

FCC RF Test Report

(FHSS)

Applicant: Shenzhen VANCH Intelligent Technology Co., Ltd

Address of Applicant: Floor 4, Building B west side, QingHu FuAnNa industrial zone,
QingNing road 1, LongHua district, Shenzhen, Guangdong,
China 518109

Equipment Under Test (EUT)

Product Name: UHF RFID Reader Module

Model No.: VM-M50

FCC ID: 2A3H9VM-M50

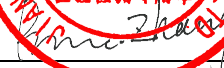
Applicable Standards: FCC CFR Title 47 Part 15C (§15.247)

Date of Sample Receipt: 16 Jun., 2023

Date of Test: 17 Jun., to 09 Aug., 2023

Date of Report Issued: 21 Aug., 2023

Test Result: PASS

Tested by:
_____**Date:**21 Aug., 2023
_____**Reviewed by:**
_____**Date:**21 Aug., 2023
_____**Approved by:**
_____**Date:**21 Aug., 2023
_____**Manager**

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in above the application standard version. Test results reported herein relate only to the item(s) tested.

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1 Version

Version No.	Date	Description
00	10 Aug., 2023	Original
01	21 Aug., 2023	Update page 14/17

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3 General Information

3.1 Client Information

Applicant:	Shenzhen VANCH Intelligent Technology Co., Ltd
Address:	Floor 4, Building B west side, QingHu FuAnNa industrial zone, QingNing road 1, LongHua district, Shenzhen, Guangdong, China 518109
Manufacturer/Factory:	Shenzhen VANCH Intelligent Technology Co., Ltd
Address:	Floor 4, Building B west side, QingHu FuAnNa industrial zone, QingNing road 1, LongHua district, Shenzhen, Guangdong, China 518109

3.2 General Description of E.U.T.

Product Name:	UHF RFID Reader Module
Model No.:	VM-M50
Operation Frequency:	902 MHz - 928 MHz
Number of Channel:	52
Modulation Technology:	2-FSK
Antenna Type:	Internal Antenna
Antenna Gain:	2.5 dBi
Power Supply:	DC 3.5~ 5 V
Test Sample Condition:	The test samples were provided in good working order with no visible defects.

3.3 Test Mode and Test Environment

Test Modes:	
Non-hopping mode:	Keep the EUT in continuous transmitting mode.
Hopping mode:	Keep the EUT in hopping mode.
Remark: For spurious emission of below 1GHz, pre-scan lowest, middle and highest channel, found lowest channel was worse case mode. The report only reflects the test data of worst mode.	
Operating Environment:	
Temperature:	15°C ~ 35°C
Humidity:	20 % ~ 75 % RH
Atmospheric Pressure:	1008 mbar

3.4 Description of Test Auxiliary Equipment

The EUT has been tested as an independent unit.

3.5 Measurement Uncertainty

Parameter	Expanded Uncertainty (Confidence of 95%(U = 2Uc(y)))
Conducted Emission for LISN (9kHz ~ 10MHz)	1.9 dB
Conducted Emission for LISN (10MHz ~ 30MHz)	2.6 dB
Radiated Emission (30MHz ~ 1GHz) (3m SAC)	3.8 dB
Radiated Emission (1GHz ~ 18GHz) (3m SAC)	3.6 dB
Radiated Emission (18GHz ~ 40GHz) (3m SAC)	5.34 dB
Note: All the measurement uncertainty value were shown with a coverage k=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.	

3.6 Additions to, Deviations, or Exclusions From the Method

No

3.7 Laboratory Facility

The test facility is recognized, certified, or accredited by the following organizations: ● FCC - Designation No.: CN1211 JianYan Testing Group Shenzhen Co., Ltd. has been accredited as a testing laboratory by FCC(Federal Communications Commission). The test firm Registration No. is 727551. ● ISED – CAB identifier.: CN0021 The 3m Semi-anechoic chamber and 10m Semi-anechoic chamber of JianYan Testing Group Shenzhen Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1. ● CNAS - Registration No.: CNAS L15527 JianYan Testing Group Shenzhen Co., Ltd. is accredited to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L15527. ● A2LA - Registration No.: 4346.01 This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: https://portal.a2la.org/scopepdf/4346-01.pdf
--

3.8 Laboratory Location

JianYan Testing Group Shenzhen Co., Ltd. Address: No.101, Building 8, Innovation Wisdom Port, No.155 Hongtian Road, Huangpu Community, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, People's Republic of China. Tel: +86-755-23118282, Fax: +86-755-23116366 Email: info-JYTee@lets.com, Website: http://jyt.lets.com

3.9 Test Instruments List

Radiated Emission(3m SAC):					
Test Equipment	Manufacturer	Model No.	Manage No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
3m SAC	ETS	9m*6m*6m	WXJ001-1	04-14-2021	04-13-2024
Loop Antenna	Schwarzbeck	FMZB 1519 B	WXJ002-4	02-09-2023	02-08-2024
BiConiLog Antenna	Schwarzbeck	VULB9163	WXJ002	02-09-2023	02-08-2024
Horn Antenna	Schwarzbeck	BBHA9120D	WXJ002-2	02-09-2023	02-08-2024
Horn Antenna	Schwarzbeck	BBHA9170	WXJ002-5	01-09-2023	01-08-2024
Pre-amplifier (30MHz ~ 1GHz)	Schwarzbeck	BBV9743B	WXJ001-2	01-10-2023	01-09-2024
Pre-amplifier (1GHz ~ 18GHz)	SKET	LNPA_0118G-50	WXJ001-3	01-10-2023	01-09-2024
Pre-amplifier (18GHz ~ 40GHz)	RF System	TRLA-180400G45B	WXJ002-7	01-11-2023	01-10-2024
EMI Test Receiver	Rohde & Schwarz	ESRP7	WXJ003-1	01-11-2023	01-10-2024
Spectrum Analyzer	Rohde & Schwarz	FSP 30	WXJ004	01-10-2023	01-09-2024
Spectrum Analyzer	KEYSIGHT	N9010B	WXJ004-2	10-17-2022	10-16-2023
Coaxial Cable (30MHz ~ 1GHz)	JYTSZ	JYT3M-1G-NN-8M	WXG001-4	01-18-2023	01-17-2024
Coaxial Cable (1GHz ~ 18GHz)	JYTSZ	JYT3M-18G-NN-8M	WXG001-5	01-18-2023	01-17-2024
Coaxial Cable (18GHz ~ 40GHz)	JYTSZ	JYT3M-40G-SS-8M	WXG001-7	01-18-2023	01-17-2024
Band Reject Filter Group	Tonscend	JS0806-F	WXJ089	N/A	
Test Software	Tonscend	TS+	Version: 3.0.0.1		
EMI Test Software	AUDIX	E3	Version: 6.110919b		

Conducted Method:					
Test Equipment	Manufacturer	Model No.	Manage No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
Spectrum Analyzer	Rohde & Schwarz	FSP 30	WXJ004	01-10-2023	01-09-2024
EMI Test Receiver	Rohde & Schwarz	ESCI3	WXJ003	01-10-2023	01-09-2024
Spectrum Analyzer	Keysight	N9010B	WXJ004-3	10-17-2022	10-16-2023
DC Power Supply	Keysight	E3642A	WXJ025-2	10-27-2021	10-26-2022

4 Measurement Setup and Procedure

4.1 Test Channel

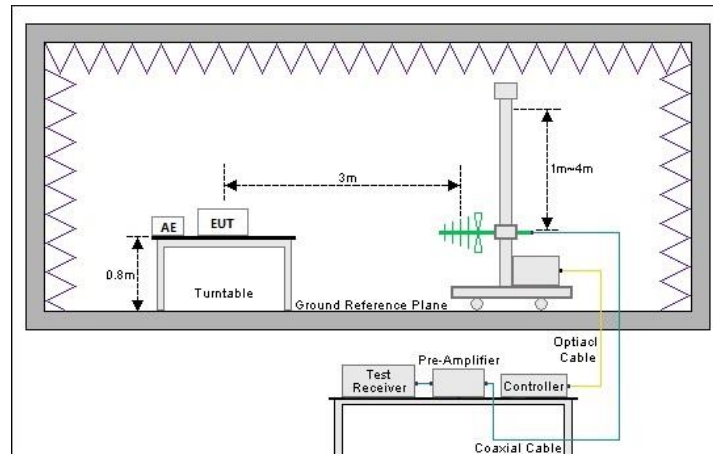
According to ANSI C63.10-2013 chapter 5.6.1 Table 4 requirement, select lowest channel, middle channel, and highest channel in the frequency range in which device operates for testing. The detailed frequency points are as follows:

Lowest channel		Middle channel		Highest channel	
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
0	902.25	25	914.75	50	927.25
1	902.75	26	915.25	51	927.75
2	903.25	27	915.75		
3	903.75	28	916.25		
4	904.25	29	916.75		
5	904.75	30	917.25		
6	905.25	31	917.75		
7	905.75	32	918.25		
8	906.25	33	918.75		
9	906.75	34	919.25		
10	907.25	35	919.75		
11	907.75	36	920.25		
12	908.25	37	920.75		
13	908.75	38	921.25		
14	909.25	39	921.75		
15	909.75	40	922.25		
16	910.25	41	922.75		
17	910.75	42	923.25		
18	911.25	43	923.75		
19	911.75	44	924.25		
20	912.25	45	924.75		
21	912.75	46	925.25		
22	913.25	47	925.75		
23	913.75	48	926.25		
24	914.25	49	926.75		

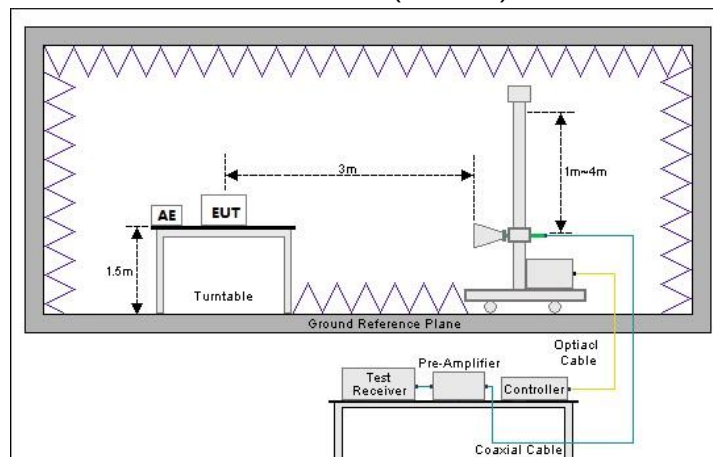
4.2 Test Setup

1) Radiated emission measurement:

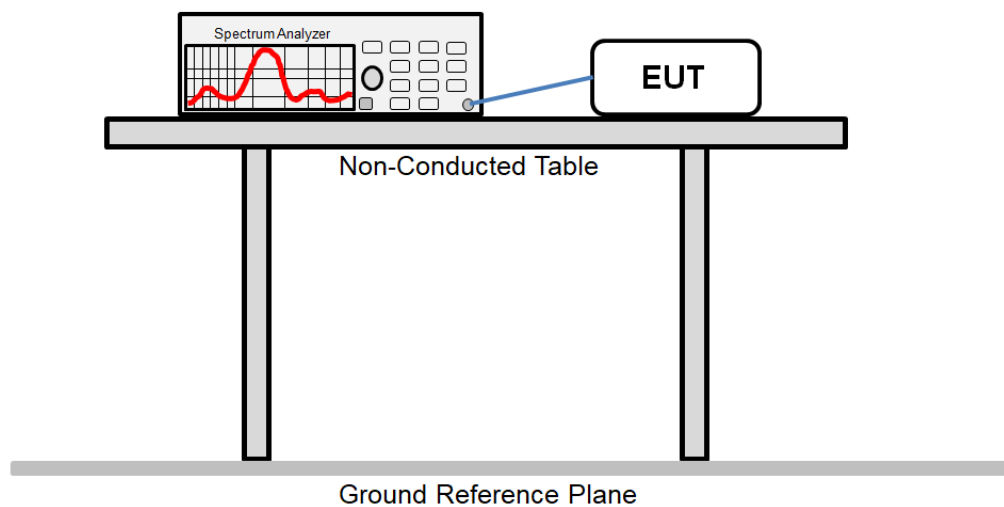
Below 1GHz (3m SAC)



Above 1GHz (3m SAC)



2) Conducted test method



4.3 Test Procedure

Test method	Test step
Radiated emission	For below 1GHz: 1. The EUT was placed on the tabletop of a rotating table 0.8 m the ground at a 3 m semi anechoic chamber. The measurement distance from the EUT to the receiving antenna is 3 m. 2. EUT works in each mode of operation that needs to be tested, and having the EUT continuously working, respectively on 3 axis (X, Y & Z) and considered typical configuration to obtain worst position. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations. 3. Open the test software to control the test antenna and test turntable. Perform the test, save the test results, and export the test data. For above 1GHz: 1. The EUT was placed on the tabletop of a rotating table 1.5 m the ground at a 3 m fully anechoic room. The measurement distance from the EUT to the receiving antenna is 3 m. 2. EUT works in each mode of operation that needs to be tested, and having the EUT continuously working, respectively on 3 axis (X, Y & Z) and considered typical configuration to obtain worst position. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations. 3. Open the test software to control the test antenna and test turntable. Perform the test, save the test results, and export the test data.
Conducted test method	1. The antenna port of EUT was connected to the test port of the test system through an RF cable. 2. The EUT is keeping in continuous transmission mode and tested in all modulation modes. 3. Open the test software, prepare a test plan, and control the system through the software. After the test is completed, the test report is exported through the test software.

5 Test Results

5.1 Summary

5.1.1 Clause and data summary

Test items	Standard clause	Test data	Result
Antenna Requirement	15.203 15.247 (b)(4)	See Section 5.2	Pass
AC Power Line Conducted Emission	15.207	N/A	N/A
Conducted Output Power	15.247 (b)(2)	See Section 5.3	Pass
20dB Occupied Bandwidth	15.247 (a)(1)(i)	See Section 5.4	Pass
Carrier Frequencies Separation	15.247 (a)(1)	See Section 5.5	Pass
Hopping Channel Number	5.247 (a)(1)(i)	See Section 5.6	Pass
Dwell Time	15.247 (a)(1)(i)	See Section 5.7	Pass
Spurious Emission	15.205 15.209 15.247 (d)	See Section 5.8	Pass
Remark: 1. Pass: The EUT complies with the essential requirements in the standard. 2. N/A: Not Applicable. 3. The cable insertion loss used by "RF Output Power" and other conduction measurement items is 0.5dB (provided by the customer).			
Test Method:	ANSI C63.10-2013 KDB 558074 D01 15.247 Meas Guidance v05r02		

5.1.2 Test Limit

Test items	Limit																														
Conducted Output Power	For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.																														
20dB Occupied Bandwidth Hopping Channel Number Dwell Time	For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.																														
Carrier Frequencies Separation	Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater																														
Spurious Emission	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)): <table><tr><th rowspan="2">Frequency (MHz)</th><th colspan="2">Limit (dBµV/m)</th><th rowspan="2">Detector</th></tr><tr><th>@ 3m</th><th>@ 10m</th></tr><tr><td>30 – 88</td><td>40.0</td><td>30.0</td><td>Quasi-peak</td></tr><tr><td>88 – 216</td><td>43.5</td><td>33.5</td><td>Quasi-peak</td></tr><tr><td>216 – 960</td><td>46.0</td><td>36.0</td><td>Quasi-peak</td></tr><tr><td>960 – 1000</td><td>54.0</td><td>44.0</td><td>Quasi-peak</td></tr></table> Note: The more stringent limit applies at transition frequencies. <table><tr><th rowspan="2">Frequency</th><th colspan="2">Limit (dBµV/m) @ 3m</th></tr><tr><th>Average</th><th>Peake</th></tr><tr><td>Above 1 GHz</td><td>54.0</td><td>74.0</td></tr></table> Note: The measurement bandwidth shall be 1 MHz or greater.	Frequency (MHz)	Limit (dBµV/m)		Detector	@ 3m	@ 10m	30 – 88	40.0	30.0	Quasi-peak	88 – 216	43.5	33.5	Quasi-peak	216 – 960	46.0	36.0	Quasi-peak	960 – 1000	54.0	44.0	Quasi-peak	Frequency	Limit (dBµV/m) @ 3m		Average	Peake	Above 1 GHz	54.0	74.0
Frequency (MHz)	Limit (dBµV/m)		Detector																												
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960 – 1000	54.0	44.0	Quasi-peak																												
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	Average	Peake																													
Above 1 GHz	54.0	74.0																													

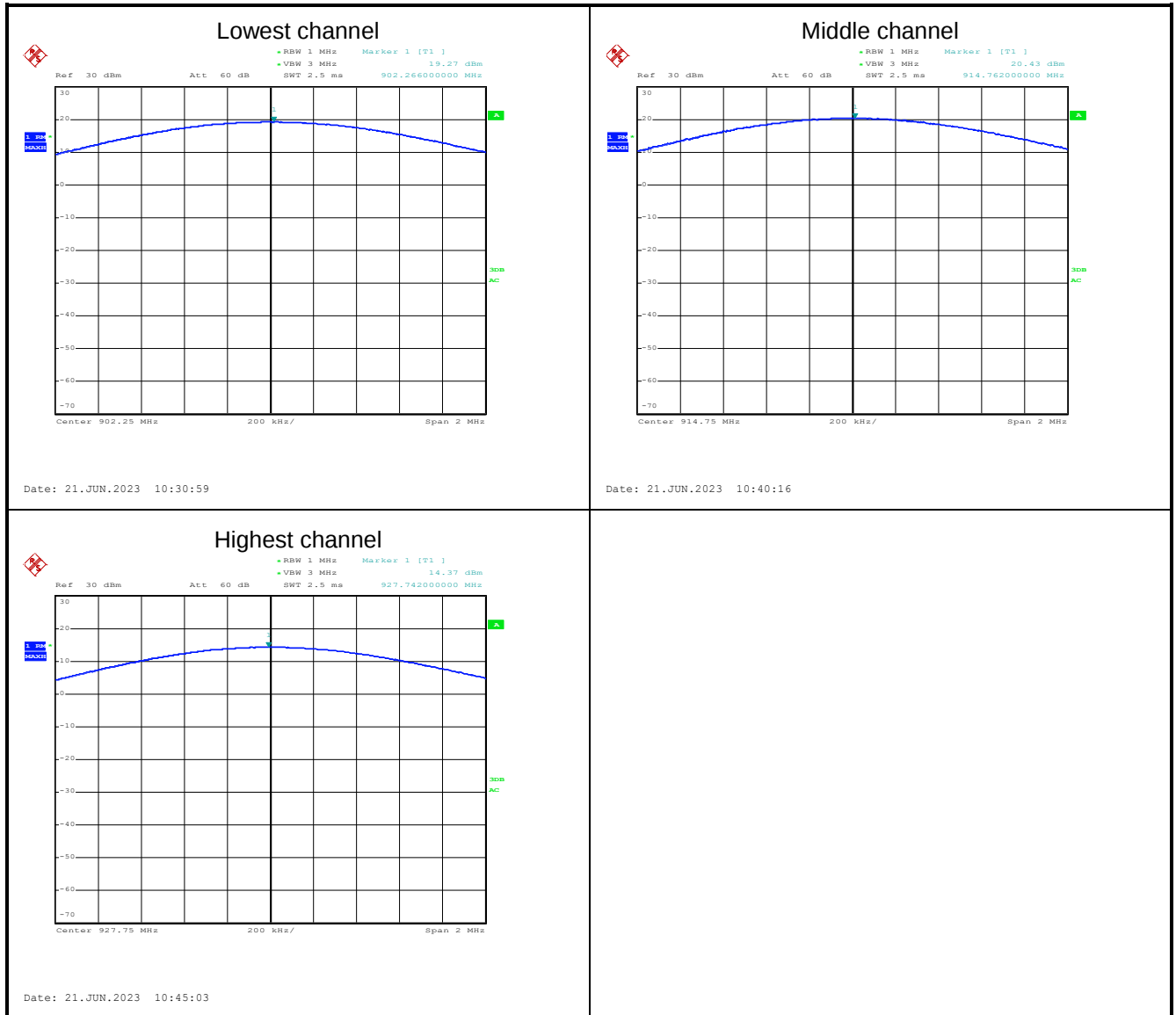
5.2 Antenna Requirement

Standard requirement:	FCC Part 15 C Section 15.203 & 247(b)
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. 15.247(b) (4) requirement: (4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.	
E.U.T Antenna:	
The EUT antenna is an Internal antenna which permanently attached, and the best case gain of the antenna is 2.5 dBi. See product internal photos for details.	

5.3 Conducted Output Power

Test channel	Maximum Output Power (dBm)	Limit (dBm)	Result
Lowest channel	19.27	30.00	Pass
Middle channel	20.43	30.00	Pass
Highest channel	14.37	30.00	Pass

Test plot as follows:

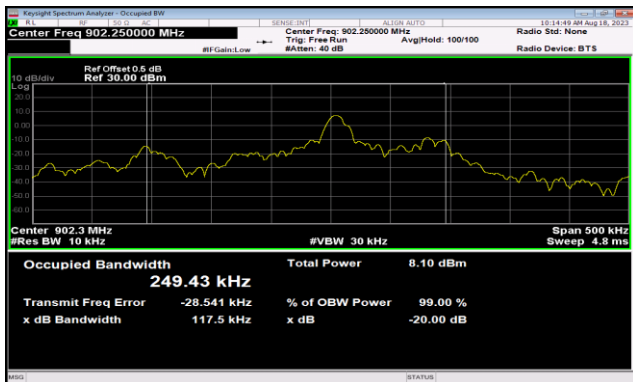


5.4 20dB Occupied Bandwidth

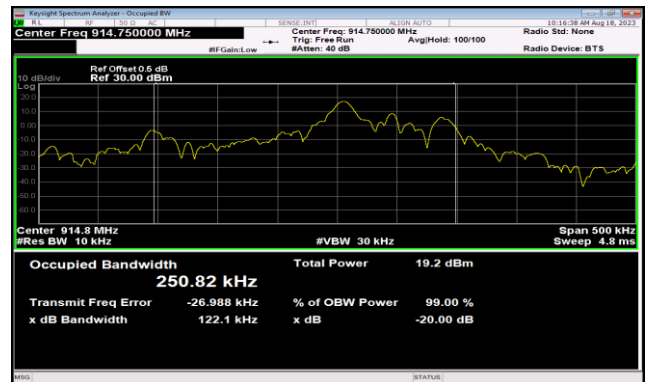
Test channel	20dB Occupy Bandwidth (kHz)	Limit (kHz)	Result
Lowest channel	117.5	$BW_{20dB} \leq 250$	Pass
Middle channel	122.1	$BW_{20dB} \leq 250$	Pass
Highest channel	181.4	$BW_{20dB} \leq 250$	Pass

Test plot as follows:

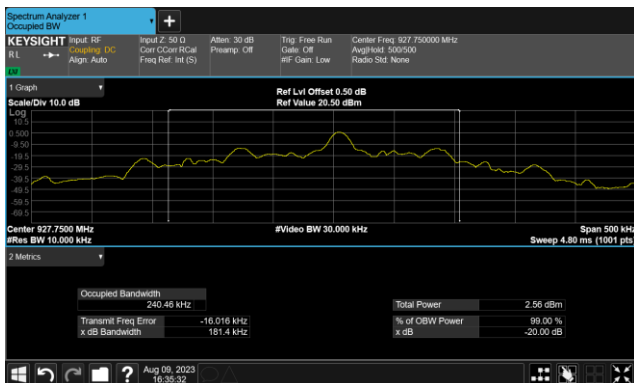
Lowest channel



Middle channel



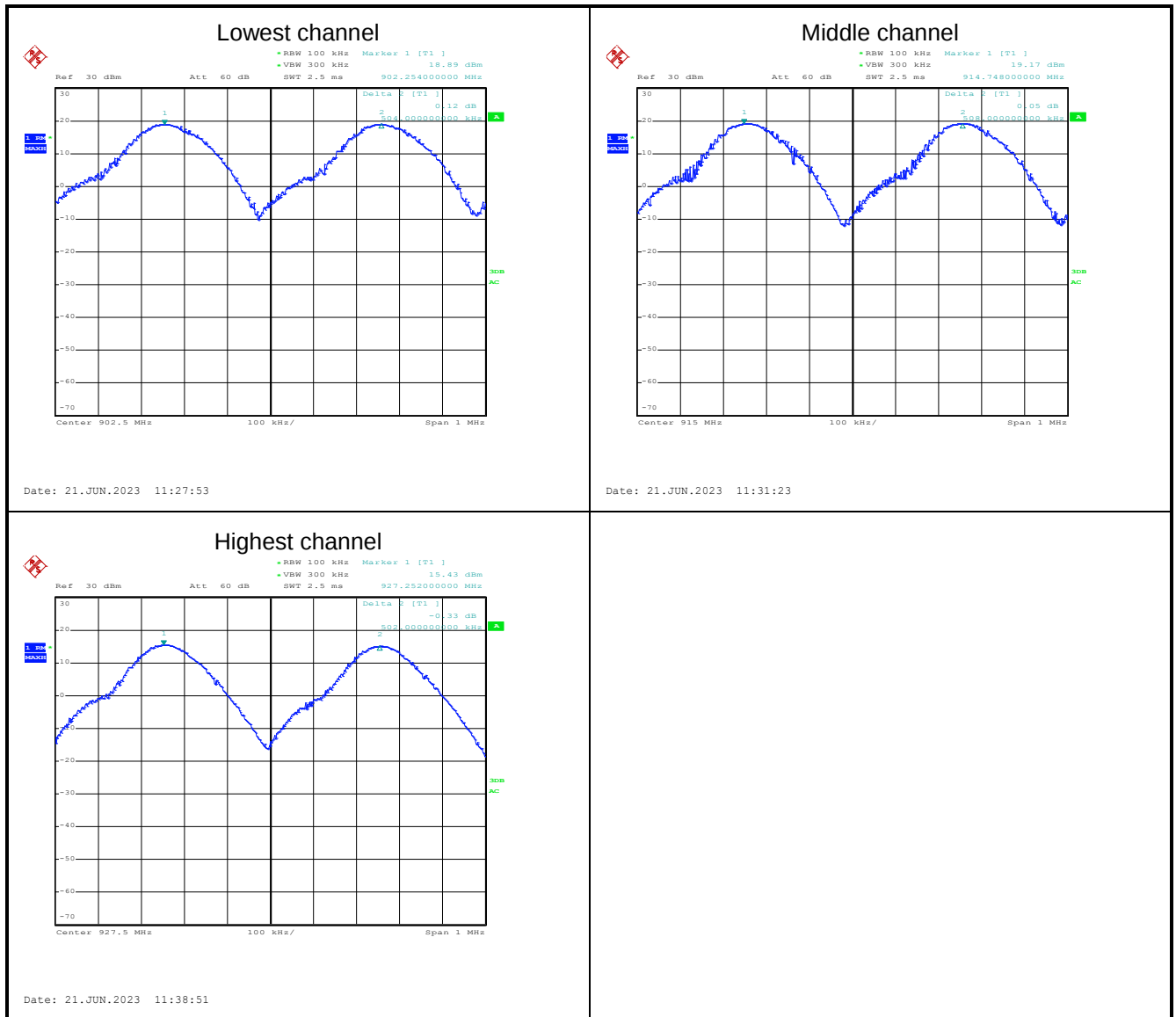
Highest channel



5.5 Carrier Frequencies Separation

Test channel	Carrier Frequencies Separation (kHz)	Limit (kHz)	Result
Lowest channel	504	259.2	Pass
Middle channel	508	259.2	Pass
Highest channel	502	259.2	Pass

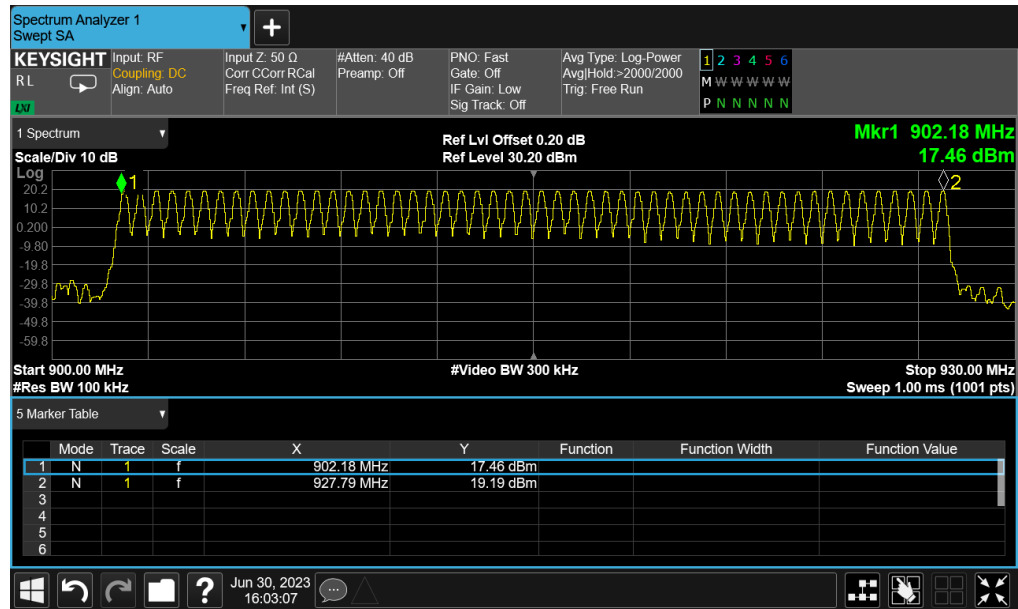
Test plot as follows:



5.6 Hopping Channel Number

Hopping channel numbers	Limit	Result
52	Nch $\geq$ 50	Pass

Test plot as follows:



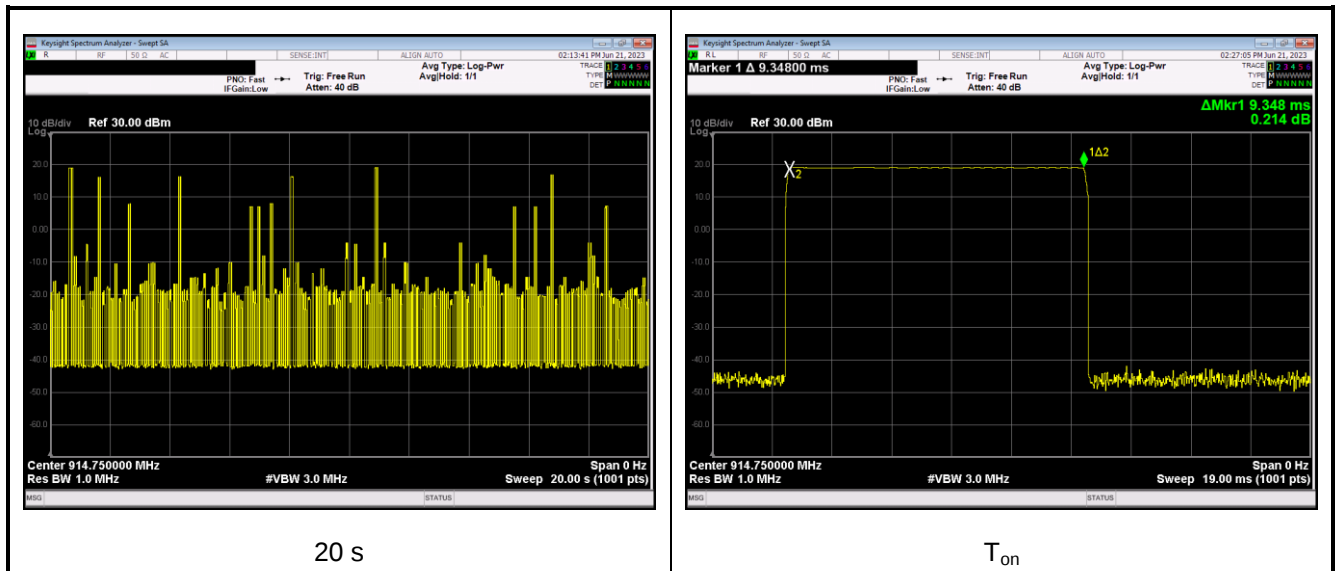
5.7 Dwell Time

T_{on} (s)	Hopping numbers (20 s period)	Dwell time (s)	Limit (s)	Result
0.009348	6	0.056628	0.4	Pass

Note:

- T_{on} is time per hop.
- Dwell time = T_{on} * Hopping numbers.

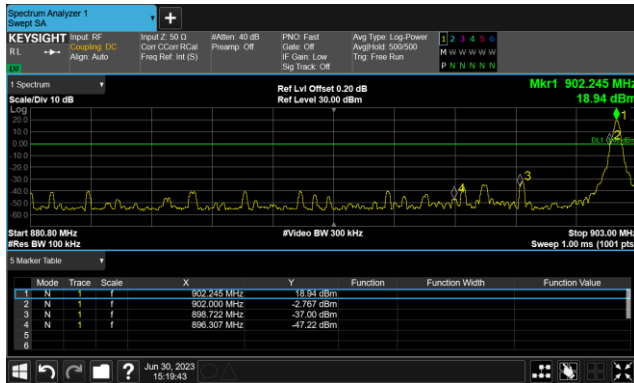
Test plot as follows:



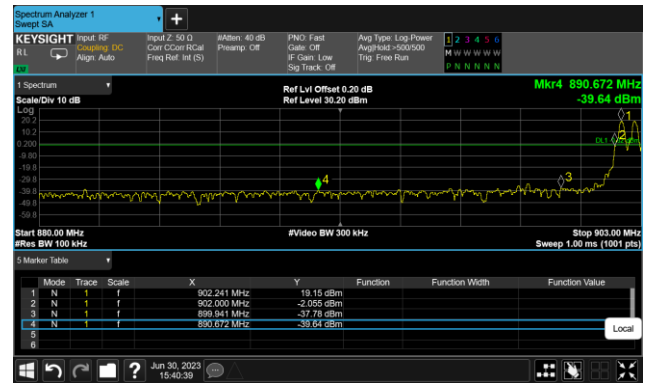
5.8 Spurious Emission

5.8.1 Band-edge Emission

Lowest Channel

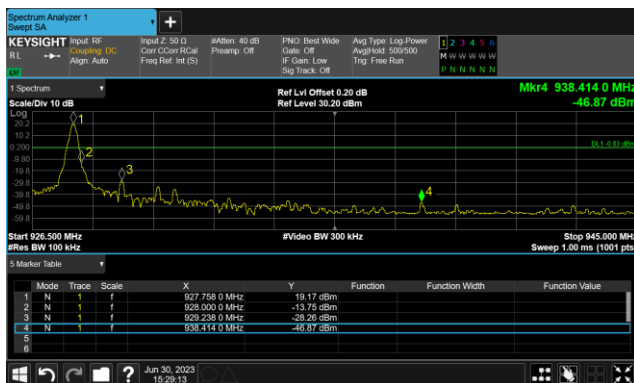


No-hopping mode

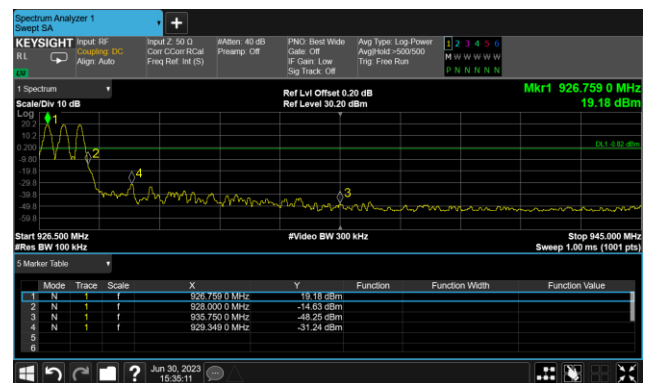


Hopping mode

Highest Channel



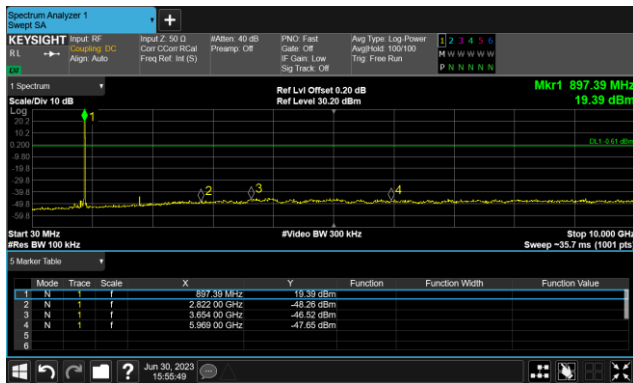
No-hopping mode



Hopping mode

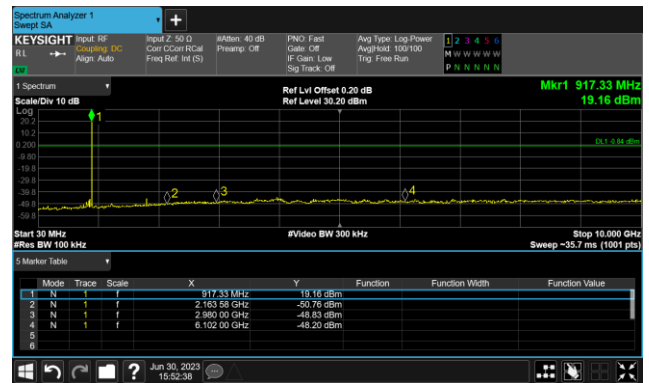
5.8.2 Conducted Spurious Emission

Lowest channel



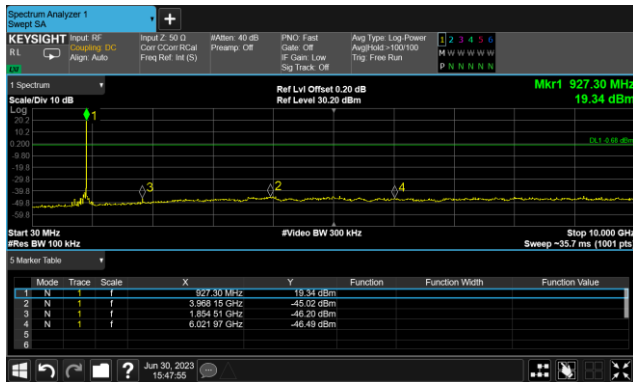
30MHz~10GHz

Middle channel



30MHz~10GHz

Highest channel

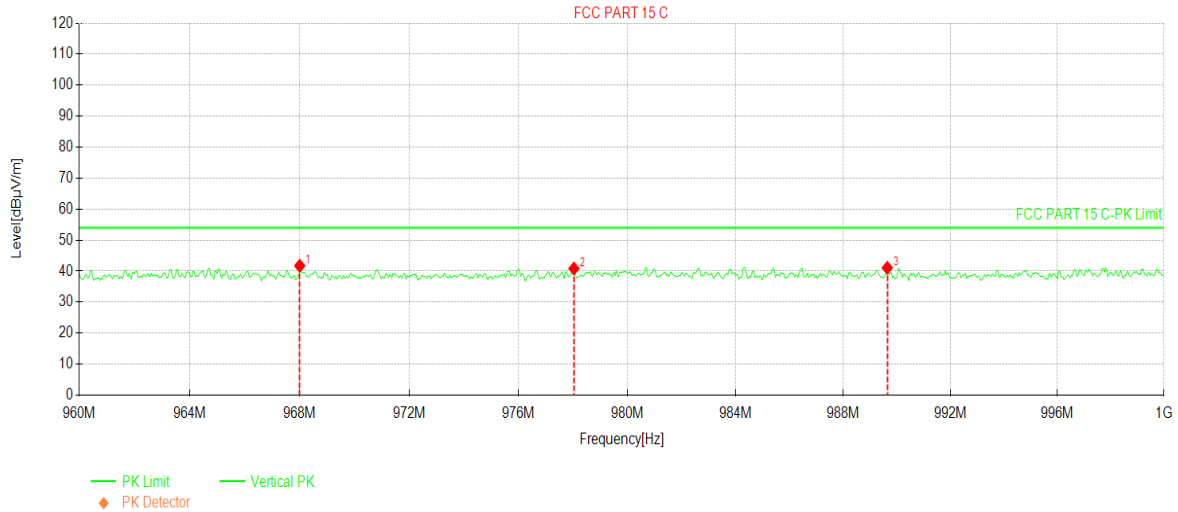


30MHz~10GHz

5.8.3 Emissions in Restricted Frequency Bands

902.25MHz:

Product Name:	UHF RFID Reader Module	Product Model:	VM-M50
Test By:	Harper	Test mode:	Tx mode
Test Channel:	960MHz-1GHz	Polarization:	Vertical
Test Voltage:	AC 120/60Hz		



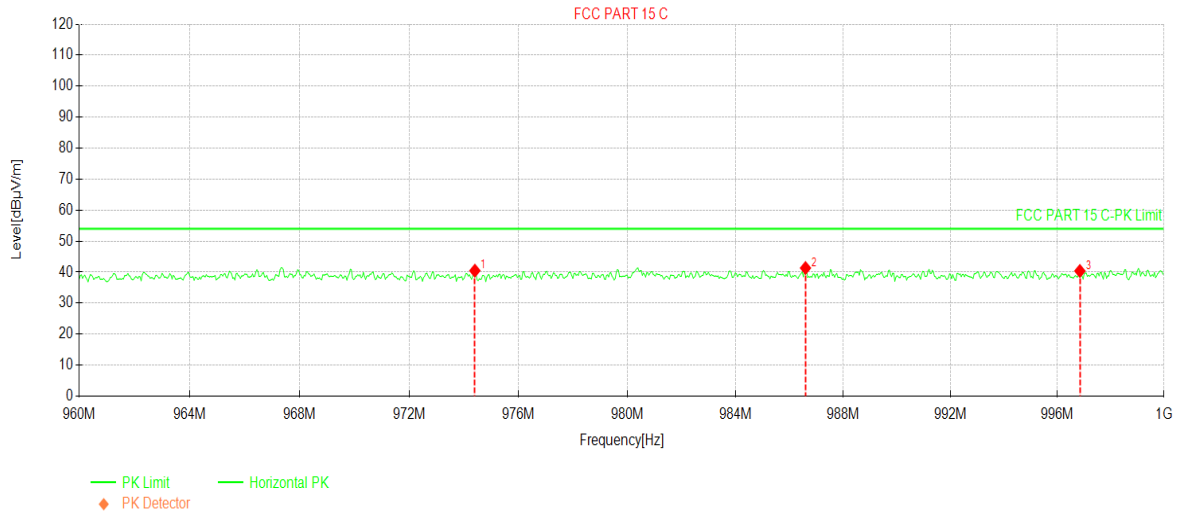
Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Trace	Polarity
1	968.000	15.98	41.72	25.74	54.00	12.28	PK	Vertical
2	978.040	14.94	40.85	25.91	54.00	13.15	PK	Vertical
3	989.640	14.88	41.08	26.20	54.00	12.92	PK	Vertical

Remark:

1. Level = Reading + FactorAntenna Factor + Cable Loss – Preamplifier Factor).

Product Name:	UHF RFID Reader Module	Product Model:	VM-M50
Test By:	Harper	Test mode:	Tx mode
Test Channel:	960MHz-1GHz	Polarization:	Horizontal
Test Voltage:	AC 120/60Hz		



Suspected Data List

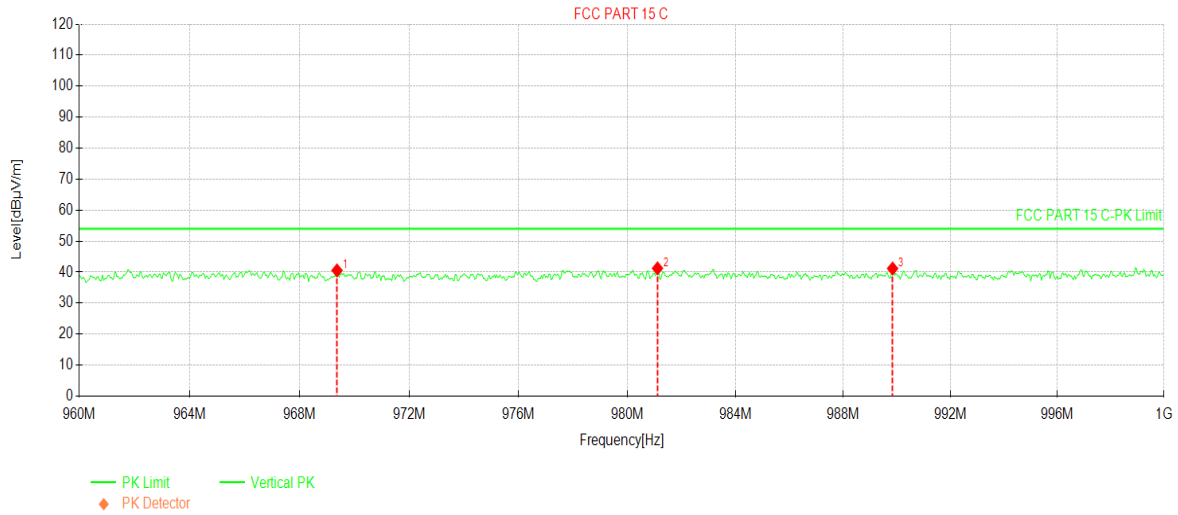
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Trace	Polarity
1	974.400	14.62	40.47	25.85	54.00	13.53	PK	Horizontal
2	986.600	15.21	41.33	26.12	54.00	12.67	PK	Horizontal
3	996.840	14.18	40.38	26.20	54.00	13.62	PK	Horizontal

Remark:

1. Level = Reading + FactorAntenna Factor + Cable Loss – Preamplifier Factor).

914.75MHz:

Product Name:	UHF RFID Reader Module	Product Model:	VM-M50
Test By:	Harper	Test mode:	Tx mode
Test Channel:	960MHz-1GHz	Polarization:	Vertical
Test Voltage:	AC 120/60Hz		

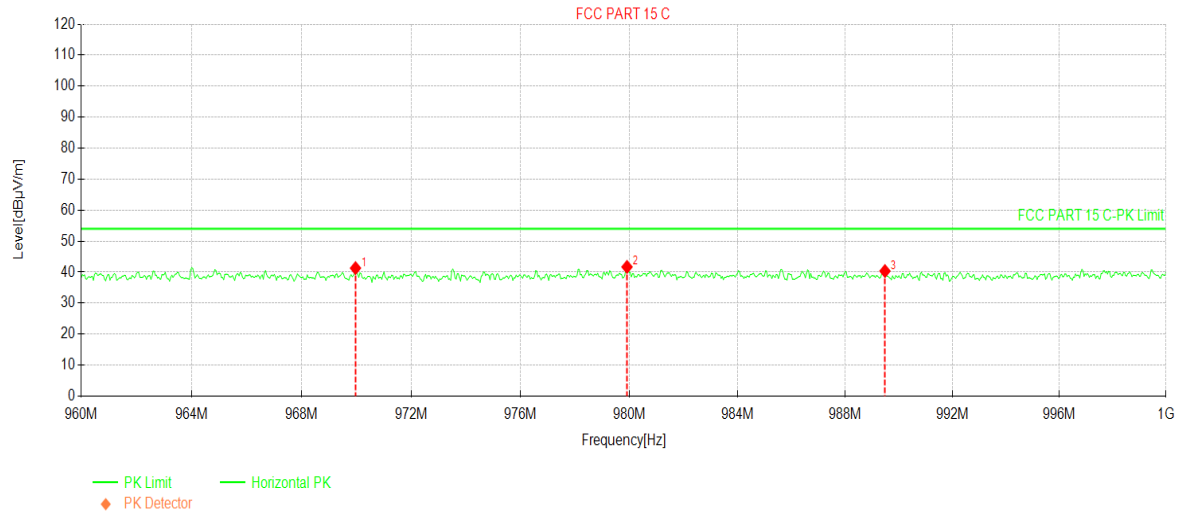

Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Trace	Polarity
1	969.360	14.78	40.55	25.77	54.00	13.45	PK	Vertical
2	981.120	15.25	41.22	25.97	54.00	12.78	PK	Vertical
3	989.840	14.96	41.17	26.21	54.00	12.83	PK	Vertical

Remark:

1. Level = Reading + FactorAntenna Factor + Cable Loss – Preamplifier Factor).

Product Name:	UHF RFID Reader Module	Product Model:	VM-M50
Test By:	Harper	Test mode:	Tx mode
Test Channel:	960MHz-1GHz	Polarization:	Horizontal
Test Voltage:	AC 120/60Hz		



Suspected Data List

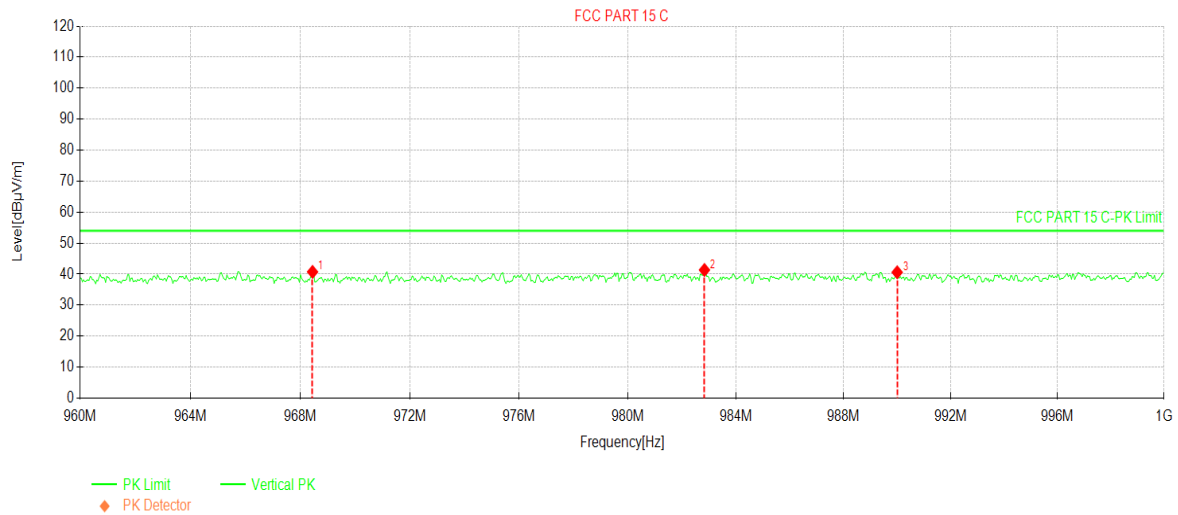
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Trace	Polarity
1	969.960	15.51	41.29	25.78	54.00	12.71	PK	Horizontal
2	979.920	15.74	41.68	25.94	54.00	12.32	PK	Horizontal
3	989.480	14.16	40.36	26.20	54.00	13.64	PK	Horizontal

Remark:

1. Level = Reading + FactorAntenna Factor + Cable Loss – Preamplifier Factor).

927.75MHz:

Product Name:	UHF RFID Reader Module	Product Model:	VM-M50
Test By:	Harper	Test mode:	Tx mode
Test Channel:	960MHz-1GHz	Polarization:	Vertical
Test Voltage:	AC 120/60Hz		



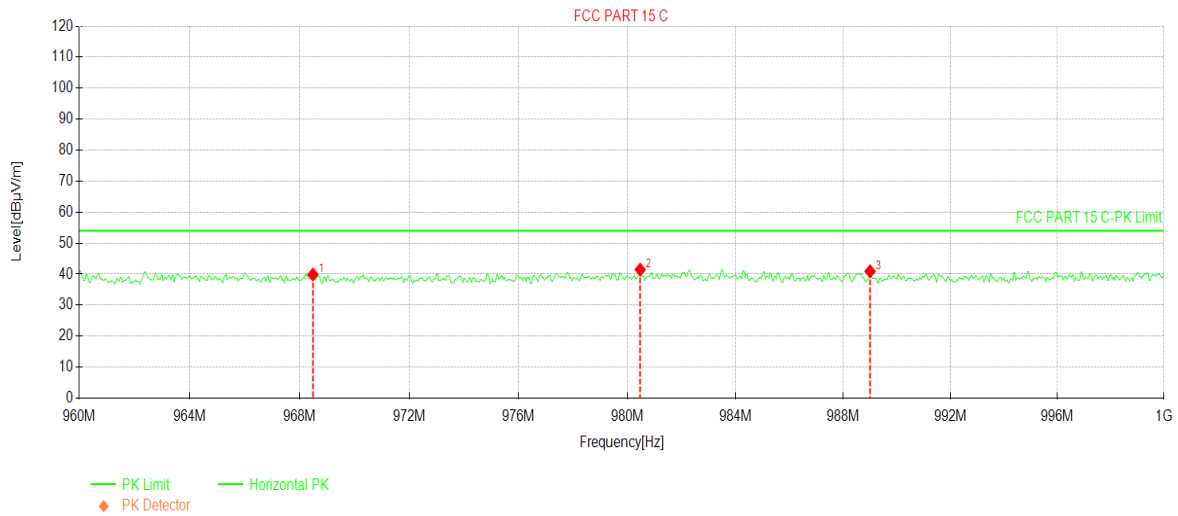
Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Trace	Polarity
1	968.440	14.98	40.73	25.75	54.00	13.27	PK	Vertical
2	982.840	15.32	41.34	26.02	54.00	12.66	PK	Vertical
3	990.000	14.38	40.59	26.21	54.00	13.41	PK	Vertical

Remark:

1. Level = Reading + FactorAntenna Factor + Cable Loss – Preamplifier Factor).

Product Name:	UHF RFID Reader Module	Product Model:	VM-M50
Test By:	Harper	Test mode:	Tx mode
Test Channel:	960MHz-1GHz	Polarization:	Horizontal
Test Voltage:	AC 120/60Hz		



Suspected Data List

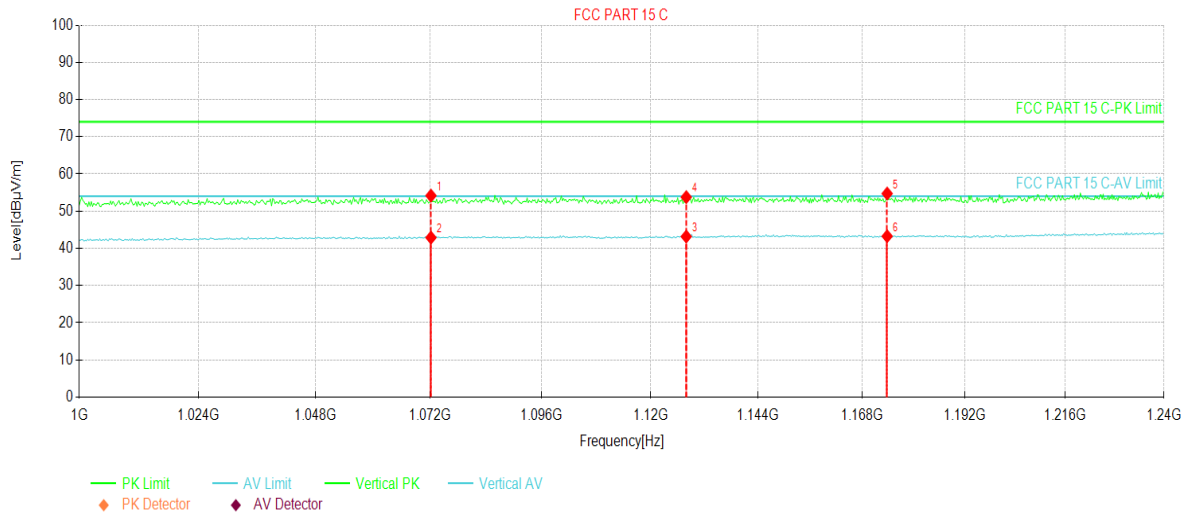
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Trace	Polarity
1	968.480	14.14	39.89	25.75	54.00	14.11	PK	Horizontal
2	980.480	15.52	41.47	25.95	54.00	12.53	PK	Horizontal
3	989.000	14.74	40.92	26.18	54.00	13.08	PK	Horizontal

Remark:

1. Level = Reading + FactorAntenna Factor + Cable Loss – Preamplifier Factor).

902.25MHz:

Product Name:	UHF RFID Reader Module	Product Model:	VM-M50
Test By:	Harper	Test mode:	Tx mode
Test Channel:	1GHz-1.24GHz	Polarization:	Vertical
Test Voltage:	AC 120/60Hz		



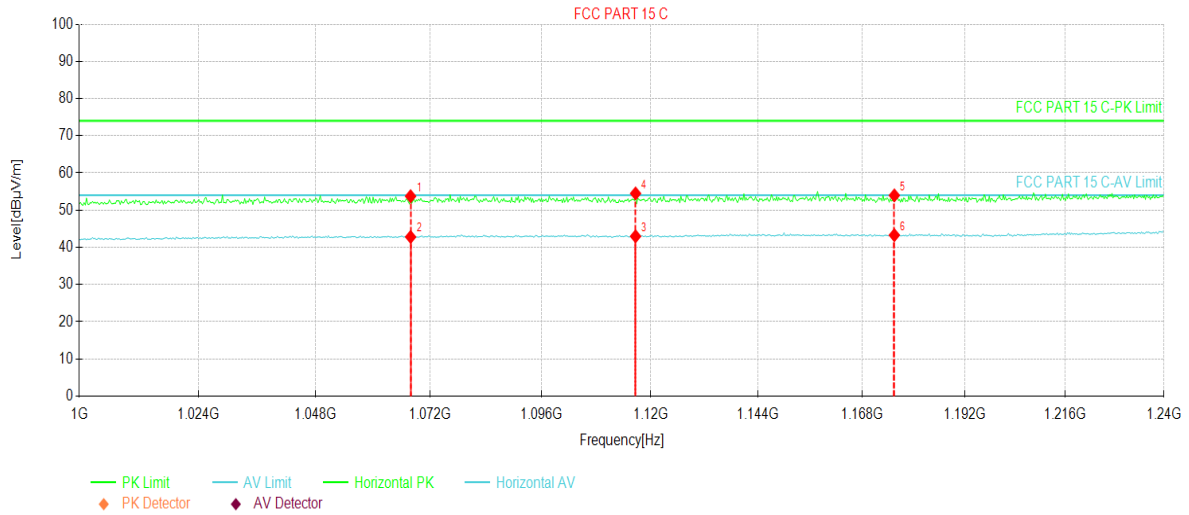
Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Trace	Polarity
1	1072.24	24.36	54.16	29.80	74.00	19.84	PK	Vertical
2	1072.24	13.09	42.89	29.80	54.00	11.11	AV	Vertical
3	1127.92	12.92	43.17	30.25	54.00	10.83	AV	Vertical
4	1127.92	23.51	53.76	30.25	74.00	20.24	PK	Vertical
5	1173.76	24.43	54.72	30.29	74.00	19.28	PK	Vertical
6	1173.76	12.96	43.25	30.29	54.00	10.75	AV	Vertical

Remark:

1. Level = Reading + FactorAntenna Factor + Cable Loss – Preamplifier Factor).

Product Name:	UHF RFID Reader Module	Product Model:	VM-M50
Test By:	Harper	Test mode:	Tx mode
Test Channel:	1GHz-1.24GHz	Polarization:	Horizontal
Test Voltage:	AC 120/60Hz		



Suspected Data List

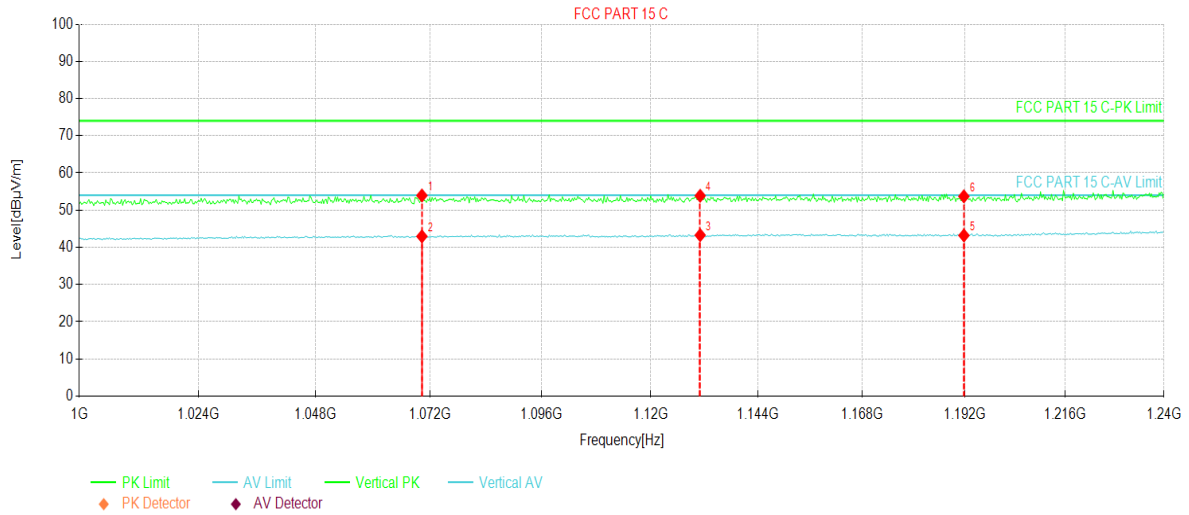
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Trace	Polarity
1	1067.92	23.97	53.74	29.77	74.00	20.26	PK	Horizontal
2	1067.92	13.03	42.80	29.77	54.00	11.20	AV	Horizontal
3	1116.64	12.83	42.97	30.14	54.00	11.03	AV	Horizontal
4	1116.64	24.35	54.49	30.14	74.00	19.51	PK	Horizontal
5	1175.44	23.69	53.96	30.27	74.00	20.04	PK	Horizontal
6	1175.44	13.01	43.28	30.27	54.00	10.72	AV	Horizontal

Remark:

1. Level = Reading + FactorAntenna Factor + Cable Loss – Preamplifier Factor).

914.75MHz:

Product Name:	UHF RFID Reader Module	Product Model:	VM-M50
Test By:	Harper	Test mode:	Tx mode
Test Channel:	1GHz-1.24GHz	Polarization:	Vertical
Test Voltage:	AC 120/60Hz		



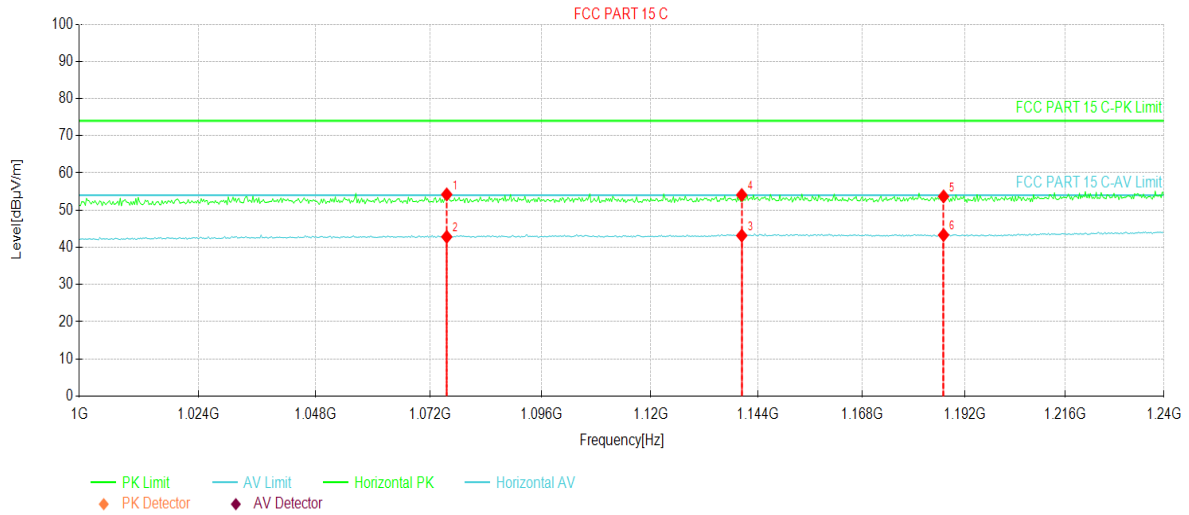
Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Trace	Polarity
1	1070.32	24.16	53.94	29.78	74.00	20.06	PK	Vertical
2	1070.32	13.18	42.96	29.78	54.00	11.04	AV	Vertical
3	1131.04	12.99	43.27	30.28	54.00	10.73	AV	Vertical
4	1131.04	23.59	53.87	30.28	74.00	20.13	PK	Vertical
5	1191.76	13.05	43.20	30.15	54.00	10.80	AV	Vertical
6	1191.76	23.56	53.71	30.15	74.00	20.29	PK	Vertical

Remark:

1. Level = Reading + FactorAntenna Factor + Cable Loss – Preamplifier Factor).

Product Name:	UHF RFID Reader Module	Product Model:	VM-M50
Test By:	Harper	Test mode:	Tx mode
Test Channel:	1GHz-1.24GHz	Polarization:	Horizontal
Test Voltage:	AC 120/60Hz		



Suspected Data List

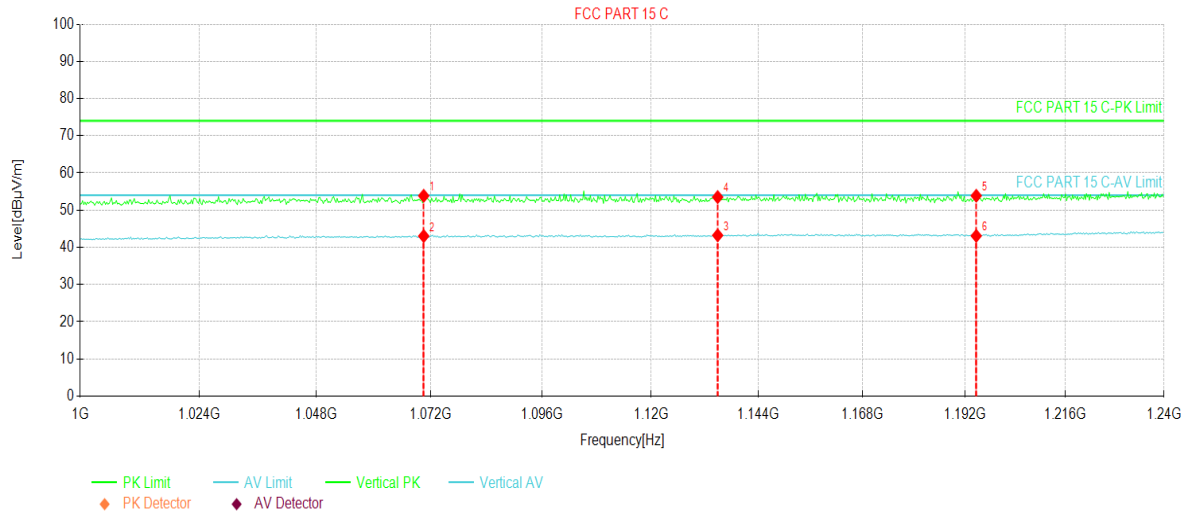
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Trace	Polarity
1	1075.60	24.40	54.22	29.82	74.00	19.78	PK	Horizontal
2	1075.60	13.00	42.82	29.82	54.00	11.18	AV	Horizontal
3	1140.40	12.79	43.17	30.38	54.00	10.83	AV	Horizontal
4	1140.40	23.70	54.08	30.38	74.00	19.92	PK	Horizontal
5	1186.96	23.50	53.68	30.18	74.00	20.32	PK	Horizontal
6	1186.96	13.14	43.32	30.18	54.00	10.68	AV	Horizontal

Remark:

1. Level = Reading + FactorAntenna Factor + Cable Loss – Preamplifier Factor).

927.75MHz:

Product Name:	UHF RFID Reader Module	Product Model:	VM-M50
Test By:	Harper	Test mode:	Tx mode
Test Channel:	1GHz-1.24GHz	Polarization:	Vertical
Test Voltage:	AC 120/60Hz		



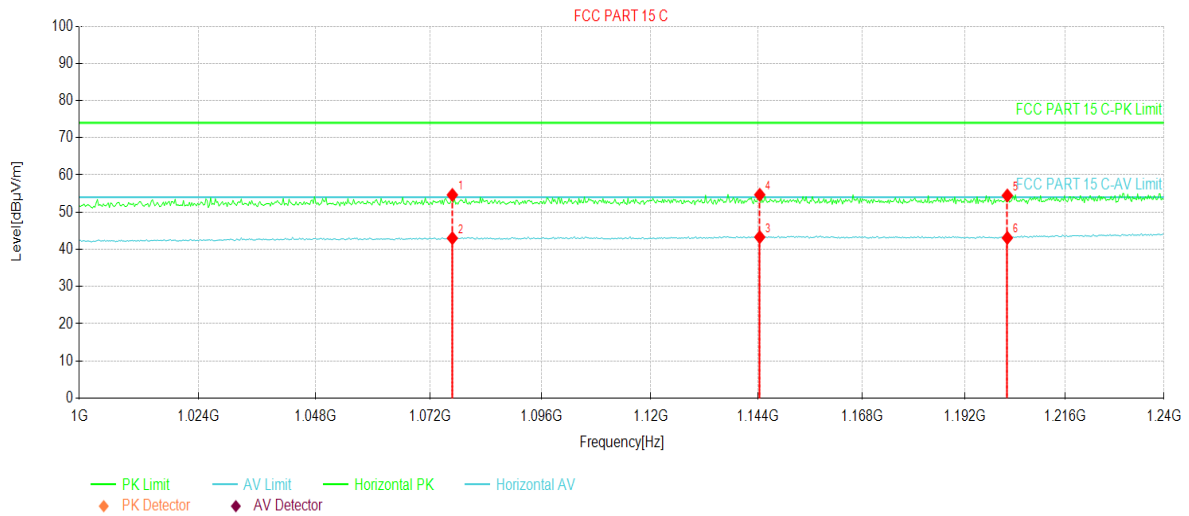
Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Trace	Polarity
1	1070.56	24.08	53.86	29.78	74.00	20.14	PK	Vertical
2	1070.56	13.25	43.03	29.78	54.00	10.97	AV	Vertical
3	1134.88	12.91	43.23	30.32	54.00	10.77	AV	Vertical
4	1134.88	23.20	53.52	30.32	74.00	20.48	PK	Vertical
5	1194.64	23.76	53.88	30.12	74.00	20.12	PK	Vertical
6	1194.64	12.97	43.09	30.12	54.00	10.91	AV	Vertical

Remark:

1. Level = Reading + FactorAntenna Factor + Cable Loss – Preamplifier Factor).

Product Name:	UHF RFID Reader Module	Product Model:	VM-M50
Test By:	Harper	Test mode:	Tx mode
Test Channel:	1GHz-1.24GHz	Polarization:	Horizontal
Test Voltage:	AC 120/60Hz		



Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Trace	Polarity
1	1076.80	24.81	54.63	29.82	74.00	19.37	PK	Horizontal
2	1076.80	13.19	43.01	29.82	54.00	10.99	AV	Horizontal
3	1144.48	12.87	43.29	30.42	54.00	10.71	AV	Horizontal
4	1144.48	24.25	54.67	30.42	74.00	19.33	PK	Horizontal
5	1202.08	24.35	54.46	30.11	74.00	19.54	PK	Horizontal
6	1202.08	12.97	43.08	30.11	54.00	10.92	AV	Horizontal

Remark:

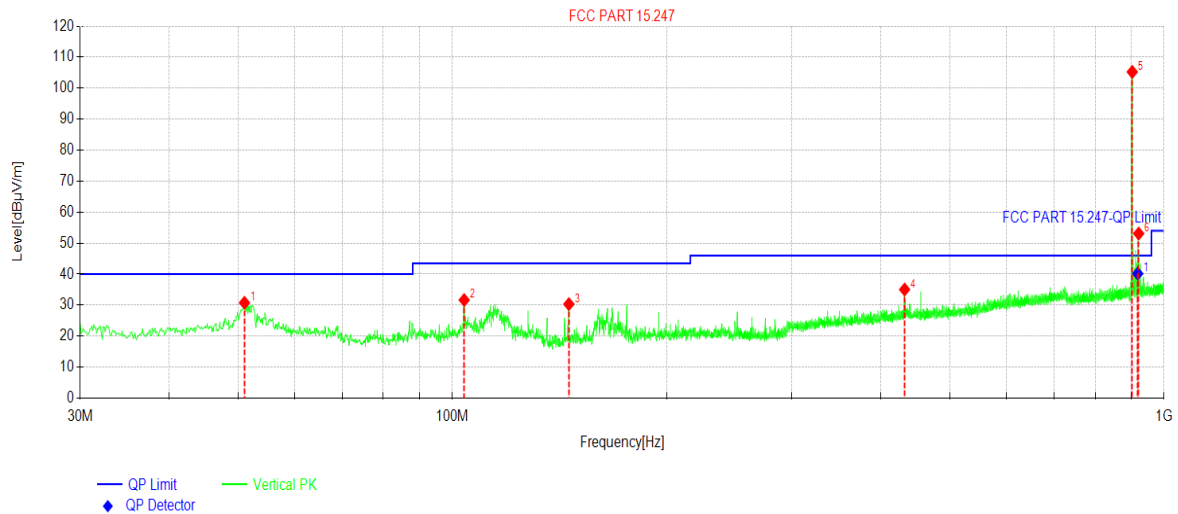
1. Level = Reading + FactorAntenna Factor + Cable Loss – Preamplifier Factor).

5.8.4 Emissions in Non-restricted Frequency Bands

Below 1GHz:

902.25MHz:

Product Name:	UHF RFID Reader Module	Product Model:	VM-M50
Test By:	Harper	Test mode:	Tx mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Vertical
Test Voltage:	AC 120/60Hz		

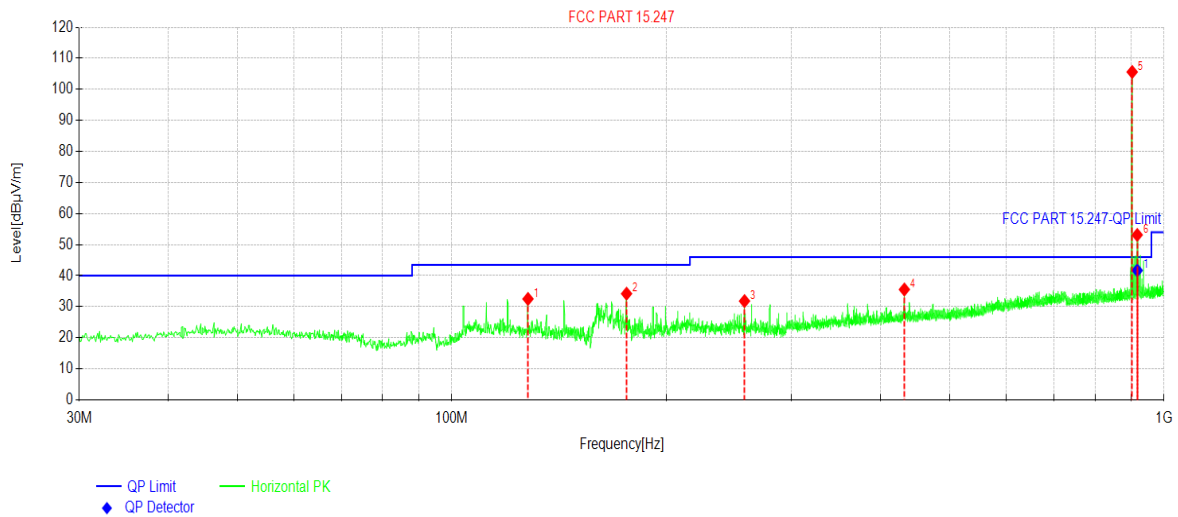


Suspected Data List								
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Trace	Polarity
1	51.0511	43.41	30.76	-12.65	40.00	9.24	PK	Vertical
2	103.921	45.86	31.64	-14.22	43.50	11.86	PK	Vertical
3	145.829	48.43	30.32	-18.11	43.50	13.18	PK	Vertical
4	432.008	44.91	35.04	-9.87	46.00	10.96	PK	Vertical
5	902.311	108.00	105.25	-2.75	46.00	-59.25	PK	Vertical
6	921.228	55.43	53.10	-2.33	46.00	-7.10	PK	Vertical
Final Data List								
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	QP Reading [dBμV/m]	Angle [°]	Verdict
1	918.415	-2.33	40.16	46.00	5.84	42.49	282	PASS

Remark:

1. Level = Reading + FactorAntenna Factor + Cable Loss – Preamplifier Factor).

Product Name:	UHF RFID Reader Module	Product Model:	VM-M50
Test By:	Harper	Test mode:	Tx mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Horizontal
Test Voltage:	AC 120/60Hz		



Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Trace	Polarity
1	127.979	50.03	32.51	-17.52	43.50	10.99	PK	Horizontal
2	175.999	51.06	34.20	-16.86	43.50	9.30	PK	Horizontal
3	257.681	45.26	31.82	-13.44	46.00	14.18	PK	Horizontal
4	432.008	45.42	35.55	-9.87	46.00	10.45	PK	Horizontal
5	902.311	108.36	105.61	-2.75	46.00	-59.61	PK	Horizontal
6	917.153	55.55	53.12	-2.43	46.00	-7.12	PK	Horizontal

Final Data List

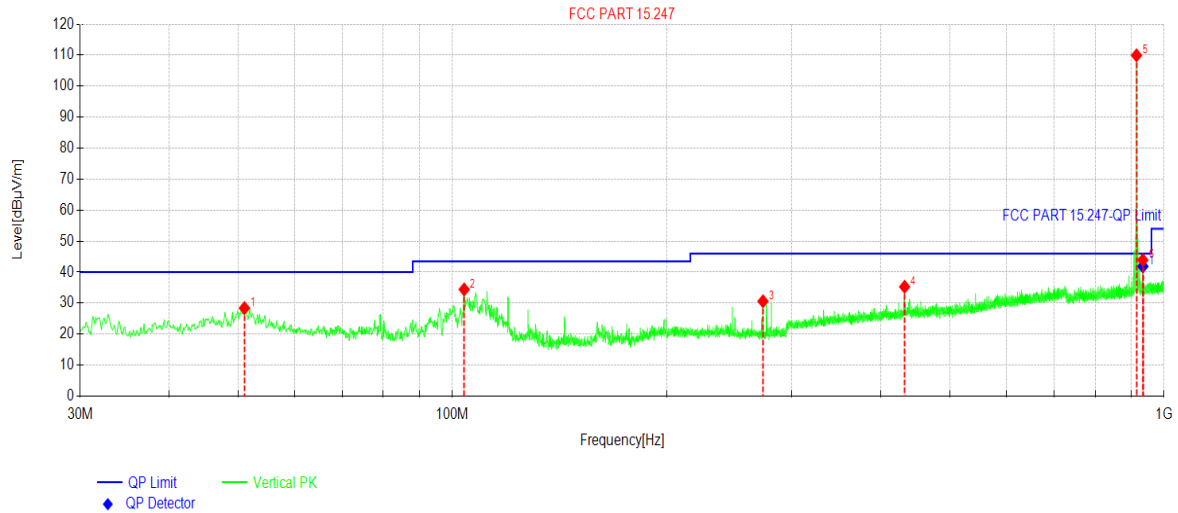
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	QP Reading [dBμV/m]	Angle [°]	Verdict
1	917.153	-2.43	41.70	46.00	4.30	44.13	130	PASS

Remark:

1. Level = Reading + FactorAntenna Factor + Cable Loss – Preamplifier Factor).

914.75MHz:

Product Name:	UHF RFID Reader Module	Product Model:	VM-M50
Test By:	Harper	Test mode:	Tx mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Vertical
Test Voltage:	AC 120/60Hz		


Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Trace	Polarity
1	51.0511	41.05	28.40	-12.65	40.00	11.60	PK	Vertical
2	103.921	48.64	34.42	-14.22	43.50	9.08	PK	Vertical
3	273.203	43.95	30.61	-13.34	46.00	15.39	PK	Vertical
4	432.008	45.15	35.28	-9.87	46.00	10.72	PK	Vertical
5	914.825	112.49	109.97	-2.52	46.00	-63.97	PK	Vertical
6	933.839	46.23	43.92	-2.31	46.00	2.08	PK	Vertical

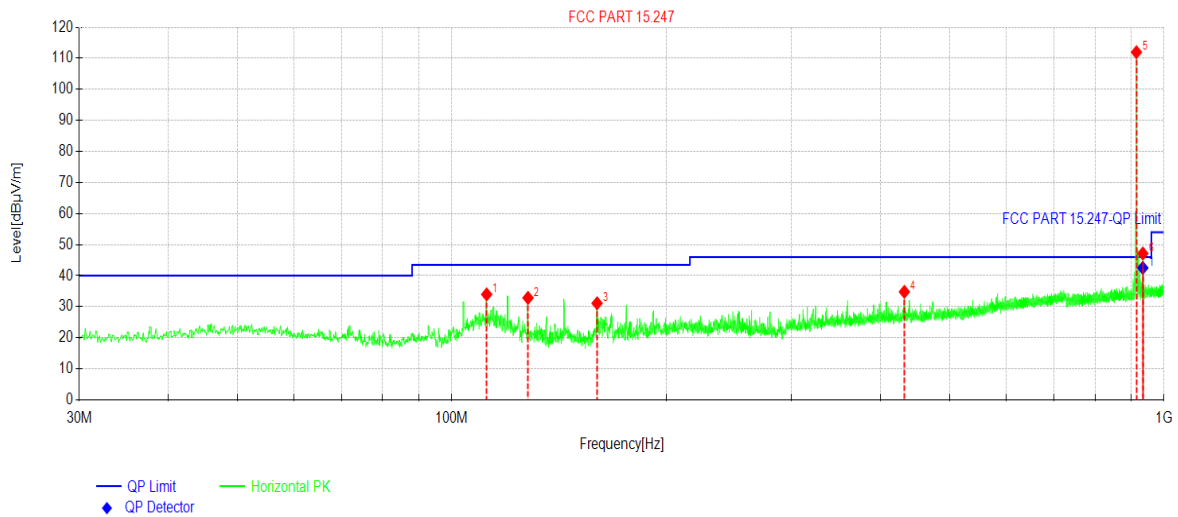
Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	QP Reading [dBμV/m]	Angle [°]	Verdict
1	933.839	-2.31	41.86	46.00	4.14	44.17	3	PASS

Remark:

1. Level = Reading + FactorAntenna Factor + Cable Loss – Preamplifier Factor).

Product Name:	UHF RFID Reader Module	Product Model:	VM-M50
Test By:	Harper	Test mode:	Tx mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Horizontal
Test Voltage:	AC 120/60Hz		



Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Trace	Polarity
1	111.973	49.16	33.98	-15.18	43.50	9.52	PK	Horizontal
2	127.979	50.38	32.86	-17.52	43.50	10.64	PK	Horizontal
3	159.993	49.02	31.11	-17.91	43.50	12.39	PK	Horizontal
4	432.008	44.67	34.80	-9.87	46.00	11.20	PK	Horizontal
5	914.825	114.49	111.97	-2.52	46.00	-65.97	PK	Horizontal
6	933.839	49.46	47.15	-2.31	46.00	-1.15	PK	Horizontal

Final Data List

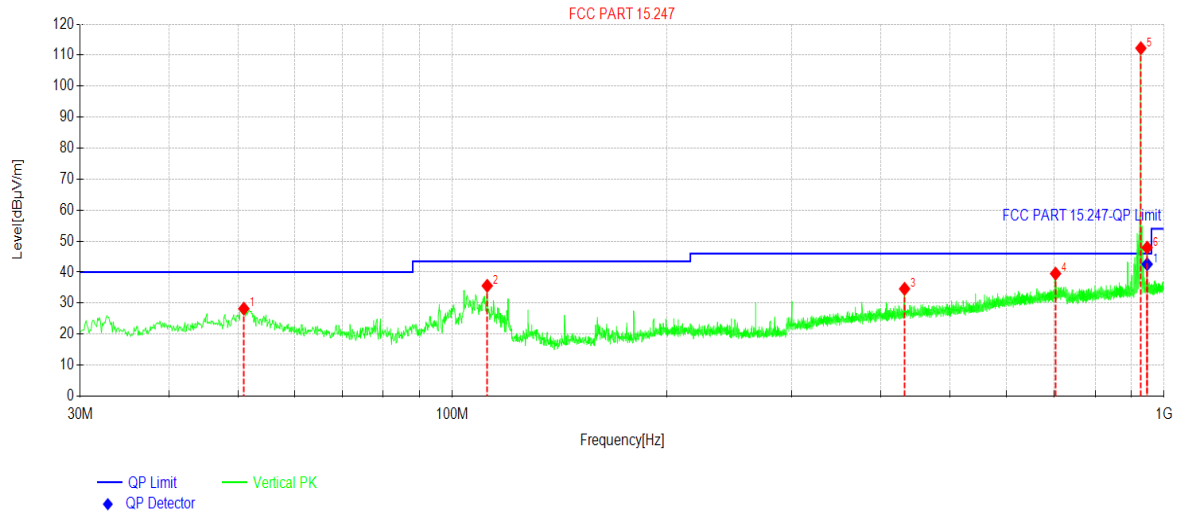
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	QP Reading [dBμV/m]	Angle [°]	Verdict
1	933.839	-2.31	42.50	46.00	3.50	44.81	51	PASS

Remark:

1. Level = Reading + FactorAntenna Factor + Cable Loss – Preamplifier Factor).

927.75MHz:

Product Name:	UHF RFID Reader Module	Product Model:	VM-M50
Test By:	Harper	Test mode:	Tx mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Vertical
Test Voltage:	AC 120/60Hz		


Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Trace	Polarity
1	50.9541	40.86	28.21	-12.65	40.00	11.79	PK	Vertical
2	111.973	50.78	35.60	-15.18	43.50	7.90	PK	Vertical
3	432.008	44.49	34.62	-9.87	46.00	11.38	PK	Vertical
4	704.023	44.56	39.53	-5.03	46.00	6.47	PK	Vertical
5	927.824	114.57	112.26	-2.31	46.00	-66.26	PK	Vertical
6	946.838	49.99	47.91	-2.08	46.00	-1.91	PK	Vertical

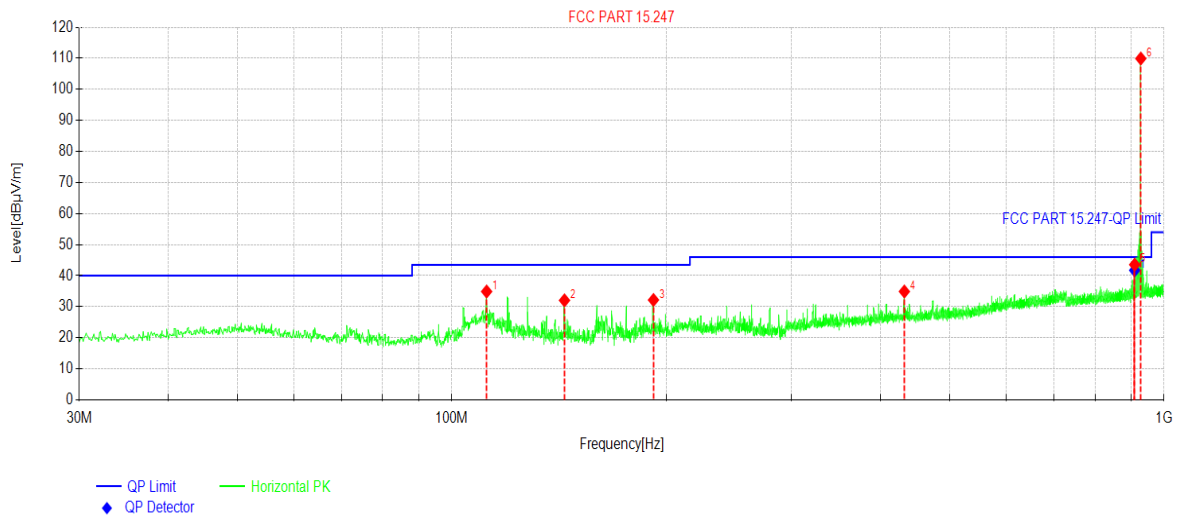
Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	QP Reading [dBμV/m]	Verdict
1	946.838	-2.08	42.57	46.00	3.43	44.65	PASS

Remark:

1. Level = Reading + FactorAntenna Factor + Cable Loss – Preamplifier Factor).

Product Name:	UHF RFID Reader Module	Product Model:	VM-M50
Test By:	Harper	Test mode:	Tx mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Horizontal
Test Voltage:	AC 120/60Hz		



Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Trace	Polarity
1	111.973	50.07	34.89	-15.18	43.50	8.61	PK	Horizontal
2	143.986	50.26	32.05	-18.21	43.50	11.45	PK	Horizontal
3	192.006	47.50	32.18	-15.32	43.50	11.32	PK	Horizontal
4	432.008	44.77	34.90	-9.87	46.00	11.10	PK	Horizontal
5	909.587	46.24	43.55	-2.69	46.00	2.45	PK	Horizontal
6	927.824	112.23	109.92	-2.31	46.00	-63.92	PK	Horizontal

Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	QP Reading [dBμV/m]	Angle [°]	Verdict
1	909.587	-2.69	41.74	46.00	4.26	44.43	249	PASS

Remark:

1. Level = Reading + FactorAntenna Factor + Cable Loss – Preamplifier Factor).

Above 1GHz:

Lowest channel						
Peak Value						
Frequency (MHz)	Read Level (dBuV)	Factor(dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polarization
1804.50	67.74	-21.87	45.87	74.00	28.13	Vertical
1804.50	68.75	-21.87	46.88	74.00	27.12	Horizontal
Average Value						
Frequency (MHz)	Read Level (dBuV)	Factor(dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polarization
1804.50	61.75	-21.87	39.88	54.00	14.12	Vertical
1804.50	62.94	-21.87	41.07	54.00	12.93	Horizontal
Middle channel						
Peak Value						
Frequency (MHz)	Read Level (dBuV)	Factor(dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polarization
1829.50	71.48	-21.73	49.75	74.00	24.25	Vertical
1829.50	71.36	-21.73	49.63	74.00	24.37	Horizontal
Average Value						
Frequency (MHz)	Read Level (dBuV)	Factor(dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polarization
1829.50	67.93	-21.73	46.20	54.00	7.80	Vertical
1829.50	67.19	-21.73	45.46	54.00	8.54	Horizontal
Highest channel						
Peak Value						
Frequency (MHz)	Read Level (dBuV)	Factor(dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polarization
1855.50	70.84	-21.59	49.25	74.00	24.75	Vertical
1855.50	73.53	-21.59	51.94	74.00	22.06	Horizontal
Average Value						
Frequency (MHz)	Read Level (dBuV)	Factor(dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polarization
1855.50	64.25	-21.59	42.66	54.00	11.34	Vertical
1855.50	66.10	-21.59	44.51	54.00	9.49	Horizontal
Remark:						
1. Level = Read level + Factor.						

-----End of report-----