

CFR 47 FCC PART 15 SUBPART C

TEST REPORT

For

T200 PLUS 2K AI Dash Cam + 1080P Rear Cam

MODEL NUMBER: BT533643

REPORT NUMBER: E04A23080299F00201

ISSUE DATE: September 1, 2023

FCC ID:WUI-AICAMWIFI

Prepared for

Winplus Co., Ltd

Suites 6-11, 7th Floor, Corporation Park, 11 On Lai Street, Shatin, Hong Kong

Prepared by

Guangdong Global Testing Technology Co., Ltd.

**Room 101-105, 203-210, Building 1, No.2, Keji 8 Road, Songshan
Lake Park, Dongguan city, Guangdong, People's Republic of China,
523808**

**This report shall not be reproduced, except in full, without the written approval of
Guangdong Global Testing Technology Co., Ltd.**

Revision History

Rev.	Issue Date	Revisions	Revised By
V0	September 1, 2023	Initial Issue	Jok Yang

Summary of Test Results

Test Item	Clause	Limit/Requirement	Result
Antenna Requirement	N/A	FCC Part 15.203/15.247 (c)	Pass
AC Power Line Conducted Emission	ANSI C63.10-2013, Clause 6.2	FCC Part 15.207	Pass
Conducted Output Power	ANSI C63.10-2013, Clause 11.9.1.3	FCC Part 15.247 (b)(3)	Pass
6dB Bandwidth and 99% Occupied Bandwidth	ANSI C63.10-2013, Clause 11.8.1	FCC Part 15.247 (a)(2)	Pass
Power Spectral Density	ANSI C63.10-2013, Clause 11.10.2	FCC Part 15.247 (e)	Pass
Conducted Band edge and spurious emission	ANSI C63.10-2013, Clause 11.11	FCC Part 15.247(d)	Pass
Radiated Band edge and Spurious Emission	ANSI C63.10-2013, Clause 11.11 & Clause 11.12	FCC Part 15.205/15.209	Pass
Duty Cycle	ANSI C63.10-2013, Clause 11.6	None; for reporting purposes only.	Pass

*This test report is only published to and used by the applicant, and it is not for evidence purpose in China.

*The measurement result for the sample received is <Pass> according to <CFR 47 FCC PART 15 SUBPART C> when <Accuracy Method> decision rule is applied.

CONTENTS

1. ATTESTATION OF TEST RESULTS.....	5
2. TEST METHODOLOGY.....	6
3. FACILITIES AND ACCREDITATION.....	6
4. CALIBRATION AND UNCERTAINTY.....	7
4.1. <i>MEASURING INSTRUMENT CALIBRATION</i>	7
4.2. <i>MEASUREMENT UNCERTAINTY</i>	7
5. EQUIPMENT UNDER TEST	8
5.1. <i>DESCRIPTION OF EUT</i>	8
5.2. <i>CHANNEL LIST</i>	8
5.3. <i>Maximum Conducted Peak Output Power</i>	9
5.4. <i>TEST CHANNEL CONFIGURATION</i>	9
5.5. <i>THE WORSE CASE POWER SETTING PARAMETER</i>	9
5.6. <i>DESCRIPTION OF AVAILABLE ANTENNAS</i>	10
5.7. <i>SUPPORT UNITS FOR SYSTEM TEST</i>	10
5.8. <i>SETUP DIAGRAM</i>	10
6. MEASURING EQUIPMENT AND SOFTWARE USED.....	11
7. ANTENNA PORT TEST RESULTS	13
7.1. <i>Conducted Output Power</i>	13
7.2. <i>6dB Bandwidth</i>	14
7.3. <i>Power Spectral Density</i>	16
7.4. <i>Conducted Band edge and spurious emission</i>	17
7.5. <i>Duty Cycle</i>	19
8. RADIATED TEST RESULTS	20
9. ANTENNA REQUIREMENT	37
PENDIX: PHOTOGRAPHS OF TEST CONFIGURATION	38
APPENDIX: PHOTOGRAPHS OF THE EUT.....	39

1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name: Winplus Co., Ltd
 Address: Suites 6-11, 7th Floor, Corporation Park, 11 On Lai Street, Shatin, Hong Kong

Manufacturer Information

Company Name: ADC Solutions Auto, LLC
 Address: 2975 Red Hill Ave., Ste. 100, Costa Mesa, CA 92626, USA

Factory Information

Company Name: ADC Solutions Auto, LLC
 Address: 2975 Red Hill Ave., Ste. 100, Costa Mesa, CA 92626, USA

EUT Information

Product Description: T200 PLUS 2K AI Dash Cam + 1080P Rear Cam
 Model: BT533643
 Sample Received Date: August 10, 2023
 Sample Status: Normal
 Sample ID: A23080299 001
 Date of Tested: August 10, 2023 to August 20, 2023

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 FCC PART 15 SUBPART C	Pass

Prepared By:

John Yang
 Project Engineer

Approved By:

Shawn Wen
 General Manager



Checked By:

Alan He
 Manager

2. TEST METHODOLOGY

All tests were performed in accordance with the standard CFR 47 FCC PART 15 SUBPART C

3. FACILITIES AND ACCREDITATION

Accreditation Certificate	<p>A2LA (Certificate No.: 6947.01) Guangdong Global Testing Technology Co., Ltd. has been assessed and proved to be in compliance with A2LA.</p> <p>FCC (FCC Designation No.: CN1343) Guangdong Global Testing Technology Co., Ltd. has been recognized to perform compliance testing on equipment subject to Supplier's Declaration of Conformity (SDoC) and Certification rules</p> <p>ISED (Company No.: 30714) Guangdong Global Testing Technology Co., Ltd. has been registered and fully described in a report filed with ISED. The Company Number is 30714 and the test lab Conformity Assessment Body Identifier (CABID) is CN0148.</p>
---------------------------	--

Note: All tests measurement facilities use to collect the measurement data are located at
Room 101-105, 203-210, Building 1, No.2, Keji 8 Road, Songshan Lake Park,
Dongguan city, Guangdong, People's Republic of China, 523808

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations and is traceable to recognized national standards.

4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Test Items	k	Uncertainty
DTS Bandwidth	1.96	±9.2 PPM
20dB Emission Bandwidth	1.96	±9.2 PPM
Carrier Frequency Separation	1.96	±9.2 PPM
Number of Hopping Channel	1.96	±9.2 PPM
Time of Occupancy	1.96	±0.57%
Maximum Conducted Output Power	1.96	± 0.73 dB
Max Peak Conducted Output Power	1.96	±1.5 dB
Maximum Power Spectral Density Level	1.96	±1.9 dB
Conducted Band edge	1.96	±9.2 PPM
Conducted spurious emission	1.96	9 kHz-30 MHz: ± 0.95 dB 30 MHz-1 GHz: ± 1.5 dB 1GHz-12.75GHz: ± 1.8 dB 12.75 GHz-26.5 GHz: ± 2.1dB
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.		

Test Item	Measurement Frequency Range	K	U(dB)
Conducted emissions from the AC mains power ports (AMN)	150 kHz ~ 30 MHz	2	3.37
Radiated emissions	30 MHz ~ 1 GHz	2	3.79
Radiated emissions	1 GHz ~ 18 GHz	2	5.62
Radiated emissions	18 GHz ~ 40 GHz	2	5.54
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.			

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

EUT Name		T200 PLUS 2K AI Dash Cam + 1080P Rear Cam	
Model		BT533643	
EUT Classification		Class B	
Hardware Version		V1.0	
Software Version		V1.0	
Ratings		Input:DC 12V / 24V	
Power Supply	DC	12V / 24V	

Frequency Band:	2400 MHz to 2483.5 MHz
Frequency Range:	2412 MHz to 2462 MHz
Support Standards:	IEEE 802.11b, IEEE 802.11g, IEEE 802.11n HT20, IEEE 802.11n HT40
Type of Modulation:	IEEE 802.11b: DSSS(CCK, DQPSK, DBPSK) IEEE 802.11g/n: OFDM(64-QAM, 16-QAM, QPSK, BPSK)
Data Rate:	IEEE 802.11b: Up to 11 Mbps IEEE 802.11g: Up to 54 Mbps IEEE 802.11n: Up to MCS7
Number of Channels:	IEEE 802.11b/g/n HT20: 11 IEEE 802.11n HT40: 7
Antenna Type:	FPC Antenna
Antenna Gain:	2.92dBi
EUT Test software:	SecureCRT

5.2. CHANNEL LIST

Channel List for 802.11b/g/n (20 MHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	4	2427	7	2442	10	2457
2	2417	5	2432	8	2447	11	2462
3	2422	6	2437	9	2452	/	/

Channel List for 802.11n (40 MHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
3	2422	5	2432	7	2442	9	2452
4	2427	6	2437	8	2447	/	/

5.3. MAXIMUM CONDUCTED PEAK OUTPUT POWER

IEEE Std. 802.11	Frequency (MHz)	Channel Number	Maximum Conducted Peak Output Power (dBm)
b	2412 ~ 2462	1-11[11]	-0.34
g	2412 ~ 2462	1-11[11]	-1.32
n HT20	2412 ~ 2462	1-11[11]	-1.60
n HT40	2422 ~ 2452	3-9[7]	-1.97

5.4. TEST CHANNEL CONFIGURATION

IEEE Std. 802.11	Test Channel Number	Frequency
b	CH 1(Low Channel), CH 6(MID Channel), CH 11(High Channel)	2412 MHz, 2437 MHz, 2462 MHz
g	CH 1(Low Channel), CH 6(MID Channel), CH 11(High Channel)	2412 MHz, 2437 MHz, 2462 MHz
n HT20	CH 1(Low Channel), CH 6(MID Channel), CH 11(High Channel)	2412 MHz, 2437 MHz, 2462 MHz
n HT40	CH 3(Low Channel), CH 6(MID Channel), CH 9(High Channel)	2422 MHz, 2437 MHz, 2452 MHz

5.5. THE WORSE CASE POWER SETTING PARAMETER

The Worse Case Power Setting Parameter under 2400 ~ 2483.5MHz Band							
Test Software		SecureCRT					
Modulation Mode	Transmit Antenna Number	Test Channel					
		NCB: 20MHz			NCB: 40MHz		
		CH 1	CH 6	CH 11	CH 3	CH 6	CH 9
802.11b	1	0	0	0			
802.11g	1	0	0	0			
802.11n HT20	1	0	0	0			
802.11n HT40	1				0	0	0

WORST-CASE CONFIGURATIONS

The EUT was tested in the following configuration(s):

Controlled in test mode using a software application on the EUT supplied by customer. The application was used to enable a continuous transmission and to select the mode, test channels, bandwidth, data rates as required.

Test channels referring to section 5.4.

Maximum power setting referring to section 5.5.

Worst-case data rates as provided by the client were:

802.11b mode: 1 Mbps

802.11g mode: 6 Mbps

802.11n HT20 mode: MCS0

802.11n HT40 mode: MCS0

5.6. DESCRIPTION OF AVAILABLE ANTENNAS

Antenna	Frequency (MHz)	Antenna Type	MAX Antenna Gain (dBi)
1	2412-2462	FPC Antenna	2.92

Test Mode	Transmit and Receive Mode	Description
IEEE 802.11b	<input checked="" type="checkbox"/> 1TX, 1RX	ANT 1 can be used as transmitting/receiving antenna.
IEEE 802.11g	<input checked="" type="checkbox"/> 1TX, 1RX	ANT 1 can be used as transmitting/receiving antenna.
IEEE 802.11n HT20	<input checked="" type="checkbox"/> 1TX, 1RX	ANT 1 can be used as transmitting/receiving antenna.
IEEE 802.11n HT40	<input checked="" type="checkbox"/> 1TX, 1RX	ANT 1 can be used as transmitting/receiving antenna.

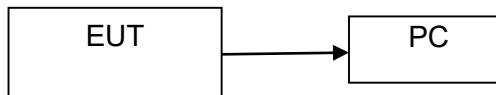
Note: The value of the antenna gain was declared by customer.

5.7. SUPPORT UNITS FOR SYSTEM TEST

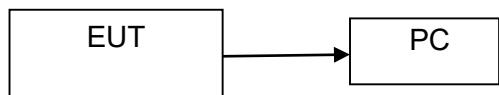
Equipment	Manufacturer	Model No.
PC	Lenovo	T14

5.8. SETUP DIAGRAM

Radiated Emission:



RF conducted:



6. MEASURING EQUIPMENT AND SOFTWARE USED

Test Equipment of Conducted RF					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Date
Spectrum Analyzer	Rohde & Schwarz	FSV40	102257	2022/10/08	2023/10/07
Spectrum Analyzer	KEYSIGHT	N9020A	MY51285127	2022/10/08	2023/10/07
EXG Analog Signal Generator	KEYSIGHT	N5173B	MY61253075	2022/10/08	2023/10/07
Vector Signal Generator	Rohde & Schwarz	SMM100A	101899	2023/03/16	2024/03/15
RF Control box	MWRF-test	MW100-RFCB	MW220926GTG	2022/10/08	2023/10/07
Wideband Radio Communication Tester	Rohde & Schwarz	CMW270	102792	2023/03/16	2024/03/15
Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	103235	2022/10/08	2023/10/07
temperature humidity chamber	Espec	SH-241	SH-241-2014	2022/10/08	2023/10/07
RF Test Software	MWRF-test	MTS8310E (Ver. V2/0)	N/A	N/A	N/A

Test Equipment of Radiated emissions below 1GHz					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Date
3m Semi-anechoic Chamber	ETS	9m*6m*6m	Q2146	2022/08/30	2025/08/29
EMI Test Receiver	Rohde & Schwarz	ESCI3	101409	2022/10/08	2023/10/07
Spectrum Analyzer	KEYSIGHT	N9020A	MY51283932	2022/10/08	2023/10/07
Pre-Amplifier	HzEMC	HPA-9K0130	HYPA21001	2022/10/29	2023/10/28
Biconilog Antenna	Schwarzbeck	VULB 9168	01315	2022/10/10	2025/10/09
Biconilog Antenna	ETS	3142E	00243646	2022/03/23	2025/03/22
Loop Antenna	ETS	6502	243668	2022/03/30	2025/03/29
Test Software	Farad	EZ-EMC (Ver.FA-03A2 RE)	N/A	N/A	N/A

Test Equipment of Radiated emissions above 1GHz					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Date
3m Semi-anechoic Chamber	ETS	9m*6m*6m	Q2149	2022/08/30	2025/08/29
Spectrum Analyzer	Rohde & Schwarz	FSV40	101413	2022/10/08	2023/10/07
Spectrum Analyzer	KEYSIGHT	N9020A	MY51283932	2022/10/08	2023/10/07
Pre-Amplifier	A-INFO	HPA-1G1850	HYPA21003	2022/10/29	2023/10/28
Horn antenna	A-INFO	3117	246069	2022/03/11	2023/03/10

Pre-Amplifier	ZKJC	HPA-184057	HYPA21004	2022/10/29	2023/10/28
Horn antenna	ZKJC	3116C	246265	2022/03/29	2023/03/28
Test Software	Farad	EZ-EMC (Ver.FA-03A2 RE+)	N/A	N/A	N/A

7. ANTENNA PORT TEST RESULTS

7.1. CONDUCTED OUTPUT POWER

LIMITS

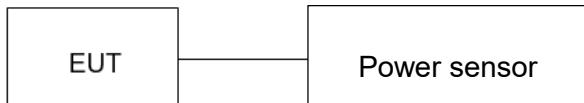
CFR 47 FCC Part15 (15.247) Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC 15.247(b)(3)	Peak Conduct Output Power	1 watt or 30 dBm	2400-2483.5

TEST PROCEDURE

Connect the EUT to a low loss RF cable from the antenna port to the power sensor (video bandwidth is greater than the occupied bandwidth).

Measure peak emission level, the indicated level is the peak output power, after any corrections for external attenuators and cables.

TEST SETUP



TEST ENVIRONMENT

Temperature	24.4°C	Relative Humidity	53%RH
Atmosphere Pressure	101kPa		

TEST RESULTS

Test results refer to report E04A23080299F00202 - Appendix B.

7.2. 6DB BANDWIDTH

LIMITS

CFR 47 FCC Part15 (15.247) Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC 15.247(a)(2)	6 dB Bandwidth	≥ 500 kHz	2400-2483.5

TEST PROCEDURE

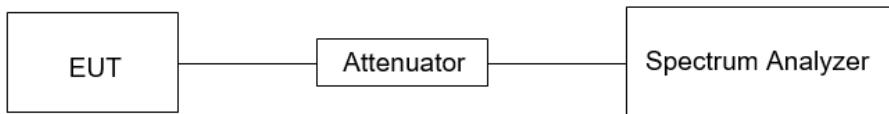
Refer to ANSI C63.10-2013 clause 11.8 for DTS bandwidth.

Connect the EUT to the spectrum analyser and use the following settings:

Center Frequency	The center frequency of the channel under test
Frequency Span	For 6 dB Bandwidth: Enough to capture all products of the modulation carrier emission
Detector	Peak
RBW	For 6 dB Bandwidth: 100 kHz
VBW	For 6 dB Bandwidth: $\geq 3 \times$ RBW
Trace	Max hold
Sweep	Auto couple

a) Allow the trace to stabilize and measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

TEST SETUP



TEST ENVIRONMENT

Temperature	24.4°C	Relative Humidity	53%RH
Atmosphere Pressure	101kPa		

TEST RESULTS

Test results refer to report E04A23080299F00202 - Appendix C .

7.3. POWER SPECTRAL DENSITY

LIMITS

CFR 47 FCC Part15 (15.247) Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC §15.247 (e)	Power Spectral Density	8 dBm in any 3 kHz band	2400-2483.5

TEST PROCEDURE

Refer to ANSI C63.10-2013 clause 11.10.

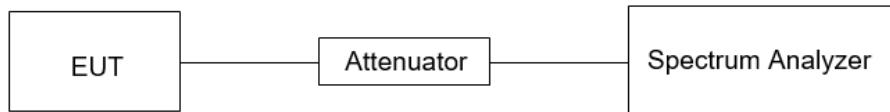
Connect the EUT to the spectrum analyser and use the following settings:

Center Frequency	The center frequency of the channel under test
Detector	PEAK
RBW	$3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$
VBW	$\geq 3 \times \text{RBW}$
Span	$1.5 \times \text{DTS bandwidth}$
Trace	Max hold
Sweep time	Auto couple

Allow trace to fully stabilize and use the peak marker function to determine the maximum amplitude level within the RBW.

If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

TEST SETUP



TEST ENVIRONMENT

Temperature	24.4°C	Relative Humidity	53%RH
Atmosphere Pressure	101kPa		

TEST RESULTS

Test results refer to report E04A23080299F00202 - Appendix D.

7.4. CONDUCTED BAND EDGE AND SPURIOUS EMISSION

LIMITS

CFR 47 FCC Part15 (15.247) Subpart C		
Section	Test Item	Limit
CFR 47 FCC §15.247 (d)	Conducted Bandedge and Spurious Emissions	at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power

TEST PROCEDURE

Refer to ANSI C63.10-2013 clause 11.11 and 11.13.

Connect the EUT to the spectrum analyser and use the following settings for reference level measurement:

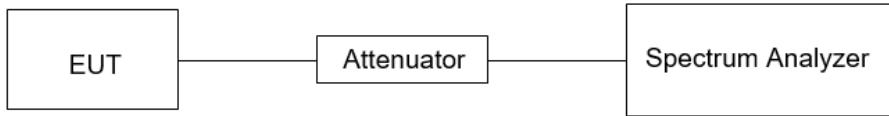
Center Frequency	The center frequency of the channel under test
Detector	Peak
RBW	100 kHz
VBW	$\geq 3 \times$ RBW
Span	1.5 x DTS bandwidth
Trace	Max hold
Sweep time	Auto couple.

Allow trace to fully stabilize and use the peak marker function to determine the maximum PSD level.

Change the settings for emission level measurement:

Span	Set the center frequency and span to encompass frequency range to be measured
Detector	Peak
RBW	100 kHz
VBW	$\geq 3 \times$ RBW
measurement points	\geq span/RBW
Trace	Max hold
Sweep time	Auto couple.

Allow trace to fully stabilize and use the peak marker function to determine the maximum PSD level. Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) is attenuated by at least the minimum requirements specified in 11.11.

TEST SETUP**TEST ENVIRONMENT**

Temperature	24.4°C	Relative Humidity	53%RH
Atmosphere Pressure	101kPa		

TEST RESULTS

Test results refer to report E04A23080299F00202 - Appendix E and Appendix F.

7.5. DUTY CYCLE

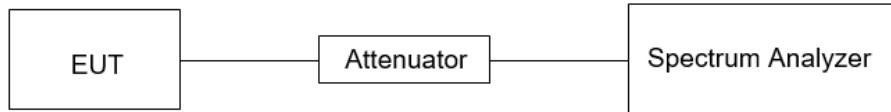
LIMITS

None; for reporting purposes only.

TEST PROCEDURE

Refer to ANSI C63.10-2013 clause 11.6 Zero – Span Spectrum Analyzer method.

TEST SETUP



TEST ENVIRONMENT

Temperature	24.4°C	Relative Humidity	53%RH
Atmosphere Pressure	101kPa		

TEST RESULTS

Test results refer to report E04A23080299F00202 - Appendix A.

8. RADIATED TEST RESULTS

Radiated Band edge and Spurious Emission LIMITS

Please refer to CFR 47 FCC §15.205 and §15.209.

Radiation Disturbance Test Limit for FCC (Class B)

Emissions radiated outside of the specified frequency bands above 30 MHz			
Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m	
		Quasi-Peak	
30 - 88	100	40	
88 - 216	150	43.5	
216 - 960	200	46	
Above 960	500	54	
Above 1000	500	Peak	Average
		74	54

FCC Emissions radiated outside of the specified frequency bands below 30 MHz			
Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)	
0.009-0.490	2400/F(kHz)	300	
0.490-1.705	24000/F(kHz)	30	
1.705-30.0	30	30	

FCC Restricted bands of operation refer to FCC §15.205 (a):

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
¹ 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(²)
13.36-13.41			

Note: ¹Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

²Above 38.6c

TEST PROCEDURE

Below 30 MHz

The setting of the spectrum analyser

RBW	200 Hz (From 9 kHz to 0.15 MHz)/ 9 kHz (From 0.15 MHz to 30 MHz)
VBW	200 Hz (From 9 kHz to 0.15 MHz)/ 9 kHz (From 0.15 MHz to 30 MHz)
Sweep	Auto

1. The testing follows the guidelines in ANSI C63.10-2013 clause 6.4.
2. The EUT was arranged to its worst case and then turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both Horizontal, Face-on and Face-off polarizations of the antenna are set to make the measurement.
3. The EUT was placed on a turntable with 80 cm above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a 1 m height antenna tower.
5. The radiated emission limits are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz Radiated emission limits in these three bands are based on measurements employing an average detector.
6. For measurement below 1 GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak and average detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak and average detector and reported.
7. Although these tests were performed other than open field site, adequate comparison measurements were confirmed against 30m open field site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field site based on KDB 414788.
8. The limits in CFR 47, Part 15, Subpart C, paragraph 15.209 (a),since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377Ω . For example, the measurement frequency X KHz resulted in a level of Y dB μ V/m, which is equivalent to $Y - 51.5 = Z$ dB μ A/m, which has the same margin, W dB, to the corresponding 15.209(a) limit.

Below 1 GHz and above 30 MHz

The setting of the spectrum analyser

RBW	120 kHz
VBW	300 kHz
Sweep	Auto
Detector	Peak/QP
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013 clause 6.5.

2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

3. The EUT was placed on a turntable with 80 cm above ground.

4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

5. For measurement below 1 GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

Above 1G

The setting of the spectrum analyser

RBW	1 MHz
VBW	PEAK: 3 MHz AVG: see note 6
Sweep	Auto
Detector	Peak
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013 clause 6.6.

2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

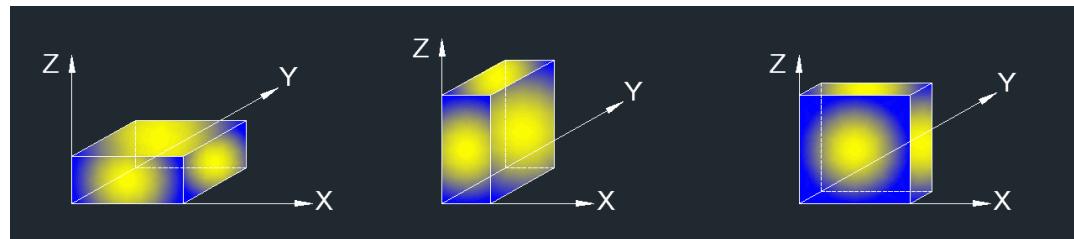
3. The EUT was placed on a turntable with 1.5 m above ground.

4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

5. For measurement above 1 GHz, the emission measurement will be measured by the peak detector. This peak level, once corrected, must comply with the limit specified in Section 15.209.

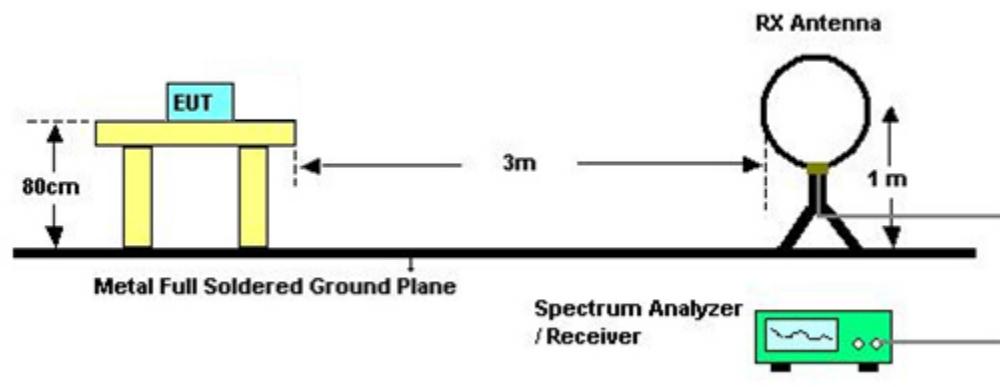
6. For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 1/T video bandwidth with peak detector for average measurements. For the Duty Cycle please refer to clause 7.1.ON TIME AND DUTY CYCLE.

X axis, Y axis, Z axis positions:

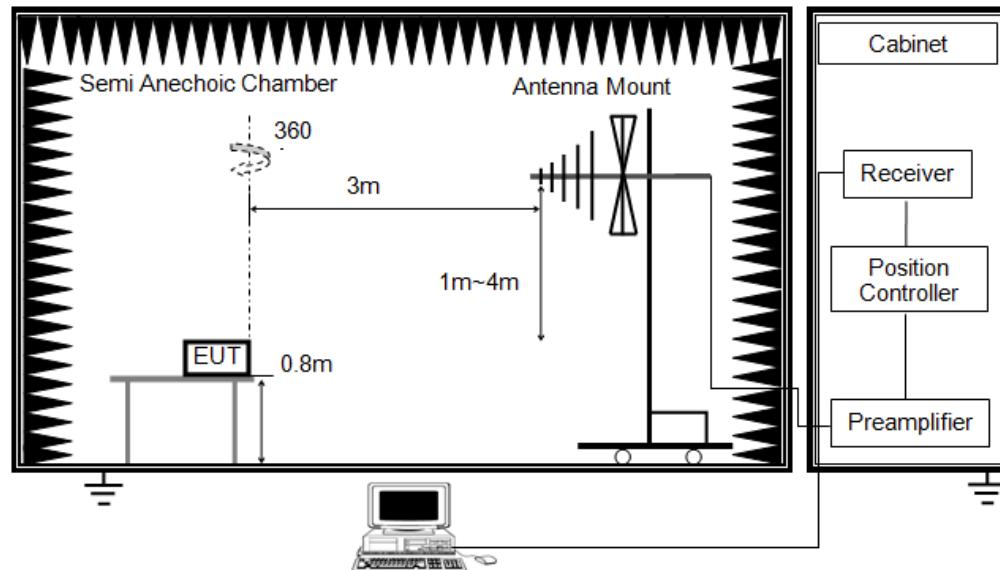


Note 1: For all radiated test, EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report.

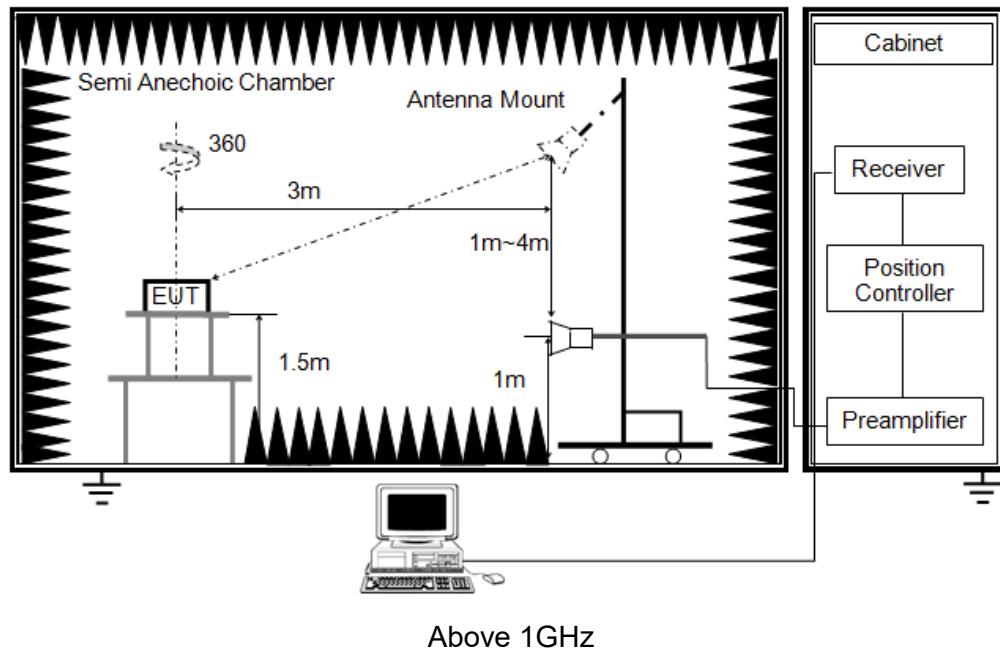
TEST SETUP



9kHz-30MHz



30MHz-1GHz



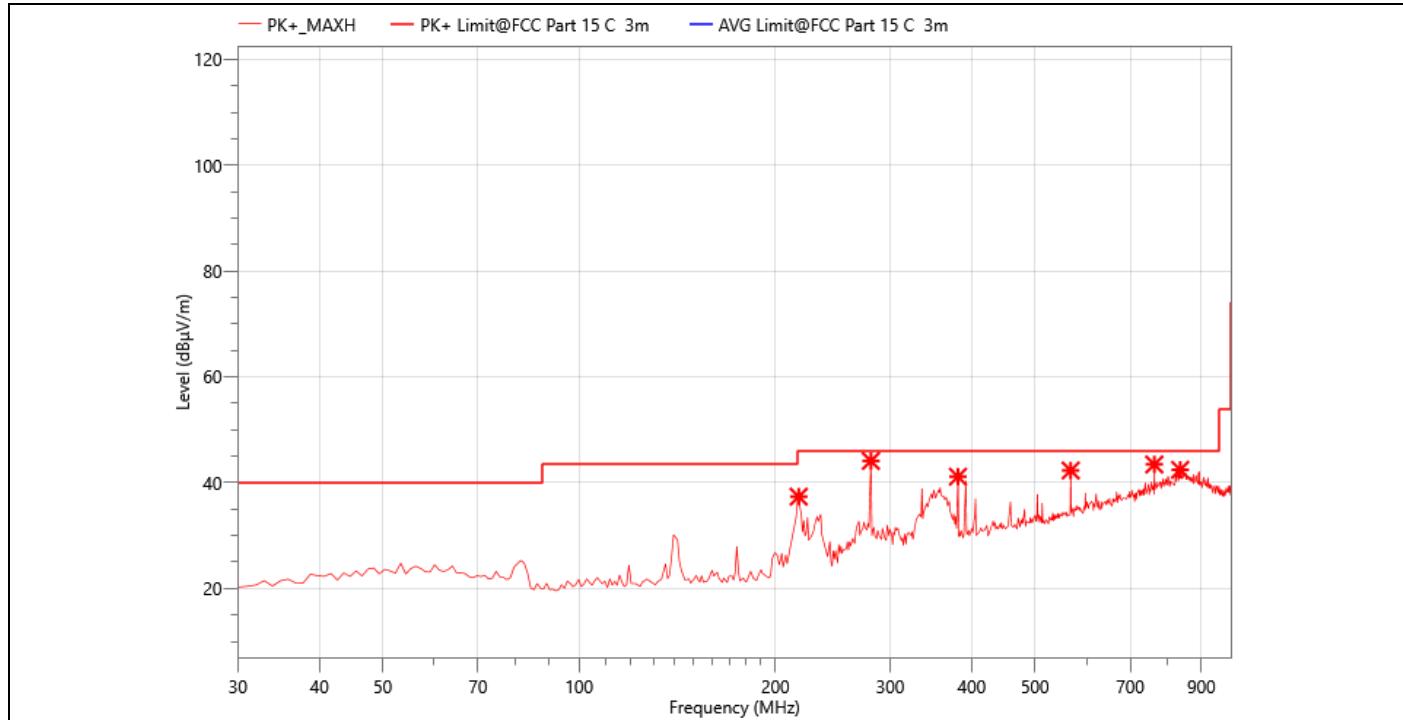
TEST ENVIRONMENT

Temperature	24.3°C	Relative Humidity	54%RH
Atmosphere Pressure	101kPa		

TEST RESULTS

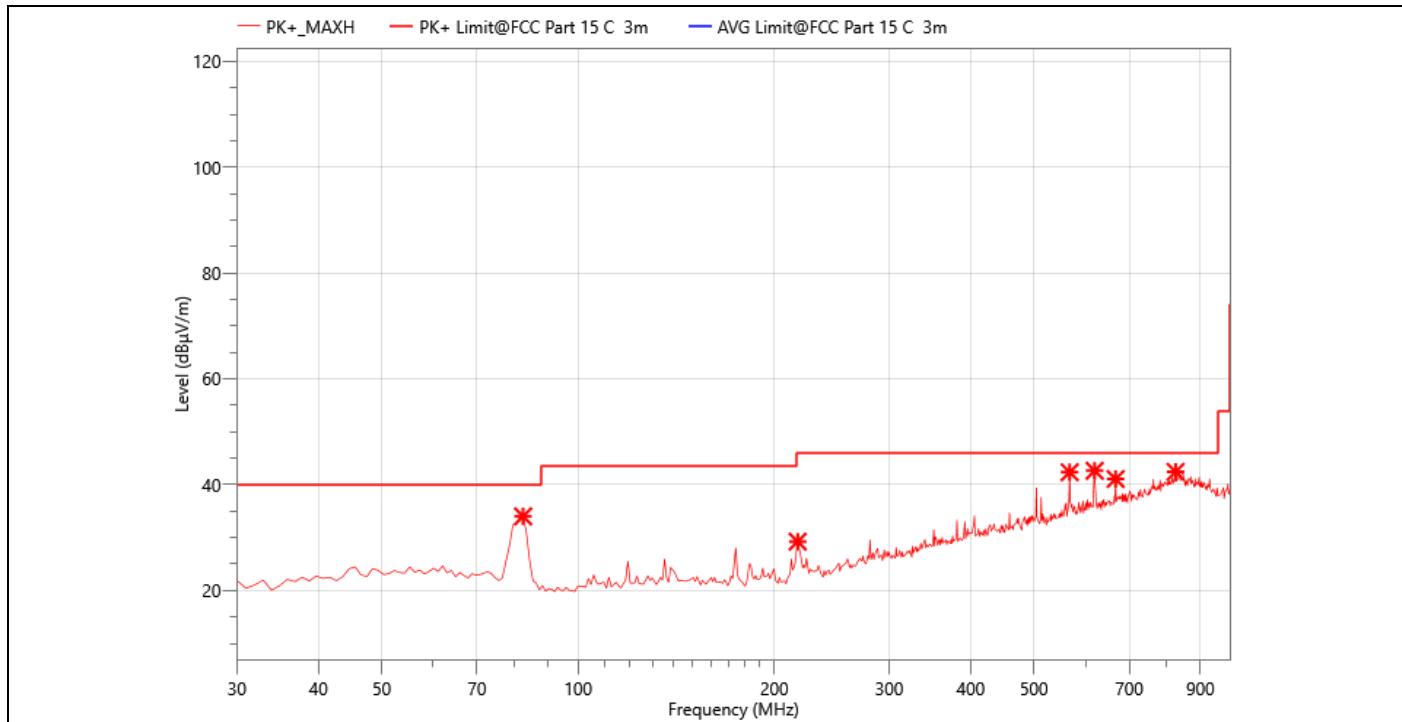
- Undesirable radiated Spurious Emission below 1GHz (30MHz to 1GHz)

The worst result as bellow:



EUT:	T200 PLUS 2K AI Dash Cam + 1080P	Temperature:	24.3°C
	Rear Cam		
M/N.:	BT533643	Humidity:	54% RH
Mode:	802.11b 2437MHz	Power Rating:	DC 12V
Test Engineer:	Vier	Test Time:	2023-08-15

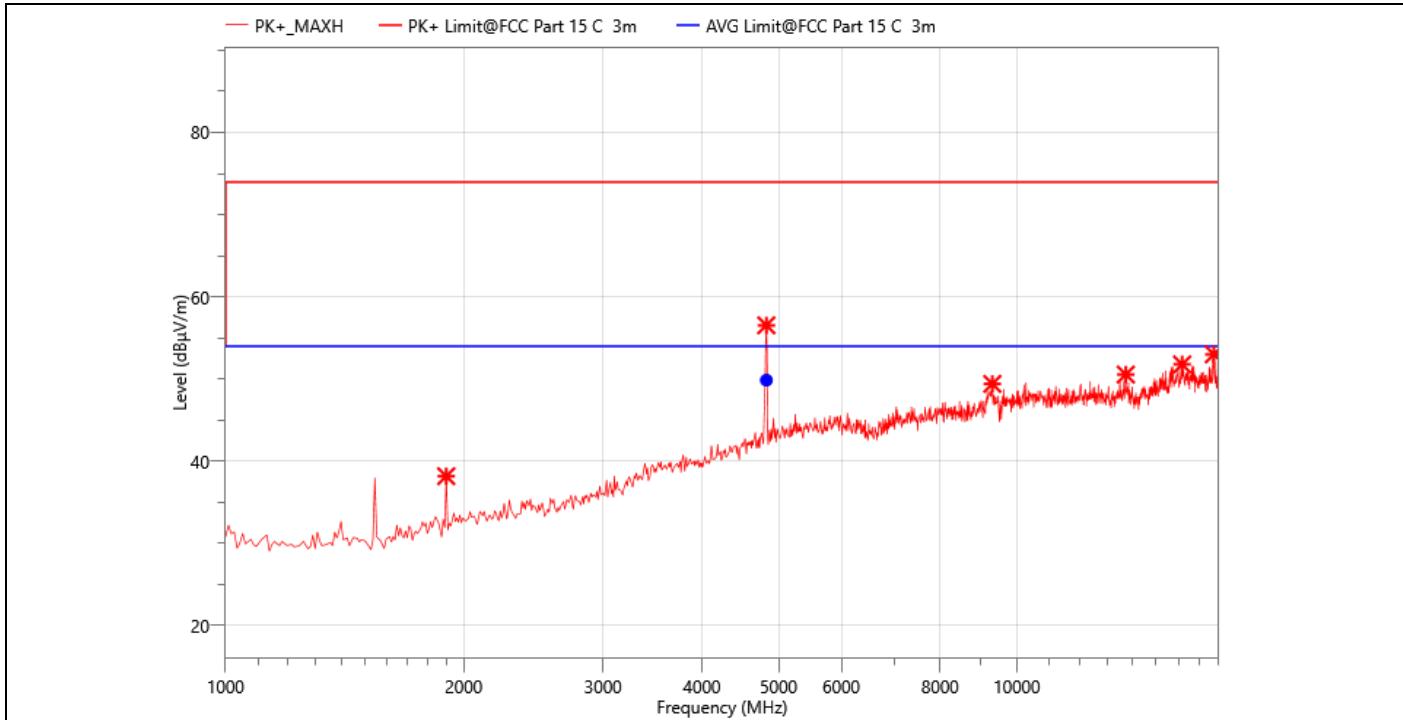
No.	Freq. (MHz)	Reading (dBμV)	Meas. (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Det.	Pol.	Corr. (dB)
1	217.210	42.00	37.37	46.00	8.63	PK+	H	-4.63
2	280.260	45.62	44.11	46.00	1.89	PK+	H	-1.51
3	381.140	38.95	41.14	46.00	4.86	PK+	H	2.19
4	567.380	35.14	42.30	46.00	3.70	PK+	H	7.16
5	762.350	31.87	43.45	46.00	2.55	PK+	H	11.58
6	835.100	28.75	42.44	46.00	3.56	PK+	H	13.69



EUT:	T200 PLUS 2K AI Dash Cam + 1080P	Temperature:	24.3 °C
M/N.:	Rear Cam	Humidity:	54% RH
Mode:	BT533643	Power Rating:	DC 12V
Test Engineer:	802.11b 2437MHz	Test Time:	2023-08-15

No.	Freq. (MHz)	Reading (dBμV)	Meas. (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Det.	Pol.	Corr. (dB)
1	82.380	40.43	34.02	40.00	5.98	PK+	V	-6.41
2	217.210	33.87	29.24	46.00	16.76	PK+	V	-4.63
3	567.380	35.20	42.36	46.00	3.64	PK+	V	7.16
4	619.760	34.17	42.63	46.00	3.37	PK+	V	8.46
5	667.290	31.86	41.08	46.00	4.92	PK+	V	9.22
6	824.430	29.36	42.43	46.00	3.57	PK+	V	13.07

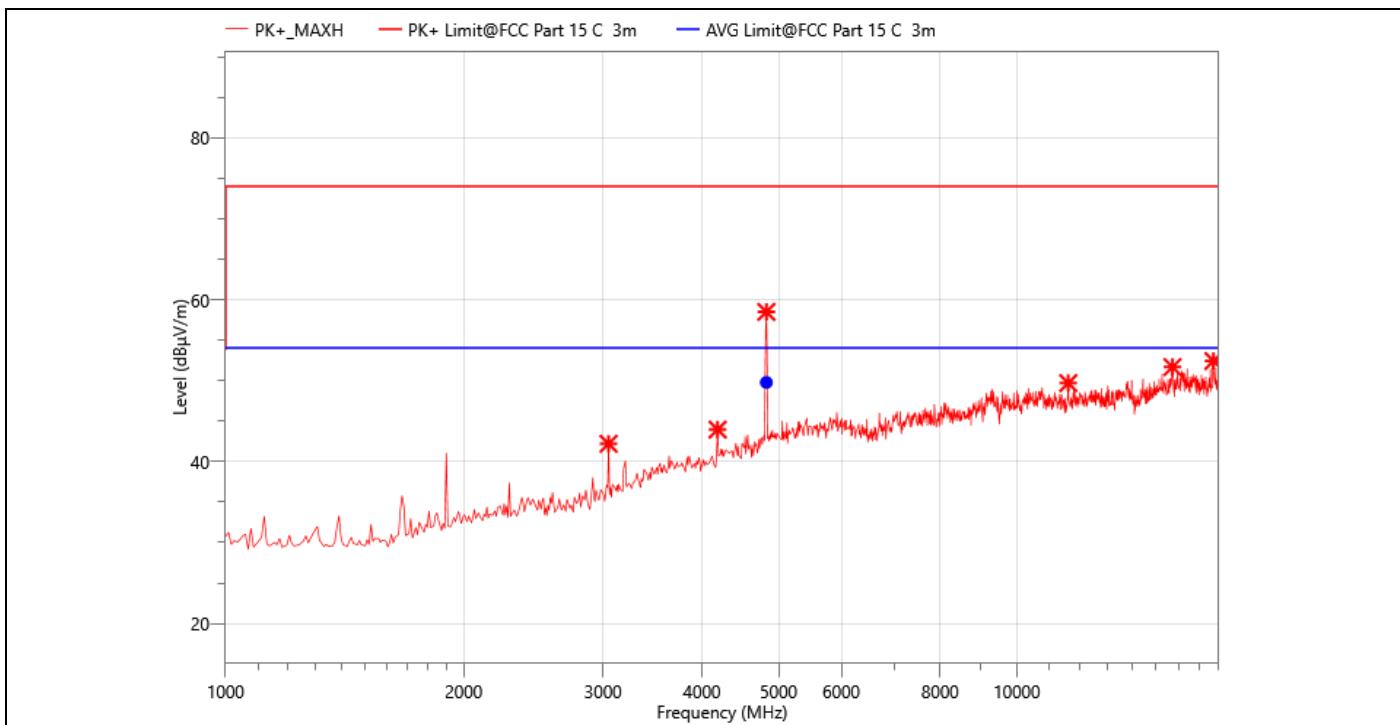
- Undesirable radiated Spurious Emission Above 1GHz (1GHz to 26.5GHz)
All modes has been tested and the worst result (802.11b) recorded as below:



EUT:	T200 PLUS 2K AI Dash Cam + 1080P	Temperature:	24.3°C
	Rear Cam		
M/N.:	BT533643	Humidity:	54% RH
Mode:	802.11b 2412MHz	Power Rating:	DC 12V
Test Engineer:	Vier	Test Time:	2023-08-15

No.	Freq. (MHz)	Reading (dB μ V)	Meas. (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Det.	Pol.	Corr. (dB)
1	1901.000	61.16	38.19	74.00	35.81	PK+	H	-22.97
2	4825.000	65.55	56.54	74.00	17.46	PK+	H	-9.01
3	9313.000	50.40	49.42	74.00	24.58	PK+	H	-0.98
4	13733.000	47.86	50.55	74.00	23.45	PK+	H	2.69
5	16181.000	46.68	51.79	74.00	22.21	PK+	H	5.11
6	17745.000	47.63	53.01	74.00	20.99	PK+	H	5.38

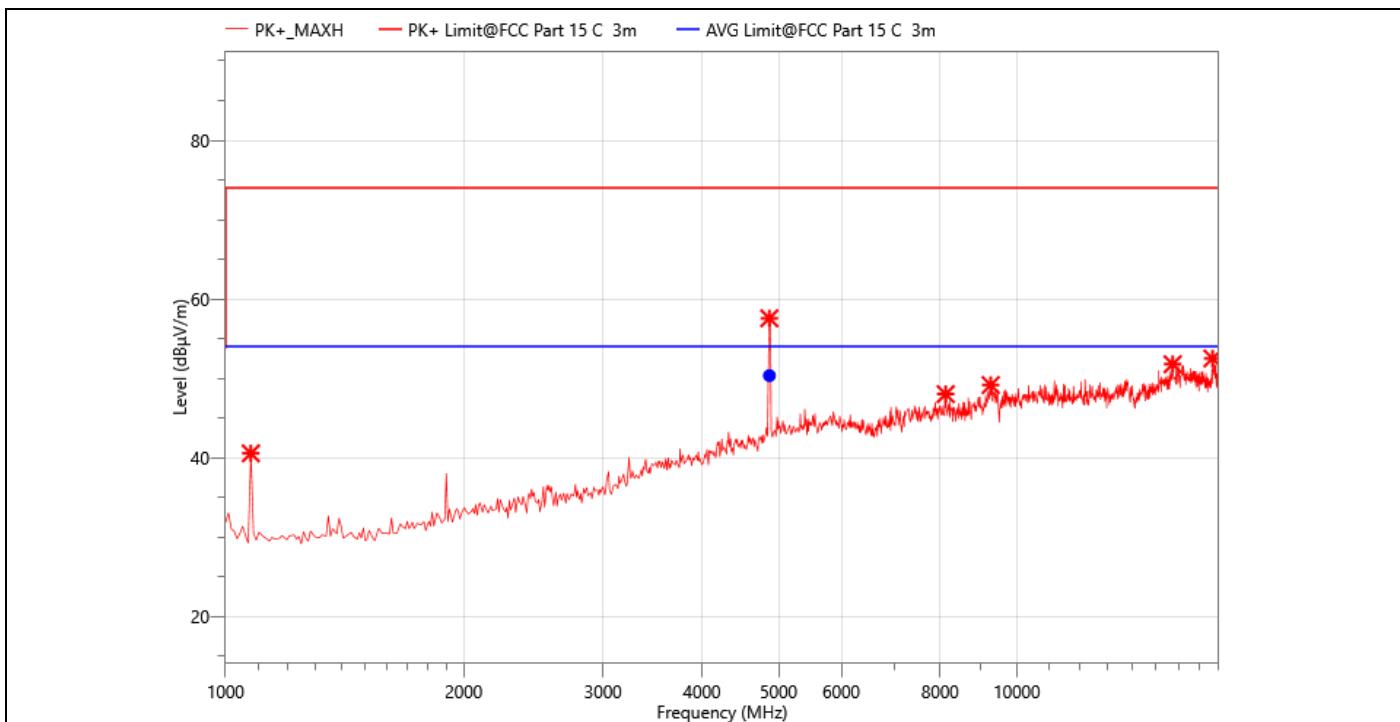
No.	Freq. (MHz)	Reading (dB μ V)	Meas. (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Det.	Pol.	Corr. (dB)
1	4825.000	58.88	49.87	54.00	4.13	AVG	H	-9.01



EUT:	T200 PLUS 2K AI Dash Cam + 1080P	Temperature:	24.3°C
M/N.:	Rear Cam	Humidity:	54% RH
Mode:	BT533643	Power Rating:	DC 12V
Test Engineer:	802.11b 2412MHz	Test Time:	2023-08-15

No.	Freq. (MHz)	Reading (dB μ V)	Meas. (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Det.	Pol.	Corr. (dB)
1	3048.500	59.59	42.20	74.00	31.80	PK+	V	-17.39
2	4187.500	55.74	43.95	74.00	30.05	PK+	V	-11.79
3	4825.000	67.50	58.49	74.00	15.51	PK+	V	-9.01
4	11616.500	49.14	49.70	74.00	24.30	PK+	V	0.56
5	15730.500	48.14	51.68	74.00	22.32	PK+	V	3.54
6	17728.000	47.24	52.42	74.00	21.58	PK+	V	5.18

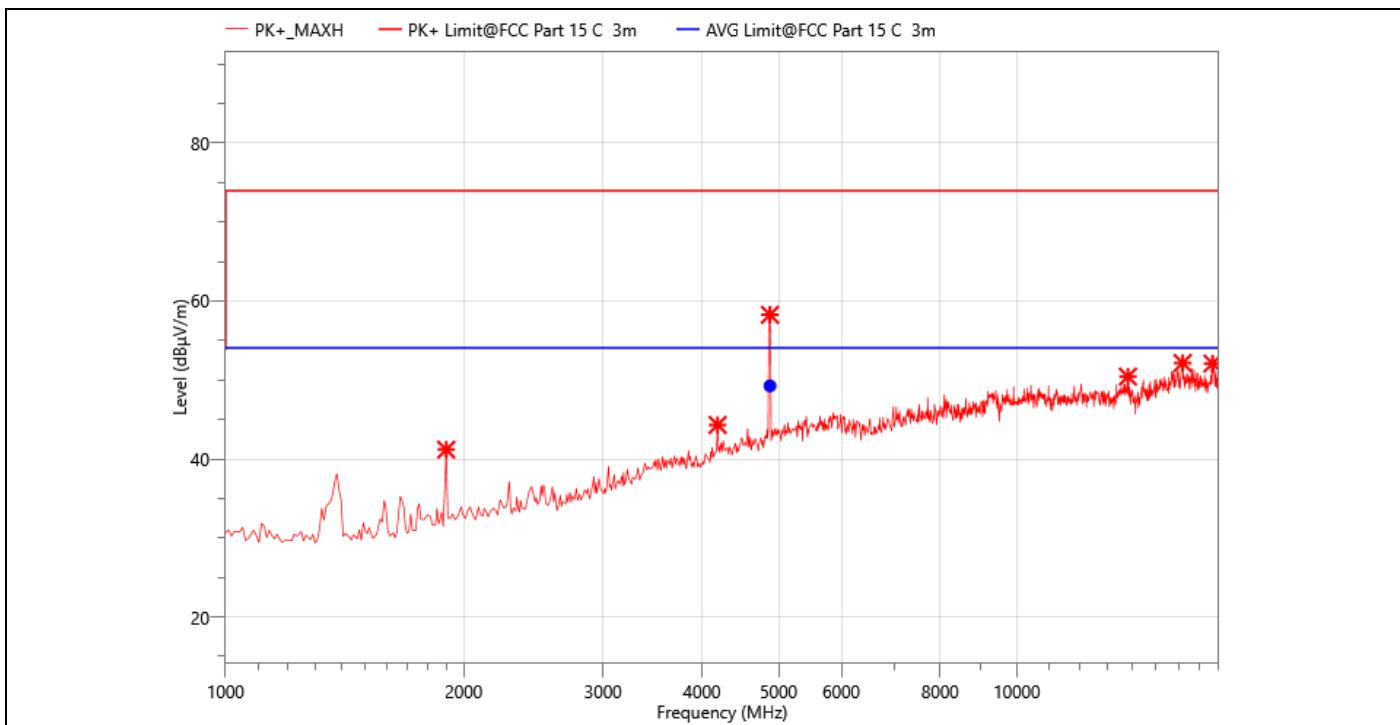
No.	Freq. (MHz)	Reading (dB μ V)	Meas. (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Det.	Pol.	Corr. (dB)
1	4825.000	58.79	49.78	54.00	4.22	AVG	V	-9.01



EUT:	T200 PLUS 2K AI Dash Cam + 1080P	Temperature:	24.3°C
M/N.:	Rear Cam	Humidity:	54% RH
Mode:	BT533643	Power Rating:	DC 12V
Test Engineer:	802.11b 2437MHz	Test Time:	2023-08-15

No.	Freq. (MHz)	Reading (dB μ V)	Meas. (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Det.	Pol.	Corr. (dB)
1	1076.500	67.20	40.58	74.00	33.42	PK+	H	-26.62
2	4867.500	66.68	57.59	74.00	16.41	PK+	H	-9.09
3	8131.500	50.11	48.04	74.00	25.96	PK+	H	-2.07
4	9270.500	49.96	49.18	74.00	24.82	PK+	H	-0.78
5	15739.000	48.22	51.81	74.00	22.19	PK+	H	3.59
6	17677.000	48.04	52.53	74.00	21.47	PK+	H	4.49

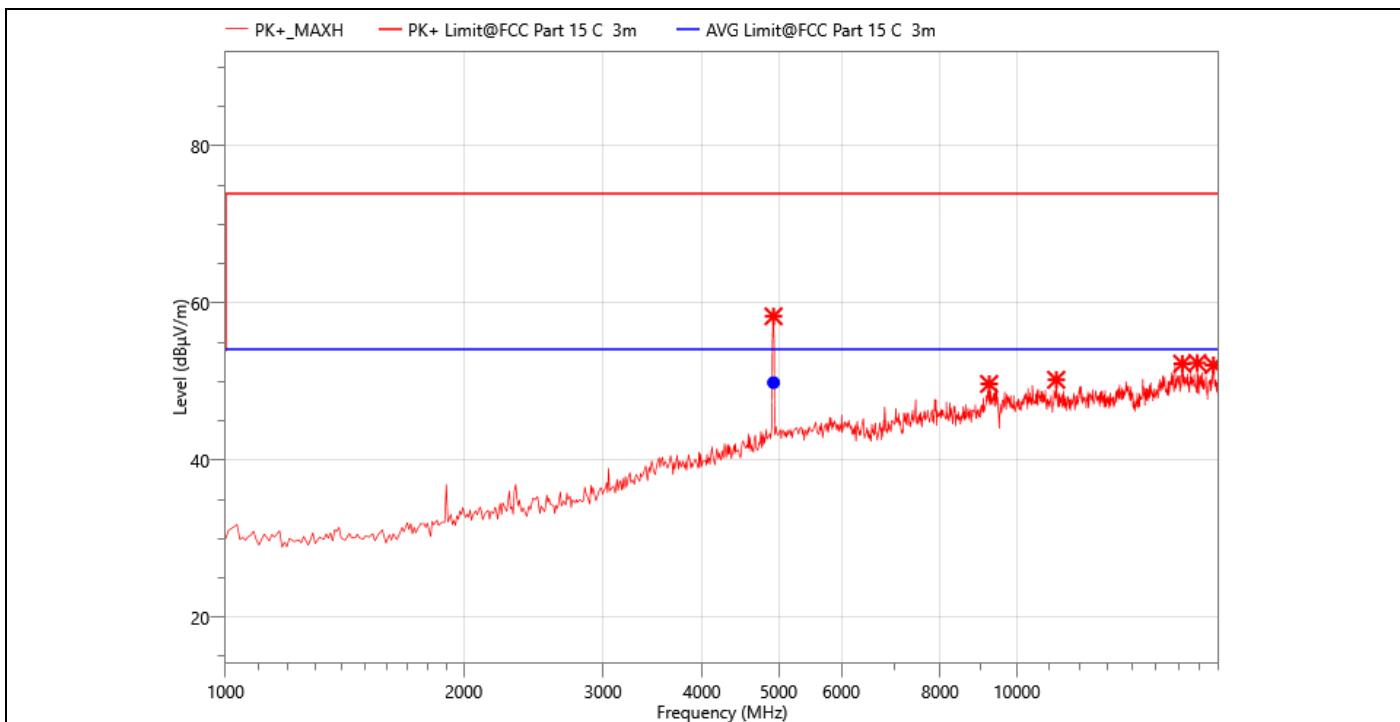
No.	Freq. (MHz)	Reading (dB μ V)	Meas. (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Det.	Pol.	Corr. (dB)
1	4867.500	59.46	50.37	54.00	3.63	AVG	H	-9.09



EUT:	T200 PLUS 2K AI Dash Cam + 1080P	Temperature:	24.3°C
M/N.:	Rear Cam	Humidity:	54% RH
Mode:	BT533643	Power Rating:	DC 12V
Test Engineer:	802.11b 2437MHz	Test Time:	2023-08-15

No.	Freq. (MHz)	Reading (dBμV)	Meas. (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Det.	Pol.	Corr. (dB)
1	1901.000	64.16	41.19	74.00	32.81	PK+	V	-22.97
2	4187.500	56.10	44.31	74.00	29.69	PK+	V	-11.79
3	4876.000	67.13	58.26	74.00	15.74	PK+	V	-8.87
4	13818.000	48.17	50.44	74.00	23.56	PK+	V	2.27
5	16206.500	47.56	52.16	74.00	21.84	PK+	V	4.6
6	17677.000	47.60	52.09	74.00	21.91	PK+	V	4.49

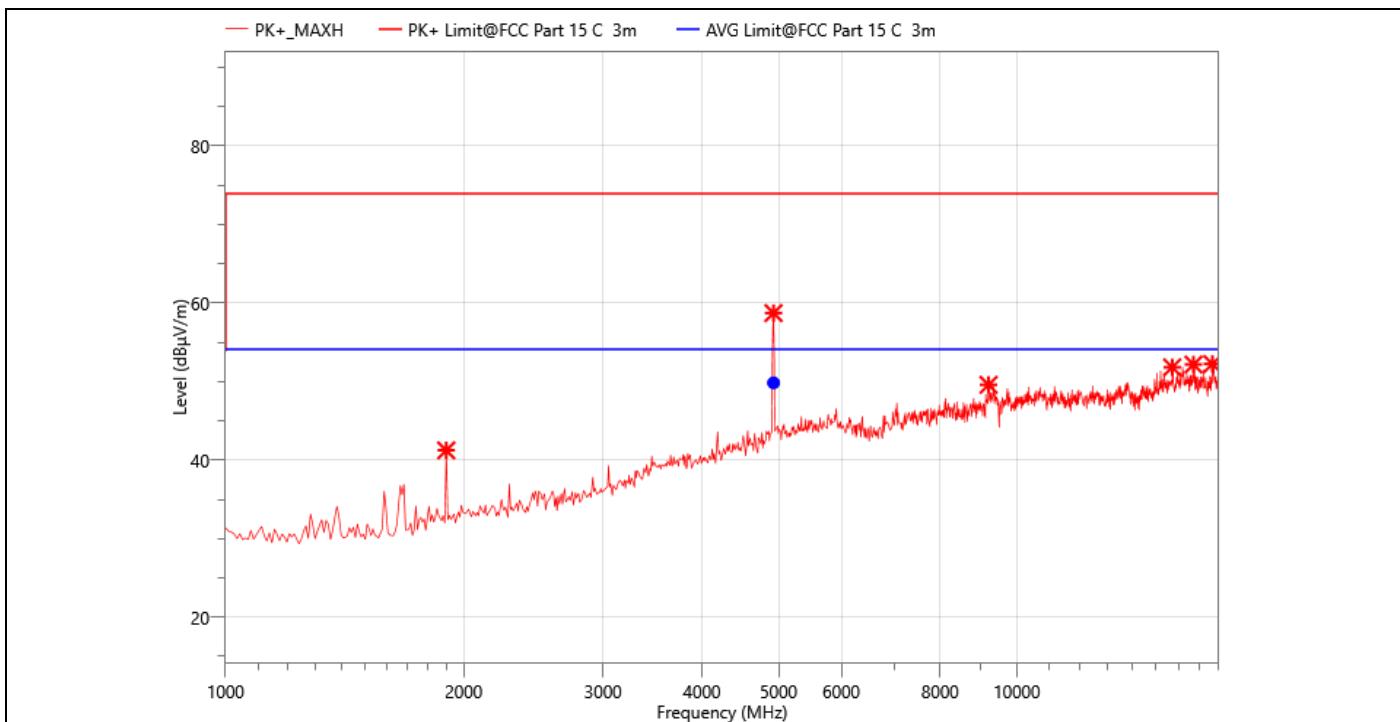
No.	Freq. (MHz)	Reading (dBμV)	Meas. (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Det.	Pol.	Corr. (dB)
1	4876.000	58.13	49.26	54.00	4.74	AVG	V	-8.87



EUT:	T200 PLUS 2K AI Dash Cam + 1080P	Temperature:	24.3°C
M/N.:	Rear Cam	Humidity:	54% RH
Mode:	BT533643	Power Rating:	DC 12V
Test Engineer:	802.11b 2462MHz	Test Time:	2023-08-15

No.	Freq. (MHz)	Reading (dB μ V)	Meas. (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Det.	Pol.	Corr. (dB)
1	4927.000	67.01	58.30	74.00	15.70	PK+	H	-8.71
2	9228.000	50.05	49.69	74.00	24.31	PK+	H	-0.36
3	11217.000	48.82	50.22	74.00	23.78	PK+	H	1.4
4	16189.500	47.08	52.27	74.00	21.73	PK+	H	5.19
5	16912.000	47.68	52.36	74.00	21.64	PK+	H	4.68
6	17728.000	46.90	52.08	74.00	21.92	PK+	H	5.18

No.	Freq. (MHz)	Reading (dB μ V)	Meas. (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Det.	Pol.	Corr. (dB)
1	4927.000	58.57	49.86	54.00	4.14	AVG	H	-8.71



EUT:	T200 PLUS 2K AI Dash Cam + 1080P	Temperature:	24.3°C
M/N.:	Rear Cam	Humidity:	54% RH
Mode:	BT533643	Power Rating:	DC 12V
Test Engineer:	802.11b 2462MHz	Test Time:	2023-08-15

No.	Freq. (MHz)	Reading (dBμV)	Meas. (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Det.	Pol.	Corr. (dB)
1	1901.000	64.21	41.24	74.00	32.76	PK+	V	-22.97
2	4927.000	67.42	58.71	74.00	15.29	PK+	V	-8.71
3	9211.000	49.95	49.58	74.00	24.42	PK+	V	-0.37
4	15722.000	48.38	51.81	74.00	22.19	PK+	V	3.43
5	16725.000	48.26	52.16	74.00	21.84	PK+	V	3.9
6	17668.500	47.97	52.23	74.00	21.77	PK+	V	4.26

No.	Freq. (MHz)	Reading (dBμV)	Meas. (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Det.	Pol.	Corr. (dB)
1	4927.000	58.54	49.83	54.00	4.17	AVG	V	-8.71

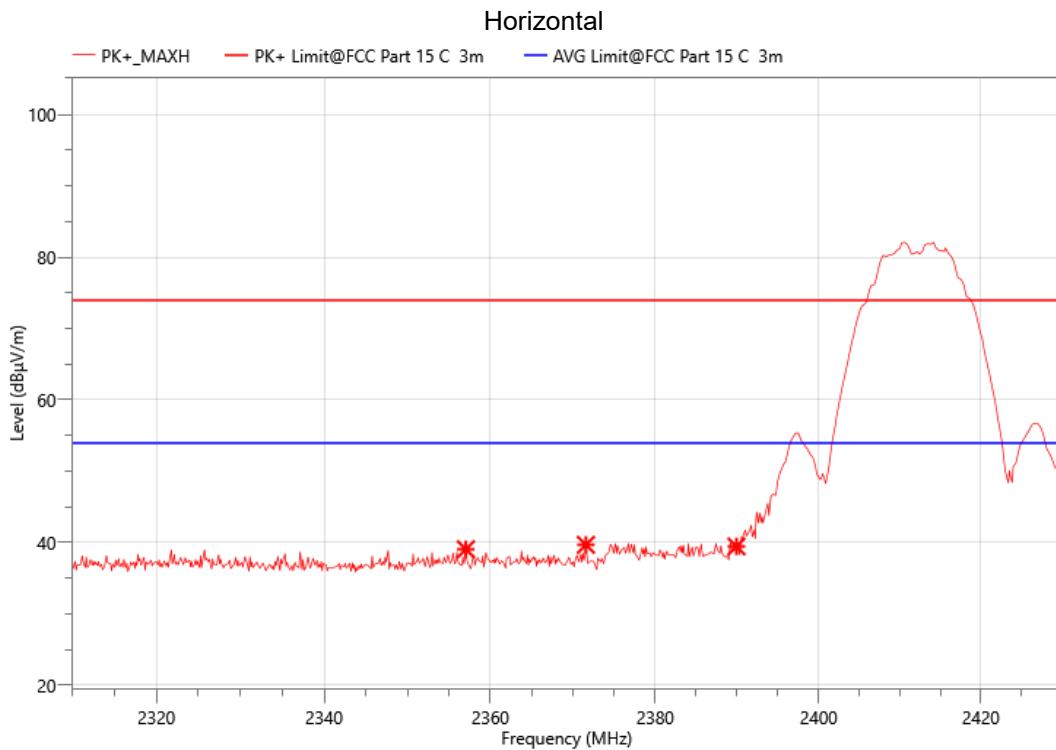
Note: 1. All Readings are Peak Value (VBW=3MHz) and Peak Value (VBW=10Hz).

2. Emission Level= Reading Level+Probe Factor +Cable Loss.

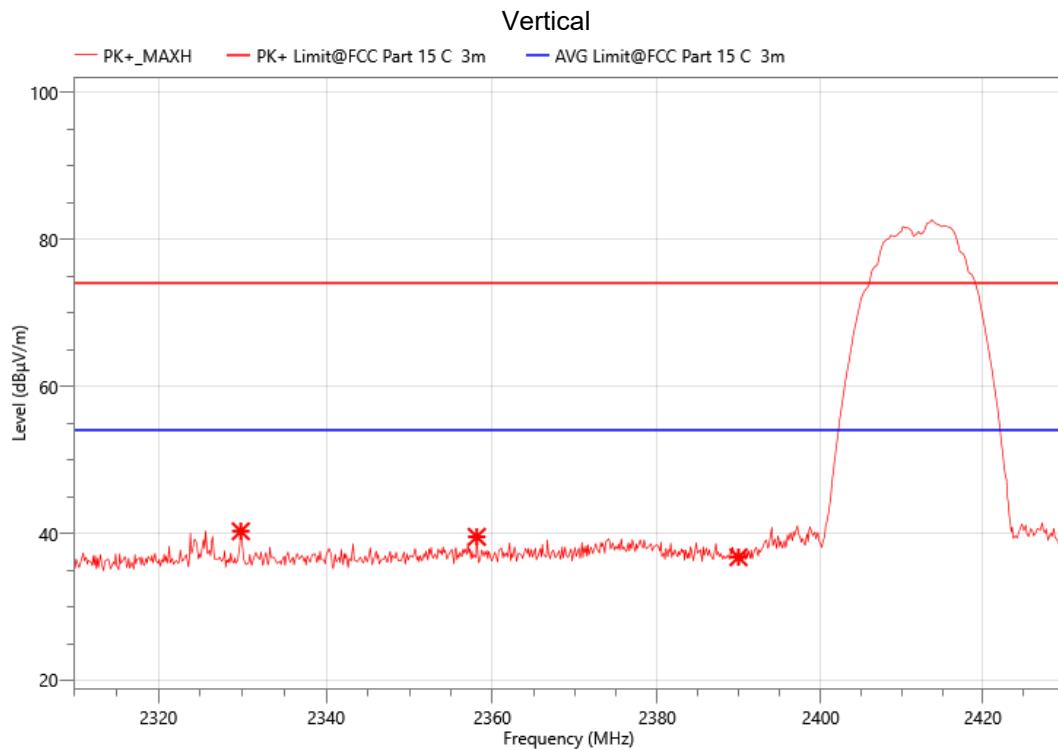
3. EIRP[dBm] = E[dBμV/m] + 20 log(d[meters]) - 104.77

d is the measurement distance in 3 meters

- Band Edge
802.11b 2412MHz

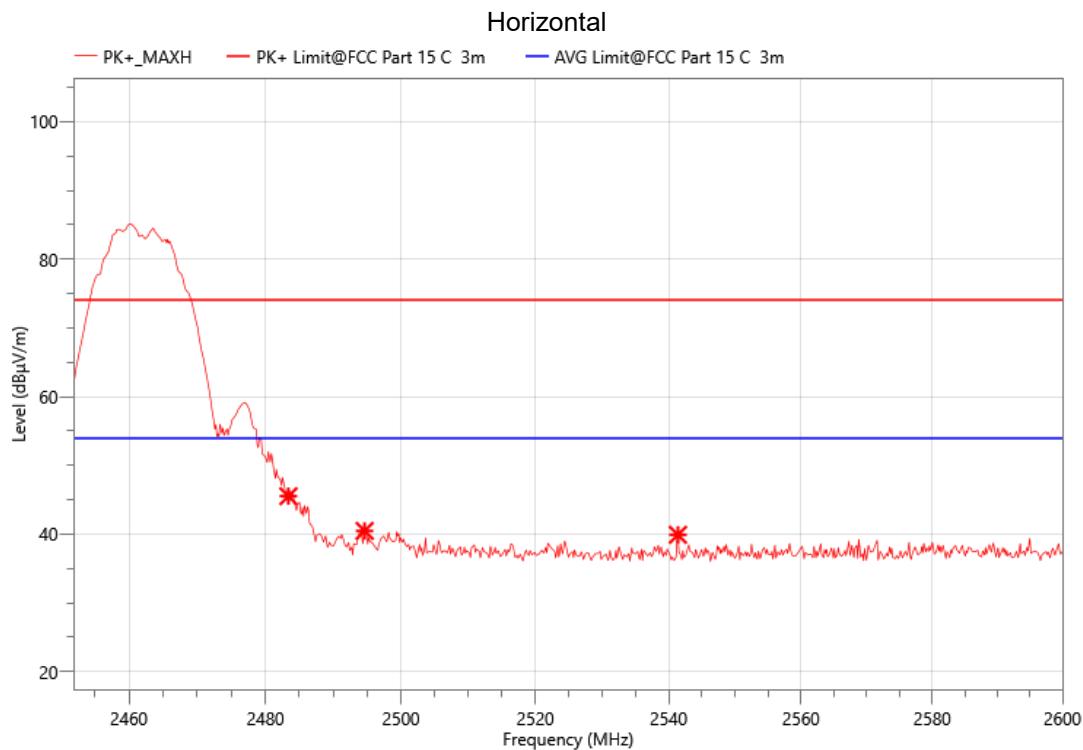


Freq. (MHz)	Reading (dB μ V)	Meas. (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Det.	Pol.	Corr. (dB)
2357.040	59.78	39.04	74.00	34.96	PK+	H	-20.74
2371.560	60.41	39.67	74.00	34.33	PK+	H	-20.74
2389.920	60.17	39.44	74.00	34.56	PK+	H	-20.73

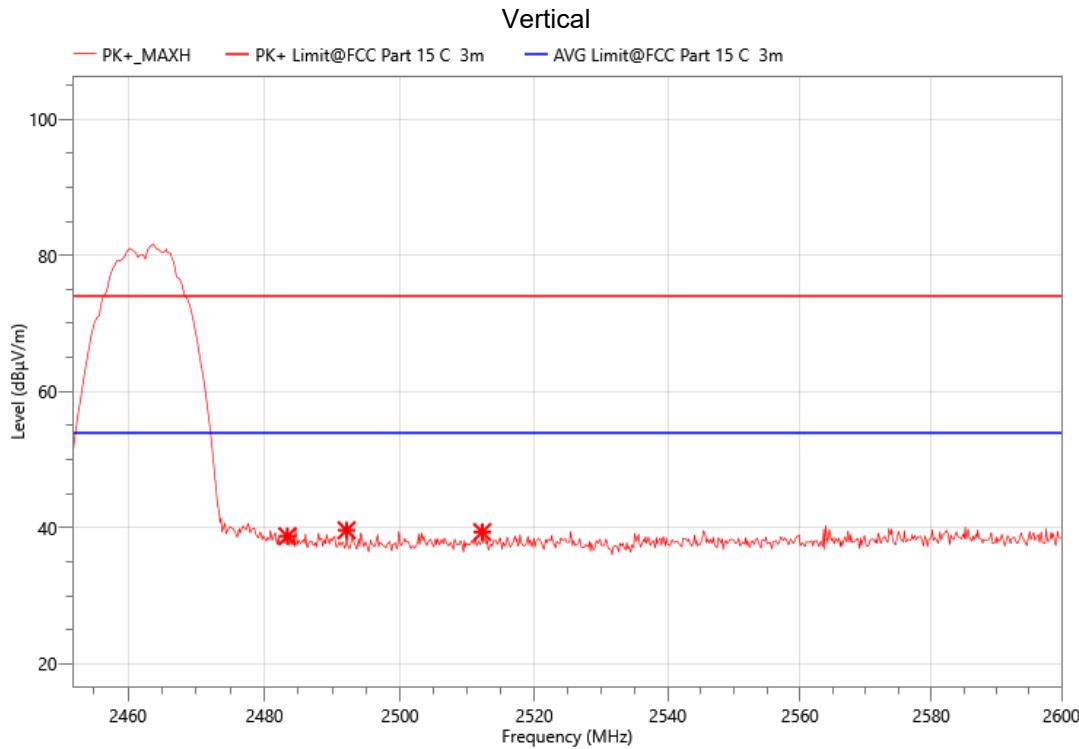


Freq. (MHz)	Reading (dB μ V)	Meas. (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Det.	Pol.	Corr. (dB)
2329.800	61.22	40.29	74.00	33.71	PK+	V	-20.93
2358.120	60.27	39.54	74.00	34.46	PK+	V	-20.73
2389.920	57.49	36.76	74.00	37.24	PK+	V	-20.73

802.11b 2462MHz



Freq. (MHz)	Reading (dB μ V)	Meas. (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Det.	Pol.	Corr. (dB)
2483.376	65.82	45.52	74.00	28.48	PK+	H	-20.3
2494.624	60.74	40.47	74.00	33.53	PK+	H	-20.27
2541.392	59.96	39.91	74.00	34.09	PK+	H	-20.05



Freq. (MHz)	Reading (dB μ V)	Meas. (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Det.	Pol.	Corr. (dB)
2483.376	59.05	38.75	74.00	35.25	PK+	V	-20.3
2492.108	59.90	39.63	74.00	34.37	PK+	V	-20.27
2512.236	59.57	39.36	74.00	34.64	PK+	V	-20.21

Note: 1.802.11b, 802.11g, 802.11n HT20, 802.11n HT40, 802.11ax HE20, 802.11ax HE40, all has been tested, the worst case is 802.11b, only shown the worst case.

9. ANTENNA REQUIREMENT

REQUIREMENT

Please refer to FCC §15.203

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 shall be considered sufficient to comply with the provisions of this section. 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.

Please refer to FCC §15.247(b)(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.

DESCRIPTION

Pass

PENDIX: PHOTOGRAPHS OF TEST CONFIGURATION

Please refer to report E04A23080299F00203.

APPENDIX: PHOTOGRAPHS OF THE EUT

Please refer to report E04A23080299F00204.

--- END OF REPORT---