TEST REPORT

REPORT NUMBER:	12197499-E37V2
COMPANY NAME:	Google LLC
EUT DESCRIPTION:	Multimedia Device with BLE/BT, 2.4GHz and 5GHz Radios
MODEL:	NC2-6A5
SERIAL NUMBER:	PROTO 1
ISSUE DATE:	29-Jun-18
DATE TESTED:	8/06/2015 to 8/12/2015, 4/30/18 to 5/4/18, and 6/29/18
APPLICABLE STANDARDS:	JAPAN RADIO LAW RADIO EQUIPMENT REGULATIONS
TEST METHOD:	Notice 88 of Ordinance Concerning Technical Regulations Conformity Certification of Specified Radio Equipment
Place of Testing:	UL Verification Services Inc. 47173 BENICIA ST, FREMONT, CA 94538, USA
Test Result:	Pass
Classification of Specified Radio Equipment:	Article 2 Clause 1 Item 19-3
Type of radio wave, Frequency and antenna power:	G1D, D1D 5180-5240MHz (Interval of 20MHz 4ch) 0.002805W/MHz

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted

Approved & Released For UL Verification Services Inc. By: Prepared By:

Francisco de Anda   Steven Tran
Operations Leader   EMC ENGINEER
UL Verification Services Inc.   UL Verification Services Inc.

TESTING
NVLAP LAB CODE 200065-0

1. EUT Information

Report No. :	12197499-E37V2
Applicant :	Google LLC
Equipment Description:	Multimedia Device with BLE/BT, 2.4GHz and 5GHz Radios
Model No. :	NC2-6A5
SerialNo. :	PROTO 1
The number of Tx Antenna :	1
Max Antenna Gain :	4.0dBi
Mode :	IEEE802.11n HT20
Type of Radio wave :	G1D, D1D

Supply Voltage
- ◉ DC ○ AC   5.00V
  -

Voltage Condition
- ◉ Non-Extreme   ○ Extreme

Normal	DC5V
Normal-10%	-
Normal+10%	-

Band
- ◉ W52
- ○ W53

Modulation
- ◉ OFDM (OBW<19MHz)
- ○ OFDM (OBW<19-38MHz)
- ○ ~~DS (OBW<18MHz)~~
- ○ Other Modulation (OBW<18MHz)

EUT has
- ◉ ANT Connector
- ○ No ANT Connector   distance -

EUT has
- ○ TPC Function
- ◉ No TPC Funciton

The worst-case data rate for each mode is determined to be as follows, based on preliminary test of the chipset utilized in this radio.
All final tests were made at the Lowest Rate.

Factors

		Other than for Power and ACP		For Power	
	[MHz]	Cable Loss [dB]	ATT/ [dB]	Cable Loss [dB]	ATT/ [dB]
Low Channel (Tx1)	5180	1.00	10.00	1.00	10.00
Middle Channel (Tx2)	5220	4.10	10.00	1.00	10.00
High Channel (Tx3)	5240	1.00	10.00	1.00	10.00

* Cable loss and ATT are not taken into account for ACP.

2.TEST Result

2.1. Frequency Tolerance

Job No.	12197499-E37V2
Remark1	
Remark2	

[DATA]

Voltage	Freq. [MHz]	Result [MHz]	Tolerance [kHz]	Tolerance [ppm]	Limit [ppm]
DC5V	5180	5179.9704	-29.6203	-5.72	±20.0
	5220	5219.9761	-23.8748	-4.57	±20.0
	5240	5239.9770	-22.9792	-4.39	±20.0

Tx1_Freq_Nom

❄ **Agilent** 09:45:56 Aug 10, 2015

R L

Cntr1   5 179 970 379.667 Hz

Ref 20 dBm   #Atten 40 dB   6.94 dBm

#Peak
Log
10
dB/

LgAv

W1 S2
S3 FS
  AA
£(f):
f<50k
Swp

Start 5.179 955 385 GHz   Stop 5.179 985 385 GHz
#Res BW 300 Hz _____ #VBW 300 Hz _____ Sweep 401.9 ms (1201 pts)_
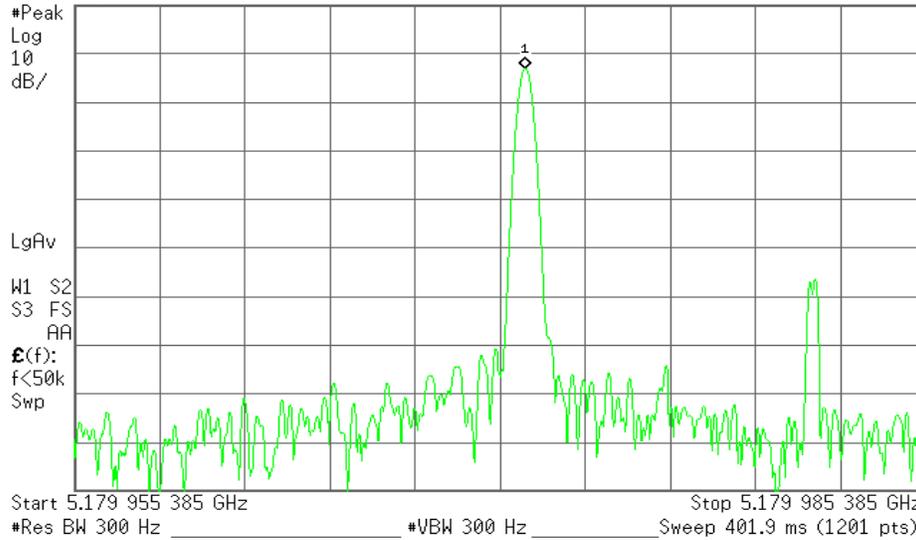
Tx2_Freq_Nom

Agilent 09:54:35 Aug 10, 2015

R L

Cntr1   5 219 976 125.164 Hz

Ref 20 dBm   #Atten 40 dB   6.40 dBm

#Peak
Log
10
dB/

LgAv

W1 S2
S3 FS
    AA
£(f):
f<50k
Swp

Start 5.219 961 127 GHz   Stop 5.219 991 127 GHz
#Res BW 300 Hz_____#VBW 300 Hz_____Sweep 401.9 ms (1201 pts)_
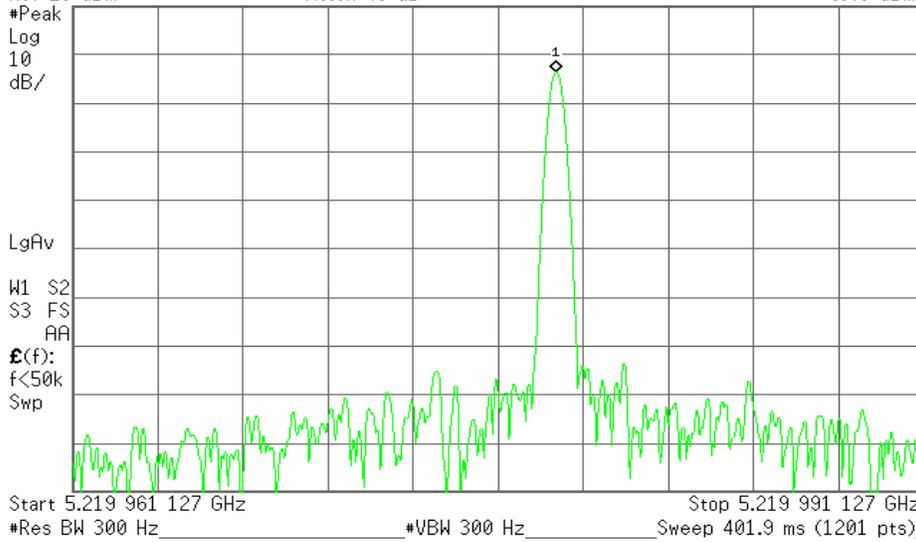
Tx3_Freq_Nom

Agilent 10:02:22 Aug 10, 2015

R L

Cntr1   5 239 977 020.791 Hz

Ref 20 dBm   #Atten 40 dB   6.91 dBm

#Peak
Log
10
dB/

LgAv

W1 S2
S3 FS
    AA
£(f):
f<50k
Swp

Start 5.239 962 040 GHz   Stop 5.239 992 040 GHz
#Res BW 300 Hz_____#VBW 300 Hz_____Sweep 401.9 ms (1201 pts)_
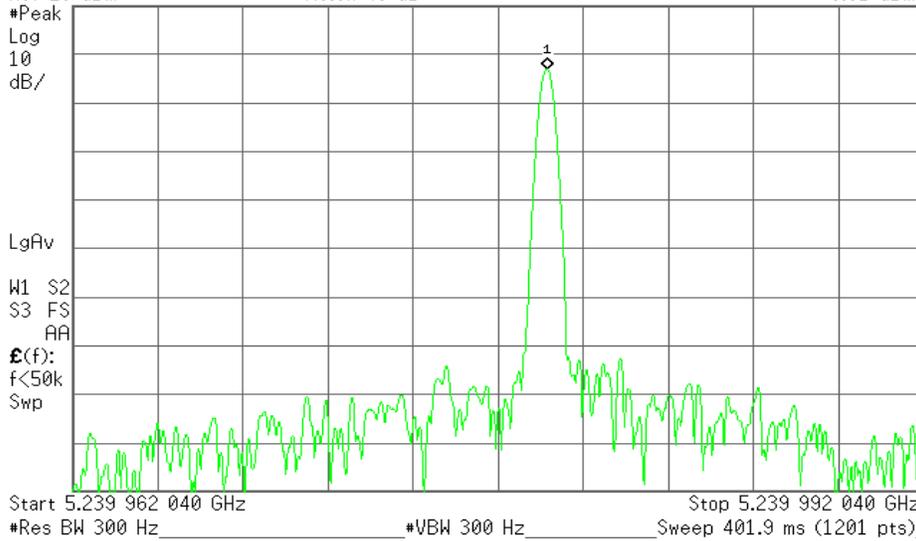
2.2. Occupied Bandwidth

Job No.	12197499-E37V2
Remark1	
Remark2	

[DATA]

99% Occupied Frequency Bandwidth

Voltage	Freq. [MHz]	Result [MHz]	Limit [MHz]
DC5V	5180	17.6473	19
	5220	17.7722	19
	5240	17.7118	19

Tx1_99OBW_Nom

※ **Agilent** 09:48:16 Aug 10, 2015   R L

Ref 0 dBm   #Atten 10 dB
#Peak
Log
10
dB/

LgAv

M1 S2
Center 5.180 00 GHz   Span 52 MHz
#Res BW 300 kHz   #VBW 300 kHz   Sweep 1.04 ms (1201 pts)
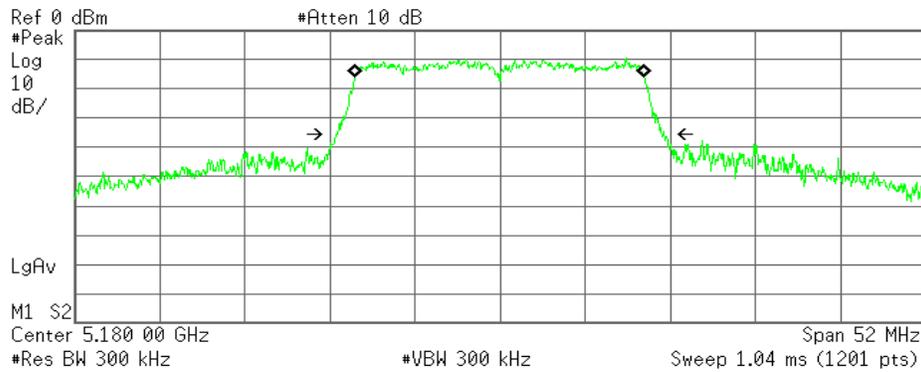
Occupied Bandwidth   Occ BW % Pwr   99.00 %
     17.6472 MHz   × dB   −26.00 dB

Transmit Freq Error   −11.622 kHz
× dB Bandwidth   19.987 MHz

Tx2_99OBW_Nom

❄ **Agilent** 09:56:27 Aug 10, 2015   R L

Ref 0 dBm   #Atten 10 dB
#Peak
Log
10
dB/

LgAv
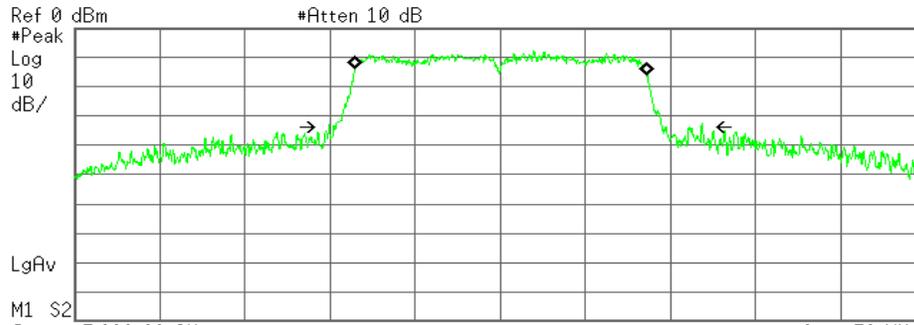
M1 S2
Center 5.220 00 GHz   Span 52 MHz
#Res BW 300 kHz   #VBW 300 kHz   Sweep 1.04 ms (1201 pts)

Occupied Bandwidth
17.7722 MHz

Occ BW % Pwr   99.00 %
x dB   −26.00 dB

Transmit Freq Error   22.670 kHz
x dB Bandwidth   22.872 MHz

Tx3_99OBW_Nom

❄ **Agilent** 10:03:44 Aug 10, 2015   R L

Ref 0 dBm   #Atten 10 dB
#Peak
Log
10
dB/

LgAv
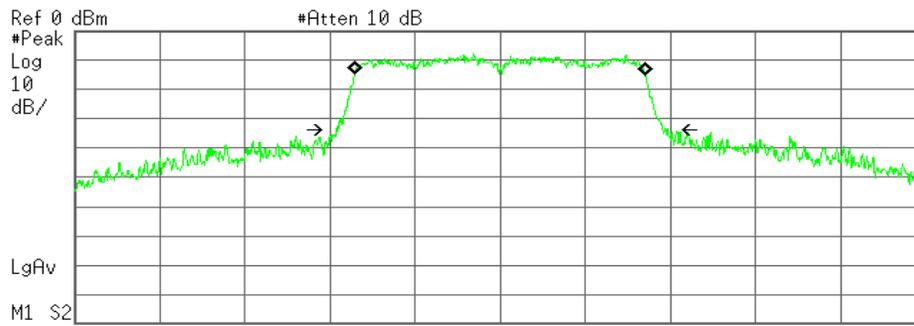
M1 S2
Center 5.240 00 GHz   Span 52 MHz
#Res BW 300 kHz   #VBW 300 kHz   Sweep 1.04 ms (1201 pts)

Occupied Bandwidth
17.7118 MHz

Occ BW % Pwr   99.00 %
x dB   −26.00 dB

Transmit Freq Error   8.834 kHz
x dB Bandwidth   20.166 MHz

2.3.Unwanted Emission Strength (Normal Voltage)

Job No.   12197499-E37V2

Remark1

Remark2

[DATA]

Voltage	Freq.	Freq.	S/A Reading	Cable Loss	Atten. Loss	Result	Result	Limit	Remark
	[MHz]	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[uW]	[uW]	
DC5V	5180	692.80	-71.86	1.00	10.00	-60.86	0.001	2.500	♦1
		3453.00	-64.75	1.00	10.00	-53.75	0.004	2.500	♦1
		5104.00	-55.11	1.00	10.00	-44.11	0.039	2.500	♦1
		5400.00	-64.23	1.00	10.00	-53.23	0.005	2.500	♦2
		10362.00	-60.40	1.00	10.00	-49.40	0.011	2.500	♦2
		15542.00	-52.50	1.00	10.00	-41.50	0.071	2.500	♦2
		24960.00	-61.79	1.00	10.00	-50.79	0.008	2.500	♦2
	5220	30.00	-65.04	4.10	10.00	-50.94	0.008	2.500	♦1
		4993.00	-63.79	4.10	10.00	-49.69	0.011	2.500	♦1
		5067.00	-61.18	4.10	10.00	-47.08	0.020	2.500	♦1
		5367.00	-64.73	4.10	10.00	-50.63	0.009	2.500	♦2
		10442.00	-59.20	4.10	10.00	-45.10	0.031	2.500	♦2
		15658.00	-51.76	4.10	10.00	-37.66	0.171	2.500	♦2
		24910.00	-61.95	4.10	10.00	-47.85	0.016	2.500	♦2
	5240	823.00	-61.57	1.00	10.00	-50.57	0.009	2.500	♦1
		3493.00	-65.43	1.00	10.00	-54.43	0.004	2.500	♦1
		5096.00	-60.98	1.00	10.00	-49.98	0.010	2.500	♦1
		5388.00	-64.07	1.00	10.00	-53.07	0.005	2.500	♦2
		10475.00	-59.32	1.00	10.00	-48.32	0.015	2.500	♦2
		15721.00	-54.85	1.00	10.00	-43.85	0.041	2.500	♦2
		25020.00	-61.23	1.00	10.00	-50.23	0.009	2.500	♦2

Sample Calculation :

Result = Reading + Cable Loss + Attenuator

♦1:Freq Range1 (< 5,135MHz)

♦2:Freq Range2 (> 5,365MHz)

Tx1_SpuriousM_Nom

❄ **Agilent** 09:49:40 Aug 10, 2015   R L

Mkr1 692.8 MHz

Ref 0 dBm   #Atten 10 dB   −71.86 dBm

#Peak
Log
10
dB/

1
◇

LgAv

V1 S2

Start 30.0 MHz   Stop 1.000 0 GHz
#Res BW 1 MHz   #VBW 1 MHz   Sweep 1.68 ms (1201 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	692.8 MHz	−71.86 dBm
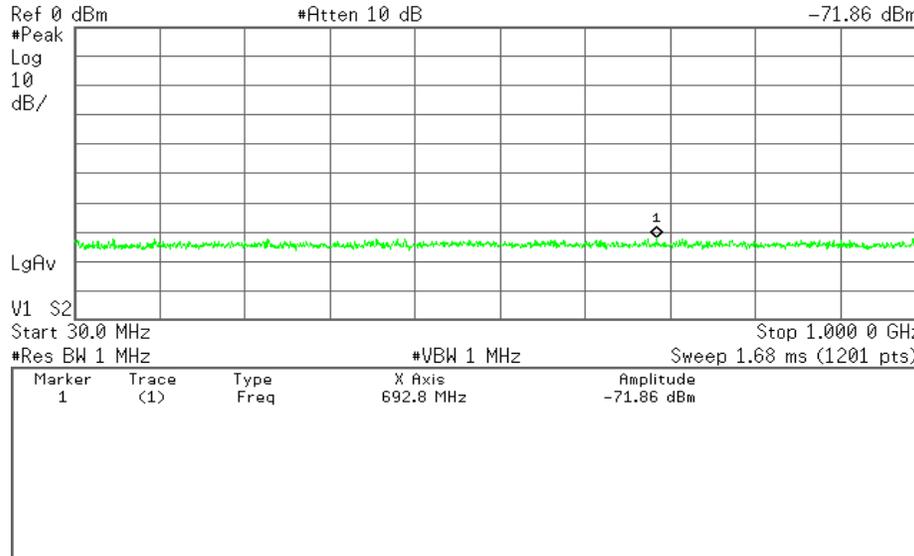
Tx1_SpuriousG1_Nom

❄ **Agilent** 09:48:42 Aug 10, 2015   R L

Mkr1 3.453 GHz

Ref 0 dBm   #Atten 10 dB   −64.75 dBm

#Peak
Log
10
dB/

1
◇

LgAv

V1 S2

Start 1.000 GHz   Stop 5.000 GHz
#Res BW 1 MHz   #VBW 1 MHz   Sweep 6.72 ms (1201 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	3.453 GHz	−64.75 dBm
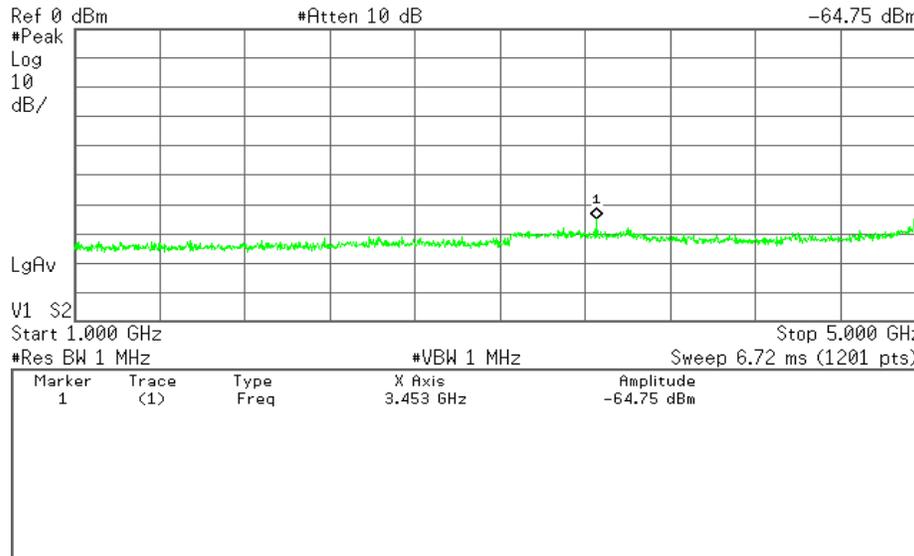
Tx1_SpuriousG2_Nom

Agilent 09:48:54 Aug 10, 2015   R L

Mkr3 5.400 GHz
Ref 0 dBm   #Atten 10 dB   -64.23 dBm
#Peak
Log
10
dB/

LgAv

V1 S2
Start 5.000 GHz   Stop 10.000 GHz
#Res BW 1 MHz   #VBW 1 MHz   Sweep 8.4 ms (1201 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	5.180 GHz	-4.91 dBm
2	(1)	Freq	5.104 GHz	-55.11 dBm
3	(1)	Freq	5.400 GHz	-64.23 dBm
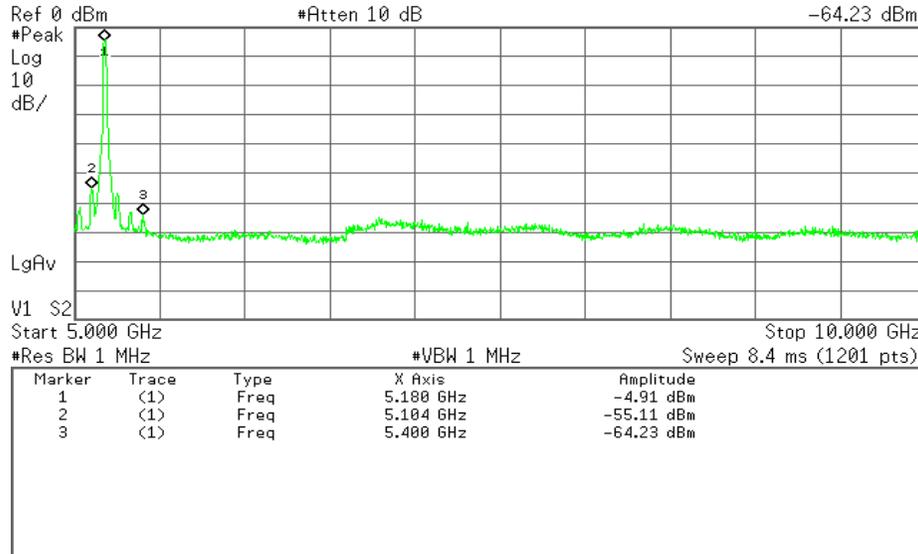
Tx1_SpuriousG3_Nom

Agilent 09:49:05 Aug 10, 2015   R L

Mkr1 10.362 GHz
Ref 0 dBm   #Atten 10 dB   -60.40 dBm
#Peak
Log
10
dB/

LgAv

V1 S2
Start 10.000 GHz   Stop 15.000 GHz
#Res BW 1 MHz   #VBW 1 MHz   Sweep 16.72 ms (1201 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	10.362 GHz	-60.40 dBm
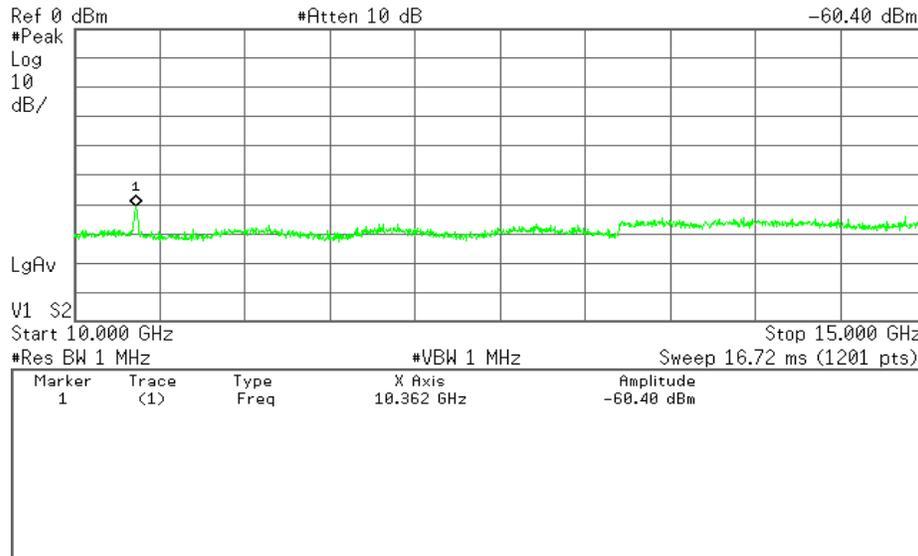
Tx1_SpuriousG4_Nom

Agilent 09:49:16 Aug 10, 2015   R L

                                                    Mkr1 15.542 GHz
Ref 0 dBm   #Atten 10 dB   -52.50 dBm
#Peak
Log
10
dB/

                    1

LgAv

V1 S2
Start 15.000 GHz   Stop 20.000 GHz
#Res BW 1 MHz   #VBW 1 MHz   Sweep 25.04 ms (1201 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	15.542 GHz	-52.50 dBm
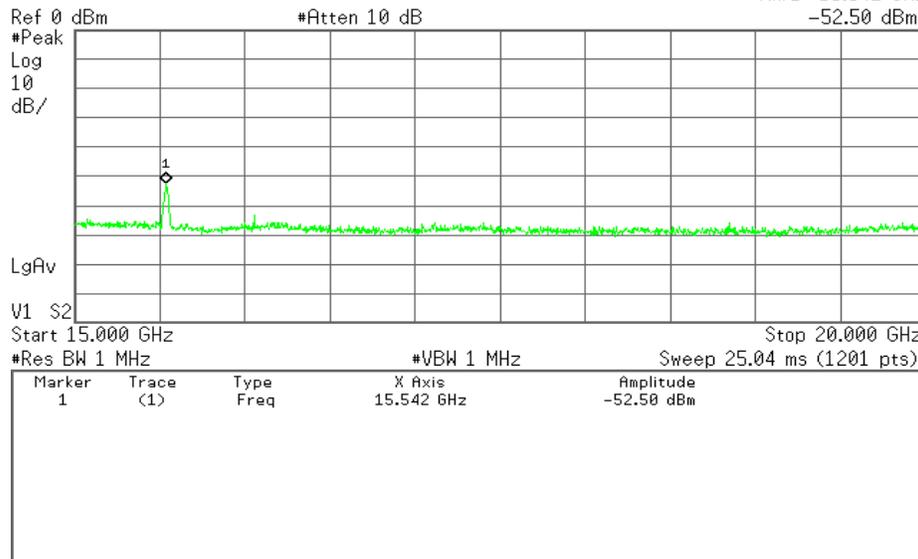
Tx1_SpuriousG5_Nom

Agilent 09:49:27 Aug 10, 2015   R L

                                                    Mkr1 24.960 GHz
Ref 0 dBm   #Atten 10 dB   -61.79 dBm
#Peak
Log
10
dB/

                                              1

LgAv

V1 S2
Start 20.000 GHz   Stop 26.000 GHz
#Res BW 1 MHz   #VBW 1 MHz   Sweep 30 ms (1201 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	24.960 GHz	-61.79 dBm
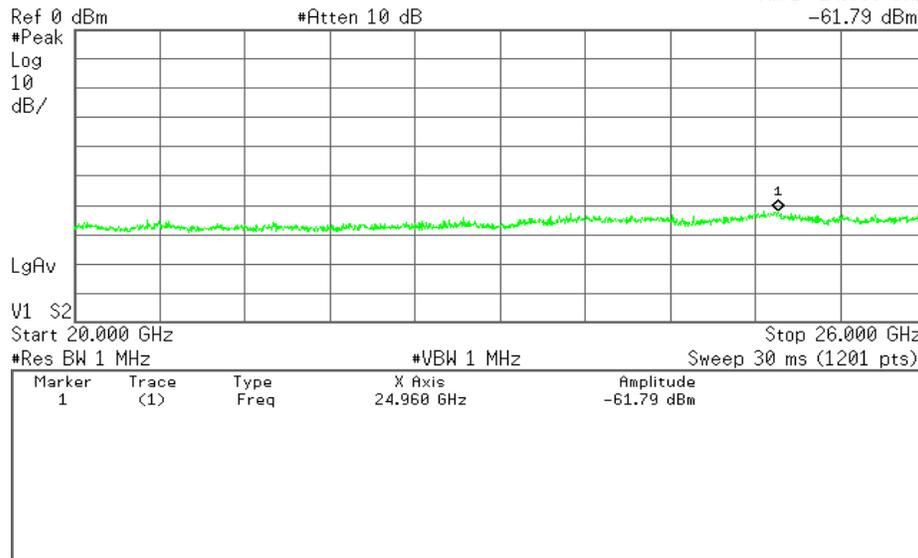
Tx2_SpuriousM_Nom

Agilent 09:57:48 Aug 10, 2015   R L

Mkr1 30.0 MHz

Ref 0 dBm   #Atten 10 dB   −65.04 dBm

#Peak
Log
10
dB/

LgAv

V1 S2

Start 30.0 MHz   Stop 1.000 0 GHz

#Res BW 1 MHz   #VBW 1 MHz   Sweep 1.68 ms (1201 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	30.0 MHz	−65.04 dBm
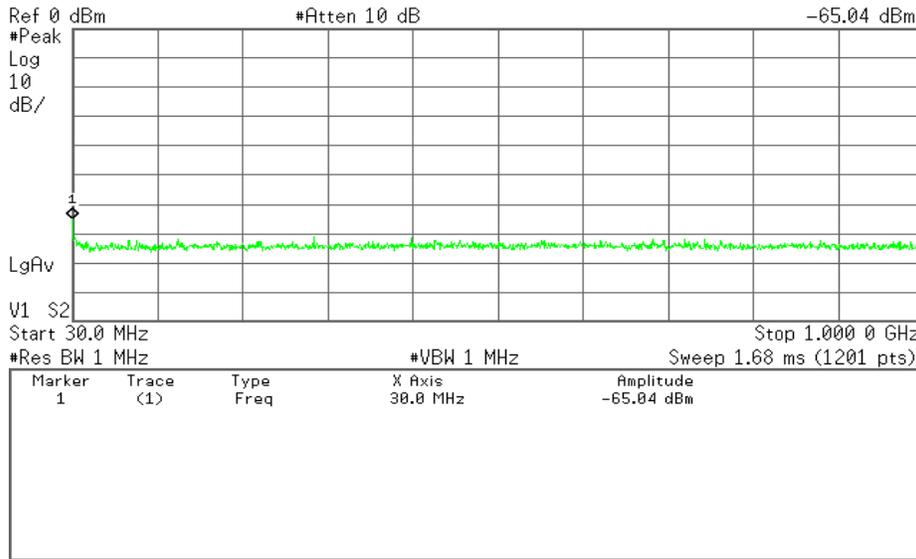
Tx2_SpuriousG1_Nom

Agilent 09:56:50 Aug 10, 2015   R L

Mkr1 4.993 GHz

Ref 0 dBm   #Atten 10 dB   −63.78 dBm

#Peak
Log
10
dB/

LgAv

V1 S2

Start 1.000 GHz   Stop 5.000 GHz

#Res BW 1 MHz   #VBW 1 MHz   Sweep 6.72 ms (1201 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	4.993 GHz	−63.78 dBm
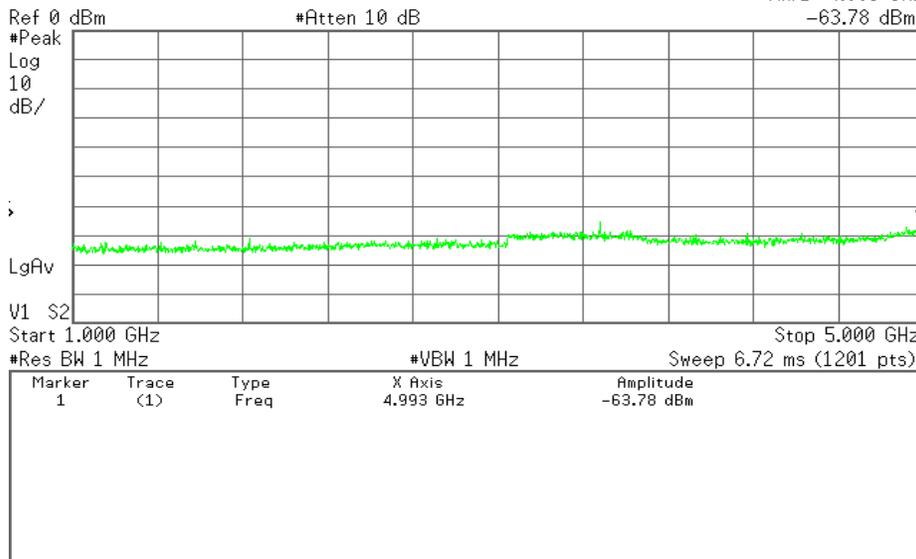
Tx2_SpuriousG2_Nom

☀ **Agilent** 09:57:02 Aug 10, 2015   R L

Mkr3 5.367 GHz

Ref 0 dBm   #Atten 10 dB   −64.73 dBm

#Peak
Log
10
dB/

LgAv

V1 S2

Start 5.000 GHz   Stop 10.000 GHz
#Res BW 1 MHz   #VBW 1 MHz   Sweep 8.4 ms (1201 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	5.220 GHz	−3.76 dBm
2	(1)	Freq	5.067 GHz	−61.17 dBm
3	(1)	Freq	5.367 GHz	−64.73 dBm
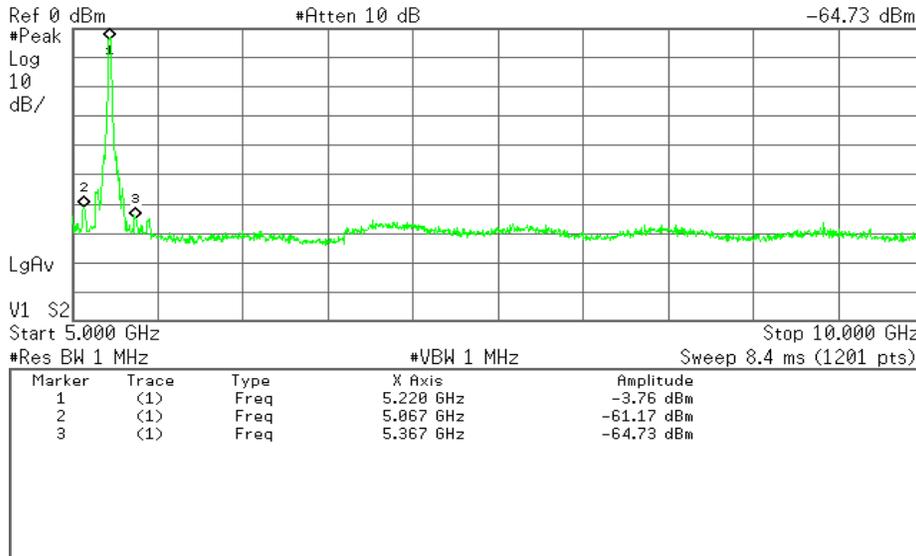
Tx2_SpuriousG3_Nom

☀ **Agilent** 09:57:13 Aug 10, 2015   R L

Mkr1 10.442 GHz

Ref 0 dBm   #Atten 10 dB   −59.20 dBm

#Peak
Log
10
dB/

LgAv

V1 S2

Start 10.000 GHz   Stop 15.000 GHz
#Res BW 1 MHz   #VBW 1 MHz   Sweep 16.72 ms (1201 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	10.442 GHz	−59.20 dBm
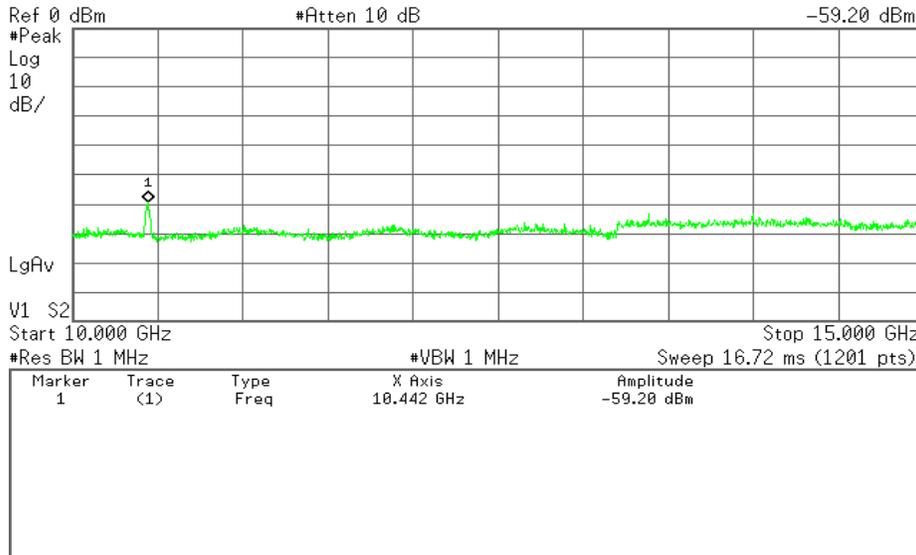
Tx2_SpuriousG4_Nom

✳ **Agilent** 09:57:24 Aug 10, 2015   R L

Mkr1 15.658 GHz

Ref 0 dBm   #Atten 10 dB   −51.76 dBm

#Peak
Log
10
dB/

1

LgAv

V1 S2
Start 15.000 GHz   Stop 20.000 GHz
#Res BW 1 MHz   #VBW 1 MHz   Sweep 25.04 ms (1201 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	15.658 GHz	−51.76 dBm
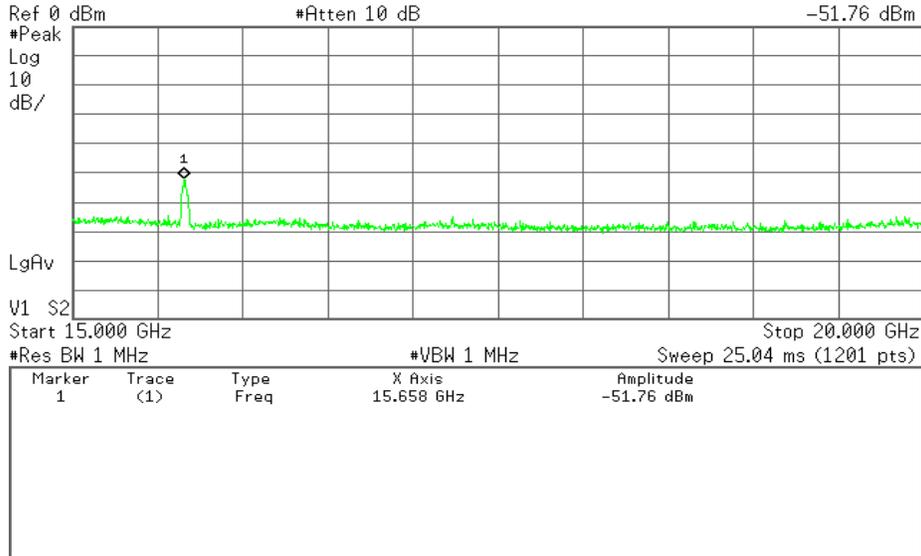
Tx2_SpuriousG5_Nom

✳ **Agilent** 09:57:36 Aug 10, 2015   R L

Mkr1 24.910 GHz

Ref 0 dBm   #Atten 10 dB   −61.95 dBm

#Peak
Log
10
dB/

1

LgAv

V1 S2
Start 20.000 GHz   Stop 26.000 GHz
#Res BW 1 MHz   #VBW 1 MHz   Sweep 30 ms (1201 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	24.910 GHz	−61.95 dBm
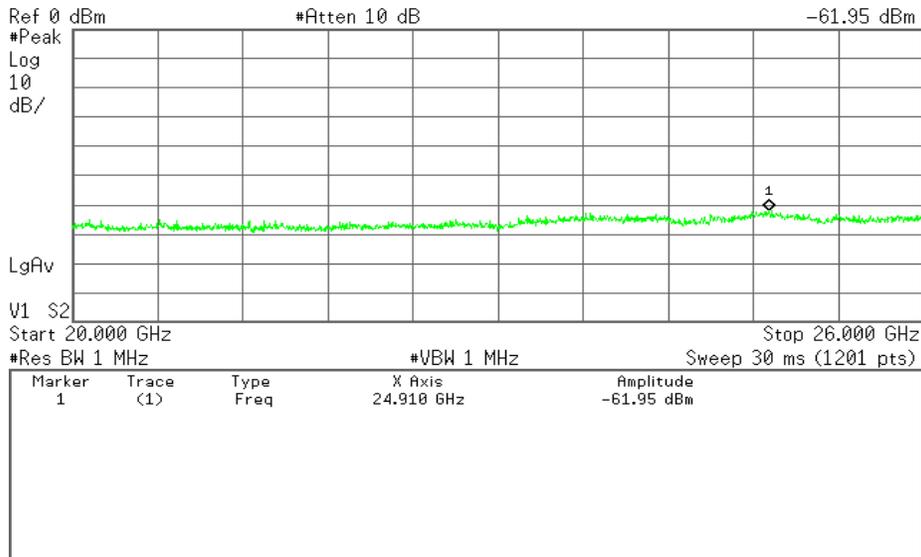
Tx3_SpuriousM_Nom
☀ **Agilent** 10:05:02 Aug 10, 2015   R L

Mkr1 823.0 MHz
Ref 0 dBm   #Atten 10 dB   −61.57 dBm
#Peak
Log
10
dB/

| | | | | | | | 1 | |
| | | | | | | | ◇ | |

LgAv

V1 S2
Start 30.0 MHz   Stop 1.000 0 GHz
#Res BW 1 MHz   #VBW 1 MHz   Sweep 1.68 ms (1201 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	823.0 MHz	−61.57 dBm
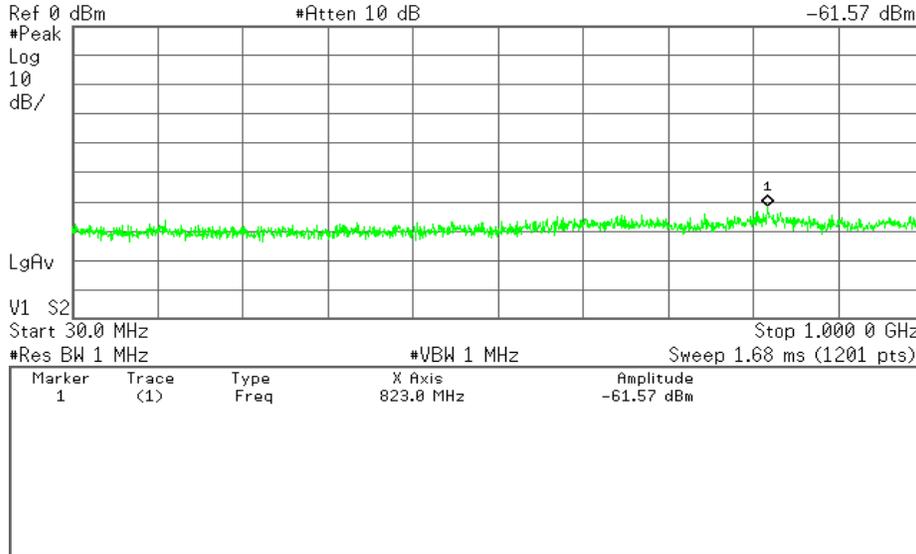
Tx3_SpuriousG1_Nom
☀ **Agilent** 10:04:05 Aug 10, 2015   R L

Mkr1 3.493 GHz
Ref 0 dBm   #Atten 10 dB   −65.43 dBm
#Peak
Log
10
dB/

LgAv

V1 S2
Start 1.000 GHz   Stop 5.000 GHz
#Res BW 1 MHz   #VBW 1 MHz   Sweep 6.72 ms (1201 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	3.493 GHz	−65.43 dBm
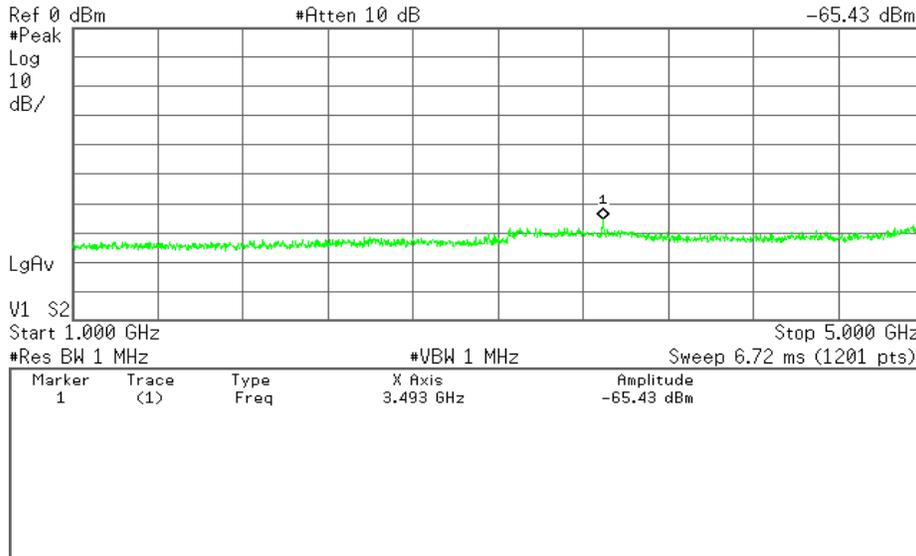
Tx3_SpuriousG2_Nom
✳ **Agilent** 10:04:16 Aug 10, 2015   R L

Mkr3 5.388 GHz
-64.07 dBm
Ref 0 dBm   #Atten 10 dB
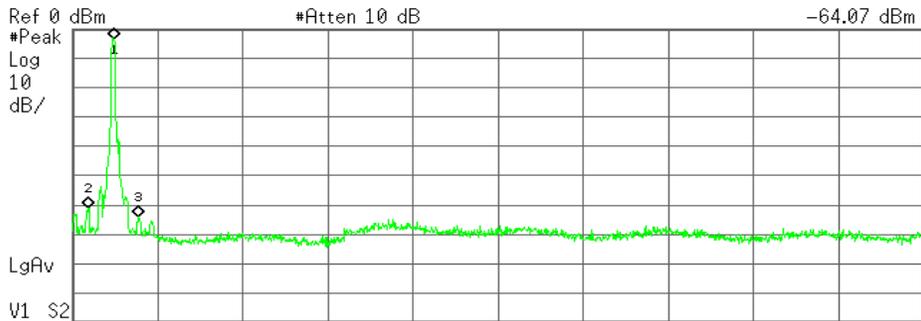
#Peak
Log
10
dB/

LgAv

V1 S2
Start 5.000 GHz   Stop 10.000 GHz
#Res BW 1 MHz   #VBW 1 MHz   Sweep 8.4 ms (1201 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	5.240 GHz	-3.27 dBm
2	(1)	Freq	5.096 GHz	-60.98 dBm
3	(1)	Freq	5.388 GHz	-64.07 dBm

Tx3_SpuriousG3_Nom
✳ **Agilent** 10:04:27 Aug 10, 2015   R L

Mkr1 10.475 GHz
-59.32 dBm
Ref 0 dBm   #Atten 10 dB
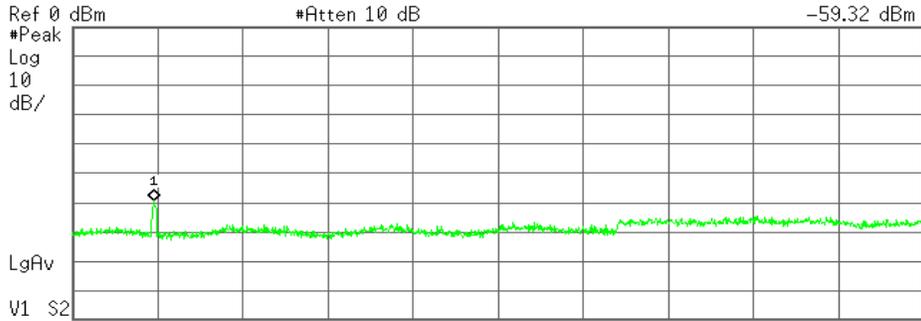
#Peak
Log
10
dB/

LgAv

V1 S2
Start 10.000 GHz   Stop 15.000 GHz
#Res BW 1 MHz   #VBW 1 MHz   Sweep 16.72 ms (1201 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	10.475 GHz	-59.32 dBm

Tx3_SpuriousG4_Nom

Agilent 10:04:39 Aug 10, 2015   R L

                                                          Mkr1 15.721 GHz
Ref 0 dBm   #Atten 10 dB   −54.85 dBm
#Peak
Log
10
dB/

                    1
                    ◇

LgAv

V1 S2
Start 15.000 GHz   Stop 20.000 GHz
#Res BW 1 MHz   #VBW 1 MHz   Sweep 25.04 ms (1201 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	15.721 GHz	−54.85 dBm
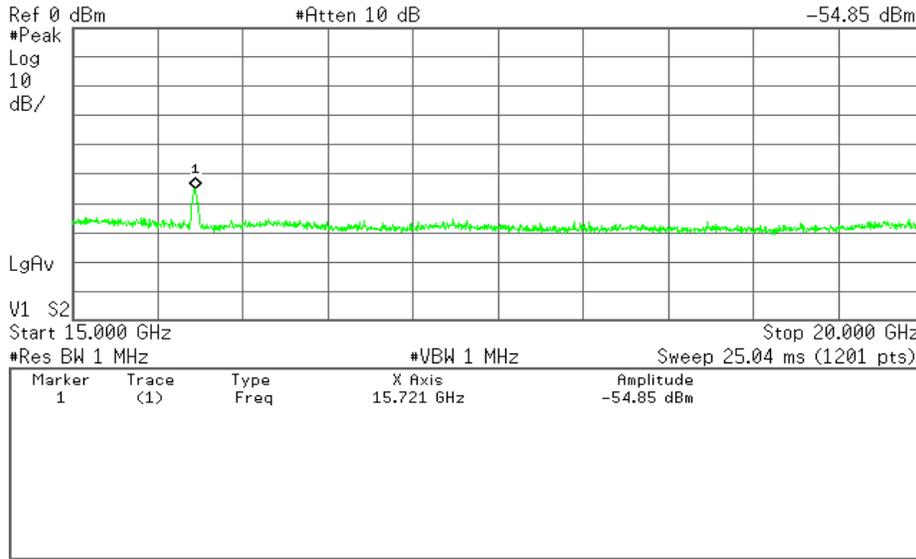
Tx3_SpuriousG5_Nom

Agilent 10:04:50 Aug 10, 2015   R L

                                                          Mkr1 25.020 GHz
Ref 0 dBm   #Atten 10 dB   −61.23 dBm
#Peak
Log
10
dB/

                                                    1
   ◇

LgAv

V1 S2
Start 20.000 GHz   Stop 26.000 GHz
#Res BW 1 MHz   #VBW 1 MHz   Sweep 30 ms (1201 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	25.020 GHz	−61.23 dBm
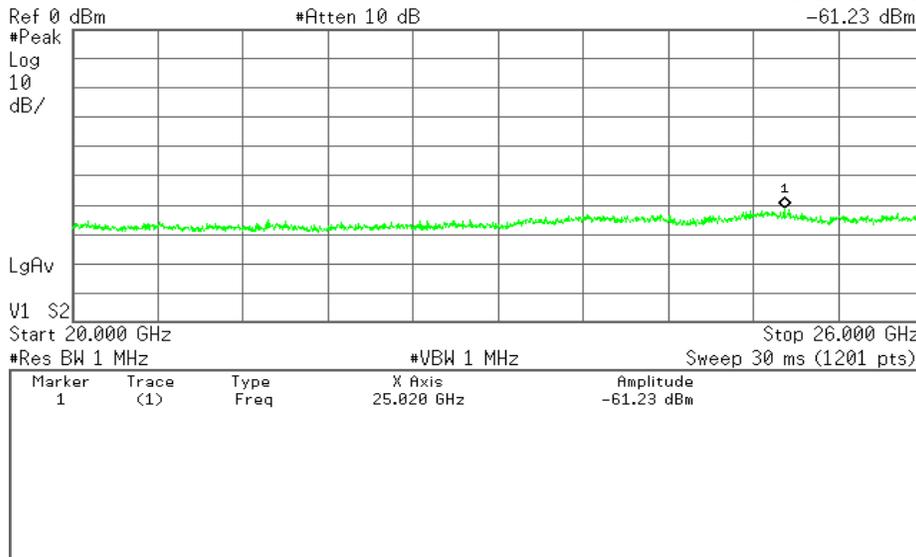
2.4. Output Power/ E.I.R.P

Job No.   12197499-E37V2

Remark1

Remark2

[DATA]

Voltage	Port No.	Freq.	Reading	Cable Loss	Atten. Loss	Burst Rate	Output Power (A)	Antenna Gain	E.I.R.P. (A)
		[MHz]	[dBm]	[dB]	[dB]		[W/MHz]	[dBi]	[W/MHz]
DC5V	0	5180	-8.41	1.00	10.00	1.00	0.001821	4.00	0.004574
		5220	-7.01	1.00	10.00	1.00	0.002514	4.00	0.006314
		5240	-9.09	1.00	10.00	1.00	0.001556	4.00	0.003908
DC5V	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-
DC5V	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-
DC5V	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-

Sample Calculation :

Output Power (A) = {Reading + Cable Loss + Atten. Loss} * Burst Rate

E.I.R.P. (A) = Output Power (A) * 10^(Antenna Gain[dBi]/10)

[Total Power / Result and Limit]

Voltage	Freq.	Output Power				E.I.R.P.	
		Result (B)	Tolerance Result	Limit	Tolerance Limit	Result (B)	Limit
	[MHz]	[W/MHz]	[%]	[W/MHz]	[%]	[W/MHz]	[W/MHz]
DC5V	5180	0.001821	-35.1	0.010000	+20 ～ -80	0.004574	0.010000
	5220	0.002514	-10.4	0.010000	+20 ～ -80	0.006314	0.010000
	5240	0.001556	-44.5	0.010000	+20 ～ -80	0.003908	0.010000

Sample Calculation :

Tolerance = Output Power Result (B) / Declared Output Power * 100 - 100.

Output Power Result (B) : Sum of all "Output Power (A)" at same Freq.

E.I.R.P. Result (B): Sum of all "E.I.R.P. (A)" at same Freq.

[Declared Output Power]

|					
Average of Output Power Result (B)	0.001964	W/MHz	Average of E.I.R.P. Result(B)	0.004932	W/MHz
Declared Output Power	0.002805	W/MHz	E.I.R.P. for Declared Output Power	0.007046	W/MHz
+20	0.003366	W/MHz			
Middle (Declared Output Power -30%)	0.001964	W/MHz			
-80	0.000561	W/MHz			

Sample Calculation :

E.I.R.P. for Declared Output Power

= Average of E.I.R.P. Result (B) * (Declared Output Power / Average of Output Power Result (B))

Tx1_Power_Chain0_Nom

✳ **Agilent** 16:07:54 May 4, 2018   R L

Ref 10 dBm   #Atten 20 dB
#Samp
Log
10
dB/

#PAvg

W1 S2
Center 5.181 750 GHz   Span 10 MHz
#Res BW 30 kHz   #VBW 300 kHz   Sweep 32.48 ms (1201 pts)
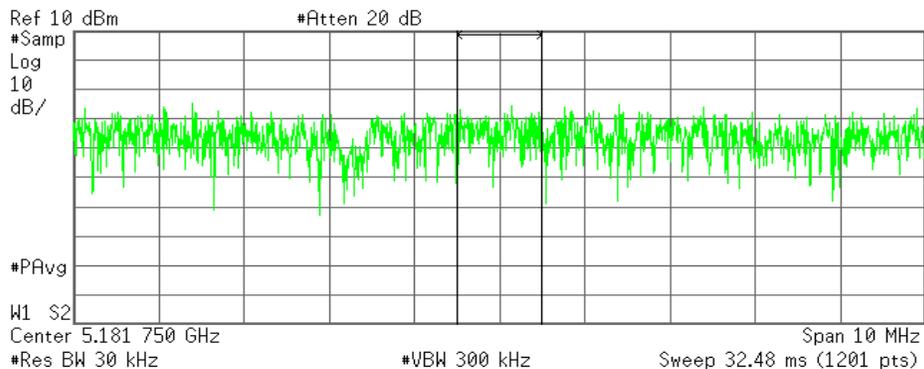
Channel Power   **Power Spectral Density**

−8.41 dBm   /1.0000 MHz   −68.41 dBm/Hz

Tx2_Power_Chain0_Nom

✳ **Agilent** 12:00:29 May 4, 2018   R L

Ref 10 dBm   #Atten 20 dB
#Samp
Log
10
dB/

#PAvg

W1 S2
Center 5.222 300 GHz   Span 10 MHz
#Res BW 30 kHz   #VBW 300 kHz   Sweep 32.48 ms (1201 pts)
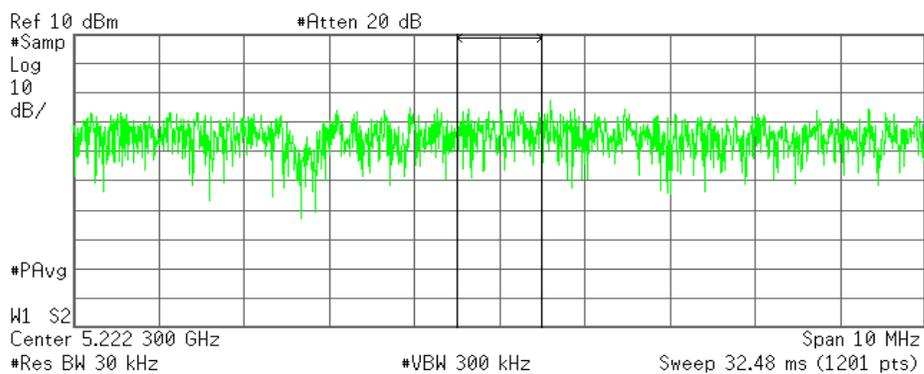
Channel Power   **Power Spectral Density**

−7.01 dBm   /1.0000 MHz   −67.01 dBm/Hz

Tx3_Power_Chain0_Nom

Ref 10 dBm   #Atten 20 dB
#Samp
Log
10
dB/

#PAvg

W1 S2
Center 5.242 000 GHz   Span 10 MHz
#Res BW 30 kHz   #VBW 300 kHz   Sweep 32.48 ms (1201 pts)
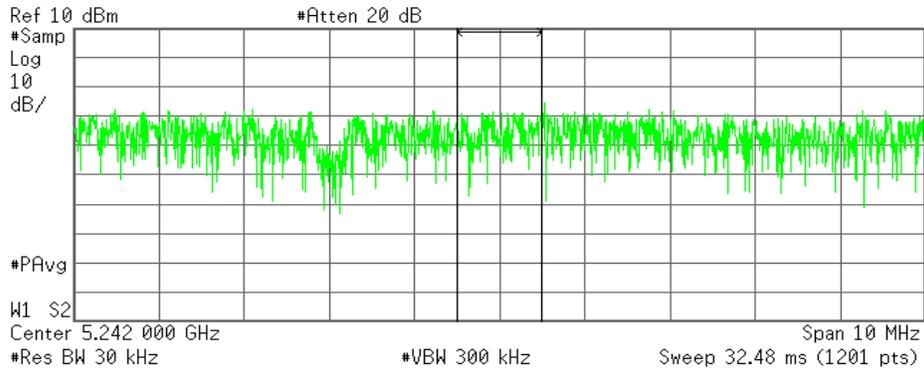
Channel Power   **Power Spectral Density**

−9.09 dBm   /1.0000 MHz   −69.09 dBm/Hz

2.5.Secondary Radiated Emission Strength(Normal Voltage)

Job No.   12197499-E37V2
Remark1
Remark2

[DATA]

Voltage	Freq.	Freq.	S/A Reading	Cable Loss	Atten. Loss	Result	Result	Limit	Remark
[V]	[MHz]	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[nW]	[nW]	
DC5V	5220	74.5	-80.58	4.10	10.00	-66.48	0.225	4.000	♦9
		3493.0	-71.55	4.10	10.00	-57.45	1.800	20.000	♦10
		6988.0	-75.89	4.10	10.00	-61.79	0.663	20.000	♦10
		13275.0	-74.15	4.10	10.00	-60.05	0.990	20.000	♦10
		15017.0	-74.29	4.10	10.00	-60.19	0.958	20.000	♦10
		24850.0	-71.71	4.10	10.00	-57.61	1.736	20.000	♦10

Sample Calculation :

Result = Reading + Cable Loss

♦9:Freq Range9 (< 1GHz)

♦10:Freq Range10 (≥ 1GHz)

Rx1_SpuriousM_Nom
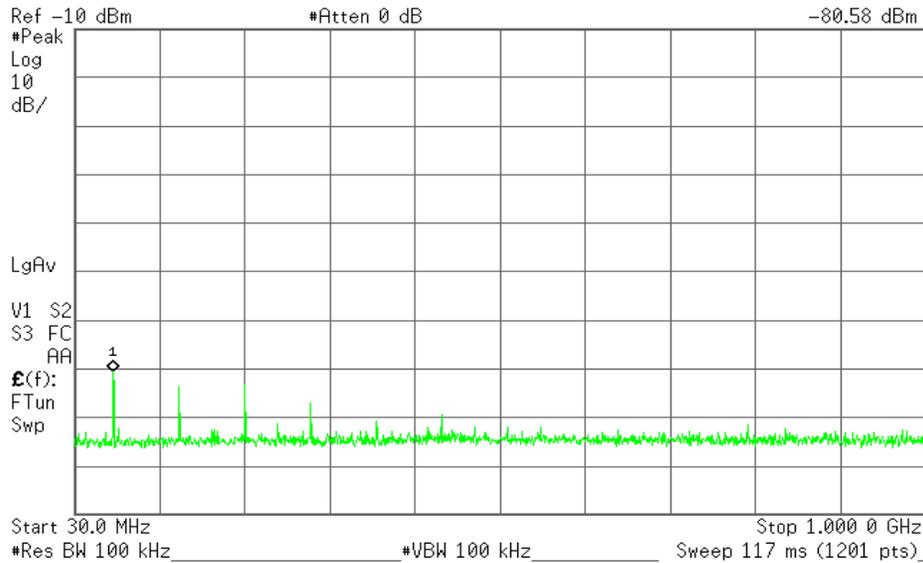
Rx1_SpuriousG1_Nom

※ **Agilent** 10:07:50 Aug 10, 2015   **R L**

                                                        Mkr1 3.493 GHz
Ref −10 dBm   #Atten 0 dB   −71.55 dBm
#Peak
Log
10
dB/

LgAv

V1 S2
S3 FC
    AA
£(f):
FTun
Swp

Start 1.000 GHz   Stop 5.000 GHz
#Res BW 1 MHz_____#VBW 1 MHz_____Sweep 6.72 ms (1201 pts)_
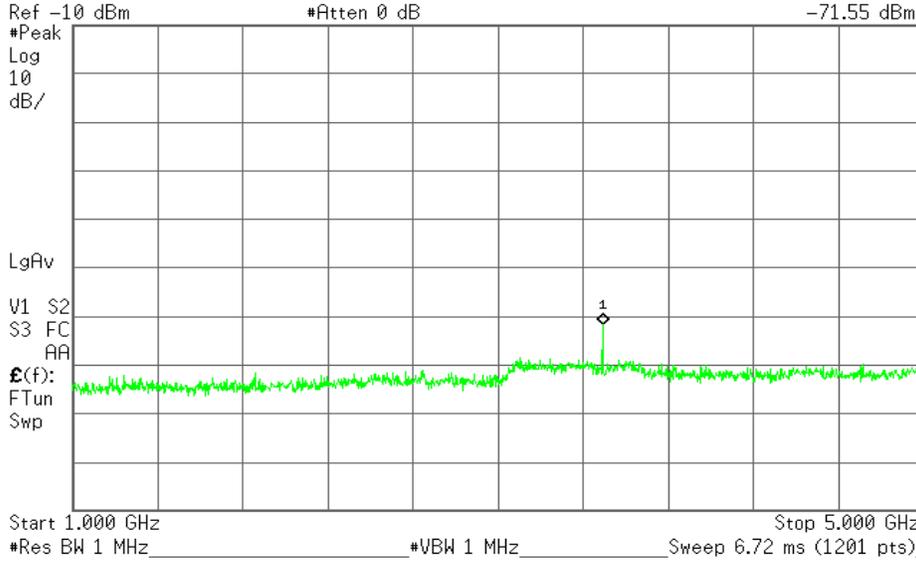
Rx1_SpuriousG2_Nom

※ **Agilent** 10:08:01 Aug 10, 2015   **R L**

                                                        Mkr1 6.988 GHz
Ref −10 dBm   #Atten 0 dB   −75.89 dBm
#Peak
Log
10
dB/

LgAv

V1 S2
S3 FC
    AA
£(f):
FTun
Swp

Start 5.000 GHz   Stop 10.000 GHz
#Res BW 1 MHz_____#VBW 1 MHz_____Sweep 8.4 ms (1201 pts)_
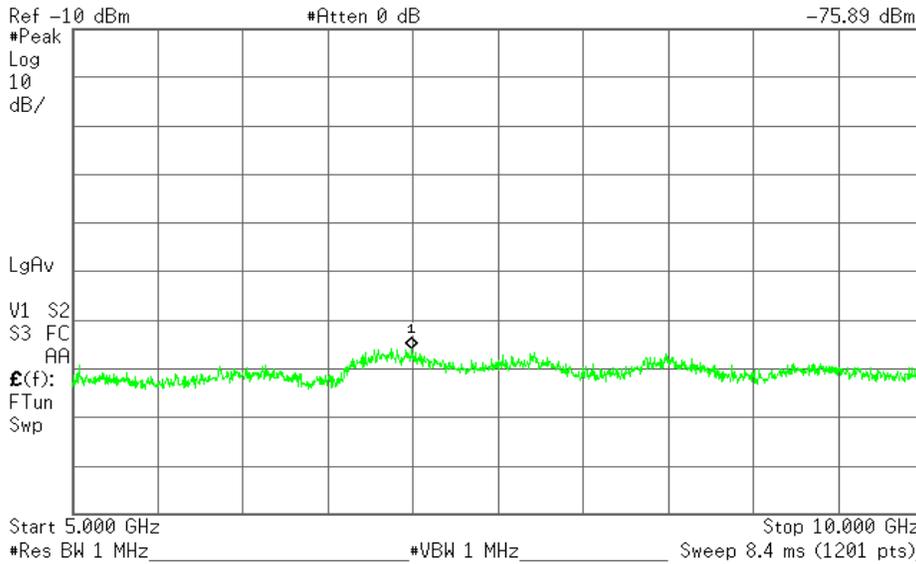
Rx1_SpuriousG3_Nom

※ **Agilent** 10:08:12 Aug 10, 2015   R L

                                                     Mkr1 13.275 GHz

Ref −10 dBm   #Atten 0 dB   −74.14 dBm

#Peak
Log
10
dB/

LgAv

V1 S2
S3 FC
   AA
£(f):
FTun
Swp

Start 10.000 GHz   Stop 15.000 GHz

#Res BW 1 MHz_____#VBW 1 MHz_____Sweep 16.72 ms (1201 pts)_
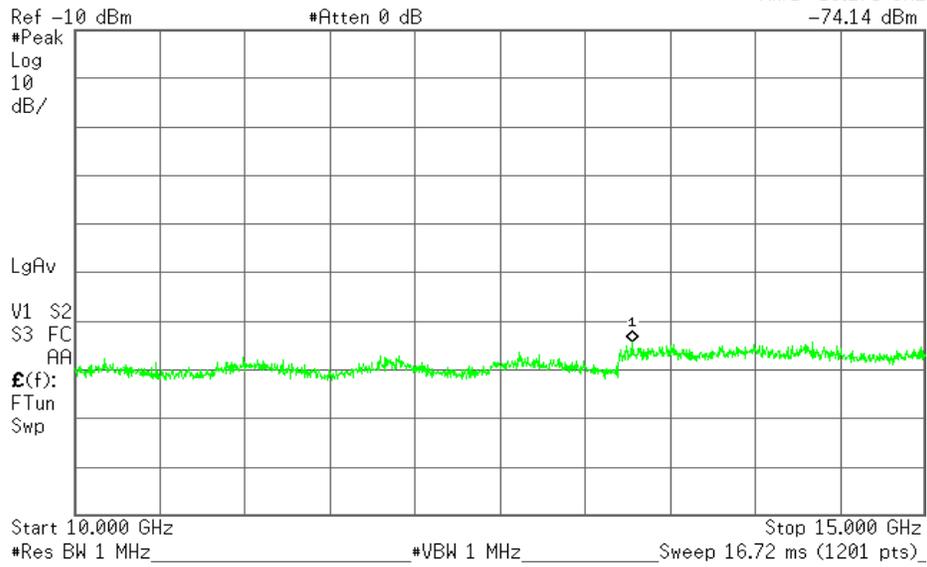
Rx1_SpuriousG4_Nom

※ **Agilent** 10:08:24 Aug 10, 2015   R L

                                                     Mkr1 15.017 GHz

Ref −10 dBm   #Atten 0 dB   −74.29 dBm

#Peak
Log
10
dB/

LgAv

V1 S2
S3 FC
   AA
£(f):
FTun
Swp

Start 15.000 GHz   Stop 20.000 GHz

#Res BW 1 MHz_____#VBW 1 MHz_____Sweep 25.04 ms (1201 pts)_
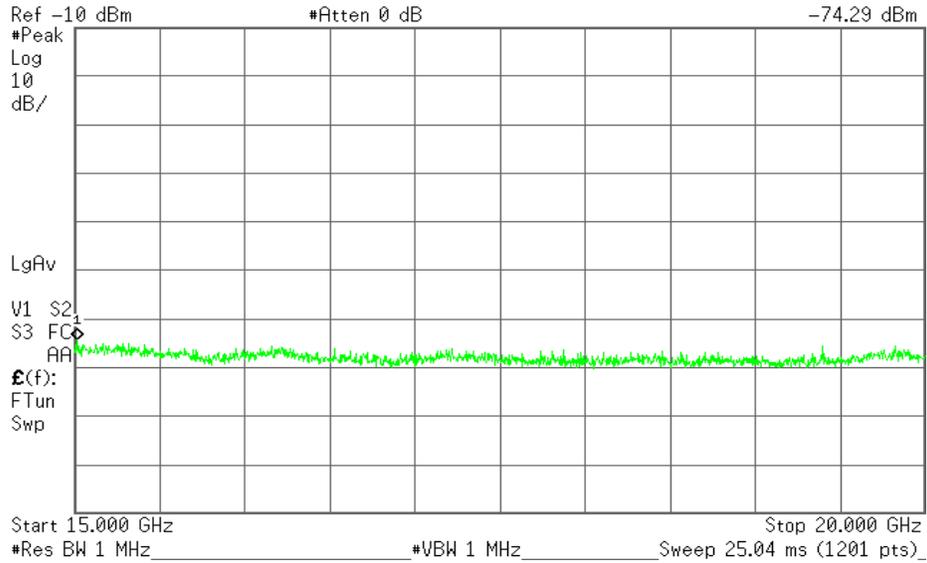
Rx1_SpuriousG5_Nom

R L

Mkr1 24.850 GHz
−71.71 dBm

Ref −10 dBm   #Atten 0 dB

#Peak
Log
10
dB/

LgAv

V1 S2
S3 FC
AA
£(f):
FTun
Swp

Start 20.000 GHz   Stop 26.000 GHz
#Res BW 1 MHz_____#VBW 1 MHz_____ Sweep 30 ms (1201 pts)_
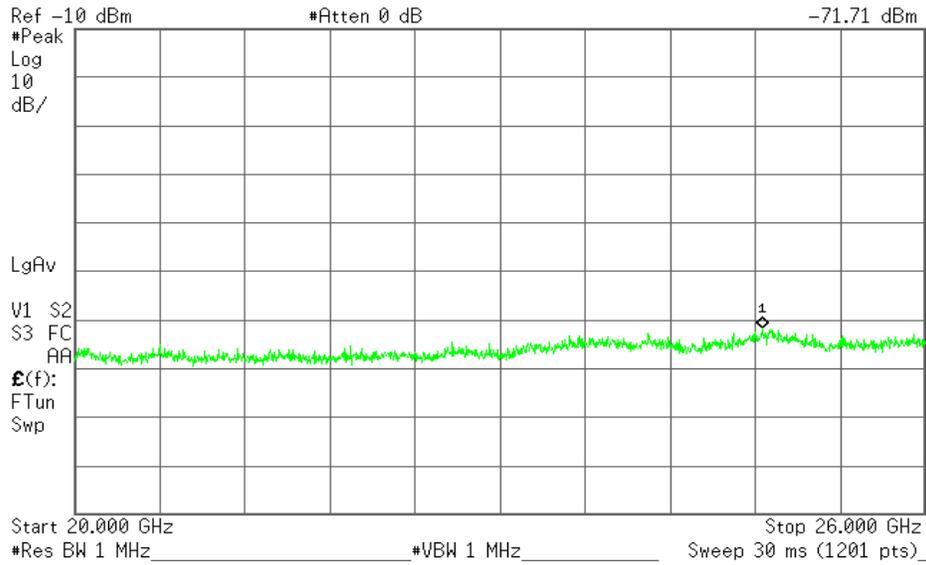
2.6. Burst Length / Duty

Job No.	12197499-E37V2
Remark1	
Remark2	

[DATA]

Voltage	Freq.	On Time	Period	Result (Duty)	Result (Burst Rate)	Limit
[V]	[MHz]	[msec]	[msec]	[%]		[msec]
DC5V	5220	3.125	3.133	99.7	1.003	4

Sample Calculation :

Result(Duty) = On Time / Period * 100

Result(Burst Rate) = Period / On Time

Tx2_Duty_Nom

Marker	Trace	Type	X Axis	Amplitude
1R	(1)	Time	1.138 ms	-69.97 dBm
1Δ	(1)	Time	3.125 ms	3.34 dB
2R	(1)	Time	1.138 ms	-69.97 dBm
2Δ	(1)	Time	3.133 ms	4.46 dB
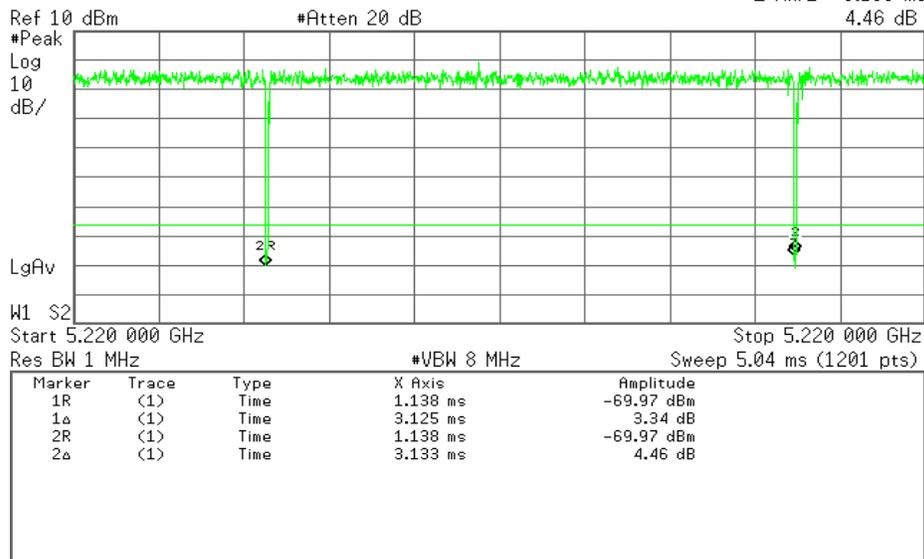
2.7. Adjacent Channel Power

Job No.	12197499-E37V2	
Remark1	Chain 0	
Remark2		

[DATA]

Voltage	Freq.	Separation	Lower Side Result	Upper Side Result	Limit	Remark
[V]	[MHz]	[MHz]	[dBc]	[dBc]	[dBc]	
DC5V	5180	20	-38.27	-38.12	-25.00	
		40	-52.18	-52.55	-40.00	
	5220	20	-35.19	-35.86	-25.00	
		40	-49.66	-48.86	-40.00	
	5240	20	-40.91	-39.29	-25.00	
		40	-53.20	-53.00	-40.00	

Tx1_ACP_Chain0_Nom

❄ **Agilent** 09:50:36 Aug 10, 2015   **R L**

Ref 10 dBm   #Atten 20 dB
#Samp
Log
10
dB/

#PAvg
100
W1 S2
Start 5.130 00 GHz   Stop 5.230 00 GHz
#Res BW 300 kHz   #VBW 300 kHz   Sweep 4.24 ms (1201 pts)

RMS Results Freq Offset   Ref BW   dBc Lower dBm   dBc Upper dBm
Carrier Power   20.00 MHz   19.00 MHz -38.27   -38.03 -38.12   -37.89
  0.24 dBm /   40.00 MHz   19.00 MHz -52.18   -51.95 -52.55   -52.31
19.0000 MHz
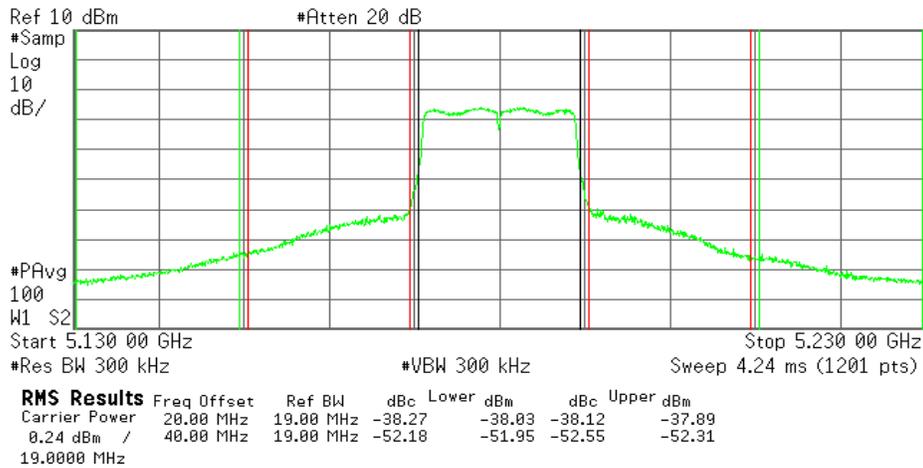
Tx2_ACP_Chain0_Nom
✳ **Agilent** 09:59:00 Aug 10, 2015   **R L**

Ref 10 dBm   #Atten 20 dB
#Samp
Log
10
dB/

#PAvg
100
W1 S2
Start 5.170 00 GHz   Stop 5.270 00 GHz
#Res BW 300 kHz   #VBW 300 kHz   Sweep 4.24 ms (1201 pts)

RMS Results Freq Offset   Ref BW   dBc Lower dBm   dBc Upper dBm
Carrier Power 20.00 MHz   19.00 MHz -35.19   -34.08 -35.86   -34.75
 1.11 dBm /   40.00 MHz   19.00 MHz -49.66   -48.55 -48.86   -47.75
19.0000 MHz
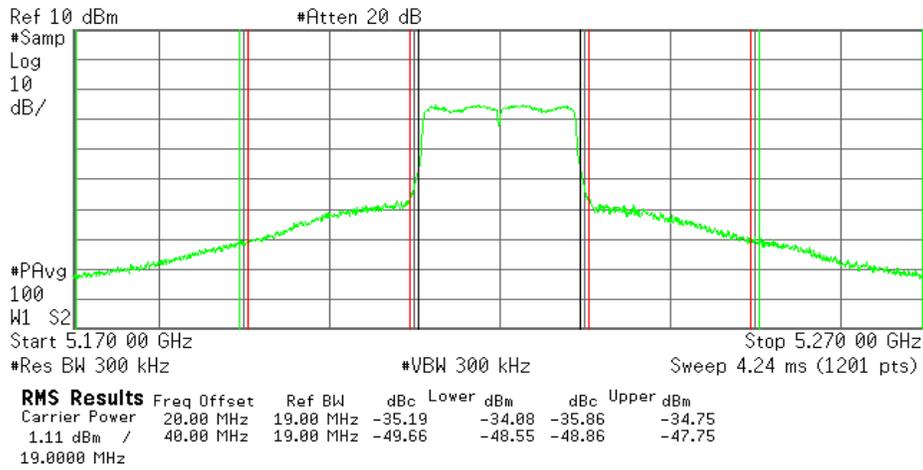
Tx3_ACP_Chain0_Nom
✳ **Agilent** 10:30:05 Aug 10, 2015   **R L**

Ref 10 dBm   #Atten 20 dB
#Samp
Log
10
dB/

#PAvg
100
W1 S2
Start 5.190 00 GHz   Stop 5.290 00 GHz
#Res BW 300 kHz   #VBW 300 kHz   Sweep 4.24 ms (1201 pts)

RMS Results Freq Offset   Ref BW   dBc Lower dBm   dBc Upper dBm
Carrier Power 20.00 MHz   19.00 MHz -40.91   -41.40 -39.29   -39.78
-0.49 dBm /   40.00 MHz   19.00 MHz -53.20   -53.69 -53.00   -53.49
19.0000 MHz
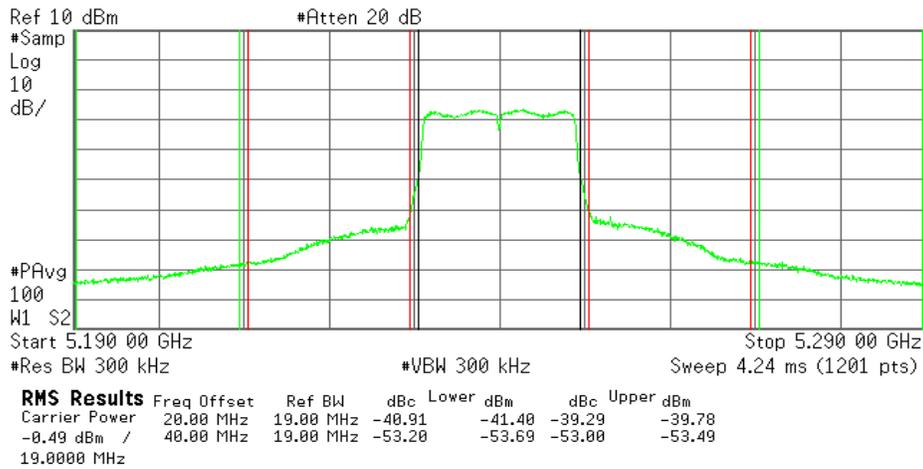
2.8.Outband Leakage Power Strength (Normal Voltage)

Job No.   12197499-E37V2

Remark1
Remark2

[DATA]

Voltage	Freq.	Freq.	S/A Reading	Cable Loss	Atten. Loss	Antenna Gain	Result	Result	Limit	Remark
[V]	[MHz]	[MHz]	[dBm]	[dB]	[dB]	[dBi]	[dBm]	[uW/MHz]	[uW/MHz]	
DC5V	5180	5140.83	-49.19	1.00	10.00	4.00	-34.19	0.381	2.500	♦3
		5148.13	-44.16	1.00	10.00	4.00	-29.16	1.213	15.000	♦4
	5240	5250.00	-16.26	1.00	10.00	4.00	-1.26	748.170	1000.000	♦5
		5259.99	-52.79	1.00	10.00	4.00	-37.79	0.166	15.898	♦6
		5266.69	-60.70	1.00	10.00	4.00	-45.70	0.027	2.496	♦7
		5268.99	-61.55	1.00	10.00	4.00	-46.55	0.022	2.500	♦8

Sample Calculation :

Result = Reading + Cable Loss + Attenuator+Antenna Gain

♦3:Freq Range3 ($\geq$ 5,135MHz, $\leq$ 5,142MHz)

♦4:Freq Range4 (> 5,142MHz, $\leq$ 5,150MHz)

♦5:Freq Range5 ($\geq$ 5,250MH z , < 5,251MHz)

♦6:Freq Range6 ($\geq$ 5,251MHz, < 5,260MHz)

♦7:Freq Range7 ($\geq$ 5,260MHz, < 5,266.7MHz)

♦8:Freq Range8 ($\geq$ 5,266.7MHz, $\leq$ 5,365MHz)

Tx1_Leak2_Nom

❄ **Agilent** 11:03:50 May 4, 2018   **R L**

Mkr1 5.148 133 GHz

Ref −10 dBm   #Atten 0 dB   −44.16 dBm
#Peak
Log
10
dB/

LgAv

V1 S2
S3 FS
    AA
£(f):
FTun
Swp

Start 5.142 000 GHz   Stop 5.150 000 GHz
#Res BW 1 MHz   #VBW 1 MHz   #Sweep 2.5 s (601 pts)
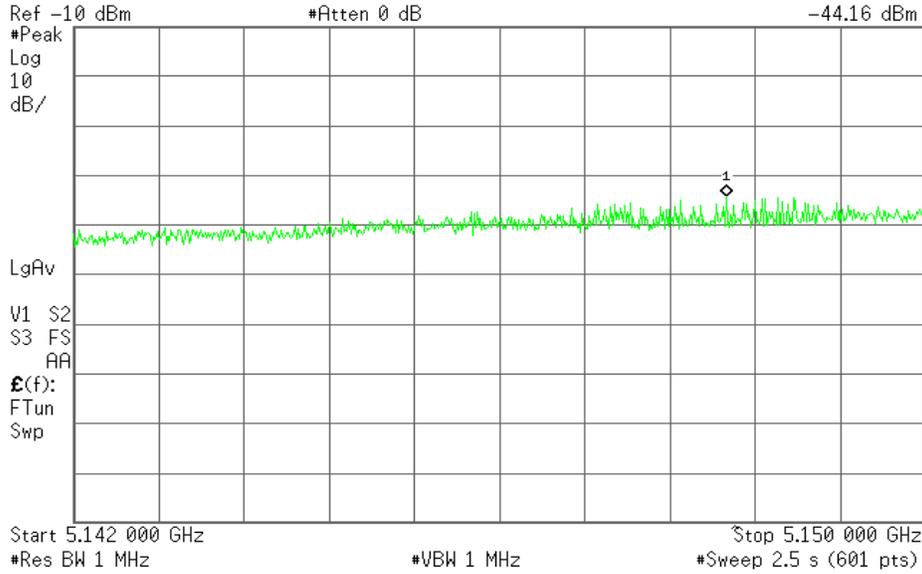
Tx3_Leak3_Nom

❄ **Agilent** 14:53:57 May 2, 2018   **R L**

Mkr1 5.250 000 0 GHz

Ref 0 dBm   #Atten 10 dB   −18.38 dBm
#Peak
Log
10
dB/

LgAv

V1 S2
S3 FS
    AA
£(f):
FTun
Swp

Start 5.250 000 0 GHz   Stop 5.251 000 0 GHz
#Res BW 1 MHz   #VBW 1 MHz   #Sweep 2.5 s (601 pts)

Tx3_Leak4_Nom

APv8.2(032118),39005, Conducted B

L

Mkr1   890 µs

Ref −10 dBm   #Atten 0 dB   −52.795 dBm

#Samp
Log
10
dB/

LgAv
100
W1 S2
S3 FS
    AA
£(f):
FTun
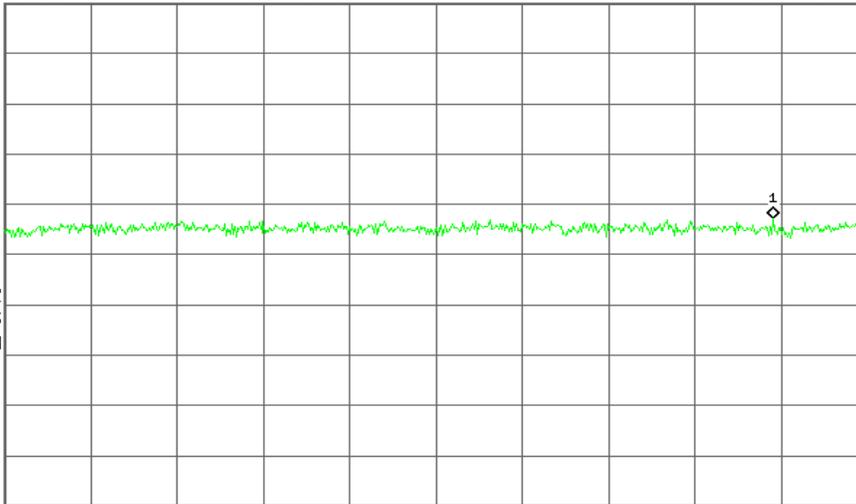
Center 5.259 985 GHz   Span 0 Hz
Res BW 1 MHz   #VBW 1 MHz   Sweep 1 ms (601 pts)

Tx3_Leak5_Nom

APv8.2(032118),39005, Conducted B

L

Mkr1   846.7 µs

Ref −10 dBm   #Atten 0 dB   −60.701 dBm

#Samp
Log
10
dB/

LgAv
100
W1 S2
S3 FS
    AA
£(f):
FTun
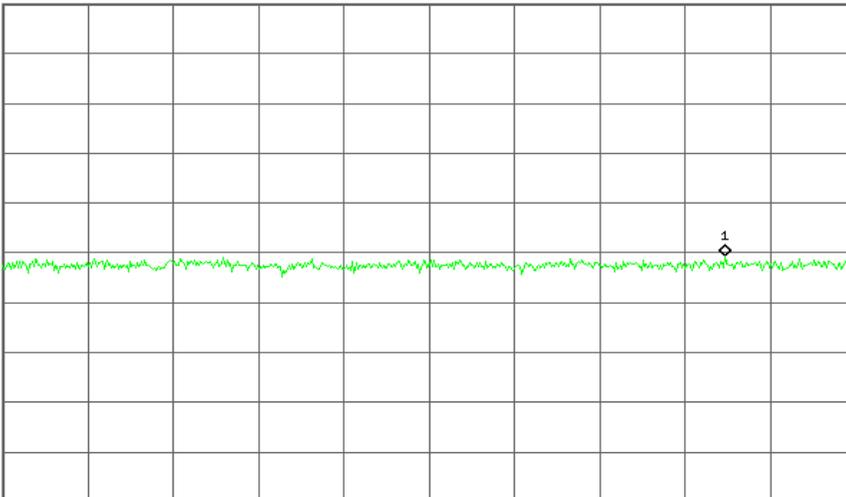
Center 5.266 689 GHz   Span 0 Hz
Res BW 1 MHz   #VBW 1 MHz   Sweep 1 ms (601 pts)

Tx3_Leak6_Nom

❄ **Agilent** 11:56:26 May 4, 2018   **L**

APv8.2(032118),39005, Conducted B   Mkr1   316.7 μs:

Ref 0 dBm   #Atten 10 dB   −61.556 dBm

#Samp
Log
10
dB/

LgAv
100
W1 S2
S3 FS
AA

£(f):
FTun
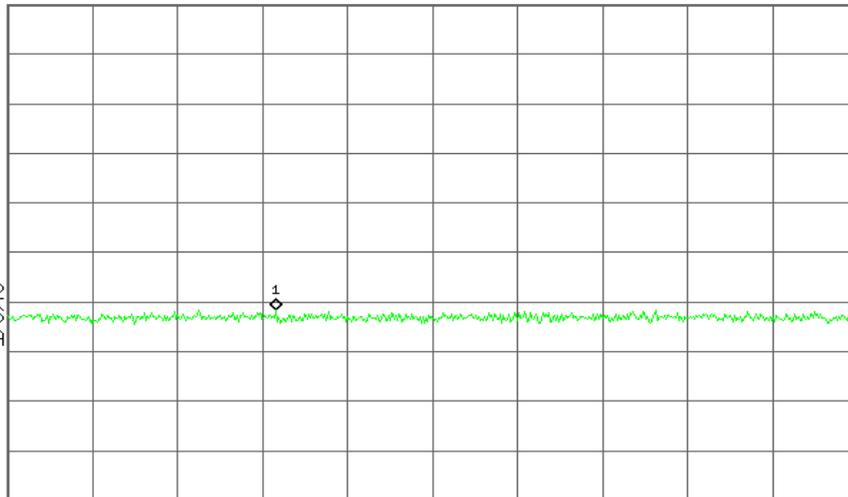
Center 5.268 987 GHz   Span 0 Hz
Res BW 1 MHz   #VBW 1 MHz   Sweep 1 ms (601 pts)

Average Power

[DATA]

Voltage	Port No.	Freq.	Reading	Cable Loss	Atten. Loss	Burst Rate	Output Power Result
		[MHz]	[dBm]	[dB]	[dB]		[dBm]
DC5V	0	5180	3.33	1.00	10.00	1.00	14.34
		5220	4.36	1.00	10.00	1.00	15.37
		5240	2.33	1.00	10.00	1.00	13.34
DC5V	-	-		-	-	-	-
		-		-	-	-	-
		-		-	-	-	-
DC5V	-	-		-	-	-	-
		-		-	-	-	-
		-		-	-	-	-
DC5V	-	-		-	-	-	-
		-		-	-	-	-
		-		-	-	-	-

Total Output Power

Voltage	Freq. [MHz]	Power [mW]
DC5V	5180	27.17
	5220	34.44
	5240	21.58

3. Measurement Equipment

| Use	Int. No.	Kind of Equipment	Model No.	Manufacturer	Serial No.	Calibration Authority	Calibration Date
X	T146	Spectrum Analyzer	E4446A	Agilent	MY53322020	Keysight	2/3/2018
X	T1268	Power Meter	N1911A	Keysight	MY55196017	Keysight	6/15/2017
X	T1226	Power Sensor	N1921A	Keysight	MY55200004	Keysight	8/30/2017
X	T1829	Hygro-Thermometer	14-650-118	Control Company	170024385	Control Company	1/11/2018

Note :   1.   The calibration of measurement equipment is valid for a one year period.
        2.   "X" used equipment.
        3   Calibrated per ISO/IEC 17025

4. Test Condition

Test Item	Date	Temp	Hum	Engineer	Test Room
Frequency Tolerance	8/10/2015	21.9	50	C. Susa	Temp Room B
Occupied Bandwidth	8/10/2015	21.9	50	C. Susa	Temp Room B
Unwanted Emission Strength	8/10/2015	21.9	50	C. Susa	Temp Room B
Output Power/ E.I.R.P	5/4/2018	22.6	50	Steven Tran	Temp Room A
Secondary Radiated Emission Strength	8/10/2015	21.9	50	C. Susa	Temp Room B
Burst Length / Duty	6/29/2018	21.9	47	Steven Tran	Temp Room A
Adjacent Channel Power	8/10/2015	21.9	50	C. Susa	Temp Room B
Outband Leakage Power Strength	5/4/2018	22.6	50	Steven Tran	Temp Room A
Average Power	5/4/2018	22.6	50	Steven Tran	Temp Room A

5. TEST CONFIGURATION

TEST CirCuit

PHOTO