

# FCC Test Report

Product Name	V2X DSRC Module
Model No	VTX-301
FCC ID	NUK-VTX3012

Applicant	Unex Technology Corporation
Address	7F-2, No. 100, Sec. 1, Jiafeng 11th Rd., Zhubei City, Hsinchu County 30273, Taiwan, R.O.C.

Date of Receipt	Feb. 05, 2020
Issued Date	Apr. 09, 2020
Report No.	2020046R-E3032110123
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: Apr. 09, 2020

Report No.: 2020046R-E3032110123



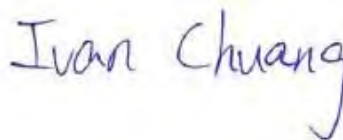
Product Name	V2X DSRC Module
Applicant	Unex Technology Corporation
Address	7F-2, No. 100, Sec. 1, Jiafeng 11th Rd., Zhubei City, Hsinchu County 30273, Taiwan, R.O.C.
Manufacturer	Unex Technology Corporation
Model No.	VTX-301
FCC ID.	NUK-VTX3012
EUT Rated Voltage	DC 5V
EUT Test Voltage	DC 5V by Test Fixture
Trade Name	Unex
Applicable Standard	FCC CFR Title 47 Part 15 Subpart E ANSI C63.4: 2014, ANSI C63.10: 2013 KDB Publication 789033
Test Result	Complied

Documented By :



( Senior Adm. Specialist / Jinn Chen )

Tested By :



( Senior Engineer / Ivan Chuang )

Approved By :



( Director / Vincent Lin )

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## 1. GENERAL INFORMATION

### 1.1. EUT Description

Product Name	V2X DSRC Module
Trade Name	Unex
FCC ID.	NUK-VTX3012
Model No.	VTX-301
Frequency Range	5745-5825MHz
Number of Channels	10MHz Bandwidth:9CH
Data Rate	6 Mbps
Channel Control	Auto
Type of Modulation	OFDM
Antenna type	OMNI Antenna
Antenna Gain	Refer to the table "Antenna List"

#### Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain with Antenna cable loss
1	Unex Technology Corporation	EX-30	OMNI Antenna	3.73dBi

Note:

1. The antenna of EUT is conforming to FCC 15.203.
2. Antenna cable loss is 1.4dBi

Center Working Frequency of Each Channel: (10MHz Bandwidth)

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 149:	5745 MHz	Channel 151:	5755 MHz	Channel 153:	5765 MHz	Channel 155:	5775 MHz
Channel 157:	5785 MHz	Channel 159:	5795 MHz	Channel 161:	5805 MHz	Channel 163:	5815 MHz
Channel 165:	5825 MHz						

Note:

1. This device is a V2X DSRC Module with a built-in 5GHz wireless transceiver.
2. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
3. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance of transmitter with Part 15 Subpart E for Unlicensed National Information Infrastructure devices.

Test Mode	Mode 1: Transmit (10MHz Bandwidth)
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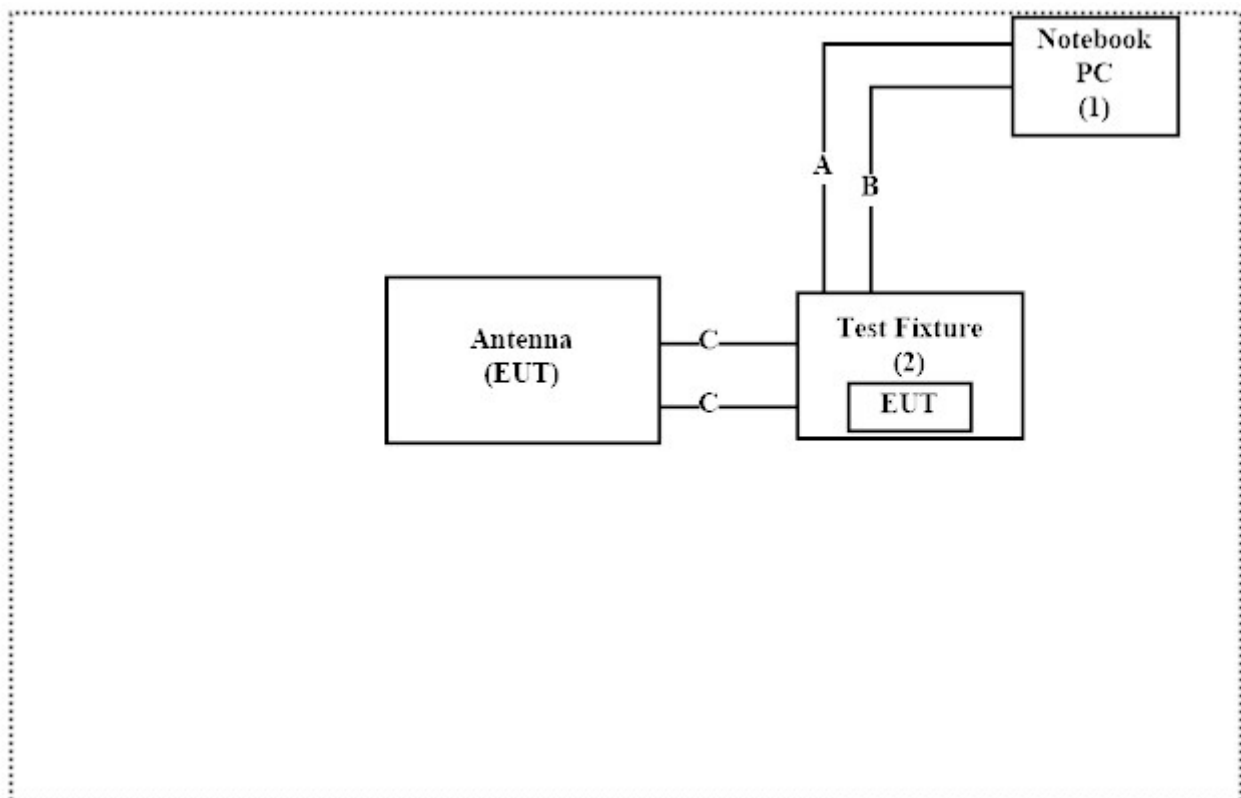
### 1.3. Tested System Details

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   Notebook PC	DELL	P62G	CY9FJC2	N/A
2   Test Fixture	Unex	N/A	N/A	N/A

Signal Cable Type	Signal cable Description
A   USB Cable	Non-shielded, 0.8m
B   USB Cable	Shielded, 0.9m
C   Antenna Cable	Non-shielded, 0.2m, two PCS.

### 1.4. Configuration of tested System



### 1.5. EUT Exercise Software

1. Setup the EUT as shown in Section 1.4.
2. Execute software “PuTTY V0.63” on the Notebook PC.
3. Configure the test mode, the test channel, and the data rate.
4. Press “OK” to start the continuous Transmit.
5. Verify that the EUT works properly.

## 1.6. Test Facility

Ambient conditions in the laboratory:

Performed Item	Items	Required	Actual
Conducted Emission	Temperature (°C)	10~40 °C	23.5°C
	Humidity (%RH)	10~90 %	53.5%
Radiated Emission	Temperature (°C)	10~40 °C	22.8°C
	Humidity (%RH)	10~90 %	61.2%
Conductive	Temperature (°C)	10~40 °C	22°C
	Humidity (%RH)	10~90 %	55%

**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](mailto:info.tw@dekra.com)  
Website : <http://www.dekra.com.tw>



## 1.7. List of Test Equipment

### For Conduction measurements /ASR1

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	EMI Test Receiver	R&S	ESR7	101601	2019.05.13	2020.05.12
X	Two-Line V-Network	R&S	ENV216	101306	2020.03.25	2021.03.24
X	Two-Line V-Network	R&S	ENV216	101307	2019.04.03	2020.04.02
X	Coaxial Cable	Quietek	RG400_BNC	RF001	2019.05.24	2020.05.23

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 V1.1

### For Conducted measurements /ASR2

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	Spectrum Analyzer	R&S	FSV40	101149	2019.12.16	2020.12.15
X	Peak Power Analyzer	KEYSIGHT	8900B	MY51000539	2019.05.06	2020.05.05
X	Power Sensor	KEYSIGHT	N1923A	MY59240002	2019.06.12	2020.06.11
X	Power Sensor	KEYSIGHT	N1923A	MY59240003	2019.06.13	2020.06.12

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	9168-675	2019.07.01	2020.06.30
X	Horn Antenna	ETS-Lindgren	3117	00203761	2019.10.31	2020.10.30
X	Horn Antenna	Com-Power	AH-840	101087	2019.05.30	2020.05.29
X	Pre-Amplifier	EMCI	EMC001330	980301	2019.05.20	2020.05.19
X	Pre-Amplifier	EMCI	EMC051835SE	980312	2019.06.03	2020.06.02
X	Pre-Amplifier	EMCI	EMC05820SE	980308	2019.09.02	2020.09.01
X	Pre-Amplifier	EMCI	EMC184045SE	980314	2019.05.28	2020.05.27
	Filter	MICRO TRONICS	BRM50702	G251	2019.09.03	2020.09.02
X	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	2020.03.16	2021.03.15
X	Coaxial Cable	SUHNER	SUCOFLEX 106	RF002	2019.07.03	2020.07.02
X	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 V1.1

## 1.8. Uncertainty

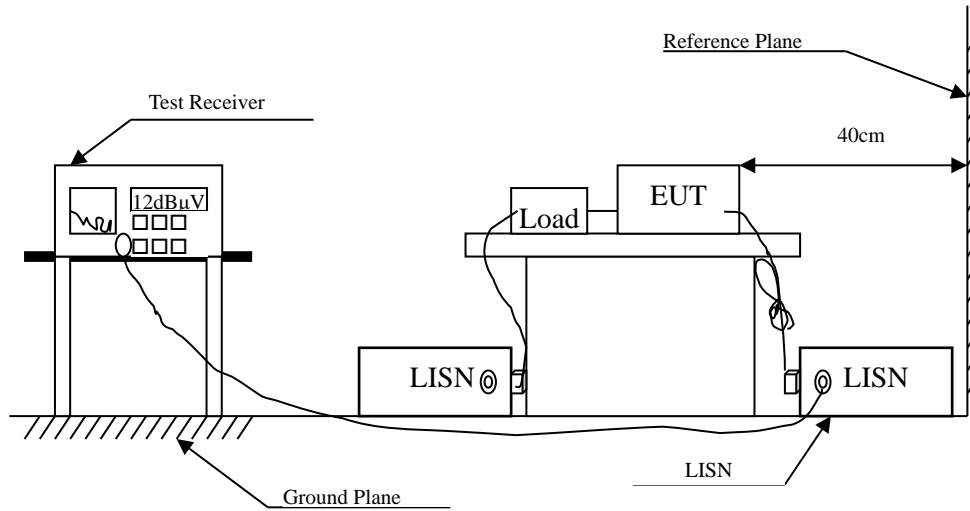
Uncertainties have been calculated according to the DEKRA internal document, and is described in each test chapter of this report.

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 $\mu$ V) Limit		
Frequency MHz	Limits	
	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 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.

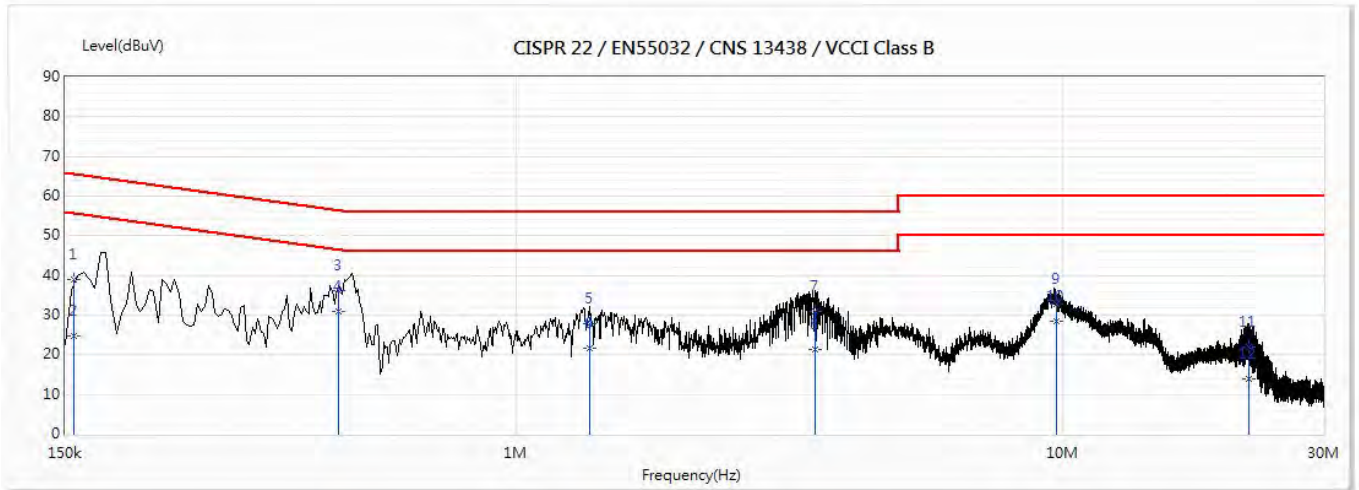
Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

### **2.4. Uncertainty**

±2.35dB

## 2.5. Test Result of Conducted Emission

Product : V2X DSRC Module  
 Test Item : Conducted Emission Test  
 Power Line : L 1  
 Test Mode : Mode 1: Transmit (10MHz Bandwidth) (5745MHz) \_ Chain 1  
 Test Date : 2020/03/27

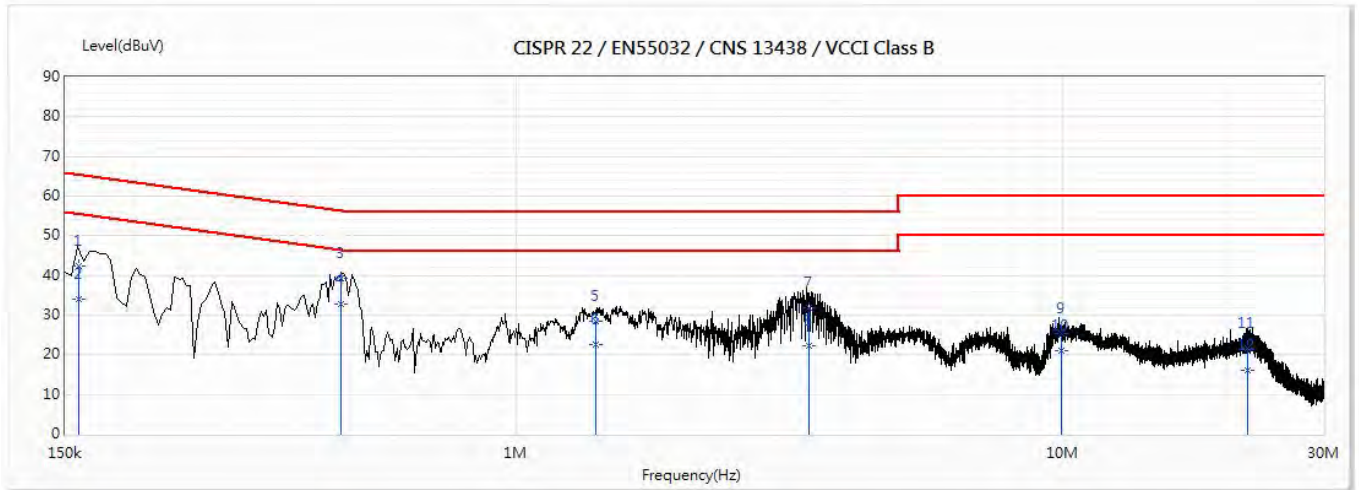


No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	0.156	39.02	65.68	-26.66	29.38	9.64	QP
2	0.156	24.89	55.68	-30.80	15.25	9.64	AV
3	0.474	36.13	56.45	-20.32	26.48	9.65	QP
*4	0.474	30.84	46.45	-15.60	21.19	9.65	AV
5	1.364	27.76	56.00	-28.24	18.08	9.68	QP
6	1.364	21.76	46.00	-24.24	12.08	9.68	AV
7	3.519	30.96	56.00	-25.04	21.22	9.75	QP
8	3.519	21.40	46.00	-24.60	11.66	9.75	AV
9	9.735	32.83	60.00	-27.17	22.96	9.88	QP
10	9.735	28.31	50.00	-21.69	18.43	9.88	AV
11	21.912	21.84	60.00	-38.16	11.88	9.96	QP
12	21.912	13.77	50.00	-36.23	3.80	9.96	AV

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. “ \* “ means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : V2X DSRC Module  
 Test Item : Conducted Emission Test  
 Power Line : N  
 Test Mode : Mode 1: Transmit (10MHz Bandwidth) (5745MHz) \_ Chain 1  
 Test Date : 2020/03/27



No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	0.159	42.39	65.54	-23.15	32.74	9.65	QP
2	0.159	33.89	55.54	-21.65	24.24	9.65	AV
3	0.479	39.24	56.36	-17.12	29.58	9.66	QP
*4	0.479	32.78	46.36	-13.58	23.12	9.66	AV
5	1.397	28.40	56.00	-27.60	18.71	9.69	QP
6	1.397	22.59	46.00	-23.41	12.90	9.69	AV
7	3.438	31.98	56.00	-24.02	22.23	9.75	QP
8	3.438	22.41	46.00	-23.59	12.65	9.75	AV
9	9.951	25.31	60.00	-34.69	15.41	9.90	QP
10	9.951	20.96	50.00	-29.04	11.06	9.90	AV
11	21.785	21.58	60.00	-38.42	11.52	10.06	QP
12	21.785	16.05	50.00	-33.95	5.99	10.06	AV

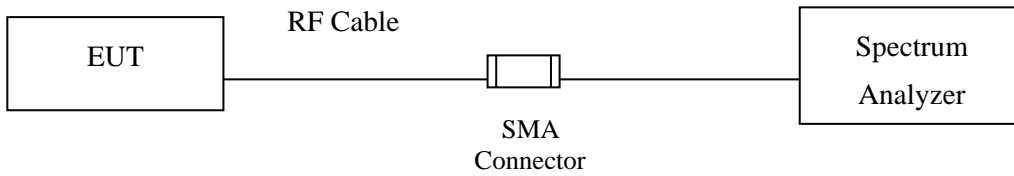
Note:

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

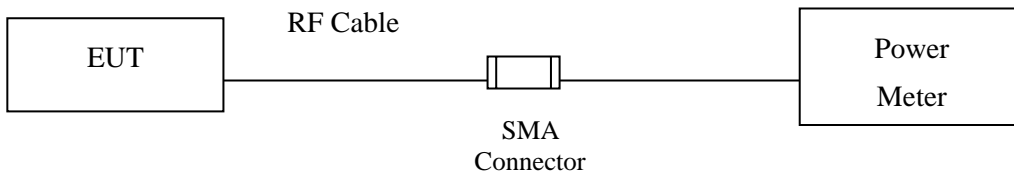
### 3. Maximun conducted output power

#### 3.1. Test Setup

##### Occupied Bandwidth



##### Conduction Power Measurement



### 3.2. Limits

For the band 5.15-5.25 GHz,

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W, provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, if transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, if transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , where B is the 26dB emission bandwidth in megahertz. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.



For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, if transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point UNII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple colocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

### **3.3. Test Procedure**

As an alternative to FCC KDB-789033, the EUT maximum conducted output power was measured with an average power meter employing a video bandwidth greater than the 6dB BW of the emission under test. Maximum conducted output power was read directly from the meter across all data rates, and across three channels within each sub-band. Special care was used to make sure that the EUT was transmitting in continuous mode. This method exceeds the limitations of FCC KDB-789033, and provides more accurate measurements.

### **3.4. Uncertainty**

±0.95dB

### 3.5. Test Result of Maximum conducted output power

Product : V2X DSRC Module  
 Test Item : Maximum conducted output power  
 Test Mode : Mode 1: Transmit (10MHz Bandwidth)  
 Test Date : 2020/03/13

#### Chain 0

Cable loss=1dB		Maximum conducted output power
Channel No.	Frequency (MHz)	Data Rate (Mbps)
		6
		Measurement Level (dBm)
149	5745	19.87
157	5785	19.91
165	5825	19.95

Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

#### Maximum conducted output power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit	
				(dBm)	dBm+10log(BW)
149	5745	--	19.87	30	--
157	5785	--	19.91	30	--
165	5825	--	19.95	30	--

#### Chain 1

Cable loss=1dB		Maximum conducted output power
Channel No.	Frequency (MHz)	Data Rate (Mbps)
		6
		Measurement Level (dBm)
149	5745	19.98
157	5785	19.96
165	5825	19.97

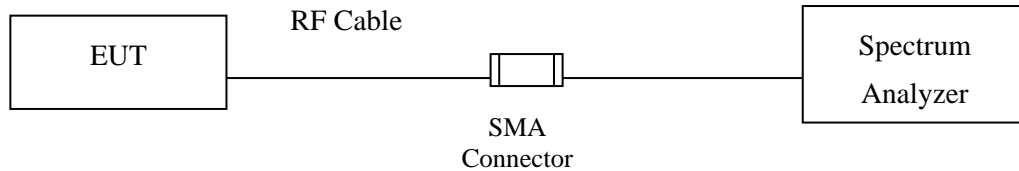
Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

#### Maximum conducted output power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit	
				(dBm)	dBm+10log(BW)
149	5745	--	19.98	30	--
157	5785	--	19.96	30	--
165	5825	--	19.97	30	--

## 4. Peak Power Spectral Density

### 4.1. Test Setup



### 4.2. Limits

For the band 5.15-5.25 GHz,

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.+

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point UNII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

#### **4.3. Test Procedure**

The EUT was setup to ANSI C63.10, 2013; tested to UNII test procedure of FCC KDB-789033 for compliance to FCC 47CFR Subpart E requirements.

The Peak Power Spectral Density using KDB 789033 section F) procedure, Create an average power spectrum for the EUT operating mode being tested by following the instructions in section E)2) for measuring maximum conducted output power using a spectrum analyzer.

SA-1 method is selected to run the test.

For the band 5.725-5.85 GHz, Scale the observed power level to an equivalent value in 500 kHz by adjusting (increase) the measured power by a bandwidth correction factor (BWCF) where  $BWCF = 10\log(500\text{ kHz}/100\text{ kHz}) = 6.98\text{ dB}$ .

#### **4.4. Uncertainty**

±1.30dB

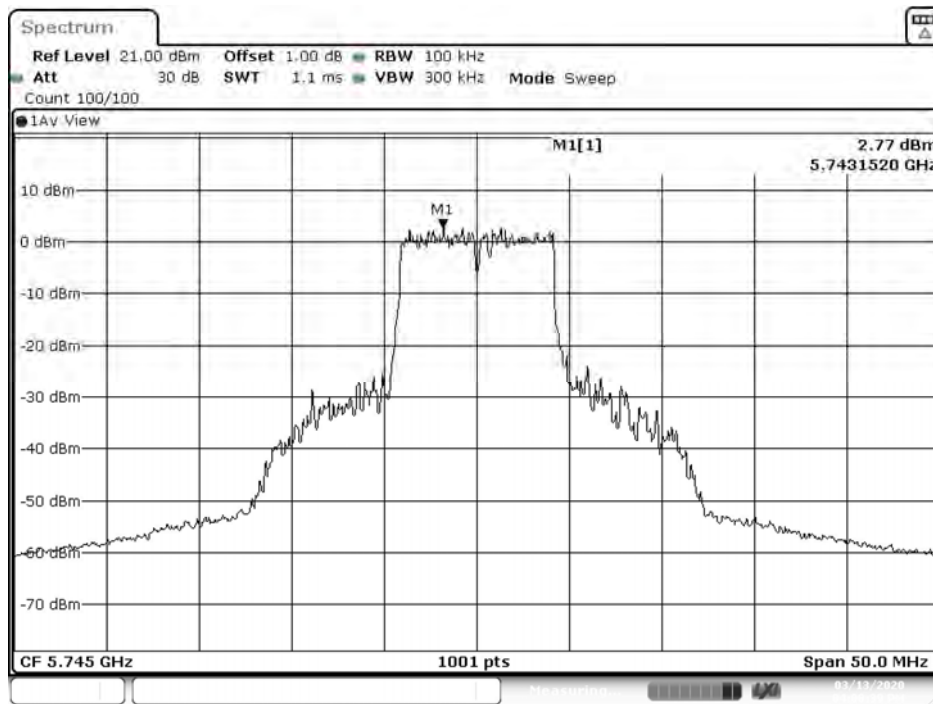
### 4.5. Test Result of Peak Power Spectral Density

Product : V2X DSRC Module  
 Test Item : Peak Power Spectral Density  
 Test Mode : Mode 1: Transmit (10MHz Bandwidth)  
 Test Date : 2020/03/13

#### Chain 1

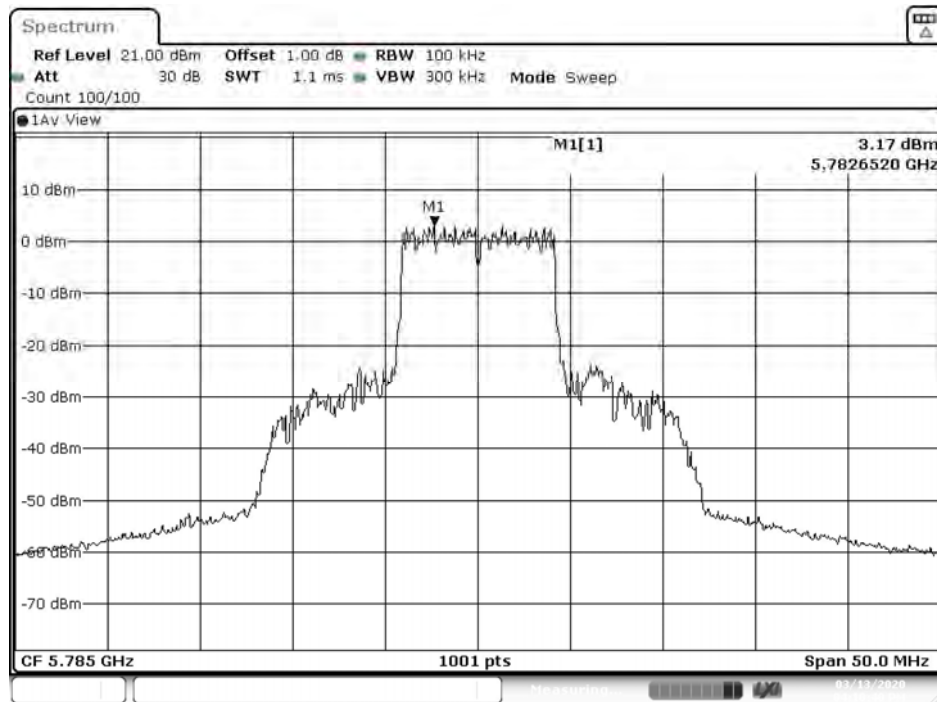
Channel Number	Frequency (MHz)	Data Rate (Mbps)	PPSD (dBm)	BWCF (dB)	Total PPSD (dBm)	Required Limit (dBm)	Result
149	5745	6	2.77	6.98	9.75	<30	Pass
157	5785	6	3.17	6.98	10.15	<30	Pass
165	5825	6	3.21	6.98	10.19	<30	Pass

Channel 149



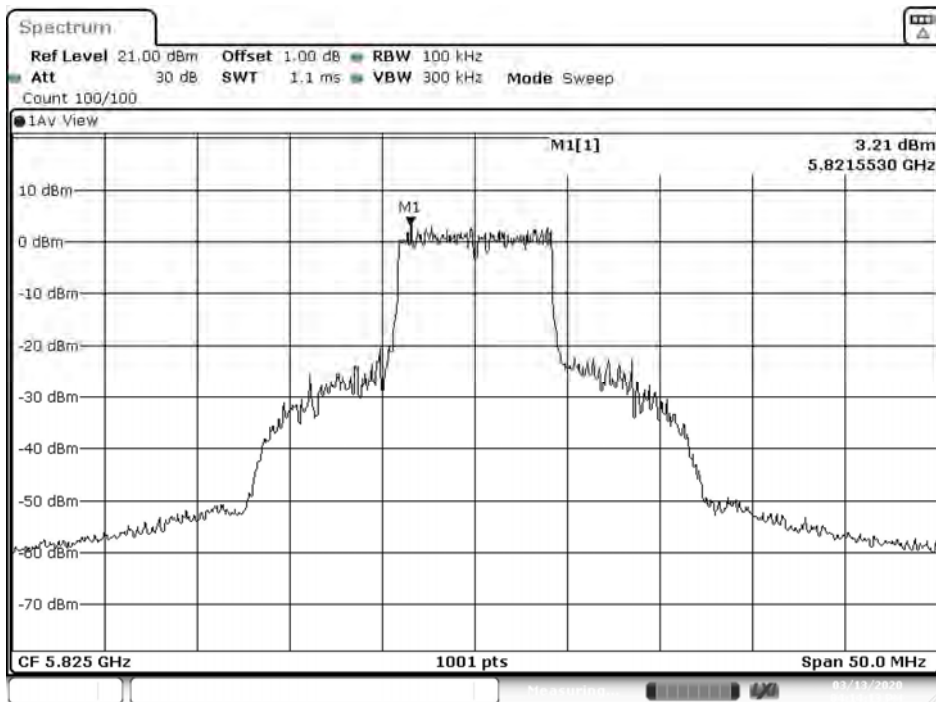
Date: 13.MAR.2020 16:08:39

### Channel 157



Date: 13.MAR.2020 16:10:40

### Channel 165

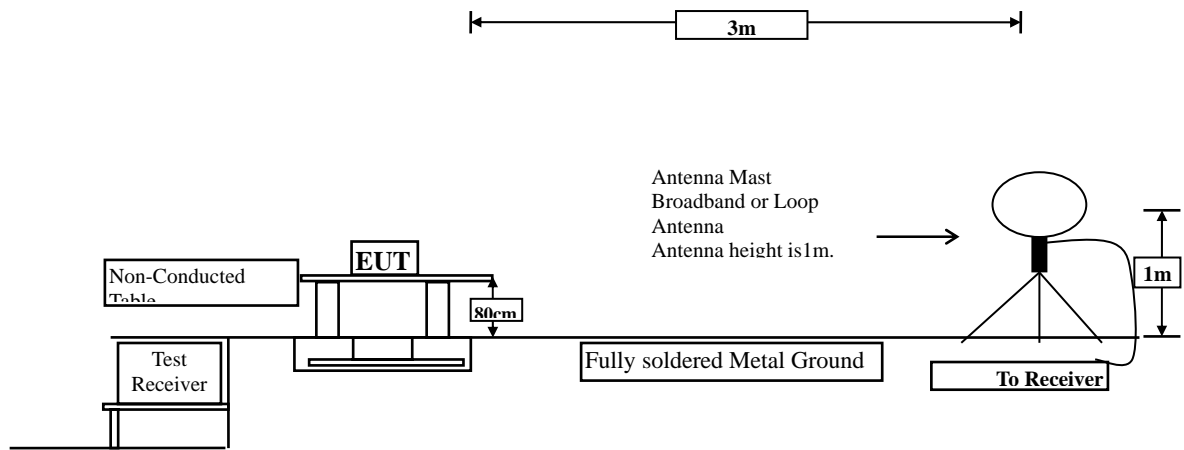


Date: 13.MAR.2020 16:14:14

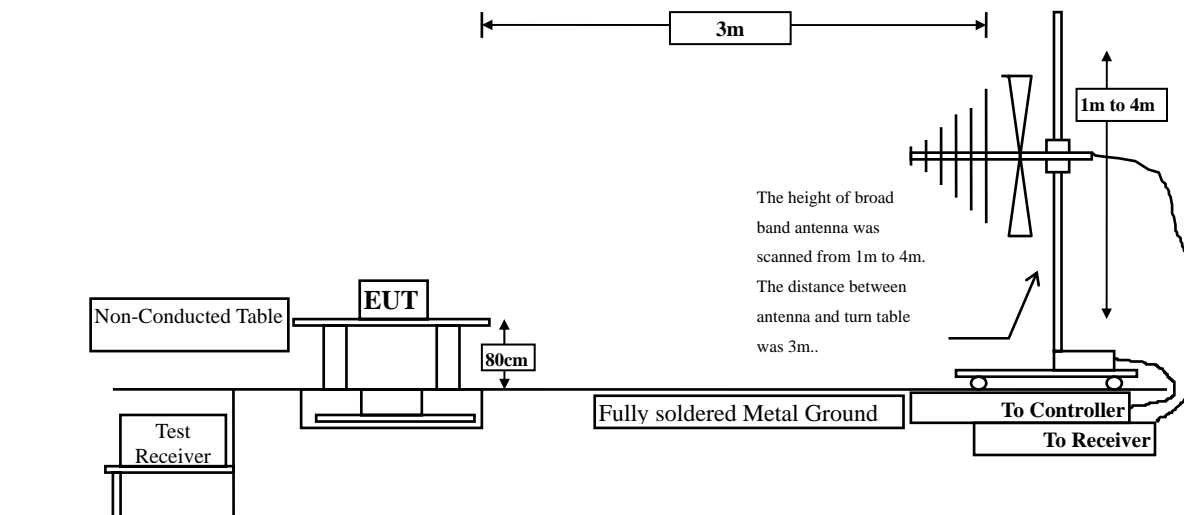
## 5. Radiated Emission

### 5.1. Test Setup

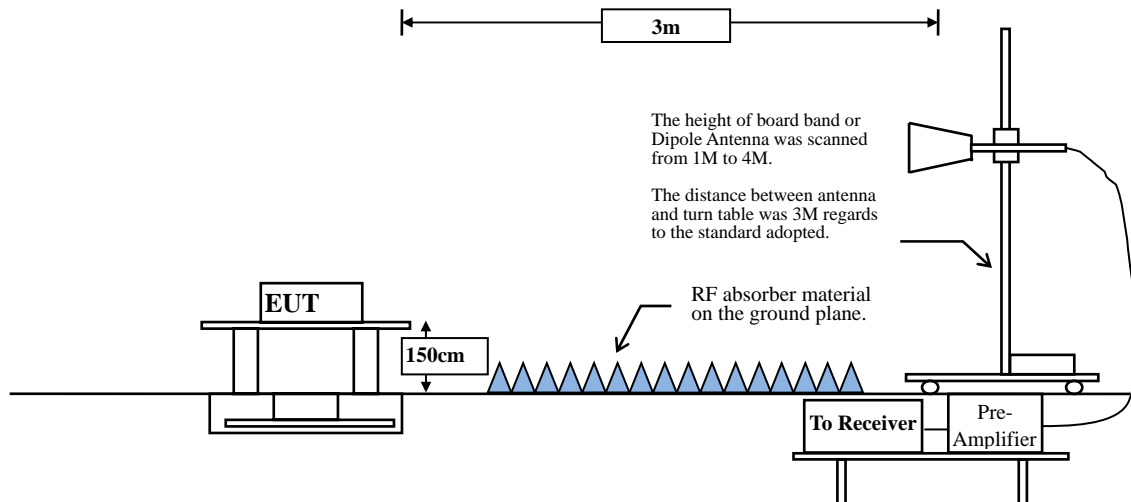
Radiated Emission Under 30MHz



Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



## 5.2. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

<b>FCC Part 15 Subpart C Paragraph 15.209(a) Limits</b>		
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: E field strength (dB $\mu$ V/m) = 20 log E field strength (uV/m)



### 5.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013 and tested according to FCC KDB-789033 test procedure for compliance to FCC 47CFR 15.407 requirements.

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 turn table is rotated 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 is scanned between 1 meter and 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were 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.

### RBW and VBW Parameter setting:

According to KDB 789033 section II.G.5 Procedure for Unwanted Maximum Emissions Measurements above 1000 MHz.

RBW = 1MHz.

VBW  $\geq$  3MHz.

According to KDB 789033 section II.G.6 Procedures for Average Unwanted Emissions Measurements above 1000 MHz.

RBW = 1MHz.

VBW = 10Hz, when duty cycle  $\geq$  98 %

VBW  $\geq$  1/T, when duty cycle < 98 %

( T refers to the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.)

5GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
5GHz wireless	100.00	--	--	10

Note: Duty Cycle Refer to Section 8

## 5.4. Uncertainty

Horizontal polarization :

30-300MHz:  $\pm 4.08$ dB ; 300M-1GHz:  $\pm 3.86$ dB ; 1-18GHz:  $\pm 3.77$ dB ; 18-40GHz:  $\pm 3.98$ dB

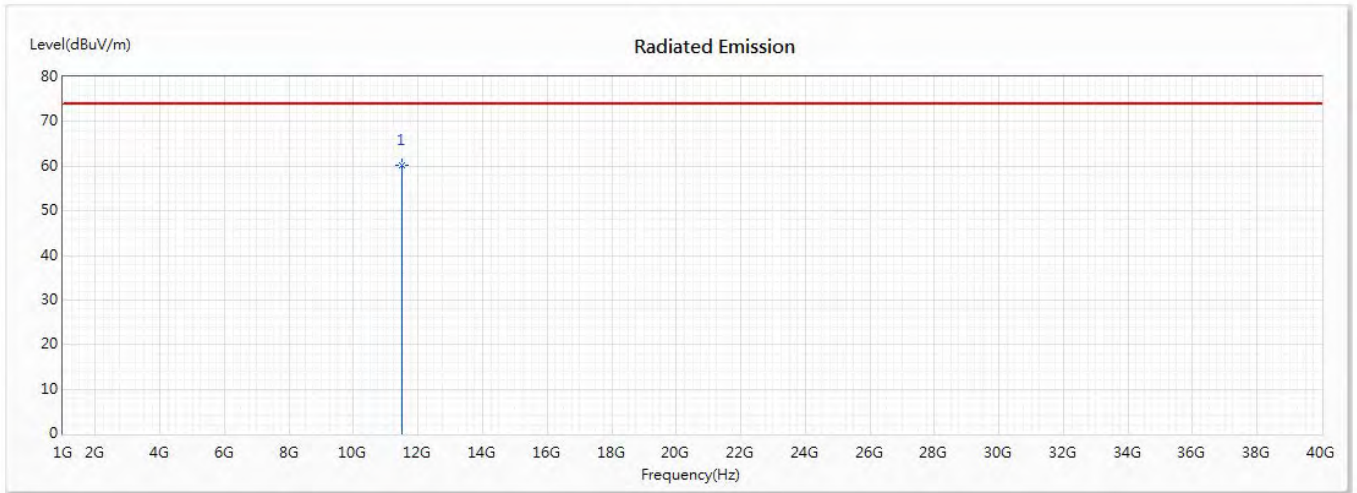
Vertical polarization :

30-300MHz:  $\pm 4.81$ dB ; 300M-1GHz:  $\pm 3.87$ dB ; 1-18GHz :  $\pm 3.83$ dB ; 18-40GHz:  $\pm 3.98$ dB

### 5.5. Test Result of Radiated Emission

Product : V2X DSRC Module  
 Test Item : Harmonic Radiated Emission Data  
 Test Mode : Mode 1: Transmit (10MHz Bandwidth) (5745MHz)\_ Chain 1  
 Test Date : 2020/03/19

#### Horizontal



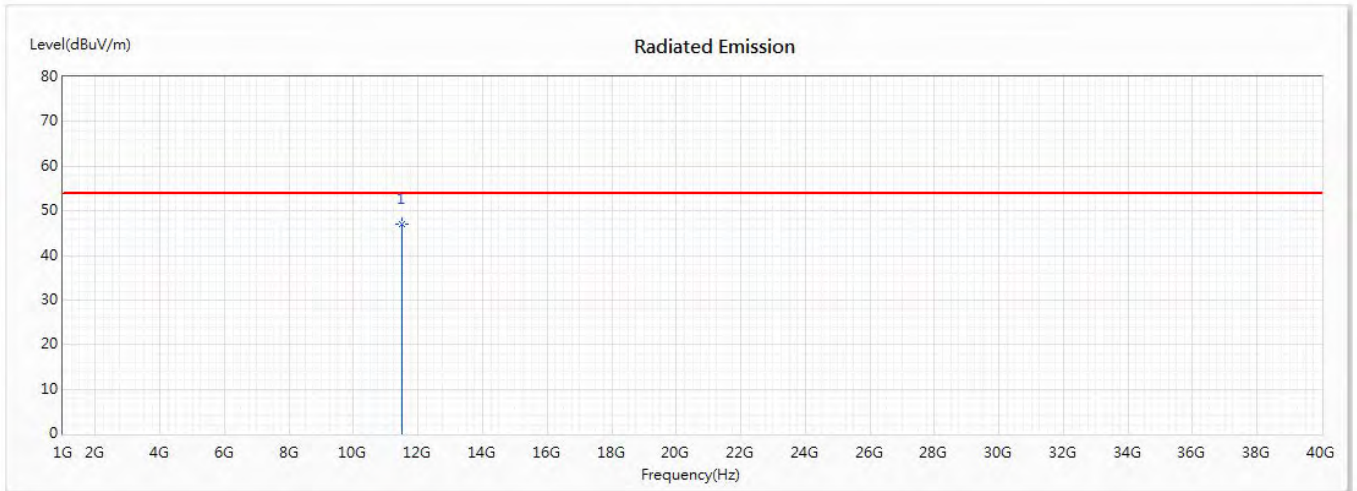
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	11490	60.33	74.00	-13.67	55.89	4.44	PK

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 average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : V2X DSRC Module  
 Test Item : Harmonic Radiated Emission Data  
 Test Mode : Mode 1: Transmit (10MHz Bandwidth) (5745MHz)\_ Chain 1  
 Test Date : 2020/03/19

**Horizontal**



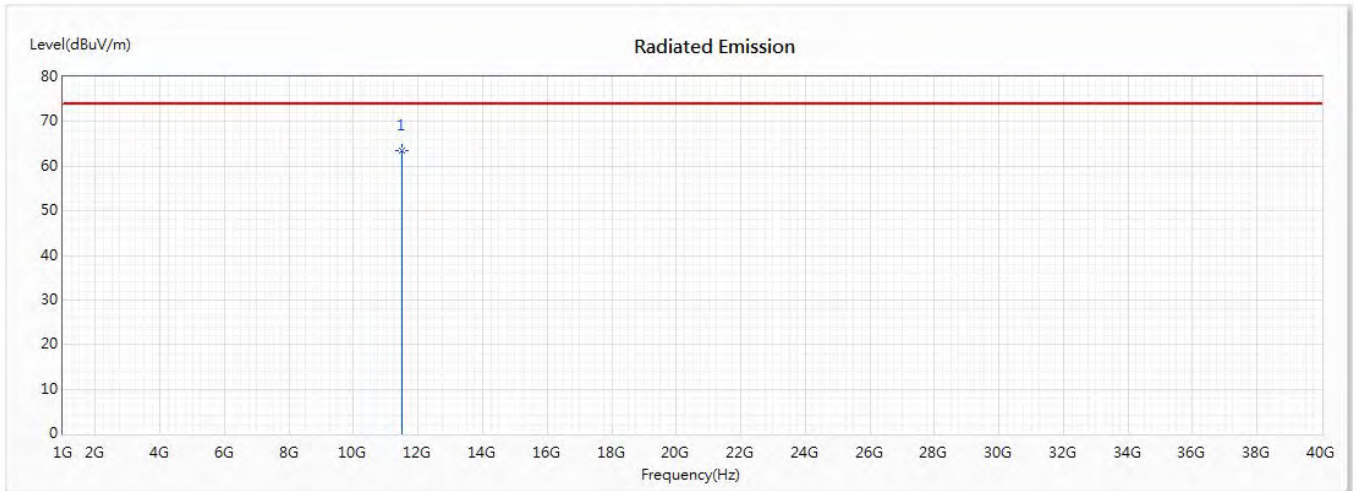
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	11490	47.04	54.00	-6.96	42.60	4.44	AV

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 average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : V2X DSRC Module  
 Test Item : Harmonic Radiated Emission Data  
 Test Mode : Mode 1: Transmit (10MHz Bandwidth) (5745MHz) \_ Chain 1  
 Test Date : 2020/03/19

**Vertical**



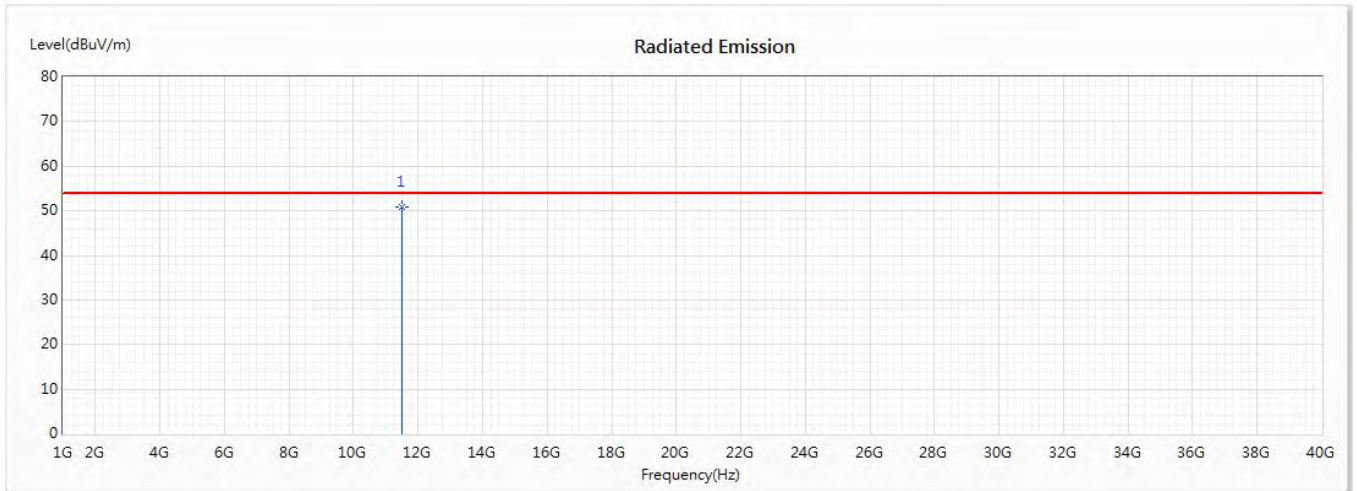
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	11490	63.50	74.00	-10.50	59.06	4.44	PK

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 average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : V2X DSRC Module  
 Test Item : Harmonic Radiated Emission Data  
 Test Mode : Mode 1: Transmit (10MHz Bandwidth) (5745MHz) \_ Chain 1  
 Test Date : 2020/03/19

**Vertical**



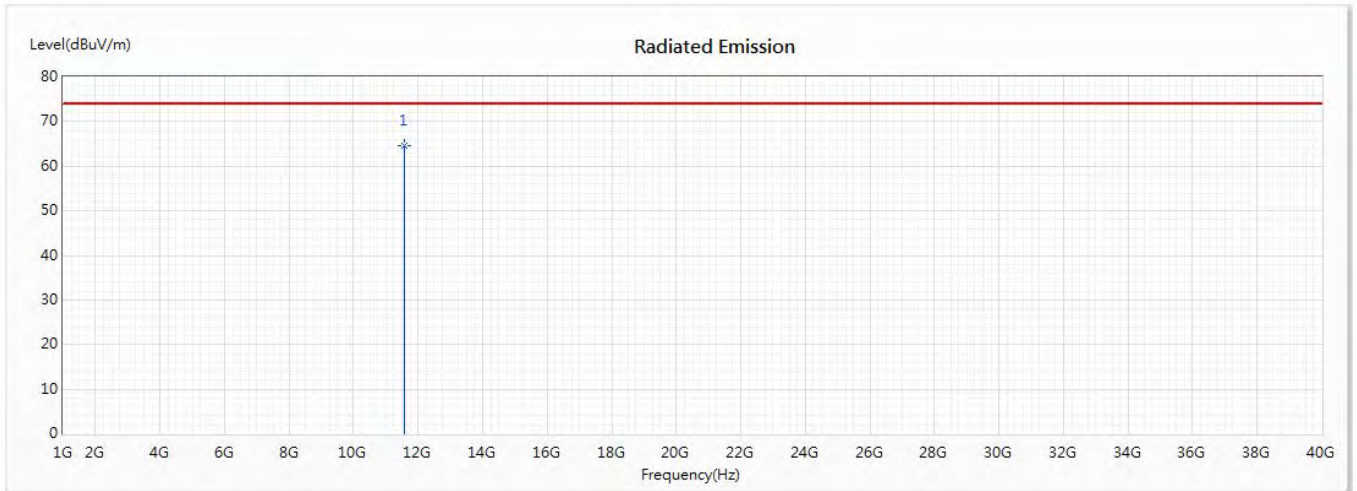
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	11490	50.78	54.00	-3.22	46.34	4.44	AV

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 average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : V2X DSRC Module  
 Test Item : Harmonic Radiated Emission Data  
 Test Mode : Mode 1: Transmit (10MHz Bandwidth) (5785MHz) \_ Chain 1  
 Test Date : 2020/03/19

**Horizontal**



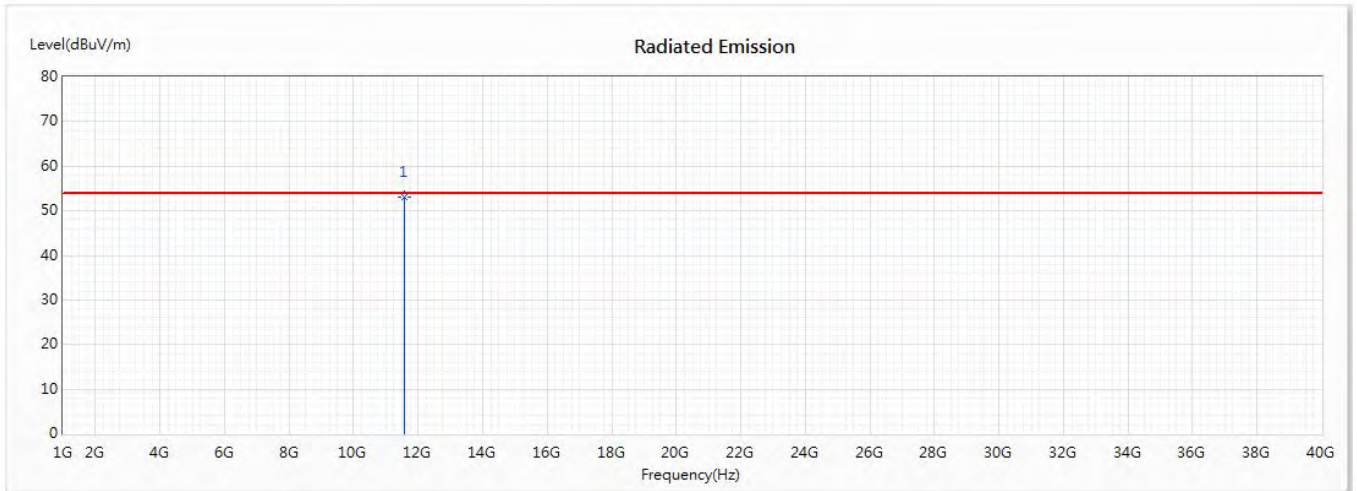
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	11570	64.58	74.00	-9.42	59.88	4.70	PK

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 average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : V2X DSRC Module  
 Test Item : Harmonic Radiated Emission Data  
 Test Mode : Mode 1: Transmit (10MHz Bandwidth) (5785MHz) \_ Chain 1  
 Test Date : 2020/03/19

**Horizontal**



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	11570	53.10	54.00	-0.90	48.40	4.70	AV

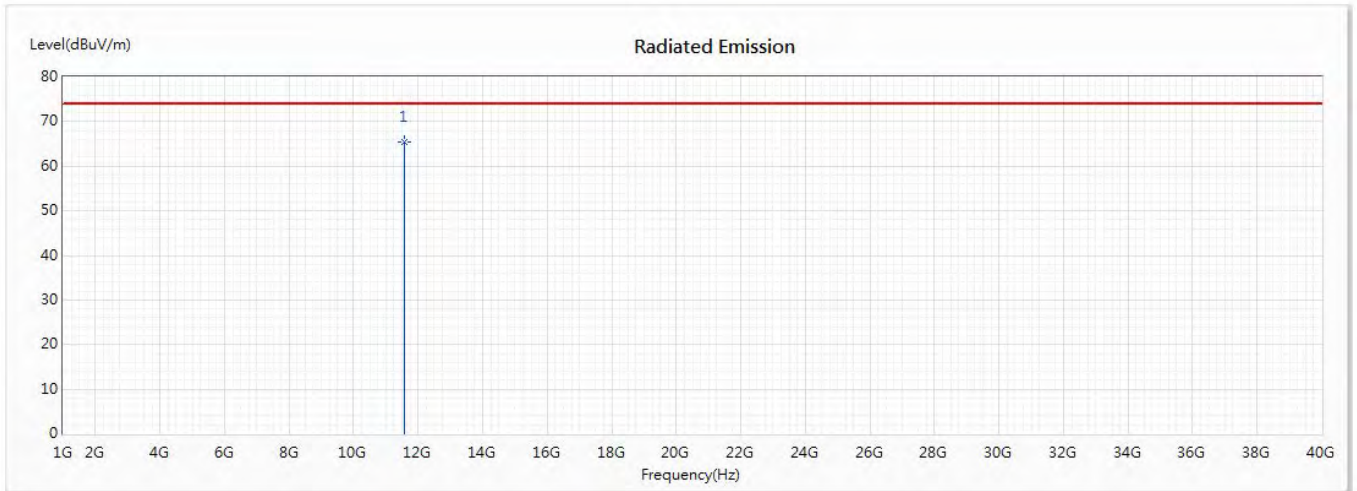
Note:

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 average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.



Product : V2X DSRC Module  
 Test Item : Harmonic Radiated Emission Data  
 Test Mode : Mode 1: Transmit (10MHz Bandwidth) (5785MHz) \_ Chain 1  
 Test Date : 2020/03/19

**Vertical**



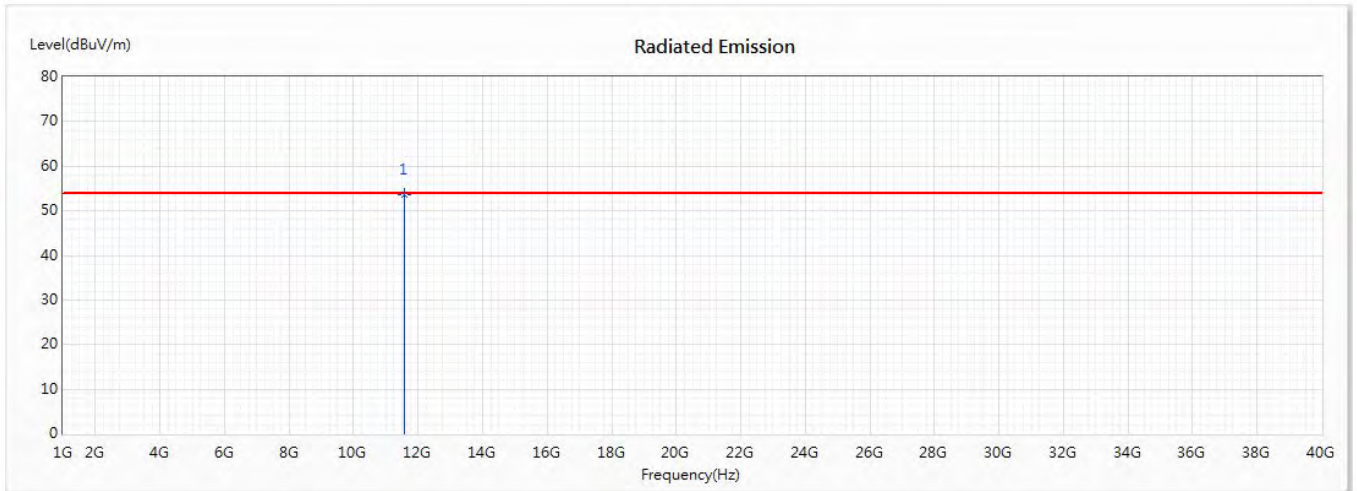
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	11570	65.56	74.00	-8.44	60.86	4.70	PK

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 average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : V2X DSRC Module  
 Test Item : Harmonic Radiated Emission Data  
 Test Mode : Mode 1: Transmit (10MHz Bandwidth) (5785MHz) \_ Chain 1  
 Test Date : 2020/03/19

**Vertical**



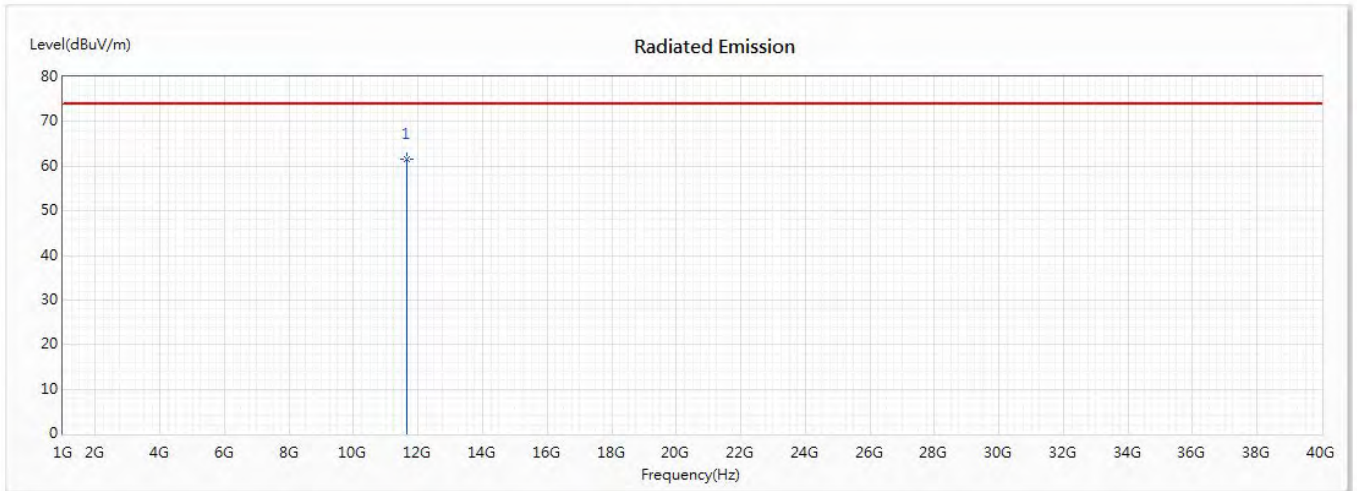
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	11570	53.67	54.00	-0.33	48.97	4.70	AV

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 average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : V2X DSRC Module  
 Test Item : Harmonic Radiated Emission Data  
 Test Mode : Mode 1: Transmit (10MHz Bandwidth) (5825MHz) \_ Chain 1  
 Test Date : 2020/03/19

**Horizontal**



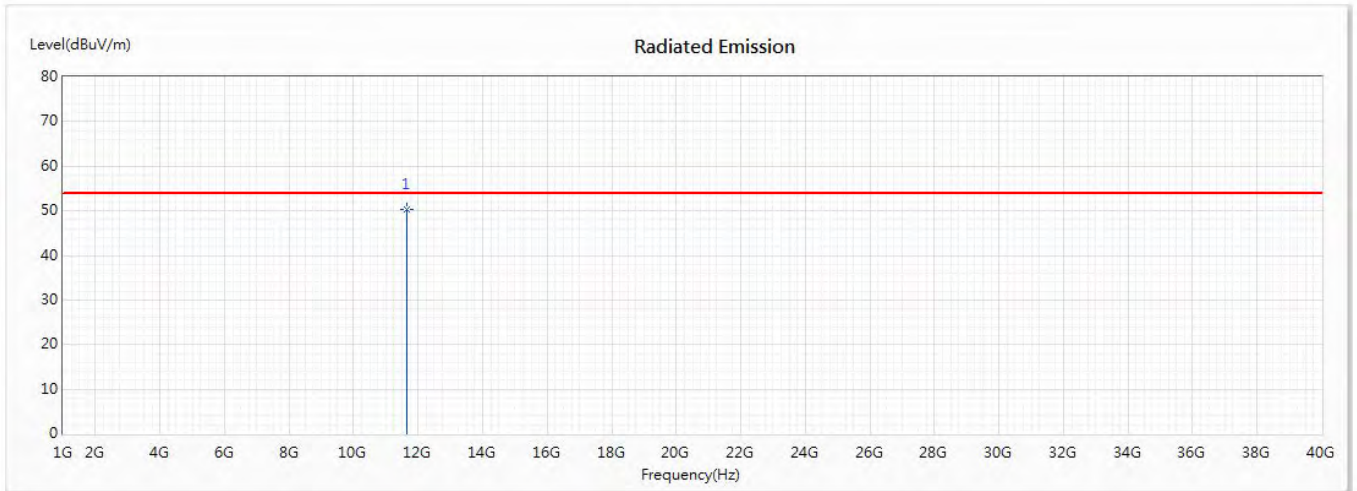
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	11650	61.64	74.00	-12.36	56.97	4.67	PK

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 average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : V2X DSRC Module  
 Test Item : Harmonic Radiated Emission Data  
 Test Mode : Mode 1: Transmit (10MHz Bandwidth) (5825MHz) \_ Chain 1  
 Test Date : 2020/03/19

**Horizontal**



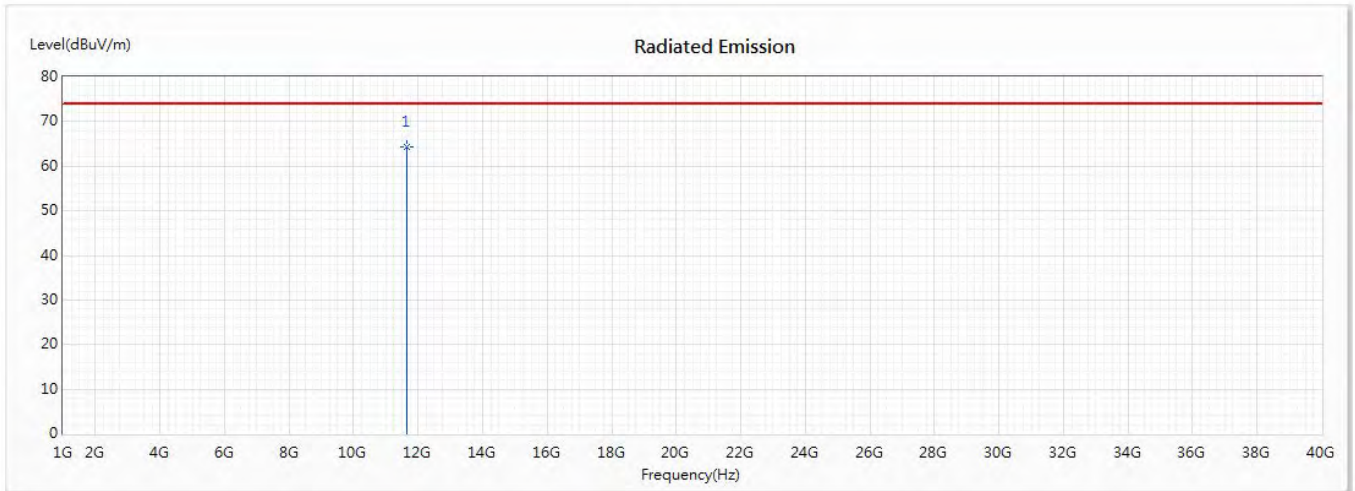
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	11650	50.38	54.00	-3.62	45.71	4.67	AV

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 average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : V2X DSRC Module  
 Test Item : Harmonic Radiated Emission Data  
 Test Mode : Mode 1: Transmit (10MHz Bandwidth) (5825MHz) \_ Chain 1  
 Test Date : 2020/03/19

**Vertical**



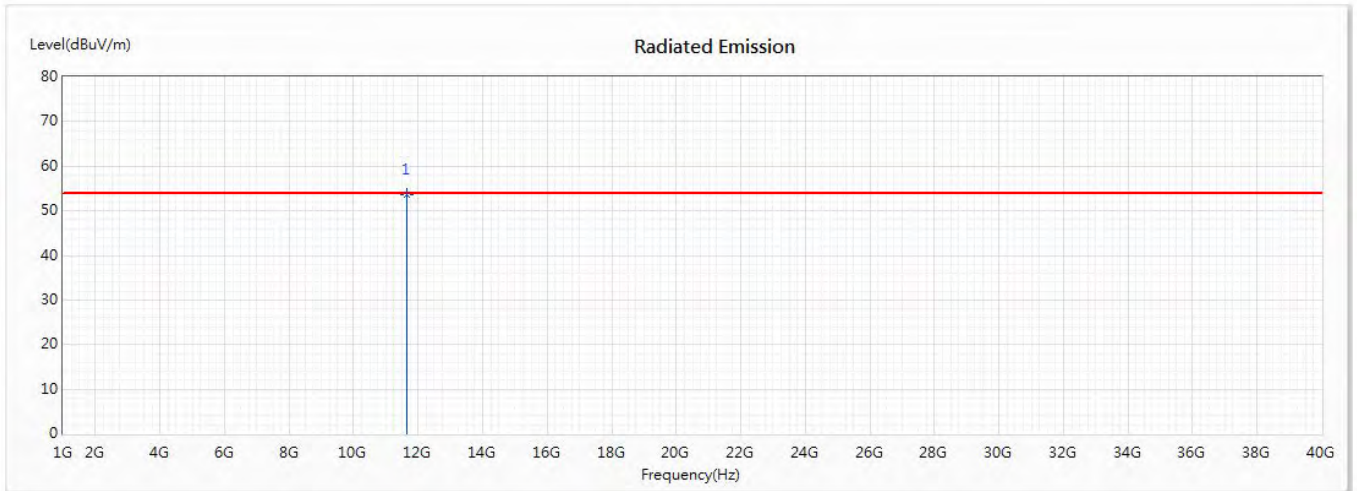
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	11650	64.40	74.00	-9.60	59.73	4.67	PK

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 average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : V2X DSRC Module  
 Test Item : Harmonic Radiated Emission Data  
 Test Mode : Mode 1: Transmit (10MHz Bandwidth) (5825MHz) \_ Chain 1  
 Test Date : 2020/03/19

**Vertical**



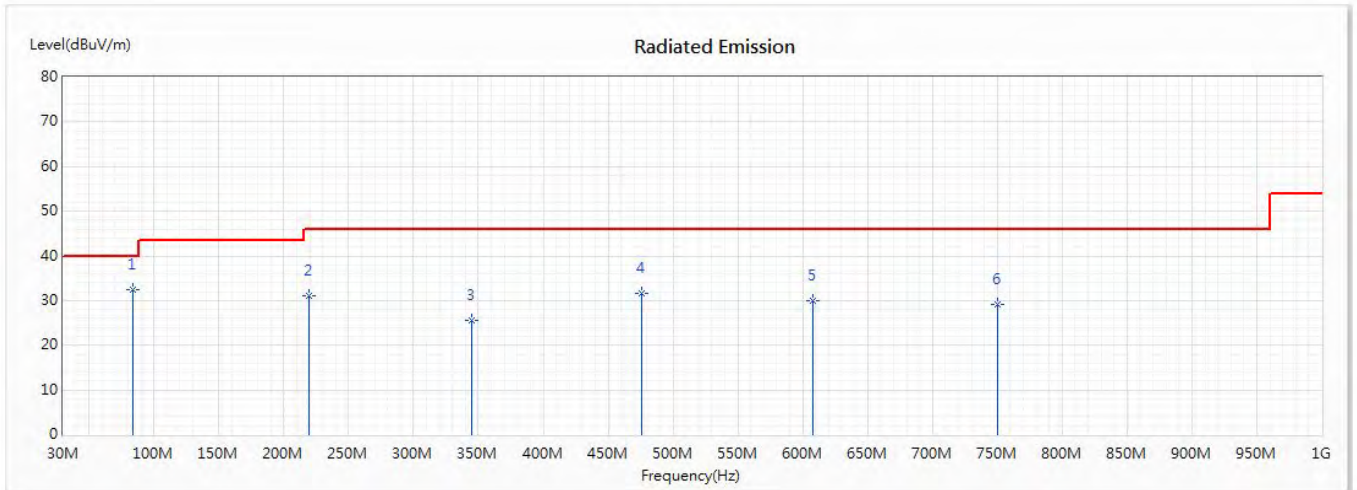
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	11650	53.60	54.00	-0.40	48.93	4.67	AV

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 average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : V2X DSRC Module  
 Test Item : General Radiated Emission  
 Test Mode : Mode 1: Transmit (10MHz Bandwidth) (5745MHz) \_ Chain 1  
 Test Date : 2020/03/19

**Horizontal**



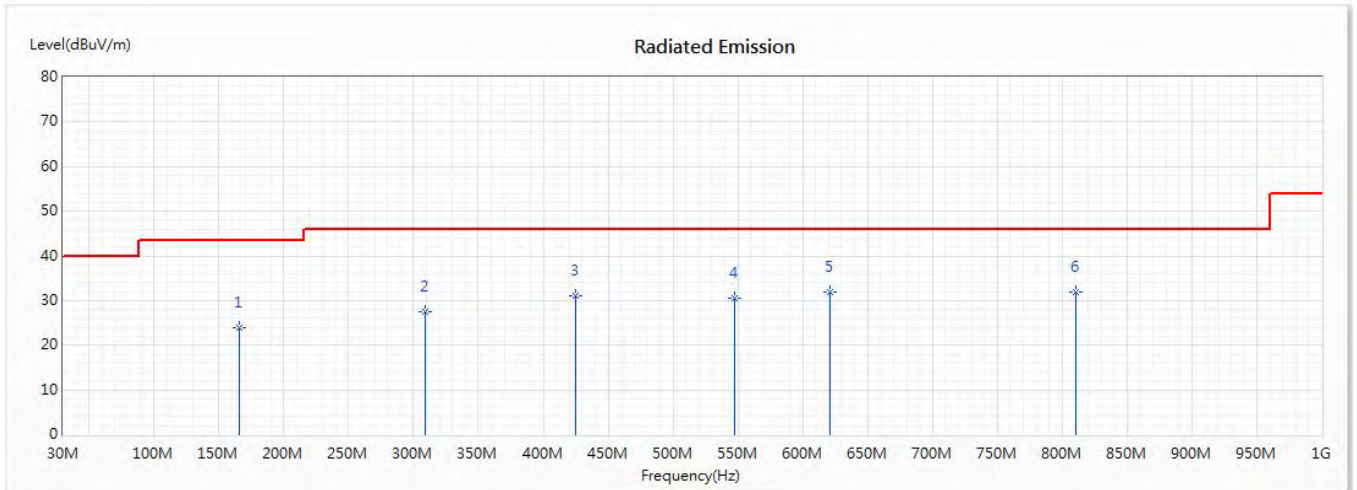
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	83.35	32.41	40.00	-7.59	48.99	-16.58	QP
2	219.15	31.20	46.00	-14.80	43.71	-12.51	QP
3	345.25	25.55	46.00	-20.45	34.18	-8.63	QP
4	476.2	31.75	46.00	-14.25	37.38	-5.63	QP
5	608.12	29.98	46.00	-16.02	33.08	-3.10	QP
6	749.74	29.22	46.00	-16.78	30.27	-1.05	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 : V2X DSRC Module  
 Test Item : General Radiated Emission  
 Test Mode : Mode 1: Transmit (10MHz Bandwidth) (5745MHz) \_ Chain 1  
 Test Date : 2020/03/19

**Vertical**



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	165.8	23.93	43.50	-19.57	34.80	-10.87	QP
2	309.36	27.54	46.00	-18.46	37.15	-9.61	QP
3	424.79	31.10	46.00	-14.90	37.94	-6.84	QP
4	547.98	30.49	46.00	-15.51	34.86	-4.37	QP
5	620.73	31.82	46.00	-14.18	34.89	-3.07	QP
* 6	810.85	31.93	46.00	-14.07	32.34	-0.41	QP

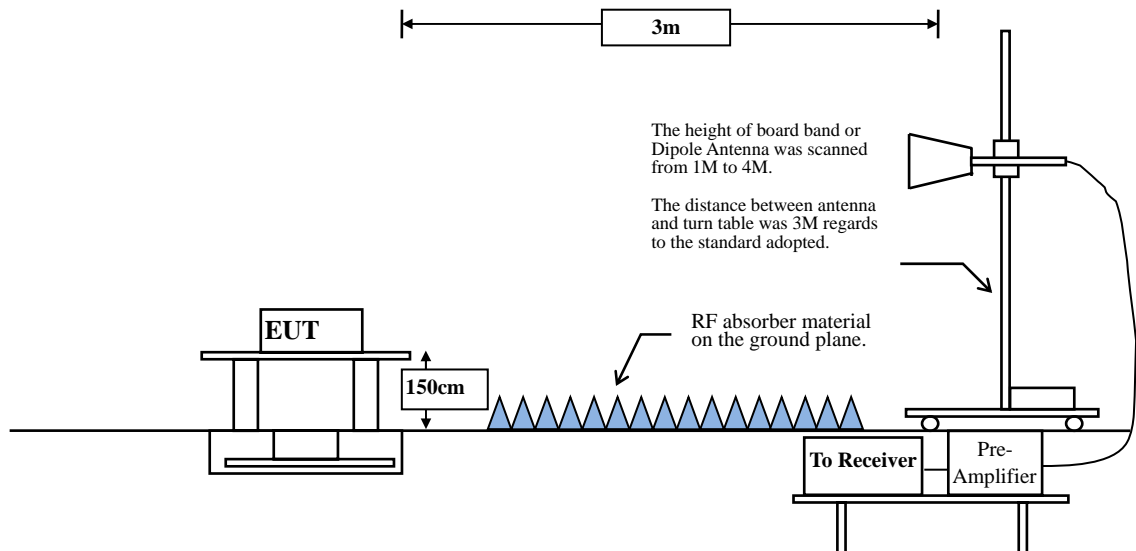
**Note:**

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.



## 6. Band Edge

### 6.1. Test Setup



### 6.2. Limits

The provisions of Section 15.205 of this part apply to intentional radiators operating under this section.

Radiated emissions which fall in the restricted bands, as defined in Section 15.205, must also comply with the radiated emission limits specified in Section 15.209:

FCC Part 15 Subpart C Paragraph 15.209 Limits		
Frequency MHz	uV/m @3m	dBµV/m@3m
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

- Remarks :
1. RF Voltage (dBµV) = 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.

Undesirable emission limits. Except as the provisions of §15.205 apply to intentional radiators operating under this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of - 27 dBm/MHz.

(2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of - 27 dBm/MHz.

(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of - 27 dBm/MHz.

(4) For transmitters operating in the 5.725-5.85 GHz band:

(i) All emissions shall be limited to a level of - 27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

### 6.3. Test Procedure

The EUT is placed on a turn table which is 1.5 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 bandwidth below 1GHz setting on the field strength meter is 120 kHz, above 1GHz are 1 MHz.

The EUT was setup to ANSI C63.10, 2013; tested to UNII test procedure of FCC KDB-789033 for compliance to FCC 47CFR Subpart E requirements.

### RBW and VBW Parameter setting:

According to KDB 789033 section II.G.5 Procedure for Unwanted Maximum Emissions Measurements above 1000 MHz.

RBW = 1MHz.

VBW  $\geq$  3MHz.

According to KDB 789033 section II.G.6 Procedures for Average Unwanted Emissions Measurements above 1000 MHz.

RBW = 1MHz.

VBW = 10Hz, when duty cycle  $\geq$  98 %

VBW  $\geq$  1/T, when duty cycle < 98 %

( T refers to the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.)

5GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
5GHz wireless	100.00	--	--	10

Note: Duty Cycle Refer to Section 8

## 6.4. Uncertainty

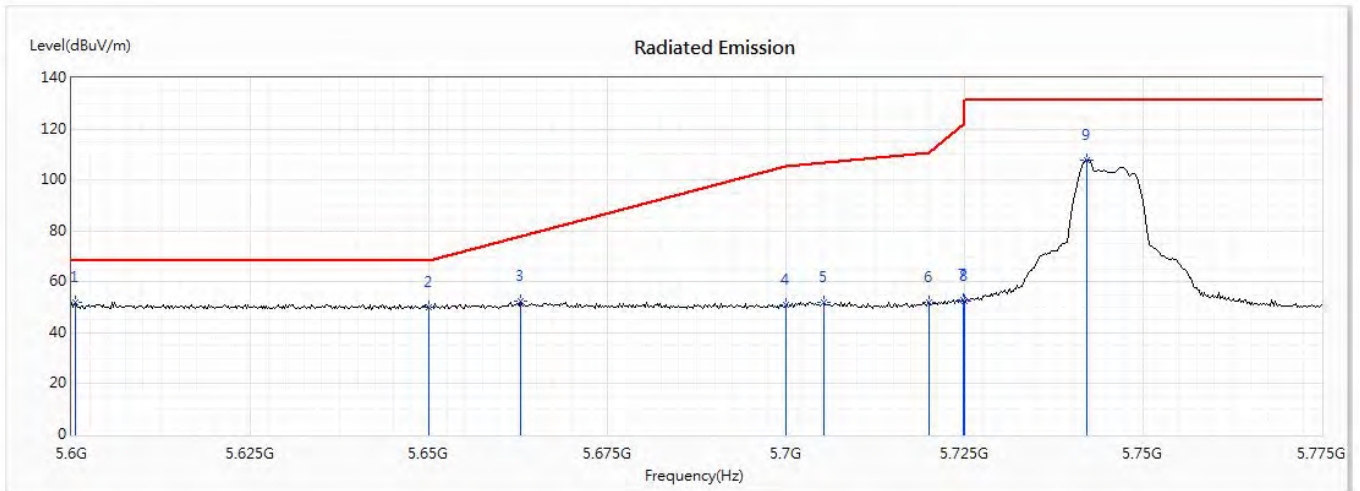
Horizontal polarization : 1-18GHz:  $\pm 3.77$ dB

Vertical polarization : 1-18GHz :  $\pm 3.83$ dB

### 6.5. Test Result of Band Edge

Product : V2X DSRC Module  
 Test Item : Band Edge Data  
 Test Mode : Mode 1: Transmit (10MHz Bandwidth) (5745MHz) \_ Chain 1  
 Test Date : 2020/03/19

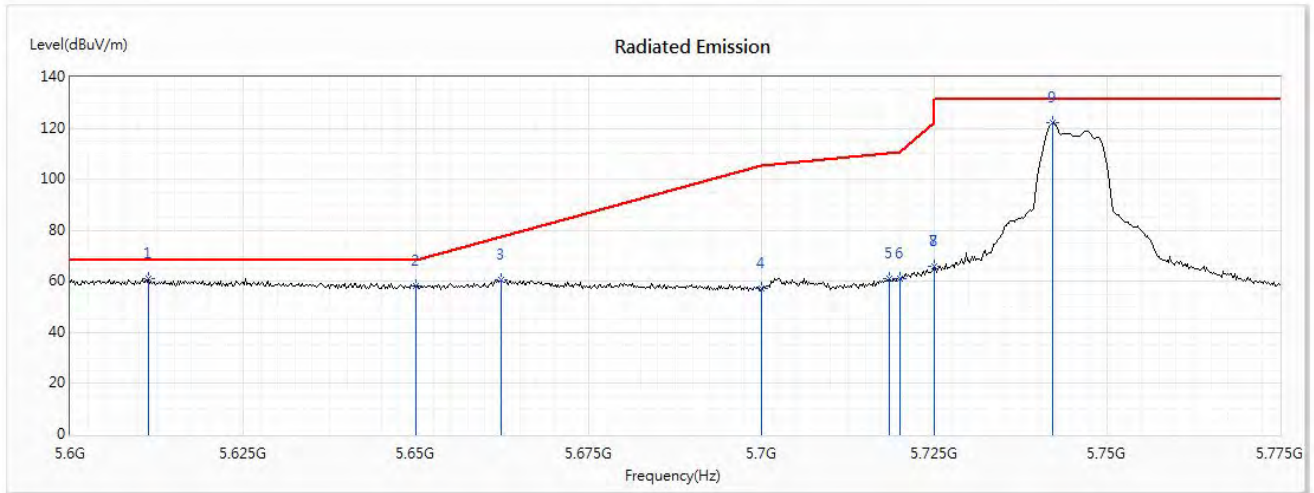
#### Horizontal



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	5600.525	51.89	68.22	-16.33	34.75	17.14	PK
2	5650	50.10	68.22	-18.12	32.86	17.24	PK
3	5662.825	52.30	77.74	-25.44	34.96	17.34	PK
4	5700	50.84	105.20	-54.36	33.41	17.43	PK
5	5705.35	52.03	106.70	-54.67	34.63	17.40	PK
6	5720	51.99	110.80	-58.81	34.60	17.39	PK
7	5724.775	53.07	121.69	-68.62	35.68	17.39	PK
8	5725	52.23	122.20	-69.97	34.84	17.39	PK
9	5742.1	107.92	131.20	-23.28	90.46	17.46	PK

Product : V2X DSRC Module  
 Test Item : Band Edge Data  
 Test Mode : Mode 1: Transmit (10MHz Bandwidth) (5745MHz) \_ Chain 1  
 Test Date : 2020/03/19

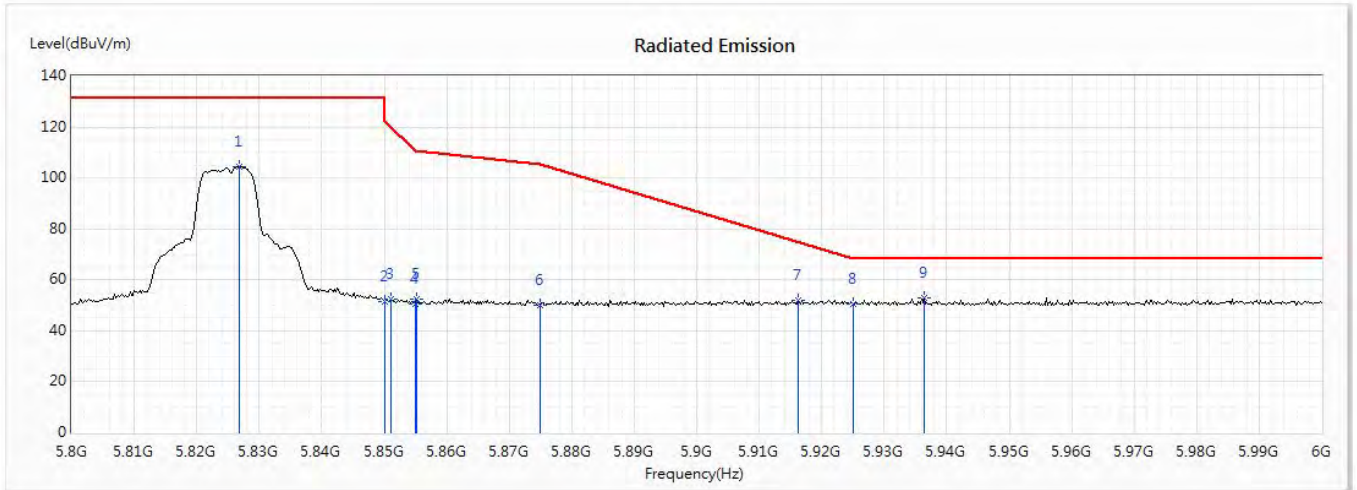
**Vertical**



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	5611.375	61.06	68.22	-7.16	43.91	17.15	PK
2	5650	58.20	68.22	-10.02	40.96	17.24	PK
3	5662.3	60.62	77.35	-16.72	43.29	17.33	PK
4	5700	57.17	105.20	-48.03	39.74	17.43	PK
5	5718.475	61.25	110.37	-49.12	43.86	17.39	PK
6	5720	60.90	110.80	-49.90	43.51	17.39	PK
7	5724.95	66.05	122.09	-56.03	48.66	17.39	PK
8	5725	65.68	122.20	-56.52	48.29	17.39	PK
9	5742.1	121.99	131.20	-9.21	104.53	17.46	PK

Product : V2X DSRC Module  
 Test Item : Band Edge Data  
 Test Mode : Mode 1: Transmit (10MHz Bandwidth) (5825MHz) \_ Chain 1  
 Test Date : 2020/03/19

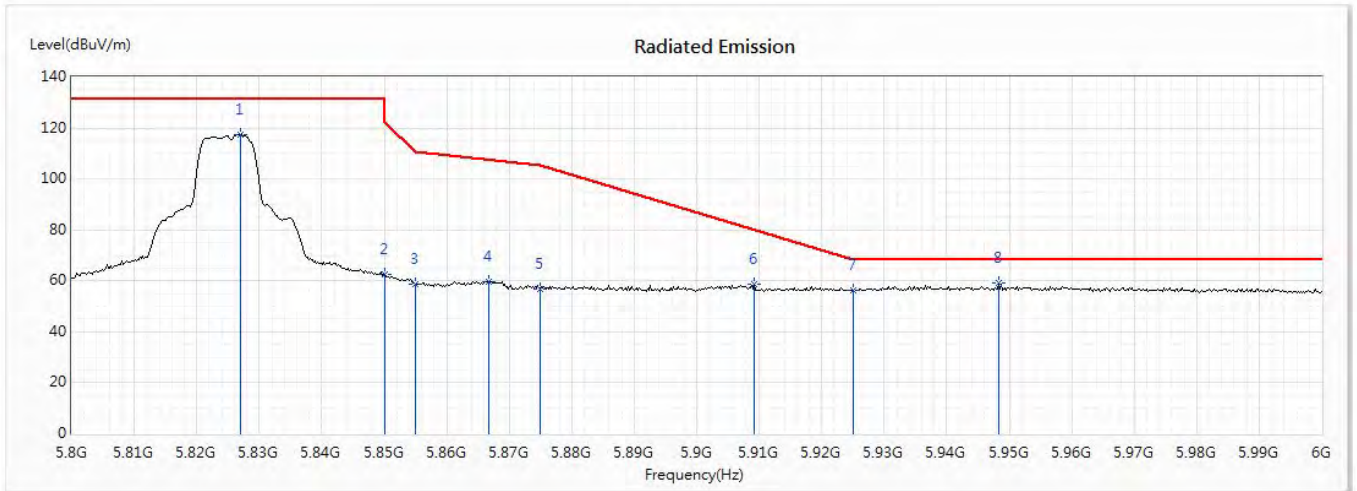
**Horizontal**



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	5826.8	104.49	131.20	-26.71	86.72	17.77	PK
2	5850	51.59	122.20	-70.61	33.73	17.86	PK
3	5851	52.41	119.92	-67.51	34.54	17.87	PK
4	5855	50.56	110.80	-60.24	32.70	17.86	PK
5	5855.2	52.46	110.74	-58.28	34.60	17.86	PK
6	5875	50.27	105.20	-54.93	32.47	17.80	PK
7	5916.2	52.19	74.71	-22.52	34.22	17.97	PK
8	5925	50.41	68.22	-17.81	32.38	18.03	PK
* 9	5936.4	52.80	68.22	-15.42	34.74	18.06	PK

Product : V2X DSRC Module  
 Test Item : Band Edge Data  
 Test Mode : Mode 1: Transmit (10MHz Bandwidth) (5825MHz) \_ Chain 1  
 Test Date : 2020/03/19

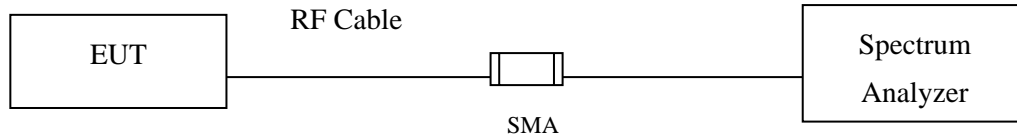
**Vertical**



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	5827	117.47	131.20	-13.73	99.71	17.76	PK
2	5850	62.47	122.20	-59.73	44.61	17.86	PK
3	5855	58.61	110.80	-52.19	40.75	17.86	PK
4	5866.8	59.85	107.49	-47.64	42.05	17.80	PK
5	5875	56.96	105.20	-48.24	39.16	17.80	PK
6	5909.2	58.53	79.87	-21.34	40.62	17.91	PK
7	5925	56.44	68.22	-11.78	38.41	18.03	PK
* 8	5948.4	59.08	68.22	-9.14	41.00	18.08	PK

## 7. Occupied Bandwidth

### 7.1. Test Setup



### 7.2. Limits

For the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz

### 7.3. Test Procedure

The EUT was setup to ANSI C63.10, 2013; tested to UNII test procedure of FCC KDB-789033 for compliance to FCC 47CFR Subpart E requirements.

### 7.4. Uncertainty

$\pm 671.83\text{Hz}$



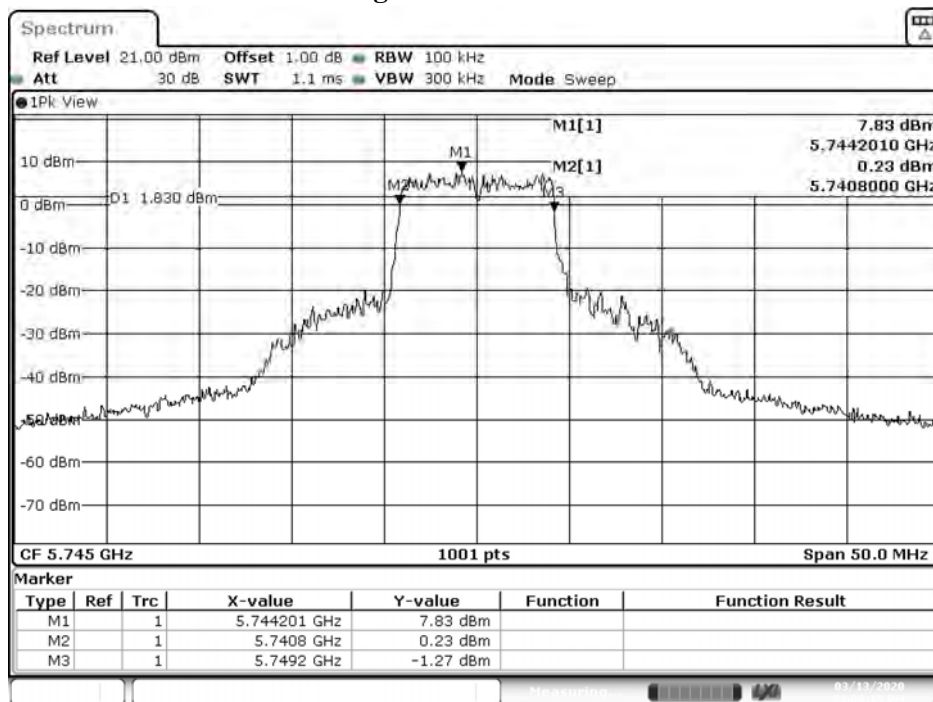
### 7.5. Test Result of Occupied Bandwidth

Product : V2X DSRC Module  
 Test Item : Occupied Bandwidth Data  
 Test Mode : Mode 1: Transmit (10MHz Bandwidth)  
 Test Date : 2020/03/13

#### Chain 1

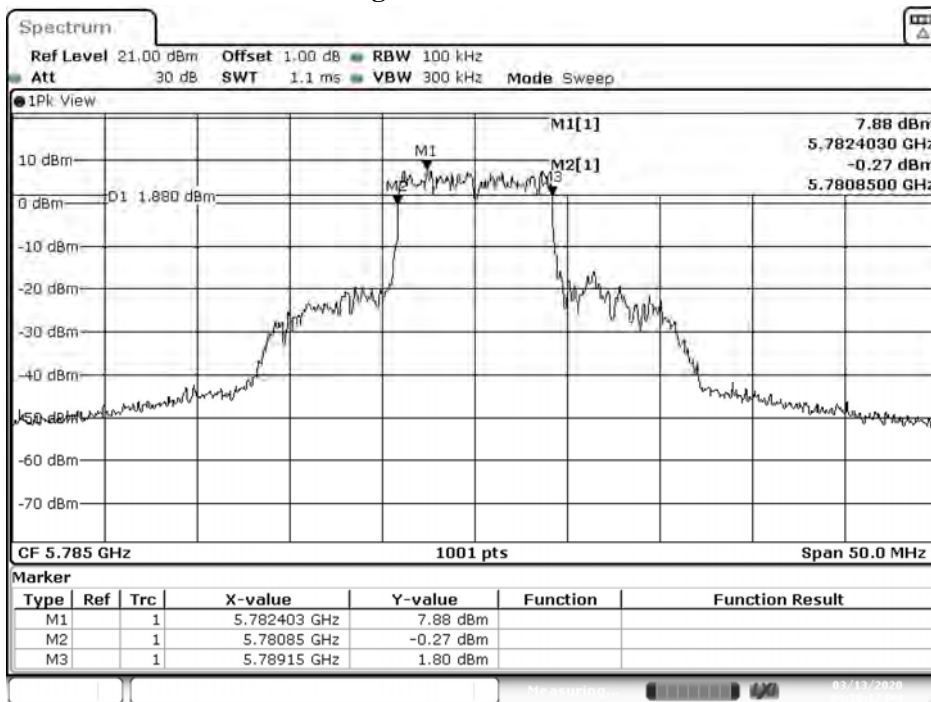
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
149	5745	8400	>500	Pass
157	5785	8300	>500	Pass
165	5825	8350	>500	Pass

Figure Channel 149:



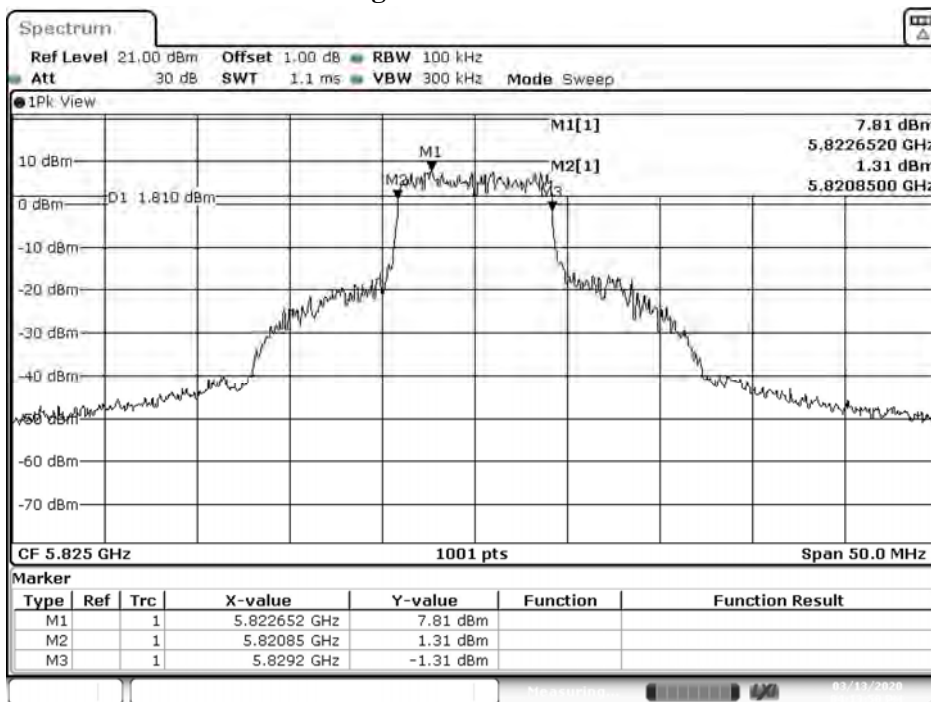
Date: 13.MAR.2020 16:08:15

Figure Channel 157:



Date: 13.MAR.2020 16:10:17

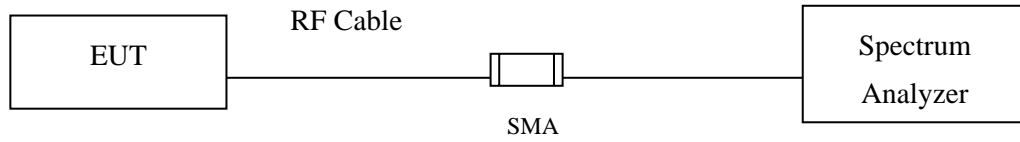
Figure Channel 165:



Date: 13.MAR.2020 16:13:50

## 8. Duty Cycle

### 8.1. Test Setup



### 8.2. Test Procedure

The EUT was setup according to ANSI C63.10 2013; tested according to U-NII test procedure of KDB789033 for compliance to FCC 47CFR 15.407 requirements.

### 8.3. Uncertainty

$\pm 2.31\text{msec}$

### 8.4. Test Result of Duty Cycle

Product : V2X DSRC Module  
 Test Item : Duty Cycle  
 Test Mode : Transmit (10MHz Bandwidth)

Duty Cycle Formula:

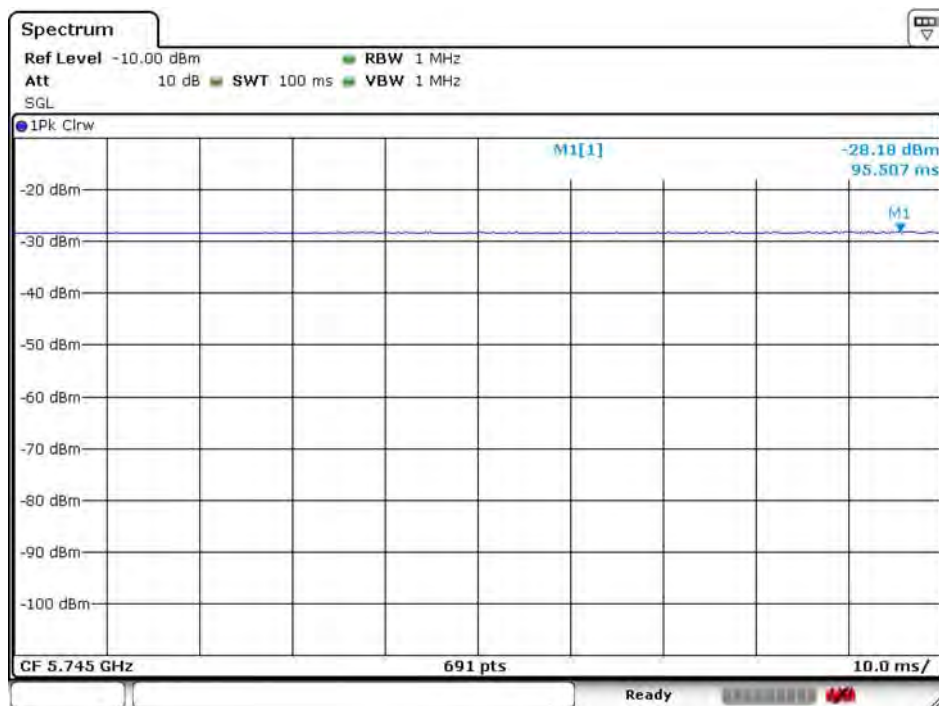
$$\text{Duty Cycle} = \text{Ton} / (\text{Ton} + \text{Toff})$$

$$\text{Duty Factor} = 10 \text{ Log} (1/\text{Duty Cycle})$$

Results:

#### Chain 1

5GHz band	Ton (ms)	Ton + Toff (ms)	Duty Cycle (%)	Duty Factor (dB)
5GHz wireless	--	--	100.00	0.00



Date: 8 APR 2020 13:47:34

## **9. EMI Reduction Method During Compliance Testing**

No modification was made during testing.