EMC TEST REPORT

NVLAP Lab Code:200033-0

Standard(s):

47 CFR FCC Part 15.247
RSS 247, Issue 3, 2023

FCC ID:Y9ZFL61007WS7
IC:4406A-FL61007WS7

Product: 3M™ Peltor™ WS Adapter G3 Ground Mechanic (DTS)

Model(s): FL61007-WS7

Company Name:
3M Svenska AB

3M Division: PSD

Address:
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SE-33102 Värnamo, Sweden

Report Number: HRE202312453-1
Report Issue Date: September 16, 2024

Report Prepared by:

Signature:
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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(a))/RSS-Gen (6.7)	DTS Bandwidth	**pass**	
4.2	FCC Part 15.247(b)(3)/ RSS-247(5.4(d))	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

1.2 Test Facility

Test Facility Accreditations:	ISO/IEC 17025:2017, NVLAP LAB CODE: 200033-0
	FCC OET Designation Number: US5320
	ISED CAB identifier: US0012
	Chinese Taipei - (NCC) CAB identifier: US0012

2.0 Equipment Description

2.1	Equipment Under Test			
Description:	WS Adapter is a Bluetooth host to be used for wireless communications on airplanes and around airports.			
Model(s):	FL61007-WS7			
Serial number:	1824111478 (conducted) and 1824111479 (radiated)			
3M Division:	Personal Safety			
Modifications and Special Measures:	none			
Frequency Range:	2402.0-2480.0 MHz			
Channel No.:	39			
Modulation Type:	GFSK and $\pi/4$ QPSK			
FCC Classification:	Digital Transmission System (DTS)			
Conducted RF Output Power:	4.5dBm (2.8mW)			
Antenna Type and Antenna Assembly Gain:	☐ External	☒ Integral PCB Antenna	☐ Dedicated	
	☒ 1.35dBi	☐ 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:	N/A		
Test Dates:	06/03-09/16/2024			
Received Date:	06/03/2024			
Received Conditions:	☐ Poor	☒ Good		
	☒ Prototype	☐ Production		

3.0 EUT Configuration

3.1 System Configuration

No.	Product Type	Manufacturer	Model	Comments
1	WS Adapter	3M	MRX21A1WS7	EUT
2	Li-Io Battery	3M	ACK081	3.7VDC/1800mAh
3	USB Charger	Apple	M1385	Support Equipment
4	Headset	3M	MT15H7AWSS6-111	Support Equipment

3.2 Input/Output Ports of EUT

No.	Description	Type	Comments
1	Audio	Phone Plug	Media jack
2			

3.3 Cables

No.	Description	Type	Length	Shielding	Comments
1	Audio	3 conductors audio	30cm	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 Primary function(s) of EUT

No.	List of Essential Functions
1	Voice communications and audio listing over Bluetooth.
2	

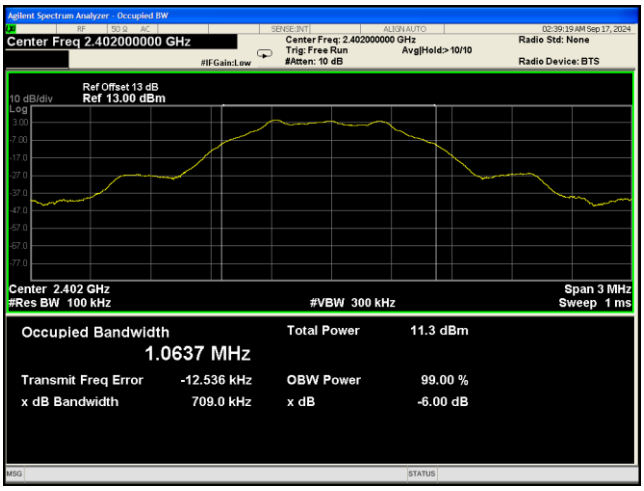
3.6 Exercising of EUT and Interfaces

No.	Mode of Operation
1	LE -1mbps and QHS(HSL-L)-2mbps
2	Transmitting at lowest, middle and highest channels of operation using modulated carrier at each operation mode according to applicable Bluetooth test protocol.
3	Device programming using Qualcomm BlueSuite WIN.3.3 software for continuous transmission of modulated carrier at maximum rated RF output power and Duty Cycle.

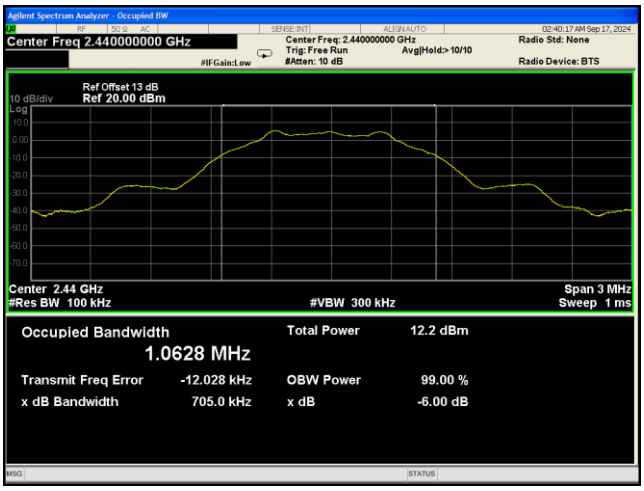
4.0 Test Conditions and Results

4.1	**DTS Bandwidth**	
	Laboratory Ambient Temperature:	23°C
	Relative Humidity:	48%
	Atmospheric Pressure:	1011 mbars
Reference Standard(s):	☒ ANSI C63.10:2020, Section 11.8.2 ☒ 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:** 09/16//2024

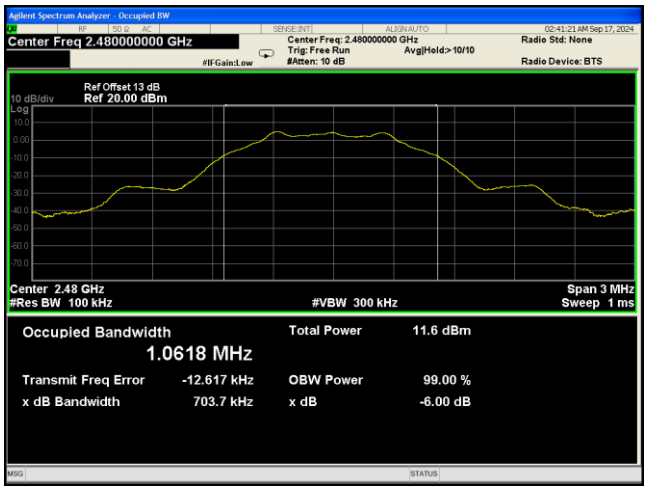
Mode	Frequency (MHz)	Data Rate	99% dB Bandwidth (KHz)	6 dB Bandwidth (KHz)	6dB OBW Limit (KHz)	Results
BLE	2402	1 Mbps	1064	709.0	> 500	pass
	2440	1 Mbps	1063	705.0	> 500	pass
	2480	1 Mbps	1062	704.0	> 500	pass
QHS	2402	2 Mbps	2386	1628	> 500	pass
	2440	2 Mbps	2378	1629	> 500	pass
	2480	2 Mbps	2378	1628	> 500	pass



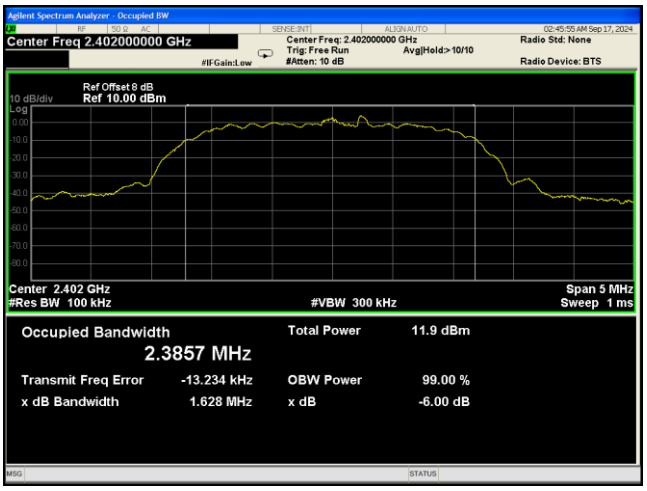
OBW – BLE Low Channel



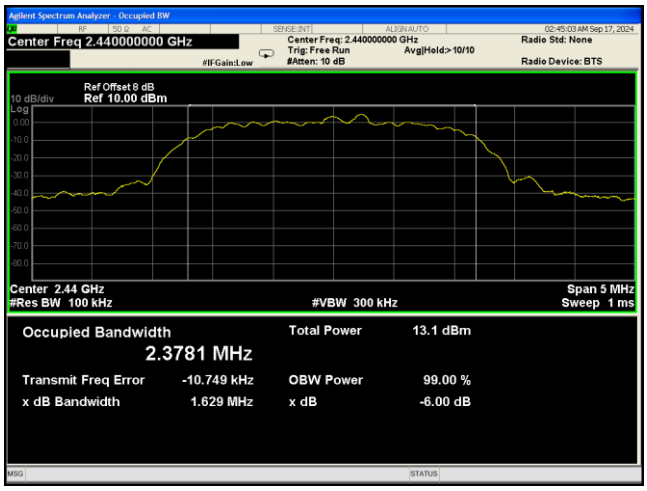
OBW – BLE Mid Channel



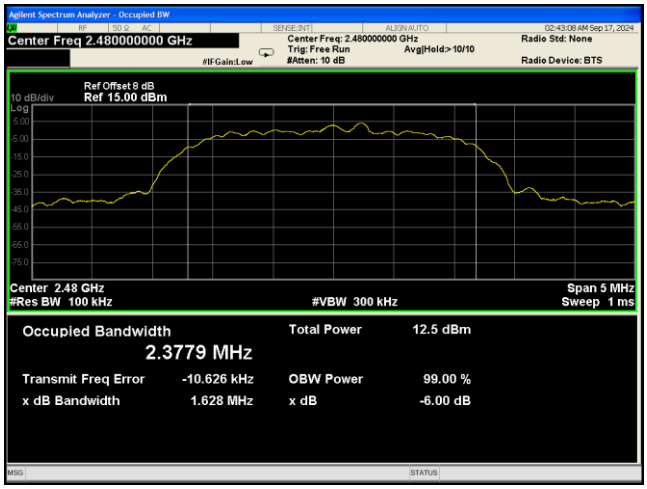
OBW – BLE High Channel



OBW – QHS Low Channel



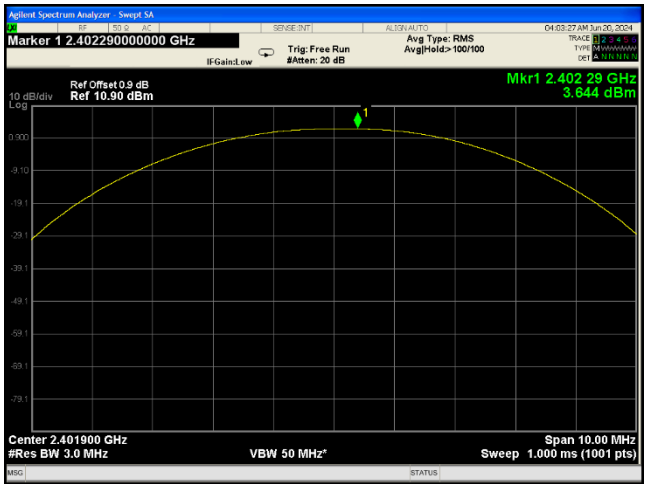
OBW – QHS Mid Channel



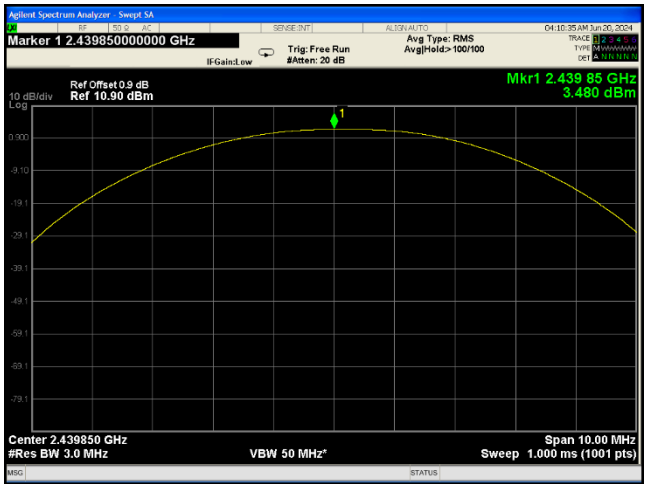
OBW – QHS High Channel

4.2	**Maximum Output Power**	
Method:	Measurements was performed with CW 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 C63.10:2020, Section 11.9 ☒ FCC Part 15.247/RSS 247 ☒ KDB 558074	**Measurement Point** ☒ Conducted ☐ Radiated
Frequency Range:	☒ 2402.0 – 2480.0 MHz	
Antenna Gain:	1.35dBi	**Maximum Conducted RF Power:**
Limit:	30 dBm	3.6dBm (BLE)/4.5dBm (QHS)
Nominal Voltage:	☐ 120VAC ☒ 3.7VDC	
Test Personnel:	Yuriy Litvinov	**Date:** 06/19/2024

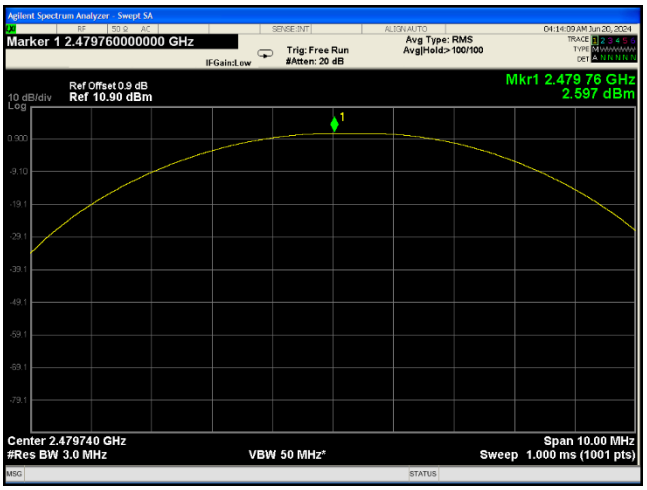
Note:	EIRP (dBm) = 3.6+1.35=4.95dBm (BLE) EIRP (dBm) = 4.5+1.35=5.85dBm (QHS)



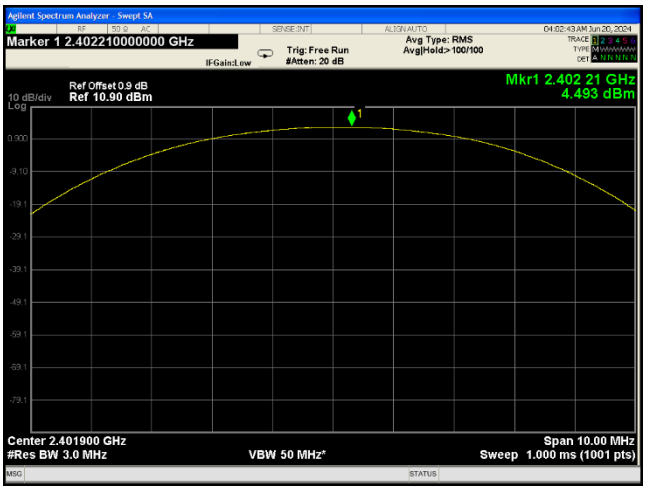
BLE Low Channel



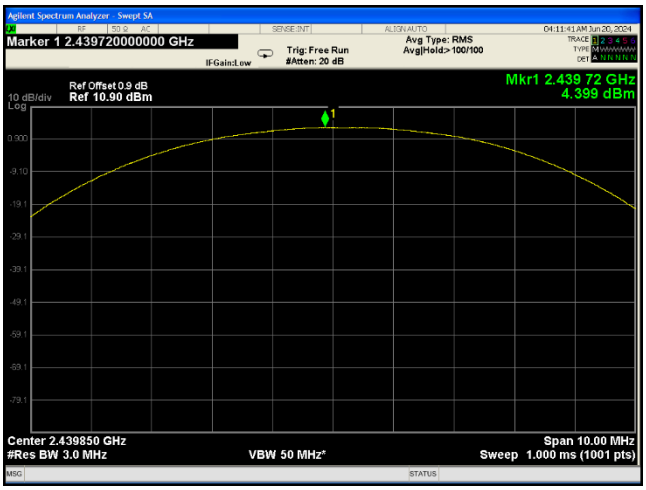
BLE Mid Channel



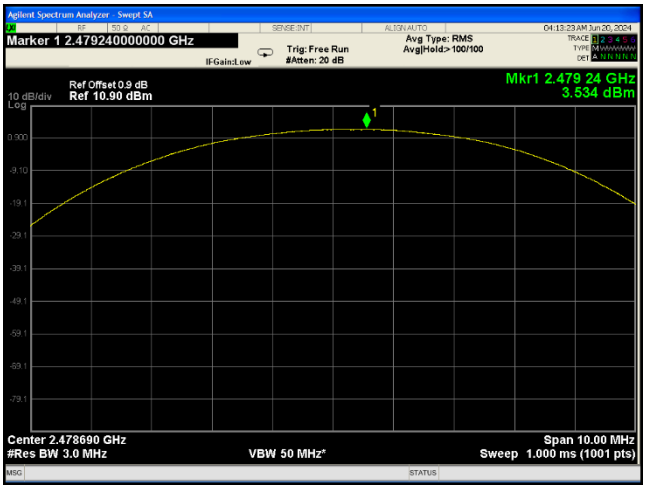
BLE High Channel



QHS Low Channel

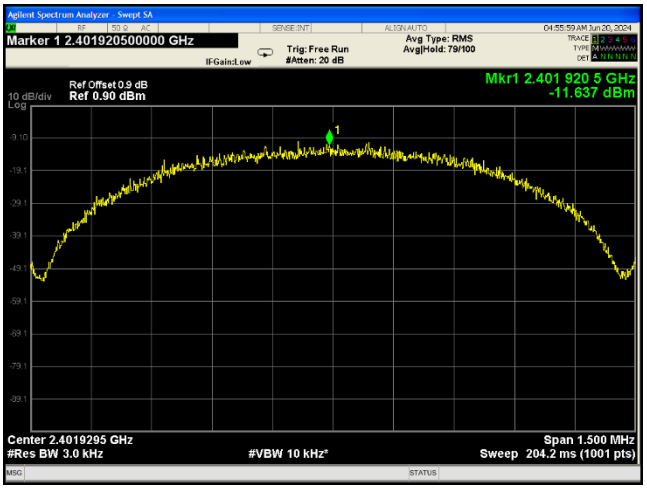


QHS Mid Channel

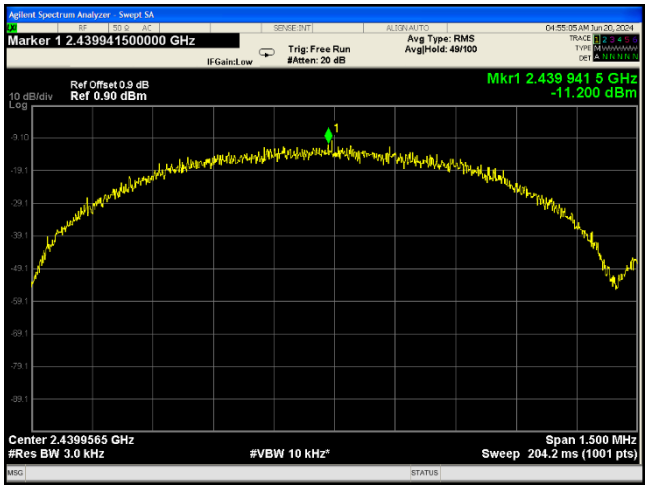


QHS High Channel

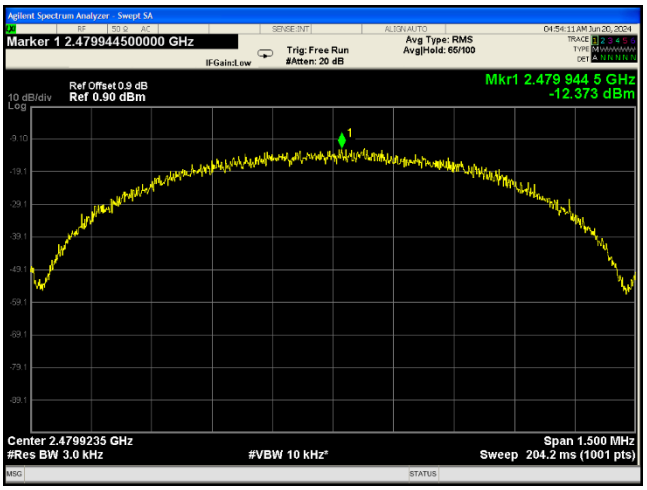
4.3	**Maximum Power Spectral Density level**	
Method:	Measurements was performed with modulated carrier at the highest power level at which the transmitter is intended to operate. The analyzer offset was adjusted to compensate for the attenuator and other losses.	
	Laboratory Ambient Temperature:	23°C
	Relative Humidity:	48%
	Atmospheric Pressure:	1011 mbars
Reference Standard(s):	☒ ANSI C63.10:2020, Section 11.10.2 ☒ FCC Part 15.247/RSS 247 ☒ KDB 558074	**Measurement Point** ☒ Conducted ☐ Radiated
Frequency Range:	☒ 2402.0 – 2480.0 MHz	**PSD Results**
PSD Limit:	8 dBm in any 3KHz band	-11.2dBm (BLE)/-18dBm (QHS)
Nominal Voltage:	☐ 120VAC ☒ 3.7VDC	
Test Personnel:	Yuriy Litvinov	**Date:** 06/19/2024



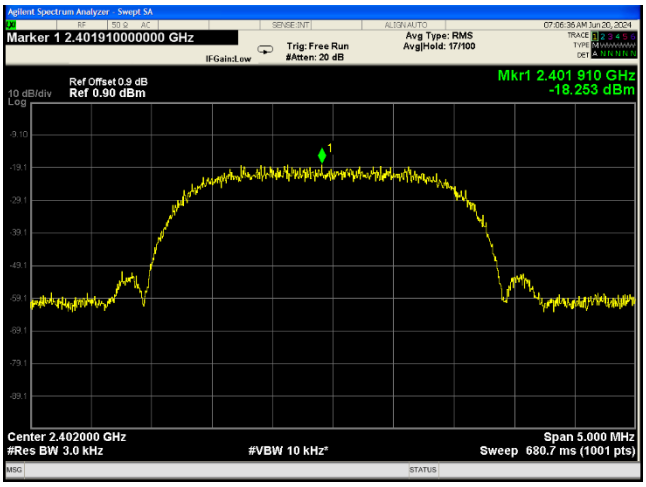
PSD BLE Low Channel



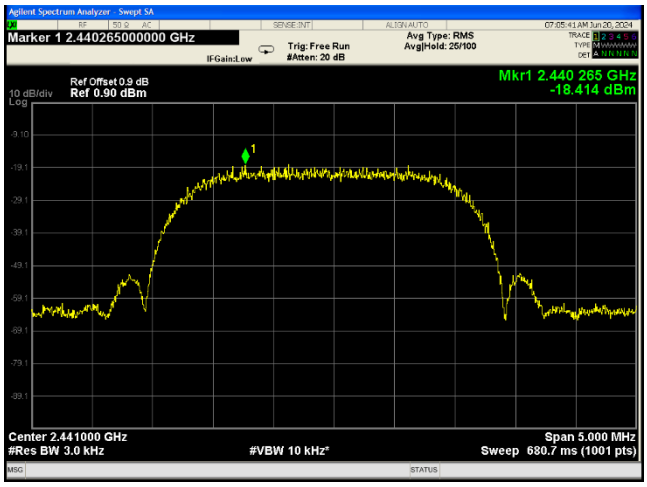
PSD BLE Mid Channel



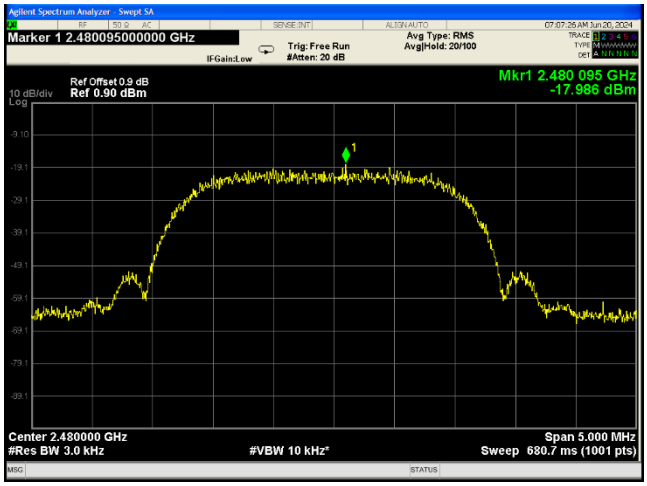
PSD BLE High Channel



PSD QHS Low Channel



PSD QHS Mid Channel



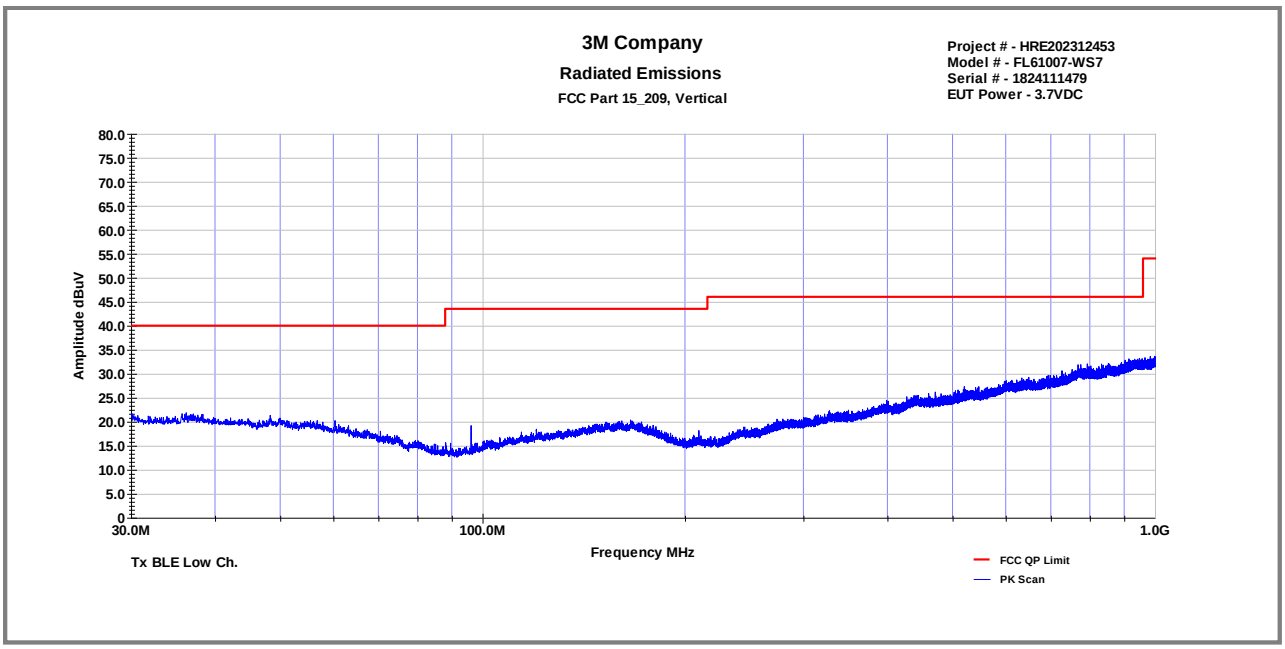
PSD QHS High Channel

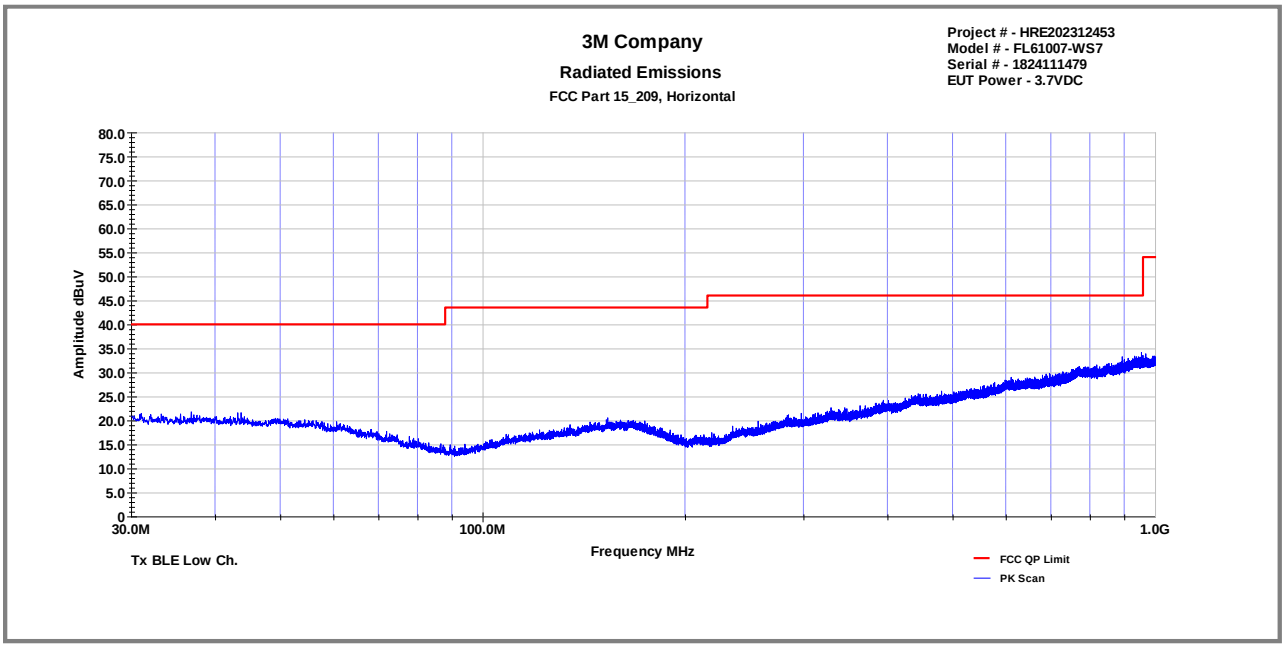
4.4	**Radiated Emissions in restricted band**		
Method:	Measurements were made in a 3-meter semi-anechoic chamber that complies to CISPR 16/ANSI C63.4 standards. EUT was rotated through three orthogonal axes to determine which attitude (orientation) and arrangement produces the highest emission relative 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 C63.10:2020, Section 11.12.1 ☒ FCC Part 15.205/15.209/RSS Gen (8.9) ☒ KDB 558074	**Measurement Distance**	
		☒ 3 Meters ☐	
Frequency Range:	☒ 30 MHz to 1 GHz	RBW = 100KHz, VBW ≥ 3 x RBW	
	☒ 1 GHz to 25 GHz	RBW = 1MHz, VBW ≥ 3 x RBW	
Nominal Voltage:	☐ 120VAC ☒ 3.7VDC		
Test Personnel:	Keith Schwartz KS	**Date:** 06/20/2024	

Limits –15.209 and RSS Gen

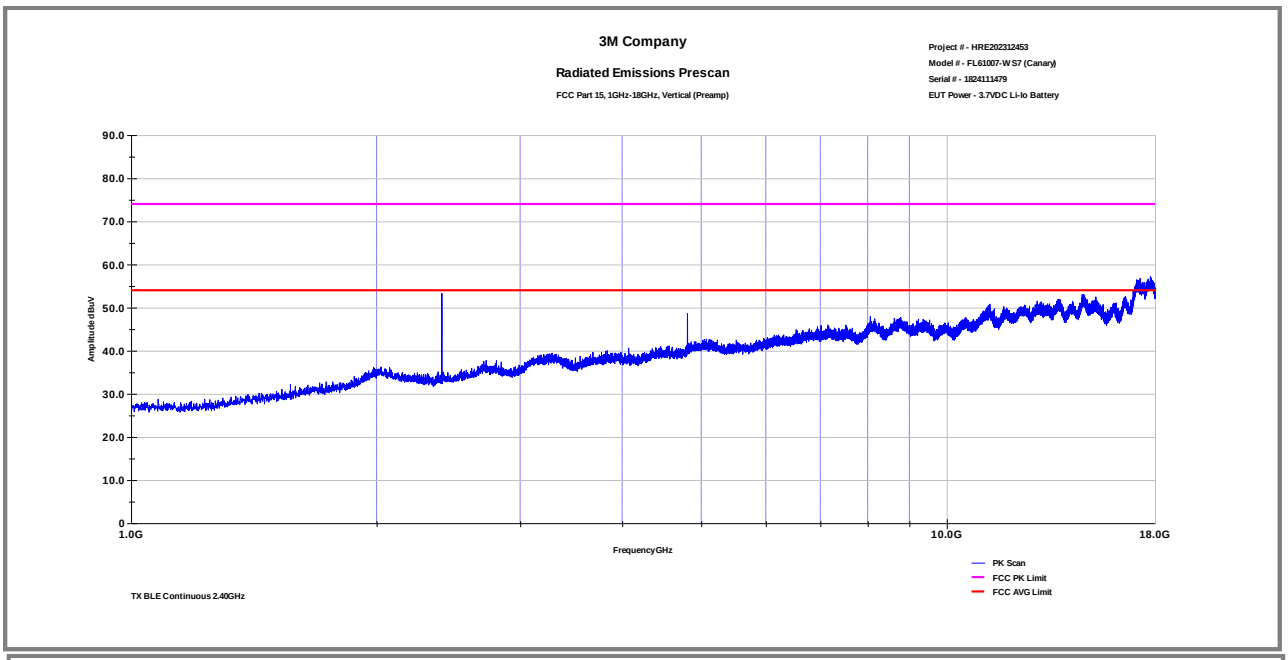
Frequency (MHz)	Limit dB (µV/m)				
	Quasi-Peak	Average	Peak	Distance	Results
0.009-0.490		2400/F(KHz)		300	**N/A**
0.490-1.705	24000/F(KHz)			30	**N/A**
1.705-30	30			30	**N/A**
30 to 88	40			3	**pass**
88 to 216	43.5			3	**pass**
216 to 960	46			3	**pass**
Above 960		54	74	3	**pass**

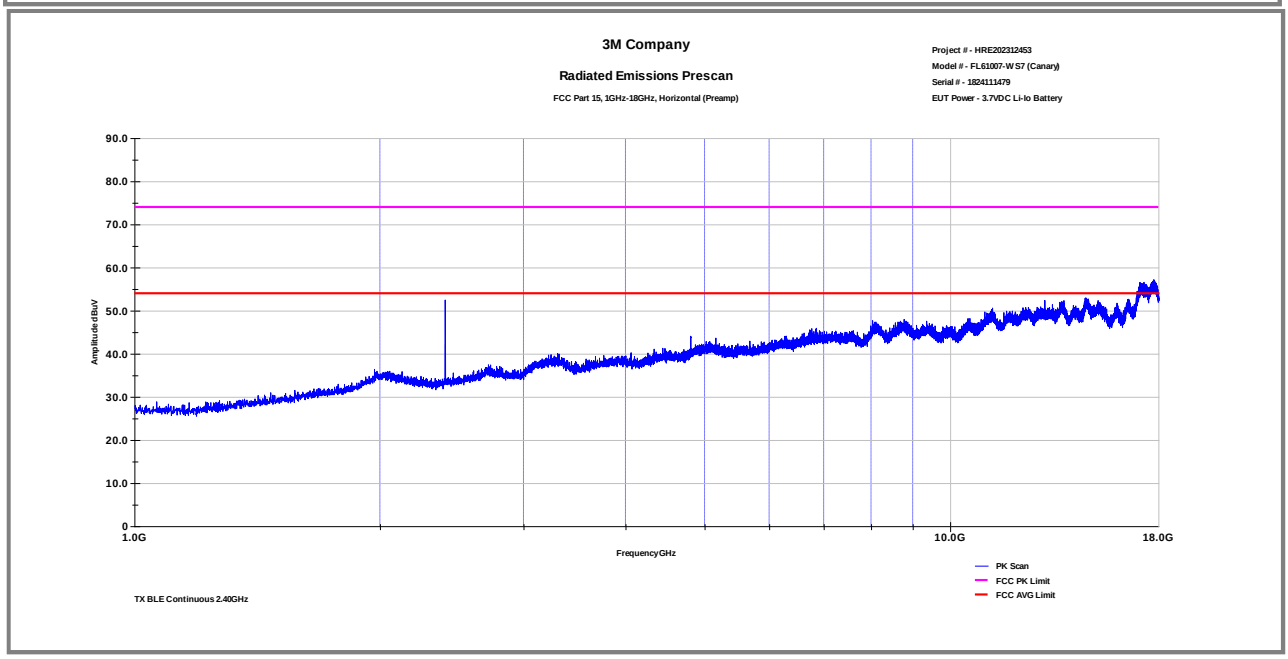
Modifications:	
Note:	The lower limit applies at the transition frequency. An inverse proportionality factor of 20 dB per decade has been used to normalize the measured data to the specified distance for determining compliance For emission in the restricted bands, the limit of 15.209 was used. There are no emissions were detected in the 15.205 restricted band within 30dB below 15.209 limit adjacent or nearby to 2400-2483.5MHz frequency band during operation at the high channel. No radiated spurious emissions were detected above 18GHz



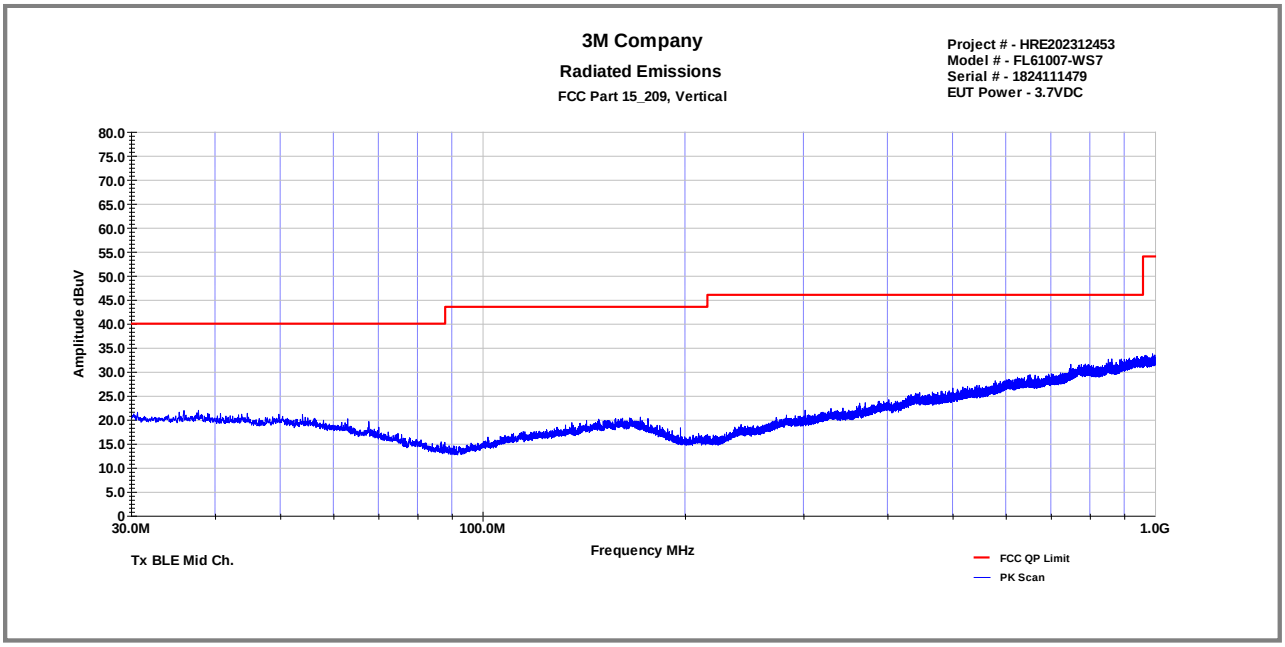


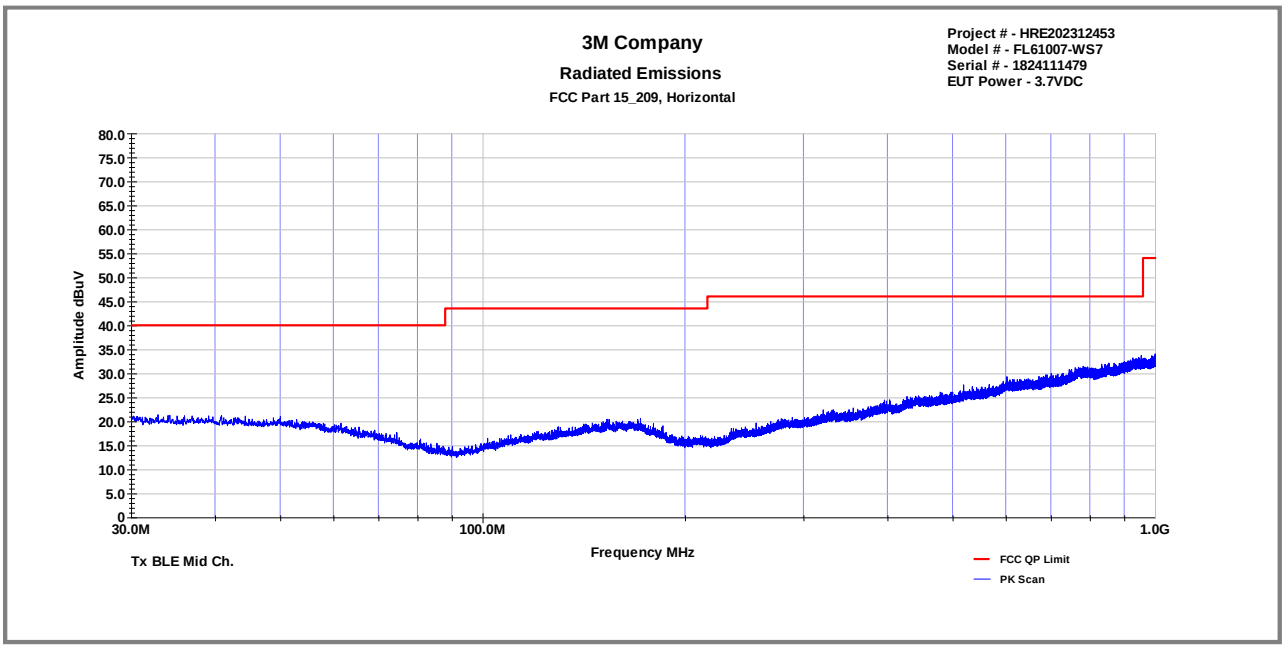
FCC Part 15.209 Radiated Emissions in restricted band – BLE Low Channel



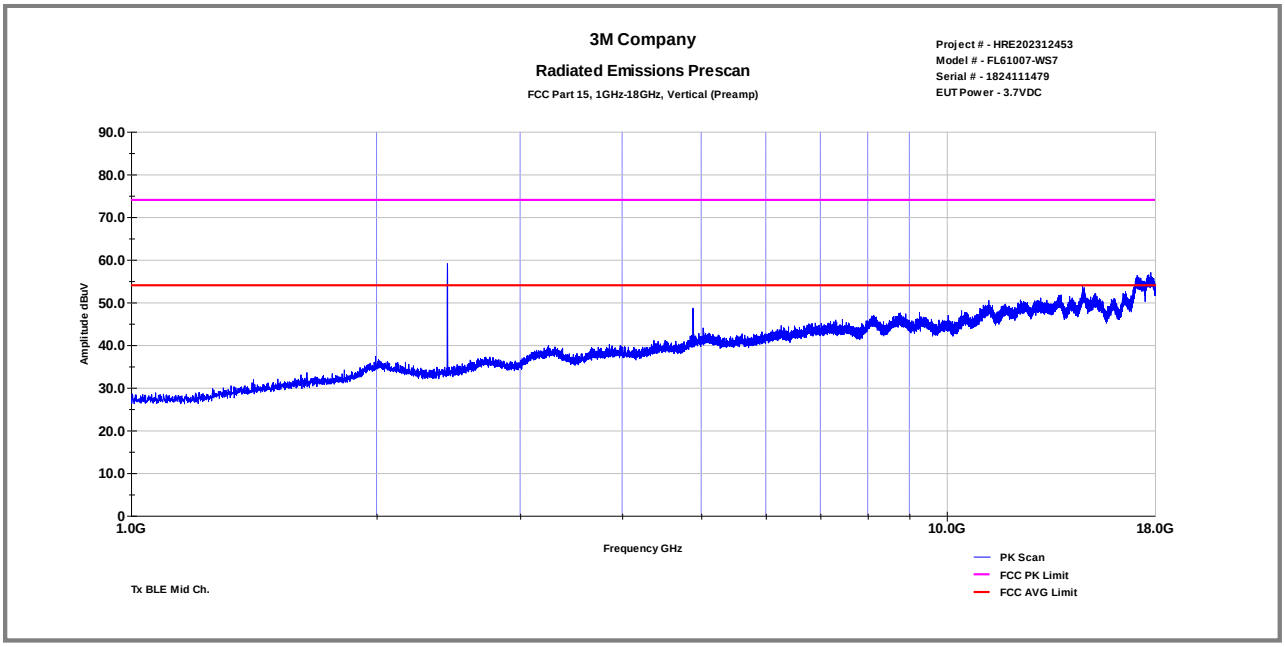


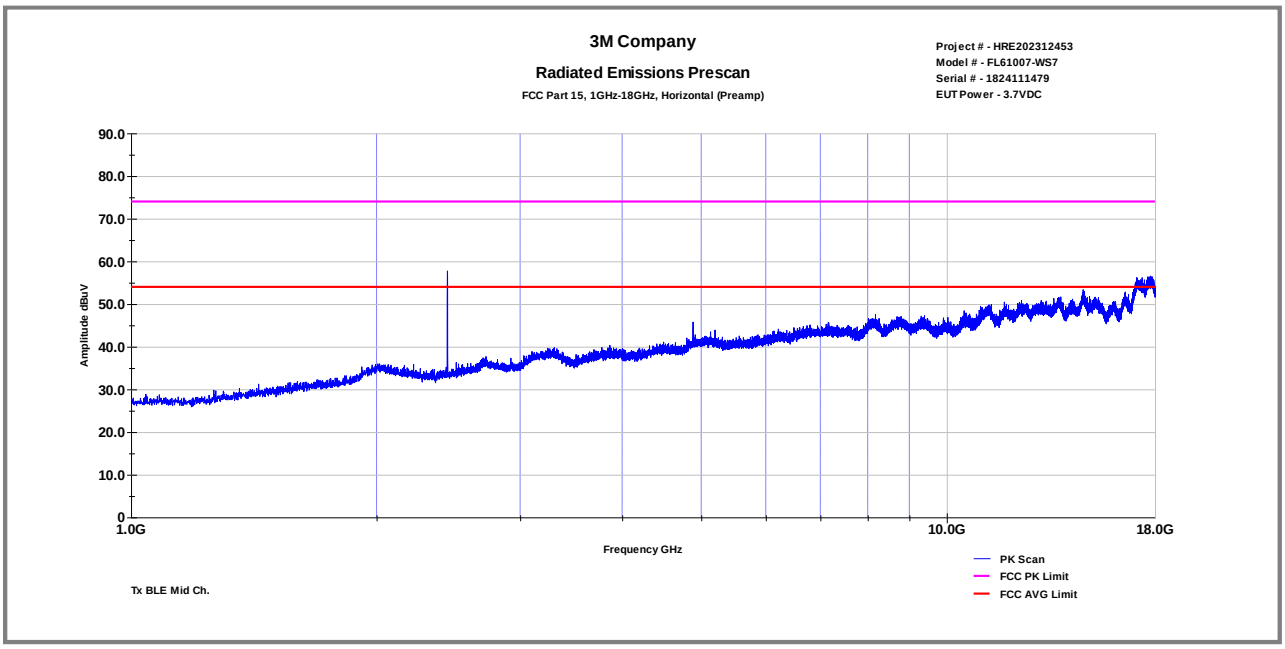
FCC Part 15.209 Radiated Emissions in restricted band – BLE Low Channel



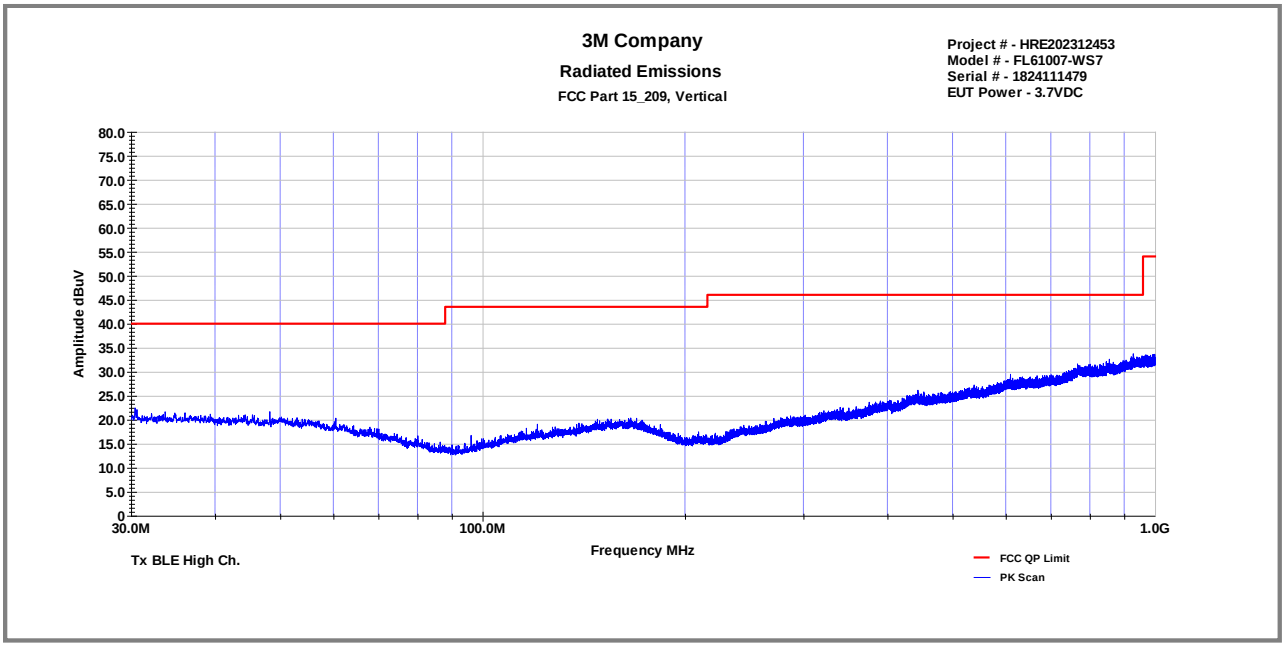


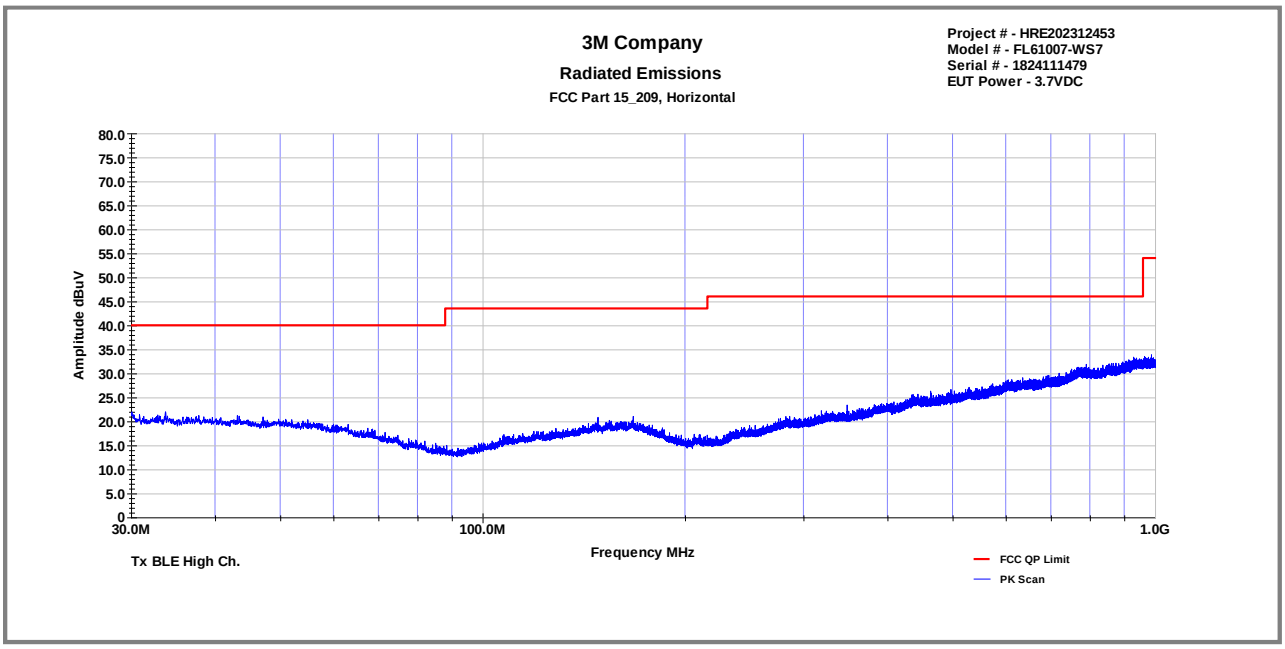
FCC Part 15.209 Radiated Emissions in restricted band – BLE Mid Channel



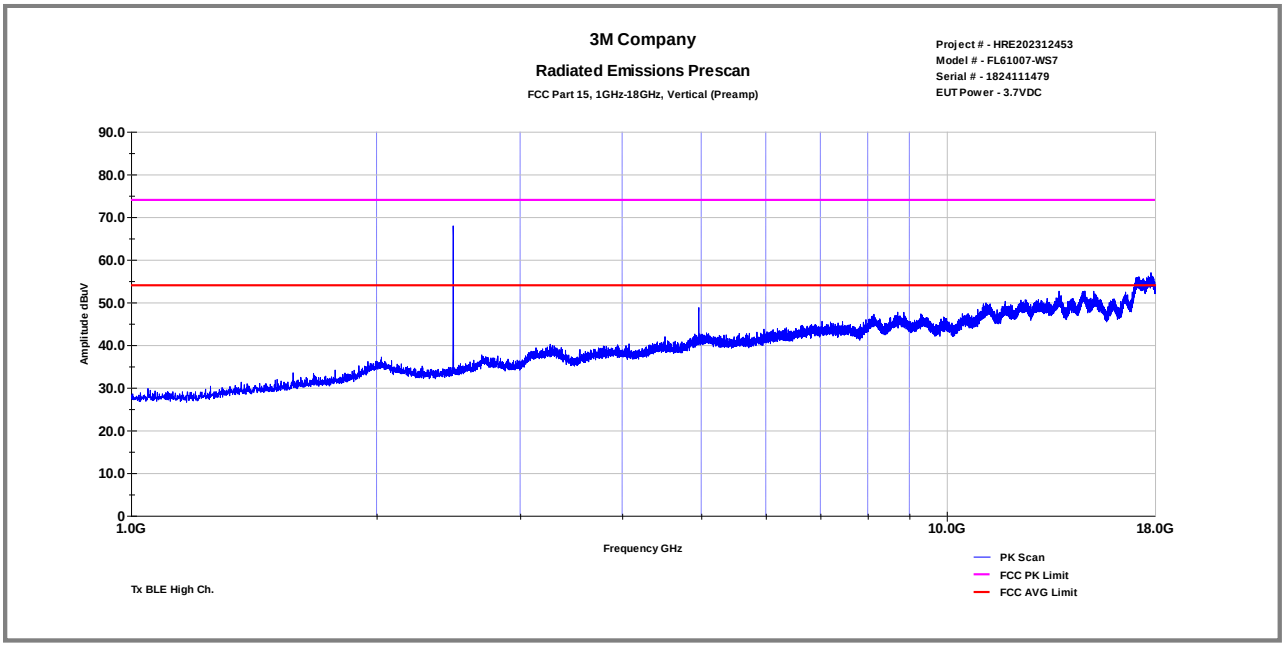


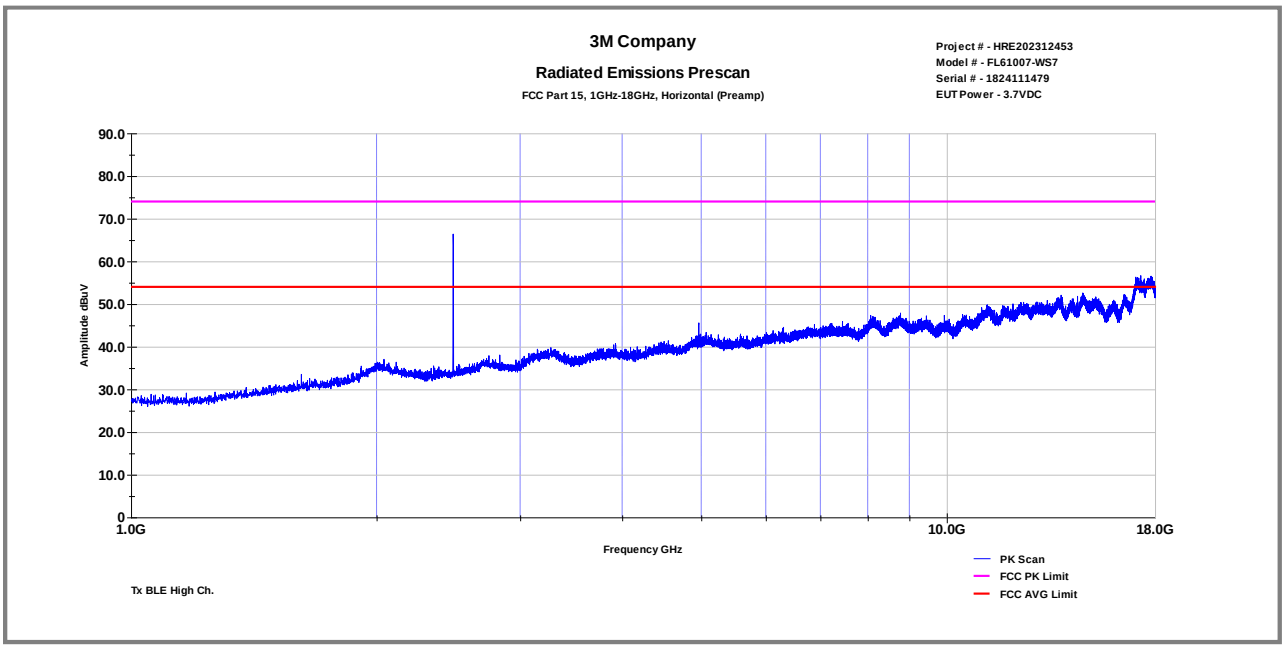
FCC Part 15.209 Radiated Emissions in restricted band – BLE Mid Channel





FCC Part 15.209 Radiated Emissions in restricted band – BLE High Channel





FCC Part 15.209 Radiated Emissions in restricted band – BLE 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
35.78	H	3.8	16.9	20.6	40	-19.4
47.87	H	2.5	18.2	20.8	40	-19.2
59.51	V	2.2	17.7	20	40	-20
96.17	H	2.3	13.1	15.4	43.5	-28.1
284.21	H	2.2	18.4	20.6	46	-25.4
931.94	H	3.5	30	33.5	46	-12.5
Notes:	Net Reading (dBuV) = Reading (dBµV) + Antenna CF(dB)+Cable CF(dB) – Amp Gain(dB) Low Channel-BLE					

Frequency (MHz)	Pol.	QP Reading dBµV/m	Total CF dB	Net at 3 m dBµV/m	Limit (dBµV/m)	Margin dB
37.16	V	3.7	17	20.7	40	-19.3
43.67	H	2.9	17.9	20.8	40	-19.2
172.16	H	2.2	17.6	19.8	43.5	-23.7
519.47	H	3.3	23.7	27	46	-19
602.03	H	3.7	25.6	29.3	46	-16.7
944.66	V	3.4	30.2	33.7	46	-12.3
Notes:	Net Reading (dBuV) = Reading (dBµV) + Antenna CF(dB)+Cable CF(dB) – Amp Gain(dB) Mid Channel-BLE					

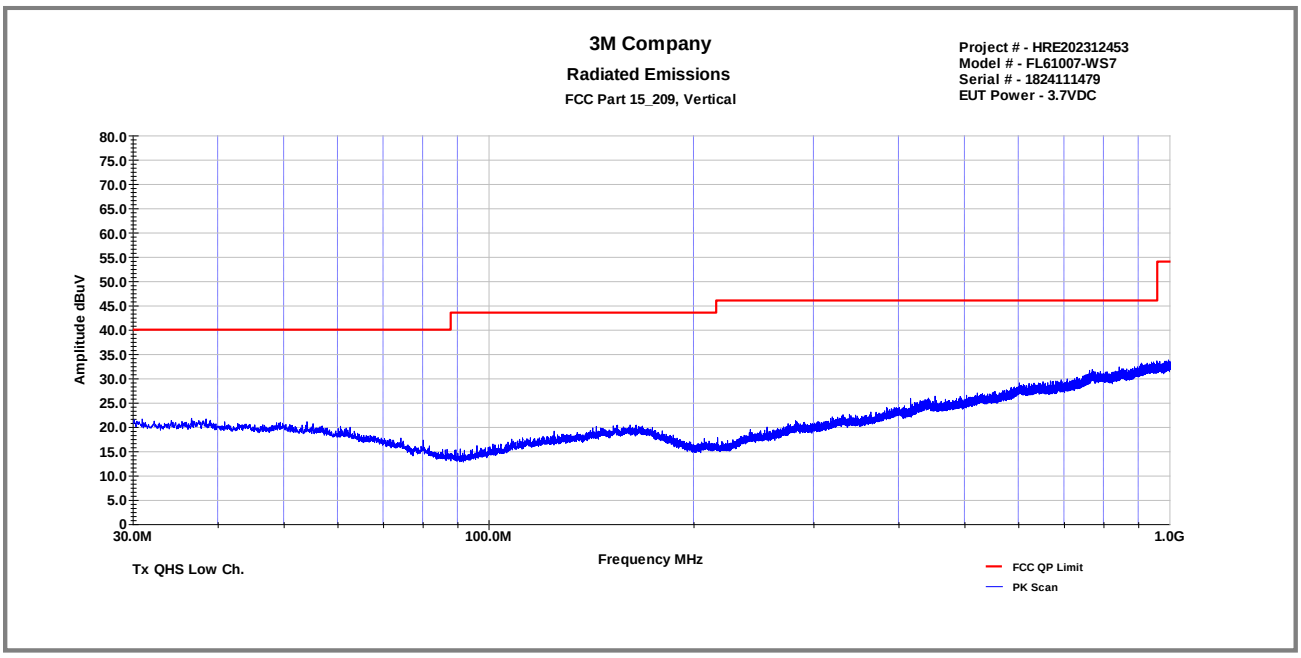
Frequency (MHz)	Pol.	QP Reading dBµV/m	Total CF dB	Net at 3 m dBµV/m	Limit (dBµV/m)	Margin dB
30.03	H	4.6	16.7	21.2	40	-18.8
43.49	H	2.9	17.9	20.8	40	-19.2
47.81	V	2.5	18.2	20.7	40	-19.3
462.77	H	2.7	22.7	25.4	46	-20.6
854.66	H	3.5	28.8	32.3	46	-13.7
926.6	H	3.6	29.9	33.6	46	-12.4
Notes:	Net Reading (dBuV) = Reading (dBµV) + Antenna CF(dB)+Cable CF(dB) – Amp Gain(dB) Mid Channel-BLE					

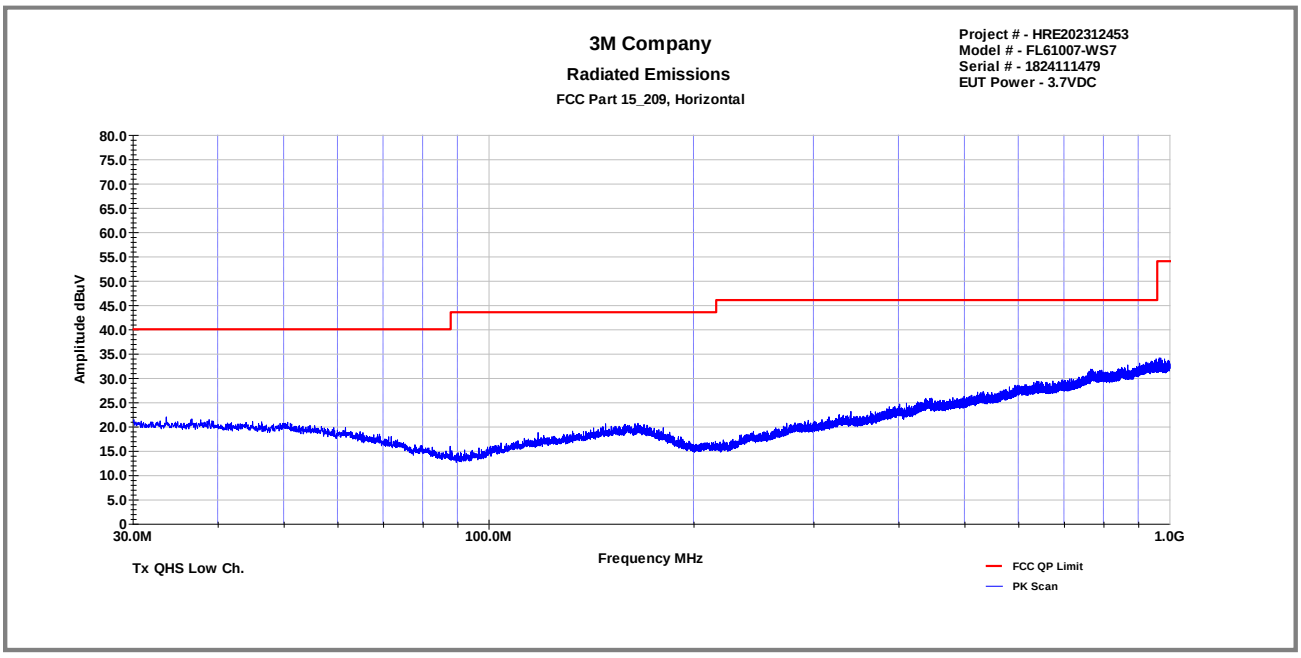
Tables - Radiated Emissions in restricted band

Pol	Frequency (MHz)	Peak dBµV/m	AVG dBµV/m	Total CF dB	Net Peak dBµV/m	Net AVG dBµV/m	PK Limit dBµV/m	AVG Limit dBµV/m	PK Margin dB	AVG Margin dB
V	3298.40	50.45	39.5	-9.85	40.60	29.66	74.00	54.00	-33.40	-24.34
H	3298.40	51.01	39.8	-9.85	41.16	29.99	74.00	54.00	-32.84	-24.01
V	4802.90	55.98	51.7	-6.36	49.62	45.31	74.00	54.00	-24.38	-8.69
H	4902.90	52.54	45.6	-6.36	46.18	39.25	74.00	54.00	-27.82	-14.75
V	8099.70	48.99	36.9	-3.69	45.30	33.19	74.00	54.00	-28.70	-20.81
H	8099.70	48.50	37.2	-3.69	44.81	33.47	74.00	54.00	-29.19	-20.53
V	9607.00	48.86	39.1	-1.60	47.26	37.53	74.00	54.00	-26.74	-16.47
H	9607.00	49.21	39.3	-1.60	47.61	37.73	74.00	54.00	-26.39	-16.27
Notes:		Net Reading (dBuV) = Reading (dBµV) + (Antenna with amp CF(dB)+Cable CF(dB)) AVG VBW>1/T=3KHz								
		BLE Low Channel								

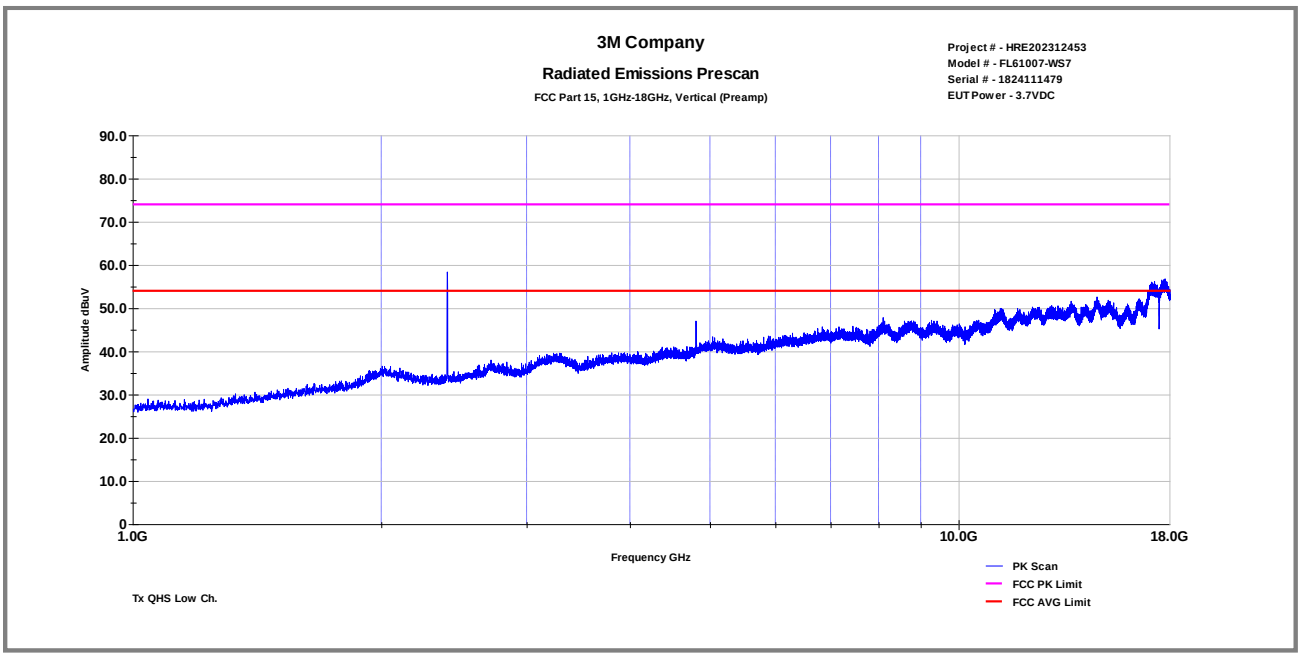
Pol	Frequency (MHz)	Peak dBµV/m	AVG dBµV/m	Total CF dB	Net Peak dBµV/m	Net AVG dBµV/m	PK Limit dBµV/m	AVG Limit dBµV/m	PK Margin dB	AVG Margin dB
V	3858.55	50.24	38.6	-8.82	41.42	29.78	74.00	54.00	-32.58	-24.22
H	3858.55	50.00	38.6	-8.82	41.18	29.73	74.00	54.00	-32.82	-24.27
V	4878.55	55.99	51.1	-5.30	50.69	45.84	74.00	54.00	-23.31	-8.16
H	4878.55	52.50	45.7	-5.30	47.20	40.38	74.00	54.00	-26.80	-13.62
V	7320.00	49.31	38.6	-2.01	47.30	36.63	74.00	54.00	-26.70	-17.37
H	7320.00	48.62	37.9	-2.01	46.61	35.87	74.00	54.00	-27.39	-18.13
V	12200.00	46.25	34.8	4.97	51.22	39.76	74.00	54.00	-22.78	-14.24
H	12200.00	46.00	35.1	4.97	50.97	40.02	74.00	54.00	-23.03	-13.98
Notes:		Net Reading (dBuV) = Reading (dBµV) + (Antenna with amp CF(dB)+Cable CF(dB)) AVG VBW>1/T=3KHz								
		BLE Mid Channel								

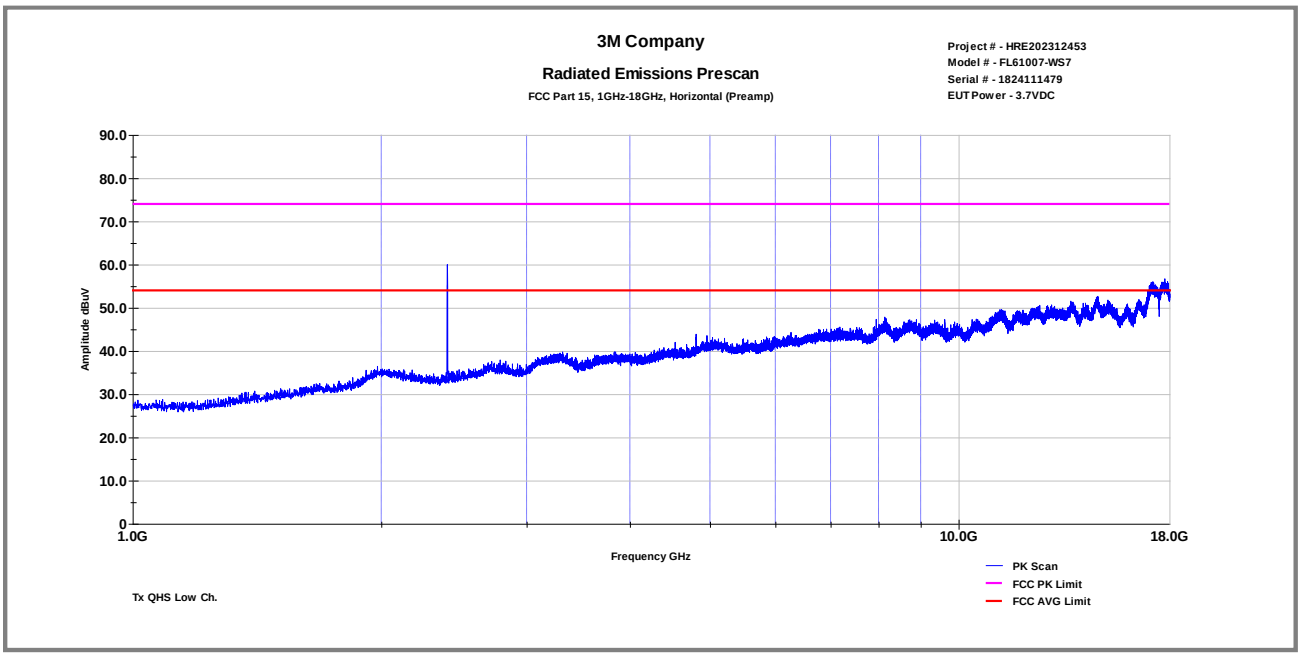
Pol	Frequency (MHz)	Peak dBµV/m	AVG dBµV/m	Total CF dB	Net Peak dBµV/m	Net AVG dBµV/m	PK Limit dBµV/m	AVG Limit dBµV/m	PK Margin dB	AVG Margin dB
V	2742.50	51.16	40.1	-12.21	38.95	27.89	74.00	54.00	-35.05	-26.11
H	2742.50	51.18	39.7	-12.21	38.97	27.47	74.00	54.00	-35.03	-26.53
V	4960.15	55.20	50.5	-5.17	50.03	45.35	74.00	54.00	-23.97	-8.65
H	4960.15	52.61	46.3	-5.17	47.44	41.17	74.00	54.00	-26.56	-12.83
V	7439.40	50.31	40.9	-1.69	48.62	39.20	74.00	54.00	-25.38	-14.80
H	7439.40	50.06	40.7	-1.69	48.37	39.05	74.00	54.00	-25.63	-14.95
V	14649.00	45.19	33.7	8.22	53.41	41.87	74.00	54.00	-20.59	-12.13
H	14649.00	45.16	33.8	8.22	53.38	42.03	74.00	54.00	-20.62	-11.97
Notes:		Net AVG VBW>1/T=2KHz Reading (dBuV) = Reading (dBµV) + (Antenna with amp CF(dB)+Cable CF(dB)) AVG VBW>1/T=3KHz								
		BLE High Channel								



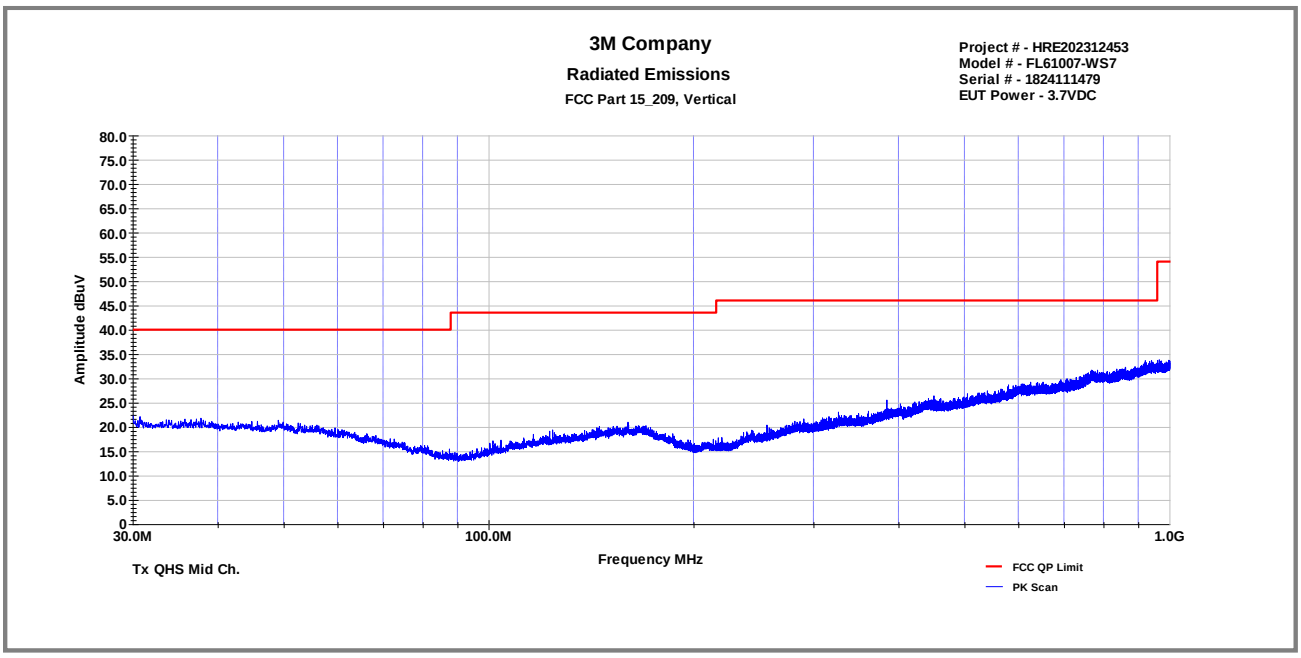


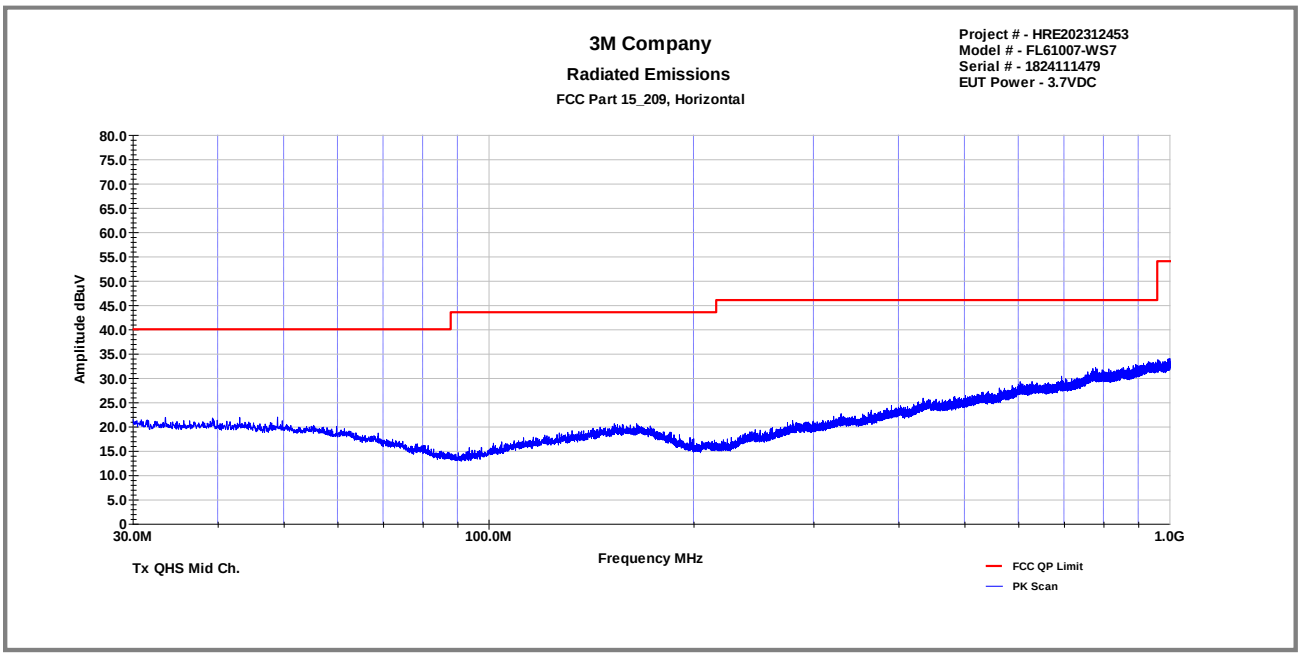
FCC Part 15.209 Radiated Emissions in restricted band – QHS Low Channel



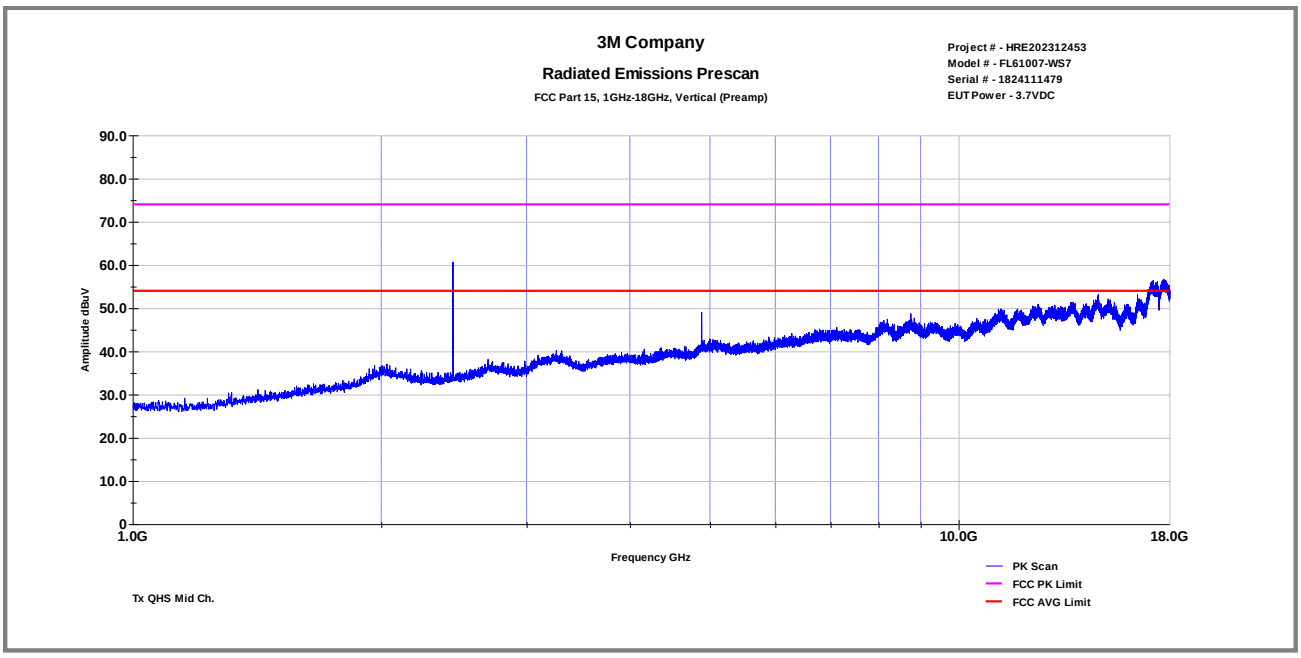


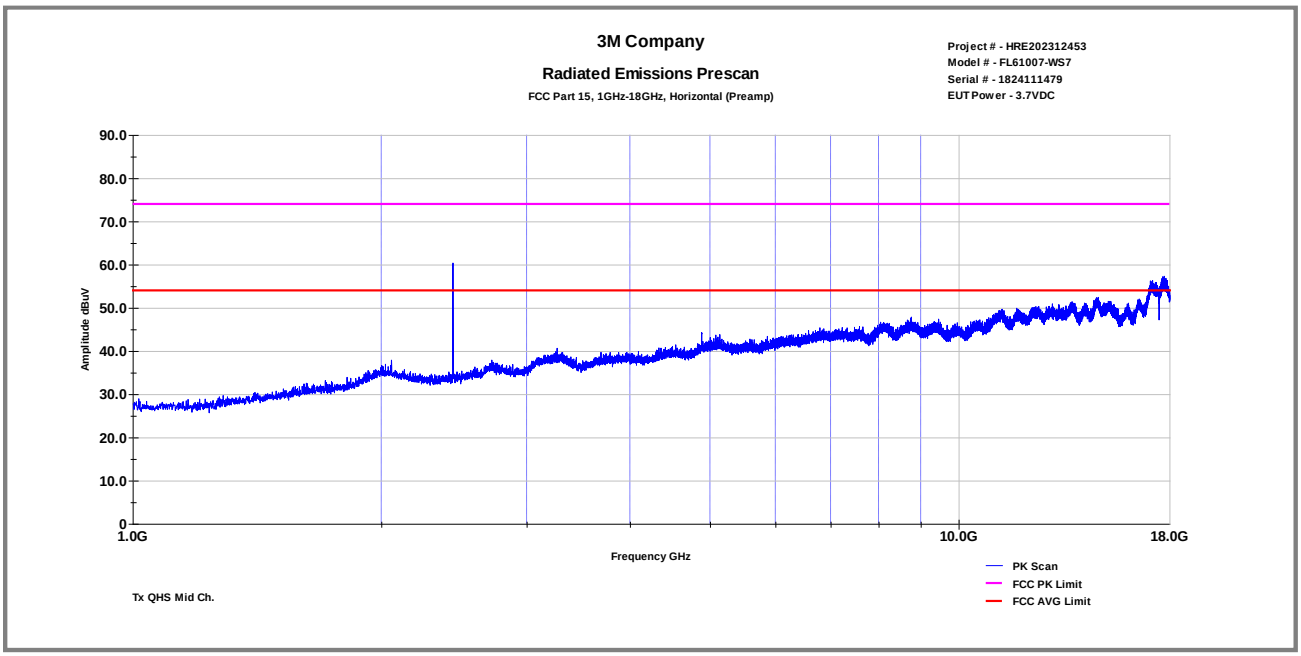
FCC Part 15.209 Radiated Emissions in restricted band – QHS Low Channel



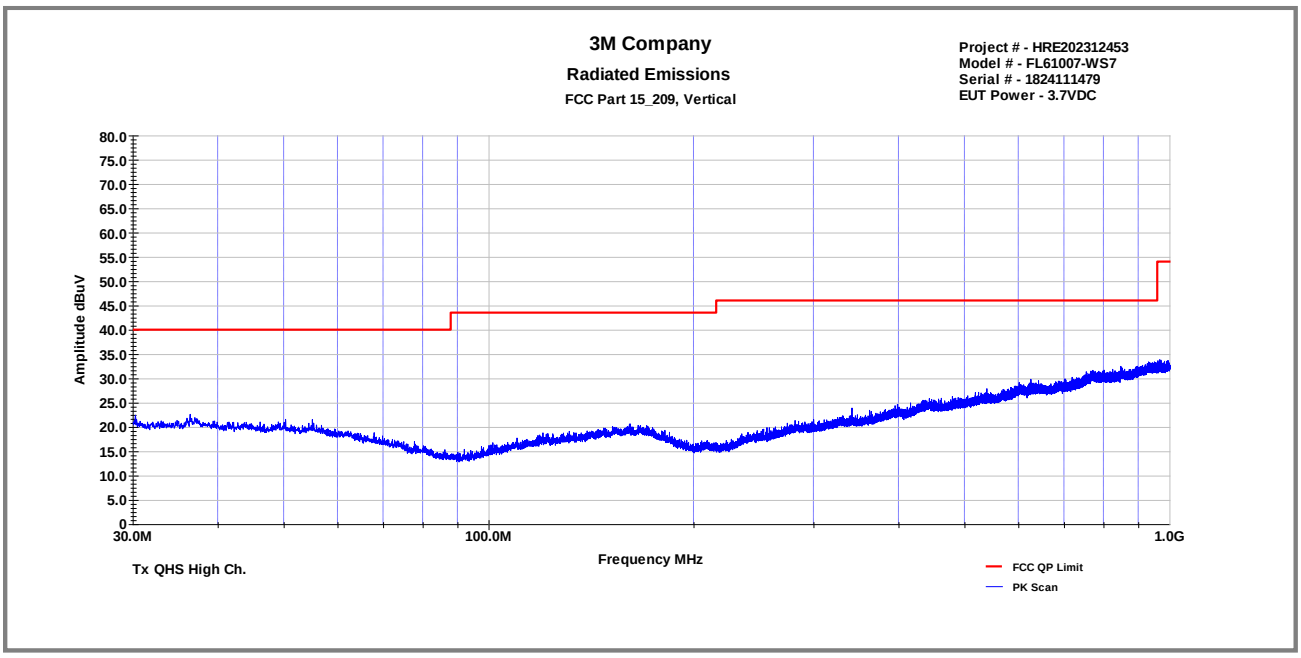


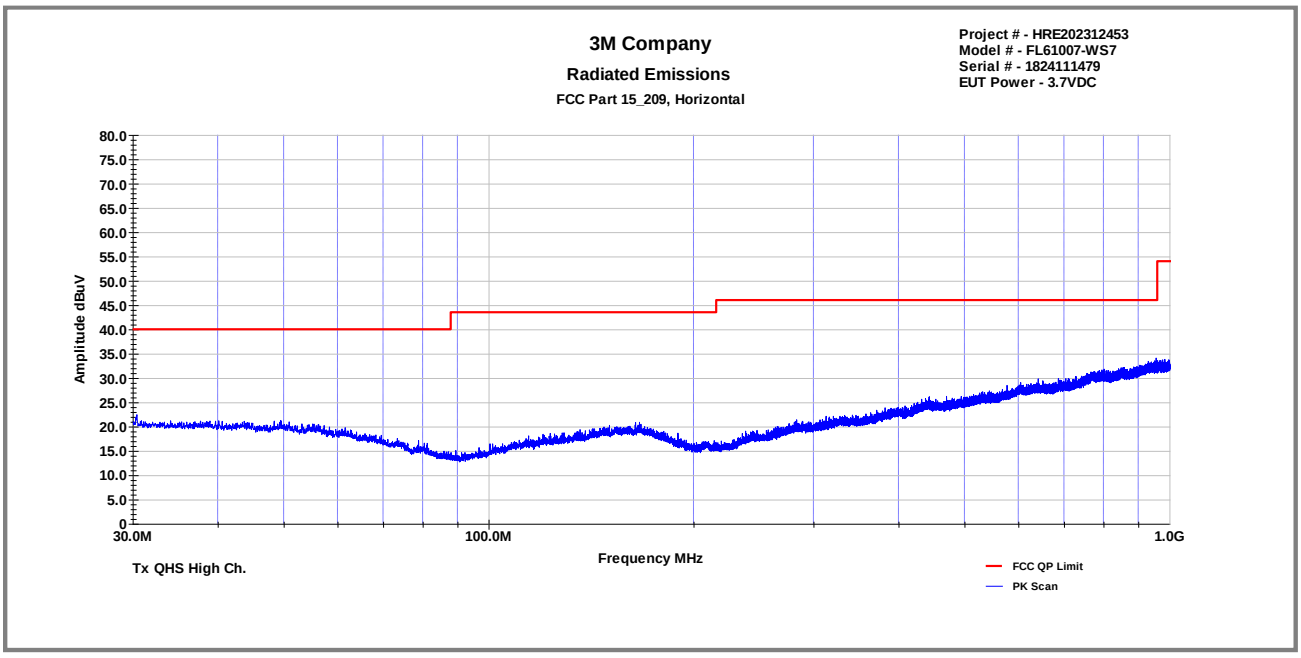
FCC Part 15.209 Radiated Emissions in restricted band – QHS Mid Channel



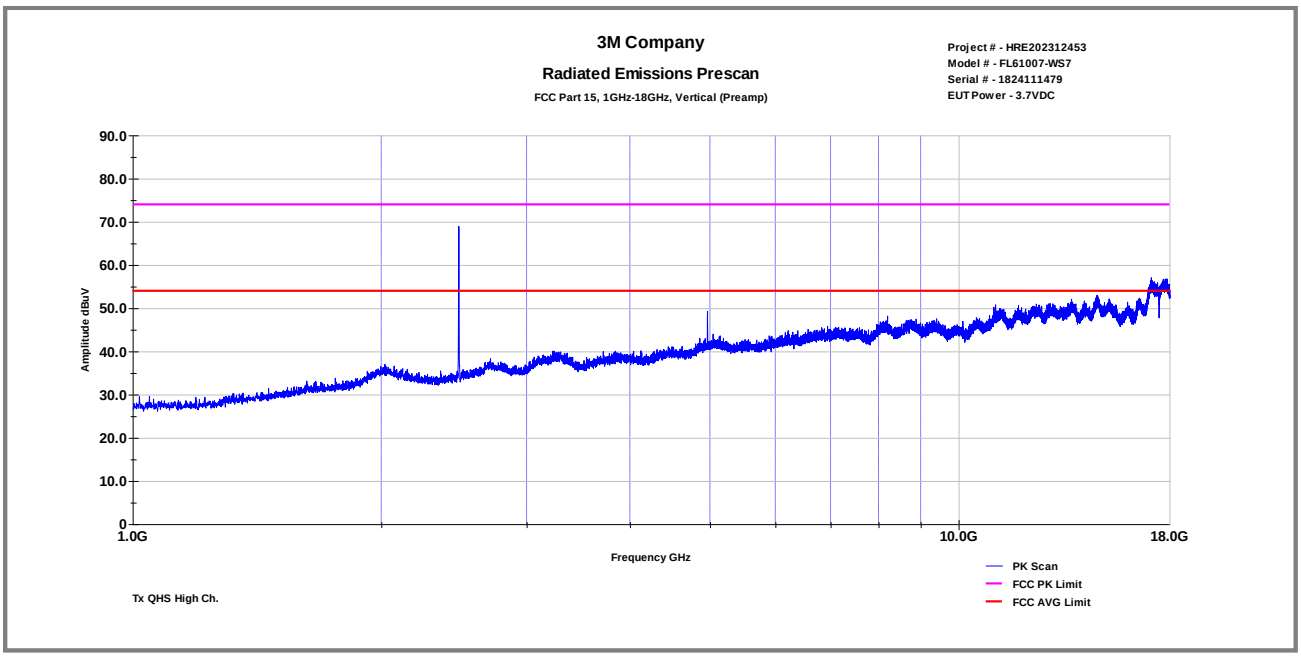


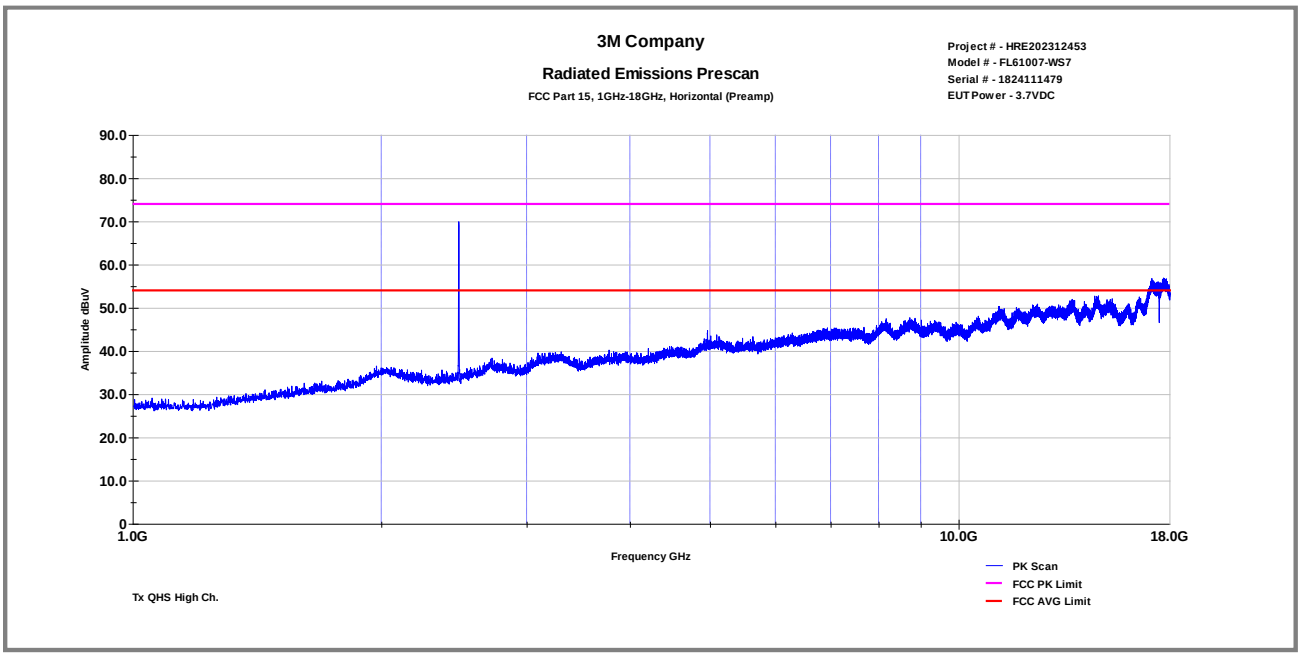
FCC Part 15.209 Radiated Emissions in restricted band – QHS Mid Channel





FCC Part 15.209 Radiated Emissions in restricted band – QHS High Channel





FCC Part 15.209 Radiated Emissions in restricted band – QHS 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
33.77	H	4.3	16.6	20.9	40	-19.1
53.54	H	2.6	18.2	20.9	40	-19.1
165.32	V	2.5	18.1	20.6	43.5	-22.9
452.23	V	3.1	22.6	25.7	46	-20.3
767.9	H	3.4	28.4	31.8	46	-14.2
867.5	H	3.5	28.9	32.4	46	-13.6
Notes:	Net Reading (dBuV) = Reading (dBµV) + Antenna CF(dB)+Cable CF(dB) – Amp Gain(dB) Low Channel-QHS					

Frequency (MHz)	Pol.	QP Reading dBµV/m	Total CF dB	Net at 3 m dBµV/m	Limit (dBµV/m)	Margin dB
39.67	H	3.6	17.4	21	40	-19
42.98	H	3.2	17.8	21	40	-19
48.56	V	2.9	18.2	21.1	40	-18.9
159.44	H	2.6	18.3	20.8	43.5	-22.7
384.95	V	3.2	20.9	24.1	46	-21.9
776.84	H	3.4	28.4	31.8	46	-14.2
Notes:	Net Reading (dBuV) = Reading (dBµV) + Antenna CF(dB)+Cable CF(dB) – Amp Gain(dB) Mid Channel-QHS					

Frequency (MHz)	Pol.	QP Reading dBµV/m	Total CF dB	Net at 3 m dBµV/m	Limit (dBµV/m)	Margin dB
35.39	V	4.1	16.8	21	40	-19
55.43	H	2.6	18.1	20.7	40	-19.3
166.34	V	2.6	18	20.6	43.5	-22.9
341.18	H	2.8	19.7	22.5	46	-23.5
625.13	H	3.4	26.1	29.4	46	-16.6
847.43	V	3.7	28.8	32.5	46	-13.5
Notes:	Net Reading (dBuV) = Reading (dBµV) + Antenna CF(dB)+Cable CF(dB) – Amp Gain(dB) Mid Channel-QHS					

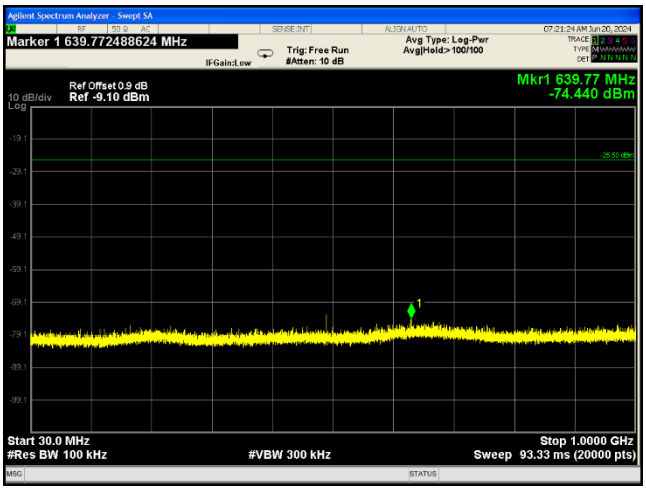
Pol	Frequency (MHz)	Peak dBµV/m	AVG dBµV/m	Total CF dB	Net Peak dBµV/m	Net AVG dBµV/m	PK Limit dBµV/m	AVG Limit dBµV/m	PK Margin dB	AVG Margin dB
V	3689.40	50.25	38.9	-9.85	40.40	29.06	74.00	54.00	-33.60	-24.94
H	3689.40	49.89	39.0	-9.85	40.04	29.14	74.00	54.00	-33.96	-24.86
V	4803.75	54.69	47.6	-6.36	48.33	41.25	74.00	54.00	-25.67	-12.75
H	4803.75	52.29	43.6	-6.36	45.93	37.22	74.00	54.00	-28.07	-16.78
V	8099.70	48.36	36.7	0.10	-0.08	36.81	74.00	54.00	-74.08	-17.19
H	8099.70	47.58	36.7	0.10	-0.08	36.76	74.00	54.00	-74.08	-17.24
V	9608.00	49.26	39.7	-0.23	-0.22	39.46	74.00	54.00	-74.22	-14.54
H	9608.00	49.68	39.9	-0.23	-0.22	39.66	74.00	54.00	-74.22	-14.34
Notes:		Net Reading (dBuV) = Reading (dBµV) + (Antenna with amp CF(dB)+Cable CF(dB)) AVG VBW>1/T=3KHz								
		QHS Low Channel								

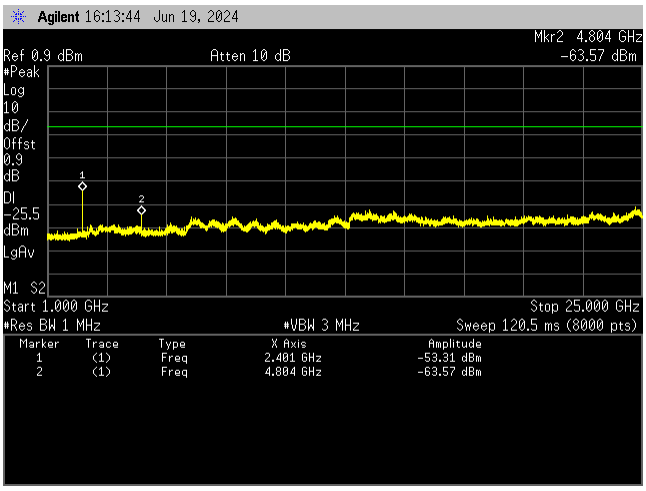
Pol	Frequency (MHz)	Peak dBµV/m	AVG dBµV/m	Total CF dB	Net Peak dBµV/m	Net AVG dBµV/m	PK Limit dBµV/m	AVG Limit dBµV/m	PK Margin dB	AVG Margin dB
V	4880.00	55.29	48.8	-5.30	49.99	43.52	74.00	54.00	-24.01	-10.48
H	4880.00	52.98	44.8	-5.30	47.68	39.53	74.00	54.00	-26.32	-14.47
V	7322.00	48.35	37.4	-2.01	46.34	35.34	74.00	54.00	-27.66	-18.66
H	7322.00	47.30	36.5	-2.01	45.29	34.53	74.00	54.00	-28.71	-19.47
V	9763.50	46.97	35.8	-0.16	46.81	35.61	74.00	54.00	-27.19	-18.39
H	9763.50	46.49	35.8	-0.16	46.33	35.59	74.00	54.00	-27.67	-18.41
V	13648.00	45.40	34.5	6.43	51.83	40.97	74.00	54.00	-22.17	-13.03
H	13648.00	45.51	34.8	6.43	51.94	41.20	74.00	54.00	-22.06	-12.80
Notes:		Net Reading (dBuV) = Reading (dBµV) + (Antenna with amp CF(dB)+Cable CF(dB)) AVG VBW>1/T=3KHz								
		QHS Mid Channel								

Pol	Frequency (MHz)	Peak dBµV/m	AVG dBµV/m	Total CF dB	Net Peak dBµV/m	Net AVG dBµV/m	PK Limit dBµV/m	AVG Limit dBµV/m	PK Margin dB	AVG Margin dB
V	2700.00	51.69	40.2	-12.21	39.48	28.01	74.00	54.00	-34.52	-25.99
H	2700.00	51.29	40.0	-12.21	39.08	27.83	74.00	54.00	-34.92	-26.17
V	4960.00	55.10	48.1	-5.17	49.93	42.97	74.00	54.00	-24.07	-11.03
H	4960.00	52.25	43.8	-5.17	47.08	38.61	74.00	54.00	-26.92	-15.39
V	7440.00	48.89	38.1	-1.69	47.20	36.38	74.00	54.00	-26.80	-17.62
H	7440.00	48.85	38.0	-1.69	47.16	36.30	74.00	54.00	-26.84	-17.70
V	9919.30	48.90	39.0	0.35	49.25	39.30	74.00	54.00	-24.75	-14.70
H	9919.30	49.9	39.9	0.35	50.25	40.25	74.00	54.00	-23.75	-13.75
Notes:		Net AVG VBW>1/T=2KHz Reading (dBuV) = Reading (dBµV) + (Antenna with amp CF(dB)+Cable CF(dB)) AVG VBW>1/T=3KHz								
		QHS High Channel								

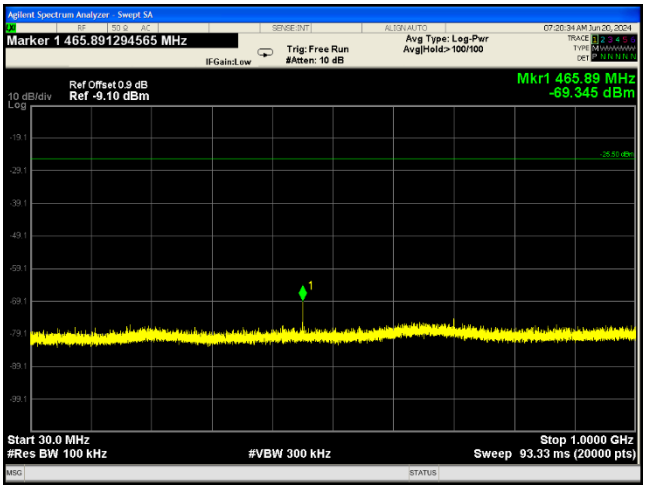
4.5	**Radiated Emissions in non-restricted band**	
Method:	Antenna-port conducted measurements were used in addition to radiated measurements for determining compliance in the restricted frequency bands requirements using the proper antenna impedance matching. The measurements were made with transmitter set to transmit continuously low, medium and high channels. The notch filter was installed in the signal path to minimize the radiated power on the fundamental transmitting frequency in order to avoid saturation effect.	
	Laboratory Ambient Temperature:	23°C
	Relative Humidity:	48%
	Atmospheric Pressure:	1011 mbars
Reference Standard(s):	☒ ANSI C63.10:2020, Section 11.11 ☒ FCC Part 15.247/RSS 247 ☒ KDB 558074	**Measurement Point** ☒ Conducted ☐ Radiated
Frequency Range:	☒ 2402.0-2480.0MHz	
Antenna Gain:	1.35dBi	
In-band power in 100KHz:	☒ 4.5dBm	**Results:**
Limit:	☒ -22.5dBm (30dBc below in-band power)	>65dBc
Nominal Voltage:	☐ 120VAC ☒ 3.7VDC	
Test Personnel:	Yuriy Litvinov	**Date:** 06/19/2024

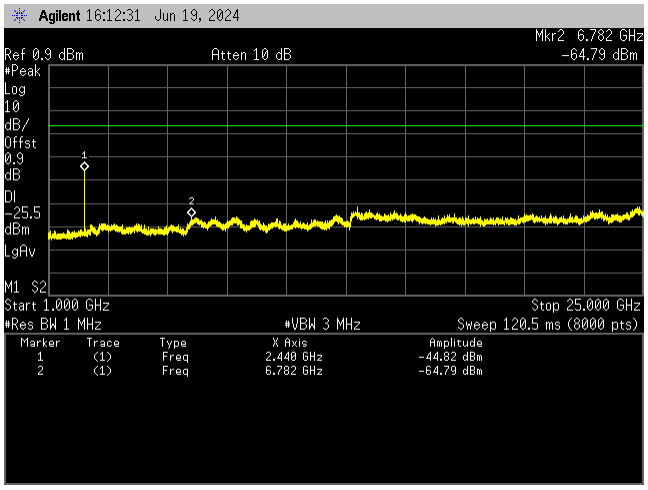
Note:	



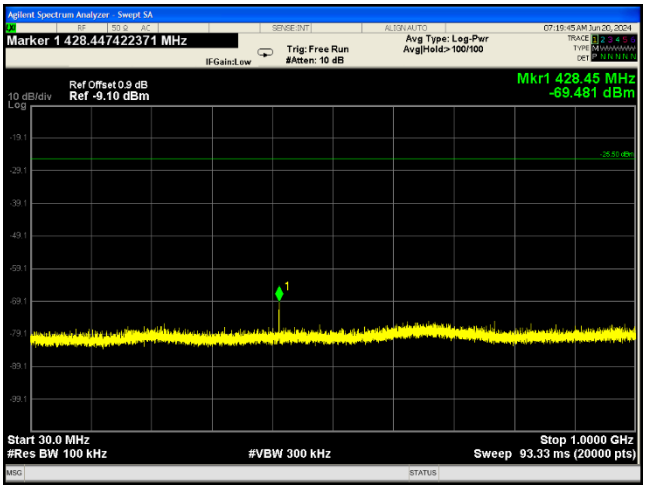


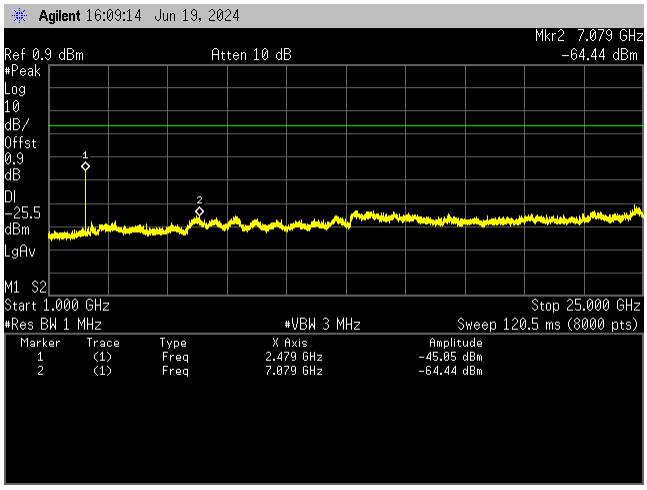
Conducted Spurious - BLE Low Channel



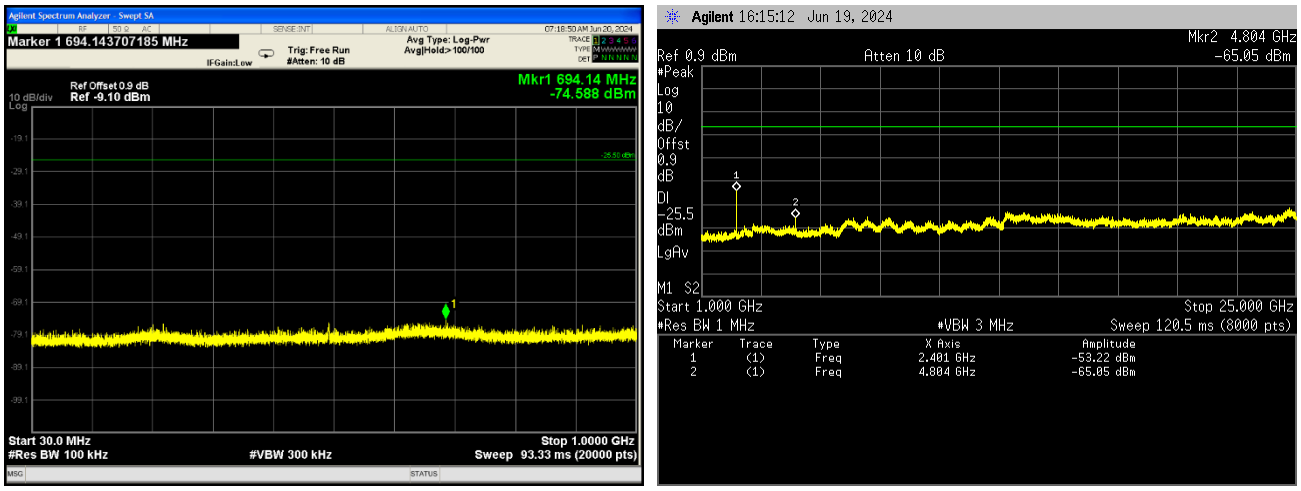


Conducted Spurious – BLE Mid Channel

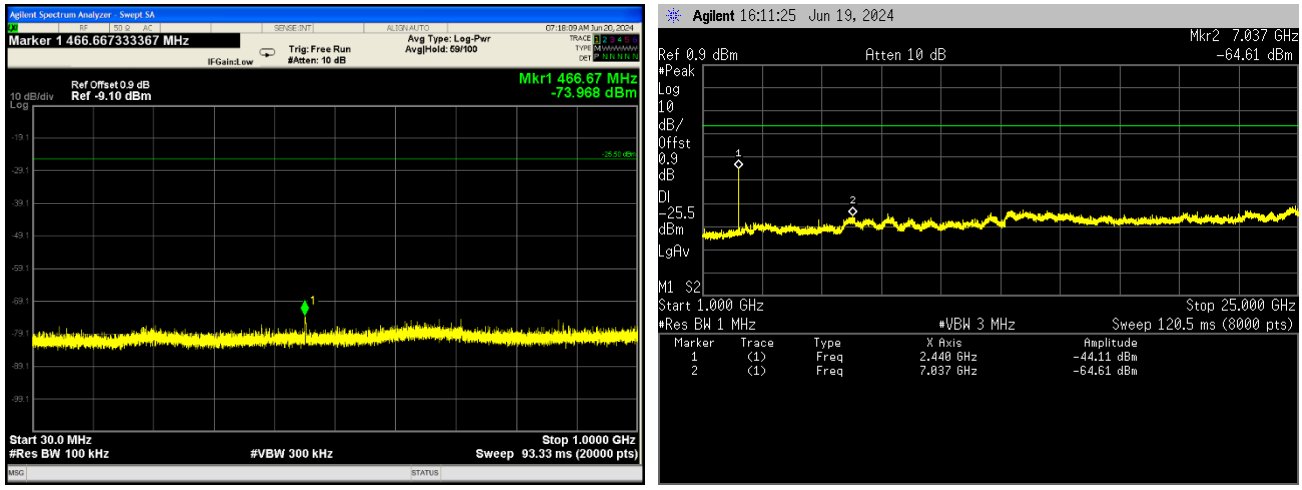




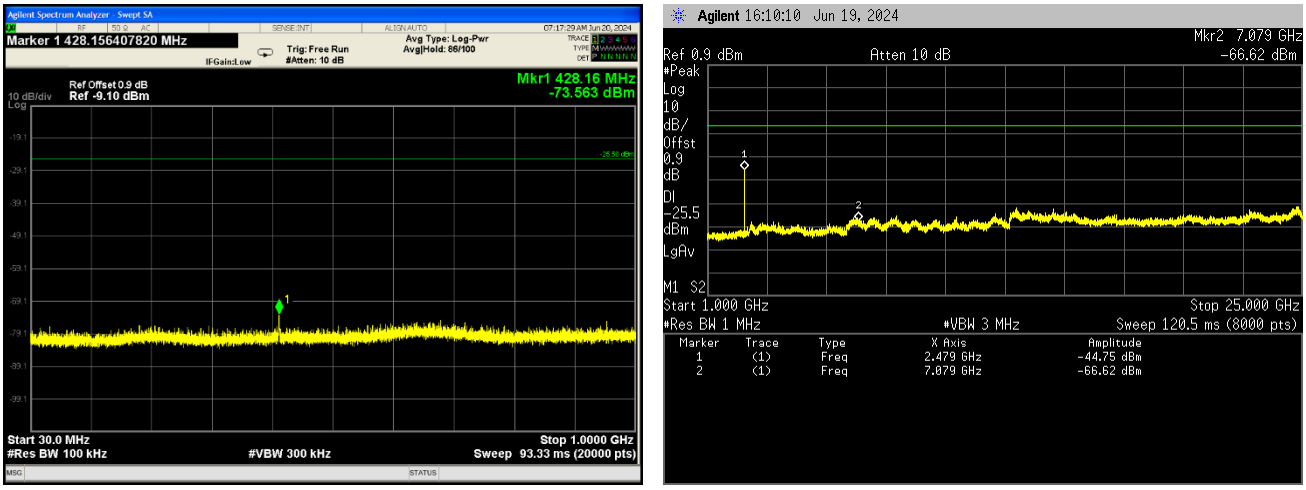
Conducted Spurious – BLE High Channel



Conducted Spurious – QHS Low Channel



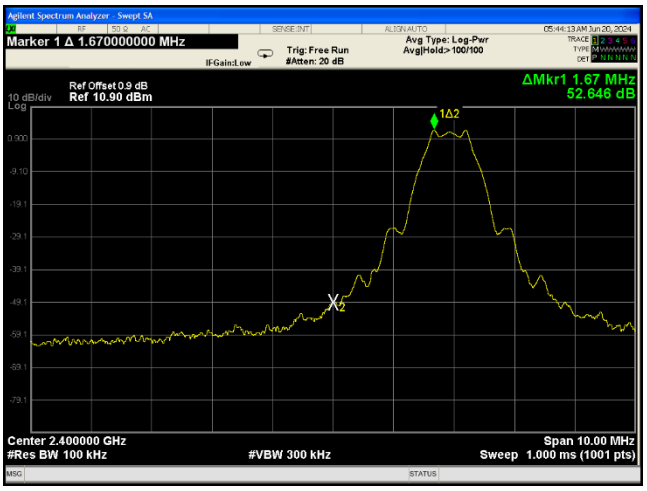
Conducted Spurious – QHS Mid Channel



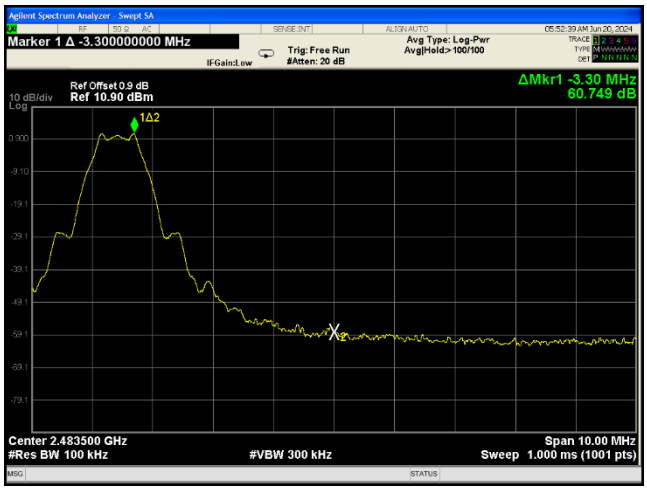
Conducted Spurious – QHS High Channel

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 C63.10:2020, Section 11.13.2 ☒ FCC Part 15.247/RSS 247 ☒ KDB 558074	**Measurement Point** ☒ Conducted ☐ Radiated
Frequency Range:	☒ 2402.0-2480.0 MHz	
In-band power in 100KHz:	☒ 4.5dBm	**Results**
Limit:	☒ >30dBc	Low Ch., 2402 MHz > 51dBc High Ch., 2480 MHz > 57dBc
Nominal Voltage:	☐ 120VAC ☒ 3.7VDC	
Test Personnel:	Yuriy Litvinov	**Date:** 02/06/2024

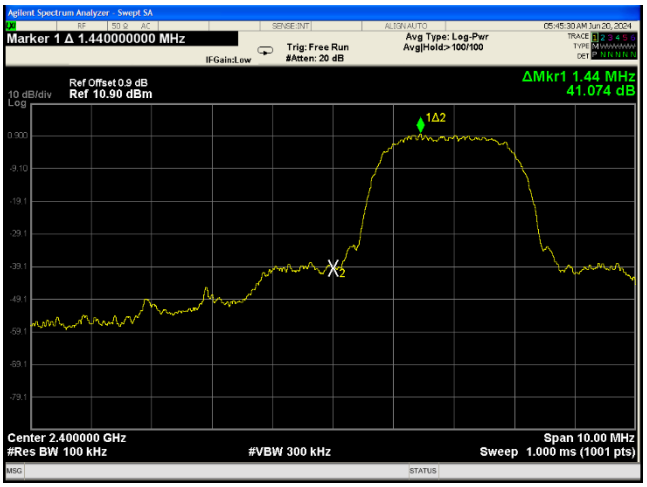
Note:	



BLE Band Edge - Low Channel
Center Freq. 2.400GHz



BLE Band Edge - High Channel
Center Freq. 2.4835GHz



QHS Band Edge - Low Channel
Center Freq. 2.400GHz

QHS Band Edge - High Channel
Center Freq. 2.4835GHz

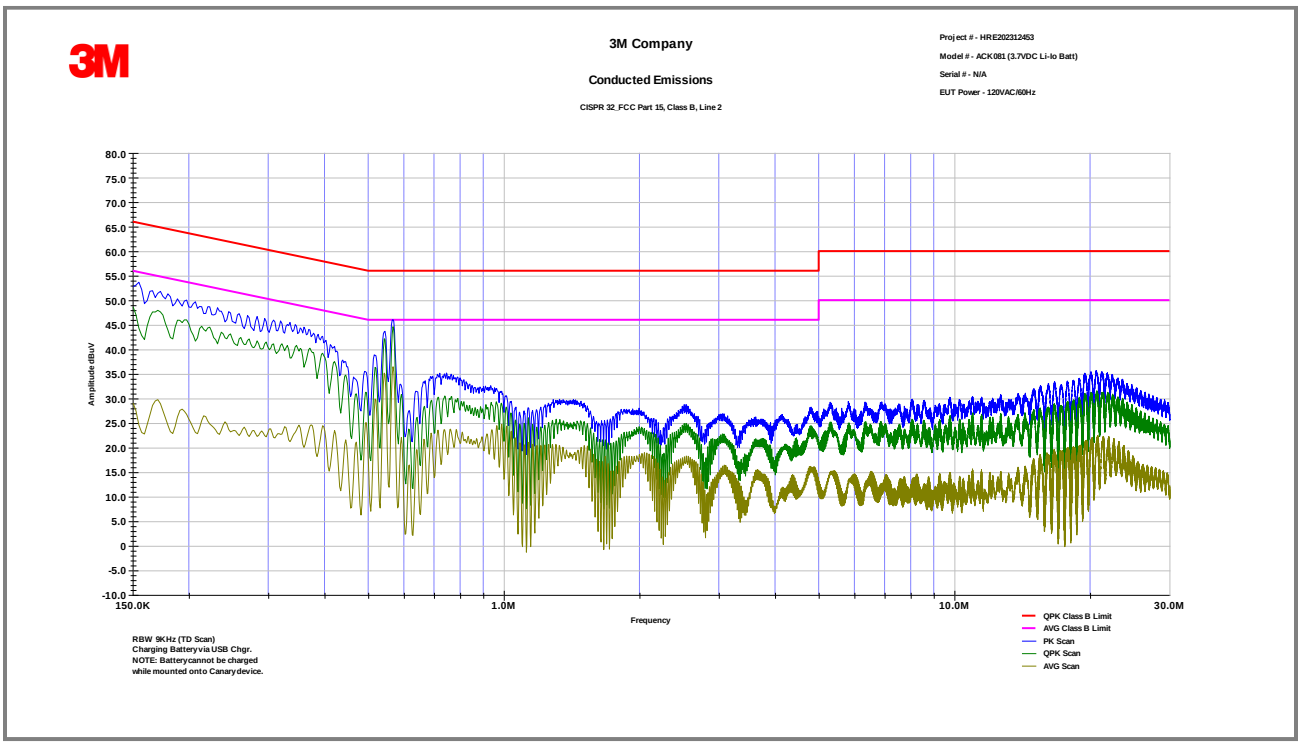
4.7	**Conducted Emissions Data**
Method:	The AMN was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane. This distance was between the closest points of the AMN and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the AMN. 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.

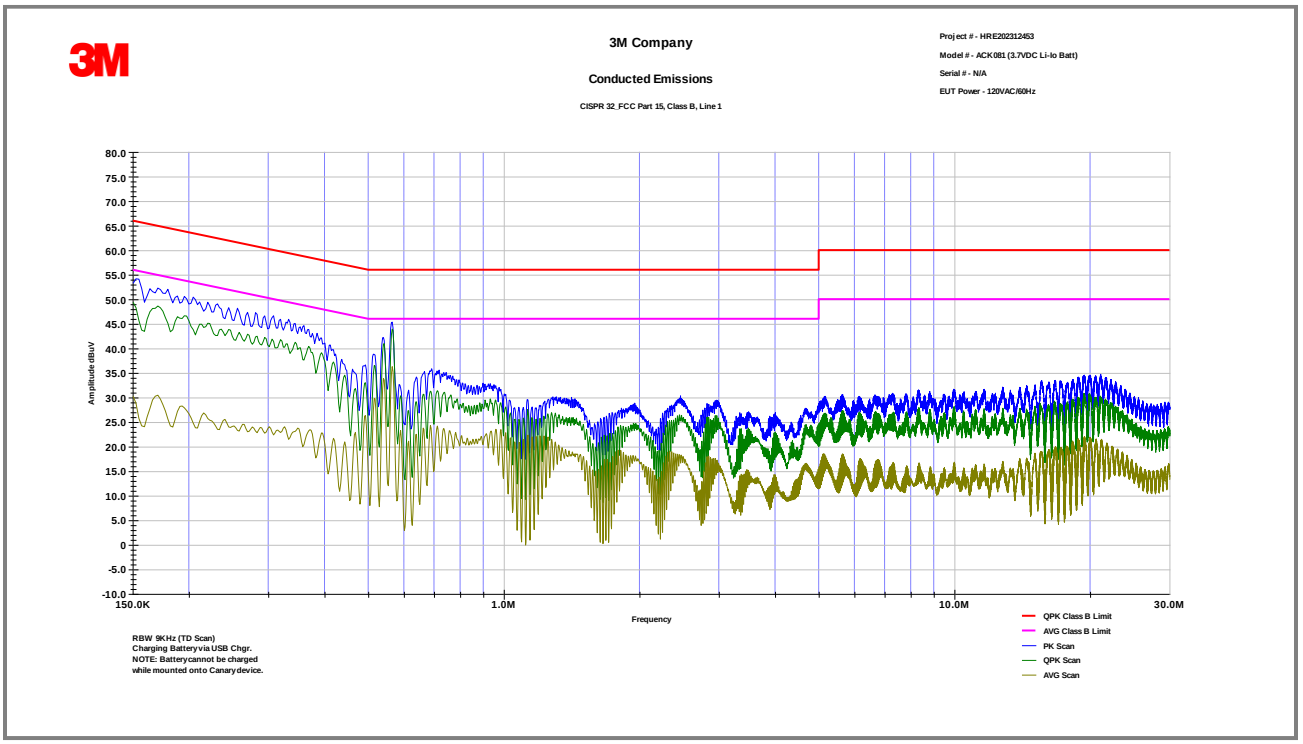
Test Verification: ☒	Laboratory Ambient Temperature:	23°C
	Relative Humidity:	48%
	Atmospheric Pressure:	1011 mbars
Reference Standard(s):	☒ RSS Gen/FCC 15.207 ☐ ANSI C63.4:2014 ☒ ANSI C63.10:2020	**Measurement Point** ☒ Mains ☐ Telecommunication ports ☐
Nominal Voltage:	☒ 120VAC ☐ 230VAC ☐ VDC	
Test Personnel:	Keith Schwartz KS	**Date:** 06/03/2024

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:	Battery can be charged when removed from WS Adapter. Test data is for reference only.


3M Company
Conducted Emissions
CISPR 32_FCC Part 15, Class B, Line 2
Project # - HRE202312453
Model # - ACK081 (3.7VDC Li-Io Batt)
Serial # - N/A
EUT Power - 120VAC/60Hz
Amplitude dBuV
Frequency
150.0K
1.0M
10.0M
30.0M
QPK Class B Limit
AVG Class B Limit
PK Scan
QPK Scan
AVG Scan
RBW 9KHz (TD Scan)
Charging Batteryvia USB Chgr.
NOTE: Batterycannot be charged
while mounted onto Canarydevice.


3M Company
Conducted Emissions
CISPR 32_FCC Part 15, Class B, Line 1
Project # - HRE202312453
Model # - ACK081 (3.7VDC Li-Io Batt)
Serial # - N/A
EUT Power - 120VAC/60Hz
Amplitude dBuV
Frequency
150.0K
1.0M
10.0M
30.0M
QPK Class B Limit
AVG Class B Limit
PK Scan
QPK Scan
AVG Scan
RBW 9KHz (TD Scan)
Charging Batteryvia USB Chgr.
NOTE: Batterycannot be charged
while mounted onto Canarydevice.

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):	☒ 2402-2480.0MHz ☐	

Antenna Separation Distance:	>8mm
RF Exposure Conditions:	Portable (Body-worn)
2.4GHz Antenna Gain:	1.35dBi
BR/EDR the source-based output power:	2.5mW(4.0dBm)*0.7(FHSS worst case duty cycle)= 1.8mW(2.6dBm)
BR/EDR EIRP/ERP output power:	**EIRP**=2.6dBm + 1.35dBi=3.95dBm, **ERP**=3.95dBm - 2.15dB=1.8dBm(1.5mW)
LE/QHS the source-based output power:	2.8mW(4.5dBm)*0.85(worst case duty cycle)=2.4mW(3.8dBm)
LE/QHS EIRP/ERP output power:	**EIRP**=3.8dBm + 1.35Bi=5.15dBm, **ERP**=5.15dBm - 2.15dB= 3.0dBm(2mW)
The SAR Exclusion Threshold Level	
FCC Part 2.1093	10mW<5mm @2.45GHz
RSS 102, Issue 5	4mW<5mm @2.45GHz

Note:	

5.0	Test Equipment				
Test Equipment Used					
Description	**Manufacturer**	**Model**	**Identifier**	**Last Cal. Date**	**Check**
Biconilog Antenna	Schwarzbeck	VULB 9168	9168-1070	10/20/2023	☒
Horn Antenna	A.H. Systems	SAS 571	1010	10/20/2023	☒
Loop Antenna	A.H. Systems	EHA-51B	1213E	10/20/2023	☐
EMI Receiver	Rohde & Schwarz	ESW26	101412	10/20/2023	☒
Signal Analyzer	Agilent	N9000A	MY53031040	10/20/2023	☒
EMI Receiver	Agilent	E4448A	1530975	10/20/2023	☒
LISN	TESEQ	NNB51	1130	10/20/2023	☒
Coaxial Cable	Insulated Wire	2803	CBL2039	10/20/2023	☒
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	09/16/2024	HRE202312453-1	Original Issue