REPORT NUMBER 1919 SEPTEMBER 2003

RADIO PERFORMANCE MEASUREMENTS

On the TMAB12-H500 Mobile Transceiver

FCC ID: CASTMAH5A

SN: 19001327

In accordance with

FCC 47 CFR Parts 22 and 90

PREPARED BY: Garry Pringle _____
Test Technician

CHECKED & APPROVED BY: SA Crompton _____
Laboratory Manager

577 new zealand accredited laboratory

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REPORT ON :

Type Approval Testing of the TMAB12-H500 (Serial No 19001327)
in accordance with:

FCC CFR 47 Parts 22 & 90

Report No 1919

FCC ID: CASTMAH5A

PREPARED FOR :

Tait Electronics Ltd
PO Box 1645
558 Wairakei Rd
Christchurch
New Zealand

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Tait Electronics Ltd	Mr. Dave Wright	Copy No 3

APPROVED :

S. A. Crompton

Compliance Laboratory Manager

Date :

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

Copy No:

DECLARATION OF CONFORMITY

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

Equipment:	Mobile Transceiver
Type:	TMAH5A
Product code:	TMAB12-H500
Serial Numbers:	19001327
Quantity:	1

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

FCC CFR 47 Parts 22 & 90

Signature:_____

S. A. Crompton
Compliance Laboratory Manager.

Date:_____

TABLE OF CONTENTS

NAME OF TEST: TRANSMITTER OUTPUT POWER (CONDUCTED)

TEST CONDITIONS:

Ambient Temperature	23 °C
Relative Humidity	46 %
Standard Voltage	13.8 V DC

SPECIFICATION: FCC 47 CFR 2.1046

GUIDE: TIA/EIA-603 2.2.1

MEASUREMENT PROCEDURE:
1. The Equipment Under Test (EUT) was set up as shown in the following diagram.
2. The coaxial attenuator has an impedance of 50 Ohms.
3. The unmodulated output power was measured with an RF Power meter.

MEASUREMENT RESULTS:

Manufacturer's Rated Output Power: Switchable: 1 W and 25 W

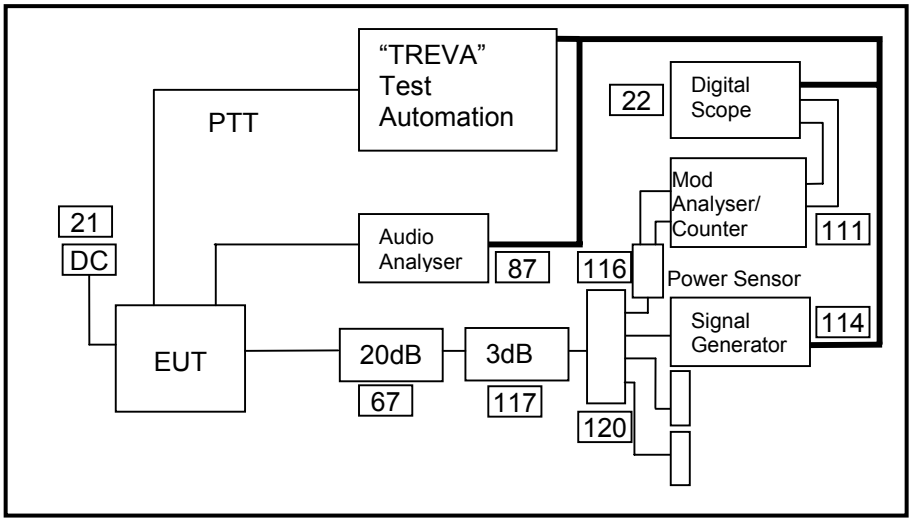
425.1 MHz	1 W nominal	25 W nominal
POWER (W)	1.0	24.6
Variation from Nominal (%)	0.0	-1.6
MHz	1 W nominal	25 W nominal
POWER (W)	~	~
Variation from Nominal (%)	~	~
Measurement Uncertainty (dB)	+0.63 -0.68	

LIMIT CLAUSE: FCC 47 CFR 90.205

Radio Type: Mobile Transceiver
Frequency Band: 421 MHz ~ 512 MHz

(o) The output power shall not exceed by more than 20% the manufacturer's rated output power for the particular transmitter.

TEST SETUP: See page 46 for Test Equipment information.



NAME OF TEST:	AUDIO FREQUENCY FILTER RESPONSE	
TEST CONDITIONS:	Ambient Temperature	°C
	Relative Humidity	%
	Standard Voltage	V DC
SPECIFICATION:	FCC 47 CFR 2.1047	
GUIDE:	TIA/EIA-603 2.2.15	

MEASUREMENT PROCEDURE:

This test was not carried out as the EUT meets the emission limits specified in §90.210.

MEASUREMENT RESULTS:
See Occupied Bandwidth tests on

LIMIT CLAUSE: FCC 47 CFR 90.211 (a)

(a) Transmitters utilizing analog emissions that are equipped with an audio low-pass filter must meet the emission limitations specified in §90.210….

TEST SETUP: See page – Occupied Bandwidth

NAME OF TEST:	TRANSMITTER AUDIO FREQUENCY RESPONSE PRE-EMPHASIS	
TEST CONDITIONS:	Ambient Temperature	23 °C
	Relative Humidity	46 %
	Standard Voltage	13.8 V DC
SPECIFICATION:	FCC 47 CFR 2.1047 (a)	
GUIDE:	TIA/EIA-603 2.2.6	

MEASUREMENT PROCEDURE:
1. The Equipment Under Test (EUT) was set up as shown in the following diagram.
2. An audio input tone of 1000Hz was applied with the level set to obtain 20% of maximum deviation. This was used as the 0dB reference point.
3. The AF was varied while the audio level was held constant.
4. The response in dB relative to 1000Hz was measured.

MEASUREMENT RESULTS:
See the plots on the following pages for 12.5 kHz & 25.0 kHz channel spacings.
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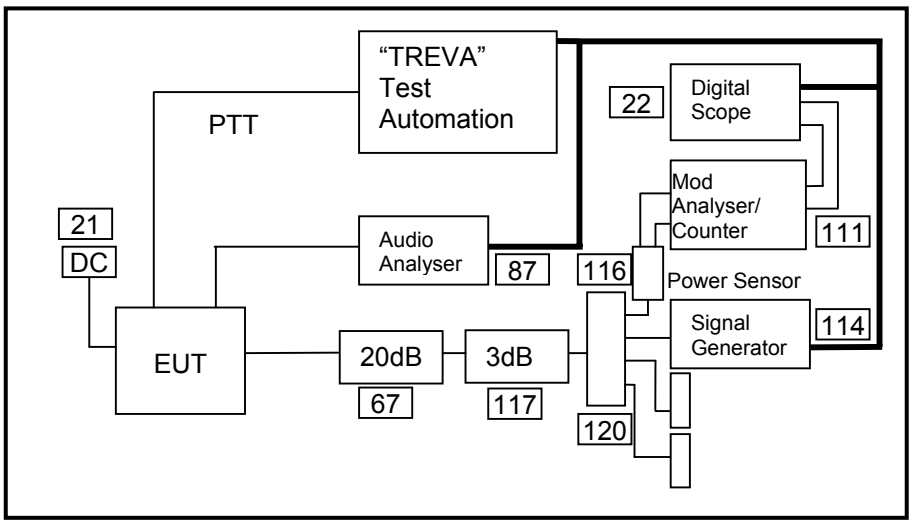
LIMIT CLAUSE: TIA/EIA-603 2.2.6

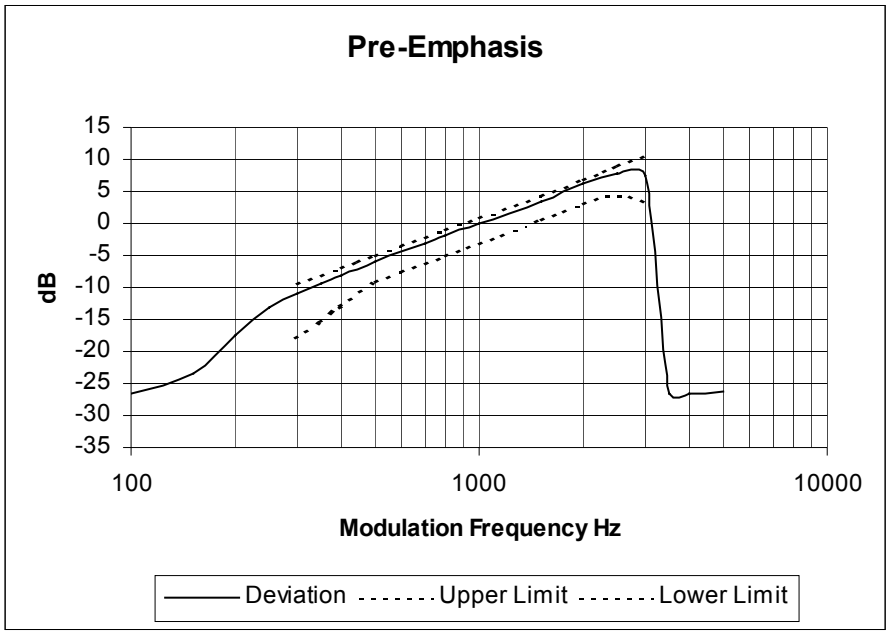
TEST SETUP: See page 46 for Test Equipment information.



NAME OF TEST: TRANSMITTER AUDIO FREQUENCY RESPONSE
PRE-EMPHASIS

SPECIFICATION: FCC CFR 2.1047 (a)

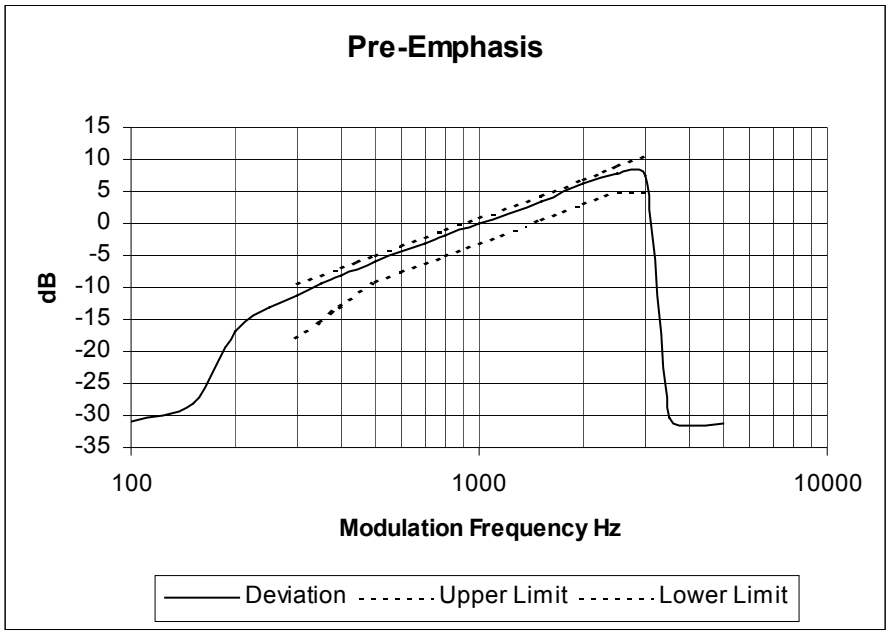
Tx FREQUENCY: 425.1 MHz 12.5 kHz Channel Spacing



NAME OF TEST: TRANSMITTER AUDIO FREQUENCY RESPONSE
PRE-EMPHASIS

SPECIFICATION: FCC CFR 2.1047 (a)

Tx FREQUENCY: 425.1 MHz 25.0 kHz Channel Spacing



NAME OF TEST: TRANSMITTER MODULATION LIMITING

TEST CONDITIONS:

Ambient Temperature	23 °C
Relative Humidity	46 %
Standard Voltage	13.8 V DC

SPECIFICATION: FCC 47 CFR 2.1047 (b)

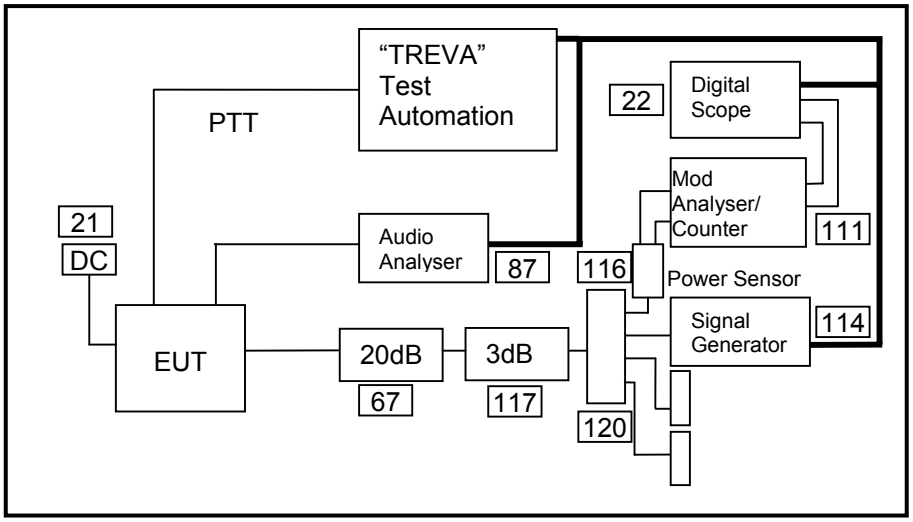
GUIDE: TIA/EIA-603 2.2.3

MEASUREMENT PROCEDURE:
1. The EUT was set up as shown in the following diagram.
2. The modulation response was measured at three audio frequencies while varying the input level.
3. Measurements were made for both Positive and Negative Deviation.

MEASUREMENT RESULTS:
See the plots on the following pages for 12.5 kHz & 25.0 kHz channel spacings.

LIMIT CLAUSE: FCC 47 CFR 90.211 (a)

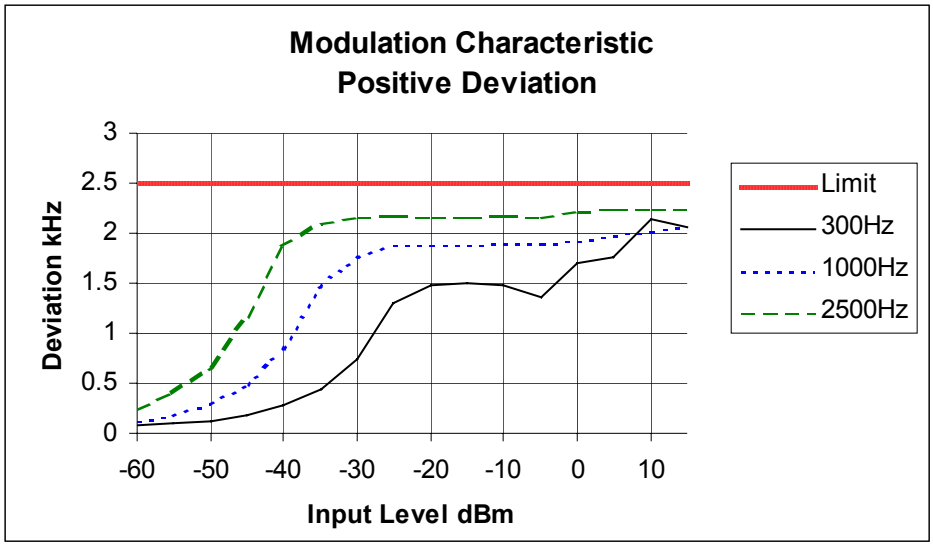
TEST SETUP: See page 46 for Test Equipment information.

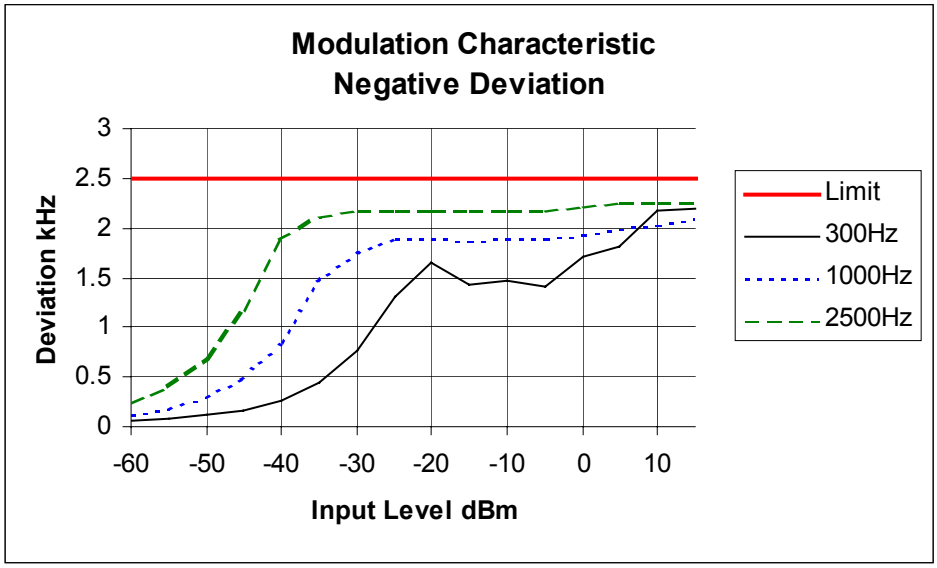


NAME OF TEST: TRANSMITTER MODULATION LIMITING

SPECIFICATION: FCC CFR 2.1047 (b)

Tx FREQUENCY: 425.1 MHz 12.5 kHz Channel Spacing

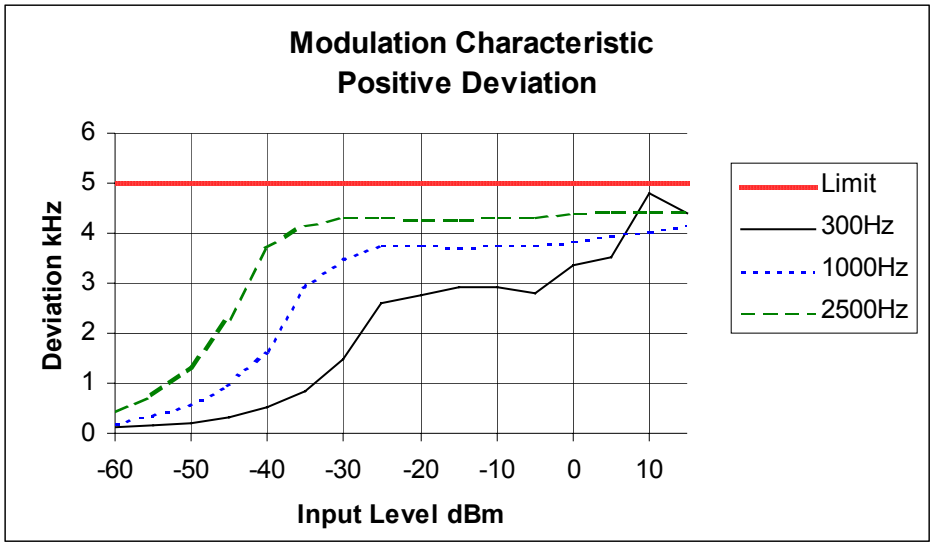


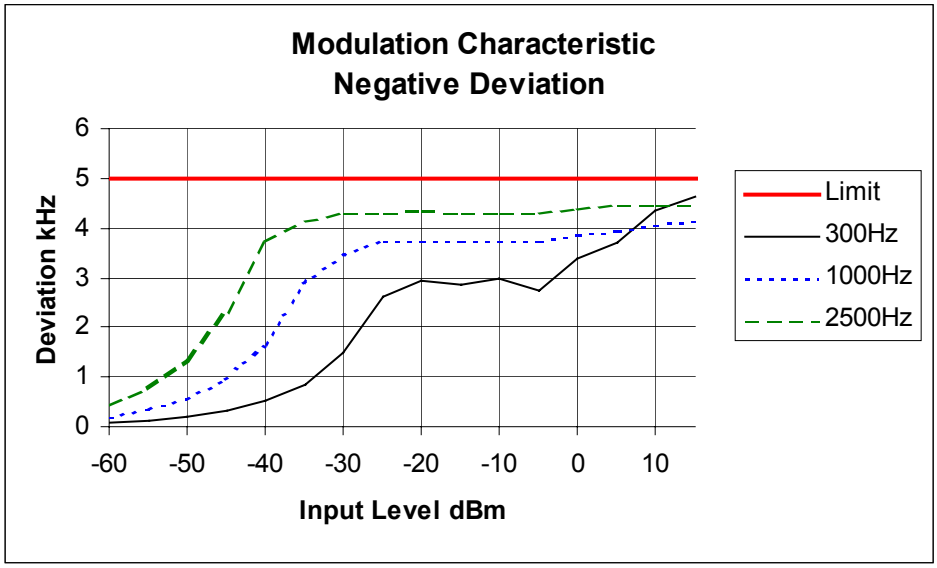


NAME OF TEST: TRANSMITTER MODULATION LIMITING

SPECIFICATION: FCC CFR 2.1047 (b)

Tx FREQUENCY: 425.1 MHz 25.0 kHz Channel Spacing



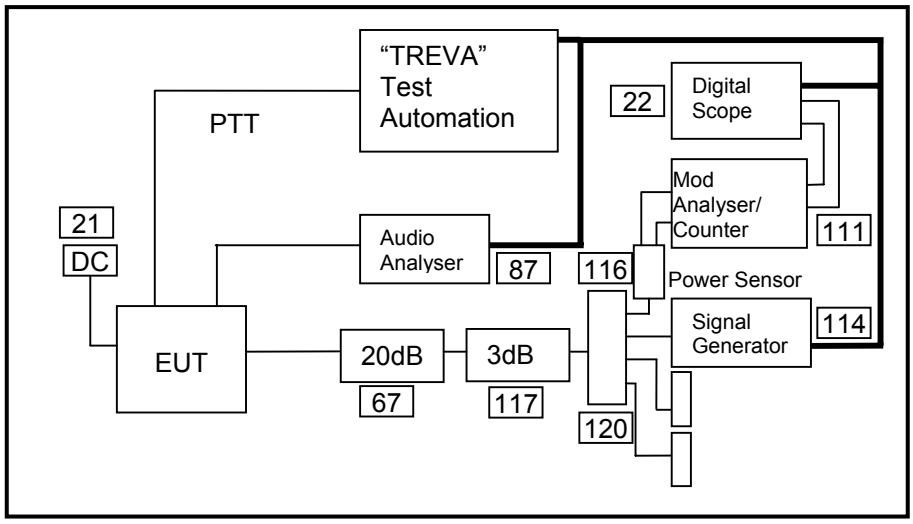


NAME OF TEST:	TRANSMITTER MODULATION LIMITING STEADY STATE
TEST CONDITIONS:	Ambient Temperature 23 °C Relative Humidity 46 % Standard Voltage 13.8 V DC
SPECIFICATION:	FCC 47 CFR 2.1047 (b)
GUIDE:	TIA/EIA-603 2.2.3

MEASUREMENT PROCEDURE:
1. The Equipment Under Test was set up as shown in the following diagram.
2. The modulation response was measured with a level stepped 20 dB above the level required to obtain 60% deviation at 1000Hz AF.
3. Measurements were made for both Positive and Negative deviation.

MEASUREMENT RESULTS:
See the plots on the following pages for 12.5 kHz & 25.0 kHz channel spacings.

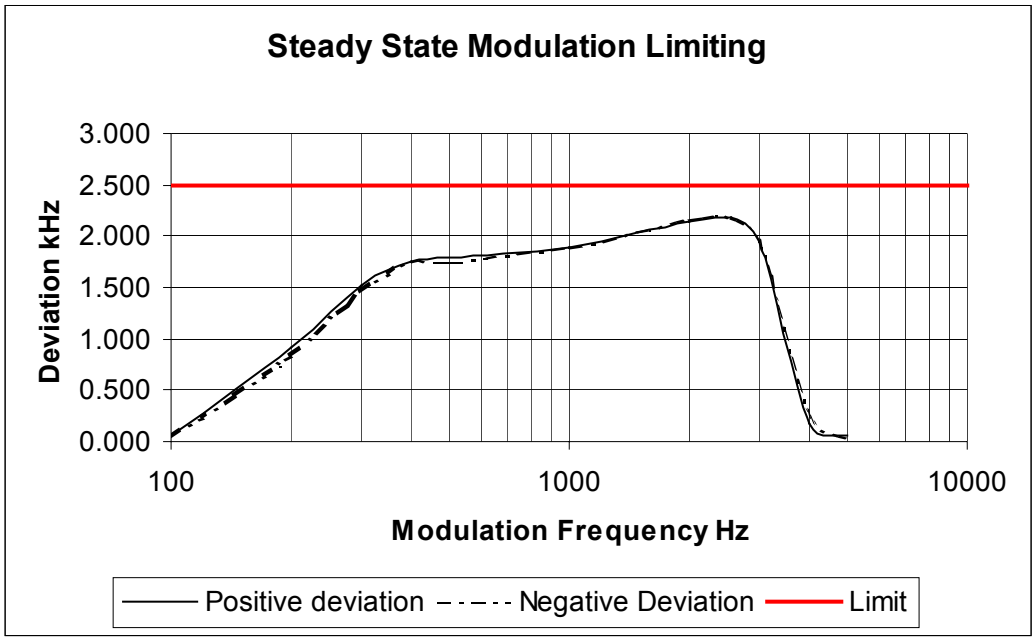
LIMIT CLAUSE:	FCC 47 CFR 90.211 (a) 2.1047 (b)
TEST SETUP:	See page 46 for Test Equipment information.



NAME OF TEST: TRANSMITTER MODULATION LIMITING
STEADY STATE

SPECIFICATION: FCC CFR 2.1047 (b)

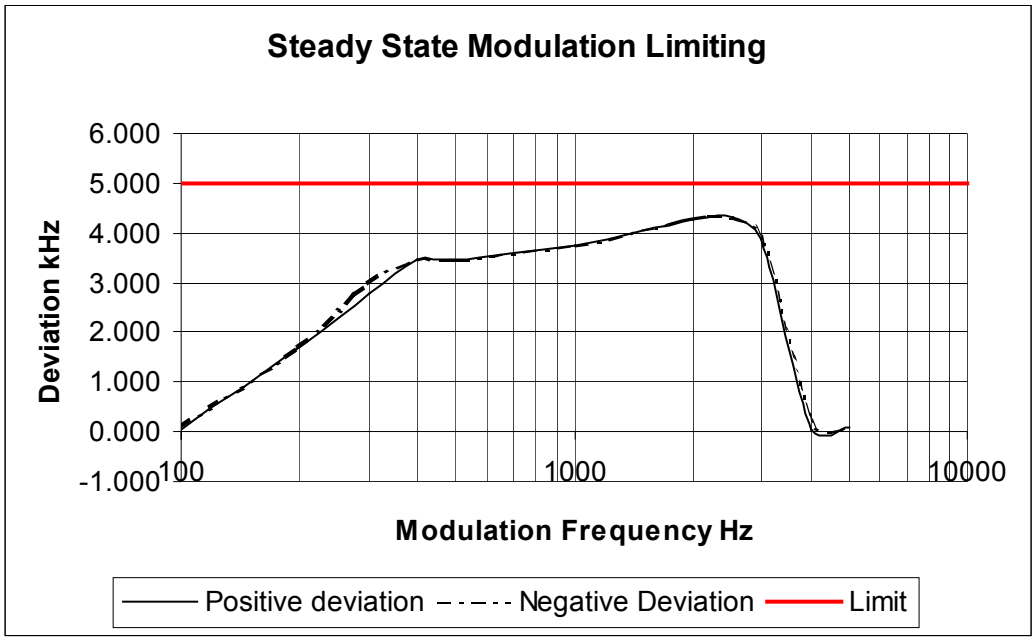
Tx FREQUENCY: 425.1 MHz 12.5 kHz Channel Spacing



NAME OF TEST: TRANSMITTER MODULATION LIMITING
STEADY STATE

SPECIFICATION: FCC CFR 2.1047 (b)

Tx FREQUENCY: 425.1 MHz 25.0 kHz Channel Spacing



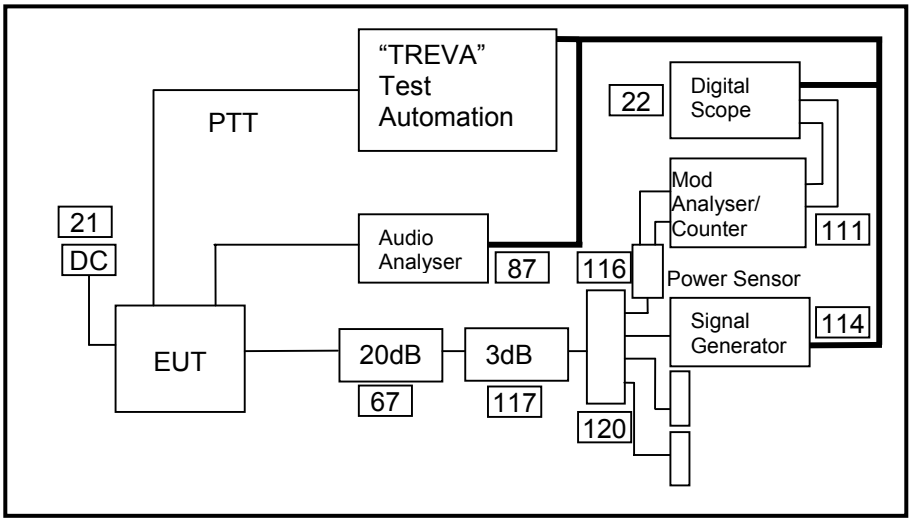
NAME OF TEST:	TRANSMITTER MODULATION LIMITING INSTANTANEOUS	
TEST CONDITIONS:	Ambient Temperature	23 °C
	Relative Humidity	46 %
	Standard Voltage	13.8 V DC
SPECIFICATION:	FCC 47 CFR 2.1047 (b)	
GUIDE:	TIA/EIA-603 2.2.3	

MEASUREMENT PROCEDURE:
1. The Equipment Under Test was set up as shown in the following diagram.
2. The modulation response was measured with a level stepped 20 dB above the level required to obtain 60% deviation at 1000Hz AF.
3. Measurements were made for both Positive and Negative deviation.

MEASUREMENT RESULTS:
See the plots on the following pages for 12.5 kHz & 25.0 kHz channel spacings.

LIMIT CLAUSE: FCC 47 CFR 90.211 (a) 2.1047 (b)

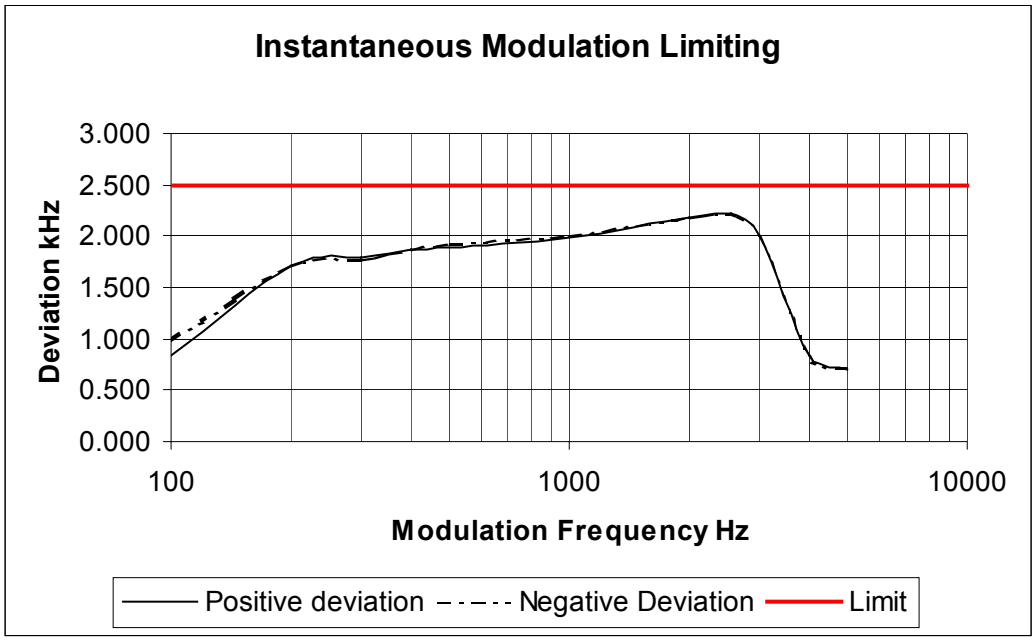
TEST SETUP: See page 46 for Test Equipment information.



NAME OF TEST: TRANSMITTER MODULATION LIMITING INSTANTANEOUS

SPECIFICATION: FCC CFR 2.1047 (b)

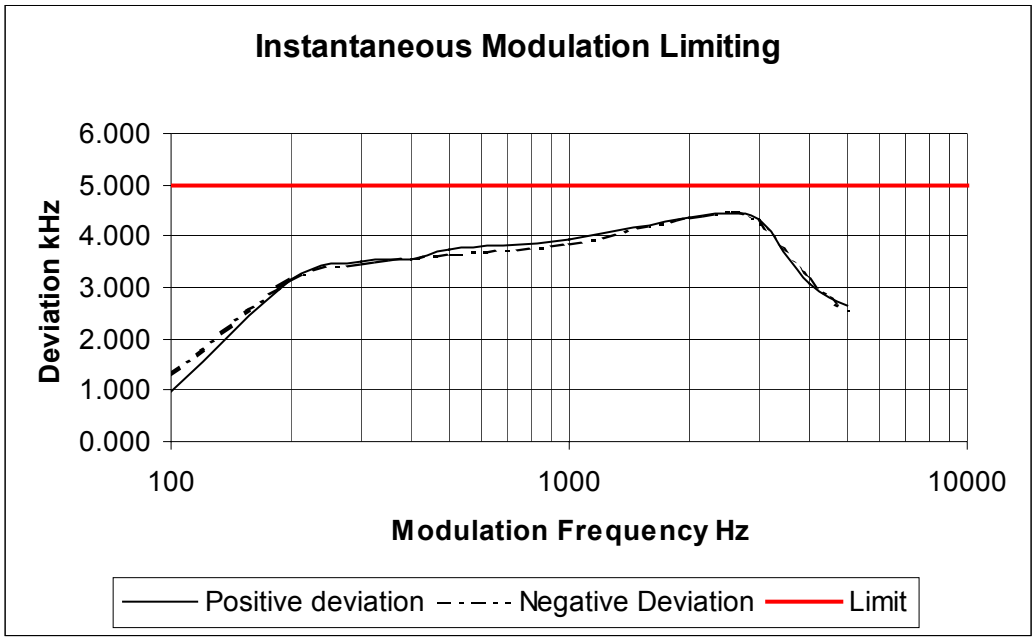
Tx FREQUENCY: 425.1 MHz 12.5 kHz Channel Spacing



NAME OF TEST: TRANSMITTER MODULATION LIMITING INSTANTANEOUS

SPECIFICATION: FCC CFR 2.1047 (b)

Tx FREQUENCY: 425.1 MHz 25.0 kHz Channel Spacing



NAME OF TEST:	OCCUPIED BANDWIDTH	
TEST CONDITIONS:	Ambient Temperature	23 °C
	Relative Humidity	49 %
	Standard Voltage	13.8 V DC
SPECIFICATION:	FCC 47 CFR 2.1049 (c)	
GUIDE:	TIA/EIA-603 2.2.11	

MEASUREMENT PROCEDURE:
1. The Equipment Under Test was set up as shown in the following diagram.
2. For analogue measurements: The EUT was modulated by a 2500Hz tone at an input level 16dB 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 pseudorandom bit sequence at the appropriate Baud rates.
3. The Occupied Bandwidth was measured on the Spectrum Analyser with the controls set as shown on the following plots.

MEASUREMENT RESULTS:
See the plots on the following pages for 12.5 kHz & 25.0 kHz channel spacings.

LIMIT CLAUSE: FCC 47 CFR 90.210

EMISSION MASKS

Emission Mask D	12.5 kHz Channel Spacing	Analog; FFSK; THSD
Emission Mask B	25.0 kHz Channel Spacing	Analog;
Emission Mask C	25.0 kHz Channel Spacing	FFSK; THSD

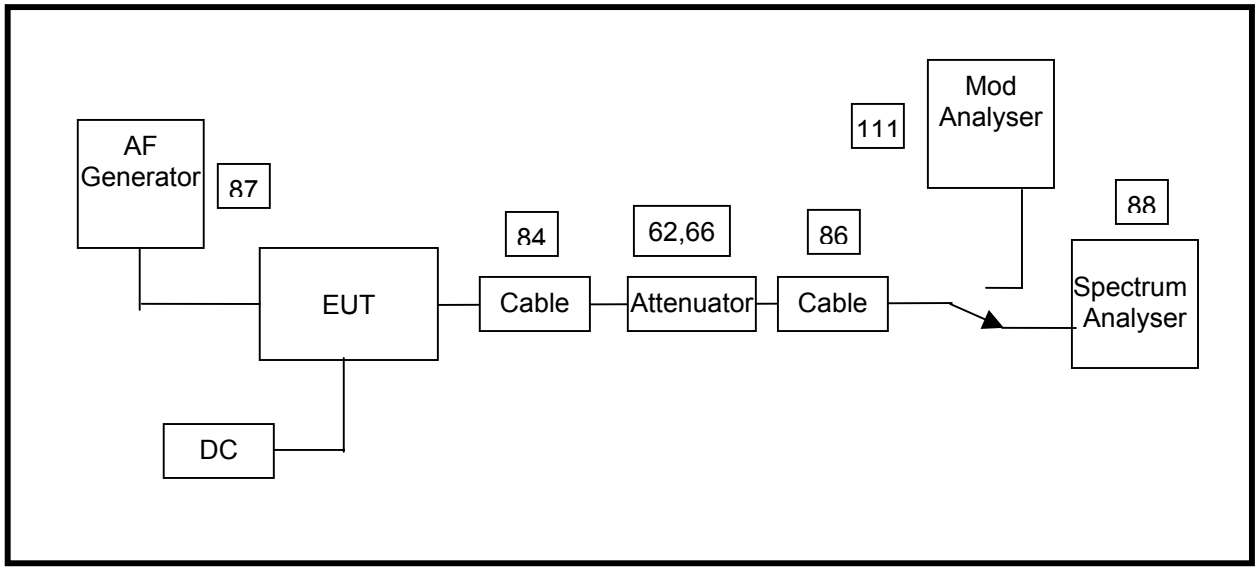
DATA SPEED

FFSK	1200 bps	12.5 kHz Channel Spacing
FFSK	1200 bps	25.0 kHz Channel Spacing
THSD	12000 bps	12.5 kHz Channel Spacing
THSD	19200 bps	25.0 kHz Channel Spacing

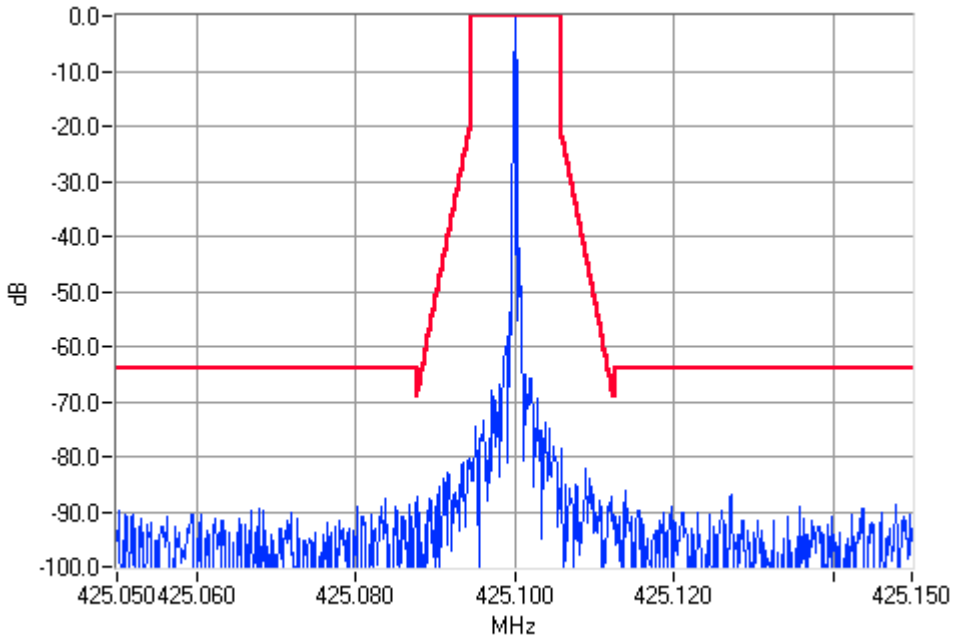
(FFSK is Fast Frequency Shift Keying; THSD is Tait High Speed Data)

TEST SETUP: For analogue modulation

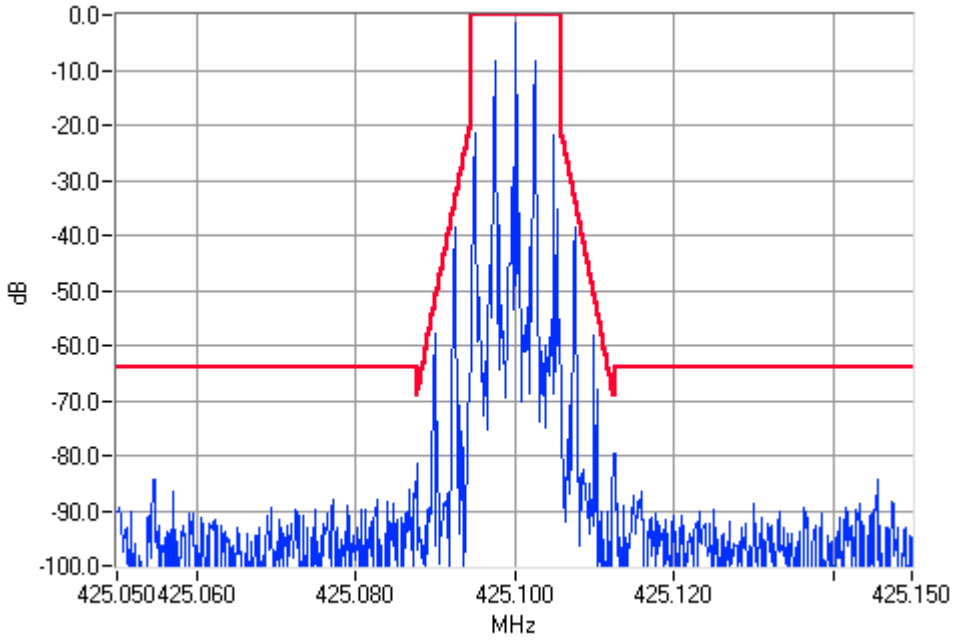
See page 46 for Test Equipment information



NAME OF TEST:	OCCUPIED BANDWIDTH		VOICE
SPECIFICATION:	FCC CFR 2.1049 (c)		
Tx FREQUENCY:	425.1 MHz	25W	12.5 kHz Channel Spacing



Unmodulated 425.1000MHz Mask D 25W Pass

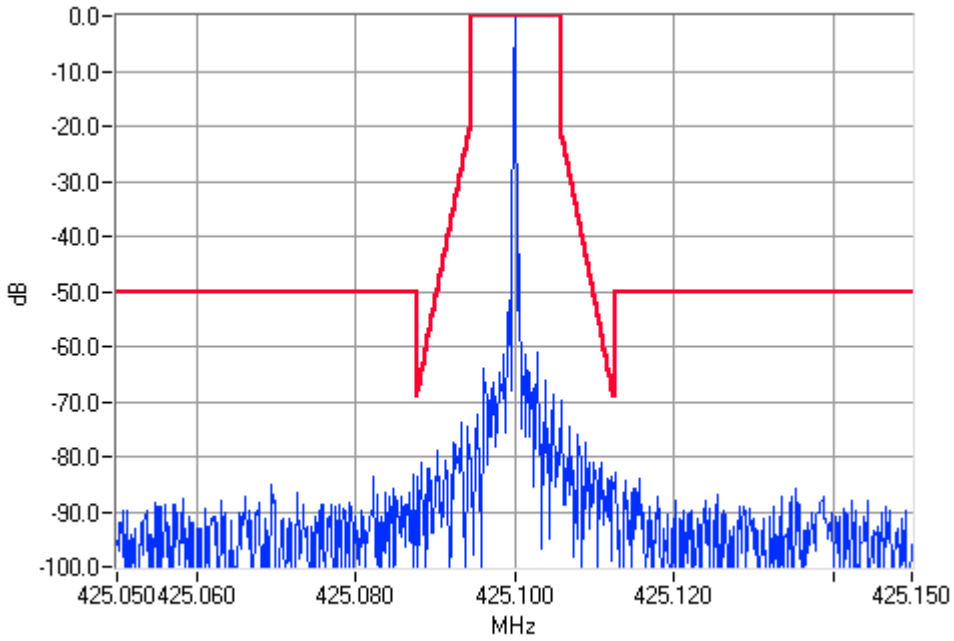


Analogue Modulation 425.1000MHz Mask D 25W Pass

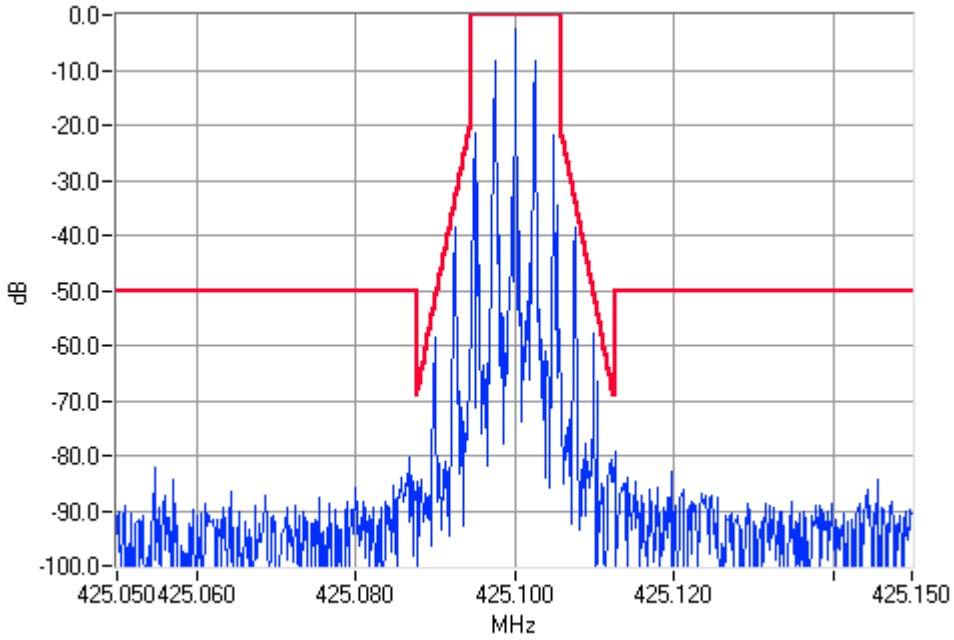
NAME OF TEST: OCCUPIED BANDWIDTH VOICE

SPECIFICATION: FCC CFR 2.1049 (c)

Tx FREQUENCY: 425.1 MHz 1W 12.5 kHz Channel Spacing

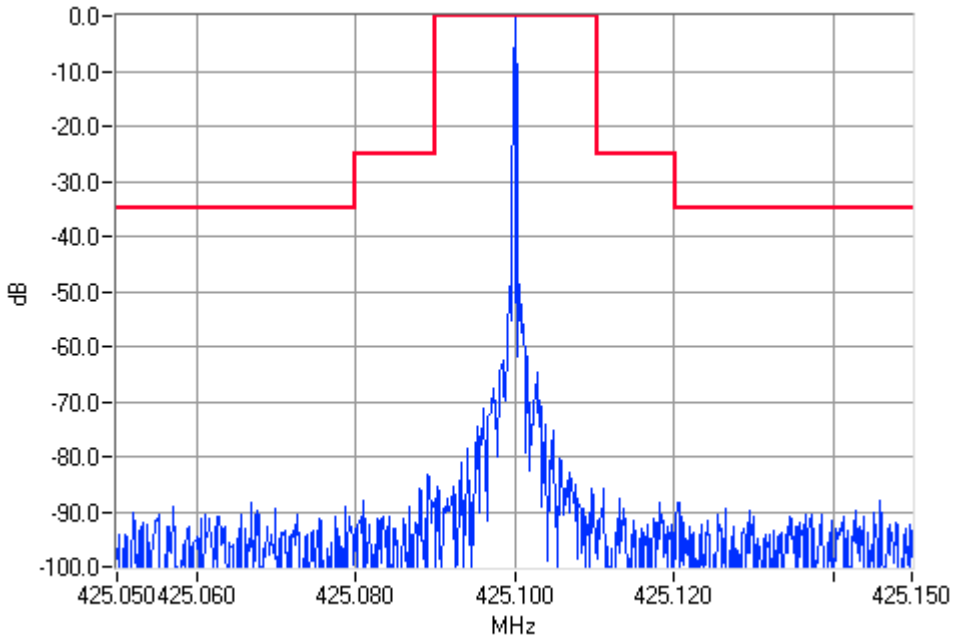


Unmodulated 425.1000MHz Mask D 1W Pass

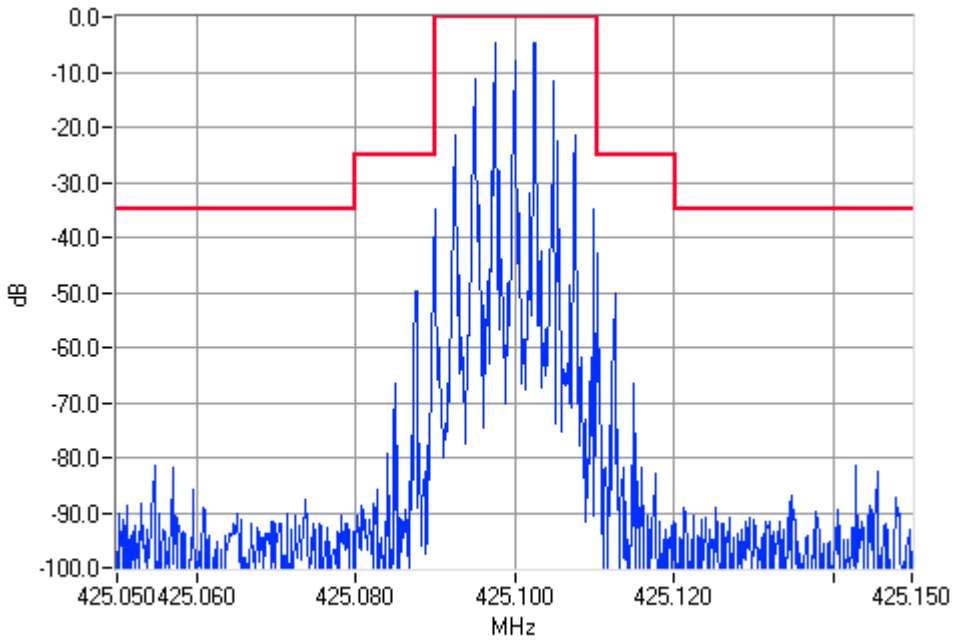


Analogue Modulation 425.1000MHz Mask D 1W Pass

NAME OF TEST:	OCCUPIED BANDWIDTH		VOICE
SPECIFICATION:	FCC CFR 2.1049 (c)		
Tx FREQUENCY:	425.1 MHz	25W	25.0 kHz Channel Spacing

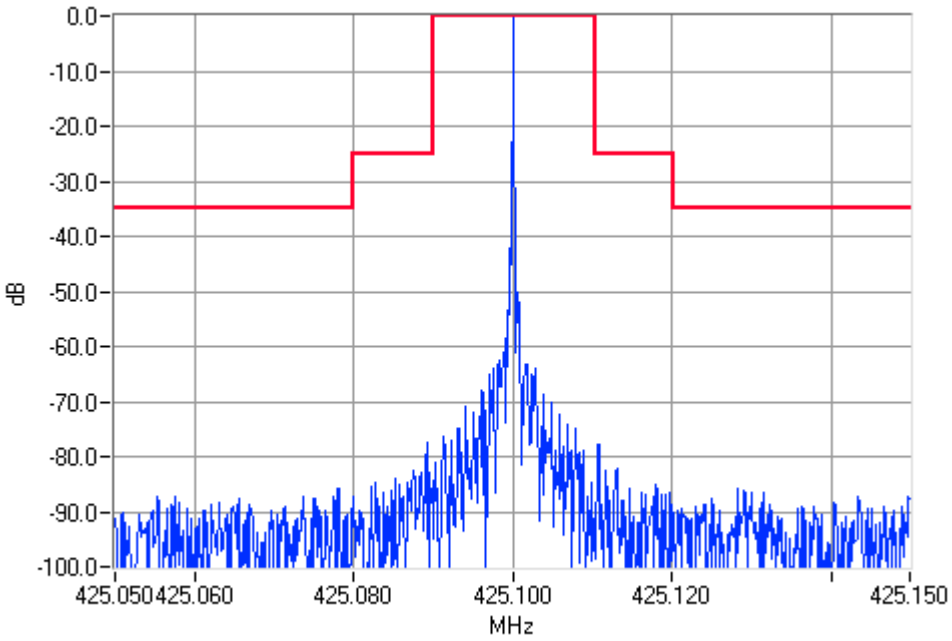


Unmodulated 425.1000MHz Mask B 25W Pass

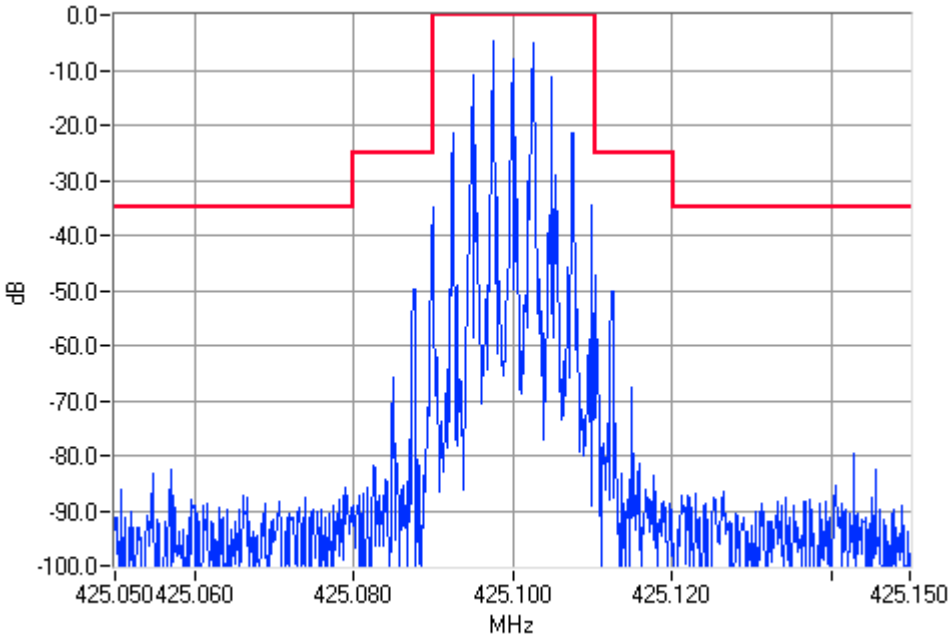


Analogue Modulation 425.1000MHz Mask B 25W Pass

NAME OF TEST:	OCCUPIED BANDWIDTH		VOICE
SPECIFICATION:	FCC CFR 2.1049 (c)		
Tx FREQUENCY:	425.1 MHz	1W	25.0 kHz Channel Spacing



Unmodulated 425.1000MHz Mask B 1W Pass

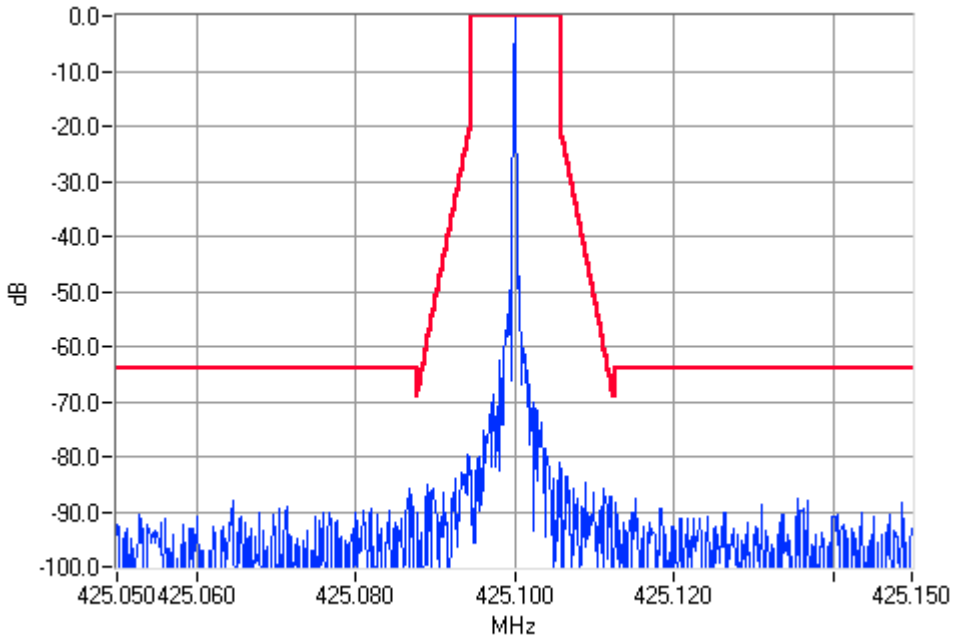


Analogue Modulation 425.1000MHz Mask B 1W Pass

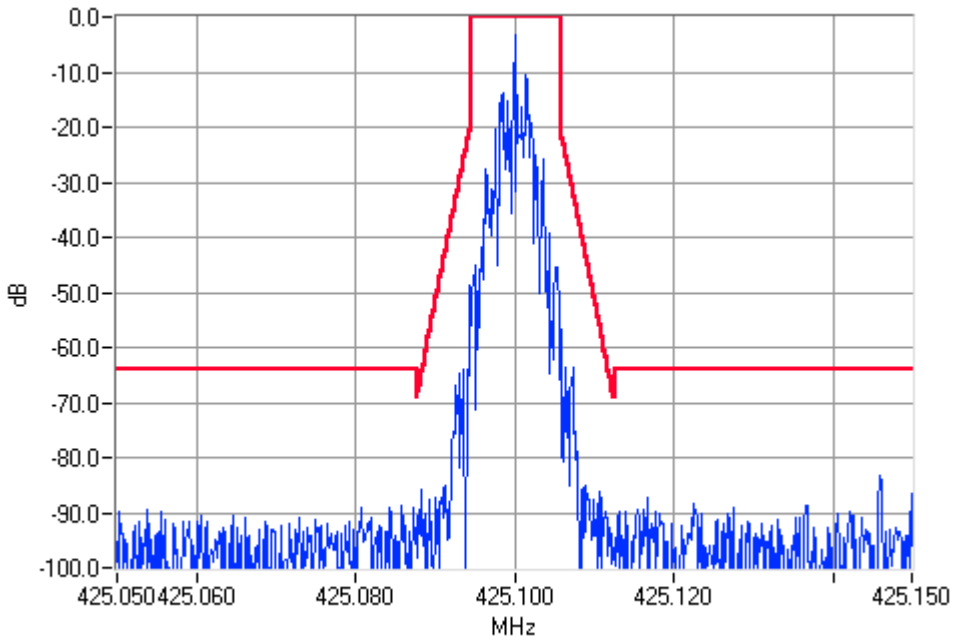
NAME OF TEST: OCCUPIED BANDWIDTH DATA FFSK

SPECIFICATION: FCC CFR 2.1049 (c)

Tx FREQUENCY: 425.1 MHz 25W 12.5 kHz Channel Spacing



Unmodulated 425.1000MHz Mask D 25W Pass

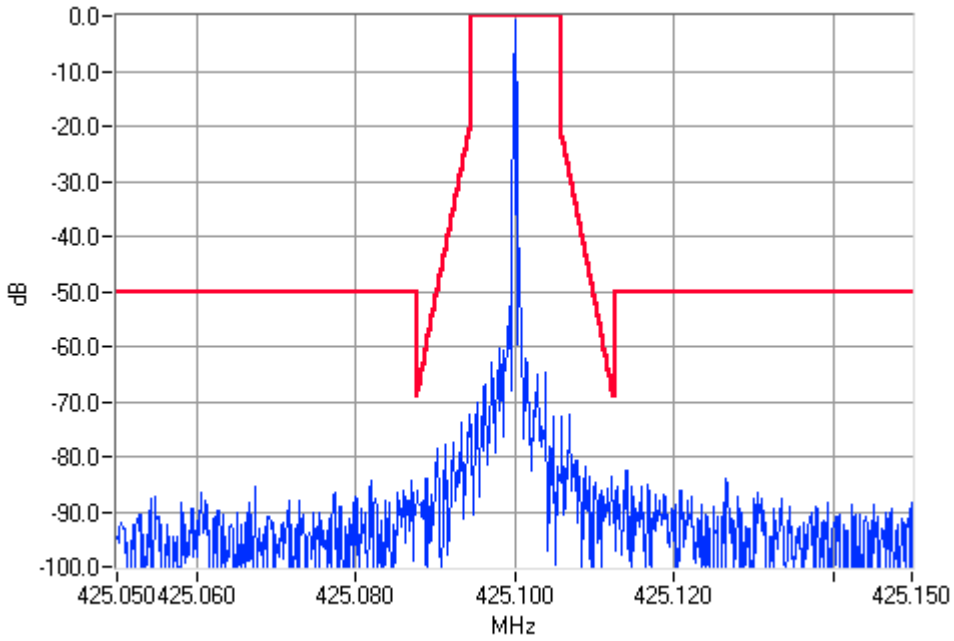


Digital Modulation 425.1000MHz Mask D 25W Pass

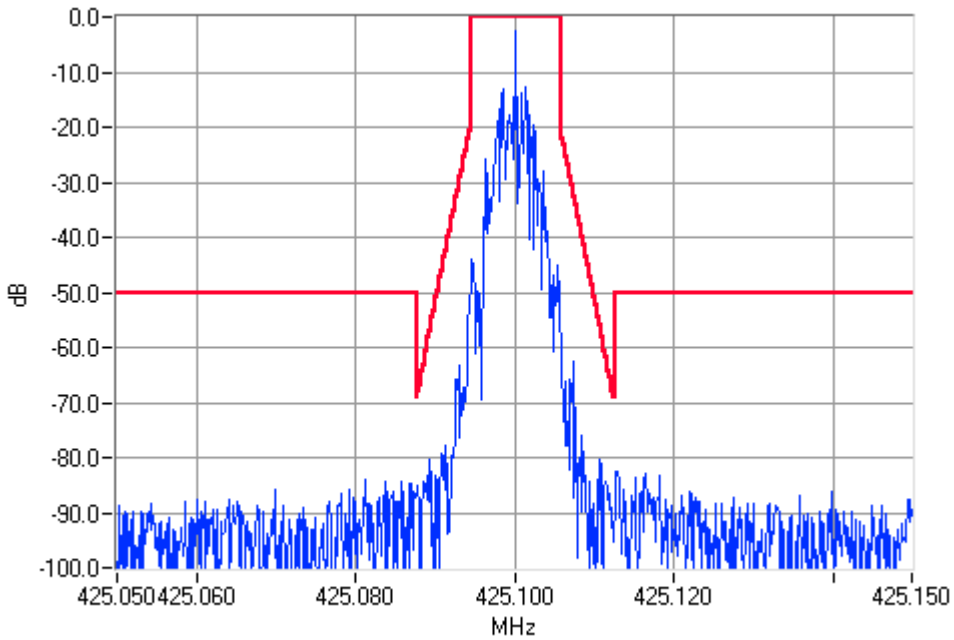
NAME OF TEST: OCCUPIED BANDWIDTH DATA FFSK

SPECIFICATION: FCC CFR 2.1049 (c)

Tx FREQUENCY: 425.1 MHz 1W 12.5 kHz Channel Spacing



Unmodulated 425.1000MHz Mask D 1W Pass

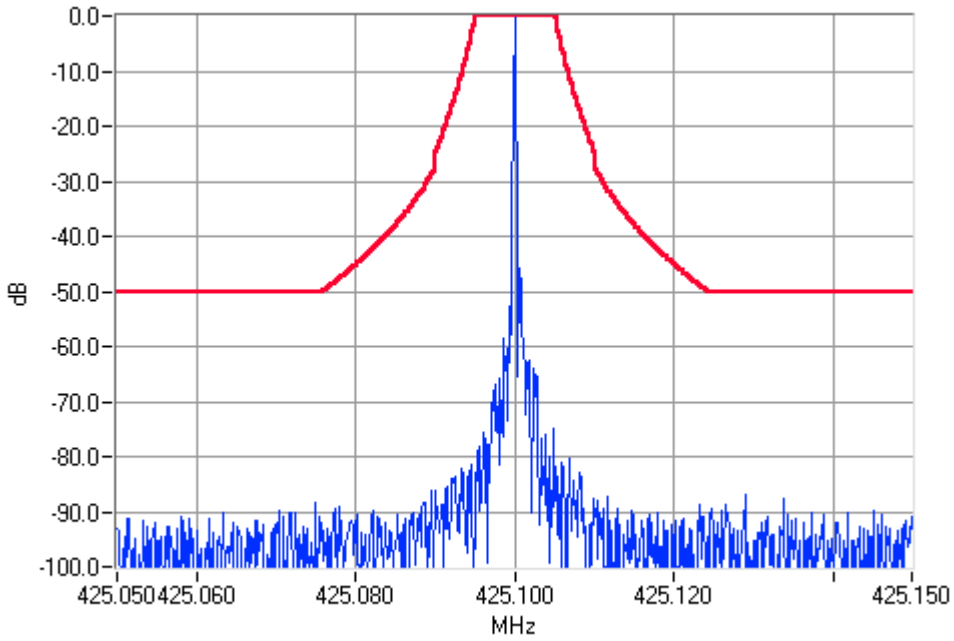


Digital Modulation 425.1000MHz Mask D 1W Pass

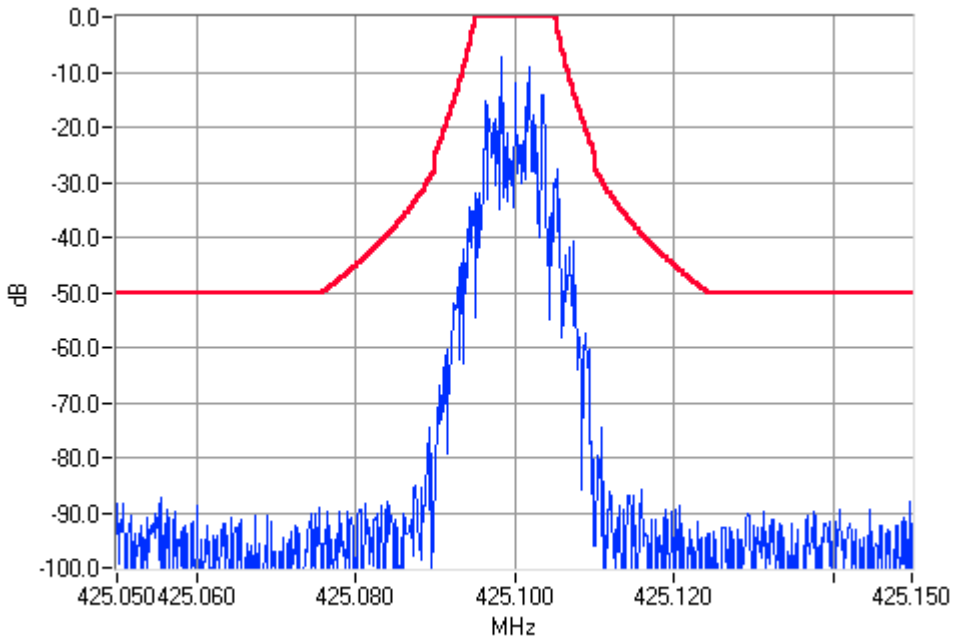
NAME OF TEST: OCCUPIED BANDWIDTH DATA FFSK

SPECIFICATION: FCC CFR 2.1049 (c)

Tx FREQUENCY: 425.1 MHz 25W 25.0 kHz Channel Spacing



Unmodulated 425.1000MHz Mask C 25W Pass

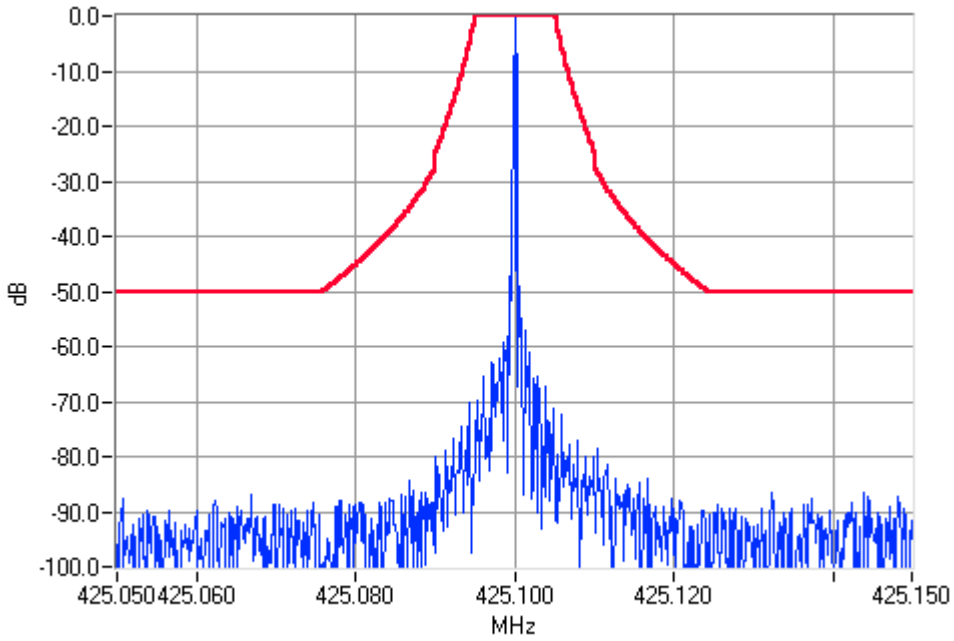


Digital Modulation 425.1000MHz Mask C 25W Pass

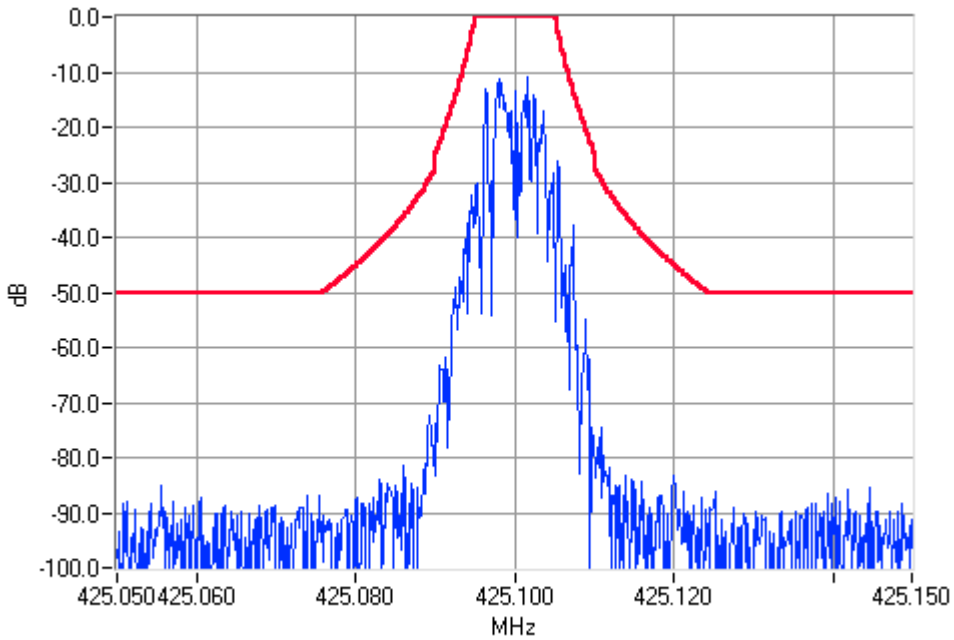
NAME OF TEST: OCCUPIED BANDWIDTH DATA FFSK

SPECIFICATION: FCC CFR 2.1049 (c)

Tx FREQUENCY: 425.1 MHz 1W 25.0 kHz Channel Spacing



Unmodulated 425.1000MHz Mask C 1W Pass

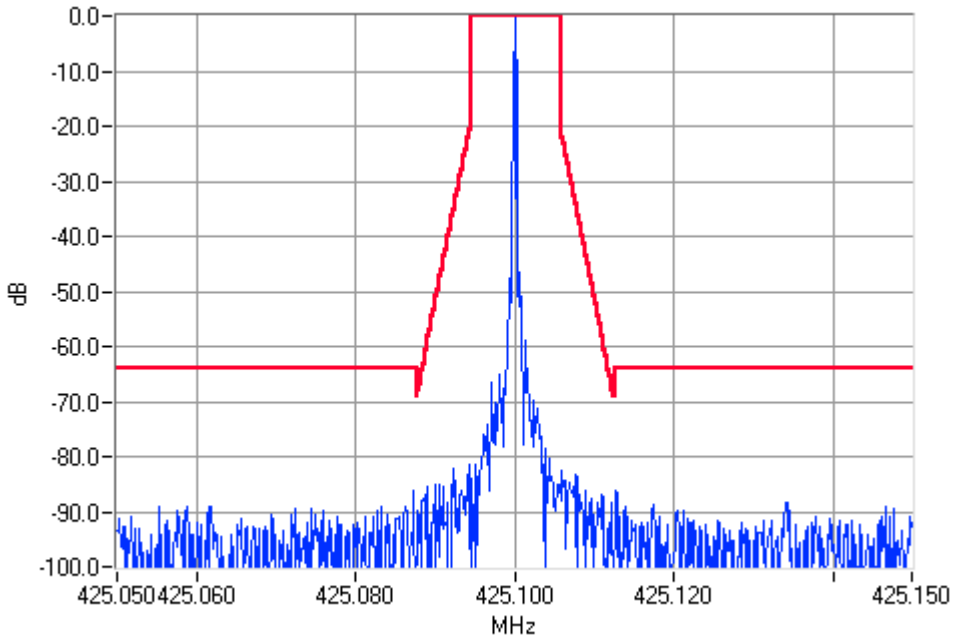


Digital Modulation 425.1000MHz Mask C 1W Pass

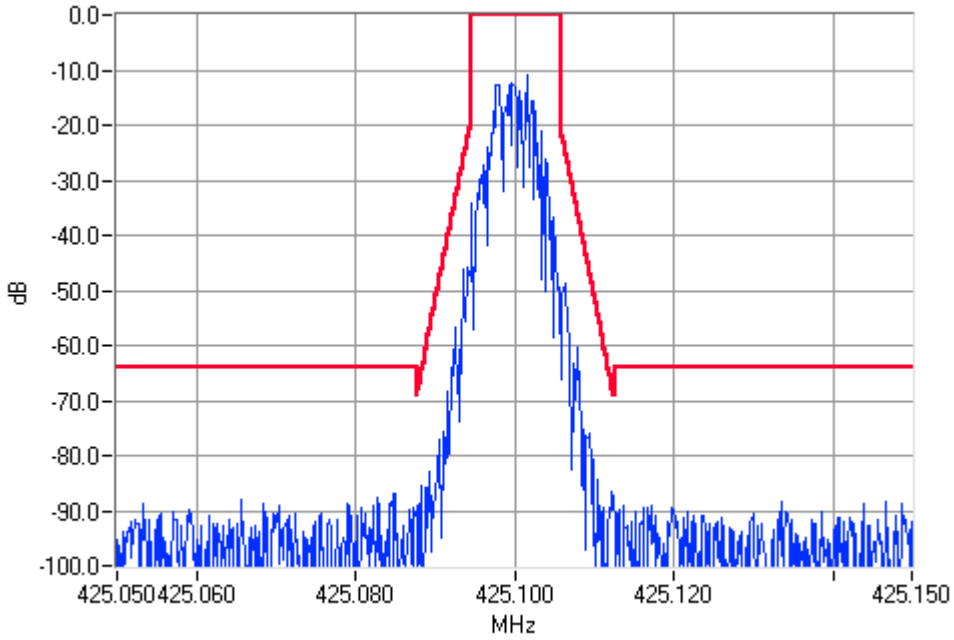
NAME OF TEST: OCCUPIED BANDWIDTH DATA THSD

SPECIFICATION: FCC CFR 2.1049 (c)

Tx FREQUENCY: 425.1 MHz 25W 12.5 kHz Channel Spacing



Unmodulated 425.1000MHz Mask D 25W Pass

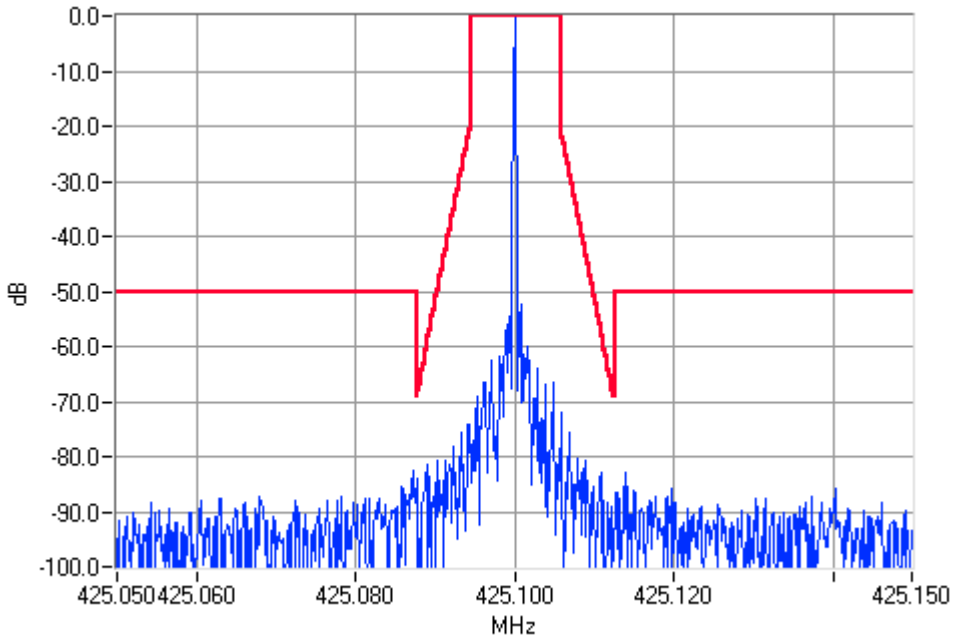


Digital Modulation 425.1000MHz Mask D 25W Pass

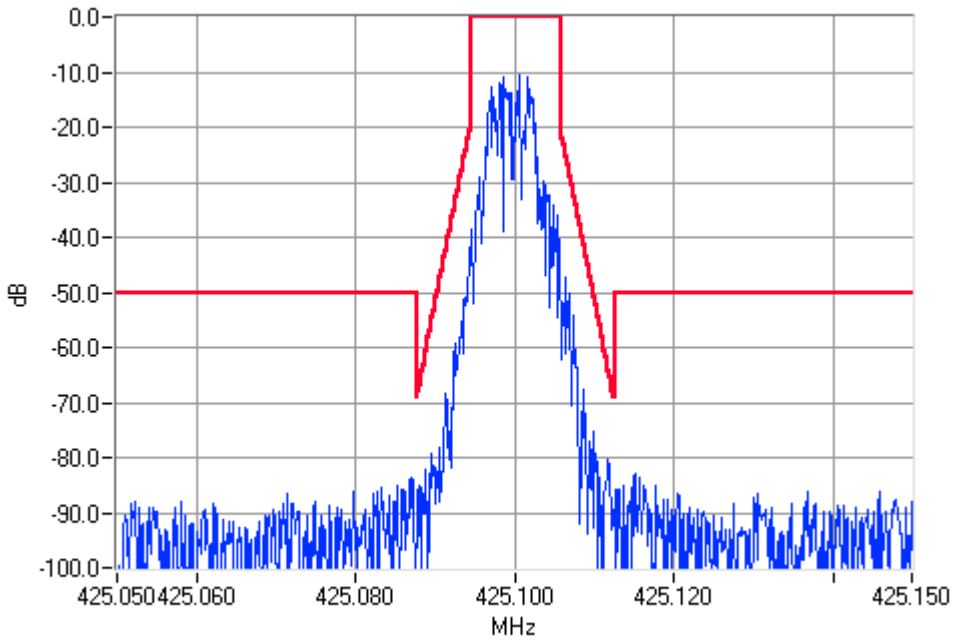
NAME OF TEST: OCCUPIED BANDWIDTH DATA THSD

SPECIFICATION: FCC CFR 2.1049 (c)

Tx FREQUENCY: 425.1 MHz 1W 12.5 kHz Channel Spacing



Unmodulated 425.1000MHz Mask D 1W Pass

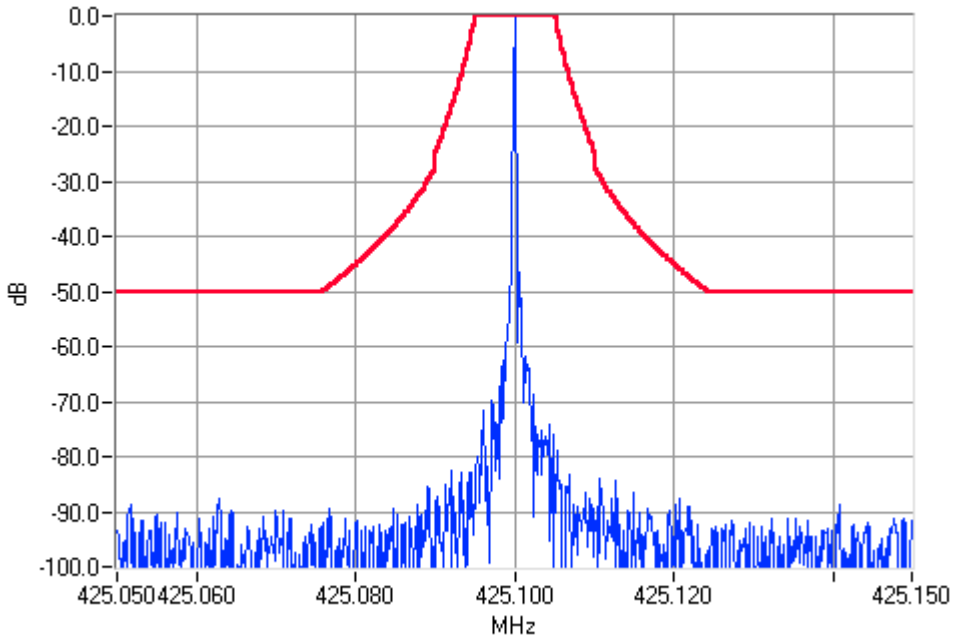


Digital Modulation 425.1000MHz Mask D 1W Pass

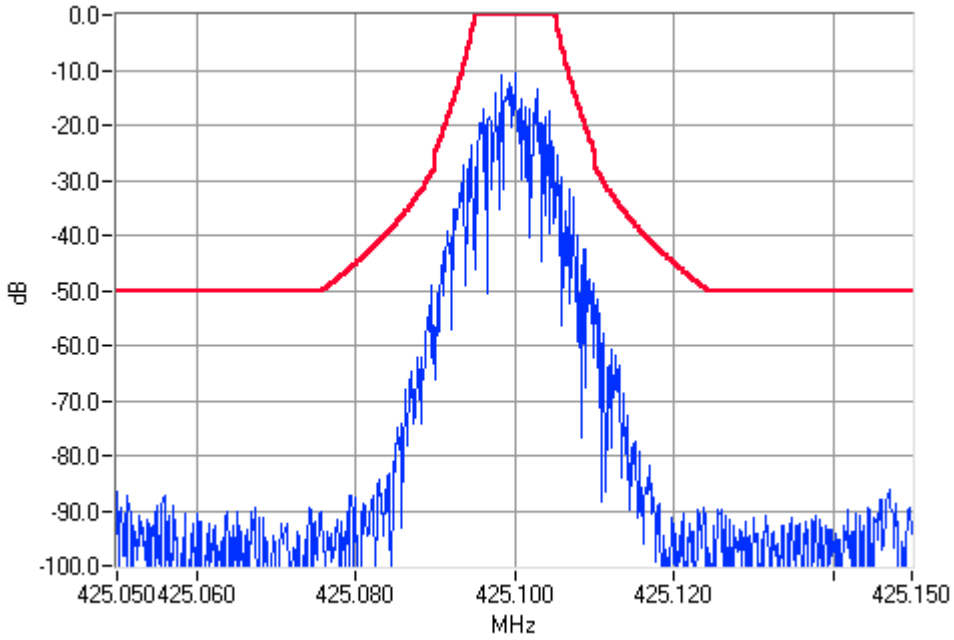
NAME OF TEST: OCCUPIED BANDWIDTH DATA THSD

SPECIFICATION: FCC CFR 2.1049 (c)

Tx FREQUENCY: 425.1 MHz 25W 25.0 kHz Channel Spacing

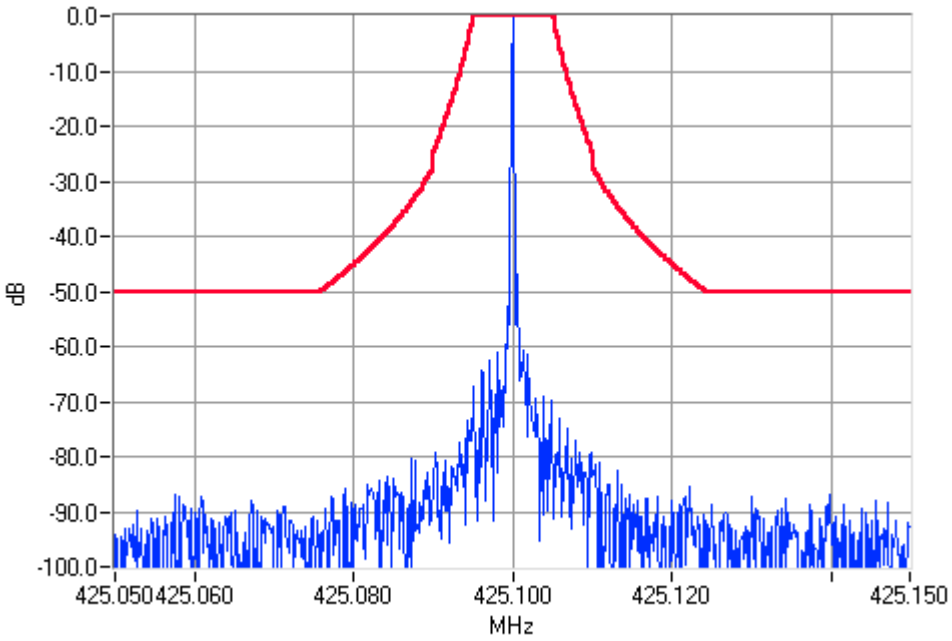


Unmodulated 425.1000MHz Mask C 25W Pass

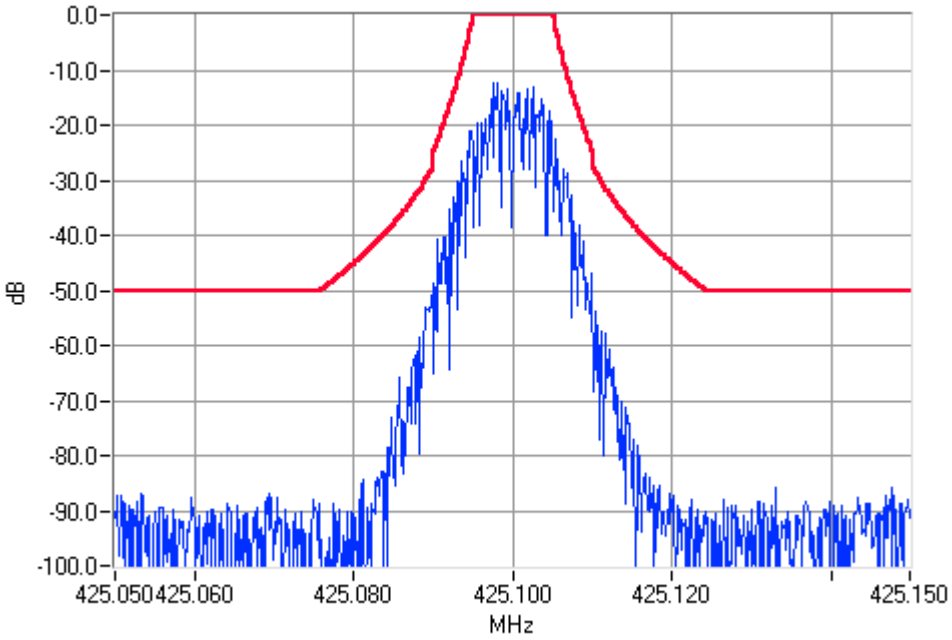


Digital Modulation 425.1000MHz Mask C 25W Pass

NAME OF TEST:	OCCUPIED BANDWIDTH		DATA THSD
SPECIFICATION:	FCC CFR 2.1049 (c)		
Tx FREQUENCY:	425.1 MHz	1W	25.0 kHz Channel Spacing



Unmodulated 425.1000MHz Mask C 1W Pass



Digital Modulation 425.1000MHz Mask C 1W Pass

NAME OF TEST: SPURIOUS EMISSIONS (CONDUCTED)

TEST CONDITIONS:

Ambient Temperature	23 °C
Relative Humidity	46 %
Standard Voltage	13.8 V DC

SPECIFICATION: FCC 47 CFR 2.1051

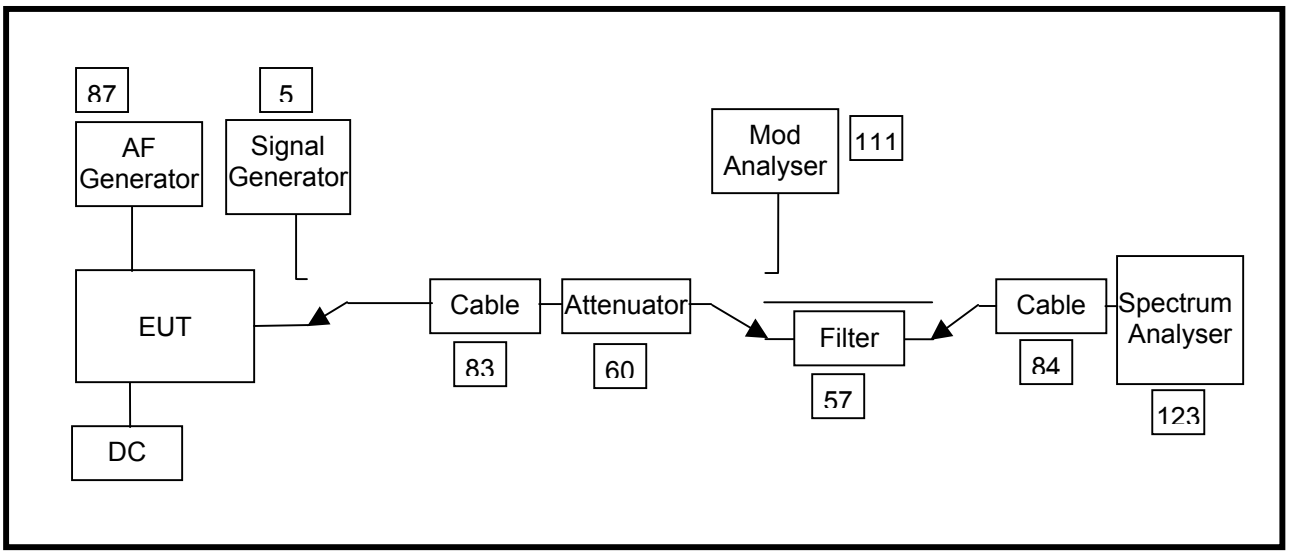
GUIDE: TIA/EIA-603 2.2.13

MEASUREMENT PROCEDURE:
1. The Equipment Under Test was set up as shown in the following diagram.
2. The frequency range examined was from the lowest frequency generated within the EUT, to a frequency higher than the 10th Harmonic: 100kHz to Fc-BW
   Fc+BW to 4.7 GHz
3. Spurious emissions which were attenuated more than 20dB below the limit were not recorded.

MEASUREMENT RESULTS:
See the tables on the following pages for 12.5 kHz & 25.0 kHz channel spacings.

LIMIT CLAUSE: FCC 47 CFR 90.210

TEST SETUP: See page 46 for Test Equipment information.



NAME OF TEST: SPURIOUS EMISSIONS (CONDUCTED)

SPECIFICATION: FCC CFR 2.1051

Tx FREQUENCY: 425.1 MHz

12.5 kHz Channel Spacing	425.1 MHz @ 1 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
No emissions were detected at a level greater than 20 dB below the limit.		

LIMITS:

Carrier Output Power Watts	Emission Mask D 12.5 kHz Channel Spacing $50 + 10 \text{ Log}_{10} (P_{Watts})$	
1 W	-20 dBm	50 dBc
25 W	-20 dBm	64 dBc

NAME OF TEST: SPURIOUS EMISSIONS (CONDUCTED)

SPECIFICATION: FCC CFR 2.1051

Tx FREQUENCY: 425.1 MHz

12.5 kHz Channel Spacing	425.1 MHz @ 25 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
No emissions were detected at a level greater than 20 dB below the limit.		

LIMITS:

Carrier Output Power Watts	Emission Mask D 12.5 kHz Channel Spacing $50 + 10 \text{ Log}_{10} (P_{Watts})$	
1 W	-20 dBm	50 dBc
25 W	-20 dBm	64 dBc

NAME OF TEST: SPURIOUS EMISSIONS (CONDUCTED)

SPECIFICATION: FCC CFR 2.1051

Tx FREQUENCY: 425.1 MHz

25.0 kHz Channel Spacing	425.1 MHz @ 1 W	Emission Mask B
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
No emissions were detected at a level greater than 20 dB below the limit.		

LIMITS:

Carrier Output Power Watts	Emission Mask B 25.0 kHz Channel Spacing $43 + 10 \text{ Log}_{10} (P_{Watts})$	
1 W	-13 dBm	43 dBc
25 W	-13 dBm	57 dBc

NAME OF TEST: SPURIOUS EMISSIONS (CONDUCTED)

SPECIFICATION: FCC CFR 2.1051

Tx FREQUENCY: 425.1 MHz

25.0 kHz Channel Spacing	425.1 MHz @ 25 W	Emission Mask B
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
No emissions were detected at a level greater than 20 dB below the limit.		

LIMITS:

Carrier Output Power Watts	Emission Mask B 25.0 kHz Channel Spacing $43 + 10 \text{ Log}_{10} (P_{Watts})$	
1 W	-13 dBm	43 dBc
25 W	-13 dBm	57 dBc

NAME OF TEST: TRANSMITTER FREQUENCY STABILITY (TEMPERATURE)

TEST CONDITIONS:

Ambient Temperature	23 °C
Relative Humidity	46 %
Standard Voltage	13.8 V DC

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

GUIDE: TIA/EIA-603 2.2.2

MEASUREMENT PROCEDURE:
1. The Equipment Under Test was set up as shown in the following diagram.
2. The EUT was tested for frequency error from –30 °C to +50°C in 10 °C increments
3. The frequency error was recorded in parts per million (ppm).

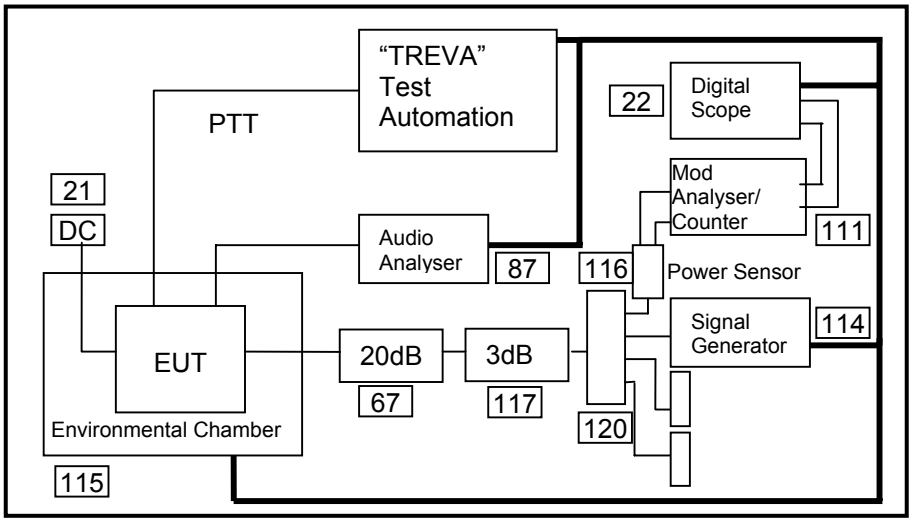
MEASUREMENT RESULTS:
See the plots on the following pages for 12.5 kHz & 25.0 kHz channel spacings.

LIMIT CLAUSE: FCC 47 CFR 90.213

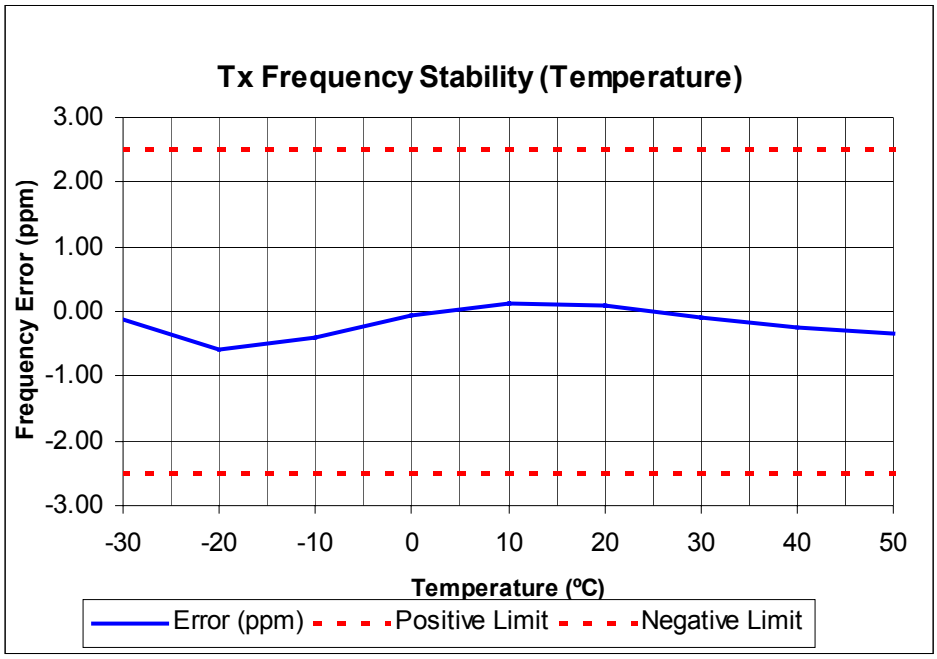
Frequency Range: 421 MHz to 512 MHz

Channel Spacing (kHz)	Frequency Error (ppm)
12.5	2.5
25.0	5.0

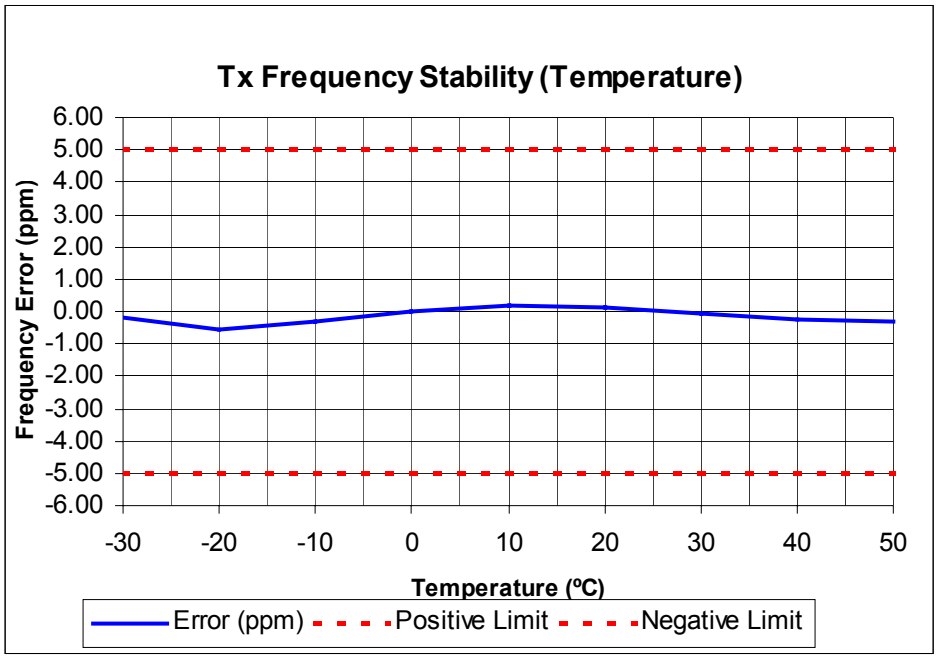
TEST SETUP: See page 46 for Test Equipment information.



NAME OF TEST:	TRANSMITTER FREQUENCY STABILITY (TEMPERATURE)		
SPECIFICATION:	FCC 47 CFR 2.1055 (a) (1)		
Tx FREQUENCY:	425.1 MHz	25W	12.5 kHz channel Spacing



NAME OF TEST:	TRANSMITTER FREQUENCY STABILITY (TEMPERATURE)		
SPECIFICATION:	FCC 47 CFR 2.1055 (a) (1)		
Tx FREQUENCY:	425.1 MHz	25W	25.0 kHz channel Spacing



NAME OF TEST: TRANSMITTER FREQUENCY STABILITY (VOLTAGE)

TEST CONDITIONS:

Ambient Temperature	23 °C
Relative Humidity	46 %
Standard Voltage	13.8 V DC

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

GUIDE: TIA/EIA-603 2.2.2

MEASUREMENT PROCEDURE:
1. The Equipment Under Test was set up as shown in the following diagram.
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).

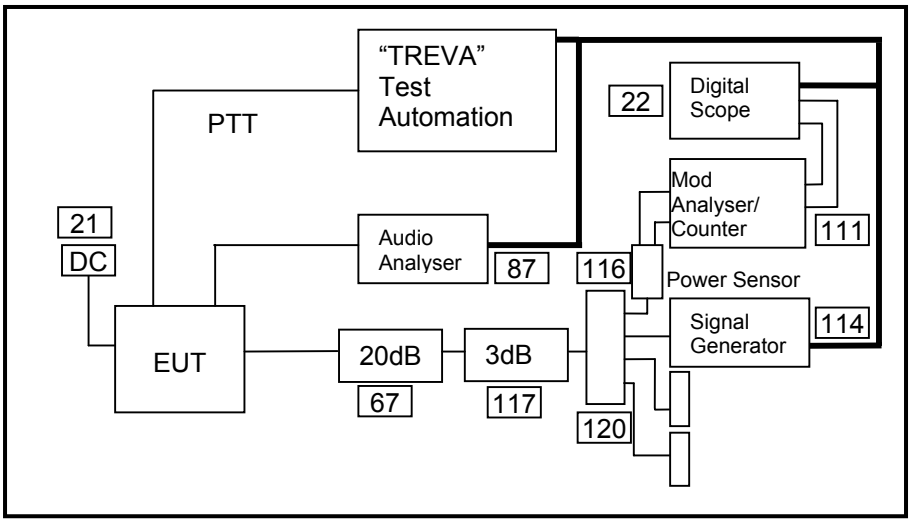
MEASUREMENT RESULTS: Frequency Range: 421 MHz to 512 MHz

Channel Spacing (kHz)	FREQUENCY ERROR (ppm) @ 425.1 MHz		
	11.73 V DC	13.8 V DC	15.87 V DC
12.5	-0.03	-0.04	-0.03
25.0	0.04	0.05	0.01
	FREQUENCY ERROR (ppm) @ MHz		
12.5	~	~	~
25.0	~	~	~

LIMIT CLAUSE: FCC 47 CFR 90.213

Channel Spacing (kHz)	Frequency Error (ppm)
12.5	2.5
25.0	5.0

TEST SETUP: See page 46 for Test Equipment information.



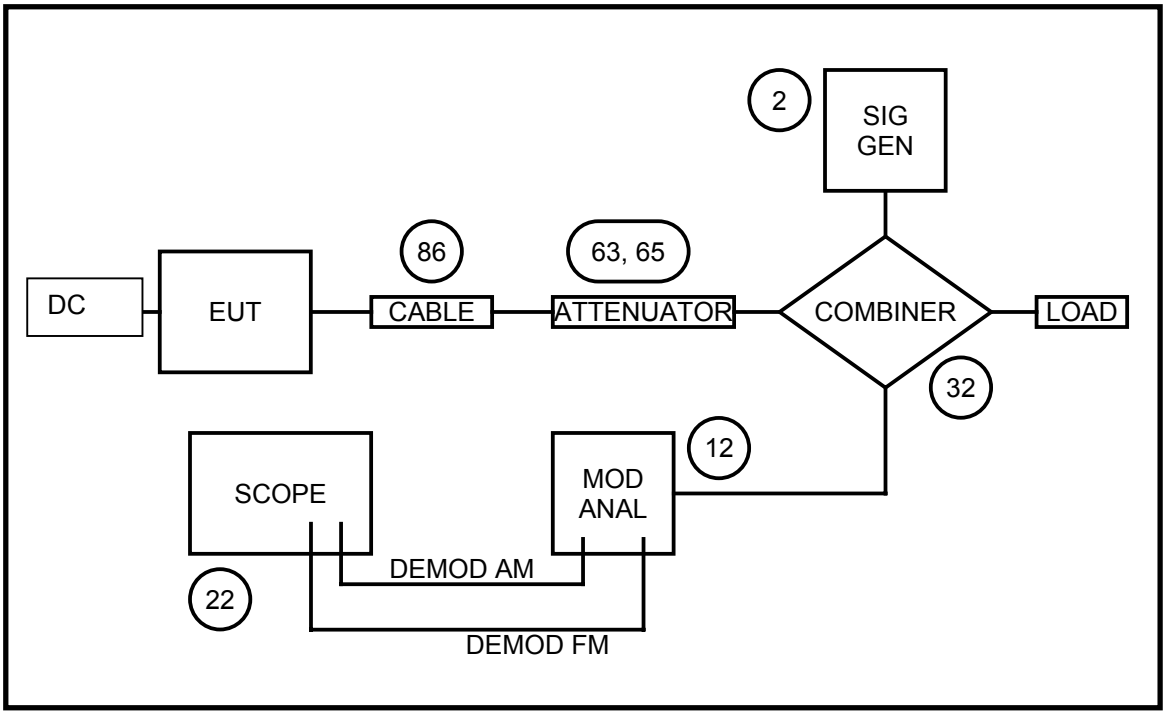
NAME OF TEST:	TRANSIENT FREQUENCY BEHAVIOR	
TEST CONDITIONS:	Ambient Temperature	23 °C
	Relative Humidity	46 %
	Standard Voltage	13.8 V DC
SPECIFICATION:	FCC 47 CFR 90.214	
GUIDE:	TIA/EIA-603 2.2.19	

MEASUREMENT PROCEDURE:
1. The Equipment Under Test was set up as shown in the following diagram.
2. Measurements and plots were made following the TIA/EIA procedure.

MEASUREMENT RESULTS:
See the tables and plots on the following pages for 12.5 kHz & 25.0 kHz channel spacings.

LIMIT CLAUSE: FCC 47 CFR 90.214

TEST SETUP: See page 46 for Test Equipment information.



NAME OF TEST: TRANSIENT FREQUENCY BEHAVIOUR

SPECIFICATION: FCC 47 CFR 90.214

Tx FREQUENCY: 425.1 MHz 25 W 12.5 kHz Channel Spacing

FREQUENCY	425.1 MHz @ 25 W Tx	
TRANSIENT RESPONSE PERIOD	CARRIER PEAK VARIATION FROM NORMAL	
	Key ON (kHz)	Key OFF (kHz)
t_1	0.7	N/A
t_2	-0.3	N/A
t_3	N/A	0.3
$t_2 \rightarrow t_3$ ppm	-0.7	
ERROR LIMIT ($t_2 \rightarrow t_3$) ppm	2.5	

Confirm that during periods t_1 and t_3 the frequency difference does not exceed the value of one channel separation.	YES	NO
	Y	
Confirm that during the period t_2 the frequency difference does not exceed half a channel separation.	YES	NO
	Y	
Confirm that during the period t_2 to t_3 the frequency difference does not exceed the frequency error limit.	YES	NO
	Y	

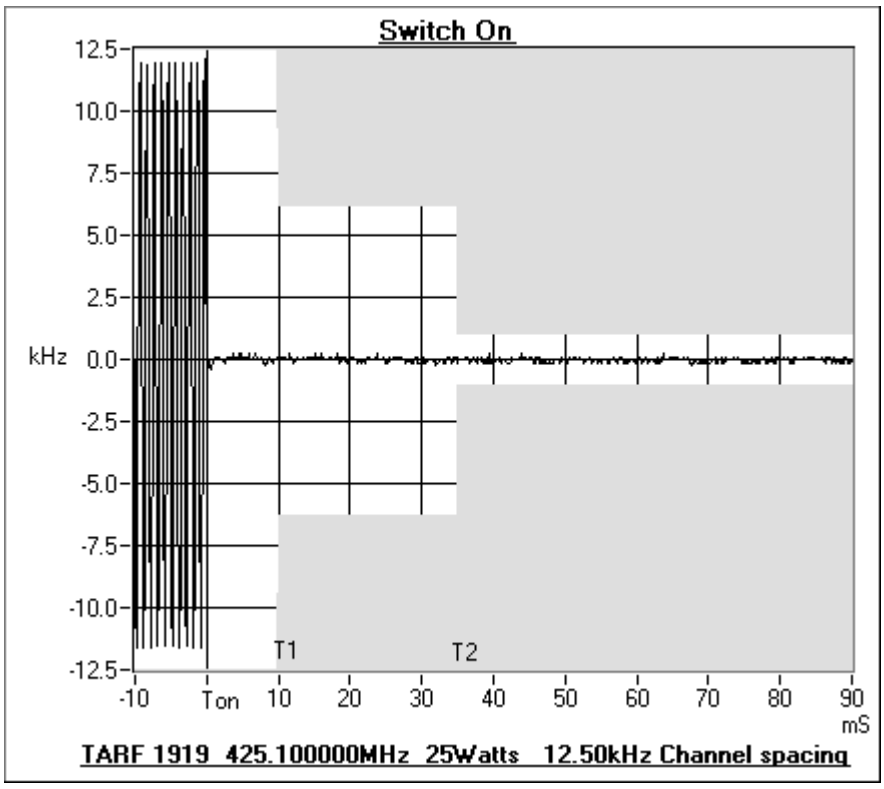
LIMIT:

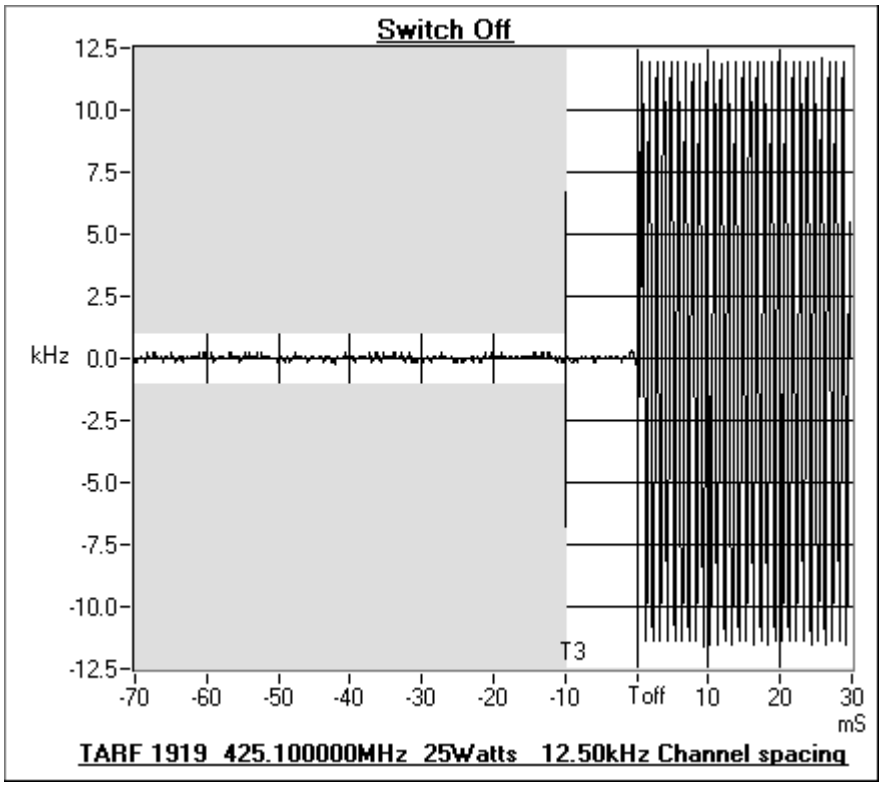
TRANSIENT PERIODS	FREQUENCY RANGE 150MHz – 174 MHz	FREQUENCY RANGE 421MHz – 512 MHz
t_1 (ms)	5 ms	10 ms
t_2 (ms)	20 ms	25 ms
t_3 (ms)	5 ms	10 ms

NAME OF TEST: TRANSIENT FREQUENCY BEHAVIOUR

SPECIFICATION: FCC 47 CFR 90.214

Tx FREQUENCY: 425.1 MHz 25 W 12.5 kHz Channel Spacing





NAME OF TEST: TRANSIENT FREQUENCY BEHAVIOUR

SPECIFICATION: FCC 47 CFR 90.214

Tx FREQUENCY: 425.1 MHz 25 W 25.0 kHz Channel Spacing

FREQUENCY	425.1 MHz @ 25 W Tx	
TRANSIENT RESPONSE PERIOD	CARRIER PEAK VARIATION FROM NORMAL	
	Key ON (kHz)	Key OFF (kHz)
t_1	-0.6	N/A
t_2	-0.4	N/A
t_3	N/A	0.4
$t_2 \rightarrow t_3$ ppm	-0.9	
ERROR LIMIT ($t_2 \rightarrow t_3$) ppm	5.0	

Confirm that during periods t_1 and t_3 the frequency difference does not exceed the value of one channel separation.	YES	NO
	Y	
Confirm that during the period t_2 the frequency difference does not exceed half a channel separation.	YES	NO
	Y	
Confirm that during the period t_2 to t_3 the frequency difference does not exceed the frequency error limit.	YES	NO
	Y	

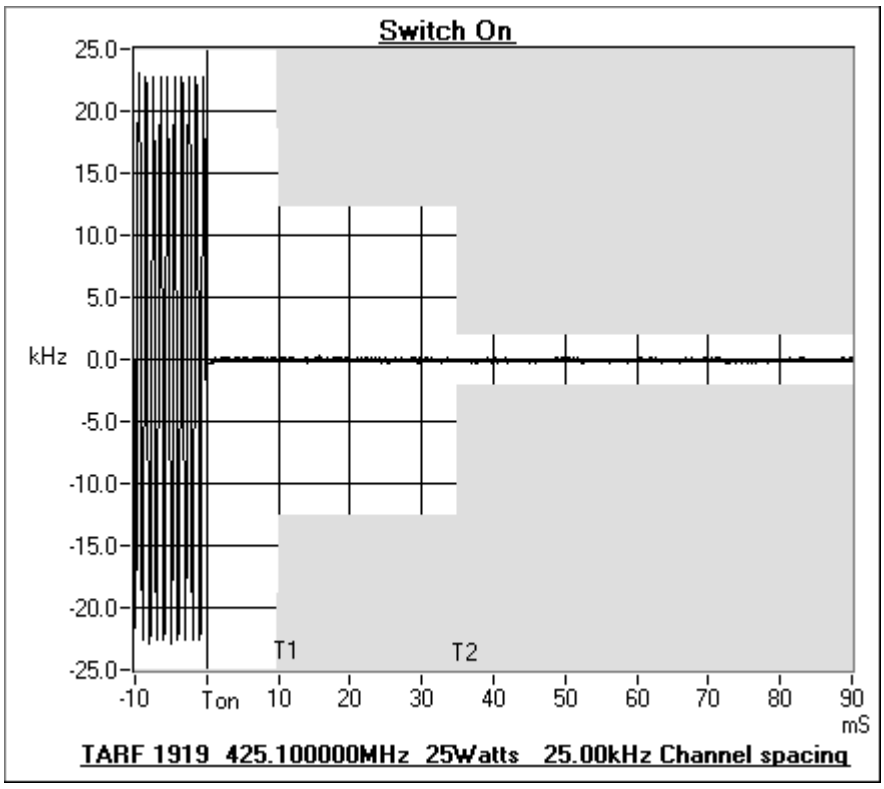
LIMIT:

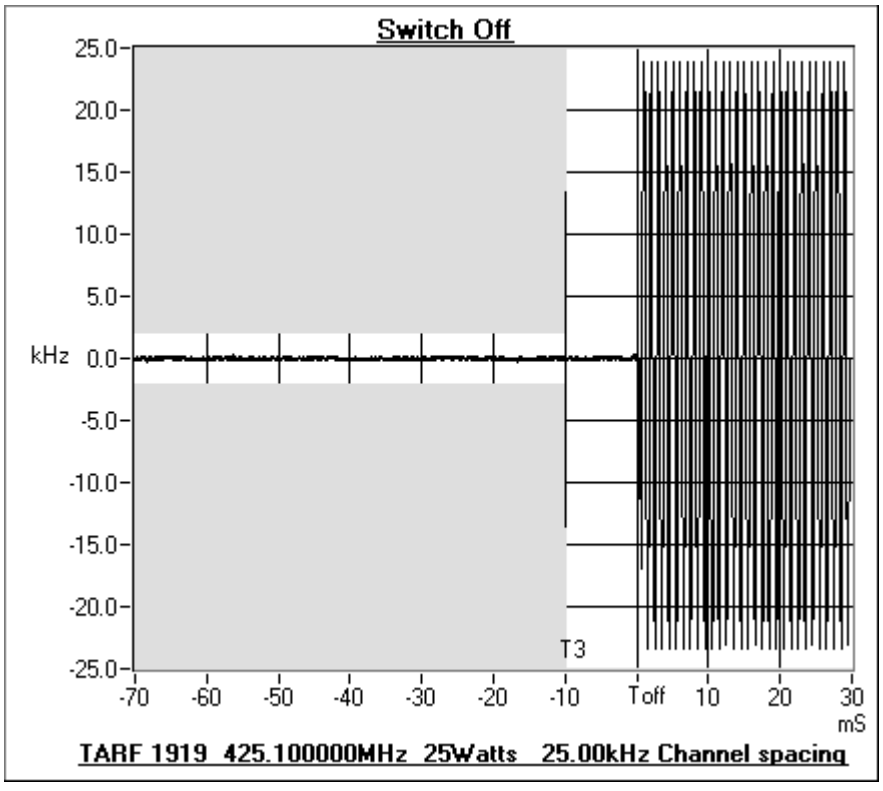
TRANSIENT PERIODS	FREQUENCY RANGE 150MHz – 174 MHz	FREQUENCY RANGE 421MHz – 512 MHz
t_1 (ms)	5 ms	10 ms
t_2 (ms)	20 ms	25 ms
t_3 (ms)	5 ms	10 ms

NAME OF TEST: TRANSIENT FREQUENCY BEHAVIOUR

SPECIFICATION: FCC 47 CFR 90.214

Tx FREQUENCY: 425.1 MHz 25 W 25.0 kHz Channel Spacing





TELTEST LABORATORIES Test equipment List

To facilitate inclusion on each page, the test equipment used is numbered and listed against the related test in the report.

No	Equipment Type	Manufacturer	Model Number	Serial No	Tait ID
1	Signal Generator	Hewlett Packard	HP8642B (Opt 001)	2512A00176	E3064
2	Signal Generator	Hewlett Packard	HP8648A	3430U00344	E3579
3	Signal Generator	Agilent	E4422B	GB40050320	E3788
4	Signal Generator	Hewlett Packard	HP8648C	3443U00543	E3558
5	Signal Generator	Rohde & Schwarz	SMY01 1062.5502.11	841736/019	E3553
10	Spectrum Analyser	Hewlett Packard	HP8596E (Opt 140)	3346A00213	E3427
11	Modulation Analyser	Hewlett Packard	HP8901B (Opt 002)	2441A00393	E3073
12	Modulation Analyser	Rohde & Schwarz	FMA0852.8500.52	842541/001	E3554
13	Audio Analyser	Hewlett Packard	HP8903A	2308A02597	E3074
14	Power Head	Hewlett Packard	HP11722A	2320A00688	E3307
15	Power Meter	Rohde & Schwarz	NRVS 1020.1809.02	841954/005	E3555
16	Power Sensor	Rohde & Schwarz	URV5- Z4 395.1619. 55	841.498/003	E3557
20	Power Supply	Hewlett Packard	HP6032A	2441A-0041Z	E3075
21	Power Supply	Rohde & Schwarz	NGS M32/10 192.0810.31	Fnr 434	E3556
22	Oscilloscope	Tektronics	TDS340	B013611	E3585
23	Universal Counter	Goldstar	FC2015U -	600801	E3550
24	Environ. Chamber	Contherm	Spatial Cal	E3397	E3397
24	Environ. Chamber	Contherm	Temp Control	E3397	E3397
25	Whirling Hygrometer	Casella	3156/82	TA004	TA004
30	Directional Coupler	Hewlett Packard	HP778D-012	1144 07392	E3292
31	4 Port Combiner (CAST)	Rohde & Schwarz	DVU4,3W 201.4018.03	300.729/47	E3623
32	4 Port Combiner	Rohde & Schwarz	DVU4, 3W 201.4018. 03	300.971/28	E3572
33	3 Port Combiner	Weinschel	1506A, 1W	LD858	E3672
34	Mixer Spurious Emission	Tait	(3. 2GHz# Rfx#4.0 GHz)	E3661	E3661
35	Mixer Transient ACP	Minicircuits	ZAD-1177031	ZAD-11	E3394
36	Voltmeter	Hewlett Packard	HP3478A	2545A25838	1559
37	Variac	Yamabishi	S-260-5	TX-533	E1737
38	Rx & Tx, RF Paths	Tait	CAST Interface	E3067	E3067
40	Reference Dipoles	Emco	3121C DB1	9510-1164	E3559
41	Biconical Antenna	Emco	3110B	9307-1680	E3033
42	Reference Horn Antenna	Emco	DRG3115	9512-4638	E3560
43	Horn Antenna	Emco	DRG3115	2084	E3076
44	Corner 175-420 MHz	Ailtech	DM105A-T2	J1417-103	E3031
45	Corner 400-1000 MHz	Ailtech	DM105A-T3	J1418-108	E3036
46	S-LINE TEM CELL	Rohde & Schwarz	1089.9296.02	338232/003	E3636
50	Amplifier 1MHz-1000MHz	Amplifier Research	25W1000A	20444	E3637
51	Amplifier 10kHz-250MHz	Amplifier Research	25A250	16373	E3570
52	Amplifier +21.7 dB	Tait	ZFL-1000LN	E3660	E3360
53	RF Filter 21.4M (CAST)	Tait	NDK21G-6DT	E3069	E3069
54	RF Filter 21.4M (ACP)	Tait	NDK21G-6DT	RA-7'	E3249
55	Filter Notch	Tait		N/A	-
56	Filter High Pass	Tait	4 MHz	N/A	-
57	Filter Low Pass	Tait	MHz	N/A	-
60	RF Attenuator 250W	Weinschel	45-30-34	JW663	E3386
61	RF Attenuator 150W	Weinschel	40-20-33	CJ404	E3387
62	RF Attenuator 150W	Weinschel	57-10-34	LB590	E3674
63	RF Attenuator 150W	Weinschel	40-06-34	KV457	E3561
64	RF Attenuator 50W	Weinschel	24-10-34	AZ0401	E3388
65	RF Attenuator 50W	Weinschel	24-20-44	AW1266	E3562
66	RF Attenuator 25W	Weinschel	33-20-33	BD5871	E3673
67	RF Attenuator 150W	Weinschel	40-20-33	CJ405	E3733
70	RF Load 150W	Bird	8166	524	E3625
71	RF Load 50W	Weinschel	F1426	BF0487	E3675
72	RF Load 50W	Weinschel	F1426	AE2490	E3624
73	RF Termination 20W	Deltec		118.001	E3626
74	RF Termination 2W	MCL	NTRM-50	951215	E3574
75	RF Termination 2W	MCL	NTRM-50	954214	E3575
76	RF Termination 2W	MCL	NTRM-50	954214	E3576
80	20m Coax Cable	Intelcom	RG214/U-50(Ext Cal)	CBL01	E3659

81	2m Coax Cable	Intelcom	RG213/U-50 (Ext Cal)	CBL02	E3658
82	3m Coax Cable BLUE)	Suhner	Sucoflex 104A	25033/4A	E3694
83	1m Coax Cable (BLUE)	Suhner	Sucoflex 104A	25006/4A	E3693
84	1m Coax Cable (BLUE)	Suhner	Sucoflex 104A	25005/4A	E3692
85	1m Coax Cable (BLUE)	Suhner	Sucoflex 104A	25004/4A	E3691
86	1m Coax Cable (BLUE)	Suhner	Sucoflex 104A	25003/4A	E3690
87	Audio Analyser	Hewlett Packard	HP8903B	2818A04275	E3710
88	Spectrum Analyser	Hewlett Packard	HP8562E	3821A00779	E3715
89	Field Strength Meter	Holaday	HI-422	95661	E3630
90	Power Supply	Hewlett Packard	HP6012B	2524A00616	E3712
91	20m Coax Cable		RG214/U-50 (Ext Cal)	CBL01	E3404
92	LISN	Emco	3825/2	9204-1961	E3040
93	EMC Test Instr	Schaffner	BEST +A	199825-010SC	AT183
94	ESD Test Set	Haefely	PSD 25B	082 999 24	E3629
95	Vehicle Conducted Immunity Test Set	Schaffner	NSG 5000	IN5094-090	E3506
96	Burst Generator	Schaffner	NSG5003	AR5194-151	E3508
97	Battery Simulator	Schaffner	NSG 5004	IN1695-003	-
98	RF Injection Probe	Fischer	F120-9	121	-
99	BER Meter	Datatool	5000	9405003	-
100	Oscilloscope	Tektronics	TDS380	B017095	E3782
101	Coupler Decoupler Network	MEB	S15	10344	E3563
102	Coupler Decoupler Network	MEB	S1/50	10328	E3564
103	Coupler Decoupler Network	MEB	AF2	10967	E3565
104	Coupler Decoupler Network	MEB	M3-1	12207	E3566
105	Coupler Decoupler Network	MEB	S25	10762	E3567
105	Coupler Decoupler Network	MEB	T2	10778	E3568
106	Coupler Decoupler Network	MEB	M2	10701	E3569
107	Benchlink	Hewlett Packard	E4444A Ver A.01.06	19980701	-
108	GPIB Software	National Instruments	Ver 1.6	500739A-00	-
109	Labview	National Instruments	Ver 5.1.1	500573J-00	-
110	Wavestar	Tektronix	WSTR31 Ver 2.4	063-2173-04	-
111	Modulation Analyser	Hewlett Packard	HP8901B (Opt 002)	3704A05837	E3786
112					
113	Hi Level Mixer	Tait			E3933
114	Signal Generator	Rohde & Schwarz	SML03 1090.3000.13	100597	E4050
115	Environ. Chamber	Contherm	5400 RHSLT.M	1416	E4051
116	Power Head	Hewlett Packard	HP11722A	2716A02037	1575
117	RF Attenuator	Weinschel	Model 1	BL9950	E4080
118	RF Attenuator	Weinschel	Model 1	BL9958	E4081
119	RF Attenuator 150W	Weinschel	40-20-23	MF817	E4082
120	RF Splitter Combiner	Minicircuits	ZFSC-4-1	-	E4083
121	RF Splitter Combiner	Minicircuits	ZFSC-4-1	-	E4084
122	RF Splitter Combiner	Minicircuits	ZFSC-4-1	-	E4085
123	Spectrum Analyser	Agilent	E4445A	MY42510072	E4139