



# Test Report

## FCC Part15 Subpart C& RSS-247 Issue 2

Product Name : Object Locator  
Model No. : TBOL100-915  
FCC ID : 2AMUGTBOL100  
IC : 22980-TBOL100

Applicant : TrackNet, Inc

Address : 900 Lafayette Street #329 Santa Clara, CA 95050 USA

Date of Receipt : Aug. 25, 2017  
Test Date : Aug. 25, 2017~ Dec. 04, 2017  
Issued Date : Mar. 07, 2018  
Report No. : 1782120R-RF-US-P06V01  
Report Version : V2.2

The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration of the equipment and evaluated measurement uncertainty herein.

This report must not be used to claim product endorsement by TAF, A2LA or any agency of the government.

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# Test Report Certification

Issued Date : Mar. 07, 2018

Report No. : 1782120R-RF-US-P06V01



Product Name : Object Locator  
 Applicant : TrackNet, Inc  
 Address : 900 Lafayette Street #329 Santa Clara, CA 95050 USA  
 Manufacturer : FLEXTRONICS COMPUTING (SUZHOU) CO., LTD  
 Address : No. 1 Guanpu Road, Guoxiang Street, Wuzhong District  
 Suzhou, Jiangsu, China, 215124  
 Model No. : TBOL100-915  
 FCC ID : 2AMUGTBOL100  
 IC : 22980-TBOL100  
 EUT Voltage : 3.8V DC  
 Test Voltage : AC120V/60Hz  
 Applicable Standard : FCC CFR Title 47 Part 15 Subpart C: 2017  
 KDB DA 00-705 Released March 30, 2000  
 ANSI C63.10: 2013  
 ISED RSS-Gen Issue 4 / RSS-247 Issue 2  
 Test Result : Complied  
 Performed Location : DEKRA Testing & Certification (Suzhou) Co., Ltd.  
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 Jiangsu, China  
 TEL: +86-512-6251-5088 / FAX: +86-512-6251-5098  
 FCC Designation Number: CN1199; IC Lab Code: 4075B

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## History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
1782120R-RF-US-P06V01	V1.0	Initial Issued Report	Dec. 18, 2017
1782120R-RF-US-P06V01	V2.0	Modified the Model number, Applicant and applicants address	Dec. 22, 2017
1782120R-RF-US-P06V01	V2.1	<ol style="list-style-type: none"><li>1. In Page 49, added the Time of Occupancy with the configuration of minimum number hopping channels data</li><li>2. In Page 59, added the Power Spectral Density data</li></ol>	Feb. 26, 2018
1782120R-RF-US-P06V01	V2.2	In Page 48-50, added the Time of Occupancy description	Mar. 07, 2018

**1. General Information**

**1.1. EUT Description**

Product Name	Object Locator
Model No.	TBOL100-915
Working Voltage	3.8V DC
Test Voltage	120V/60Hz
Frequency Range	902- 928 MHz
Channel Number	64
Channel Separation	200 kHz
Type of Modulation	LoRa
Data Rate	DR0~DR3:980bps/1760bps/3125bps/5470bps
Antenna Type	Reference to Antenna List
Peak Antenna Gain	Reference to Antenna List

Note: The power of DR1-DR3 is less than the power of DR0, so only DR0 mode was performed.

Working Frequency of Each Channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
00	902.3 MHz	01	902.5 MHz	02	902.7 MHz	03	902.9 MHz
04	903.1 MHz	05	903.3 MHz	06	903.5 MHz	07	903.7 MHz
08	903.9 MHz	09	904.1 MHz	10	904.3 MHz	11	904.5 MHz
12	904.7 MHz	13	904.9 MHz	14	905.1 MHz	15	905.3 MHz
16	905.5 MHz	17	905.7 MHz	18	905.9 MHz	19	906.1 MHz
20	906.3 MHz	21	906.5 MHz	22	906.7 MHz	23	906.9 MHz
24	907.1 MHz	25	907.3 MHz	26	907.5 MHz	27	907.7 MHz
28	907.9 MHz	29	908.1 MHz	30	908.3 MHz	31	908.5 MHz
32	908.7 MHz	33	908.9 MHz	34	909.1 MHz	35	909.3 MHz
36	909.5 MHz	37	909.7 MHz	38	909.9 MHz	39	910.1 MHz
40	910.3 MHz	41	910.5 MHz	42	910.7 MHz	43	910.9 MHz
44	911.1 MHz	45	911.3 MHz	46	911.5 MHz	47	911.7 MHz
48	911.9 MHz	49	912.1 MHz	50	912.3 MHz	51	912.5 MHz
52	912.7 MHz	53	912.9 MHz	54	913.1 MHz	55	913.3 MHz
56	913.5 MHz	57	913.7 MHz	58	913.9 MHz	59	914.1 MHz
60	914.3 MHz	61	914.5 MHz	62	914.7 MHz	63	914.9 MHz



### 1.2. Antenna information

Model No.	N/A		
Antenna manufacturer	N/A		
Antenna Delivery	<input checked="" type="checkbox"/> 1*TX+1*RX	<input type="checkbox"/> 2*TX+2*RX	<input type="checkbox"/> 3*TX+3*RX
Antenna technology	<input checked="" type="checkbox"/> SISO		
	<input type="checkbox"/> MIMO	<input type="checkbox"/> Basic	
		<input type="checkbox"/> CDD	
		<input type="checkbox"/> Beam-forming	
Antenna Type	<input type="checkbox"/> External	<input type="checkbox"/> Dipole	
	<input checked="" type="checkbox"/> Internal	<input checked="" type="checkbox"/> PIFA	
		<input type="checkbox"/> PCB	
		<input type="checkbox"/> Ceramic Chip Antenna	
		<input type="checkbox"/> Metal plate type F antenna	
		<input type="checkbox"/> Printed Antenna	
Antenna Gain	-4.63dBi		

### 1.3. Mode of Operation

DEKRA has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Test Mode
Mode 1: Transmitter

Note:

1. For portable device, radiated spurious emission was verified over X, Y, Z Axis, and shown the worst case on this report.
2. Regards to the frequency band operation for systems using FHSS modulation: normal operation (hopping) was selected to test for conducted spurious test.
3. The extreme test condition for voltage and temperature were declared by the manufacturer.
4. The reading values of all the test items contain cable loss.

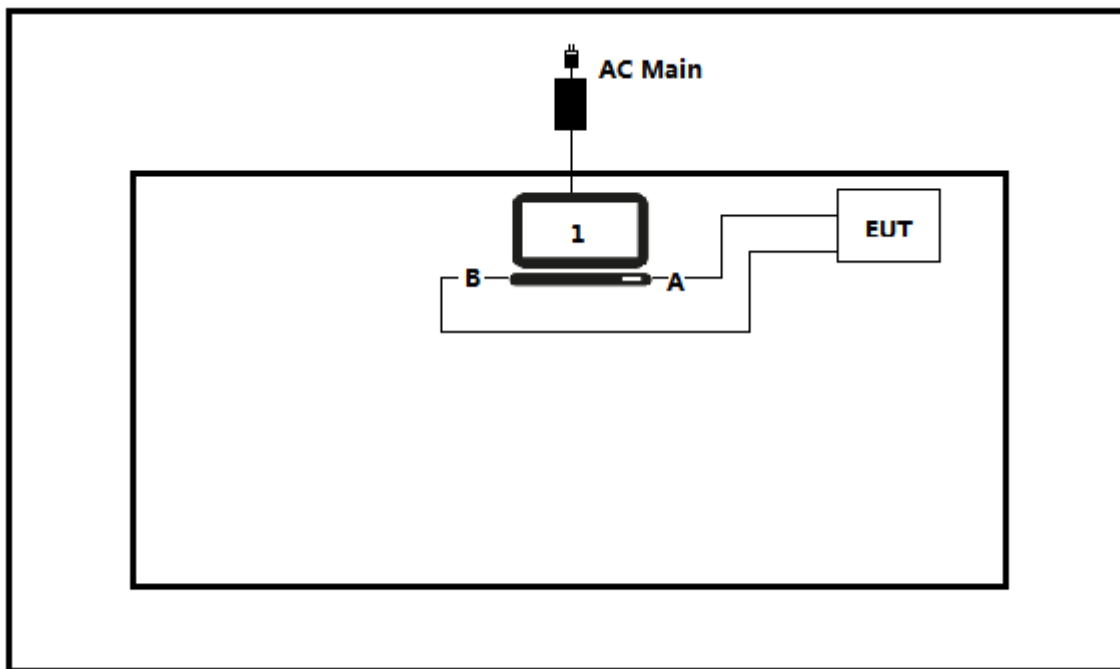
### 1.4. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

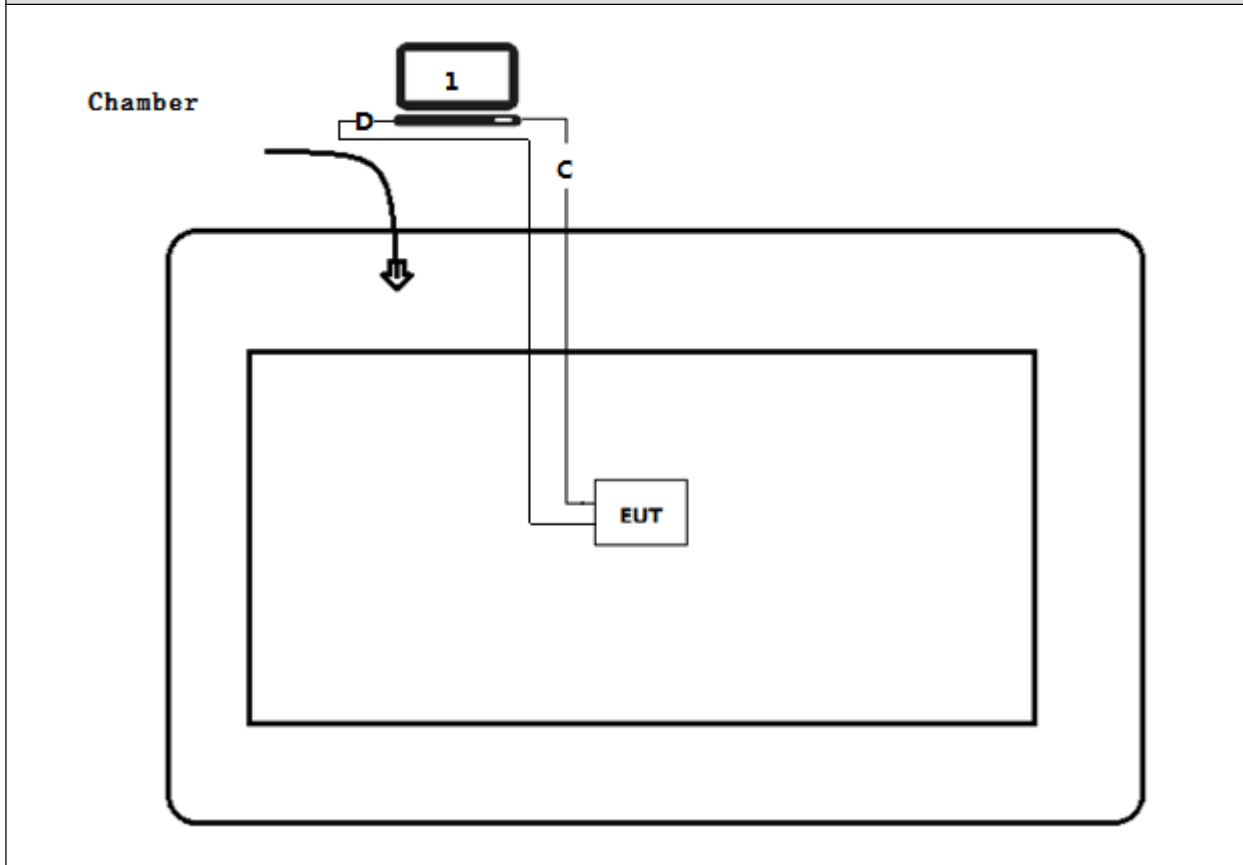
Product	Manufacturer	Model No.	Serial No.	Power Cord
1 Notebook	Think Pad	2526	LV-A3285	Power by adapter
A USB Cable	N/A	N/A	N/A	Shield, 0.75m
B Serial Cable	N/A	N/A	N/A	Shield, 0.75m
C USB Cable	N/A	N/A	N/A	Shield, 10m
D Serial Cable	N/A	N/A	N/A	Shield, 10m

### 1.5. Configuration of Tested System

Test setup Diagram- AC Line Conducted Emission Test



Test setup Diagram- Radiated Emission



## 1.6. EUT Exercise Software

1	Setup the EUT and simulators as shown on above.
2	Turn on the power of all equipment.
3	Run "cmd", and set the test mode and channel, then start continue Transmit.

**2. Technical Test**

**2.1. Summary of Test Result**

**For FCC:**

Performed Test Item	Normative References	Test Performed	Deviation
Conducted Emission	FCC CFR Title 47 Part 15 Subpart C: 2015 Section 15.207	Yes	No
Emissions in restricted frequency bands	FCC CFR Title 47 Part 15 Subpart C: 2015 Section 15.209	Yes	No
20dB Bandwidth	FCC CFR Title 47 Part 15 Subpart C: 2015 Section 15.247(a)(1)	Yes	No
Carrier Frequency Separation	FCC CFR Title 47 Part 15 Subpart C: 2015 Section 15.247(a)(1)	Yes	No
Number of Hopping Frequencies	FCC CFR Title 47 Part 15 Subpart C: 2015 Section 15.247(a)(1)(iii)	Yes	No
Time of Occupancy (Dwell Time)	FCC CFR Title 47 Part 15 Subpart C: 2015 Section 15.247(a)(1)(iii)	Yes	No
Peak Output Power	FCC CFR Title 47 Part 15 Subpart C: 2015 Section 15.247(b)(1)	Yes	No
Emissions in non-restricted frequency bands	FCC CFR Title 47 Part 15 Subpart C: 2015 Section 15.215(c), 15.247(d)	Yes	No
Radiated Emission Band Edge	FCC CFR Title 47 Part 15 Subpart C: 2015 15.247(d)	Yes	No
Antenna Requirement	FCC CFR Title 47 Part 15 Subpart C: 2015 Section 15.203	Yes	No

**For ISED:**

Performed Test Item	Normative References	Test Performed	Deviation
Conducted Emission	RSS-Gen Issue 4 Section 8.8	Yes	No
Emissions in restricted frequency bands	RSS-Gen Issue 4 Section 8.9	Yes	No
20dB Bandwidth	RSS-247 Issue 2 Section 5.1	Yes	No
Carrier Frequency Separation	RSS-247 Issue 2 Section 5.1	Yes	No
Number of Hopping Frequencies	RSS-247 Issue 2 Section 5.1	Yes	No
Time of Occupancy (Dwell Time)	RSS-247 Issue 2 Section 5.1	Yes	No
Peak Output Power	RSS-247 Issue 2 Section 5.4	Yes	No
Emissions in non-restricted frequency bands	RSS-247 Issue 2 Section 5.5	Yes	No
Radiated Emission Band Edge	RSS-Gen Issue 4 Section 8.10	Yes	No
Antenna Requirement	RSS-Gen Issue 4 Section 8.3	Yes	No

## 2.2. Test Environment

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	21
Humidity (%RH)	25-75	50
Barometric pressure (mbar)	860-1060	950-1000



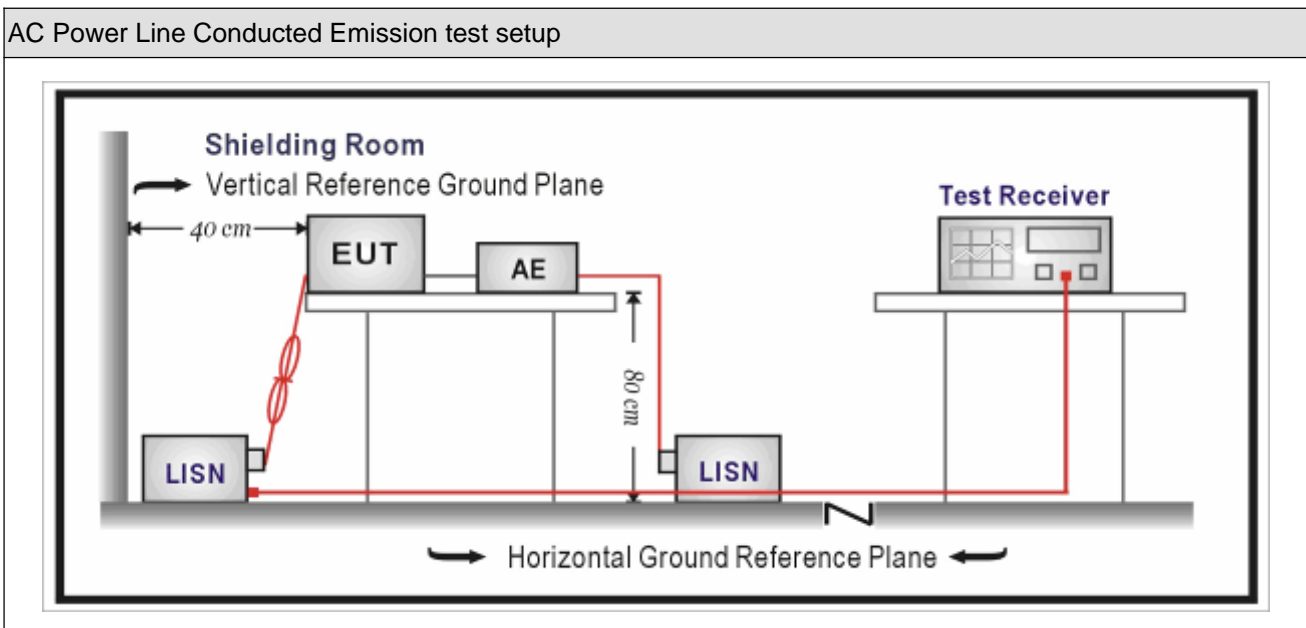
### 3. Conducted Emission

#### 3.1. Test Equipment

AC Power Line Conducted Emission / TR-1					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
EMI Test Receiver	R&S	ESCI	100906	2017.03.05	2018.03.04
Two-Line V-Network	R&S	ENV 216	101189	2017.07.16	2018.07.15
Two-Line V-Network	R&S	ENV 216	101044	2017.09.15	2018.09.15
50ohm Coaxial Switch	Anritsu	MP59B	6200464462	N/A	N/A
50ohm Termination	SHX	TF2	07081402	2017.09.15	2018.09.15
Temperature/Humidity Meter	Zhichen	ZC1-2	TR1-TH	2017.01.05	2018.01.04

Note: All equipment are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

#### 3.2. Test Setup



### 3.3. Limit

Frequency of Emission (MHz)	Conducted Limit	
	Quasi-peak (dB $\mu$ V)	Average (dB $\mu$ V)
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

Note 1: The lower limit shall apply at the transition frequencies.  
 Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

### 3.4. Test Procedure

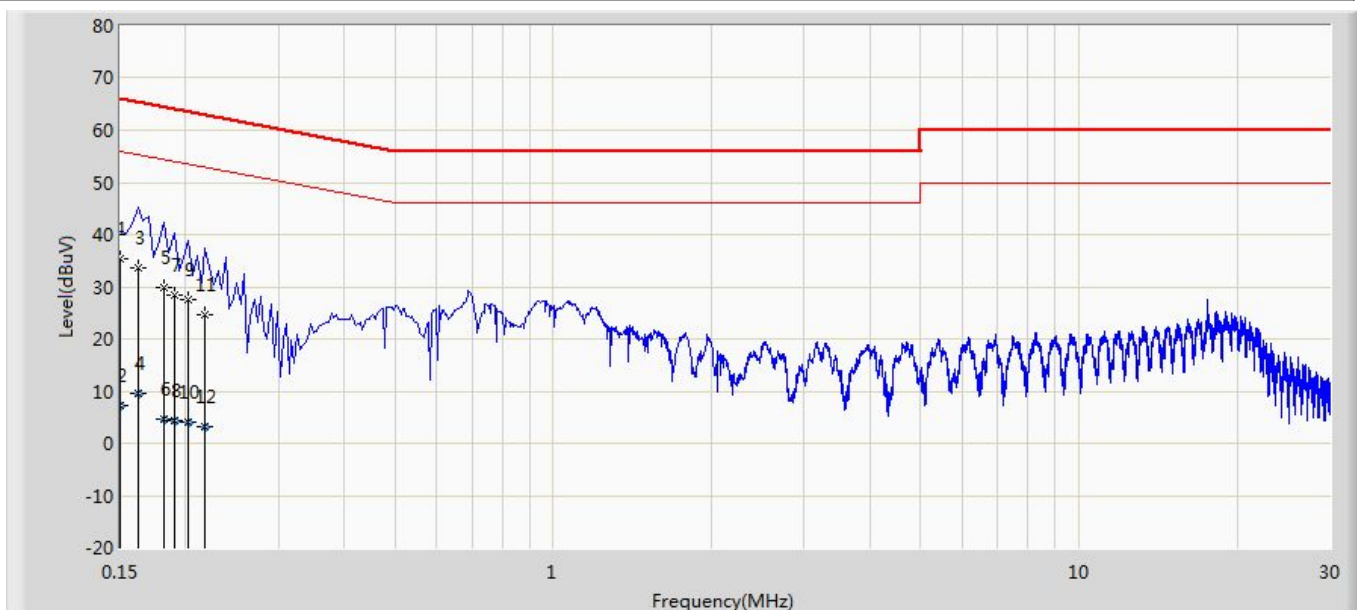
Test Method			
	References Rule	Chapter	Item
<input checked="" type="checkbox"/>	ANSI C63.10-2013	6.2	Standard test method for ac power-line conducted emissions from unlicensed wireless devices

### 3.5. Uncertainty

The measurement uncertainty is defined as  $\pm 2.02$  dB

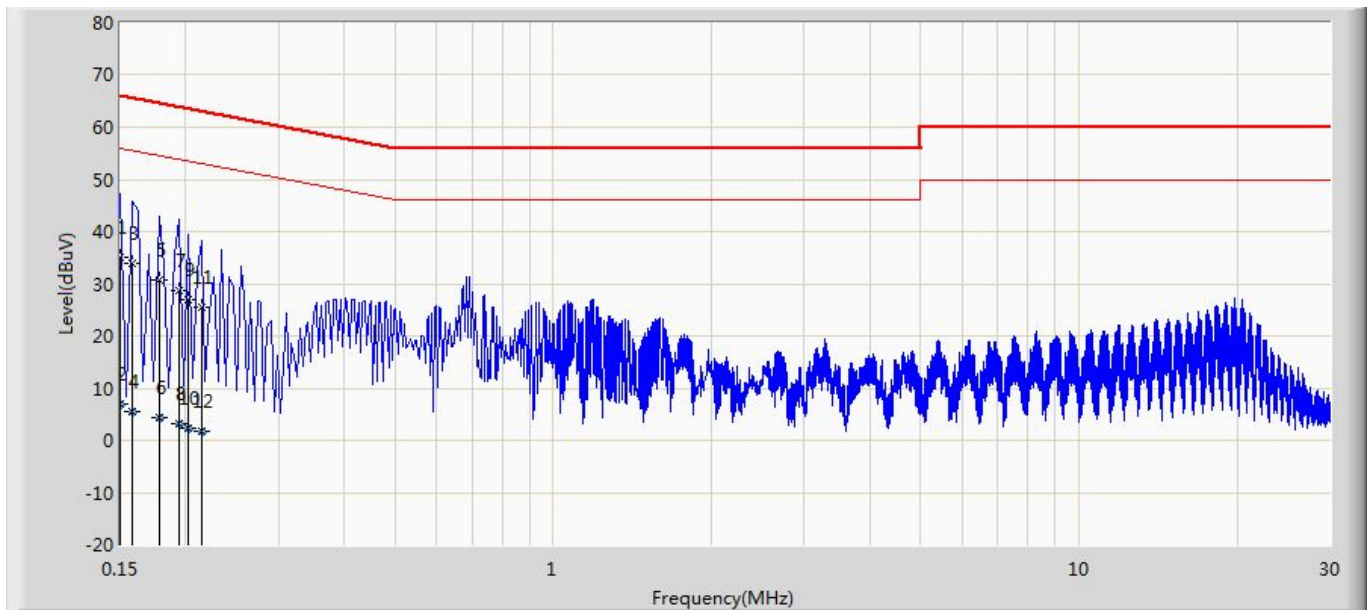
### 3.6. Test Result

Site: TR1	Time: 2017/09/15
Limit: FCC_Part15.207_CE	Margin: 0
Probe: ENV216_101190(0.009-30MHz)	Polarity: Line
EUT: Object Locator	Power: AC 120V/60Hz
Note: Mode 1:Transmit at channel 902.3MHz	



No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Probe (dB)	Cable (dB)	Amp (dB)	Type
1	*	0.150	35.226	25.591	-30.774	66.000	9.610	0.025	0.000	QP
2		0.150	7.153	-2.482	-48.847	56.000	9.610	0.025	0.000	AV
3		0.162	33.688	24.055	-31.673	65.361	9.607	0.026	0.000	QP
4		0.162	9.643	0.010	-45.717	55.361	9.607	0.026	0.000	AV
5		0.182	29.946	20.315	-34.448	64.394	9.603	0.028	0.000	QP
6		0.182	4.662	-4.969	-49.732	54.394	9.603	0.028	0.000	AV
7		0.190	28.546	18.915	-35.491	64.037	9.602	0.028	0.000	QP
8		0.190	4.311	-5.319	-49.726	54.037	9.602	0.028	0.000	AV
9		0.202	27.681	18.051	-35.847	63.528	9.601	0.029	0.000	QP
10		0.202	3.975	-5.655	-49.553	53.528	9.601	0.029	0.000	AV
11		0.218	24.661	15.032	-38.234	62.895	9.600	0.029	0.000	QP
12		0.218	3.132	-6.497	-49.763	52.895	9.600	0.029	0.000	AV

Site: TR1	Time: 2017/09/15
Limit: FCC_Part15.107_CE_AC Power_ClassB	Margin: 0
Probe: ENV216_101190(0.009-30MHz)	Polarity: Neutral
EUT: Object Locator	Power: AC 120V/60Hz
Note: Mode 1:Transmit at channel 902.3MHz	



No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Probe (dB)	Cable (dB)	Amp (dB)	Type
1	*	0.150	35.039	25.421	-30.961	66.000	9.594	0.025	0.000	QP
2		0.150	7.043	-2.575	-48.957	56.000	9.594	0.025	0.000	AV
3		0.158	33.852	24.234	-31.717	65.568	9.592	0.026	0.000	QP
4		0.158	5.432	-4.186	-50.137	55.568	9.592	0.026	0.000	AV
5		0.178	30.620	20.996	-33.958	64.578	9.596	0.028	0.000	QP
6		0.178	4.459	-5.164	-50.119	54.578	9.596	0.028	0.000	AV
7		0.194	28.691	19.064	-35.172	63.864	9.598	0.028	0.000	QP
8		0.194	3.171	-6.456	-50.693	53.864	9.598	0.028	0.000	AV
9		0.202	26.997	17.370	-36.531	63.528	9.598	0.029	0.000	QP
10		0.202	2.356	-7.271	-51.172	53.528	9.598	0.029	0.000	AV
11		0.214	25.641	16.013	-37.408	63.049	9.599	0.029	0.000	QP
12		0.214	1.761	-7.867	-51.287	53.049	9.599	0.029	0.000	AV

#### 4. Emissions in restricted frequency bands

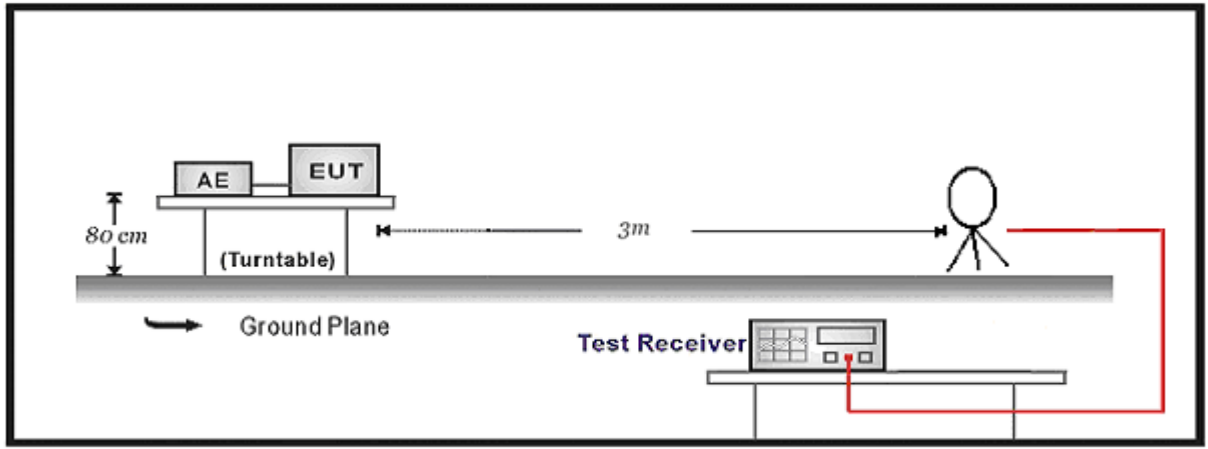
##### 4.1. Test Equipment

Radiated Emission(Below 1GHz) / AC-2					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
EMI Test Receiver	R&S	ESCI	100573	2017.03.29	2018.03.28
Loop Antenna	R&S	HFH2-Z2	833799/003	2017.11.16	2018.11.15
Bilog Antenna	Teseq GmbH	CBL6112D	27611	2017.10.16	2018.10.15
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC2-C	2017.03.02	2018.03.01
Temperature/Humidity Meter	Zhichen	ZC1-2	AC2-TH	2017.01.04	2018.01.03
Note: All equipment are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.					

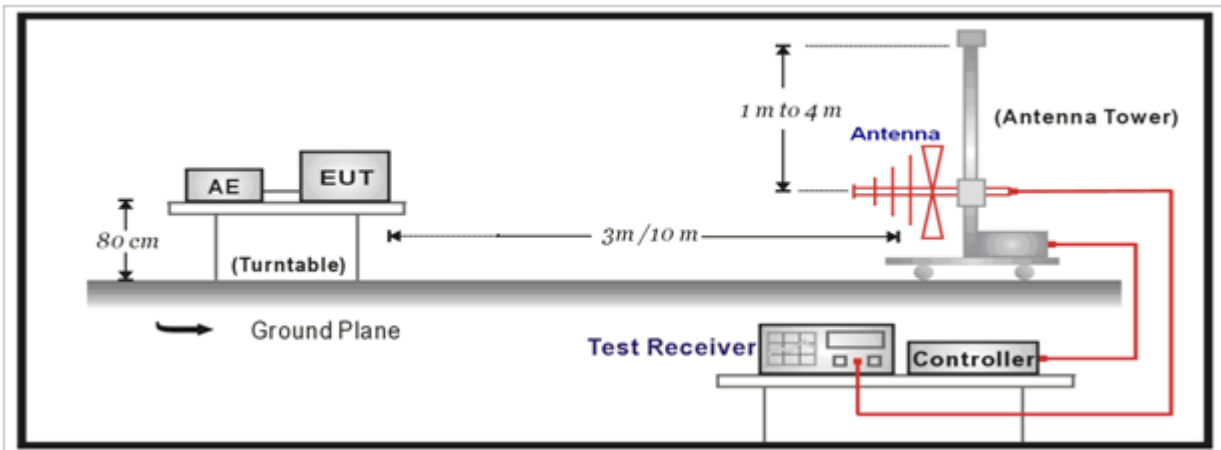
Radiated Emission(Above 1GHz) / AC-5					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2017.01.04	2018.01.03
Preamplifier	Miteq	NSP1800-25	1364185	2017.05.06	2018.05.05
Preamplifier	QuieTek	AP-040G	CHM-0906001	2017.05.06	2018.05.05
DRG Horn	ETS-Lindgren	3117	00123988	2017.01.22	2018.01.21
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	294	2017.11.25	2018.11.24
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C1	2017.03.02	2018.03.01
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C2	2017.03.02	2018.03.01
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	AC5-C3	2017.03.02	2018.03.01
EMI Receiver	Agilent	N9038A	MY51210196	2017.06.10	2018.06.09
Temperature/Humidity Meter	Zhichen	ZC1-2	AC5-TH	2017.01.04	2018.01.03
Note: All equipment are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.					

### 4.2. Test Setup

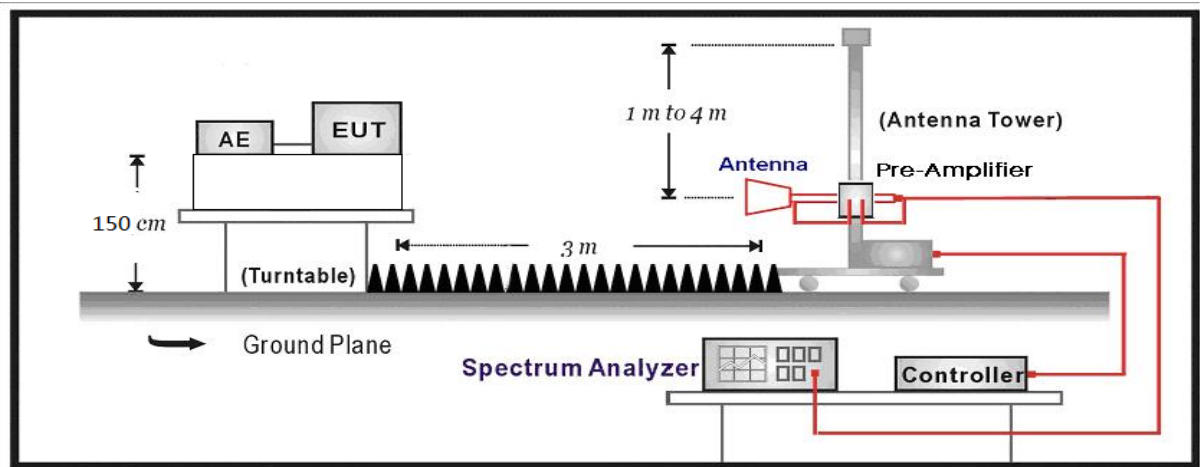
Below 30MHz Test Setup:



30MHz-1GHz Test Setup:



Above 1GHz Test Setup:



**4.3. Limit**

**For FCC:**

Restricted Bands of operation			
Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.090 – 0.110	16.42 – 16.423	399.9 – 410	4.5 – 5.15
0.495 – 0.505	16.69475 – 16.69525	608 – 614	5.35 – 5.46
2.1735 – 2.1905	16.80425 – 16.80475	960 – 1240	7.25 – 7.75
4.125 – 4.128	25.5 – 25.67	1300 – 1427	8.025 – 8.5
4.17725 – 4.17775	37.5 – 38.25	1435 – 1626.5	9.0 – 9.2
4.20725 – 4.20775	73 – 74.6	1645.5 – 1646.5	9.3 – 9.5
6.215 – 6.218	74.8 – 75.2	1660 – 1710	10.6 – 12.7
6.26775 – 6.26825	108 – 121.94	1718.8 – 1722.2	13.25 – 13.4
6.31175 – 6.31225	123 – 138	2200 – 2300	14.47 – 14.5
8.291 – 8.294	149.9 – 150.05	2310 – 2390	15.35 – 16.2
8.362 – 8.366	156.52475 – 156.52525	2483.5 – 2500	17.7 – 21.4
8.37625 – 8.38675	156.7 – 156.9	2690 – 2900	22.01 – 23.12
8.81425 – 8.81475	162.0125 – 167.17	3260 – 3267	23.6 – 24.0
12.29 – 12.293	167.72 – 173.2	3332 – 3339	31.2 – 31.8
12.51975 – 12.52025	240 – 285	3345.8 – 3358	36.43 – 36.5
12.57675 – 12.57725	322 – 335.4	3600 – 4400	
13.36 – 13.41			

**For ISED:**

Restricted Bands of operation			
Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.090-0.110	13.36-13.41	1645.5-1646.5	13.25-13.4
2.1735-2.1905	16.42-16.423	1660-1710	14.47-14.5
3.020-3.026	16.69475-16.69525	1718.8-1722.2	15.35-16.2
4.125-4.128	16.80425-16.80475	2200-2300	17.7-21.4
4.17725-4.17775	25.5-25.67	2310-2390	22.01-23.12
4.20725-4.20775	37.5-38.25	2655-2900	23.6-24.0
5.677-5.683	73-74.6	3260-3267	31.2-31.8
6.215-6.218	74.8-75.2	3332-3339	36.43-36.5
6.26775-6.26825	108-138	3345.8-3358	Above 38.6
6.31175-6.31225	156.52475-156.52525	3500-4400	
8.291-8.294	156.7-156.9	4500-5150	
8.362-8.366	240-285	5350-5460	
8.37625-8.38675	322-335.4	7250-7750	
8.41425-8.41475	399.9-410	8025-8500	
12.29-12.293	608-614	9.0-9.2	
12.51975-12.52025	960-1427	9.3-9.5	
12.57675-12.57725	1435-1626.5	10.6-12.7	



Restricted Band Emissions Limit			
Frequency (MHz)	Field strength ( $\mu$ V/m)	Field strength (dB $\mu$ V/m)	Measurement distance (m)
0.009 - 0.49	2400/F(kHz)	48.5 – 13.8	300 <sub>(Note 1)</sub>
0.49 - 1.705	24000/F(kHz)	33.8 - 23	30 <sub>(Note 1)</sub>
1.705 - 30	30	29.5	30 <sub>(Note 1)</sub>
30 - 88	100	40	3 <sub>(Note 2)</sub>
88 - 216	150	43.5	3 <sub>(Note 2)</sub>
216 - 960	200	46	3 <sub>(Note 2)</sub>
Above 960	500	54	3 <sub>(Note 2)</sub>

Note 1: At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade).

Note 2: At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 meters unless it can be further demonstrated that measurements at a distance of 30 meters or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).

#### 4.4. Test Procedure

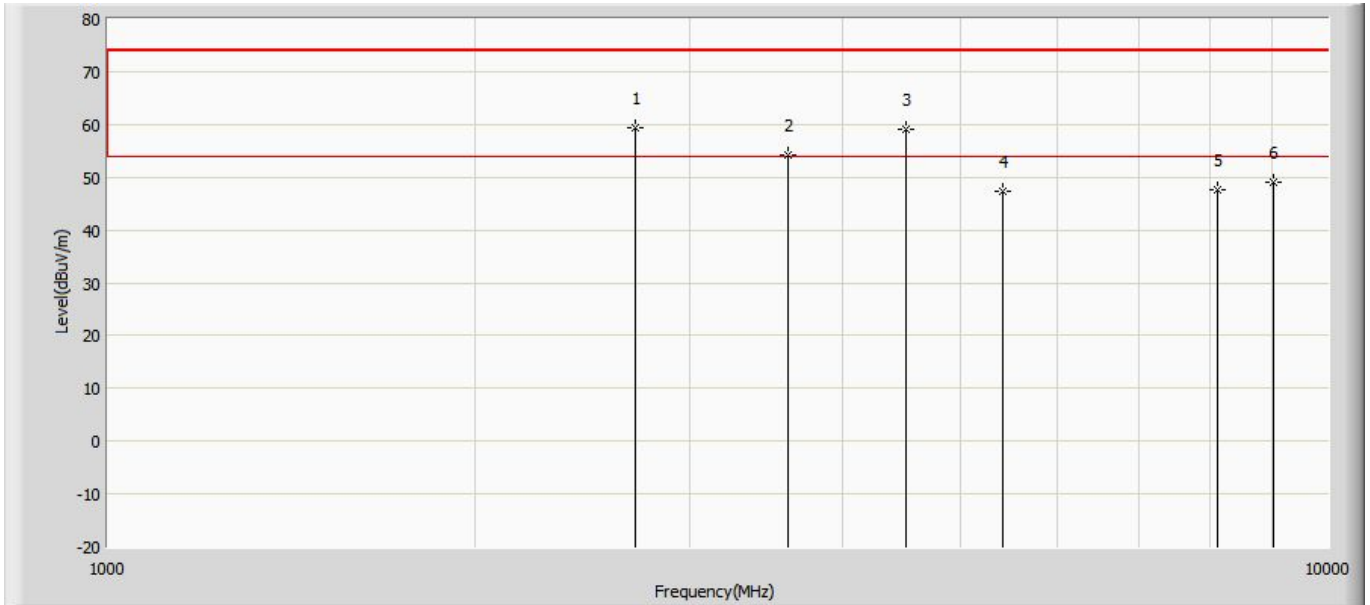
Test Method			
	References Rule	Chapter	Description
<input checked="" type="checkbox"/>	ANSI C63.10	6.4	Radiated emissions from unlicensed wireless devices below 30 MHz
<input checked="" type="checkbox"/>	ANSI C63.10	6.5	Radiated emissions from unlicensed wireless devices in the frequency range of 30 MHz to 1000 MHz
<input checked="" type="checkbox"/>	ANSI C63.10	6.6	Radiated emissions from unlicensed wireless devices above 1 GHz

#### 4.5. Uncertainty

The measurement uncertainty above 1G is defined as  $\pm 3.9$  dB  
 below 1G is defined as  $\pm 3.8$  dB

### 4.6. Test Result

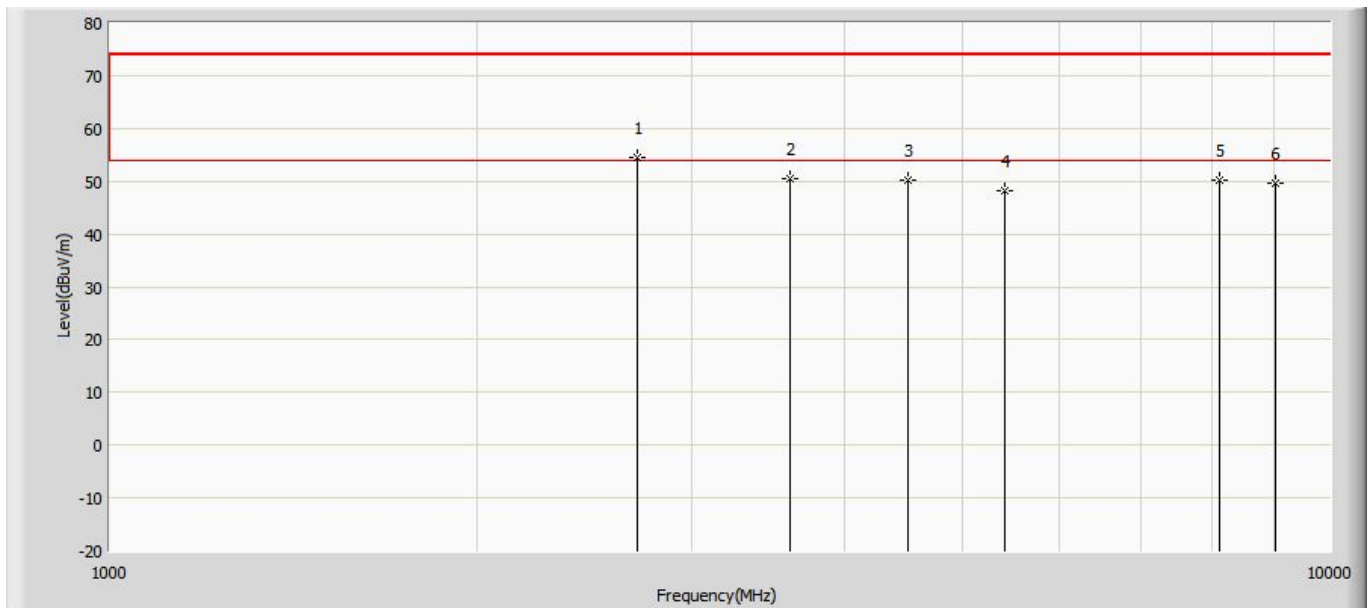
Site: AC5	Time: 2017/11/21 - 14:39
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: Object Locator	Power: 120V/60Hz
Note: Mode 1:Transmit at channel 902.3MHz	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2705.500	59.332	76.282	-14.668	74.000	-16.950	PK
2		3610.000	54.207	68.847	-19.793	74.000	-14.640	PK
3		4510.000	59.105	72.115	-14.895	74.000	-13.010	PK
4		5414.500	47.409	59.639	-26.591	74.000	-12.230	PK
5		8119.000	47.594	52.494	-26.406	74.000	-4.900	PK
6		9023.500	48.917	50.757	-25.083	74.000	-1.840	PK

No	Mark	Frequency (MHz)	PK Level (dBuV/m)	AV Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2705.500	59.332	43.962	-10.038	54.000	15.370	AV
2		3610.000	54.207	38.837	-15.163	54.000	15.370	AV
3		4510.000	59.105	43.735	-10.265	54.000	15.370	AV
4		5414.500	47.409	32.039	-21.961	54.000	15.370	AV
5		8119.000	47.594	32.224	-21.776	54.000	15.370	AV
6		9023.500	48.917	33.547	-20.453	54.000	15.370	AV

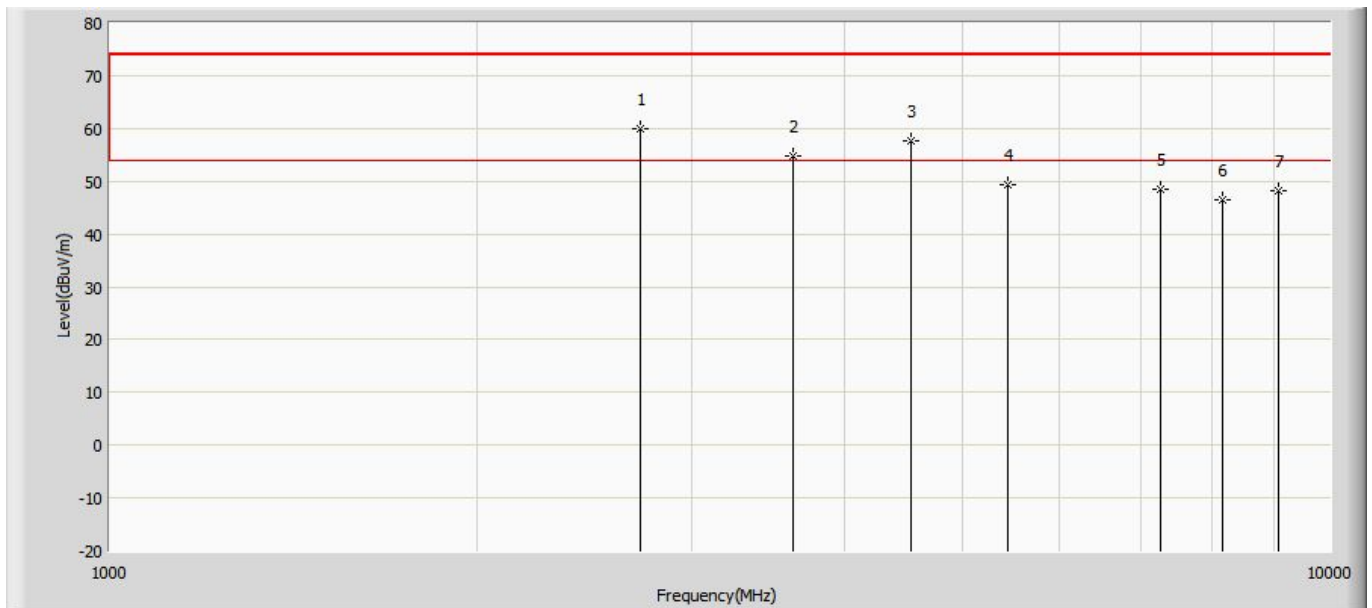
Site: AC5	Time: 2017/11/21 - 14:39
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: Object Locator	Power: 120V/60Hz
Note: Mode 1:Transmit at channel 902.3MHz	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2705.500	54.420	71.370	-19.580	74.000	-16.950	PK
2		3610.000	50.554	65.194	-23.446	74.000	-14.640	PK
3		4510.000	50.131	63.141	-23.869	74.000	-13.010	PK
4		5414.500	48.284	60.514	-25.716	74.000	-12.230	PK
5		8119.000	50.068	54.968	-23.932	74.000	-4.900	PK
6		9023.500	49.674	51.514	-24.326	74.000	-1.840	PK

No	Mark	Frequency (MHz)	PK Level (dBuV/m)	AV Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2705.500	54.420	39.050	-14.950	54.000	15.370	AV
2		3610.000	50.554	35.184	-18.816	54.000	15.370	AV
3		4510.000	50.131	34.761	-19.239	54.000	15.370	AV
4		5414.500	48.284	32.914	-21.086	54.000	15.370	AV
5		8119.000	50.068	34.698	-19.302	54.000	15.370	AV
6		9023.500	49.674	34.304	-19.696	54.000	15.370	AV

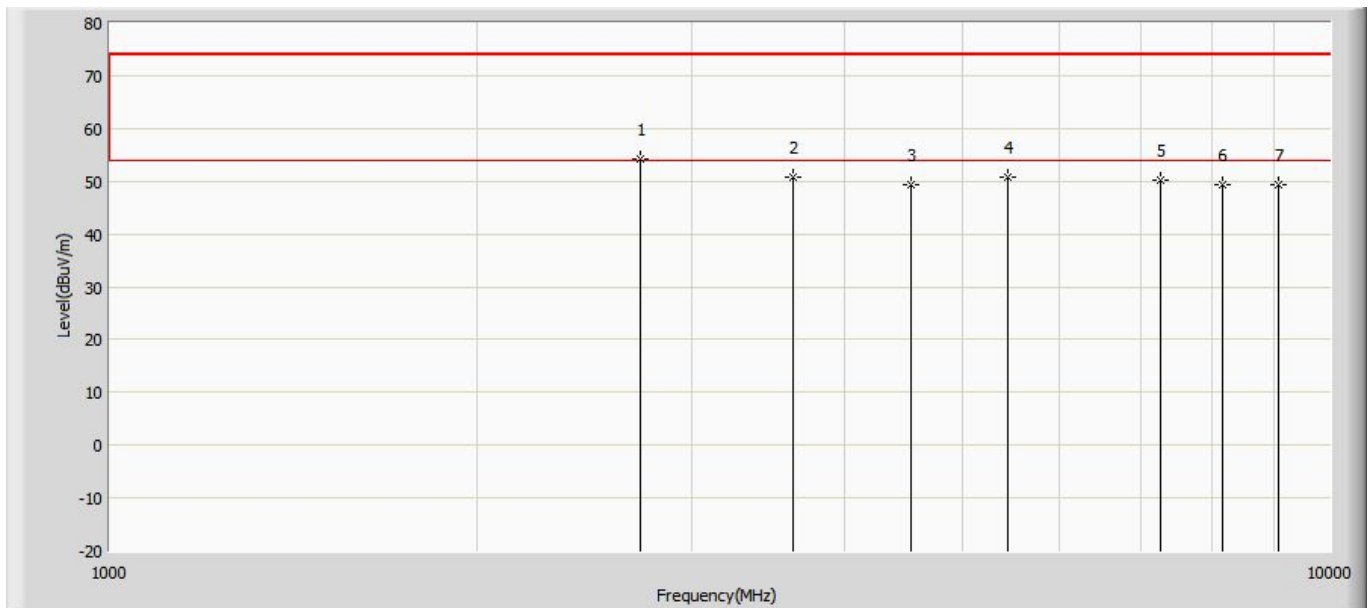
Site: AC5	Time: 2017/11/21 - 14:40
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: Object Locator	Power: 120V/60Hz
Note: Mode 1:Transmit at channel 908.5MHz	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2723.500	59.848	76.798	-14.152	74.000	-16.950	PK
2		3632.500	54.662	69.302	-19.338	74.000	-14.640	PK
3		4541.500	57.607	70.617	-16.393	74.000	-13.010	PK
4		5450.500	49.348	60.068	-24.652	74.000	-10.720	PK
5		7268.500	48.443	56.153	-25.557	74.000	-7.710	PK
6		8176.500	46.506	51.406	-27.494	74.000	-4.900	PK
7		9082.000	48.092	49.932	-25.908	74.000	-1.840	PK

No	Mark	Frequency (MHz)	PK Level (dBuV/m)	AV Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2723.500	59.848	44.478	-9.522	54.000	15.370	AV
2		3632.500	54.662	39.292	-14.708	54.000	15.370	AV
3		4541.500	57.607	42.237	-11.763	54.000	15.370	AV
4		5450.500	49.348	33.978	-20.022	54.000	15.370	AV
5		7268.500	48.443	33.073	-20.927	54.000	15.370	AV
6		8176.500	46.506	31.136	-22.864	54.000	15.370	AV
7		9082.000	48.092	32.722	-21.278	54.000	15.370	AV

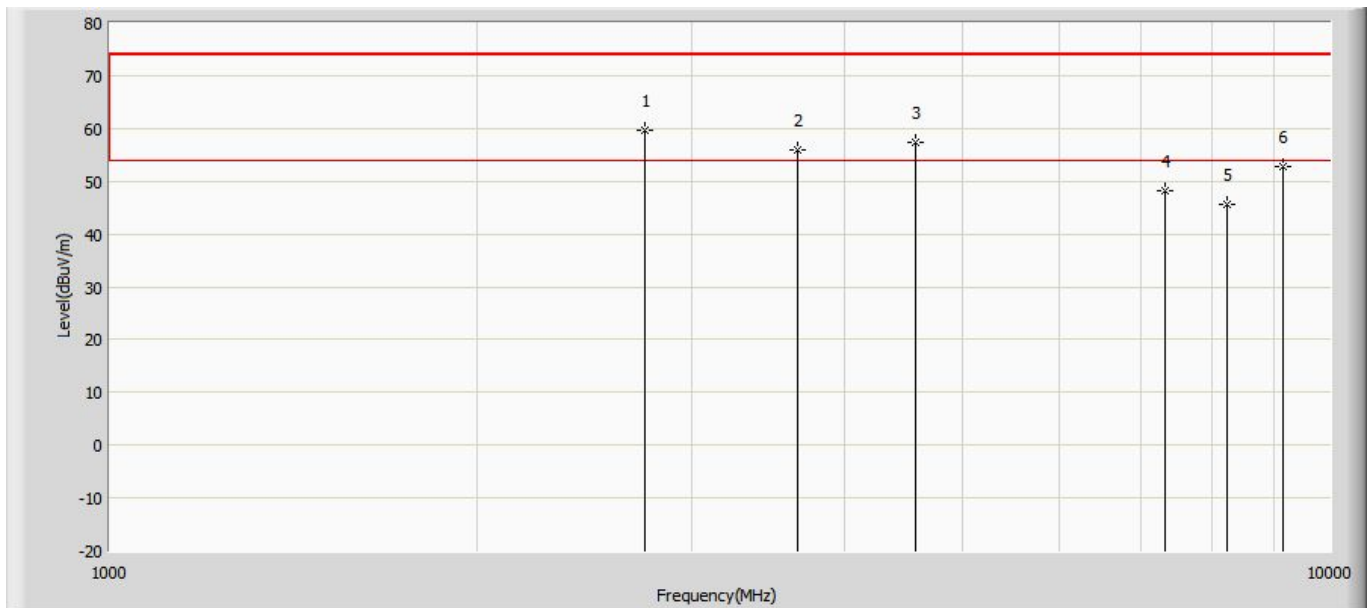
Site: AC5	Time: 2017/11/21 - 14:40
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: Object Locator	Power: 120V/60Hz
Note: Mode 1:Transmit at channel 908.5MHz	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2723.500	54.281	71.231	-19.719	74.000	-16.950	PK
2		3632.500	50.734	65.374	-23.266	74.000	-14.640	PK
3		4541.500	49.454	62.464	-24.546	74.000	-13.010	PK
4		5450.500	50.895	61.615	-23.105	74.000	-10.720	PK
5		7268.500	50.236	57.946	-23.764	74.000	-7.710	PK
6		8177.500	49.454	54.354	-24.546	74.000	-4.900	PK
7		9086.500	49.202	51.042	-24.798	74.000	-1.840	PK

No	Mark	Frequency (MHz)	PK Level (dBuV/m)	AV Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2723.500	54.281	38.911	-15.089	54.000	15.370	AV
2		3632.500	50.734	35.364	-18.636	54.000	15.370	AV
3		4541.500	49.454	34.084	-19.916	54.000	15.370	AV
4		5450.500	50.895	35.525	-18.475	54.000	15.370	AV
5		7268.500	50.236	34.866	-19.134	54.000	15.370	AV
6		8177.500	49.454	34.084	-19.916	54.000	15.370	AV
7		9086.500	49.202	33.832	-20.168	54.000	15.370	AV

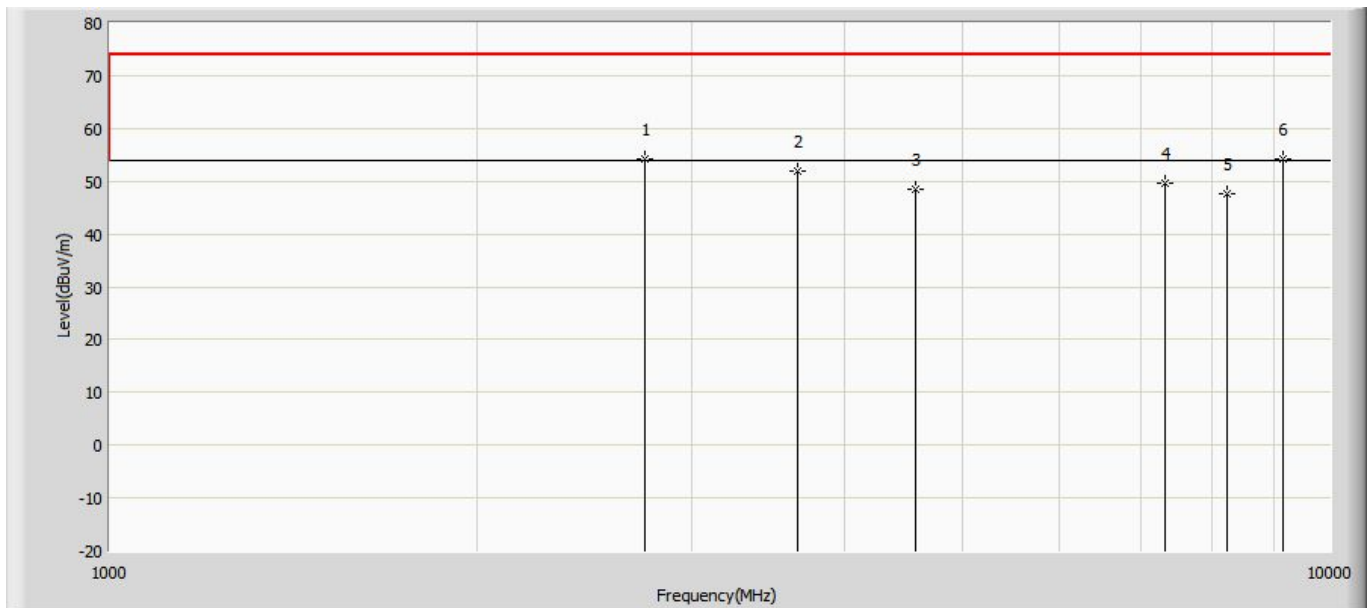
Site: AC5	Time: 2017/11/21 - 14:40
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: Object Locator	Power: 120V/60Hz
Note: Mode 1:Transmit at channel 914.9MHz	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2746.000	59.617	76.567	-14.383	74.000	-16.950	PK
2		3659.500	55.909	70.549	-18.091	74.000	-14.640	PK
3		4573.000	57.273	70.283	-16.727	74.000	-13.010	PK
4		7318.000	48.125	55.835	-25.875	74.000	-7.710	PK
5		8234.100	45.662	50.562	-28.338	74.000	-4.900	PK
6		9149.500	52.851	54.691	-21.149	74.000	-1.840	PK

No	Mark	Frequency (MHz)	PK Level (dBuV/m)	AV Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2746.000	59.617	44.247	-9.753	54.000	15.370	AV
2		3659.500	55.909	40.539	-13.461	54.000	15.370	AV
3		4573.000	57.273	41.903	-12.097	54.000	15.370	AV
4		7318.000	48.125	32.755	-21.245	54.000	15.370	AV
5		8234.100	45.662	30.292	-23.708	54.000	15.370	AV
6		9149.500	52.851	37.481	-16.519	54.000	15.370	AV

Site: AC5	Time: 2017/11/21 - 14:40
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: Object Locator	Power: 120V/60Hz
Note: Mode 1:Transmit at channel 914.9MHz	



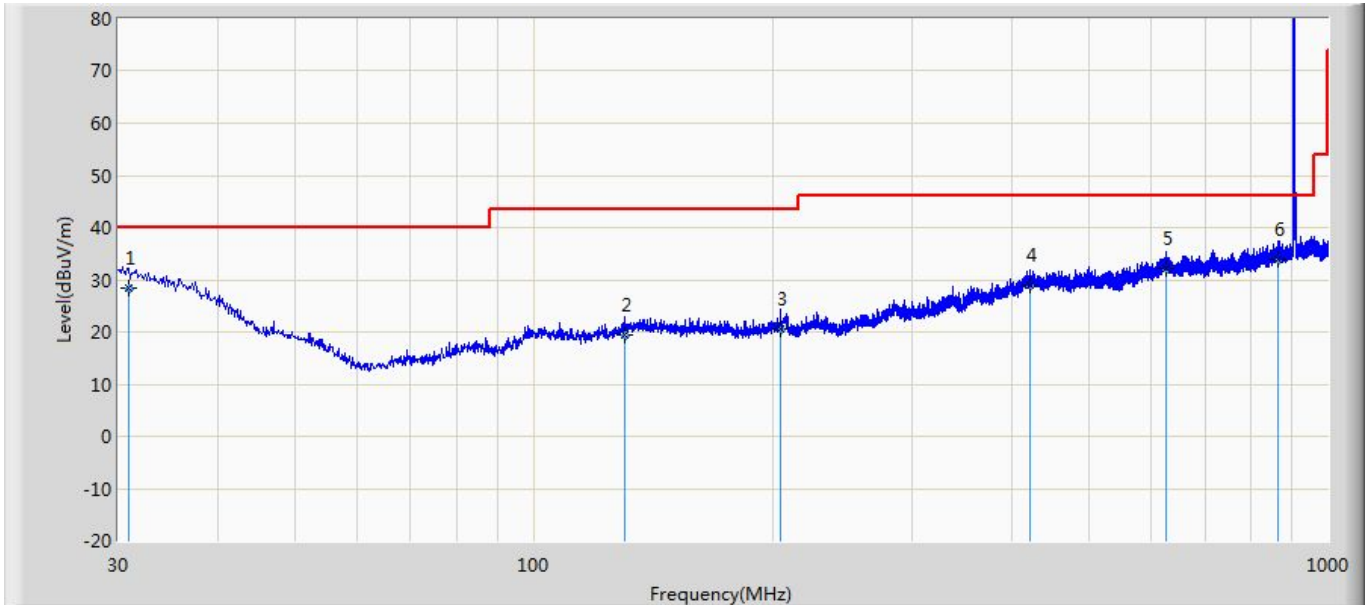
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2746.000	54.315	71.265	-19.685	74.000	-16.950	PK
2		3659.500	51.906	66.546	-22.094	74.000	-14.640	PK
3		4573.000	48.524	61.534	-25.476	74.000	-13.010	PK
4		7318.000	49.697	57.407	-24.303	74.000	-7.710	PK
5		8236.000	47.679	52.579	-26.321	74.000	-4.900	PK
6		9149.500	54.170	56.010	-19.830	74.000	-1.840	PK

No	Mark	Frequency (MHz)	PK Level (dBuV/m)	AV Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2746.000	54.315	38.945	-15.055	54.000	15.370	AV
2		3659.500	51.906	36.536	-17.464	54.000	15.370	AV
3		4573.000	48.524	33.154	-20.846	54.000	15.370	AV
4		7318.000	49.697	34.327	-19.673	54.000	15.370	AV
5		8236.000	47.679	32.309	-21.691	54.000	15.370	AV
6		9149.500	54.170	38.800	-15.200	54.000	15.370	AV



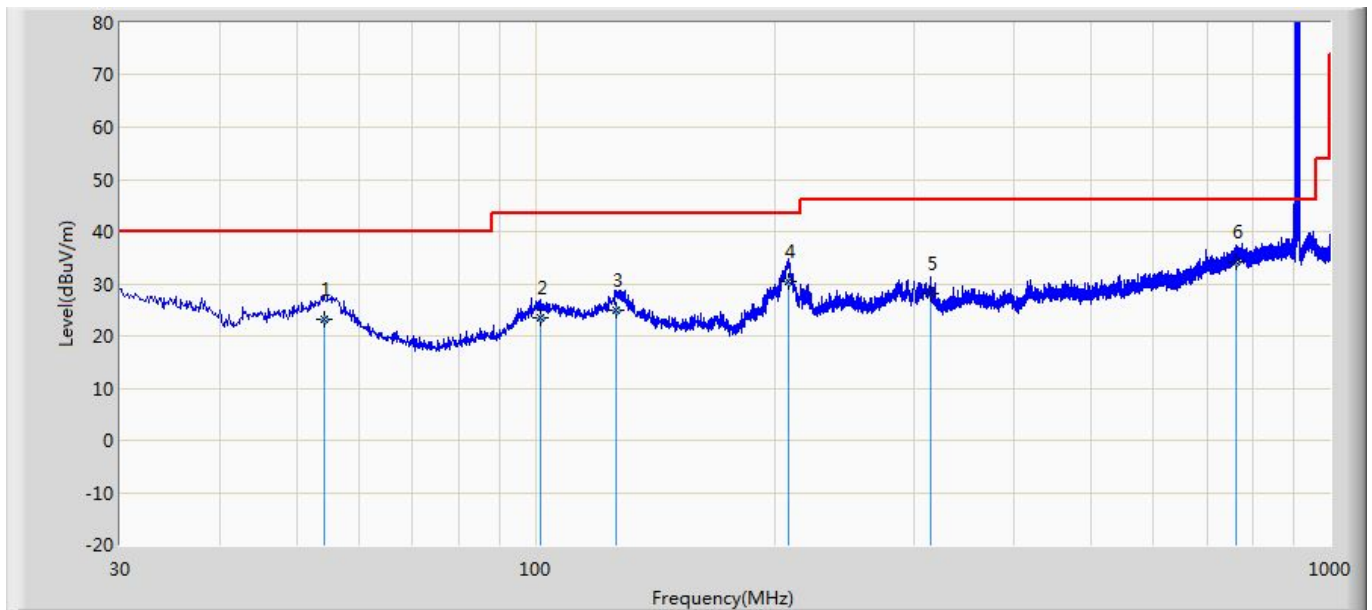
**The worst case of Radiated Emission below 1GHz:**

Site: AC3	Time: 2017/09/18
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: AC3_3m (30-1000MHz)	Polarity: Horizontal
EUT: Object Locator	Power: AC 120V/60Hz
Note: Mode 1:Transmit at channel 902.3MHz	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Probe (dB/m)	Cable (dB)	Amp (dB)	Ant Pos (cm)	Table Pos (deg)	Type
1	*	30.947	28.513	1.100	-11.487	40.000	20.953	6.460	0.000	100	200	QP
2		130.274	19.376	2.100	-24.124	43.500	10.285	6.991	0.000	100	351	QP
3		204.479	20.506	2.800	-22.994	43.500	10.409	7.297	0.000	100	283	QP
4		420.910	28.962	1.800	-17.038	46.000	19.202	7.960	0.000	193	360	QP
5		626.186	32.140	2.300	-13.860	46.000	21.345	8.495	0.000	103	360	QP
6		865.046	33.961	2.100	-12.039	46.000	22.832	9.029	0.000	200	312	QP

Site: AC3	Time: 2017/09/18
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: AC3_3m (30-1000MHz)	Polarity: Vertical
EUT: Object Locator	Power: AC 120V/60Hz
Note: Mode 1:Transmit at channel 902.3MHz	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Probe (dB/m)	Cable (dB)	Amp (dB)	Ant Pos (cm)	Table Pos (deg)	Type
1		54.129	23.056	5.900	-16.944	40.000	10.537	6.619	0.000	102	360	QP
2		101.416	23.609	1.500	-19.891	43.500	15.247	6.862	0.000	200	38	QP
3		126.151	24.930	3.600	-18.570	43.500	14.356	6.974	0.000	100	0	QP
4		207.874	30.557	7.300	-12.943	43.500	15.947	7.310	0.000	100	99	QP
5		314.331	28.114	3.500	-17.886	46.000	16.949	7.665	0.000	200	266	QP
6	*	761.983	34.201	2.200	-11.799	46.000	23.204	8.797	0.000	100	7	QP

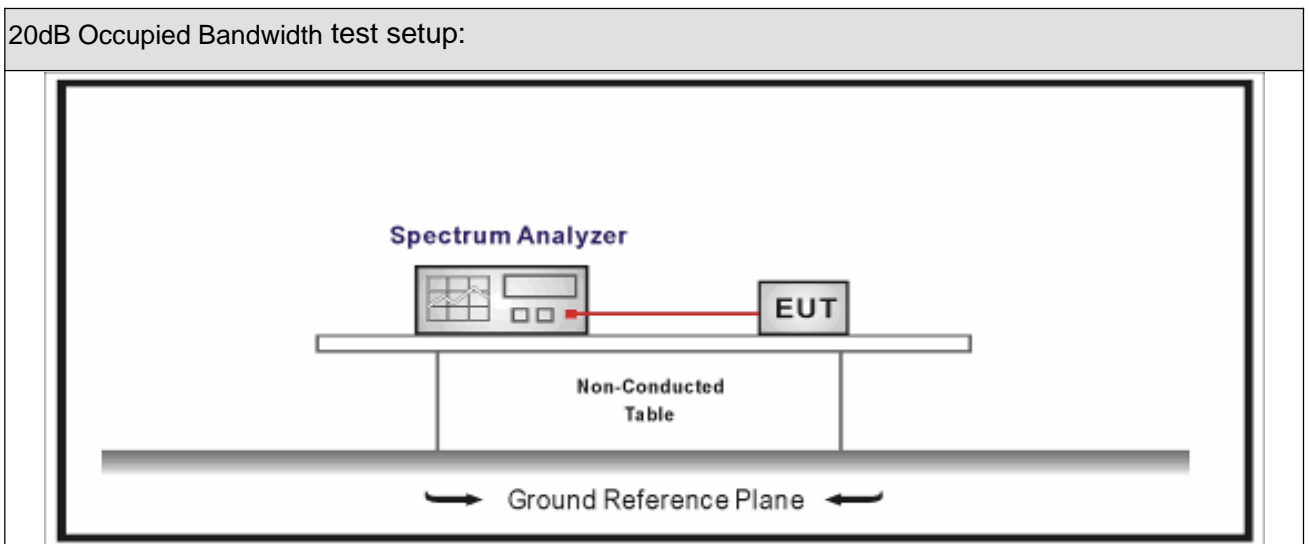
## 5. 20dB Bandwidth

### 5.1 Test Equipment

20dB Occupied Bandwidth / TR-8					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2017.02.04	2018.02.03
EXA Spectrum Analyzer	Keysight	N9010A	MY55370495	2017.04.09	2018.04.08
MXA Signal Analyzer	Keysight	N9020A	MY56060147	2017.04.09	2018.04.08
Temperature/Humidity Meter	zhichen	ZC1-2	TR8-TH	2017.04.10	2018.04.09

Note: All equipment are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

### 5.2 Test Setup



### 5.3 Limit

Carrier Frequency Separation	
<input type="checkbox"/>	For frequency hopping systems operating in 2400-2483.5 MHz band, within frequency range.
<input checked="" type="checkbox"/>	For frequency hopping systems operating in 902-928 MHz band, the maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.
<input type="checkbox"/>	For frequency hopping systems operating in 5725-5850 MHz band, the maximum 20 dB bandwidth of the hopping channel is 1 MHz.

## 5.4 Test Procedure

Test Method			
	References Rule	Chapter	Description
<input checked="" type="checkbox"/>	DA 00-705	N/A	20 dB Bandwidth

## 5.5 Uncertainty

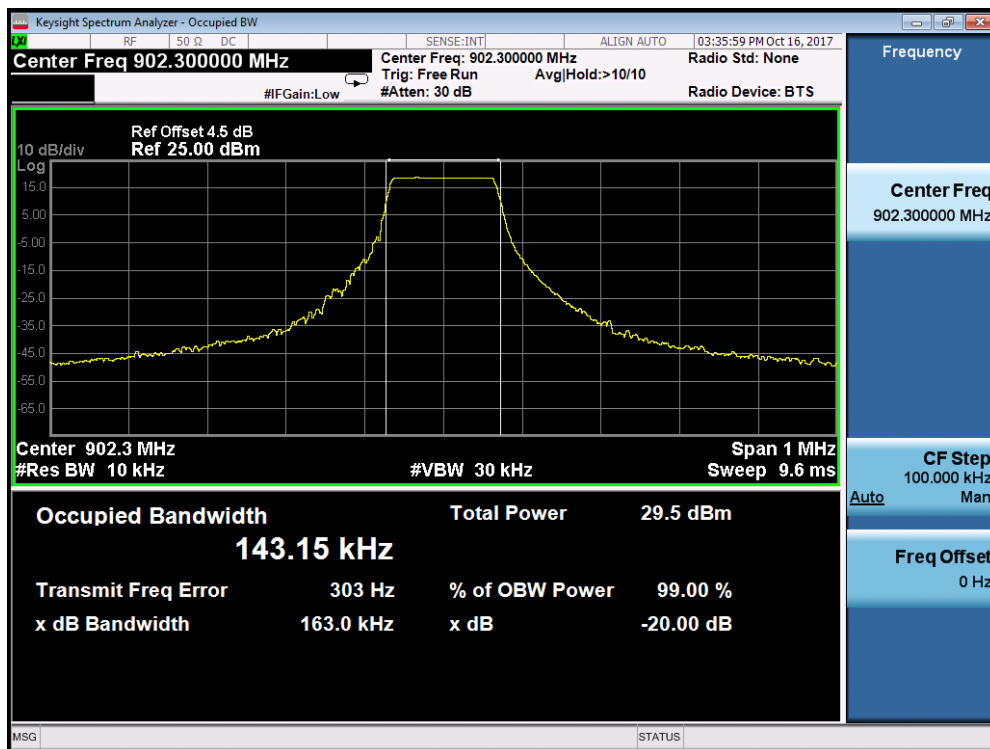
The measurement uncertainty is defined as  $\pm 1$  kHz

### 5.6 Test Result

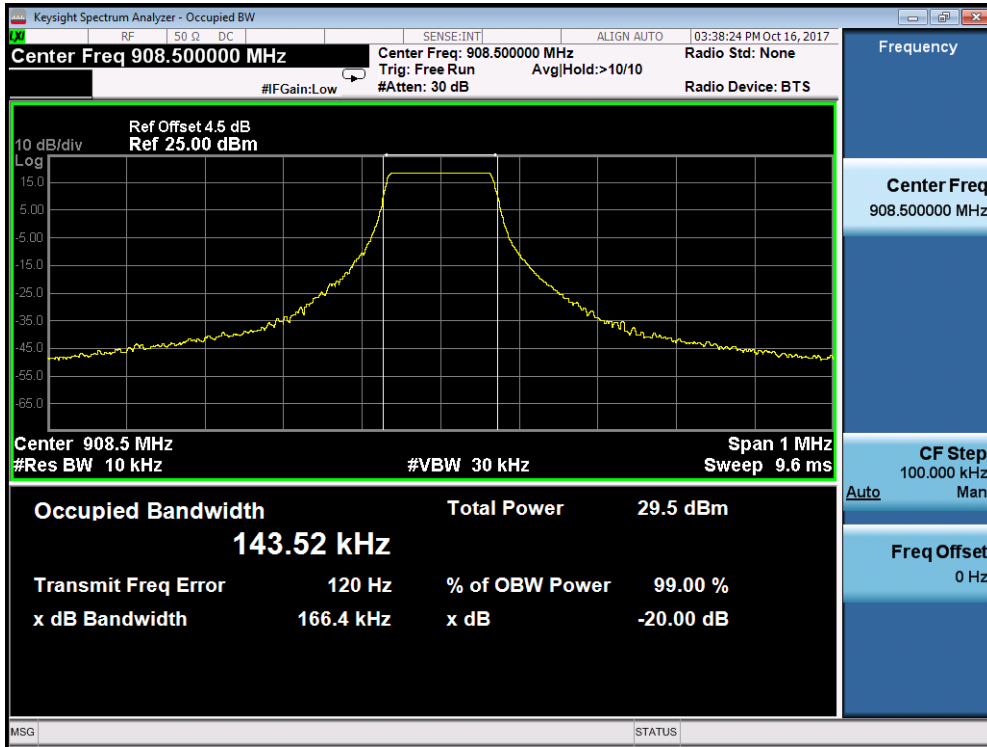
Product Name	: Object Locator	Power	: AC 120V/60Hz
Test Mode	: Mode 1	Test Site	: TR-8
Test Date	: 2017.10.26		

Channel No.	Frequency (MHz)	20dB Bandwidth (kHz)	99% Bandwidth (kHz)
00	902.3	163.0	143.15
31	908.5	166.4	143.52
63	914.9	161.8	142.55

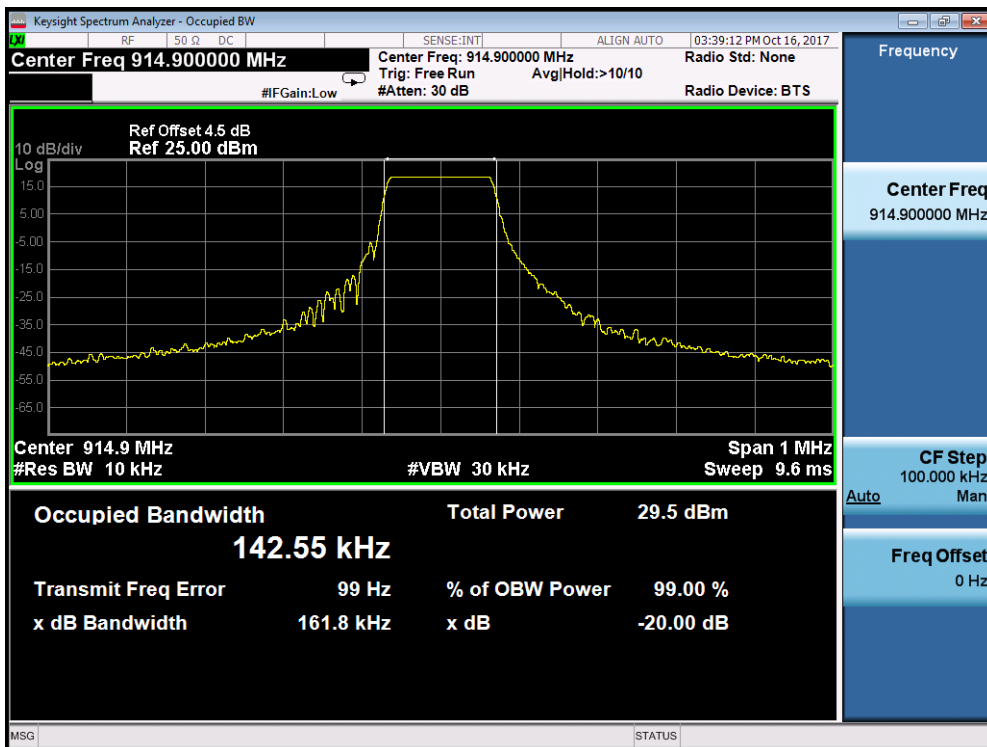
#### Channel 00 (902.3MHz)



### Channel 31 (908.5MHz)



### Channel 63 (914.9MHz)



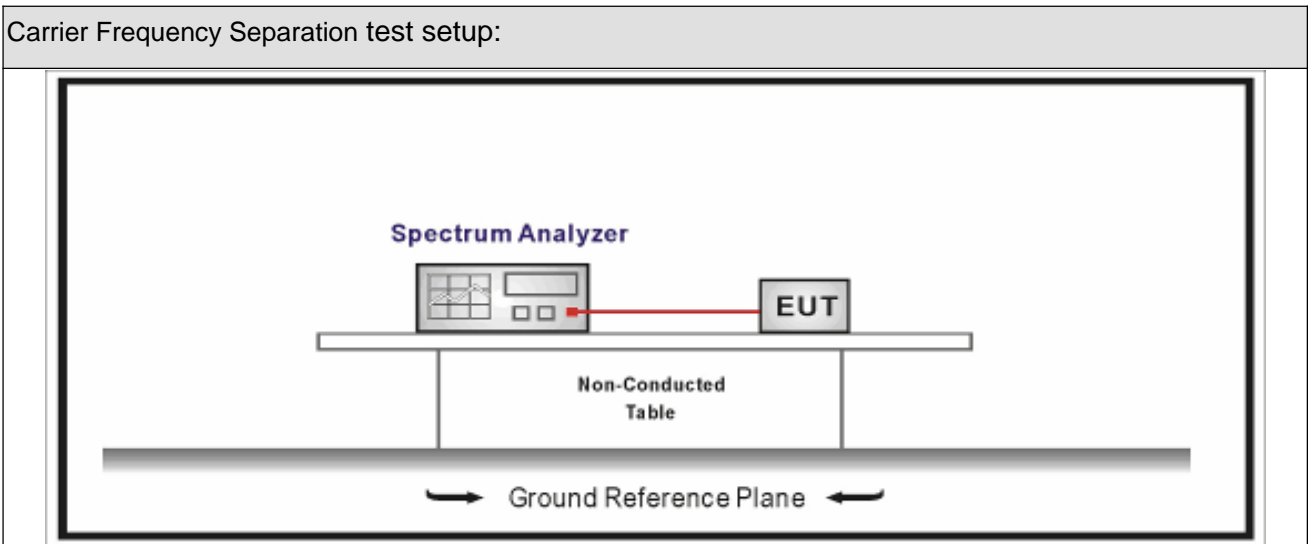
## 6. Carrier Frequency Separation

### 6.1. Test Equipment

Carrier Frequency Separation / TR-8					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2017.02.04	2018.02.03
EXA Spectrum Analyzer	Keysight	N9010A	MY55370495	2017.04.09	2018.04.08
MXA Signal Analyzer	Keysight	N9020A	MY56060147	2017.04.09	2018.04.08
Temperature/Humidity Meter	zhichen	ZC1-2	TR8-TH	2017.04.10	2018.04.09

Note: All equipment are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

### 6.2. Test Setup



### 6.3. Limit

Carrier Frequency Separation	
<input checked="" type="checkbox"/>	Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.
<input type="checkbox"/>	Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel.
<input type="checkbox"/>	The 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period;
<input type="checkbox"/>	The 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.
<input type="checkbox"/>	Frequency hopping systems operating in the 5725-5850 MHz band shall use at least 75 hopping frequencies. The maximum 20 dB bandwidth of the hopping channel is 1 MHz.

### 6.4. Test Procedure

Test Method			
	References Rule	Chapter	Description
<input checked="" type="checkbox"/>	ANSI C63.10	7.8.2	Carrier frequency separation

### 6.5. Uncertainty

The measurement uncertainty is defined as  $\pm 1$  kHz

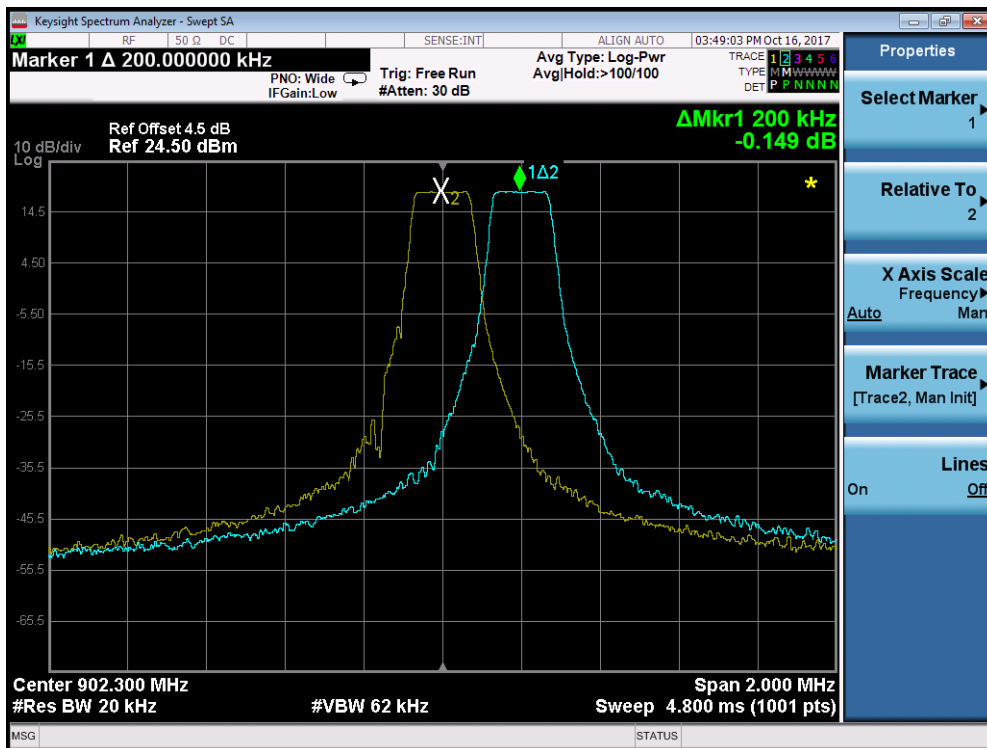


### 6.6. Test Result

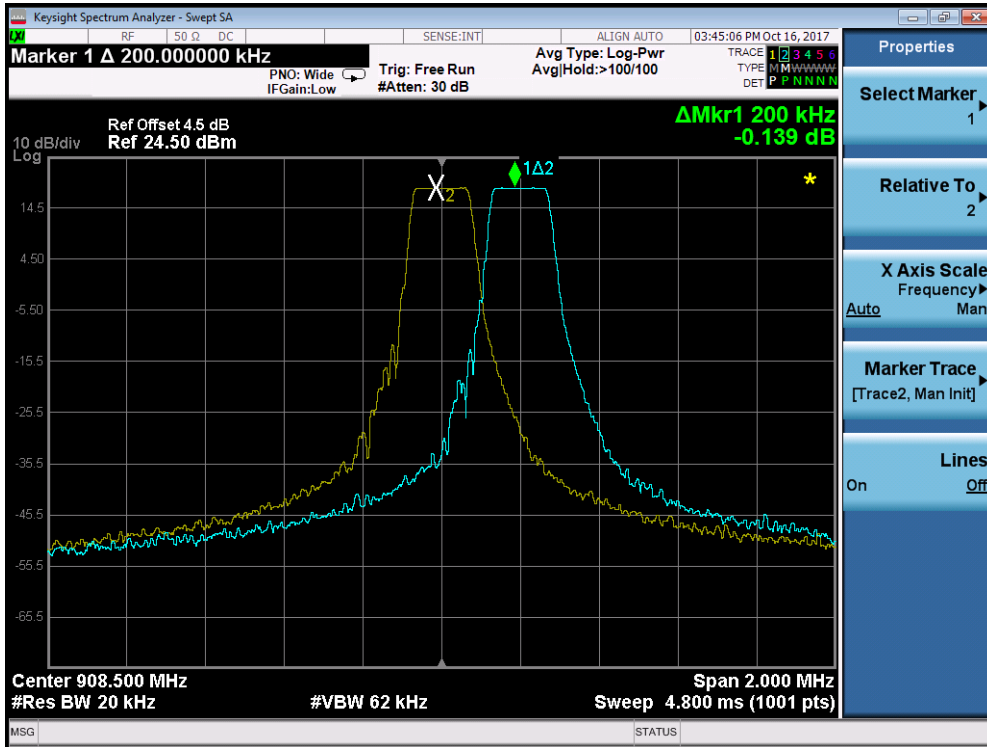
Product Name	: Object Locator	Power	: AC 120V/60Hz
Test Mode	: Mode 1	Test Site	: TR-8
Test Date	: 2017.10.16		

Channel No.	Frequency (MHz)	Carrier Frequency Separation (kHz)	Limit (kHz)	Result
00	902.3	200	163.0	Pass
31	908.5	200	166.4	Pass
63	914.9	200	161.8	Pass

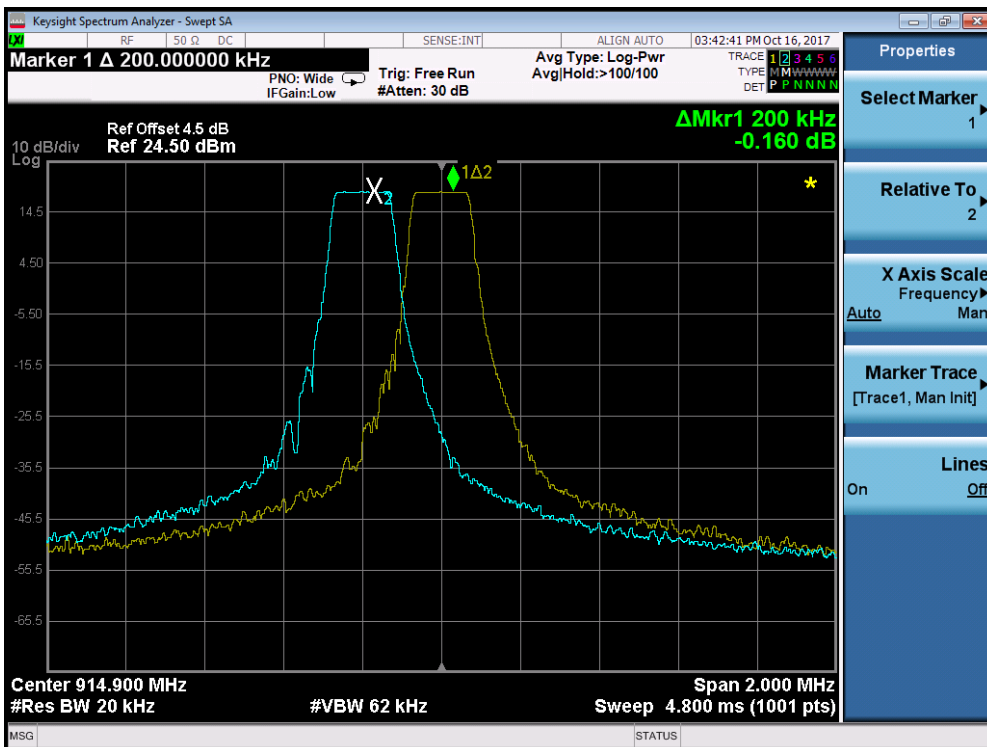
Channel 00 (902.3MHz)



### Channel 31 (908.5MHz)



### Channel 63 (914.9MHz)



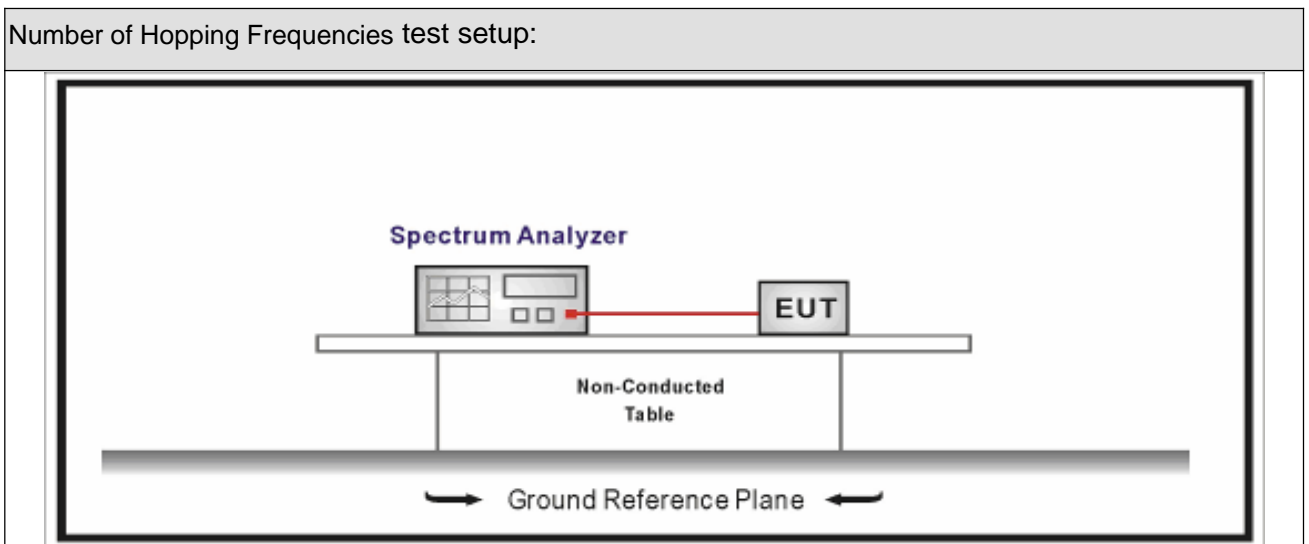
## 7. Number of Hopping Frequencies

### 7.1. Test Equipment

Number of Hopping Frequencies / TR-8					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2017.02.04	2018.02.03
EXA Spectrum Analyzer	Keysight	N9010A	MY55370495	2017.04.09	2018.04.08
MXA Signal Analyzer	Keysight	N9020A	MY56060147	2017.04.09	2018.04.08
Temperature/Humidity Meter	zhichen	ZC1-2	TR8-TH	2017.04.10	2018.04.09

Note: All equipment are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

### 7.2. Test Setup



### 7.3. Limit

Carrier Frequency Separation	
<input type="checkbox"/>	For frequency hopping systems operating in the 2400-2483.5 MHz band shall use at least 15 hopping frequencies.
<input checked="" type="checkbox"/>	For frequency hopping systems operating in 902-928 MHz band, if the 20 dB bandwidth of the hopping channel is less than 250 kHz, shall use at least 50 hopping frequencies.
<input type="checkbox"/>	For frequency hopping systems operating in 902-928 MHz band, if the 20 dB bandwidth of the hopping channel is higher than 250 kHz, shall use at least 25 hopping frequencies.
<input type="checkbox"/>	For frequency hopping systems operating in the 5725-5850 MHz band shall use at least 75 hopping frequencies.

## 7.4. Test Procedure

Test Method			
	References Rule	Chapter	Description
<input checked="" type="checkbox"/>	ANSI C63.10	7.8.3	Number of Hopping Frequencies

## 7.5. Uncertainty

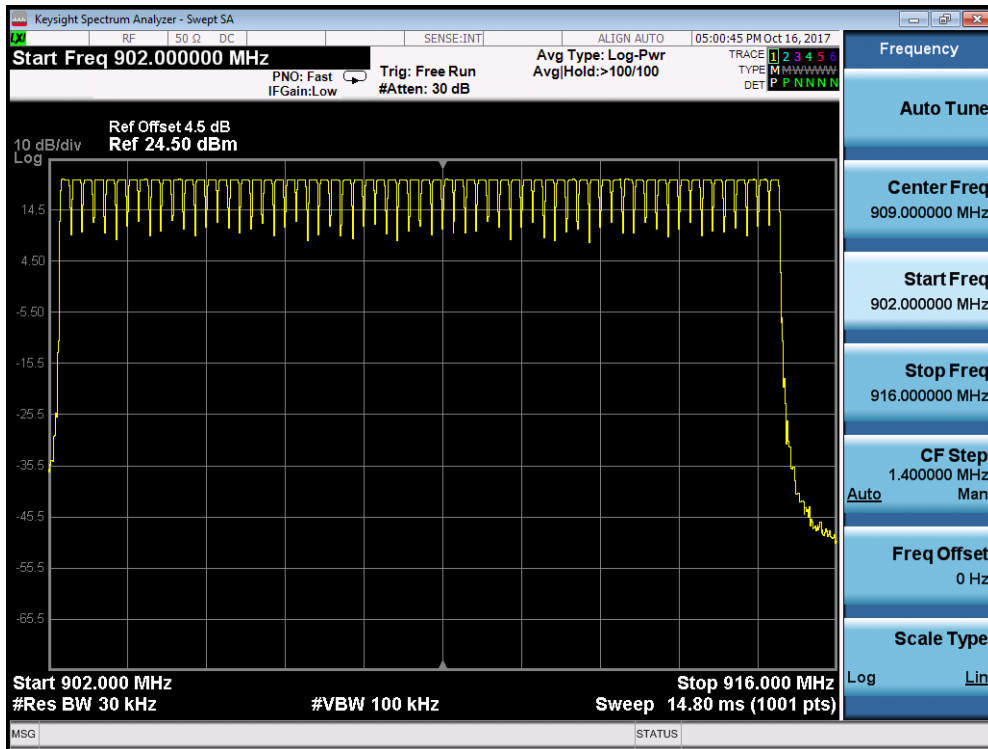
The measurement uncertainty is defined as  $\pm 1$  kHz

### 7.6. Test Result

Product Name	: Object Locator	Power	: AC 120V/60Hz
Test Mode	: Mode 1	Test Site	: TR-8
Test Date	: 2017.10.16		

Frequency Band (MHz)	Number of Hopping Frequencies	Limit	Result
902 - 928	64	>50	Pass

#### 902 - 928MHz



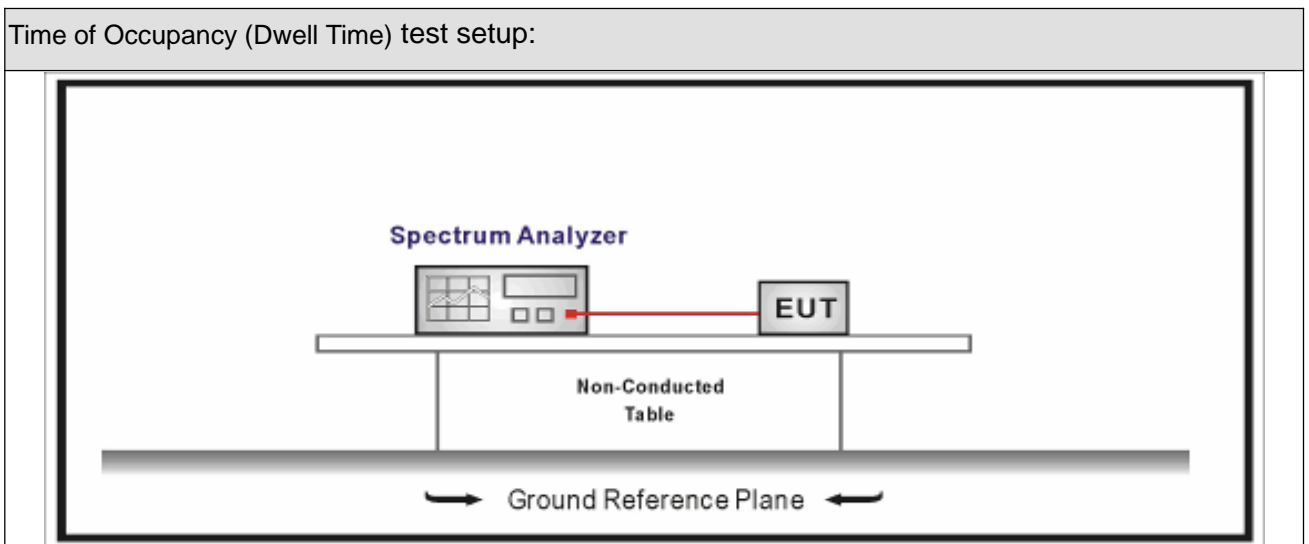
## 8. Time of Occupancy (Dwell Time)

### 8.1. Test Equipment

Time of Occupancy (Dwell Time) / TR-8					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2018.02.04	2019.02.03
EXA Spectrum Analyzer	Keysight	N9010A	MY55370495	2017.04.09	2018.04.08
MXA Signal Analyzer	Keysight	N9020A	MY56060147	2017.04.09	2018.04.08
Temperature/Humidity Meter	zhichen	ZC1-2	TR8-TH	2017.04.10	2018.04.09

Note: All equipment are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

### 8.2. Test Setup



### 8.3. Limit

Time of Occupancy (Dwell Time)	
<input type="checkbox"/>	Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.
<input checked="" type="checkbox"/>	For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period
<input type="checkbox"/>	For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping

	frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period.
<input type="checkbox"/>	Frequency hopping systems operating in the 5725-5850 MHz band shall use at least 75 hopping frequencies. The maximum 20 dB bandwidth of the hopping channel is 1 MHz. The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 30 second period.
<input checked="" type="checkbox"/>	The frequency hopping operation of the hybrid system, with the direct sequence or digital modulation operation turned off, shall have an average time of occupancy on any frequency not to exceed 0.4 seconds within a time period in seconds equal to the number of hopping frequencies employed multiplied by 0.4.

**8.4. Test Procedure**

Test Method			
	References Rule	Chapter	Description
<input checked="" type="checkbox"/>	ANSI C63.10	7.8.4	Time of Occupancy (Dwell Time)

**8.5. Uncertainty**

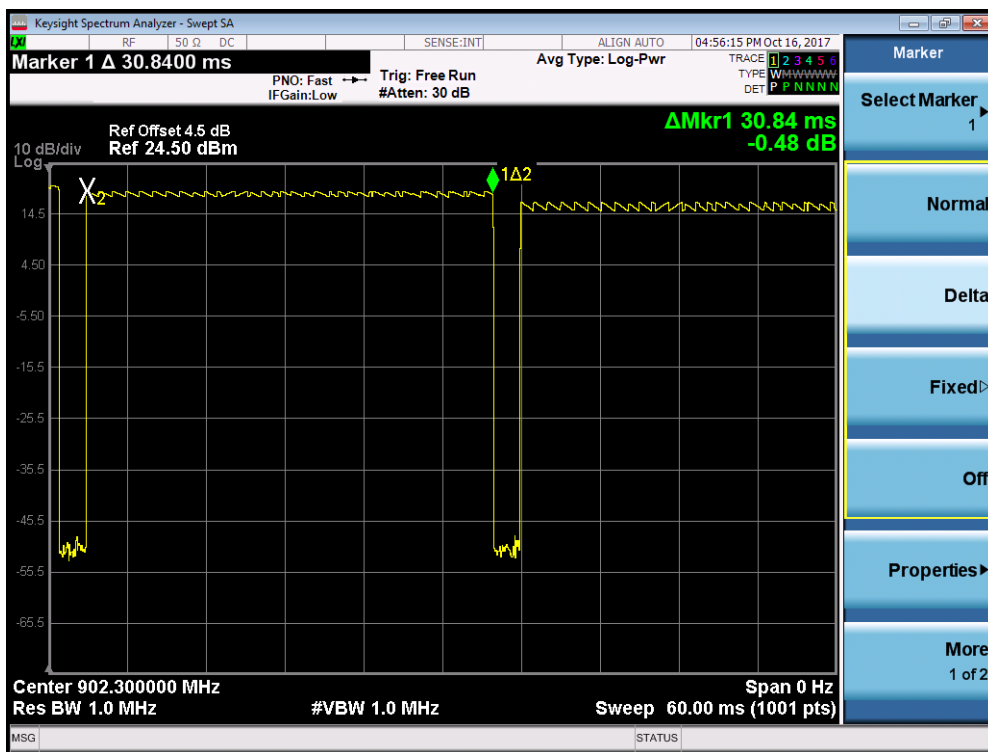
The measurement uncertainty is defined as  $\pm 0.1$  us

### 8.6. Test Result

Product Name	: Object Locator	Power	: AC 120V/60Hz
Test Mode	: Mode 1	Test Site	: TR-8
Test Date	: 2017.10.16		

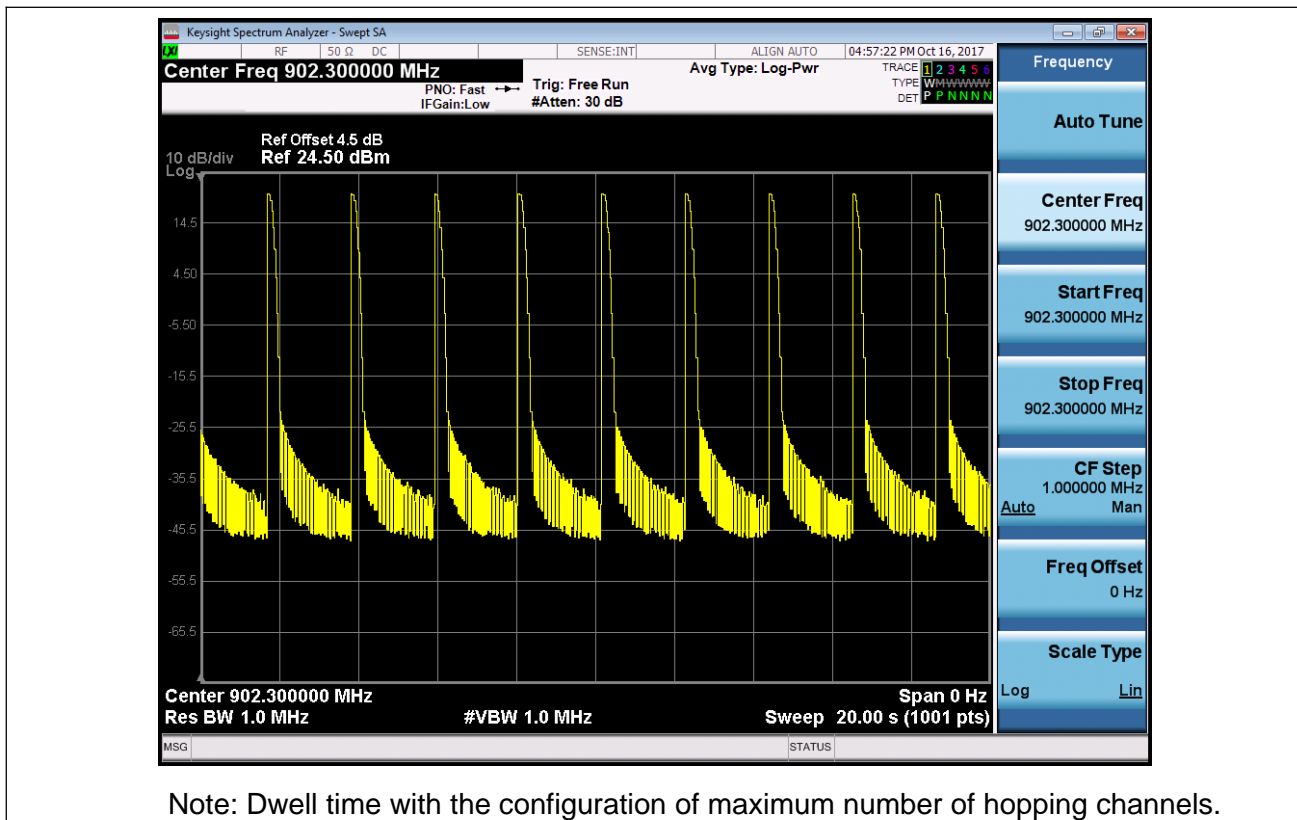
Channel No.	Frequency (MHz)	Time of Occupancy (ms)	Limit (ms)	Result
00	902.3	277.56	< 400	Pass

Channel 00 (902.3MHz)



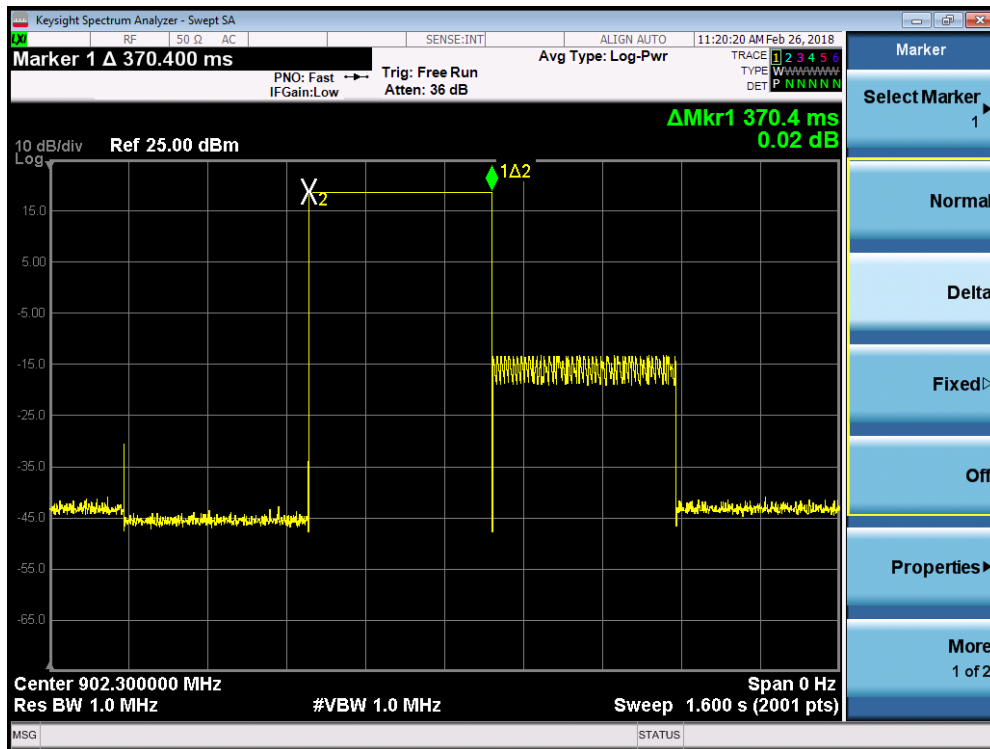
Note: Dwell time with the configuration of maximum number of hopping channels.





Channel No.	Frequency (MHz)	Time of Occupancy (ms)	Limit (ms)	Result
00	902.3	370.4	< 400	Pass

**Channel 00 (902.3MHz)**



Note: Dwell time with the configuration of minimum number of hopping channels.

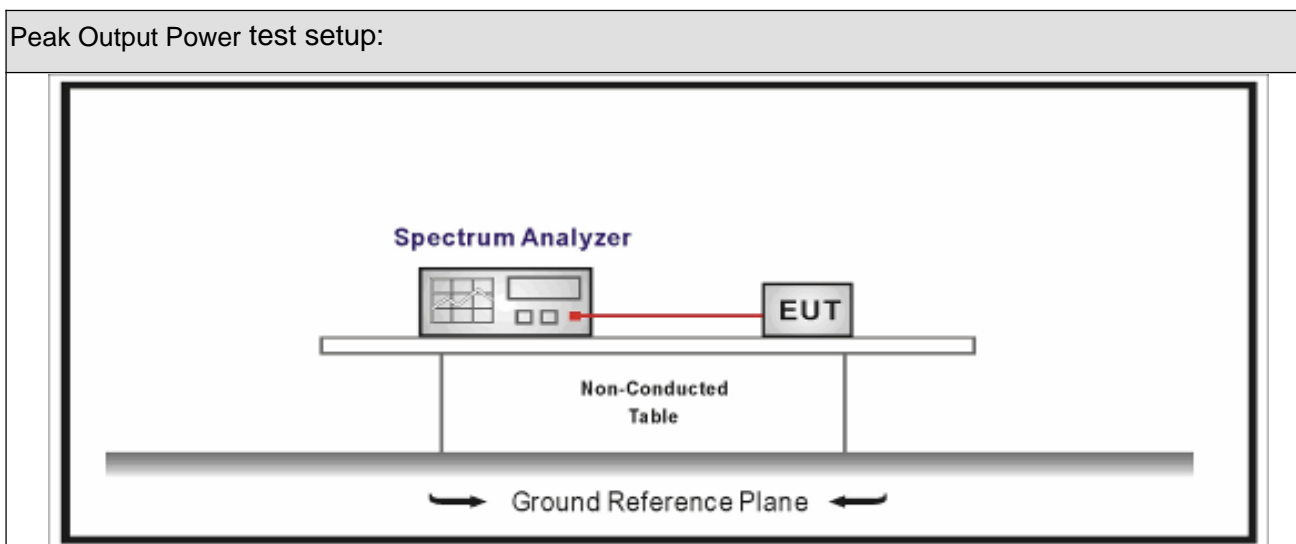
## 9. Peak Output Power

### 9.1. Test Equipment

Peak Output Power / TR-8					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2017.02.04	2018.02.03
EXA Spectrum Analyzer	Keysight	N9010A	MY55370495	2017.04.09	2018.04.08
MXA Signal Analyzer	Keysight	N9020A	MY56060147	2017.04.09	2018.04.08
Temperature/Humidity Meter	zhichen	ZC1-2	TR8-TH	2017.04.10	2018.04.09

Note: All equipment are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

### 9.2. Test Setup



### 9.3. Limit

Peak Output Power	
<input type="checkbox"/>	Frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.
<input type="checkbox"/>	Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.
<input checked="" type="checkbox"/>	For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels

### 9.4. Test Procedure

Test Method			
	References Rule	Chapter	Description
<input checked="" type="checkbox"/>	ANSI C63.10	7.8.5	Output power test procedure for frequency-hopping spread-spectrum (FHSS) devices

### 9.5. Uncertainty

The measurement uncertainty is defined as  $\pm 1.0$  dB

**9.6. Test Result**

Product Name	: Object Locator	Power	: AC 120V/60Hz
Test Mode	: Mode 1	Test Site	: TR-8
Test Date	: 2017.11.29		

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)	Limit (dBm)	Result
00	902.3	20.43	30.00	Pass
31	908.5	20.38	30.00	Pass
63	914.9	20.35	30.00	Pass

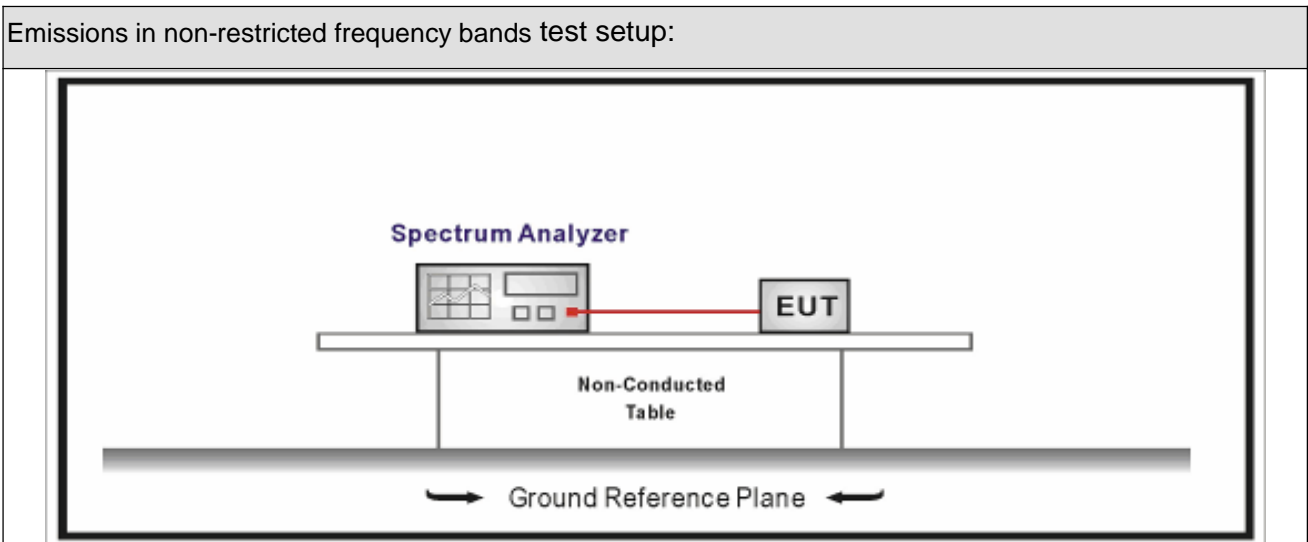
## 10. Emissions in non-restricted frequency bands

### 10.1. Test Equipment

Emissions in non-restricted frequency bands / TR-8					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2017.02.04	2018.02.03
EXA Spectrum Analyzer	Keysight	N9010A	MY55370495	2017.04.09	2018.04.08
MXA Signal Analyzer	Keysight	N9020A	MY56060147	2017.04.09	2018.04.08
Temperature/Humidity Meter	zhichen	ZC1-2	TR8-TH	2017.04.10	2018.04.09

Note: All equipment are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

### 10.2. Test Setup



**10.3. Limit**

Un-Restricted Band Emissions Limit	
RF Output power (Detection methods)	Limit(dB)
RF Output power(Average detector)	30c(Note1)
RF Output power(PK detector)	20c(Note2)
<p>Note 1: If maximum conducted (average) output power was used to demonstrate compliance as described in 9.2, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 30 dBc).</p> <p>Note 2: If the maximum peak conducted output power procedure was used, then the peak output power measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 20 dBc).</p>	

**10.4. Test Procedure**

Test Method			
	References Rule	Chapter	Description
<input checked="" type="checkbox"/>	ANSI C63.10	7.8.6	Band-edge Compliance of RF Conducted Emissions

**10.5. Uncertainty**

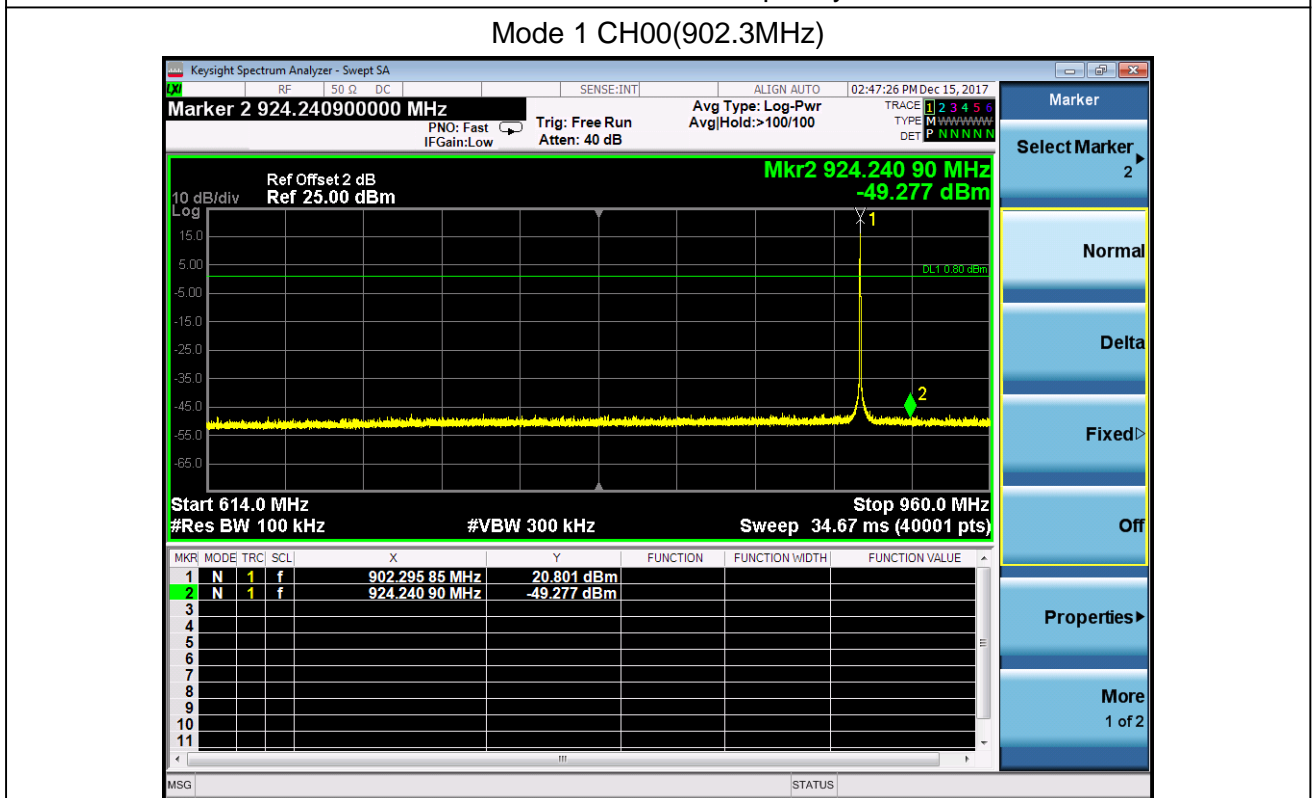
The measurement uncertainty is defined as  $\pm 1.0$  dB

### 10.6. Test Result

Product Name	: Object Locator	Power	: AC 120V/60Hz
Test Mode	: Mode 1	Test Site	: TR-8
Test Date	: 2017.11.06		

Mode	Channel	Test Frequency (MHz)	In-Band PSD[a] (dBm/100kHz)	Frequency (MHz)	Out-Band PSD[b] (dBm/100kHz)	[a]-[b] (dB)	Limit (dB)	Result
1	00	902.3	20.801	924.2	-49.227	70.028	>20	Pass
1	63	914.9	20.617	927.1	-49.880	70.497	>20	Pass
1	00~63	00~63	20.393	902	-53.580	73.973	>20	Pass

Note1: The worst case of Emissions in non-restricted frequency bands as below:



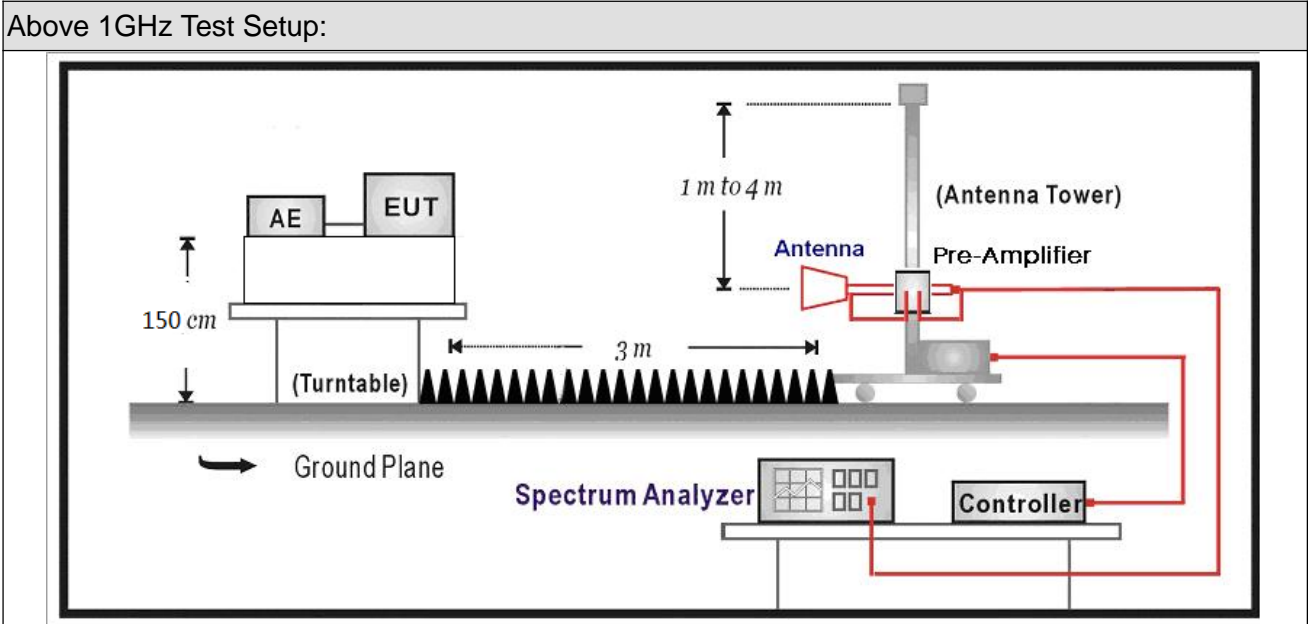


## 11. Radiated Emission Band Edge

### 11.1. Test Equipment

Radiated Emission(Above 1GHz) / AC-5					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
EMI Receiver	Agilent	N9038A	MY51210196	2017.07.16	2018.07.15
Pre-Amplifier	Miteq	NSP1800-25	1364185	2017.05.03	2018.05.02
DRG Horn Antenna	ETS-Lindgren	3117	00167055	2017.07.12	2018.07.11
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	294	2017.09.18	2018.09.17
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C1	2017.02.28	2018.02.27
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C2	2017.02.28	2018.02.27
Temperature/Humidity Meter	Zhichen	ZC1-2	AC5-TH	2017.01.05	2018.01.04

### 11.2. Test Setup



### 11.3. Limit

Band edge Limit				
Frequency bands (MHz)	Detector	Limit (dB $\mu$ V/m)	RBW (KHz)	Distance (m)
608-614	PK	74	100	3
960-1240	AV	54	300	3

Note: The field strength of emissions appearing within these frequency bands shall not exceed the limits.

### 11.4. Test Procedure

Test Method			
	References Rule	Chapter	Description
<input checked="" type="checkbox"/>	DA 00-705	N/A	duty cycle correction factor
<input checked="" type="checkbox"/>	ANSI C63.10	6.10	Band-edge testing
	<input checked="" type="checkbox"/> ANSI C63.10	6.10.5	Restricted-band band-edge measurements
	<input type="checkbox"/> ANSI C63.10	6.10.6	Marker-delta method
<input type="checkbox"/>	ANSI C63.10	6.4	Radiated emissions from unlicensed wireless devices below 30 MHz
<input type="checkbox"/>	ANSI C63.10	6.5	Radiated emissions from unlicensed wireless devices in the frequency range of 30 MHz to 1000 MHz
<input checked="" type="checkbox"/>	ANSI C63.10	6.6	Radiated emissions from unlicensed wireless devices above 1 GHz

### 11.5. Uncertainty

The measurement uncertainty above 1G is defined as  $\pm 3.9$  dB  
 below 1G is defined as  $\pm 3.8$  dB

## 11.6. Test Result

No restricted band in the range  $\pm 2$  channel bandwidths of the Band-edges of the specified emission band! (608 MHz – 614 MHz and 960 MHz – 1240 MHz).

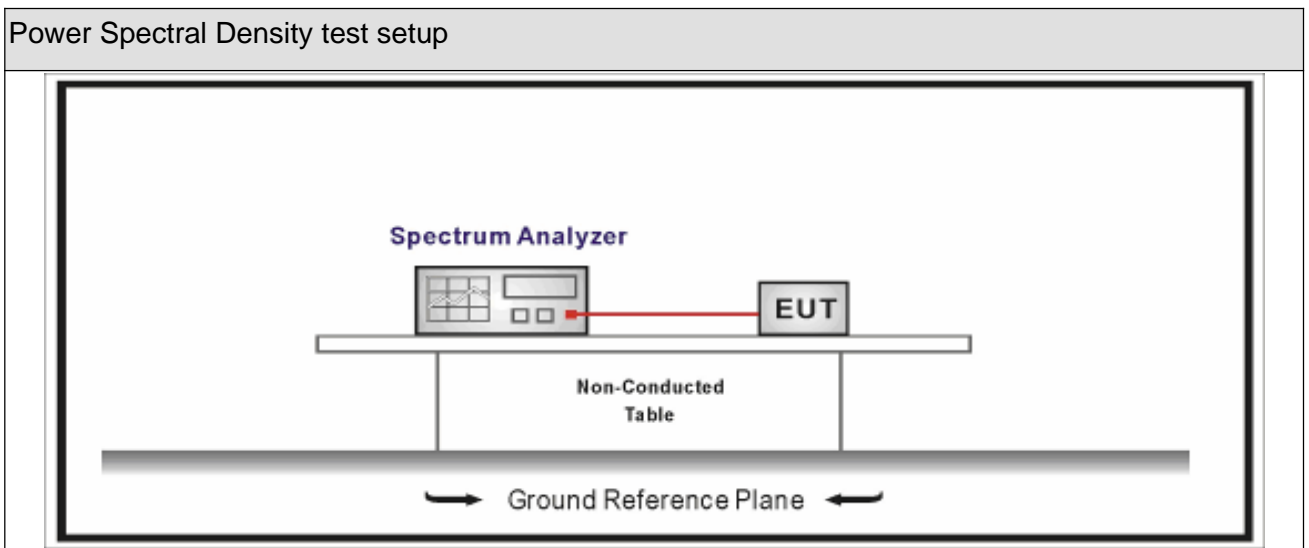
## 12. Power Spectral Density

### 12.1. Test Equipment

Power Spectral Density / TR-8					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2018.02.04	2019.02.03
EXA Spectrum Analyzer	Keysight	N9010A	MY55370495	2017.04.09	2018.04.08
MXA Signal Analyzer	Keysight	N9020A	MY56060147	2017.04.09	2018.04.08
Temperature/Humidity Meter	zhichen	ZC1-2	TR8-TH	2017.04.10	2018.04.09

Note: All equipment are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

### 12.2. Test Setup



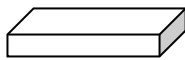
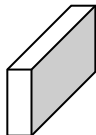
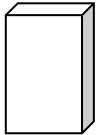
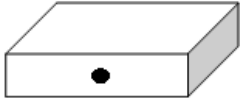


### 12.3. Limit

Power Spectral Density Limit
Power Spectral Density $\leq 8\text{dBm}/3\text{kHz}$

### 12.4. Test Procedure

Power Spectral Density Test Method			
	References Rule	Chapter	Description
<input checked="" type="checkbox"/>	ANSI C63.10	11.10	Maximum power spectral density level in the fundamental emission
<input type="checkbox"/>	ANSI C63.10	11.10.2	Method PKPSD (peak PSD)
<input checked="" type="checkbox"/>	ANSI C63.10	11.10.3	Method AVGPSD-1(Duty cycle $\geq$ 98%)
<input type="checkbox"/>	ANSI C63.10	11.10.4	Method AVGPSD-1A(Duty cycle $\geq$ 98%)
<input type="checkbox"/>	ANSI C63.10	11.10.5	Method AVGPSD-2(Duty cycle $<$ 98%)
<input type="checkbox"/>	ANSI C63.10	11.10.6	Method AVGPSD-2A(Duty cycle $<$ 98%)
<input type="checkbox"/>	ANSI C63.10	11.10.7	Method AVGPSD-3
<input type="checkbox"/>	ANSI C63.10	11.10.8	Method AVGPSD-3A

**12.5. EUT test definition**

Item	Power Spectral Density Test Method			
Device Category	<input type="checkbox"/>	Fixed position use		
	<input checked="" type="checkbox"/>	Mobile position use		
Test mode	Mode 1			
Test method	<input type="checkbox"/>	Radiated		
		X Axis	Y Axis	Z Axis
				
		Worst Axis <input type="checkbox"/>	Worst Axis <input type="checkbox"/>	Worst Axis <input type="checkbox"/>
	<input checked="" type="checkbox"/>	Conducted		
	<input checked="" type="checkbox"/>	Chain 0		
				
	<input type="checkbox"/>	Chain 0	Chain 1	
				
	<input type="checkbox"/>	Chain 0	Chain 1	Chain 2
				

### 12.6. Test Result

Product Name	: Object Locator	Power	: AC 120V/60Hz
Test Mode	: Mode1	Test Site	: TR8
Test Date	: 2018.02.11		

Mode	Channel	Test Frequency (MHz)	Measurement PSD (dBm/3kHz)	Antenna Gain (dBi)	Limit (dBm/3kHz)	Result
1	00	902.3	7.62	-4.63	8.0	Pass
1	31	908.5	7.13	-4.63	8.0	Pass
1	63	914.9	7.23	-4.63	8.0	Pass

**Channel 00 (902.3MHz)**



### 13. Antenna Requirement

#### 13.1.Limit

Antenna Requirement Limit
<p>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 shall be considered sufficient to comply with the provisions of this section. 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. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.</p>

#### 13.2.Antenna Connector Construction

Antenna Connector Construction	
<input checked="" type="checkbox"/>	The use of a permanently attached antenna
<input type="checkbox"/>	The antenna use of a unique coupling to the intentional radiator
<input type="checkbox"/>	The use of a nonstandard antenna jack or electrical connector
Please refer to the attached document "Internal Photograph" to show the antenna connector.	

\_\_\_\_\_ The End \_\_\_\_\_