

# LABORATORY TEST REPORT

## RADIO PERFORMANCE MEASUREMENTS

for the

TMBK5B MOBILE Transceiver

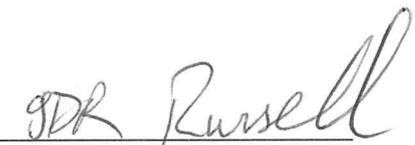
Tested in accordance with:

FCC 47 CFR Parts 27 and 90

RSS-119 Issue 12  
RSS-Gen Issue 5

Report Revision: 1  
Issue Date: 21 May 2025

PREPARED BY: I. D. Russell

  
Test Technician

CHECKED & APPROVED BY: M. C. James

  
Laboratory Technical Manager



FCC Registration: 838288  
ISED Registration: 737A

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.

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FCC ID: CASTMBK5B  
IC : 737A-TMBK5B

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Report Revision: 1  
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## REVISION HISTORY

<b>Date</b>	<b>Revision</b>	<b>Comments</b>
21 May 2025	1	Initial test report

## INTRODUCTION

Type approval testing of the TMBK5B, 30/35 Watt, MOBILE transceiver in order to demonstrate continued compliance with FCC 47 Parts 27 & 90, and RSS-119 Issue 12 & RSS-Gen Issue 5, after a change in RF power amplifier design.

This radio supports analogue, digital FFSK, Digital Mobile Radio (DMR), APCO P25 phase-1 and APCO P25 phase-2 modulations, however the change in RF design does not affect modulation.

PCB IPN (old) 220-01815-11  
PCB IPN (new) 220-01815-13

### REPORT PREPARED FOR

Tait International Ltd  
245 Wooldridge Road  
Harewood  
Christchurch 8051  
New Zealand

### DESCRIPTION OF SAMPLE

Manufacturer: Tait International Limited  
Equipment: MOBILE Transceiver  
Type: TMBK5B  
Product Code: T02-00012-XFZR  
Serial Number(s): 21737197  
Frequency range: 762 → 870 MHz  
Transmit Power: 30/35 W

### HARDWARE & SOFTWARE

Quantity: 1

Type	Code and Version	Hardware
Hardware ID	TMBC62-0100_0001	Head
Firmware Package	QIDMR_3.05.09.0118	Head
Hardware ID	TMBB34-K510_0003	Torso
Firmware Package	QIDMR_3.05.09.0118	Torso

### TEST CONDITIONS

All testing was performed between 8 May → 16 May 2025, and under the following conditions:

Ambient temperature: 15°C → 30°C  
Relative Humidity: 20% → 90%  
Standard Test Voltage: 13.8 V<sub>DC</sub>

## TEST REQUIREMENTS AND RESULT SUMMARY

ISED Specification	FCC Specification	Test Name	Test Methods	Result
RSS-119 5.4	FCC 47 CFR 2.1046	Transmitter Output Power (Conducted)	RSS-Gen 6.12 ANSI C63.26 5.2.4.2	P
No specification	FCC 47 CFR 2.1047 (a)	Transmitter Audio Frequency Response – Pre-emphasis	ANSI C63.26 5.3.3.2	N1
No specification	FCC 47 CFR 2.1047 (b)	Transmitter Modulation Limiting	ANSI C63.26 5.3.2	N1
RSS-119 5.5	FCC 47 CFR 2.1049 (c)	Transmitter Occupied (99%) Bandwidth	RSS-Gen 6.7 ANSI C63.26 5.4.4	N1
RSS-119 5.5	FCC 47 CFR 90.210	Transmitter Spectrum Masks	RSS-119 4.2.2 TIA-603-E 2.2.11	N1
RSS-119 5.8.9	FCC 47 CFR 90.543	Adjacent Channel Power Ratio	RSS-119 4.3 ANSI C63.26 6.5.2.4	P
RSS-119 5.8	FCC 47 CFR 2.1051	Transmitter Spurious Emissions (Conducted)	RSS-Gen 6.13 ANSI C63.26 5.7	P
RSS-119 5.8	FCC 47 CFR 2.1053	Transmitter Spurious Emissions (Radiated)	RSS-Gen 6.13 ANSI C63.26 5.5	P
No specification	FCC CFR 90.543	Transmitter Radiated Emissions in the GNSS Band	ANSI C63.26 6.5.2.7.3	P
RSS-119 5.8.9.2 rad	No specification	Transmitter Conducted Emissions in the GNSS Band	RSS-119 5.8 ANSI C63.26 6.5.2.7.4	P
RSS-119 5.9	FCC 47 CFR 90.214	Transient Frequency Behaviour	RSS-119 5.9 ANSI C63.26 6.5.2.2	N/A 1
RSS-119 5.3	FCC 47 CFR 90.214	Transmitter Frequency Stability - Temperature	RSS-Gen 6.11 ANSI C63.26 5.6.4	P
RSS-119 5.3	FCC 47 CFR 2.1055 (d) (1)	Transmitter Frequency Stability - Voltage	RSS-Gen 6.11 ANSI C63.26 5.6.5	P
RSS-Gen 7.4	FCC 47 CFR 15.111	Receiver Spurious Emissions (Conducted)	RSS-Gen 7.4 TIA-603-E 2.1.2	P
No specification	FCC 47 CFR 27.53 c (4) & (6)	Transmitter Spurious Emissions (Conducted) Part 27	TIA-102.CAAA-C 2.2.7	P
No specification	FCC 47 CFR 27.53 c (4) & (6)	Transmitter Spurious Emissions (Radiated) Part 27	TIA-102.CAAA-C 2.2.7	N1

Test Case Result Definitions	
No test Performed	N
Test does not apply to the test object	N/A
Test object meets requirements	P (Pass)
Test object does not meet requirements	F (Fail)
Test object is not conclusive	I (Inconclusive)

Comments:
N/A 1: Only required where the EUT transmits in the 138-174 or 406.1-512 MHz band
N1: Not tested as this parameter is unlikely to be affected by the change in the Power Amplifier

## STATEMENT OF COMPLIANCE

We, TELTEST LABORATORIES of 558 Wairakei Road, Christchurch, New Zealand, declare under our sole responsibility that the product:

Equipment: MOBILE Transceiver  
Type: TMBK5B  
Product Code: T02-00012-XFZR  
Serial Number(s): 21737197  
Quantity: 1

to which this declaration relates, is in conformity with the following standards:

FCC 47 CFR Parts 27 and 90

RSS-119 Issue 12 & RSS-Gen Issue 5

for the parameters tested in this report.

**Signature:** 

M. C. James  
Laboratory Technical Manager

**Date:** 29 May 2025

The results obtained in this test report pertain only to the item(s) tested. Teltest does not make any claims of compliance for samples or variants that were not tested.

## CHANNEL TABLE

Label	Channel Number	Receive Frequency	Transmit Frequency	Power	Bandwidth
762 Hi	1	762.025	762.025	30 W	12.5KHz
768 Hi	3	768.025	768.025	30 W	12.5KHz
769 Hi	5	769.075	769.075	30 W	12.5KHz
774 Hi	7	774.9	774.9	30 W	12.5KHz
775 Hi	9	775.975	775.975	30 W	12.5KHz
787 Hi	11	857.5	787.5	30 W	12.5KHz
798 Hi	13	768.025	798.025	30 W	12.5KHz
799 Hi	15	769.075	799.075	30 W	12.5KHz
804 Hi	17	774.9	804.9	30 W	12.5KHz
805 Hi	19	775.975	805.975	30 W	12.5KHz
806 Hi	21	856.025	806.025	35W	12.5KHz
815 Hi	23	865.025	815.025	35W	12.5KHz
823 Hi	25	869.975	823.975	35W	12.5KHz
851 Hi	27	851.025	851.025	35W	12.5KHz
860 Hi	29	860.025	860.025	35W	12.5KHz
868 Hi	31	868.975	868.975	35W	12.5KHz
762 Lo	2	762.025	762.025	2 W	12.5KHz
768 Lo	4	768.025	768.025	2 W	12.5KHz
769 Lo	6	769.075	769.075	2 W	12.5KHz
774 Lo	8	774.9	774.9	2 W	12.5KHz
775 Lo	10	775.975	775.975	2 W	12.5KHz
787 Lo	12	857.5	787.5	2 W	12.5KHz
798 Lo	14	768.025	798.025	2 W	12.5KHz
799 Lo	16	769.075	799.075	2 W	12.5KHz
804 Lo	18	774.9	804.9	2 W	12.5KHz
805 Lo	20	775.975	805.975	2 W	12.5KHz
806 Lo	22	856.025	806.025	2 W	12.5KHz
815 Lo	24	865.025	815.025	2 W	12.5KHz
823 Lo	26	869.975	823.975	2 W	12.5KHz
851 Lo	28	851.025	851.025	2 W	12.5KHz
860 Lo	30	860.025	860.025	2 W	12.5KHz
868 Lo	32	868.975	868.975	2W	12.5KHz

**Programming Application Name**

DMR and P25 Terminals Programming Application

**Version**

20.25.14.118 Alpha

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## TEST RESULTS

### TRANSMITTER OUTPUT POWER (CONDUCTED)

SPECIFICATION: FCC 47 CFR 2.1046  
RSS-119 5.4

GUIDE: ANSI C63.26 5.2.4.2

MEASUREMENT PROCEDURE:

1. Refer Annex A for Equipment set up.
2. The coaxial attenuator has an impedance of 50 Ohms.
3. The unmodulated output power was measured with an RF Power meter.

Example calculation	
Power in dBm =	Measured power (dBm) + attenuator and cable loss (dB)
Chan 1 power (dBm)	12.96 dBm +31.97 dB
=	= 44.93dBm
Power in Watts =	$(10^{(44.93\text{dBm}/10)})/1000$
=	= 31.1W

MEASUREMENT RESULTS:

Manufacturer's Rated Output Power:

Switchable: 30/35 W and 2 W

Frequency	Nominal (W)	Measured (W)	Variation (%)	Variation (dB)
762.025MHz	30	31.1	3.7	0.2
768.025MHz	30	34.5	14.9	0.6
769.075MHz	30	34.9	16.3	0.7
774.9MHz	30	34.8	15.9	0.6
775.975MHz	30	34.8	16.0	0.6
787.5MHz	30	33.1	10.5	0.4
798.025MHz	30	31.6	5.4	0.2
799.075MHz	30	31.7	5.5	0.2
804.9MHz	30	31.8	6.2	0.3
805.975MHz	30	31.8	6.0	0.3
806.025MHz	35	36.0	2.9	0.1
815.025MHz	35	35.6	1.6	0.1
823.975MHz	35	34.3	-1.9	-0.1
851.025MHz	35	35.3	1.0	0.0
860.025MHz	35	37.0	5.7	0.2
868.975MHz	35	34.8	-0.5	0.0
Measurement Uncertainty			± 0.6 dB	

Transmitter Output Power (Conducted) - continued

Nominal 2 W	Measured (W)	Variation (%)	Variation (dB)
762.025MHz	2.0	1.6	0.1
768.025MHz	2.2	10.5	0.4
769.075MHz	2.3	15.2	0.6
774.9MHz	2.4	18.9	0.8
775.975MHz	2.4	19.5	0.8
787.5MHz	2.2	10.0	0.4
798.025MHz	2.1	5.0	0.2
799.075MHz	2.0	0.8	0.0
804.9MHz	2.0	0.0	0.0
805.975MHz	2.0	1.0	0.0
806.025MHz	2.0	-0.8	0.0
815.025MHz	2.0	-1.4	-0.1
823.975MHz	2.0	-1.9	-0.1
851.025MHz	2.0	1.9	0.1
860.025MHz	2.0	2.4	0.1
868.975MHz	2.0	0.2	0.0
Measurement Uncertainty		± 0.6 dB	

LIMIT CLAUSES:

FCC 47 CFR 90.205 (s)

The output power shall not exceed by more than 20%... the manufacturer's rated output power for the particular transmitter specifically listed on the authorization.

RSS-119 5.4

The output power shall be within ±1.0 dB of the manufacturer's rated power.

## ADJACENT CHANNEL POWER RATIO

SPECIFICATION: FCC 47 CFR 90.543

RSS-119 5.8.9

### MEASUREMENT PROCEDURE:

1. Refer Annex A for equipment set up.
2. The transmitter is modulated with the standard test pattern for digital modulation.
3. The test is performed in accordance with 47 CFR 90.543

LIMIT CLAUSE: FCC 47 CFR 90.543

RSS-119 5.8.9

MEASUREMENT UNCERTAINTY:  $\leq 12.75$  GHz  $\pm 3.0$  dB

As the changes in the power amplifier are not related to modulation, and all the radios modulations have a constant amplitude envelope, the ACP was only measured using analogue modulation.

### MEASUREMENT RESULTS:

Analogue

Tx FREQUENCY: 769.075 MHz 30 W 12.5 kHz Channel Spacing

Frequency Offset	Measurement Bandwidth	ACP Measured Lower (dBc)	ACP Measured Upper (dBc)	Maximum ACP(dBc)
9.375 kHz	6.25 kHz	-49.57	-48.77	-40
15.625 kHz	6.25 kHz	-72.15	-71.68	-60
21.875 kHz	6.25 kHz	-79.56	-79.75	-60
37.5 kHz	25 kHz	-78.53	-78.95	-60
62.5 kHz	25 kHz	-82.47	-83.04	-65
87.5 kHz	25 kHz	-82.51	-83.77	-65
150 kHz	100 kHz	-78.59	-78.81	-65
250 kHz	100 kHz	-83.41	-83.63	-65
350 kHz	100 kHz	-86.07	-86.42	-65
>400 kHz to 12 MHz	30 kHz (swept)	-89		-75
12 MHz to paired receive band	30 kHz (swept)	-97		-75
In the paired receive band	30 kHz (swept)	-113		-100

Analogue

Tx FREQUENCY: 774.9 MHz 30 W 12.5 kHz Channel Spacing

Frequency Offset	Measurement Bandwidth	ACP Measured Lower (dBc)	ACP Measured Upper (dBc)	Maximum ACP (dBc)
9.375 kHz	6.25 kHz	-49.69	-48.76	-40
15.625 kHz	6.25 kHz	-71.98	-71.63	-60
21.875 kHz	6.25 kHz	-79.19	-79.47	-60
37.5 kHz	25 kHz	-78.17	-78.43	-60
62.5 kHz	25 kHz	-81.68	-82.12	-65
87.5 kHz	25 kHz	-81.83	-82.74	-65
150 kHz	100 kHz	-78.56	-78.7	-65
250 kHz	100 kHz	-83.28	-83.39	-65
350 kHz	100 kHz	-85.78	-85.99	-65
>400 kHz to 12 MHz	30 kHz (swept)	-91		-75
12 MHz to paired receive band	30 kHz (swept)	-106		-75
In the paired receive band	30 kHz (swept)	-112		-100

TELTEST Laboratories  
Tait International Ltd  
Report Number 4409

Analogue

Tx FREQUENCY: 799.075 MHz 30 W 12.5 kHz Channel Spacing

Frequency Offset	Measurement Bandwidth	ACP Measured Lower (dBc)	ACP Measured Upper (dBc)	Maximum ACP(dBc)
9.375 kHz	6.25 kHz	-49.59	-48.78	-40
15.625 kHz	6.25 kHz	-72.03	-71.87	-60
21.875 kHz	6.25 kHz	-79.42	-79.87	-60
37.5 kHz	25 kHz	-78.88	-79.14	-60
62.5 kHz	25 kHz	-82.81	-83.23	-65
87.5 kHz	25 kHz	-82.28	-83.51	-65
150 kHz	100 kHz	-78.87	-78.94	-65
250 kHz	100 kHz	-83.54	-83.59	-65
350 kHz	100 kHz	-86.38	-86.49	-65
>400 kHz to 12 MHz	30 kHz (swept)	-90		-75
12 MHz to paired receive band	30 kHz (swept)	-112		-75
In the paired receive band	30 kHz (swept)	-108		-100

Analogue

Tx FREQUENCY: 804.9 MHz 30 W 12.5 kHz Channel Spacing

Frequency Offset	Measurement Bandwidth	ACP Measured Lower (dBc)	ACP Measured Upper (dBc)	Maximum ACP (dBc)
9.375 kHz	6.25 kHz	-49.49	-48.64	-40
15.625 kHz	6.25 kHz	-71.84	-71.74	-60
21.875 kHz	6.25 kHz	-79.19	-79.59	-60
37.5 kHz	25 kHz	-78.77	-79.06	-60
62.5 kHz	25 kHz	-82.75	-83.19	-65
87.5 kHz	25 kHz	-82.62	-83.74	-65
150 kHz	100 kHz	-78.87	-78.95	-65
250 kHz	100 kHz	-83.43	-83.58	-65
350 kHz	100 kHz	-86.39	-86.45	-65
>400 kHz to 12 MHz	30 kHz (swept)	-90		-75
12 MHz to paired receive band	30 kHz (swept)	-108		-75
In the paired receive band	30 kHz (swept)	-110		-100

Analogue

Tx FREQUENCY: 769.075 MHz 30 W 25 kHz Channel Spacing

Frequency Offset	Measurement Bandwidth	ACP Measured Lower (dBc)	ACP Measured Upper (dBc)	Maximum ACP(dBc)
15.625 kHz	6.25 kHz	-61.73	-61.55	-40
21.875 kHz	6.25 kHz	-75.42	-75.62	-60
37.5 kHz	25 kHz	-77.9	-78.34	-60
62.5 kHz	25 kHz	-82.32	-82.88	-65
87.5 kHz	25 kHz	-82.1	-83.5	-65
150 kHz	100 kHz	-78.54	-78.77	-65
250 kHz	100 kHz	-83.36	-83.61	-65
350 kHz	100 kHz	-86.09	-86.35	-65
>400 kHz to 12 MHz	30 kHz (swept)	-90		-75
12 MHz to paired receive band	30 kHz (swept)	-104		-75
In the paired receive band	30 kHz (swept)	-110		-100

Analogue

Tx FREQUENCY: 774.9 MHz 30 W 25 kHz Channel Spacing

Frequency Offset	Measurement Bandwidth	ACP Measured Lower (dBc)	ACP Measured Upper (dBc)	Maximum ACP (dBc)
15.625 kHz	6.25 kHz	-61.87	-61.64	-40
21.875 kHz	6.25 kHz	-75.5	-75.44	-60
37.5 kHz	25 kHz	-77.73	-78.04	-60
62.5 kHz	25 kHz	-81.7	-82.17	-65
87.5 kHz	25 kHz	-81.72	-82.7	-65
150 kHz	100 kHz	-78.55	-78.75	-65
250 kHz	100 kHz	-83.23	-83.41	-65
350 kHz	100 kHz	-85.8	-86.1	-65
>400 kHz to 12 MHz	30 kHz (swept)	-90		-75
12 MHz to paired receive band	30 kHz (swept)	-103		-75
In the paired receive band	30 kHz (swept)	-109		-100

Analogue

Tx FREQUENCY: 799.075 MHz 30 W 25 kHz Channel Spacing

Frequency Offset	Measurement Bandwidth	ACP Measured Lower (dBc)	ACP Measured Upper (dBc)	Maximum ACP (dBc)
15.625 kHz	6.25 kHz	-61.7	-61.53	-40
21.875 kHz	6.25 kHz	-75.46	-75.69	-60
37.5 kHz	25 kHz	-78.32	-78.68	-60
62.5 kHz	25 kHz	-82.84	-83.3	-65
87.5 kHz	25 kHz	-82.06	-83.48	-65
150 kHz	100 kHz	-78.79	-78.98	-65
250 kHz	100 kHz	-83.53	-83.58	-65
350 kHz	100 kHz	-86.32	-86.47	-65
>400 kHz to 12 MHz	30 kHz (swept)	-89		-75
12 MHz to paired receive band	30 kHz (swept)	-107		-75
In the paired receive band	30 kHz (swept)	-108		-100

Analogue

Tx FREQUENCY: 804.9 MHz 30 W 25 kHz Channel Spacing

Frequency Offset	Measurement Bandwidth	ACP Measured Lower (dBc)	ACP Measured Upper (dBc)	Maximum ACP (dBc)
15.625 kHz	6.25 kHz	-62.2	-61.72	-40
21.875 kHz	6.25 kHz	-75.52	-75.42	-60
37.5 kHz	25 kHz	-78.22	-78.49	-60
62.5 kHz	25 kHz	-82.77	-83.21	-65
87.5 kHz	25 kHz	-83.02	-84	-65
150 kHz	100 kHz	-78.79	-78.93	-65
250 kHz	100 kHz	-83.43	-83.62	-65
350 kHz	100 kHz	-86.38	-86.37	-65
>400 kHz to 12 MHz	30 kHz (swept)	-90		-75
12 MHz to paired receive band	30 kHz (swept)	-108		-75
In the paired receive band	30 kHz (swept)	-108		-100



Spurious Emissions (Tx Conducted)

SPECIFICATION: FCC 47 CFR 2.1051

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12.5 kHz Channel Spacing                      762.025 MHz @ 30 W                      Emission Mask D

Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~

12.5 kHz Channel Spacing                      762.025 MHz @ 2 W                      Emission Mask D

Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~

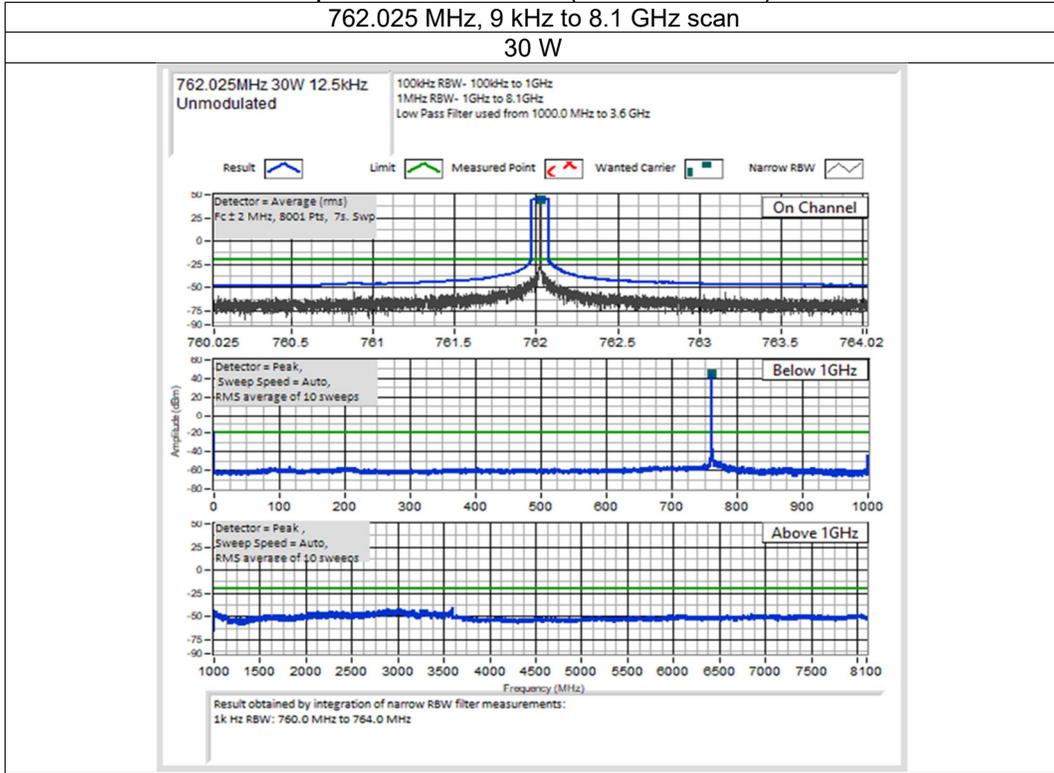
Measurement Uncertainty:	≤12.75 GHz    ± 3.0 dB	
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No emissions were detected at a level greater than 20 dB below the limit.		
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### Spurious Emissions (Tx Conducted)

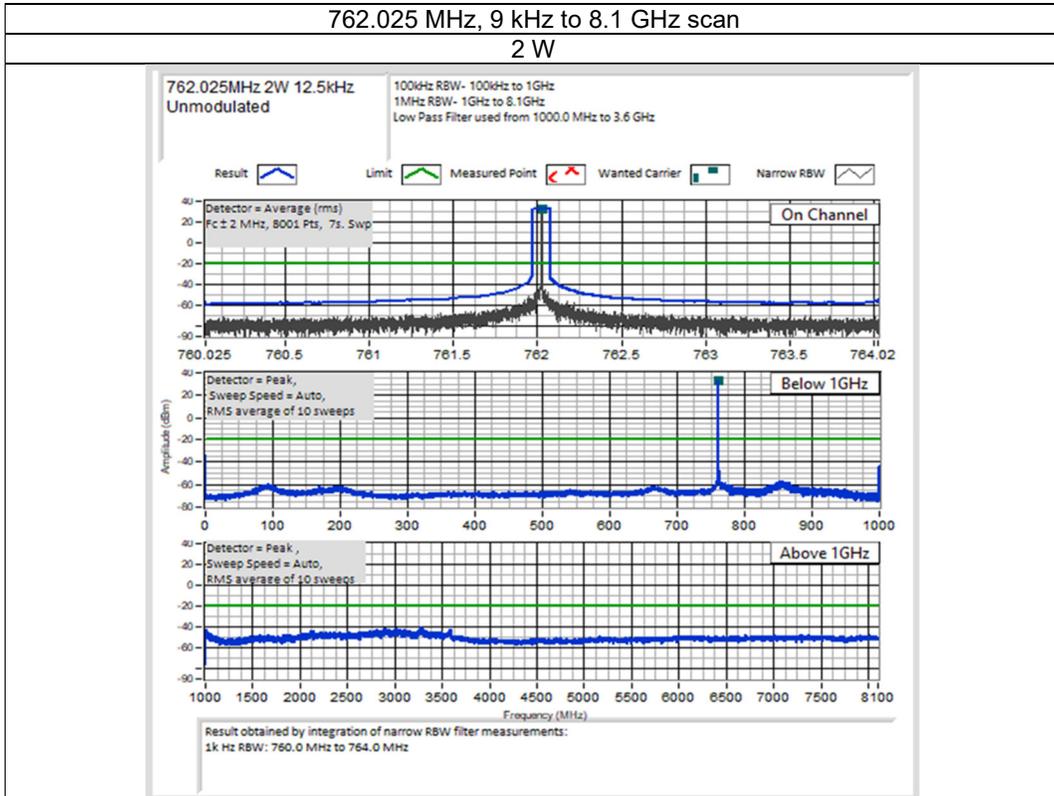
762.025 MHz, 9 kHz to 8.1 GHz scan

30 W



762.025 MHz, 9 kHz to 8.1 GHz scan

2 W



Spurious Emissions (Tx Conducted)

SPECIFICATION: FCC 47 CFR 2.1051

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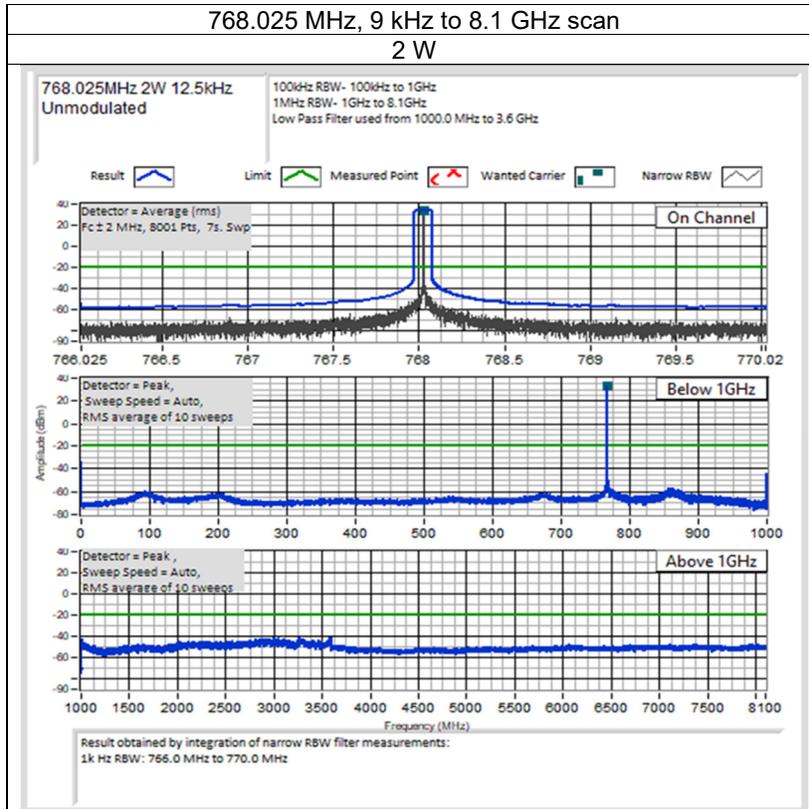
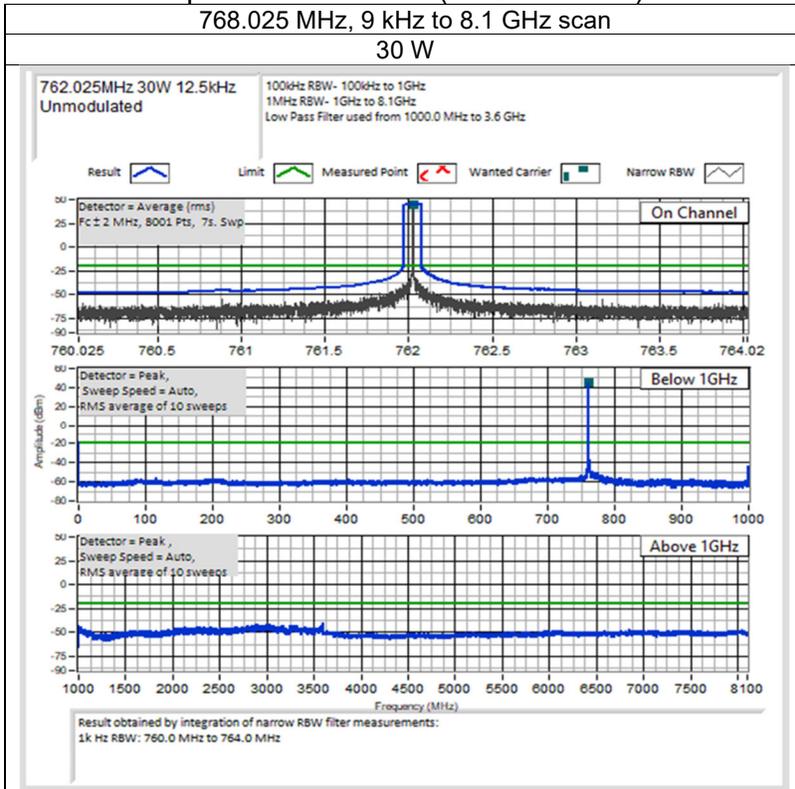
12.5 kHz Channel Spacing                      768.025 MHz @ 30 W                      Emission Mask D

Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~

12.5 kHz Channel Spacing                      768.025 MHz @ 2 W                      Emission Mask D

Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
Measurement Uncertainty:	≤12.75 GHz    ± 3.0 dB	
No emissions were detected at a level greater than 20 dB below the limit.		

### Spurious Emissions (Tx Conducted)



Spurious Emissions (Tx Conducted)

SPECIFICATION: FCC 47 CFR 2.1051

RSS-119 5.8

12.5 kHz Channel Spacing                      769.075 MHz @ 30 W                      Emission Mask D

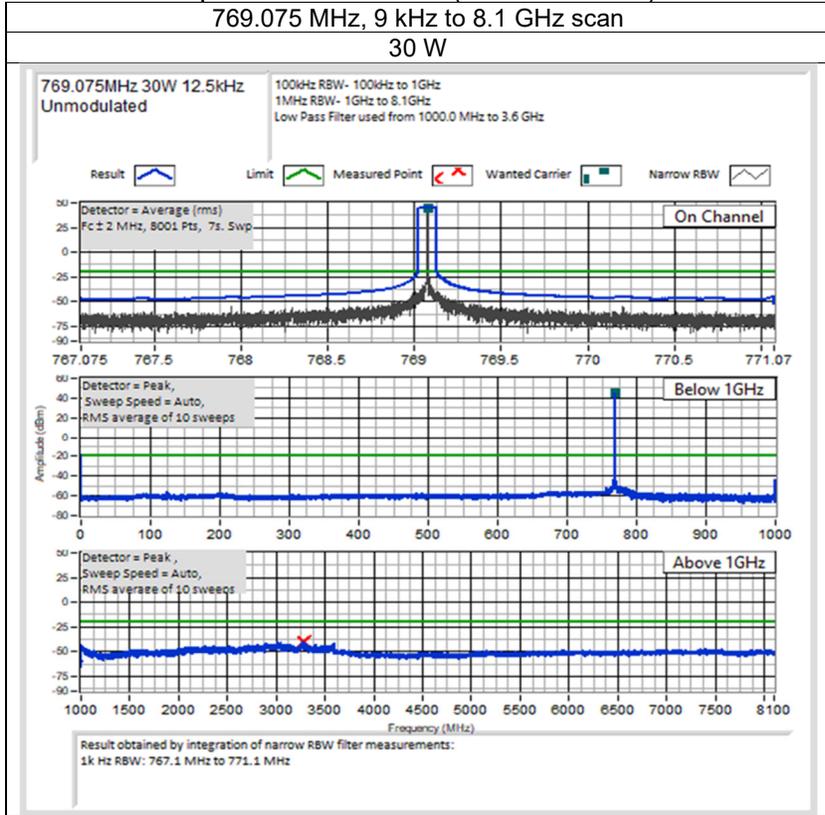
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
3282.578	-40	-84.77
~	~	~

12.5 kHz Channel Spacing                      769.075 MHz @ 2 W                      Emission Mask D

Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
Measurement Uncertainty:	≤12.75 GHz    ± 3.0 dB	
No other emissions were detected at a level greater than 20 dB below the limit.		

### Spurious Emissions (Tx Conducted)

769.075 MHz, 9 kHz to 8.1 GHz scan  
30 W



769.075 MHz, 9 kHz to 8.1 GHz scan  
2 W

