RADIO TEST REPORT

The device described below is tested by Dongguan Nore Testing Center Co., Ltd. to determine the maximum emission levels emanating from the device, the severe levels which the device can endure and E.U.T.'s performance criterion. The test results, data evaluation, test procedures, and equipment of configurations shown in this report were made in accordance with the procedures in ANSI C63.10(2013).

Applicant	:	Shenzhen Cartvshine Electronic Technology Co., Ltd.
Address	:	F7 A1 Block, Anle Industrial Park, Hezhou, Xixiang Street, Bao'an District, Shenzhen city, China
Manufacturer/Factory	:	Shenzhen Cartvshine Electronic Technology Co., Ltd.
Address	:	F7 A1 Block, Anle Industrial Park, Hezhou, Xixiang Street, Bao'an District, Shenzhen city, China
E.U.T.	:	Car wireless charging device
Brand Name	:	N/A
Model No.	:	MG-BT-02A, MG-XX-yyA (For model difference refer to section 1)
FCC ID	:	2AORLFT03A
Measurement Standard	:	FCC PART 15 Subpart C
Date of Receiver	:	December 27, 2017
Date of Test	:	December 29, 2017 to January 09, 2018
Date of Report	:	January 15, 2018

This Test Report is Issued Under the Authority of :

Prepared by	Approved & Authorized Signer
Alina Guo / Engineer	Iori Fan / Authorized Signatory

This test report is for the customer shown above and their specific product only. This report applies to above tested sample only and shall not be reproduced in part without written approval of Dongguan Nore Testing Center Co., Ltd.

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Address: Building D, Gaosheng Science & Technology Park, Zhouxi Longxi Road, Nancheng District, Dongguan City, Guangdong, China

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Revision History of This Test Report

Report Number	Description	Issued Date
NTC1712339FV00	Initial Issue	2018-01-15

1. GENERAL INFORMATION

1.1 Product Description for Equipment under Test

Product name	:	Car wireless charging device
Main model	:	MG-BT-02A
Additional model	:	MG-XX-yyA (X represents the letter A-Z； y represents Arabia number 0-9)
Model difference	:	These models have the same circuit schematic, construction, PCB Layout and critical components. Their difference in model number due to trading purpose.
Power Supply	:	Input: DC 9-16V Output: DC 5V 1A
Test voltage	:	DC 12V
Adapter	:	N/A
Cable	:	N/A
Software version	:	V1.0
Hardware version	:	V1.0
Note	:	All the test performed on model MG-BT-02A.
Remark	:	N/A
Frequency Range	:	105.5-204.5KHz

Note: The Lowest, middle, and the Highest frequency of channel were selected to perform the test. The selected frequency and test software see below:

Channel	Frequency KHz
1	105.5
51	155.5
100	204.5

1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: **2AORLFT03A** filing to comply with FCC Part 15 (2016), Subpart C Rule.

1.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.10 (2013). Radiated emission measurement was performed in semi-anechoic chamber and conducted emission measurement was performed in shield room. For radiated emission measurement, preliminary scans were performed in the semi-anechoic chamber only to determine the worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters.

1.4 Equipment Modifications

Not available for this EUT intended for grant.

1.5 Support Device

Note

1.6 Test Facility and Location

Site Description

EMC Lab : Listed by CNAS, August 14, 2015
The certificate is valid until August 13, 2018
The Laboratory has been assessed and proved to be in compliance with CNAS/CL01
The Certificate Registration Number is L5795.

Listed by A2LA, November 01, 2017
The certificate is valid until December 31, 2019
The Laboratory has been assessed and proved to be in compliance with ISO17025
The Certificate Registration Number is 4429.01

Listed by FCC, November 06, 2017
The Designation Number is CN1214
Test Firm Registration Number: 907417

Listed by Industry Canada, June 08, 2017
The Certificate Registration Number. Is 46405-9743

Name of Firm : Dongguan Nore Testing Center Co., Ltd.
(Dongguan NTC Co., Ltd.)

Site Location : Building D, Gaosheng Science & Technology Park, Zhouxi Longxi Road, Nancheng District, Dongguan City, Guangdong Province, China

1.7 Summary of Test Results

FCC Rules	Description Of Test	Uncertainty	Result
§15.35	20dB Bandwidth	±1.42 x10^{-4}%	Compliant
§15.207 (a)	AC Power Conducted Emission	±1.06dB	N/A Note
§15.209	Radiated Emission	±3.70dB	Compliant

Note: Due to this EUT is powered by DC power only, the AC Power Conducted Emission is not applicable.

2. System Test Configuration

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 Special Accessories

Not available for this EUT intended for grant.

2.3 Description of test modes

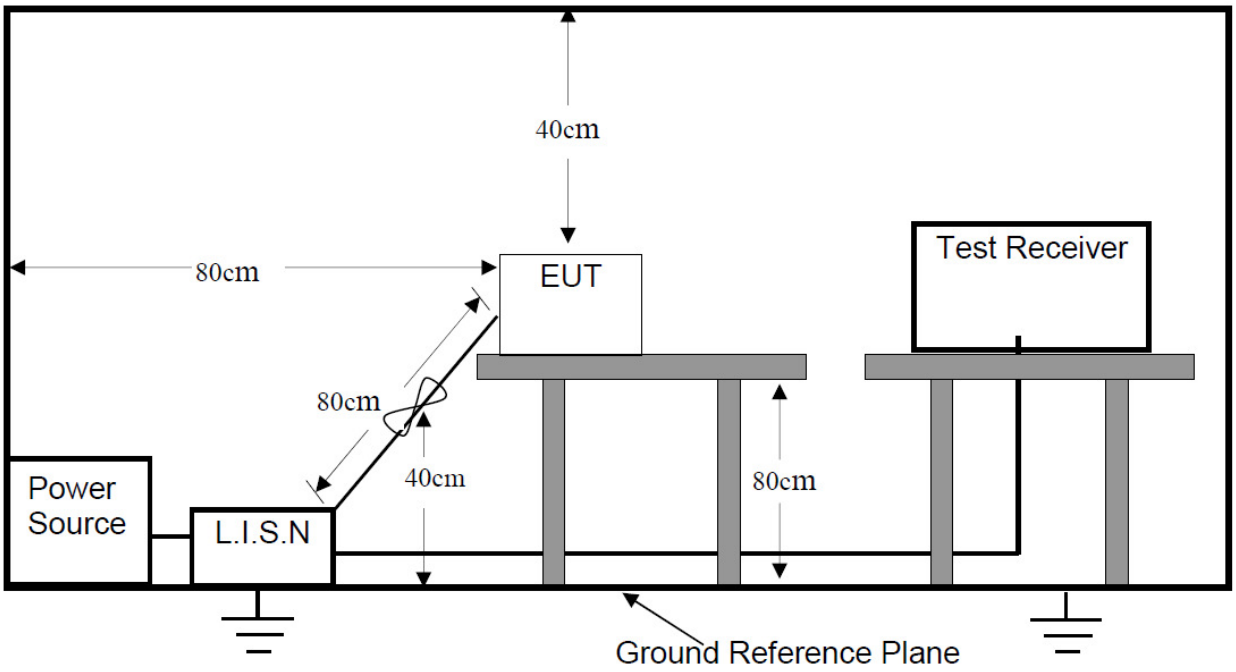
The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting and normal mode is programmed. The Lowest, middle and highest channel were chosen for testing.

2.4 EUT Exercise

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements.

3. Conducted Emissions Test

3.1 Test SET-UP (Block Diagram of Configuration)



3.2 Test Condition

Test Requirement: FCC Part 15.207

Frequency Range: 150KHz ~ 30MHz

Detector: RBW 9KHz, VBW 30KHz

Operation Mode: Full Load, Half Load, Empty Load

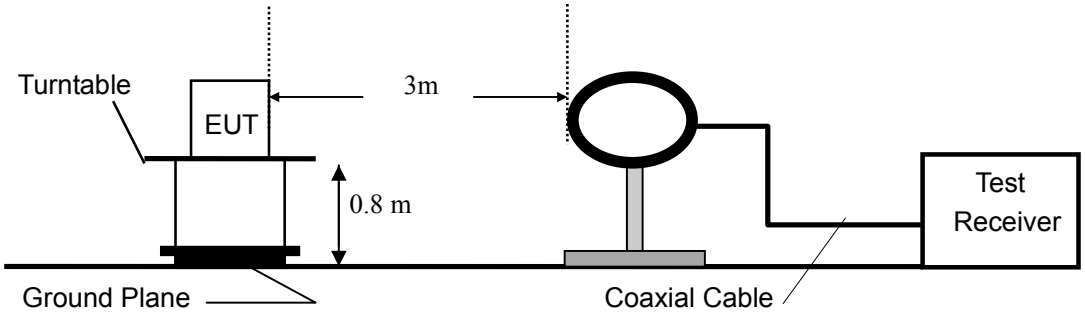
3.3 Measurement Results

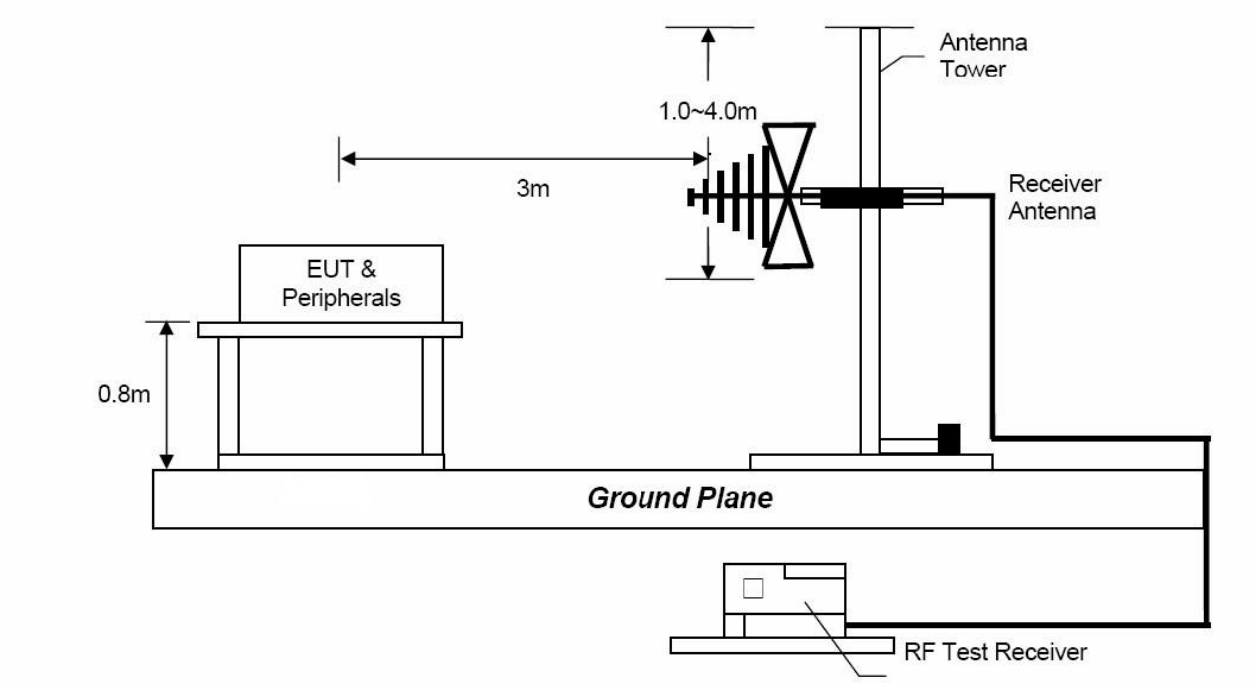
Not Applicable.

4. Radiated Emission Test

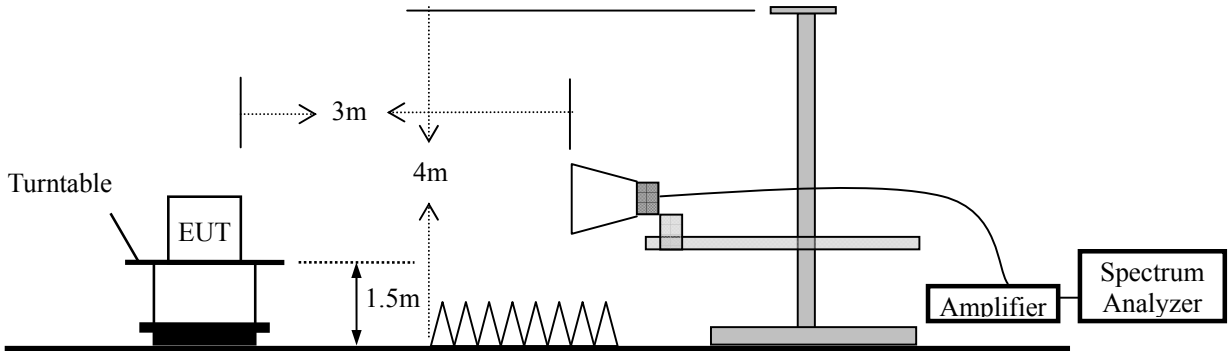
4.1 Test SET-UP (Block Diagram of Configuration)

4.1.1 Radiated Emission Test Set-Up, Frequency Below 30MHz





4.1.2 Radiated Emission Test Set-Up, Frequency above 1GHz



4.2 Measurement Procedure

a. Blow 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi- anechoic chamber room.
b. For the radiated emission test above 1GHz:
   The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter full anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
c. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
d. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. The test-receiver system was set to peak detect function and specified bandwidth with maximum hold mode.
f. A Quasi-peak measurement was then made for that frequency point for below 1GHz test. PK and AV for above 1GHz emission test.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

Frequency Band (MHz)	Level	Resolution Bandwidth	Video Bandwidth
30 to 1000	QP	120 kHz	300 kHz
Above 1000	Peak	1 MHz	3 MHz
	Average	1 MHz	10 Hz

4.3 Limit

Frequency range MHz	Distance Meters	Field Strengths Limit (15.209) μV/m
0.009 ~ 0.490	300	2400/F(kHz)
0.490 ~ 1.705	30	24000/F(kHz)
1.705 ~ 30	30	30
30 ~ 88	3	100
88 ~ 216	3	150
216 ~ 960	3	200
Above 960	3	500

Remark : (1) Emission level (dB)μV = 20 log Emission level μV/m

(2) The smaller limit shall apply at the cross point between two frequency bands.

(3) As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

(4) The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower.

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9KHz~90KHz/ RB 200Hz for AV
	90KHz~110KHz/ RB 200Hz for QP
	110KHz~490KHz/ RB 200Hz for AV
	490KHz~30MHz/ RB 9KHz for QP
	30MHz~1000MHz/ RB 120KHz for QP

FCC 15.209 (d) The emission limits 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 limits in these three bands are based on measurements employing an average detector.

4.4 Measurement Results

Please refer to following plots of the worst case: Full Load.

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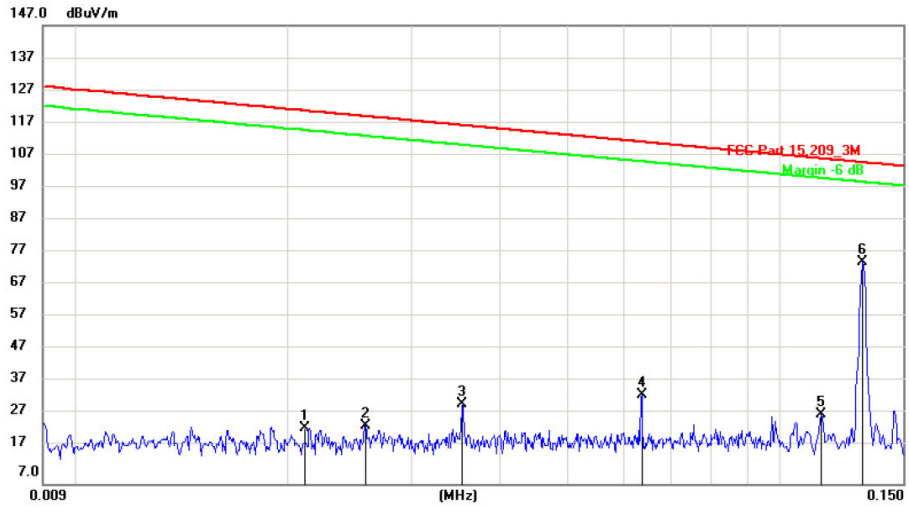
Radiated Emission Measurement

File :MG-BT-02A Data :#7 Date: 2018-1-8 Time: 9:03:54



Site	Polarization: *Horizontal*	Temperature: 26
Limit: FCC Part 15.209_3M	Power: DC12V	Humidity: 60 %
EUT: Vehicle Wireless Charger	Distance: 3m	
M/N: MG-BT-02A		
Mode: Full Load		
Note:		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		0.0212	3.60	20.37	23.97	120.9	-96.96	peak			
2		0.0258	4.18	20.49	24.67	119.2	-94.56	peak			
3		0.0354	10.74	20.54	31.28	116.5	-85.22	peak			
4		0.0637	13.50	20.52	34.02	111.4	-77.40	peak			
5		0.1146	7.69	20.53	28.22	106.3	-78.13	peak			
6	*	0.1313	54.04	20.53	74.57	105.1	-30.60	peak			

*:Maximum data x:Over limit !:over margin 〈Reference Only

Note: Due to the PEAK level was below the limit of AV level, therefore AV levels were considered to meet the requirements.

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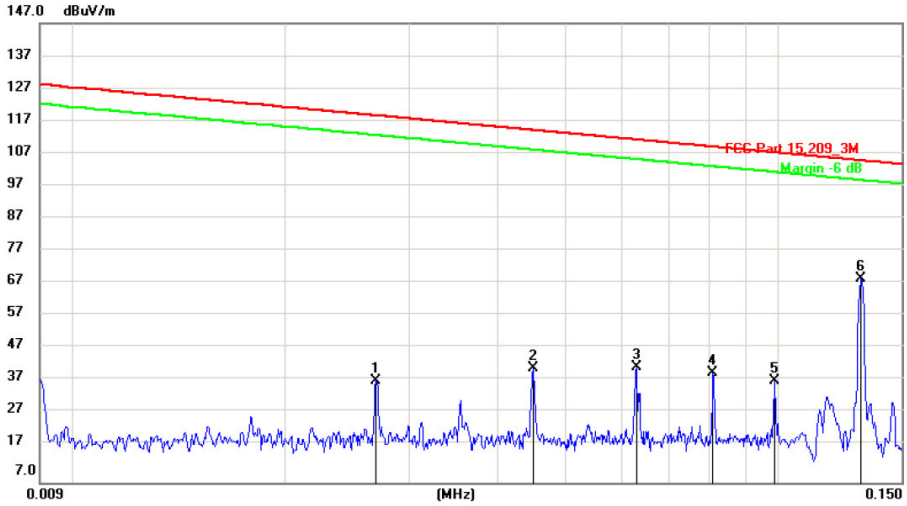
Radiated Emission Measurement

File :MG-BT-02A Data :#8 Date: 2018-1-8 Time: 9:13:16



Site		Polarization:	*Vertical*	Temperature:	26
Limit:	FCC Part 15.209_3M	Power:	DC12V	Humidity:	60 %
EUT:	Vehicle Wireless Charger	Distance:	3m		
M/N:	MG-BT-02A				
Mode:	Full Load				
Note:					

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		0.0269	17.37	20.49	37.86	118.8	-81.01	peak			
2		0.0449	21.29	20.59	41.88	114.4	-72.56	peak			
3		0.0631	21.56	20.53	42.09	111.5	-69.41	peak			
4		0.0810	19.79	20.53	40.32	109.3	-69.03	peak			
5		0.0990	17.52	20.54	38.06	107.6	-69.55	peak			
6	*	0.1313	48.68	20.53	69.21	105.1	-35.96	peak			

*:Maximum data x:Over limit !:over margin 〈Reference Only

Note: Due to the PEAK level was below the limit of AV level, therefore AV levels were considered to meet the requirements.

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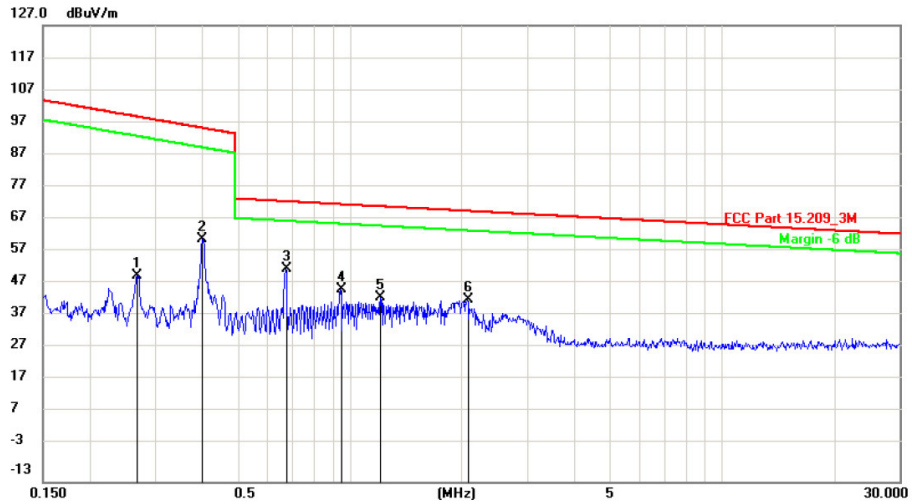
Radiated Emission Measurement

File :MG-BT-02A Data :#18 Date: 2018-1-8 Time: 10:17:21



Site
Limit: FCC Part 15.209_3M
EUT: Vehicle Wireless Charger
M/N: MG-BT-02A
Mode: Full Load
Note:

Polarization: *Horizontal*
Power: DC12V
Distance: 3m

Temperature: 26
Humidity: 60 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		0.2686	29.74	20.49	50.23	98.99	-48.76	peak			
2		0.4017	40.85	20.46	61.31	95.52	-34.21	peak			
3	*	0.6719	31.92	20.43	52.35	72.97	-20.62	peak			
4		0.9431	25.55	20.40	45.95	72.08	-26.13	peak			
5		1.2096	23.03	20.40	43.43	71.42	-27.99	peak			
6		2.0659	22.26	20.40	42.66	70.01	-27.35	peak			

*:Maximum data x:Over limit !:over margin 〈Reference Only

Note: Due to the PEAK level was below the limit of AV level, therefore AV levels were considered to meet the requirements.

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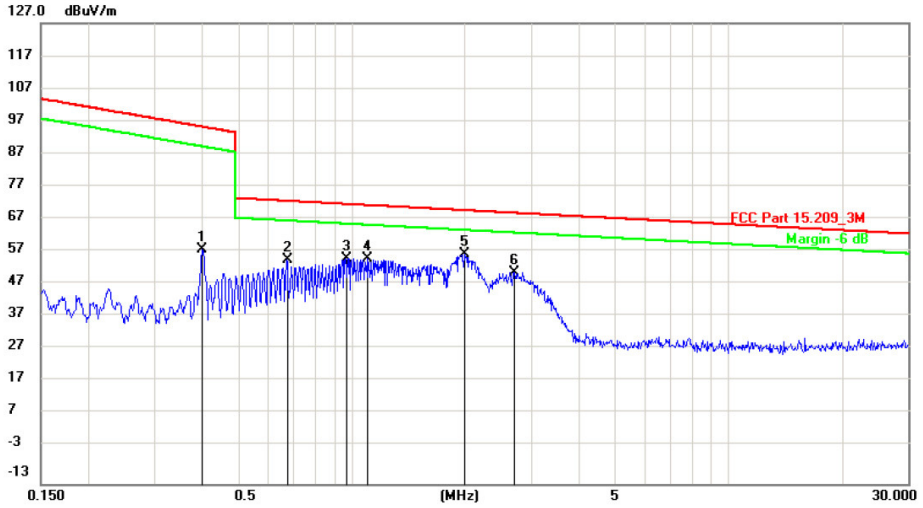
Radiated Emission Measurement

File :MG-BT-02A Data :#17 Date: 2018-1-8 Time: 10:05:34



Site	Polarization: *Vertical*	Temperature: 26
Limit: FCC Part 15.209_3M	Power: DC12V	Humidity: 60 %
EUT: Vehicle Wireless Charger	Distance: 3m	
M/N: MG-BT-02A		
Mode: Full Load		
Note:		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		0.4017	37.65	20.46	58.11	95.52	-37.41	peak			
2		0.6719	34.54	20.43	54.97	72.97	-18.00	peak			
3		0.9633	35.20	20.40	55.60	72.02	-16.42	peak			
4		1.1054	34.97	20.40	55.37	71.66	-16.29	peak			
5	*	1.9904	36.26	20.40	56.66	70.11	-13.45	peak			
6		2.7067	30.97	20.40	51.37	69.30	-17.93	peak			

*:Maximum data x:Over limit !:over margin 〈Reference Only

Note: Due to the PEAK level was below the limit of AV level, therefore AV levels were considered to meet the requirements.

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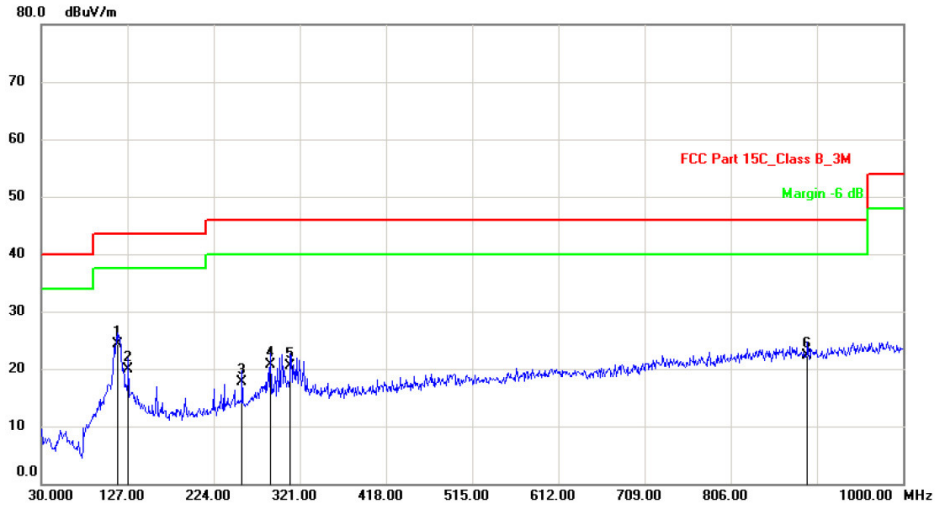
Radiated Emission Measurement

File :MG-BT-02A Data :#1 Date: 2018-1-3 Time: 10:38:19



Site	Polarization: *Horizontal*	Temperature: 26
Limit: FCC Part 15C_Class B_3M	Power: DC12V	Humidity: 47 %
EUT: Vehicle Wireless Charger	Distance: 3m	
M/N: MG-BT-02A		
Mode: Full Load		
Note:		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	116.3300	37.55	-13.25	24.30	43.50	-19.20	QP			
2		127.9700	34.84	-14.94	19.90	43.50	-23.60	QP			
3		256.0100	29.24	-11.54	17.70	46.00	-28.30	QP			
4		288.0200	31.50	-10.80	20.70	46.00	-25.30	QP			
5		310.3300	30.80	-10.20	20.60	46.00	-25.40	QP			
6		892.3300	23.60	-1.20	22.40	46.00	-23.60	QP			

*:Maximum data x:Over limit !:over margin 〈Reference Only

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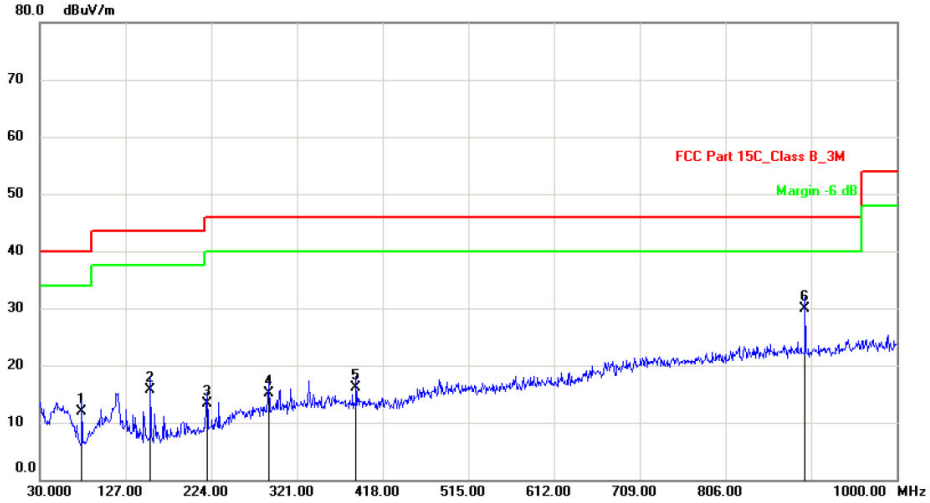
Radiated Emission Measurement

File :MG-BT-02A Data :#2 Date: 2018-1-3 Time: 10:45:37



Site	Polarization: *Vertical*	Temperature: 26
Limit: FCC Part 15C_Class B_3M	Power: DC12V	Humidity: 47 %
EUT: Vehicle Wireless Charger	Distance: 3m	
M/N: MG-BT-02A		
Mode: Full Load		
Note:		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		77.5300	30.98	-19.08	11.90	40.00	-28.10	QP			
2		155.1300	34.06	-18.36	15.70	43.50	-27.80	QP			
3		219.1500	29.40	-16.00	13.40	46.00	-32.60	QP			
4		288.9900	27.98	-12.78	15.20	46.00	-30.80	QP			
5		387.9300	27.27	-11.17	16.10	46.00	-29.90	QP			
6	*	896.2100	31.11	-1.21	29.90	46.00	-16.10	QP			

*:Maximum data x:Over limit !:over margin 〈Reference Only

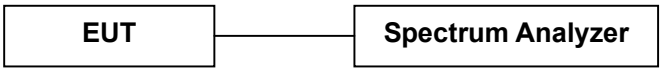
5. 20dB Bandwidth

5.1 Measurement Procedure

Maximum 20dB RF Bandwidth, FCC Rule 15.35:

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RBW was chosen so that the display was a result of the hopping channel modulation. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. Use the spectrum 20dB down delta function to measure the bandwidth.

5.2 Test SET-UP (Block Diagram of Configuration)



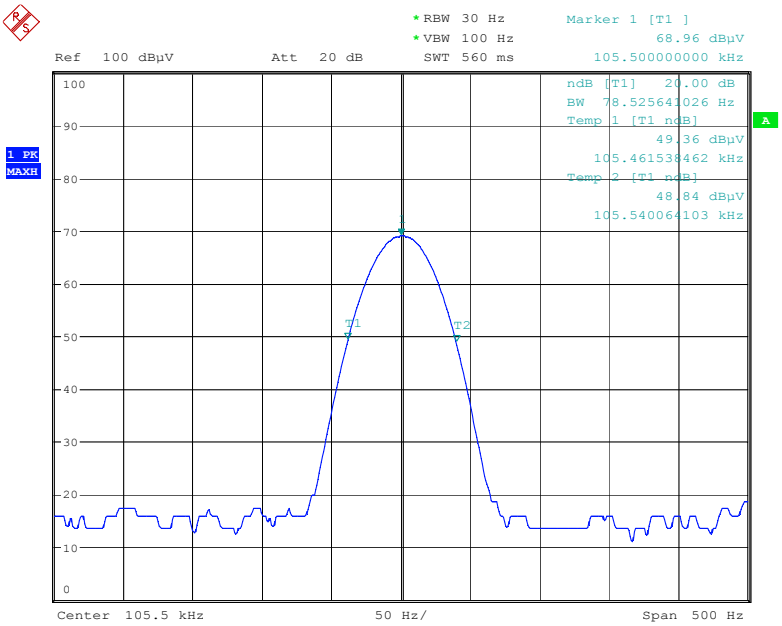
5.3 Measurement Results

Refer to attached data chart.

RBW:	30Hz	VBW:	100Hz
Test By:	Sance	Spectrum Detector:	PK
Temperature :	24 ℃	Test Date :	December 30, 2017
Test Result:	PASS	Humidity :	50 %

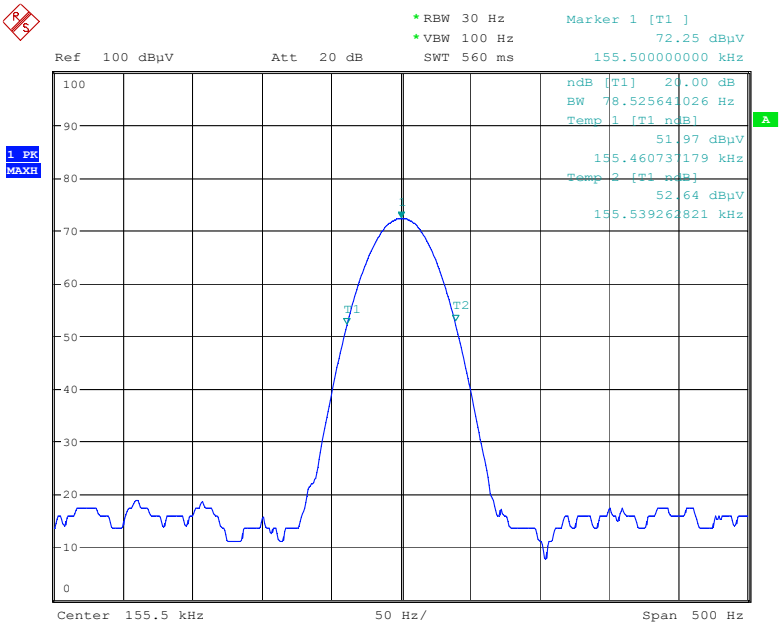
Channel frequency (KHz)	20dB Down BW(Hz)
105.5	78.53
155.5	78.53
204.5	78.53

Lowest Channel



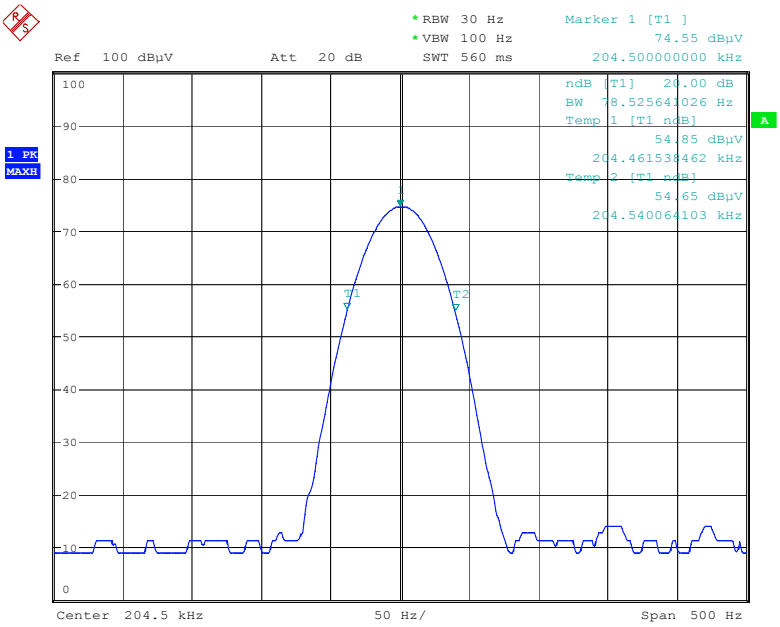
Date: 30.DEC.2017 16:00:47

Middle Channel



Date: 30.DEC.2017 16:01:42

Highest Channel



Date: 30.DEC.2017 16:02:28

6. Test Equipment List

Description	Manufacturer	Model Number	Serial Number	Characteristics	Calibration Date	Calibration Due Date
Test Receiver	Rohde & Schwarz	ESCI7	100837	9KHz~7GHz	Mar. 14, 2017	Mar. 13, 2018
Antenna	Schwarzbeck	VULB9162	9162-010	30MHz~7GHz	Mar. 15, 2017	Mar. 14, 2018
Cable	Huber+Suhner	CBL2-NN-1M	22390001	9KHz~7GHz	Mar. 14, 2017	Mar. 13, 2018
Cable	Huber+Suhner	CIL02	N/A	9KHz~7GHz	Mar. 14, 2017	Mar. 13, 2018
RF Cable	Huber+Suhner	SF-104	MY16559/4	9KHz~25GHz	Apr. 25, 2017	Apr. 25, 2018
Power Amplifier	HP	HP 8447D	1145A00203	100KHz~1.3GHz	Mar. 14, 2017	Mar. 13, 2018
Horn Antenna	Schwarzbeck	BBHA9170	9170-242	15GHz~40GHz	Mar. 14, 2017	Mar. 13, 2018
Horn Antenna	Com-Power	AH-118	071078	1GHz~18GHz	Mar. 15, 2017	Mar. 14, 2018
RF Cable	Huber+Suhner	SF-104	N/A	9KHz~40GHz	Apr. 25, 2017	Apr. 24, 2018
Loop antenna	Schwarzbeck	FMZB1513	1513-272	9KHz~30MHz	Sep. 09, 2017	Sep. 08, 2018
Spectrum Analyzer	Rohde & Schwarz	FSU26	200409/026	20Hz~26.5GHz	Apr. 25, 2017	Apr. 24, 2018
Spectrum Analyzer	Rohde & Schwarz	FSV40	101003	10Hz~40GHz	April. 06, 2017	April. 05, 2018
Pre-Amplifier	EMCI	EMC 184045	980102	18GHz~40GHz	Nov. 03, 2017	Nov. 02, 2018
Pre-Amplifier	Agilent	8449B	3008A02964	1GHz~26.5GHz	Apr. 25, 2017	Apr. 24, 2018
L.I.S.N.	Rohde & Schwarz	ENV 216	101317	9KHz~30MHz	Mar. 14, 2017	Mar. 13, 2018
Temporary antenna connector	TESCOM	SS402	N/A	9KHz-25GHz	N/A	N/A

Note: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

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