

FCC Test Report

Product Name : WIRELESS POWER TRANSMISSION SYSTEM

Trade Name : Datalogic

Model No. : JOYA TOUCH SINGLE SLOT DOCK LOCKING

FCC ID. : U4GJNGSSD

IC ID. : 3862E-JNGSSD

Applicant : DATALOGIC SRL

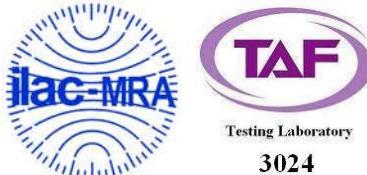
Address : Via S. Vitalino 13, 40012 Lippo di Calderara di Reno (BO) – Italy

Date of Receipt : Aug. 14, 2017

Issued Date : Sep. 08, 2017

Report No. : 1780285R-RFUSP17V01

Version : V3.0



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Test Report Certification

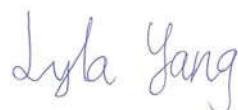
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Applicant : DATALOGIC SRL
Address : Via S. Vitalino 13, 40012 Lippo di Calderara di Reno (BO) – Italy
Manufacturer : DATALOGIC SRL
Model No. : JOYA TOUCH SINGLE SLOT DOCK LOCKING
FCC ID. : U4GJNGSSD
IC ID. : 3862E-JNGSSD
EUT Voltage : AC 100-240V, 50/60Hz
Testing Voltage : AC 120V/60Hz
Trade Name : Datalogic
Applicable Standard : FCC CFR Title 47 Part 15 Subpart C Section 15.225,
RSS-210 Issue 9 (Aug. 2016)
Laboratory Name : Hsin Chu Laboratory
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TEL: +886-3-582-8001 / FAX: +886-3-582-8958
Test Result : Complied

Documented By :



(Lyla Yang / Engineering Adm. Specialist)

Tested By :



(Mark Chang / Engineer)

Approved By :



(Roy Wang / Director)

Revision History

Report No.	Version	Description	Issued Date
1780285R-RFUSP17V01	V3.0	Initial issue of report	Sep. 08, 2017

Laboratory Information

We, **DEKRA Testing and Certification Co., Ltd.**, are an independent RF consultancy that was established the whole facility in our laboratories. The test facility has been accredited/accepted (audited or listed) by the following related bodies in compliance with ISO 17025 specified testing scopes:

Taiwan R.O.C.	: TAF, Accreditation Number: 3024
USA	: FCC, Registration Number: 0007939127
Canada	: IC, Submission No: 181665 / IC Registration Number: 22397-1 / 22397-2 / 22397-3

The related certificate for our laboratories about the test site and management system can be downloaded from DEKRA Testing and Certification Co., Ltd. Web Site :

<http://www.dekra.com.tw/english/about/certificates.aspx?bval=5>

The address and introduction of DEKRA Testing and Certification Co., Ltd. laboratories can be founded in our Web site : http://www.dekra.com.tw/index_en.aspx

If you have any comments, Please don't hesitate to contact us. Our test sites as below:

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1. General Information

1.1. EUT Description

Product Name	WIRELESS POWER TRANSMISSION SYSTEM
Trade Name	Datalogic
Model No.	JOYA TOUCH SINGLE SLOT DOCK LOCKING
Frequency Range	13.56MHz
Channel Number	1
Type of Modulation	ASK
HW version	beta
SW version	1.0.1

Accessories Information

Power Adapter	EDAC, EA10681U-120 I/P: 100-240V~2.0A, 50-60Hz O/P: 12V ==6A Cable Out: Non-Shielded, 1.2m, two ferrite cores bonded. Power Cord: Non-Shielded, 2m.
---------------	---

Working Frequency of Each Channel	
Channel	Frequency
Channel 1	13.56MHz

Note:

1. This device is a WIRELESS POWER TRANSMISSION SYSTEM including 13.56MHz transmitting and receiving function.
2. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.225 for spread spectrum devices.

1.2. Test Mode

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	
TX	Mode 1: Transmit

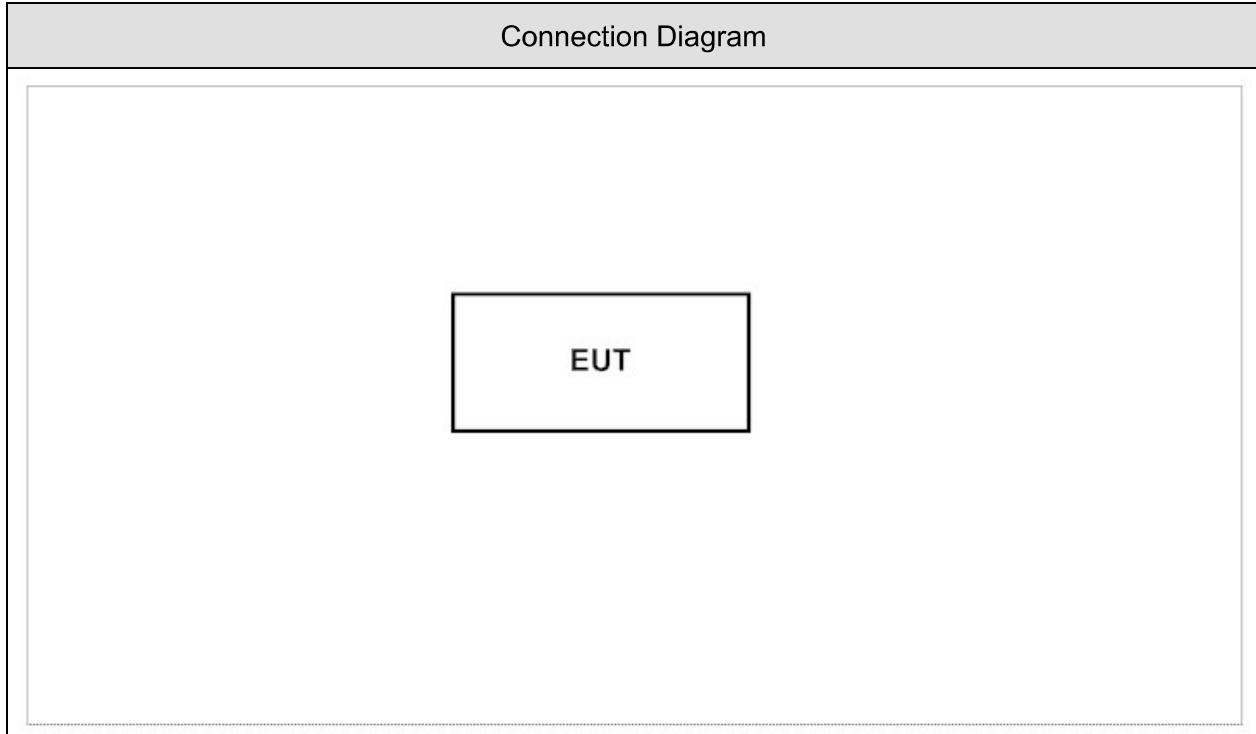
Emission	
Conducted Emission	Yes
Occupied Bandwidth	Yes
Radiated Emission	Yes
Frequency Tolerance	Yes

1.3. Tested System Details

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

Product	Manufacturer	Model No.	Serial No.	FCC ID	Power Cord
1	N/A				

1.4. Configuration of tested System



1.5. EUT Exercise Software

1	Setup the EUT as shown in Section 1.4.
2	Turn on the EUT power. Execute the software "Test-NFC".
3	Configure the test mode, the test channel, and the data rate.
4	Press "Start TX" to start the continuous transmitting.
5	Verify that the EUT works properly.

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Test Item	Required (IEC 68-1)	Actual	Test Site
Temperature (°C)	FCC PART 15 C 15.225 Conducted Emission	15 - 35	25°C	3
Humidity (%RH)		25 - 75	45%RH	
Barometric pressure (mbar)		860 - 1060	950-1000	
Temperature (°C)	FCC PART 15 C 15.225 Occupied Bandwidth	15 - 35	25°C	3
Humidity (%RH)		25 - 75	45%RH	
Barometric pressure (mbar)		860 - 1060	950-1000	
Temperature (°C)	FCC PART 15 C 15.225 Radiated Emission	15 - 35	25°C	2
Humidity (%RH)		25 - 75	65%RH	
Barometric pressure (mbar)		860 - 1060	950-1000	
Temperature (°C)	FCC PART 15 C 15.225 Frequency Tolerance	15 - 35	25°C	3
Humidity (%RH)		25 - 75	45%RH	
Barometric pressure (mbar)		860 - 1060	950-1000	

Note: Test Site information refers to Laboratory Information.

2. Conducted Emission

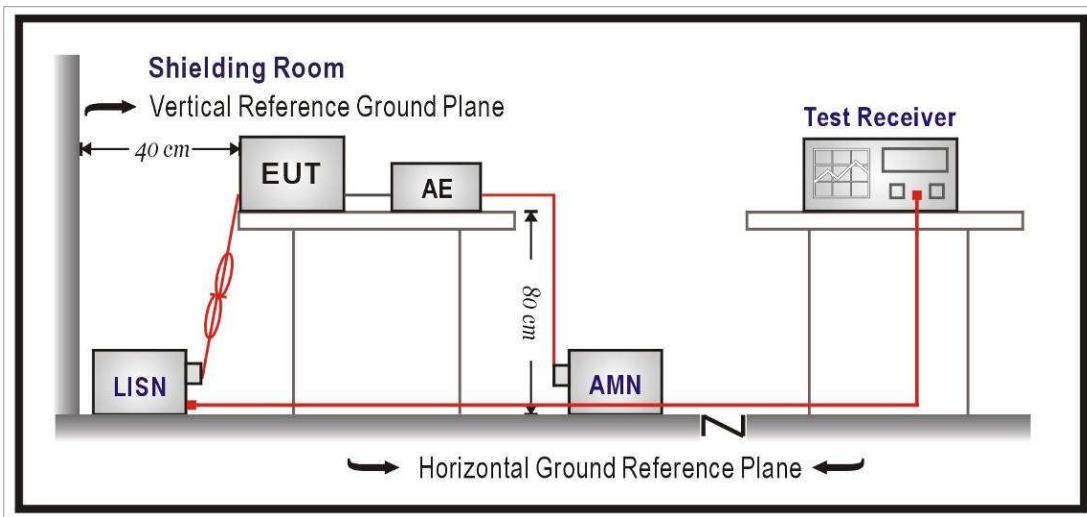
2.1. Test Equipment

The following test equipment are used during the test:

Conducted Emission /SR2-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Artificial Mains Network	R&S	ENV4200	848411/010	2017/02/06	2018/02/05
Test Receiver	R&S	ESCS 30	836858/022	2017/04/12	2018/04/11
LISN	R&S	ENV216	100092	2017/07/31	2018/07/30

2.2. Test Setup



2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 Limits (dBuV)		
Frequency MHz	QP	AV
0.15 - 0.50	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Remarks: In the above table, the tighter limit applies at the band edges.

2.4. Test Procedure

The EUT was setup according to ANSI C63.10: 2013 and tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs.)

Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.

The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.

2.5. Test Specification

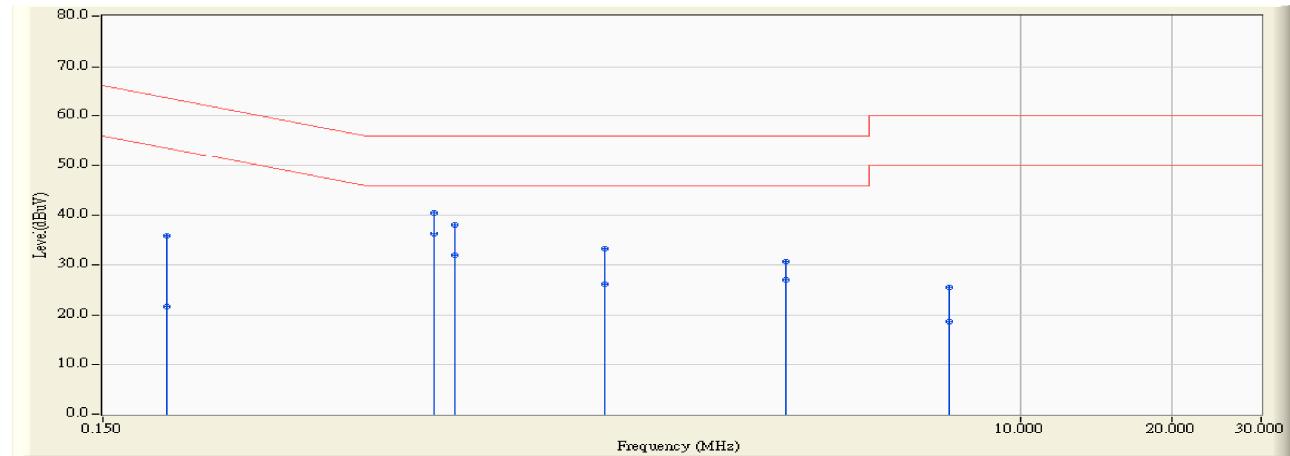
According to FCC Part 15 Subpart C Paragraph 15.207: 2014

2.6. Uncertainty

The measurement uncertainty is ± 2.26 dB.

2.7. Test Result

Site : SR2-H	Time : 2017/08/24
Limit : CISPR_B_00M_QP	Margin : 10
Probe : SR2_LISN(16A)-6_0712 - Line1	Power : AC 120V/60Hz
EUT : WIRELESS POWER TRANSMISSION SYSTEM	Note :

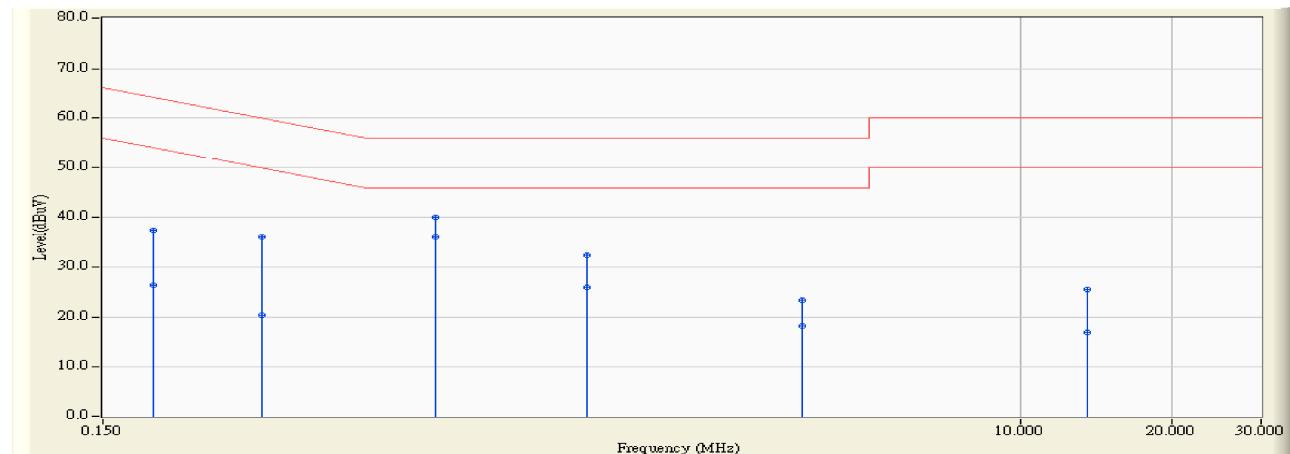


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	0.201	9.750	26.113	35.863	-28.684	64.547	QUASIPEAK
2	0.201	9.750	11.924	21.674	-42.873	64.547	AVERAGE
3	* 0.681	9.761	30.754	40.515	-15.485	56.000	QUASIPEAK
4	* 0.681	9.761	26.572	36.333	-19.667	56.000	AVERAGE
5	0.751	9.774	28.463	38.237	-17.763	56.000	QUASIPEAK
6	0.752	9.774	22.112	31.886	-24.114	56.000	AVERAGE
7	1.494	9.840	23.360	33.200	-22.800	56.000	QUASIPEAK
8	1.493	9.840	16.282	26.122	-29.878	56.000	AVERAGE
9	3.408	9.902	20.699	30.601	-25.399	56.000	QUASIPEAK
10	3.408	9.902	17.067	26.969	-29.031	56.000	AVERAGE
11	7.209	10.013	15.497	25.510	-34.490	60.000	QUASIPEAK
12	7.208	10.013	8.739	18.752	-41.248	60.000	AVERAGE

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Site : SR2-H	Time : 2017/08/24
Limit : CISPR_B_00M_QP	Margin : 10
Probe : SR2_LISN(16A)-6_0712 - Line2	Power : AC 120V/60Hz
EUT : WIRELESS POWER TRANSMISSION SYSTEM	Note :



	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	0.189	9.751	27.693	37.444	-27.447	64.891	QUASIPEAK
2	0.189	9.751	16.714	26.465	-38.415	64.880	AVERAGE
3	0.310	9.750	26.352	36.102	-25.322	61.424	QUASIPEAK
4	0.310	9.750	10.664	20.414	-41.007	61.422	AVERAGE
5	* 0.685	9.773	30.253	40.026	-15.974	56.000	QUASIPEAK
6	* 0.685	9.773	26.209	35.982	-20.018	56.000	AVERAGE
7	1.373	9.831	22.478	32.309	-23.691	56.000	QUASIPEAK
8	1.372	9.831	16.162	25.993	-30.007	56.000	AVERAGE
9	3.685	9.842	13.476	23.318	-32.682	56.000	QUASIPEAK
10	3.685	9.842	8.482	18.324	-37.676	56.000	AVERAGE
11	13.556	10.264	15.235	25.499	-34.501	60.000	QUASIPEAK
12	13.556	10.264	6.636	16.900	-43.100	60.000	AVERAGE

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

3. Occupied Bandwidth

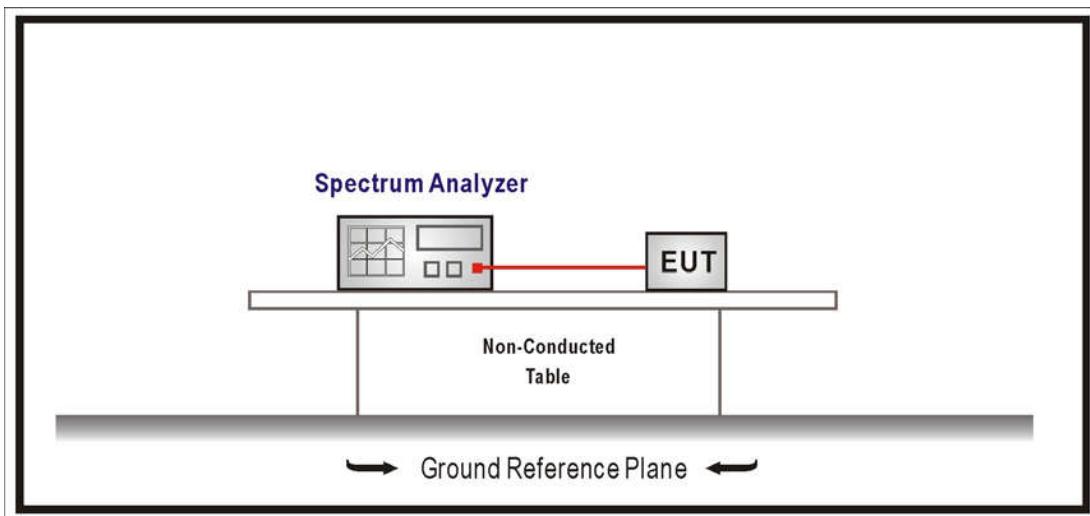
3.1. Test Equipment

The following test equipment is used during the test:

Occupied Bandwidth / SR10-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Signal & Spectrum Analyzer	R&S	FSV40	101049	2017/01/23	2018/01/22
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2017/03/13	2018/03/12
High Speed Peak Power Meter Dual Input	Anritsu	ML2496A	1602004	2017/01/20	2018/01/19
Pulse Power Sensor	Anritsu	MA2411B	1531043	2017/01/20	2018/01/19
Pulse Power Sensor	Anritsu	MA2411B	1531044	2017/01/20	2018/01/19

3.2. Test Setup



3.3. Limits

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

3.4. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.231(b): 2015

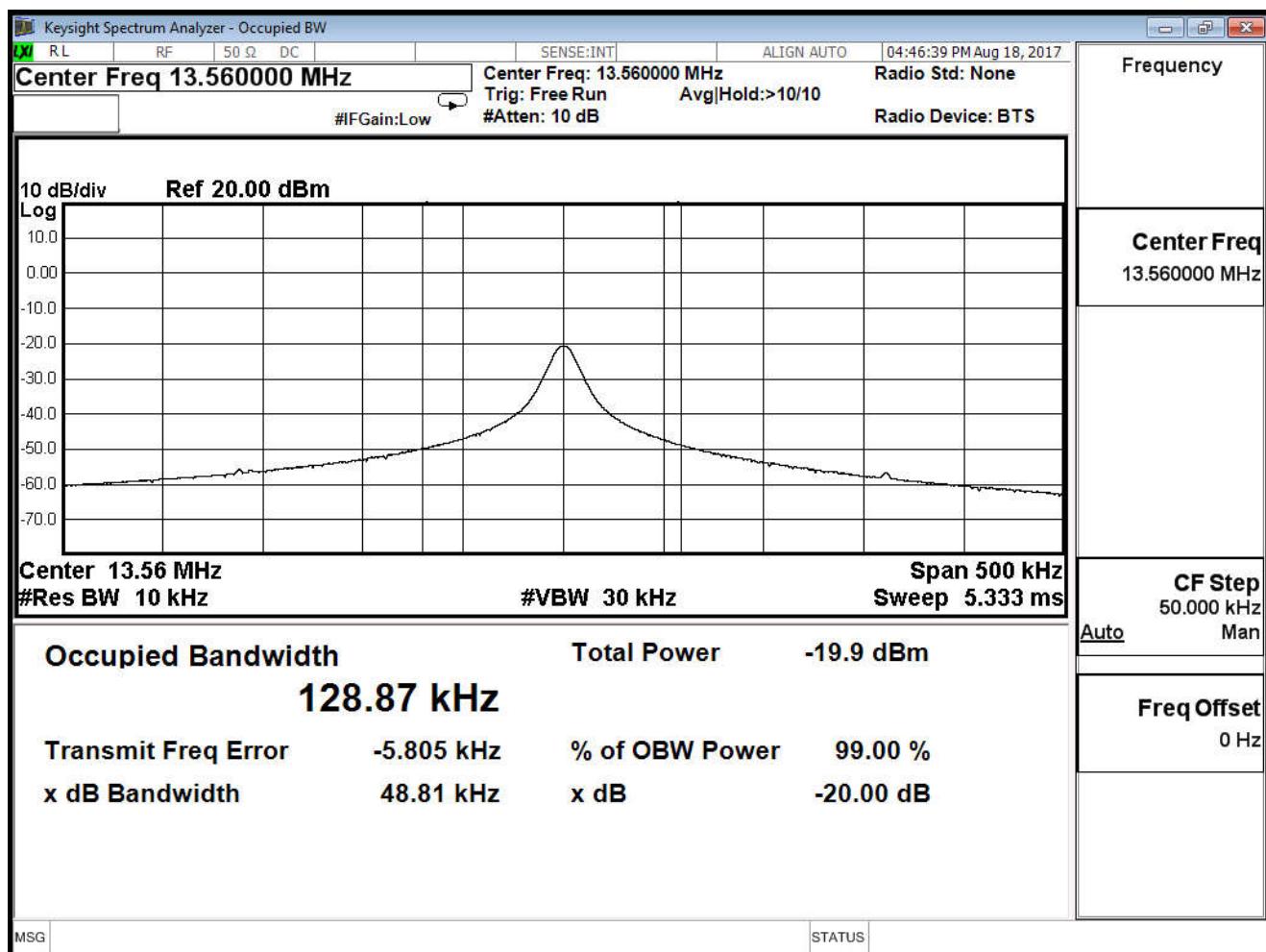
3.5. Uncertainty

The measurement uncertainty is ± 150 Hz.

3.6. Test Result

Product	WIRELESS POWER TRANSMISSION SYSTEM		
Test Item	Occupied Bandwidth		
Test Mode	Mode 1: Transmit		
Date of Test	2017/08/18	Test Site	SR10-H

Center Frequency	13.56 MHz
Allowable Bandwidth	--
Bandwidth at 20dB down (Max)	48.81 kHz
Result	PASS



4. Radiated Emission

4.1. Test Equipment

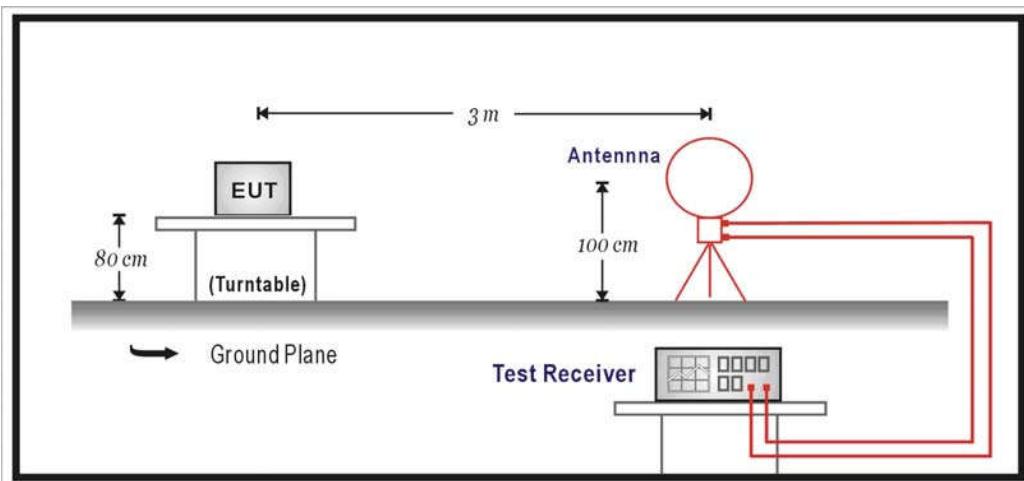
The following test equipment are used during the test:

Radiated Emission Band Edge / CB1-H, CB4-H

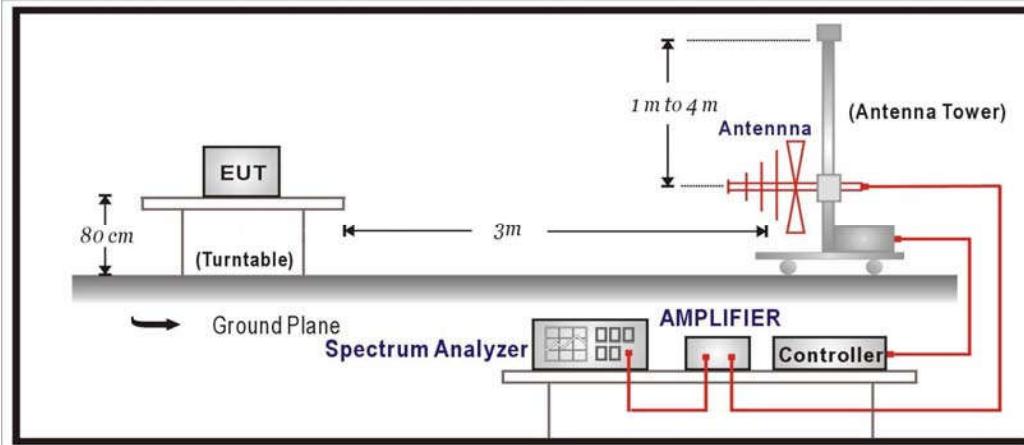
Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Signal Analyzer	R&S	FSVA40	101455	2016/11/28	2017/11/27
Signal & Spectrum Analyzer	R&S	FSV40	101049	2017/01/23	2018/01/22
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2017/03/13	2018/03/12
Bilog Antenna	Teseq	CBL6112D	23191	2017/06/28	2018/06/27
Horn Antenna	Schwarzbeck	BBHA 9120D	639	2017/06/14	2018/06/13
Horn Antenna	Schwarzbeck	BBHA 9170	203	2016/08/29	2017/08/28
Pre-Amplifier	RF Bay Inc.	LNA-1330	12162511	2017/03/09	2018/03/08
Pre-Amplifier	EMCI	EMCI 1830I	980366	2017/01/23	2018/01/22
Pre-Amplifier	MITEQ	JS44-45-8P	2014754	2016/12/26	2017/12/25

4.2. Test Setup

Under 30MHz Test Setup:



Under 1GHz Test Setup:



4.3. Limits

➤ FCC Part 15 Subpart C Paragraph 15.225 Limit

- The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

FCC Part 15 Subpart C Paragraph 15.225 Limits				
Field strength of fundamental				
Frequency (MHz)	30m		3m	
	uV/m	dBuV/m	uV/m	dBuV/m
13.553~13.567	15,848	84	1,584,800	124
13.410-13.553 13.567-13.710	334	50.475	33,400	90.475
13.110-13.410 13.710-14.010	106	40.506	10,600	80.506

Remarks : Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

➤ General Radiated Emission Limits

FCC Part 15 Paragraph 15.209 Limits		
Frequency MHz	Field Strength (Microvolts/meter)	Distance (Meters)
0.009-0.490	2400/F (kHz)	300
0.490-1.705	24000/F (kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remark:

1. The tighter limit shall apply at the edge between two frequency bands.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
3. RF Voltage (dBuV/m) = $20 \log_{10} \text{RF Voltage (uV/m)}$
4. When the very low emission of EUT, the 3m measurement distance was performed. Regards to an inverse linear extrapolation 40dB/dec is adopted. The collection factor will be 80dB for this case.

4.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Regard to the characteristic and operation band of EUT, Loop antenna was used for this measurement. The measurement method is hosed or ANSI C63.4 section 8.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4: 2003 on radiated measurement.

Radiated emissions were invested over the frequency range from 9kHz to 30MHz using a receive bandwidth of 9kHz and 30MHz to 1GHz using a receiver bandwidth of 120kHz.

Radiated was performed at an antenna to EUT distance of 3 meters.

The frequency range from 30MHz to 10th harmonics is checked.

The emission limit shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000MHz.

Radiated emission limit in these three bands are based on measurements employing an average detector.

4.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.225: 2007

4.6. Uncertainty

The measurement uncertainty 30MHz~1GHz as $\pm 3.19\text{dB}$.

4.7. Test Result

Product	WIRELESS POWER TRANSMISSION SYSTEM			
Test Item	Fundamental Radiated Emission			
Test Mode	Mode 1: Transmit			
Date of Test	2017/08/22		Test Site	CB1-H

Axle	Frequency (MHz)	Reading Level (dB μ V@3M)	Measure Level (dB μ V/m@3M)	Limit (dB μ V/m@3M)	margin(dB)
X	13.560	29.990	49.990	123.999	-74.009
Y	13.560	41.880	61.880	123.999	-62.119
Z	13.560	40.150	60.150	123.999	-63.849

Frequency (MHz)	Reading Level (dB μ V@3M)	Measure Level (dB μ V/m@3M)	Limit (dB μ V/m@3M)	margin(dB)
13.553-13.567	41.880	61.880	123.999	-62.119
13.410-13.553	35.950	55.950	90.475	-34.525
13.567-13.710	36.090	56.090	90.475	-34.385
13.110-13.410	15.850	35.850	80.506	-44.656
13.710-14.010	15.970	35.970	80.506	-44.536

Note: Measure Level (dB μ V/m) = Reading Level (dB μ V) + Antenna Factor (AF_E)

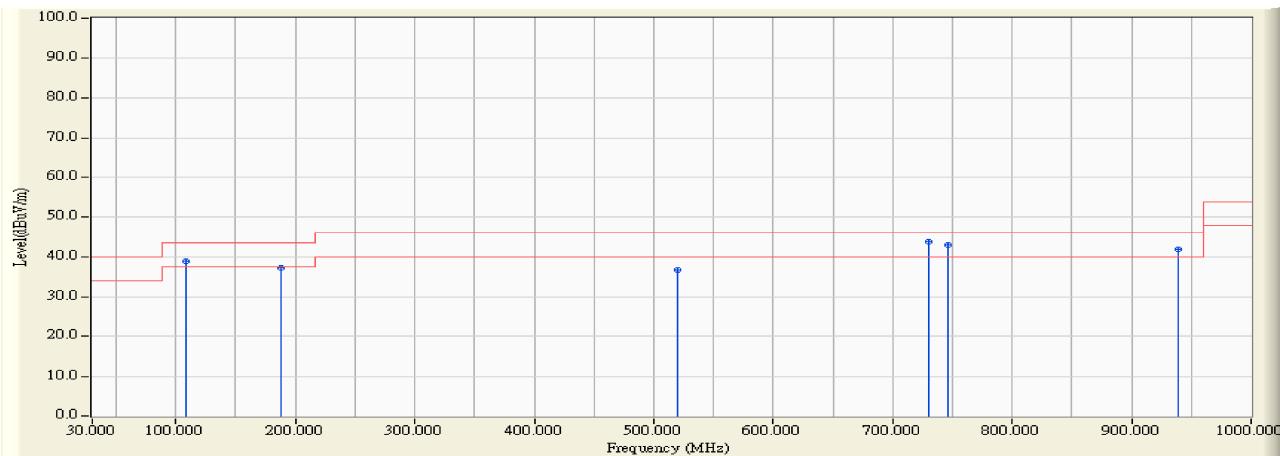
Product	WIRELESS POWER TRANSMISSION SYSTEM		
Test Item	Radiated Emission (<30MHz)		
Test Mode	Mode 1: Transmit		
Date of Test	2017/08/22	Test Site	CB1-H

Frequency (MHz)	Reading Level (dB μ V@3M)	Measure Level (dB μ V/m@3M)	Limit (dB μ V/m@3M)	margin(dB)
0.162	23.840	43.840	103.414	-59.574
1.006	16.950	36.950	67.552	-30.602
16.895	17.570	37.570	69.542	-31.972
18.657	16.870	36.870	69.542	-32.672
14.412	20.020	40.020	69.542	-29.522
27.12	20.700	40.700	69.542	-28.842

Note: Measure Level (dB μ V/m) = Reading Level (dB μ V) + Antenna Factor (AF_E)

Spurious Emission (30MHz~1GHz)

Site : CB4-H	Time : 2017/08/18
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Probe : CB4_FCC_EFS_S2_30M-1GHz_1116 - HORIZONTAL	Power : 120V/60Hz
EUT : WIRELESS POWER TRANSMISSION SYSTEM	Note :

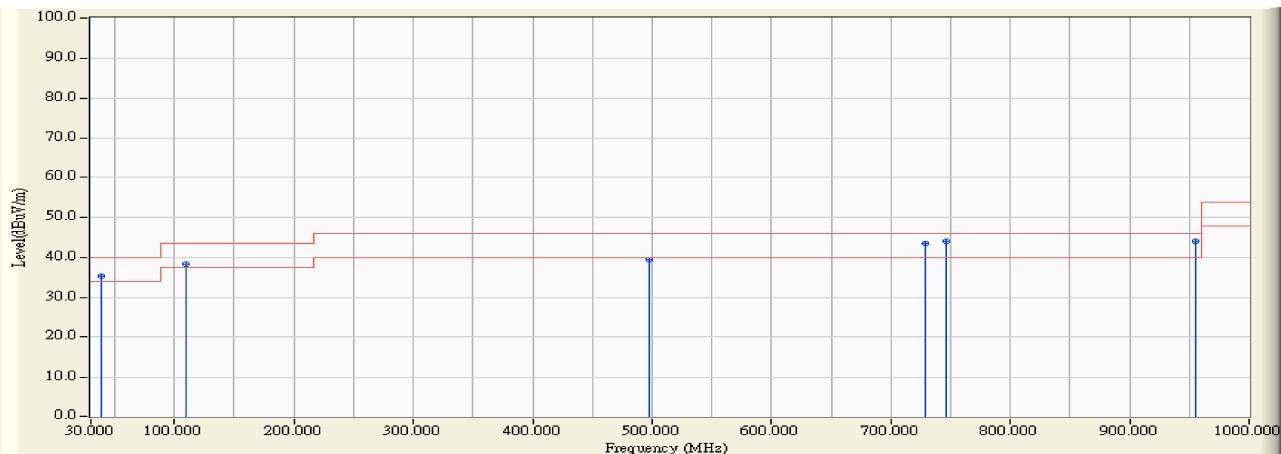


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	108.085	-16.524	55.487	38.962	-4.538	43.500	QUASIPEAK
2	188.110	-15.833	53.221	37.387	-6.113	43.500	QUASIPEAK
3	519.850	-13.735	50.501	36.766	-9.234	46.000	QUASIPEAK
4	729.855	-12.332	55.967	43.635	-2.365	46.000	QUASIPEAK
5	746.345	-13.026	55.857	42.831	-3.169	46.000	QUASIPEAK
6	938.890	-11.151	52.975	41.824	-4.176	46.000	QUASIPEAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. “ * ”, means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Site : CB4-H	Time : 2017/08/18
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Probe : CB4_FCC_EFS_S2_30M-1GHz_1116 - VERTICAL	Power : 120V/60Hz
EUT : WIRELESS POWER TRANSMISSION SYSTEM	Note :



	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type	
1	38.245	-16.501	51.945	35.444	-4.556	40.000	QUASIPEAK	
2	110.025	-22.237	60.677	38.441	-5.059	43.500	QUASIPEAK	
3	498.025	-14.076	53.389	39.313	-6.687	46.000	QUASIPEAK	
4	728.885	-10.609	54.070	43.462	-2.538	46.000	QUASIPEAK	
5	746.345	-11.109	54.994	43.885	-2.115	46.000	QUASIPEAK	
6	*	954.895	-7.365	51.278	43.913	-2.087	46.000	QUASIPEAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. “ * ”, means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

5. Frequency Stability

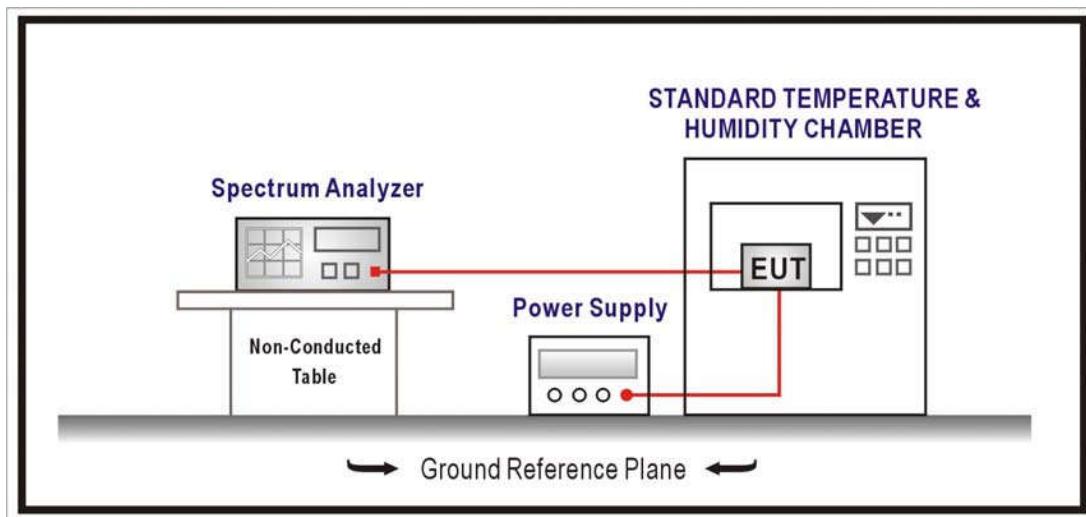
5.1. Test Equipment

The following test equipments are used during the radiated emission tests:

Frequency Separation / SR10-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Signal & Spectrum Analyzer	R&S	FSV40	101049	2017/01/23	2018/01/22
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2017/03/13	2018/03/12
High Speed Peak Power Meter Dual Input	Anritsu	ML2496A	1602004	2017/01/20	2018/01/19
Pulse Power Sensor	Anritsu	MA2411B	1531043	2017/01/20	2018/01/19
Pulse Power Sensor	Anritsu	MA2411B	1531044	2017/01/20	2018/01/19

5.2. Test Setup



5.3. Test Procedure

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency over a temperature variation of -20 degrees to 50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

5.4. Uncertainty

The measurement uncertainty is ± 150 Hz.

5.5. Test Result

Product	WIRELESS POWER TRANSMISSION SYSTEM			
Test Item	Frequency Tolerance			
Test Mode	Mode 1: Transmit			
Date of Test	2017/08/18			

Temperature Interval (°C)	AC Voltage (V)	Frequency (MHz)	Deviation (%)	Result
-20	120	13.560086	0.0006342	Pass
-10		13.560084	0.0006195	Pass
0		13.560088	0.0006490	Pass
10		13.560078	0.0005752	Pass
20		13.560072	0.0005310	Pass
30		13.560070	0.0005162	Pass
40		13.560050	0.0003687	Pass
50		13.560049	0.0003614	Pass

Temperature Interval (°C)	AC Voltage (V)	Frequency (MHz)	Deviation (%)	Result
20	102.0	13.560037	0.0002729	Pass
	120.0	13.560015	0.0001106	Pass
	138.0	13.560003	0.0000221	Pass