LABORATORY TEST REPORT

RADIO PERFORMANCE MEASUREMENTS

for the

TPDB1D 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:

3 October 2018

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Laboratory Technical Manager



FCC REGISTRATION: 838288 IC LISTING REGISTRATION: SITE# 737A-1

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

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TELTEST Laboratories (A Division of Tait International Ltd) PO Box 1645, 558 Wairakei Road, Christchurch, New Zealand. FCC ID: CASTPDB1D Page 1 of 199 IC : 737A-TPDB1D Telephone: 64 3 358 3399 FAX: 64 3 359 4632 Report Revision: 1 Issue Date: 3 October 2018

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REVISION

Date	Revision	Comments
3 October 2018	1	Initial test report

INTRODUCTION

Type approval testing of the TPDB1D, 5 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, digital FFSK, Digital Mobile Radio (DMR), APCO P25 phase-1 and APCO P25 phase-2 modulations.

REPORT PREPARED FOR

Tait International Ltd 245 Wooldridge Road Harewood Christchurch 8051 New Zealand

DESCRIPTION OF SAMPLE

Manufacturer	Tait International Limited
Equipment:	Handportable Transceiver
Type:	TPDB1D
Product Code:	T03-00043-BZZL
Serial Number(s):	26072208
Frequency range	136 → 174 MHz
Transmit Power	5 W

Modulation		Channel Spacing	Speech Channels	Symbol Rate (symbols/sec)	Data Rate (bps)
Analogue FM		12.5 kHz	1	-	-
FFSK	Fast Frequency Shift	12.5 kHz	-	1200	1200
Keying		12.5 kHz	-	2400	2400
Digital Mobile Radio (DMR)	4 Level FSK (2 slot TDMA) (ETSI TS102 361-1)	12.5 kHz	2	4800	9600
APCO P25 Phase 1	C4FM (TIA 102)	12.5 kHz	1	4800	9600
APCO P25 Phase 2	H-CPM (2 slot TDMA) (TIA 102)	12.5 kHz	2	6000	12000

HARDWARE & SOFTWARE

1

Quantity:

	Analogue, FFSK and DMR tests	P25 tests
Hardware ID	TPDB5X-B100_0001	TPDB5X-B100_0001
Boot Code	QPD5B_S00_3.05.11.0001	QPD5B_S00_3.05.11.0001
DSP	QPD5A_E00_2.19.03.0049	QPD5A_A02_2.12.11.0061
Radio Application	QPD5F_E00_2.19.03.0049	QPD5F_A00_2.12.11.0061
Firmware Package	QI93P_E00_2.19.03.0049	QI94P_A02_2.12.11.0061
FPGA Image	QPD5G_S00_1.12.14.0001	QPD5G_S00_1.12.13.0001

TEST CONDITIONS

All testing was performed between 19 September \rightarrow 2 October 2018, and under the following conditions: Ambient temperature: $15^{\circ}C \rightarrow 30^{\circ}C$

Relative Humidity: $20\% \rightarrow 75\%$ Standard Test Voltage $7.5 V_{DC}$

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:	TPDB1D
Product Code:	T03-00043-BZZL
Serial Number(s):	26072208
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:

MODULATION TYPES, NECESSARY BANDWIDTH & EMISSION DESIGNATORS

MODULATION TYPES:

F3E		Analogue Frequency Modulation (FM)
F2D		FFSK	1200 bps and 2400 bps
FXW		DMR Digital Voice	9600 bps
FXD		DMR Digital Data	9600 bps
F1E, F7E		P25 phase 1 Digital Voice	9600 bps
F1D, F7[)	P25 phase 1 Digital Data	9600 bps
F1W		P25 phase 2 Digital Voice / Data	12000 bps

CHANNEL SPACING: 12.5 kHz

EMISSION DESIGNATORS:

	12.5 kHz
Analogue FM	11K0F3E
FFSK Data 1200 bps	6K60F2D
FFSK Data 2400 bps	7K80F2D
Digital Voice DMR	7K60FXW
Digital Data DMR	7K60FXD
Digital Voice P25 phase 1	8K10F1E
Digital Data P25 phase 1	8K10F1D
Digital Voice P25 phase 2	8K10F1W
Digital Data P25 phase 2	8K10F1W

CALCULATIONS

Equation: Bn = 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 kHzD = 2.5 kHz $Bn = (2x3.0) + (2x2.5) \times 1$ = 11.0 kHz

Emission Designator 11K0F3E F3E represents an FM voice transmission

Fast Frequency Shift Keying (FFSK – 1200 bps) 12.5 kHz Bandwidth			
Necessary bandwidth	Emission Designator		
M = 1.8 kHz	6K60F2D		
D = 1.5 kHz (60% of peak deviation)	F2D represents a FM data transmission with		
Bn = (2 x 1.8) + (2 x 1.5) x 1	the use of a modulating sub carrier		
= 6.6 kHz	-		

Fast Frequency Shift Keying (FFSK – 2400 bps) 12.5 kHz Bandwidth			
Necessary bandwidth	Emission Designator		
M = 2.4 kHz	7K80F2D		
D = 1.5 kHz (60% of peak deviation)	F2D represents a FM data transmission with		
Bn = (2 x 2.4) + (2 x 1.5) x 1	the use of a modulating sub carrier		
= 7.8 kHz	-		

Emission Designators – Continued	
Digital Voice 12.5 kHz Bandwidth DMR 99% bandwidth = 7.6 kHz FXW represents a FM Time Division Multiple Ac	Emission Designator 7K60FXW ccess (TDMA) combination of data and telephony
Digital Data 12.5 kHz Bandwidth DMR 99% bandwidth = 7.6 kHz FXD represents FM Time Division Multiple Acce	Emission Designator 7K60FXD ess (TDMA) data only
Digital Voice 12.5 kHz Bandwidth P25 phas 99% bandwidth = 8.1 kHz	se 1 Emission Designator 8K10F1E F1E represents a digital FM voice transmission
Digital Data 12.5 kHz Bandwidth P25 phase 99% bandwidth = 8.1 kHz	e 1 Emission Designator 8K10F1D F1D represents an digital FM data transmission
Digital Voice 12.5 kHz Bandwidth P25 phas 99% bandwidth = 8.1 kHz	e 2 Emission Designator 8K10F1W F1W represents a single FM telephony channel
Digital Data 12.5 kHz Bandwidth P25 phase 99% bandwidth = 8.1 kHz	e 2 Emission Designator 8K10F1W F1W represents digital FM data transmission

TEST RESULTS

TRANSMITTER OUTPUT POWER (CONDUCTED)

SPECIFICATION: FCC 47 CFR 2.1046 RSS-119 5.4

GUIDE: TIA/EIA-603D 2.2.1

MEASUREMENT PROCEDURE:

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

MEASUREMENT RESULTS:

Manufacturer's Rated Output Power

Manufacturer's Rated Ou	tput Power:		Switchable: 5 W and 1 W
Nominal 5 W	Measured	Variation (%)	Variation (dB)
138.1 MHz	5.4	7.13	0.3
143.9 MHz	5.2	4.28	0.2
148.1 MHz	5.3	6.04	0.3
149.8 MHz	5.4	7.02	0.3
150.1 MHz	5.4	7.54	0.3
152.0 MHz	5.4	7.95	0.3
156.3 MHz	5.4	7.23	0.3
156.67 MHz	5.4	7.31	0.3
157.0 MHz	5.4	7.93	0.3
160.0 MHz	5.2	4.85	0.2
161.0 MHz	5.3	5.86	0.2
162.0 MHz	5.3	5.21	0.2
162.1 MHz	5.3	5.10	0.2
168.0 MHz	5.0	0.04	0.0
173.9 MHz	5.0	-0.70	0.0
Measurement Uncertainty		± 0.6	6 dB

Transmitter Output Power (Conducted) - continued

Nominal 1 W	Measured	Variation (%)	Variation (dB)
138.1 MHz	1.1	10.64	0.4
143.9 MHz	1.1	7.44	0.3
148.1 MHz	1.1	10.00	0.4
149.8 MHz	1.1	11.64	0.5
150.1 MHz	1.1	11.34	0.5
152.0 MHz	1.1	12.28	0.5
156.3 MHz	1.1	11.69	0.5
156.67 MHz	1.1	10.86	0.4
157.0 MHz	1.1	11.79	0.5
160.0 MHz	1.1	12.04	0.5
161.0 MHz	1.1	10.59	0.4
162.0 MHz	1.1	9.41	0.4
162.1 MHz	1.1	8.87	0.4
168.0 MHz	1.0	2.39 0.1	
173.9 MHz	1.1	5.16	0.2
Measurement Uncertainty		± 0.6 dB	

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: TIA/EIA-603D 2.2.6

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 channel spacing tested at 5 W transmit power.

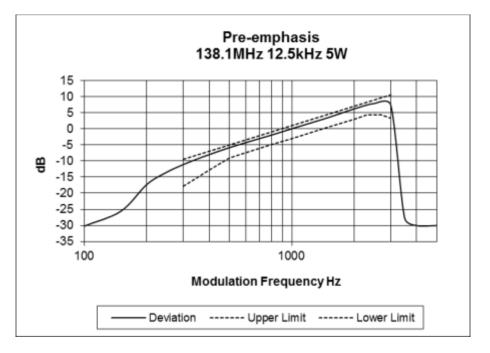
LIMIT CLAUSE: TIA/EIA-603D 3.2.6

MEASUREMENT UNCERTAINTY: ± 1.5 %

SPECIFICATION: FCC CFR 2.1047 (a)

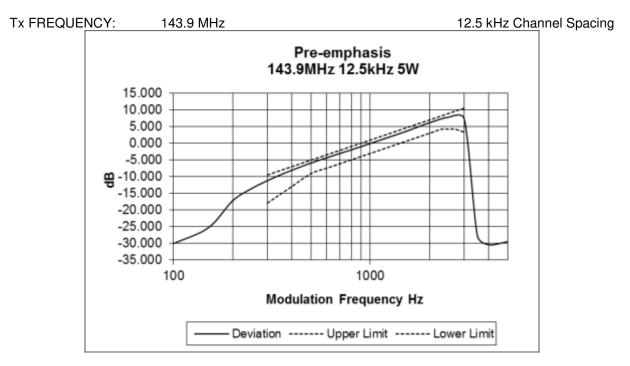
Tx FREQUENCY: 138.1 MHz

12.5 kHz Channel Spacing

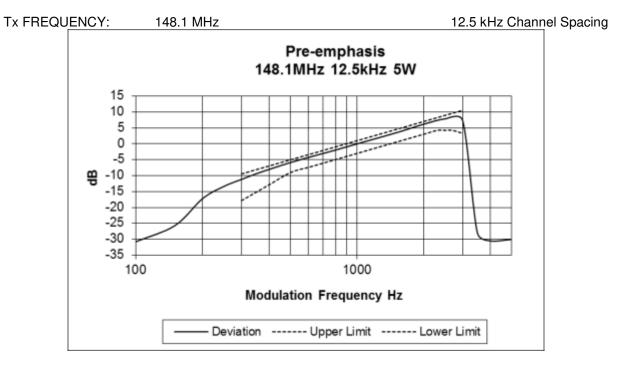


Transmitter Audio Frequency Response – Pre-emphasis

SPECIFICATION: FCC CFR 2.1047 (a)

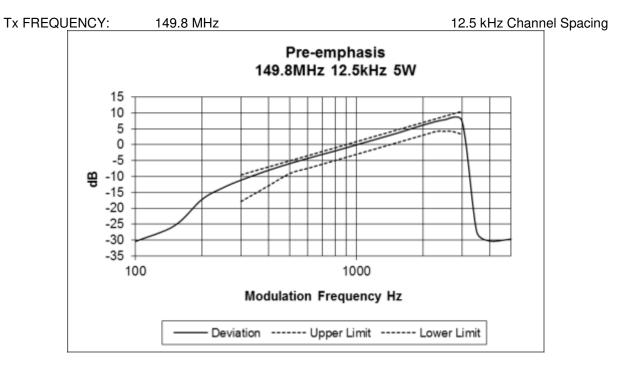


SPECIFICATION:

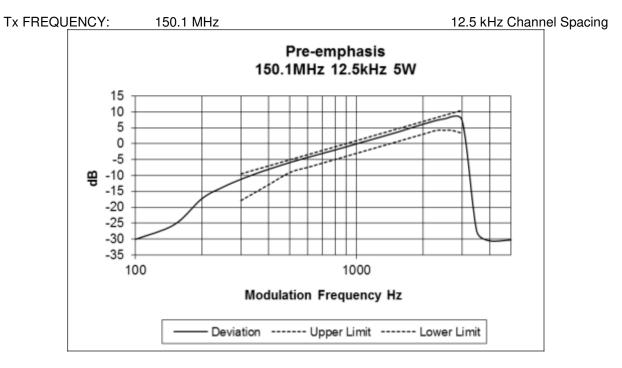


Transmitter Audio Frequency Response – Pre-emphasis

SPECIFICATION: FCC CFR 2.1047 (a)

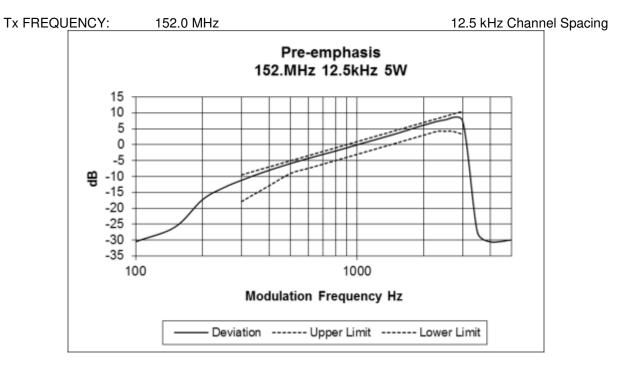


SPECIFICATION:

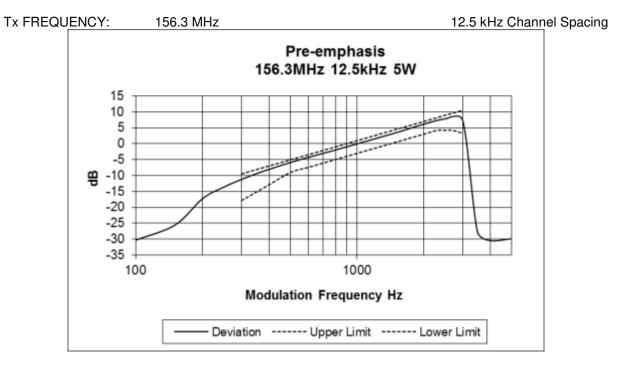


Transmitter Audio Frequency Response – Pre-emphasis

SPECIFICATION: FCC CFR 2.1047 (a)

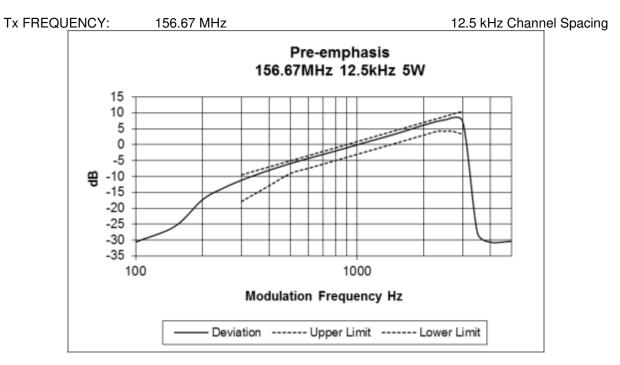


SPECIFICATION:

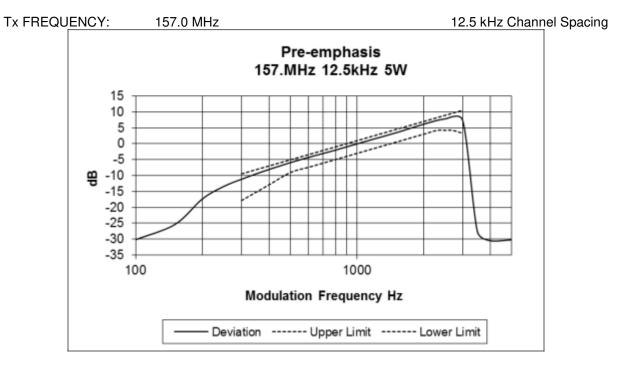


Transmitter Audio Frequency Response – Pre-emphasis

SPECIFICATION: FCC CFR 2.1047 (a)

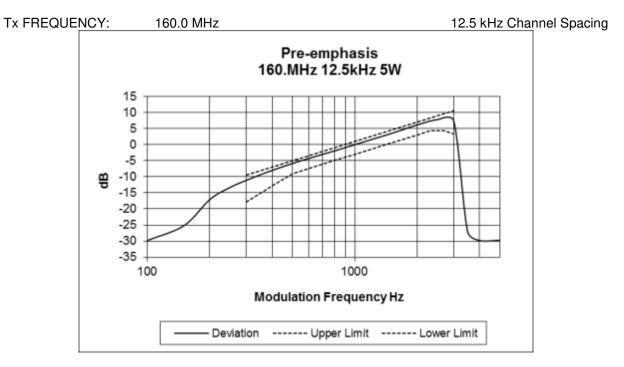


SPECIFICATION:

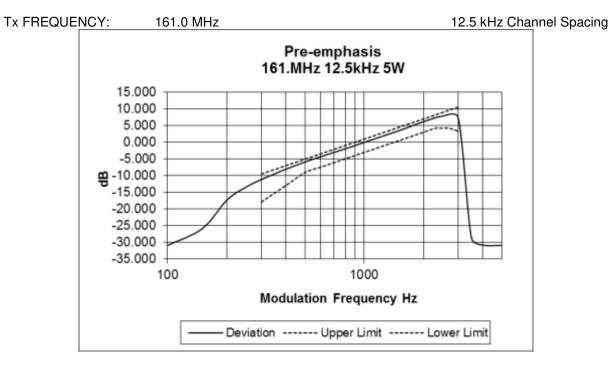


Transmitter Audio Frequency Response – Pre-emphasis

SPECIFICATION: FCC CFR 2.1047 (a)

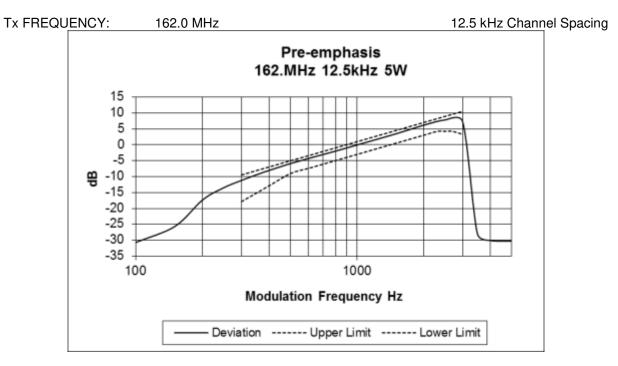


SPECIFICATION:

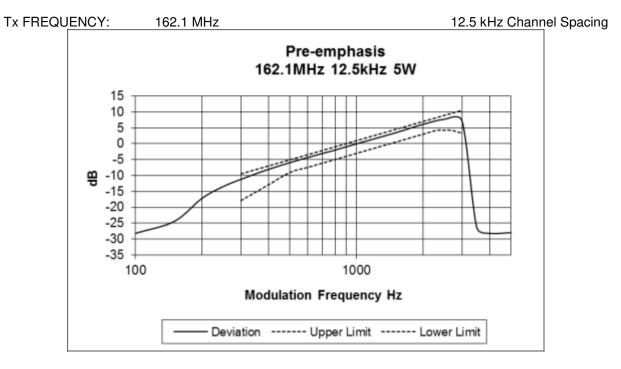


Transmitter Audio Frequency Response – Pre-emphasis

SPECIFICATION: FCC CFR 2.1047 (a)

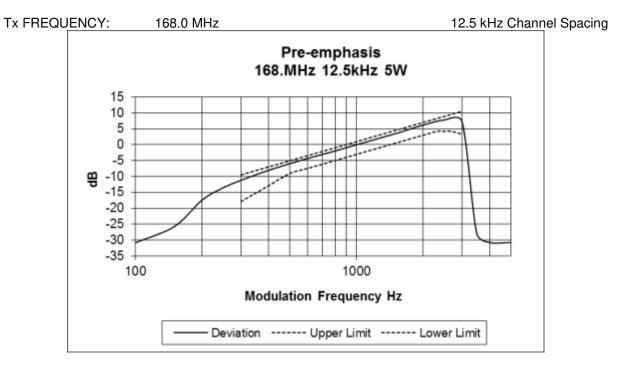


SPECIFICATION:

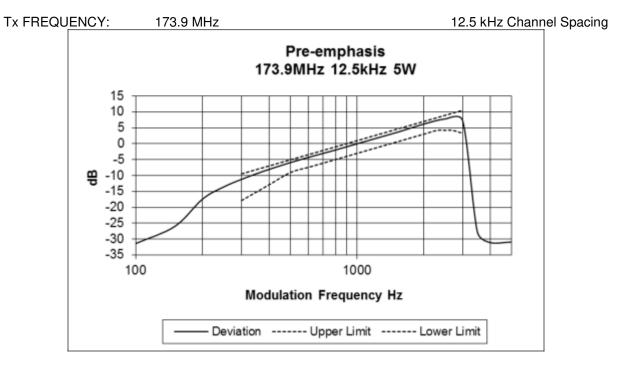


Transmitter Audio Frequency Response – Pre-emphasis

SPECIFICATION: FCC CFR 2.1047 (a)



SPECIFICATION:



TRANSMITTER MODULATION LIMITING

SPECIFICATION: FCC 47 CFR 2.1047 (b)

GUIDE: TIA/EIA-603D 2.2.3

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.

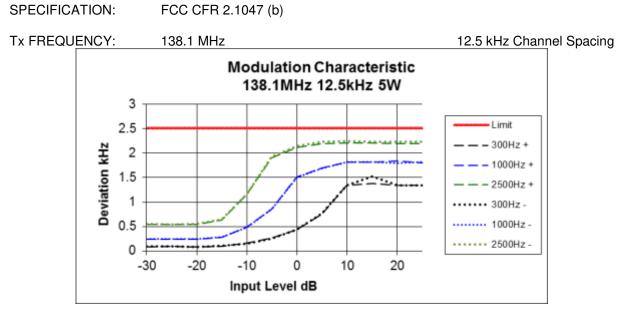
MEASUREMENT RESULTS:

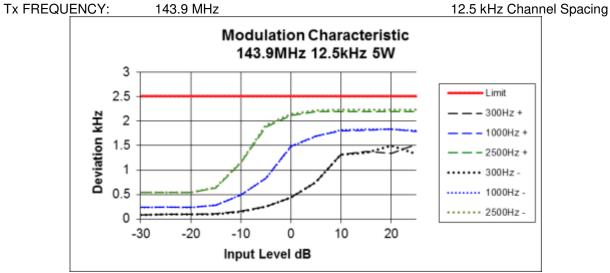
See the plots on the following pages for 12.5 kHz channel spacing.

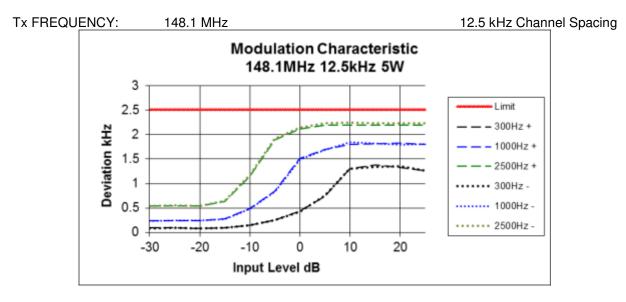
LIMIT CLAUSE: TIA/EIA-603D 1.3.4.4

MEASUREMENT UNCERTAINTY: ± 1.5 %

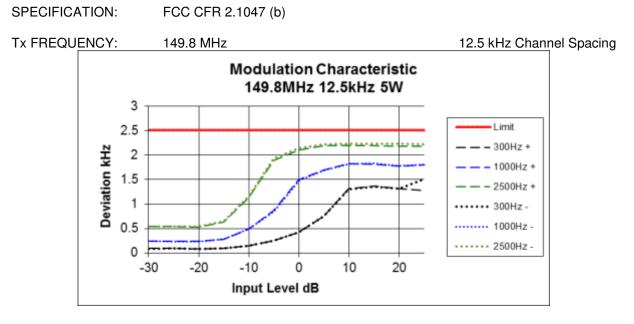
Transmitter Modulation Limiting

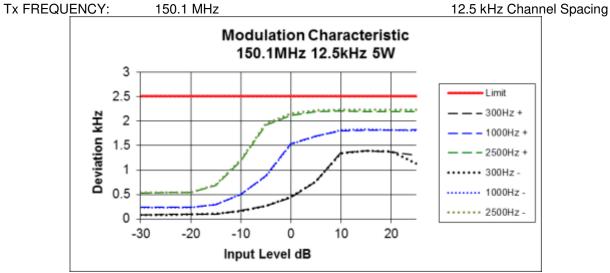


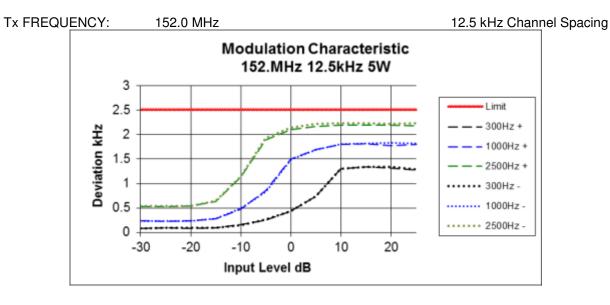




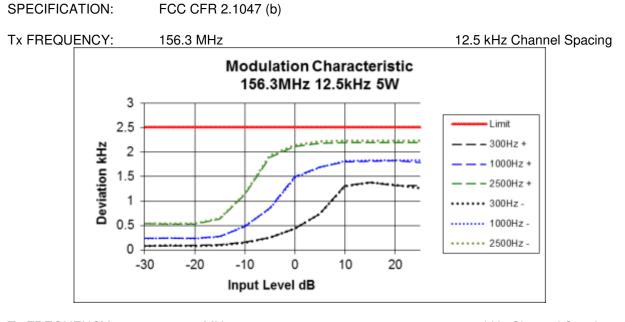
Transmitter Modulation Limiting

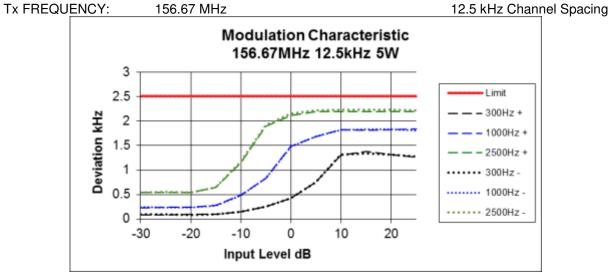


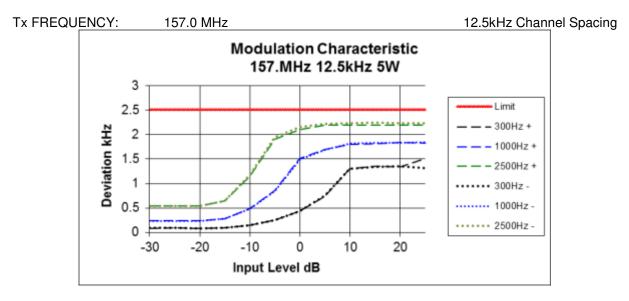




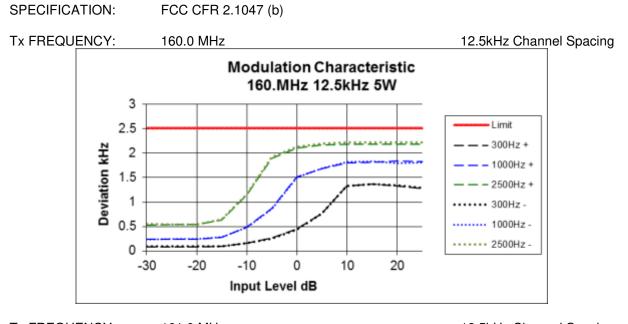
Transmitter Modulation Limiting

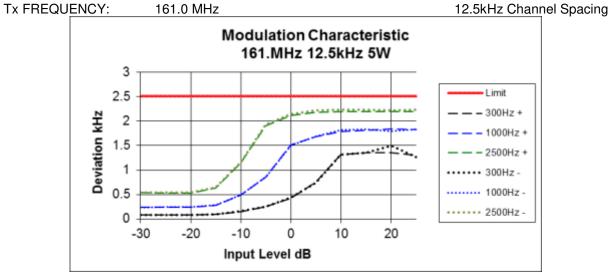


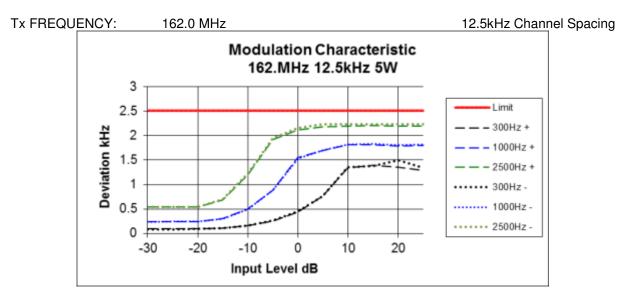




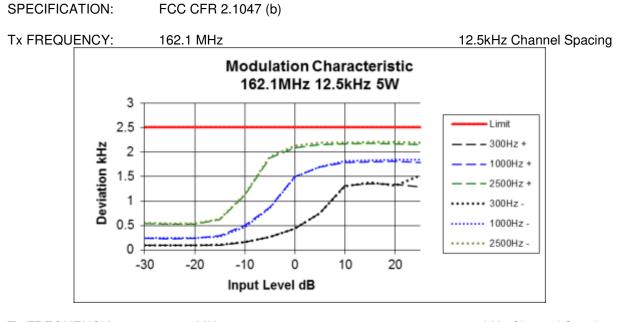
Transmitter Modulation Limiting

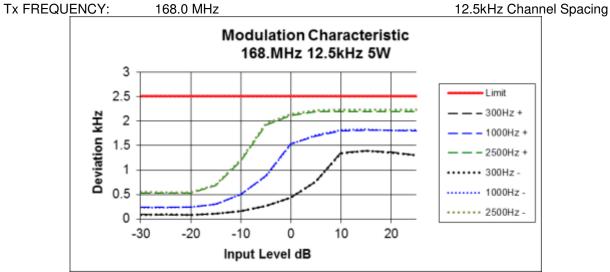


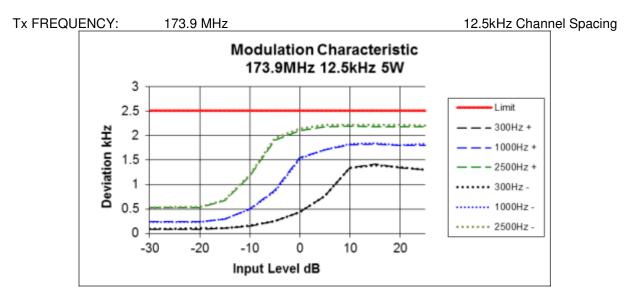




Transmitter Modulation Limiting







TRANSMITTER OCCUPIED BANDWIDTH AND SPECTRUM MASKS

SPECIFICATION: FCC 47 CFR 2.1049 (c)

RSS-119 5.5

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

MEASUREMENT PROCEDURE:

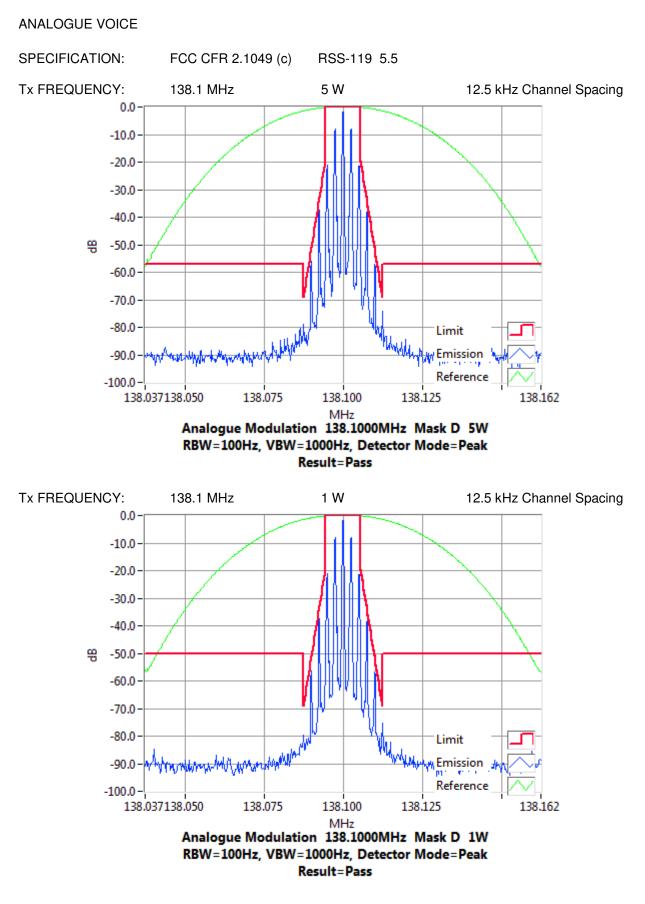
- 1. Refer Annex A for Equipment Set up.
- 2. For Analogue measurements: The EUT was modulated by a 2500 Hz tone at an input level 16 dB above a level that produced 50% deviation. The input level was established at the frequency of maximum response of the audio modulating circuit. For Data measurements: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

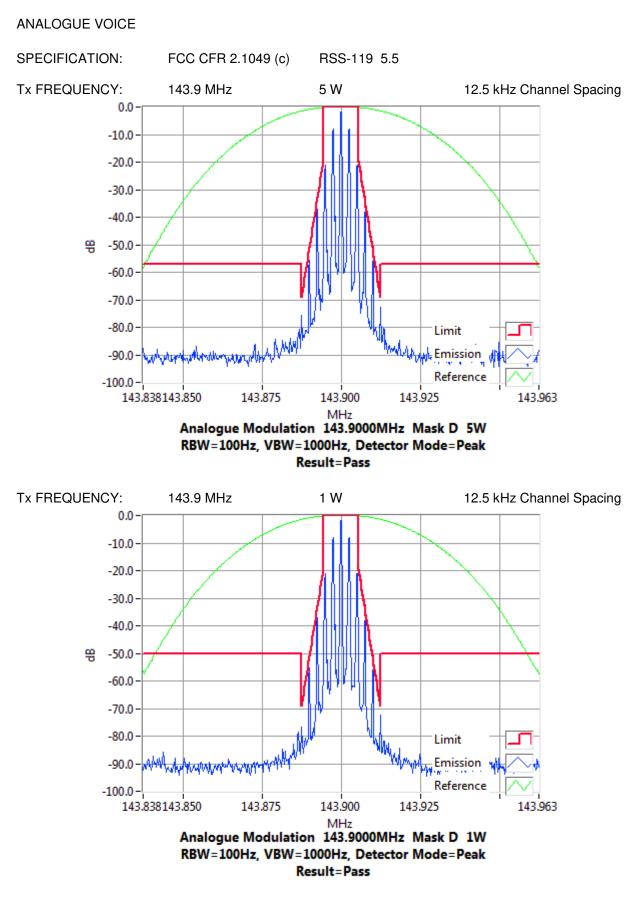
Emission Mask D - Resolution Bandwidth = 100 Hz, Video Bandwidth = 1 kHz

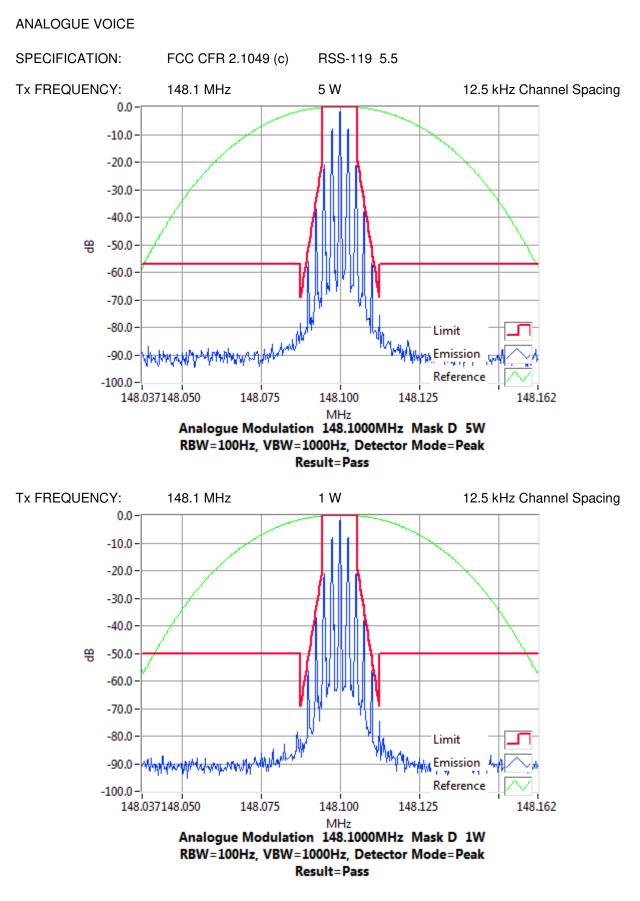
MEASUREMENT RESULTS:

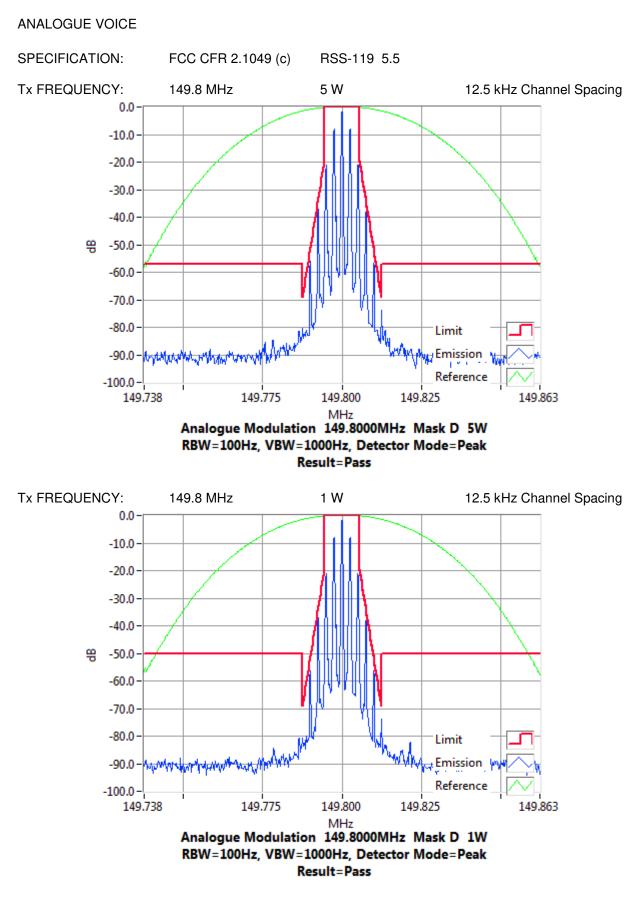
See the plots on the following pages for 12.5 kHz channel spacing.

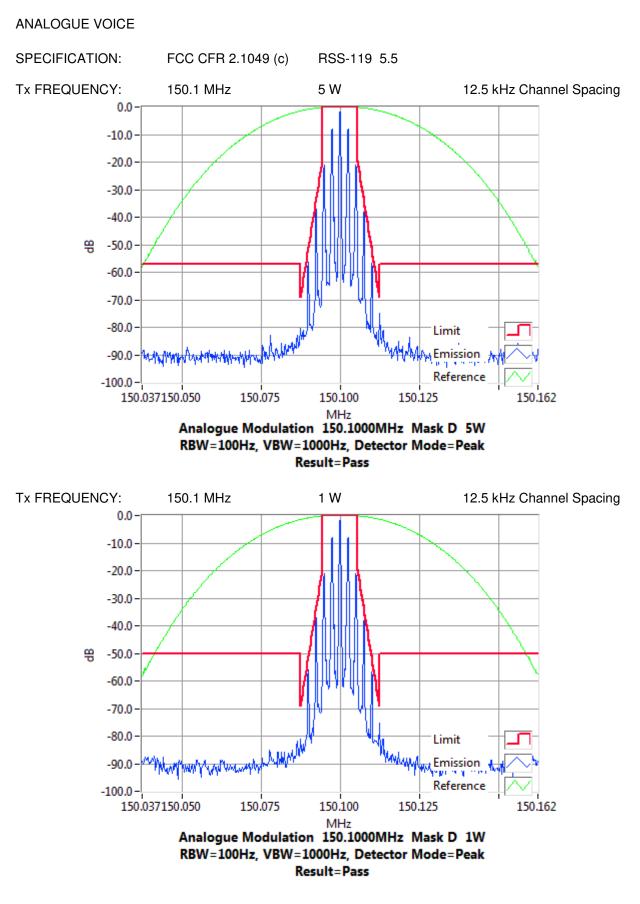
MEASUREMENT UNCERTAINTY 95%		±0.65dB		
LIMIT CLAUSE:	FCC 47 CFR 90.210		RSS-119 5.5	
EMISSION MASKS Emission Mask D	12.5 kHz Channel Spacing		Analogue, FFSK, Digital Voice/data	
DATA SPEED Digital Voice/Data FFSK	12.5 kHz Channel Spac 12.5 kHz Channel Spac		9600 bps & 12000 bps 1200 bps & 2400 bps	

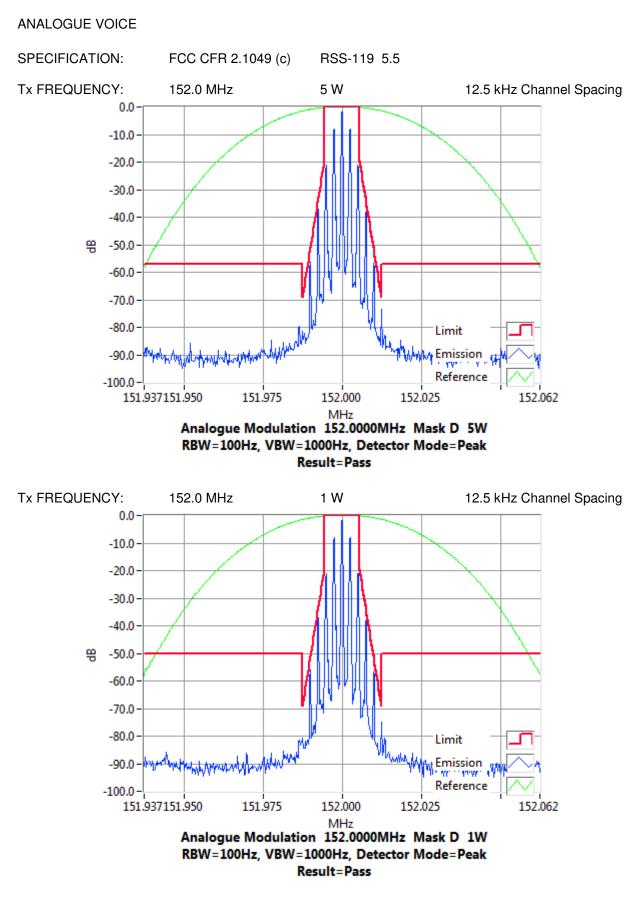




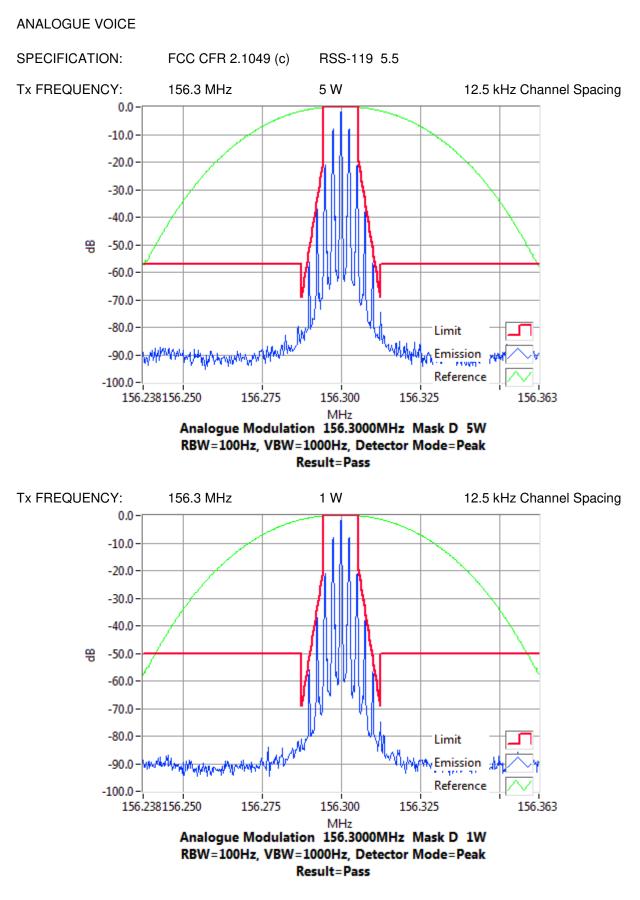


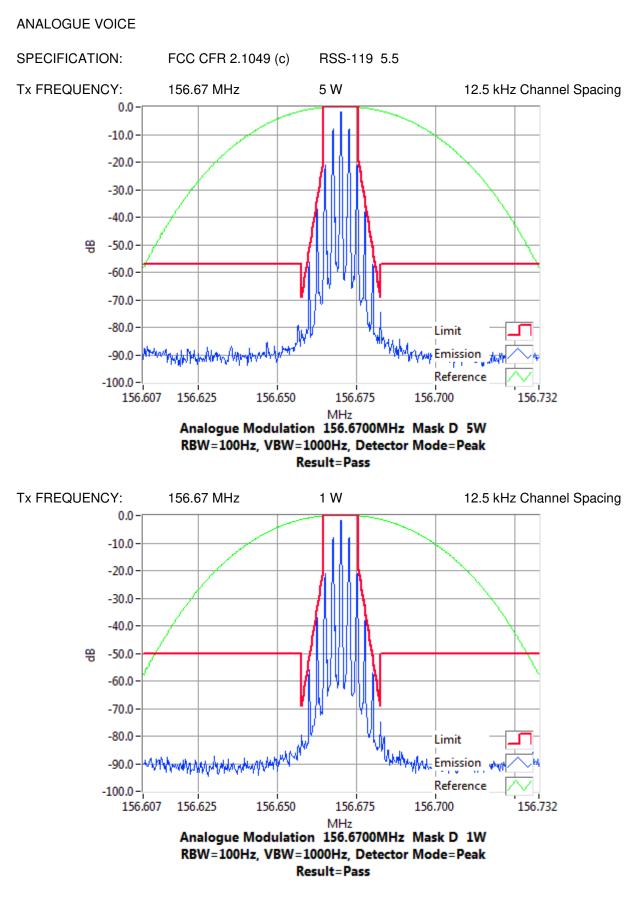


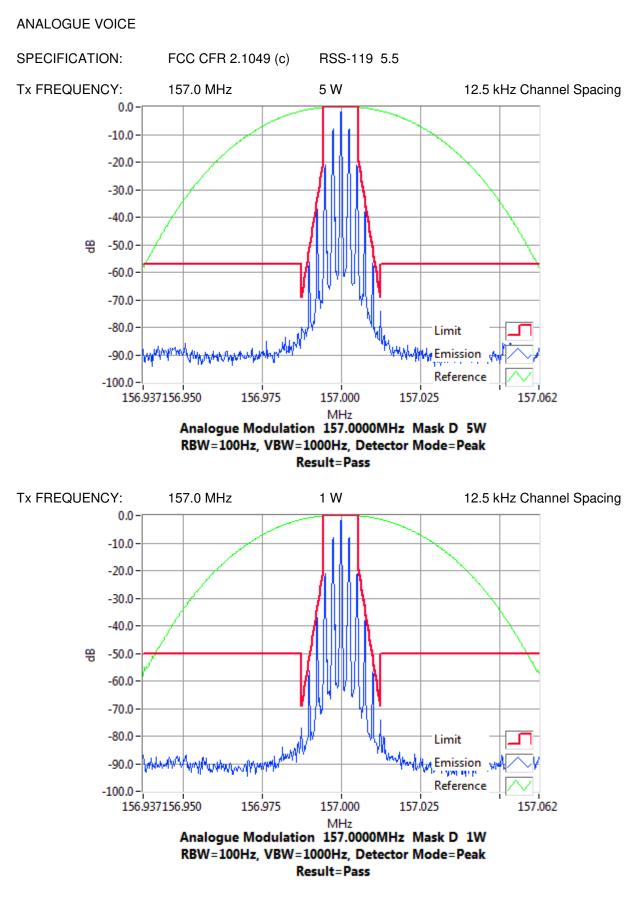


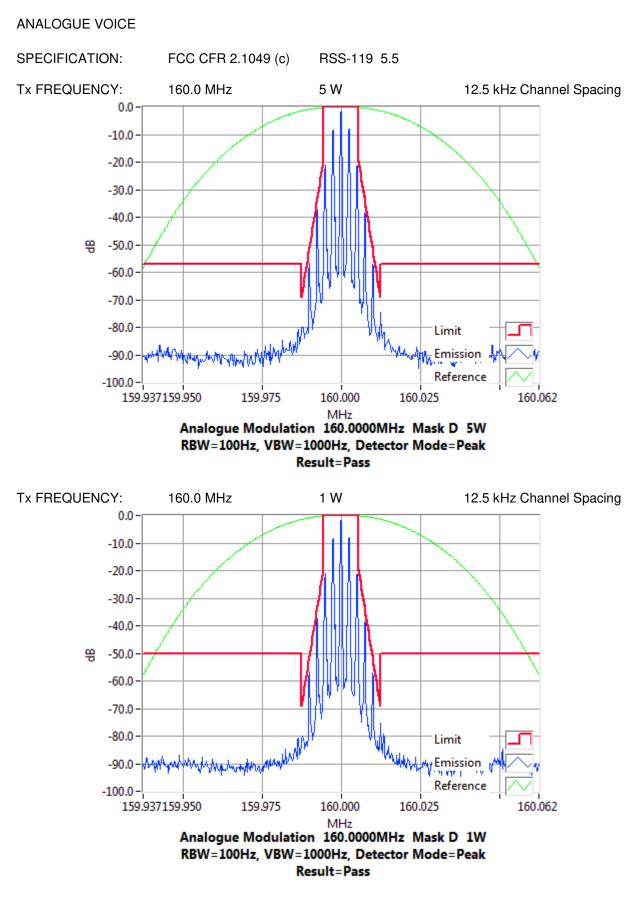


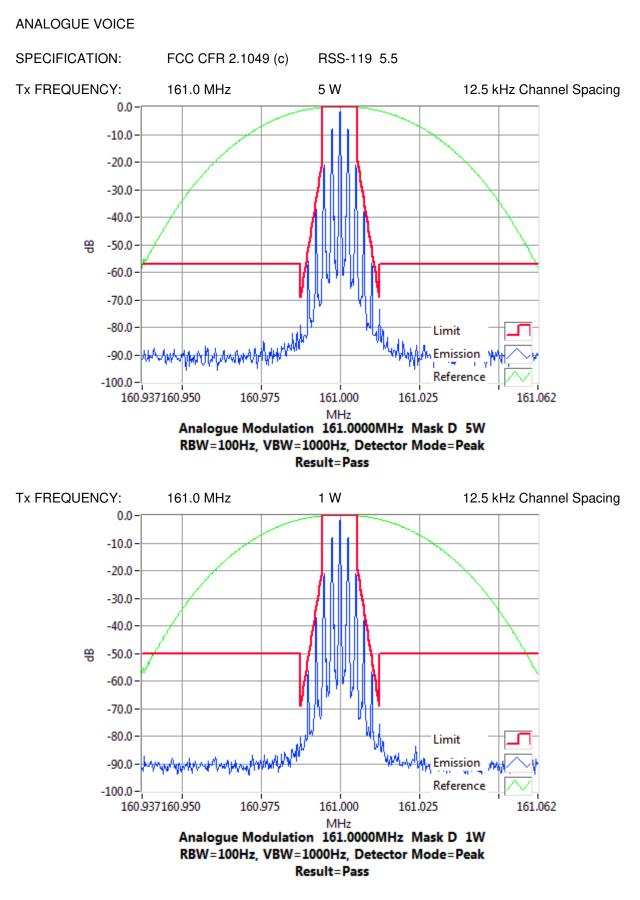
Occupied Bandwidth and Spectrum Masks

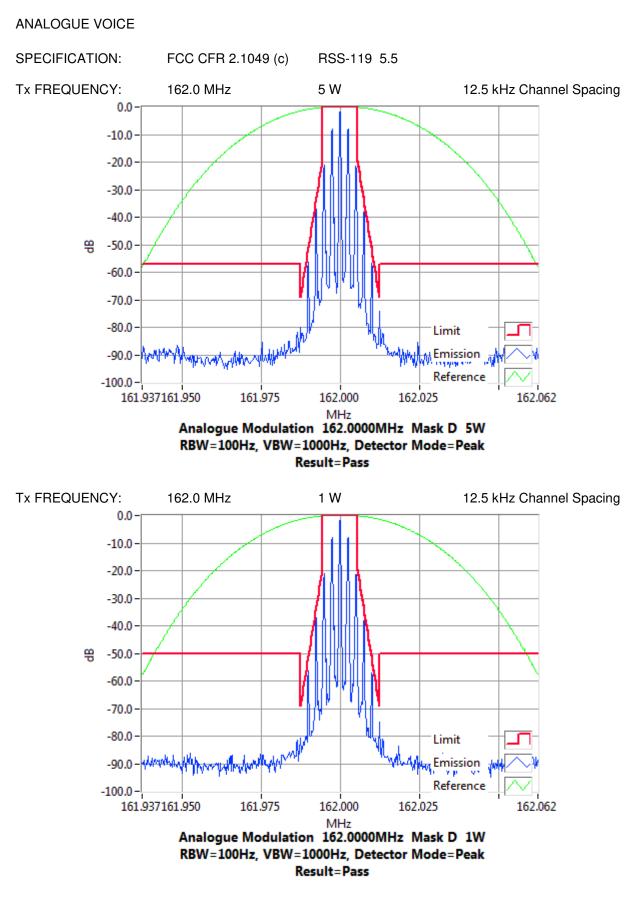


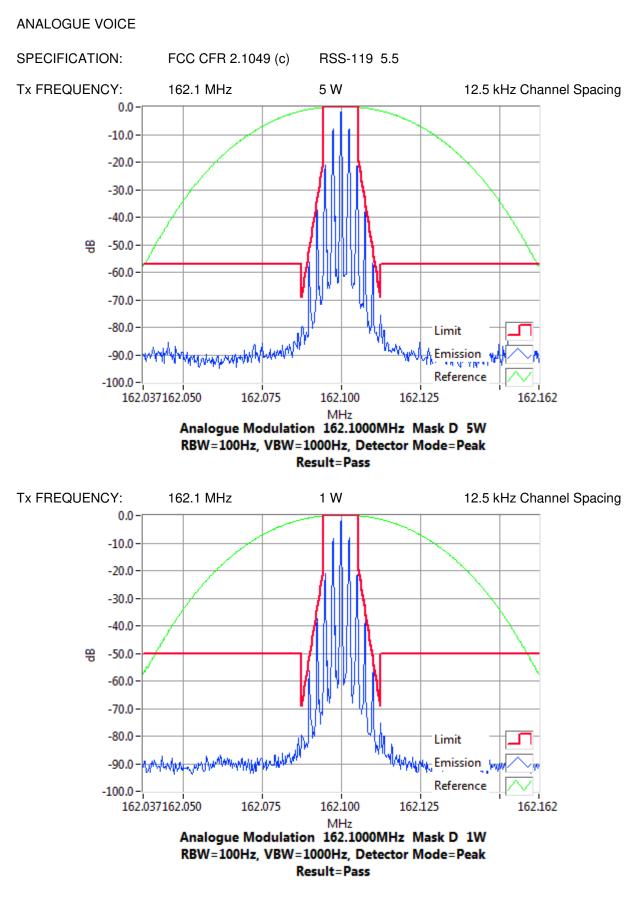


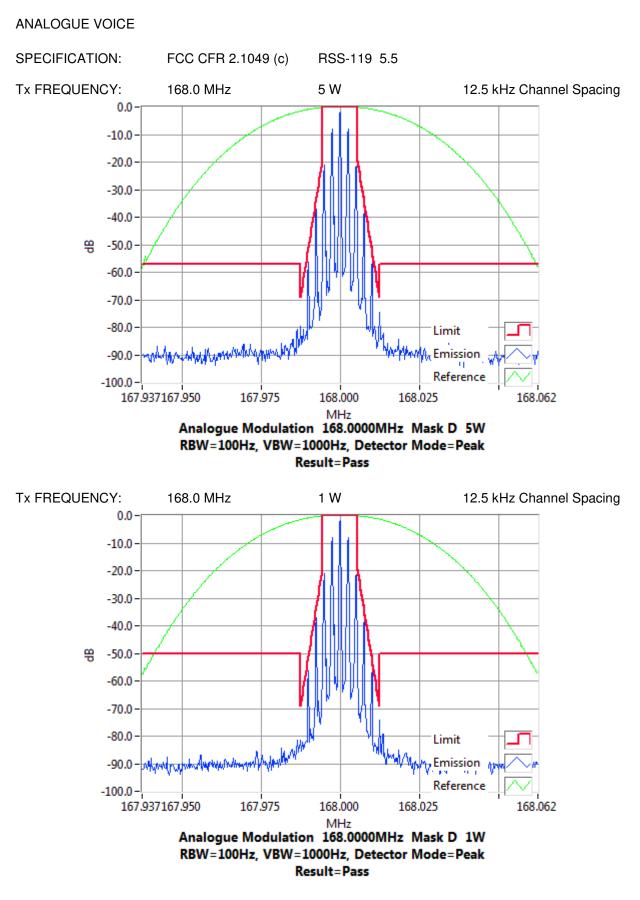


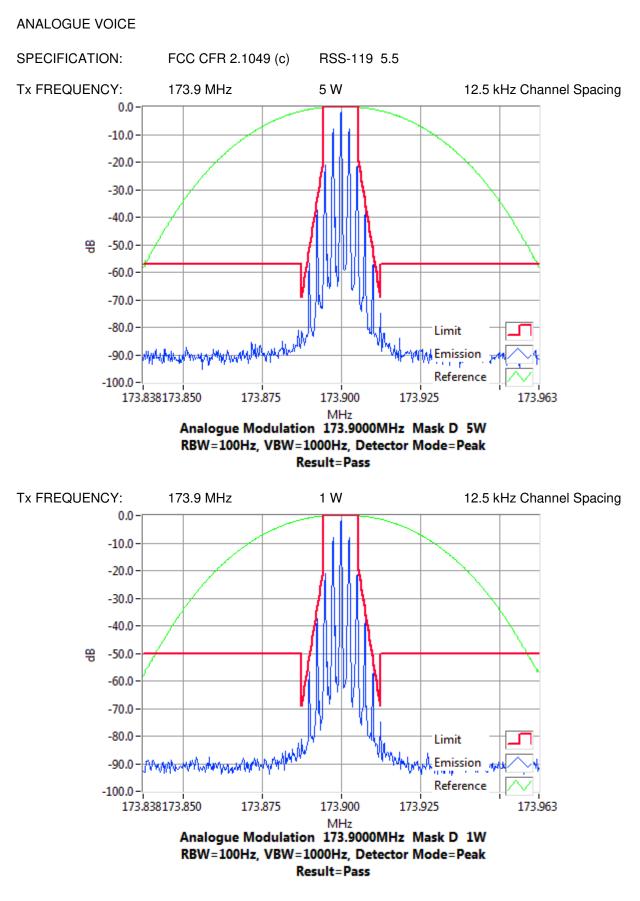


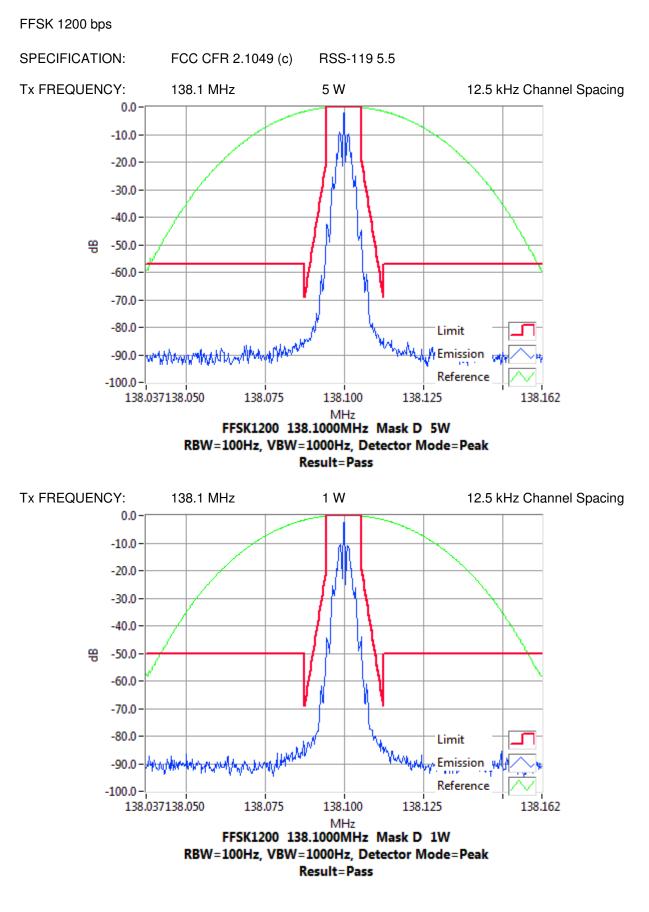


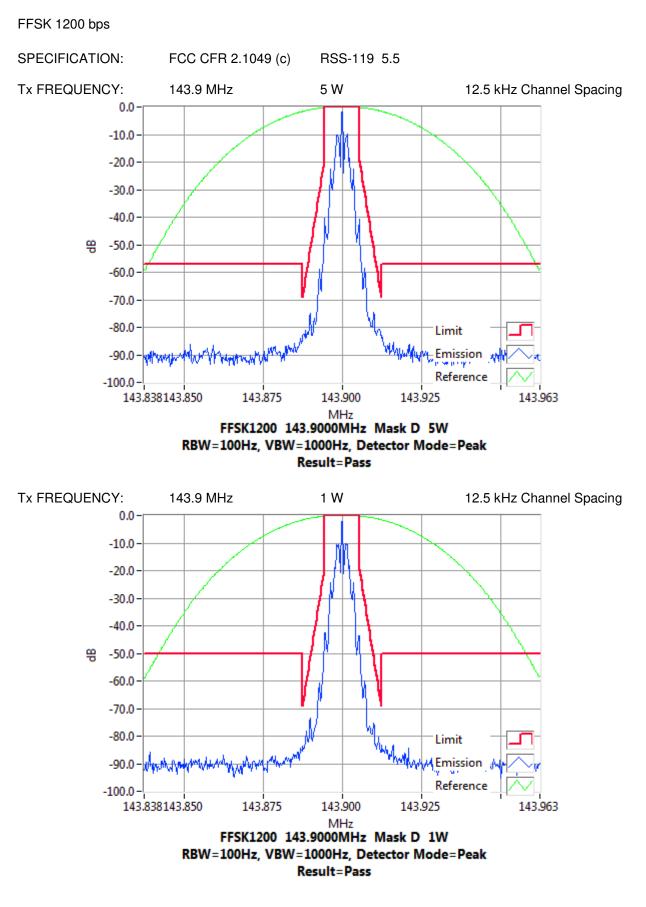


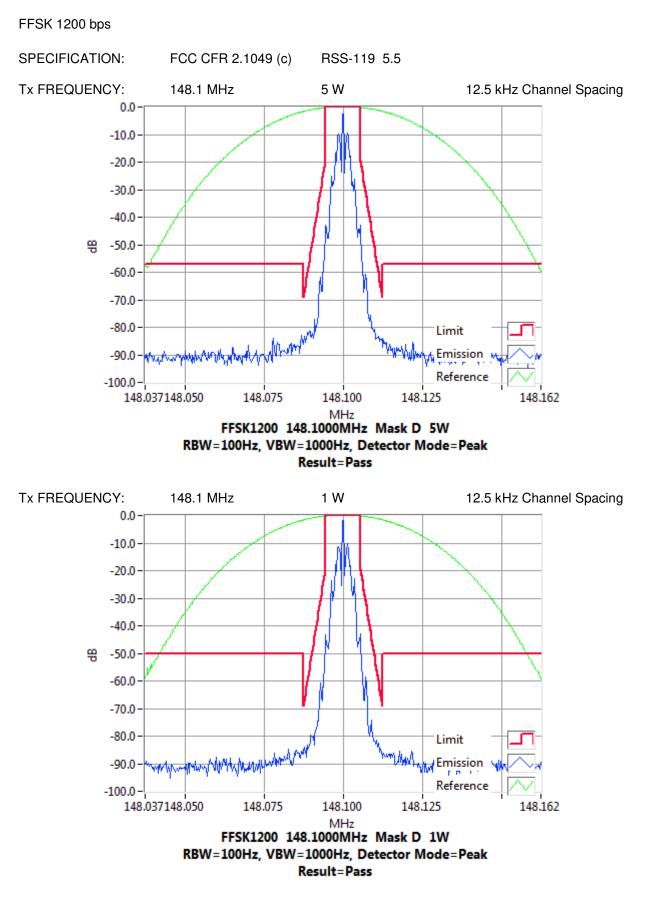


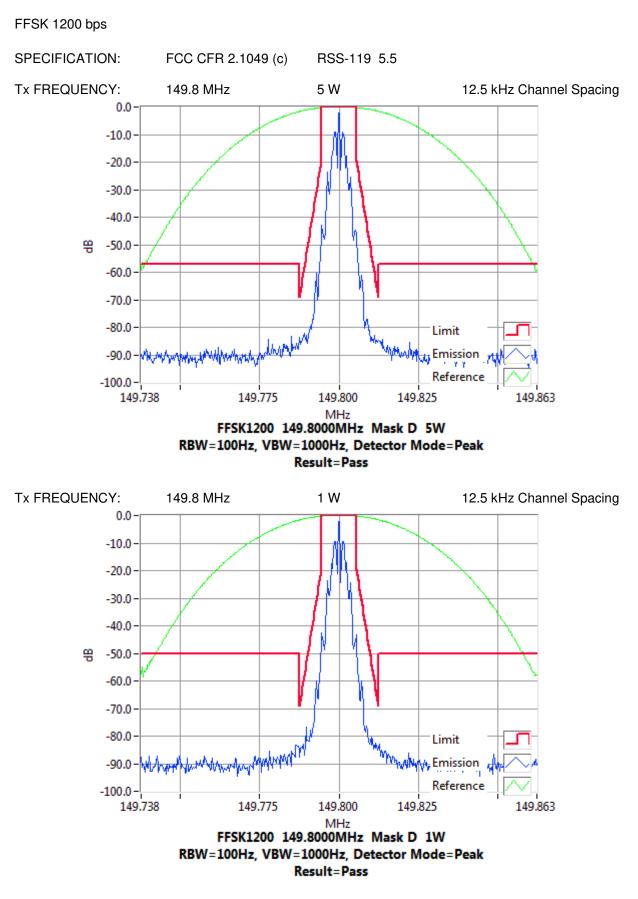


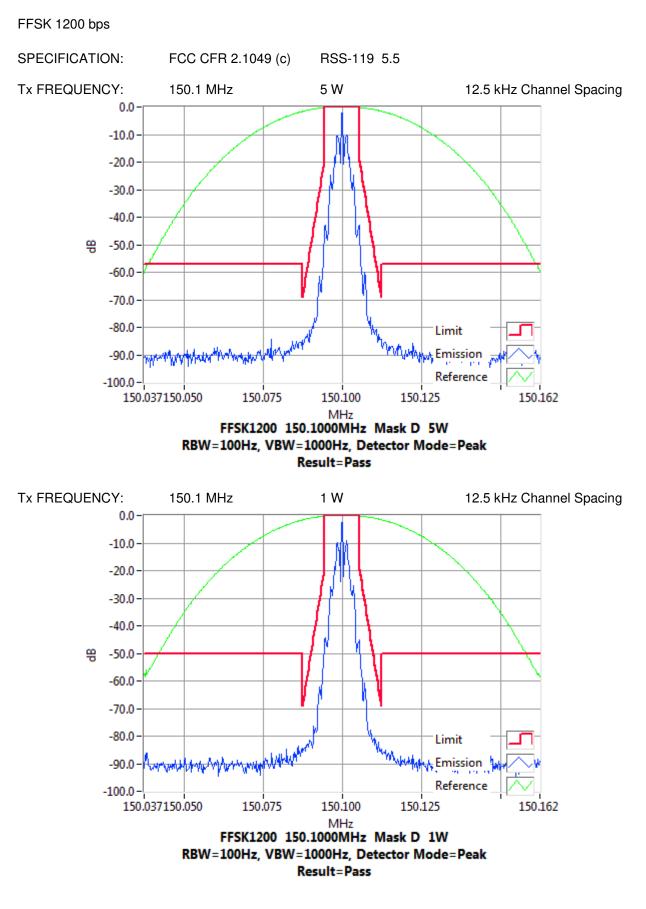


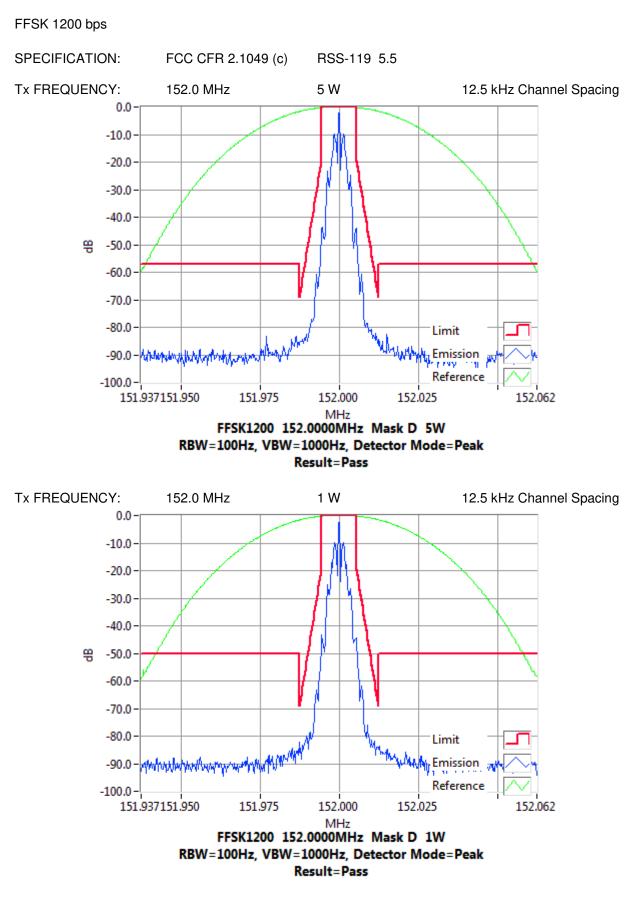


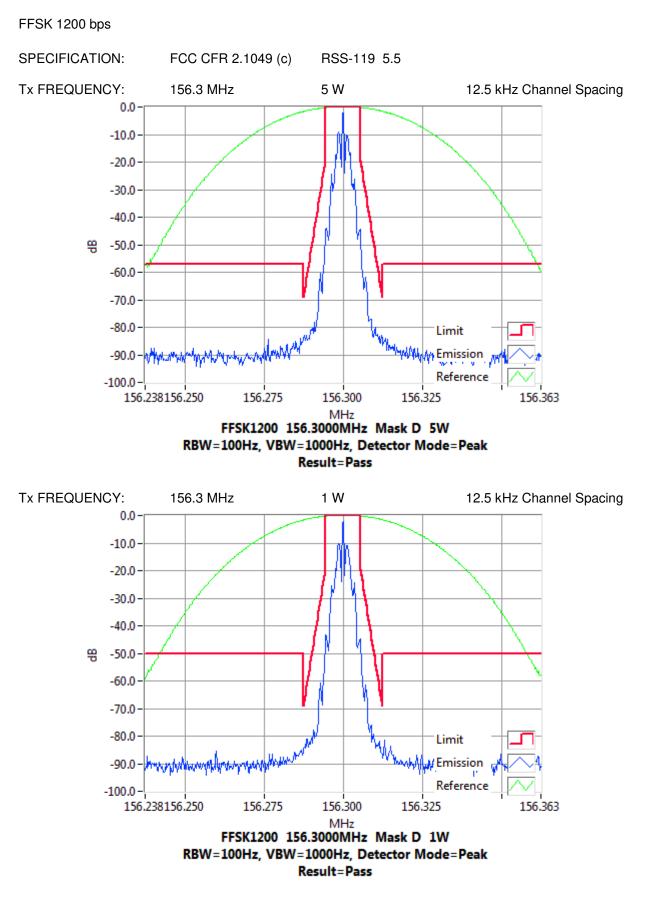


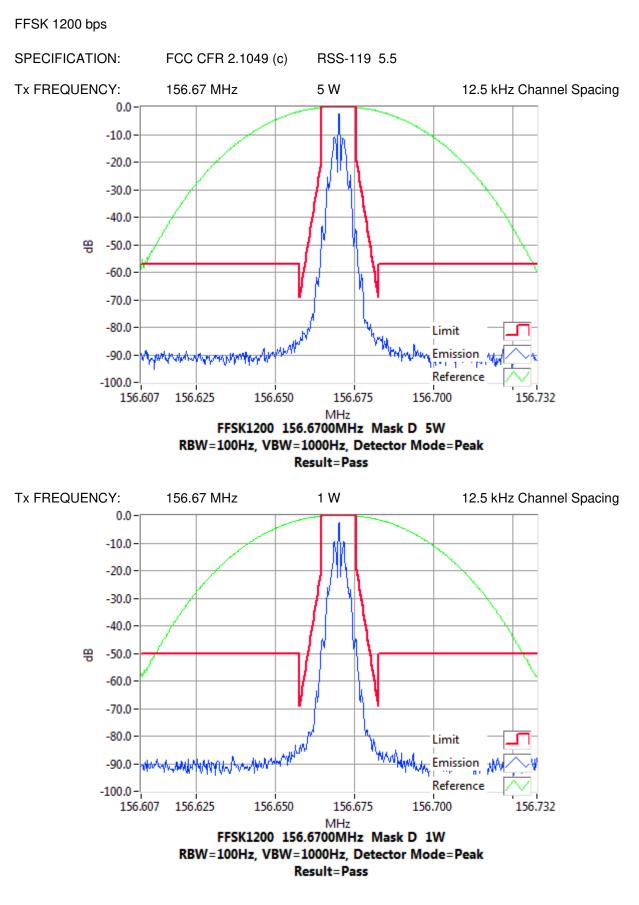


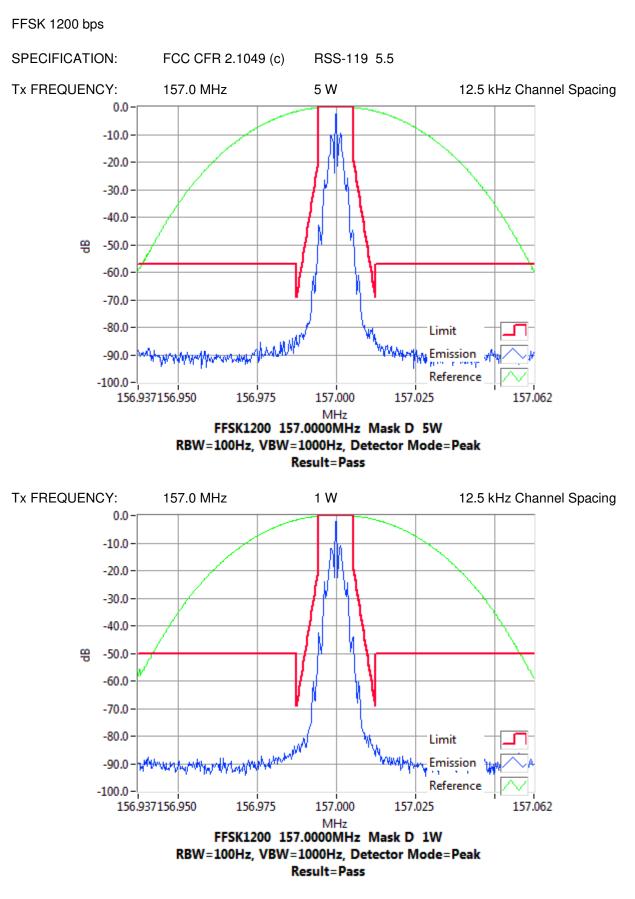


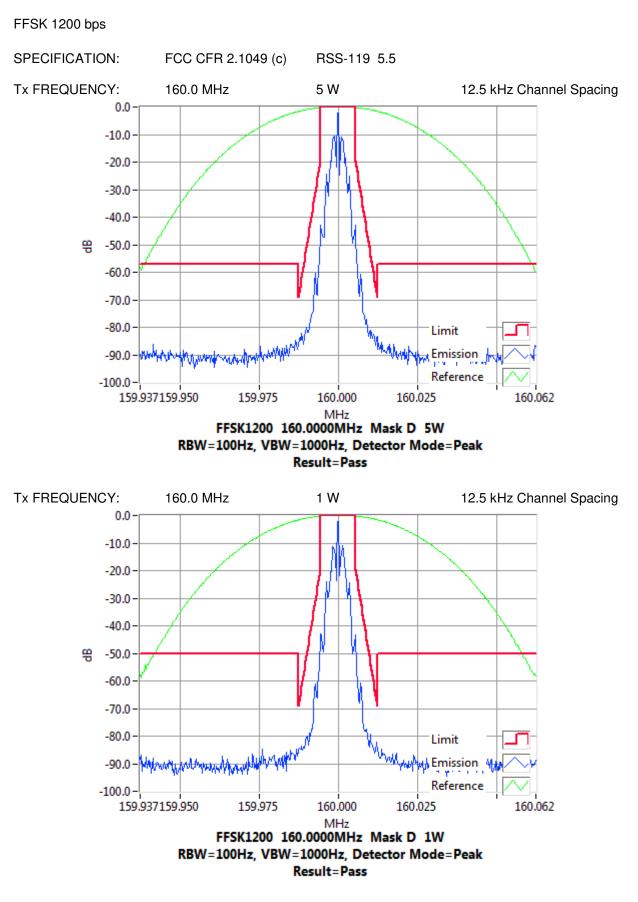


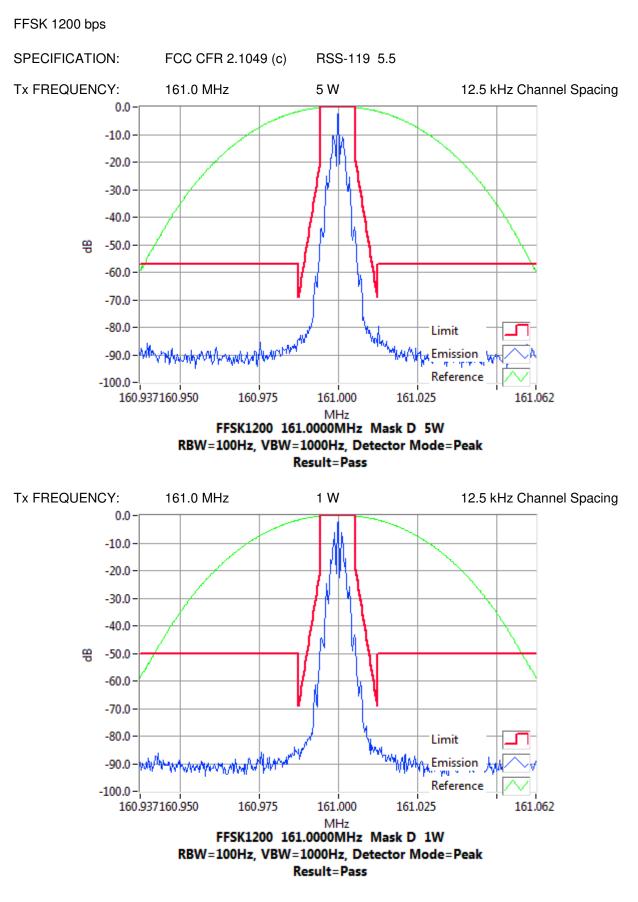


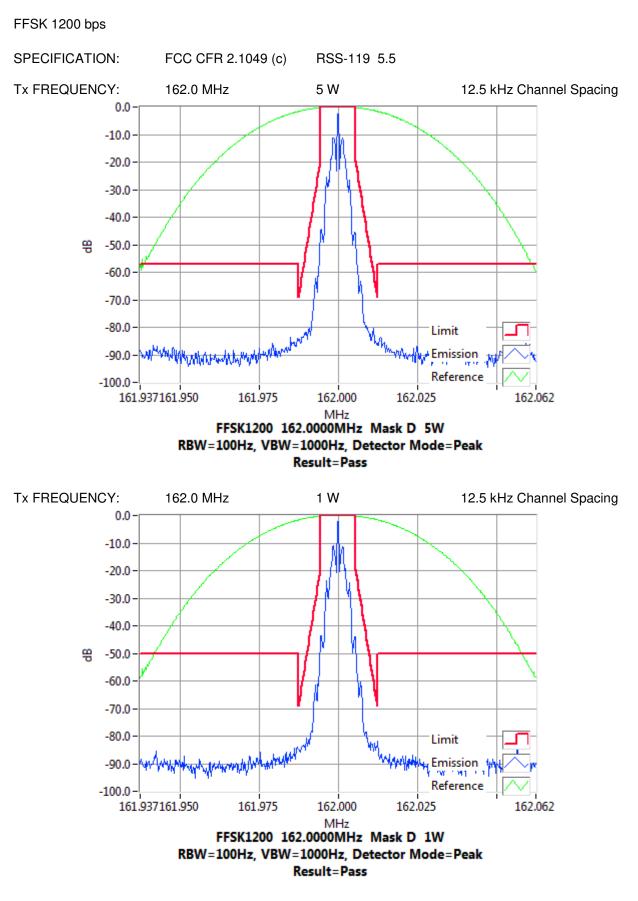


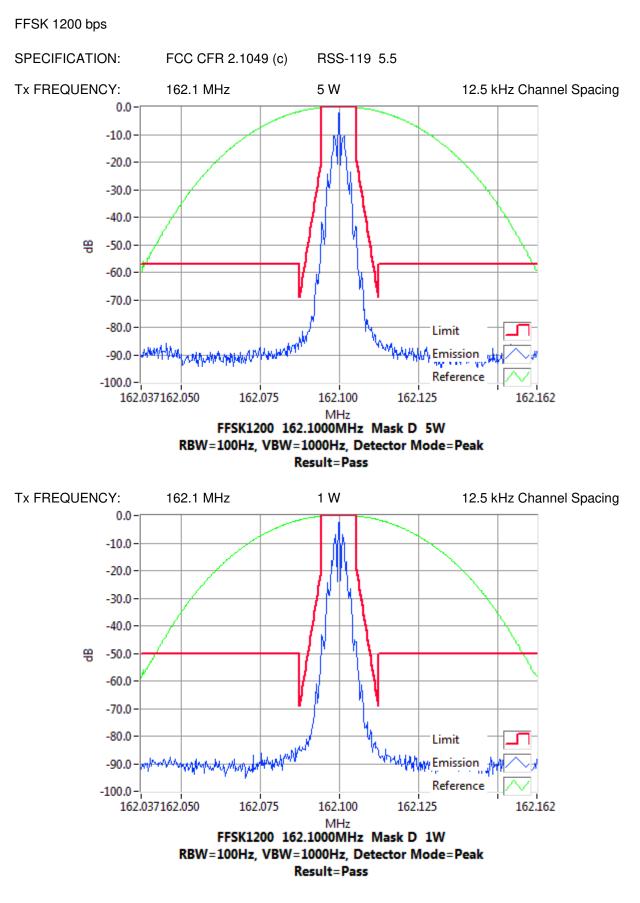


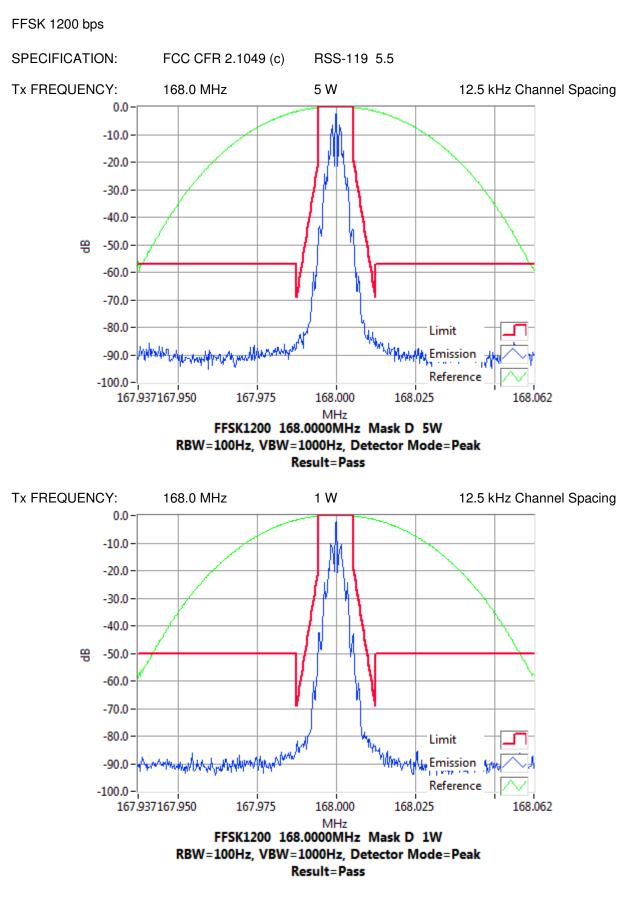


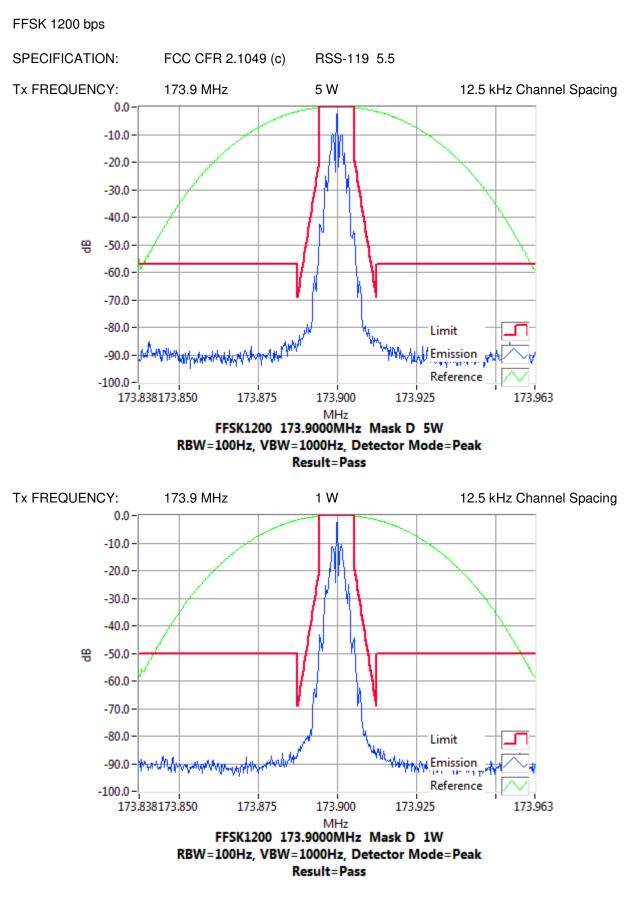


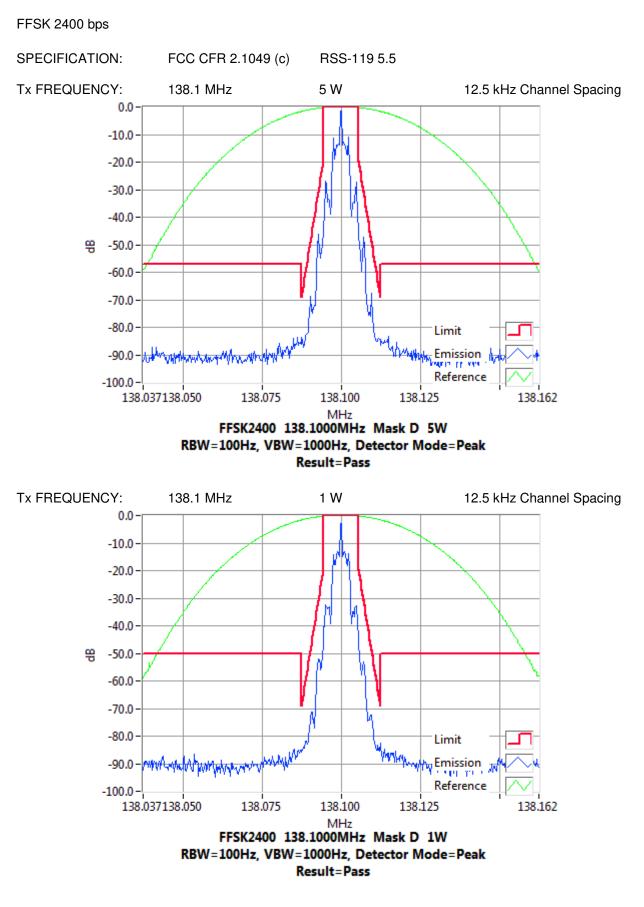


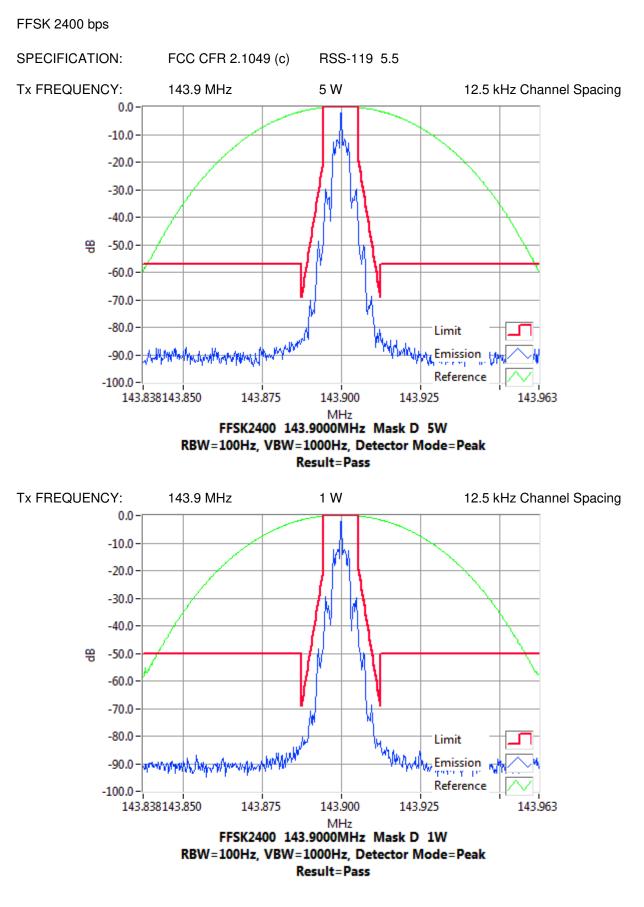


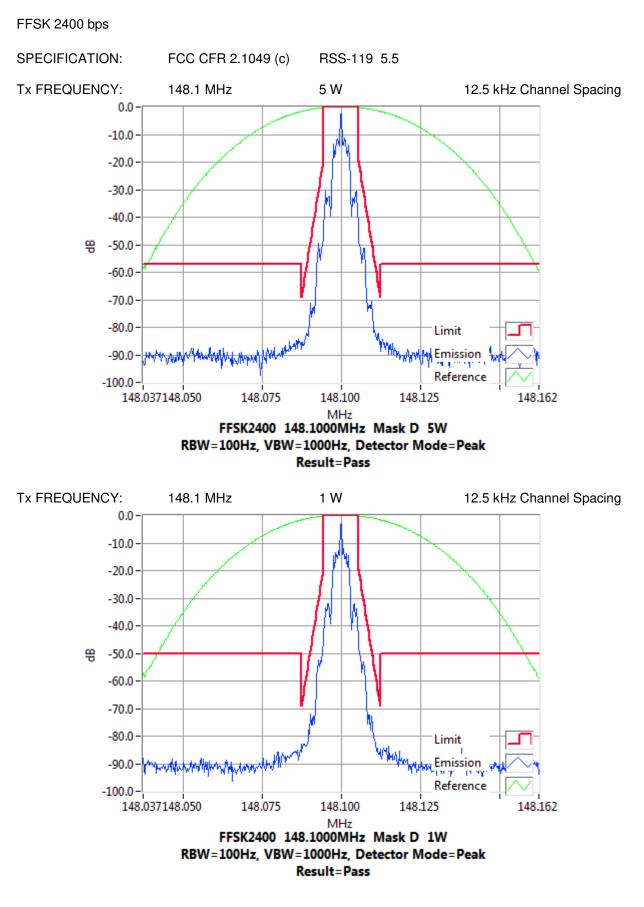


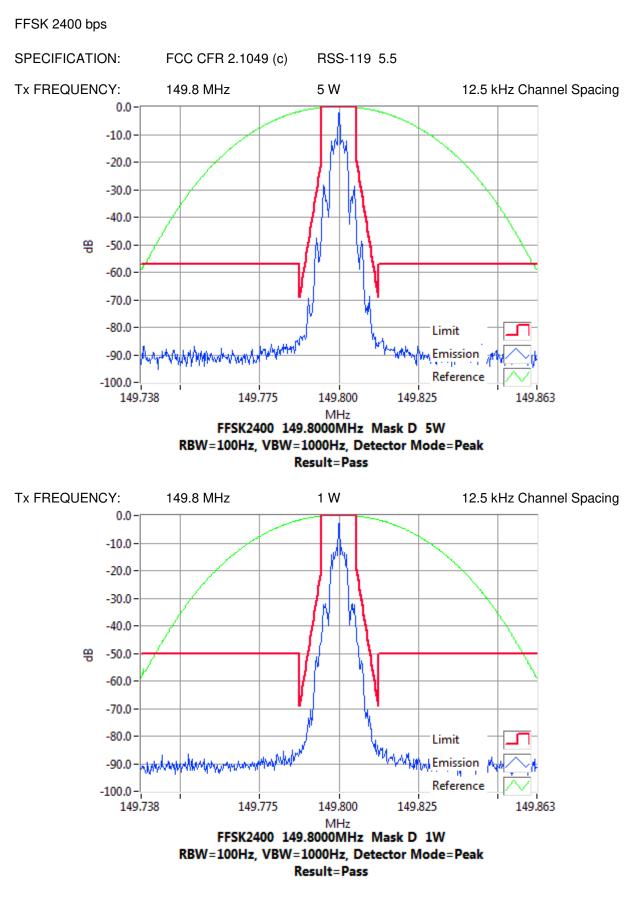


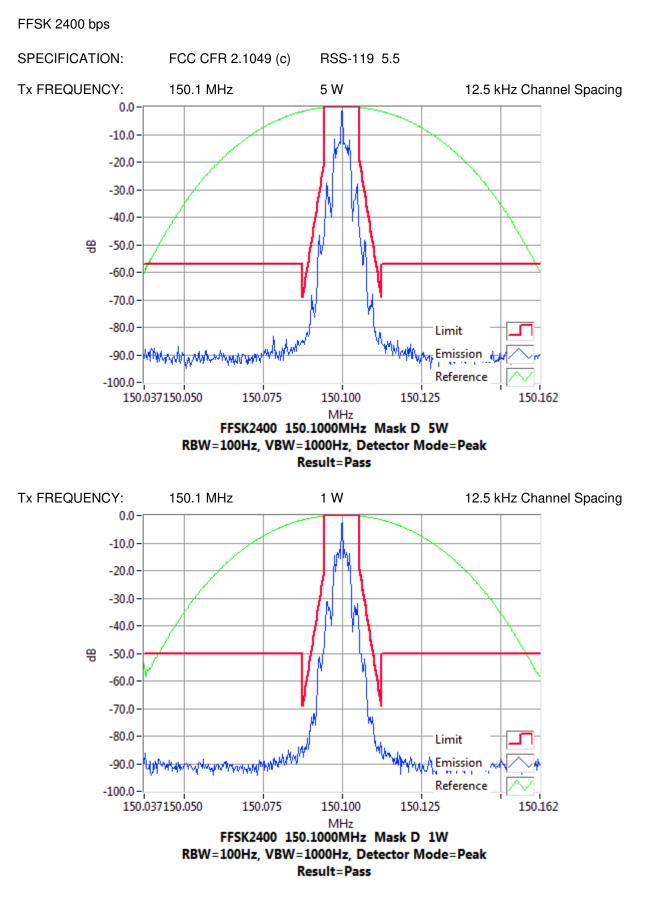


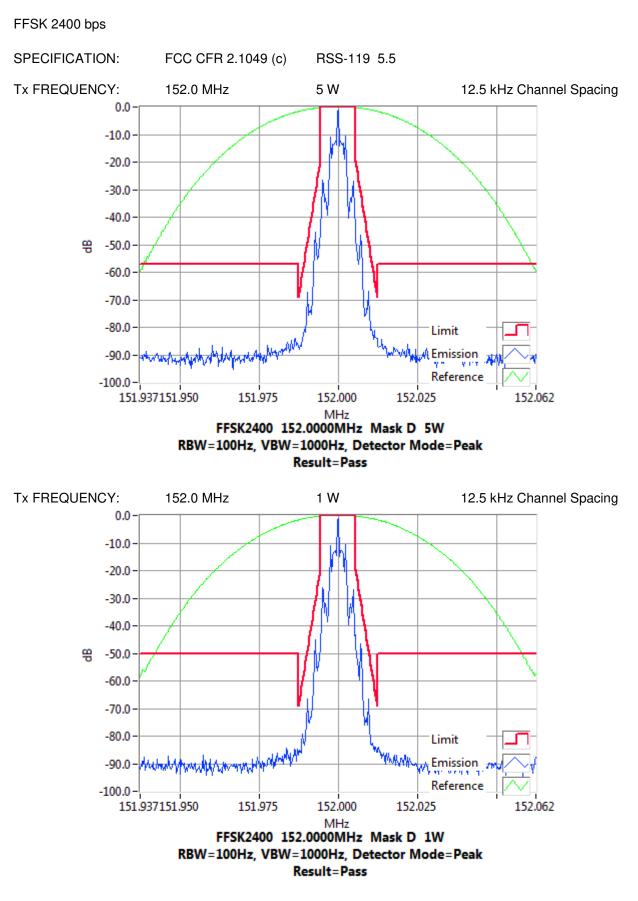


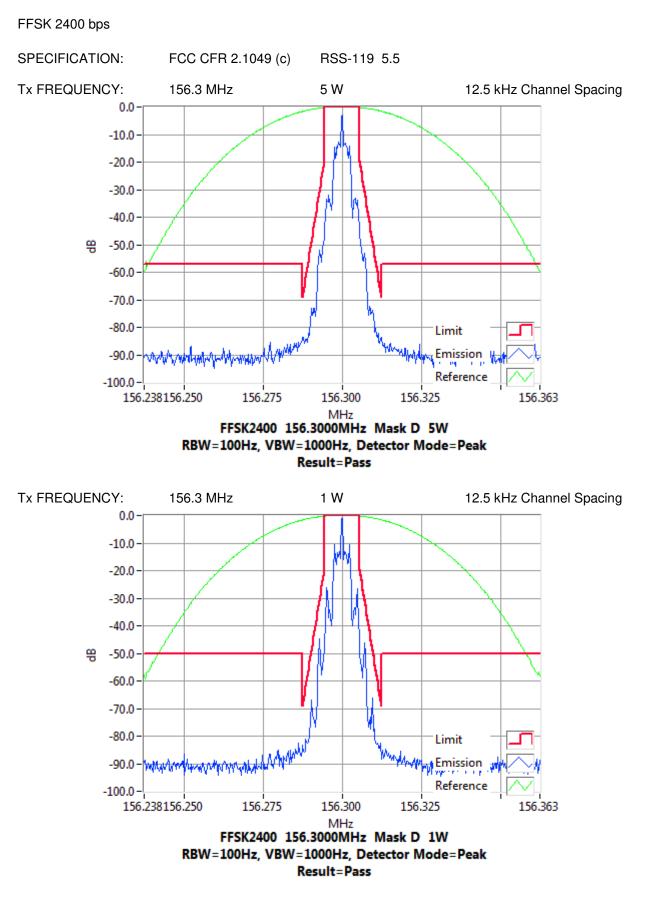


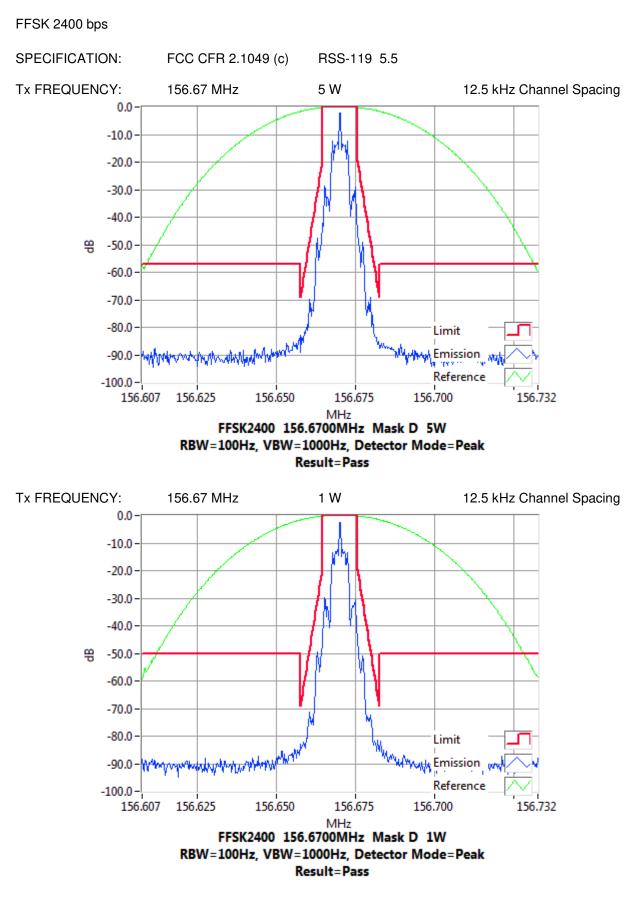


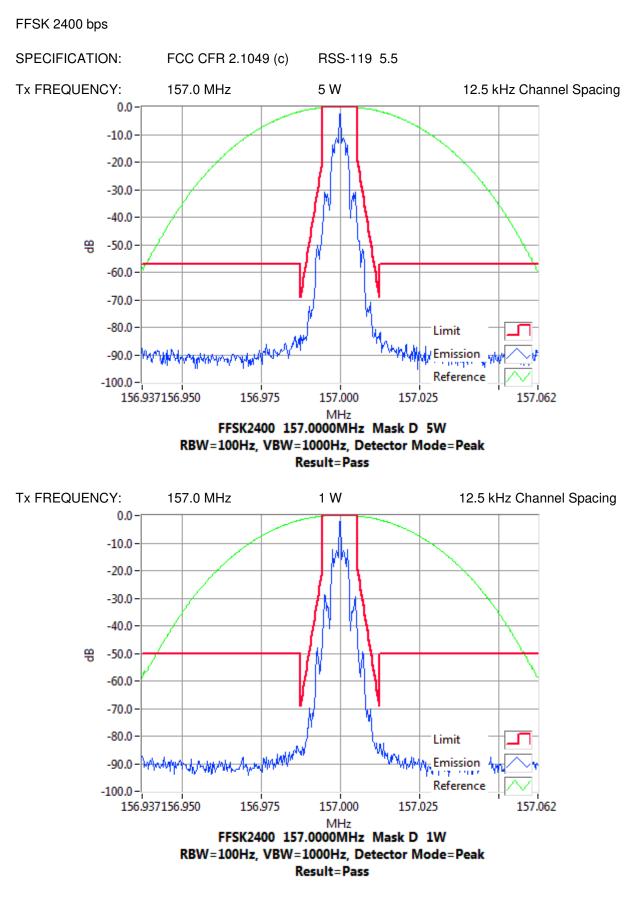


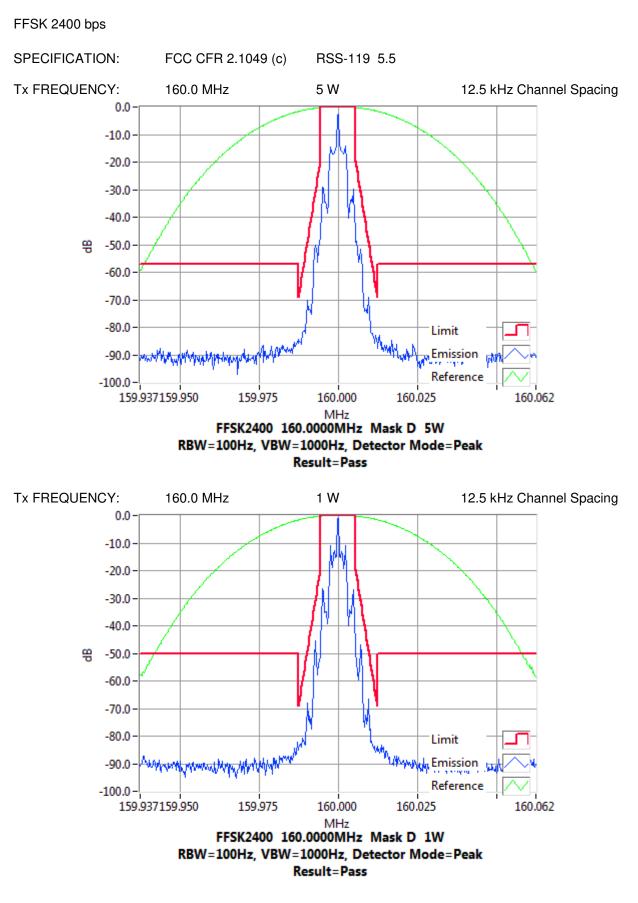


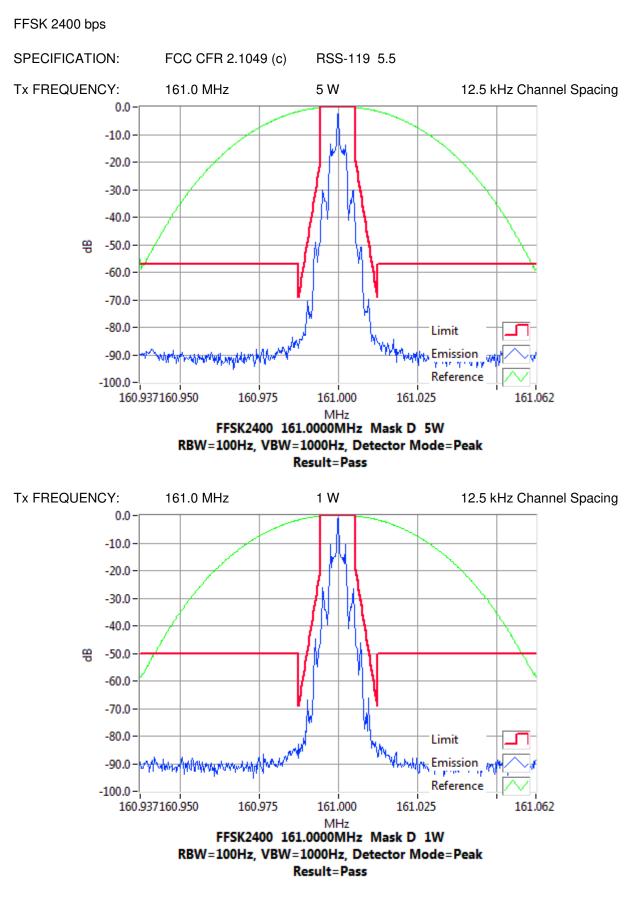


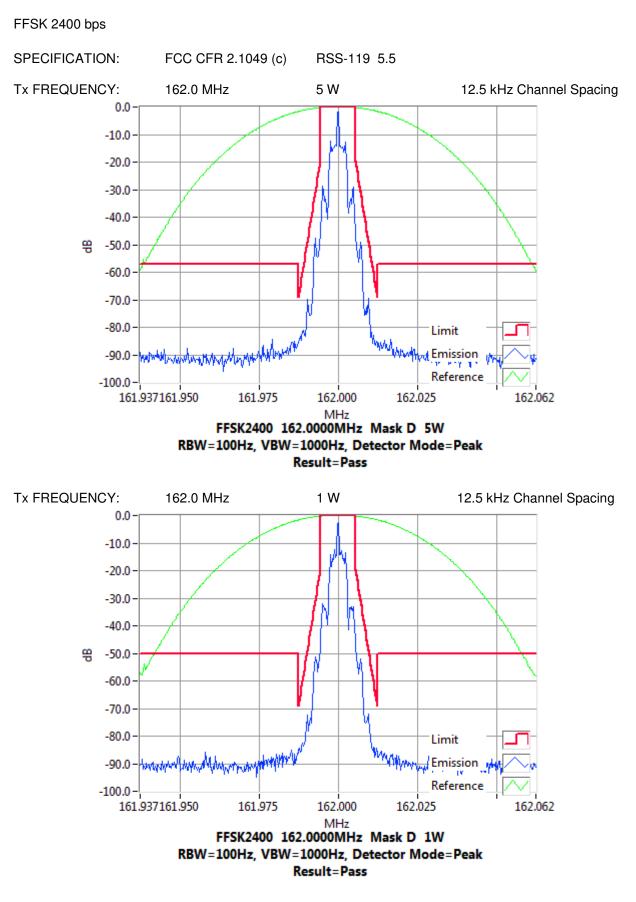


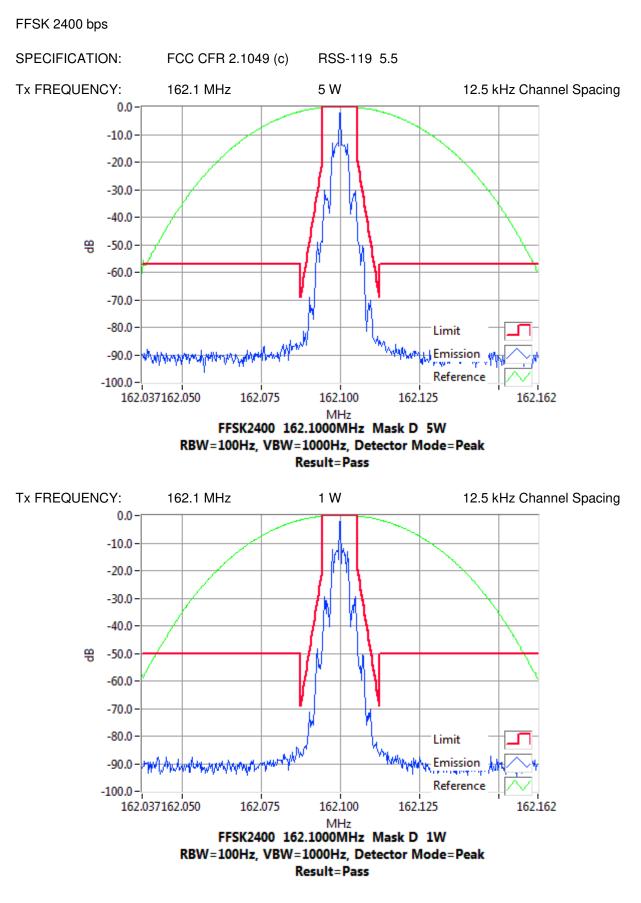


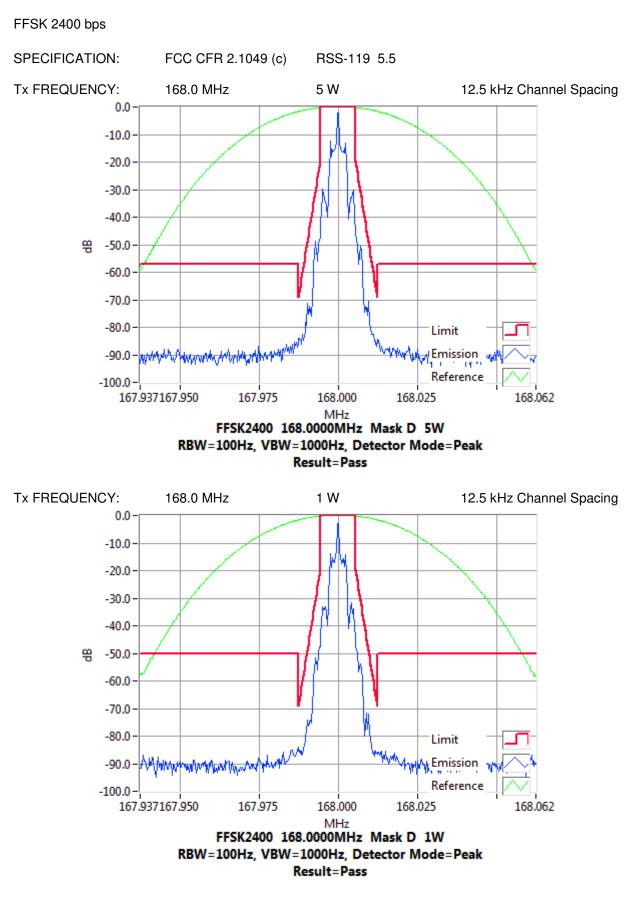


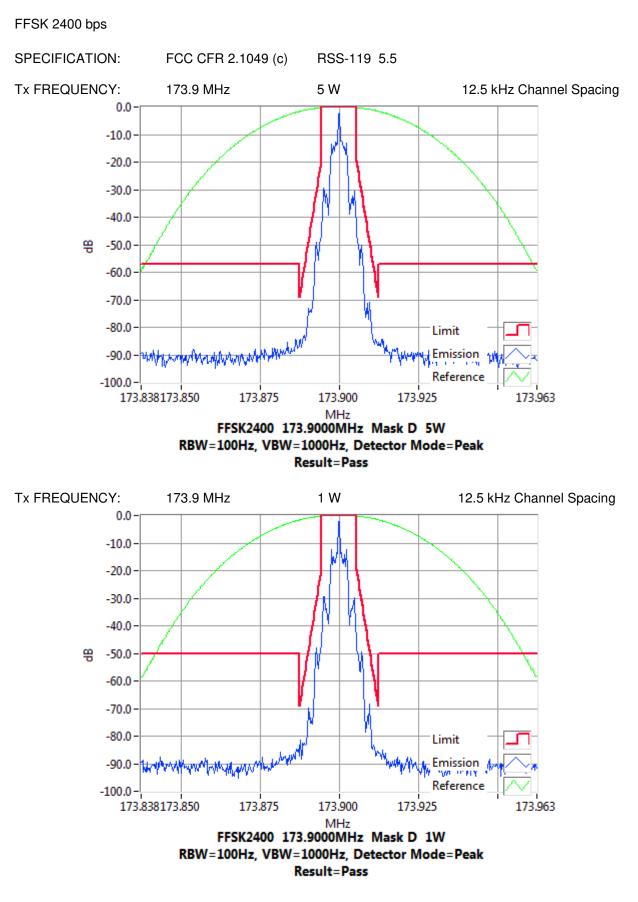


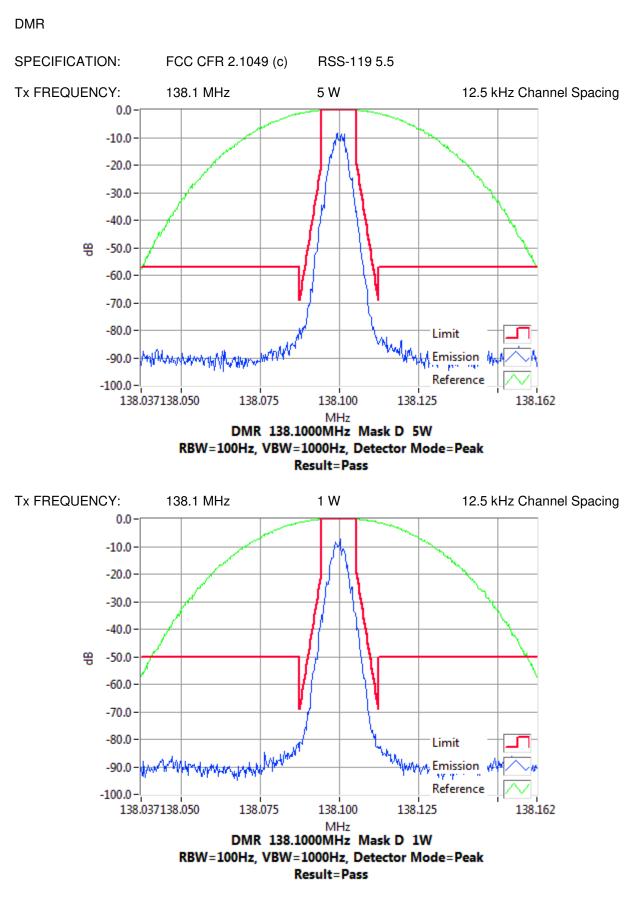


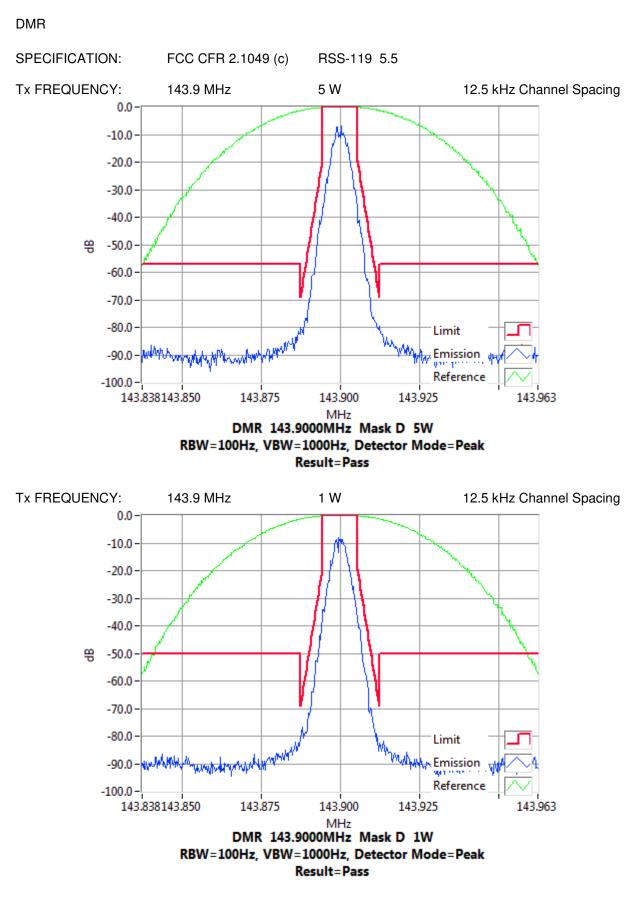


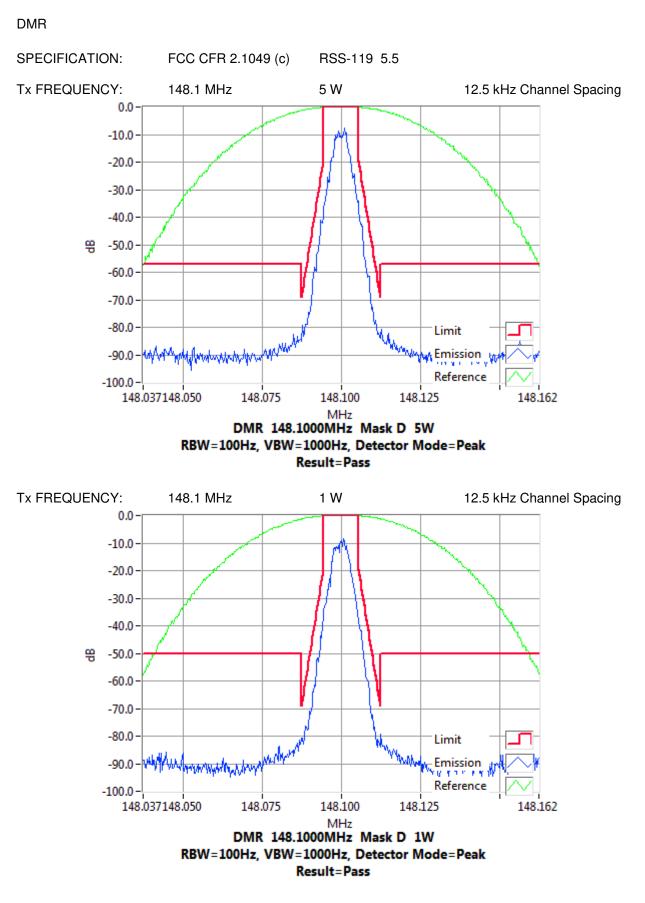




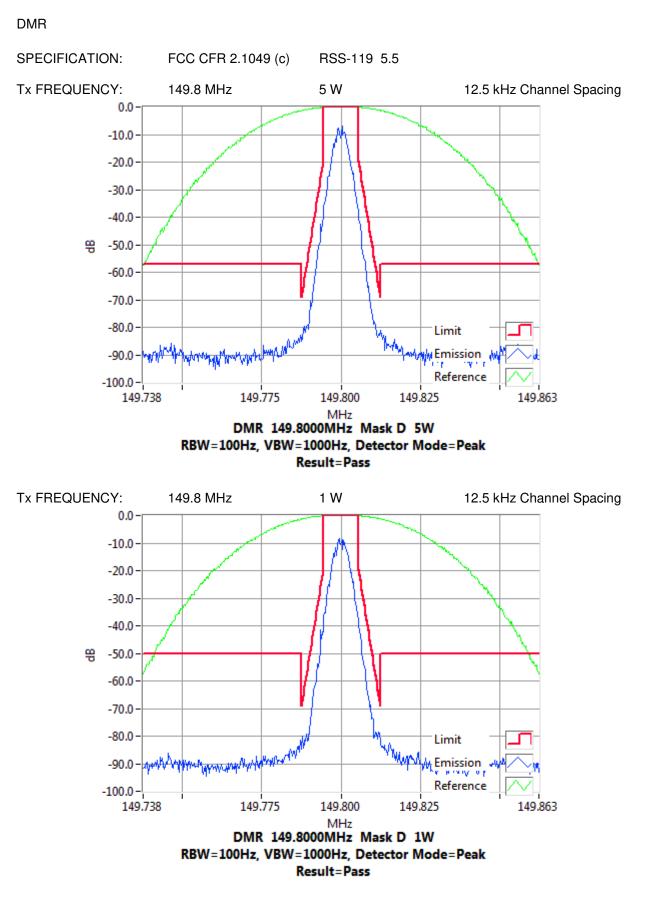


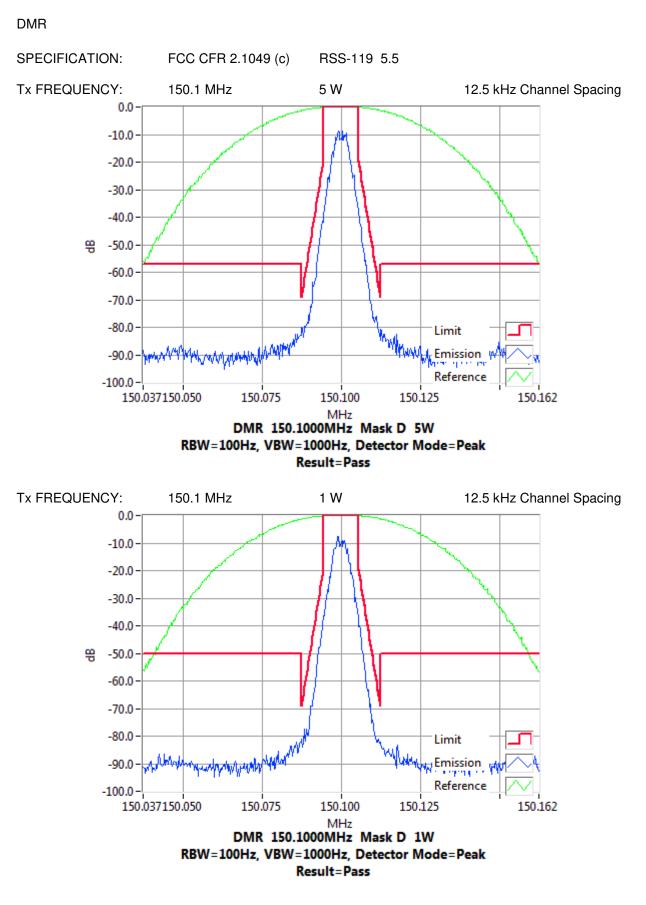


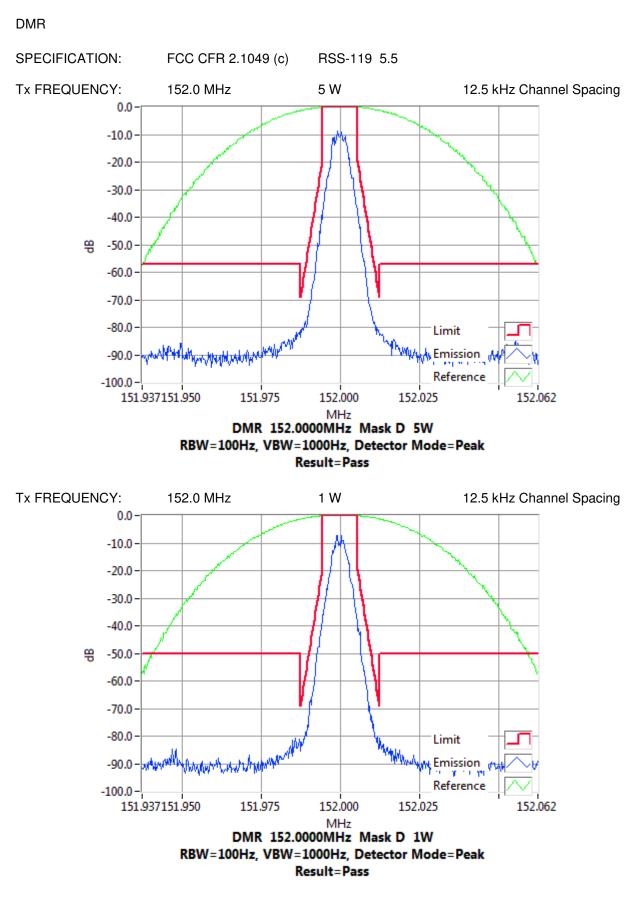


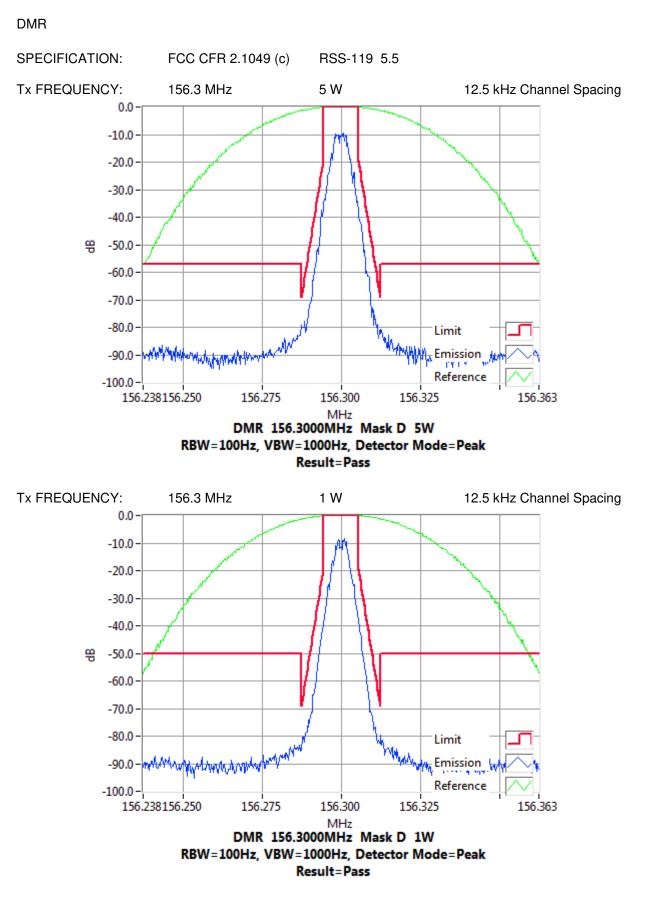


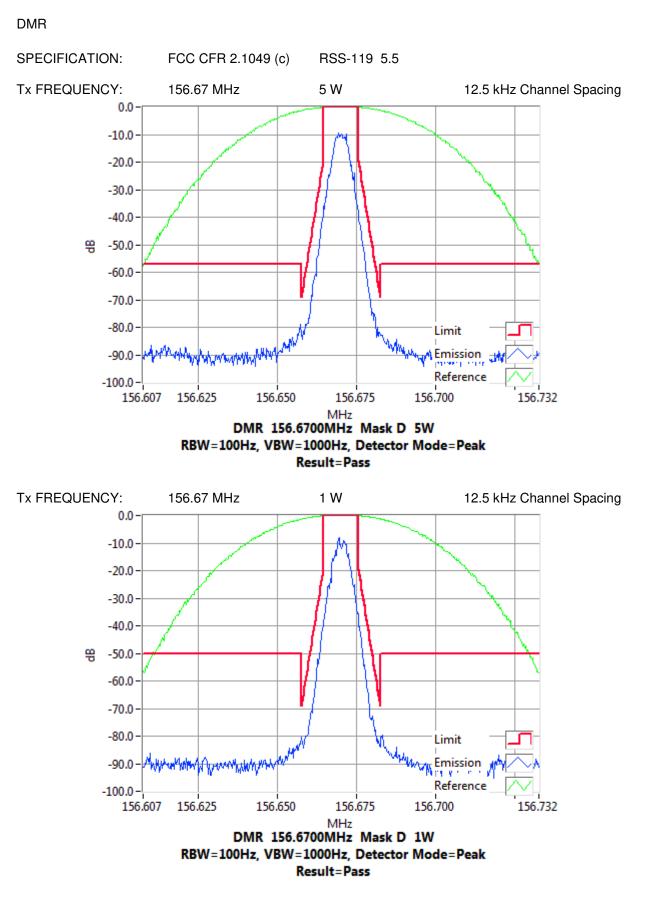
Occupied Bandwidth and Spectrum Masks



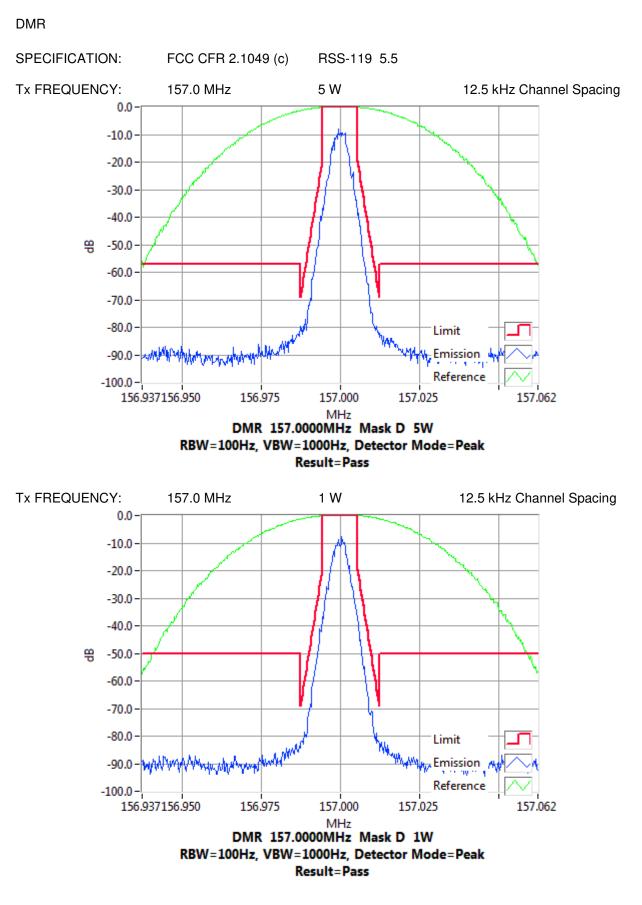


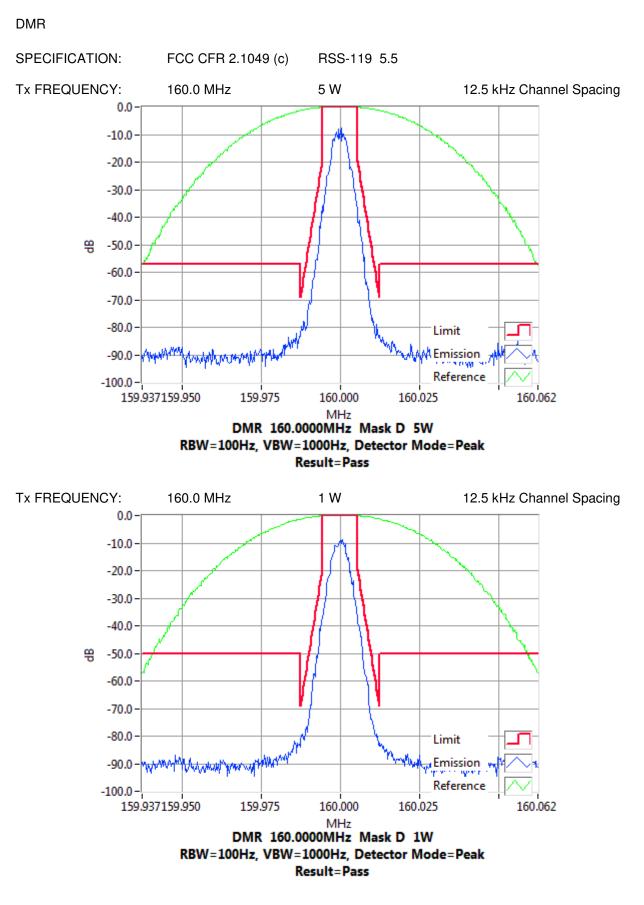


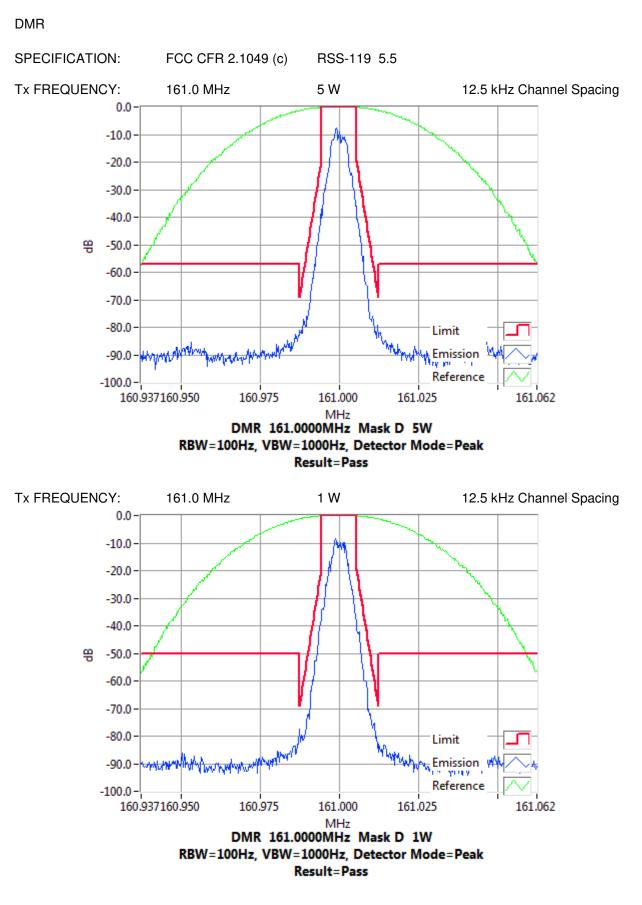




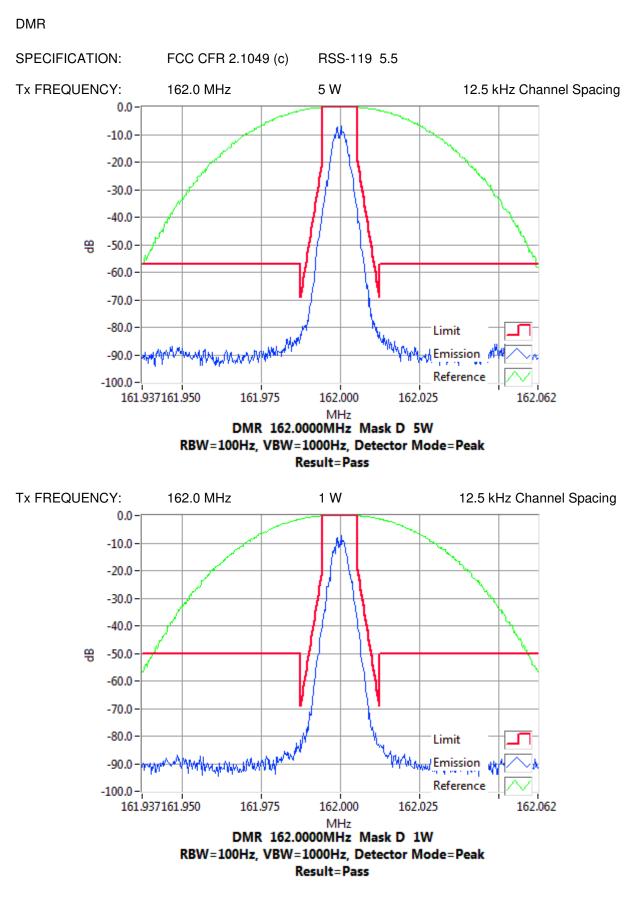
Occupied Bandwidth and Spectrum Masks

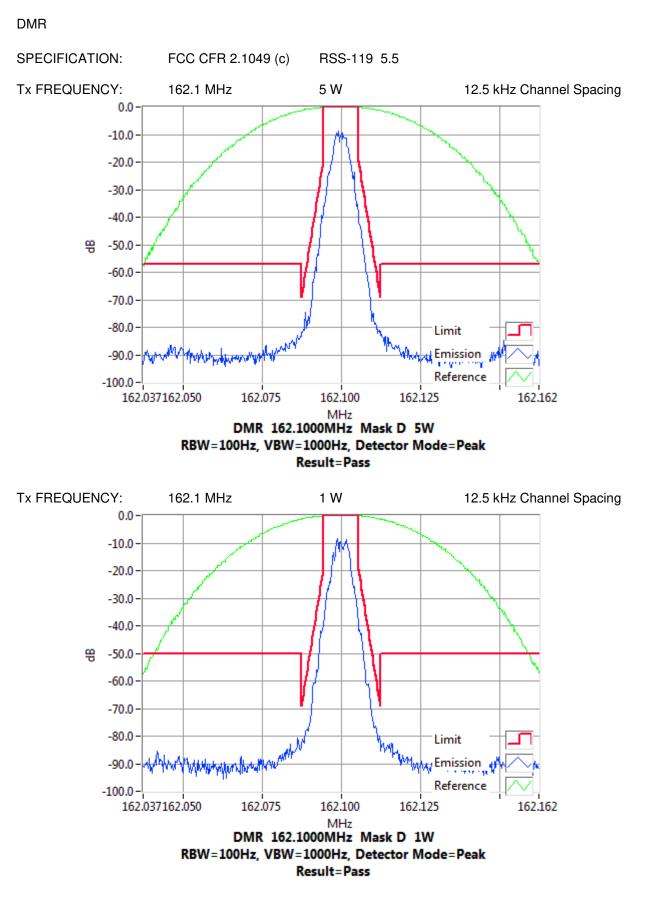


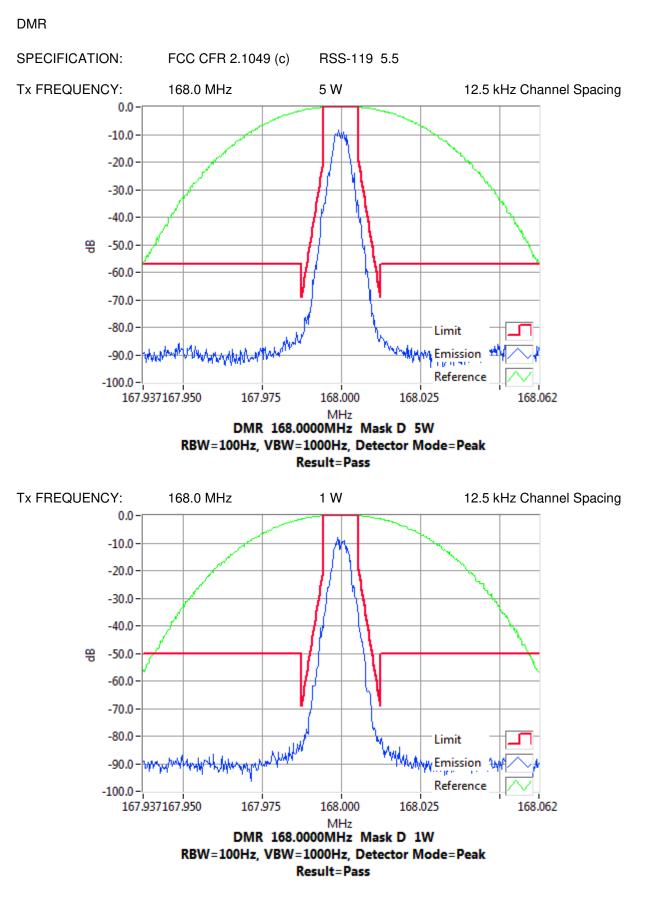


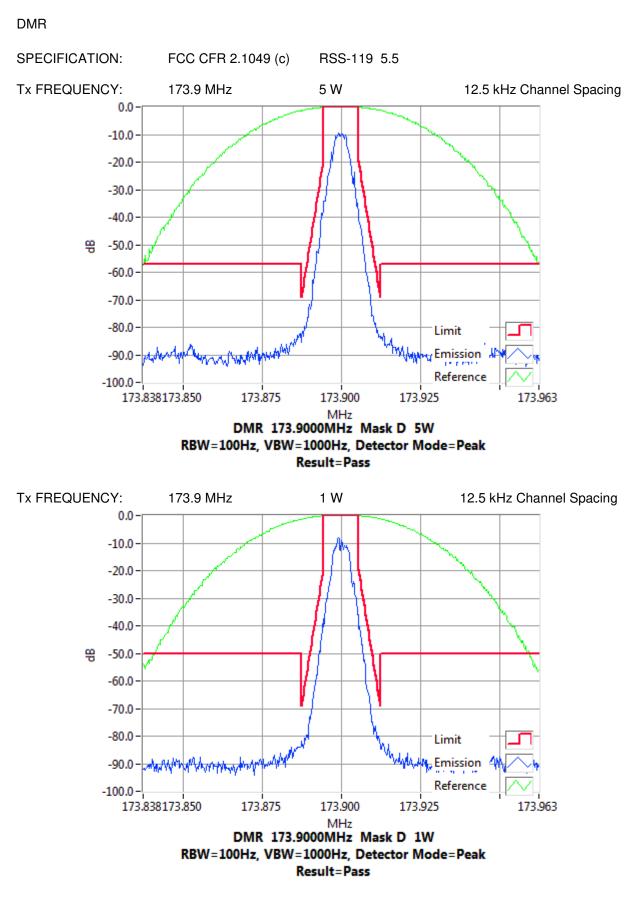


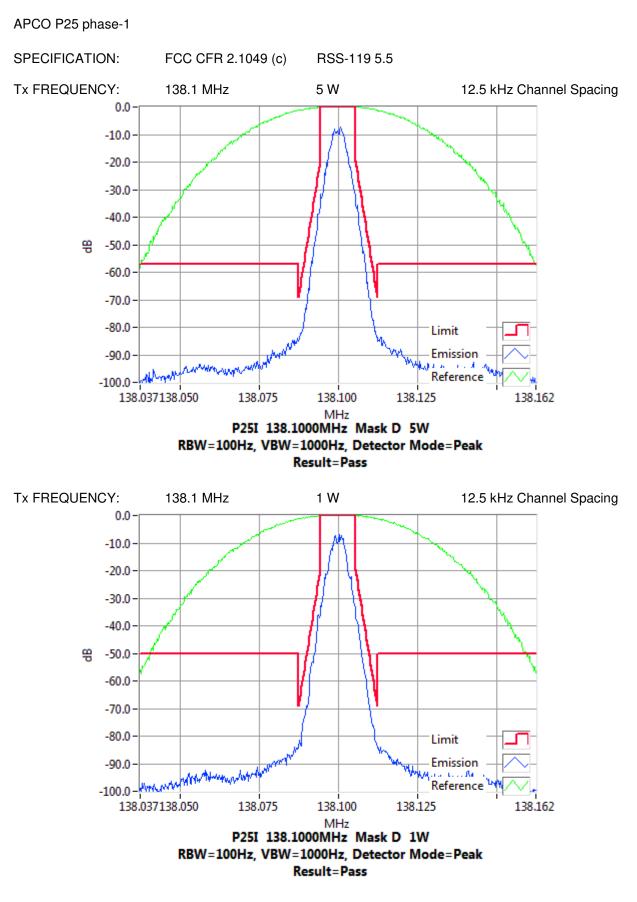
Occupied Bandwidth and Spectrum Masks



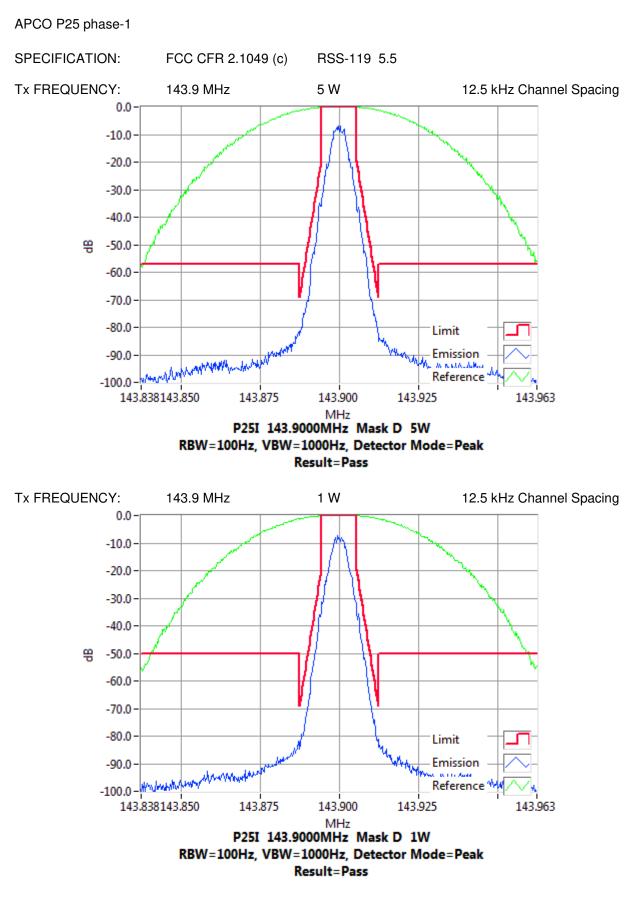




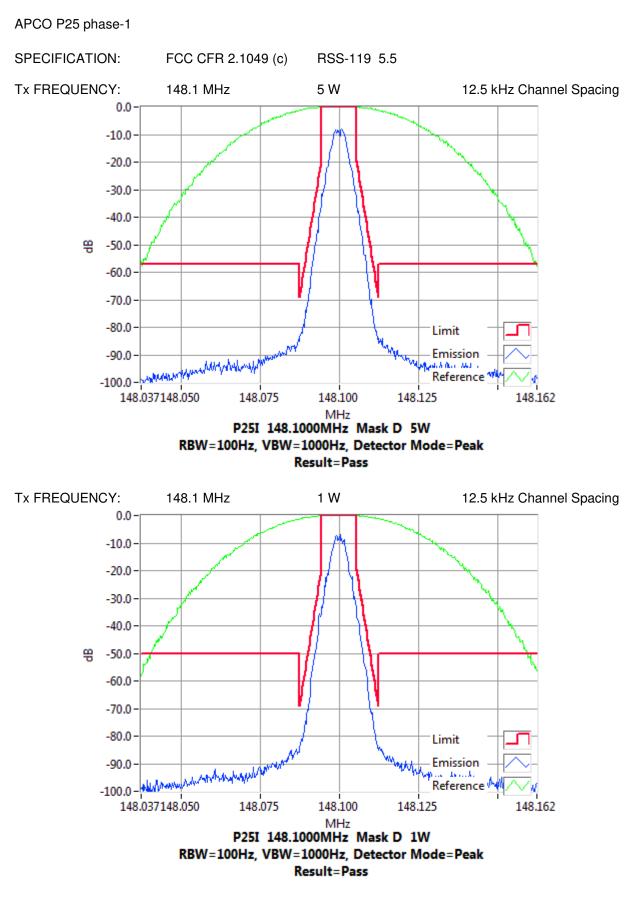


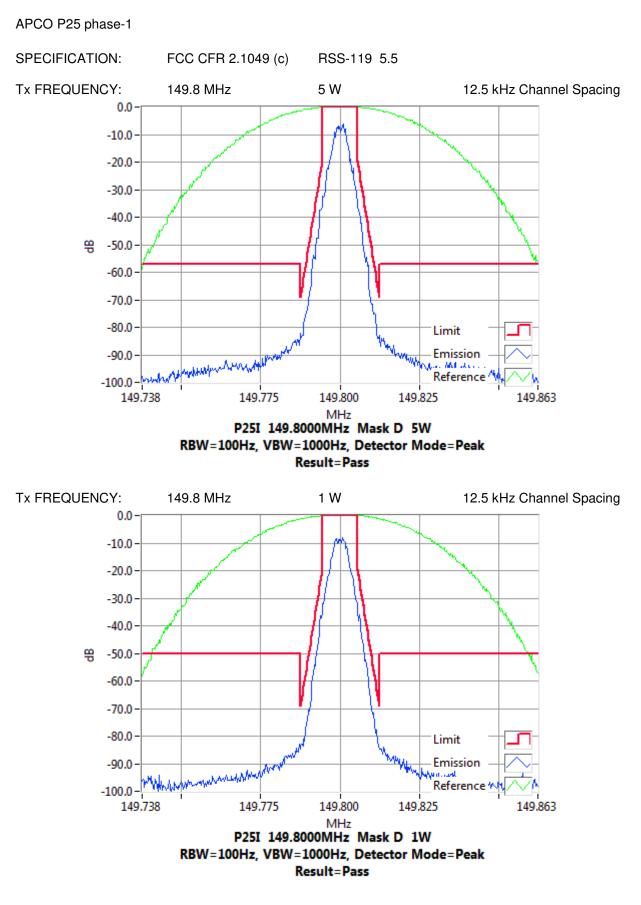


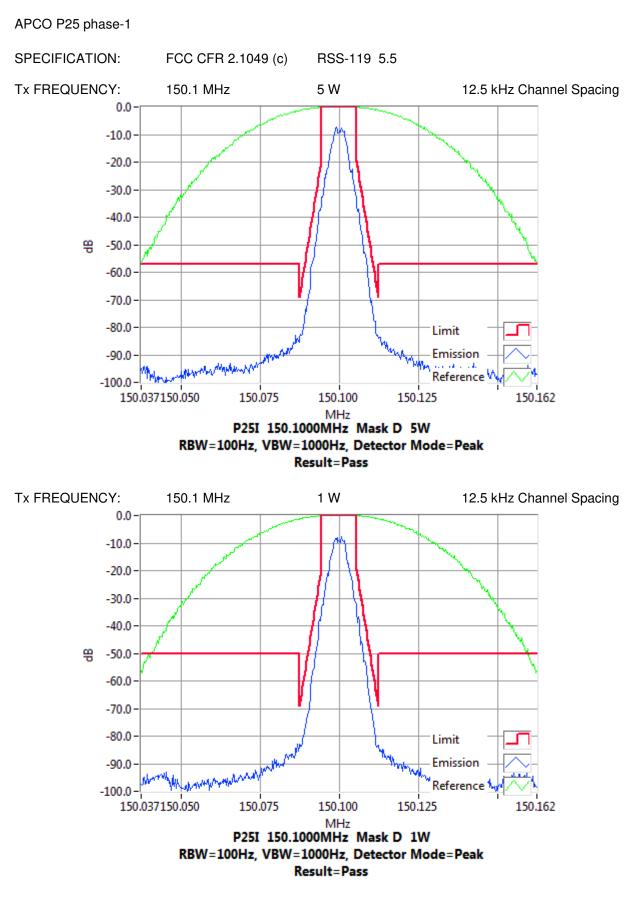
Occupied Bandwidth and Spectrum Masks

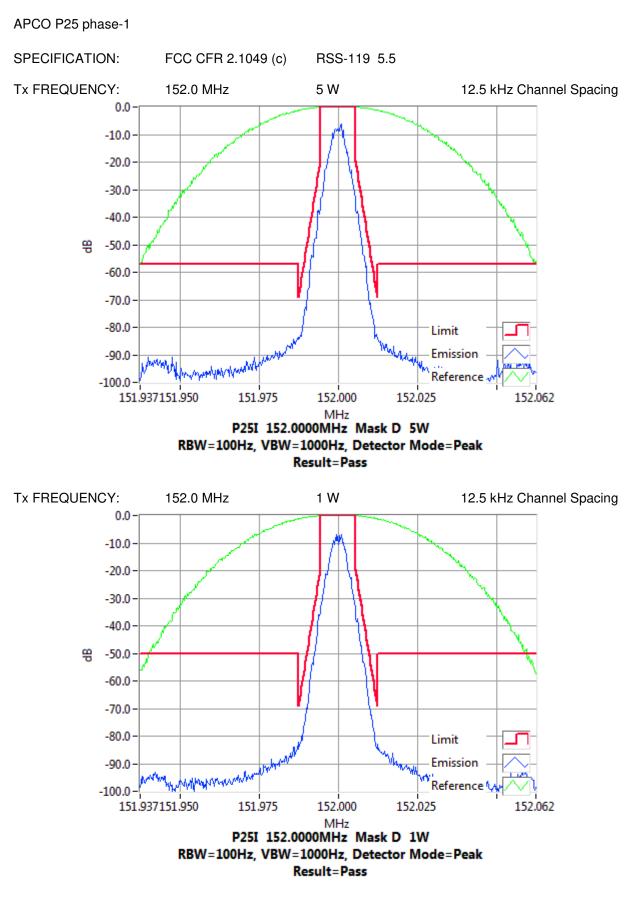


Occupied Bandwidth and Spectrum Masks

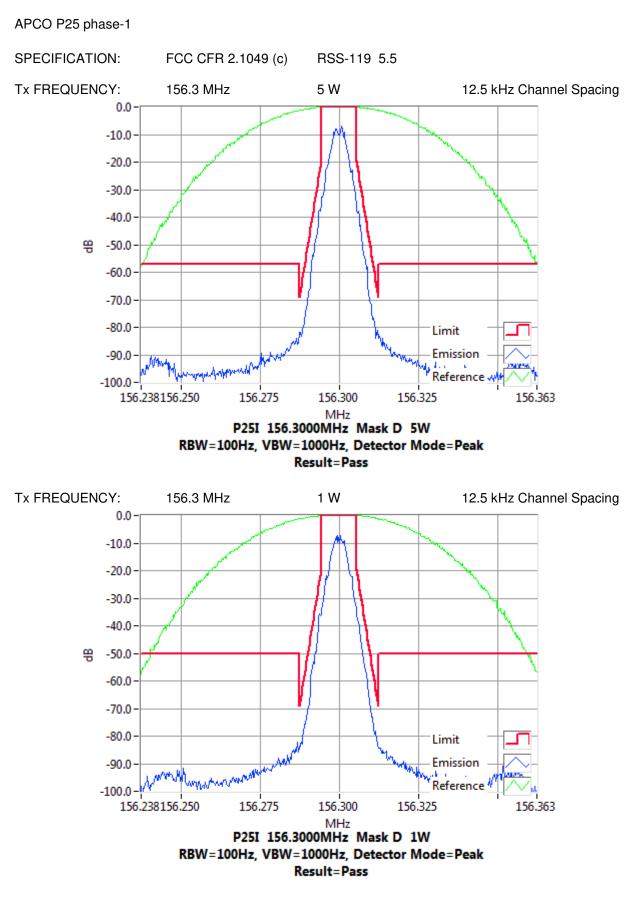


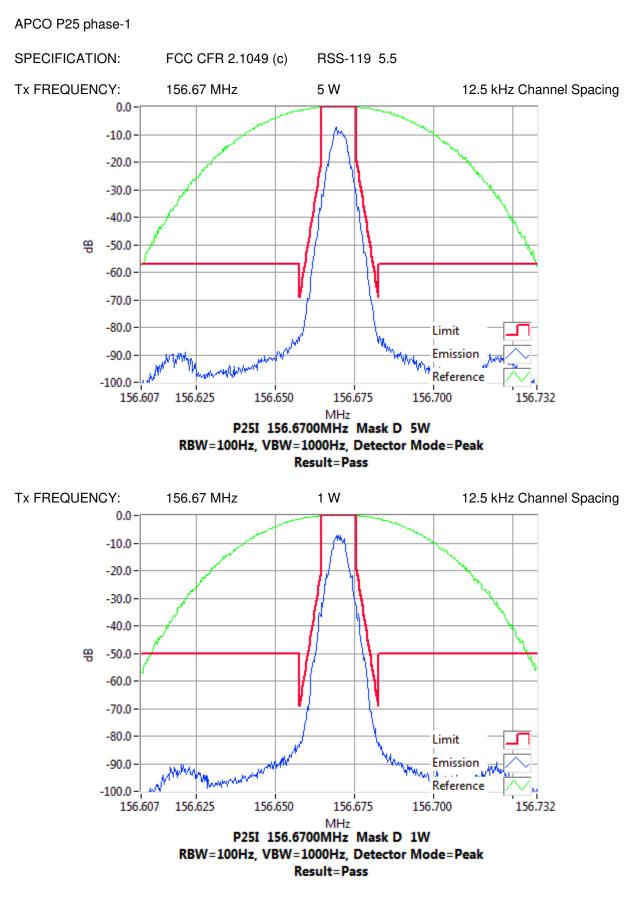


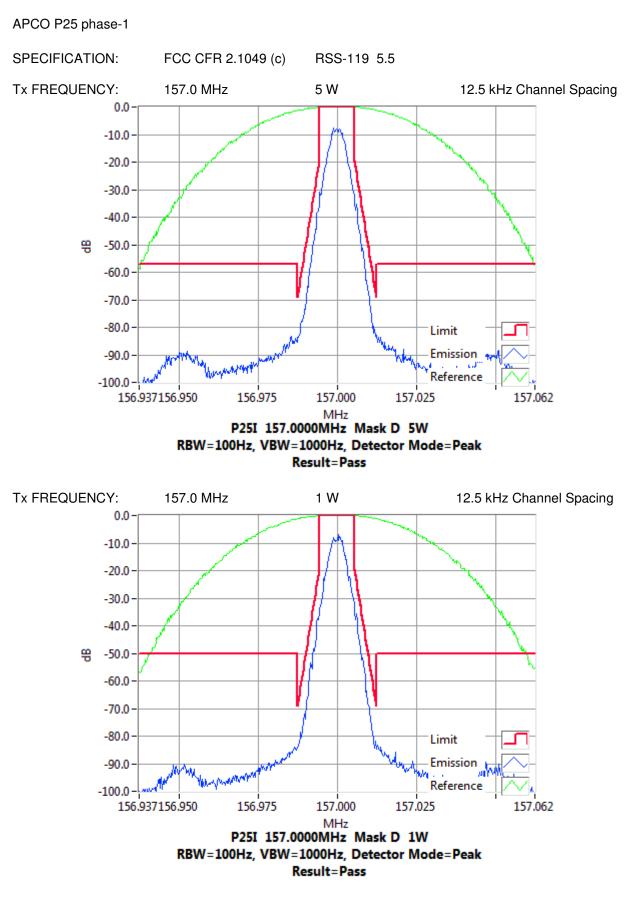




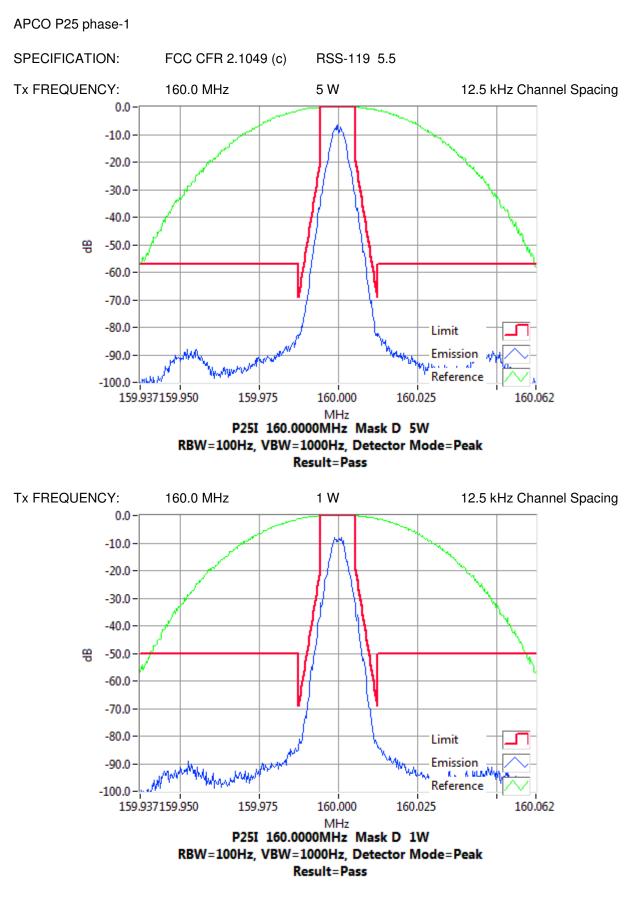
Occupied Bandwidth and Spectrum Masks

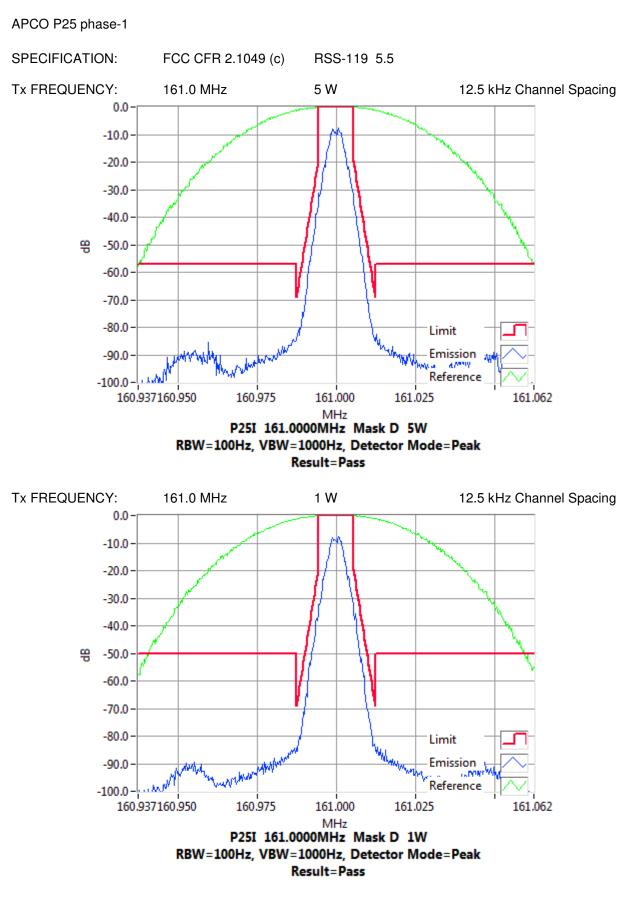




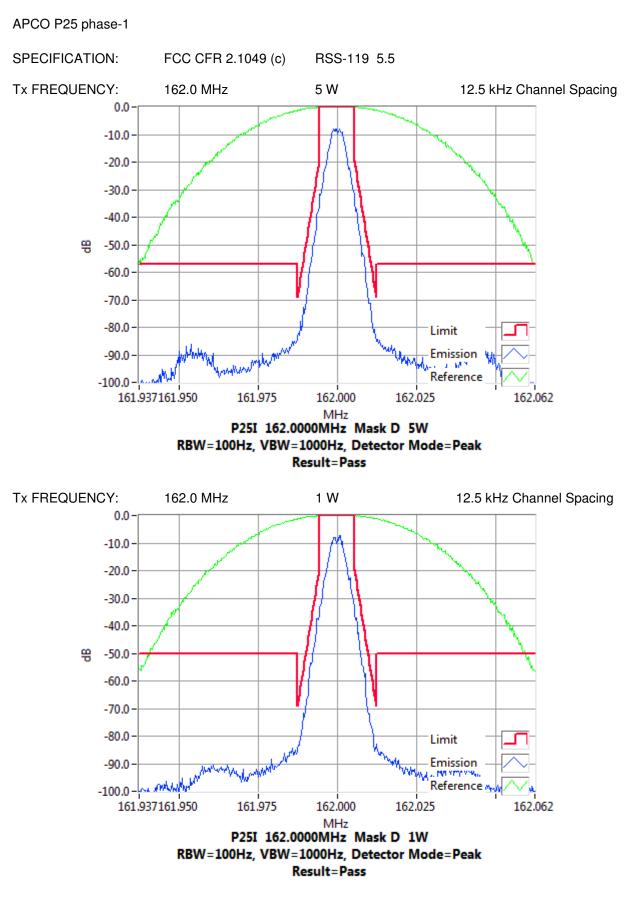


Occupied Bandwidth and Spectrum Masks

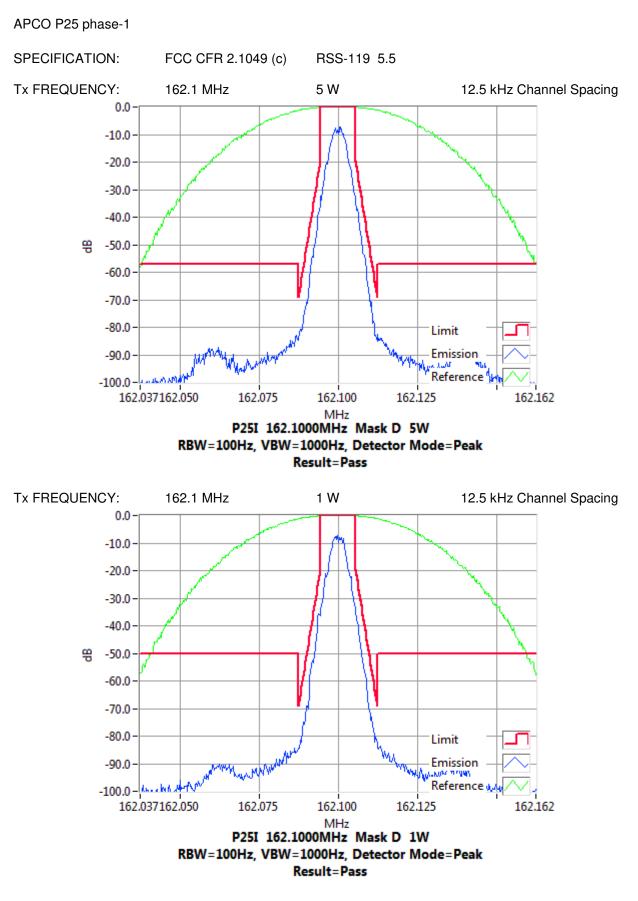


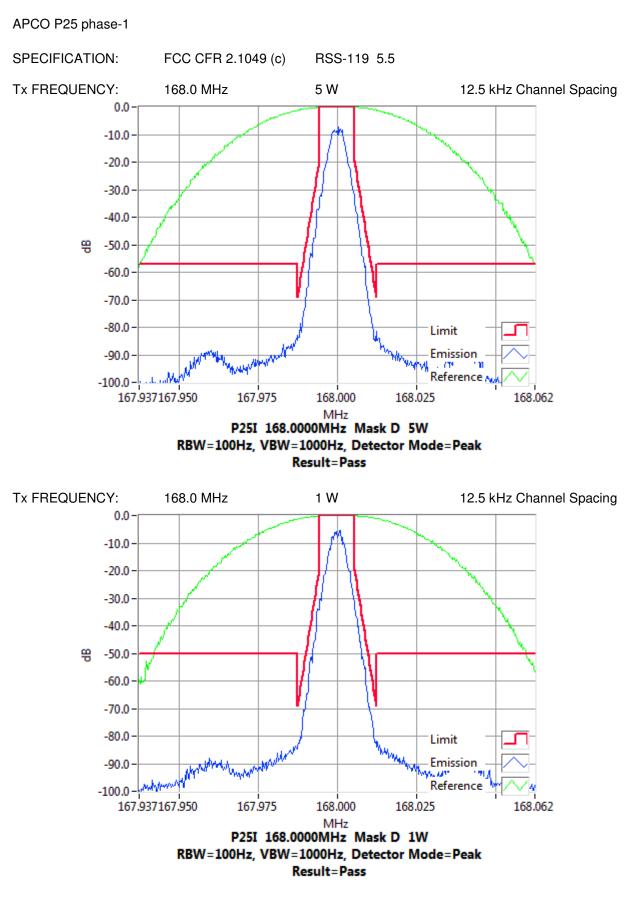


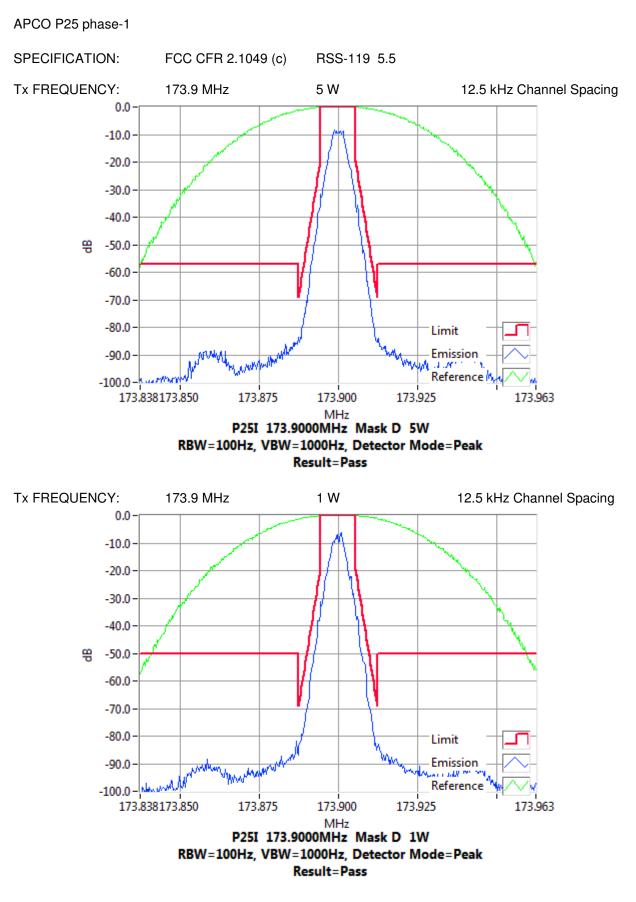
Occupied Bandwidth and Spectrum Masks

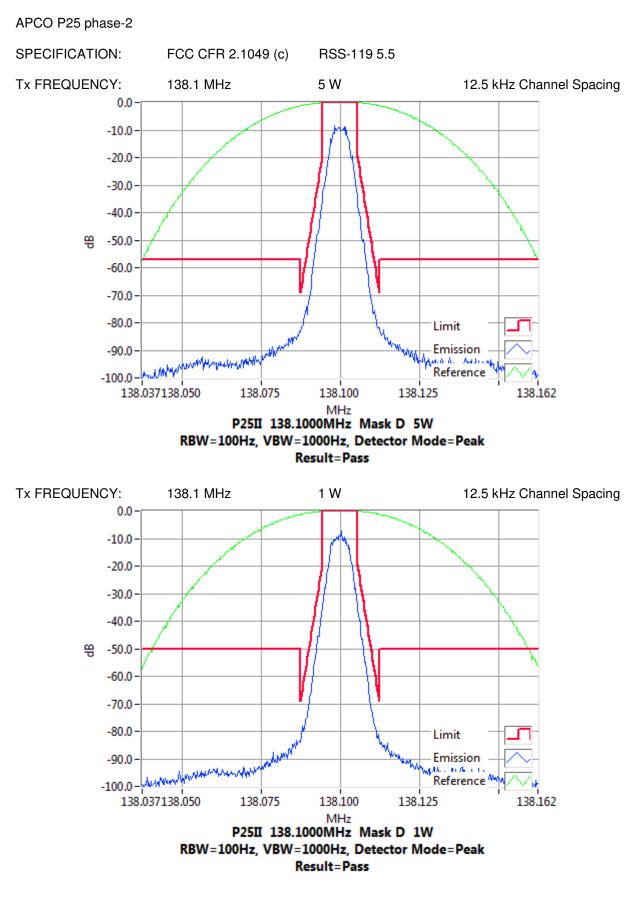


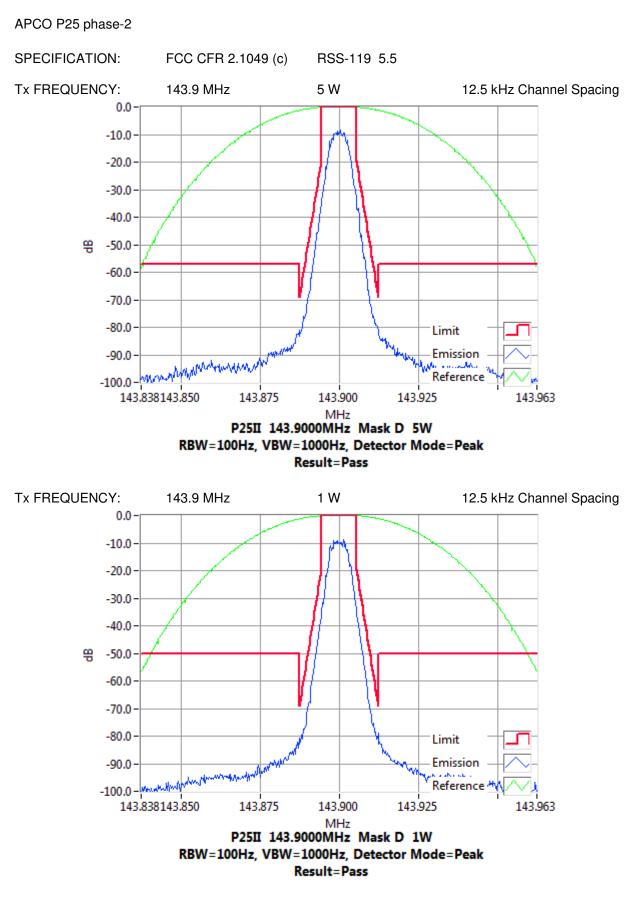
Occupied Bandwidth and Spectrum Masks

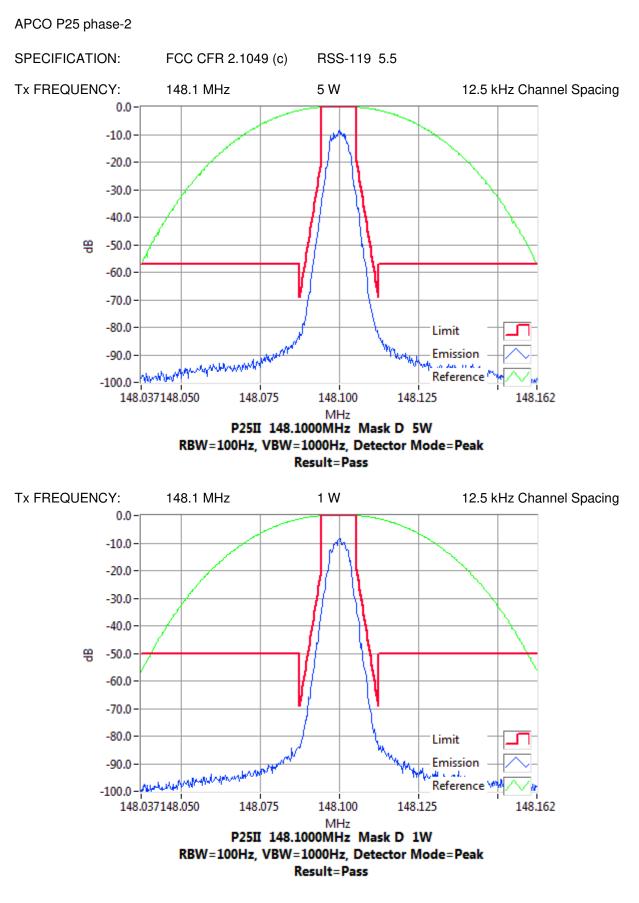


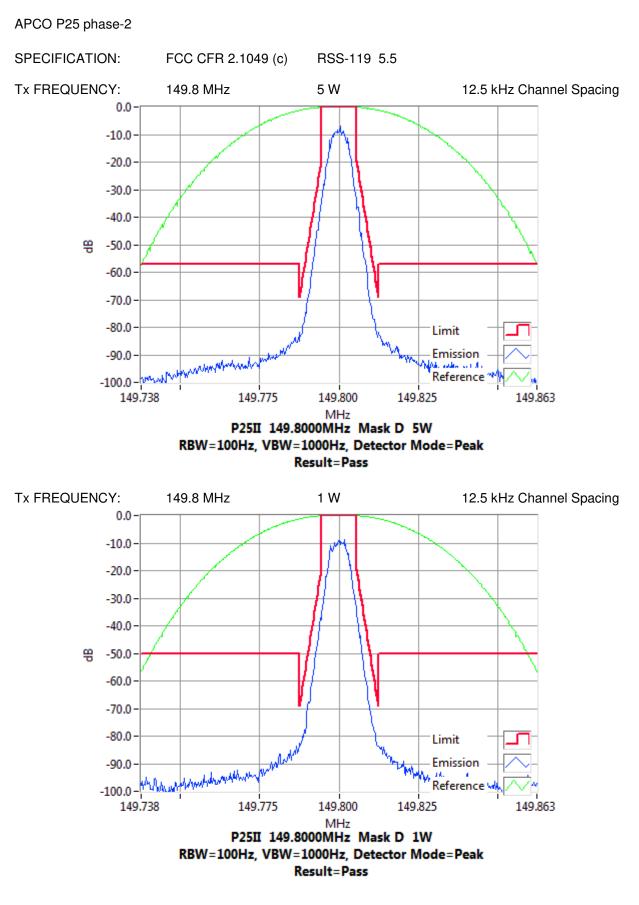


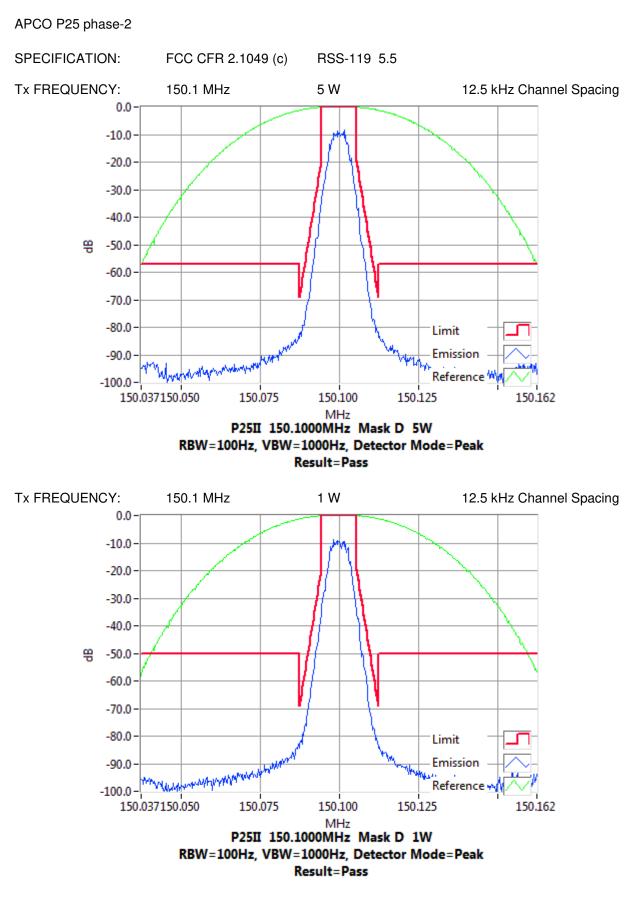


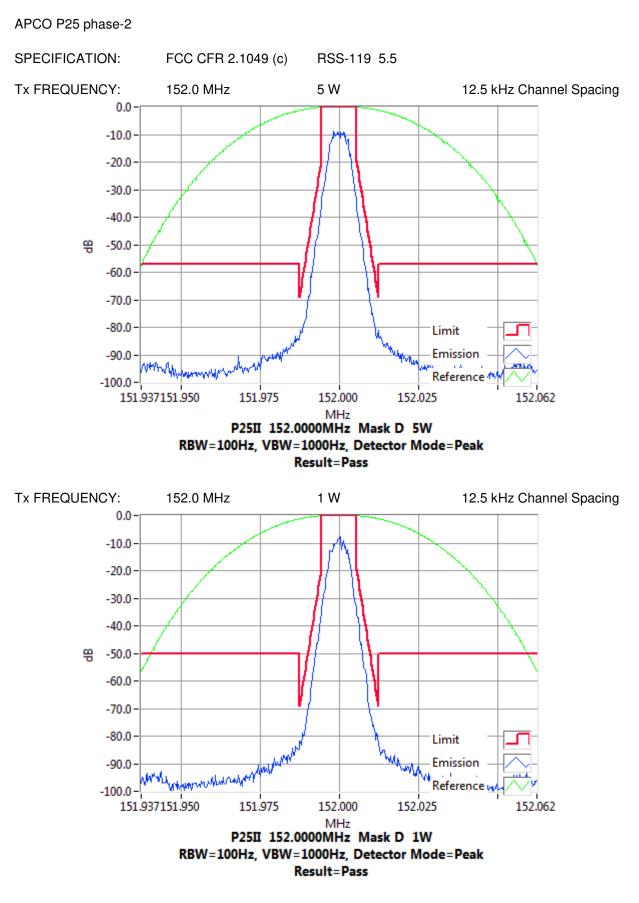




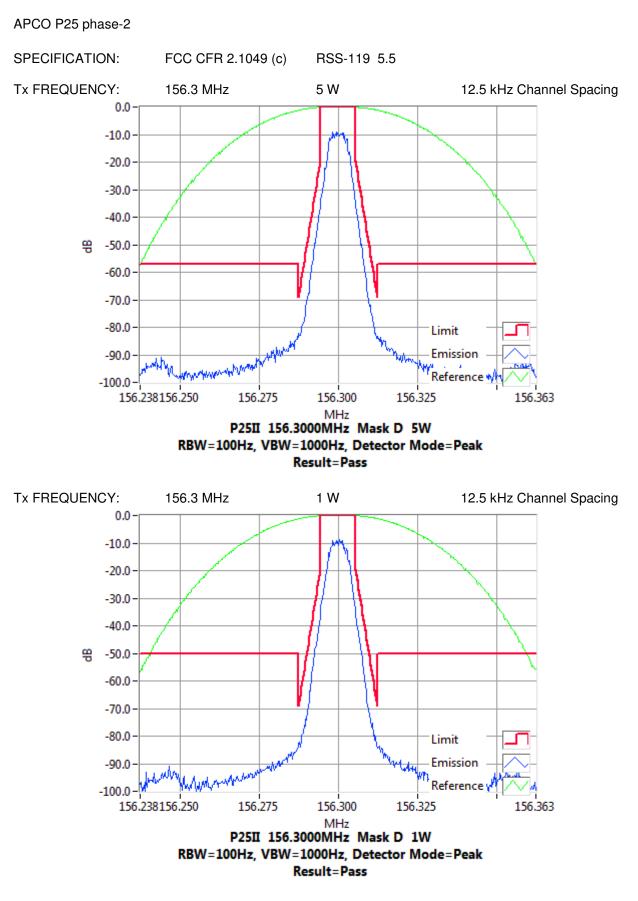








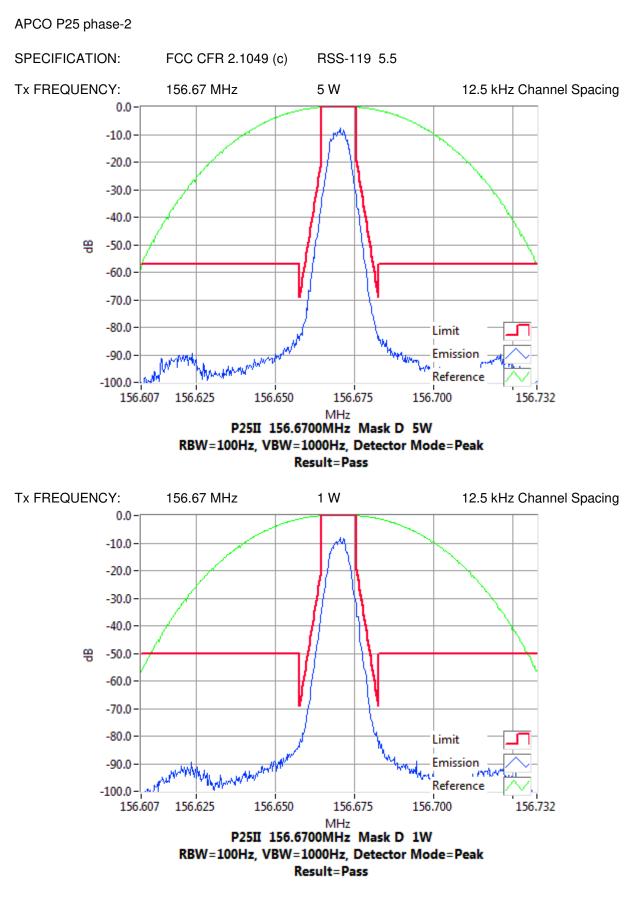
Occupied Bandwidth and Spectrum Masks

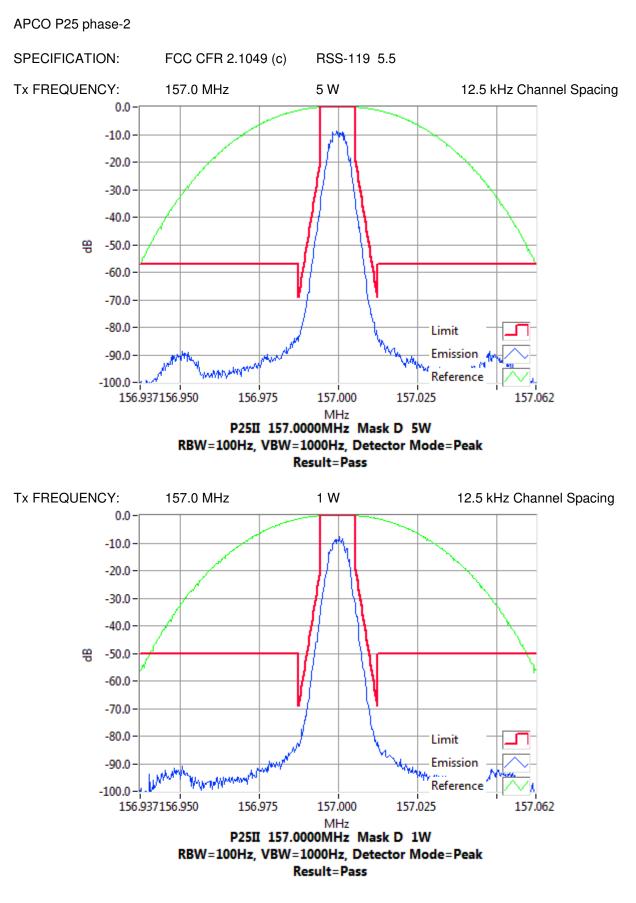


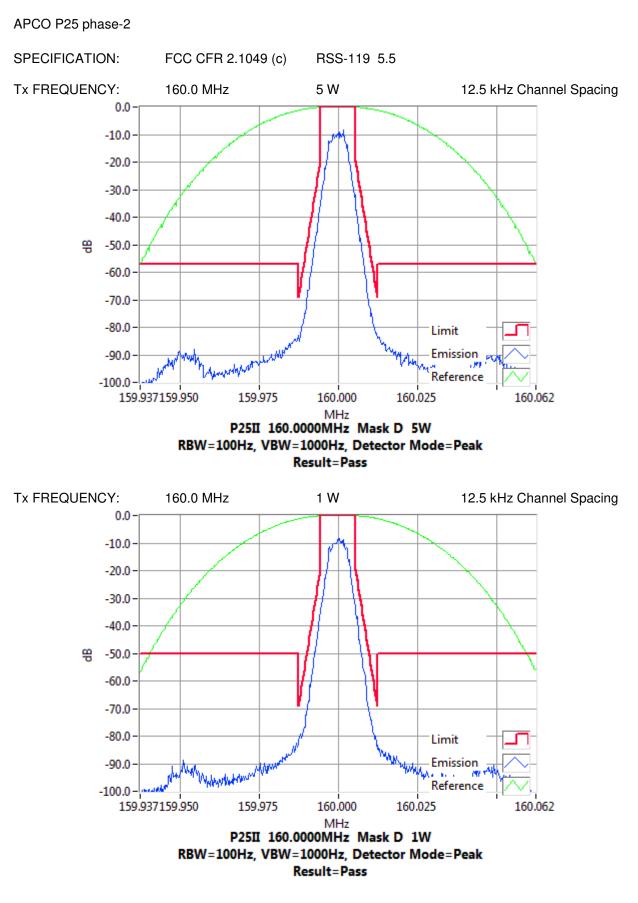
FCC ID: CASTPDB1D IC : 737A-TPDB1D

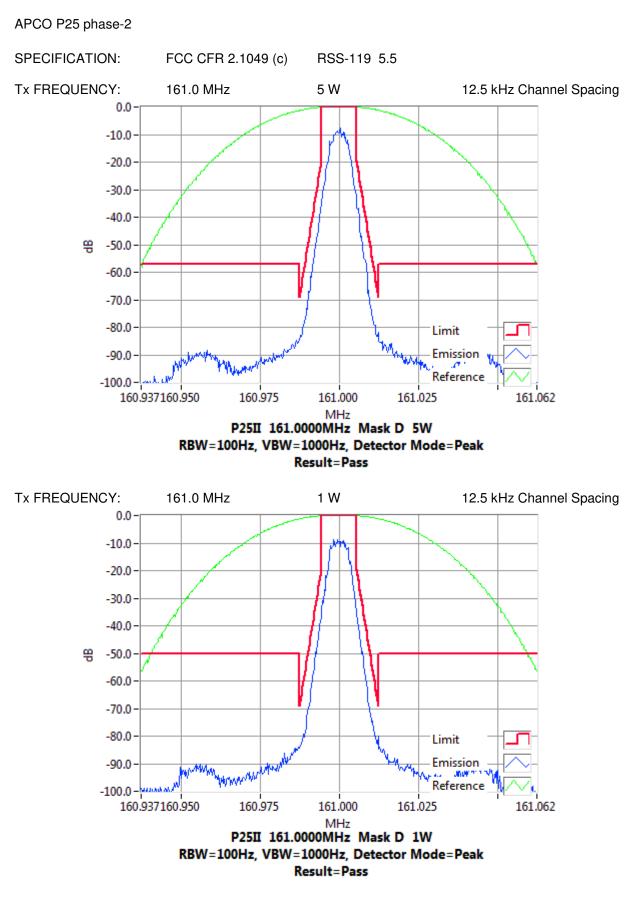
Page 106 of 199

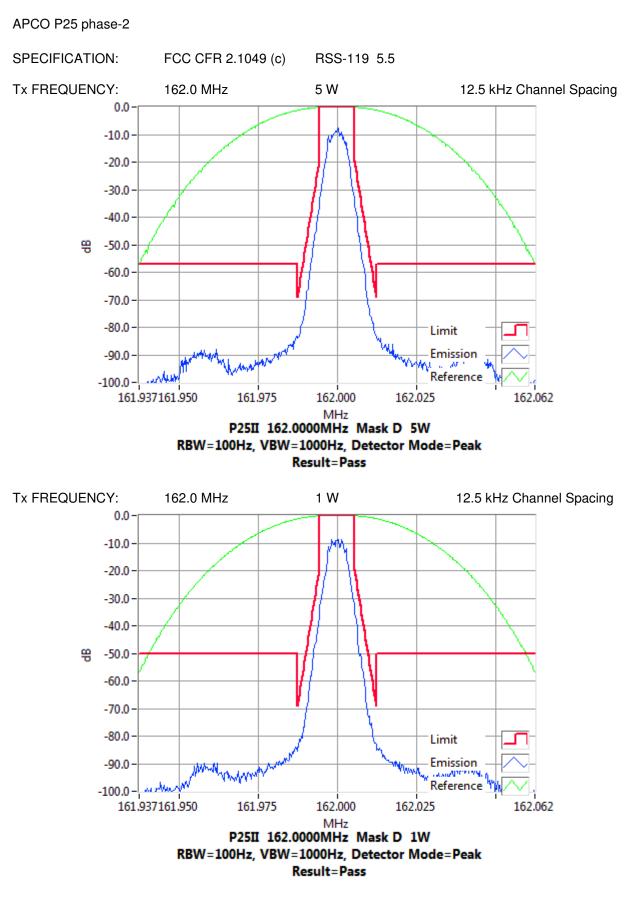
Occupied Bandwidth and Spectrum Masks

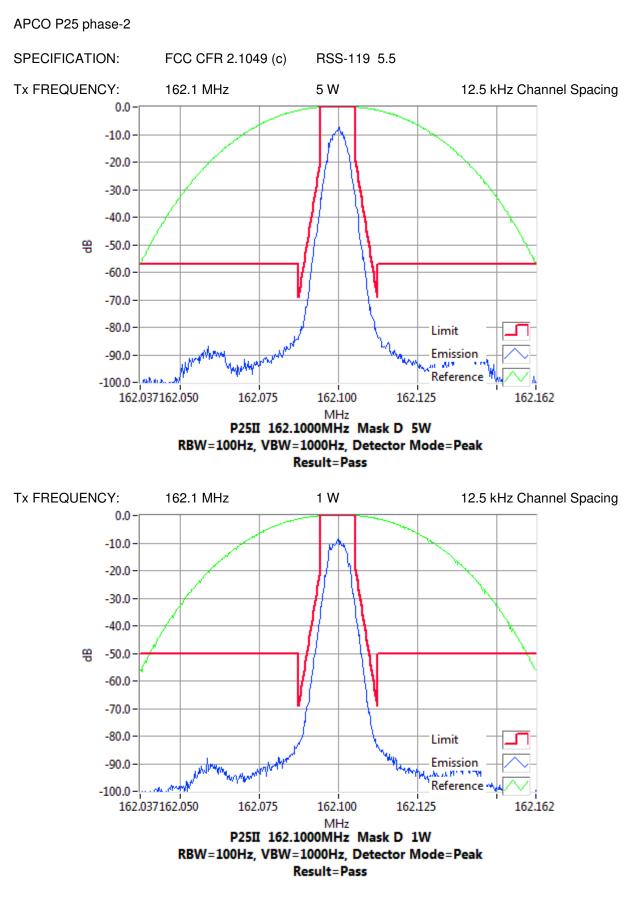


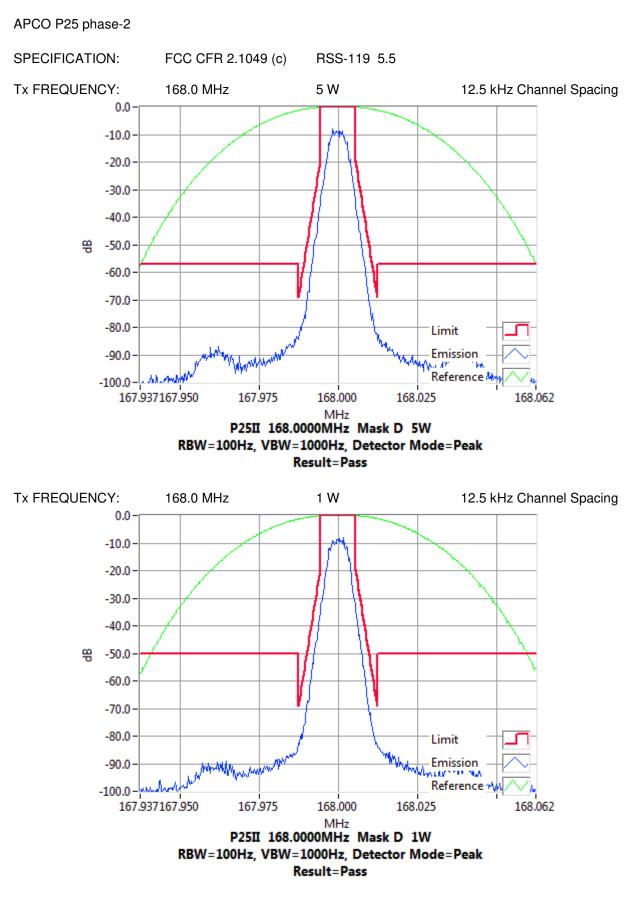


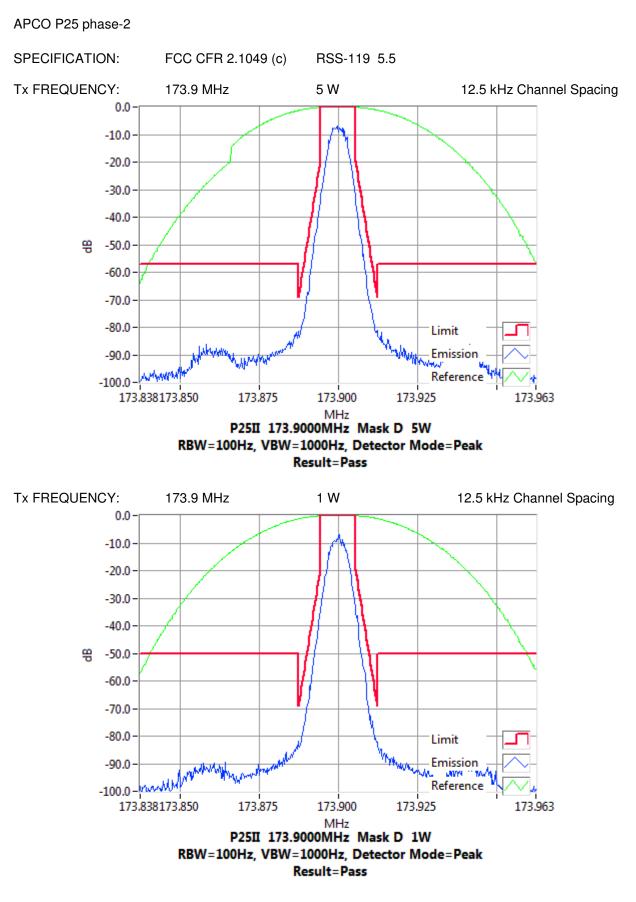












TRANSMITTER SPURIOUS EMISSIONS (CONDUCTED)

SPECIFICATIONS: FCC 47 CFR 2.1051

RSS-119 5.8

RSS-119 5.8

GUIDE: TIA/EIA-603D 2.2.13

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: 10 kHz to Fc-BW

Fc+ BW to >10Fc (2 GHz)

- 3. Frequencies above 270 MHz were measured using a band-stop filter to suppress the on-channel signal.
- 4. The spectrum analyser was loaded with the appropriate calibration figures to compensate for the cables, attenuator and filter losses.

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

A photograph of the test set-up is included below.

MEASUREMENT RESULTS:

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

LIMIT CLAUSES: FCC 47 CFR 90.210

Photo: Conducted Emissions Test Setup

FCC ID: CASTPDB1D IC : 737A-TPDB1D

SPECIFICATION: FCC CF	R 2.1051	RSS-119 5.8
12.5 kHz Channel Spacing	138.1 MHz @ 5 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
12.5 kHz Channel Spacing	138.1 MHz @ 1 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
Measurement Uncertainty:	≤12.75 GHz	± 3.0 dB
No emissions were	detected at a level greater than 20) dB below the limit.

Spurious Emissions (Tx Conducted)

138.1 MHz 5 watts

138.1 MHz 1 watt

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itart 10 kHz Res BW 10 kHz	#VBW 30 kHz		Stop 270.0 MH weep 2.58 s (40001 pt
80		status 🛕 DC Couple	

Marker 1 138.100000000 N	Hz FRO. Feel - Trig Free Run FlainLow - Mitter: 10 40	Avg Type: Log-Per Avg/told=58	19m2 1 3 3 41 TVRL 2 3 41 2010 1 1 1 1 1
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Res BW 10 kHz	#VBW 30 kHz	DC Couple	weep 2.58 s (40001 p

larker 1 276.2000000	P	RO.Fait G	Trig Free Alden: 10	Run 40	Avg Type:	Log-Pur		Macil 1334 Triel Control of Contr
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tart 1.0000 GHr				Stop 2.0000 GP
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71.0			-						
Start 1.000				W 3.0 MHz				Stop 2 rp 1.33 ms	1.0000 Gi

SPECIFICATION: FCC CFF	R 2.1051	RSS-119 5.8
12.5 kHz Channel Spacing	143.9 MHz @ 5 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
12.5 kHz Channel Spacing	143.9 MHz @ 1 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
Measurement Uncertainty:	≤12.75 GHz	± 3.0 dB
No emissions were	detected at a level greater than 20) dB below the limit.

Spurious Emissions (Tx Conducted)

143.9 MHz 5 watts

143.9 MHz 1 watt

Marker 1 143.900000000 MH	Z FRO: Foot PEaksLow Flatter with 40	Avg Type: Log-Pur Avg[Hald=58	1200157p.m. Genda, 38 19662 (2.2.2.3.4.5 17482); 2.3.3.4.5 040 (2.1.6.66);
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Start 10 kHz Res BW 10 kHz	#VBW 30 kHz		Stop 270.0 MH weep 2.58 s (40001 pt
60		MATUR ADC Couple	



larker 1 287.8	00000000 M	HZ PSO PCeb	Fair G	Trig Free Miller: 10	Run 40	Avg Type:	Log-Pwr		And 13341 role of high
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tart 1.0000 GHz Res BW 1.0 MHz	#VBW 3.0 MHz		Stop 2.0000 GH ep 1.33 ms (5000 pts

Warker 12	87.8000000		FRO Fast	Trig Free Alden: 10	Run 40	Avg Type:	Log-Per		Net Plants
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tart 270.0 Res BW 1			1 /8	W 30 kHz			8	Stop	1.0000 G

nput Mech Atten 6 dB	THE OWNER OF T	ig Free Run Man: 5 dB	Avg Type: Log Avg/hold=58	Par	9000 0000 0000 00000 00000000000000000
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itart 1.0000 GHz Res BW 1.0 MHz	#VBW 3			Sweep 1.33	op 2.0000 Gi

SPECIFICATION: FCC CF	R 2.1051	RSS-119 5.8
12.5 kHz Channel Spacing	148.1 MHz @ 5 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
12.5 kHz Channel Spacing	148.1 MHz @ 1 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
Measurement Uncertainty:	≤12.75 GHz	± 3.0 dB
No emissions were	detected at a level greater than 20) dB below the limit.

Spurious Emissions (Tx Conducted)

148.1 MHz 5 watts

148.1 MHz 1 watt

Marker 1 148.100000000 MH		Avg Type: Log-Per AvgPald:-58	10.40 28 am cental an Tendi (2.2.2.3.4.5 Tritti (a art) ² 11.6 km
Ref Offset 39.42 dB 2-dBidly Ref 35.00 dBm			Mkr1 148,100 MH 37,404 dBr
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itart 10 kHz Res BW 10 kHz	#VBW 30 kHz		Stop 270.0 MH weep 2.58 s (40001 pt
no UFile <screen_0001.png> save</screen_0001.png>	1	status ADC Couple	

Marker 1 148.10000000	FRO. Fast C Trig Free Run / Fishelow Alden: 16 48	Avg Type: Log-Per 1963 2.2.3 AvgBiold:+68 2000 2000
Ref Offset 39.42 d 0 dB/div Ref 36.00 dBm		Mkr1 148.100 M 30.587 dB
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Itart 10 kHz Res BW 10 kHz	#VBW 30 kHz	Stop 276.0 h Sweep 2.58 s (40001

farker 12	95.2000000		Salation -	Trig Free Alden: 10		Avg Type:	Log-Pwr		041 P 105 10
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1.0		Province of the	446.100	a designed as	activities.				
tart 270.0		-		W 30 kHz				Stop	1.0000 GR

nput Mech Atten 6 dB	PROFeet C 14	g Free Run ten: 5 dB	Avg Type: Log-Pv Avg/told:-58	(2.44)(7)(-0.07) 9(4.2)(-1) 10(2)(1451
Bef Offset 42.45 dB dB/div Ref 19.00 dBm					
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tart 1.0000 GHz Res BW 1.0 MHz	EVBW 3/	1 MHz		Stop 2.000 Sweep 1.33 ms (500	

farker 1 295.20000000 MH	Z Trip		Conference on the second secon
Ref Offset 42.45 dB c dB/div Ref 19.00 dBm			Mkr1 296.20 MH -49.53 dB
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tart 270.0 MHz Res BW 10 kHz	#VBW 30 k	Hz	Stop 1.0000 Gi Sweep 6.98 s (5000 p

plent Spectrale Radgeer Recept IA 5 10 10 20 AC 10 nput Mech Atten 6 dB		na Run 5 dB	Avg Type: 1 Avg Type: 1 Avg/field/d	ng-Pur B		gan (km0), 20 km2) (1, 2, 3, 4, 1 hm2) (1, 2, 3, 4, 1) hm2) (1, 2, 3, 4, 1)
Ref Offset 42.45 dB additive Ref 19.00 dBm						
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itart 1.0000 GHz Res BW 1.0 MHz	#VBW 3.0 M				Stop	2.0000 GH
Nes BW 1.0 MHz		n:	2147/0	SWC	ep 1.33 m	e faego be

SPECIFICATION: FCC CF	R 2.1051	RSS-119 5.8
12.5 kHz Channel Spacing	149.8 MHz @ 5 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
12.5 kHz Channel Spacing	149.8 MHz @ 1 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
Measurement Uncertainty:	≤12.75 GHz	± 3.0 dB
No emissions were	detected at a level greater than 20) dB below the limit.

Spurious Emissions (Tx Conducted)

149.8 MHz 5 watts

149.8 MHz 1 watt

Marker 1 149.800000000 MHz		AvgType: Log AvgPtold=58	Get P to 5 hor
Ref Offset 39.42 dB 2 dB/div Ref 35.00 dBm			Mkr1 149.800 MH 37.420 dBr
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- 20			
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itart 10 kHz Res BW 10 kHz	#VBW 30 kHz	n –	Stop 270.0 M9 Sweep 2.58 s (40001 pt
Noes BW 10 KHz	BARM 30 KHS	status 📥 DC C	



	Ref Offset 42		PSO Fail C PEalettee	P Siden: 10	6			Mkr1 29	9.60 M
48101	Ref 19.00 d	10m						-4	4.53 dB
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FBC Fall (+	Dig Free Run Mitem 6 dB	Avg Type: Log-Per AvgPiold:=58	9463 (2.3.3.4.5 1745) A 44444 045 (P. 515 615
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	W 3.0 MHz		Stop 2.0000 GH weep 1.33 ms (5000 pt
	PEaket are		

larker 1 299.	50000000		FRO Fail G	Trig Free #Atten: 10	Run 40	Avg Type:	Log-Per		MEP NISS
Ref 0 2-dBldiv Ref	Must 42.46 d 19.00 dBm	10 1						Mkr1 29 -5	9.60 Mi 2.54 dB
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tart 270.0 MH Res BW 10 kH			1/8	W 30 kHz			8	Stop 1 veep 6.98 1	1.0000 G

nput Mech Atten 6 dB	PBC Fail G	Trig Free Run Mitten: 5 dB	Avg Type: Log-Per Avg/told:-58	02-00-000,00,000,00 96-00,00,00,00 1000,0,000,00 000,0,000,00 000,0,000,00
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tart 1.0000 GHz Res BW 1.0 MHz	-	W 3.0 MHz		Stop 2.0000 Gi weep 1.33 ms (5000 p

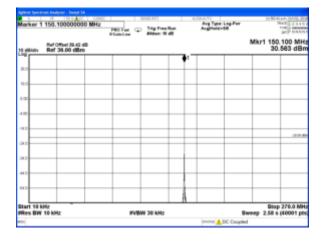
SPECIFICATION: FCC CF	R 2.1051	RSS-119 5.8
12.5 kHz Channel Spacing	150.1 MHz @ 5 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
12.5 kHz Channel Spacing	150.1 MHz @ 1 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
Measurement Uncertainty:	≤12.75 GHz	± 3.0 dB
No emissions were	detected at a level greater than 20) dB below the limit.

Spurious Emissions (Tx Conducted)

150.1 MHz 5 watts

150.1 MHz 1 watt

Marker 1 150.100000	000 MHz PRO Feel PEaled on	Trig Free Run African 16 all		vg Type: Log-Pur vgHold:-58		Total Participation
Ref Offset 29.4 0-d8/div Ref 35.00 dB	2 dB Im				Mkr1 150 37	100 MH
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e 20		_				
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Start 10 kHz RRes BW 10 kHz		TVBW 30 KHz			Stop weep 2.58 s	270.0 MH (40001 pt
60				txtus 🛕 DC Couple	d	



	Ref Offset 42		PSO Feet G	Alden: 10				Mkr1 30	0.20 M
4810v	Ref 19.00 c	10m						- 4	4.42 dB
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nput Moch Atten 6 dB	PROTest Trig Prest	Avg Type: Log-Pr fun Avg@told:=58 8	02-44550p.m. 00m02, 20 97 78421 (2.2.2.4.5 71051 (4.4.9450) 0410 (7.5.9.60)
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tart 1.0009 GHz Res BW 1.0 MHz	#VBW 3.0 MHz		Stop 2.0000 GH Sweep 1.33 ms (5000 pt

Marker 1 300.200000		PRO.Fast	Trig Free Alden: 10	Run 40	Avg Type:	Log Par		AT 1 111
Ref Offset 42.4 Ref 19.00 dB	i dili Im						Mkr1 30 -51	1.63 dB
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710	A STREET			and the second				
itart 270.0 MHz Res BW 10 kHz			W 30 kHz			84	Stop 1 reep 6.98 s	.0000 G

nput Mech Atten 6 dB	PRO Fast G	Trig Free Run #Mean: 5 dB	AvgTube:Log-Per AvgPold:-58	02-887562-87 (2012) 20 1986-20 (2.1.2.3.4.1 1986-20 (2.1.3.4.1 1986-20 (2.1.3.4.1) 040 (2.1.3.4.1)
D dBidiv Ref 19.00 dBm				
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tart 1.0000 GHz Res BW 1.0 MHz		W 3.0 MHz		Stop 2.0000 Gi eep 1.33 ms (5000 pl

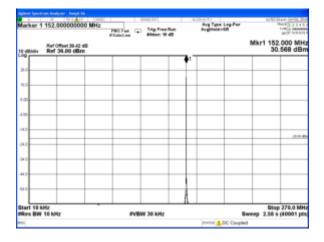
SPECIFICATION: FCC CF	R 2.1051	RSS-119 5.8
12.5 kHz Channel Spacing	152.0 MHz @ 5 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
12.5 kHz Channel Spacing	152.0 MHz @ 1 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
Measurement Uncertainty:	≤12.75 GHz	± 3.0 dB
No emissions were	detected at a level greater than 20) dB below the limit.

Spurious Emissions (Tx Conducted)

152.0 MHz 5 watts

152.0 MHz 1 watt

Marker 1 152.000000000	MHZ F80. Feet FCalcil.com FCalcil.com	Avg Type: Log-Per Avg/told:-58	Det P to show
Ref Offset 39.42 dB 0 dB/div Ref 35.00 dBm			Mkr1 152.000 MH 37.391 dBr
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Start 10 kHz		Λ	Stop 270.0 MH
Res BW 10 kHz	#VBW 30 kHz		Sweep 2.58 s (40001 pt
10		EXAMPLE DC Cave	pled



farker 1 304	.00000000	-	Salad and	Trig Free Bilden: 10	Run 40	Avg Type:	ag Pur		Net 2 3 3 4 1 THE CONTRACTOR
o dBAdiv Re	Offset 42.46 d 19.00 dBm	6						Mkr1 30	4.00 MH 6.28 dB
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tart 270.0 M	Hr .			_				Stop	1.0000 Gi

nput Mech Atten 6 dB	PBC Fait Tig Free Run PEcilic are Bitter: 1 dB	Avg Tgss: Log-Per Avg Hald=58	Statistics of the second secon
Buf Offset 42.48 dB			
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tart 1.0000 GHz Res BW 1.0 MHz	#VBW 3.0 MHz		Stop 2.0000 GH

farker 1 304.000	1000000 MHz	PSC Fast	Trig Free F	Run 40	Avg Type:	Log-Pwr		an ordina a had 1,3,3,4,1 had 2,3,3,4,1 had 2 had b
D-dBldiv Ref 19.	rt 42.46 dB 00 dBm						Mkr1 30 -54	4.00 MH
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	and the second second		a provinsi	and the second second	10.00	2011-2018	in - a dista	19150
tart 270.0 MHz Res BW 10 kHz			W 30 kHz			84	Stop	1.0000 G

nput Mech Atten 6 dB	PRO. Fast	Trig Free Run Mitten: 5 48	Avg Type: Log-Par Avg[Hold:-08	02-60 (Sp.m. Ontol), 20 Trate (J. 2.3.3.4.1 Trate (J. 2.3.4.1 Out (P. 5.1.6.1)
Bef Offset 42.45 dB 0 dBdiv Ref 19.00 dBm				
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71.0				
itart 1.0000 GHz Res BW 1.0 MHz		W 3.0 MHz		Stop 2.0000 Gr

SPECIFICATION: FCC CF	R 2.1051	RSS-119 5.8
12.5 kHz Channel Spacing	156.3 MHz @ 5 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
12.5 kHz Channel Spacing	156.3 MHz @ 1 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
Measurement Uncertainty:	≤12.75 GHz	± 3.0 dB
No emissions were	detected at a level greater than 20) dB below the limit.

Spurious Emissions (Tx Conducted)

156.3 MHz 5 watts

156.3 MHz 1 watt

Marker 1 156.30000000 MH	FRO: Foot Trig: Free Run FRO: Foot Trig: Free Run Ficalist.com	Avg Type: Log-Per Avg/told=58	10-52-58 a.m. Ornida, 30 TRes2 3, 3, 3, 4, 5 Tri00, 6 Get(P, 10-5 km
Ref Offset 29.42 dB 2-dB/div Ref 36.00 dBm			Mkr1 156.300 MH 37.299 dBr
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itart 10 kHz Res BW 10 kHz	#VBW 30 kHz		Stop 270.0 MH Iweep 2.58 s (40001 pt
60		ITATUS 🔔 DC Couple	ed



larker 1 312.6000		PSO Feet G	Alter: 10-	lun AB	Avg Type:	Mkr1 31	100 P 105 M
Ref Offset	12.45 dB 0 dBm					 -4	8.37 dB
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10	- Bucklasi	No. of Concession, Name	and discut	10-020	and south	 	
itart 270.0 MHz Res BW 10 kHz	-		W 30 kHz			 Stop	1.0000 G

put Mech Atten 6 dB	PROTEINE Proteinition Proteinition	Avg Type: Log-Pur Avg/told=58	02-65 50p.m 04102 300 98x33 (2.3.3.4.5 1745(3.4.64444 040)P 515 516
Ref Offset 42.45-dB Ref 19.00 dBm			
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winewyddanaderus fei yn frifa	ware and a second and the second and	*****	erinalisination
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tart 1.0000 GHz Res BW 1.0 MHz	#VBW 3.0 MHz		Stop 2.0000 GH

	Ref Offset 42.		PBO F PCale		After: 10	80 10			Mkr1 31	2.60 MP
0.48Miv	Ref 19.00 d	6m								5.66 dB
9.00			_							
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	(married and the second		4000	فتدع	a na lana	فلانتقاص	فالمطغا	متعانينه	لحاديات	فشعابة
71.0	1.000		decarded	and i	and the second	THE BIO	a sela con pr	-1		
itart 270.0 Res BW 1			_		W 30 kHz	_		-	Stop	1.0000 G

nput Mech Atten 6 dB	FBO Fail G	Trig Free Run Altern 5 dB	Avg Type: Log-Pur AvgPold:/58	00-45 (Span, Orrida 3) 746(3) 2 2 3 4 1 746(3) 4 1000 041(7) 5 5 5 50
Ref Offset 42.46 dB				
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ministration	wiking	elourseriuity	-	-
tart 1.0000 GHz Res BW 1.0 MHz	1.10	W 3.0 MHz	24	Stop 2.0000 Gi reep 1.33 ms (5000 p

SPECIFICATION: FCC CF	R 2.1051	RSS-119 5.8
12.5 kHz Channel Spacing	156.67 MHz @ 5 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
12.5 kHz Channel Spacing	156.67 MHz @ 1 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
Measurement Uncertainty:	≤12.75 GHz	± 3.0 dB
No emissions were	detected at a level greater than 20) dB below the limit.

Spurious Emissions (Tx Conducted)

156.67 MHz 5 watts

156.67 MHz 1 watt

Marker 1 156.670000000 MH		Avg/Note-10 Avg/Note-10	10-52-65 am, Genda, 20 TRec2 2, 2, 3, 3, 4, 5 Triffic a methods Get P. 14 5 form
Ref Offset 39.42 dB to dB4div Ref 35.00 dBm			Mkr1 156.670 MH 37.309 dBr
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16.0			
6.00			
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34.0			
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64.0		A	
Start 10 kHz RRes BW 10 kHz	#VBW 30 kHz		Stop 270.0 MH weep 2.58 s (40001 pt
e90		INATUR A DC Couple	d

Marker 1 156.670	000000 MHz	PRO Fail Tog Pres PEaled or Bidden: 10	But	Avg Type: Log-Per Avg/feld=58	11.94	Nucl 1 1 1 4 1 Tree of the back
Bef Offse 0 dBidly Ref 36.	rt 39.42 dB 00 dBm				Mkr1 156 30	480 dB
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MO			\vdash			
44.0						
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itart 10 kHz Res BW 10 kHz		#VBW 30 kHz	- 1		Sta Iweep 2.58 s	p 270.0 Mi
80				status ADC Couple		

larker 13	13.340000	000 MHz	PROFeet G	Trig Free Alden: 10		Avg Type:	Log-Pwr		No.3 13341 100 00000
1.48Miv	Ref Offset 42.4 Ref 19.00 di	6-d8 Im						Mkr1 3	13.34 MH 48.76 dB
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	-		winner	وبايبو ك	***	in the second	*****	****	بيانونية:
lart 270.0	MHz 0 kHz			W 30 kHz				Sto weep 6.9	p 1.0000 G

nput Mech Atten 6 dB	FRO. Fait FEated are FEated are FROM 1 48	AvgType:Log-Per AvgHeid:-58	00-45 20pm, 00-45, 20 7445 2, 2 2 3 4 5 7445 0, 2 5 5 5 5 5
Ref Offset 42.45 dB dB/div Ref 19.00 dBm			
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المجانبة بالمراجل والمرجو	-	un anna an	بمؤوب فيلموه والمراجع
10 Note that the second se			
tart 1.0000 GHz			Stop 2.0000 GH
Res BW 1.0 MHz	#VBW 3.0 MHz	Swe	ep 1.33 ms (\$600 pt

Marker 1 313	3400000		TROX Fast G	Trig Free Alden: 10	Run 40	Avg Type:	Log-Pwr		off P NAME
Ref	Offset 42.46 c 19.00 dBm	6						Mkr1 31: -55	3.34 MH
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Start 270.0 MP			FV8	W 30 kHz			Sw	Stop 1 reep 6.98 s	.0000 G

nput Mech Atten 6 dB	FBOX Fast Trig Free R PEaleLow Bidser 6 dB	Avg Type: Log-Po ken AvgStald:-58	02-45-290-01-02-30 99-62 (2-2-2-4-2 7-02) A - 04-02 441 (P-5-9-60
Bef Offset 42.46 dB Bef 19.00 dBm			
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-	wind the second second	utiliseterine universite	www.
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tart 1.0000 GHz Res BW 1.0 MHz	IVBW 3.0 MHz		Stop 2.0000 Gi Sweep 1.33 ms (5000 pl

SPECIFICATION: FCC CF	R 2.1051	RSS-119 5.8						
12.5 kHz Channel Spacing	157.0 MHz @ 5 W	Emission Mask D						
Emission Frequency (MHz)	Level (dBm)	Level (dBc)						
~	~	~						
12.5 kHz Channel Spacing	157.0 MHz @ 1 W	Emission Mask D						
Emission Frequency (MHz)	Level (dBm)	Level (dBc)						
~	~	~						
Measurement Uncertainty:	Measurement Uncertainty: ≤12.75 GHz ± 3.0 dB							
No emissions were	detected at a level greater than 20) dB below the limit.						

Spurious Emissions (Tx Conducted)

157.0 MHz 5 watts

157.0 MHz 1 watt

Marker 1 157.000000000 MH	2 PROTest PEakstow PEakstow PEakstow PEakstow	Avg/told=56	10.5450 a.m. Centil, 20 19642 3.2.3.4.5 7780 0 00000 0400 10.6.60
Ref 36.00 dBm			Mkr1 157.000 MH 37.323 dBr
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16.0			
6.00			
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14.0			
34.0			
34.0			
44.0			
64.0		A	
Start 10 kHz Rics BW 10 kHz	#VBW 30 kHz		Stop 270.0 MH weep 2.58 s (40001 pt
80		ITATUS ADC Couple	d

Marker 1	157.0000000	0 MHz	FBO Fast C	Trig Free Run Alden: 16 40		Avg Type: Log-Po Avg/told=58	*	March 1, 2, 3, 4, 1 Trans 6 March 1, 2, 3, 4, 1 Trans 6 March 10, 6, 10
10 48Miv	Ref Offset 39.42 Ref 35.00 dBn				_		Mkr1 15	57.000 MH 0.519 dBr
20					•			
11.0					+			
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4.00	_	-	-		+			
MD			-		-			
34.0		-	-		-			
мо —		-	-		+			
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larker 1	314.000000	0000 MHz	PRO Fast PEaksLaw	Trig Fre	e Run 9 ett	Avg Type	Log-Pur		Read 1.3341 Total Photos
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nput Mech Atten 6 dB	PSC Fait @	Trig Free Run Alden: 5 dB	Avg/Note-58	00-00 20a on October 20 76x23 2 2 2 3 4 5 7x85 0 2 2 5 6 5 6
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nput Mech Atten 6 dB	FBX Fait Trig Free Plaint or Filder. 6	Run Avgittald	e Log-Pwr ⊨58	74,400,24:50 (Real) (Real) (Real) (Real) (Real)	1 2 3 4 1 0 5 4 10
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tart 1.0000 GHz Res BW 1.0 MHz	IVEW 3.0 MHz		-	Stop 2.00 p 1.33 ms (5	100 GI

SPECIFICATION: FCC CF	R 2.1051	RSS-119 5.8						
12.5 kHz Channel Spacing	160.0 MHz @ 5 W	Emission Mask D						
Emission Frequency (MHz)	Level (dBm)	Level (dBc)						
~	~	~						
12.5 kHz Channel Spacing	160.0 MHz @ 1 W	Emission Mask D						
Emission Frequency (MHz)	Level (dBm)	Level (dBc)						
~	~	~						
Measurement Uncertainty:	Measurement Uncertainty: ≤12.75 GHz ± 3.0 dB							
No emissions were	detected at a level greater than 20) dB below the limit.						

Spurious Emissions (Tx Conducted)

160.0 MHz 5 watts

160.0 MHz 1 watt

Marker 1 160.000000000 M	HZ F90: Fait F50: Can Add Field	AvgTuse: Log-Per AvgHebd=58	10.55 Skam, Genda, 20 Skali 2, 3, 3, 4, 5 Triff, 6 Get P. 16 Skot
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Marker 1 160.000000000 N	H2 F8X Fast F52stLaw F62stLaw	Avg Type: Log-Per Avg/Hold:+58	10:50:27 a.m. Option 20 78m2 2:2:3:4:1 7:00:0 option 10:500
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arker 1 320.00000000 MHz	PBX Fail G	Trig Free Mitter: 10	Avg Type: 1	.og.Pwr	Mkr1 32	100 000 000
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art 270.0 MHz bes BW 10 kHz		W 30 kHz			Stop	1.0000 Gi

nput Mech Atten 6 dB	FBOX Fast Trigg Free Run FEakel are Filter 1 48	AvgPoints AvgPoint-58	00-45 Mp.m. 04102 20 Min.2 2 2 3 4 5 1745 0 2 5 5 6 6 9 0417 5 5 6 6 9
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tart 1.0000 GHz Res BW 1.0 MHz	#VBW 3.0 MHz	1 and	Stop 2.0000 GH p 1.33 ms (5000 pt

Warker 1 32	0.00000000		FBOX Fault Ga	Trig Free Alden: 10	Run 48	Avg Type:	Ag-Pur		ALL PROPERTY
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tart 270.0 M Res BW 10				W 30 kHz			84	Stop 1 eep 6.98 s	.0998 G

nput Mech Atten 6 dB	PROFeet Total Free	Autoration Avenues and Avenues	g Type: Log-Pwr grold:-58	02-45-40pm 02-45 23 2 4 1 1946 2 2 2 2 4 1 1946 2 4 1 041 P 5-9 50
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tart 1.0000 GHz Res BW 1.0 MHz	IVBW 3.0 MH			Stop 2.0000 Gi Mp 1.33 ms (5000 pt

SPECIFICATION: FCC CF	R 2.1051	RSS-119 5.8
12.5 kHz Channel Spacing	161.0 MHz @ 5 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
12.5 kHz Channel Spacing	161.0 MHz @ 1 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
Measurement Uncertainty:	≤12.75 GHz	± 3.0 dB
No emissions were	detected at a level greater than 20) dB below the limit.

Spurious Emissions (Tx Conducted)

161.0 MHz 5 watts

161.0 MHz 1 watt

Marker 1 161.000000000 M	HZ FSX Fast PEaled are PEaled are FS 40	Avg Type: Log-Per Avg/Nobi-58	11.50.50 Auto, Central, 20 196-2 (2.2.3.4.5 1745) auto- art (2.1.6.60)
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itart 10 kHz Res BW 10 kHz	#VRW 30 kHz		Stop 270.0 MH weep 2.58 s (40001 pt
10		ITATUS ADC Couple	

Marker 1 161.000000000 N		Avg Type: Log-Per Avg/Hold=58	10:57 SEAR OF STATE
Ref Offset 39.42 dB			Mkr1 161.000 MH 30.499 dB
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nput Mech Atten 6 dB	FRO Fast Trig Free PEaksLaw Ridsen	Run Avg 60	Type: Log-Pur fold:-58	024640pm 0410230 9463 2 2 3 4 5 1746 5 4 041 P 515 515
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tart 1.0000 GHz Res BW 1.0 MHz	IVBW 3.0 MHz			Stop 2.0000 GH

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D dBldy R	rf Offset 42.46 ef 19.00 cille	dB m					Mkr1 32 -5	2.00 Mi 5.57 dB
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itart 270.0 N Res BW 10		-		W 30 kHz			Stop eep 6.98	1.0000 G

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	t 1.000 s BW 1				-	W 3.0 MHz				Stop 2 ep 1.33 me	2.0000 Gi

SPECIFICATION: FCC CF	R 2.1051	RSS-119 5.8
12.5 kHz Channel Spacing	162.0 MHz @ 5 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
12.5 kHz Channel Spacing	162.0 MHz @ 1 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
Measurement Uncertainty:	≤12.75 GHz	± 3.0 dB
No emissions were	detected at a level greater than 20) dB below the limit.

Spurious Emissions (Tx Conducted)

162.0 MHz 5 watts

162.0 MHz 1 watt

Marker 1 162.000000000 M	HZ FS0: Fast FEater and FEater and FEater and FS0: Fast	Avg Type: Log-Pur Avg/tote=68	11.500 Blan, Ortól 20 9863 (2.2.2.4.5 1798) autority artificial and a
Ref 35.00 dBm			Mkr1 162.000 MH 37.280 dBr
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Start 19 kHz RRes BW 19 kHz	#VBW 30 kHz	8	Stop 270.0 MH weep 2.58 s (40001 pt
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Marker 1	162.000000000	MH2 PRO: Fast PEaksCom	Trig Free Run Alden: 16 dB	Avg Type: Log-Pur Avg/tald:-58		Anno Genetici, 20 Marca II. 2. 2. 4. 5 From De Marca Anno Anno P. Marca Anno Anno Anno P. Marca Anno Anno Anno P. Marca Anno Anno Anno Anno Anno Anno Anno Anno
0 48Miv	Ref Offnet 39.42 dB Ref 35.00 dBm				Mkr1 162 30	.000 MH
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itart 10 kH			BW 30 kHz	a	Stop Sweep 2.58 s	270.0 MP
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farker 1 324.00	0000000 MH2	PS0.Fell (+	Mitter: 10 -	lun 18	Avg Type:			100 1 2 3 4 1 041 P 105 h
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tart 270.0 MHz							Stop	1.0000 Gi

k # 1918 AC 034	NEC SEMICIN'	ALCONT(1)	024658am.0m62.20
put Mech Atten 6 dB	PSO: Fast Trig Free But PEaksLaw Rither: 5 dB	Avg Type: Log-Per Avg/Hold:+58	THE A CONTRACT OF STREET
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art 1.0000 GHz			Stop 2.0000 GH
Res BW 1.0 MHz	#VBW 3.0 MHz	Save	ep 1.33 ms (5000 pt

Marker 1 324.0000000	1	90 Fait G	Trig Free I #Htten: 10-	lun 48	Avg Type:	og e we		out P to the
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itart 270.0 MHz Res BW 10 kHz			W 30 kHz			8	Stop 1 verp 6.98 s	.0000 G

nput Mech Atten 6 dB	PSO Fast C	Trig Free Run #Maan: 5 dB	Avg Type: Log-Per Avg/Hold:=58	02:46:00 p.m. 0m02, 20 946:20 [2:2:2:4:1 1/20] 0 = 0.4400 040 [P 5:4:60
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tart 1.0000 GHz Res BW 1.0 MHz		3.0 MHz		Stop 2.0000 Gil eep 1.33 ms (5000 pl

SPECIFICATION: FCC CF	R 2.1051	RSS-119 5.8
12.5 kHz Channel Spacing	162.1 MHz @ 5 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
12.5 kHz Channel Spacing	162.1 MHz @ 1 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
Measurement Uncertainty:	≤12.75 GHz	± 3.0 dB
No emissions were	detected at a level greater than 20) dB below the limit.

Spurious Emissions (Tx Conducted)

162.1 MHz 5 watts

162.1 MHz 1 watt

Marker 1 162, 100000000 MH	PROFeed of All Annual A	Avg Type: Log-Pur Avg[Hold=68	Mkr1 162.100 MH
addition Ref 35.00 dBm		-+,	37.314 dBr
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Marker 1 162.10000000 M	HZ FRO Fort Flain or Flain or Flain or	Avg Type: Log-Per Avg/Hold:+58	10:50:05 447. Optio2, 20 196020 (2:2:2:3:4:1 7:000,6:000000 04000 14:5:000
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Bart 10 KHz Res BW 10 KHz	#VBW 30 kHz		Stop 270.0 MH weep 2.58 s (40001 pt
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larker 1 324.20000000 Mi	Hz PBO Fast C PEaled res	P Trig Free R Alden: 10 d		Avg Type: 1	Ag-Pur	9	4 20 MM
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art 270.0 MHz Res BW 10 KHz		BW 30 kHz				Stop	1,0000 Gi

put Mech Atten 6 dB		Automation Avg Type: Log-Per	0246/07pm.0008_201 Real 0.1.3.4.5
por mech Anen o de	PSO Fast C Trig Free But PEakstow #Mean: 5 48	Avg Type: Log-Per Avg/told:+58	WED ADDRESS
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tart 1.0000 GHz			Stop 2.0000 GH
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Marker 1 324.2000	00000 MHz	PSO Fait G	Trig Free Alden: 10	Run 40	Avg Type:	Log-Pwr		NET P NUMBER
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tart 270.0 MHz Res BW 10 kHz		#V8	W 30 kHz			Sw	Stop 1 reep 6.98 s	1.0000 G

put Mech Atten 6 dB	PRO.Fail	Trig Free Bun Altern 5 48	Avg Type: Log-Pur Avg/tald:-58	024615pm.04162,3 94632,33343 119634 0419-55463
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tart 1.0000 GHz				Stop 2.0000 Gi

SPECIFICATION: FCC CF	R 2.1051	RSS-119 5.8
12.5 kHz Channel Spacing	168.0 MHz @ 5 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
12.5 kHz Channel Spacing	168.0 MHz @ 1 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
Measurement Uncertainty:	≤12.75 GHz	± 3.0 dB
No emissions were	detected at a level greater than 20) dB below the limit.

Spurious Emissions (Tx Conducted)

168.0 MHz 5 watts

168.0 MHz 1 watt

Marker 1 168.000000000 M		AvgType: Log-Per AvgPold=58	12:00:0030-0-0002,20 78xx2012,2:2:3:4:5 71x80,3:000000 0400* 12:5:60
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itart 10 kHz Res BW 10 kHz	#VBW 30 kHz		Stop 270.0 MH weep 2.58 s (40001 pt
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Marker 1 168.000000		Trig Free Bun Alder: 16 dB	Avg Type: Log-Per Avg/tald:-58	12:00 36p.m. 0 96m3 1 1/481,6 3419	2343
Ref Offset 39/ 10 dB/div Ref 35.00 d	12 dB Bm			Mkr1 168.000 30.361	dBr
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Start 10 kHz #Res BW 10 kHz		BW 30 kHz		Stop 278. weep 2.58 s (400	0 MH 01 pt
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nput Mech Atten 6 dB	PROTest Trig Free PlainLess Midset 6	AvgType:1 Run AvgPold=0 @	ng Pur B	02-46 (Sp.m. Octob, 20) 98x3 (1, 1, 3, 4, 5) 1746 (1, 4, 6) 241(P 5) 5 (1)
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tart 1.0000 GHz				Stop 2.0000 GH
Res BW 1.0 MHz	#VBW 3.0 MH		Sweep	1.33 ms (\$600 pt)

farker 1 335.0000000		FBOX Fault G	Trig Free Alden: 10-	Run 40	Avg Type:	Log-Pwr		Net P Net Art
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itart 270.0 MHz Res BW 10 kHz		1/8	W 30 kHz			84	Stop	1.0000 G

nput Mech Atten 6 dB	THE CO. THE	Free Run n: 6 dB	Avg Type: Log-Pv Avg/Hold:+58	r	Naci 12345 100 0 00000
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SPECIFICATION: FCC CF	R 2.1051	RSS-119 5.8
12.5 kHz Channel Spacing	173.9 MHz @ 5 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
12.5 kHz Channel Spacing	173.9 MHz @ 1 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
Measurement Uncertainty:	≤12.75 GHz	± 3.0 dB
No emissions were	detected at a level greater than 20) dB below the limit.

Spurious Emissions (Tx Conducted)

173.9 MHz 5 watts

173.9 MHz 1 watt

larker 1 173.900000000 MH	12 12 13 The Peer Run 14 The Peer Run 14 The Peer Run 14 The Peer Run	AvgType: Log-Per AvgPald=58	12:00:51 p.m. Omrid, 20 78m2 2, 2, 2, 4, 5 71/20 3, 000000 0410 7116 60
Ref Offset 39.42 dB dB/div Ref 36.00 dBm			Mkr1 173.900 MH 37.139 dBr
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tart 10 kHz Res BW 10 kHz	#VBW 30 kHz		Stop 270.0 MH weep 2.58 s (40001 pt
o ber te kn2	WYEW 30 KH2	ITATUS A DC Couple	

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94.0			
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tart 270.0 M			-	W 30 kHz				Stop	1.0000 GR

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itart 270.0 MHz Res BW 10 kHz		W 30 kHz		Stop 1.0000 Gi weep 6.98 s (5000 p

nput Mech A	tten 6 dB		FRO Fast	Trig Free Alter: 5 d	Sue .	Avg Type: AvgDtald.v	Log-Pur 58	9	100 00001 0000000000000000000000000000
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71.0									
itart 1.0000 G								Stop	2.0000 GH
Res BW 1.0 h		saved	PV8	W 3.0 MHz		211/0	Swe	ep 1.33 m	r (seeo pe

Spurious Emissions (Tx Conducted)

SPECIFICATION: FCC CFR 2.1051

RSS-119 5.8

LIMITS: FCC 47 CFR 90.210

RSS-119 5.8

Carrier Output Power	Emission Mask D 12.5 kHz Channel Spacing 50 + 10 Log ₁₀ (Pw _{atts})	
5 W	-20 dBm	-57 dBc
1 W	-20 dBm	-50 dBc

TRANSMITTER SPURIOUS EMISSIONS (RADIATED)

SPECIFICATION: FCC 47 CFR 2.1053

GUIDE: TIA/EIA-603D 2.2.12

MEASUREMENT PROCEDURE:

Initial Scan:

- 1. The EUT is placed in the S-Line TEM cell and emissions are measured from 30 MHz to 800 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 800 MHz to the upper frequency required. 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.
- 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 RESULTS: See the tables on the following pages

LIMIT CLAUSE: FCC 47 CFR 90.210

Spurious Emissions (Tx Radiated) - Continued

SPECIFICATION: FCC CFR 2.1053 12.5 kHz Channel Spacing 138.1 MHz @ 5 W Emission Mask D Emission Frequency (MHz) Level (dBm) Level (dBc) 12.5 kHz Channel Spacing 138.1 MHz @ 1 W Emission Mask D Emission Frequency (MHz) Level (dBm) Level (dBc) ~ ~ ~ ± 4.6 dB Measurement Uncertainty No emissions were detected at a level greater than 20 dB below the limit. 12.5 kHz Channel Spacing 143.9 MHz @ 5 W Emission Mask D Emission Frequency (MHz) Level (dBm) Level (dBc) ~ ~ ~ 12.5 kHz Channel Spacing 143.9 MHz @ 1 W Emission Mask D Level (dBc) Emission Frequency (MHz) Level (dBm) ~ Measurement Uncertainty ± 4.6 dB No emissions were detected at a level greater than 20 dB below the limit. 12.5 kHz Channel Spacing Emission Mask D 148.1 MHz @ 5 W Emission Frequency (MHz) Level (dBm) Level (dBc) ~ ~ 12.5 kHz Channel Spacing 148.1 MHz @ 1 W Emission Mask D Level (dBm) Level (dBc) Emission Frequency (MHz) ~ ~ ~ ± 4.6 dB Measurement Uncertainty No emissions were detected at a level greater than 20 dB below the limit. FCC ID: CASTPDB1D Page 148 of 199 Report Revision: 1

Spurious Emissions (Tx Radiated) - Continued

12.5 kHz Channel Spacing	149.8 MHz @ 5 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
12.5 kHz Channel Spacing	149.8 MHz @ 1 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
Measurement Uncertainty	± 4.	6 dB
	etected at a level greater than 2	
	-	
12.5 kHz Channel Spacing	150.1 MHz @ 5 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
12.5 kHz Channel Spacing	150.1 MHz @ 1 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
Measurement Uncertainty	<u>±</u> 4.	6 dB
No emissions were d	etected at a level greater than 2	0 dB below the limit.
12.5 kHz Channel Spacing	152.0 MHz @ 5 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
12.5 kHz Channel Spacing	152.0 MHz @ 1 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~

Emission Frequency (MHz)	Level (dBm)	Level (dBc)		
~	~	~		
Measurement Uncertainty	± 4.6 dB			
No emissions were detected at a level greater than 20 dB below the limit.				

Spurious Emissions (Tx Radiated) - Continued

opulious	Emissions (1x naulaleu) - O	Untillueu		
12.5 kHz Channel Spacing	156.3 MHz @ 5 W	Emission Mask D		
Emission Frequency (MHz)	Level (dBm)	Level (dBc)		
~	~	~		
12.5 kHz Channel Spacing	156.3 MHz @ 1 W	Emission Mask D		
Emission Frequency (MHz)	Level (dBm)	Level (dBc)		
~	~	~		
Measurement Uncertainty	± 4.1	6 dB		
No emissions were	detected at a level greater than 20) dB below the limit.		
12.5 kHz Channel Spacing	156.67 MHz @ 5 W	Emission Mask D		
Emission Frequency (MHz)	Level (dBm)	Level (dBc)		
~	~	~		
12.5 kHz Channel Spacing	156.67 MHz @ 1 W	Emission Mask D		
Emission Frequency (MHz)	Level (dBm)	Level (dBc)		
~	~	~		
Measurement Uncertainty	± 4.	6 dB		
	e detected at a level greater than 20 dB below the limit.			
12.5 kHz Channel Spacing	157.0 MHz @ 5 W	Emission Mask D		
Emission Frequency (MHz)	Level (dBm)	Level (dBc)		
~	~	~		

12.5 kHz Channel Spacing

157.0 MHz @ 1 W

Emission Mask D

Emission Frequency (MHz)	Level (dBm)	Level (dBc)		
~	~	~		
Measurement Uncertainty	± 4.6 dB			
No emissions were detected at a level greater than 20 dB below the limit.				

Spurious Emissions (Tx Radiated) - Continued

Spullous	Emissions (TX naulaleu) - O	Untinueu
12.5 kHz Channel Spacing	160.0 MHz @ 5 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
12.5 kHz Channel Spacing	160.0 MHz @ 1 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
Measurement Uncertainty		6 dB
No emissions were o	detected at a level greater than 20) dB below the limit.
12.5 kHz Channel Spacing	161.0 MHz @ 5 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
12.5 kHz Channel Spacing	161.0 MHz @ 1 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
Measurement Uncertainty	± 4.0	
No emissions were o	detected at a level greater than 20) dB below the limit.
12.5 kHz Channel Spacing	162.0 MHz @ 5 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
12.5 kHz Channel Spacing	162.0 MHz @ 1 W	Emission Mask D

Emission Frequency (MHz)	Level (dBm)	Level (dBc)	
~	~	~	
Measurement Uncertainty ± 4.6 dB			
No emissions were detected at a level greater than 20 dB below the limit.			

Spurious Emissions (Tx Radiated) - Continued

Spurious	EIIIISSIUIIS (IX naulaleu) - G	Untinued
12.5 kHz Channel Spacing	162.1 MHz @ 5 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
12.5 kHz Channel Spacing	162.1 MHz @ 1 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
Measurement Uncertainty	± 4.0	6 dB
No emissions were	detected at a level greater than 20) dB below the limit.
12.5 kHz Channel Spacing	168.0 MHz @ 5 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
12.5 kHz Channel Spacing	168.0 MHz @ 1 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~
Measurement Uncertainty	± 4.0	6 dB
No emissions were	detected at a level greater than 20) dB below the limit.
12.5 kHz Channel Spacing	173.9 MHz @ 5 W	Emission Mask D
Emission Frequency (MHz)	Level (dBm)	Level (dBc)
~	~	~

12.5 kHz Channel Spacing

173.9 MHz @ 1 W

Emission Mask D

Emission Frequency (MHz)	Level (dBm)	Level (dBc)	
~	~	~	
Measurement Uncertainty ± 4.6 dB			
No emissions were detected at a level greater than 20 dB below the limit.			

Spurious Emissions (Tx Radiated) - Continued

LIMITS:	FCC CFR 2.1053		
Carrie	er Output Power		n Mask D Innel Spacing Ig10 (Pwatts)
	5 W	-20 dBm	-57 dBc
	1 W	-20 dBm	-50 dBc

Open Area Test Site Results:

12.5 kHz Channel Spacing	156.3 MHz @ 5 W	Emission Mask D
Harmonics Emission Frequency (MHz)	Level (dBm)	Level (dBc)
312.6	-54.03	-91.03
468.9	-72.35	-109.35
625.2	-71.74	-108.74
781.5	-65.18	-102.18
937.8	-44.71	-81.71
1094.1	-69.72	-106.72
Measurement Uncertainty	± 4.	6 dB

Sample Calculation	Measurement						
	Reference	Substitution				Res	ult
Emission Frequency (MHz)	Reference Level (dBm)	Sig-gen Level	Cable and Attenuator Gain	Antenna Gain (dBd)	Path and Boresight corrections	dBm	nW
312.6	-79.17	-40.20	-13.64	-0.35	0.16	-54.03	3.95
		А	В	С	D	E	-

Result (E) = A+B+C+D



FCC ID: CASTPDB1D IC : 737A-TPDB1D Page 153 of 199

Report Revision: 1 Issue Date: 3 October 2018

TRANSIENT FREQUENCY BEHAVIOUR

SPECIFICATION: FCC 47 CFR 90.214

RSS-119 5.9

GUIDE: TIA/EIA-603D 2.2.19

MEASUREMENT PROCEDURE:

1. Refer Annex A for equipment set up.

2. Measurements and plots were made following the TIA/EIA procedure.

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

LIMIT CLAUSES: FCC 47 CFR 90.214

RSS-119 5.9

Transient Frequency Behaviour

5 W

RSS-119 5.9

Tx FREQUENCY:

138.1 MHz

12.5 kHz Channel Spacing

TRANSIENT RESPONSE	CARRIER PEAK VARIATION FROM NORMAL		
PERIOD	Key ON (kHz)	Key OFF (kHz)	
t1	0.6	N/A	
t2	-0.8	N/A	
t3	N/A	-0.8	

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

Measurement Uncertainty:

: Frequency ± 130 Hz;

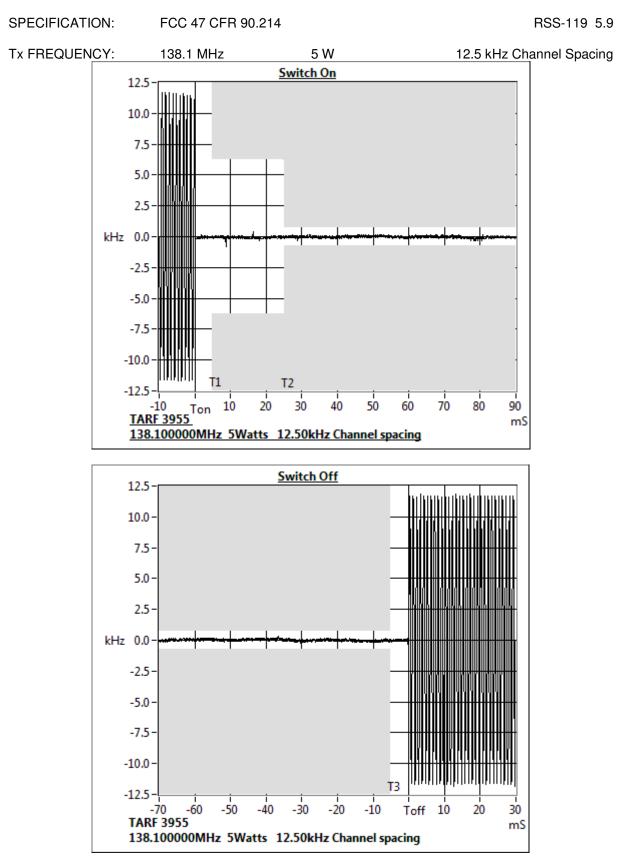
Time ± 0.2%

LIN	LIMIT: FCC 47 CFR 90.214					
		FREQUENCY RANGE				
	TRANSIENT PERIODS	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	FREQUE	NCY RANGE	
TRANSIENT FERIODS	Difference	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	

Transient Frequency Behaviour



FCC ID: CASTPDB1D IC : 737A-TPDB1D

Transient Frequency Behaviour

SPECIFICATION: FCC 47 CFR 90.214

143.9 MHz

Tx FREQUENCY:

5 W

12.5 kHz Channel Spacing

TRANSIENT RESPONSE	CARRIER PEAK VARIATION FROM NORMAL		
PERIOD	Key ON (kHz)	Key OFF (kHz)	
t1	2.8	N/A	
t2	-0.9	N/A	
t3	N/A	-0.4	

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

Measurement Uncertainty:

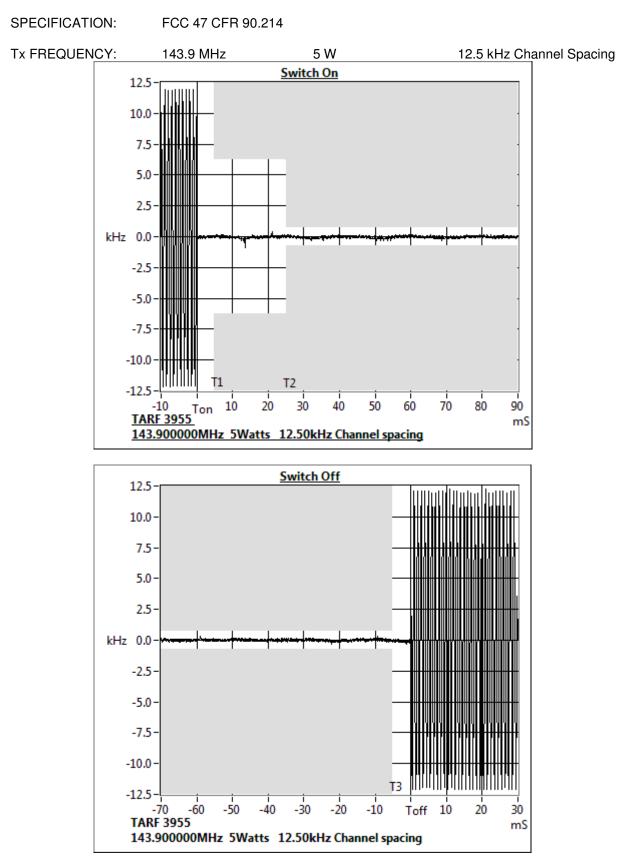
: Frequency ± 130 Hz;

Time ± 0.2%

L	IMIT: FCC 47 0	CFR 90.214	
F	TRANSIENT PERIODS	FREQUENCY RANGE	
	TRANSIENT FERIODS	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	FREQUE	NCY RANGE
TRANSIENT FERIODS	Difference 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



Transient Frequency Behaviour

5 W

RSS-119 5.9

Tx FREQUENCY:

148.1 MHz

12.5 kHz Channel Spacing

TRANSIENT RESPONSE	CARRIER PEAK VARIATION FROM NORMAL	
PERIOD	Key ON (kHz)	Key OFF (kHz)
t1	1.5	N/A
t2	-0.3	N/A
t3	N/A	-0.4

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

Measurement Uncertainty:

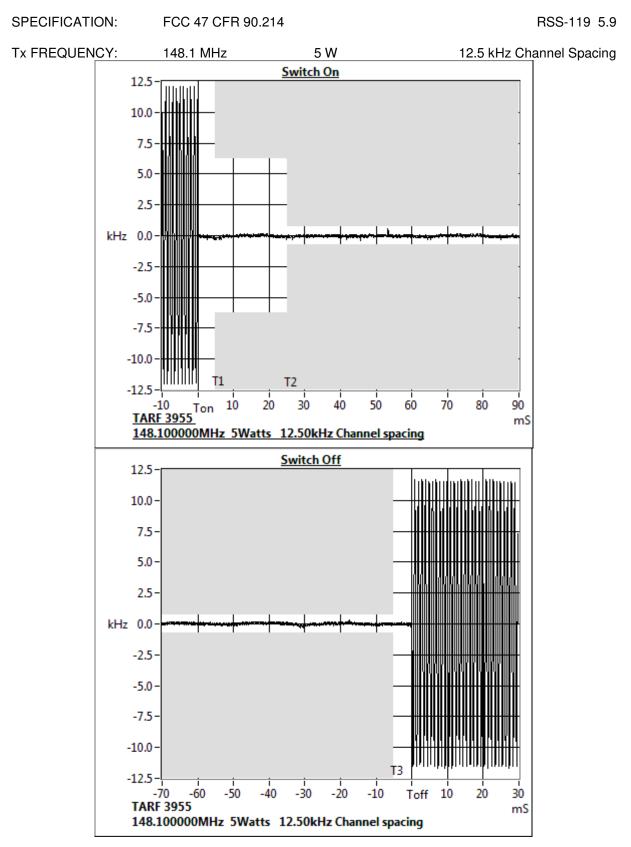
: Frequency ± 130 Hz;

Time ± 0.2%

LIMIT: FCC 47 CFR 90.214				
TDANQIENI		FREQUENCY RANGE		
TRANSIENT PERIODS		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	FREQUE	NCY RANGE
TRANSIENT FERIODS	Difference	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



Transient Frequency Behaviour

149.8 MHz

RSS-119 5.9

Tx FREQUENCY:

5 W

12.5 kHz Channel Spacing

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

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

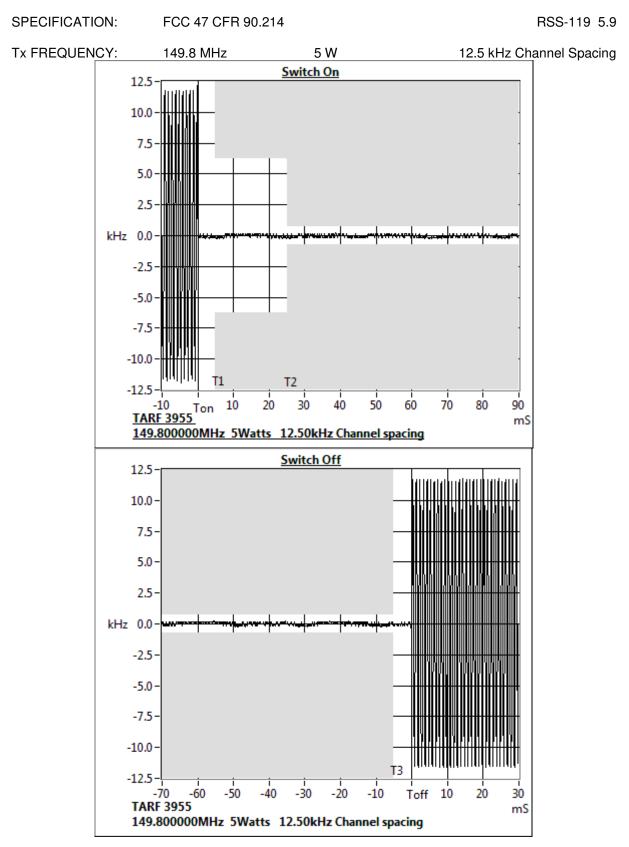
Measurement Uncertainty: Frequency ± 130 Hz;

Time ± 0.2%

L	IMIT: FCC 47 0	CFR 90.214	
F	TRANSIENT PERIODS	FREQUENCY RANGE	
	TRANSIENT FERIODS	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

RSS-119 5.9 LIMIT:

Transient Frequency Behaviour for Equipment Designed to Operate on 12.5 kHz Channels			12.5 kHz Channels	
TRANSIENT PERIODS	Maximum Frequency		TRANSIENT REPLODE Maximum Frequency FREQUENC	NCY RANGE
TRANSIENT FERIODS	Difference	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	



Transient Frequency Behaviour

5 W

RSS-119 5.9

Tx FREQUENCY:

150.1 MHz

12.5 kHz Channel Spacing

TRANSIENT RESPONSE	CARRIER PEAK VARIATION FROM NORMAL		
PERIOD	Key ON (kHz)	Key OFF (kHz)	
t1	-1.6	N/A	
t2	-0.3	N/A	
t3	N/A	-0.2	

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

Measurement Uncertainty:

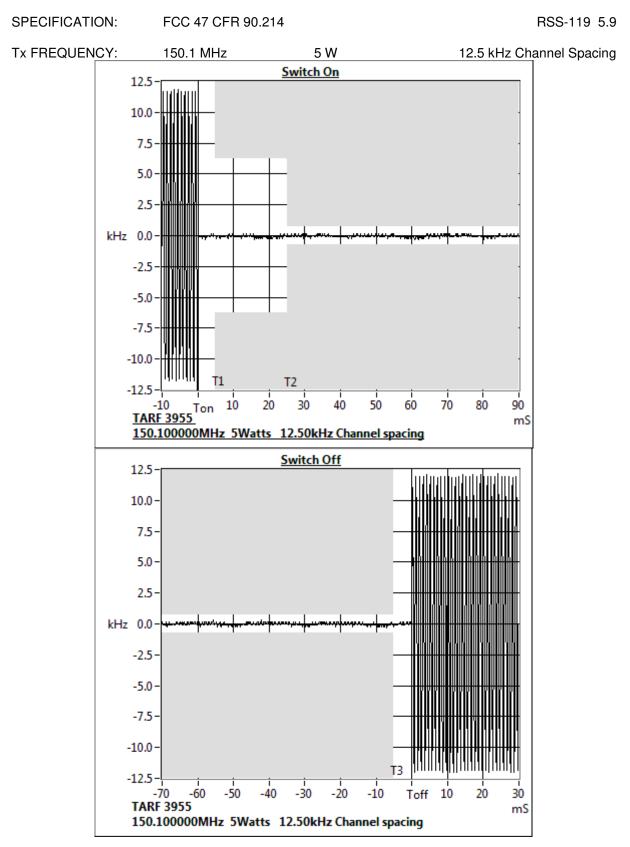
: Frequency ± 130 Hz;

Time ± 0.2%

LIMIT: FCC 47 CFR 90.214					
TDANQIENI	TRANSIENT PERIODS		CY RANGE		
INANSIEN	I FERIODS	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			12.5 kHz Channels	
TRANSIENT PERIODS	Maximum Frequency		TRANSIENT REPLODE Maximum Frequency FREQUENC	NCY RANGE
TRANSIENT FERIODS	Difference	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	



Transient Frequency Behaviour

152.0 MHz

RSS-119 5.9

Tx FREQUENCY:

5 W

12.5 kHz Channel Spacing

TRANSIENT RESPONSE	CARRIER PEAK VARIATION FROM NORMAL		
PERIOD	Key ON (kHz)	Key OFF (kHz)	
t1	-0.4	N/A	
t2	0.7	N/A	
t3	N/A	-0.3	

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

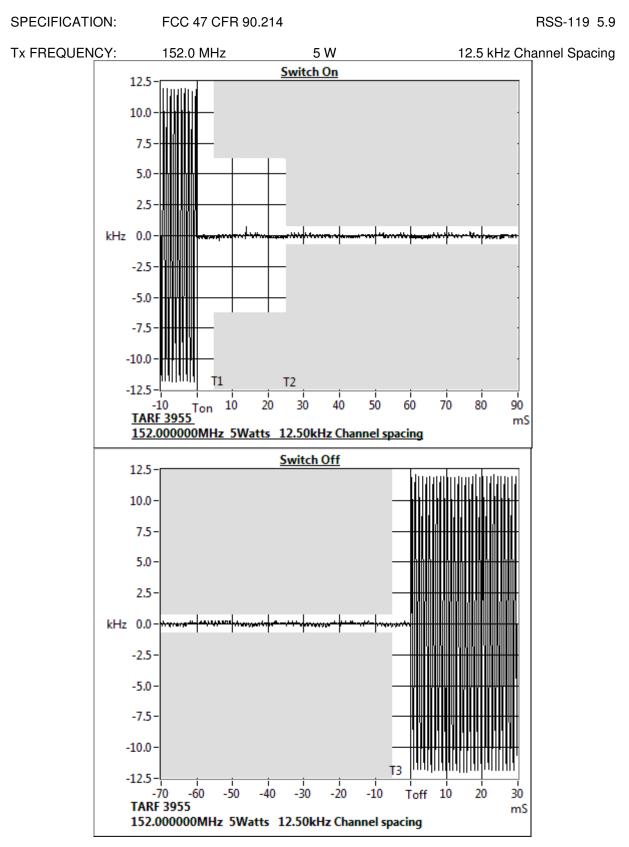
Measurement Uncertainty: Frequency ± 130 Hz;

Time ± 0.2%

L	IMIT: FCC 47 0	CFR 90.214	
F	TRANSIENT PERIODS		CY RANGE
	TRANSIENT FERIODS	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

RSS-119 5.9 LIMIT:

Transient Frequency Behaviour for Equipment Designed to Operate on 12.5 kHz Channels			12.5 kHz Channels
TRANSIENT PERIODS	Maximum Frequency	FREQUE	NCY RANGE
TRANSIENT FERIODS	Difference	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



Transient Frequency Behaviour

156.3 MHz

RSS-119 5.9

Tx FREQUENCY:

5 W

12.5 kHz Channel Spacing

TRANSIENT RESPONSE PERIOD	CARRIER PEAK VARIATION FROM NORMAL		
	Key ON (kHz)	Key OFF (kHz)	
t1	-0.6	N/A	
t2	-0.2	N/A	
t3	N/A	0.3	

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

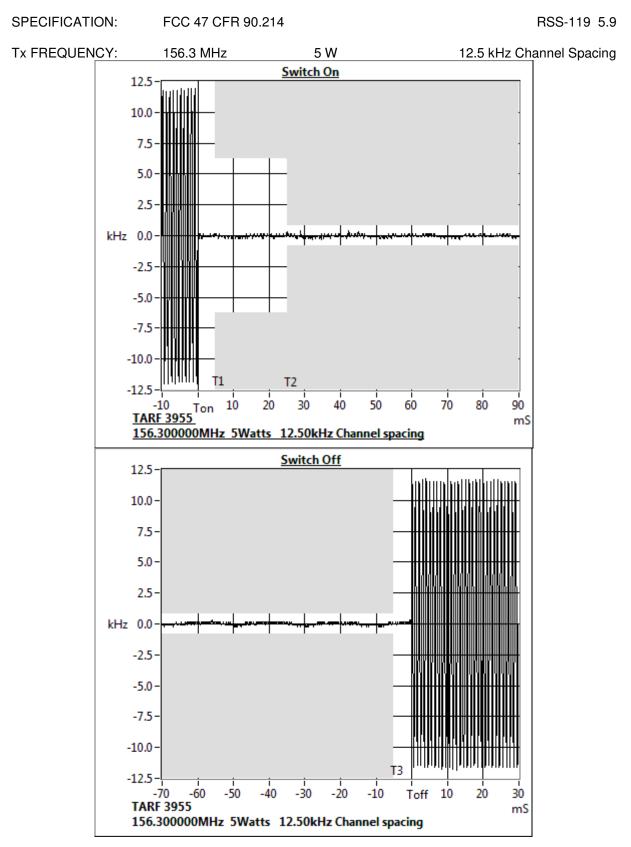
Measurement Uncertainty: Frequency ± 130 Hz;

Time ± 0.2%

L	IMIT: FCC 47 0	CFR 90.214		
F	TRANSIENT PERIODS	FREQUENCY RANGE		
	TRANSIENT FERIODS	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	

RSS-119 5.9 LIMIT:

Transient Frequency Behaviour for Equipment Designed to Operate on 12.5 kHz Channels			
TRANSIENT PERIODS	Maximum Frequency	FREQUENCY RANGE	
TRANSIENT FERIODS	Difference	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



Transient Frequency Behaviour

RSS-119 5.9

Tx FREQUENCY:

156.67 MHz

5 W

12.5 kHz Channel Spacing

TRANSIENT RESPONSE PERIOD	CARRIER PEAK VARIATION FROM NORMAL		
	Key ON (kHz)	Key OFF (kHz)	
t1	1.5	N/A	
t2	-0.2	N/A	
t3	N/A	0.3	

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

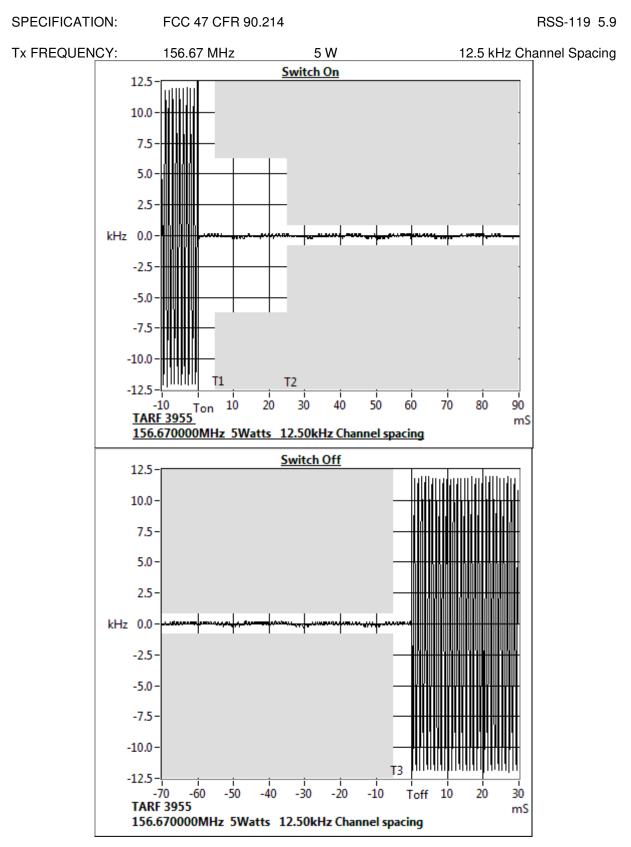
Measurement Uncertainty: Frequency ± 130 Hz;

Time ± 0.2%

L	IMIT: FCC 47 0	CFR 90.214		
F	TRANSIENT PERIODS	FREQUENCY RANGE		
	TRANSIENT FERIODS	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	

RSS-119 5.9 LIMIT:

Transient Frequency Behaviour for Equipment Designed to Operate on 12.5 kHz Channels			
TRANSIENT PERIODS	Maximum Frequency	FREQUENCY RANGE	
TRANSIENT FERIODS	Difference	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



Transient Frequency Behaviour

157.0 MHz

RSS-119 5.9

Tx FREQUENCY:

5 W

12.5 kHz Channel Spacing

TRANSIENT RESPONSE	CARRIER PEAK VARIATION FROM NORMAL		
PERIOD	Key ON (kHz)	Key OFF (kHz)	
t1	3.8	N/A	
t2	-0.3	N/A	
t3	N/A	0.4	

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

Measurement Uncertainty: Frequency ± 130 Hz;

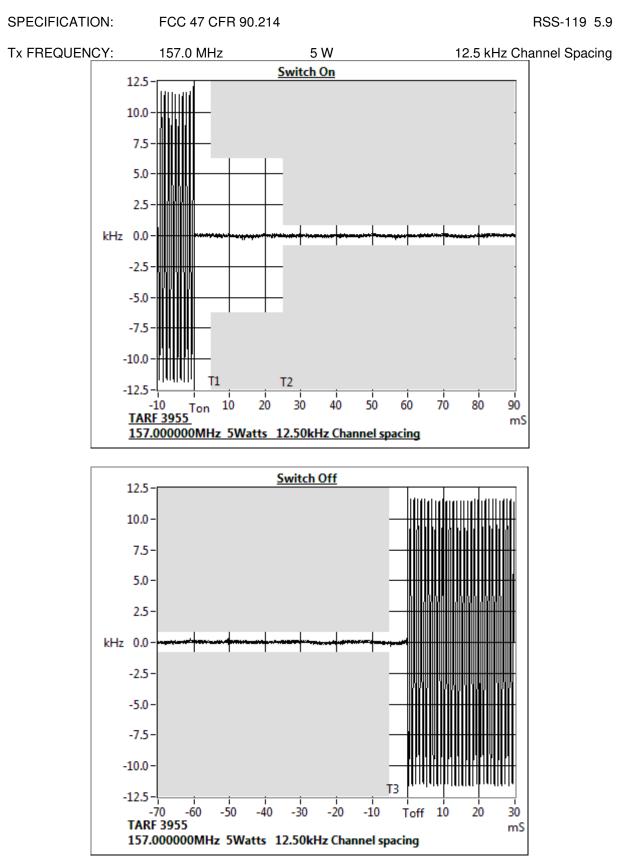
Time ± 0.2%

L	IMIT: FCC 47 0	CFR 90.214		
F	TRANSIENT PERIODS	FREQUENCY RANGE		
	TRANSIENT FERIODS	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	

RSS-119 5.9 LIMIT:

Transient Frequency Behaviour for Equipment Designed to Operate on 12.5 kHz Channels			
TRANSIENT PERIODS	Maximum Frequency	FREQUENCY RANGE	
TRANSIENT FERIODS	Difference	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

Transient Frequency Behaviour



FCC ID: CASTPDB1D IC : 737A-TPDB1D

Transient Frequency Behaviour

160.0 MHz

RSS-119 5.9

Tx FREQUENCY:

5 W

12.5 kHz Channel Spacing

TRANSIENT RESPONSE	CARRIER PEAK VARIATION FROM NORMAL	
PERIOD	Key ON (kHz)	Key OFF (kHz)
t1	-0.9	N/A
t2	-0.3	N/A
t3	N/A	-0.3

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

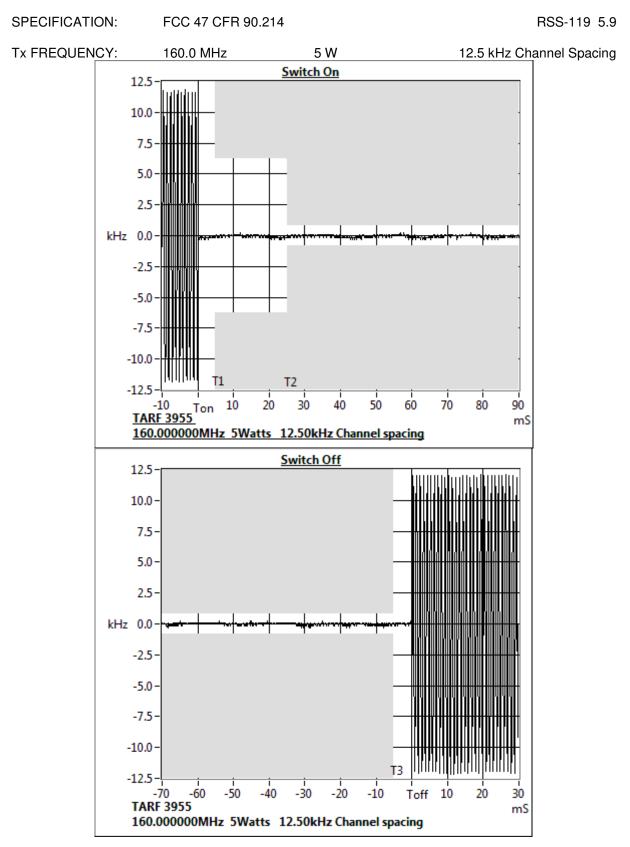
Measurement Uncertainty: Frequency ± 130 Hz;

Time ± 0.2%

L	IMIT: FCC 47 0	CFR 90.214		
F	TRANSIENT PERIODS	FREQUENCY RANGE		
	TRANSIENT FERIODS	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	

RSS-119 5.9 LIMIT:

Transient Frequency Behaviour for Equipment Designed to Operate on 12.5 kHz Channels			
TRANSIENT PERIODS	Maximum Frequency	FREQUENCY RANGE	
TRANSIENT FERIODS	Difference	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



Transient Frequency Behaviour

5 W

RSS-119 5.9

Tx FREQUENCY:

161.0 MHz

12.5 kHz Channel Spacing

TRANSIENT RESPONSE	CARRIER PEAK VARIATION FROM NORMAL		
PERIOD	Key ON (kHz)	Key OFF (kHz)	
t1	0.9	N/A	
t2	0.3	N/A	
t3	N/A	-0.2	

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

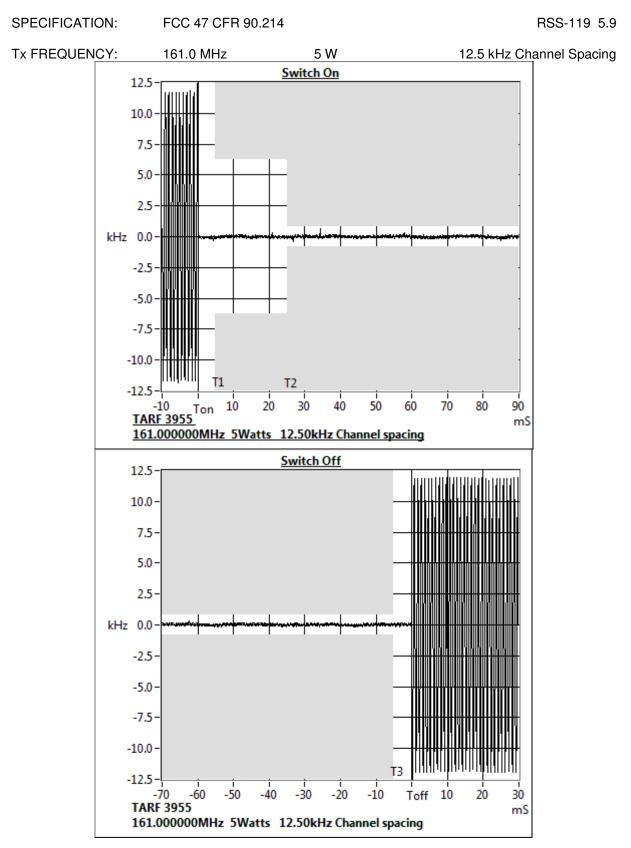
Measurement Uncertainty: Frequency ± 130 Hz;

Time ± 0.2%

L	IMIT: FCC 47 0	CFR 90.214		
F	TRANSIENT PERIODS	FREQUENCY RANGE		
	TRANSIENT FERIODS	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	

RSS-119 5.9 LIMIT:

Transient Frequency Behaviour for Equipment Designed to Operate on 12.5 kHz Cha			
TRANSIENT PERIODS	Maximum Frequency	FREQUENCY RANGE	
TRANSIENT FERIODS	Difference	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



Transient Frequency Behaviour

162.0 MHz

RSS-119 5.9

Tx FREQUENCY:

5 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	-0.3	N/A	
t3	N/A	-0.6	

Confirm that during periods t1 and t3 the frequency difference	YES	NO
does not exceed the value of one channel separation.		
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	YES	NO
does not exceed the frequency error limit.		

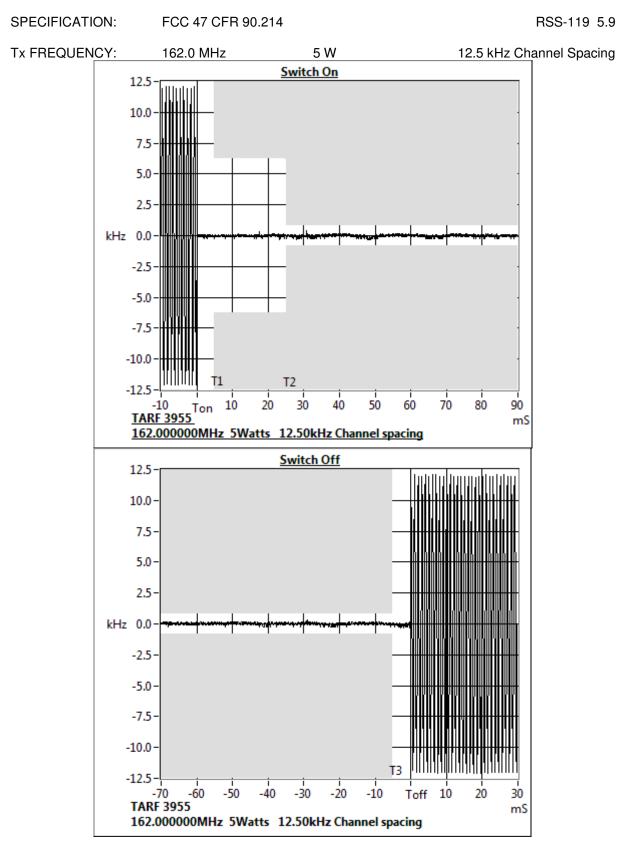
Measurement Uncertainty: Frequency ± 130 Hz;

Time ± 0.2%

L	IMIT: FCC 47 0	CFR 90.214		
F	TRANSIENT PERIODS	FREQUENCY RANGE		
	TRANSIENT PERIODS	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	

RSS-119 5.9 LIMIT:

Transient F	Transient Frequency Behaviour for Equipment Designed to Operate on 12.5 kHz Channels			
TRANSIENT I		Maximum Frequency	FREQUE	NCY RANGE
	-ENIOD3	Difference	138 – 174 MHz	406.1 – 470 MHz
t1 (ms	5)	± 12.5 kHz	5 ms	10 ms
t2 (ms	5)	± 6.25 kHz	20 ms	25 ms
t3 (ms	5)	± 12.5 kHz	5 ms	10 ms



Transient Frequency Behaviour

5 W

RSS-119 5.9

Tx FREQUENCY:

- ---

162.1 MHz

12.5 kHz Channel Spacing

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

Confirm that during periods t1 and t3 the frequency difference	YES	NO
does not exceed the value of one channel separation.		
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	YES	NO
does not exceed the frequency error limit.		

Measurement Uncertainty:

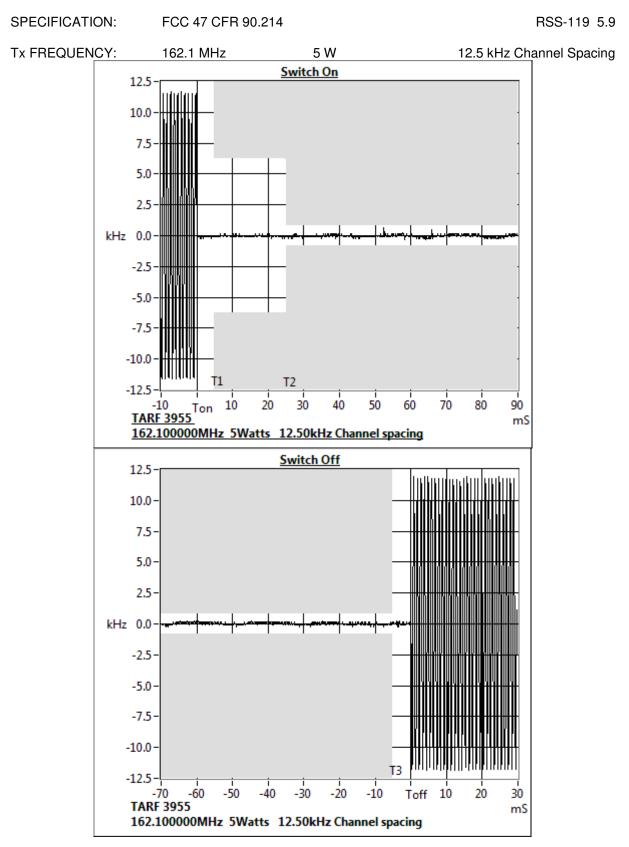
: Frequency ± 130 Hz;

Time ± 0.2%

LIMIT: FCC 47 CFR 90.214				
	TRANSIENT PERIODS	FREQUENCY RANGE		
		150 MHz – 174 MHz	421 MHz – 512 MHz	
	t1 (ms)	5 ms	10 ms	
	t2 (ms)	20 ms	25 ms	
	t3 (ms)	5 ms	10 ms	

LIMIT: RSS-119 5.9

Transient Frequency Behaviour for Equipment Designed to Operate on 12.5 kHz Channels				
TRANSIENT PERIODS	Maximum Frequency	FREQUE	FREQUENCY RANGE	
TRANSIENT FERIODS	Difference	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	



Transient Frequency Behaviour

168.0 MHz

RSS-119 5.9

Tx FREQUENCY:

5 W

12.5 kHz Channel Spacing

TRANSIENT RESPONSE	CARRIER PEAK VARIATION FROM NORMAL			
PERIOD	Key ON (kHz)	Key OFF (kHz)		
t1	-0.2	N/A		
t2	-0.2	N/A		
t3	N/A	-0.4		

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

Measurement Uncertainty: Frequency ± 130 Hz;

Time ± 0.2%

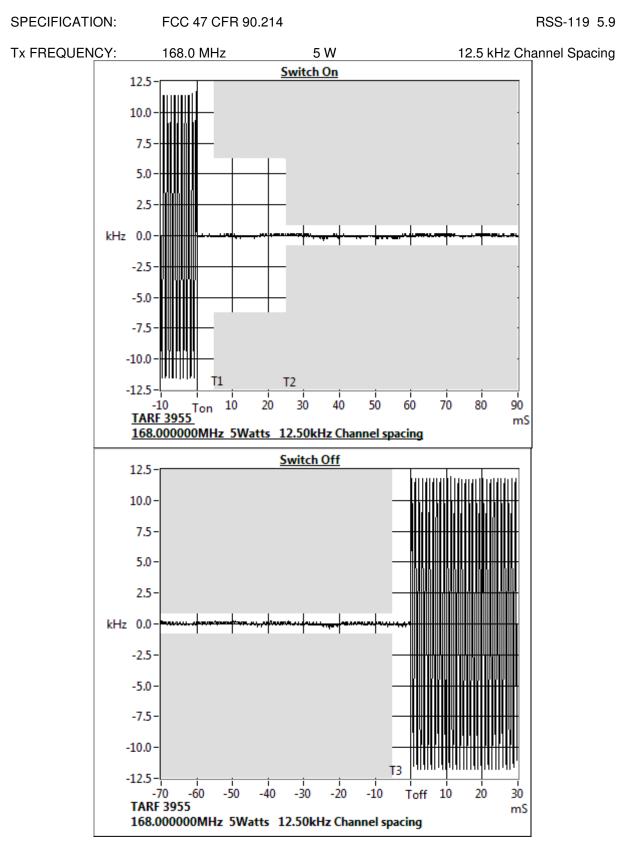
L	IMIT: FCC 47 0	CFR 90.214	
F	TRANSIENT PERIODS	FREQUENCY RANGE	
	TRANSIENT FERIODS	150 MHz – 174 MHz	421 MHz – 512 MHz
	t1 (ms)	5 ms	10 ms
	t2 (ms)	20 ms	25 ms
	t3 (ms)	5 ms	10 ms

RSS-119 5.9 LIMIT:

Transient Frequency Behaviour for Equipment Designed to Operate on 12.5 kHz Channels							
TRANSIENT PERIODS	Maximum Frequency	FREQUE	NCY RANGE				
TRANSIENT FERIODS	Difference	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.

Transient Frequency Behaviour



Transient Frequency Behaviour

173.9 MHz

RSS-119 5.9

Tx FREQUENCY:

5 W

12.5 kHz Channel Spacing

TRANSIENT RESPONSE	CARRIER PEAK VARIATION FROM NORMAL			
PERIOD	Key ON (kHz)	Key OFF (kHz)		
t1	0.7	N/A		
t2	-0.9	N/A		
t3	N/A	0.3		

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

Measurement Uncertainty: Frequency ± 130 Hz;

Time ± 0.2%

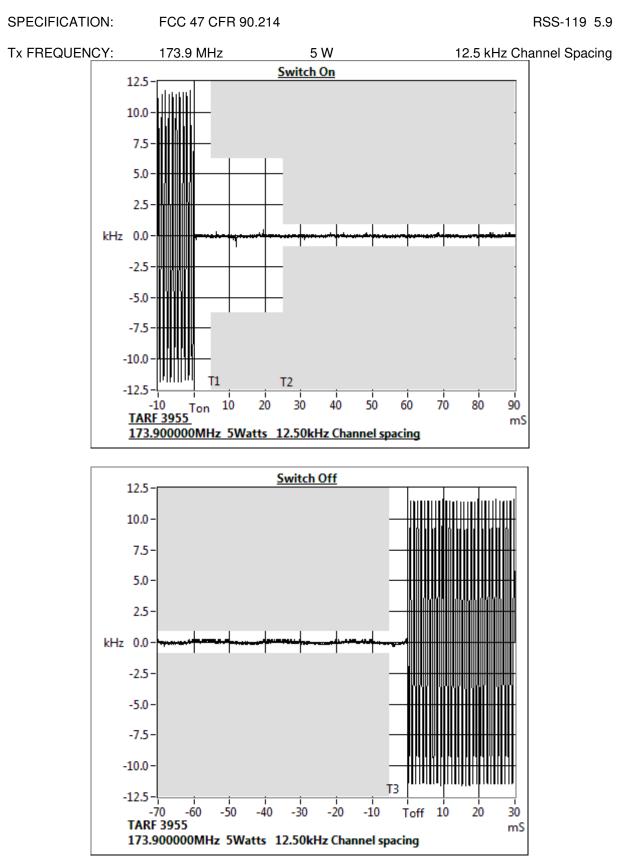
L	IMIT: FCC 47 0	CFR 90.214				
F	TRANSIENT PERIODS	FREQUENCY RANGE				
	TRANSIENT FERIODS	150 MHz – 174 MHz	421 MHz – 512 MHz			
	t1 (ms)	5 ms	10 ms			
	t2 (ms)	20 ms	25 ms			
	t3 (ms)	5 ms	10 ms			

RSS-119 5.9 LIMIT:

Transient Frequency Behaviour for Equipment Designed to Operate on 12.5 kHz Channels							
TRANSIENT PERIODS	Maximum Frequency	FREQUE	NCY RANGE				
TRANSIENT FERIODS	Difference	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.

Transient Frequency Behaviour



TRANSMITTER FREQUENCY STABILITY - TEMPERATURE

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

RSS-119 5.3

GUIDE: TIA/EIA-603D 2.2.2

MEASUREMENT PROCEDURE:

1. Refer Annex A for equipment set up.

2. The EUT was tested for frequency error from -30° C to +50° C in 10° C increments

3. The frequency error was recorded in parts per million (ppm).

MEASUREMENT RESULTS:

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

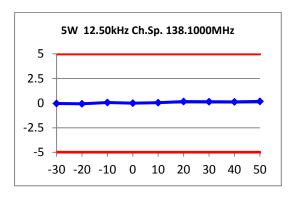
	Error (ppm)							
Temperature (ºC)	138.1 MHz	143.9 MHz	148.1 MHz	149.8 MHz	150.1 MHz	152.0 MHz	156.3 MHz	156.67 MHz
-30	-0.04	-0.03	-0.03	-0.04	-0.04	-0.06	-0.06	-0.07
-20	-0.07	-0.07	-0.06	-0.04	-0.03	-0.01	-0.01	0.02
-10	0.06	0.08	0.07	0.07	0.07	0.06	0.04	0.03
0	-0.01	-0.01	-0.01	-0.02	-0.01	-0.01	0.01	0.01
10	0.05	0.06	0.09	0.09	0.10	0.12	0.12	0.14
20	0.15	0.16	0.16	0.17	0.17	0.18	0.18	0.17
30	0.14	0.14	0.14	0.13	0.13	0.13	0.13	0.13
40	0.12	0.12	0.12	0.13	0.13	0.14	0.15	0.15
50	0.17	0.17	0.18	0.18	0.19	0.20	0.19	0.20
Measurement Uncertainty					± 7 x 10-	8		

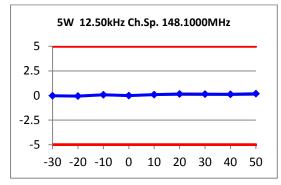
	Error (ppm)						
Temperature (ºC)	157.0 MHz	160.0 MHz	161.0 MHz	162.0 MHz	162.1 MHz	168.0 MHz	173.9 MHz
-30	-0.07	-0.01	-0.01	-0.01	-0.02	-0.04	-0.03
-20	0.04	-0.04	-0.03	-0.01	0	0.01	0.04
-10	0.03	0.01	0.01	-0.01	-0.01	-0.01	-0.02
0	0.02	-0.03	-0.02	-0.01	-0.01	0.01	0.03
10	0.15	0.08	0.08	0.10	0.11	0.13	0.16
20	0.17	0.15	0.16	0.17	0.16	0.17	0.17
30	0.13	0.13	0.14	0.14	0.13	0.14	0.14
40	0.16	0.11	0.12	0.13	0.14	0.15	0.16
50	0.22	0.19	0.19	0.19	0.20	0.21	0.21
Measurement Uncertainty				±7×	(10 ⁻⁸		

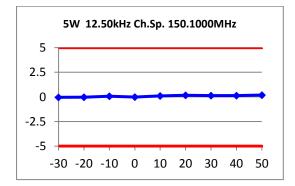
LIMIT:	FCC 47 CFR 9	0.213	RSS-119 5.3
	Channel Spacing (kHz)		Frequency Error (ppm)
	12.5		5.0

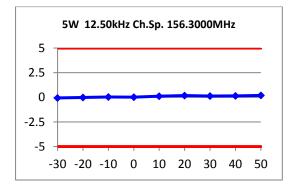
FCC ID: CASTPDB1D IC : 737A-TPDB1D Report Revision: 1 Issue Date: 3 October 2018

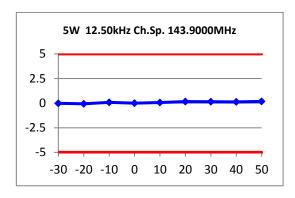
Transmitter Frequency Stability – Temperature

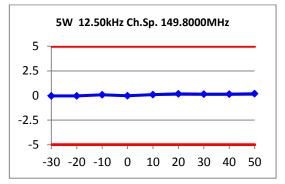


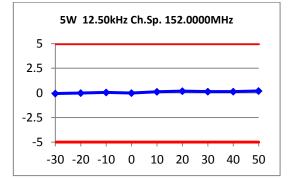


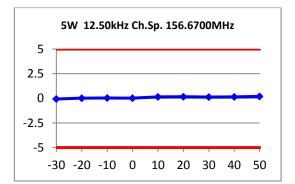




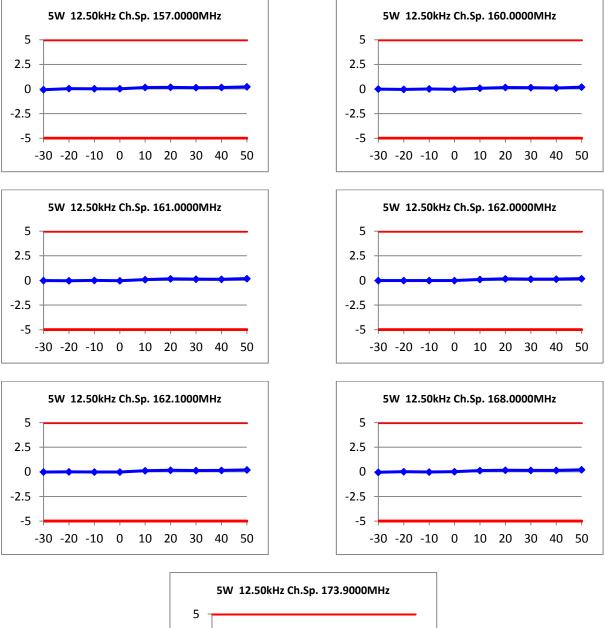


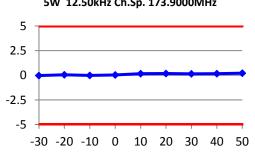






Transmitter Frequency Stability – Temperature





TRANSMITTER FREQUENCY STABILITY - VOLTAGE

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

RSS-119 5.3

GUIDE: TIA/EIA-603D 2.2.2

MEASUREMENT PROCEDURE:

- 1. Refer Annex A for equipment set up.
- The EUT was tested for frequency error at an input voltage to the radio of nominal battery voltage and battery end point .
- 3. The frequency error was recorded in parts per million (ppm).

MEASUREMENT RESULTS:

	FREQUENCY ERRC	OR (ppm) for 12.5 kHz
	7.5 V _{DC}	6.375 V _{DC}
138.1 MHz	0.14	0.15
143.9 MHz	0.012	0.13
148.1 MHz	0.11	0.12
149.8 MHz	0.09	0.09
150.1 MHz	0.09	0.09
152.0 MHz	0.08	0.09
156.3 MHz	0.08	0.06
156.67 MHz	0.06	0.08
157.0 MHz	0.16	0.15
160.0 MHz	0.06	0.07
161.0 MHz	0.16	0.15
162.0 MHz	0.19	0.18
162.1 MHz	0.14	0.15
168.0 MHz	0.11	0.11
173.9 MHz	0.07	0.07
Measuremen	t Uncertainty	± 7 x 10 ⁻⁸

LIMIT CLAUSES:	FCC 47 CFR 90.213	RSS-119 5.3

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

RECEIVER SPURIOUS EMISSIONS (CONDUCTED)

SPECIFICATION: RSS-119 5.8

GUIDE: TIA/EIA-603D 2.1.2

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.

138.1 MHz Receive, 138.1 MHz Tx standby										
Emission Frequency (MHz)	Level (nW)	Level (dBm)								
~	~	~								
Measurement Uncertainty ≤12.75 GHz ± 3.0 dB										
No emis	ssions were detected within 20 dB	of Limit.								

								-00.1	-						
			_					-46.1						neule des	
			-					-36.1		-		-			+
			_				-20.0	-26.1							
l								-4.0							
ï	Raf Idiv Ref	0ffset 21.91 dB 8.91 dBm						10-4 Log	ienav R	ef Officet 21.9/ ef 1.91 dBr	1 dB				

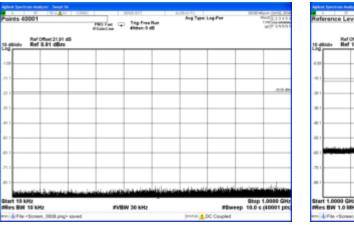
Stop 2.000 rep 10.0 s (4000

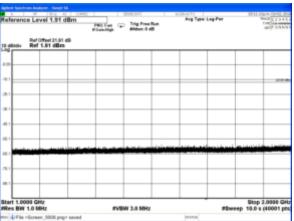
Receiver Spurious Emissions (Conducted) - Continued

143.9 MHz Receive, 143.9 MHz Tx standby										
Emission Frequency (MHz)	Level (nW)	Level (dBm)								
~	~	~								
Measurement Uncertainty ≤12.75 GHz ± 3.0 dB										
No emis	sions were detected within 20 dB	of Limit.								

oints 40	1001	FBC Fast G	Trig Free Sidner: 0 d	Run 18	Avg Type:	Log-Pur		March 1.2.3.4.5.6 March 5.6.6.9	Ret	erence l	Level 1.91	dBm	PBX Fast G	Trig Free #Mar: 0	Run 48	Avg Type:	Log-Per		1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
0.48Miv	Ref 0ffset 21.91 dB Ref 8.91 dBm								10 d Log	RADY R	ef 0ffset 21.91 ef 1.91 dBr	1 dB 8							
									4.05	<u> </u>									<u> </u>
									-18.1		-		_						
									- 28.1			-							
									- 36.1										
									-46.1										
0.1	_								-68.1	<u> </u>		-				-			
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148.1 MHz Receive, 148.1 MHz Tx standby										
Emission Frequency (MHz)	Level (nW)	Level (dBm)								
~	~	~								
Measurement Uncertainty	Measurement Uncertainty ≤12.75 GHz ± 3.0 dB									
No emissio	ns were detected within 20 dB	of Limit.								



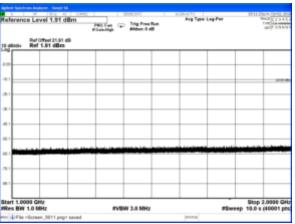


149.8 MHz Receive, 149.8 MHz Tx standby										
Emission Frequency (MHz)	Level (nW)	Level (dBm)								
~	~	~								
Measurement Uncertainty ≤12.75 GHz ± 3.0 dB										
No emis	sions were detected within 20 dB	of Limit.								

oints 4		PBC F	<u>-</u>	Trig Free I #Attan: 0 d	tun B	Avg Type:	Log-Per		And 123450 And 556406	Rat		evel 1.91 (FRX Fail G	P Man	ne Run 2 dB	Avg Type	Log-Pur		Nacional Control 2 2 Nacional 2 2 2 4 Nacional Control 2 4
2.4810v	Ref 8.91 dBm									10 d Log	RADy Ref	1.91 dBm	40		_	_				
	_									4.05	<u> </u>									-
	_									-18.1			_		_	-	-			-
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	_		-							-36.1	<u> </u>			-	-	-	-			-
			-							-46.1	<u> </u>				-	-	-			+
			-							-68.1	<u> </u>									-
			-							-68.1	-	-								
			-							-76.1					-	-	-			\vdash
	ha mining a special of	and and and		i de la	a loda - ta sti		e district of	A DEPARTMENT		-00.1	-			-	-	-	-			-
tart 10 k Res BW	dHiz			30 kHz				Stop	1.0000 GHz (40001 pts)		t 1.0000 G				BW 3.0 M			-	Stop rep 10.0 s	2.0000

150.1 MHz Receive, 150.1 MHz Tx standby											
Emission Frequency (MHz)	Level (nW)	Level (dBm)									
~	~	~									
Measurement Uncertainty ≤12.75 GHz ± 3.0 dB											
No emis	sions were detected within 20 dB	of Limit.									

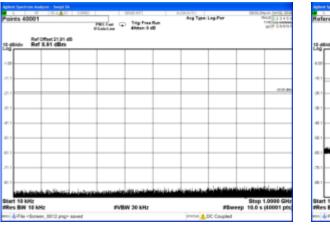
Points 40001	FROTTest PEdicLase PEdicLase PEdicLase	Avg Type: Log-Pur	000010020-00002000000000000000000000000	Reference Le
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1.09				4.09
				-10.1
20.1			33.0	
21.1				-36.1
e1.1				-40.1
01.1				-98.1
0.1				-cc 1 Hotelahd
20				70.1
en district to another out	and a second	a a constant a constant de la const	in a second second second	48.1
Start 10 kHz fRes BW 10 kHz	#VBW 30 kHz	fbure	Stop 1.0000 GHz p 10.0 s (40001 pts)	Start 1.0000 Gi mes BW 1.0 M
nto File <screen_0010.png> save</screen_0010.png>	1	status ADC Coupled		woo U File <scree< td=""></scree<>

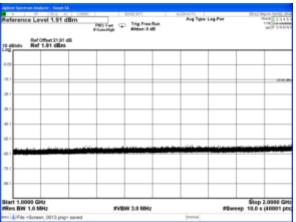


152.0	MHz Receive, 152.0 MHz Tx sta	ndby
Emission Frequency (MHz)	Level (nW)	Level (dBm)
~	~	~
Measurement Uncertainty	≤12.75 GHz	± 3.0 dB
No emiss	sions were detected within 20 dB	of Limit.

oints 40	1001	-	RT Fast G	Trig Freel Sitter: 0 d		Avg Type:	Log-Per	1	40 0000 200 00 0 2 2 2 4 5 0 00 0 5 5 5 5 5 5	Rel	erence	Level 1.91	dBm		Dig fre Alden 0	But	Avg Type	Log-Pur	1011.0	100 000 000 000 100 000 000 000 000 0 000 00
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- 1.5									-2.0.00	38.1	<u> </u>		-		-	-	-			
	_								_	-36.1	<u> </u>		-		-	-	-			
	-									-40.1	<u> </u>				-	-	-			
01.1	_									-68.1	-									
									_	-60.1	-	-	-	-	-					
- 1.1									_	-76.1	-		-	-	-	-	-			
	u ei den en china			able the	a desta a co	at at Laborat	معفالدم	alibaida	وبالمقاملته	-00.1		-	-	-	-	-	-			
itart 10 k Res BW	Hz	Strain Street		W 30 kHz					.0000 GHr		rt 1.0000		-	-	BW 3.0 MH			flue	Stop	2.0000 GHz

156.0	3 MHz Receive, 156.3 MHz Tx sta	ndby
Emission Frequency (MHz)	Level (nW)	Level (dBm)
~	~	~
Measurement Uncertainty	≤12.75 GHz	± 3.0 dB
No emis	sions were detected within 20 dB	of Limit.



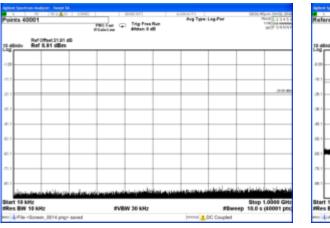


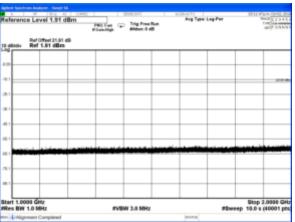
156.6	7 MHz Receive, 156.67 MHz Tx st	andby
Emission Frequency (MHz)	Level (nW)	Level (dBm)
~	~	~
Measurement Uncertainty	≤12.75 GHz	± 3.0 dB
No emis	sions were detected within 20 dB	of Limit.

No emissions were detected within 20 dB of Limit	t.
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gilent Spect												Agilie	of Spectrum	Analyser - Swept 1							2011 give (cr.2) 200			
oints 4	4000	1	e Alto	COMIC	FBC Fast G	Trig Free Mittam 0 (Run	Avg Type:	Log-Pwr	00-01-0	No.2 2 3 4 5 4 Marcine 2 3 4 5 4 Marcine 2 5 5 5 5 5	Ret	erence	Level 1.91 c	Bm	FRO Fait	Trig Free Althor: 0 -		Avg Type	Log-Pwr	0011.4			
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												4.09												
		_										-18.1												
		+	-								-2.0 00	38.1							_					
-		+	_		-							-36.1						-				_		
		+	-		-							-46.1						-	-			-		
-		+	-			-						-58.1												
-		+	-		-	-	-	-				-681.1	-											
-		+	-		-		-	-				-76.1				-		-	-					
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art 10 les BW	kHz					W 30 kHz				<u>Ştop</u>	1.0000 GHz (40001 pts)		rt 1.0000 IS BW 1.0				W 3.0 MHz			#Ewe	Stop ep 10.0 s	1.0000 G		
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157.0	MHz Receive, 157.0 MHz Tx sta	ndby
Emission Frequency (MHz)	Level (nW)	Level (dBm)
~	~	~
Measurement Uncertainty	≤12.75 GHz	± 3.0 dB
No emiss	sions were detected within 20 dB	of Limit.



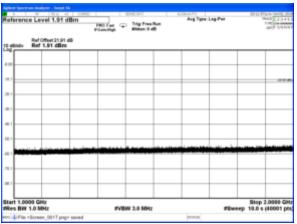


160.0) MHz Receive, 160.0 MHz Tx sta	ndby
Emission Frequency (MHz)	Level (nW)	Level (dBm)
~	~	~
Measurement Uncertainty	≤12.75 GHz	± 3.0 dB
No emis	sions were detected within 20 dB	of Limit.

oints 40001		FBO: Fast G	Alter: 0 d	Run 18	Avg Type: I	Log-Pwr		Span, Denda, Jana Naciji I. J. J. 4 5 C Traniji Ura Materia Mili P. S. 6 No. 6	Ret	erence Le	evel 1.91	dBm	PRO Fast C	D Trig Fre Alden:0	e Run 48	Avg Type:	Log-Pwr	,	200 00000 2 8003 1.3.3.4 1000 000000 000 0.5.4.6 000 0.5.4.6
alling Ref	0ffset21.91 dB 8.91 dBm								10 d Log	RADy Ref	0ffeet 21.91 f 1.91 dBm	45							
									4.05	L									-
		_							-18.1										
				-				-22.0	-36.1										-
		_							-06.1	<u> </u>			-	-	-	-			-
e.1			-						-40.1	<u> </u>			-	-	-	-			-
0.1									-68.1	<u> </u>									
0.1									-68.1										
			-	-					-76.1				-	-	-	-			-
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itart 10 kHz Res BW 10 k			W 30 kHz				Stop	1.0000 GH2 (40001 pts)		t 1.0000 G		-		BW 3.0 MH	-		titue	Stop	2.0000 (

161.0	0 MHz Receive, 161.0 MHz Tx sta	ndby
Emission Frequency (MHz)	Level (nW)	Level (dBm)
~	~	~
Measurement Uncertainty	≤12.75 GHz	± 3.0 dB
No emis	sions were detected within 20 dB	of Limit.

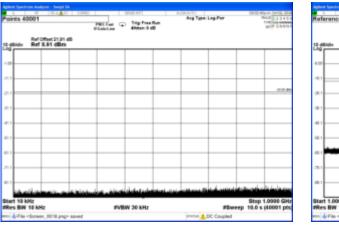
40001	PBOX Fast PBOX Fast PCoint.com Biddear:0.0	Avg Type: Log-Pur Run B	0002 Mp.m. 0m02, 2018 Nex3 (2, 2, 3, 4, 5, 6) TVR (As shows art)P 5-9-901
Ref Offset 21.91 dB Ref 8.91 dBm			
_			-22.0
		A construction of methodal	de a casa de la cherie
niezaitutin o chine Mtz	والمتعاد والمتعار والمتركز والمتعرين والمرورين		Stop 1.0000 GHz
N 10 KHz	#VBW 30 kHz	#Bwe	ep 10.0 s (40001 pts

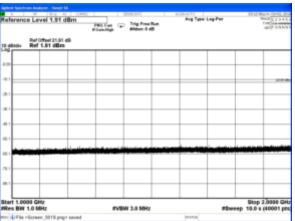


162.0 MHz Receive, 162.0 MHz Tx standby										
Emission Frequency (MHz)	Level (nW)	Level (dBm)								
~	~	~								
Measurement Uncertainty ≤12.75 GHz ± 3.0 dB										
No emis	No emissions were detected within 20 dB of Limit.									

Points 4	0001		PSX Fast G	D Trig Free #Maan:0.0	Run 16	Avg Type:	Log-Pur		And Links and And	Ref	erence L	evel 1.91 (dBm	PRO Fail C	D Trig Fre Alden:3	e Run 148	Avg Type	Log-Pur		100 00000 20 102 0 2 2 2 4 1 100 0 0 0 0 0 0 0 00 0 0 0 0 0 0 0
0.48Mir	Ref 0ffset 2 Ref 8.91 d									10-d Log	RADY Re	1.91 dBm	-		_	_				
		_								-8.09	<u> </u>									
		_								-18.1				-						
2.1	-	_	-	_					-2.0 40	-38.1	<u> </u>			-	-	-				
	_	_	-							-36.1	<u> </u>				-	-	-			
e.,	_	_								-40.1	<u> </u>				-	-				
01.1	_	_								-68.1	<u> </u>		-		-	-	-			
0.1	_	_	-	-		_				-6811	-	-	-	-	-	-	-			للبريقين
- 12										-78.1	-				-	-				
							- Louis a	in stands	a control to	480.1	-		-		-	-	-			
itart 10 k	initia de la constante 1987		- Submodular	a sa a s	10000	We that the			1.0000 GHr	Sta	rt 1.0000 0	ally a							Stop 2	.0000 GR

162.1	162.1 MHz Receive, 162.1 MHz Tx standby										
Emission Frequency (MHz)	Level (nW)	Level (dBm)									
~	~	~									
Measurement Uncertainty	Measurement Uncertainty ≤12.75 GHz ± 3.0 dB										
No emis	sions were detected within 20 dB	of Limit.									



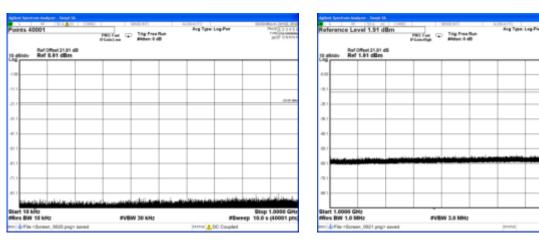


Receiver Spurious Emissions (Conducted) - Continued

168.0 MHz Receive, 168.0 MHz Tx standby										
Emission Frequency (MHz)	Level (dBm)									
~	~	~								
Measurement Uncertainty ≤12.75 GHz ± 3.0 dB										
No emis	No emissions were detected within 20 dB of Limit.									

oints 40	Ref Offset 2		PRX Fast C PEalet.com	Fig Free #Attant 0 d	Run 18	Avg Type:	Log-Pur		Mar 1 2 3 4 5 6 Trans. MTP 5 8 8/4 8	Ref		evel 1.91		PBO Fait G	Trig Free #Maan:0	Run 18	Avg Type	Log-Pwr		Red Type all
0 dBhliv	Ref 8.91 d	Ben								10-di Log	Maly Re	f 1.91 dBr	-							_
		_								4.09										_
										-18.1										
	_	_	_							-38.1										\top
	_									-36.1										+
	_	_								-46.1										1
		_								-68.1										+
	_	_								-68.1	-	-	-	-	-			-	-	-
	_									-76.1										+
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		uniaine e	مرجباهم	بمنتعممة	فيواحسنونا	and interfaced	فتتع هادره													
tart 10 k Res BW	Hz 10 kHz		IN I	BW 30 kHz			#Bw	Stop rep 10.0 s	1.0000 GHz (40001 pts)		t 1.0000 0 s BW 1.0			114	W 3.0 MH			#Bw	Stop reep 10.0	p 2.00

173.	173.9 MHz Receive, 173.9 MHz Tx standby										
Emission Frequency (MHz)	Level (dBm)										
~	~	~									
Measurement Uncertainty	Measurement Uncertainty ≤12.75 GHz ± 3.0 dB										
No emis	No emissions were detected within 20 dB of Limit.										



LIMIT CLAUSE:	RSS-Gen 7.4		
LIMIT	30 → 1000 MHz	2 nW	- 57 dBm
	> 1000 MHz	5 nW	- 53 dBm

Report Revision: 1 Issue Date: 3 October 2018

Stop 2.0000 #Sweep 10.0 s (40001

TEST EQUIPMENT LIST

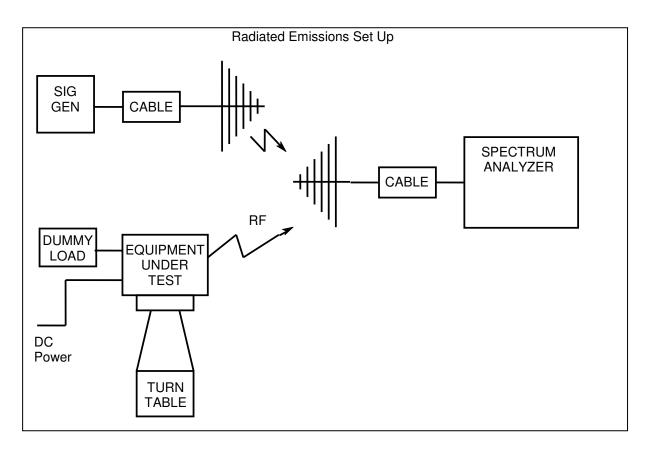
Equipment Type	Information	Manufacturer	Model No	Serial No#	Tait ID	Cal Due
Antenna	Reference Dipoles	Emco	3121C DB1	9510-1164	E3559	14-Apr-19
Antenna	Log Periodic	Schwarzbeck	VUSLP	9111-219	E4617	
Antenna	Reverb - 1-18GHz DRG	Schwarzbeck	BBHA 9120 D	9120D-885	E4857	
Antenna	Reverb - 1-18GHz DRG	Schwarzbeck	BBHA 9120 D	9120D-884	E4858	
Audio Analyser	TREVA1	Hewlett Packard	HP8903A	2437A04625	E4986	28-Sep-18*
Coax Cable	2m Black	Suhner	RG214HF/Nm/Nm/ 2000	TeltestBlack2	E4623	20-Dec-18
Coax Cable	2m Black	Suhner	RG214HF/Nm/Nm/ 2000	TeltestBlack3	E4624	20-Dec-18
Coax Cable	2m Black	Suhner	RG214HF/Nm/Nm/ 2000	TeltestBlack4	E4653	21-Dec-18
Coax Cable	OATS Turntable Cable 1	Intelcom	RG214	OATS1	E4621	1-Jan-19
Coax Cable	OATS Tower Cable	Intelcom	RG214	OATS2	E4622	1-Jan-19
Coax Cable	2m Black	Suhner	RG214HF/Nm/Nm/ 2000	TeltestBlack5	E4850	20-Dec-18
Coax Cable	Reverb - 4.5m Multiflex 141	TeltestBlue6	MF 141	TeltestBlue6	E4843	20-Dec-18
Coax Cable	Reverb - 2m Multiflex 141	TeltestBlue5	MF 141	TeltestBlue5	E4844	20-Dec-18
Coax Cable	Reverb - 2m Multiflex 141	TeltestBlue4	MF 141	TeltestBlue4	E4845	20-Dec-18
Coax Cable	Reverb - 1m Multiflex 141	TeltestBlue2	MF 141	TeltestBlue2	E4847	20-Dec-18
Coax Cable	Reverb - 1m Multiflex 141	TeltestBlue1	MF 141	TeltestBlue1	E4848	20-Dec-18
Coax Cable	OATS Turntable Cable 2	Intelcom	RG215	OATS3	E4995	1-Jan-19
Coax Cable	2m Black	Suhner	RG214HF/Nm/Nm/ 2000	TeltestBlack7	E5004	1-Jan-19
Environ. Chamber	Upright	Contherm	5400 RHSLT.M	1416	E4051	23-Apr-19
Modulation Analyser	TREVA1	Hewlett Packard	HP8901B (Opt 002)	2441A00393	E3073	3-Oct-18
OATS	Antenna Tower	Electrometrics	EM-4720-2	112	E4447	
OATS	Controller	Electrometrics	EM-4700	119	E4445	
OATS	Turntable	Electrometrics	EM-4704A	105	E4446	
Oscilloscope	100MHz Digital	Tektronics	TDS340	B013611	E3585	28-Sep-19
Power Meter	TREVA1 Power Head for HP8901	Hewlett Packard	HP11722A	3111A05573	E7054	30-Sep-18*
Power Supply	60V/50A/1000W	Hewlett Packard	HP6012B	2524A00616	E3712	30-Sep-19
Power Supply	60V/25A	Agilent	N5767A	3111A05573	E4979	10-Oct-18
Power Supply	40V/38A	Agilent	N5766A	US09E4663L	E4719	26-Sep-19
RF Amplifier	+21.7 dB 1GHz	Tait	ZFL-1000LN	E3660	E3360	17-Apr-19
RF Amplifier	Pre-amplifier	Agilent	87405C	MY47010688	E4941	9-Oct-18
RF Attenuator	30dB 350W	Weinschel	67-30-33	BR0531	E4280	20-Dec-18
RF Attenuator	10dB 50W	Weinschel	24-10-34	AZ0401	E3388	20-Dec-18
RF Attenuator	20dB 25W	Weinschel	33-20-33	BD5871	E3673	20-Dec-18
RF Attenuator	10dB 50W	Weinschel	24-10-34	BC3293	E4364	21-Dec-18
RF Attenuator	TREVA1 3dB	Weinschel	Model 1	BL9958	E4081	20-Dec-18
RF Attenuator	TREVA 1 20dB 150W	Weinschel	40-20-23	MF817	E4082	20-Dec-18
RF Chamber	S-LINE TEM CELL	Rohde & Schwarz	1089.9296.02	338232/003	E3636	12-Sep-20

Equipment Type	Information	Manufacturer	Model No	Serial No#	Tait ID	Cal Due
RF Chamber	controller for reverb chamber		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 Filter	135-175MHz band stop filter	Tait	-	-	E3382	25-Sep-19
RF Load	50W	Weinschel	F1426	AE2490	E3624	20-Dec-18
Signal Generator	Analog 4GHz	Agilent	E4422B	GB40050320	E3788	27-Sep-19
Signal Generator	TREVA1 Analog 3.2GHz	Agilent	E8663D	MY50420224	E4908	20-Oct-18
Signal Generator	Digital 4GHz	Agilent	E4437B	US39260389	E4764	30-Sep-19
Spectrum Analyser	26.5GHz	Agilent	PXA N9030A	MY49432161	E4907	18-Oct-18
Spectrum Analyser	13.2GHz	Agilent	E4445A	MY42510072	E4139	19-Jul-20
Spectrum Analyser	13.2GHz	Hewlett Packard	HP8562E	3821A00779	E3715	26-Sep-19
Temp & Humidity datalogger		Hobo	U21-011	10134276	E4981	22-Apr-19
Testware	Frequency Vs Temperature		April 2018	-	-	
Testware	Occupied Bandwidth		March 2018	-	-	
Testware	Radiated Emissions		April 2018	-	-	
Testware	Reverb Emissions		June 2018	-	-	
Testware	Sideband Spectrum		February 2017	-	-	
Testware	S-Line Radiated Emissions		April 2018	-	-	
Testware	TREVA		April 2018	-	-	

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

*The Audio Analyser and Power meter power head were in use for tests before the calibration due date.

ANNEX A – TEST SETUP DETAILS



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

