

FCC Test Report

Product Name	FCA WL/WS PASE System MY 2021
Model No.	WXMVSKIN
FCC ID.	M3N-WXMVSKIN

Applicant	Continental Automotive GmbH
Address	Siemensstrasse 12, 93055 Regensburg, Germany

Date of Receipt	Dec. 24, 2019
Issued Date	Jan. 14, 2020
Report No.	19C0371R-RFUSP20V00
Report Version	V1.0



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 report of the equipment and evaluated measurement uncertainty herein.

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Test Report

Issued Date: Jan. 14, 2020

Report No.: 19C0371R-RFUSP20V00



Product Name	FCA WL/WS PASE System MY 2021
Applicant	Continental Automotive GmbH
Address	Siemensstrasse 12, 93055 Regensburg, Germany
Manufacturer	Continental Automotive GmbH
Factory sites	1) Continental Automotive Nogales S.A. de C.V. 2) Continental Automotive Guadalajara Mexico S.A. de C.V.
Address	1) San Patricio #19, Nogales Sonora Mexico, Mexico 2) Camino a la Tijera No. 3, Guadalajara, Jalisco, Mexico
Model No.	WXMMSKIN
FCC ID.	M3N-WXMMSKIN
EUT Rated Voltage	DC 12V (Power by Battery)
EUT Test Voltage	DC 12V (Power by Battery)
Trade Name	Continental
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C ANSI C63.4: 2014, ANSI C63.10: 2013
Test Result	Complied

Documented By :

Jinn Chen

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Tested By :

Bill Lin

(Senior Engineer / Bill Lin)

Approved By :



(Director / Vincent Lin)

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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	FCA WL/WS PASE System MY 2021
Trade Name	Continental
Model No.	WXMXXSKIN
FCC ID.	M3N-WXMXXSKIN
Frequency Range	125 kHz
Type of antenna	Coil Antenna

Frequency of Each Channel:

Channel	Frequency
1	125 kHz

Note:

1. The EUT model WXMXXSKIN is a vehicle start/stop switch with 125 kHz immobilizer function with built-in 125 kHz RFID transceiver.
2. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.209.
3. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

Test Mode	Mode 1: Transmit
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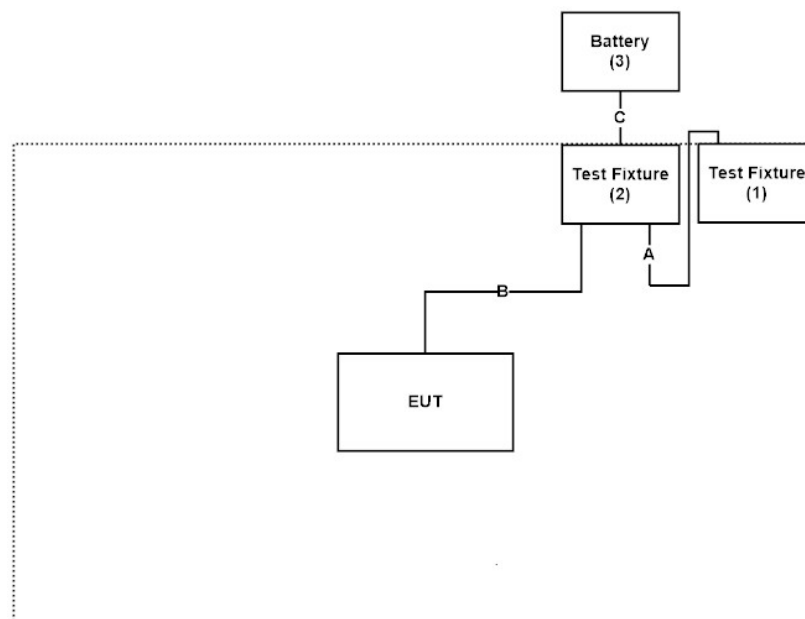
1.3. Test System Details

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	Test Fixture	Continental	RFHUB	N/A	N/A
2	Test Fixture	Continental	Switch Box	N/A	N/A
3	Battery	YUASA	55B24L-CMFII	N/A	N/A

Signal Cable Type	Signal cable Description
A	Signal Cable
B	Signal Cable
C	Power Cable

1.4. Configuration of Test System



1.5. EUT Exercise Software

- (1) Setup the EUT as shown in Section 1.4
- (2) Provide battery to the EUT.
- (3) Start the continuous transmitter.
- (4) Verify that the EUT works properly.

1.6. Test Facility

Ambient conditions in the laboratory:

Performed Item	Items	Required	Actual
Radiated Emission	Temperature (°C)	10~40 °C	23.5°C
	Humidity (%RH)	10~90 %	58.5%

USA : FCC Registration Number: TW0023

Canada : IC Registration Number: 4075A

Site Description : Accredited by TAF
Accredited Number: 3023

Test Laboratory : DEKRA Testing and Certification Co., Ltd
Address : No.159, Sec. 2, Wenhua 1st Rd., Linkou Dist.,
New Taipei City 24457, Taiwan, R.O.C.
Phone number : 886-2-2602-7968
Fax number : 866-2-2602-3286
Email address : info.tw@dekra.com
Website : <http://www.dekra.com.tw>

1.7. List of Test Equipment

For Radiated measurements ACB1

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	Loop Antenna	AMETEK	HLA6121	49611	2019.02.22	2020.02.21
X	Bi-Log Antenna	SCHWARZBECK	VULB9168	9168-675	2019.07.01	2020.06.30
X	Horn Antenna	ETS-Lindgren	3117	00203761	2019.10.31	2020.10.30
	Horn Antenna	Com-Power	AH-840	101088	2019.08.29	2020.08.28
X	Pre-Amplifier	EMCI	EMC001330	980301	2019.05.20	2020.05.19
X	Pre-Amplifier	EMCI	EMC051835SE	980312	2019.06.03	2020.06.02
	Pre-Amplifier	EMCI	EMC05820SE	980308	2019.09.02	2020.09.01
	Pre-Amplifier	EMCI	EMC184045SE	980314	2019.05.28	2020.05.27
	Filter	MICRO TRONICS	BRM50702	G251	2019.09.03	2020.09.02
	Filter	MICRO TRONICS	BRM50716	G188	2019.09.03	2020.09.02
X	EMI Test Receiver	R&S	ESR7	101602	2019.12.16	2020.12.15
X	Spectrum Analyzer	R&S	FSV40	101148	2019.02.08	2020.02.07
X	Coaxial Cable	SUHNER	SUCOFLEX 106	RF002	2019.07.03	2020.07.02
	Mircoflex Cable	HUBER SUHNER	SUCOFLEX 102	MY3381/2	2019.05.28	2020.05.27

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.
3. Test Software version : DEKRA Testing System V1.0.0.20

1.8. Uncertainty

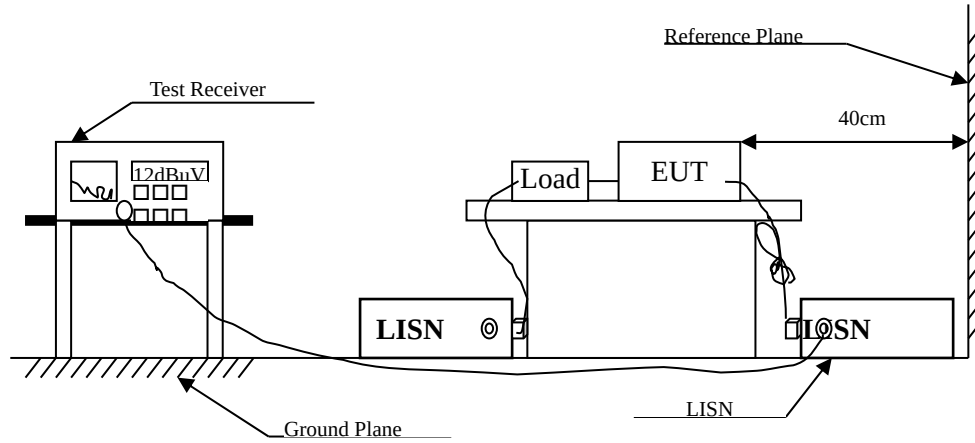
Uncertainties have been calculated according to the DEKRA internal document, and is described in each test chapter of this report.

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

Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

2. Conducted Emission

2.1. Test Setup



2.2. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dB μ V) Limit		
Frequency MHz	Limits	
	QP	AV
0.15 - 0.50	66-56 _(註)	56-46 _(註)
0.50-5.0	56	46
5.0 - 30	60	50

2.3. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement.

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

2.4. Uncertainty

± 2.35 dB

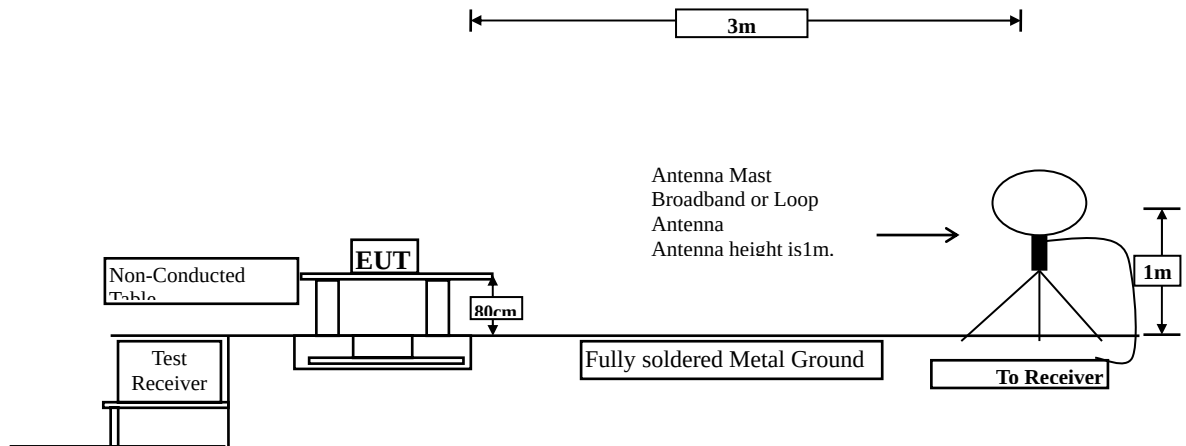
2.5. Test Result of Conducted Emission

Owing to the DC operation of EUT, this test item is not performed.

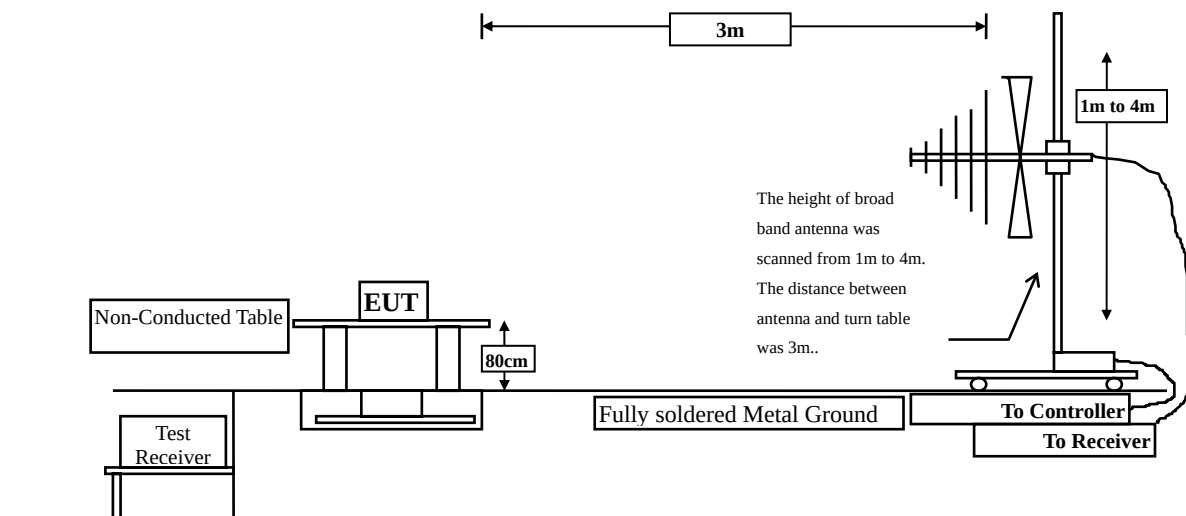
3. Radiated Emission

3.1. Test Setup

Radiated Emission Under 30MHz



Radiated Emission Below 1GHz



3.2. Limits

FCC Part 15 Subpart C Paragraph 15.209 Limits		
Frequency MHz	Field strength (microvolts/meter)	Measurement distance (meter)
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

Remarks :

1. RF Voltage (dB μ V) = 20 log RF Voltage (uV)
2. In the Above Table, the tighter limit applies at the band edges.
3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

3.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013 and tested compliance to FCC 47CFR 15.209 requirements.

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.

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 C63.10: 2013 on radiated measurement.

The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz. Radiated emission measurements below 1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.

The worst radiated emission is measured on the Final Measurement.

The measurement frequency range from 9kHz - 10th Harmonic of fundamental was investigated.

3.4. Uncertainty

Horizontal :

30-300MHz: $\pm 4.08\text{dB}$; 300M-1GHz: $\pm 3.86\text{dB}$ °

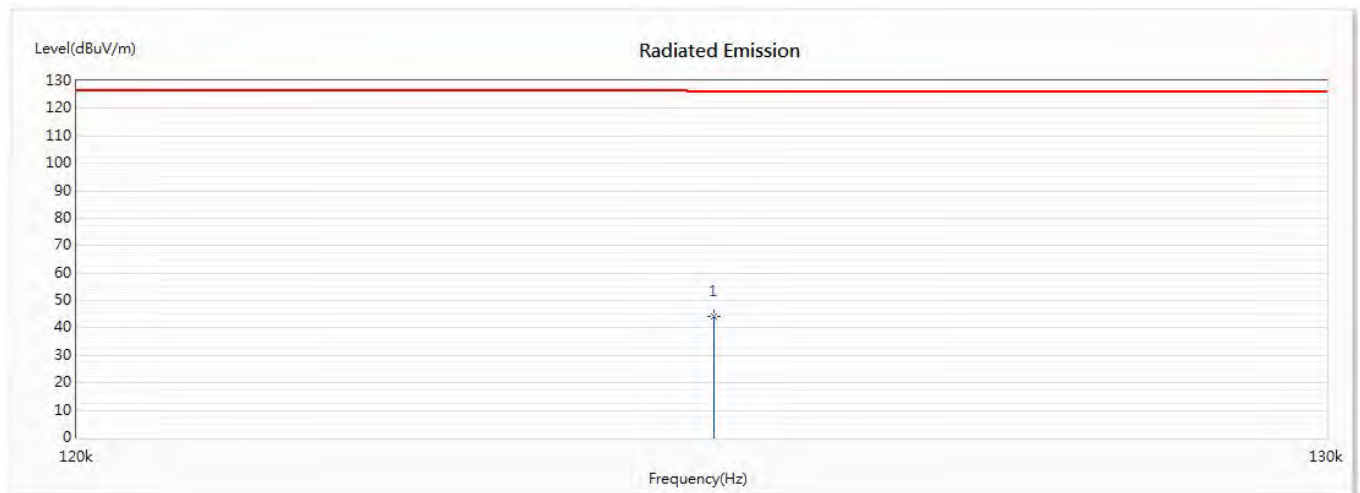
Vertical :

30-300MHz: $\pm 4.81\text{dB}$; 300M-1GHz: $\pm 3.87\text{dB}$ °

3.5. Test Result of Radiated Emission

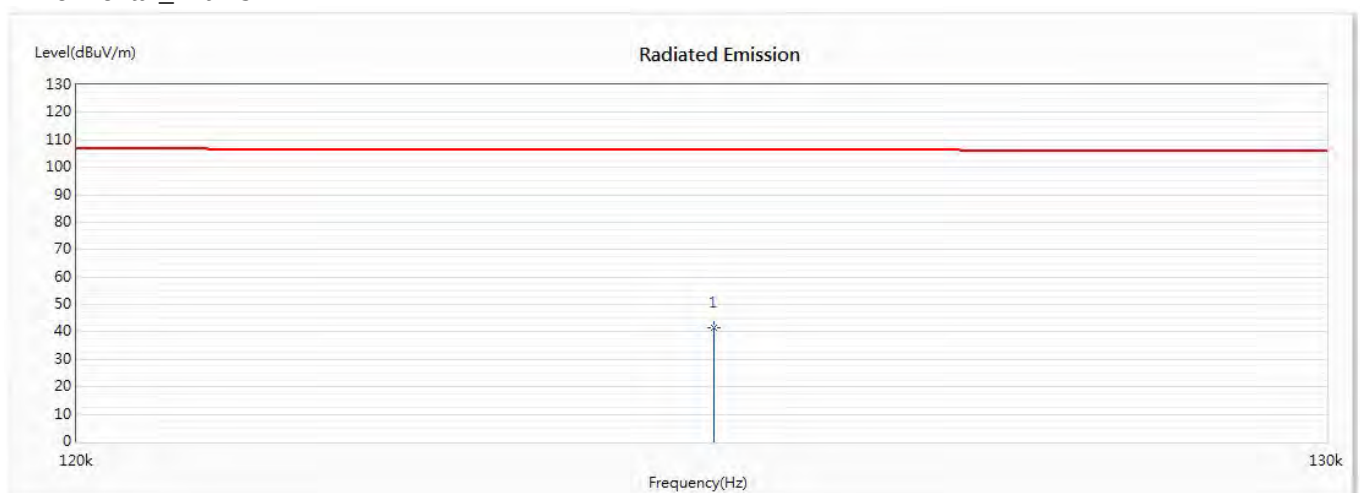
Product : FCA WL/WS PASE System MY 2021
 Test Item : Fundamental Radiated Emission
 Test date : 2020/01/07
 Test Mode : Mode 1: Transmit

Horizontal_X-axis



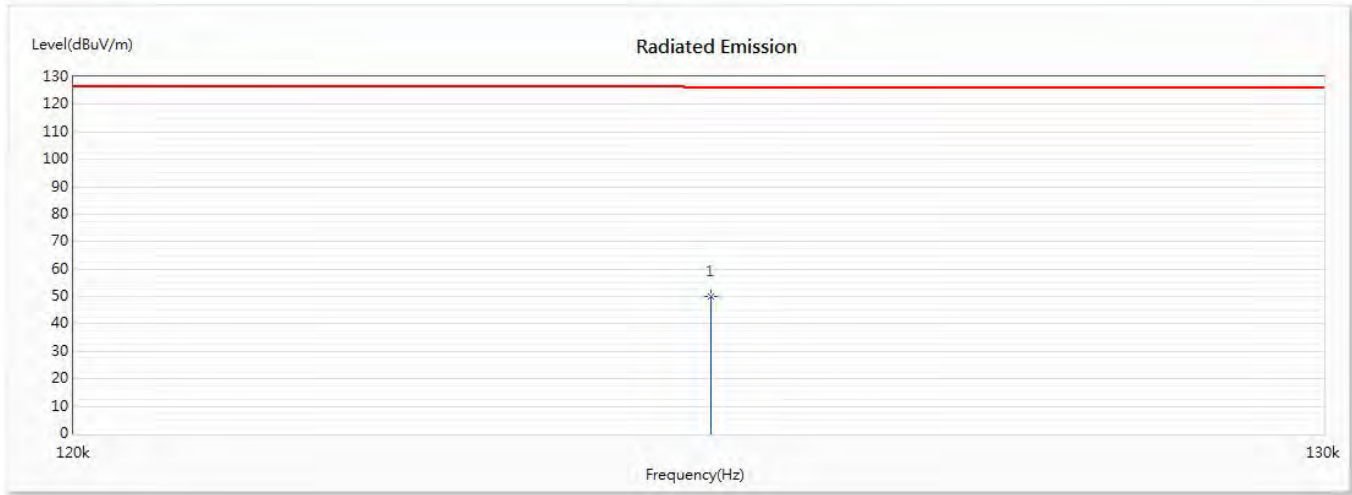
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	0.125	44.09	125.66	-81.57	24.69	19.41	PK

Horizontal_X-axis



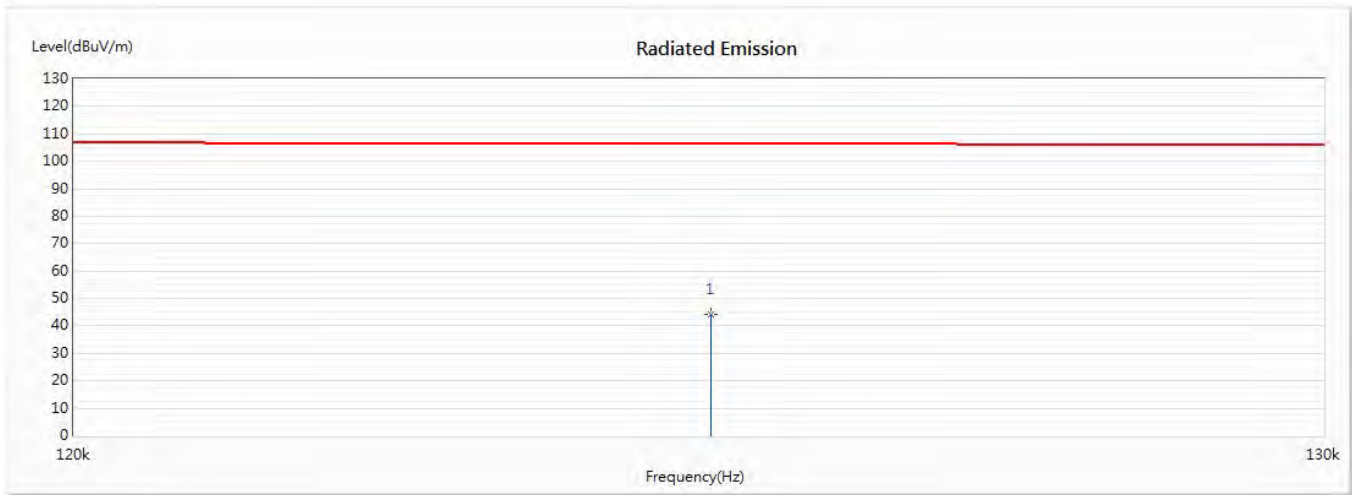
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	0.125	41.39	105.66	-64.27	21.99	19.41	AV

Vertical_X-axis



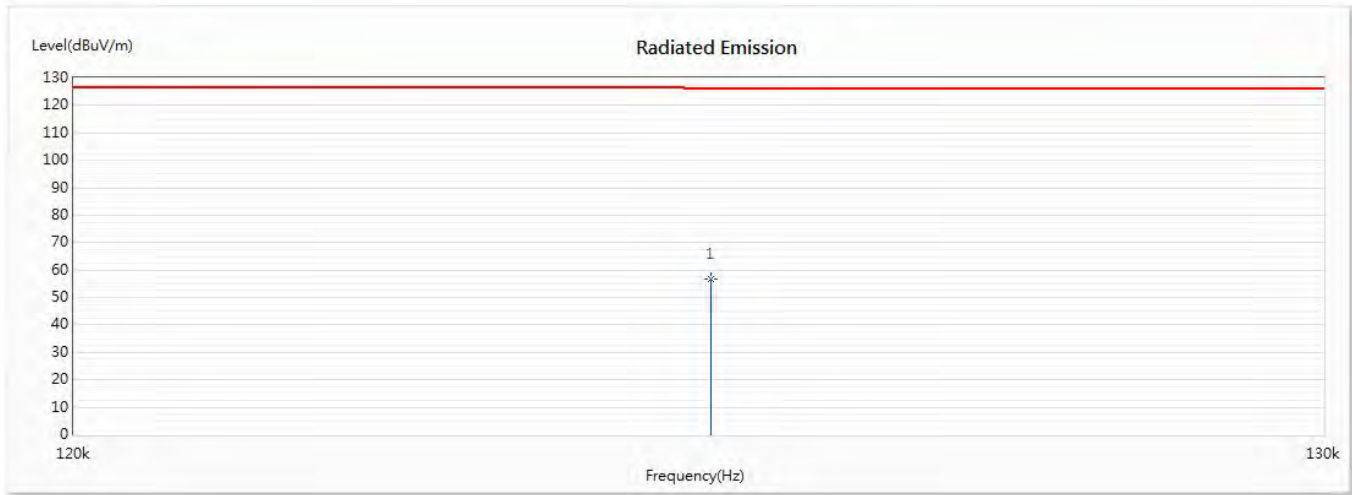
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	0.125	50.09	125.66	-75.57	30.69	19.41	PK

Vertical_X-axis



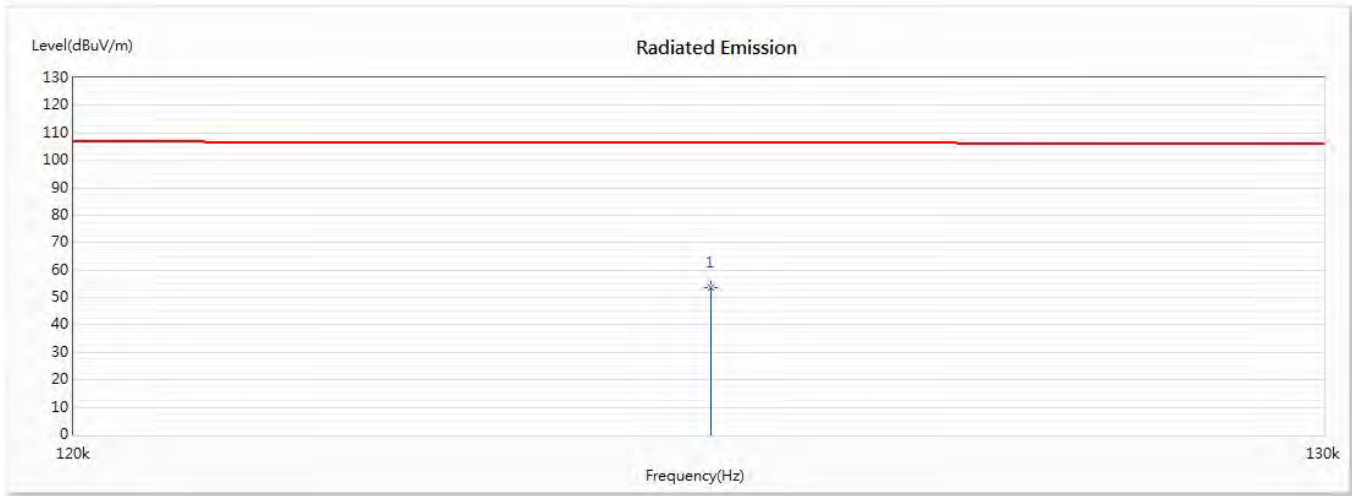
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	0.125	44.29	105.66	-61.37	24.89	19.41	AV

Horizontal_Y-axis



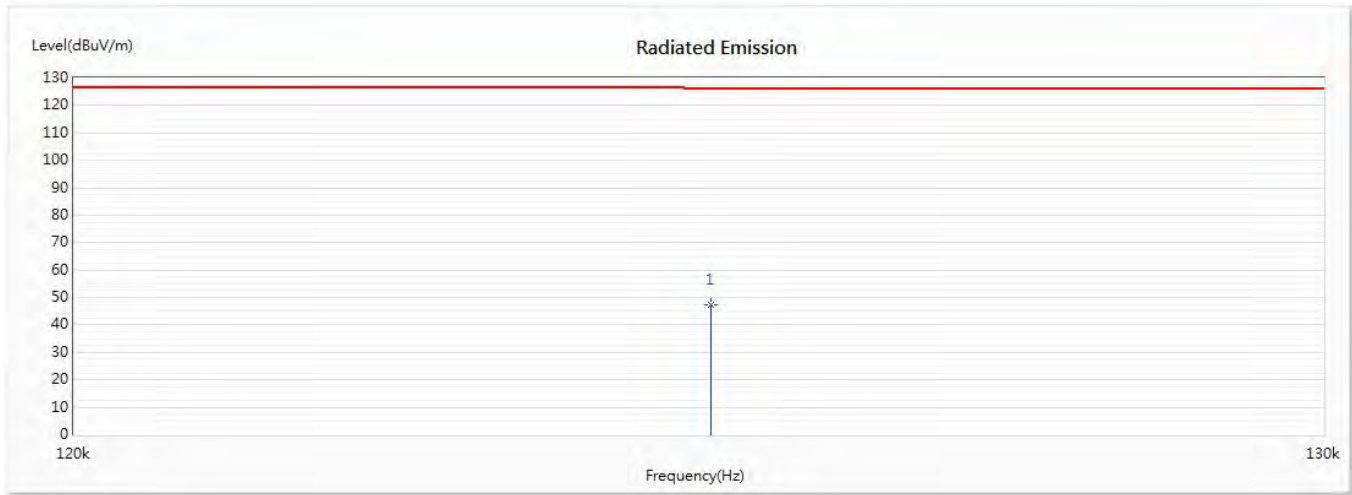
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	0.125	56.59	125.66	-69.07	37.19	19.41	PK

Horizontal_Y-axis



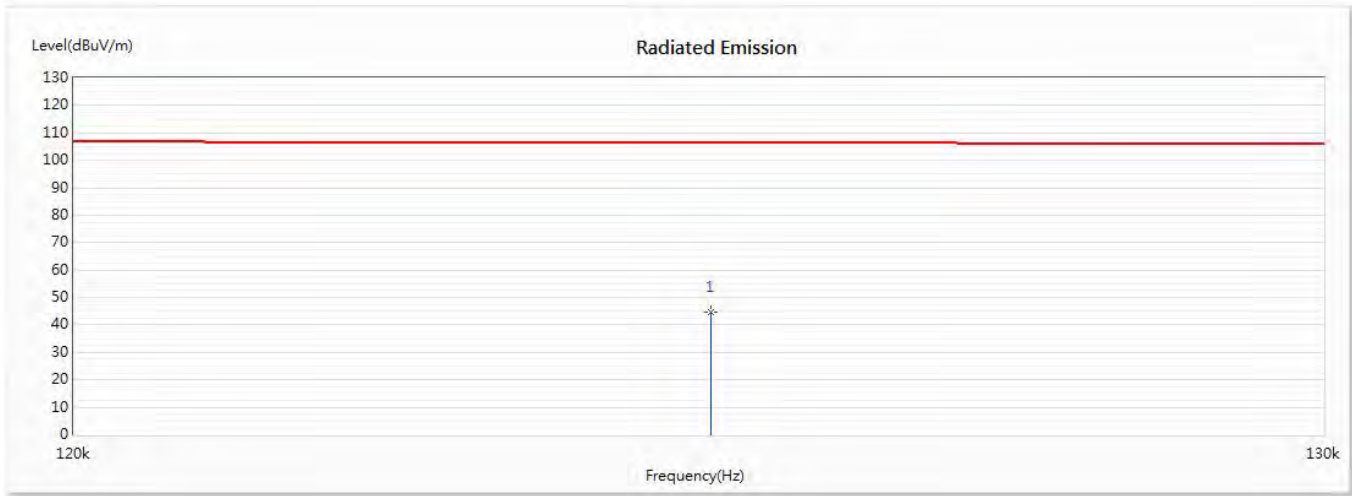
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	0.125	53.79	105.66	-51.87	34.39	19.41	AV

Vertical_Y-axis



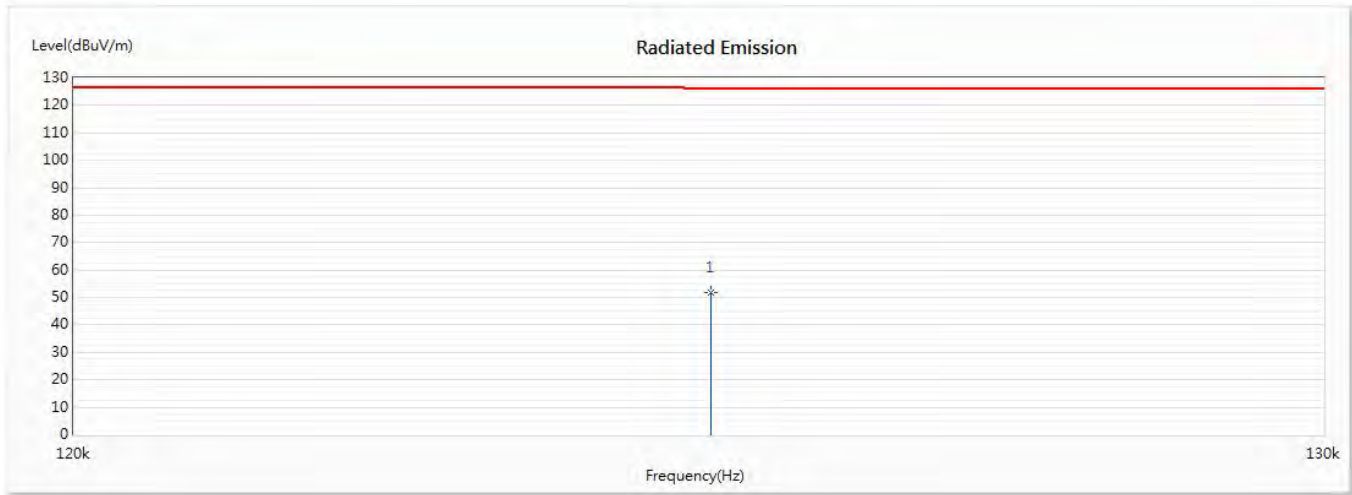
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	0.125	47.29	125.66	-78.37	27.89	19.41	PK

Vertical_Y-axis



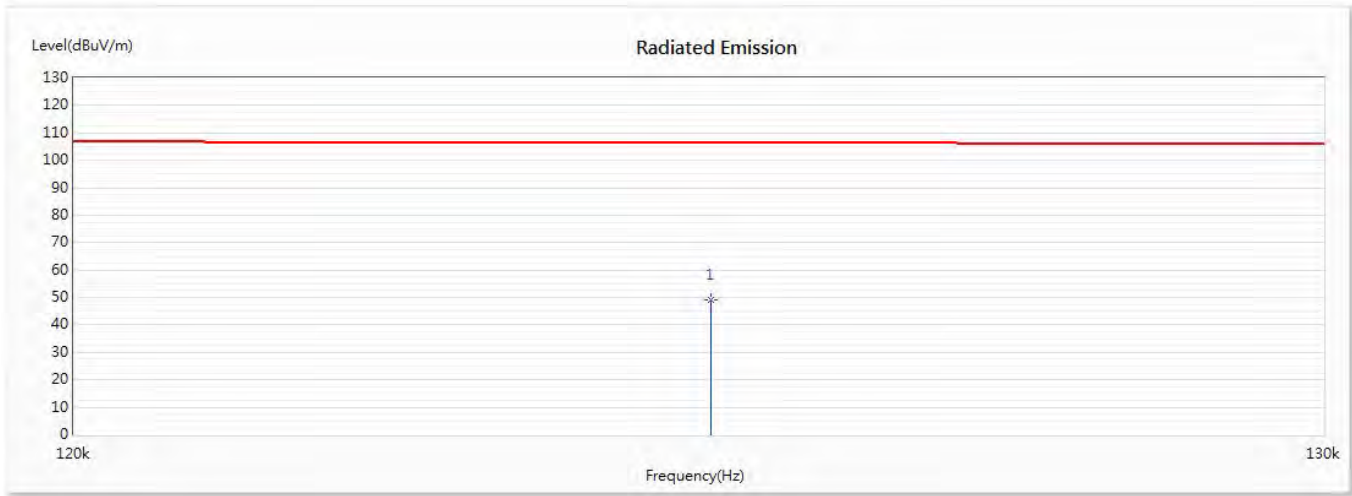
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	0.125	44.59	105.66	-61.07	25.19	19.41	AV

Horizontal_Z-axis



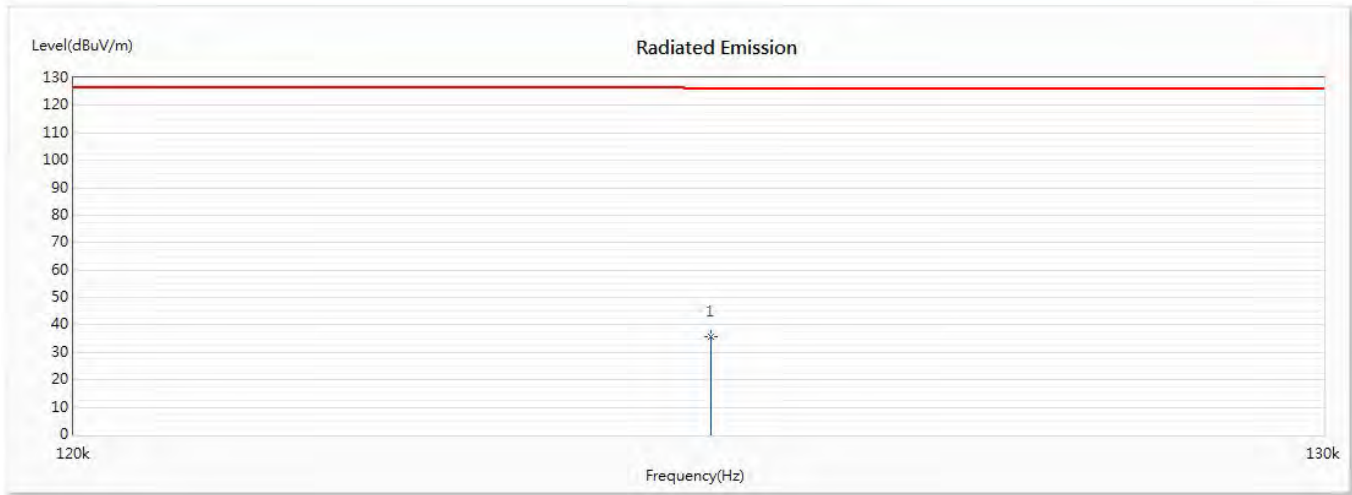
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	0.125	51.89	125.66	-73.77	32.49	19.41	PK

Horizontal_Z-axis



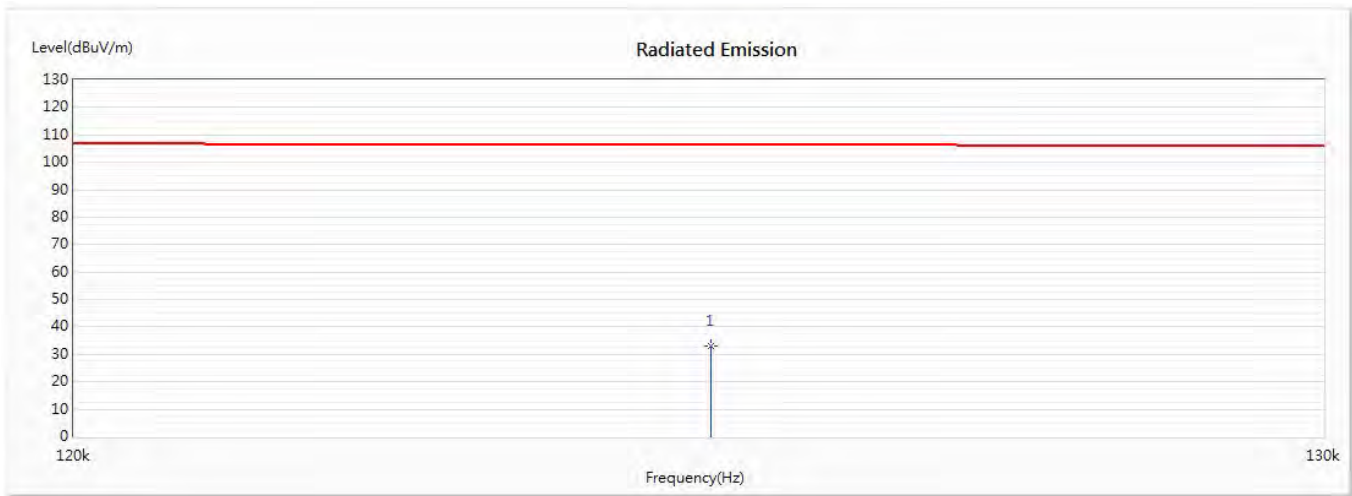
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	0.125	49.19	105.66	-56.47	29.79	19.41	AV

Vertical_Z-axis



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	0.125	35.79	125.66	-89.87	16.39	19.41	PK

Vertical_Z-axis



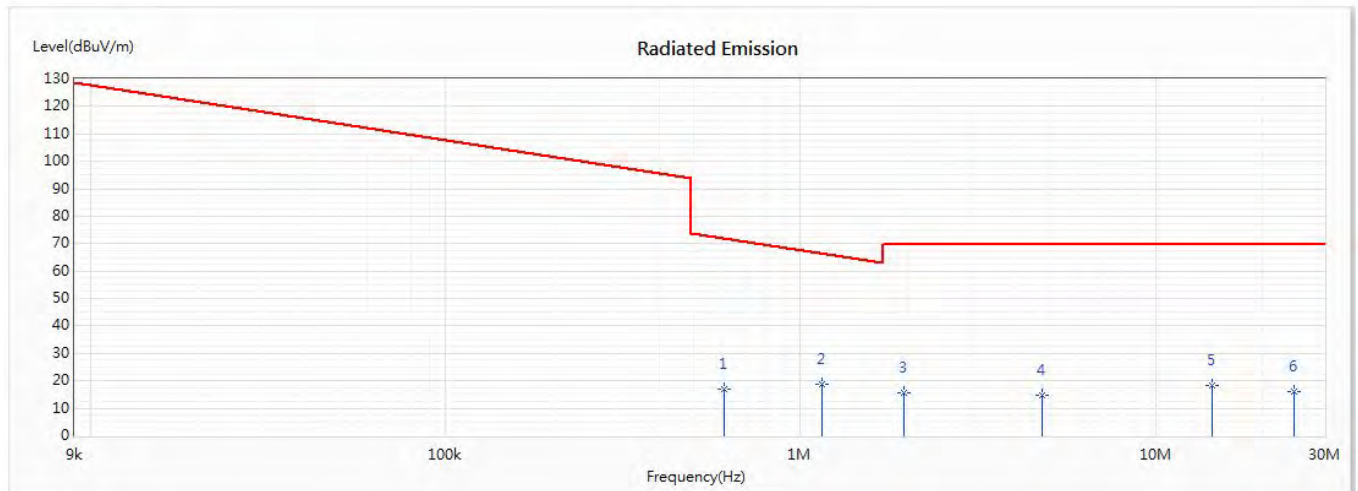
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	0.125	32.99	105.66	-72.67	13.59	19.41	AV

Note:

1. Measurement Level = Reading Level + Correct Factor.

Product : FCA WL/WS PASE System MY 2021
 Test Item : Radiated Emission
 Test date : 2020/01/07
 Test Mode : Mode 1: Transmit

9kHz~30MHz_Horizontal



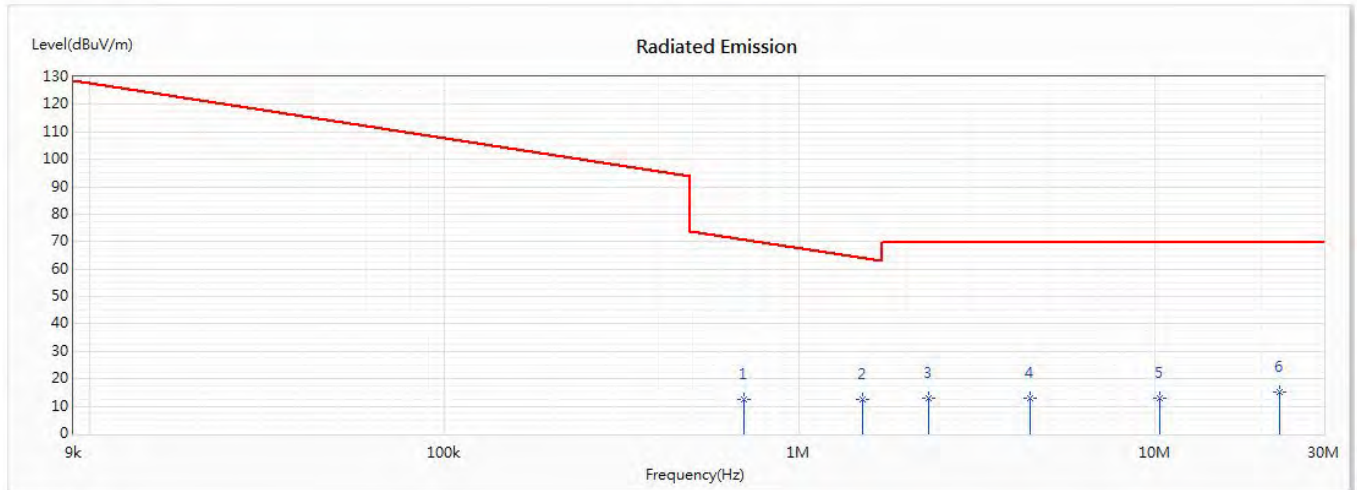
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	0.609	17.18	71.92	-54.74	-2.82	20.00	QP
* 2	1.149	18.96	66.42	-47.46	-1.00	19.96	QP
3	1.958	15.53	69.54	-54.01	-4.23	19.76	QP
4	4.808	14.59	69.54	-54.95	-5.72	20.31	QP
5	14.495	18.45	69.54	-51.09	-3.12	21.57	QP
6	24.572	15.95	69.54	-53.59	-6.18	22.13	QP

Note:

1. The reading levels below 1GHz are quasi-peak values.
2. “ * ” means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : FCA WL/WS PASE System MY 2021
 Test Item : Radiated Emission
 Test date : 2020/01/07
 Test Mode : Mode 1: Transmit

9kHz~30MHz_Vertical



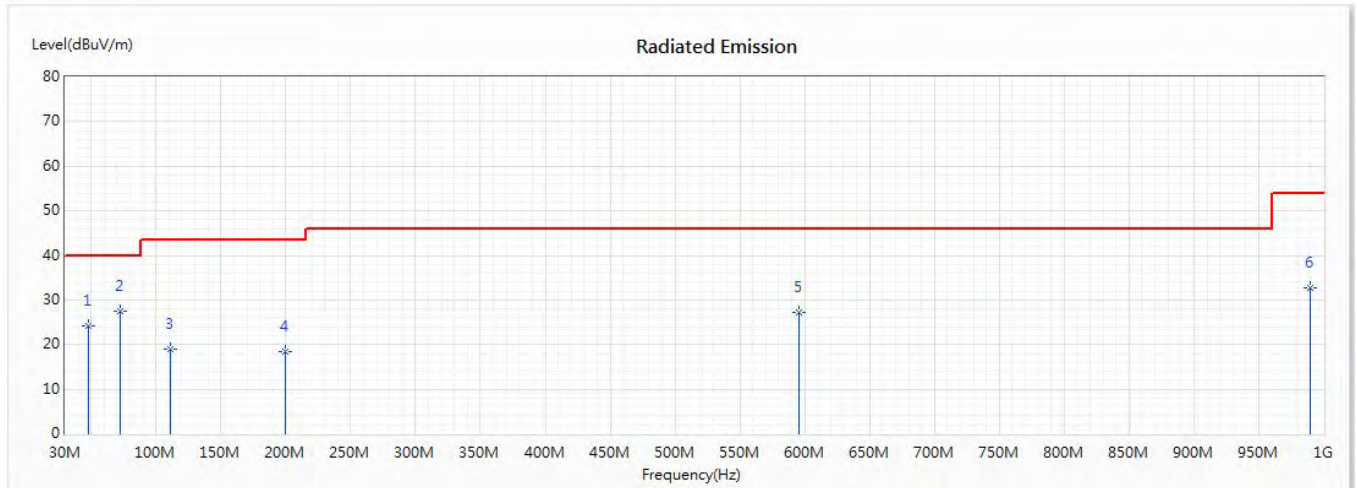
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	0.699	12.71	70.72	-58.01	-7.29	20.00	QP
* 2	1.509	12.56	64.06	-51.49	-7.31	19.87	QP
3	2.318	12.76	69.54	-56.78	-6.91	19.67	QP
4	4.448	13.16	69.54	-56.38	-6.99	20.15	QP
5	10.326	12.75	69.54	-56.79	-8.57	21.32	QP
6	22.532	15.16	69.54	-54.38	-6.87	22.03	QP

Note:

1. The reading levels below 1GHz are quasi-peak values.
2. “ * ” means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : FCA WL/WS PASE System MY 2021
 Test Item : General Radiated Emission
 Test date : 2020/01/07
 Test Mode : Mode 1: Transmit

30MHz~1GHz_Horizontal



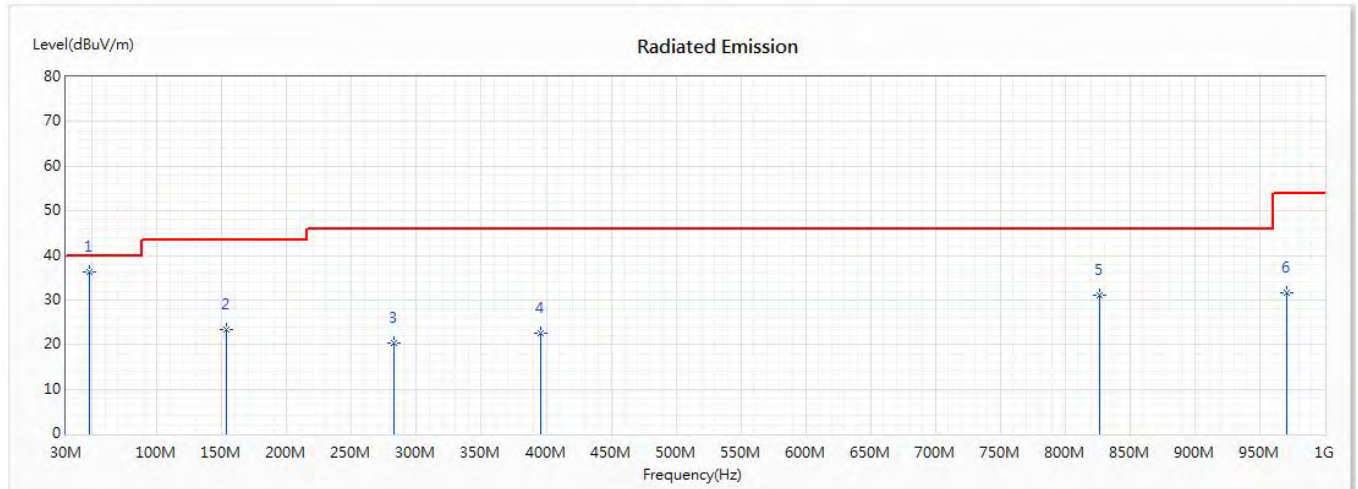
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	47.46	24.13	40.00	-15.87	34.49	-10.36	QP
* 2	72.68	27.61	40.00	-12.39	41.27	-13.66	QP
3	111.48	19.08	43.50	-24.42	32.86	-13.78	QP
4	199.75	18.30	43.50	-25.20	31.63	-13.33	QP
5	595.51	27.12	46.00	-18.88	30.21	-3.09	QP
6	989.33	32.58	54.00	-21.42	30.64	1.94	QP

Note:

1. The reading levels below 1GHz are quasi-peak values.
2. “ * ” means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : FCA WL/WS PASE System MY 2021
 Test Item : General Radiated Emission
 Test date : 2020/01/07
 Test Mode : Mode 1: Transmit

30MHz~1GHz_Vertical



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	47.46	36.27	40.00	-3.73	46.63	-10.36	QP
2	153.19	23.31	43.50	-20.19	33.81	-10.50	QP
3	282.2	20.32	46.00	-25.68	30.53	-10.21	QP
4	395.69	22.54	46.00	-23.46	29.99	-7.45	QP
5	826.37	30.95	46.00	-15.05	30.97	-0.02	QP
6	970.9	31.56	54.00	-22.44	29.64	1.92	QP

Note:

1. The reading levels below 1GHz are quasi-peak values.
2. “ * ” means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

4. EMI Reduction Method During Compliance Testing

No modification was made during testing.