

LABORATORY TEST REPORT

RADIO PERFORMANCE MEASUREMENTS

for the

TBCH3A BASE STATION Transceiver
Fitted with the H3 470-520 MHz Reciter

Tested in accordance with:

FCC 47 CFR Parts 22 and 90

Report Revision: 1
Issue Date: 02 October 2020

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.

This document must not be reproduced except in full, without the written permission of the Compliance Laboratory Manager

TELTEST Laboratories (A Division of Tait International Ltd)
PO Box 1645, 558 Wairakei Road, Christchurch, New Zealand.

Telephone: 64 3 358 3399
FAX: 64 3 359 4632

TABLE OF CONTENTS

REVISION HISTORY	3
INTRODUCTION	4
TEST REQUIREMENTS AND RESULT SUMMARY	5
STATEMENT OF COMPLIANCE	6
CHANNEL TABLE	7
MODULATION TYPES, NECESSARY BANDWIDTH & EMISSION DESIGNATORS	8
TEST RESULTS.....	10
TRANSMITTER AUDIO FREQUENCY RESPONSE - PRE-EMPHASIS.....	10
TRANSMITTER MODULATION LIMITING	12
TRANSMITTER OCCUPIED (99%) BANDWIDTH	14
TRANSMITTER SPECTRUM MASKS.....	18
TRANSIENT FREQUENCY BEHAVIOR.....	28
TEST EQUIPMENT LIST.....	35
ANNEX A – TEST SETUP DETAILS.....	36

REVISION HISTORY

Date	Revision	Comments
02 October 2020	1	Initial test report

INTRODUCTION

Type approval testing of the TBCH3A, 50 Watt, BASE STATION transceiver in order to demonstrate continued compliance with FCC 47 Parts 22 & 90, after the addition of Wideband Analogue (25kHz channel spacing), DMR, and FFSK1200 modulations.

This transceiver is also capable of Analogue NB (12.5kHz), APCO P25 phase-1 and APCO P25 phase-2 modulations. See TELTEST report 3867 for results.

REPORT PREPARED FOR

Tait International Limited
245 Wooldridge Road
Harewood
Christchurch 8051
New Zealand

DESCRIPTION OF SAMPLE

Manufacturer: Tait International Limited
Equipment: BASE STATION Transceiver
Type: TBCH3A
Product Code: T01-01121-MAAA
Serial Number(s): 18264260
Frequency range: 470 → 520 MHz
Transmit Power: 50 Watts

Modulation		Channel Spacing	Speech Channels	Symbol Rate (symbols/sec)	Data Rate (bps)
Analogue FM	Wideband	25 kHz	1	-	-
FFSK	Fast Frequency Shift Keying	12.5 kHz	-	1200	1200
Digital Mobile Radio (DMR)	4 Level FSK (2 slot TDMA) (ETSI TS102 361-1)	12.5 kHz	2	4800	9600

HARDWARE & SOFTWARE

Quantity: 1

Module	Product Code	Serial Number	Firmware Version	Hardware Version
Reciter	T01-01103-MACA	18264259	p25-3.10.00.0006 dmr-3.10.00.0006	2
Power Amplifier	T01-01121-MAAA	18264260	1.12.00.0001	0.06
Front Panel	T01-01110-BAAA	18264477	1.10.01.0001	0.04
Power management unit	TBA30A0-0100	18264262	3.16	1

TEST CONDITIONS

All testing was performed between 30 September → 01 October 2020, and under the following conditions:

Ambient temperature: 15°C → 30°C
Relative Humidity: 20% → 75%
Standard Test Voltage: 120 V_{AC}

TEST REQUIREMENTS AND RESULT SUMMARY

FCC Specification	Test Name	Test Methods	Result
FCC 47 CFR 2.1046	Transmitter Output Power (Conducted)	ANSI C63.26 5.2.4.2	N1
FCC 47 CFR 2.1047 (a)	Transmitter Audio Frequency Response – Pre-emphasis	ANSI C63.26 5.3.3.2	P
FCC 47 CFR 2.1047 (b)	Transmitter Modulation Limiting	ANSI C63.26 5.3.2	P
FCC 47 CFR 2.1049 (c)	Transmitter Occupied (99%) Bandwidth	ANSI C63.26 5.4.4	P
FCC 47 CFR 90.210	Transmitter Spectrum Masks	TIA-603-E 2.2.11	P
FCC 47 CFR 90.543	Adjacent Channel Power Ratio	ANSI C63.26 6.5.2.4	N/A 2
FCC 47 CFR 2.1051	Transmitter Spurious Emissions (Conducted)	ANSI C63.26 5.7	N1
FCC 47 CFR 2.1053	Transmitter Spurious Emissions (Radiated)	ANSI C63.26 5.5	N1
FCC CFR 90.543	Transmitter Radiated Emissions in the GNSS Band	ANSI C63.26 6.5.2.7.3	N/A 2
No specification	Transmitter Conducted Emissions in the GNSS Band	ANSI C63.26 6.5.2.7.4	N/A 2
FCC 47 CFR 90.214	Transient Frequency Behaviour	ANSI C63.26 6.5.2.2	P
FCC 47 CFR 90.214	Transmitter Frequency Stability - Temperature	ANSI C63.26 5.6.4	N1
FCC 47 CFR 2.1055 (d) (1)	Transmitter Frequency Stability - Voltage	ANSI C63.26 5.6.5	N1
FCC 47CFR 15.111	Receiver Spurious Emissions (Conducted)	TIA-603-E 2.1.2	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 2: Only required where the EUT transmits in the 769-775 or 799-805 MHz band (FCC).

N1: Not tested as this parameter is unlikely to be affected by the change in modulation

STATEMENT OF COMPLIANCE

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

Equipment: BASE STATION Transceiver
Type: TBCH3A

Module	Product Code	Serial Number	Firmware Version	Hardware Version
Reciter	T01-01103-MACA	18264259	p25-3.10.00.0006 dmr-3.10.00.0006	2
Power Amplifier	T01-01121-MAAA	18264260	1.12.00.0001	0.06
Front Panel	T01-01110-BAAA	18264477	1.10.01.0001	0.04
Power management unit	TBA30A0-0100	18264262	3.16	1

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

FCC 47 CFR Parts 22 and 90

for the parameters tested in this report.

Signature:



Mike James
Technical Manager

Date:

11 November 2020

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
470 50W	1	NA	470.0125	50
470 5W	2	NA	470.0125	5
491 50W	3	NA	491.0	50
491 5W	4	NA	491.0	5
511 50W	5	NA	511.975	50
511 5W	6	NA	511.975	5

MODULATION TYPES, NECESSARY BANDWIDTH & EMISSION DESIGNATORS

MODULATION TYPES:

F3E	FM Analogue Voice	-	-
F2D	Fast Frequency Shift Keying	1200 symbols/sec	1200 bps
FXW	Digital Voice / Data	4800 symbols/sec	9600 bps
FXD	Digital Data	4800 symbols/sec	9600 bps

CHANNEL SPACING: 12.5 kHz

EMISSION DESIGNATORS:

FFSK	7K60F2D
DMR Digital Voice / Data	8K00FXW
DMR Digital Data	8K00FXD

Equation: $B_n = 2M + 2Dk$

(M is highest modulating frequency; D is peak allowable deviation; k is a constant of 1 for FM)

Fast Frequency Shift Keying (FFSK – 1200 bps) 12.5 kHz Channel Spacing

Necessary bandwidth

M = 1.8 kHz

D = 2.0 kHz

$$B_n = (2 \times 1.8) + (2 \times 2.0) \times 1 \\ = 7.6 \text{ kHz}$$

Emission Designator

7K60F2D

F2D represents a FM data transmission with the use of a modulating sub carrier

Digital Mobile Radio (DMR)

4 level FSK (as per ETSI TS 102 361-1)

4800 symbols/sec 9600 bps

Digital Data 12.5 kHz Channel Spacing – 8K00FXW

99% bandwidth

= 8.00 kHz

Emission Designator

8K00FXW

FXW represents FM combination of data and telephony.

Digital Data 12.5 kHz Channel Spacing – 8K00FXD

99% bandwidth

= 8.00 kHz

Emission Designator

8K00FXD

FXD represents FM data only

CHANNEL SPACING: 25 kHz

EMISSION DESIGNATORS:

Analogue Voice 16K0F3E

Equation: $B_n = 2M + 2Dk$

(M is highest modulating frequency; D is peak allowable deviation; k is a constant of 1 for FM)

Analogue Voice 25 kHz Channel Spacing

Necessary bandwidth

M = 3.0 kHz

D = 5.0 kHz

$$\begin{aligned} B_n &= (2 \times 3.0) + (2 \times 5) \times 1 \\ &= 16.0 \text{ kHz} \end{aligned}$$

Emission Designator

16K0F3E

F3E represents an FM voice transmission

TEST RESULTS

TRANSMITTER AUDIO FREQUENCY RESPONSE - PRE-EMPHASIS

SPECIFICATION: FCC 47 CFR 2.1047 (a)

GUIDE: ANSI C63.26 5.3.3.2

MEASUREMENT PROCEDURE:

1. Refer Annex A for Equipment set up.
2. An audio input tone of 1000 Hz was applied with the level set to obtain 20% of maximum deviation. This was used as the 0 dB reference point.
3. The AF was varied while the audio level was held constant.
4. The response in dB relative to 1000 Hz was measured.

MEASUREMENT RESULTS:

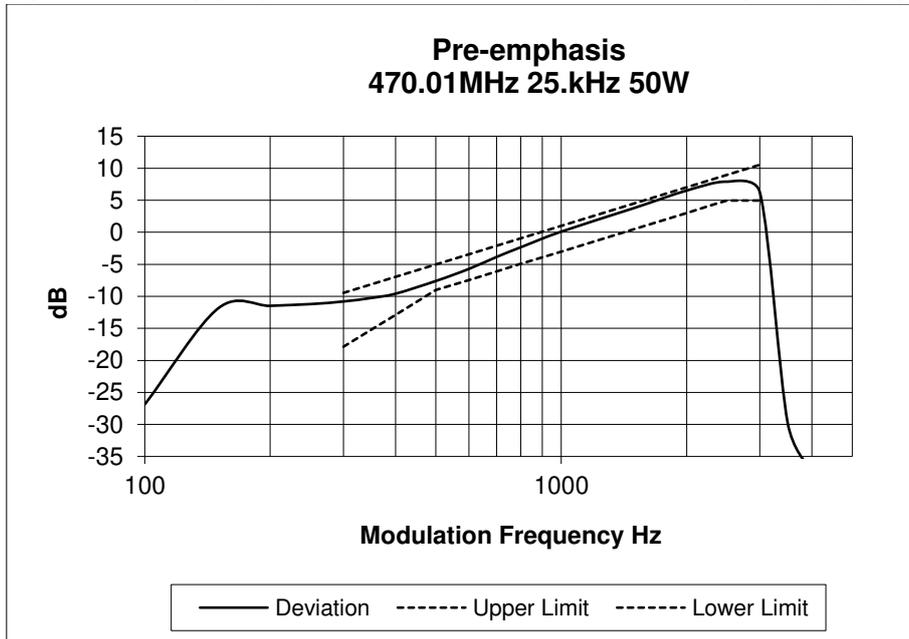
See the plots on the following pages for 25 kHz channel spacing tested at 50 W transmit power.

LIMIT CLAUSE: TIA/EIA-603E 3.2.6

MEASUREMENT UNCERTAINTY: $\pm 1.5 \%$

SPECIFICATION: FCC CFR 2.1047 (a)

Tx FREQUENCY: 470.0125 MHz 25 kHz Channel Spacing



TRANSMITTER MODULATION LIMITING

SPECIFICATION: FCC 47 CFR 2.1047 (b)

GUIDE: ANSI C63.26 5.3.2

MEASUREMENT PROCEDURE:

1. Refer Annex A for Equipment set up.
2. An audio input tone of 1000 Hz was applied with the level set to obtain 60% of maximum deviation. This was used as the 0 dB reference point.
3. The modulation response was measured at four audio frequencies while increasing the input level in 5dB steps.
4. Additionally the level used to measure sideband spectrum (occupied bandwidth) was included in the level sweep.
5. Measurements were made for both Positive and Negative Deviation.

MEASUREMENT RESULTS:

See the plots on the following pages for 25 kHz channel spacing.

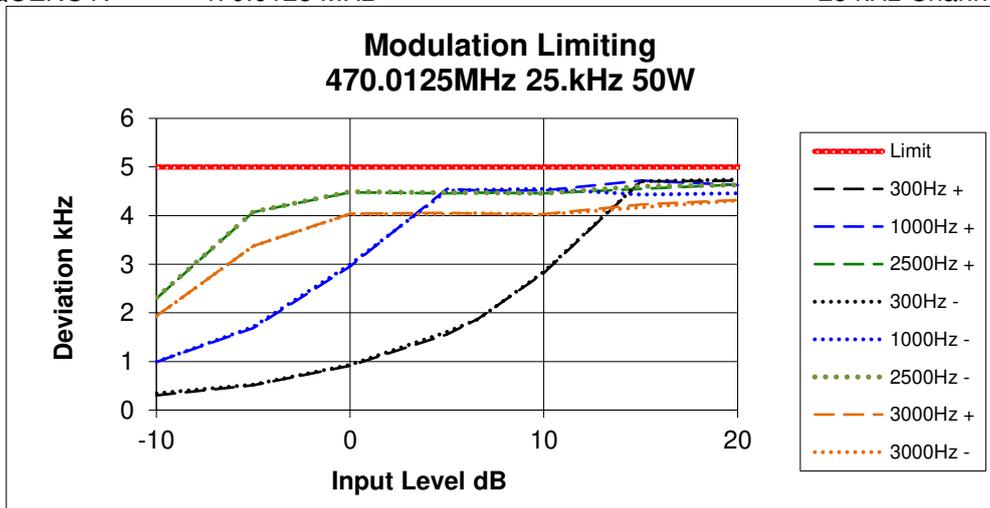
LIMIT CLAUSE: TIA/EIA-603E 1.3.4.4

MEASUREMENT UNCERTAINTY: $\pm 1.5\%$

SPECIFICATION: FCC CFR 2.1047 (b)

Tx FREQUENCY: 470.0125 MHz

25 kHz Channel Spacing

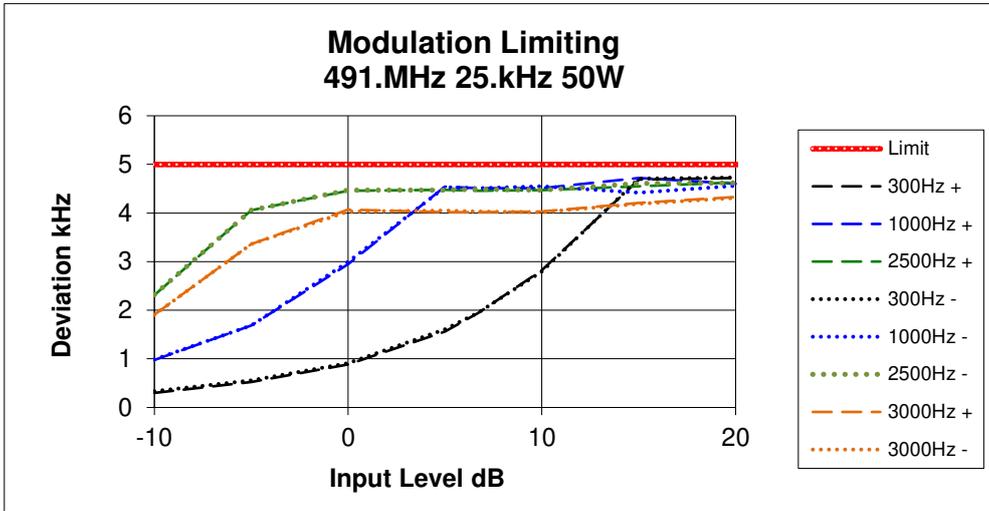


Transmitter Modulation Limiting

SPECIFICATION: FCC CFR 2.1047 (b)

Tx FREQUENCY: 491.0 MHz

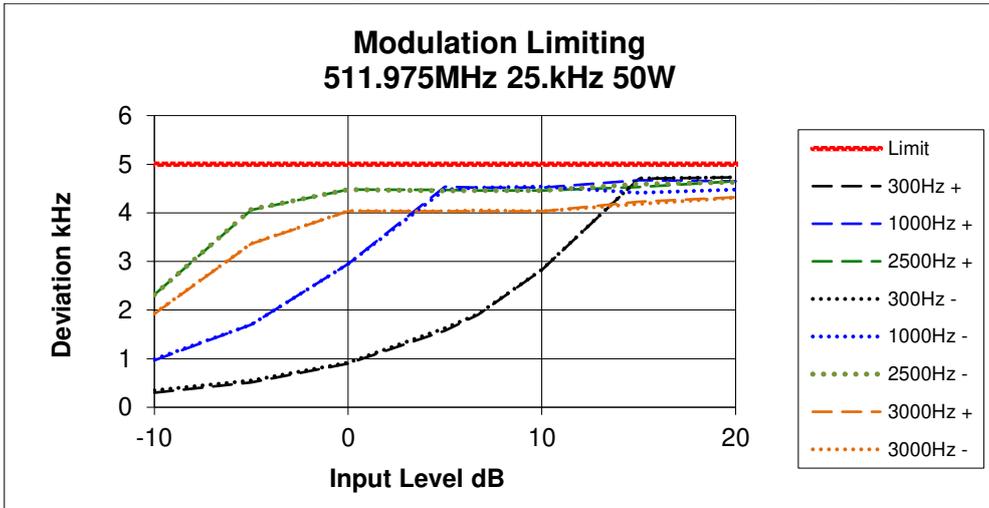
25 kHz Channel Spacing



SPECIFICATION: FCC CFR 2.1047 (b)

Tx FREQUENCY: 511.975 MHz

25 kHz Channel Spacing



TRANSMITTER OCCUPIED (99%) BANDWIDTH

SPECIFICATION: FCC 47 CFR 2.1049(c)

GUIDE: C63.26 5.4.4

MEASUREMENT PROCEDURE:

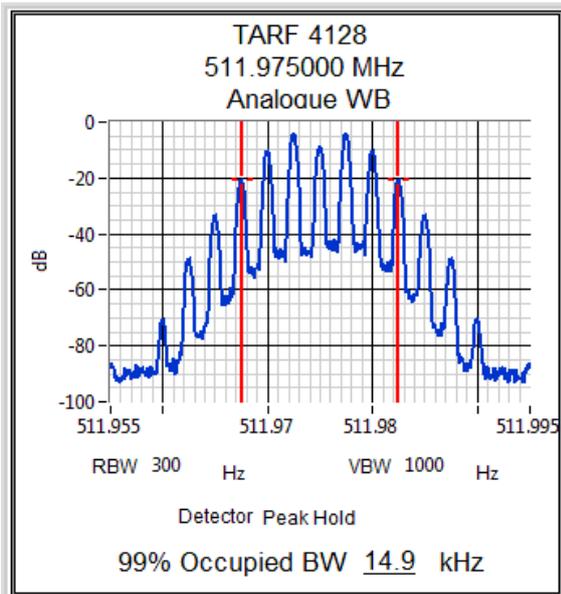
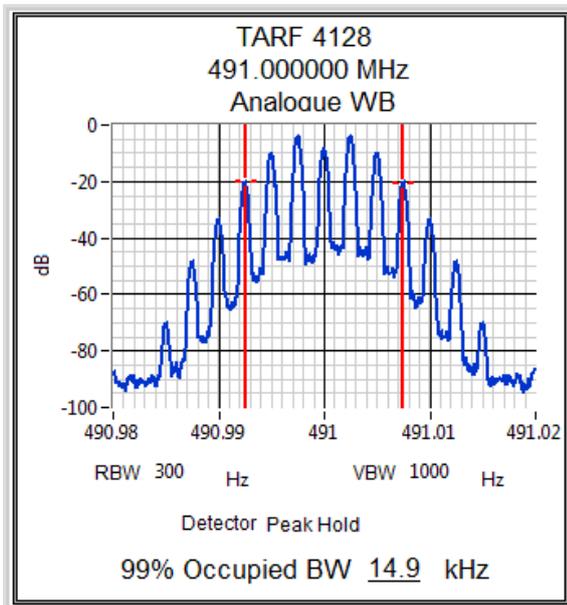
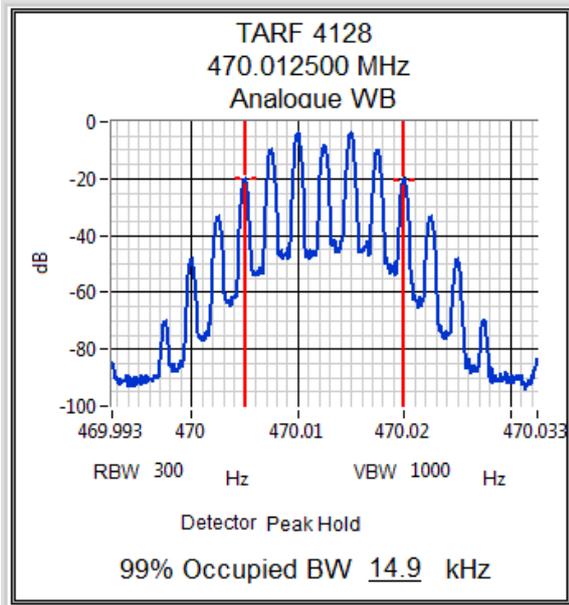
1. Refer Annex A for Equipment Set up.
2. For analog measurements: The EUT was modulated by a 2500 Hz tone at an input level 16 dB above a level that produced 50% deviation. The input level was established at the frequency of maximum response of the audio modulating circuit.
For Data measurements: The EUT was modulated with an internally generated pseudo random bit sequence at the appropriate Baud rates.
3. The Occupied Bandwidth was measured on the Spectrum Analyser, with bandwidth settings as follows.
Resolution Bandwidth = 300 Hz, Video Bandwidth = 1000 Hz

MEASUREMENT RESULTS:

Channel Frequency (MHz)	Channel Spacing (kHz)	Bandwidths (kHz)		
		Analog WB	FFSK 1200 bps	DMR
470.0125 MHz	12.5		6.93	7.87
491.0 MHz	12.5		6.93	7.87
511.975 MHz	12.5		6.93	7.80
470.0125 MHz	25.0	14.9		
491.0 MHz	25.0	14.9		
511.975 MHz	25.0	14.9		
<u>Limit</u> Authorized Bandwidth 47 CFR 90.209 RSS 119 5.5		20.0	11.25	11.25
Necessary BW used in emission designator		16.0	7.6	8.0
Result		Pass	Pass	Pass

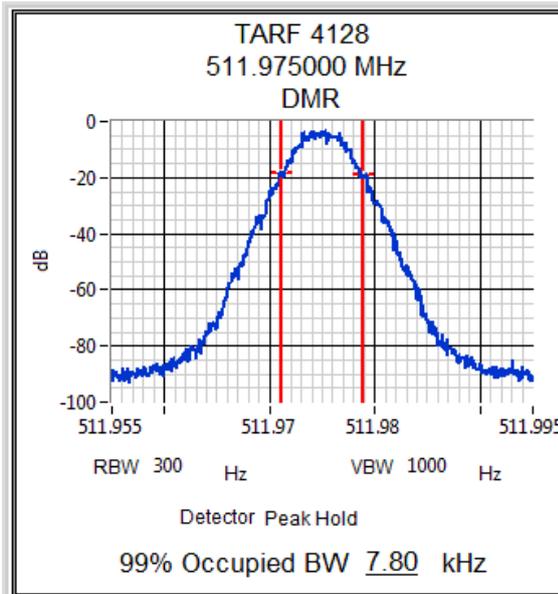
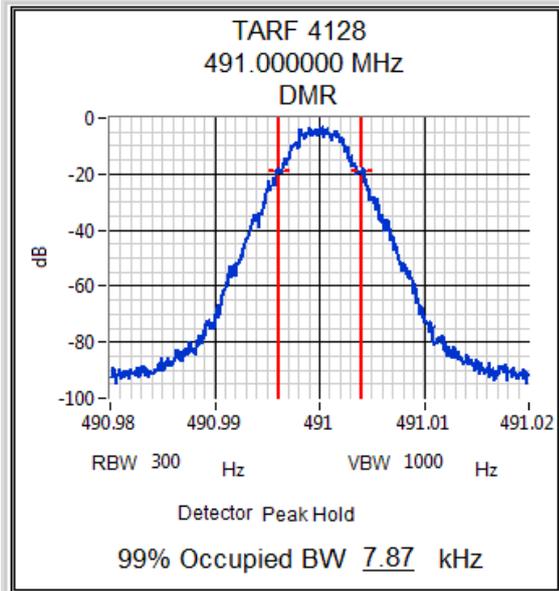
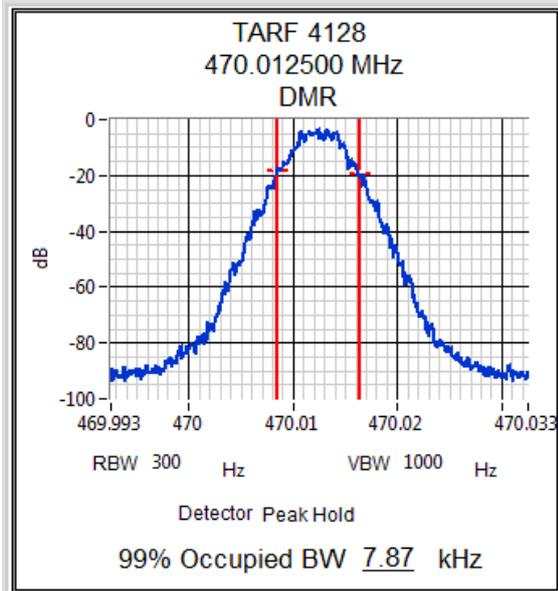
Transmitter Occupied (99%) Bandwidth

Channel 1-3 50 watts 25 kHz CH spacing Analogue Modulation



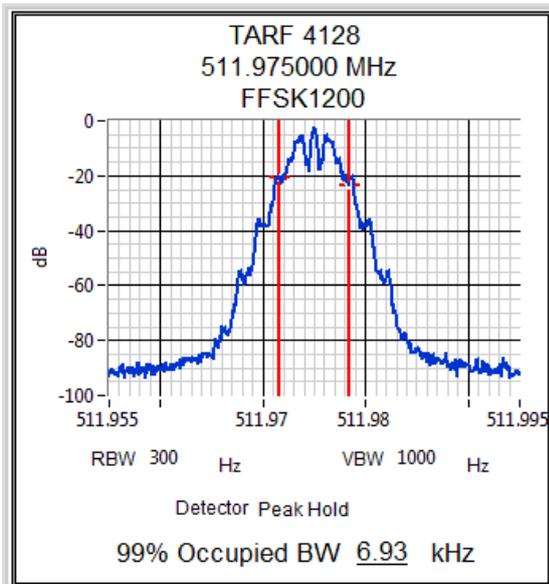
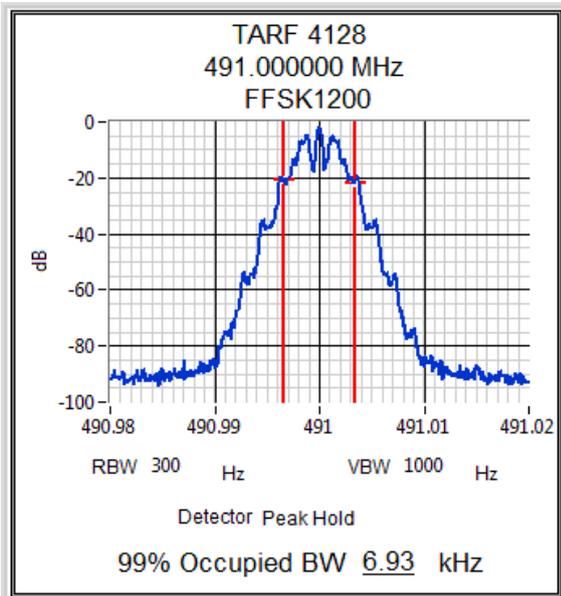
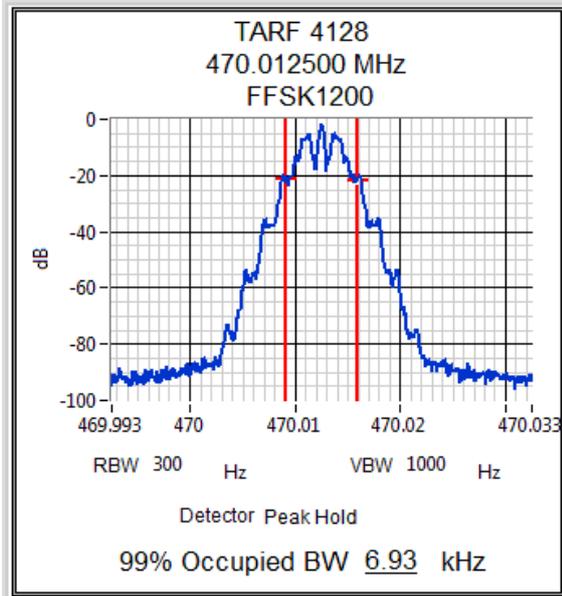
Transmitter Occupied (99%) Bandwidth

Channel 1-3 50 watts 25 kHz CH spacing DMR Modulation



Transmitter Occupied (99%) Bandwidth

Channel 1-3 50 watts 25 kHz CH spacing FFSK Modulation



TRANSMITTER SPECTRUM MASKS

SPECIFICATION: FCC 47 CFR 2.1049 (c)

GUIDE: TIA/EIA-603E 2.2.11 (Analog)
TIA-102.CAAA-C 2.2.5 (Digital)

MEASUREMENT PROCEDURE:

1. Refer Annex A for Equipment Set up.
2. For Analogue measurements: The EUT was modulated by a 2500 Hz tone at an input level 16 dB above a level that produced 50% deviation. The input level was established at the frequency of maximum response of the audio modulating circuit.
For Data measurements: The EUT was modulated with an internally generated pseudo random bit sequence at the appropriate Baud rates.
3. The Occupied Bandwidth was measured on the Spectrum Analyser, with bandwidth settings as noted on the recorded plots.

MEASUREMENT RESULTS:

See the plots on the following pages.

MEASUREMENT UNCERTAINTY 95% $\pm 0.65\text{dB}$

LIMIT CLAUSE: FCC 47 CFR 90.210

EMISSION MASKS

Emission Mask D	12.5 kHz Channel Spacing	FFSK, DMR
Emission Mask B	25 kHz Channel Spacing	Analogue WB

DATA SPEED

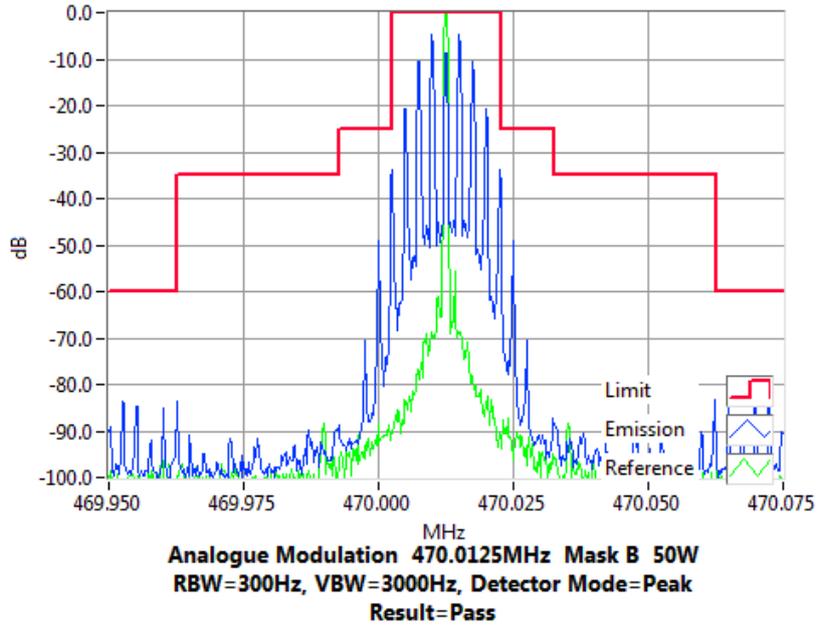
FFSK	12.5 kHz Channel Spacing	1200 bps
DMR	12.5 kHz Channel Spacing	9600 bps DMR

Transmitter Spectrum Masks

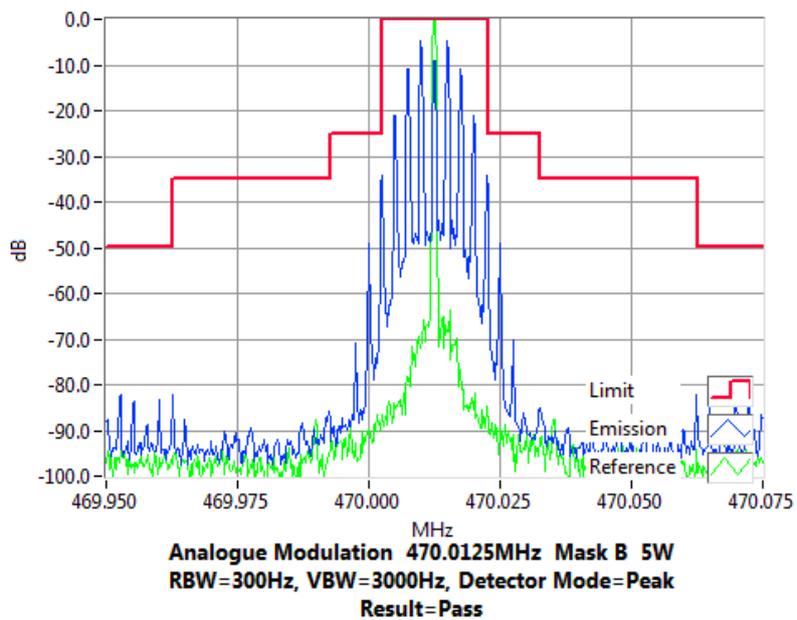
ANALOGUE VOICE

SPECIFICATION: FCC CFR 2.1049 (c)

Tx FREQUENCY: 470.0125 MHz 50 W 25 kHz Channel Spacing



Tx FREQUENCY: 470.0125 MHz 5 W 25 kHz Channel Spacing

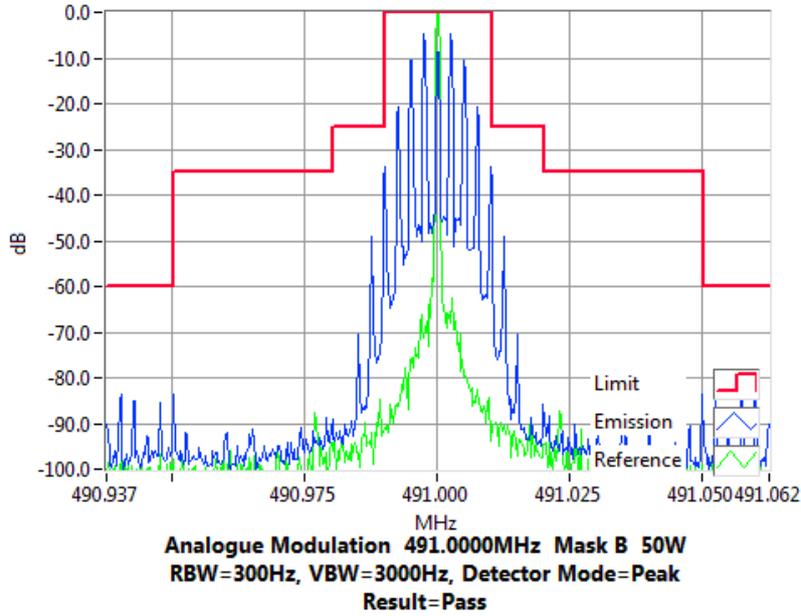


Transmitter Spectrum Masks

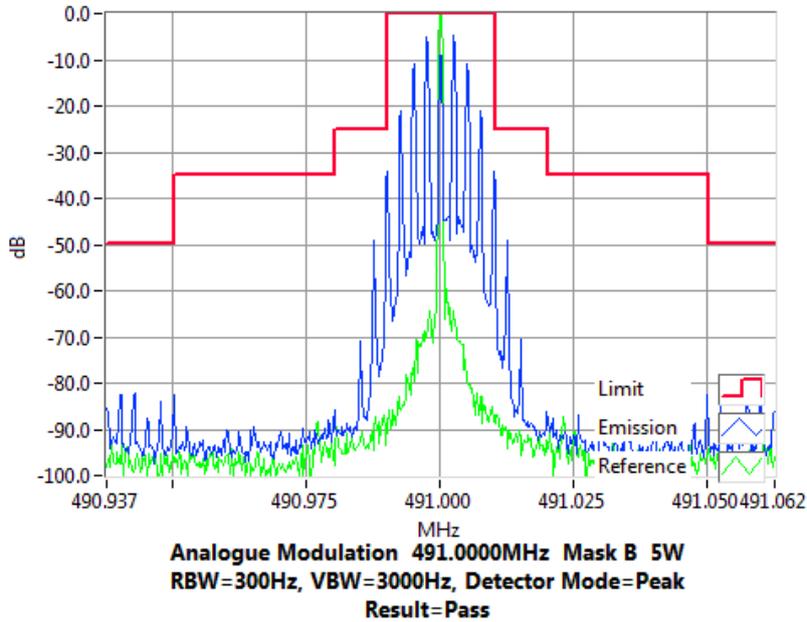
ANALOGUE VOICE

SPECIFICATION: FCC CFR 2.1049 (c)

Tx FREQUENCY: 491.0 MHz 50 W 25 kHz Channel Spacing



Tx FREQUENCY: 491.0 MHz 5 W 25 kHz Channel Spacing

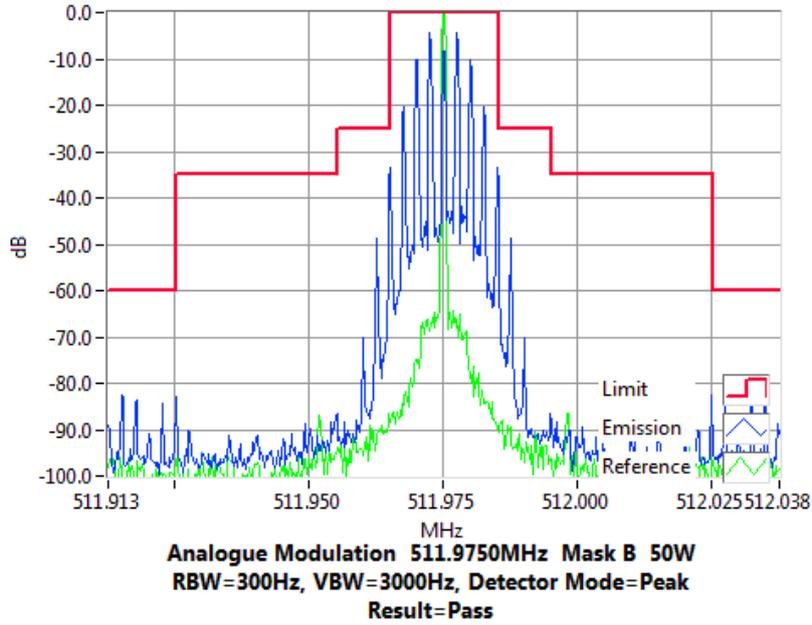


Transmitter Spectrum Masks

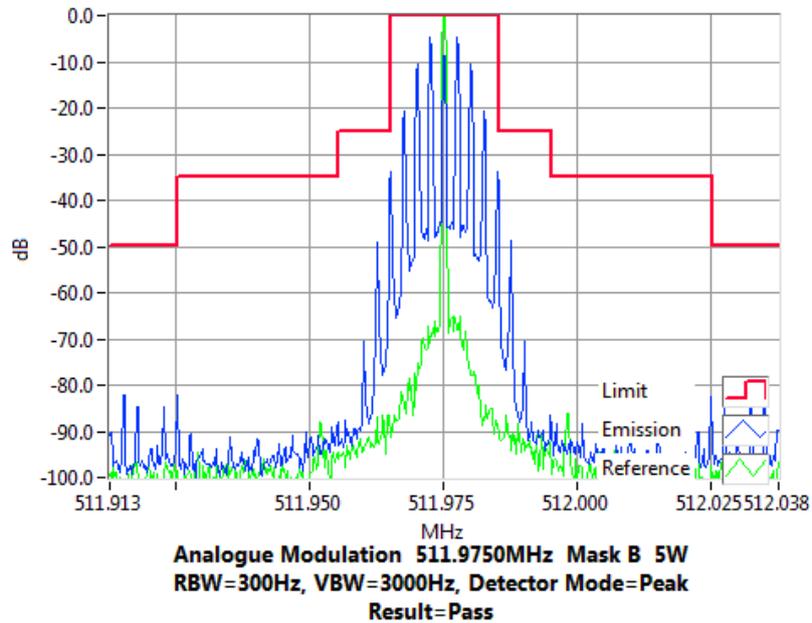
ANALOGUE VOICE

SPECIFICATION: FCC CFR 2.1049 (c)

Tx FREQUENCY: 511.975 MHz 50 W 25 kHz Channel Spacing



Tx FREQUENCY: 511.975 MHz 5 W 25 kHz Channel Spacing

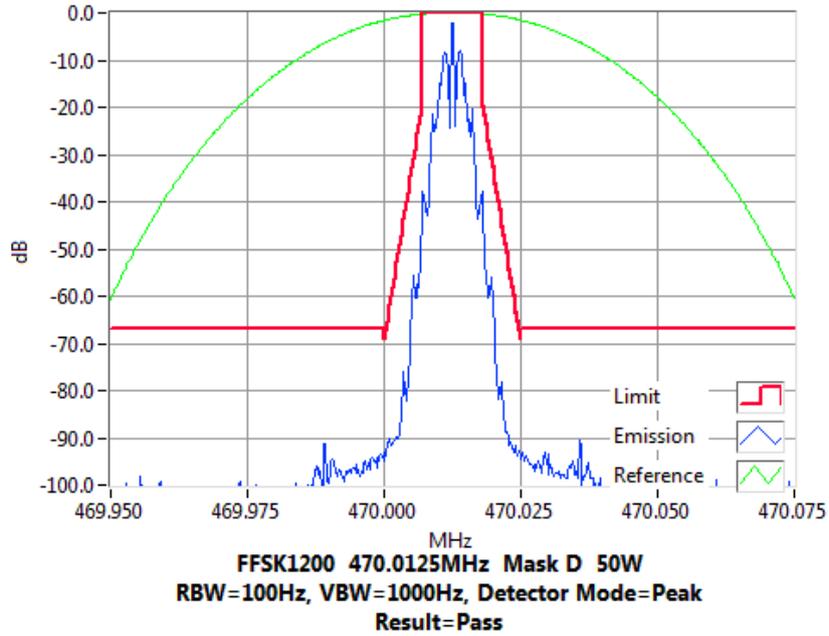


Transmitter Spectrum Masks

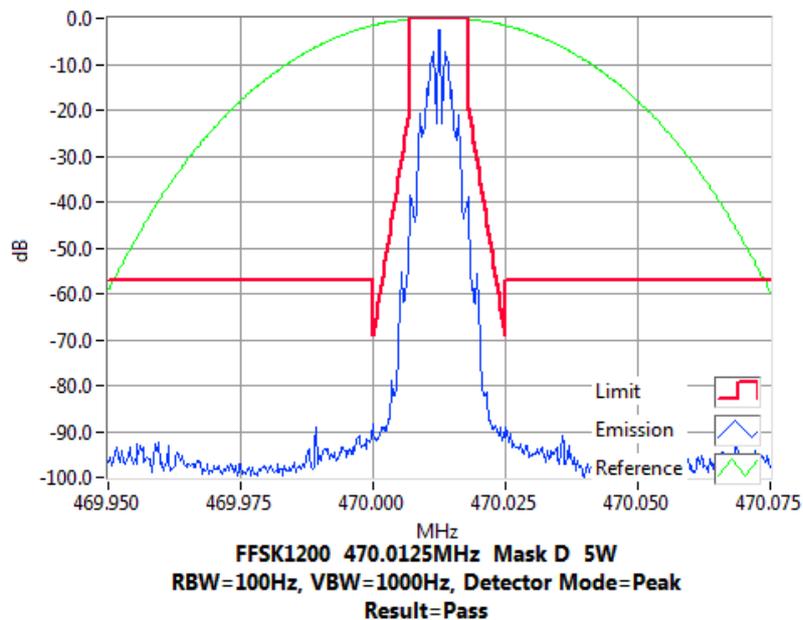
FFSK, 1200 bps

SPECIFICATION: FCC CFR 2.1049 (c)

Tx FREQUENCY: 470.0125 MHz 50 W 12.5 kHz Channel Spacing



Tx FREQUENCY: 470.0125 MHz 5 W 12.5 kHz Channel Spacing

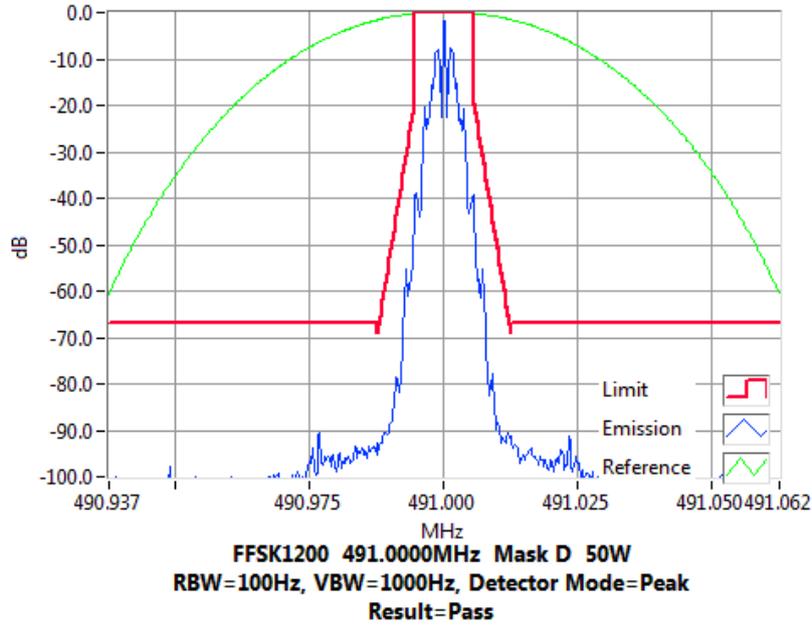


Transmitter Spectrum Masks

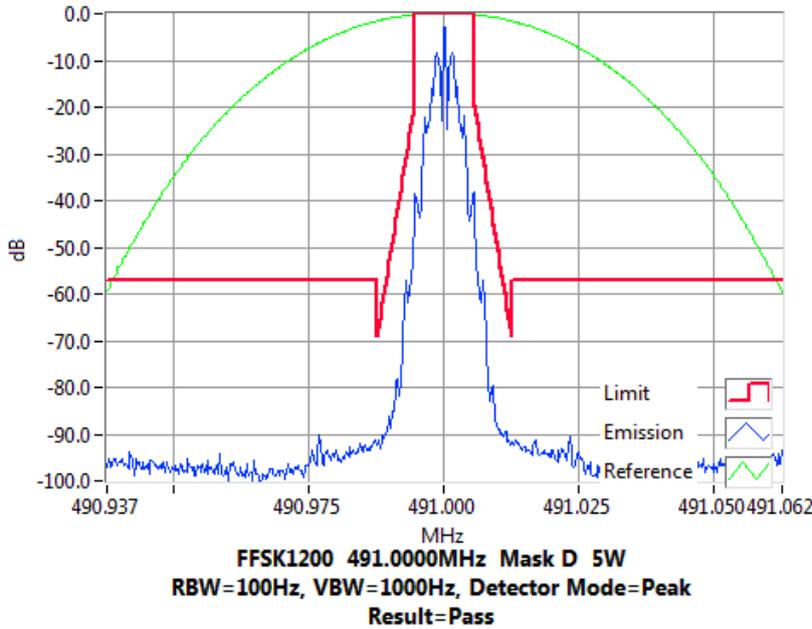
FFSK, 1200 bps

SPECIFICATION: FCC CFR 2.1049 (c)

Tx FREQUENCY: 491.0 MHz 50 W 12.5 kHz Channel Spacing



Tx FREQUENCY: 491.0 MHz 5 W 12.5 kHz Channel Spacing

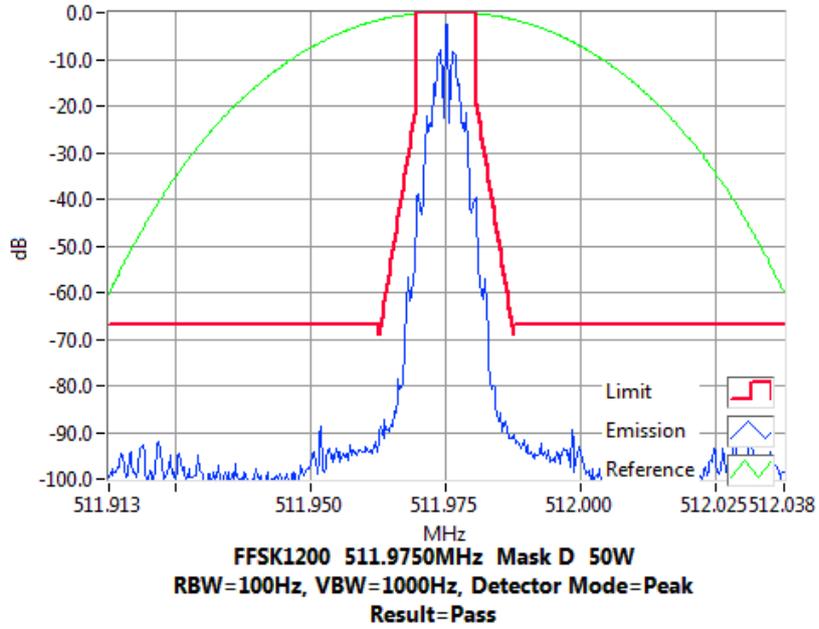


Transmitter Spectrum Masks

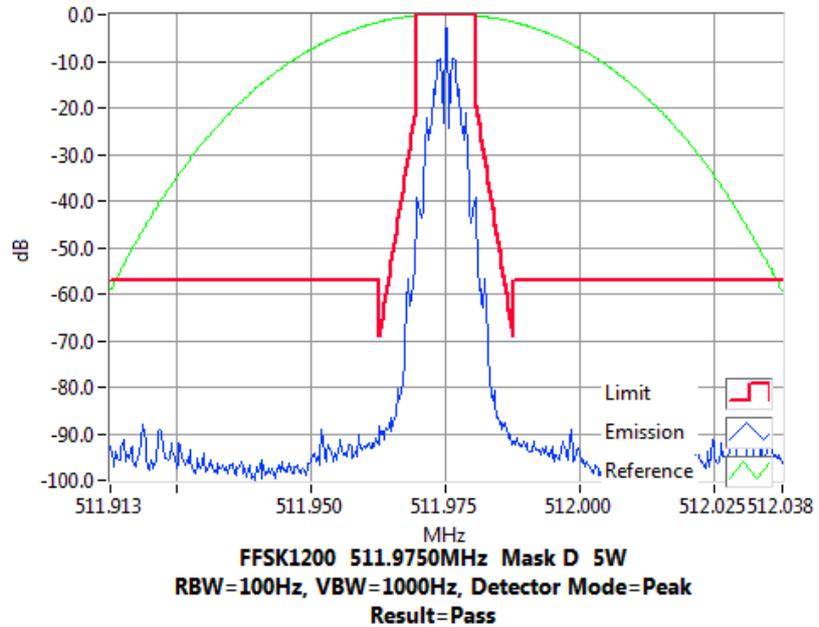
FFSK, 1200 bps

SPECIFICATION: FCC CFR 2.1049 (c)

Tx FREQUENCY: 511.975 MHz 50 W 12.5 kHz Channel Spacing



Tx FREQUENCY: 511.975 MHz 5 W 12.5 kHz Channel Spacing

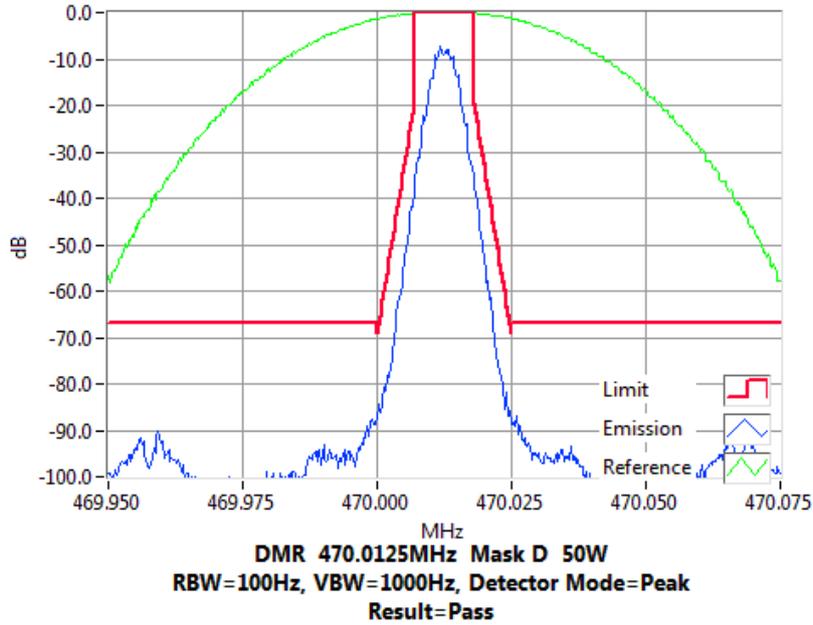


Transmitter Spectrum Masks

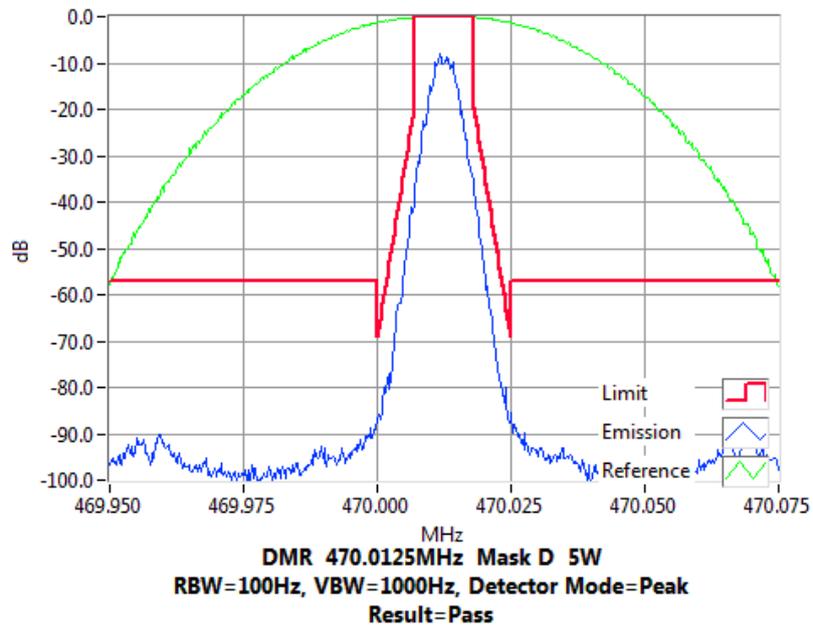
DMR

SPECIFICATION: FCC CFR 2.1049 (c)

Tx FREQUENCY: 470.0125 MHz 50 W 12.5 kHz Channel Spacing



Tx FREQUENCY: 470.0125 MHz 5 W 12.5 kHz Channel Spacing

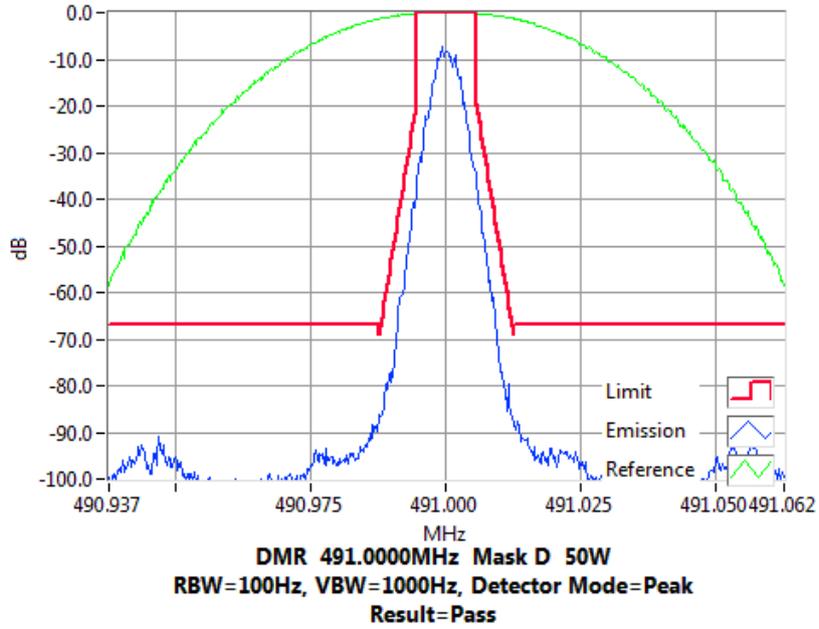


Transmitter Spectrum Masks

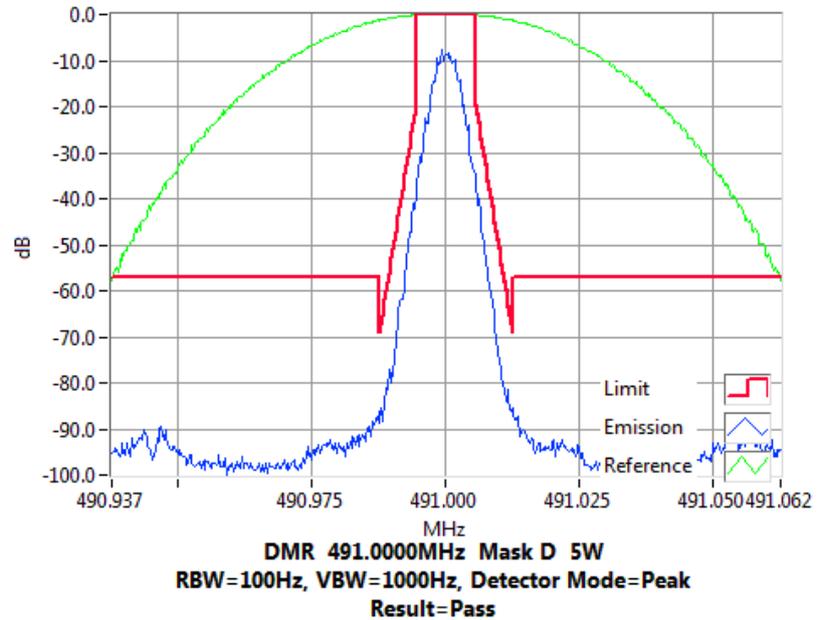
DMR

SPECIFICATION: FCC CFR 2.1049 (c)

Tx FREQUENCY: 491.0 MHz 50 W 12.5 kHz Channel Spacing



Tx FREQUENCY: 491.0 MHz 5 W 12.5 kHz Channel Spacing

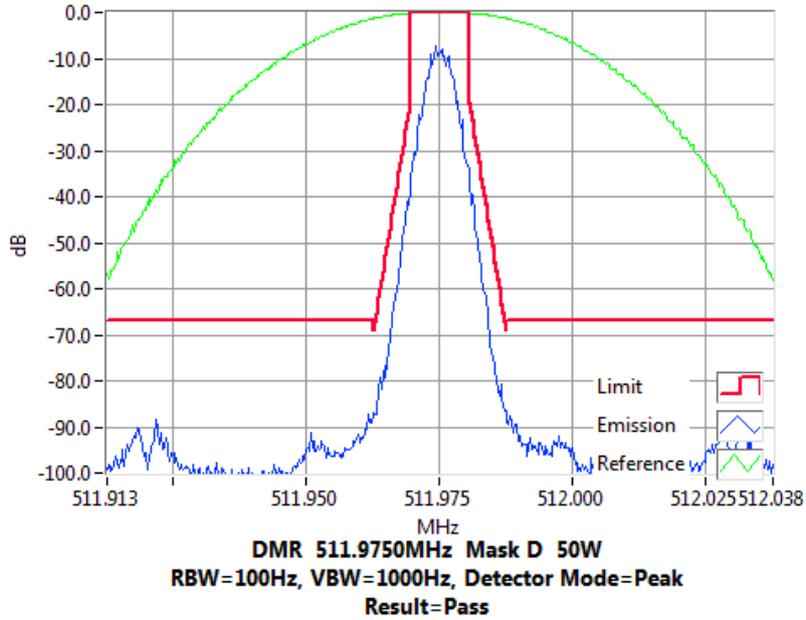


Transmitter Spectrum Masks

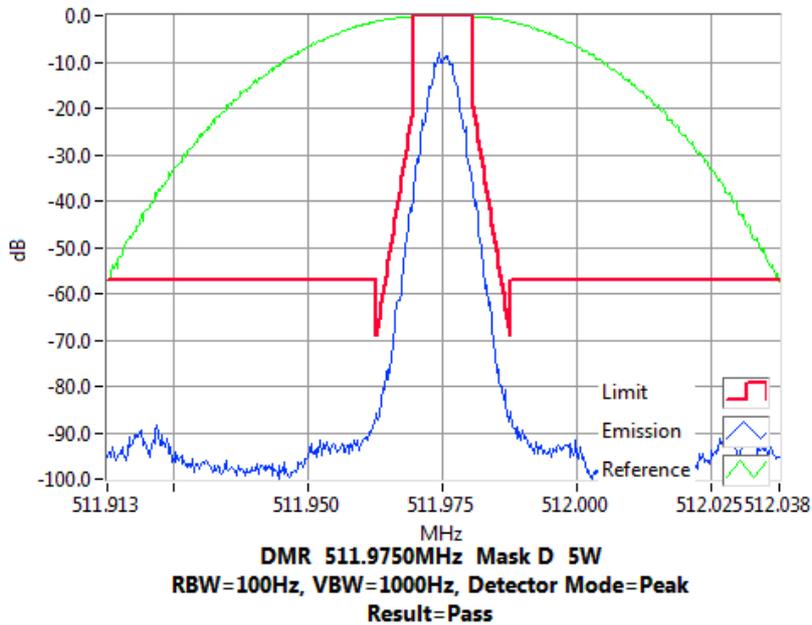
DMR

SPECIFICATION: FCC CFR 2.1049 (c)

Tx FREQUENCY: 511.975 MHz 50 W 12.5 kHz Channel Spacing



Tx FREQUENCY: 511.975 MHz 5 W 12.5 kHz Channel Spacing



TRANSIENT FREQUENCY BEHAVIOR

SPECIFICATION: FCC 47 CFR 90.214

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 RESULTS:

See the tables and plots on the following pages for 25 kHz channel spacing.

LIMIT CLAUSES: FCC 47 CFR 90.214

Transient Frequency Behaviour

SPECIFICATION: FCC 47 CFR 90.214

Tx FREQUENCY: 470.0125 MHz 50 W 25 kHz Channel Spacing

TRANSIENT RESPONSE PERIOD	CARRIER PEAK VARIATION FROM NORMAL	
	Key ON (kHz)	Key OFF (kHz)
t1	-1.1	N/A
t2	-0.3	N/A
t3	N/A	-2.5

Confirm that during periods t1 and t3 the frequency difference does not exceed the value of one channel separation.	YES	NO
	<input type="checkbox"/>	<input type="checkbox"/>
Confirm that during the period t2 the frequency difference does not exceed half a channel separation.	YES	NO
	<input type="checkbox"/>	<input type="checkbox"/>
Confirm that during the period t2 to t3 the frequency difference does not exceed the frequency error limit.	YES	NO
	<input type="checkbox"/>	<input type="checkbox"/>

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

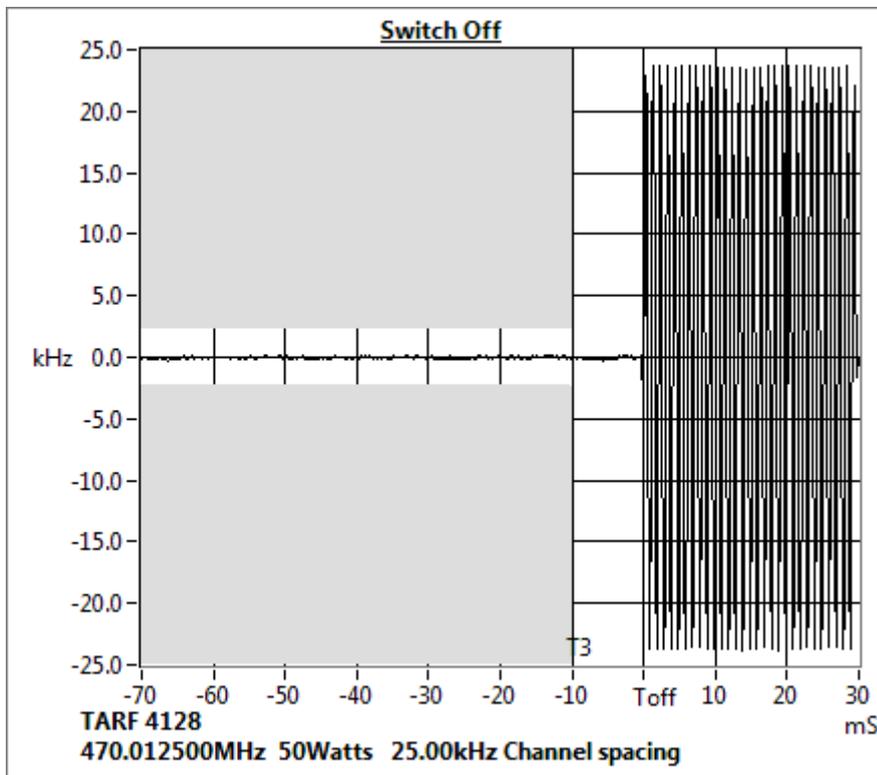
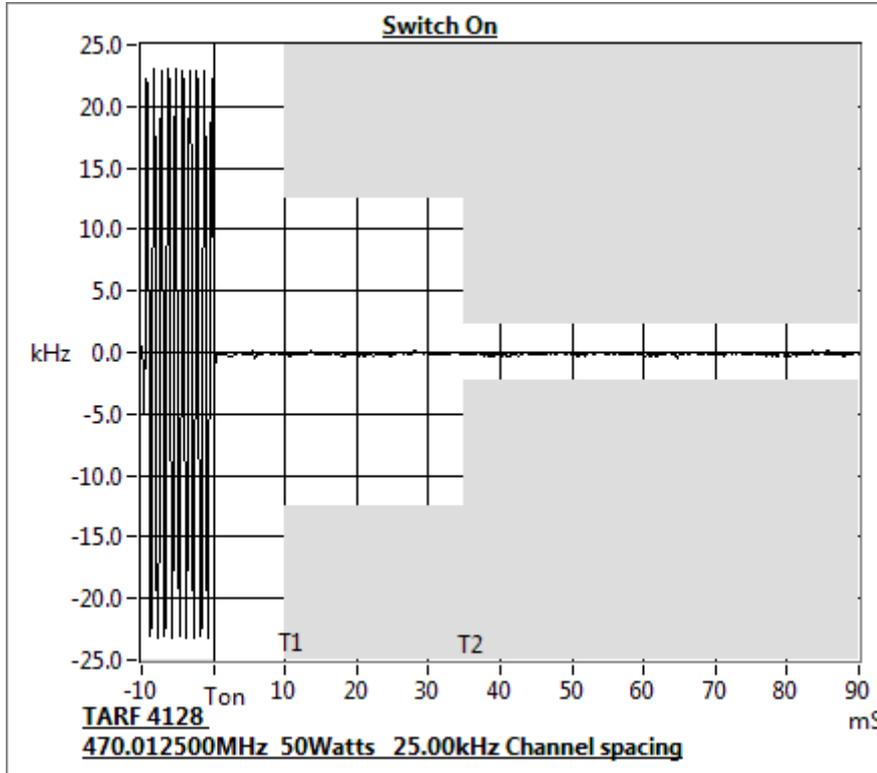
LIMIT: FCC 47 CFR 90.214

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

Transient Frequency Behaviour

SPECIFICATION: FCC 47 CFR 90.214

Tx FREQUENCY: 470.0125 MHz 50 W 25 kHz Channel Spacing



Transient Frequency Behaviour

SPECIFICATION: FCC 47 CFR 90.214

Tx FREQUENCY: 491.0 MHz 50 W 25 kHz Channel Spacing

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

Confirm that during periods t1 and t3 the frequency difference does not exceed the value of one channel separation.	YES	NO
	<input type="checkbox"/>	<input type="checkbox"/>
Confirm that during the period t2 the frequency difference does not exceed half a channel separation.	YES	NO
	<input type="checkbox"/>	<input type="checkbox"/>
Confirm that during the period t2 to t3 the frequency difference does not exceed the frequency error limit.	YES	NO
	<input type="checkbox"/>	<input type="checkbox"/>

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

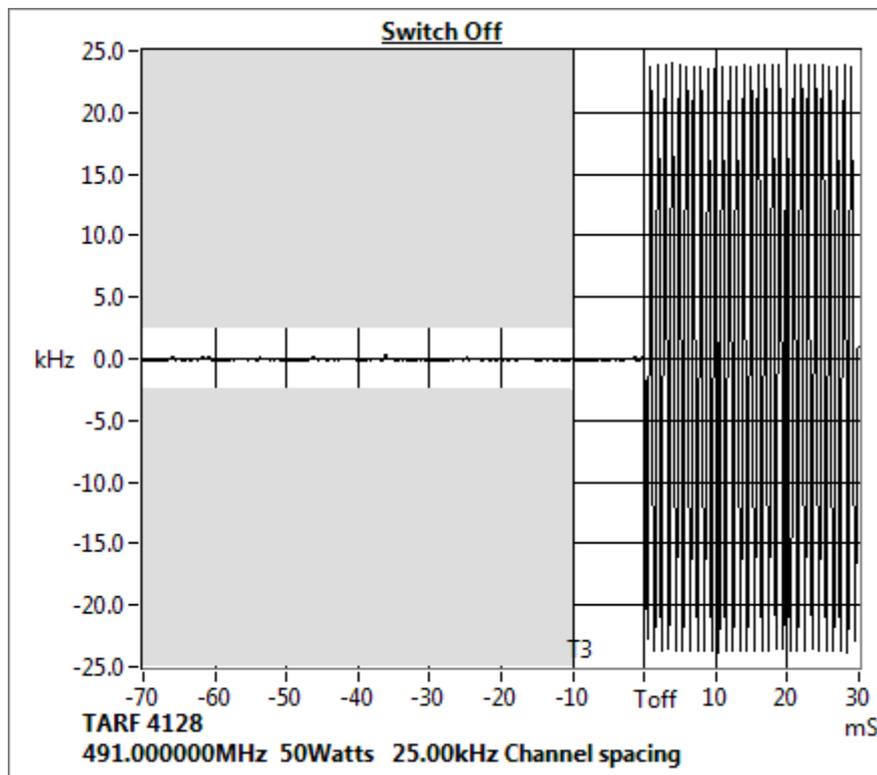
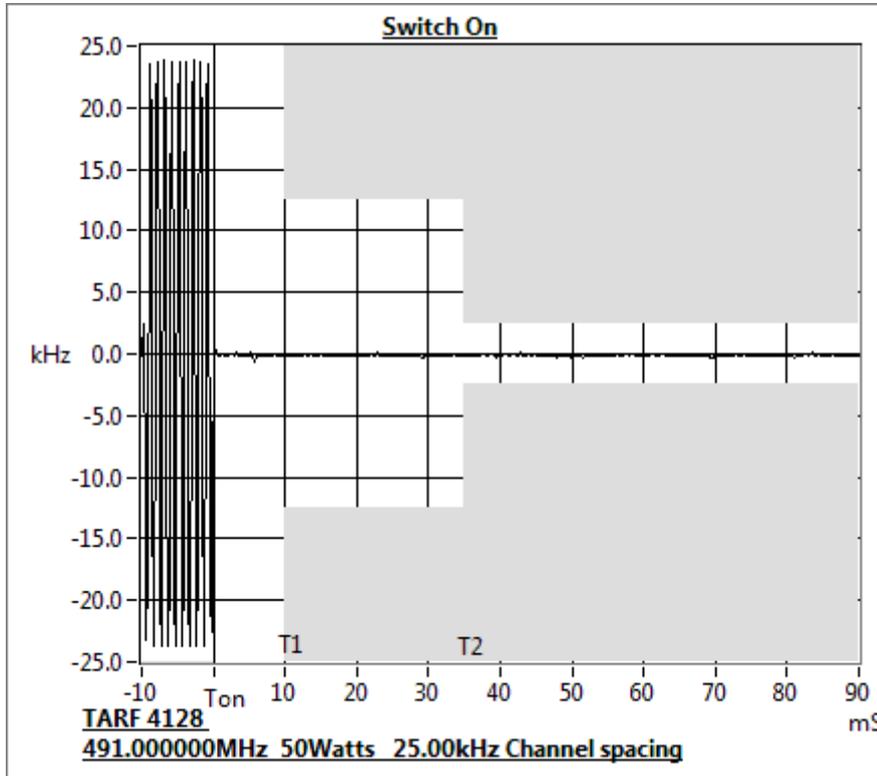
LIMIT: FCC 47 CFR 90.214

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

Transient Frequency Behaviour

SPECIFICATION: FCC 47 CFR 90.214

Tx FREQUENCY: 491.0 MHz 50 W 25 kHz Channel Spacing



Transient Frequency Behaviour

SPECIFICATION: FCC 47 CFR 90.214

Tx FREQUENCY: 511.975 MHz 50 W 25 kHz Channel Spacing

TRANSIENT RESPONSE PERIOD	CARRIER PEAK VARIATION FROM NORMAL	
	Key ON (kHz)	Key OFF (kHz)
t1	-1.7	N/A
t2	-0.3	N/A
t3	N/A	-1.2

Confirm that during periods t1 and t3 the frequency difference does not exceed the value of one channel separation.	YES	NO
	<input type="checkbox"/>	<input type="checkbox"/>
Confirm that during the period t2 the frequency difference does not exceed half a channel separation.	YES	NO
	<input type="checkbox"/>	<input type="checkbox"/>
Confirm that during the period t2 to t3 the frequency difference does not exceed the frequency error limit.	YES	NO
	<input type="checkbox"/>	<input type="checkbox"/>

Measurement Uncertainty: Frequency ± 130 Hz; Time ± 0.2%

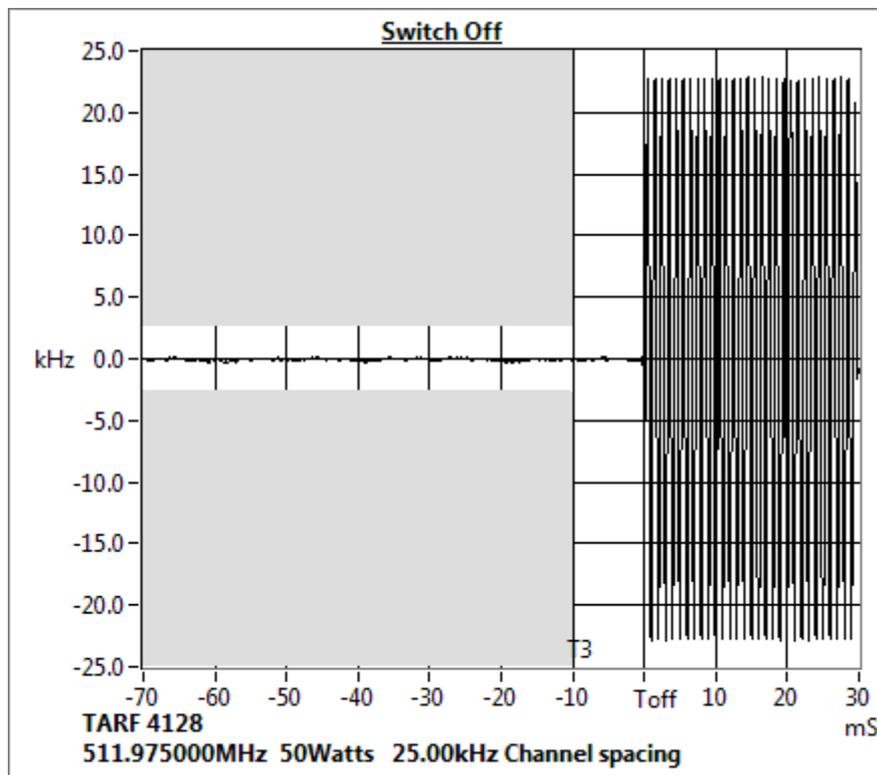
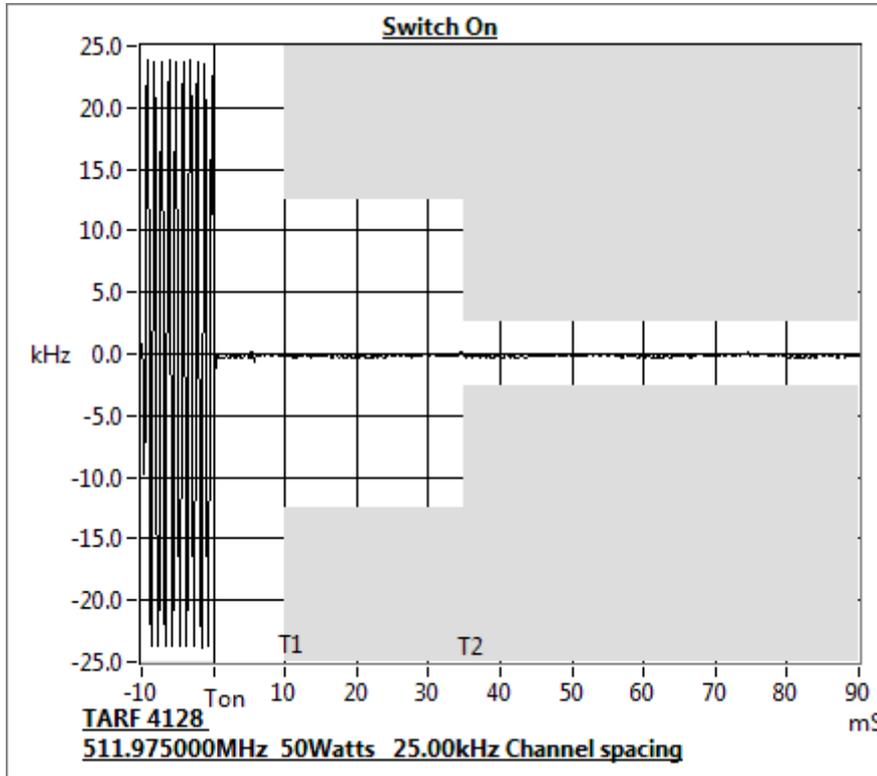
LIMIT: FCC 47 CFR 90.214

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

Transient Frequency Behaviour

SPECIFICATION: FCC 47 CFR 90.214

Tx FREQUENCY: 511.975 MHz 50 W 25 kHz Channel Spacing



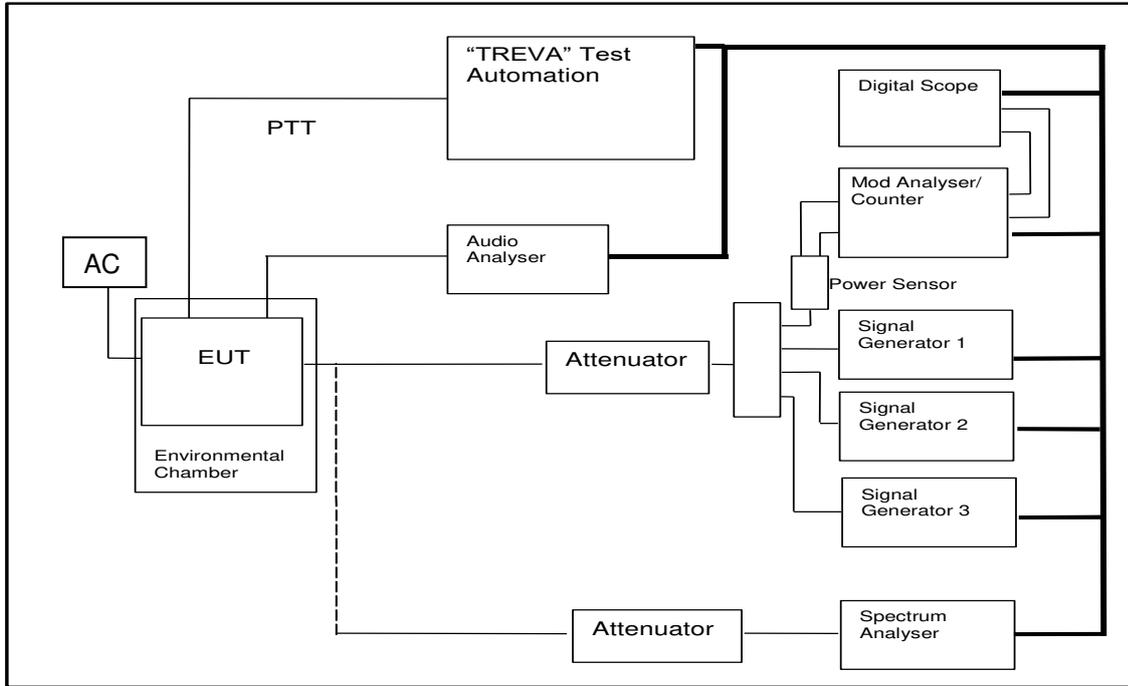
TEST EQUIPMENT LIST

Equipment Type	Information	Manufacturer	Model No	Serial No#	Tait ID	Cal Due
Audio Analyser	TREVA1	Hewlett Packard	HP8903A	2437A04625	E4986	25-Sep-21
Coax Cable	2m Black	Suhner	RG214HF/Nm/Nm/2000	TeltestBlack7	E5004	28-Oct-20
Coax Cable	2.5m Blue	Suhner	Sucoflex 104A	33449/4PEA	E4997	23-Oct-20
Coax Cable	3m Blue	Suhner	Sucoflex 126EA	503429/126EA	E5015	23-Oct-20
Modulation Analyser	TREVA1	Hewlett Packard	HP8901B (Opt 002)	2441A00393	E3073	28-Sep-21
Oscilloscope	100MHz Digital	Tektronics	TDS340	B013611	E3585	3-Oct-21
Power Supply	TREVA1	Agilent	HP6032A	MY41000319	E4045	25-Sep-22
RF Attenuator	TREVA 1 20dB 150W	Weinschel	40-20-23	MF817	E4082	28-Oct-20
RF Attenuator	30+3dB 350W	Weinschel	67-30-33 & BW-N3W5+	CK9178	E5023	23-Oct-20
RF Attenuator	TREVA1 3dB	Weinschel	Model 1	BL9958	E4081	24-Oct-20
RF Combiner	TREVA1	Minicircuits	ZFSC-4-1	-	E4083	
Spectrum Analyser	26.5GHz	Agilent	PXA N9030A	MY49432161	E4907	27-Oct-20
Temp & Humidity datalogger		Hobo	U21-011	10134276	E4981	7-Jul-21
Testware	Occupied Bandwidth		July 2019	-	-	
Testware	Sideband Spectrum		February 2017	-	-	
Testware	TREVA		29/01/2020	-	-	
TREVA 1		Teltest	-	1	-	2-Dec-20

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

ANNEX A – TEST SETUP DETAILS

All testing is performed using the Teltest Radio **EVA**luation system (TREVA), which is configured as shown below. The Spectrum Analyser is connected to the EUT via the attenuator network for Occupied Bandwidth and Sideband Spectrum.



END OF REPORT