

XMit 2017.02.08

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Power Supply - DC	Topward	TPS-2000	TPD	NCR	NCR
Meter - Multimeter	Fluke	8846A	MMZ	10/22/2015	10/22/2018
Meter - Multimeter	Tektronix	DMM912	MMH	2/17/2016	2/17/2019
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	5/30/2017	5/30/2018
Attenuator	Fairview Microwave	SA26B-10	TWG	4/15/2017	4/15/2018
Attenuator	S.M. Electronics	SA26B-20	AUY	5/30/2017	5/30/2018
Block - DC	Fairview Microwave	SD3379	AMW	6/5/2017	6/5/2018
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFP	8/10/2016	8/10/2017

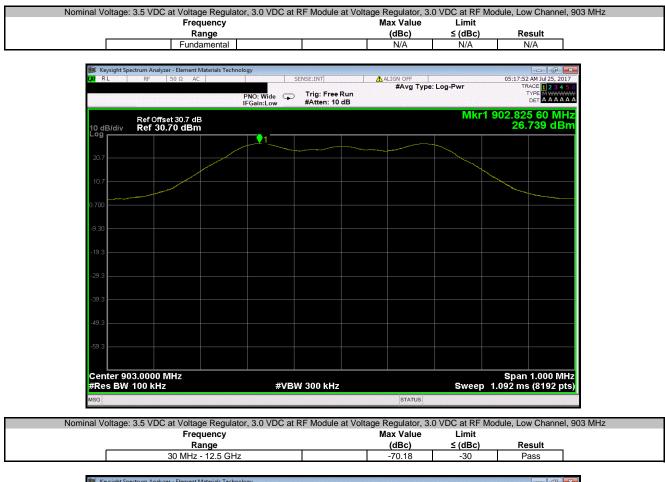
TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The spurious RF conducted emissions were measured with the EUT set to low, medium and high transmit frequencies. The EUT was transmitting at the data rate(s) listed in the datasheet. For each transmit frequency, the spectrum was scanned throughout the specified frequency range.



EUT:	9630-9110			Work Order:	SCHW0219	
Serial Number:	A02654144			Date:	07/24/17	
Customer:	Schweitzer Engineering La	aboratories, Inc.		Temperature:	23.8 °C	
Attendees:	Allan Davis	· · · ·		Humidity:		
Project:				Barometric Pres.:		
Tested by:	Mark Baytan		Power: 3.5 VDC	Job Site:	EV06	-
EST SPECIFICATIO			Test Method			
CC 15.247:2017			ANSI C63.10:2013			
OMMENTS						
	al offset (DC Block + 20dB	Attenuator + 10dB Attenuator + BE C	Cable) = 30.7 dB. Power level setting: 27 dBm			
otal reference leve	el oliset (DC block + 200b /	Attenuator + Toub Attenuator + Kr C	able) = 30.7 ub. 1 ower level setting. 27 ubin			
EVIATIONS FROM	I TEST STANDARD					
lone						
			11 -			
Configuration #	1	-	14 St-			
_		Signature				
			Frequency	Max Value	Limit	
			Range	(dBc)	≤ (dBc)	Resu
ominal Voltage: 3.5	VDC at Voltage Regulator, 3	3.0 VDC at RF Module	-			
0	Low Channel, 903 MHz		Fundamental	N/A	N/A	N/A
	Low Channel, 903 MHz		30 MHz - 12.5 GHz	-70.18	-30	Pass
	Low Channel, 903 MHz		12.5 GHz - 25 GHz	-64.92	-30	Pass
	Mid Channel, 915 MHz		Fundamental	N/A	N/A	N/A
	Mid Channel, 915 MHz		30 MHz - 12.5 GHz	-64.75	-30	Pass
	Mid Channel, 915 MHz		12.5 GHz - 25 GHz	-65.11	-30	Pass
	High Channel, 927 MHz		Fundamental	N/A	N/A	N/A
	High Channel, 927 MHz		30 MHz - 12.5 GHz	-60.98	-30	Pass
	High Channel, 927 MHz		12.5 GHz - 25 GHz	-64.93	-30	Pass
		age Regulator, 2.7 VDC at RF Module		01100	00	1 000
	Low Channel, 903 MHz		Fundamental	N/A	N/A	N/A
	Low Channel, 903 MHz		30 MHz - 12.5 GHz	-67.59	-30	Pass
	Low Channel, 903 MHz		12.5 GHz - 25 GHz	-64.44	-30	Pass
	Mid Channel, 915 MHz		Fundamental	N/A	N/A	N/A
	Mid Channel, 915 MHz		30 MHz - 12.5 GHz	-61.97	-30	Pass
	Mid Channel, 915 MHz		12.5 GHz - 25 GHz	-63.51	-30	Pass
	High Channel, 927 MHz		Fundamental	N/A	N/A	N/A
	High Channel, 927 MHz		30 MHz - 12.5 GHz	-57.76	-30	Pass
	High Channel, 927 MHz		12.5 GHz - 25 GHz	-63.48	-30	Pass
		/oltage Regulator, 3.465 VDC at RF Mo				
	Low Channel, 903 MHz		Fundamental	N/A	N/A	N/A
	Low Channel, 903 MHz		30 MHz - 12.5 GHz	-70.34	-30	Pass
	Low Channel, 903 MHz		12.5 GHz - 25 GHz	-64.31	-30	Pass
	Mid Channel, 915 MHz		Fundamental	N/A	N/A	N/A
	Mid Channel, 915 MHz		30 MHz - 12.5 GHz	-65.68	-30	Pass
	Mid Channel, 915 MHz		12.5 GHz - 25 GHz	-64.18	-30	Pass
				N/A	N/A	N/A
	High Channel, 927 MHz		Fundamental	IN/A		
	High Channel, 927 MHz High Channel, 927 MHz		Fundamental 30 MHz - 12.5 GHz	-61.39	-30	Pass





📕 Keysight Spectrum Analyzer - E								
X RL RF 50		PNO: Fast 😱	Trig: Free F #Atten: 10	Run	LIGN OFF #Avg Type:	Log-Pwr	TR. T	AM Jul 25, 2017 ACE 1 2 3 4 5 6 YPE M WWWWWW DET A A A A A A
Ref Offset 3 0 dB/div Ref 30.70						Γ	Mkr1 1.80 -43	06 6 GHz .44 dBm
20.7								
10.7								
700								
3.30								
9.3								
9.3	1							
19.3			and a state West of a	landa a lataka se				
59.3 Martin Martin Anna an Anna		have a superior and			leinetten die seinetten	ili ni		
tart 0.030 GHz Res BW 100 kHz		#VB\	N 300 kHz			Sweep	Stop 1 52.42 ms	2.500 GHz (8192 pts
SG					STATUS			



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Nominal Voltage: 3.5 VDC at Voltage Regulator, 3.0 VDC at RF Module at Voltage Regulator, 3.0 VDC at RF Module, Low Channel, 903 MHz Max Value Frequency Limit ≤ (dBc) Range (dBc) Result 12.5 GHz - 25 GHz -64.92 -30 Pass lyzer - Element Materials Techr 05:18:38 AM Jul 25, 2017 TRACE 1 2 3 4 5 6 TYPE M WWWW DET A A A A A A Keysight ! RL 🚺 🗘 ALI #Avg Type: Log-Pwr PNO: Fast Trig: Free Run IFGain:Low #Atten: 10 dB Mkr1 24.940 5 GHz -38.18 dBm Ref Offset 30.7 dB Ref 30.70 dBm 10 dB/div Log 1 Start 12.500 GHz #Res BW 100 kHz Stop 25.000 GHz Sweep 52.97 ms (8192 pts) #VBW 300 kHz STATUS

 Nominal Voltage: 3.5 VDC at Voltage Regulator, 3.0 VDC at RF Module at Voltage Regulator, 3.0 VDC at RF Module, Mid Channel, 915 MHz

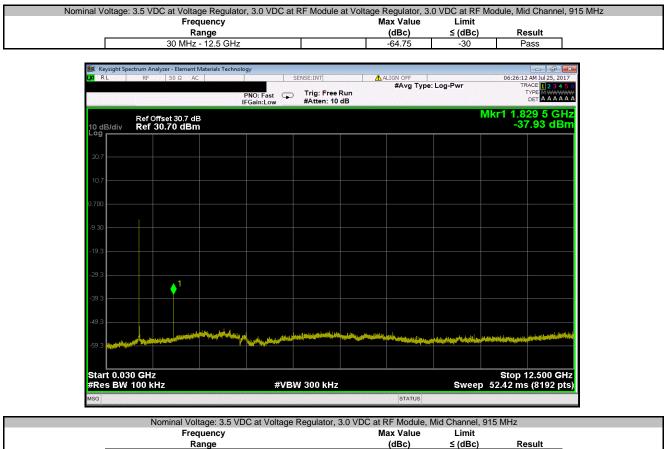
 Frequency
 Max Value
 Limit

 Range
 (dBc)
 Result

 Fundamental
 N/A
 N/A
 N/A

RL RF 50 Ω AC	SENS	SE:INT	ALIGN OFF		06:25:46 AM Jul 25, 201
	PNO: Wide	Trig: Free Run #Atten: 10 dB	#Avg Type: L	og-Pwr	TYPE A A A A
Ref Offset 30.7 dB dB/div Ref 30.70 dBm				Mkr1 91	4.823 65 MF 26.81 dB
7					
7					
0					
3					
3					
3					
3					
3					
nter 915.0000 MHz es BW 100 kHz	#VBW :	300 kHz		Sweep 1.0	Span 1.000 M 92 ms (8192 p





Nominal Voltage: 3.5 VDC at Voltage R	egulator, 3.0 VD	C at RF Module, I	Mid Channel, 915	MHz	
Frequency		Max Value	Limit		
Range		(dBc)	≤ (dBc)	Result	
12.5 GHz - 25 GHz		-65.11	-30	Pass	

RL	RF	50 Ω	AC		S	ENSE:INT		ALIGN OFF		06:26:4	0 AM Jul 25, 201
		100 K		PNO: Fast IFGain:Low	G	Trig: Free I #Atten: 10	Run dB	#Avg Type	e: Log-Pwr		RACE 1 2 3 4 5 TYPE M WWW DET A A A A A
) dB/div	Ref Off Ref 3	fset 30.7 0.70 d E	dB 3m							Vkr1 24.9 -3	90 8 GH 8.29 dBi
20.7											
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9.3	(aniputation)										
tart 12.5										Stop	25.000 GF
Res BW	100 KH	Z			ŦVΒV	V 300 kHz			Swee	p 52.97 m	s (8192 pt



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TbtTx 2017.04.18

Nominal Voltage: 3.5 VDC at Voltage Regulator, 3.0 VDC at RF Module, High Channel, 927 MHz Frequency Max Value Limit (dBc) ≤ (dBc) Range Result Fundamental N/A N/A N/A nalyzer - Element Materials Technology 06:39:16 AM Jul 25, 2017 TRACE 1 2 3 4 5 6 TYPE MWWWWW DET A A A A A A Keysight Sj ALIGN OFF #Avg Type: Log-Pwr PNO: Wide Trig: Free Run IFGain:Low #Atten: 10 dB Mkr1 926.820 60 MHz 26.734 dBm Ref Offset 30.7 dB Ref 30.70 dBm 10 dB/div Log 1 Center 927.0000 MHz #Res BW 100 kHz Span 1.000 MHz Sweep 1.092 ms (8192 pts) #VBW 300 kHz STATUS

Nominal Voltage: 3.5 VDC at Voltage Re	egulator, 3.0 VDC	Cat RF Module, F	ligh Channel, 927	7 MHz
Frequency		Max Value	Limit	
Range		(dBc)	≤ (dBc)	Result
30 MHz - 12.5 GHz		-60.98	-30	Pass

RL	RF	zer - Element I 50 Ω AC			S	ENSE:INT		ALIGN OFF		06:39	:43 AM Jul 25, 201
				PNO: Fast FGain:Low	Ģ	Trig: Free #Atten: 10	Run	#Avg Type	: Log-Pwr		TRACE 2 3 4 TYPE MWWW DET A A A A A
dB/div	Ref Off: Ref 30	set 30.7 dE).70 dBm	3							Mkr1 1.	853 8 GH 34.25 dB
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.7											
0											
3											
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.3											
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.3 Ny tanàna m				Negering and the					and a state of the		
art 0.03										Stop	o 12.500 Gł
es BW	100 kH;	z		#	VBV	/ 300 kHz			Swe	ep 52.42 r	ns (8192 pi



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Nominal Voltage: 3.5 VDC at Voltage Regulator, 3.0 VDC at RF Module, High Channel, 927 MHz Frequency Max Value Limit ≤ (dBc) Range (dBc) Result 12.5 GHz - 25 GHz -64.93 -30 Pass m Analyzer - Element Materials Technolog 06:40:21 AM Jul 25, 2017 TRACE 1 2 3 4 5 6 TYPE MWWWWW DET A A A A A A Keysight Sp RL ALIGN OFF #Avg Type: Log-Pwr PNO: Fast Trig: Free Run IFGain:Low #Atten: 10 dB Mkr1 24.932 9 GHz -38.20 dBm Ref Offset 30.7 dB Ref 30.70 dBm 10 dB/div Log in the second second Start 12.500 GHz #Res BW 100 kHz Stop 25.000 GHz Sweep 52.97 ms (8192 pts) #VBW 300 kHz STATUS

Extreme Voltage Condition, Lo	w: 2.7 VDC at Vol	Itage Regulator,	2.7 VDC at RF M	lodule, Low Chan	nel, 903 MHz
Frequency			Max Value	Limit	
Range			(dBc)	≤ (dBc)	Result
Fundamental			N/A	N/A	N/A

Keysight Spectrum Analyzer - Element Materia RL RF 50 Ω AC		SENSE:INT	ALIGN OFF		06:12:11 AM Jul 25, 20
	PNO: Wide 😱 IFGain:Low		#Avg Type: L		TRACE 1 2 3 4 TYPE MWWW DET A A A A
Ref Offset 30.7 dB dB/div Ref 30.70 dBm				Mkr1 9	02.826 46 MH 26.143 dB
7					
7					
0					
3					
3					
3					
3					
3					
nter 903.0000 MHz es BW 100 kHz	#VB	W 300 kHz		Sweep 1.	Span 1.000 M 092 ms (8192 p
			STATUS		



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TbtTx 2017.04.18

Extreme Voltage Condition, Low: 2.7 VDC at Voltage Regulator, 2.7 VDC at RF Module, Low Channel, 903 MHz Frequency Max Value Limit Range 30 MHz - 12.5 GHz (dBc) ≤ (dBc) Result -67.59 -30 Pass n Analyzer - Element Materials Techno 06:12:33 AM Jul 25, 2017 TRACE 1 2 3 4 5 6 TYPE MWWWWW DET A A A A A A Keysight Sp RL ALIGN OFF #Avg Type: Log-Pwr PNO: Fast Trig: Free Run IFGain:Low #Atten: 10 dB Mkr1 1.806 6 GHz -41.45 dBm Ref Offset 30.7 dB Ref 30.70 dBm 10 dB/div Log Start 0.030 GHz #Res BW 100 kHz Stop 12.500 GHz Sweep 52.42 ms (8192 pts) #VBW 300 kHz STATUS

Extreme Voltage Condition, Low: 2.7 VDC at Vo	oltage Regulator,	2.7 VDC at RF M	lodule, Low Chan	inel, 903 MHz
Frequency		Max Value	Limit	
Range		(dBc)	≤ (dBc)	Result
12.5 GHz - 25 GHz		-64.44	-30	Pass

RL	ectrum Analyzer - El			SENSE:INT	ALIGN OFF		06:12:57	AM Jul 25, 201
			PNO: Fast 🕞 IFGain:Low		#Avg Typ	e: Log-Pwr	TRA T [CE 1 2 3 4 5 PE M WWW DET A A A A A
dB/div	Ref Offset 30 Ref 30.70	0.7 dB dBm				N	1kr1 24.95 -38	2 7 GH .30 dBi
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.3								
	00 GHz 100 kHz		#VF	SW 300 kHz		Swee	Stop 2: 52.97 ms	5.000 GH
								tere p



Frequenc Range	y	Max Value (dBc)	Limit ≤ (dBc)	Result
Fundament	al	N/A	N/A	N/A
🚺 Keysight Spectrum Analyzer - Element Materials Ω RL RF 50 Ω AC	SENSE:INT	ALIGN OFF #Avg Type	: Log-Pwr	06:30:17 AM Jul 25, 2017 TRACE 2 3 4 5 6 TYPE
	PNO: Wide 🍙 Trig: Free F IFGain:Low #Atten: 10 d	dB		
Ref Offset 30.7 dB 10 dB/div Ref 30.70 dBm			Mkr1 9	14.821 45 MHz 25.980 dBm
20.7				
0,700				
-9.30				
-19.3				
-39.3				
-49.3				
Center 915.0000 MHz				Span 1.000 MHz
#Res BW 100 kHz	#VBW 300 kHz	STATUS	Sweep 1.	092 ms (8192 pts)
1				
Extreme Voltage Conditior Frequenc	n, Low: 2.7 VDC at Voltage Reg v	ulator, 2.7 VDC at RF N Max Value	Iodule, Mid Chan Limit	nel, 915 MHz
8 8 1 1 2 3 1 1 2 3 1 3 1		(dBc) -61.97	≤ (dBc) -30	Result Pass
		•		

	m Analyzer - Element I RF 50 Ω AC			SENSE:INT	A	LIGN OFF			0 AM Jul 25, 2017
		F	PNO: Fast 🖵 Gain:Low	Trig: Free #Atten: 10	Run dB	#Avg Type:	Log-Pwr		RACE 1 2 3 4 5 TYPE MWWW DET A A A A A
Ro 0 dB/div R	ef Offset 30.7 dE ef 30.70 dBm	3 1						Mkr1 1.8 -3	29 5 GH 5.99 dBn
20.7									
10.7									
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59.3						and the second second			
tart 0.030 G							_	Stop	12.500 GH
Res BW 10	U KHZ		#VB	W 300 kHz		STATUS	Swee	p 52.42 m	s (8192 pts



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TbtTx 2017.04.18

Extreme Voltage Condition, Low: 2.7 VDC at Voltage Regulator, 2.7 VDC at RF Module, Mid Channel, 915 MHz Frequency Max Value Limit Range 12.5 GHz - 25 GHz ≤ (dBc) (dBc) Result -63.51 -30 Pass m Analyzer - Element Materials Technology 06:31:04 AM Jul 25, 2017 TRACE 1 2 3 4 5 6 TYPE MWWWWW DET A A A A A A Keysight Sp RL ALIGN OFF #Avg Type: Log-Pwr PNO: Fast Trig: Free Run IFGain:Low #Atten: 10 dB Mkr1 24.958 8 GHz -37.53 dBm Ref Offset 30.7 dB Ref 30.70 dBm 10 dB/div Log Start 12.500 GHz #Res BW 100 kHz Stop 25.000 GHz Sweep 52.97 ms (8192 pts) #VBW 300 kHz STATUS

Extreme Voltage Condition, Lo	w: 2.7 VDC at Voltag	ige Regulator, 2	2.7 VDC at RF M	odule, High Char	nel, 927 MHz
Frequency			Max Value	Limit	
Range			(dBc)	≤ (dBc)	Result
Fundamental			N/A	N/A	N/A

RL RF 50 Ω AC	SE	NSE:INT	ALIGN OFF		06:32:35	AM Jul 25, 201
	PNO: Wide 😱	Trig: Free Run #Atten: 10 dB	#Avg Type	: Log-Pwr	TRA	CE 1234 (PE MWWW DET AAAA
Ref Offset 30.7 dB dB/div Ref 30.70 dBm				Mkr	926.822 25.8	2 18 Mi 386 dB
7						
7					and a second	
0						
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nter 927.0000 MHz es BW 100 kHz	#VBW	300 kHz		Sweep	Span 1.092 ms	1.000 M (8192 p
			STATUS			



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Extreme Voltage Condition, Low: 2.7 VDC at Voltage Regulator, 2.7 VDC at RF Module, High Channel, 927 MHz Frequency Max Value Limit Range 30 MHz - 12.5 GHz (dBc) ≤ (dBc) Result 57.76 -30 Pass nalyzer - Element Materials Techno 06:32:56 AM Jul 25, 2017 TRACE 1 2 3 4 5 6 TYPE MWWWWW DET A A A A A A Keysight Sp RL ALIGN OFF #Avg Type: Log-Pwr PNO: Fast Trig: Free Run IFGain:Low #Atten: 10 dB Mkr1 1.853 8 GHz -31.87 dBm Ref Offset 30.7 dB Ref 30.70 dBm 10 dB/div Log Start 0.030 GHz #Res BW 100 kHz Stop 12.500 GHz Sweep 52.42 ms (8192 pts) #VBW 300 kHz STATUS

Extreme Voltage Condition, Low: 2.7 VDC at Vo	ltage Regulator,	2.7 VDC at RF M	odule, High Char	nnel, 927 MHz
Frequency		Max Value	Limit	
Range		(dBc)	≤ (dBc)	Result
12.5 GHz - 25 GHz		-63.48	-30	Pass

RL	RF	50 Ω	t Materials Technology		S	ENSE:INT		ALIGN OFF		06:33:1	9 AM Jul 25, 201
	_	10010		PNO: Fast IFGain:Low		Trig: Free I #Atten: 10	Run	#Avg Type	: Log-Pwr		RACE 1 2 3 4 5 TYPE MWWW DET A A A A A
) dB/div	Ref Of Ref 3	fset 30.7 d 0.70 dB	1B m							Mkr1 24.9 -3	74 1 GH 7.59 dBi
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art 12.5 les BW				#\	VBV	V 300 kHz			Swe	Stop 52.97 m	25.000 GH
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tart 0.03 Res BW	30 GHz 100 kHz	2		#VB	W 300 kHz			Sweep	Stop 1 52.42 ms	2.500 GH (8192 pts
SG							STATUS			



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Extreme Voltage Condition, High: 5.025 VDC at Voltage Regulator, 3.465 VDC at RF Module, Low Channel, 903 MHz Frequency Max Value Limit ≤ (dBc) Range (dBc) Result 12.5 GHz - 25 GHz -64.31 -30 Pass nalyzer - Element Materials Technolog 06:16:16 AM Jul 25, 2017 TRACE 1 2 3 4 5 6 TYPE MWWWWW DET A A A A A A Keysight Sp RL ALIGN OFF #Avg Type: Log-Pwr PNO: Fast Trig: Free Run IFGain:Low #Atten: 10 dB Mkr1 24.961 8 GHz -37.68 dBm Ref Offset 30.7 dB Ref 30.70 dBm 10 dB/div Log dial participation Stop 25.000 GHz Sweep 52.97 ms (8192 pts) Start 12.500 GHz #Res BW 100 kHz #VBW 300 kHz STATUS

Extreme Voltage Condition, High: 5.02	25 VDC at Voltage Regulator	, 3.465 VDC at RI	F Module, Mid Ch	annel, 915 MHz
Frequency		Max Value	Limit	
Range		(dBc)	≤ (dBc)	Result
Fundamental		N/A	N/A	N/A

RL RF 50 Ω AC	SENSE:INT	ALIGN OFF	06:18:24 AM Jul 25, 20
	PNO: Wide C Trig: Free IFGain:Low #Atten: 1	#Avg Type: Log-Pw e Run 0 dB	TRACE 1234 TYPE MWWW DET A A A A
Ref Offset 30.7 dB dB/div Ref 30.70 dBm			Mkr1 914.819 13 Mi 26.697 dB
7	1		
7			
0			
3			
3			
3			
3			
3			
nter 915.0000 MHz			Spap 4 000 M
es BW 100 kHz	#VBW 300 kH	z S	Span 1.000 M weep 1.092 ms (8192 p



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Extreme Voltage Condition, High: 5.025 VDC at Voltage Regulator, 3.465 VDC at RF Module, Mid Channel, 915 MHz Frequency Max Value Limit ≤ (dBc) Range (dBc) Result 30 MHz - 12.5 GHz -65.68 -30 Pass 06:18:50 AM Jul 25, 2017 TRACE 1 2 3 4 5 6 TYPE MWWWWW DET A A A A A A alyzer - Element Materials Techr Keysight S RL 🚺 🗘 ALI #Avg Type: Log-Pwr PNO: Fast Trig: Free Run IFGain:Low #Atten: 10 dB Mkr1 1.829 5 GHz -38.98 dBm Ref Offset 30.7 dB Ref 30.70 dBm 10 dB/div Log 1 Start 0.030 GHz #Res BW 100 kHz Stop 12.500 GHz Sweep 52.42 ms (8192 pts) #VBW 300 kHz STATUS

 Extreme Voltage Condition, High: 5.025 VDC at Voltage Regulator, 3.465 VDC at RF Module, Mid Channel, 915 MHz

 Frequency
 Max Value
 Limit

 Range
 (dBc)
 Result

 12.5 GHz
 -64.18
 -30
 Pass

RL	RF	50 Ω /	C		5	ENSE:INT		ALIGN OFF		06:20:	20 AM Jul 25, 201
				PNO: Fast IFGain:Low	Ģ	Trig: Free I #Atten: 10	Run	#Avg Type	e: Log-Pwr		TRACE 1 2 3 4 5 TYPE M WWW DET A A A A A
dB/div	Ref Of Ref 3	fset 30.7 d 0.70 dB	IB n							Mkr1 24.9	948 1 GH 37.48 dBi
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	500 GH:									Stop	25.000 GF
les BW	100 kH	z		#	VBV	V 300 kHz			SW	eep 52.97 m	is (8192 pt



Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Desult
Fundamental			N/A	<u>S (UBC)</u> N/A	Result N/A
E Keysight Spectrum Analyzer - Element Materials Tech RL RF 50Ω AC	PNO: Wide	SE:INT Trig: Free Run #Atten: 10 dB	ALIGN OFF //////////////////////////////////	Log-Pwr	06:21:56 AM Jul 25, 2017 TRACE 1 2 3 4 5 6 TYPE M WWWWW DET A A A A A A
Ref Offset 30.7 dB 10 dB/div Ref 30.70 dBm	- Sameon			Mkr1 9	26.816 81 MHz 26.522 dBm
20.7 10.7 0.700					
-19.3					
-49.3					
Center 927.0000 MHz #Res BW 100 kHz	#VBW :	300 kHz		Sweep 1	Span 1.000 MHz .092 ms (8192 pts)
Extreme Voltage Condition, High Frequency Range 30 MHz, 12 5 Gl		tage Regulator, 3	Max Value (dBc)	Limit ≤ (dBc)	Result
	nology	5E:INT		≤ (dBc) -30	Result Pass 06:22:21 AM Jul 25, 2017 TRACE 2 3 4 5

			PNO: Fast 🕞	Trig: Free Run #Atten: 10 dB	#Avg Type: Log-Pwr	
0 dB/div og	Ref Offset 30 Ref 30.70 (.7 dB d Bm				Mkr1 1.853 8 GH -34.87 dBn
20.7						
0.7						
700						
9.30						
9.3						
9.3						
9.3	• '					
19.3						
59.3 4	and the second	ملينه ويترك المانين المناطقة ا	and the second s	ويهادونها فالمنامط والمعروط	and and the side in the state of the state o	والفاقيل الموجعة ومعاوم وودوي فالمحافظ المراجعة المحاوية
tart 0.03 Res BW			#VB	W 300 kHz		Stop 12.500 GH eep 52.42 ms (8192 pts
SG					STATUS	



XMit 2017.02.08

TbtTx 2017.04.18

Extreme Voltage Condition, High: 5.025 VDC at Voltage Regulator, 3.465 VDC at RF Module, High Channel, 927 MHz Frequency Max Value Limit ≤ (dBc) Range (dBc) Result 12.5 GHz - 25 GHz -64.18 -30 Pass 06:22:46 AM Jul 25, 2017 TRACE 1 2 3 4 5 6 TYPE MWWWW DET A A A A A A m Analyzer - Element Materials Technology Keysight Sp RL GN OFF #Avg Type: Log-Pwr ALI PNO: Fast Trig: Free Run IFGain:Low #Atten: 10 dB Mkr1 24.960 3 GHz -37.66 dBm Ref Offset 30.7 dB Ref 30.70 dBm 10 dB/div Log a lain la sing Start 12.500 GHz #Res BW 100 kHz Stop 25.000 GHz Sweep 52.97 ms (8192 pts) #VBW 300 kHz STATUS



XMit 2017.02.08

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT					
Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Power Supply - DC	Topward	TPS-2000	TPD	NCR	NCR
Meter - Multimeter	Fluke	8846A	MMZ	10/22/2015	10/22/2018
Meter - Multimeter	Tektronix	DMM912	MMH	2/17/2016	2/17/2019
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	5/30/2017	5/30/2018
Attenuator	Fairview Microwave	SA26B-10	TWG	4/15/2017	4/15/2018
Attenuator	S.M. Electronics	SA26B-20	AUY	5/30/2017	5/30/2018
Block - DC	Fairview Microwave	SD3379	AMW	6/5/2017	6/5/2018
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFP	8/10/2016	8/10/2017

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The power spectral density was measured using the channels as called out on the following data sheets. The transmit power was set to its default maximum.

The method AVGPSD-1 in section 11.10.3 of ANSI C63.10:2013 was used to make the measurement. This method uses trace averaging and RMS detection across the full power of the burst. This method is allowed as the same method has been used to determine the conducted output power.



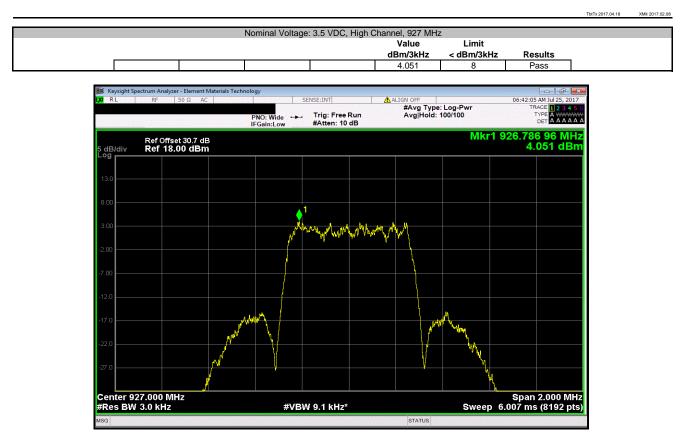
			TbtTx 2017.04.18	
EUT: 963	630-9110	Work Order:	SCHW0219	
Serial Number: A0	02654144	Date:	07/24/17	
Customer: Sc	chweitzer Engineering Laboratories, Inc.	Temperature:	23.8 °C	
Attendees: All	Ilan Davis	Humidity:	44.2% RH	
Project: No	one	Barometric Pres.:	1016 mbar	
Tested by: Ma	ark Baytan Power: 3.5 VDC	Job Site:		
TEST SPECIFICATION				
FCC 15.247:2017	ANSI C63.10:2013			
COMMENTS				
	offset (DC Block + 20dB Attenuator + 10dB Attenuator + RF Cable) = 30.7 dB. Power level setting: 27 dBm			
Total reference level of DEVIATIONS FROM TE				
Total reference level of DEVIATIONS FROM TE None	1 MAR Sytem	Value dBm/3kHz	Limit < dBm/3kHz	Results
Total reference level of DEVIATIONS FROM TE None	1 Signature			Results
Total reference level of DEVIATIONS FROM TE None Configuration #	1 Signature			Results Pass
Total reference level of DEVIATIONS FROM TE None Configuration # Nominal Voltage: 3.5 VE	1 Signature	dBm/3kHz	< dBm/3kHz	













RADIATED EMISSIONS FOR RECEIVER



Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

Continuous Rx

POWER SETTINGS INVESTIGATED

3.5 VDC

CONFIGURATIONS INVESTIGATED

SCHW0228 - 2 SCHW0228 - 3

FREQUENCY RANGE INVESTIGATED

Start Frequency 30 MHz

Stop Frequency 12.4 GHz

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Cable	None	Standard Gain Horns Cable	EVF	2/6/2017	12 mo
Amplifier - Pre-Amplifier	L-3 Narda-MITEQ	AMF-6F-08001200-30-10P	PAO	2/7/2017	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-07	AHU	NCR	0 mo
Cable	N/A	Double Ridge Horn Cables	EVB	7/20/2017	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	PAG	7/20/2017	12 mo
Antenna - Double Ridge	ETS Lindgren	3115	AIZ	2/3/2016	24 mo
Cable	N/A	Bilog Cables	EVA	2/6/2017	12 mo
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	AOL	2/6/2017	12 mo
Antenna - Biconilog	Teseq	CBL 6141B	AXR	6/30/2016	24 mo
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	4/13/2017	12 mo

TEST DESCRIPTION

The highest gain antenna of each type to be used with the EUT was tested. The EUT was configured for the required transmit frequencies and the modes as showed in the data sheets.

For each configuration, the spectrum was scanned throughout the specified range as part of the exploratory investigation of the emissions. These "pre-scans" are not included in the report. Final measurements on individual emissions were then made and included in this test report.

The individual emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis if required, and adjusting the measurement antenna height and polarization (per ANSI C63.10). A preamp and high pass filter (and notch filter) were used for this test in order to provide sufficient measurement sensitivity.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector PK = Peak Detector AV = RMS Detector

Measurements were made to satisfy the specific requirements of the test specification for out of band emissions as well as the restricted band requirements.

If there are no detectable emissions above the noise floor, the data included may show noise floor measurements for reference only.

Measurements at the edges of the allowable band may be presented in an alternative method as provided for in the ANSI C63.10 Marker-Delta method. This method involves performing an in-band fundamental measurement followed by a screen capture of the fundamental and out-of-band emission using reduced measurement instrumentation bandwidths. The amplitude delta measured on this screen capture is applied to the fundamental emission value to show the out-of-band emission level as applied to the limit.

RADIATED EMISSIONS FOR RECEIVER



W		COL INA/	0000		Deter	10/0	0/17			
wo	ork Order:			Terr	Date: nperature:	10/2		The 1	2	la
	Project: Job Site:				Humidity:	40.3%		aly h		0
Sorial	Number:				tric Pres.:	1012	0 111			d Rod Peloquin
Serial		9630-9110	Jing	Daronne	THE FIES.	1012	IIIJai	Tested by: J	ien Alcoke and	
Confi	iguration:									
		Schweitzer	Engineeri	ing Laborato	ries Inc					
		Allan Davis	Lingineen	ing Laborato	103, 110.					
	JT Power:									
	ing Mode:	O 1 1 1 1 1	Rx							
De	eviations:	None								
Co	omments:	See comme	nts belov	v for Channe	I, Frequency, a	and EUT	orientation.			
st Speci	fications				Class B		Test Method			
C 15.109							ANSI C63.4:2014			
Run #	17	Test Dist	ance (m)	3	Antenna H	eight(s)	1 to 4(m	ו)	Results	Pass
Run #	17	Test Dist	ance (m)) 3	Antenna H	eight(s)	1 to 4(m	n)	Results	Pass
Run #	17	Test Dist	ance (m)) 3	Antenna He	eight(s)	1 to 4(m	n)	Results	Pass
Γ	17	Test Dist	ance (m)) 3	Antenna He	eight(s)	1 to 4(m	n)	Results	Pass
80	17	Test Dist	ance (m)	3	Antenna He	eight(s)	1 to 4(m	n)	Results	Pass
Γ	17	Test Dist	ance (m)	3	Antenna He	eight(s)	1 to 4(m	n)	Results	Pass
80	17	Test Dist	ance (m)	3	Antenna He	eight(s)	1 to 4(m		Results	Pass
80 -	17	Test Dist	ance (m)) 3	Antenna H	eight(s)	1 to 4(m		Results	Pass
80	17	Test Dist	ance (m)) 3	Antenna H	eight(s)	1 to 4(m		Results	Pass
80 -	17	Test Dist	ance (m)) 3	Antenna H	eight(s)	1 to 4(m		Results	Pass
80 - 70 - 60 - 50 -	17	Test Dist	ance (m)) 3	Antenna H	eight(s)	1 to 4(m		Results	Pass
80 - 70 - 60 - 50 -	17	Test Dist	ance (m)		Antenna H	eight(s)	1 to 4(m		Results	Pass
80 - 70 - 60 - 50 -		Test Dist) 3	Antenna H	eight(s)	1 to 4(m			Pass
80 - 70 - 60 - 50 -	17	Test Dist			Antenna H	eight(s)	1 to 4(m		Results	Pass
80 - 70 - 60 -	17	Test Disf			Antenna H	eight(s)				Pass
80 70 60 50 50 40	17		ance (m)		Antenna H	eight(s)	1 to 4(m			Pass
80 - 70 - 60 - 50 -	17	Test Dist			Antenna H	eight(s)				Pass
80 70 60 50 50 40	17	Test Dist	ance (m)		Antenna H	eight(s)				Pass
80 70 60 50 50 40		Test Dist			Antenna H	eight(s)				Pass
80 - 70 - 60 - 50 - 50 - 30 -		Test Disf			Antenna H	eight(s)				
80 70 60 50 50 40 30 20					Antenna H	eight(s)				
80 - 70 - 60 - 50 - 50 - 30 -		Test Dist			Antenna H	eight(s)				
80 70 60 50 50 40 30 20					Antenna H	eight(s)				Pass
80 70 60 50 50 40 30 20					Antenna H	eight(s)				
80 70 60 50 40 30 20 10					Antenna H	eight(s)				Pass

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
3710.283	29.8	7.2	1.0	143.0	3.0	0.0	Horz	AV	0.0	37.0	54.0	-17.0	High Ch. EUT Horizontal
3707.367	29.6	7.1	1.0	156.0	3.0	0.0	Vert	AV	0.0	36.7	54.0	-17.3	High Ch. EUT on Side
3662.183	29.5	6.9	1.0	34.0	3.0	0.0	Vert	AV	0.0	36.4	54.0	-17.6	Mid Ch. EUT on Side
3662.150	29.5	6.9	3.9	142.0	3.0	0.0	Horz	AV	0.0	36.4	54.0	-17.6	Mid Ch. EUT Horizontal
913.858	16.4	10.3	1.0	205.0	3.0	0.0	Vert	QP	0.0	26.7	46.0	-19.3	Mid CH. EUT on Side
915.478	16.3	10.3	3.5	280.0	3.0	0.0	Horz	QP	0.0	26.6	46.0	-19.4	Mid CH. EUT Horizontal
902.340	16.4	10.0	1.2	130.0	3.0	0.0	Vert	QP	0.0	26.4	46.0	-19.6	Low CH, EUT on Side
903.818	16.3	9.9	3.0	333.0	3.0	0.0	Horz	QP	0.0	26.2	46.0	-19.8	Low CH, EUT Horizontal
3610.425	26.2	6.9	2.5	81.0	3.0	0.0	Horz	AV	0.0	33.1	54.0	-20.9	Low CH, EUT Horizontal
3610.275	26.2	6.9	1.0	201.0	3.0	0.0	Vert	AV	0.0	33.1	54.0	-20.9	Low CH, EUT on Side
2778.525	30.2	1.6	1.0	296.0	3.0	0.0	Horz	AV	0.0	31.8	54.0	-22.2	High Ch. EUT Horizontal
2782.392	30.1	1.6	1.0	260.0	3.0	0.0	Vert	AV	0.0	31.7	54.0	-22.3	High Ch. EUT on Side
2743.058	30.4	1.3	1.0	39.0	3.0	0.0	Vert	AV	0.0	31.7	54.0	-22.3	Mid Ch. EUT on Side
2743.225	30.3	1.3	2.7	2.0	3.0	0.0	Horz	AV	0.0	31.6	54.0	-22.4	Mid Ch. EUT Horizontal
3707.100	41.8	7.1	1.0	156.0	3.0	0.0	Vert	PK	0.0	48.9	74.0	-25.1	High Ch. EUT on Side
3706.592	41.4	7.1	1.0	143.0	3.0	0.0	Horz	PK	0.0	48.5	74.0	-25.5	High Ch. EUT Horizontal
2709.192	27.3	1.1	1.0	149.0	3.0	0.0	Horz	AV	0.0	28.4	54.0	-25.6	Low CH, EUT Horizontal
2707.858	27.2	1.0	1.0	329.0	3.0	0.0	Vert	AV	0.0	28.2	54.0	-25.8	Low CH, EUT on Side
3659.400	41.2	6.9	1.0	34.0	3.0	0.0	Vert	PK	0.0	48.1	74.0	-25.9	Mid Ch. EUT on Side
3659.858	40.9	6.9	3.9	142.0	3.0	0.0	Horz	PK	0.0	47.8	74.0	-26.2	Mid Ch. EUT Horizontal
3612.642	39.2	6.9	1.0	201.0	3.0	0.0	Vert	PK	0.0	46.1	74.0	-27.9	Low CH, EUT on Side
3610.383	38.9	6.9	2.5	81.0	3.0	0.0	Horz	PK	0.0	45.8	74.0	-28.2	Low CH, EUT Horizontal
2710.233	42.7	1.2	1.0	149.0	3.0	0.0	Horz	PK	0.0	43.9	74.0	-30.1	Low CH, EUT Horizontal
2779.775	41.9	1.6	1.0	296.0	3.0	0.0	Horz	PK	0.0	43.5	74.0	-30.5	High Ch. EUT Horizontal
2781.608	41.7	1.6	1.0	260.0	3.0	0.0	Vert	PK	0.0	43.3	74.0	-30.7	High Ch. EUT on Side
2745.158	42.0	1.3	1.0	39.0	3.0	0.0	Vert	PK	0.0	43.3	74.0	-30.7	Mid Ch. EUT on Side
2744.267	41.9	1.3	2.7	2.0	3.0	0.0	Horz	PK	0.0	43.2	74.0	-30.8	Mid Ch. EUT Horizontal
2707.200	41.3	1.0	1.0	329.0	3.0	0.0	Vert	PK	0.0	42.3	74.0	-31.7	Low CH, EUT on Side

RADIATED EMISSIONS FOR RECEIVER



										EmiR5 2017.07.11		PSA-ESCI 2017.06.01
Wor	k Order:	SCH	W0228		Date:		20/17	1	0	1 -	20	2
	Project:		lone	Ter	nperature:		7 °C	100	lag .	e ?	etu	200
	lob Site:		V01		Humidity:		% RH		and the second sec		V	
Serial N	Number:		Config	Barome	etric Pres.:	1015	mbar	1	Tested by:	Jeff Alcoke	and Rod I	Peloquin
		9630-911	0									
	uration:											
			er Engineerir	ng Laborato	ories, Inc.							
			ris									
EUT	Power:	3.5 VDC										
Operatin	g Mode:	Continuou	us Rx									
Dev	viations:	None										
Cor	nments:	See comr	ments below	for Channe	el, Frequenc	y, and EUT	orientatior	1.				
st Specifi	cations				Class B		Test Meth	od				
C 15.109:	2017						ANSI C63.	4:2014				
Run #	20	Test D	istance (m)	3	Antenna	Height(s)		1 to 4(m)		Results	Pa	ass
80												
00												
70												
60 +												++-
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5 40												
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10			100			1000			10000			100000
			.50									
						MHz				PK	AV	QP
						Extornal	Polarity/		Distance			Compared to
Freq	Amplitude	Factor	Antenna Height	Azimuth	Test Distance	External Attenuation	Transducer Type	Detector	Distance Adjustment	Adjusted	Spec. Limit	Compared to Spec.
(MHz)	(dBuV)	(dB)	(meters)	(degrees)	(meters)	(dB)	,,,,,	2 21.50101	(dB)	(dBuV/m)	(dBuV/m)	(dB)
,												
25.328	16.7	10.1	1.0	347.0	3.0	0.0	Horz	QP	0.0	26.8	46.0	-19.2
28.102	16.6	10.1	1.0	347.0	3.0	0.0	Vert	QP	0.0	26.7	46.0	-19.3