EMC TEST REPORT

NVLAP Lab Code 200033-0

Standard(s):

47 CFR FCC Part 15.247
RSS 247, Issue 2, 2017

FCC ID:DGFPSDPIC100NA
IC:458A-PSDPIC100NA

Product: 3M™ PELTOR™ Professional In-Ear Communication Headset
Model(s): PIC-100NA

Company Name:
3M Company

Address:
7911 Zionsville Rd,
Indianapolis, IN 46268

Report Number: RE1910211-1
Report Issue Date: July 19, 2022

Report Prepared by:

Signature:
Yuriy Litvinov
Lead EMC Engineer

Tested by:
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1.0 Test Summary

Based on the results of our investigation, we have concluded the product tested **comply** with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested.

	Requirement – Test	Test Description	Result	Comments
4.1	FCC Part 15.247(a)(2)/ RSS-247(5.2)/RSS-Gen (6.6)	DTS Bandwidth	**pass**	
4.2	FCC Part 15.247(b)(3)/ RSS-247(5.4(4))	Maximum Peak Conducted Output Power	**pass**	
4.3	FCC Part 15.247(e)/ RSS-247(5.2(b))	Maximum Power Spectral Density level	**pass**	
4.4	FCC Part 15.209 RSS-Gen, 8.9	Radiated Emissions in restricted band	**pass**	
4.5	FCC Part 15.247(d)/ RSS-247(5.5)	Radiated Emissions in non-restricted band	**pass**	
4.6	FCC Part 15.247(d)(1)/ RSS-247(5.5)	DTS Band-edge Emissions Measurements	**pass**	
4.7	FCC Part 15.207/ RSS-Gen (8.8)	Conducted Emissions	**pass**	
4.8	FCC Part 15.247(i)/ RSS 102 Issue 5	RF Exposure Compliance	**pass**	

Note:	

1.1 Measurement Uncertainty

The measured value related to the corresponding limit will be used to decide whether the equipment meets the requirements. The measurement uncertainty figures were calculated and correspond to a coverage factor of k=2, providing a confidence level of respectively 95.45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian).

Radiated emissions 30MHz to 1000MHz	4.9 dB
Radiated emissions 1GHz to 18GHz	4.6 dB
Conducted emissions 150KHz to 30MHz (AMN)	2.7 dB
Conducted emissions 150KHz to 30MHz (AAN)	1.92 dB
RF frequency	$\pm 3 \times 10^{-8}$
RF power, conducted	1.4 dB
RF Power Spectral Density	0.96 dB

2.0 Equipment Description

2.1	Equipment Under Test			
Description:	Body worn radio headset with a battery pack operating in two frequency bands			
Model(s):	PIC-100NA			
Serial number:	N/A			
3M Division:	Personal Safety			
Modifications and Special Measures:	none			
Frequency Range:	2402.0-2480.0 MHz			
Channel No.:	39			
Modulation Type:	GFSK			
FCC Classification:	Digital Transmission System (DTS)			
RF Output Power:	0.03dBm (1.0mW) Peak Conducted			
Antenna Type and Antenna Assembly Gain:	☐ External	☒ Integral PCB Antenna	☐ Dedicated	
	☒ 2.3dBi	☒ Declared by the Manufacturer	☐ Measured	
Test Deviations or Exclusions	☐ Yes	☒ No		
Rated Power:	**Voltage:**	☐ 120VAC	☐ 230VAC	☒ 3.7VDC
	Phase:	☐ 1ph	☐ 3ph	☒ Battery
	Frequency:	☐ 50Hz	☐ 60Hz	
	Current:			
Test Dates:	08/15/2021-07/18/2022			
Received Date:	08/13/2021			
Received Conditions:	☐ Poor	☒ Good		
	☒ Prototype	☐ Production		

3.0 EUT Configuration

3.1 System Configuration

No.	Product Type	Manufacturer	Model	Comments
1	Headset	3M	PIC-100NA	
2	Battery Pack	3M	PIC-100BA	
3	USB Charger	Samsung	ETA-U90AWS	Support Equipment

3.2 Input/Output Ports of EUT

No.	Description	Type	Comments
1	DC Power	USB-C	
2			

3.3 Cables

No.	Description	Type	Length	Shielding	Comments
1	USB-C	USB 2.0	1m	Yes	
2					

3.4 Measurement Arrangements of EUT

	Intended Operational Arrangement(s)	Comments
☒	Table-top only	
☐	Floor-standing only	
☐	Floor-standing or table-top	
☒	Other	Body-worn

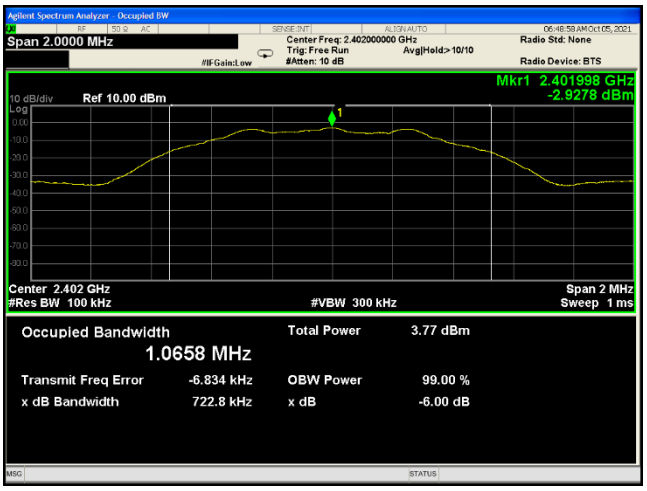
3.5 Exercising of EUT and Interfaces

No.	Mode of Operation
1	Continues transmission of modulated and CW signals at lowest (0), middle (19) and highest (39) channels
2	Device programming using Anvil Radio Tester v.1.3.0 software for continues transmission at maximum rated RF output power and Duty Cycle.

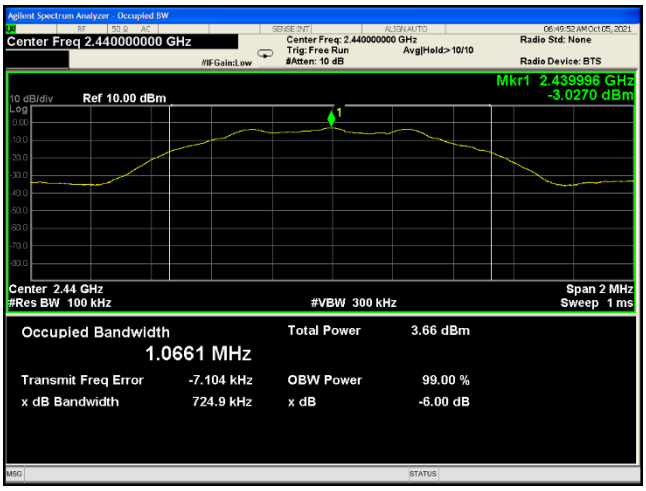
4.0 Test Conditions and Results

4.1	**DTS Bandwidth**	
	Laboratory Ambient Temperature:	23°C
	Relative Humidity:	48%
	Atmospheric Pressure:	1011 mbars
Reference Standard(s):	☒ ANSI C63.10:2013 ☒ FCC Part 15.247/RSS 247 ☒ KDB 558074	**Measurement Point** ☒ Conducted ☐ Radiated
Frequency Range:	☒ 2402.0-2480.0 MHz	RBW = 100KHz VBW ≥ 3 x RBW
Nominal Voltage:	☐ 120VAC ☒ 3.7VDC	
Test Personnel:	Yuriy Litvinov	**Date:** 10/04/2021

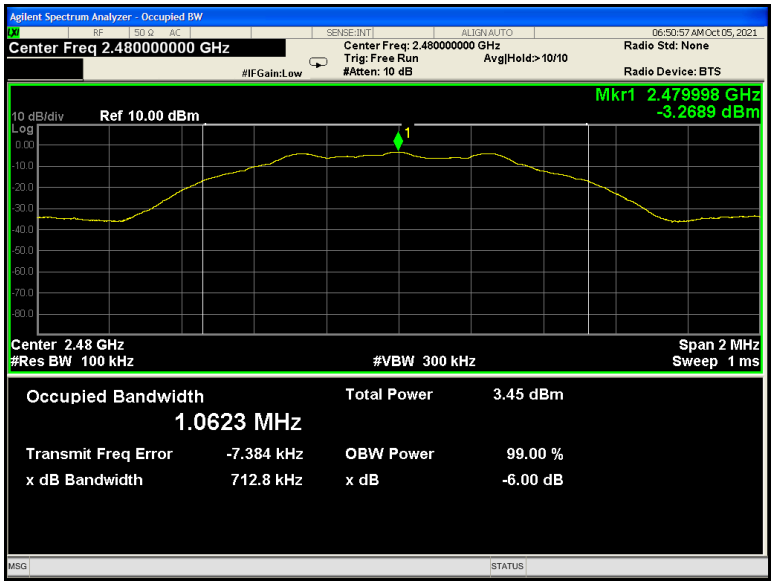
Frequency (MHz)	Data Rate	99%dB Bandwidth (KHz)	6dB Bandwidth (KHz)	6dB OBW Limit (KHz)	Results
2402	1 Mbps	1065	722.8	**> 500**	**pass**
2440	1 Mbps	1066	724.9	**> 500**	**pass**
2480	1 Mbps	1062	712.8	**> 500**	**pass**



OBW – Low Channel



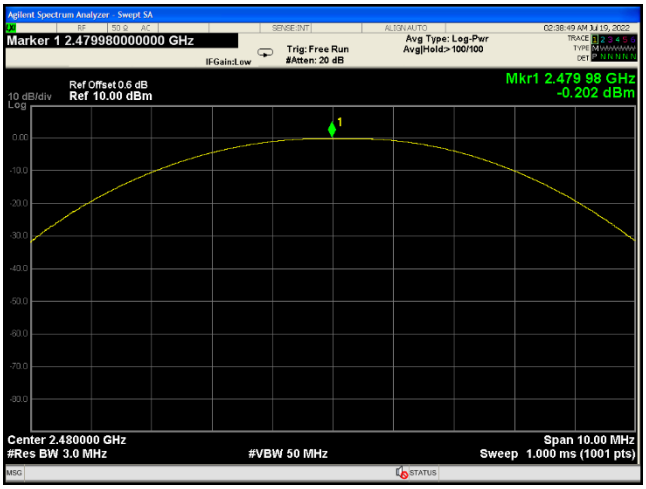
OBW – Mid Channel



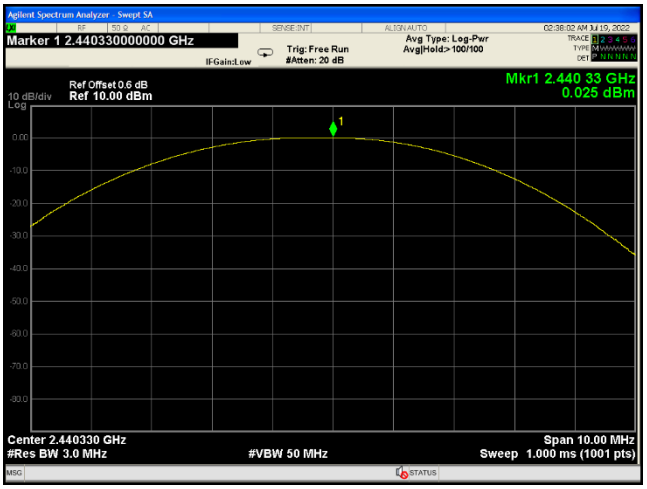
OBW – High Channel

4.2	**Maximum Output Power**	
Method:	Measurements was performed at the appropriated frequencies and at the highest power level at which the transmitter is intended to operate. The analyzer offset was adjusted to compensate for the attenuator and other losses.	
	Laboratory Ambient Temperature:	23°C
	Relative Humidity:	48%
	Atmospheric Pressure:	1011 mbars
Reference Standard(s):	☒ ANSI C63.10:2013 ☒ FCC Part 15.247/RSS 247 ☒ KDB 558074	**Measurement Point** ☒ Conducted ☐ Radiated at 3 meters
Frequency Range:	☒ 2402.0 – 2480.0 MHz	
Antenna Gain:	2.3dBi	**Maximum Peak Conducted Power:**
Limit:	30 dBm	0.025dBm
Nominal Voltage:	☐ 120VAC ☒ 3.7VDC	
Test Personnel:	Yuriy Litvinov	**Date:** 07/18/2022

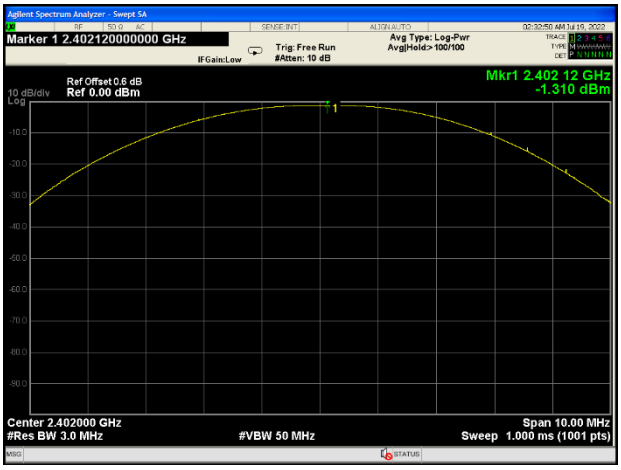
Note:	EIRP (dBm) = Conducted Power (dBm) +Antenna Gain (dBi)= 0.025+2.3= 2.3dBm



Low Channel

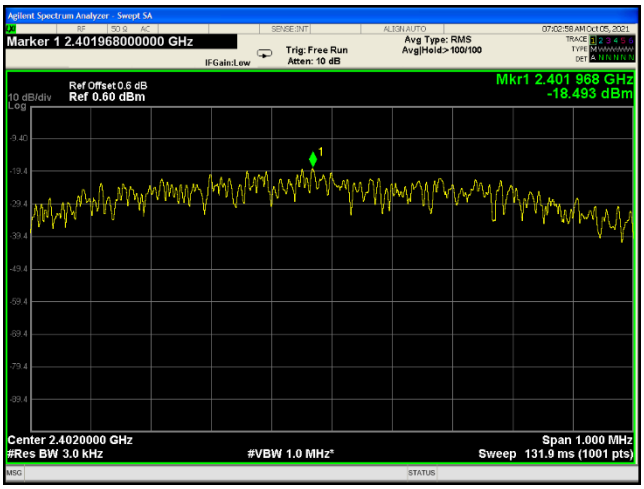


Mid Channel

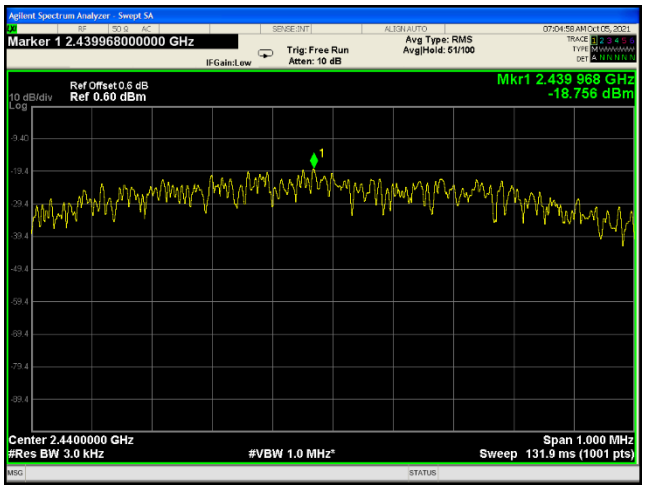


High Channel

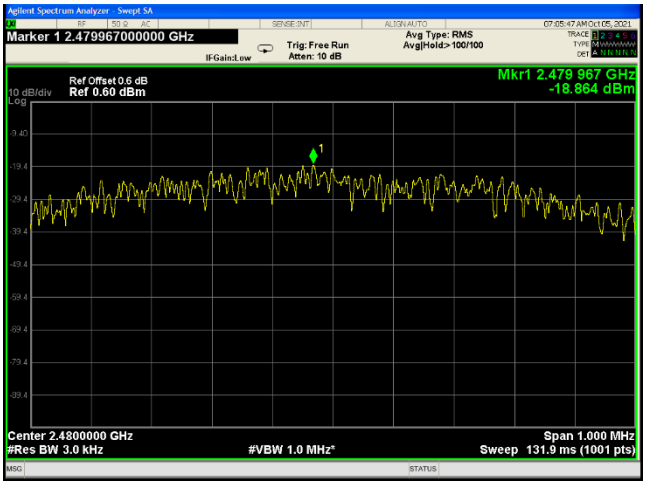
4.3	**Maximum Power Spectral Density level**	
Method:	Measurements was performed with modulated carrier at the highest power level at which the transmitter is intended to operate. The analyzer offset was adjusted to compensate for the attenuator and other losses.	
	Laboratory Ambient Temperature:	23°C
	Relative Humidity:	48%
	Atmospheric Pressure:	1011 mbars
Reference Standard(s):	☒ ANSI C63.10:2013 ☒ FCC Part 15.247/RSS 247 ☒ KDB 558074	**Measurement Point** ☒ Conducted ☐ Radiated at 3 meters
Frequency Range:	☒ 2402.0 – 2480.0 MHz	**PSD Results**
PSD Limit:	8 dBm in any 3KHz band	-18dBm
Nominal Voltage:	☐ 120VAC ☒ 3.7VDC	
Test Personnel:	Yuriy Litvinov	**Date:** 10/04/2021



PSD Low Channel



PSD Mid Channel



PSD High Channel

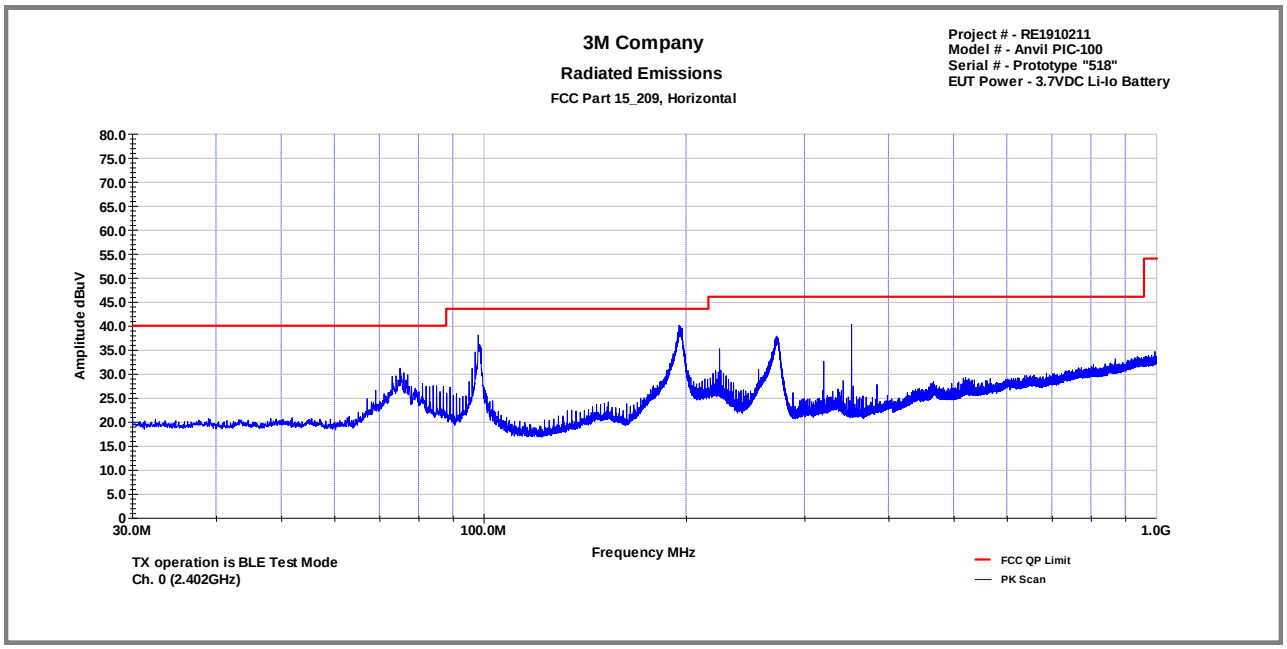
4.4	**Radiated Emissions in restricted band**
Method:	Measurements were made in a 3-meter semi-anechoic chamber that complies to CISPR 16/ANSI C63.4 standards. EUT was rotated through three orthogonal axes to determine which attitude (orientation) and arrangement produces the highest emission relative to the limit; the attitude and device arrangement that produces the highest emission relative to the limit was used in making final radiated emission measurements. Spurious Radiated emissions measurements ware performed with external preamp and a high pass filter. Final measurements were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4 m. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.

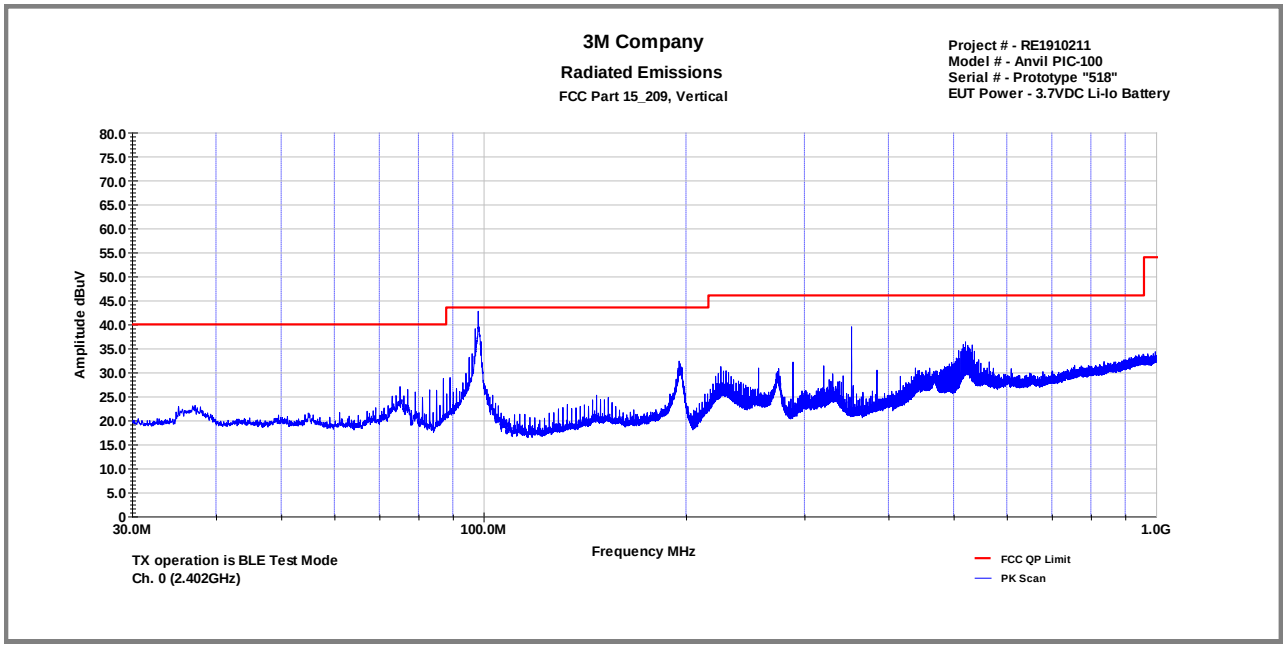
Test Verification: ☒	Laboratory Ambient Temperature:	23°C
	Relative Humidity:	55%
	Atmospheric Pressure:	1011 mbars
Reference Standard(s):	☒ ANSI C63.10:2013, Section 11.12.1 ☒ FCC Part 15.247/RSS 247 ☒ KDB 558074	**Measurement Distance** ☒ 3 Meters ☐
Frequency Range:	☒ 30 MHz to 1 GHz ☒ 1 GHz to 25 GHz	
Nominal Voltage:	☐ 120VAC ☒ 3.7VDC	
Test Personnel:	Keith Schwartz KS	**Date:** 09/09/2021

Limits –15.209 and RSS Gen

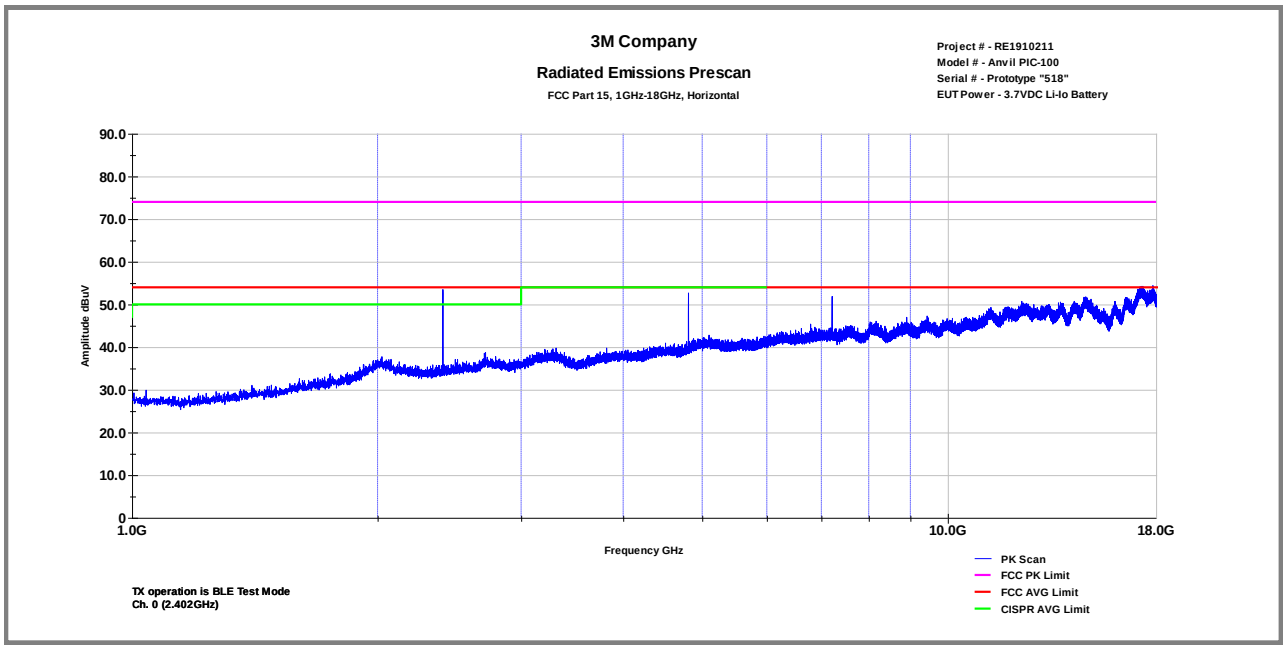
Frequency (MHz)	Limit dB (µV/m)				
	Quasi-Peak	Average	Peak	Distance	Results
0.009-0.490		2400/F(KHz)		300	**N/A**
0.490-1.705	24000/F(KHz)			30	**N/A**
1.705-30	30			30	**N/A**
30 to 88	40			3	**pass**
88 to 216	43.5			3	**pass**
216 to 960	46			3	**pass**
Above 960		54	74	3	**pass**

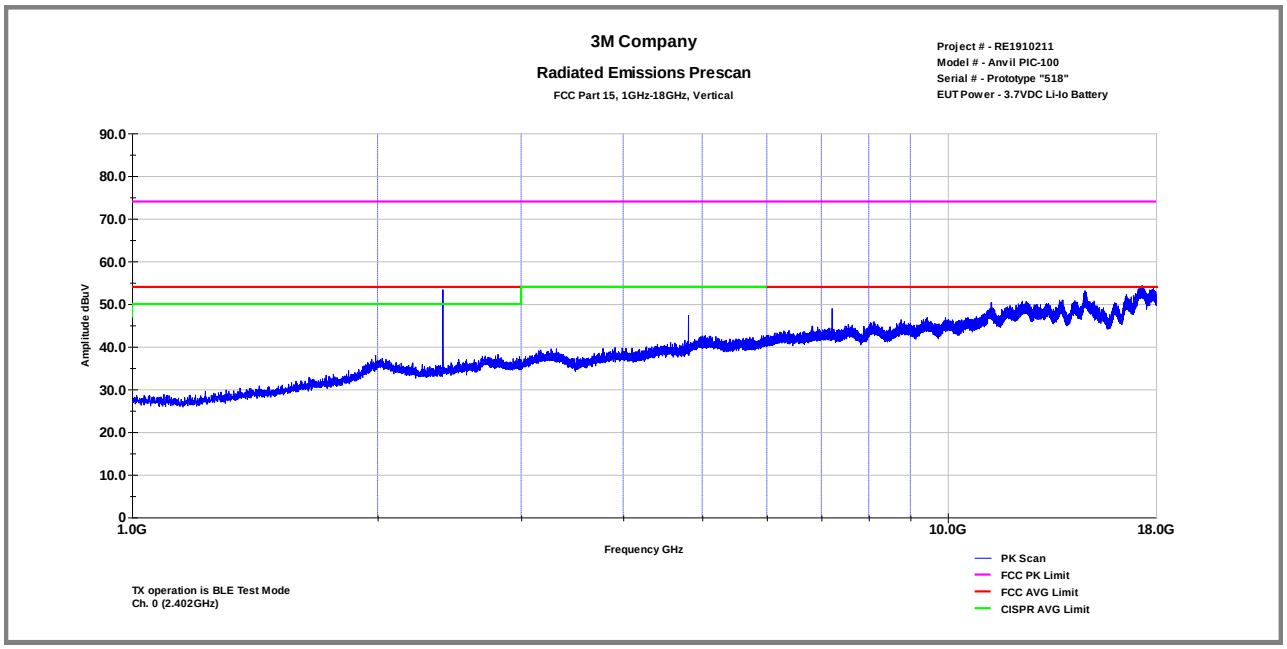
Modifications:	
Note:	The lower limit applies at the transition frequency. An inverse proportionality factor of 20 dB per decade has been used to normalize the measured data to the specified distance for determining compliance For emission in the restricted bands, the limit of 15.209 was used. There are no emissions were detected in the restricted band within 30dB below 15.209 limit adjacent or nearby to 2400-2483.5MHz frequency band during operation at the high channel. The duty cycle correction factor applied to field strength measurements in the restricted band harmonics above 1GHz. No radiated spurious emissions were detected above 18GHz



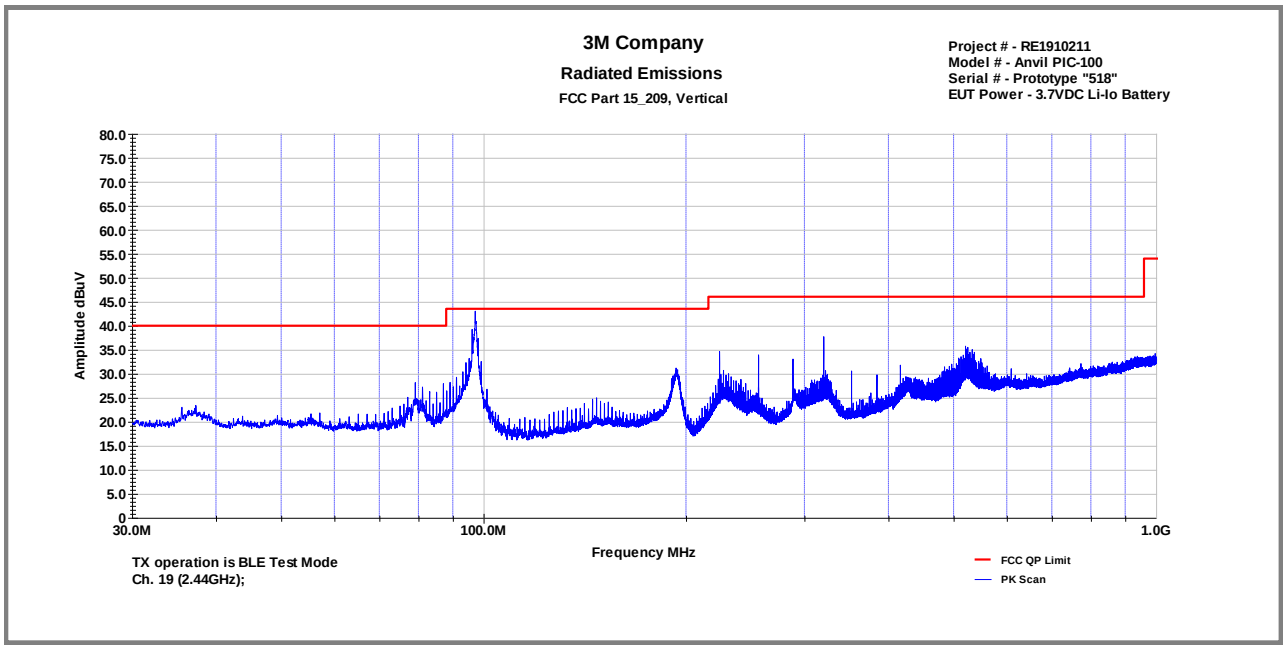


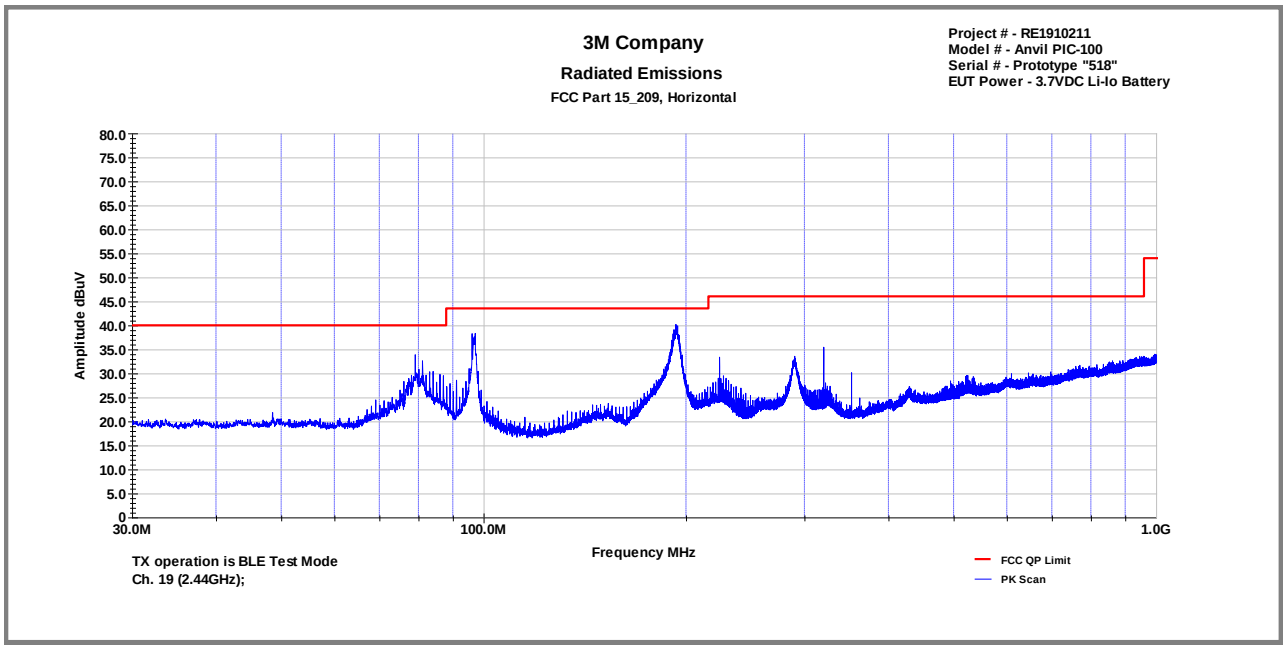
FCC Part 15.209 Radiated Emissions in restricted band – Low Channel



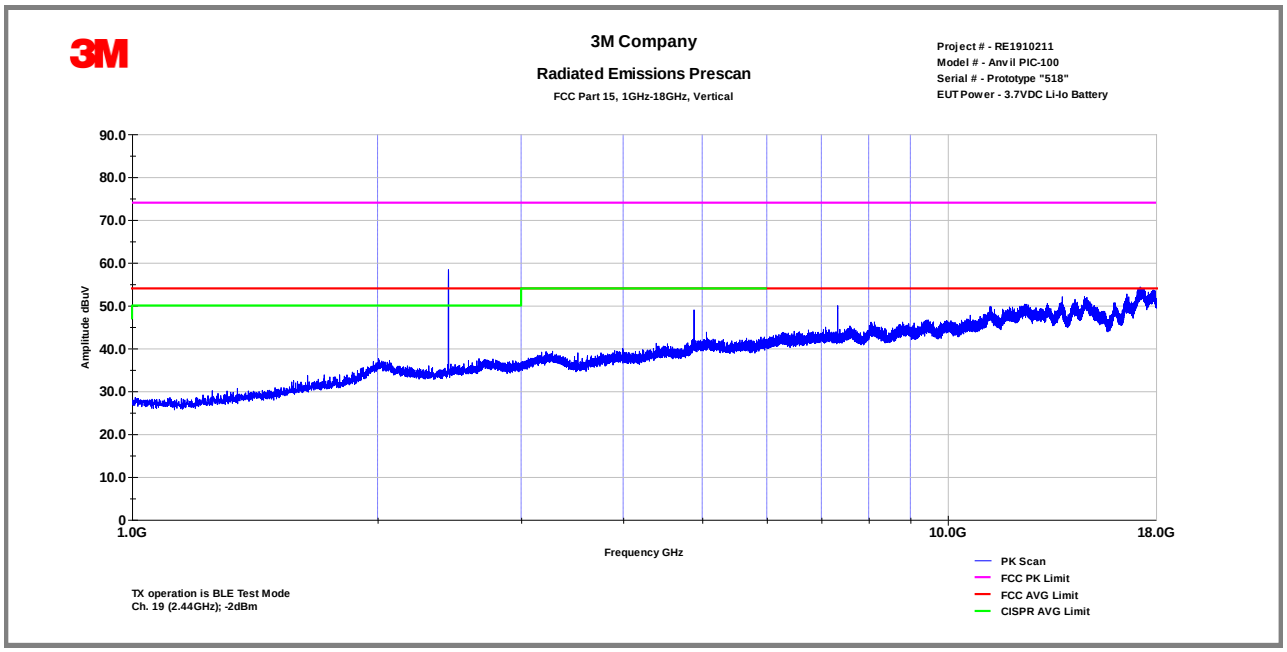


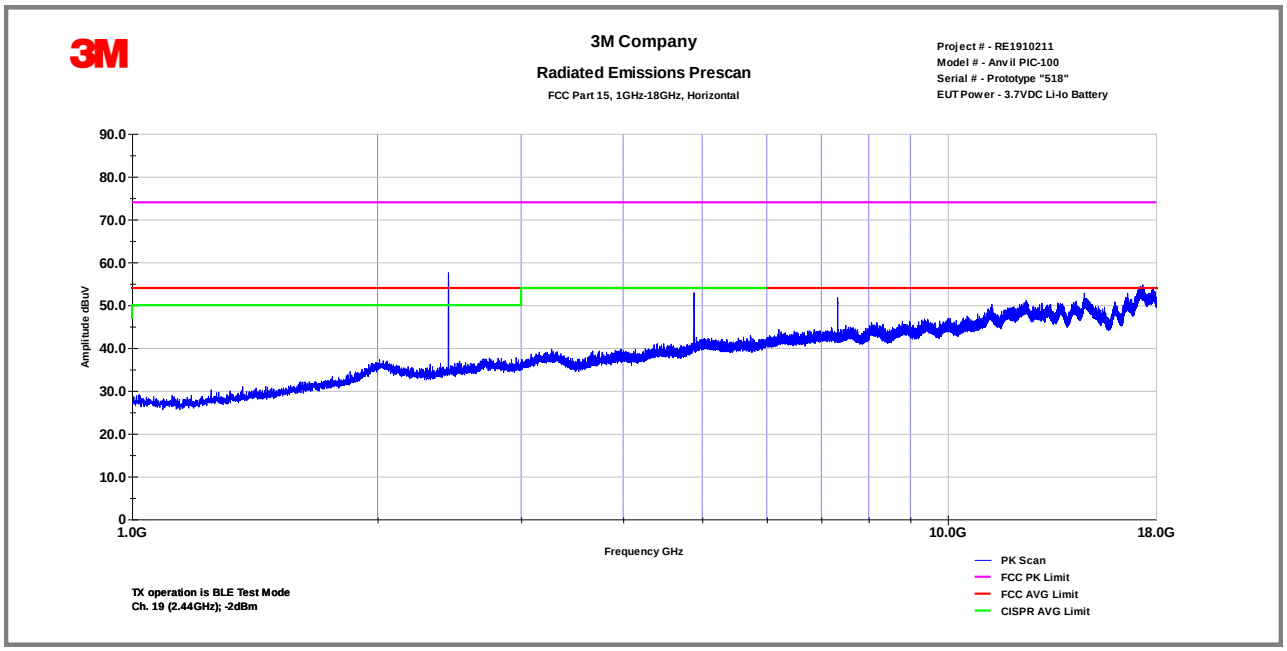
FCC Part 15.209 Radiated Emissions in restricted band – Low Channel



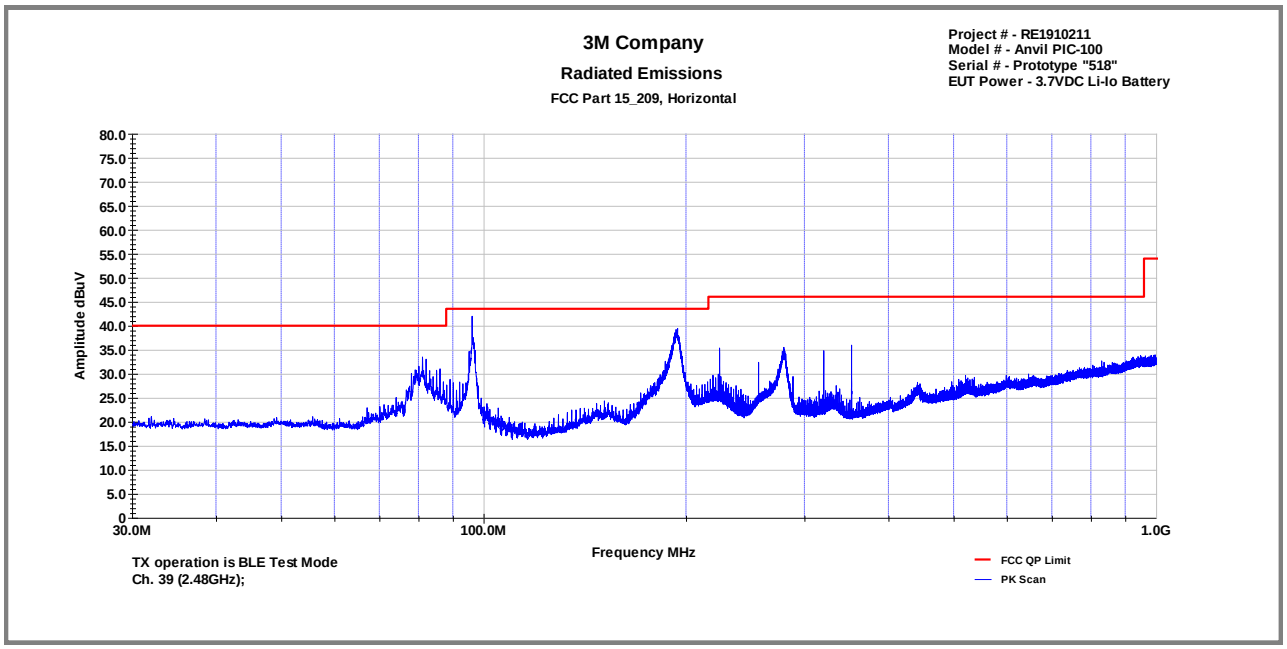


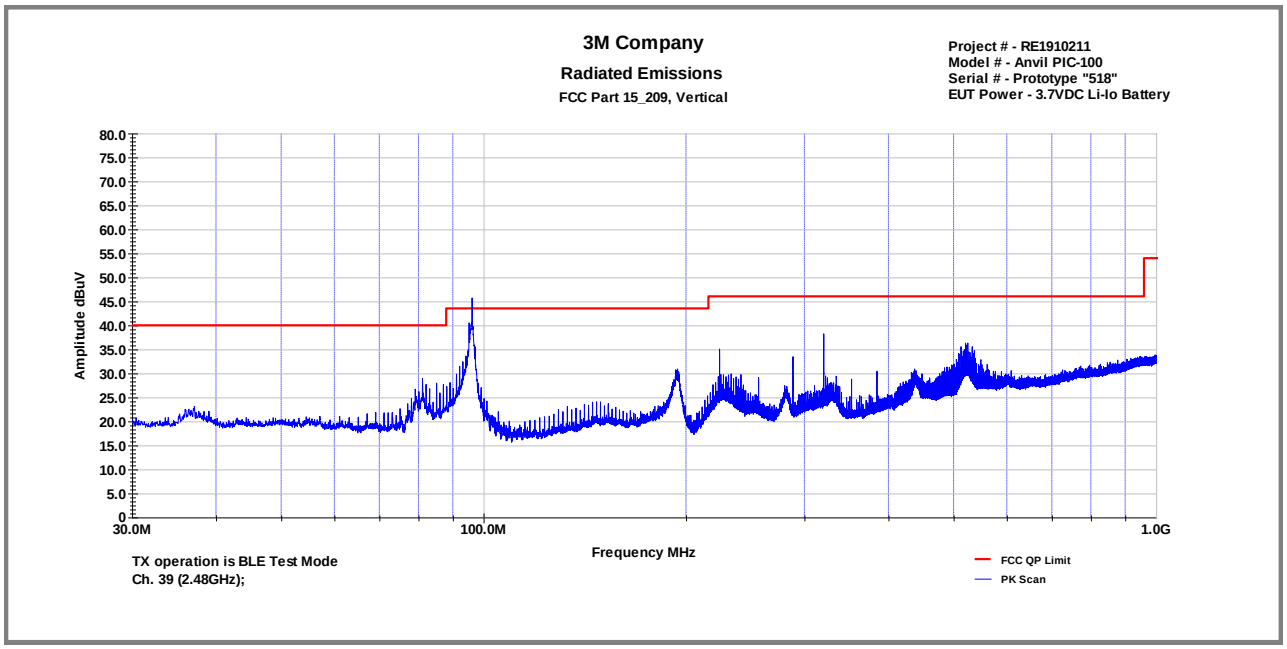
FCC Part 15.209 Radiated Emissions in restricted band – Mid Channel



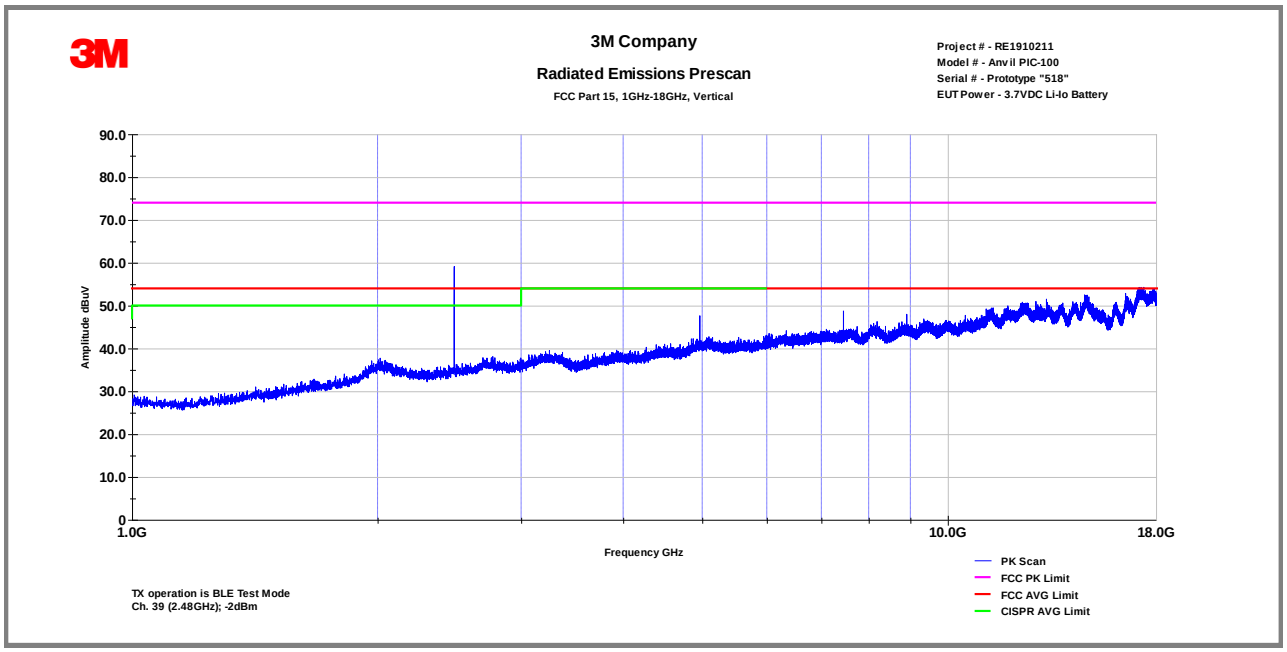


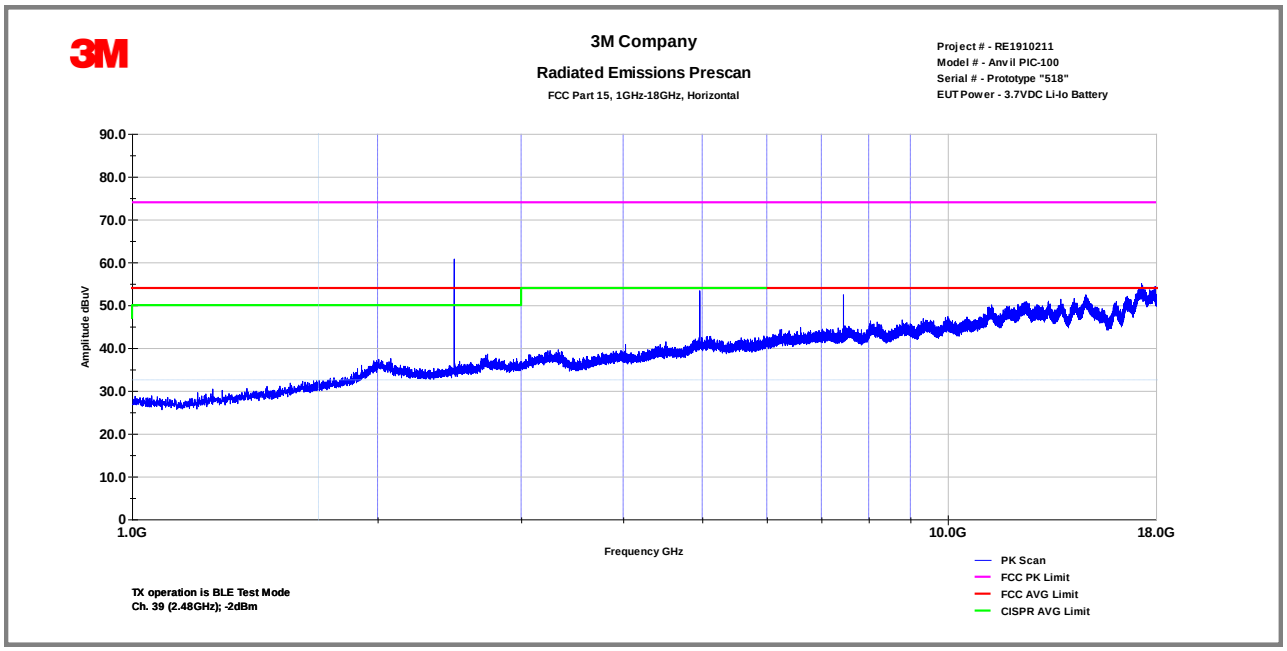
FCC Part 15.209 Radiated Emissions in restricted band – Mid Channel





FCC Part 15.209 Radiated Emissions in restricted band – High Channel





FCC Part 15.209 Radiated Emissions in restricted band – High Channel

Tables - Radiated Emissions in restricted band

Frequency (MHz)	Pol.	QP Reading dBµV/m	Total CF dB	Net at 3 m dBµV/m	Limit (dBµV/m)	Margin dB
95.99	V	25	13.3	38.3	43.5	-5.3
194.18	H	17.5	15.6	33.1	43.5	-10.4
223.01	H	11.5	14.9	26.4	46	-19.6
279.5	H	8.5	18.3	26.8	46	-19.2
320.99	V	5.6	19.5	25.1	46	-20.9
352.01	V	5.4	19.9	25.4	46	-20.7
Notes:	Net Reading (dBuV) = Reading (dBµV) + Antenna CF(dB)+Cable CF(dB) – Amp Gain(dB) Low Channel					

Frequency (MHz)	Pol.	QP Reading dBµV/m	Total CF dB	Net at 3 m dBµV/m	Limit (dBµV/m)	Margin dB
79.01	H	14.7	14.1	28.8	40	-11.2
96.02	V	25.2	13.3	38.4	43.5	-5.1
192.89	H	17.4	15.7	33.1	43.5	-10.4
223.01	H	11.9	14.9	26.9	46	-19.2
319.01	V	7.4	19.5	26.8	46	-19.2
519.32	V	5.7	23.8	29.4	46	-16.6
Notes:	Net Reading (dBuV) = Reading (dBµV) + Antenna CF(dB)+Cable CF(dB) – Amp Gain(dB) Mid Channel					

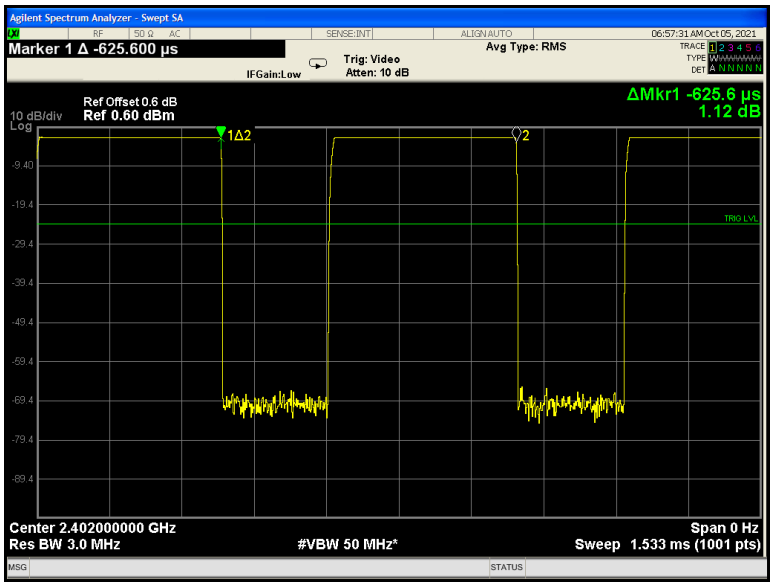
Frequency (MHz)	Pol.	QP Reading dBµV/m	Total CF dB	Net at 3 m dBµV/m	Limit (dBµV/m)	Margin dB
98.48	V	19.4	13.5	32.9	43.5	-10.6
195.8	H	18.4	15.3	33.7	43.5	-9.8
223.01	H	12.9	14.9	27.8	46	-18.2
271.46	H	14.9	17.9	32.8	46	-13.2
351.86	H	4.1	19.9	24	46	-22
519.44	H	4.9	23.8	28.7	46	-17.3
Notes:	Net Reading (dBuV) = Reading (dBµV) + Antenna CF(dB)+Cable CF(dB) – Amp Gain(dB) Mid Channel					

Pol	Frequency (MHz)	Peak dBµV/m	AVG dBµV/m	Total CF dB	Net Peak dBµV/m	Net AVE dBµV/m	PK Limit dBµV/m	AVE Limit dBµV/m	PK Margin dB	AVG Margin dB
V	4804.00	58.04	53.8	-6.22	51.82	47.61	74.00	54.00	-22.18	-6.39
H	4804.00	61.50	57.3	-6.22	55.28	51.07	74.00	54.00	-18.72	-2.93
V	7630.00	48.87		-3.69	45.18		74.00	54.00	-28.82	
H	7630.00	48.95		-3.69	45.26		74.00	54.00	-28.74	
V	9608.00	50.65	46.4	-1.60	49.05	44.84	74.00	54.00	-24.95	-9.16
H	9608.00	50.12	45.9	-1.60	48.52	44.31	74.00	54.00	-25.48	-9.69
V	4804.00	58.04	53.8	-6.22	51.82	47.61	74.00	54.00	-22.18	-6.39
H	4804.00	61.50	57.3	-6.22	55.28	51.07	74.00	54.00	-18.72	-2.93
Notes:		Net Reading (dBuV) = Reading (dBµV) + (Antenna with amp CF(dB)+Cable CF(dB))								
		Low Channel								

Pol	Frequency (MHz)	Peak dBµV/m	AVG dBµV/m	Total CF dB	Net Peak dBµV/m	Net AVE dBµV/m	PK Limit dBµV/m	AVE Limit dBµV/m	PK Margin dB	AVG Margin dB
V	4880.00	55.97	51.8	-5.30	50.67	46.46	74.00	54.00	-23.33	-7.54
H	4880.00	59.09	54.9	-5.30	53.79	49.58	74.00	54.00	-20.21	-4.42
V	7320.00	54.94	50.7	-3.60	51.34	47.13	74.00	54.00	-22.66	-6.87
H	7320.00	58.53	54.3	-3.60	54.93	50.72	74.00	54.00	-19.07	-3.28
V	12200.00	47.06		3.27	50.33		74.00	54.00	-23.67	
H	12200.00	46.47		3.27	49.74		74.00	54.00	-24.26	
V	4880.00	55.97	51.8	-5.30	50.67	46.46	74.00	54.00	-23.33	-7.54
H	4880.00	59.09	54.9	-5.30	53.79	49.58	74.00	54.00	-20.21	-4.42
Notes:		Net Reading (dBuV) = Reading (dBµV) + (Antenna with amp CF(dB)+Cable CF(dB))								
		Mid Channel								

Pol	Frequency (MHz)	Peak dBµV/m	AVG dBµV/m	Total CF dB	Net Peak dBµV/m	Net AVE dBµV/m	PK Limit dBµV/m	AVE Limit dBµV/m	PK Margin dB	AVG Margin dB
V	2700.00	47.95	37.0	-5.01	42.94	31.96	74.00	54.00	-31.06	-22.04
H	2700.00	47.70	37.1	-5.01	42.69	32.11	74.00	54.00	-31.31	-21.89
V	4959.86	54.61	50.4	-5.01	49.60	45.39	74.00	54.00	-24.40	-8.61
H	4959.86	59.44	55.2	-5.01	54.43	50.22	74.00	54.00	-19.57	-3.78
V	7439.40	55.91	51.7	-2.90	53.01	48.80	74.00	54.00	-20.99	-5.20
H	7439.40	58.34	54.1	-2.90	55.44	51.23	74.00	54.00	-18.56	-2.77
V	12240.00	46.71		3.59	50.30		74.00	54.00	-23.70	
H	12240.00	46.42		3.59	50.01		74.00	54.00	-23.99	
Notes:		Reading (dBuV) = Reading (dBµV) + (Antenna with amp CF(dB)+Cable CF(dB))								
		High Channel								

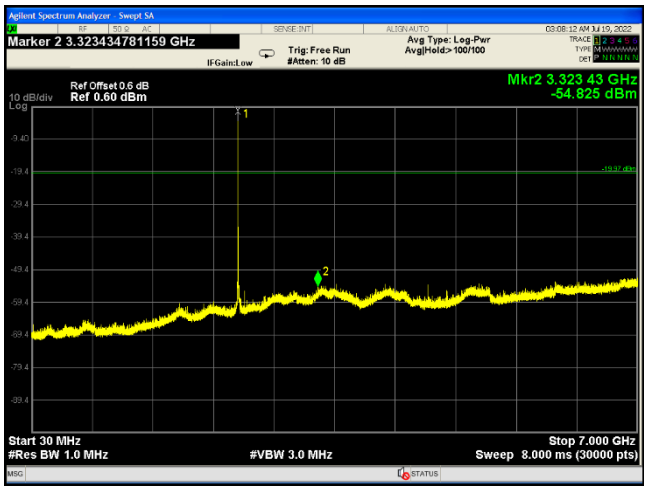
Duty Cycle Correction factor

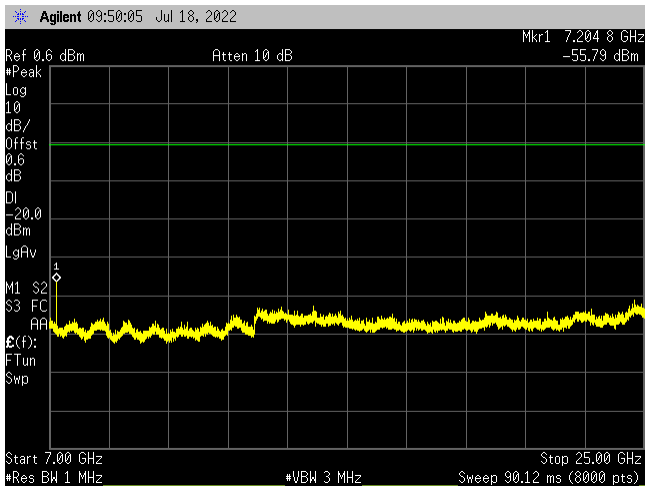


The total number of pulses over 100ms/0.625ms= 160
Transmission On time per burst = 0.385ms
Total on time over 100 ms = 0.385ms x 160 = 61.6ms
Duty Cycle Correction Factor = 20 log (61.6ms/100ms) = -4.2dB

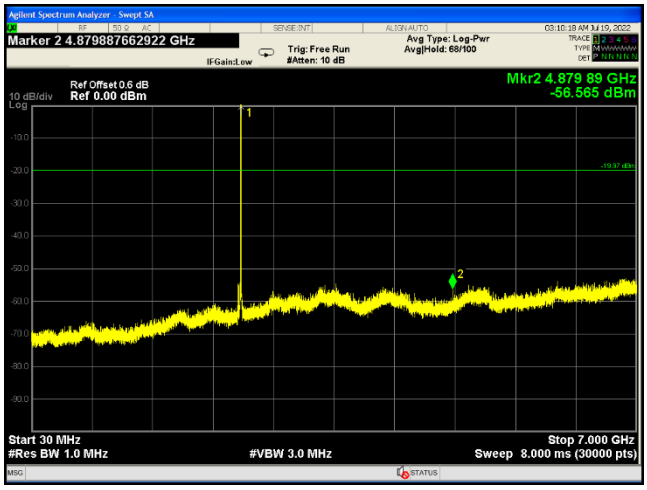
4.5	**Radiated Emissions in non-restricted band**	
Method:	The measurements were made with transmitter set to transmit continuously low, medium and high channels.	
	Laboratory Ambient Temperature:	23°C
	Relative Humidity:	48%
	Atmospheric Pressure:	1011 mbars
Reference Standard(s):	☒ ANSI C63.10:2013 ☒ FCC Part 15.247/RSS 247 ☒ KDB 558074	**Measurement Point** ☒ Conducted ☐ Radiated
Frequency Range:	☒ 2402.0-2480.0MHz	
In-band power in 100KHz:	☒ 0.03dBm	**Results:**
Limit:	☒ -19.97dBm (20dBc below in-band power)	>55dBc
Nominal Voltage:	☐ 120VAC ☒ 3.7VDC	
Test Personnel:	Yuriy Litvinov	**Date:** 07/18/2022

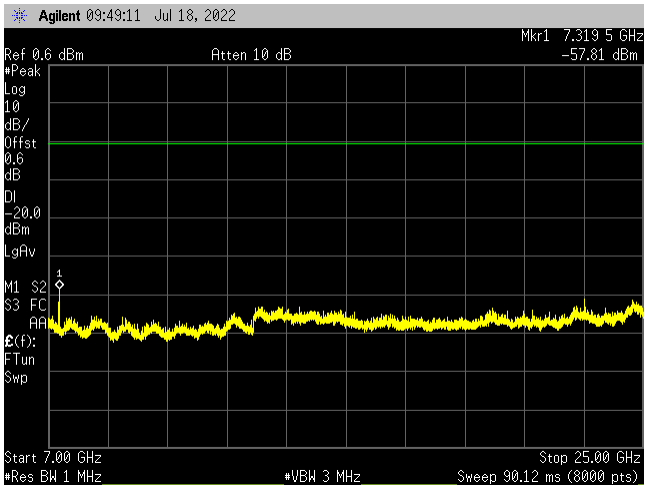
Note:	RBW was set to 1MHz rather than 100KHz in order to increase the measurements speed.



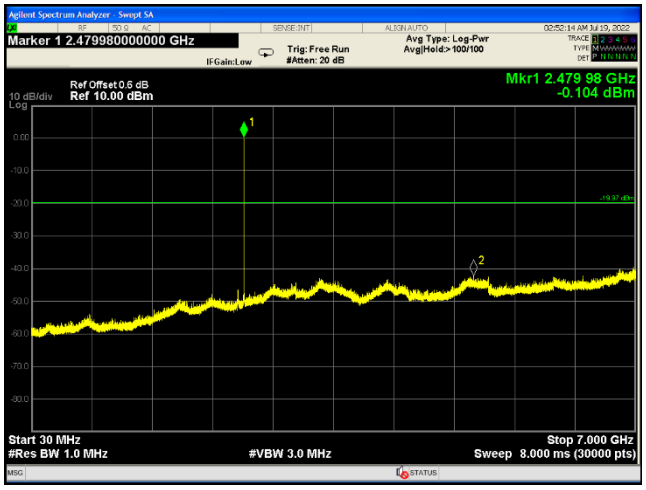


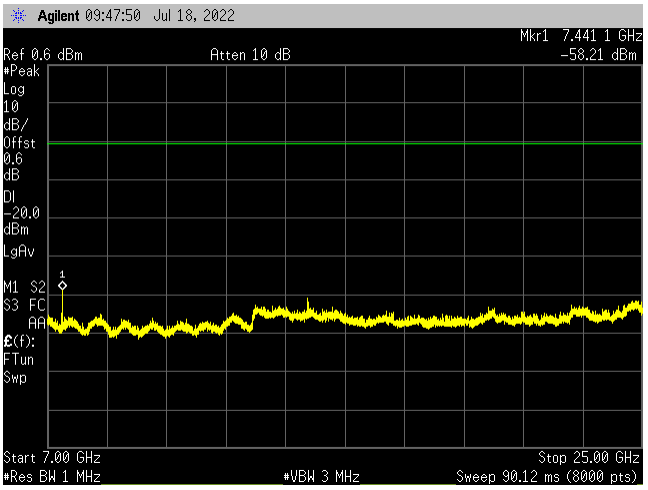
Conducted Spurious - Low Channel





Conducted Spurious – Mid Channel

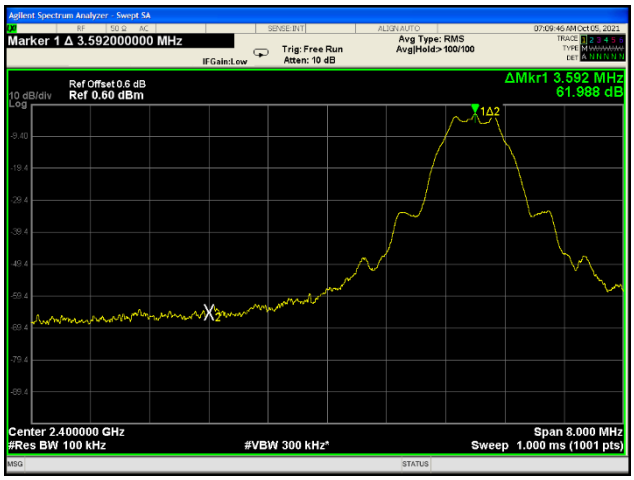




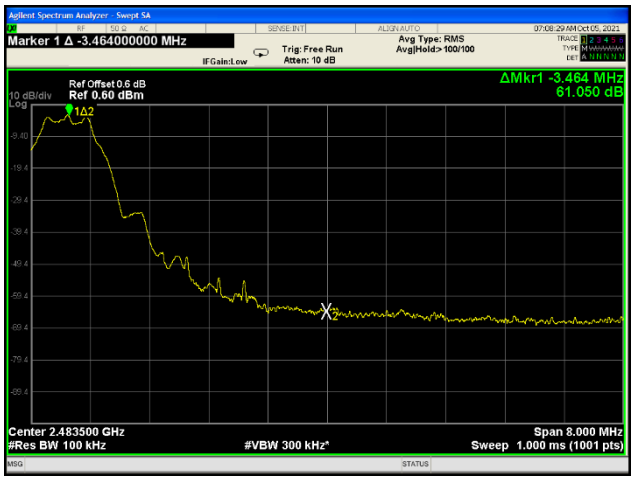
Conducted Spurious – High Channel

4.6	**Band-Edge Compliance**	
Method:	The measurements were made with transmitter set to transmit continuously with modulated signal at low and high channels.	
	Laboratory Ambient Temperature:	23°C
	Relative Humidity:	48%
	Atmospheric Pressure:	1011 mbars
Reference Standard(s):	☒ ANSI C63.10:2013, Section 11.13.2 ☒ FCC Part 15.247/RSS 247 ☒ KDB 558074	**Measurement Point** ☒ Conducted ☐ Radiated
Frequency Range:	☒ 2402.0-2480.0 MHz	**Results**
Limit:	☒ >20dBc	Low Ch., 2402 MHz > 61dBc High Ch., 2480 MHz > 61dBc
Nominal Voltage:	☐ 120VAC ☒ 3.7VDC	
Test Personnel:	Yuriy Litvinov	**Date:** 10/04/2021

Note:	



Band Edge - Low Channel
Center Freq. 2.400GHz



Band Edge - High Channel
Center Freq. 2.4835GHz

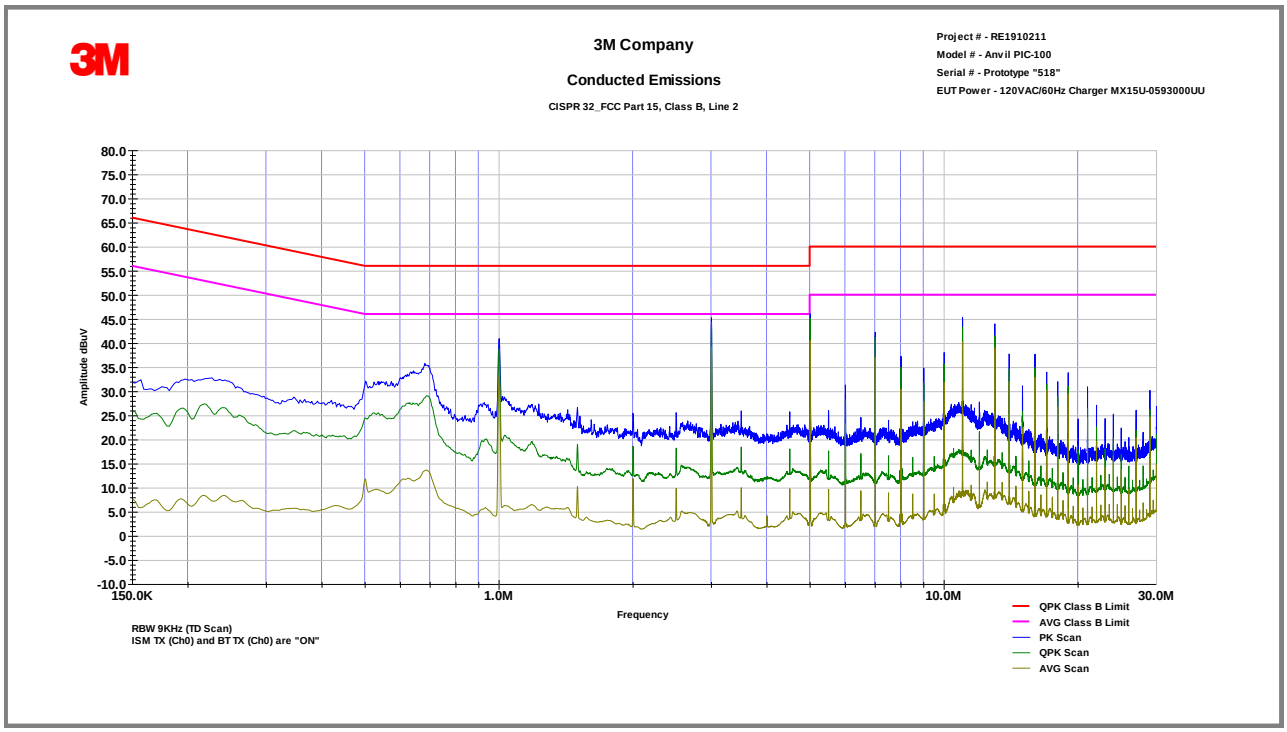
4.7	**Conducted Emissions Data**
Method:	The AMN was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane. This distance was between the closest points of the AMN and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the AMN. All power was connected to the system through Artificial Mains Network (AMN). Conducted voltage measurements on mains lines were made at the output of the AMN.
	All power was connected to the system through Artificial Mains Network (AMN). All tested telecommunications lines were connected to an Asymmetric Artificial Network (AAN) and conducted voltage measurements on telecommunications lines were made at the output of the ISN. Where an AAN was not appropriate or available measurements were made using a Capacitive Voltage Probe.

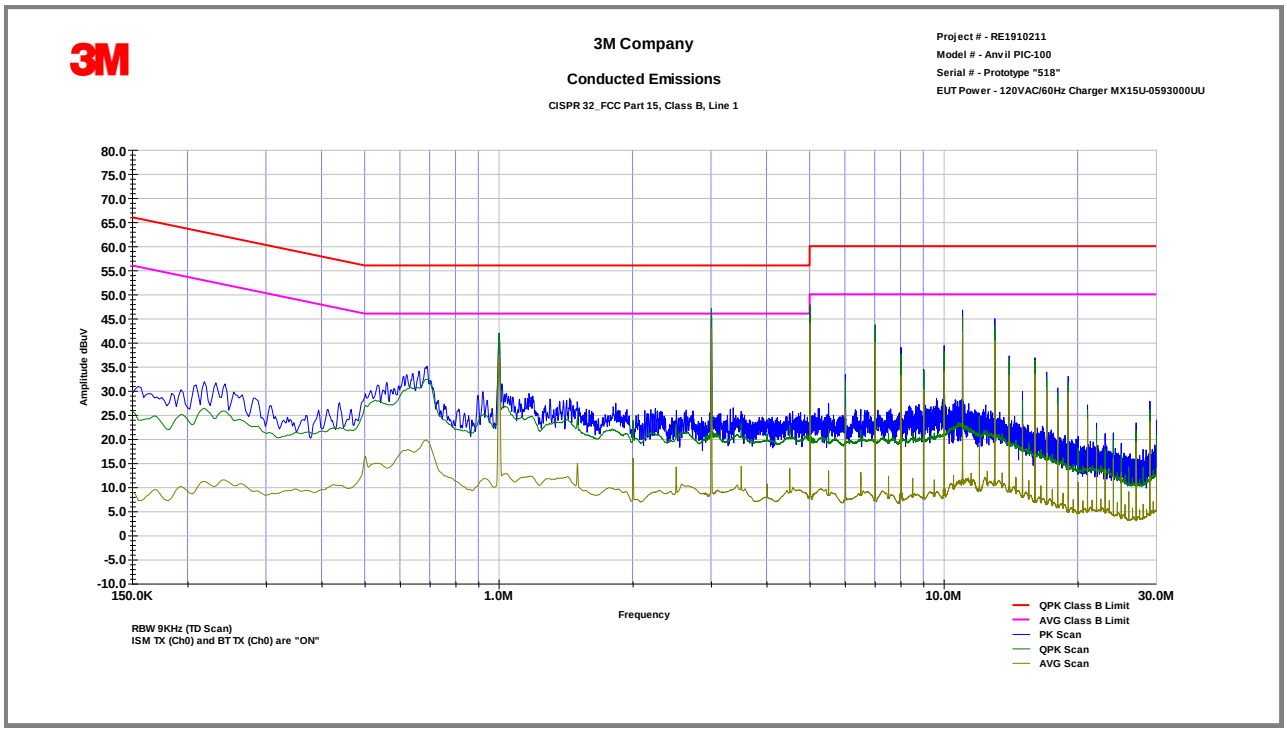
Test Verification: ☒	Laboratory Ambient Temperature:	23°C
	Relative Humidity:	48%
	Atmospheric Pressure:	1011 mbars
Reference Standard(s):	☒ RSS GEN/FCC 15.207 ☒ ANSI C63.4:2014 ☒ ANSI C63.10:2013	**Measurement Point** ☒ Mains ☐ Telecommunication ports ☐
Nominal Voltage:	☒ 120VAC ☐ 230VAC ☐ 3.7VDC	
Test Personnel:	Keith Schwartz KS	**Date:** 08/24/2021

Limits – Part 15.207/RSS Gen – AC Mains

Frequency (MHz)	Limit dB (µV)			
	Quasi-Peak	Average	Result	Comments
0.15 to 0.50	66 to 56	56 to 46	**pass**	Time Domain Scan
0.50 to 5	56	46	**pass**	Time Domain Scan
5 to 30	60	50	**pass**	Time Domain Scan

Modifications:	
Note:	


3M Company
Conducted Emissions
CISPR 32_FCC Part 15, Class B, Line 2
Project # - RE1910211
Model # - Anvil PIC-100
Serial # - Prototype "518"
EUT Power - 120VAC/60Hz Charger MX15U-0593000UU
Amplitude dBuV
80.0
75.0
70.0
65.0
60.0
55.0
50.0
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0
-5.0
-10.0
150.0K
1.0M
10.0M
30.0M
Frequency
RBW 9KHz (TD Scan)
ISM TX (Ch0) and BT TX (Ch0) are "ON"
QPK Class B Limit
AVG Class B Limit
PK Scan
QPK Scan
AVG Scan


3M Company
Conducted Emissions
CISPR 32_FCC Part 15, Class B, Line 1
Project # - RE1910211
Model # - Anvil PIC-100
Serial # - Prototype "518"
EUT Power - 120VAC/60Hz Charger MX15U-0593000UU
Amplitude dBuV
80.0
75.0
70.0
65.0
60.0
55.0
50.0
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0
-5.0
-10.0
150.0K
1.0M
10.0M
30.0M
Frequency
RBW 9KHz (TD Scan)
ISM TX (Ch0) and BT TX (Ch0) are "ON"
QPK Class B Limit
AVG Class B Limit
PK Scan
QPK Scan
AVG Scan

Frequency (MHz)	QP Line 1 dBµV	AVG Line 1 dBµV	QP Limit dBµV	AVG Limit dBµV	QP Margin dB	AVG Margin dB
1	41.97	37.3	56	46	-14.03	-8.7
2.999	47.18	42.79	56	46	-8.82	-3.21
5.001	48.09	43.9	60	50	-11.91	-6.1
7	43.96	40.03	60	50	-16.04	-9.97
8.001	37.46	32.66	60	50	-22.54	-17.34
10	37.9	33.7	60	50	-22.1	-16.3
10.999	45.12	41.71	60	50	-14.88	-8.29
13.001	43.37	40.19	60	50	-16.63	-9.81
Frequency (MHz)	**QP Line 2 dBµV**	**AVG Line 2 dBµV**	**QP Limit dBµV**	**AVG Limit dBµV**	**QP Margin dB**	**AVG Margin dB**
1	38.73	32.85	56	46	-17.27	-13.15
2.999	44.24	38.86	56	46	-11.76	-7.14
5.001	45.31	40.35	60	50	-14.69	-9.65
7	41.38	36.96	60	50	-18.62	-13.04
8.001	34.56	29.88	60	50	-25.44	-20.12
10	35.36	31.35	60	50	-24.64	-18.65
10.999	42.94	39.67	60	50	-17.06	-10.33
13.001	41.42	38.66	60	50	-18.58	-11.34
Voltage		☒ 120VAC ☐ 230VAC ☐				
Notes		**Net Reading (dBuV) = Reading (dBµV)+AMN CF(dB)+Cable CF(dB)** **RBW 9KHz**				

4.8	RF Exposure Evaluation	
Reference Standard(s):	☒ KDB 447498 RF Exposure Guidance v06 ☐ KDB 447498 Interim RF Exposure Guidance v01 ☒ RSS 102, Issue 5 ☐	☐ MPE ☐ SAR Evaluation ☒ SAR Test Exclusion
Frequency Range(s):	☒ 911-918.5MHz ☒ 2402-2480.0MHz ☐	

Antenna Separation Distance:	>8mm
RF Exposure Conditions:	Portable (Body-worn)
2.4GHz Antenna Gain:	2.3dBi
BT EDR the source-based output power:	6.9mW(8.4dBm)*0.7(FHSS worst case duty cycle)=4.8mW(6.8dBm)
BT EDR EIRP/ERP output power:	**EIRP**=6.8dBm + 2.3dBi=9.1dBm, **ERP**=9.1dBm - 2.15dB=6.95dBm(4.95mW)
The estimated 1-g SAR Value of the BT EDR transmitter:	[(*max. power of channel, including tune-up tolerance, mW*) / (*min. test separation distance, mm*)]·[√f(GHz)/*x*] W/kg, for *test separation distances* ≤ 50 mm; where x = 7.5 for 1-g SAR (4.95mW/8mm)*(√2.45/7.5) =(0.62)*(1.57/7.5)=0.13 W/Kg
BLE the source-based output power:	1mW(0.03dBm)*0.85(worst case duty cycle)=0.85mW(-0.71dBm)
BLE EIRP/ERP output power:	**EIRP**=-0.71dBm + 2.3dBi=1.59dBm, **ERP**=1.59dBm - 2.15dB= -0.56dBm(0.88mW)
The estimated 1-g SAR Value of the BLE transmitter:	[(*max. power of channel, including tune-up tolerance, mW*) / (*min. test separation distance, mm*)]·[√f(GHz)/*x*] W/kg, for *test separation distances* ≤ 50 mm; where x = 7.5 for 1-g SAR (0.85mW/8mm)*(√2.45/7.5) =(0.1)*(1.57/7.5)=0.02 W/Kg
ISRD Band Maximum Output Power:	EIRP= 0.3mW and ERP= 0.18mW (estimated from the field strength)
The estimated 1-g SAR Value of the ISM transmitter:	(0.3mW/8mm)*(√0.915/7.5) =0.008 W/Kg
The sum of ratios for all simultaneously transmitting BT and ISRD	4.95/10+0.85/10+0.3/10=0.61 (sum of ratio is < 1.0)
The sum of ratios (1-g SAR value) for all simultaneously transmitting BT and ISRD antennas incorporated in a radio:	(SAR value of BT EDR Transmitter/SAR limit) + (SAR value of ISRD Transmitter/SAR limit) + (SAR value of BT EDR Transmitter/SAR limit) = (0.13/1.6) + (0.02/1.6) + (0.008/1.6) = 0.1< 1
The SAR Exclusion Threshold Level	
FCC Part 2.1093	10mW<5mm @2.45GHz
FCC Part 2.1093	16mW<5mm @900MHz
RSS 102, Issue 5	6.1mW>8mm @2.45GHz

Note:	The device has two simultaneously transmitting antennas for ISM and 2.4GHz bands.

5.0	Test Equipment				
Test Equipment Used					
Description	**Manufacturer**	**Model**	**Identifier**	**Last Cal. Date**	**Check**
Biconilog Antenna	Schwarzbeck	VULB 9168	9168-1070	10/20/2020	☒
Horn Antenna	A.H. Systems	SAS 571	1010	10/20/2020	☒
Loop Antenna	A.H. Systems	EHA-51B	1213E	10/20/2020	☐
EMI Receiver	Rohde & Schwarz	ESW26	101412	10/20/2020	☒
Signal Analyzer	Agilent	N9000A	MY53031040	10/20/2020	☒
EMI Receiver	Agilent	E4448A	1530975	10/20/2020	☒
LISN	TESEQ	NNB51	1130	10/20/2020	☒
Coaxial Cable	Insulated Wire	2803	CBL2039	10/20/2020	☒
EMC Software	ETS-Lindgren	TILE 7		N/A	☒
Equipment Calibration Interval:		☒ 12 months		☐ 24 months	

6.0	Report revision history		
Revision Level	**Date**	**Report Number**	**Notes**
0	07/18/2022	RE1910211-1	Original Issue