

FCC Test Report

Product Name	FCA WL/WS PASE System MY 2021
Model No.	WXFOB1
FCC ID.	M3NWXFOB1

Applicant	Continental Automotive Systems US Inc.
Address	4685 Investment Drive Troy Michigan, 48098 United States Of America

Date of Receipt	Apr. 28, 2020
Issued Date	Sep. 21, 2020
Report No.	2040736R-E3032110105
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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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.

Test Report

Issued Date: Sep. 21, 2020

Report No.: 2040736R-E3032110105



Product Name	FCA WL/WS PASE System MY 2021
Applicant	Continental Automotive Systems US Inc.
Address	4685 Investment Drive Troy Michigan, 48098 United States Of America
Manufacturer	Continental Automotive GmbH
Model No.	WXFOB1
FCC ID.	M3NWXFOB1
EUT Rated Voltage	DC 3V (Power by Battery)
EUT Test Voltage	DC 3V (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

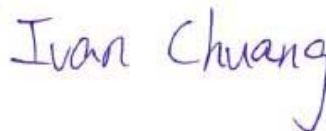
:



(Senior Adm. Specialist / Joanne Lin)

Tested By

:



(Senior Engineer / Ivan Chuang)

Approved By

:



(Director / Vincent Lin)

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Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs

Revision History

Report No.	Version	Description	Issued Date
2040736R-E3032110105	V1.0	Initial issue of report.	2020-09-21

1. General Information

1.1. EUT Description

Product Name	FCA WL/WS PASE System MY 2021
Trade Name	Continental
Model No.	WXFOB1
FCC ID	M3NWXFOB1
Frequency Range	433.925MHz
Number of Channels	1
Type of Modulation	FSK, ASK
Antenna Type	PCB antenna

Frequency of Each Channel:

Channel	Frequency
Channel 1:	433.925MHz

Note:

1. The EUT is a FCA WL/WS PASE System MY 2021 with a built-in 433.925MHz transmitter.
2. The manufacturer declared that the WXFOB1 can be available in different button configurations, depending on car manufacturer requirement. The EUT tested in this report represents the highest populated variant and is further declared as the worst case configuration by the manufacturer.
3. The antenna of EUT is conform to FCC 15.203.
4. These tests are conducted on a sample for the purpose of demonstrating compliance of transmitter with Part 15 Subpart C Paragraph 15.231.
5. 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 (ASK) Mode 2: Transmit (FSK) Mode 3: Normal Mode
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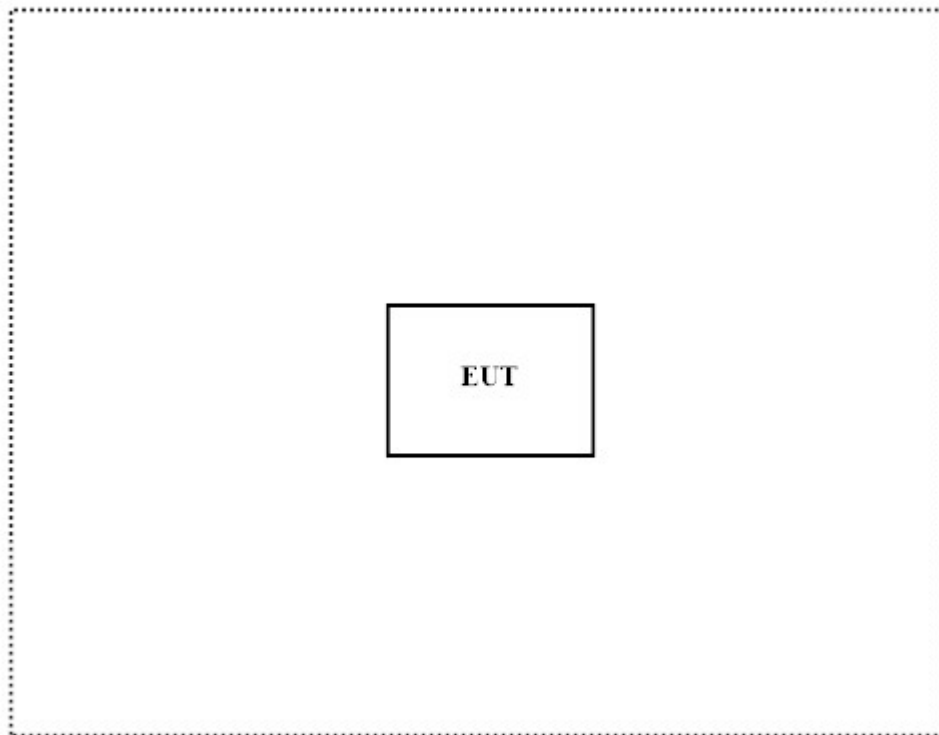
1.2. Tested System Details

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
N/A					

Signal Cable Type	Signal cable Description
N/A	

1.3. Configuration of tested System



1.4. EUT Exercise Software

1	Setup the EUT as shown in section 1.4.
2	Push the button of EUT.
3	Start transmit continually.
4	Verify that the EUT works properly.

1.5. Test Facility

Ambient conditions in the laboratory:

Performed Item	Items	Required	Actual
Radiated Emission	Temperature (°C)	10~40 °C	21°C
	Humidity (%RH)	10~90 %	61.6%
Conductive	Temperature (°C)	10~40 °C	23.2°C
	Humidity (%RH)	10~90 %	56%

USA : FCC Registration Number: TW0023

Canada : IC Registration Number: 25880

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>

1.6. List of Test Equipment

For Conducted measurements /ASR2

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	Spectrum Analyzer	R&S	FSV30	103466	2019.12.16	2020.12.15
	Peak Power Analyzer	KEYSIGHT	8900B	MY51000539	2020.05.13	2021.05.12
	Power Sensor	KEYSIGHT	N1923A	MY59240002	2020.05.22	2021.05.21
	Power Sensor	KEYSIGHT	N1923A	MY59240003	2020.05.22	2021.05.21

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 Conduction Test System V9.0.5

For Radiated measurements /ACB1

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	Loop Antenna	AMETEK	HLA6121	49611	2020.03.16	2021.03.15
X	Bi-Log Antenna	SCHWARZBECK	VULB9168	9168-953	2020.01.03	2021.01.02
X	Horn Antenna	ETS-Lindgren	3117	00203800	2019.12.12	2020.12.11
	Horn Antenna	Com-Power	AH-840	101087	2020.06.08	2021.06.07
X	Pre-Amplifier	EMCI	EMC001330	980316	2020.06.23	2021.06.22
X	Pre-Amplifier	EMCI	EMC051835SE	980313	2019.09.17	2020.09.16
	Pre-Amplifier	EMCI	EMC05820SE	980310	2020.06.24	2021.06.23
	Pre-Amplifier	EMCI	EMC184045SE	980314	2020.06.10	2021.06.09
	Filter	MICRO TRONICS	BRM50702	G251	2020.09.17	2021.09.16
	Filter	MICRO TRONICS	BRM50716	G188	2020.09.17	2021.09.16
X	EMI Test Receiver	R&S	ESR7	101602	2019.12.16	2020.12.15
X	Spectrum Analyzer	R&S	FSV40	101148	2020.03.16	2021.03.15
X	Coaxial Cable	SUHNER	SUCOFLEX 106	RF002	2020.07.03	2021.07.02
	Mircoflex Cable	HUBER SUHNER	SUCOFLEX 102	MY3381/2	2020.06.10	2021.06.09

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 V1.2

1.7. Uncertainty

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

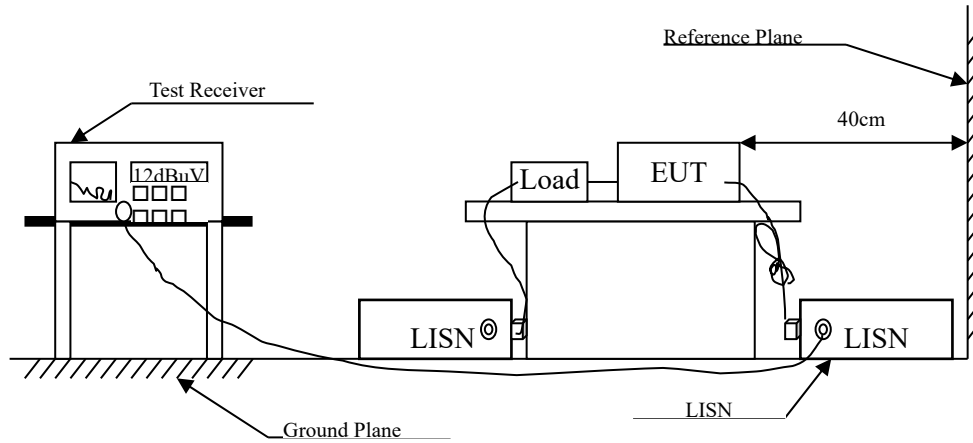
The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.

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.

Test item	Uncertainty	
Conducted Emission	± 3.42 dB	
Radiated Emission	Under 1GHz ± 4.06 dB	Above 1GHz ± 3.73 dB
Transmit time	± 2.31 ms	
Occupied Bandwidth	± 682.83 Hz	
Duty Cycle	± 2.31 ms	

2. Conducted Emission

2.1. Test Setup



2.2. 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.

2.3. Test Procedure

The EUT and Peripherals 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 refer 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 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.

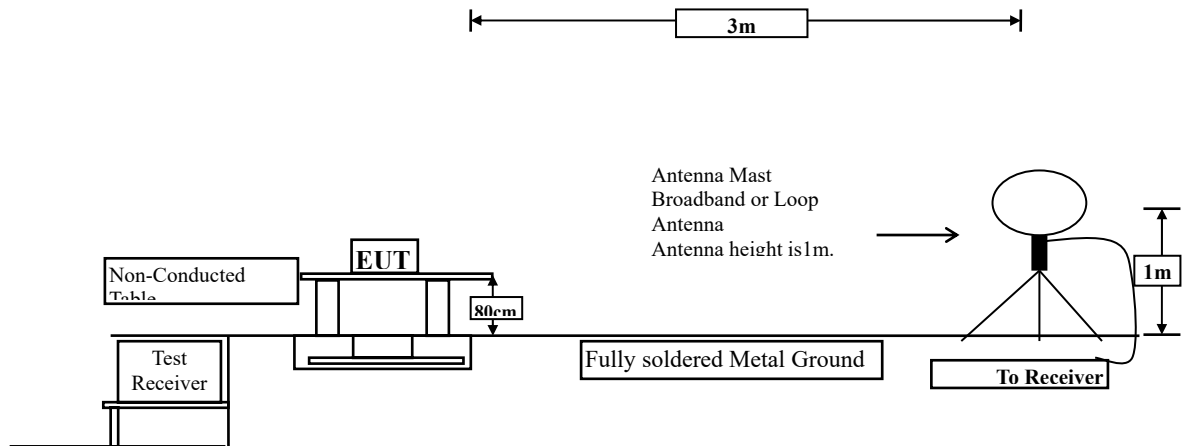
2.4. Test Result of Conducted Emission

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

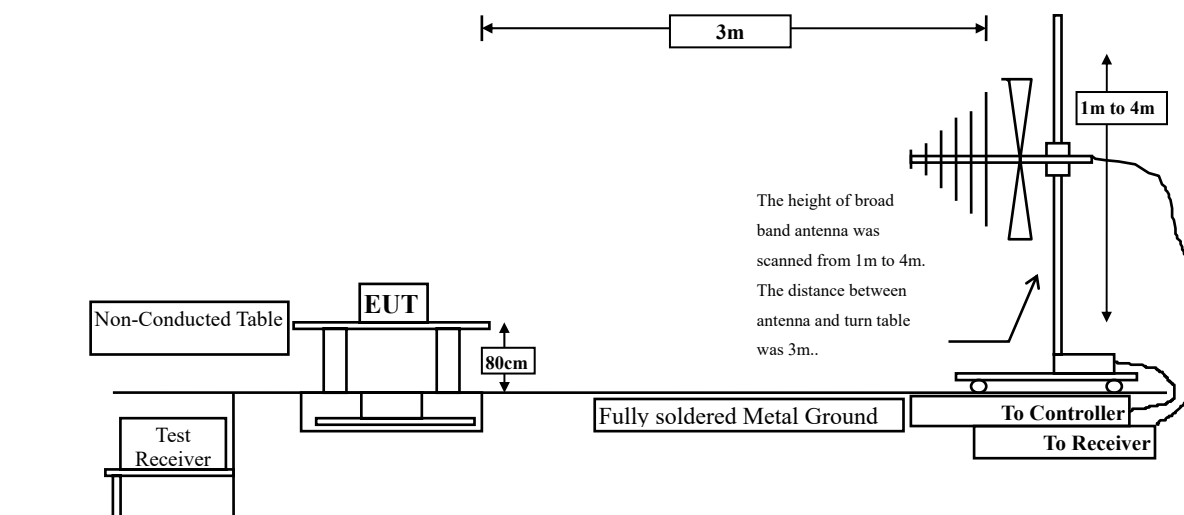
3. Radiated Emission

3.1. Test Setup

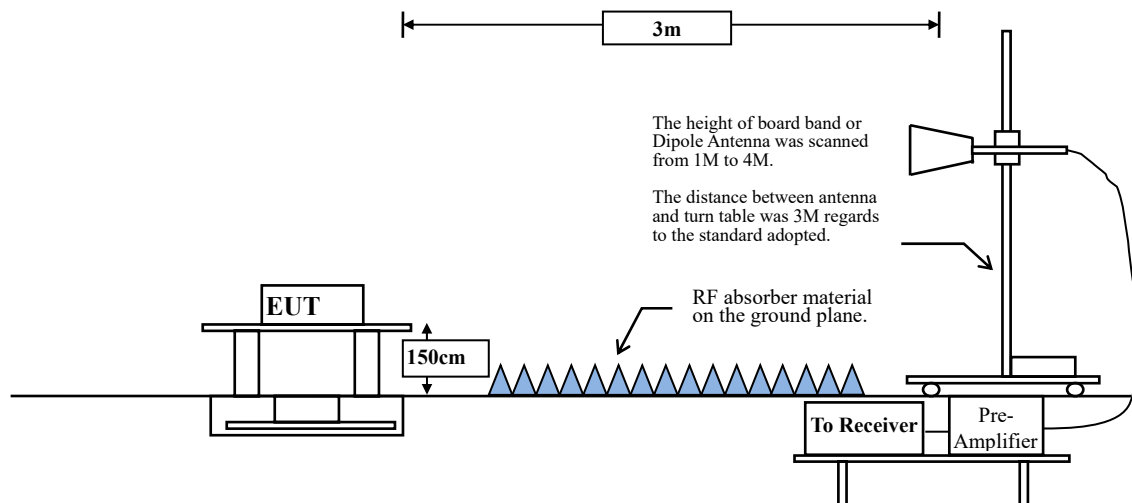
Radiated Emission Under 30MHz



Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



3.2. Limits

➤ Fundamental and Harmonics Emission Limits

FCC Part 15 Subpart C Paragraph 15.231(b) Limits		
Fundamental Frequency MHz	Field Strength of Fundamental	Field Strength of Spurious Emission
40.66-40.70	2250	225
70-130	1250	125
130-174	1250-3750	125-375
174-260	3750	375
260-470	3750-12500	375-1250
above 470	12500	1250

- Remarks :
1. RF Voltage (dBuV) = 20 log RF Voltage (uV)
 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. The emission limit in this paragraph is based on measurement instrumentation employing an average detector.

➤ Spurious electric field strength limits

FCC Part 15 Subpart C Paragraph 15.209 Limits			
Frequency MHz	uV/m	dBuV/m	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	See Remark ¹	300
0.490-1.705	24000/F(kHz)	See Remark ¹	30
1.705-30	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

- Remarks :
1. RF Voltage (dBuV) = 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

Measuring the frequency range below 1GHz, the EUT is placed on a turn table which is 0.8 meter above ground, when measuring the frequency range above 1GHz, the EUT is placed on a turn table which is 1.5 meter above ground.

The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The turn table is rotated 360 degrees to determine the position of the maximum emission level.

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 30MHz setting on the field strength meter is 9kHz and 30MHz~1GHz is 120kHz and above 1GHz is 1MHz.

Radiated emission measurements below 30MHz are made using Loop Antenna and 30MHz~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.

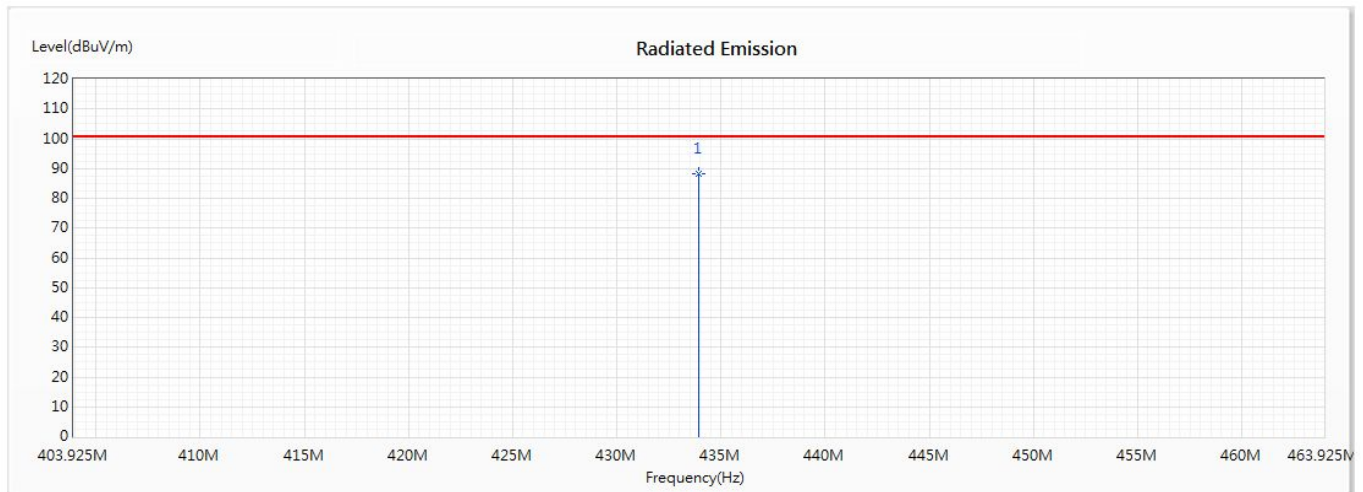
The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the 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 measurement frequency range from 9kHz - 10th Harmonic of fundamental was investigated.

3.4. Test Result

Product	FCA WL/WS PASE System MY 2021
Test Item	Fundamental Radiated Emission
Test Mode	Mode 1: Transmit (ASK) (433.925MHz)
Date of Test	2020/05/13

Horizontal_X-Axis



No	Frequency (MHz)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Reading Level (dBμV)	Correct Factor (dB/m)	Detector Type
* 1	433.925	88.10	100.82	-12.72	94.50	-6.40	PK

Note:

1. Emission Level = Reading Level + Correct Factor
2. Average Limit=20log(10996.88)=80.82 dBuV 、Peak Limit=100.82 dBuV

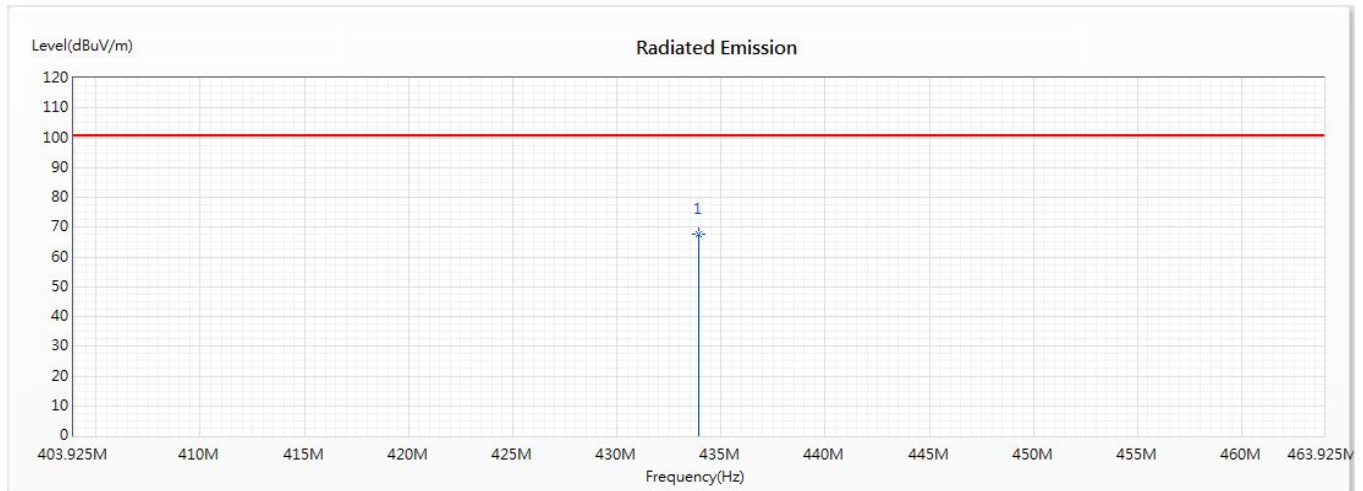
Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Average Measurement (dBμV/m)	Margin (dB)	Average Limit (dBμV/m)
433.925	88.10	-12.249	75.851	-4.969	80.820

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor
2. The Duty Cycle is refer to section 6.

Product	FCA WL/WS PASE System MY 2021
Test Item	Fundamental Radiated Emission
Test Mode	Mode 1: Transmit (ASK) (433.925MHz)
Date of Test	2020/05/13

Vertical_X-Axis



No	Frequency (MHz)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Reading Level (dBμV)	Correct Factor (dB/m)	Detector Type
* 1	433.925	67.80	100.82	-33.02	74.20	-6.40	PK

Note:

1. Emission Level = Reading Level + Correct Factor
2. Average Limit=20log(10996.88)=80.82 dBuV 、Peak Limit=100.82 dBuV

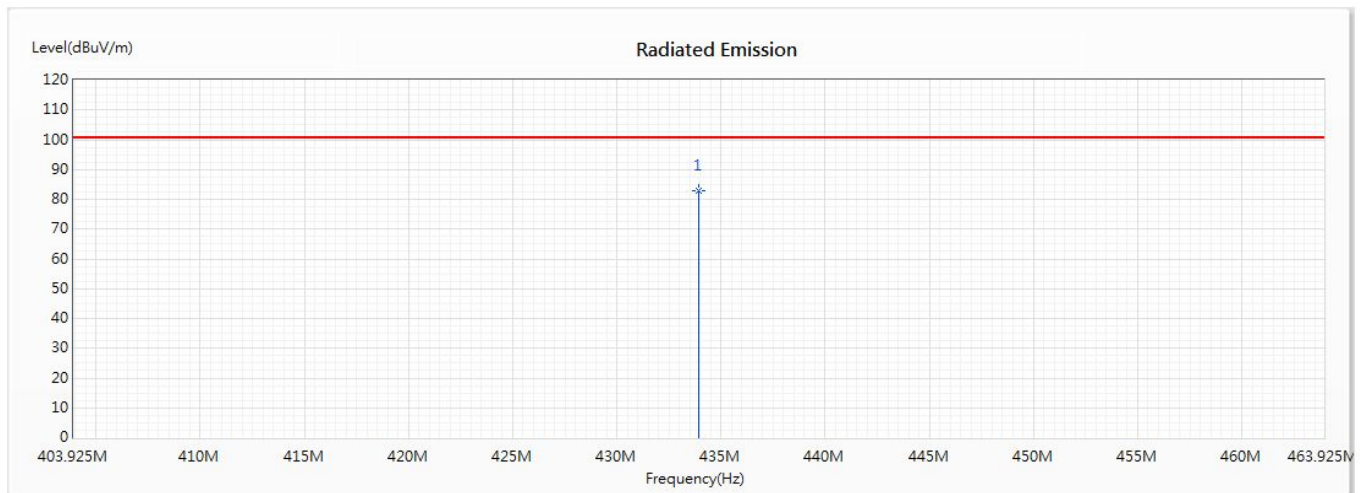
Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Average Measurement (dBμV/m)	Margin (dB)	Average Limit (dBμV/m)
433.925	67.80	-12.249	55.551	-25.269	80.820

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor
2. The Duty Cycle is refer to section 6.

Product	FCA WL/WS PASE System MY 2021
Test Item	Fundamental Radiated Emission
Test Mode	Mode 1: Transmit (ASK) (433.925MHz)
Date of Test	2020/05/13

Horizontal_Y-Axis



No	Frequency (MHz)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Reading Level (dBμV)	Correct Factor (dB/m)	Detector Type
* 1	433.925	82.80	100.82	-18.02	89.20	-6.40	PK

Note:

1. Emission Level = Reading Level + Correct Factor
2. Average Limit=20log(10996.88)=80.82 dBuV 、Peak Limit=100.82 dBuV

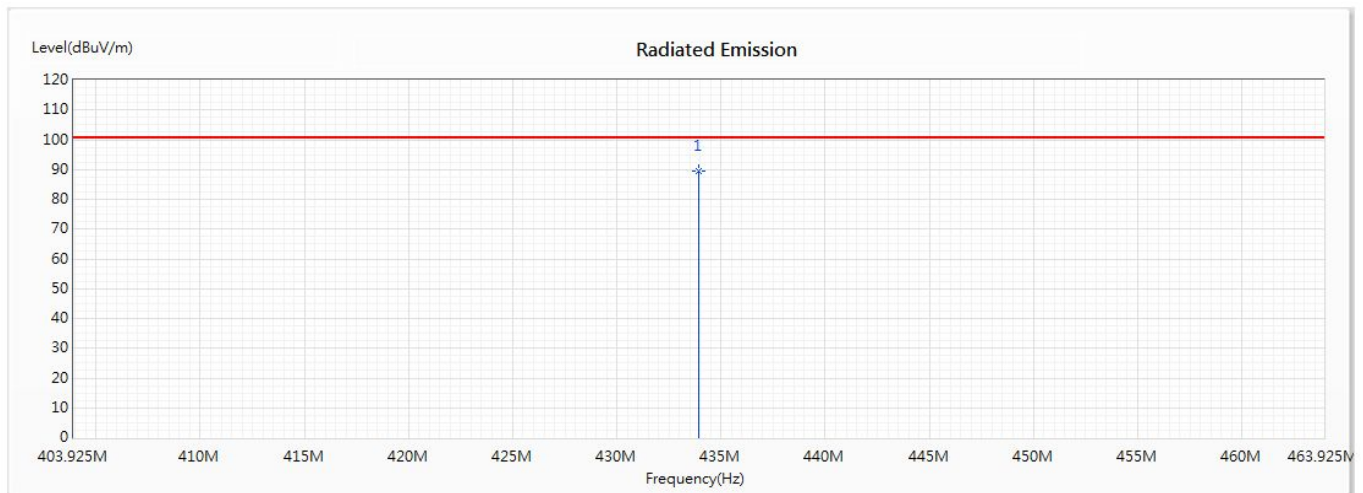
Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Average Measurement (dBμV/m)	Margin (dB)	Average Limit (dBμV/m)
433.925	82.80	-12.249	70.551	-10.269	80.820

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor
2. The Duty Cycle is refer to section 6.

Product	FCA WL/WS PASE System MY 2021
Test Item	Fundamental Radiated Emission
Test Mode	Mode 1: Transmit (ASK) (433.925MHz)
Date of Test	2020/05/13

Vertical_Y-Axis



No	Frequency (MHz)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Reading Level (dB μ V)	Correct Factor (dB/m)	Detector Type
* 1	433.925	89.60	100.82	-11.22	96.00	-6.40	PK

Note:

1. Emission Level = Reading Level + Correct Factor
2. Average Limit=20log(10996.88)=80.82 dBuV 、Peak Limit=100.82 dBuV

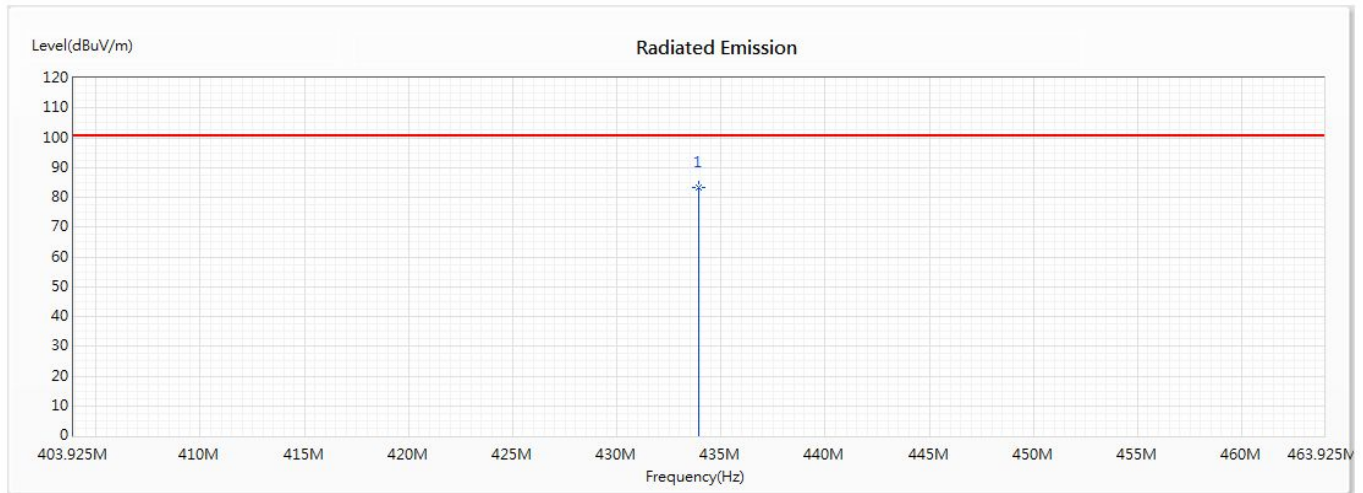
Frequency (MHz)	Peak Measurement (dB μ V/m)	Duty Cycle Factor (dB)	Average Measurement (dB μ V/m)	Margin (dB)	Average Limit (dB μ V/m)
433.925	89.60	-12.249	77.351	-3.469	80.820

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor
2. The Duty Cycle is refer to section 6.

Product	FCA WL/WS PASE System MY 2021
Test Item	Fundamental Radiated Emission
Test Mode	Mode 1: Transmit (ASK) (433.925MHz)
Date of Test	2020/05/13

Horizontal_Z-Axis



No	Frequency (MHz)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Reading Level (dBμV)	Correct Factor (dB/m)	Detector Type
* 1	433.925	83.10	100.82	-17.72	89.50	-6.40	PK

Note:

1. Emission Level = Reading Level + Correct Factor
2. Average Limit=20log(10996.88)=80.82 dBuV 、Peak Limit=100.82 dBuV

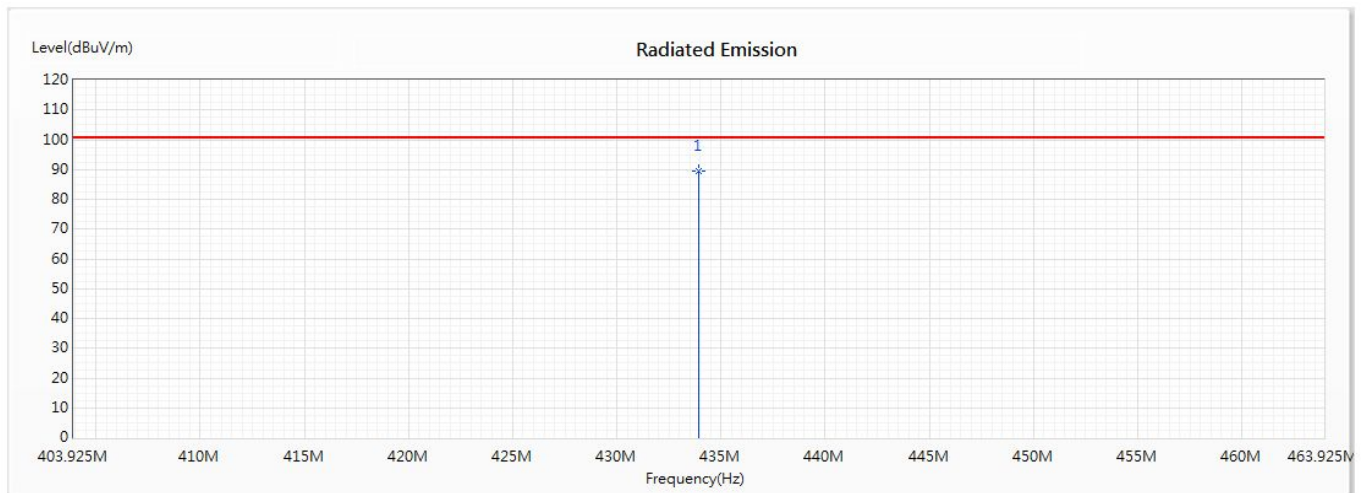
Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Average Measurement (dBμV/m)	Margin (dB)	Average Limit (dBμV/m)
433.925	83.10	-12.249	70.851	-9.969	80.820

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor
2. The Duty Cycle is refer to section 6.

Product	FCA WL/WS PASE System MY 2021
Test Item	Fundamental Radiated Emission
Test Mode	Mode 1: Transmit (ASK) (433.925MHz)
Date of Test	2020/05/13

Vertical_Z-Axis



No	Frequency (MHz)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Reading Level (dBμV)	Correct Factor (dB/m)	Detector Type
* 1	433.925	89.50	100.82	-11.32	95.90	-6.40	PK

Note:

1. Emission Level = Reading Level + Correct Factor
2. Average Limit=20log(10996.88)=80.82 dBuV 、Peak Limit=100.82 dBuV

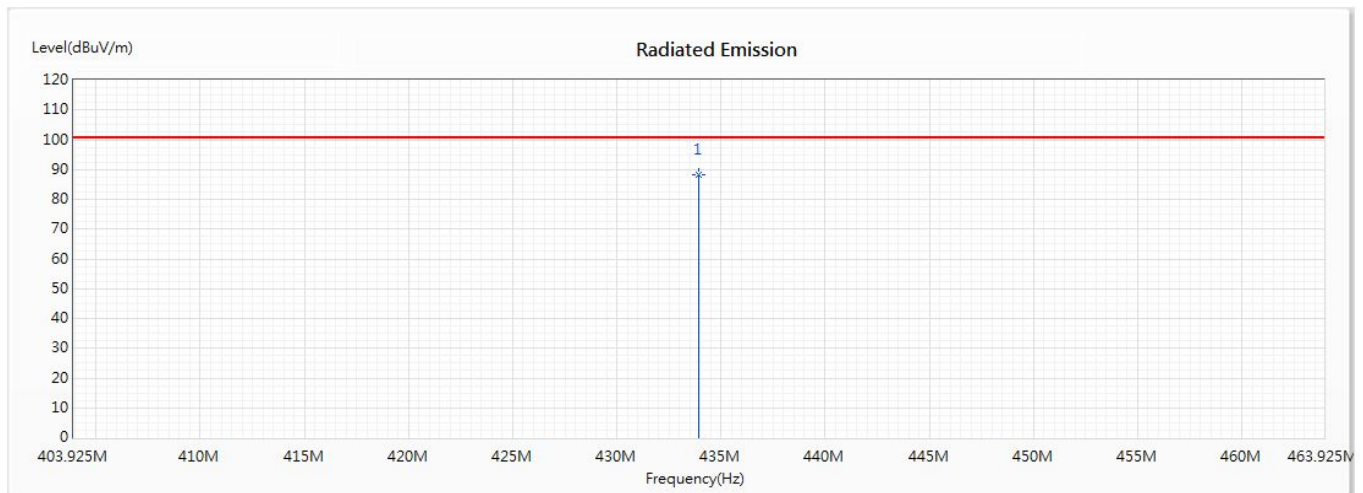
Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Average Measurement (dBμV/m)	Margin (dB)	Average Limit (dBμV/m)
433.925	89.50	-12.249	77.251	-3.569	80.820

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor
2. The Duty Cycle is refer to section 6.

Product	FCA WL/WS PASE System MY 2021
Test Item	Fundamental Radiated Emission
Test Mode	Mode 2: Transmit (FSK) (433.925MHz)
Date of Test	2020/05/13

Horizontal_X-Axis



No	Frequency (MHz)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Reading Level (dBμV)	Correct Factor (dB/m)	Detector Type
* 1	433.925	88.20	100.82	-12.62	94.60	-6.40	PK

Note:

1. Emission Level = Reading Level + Correct Factor
2. Average Limit=20log(10996.88)=80.82 dBuV 、Peak Limit=100.82 dBuV

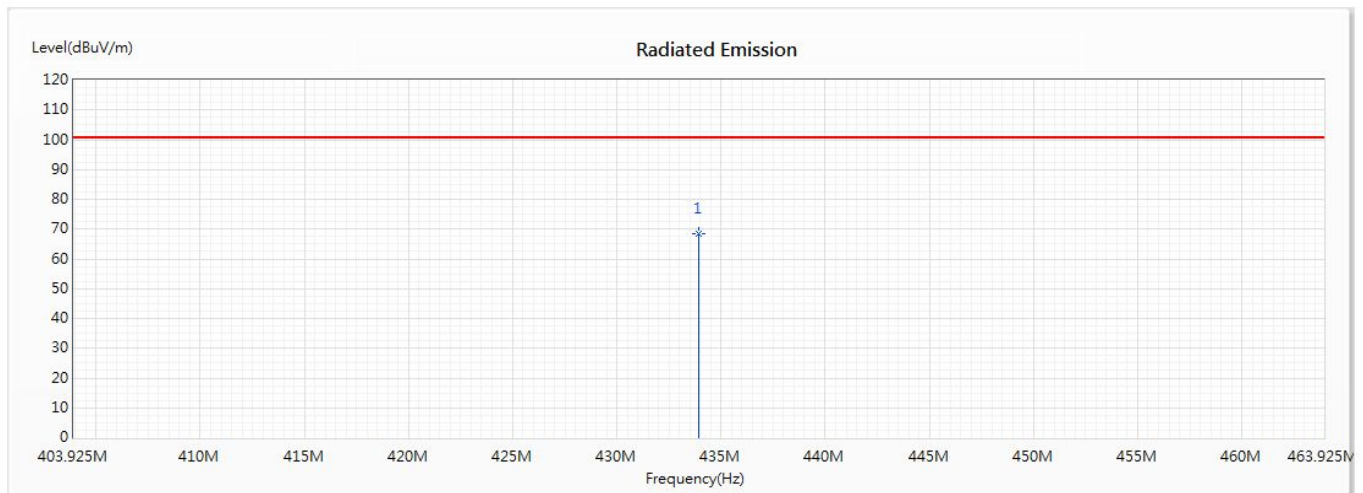
Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Average Measurement (dBμV/m)	Margin (dB)	Average Limit (dBμV/m)
433.925	88.20	-12.249	75.951	-4.869	80.820

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor
2. The Duty Cycle is refer to section 6.

Product	FCA WL/WS PASE System MY 2021
Test Item	Fundamental Radiated Emission
Test Mode	Mode 2: Transmit (FSK) (433.925MHz)
Date of Test	2020/05/13

Vertical_X-Axis



No	Frequency (MHz)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Reading Level (dBμV)	Correct Factor (dB/m)	Detector Type
* 1	433.925	68.40	100.82	-32.42	74.80	-6.40	PK

Note:

1. Emission Level = Reading Level + Correct Factor
2. Average Limit=20log(10996.88)=80.82 dBuV 、Peak Limit=100.82 dBuV

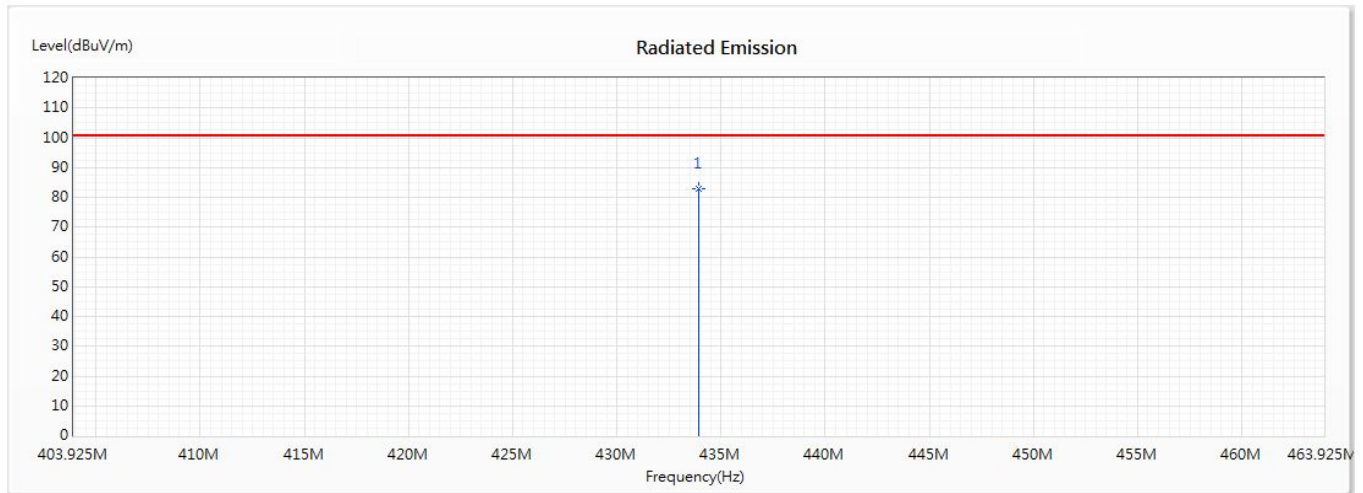
Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Average Measurement (dBμV/m)	Margin (dB)	Average Limit (dBμV/m)
433.925	68.40	-12.249	56.151	-24.669	80.820

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor
2. The Duty Cycle is refer to section 6.

Product	FCA WL/WS PASE System MY 2021
Test Item	Fundamental Radiated Emission
Test Mode	Mode 2: Transmit (FSK) (433.925MHz)
Date of Test	2020/05/13

Horizontal_Y-Axis



No	Frequency (MHz)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Reading Level (dBμV)	Correct Factor (dB/m)	Detector Type
* 1	433.925	82.70	100.82	-18.12	89.10	-6.40	PK

Note:

1. Emission Level = Reading Level + Correct Factor
2. Average Limit=20log(10996.88)=80.82 dBuV 、Peak Limit=100.82 dBuV

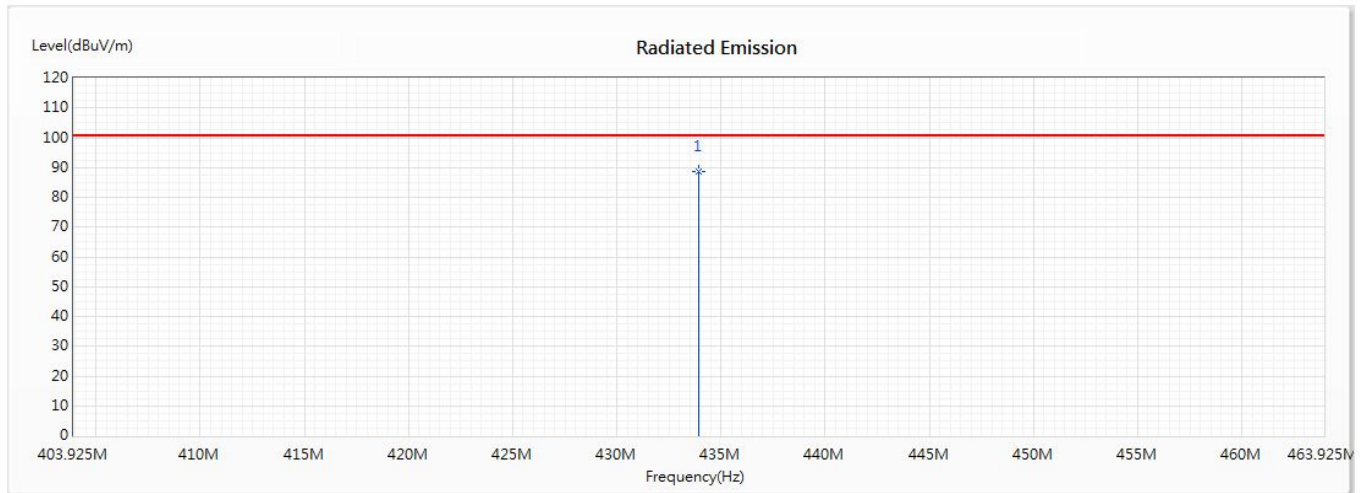
Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Average Measurement (dBμV/m)	Margin (dB)	Average Limit (dBμV/m)
433.925	82.70	-12.249	70.451	-10.369	80.820

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor
2. The Duty Cycle is refer to section 6.

Product	FCA WL/WS PASE System MY 2021
Test Item	Fundamental Radiated Emission
Test Mode	Mode 2: Transmit (FSK) (433.925MHz)
Date of Test	2020/05/13

Vertical_Y-Axis



No	Frequency (MHz)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Reading Level (dBμV)	Correct Factor (dB/m)	Detector Type
* 1	433.925	88.80	100.82	-12.02	95.20	-6.40	PK

Note:

1. Emission Level = Reading Level + Correct Factor
2. Average Limit=20log(10996.88)=80.82 dBuV 、Peak Limit=100.82 dBuV

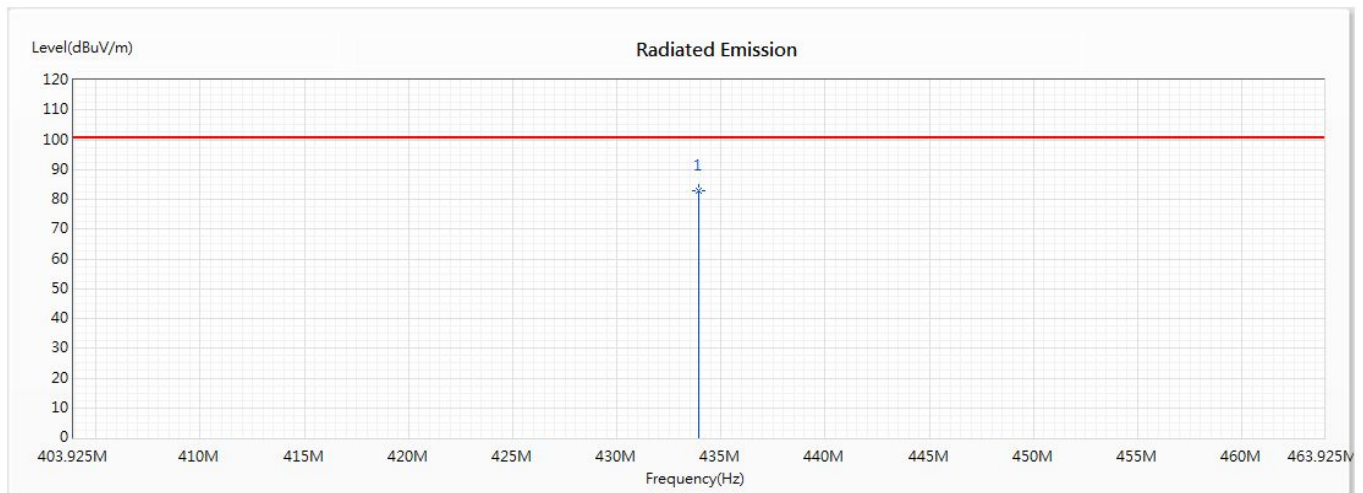
Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Average Measurement (dBμV/m)	Margin (dB)	Average Limit (dBμV/m)
433.925	88.80	-12.249	76.551	-4.269	80.820

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor
2. The Duty Cycle is refer to section 6.

Product	FCA WL/WS PASE System MY 2021
Test Item	Fundamental Radiated Emission
Test Mode	Mode 2: Transmit (FSK) (433.925MHz)
Date of Test	2020/05/13

Horizontal_Z-Axis



No	Frequency (MHz)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Reading Level (dBμV)	Correct Factor (dB/m)	Detector Type
* 1	433.925	82.80	100.82	-18.02	89.20	-6.40	PK

Note:

1. Emission Level = Reading Level + Correct Factor
2. Average Limit=20log(10996.88)=80.82 dBuV 、Peak Limit=100.82 dBuV

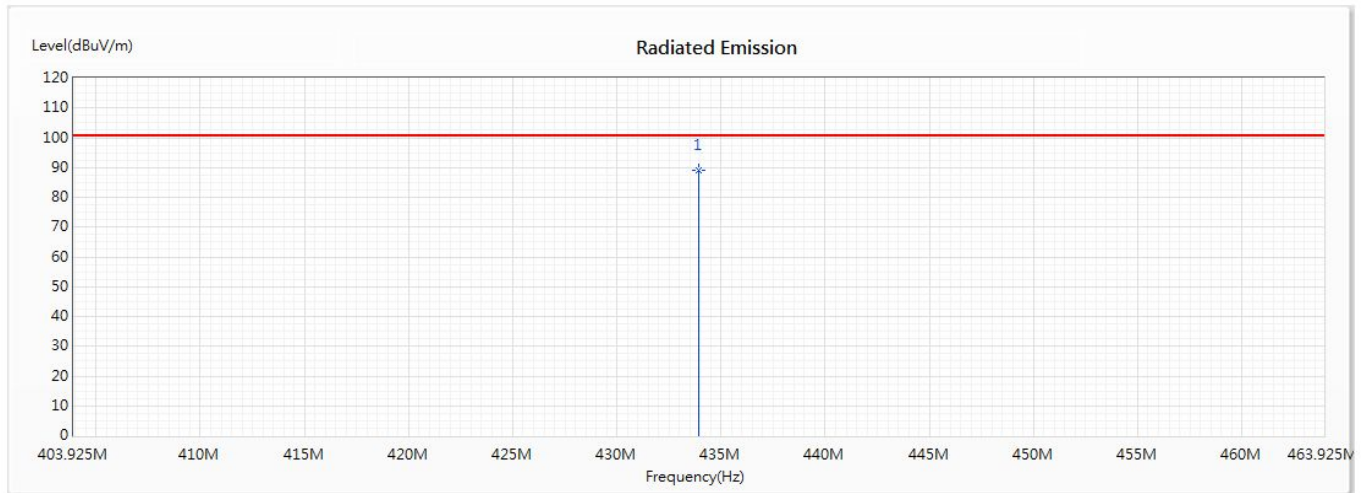
Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Average Measurement (dBμV/m)	Margin (dB)	Average Limit (dBμV/m)
433.925	82.80	-12.249	70.551	-10.269	80.820

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor
2. The Duty Cycle is refer to section 6.

Product	FCA WL/WS PASE System MY 2021
Test Item	Fundamental Radiated Emission
Test Mode	Mode 2: Transmit (FSK) (433.925MHz)
Date of Test	2020/05/13

Vertical_Z-Axis



No	Frequency (MHz)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Reading Level (dBμV)	Correct Factor (dB/m)	Detector Type
* 1	433.925	88.90	100.82	-11.92	95.30	-6.40	PK

Note:

1. Emission Level = Reading Level + Correct Factor
2. Average Limit=20log(10996.88)=80.82 dBuV 、Peak Limit=100.82 dBuV

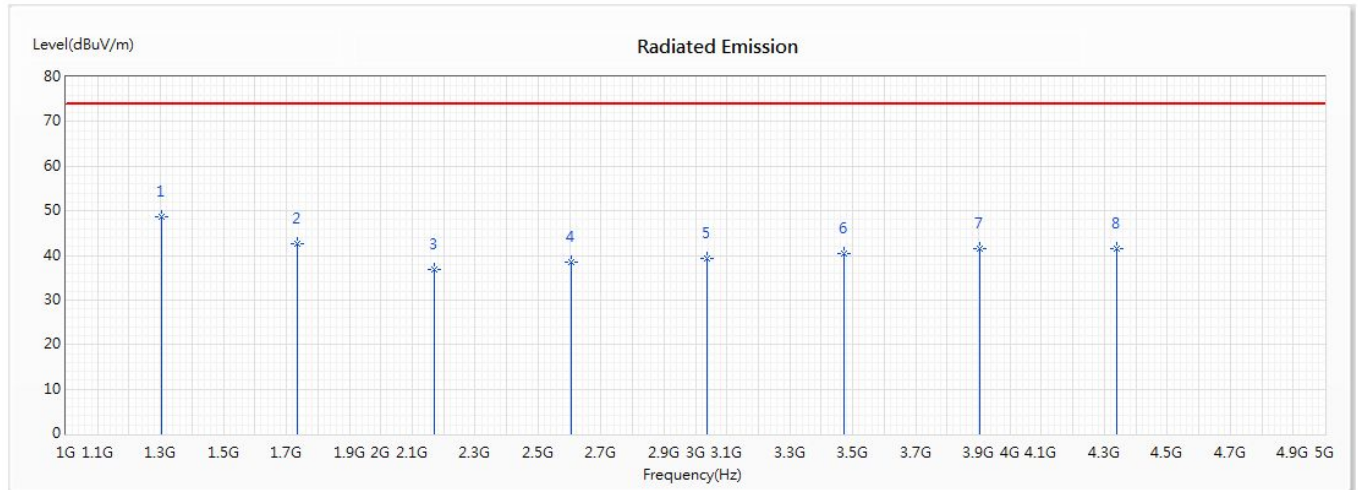
Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Average Measurement (dBμV/m)	Margin (dB)	Average Limit (dBμV/m)
433.925	88.90	-12.249	76.651	-4.169	80.820

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor
2. The Duty Cycle is refer to section 6.

Product	FCA WL/WS PASE System MY 2021
Test Item	Harmonic Radiated Emission
Test Mode	Mode 1: Transmit (ASK) (433.925MHz)
Date of Test	2020/05/14

Horizontal



No	Frequency (MHz)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Reading Level (dB μ V)	Correct Factor (dB/m)	Detector Type
* 1	1301.77	48.78	74.00	-25.22	59.08	-10.30	PK
2	1735.7	42.52	74.00	-31.48	51.39	-8.87	PK
3	2169.62	36.88	74.00	-37.12	44.07	-7.19	PK
4	2603.55	38.42	74.00	-35.58	44.17	-5.75	PK
5	3037.47	39.42	74.00	-34.58	44.68	-5.26	PK
6	3471.4	40.38	74.00	-33.62	45.57	-5.19	PK
7	3905.32	41.58	74.00	-32.42	45.84	-4.26	PK
8	4339.25	41.53	74.00	-32.47	45.28	-3.75	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Measurement Level = Reading Level + Correct Factor.
4. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
5. The average measurement was not performed when the peak measured data under the limit of average detection.
6. The emission levels of other frequencies are very lower than the limit and not show in test report.

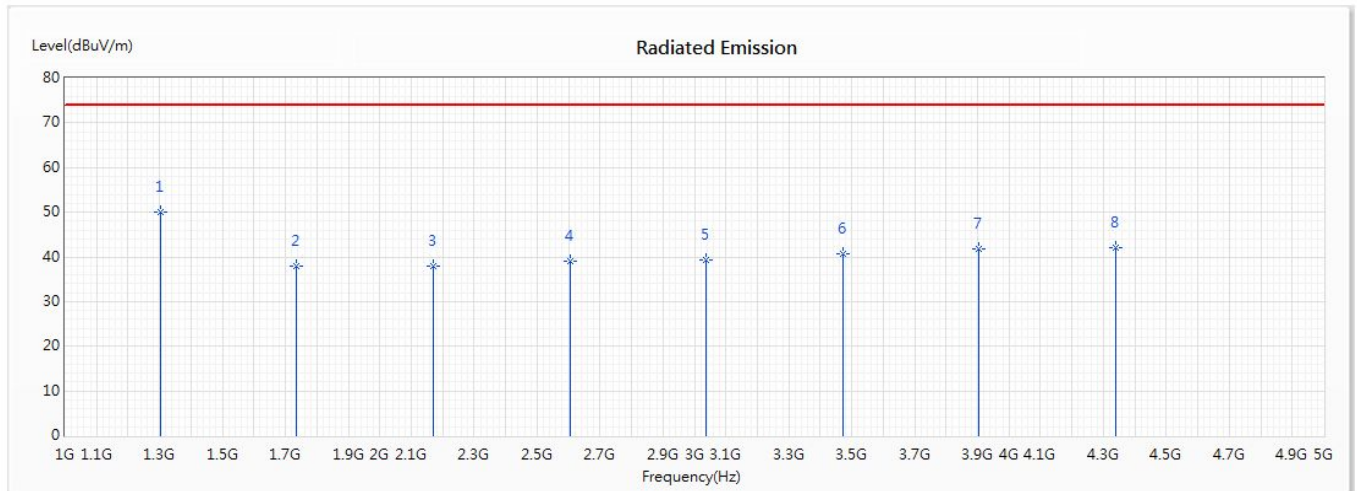
Frequency (MHz)	Peak Measurement (dB μ V/m)	Duty Cycle Factor (dB)	Average Measurement (dB μ V/m)	Margin (dB)	Average Limit (dB μ V/m)
--	--	--	--	--	54.00

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor
2. The Duty Cycle is refer to section 6.

Product	FCA WL/WS PASE System MY 2021
Test Item	Harmonic Radiated Emission
Test Mode	Mode 1: Transmit (ASK) (433.925MHz)
Date of Test	2017/05/23

Vertical



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	1301.77	50.05	74.00	-23.95	60.35	-10.30	PK
2	1735.7	37.86	74.00	-36.14	46.73	-8.87	PK
3	2169.62	37.96	74.00	-36.04	45.15	-7.19	PK
4	2603.55	38.99	74.00	-35.01	44.74	-5.75	PK
5	3037.47	39.44	74.00	-34.56	44.70	-5.26	PK
6	3471.4	40.62	74.00	-33.38	45.81	-5.19	PK
7	3905.32	41.72	74.00	-32.28	45.98	-4.26	PK
8	4339.25	41.99	74.00	-32.01	45.74	-3.75	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Measurement Level = Reading Level + Correct Factor.
4. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
5. The average measurement was not performed when the peak measured data under the limit of average detection.
6. The emission levels of other frequencies are very lower than the limit and not show in test report.

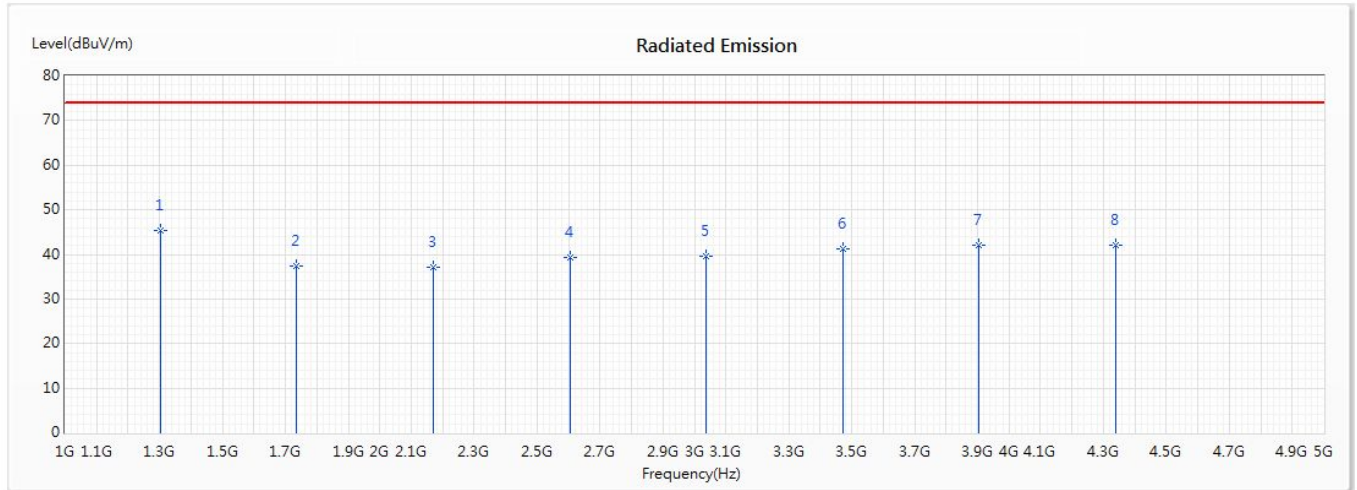
Frequency (MHz)	Peak Measurement (dBuV/m)	Duty Cycle Factor (dB)	Average Measurement (dBuV/m)	Margin (dB)	Average Limit (dBuV/m)
--	--	--	--	--	54.00

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor
2. The Duty Cycle is refer to section 6.

Product	FCA WL/WS PASE System MY 2021
Test Item	Harmonic Radiated Emission
Test Mode	Mode 2: Transmit (FSK) (433.925MHz)
Date of Test	2020/05/14

Horizontal



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	1301.77	45.40	74.00	-28.60	55.70	-10.30	PK
2	1735.7	37.38	74.00	-36.62	46.25	-8.87	PK
3	2169.62	37.22	74.00	-36.78	44.41	-7.19	PK
4	2603.55	39.24	74.00	-34.76	44.99	-5.75	PK
5	3037.47	39.65	74.00	-34.35	44.91	-5.26	PK
6	3471.4	41.32	74.00	-32.68	46.51	-5.19	PK
7	3905.32	42.18	74.00	-31.82	46.44	-4.26	PK
8	4339.25	42.08	74.00	-31.92	45.83	-3.75	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Measurement Level = Reading Level + Correct Factor.
4. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
5. The average measurement was not performed when the peak measured data under the limit of average detection.
6. The emission levels of other frequencies are very lower than the limit and not show in test report.

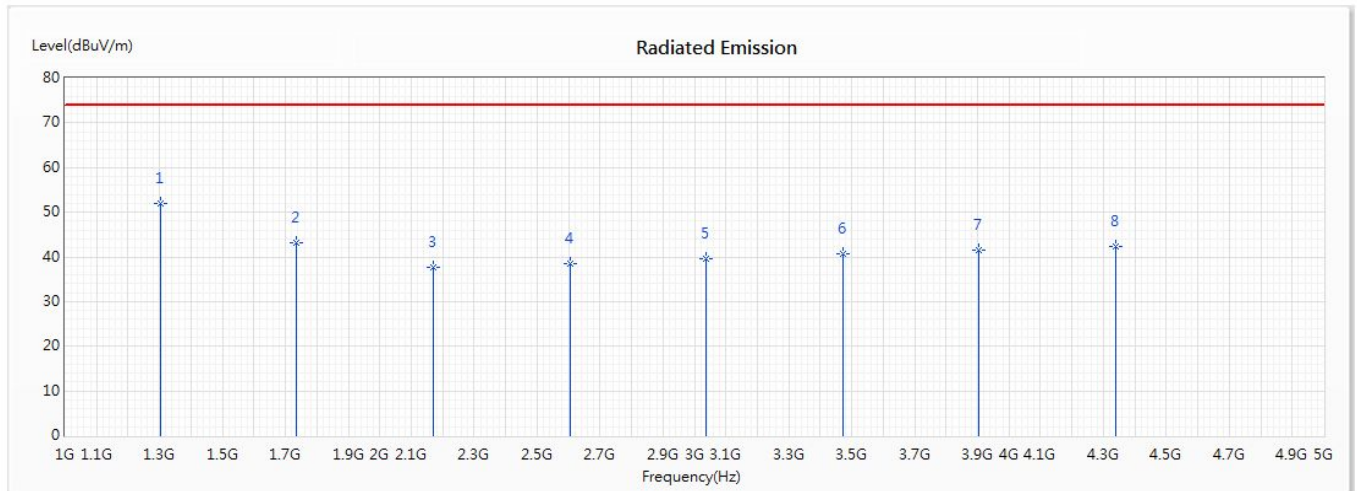
Frequency (MHz)	Peak Measurement (dBuV/m)	Duty Cycle Factor (dB)	Average Measurement (dBuV/m)	Margin (dB)	Average Limit (dBuV/m)
--	--	--	--	--	54.00

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor
2. The Duty Cycle is refer to section 6.

Product	FCA WL/WS PASE System MY 2021
Test Item	Harmonic Radiated Emission
Test Mode	Mode 2: Transmit (FSK) (433.925MHz)
Date of Test	2017/05/23

Vertical



No	Frequency (MHz)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Reading Level (dBμV)	Correct Factor (dB/m)	Detector Type
* 1	1301.77	51.93	74.00	-22.07	62.23	-10.30	PK
2	1735.7	43.13	74.00	-30.87	52.00	-8.87	PK
3	2169.62	37.56	74.00	-36.44	44.75	-7.19	PK
4	2603.55	38.45	74.00	-35.55	44.20	-5.75	PK
5	3037.47	39.49	74.00	-34.51	44.75	-5.26	PK
6	3471.4	40.79	74.00	-33.21	45.98	-5.19	PK
7	3905.32	41.56	74.00	-32.44	45.82	-4.26	PK
8	4339.25	42.45	74.00	-31.55	46.20	-3.75	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Measurement Level = Reading Level + Correct Factor.
4. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
5. The average measurement was not performed when the peak measured data under the limit of average detection.
6. The emission levels of other frequencies are very lower than the limit and not show in test report.

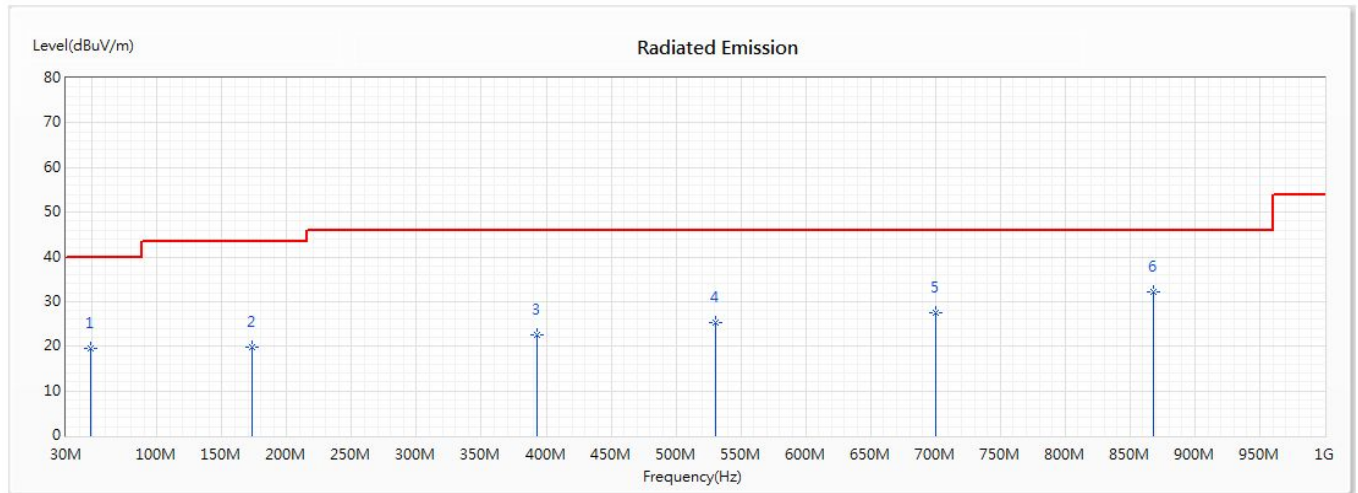
Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Average Measurement (dBμV/m)	Margin (dB)	Average Limit (dBμV/m)
--	--	--	--	--	54.00

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor
2. The Duty Cycle is refer to section 6.

Product	FCA WL/WS PASE System MY 2021
Test Item	General Radiated Emission
Test Mode	Mode 1: Transmit (ASK) (433.925MHz)
Date of Test	2020/05/13

Horizontal



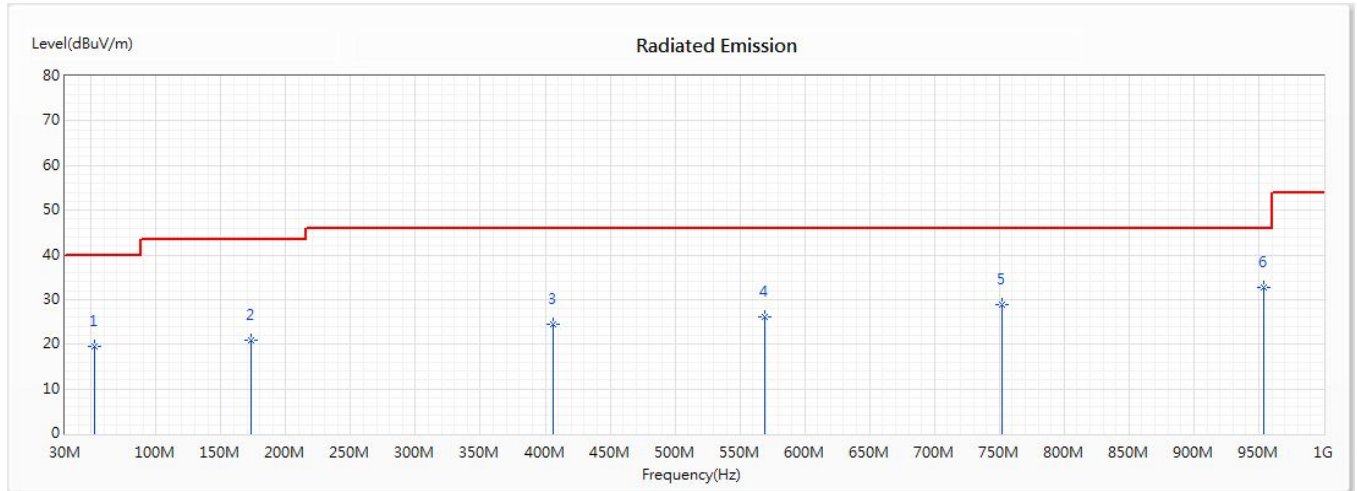
No	Frequency (MHz)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Reading Level (dB μ V)	Correct Factor (dB/m)	Detector Type
1	48.43	19.47	40.00	-20.53	29.69	-10.22	QP
2	173.56	19.69	43.50	-23.81	30.45	-10.76	QP
3	392.78	22.46	46.00	-23.54	29.57	-7.11	QP
4	530.52	25.16	46.00	-20.84	29.71	-4.55	QP
5	700.27	27.44	46.00	-18.56	29.20	-1.76	QP
* 6	868.08	32.16	46.00	-13.84	32.12	0.04	QP

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.

Product	FCA WL/WS PASE System MY 2021
Test Item	General Radiated Emission
Test Mode	Mode 1: Transmit (ASK) (433.925MHz)
Date of Test	2020/05/13

Vertical



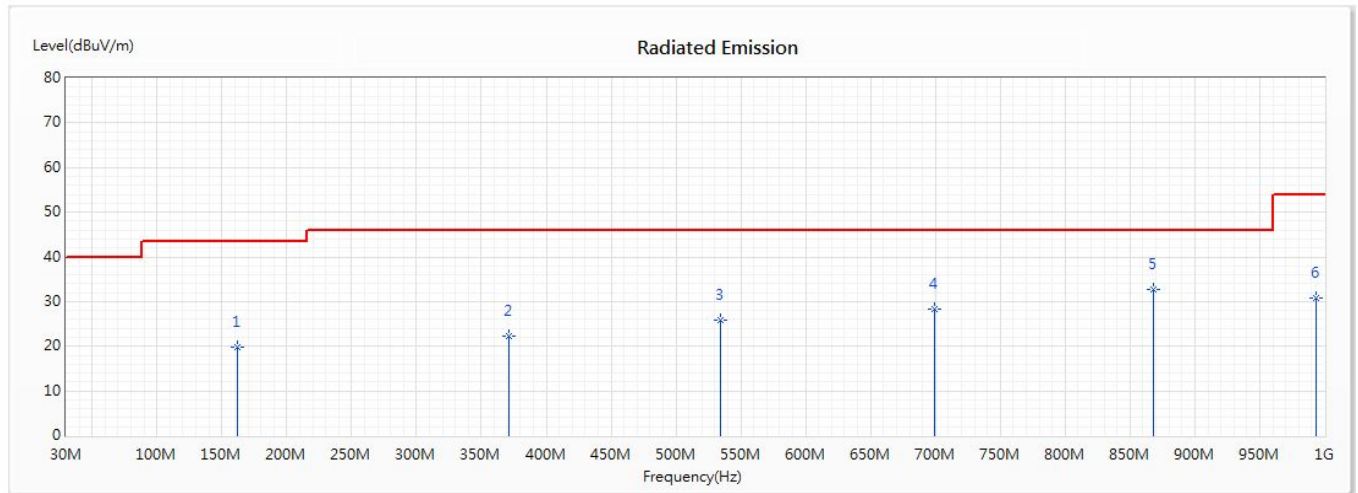
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	52.31	19.56	40.00	-20.44	29.88	-10.32	QP
2	173.56	20.79	43.50	-22.71	31.55	-10.76	QP
3	406.36	24.48	46.00	-21.52	31.41	-6.93	QP
4	569.32	26.17	46.00	-19.83	29.96	-3.79	QP
5	751.68	28.98	46.00	-17.02	30.08	-1.10	QP
* 6	953.44	32.67	46.00	-13.33	31.42	1.25	QP

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.

Product	FCA WL/WS PASE System MY 2021
Test Item	General Radiated Emission
Test Mode	Mode 2: Transmit (FSK) (433.925MHz)
Date of Test	2020/05/13

Horizontal



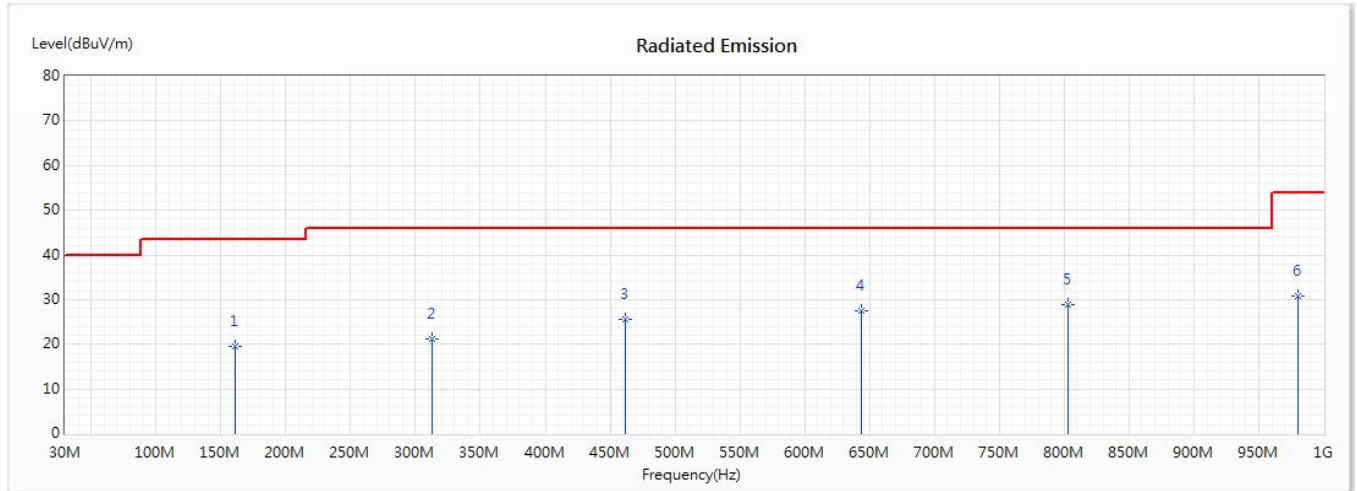
No	Frequency (MHz)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Reading Level (dBμV)	Correct Factor (dB/m)	Detector Type
1	161.92	19.70	43.50	-23.80	29.96	-10.26	QP
2	371.44	22.17	46.00	-23.83	29.94	-7.77	QP
3	534.4	25.72	46.00	-20.28	30.18	-4.46	QP
4	699.3	28.36	46.00	-17.64	30.16	-1.80	QP
* 5	868.08	32.64	46.00	-13.36	32.60	0.04	QP
6	993.21	30.69	54.00	-23.31	29.19	1.50	QP

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.

Product	FCA WL/WS PASE System MY 2021
Test Item	General Radiated Emission
Test Mode	Mode 2: Transmit (FSK) (433.925MHz)
Date of Test	2020/05/13

Vertical



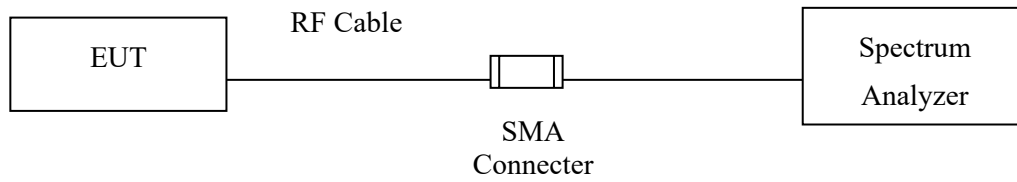
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	160.95	19.46	43.50	-24.04	29.74	-10.28	QP
2	313.24	21.22	46.00	-24.78	30.47	-9.25	QP
3	461.65	25.47	46.00	-20.53	31.19	-5.72	QP
4	644.01	27.42	46.00	-18.58	30.01	-2.59	QP
* 5	803.09	29.00	46.00	-17.00	29.58	-0.58	QP
6	980.6	30.88	54.00	-23.12	29.13	1.75	QP

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.

4. Transmit time

4.1. Test Setup



4.2. Limits

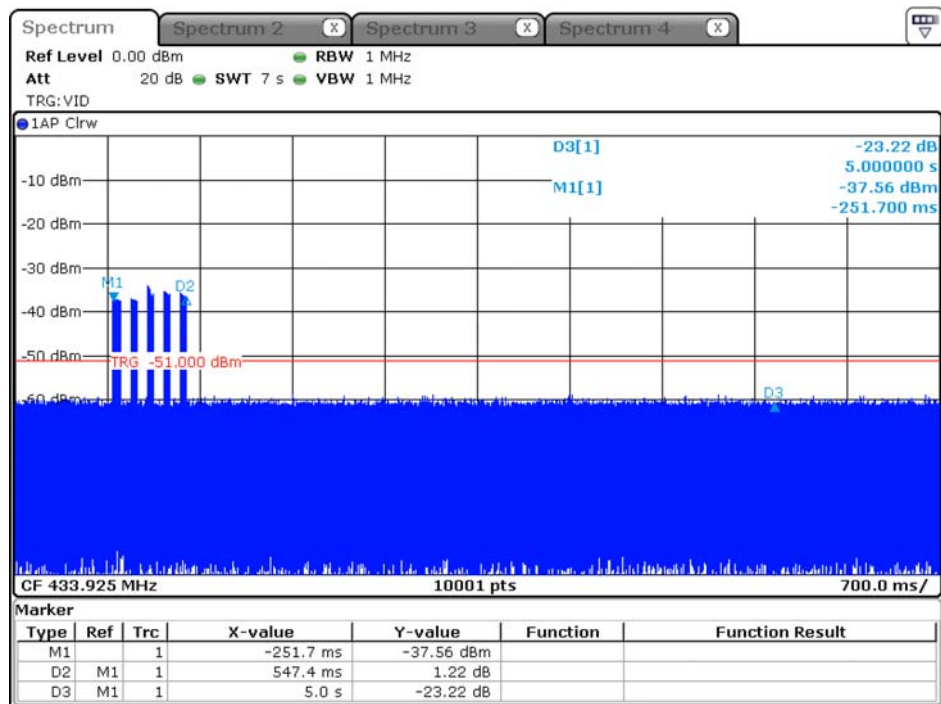
A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

A transmitter activated automatically shall cease transmission within 5 seconds after activation.

4.3. Test Result

Product FCA WL/WS PASE System MY 2021
 Test Item Transmit time
 Test Mode Mode 3: Normal Mode (433.925MHz)

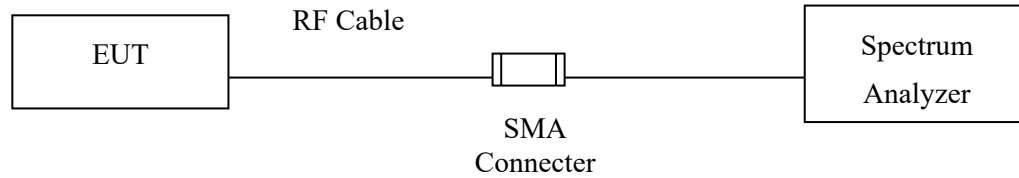
Channel No.	Frequency (MHz)	Measurement Value (Sec)	Limit (Sec)	Result
01	433.925	0.5474	< 5	Pass



Date: 16.SEP.2020 17:49:43

5. Occupied Bandwidth

5.1. Test Setup



5.2. Limits

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70MHz and below 900MHz. For devices operating above 900MHz, 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

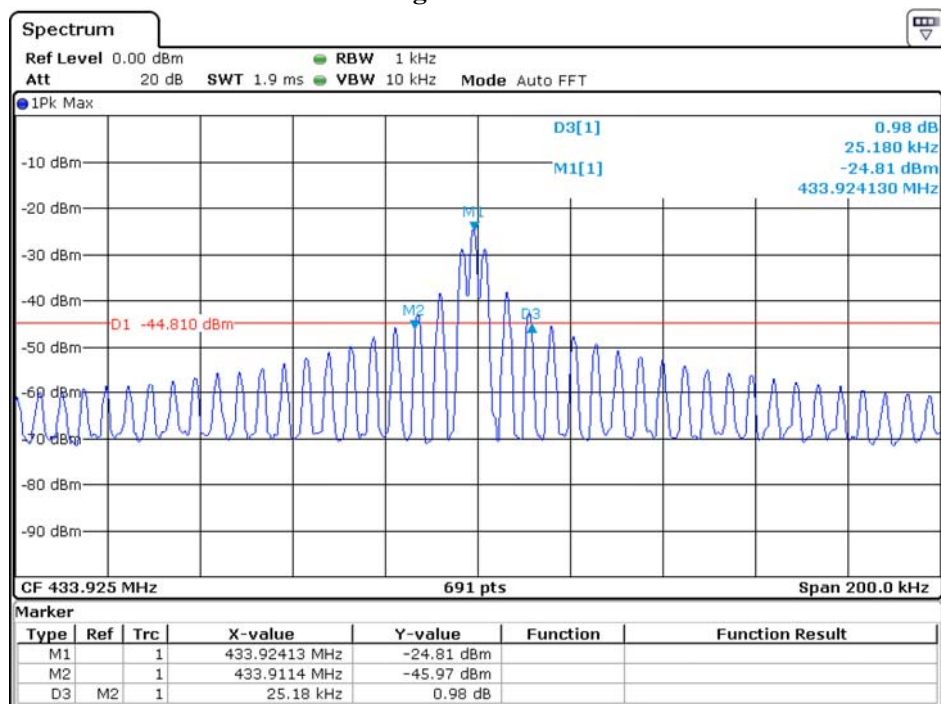
5.3. Test Result

Product FCA WL/WS PASE System MY 2021
 Test Item Occupied Bandwidth
 Test Mode Mode 1: Transmit (ASK) (433.925MHz)

Channel No.	Frequency (MHz)	Measurement Value (MHz)	Limit (MHz)	Result
01	433.925	0.0251	1.0848	Pass

Note: Limit = 433.925MHz * 0.25% = 1.0848MHz

Figure Channel 01:



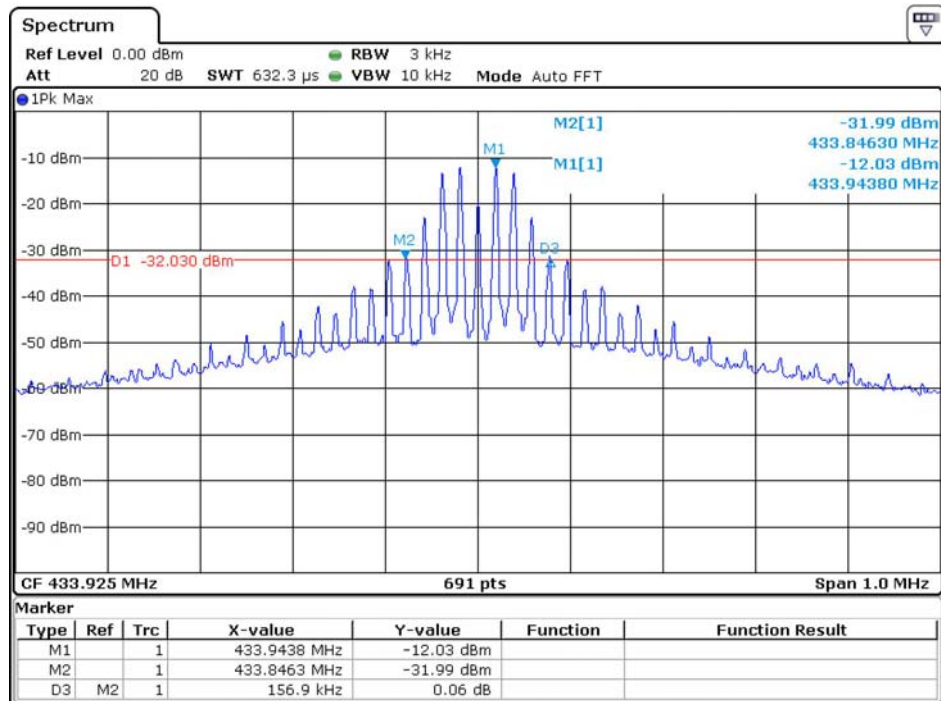
Date: 23.OCT.2020 06:11:26

Product FCA WL/WS PASE System MY 2021
 Test Item Occupied Bandwidth
 Test Mode Mode 2: Transmit (FSK) (433.925MHz)

Channel No.	Frequency (MHz)	Measurement Value (MHz)	Limit (MHz)	Result
01	433.925	0.1569	1.0848	Pass

Note: Limit = 433.925MHz * 0.25% = 1.0848MHz

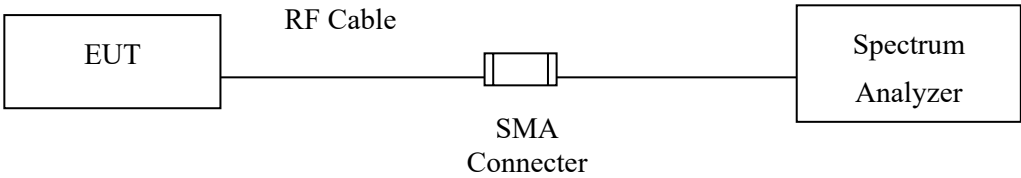
Figure Channel 01:



Date: 23.OCT.2020 06:21:47

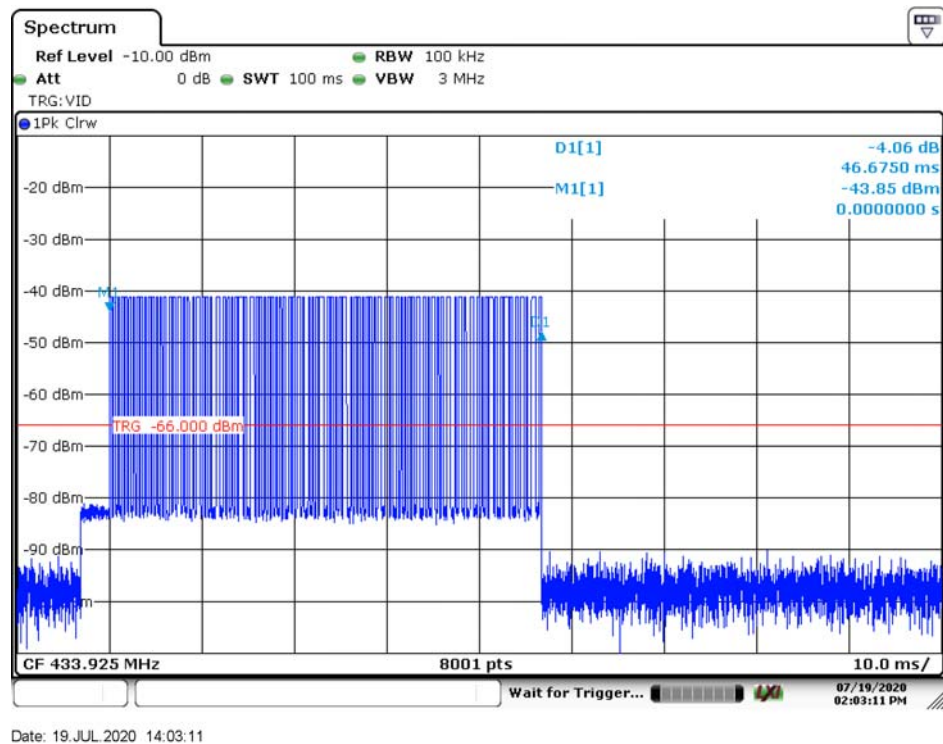
6. Duty Cycle

6.1. Test Setup



6.2. Test Result of Duty Cycle

Product : FCA WL/WS PASE System MY 2021
 Test Item : Duty Cycle Data
 Test Mode : Mode 3: Normal Mode



Bins Size = Sweep time / Sweep points

Time on of 100ms = Bins Size * total transmitter bins

Time on of 100ms = (100ms/8001points) * 1953(bins) = 24.41ms

Time on of 100ms= 24.41ms

Duty Cycle=24.41ms / 100ms= 0.2441

Duty Cycle correction factor= 20 LOG 0.2441= -12.249 dB

Duty Cycle correction factor	-12.249dB
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