



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AV0032302(0) Date : 16 Jun 2017

Application No. : LV018432(7)

Applicant : Kid Galaxy Inc
150 Dow Street,
Unit 425B Manchester, NH03101, U.S.A

Sample Description : One(1) item of submitted sample stated to be Car of 2.4G High Speed 20V RC F150 of Model No. 10314
Sample registration no. : RV0024505-001
Radio Frequency : 2413MHz – 2473MHz Transceiver
Rating : 20V rechargeable battery
No. of submitted sample : Two (2) piece (s)

Date Received : 02 Jun 2017

Test Period : 06 Jun 2017 to 09 Jun 2017

Test Requested : FCC Part 15 Certification (15.249), FCC Part 15 Verification Procedure
Industry Canada RSS-210 Issue 9, Class B digital apparatus under ICES-003 Issue 6

Test Method : 47 CFR Part 15 (10-1-15 Edition), ANSI C63.4 – 2014, ANSI C63.10 – 2013,
Industry Canada RSS-210 Issue 9, Industry Canada RSS-Gen Issue 6

Test Engineer : Mr. LEUNG Shu-kan, Ken

Test Result : See attached sheet(s) from page 2 to 44.

Conclusion : The submitted sample was found to comply with requirement of FCC Subpart B and C, Industry Canada RSS-210 Issue 9, Class B digital apparatus under ICES-003 Issue 6.

For and on behalf of
CMA Industrial Development Foundation Limited

Authorized Signature : _____


Mr. WONG Lap-pong, Andrew
Manager
Electrical Division

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FCC ID: QEA-U282-2G4R
IC: 22849-U282R

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CMA Industrial Development Foundation Limited

Room 1302, Yan Hing Centre, 9-13 Wong Chuk Yeung St., Fo Tan, Shatin, N.T., Hong Kong.

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1 General Information

1.1 General Description

The equipment under test (EUT) is a remote cycle. The EUT is power by 20V rechargeable battery. It operates at 2413MHz – 2473MHz. When the EUT received the radio signal from controller, it will take the corresponding action.

The brief circuit description is listed as follows:

- U1 and its associated circuit act as MCU with RF circuit
- U2, L1, CE2, and its associated circuit act as step down DC
CE3, CE5
- U6, L3, D1, CE4 and its associated circuit act as step up DC
- U4, U5, VR1 and its associated circuit act as steering gear device
- U7, D3 and its associated circuit act as control level conversion
- Q1, Q2, Q3, Q4 and its associated circuit act as motor



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1.2 Location of the test site

FCC Registered Test Site Number: 416666

IC Registered Test Site Number: 4093A

Radiated emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.10 – 2013. A Semi-Anechoic Chamber Testing Site is set up for investigation and located at:

Ground Floor, Yan Hing Centre,
9 – 13 Wong Chuk Yeung Street,
Fo Tan, Shatin,
New Territories,
Hong Kong.

Conducted emissions measurements are investigated and also taken pursuant to the procedures of ANSI C63.10 – 2013. A shielded room is located at :

Ground Floor, Yan Hing Centre,
9 – 13 Wong Chuk Yeung Street,
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1.3 List of measuring equipment

Equipment	Manufacturer	Model No.	Serial No.	Calibration Due Date	Calibration Period
EMI Test Receiver	R&S	ESCI	100152	15 Nov 2017	1Year
Spectrum Analyzer	R&S	FSV40	100964	08 Feb 2018	1Year
Biconical Antenna	Rohde & Schwarz	HK116	837414/004	17 Aug 2017	1Year
Log Periodic Antenna	Teseq	UPA6109	43666	27 Jul 2017	1Year
Loop Antenna	EMCO	6502	00056620	25 Jan 2018	2Years
Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-531	19 Dec 2018	2Years
Broadband Pre-Amplifier	Schwarzbeck	BBV 9718	9718-119	21 Dec 2018	2Years
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170442	02 Aug 2017	2Years
Broadband Pre-Amplifier	Schwarzbeck	BBV 9719	9719-010	02 Aug 2017	2Years
Horn Antenna	Schwarzbeck	BBHA 9120C	9120C 594	26 Jul 2018	2Years
Pre-amplifier	Schwarzbeck	BBV9718	BBV9718 297	24 Jul 2018	2Years
Coaxial Cable	Schaffner	RG 213/U	N/A	18 May 2018	1Year
Coaxial Cable	Suhner	RG 214/U	N/A	18 May 2018	1Year
Coaxial Cable	Suhner	Sucoflex_104	N/A	20 Dec 2017	1Year
LISN	Rohde & Schwarz	ENV216	101232	10 Nov 2017	1Year
Coaxial Cable	Tyco Electronics	RG58C/U	N/A	29 Oct 2017	1Year

Support equipment:

Charging adaptor:

Provide by client



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1.4 Measurement Uncertainty

The reported uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a level of confidence of approximately 95%.

Radiated emissions

Frequency	Uncertainty (U_{lab})
30MHz ~ 200MHz (Horizontal)	4.83dB
30MHz ~ 200MHz (Vertical)	4.84dB
200MHz ~ 1000MHz (Horizontal)	4.87dB
200MHz ~ 1000MHz (Vertical)	5.94dB
1GHz ~ 6GHz	4.41dB
6GHz ~ 18GHz	4.64dB

Line-conducted emissions

Frequency	Uncertainty (U_{lab})
150kHz~30MHz	2.64dB



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2 Description of the emission test

2.1 Test Procedure

Radiated emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.10 – 2013.

The equipment under test (EUT) was placed on a non-conductive turntable with dimensions of 1.5m x 1m and 0.8m high above the ground for below 1GHz measurement and 1.5m high above the ground for above 1GHz measurement. 3m from the EUT, a broadband antenna mounting on the mast received the signal strength. The turntable was rotated to maximize the emission level. The antenna was then moving along the mast from 1m up to 4m until no more higher value was found. Both horizontal and vertical polarization of the antenna were placed and investigated.

For below 30MHz, a loop antenna with its vertical plane is placed 3m from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1 m above the ground.

For 30MHz to 1GHz, broadband antenna with its vertical and horizontal plane is placed 3m from the EUT and rotated about its vertical and horizontal axis for maximum response at each azimuth about the EUT. And the reference point of antenna shall be 1 m above the ground.

For above 1GHz, horn antenna with its vertical and horizontal plane is placed 3m from the EUT and rotated about its vertical and horizontal axis for maximum response at each azimuth about the EUT. Preamplifier and High Pass filter was used for measurements. The reference point of antenna shall be 1 m above the ground.

The device was rotated through three orthogonal to determine which attitude and configuration produce the highest emission during measurement for Radiated Emission measurement.

The EUT will connect to TS 8997 testing system for direct conducted measurement.



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2.2 Radiated Emission Measurement Data

Environmental conditions:

Parameter	Recorded value	
Ambient temperature:	28	° C
Relative humidity:	65	%

Testing frequency range: 9kHz to 26GHz Mode: Transmission

Measurement: Quasi-peak (9kHz – 1GHz), Peak and Average(above 1GHz)

RBW: 9kHz (below 30MHz), 120kHz (30MHz – 1GHz), 1MHz (above 1GHz)

VBW: 30kHz (below 30MHz), 300kHz (30MHz – 1GHz), 3MHz (above 1GHz, Peak measurement), 10Hz (above 1GHz, Average measurement)

Frequency (MHz)	Polarity (H/V)	Reading at 3m (dBμV)	Transducer Factor (dB/m)	Field Strength at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)	Measurement (Peak/Average)
2412.981	H	88.4	- 4.7	83.7	114.0	- 30.3	Peak
2412.981	V	81.0	- 4.7	76.3	114.0	- 37.7	Peak
2450.084	H	86.0	- 4.7	81.3	114.0	- 32.7	Peak
2450.096	V	79.6	- 4.7	74.9	114.0	- 39.1	Peak
2472.932	H	85.0	- 4.7	80.3	114.0	- 33.7	Peak
2473.055	V	79.6	- 4.7	74.9	114.0	- 39.1	Peak
2381.421	H	66.1	- 4.7	61.4	74.0	- 12.6	Peak
2381.421	H	24.8	- 4.7	20.1	54.0	- 33.9	Average
2381.937	V	59.8	- 4.7	55.1	74.0	- 18.9	Peak
2381.937	V	24.6	- 4.7	19.9	54.0	- 34.1	Average
2451.699	V	65.5	- 4.7	60.8	74.0	- 13.2	Peak
2451.699	V	24.9	- 4.7	20.2	54.0	- 33.8	Average
2516.837	V	64.9	- 4.7	60.2	74.0	- 13.8	Peak
2516.770	V	24.9	- 4.7	20.2	54.0	- 33.8	Average
4825.953	H	57.6	3.0	60.6	74.0	- 13.4	Peak
4825.887	H	28.1	3.0	31.1	54.0	- 22.9	Average
4826.169	V	55.3	3.0	58.3	74.0	- 15.7	Peak
4825.973	V	27.7	3.0	30.7	54.0	- 23.3	Average

Remark: Other emissions more than 20dB below the limit are not reported.

If Peak measurement values are lower than average limit, average measurement is not necessary.

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Frequency (MHz)	Polarity (H/V)	Reading at 3m (dBμV)	Transducer Factor (dB/m)	Field Strength at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)	Measurement (Peak/Average)
4900.190	H	57.7	3.6	61.3	74.0	- 12.7	Peak
4899.893	H	28.0	3.0	31.0	54.0	- 23.0	Average
4899.659	V	54.3	3.0	57.3	74.0	- 16.7	Peak
4899.881	V	27.2	3.0	30.2	54.0	- 23.8	Average
4945.974	H	57.7	3.6	61.3	74.0	- 12.7	Peak
4945.926	H	27.5	3.6	31.1	54.0	- 22.9	Average
4945.665	V	50.7	3.6	54.3	74.0	- 19.7	Peak
4945.901	V	26.2	3.6	29.8	54.0	- 24.2	Average

Remark: Other emissions more than 20dB below the limit are not reported.

If Peak measurement values are lower than average limit, average measurement is not necessary.



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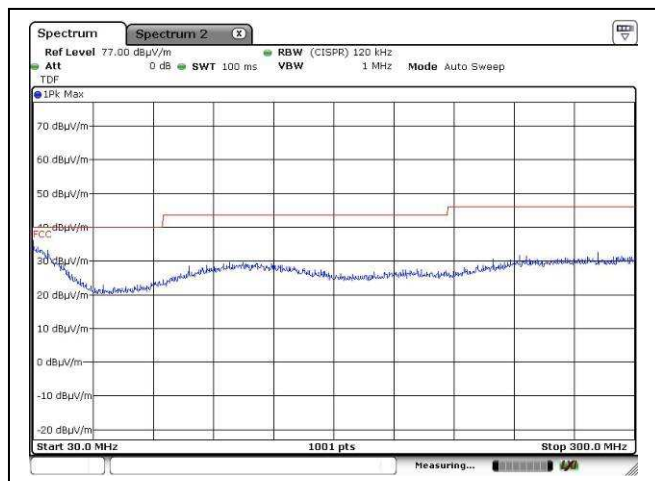
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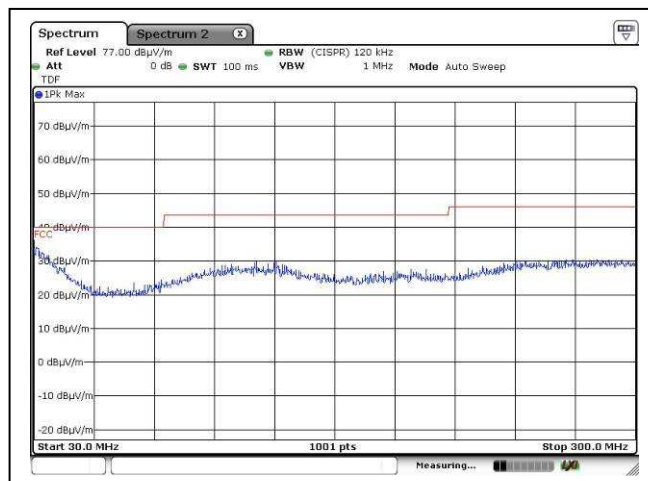
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Date : 16 Jun 2017

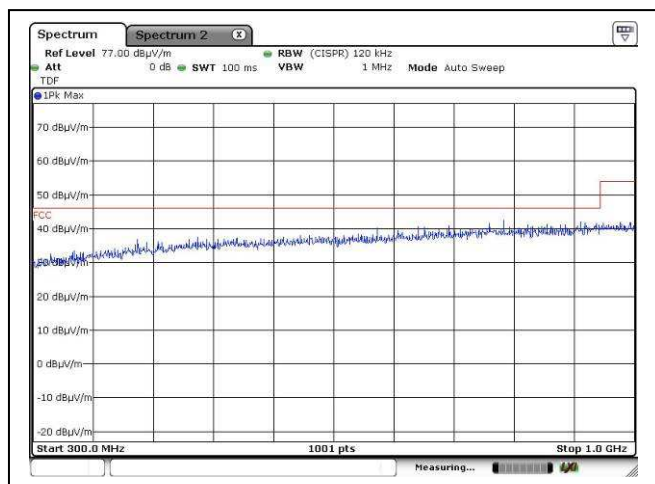
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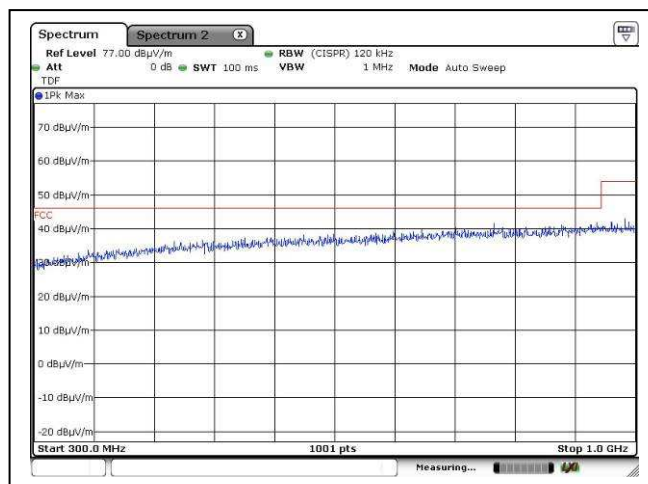
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Lower channel, 30MHz – 300MHz, Vertical



Lower channel, 300MHz – 1GHz, Horizontal



Lower channel, 300MHz – 1GHz, Vertical



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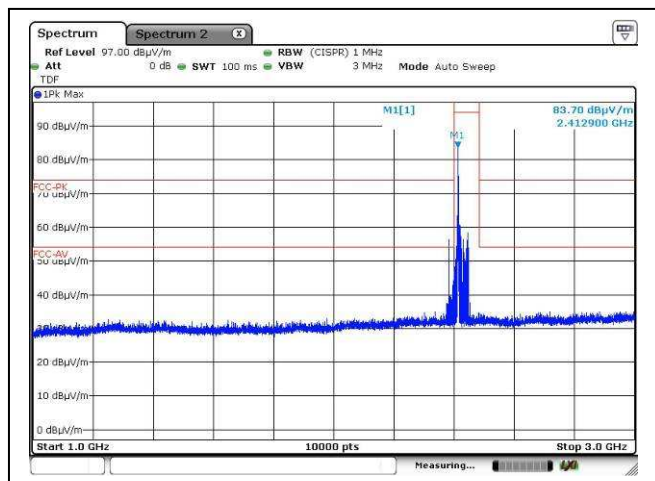
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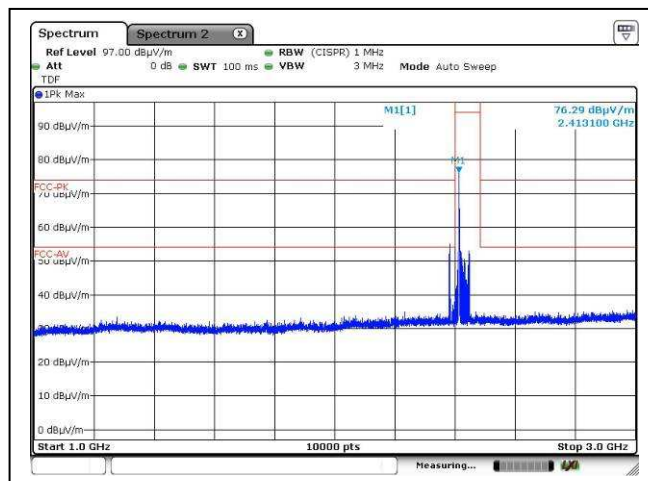
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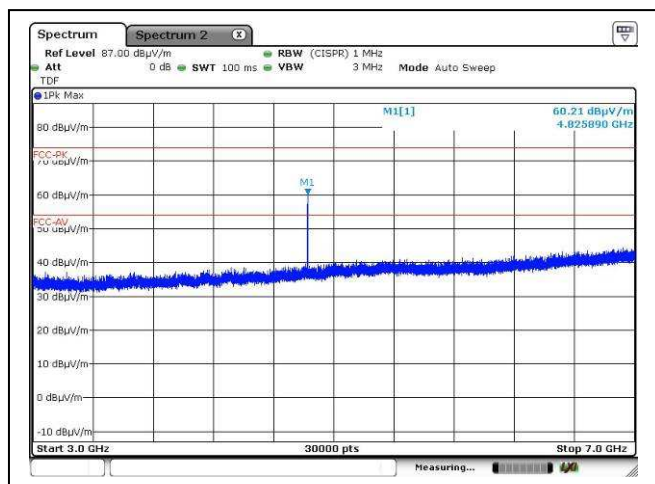
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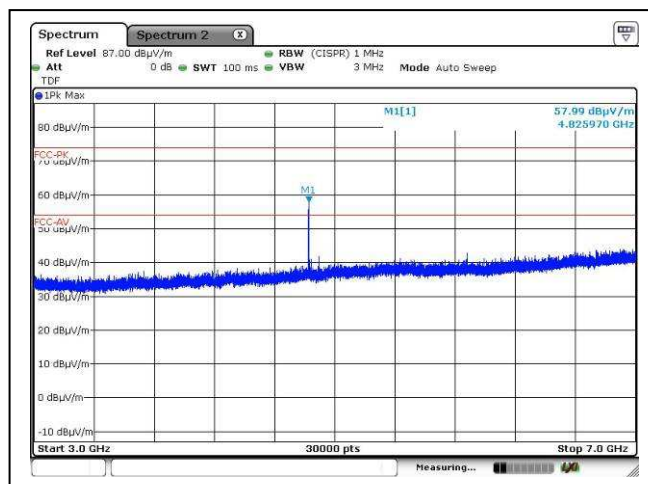
Lower channel, 1GHz – 3GHz, Horizontal



Lower channel, 1GHz – 3GHz, Vertical



Lower channel, 3GHz – 7GHz, Horizontal



Lower channel, 3GHz – 7GHz, Vertical



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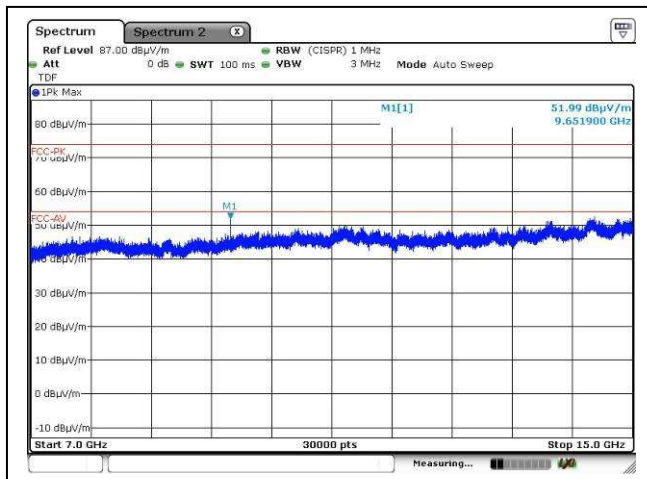
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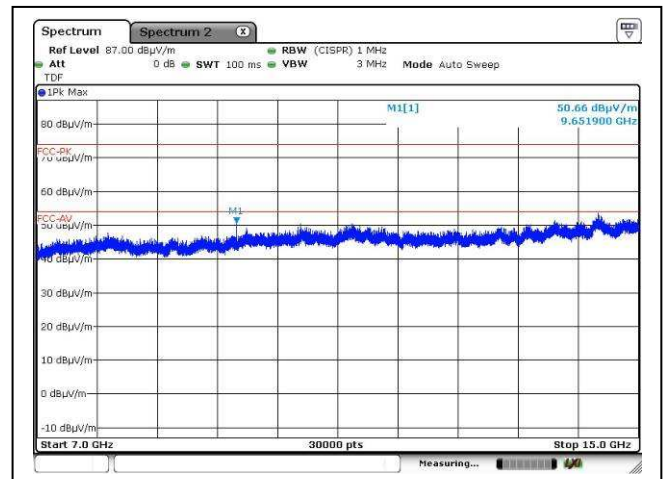
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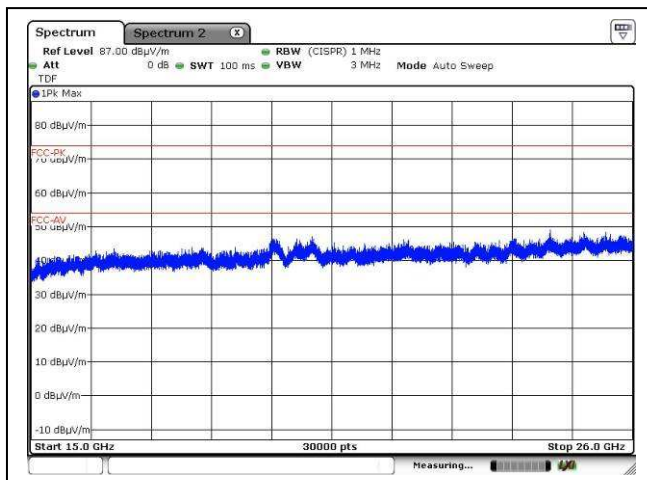
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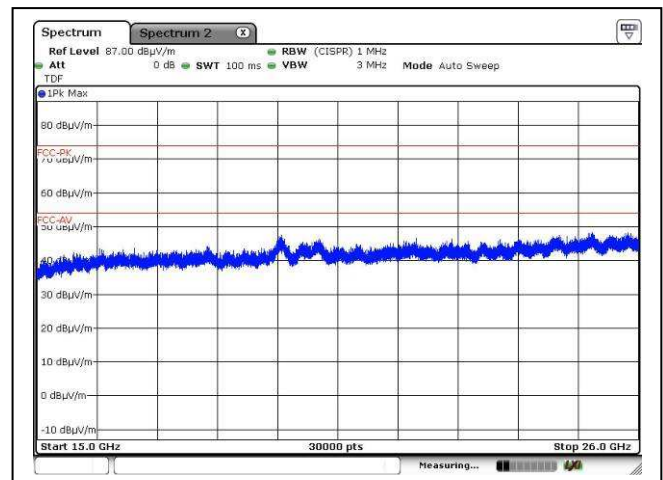
Lower channel, 7GHz – 15GHz, Horizontal



Lower channel, 7GHz – 15GHz, Vertical



Lower channel, above 15GHz, Horizontal



Lower channel, above 15GHz, Vertical



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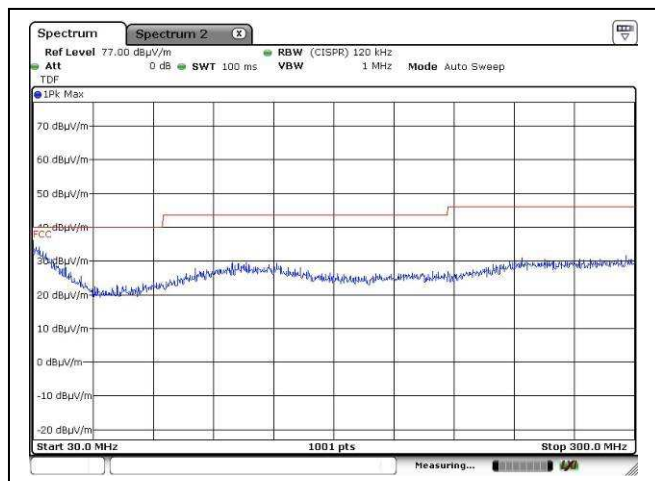
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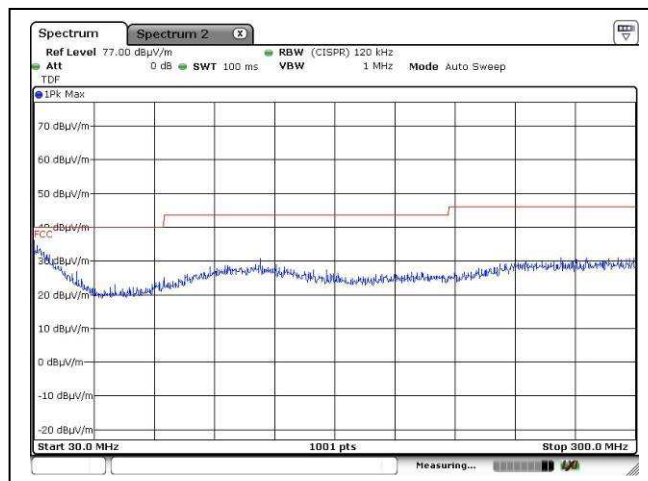
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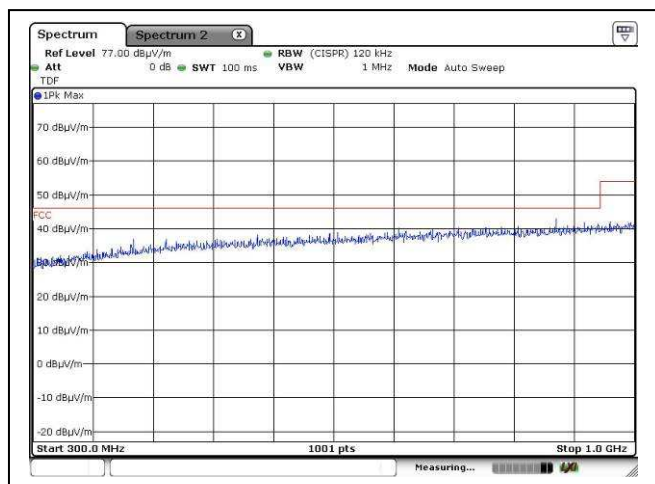
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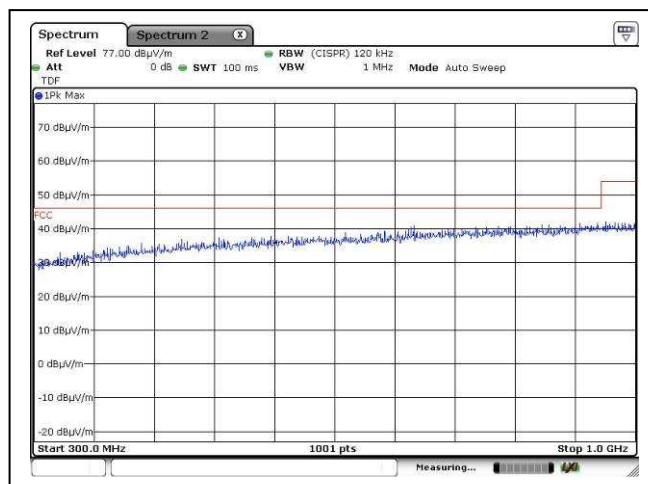
Middle channel, 30MHz – 300MHz, Horizontal



Middle channel, 30MHz – 300MHz, Vertical



Middle channel, 300MHz – 1GHz, Horizontal



Middle channel, 300MHz – 1GHz, Vertical



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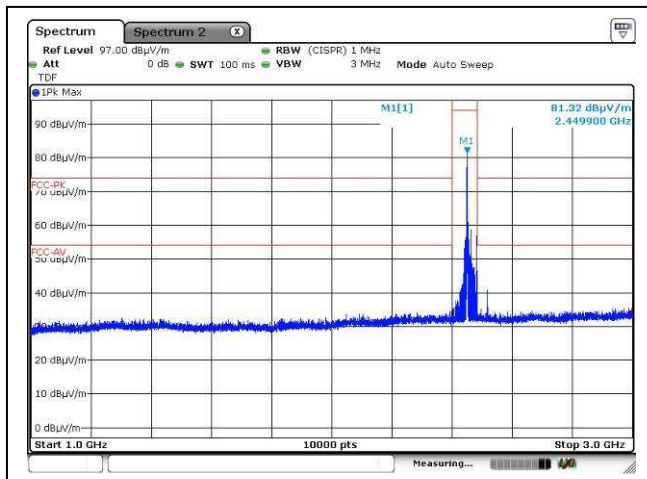
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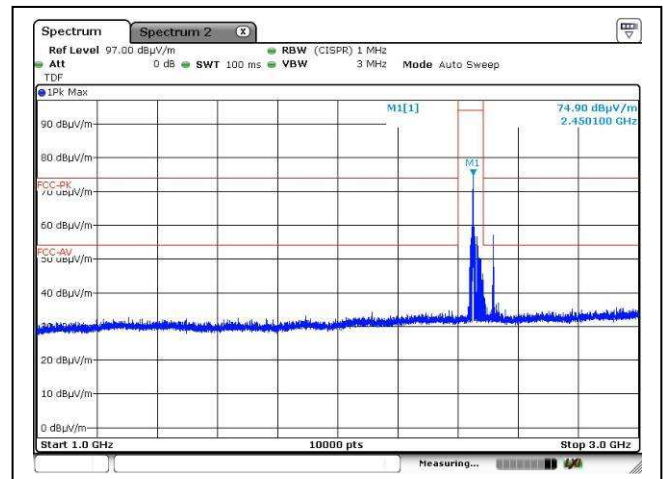
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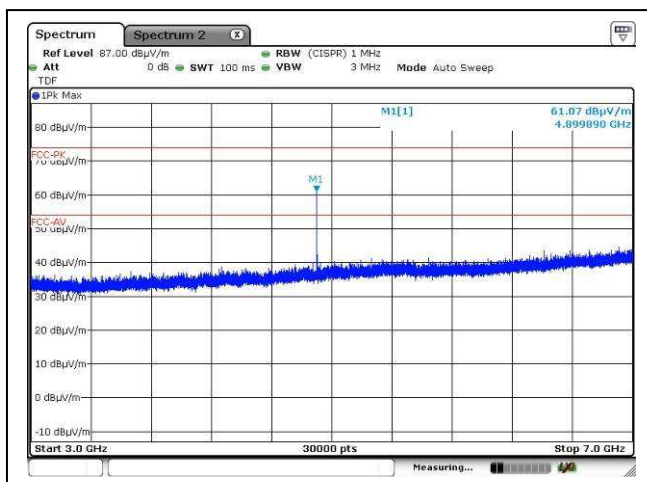
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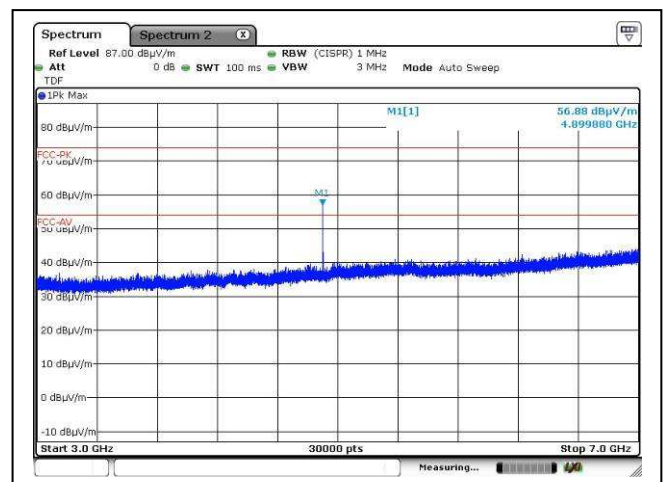
Middle channel, 1GHz – 3GHz, Horizontal



Middle channel, 1GHz – 3GHz, Vertical



Middle channel, 3GHz – 7GHz, Horizontal



Middle channel, 3GHz – 7GHz, Vertical



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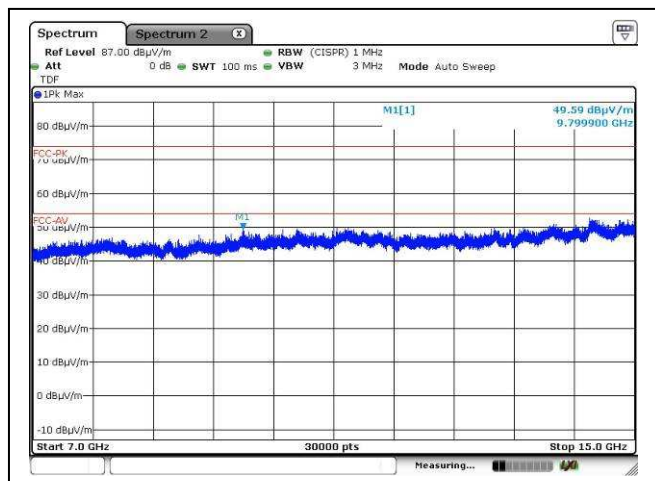
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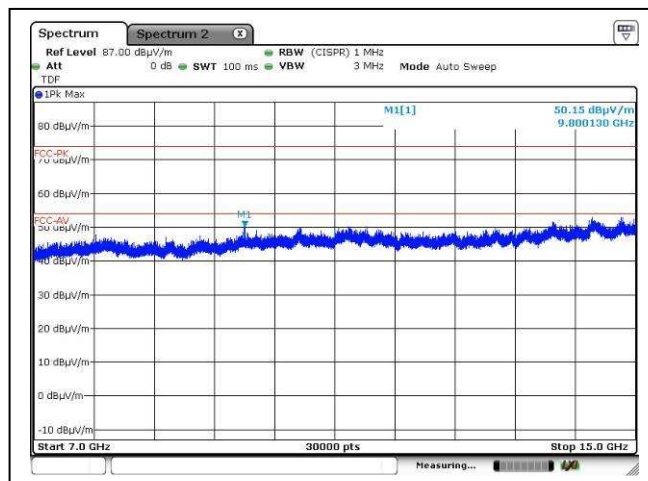
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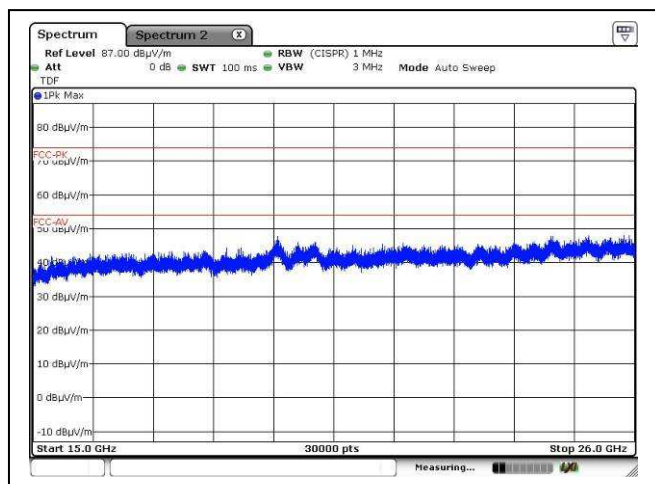
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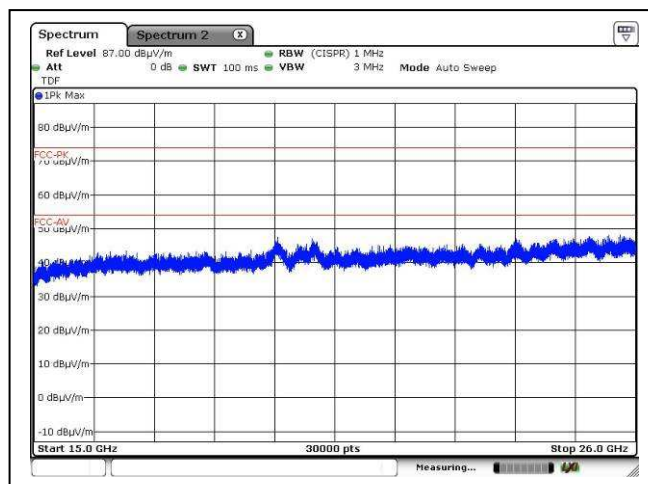
Middle channel, 7GHz – 15GHz, Horizontal



Middle channel, 7GHz – 15GHz, Vertical



Middle channel, above 15GHz, Horizontal



Middle channel, above 15GHz, Vertical



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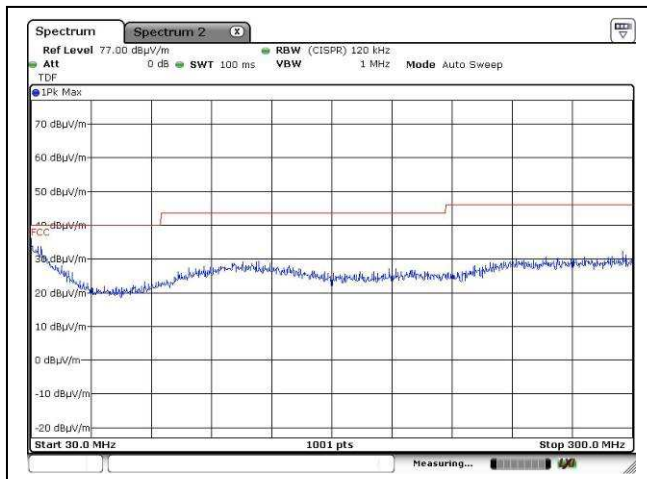
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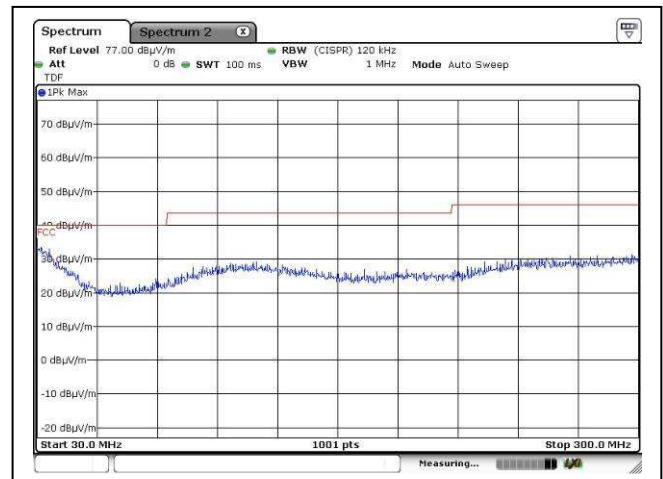
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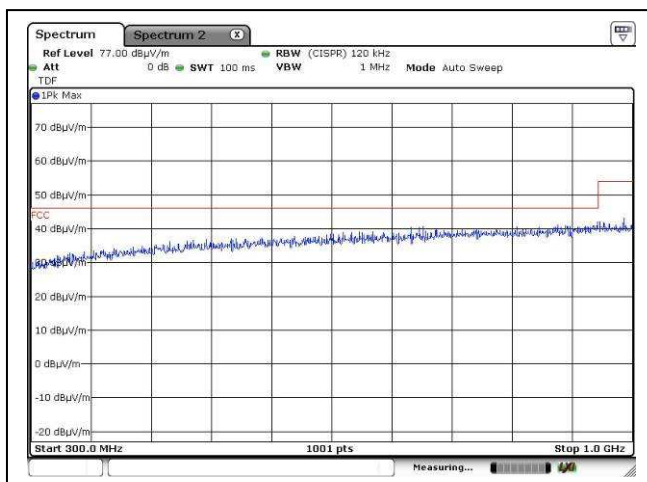
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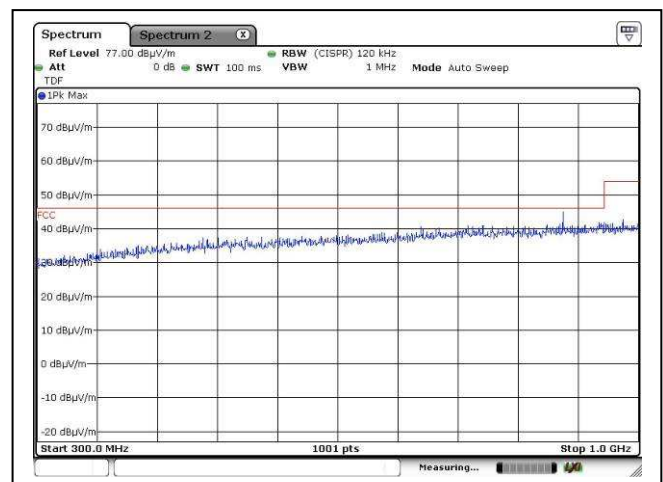
Higher channel, 30MHz – 300MHz, Horizontal



Higher channel, 30MHz – 300MHz, Vertical



Higher channel, 300MHz – 1GHz, Horizontal



Higher channel, 300MHz – 1GHz, Vertical



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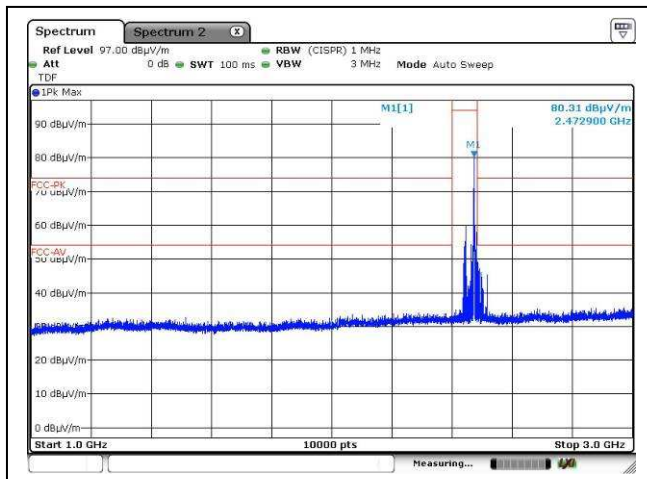
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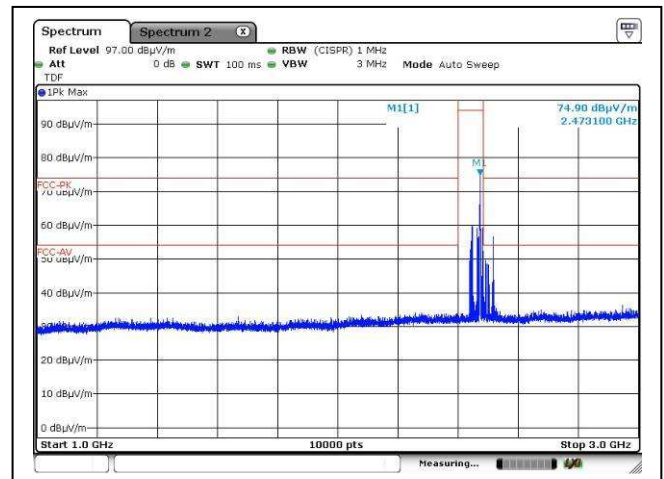
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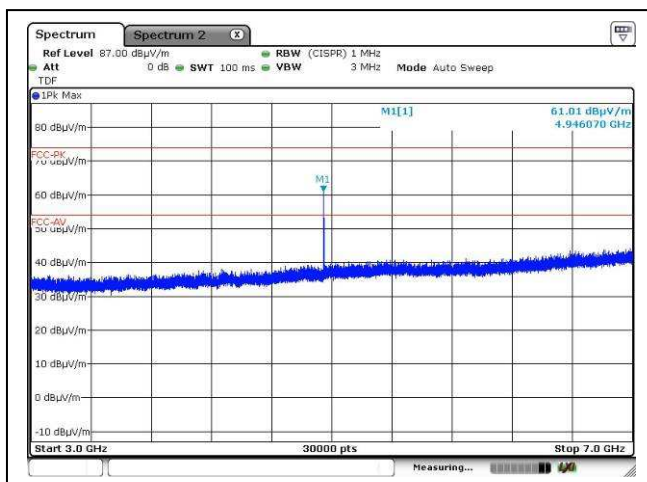
2.2 Radiated Emission Measurement Data (Con't)



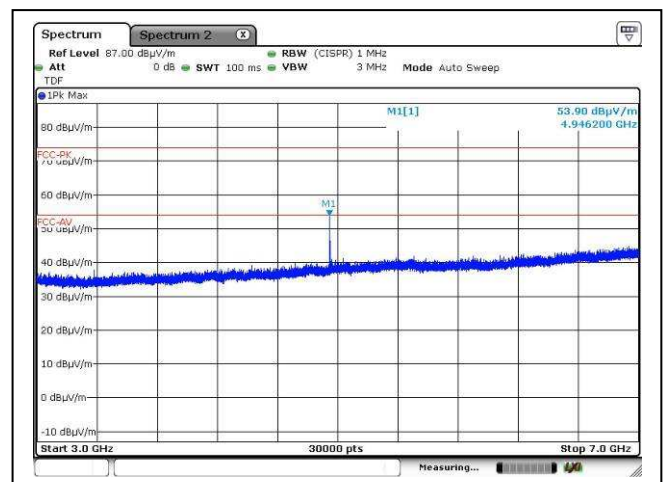
Higher channel, 1GHz – 3GHz, Horizontal



Higher channel, 1GHz – 3GHz, Vertical



Higher channel, 3GHz – 7GHz, Horizontal



Higher channel, 3GHz – 7GHz, Vertical



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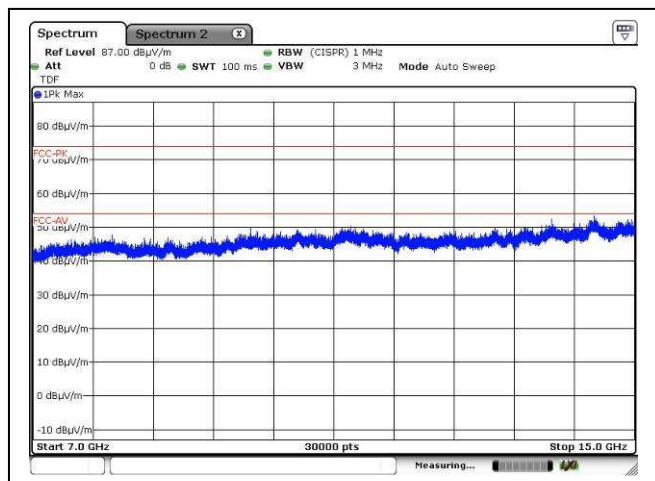
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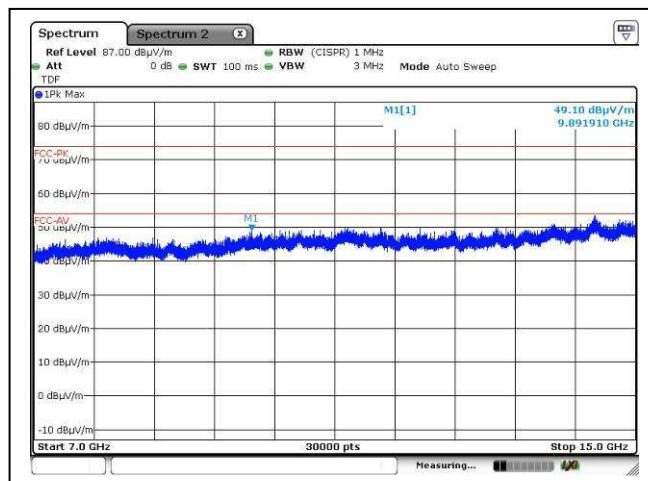
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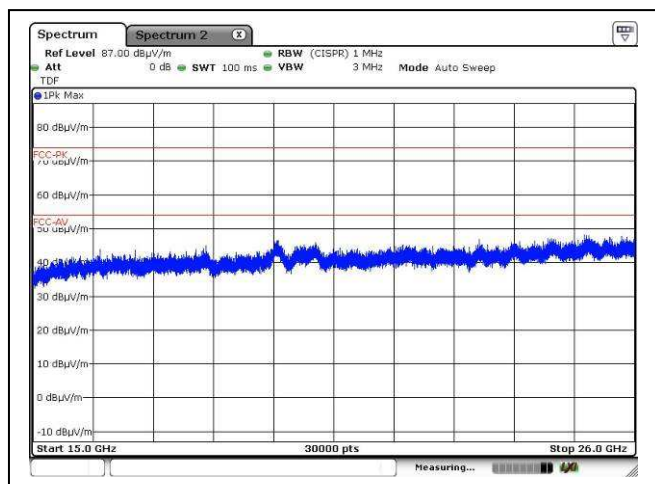
2.2 Radiated Emission Measurement Data (Con't)



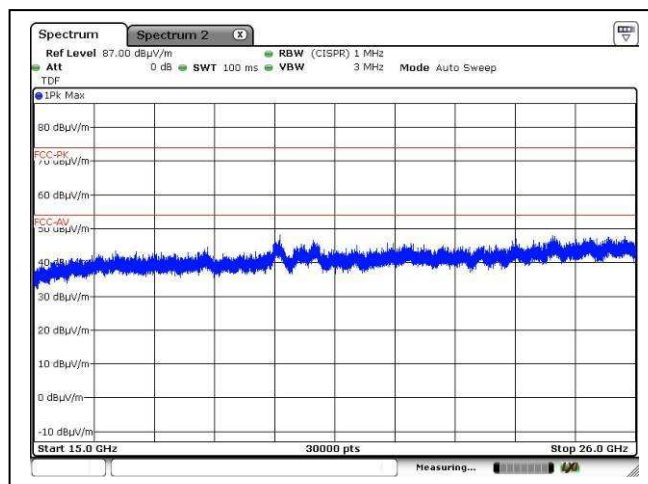
Higher channel, 7GHz – 15GHz, Horizontal



Higher channel, 7GHz – 15GHz, Vertical



Higher channel, above 15GHz, Horizontal



Higher channel, above 15GHz, Vertical



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2.2 Radiated Emission Measurement Data (Con't)

Environmental conditions:

Parameter	Recorded value	
Ambient temperature:	28	° C
Relative humidity:	65	%

Testing frequency range: 9kHz to 26GHz Mode: Receiving

Measurement: Quasi-peak (9kHz – 1GHz), Peak (above 1GHz)

RBW: 9kHz (below 30MHz), 120KHz (30MHz – 1GHz), 1MHz (above 1GHz)

VBW: 30kHz (below 30MHz), 300kHz (30MHz – 1GHz), 3MHz (above 1GHz)

Frequency (MHz)	Polarity (H/V)	Reading at 3m (dBμV)	Transducer Factor (dB/m)	Field Strength at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)

Remark: No specified emission found



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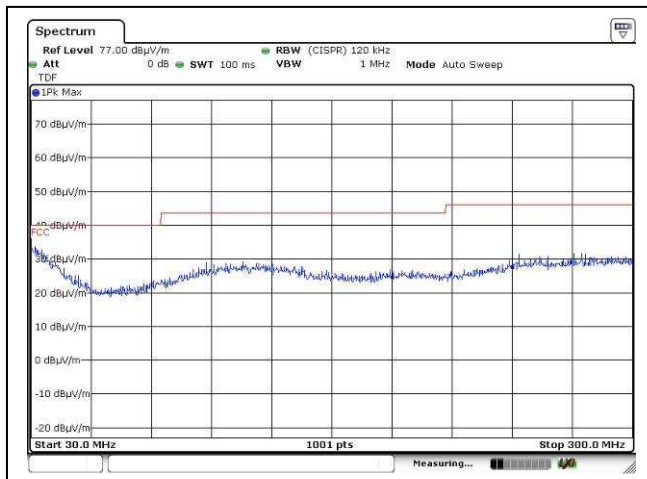
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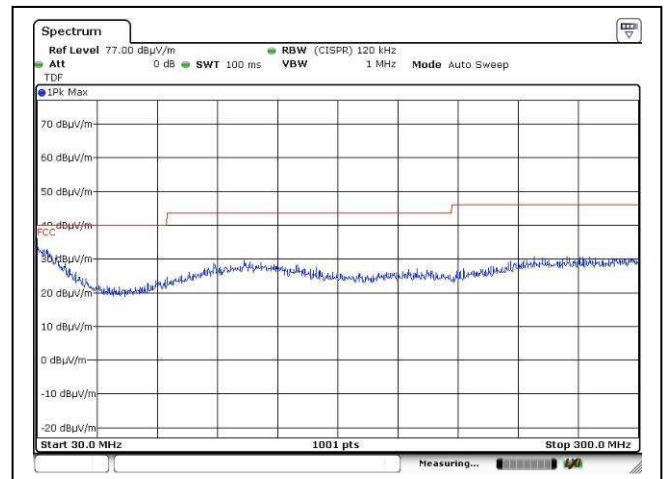
Report No. : AV0032302(0)

Date : 16 Jun 2017

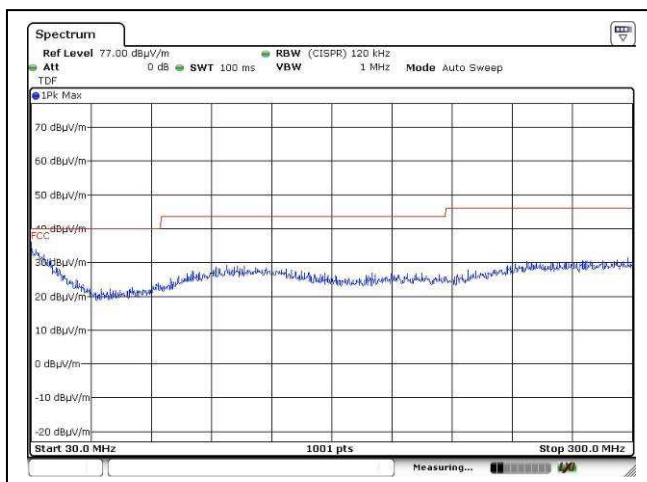
2.2 Radiated Emission Measurement Data (Con't)



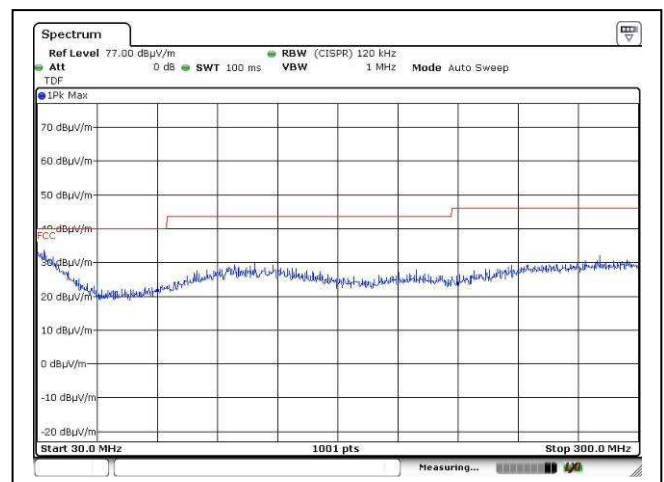
Receiving mode, 30MHz – 300MHz, Horizontal



Receiving mode, 30MHz – 300MHz, Vertical



Receiving mode, 300MHz – 1GHz, Horizontal



Receiving mode, 300MHz – 1GHz, Vertical



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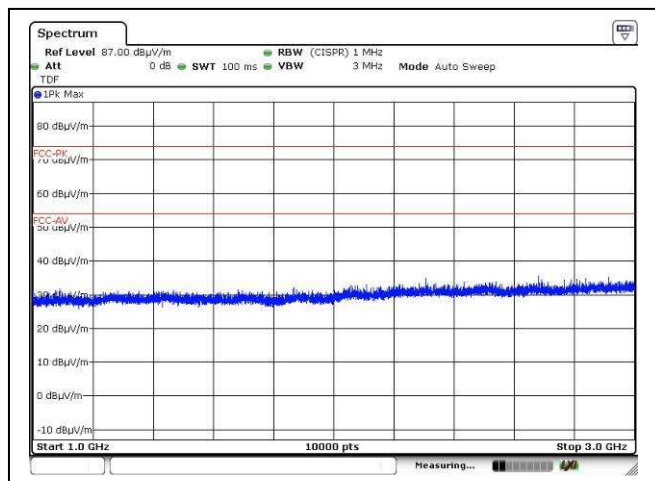
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TEST REPORT

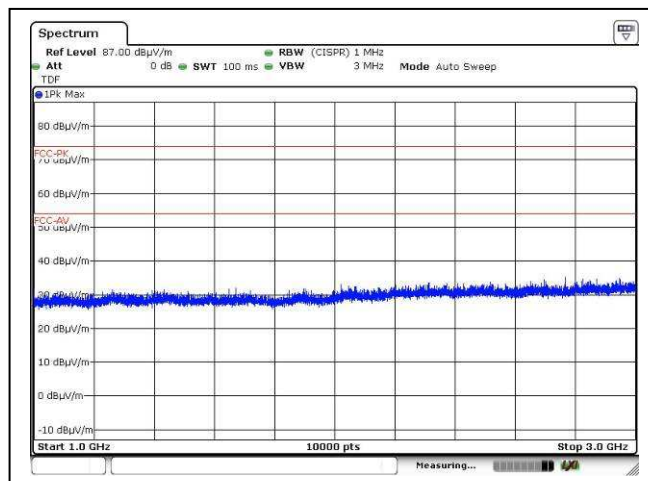
Report No. : AV0032302(0)

Date : 16 Jun 2017

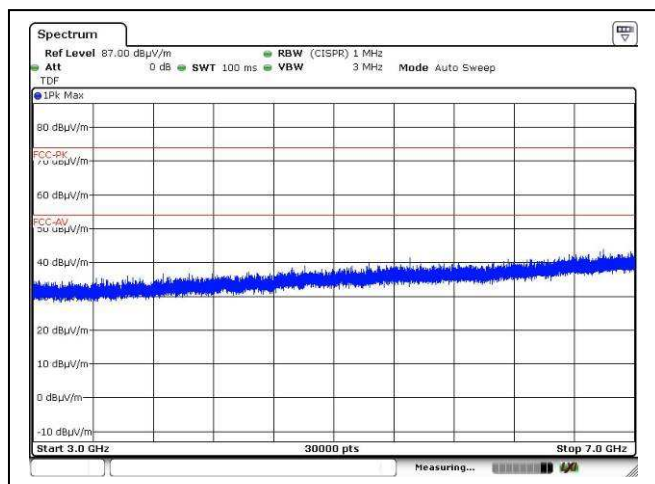
2.2 Radiated Emission Measurement Data (Con't)



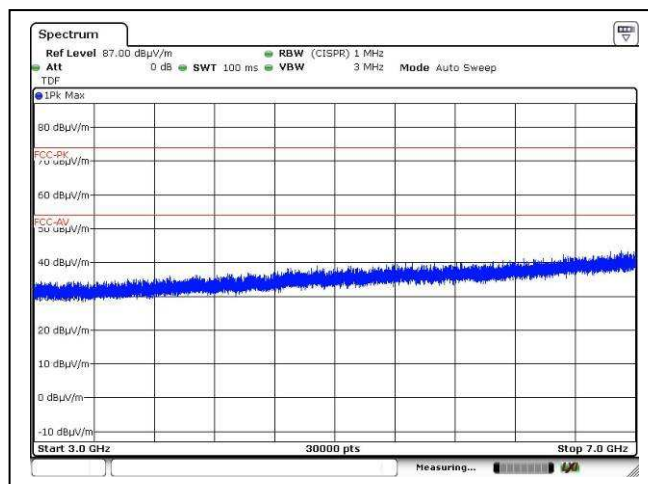
Receiving mode, 1GHz – 3GHz, Horizontal



Receiving mode, 1GHz – 3GHz, Vertical



Receiving mode, 3GHz – 7GHz, Horizontal



Receiving mode, 3GHz – 7GHz, Vertical



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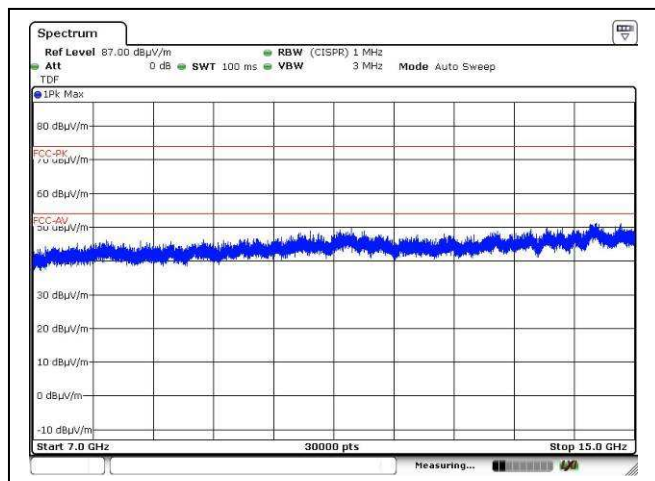
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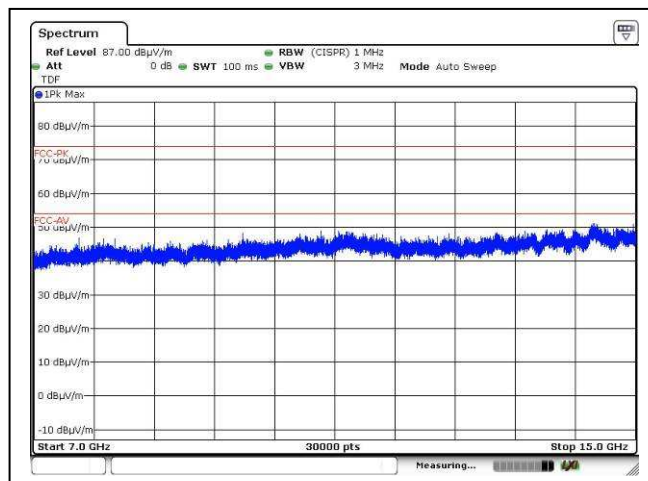
Report No. : AV0032302(0)

Date : 16 Jun 2017

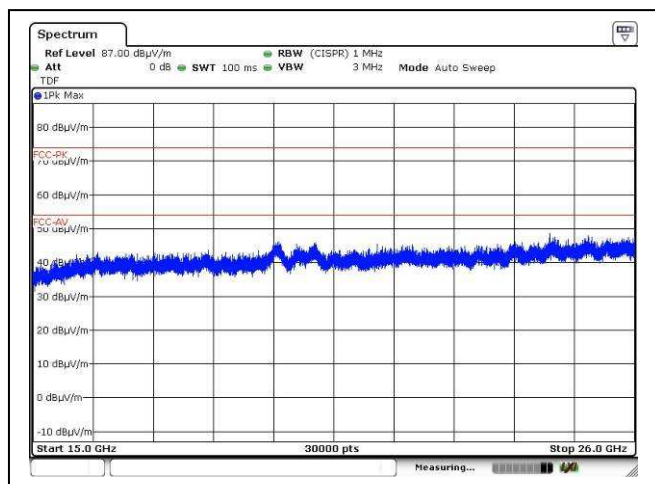
2.2 Radiated Emission Measurement Data (Con't)



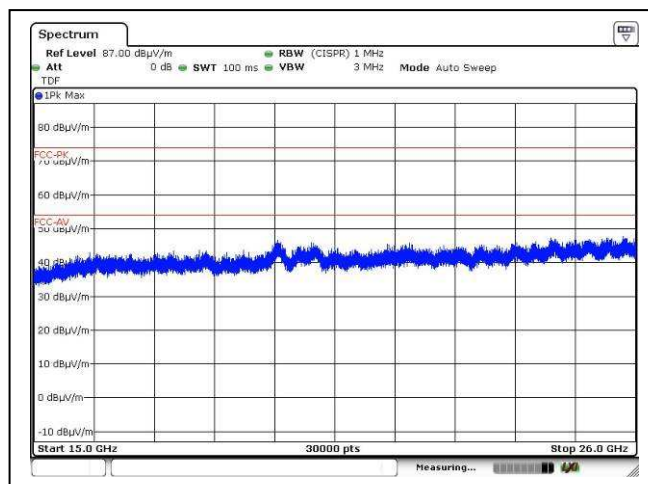
Receiving mode, 7GHz – 15GHz, Horizontal



Receiving mode, 7GHz – 15GHz, Vertical



Receiving mode, above 15GHz, Horizontal



Receiving mode, above 15GHz, Vertical



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TEST REPORT

Report No. : AV0032302(0)

Date : 16 Jun 2017

2.2 Radiated Emission Measurement Data (Con't)

Environmental conditions:

Parameter	Recorded value	
Ambient temperature:	28	° C
Relative humidity:	65	%

Testing frequency range: 9kHz to 1GHz Mode: Charging

Measurement: Quasi-peak

RBW: 120KHz

VBW: 300kHz

Frequency (MHz)	Polarity (H/V)	Reading at 3m (dBμV)	Transducer Factor (dB/m)	Field Strength at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
49.242	V	21.6	12.8	34.4	40.0	- 5.6

Remark: Other emissions more than 20dB below the limit are not reported.



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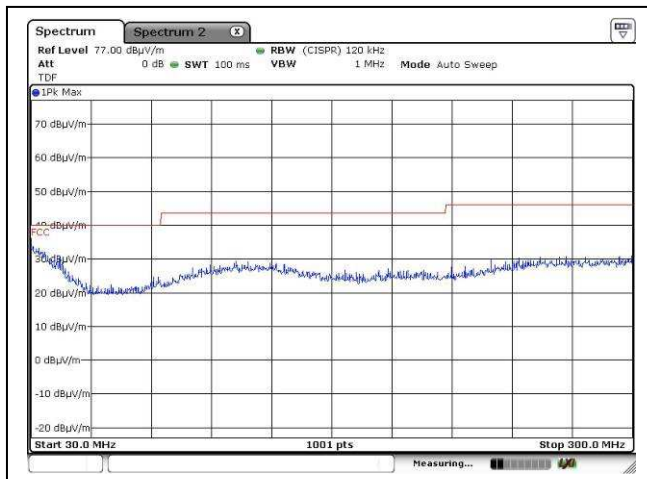
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TEST REPORT

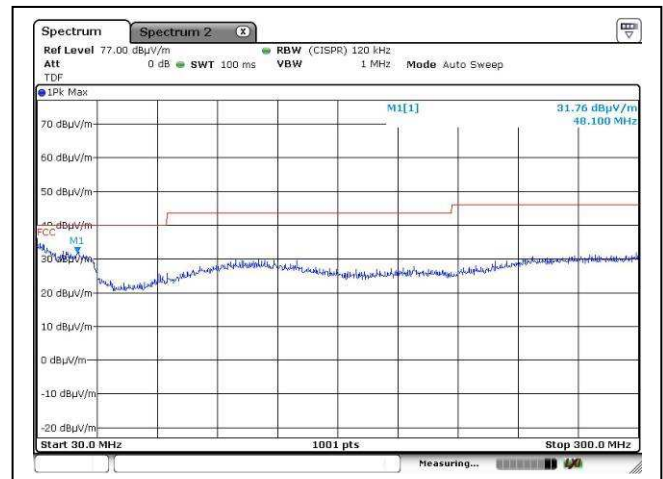
Report No. : AV0032302(0)

Date : 16 Jun 2017

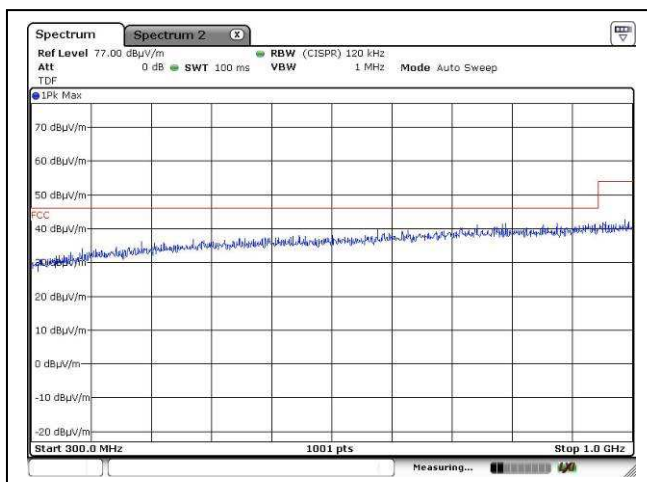
2.2 Radiated Emission Measurement Data (Con't)



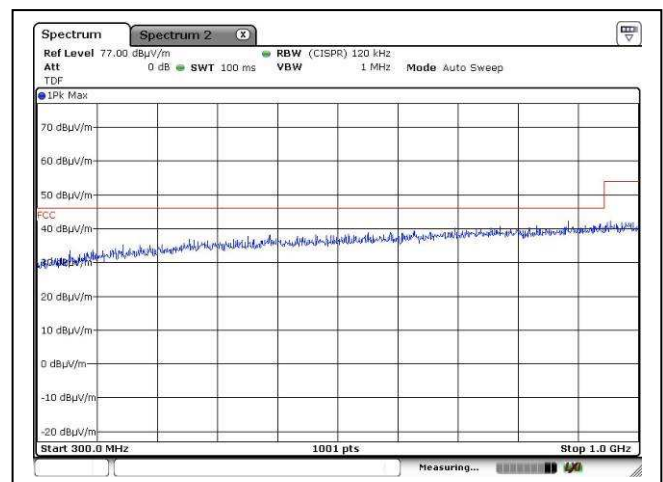
Charging mode, 30MHz – 300MHz, Horizontal



Charging mode, 30MHz – 300MHz, Vertical



Charging mode, 300MHz – 1GHz, Horizontal



Charging mode, 300MHz – 1GHz, Vertical



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TEST REPORT

Report No. : AV0032302(0)

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2.3 99% Bandwidth



Lower channel



Middle channel



Higher channel



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Report No. : AV0032302(0)

Date : 16 Jun 2017

3 Description of the Line-conducted Test

3.1 Test Procedure

Conducted emissions measurements are investigated and also taken pursuant to the procedures of ANSI C63.10 – 2013. The EUT was setup as described in the procedures, and both lines were measured.

3.2 Test Result

The EUT connected to an adaptor for cahrging



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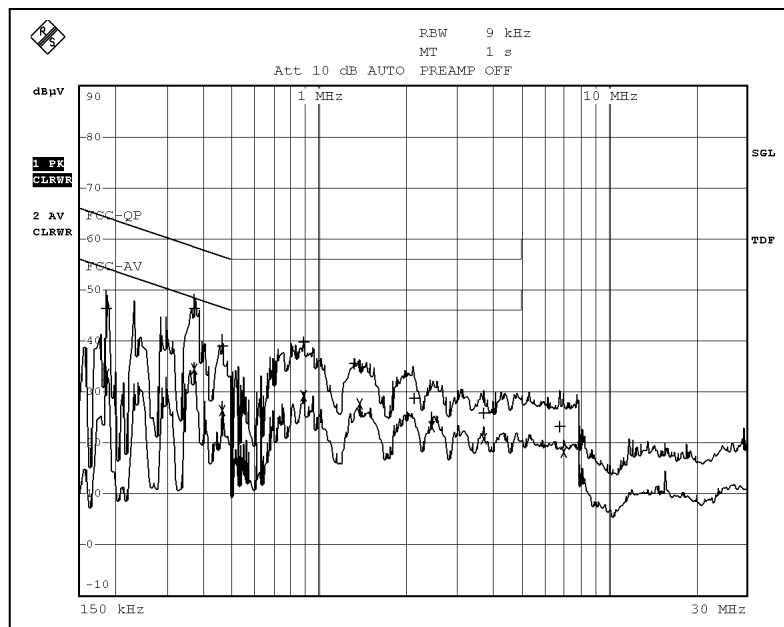
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Report No. : AV0032302(0)

Date : 16 Jun 2017

3.3 Graph and Table of Conducted Emission Measurement Data



EDIT PEAK LIST (Final Measurement Results)				
Trace1:	FCC-QP			
Trace2:	FCC-AV			
Trace3:	---			
TRACE	FREQUENCY	LEVEL dBμV	DELTA	LIMIT dB
1 Quasi Peak	186 kHz	46.27 L1 gnd	-17.93	
2 Average	186 kHz	33.33 N gnd	-20.87	
1 Quasi Peak	375 kHz	46.36 N gnd	-12.02	
2 Average	375 kHz	34.58 N gnd	-13.80	
1 Quasi Peak	465 kHz	38.90 N gnd	-17.69	
2 Average	465 kHz	26.22 N gnd	-20.37	
1 Quasi Peak	882.5 kHz	39.74 N gnd	-16.25	
2 Average	882.5 kHz	29.21 N gnd	-16.79	
1 Quasi Peak	1.3235 MHz	35.51 N gnd	-20.48	
2 Average	1.391 MHz	27.70 N gnd	-18.30	
1 Quasi Peak	2.129 MHz	28.75 L1 gnd	-27.24	
2 Average	2.4485 MHz	23.19 L1 gnd	-22.80	
1 Quasi Peak	3.713 MHz	25.86 N gnd	-30.13	
2 Average	3.713 MHz	20.85 N gnd	-25.14	
1 Quasi Peak	6.809 MHz	23.27 L1 gnd	-36.72	
2 Average	7.0205 MHz	18.08 L1 gnd	-31.91	



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Report No. : AV0032302(0)

Date : 16 Jun 2017

4 Photograph

4.1 Photographs of the Test Setup for Radiated Emission and Conducted Emission

For electronic filing, the photos are saved with filename QEA-U282-2G4R TSup.pdf.

4.2 Photographs of the External and Internal Configurations of the EUT

For electronic filing, the photos are saved with filename QEA-U282-2G4R ExPho.pdf and QEA-U282-2G4R InPho.pdf.

4.3 Antenna requirement

Appendices A4 shows the antenna is permanently attached and cannot be changed. Therefore it fulfils the section 15.203 requirement



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TEST REPORT

Report No. : AV0032302(0)

Date : 16 Jun 2017

5 Appendices

A1	Photos of the set-up of Radiated Emissions	4	pages
A2	Photos of the set-up of Line-conducted Emissions	1	page
A3	Photos of External Configurations	5	pages
A4	Photos of Internal Configurations	2	pages
A5	ID Label/Location	3	pages



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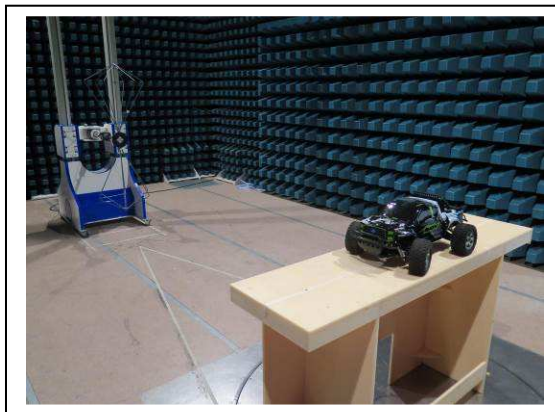
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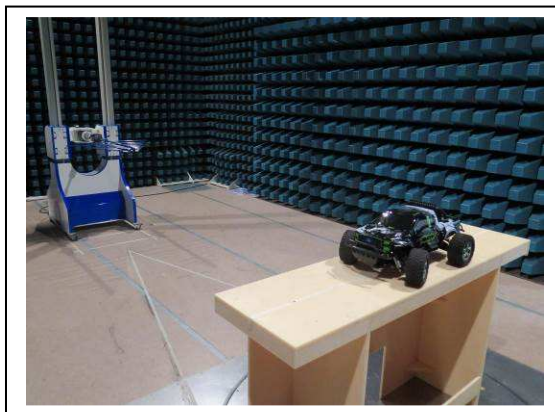
Report No. : AV0032302(0)

Date : 16 Jun 2017

A1. Photos of the set-up of Radiated Emissions



30MHz – 300MHz



300MHz – 1GHz

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

FCC ID: QEA-U282-2G4R
IC: 22849-U282R

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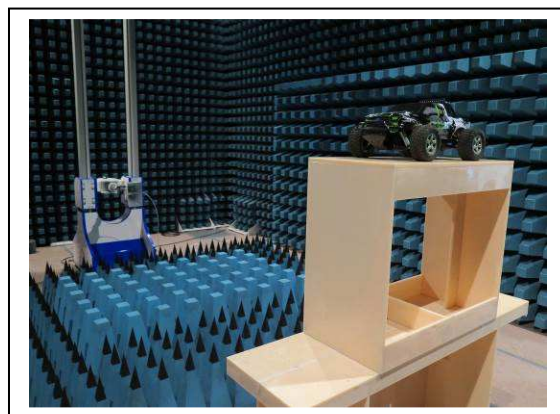
Report No. : AV0032302(0)

Date : 16 Jun 2017

A1. Photos of the set-up of Radiated Emissions



9kHz – 30MHz



Above 1GHz

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Reviewed by:

Mr. WONG Lap-pong, Andrew



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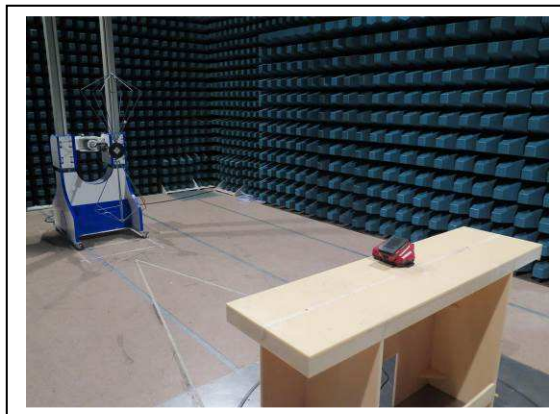
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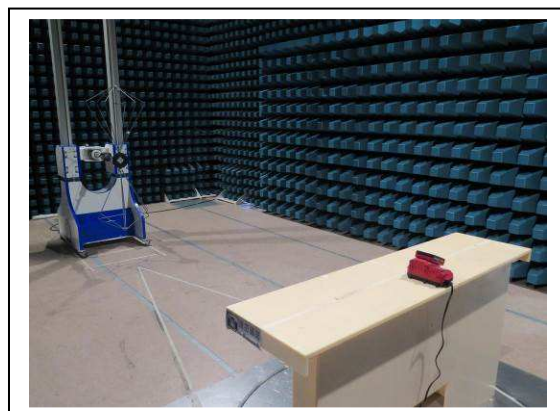
Report No. : AV0032302(0)

Date : 16 Jun 2017

A1. Photos of the set-up of Radiated Emissions



30MHz – 300MHz (Charging, front view)



30MHz – 300MHz (Charging, rear view)

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Reviewed by:

Mr. WONG Lap-pong, Andrew



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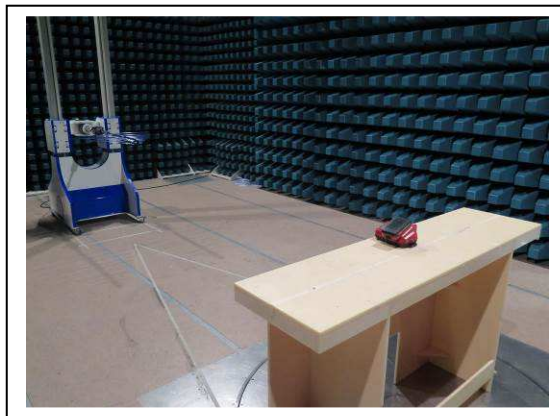
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TEST REPORT

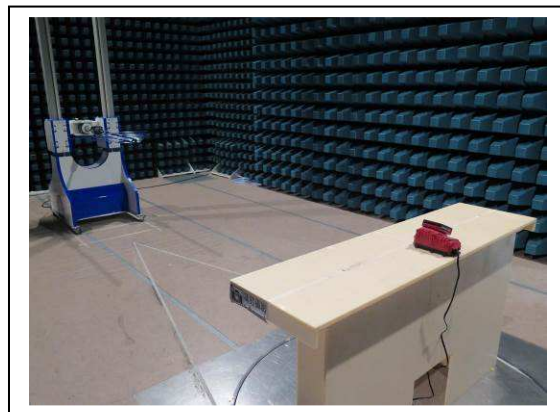
Report No. : AV0032302(0)

Date : 16 Jun 2017

A1. Photos of the set-up of Radiated Emissions



300MHz – 1GHz (Charging, front view)



300MHz – 1GHz (Charging, rear view)

Tested by:

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Reviewed by:

Mr. WONG Lap-pong, Andrew



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Date : 16 Jun 2017

A2. Photos of the set-up of Line-conducted Emissions



Front view



Side view

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Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

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Date : 16 Jun 2017

A3 Photos of External Configurations



External Configuration 1



External Configuration 2

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



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TEST REPORT

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Date : 16 Jun 2017

A3 Photos of External Configurations



External Configuration 3



External Configuration 4

Tested by:

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Reviewed by:

Mr. WONG Lap-pong, Andrew



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A3 Photos of External Configurations



External Configuration 5



External Configuration 6

Tested by:

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Reviewed by:

Mr. WONG Lap-pong, Andrew



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Date : 16 Jun 2017

A3 Photos of External Configurations



External Configuration 7



External Configuration 8

Tested by:

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Reviewed by:

Mr. WONG Lap-pong, Andrew

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Date : 16 Jun 2017

A3 Photos of External Configurations



External Configuration 9

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



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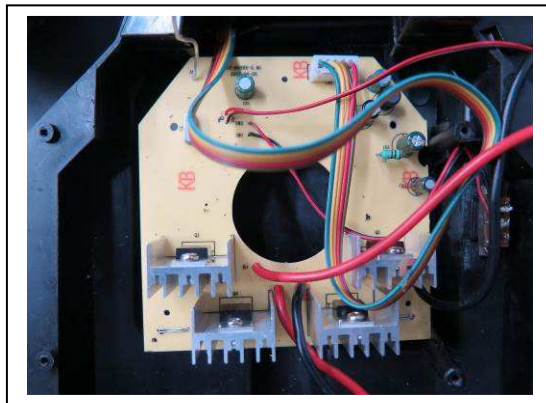
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TEST REPORT

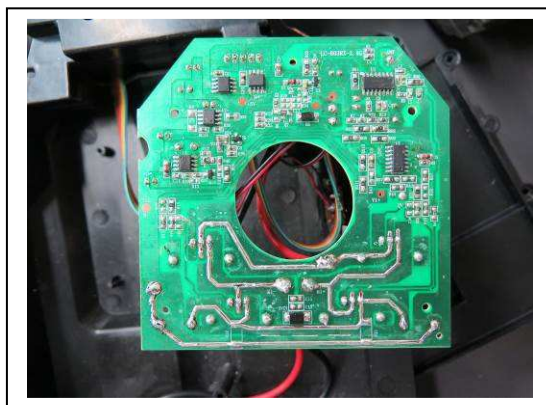
Report No. : AV0032302(0)

Date : 16 Jun 2017

A4 Photos of Internal Configurations



Internal Configuration 1



Internal Configuration 2

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

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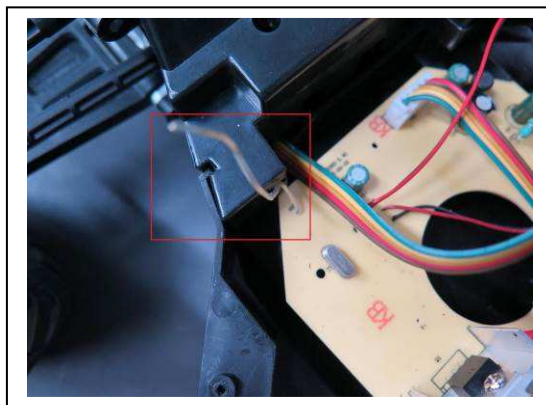
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A4 Photos of Internal Configurations



EUT antenna

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



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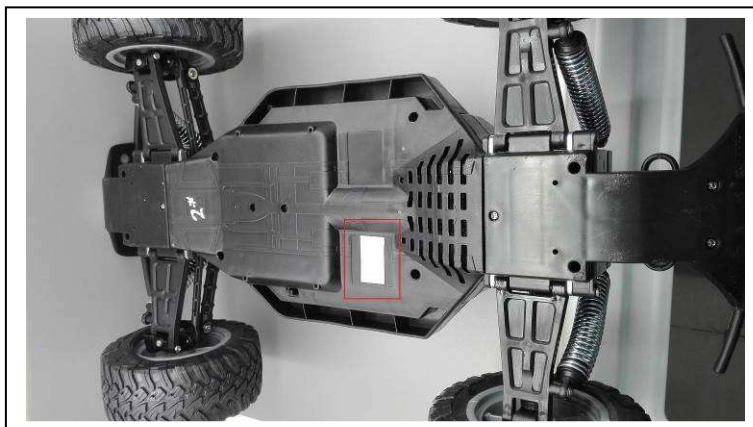
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Report No. : AV0032302(0)

Date : 16 Jun 2017

A5 ID Label / Location



ID Label 1 (FCC)



ID Label 2 (FCC)

Tested by:

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Reviewed by:

Mr. WONG Lap-pong, Andrew

FCC ID: QEA-U282-2G4R
IC: 22849-U282R

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TEST REPORT

Report No. : AV0032302(0)

Date : 16 Jun 2017

A5 ID Label / Location



ID Label 3 (IC)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew



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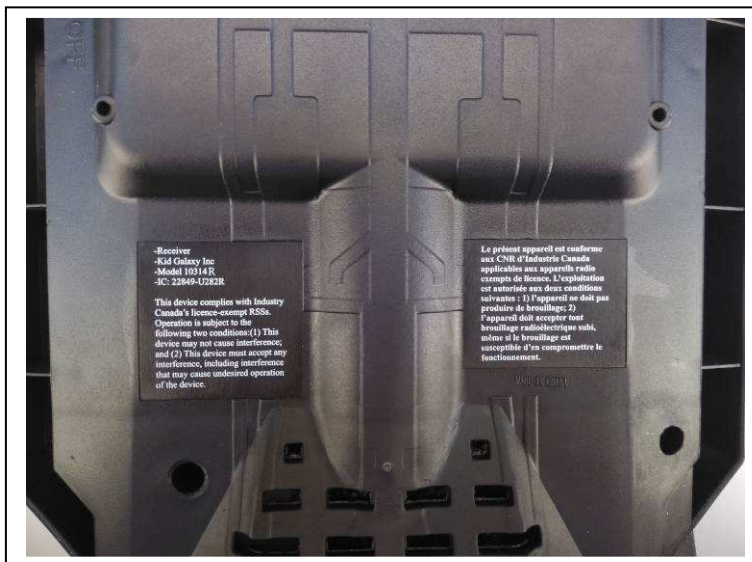
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TEST REPORT

Report No. : AV0032302(0)

Date : 16 Jun 2017

A5 ID Label / Location



ID Label 4 (IC)

***** End of Report *****

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew