Laboratory Test Report

For the

TBAK2 Base Station Transceiver

Tested In accordance with

FCC 47 CFR Parts 22, 90S and 90R

Report Revision: 1
Issue Date: 18-September-2006
FCC ID: CASTBA7K2

PREPARED BY: Marcus Ludwig _____
Test Technician

CHECKED & APPROVED BY: Steve Crompton _____
Laboratory Manager

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

TABLE OF CONTENTS

REVISION HISTORY

Date	Revision	Comments
18-September-2006	1	Initial test report

INTRODUCTION

Type approval testing of the 5W variant of the TBAK2 base station transceiver in accordance with:

FCC CFR 47 Parts 22, 90S & 90R

DESCRIPTION OF SAMPLE

Equipment: Base Station Transceiver
Type: TBAK2

The TBAK2 is a modular base station transceiver consisting of:

Module	Product Designation Code	Serial Number	Description
Reciter	TBA40K4-PA00	18005777	Transmit 764 – 776 MHz 850 – 870 MHz Receive 794 – 824 MHz
Power Amplifier	TBA70K2-0000 TBA71K2-0000	18022881 18022882	1 – 5Watts in 1 Watt steps
Power Management Unit	TBA30A0-0100	18001753	Input 88 – 264 Vac 45 – 65 Hz Output: 28 Vdc
User Interface	XBA2020	2051088	

Modulation type:
F3E Analogue FM
F1E, F7E Digital Voice C4FM (9600 bps)
F1D, F7D Digital Data C4FM (9600 bps)

Channel spacing: 12.5 kHz, 25 kHz

Emission designators: 11K0F3E, 16K0F3E
8K10F1E, 8K10F7E
8K10F1D, 8K10F7D

REPORT PREPARED FOR

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

STATEMENT OF COMPLIANCE

The TBAK2 Base Station transceiver as tested in this report was found to conform to the following standards:

FCC CFR 47 Parts 22, 90S & 90R

TEST CONDITIONS

All testing was performed at the following conditions.

Ambient Temperature	15°C → 30°C
Relative Humidity	20% → 75%
Standard Test Voltage	120 Vac (PMU), 13.8Vdc (12V PA)

TEST RESULTS

TRANSMITTER OUTPUT POWER (CONDUCTED)

SPECIFICATION: FCC 47 CFR 2.1046

GUIDE: TIA/EIA-603C 2.2.1

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

MEASUREMENT RESULTS:

12.5 kHz Channel Spacing:
Manufacturer's Rated Output Power: Switchable: between 5W and 1W

Testing of TBA70K2-0000 Power Amplifier	
Frequency	5W nominal
766.9 MHz	4.3
Variation from Nominal (%)	-14%
853.9 MHz	5.3
Variation from Nominal (%)	+6%
Measurement Uncertainty (dB)	+/-0.6

Testing of TBA71K2-0000 12V dc Power Amplifier	
Frequency	5W nominal
766.9 MHz	4.3
Variation from Nominal (%)	-14%
853.9 MHz	5.3
Variation from Nominal (%)	+6%
Measurement Uncertainty (dB)	+/-0.6

LIMIT CLAUSE: FCC 47 CFR 90.541(c) 764 – 776 MHz
FCC 47 CFR 90.635 851 – 869 MHz

FCC 47 CFR 90.205 (r) The output power shall not exceed by more than 20% the manufacturer's rated output power for the particular transmitter.

TRANSMITTER OUTPUT POWER (CONDUCTED)

SPECIFICATION: FCC 47 CFR 2.1046

GUIDE: TIA/EIA-603C 2.2.1

25.0 kHz Channel Spacing:
Manufacturer's Rated Output Power: Switchable: between 5W and 1W

Testing of TBA70K2-0000 Power Amplifier	
Frequency	5W nominal
853.9 MHz	5.2
Variation from Nominal (%)	+4%
Measurement Uncertainty (dB)	+/-0.6

Testing of TBA71K2-0000 12V dc Power Amplifier	
Frequency	5W nominal
853.9 MHz	5.3
Variation from Nominal (%)	+6%
Measurement Uncertainty (dB)	+/-0.6

LIMIT CLAUSE: FCC 47 CFR 90.541(c) 764 – 776 MHz
FCC 47 CFR 90.635 851 – 869 MHz

FCC 47 CFR 90.205 (r) The output power shall not exceed by more than 20% the manufacturer's rated output power for the particular transmitter.

TRANSMITTER AUDIO FREQUENCY RESPONSE - PRE-EMPHASIS

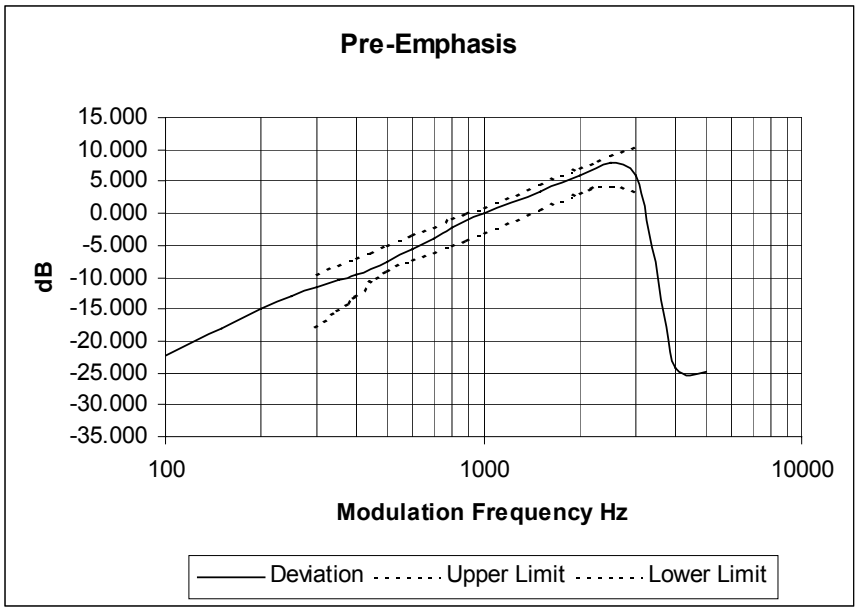
SPECIFICATION: FCC 47 CFR 2.1047 (a)

GUIDE: TIA/EIA-603C 2.2.6

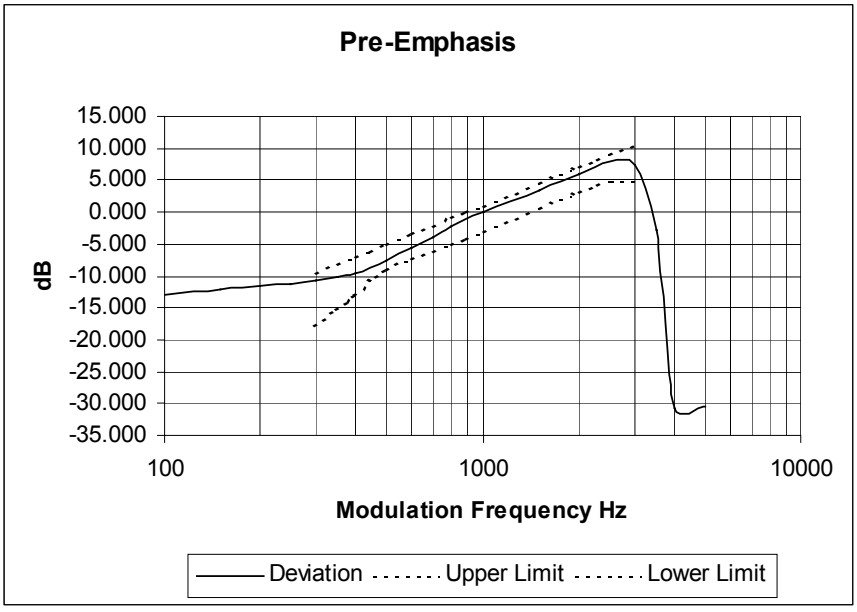
MEASUREMENT PROCEDURE:
1. Refer Annex A for Equipment set up.
2. An audio input tone of 1000Hz was applied with the level set to obtain 20% of maximum deviation. This was used as the 0dB reference point.
3. The AF was varied while the audio level was held constant.
4. The response in dB relative to 1000Hz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

LIMIT CLAUSE: TIA/EIA-603C 3.2.6

Tx FREQUENCY: 853.9 MHz 12.5 kHz Channel Spacing



Tx FREQUENCY: 853.9 MHz 25.0 kHz Channel Spacing



TRANSMITTER MODULATION LIMITING

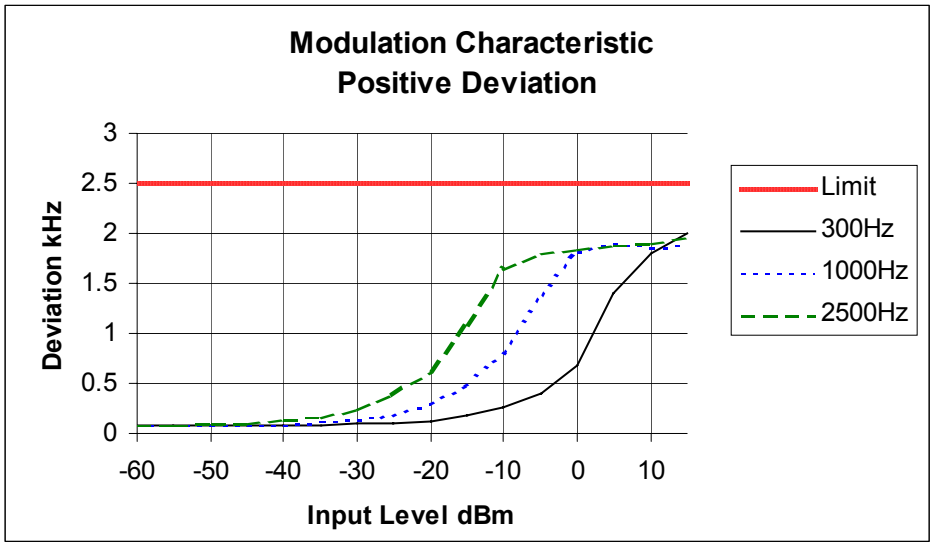
SPECIFICATION: FCC 47 CFR 2.1047 (b)

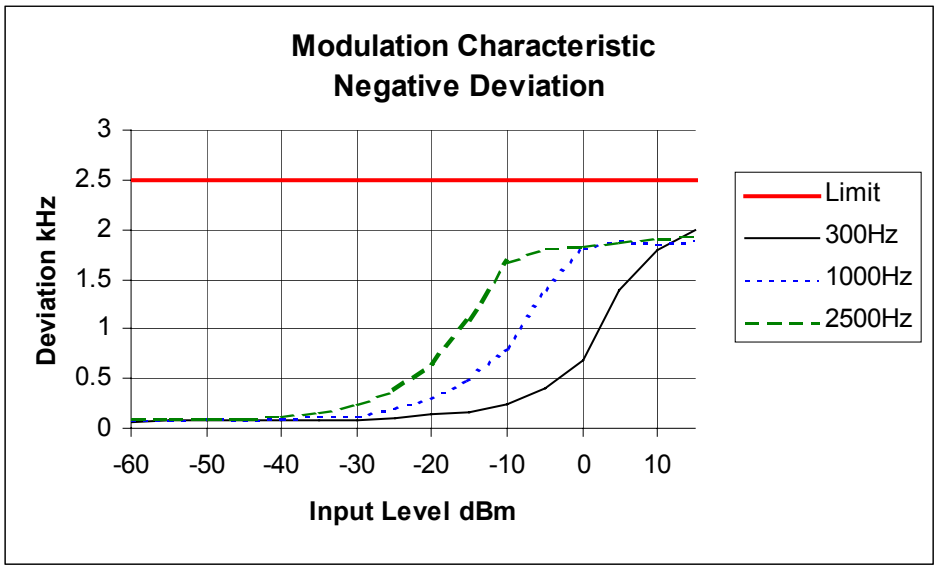
MEASUREMENT PROCEDURE:
1. Refer Annex A for Equipment set up.
2. The modulation response was measured at three audio frequencies while varying the input level.
3. Measurements were made for both Positive and Negative Deviation.

LIMIT CLAUSE: TIA/EIA-603C 1.3.4.4

MEASUREMENT UNCERTAINTY (%): 1.5

Tx FREQUENCY: 853.9 MHz 12.5 kHz Channel Spacing

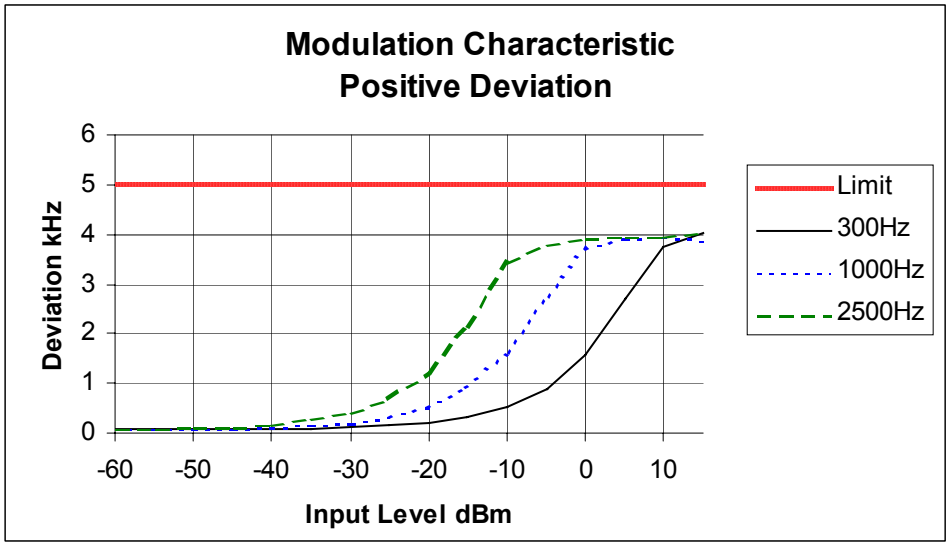


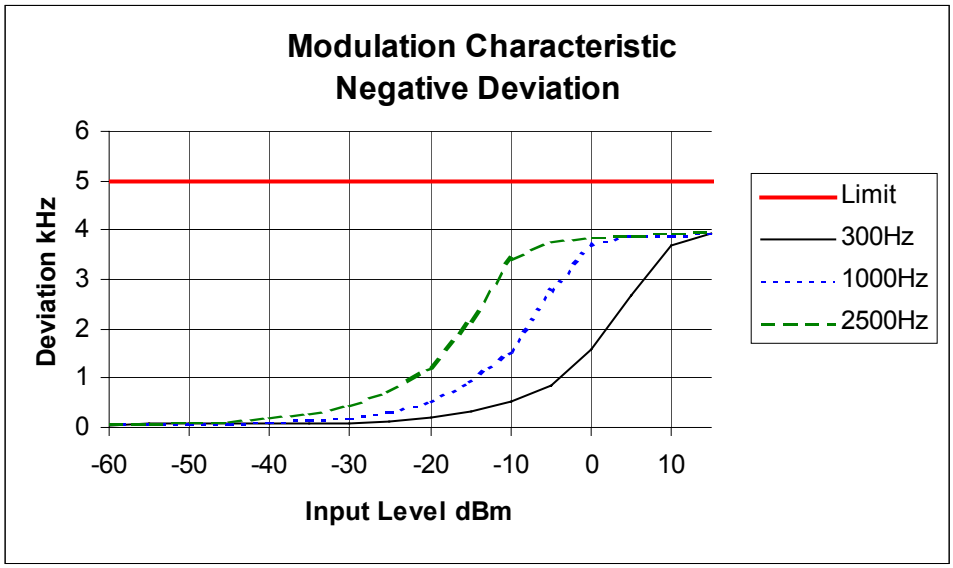


TRANSMITTER MODULATION LIMITING

SPECIFICATION: FCC CFR 2.1047 (b)

Tx FREQUENCY: 853.9 MHz 25.0 kHz Channel Spacing





OCCUPIED BANDWIDTH

SPECIFICATION: FCC 47 CFR 2.1049 (c)

GUIDE: TIA/EIA-603C 2.2.11
TIA/EIA-102CAAA-A 2.2.5

MEASUREMENT PROCEDURE:
1. Refer Appendix A for Equipment Set up.
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 pseudo random bit sequence at the appropriate Baud rates.
3. The Occupied Bandwidth was measured on the Spectrum Analyser, with bandwidth settings as follows.

   Emission Mask D – Resolution Bandwidth = 100Hz, Video Bandwidth = 1 kHz
   Emission Mask B – Resolution Bandwidth = 300Hz, Video Bandwidth = 3 kHz

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	Analogue; Digital Voice/Data
Emission Mask B	25.0 kHz Channel Spacing	Analogue

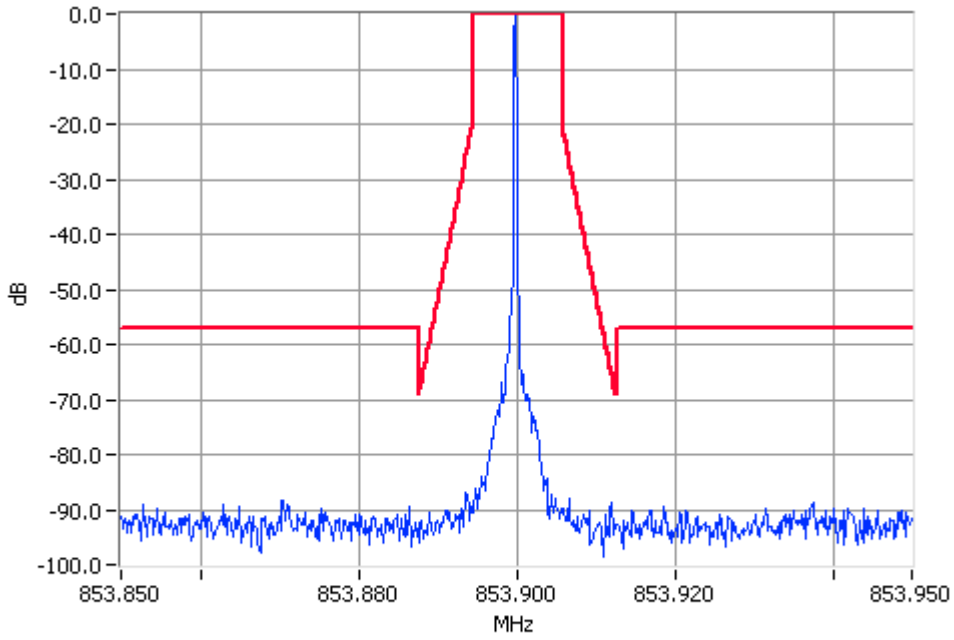
DATA SPEED

Digital Voice/Data	9600 bps	12.5 kHz Channel Spacing
Digital Voice/Data	9600 bps	25.0 kHz Channel Spacing

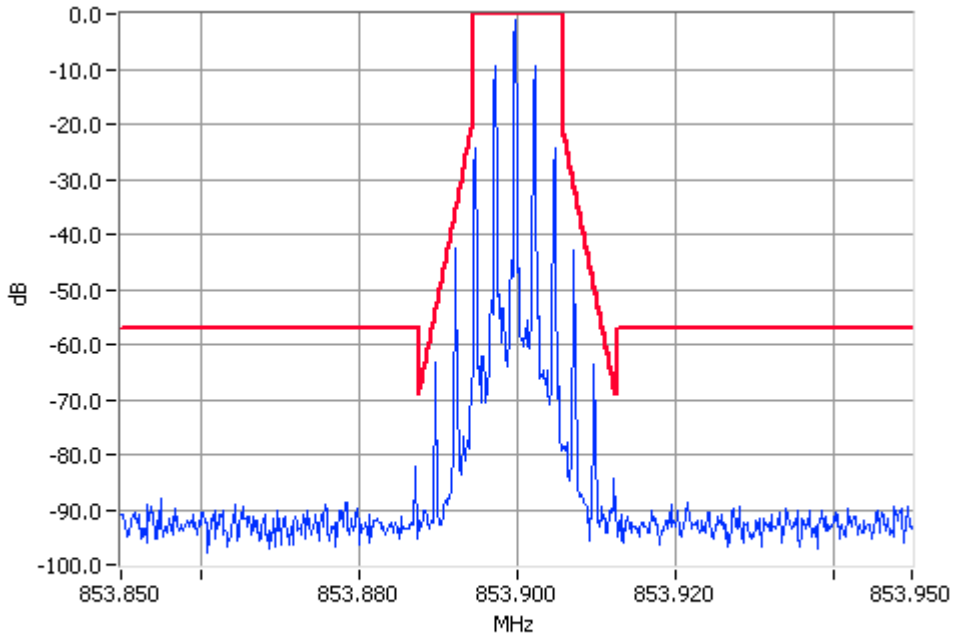
OCCUPIED BANDWIDTH

ANALOGUE VOICE

SPECIFICATION:	FCC CFR 2.1049 (c)		TBA70K2 PA
Tx FREQUENCY:	853.9 MHz	5W	12.5 kHz Channel Spacing



Unmodulated 853.9000MHz Mask D 5W Pass
RBW=100Hz VBW=1000Hz

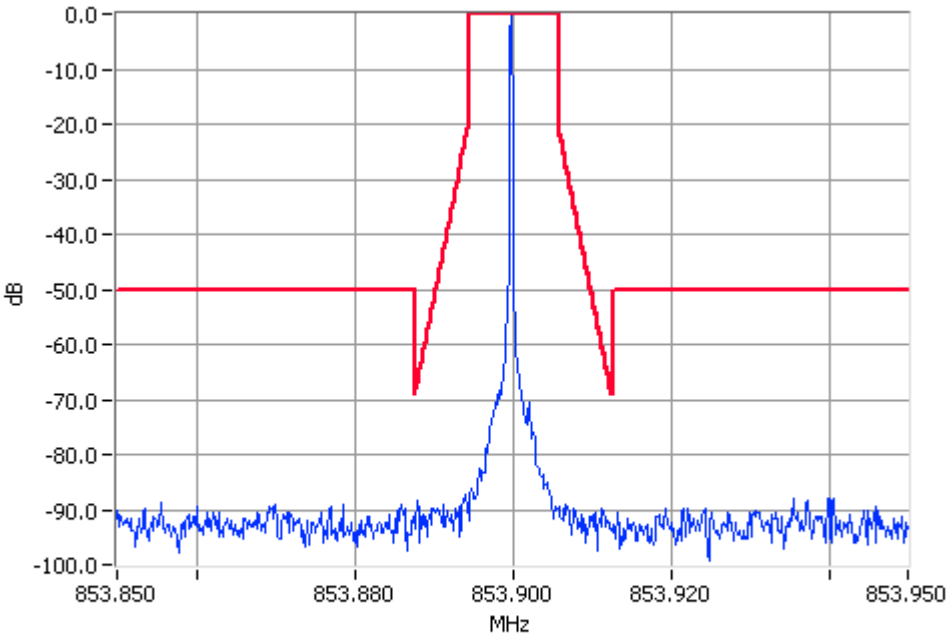


Analogue Modulation 853.9000MHz Mask D 5W Pass
RBW=100Hz VBW=1000Hz

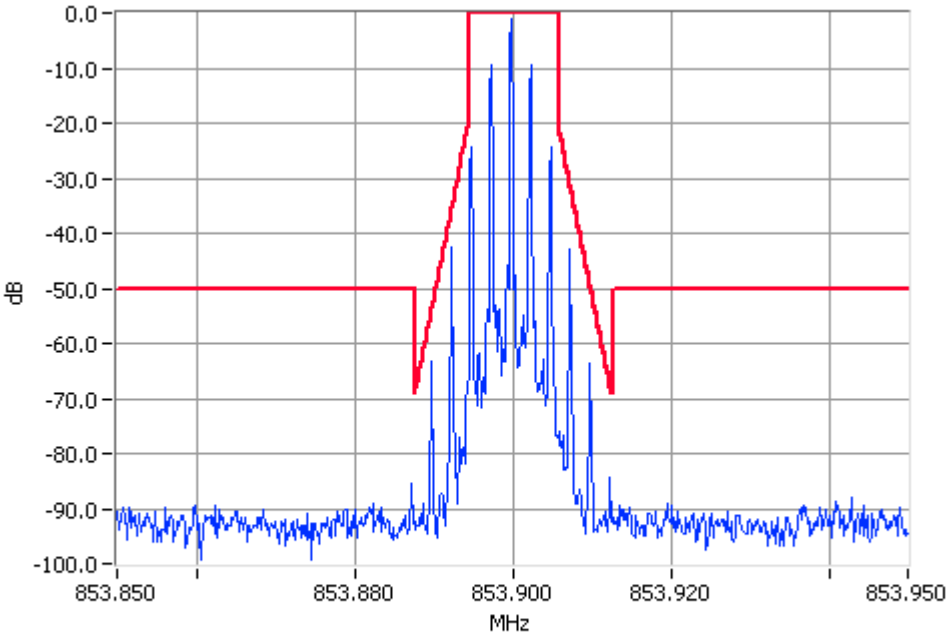
OCCUPIED BANDWIDTH

ANALOGUE VOICE

SPECIFICATION:	FCC CFR 2.1049 (c)		TBA70K2 PA
Tx FREQUENCY:	853.9 MHz	1W	12.5 kHz Channel Spacing



Unmodulated 853.9000MHz Mask D 1W Pass
RBW=100Hz VBW=1000Hz

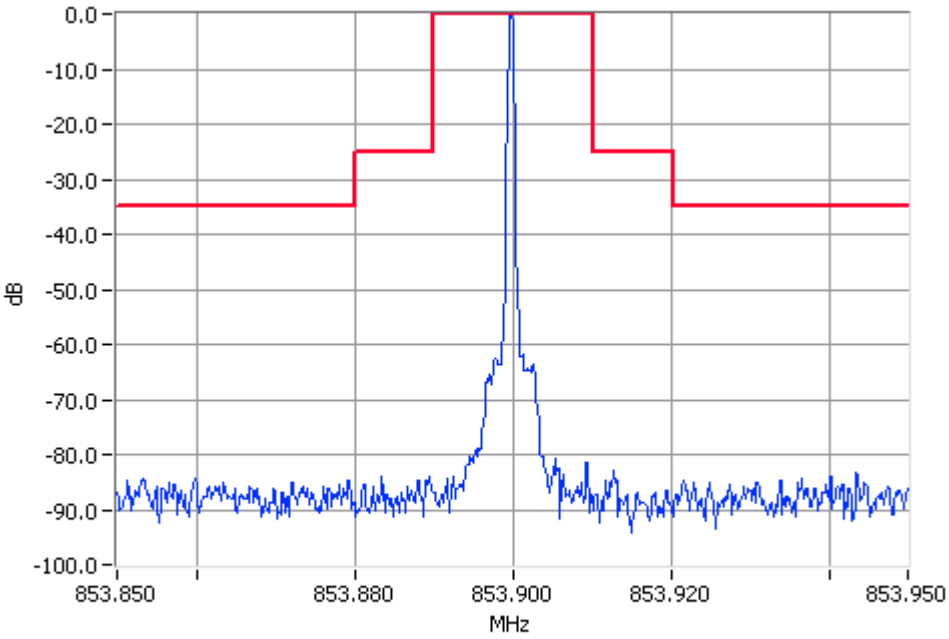


Analogue Modulation 853.9000MHz Mask D 1W Pass
RBW=100Hz VBW=1000Hz

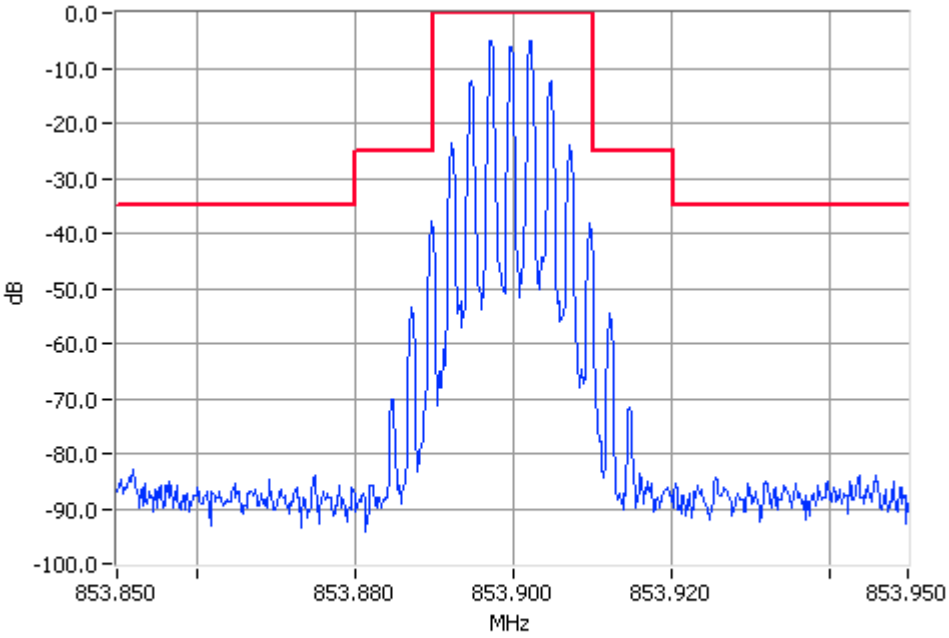
OCCUPIED BANDWIDTH

ANALOGUE VOICE

SPECIFICATION:	FCC CFR 2.1049 (c)		TBA70K2 PA
Tx FREQUENCY:	853.9 MHz	5W	25 kHz Channel Spacing



Unmodulated 853.9000MHz Mask B 5W Pass
RBW=300Hz VBW=3000Hz

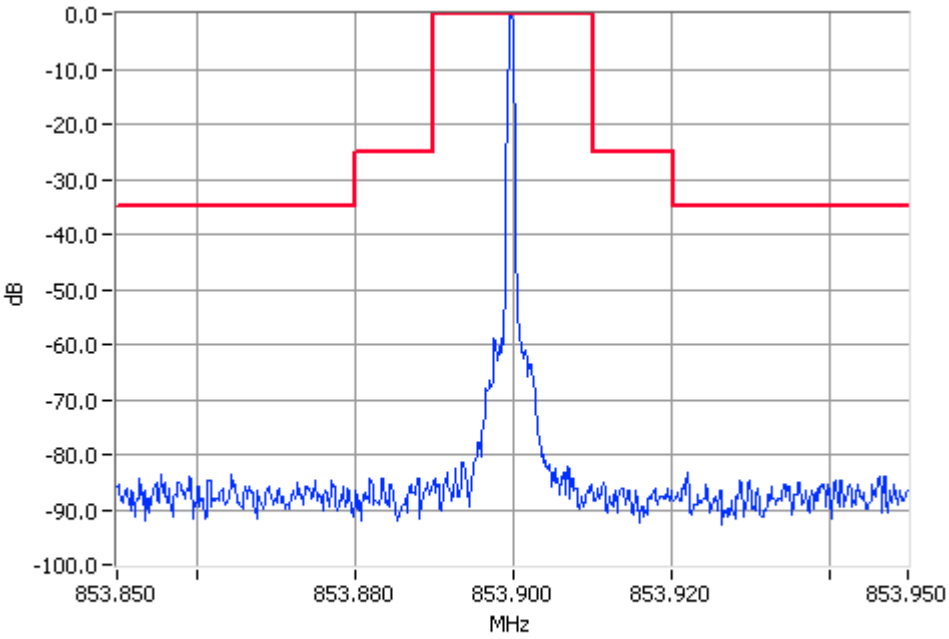


Analogue Modulation 853.9000MHz Mask B 5W Pass
RBW=300Hz VBW=3000Hz

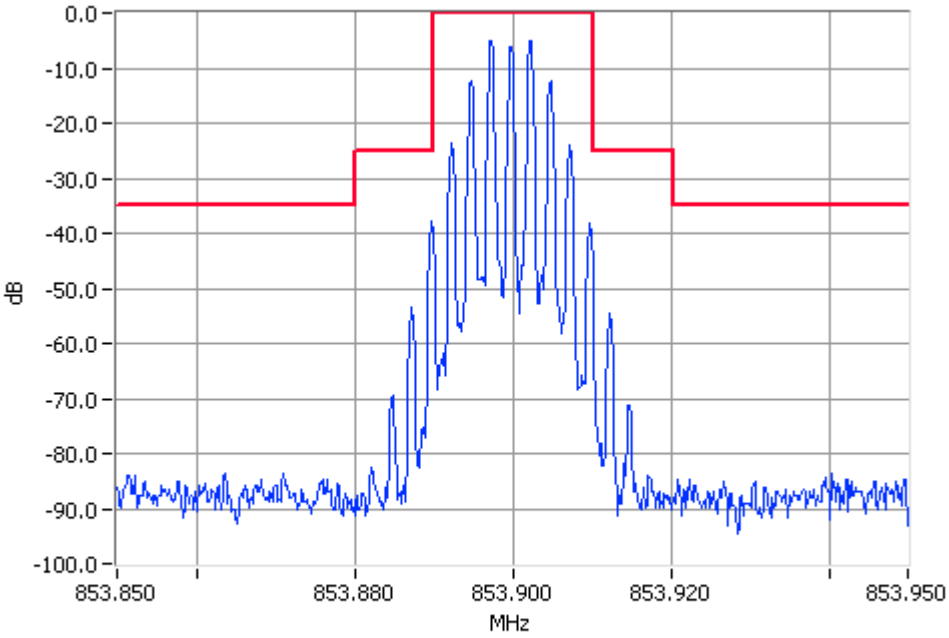
OCCUPIED BANDWIDTH

ANALOGUE VOICE

SPECIFICATION:	FCC CFR 2.1049 (c)		TBA70K2 PA
Tx FREQUENCY:	853.9 MHz	1W	25 kHz Channel Spacing



Unmodulated 853.9000MHz Mask B 1W Pass
RBW=300Hz VBW=3000Hz

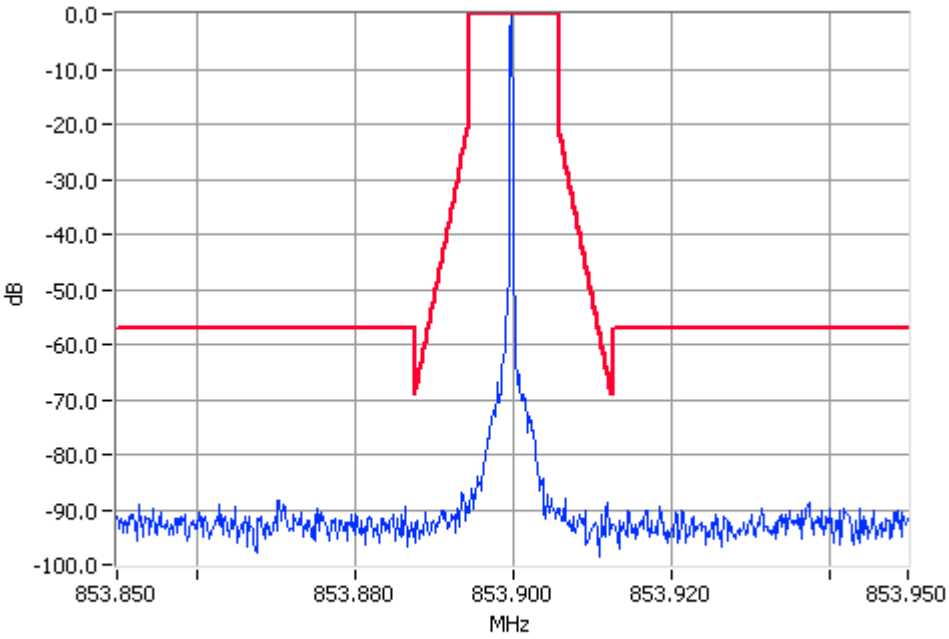


Analogue Modulation 853.9000MHz Mask B 1W Pass
RBW=300Hz VBW=3000Hz

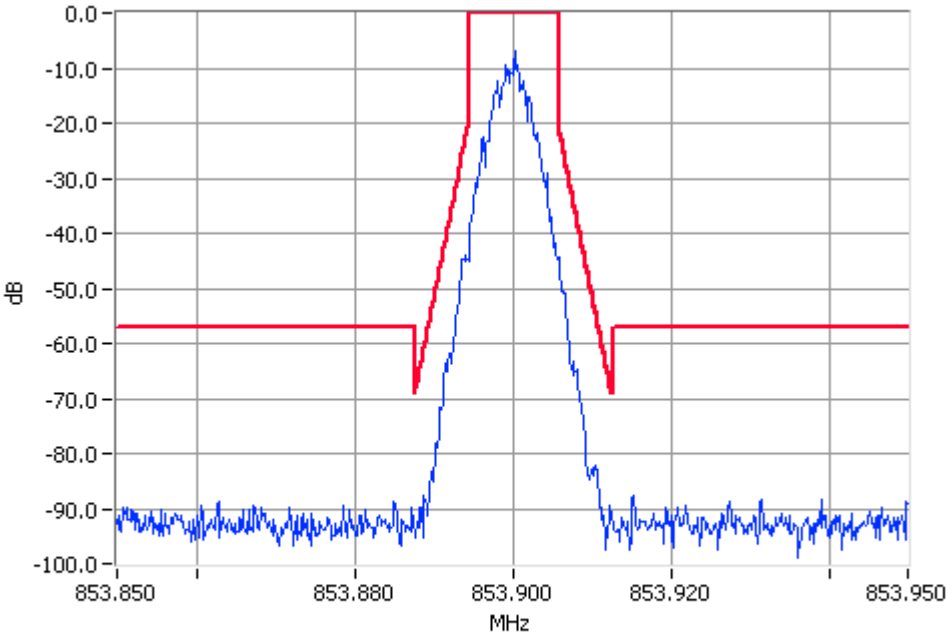
OCCUPIED BANDWIDTH

DIGITAL – (4 Level FSK)

SPECIFICATION:	FCC CFR 2.1049 (c)		TBA70K2 PA
Tx FREQUENCY:	853.9 MHz	5W	12.5 kHz Channel Spacing



Unmodulated 853.9000MHz Mask D 5W Pass
RBW=100Hz VBW=1000Hz

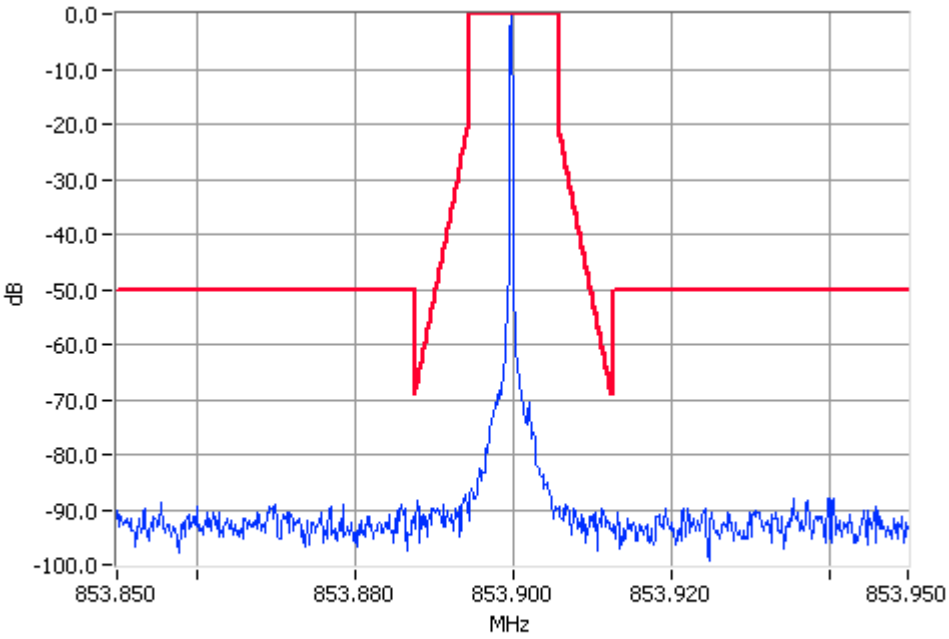


Digital Modulation 853.9000MHz Mask D 5W Pass
RBW=100Hz VBW=1000Hz

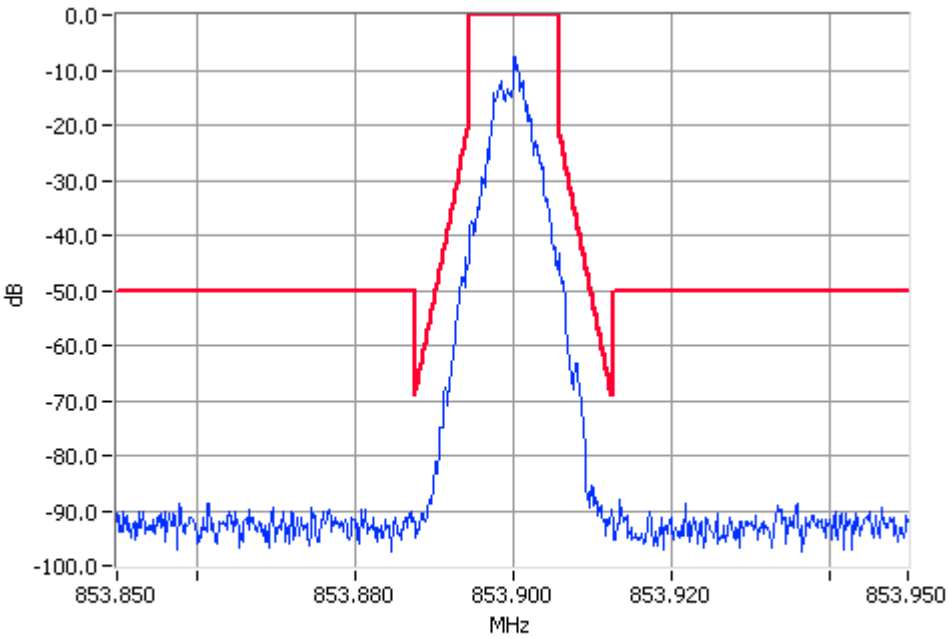
OCCUPIED BANDWIDTH

DIGITAL – (4 Level FSK)

SPECIFICATION:	FCC CFR 2.1049 (c)		TBA70K2 PA
Tx FREQUENCY:	853.9 MHz	1W	12.5 kHz Channel Spacing



Unmodulated 853.9000MHz Mask D 1W Pass
RBW=100Hz VBW=1000Hz

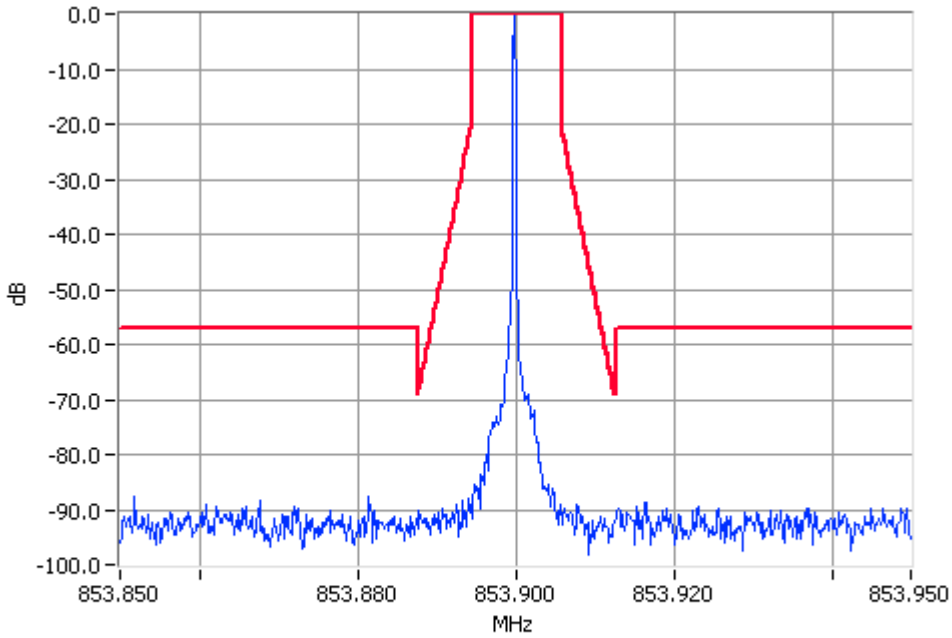


Digital Modulation 853.9000MHz Mask D 1W Pass
RBW=100Hz VBW=1000Hz

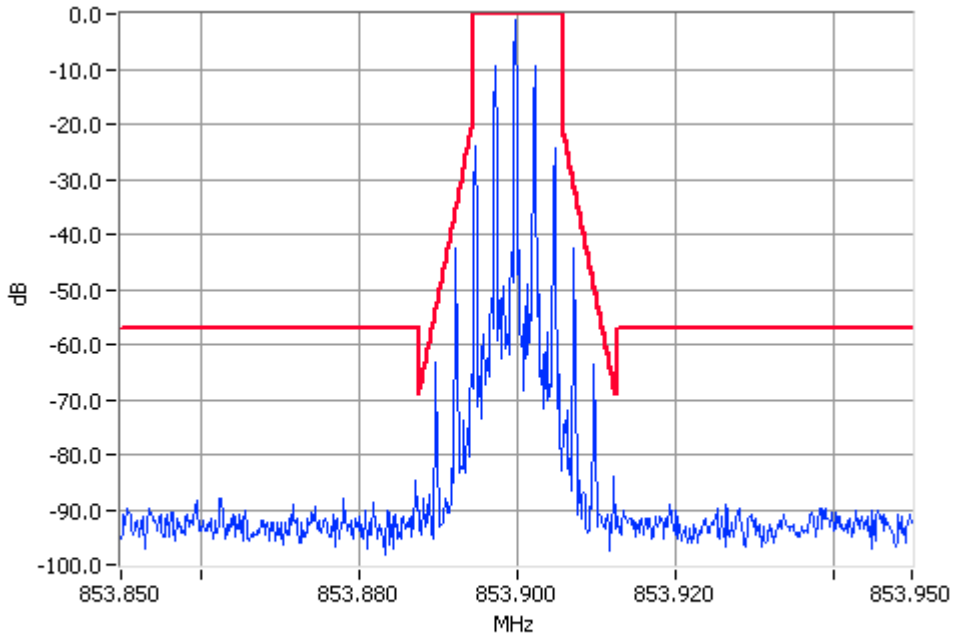
OCCUPIED BANDWIDTH

ANALOGUE VOICE

SPECIFICATION:	FCC CFR 2.1049 (c)	TBA71K2 12Vdc PA
Tx FREQUENCY:	853.9 MHz 5W	12.5 kHz Channel Spacing



Unmodulated 853.9000MHz Mask D 5W Pass
RBW=100Hz VBW=1000Hz

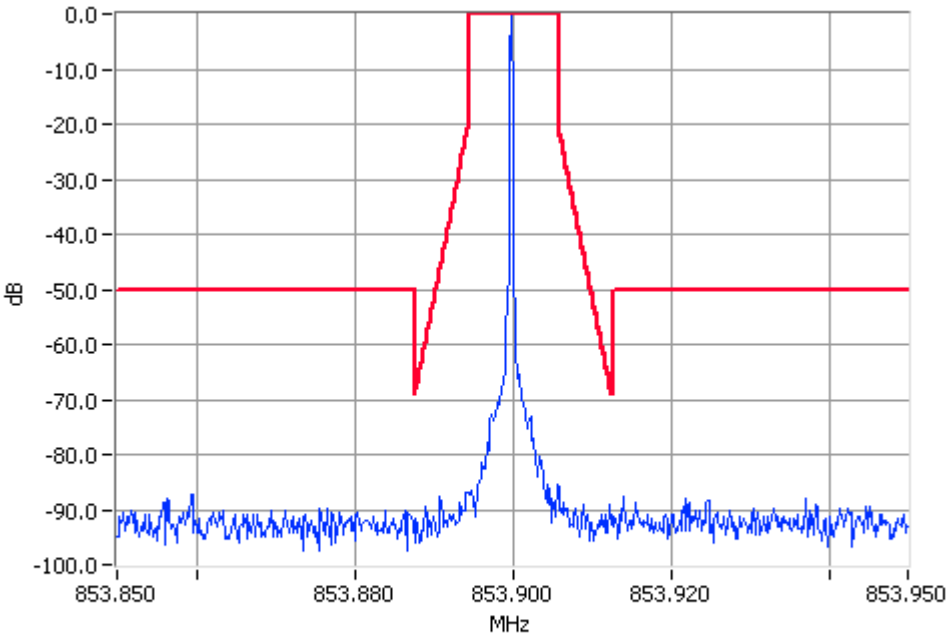


Analogue Modulation 853.9000MHz Mask D 5W Pass
RBW=100Hz VBW=1000Hz

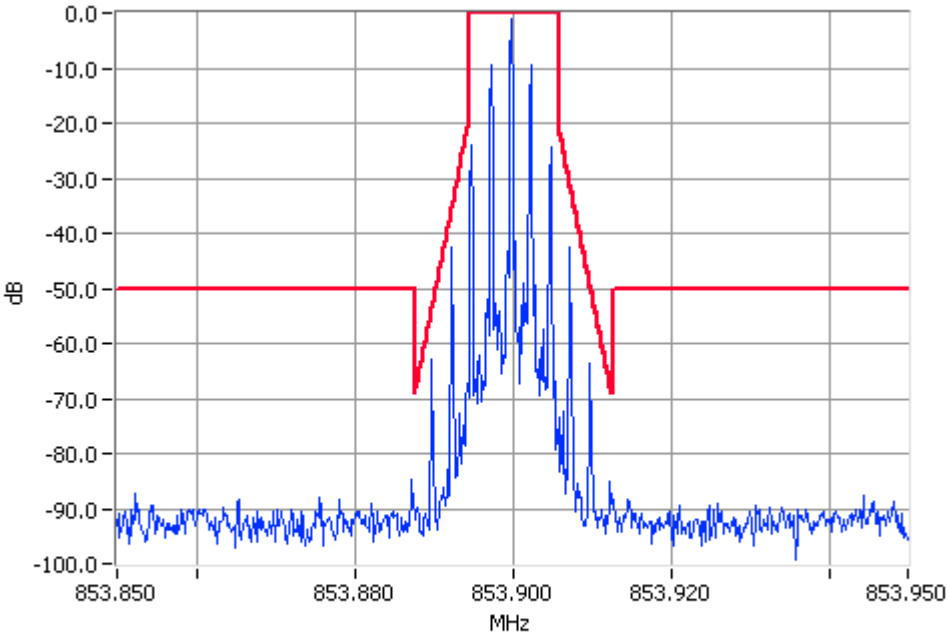
OCCUPIED BANDWIDTH

ANALOGUE VOICE

SPECIFICATION:	FCC CFR 2.1049 (c)	TBA71K2 12VDC PA
Tx FREQUENCY:	853.9 MHz 1W	12.5 kHz Channel Spacing



Unmodulated 853.9000MHz Mask D 1W Pass
RBW=100Hz VBW=1000Hz

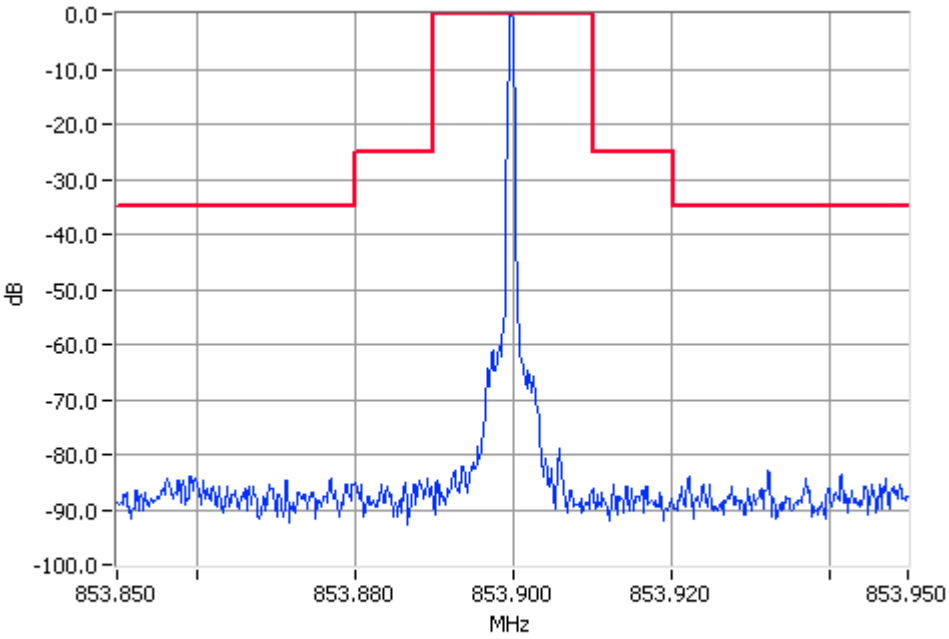


Analogue Modulation 853.9000MHz Mask D 1W Pass
RBW=100Hz VBW=1000Hz

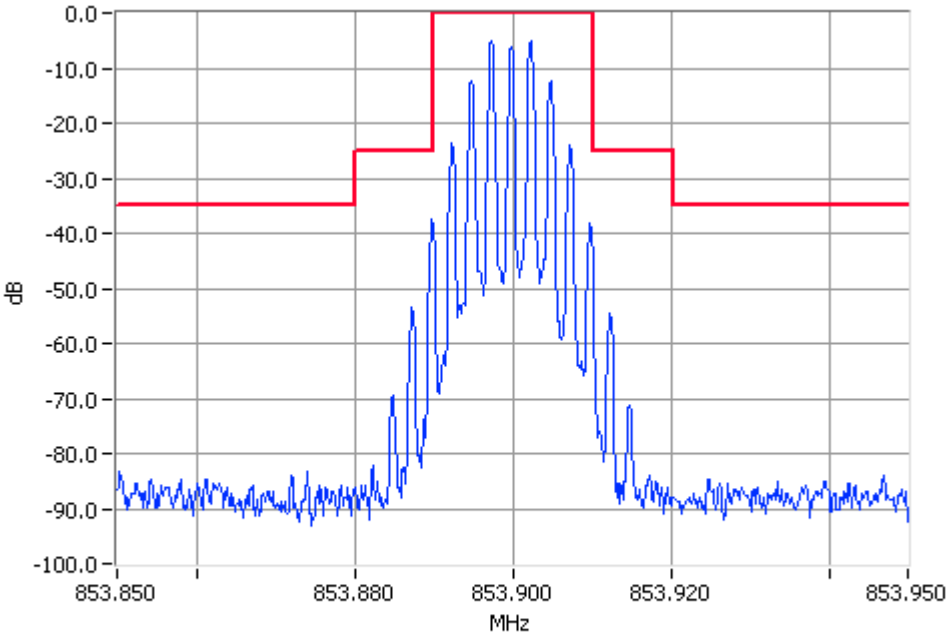
OCCUPIED BANDWIDTH

ANALOGUE VOICE

SPECIFICATION:	FCC CFR 2.1049 (c)		TBA71K2 12VDC PA
Tx FREQUENCY:	853.9 MHz	5W	25 kHz Channel Spacing



Unmodulated 853.9000MHz Mask B 5W Pass
RBW=300Hz VBW=3000Hz

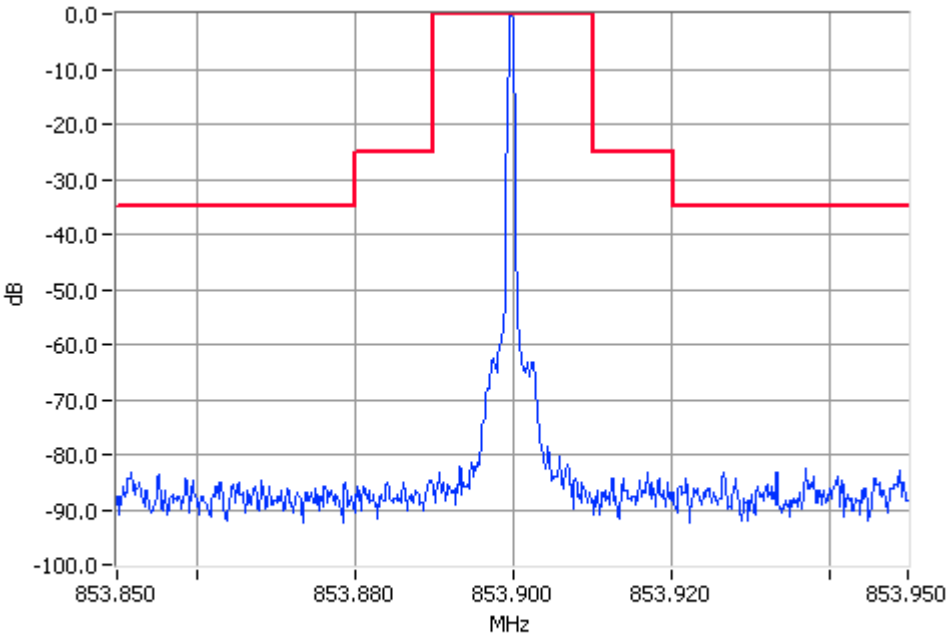


Analogue Modulation 853.9000MHz Mask B 5W Pass
RBW=300Hz VBW=3000Hz

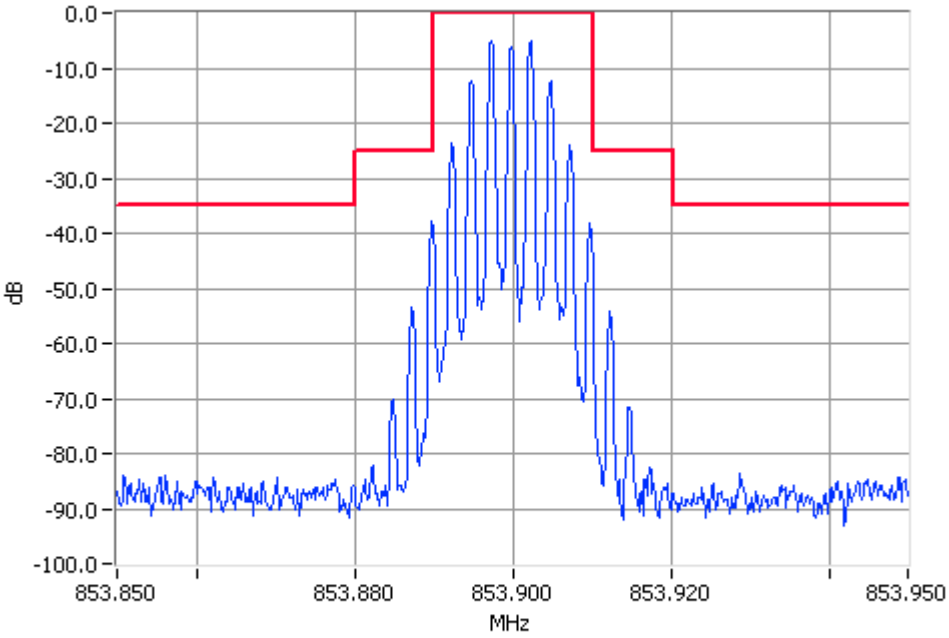
OCCUPIED BANDWIDTH

ANALOGUE VOICE

SPECIFICATION:	FCC CFR 2.1049 (c)	TBA71K2 12VDC PA
Tx FREQUENCY:	853.9 MHz 1W	25 kHz Channel Spacing



Unmodulated 853.9000MHz Mask B 1W Pass
RBW=300Hz VBW=3000Hz

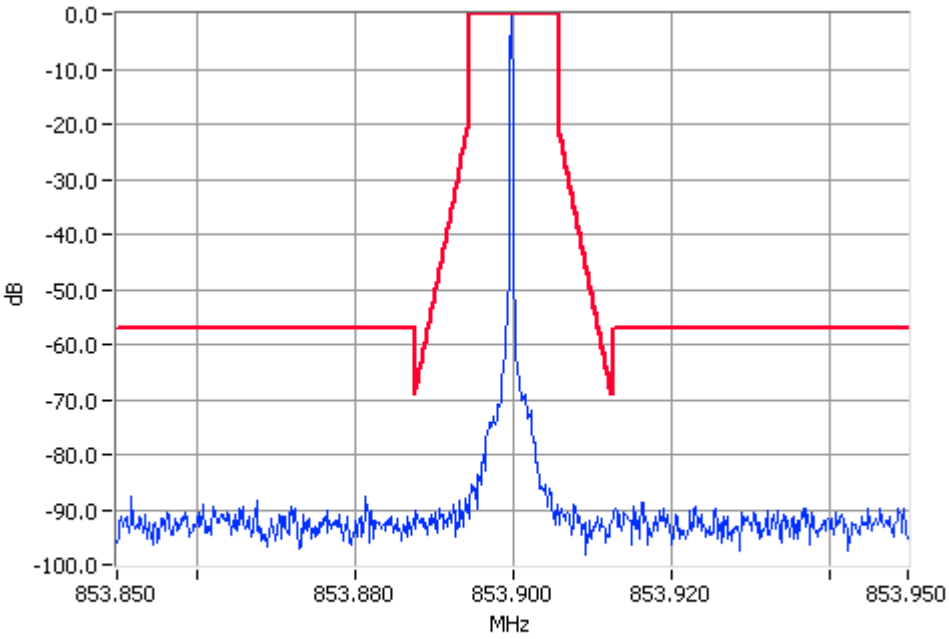


Analogue Modulation 853.9000MHz Mask B 1W Pass
RBW=300Hz VBW=3000Hz

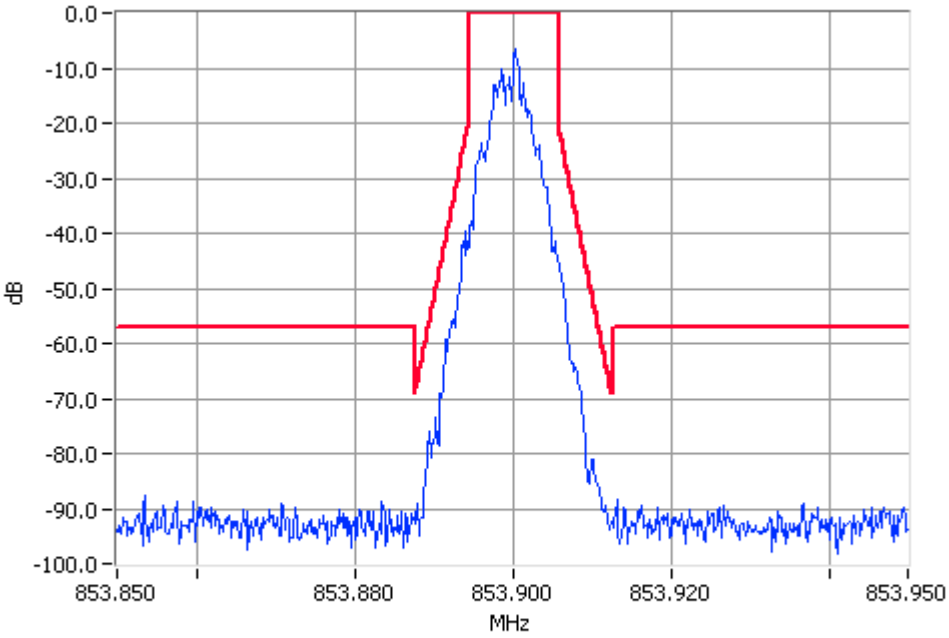
OCCUPIED BANDWIDTH

DIGITAL – (4 Level FSK)

SPECIFICATION:	FCC CFR 2.1049 (c)	TBA71K2 12VDC PA
Tx FREQUENCY:	853.9 MHz 5W	12.5 kHz Channel Spacing



Unmodulated 853.9000MHz Mask D 5W Pass
RBW=100Hz VBW=1000Hz

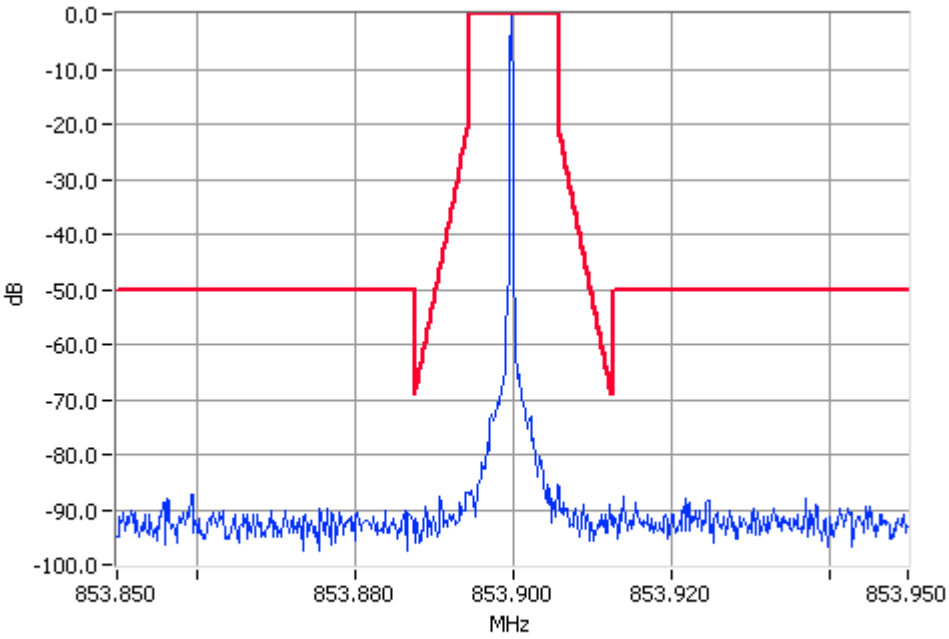


Digital Modulation 853.9000MHz Mask D 5W Pass
RBW=100Hz VBW=1000Hz

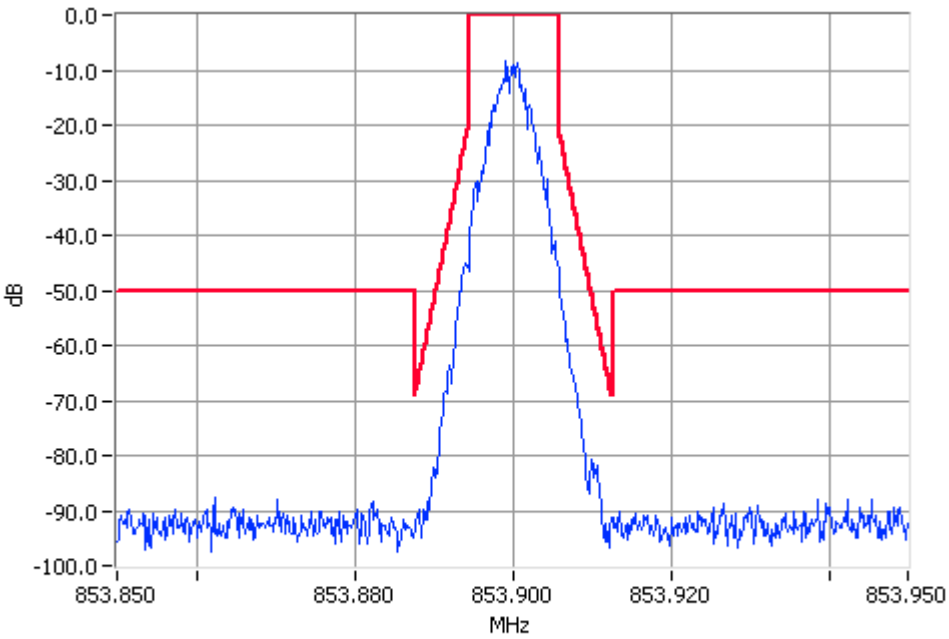
OCCUPIED BANDWIDTH

DIGITAL – (4 Level FSK)

SPECIFICATION:	FCC CFR 2.1049 (c)	TBA71K2 12VDC PA
Tx FREQUENCY:	853.9 MHz 1W	12.5 kHz Channel Spacing



Unmodulated 853.9000MHz Mask D 1W Pass
RBW=100Hz VBW=1000Hz



Digital Modulation 853.9000MHz Mask D 1W Pass
RBW=100Hz VBW=1000Hz

ADJACENT CHANNEL POWER

SPECIFICATION: FCC 47 CFR 90.543

GUIDE TIA/EIA-603C 2.2.14

MEASUREMENT PROCEDURE:
1. Refer Annex A for equipment set up.
2. The transmitter is modulated with the standard modulating signal.
3. The test is performed in accordance with 47 CFR 90.543

LIMIT CLAUSE: FCC 47 CFR 90.543

MEASUREMENT RESULTS:

DIGITAL – (4 Level FSK)

Tx FREQUENCY: 766.9 MHz 5W 12.5 kHz Channel Spacing
TBA70K2 PA

Frequency Offset	Measurement Bandwidth	ACP Measured Lower (dBc)	ACP Measured Upper (dBc)	Maximum ACP (dBc)
9.375 kHz	6.25 kHz	-47.49	-50.39	-40
15.625 kHz	6.25 kHz	-74.72	-75.57	-60
21.875 kHz	6.25 kHz	-76.29	-76.26	-60
37.5 kHz	25.0 kHz	-71.71	-71.40	-60
62.5 kHz	25.0 kHz	-74.84	-74.90	-65
87.5 kHz	25.0 kHz	-78.24	-78.74	-65
150 kHz	100 kHz	-76.44	-76.47	-65
250 kHz	100 kHz	-82.71	-82.67	-65
350 kHz	100 kHz	-86.46	-86.66	-65
>400 kHz to 12 MHz	30 kHz (swept)	< -80		-80
12 MHz to paired receive band	30 kHz (swept)	< -80		-80
In the paired receive band	30 kHz (swept)	< -100		-100

Tx FREQUENCY: 766.9 MHz 1W 12.5 kHz Channel Spacing
TBA70K2 PA

Frequency Offset	Measurement Bandwidth	ACP Measured Lower (dBc)	ACP Measured Upper (dBc)	Maximum ACP (dBc)
9.375 kHz	6.25 kHz	-48.37	-47.57	-40
15.625 kHz	6.25 kHz	-74.58	-74.48	-60
21.875 kHz	6.25 kHz	-75.02	-75.47	-60
37.5 kHz	25.0 kHz	-70.96	-71.01	-60
62.5 kHz	25.0 kHz	-74.46	-74.58	-65
87.5 kHz	25.0 kHz	-77.87	-78.13	-65
150 kHz	100 kHz	-76.49	-76.50	-65
250 kHz	100 kHz	-82.85	-82.71	-65
350 kHz	100 kHz	-86.73	-87.20	-65
>400 kHz to 12 MHz	30 kHz (swept)	< -80		-80
12 MHz to paired receive band	30 kHz (swept)	< -80		-80
In the paired receive band	30 kHz (swept)	< -100		-100

ADJACENT CHANNEL POWER

SPECIFICATION: FCC 47 CFR 90.543

DIGITAL – (4 Level FSK)

Tx FREQUENCY: 766.9 MHz 5W 12.5 kHz Channel Spacing
TBA71K2 12Vdc PA

Frequency Offset	Measurement Bandwidth	ACP Measured Lower (dBc)	ACP Measured Upper (dBc)	Maximum ACP (dBc)
9.375 kHz	6.25 kHz	-45.90	-47.06	-40
15.625 kHz	6.25 kHz	-75.21	-75.48	-60
21.875 kHz	6.25 kHz	-75.79	-75.73	-60
37.5 kHz	25.0 kHz	-71.34	-71.37	-60
62.5 kHz	25.0 kHz	-74.65	-74.53	-65
87.5 kHz	25.0 kHz	-78.31	-78.18	-65
150 kHz	100 kHz	-76.35	-76.24	-65
250 kHz	100 kHz	-82.24	-82.25	-65
350 kHz	100 kHz	-86.59	-86.81	-65
>400 kHz to 12 MHz	30 kHz (swept)	< -80		-80
12 MHz to paired receive band	30 kHz (swept)	< -80		-80
In the paired receive band	30 kHz (swept)	< -100		-100

Tx FREQUENCY: 766.9 MHz 1W 12.5 kHz Channel Spacing
TBA71K2 12Vdc PA

Frequency Offset	Measurement Bandwidth	ACP Measured Lower (dBc)	ACP Measured Upper (dBc)	Maximum ACP (dBc)
9.375 kHz	6.25 kHz	-48.29	-47.83	-40
15.625 kHz	6.25 kHz	-75.10	-74.94	-60
21.875 kHz	6.25 kHz	-75.97	-75.39	-60
37.5 kHz	25.0 kHz	-71.07	-71.11	-60
62.5 kHz	25.0 kHz	-74.61	-74.53	-65
87.5 kHz	25.0 kHz	-78.18	-78.30	-65
150 kHz	100 kHz	-75.83	-75.95	-65
250 kHz	100 kHz	-82.31	-82.25	-65
350 kHz	100 kHz	-86.49	-86.68	-65
>400 kHz to 12 MHz	30 kHz (swept)	< -80		-80
12 MHz to paired receive band	30 kHz (swept)	< -80		-80
In the paired receive band	30 kHz (swept)	< -100		-100

SPURIOUS EMISSIONS (CONDUCTED)

SPECIFICATION: FCC 47 CFR 2.1051

GUIDE: TIA/EIA-603C 2.2.13

MEASUREMENT PROCEDURE:

4. Refer Annex A for equipment set up.
5. 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 10th Harmonic
6. A Pre-scan is performed with a resolution bandwidth of 1 kHz, and a video bandwidth of 3 kHz. If any emissions are found to be within 20dB of the limit a second measurement is made with the carrier modulated, and a resolution bandwidth of 10 kHz, and a video bandwidth of 30kHz.
7. 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
FCC 47 CFR 90.543 (c)

SPURIOUS EMISSIONS (CONDUCTED)

SPECIFICATION: FCC CFR 2.1051

Tx FREQUENCY: 766.9 MHz

Testing of TBA70K2-0000 Power Amplifier		
12.5 kHz Channel Spacing	766.9 MHz @ 5W	
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
No emissions were detected at a level greater than 20 dB below the limit.		

Testing of TBA70K2-0000 Power Amplifier		
12.5 kHz Channel Spacing	766.9 MHz @ 1W	
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
No emissions were detected at a level greater than 20 dB below the limit.		

LIMIT CLAUSE

Carrier Output Power Watts	FCC 47 CFR 90.543 (c) 12.5 kHz Channel Spacing $43 + 10 \text{ Log}_{10} (P_{Watts})$	
5W	-13 dBm	50 dBc
1W	-13dBm	43 dBc
Measurement Uncertainty (dB)	+/-3.0	

SPURIOUS EMISSIONS (CONDUCTED)

SPECIFICATION: FCC CFR 2.1051

Tx FREQUENCY: 853.9 MHz

Testing of TBA70K2-0000 Power Amplifier		
12.5 kHz Channel Spacing	853.9 MHz @ 5W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
No emissions were detected at a level greater than 20 dB below the limit.		

Tx FREQUENCY: 853.9 MHz

Testing of TBA70K2-0000 Power Amplifier		
12.5 kHz Channel Spacing	853.9 MHz @ 1W	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 $50 + 10 \text{Log}_{10} (P_{Watts})$	
5W	-20 dBm	57 dBc
1W	-20dBm	50 dBc
Measurement Uncertainty (dB)	+/-3.0	

SPURIOUS EMISSIONS (CONDUCTED)

SPECIFICATION: FCC CFR 2.1051

Tx FREQUENCY: 766.9 MHz

Testing of TBA71K2-0000 12V dc Power Amplifier		
12.5 kHz Channel Spacing	766.9 MHz @ 5W	
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
No emissions were detected at a level greater than 20 dB below the limit.		

Testing of TBA71K2-0000 12V dc Power Amplifier		
12.5 kHz Channel Spacing	766.9 MHz @ 1W	
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
No emissions were detected at a level greater than 20 dB below the limit.		

LIMIT CLAUSE

Carrier Output Power Watts	FCC 47 CFR 90.543 (c) 12.5 kHz Channel Spacing $43 + 10 \text{Log}_{10} (P_{Watts})$	
5W	-13 dBm	50 dBc
1W	-13dBm	43 dBc
Measurement Uncertainty (dB)	+/-3.0	

SPURIOUS EMISSIONS (CONDUCTED)

SPECIFICATION: FCC CFR 2.1051

Tx FREQUENCY: 853.9 MHz

Testing of TBA71K2-0000 12V dc Power Amplifier		
12.5 kHz Channel Spacing	853.9 MHz @ 5W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
No emissions were detected at a level greater than 20 dB below the limit.		

Tx FREQUENCY: 853.9 MHz

Testing of TBA71K2-0000 12V dc Power Amplifier		
12.5 kHz Channel Spacing	853.9 MHz @ 1W	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 $50 + 10 \text{ Log}_{10} (P_{Watts})$	
5W	-20 dBm	57 dBc
1W	-20dBm	50 dBc
Measurement Uncertainty (dB)	+/-3.0	

SPURIOUS EMISSIONS (RADIATED)

SPECIFICATION: FCC 47 CFR 2.1053

GUIDE: TIA/EIA-603C 2.2.12

MEASUREMENT PROCEDURE:
1. Refer Annex A for equipment set up.
2. The EUT was placed on a wooden turntable at a distance of three metres from the test antenna. The output terminal was connected to an RF dummy load.
3. The turntable was rotated through 360^{o} to obtain the maximum response of each spurious emission. Valid emissions were determined by switching the EUT on and off.
4. The EUT was replaced by a signal generator and substitution antenna to make measurements by the substitution method.

MEASUREMENT RESULTS:
See the tables on the following pages

LIMIT CLAUSE: FCC 47 CFR 90.210
FCC 47 CFR 90.543 (c)

SPURIOUS EMISSIONS (RADIATED)

SPECIFICATION: FCC CFR 2.1053

Tx FREQUENCY: 766.9 MHz

Testing of TBA70K2-0000 Power Amplifier		
12.5 kHz Channel Spacing	766.9 MHz @ 5W	
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
1533.8	-38.34	-65.34
No other emissions were detected at a level greater than 20 dB below the limit.		

Testing of TBA70K2-0000 Power Amplifier		
12.5 kHz Channel Spacing	766.9 MHz @ 1W	
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
No emissions were detected at a level greater than 20 dB below the limit.		

LIMIT CLAUSE

Carrier Output Power Watts	FCC 47 CFR 90.543 (c) 12.5 kHz Channel Spacing $43 + 10 \text{ Log}_{10} (P_{Watts})$	
5W	-13 dBm	-50 dBc
1W	-13dBm	-43 dBc
Measurement Uncertainty (dB)	+/-4.6	

SPURIOUS EMISSIONS (RADIATED)

SPECIFICATION: FCC CFR 2.1053

Tx FREQUENCY: 766.9 MHz

Testing of TBA71K2-0000 12V dc Power Amplifier		
12.5 kHz Channel Spacing 766.9 MHz @ 5W		
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
No emissions were detected at a level greater than 20 dB below the limit.		

Testing of TBA71K2-0000 12V dc Power Amplifier		
12.5 kHz Channel Spacing 766.9 MHz @ 1W		
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
No emissions were detected at a level greater than 20 dB below the limit.		

LIMIT CLAUSE

Carrier Output Power Watts	FCC 47 CFR 90.543 (c) 12.5 kHz Channel Spacing $43 + 10 \text{Log}_{10} (P_{Watts})$	
5W	-13 dBm	-50 dBc
1W	-13dBm	-43 dBc
Measurement Uncertainty (dB)	+/-4.6	

SPURIOUS EMISSIONS (RADIATED)

SPECIFICATION: FCC CFR 2.1053

Tx FREQUENCY: 853.9 MHz

Testing of TBA70K2-0000 Power Amplifier		
12.5 kHz Channel Spacing	853.9 MHz @ 5W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
1707.8	-30.53	-67.53
3415.6	-29.26	-66.26
No other emissions were detected at a level greater than 20 dB below the limit.		

Testing of TBA70K2-0000 Power Amplifier		
12.5 kHz Channel Spacing	853.9 MHz @ 1W	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 $50 + 10 \text{ Log}_{10} (P_{Watts})$	
5W	-20 dBm	-57 dBc
1W	-20dBm	-50 dBc
Measurement Uncertainty (dB)	+/-4.6	

SPURIOUS EMISSIONS (RADIATED)

SPECIFICATION: FCC CFR 2.1053

Tx FREQUENCY: 853.9 MHz

Testing of TBA71K2-0000 12V dc Power Amplifier		
12.5 kHz Channel Spacing	853.9 MHz @ 5W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
No emissions were detected at a level greater than 20 dB below the limit.		

Testing of TBA71K2-0000 12V dc Power Amplifier		
12.5 kHz Channel Spacing	853.9 MHz @ 1W	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 $50 + 10 \text{ Log}_{10} (P_{Watts})$	
5W	-20 dBm	-57 dBc
1W	-20dBm	-50 dBc
Measurement Uncertainty (dB)	+/-4.6	

TRANSMITTER FREQUENCY STABILITY (TEMPERATURE)

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

GUIDE: TIA/EIA-603C 2.2.2

MEASUREMENT PROCEDURE:
1. Refer Annex A for equipment set up.
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).
4. Where the Error limit is 0.1ppm an external reference oscillator has been used.

MEASUREMENT UNCERTAINTY (Hz): 50

MEASUREMENT RESULTS:
See the plots on the following pages for 12.5 kHz channel spacing.

LIMIT

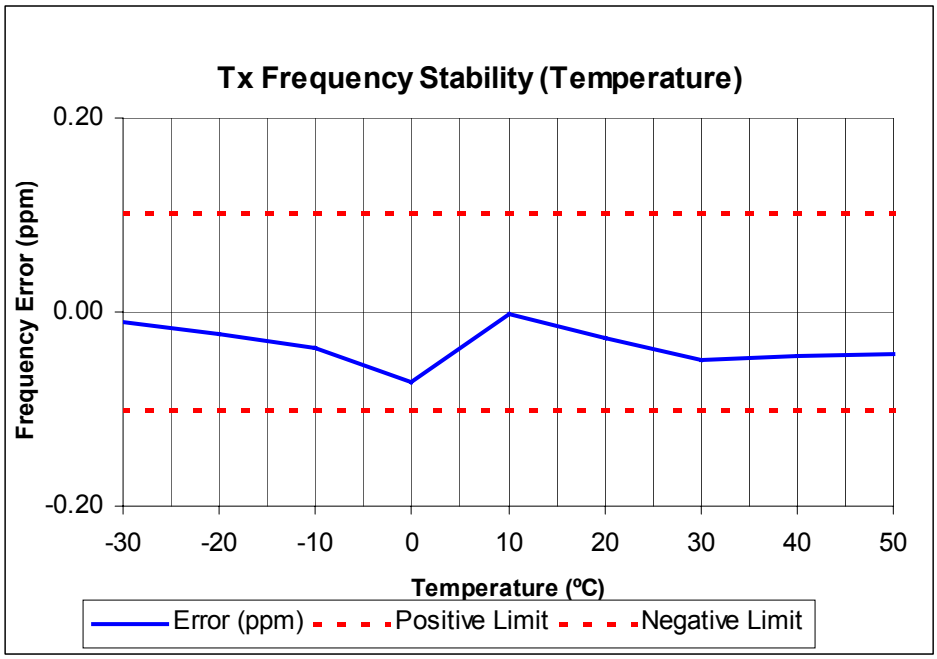
Limit Clause	Frequency range	Test Frequency (MHz)	Frequency Error (ppm)
47 CFR 90.539	764 – 776 MHz	766.9	0.1
47 CFR 90.213	851 – 854 MHz	853.9	1.0
Tait Electronics Ltd. Specification	764 – 776 MHz 850 – 870 MHz	853.9	0.5 (internal osc reference)

TRANSMITTER FREQUENCY STABILITY (TEMPERATURE)

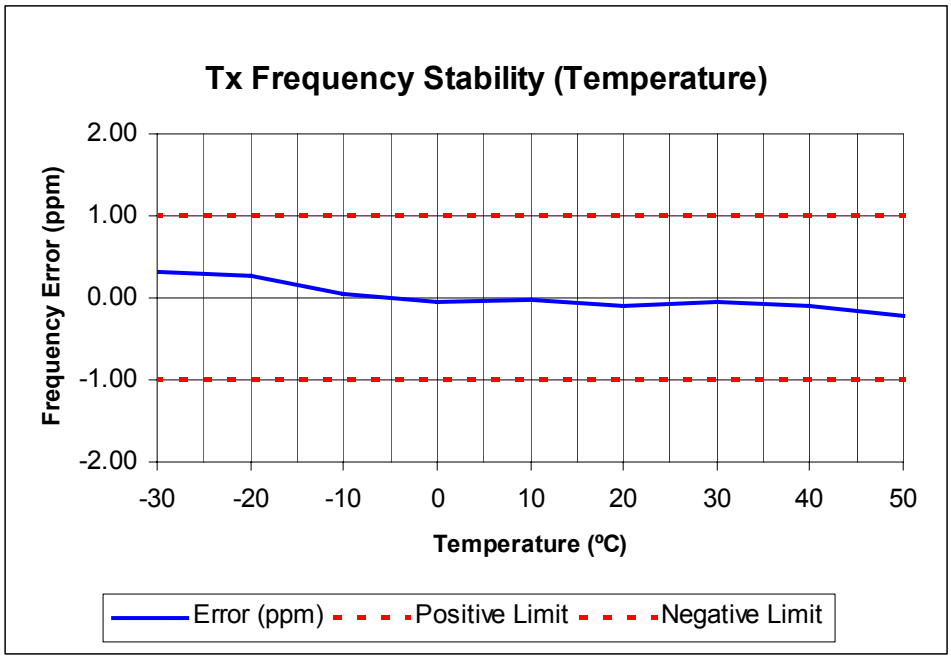
SPECIFICATION: FCC 47 CFR 2.1055 (a) (1)

(TBA70K2-0000 PA)

Tx FREQUENCY: 766.9 MHz 5W 12.5 kHz channel Spacing
(External 10 MHz Frequency Reference T801-20-000)



Tx FREQUENCY: 853.9 MHz 5W 12.5 kHz channel Spacing



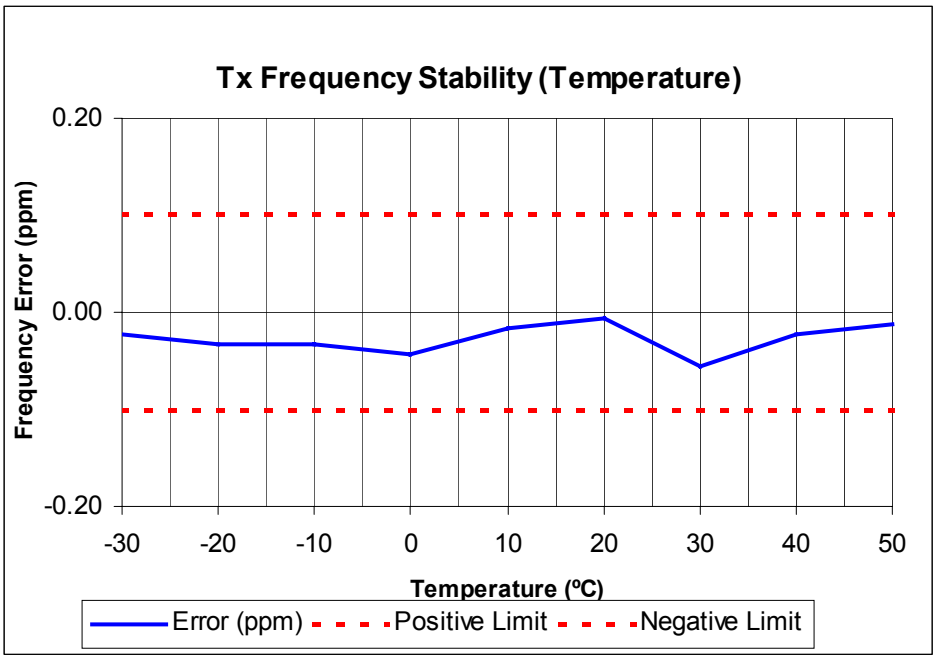
TRANSMITTER FREQUENCY STABILITY (TEMPERATURE)

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

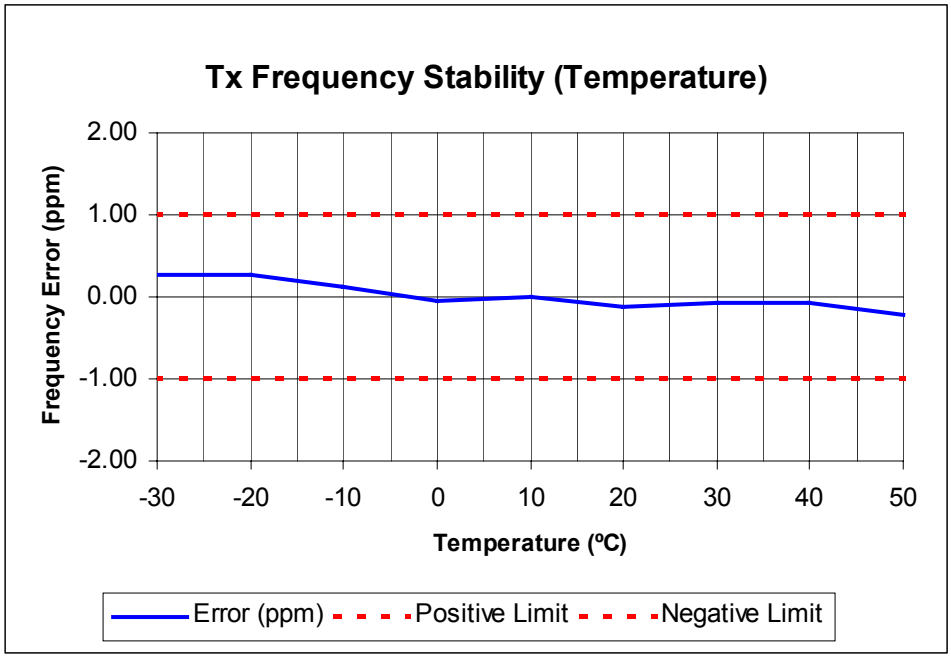
(TBA71K2-0000 12Vdc PA)

Tx FREQUENCY 766.9 MHz 5W 12.5 kHz channel spacing

(External 10 MHz Reference T801-20-000)



Tx FREQUENCY: 853.9 MHz 5W 12.5 kHz channel Spacing



TRANSMITTER FREQUENCY STABILITY (VOLTAGE)

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

GUIDE: TIA/EIA-603B 2.2.2

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).
4. Where the error limit is 0.1ppm an external reference oscillator has been used.

MEASUREMENT UNCERTAINTY (Hz): 50

MEASUREMENT RESULTS:

TBA70K2-0000 PA

Channel Spacing (kHz)	FREQUENCY ERROR (ppm) @ 766.9 MHz (External 10 MHz Frequency Reference T801-20-000)		
	102V ac	120 V ac	138 V ac
12.5	-0.05	-0.04	-0.05

Channel Spacing (kHz)	FREQUENCY ERROR (ppm) @ 853.9 MHz		
	102V ac	120 V ac	138 V ac
12.5	-0.15	-0.15	-0.15

TBA71K2-0000 12V dc PA

Channel Spacing (kHz)	FREQUENCY ERROR (ppm) @ 766.9 MHz (External 10 MHz Frequency Reference T801-20-000)		
	11.73V DC	13.8 V DC	15.87 V DC
12.5	-0.05	-0.04	-0.06

Channel Spacing (kHz)	FREQUENCY ERROR (ppm) @ 853.9 MHz		
	11.73V DC	13.8 V DC	15.87 V DC
12.5	-0.12	-0.12	-0.12

LIMIT

Limit Clause	Frequency range	Test Frequency (MHz)	Frequency Error (ppm)
47 CFR 90.539	764 – 776 MHz	766.9	0.1
47 CFR 90.213	851 – 854 MHz	853.9	1.0
Tait Electronics Ltd. Specification	764 – 776 MHz 850 – 870 MHz	853.9	0.5 (internal osc reference)

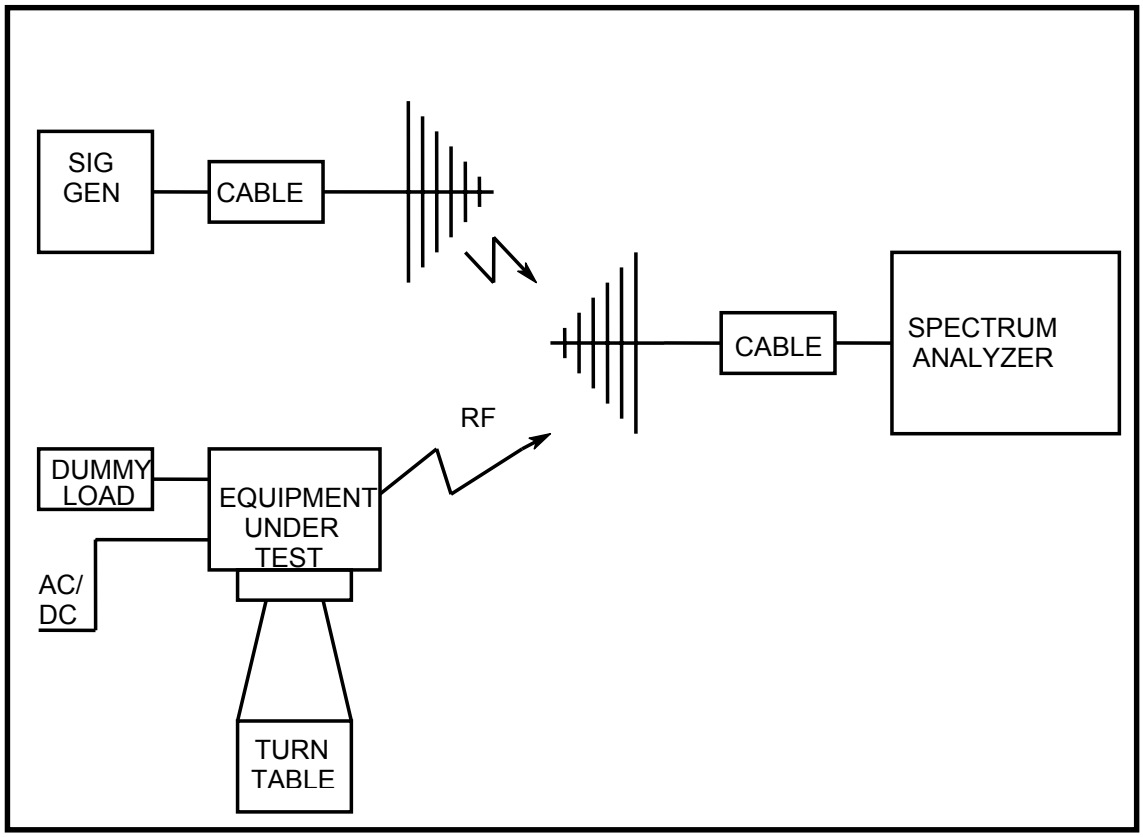
TEST EQUIPMENT USED

No#	Equipment	Manufacturer	Model No	Serial No#	Tait ID	Cal Due
21	Power Supply	Rohde & Schwarz	NGS M32/10 192.0810.31	Fnr 434	E3556	26-Sep-06
24	Environ. Chamber	Contherm	Spatial Cal	E3397	E3397	
24	Environ. Chamber	Contherm	Temp Control	E3397	E3397	
37	Variac	Yamabishi	S-260-5	TX-533	E1737	
43	Horn Antenna	Emco	DRG3115	2084	E3076	27-Sep-06
44	Corner 175-420 MHz	Ailtech	DM105A-T2	J1417-103	E3031	
46	S-LINE TEM CELL	Rohde & Schwarz	1089.9296.02	338232/003	E3636	
66	RF Attenuator 25W	Weinschel	33-20-33	BD5871	E3673	24-Nov-06
73	RF Termination 20W	Deltec		118.001	E3626	
80	20m Coax Cable	Intelcom	RG214/U-50	CBL03	E3659	29-Nov-06
81	2m Coax Cable	Intelcom	RG213/U-50	CBL02	E3658	
87	Audio Analyser	Hewlett Packard	HP8903B	2818A04275	E3710	23-Nov-06
88	Spectrum Analyser	Hewlett Packard	HP8562E	3821A00779	E3715	25-Nov-06
91	20m Coax Cable		RG214/U-50 (Ext Cal)	CBL01	E3404	29-Nov-06
100	Oscilloscope	Tektronics	TDS380	B017095	E3782	25-Nov-06
111	Modulation Analyser	Hewlett Packard	HP8901B (Opt 002)	3704A05837	E3786	23-Nov-06
112	Signal Generator	Agilent	E4433B	US38440446	E4147	10-Aug-08
114	Signal Generator	Rohde & Schwarz	SML03 1090.3000.13	100597	E4050	26-Nov-06
123	Spectrum Analyser	Agilent	E4445A	MY42510072	E4139	4-Jul-07
129	Antenna Tower	Electrometrics	EM-4720-2	112	E4447	
130	Controller	Electrometrics	EM-4700	119	E4445	
131	Turntable	Electrometrics	EM-4704A	105	E4446	
137	1m Multiflex Cable	Suhner	MF141	TT007	E4443	25-Nov-06
138	1m Multiflex Cable	Suhner	MF141	TT086	E4444	25-Nov-06
145	AC Voltmeter	Tait				10-Apr-07
148	Power Sensor	Hewlett Packard	11722A	3111A05573	E7054	2-Aug-07

ANNEX A

TEST SETUP DETAILS

Radiated Emissions Set up.



All other testing is performed using the **T**eltest **R**adio **EVA**luation system (TREVA), which is configured as shown below. The Spectrum Analyser is connected to the EUT via the attenuator network for Conducted Emissions, Occupied Bandwidth, and ACP measurements