

LABORATORY TEST REPORT

RADIO PERFORMANCE MEASUREMENTS

for the
TPJHGB Handportable Transceiver

Tested in accordance with:
FCC 47 CFR Parts 22 and 90
RSS-119 Issue 12
RSS-Gen Issue 5

Report Revision: 1
Issue Date: 05 December 2025

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CHECKED & APPROVED BY: M. C. James


Laboratory Technical Manager



FCC Registration: 838288
ISED Registration: 737A

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

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REVISION HISTORY

Date	Revision	Comments
05 December 2025	1	Initial test report

INTRODUCTION

Type approval testing of the TPJHGB, 4 Watt, handportable transceiver in order to demonstrate compliance with FCC 47 Parts 22 & 90, and RSS-119 Issue 12 & RSS-Gen Issue 5. This radio supports Analogue and Digital Mobile Radio (DMR) modulations.

REPORT PREPARED FOR

Tait International Ltd
241 Wooldridge Road
Harewood
Christchurch 8051
New Zealand

DESCRIPTION OF SAMPLES

Manufacturer: Tait International Limited
Equipment: Handportable Transceiver
Type Code: TPJHGB
Product Code: T03-00401-GAAA
Serial Number(s): (A) 35000277 & (B) 35000278
Frequency Range: 400 → 480 MHz
Transmit Power: 4 W
Firmware Version: V5.3.7.14 (TP35_20251128_145028)

Modulation		Channel Spacing	Speech Channels	Symbol Rate (symbols/sec)	Data Rate (bps)
Analogue FM		12.5 kHz	1	-	-
		25.0 kHz	1	-	-
Digital Mobile Radio (DMR)	4 Level FSK (2 slot TDMA) (ETSI TS102 361-1)	12.5 kHz	2	4800	9600

TEST CONDITIONS

All testing was performed between 27 November → 04 December 2025, and under the following conditions:

Ambient temperature: 15°C → 30°C
Relative Humidity: 20% → 75%
Standard Test Voltage: 7.5 V_{DC} (battery pack)

Two identical samples were used for the test: Sample B was utilized for conducted and radiated spurious emissions tests, while Sample A was used for the remaining tests in this report.

TEST REQUIREMENTS AND RESULT SUMMARY

ISED Specification	FCC Specification	Test Name	Test Methods	Result
RSS-119 5.4	FCC 47 CFR 2.1046	Transmitter Output Power (Conducted)	ANSI C63.26 5.2.4.2	P
No specification	FCC 47 CFR 2.1047 (a)	Transmitter Audio Frequency Response – Pre-emphasis	ANSI C63.26 5.3.3.2	P
No specification	FCC 47 CFR 2.1047 (b)	Transmitter Modulation Limiting	ANSI C63.26 5.3.2	P
RSS-119 5.5	FCC 47 CFR 2.1049 (c)	Transmitter Occupied (99%) Bandwidth	ANSI C63.26 5.4.4	P
RSS-119 5.5	FCC 47 CFR 90.210	Transmitter Spectrum Masks	ANSI C63.26.5.7.3	P
RSS-119 5.8.9	FCC 47 CFR 90.543	Adjacent Channel Power Ratio	ANSI C63.26 6.5.2.4	N/A 2
RSS-119 5.8	FCC 47 CFR 2.1051	Transmitter Spurious Emissions (Conducted)	ANSI C63.26 5.7	P
RSS-119 5.8	FCC 47 CFR 2.1053	Transmitter Spurious Emissions (Radiated)	ANSI C63.26 5.5.3	P
RSS-119 5.8.9.2 rad	FCC CFR 90.543	Transmitter Radiated Emissions in the GNSS Band	ANSI C63.26 6.5.2.7.3	N/A 2
RSS-119 5.8.9.2	FCC CFR 90.543	Transmitter Conducted Emissions in the GNSS Band	ANSI C63.26 6.5.2.7.4	N/A 2
RSS-119 5.9	FCC 47 CFR 90.214	Transient Frequency Behaviour	ANSI C63.26 6.5.2.2	P
RSS-119 5.3	FCC 47 CFR 2.1055, FCC 47 CFR 90.213	Transmitter Frequency Stability - Temperature	ANSI C63.26 5.6.4	P
RSS-119 5.3	FCC 47 CFR 2.1055 (d) (1), FCC 47 CFR 90.213	Transmitter Frequency Stability - Voltage	ANSI C63.26 5.6.5	P
RSS-Gen 7.4	FCC 47CFR 15.111	Receiver Spurious Emissions (Conducted)	ANSI C63.26 5.7	P

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

Comments:
N/A 1: Only required where the EUT is capable of Analogue modulation
N/A 2: Only required where the EUT transmits in the 768-776 or 798-806 MHz band (ISED), or 769-775 or 799-805 MHz band (FCC).
N/A 3: Only required where the EUT transmits in the 138-174 or 406.1-512 MHz band

STATEMENT OF COMPLIANCE

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

Equipment: Handportable Transceiver
Type Code: TPJHGB
Product Code: T03-00401-GAAA
Serial Number(s): (A) 35000277 & (B) 35000278
Quantity: 1

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

FCC 47 CFR Parts 22 and 90

RSS-119 Issue 12 & RSS-Gen Issue 5

Signature: 

M. C. James
Laboratory Technical Manager

Date: 11 December 2025

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

95% measurement uncertainties are stated in this report but are not applied in the assessment of results.

CHANNEL TABLE

Analogue Channels

Label	Channel Number	Receive Frequency MHz	Transmit Frequency MHz	Power Watts	Channel Spacing kHz
A406.125-WB-L	1	406.125	406.125	1	25.0
A406.125-WB-H	2	406.125	406.125	4	25.0
A406.125-NB-L	3	406.125	406.125	1	12.5
A406.125-NB-H	4	406.125	406.125	4	12.5
A418.025-WB-L	5	418.025	418.025	1	25.0
A418.025-WB-H	6	418.025	418.025	4	25.0
A418.025-NB-L	7	418.025	418.025	1	12.5
A418.025-NB-H	8	418.025	418.025	4	12.5
A429.975-WB-L	9	429.975	429.975	1	25.0
A429.975-WB-H	10	429.975	429.975	4	25.0
A429.975-NB-L	11	429.975	429.975	1	12.5
A429.975-NB-H	12	429.975	429.975	4	12.5
A450.025-WB-L	13	450.025	450.025	1	25.0
A450.025-WB-H	14	450.025	450.025	4	25.0
A450.025-NB-L	15	450.025	450.025	1	12.5
A450.025-NB-H	16	450.025	450.025	4	12.5
A460.025-WB-L	17	460.025	460.025	1	25.0
A460.025-WB-H	18	460.025	460.025	4	25.0
A460.025-NB-L	19	460.025	460.025	1	12.5
A460.025-NB-H	20	460.025	460.025	4	12.5
A479.975-WB-L	21	479.975	479.975	1	25.0
A479.975-WB-H	22	479.975	479.975	4	25.0
A479.975-NB-L	23	479.975	479.975	1	12.5
A479.975-NB-H	24	479.975	479.975	4	12.5
A469.975-WB-L	25	469.975	469.975	1	25.0
A469.975-WB-H	26	469.975	469.975	4	25.0
A469.975-NB-L	27	469.975	469.975	1	12.5
A469.975-NB-H	28	469.975	469.975	4	12.5

CHANNEL TABLE

DMR Channels

Label	Channel Number	Receive Frequency MHz	Transmit Frequency MHz	Power Watts	Channel Spacing kHz
D406.125-NB-L	1	406.125	406.125	1	12.5
D406.125-NB-H	2	406.125	406.125000	4	12.5
D418.025-NB-L	3	418.025	418.025000	1	12.5
D418.025-NB-H	4	418.025	418.025000	4	12.5
D429.975-NB-L	5	429.975	429.975000	1	12.5
D429.975-NB-H	6	429.975	429.975000	4	12.5
D450.025-NB-L	7	450.025	450.025000	1	12.5
D450.025-NB-H	8	450.025	450.025000	4	12.5
D460.025-NB-L	9	460.025	460.025000	1	12.5
D460.025-NB-H	10	460.025	460.025000	4	12.5
D469.975-NB-L	11	469.975	469.975000	1	12.5
D469.975-NB-H	12	469.975	469.975000	4	12.5
D479.975-NB-L	13	479.975	479.975000	1	12.5
D479.975-NB-H	14	479.975	479.975000	4	12.5

Programming Application Name
Tait TO2-P Programming Application

Version
V5.15

ANTENNA INTENDED FOR USE WITH THE DEVICE

The equipment tested has a 50 Ω coaxial antenna connection. No antenna was fitted to the EUT during testing the parameters in this report.

Antennas and transmitter power settings are selected with regard to the overall loss of the antenna system, the desired coverage and the EIRP limit of the license.

The EUT comes with a default antenna with the following specifications:

Manufacturer	Product Code	Tuning Bandwidth and / or Frequency Range - MHz	Gain - dBd (dBi)
Tait International Limited	T03-00420-EAAA	400 – 480 MHz + GPS 1575 MHz	-0.65 (1.5)

MODULATION TYPES, NECESSARY BANDWIDTH & EMISSION DESIGNATORS

MODULATION TYPES:

F3E	Analogue Frequency Modulation (FM)	
FXW	DMR Digital Voice	9600 bps
FXD	DMR Digital Data	9600 bps

CHANNEL SPACING: 12.5 kHz 25.0 kHz

EMISSION DESIGNATORS:

	12.5 kHz	25.0 kHz
Analogue FM	11K0F3E	16K0F3E
Digital Voice DMR	8K00FXW	
Digital Data DMR	8K00FXD	

CALCULATIONS

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: 12.5 kHz Bandwidth

Necessary bandwidth

M = 3.0 kHz

D = 2.5 kHz

$$B_n = (2 \times 3.0) + (2 \times 2.5) \times 1$$

$$= 11.0 \text{ kHz}$$

Emission Designator

11K0F3E

F3E represents an FM voice transmission

Analogue Voice: 25.0 kHz Bandwidth

Necessary bandwidth

M = 3.0 kHz

D = 5.0 kHz

$$B_n = (2 \times 3.0) + (2 \times 5.0) \times 1$$

$$= 16.0 \text{ kHz}$$

Emission Designator

16K0F3E

F3E represents an FM voice transmission

DMR: Digital Voice, 12.5 kHz Channel Spacing

99% bandwidth

= 8.0 kHz

Emission Designator

8K00FXW

FXW represents an FM Time Division Multiple Access (TDMA) combination of data and telephony

DMR: Digital Data, 12.5 kHz Channel Spacing

99% bandwidth

= 8.0 kHz

Emission Designator

8K00FXD

FXD represents FM Time Division Multiple Access (TDMA) data only

TEST RESULTS

TRANSMITTER OUTPUT POWER (CONDUCTED)

SPECIFICATION: FCC 47 CFR 2.1046

RSS-119 5.4

GUIDE: ANSI C63.26 5.2.4.2

MEASUREMENT PROCEDURE:

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

Example calculation

$$\begin{aligned}\text{Power in dBm} &= \text{Measured power (dBm)} + \text{attenuator and cable loss (dB)} \\ \text{Chan 1 power (dBm)} &= 5.09 \text{ dBm} + 30.78 \text{ dB} \\ &= 35.87 \text{ dBm} \\ (10^{(35.81\text{dBm})/10})/1000 &= 3.9 \text{ W}\end{aligned}$$

MEASUREMENT UNCERTAINTY: $\pm 0.6\text{dB}$

MEASUREMENT RESULTS:

Manufacturer's Rated Output Power:

Switchable: 4 W and 1 W

Nominal 4 W	Measured	Variation (%)	Variation (dB)
406.125 MHz	3.9	-3.4	-0.1
418.025 MHz	3.8	-6.1	-0.3
429.975 MHz	3.6	-10.1	-0.5
450.025 MHz	3.8	-5.8	-0.3
460.025 MHz	3.7	-6.9	-0.3
469.975 MHz	3.9	-3.5	-0.2
479.975 MHz	3.9	-1.8	-0.1

Transmitter Output Power (Conducted) - continued

Nominal 1 W	Measured	Variation (%)	Variation (dB)
406.125 MHz	0.9	-11.1	-0.5
418.025 MHz	0.9	-11.7	-0.5
429.975 MHz	0.9	-13.8	-0.6
450.025 MHz	0.9	-13.6	-0.6
460.025 MHz	0.9	-14.3	-0.7
469.975 MHz	0.9	-11.4	-0.5
479.975 MHz	0.9	-9.4	-0.4

LIMIT CLAUSES:

FCC 47 CFR 90.205 (s)

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

RSS-119 5.4

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

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:

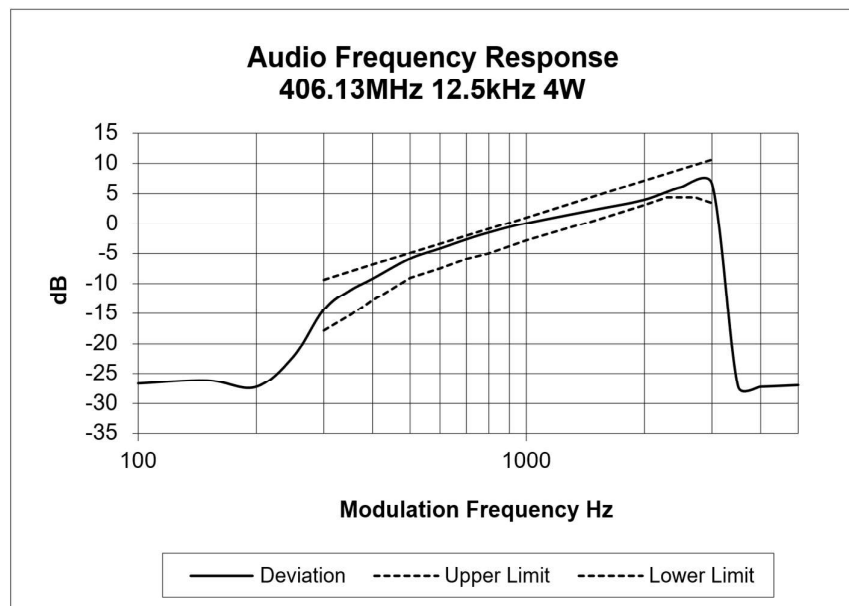
See the plots on the following pages for 12.5 kHz and 25.0 kHz channel spacing tested at 4 W transmit power.

MEASUREMENT UNCERTAINTY: $\pm 1.5 \%$

SPECIFICATION: FCC 47 CFR 2.1047 (a)

Tx FREQUENCY: 406.125 MHz

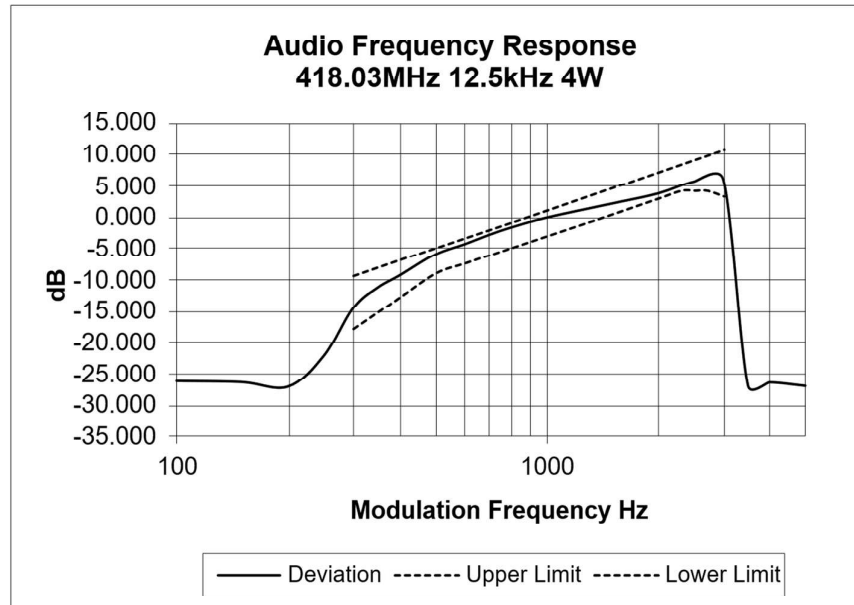
12.5 kHz Channel Spacing



Transmitter Audio Frequency Response – Pre-emphasis

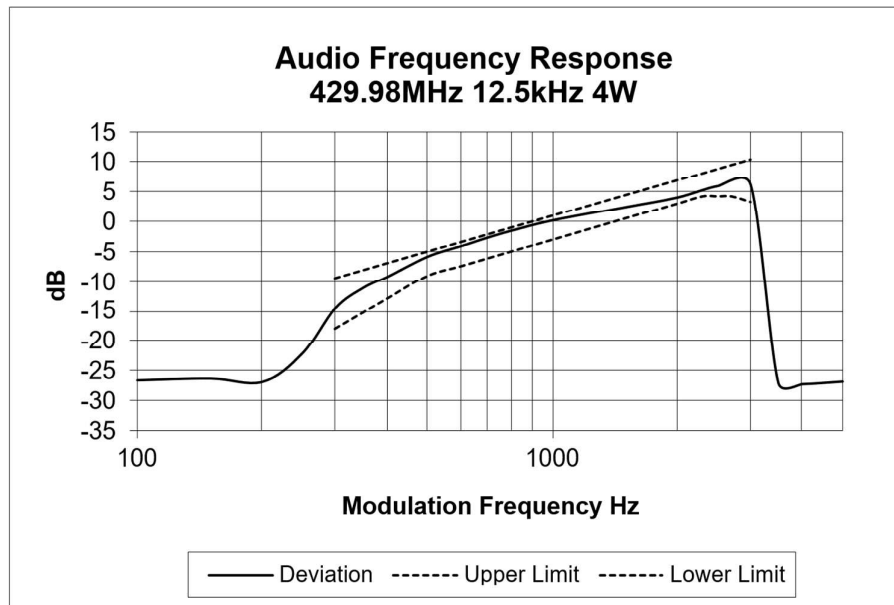
Tx FREQUENCY: 418.025 MHz

12.5 kHz Channel Spacing



Tx FREQUENCY: 429.975 MHz

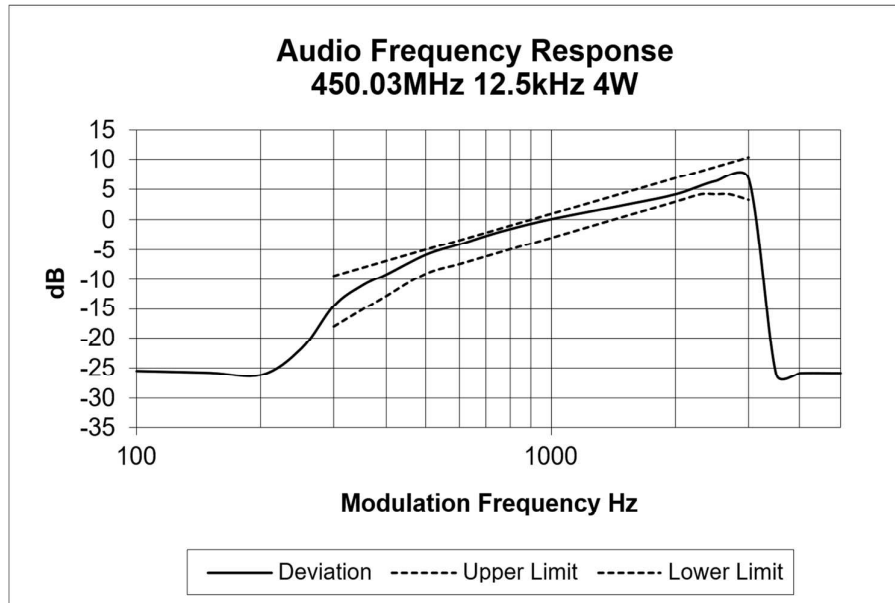
12.5 kHz Channel Spacing



Transmitter Audio Frequency Response – Pre-emphasis

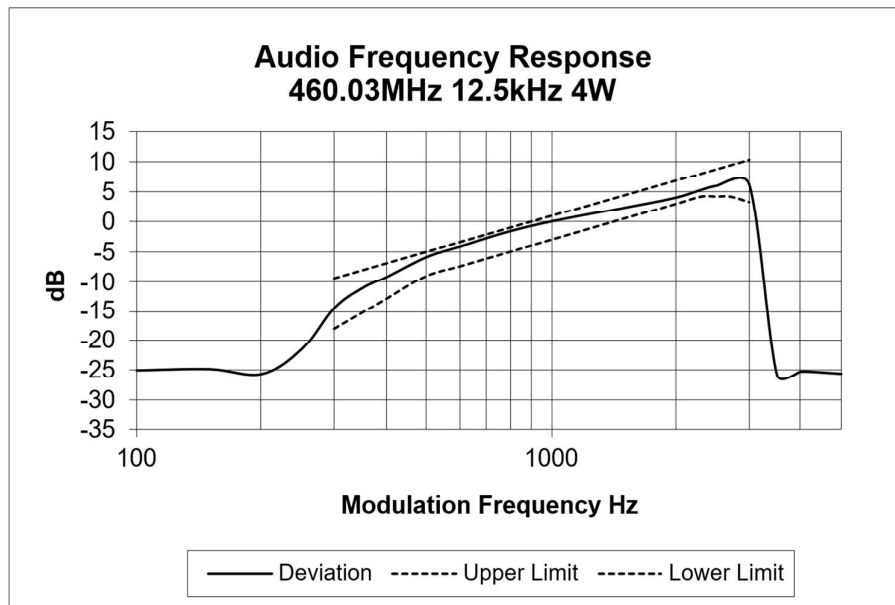
Tx FREQUENCY: 450.025 MHz

12.5 kHz Channel Spacing



Tx FREQUENCY: 460.025 MHz

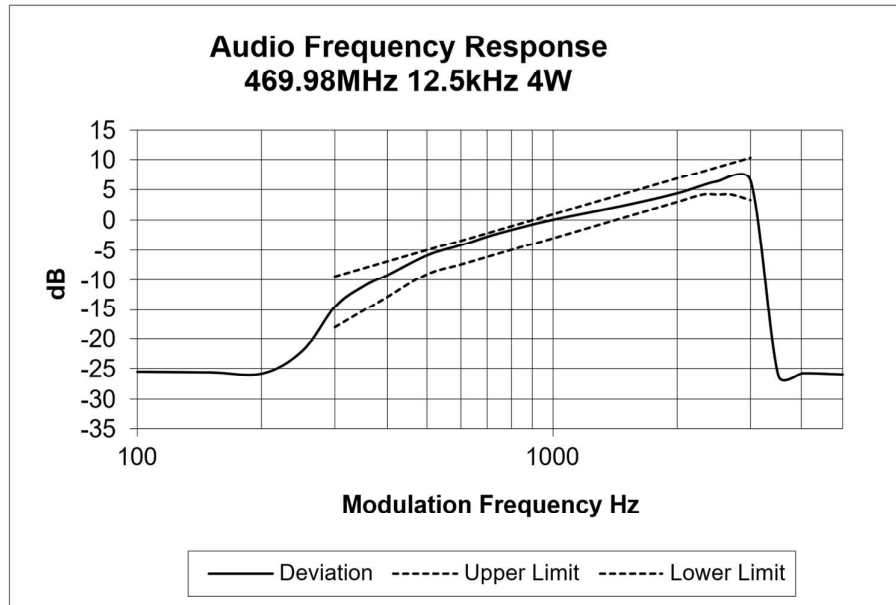
12.5 kHz Channel Spacing



Transmitter Audio Frequency Response – Pre-emphasis

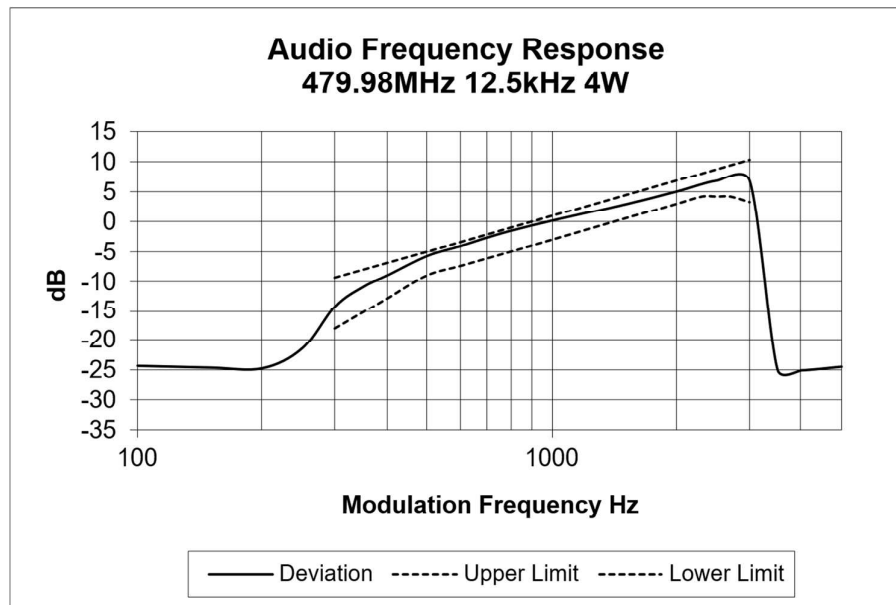
Tx FREQUENCY: 469.975 MHz

12.5 kHz Channel Spacing



Tx FREQUENCY: 479.975 MHz

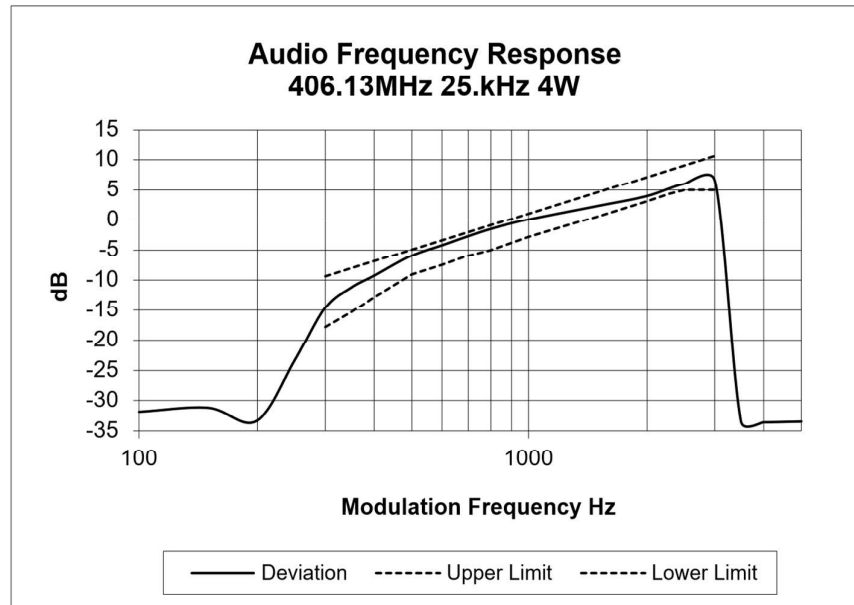
12.5 kHz Channel Spacing



Transmitter Audio Frequency Response – Pre-emphasis

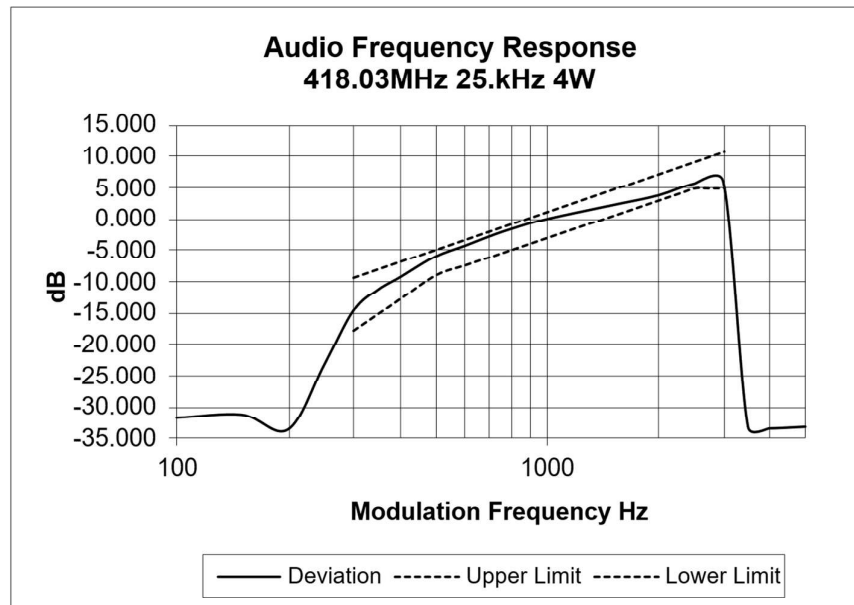
Tx FREQUENCY: 406.125 MHz

25 kHz Channel Spacing



Tx FREQUENCY: 418.025 MHz

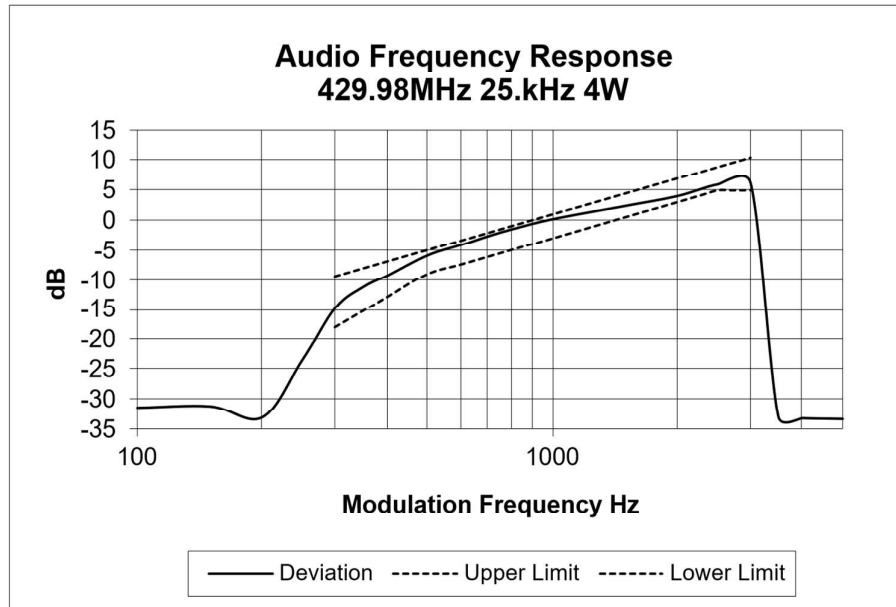
25 kHz Channel Spacing



Transmitter Audio Frequency Response – Pre-emphasis

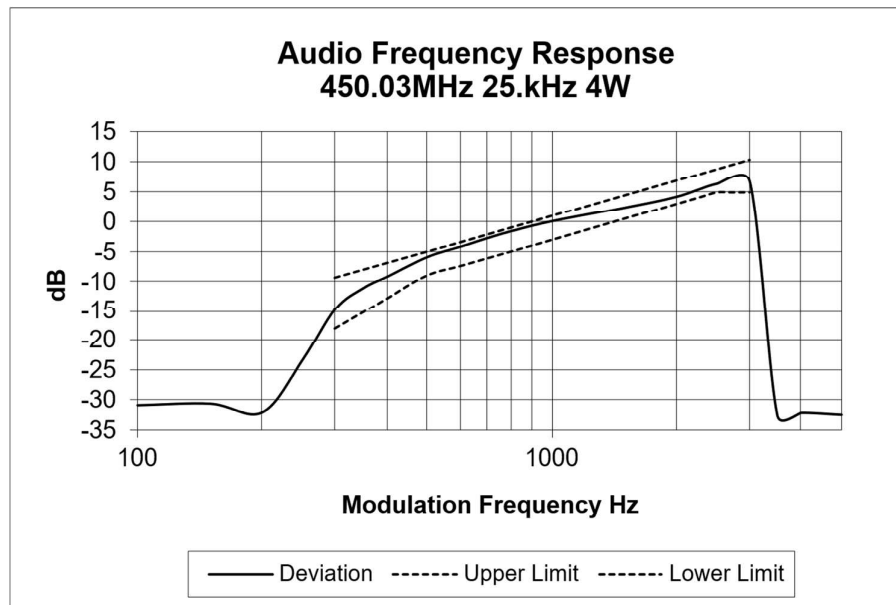
Tx FREQUENCY: 429.975 MHz

25 kHz Channel Spacing



Tx FREQUENCY: 450.025 MHz

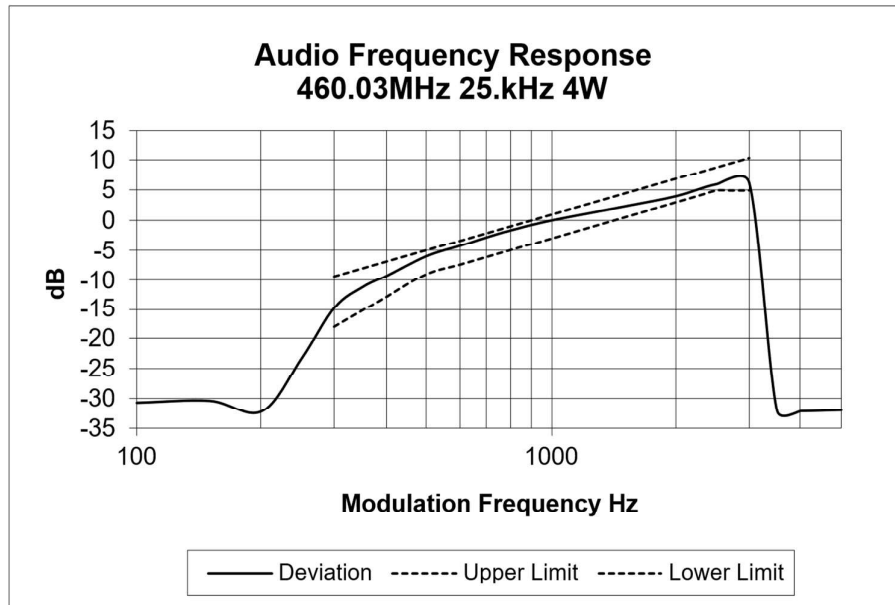
25 kHz Channel Spacing



Transmitter Audio Frequency Response – Pre-emphasis

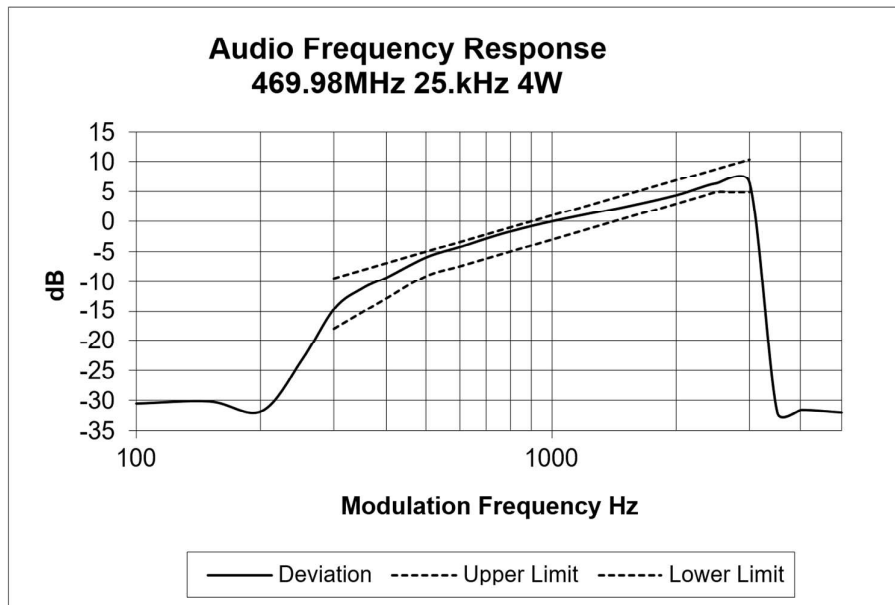
Tx FREQUENCY: 460.025 MHz

25 kHz Channel Spacing



Tx FREQUENCY: 469.975 MHz

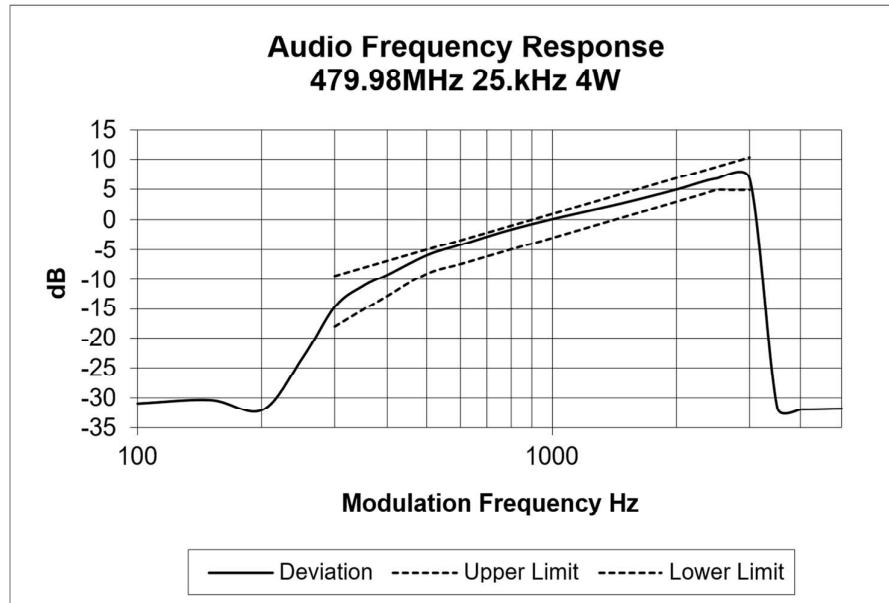
25 kHz Channel Spacing



Transmitter Audio Frequency Response – Pre-emphasis

Tx FREQUENCY: 479.975 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. 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:

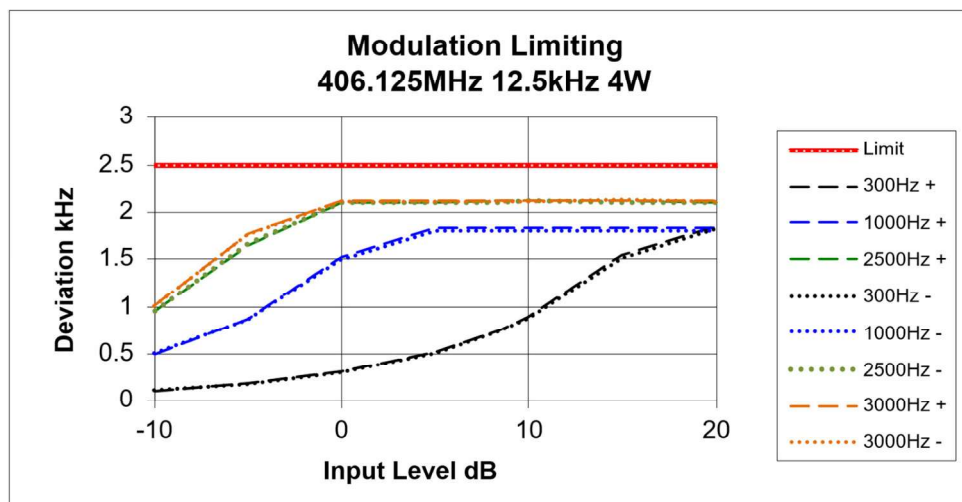
See the plots on the following pages for 12.5 kHz and 25.0 kHz channel spacing tested at 4 W transmit power.

LIMIT CLAUSE: ANSI C63.26 5.3.2

MEASUREMENT UNCERTAINTY: $\pm 1.5\%$

Tx FREQUENCY: 406.125 MHz

12.5 kHz Channel Spacing

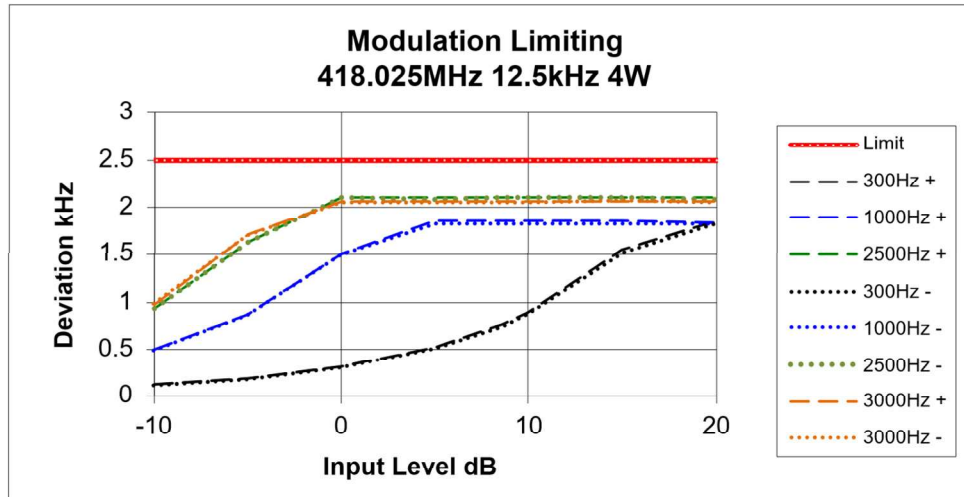


Transmitter Modulation Limiting

SPECIFICATION: FCC 47 CFR 2.1047 (b)

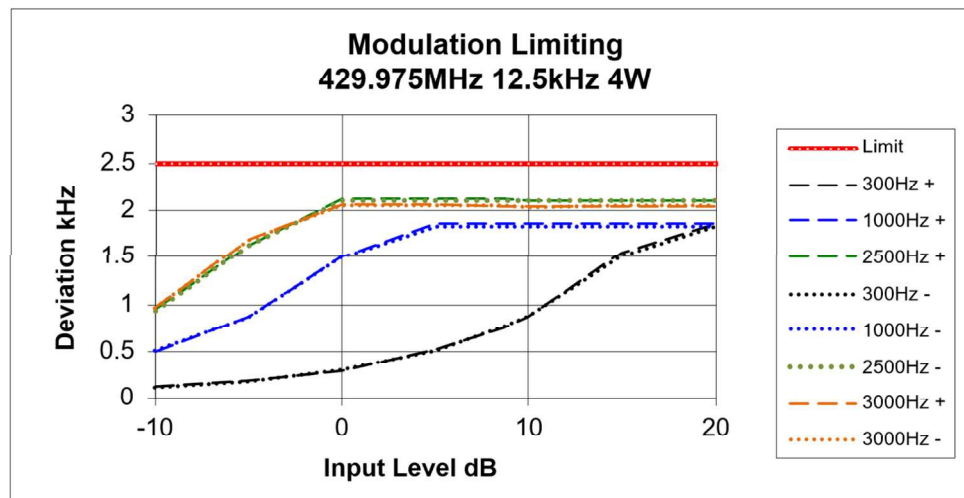
Tx FREQUENCY: 418.025 MHz

12.5 kHz Channel Spacing



Tx FREQUENCY: 429.975 MHz

12.5 kHz Channel Spacing

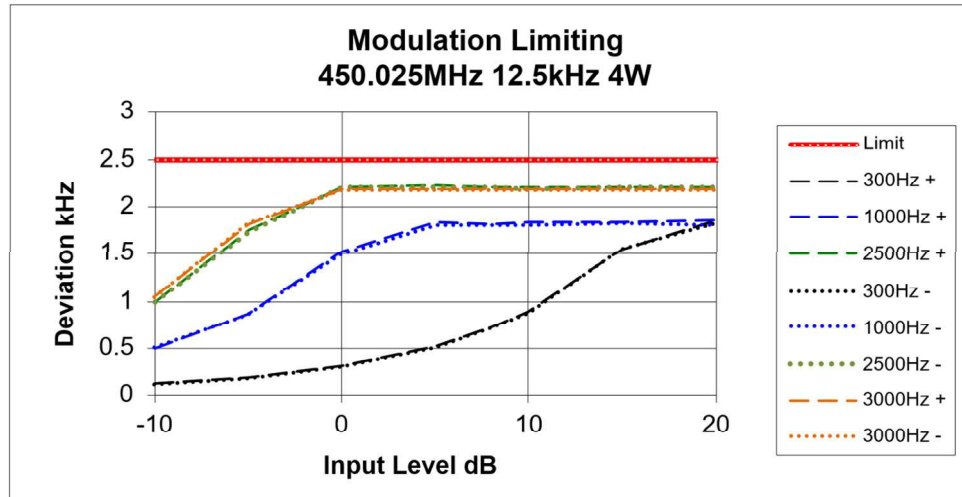


Transmitter Modulation Limiting

SPECIFICATION: FCC 47 CFR 2.1047 (b)

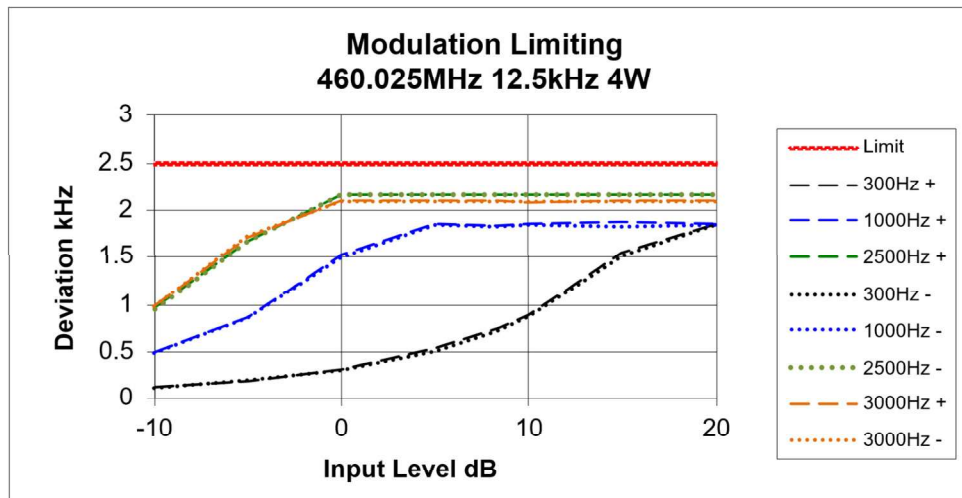
Tx FREQUENCY: 450.025 MHz

12.5 kHz Channel Spacing



Tx FREQUENCY: 460.025 MHz

12.5 kHz Channel Spacing

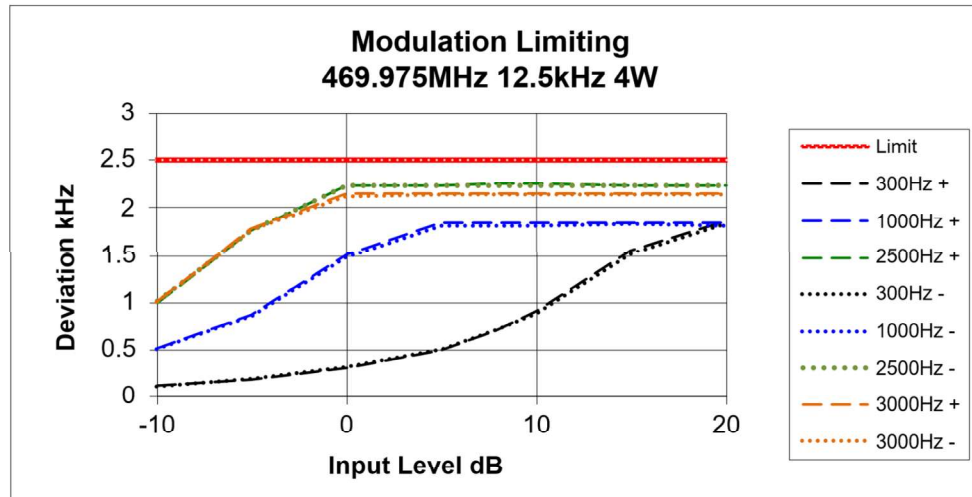


Transmitter Modulation Limiting

SPECIFICATION: FCC 47 CFR 2.1047 (b)

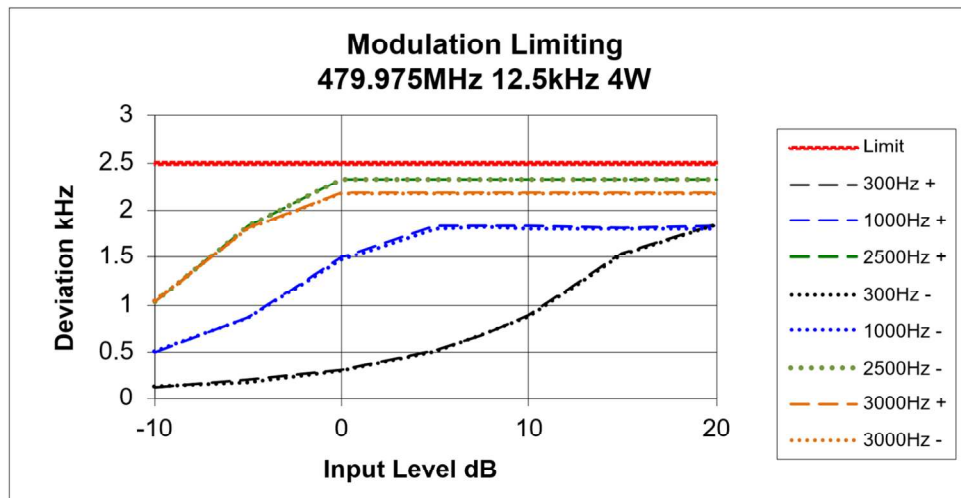
Tx FREQUENCY: 469.975 MHz

12.5 kHz Channel Spacing



Tx FREQUENCY: 479.975 MHz

12.5 kHz Channel Spacing

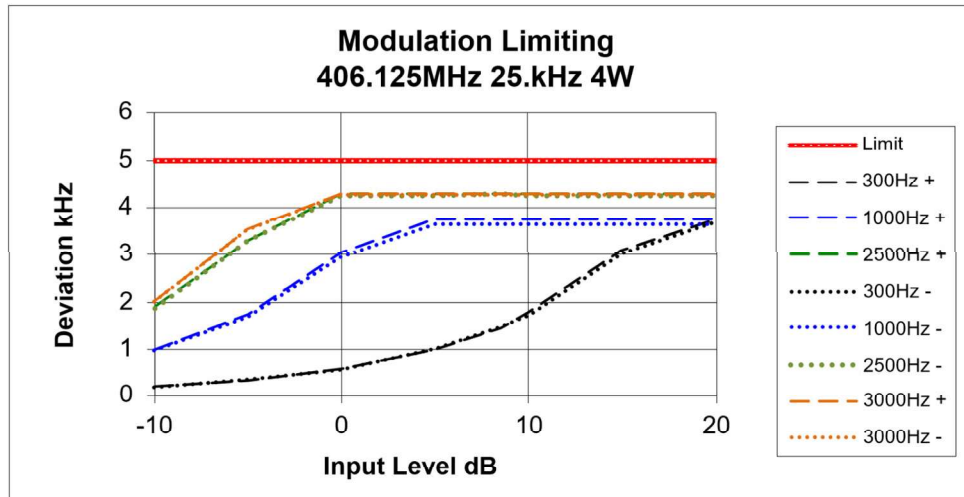


Transmitter Modulation Limiting

SPECIFICATION: FCC 47 CFR 2.1047 (b)

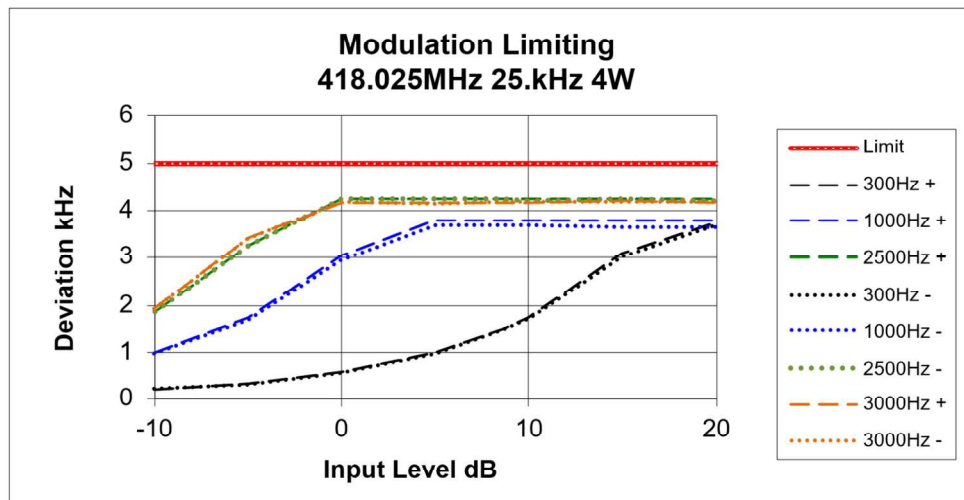
Tx FREQUENCY: 406.125 MHz

25 kHz Channel Spacing



Tx FREQUENCY: 418.025 MHz

25 kHz Channel Spacing

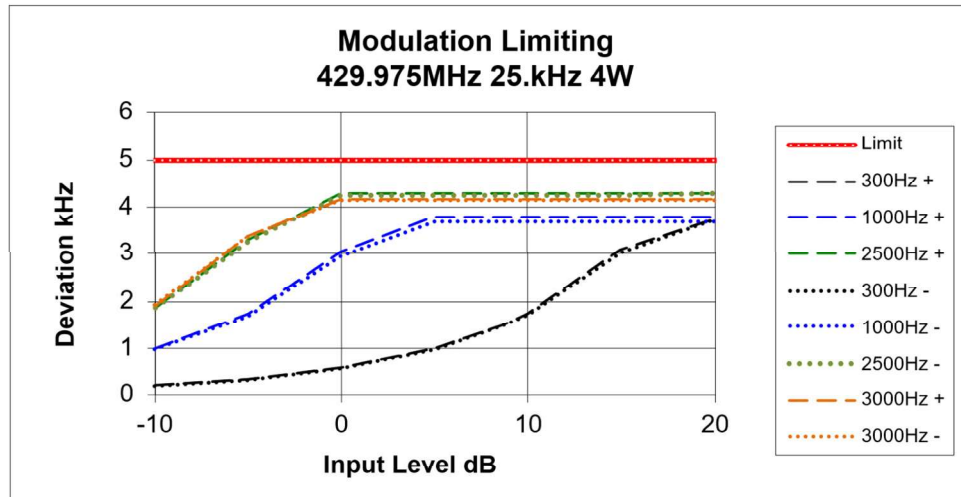


Transmitter Modulation Limiting

SPECIFICATION: FCC 47 CFR 2.1047 (b)

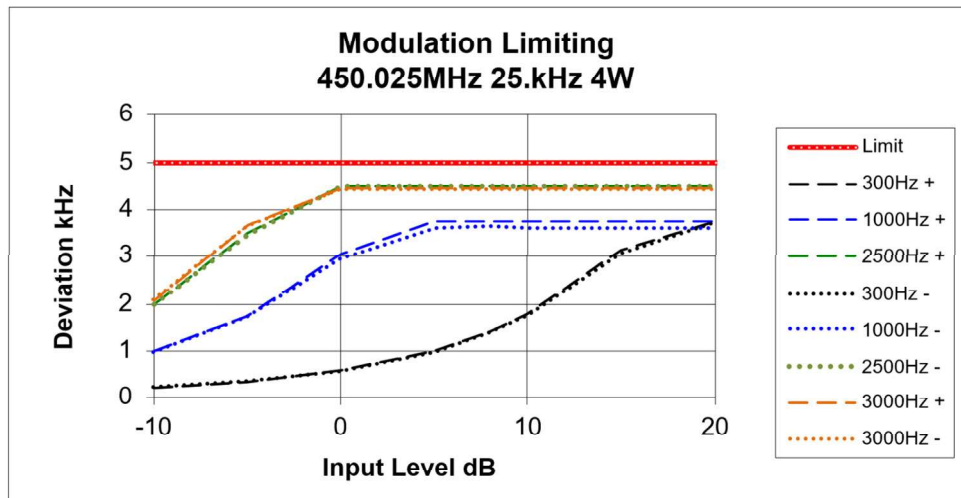
Tx FREQUENCY: 429.975 MHz

25 kHz Channel Spacing



Tx FREQUENCY: 450.025 MHz

25 kHz Channel Spacing

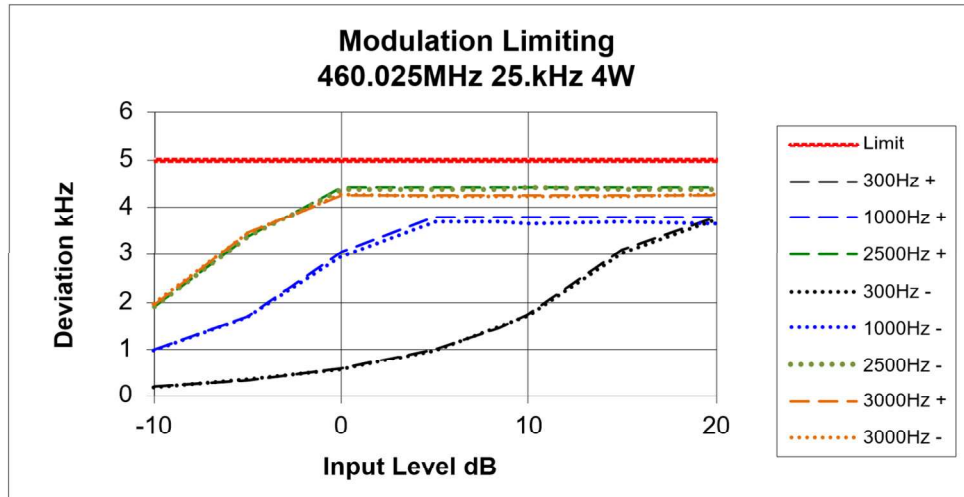


Transmitter Modulation Limiting

SPECIFICATION: FCC 47 CFR 2.1047 (b)

Tx FREQUENCY: 460.025 MHz

25 kHz Channel Spacing



Tx FREQUENCY: 469.975 MHz

25 kHz Channel Spacing

