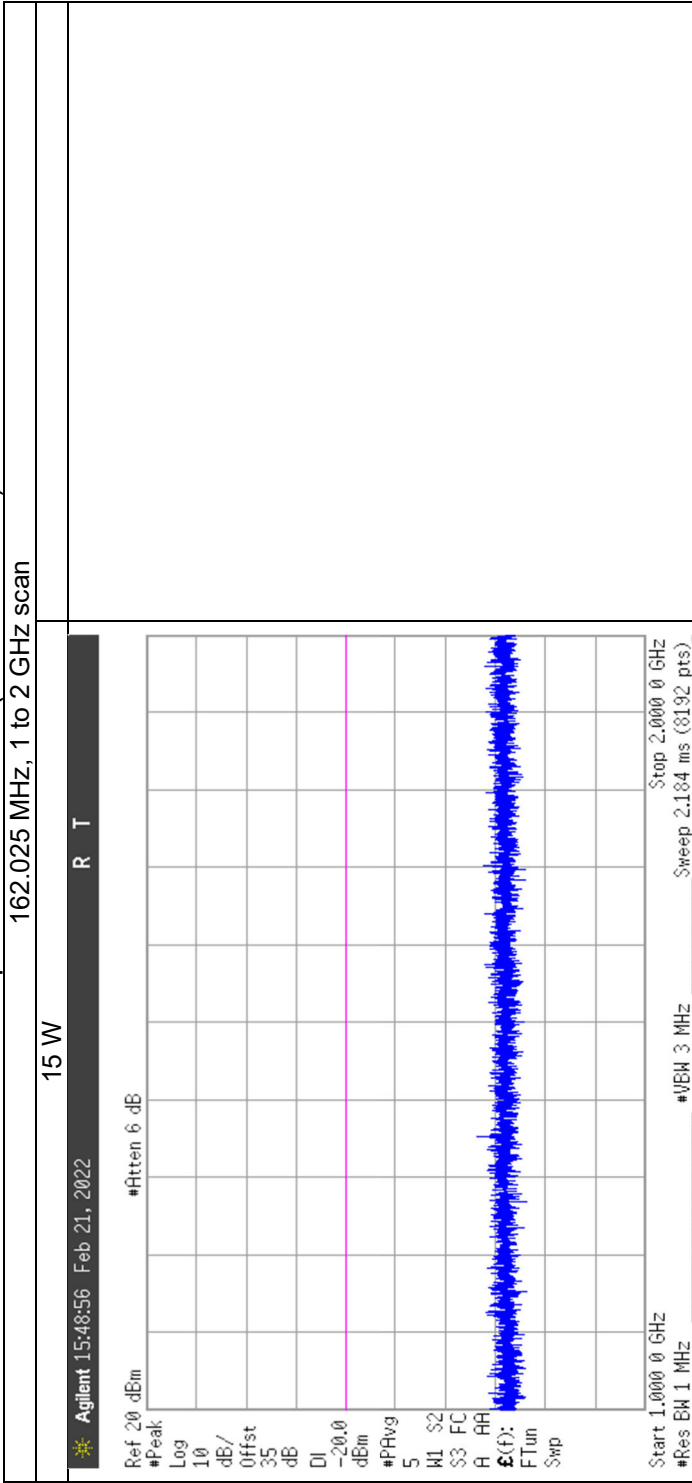


Spurious Emissions (Tx Conducted)



Spurious Emissions (Tx Conducted)

SPECIFICATION: FCC CFR 2.1051

RSS-119 5.8

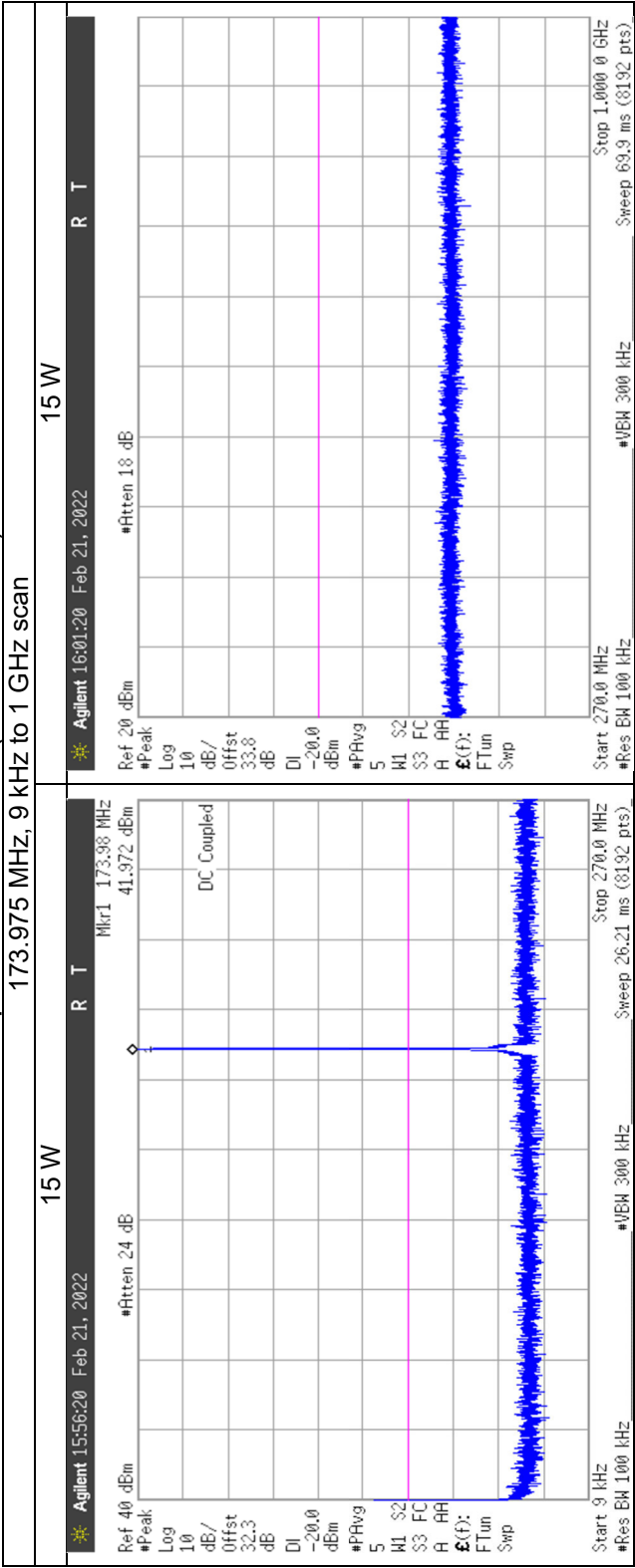
12.5 kHz Channel Spacing

173.975 MHz @ 15 W

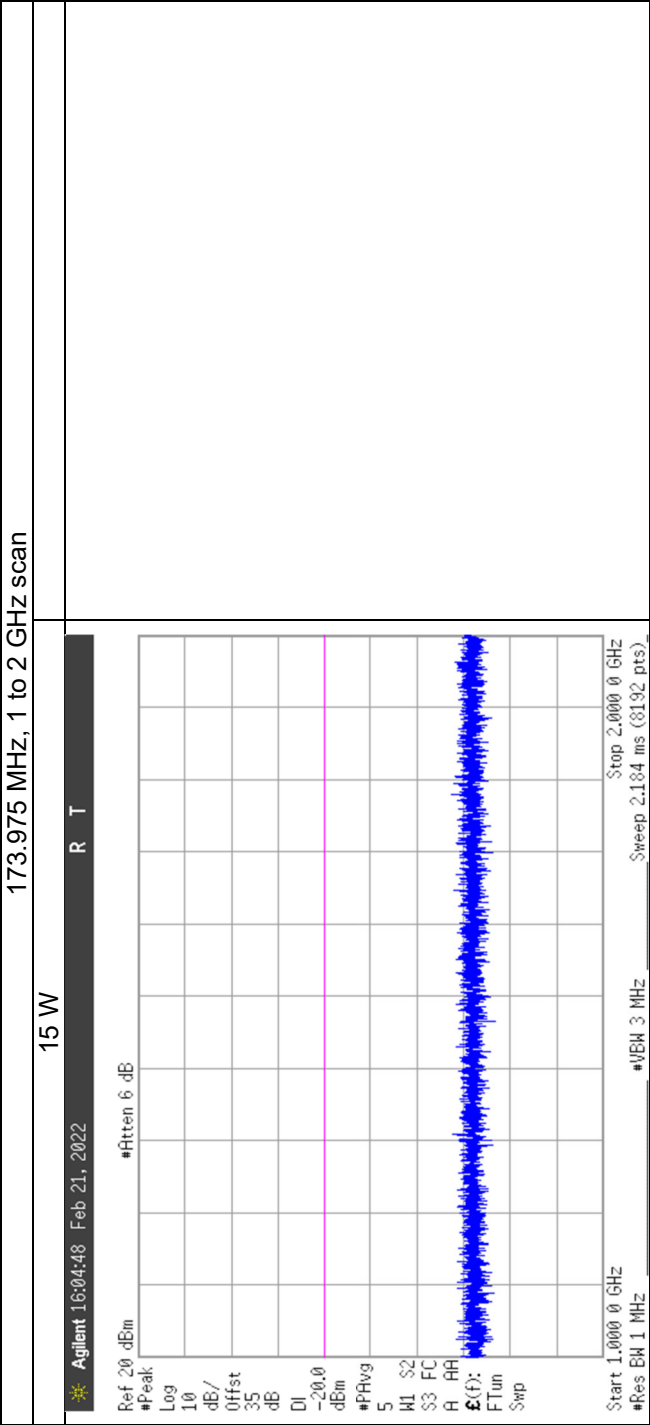
Emission Mask D

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)



Spurious Emissions (Tx Conducted)

SPECIFICATION: FCC CFR 2.1051 RSS-119 5.8

LIMITS: FCC 47 CFR 90.210 RSS-119 5.8

Carrier Output Power	Emission Mask D 12.5 kHz Channel Spacing $50 + 10 \log_{10} (P_{\text{Watts}})$	
	-20 dBm	-61.76 dBc
15 W		

TRANSMITTER SPURIOUS EMISSIONS (RADIATED)

SPECIFICATION: FCC 47 CFR 2.1053

GUIDE: TIA-102.CAAA-C 2.2.6

MEASUREMENT PROCEDURE:

Initial Scan:

1. The EUT is placed in the S-Line TEM cell and emissions are measured from 30 MHz to 800 MHz. Any emission within 20 dB of the limit is then re-tested on the OATS.
2. The EUT is placed in the reverberation chamber and emissions are measured from 800 MHz to the upper frequency required ($10 \times F_c$). Any emission within 20 dB of the limit is then re-tested on the OATS.
3. The harmonics emissions up to the 6th harmonic of the fundamental frequency are measured on the OATS

OATS Measurement:

1. The EUT is placed on a wooden turntable at a distance of three metres from the test antenna. The output terminal is connected to an RF dummy load.
2. The test antenna is raised from 1 m to 4 m to obtain a maximum reading; the turntable is then rotated through 360° to obtain the maximum response of each spurious emission. Valid emissions are determined by switching the EUT on and off.
3. The EUT is then replaced by a signal generator and substitution antenna to make measurements by the substitution method.

Measurement Date: 18 February 2022

MEASUREMENT RESULTS:

See the tables on the following pages

LIMIT CLAUSE: FCC 47 CFR 90.210

Spurious Emissions (Tx Radiated)

SPECIFICATION: FCC CFR 2.1053

12.5 kHz Channel Spacing

138.025 MHz @ 15 W

Emission Mask D

Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
Measurement Uncertainty	± 4.6 dB	
No emissions were detected at a level greater than 20 dB below the limit.		

12.5 kHz Channel Spacing

143.975 MHz @ 15 W

Emission Mask D

Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
Measurement Uncertainty	± 4.6 dB	
No emissions were detected at a level greater than 20 dB below the limit.		

12.5 kHz Channel Spacing

148.025 MHz @ 15 W

Emission Mask D

Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
Measurement Uncertainty	± 4.6 dB	
No emissions were detected at a level greater than 20 dB below the limit.		

12.5 kHz Channel Spacing

150.05 MHz @ 15 W

Emission Mask D

Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
Measurement Uncertainty	± 4.6 dB	
No emissions were detected at a level greater than 20 dB below the limit.		

Spurious Emissions (Tx Radiated)

SPECIFICATION: FCC CFR 2.1053

12.5 kHz Channel Spacing

162.025 MHz @ 15 W

Emission Mask D

Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
Measurement Uncertainty	± 4.6 dB	
No emissions were detected at a level greater than 20 dB below the limit.		

12.5 kHz Channel Spacing

173.975 MHz @ 15 W

Emission Mask D

Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
Measurement Uncertainty	± 4.6 dB	
No emissions were detected at a level greater than 20 dB below the limit.		

LIMITS: FCC CFR 2.1053

Carrier Output Power	Emission Mask D 12.5 kHz Channel Spacing $50 + 10 \log_{10} (P_{\text{Watts}})$	
15 W	-20 dBm	-61.76 dBc

Tx Radiated Emissions - Continued

Open Area Test Site Results:

12.5 kHz Channel Spacing

150.05 MHz @ 15 W

Emission Mask D

Harmonics Emission Frequency (MHz)	Level (dBm)	Level (dBc)
300.1	-55.98	-97.74
450.15	-41.28	-83.04
600.2	-60.11	-101.87
750.25	-70.35	-112.11
900.3	-73.93	-115.69
1050.35	-67.37	-109.13
Measurement Uncertainty	± 4.6 dB	

Sample Calculation	Measurement					Result	
	Reference	Substitution					
Emission Frequency (MHz)	Reference Level (dBm)	Sig-gen Level	Cable and Attenuator Gain	Antenna Gain (dBd)	Path and Boresight corrections	dBm	nW
300.1	-79.78	-41.55	-13.96	-0.39	-0.09	-55.98	2.523
		A	B	C	D	E	

Result (E) = A+B+C+D

Photo: OATS Setup



TRANSIENT FREQUENCY BEHAVIOR

SPECIFICATION: FCC 47 CFR 90.214

RSS-119 5.9

GUIDE: TIA/EIA-603E 2.2.19

MEASUREMENT PROCEDURE:

1. Refer Annex A for equipment set up.
2. Measurements and plots were made following the TIA procedure.

Measurement Date: 14 February 2022

MEASUREMENT RESULTS:

See the tables and plots on the following pages for 12.5 kHz channel spacing.

LIMIT CLAUSES: FCC 47 CFR 90.214

RSS-119 5.9

Transient Frequency Behaviour

SPECIFICATION: FCC 47 CFR 90.214

RSS-119 5.9

Tx FREQUENCY: 138.025 MHz

15 W

12.5 kHz Channel Spacing

TRANSIENT RESPONSE PERIOD	CARRIER PEAK VARIATION FROM NORMAL	
	Key ON (kHz)	Key OFF (kHz)
t1	-0.2	N/A
t2	-0.2	N/A
t3	N/A	3.0

Confirm that during periods t1 and t3 the frequency difference does not exceed the value of one channel separation.	YES	NO
	✓	☐
Confirm that during the period t2 the frequency difference does not exceed half a channel separation.	YES	NO
	✓	☐
Confirm that during the period t2 to t3 the frequency difference does not exceed the frequency error limit.	YES	NO
	✓	☐

Measurement Uncertainty: Frequency ± 130 Hz; Time $\pm 0.2\%$

LIMIT: FCC 47 CFR 90.214

TRANSIENT PERIODS	FREQUENCY RANGE	
	150 MHz – 174 MHz	421 MHz – 512 MHz
t1 (ms)	5 ms	10 ms
t2 (ms)	20 ms	25 ms
t3 (ms)	5 ms	10 ms

LIMIT: RSS-119 5.9

Transient Frequency Behaviour for Equipment Designed to Operate on 12.5 kHz Channels			
TRANSIENT PERIODS	Maximum Frequency Difference	FREQUENCY RANGE	
		138 – 174 MHz	406.1 – 470 MHz
t1 (ms)	± 12.5 kHz	5 ms	10 ms
t2 (ms)	± 6.25 kHz	20 ms	25 ms
t3 (ms)	± 12.5 kHz	5 ms	10 ms

Note: RSS-119 5.9 - If the transmitter carrier output power rating is 6 Watts or less, the frequency difference during the time periods t1 and t3 may exceed the maximum frequency difference for these time periods.

Transient Frequency Behaviour

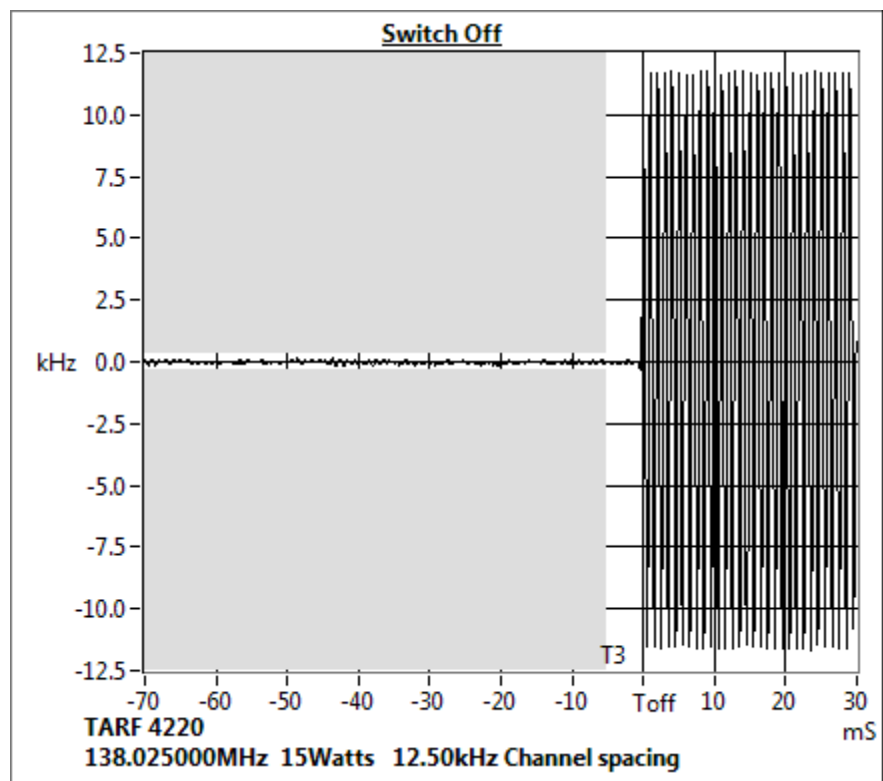
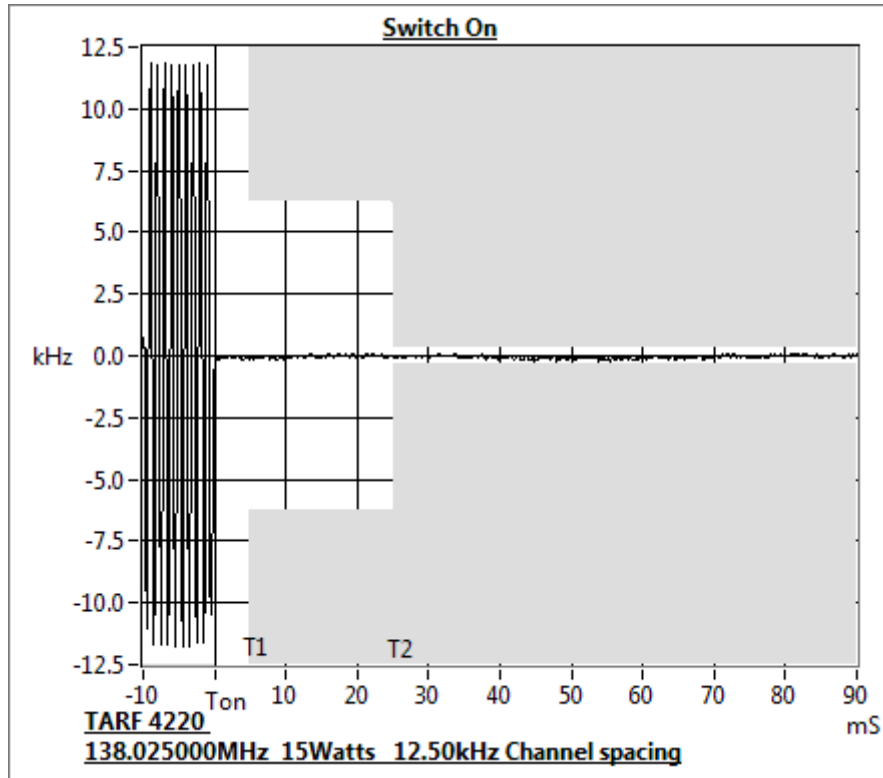
SPECIFICATION: FCC 47 CFR 90.214

RSS-119 5.9

Tx FREQUENCY: 138.025 MHz

15 W

12.5 kHz Channel Spacing



Transient Frequency Behaviour

SPECIFICATION: FCC 47 CFR 90.214

RSS-119 5.9

Tx FREQUENCY: 143.975 MHz

15 W

12.5 kHz Channel Spacing

TRANSIENT RESPONSE PERIOD	CARRIER PEAK VARIATION FROM NORMAL	
	Key ON (kHz)	Key OFF (kHz)
t1	0.2	N/A
t2	-0.1	N/A
t3	N/A	0.7

Confirm that during periods t1 and t3 the frequency difference does not exceed the value of one channel separation.	YES	NO
	✓	☐
Confirm that during the period t2 the frequency difference does not exceed half a channel separation.	YES	NO
	✓	☐
Confirm that during the period t2 to t3 the frequency difference does not exceed the frequency error limit.	YES	NO
	✓	☐

Measurement Uncertainty: Frequency ± 130 Hz; Time $\pm 0.2\%$

LIMIT: FCC 47 CFR 90.214

TRANSIENT PERIODS	FREQUENCY RANGE	
	150 MHz – 174 MHz	421 MHz – 512 MHz
t1 (ms)	5 ms	10 ms
t2 (ms)	20 ms	25 ms
t3 (ms)	5 ms	10 ms

LIMIT: RSS-119 5.9

Transient Frequency Behaviour for Equipment Designed to Operate on 12.5 kHz Channels			
TRANSIENT PERIODS	Maximum Frequency Difference	FREQUENCY RANGE	
		138 – 174 MHz	406.1 – 470 MHz
t1 (ms)	± 12.5 kHz	5 ms	10 ms
t2 (ms)	± 6.25 kHz	20 ms	25 ms
t3 (ms)	± 12.5 kHz	5 ms	10 ms

Note: RSS-119 5.9 - If the transmitter carrier output power rating is 6 Watts or less, the frequency difference during the time periods t1 and t3 may exceed the maximum frequency difference for these time periods,

Transient Frequency Behaviour

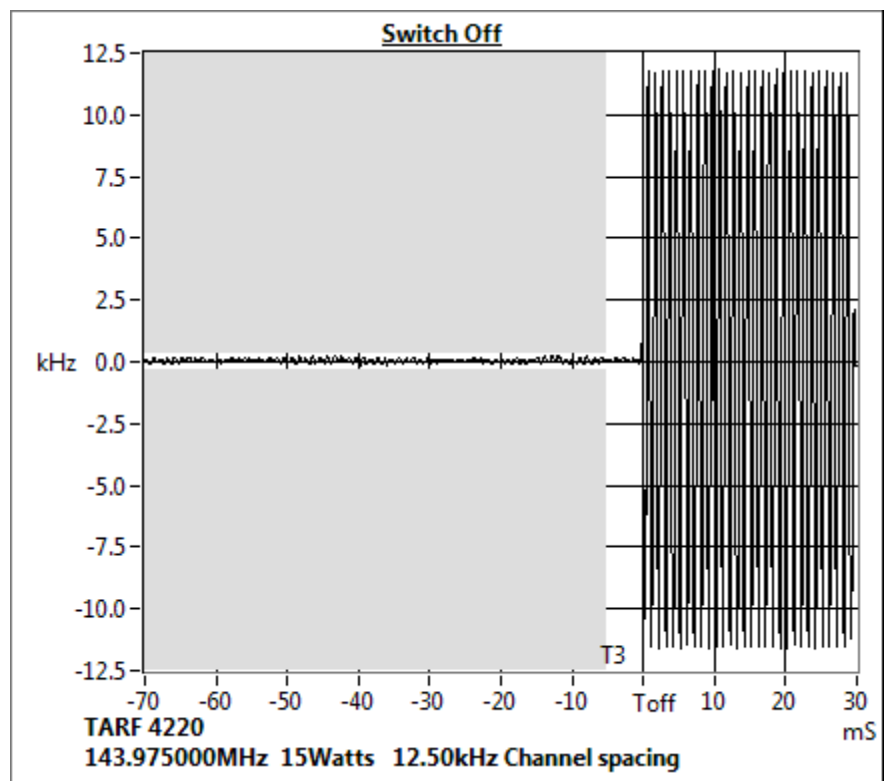
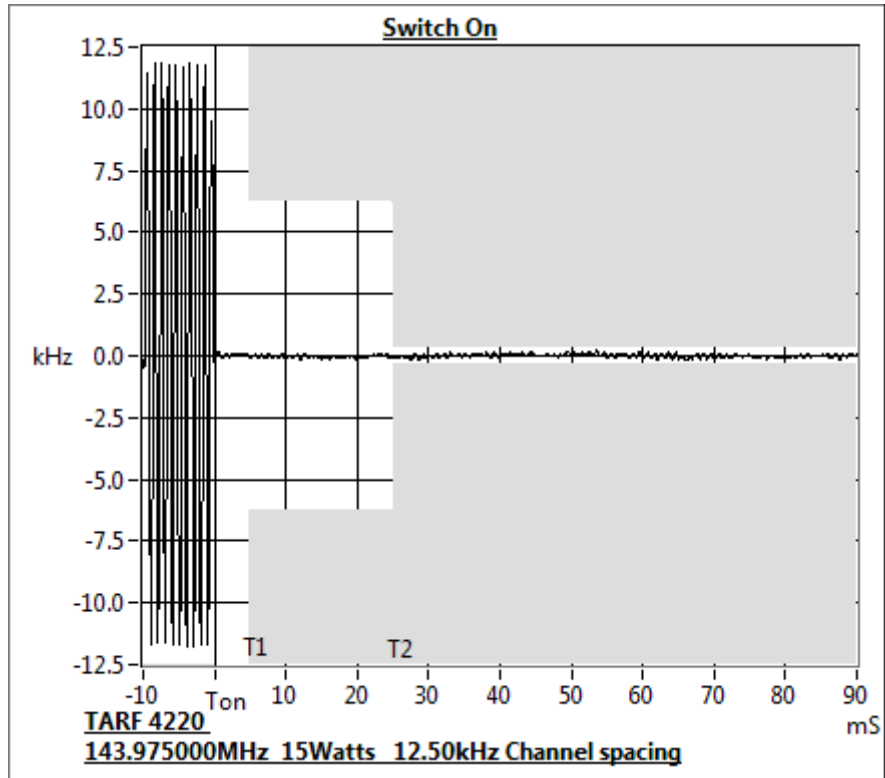
SPECIFICATION: FCC 47 CFR 90.214

RSS-119 5.9

Tx FREQUENCY: 143.975 MHz

15 W

12.5 kHz Channel Spacing



Transient Frequency Behaviour

SPECIFICATION: FCC 47 CFR 90.214

RSS-119 5.9

Tx FREQUENCY: 148.025 MHz

15 W

12.5 kHz Channel Spacing

TRANSIENT RESPONSE PERIOD	CARRIER PEAK VARIATION FROM NORMAL	
	Key ON (kHz)	Key OFF (kHz)
t1	0.3	N/A
t2	0.2	N/A
t3	N/A	3.6

Confirm that during periods t1 and t3 the frequency difference does not exceed the value of one channel separation.	YES	NO
	✓	☐
Confirm that during the period t2 the frequency difference does not exceed half a channel separation.	YES	NO
	✓	☐
Confirm that during the period t2 to t3 the frequency difference does not exceed the frequency error limit.	YES	NO
	✓	☐

Measurement Uncertainty: Frequency $\pm$ 130 Hz; Time $\pm$ 0.2%

LIMIT: FCC 47 CFR 90.214

TRANSIENT PERIODS	FREQUENCY RANGE	
	150 MHz – 174 MHz	421 MHz – 512 MHz
t1 (ms)	5 ms	10 ms
t2 (ms)	20 ms	25 ms
t3 (ms)	5 ms	10 ms

LIMIT: RSS-119 5.9

Transient Frequency Behaviour for Equipment Designed to Operate on 12.5 kHz Channels			
TRANSIENT PERIODS	Maximum Frequency Difference	FREQUENCY RANGE	
		138 – 174 MHz	406.1 – 470 MHz
t1 (ms)	$\pm$ 12.5 kHz	5 ms	10 ms
t2 (ms)	$\pm$ 6.25 kHz	20 ms	25 ms
t3 (ms)	$\pm$ 12.5 kHz	5 ms	10 ms

Note: RSS-119 5.9 - If the transmitter carrier output power rating is 6 Watts or less, the frequency difference during the time periods t1 and t3 may exceed the maximum frequency difference for these time periods.

Transient Frequency Behaviour

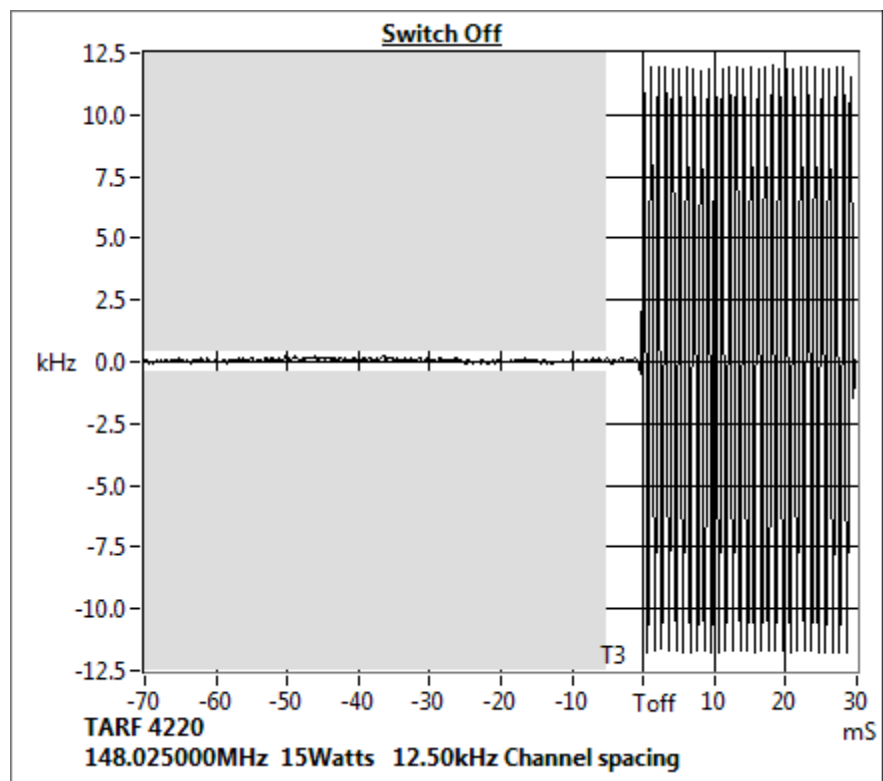
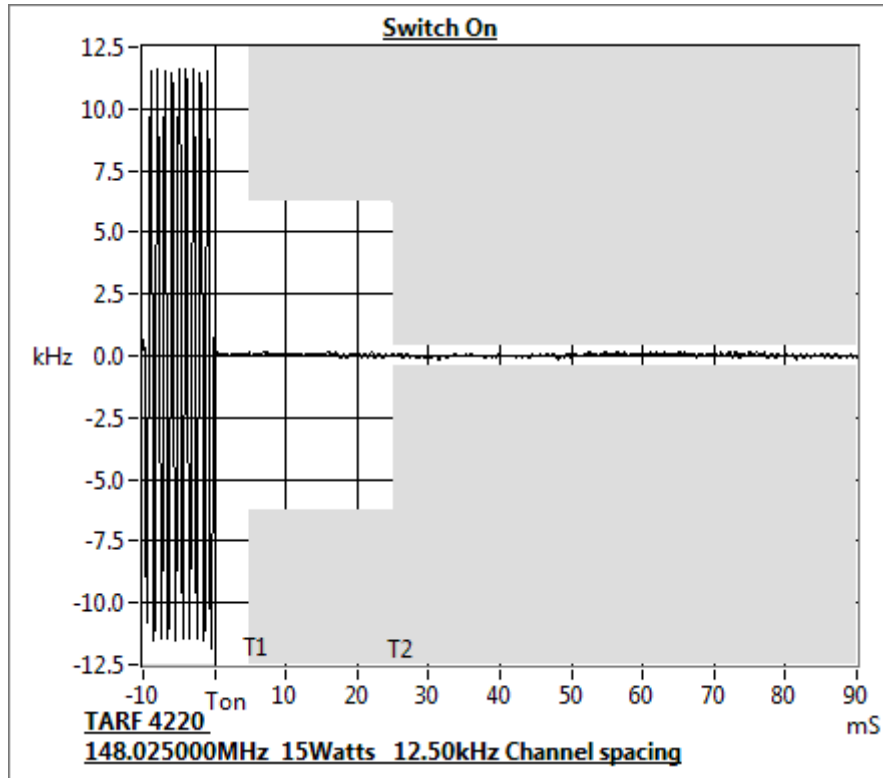
SPECIFICATION: FCC 47 CFR 90.214

RSS-119 5.9

Tx FREQUENCY: 148.025 MHz

15 W

12.5 kHz Channel Spacing



Transient Frequency Behaviour

SPECIFICATION: FCC 47 CFR 90.214

RSS-119 5.9

Tx FREQUENCY: 150.05 MHz

15 W

12.5 kHz Channel Spacing

TRANSIENT RESPONSE PERIOD	CARRIER PEAK VARIATION FROM NORMAL	
	Key ON (kHz)	Key OFF (kHz)
t1	-0.2	N/A
t2	0.3	N/A
t3	N/A	0.7

Confirm that during periods t1 and t3 the frequency difference does not exceed the value of one channel separation.	YES	NO
	✓	☐
Confirm that during the period t2 the frequency difference does not exceed half a channel separation.	YES	NO
	✓	☐
Confirm that during the period t2 to t3 the frequency difference does not exceed the frequency error limit.	YES	NO
	✓	☐

Measurement Uncertainty: Frequency ± 130 Hz; Time $\pm 0.2\%$

LIMIT: FCC 47 CFR 90.214

TRANSIENT PERIODS	FREQUENCY RANGE	
	150 MHz – 174 MHz	421 MHz – 512 MHz
t1 (ms)	5 ms	10 ms
t2 (ms)	20 ms	25 ms
t3 (ms)	5 ms	10 ms

LIMIT: RSS-119 5.9

Transient Frequency Behaviour for Equipment Designed to Operate on 12.5 kHz Channels			
TRANSIENT PERIODS	Maximum Frequency Difference	FREQUENCY RANGE	
		138 – 174 MHz	406.1 – 470 MHz
t1 (ms)	± 12.5 kHz	5 ms	10 ms
t2 (ms)	± 6.25 kHz	20 ms	25 ms
t3 (ms)	± 12.5 kHz	5 ms	10 ms

Note: RSS-119 5.9 - If the transmitter carrier output power rating is 6 Watts or less, the frequency difference during the time periods t1 and t3 may exceed the maximum frequency difference for these time periods,

Transient Frequency Behaviour

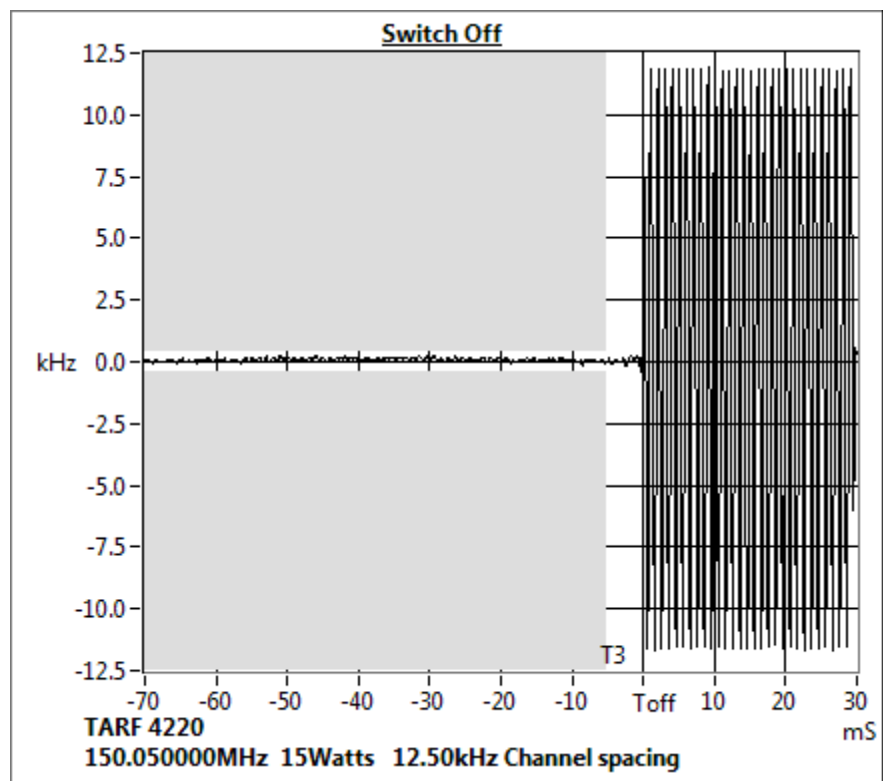
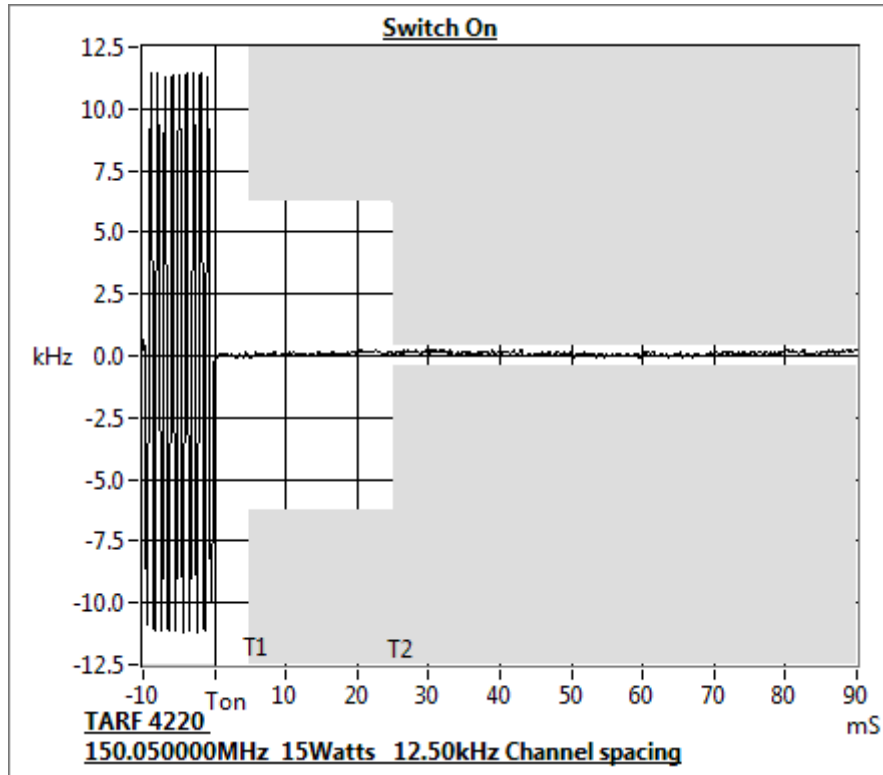
SPECIFICATION: FCC 47 CFR 90.214

RSS-119 5.9

Tx FREQUENCY: 150.05 MHz

15 W

12.5 kHz Channel Spacing



Transient Frequency Behaviour

SPECIFICATION: FCC 47 CFR 90.214

RSS-119 5.9

Tx FREQUENCY: 162.025 MHz

15 W

12.5 kHz Channel Spacing

TRANSIENT RESPONSE PERIOD	CARRIER PEAK VARIATION FROM NORMAL	
	Key ON (kHz)	Key OFF (kHz)
t1	-0.9	N/A
t2	-0.2	N/A
t3	N/A	-6.0

Confirm that during periods t1 and t3 the frequency difference does not exceed the value of one channel separation.	YES	NO
	✓	☐
Confirm that during the period t2 the frequency difference does not exceed half a channel separation.	YES	NO
	✓	☐
Confirm that during the period t2 to t3 the frequency difference does not exceed the frequency error limit.	YES	NO
	✓	☐

Measurement Uncertainty: Frequency ± 130 Hz; Time $\pm 0.2\%$

LIMIT: FCC 47 CFR 90.214

TRANSIENT PERIODS	FREQUENCY RANGE	
	150 MHz – 174 MHz	421 MHz – 512 MHz
t1 (ms)	5 ms	10 ms
t2 (ms)	20 ms	25 ms
t3 (ms)	5 ms	10 ms

LIMIT: RSS-119 5.9

Transient Frequency Behaviour for Equipment Designed to Operate on 12.5 kHz Channels			
TRANSIENT PERIODS	Maximum Frequency Difference	FREQUENCY RANGE	
		138 – 174 MHz	406.1 – 470 MHz
t1 (ms)	± 12.5 kHz	5 ms	10 ms
t2 (ms)	± 6.25 kHz	20 ms	25 ms
t3 (ms)	± 12.5 kHz	5 ms	10 ms

Note: RSS-119 5.9 - If the transmitter carrier output power rating is 6 Watts or less, the frequency difference during the time periods t1 and t3 may exceed the maximum frequency difference for these time periods.

Transient Frequency Behaviour

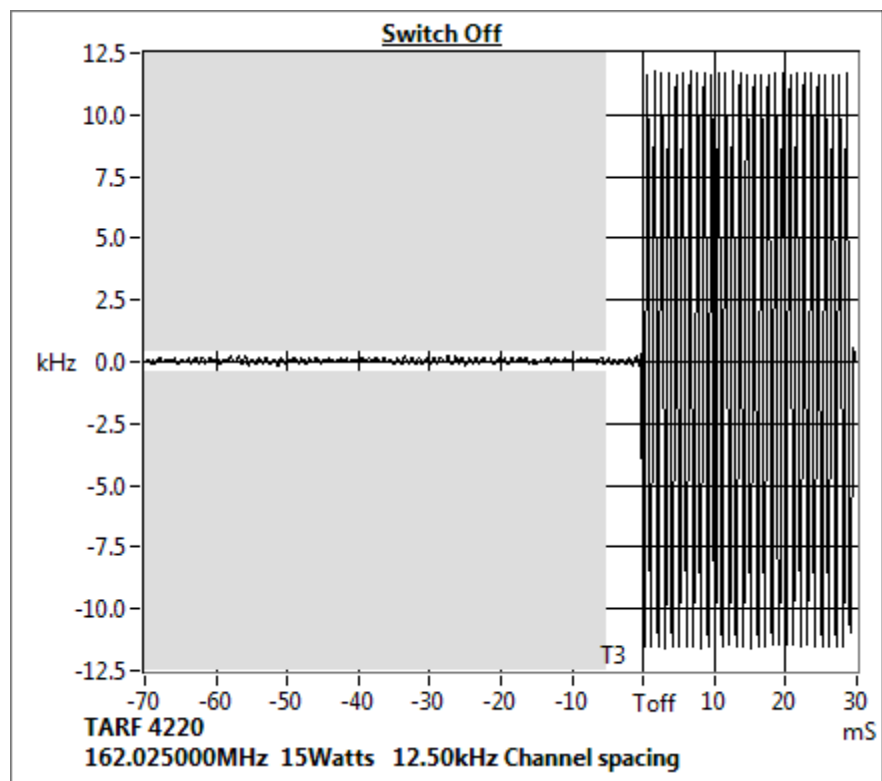
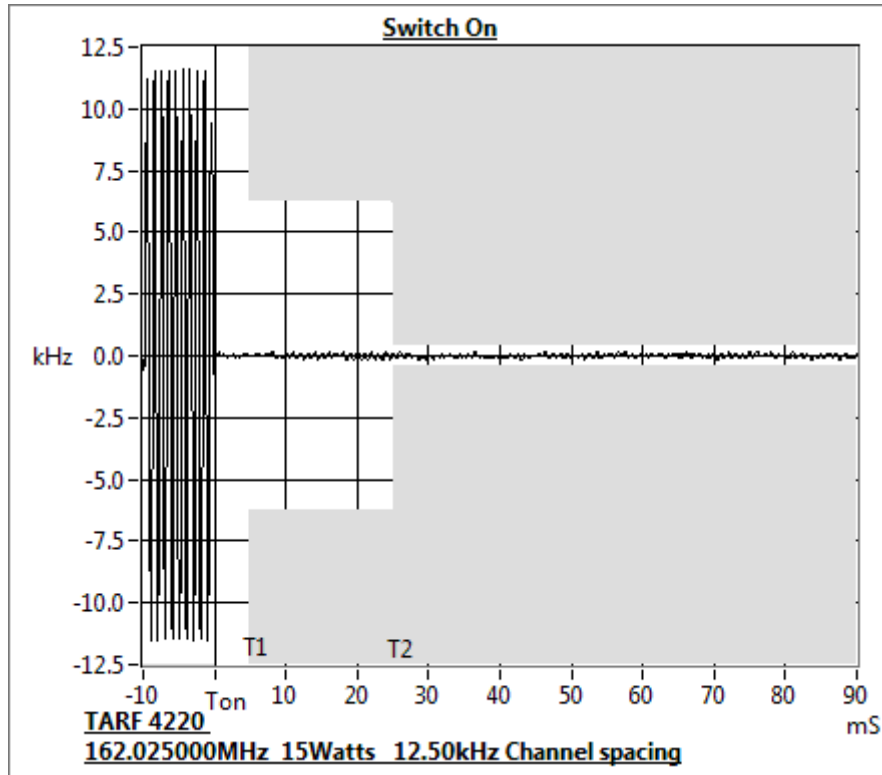
SPECIFICATION: FCC 47 CFR 90.214

RSS-119 5.9

Tx FREQUENCY: 162.025 MHz

15 W

12.5 kHz Channel Spacing



Transient Frequency Behaviour

SPECIFICATION: FCC 47 CFR 90.214

RSS-119 5.9

Tx FREQUENCY: 173.975 MHz

15 W

12.5 kHz Channel Spacing

TRANSIENT RESPONSE PERIOD	CARRIER PEAK VARIATION FROM NORMAL	
	Key ON (kHz)	Key OFF (kHz)
t1	0.3	N/A
t2	0.2	N/A
t3	N/A	2.6

Confirm that during periods t1 and t3 the frequency difference does not exceed the value of one channel separation.	YES	NO
	✓	☐
Confirm that during the period t2 the frequency difference does not exceed half a channel separation.	YES	NO
	✓	☐
Confirm that during the period t2 to t3 the frequency difference does not exceed the frequency error limit.	YES	NO
	✓	☐

Measurement Uncertainty: Frequency ± 130 Hz; Time $\pm 0.2\%$

LIMIT: FCC 47 CFR 90.214

TRANSIENT PERIODS	FREQUENCY RANGE	
	150 MHz – 174 MHz	421 MHz – 512 MHz
t1 (ms)	5 ms	10 ms
t2 (ms)	20 ms	25 ms
t3 (ms)	5 ms	10 ms

LIMIT: RSS-119 5.9

Transient Frequency Behaviour for Equipment Designed to Operate on 12.5 kHz Channels			
TRANSIENT PERIODS	Maximum Frequency Difference	FREQUENCY RANGE	
		138 – 174 MHz	406.1 – 470 MHz
t1 (ms)	± 12.5 kHz	5 ms	10 ms
t2 (ms)	± 6.25 kHz	20 ms	25 ms
t3 (ms)	± 12.5 kHz	5 ms	10 ms

Note: RSS-119 5.9 - If the transmitter carrier output power rating is 6 Watts or less, the frequency difference during the time periods t1 and t3 may exceed the maximum frequency difference for these time periods,

Transient Frequency Behaviour

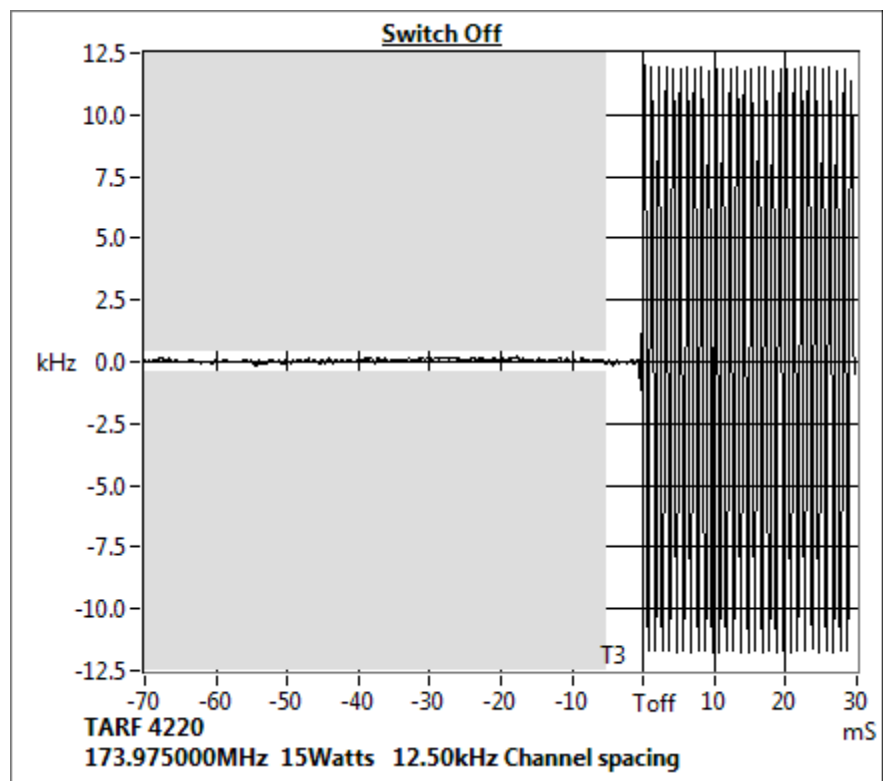
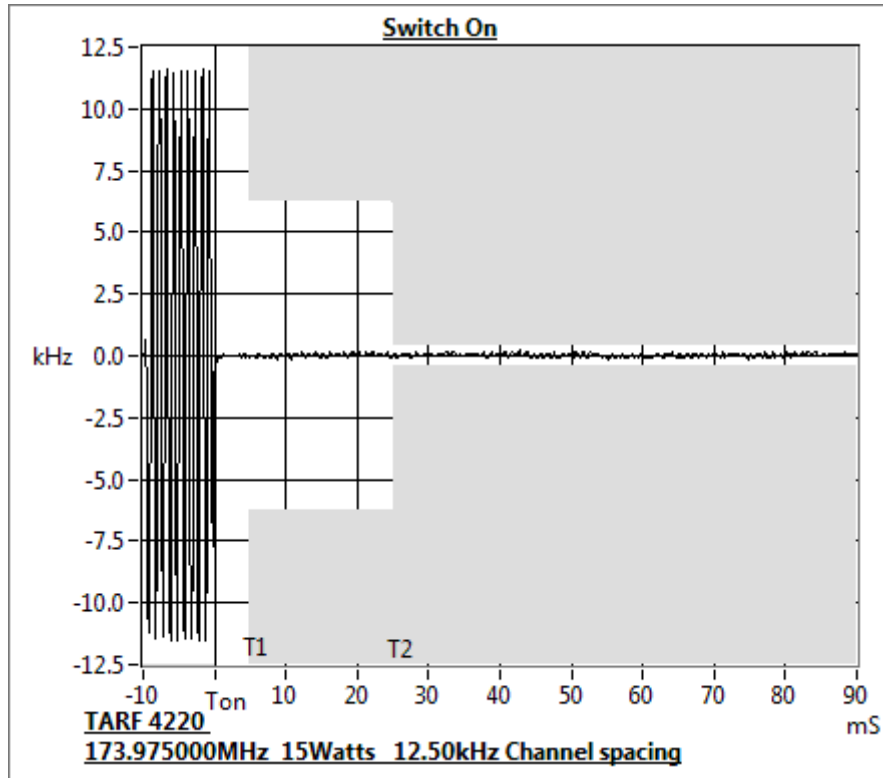
SPECIFICATION: FCC 47 CFR 90.214

RSS-119 5.9

Tx FREQUENCY: 173.975 MHz

15 W

12.5 kHz Channel Spacing



TRANSMITTER FREQUENCY STABILITY - TEMPERATURE

SPECIFICATION: FCC 47 CFR 2.1055 (a) (1)

RSS-119 5.3

GUIDE: ANSI C63.26 5.6.4

MEASUREMENT PROCEDURE:

1. Refer Annex A for equipment set up.
2. The EUT was tested for frequency error from -30°C to $+50^{\circ}\text{C}$ in 10°C increments
3. The frequency error was recorded in parts per million (ppm).

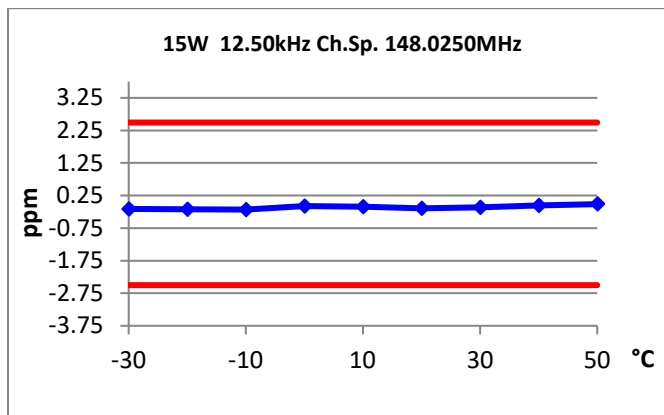
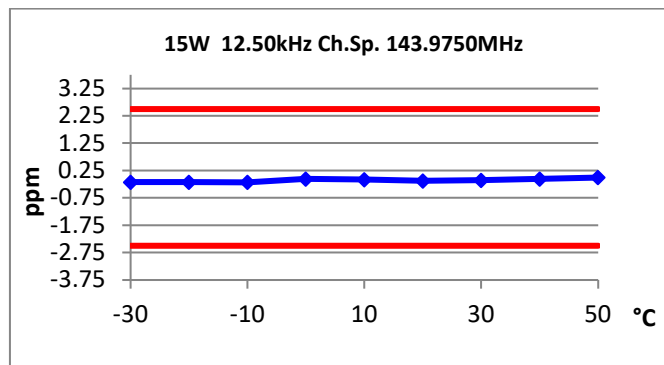
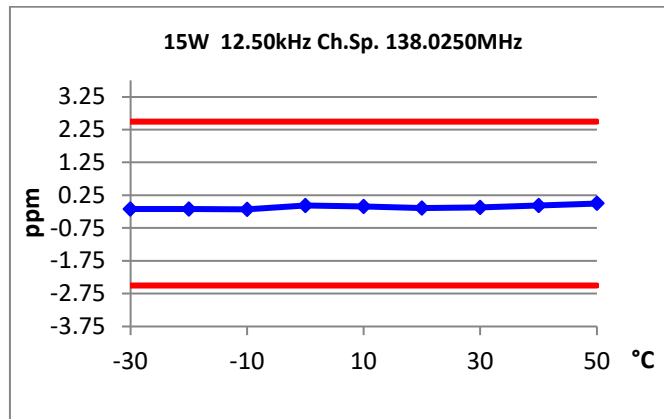
MEASUREMENT DATE: 29 January 2022

MEASUREMENT RESULTS:

See the plots on the following pages.

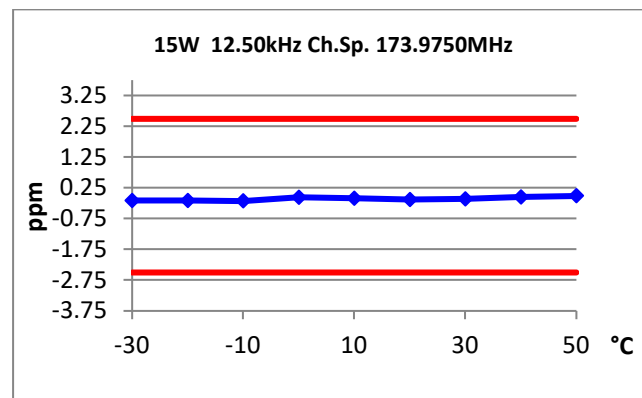
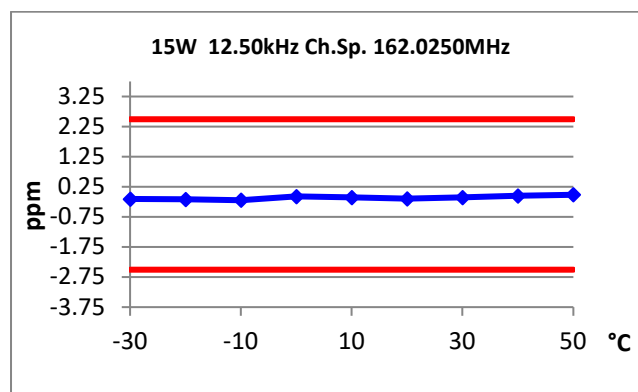
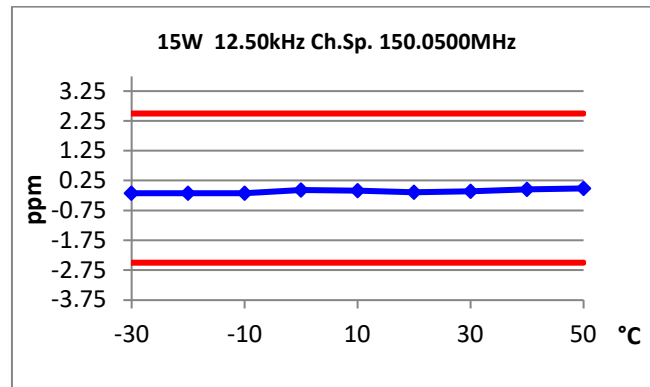
Temperature ($^{\circ}\text{C}$)	Error (ppm)					
	138.025 MHz	143.975 MHz	148.025 MHz	150.05 MHz	162.025 MHz	173.975 MHz
-30	-0.17	-0.17	-0.16	-0.17	-0.16	-0.17
-20	-0.17	-0.17	-0.17	-0.17	-0.17	-0.17
-10	-0.18	-0.18	-0.18	-0.17	-0.19	-0.18
0	-0.06	-0.06	-0.07	-0.07	-0.07	-0.06
10	-0.09	-0.08	-0.09	-0.09	-0.1	-0.09
20	-0.14	-0.13	-0.14	-0.14	-0.14	-0.13
30	-0.12	-0.1	-0.11	-0.11	-0.1	-0.11
40	-0.06	-0.06	-0.05	-0.05	-0.05	-0.05
50	0	0	-0.01	-0.01	-0.01	-0.01
Measurement Uncertainty				$\pm 5 \times 10^{-8}$		

Transmitter Frequency Stability - Temperature



LIMIT:		FCC 47 CFR 90.213	RSS-119 5.3
		Channel Spacing (kHz)	Frequency Error (ppm)
		12.5	2.5

Transmitter Frequency Stability – Temperature



LIMIT:		FCC 47 CFR 90.213	RSS-119 5.3
		Channel Spacing (kHz)	Frequency Error (ppm)
		12.5	2.5

TRANSMITTER FREQUENCY STABILITY - VOLTAGE

SPECIFICATION: FCC 47 CFR 2.1055 (d) (1)

RSS-119 5.3

GUIDE: ANSI C63.26 5.6.5

MEASUREMENT DATE: 28 January 2022

MEASUREMENT PROCEDURE:

1. Refer Annex A for equipment set up.
2. The EUT was tested for frequency error at an input voltage to the radio of 85% to 115%.
3. The frequency error was recorded in parts per million (ppm).

MEASUREMENT RESULTS:

	FREQUENCY ERROR (ppm) for 12.5 kHz		
	12.8 V _{DC}	11.5 V _{DC}	14.5 V _{DC}
138.025 MHz	-0.09	-0.09	-0.09
143.975 MHz	-0.10	-0.08	-0.10
148.025 MHz	-0.09	-0.10	-0.09
150.05 MHz	-0.09	-0.09	-0.08
162.025 MHz	-0.10	-0.09	-0.10
173.975 MHz	-0.09	-0.10	-0.10
Measurement Uncertainty		$\pm 5 \times 10^{-8}$	

LIMIT CLAUSES: FCC 47 CFR 90.213

RSS-119 5.3

Channel Spacing (kHz)	Frequency Error (ppm)
12.5	2.5

RECEIVER SPURIOUS EMISSIONS (CONDUCTED)

SPECIFICATION: RSS-Gen 7.4

GUIDE: TIA-603-E 2.1.2 (analogue)
TIA-102-CAAA-C 2.1.2 (digital)

MEASUREMENT PROCEDURE:

1. Refer Annex A for Equipment set up diagram.
2. The frequency range examined was from 30 MHz to 3 times the highest tunable frequency.
3. Spurious emissions which were attenuated more than 20 dB below the limit were not recorded.
4. A scan is performed with a resolution bandwidth of 100 kHz and a video bandwidth of 300 kHz for frequencies up to 1 GHz, and a resolution bandwidth of 1 MHz and a video bandwidth of 3 MHz for frequencies above 1 GHz
5. For each frequency range the spectrum analyser was loaded with the appropriate calibration figures to compensate for the cables and attenuator losses allowing the emission levels to be read directly with no further calculation.

Spurious emissions which were attenuated by more than 20 dB below the limit were not recorded.

Example of attenuation correction:

E4364 10dB 50W BC3293	9.7	
E5015 3m Blue 503429	0.9	
Total Attenuation @ 1000MHz	10.6	Sum of component attenuation (a)
Amplitude offset	10.34	(b)
Correction @ 1000MHz	0.26	(a-b)

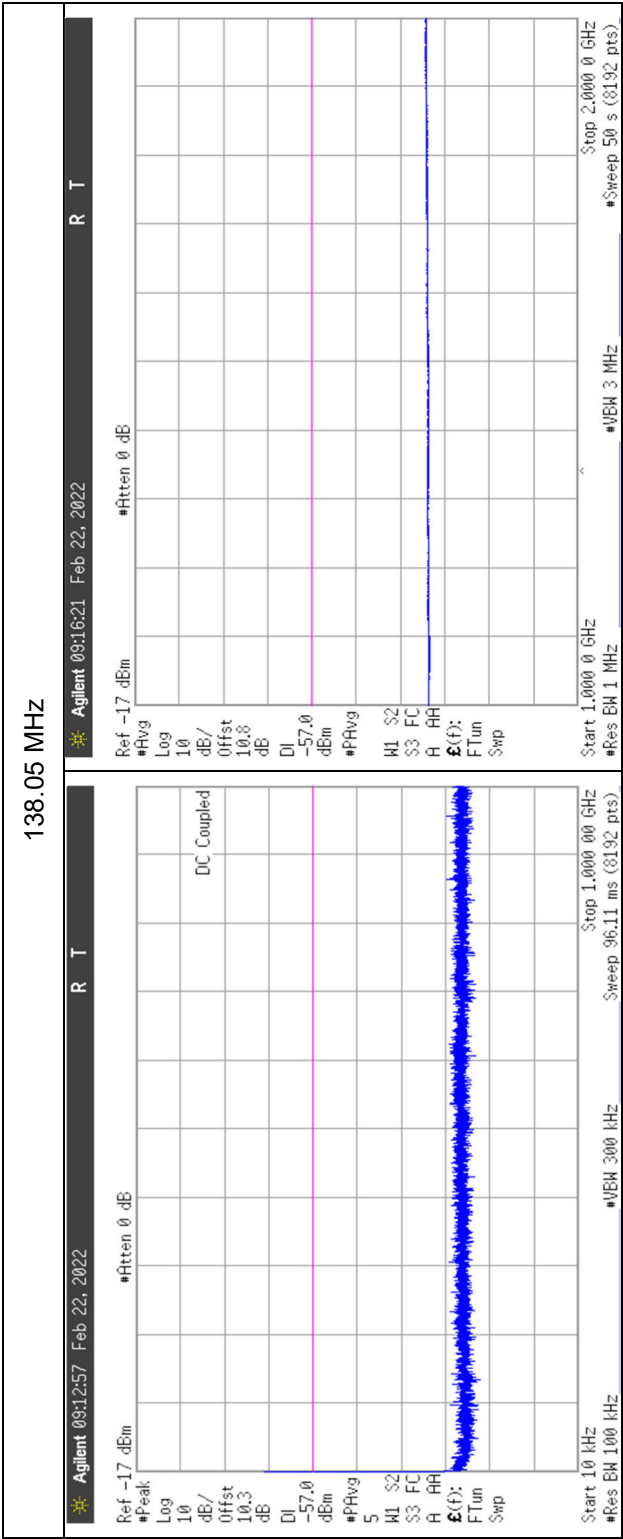
MEASUREMENT DATE: 22 February 2022

LIMIT CLAUSE: RSS-Gen 7.4

LIMIT	30 → 1000 MHz	2 nW	- 57 dBm
	> 1000 MHz	5 nW	- 53 dBm

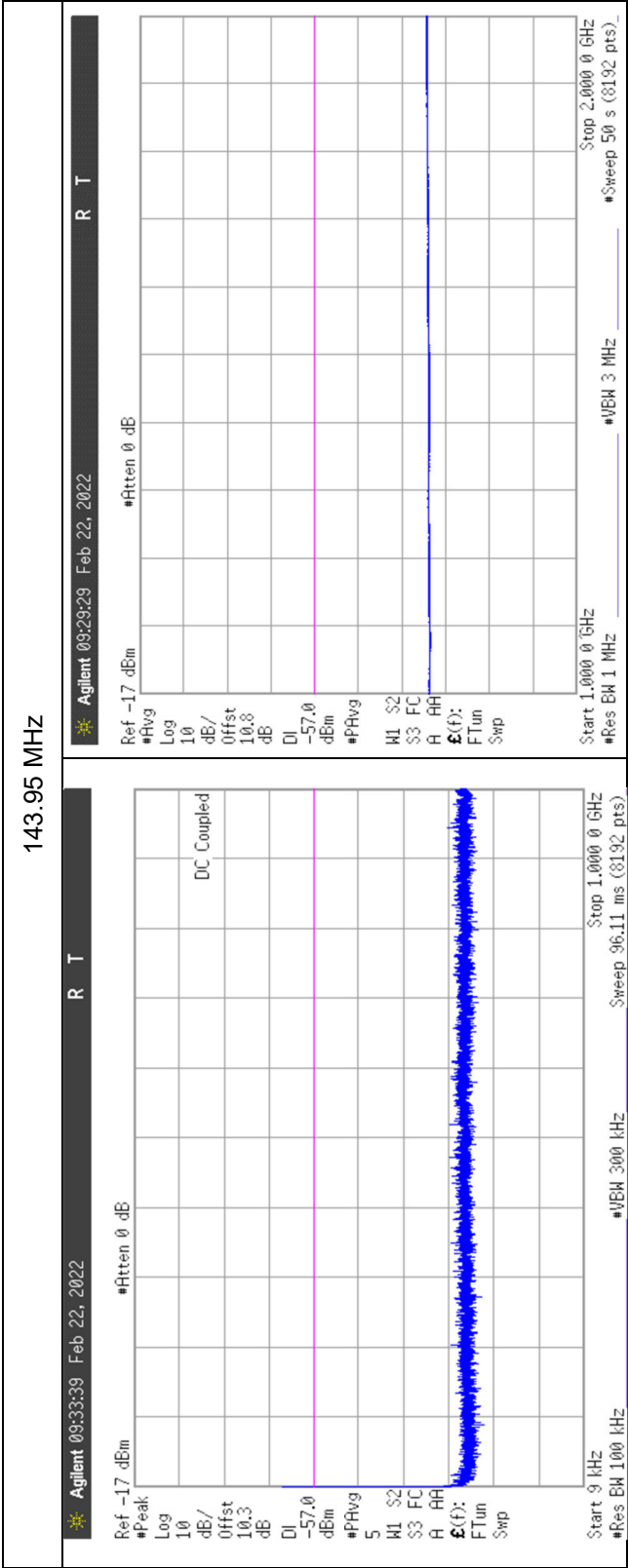
Receiver Spurious Emissions (Conducted) – Continued

138.05 MHz Receive (Receiver Input Port)		
Emission Frequency (MHz)	Level (nW)	Level (dBm)
~	~	~
Measurement Uncertainty	≤12.75 GHz ± 2.8 dB	
No emissions were detected within 20 dB of Limit.		



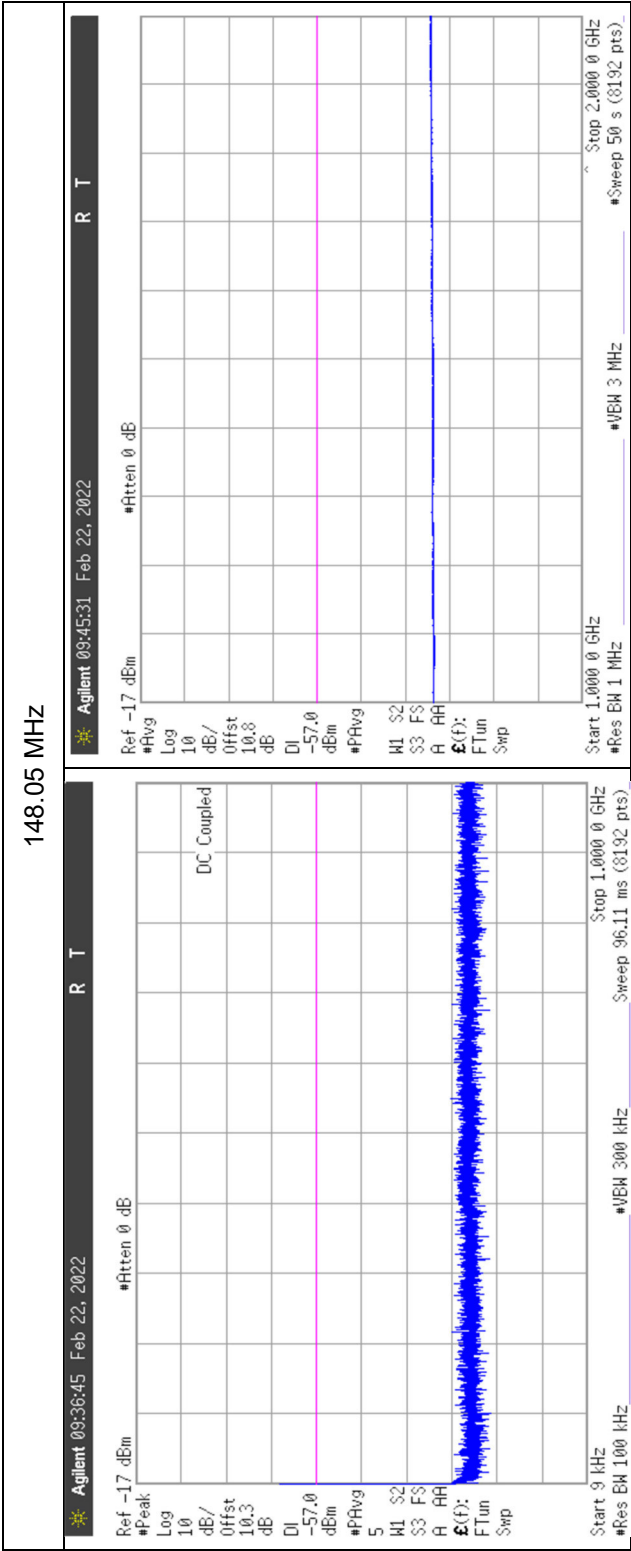
Receiver Spurious Emissions (Conducted) – Continued

143.95 MHz Receive (Receiver Input Port)		
Emission Frequency (MHz)	Level (nW)	Level (dBm)
~	~	~
Measurement Uncertainty	≤12.75 GHz ± 2.8 dB	
No emissions were detected within 20 dB of Limit.		



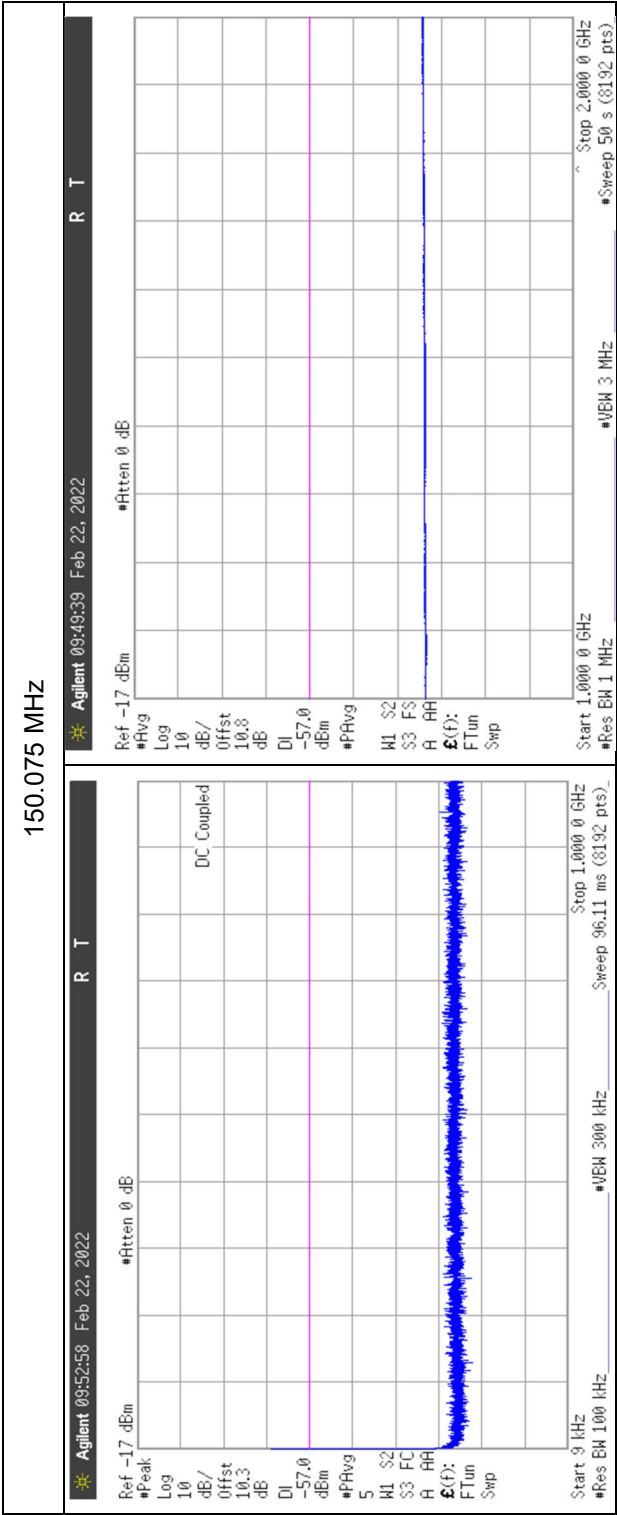
Receiver Spurious Emissions (Conducted) – Continued

148.05 MHz Receive (Receiver Input Port)		
Emission Frequency (MHz)	Level (nW)	Level (dBm)
~	~	~
Measurement Uncertainty	≤12.75 GHz ± 2.8 dB	
No emissions were detected within 20 dB of Limit.		



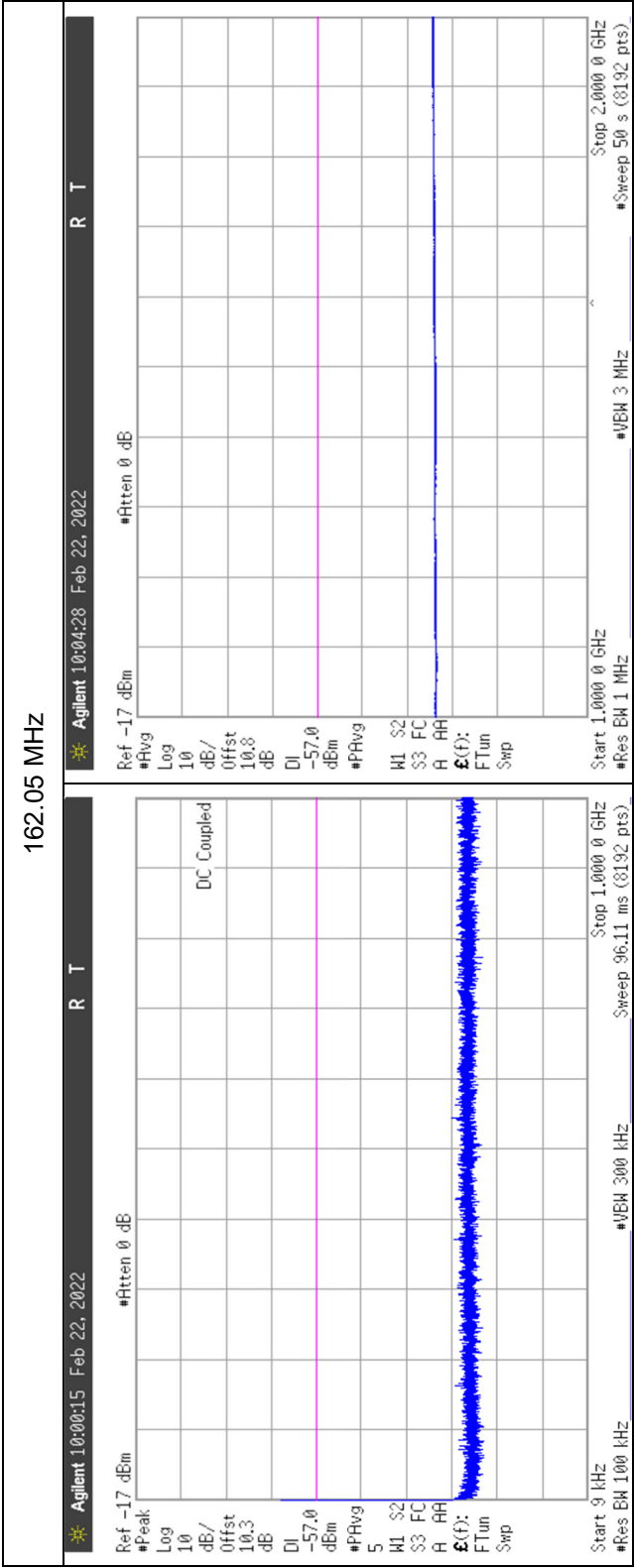
Receiver Spurious Emissions (Conducted) – Continued

150.075 MHz Receive (Receiver Input Port)		
Emission Frequency (MHz)	Level (nW)	Level (dBm)
~	~	~
Measurement Uncertainty	≤12.75 GHz ± 2.8 dB	
No emissions were detected within 20 dB of Limit.		



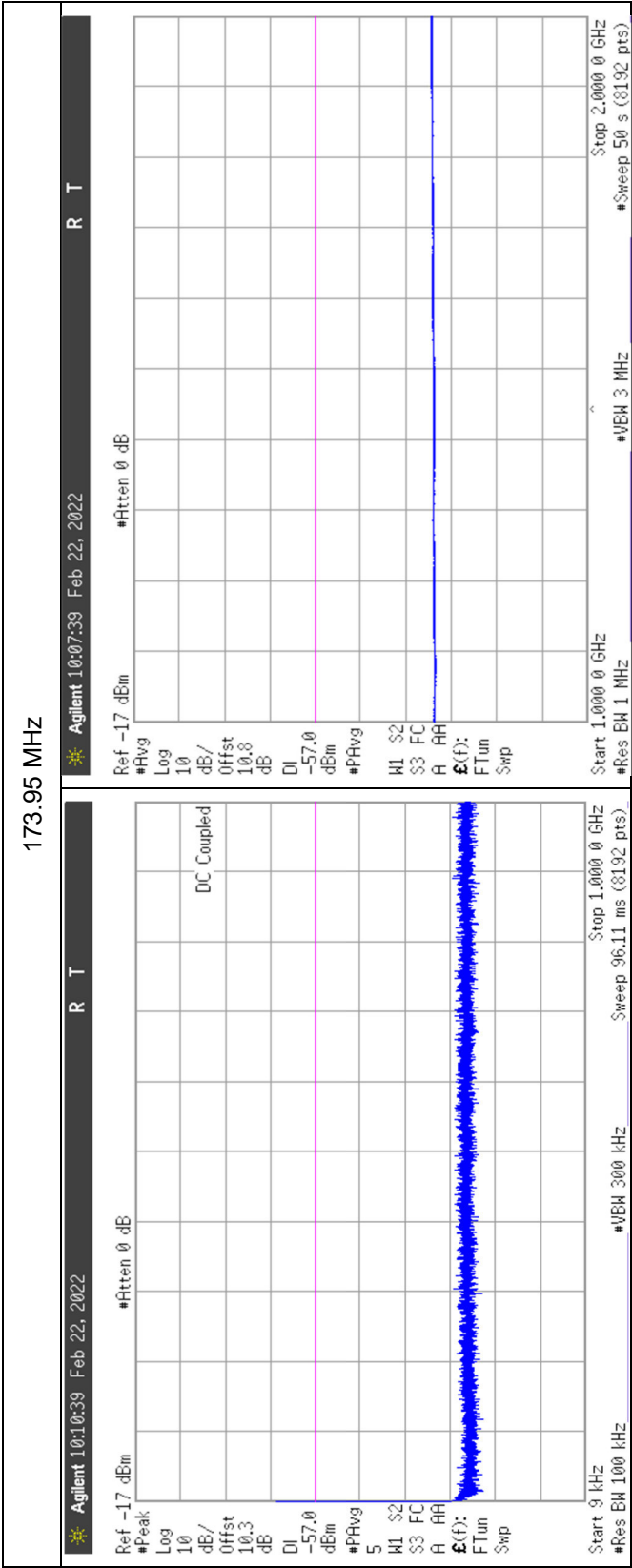
Receiver Spurious Emissions (Conducted) – Continued

162.05 MHz Receive (Receiver Input Port)		
Emission Frequency (MHz)	Level (nW)	Level (dBm)
~	~	~
Measurement Uncertainty	≤12.75 GHz ± 2.8 dB	
No emissions were detected within 20 dB of Limit.		



Receiver Spurious Emissions (Conducted) – Continued

173.95 MHz Receive (Receiver Input Port)		
Emission Frequency (MHz)	Level (nW)	Level (dBm)
~	~	~
Measurement Uncertainty	≤12.75 GHz ± 2.8 dB	
No emissions were detected within 20 dB of Limit.		



TRANSMITTER STANDBY SPURIOUS EMISSIONS (CONDUCTED)

SPECIFICATION: RSS-Gen 7.4

GUIDE: TIA-603-E 2.1.2 (analogue)
TIA-102-CAAA-C 2.1.2 (digital)

MEASUREMENT PROCEDURE:

1. Refer Annex A for Equipment set up diagram.
2. The frequency range examined was from 30 MHz to 3 times the highest tunable frequency.
3. Spurious emissions which were attenuated more than 20 dB below the limit were not recorded.
4. A scan is performed with a resolution bandwidth of 100 kHz and a video bandwidth of 300 kHz for frequencies up to 1 GHz, and a resolution bandwidth of 1 MHz and a video bandwidth of 3 MHz for frequencies above 1 GHz
5. For each frequency range the spectrum analyser was loaded with the appropriate calibration figures to compensate for the cables and attenuator losses allowing the emission levels to be read directly with no further calculation.

Spurious emissions which were attenuated by more than 20 dB below the limit were not recorded.

Example of attenuation correction:

E4364 10dB 50W BC3293	9.7	
E5015 3m Blue 503429	0.9	
Total Attenuation @1000 MHz	10.6	Sum of component attenuation (a)
Amplitude offset	10.34	(b)
Correction @ 1000MHz	0.26	(a-b)

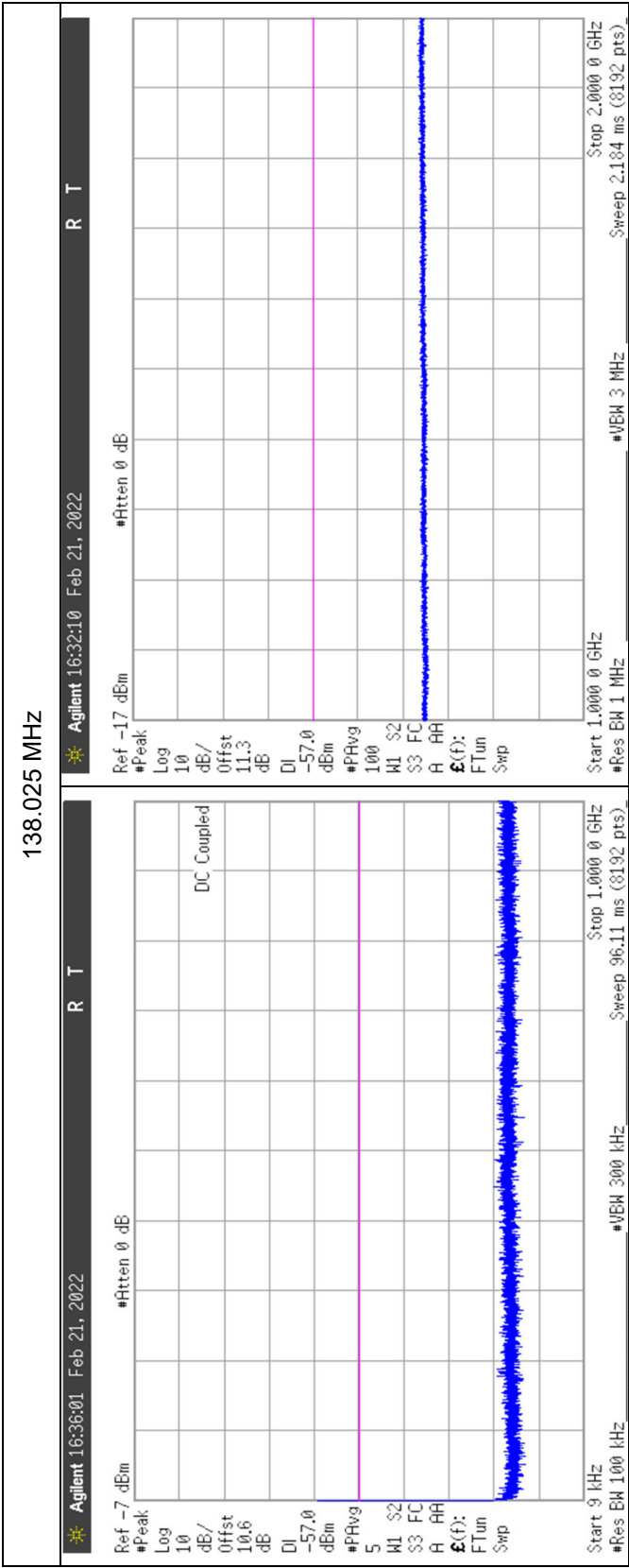
MEASUREMENT DATE: 21 & 22 February 2022

LIMIT CLAUSE: RSS-Gen 7.4

LIMIT	30 → 1000 MHz	2 nW	- 57 dBm
	> 1000 MHz	5 nW	- 53 dBm

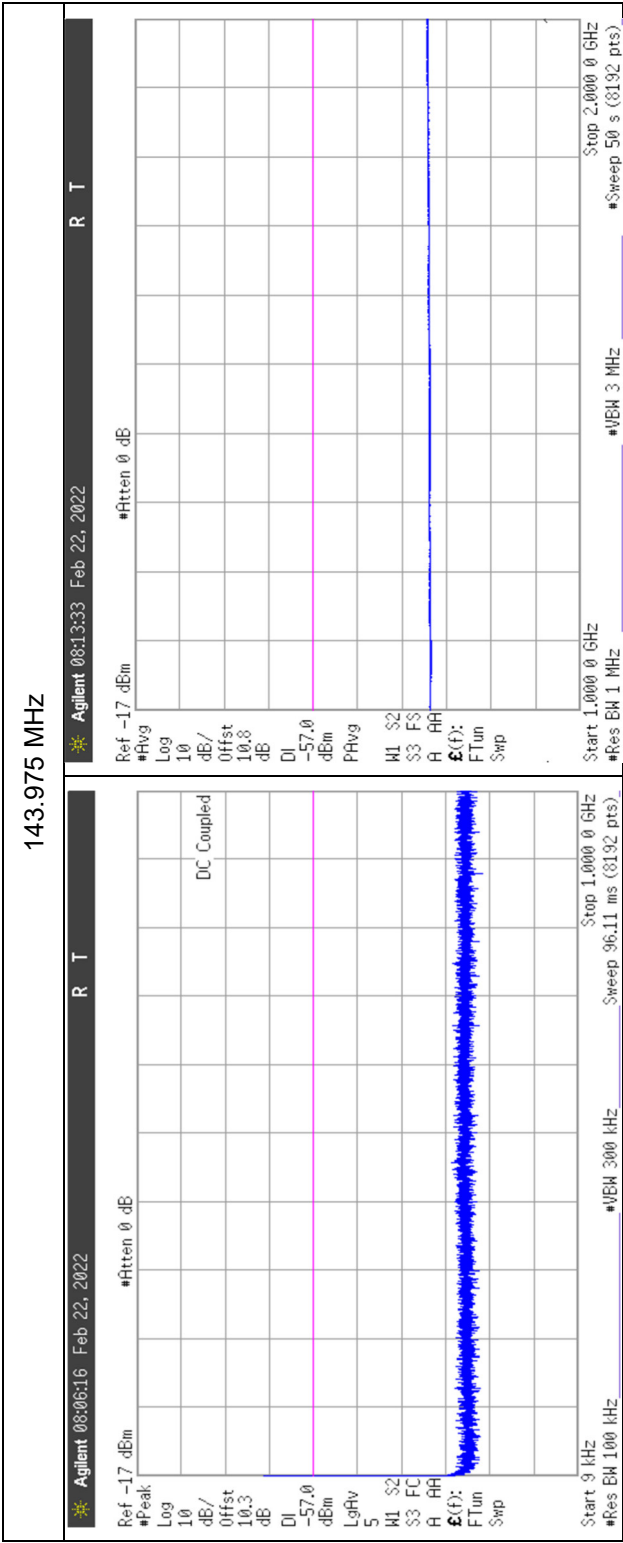
Transmitter Standby Spurious Emissions (Conducted) – Continued

138.025 MHz Transmitter Standby		
Emission Frequency (MHz)	Level (nW)	Level (dBm)
~	~	~
Measurement Uncertainty	≤12.75 GHz ± 2.8 dB	
No emissions were detected within 20 dB of Limit.		



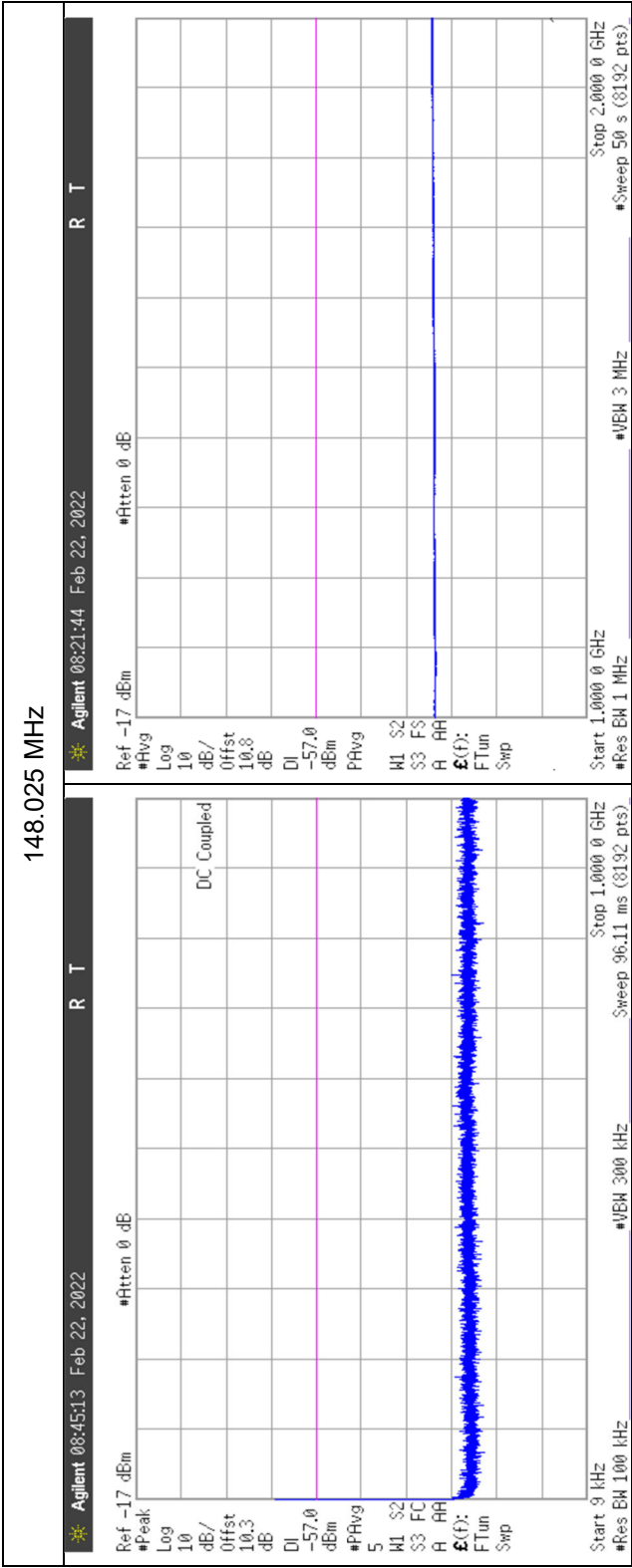
Transmitter Standby Spurious Emissions (Conducted) – Continued

143.975 MHz Transmitter Standby		
Emission Frequency (MHz)	Level (nW)	Level (dBm)
~	~	~
Measurement Uncertainty	≤12.75 GHz ± 2.8 dB	
No emissions were detected within 20 dB of Limit.		



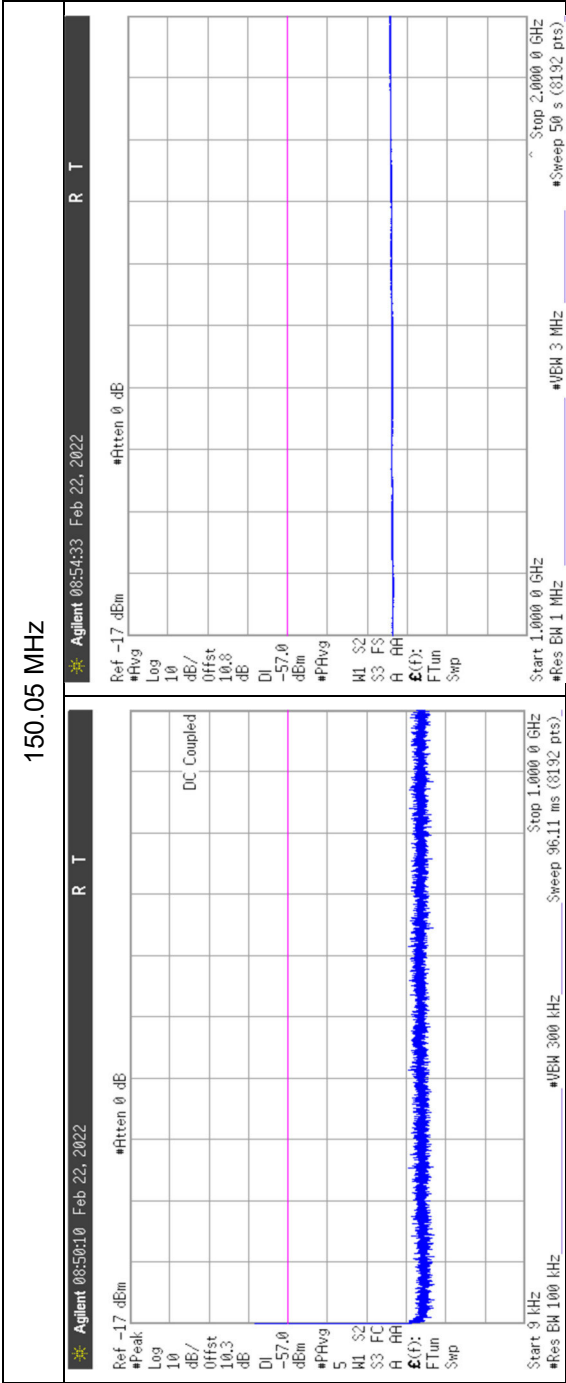
Transmitter Standby Spurious Emissions (Conducted) – Continued

148.025 MHz Transmitter Standby		
Emission Frequency (MHz)	Level (nW)	Level (dBm)
~	~	~
Measurement Uncertainty	≤12.75 GHz ± 2.8 dB	
No emissions were detected within 20 dB of Limit.		



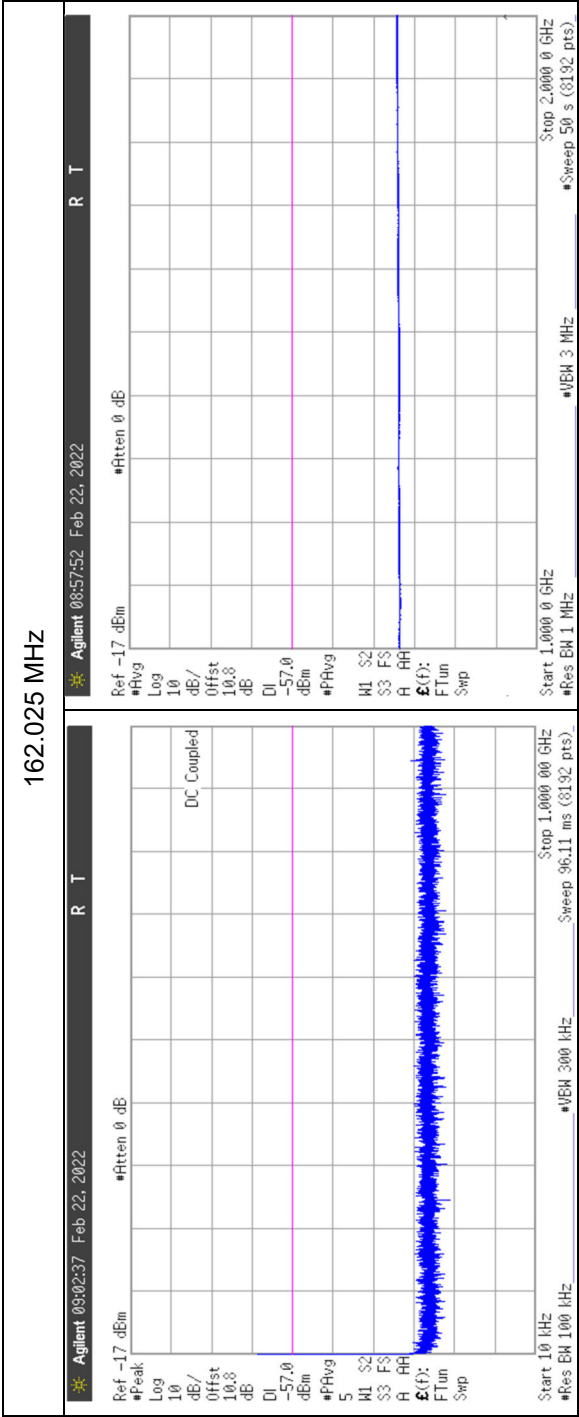
Transmitter Standby Spurious Emissions (Conducted) – Continued

150.05 MHz Transmitter Standby		
Emission Frequency (MHz)	Level (nW)	Level (dBm)
~	~	~
Measurement Uncertainty	≤12.75 GHz ± 2.8 dB	
No emissions were detected within 20 dB of Limit.		



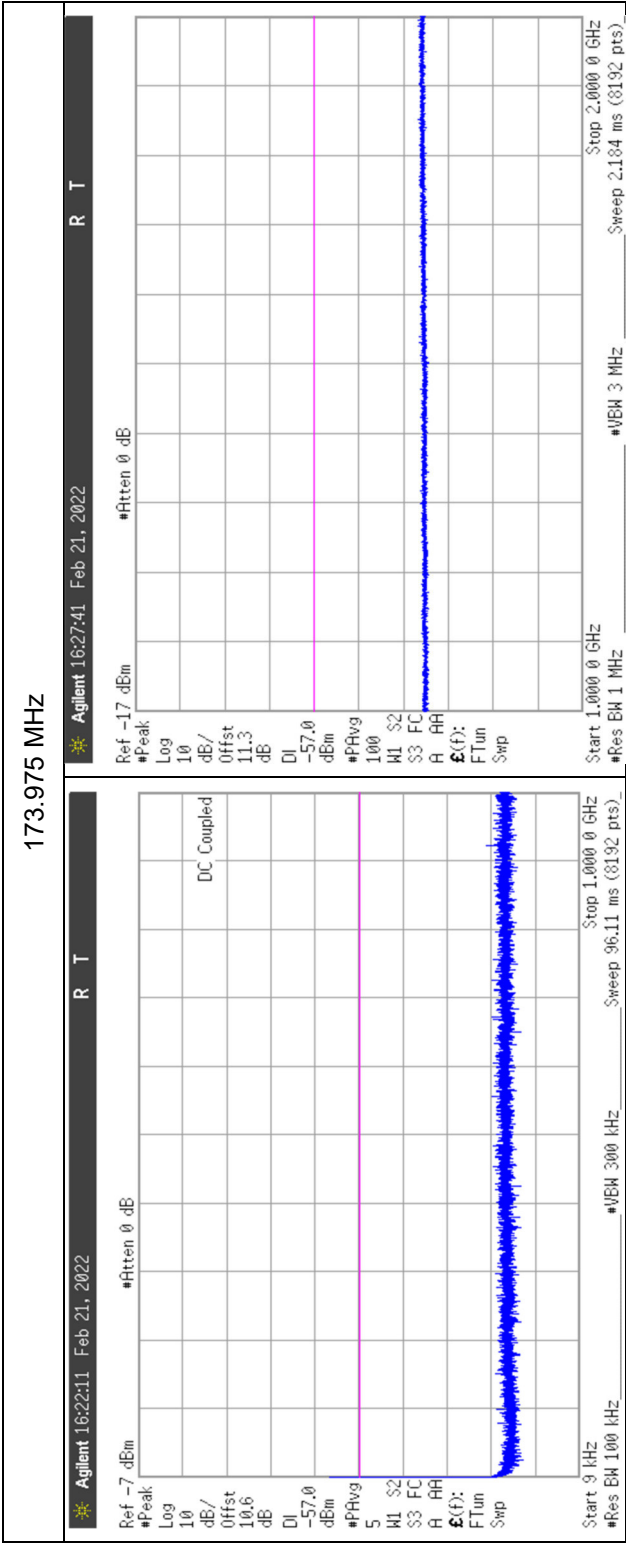
Transmitter Standby Spurious Emissions (Conducted) – Continued

162.025 MHz Transmitter Standby		
Emission Frequency (MHz)	Level (nW)	Level (dBm)
~	~	~
Measurement Uncertainty	≤12.75 GHz ± 2.8 dB	
No emissions were detected within 20 dB of Limit.		



Transmitter Standby Spurious Emissions (Conducted) – Continued

173.975 MHz Transmitter Standby		
Emission Frequency (MHz)	Level (nW)	Level (dBm)
~	~	~
Measurement Uncertainty	≤12.75 GHz ± 2.8 dB	
No emissions were detected within 20 dB of Limit.		



TEST EQUIPMENT LIST

Equipment Type	Information	Manufacturer	Model No	Serial No#	Tait ID	Cal Due
Antenna	Reference Dipoles	Emco	3121C DB1	9510-1164	E3559	14-May-22
Antenna	Collapsible Biconical and Balun	Schwarzbeck	FBAB 9177,VHA 9103	9104-2459	E4616	18-Jul-24
Antenna	Log Periodic	Schwarzbeck	VUSLP	9111-219	E4617	
Antenna	Reverb - 1-18GHz DRG	Schwarzbeck	BBHA 9120 D	9120D-885	E4857	
Antenna	Reverb - 1-18GHz DRG	Schwarzbeck	BBHA 9120 D	9120D-884	E4858	
Coax Cable	OATS Turntable Cable 1	Intelcom	RG214	OATS1	E4621	11-Jan-23
Coax Cable	OATS Tower Cable	Intelcom	RG214	OATS2	E4622	11-Jan-23
Coax Cable	2m Black	Suhner	RG214HF/Nm/ Nm/2000	TeltestBlack2	E4623	10-Jan-23
Coax Cable	2m Black	Suhner	RG214HF/Nm/ Nm/2000	TeltestBlack3	E4624	10-Jan-23
Coax Cable	2m Black	Suhner	RG214HF/Nm/ Nm/2000	TeltestBlack4	E4653	10-Jan-23
Coax Cable	Reverb - 4.5m Multiflex 141	TeltestBlue6	MF 141	TeltestBlue6	E4843	11-Jan-23
Coax Cable	Reverb - 2m Multiflex 141	TeltestBlue5	MF 141	TeltestBlue5	E4844	11-Jan-23
Coax Cable	Reverb - 2m Multiflex 141	TeltestBlue4	MF 141	TeltestBlue4	E4845	11-Jan-23
Coax Cable	Reverb - 1m Multiflex 141	TeltestBlue3	MF 141	TeltestBlue3	E4846	11-Jan-23
Coax Cable	Reverb - 1m Multiflex 141	TeltestBlue2	MF 141	TeltestBlue2	E4847	10-Jan-23
Coax Cable	Reverb - 1m Multiflex 141	TeltestBlue1	MF 141	TeltestBlue1	E4848	11-Jan-23
Coax Cable	OATS Turntable Cable 2	Intelcom	RG215	OATS3	E4995	11-Jan-23
Coax Cable	3m Blue	Suhner	Sucoflex 126EA	503429/126EA	E5015	23-Dec-22
Coax Cable	1.5m Blue	Suhner	Sucoflex 126EA	502868/126EA	E5028	23-Dec-22
Filter High Pass/ Notch	135 to 175MHz	Tait		N/A	E3382	22-Jun-22
OATS	Controller	Electrometrics	EM-4700	119	E4445	
OATS	Turntable	Electrometrics	EM-4704A	105	E4446	
OATS	Antenna Tower	Electrometrics	EM-4720-2	112	E4447	
OATS	NSA	Tait				20-Sep-22
Power Supply		Rohde & Schwarz	NGS M32/10 192.0810.31	Fnr 434	E3556	17-May-22
RF Amplifier	+21.7 dB 1GHz	Tait	ZFL-1000LN	E3660	E3360	2-Aug-22
RF Amplifier	Pre-amplifier	Agilent	87405C	MY47010688	E4941	19-Oct-22
RF Attenuator	30+3dB 350W	Weinschel	67-30-33 & BW-N3W5+	CK9178	E5023	12-Jan-23
RF Attenuator	3dB 0.5W	Weinschel	Model 1	CH6843	E5011	22-Dec-22
RF Attenuator	3dB 0.5W	Weinschel	Model 1	CH6863	E5013	22-Dec-22
RF Chamber	S-LINE TEM CELL	Rohde & Schwarz	1089.9296.02	338232/003	E3636	28-Oct-22
RF Chamber	Reverb - Stirrer controller for reverb chamber	Teseq	Stirrer Controller	29765.1	E4854	
RF Chamber	Reverb - 0.5 - 18GHz Reverberation Chamber	Teseq	RVC XS	29765	E4855	
RF Combiner	TREVA1	Minicircuits	ZFSC-4-1	-	E4083	

TELTEST Laboratories
Tait International Ltd
Report Number 4220

Equipment Type	Information	Manufacturer	Model No	Serial No#	Tait ID	Cal Due
RF Combiner	TREVA2	Minicircuits	ZFSC-4-1	-	E4084	
RF Load	150W	Bird	8166	524	E3625	22-Dec-22
Signal Generator	Analog 4GHz	Agilent	E4422B	GB40050320	E3788	16-Oct-22
Signal Generator	TREVA2 Analog 3.3GHz	Rohde & Schwarz	SML03 1090.3000.13	100597	E4050	21-Oct-22
Spectrum Analyser	13.2GHz	Agilent	PSA E4445A	MY42510072	E4139	7-Oct-22
Temp & Humidity datalogger		Hobo	U21-011	10134275	E4980	25-Jul-22
Testware	Frequency Vs Temperature		April 2018	-	-	
Testware	Occupied Bandwidth		TTEL_OCCBW 2.00.01	-	-	
Testware	Reverb Emissions		TTEL_REVEMIS 2.00.02	-	-	
Testware	Sideband Spectrum		February 2017	-	-	
Testware	S-Line Radiated Emissions		TTEL_SLINERADEM 2.00.01	-	-	
Testware	TREVA		TTEL_TREVA 2.00.00	-	-	
Testware	Spec An Correction Loader		June 2019	-	-	
Testware	Radiated Emissions		APRIL 2018	-	-	

NOTE: Items without calibration dates are calibrated immediately before use, or set using calibrated instruments.

