TEST REPORT

Report Number: 102403390MIN-001
Project Number: G102403390

Testing performed on the model
400

to
FCC ID: EOA-CM
Industry Canada ID: 6903A-CM
to
47 CFR Part 15.247:2015
RSS- 247, Issue 1, 2015
RSS-Gen, Issue 4, 2014
47 CFR, Part 15:2015, §15.107 and §15.109, Class / ICES-003, Issue 5:2012

For
Starkey Laboratories, Inc.

Test Performed by:
Intertek Testing Services NA, Inc.
7250 Hudson Blvd., Suite 100
Oakdale, MN 55128 USA

Test Authorized by:
Starkey Laboratories, Inc.
6700 Washington Avenue South
Eden Prairie, MN 55344, USA

Prepared by: _____
Simon Khazon

Reviewed by: _____ Date of issue: December 28, 2015
Norman Shpilsher

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1.0 GENERAL DESCRIPTION

Model:	400
Type of EUT:	Companion Microphone
Serial Number:	15977033 and 15977034
FCC ID:	EOA-CM
Industry Canada ID:	6903A-CM
Related Submittal(s) Grants:	None
Company:	Starkey Laboratories, Inc.
Customer:	Mr. Bill Mitchell
Address:	6700 Washington Avenue South Eden Prairie, MN 55344, USA
Phone:	952-918-5683
e-mail:	bill_mitchell@starkey.com
Test Standards:	☒ 47 CFR, Part 15:2015, §15.247 ☒ RSS–247, Issue 1, 2015 ☒ RSS-Gen, Issue 4, 2014 ☒ 47 CFR, Part 15:2015, §15.107 and §15.109, Class B ☒ ICES-003, Issue 5:2012 ☐ Other
Type of radio:	☐ Stand -alone ☐ Module ☐ Hybrid
Date Sample Submitted:	December 7, 2015
Test Work Started:	December 7, 2015
Test Work Completed:	December 18, 2015
Test Sample Conditions:	☐ Damaged ☐Poor (Usable) ☒ Good

1.1 Product Description; Test Facility

Product Description:	Transceiver
Transmitter Type:	☐ FHSS ☒ Digital Modulation ☐ WiFi ☐ Blue Tooth
Operating Frequency Range(s):	From 907.492MHz to 922.055MHz
Number of Channels:	43
Modulation:	GMSK
Emissions Designator:	508KF1D
Antenna(s) Info:	The integral antenna (trace of the Printed Circuit Board) Antenna Gain = 1.0 dBi
Antenna Installation:	☐ User ☐ Professional ☒ Factory
Transmitter power configuration:	☒ Internal rechargeable battery
Special Test Arrangement:	None
Test Facility Accreditation:	A2LA (Certificate No. 1427.01)
Test Methodology:	Measurements performed according to the procedures in ANSI C63.10-2013 and FCC 558074 D01 DTS Measurement Guidance

1.2 EUT Configuration

The equipment under test was operated during the measurement under the following conditions:

☐ - Standby
☒ - Continuous transmissions (modulated signal)
☐ - Continuous transmissions (un-modulated signal)
☐ - Continuous receiving
☐ - Test program (customer specific)
☒ - See below

Operating modes of the EUT:

No.	Description
1	Transmitting mode performed at four channels: Dual channel 369/370, Operating Frequencies: 907.492 and 907.795MHz Dual Channel 388/389, Operating Frequencies: 913.256 and 913.560MHz Dual Channel 409/410, Operating Frequencies: 919.628 and 919.931MHz Single Channel 417, Operating Frequency: 922.055MHz
2	Receiving mode for digital portion was performed at three channels: low channel 907MHz, middle channel 913MHz, and upper channel 922MHz.

Cables:

No.	Type	Length	Designation	Note
	None			

Support equipment/Services:

No.	Item	Description
	None	

General notes: For purpose of testing the samples with regular antenna and samples with temporary installed RF Antenna connector were used.
The transceiver modes of operation were pre-set for purpose of testing.
Testing performed with fully charged battery
Internal battery charging mode was not evaluated

1.3 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

☒ **Normal**

Temperature:	+15 to +35 ° C
Humidity:	20-75 %
Atmospheric pressure:	86-106 kPa

☐ **Extreme**

☐ **Temperature:**	-20 to +50 ° C
☐ **Supply voltage:**	85% to +115%

1.4 Measurement uncertainty

The expanded uncertainty (k = 2) for radiated measurements has been determined to be:
±4 dB at 10m and ±5.4 dB at 3m
The expanded uncertainty (k = 2) for conducted measurements at antenna terminal has been determined to be:
±1.0 dB
The expanded uncertainty (k = 2) for line conducted measurements has been determined to be:
±2.6 dB

1.5 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured emissions reading on the EMI Receiver.
The basic equation with a sample calculation is as follows:
FS = RA + AF + CF - AG

Where: FS = Field Strength in dB(μV/m)
RA = Receiver Amplitude in dB(μV)
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB(m^{-1})
AG = Amplifier Gain in dB

Assume a receiver reading of 48.1 dB(μV) is obtained. The antenna factor of 7.4 dB(m^{-1}) and cable factor of 1.6 dB is added and amplifier gain of 16.0 dB is subtracted giving field strength of 41.1 dB(μV/m).

RA = 48.1 dB(μV)
AF = 7.4 dB(m^{-1})
CF = 1.6 dB
AG = 16.0 dB
FS = RA + AF + CF - AG
FS = 48.1 + 7.4 + 1.6 – 16.0
FS = 41.1 dB(μV/m)

2.0 TEST SUMMARY

Referring to the performance criteria and the operating mode during the tests specified in this report, the equipment complies with the requirements according to the following standards.

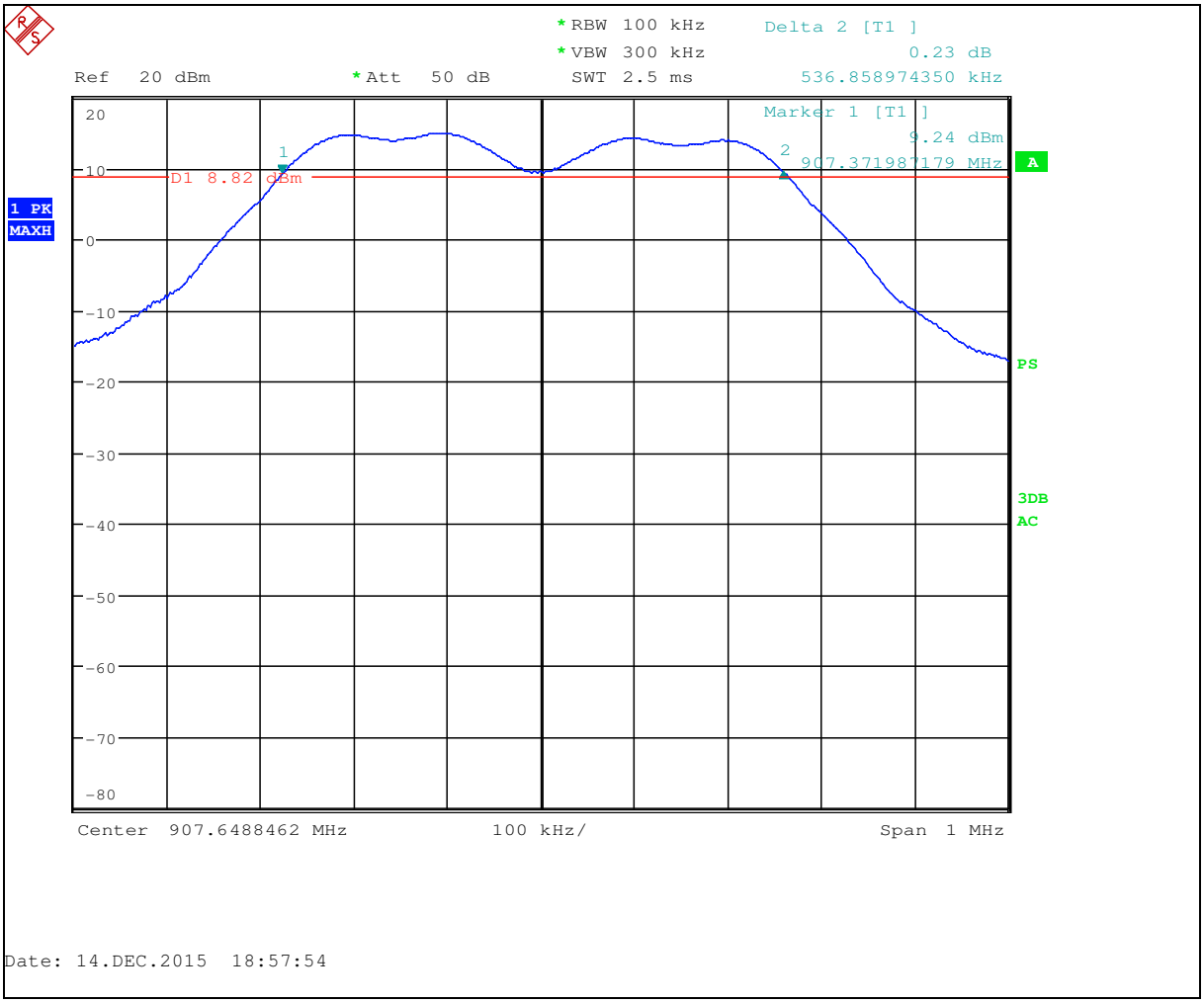
TEST SPECIFICATION	TEST PARAMETERS	RESULT
15.247(a) / RSS-247 5.2	6dB modulated DTS bandwidth	Pass
15.247(b), (c) / RSS-247 5.4	Maximum peak output power	Pass
15.247/(e) / RSS-247 5.2	Power spectral density	Pass
15.247(d) / RSS-247 5.5	Antenna conducted spurious emissions	Pass
15.247(d) / RSS-247 5.5	Radiated spurious emissions	Pass
15.247(i) / RSS- Gen 5.5	RF Exposure Compliance	Pass
15.207 / RSS-Gen 7.2.2	Transmitter Power Line conducted emissions	N/A
15.109 / ICES-003	Receiver/digital device radiated emissions	Pass
15.107 / ICES-003	Digital device conducted emissions	N/A

3.0 TEST CONDITIONS AND RESULTS

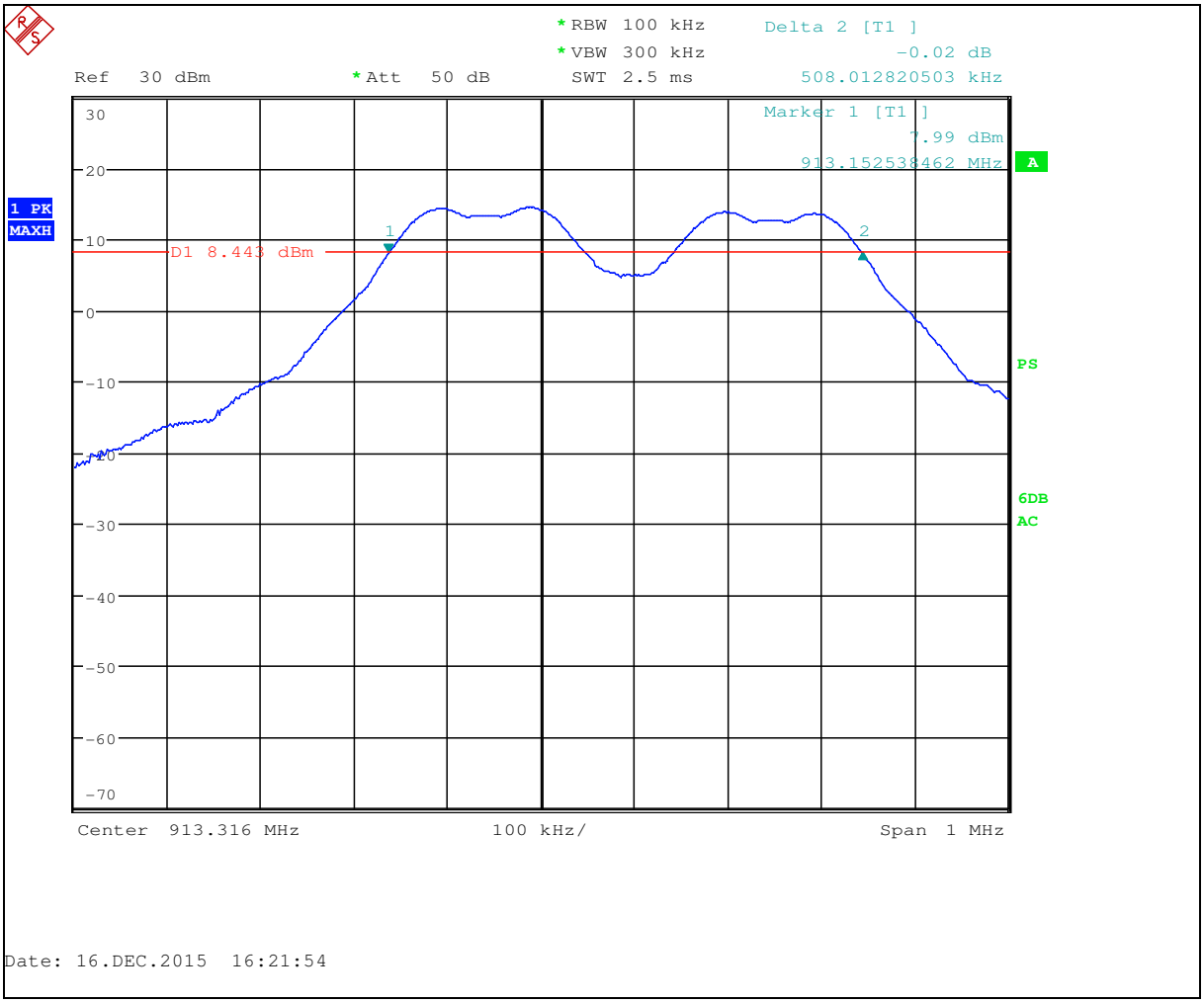
3.1 6dB modulated DTS bandwidth

Frequency 907.371 MHz Channel kHz	Middle Frequency 913.152 MHz Channel kHz	Middle Frequency 919.502 MHz Channel kHz	Upper Frequency 921.791 MHz Channel kHz	Minimum Bandwidth kHz	Result
526.8	508.0	548.1	527.2	500	**Pass**
RBW: **VBW:**		☒ 100kHz ☒ 300kHz			

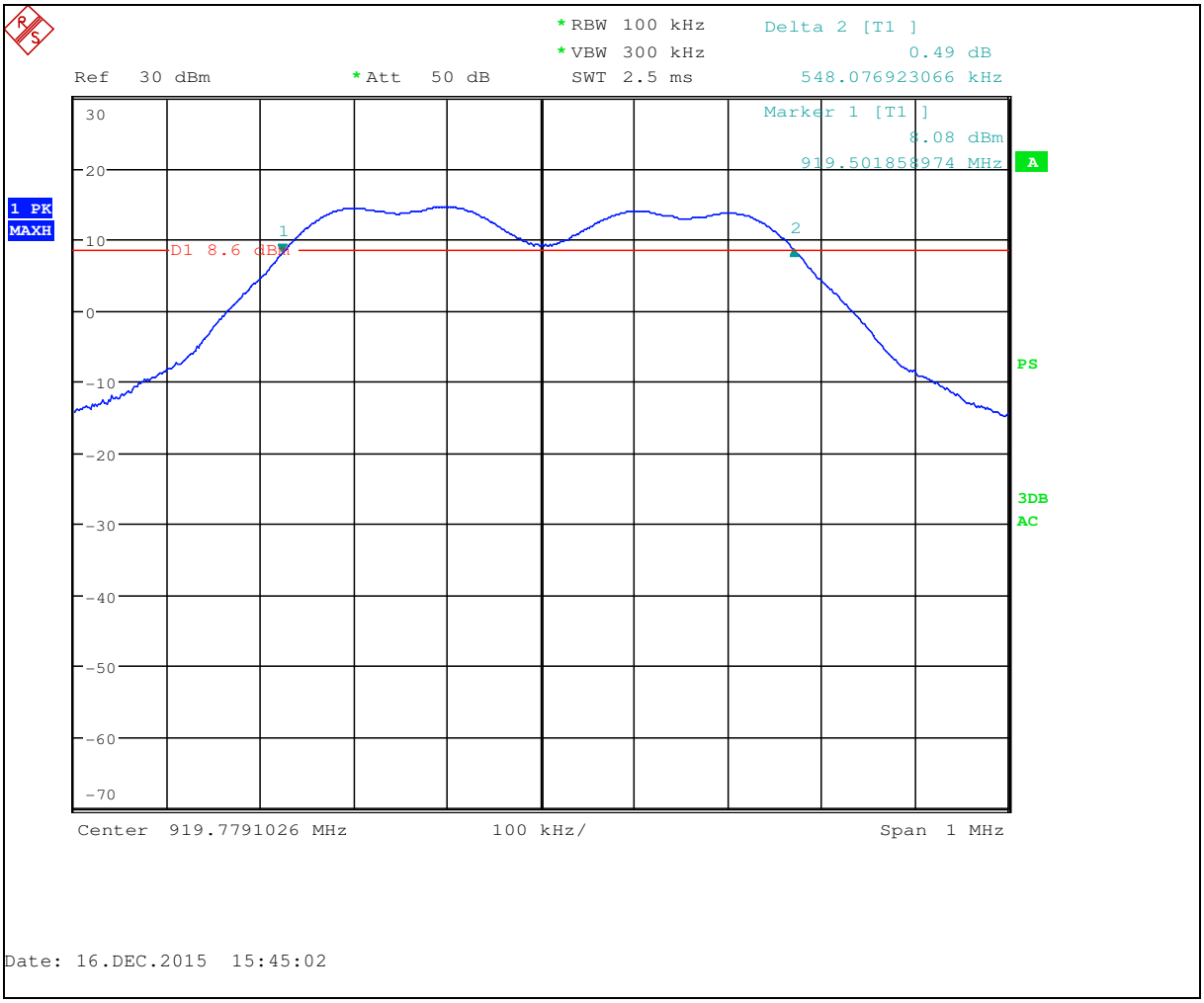
Notes: Graphs 3.1.1 to 3.1.4 show the 6dB bandwidth


*RBW 100 kHz
*VBW 300 kHz
Ref 20 dBm
*Att 50 dB
SWT 2.5 ms
Delta 2 [T1]
0.23 dB
536.858974350 kHz
Marker 1 [T1]
9.24 dBm
907.371987179 MHz
D1 8.82 dBm
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 907.6488462 MHz
100 kHz/
Span 1 MHz
Date: 14.DEC.2015 18:57:54

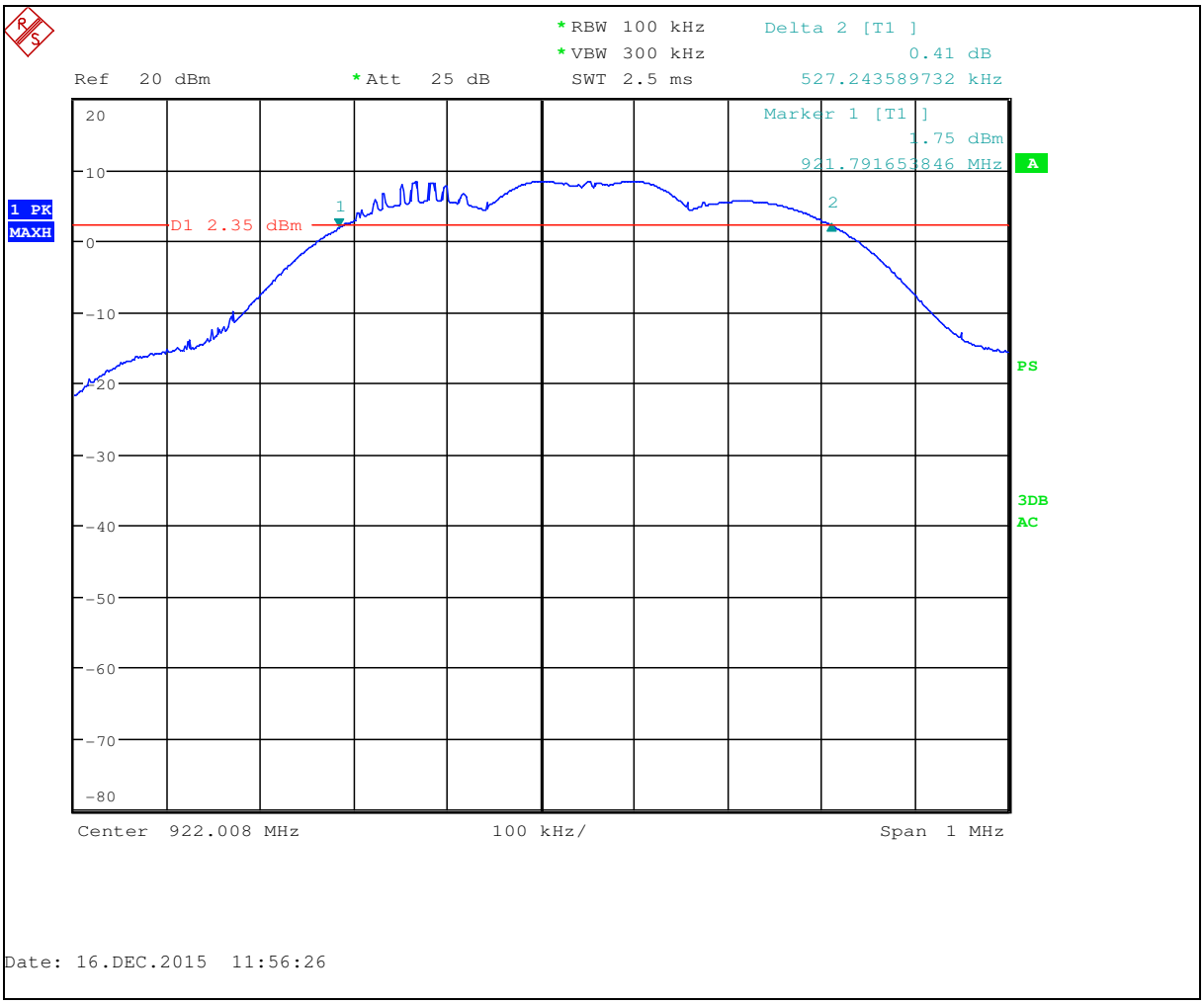
Graph 3.1.1


*RBW 100 kHz
*VBW 300 kHz
Ref 30 dBm
*Att 50 dB
SWT 2.5 ms
Delta 2 [T1]
-0.02 dB
508.012820503 kHz
Marker 1 [T1]
7.99 dBm
913.152538462 MHz
1 PK
MAXH
A
D1 8.443 dBm
PS
6DB
AC
Center 913.316 MHz
100 kHz/
Span 1 MHz
Date: 16.DEC.2015 16:21:54

Graph 3.1.2


*RBW 100 kHz
*VBW 300 kHz
Ref 30 dBm
*Att 50 dB
SWT 2.5 ms
Delta 2 [T1]
0.49 dB
548.076923066 kHz
Marker 1 [T1]
8.08 dBm
919.501858974 MHz
1 PK
MAXH
A
D1 8.6 dBm
PS
3DB
AC
Center 919.7791026 MHz
100 kHz/
Span 1 MHz
Date: 16.DEC.2015 15:45:02

Graph 3.1.3


*RBW 100 kHz
*VBW 300 kHz
Ref 20 dBm
*Att 25 dB
SWT 2.5 ms
Delta 2 [T1]
0.41 dB
527.243589732 kHz
Marker 1 [T1]
1.75 dBm
921.791653846 MHz
1 PK
MAXH
D1 2.35 dBm
A
PS
3DB
AC
Center 922.008 MHz
100 kHz/
Span 1 MHz
Date: 16.DEC.2015 11:56:26

Graph 3.1.4

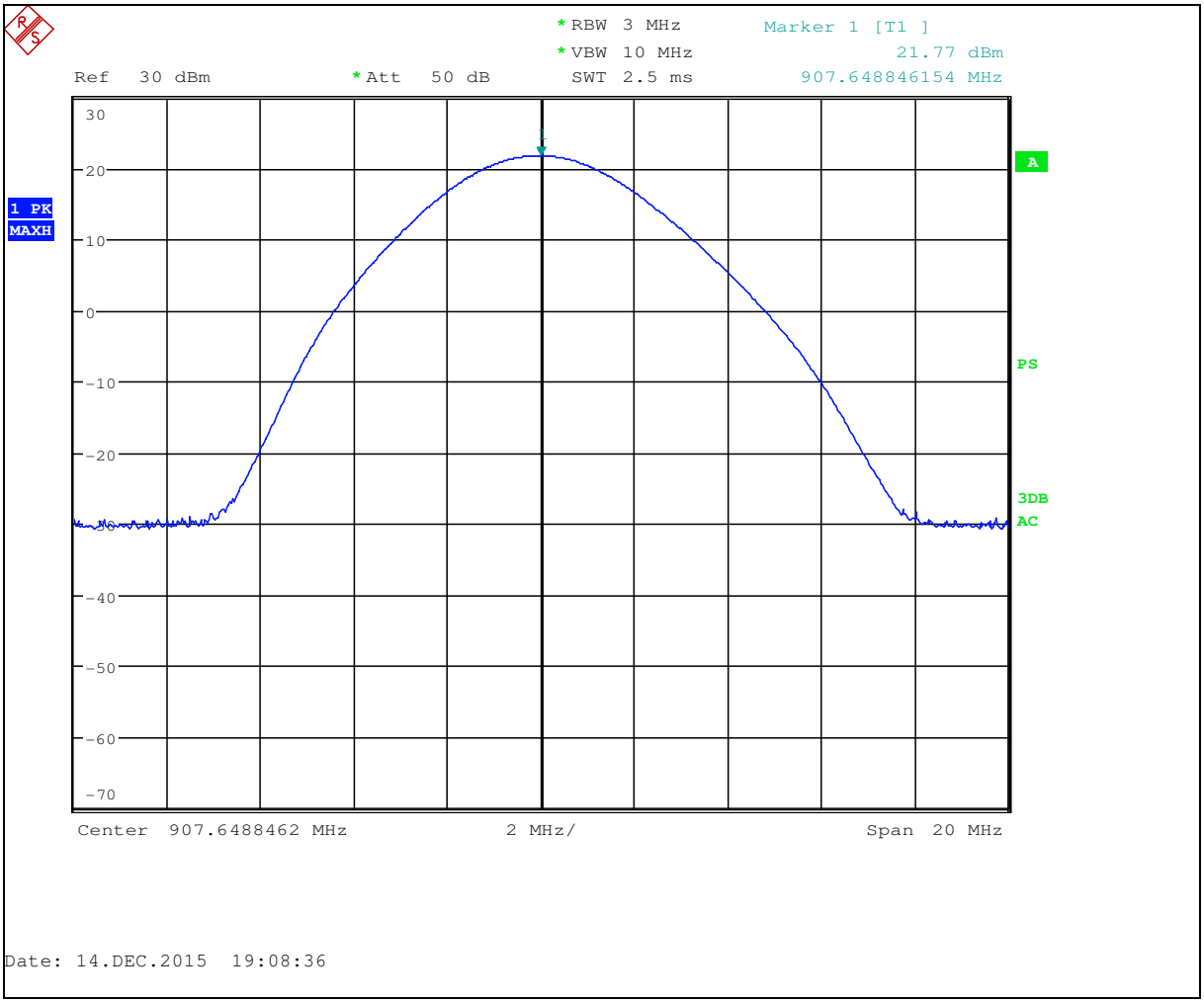
3.2 Maximum peak output power

Test result: **Pass**

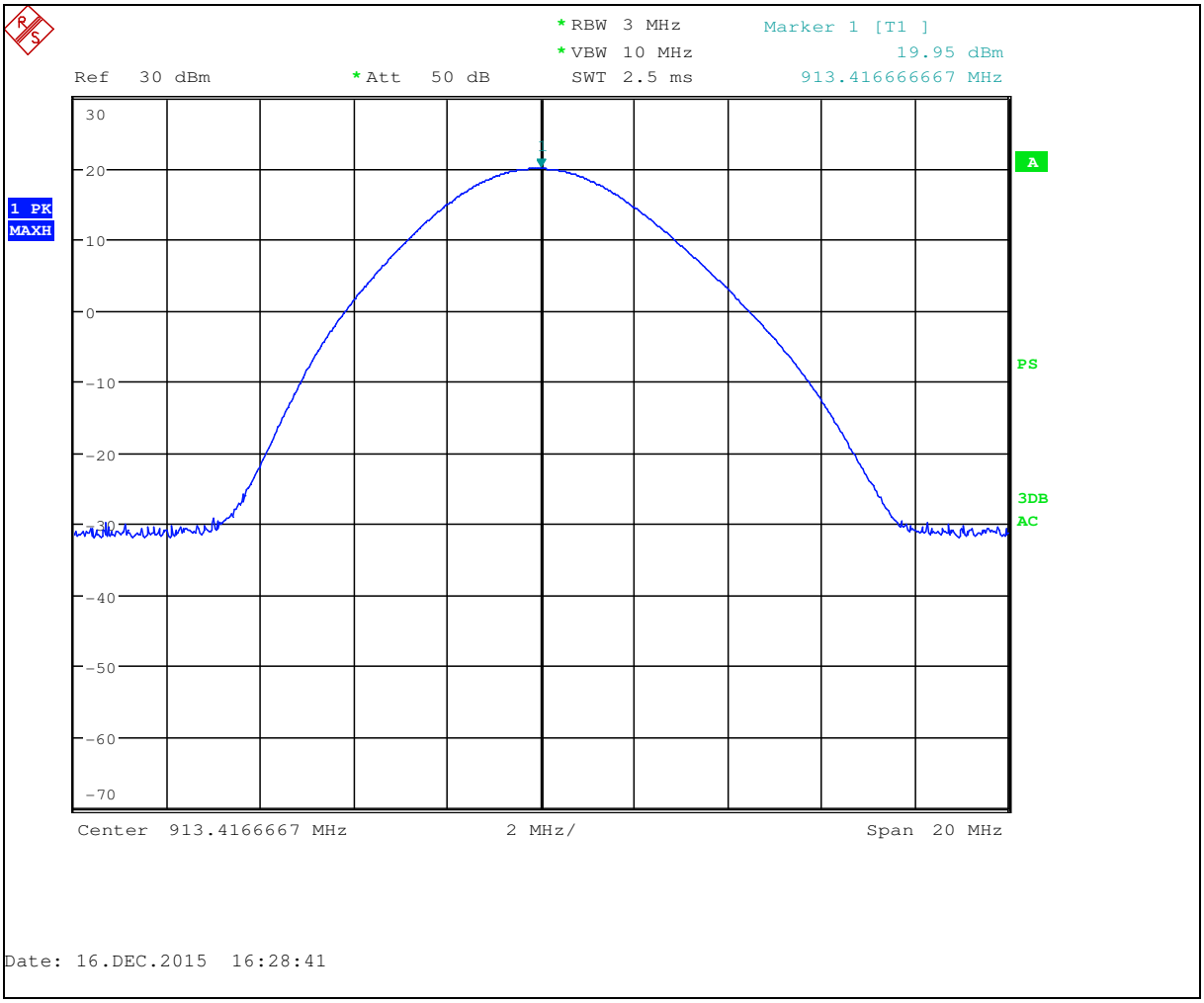
Max. Margin: 24.17dB below the limits

Power Output:	**Conducted**					
Frequency Range:	☒ 902-928MHz ☐ 2400-2483.5MHz ☐ 5725-5850MHz					
Low Frequency MHz	**Measured power dBm**	**Attenuaton dB**	**Power at Antenna dBm**	**Limit dBm**	**Limit Reduction dB**	**Margin dB**
907	21.77	0.3	22.07 (161.06mW)	30	0	-7.93
Middle Frequency MHz						
913	19.95	0.3	20.25 (105.93mW)	30	0	-9.75
919	20.00	0.3	20.30 (107.15mW)	30	0	-9.70
Upper Frequency MHz						
922	7.51	0.3	7.81 (6.04mW)	30	0	-22.19
RBW:	☐ 1MHz ☒ 3MHz ☐ 10MHz					
VBW:	☐ 1MHz ☐ 3MHz ☒ 10MHz					
Antenna Gain:	☒ < 6dBi ☐ >6dBi and = dBi, Output power reduction = dB					

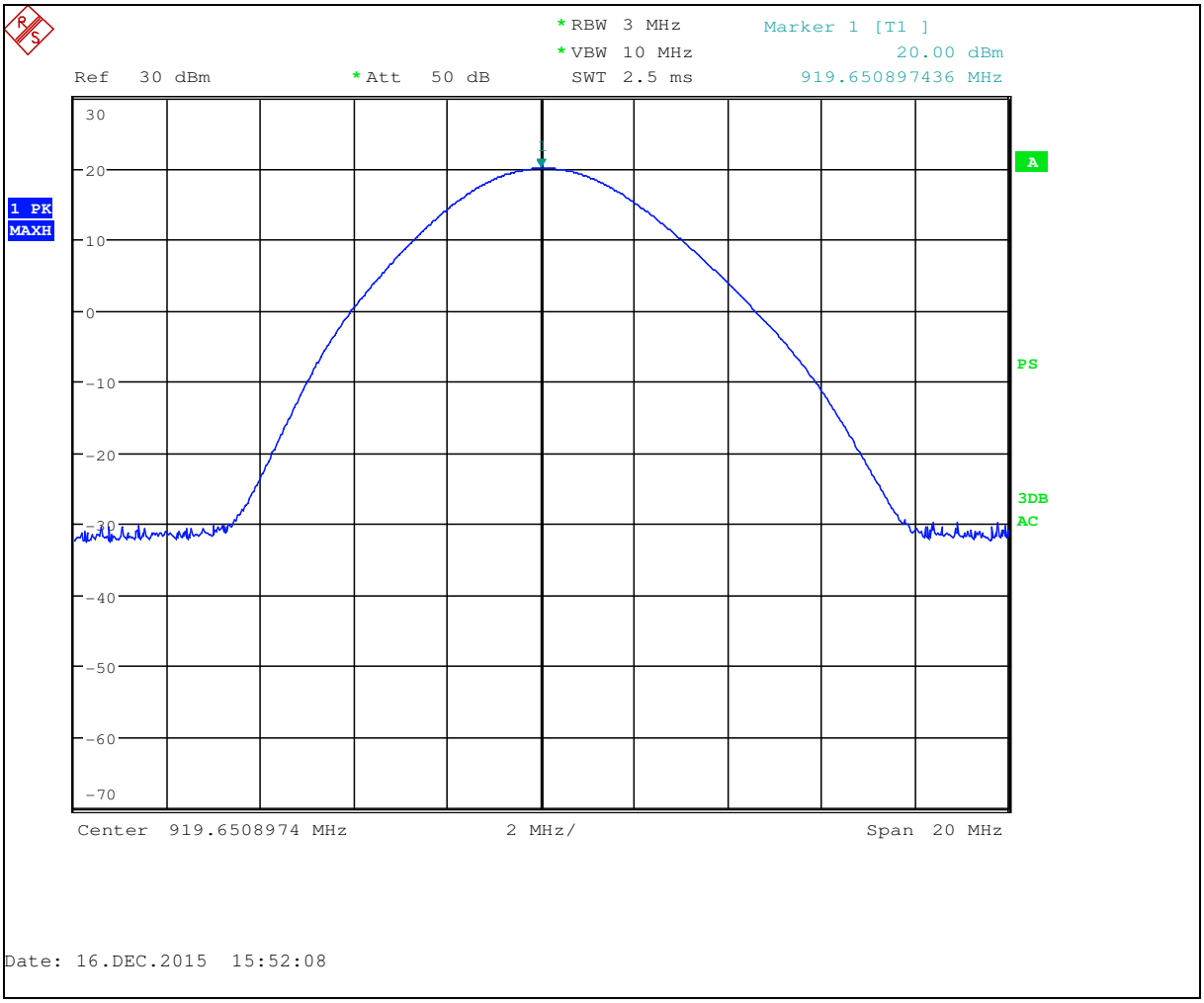
Notes: Graphs 3.2.1 to 3.2.4 show Peak Output Power


*RBW 3 MHz
*VBW 10 MHz
Ref 30 dBm
*Att 50 dB
SWT 2.5 ms
Marker 1 [T1]
21.77 dBm
907.648846154 MHz
1 PK
MAXH
A
PS
3DB
AC
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 907.6488462 MHz
2 MHz/
Span 20 MHz
Date: 14.DEC.2015 19:08:36

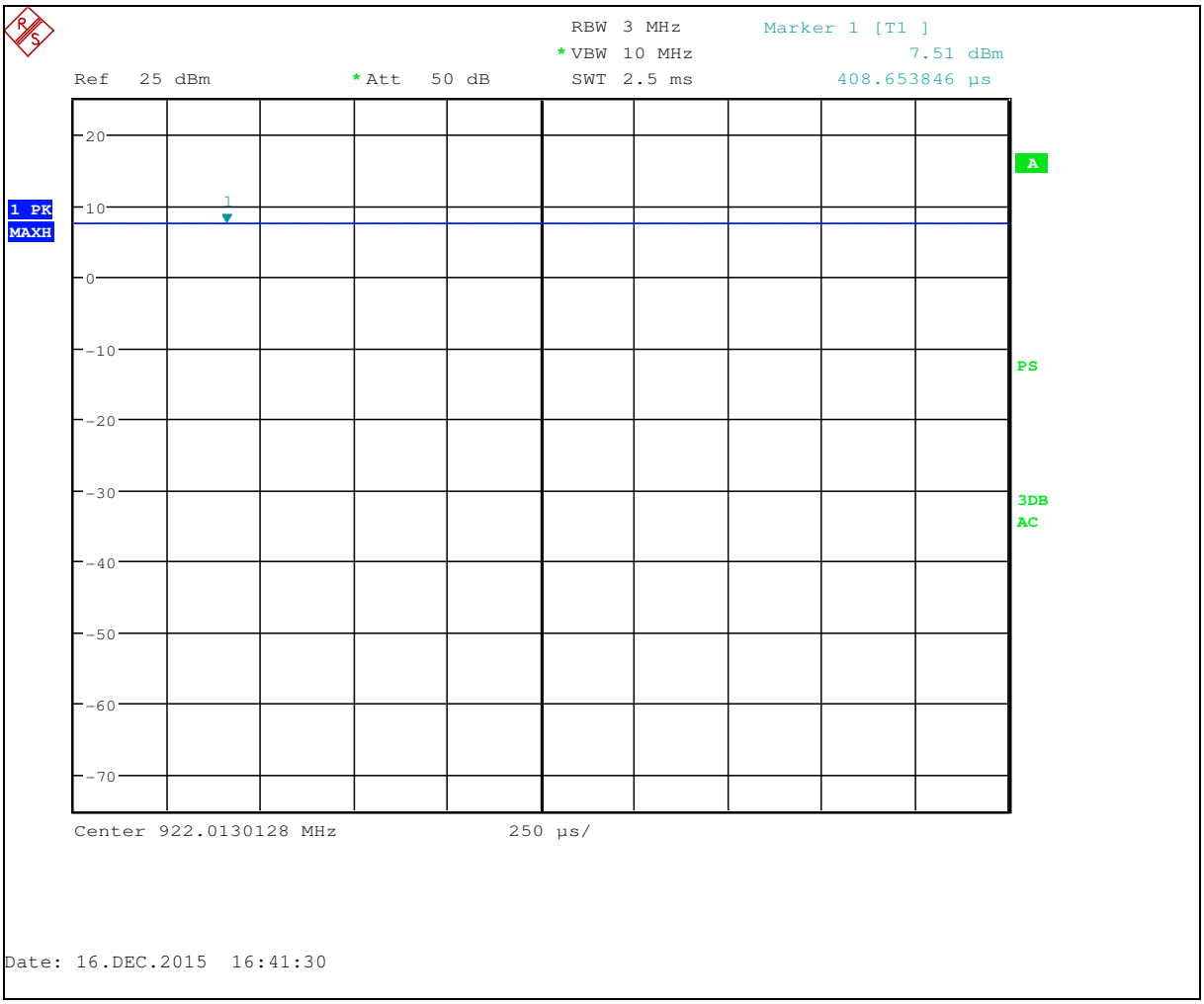
Graph 3.2.1


*RBW 3 MHz
*VBW 10 MHz
Ref 30 dBm
*Att 50 dB
SWT 2.5 ms
Marker 1 [T1]
19.95 dBm
913.416666667 MHz
1 PK
MAXH
A
PS
3DB
AC
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 913.4166667 MHz
2 MHz/
Span 20 MHz
Date: 16.DEC.2015 16:28:41

Graph 3.2.2


*RBW 3 MHz
*VBW 10 MHz
Ref 30 dBm
*Att 50 dB
SWT 2.5 ms
Marker 1 [T1]
20.00 dBm
919.650897436 MHz
1 PK
MAXH
A
PS
3DB
AC
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 919.6508974 MHz
2 MHz/
Span 20 MHz
Date: 16.DEC.2015 15:52:08

Graph 3.2.3

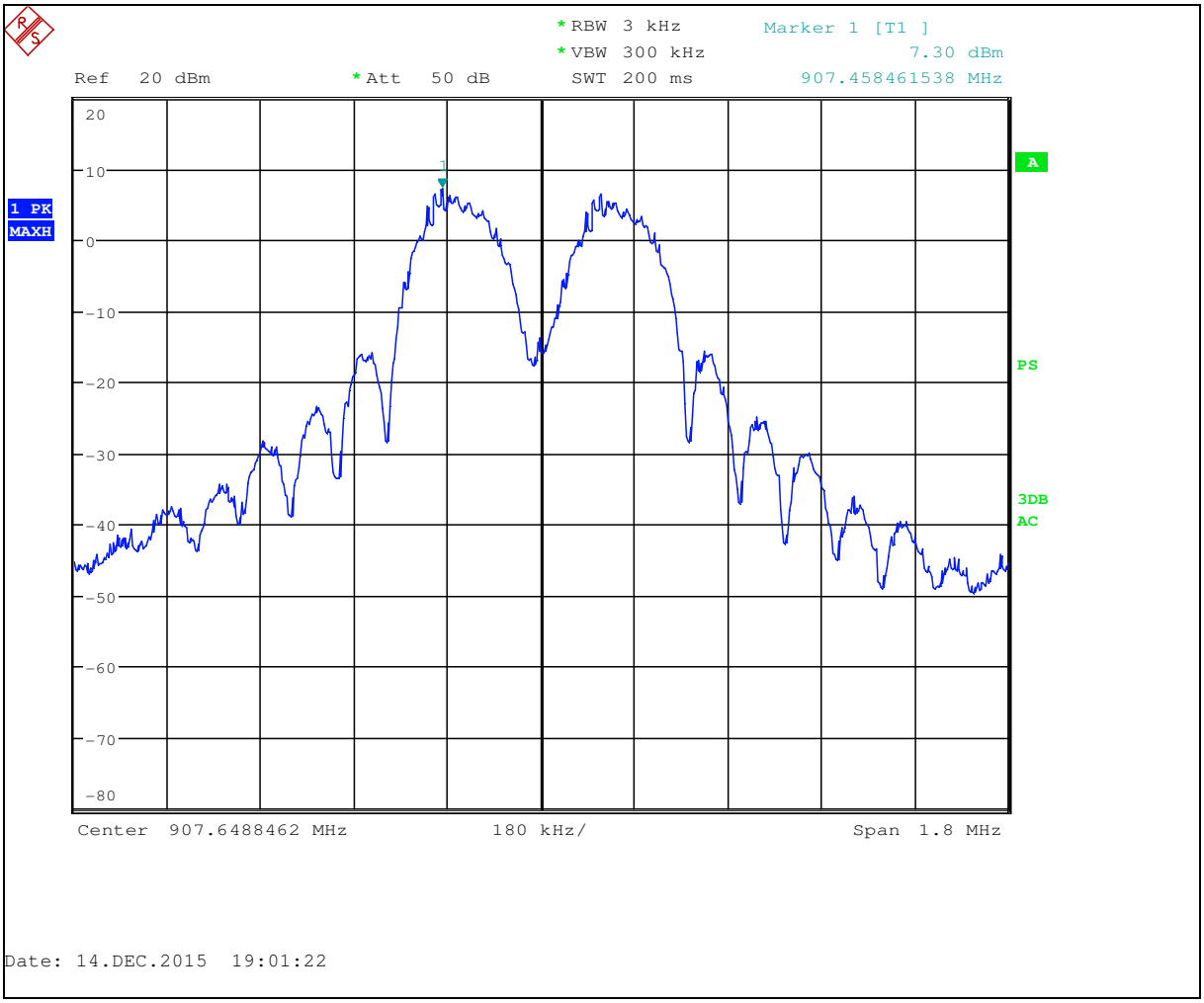

RBW 3 MHz
*VBW 10 MHz
SWT 2.5 ms
Marker 1 [T1]
7.51 dBm
408.653846 µs
Ref 25 dBm
*Att 50 dB
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 922.0130128 MHz
250 µs/
Date: 16.DEC.2015 16:41:30

Graph 3.2.4

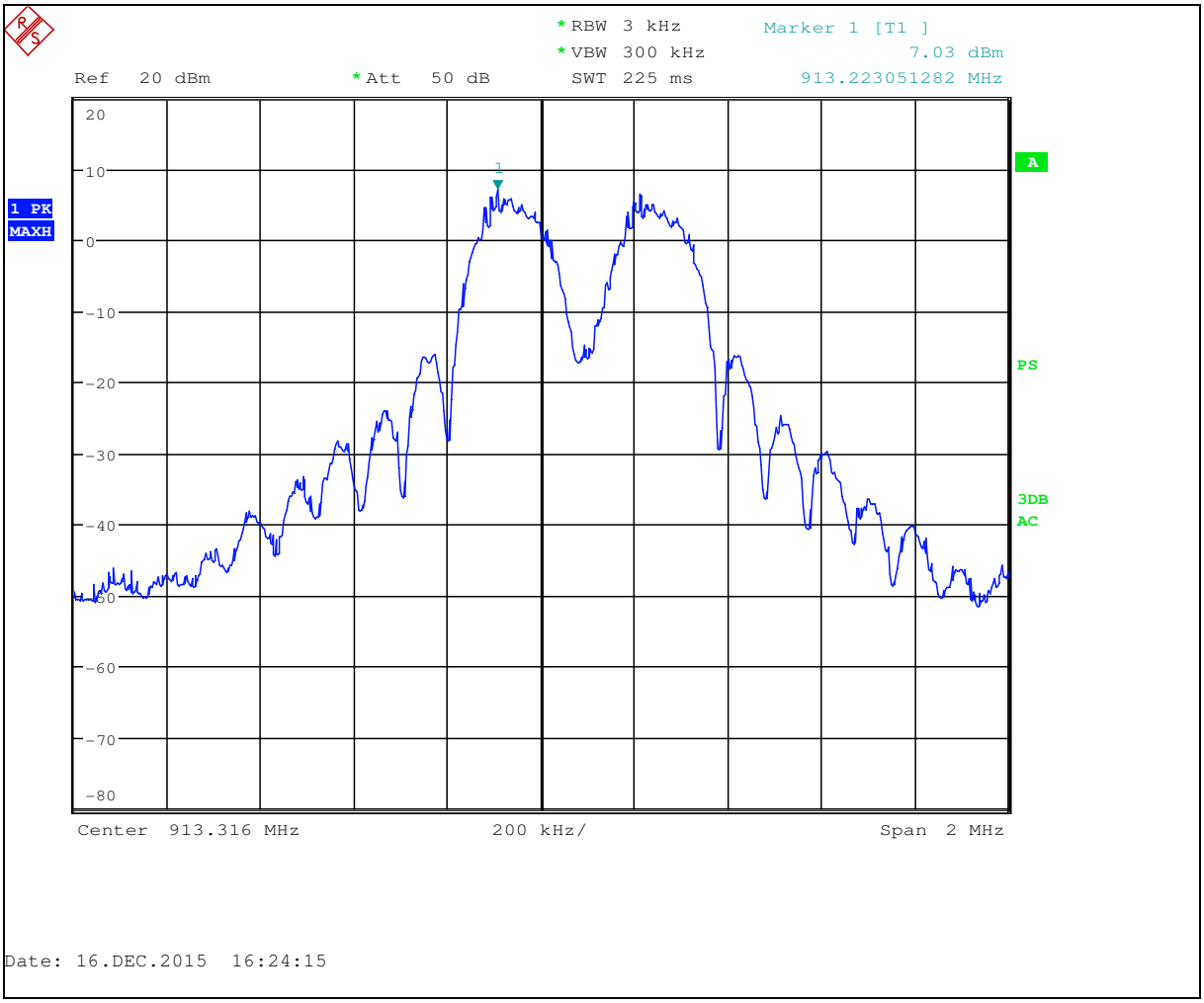
3.3 Power spectral density

Power Output:	☒ Conducted ☐ Radiated			
	Measured Density dBm	**Power Density at Antenna dBm**	**Limit dBm**	**Margin dB**
Low Frequency Channel 907MHz	7.3	7.6	8	-0.4
Middle Frequency Channel 913MHz	7.0	7.3	8	-0.7
Middle Frequency Channel 919MHz	7.0	7.3	8	-0.7
Upper Frequency Channel 922MHz	7.4	7.7	8	-0.3
Analyzer Settings:	☒ RBW=3KHz ☒ VBW=300KHz ☒ Span=2MHz ☒ Sweep=Auto			
Antenna Gain:	☒ < 6dBi and = 2dBi ☐ >6dBi and = dBi, limit reduction = dB			

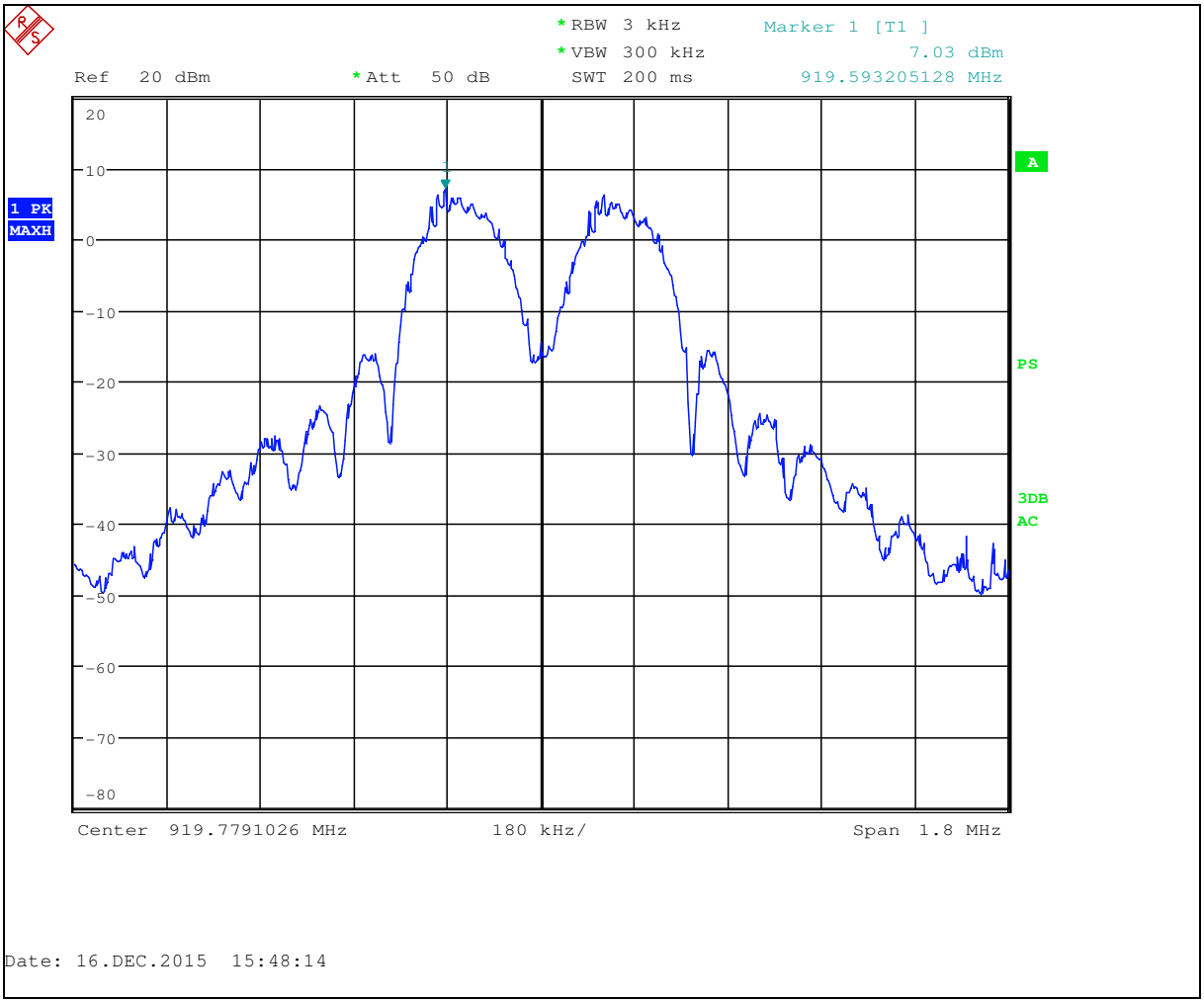
Notes: The Power Spectral Density at Antenna was calculated adding the cable loss of 0.3dB from the measured density value.
Graphs 3.3.1 to 3.3.4 show the Power Spectral Density


*RBW 3 kHz
*VBW 300 kHz
SWT 200 ms
Marker 1 [T1]
7.30 dBm
907.458461538 MHz
Ref 20 dBm
*Att 50 dB
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 907.6488462 MHz
180 kHz/
Span 1.8 MHz
Date: 14.DEC.2015 19:01:22

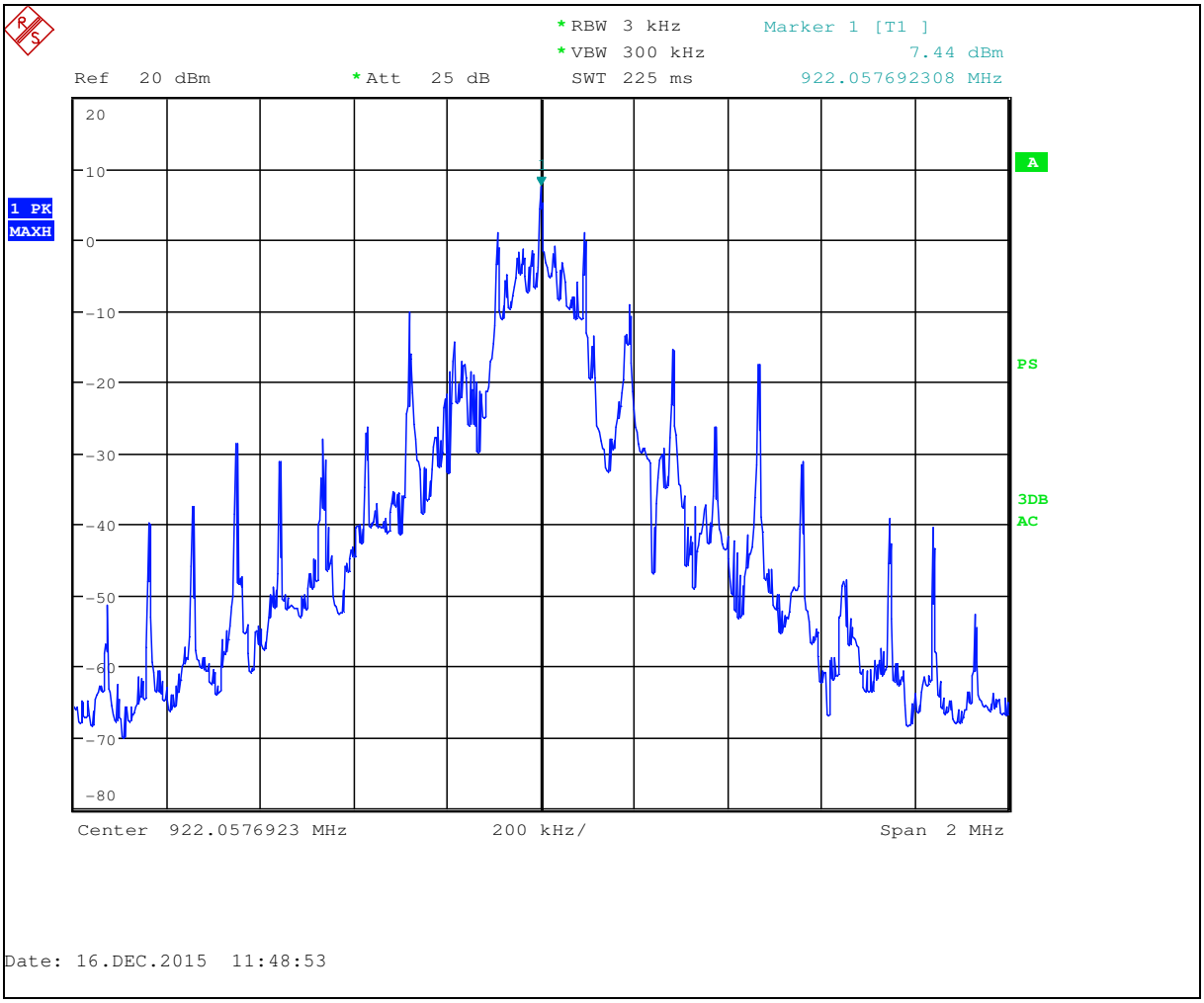
Graph 3.3.1


*RBW 3 kHz
*VBW 300 kHz
SWT 225 ms
Marker 1 [T1]
7.03 dBm
913.223051282 MHz
Ref 20 dBm
*Att 50 dB
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 913.316 MHz
200 kHz/
Span 2 MHz
Date: 16.DEC.2015 16:24:15

Graph 3.3.2


*RBW 3 kHz
*VBW 300 kHz
Ref 20 dBm
*Att 50 dB
SWT 200 ms
Marker 1 [T1]
7.03 dBm
919.593205128 MHz
1 PK
MAXH
A
PS
3DB
AC
Center 919.7791026 MHz
180 kHz/
Span 1.8 MHz
Date: 16.DEC.2015 15:48:14

Graph 3.3.3

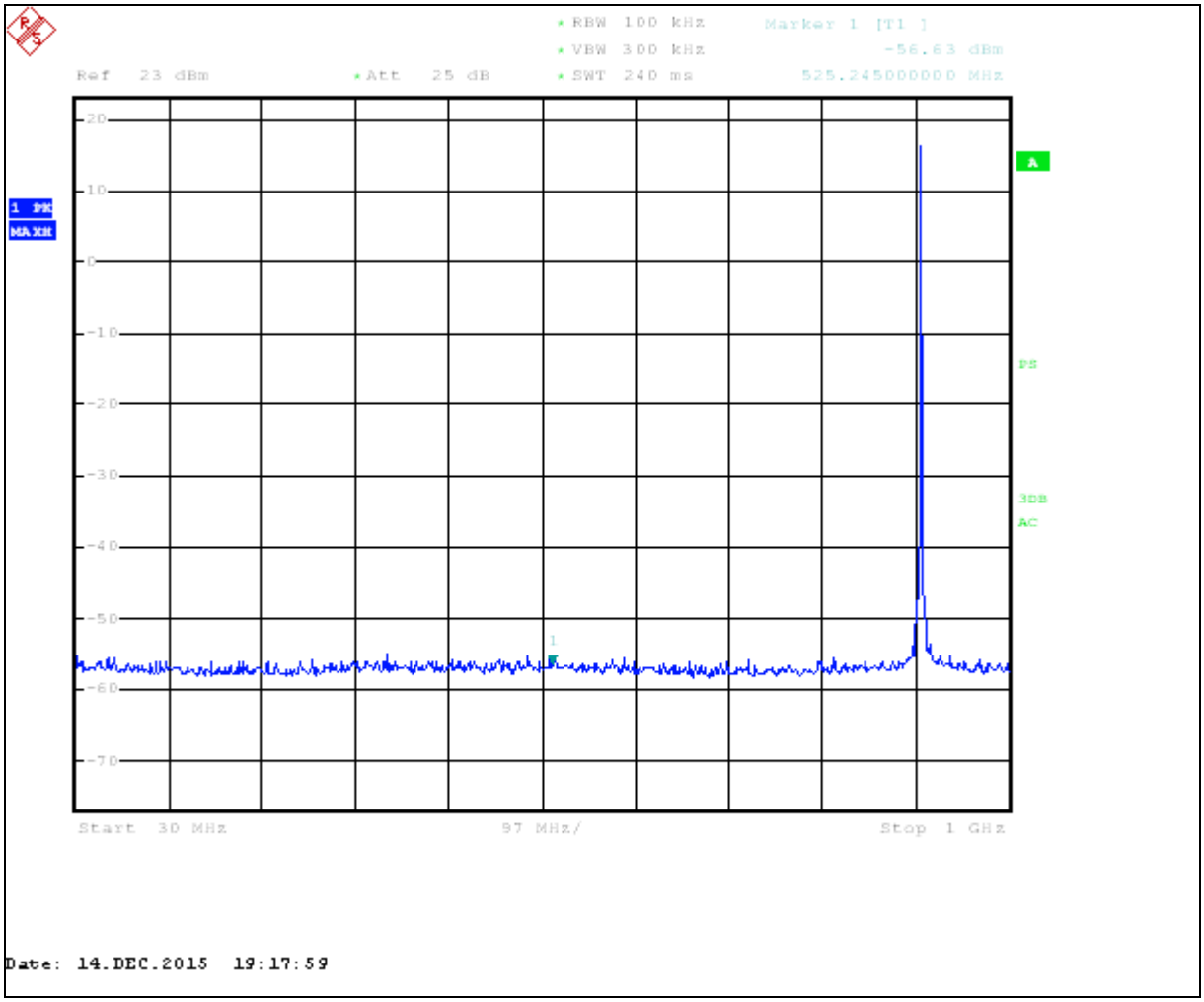

*RBW 3 kHz
*VBW 300 kHz
SWT 225 ms
Marker 1 [T1]
7.44 dBm
922.057692308 MHz
Ref 20 dBm
*Att 25 dB
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 922.0576923 MHz
200 kHz/
Span 2 MHz
Date: 16.DEC.2015 11:48:53

Graph 3.3.4

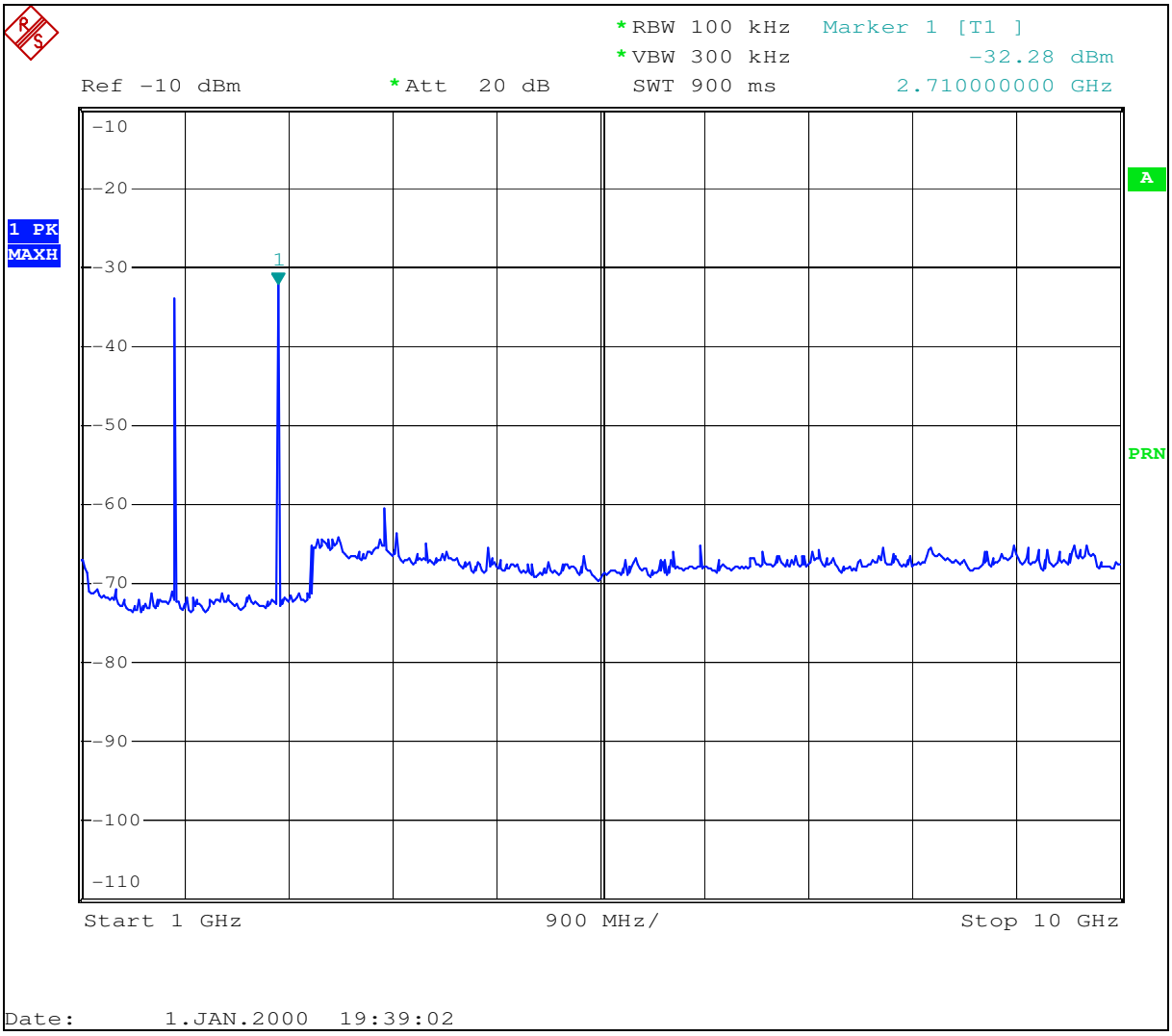
3.4 Antenna conducted spurious emissions

	Minimum Measured Attenuation dB	Minimum Allowed Attenuation dB	Margin dB
Low Frequency Channel 907MHz	32.28	20	-12.28
Middle Frequency Channel 913MHz	32.45	20	-12.45
Middle Frequency Channel 919MHz	31.64	20	-11.64
Upper Frequency Channel 922MHz	40.25	20	-20.25
Analyzer Settings:	☒ RBW=100KHz		
Minimum Allowed Attenuation:	☒ 20dB ☐ 30dB (for digital systems with conducted power measured using RMS averaging over a time interval)		

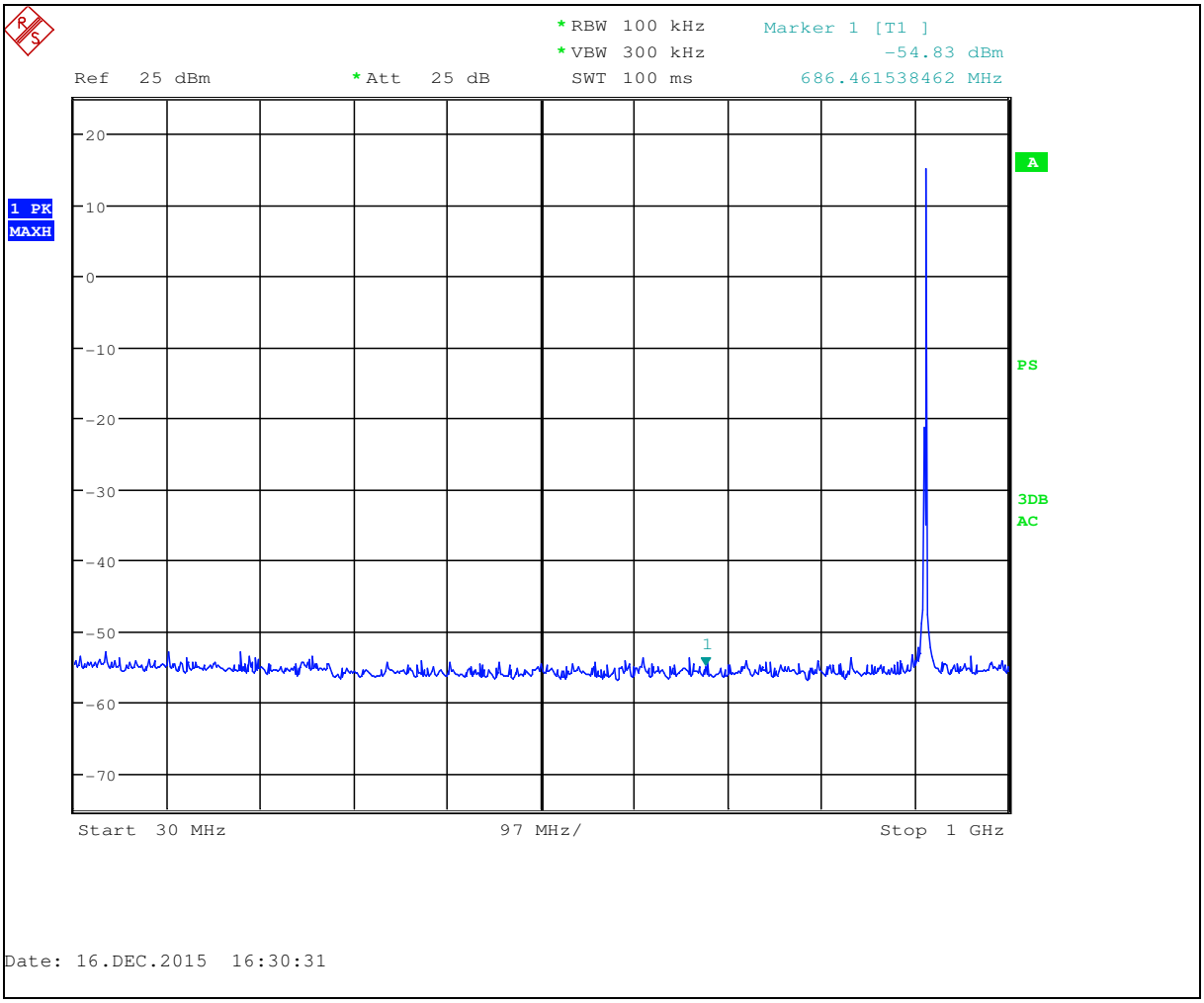
Notes: Test was performed in frequency range from 30MHz to 10GHz
Graphs 3.4.1 to 3.4.2 show the Antenna Conducted Spurious Emissions for low channel
Graphs 3.4.3 to 3.4.4 show the Antenna Conducted Spurious Emissions for middle channel
Graphs 3.4.5 to 3.4.6 show the Antenna Conducted Spurious Emissions for middle channel
Graphs 3.4.7 to 3.4.8 show the Antenna Conducted Spurious Emissions for high channel
Graph 3.4.9 shows band edge compliance at 902MHz
Graph 3.4.10 shows band edge compliance at 928MHz


RBW 100 kHz
VBW 300 kHz
SWT 240 ms
Marker 1 [T1]
-56.63 dBm
525.245000000 MHz
Ref 23 dBm
Att 25 dB
20
10
0
-10
-20
-30
-40
-50
-60
-70
1 PK
MAXH
A
PS
3DB
AC
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 14.DEC.2015 19:17:59

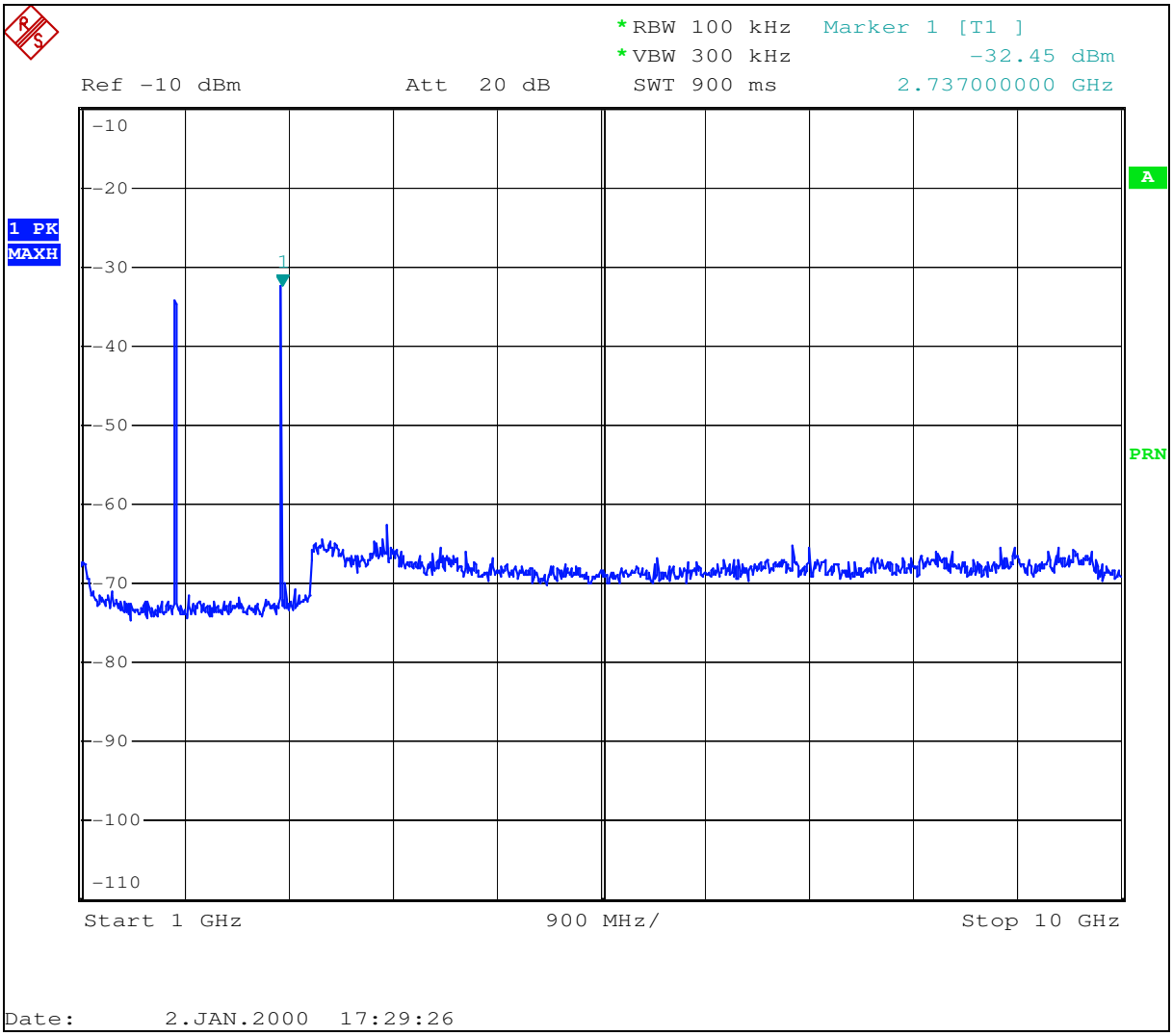
Graph 3.4.1


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-32.28 dBm
Ref -10 dBm
*Att 20 dB
SWT 900 ms
2.710000000 GHz
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
1 PK
MAXH
A
PRN
1
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 1.JAN.2000 19:39:02

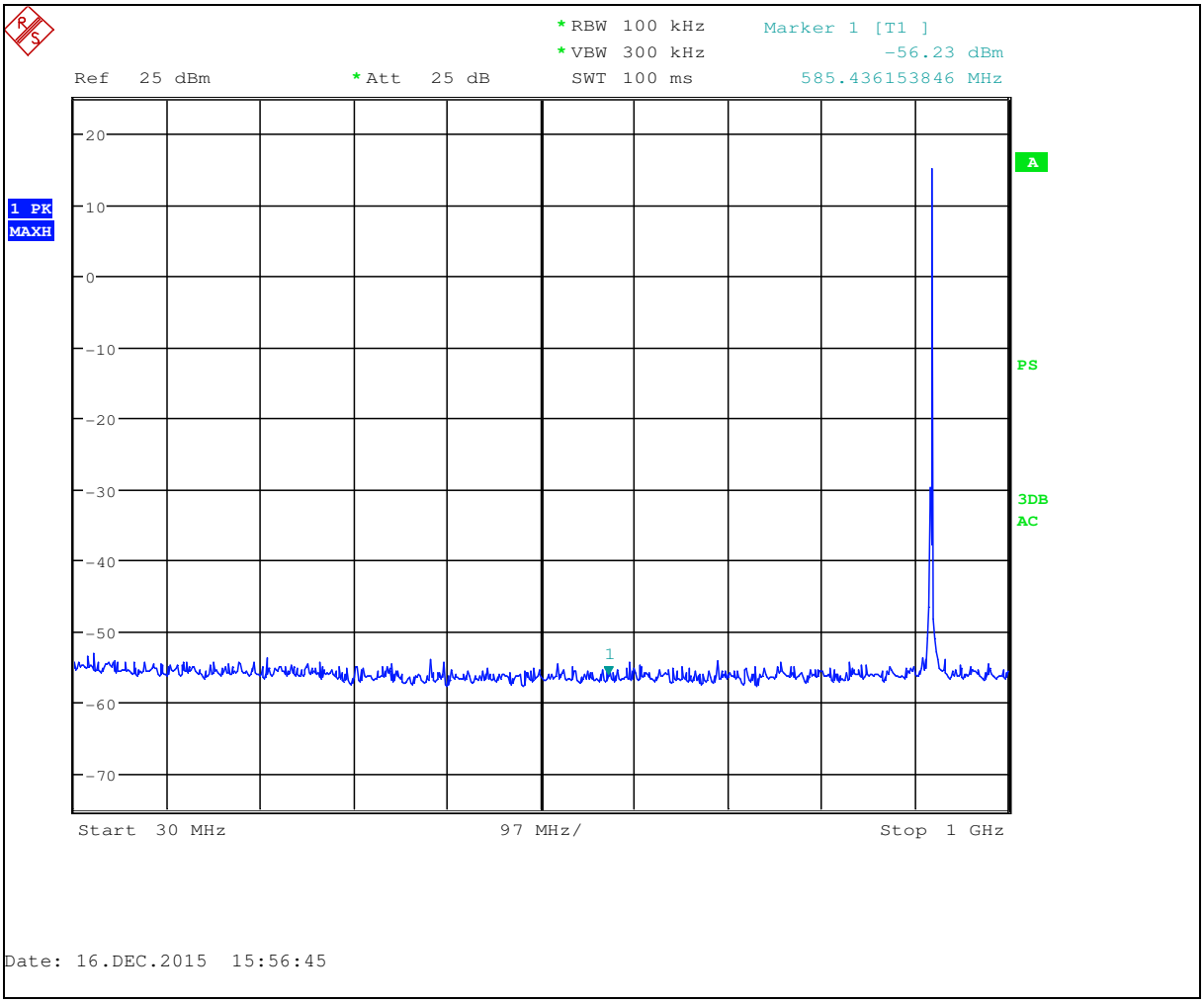
Graph 3.4.2


*RBW 100 kHz
*VBW 300 kHz
Marker 1 [T1]
-54.83 dBm
Ref 25 dBm
*Att 25 dB
SWT 100 ms
686.461538462 MHz
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
1
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 16.DEC.2015 16:30:31

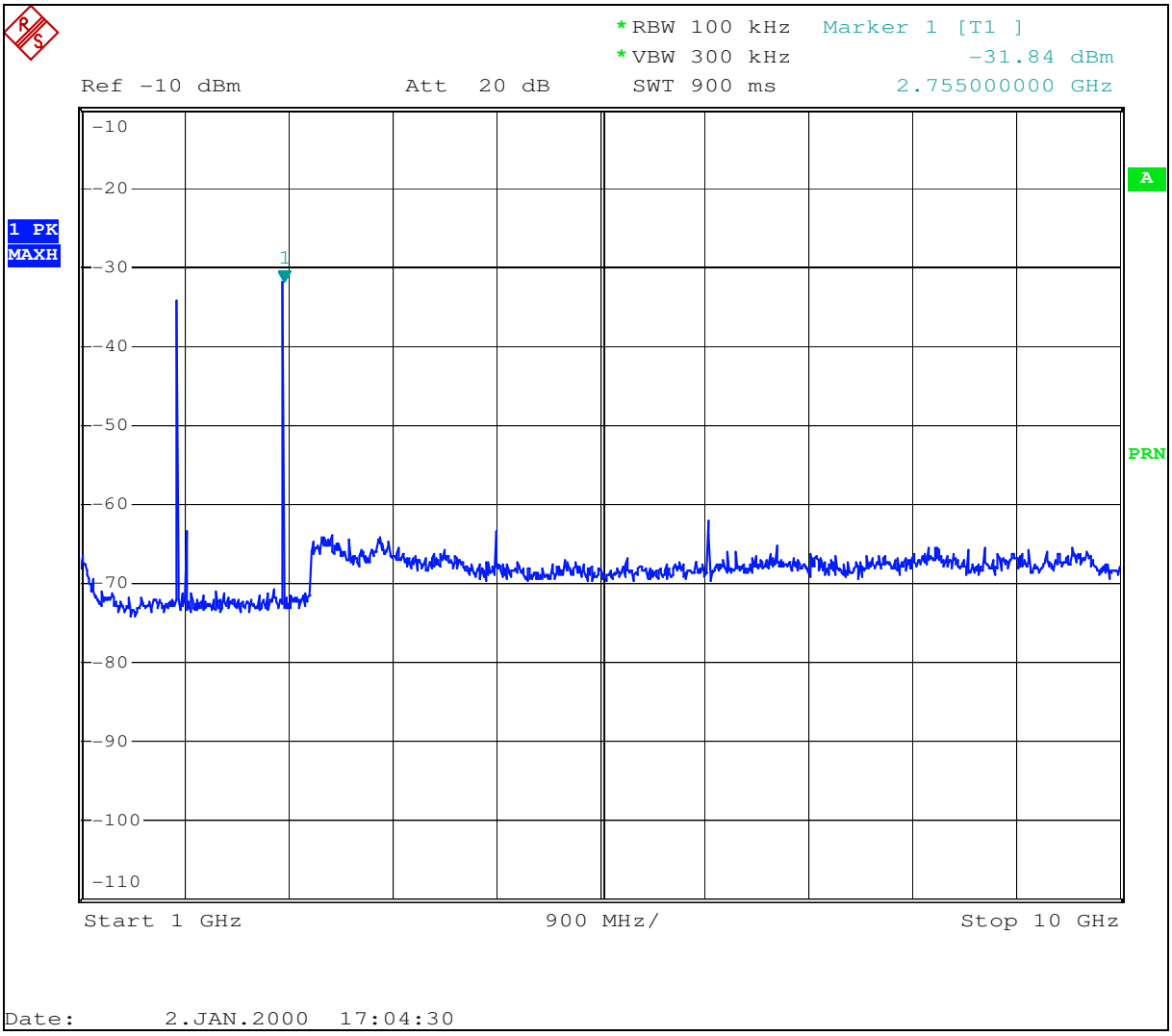
Graph 3.4.3


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-32.45 dBm
Ref -10 dBm
Att 20 dB
SWT 900 ms
2.737000000 GHz
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
1 PK
MAXH
A
PRN
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 2.JAN.2000 17:29:26

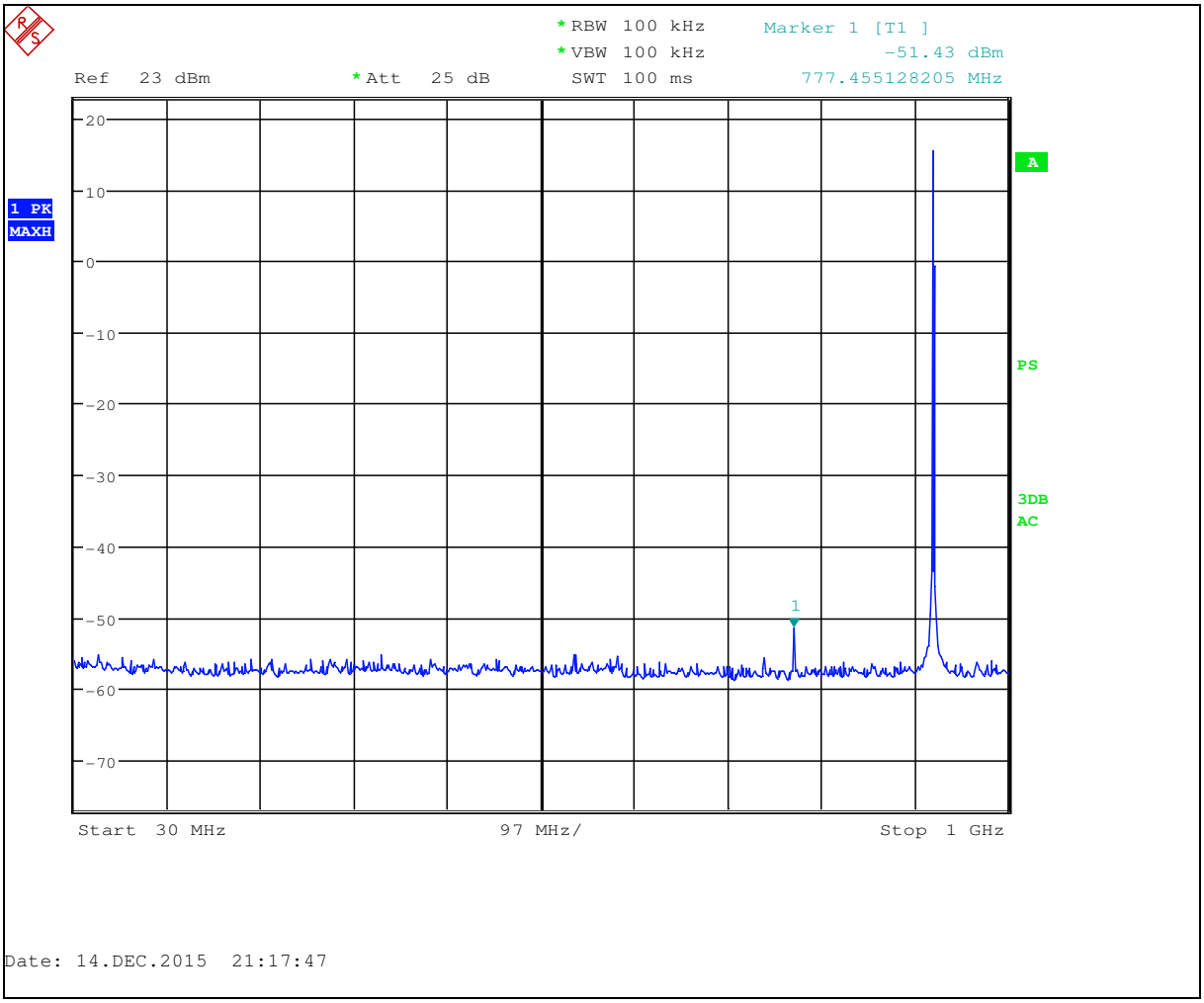
Graph 3.4.4


*RBW 100 kHz
*VBW 300 kHz
Marker 1 [T1]
-56.23 dBm
Ref 25 dBm
*Att 25 dB
SWT 100 ms
585.436153846 MHz
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
1
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 16.DEC.2015 15:56:45

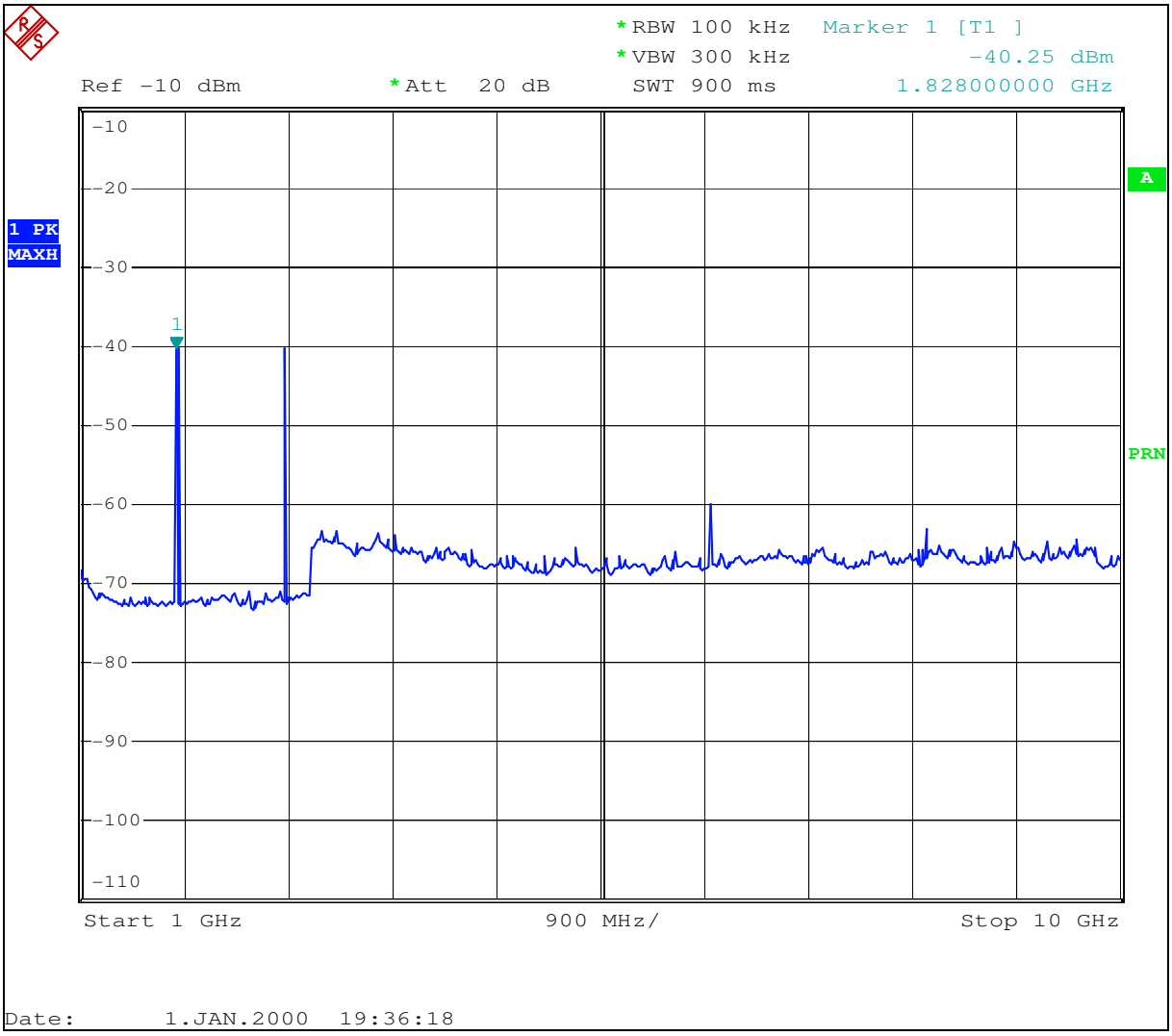
Graph 3.4.5


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-31.84 dBm
Ref -10 dBm
Att 20 dB
SWT 900 ms
2.755000000 GHz
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
1 PK
MAXH
A
PRN
1
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 2.JAN.2000 17:04:30

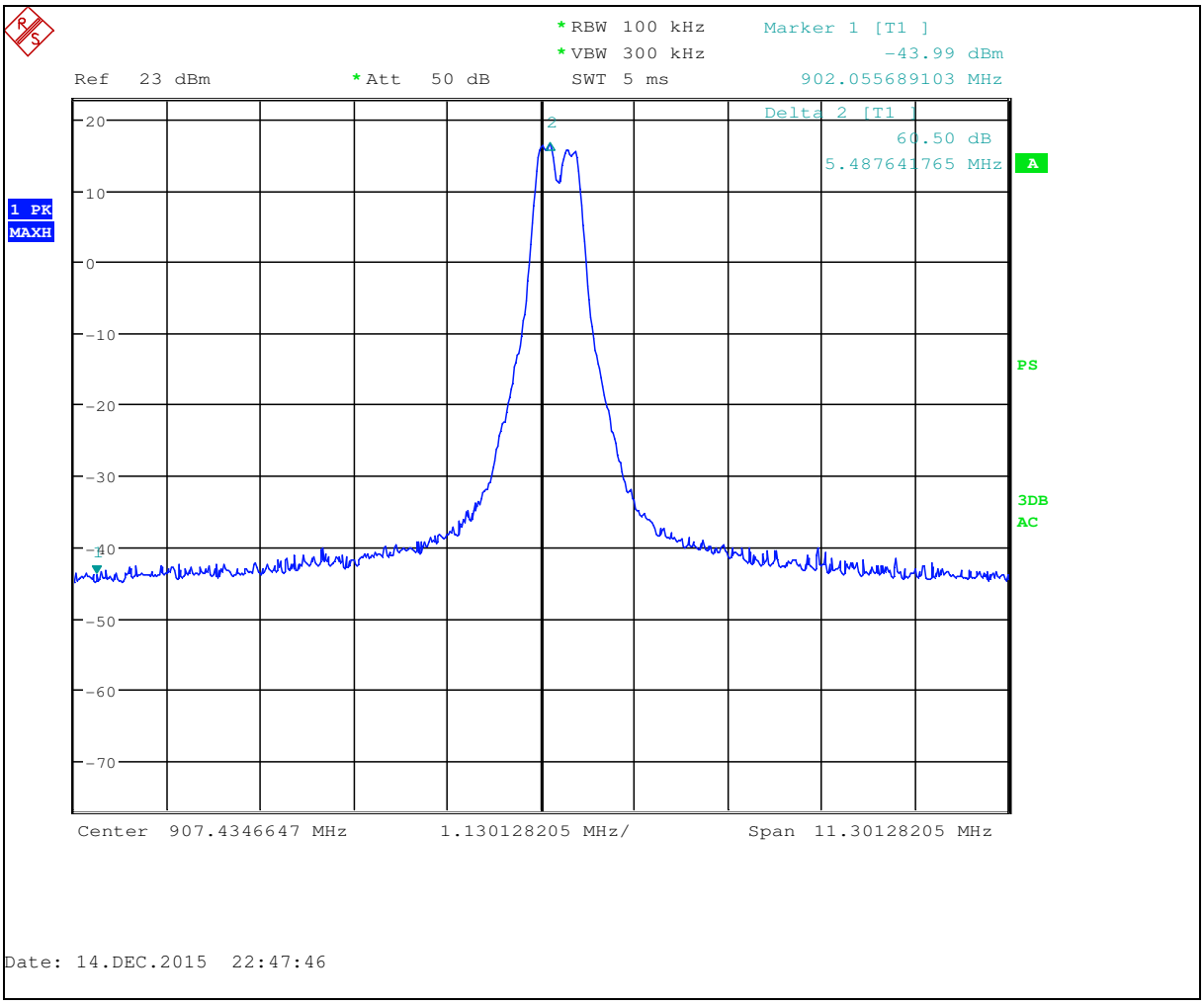
Graph 3.4.6


*RBW 100 kHz
*VBW 100 kHz
Marker 1 [T1]
-51.43 dBm
Ref 23 dBm
*Att 25 dB
SWT 100 ms
777.455128205 MHz
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
1
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 14.DEC.2015 21:17:47

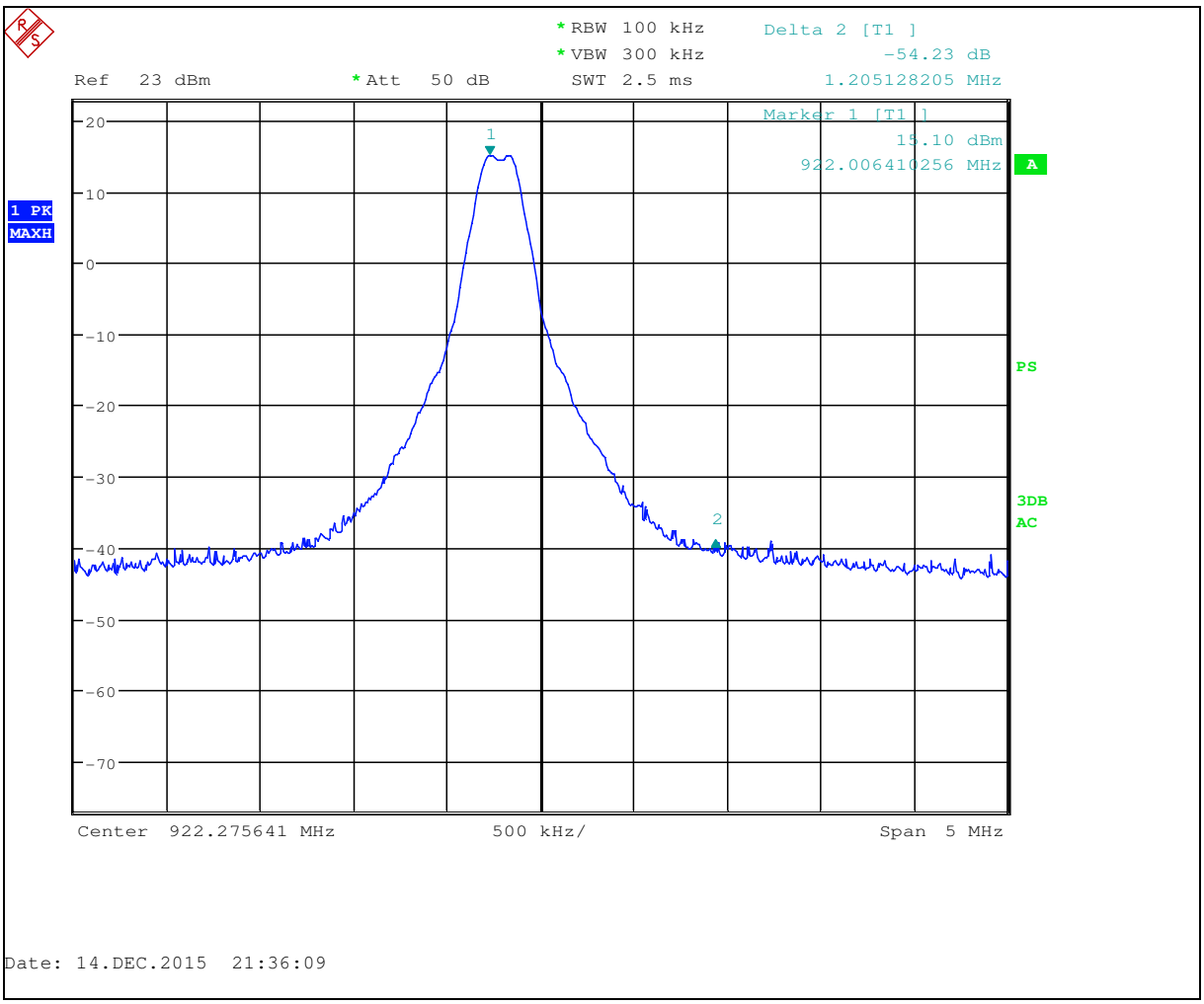
Graph 3.4.7


*RBW 100 kHz
Marker 1 [T1]
*VBW 300 kHz
-40.25 dBm
Ref -10 dBm
*Att 20 dB
SWT 900 ms
1.828000000 GHz
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
1 PK
MAXH
A
PRN
1
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 1.JAN.2000 19:36:18

Graph 3.4.8


*RBW 100 kHz
*VBW 300 kHz
Ref 23 dBm
*Att 50 dB
SWT 5 ms
Marker 1 [T1]
-43.99 dBm
902.055689103 MHz
Delta 2 [T1]
60.50 dB
5.487641765 MHz
A
1 PK
MAXH
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 907.4346647 MHz
1.130128205 MHz/
Span 11.30128205 MHz
Date: 14.DEC.2015 22:47:46

Graph 3.4.9


*RBW 100 kHz
*VBW 300 kHz
Ref 23 dBm
*Att 50 dB
SWT 2.5 ms
Delta 2 [T1]
-54.23 dB
1.205128205 MHz
Marker 1 [T1]
15.10 dBm
922.006410256 MHz
A
1 PK
MAXH
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 922.275641 MHz
500 kHz/
Span 5 MHz
Date: 14.DEC.2015 21:36:09

Graph 3.4.10

3.5 Radiated spurious emissions

Test location: ☐ OATS ☒ Anechoic Chamber ☐ Other

Test result: **Pass**

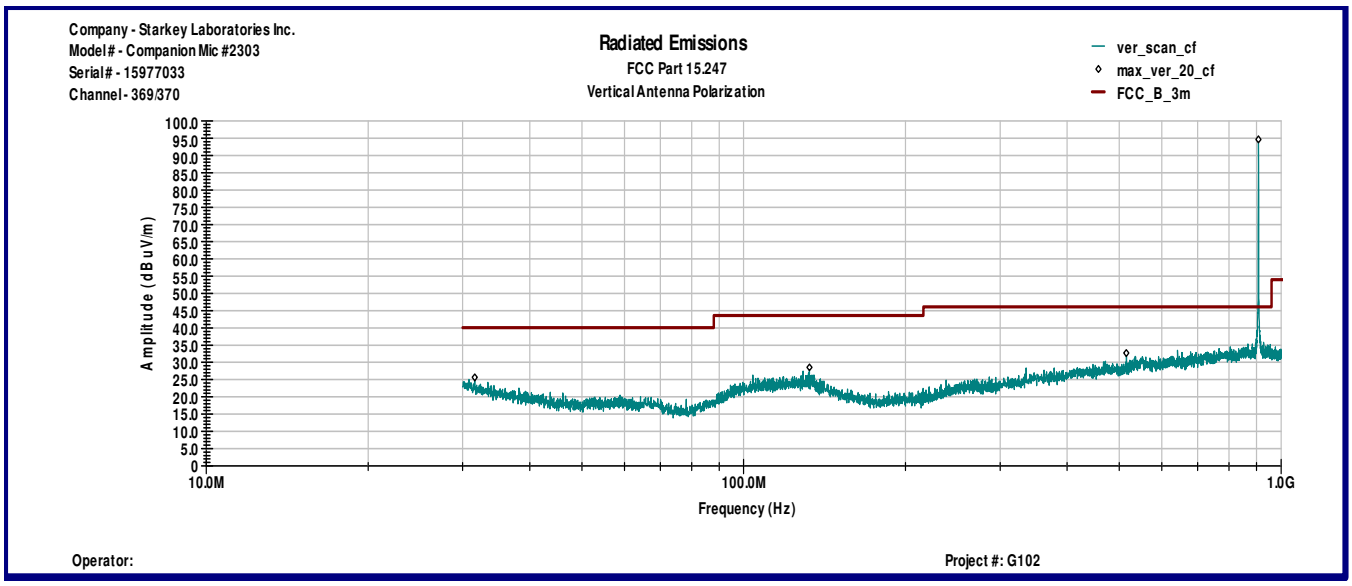
Max. Margin: 0.1dB below the limits

Note: Radiated spurious emission not related with transmitter operation, outside restricted band of operation per FCC 15.205 and fundamental frequencies were excluded form the table.

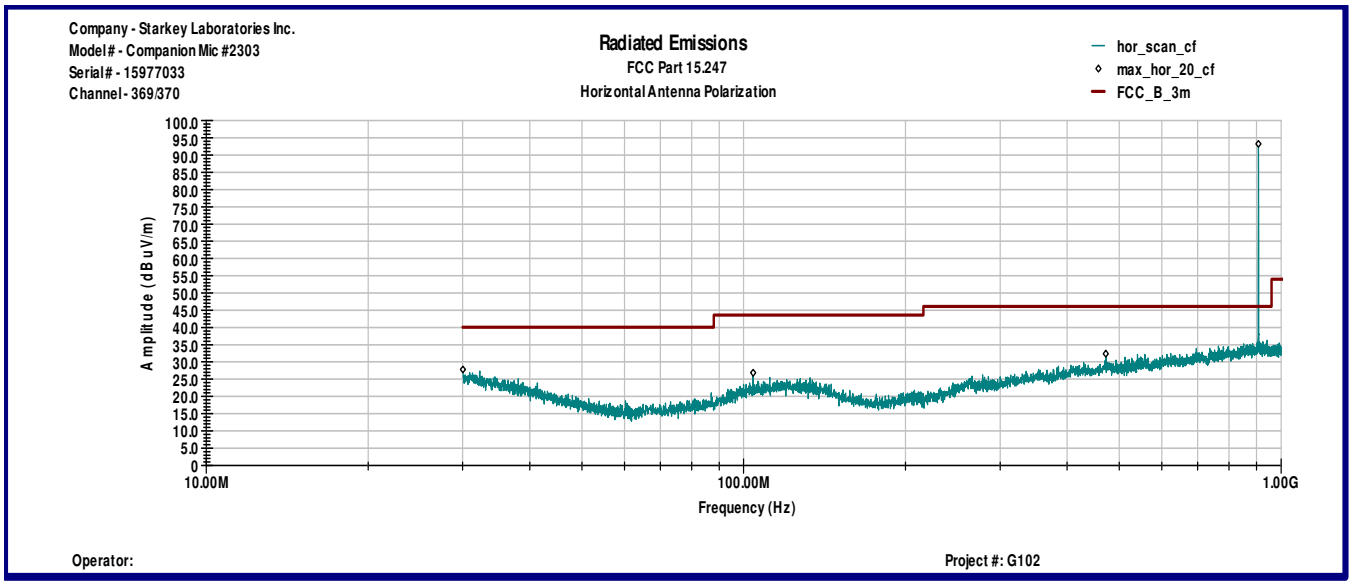
Date:	December 7-13, 2015	**Result: Pass**
Tested by:	Simon Khazon	
Standard:	FCC part 15.247(d)	
Test Point:	Enclosure	
Operation mode:	See page 5	
Environmental Conditions:	23℃; 47%(RH); 97.8kPa	
Note:	1GHz-10GHz See next page.	

Table 3.5.1

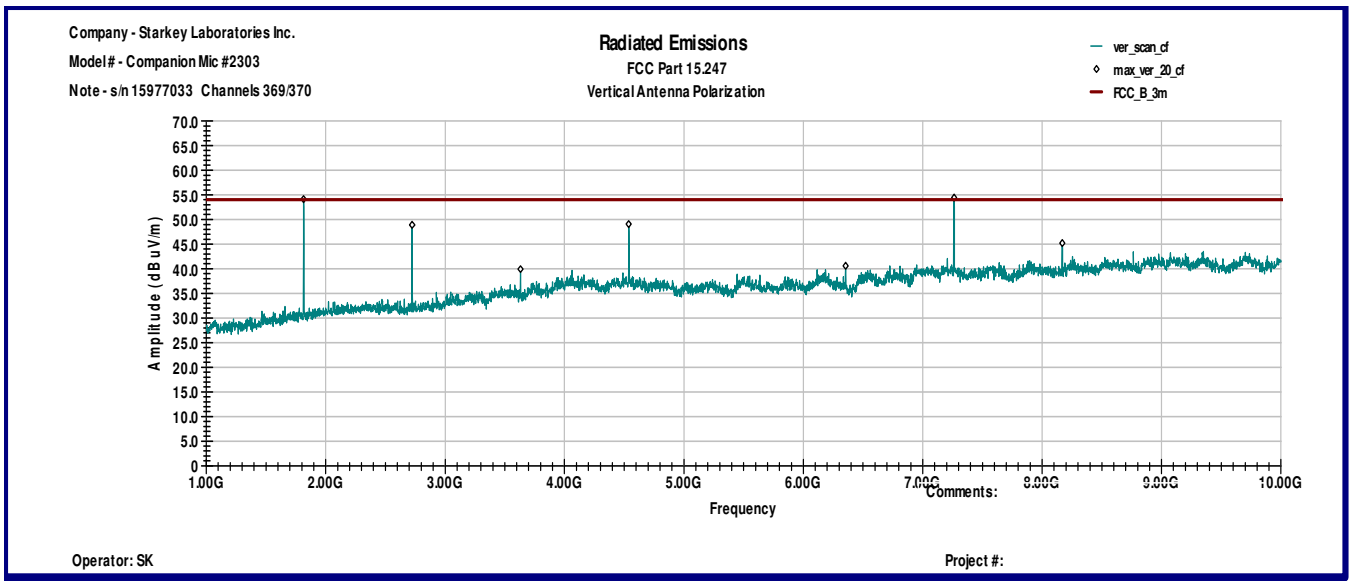
Frequency	Antenna		Ant. CF	Cable loss	Pre-amp	Reading	Total @ 3m	Limit	Margin	Comments
MHz	Polarity	Hts(cm)	dB1/m	dB	Gain (dB)	dBµV	dBµV/m	dBµV/m	dB	
				Channels 369/370						
2722.92	V	129	29.1	3.1	43.6	65.4	54.0	74.0	-20.0	Peak
2722.92	H	164	29.1	3.1	43.6	70.2	58.8	74.0	-15.2	Peak
2722.92	V	129	29.1	3.1	43.6	59.7	48.3	54.0	-5.7	Avg
2722.92	H	164	29.1	3.1	43.6	60.5	49.1	54.0	-4.9	Avg
7260.36	V	100	35.8	5.3	40.9	62.1	62.3	74.0	-11.7	Peak
7260.36	V	118	35.8	5.3	40.9	58.1	58.3	74.0	-15.7	Peak
7260.36	V	100	35.8	5.3	40.9	49.7	49.9	54.0	-4.0	Avg
7260.36	V	118	35.8	5.3	40.9	43.9	44.1	54.0	-9.8	Avg
				Channels 388/389						
2740.15	V	124	29.2	3.1	43.6	65.1	53.8	74.0	-20.2	Peak
2739.71	H	316	29.2	3.1	43.6	58.5	47.2	74.0	-26.8	Peak
2740.15	V	124	29.2	3.1	43.6	56.5	45.2	54.0	-8.8	Avg
2739.71	H	316	29.2	3.1	43.6	54.4	43.1	54.0	-10.9	Avg
7306.42	V	102	35.9	5.3	40.8	53.8	54.2	74.0	-19.8	Peak
7306.42	H	195	35.9	5.3	40.8	42.1	42.5	74.0	-31.5	Peak
7306.42	V	119	35.9	5.3	40.8	48.5	48.9	54.0	-5.0	Avg
7306.42	H	15	35.9	5.3	40.8	35.7	36.1	54.0	-17.8	Avg
				Channels 409/410						
2759.33	V	182	29.2	3.1	43.6	75.0	63.7	74.0	-10.3	Peak
2759.33	H	185	29.2	3.1	43.6	69.7	58.4	74.0	-15.6	Peak
2759.33	V	182	29.2	3.1	43.6	63.9	52.6	54.0	-1.3	Avg
2759.33	H	185	29.2	3.1	43.6	65.1	53.8	54.0	-0.1	Avg
4599.07	V	159	32.6	4.1	41.9	55.3	50.0	74.0	-24.0	Peak
4599.29	H	148	32.6	4.1	41.9	55.6	50.3	74.0	-23.7	Peak
4599.07	V	159	32.6	4.1	41.9	46.7	41.4	54.0	-12.6	Avg
4599.29	H	148	32.6	4.1	41.9	47.8	42.5	54.0	-11.5	Avg
7357.46	V	131	36.0	5.3	40.8	50.6	51.2	74.0	-22.8	Peak
7357.46	H	131	36.0	5.3	40.8	44.0	44.6	74.0	-29.4	Peak
7357.46	V	131	36.0	5.3	40.8	45.2	45.8	54.0	-8.1	Avg
7357.46	H	131	36.0	5.3	40.8	37.2	37.8	54.0	-16.1	Avg
				Channels 417						
2729.18	V	100	29.1	3.1	43.6	63.5	52.1	74.0	-21.9	Peak
2729.18	H	200	29.1	3.1	43.6	69.2	57.8	74.0	-16.2	Peak
2729.18	V	100	29.1	3.1	43.6	43.3	31.9	54.0	-22.0	Avg
2729.18	H	200	29.1	3.1	43.6	45.1	33.7	54.0	-20.2	Avg
7277.52	V	119	35.8	5.3	40.9	54.3	54.6	74.0	-19.4	Peak
7277.52	H	126	35.8	5.3	40.9	46.6	46.9	74.0	-27.1	Peak
7277.52	V	119	35.8	5.3	40.9	39.7	40.0	54.0	-14.0	Avg
7277.52	H	126	35.8	5.3	40.9	30.9	31.2	54.0	-22.8	Avg



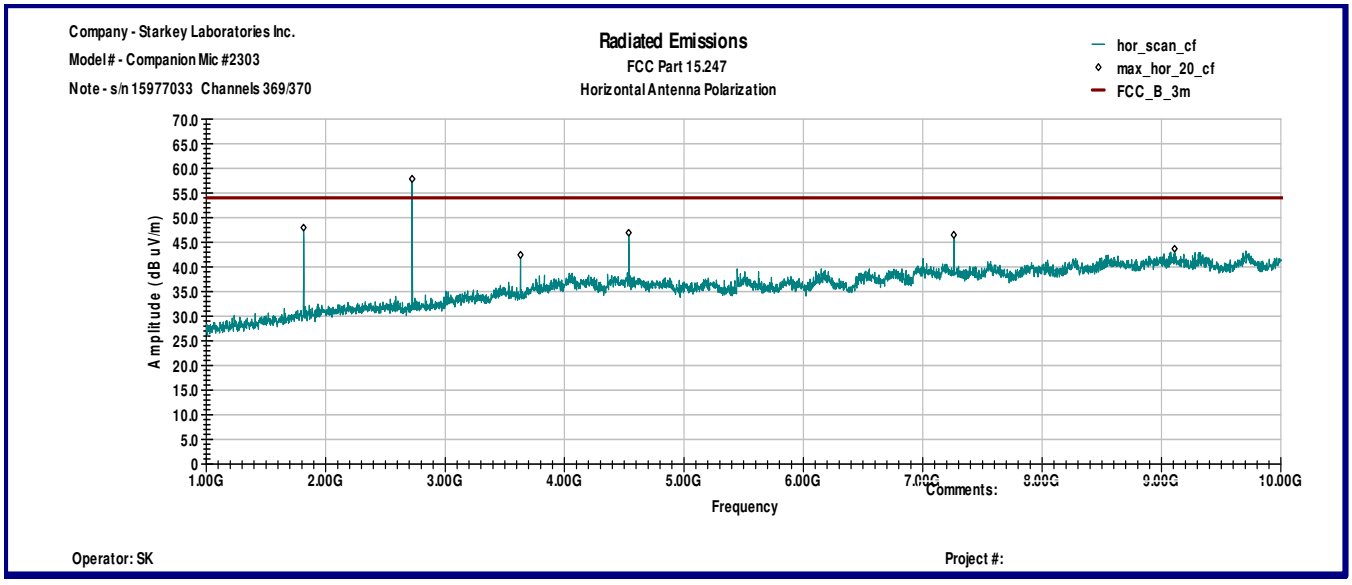
Graph 3.5.1



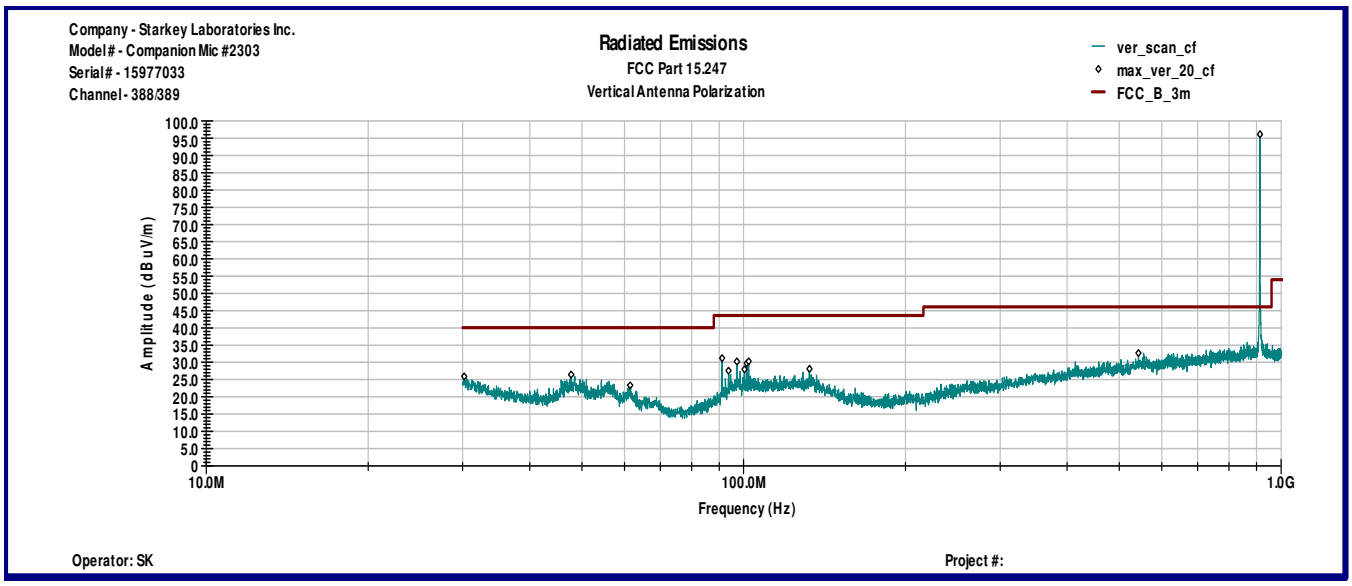
Graph 3.5.2



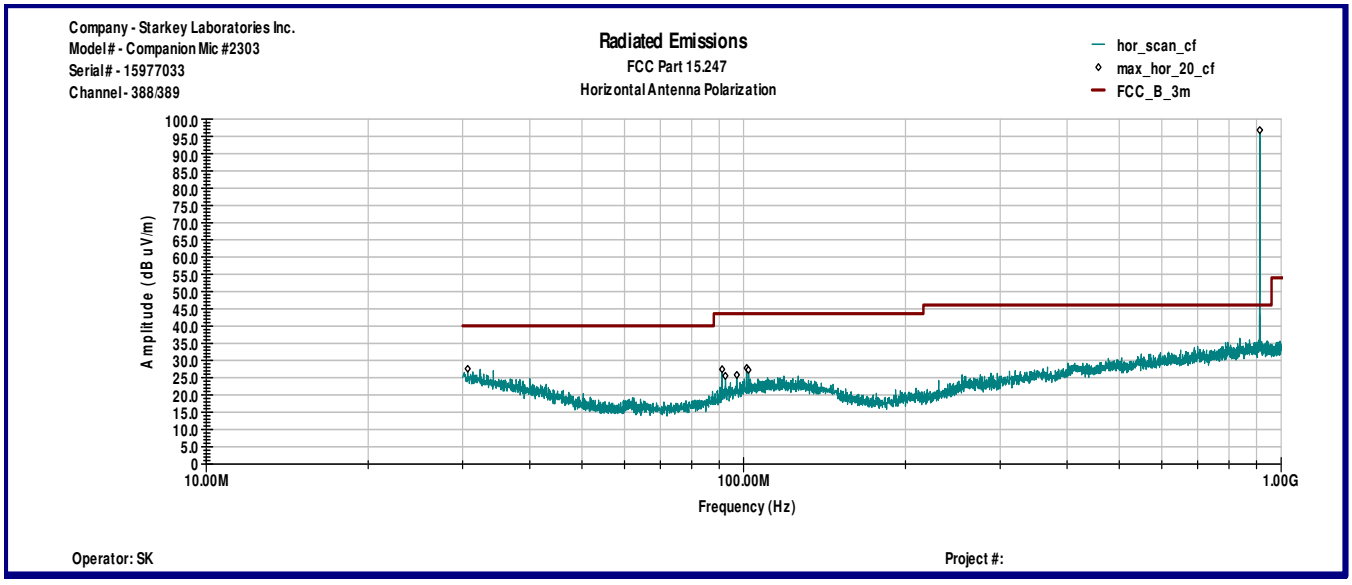
Graph 3.5.3



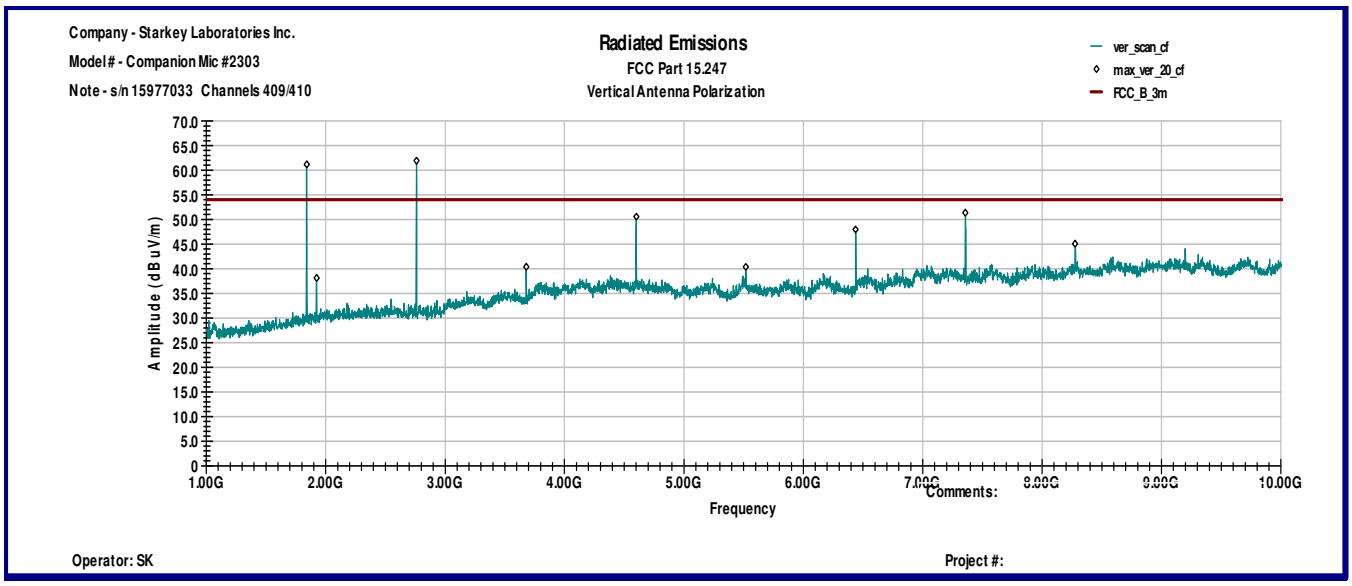
Graph 3.5.4



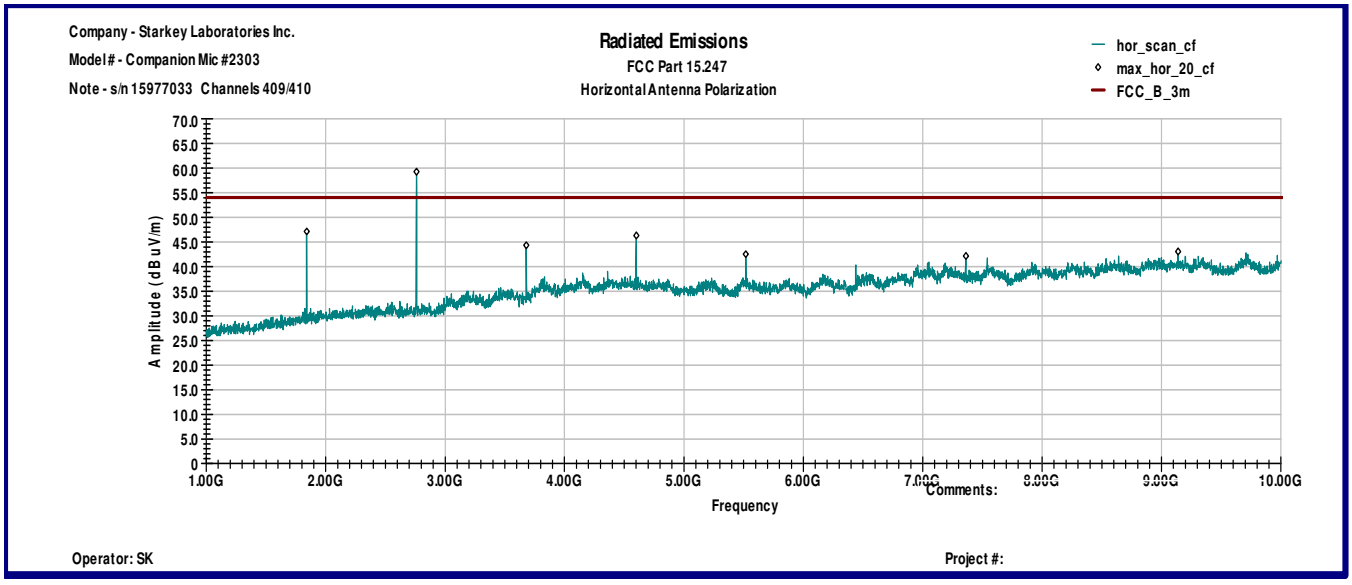
Graph 3.5.5



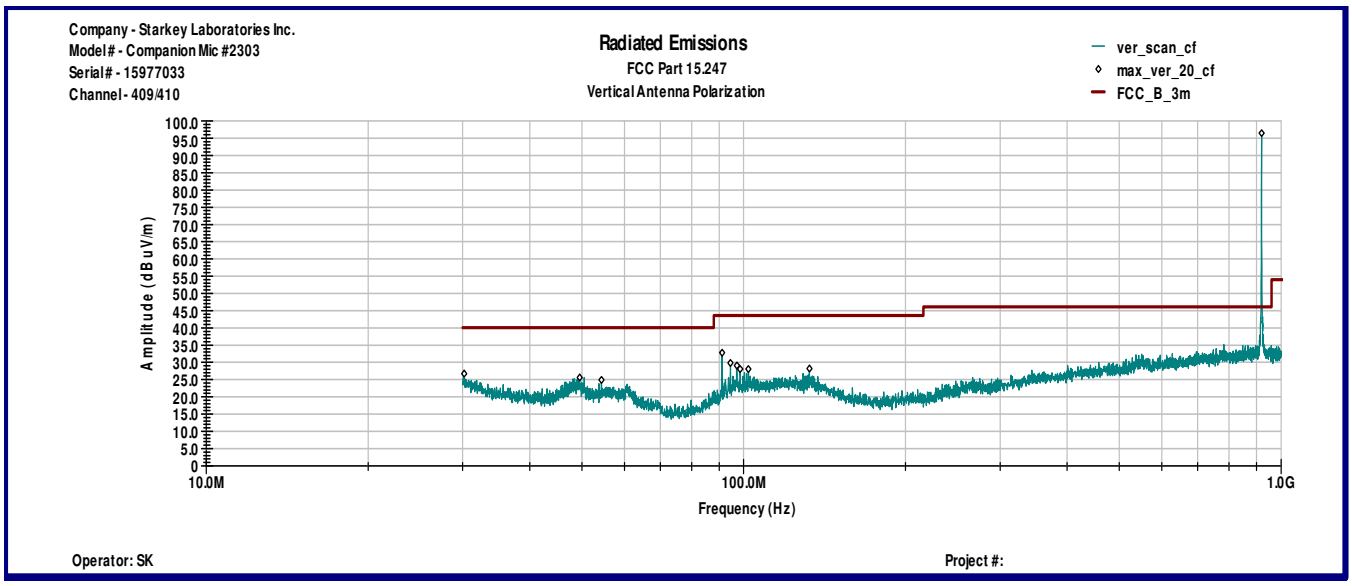
Graph 3.5.6



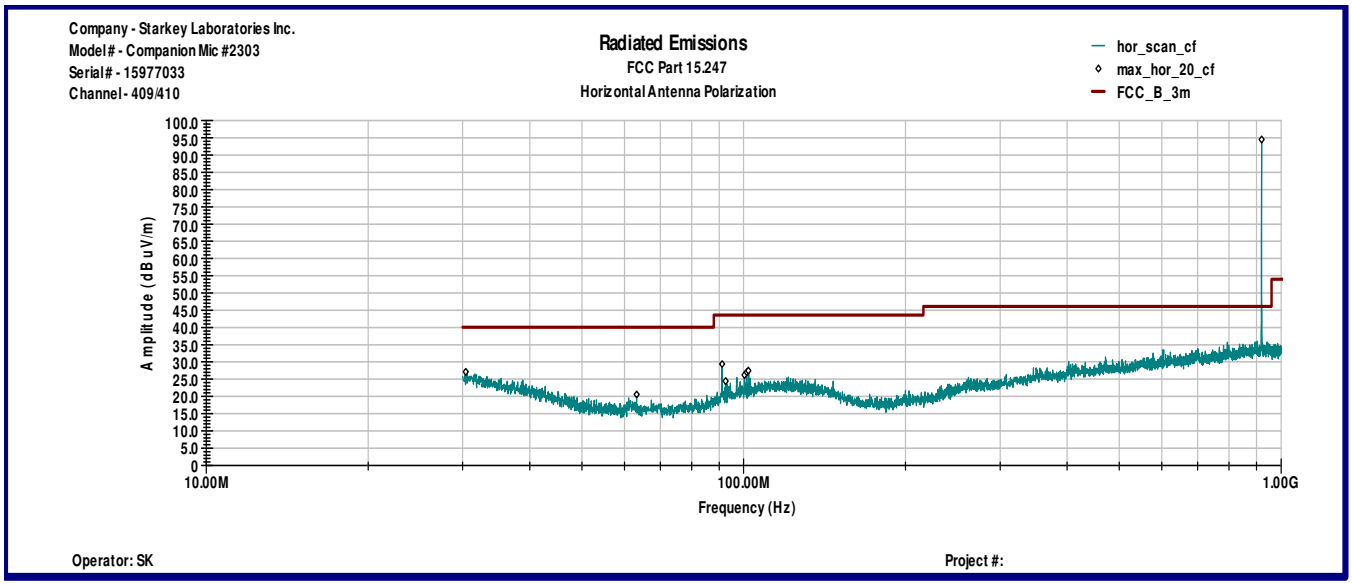
Graph 3.5.7



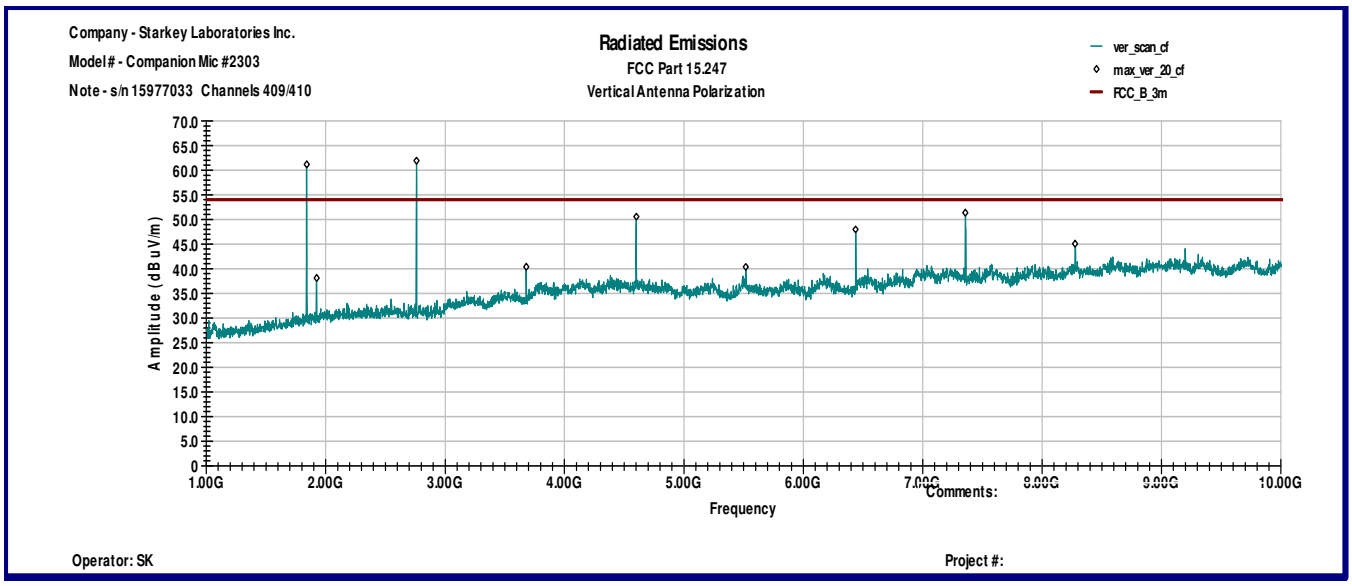
Graph 3.5.8



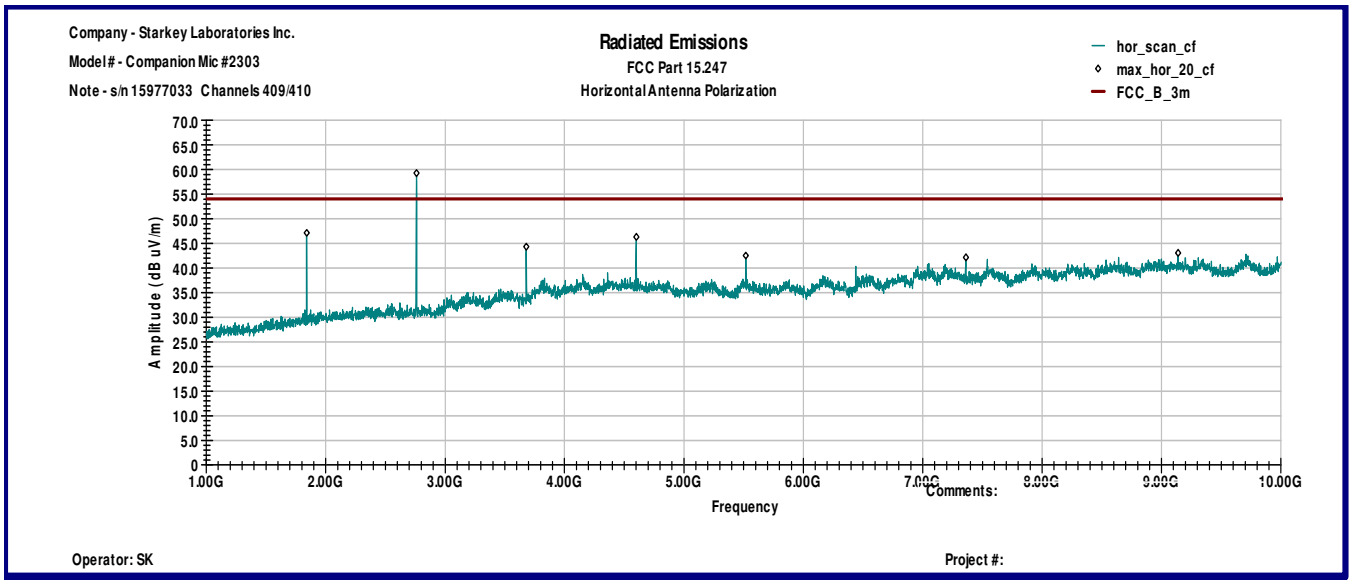
Graph 3.5.9



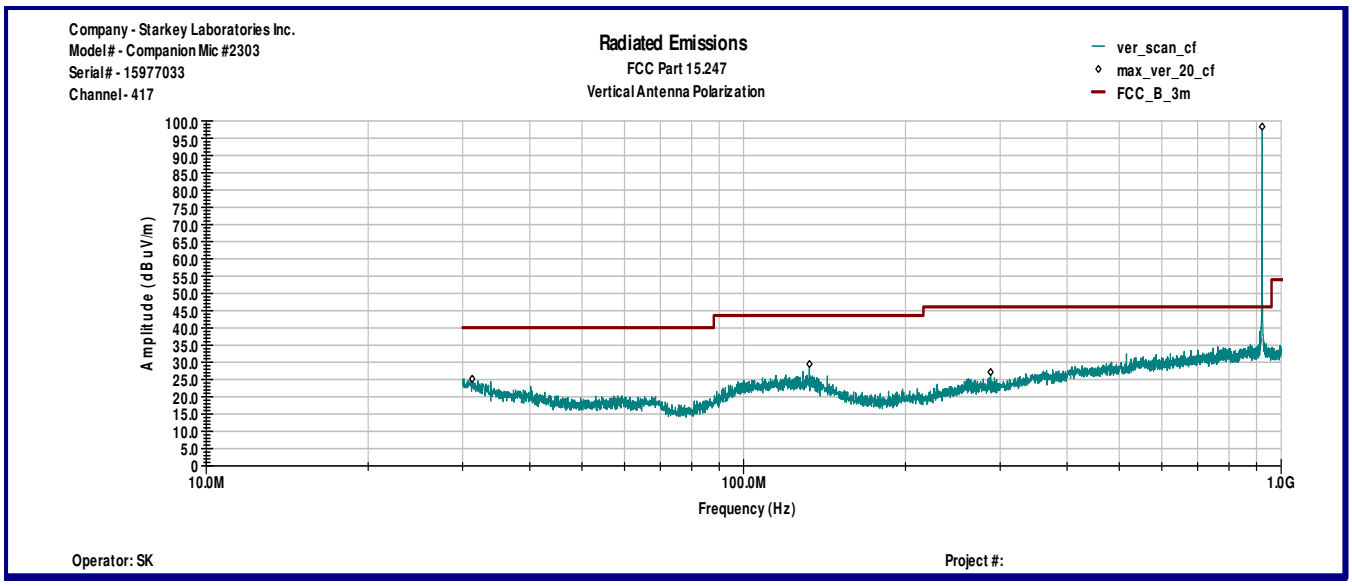
Graph 3.5.10



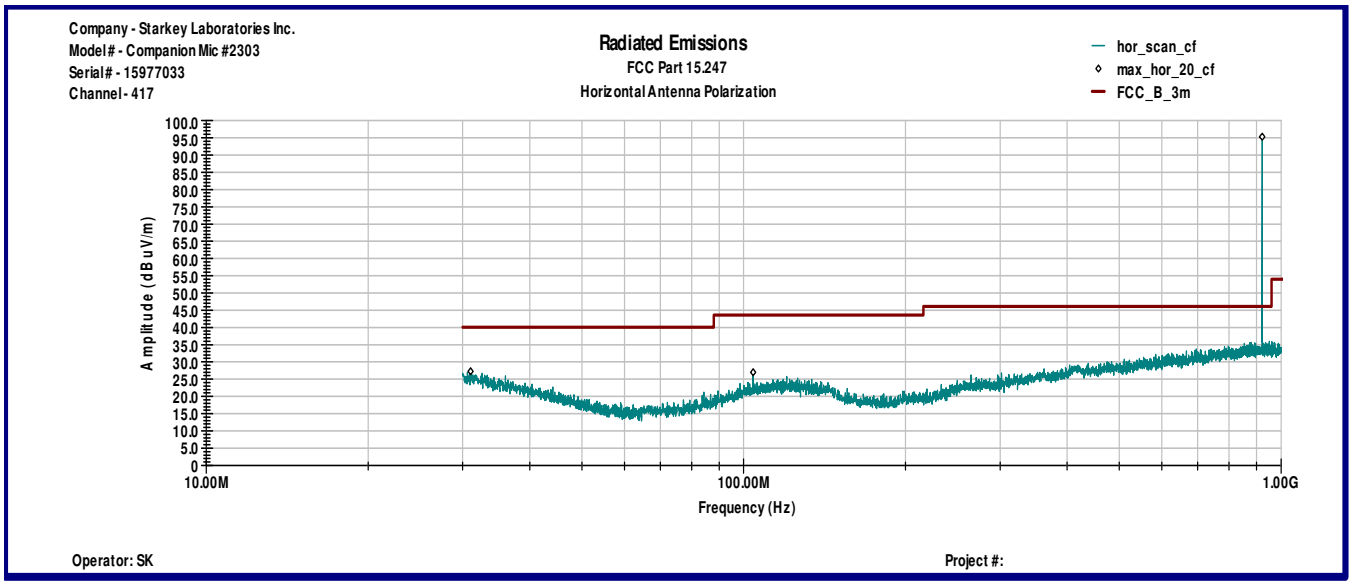
Graph 3.5.11



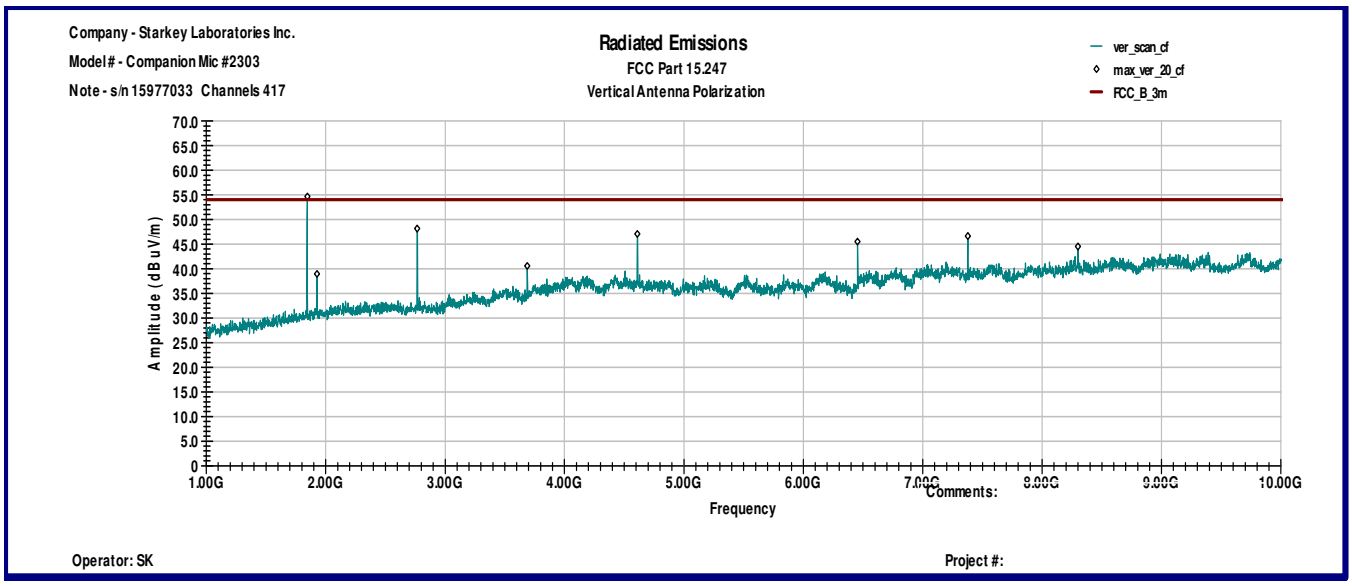
Graph 3.5.12



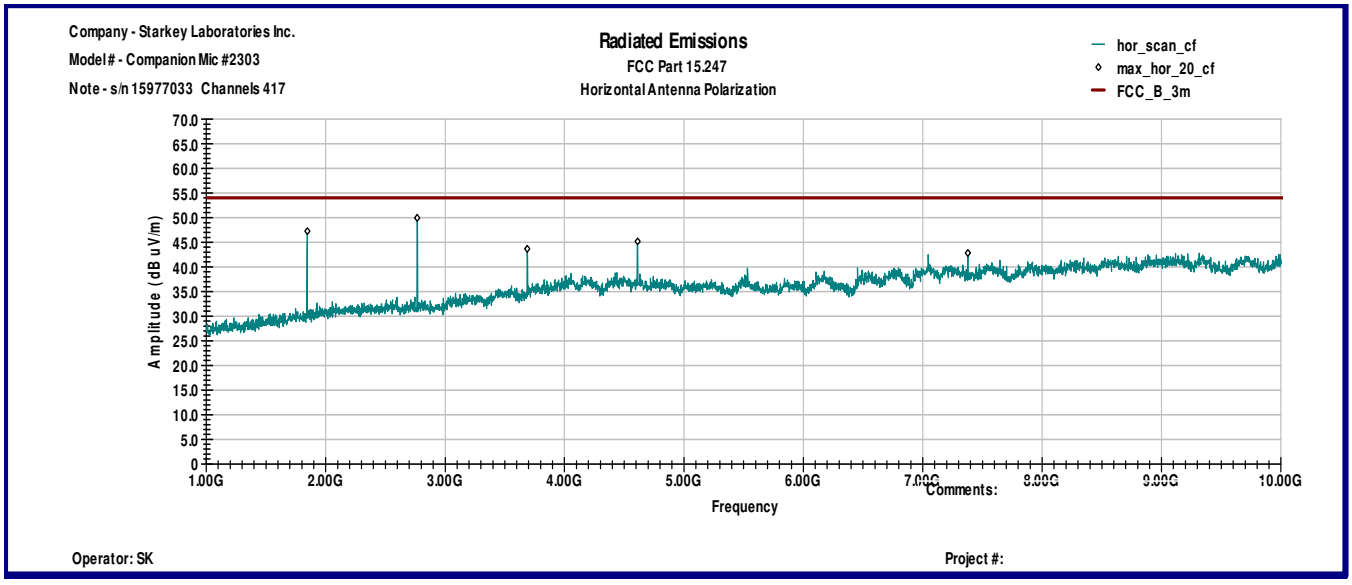
Graph 3.5.13



Graph 3.5.14



Graph 3.5.15



Graph 3.5.16

3.6 RF Exposure Compliance

The maximum measured power, P is 21.77dBm

The antenna gain, G is 1.0dBi

The maximum EIRP power = P + G
EIRP = 21.77+ 1.0 = 22.77dBm, or 189mW or 0.189W

The limits for Maximum Permissible Exposure (MPE) for transmitter operating at 928MHz, MPE is 928/1500 = **0.619mW/cm^2**

The Power Density, S is related to EIRP with the equation:
S = EIRP / 4πD^2, where D is the safe separation distance and = 0.2m, or 20cm
S = 189/ 4π20^2,
S = **0.0376mW/cm^2**, or below the Maximum Permissible Exposure (MPE) of **0.619mW/cm^2**

3.7 Transmitter power line conducted emissions

Test location: ☐ OATS ☒ Anechoic Chamber ☐ Other

Test result: **N/A**

Frequency range: 0.15MHz-30MHz

Max. Emissions margin: dB below the limits

Notes: EUT powered from internal battery.

3.8 Receiver/digital device radiated emissions

Test location:	☐ OATS	☒ Anechoic Chamber
Test distance:	☐ 10 meters	☒ 3 meters
Test result:	**Pass**	
Frequency range:	30MHz-5000MHz	
Max. Emissions margin:	9.9dB below the limits	

Notes: None

Date:	December 17-18 2015	**Result: Pass**
Tested by:	Simon Khazon	
Standard:	FCC Part 15.109, Class B	
Test Point:	Enclosure	
Operation mode:	See page 5	
Environmental Conditions:	24℃; 44%(RH); 97.8kPa	
Note:	Channel 907.492MHz. Frequency range 30MHz - 1.0GHz Operating frequency 907.492MHz and frequency not related with EUT operation were excluded from this table.	

Table 3.8.1

Frequency MHz	Antenna Polarity	Peak Reading dBµV	Total C.F. dB1/m	Total at 3m dBµV/m	Limit dBµV/m	Margin dB
30.187 MHz	V	10.0	18.5	28.4	40.0	-11.6
58.891 MHz	V	18.2	8.1	26.3	40.0	-13.7
65.027 MHz	V	20.4	7.1	27.5	40.0	-12.5
66.449 MHz	V	19.9	7.0	26.9	40.0	-13.1
132.52 MHz	V	14.1	14.2	28.3	43.5	-15.2
400.96 MHz	V	12.7	17.9	30.5	46.0	-15.5
30.327 MHz	H	7.9	20.2	28.1	40.0	-11.9
64.96 MHz	H	17.1	6.9	24.0	40.0	-16.1
66.426 MHz	H	16.3	7.0	23.3	40.0	-16.8
68.592 MHz	H	19.6	7.1	26.7	40.0	-13.3

Date:	December 17-18 2015	**Result: Pass**
Tested by:	Simon Khazon	
Standard:	FCC Part 15.109, Class B	
Test Point:	Enclosure	
Operation mode:	See page 5	
Environmental Conditions:	24℃; 44%(RH); 97.8kPa	
Note:	Channel 913.258MHz Frequency range 30MHz - 1.0GHz Operating frequency 913.258MHz and frequency not related with EUT operation were excluded from this table.	

Table 3.8.2

Frequency MHz	Antenna Polarity	Peak Reading dBµV	Total C.F. dB1/m	Total at 3m dBµV/m	Limit dBµV/m	Margin dB
55.992 MHz	V	19.8	8.1	28.0	40.0	-12.0
57.72 MHz	V	19.4	8.1	27.5	40.0	-12.6
128.93 MHz	V	12.8	14.3	27.1	43.5	-16.5
132.43 MHz	V	14.5	14.2	28.7	43.5	-14.8
360.21 MHz	V	10.7	17.0	27.7	46.0	-18.4
363.99 MHz	V	11.2	17.0	28.2	46.0	-17.8
450.38 MHz	V	10.8	18.6	29.5	46.0	-16.6
549.4 MHz	V	11.7	21.3	33.1	46.0	-13.0
665.29 MHz	V	11.8	21.6	33.3	46.0	-12.7
750.49 MHz	V	11.6	22.7	34.3	46.0	-11.7
32.396 MHz	H	9.6	19.0	28.5	40.0	-11.5
58.073 MHz	H	14.2	7.4	21.6	40.0	-18.4

Date:	December 17-18 2015	**Result: Pass**
Tested by:	Simon Khazon	
Standard:	FCC Part 15.109, Class B	
Test Point:	Enclosure	
Operation mode:	See page 5	
Environmental Conditions:	24℃; 44%(RH); 97.8kPa	
Note:	Channel 922.055MHz. Frequency range 30MHz - 1.0GHz Operating frequency 922.055MHz and frequency not related with EUT operation were excluded from this table.	

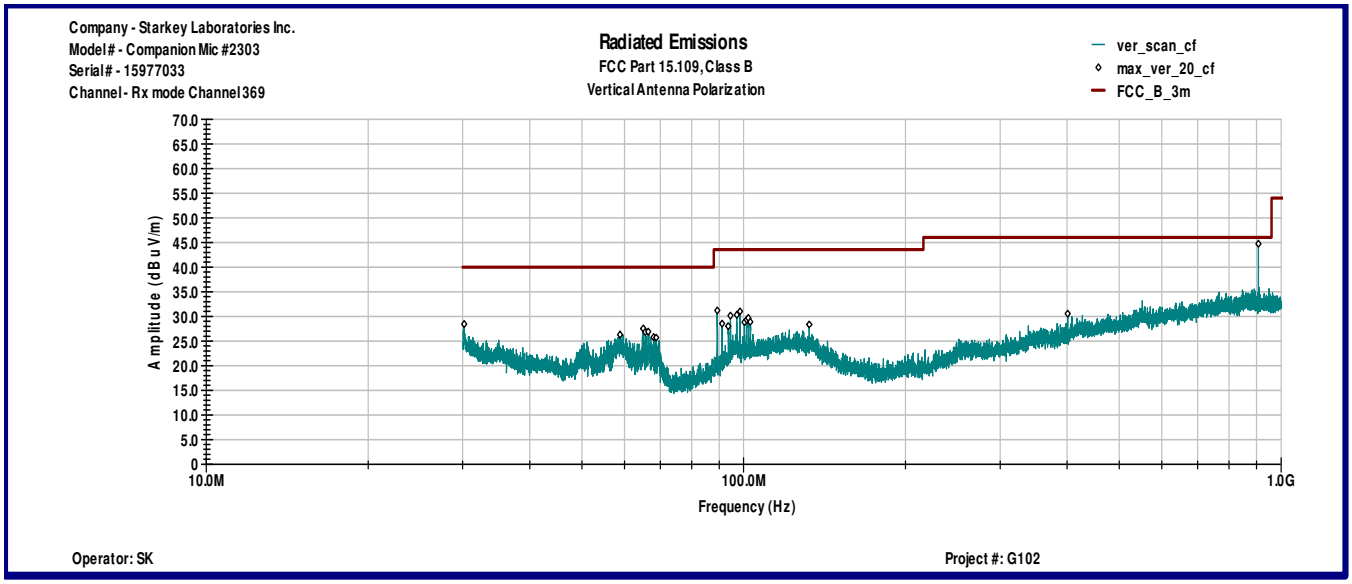
Table 3.8.3

Frequency MHz	Antenna Polarity	Peak Reading dBµV	Total C.F. dB1/m	Total at 3m dBµV/m	Limit dBµV/m	Margin dB
30.082 MHz	V	9.0	18.5	27.5	40.0	-12.5
33.342 MHz	V	10.5	16.1	26.7	40.0	-13.3
49.543 MHz	V	15.7	9.1	24.9	40.0	-15.1
56.005 MHz	V	19.3	8.1	27.4	40.0	-12.6
117.62 MHz	V	14.0	14.4	28.4	43.5	-15.1
132.47 MHz	V	14.1	14.2	28.3	43.5	-15.2
30.97 MHz	H	8.6	19.8	28.4	40.0	-11.6
36.31 MHz	H	11.6	16.7	28.2	40.0	-11.8
59.861 MHz	H	16.9	7.1	24.0	40.0	-16.0
112.92 MHz	H	12.9	13.4	26.3	43.5	-17.2

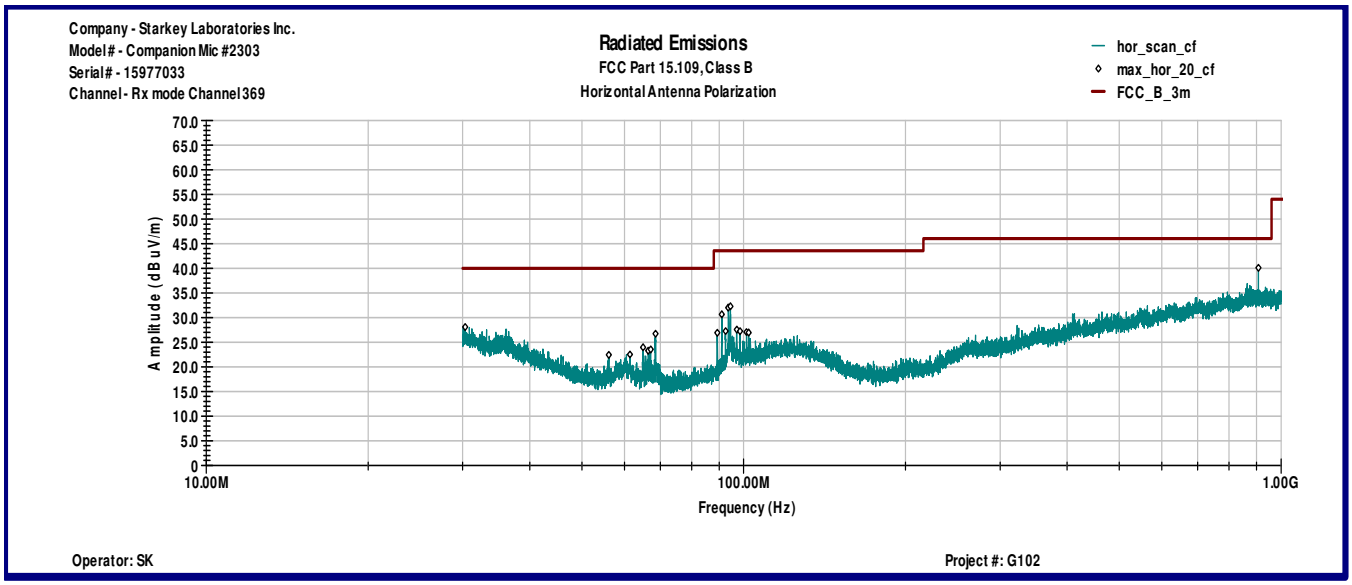
Date:	December 17-18 2015	**Result: Pass**
Tested by:	Simon Khazon	
Standard:	FCC Part 15.109, Class B	
Test Point:	Enclosure	
Operation mode:	See page 5	
Environmental Conditions:	24℃; 44%(RH); 97.8kPa	
Note:	Frequency range 1.0-5.0 GHz	

Table 3.8.4

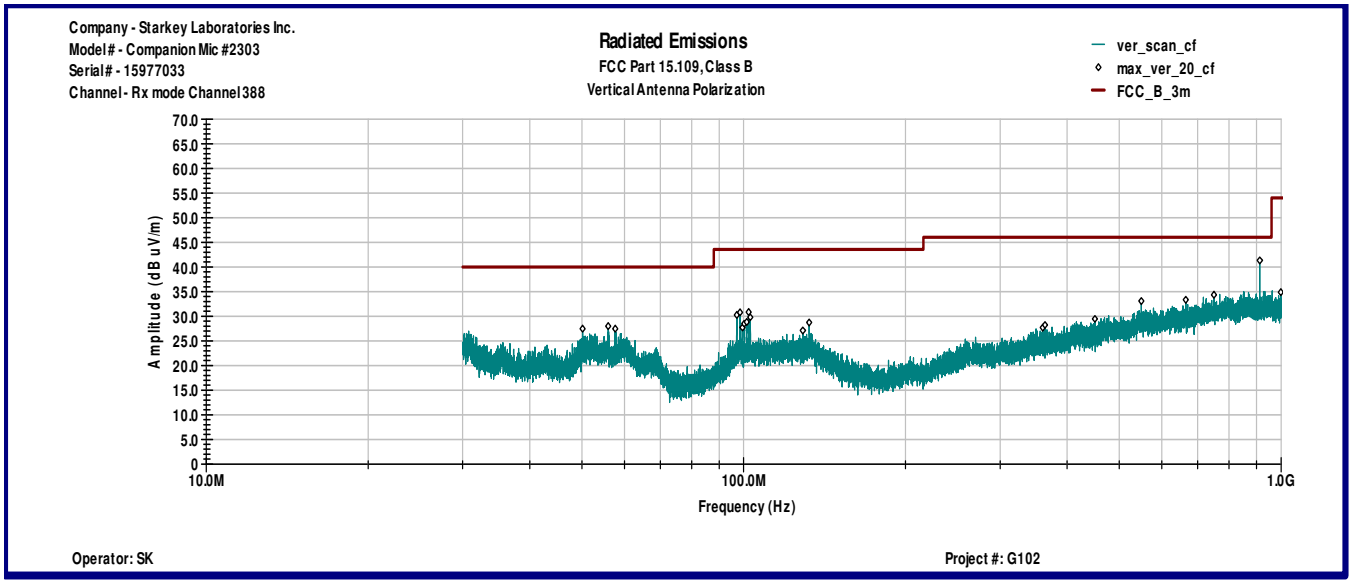
Frequency MHz	Antenna Polarity	Peak Reading dBµV	Total C.F. dB1/m	Pre-Amp. Gain (dB)	Total at 3m dBµV/m	Limit dBµV/m	Margin dB
		Channel 369					
3.63 GHz	V	50.4	35.7	43.5	42.6	54.0	-11.4
1.846 GHz	H	54.1	29.3	43.6	39.9	54.0	-14.1
3.63 GHz	H	50.7	35.5	43.5	42.6	54.0	-11.4
		Channel 388					
1.828 GHz	V	55.9	29.6	43.6	41.9	54.0	-12.1
2.438 GHz	V	56.3	31.6	43.9	44.1	54.0	-9.9
3.652 GHz	V	49.6	35.8	43.5	41.8	54.0	-12.1
1.828 GHz	H	55.8	29.2	43.6	41.5	54.0	-12.5
3.652 GHz	H	47.7	35.5	43.5	39.8	54.0	-14.2
		Channel 417					
1.846 GHz	V	55.7	29.6	43.6	41.8	54.0	-12.2
1.924 GHz	V	50.6	30.0	43.7	37.0	54.0	-17.0
3.686 GHz	V	49.3	35.9	43.5	41.8	54.0	-12.2
1.846 GHz	H	57.0	29.3	43.6	42.7	54.0	-11.3
3.686 GHz	H	46.8	35.7	43.5	39.1	54.0	-14.9



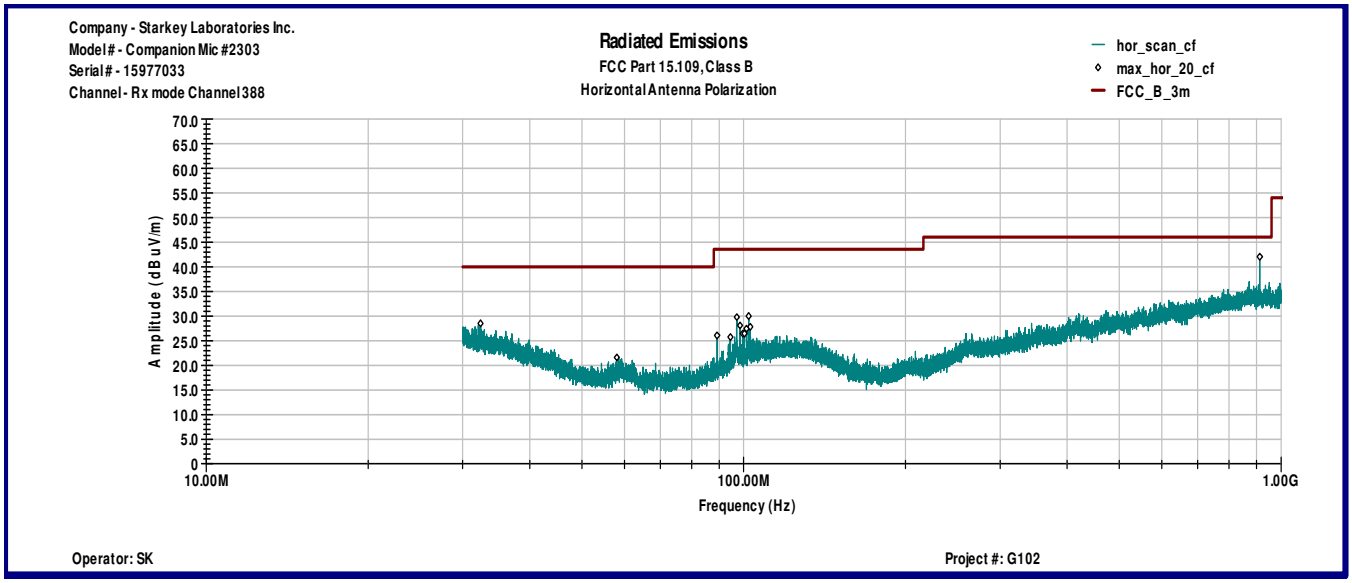
Graph 3.8.1



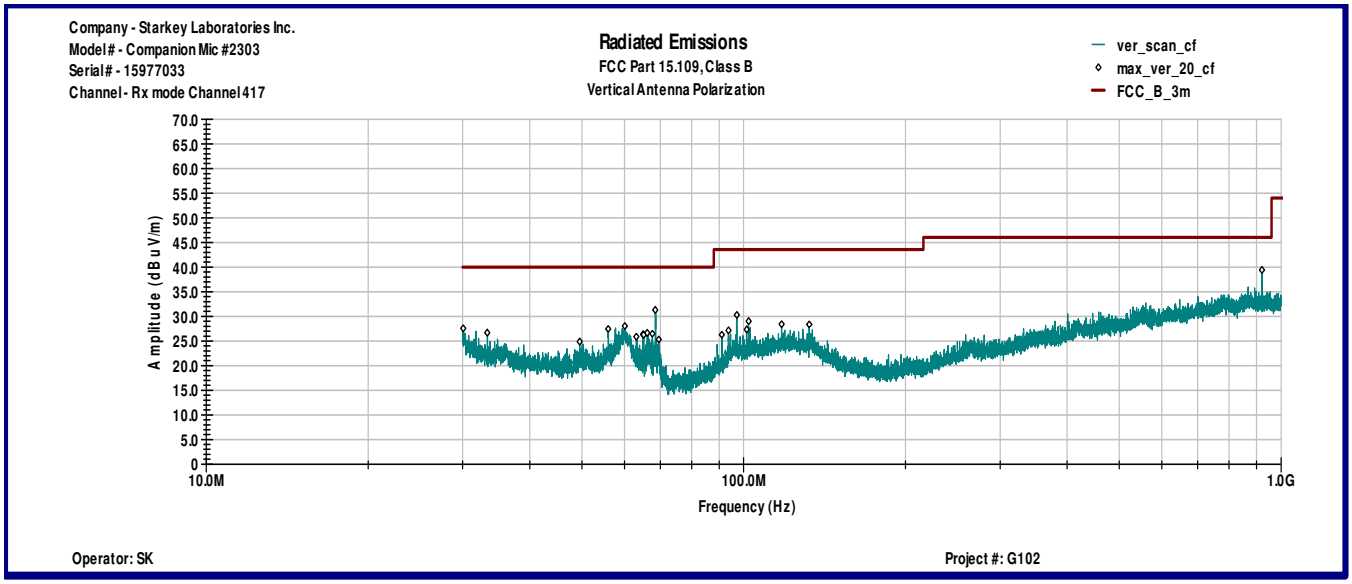
Graph 3.8.2



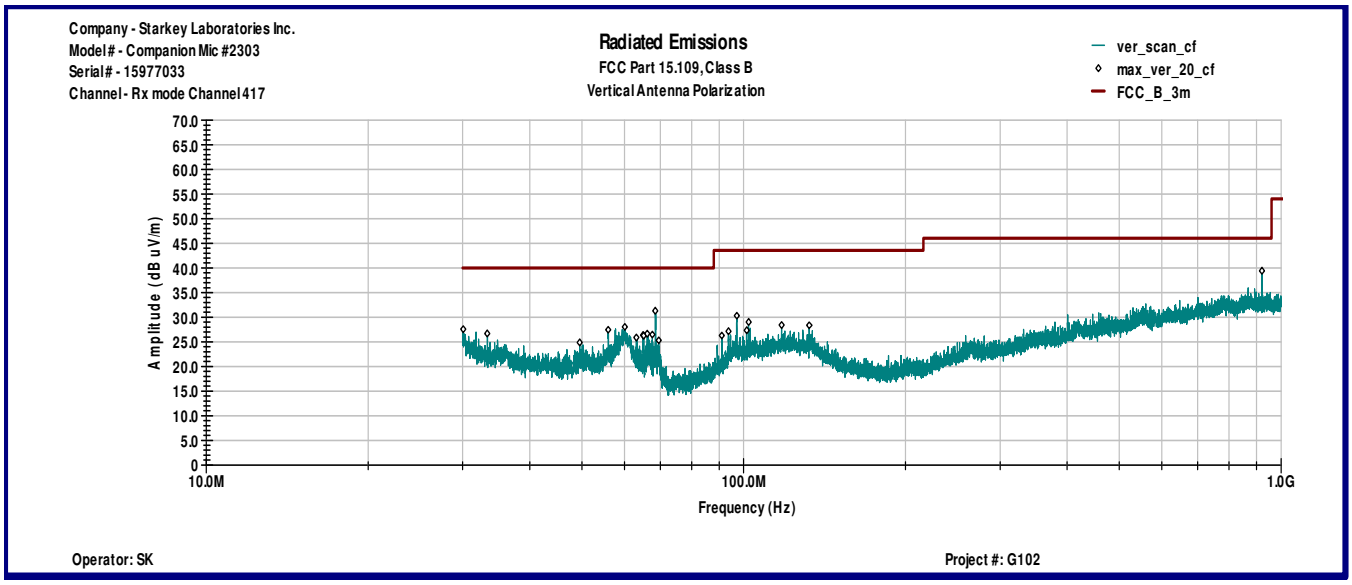
Graph 3.8.3



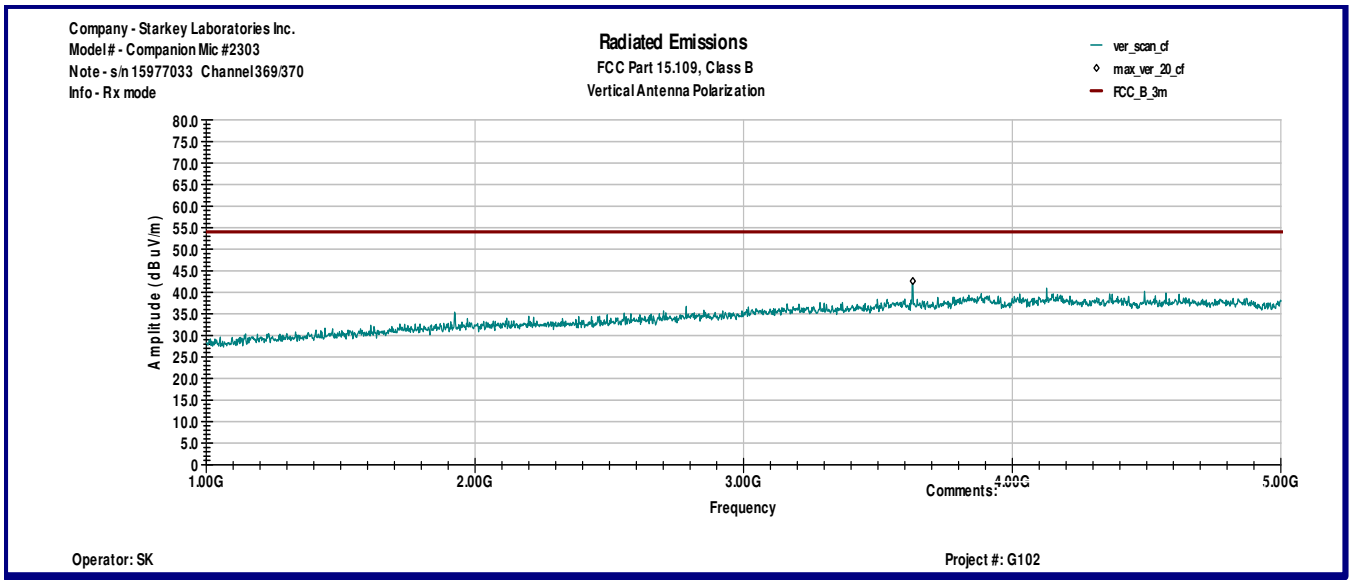
Graph 3.8.4



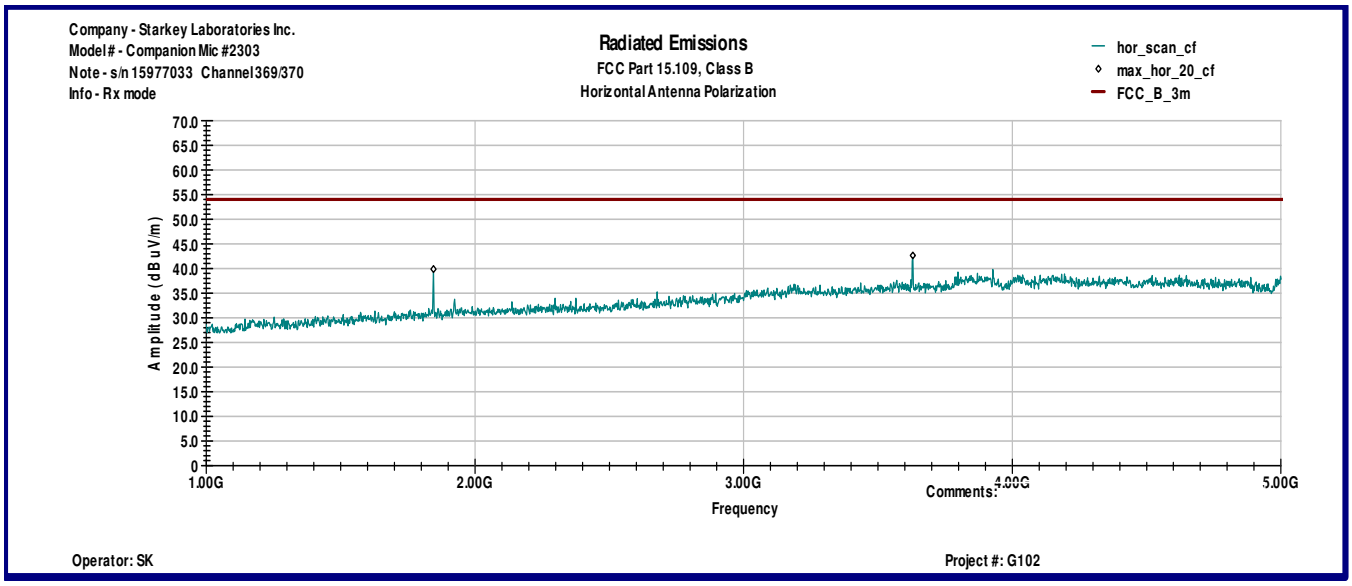
Graph 3.8.5



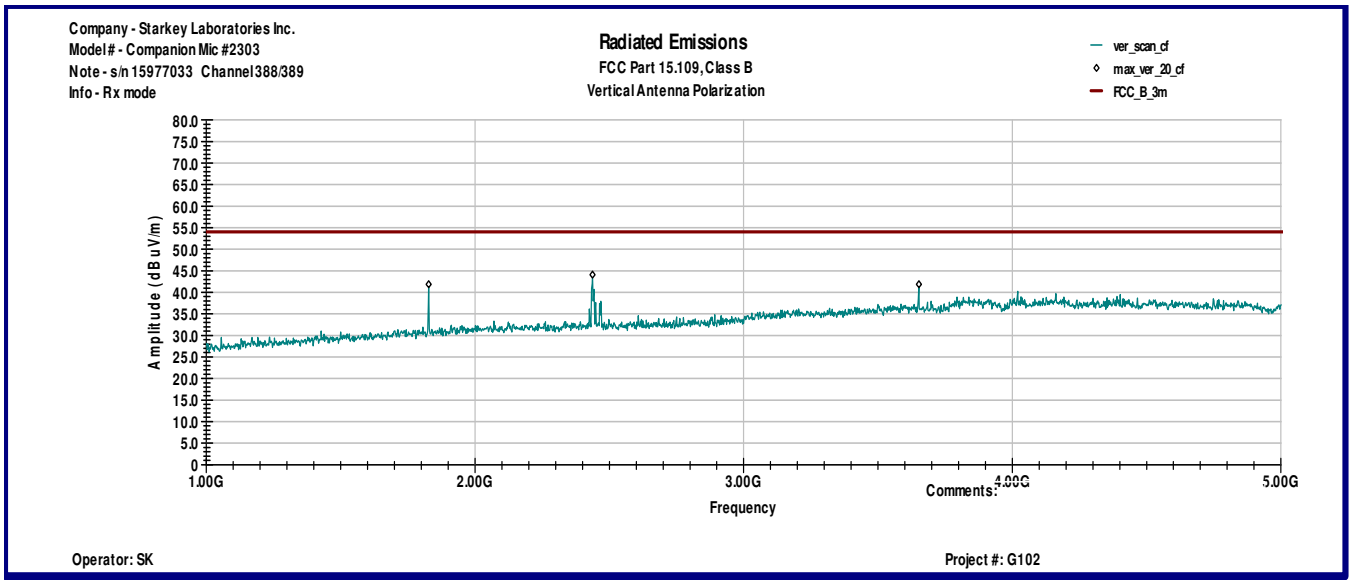
Graph 3.8.6



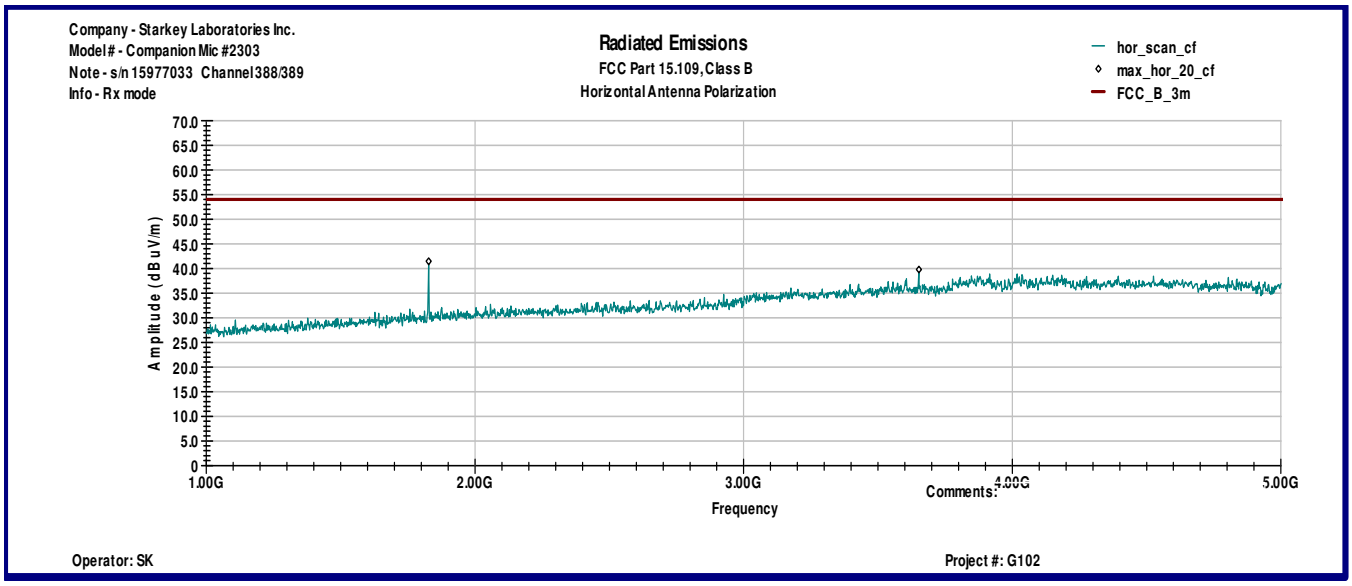
Graph 3.8.7



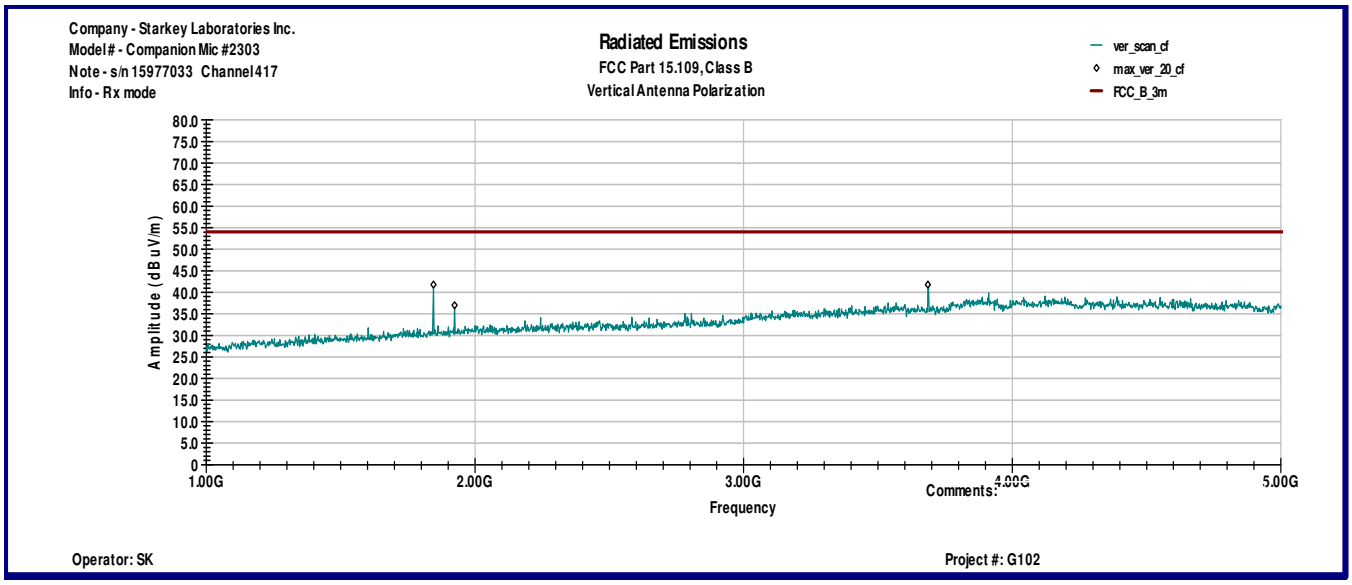
Graph 3.8.8



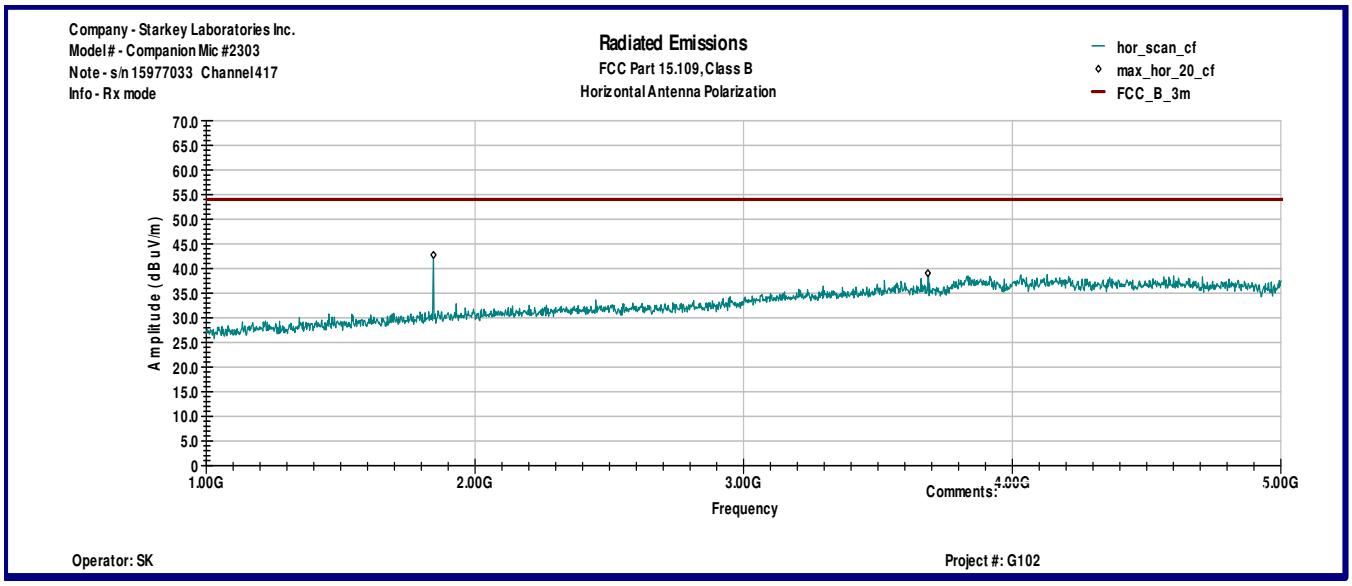
Graph 3.8.9



Graph 3.8.10



Graph 3.8.11



Graph 3.8.12

3.9 Digital device conducted emissions

Test location: ☐ OATS ☒ Anechoic Chamber ☐ Other

Test result: **N/A**

Frequency range: 0.15MHz-30MHz

Max. Emissions margin: dB below the limits

Notes: EUT powered from internal battery.

4.0 TEST EQUIPMENT

DESCRIPTION	MANUFACTURER	MODEL	SERIAL NO.	INTERTEK ID	CAL DUE	USED
Spectrum Analyzer	R & S	FSP 40	100024	12559	01/07/2016	☒
Spectrum Analyzer	R & S	ESU	100398	25283	01/26/2016	☒
Bicono-Log Antenna	Teseq	CBL6112D	32859	25289	09/24/2016	☒
Horn Antenna	EMCO	3115	6579	15580	08/04/2016	☒
Pre-Amplifier	MITEQ	AMF-5D-00501800-28-13P	1402232	172081	11/19/2016	☒
High Pass Filter	Reactel	7HS-1G-S12	0223	015275	VBU	☒
System	Quantum Change	TILE! Instrument Control	Ver. 3.4.K.29	15259	VBU	☒

5.0 Revision History

REVISION LEVEL	DATE	REPORT NUMBER	PREPARED	REVIEWED	NOTES
0	12-28-2015	102403390MIN-001	SK	NS	Original Issue