FCC 47 CFR PART 15 SUBPART C
INDUSTRY CANADA RSS-210 ISSUE 9

CERTIFICATION TEST REPORT

FOR

POD

MODEL NUMBER: Vitek DensiCHEK

FCC ID: 2AQJ2-VTK01
IC: 24083-VTK01

REPORT NUMBER: 11686827B

ORIGINAL ISSUE DATE: March 5, 2018
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Prepared for
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NVLAP TESTING
NVLAP LAB CODE 100414-0

Revision History

Rev.	Issue Date	Revisions	Revised By
1.0	3/5/2018	Initial Issue	BM
1.1	7/17/2018	Updated FCC/IC Numbers	BM
1.2	9/11/2018	Added 99% BW measurement,	BM

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	BioMerieux Inc. 595 Anglum Rd Hazelwood, MO, 63042, USA
EUT DESCRIPTION:	The VITEK® DensiCHEK™ instrument is an accessory intended for use with the VITEK® 2 Systems to measure the optical density of a microorganism suspension in 0.45-0.50% saline. The instrument provides values in McFarland units, proportional to microorganism concentrations and has applications as an in vitro diagnostic medical device.
MODEL:	Vitek DensiCHEK
SERIAL NUMBER:	POD SP-P17096302 Display Base DB-P17096302 Charging Base CB-P17096301
DATE TESTED:	July 2017 to December 2017

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APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 15 SUBPART C	Pass
INDUSTRY CANADA RSS-210 Issue 9, Annex B	Pass
INDUSTRY CANADA RSS-GEN Issue 5	Pass

UL LLC tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL LLC based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

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 LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

Approved & Released
For UL LLC By:

Robert Delisi
Principal Engineer
UL – Consumer Technology Division

Prepared By:

Bart Mucha
Staff Engineer
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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2013, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 5, and RSS-210 Issue 9.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 333 Pfingsten Road, Northbrook, IL 60062 USA.

UL NBK is accredited by NVLAP, Laboratory Code 100414-0. The full scope of accreditation can be viewed at http://ts.nist.gov/

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Sample Calculations
Radiated Field Strength and Conducted Emissions data contained within this report is calculated on the following basis:
Field Strength (dBuV/m) = Meter Reading (dBuV) + AF (dB/m) - Gain (dB) + Cable Loss (dB)
Conducted Voltage (dBuV) = Meter Reading (dBuV) + Cable Loss (dB) + LISN IL (dB)
Conducted Current (dBuA) = Meter Reading (dBuV) + Cable Loss (dB) - Transducer Factor (dBohms)

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Test	Range	Equipment	Uncertainty k=2
Radiated Emissions	30-200MHz	Bicon 10m Horz	4.27dB
Radiated Emissions	30-200MHz	Bicon 10m Vert	4.28dB
Radiated Emissions	200-1000MHz	LogP 10m Horz	3.33dB
Radiated Emissions	200-1000MHz	LogP 10m Vert	3.39dB
Radiated Emissions	30-200MHz	Bicon 3m Horz	3.30dB
Radiated Emissions	30-130MHz	Bicon 3m Vert	4.84dB
Radiated Emissions	130-200MHz	Bicon 3m Vert	4.94dB
Radiated Emissions	200-1000MHz	LogP 3m Horz	3.46dB
Radiated Emissions	200-1000MHz	LogP 3m Vert	4.98dB
Radiated Emissions	1-6GHz	Horn	5.02dB
Radiated Emissions	6-18GHz	Horn	5.34dB
Radiated Emissions	18-26GHz	Horn	6.60dB
Conducted Ant Port	30MHz-26GHz	Spectrum Analyzer	2.94

Uncertainty figures are valid to a confidence level of 95%.

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a laboratory device which contains an RFID device operating at 13.56MHz. The device can be operated by itself as battery operated (refered to as POD), as well as on a base used as charger and to display results. See section 5.7 for complete configuration information.

The device also contains a Bluetooth module FCC ID: T9JRN4020. This report only covers the testing of RFID radio.

5.2. MAXIMUM RADIATED FIELD STRENGTH

The transmitter has a maximum field strength as follows:

Frequency Range (MHz)	Mode	Output Field Strength dBuV/m @ 3m
13.56	Noral Operation	55.39

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The RFID radio utilizes an integral antenna.

The loop coil antenna area is 0.337sq in

The length of any antenna loop element is 2.39”

The antenna coil has 3 turns

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was Pod v01.00 and Base v01.02

5.5. WORST-CASE CONFIGURATION AND MODE

The transmitter and receiver must operate simultaneously for normal operation thus there is only one operating mode. Equipment is table top and it can be operated in single orientation only.

5.6. MODIFICATIONS

No modifications were made during testing.

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5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Use	Product Type	Manufacturer	Model	Comments
EUT	Laboratory Device	BioMerieux Inc	Vitek DensiCHEK	None
AE	Power Suply	BioMerieux Inc.	GTM96300-36VV-R3A	None
AE	Display Base	BioMerioux Inc	Vitek DensiCHEK	Charging and interface base with dispaly
AE	No Display Base	BioMerioux Inc	Vitek DensiCHEK	Charging and interface base
SIM	Laptop Computer	Dell Latitude	E7470	None
SIM	Laptopt Power Supply	Dell	LA65NM130	65W
Note: **EUT** - Equipment Under Test, **AE** - Auxiliary/Associated Equipment, or **SIM** - Simulator (Not Subjected to Test)				

I/O CABLES

Port #	Name	Type*	Cable Max. >3m (Y/N)	Cable Shielded (Y/N)	Comments
0	Enclosure	N/E	—	—	None
1	USB Power and Data	DC/IO	N	Y	USB cable connects to base only, never directly to the POD.

Note:
AC = AC Power Port DC = DC Power Port N/E = Non-Electrical
I/O = Signal Input or Output Port (Not Involved in Process Control)
TP = Telecommunication Ports

TEST SETUP CONFIGURATIONS

Mode #	Description
1	Pod Alone
3	Pod on Base withDisplay, with power supply attached, not connected to computer
5	Pod on Base without Display, no power supply, connected to computer
There are total of 8 possible configurations, however only configuration 1, 3, and 5 are only configurations needed for wireless testing. The configuration numbers were left unchanged between multiple regulatory reports.	

The 13.56MHz transmitter is inside the Pod, which normllay can be powered by internal battery or by power provided by the base. The transmitter can be operated in each of the above reference configurations.

For the extreme temperature and voltage testing the internal battery was removed from the Pod and the base was modified with external leads. The base was supplying power that would normally be supplied by the battery or by the base into the voltage regulator that is responsible for powering the Pod.

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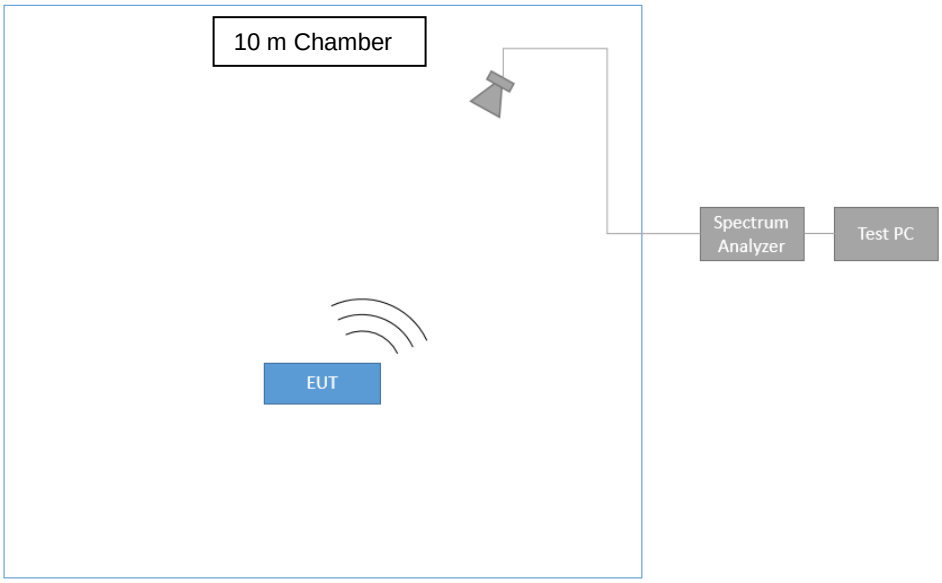
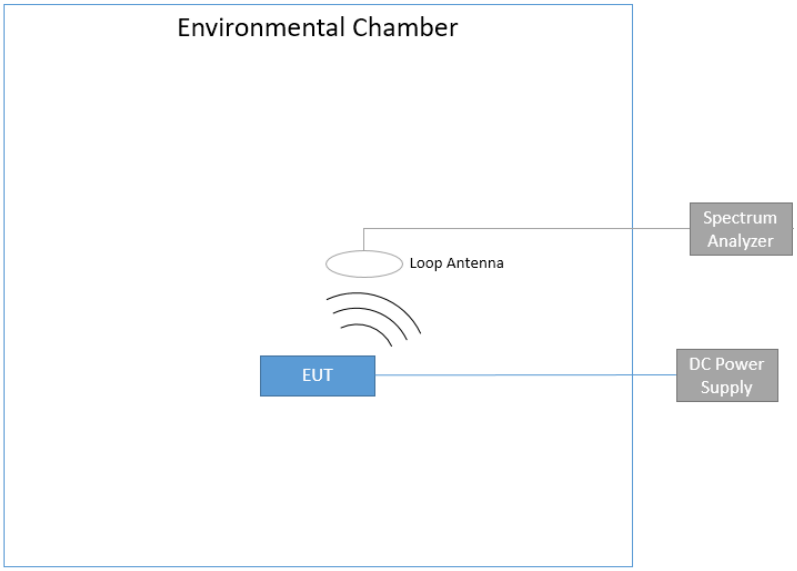
SETUP DIAGRAM FOR TESTS

Radiated Testing



Environmental Chamber Testing



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6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Radiated Emissions – 10-Meter Chamber

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due Date
EMI Test Receiver	Rohde & Schwarz	ESCI	EMC4328	12/02/2016	12/31/2017
Bicon Antenna	Chase	VBA6106A	EMC4078	02/15/2017	02/28/2018
Log-P Antenna	Chase	UPA6109	EMC4313	02/15/2017	02/15/2018
Loop Antenna	EMCO	6502/1	EMC4026	09/12/2017	09/30/2018
Temp / Humid Chamber	Espec	BTX-475	EMC4378	11/30/2016	11/30/2017
Spectrum Analyzer	Agilent	N9030A (PXA)	EMC4360	12/27/2016	12/31/2017

Conducted Emissions

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due Date
EMI Test Receiver	Rohde & Schwarz	ESR	EMC4377	12/30/2016	12/31/2017
Transient Limiter	Electro-Metrics	EM7600-2	EMC4224	N/A	N/A
High Pass Filter	Solar Electronics	2803-150	EMC4327	N/A	N/A
Attenuator	HP	8494B	2831A00838	N/A	N/A
LISN - L1	Solar	8602-50-TS-50-N	EMC4066	12/30/2016	12/31/2017
LISN - L2	Solar	8602-50-TS-50-N	EMC4064	12/30/2016	12/31/2017
LISN - L3	Solar	8602-50-TS-50-N	EMC4067	12/30/2016	12/31/2017
LISN - L4	Solar	8602-50-TS-50-N	EMC4065	12/30/2016	12/31/2017

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7. RADIATED EMISSION TEST RESULTS

7.1. LIMITS AND PROCEDURE

LIMIT

§15.225
IC RSS-210, Annex B.6 (Transmitter)

(a) The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/ meter at 30 meters.

(b) Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

(c) Within the bands 13.110–13.410 MHz and 13.710–14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

(d) The field strength of any emissions appearing outside of the 13.110– 14.010 MHz and shall not exceed the general radiated emission limits in § 15.209 as follows:
§15.209 (a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Limits for radiated disturbance of an intentional radiator		
Frequency range (MHz)	Limits (µV/m)	Measurement Distance (m)
0.009 – 0.490	2400 / F (kHz)	300
0.490 – 1.705	24000 / F (kHz)	30
1.705 – 30.0	30	30
30 – 88	100**	3
88 - 216	150**	3
216 – 960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g. §§ 15.231 and 15.241.
§15.209 (b) In the emission table above, the tighter limit applies at the band edges.

Formula for converting the filed strength from uV/m to dBuV/m is:
Limit (dBuV/m) = 20 log limit (uV/m)

Factor for converting the limit from distance specified in the table above to 3 meters is:
From 9kHz-150kHz 40 log (d1/3)
From 150kHz – 30MHz 20 log (d1/3)
where d1 is the distance in the table above.

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In addition:

§15.209 (d) The emission limits shown the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emissions limits in these three bands are based on measurements employing an average detector.

§15.209 (d) The provisions in §§ 15.225, measuring emissions at distances other than the distances specified in the above table, determining the frequency range over which radiated emissions are to be measured, and limiting peak emissions apply to all devices operated under this part.

RESULTS

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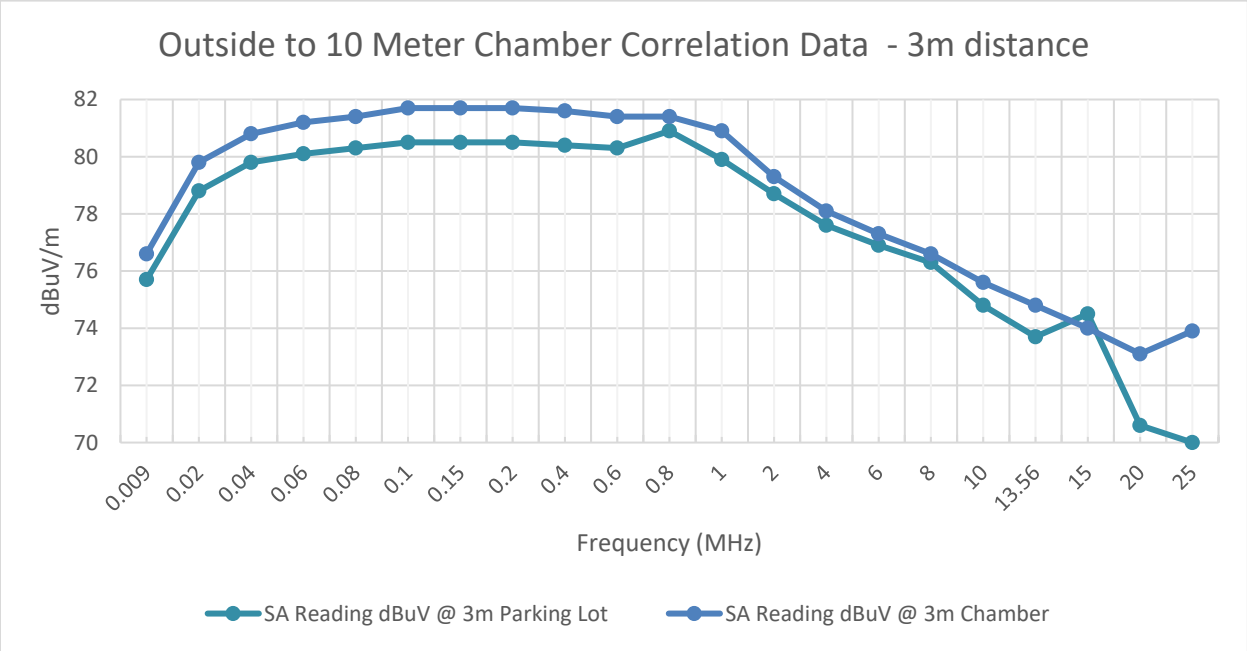
7.1.1. Open Field to 10 Meter Chamber 9kHz-30MHz Correlation Data

Correlation Data for measurements 9kHz-30MHz between Outside and 10m semi-anechoic chamber in at Underwriter Laboratories in Northbrook, IL.



Correlation measurements were conducted using a signal source with an antenna outside in open area (parking lot). Immediately following the measurements the same setup was moved inside the 10 meter semi-anechoic chamber and the measurements were repeated. The above plot shows the difference in levels measured between outside and the 10 meter semi anechoic chamber.

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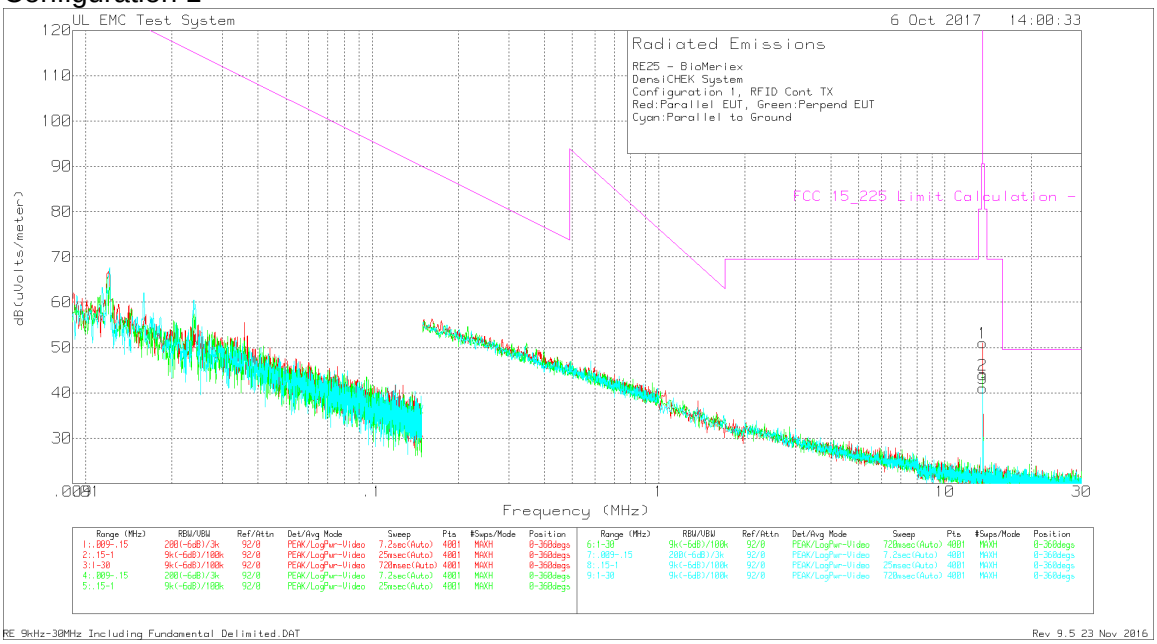
7.1.2. FUNDAMENTAL AND SPURIOUS EMISSIONS (0.15 – 30 MHz)

Configuration 1




```
RE25 - BioMeriex
DensiCHEK System
Configuration 1, RFID Cont TX
Red:Parallel EUT, Green:Perpend EUT
Cyan:Parallel to Ground

Trace Markers

      Test        Meter       Transducer  Gain/Loss  Corrected  Limit:1   2
No. Frequency    Reading       Factor      Factor    Reading dB(uVolts/meter)
      (MHz)                     (dB)        (dB)
==============================================================================
Parallel to EUT
1 13.56425      39.52dBuV Pk     11.3       .2          51.02      124     -
                 Azimuth:0-360                        Margin (dB)  -72.98   -

Perpend to EUT
2 13.56425      32.45dBuV Pk     11.3       .2          43.95      124     -
                 Azimuth:0-360                        Margin (dB)  -80.05   -

Parallel to GND
3 13.56425      29.48dBuV Pk     11.3       .2          40.98      124     -
                 Azimuth:0-360                        Margin (dB)  -83.02   -

LIMIT 1: FCC 15_225 Limit Calculation
Pk - Peak detector
```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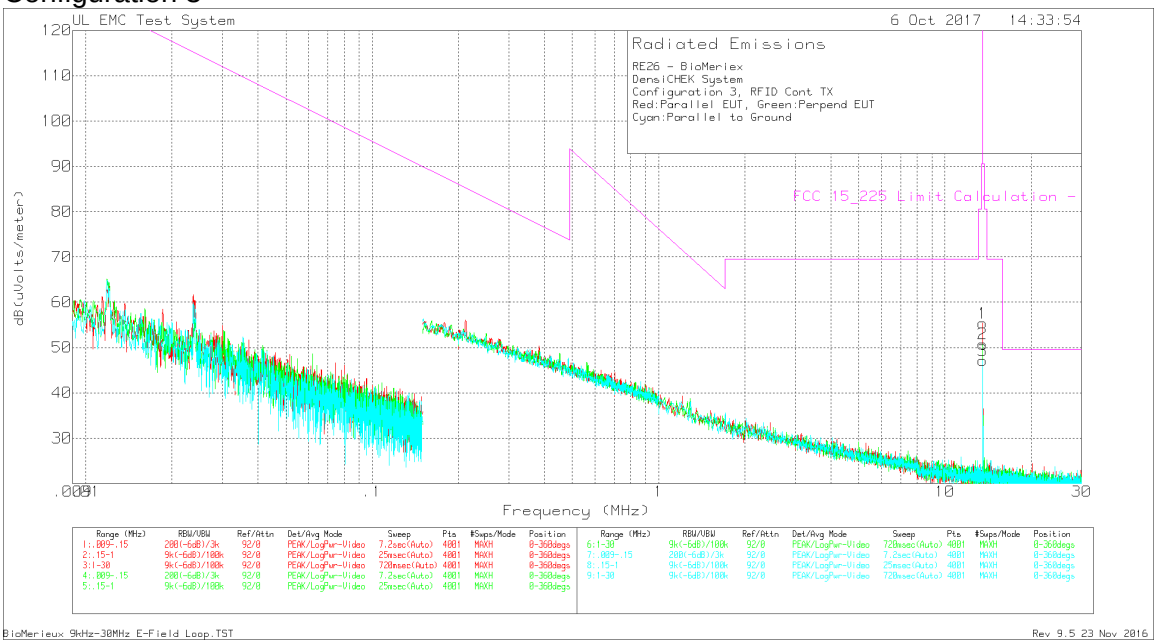
Configuration 3



RE26 - BioMeriex
DensiCHEK System
Configuration 3, RFID Cont TX
Red:Parallel EUT, Green:Perpend EUT
Cyan:Parallel to Ground

Trace Markers

No.	Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading dB(uVolts/meter)	Limit:1	2
Parallel to EUT							
1	13.56425	43.89dBuV Pk	11.3	.2	55.39	124	-
		Azimuth:0-360			Margin (dB)	-68.61	-
Perpend to EUT							
2	13.56425	39.3dBuV Pk	11.3	.2	50.8	124	-
		Azimuth:0-360			Margin (dB)	-73.2	-
Parallel to GND							
3	13.56425	35.62dBuV Pk	11.3	.2	47.12	124	-
		Azimuth:0-360			Margin (dB)	-76.88	-

LIMIT 1: FCC 15_225 Limit Calculation
Pk - Peak detector

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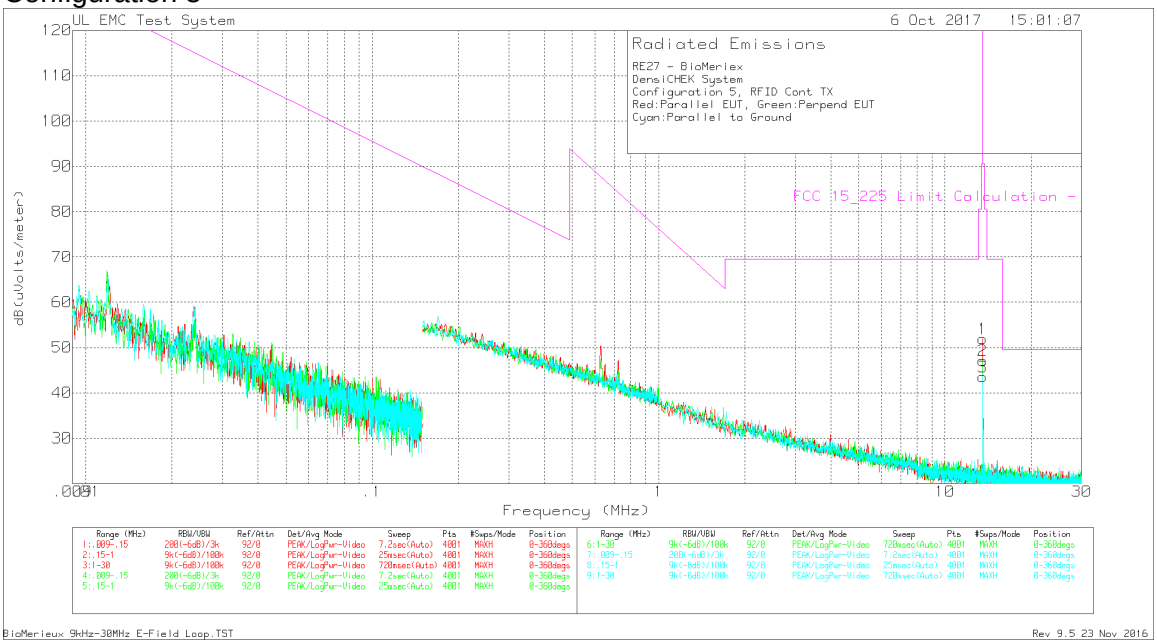
Configuration 5



RE27 - BioMeriex
DensiCHEK System
Configuration 5, RFID Cont TX
Red:Parallel EUT, Green:Perpend EUT
Cyan:Parallel to Ground

Trace Markers

Test No.	Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading dB(uVolts/meter)	Limit:1	2
Parallel to EUT							
1	13.56425	40.41dBuV Pk	11.3	.2	51.91	124	-
		Azimuth:0-360			Margin (dB)	-72.09	-
Perpend to EUT							
2	13.56425	35.66dBuV Pk	11.3	.2	47.16	124	-
		Azimuth:0-360			Margin (dB)	-76.84	-
Parallel to GND							
3	13.56425	32.07dBuV Pk	11.3	.2	43.57	124	-
		Azimuth:0-360			Margin (dB)	-80.43	-

LIMIT 1: FCC 15_225 Limit Calculation
Pk - Peak detector

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333 Pfingsten Rd., Northbrook, IL 60062, USA

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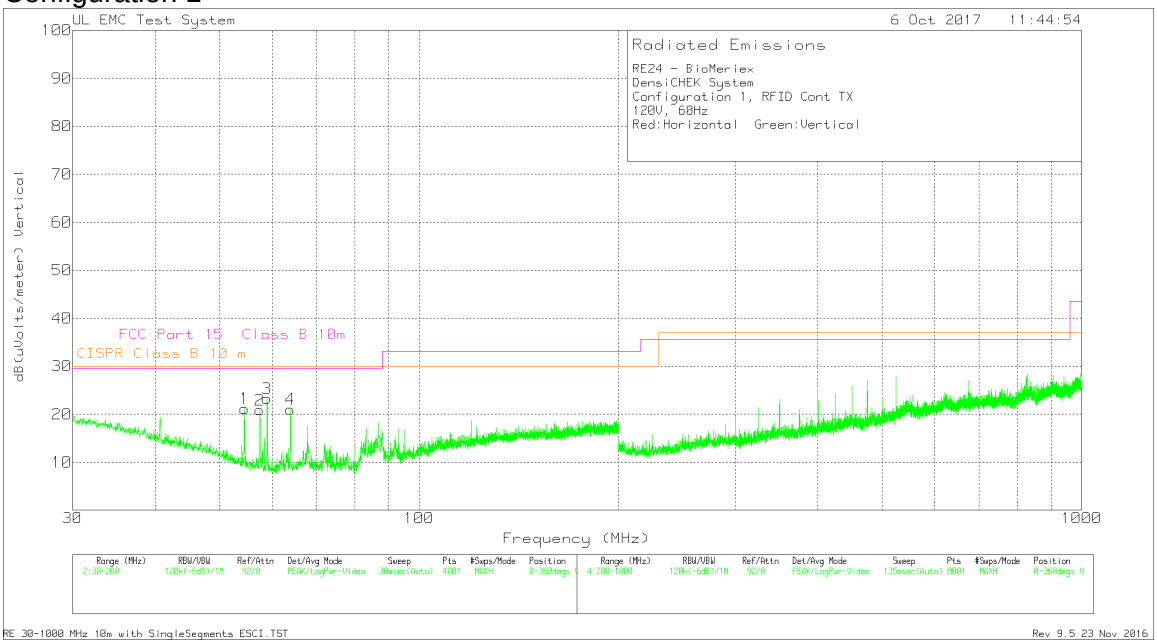
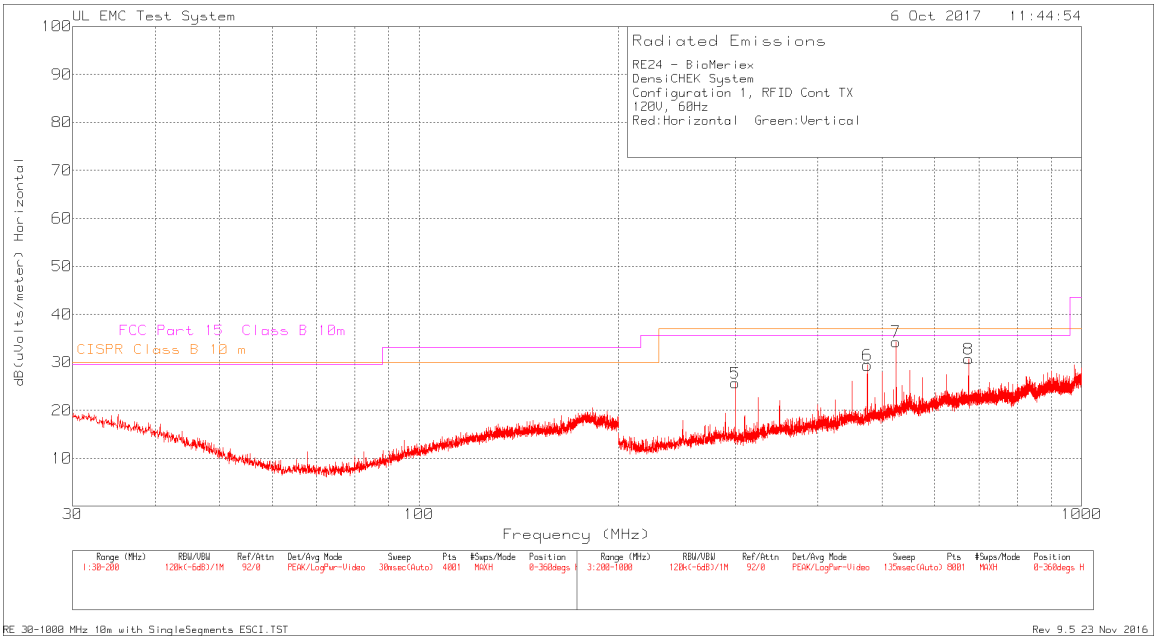
7.1.3. TX SPURIOUS EMISSION 30 TO 1000 MHz

Configuration 1





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RE24 - BioMeriex
DensiCHEK System
Configuration 1, RFID Cont TX
120V, 60Hz
Red:Horizontal Green:Vertical

Trace Markers

No.	Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading dB(uVolts/meter)	Limit:1	2	3
1	54.5225	42.91dBuV Pk	8.3	-30	21.21	-	30	29.55
		Azimuth:0-360	Height:251	Vert	Margin (dB)	-	-8.79	-8.34
2	57.4975	43.39dBuV Pk	7.5	-30	20.89	-	30	29.55
		Azimuth:0-360	Height:251	Vert	Margin (dB)	-	-9.11	-8.66
3	58.985	46.12dBuV Pk	7.1	-29.9	23.32	-	30	29.55
		Azimuth:0-360	Height:251	Vert	Margin (dB)	-	-6.68	-6.23
4	64	44.58dBuV Pk	6.5	-30	21.08	-	30	29.55
		Azimuth:0-360	Height:251	Vert	Margin (dB)	-	-8.92	-8.47
5	300	41.45dBuV Pk	13.1	-28.9	25.65	-	37	35.57
		Azimuth:0-360	Height:399	Horz	Margin (dB)	-	-11.3	-9.92
6	475	40.41dBuV Pk	17	-28	29.41	-	37	35.57
		Azimuth:0-360	Height:399	Horz	Margin (dB)	-	-7.59	-6.16
7	525	43.58dBuV Pk	18.4	-27.7	34.28	-	37	35.57
		Azimuth:0-360	Height:399	Horz	Margin (dB)	-	-2.72	-1.29
8	675	37.22dBuV Pk	20.5	-27	30.72	-	37	35.57
		Azimuth:0-360	Height:299	Horz	Margin (dB)	-	-6.28	-4.85

Radiated Emission Data

Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading dB(uVolts/meter)	Limit:1	2	3
475	40.7dBuV Qp	17	-28	29.7	-	37	35.57
Azimuth: 4	Height:384 Horz			Margin (dB):	-	-7.3	-5.87
525	42.85dBuV Qp	18.4	-27.7	33.55	-	37	35.57
Azimuth: 1	Height:374 Horz			Margin (dB):	-	-3.45	-2.02
675	37.44dBuV Qp	20.5	-27	30.94	-	37	35.57
Azimuth: 356	Height:319 Horz			Margin (dB):	-	-6.06	-4.63

LIMIT 2: CISPR Class B 10 m
LIMIT 3: FCC Part 15 Class B 10m

Pk - Peak detector
Qp - Quasi-Peak detector

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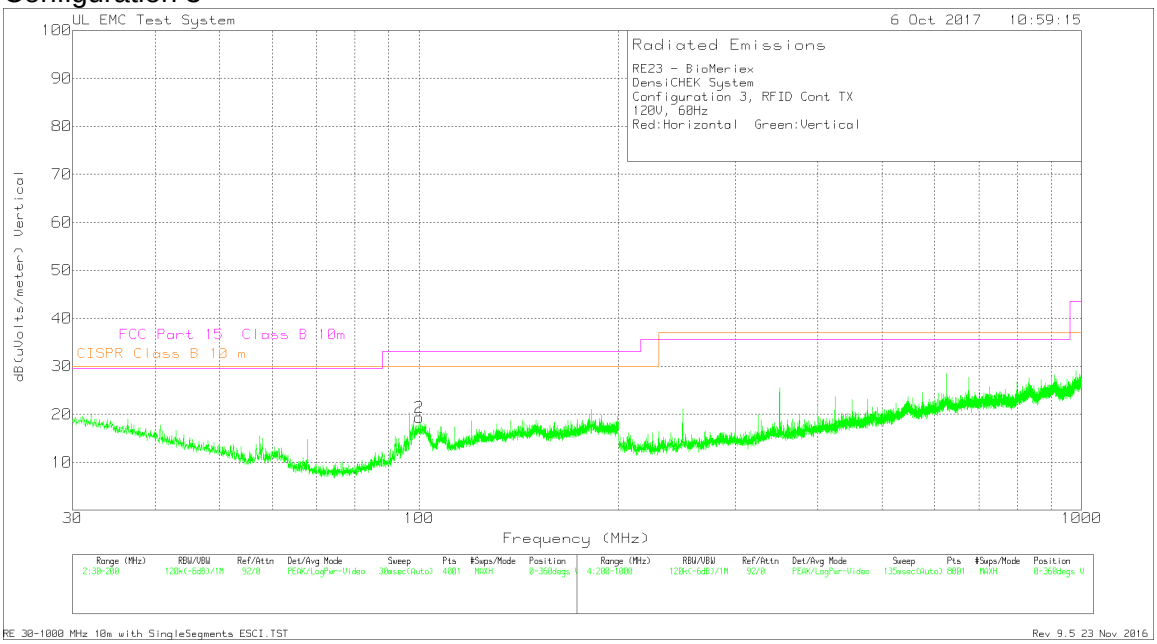
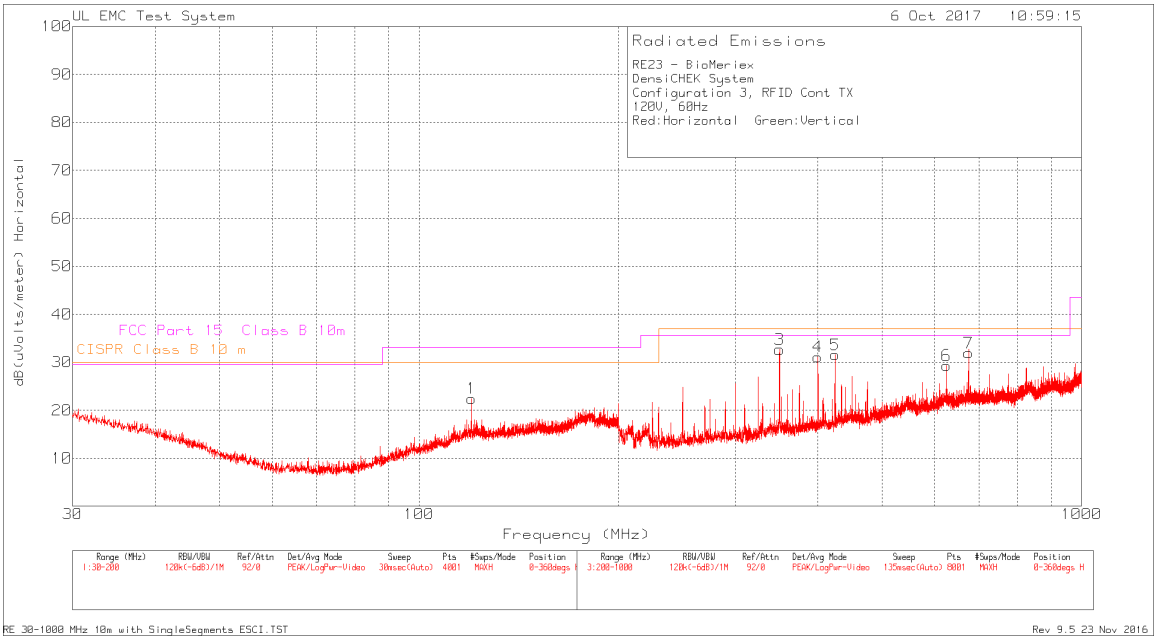
Configuration 3





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RE23 - BioMeriex
DensiCHEK System
Configuration 3, RFID Cont TX
120V, 60Hz
Red:Horizontal Green:Vertical

Trace Markers

No.	Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading dB(uVolts/meter)	Limit:1	2	3
1	120.015	38.98dBuV Pk	13.2	-29.7	22.48	-	30	33.07
		Azimuth:0-360	Height:398 Horz		Margin (dB)	-	-7.52	-10.59
2	99.9975	38.45dBuV Pk	10.7	-29.8	19.35	-	30	33.07
		Azimuth:0-360	Height:101 Vert		Margin (dB)	-	-10.65	-13.72
3	350	46.37dBuV Pk	15	-28.7	32.67	-	37	35.57
		Azimuth:0-360	Height:299 Horz		Margin (dB)	-	-4.33	-2.9
4	400	43.85dBuV Pk	15.7	-28.4	31.15	-	37	35.57
		Azimuth:0-360	Height:299 Horz		Margin (dB)	-	-5.85	-4.42
5	425	43.87dBuV Pk	16	-28.3	31.57	-	37	35.57
		Azimuth:0-360	Height:199 Horz		Margin (dB)	-	-5.43	-4
6	625	35.87dBuV Pk	20.6	-27.1	29.37	-	37	35.57
		Azimuth:0-360	Height:199 Horz		Margin (dB)	-	-7.63	-6.2
7	675.1	38.45dBuV Pk	20.5	-27	31.95	-	37	35.57
		Azimuth:0-360	Height:99 Horz		Margin (dB)	-	-5.05	-3.62

Radiated Emission Data

Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading dB(uVolts/meter)	Limit:1	2	3
350.0005	46.21dBuV Qp	15	-28.7	32.51	-	37	35.57
Azimuth: 86	Height:305 Horz			Margin (dB):	-	-4.49	-3.06
400	43.61dBuV Qp	15.7	-28.4	30.91	-	37	35.57
Azimuth: 86	Height:211 Horz			Margin (dB):	-	-6.09	-4.66
425	44.48dBuV Qp	16	-28.3	32.18	-	37	35.57
Azimuth: 85	Height:243 Horz			Margin (dB):	-	-4.82	-3.39
675	40.12dBuV Qp	20.5	-27	33.62	-	37	35.57
Azimuth: 67	Height:139 Horz			Margin (dB):	-	-3.38	-1.95
625	35.42dBuV Qp	20.6	-27.1	28.92	-	37	35.57
Azimuth: 85	Height:142 Horz			Margin (dB):	-	-8.08	-6.65

LIMIT 2: CISPR Class B 10 m
LIMIT 3: FCC Part 15 Class B 10m

Pk - Peak detector
Qp - Quasi-Peak detector

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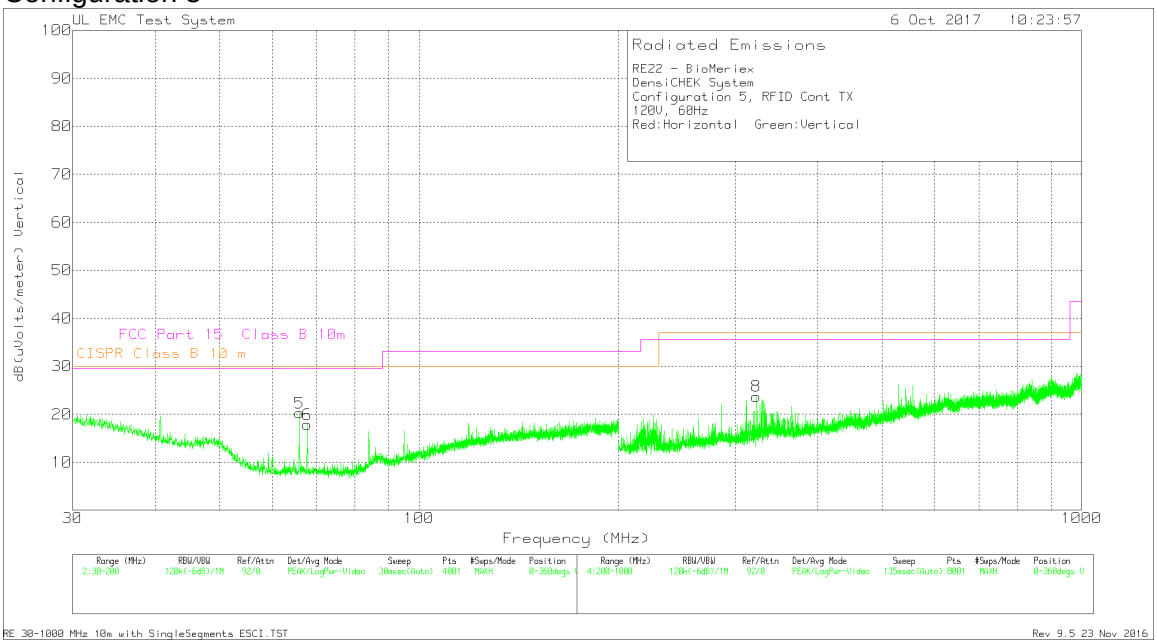
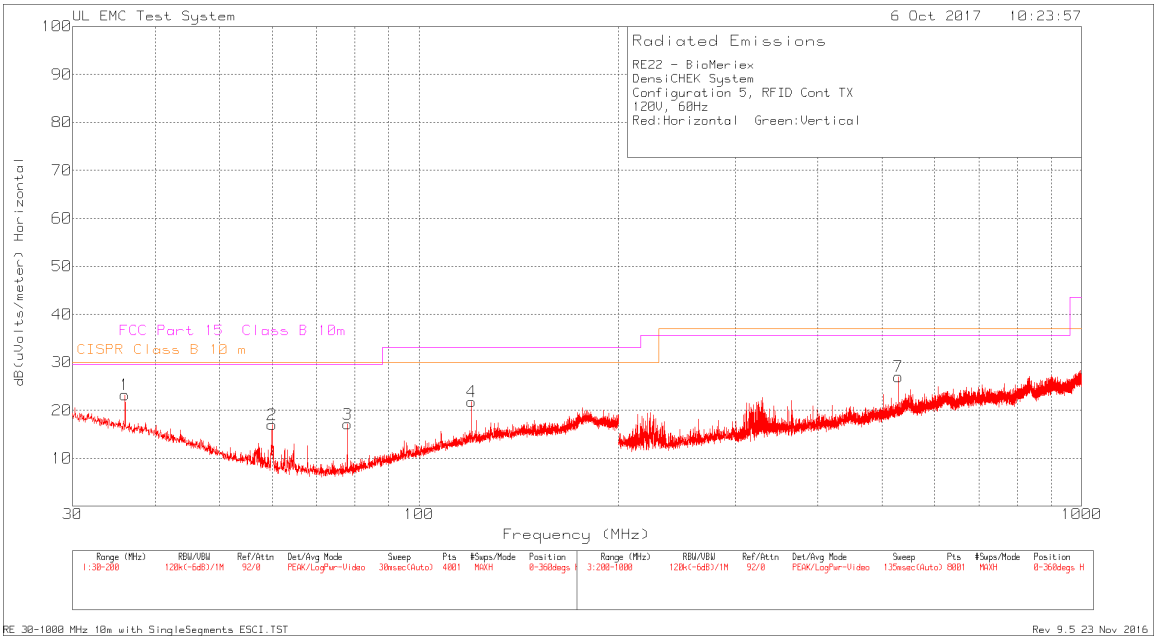
Configuration 5





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RE22 - BioMeriex
DensiCHEK System
Configuration 5, RFID Cont TX
120V, 60Hz
Red:Horizontal Green:Vertical

Trace Markers

No.	Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading	Limit:1 dB(uVolts/meter)	2	3
1	35.9925	37.24dBuV Pk	15.9	-29.9	23.24	-	30	29.55
		Azimuth:0-360	Height:398 Horz		Margin (dB)	-	-6.76	-6.31
2	60.005	39.99dBuV Pk	6.9	-29.9	16.99	-	30	29.55
		Azimuth:0-360	Height:252 Horz		Margin (dB)	-	-13.01	-12.56
3	77.9825	40.17dBuV Pk	6.9	-29.9	17.17	-	30	29.55
		Azimuth:0-360	Height:101 Horz		Margin (dB)	-	-12.83	-12.38
4	120.0575	38.32dBuV Pk	13.2	-29.7	21.82	-	30	33.07
		Azimuth:0-360	Height:398 Horz		Margin (dB)	-	-8.18	-11.25
5	65.9975	43.84dBuV Pk	6.4	-30	20.24	-	30	29.55
		Azimuth:0-360	Height:248 Vert		Margin (dB)	-	-9.76	-9.31
6	67.7825	41.58dBuV Pk	6.3	-30	17.88	-	30	29.55
		Azimuth:0-360	Height:248 Vert		Margin (dB)	-	-12.12	-11.67
7	529	36.31dBuV Pk	18.5	-27.8	27.01	-	37	35.57
		Azimuth:0-360	Height:199 Horz		Margin (dB)	-	-9.99	-8.56
8	322.9	38.74dBuV Pk	13.7	-28.7	23.74	-	37	35.57
		Azimuth:0-360	Height:99 Vert		Margin (dB)	-	-13.26	-11.83

Radiated Emission Data

Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading	Limit:1 dB(uVolts/meter)	2	3
35.9846	27.35dBuV Qp	15.9	-29.9	13.35	-	30	29.55
Azimuth: 8	Height:355 Horz			Margin (dB):	-	-16.65	-16.2

LIMIT 2: CISPR Class B 10 m
LIMIT 3: FCC Part 15 Class B 10m

Pk - Peak detector
Qp - Quasi-Peak detector

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8. AC MAINS LINE CONDUCTED EMISSIONS

LIMITS

§15.207
IC RSS-GEN, Section 8.8

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50µH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges.

Frequency range (MHz)	Limits (dBµV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
Notes: 1. The lower limit shall apply at the transition frequencies 2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

TEST PROCEDURE

ANSI C63.10

RESULTS

No non-compliance noted.

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Configuration 1

When EUT is used in configuration 1, it does not connect to AC mains

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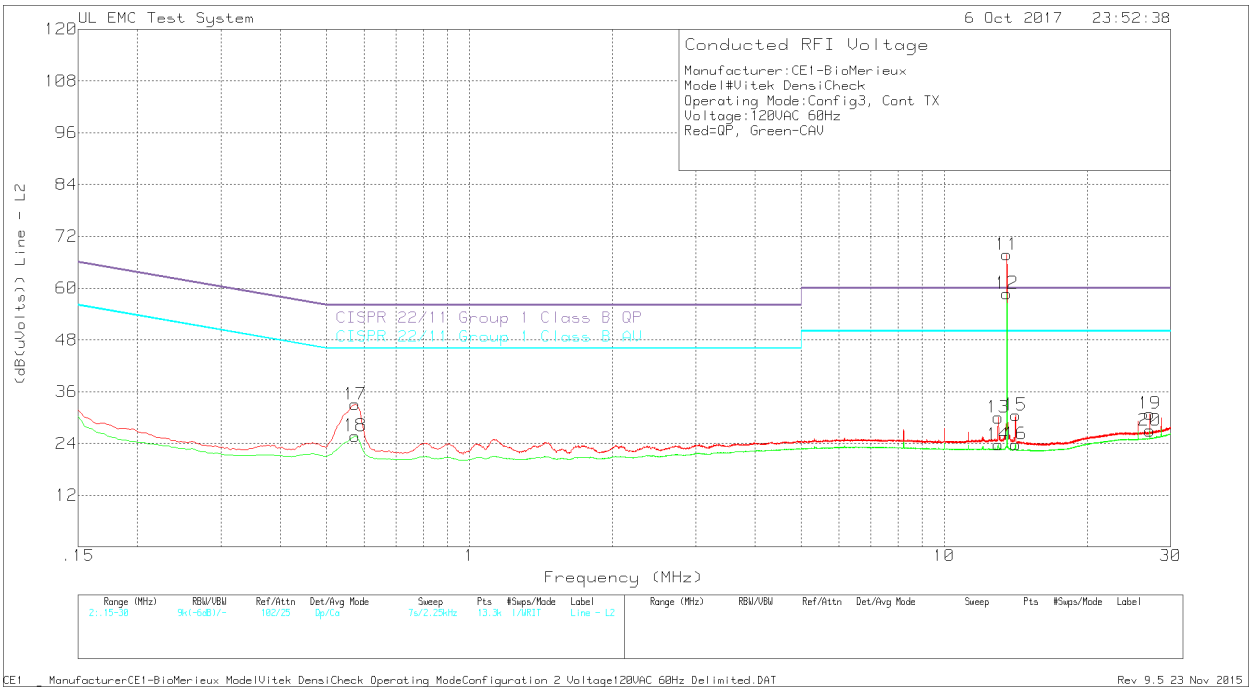
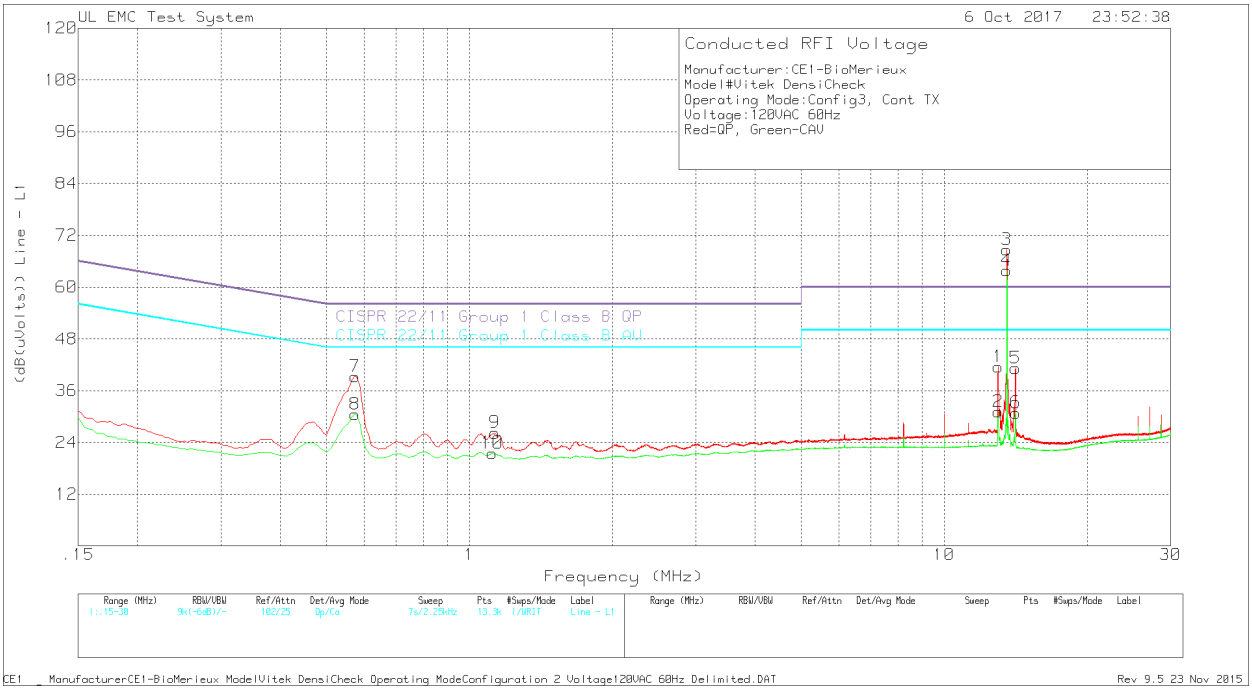
Configuration 3 – with Actual Antenna





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Manufacturer:CE1-BioMerieux
Model#Vitek DensiCheck
Operating Mode:Config3, Cont TX
Voltage:120VAC 60Hz
Red=QP, Green-CAV

Trace Markers

No.	Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading	Limit:1 (dB(uVolts))	2
Line							
1	12.98625	30.1dBuV Qp	0	11.4	41.5	60	-
					Margin (dB)	-18.5	-
2	12.98625	19.7dBuV Ca	0	11.4	31.1	-	50
					Margin (dB)	-	-18.9
3	13.56225	57.14dBuV Qp	0	11.5	68.64	60	-
					Margin (dB)	8.64	-
4	13.56225	52.32dBuV Ca	0	11.5	63.82	-	50
					Margin (dB)	-	13.82
5	14.136	29.69dBuV Qp	0	11.5	41.19	60	-
					Margin (dB)	-18.81	-
6	14.13825	19.39dBuV Ca	0	11.5	30.89	-	50
					Margin (dB)	-	-19.11
7	.57525	28.68dBuV Qp	0	10.6	39.28	56	-
					Margin (dB)	-16.72	-
8	.57412	19.88dBuV Ca	0	10.6	30.48	-	46
					Margin (dB)	-	-15.52
9	1.13325	15.63dBuV Qp	0	10.6	26.23	56	-
					Margin (dB)	-29.77	-
10	1.1175	10.92dBuV Ca	0	10.6	21.52	-	46
					Margin (dB)	-	-24.48
Neutral							
11	13.56225	55.82dBuV Qp	0	11.9	67.72	60	-
					Margin (dB)	7.72	-
12	13.56225	46.86dBuV Ca	0	11.9	58.76	-	50
					Margin (dB)	-	8.76
13	12.99075	18.11dBuV Qp	0	11.9	30.01	60	-
					Margin (dB)	-29.99	-
14	12.98625	11.86dBuV Ca	0	11.9	23.76	-	50
					Margin (dB)	-	-26.24
15	14.13825	18.46dBuV Qp	0	12.1	30.56	60	-
					Margin (dB)	-29.44	-
16	14.13938	11.71dBuV Ca	0	12.1	23.81	-	50
					Margin (dB)	-	-26.19
17	.57525	21.98dBuV Qp	0	11.1	33.08	56	-
					Margin (dB)	-22.92	-
18	.57525	14.65dBuV Ca	0	11.1	25.75	-	46
					Margin (dB)	-	-20.25
19	27.1275	17.7dBuV Qp	-.1	13.3	30.9	60	-
					Margin (dB)	-29.1	-
20	27.12525	13.79dBuV Ca	-.1	13.3	26.99	-	50
					Margin (dB)	-	-23.01

LIMIT 3: CISPR 22/11 Group 1 Class B QP
LIMIT 4: CISPR 22/11 Group 1 Class B AV

Qp - Quasi-Peak detector
Ca - CISPR Average detection

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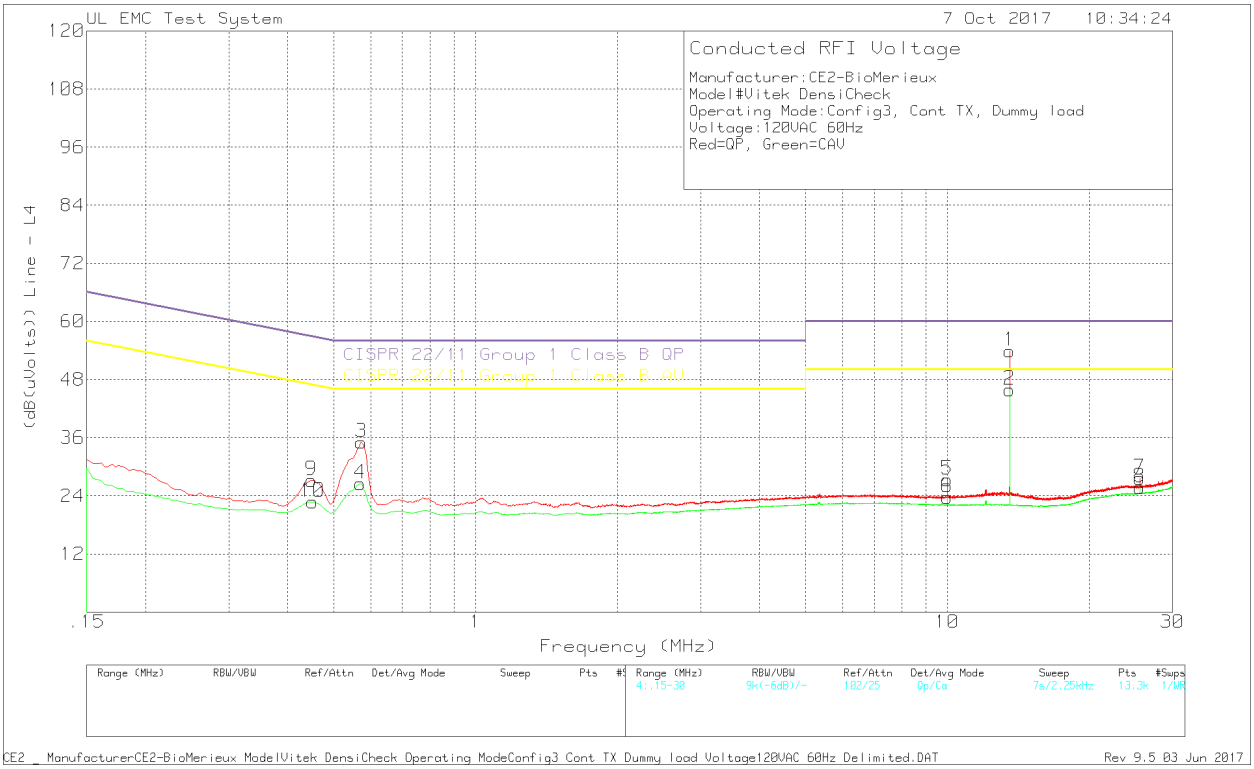
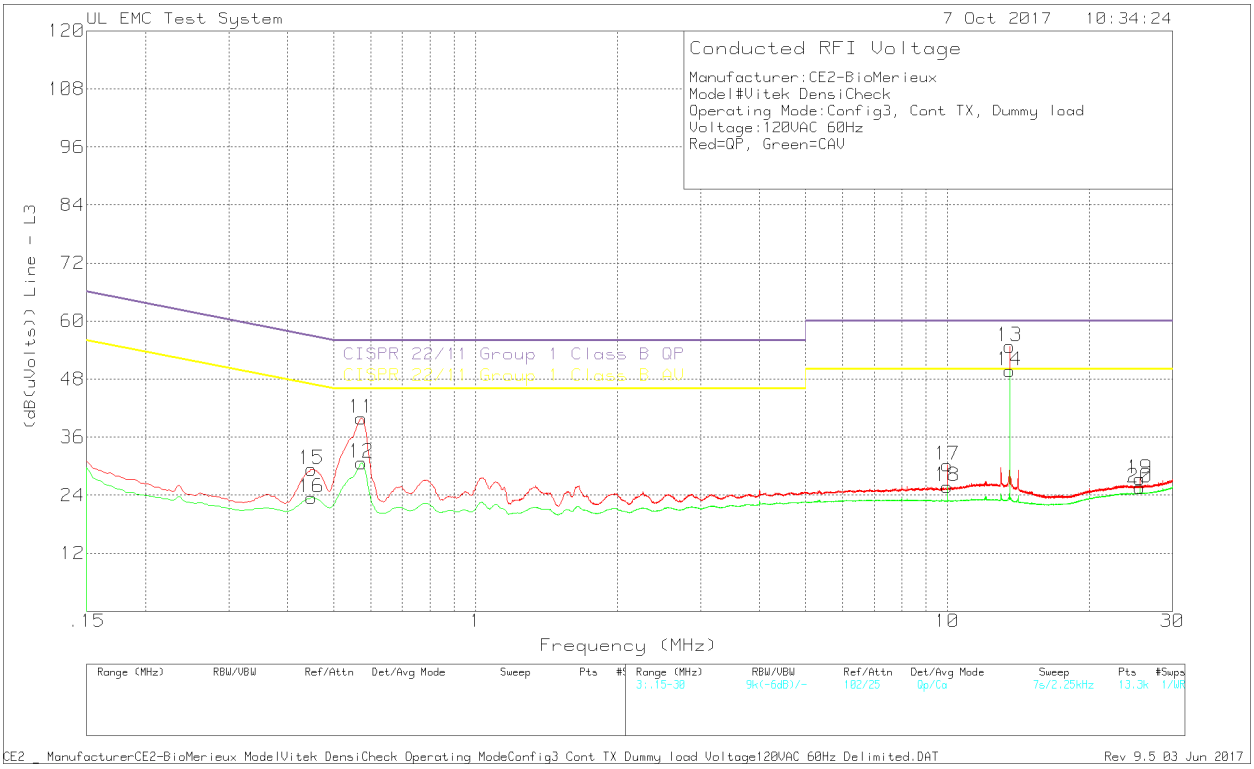
Configuration 3 – with Dummy Load





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Trace Markers

No.	Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading (dB(uVolts))	Limit:1	2
Line							
11	.573	29.32dBuV Qp	0	10.6	39.92	56	-
					Margin (dB)	-16.08	-
12	.573	20.09dBuV Ca	0	10.6	30.69	-	46
					Margin (dB)	-	-15.31
13	13.56225	43.38dBuV Qp	0	11.4	54.78	60	-
					Margin (dB)	-5.22	-
14	13.56225	38.37dBuV Ca	0	11.4	49.77	-	50
					Margin (dB)	-	-.23
15	.44925	18.65dBuV Qp	0	10.7	29.35	56.89	-
					Margin (dB)	-27.54	-
16	.44925	12.77dBuV Ca	0	10.7	23.47	-	46.89
					Margin (dB)	-	-23.42
17	10.0005	19.02dBuV Qp	0	11.2	30.22	60	-
					Margin (dB)	-29.78	-
18	10.0005	14.63dBuV Ca	0	11.2	25.83	-	50
					Margin (dB)	-	-24.17
19	25.59975	14.8dBuV Qp	0	12.6	27.4	60	-
					Margin (dB)	-32.6	-
20	25.59975	12.97dBuV Ca	0	12.6	25.57	-	50
					Margin (dB)	-	-24.43
Neutral							
1	13.56225	42.41dBuV Qp	0	11.5	53.91	60	-
					Margin (dB)	-6.09	-
2	13.56225	34.41dBuV Ca	0	11.5	45.91	-	50
					Margin (dB)	-	-4.09
3	.573	24.47dBuV Qp	0	10.6	35.07	56	-
					Margin (dB)	-20.93	-
4	.56962	15.92dBuV Ca	0	10.6	26.52	-	46
					Margin (dB)	-	-19.48
5	10.0005	16.12dBuV Qp	0	11.2	27.32	60	-
					Margin (dB)	-32.68	-
6	10.0005	12.5dBuV Ca	0	11.2	23.7	-	50
					Margin (dB)	-	-26.3
7	25.59975	15.01dBuV Qp	-.1	12.7	27.61	60	-
					Margin (dB)	-32.39	-
8	25.59975	13.13dBuV Ca	-.1	12.7	25.73	-	50
					Margin (dB)	-	-24.27
9	.44925	16.51dBuV Qp	0	10.7	27.21	56.89	-
					Margin (dB)	-29.68	-
10	.4515	12.07dBuV Ca	0	10.7	22.77	-	46.85
					Margin (dB)	-	-24.08

LIMIT 3: CISPR 22/11 Group 1 Class B QP
LIMIT 4: CISPR 22/11 Group 1 Class B AV

Qp - Quasi-Peak detector
Ca - CISPR Average detection

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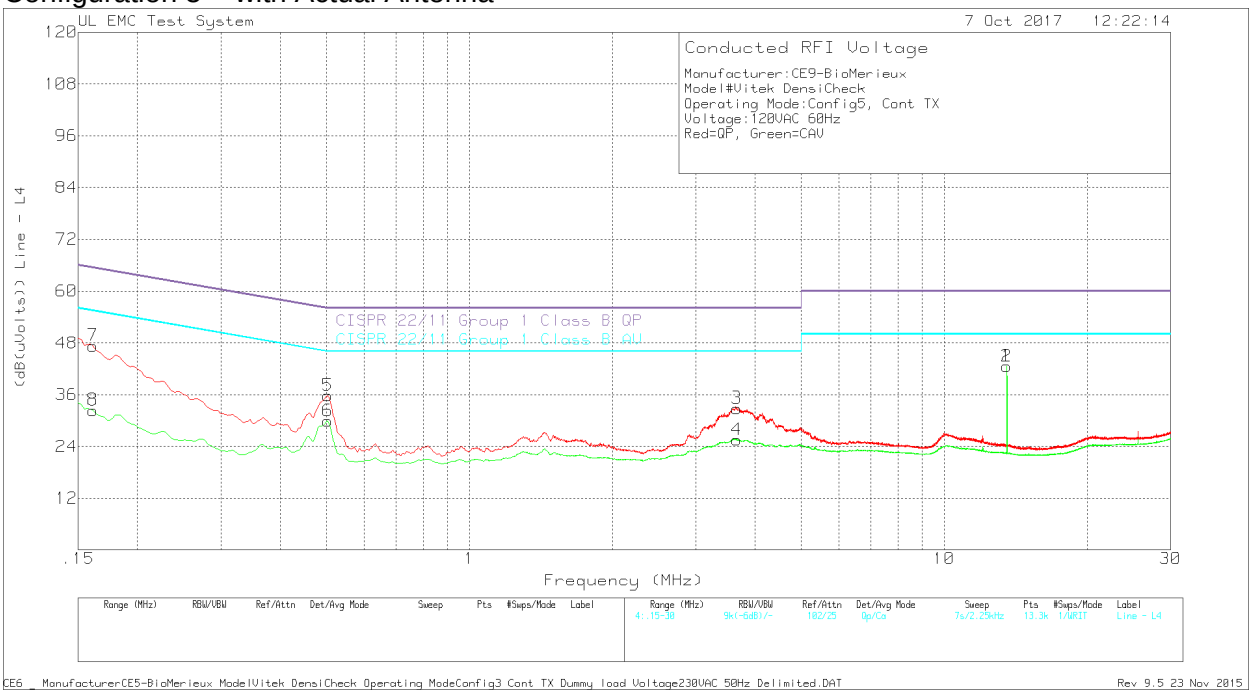
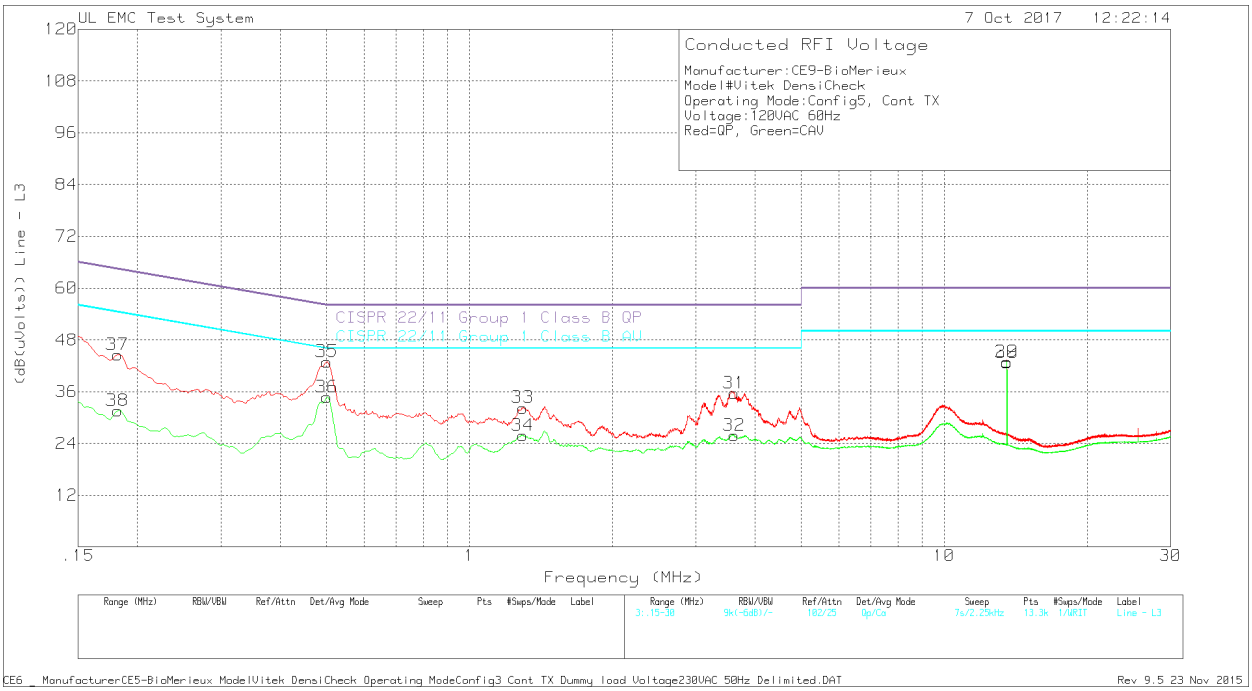
Configuration 5 – with Actual Antenna





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Manufacturer:CE9-BioMerieux
Model#Vitek DensiCheck
Operating Mode:Config5, Cont TX
Voltage:120VAC 60Hz
Red=QP, Green=CAV

Trace Markers

No.	Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading (dB(uVolts))	Limit:3	4
Line							
29	13.5645	31.51dBuV Qp	0	11.4	42.91	60	-
					Margin (dB)	-17.09	-
30	13.5645	31.39dBuV Ca	0	11.4	42.79	-	50
					Margin (dB)	-	-7.21
31	3.61275	24.98dBuV Qp	0	10.7	35.68	56	-
					Margin (dB)	-20.32	-
32	3.61275	15.1dBuV Ca	0	10.7	25.8	-	46
					Margin (dB)	-	-20.2
33	1.29525	21.65dBuV Qp	0	10.6	32.25	56	-
					Margin (dB)	-23.75	-
34	1.29525	15.28dBuV Ca	0	10.6	25.88	-	46
					Margin (dB)	-	-20.12
35	.501	32.25dBuV Qp	0	10.7	42.95	56	-
					Margin (dB)	-13.05	-
36	.501	24.02dBuV Ca	0	10.7	34.72	-	46
					Margin (dB)	-	-11.28
37	.1815	32.77dBuV Qp	.1	11.7	44.57	64.42	-
					Margin (dB)	-19.85	-
38	.1815	19.77dBuV Ca	.1	11.7	31.57	-	54.42
					Margin (dB)	-	-22.85
Neutral							
1	13.56225	31.07dBuV Qp	0	11.5	42.57	60	-
					Margin (dB)	-17.43	-
2	13.56225	31.09dBuV Ca	0	11.5	42.59	-	50
					Margin (dB)	-	-7.41
3	3.65775	22.12dBuV Qp	0	10.7	32.82	56	-
					Margin (dB)	-23.18	-
4	3.65775	14.85dBuV Ca	0	10.7	25.55	-	46
					Margin (dB)	-	-20.45
5	.50325	25.2dBuV Qp	0	10.6	35.8	56	-
					Margin (dB)	-20.2	-
6	.50325	19.28dBuV Ca	0	10.6	29.88	-	46
					Margin (dB)	-	-16.12
7	.16125	34.63dBuV Qp	.1	12.6	47.33	65.4	-
					Margin (dB)	-18.07	-
8	.16125	19.69dBuV Ca	.1	12.6	32.39	-	55.4
					Margin (dB)	-	-23.01

LIMIT 3: CISPR 22/11 Group 1 Class B QP
LIMIT 4: CISPR 22/11 Group 1 Class B AV

Qp - Quasi-Peak detector
Ca - CISPR Average detection

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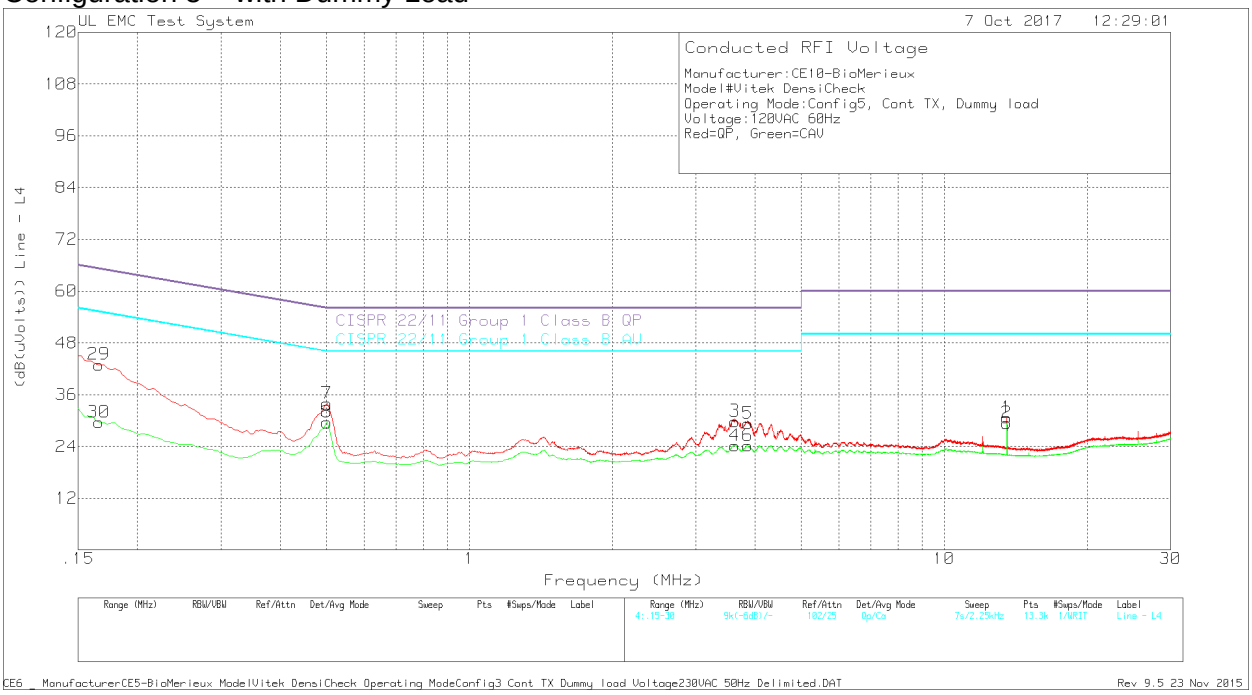
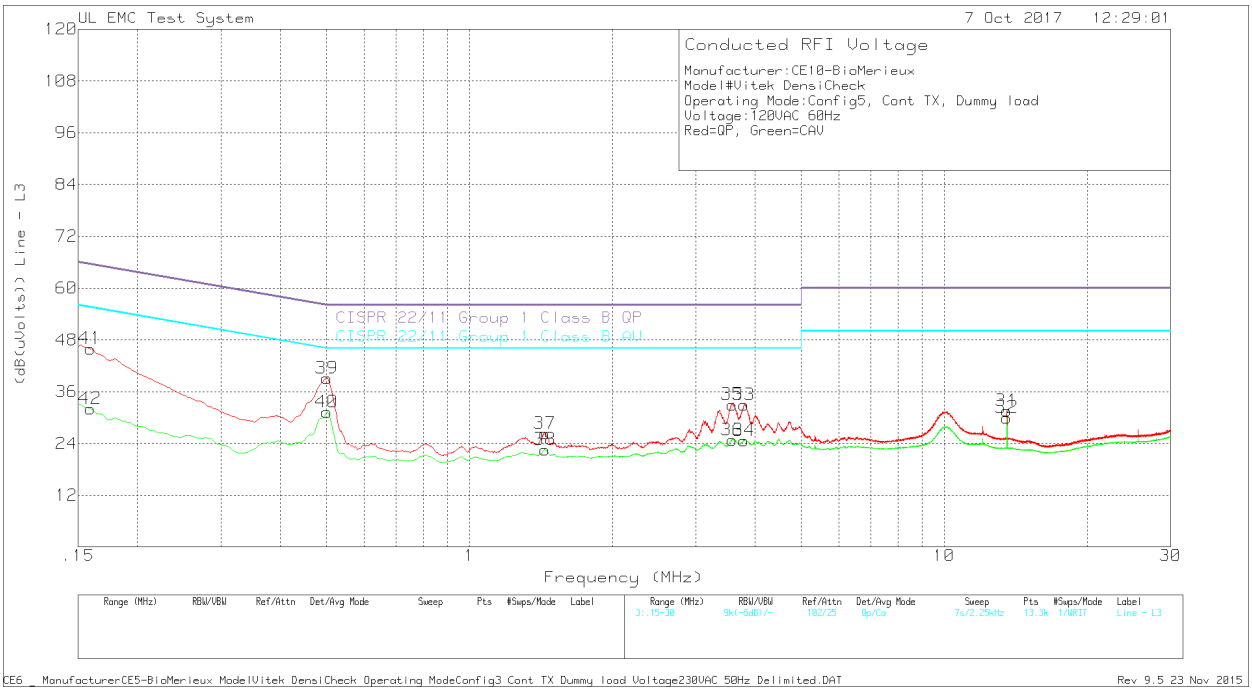
Configuration 5 – with Dummy Load





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Manufacturer:CE10-BioMerieux
Model#Vitek DensiCheck
Operating Mode:Config5, Cont TX, Dummy load
Voltage:120VAC 60Hz
Red=QP, Green=CAV

Trace Markers

Test No.	Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading	Limit:3 (dB(uVolts))	4
Line							
31	13.56225	20.15dBuV Qp	0	11.4	31.55	60	-
					Margin (dB)	-28.45	-
32	13.56225	18.57dBuV Ca	0	11.4	29.97	-	50
					Margin (dB)	-	-20.03
33	3.78825	22.22dBuV Qp	0	10.7	32.92	56	-
					Margin (dB)	-23.08	-
34	3.78825	13.99dBuV Ca	0	10.7	24.69	-	46
					Margin (dB)	-	-21.31
35	3.579	22.3dBuV Qp	0	10.7	33	56	-
					Margin (dB)	-23	-
36	3.579	14.05dBuV Ca	0	10.7	24.75	-	46
					Margin (dB)	-	-21.25
37	1.44375	15.65dBuV Qp	0	10.6	26.25	56	-
					Margin (dB)	-29.75	-
38	1.44375	11.97dBuV Ca	0	10.6	22.57	-	46
					Margin (dB)	-	-23.43
39	.501	28.42dBuV Qp	0	10.7	39.12	56	-
					Margin (dB)	-16.88	-
40	.501	20.57dBuV Ca	0	10.7	31.27	-	46
					Margin (dB)	-	-14.73
41	.159	33.06dBuV Qp	.1	12.8	45.96	65.52	-
					Margin (dB)	-19.56	-
42	.159	19.1dBuV Ca	.1	12.8	32	-	55.52
					Margin (dB)	-	-23.52
Neutral							
1	13.56225	19.18dBuV Qp	0	11.5	30.68	60	-
					Margin (dB)	-29.32	-
2	13.56225	17.91dBuV Ca	0	11.5	29.41	-	50
					Margin (dB)	-	-20.59
3	3.624	19.12dBuV Qp	0	10.7	29.82	56	-
					Margin (dB)	-26.18	-
4	3.624	13.48dBuV Ca	0	10.7	24.18	-	46
					Margin (dB)	-	-21.82
5	3.86025	18.47dBuV Qp	0	10.8	29.27	56	-
					Margin (dB)	-26.73	-
6	3.86025	13.39dBuV Ca	0	10.8	24.19	-	46
					Margin (dB)	-	-21.81
7	.501	23.23dBuV Qp	0	10.7	33.93	56	-
					Margin (dB)	-22.07	-
8	.501	18.86dBuV Ca	0	10.7	29.56	-	46
					Margin (dB)	-	-16.44
29	.16575	30.56dBuV Qp	.1	12.3	42.96	65.17	-
					Margin (dB)	-22.21	-
30	.16575	17.17dBuV Ca	.1	12.3	29.57	-	55.17
					Margin (dB)	-	-25.6

LIMIT 3: CISPR 22/11 Group 1 Class B QP
LIMIT 4: CISPR 22/11 Group 1 Class B AV

Qp - Quasi-Peak detector
Ca - CISPR Average detection

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9. FREQUENCY STABILITY

LIMIT

§15.225 (e) The frequency tolerance of the carrier signal shall be maintained within ±0.01% of the operating frequency, over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

RSS-210 Annex B.6: Carrier frequency stability shall be maintained to ±0.01% (±100 ppm).

TEST PROCEDURE

ANSI C63.10

RESULTS

No non-compliance noted.

Reference Frequency: EUT Channel 13.56 MHz @ 20ºC Limit: ± 100 ppm = 1.356 kHz										
Power Supply	Envir. Temp	Frequency Deviation Measureed with Time Elapse								
(VDC)	(ºC)	Startup (MHz)	Delta (ppm)	@ 2 mins (MHz)	Delta (ppm)	@ 5 mins (MHz)	Delta (ppm)	@ 10 mins (MHz)	Delta (ppm)	Limit (ppm)
	50	13.5630924	2.877	13.5630944	2.729	13.5630981	2.455	13.5631033	2.075	± 100
	40	13.5631011	2.233	13.5630985	2.426	13.5630977	2.484	13.5630983	2.443	± 100
	30	13.5631209	0.774	13.5631108	1.524	13.5631071	1.794	13.5631053	1.928	± 100
3.70	***20***	***13.5631314***	***0.000***	***13.5631255***	***0.437***	***13.5631256***	***0.432***	***13.5631237***	***0.573***	***± 100***
	10	13.5631473	-1.171	13.5631448	-0.983	13.5631405	-0.669	13.5631372	-0.424	± 100
	0	13.5631450	-1.000	13.5631502	-1.383	13.5631490	-1.299	13.5631472	-1.163	± 100
	-10	13.5631339	-0.182	13.5631428	-0.841	13.5631472	-1.162	13.5631494	-1.325	± 100
	-20	13.5630618	5.132	13.5631023	2.150	13.5631175	1.024	13.5631242	0.536	± 100
3.60	20	13.5631235	0.581	13.5631231	0.616	13.5631257	0.423	13.5631229	0.626	± 100
4.20	20	13.5631232	0.606	13.5631202	0.830	13.5631199	0.848	13.5631198	0.858	± 100

* EUT is operated from internal battery or from a power supply where nominal rated voltage to the transmitter is 3.7VDC. To simulate worst case condition the actual DC voltage was varied between the minimum operating voltage of 3.6VDC and maximum 4.3VDC.

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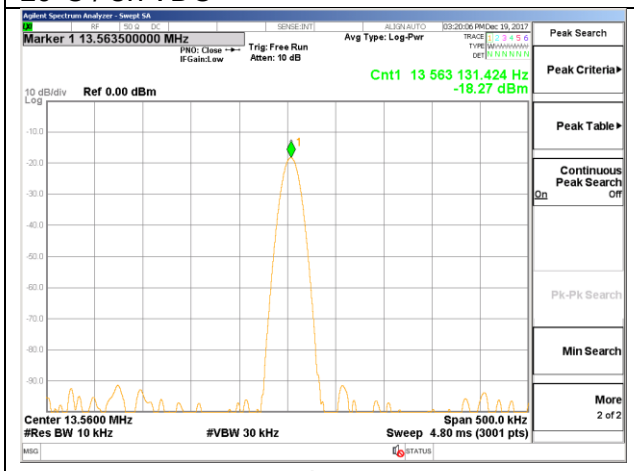
Frequency Stability Data

20°C / 3.7VDC



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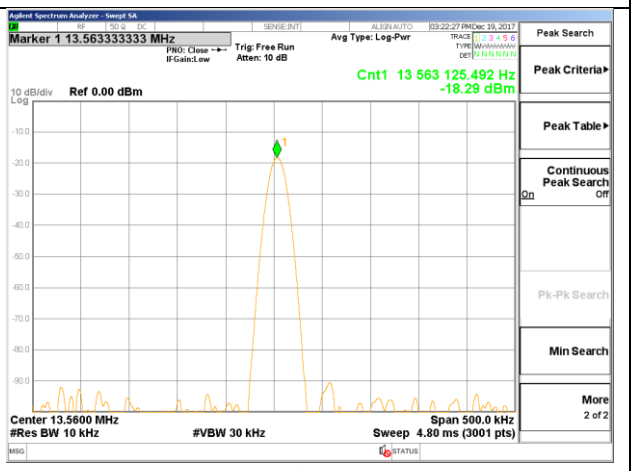

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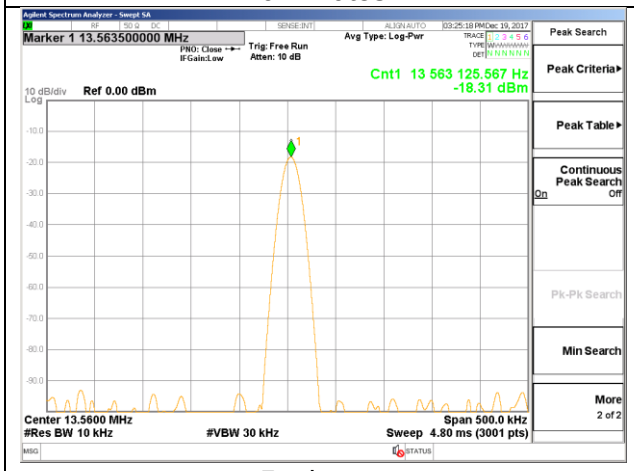

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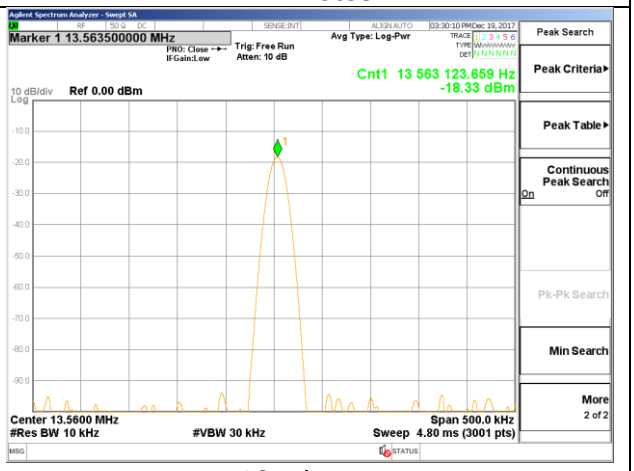

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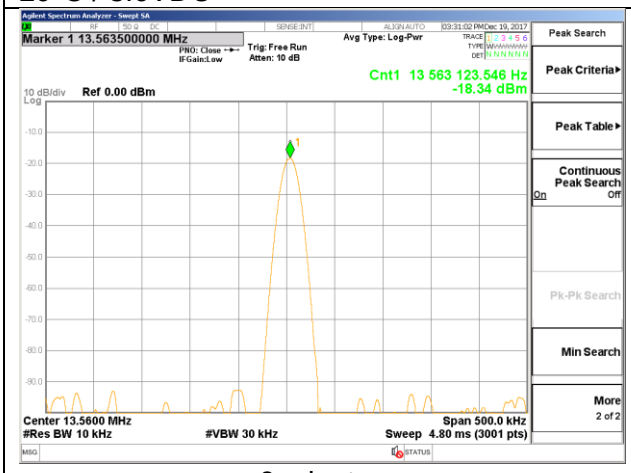
20°C / 3.6VDC



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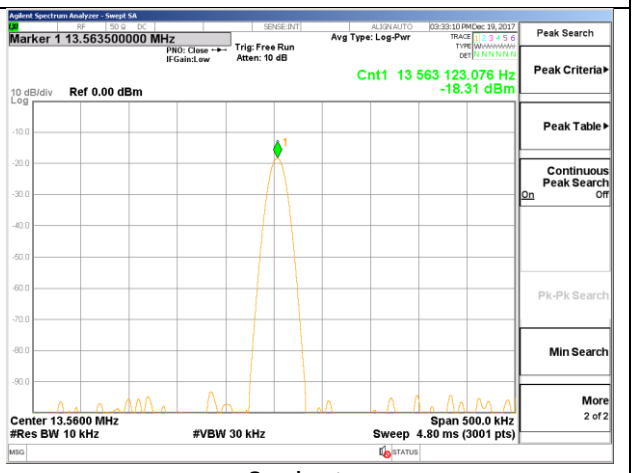

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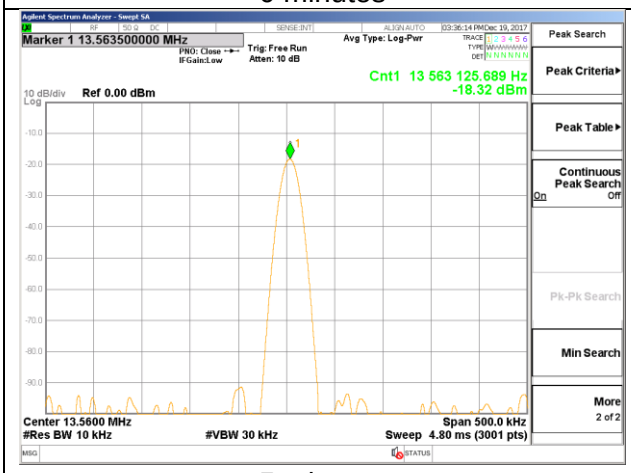

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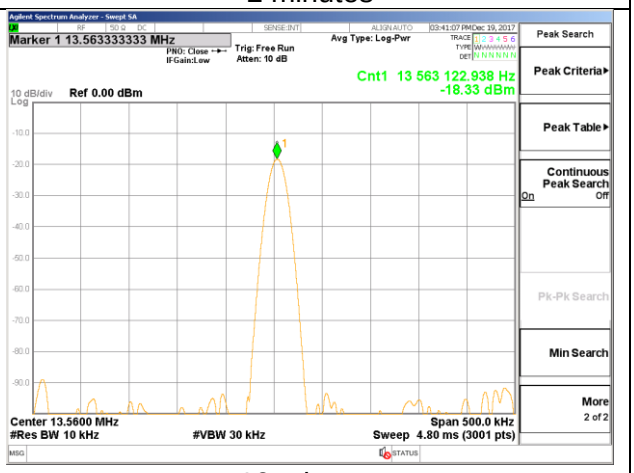

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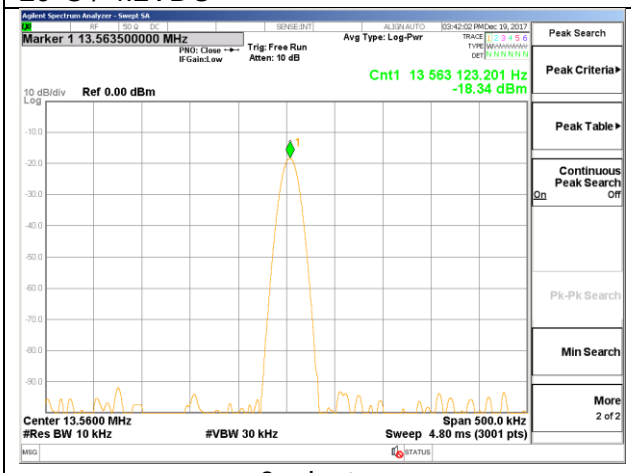
20°C / 4.2VDC



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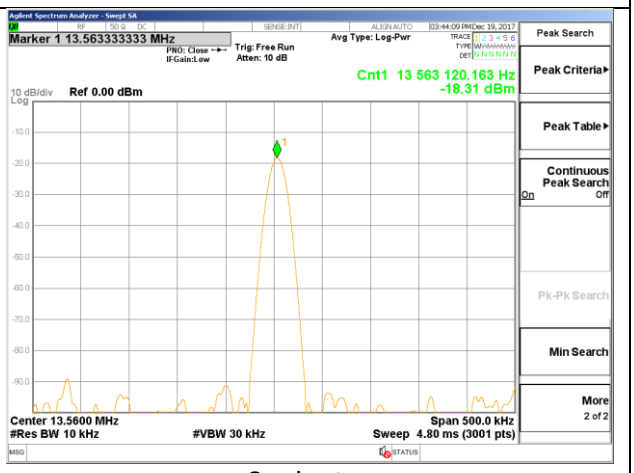

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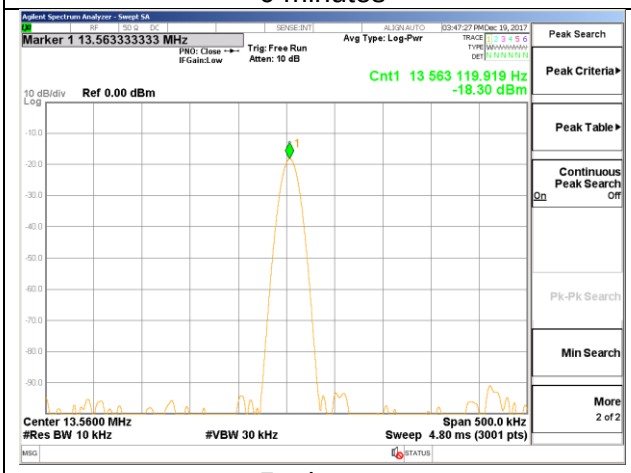

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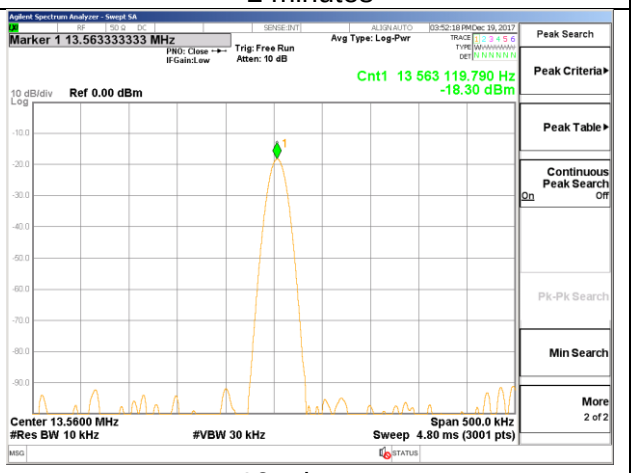

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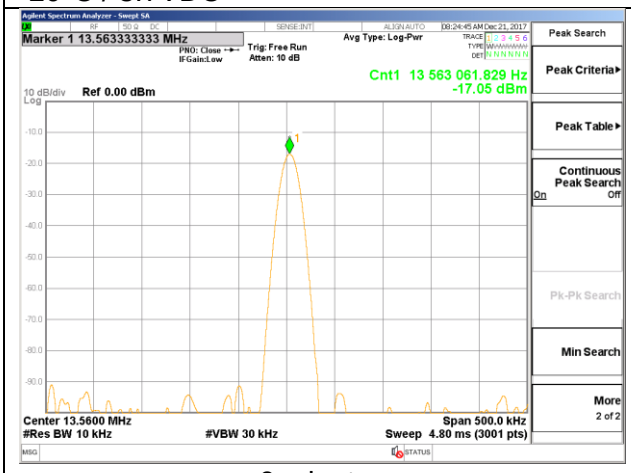
-20°C / 3.7VDC



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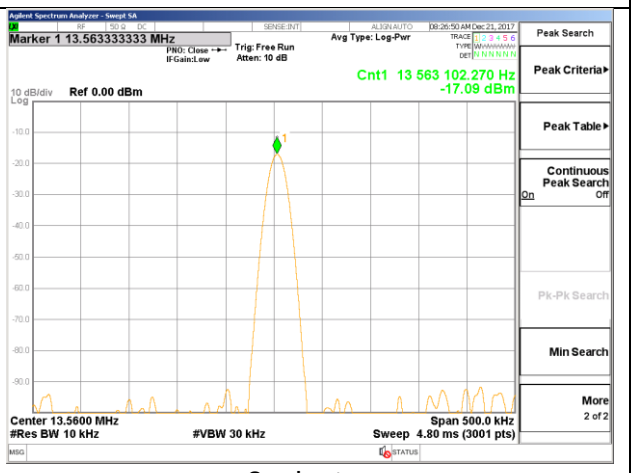

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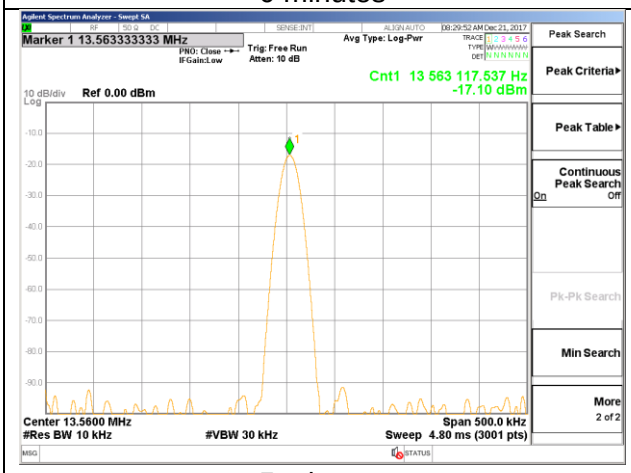

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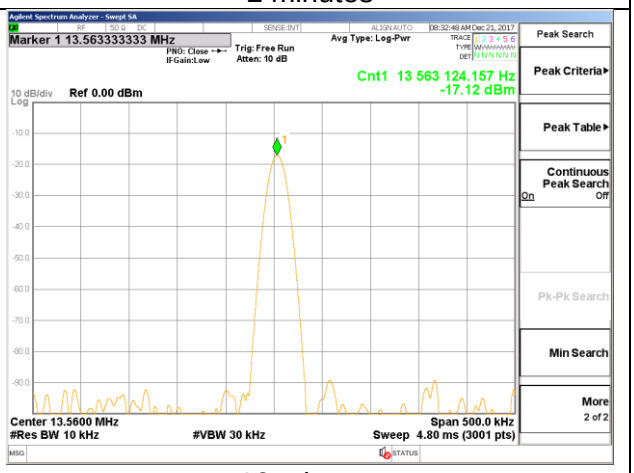

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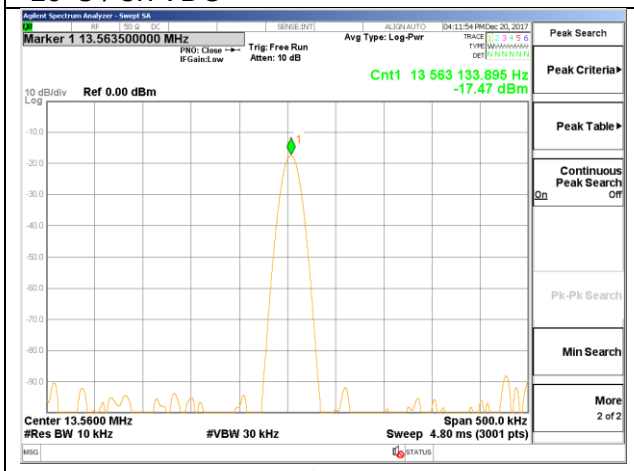
-10°C / 3.7VDC



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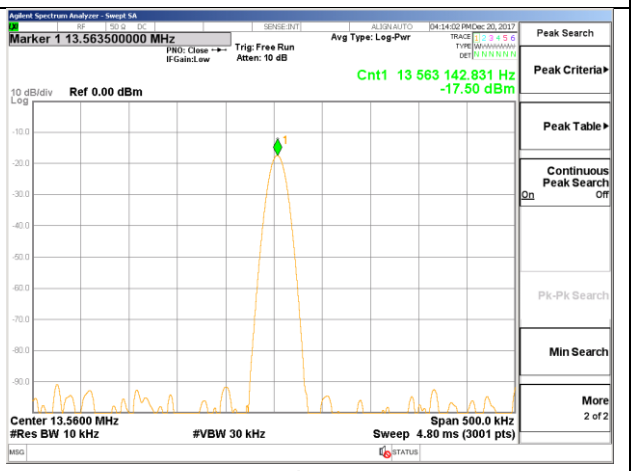

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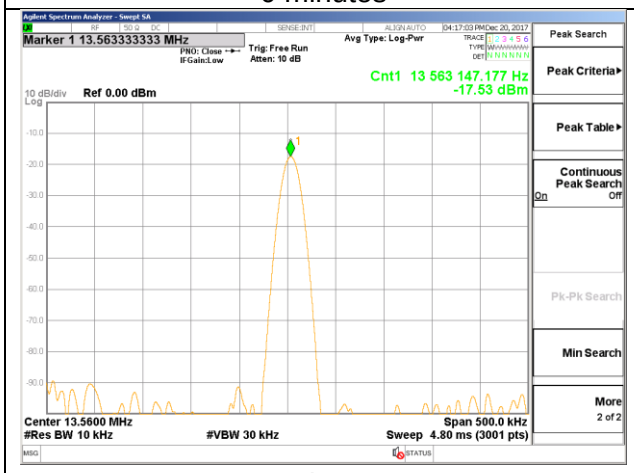

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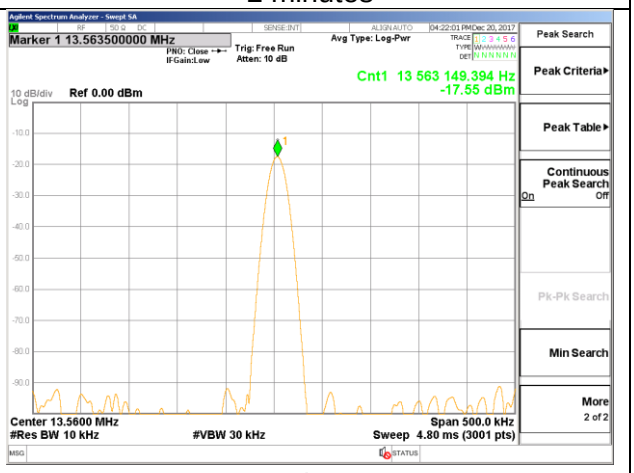

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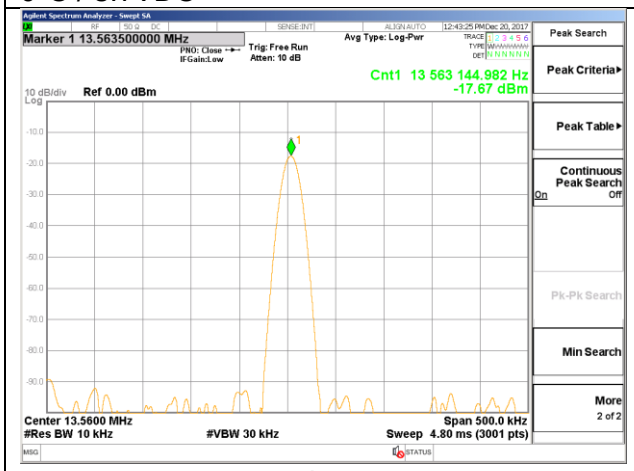
0°C / 3.7VDC



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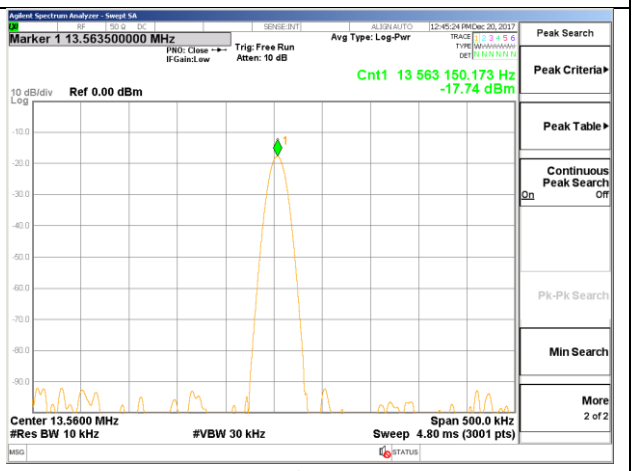

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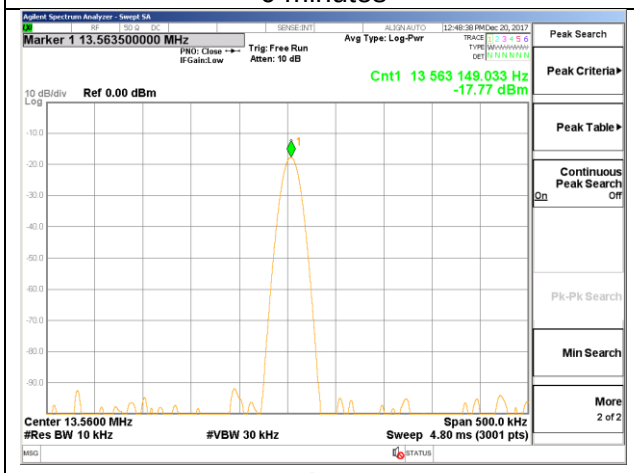

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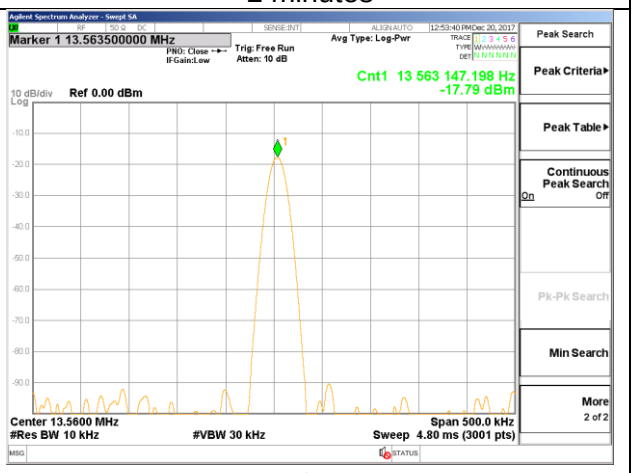

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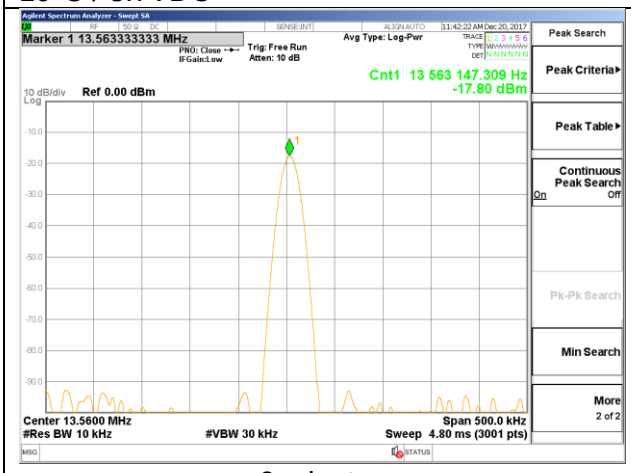
10°C / 3.7VDC



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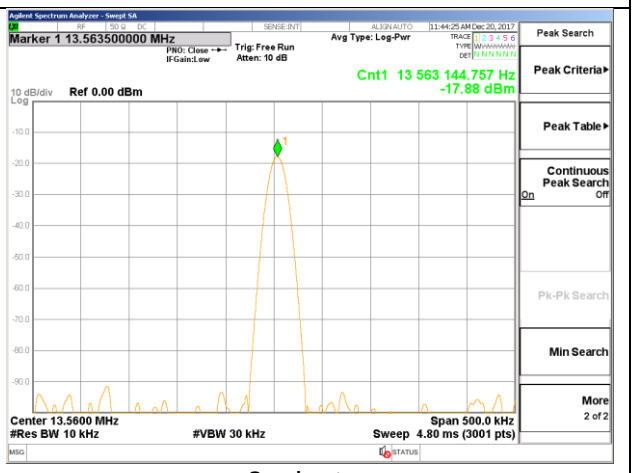

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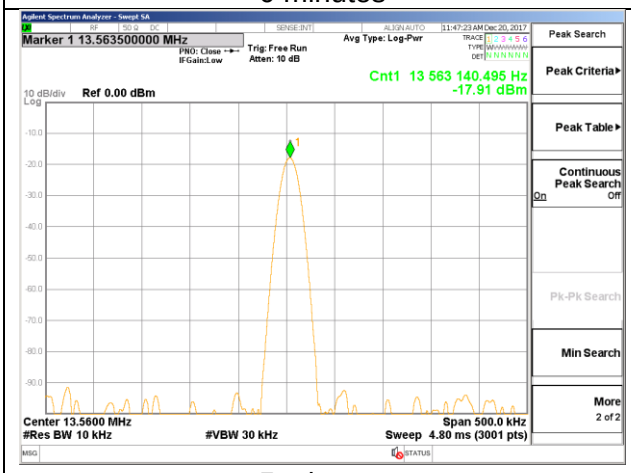

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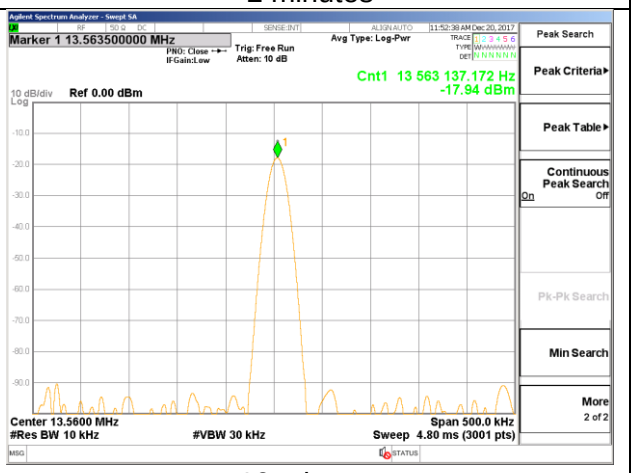

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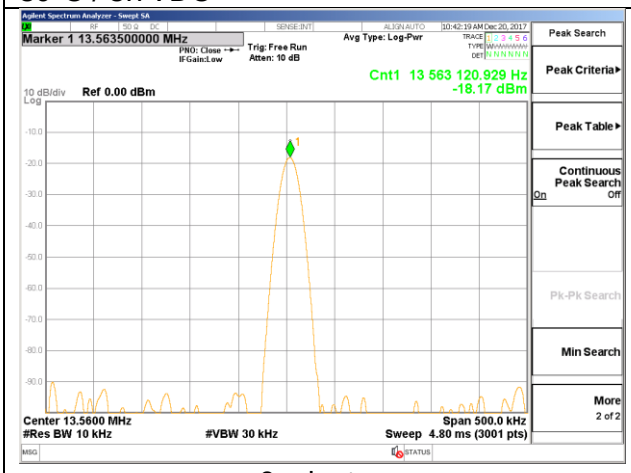
30°C / 3.7VDC



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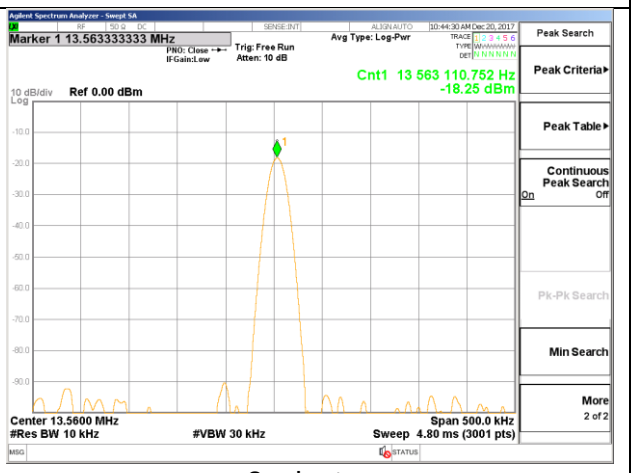

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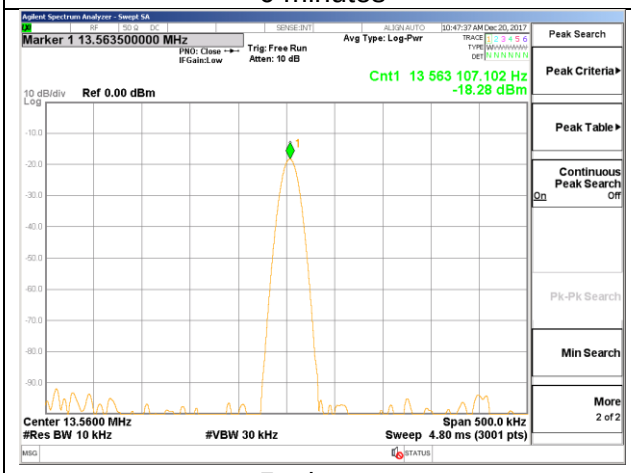

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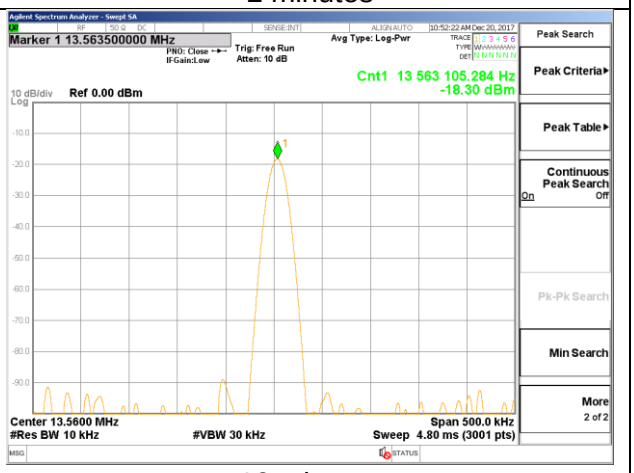

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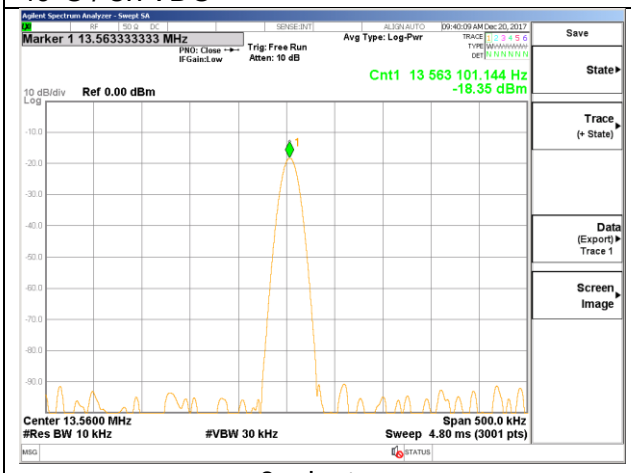
40°C / 3.7VDC



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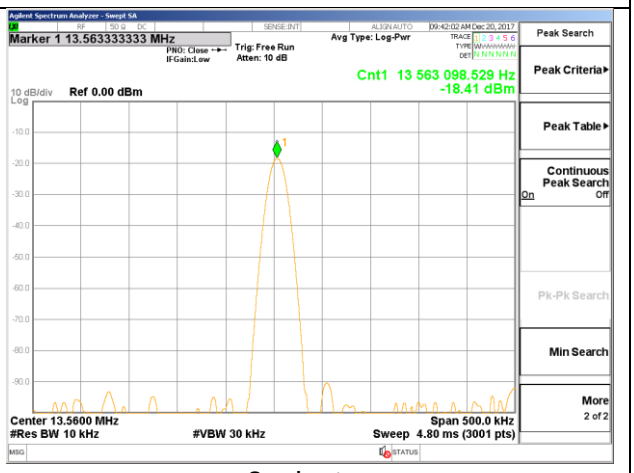

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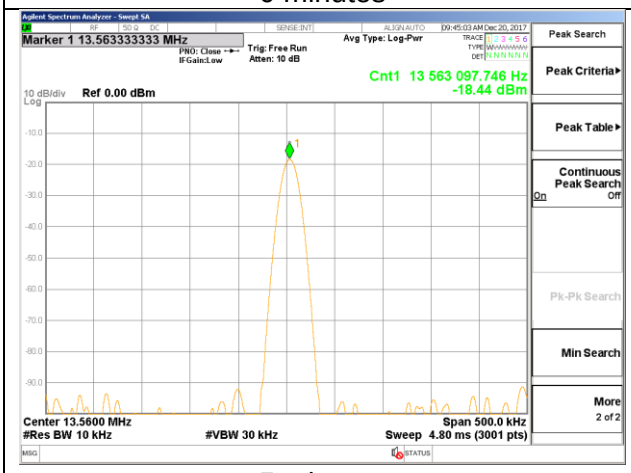

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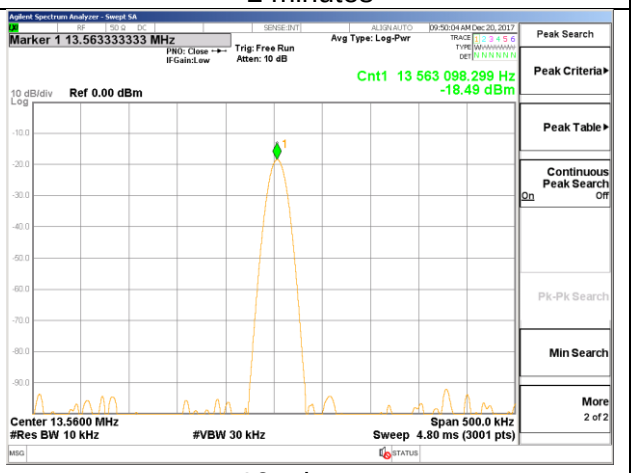

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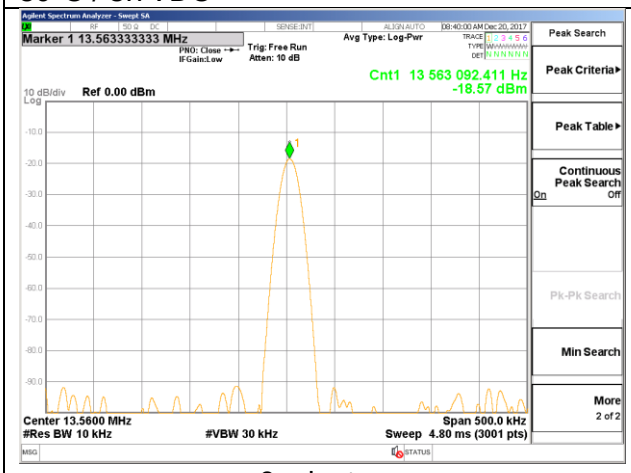
50°C / 3.7VDC



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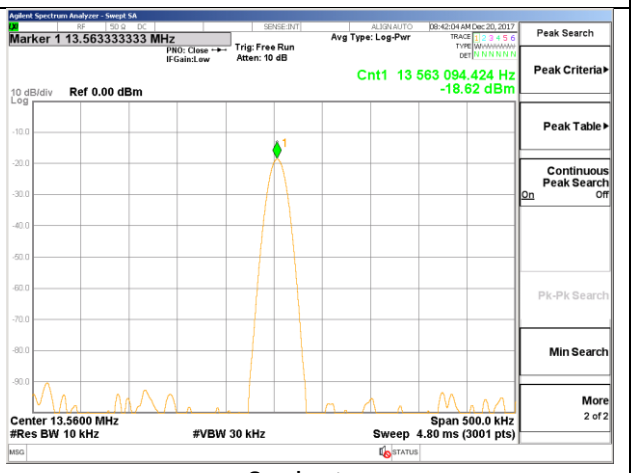

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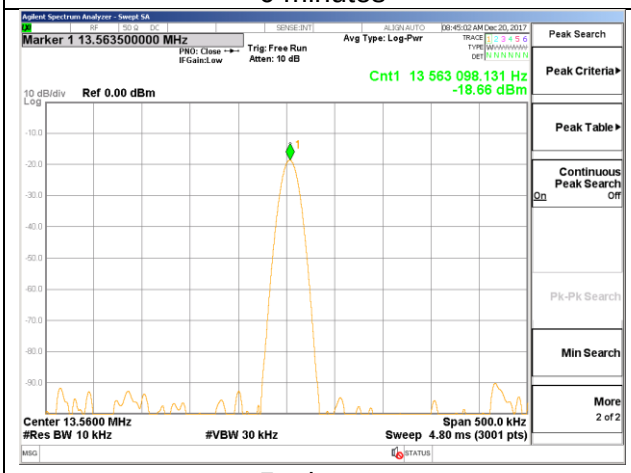

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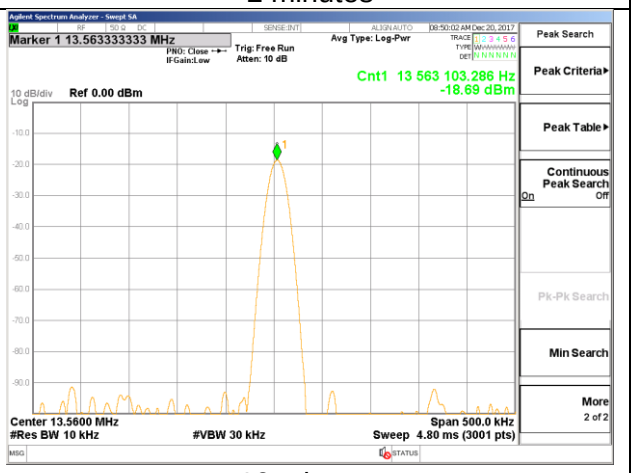

10 minutes

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10. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

* because of the nature of the signal (CW) procedure in C63.10 is not practicable since the OBW will always be about 2x the RBW.

RESULTS

Frequency (MHz)	99% Bandwidth (kHz)
13.56	24.092

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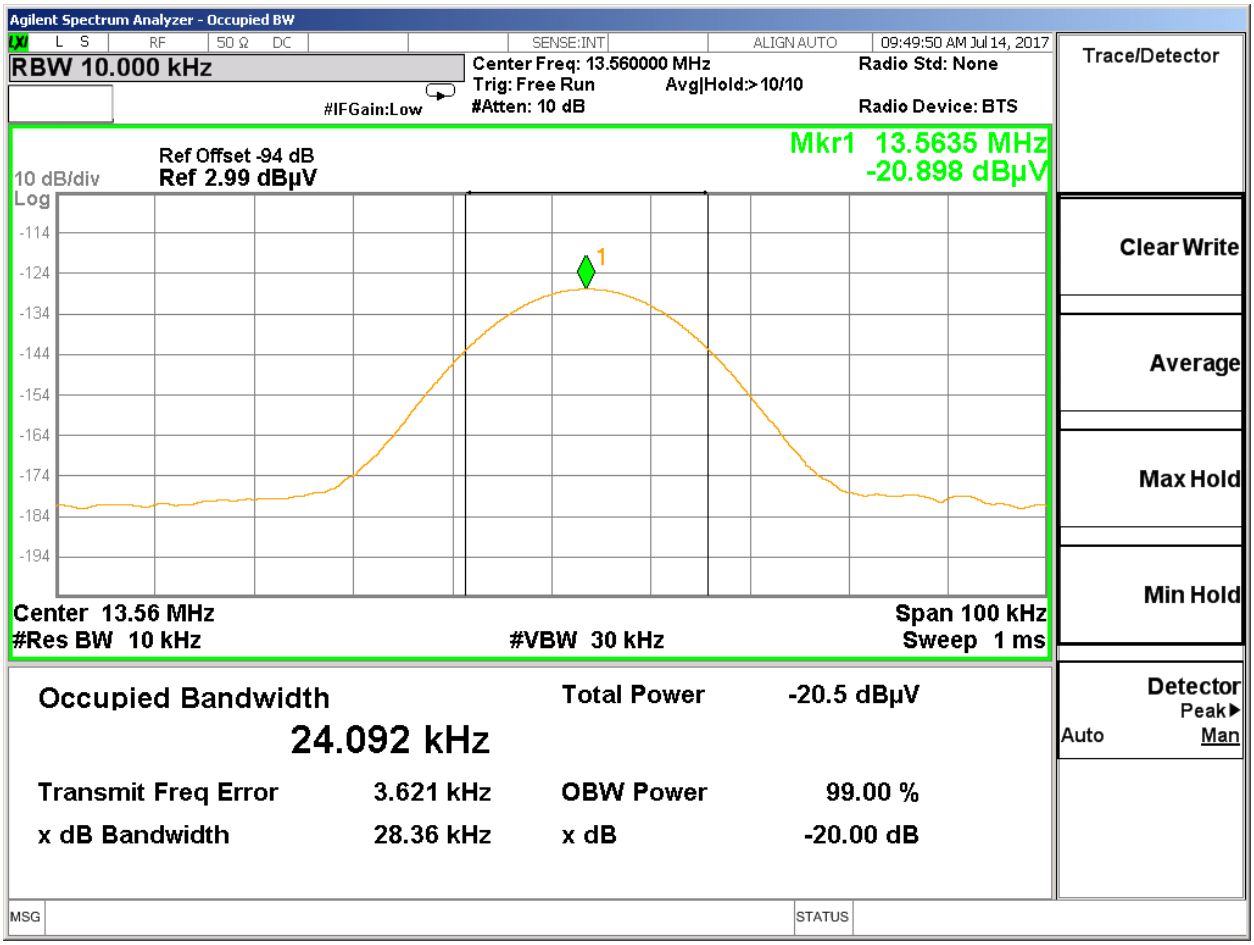
99% BANDWIDTH



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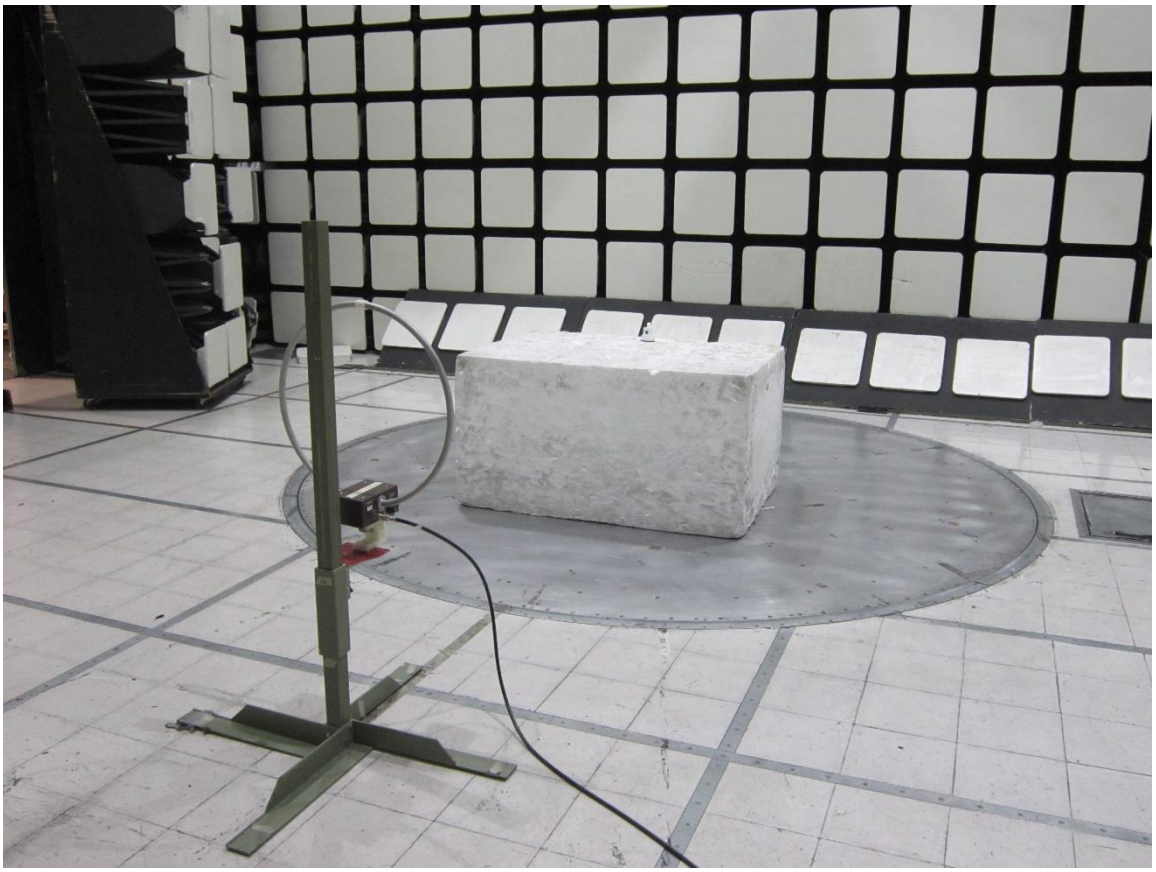
11. SETUP PHOTOS

RADIATED EMISSION BELOW 30 MHz for Configuration 1



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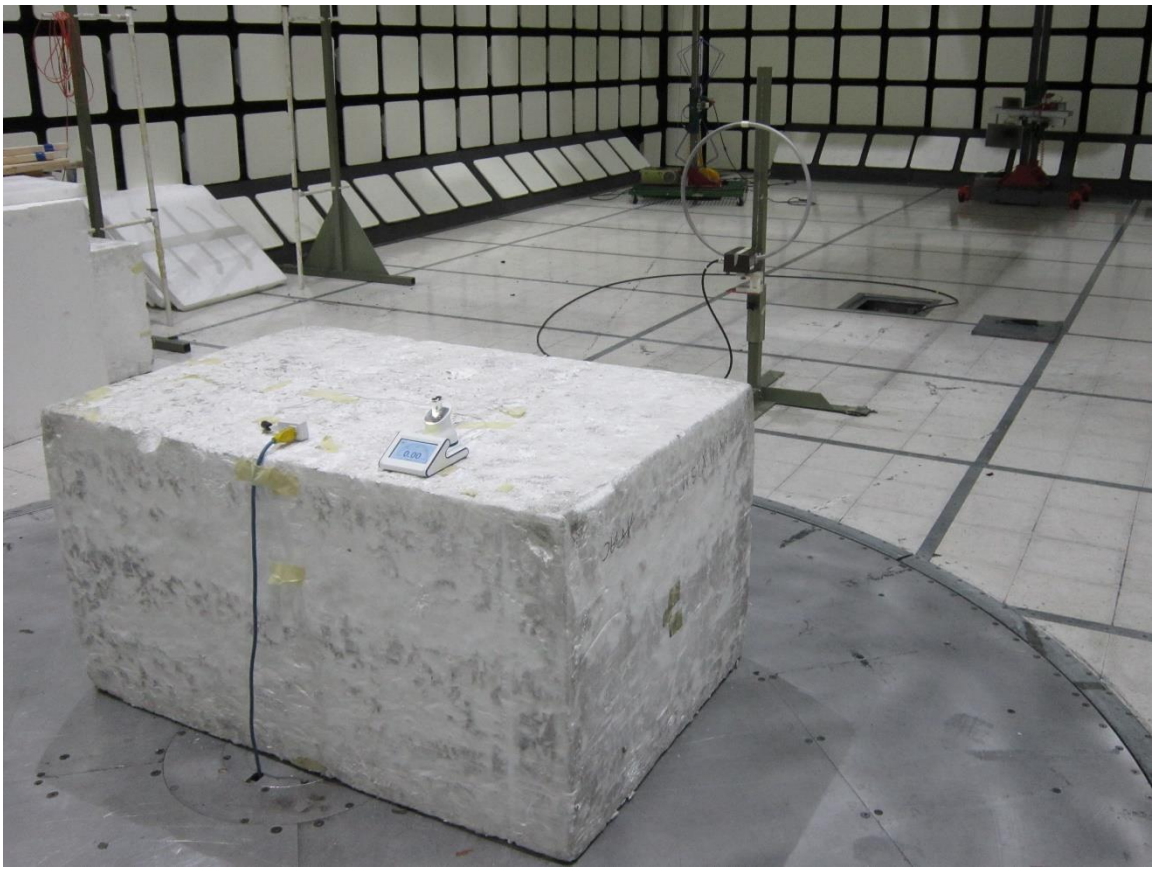
RADIATED EMISSION BELOW 30 MHz for Configuration 3



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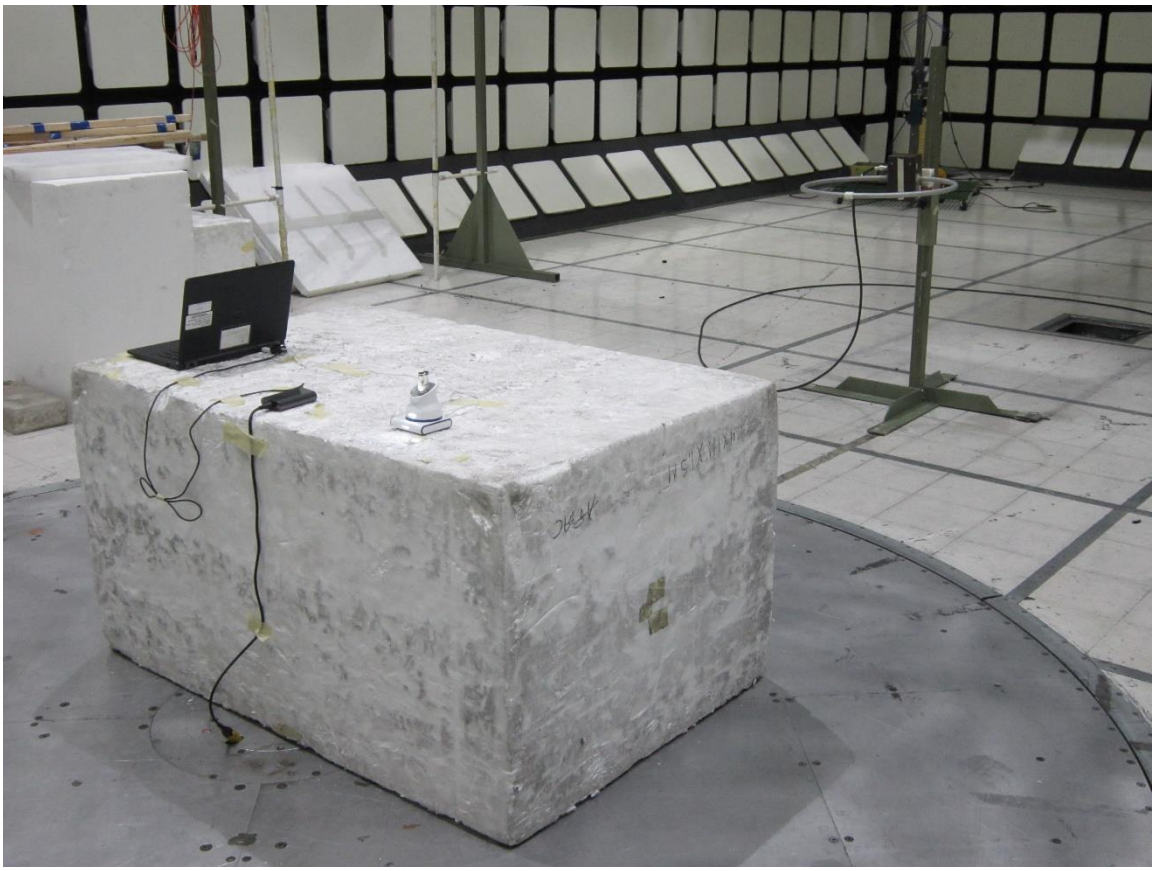
RADIATED EMISSION BELOW 30 MHz for Configuration 5



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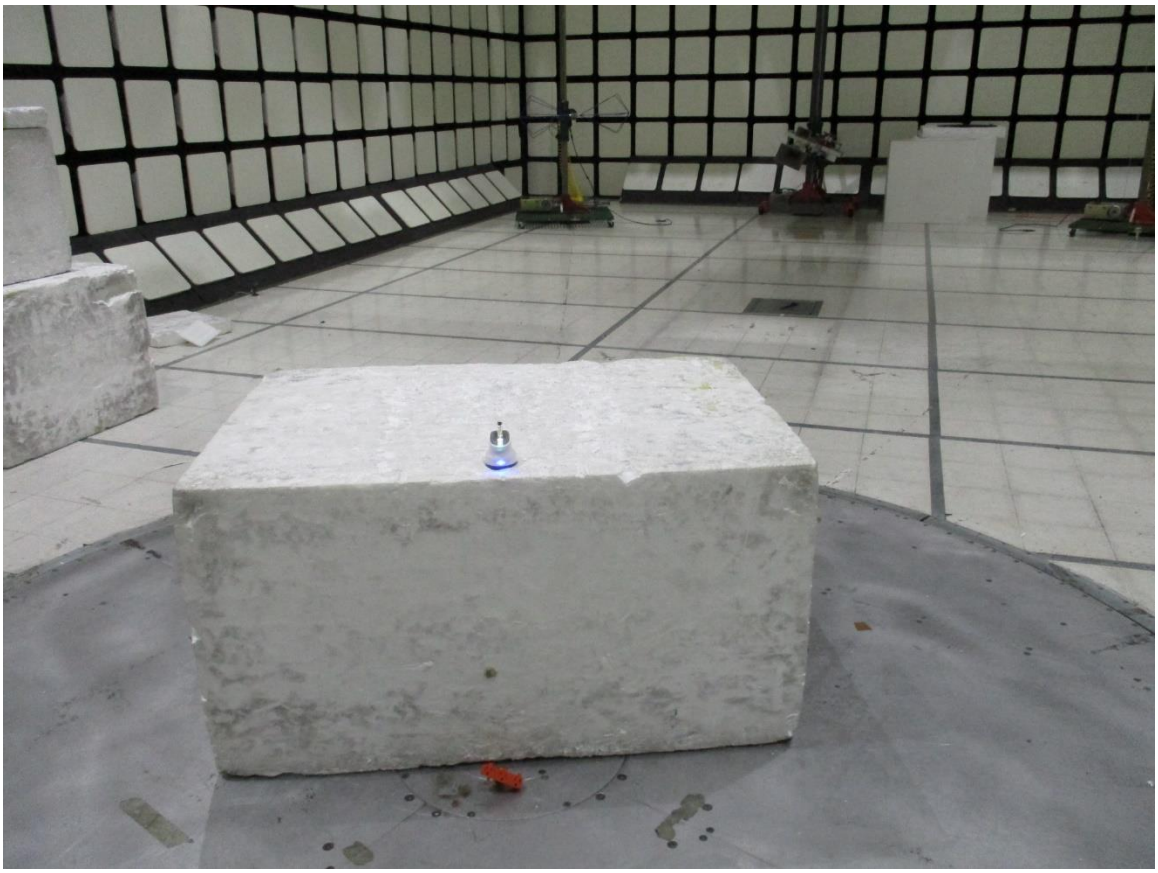
RADIATED EMISSION ABOVE 30 MHz for Configuration 1



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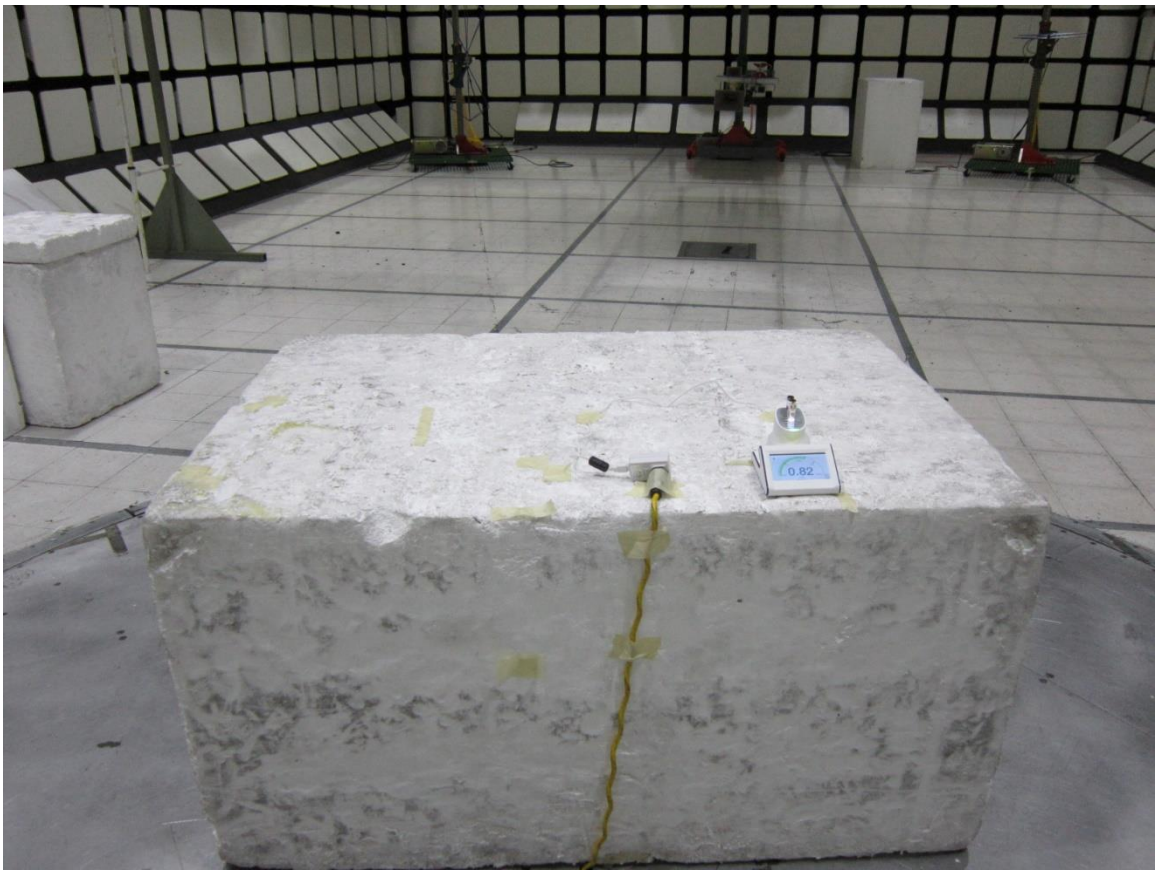
RADIATED EMISSION ABOVE 30 MHz for Configuration 3



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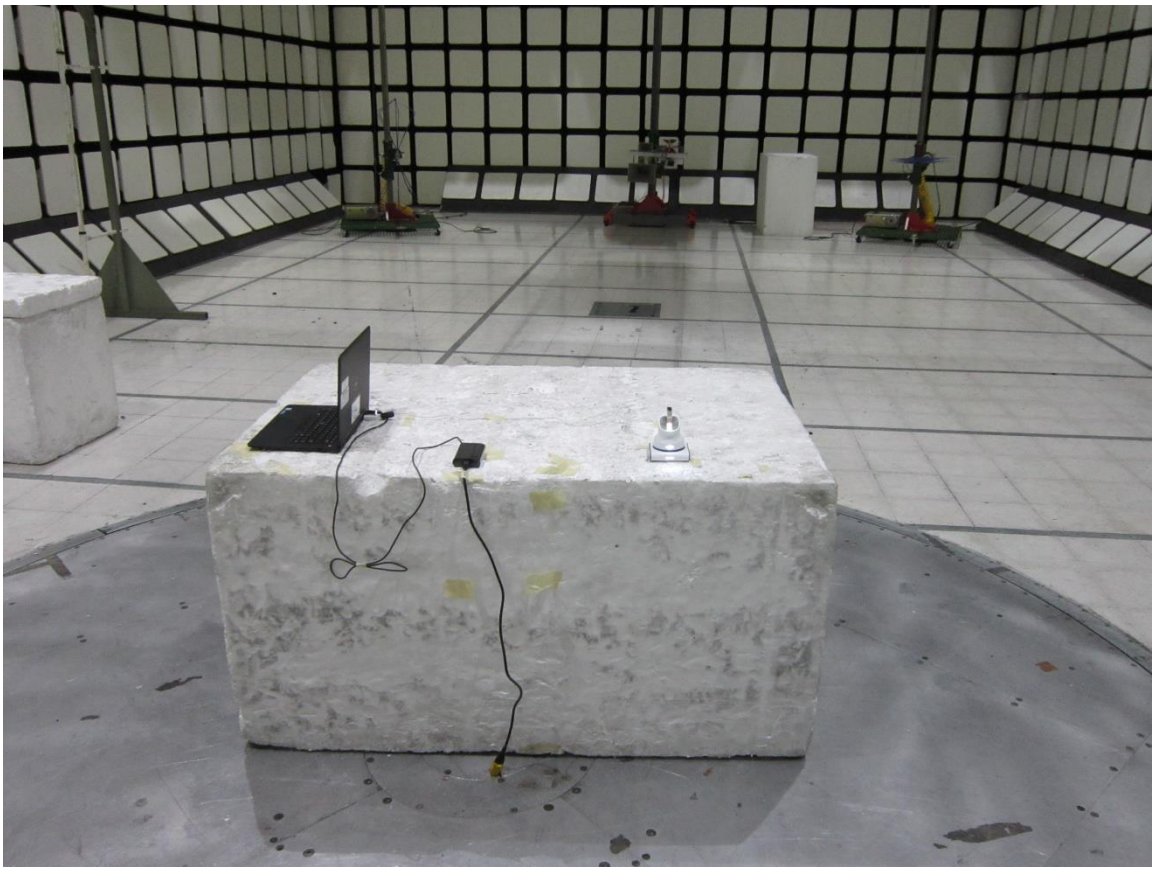
RADIATED EMISSION ABOVE 30 MHz for Configuration 5



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AC MAINS LINE CONDUCTED EMISSION for Configuration 3

The setup above is showing configuration 4 (eliminated from possible configurations). Configuration 3 is similar to configuration above, except the laptop is removed and based with display is used and its connected to power supply.

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AC MAINS LINE CONDUCTED EMISSION for Configuration 5

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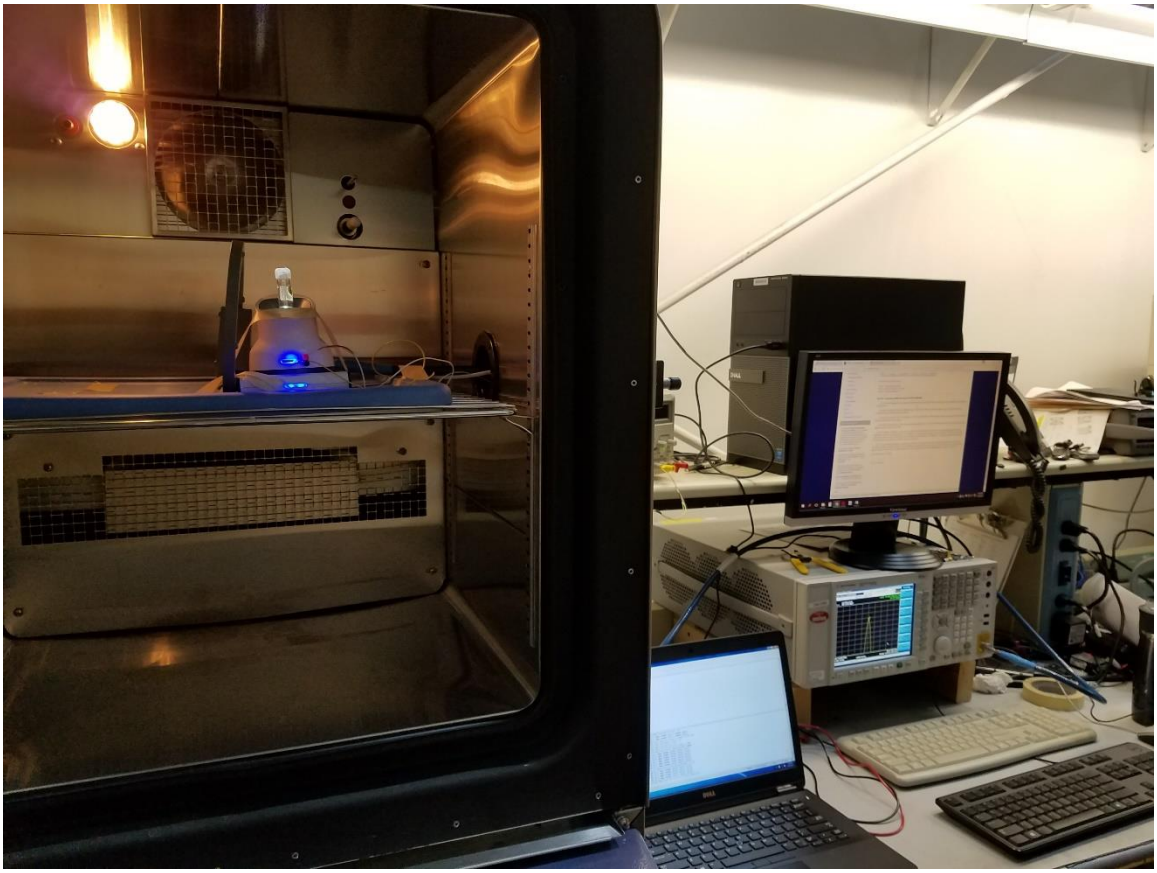
FREQUENCY TOLERANCE OVER EXTREME CONDITIONS



END OF REPORT

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