

LABORATORY TEST REPORT

RADIO PERFORMANCE MEASUREMENTS

for the

TMDHGA Mobile 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: 29 October 2025

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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.

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REVISION HISTORY

Date	Revision	Comments
29 October 2025	1	Initial test report

INTRODUCTION

Type approval testing of the TMDHGA, 40 Watt, mobile 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
245 Wooldridge Road
Harewood
Christchurch 8051
New Zealand

DESCRIPTION OF SAMPLE

Manufacturer: Tait International Limited
Equipment: Mobile Transceiver
Type Code: TMDHGA
Product Code: T02-00200-GABA
Serial Number(s): 34000022 & 34000018
Frequency Range: 400 → 480 MHz
Transmit Power: 40 W

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

HARDWARE & SOFTWARE

Quantity: 2

Sample	A	B
Serial Number	34000022	34000018
PCB Version	TM35U-R2	
Software Version	V3.0.0.1	
Firmware Version	T02-M_251010.001	
Hardware Version	T02-M-HG00_0004	

TEST CONDITIONS

All testing was performed between 22 → 29 October 2025, and under the following conditions:

Ambient temperature: 15°C → 30°C
Relative Humidity: 20% → 75%
Standard Test Voltage: 13.8 V_{DC}

Two identical samples were used for the test: Sample A was utilized for conducted and radiated spurious emissions, while Sample B 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:

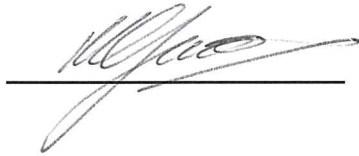
Equipment: Mobile Transceiver
Type Code: TMDHGA
Product Code: T02-00200-GABA
Serial Number(s): 34000022 & 34000018
Quantity: 2

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:

3 November 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	5	25.0
A406.125-WB-H	2	406.125	406.125	40	25.0
A406.125-NB-L	3	406.125	406.125	5	12.5
A406.125-NB-H	4	406.125	406.125	40	12.5
A418.025-WB-L	5	418.025	418.025	5	25.0
A418.025-WB-H	6	418.025	418.025	40	25.0
A418.025-NB-L	7	418.025	418.025	5	12.5
A418.025-NB-H	8	418.025	418.025	40	12.5
A429.975-WB-L	9	429.975	429.975	5	25.0
A429.975-WB-H	10	429.975	429.975	40	25.0
A429.975-NB-L	11	429.975	429.975	5	12.5
A429.975-NB-H	12	429.975	429.975	40	12.5
A450.025-WB-L	13	450.025	450.025	5	25.0
A450.025-WB-H	14	450.025	450.025	40	25.0
A450.025-NB-L	15	450.025	450.025	5	12.5
A450.025-NB-H	16	450.025	450.025	40	12.5
A460.025-WB-L	17	460.025	460.025	5	25.0
A460.025-WB-H	18	460.025	460.025	40	25.0
A460.025-NB-L	19	460.025	460.025	5	12.5
A460.025-NB-H	20	460.025	460.025	40	12.5
A479.975-WB-L	21	479.975	479.975	5	25.0
A479.975-WB-H	22	479.975	479.975	40	25.0
A479.975-NB-L	23	479.975	479.975	5	12.5
A479.975-NB-H	24	479.975	479.975	40	12.5
A469.975-WB-L	25	469.975	469.975	5	25.0
A469.975-WB-H	26	469.975	469.975	40	25.0
A469.975-NB-L	27	469.975	469.975	5	12.5
A469.975-NB-H	28	469.975	469.975	40	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	5	12.5
D406.125-NB-H	2	406.125	406.125000	40	12.5
D418.025-NB-L	3	418.025	418.025000	5	12.5
D418.025-NB-H	4	418.025	418.025000	40	12.5
D429.975-NB-L	5	429.975	429.975000	5	12.5
D429.975-NB-H	6	429.975	429.975000	40	12.5
D450.025-NB-L	7	450.025	450.025000	5	12.5
D450.025-NB-H	8	450.025	450.025000	40	12.5
D460.025-NB-L	9	460.025	460.025000	5	12.5
D460.025-NB-H	10	460.025	460.025000	40	12.5
D469.975-NB-L	11	469.975	469.975000	5	12.5
D469.975-NB-H	12	469.975	469.975000	40	12.5
D479.975-NB-L	13	479.975	479.975000	5	12.5
D479.975-NB-H	14	479.975	479.975000	40	12.5

Programming Application Name
T02-M Programming Application

Version
1.3.0.1

LIST OF ANTENNAS 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 radio manufacturer (Tait) does not manufacture specific antennas for this equipment but suggests the following from other suppliers.

Manufacturer	Part Number	Tuning Bandwidth and / or Frequency Range - MHz	Gain - dBd (dBi)
dBSpectra	DS3A06F36U-D or N	380-410MHz	6 (8.1)
dBSpectra	DS3A08F36U-D or N	380-410MHz	8 (10.1)
dBSpectra	DS4A00F36U-D or N	406-436MHz	0 (2.1)
dBSpectra	DS4A03F36U-D or N	406-436MHz	3 (5.1)
dBSpectra	DS4A06F36U-D or N	406-436MHz	6 (8.1)
dBSpectra	DS4A08F36U-D or N	406-436MHz	8 (10.1)
dBSpectra	DS4A10F36U-D or N	406-436MHz	10 (12.1)
dBSpectra	DS4A03F36D-D or N	406-436MHz	2 x 3 (5.1)
dBSpectra	DS4B06F36U-D or N	425-455MHz	6 (8.1)
dBSpectra	DS4B10F36U-D or N	425-455MHz	10 (12.1)
dBSpectra	DS4B03F36D-D or N	425-455MHz	2 x 3 (5.1)
dBSpectra	DS4C00F36U-D or N	450-482MHz	0 (2.1)
dBSpectra	DS4C03F36U-D or N	450-482MHz	3 (5.1)
dBSpectra	DS4C06F36U-D or N	450-482MHz	6 (8.1)
dBSpectra	DS4C08F36U-D or N	450-482MHz	8 (10.1)
dBSpectra	DS4C10F36U-D or N	450-482MHz	10 (12.1)
dBSpectra	DS4C00F36D-D or N	450-482MHz	2 x 0 (2.1)
dBSpectra	DS4C03F36D-D or N	450-482MHz	2 x 3 (2.1)
dBSpectra	DS4C06F36U3D or N	450-482MHz	6 (8.1)
dBSpectra	DS4C08F36U3D or N	450-482MHz	8 (10.1)
RFI	COL7, COL11	4% of 390-530MHz	3 (5.1)
RFI	COL8, COL12, COL19	10MHz within 380-530MHz	6 (8.1)
RFI	COL41 (-58/-65/-70/-71/-72)	20MHz within 380-520MHz	0 (2.1)
RFI	COL410 (-400/-420/-430/-470/-490/-530)	20MHz within 380-520MHz	9 (11.1)
RFI	COL43 (-400/-420/-430/-470/-490/-530)	20MHz within 380-520MHz	5 (7.1)
RFI	COL45 (-400/-420/-430/-470/-490/-530)	20MHz within 380-520MHz	7 (9.1)
RFI	BA40-57, BA80-57	330-420MHz	3 (5.1), 6 (8.1)
RFI	BA40-67, BA80-67	400-520MHz	3 (5.1), 6 (8.1)
RFI	BA160-67-T3	400-520MHz	9 (11.1)
RFI	BA4040-57	330-420MHz	2 x 3 (5.1)
RFI	BA4040-67	400-520MHz	2 x 3 (5.1)
RFI	EA40-57, EA80-57	330-420MHz	5 (7.1), 9 (11.1)
RFI	EA40-67, EA80-67	400-520MHz	5 (7.1), 9 (11.1)
RFI	EA4040-57	330-420MHz	2 x 5 (7.1)
RFI	EA4040-67	400-520MHz	2 x 5 (7.1)
RFI	OA20-57, OA40-57	330-420MHz	5 (7.1), 9 (11.1)
RFI	OA20-67, OA40-67	400-520MHz	5 (7.1), 9 (11.1)
RFI	OA2020-67	400-520MHz	2 x 5 (7.1)
RFI	RDA16-99	350-600MHz	12 (14.1)

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

$$\begin{aligned}\text{Power in dBm} &= \text{Measured power (dBm)} + \text{attenuator and cable loss (dB)} \\ \text{Chan 1 power (dBm)} &= 15.69 \text{ dBm} + 30.81 \text{ dB} \\ &= 46.5 \text{ dBm} \\ (10^{(46.5 \text{ dBm})/10})/1000 &= 44.7 \text{ W}\end{aligned}$$

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

MEASUREMENT RESULTS:

Manufacturer's Rated Output Power:

Switchable: 40 W and 5 W

Nominal 40 W	Measured	Variation (%)	Variation (dB)
406.125 MHz	44.7	11.7	0.5
418.025 MHz	46.5	16.4	0.7
429.975 MHz	46.7	16.8	0.7
450.025 MHz	44.0	10.1	0.4
460.025 MHz	42.5	6.3	0.3
469.975 MHz	42.1	5.3	0.2
479.975 MHz	43.8	9.5	0.4

Transmitter Output Power (Conducted) - continued

Nominal 5 W	Measured	Variation (%)	Variation (dB)
406.125 MHz	5.6	12.8	0.5
418.025 MHz	6.0	19.1	0.8
429.975 MHz	5.9	17.4	0.7
450.025 MHz	5.8	15.8	0.6
460.025 MHz	5.7	14.2	0.6
469.975 MHz	5.7	15.0	0.6
479.975 MHz	5.9	17.1	0.7

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:

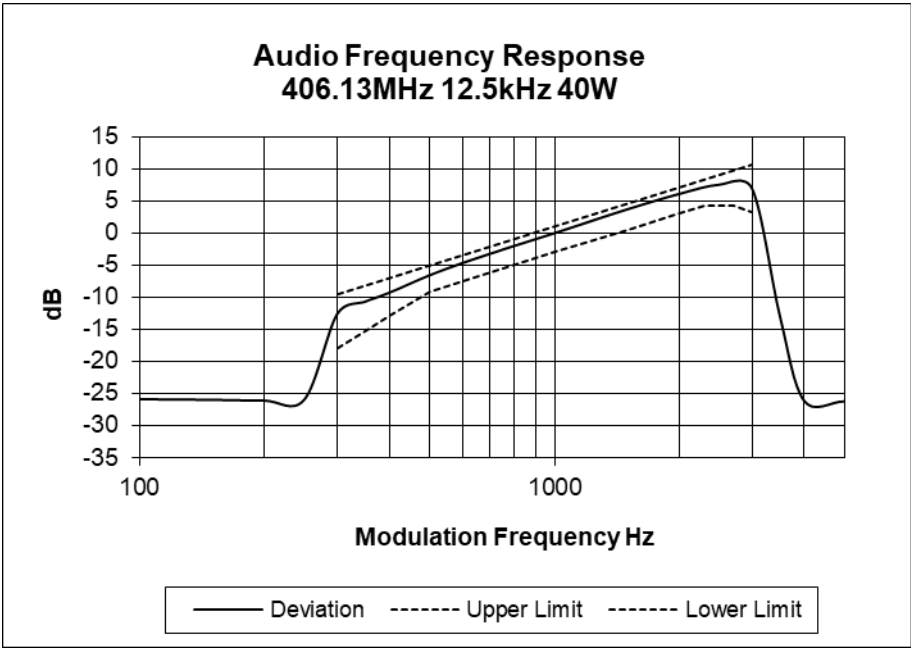
See the plots on the following pages for 12.5 kHz and 25.0 kHz channel spacing tested at 40 W transmit power.

MEASUREMENT UNCERTAINTY: ± 1.5 %

SPECIFICATION: FCC 47 CFR 2.1047 (a)

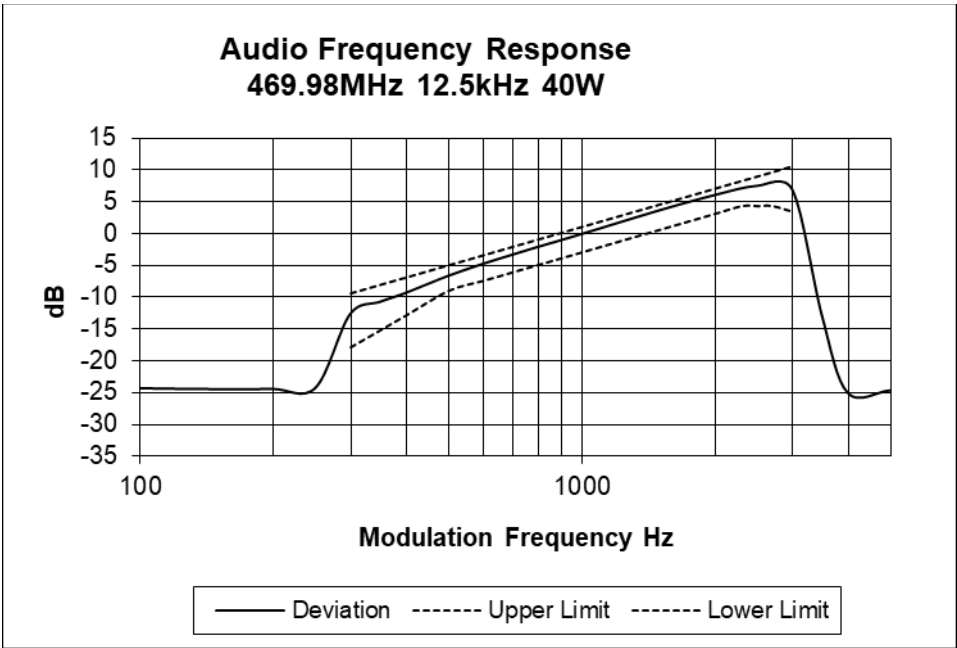
Tx FREQUENCY: 406.125 MHz

12.5 kHz Channel Spacing

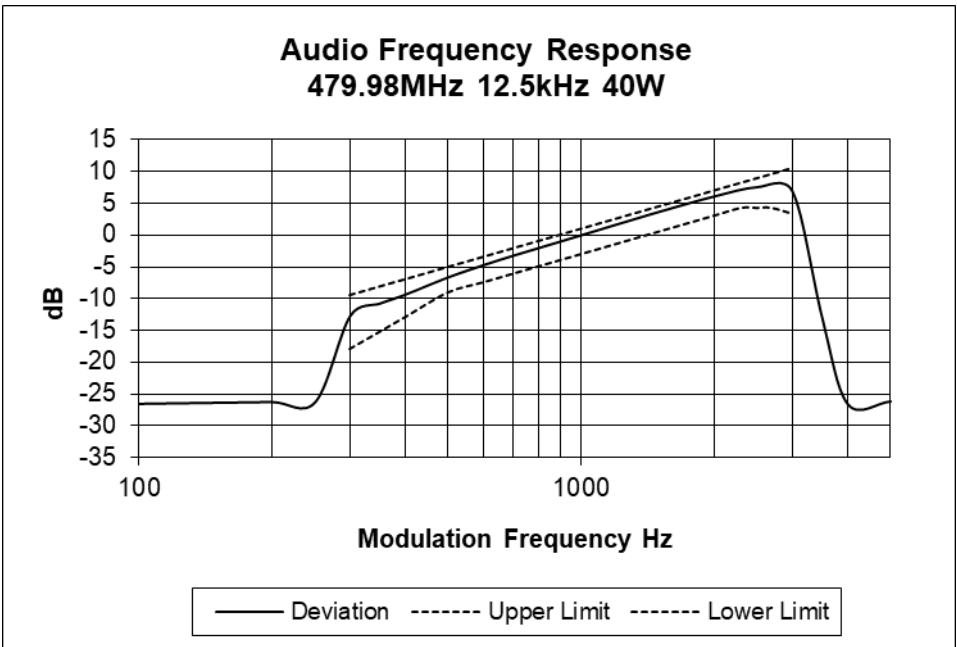


Transmitter Audio Frequency Response – Pre-emphasis

Tx FREQUENCY: 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)

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:

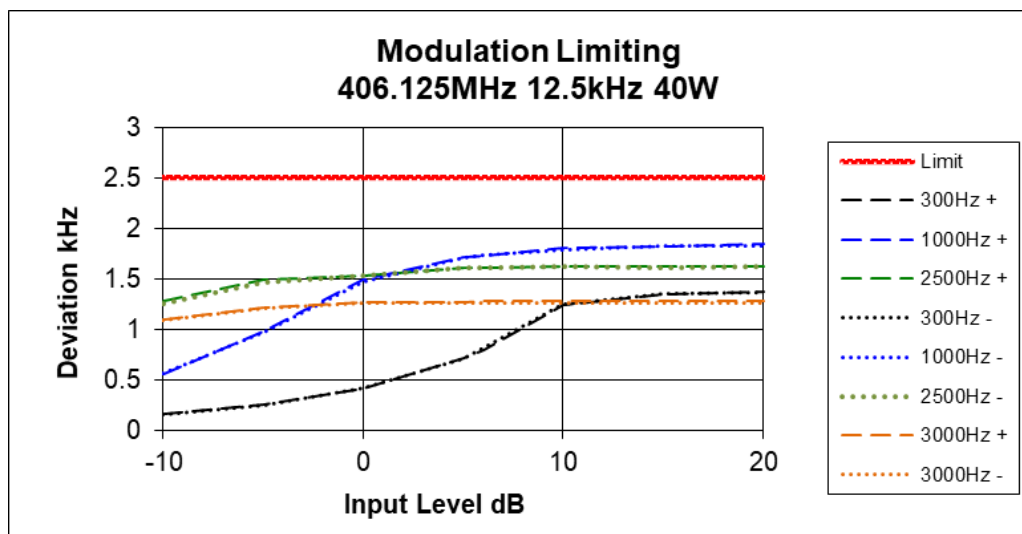
See the plots on the following pages for 12.5 kHz and 25.0 kHz channel spacing tested at 40 W transmit power.

LIMIT CLAUSE: ANSI C63.26 5.3.2

MEASUREMENT UNCERTAINTY: $\pm 1.5 \%$

Tx FREQUENCY: 406.125 MHz

12.5 kHz Channel Spacing

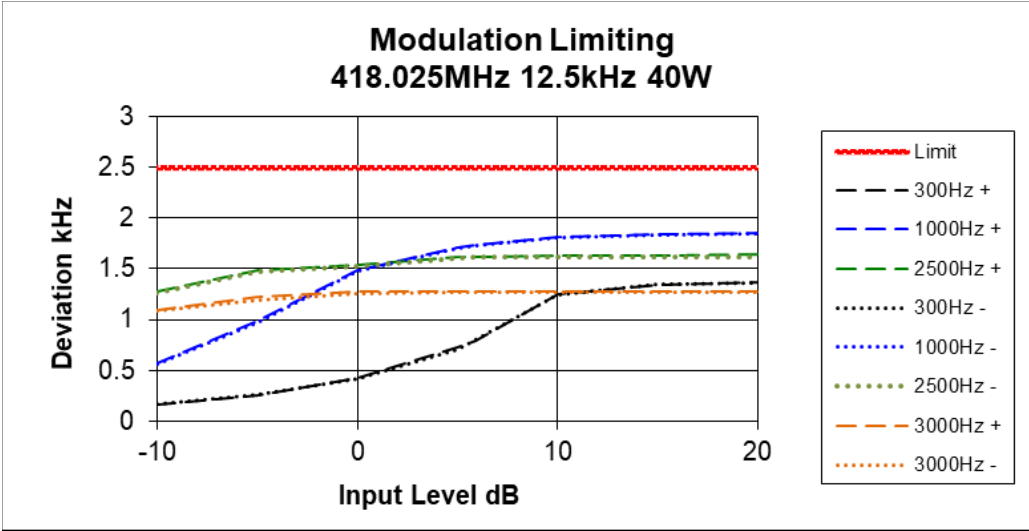


Transmitter Modulation Limiting

SPECIFICATION: FCC 47 CFR 2.1047 (b)

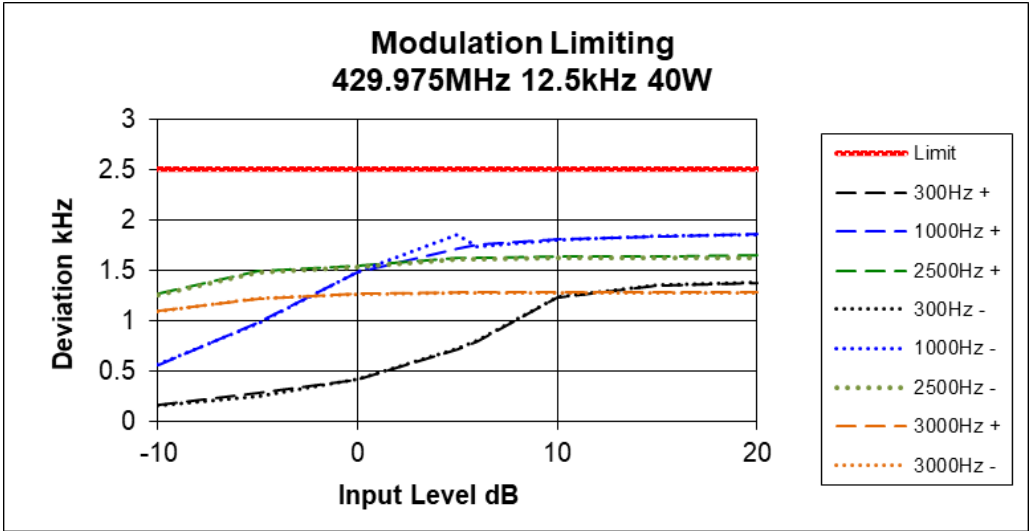
Tx FREQUENCY: 418.025 MHz

12.5 kHz Channel Spacing



Tx FREQUENCY: 429.975 MHz

12.5 kHz Channel Spacing

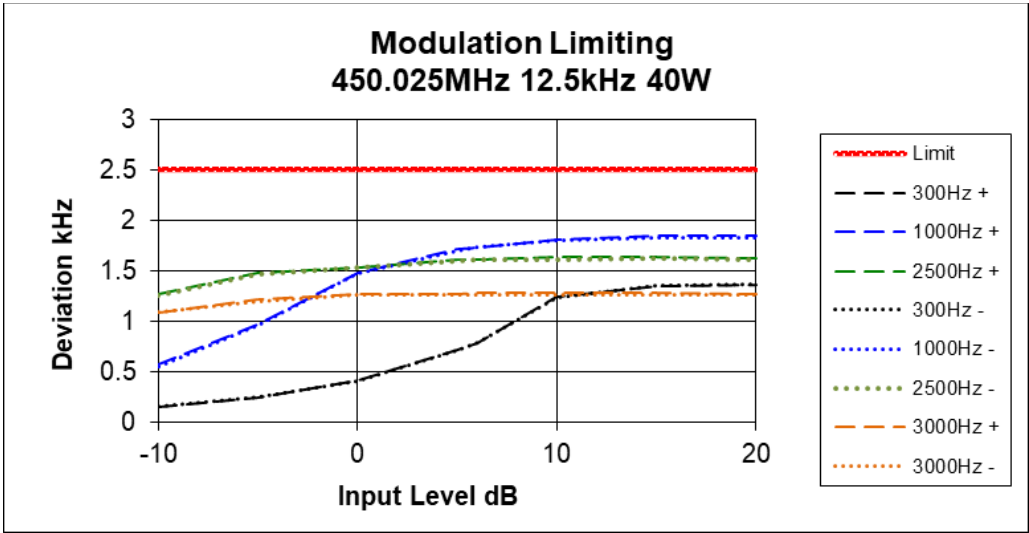


Transmitter Modulation Limiting

SPECIFICATION: FCC 47 CFR 2.1047 (b)

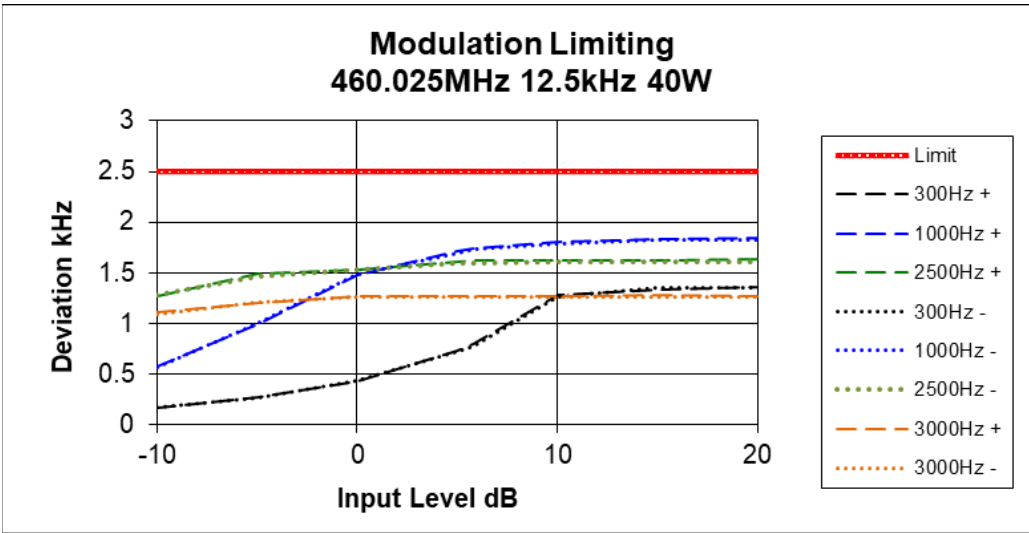
Tx FREQUENCY: 450.025 MHz

12.5 kHz Channel Spacing



Tx FREQUENCY: 460.025 MHz

12.5 kHz Channel Spacing

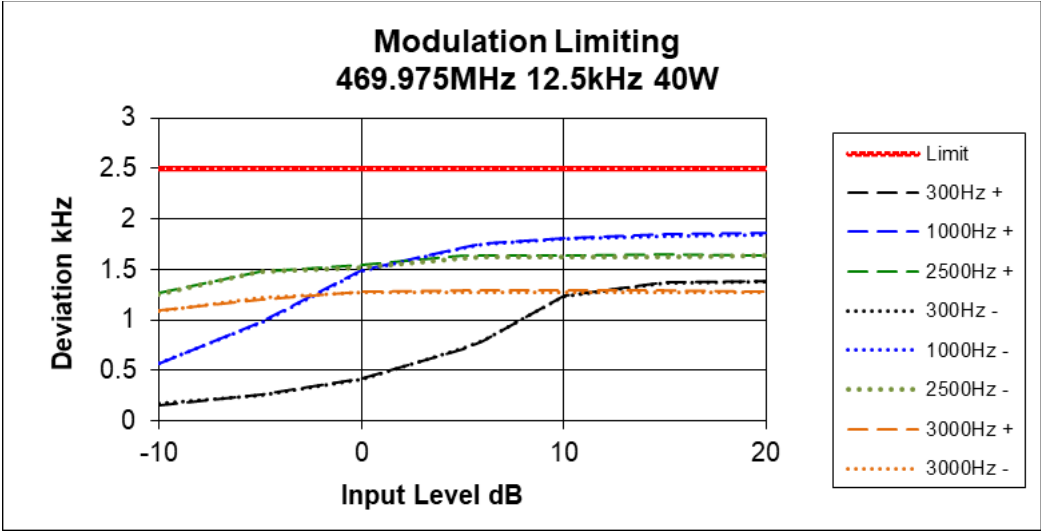


Transmitter Modulation Limiting

SPECIFICATION: FCC 47 CFR 2.1047 (b)

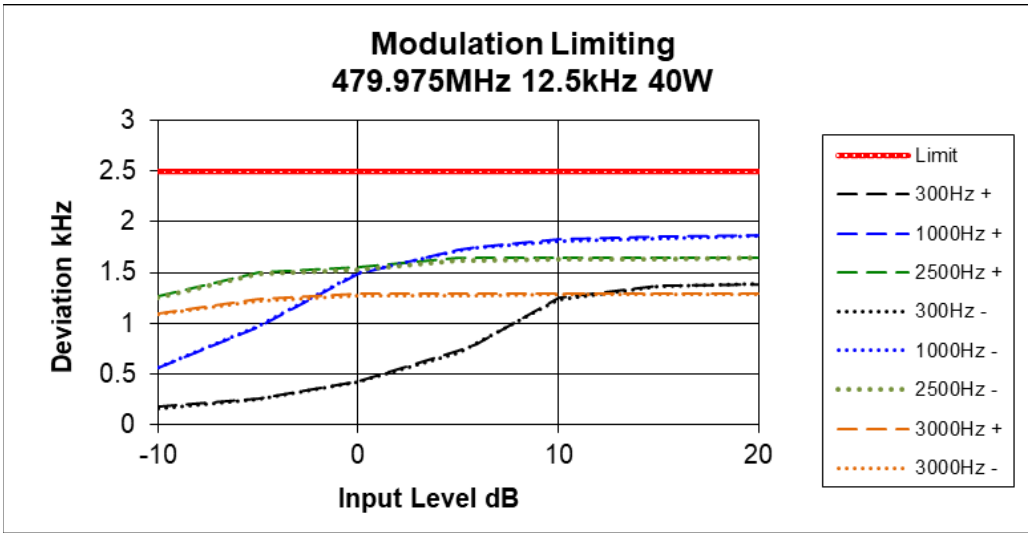
Tx FREQUENCY: 469.975 MHz

12.5 kHz Channel Spacing



Tx FREQUENCY: 479.975 MHz

12.5 kHz Channel Spacing

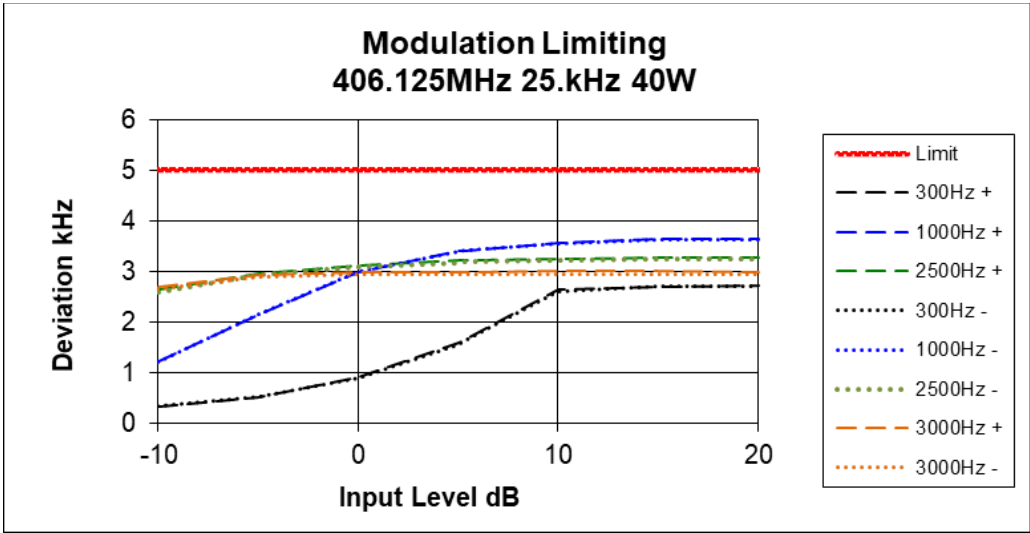


Transmitter Modulation Limiting

SPECIFICATION: FCC 47 CFR 2.1047 (b)

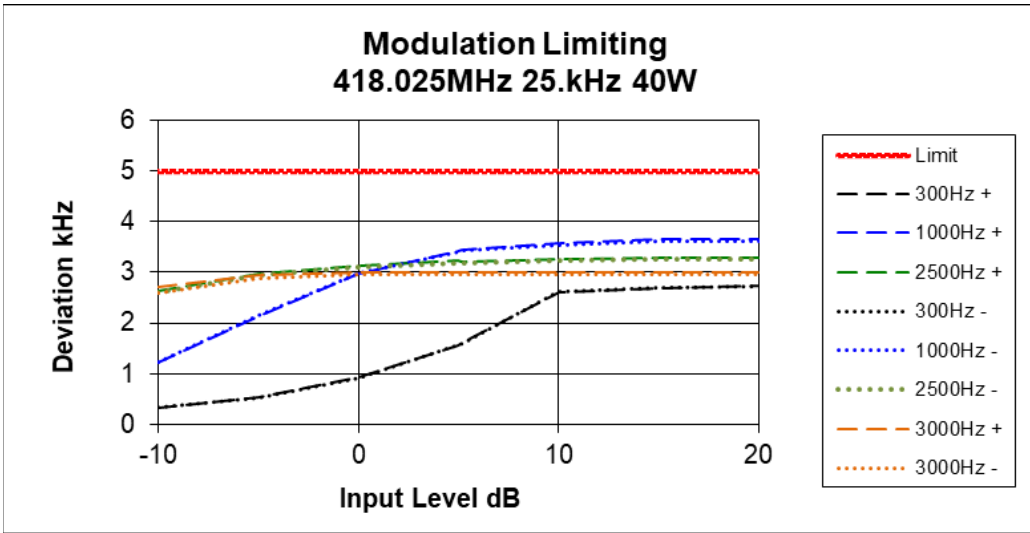
Tx FREQUENCY: 406.125 MHz

25 kHz Channel Spacing



Tx FREQUENCY: 418.025 MHz

25 kHz Channel Spacing

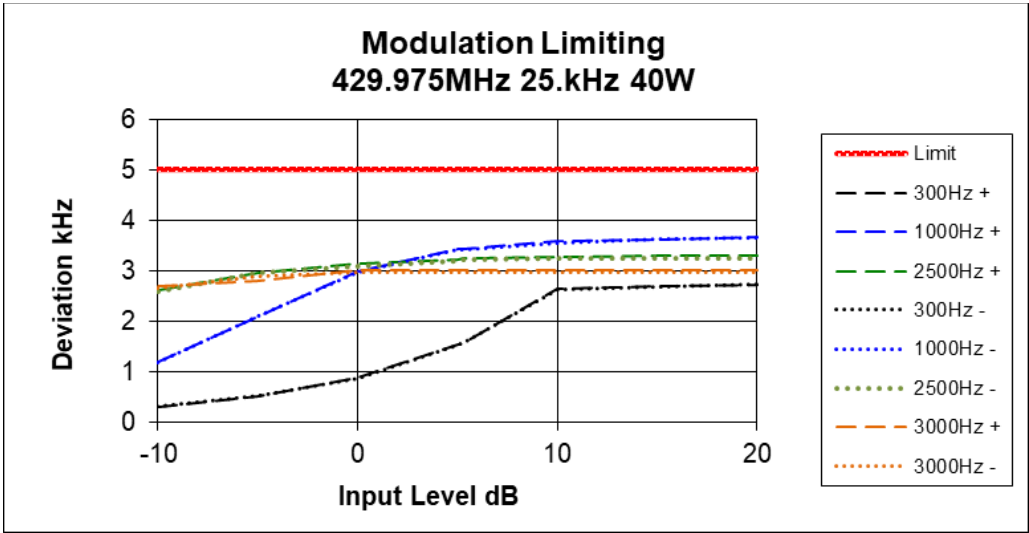


Transmitter Modulation Limiting

SPECIFICATION: FCC 47 CFR 2.1047 (b)

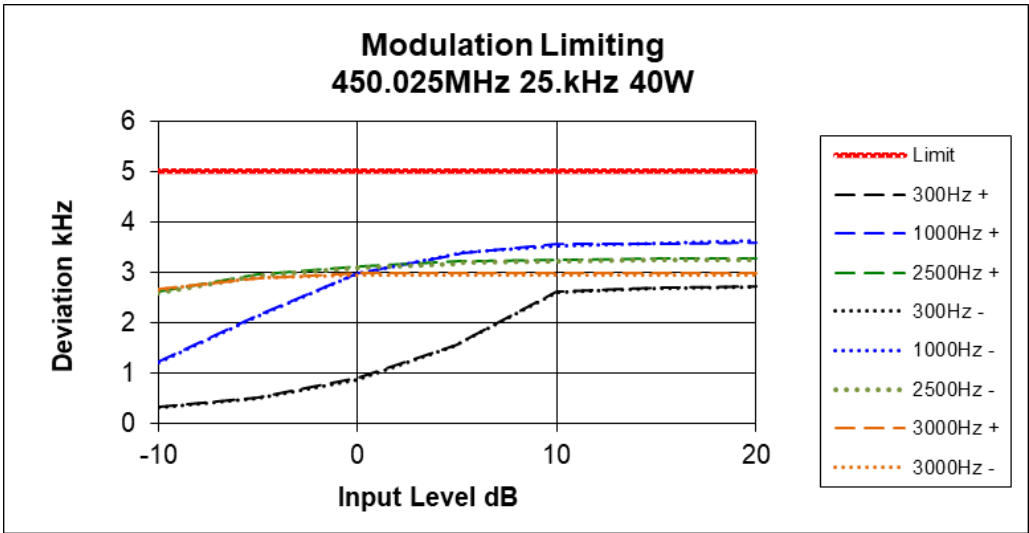
Tx FREQUENCY: 429.975 MHz

25 kHz Channel Spacing



Tx FREQUENCY: 450.025 MHz

25 kHz Channel Spacing

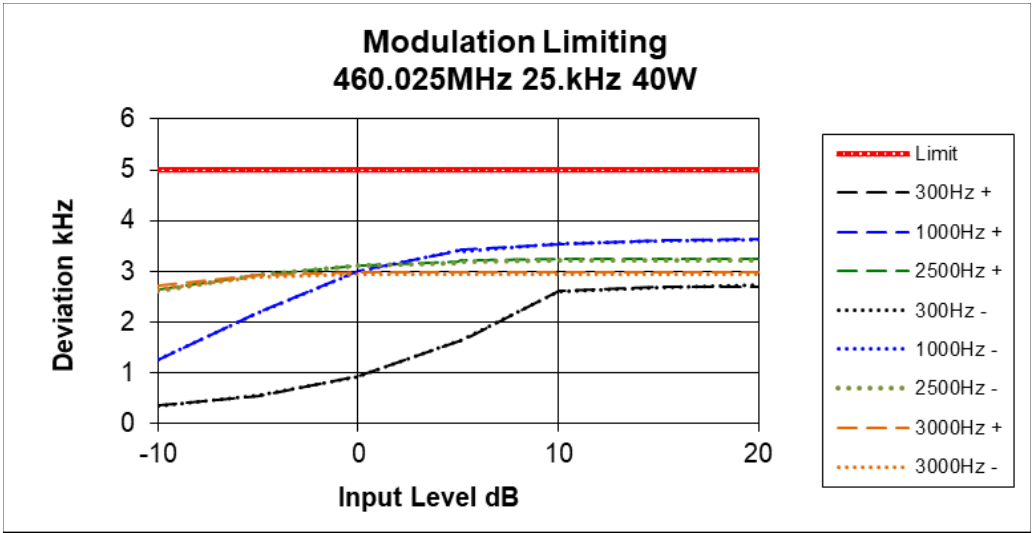


Transmitter Modulation Limiting

SPECIFICATION: FCC 47 CFR 2.1047 (b)

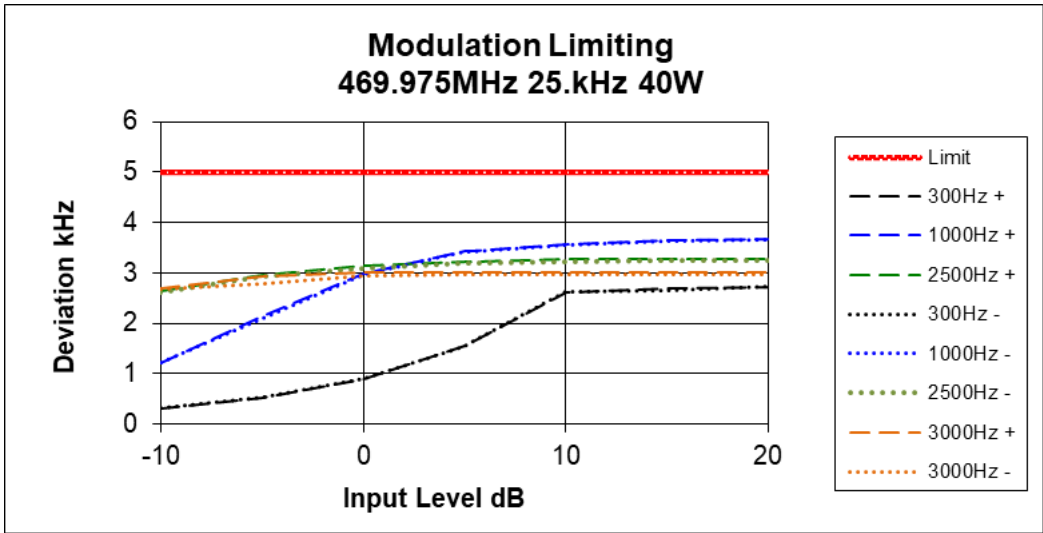
Tx FREQUENCY: 460.025 MHz

25 kHz Channel Spacing



Tx FREQUENCY: 469.975 MHz

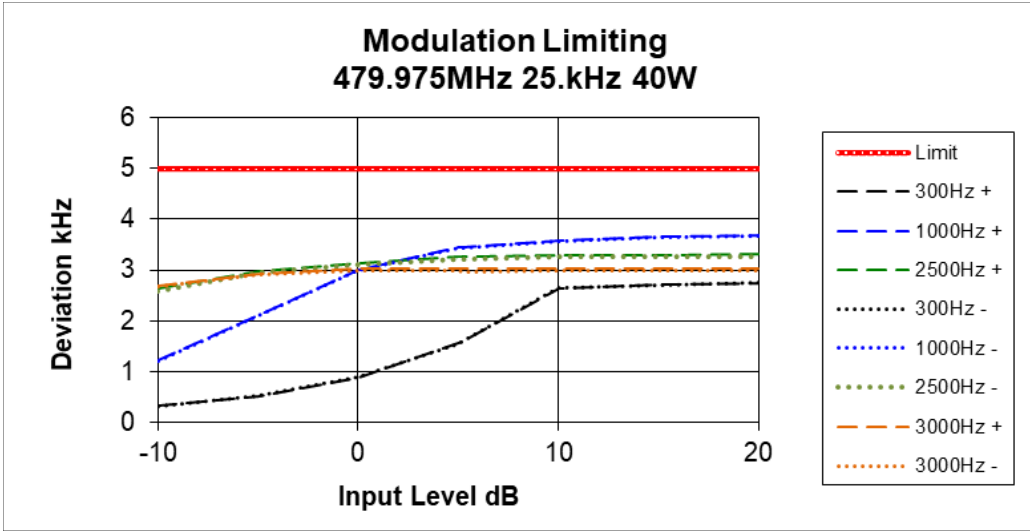
25 kHz Channel Spacing



Transmitter Modulation Limiting

SPECIFICATION: FCC 47 CFR 2.1047 (b)

Tx FREQUENCY: 479.975 MHz 25 kHz Channel Spacing



TRANSMITTER OCCUPIED (99%) BANDWIDTH

SPECIFICATION: FCC 47 CFR 2.1046
RSS-119 5.5

GUIDE: ANSI C63.26 5.4.4

MEASUREMENT PROCEDURE:

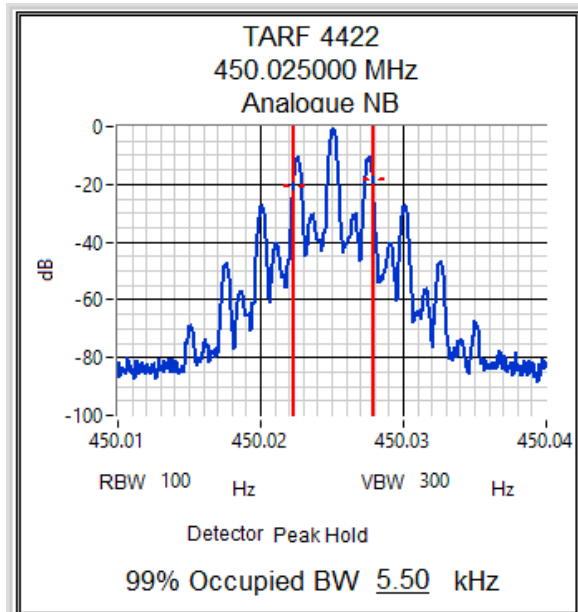
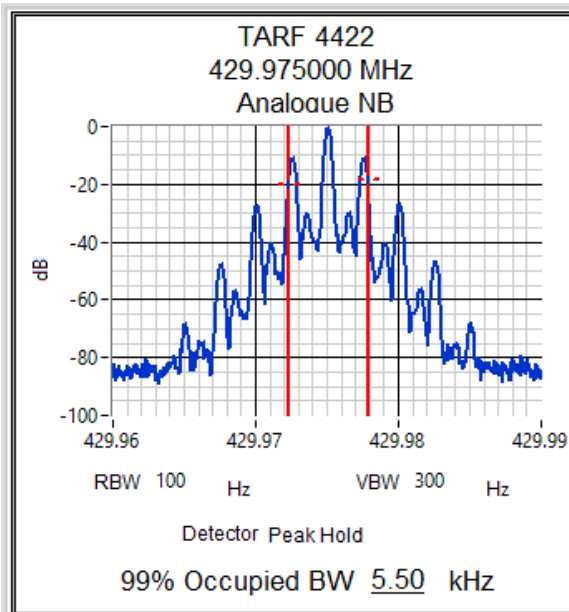
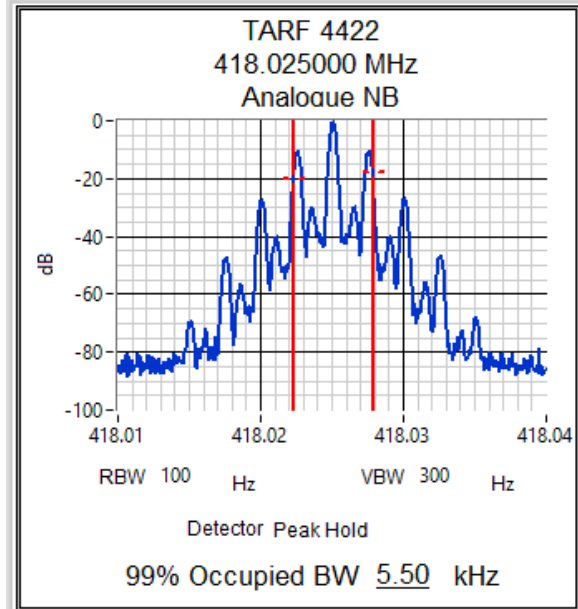
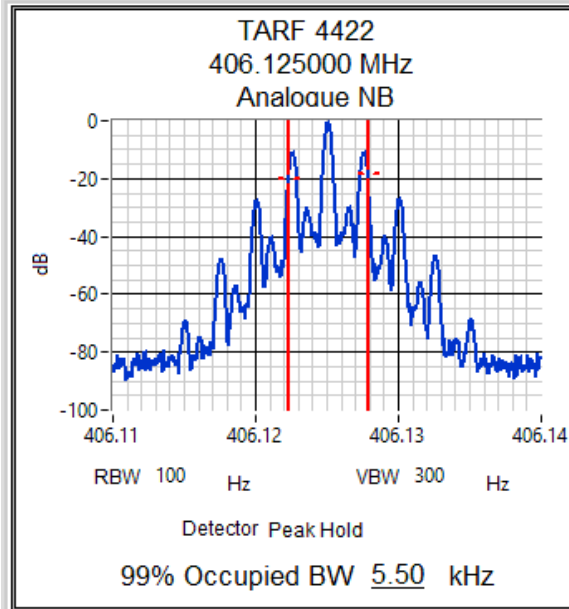
1. Refer Annex A for Equipment Set up.
2. For analogue measurements: The EUT was modulated by a 2500 Hz tone at an input level 16 dB above a level that produced 50% deviation. The input level was established at the frequency of maximum response of the audio modulating circuit.
For Data measurements: 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 follows.
Resolution Bandwidth = 100 Hz, Video Bandwidth = 300 Hz

MEASUREMENT RESULTS:

Channel Frequency (MHz)	Bandwidths (kHz)		
	Analogue NB	Analogue WB	DMR
406.125 MHz	5.50	10.30	7.60
418.025 MHz	5.50	10.30	7.60
429.975 MHz	5.50	10.30	7.50
450.025 MHz	5.50	10.30	7.55
460.025 MHz	5.50	10.30	7.65
469.975 MHz	5.50	10.30	7.65
479.975 MHz	5.50	10.30	7.65
<u>Limit</u> Authorized Bandwidth 47 CFR 90.209 RSS 119 5.5	11.25	20.0	11.25
Necessary BW used in emission designator	11.0	16.0	8.0
Result	Pass	Pass	Pass

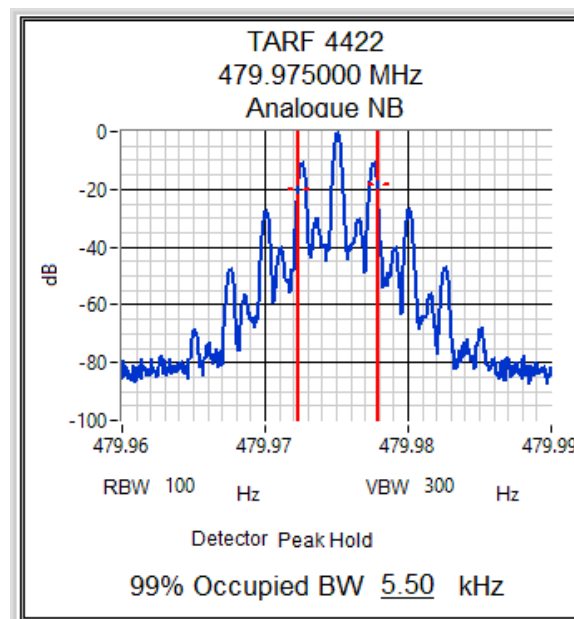
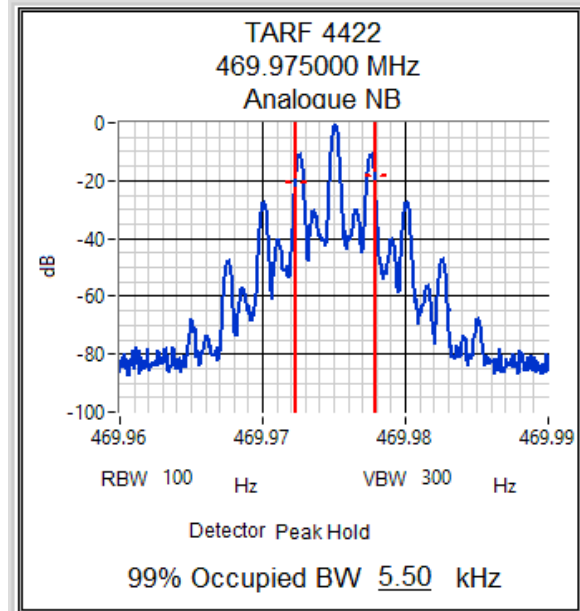
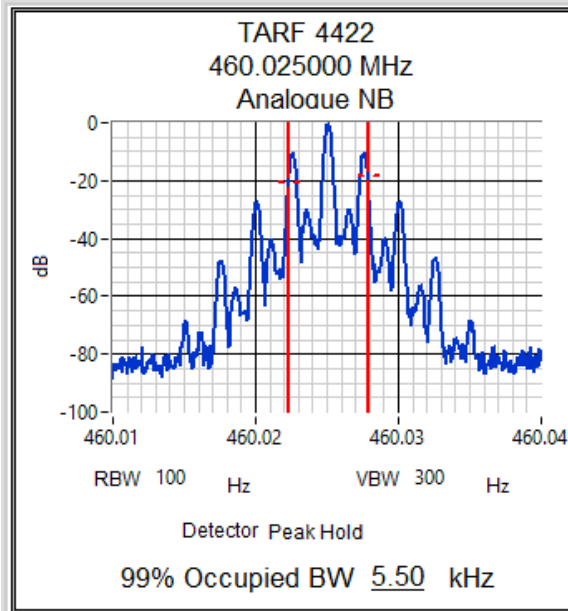
Transmitter Occupied (99%) Bandwidth

Channel 1-4 40 W 12.5 kHz channel spacing Analogue Modulation



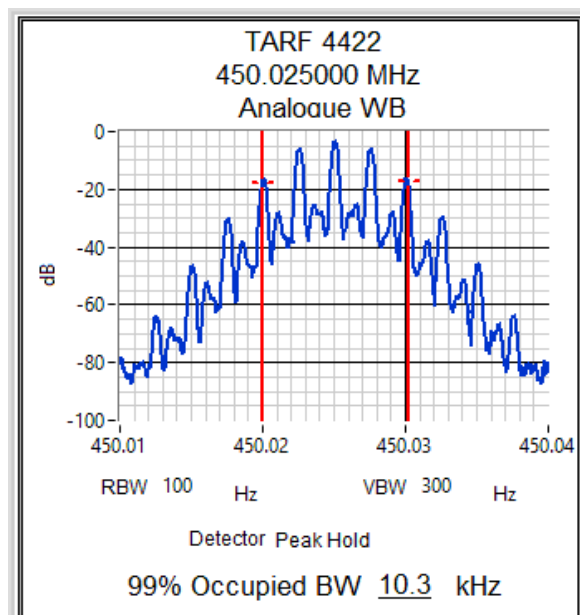
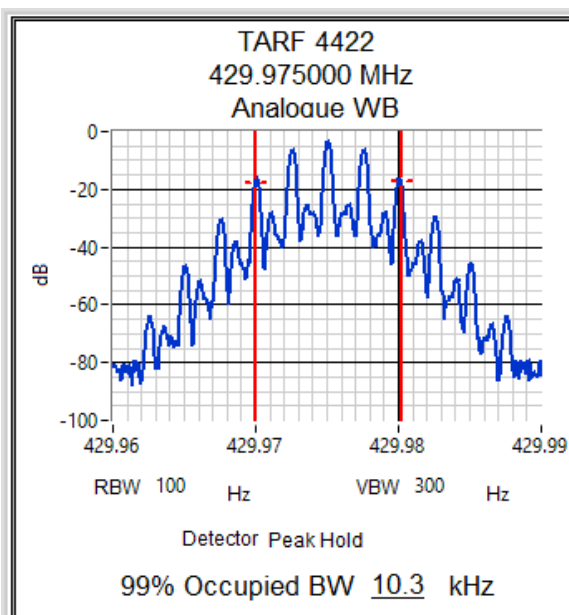
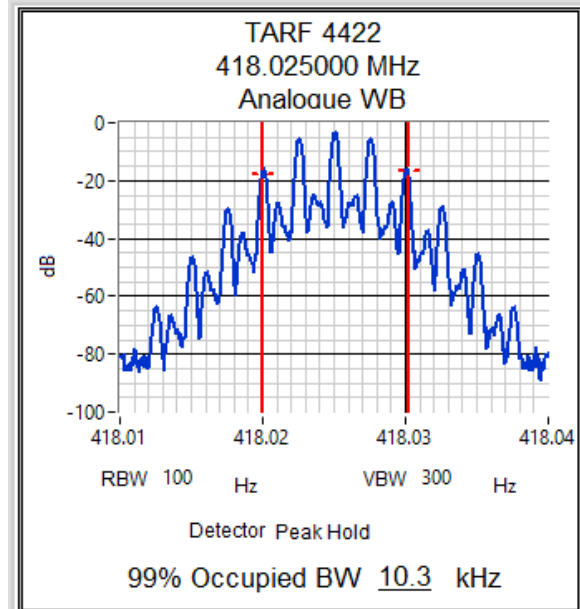
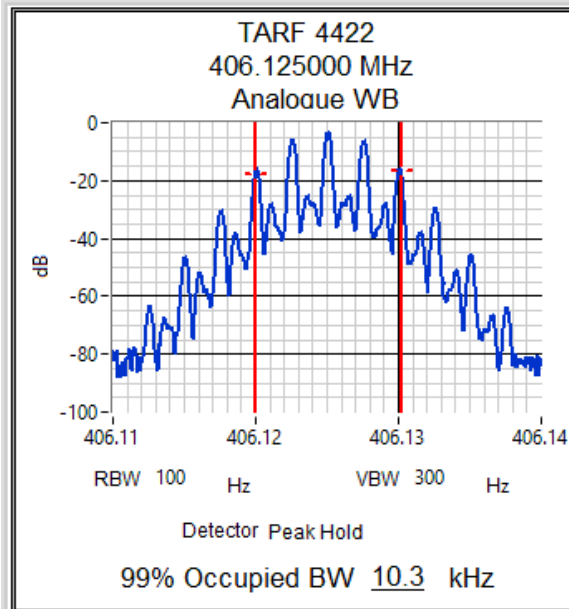
Transmitter Occupied (99%) Bandwidth

Channel 5-7 40 W 12.5 kHz channel spacing Analogue Modulation



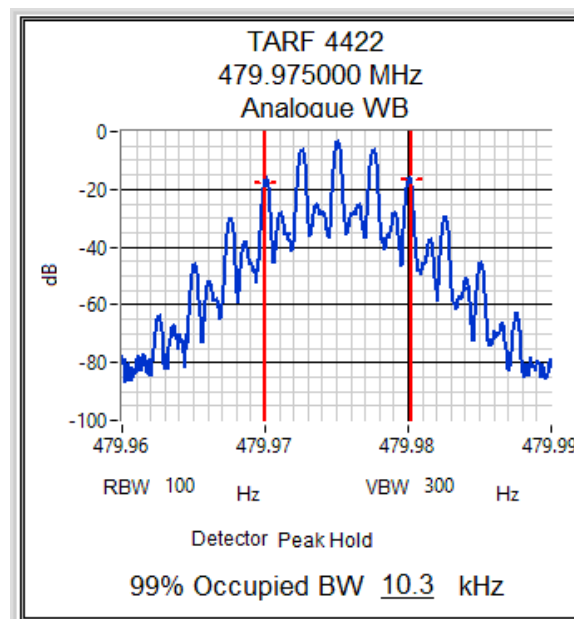
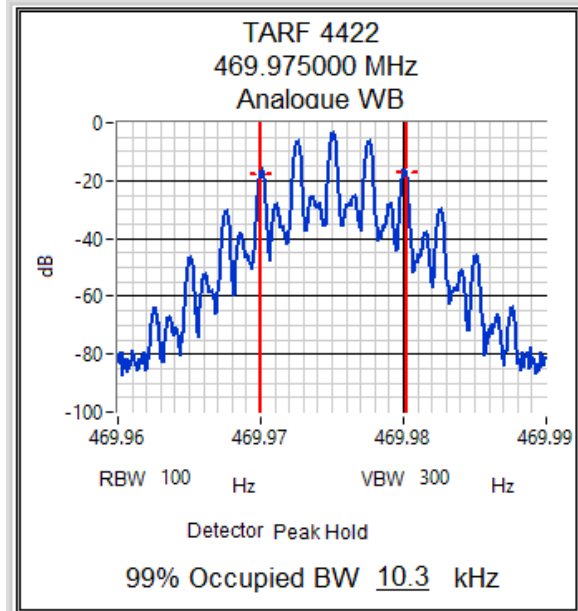
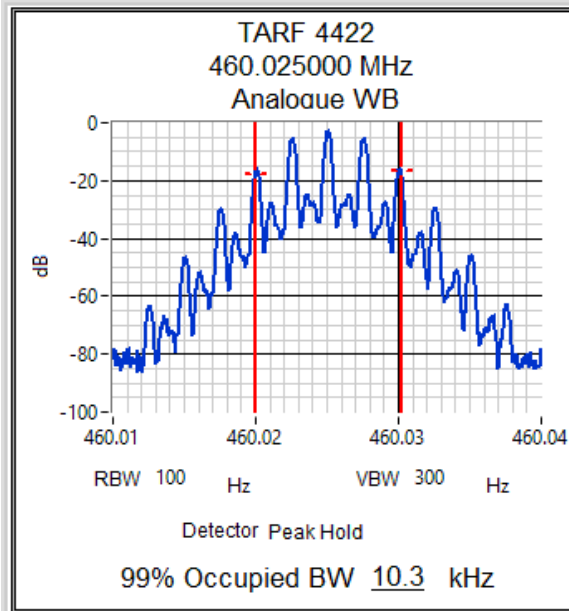
Transmitter Occupied (99%) Bandwidth

Channel 1-4 40 W 25.0 kHz channel spacing Analogue Modulation



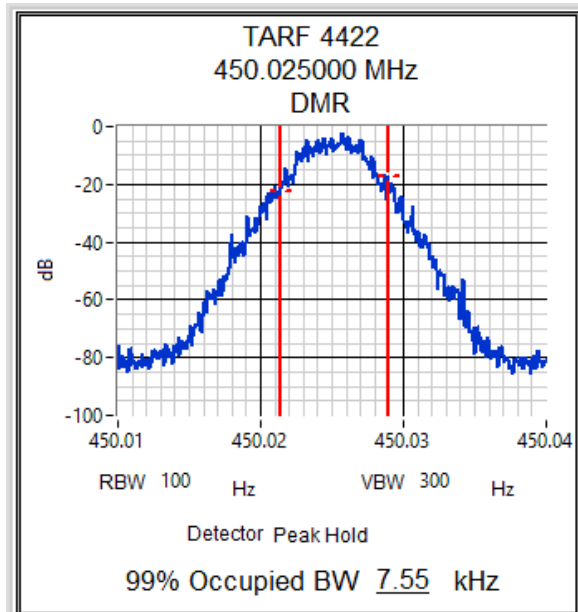
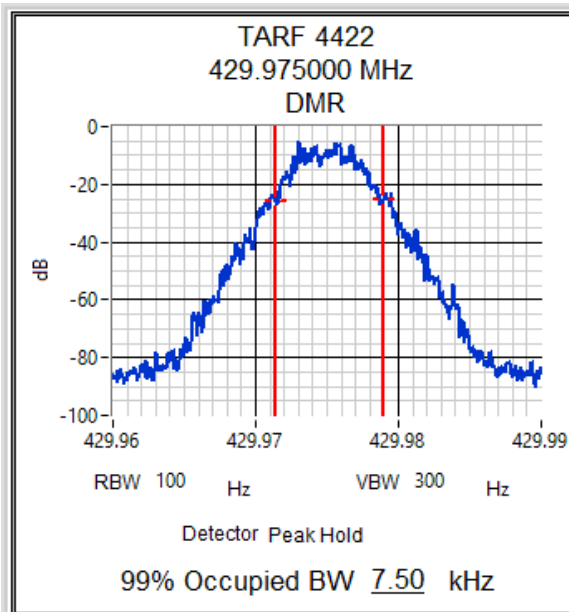
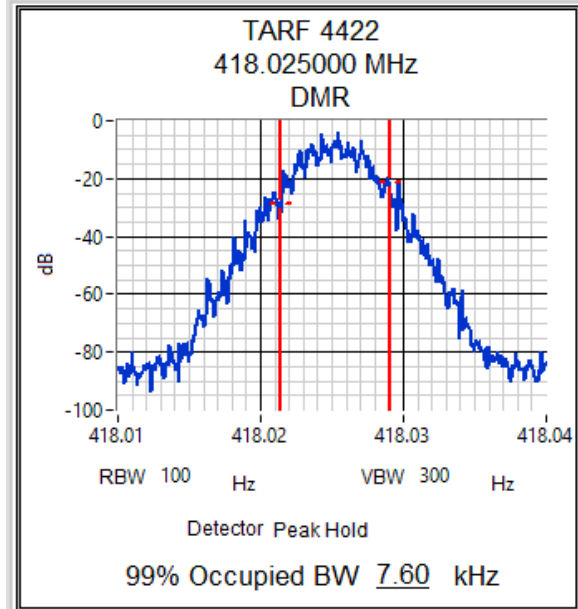
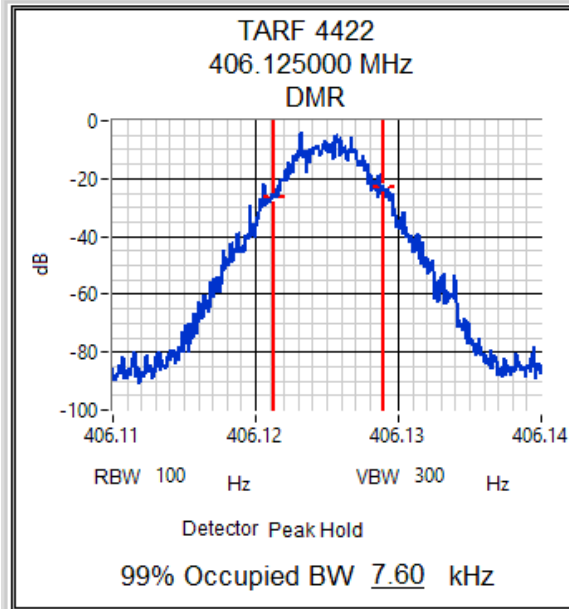
Transmitter Occupied (99%) Bandwidth

Channel 5-7 40 W 25.0 kHz channel spacing Analogue Modulation



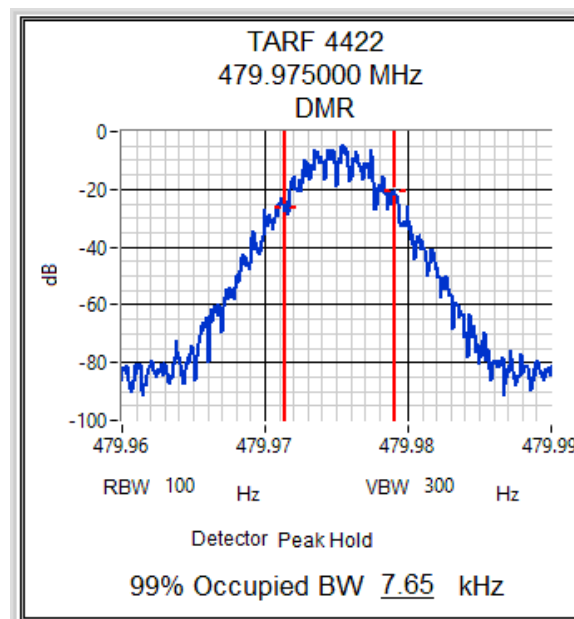
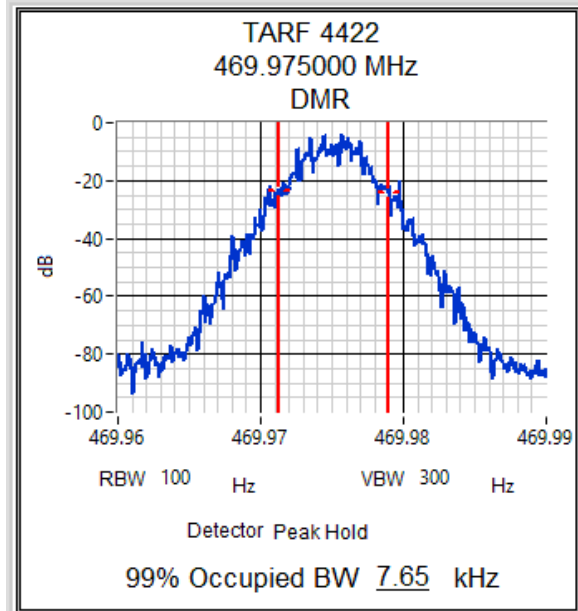
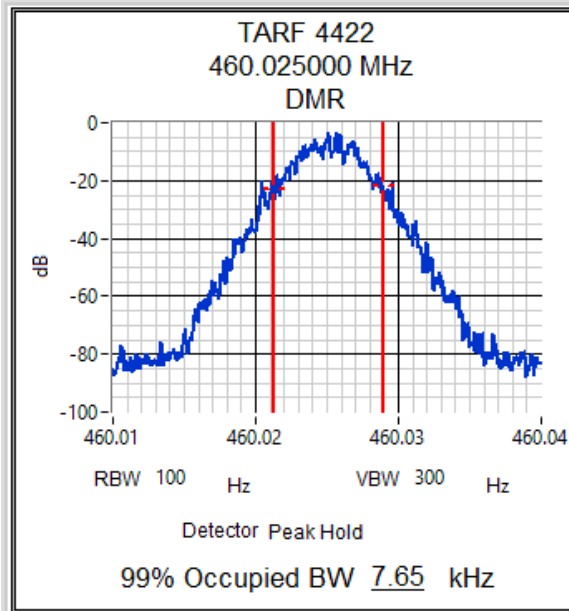
Transmitter Occupied (99%) Bandwidth

Channel 1-4 40 W 12.5 kHz channel spacing DMR Modulation



Transmitter Occupied (99%) Bandwidth

Channel 5-7 40 W 12.5 kHz channel spacing DMR Modulation



TRANSMITTER SPECTRUM MASKS

SPECIFICATION: FCC 47 CFR 2.1049 (c) RSS-119 5.5

GUIDE: ANSI C63.26.5.7.3

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 spectrum mask was measured on the Spectrum Analyser, with bandwidth settings as follows.
Emission Mask D – Resolution Bandwidth = 100 Hz, Video Bandwidth = 1 kHz
Emission Mask B – Resolution Bandwidth = 300 Hz, Video Bandwidth = 3 kHz

MEASUREMENT RESULTS:

See the plots on the following pages.

MEASUREMENT UNCERTAINTY: 95% ± 0.65 dB

LIMIT CLAUSE: FCC 47 CFR 90.210 RSS-119 5.5

EMISSION MASKS

Emission Mask D	12.5 kHz Channel Spacing	Analogue NB and DMR
Emission Mask B	25.0 kHz Channel Spacing	Analogue WB

DATA SPEED

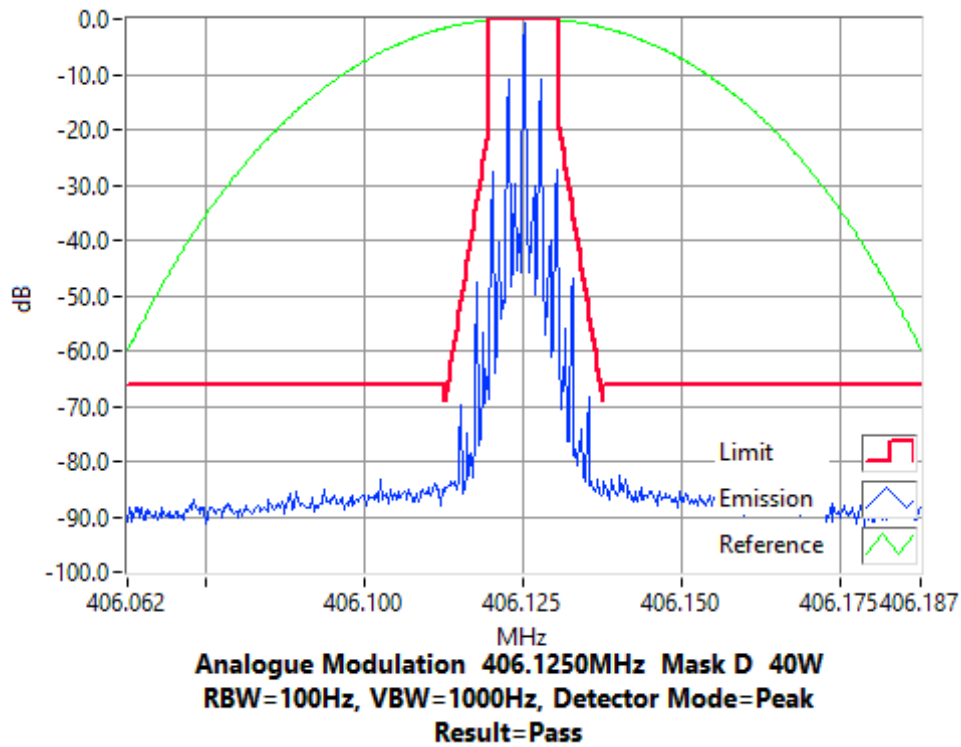
Digital Voice/Data	12.5 kHz Channel Spacing	9600 bps & 12000 bps
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Transmitter Spectrum Masks

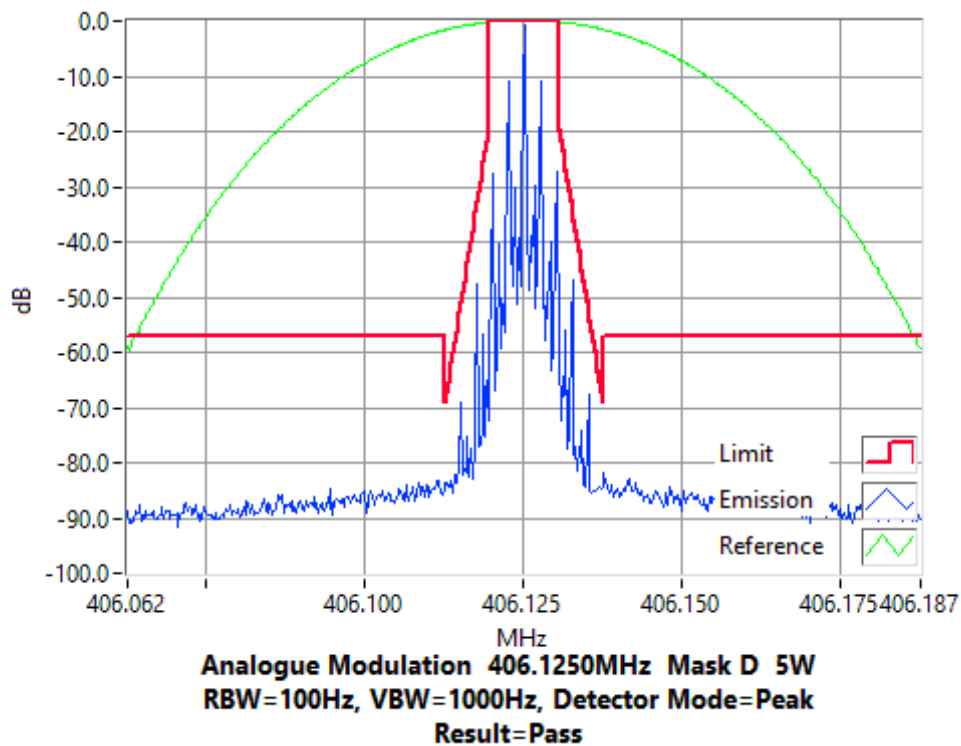
ANALOGUE VOICE

SPECIFICATION: FCC 47 CFR 2.1049 (c) RSS-119 5.5

Tx FREQUENCY: 406.125 MHz 40 W 12.5 kHz Channel Spacing



Tx FREQUENCY: 406.125 MHz 5 W 12.5 kHz Channel Spacing

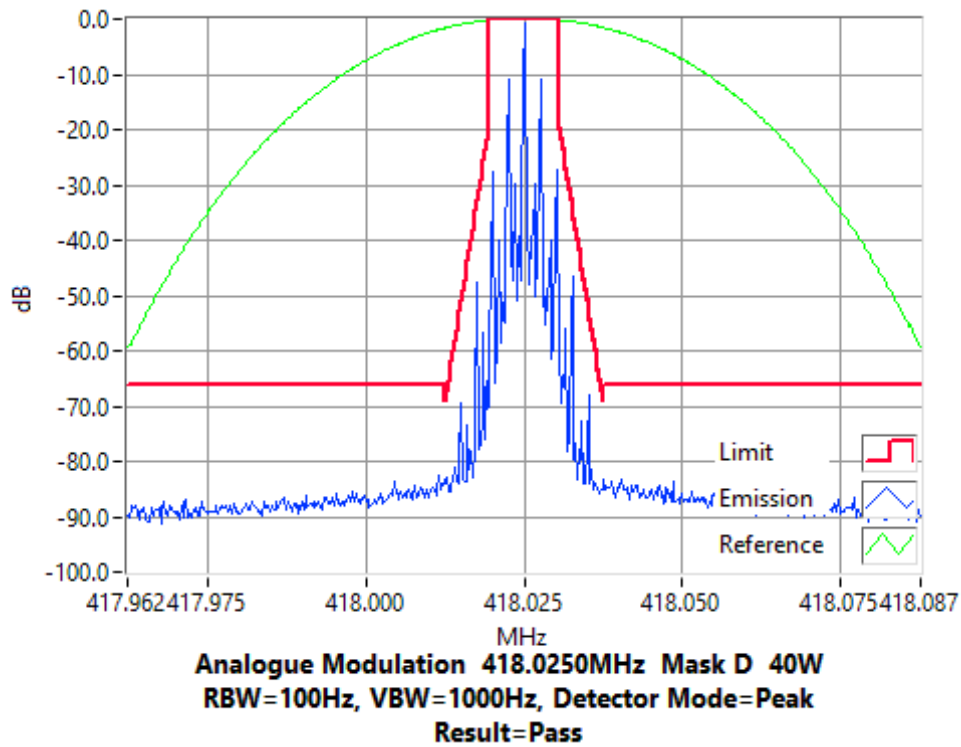


Transmitter Spectrum Masks

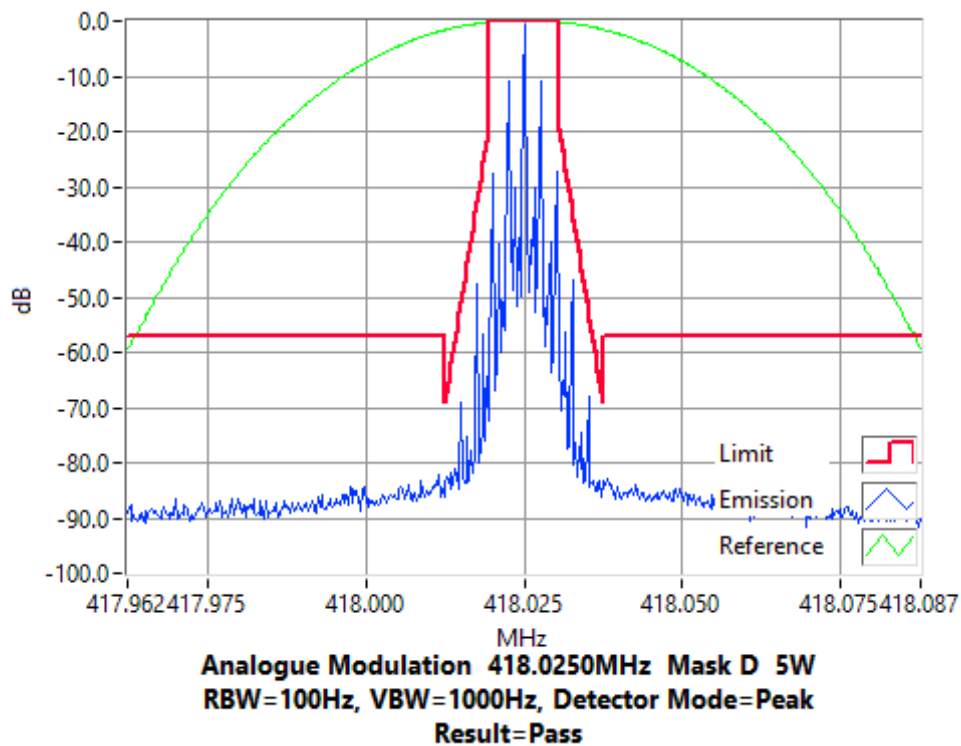
ANALOGUE VOICE

SPECIFICATION: FCC 47 CFR 2.1049 (c) RSS-119 5.5

Tx FREQUENCY: 418.025 MHz 40 W 12.5 kHz Channel Spacing



Tx FREQUENCY: 418.025 MHz 5 W 12.5 kHz Channel Spacing

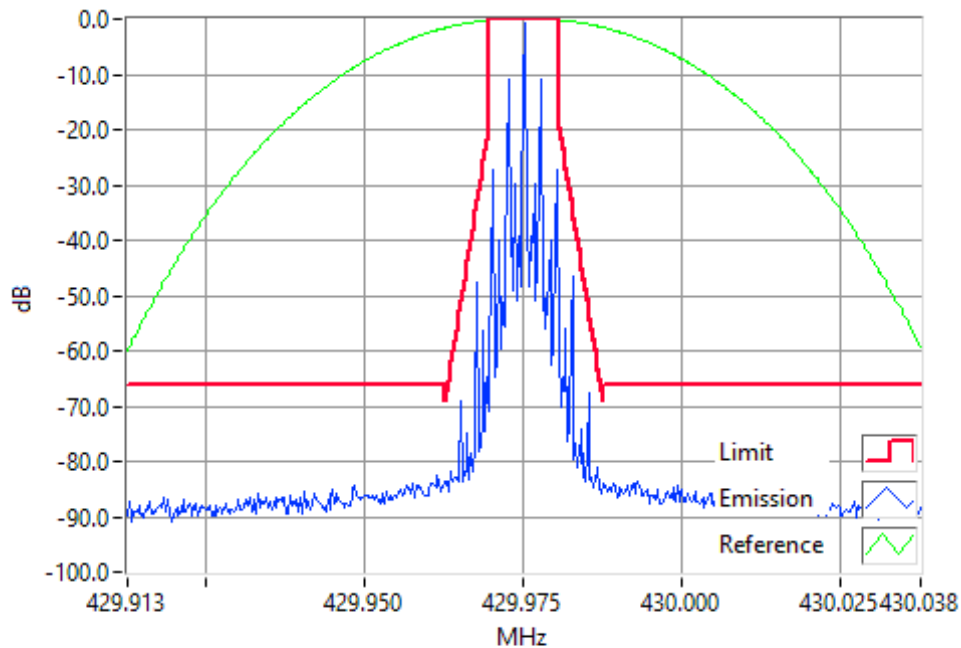


Transmitter Spectrum Masks

ANALOGUE VOICE

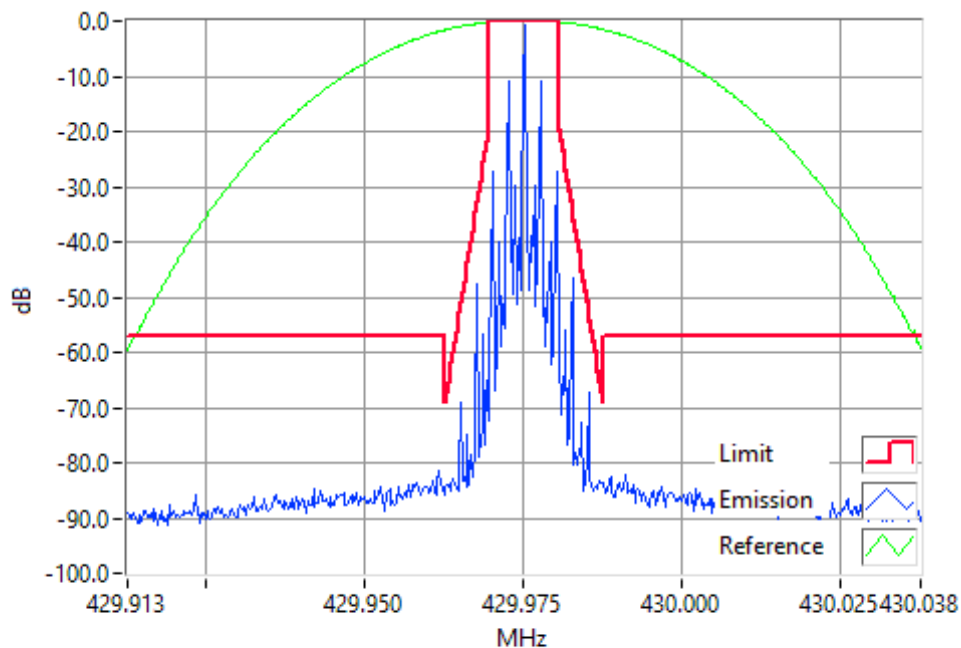
SPECIFICATION: FCC 47 CFR 2.1049 (c) RSS-119 5.5

Tx FREQUENCY: 429.975 MHz 40 W 12.5 kHz Channel Spacing



Analogue Modulation 429.9750MHz Mask D 40W
RBW=100Hz, VBW=1000Hz, Detector Mode=Peak
Result=Pass

Tx FREQUENCY: 429.975 MHz 5 W 12.5 kHz Channel Spacing



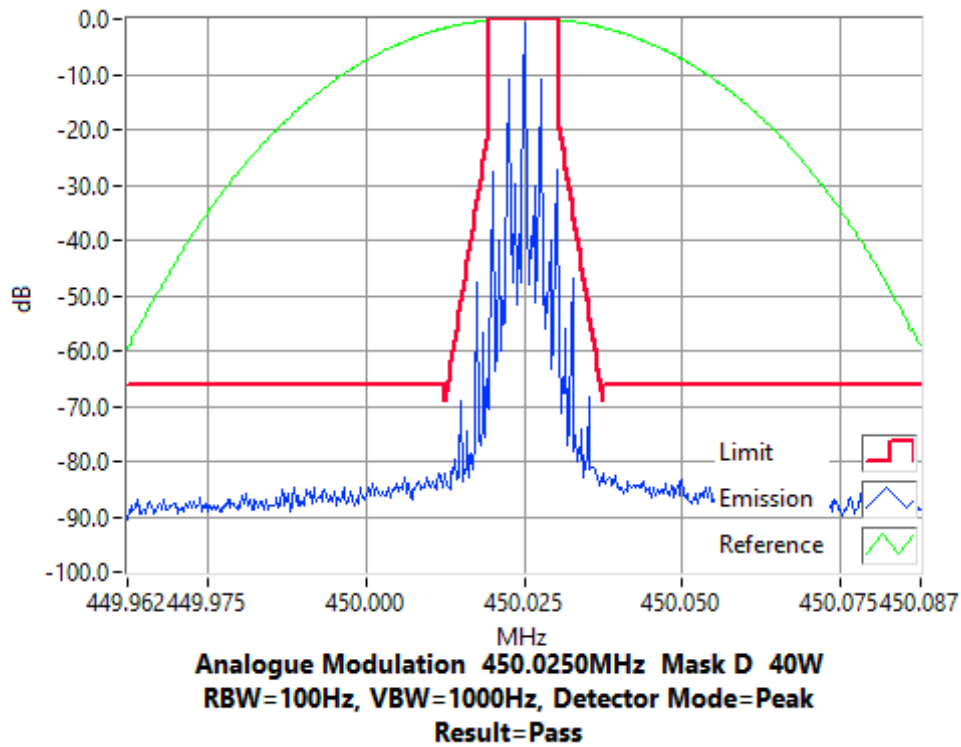
Analogue Modulation 429.9750MHz Mask D 5W
RBW=100Hz, VBW=1000Hz, Detector Mode=Peak
Result=Pass

Transmitter Spectrum Masks

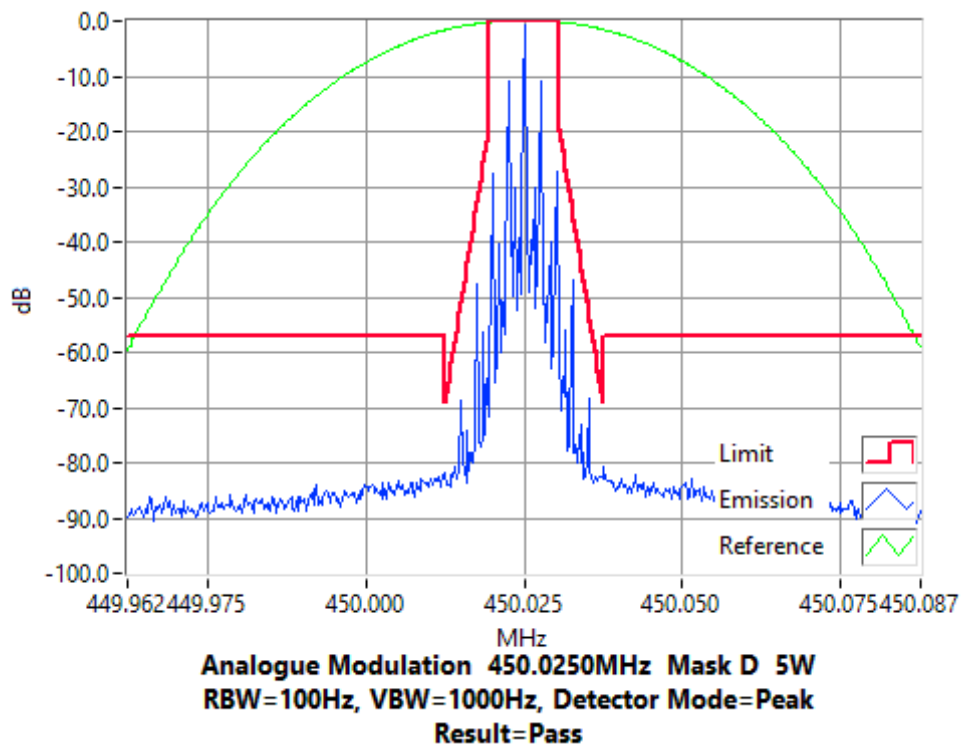
ANALOGUE VOICE

SPECIFICATION: FCC 47 CFR 2.1049 (c) RSS-119 5.5

Tx FREQUENCY: 450.025 MHz 40 W 12.5 kHz Channel Spacing



Tx FREQUENCY: 450.025 MHz 5 W 12.5 kHz Channel Spacing

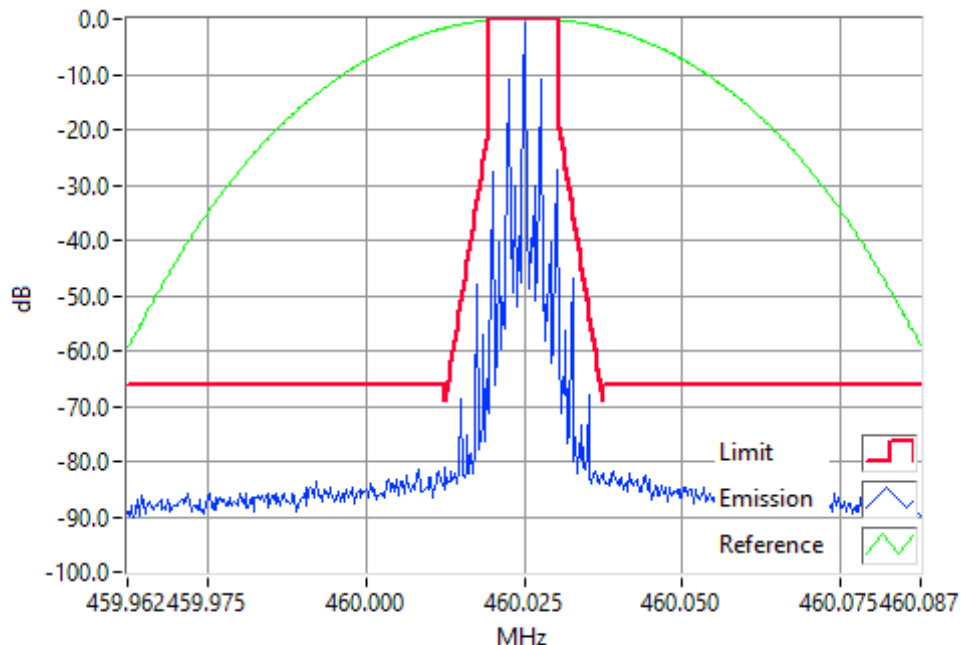


Transmitter Spectrum Masks

ANALOGUE VOICE

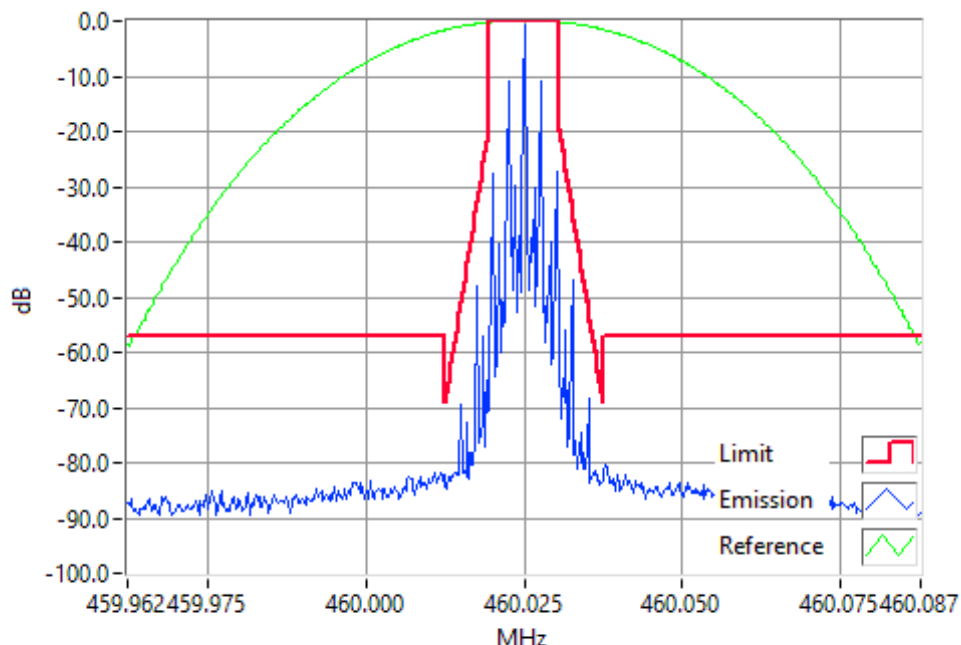
SPECIFICATION: FCC 47 CFR 2.1049 (c) RSS-119 5.5

Tx FREQUENCY: 460.025 MHz 40 W 12.5 kHz Channel Spacing



Analogue Modulation 460.0250MHz Mask D 40W
RBW=100Hz, VBW=1000Hz, Detector Mode=Peak
Result=Pass

Tx FREQUENCY: 460.025 MHz 5 W 12.5 kHz Channel Spacing



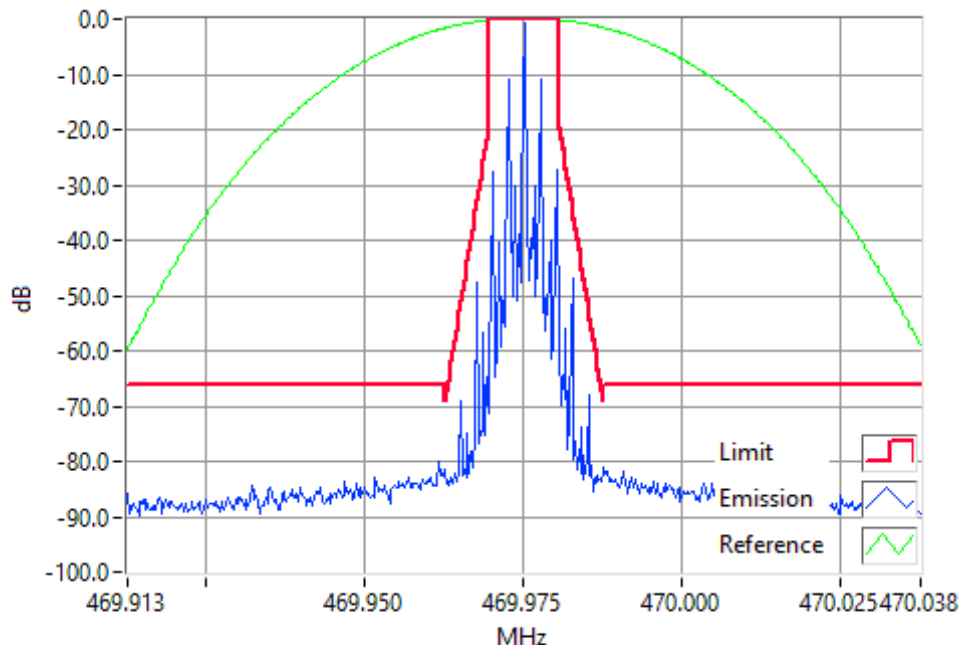
Analogue Modulation 460.0250MHz Mask D 5W
RBW=100Hz, VBW=1000Hz, Detector Mode=Peak
Result=Pass

Transmitter Spectrum Masks

ANALOGUE VOICE

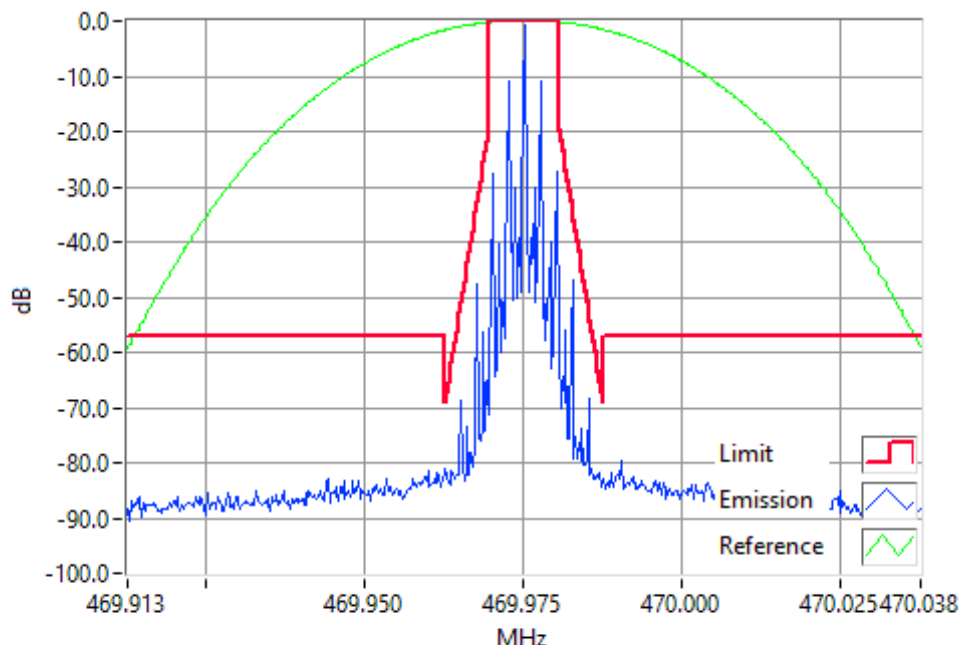
SPECIFICATION: FCC 47 CFR 2.1049 (c) RSS-119 5.5

Tx FREQUENCY: 469.975 MHz 40 W 12.5 kHz Channel Spacing



Analogue Modulation 469.9750MHz Mask D 40W
RBW=100Hz, VBW=1000Hz, Detector Mode=Peak
Result=Pass

Tx FREQUENCY: 469.975 MHz 5 W 12.5 kHz Channel Spacing



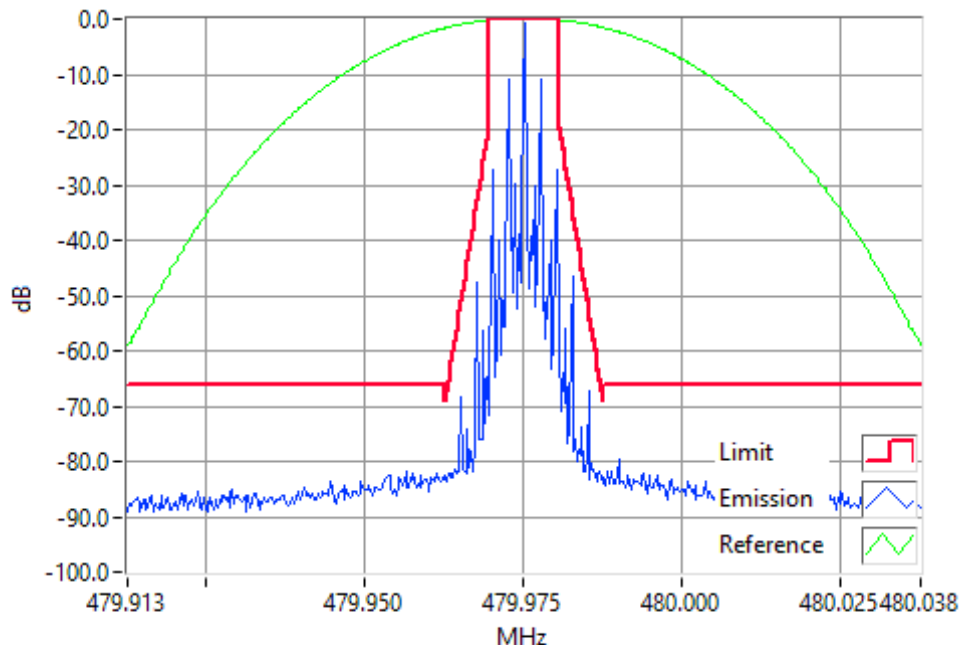
Analogue Modulation 469.9750MHz Mask D 5W
RBW=100Hz, VBW=1000Hz, Detector Mode=Peak
Result=Pass

Transmitter Spectrum Masks

ANALOGUE VOICE

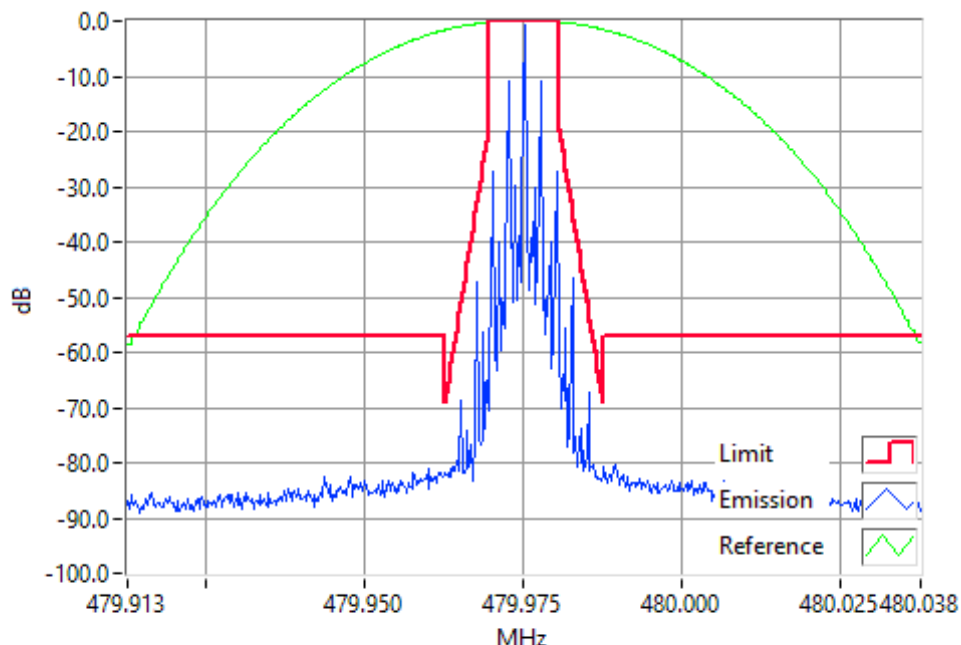
SPECIFICATION: FCC 47 CFR 2.1049 (c) RSS-119 5.5

Tx FREQUENCY: 479.975 MHz 40 W 12.5 kHz Channel Spacing



Analogue Modulation 479.9750MHz Mask D 40W
RBW=100Hz, VBW=1000Hz, Detector Mode=Peak
Result=Pass

Tx FREQUENCY: 479.975 MHz 5 W 12.5 kHz Channel Spacing



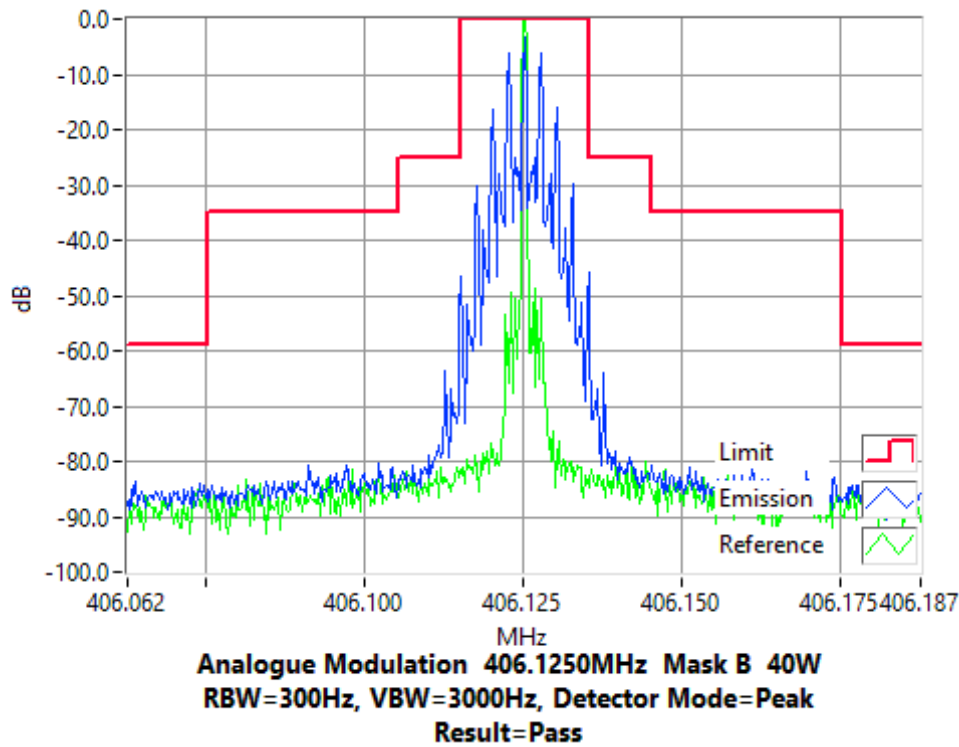
Analogue Modulation 479.9750MHz Mask D 5W
RBW=100Hz, VBW=1000Hz, Detector Mode=Peak
Result=Pass

Transmitter Spectrum Masks

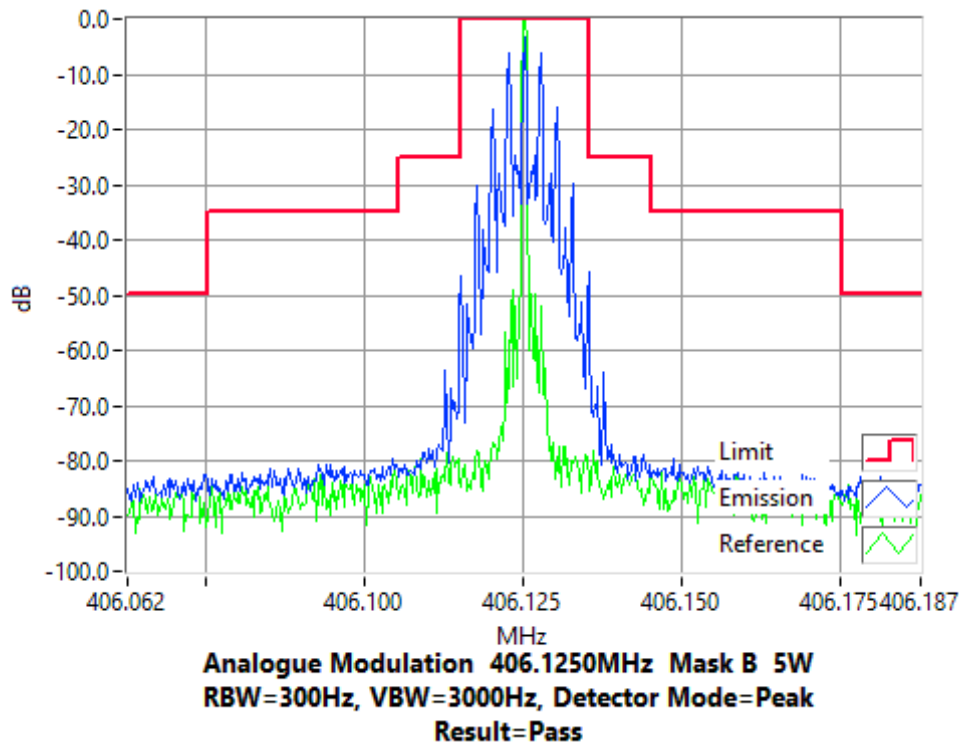
ANALOGUE VOICE

SPECIFICATION: FCC 47 CFR 2.1049 (c) RSS-119 5.5

Tx FREQUENCY: 406.125 MHz 40 W 25.0 kHz Channel Spacing



Tx FREQUENCY: 406.125 MHz 5 W 25.0 kHz Channel Spacing

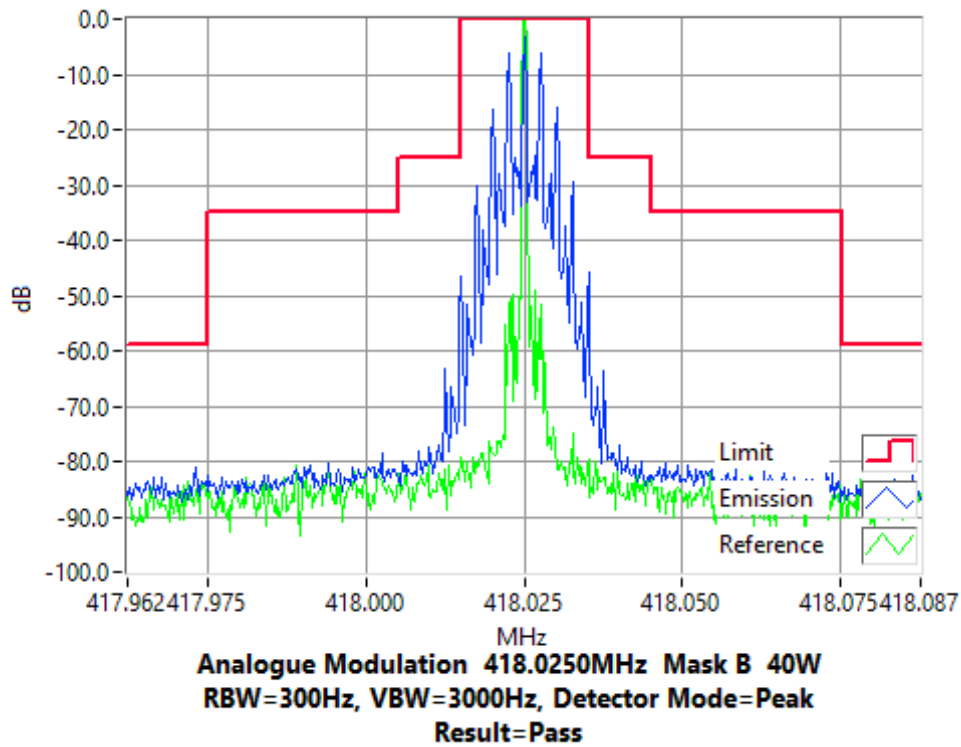


Transmitter Spectrum Masks

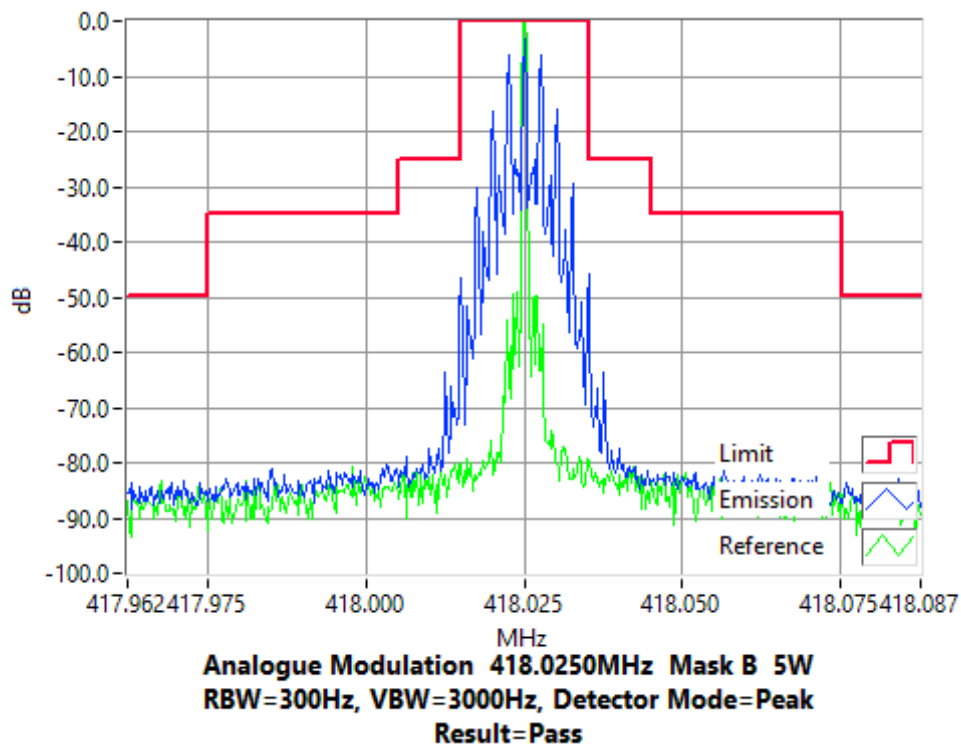
ANALOGUE VOICE

SPECIFICATION: FCC 47 CFR 2.1049 (c) RSS-119 5.5

Tx FREQUENCY: 418.025 MHz 40 W 25.0 kHz Channel Spacing



Tx FREQUENCY: 418.025 MHz 5 W 25.0 kHz Channel Spacing

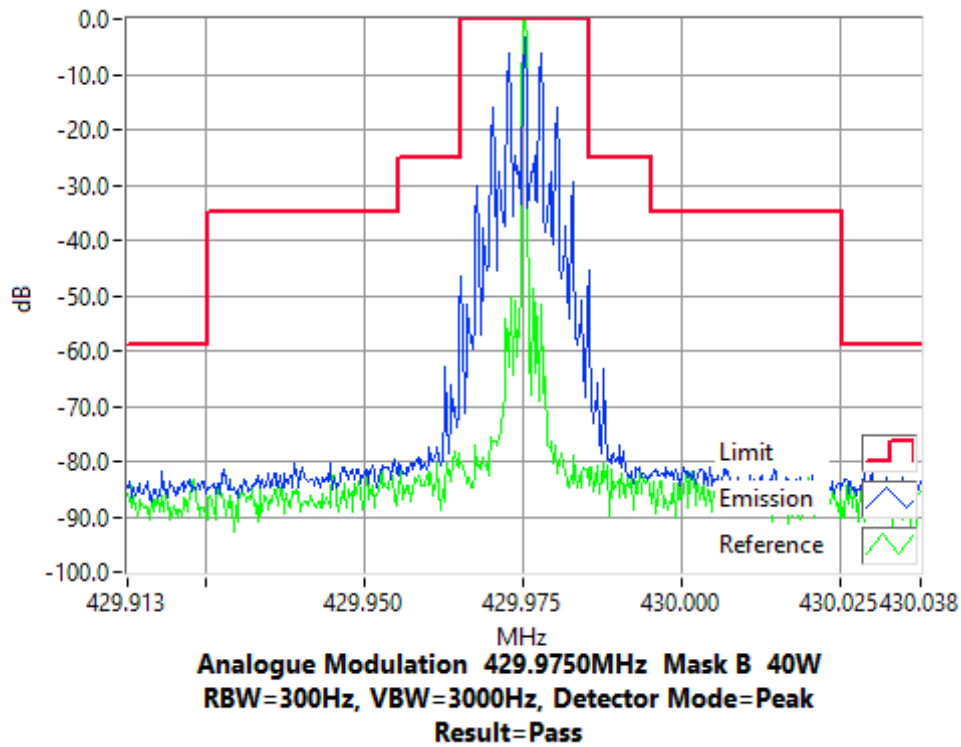


Transmitter Spectrum Masks

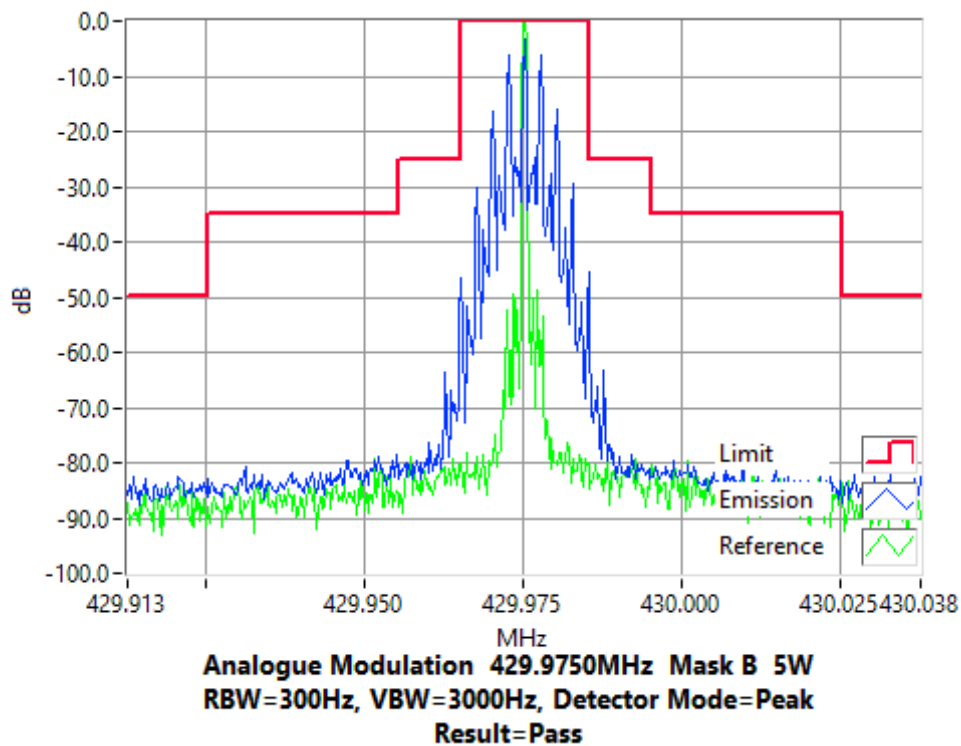
ANALOGUE VOICE

SPECIFICATION: FCC 47 CFR 2.1049 (c) RSS-119 5.5

Tx FREQUENCY: 429.975 MHz 40 W 25.0 kHz Channel Spacing



Tx FREQUENCY: 429.975 MHz 5 W 25.0 kHz Channel Spacing

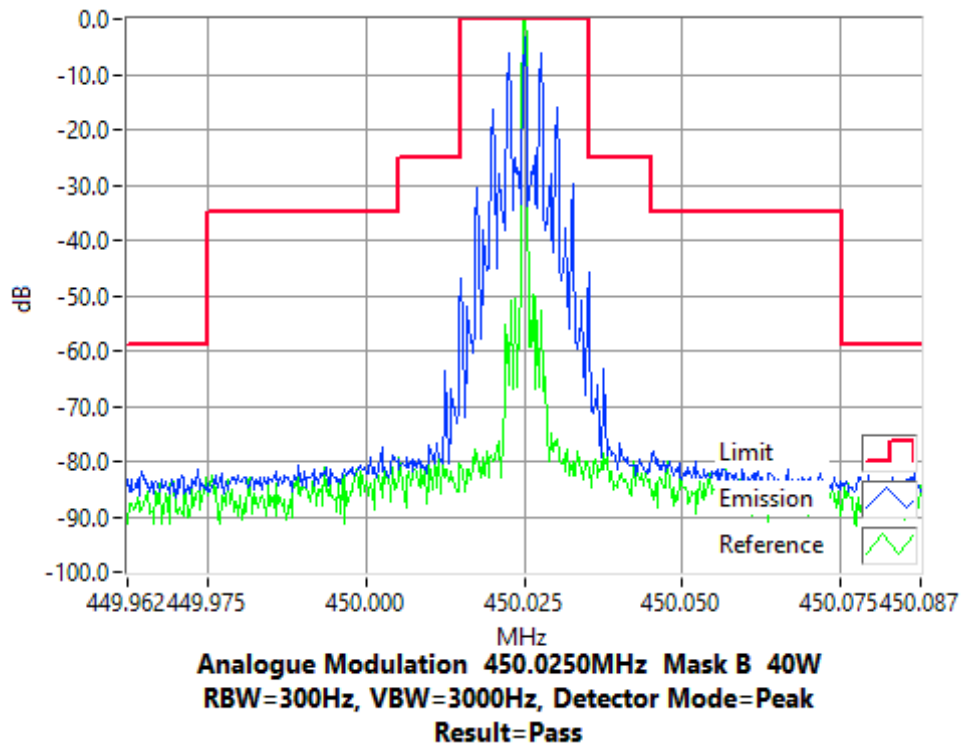


Transmitter Spectrum Masks

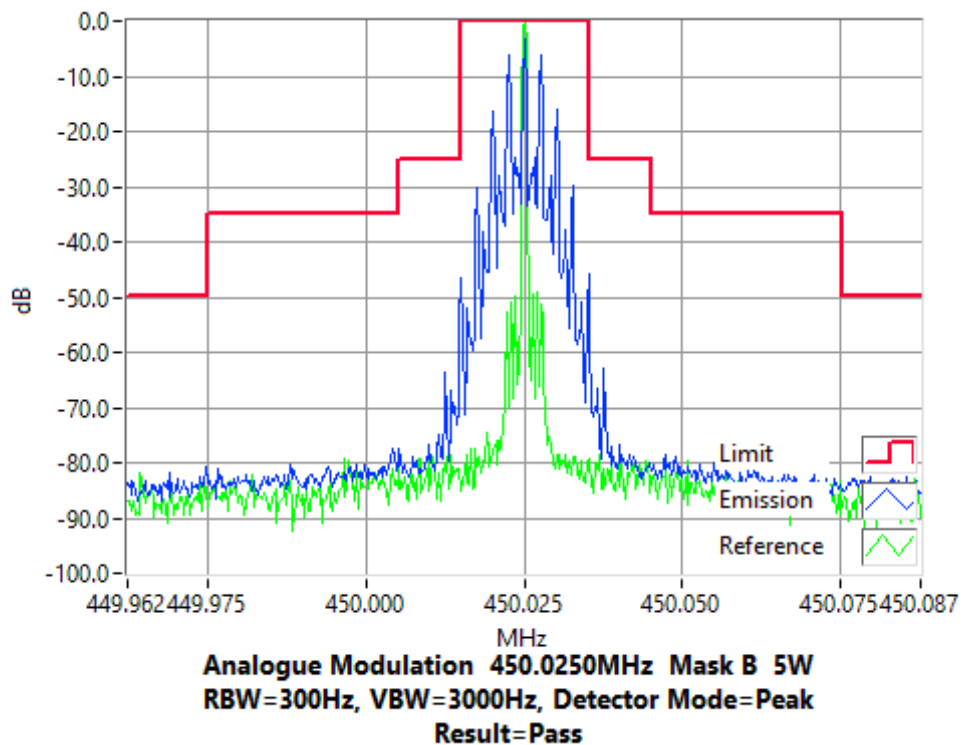
ANALOGUE VOICE

SPECIFICATION: FCC 47 CFR 2.1049 (c) RSS-119 5.5

Tx FREQUENCY: 450.025 MHz 40 W 25.0 kHz Channel Spacing



Tx FREQUENCY: 450.025 MHz 5 W 25.0 kHz Channel Spacing

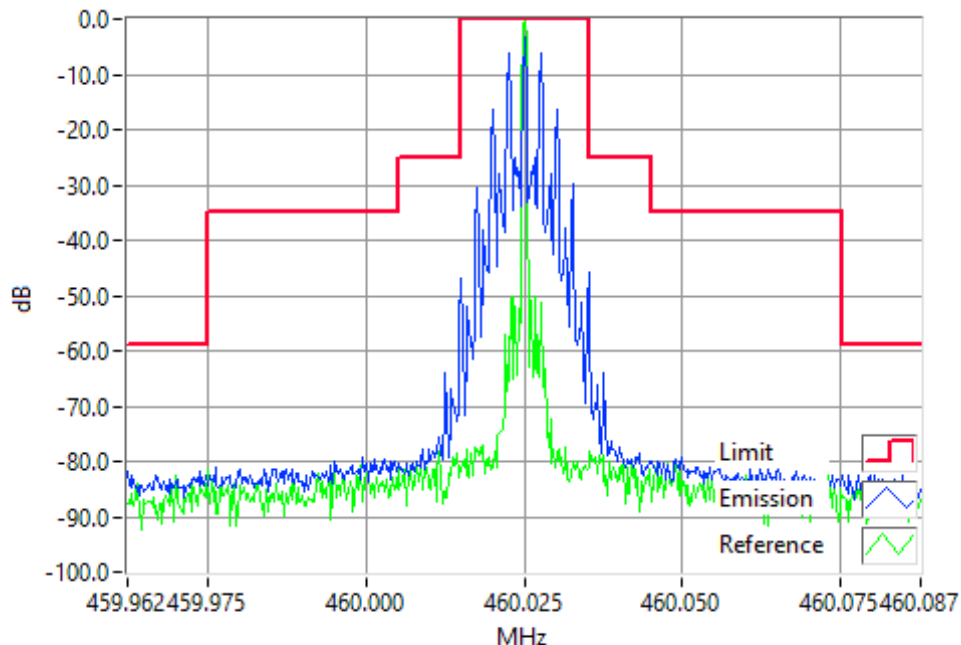


Transmitter Spectrum Masks

ANALOGUE VOICE

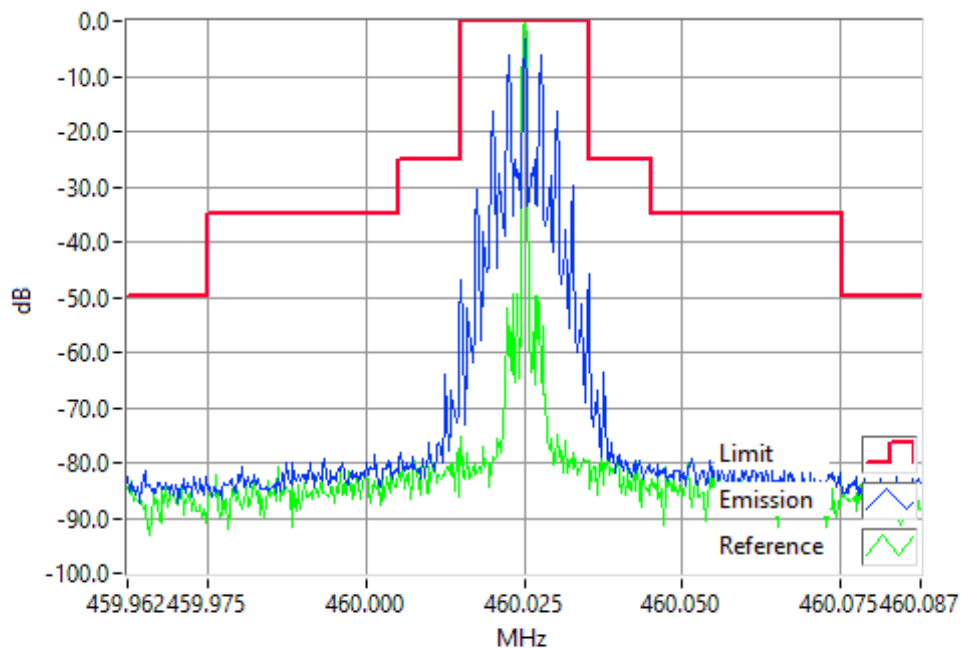
SPECIFICATION: FCC 47 CFR 2.1049 (c) RSS-119 5.5

Tx FREQUENCY: 460.025 MHz 40 W 25.0 kHz Channel Spacing



Analogue Modulation 460.0250MHz Mask B 40W
RBW=300Hz, VBW=3000Hz, Detector Mode=Peak
Result=Pass

Tx FREQUENCY: 460.025 MHz 5 W 25.0 kHz Channel Spacing



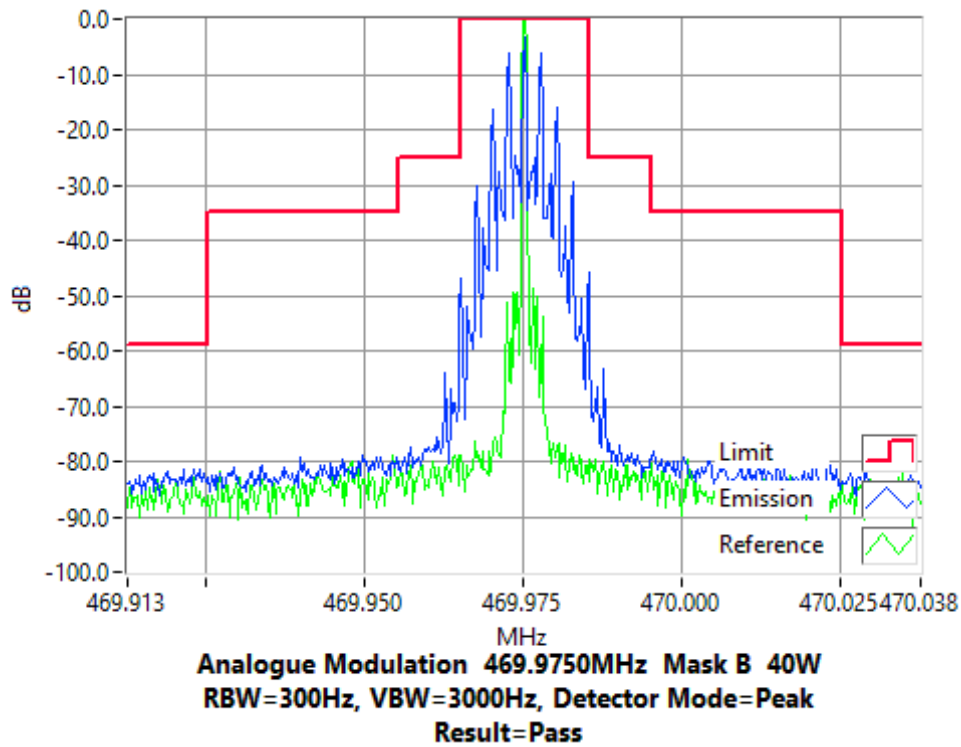
Analogue Modulation 460.0250MHz Mask B 5W
RBW=300Hz, VBW=3000Hz, Detector Mode=Peak
Result=Pass

Transmitter Spectrum Masks

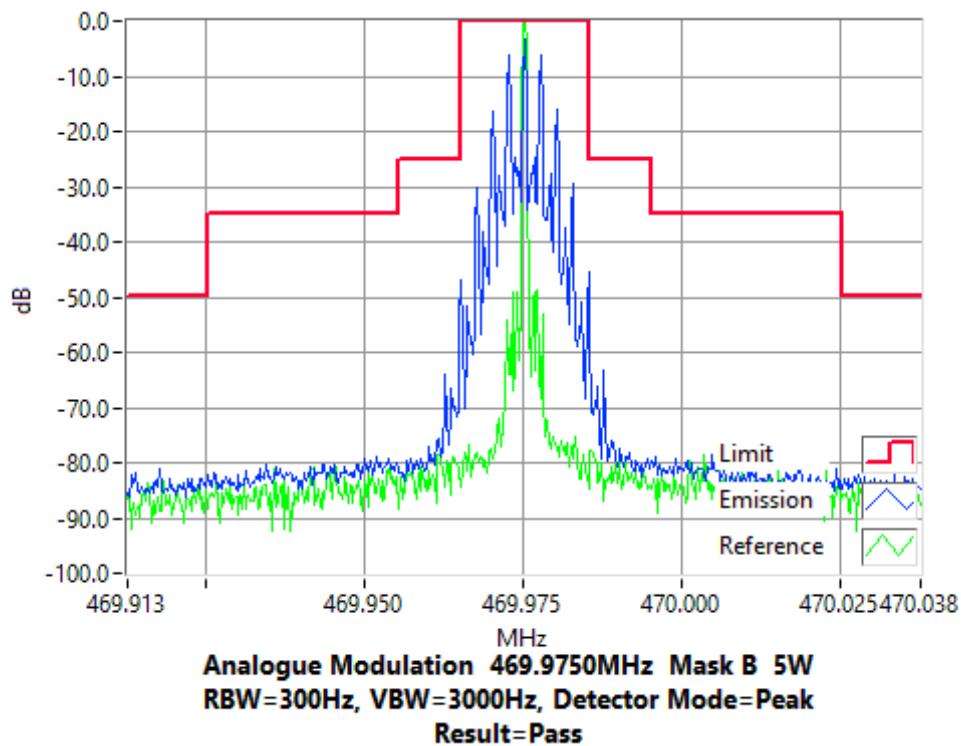
ANALOGUE VOICE

SPECIFICATION: FCC 47 CFR 2.1049 (c) RSS-119 5.5

Tx FREQUENCY: 469.975 MHz 40 W 25.0 kHz Channel Spacing



Tx FREQUENCY: 469.975 MHz 5 W 25.0 kHz Channel Spacing

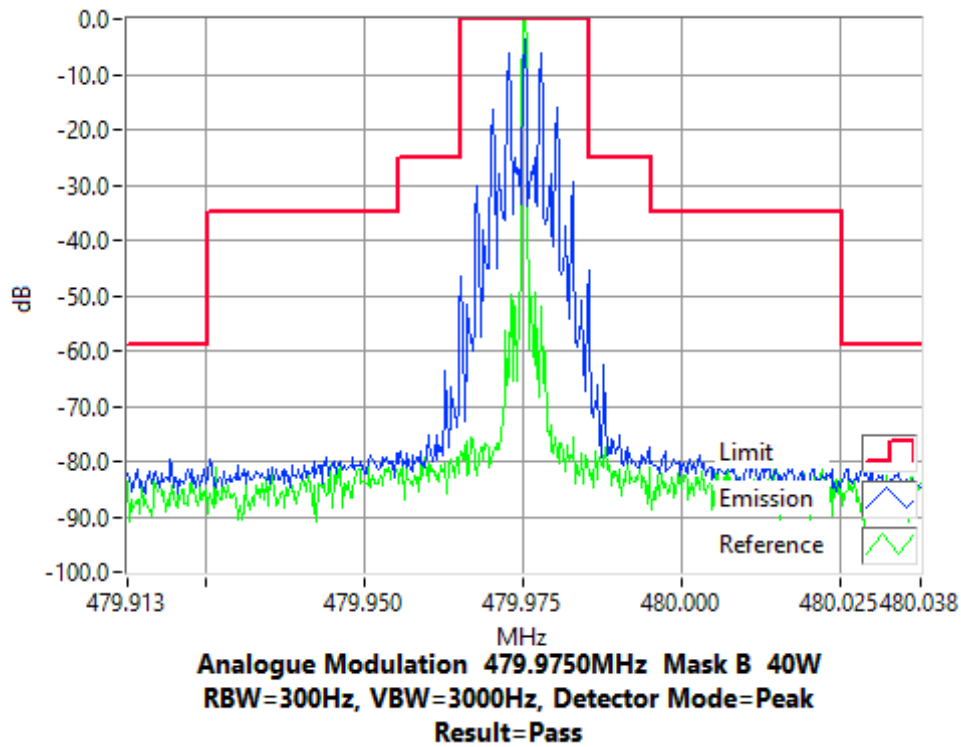


Transmitter Spectrum Masks

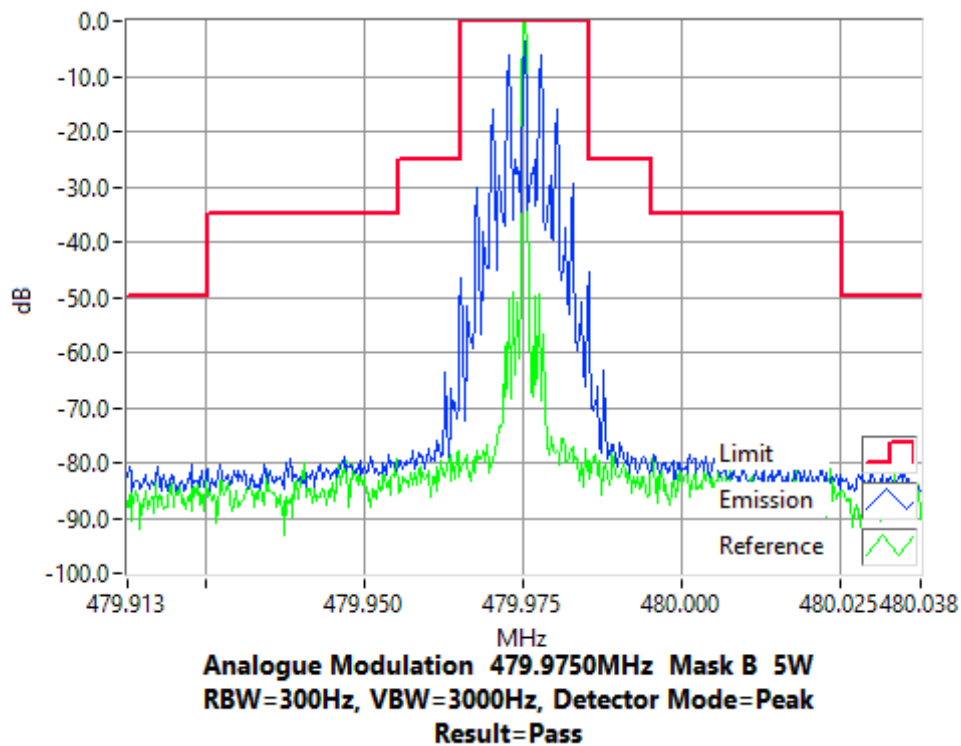
ANALOGUE VOICE

SPECIFICATION: FCC 47 CFR 2.1049 (c) RSS-119 5.5

Tx FREQUENCY: 479.975 MHz 40 W 25.0 kHz Channel Spacing



Tx FREQUENCY: 479.975 MHz 5 W 25.0 kHz Channel Spacing

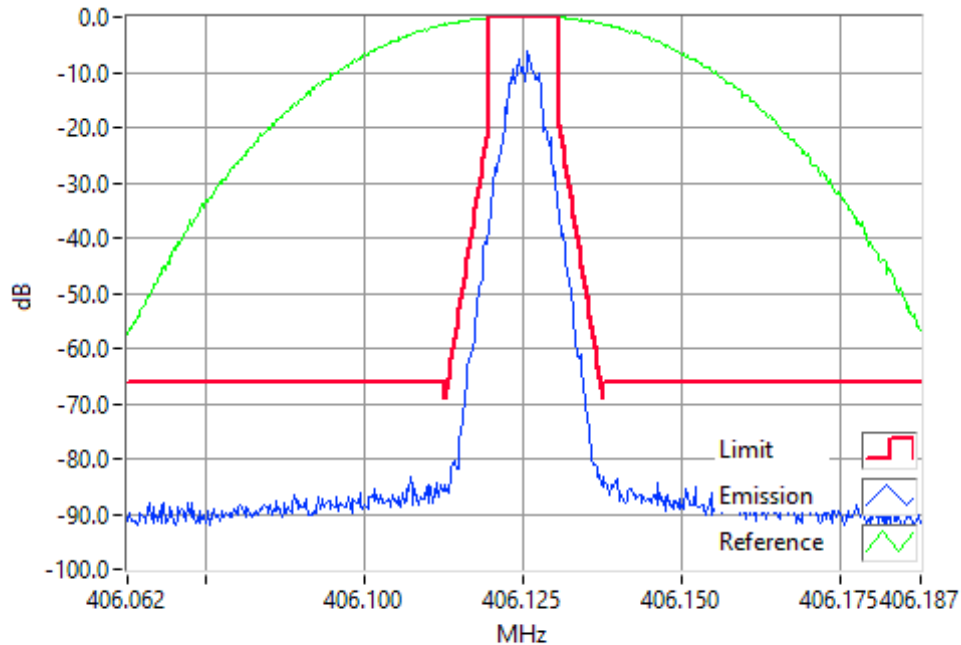


Transmitter Spectrum Masks

DMR

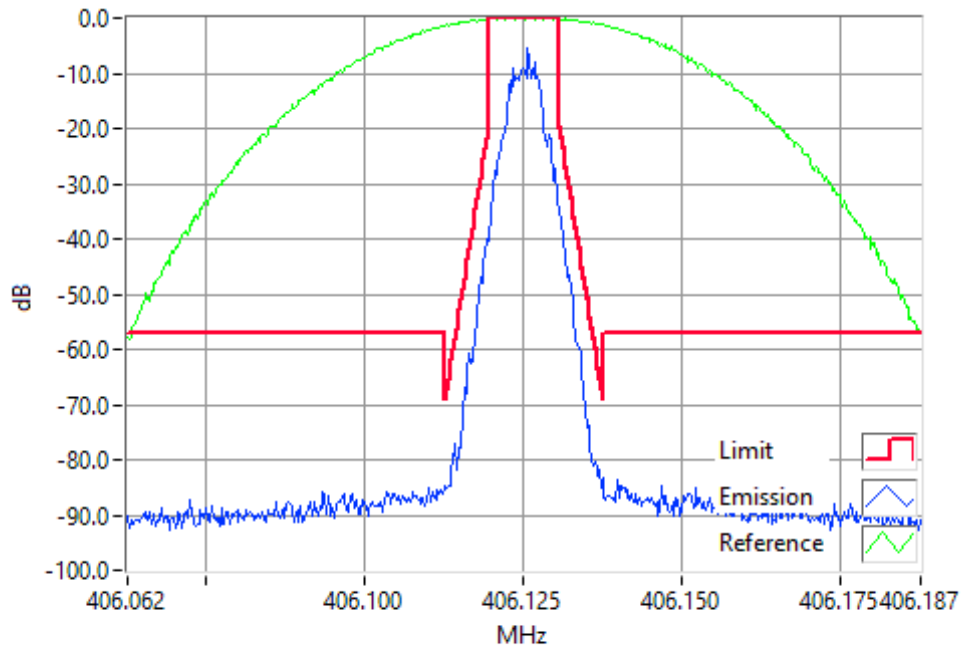
SPECIFICATION: FCC 47 CFR 2.1049 (c) RSS-119 5.5

Tx FREQUENCY: 406.125 MHz 40 W 12.5 kHz Channel Spacing



DMR 406.1250MHz Mask D 40W
RBW=100Hz, VBW=1000Hz, Detector Mode=Peak
Result=Pass

Tx FREQUENCY: 406.125 MHz 5 W 12.5 kHz Channel Spacing



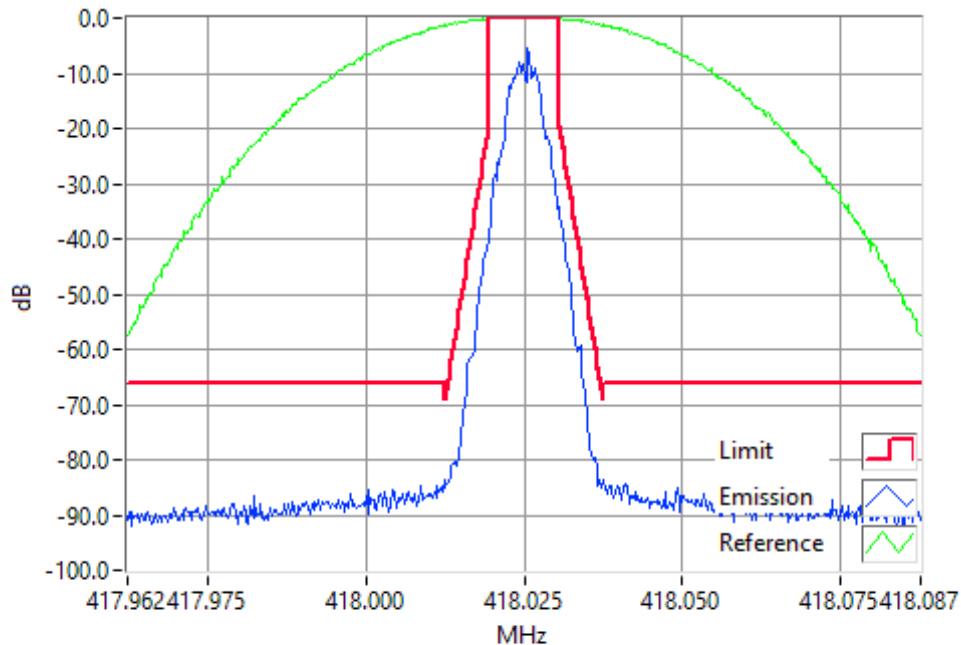
DMR 406.1250MHz Mask D 5W
RBW=100Hz, VBW=1000Hz, Detector Mode=Peak
Result=Pass

Transmitter Spectrum Masks

DMR

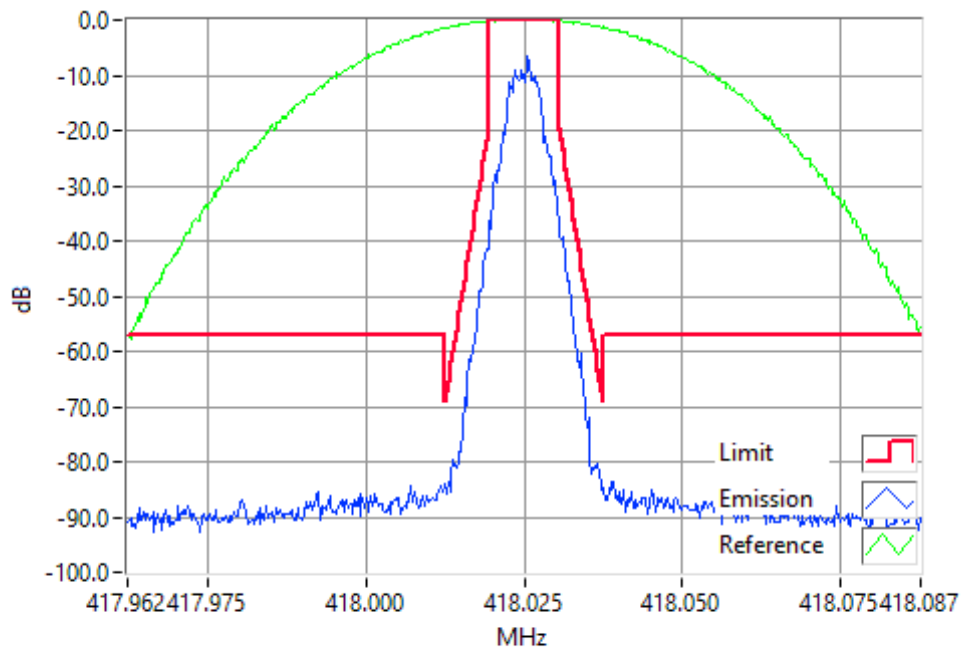
SPECIFICATION: FCC 47 CFR 2.1049 (c) RSS-119 5.5

Tx FREQUENCY: 418.025 MHz 40 W 12.5 kHz Channel Spacing



DMR 418.025MHz Mask D 40W
RBW=100Hz, VBW=1000Hz, Detector Mode=Peak
Result=Pass

Tx FREQUENCY: 418.025 MHz 5 W 12.5 kHz Channel Spacing



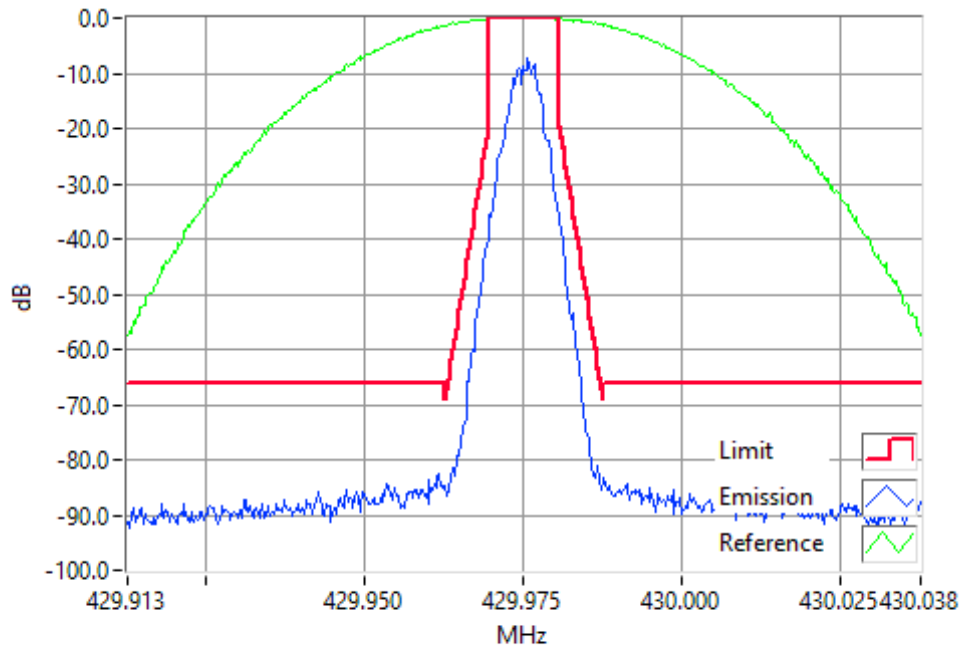
DMR 418.025MHz Mask D 5W
RBW=100Hz, VBW=1000Hz, Detector Mode=Peak
Result=Pass

Transmitter Spectrum Masks

DMR

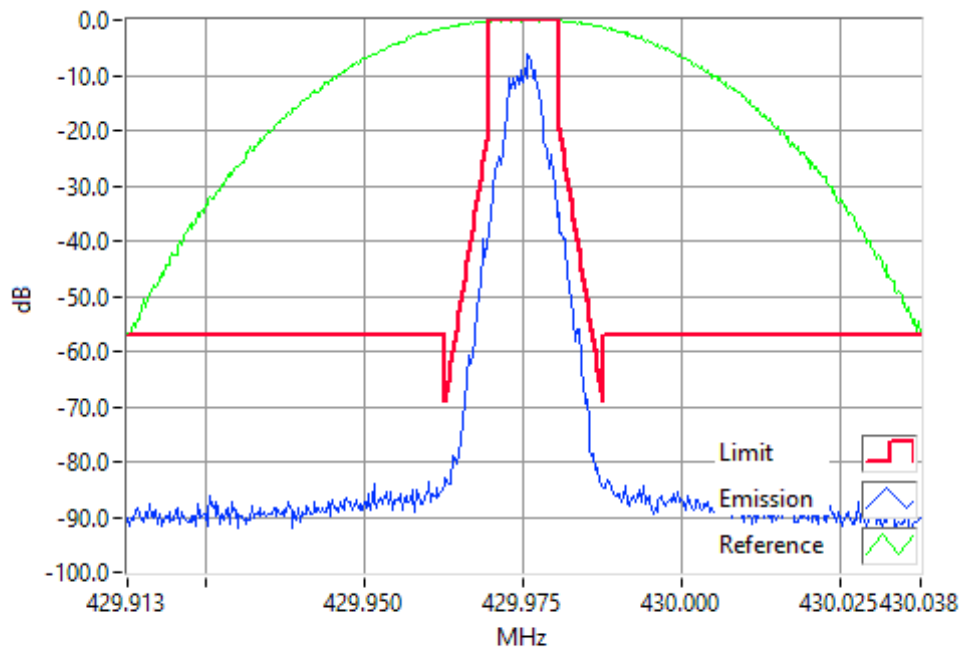
SPECIFICATION: FCC 47 CFR 2.1049 (c) RSS-119 5.5

Tx FREQUENCY: 429.975 MHz 40 W 12.5 kHz Channel Spacing



DMR 429.9750MHz Mask D 40W
RBW=100Hz, VBW=1000Hz, Detector Mode=Peak
Result=Pass

Tx FREQUENCY: 429.975 MHz 5 W 12.5 kHz Channel Spacing



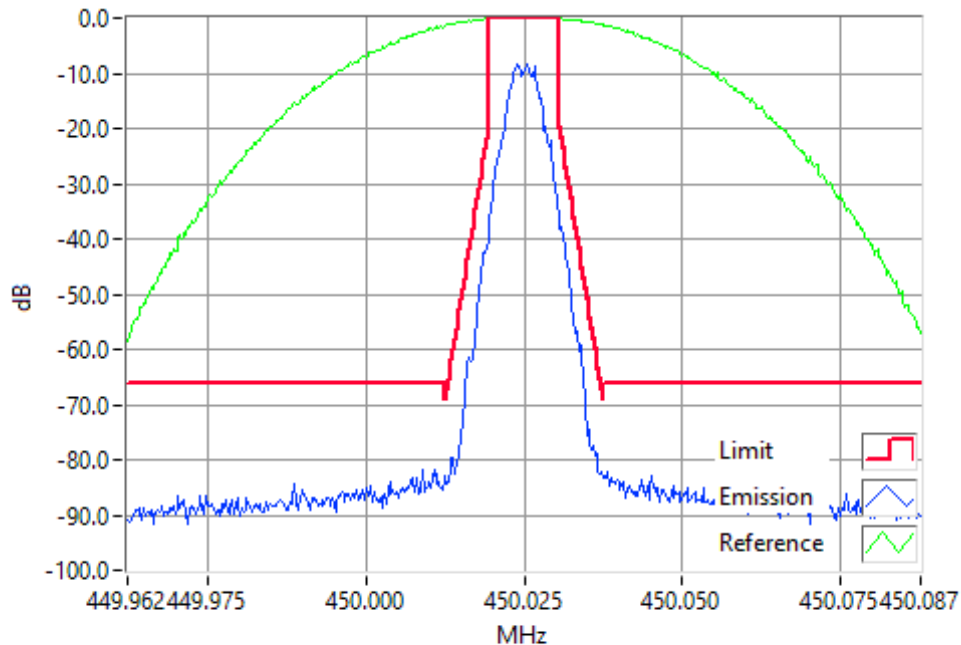
DMR 429.9750MHz Mask D 5W
RBW=100Hz, VBW=1000Hz, Detector Mode=Peak
Result=Pass

Transmitter Spectrum Masks

DMR

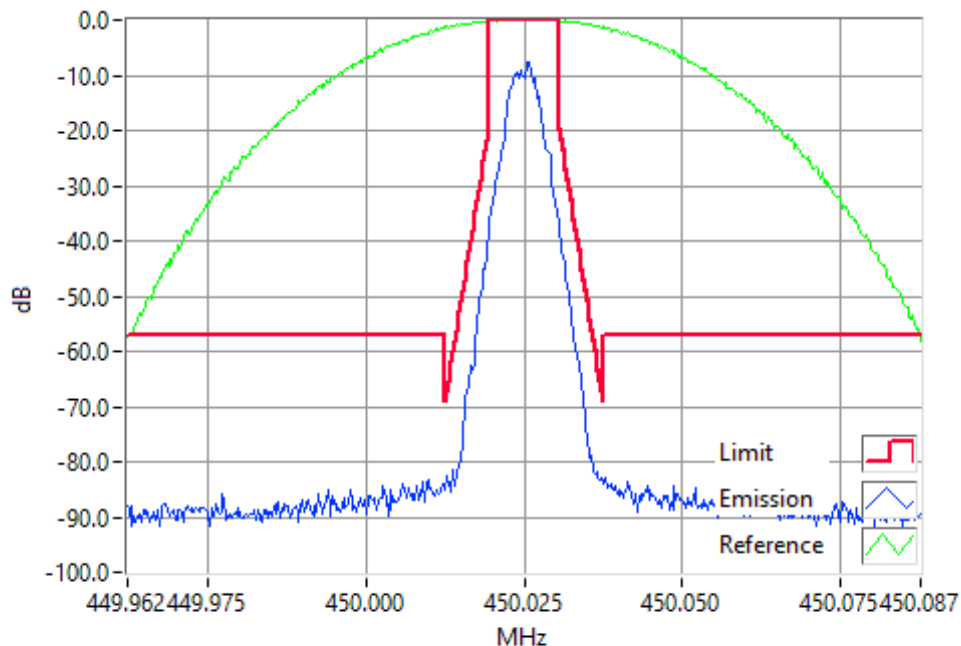
SPECIFICATION: FCC 47 CFR 2.1049 (c) RSS-119 5.5

Tx FREQUENCY: 450.025 MHz 40 W 12.5 kHz Channel Spacing



DMR 450.025MHz Mask D 40W
RBW=100Hz, VBW=1000Hz, Detector Mode=Peak
Result=Pass

Tx FREQUENCY: 450.025 MHz 5 W 12.5 kHz Channel Spacing



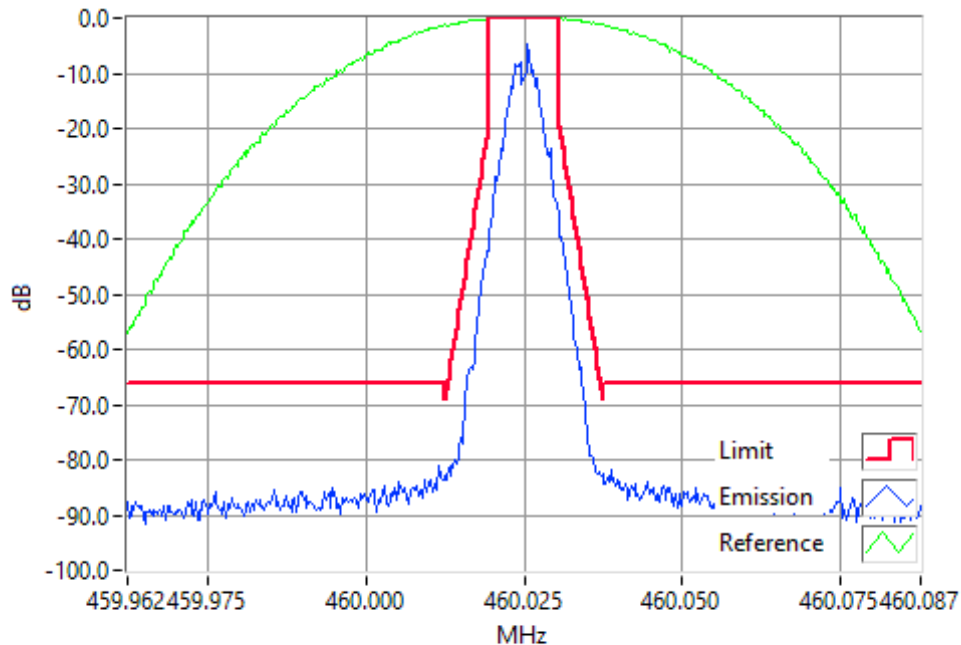
DMR 450.025MHz Mask D 5W
RBW=100Hz, VBW=1000Hz, Detector Mode=Peak
Result=Pass

Transmitter Spectrum Masks

DMR

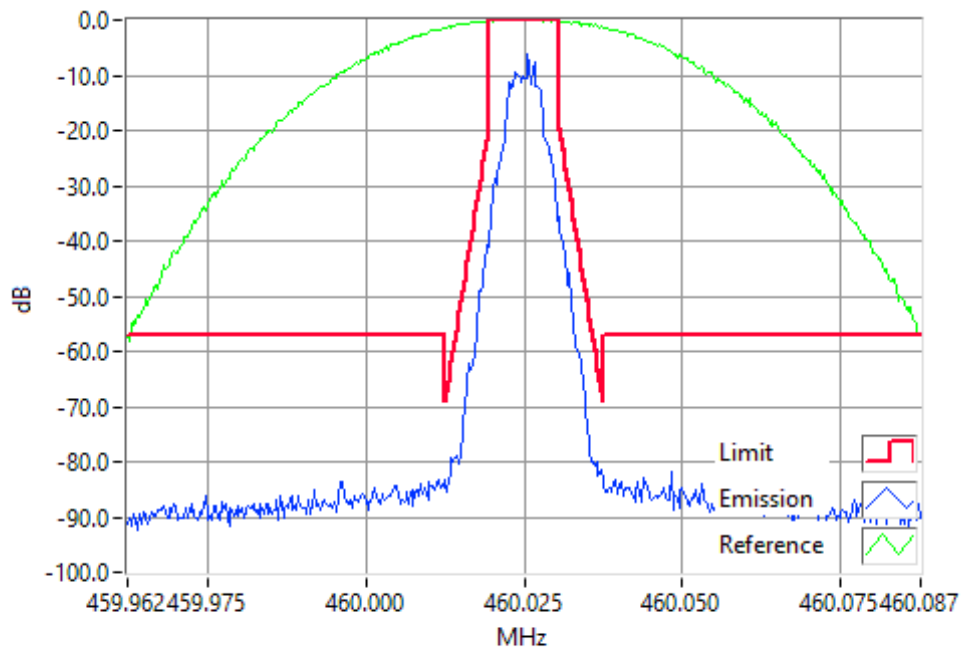
SPECIFICATION: FCC 47 CFR 2.1049 (c) RSS-119 5.5

Tx FREQUENCY: 460.025 MHz 40 W 12.5 kHz Channel Spacing



DMR 460.025MHz Mask D 40W
RBW=100Hz, VBW=1000Hz, Detector Mode=Peak
Result=Pass

Tx FREQUENCY: 460.025 MHz 5 W 12.5 kHz Channel Spacing



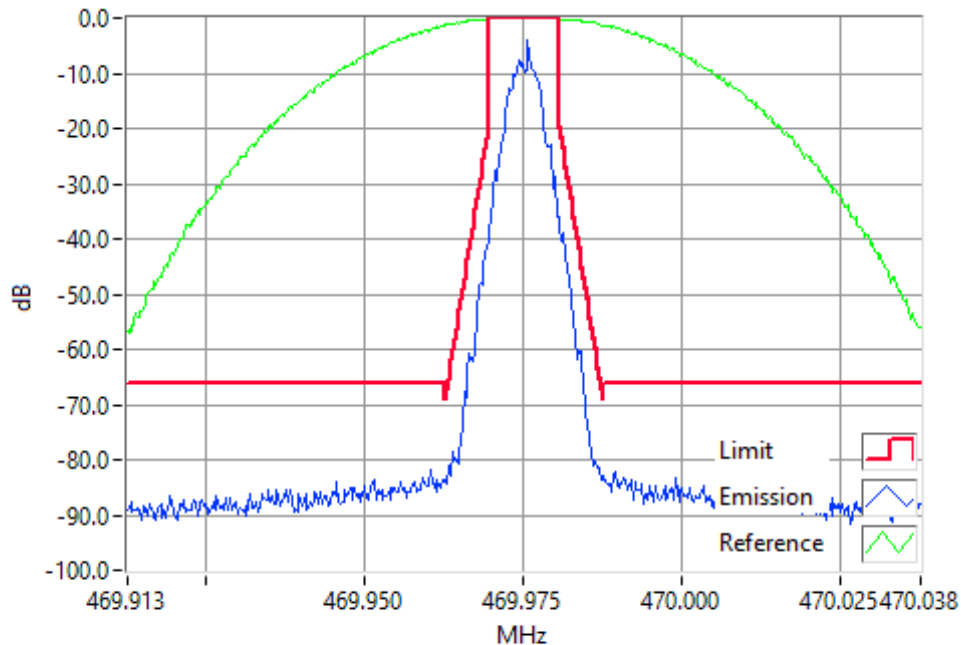
DMR 460.025MHz Mask D 5W
RBW=100Hz, VBW=1000Hz, Detector Mode=Peak
Result=Pass

Transmitter Spectrum Masks

DMR

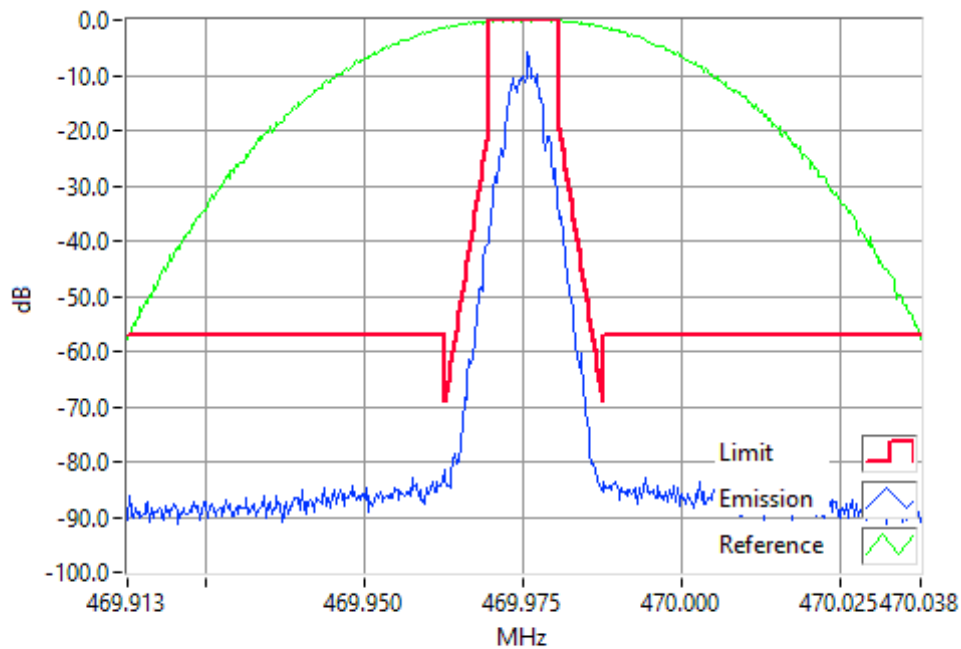
SPECIFICATION: FCC 47 CFR 2.1049 (c) RSS-119 5.5

Tx FREQUENCY: 469.975 MHz 40 W 12.5 kHz Channel Spacing



DMR 469.9750MHz Mask D 40W
RBW=100Hz, VBW=1000Hz, Detector Mode=Peak
Result=Pass

Tx FREQUENCY: 469.975 MHz 5 W 12.5 kHz Channel Spacing



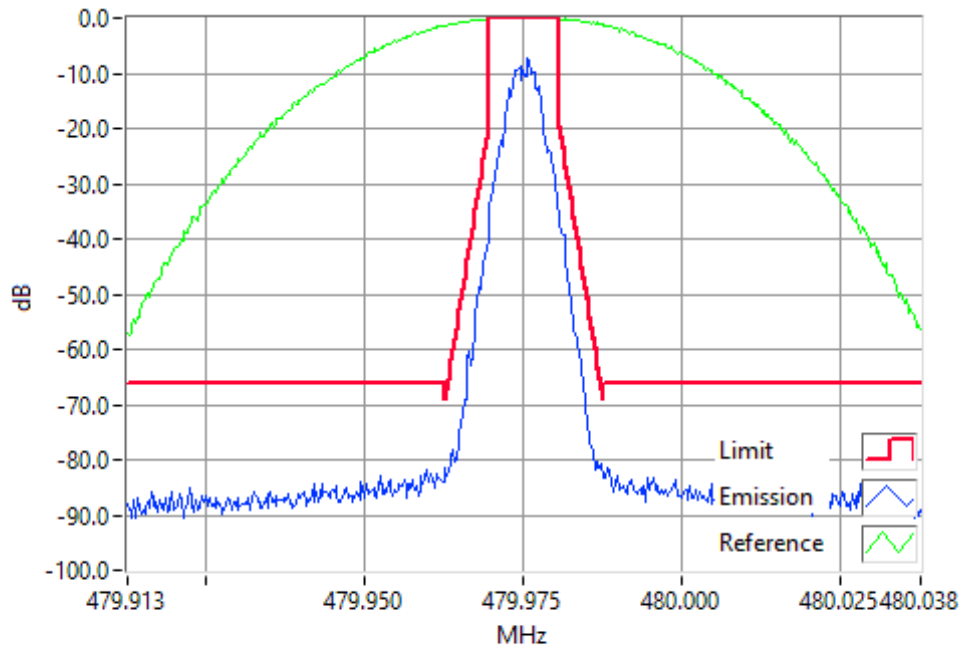
DMR 469.9750MHz Mask D 5W
RBW=100Hz, VBW=1000Hz, Detector Mode=Peak
Result=Pass

Transmitter Spectrum Masks

DMR

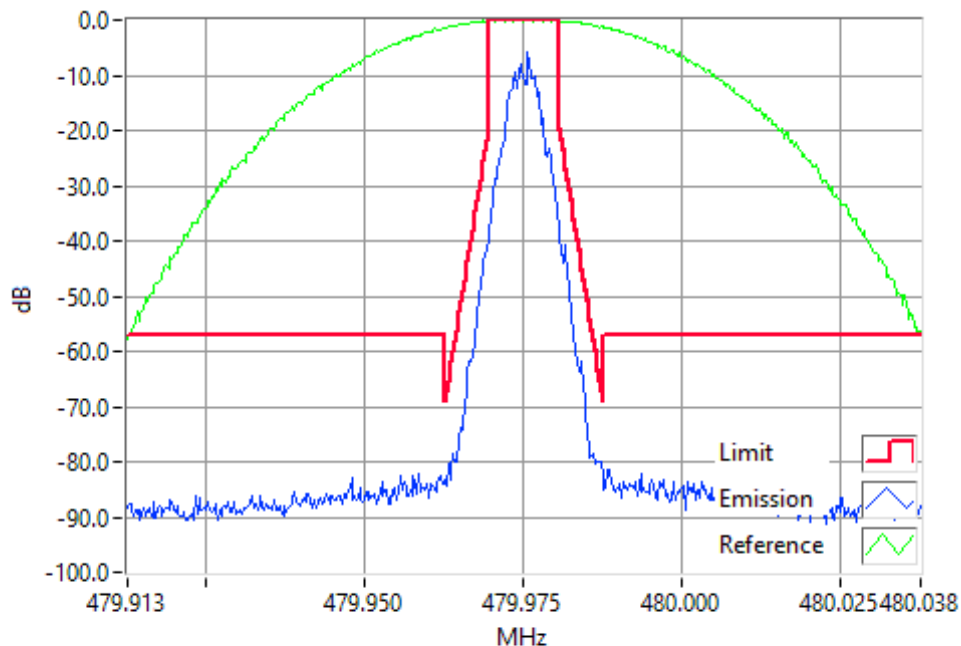
SPECIFICATION: FCC 47 CFR 2.1049 (c) RSS-119 5.5

Tx FREQUENCY: 479.975 MHz 40 W 12.5 kHz Channel Spacing



DMR 479.9750MHz Mask D 40W
RBW=100Hz, VBW=1000Hz, Detector Mode=Peak
Result=Pass

Tx FREQUENCY: 479.975 MHz 5 W 12.5 kHz Channel Spacing



DMR 479.9750MHz Mask D 5W
RBW=100Hz, VBW=1000Hz, Detector Mode=Peak
Result=Pass

TRANSMITTER SPURIOUS EMISSIONS (CONDUCTED)

SPECIFICATIONS: FCC 47 CFR 2.1051

RSS-119 5.8

GUIDE: ANSI C63.26 5.7

MEASUREMENT PROCEDURE:

1. Refer Annex A for equipment set up.
2. The frequency range examined was from the lowest frequency generated within the EUT, to a frequency higher than the 10th Harmonic: 9 kHz to Fc-BW
Fc + BW to 10Fc (4.8 GHz)
3. The EUT was set to transmit high or low power. A scan is performed with a resolution bandwidth of 100 kHz and a video bandwidth of 300 kHz for frequencies up to 1 GHz, and a resolution bandwidth of 1 MHz and a video bandwidth of 3 MHz for frequencies above 1 GHz.
4. For frequencies close to the carrier the spectrum was measured using a resolution bandwidth of 1kHz, the results were then integrated to give measurements for 100kHz bandwidth.
5. A low-pass filter was used for frequencies from 800 MHz to 4.0 GHz.
6. For each frequency range the spectrum analyser was loaded with the appropriate calibration figures to compensate for the cables, attenuator, and filter losses, allowing the emission levels to be read directly with no further calculation.
7. The results of the various sweeps were combined programmatically to give charts for frequencies near the carrier, up to 1GHz and above 1GHz.
The calibrations are loaded as an overall reference level offset plus a set of correction factors for the required frequency band.

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

Example of attenuation correction: (dB)

E5023 30dB 350W CK9178	32.20	
E5015 3m Blue	0.84	
E5028 1m5 Blue	0.36	
E3384 400_520MHz HPBRF	6.37	
Total Attenuation @ 812.250MHz	39.27	Sum of component attenuation (a)
Amplitude offset	41.19	(b)
Correction @ 812.250MHz	-1.41	(a-b)

MEASUREMENT UNCERTAINTY: ≤ 12.75 GHz ± 3.0 dB

MEASUREMENT RESULTS:

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

LIMIT CLAUSES: FCC 47 CFR 90.210

RSS-119 5.8

Photo: Conducted Emissions Test Setup



Spurious Emissions (Tx Conducted)

SPECIFICATION: FCC 47 CFR 2.1051

RSS-119 5.8

12.5 kHz Channel Spacing

406.125 MHz @ 40 W

Emission Mask D

Emission Frequency (MHz)	Level (dBm)	Level (dBc)
405.916	-27.0	-73.0
405.968	-24.8	-70.8
405.999	-23.3	-69.3
406.252	-23.4	-69.4
406.276	-24.1	-70.1
406.296	-24.9	-70.9
406.324	-26.2	-72.2
~	~	~

12.5 kHz Channel Spacing

406.125 MHz @ 5 W

Emission Mask D

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

Spurious Emissions (Tx Conducted)

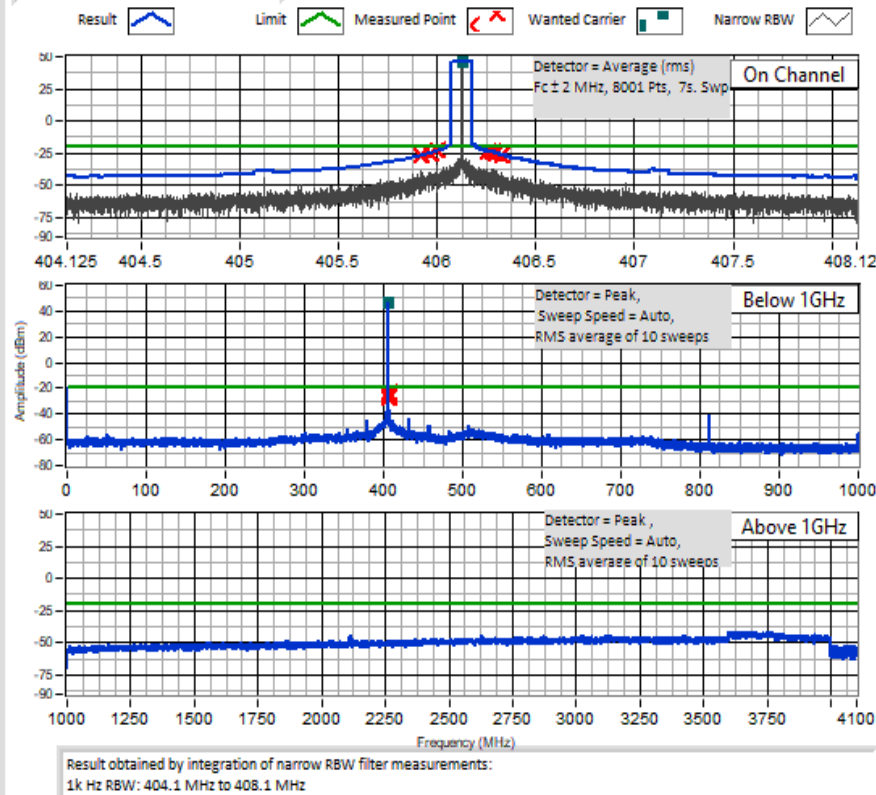
406.125 MHz

40 W

5 W

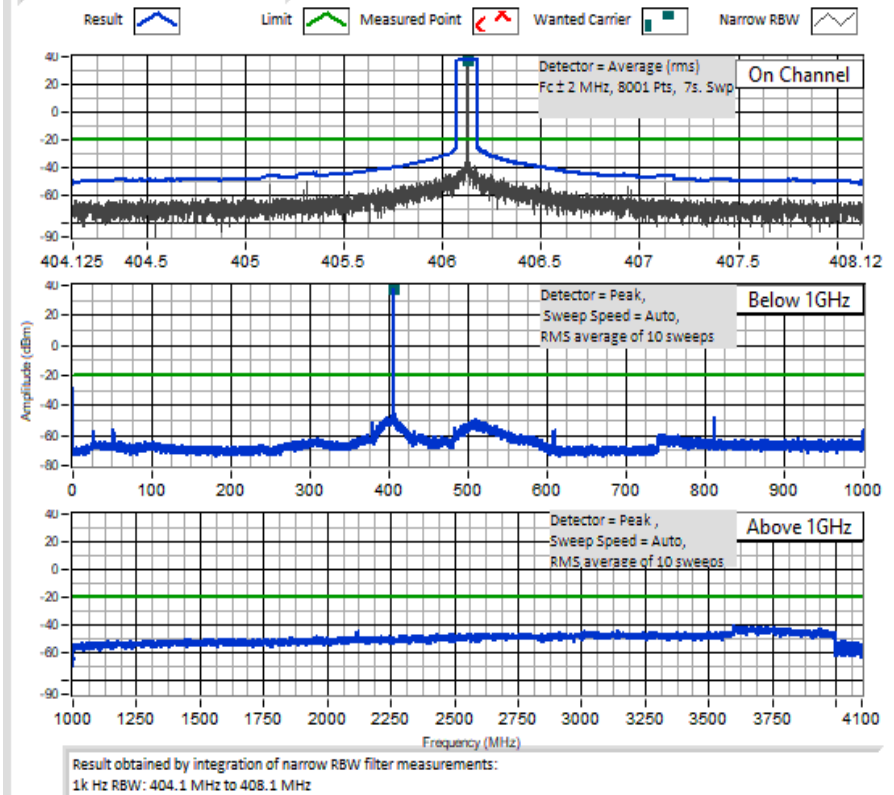
406.125MHz 40W 12.5kHz
Unmodulated

100kHz RBW- 100kHz to 1GHz
1MHz RBW- 1GHz to 4.1GHz
Low Pass Filter used from 740.0 MHz to 4.0 GHz



406.125MHz 5W 12.5kHz
Unmodulated

100kHz RBW- 100kHz to 1GHz
1MHz RBW- 1GHz to 4.1GHz
Low Pass Filter used from 740.0 MHz to 4.0 GHz



Spurious Emissions (Tx Conducted)

SPECIFICATION: FCC 47 CFR 2.1051

RSS-119 5.8

12.5 kHz Channel Spacing

418.025 MHz @ 40 W

Emission Mask D

Emission Frequency (MHz)	Level (dBm)	Level (dBc)
415.974	-39.2	-85.2
417.845	-24.6	-70.6
418.196	-25.0	-71.0
418.231	-26.5	-72.5
420.025	-39.5	-85.5
~	~	~

12.5 kHz Channel Spacing

418.025 MHz @ 5 W

Emission Mask D

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

Spurious Emissions (Tx Conducted)

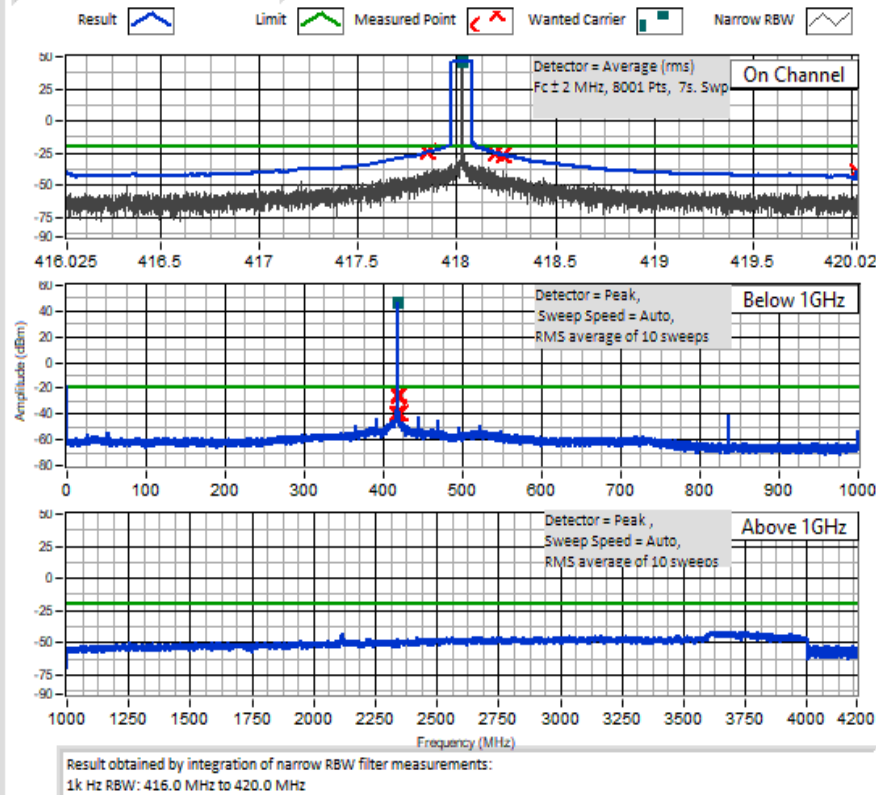
418.025 MHz

40 W

5 W

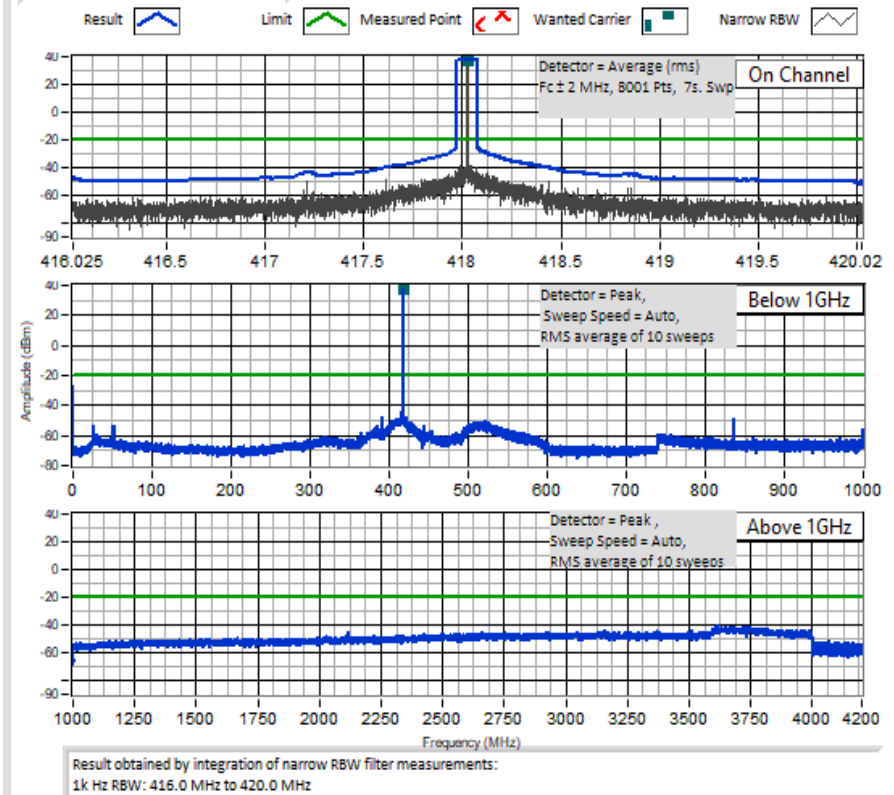
418.025MHz 40W 12.5kHz
Unmodulated

100kHz RBW- 100kHz to 1GHz
1MHz RBW- 1GHz to 4.2GHz
Low Pass Filter used from 740.0 MHz to 4.0 GHz



418.025MHz 5W 12.5kHz
Unmodulated

100kHz RBW- 100kHz to 1GHz
1MHz RBW- 1GHz to 4.2GHz
Low Pass Filter used from 740.0 MHz to 4.0 GHz



Spurious Emissions (Tx Conducted)

SPECIFICATION: FCC 47 CFR 2.1051

RSS-119 5.8

12.5 kHz Channel Spacing

429.975 MHz @ 40 W

Emission Mask D

Emission Frequency (MHz)	Level (dBm)	Level (dBc)
429.764	-25.5	-71.5
429.792	-24.4	-70.4
429.806	-23.8	-69.8
429.831	-23.1	-69.1
429.855	-22.1	-68.1
430.097	-23.1	-69.1
430.110	-23.5	-69.5
430.133	-24.2	-70.2
430.168	-25.1	-71.1
~	~	~

12.5 kHz Channel Spacing

429.975 MHz @ 5 W

Emission Mask D

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

Spurious Emissions (Tx Conducted)

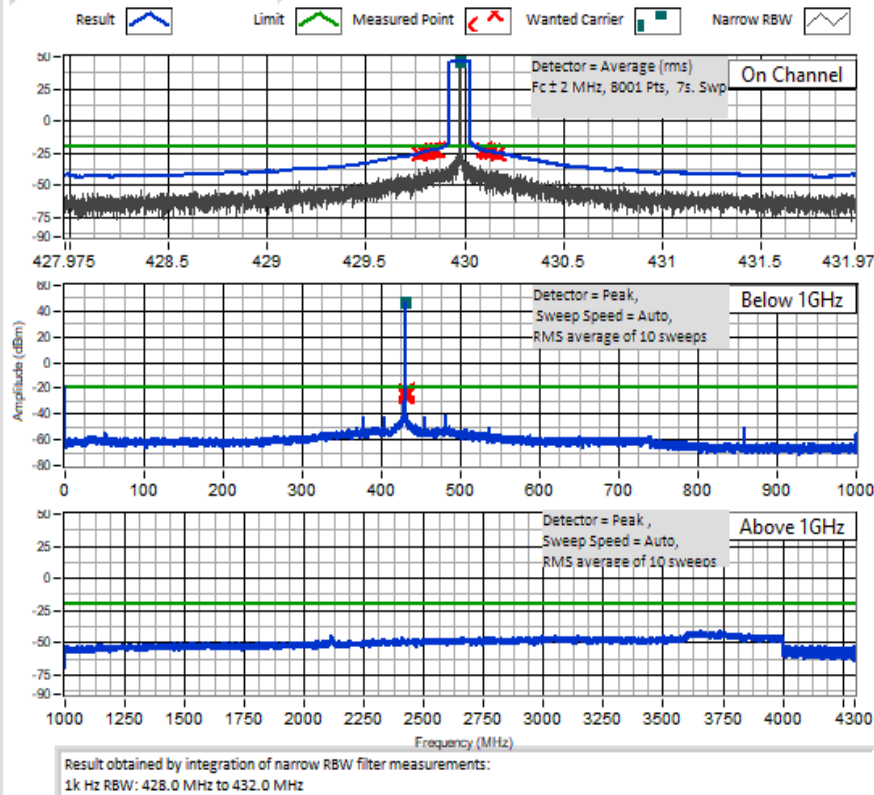
429.975 MHz

40 W

5 W

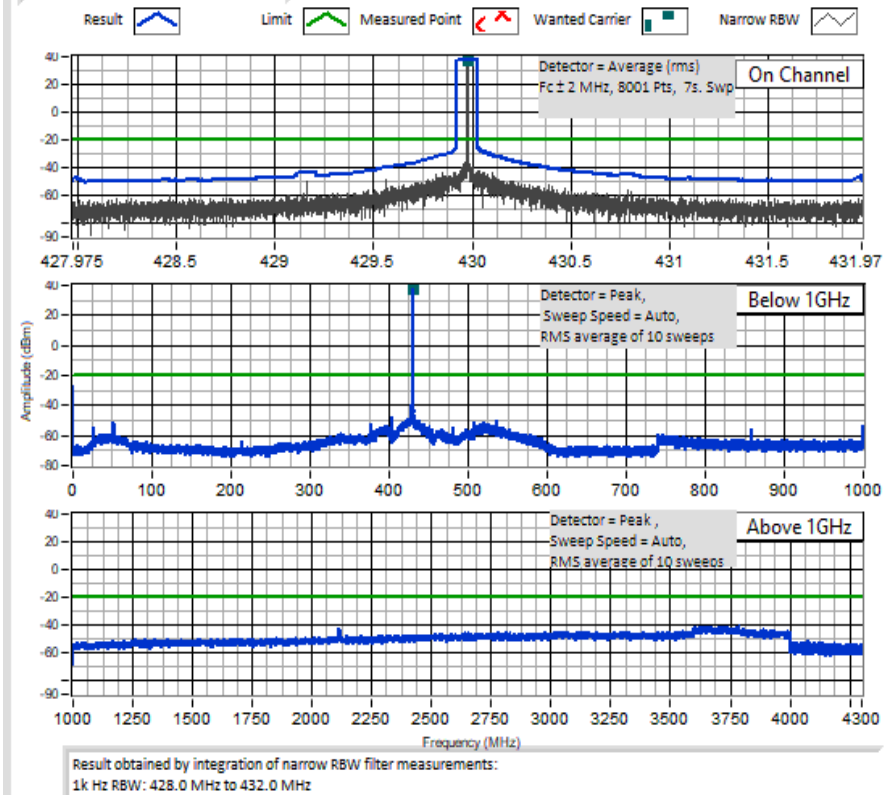
429.975MHz 40W 12.5kHz
Unmodulated

100kHz RBW- 100kHz to 1GHz
1MHz RBW- 1GHz to 4.3GHz
Low Pass Filter used from 740.0 MHz to 4.0 GHz



429.975MHz 5W 12.5kHz
Unmodulated

100kHz RBW- 100kHz to 1GHz
1MHz RBW- 1GHz to 4.3GHz
Low Pass Filter used from 740.0 MHz to 4.0 GHz



Spurious Emissions (Tx Conducted)

SPECIFICATION: FCC 47 CFR 2.1051

RSS-119 5.8

12.5 kHz Channel Spacing

450.025 MHz @ 40 W

Emission Mask D

Emission Frequency (MHz)	Level (dBm)	Level (dBc)
398.043	-39.1	-85.1
449.830	-24.0	-70.0
449.866	-23.2	-69.2
449.912	-21.3	-67.3
450.217	-24.3	-70.3
502.027	-36.5	-82.5
2114.83	-38.4	-84.4
~	~	~

12.5 kHz Channel Spacing

450.025 MHz @ 5 W

Emission Mask D

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

Spurious Emissions (Tx Conducted)

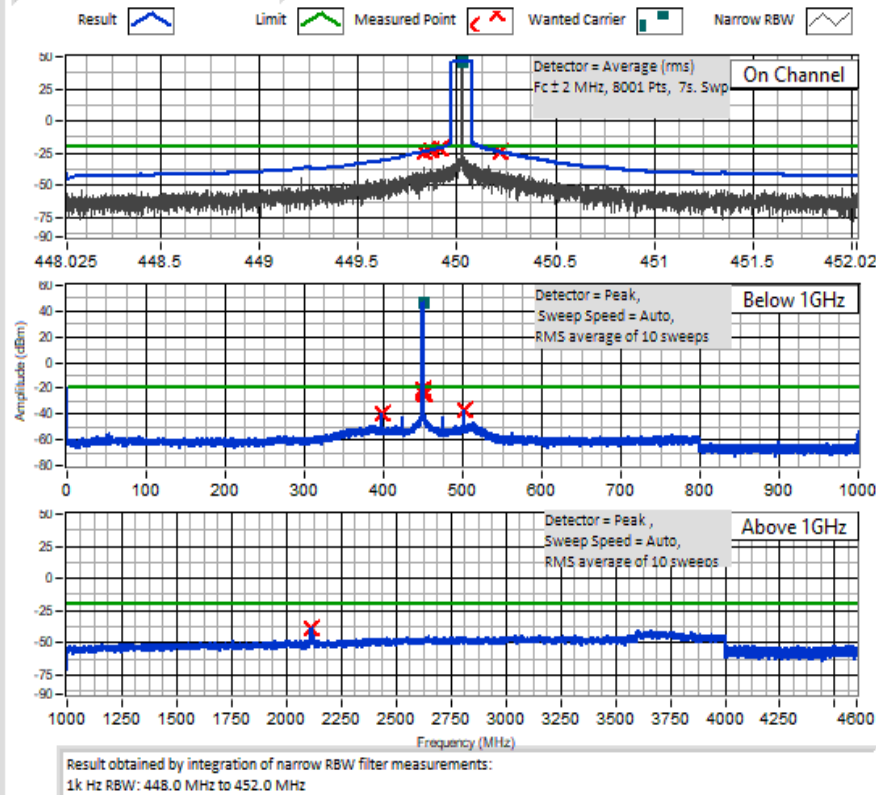
450.025 MHz

40 W

5 W

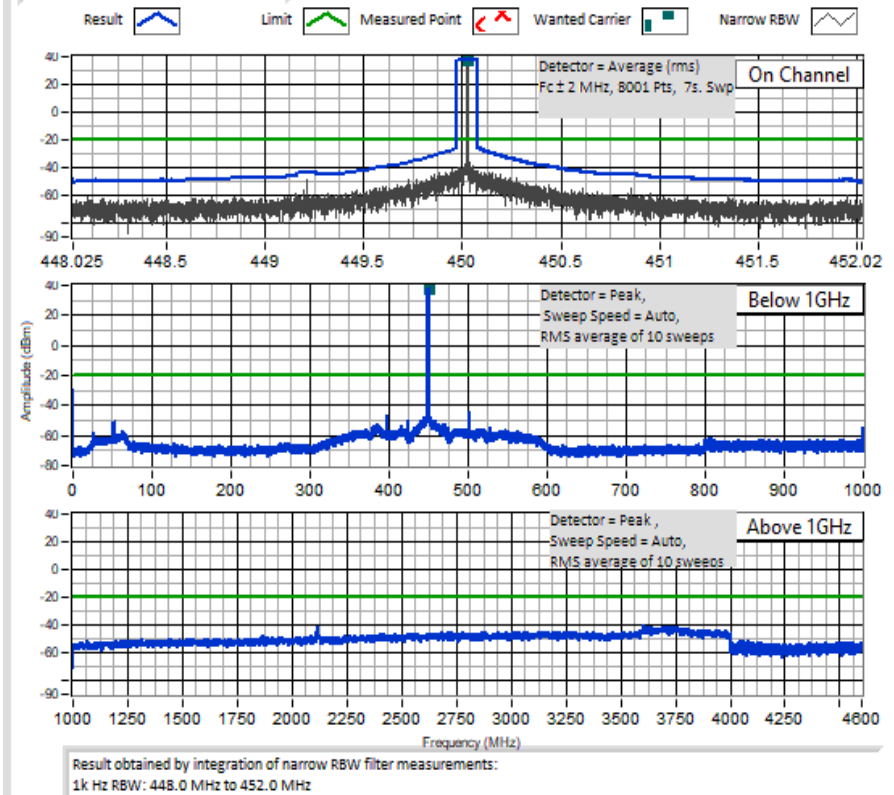
450.025MHz 40W 12.5kHz
Unmodulated

100kHz RBW- 100kHz to 1GHz
1MHz RBW- 1GHz to 4.6GHz
Low Pass Filter used from 800.0 MHz to 4.0 GHz



450.025MHz 5W 12.5kHz
Unmodulated

100kHz RBW- 100kHz to 1GHz
1MHz RBW- 1GHz to 4.6GHz
Low Pass Filter used from 800.0 MHz to 4.0 GHz



Spurious Emissions (Tx Conducted)

SPECIFICATION: FCC 47 CFR 2.1051

RSS-119 5.8

12.5 kHz Channel Spacing

460.025 MHz @ 40 W

Emission Mask D

Emission Frequency (MHz)	Level (dBm)	Level (dBc)
408.045	-39.8	-85.8
459.833	-24.5	-70.5
459.904	-22.2	-68.2
460.174	-22.9	-68.9
460.197	-23.3	-69.3
460.246	-24.6	-70.6
512.034	-37.3	-83.3
~	~	~

12.5 kHz Channel Spacing

460.025 MHz @ 5 W

Emission Mask D

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

Spurious Emissions (Tx Conducted)

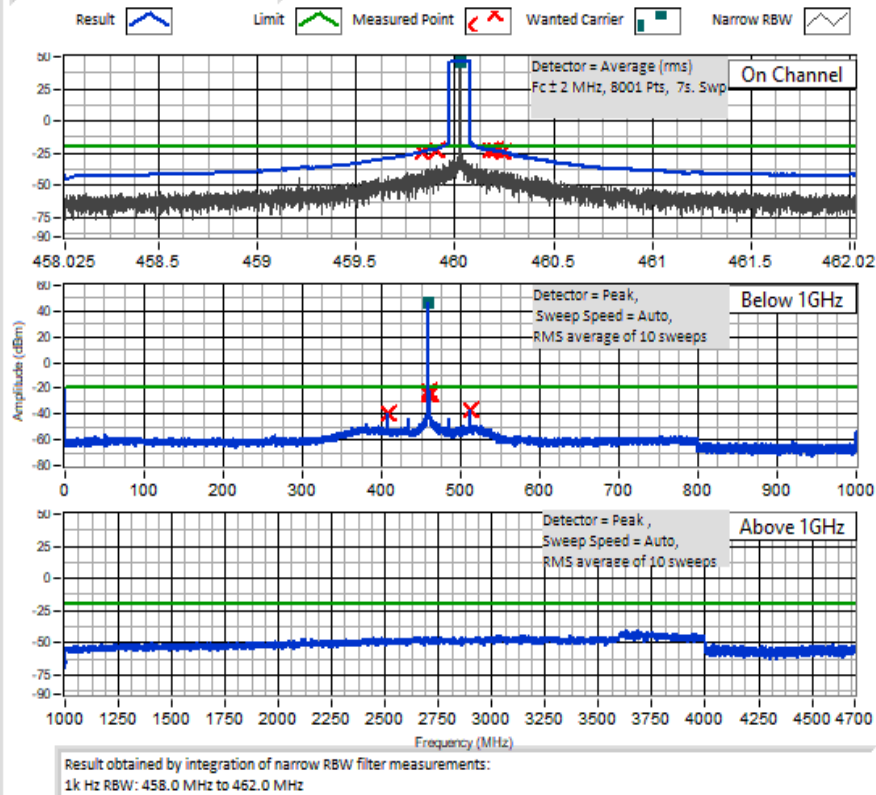
460.025 MHz

40 W

5 W

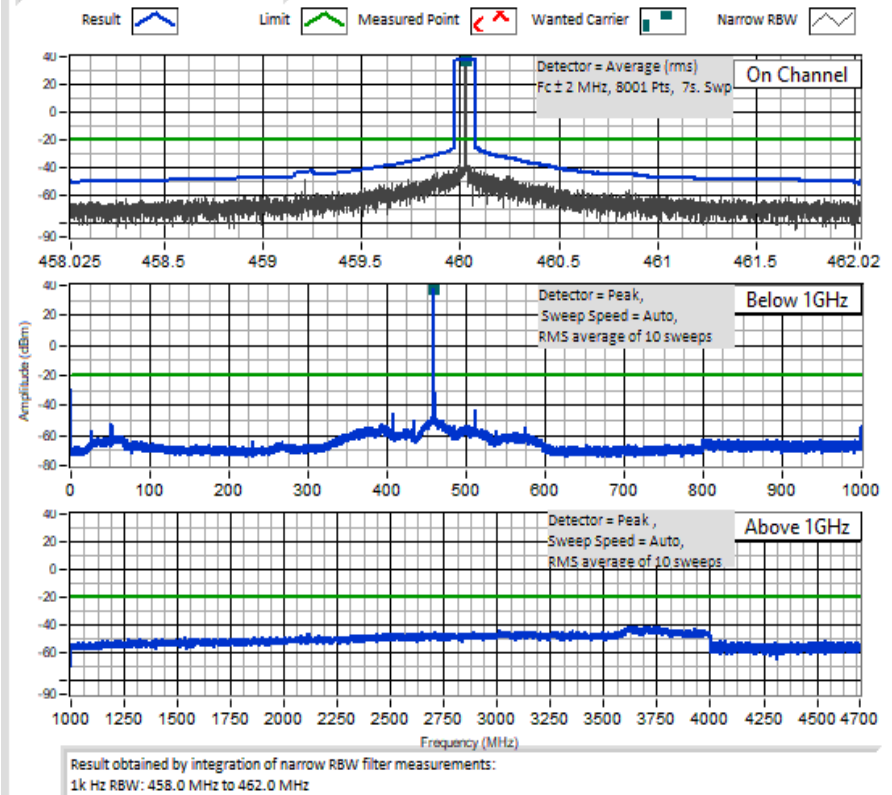
460.025MHz 40W 12.5kHz
Unmodulated

100kHz RBW- 100kHz to 1GHz
1MHz RBW- 1GHz to 4.7GHz
Low Pass Filter used from 800.0 MHz to 4.0 GHz



460.025MHz 5W 12.5kHz
Unmodulated

100kHz RBW- 100kHz to 1GHz
1MHz RBW- 1GHz to 4.7GHz
Low Pass Filter used from 800.0 MHz to 4.0 GHz



Spurious Emissions (Tx Conducted)

SPECIFICATION: FCC 47 CFR 2.1051

RSS-119 5.8

12.5 kHz Channel Spacing

469.975 MHz @ 40 W

Emission Mask D

Emission Frequency (MHz)	Level (dBm)	Level (dBc)
467.975	-38.8	-84.8
469.728	-25.0	-71.0
469.759	-24.3	-70.3
469.806	-22.7	-68.7
470.185	-23.5	-69.5
470.203	-24.2	-70.2
471.975	-38.8	-84.8
2117.394	-38.6	-84.6
~	~	~

12.5 kHz Channel Spacing

469.975 MHz @ 5 W

Emission Mask D

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

Spurious Emissions (Tx Conducted)

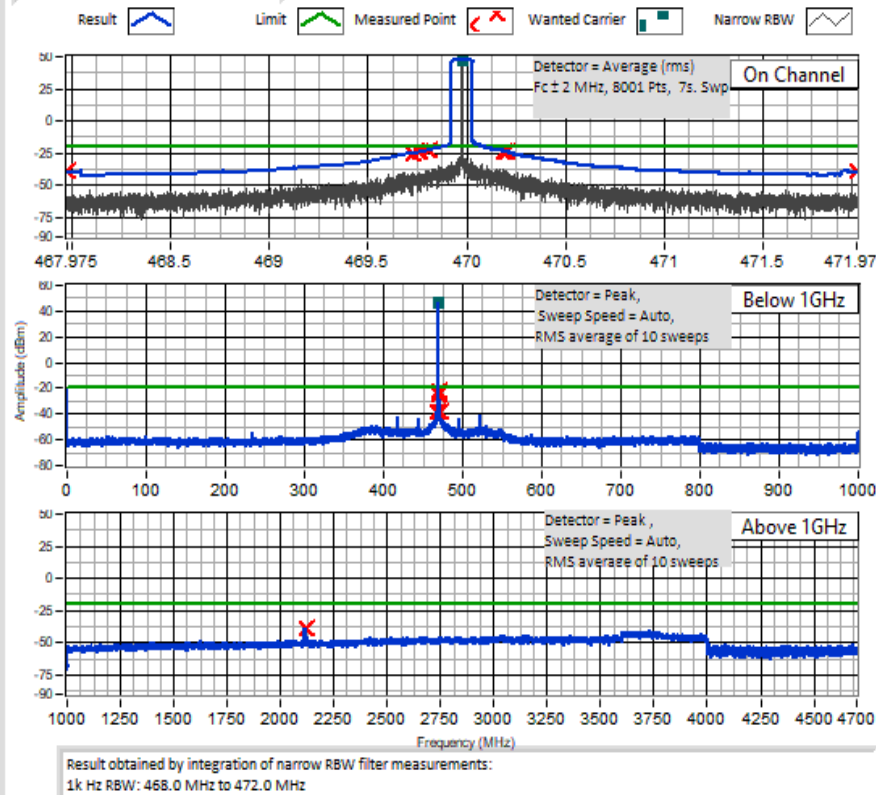
469.975 MHz

40 W

5 W

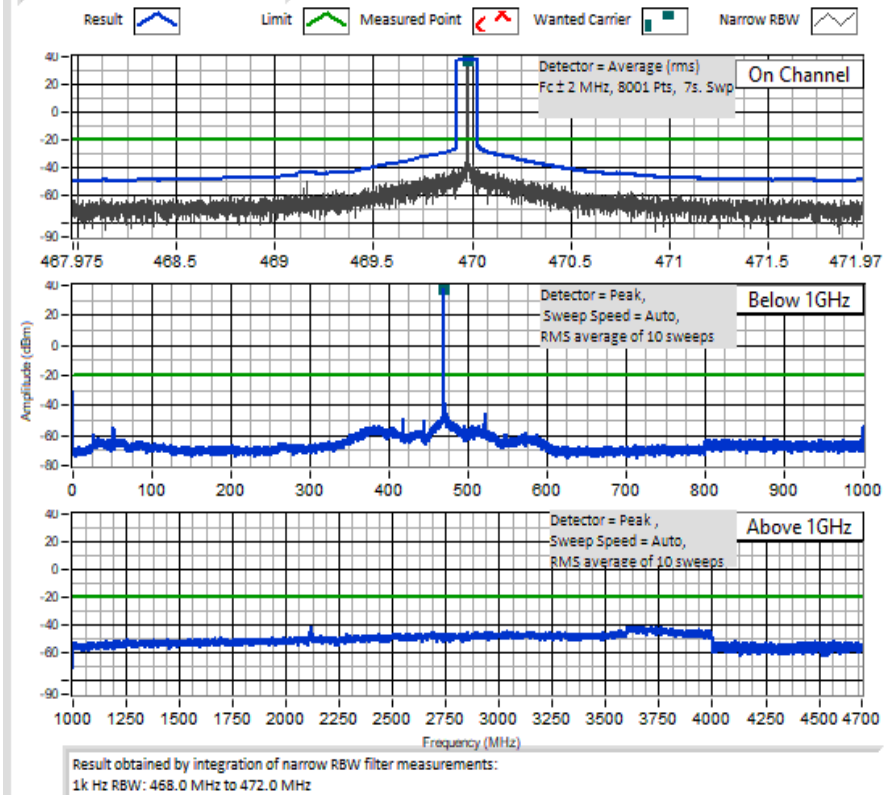
469.975MHz 40W 12.5kHz
Unmodulated

100kHz RBW- 100kHz to 1GHz
1MHz RBW- 1GHz to 4.7GHz
Low Pass Filter used from 800.0 MHz to 4.0 GHz



469.975MHz 5W 12.5kHz
Unmodulated

100kHz RBW- 100kHz to 1GHz
1MHz RBW- 1GHz to 4.7GHz
Low Pass Filter used from 800.0 MHz to 4.0 GHz



Spurious Emissions (Tx Conducted)

SPECIFICATION: FCC 47 CFR 2.1051

RSS-119 5.8

12.5 kHz Channel Spacing

479.975 MHz @ 40 W

Emission Mask D

Emission Frequency (MHz)	Level (dBm)	Level (dBc)
479.666	-26.3	-72.3
479.686	-25.5	-71.5
479.722	-24.3	-70.3
479.754	-23.4	-69.4
480.154	-22.7	-68.7
480.205	-23.6	-69.6
480.218	-24.0	-70.0
480.263	-25.4	-71.4
482.091	-39.5	-85.5
~	~	~

12.5 kHz Channel Spacing

479.975 MHz @ 5 W

Emission Mask D

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

Spurious Emissions (Tx Conducted)

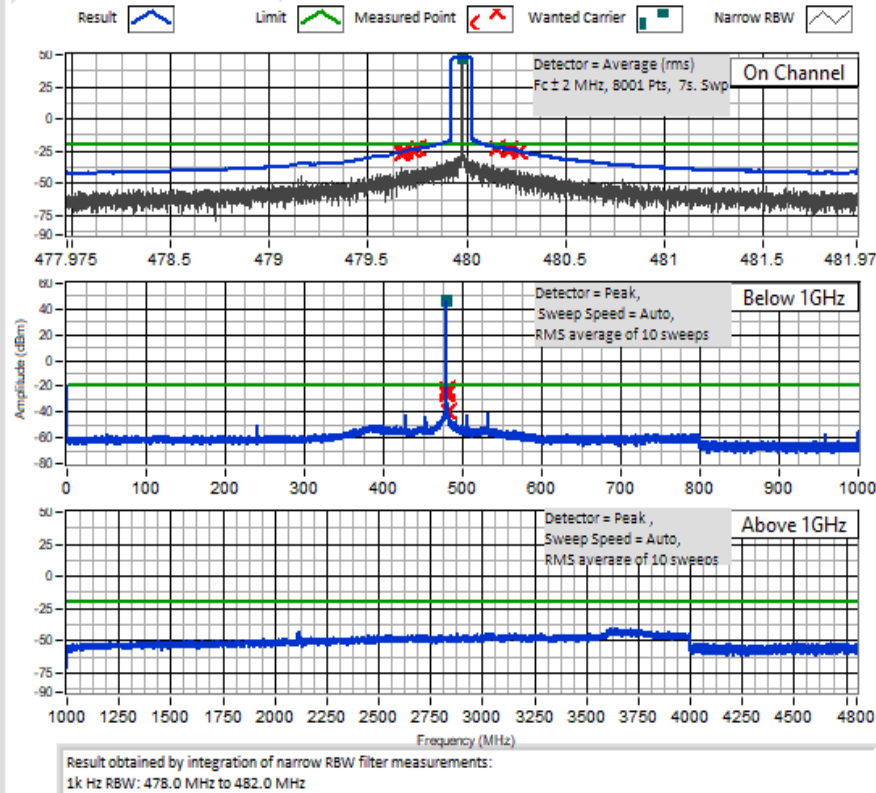
479.975 MHz

40 W

5 W

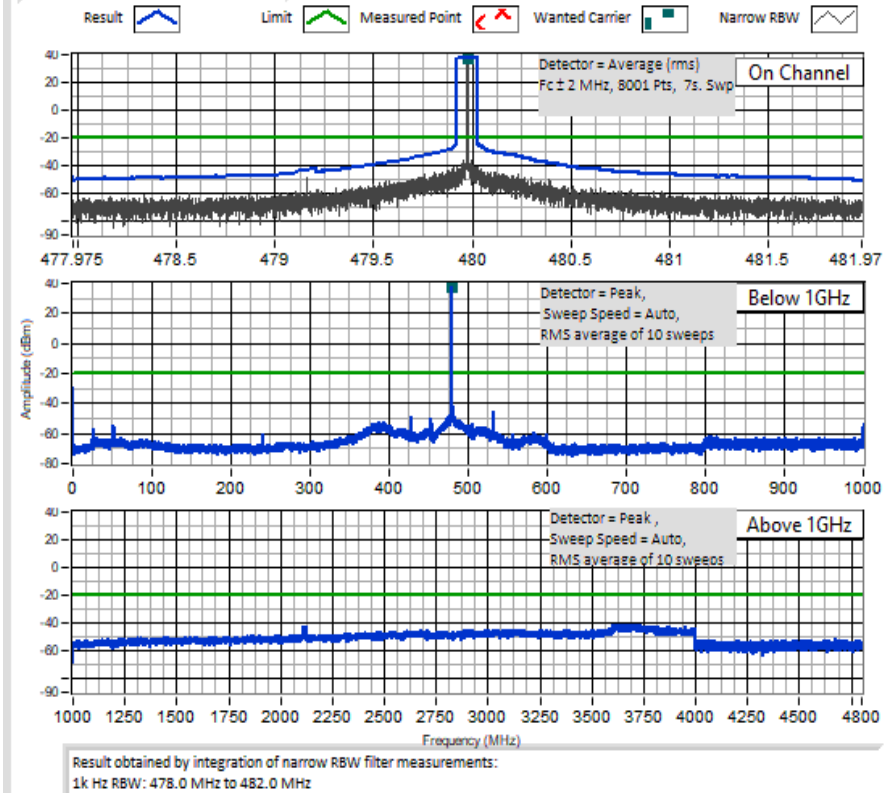
479.975MHz 40W 12.5kHz
Unmodulated

100kHz RBW- 100kHz to 1GHz
1MHz RBW- 1GHz to 4.8GHz
Low Pass Filter used from 800.0 MHz to 4.0 GHz



479.975MHz 5W 12.5kHz
Unmodulated

100kHz RBW- 100kHz to 1GHz
1MHz RBW- 1GHz to 4.8GHz
Low Pass Filter used from 800.0 MHz to 4.0 GHz



TRANSMITTER SPURIOUS EMISSIONS (RADIATED)

SPECIFICATION: FCC 47 CFR 2.1053

GUIDE: ANSI C63.26 5.5.3

MEASUREMENT PROCEDURE:

Initial Scan:

1. The EUT is placed in the S-Line TEM cell and emissions are measured from 30 MHz to 700 MHz. Any emission within 20 dB of the limit is then re-tested on the OATS.
2. The EUT is placed in the reverberation chamber and emissions are measured from 700 MHz to the upper frequency required ($10 \times F_c$). Any emission within 20 dB of the limit is then re-tested on the OATS.
3. The harmonics emissions up to the 6th harmonic of the fundamental frequency are measured on the OATS

OATS Measurement:

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

MEASUREMENT UNCERTAINTY: ≤ 12.75 GHz ± 4.6 dB

MEASUREMENT RESULTS:

See the tables on the following pages

Spurious Emissions (Tx Radiated) – Continued

SPECIFICATION: FCC 47 CFR 2.1053

12.5 kHz Channel Spacing 406.125 MHz @ 40 W Emission Mask D

Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~

12.5 kHz Channel Spacing 406.125 MHz @ 5 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.		

12.5 kHz Channel Spacing 418.025 MHz @ 40 W Emission Mask D

Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~

12.5 kHz Channel Spacing 418.025 MHz @ 5 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.		

12.5 kHz Channel Spacing 429.975 MHz @ 40 W Emission Mask D

Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~

12.5 kHz Channel Spacing 429.975 MHz @ 5 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.		

Spurious Emissions (Tx Radiated) – Continued

12.5 kHz Channel Spacing

450.025 MHz @ 40 W

Emission Mask D

Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~

12.5 kHz Channel Spacing

450.025 MHz @ 5 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.		

12.5 kHz Channel Spacing

460.025 MHz @ 40 W

Emission Mask D

Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~

12.5 kHz Channel Spacing

460.025 MHz @ 5 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.		

12.5 kHz Channel Spacing

469.975 MHz @ 40 W

Emission Mask D

Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~

12.5 kHz Channel Spacing

469.975 MHz @ 5 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.		

Spurious Emissions (Tx Radiated) – Continued

12.5 kHz Channel Spacing

479.975 MHz @ 40 W

Emission Mask D

Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~

12.5 kHz Channel Spacing

479.975 MHz @ 5 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: FCC 47 CFR 2.1053

Carrier Output Power	Emission Mask D 12.5 kHz Channel Spacing $50 + 10 \log_{10} (P_{\text{Watts}})$	
40 W	-20 dBm	-66 dBc
5 W	-20 dBm	-57 dBc

Spurious Emissions (Tx Radiated) - Continued

Open Area Test Site Results:

12.5 kHz Channel Spacing	429.975 MHz @ 40 W	Emission Mask D
Harmonics Emission Frequency (MHz)	Level (dBm)	Level (dBc)
859.950	-50.75	-96.77
1289.925	-46.36	-92.38
1719.900	-46.97	-92.99
2149.875	-43.61	-89.63
2579.850	-45.84	-91.86
3009.825	-41.05	-87.08

Sample Calculation

	Measurement				Result	
	Reference	Substitution				
Emission Frequency (MHz)	Reference Level (dBm)	Sig-gen Level	Cable and Attenuator Gain	Antenna Gain (dBd)	dBm	dBc
859.950	-84.60	-40.30	-15.70	5.25	-50.75	-96.77
		A	B	C	E	

Result (E) = A + B + C

Photo: OATS Setup



TRANSIENT FREQUENCY BEHAVIOR

SPECIFICATION: FCC 47 CFR 90.214

RSS-119 5.9

GUIDE: ANSI C63.26 6.5.2.2

MEASUREMENT PROCEDURE:

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

MEASUREMENT UNCERTAINTY: 130Hz

MEASUREMENT RESULTS:

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

LIMIT CLAUSES: FCC 47 CFR 90.214

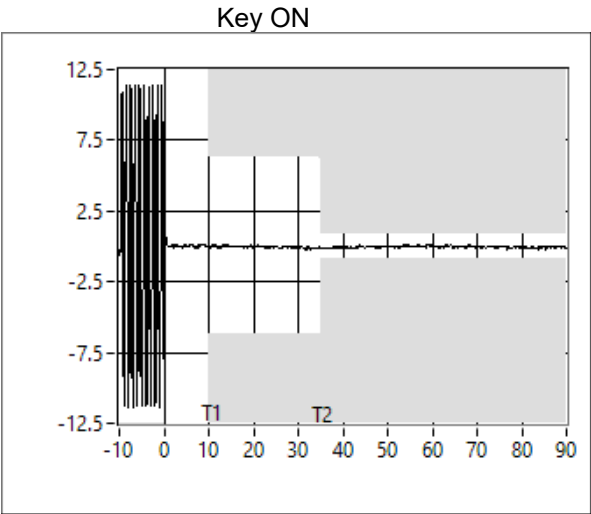
RSS-119 5.9

Transient Frequency Behaviour

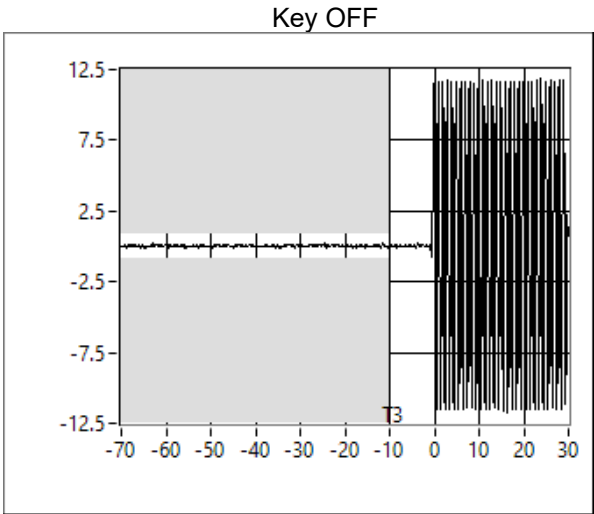
SPECIFICATION: FCC 47 CFR 90.214 RSS-119 5.9
Tx FREQUENCY: 406.125 MHz 40 W 12.5 kHz Channel Spacing

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	11.5

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



TARF 4422
406.125000MHz 40Watts 12.50kHz Channel spacing



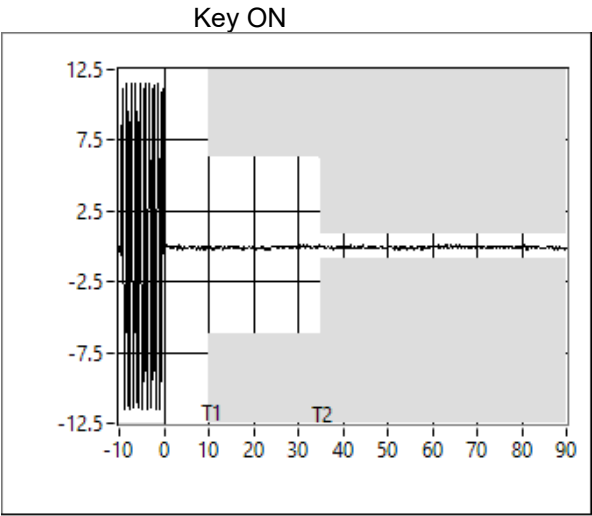
TARF 4422
406.125000MHz 40Watts 12.50kHz Channel spacing

Transient Frequency Behaviour

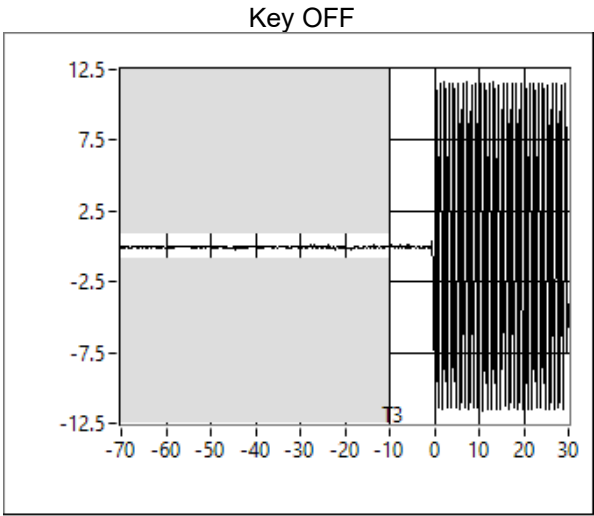
SPECIFICATION: FCC 47 CFR 90.214 RSS-119 5.9
Tx FREQUENCY: 418.025 MHz 40 W 12.5 kHz Channel Spacing

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	-7.3

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



TARF 4422
418.025000MHz 40Watts 12.50kHz Channel spacing



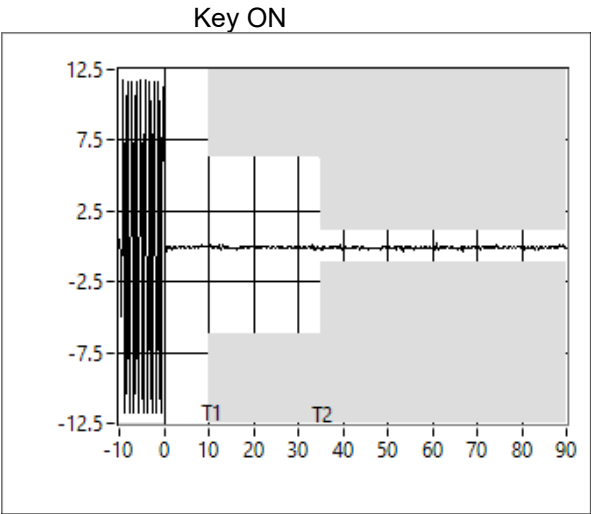
TARF 4422
418.025000MHz 40Watts 12.50kHz Channel spacing

Transient Frequency Behaviour

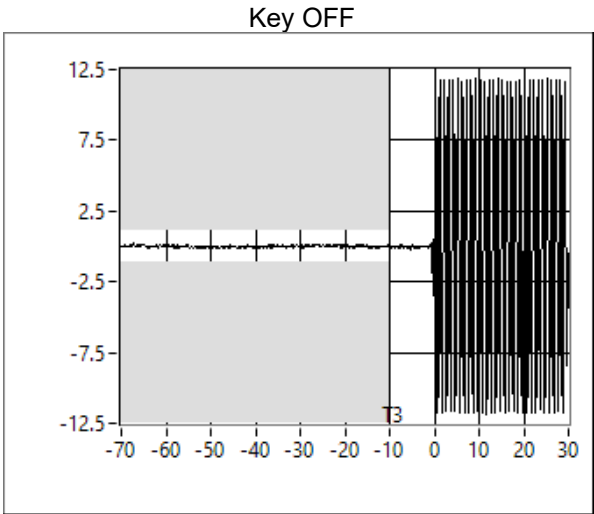
SPECIFICATION: FCC 47 CFR 90.214 RSS-119 5.9
Tx FREQUENCY: 429.975 MHz 40 W 12.5 kHz Channel Spacing

TRANSIENT RESPONSE PERIOD	CARRIER PEAK VARIATION FROM NORMAL	
	Key ON (kHz)	Key OFF (kHz)
t1	-0.9	N/A
t2	-0.2	N/A
t3	N/A	-3.5

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



TARF 4422
429.975000MHz 40Watts 12.50kHz Channel spacing



TARF 4422
429.975000MHz 40Watts 12.50kHz Channel spacing

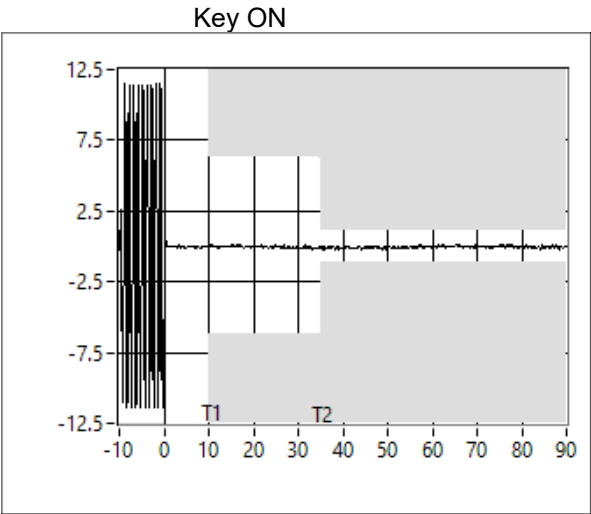
Transient Frequency Behaviour

SPECIFICATION: FCC 47 CFR 90.214 RSS-119 5.9

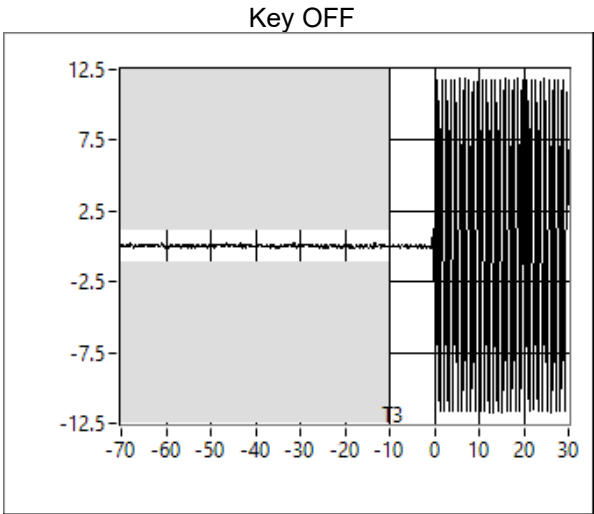
Tx FREQUENCY: 450.025 MHz 40 W 12.5 kHz Channel Spacing

TRANSIENT RESPONSE PERIOD	CARRIER PEAK VARIATION FROM NORMAL	
	Key ON (kHz)	Key OFF (kHz)
t1	0.8	N/A
t2	-0.2	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
	✓	☐
Confirm that during the period t2 the frequency difference does not exceed half a channel separation.	YES	NO
	✓	☐
Confirm that during the period t2 to t3 the frequency difference does not exceed the frequency error limit.	YES	NO
	✓	☐



TARF 4422
450.025000MHz 40Watts 12.50kHz Channel spacing



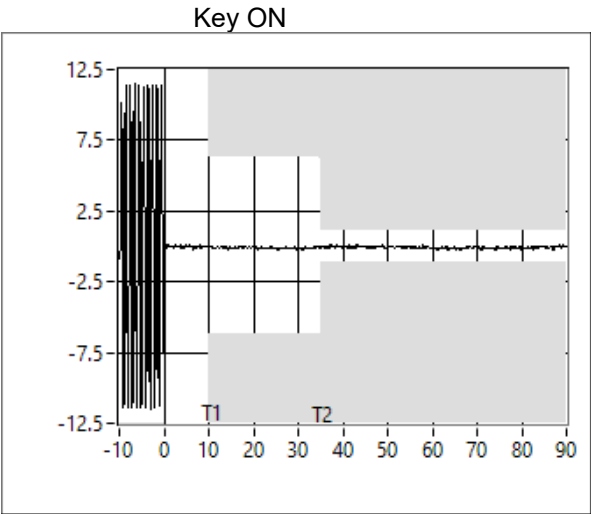
TARF 4422
450.025000MHz 40Watts 12.50kHz Channel spacing

Transient Frequency Behaviour

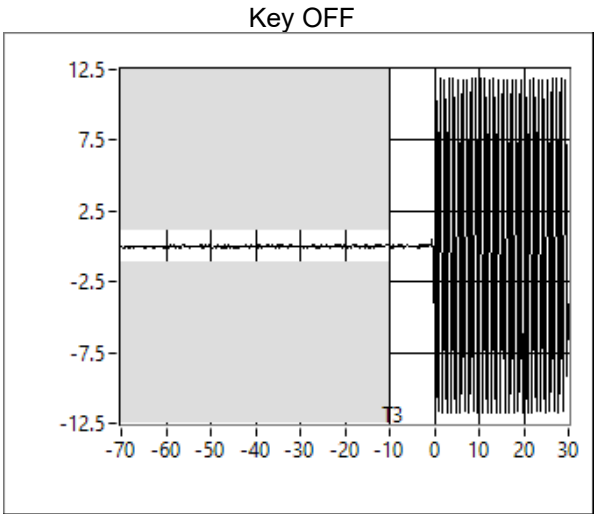
SPECIFICATION: FCC 47 CFR 90.214 RSS-119 5.9
Tx FREQUENCY: 460.025 MHz 40 W 12.5 kHz Channel Spacing

TRANSIENT RESPONSE PERIOD	CARRIER PEAK VARIATION FROM NORMAL	
	Key ON (kHz)	Key OFF (kHz)
t1	0.3	N/A
t2	-0.3	N/A
t3	N/A	-4.0

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



TARF 4422
460.025000MHz 40Watts 12.50kHz Channel spacing



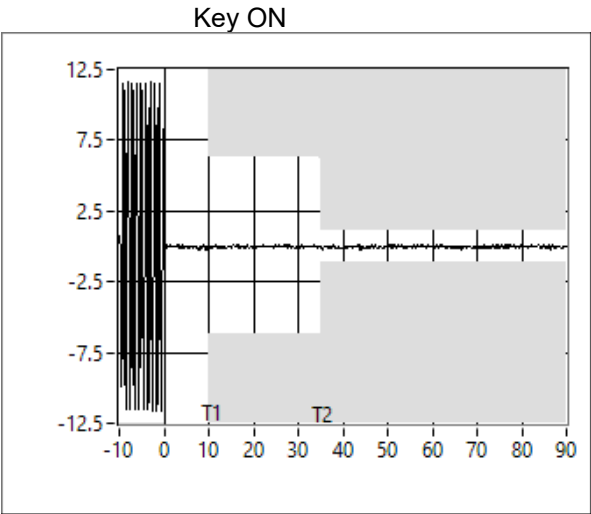
TARF 4422
460.025000MHz 40Watts 12.50kHz Channel spacing

Transient Frequency Behaviour

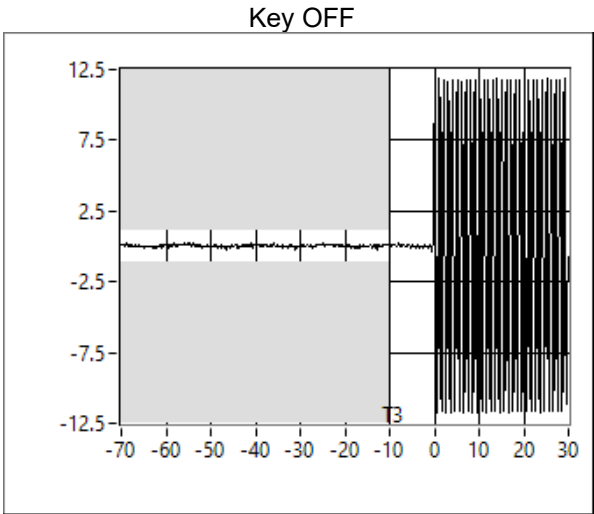
SPECIFICATION: FCC 47 CFR 90.214 RSS-119 5.9
Tx FREQUENCY: 469.975 MHz 40 W 12.5 kHz Channel Spacing

TRANSIENT RESPONSE PERIOD	CARRIER PEAK VARIATION FROM NORMAL	
	Key ON (kHz)	Key OFF (kHz)
t1	-0.5	N/A
t2	-0.2	N/A
t3	N/A	6.1

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



TARF 4422
469.975000MHz 40Watts 12.50kHz Channel spacing



TARF 4422
469.975000MHz 40Watts 12.50kHz Channel spacing

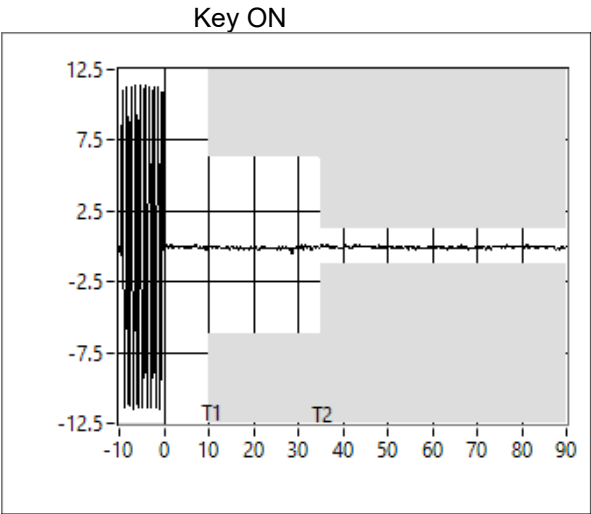
Transient Frequency Behaviour

SPECIFICATION: FCC 47 CFR 90.214 RSS-119 5.9

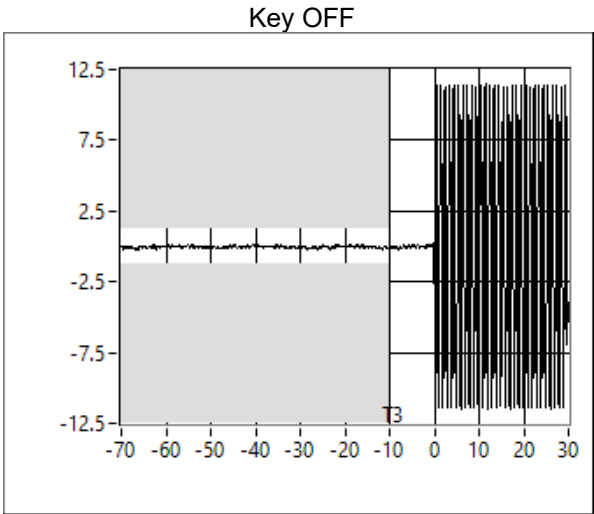
Tx FREQUENCY: 479.975 MHz 40 W 12.5 kHz Channel Spacing

TRANSIENT RESPONSE PERIOD	CARRIER PEAK VARIATION FROM NORMAL	
	Key ON (kHz)	Key OFF (kHz)
t1	-0.7	N/A
t2	-0.5	N/A
t3	N/A	-2.4

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



TARF 4422
479.975000MHz 40Watts 12.50kHz Channel spacing



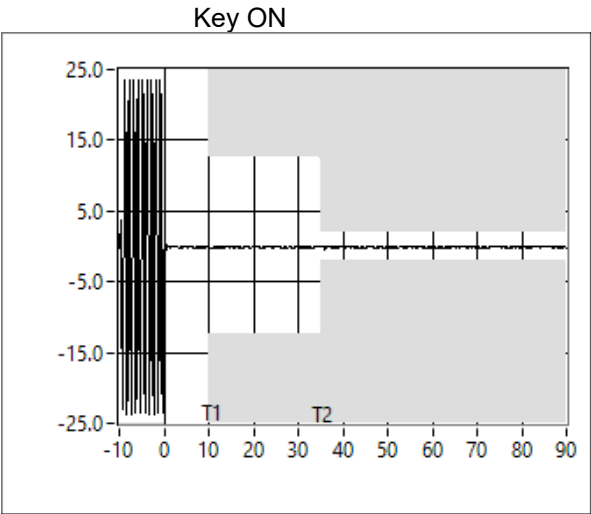
TARF 4422
479.975000MHz 40Watts 12.50kHz Channel spacing

Transient Frequency Behaviour

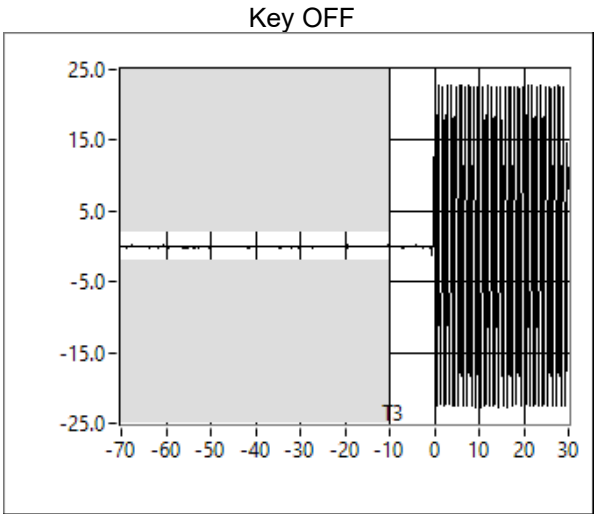
SPECIFICATION: FCC 47 CFR 90.214 RSS-119 5.9
Tx FREQUENCY: 406.125 MHz 40 W 25.0 kHz Channel Spacing

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	12.7

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



TARF 4422
406.125000MHz 40Watts 25.00kHz Channel spacing



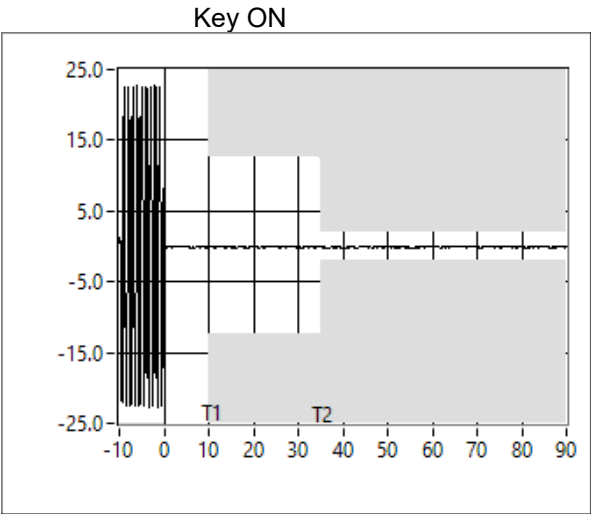
TARF 4422
406.125000MHz 40Watts 25.00kHz Channel spacing

Transient Frequency Behaviour

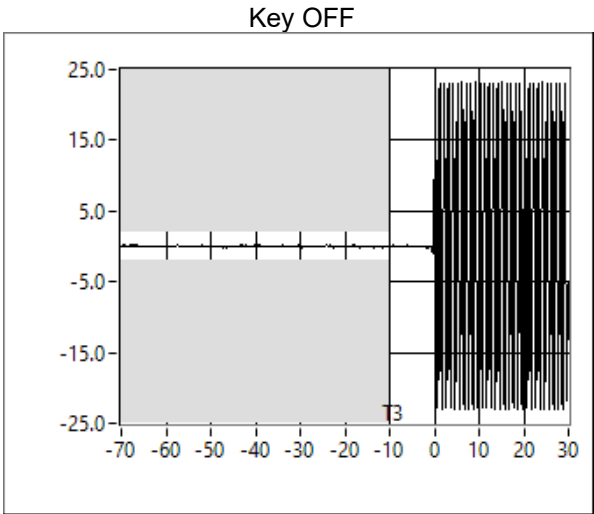
SPECIFICATION: FCC 47 CFR 90.214 RSS-119 5.9
Tx FREQUENCY: 418.025 MHz 40 W 25.0 kHz Channel Spacing

TRANSIENT RESPONSE PERIOD	CARRIER PEAK VARIATION FROM NORMAL	
	Key ON (kHz)	Key OFF (kHz)
t1	-0.6	N/A
t2	-0.4	N/A
t3	N/A	5.2

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



TARF 4422
418.025000MHz 40Watts 25.00kHz Channel spacing



TARF 4422
418.025000MHz 40Watts 25.00kHz Channel spacing

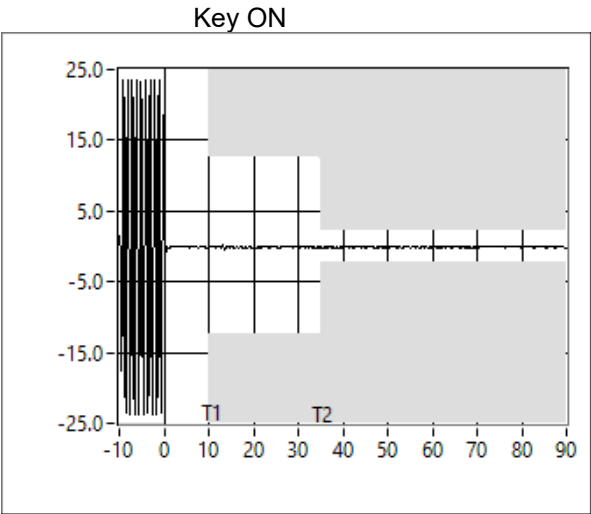
Transient Frequency Behaviour

SPECIFICATION: FCC 47 CFR 90.214 RSS-119 5.9

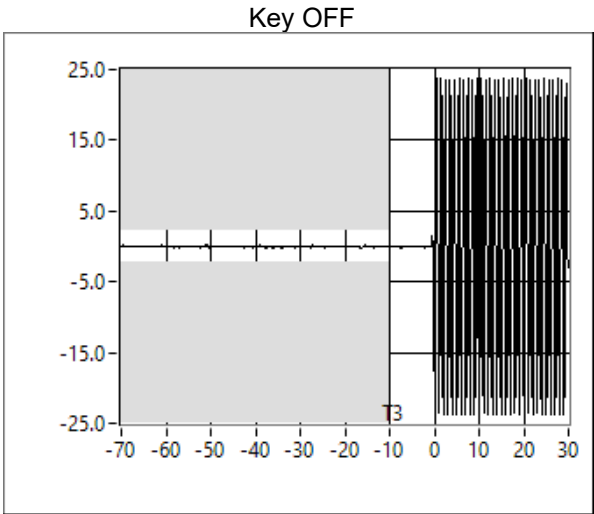
Tx FREQUENCY: 429.975 MHz 40 W 25.0 kHz Channel Spacing

TRANSIENT RESPONSE PERIOD	CARRIER PEAK VARIATION FROM NORMAL	
	Key ON (kHz)	Key OFF (kHz)
t1	-1.7	N/A
t2	-0.4	N/A
t3	N/A	-14.5

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



TARF 4422
429.975000MHz 40Watts 25.00kHz Channel spacing



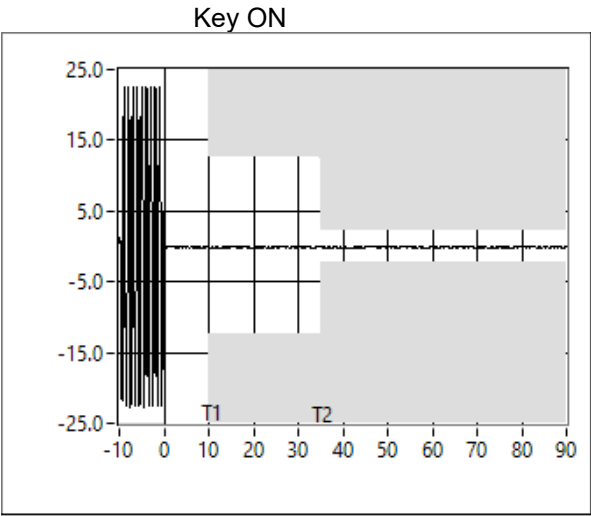
TARF 4422
429.975000MHz 40Watts 25.00kHz Channel spacing

Transient Frequency Behaviour

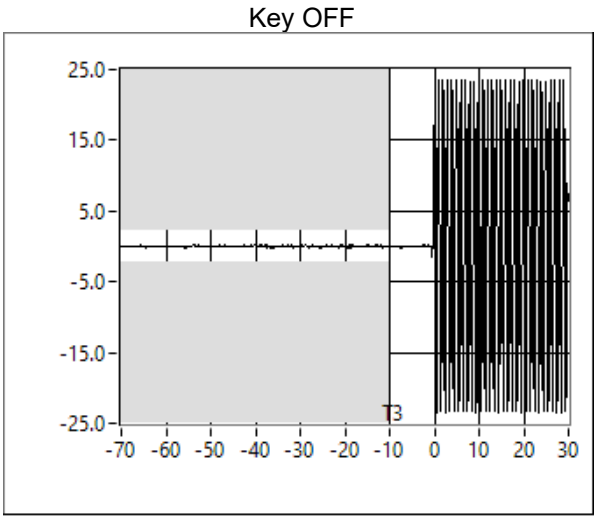
SPECIFICATION: FCC 47 CFR 90.214 RSS-119 5.9
Tx FREQUENCY: 450.025 MHz 40 W 25.0 kHz Channel Spacing

TRANSIENT RESPONSE PERIOD	CARRIER PEAK VARIATION FROM NORMAL	
	Key ON (kHz)	Key OFF (kHz)
t1	1.4	N/A
t2	-0.3	N/A
t3	N/A	16.1

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



TARF 4422
450.025000MHz 40Watts 25.00kHz Channel spacing



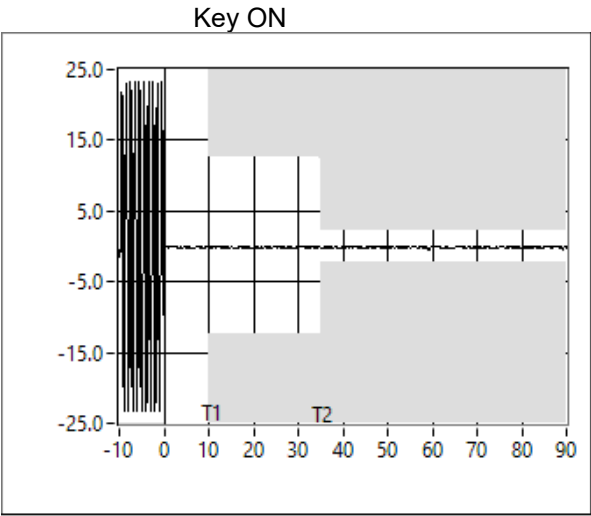
TARF 4422
450.025000MHz 40Watts 25.00kHz Channel spacing

Transient Frequency Behaviour

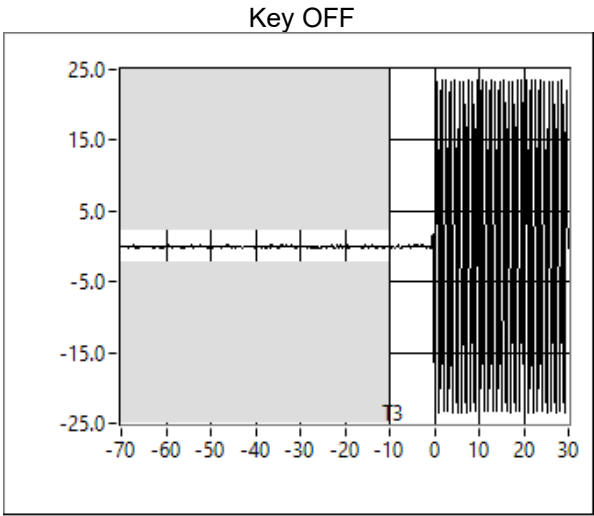
SPECIFICATION: FCC 47 CFR 90.214 RSS-119 5.9
Tx FREQUENCY: 460.025 MHz 40 W 25.0 kHz Channel Spacing

TRANSIENT RESPONSE PERIOD	CARRIER PEAK VARIATION FROM NORMAL	
	Key ON (kHz)	Key OFF (kHz)
t1	0.5	N/A
t2	-0.3	N/A
t3	N/A	-10.2

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



TARF 4422
460.025000MHz 40Watts 25.00kHz Channel spacing



TARF 4422
460.025000MHz 40Watts 25.00kHz Channel spacing

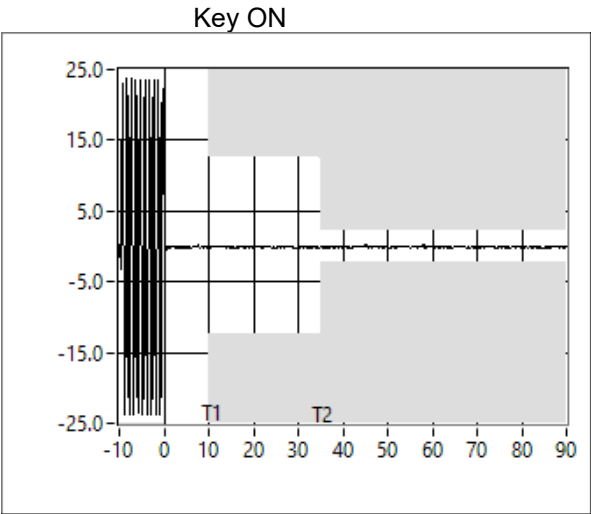
Transient Frequency Behaviour

SPECIFICATION: FCC 47 CFR 90.214 RSS-119 5.9

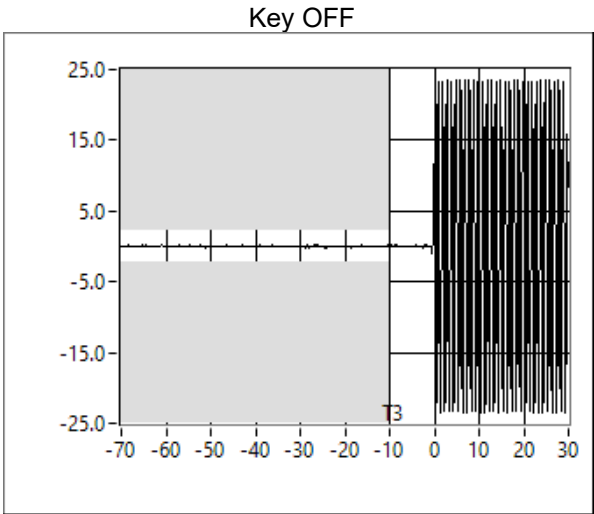
Tx FREQUENCY: 469.975 MHz 40 W 25.0 kHz Channel Spacing

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	11.6

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



TARF 4422
469.975000MHz 40Watts 25.00kHz Channel spacing



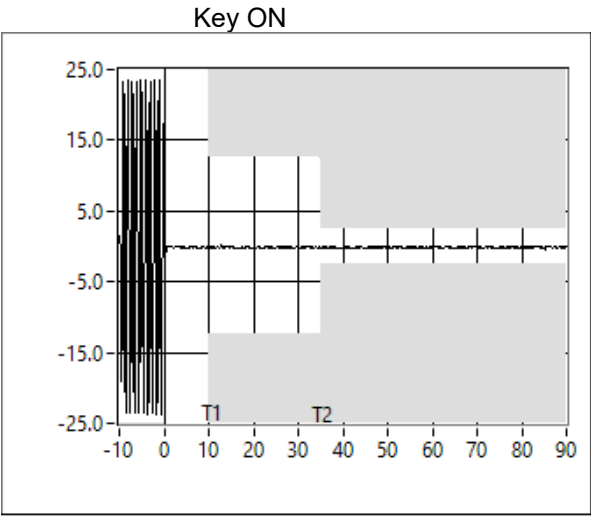
TARF 4422
469.975000MHz 40Watts 25.00kHz Channel spacing

Transient Frequency Behaviour

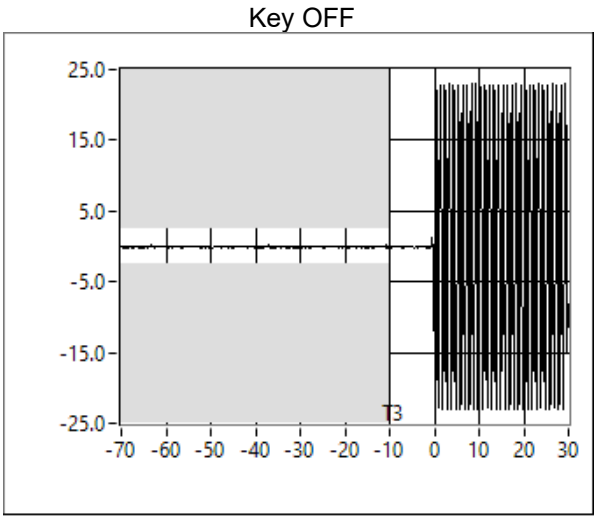
SPECIFICATION: FCC 47 CFR 90.214 RSS-119 5.9
Tx FREQUENCY: 479.975 MHz 40 W 25.0 kHz Channel Spacing

TRANSIENT RESPONSE PERIOD	CARRIER PEAK VARIATION FROM NORMAL	
	Key ON (kHz)	Key OFF (kHz)
t1	-1.4	N/A
t2	-0.3	N/A
t3	N/A	-11.8

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



TARF 4422
479.975000MHz 40Watts 25.00kHz Channel spacing



TARF 4422
479.975000MHz 40Watts 25.00kHz Channel spacing

Transient Frequency Behaviour

LIMIT: FCC 47 CFR 90.214

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

LIMIT: RSS-119 5.9

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

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

TRANSMITTER FREQUENCY STABILITY - TEMPERATURE

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

RSS-119 5.3

GUIDE: ANSI C63.26 5.6.4

MEASUREMENT PROCEDURE:

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

MEASUREMENT UNCERTAINTY: $\pm 0.05\text{ppm}$

MEASUREMENT RESULTS:

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

Temperature ($^{\circ}\text{C}$)	Error (ppm)						
	406.125 MHz	418.025 MHz	429.975 MHz	450.025 MHz	460.025 MHz	469.975 MHz	479.975 MHz
-30	-0.17	-0.17	-0.19	-0.18	-0.17	-0.19	-0.17
-20	-0.17	-0.17	-0.16	-0.16	-0.15	-0.17	-0.15
-10	-0.17	-0.19	-0.16	-0.18	-0.17	-0.15	-0.13
0	-0.20	-0.14	-0.14	-0.13	-0.11	-0.11	-0.06
10	-0.10	-0.07	-0.05	-0.04	-0.02	-0.02	0.02
20	-0.02	0.00	0.02	0.00	0.02	0.02	0.02
30	0.02	0.05	0.09	0.09	0.11	0.09	0.10
40	0.07	0.05	0.05	0.04	0.04	0.02	-0.02
50	-0.12	-0.12	-0.16	-0.20	-0.26	-0.30	-0.31

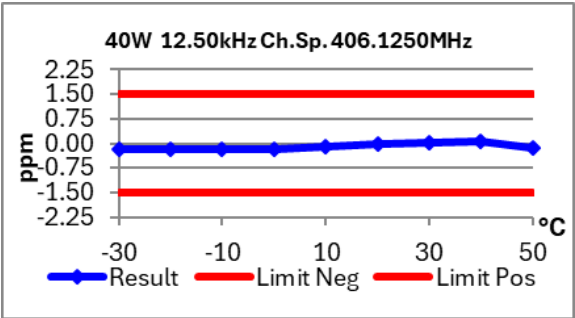
LIMIT: FCC 47 CFR 90.213

RSS-119 5.3

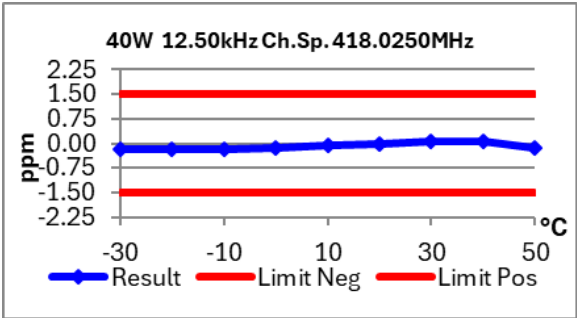
Channel Spacing (kHz)	Frequency Error (ppm)
12.5	1.5

Transmitter Frequency Stability - Temperature

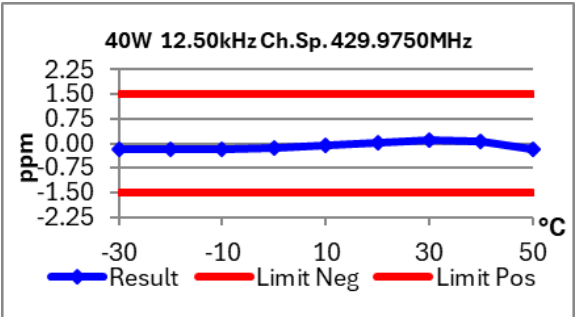
406.125 MHz



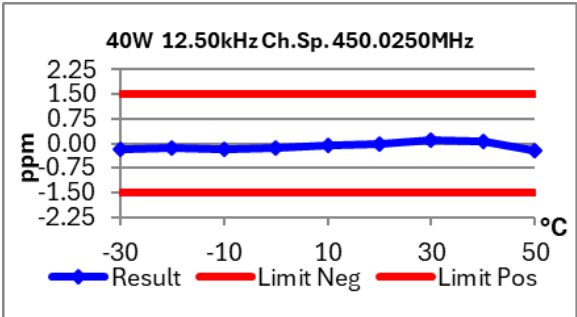
418.025 MHz



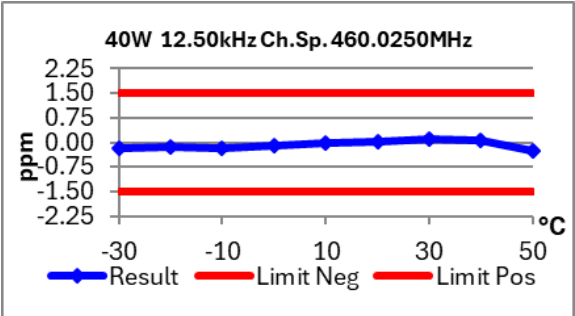
429.975 MHz



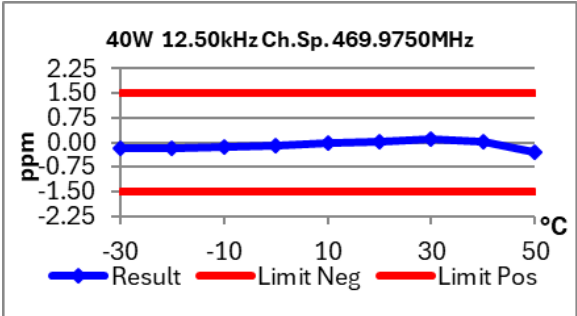
450.025 MHz



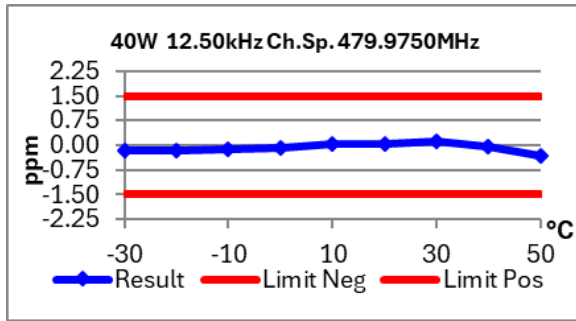
460.025 MHz



469.975 MHz



479.975 MHz



TRANSMITTER FREQUENCY STABILITY - VOLTAGE

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

RSS-119 5.3

GUIDE: ANSI C63.26 5.6.5

MEASUREMENT PROCEDURE:

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

MEASUREMENT UNCERTAINTY: $\pm 0.05\text{ppm}$

MEASUREMENT RESULTS:

	FREQUENCY ERROR (ppm) for 12.5 kHz Ch. Spacing @ 40 W Tx Power		
	13.80 V _{DC}	11.73 V _{DC}	15.87 V _{DC}
406.125 MHz	0.00	0.00	-0.01
418.025 MHz	0.00	-0.01	-0.02
429.975 MHz	-0.03	-0.03	-0.04
450.025 MHz	0.01	0.00	0.00
460.025 MHz	0.02	0.01	0.00
469.975 MHz	0.07	0.07	0.07
479.975 MHz	0.06	0.06	0.05

LIMIT CLAUSES: FCC 47 CFR 90.213

RSS-119 5.3

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

RECEIVER SPURIOUS EMISSIONS (CONDUCTED)

SPECIFICATION: FCC 47CFR 15.111

RSS-Gen 7.4

GUIDE: ANSI C63.26 5.7

MEASUREMENT PROCEDURE:

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

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

Example of attenuation correction: (dB)

E5023 30dB 350W CK9178	32.20	
E5015 3m Blue	0.84	
E5028 1m5 Blue	0.36	
E3384 400_520MHz HPBRF	6.37	
Total Attenuation @ 812.250MHz	39.27	Sum of component attenuation (a)
Amplitude offset	41.19	(b)
Correction @ 812.250MHz	-1.41	(a-b)

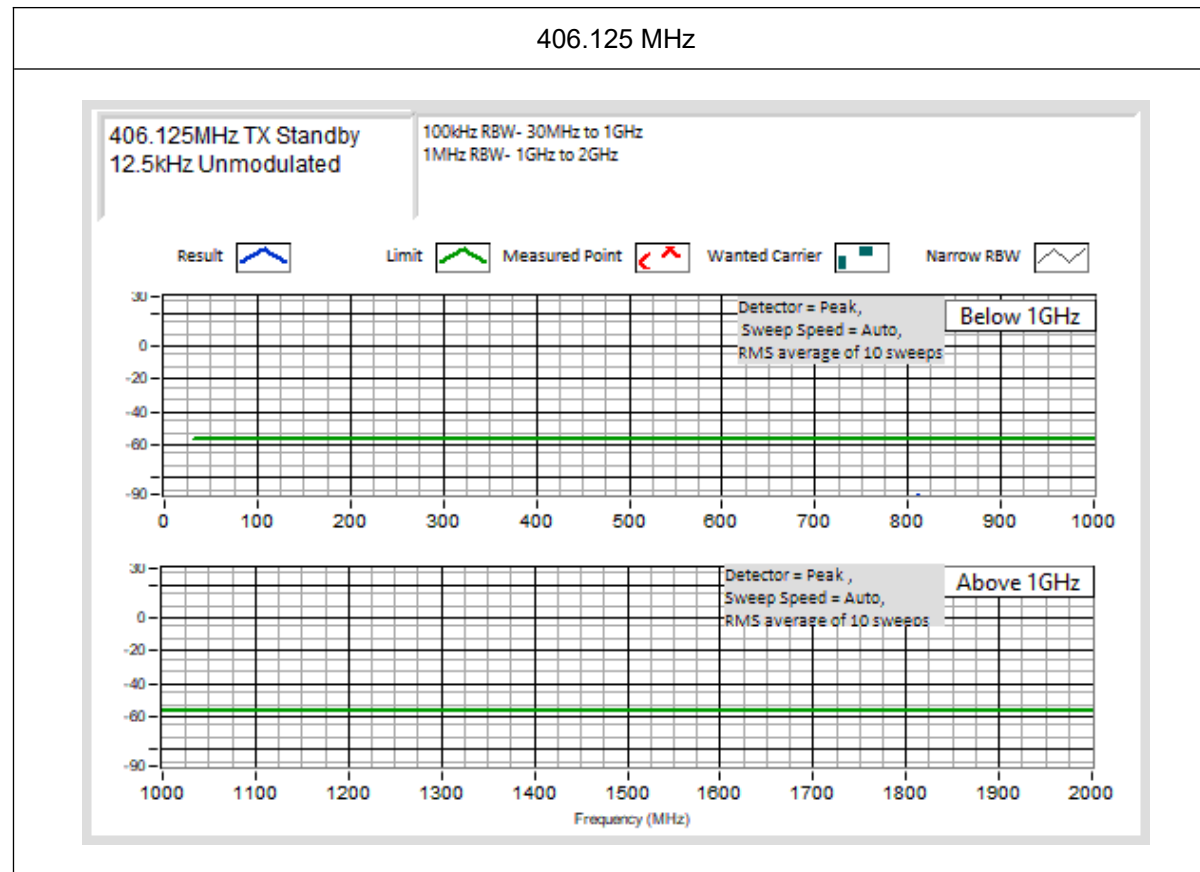
MEASUREMENT UNCERTAINTY: $\pm 2.8\text{dB}$

LIMIT CLAUSE: RSS-Gen 7.4

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

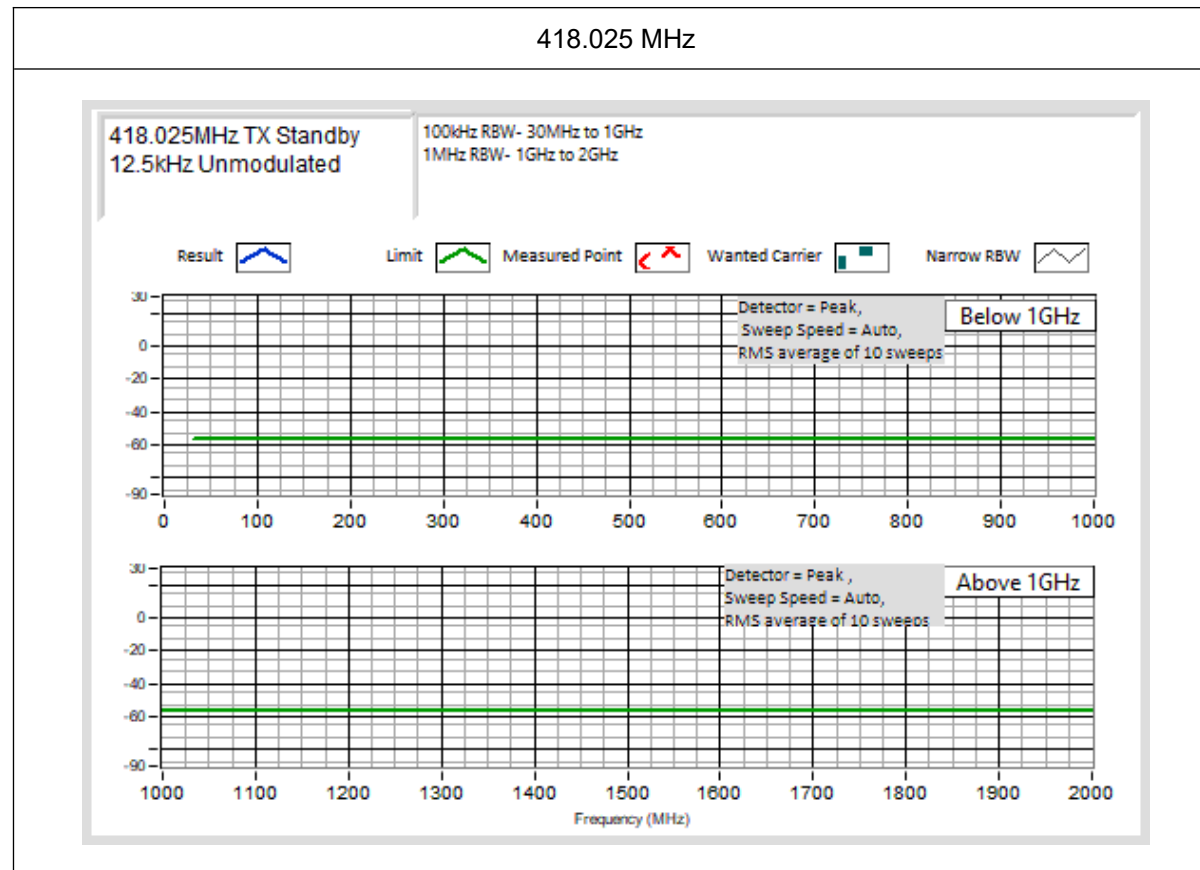
Receiver Spurious Emissions (Conducted) – Continued

406.125 MHz Receive / Tx Standby		
Emission Frequency (MHz)	Level (nW)	Level (dBm)
~	~	~
No emissions were detected within 20 dB of Limit.		



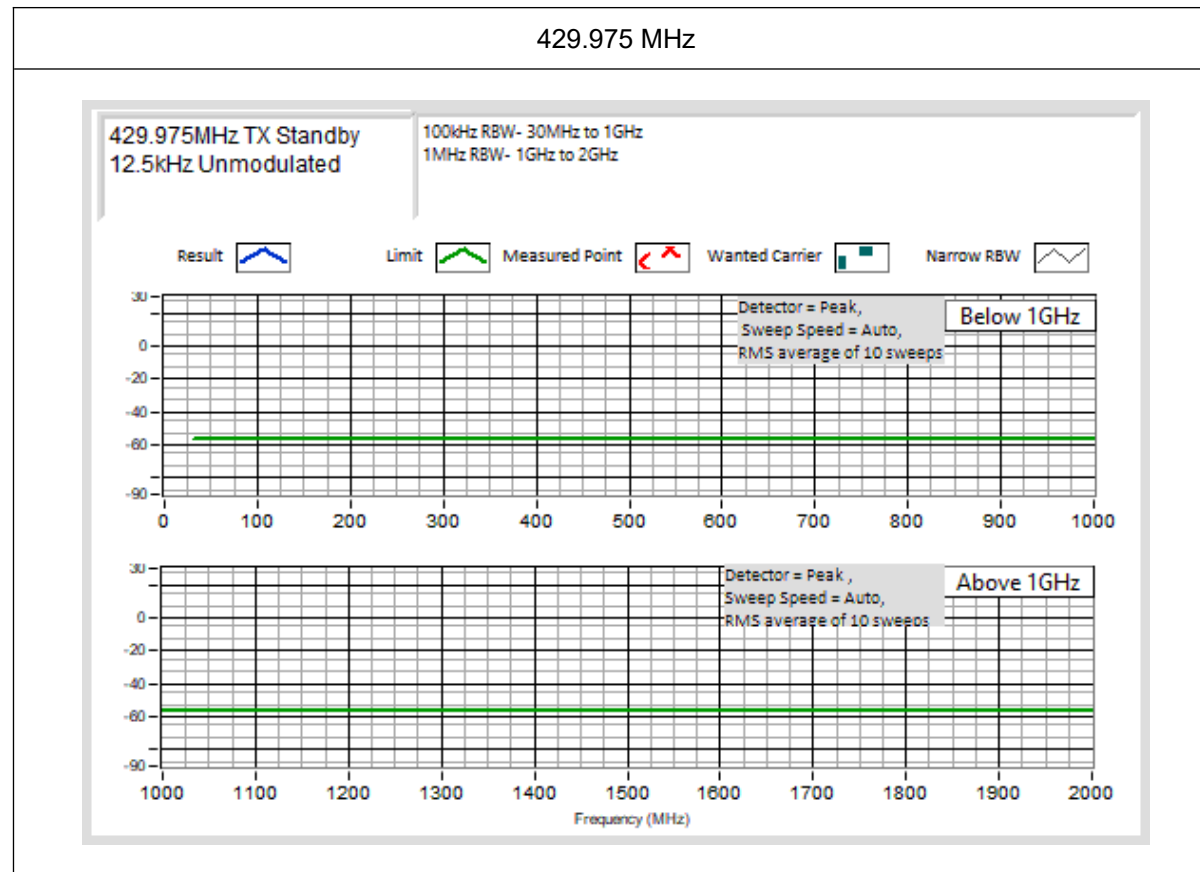
Receiver Spurious Emissions (Conducted) – Continued

418.025 MHz Receive / Tx Standby		
Emission Frequency (MHz)	Level (nW)	Level (dBm)
~	~	~
No emissions were detected within 20 dB of Limit.		



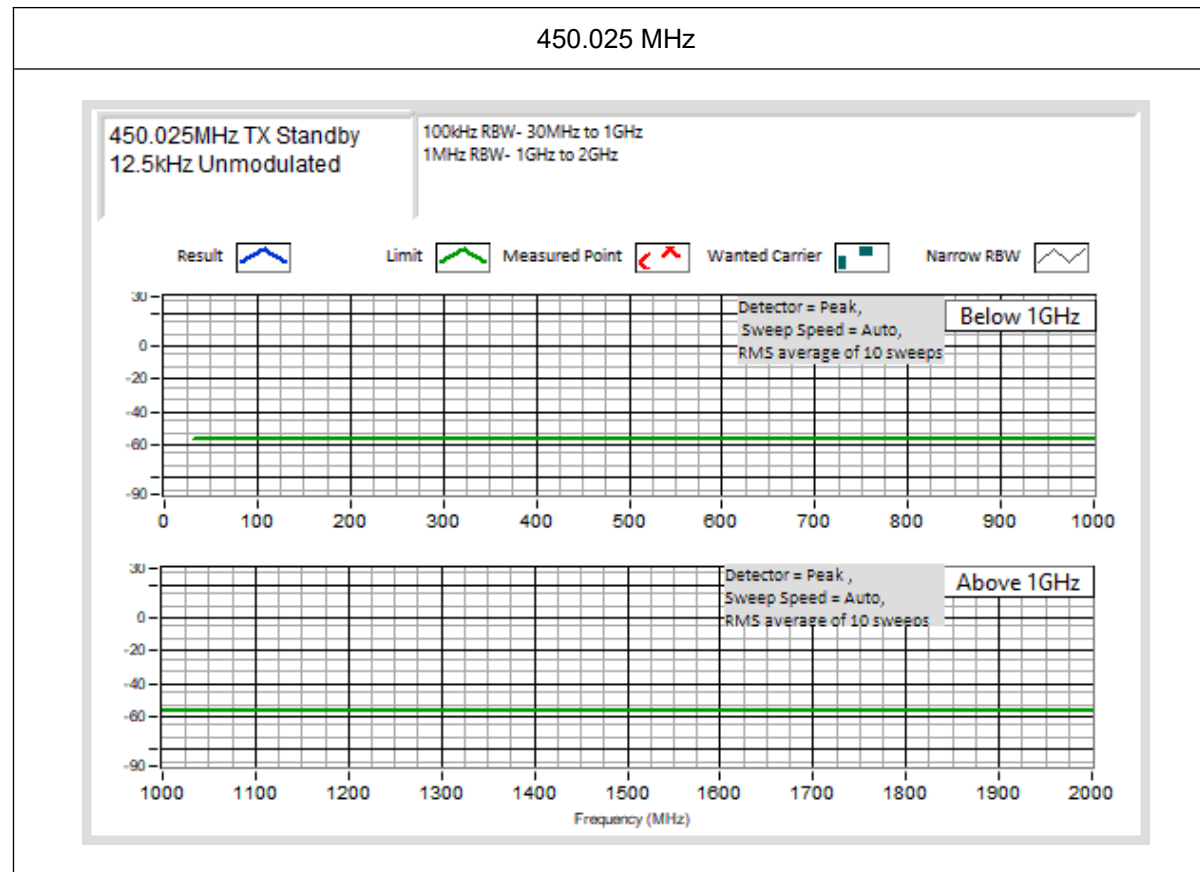
Receiver Spurious Emissions (Conducted) – Continued

429.975 MHz Receive / Tx Standby		
Emission Frequency (MHz)	Level (nW)	Level (dBm)
~	~	~
No emissions were detected within 20 dB of Limit.		



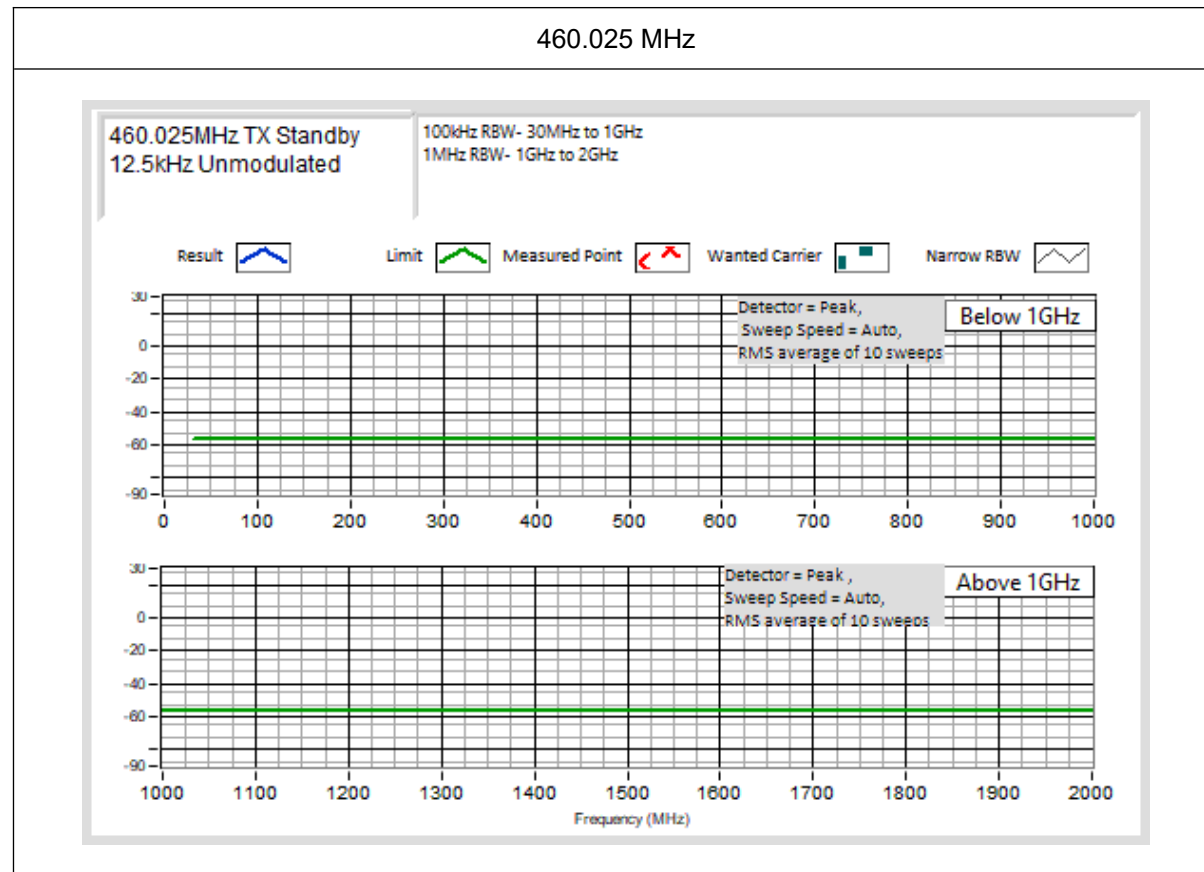
Receiver Spurious Emissions (Conducted) – Continued

450.025 MHz Receive / Tx Standby		
Emission Frequency (MHz)	Level (nW)	Level (dBm)
~	~	~
No emissions were detected within 20 dB of Limit.		



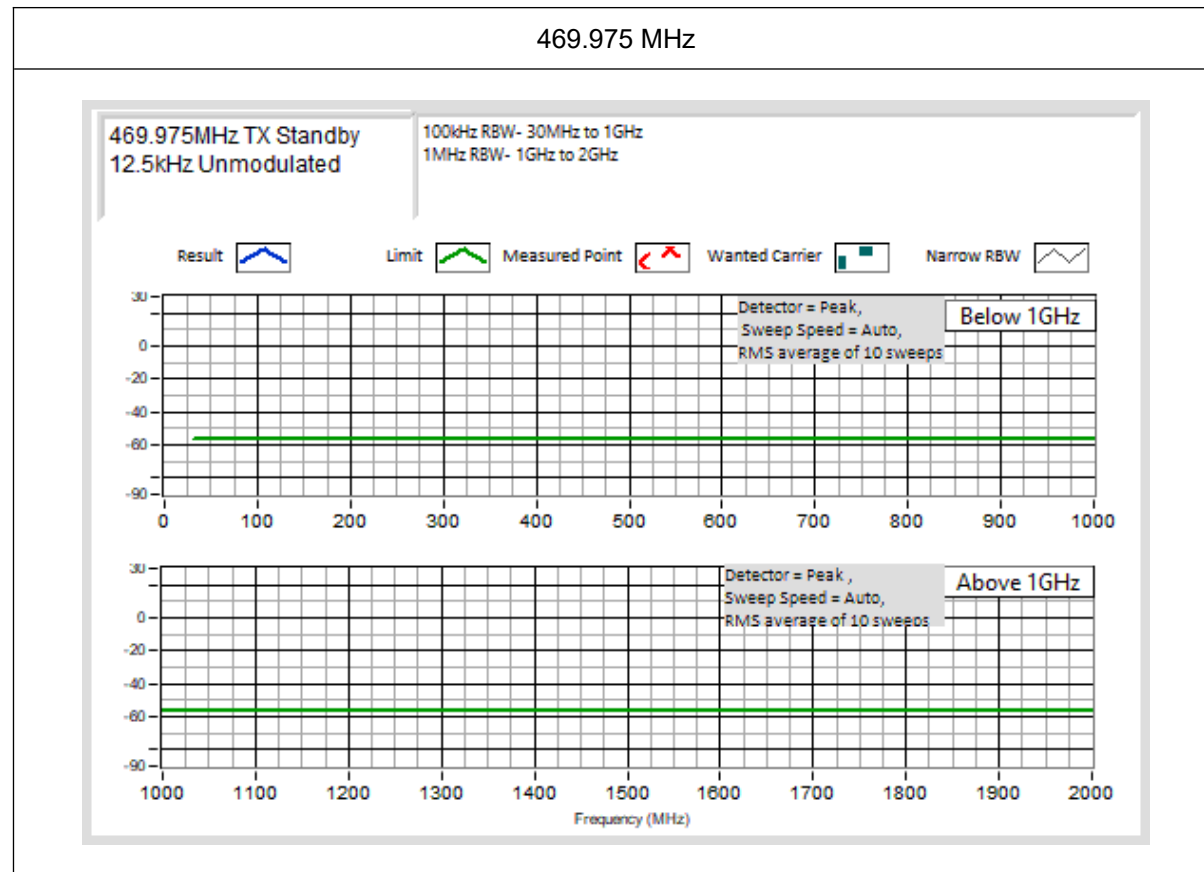
Receiver Spurious Emissions (Conducted) – Continued

460.025 MHz Receive / Tx Standby		
Emission Frequency (MHz)	Level (nW)	Level (dBm)
~	~	~
No emissions were detected within 20 dB of Limit.		



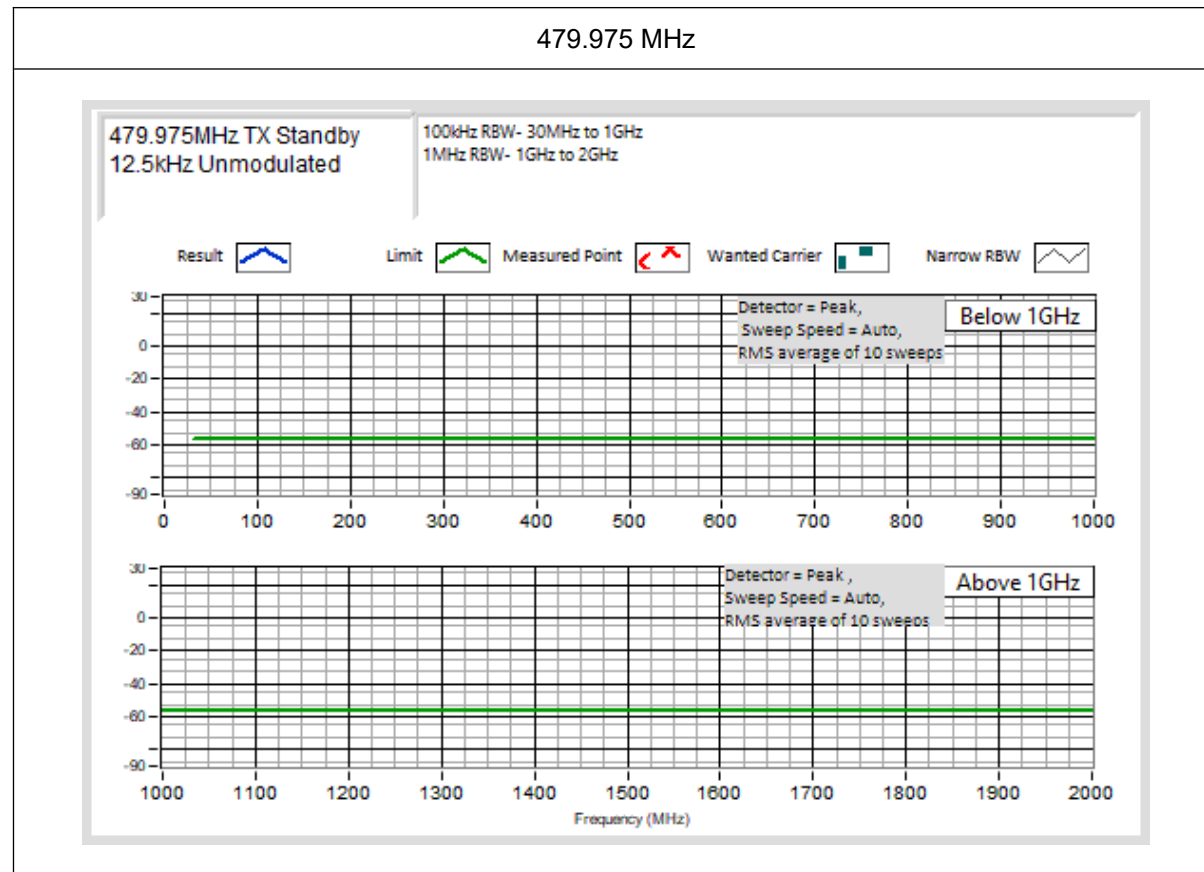
Receiver Spurious Emissions (Conducted) – Continued

469.975 MHz Receive / Tx Standby		
Emission Frequency (MHz)	Level (nW)	Level (dBm)
~	~	~
No emissions were detected within 20 dB of Limit.		



Receiver Spurious Emissions (Conducted) – Continued

479.975 MHz Receive / Tx Standby		
Emission Frequency (MHz)	Level (nW)	Level (dBm)
~	~	~
No emissions were detected within 20 dB of Limit.		



TEST EQUIPMENT LIST

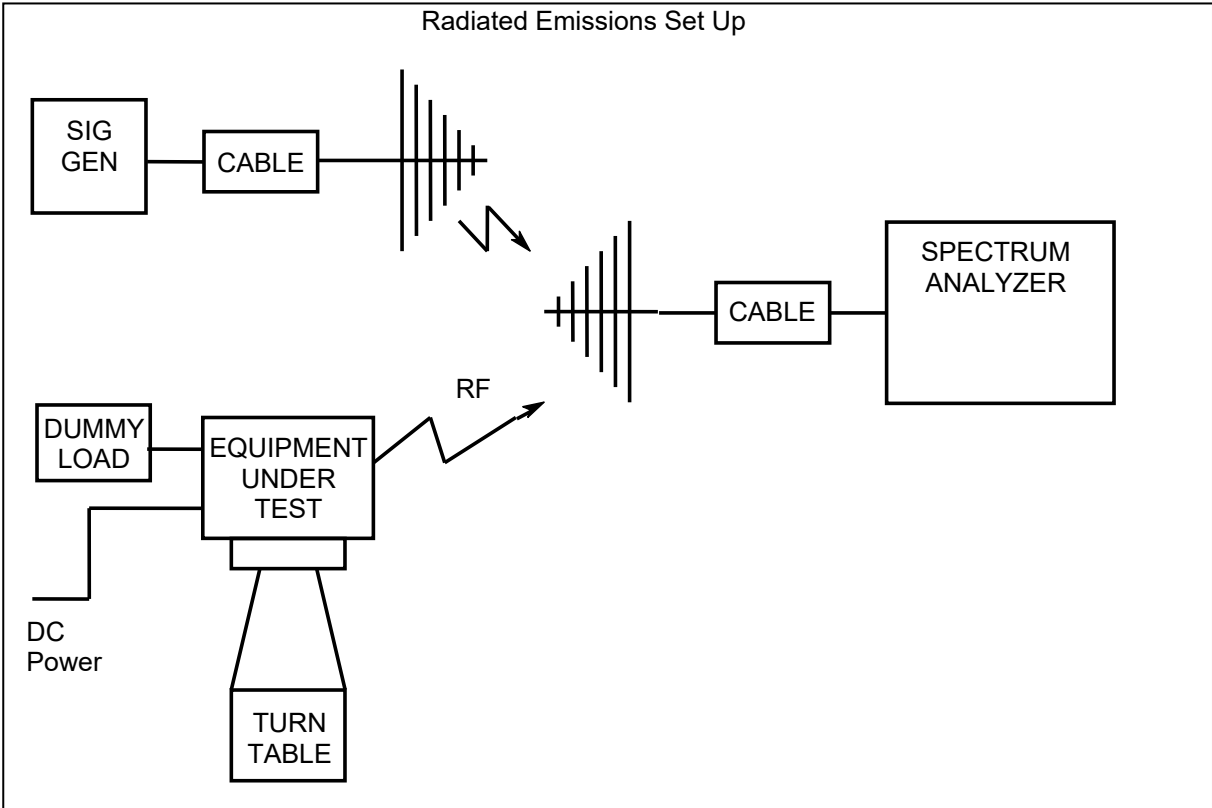
Equipment Type	Information	Manufacturer	Model No	Serial No#	Tait ID	Cal Due
Antenna	18GHz DRG	Emco	DRG3115	2084	E3076	
Antenna	18GHz DRG	Emco	DRG3115	9512-4638	E3560	20-Aug-27
Antenna	Log Periodic	Schwarzbeck	VUSLP	9111-219	E4617	07-Mar-27
Antenna	Log Periodic	Schwarzbeck	VUSLP	9111-503	E111375	07-Mar-27
Antenna	Reverb - 1-18GHz DRG	Schwarzbeck	BBHA 9120 D	9120D-885	E4857	
Antenna	Reverb - 1-18GHz DRG	Schwarzbeck	BBHA 9120 D	9120D-884	E4858	
Audio Analyser	TREVA2	Hewlett Packard	HP8903B	2818A0427 5	E3710	07-Oct-26
Coax Cable	OATS Turntable Cable 1	Intelcom	RG214	OATS1	E4621	06-Oct-26
Coax Cable	OATS Tower Cable	Intelcom	RG214	OATS2	E4622	06-Oct-26
Coax Cable	2m Black	Suhner	RG214HF/Nm/ Nm/2000	TeltestBlack 2	E4623	01-Oct-26
Coax Cable	Reverb - 4.5m Multiflex 141	TeltestBlue6	MF 141	TeltestBlue6	E4843	03-Oct-26
Coax Cable	Reverb - 2m Multiflex 141	TeltestBlue5	MF 141	TeltestBlue5	E4844	03-Oct-26
Coax Cable	Reverb - 2m Multiflex 141	TeltestBlue4	MF 141	TeltestBlue4	E4845	03-Oct-26
Coax Cable	Reverb - 1m Multiflex 141	TeltestBlue3	MF 141	TeltestBlue3	E4846	03-Oct-26
Coax Cable	Reverb - 1m Multiflex 141	TeltestBlue2	MF 141	TeltestBlue2	E4847	01-Oct-26
Coax Cable	Reverb - 1m Multiflex 141	TeltestBlue1	MF 141	TeltestBlue1	E4848	01-Oct-26
Coax Cable	2m Black	Suhner	RG214HF/Nm/ Nm/2000	TeltestBlack 6	E4849	03-Oct-26
Coax Cable	OATS Turntable Cable 2	Intelcom	RG215	OATS3	E4995	03-Oct-26
Coax Cable	2m Black	Suhner	RG214HF/Nm/ Nm/2000	TeltestBlack 8	E5005	01-Oct-26
Coax Cable	3m Blue	Suhner	Sucoflex 126EA	503429/126 EA	E5015	01-Oct-26
Coax Cable	1.5m Blue	Suhner	Sucoflex 126EA	502868/126 EA	E5028	07-Oct-26
Filter High Pass/ Notch	400 to 520MHz	Tait		N/A	E3384	14-May-26
Modulation Analyser	TREVA1	Hewlett Packard	HP8901B (Opt 002)	3704A0583 7	E3786	10-Oct-26
OATS	Controller	Electrometrics	EM-4700	119	E4445	
OATS	Turntable	Electrometrics	EM-4704A	105	E4446	
OATS	Antenna Tower	Electrometrics	EM-4720-2	112	E4447	
Power Meter	TREVA1 Power Head for HP8901	Hewlett Packard	HP11722A	3111A0557 3	E7054	11-Oct-26
Power Supply		Rohde & Schwarz	NGS M32/10 192.0810.31	Fnr 434	E3556	15-May-26
Power Supply	TREVA 1 60V/25A	Agilent	N5767A	US23D6941 R	E11372	03-Oct-26
Power Supply	40V/38A	Agilent	N5766A	US09E4663L	E4719	02-Oct-27
Power Supply	60V/25A	Agilent	N5767A	3111A0557 3	E4979	09-Oct-26
RF Amplifier	+21.7 dB 1GHz	Tait	ZFL-1000LN	E3660	E3360	04-Aug-26
RF Amplifier	Pre-amplifier	Agilent	87405C	MY4701068 8	E4941	10-Oct-26
RF Attenuator	10dB 50W	Weinschel	24-10-34	AZ0401	E3388	01-Oct-26
RF Attenuator	30+3dB 350W	Weinschel	67-30-33 & BW- N3W5+	CK9178	E5023	01-Oct-26

TEST EQUIPMENT LIST

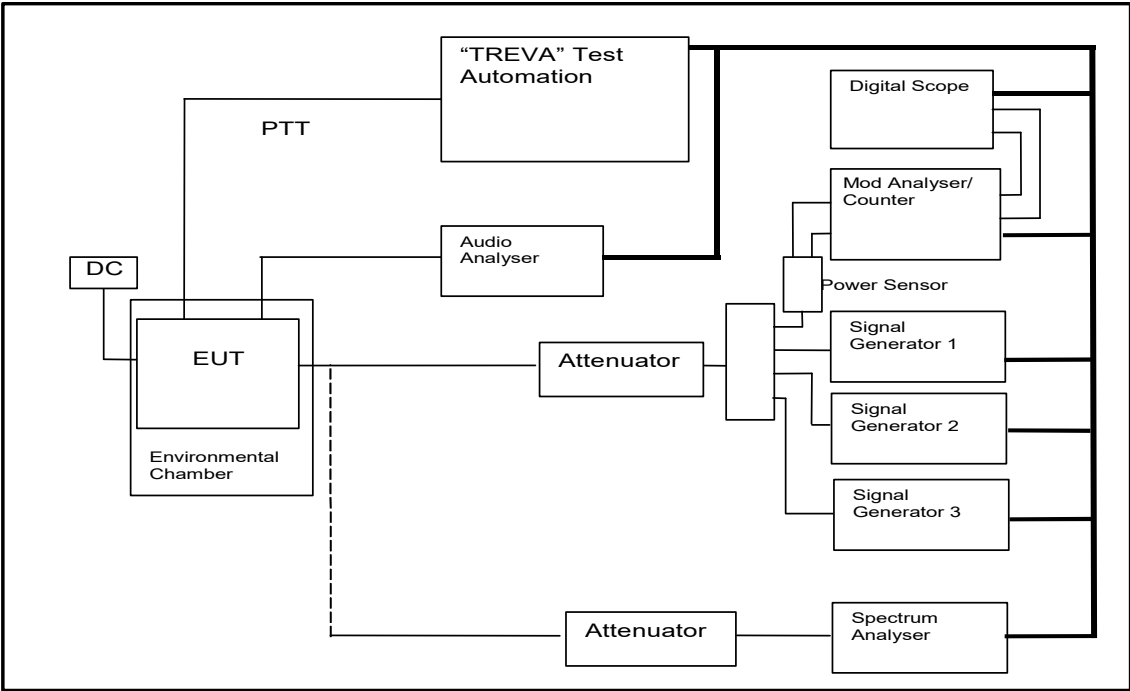
Equipment Type	Information	Manufacturer	Model No	Serial No#	Tait ID	Cal Due
RF Attenuator	10dB 50W	Weinschel	24-10-34	BC3293	E4364	01-Oct-26
RF Attenuator	TREVA1 3dB	Weinschel	Model 1	BL9958	E4081	01-Oct-26
RF Attenuator	TREVA1 20dB 150W	Weinschel	40-20-23	MF817	E4082	01-Oct-26
RF Attenuator	3dB 0.5W	Weinschel	Model 1	CH6863	E5013	01-Oct-26
RF Chamber	S-LINE TEM CELL	Rohde & Schwarz	1089.9296.02	338232/003	E3636	18-Jun-27
RF Chamber	Reverb - Stirrer controller for reverb chamber	Teseq	Stirrer Controller	29765.1	E4854	
RF Chamber	Reverb - 0.5 - 18GHz Reverberation Chamber	Teseq	RVC XS	29765	E4855	
RF Combiner	TREVA1	Minicircuits	ZFSC-4-1	-	E4083	
RF Load	50W	Weinschel	F1426	AE2490	E3624	01-Oct-26
RF Load	150W	Bird	8166	524	E3625	01-Oct-26
Signal Generator	Analog 3.2GHz	Hewlett Packard	HP8648C	3443U00543	E3558	06-Oct-26
Signal Generator	Digital 3GHz	Agilent	E4438C	MY45093154	E4600	11-Oct-26
Signal Generator	Digital 3GHz	Agilent	E4438C	MY49070242	E4657	14-Oct-26
Signal Generator	TREVA1 Analog 3.2GHz	Agilent	E8663D	MY50420224	E4908	27-Jun-27
Signal Generator	Analog 12.75GHz	Rohde & Schwarz	SMB100A	183236	E11369	12-Oct-27
Spectrum Analyser	13.2GHz	Hewlett Packard	HP8562E	3821A00779	E3715	09-Oct-26
Spectrum Analyser	13.2GHz	Agilent	PXA N9030A	US49230269	E4775	09-Oct-26
Temp & Humidity datalogger		TP-Link TAPO	T315	22383M6000671	E11377	02-Feb-26
TREVA 1		Teltest	-	1	-	18-Nov-25
Testware	Frequency Vs Temperature		TTEL_FREQTEMP_1.02.00	-	-	
Testware	Occupied Bandwidth		TTEL_OCCBW_2.01.00	-	-	
Testware	Reverb Emissions		TTEL_REVEMIS_3.00.00	-	-	
Testware	Sideband Spectrum		TTEL_SBSPEC_1.01.00	-	-	
Testware	S-Line Radiated Emissions		TTEL_SLINERADE M_2.01.00	-	-	
Testware	TREVA		TTEL_TREVA_2.03.00	-	-	
Testware	Spec An Correction Loader		TTEL_SPECANCOR R_1.01.00	-	-	
Testware	Radio Conducted Emissions		TTEL_RADIOCON D_1.02.01	-	-	

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

ANNEX A – TEST SETUP DETAILS



All other testing is performed using the Teltest Radio **E**VAuation 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 Spectrum Masks measurement.



END OF REPORT