m)	13 GHz-18 GHz	4.9 dB	4.9 dB	4.9 dB	-
	18 GHz-40 GHz	4.9 dB	4.9 dB	4.9 dB	-

SAC=Semi-Anechoic Chamber

SR= Shielded Room is applied besides radiated emission

Antenna terminal test	Uncertainty (+/-)
Power Measurement above 1 GHz (Average Detector)_SPM-06	0.76 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-06	0.79 dB
Power Measurement above 1 GHz (Average Detector)_SPM-07	0.74 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-07	1.08 dB
Spurious emission (Conducted) below 1GHz	1.5 dB
Spurious emission (Conducted) 1 GHz-3 GHz	1.7 dB
Spurious emission (Conducted) 3 GHz-18 GHz	2.4 dB
Spurious emission (Conducted) 18 GHz-26.5 GHz	2.5 dB
Spurious emission (Conducted) 26.5 GHz-40 GHz	2.5 dB
Bandwidth Measurement	0.66 %
Duty cycle and Time Measurement	0.012 %

### Radiated emission

The data listed in this test report has enough margin, more than site margin.

### 3.5 Test location

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JAB Accreditation No. : RTL02610

	IC Registration No.	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
<input type="checkbox"/> No.1 Semi-anechoic chamber	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
<input type="checkbox"/> No.2 Semi-anechoic chamber	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
<input checked="" type="checkbox"/> No.3 Semi-anechoic chamber	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5 m
<input type="checkbox"/> No.4 Semi-anechoic chamber	-	8.1 x 5.1 x 3.55	8.1 x 5.1	-
<input type="checkbox"/> No.1 shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
<input type="checkbox"/> No.2 shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
<input type="checkbox"/> No.3 shielded room	-	6.3 x 4.7 x 2.7	6.3 x 4.7	-
<input type="checkbox"/> No.4 shielded room	-	4.4 x 4.7 x 2.7	4.4 x 4.7	-
<input type="checkbox"/> No.5 shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
<input type="checkbox"/> No.6 shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
<input type="checkbox"/> No.1 Measurement room	-	2.55 x 4.1 x 2.5	-	-

### 3.6 Test setup, Data of test & Test instruments

Refer to APPENDIX 1 to 3.

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## **SECTION 4: Operation of E.U.T. during testing**

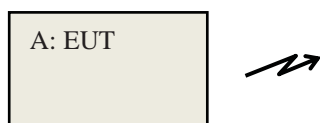
### **4.1 Operating mode**

The EUT exercise program used during testing was designed to exercise the various system components in a manner similar to typical use.

Test Item*	Mode
Automatically Deactivate	Normal use mode (Software: Ver1.3)
Duty Cycle Electric Field Strength of Fundamental Emission Electric Field Strength of Spurious Emission -20 dB & 99 % Occupied Bandwidth	Transmitting mode (Tx) *1 (Software: Testver1.0)
* The system was configured in typical fashion (as a user would normally use it) for testing. End users cannot change the settings of the output power of the product. *1) The software of this mode is the same as one of normal product, except that EUT continues to transmit when transmitter button is pressed.	

Justification: The system was configured in typical fashion (as customer would normally use it) for testing.

### **4.2 Configuration and peripherals**



\* Test data was taken under worse case conditions.

#### **Description of EUT and Support equipment**

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Pocket Key	1YH10-0000	16A22-1.2 0021	ALPHA Corporation	EUT

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## **SECTION 5: Radiated emission (Electric field strength of fundamental and spurious emission)**

### **Test Procedure and conditions**

[For below 1 GHz]

EUT was placed on a platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane.

The table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity.

The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

[For above 1 GHz]

EUT was placed on a urethane platform of nominal size, 0.5 m by 0.5 m, raised 1.5 m above the conducting ground plane. The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with absorbent materials lined on a ground plane.

Photographs of the set up are shown in Appendix 3.

### **Below 30 MHz**

The noise level was checked by moving a search-coil (Loop Antenna) close to the EUT.

### **Above 30 MHz**

The Radiated Electric Field Strength has been measured on Semi anechoic chamber with a ground plane and at a distance of 3 m. The measuring antenna height was varied between 1 and 4 m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field strength. The measurements were performed for both vertical and horizontal antenna polarization. The radiated emission measurements were made with the following detector function of the test receiver / spectrum analyzer.

### **Test Antennas are used as below;**

Frequency	Below 30 MHz	30 MHz to 300 MHz	300 MHz to 1 GHz	Above 1 GHz
Antenna Type	Loop	Biconical	Logperiodic	Horn

	9 kHz to 90 kHz and 110 kHz to 150 kHz	90 kHz to 110 kHz	150 kHz to 490 kHz	490 kHz to 30 MHz	30 MHz to 1 GHz	Above 1 GHz
Detector Type	Peak	Peak	Peak	Peak	Quasi-Peak	Peak and Average
IF Bandwidth	200 Hz	200 Hz	9.1 kHz	9.1 kHz	120 kHz	PK: S/A: RBW 1 MHz, VBW: 3 MHz AV: S/A: RBW 1 MHz, VBW: 10 Hz

The carrier level (or, noise levels) was (or were) measured at each position of all three axes X, Y and Z, and the position that has the maximum noise was determined.

Noise levels of all the frequencies were measured at the position.

This EUT has two modes which mechanical key is inserted or not. The worst case was confirmed with and without mechanical key, as a result, the test with mechanical key was the worst case. Therefore the test with mechanical key was performed only.

\*The result is rounded off to the second decimal place, so some differences might be observed.

**Measurement range** : 9 kHz - 3.2 GHz

**Test data** : APPENDIX

**Test result** : Pass

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## **SECTION 6: Automatically deactivate**

### **Test Procedure**

The measurement was performed with Electric field strength using a spectrum analyzer.

**Test data** : APPENDIX  
**Test result** : Pass

## **SECTION 7: -20 dB and 99 % occupied bandwidth**

### **Test Procedure**

The test was measured with a spectrum analyzer using a test fixture.

Test	Span	RBW	VBW	Sweep	Detector	Trace	Instrument used
20 dB Bandwidth	20 MHz	2 kHz	6.2 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99 % Occupied Bandwidth	Enough width to display emission skirts	1 to 5 % of OBW	Three times of RBW	Auto	Peak *1)	Max Hold *1)	Spectrum Analyzer
*1) The measurement was performed with Peak detector, Max Hold since the duty cycle was not 100 %.							

**Test data** : APPENDIX  
**Test result** : Pass

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# APPENDIX 1: Data of Radio tests

## Automatically deactivate: FCC 15.231(a)(1)

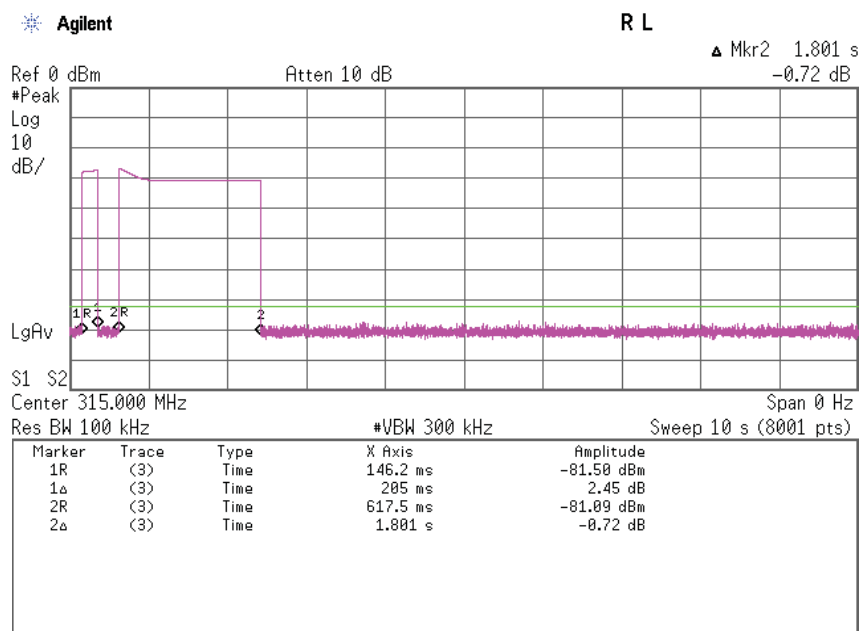
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No.3 Semi-Anechoic Chamber

Company : ALPHA corporation  
Equipment : Pocket Key  
Model : 1YH10-0000  
Sample No. : 16A22-1.2 0028  
Power : DC 3.0V (Battery)  
Mode : Transmitting (315MHz)

Regulation : FCC Part15C Section 15.231(a)(1)  
Regulation : RSS-210 A1.1.1(a)  
Test Distance : 1 m  
Date : March 20, 2016  
Temperature : 21 deg.C  
Humidity : 41 %RH  
Engineer : Yosuke Ishikawa

Time of Transmitting [sec]	Limit [sec]	Result
2.006	5	PASS



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## Radiated Emission (Electric Field Strength of Fundamental and Spurious Emission)

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No.3 Semi-Anechoic Chamber

Company : ALPHA corporation  
 Equipment : Pocket Key  
 Model : 1YH10-0000  
 Sample No. : 16A22-1.2 0028  
 Power : DC 3.0V (Battery)  
 Mode : Transmitting (315MHz)

Regulation : FCC Part15C Section 15.231(b), 15.209  
 Regulation : RSS-210 A1.1(Table A), A1.1.2  
 Test Distance : 3 m  
 Date : March 20, 2016  
 Temperature : 21 deg.C  
 Humidity : 41 %RH  
 Engineer : Yosuke Ishikawa

### Quasi-Peak detector

Frequency [MHz]	Reading [dBuV]		Ant Factor [dB/m]	Loss [dB]	Gain [dB]		Result [dBuV/m]		Limit [dBuV/m]	Margin [dB]		Remark
	Hor	Ver					Hor	Ver		Hor	Ver	
315.000	66.0	62.3	14.2	8.7	32.0	-	57.0	53.3	75.6	18.6	22.3	Carrier
630.000	35.6	36.2	19.3	10.0	31.9	-	33.1	33.7	55.6	22.6	22.0	outside
945.000	25.3	24.4	22.6	11.1	30.6	-	28.4	27.5	55.6	27.3	28.2	outside

Result = Reading + Ant Factor + Loss (Cable+Attenuator) - Gain(Amplifier)

### Peak detector

Frequency [MHz]	Reading [dBuV]		Ant Factor [dB/m]	Loss [dB]	Gain [dB]		Result [dBuV/m]		Limit [dBuV/m]	Margin [dB]		Remark Inside or Outside of Restricted Bands
	Hor	Ver					Hor	Ver		Hor	Ver	
1260.000	50.5	48.5	24.6	6.2	40.7	-	40.6	38.5	75.6	35.0	37.1	outside
1575.000	46.4	45.8	25.2	6.5	40.8	-	37.3	36.7	73.9	36.6	37.2	inside
1890.000	52.8	53.4	26.6	6.8	40.9	-	45.2	45.8	75.6	30.4	29.8	outside
2205.000	50.4	48.8	27.4	7.0	41.0	-	43.8	42.2	73.9	30.1	31.7	inside
2520.000	49.4	48.5	28.0	7.3	41.0	-	43.6	42.8	75.6	32.0	32.8	outside
2835.000	53.1	50.1	28.1	7.5	40.8	-	47.9	44.9	73.9	26.0	29.0	inside
3150.000	49.2	48.1	28.2	7.7	40.8	-	44.4	43.3	75.6	31.2	32.3	outside

Result = Reading + Ant Factor + Loss (Cable+Distance Factor) - Gain(Amplifier)

Distance factor : 1 GHz - 3.2 GHz :  $20\log(3.95\text{ m} / 3.0\text{ m}) = 3.5\text{ dB}$

### Average detector

Frequency [MHz]	Reading [dBuV]		Ant Factor [dB/m]	Loss [dB]	Gain [dB]		Result [dBuV/m]		Limit [dBuV/m]	Margin [dB]		Remark
	Hor	Ver					Hor	Ver		Hor	Ver	
1260.000	39.2	39.4	24.6	6.2	40.7	-	29.2	29.4	55.6	26.4	26.2	outside
1575.000	35.5	34.0	25.2	6.5	40.8	-	26.4	24.9	53.9	27.5	29.0	inside
1890.000	46.2	46.9	26.6	6.8	40.9	-	38.6	39.4	55.6	17.0	16.3	outside
2205.000	41.1	36.6	27.4	7.0	41.0	-	34.5	30.1	53.9	19.4	23.8	inside
2520.000	40.5	39.1	28.0	7.3	41.0	-	34.7	33.4	55.6	20.9	22.2	outside
2835.000	46.2	41.8	28.1	7.5	40.8	-	41.0	36.6	53.9	12.9	17.3	inside
3150.000	40.3	37.7	28.2	7.7	40.8	-	35.5	32.9	55.6	20.1	22.7	outside

Result = Reading + Ant Factor + Loss (Cable+Distance Factor) - Gain(Amplifier)

Distance factor : 1 GHz - 3.2 GHz :  $20\log(3.95\text{ m} / 3.0\text{ m}) = 3.5\text{ dB}$

### REMARKS

ANTENNA TYPE: 30-300 MHz Biconical / 300-1000 MHz Logperiodic / 1-3.2 GHz Horn

\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

\*Below 30MHz: No noise detected signal from EUT.

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## Duty Cycle (Fundamental) (Reference data)

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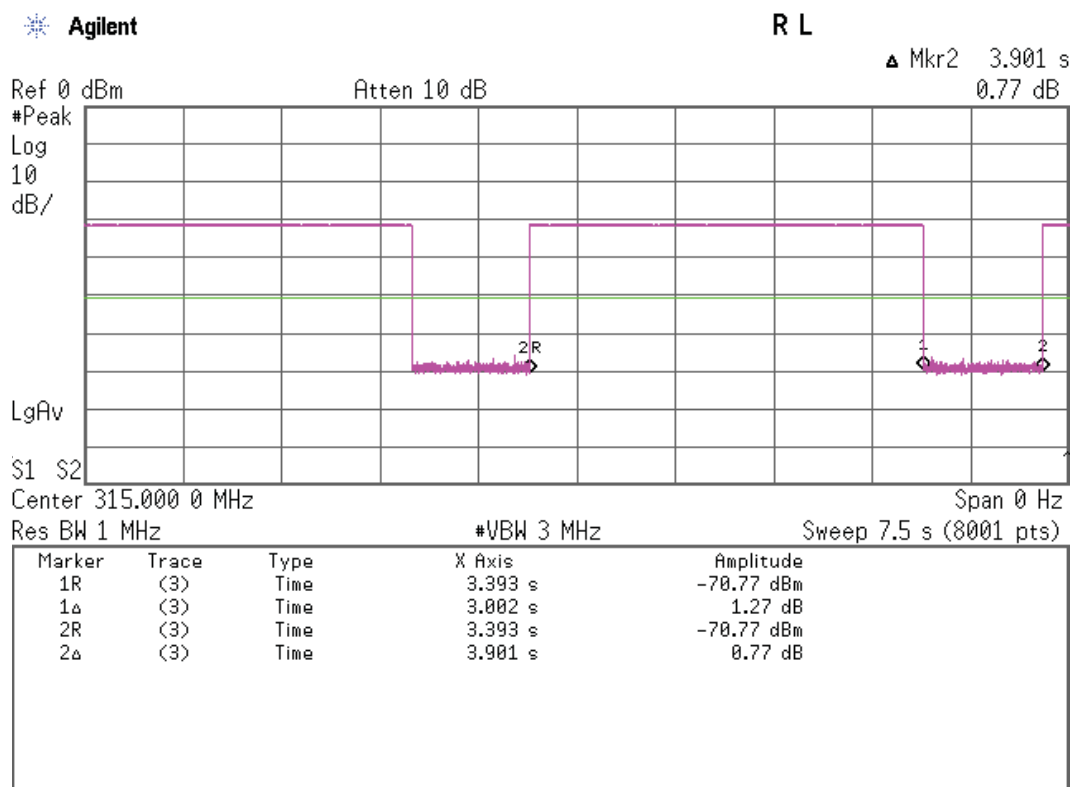
No.3 Semi-Anechoic Chamber

Company : ALPHA corporation  
Equipment : Pocket Key  
Model : 1YH10-0000  
Sample No. : 16A22-1.2 0028  
Power : DC 3.0V (Battery)  
Mode : Transmitting (315MHz)

Regulation : FCC Part15C Section 15.231(b), 15.35(c)  
Regulation : RSS-210 & RSS-Gen  
Test Distance : 1 m  
Date : March 20, 2016  
Temperature : 21 deg.C  
Humidity : 41 %RH  
Engineer : Yosuke Ishikawa

ON time [sec]	Cycle [sec]	Duty (On time / Cycle)	Duty [dB]
3.002	3.901	0.77	-2.28

\*Duty = 20log (On time / Cycle)



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## 20dB Bandwidth: FCC 15.231(c) & Occupied bandwidth

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No.3 Semi-Anechoic Chamber

Company : ALPHA corporation  
Equipment : Pocket Key  
Model : 1YH10—0000  
Sample No. : 16A22-1.2 0028  
Power : DC 3.0V (Battery)  
Mode : Transmitting (315MHz)

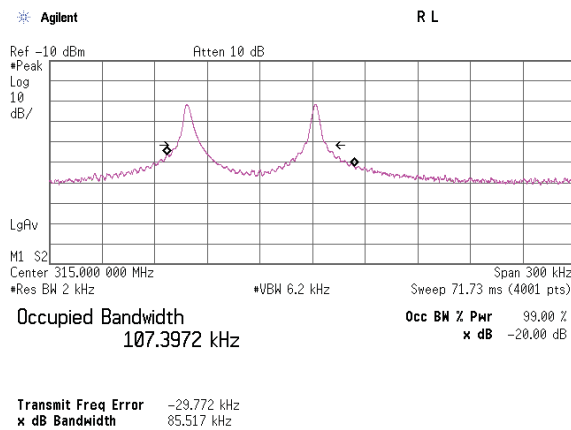
Regulation : FCC Part15C Section 15.231(c)  
Regulation : RSS-210 Annex A, A1.1.3 & RSS-Gen 4.6  
Test Distance : 1 m  
Date : March 20, 2016  
Temperature : 21 deg.C  
Humidity : 41 %RH  
Engineer : Yosuke Ishikawa

Bandwidth Limit : fundamental Frequency 315MHz x 0.25%= 787.5 kHz

20dB [kHz]	Bandwidth Limit [kHz]	Result
85.517	787.5	Pass

Bandwidth Limit : fundamental Frequency 315MHz x 0.25%= 787.5 kHz

99% Occupied [kHz]	Bandwidth Limit [kHz]	Result
107.3972	787.5	Pass



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## APPENDIX 2

### Test Instruments

#### EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2015/07/16 * 12
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	2015/10/11 * 12
SLA-03	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0901	RE	2015/10/11 * 12
SAT6-08	Attenuator	HIROSE ELECTRIC CO.,LTD.	AT-406(40)	-	RE	2015/08/31 * 12
SCC-C1/C2/C3/C4/C5/C10/ SRSE-03	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/ Suhner/Suhner/Suhner/ TOYO	8D2W/12DSFA/14 1PE/141PE/141PE /141PE/NS4906	-/0901-271(RF Selector)	RE	2015/04/17 * 12
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2016/02/25 * 12
STR-06	Test Receiver	Rohde & Schwarz	ESCI	101259	RE	2015/03/24 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE, RFLMF)	-	RE	-
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2015/10/22 * 12
SJM-15	Measure	ASKUL	-	-	RE	-
STS-03	Digital Hitester	Hioki	3805-50	080997823	RE	2015/11/18 * 12
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	1440491	RE	2015/05/27 * 12
SCC-G04	Coaxial Cable	Junkosha	J12J102207-00	JUN-12-14-018	RE	2015/06/08 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	2015/05/19 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2015/08/11 * 12
KSA-08	Spectrum Analyzer	Agilent	E4446A	MY46180525	RE	2016/03/28 * 12
SAEC-03(SVSWR)	Semi-Anechoic Chamber	TDK	SAEC-03(SVSWR)	3	RE	2015/08/28 * 12
SSCA-01	Search coil	LANGER	RF-R 400-1	02-0634	RE	Pre Check

The expiration date of the calibration is the end of the expired month .  
As for some calibrations performed after the tested dates , those test equipment have been controlled by means of an unbroken chains of calibrations .

All equipment is calibrated with valid calibrations . Each measurement data is traceable to the national or international standards .

Test Item :

RE: Radiated emission ,