FCC 47 CFR PART 15 SUBPART C
INDUSTRY CANADA RSS-210 ISSUE 8

CERTIFICATION TEST REPORT

FOR

PATIENT MONITORING DEVICE FOR MRI ENVIRONMENTS

MODEL NUMBER: MR400, REF 866185 (RADIO 2 [NORDIC RADIO])

FCC ID: S6WMR400
IC: 6331A-MR400

REPORT NUMBER: R10608232-RF4

ISSUE DATE: 2015-04-06

Prepared for
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NVLAP LAB CODE 200246-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	2015-03-11	Initial Issue	Jeff Moser
1	2015-03-30	Revised Spurious emissions data to include calculated average data per FCC 15.35c. Revised 'P/N' to 'REF' for the wECG model designations.	Jeff Moser
2	2015-04-02	Revised to include 20 dB bandwidth plots.	Jeff Moser
3	2015-04-06	Revised to include average E-field strength information on page 9. Also, editorial corrections on page 56 and 89.	Jeff Moser

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: INVIVO CORP.
12501 RESEARCH PARKWAY
ORLANDO, FL, 32826, USA

EUT DESCRIPTION: PATIENT MONITORING DEVICE FOR MRI ENVIRONMENTS

MODEL: MR400, REF 866185 (RADIO 2 [NORDIC RADIO])

SERIAL NUMBER: LP2-00005

DATE TESTED: 2015-02-02 to 2015-03-05, 2015-04-02

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-210 Issue 8 Annex 2	Pass
INDUSTRY CANADA RSS-GEN Issue 4	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, any agency of the Federal Government, or any agency of any government.

Approved & Released
For UL LLC By:

Bart Mucha
EMC Staff Engineer
UL – Consumer Technology Division

Prepared By:

Jeff Moser
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UL – Consumer Technology Division

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 4, and RSS-210 Issue 8.

Test Deviations – Test Site validation for radiated measurements above 1GHz used ANSI C63.4:2003.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 12 Laboratory Dr., Research Triangle Park, NC 27709, USA.

12 Laboratory Dr., RTP, NC 27709
☐ Chamber A
☒ Chamber C

The onsite chambers (A & C) are covered under Industry Canada company address code 2180C with site numbers 2180C -1 through 2180C-2, respectively.

UL LLC (RTP) is accredited by NVLAP, Laboratory Code 200246-0. The full scope of accreditation can be viewed at http://ts.nist.gov/standards/scopes/2002460.htm.

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

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

4.3. MEASUREMENT UNCERTAINTY

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

Test	Uncertainty
Conducted Emissions (0.150-30MHz)	+/- 2.37 dB
Radiated Emissions (30-1000 MHz)	+/- 6.04 dB (3m)
Radiated Emissions (1-6 GHz)	+/- 5.96 dB
Radiated Emissions (6-18 GHz)	+/- 6.10 dB
Radiated Emissions (18-26 GHz)	+/- 6.81 dB

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

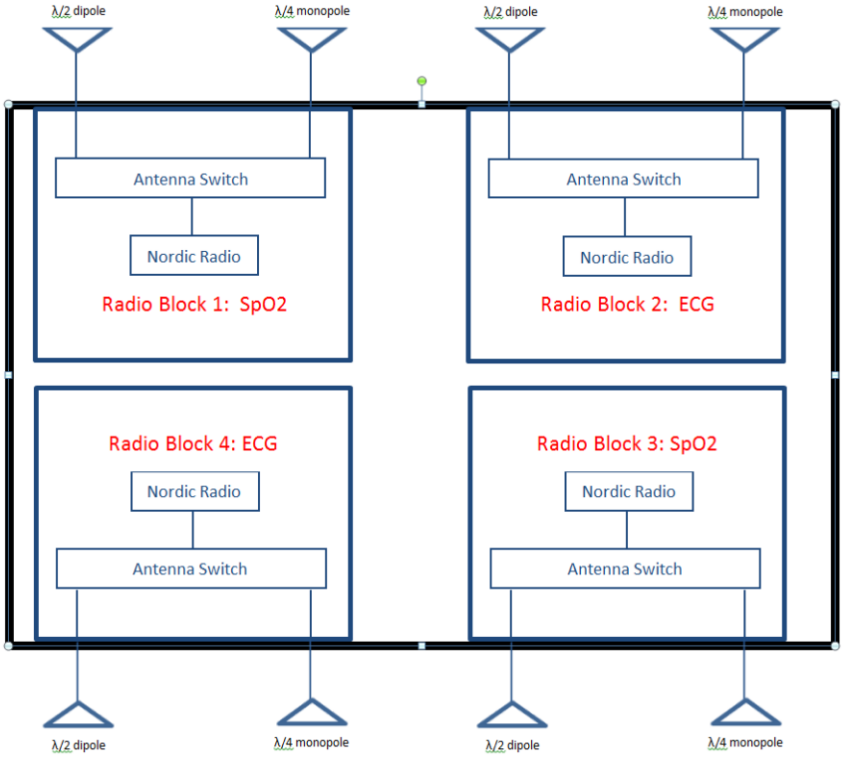
5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT, model MR400 is a Patient Monitoring Device for MRI Environments. The MR400 contains a Frequency Hopping Device, referred to as MR400 Radio 1 (2402-2483 MHz) and a custom designed radio that is DSSS, operating under a GFSK modulation.

MR400 Radio 1 is a modular radio, Murata WIT2410M4G-NF. This report covers MR400 Radio 2.

The custom radio, referred to as MR400 Radio 2 is located in the MR400 cart and contains two radio blocks for the ECG communication (2435-2472 MHz) and two radio blocks for the SpO2 communication (2425-2471 MHz). Each radio block contains a ½ wave dipole and a ¼ wave monopole. The different antennas and radio blocks are for diversity. Once one of each of the ECG and SpO2 radio blocks and antennas are selected, all other radio paths are blocked. The radio operates with a GFSK modulation. Below is a diagram of the MR400 Radio 2 module:



MR400 Channel List

Network	ECG	SpO2
1	2453	2457
2	2455	2459
3	2454	2456
4	2458	2460
5	2472	2470
6	2436	2439
7	2437	2434
8	2440	2425
9	2435	2438
10	2469	2471

Low Channel
Mid Channel
High Channel

5.2. MAXIMUM OUTPUT E-FIELD STRENGTH

The transmitter has a maximum output peak E-field as follows:

Radio	Frequency Range (MHz)	Mode	PEAK Output E-field Strength (dBuV/m)	AVERAGE Output E-field Strength (dBuV/m)
ECG	2435-2472	GFSK	103.75	48.98
SpO2	2425-2471	GFSK	104.34	49.57
Combined ECG and SpO2 Field Strength	2435-2472 (ECG) 2425-2471 (SpO2)	GFSK	107.07	52.30

Note – When combining the field strengths of the ECG and SpO2 radio, the maximum peak field strength is 107.07 dBuV/m PK and 52.30 dBuV/m AVE. Refer to Section 7.3.1 for more details.

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

MR400 Radio 1 – The modular Murata WIT2410M4G-NF utilizes a 2.1 dBi dipole antenna.

MR400 Radio 2 – Each radio block utilizes ½ wave dipole and ¼ wave monopole for diversity, each with a maximum gain of 2 dBi.

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the MR400 during testing was M5.4

The test utility software used during testing was M5.4 based with FW036 revision 00.02.05 replaced by FW041 revision 1.1.

5.5. WORST-CASE CONFIGURATION AND MODE

The worst-case channel is determined as the channel with the highest field strength.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Use*	Product Type	Manufacturer	Model	Comments
EUT	Expression Patient Monitor (MR400)	Invivo, a division of Philips Medical Systems	866185	S/N – LP2_00005

Note: * Use one of the following:
EUT - Equipment Under Test
AE - Auxiliary/Associated Equipment
SIM - Simulator (Not Subjected to Test) *Note: Use abbreviations:

I/O CABLES

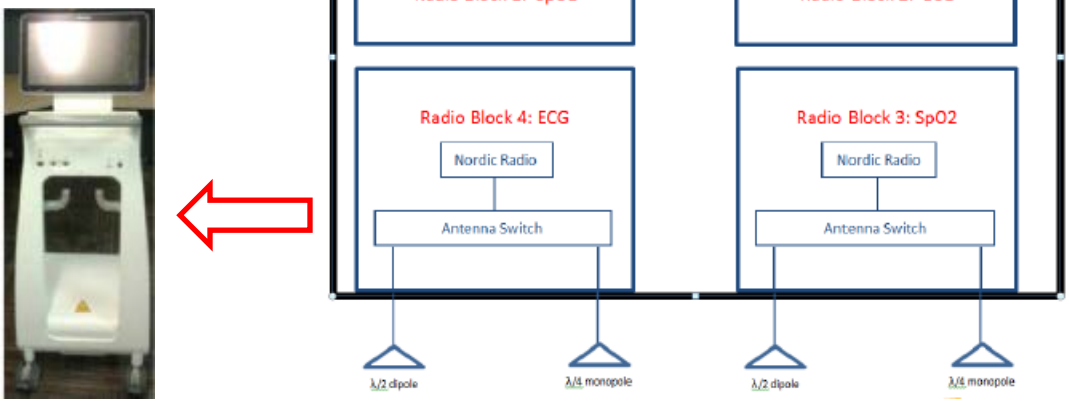
Port No.	Name	Type*	Cable Max. >3m	Cable Shielded	Comments
0	Enclosure	N/E	—	—	None
1	Mains	AC	N	N	(989803168211) NORTH AMERICAN LINE CORD

*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

The radios are installed in the MR400 as it would be in the field. Test software exercised the radio card

SETUP DIAGRAM FOR TESTS



The ECG block, both ½ wave dipole and ¼ wave monopole and the SpO2 block, both ½ wave dipole and ¼ wave monopole were tested for Radiated testing.

Note – The 2 ECG blocks and 2 SpO2 blocks are identical. They are for redundancy and diversity. Additionally, the 2 antenna types are present for diversity. Only one block type and one antenna type are used at a time. All other communication paths are shut off (e.g. Radio Block 1: SpO2, dipole and Radio Block 4: ECG, monopole could be used at the same time. All other paths would then shut off).

6. TEST AND MEASUREMENT EQUIPMENT

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

Wireless Conducted Measurement Equipment

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	Common Equipment				
SA0020	Spectrum Analyzer	Agilent Technologies	E4446A	2015-02-26	2016-02-29
MM0150	Digital Multimeter, 4½ Digit (True RMS AC, AC+DC measurement)	Agilent	U1252A	2014-09-04	2016-09-30
MM0151	Digital Multimeter, 4½ Digit (True RMS AC, AC+DC measurement)	Agilent	U1252A	2014-09-04	2016-09-30
HI0041	Temp/Humid/Pressure Meter	Cole-Parmer	99760-00	2014-02-19	2015-02-28
HI0069	Temp/Humid/Pressure Meter	Cole-Parmer	99760-00	2014-06-27	2015-06-30

Radiated Disturbance Emissions (E-field) – Chamber C

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	30-1000 MHz Range				
AT0066	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB1	2014-07-10	2015-07-31
	1-18 GHz				
AT0067	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2014-02-19	2015-02-28
	18-40 GHz (calibrated as set)				
AT0063	Horn Antenna, 18-26.5GHz	ARA	MWH-1826/B	2014-07-23	2015-07-31
	Gain-Loss Chains				
SAC_G (Hybrid) 30-1000MHz	Gain-Loss string for Hyrbid antenna at 3m	Various	Various	2015-01-26	2016-01-31
SAC_G (BOM) 1-18GHz	Gain-Loss string for Hyrbid antenna at 3m	Various	Various	2015-01-26	2016-01-31
SAC_G (BOM) 18-40GHz	Gain-Loss string for Hyrbid antenna at 3m	Various	Various	2015-01-26	2016-01-31
	Receiver & Software				
SA0018	Spectrum Analyzer	Agilent	N9030A	2014-06-24	2015-06-30
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
	Additional Equipment used				
HI0034	Temp/Humid/Pressure Meter	Cole-Parmer	99760-00	2014-02-19	2015-02-28

7. TEST RESULTS

7.1. 99% BANDWIDTH and 20 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

99% OBW: 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.

20 dB BW: The transmitter output is connected to the spectrum analyzer. The RBW is set to > 1% of the 20 dB BW. The VBW is set to 3 times the RBW. The sweep time is coupled. The detector is set to peak and a peak marker search is performed. Both sides of the signal are marked at the 20 dB points below the peak.

RESULTS

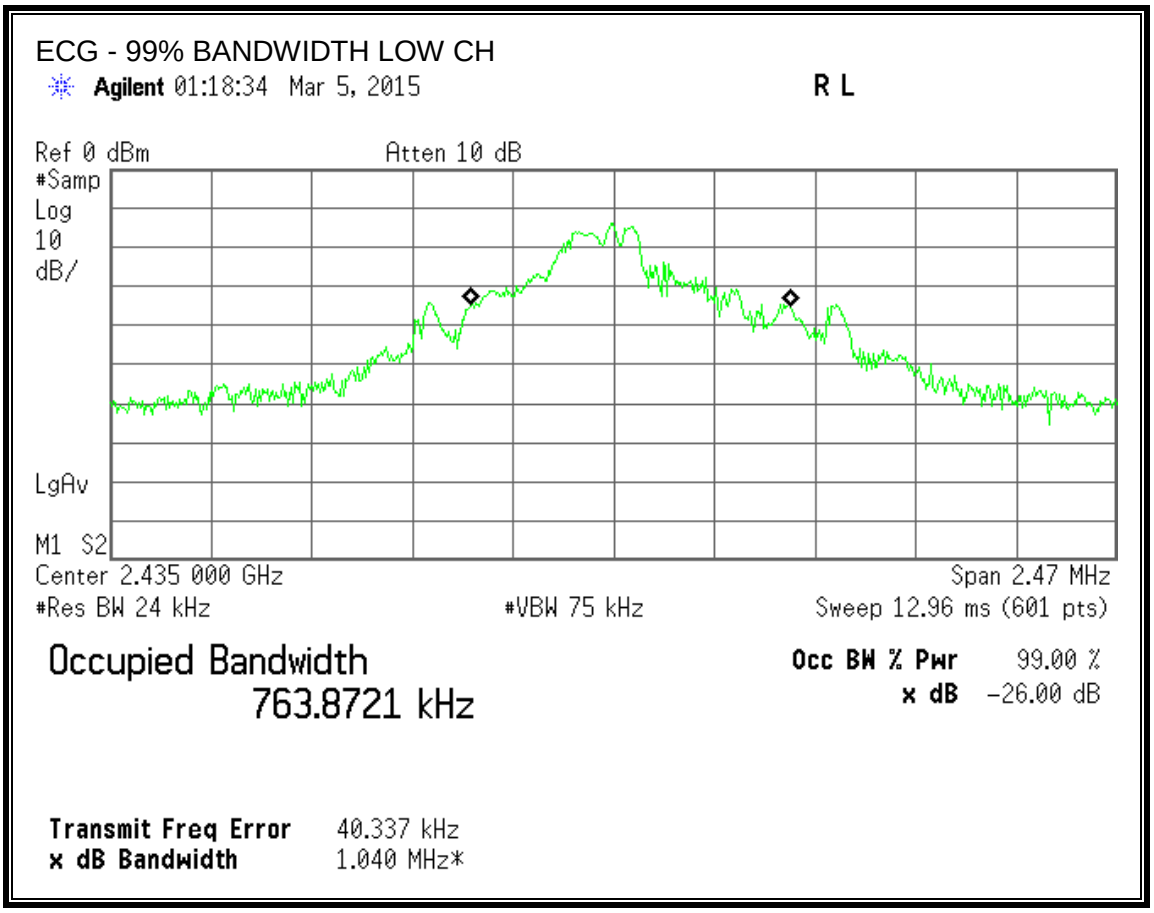
ECG

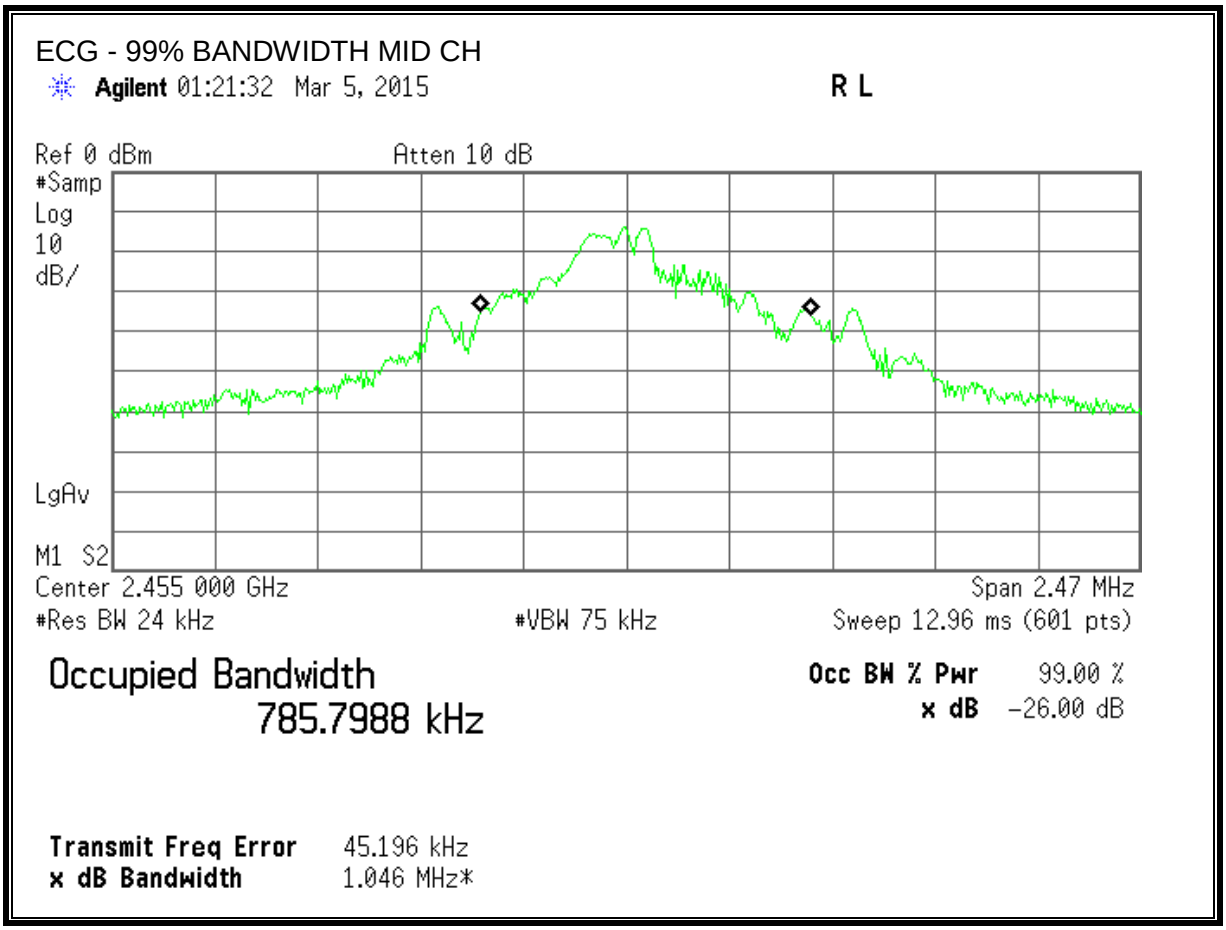
Channel	Frequency (MHz)	99% Bandwidth (MHz)	20 dB BW (MHz)
Low	2435	0.76387	0.645
Middle	2455	0.78580	0.640
High	2472	0.91832	0.635

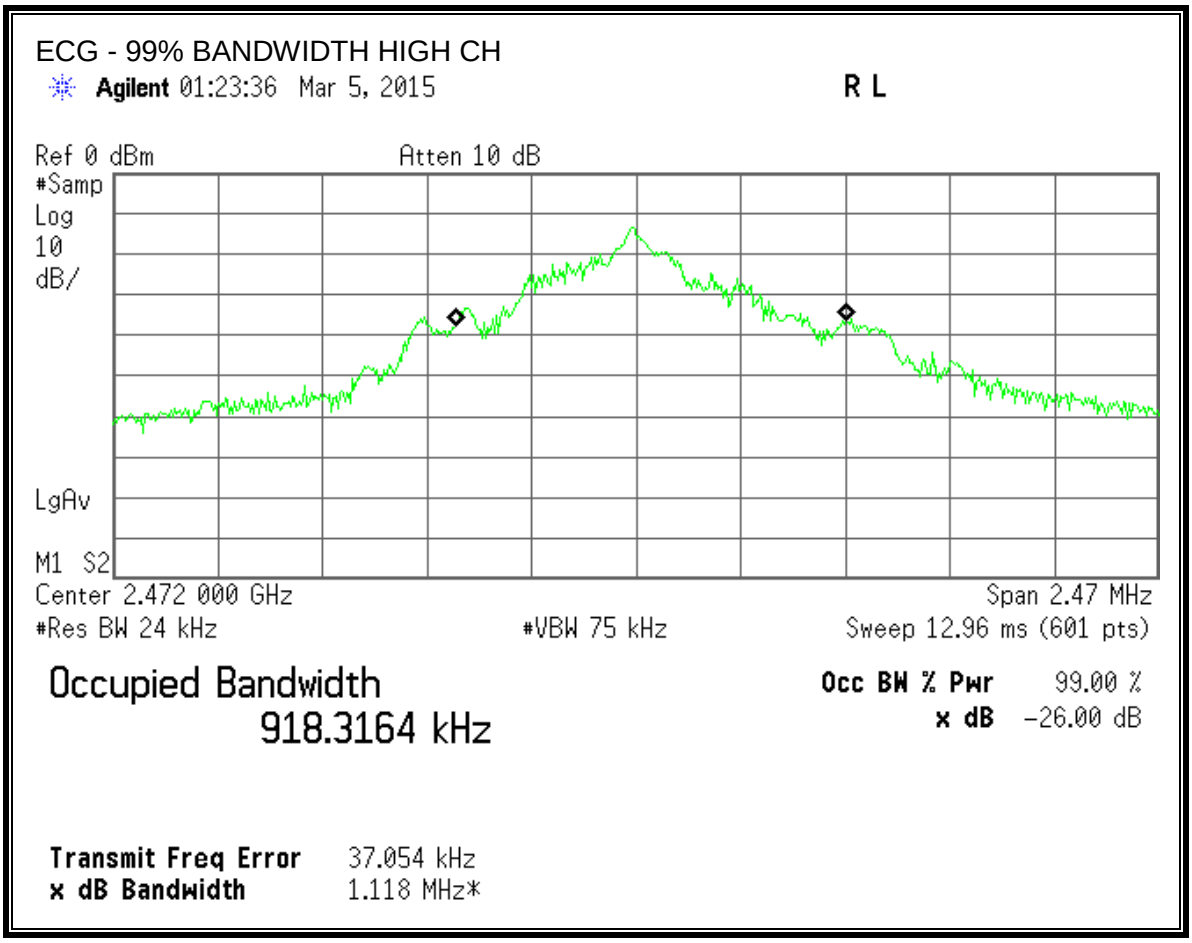
SpO2

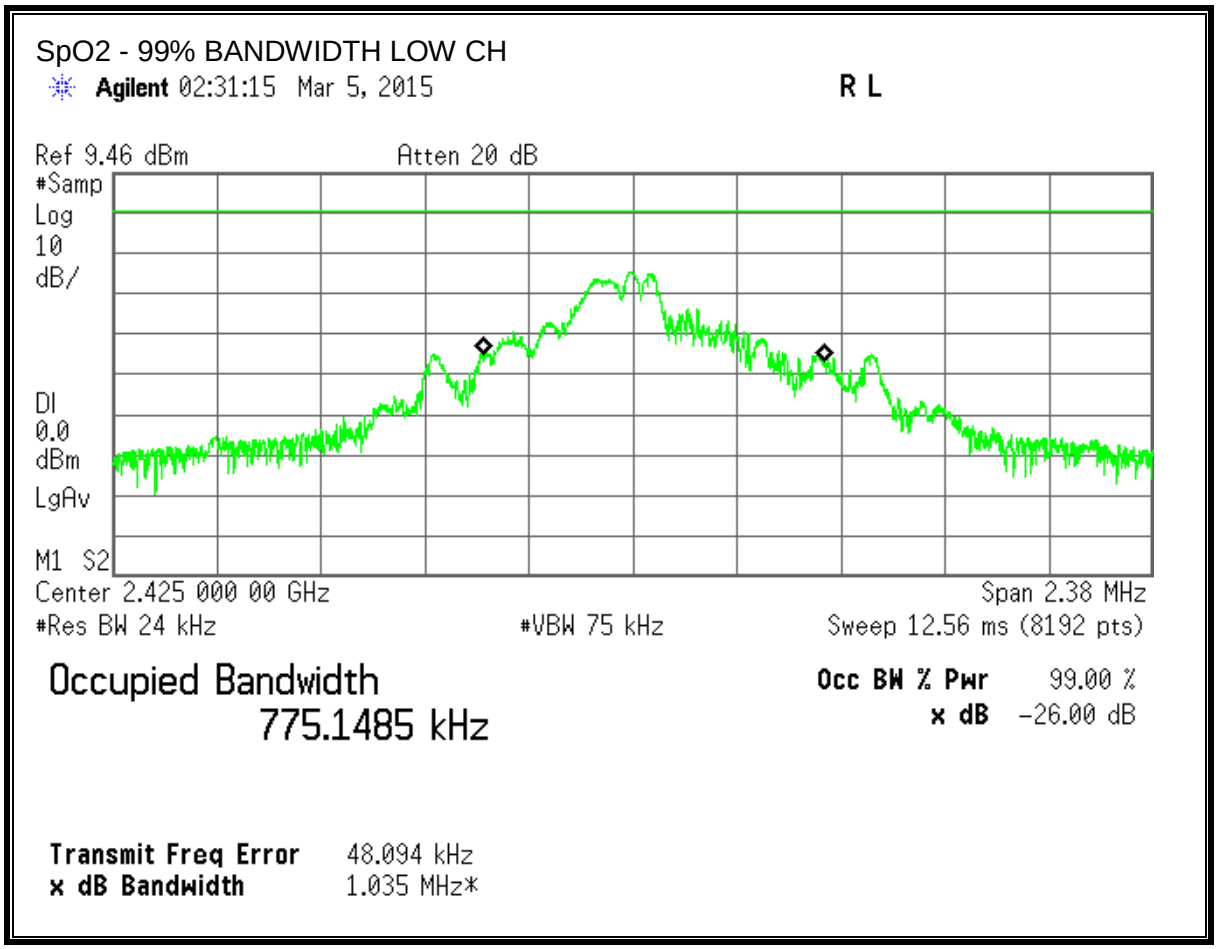
Channel	Frequency (MHz)	99% Bandwidth (MHz)	20 dB BW (MHz)
Low	2425	0.77515	0.625
Middle	2456	0.74951	0.630
High	2471	0.75217	0.620

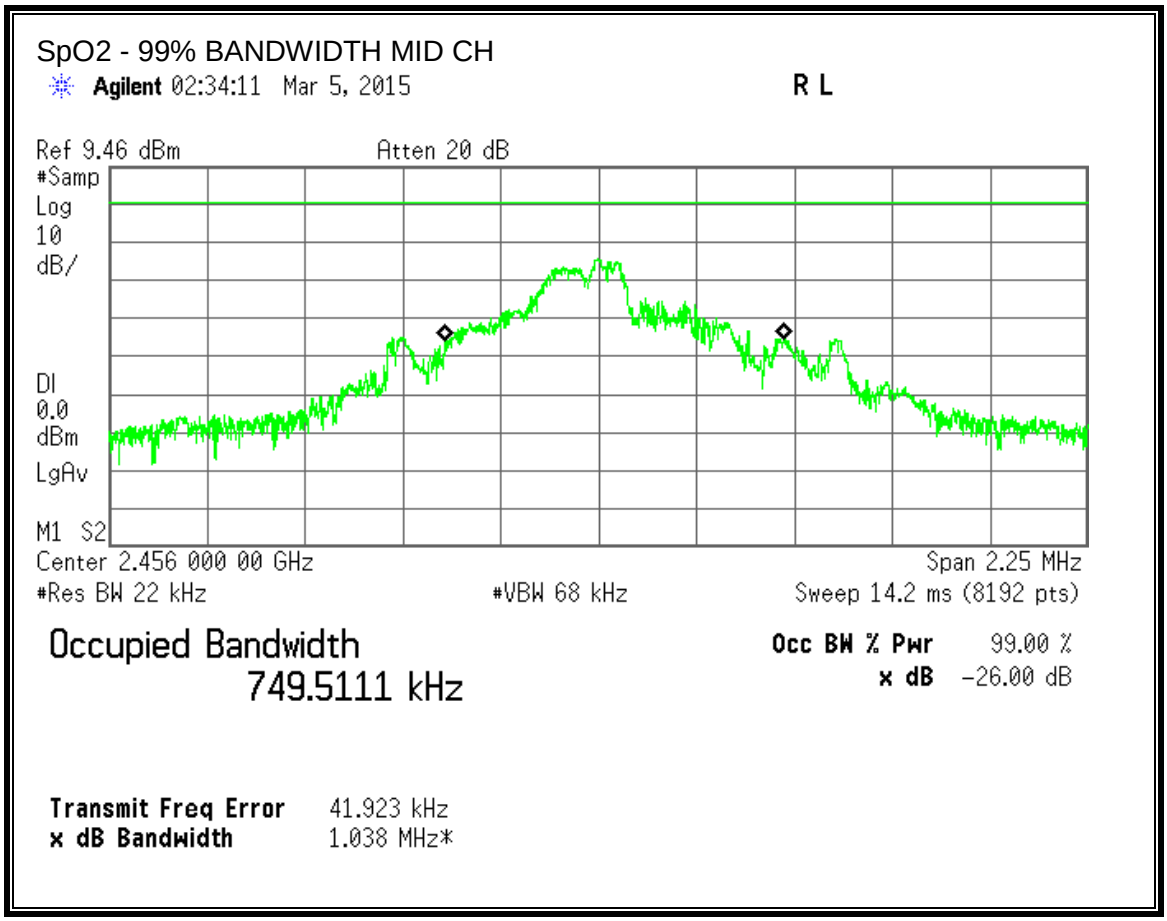
99% BANDWIDTH

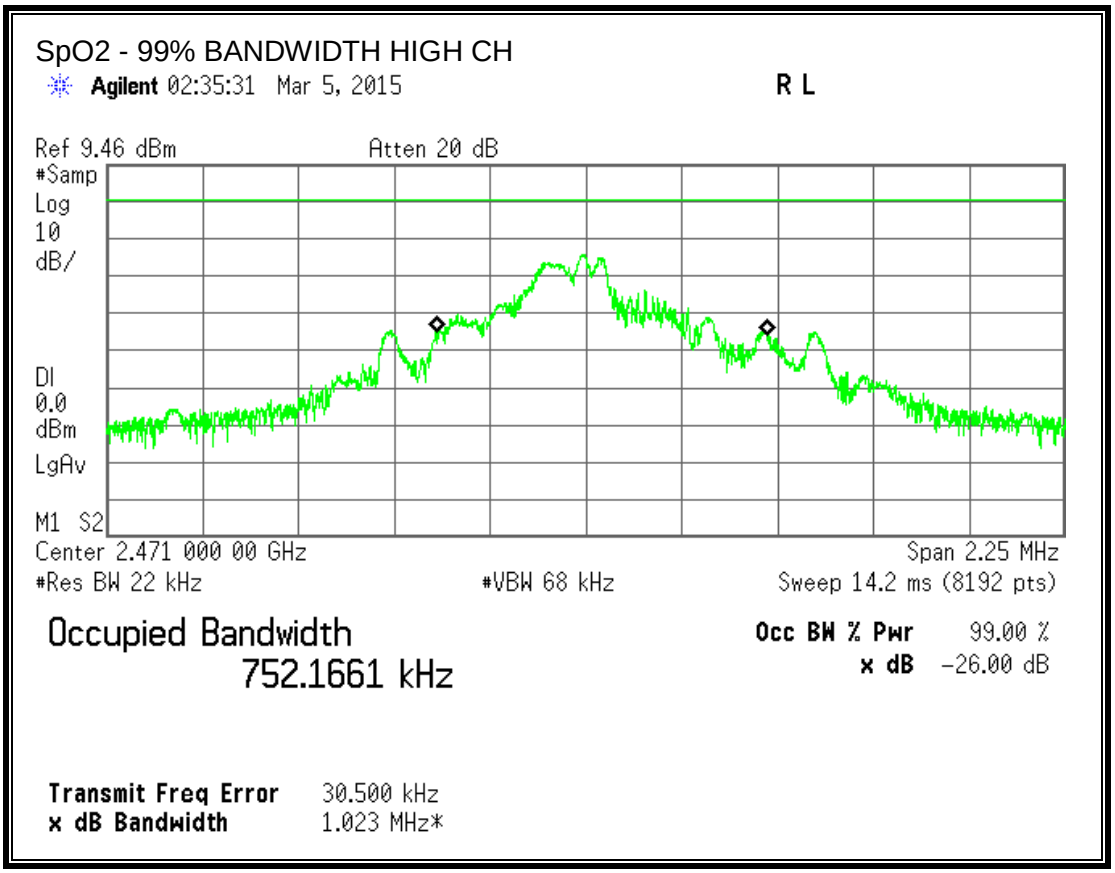






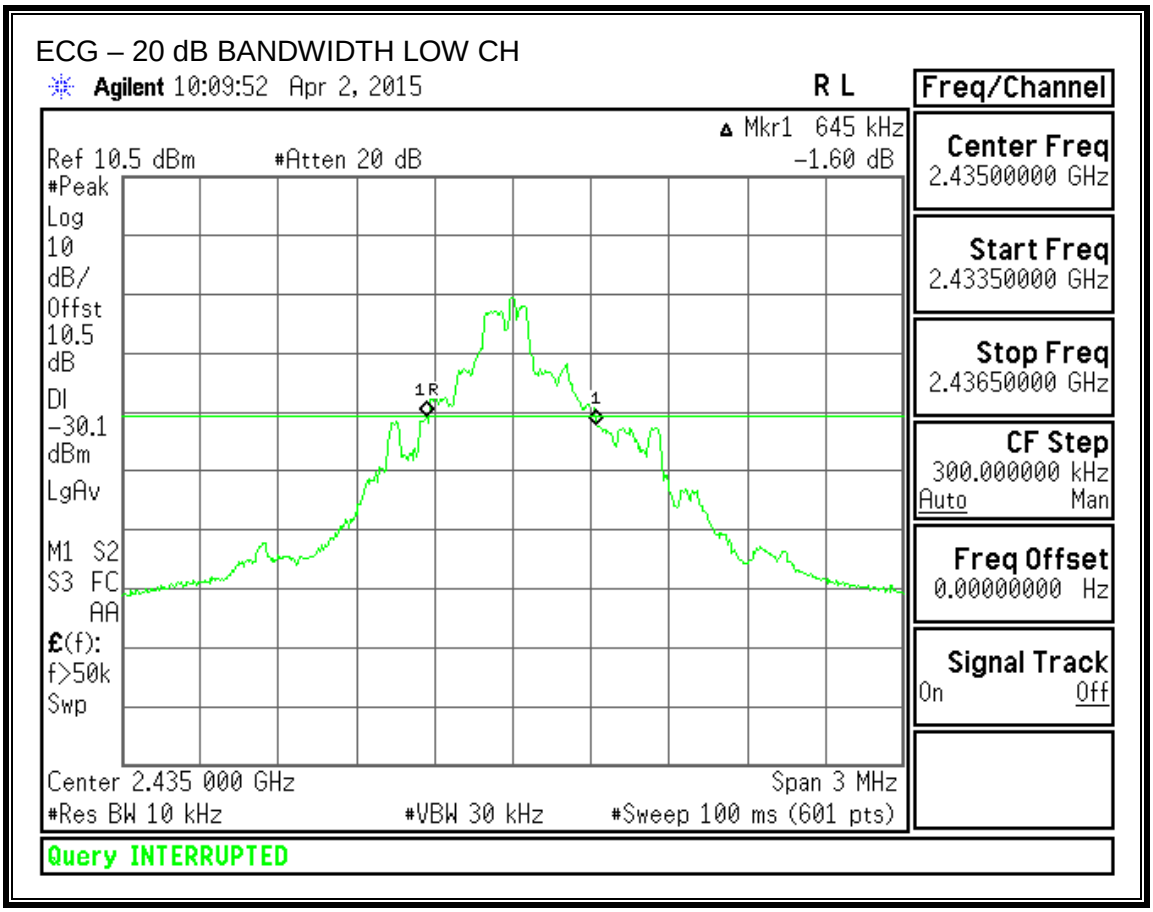




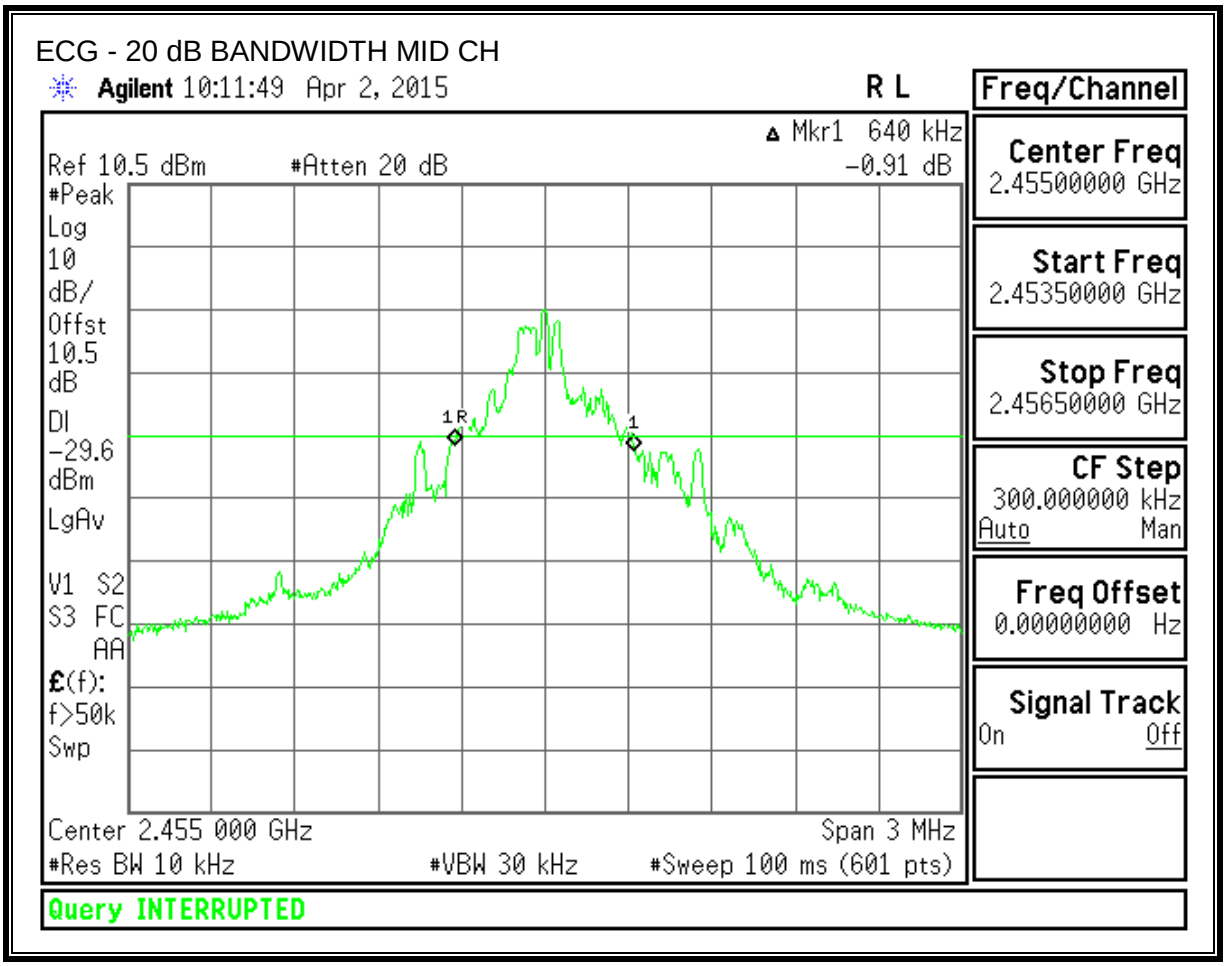


20 dB BANDWIDTH

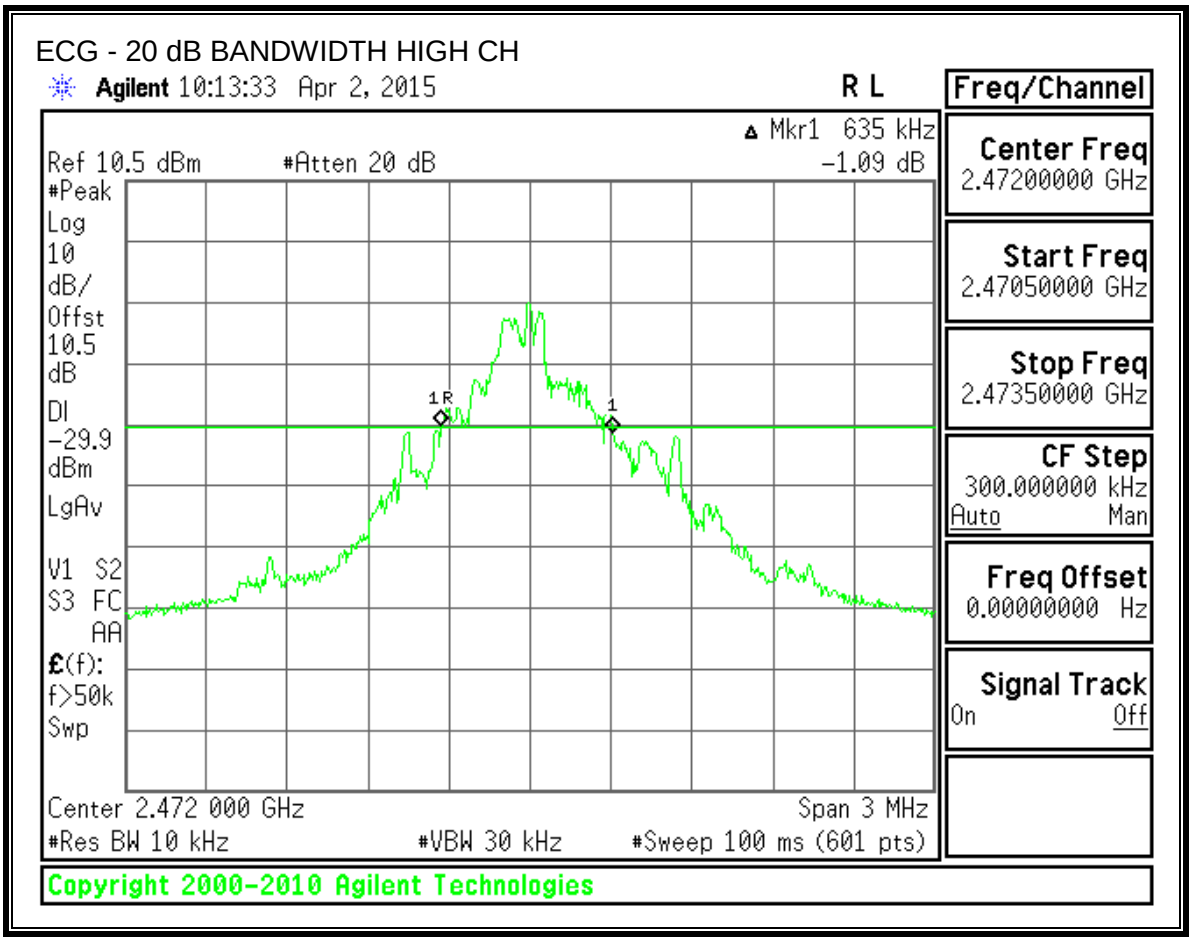
ECG – 20 dB BANDWIDTH LOW CH



ECG - 20 dB BANDWIDTH MID CH

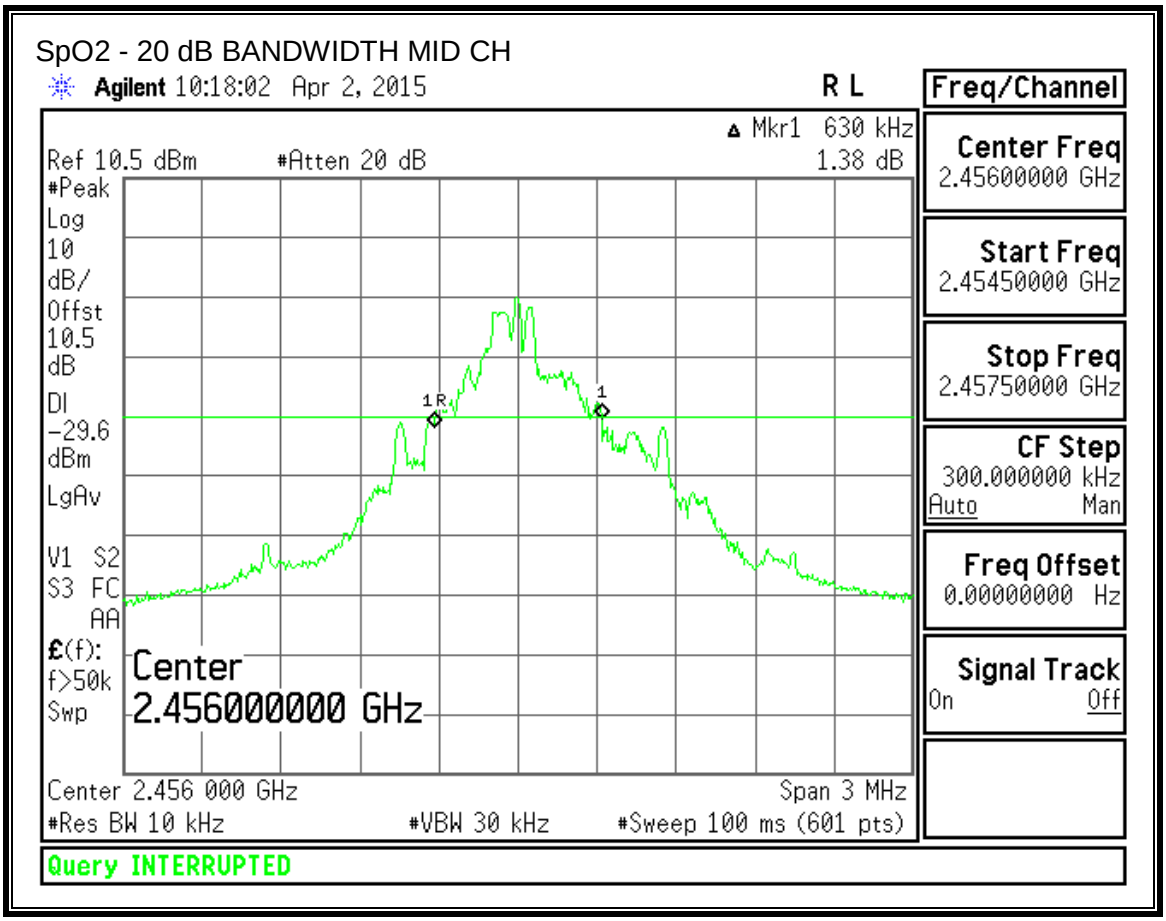


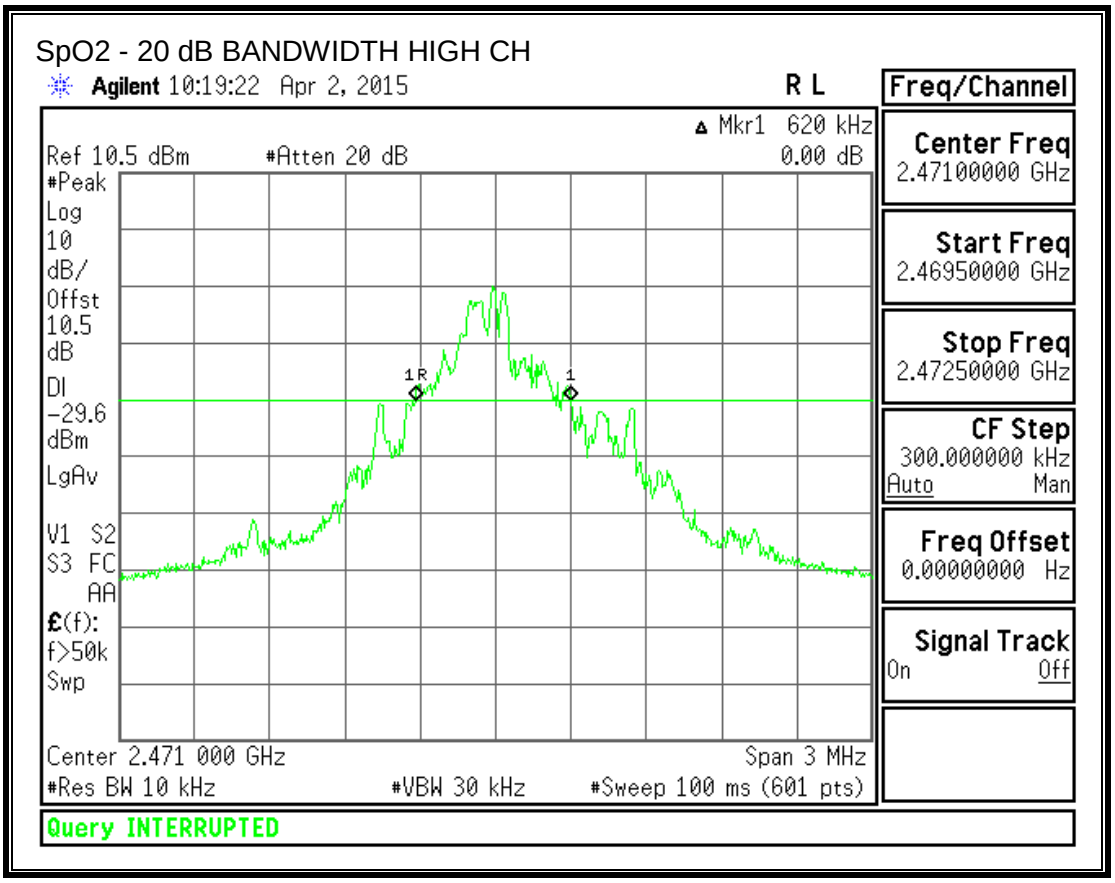
ECG - 20 dB BANDWIDTH HIGH CH



SpO2 - 20 dB BANDWIDTH LOW CH

SpO2 - 20 dB BANDWIDTH MID CH





7.2. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

PROCEDURE

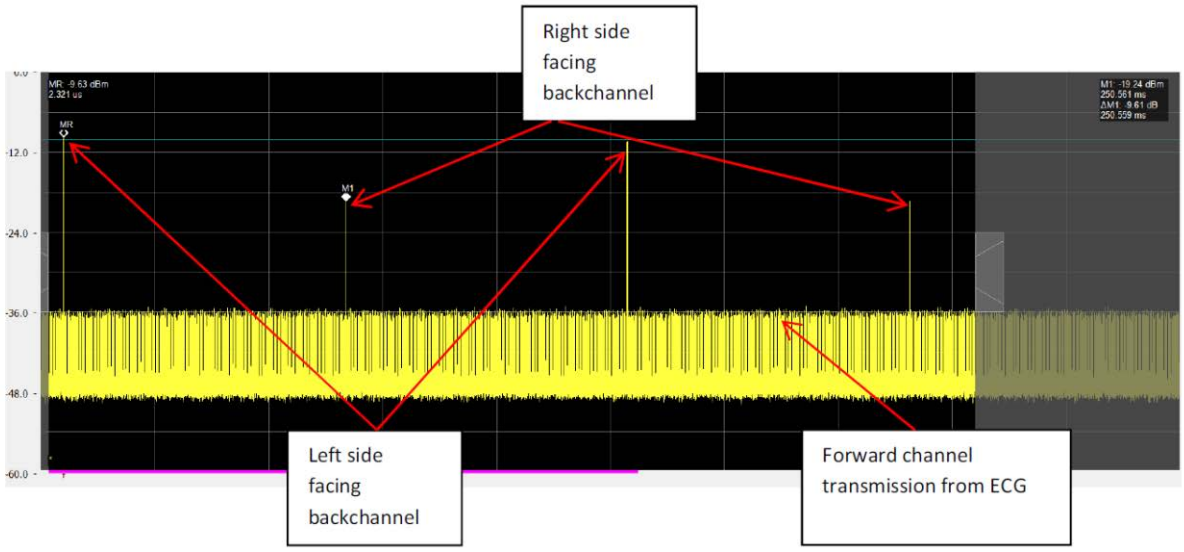
Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE

The below are manufacturer provided duty cycles. Note, per the manufacturer, the duty cycle period is 250 ms. FCC 15.35 limits the period to 100 ms. Therefore, the below duty cycle and 15.35 correction for average measurements is calculated based on the 100ms period.

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor For Average Measurements (FCC 15.35) (dB)
2.4GHz Band					
ECG	0.183	100.000	0.002	0.18%	-54.77
SpO2	0.183	100.000	0.002	0.18%	-54.77

MANUFACTURER PROVIDED DUTY CYCLE PLOT – REPRESENTS BOTH ECG AND SpO2



Note – The highest amplitude signal is the transmit signal of the left MR400 ECG Block radio. The lower amplitude signal is the transmit signal of the right MR400 ECG Block with attenuation (for this measurement to differentiate the two signals). The lowest amplitude signal is the received signal from the wECG module (not part of this evaluation and report).

Note - The lower signal channels are the received signals from the wECG. The higher amplitude signal is the MR400 ECG. Invivo states that the SpO2 signals are the same as the ECG signals.

20 log (183us/100ms) = -54.77 dB

7.3. RADIATED EMISSIONS

LIMIT

IC RSS-210, A2.9
FCC 15.249

Operation within the bands 902–928 MHz, 2400–2483.5 MHz, 5725–5875 MHZ, and 24.0–24.25 GHz.
(a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation.

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
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.

RESULTS

7.3.1. FUNDAMENTAL FREQUENCY RADIATED EMISSION

All testing was performed independently on the ECG ½ wave dipole and ¼ wave monopole and SpO2 ½ wave dipole and ¼ wave monopole. The testing was performed one radio type at a time (ECG or SpO2) due to limitations of the manufacturer's test software.

The below calculations takes the worst-case fundamental for all ECG measurements and SpO2 measurements and combines the field strengths to show that the combined ECG and SpO2 fundamental field strengths meet FCC Part 15.249. Please note, although the ECG and SpO2 signals can be functional at the same time, they do not use the same channel frequencies (separated by a minimum of 1 MHz).

The fundamental field strength of the SpO2 and ECG radios were combined by converting the Electric Field Strength to Power Density, adding the ECG/SpO2 Power values together and converting back to Electric Field Strength:

$Pd = E^2$ (V/m) / 377Ω

Per the following plots, the worst-case fundamental field strengths are:

ECG = 103.75 dBuV/m
SpO2 = 104.34 dBuV/m

Combining the Field Strengths -

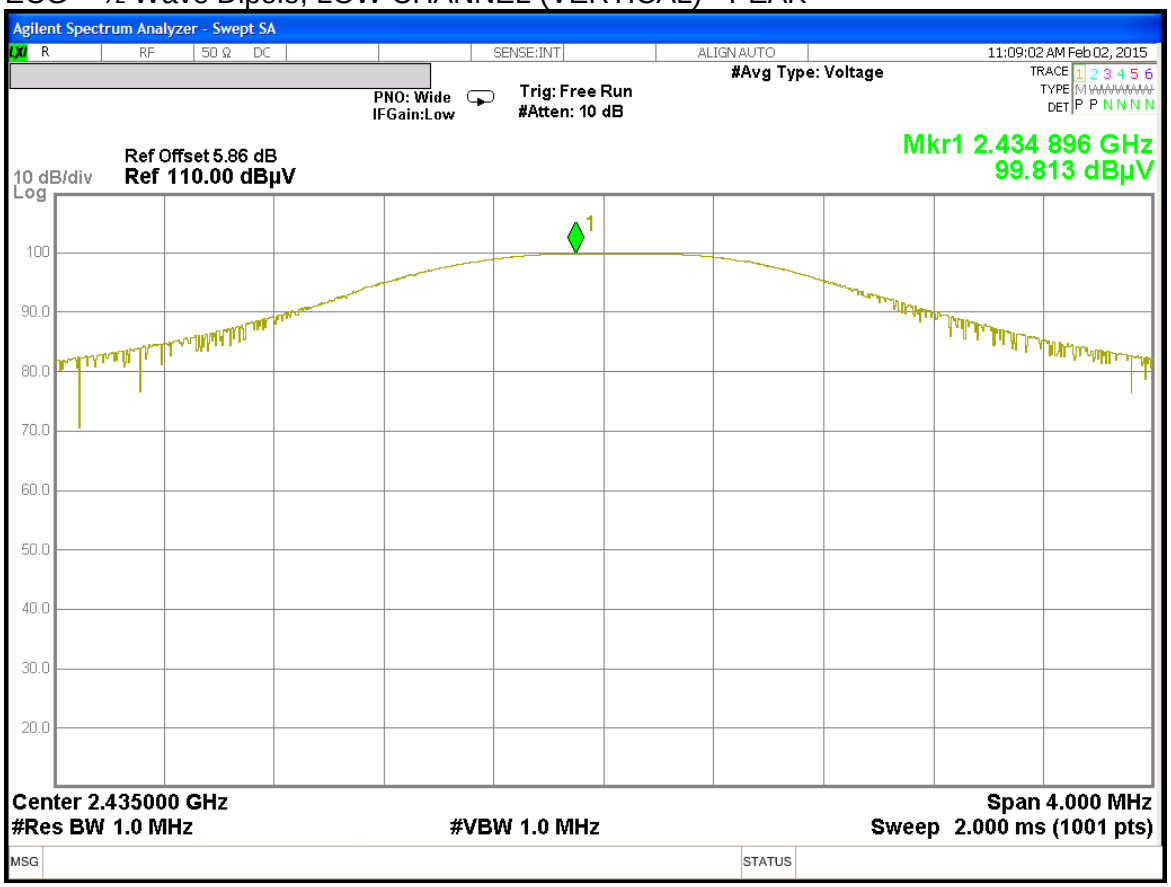
ECG = 103.75 dBuV/m => 153992.65 uV/m or 0.153992 V/m = 0.062901 mW/m2
SpO2 = 104.34 dBuV/m => 164816.2397 uV/m or 0.164816 V/m = 0.072054092 mW/m2

Combined = 0.134955092 mW/m2 or 0.000134955 W/m2 = 0.225561676 V/m or 225561.676 uV/m => 107.07 dBuV/m PK

Combined PK = 107.07 dBuV/m
Combined AVG = 52.30 dBuV/m

Note 1: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB
Average E-field = Peak - 54.77dB

ECG – ½ Wave Dipole, LOW CHANNEL (VERTICAL) - PEAK



AVERAGE MEASUREMENT

Note: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB

Average E-field = Peak - 54.77dB = 99.81 dBuV/m – 54.77 dB = 45.04 dBuV/m

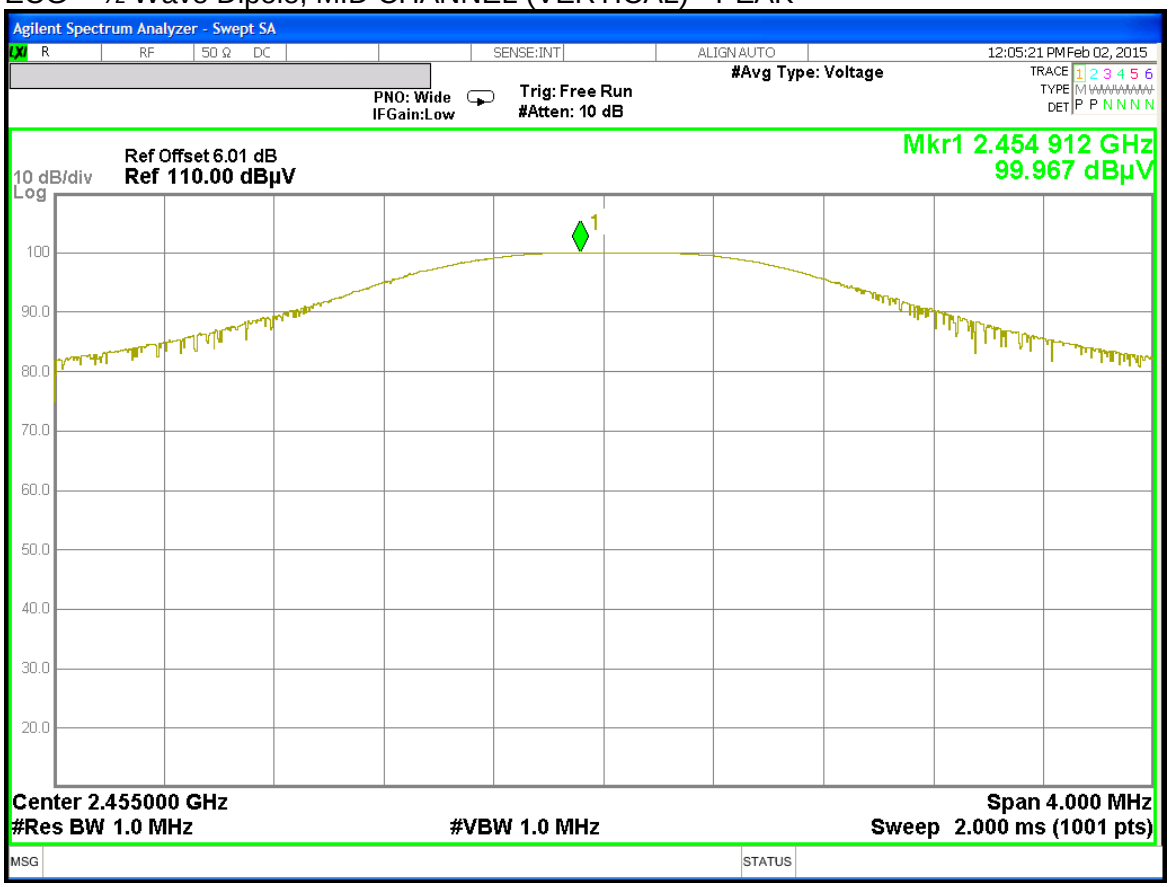
ECG – ½ Wave Dipole, LOW CHANNEL (HORIZONTAL) - PEAK

AVERAGE MEASUREMENT

Note: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB

Average E-field = Peak - 54.77dB = 94.68 dBuV/m – 54.77 dB = 39.91 dBuV/m

ECG – ½ Wave Dipole, MID CHANNEL (VERTICAL) - PEAK

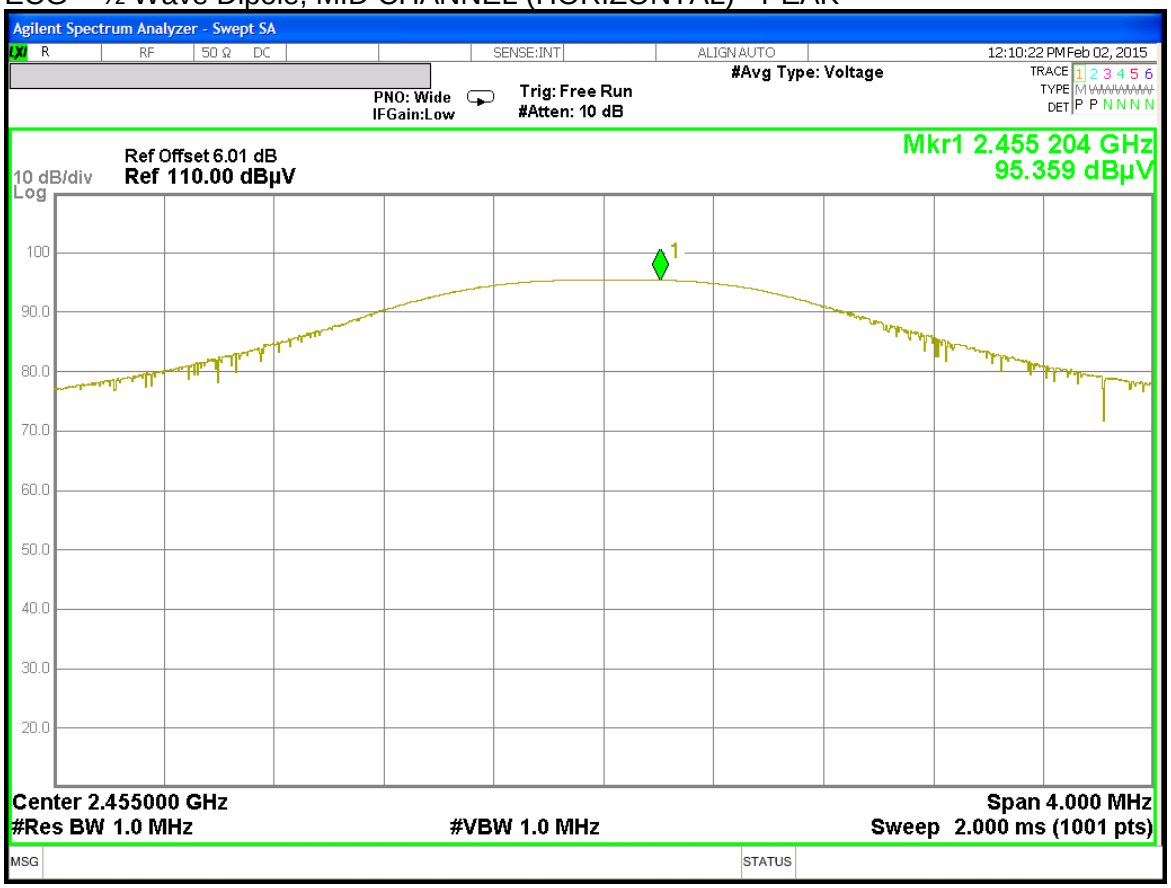


AVERAGE MEASUREMENT

Note: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB

Average E-field = Peak - 54.77dB = 99.97 dBuV/m – 54.77 dB = 45.20 dBuV/m

ECG – ½ Wave Dipole, MID CHANNEL (HORIZONTAL) - PEAK

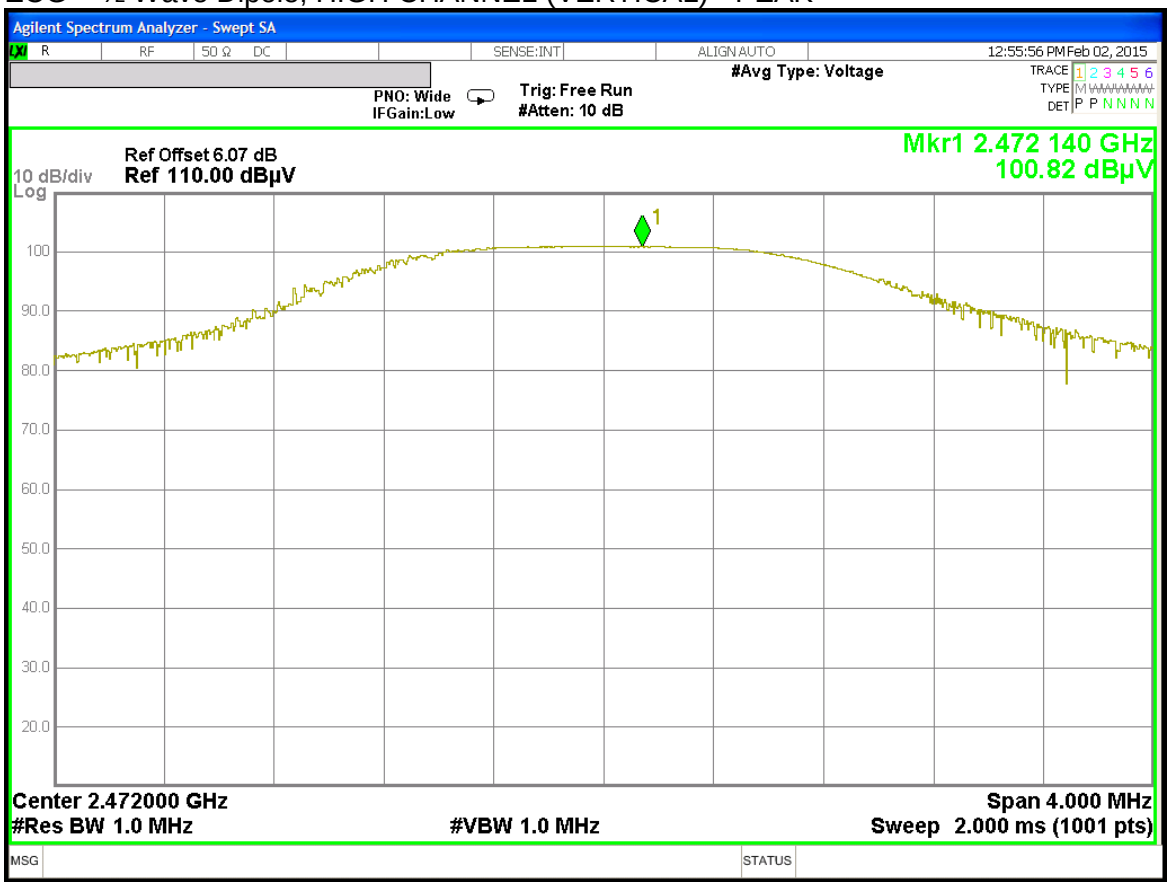


AVERAGE MEASUREMENT

Note: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB

Average E-field = Peak - 54.77dB = 95.36 dBuV/m – 54.77 dB = 40.59 dBuV/m

ECG – ½ Wave Dipole, HIGH CHANNEL (VERTICAL) - PEAK

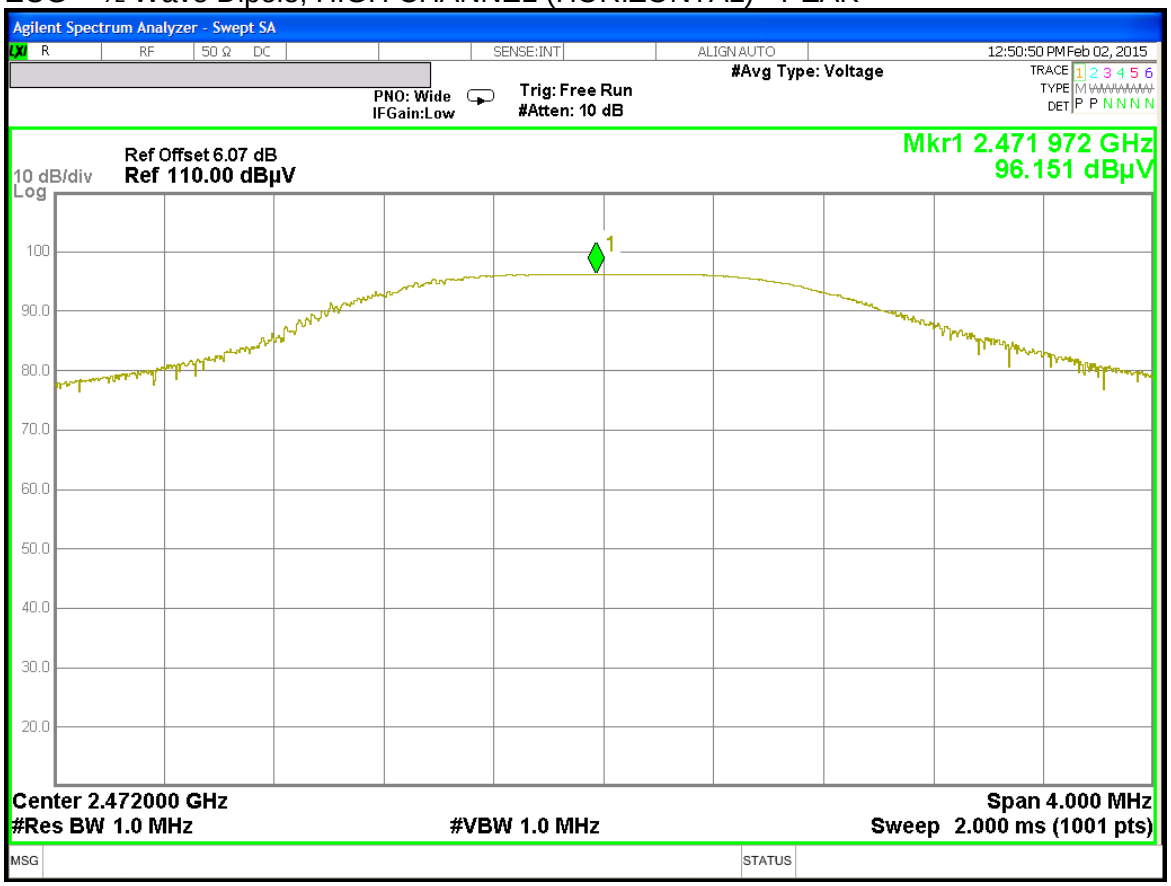


AVERAGE MEASUREMENT

Note: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB

Average E-field = Peak - 54.77dB = 100.82 dBuV/m – 54.77 dB = 46.05 dBuV/m

ECG – ½ Wave Dipole, HIGH CHANNEL (HORIZONTAL) - PEAK

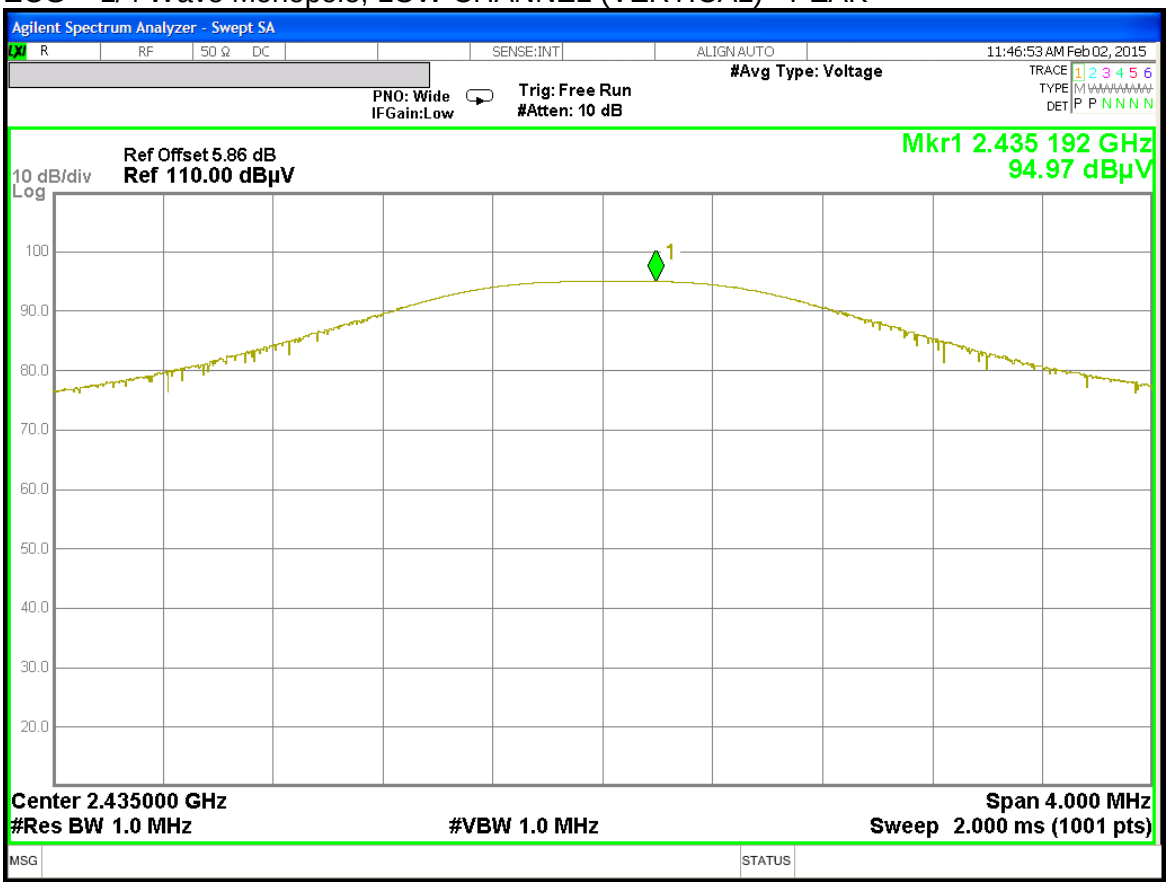


AVERAGE MEASUREMENT

Note: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB

Average E-field = Peak - 54.77dB = 96.15 dBuV/m – 54.77 dB = 41.38 dBuV/m

ECG – 1/4 Wave Monopole, LOW CHANNEL (VERTICAL) - PEAK

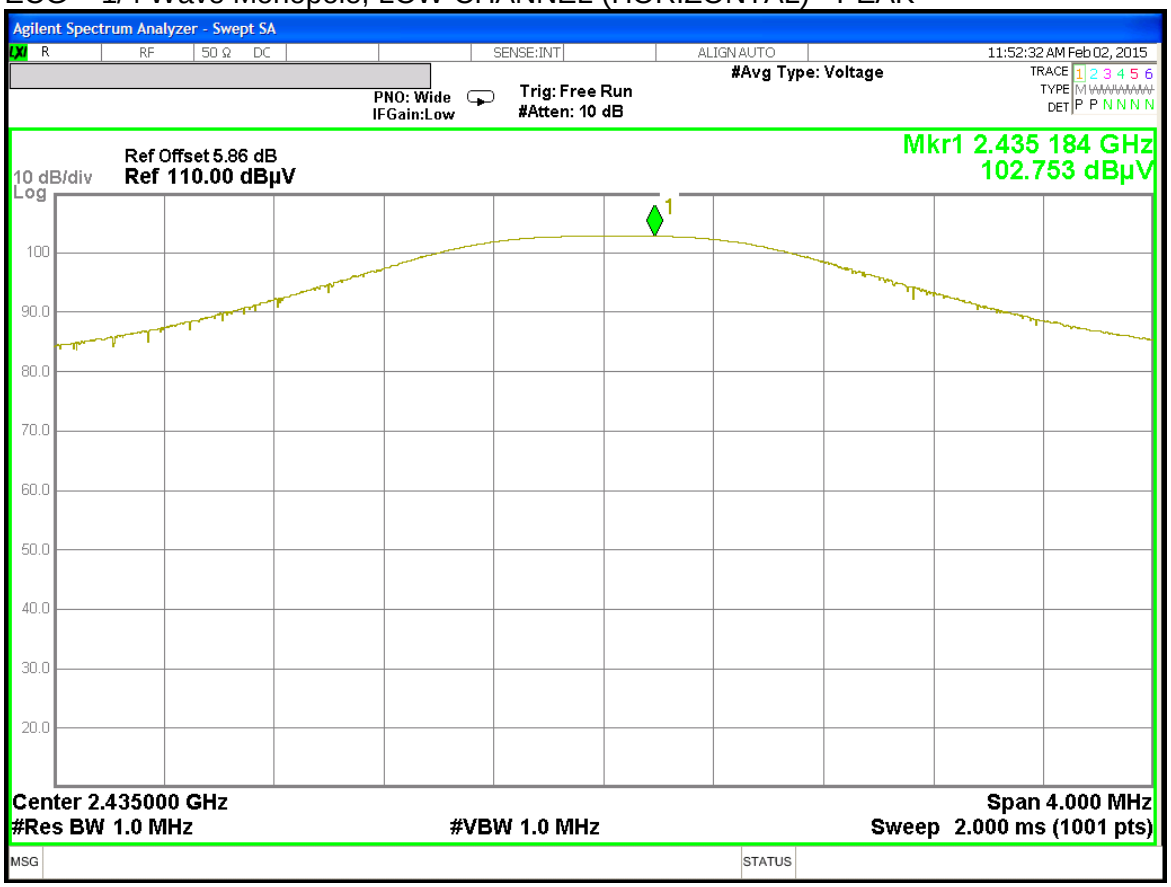


AVERAGE MEASUREMENT

Note: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB

Average E-field = Peak - 54.77dB = 94.97 dBuV/m – 54.77 dB = 40.20 dBuV/m

ECG – 1/4 Wave Monopole, LOW CHANNEL (HORIZONTAL) - PEAK

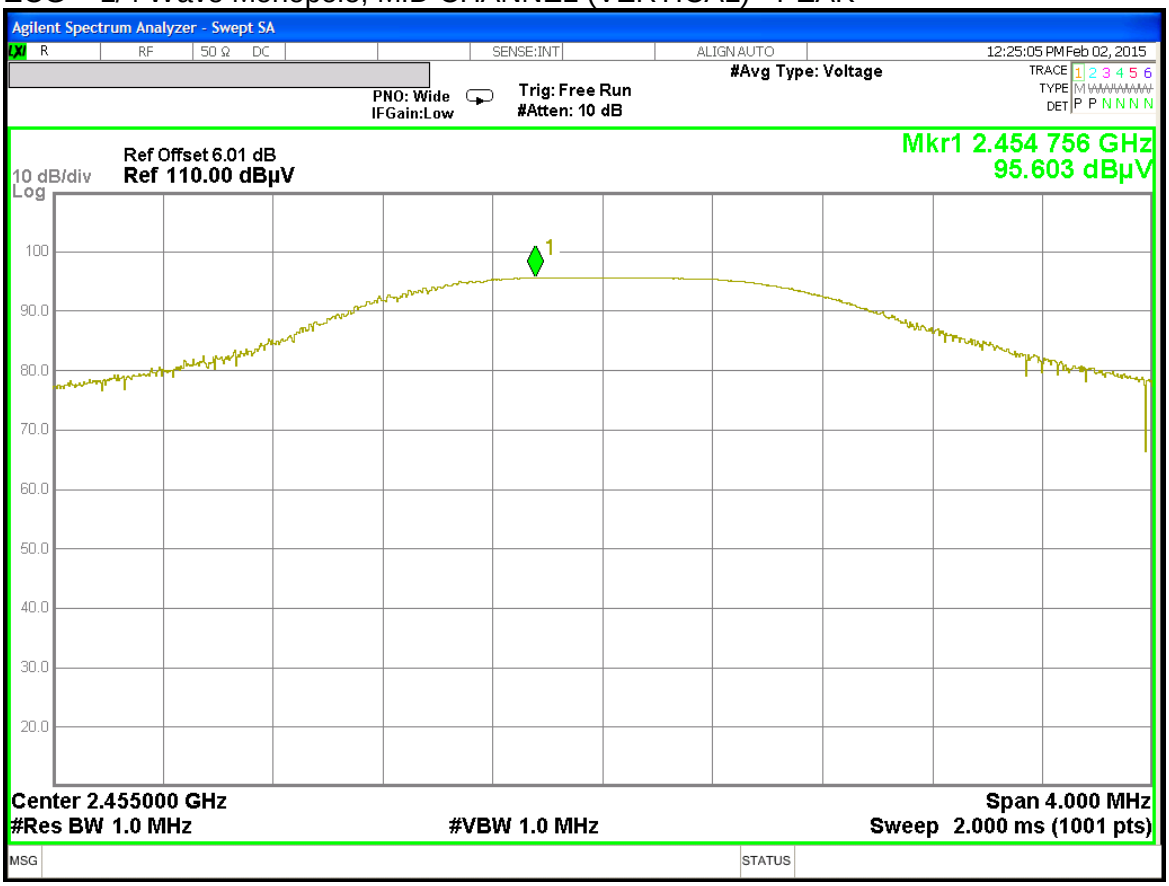


AVERAGE MEASUREMENT

Note: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB

Average E-field = Peak - 54.77dB = 102.75 dBuV/m – 54.77 dB = 47.98 dBuV/m

ECG – 1/4 Wave Monopole, MID CHANNEL (VERTICAL) - PEAK

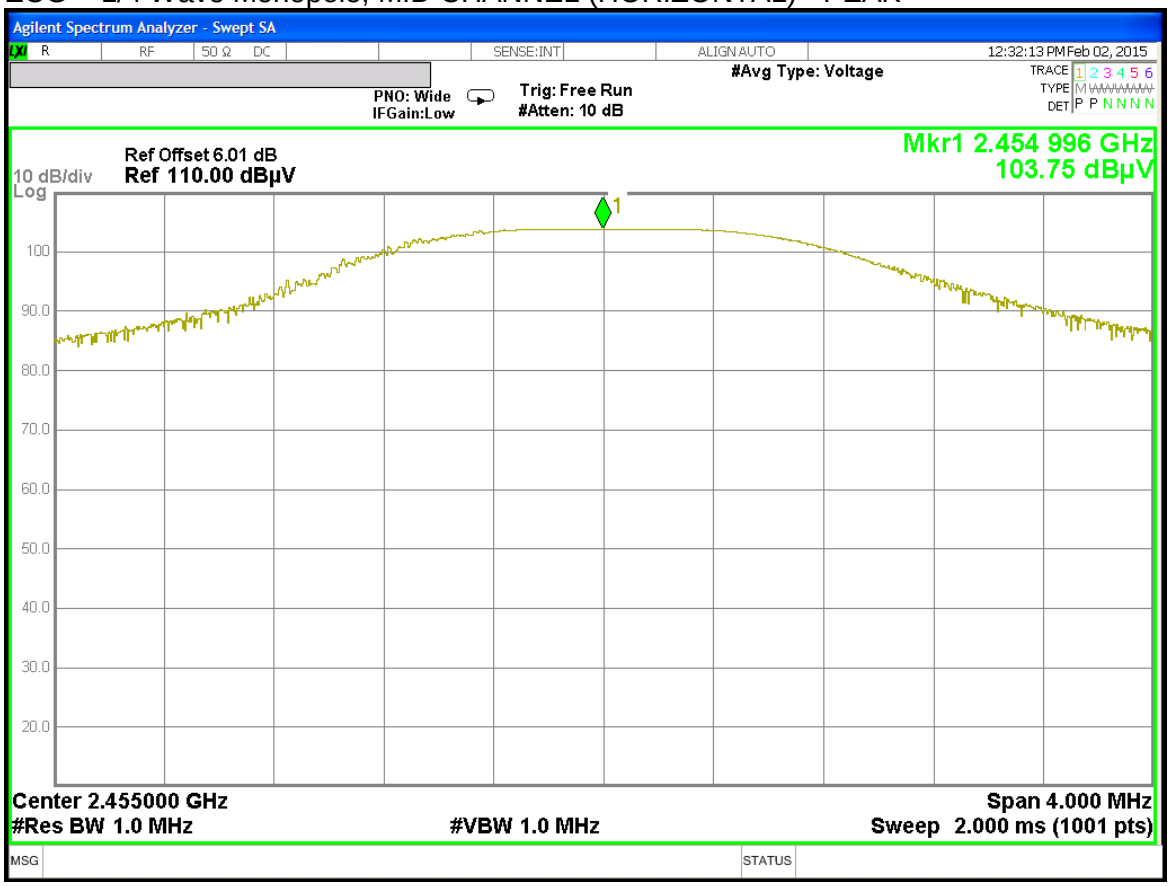


AVERAGE MEASUREMENT

Note: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB

Average E-field = Peak - 54.77dB = 95.60 dBuV/m – 54.77 dB = 40.83 dBuV/m

ECG – 1/4 Wave Monopole, MID CHANNEL (HORIZONTAL) - PEAK

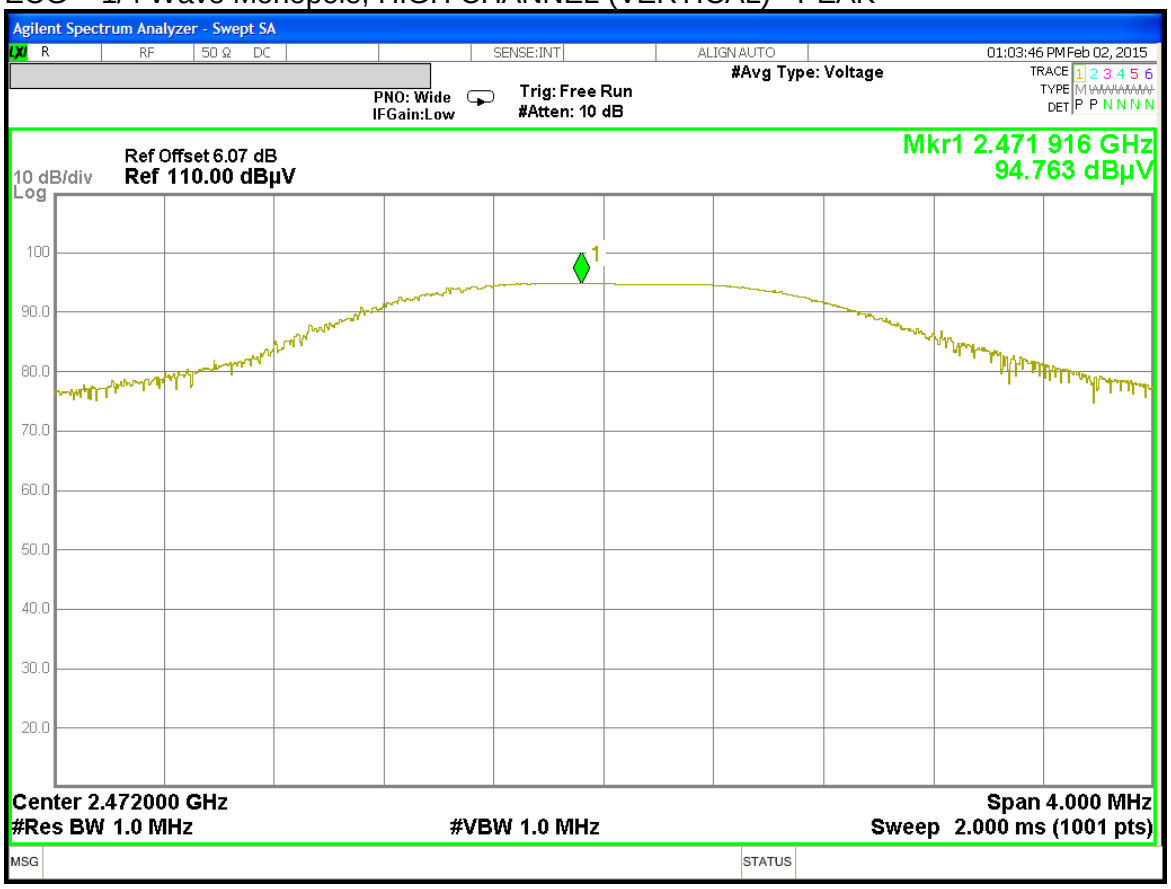


AVERAGE MEASUREMENT

Note: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB

Average E-field = Peak - 54.77dB = 103.75 dBuV/m – 54.77 dB = 48.98 dBuV/m

ECG – 1/4 Wave Monopole, HIGH CHANNEL (VERTICAL) - PEAK

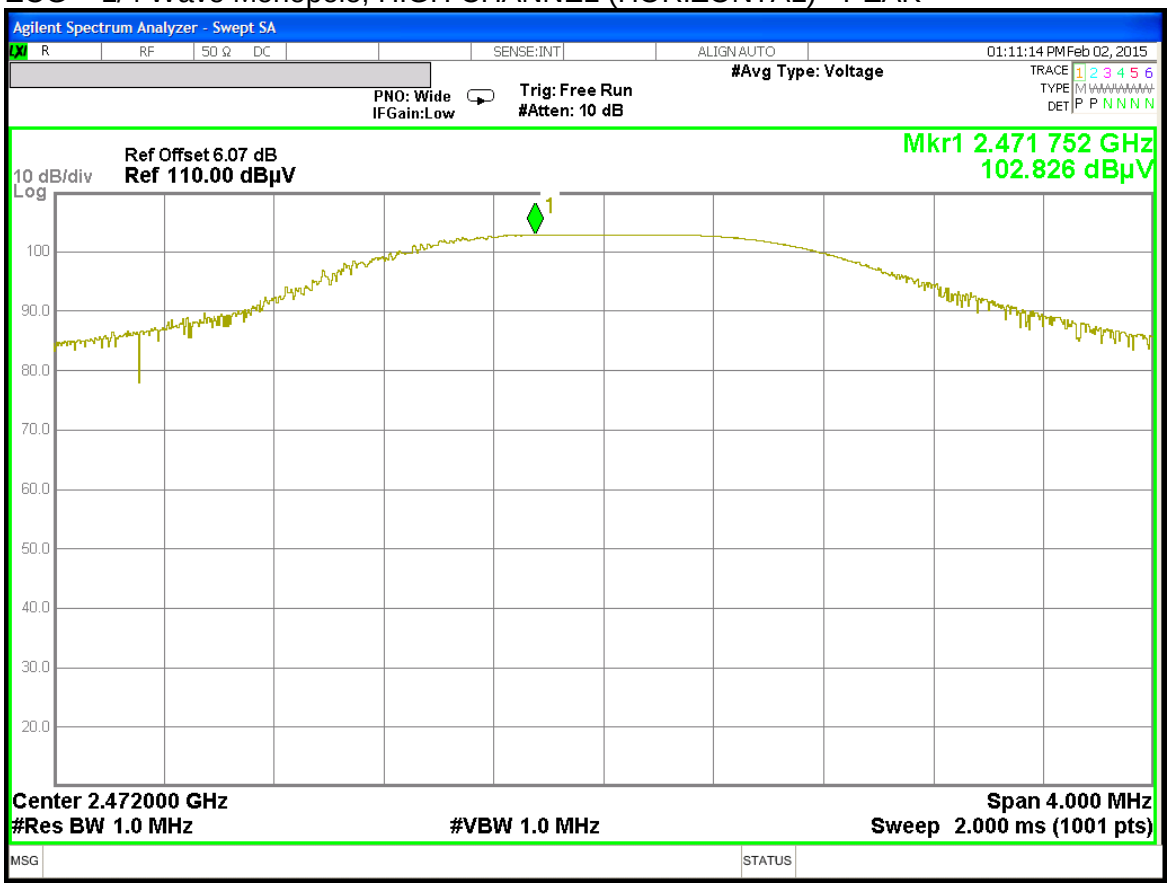


AVERAGE MEASUREMENT

Note: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB

Average E-field = Peak - 54.77dB = 94.76 dBuV/m – 54.77 dB = 39.99 dBuV/m

ECG – 1/4 Wave Monopole, HIGH CHANNEL (HORIZONTAL) - PEAK

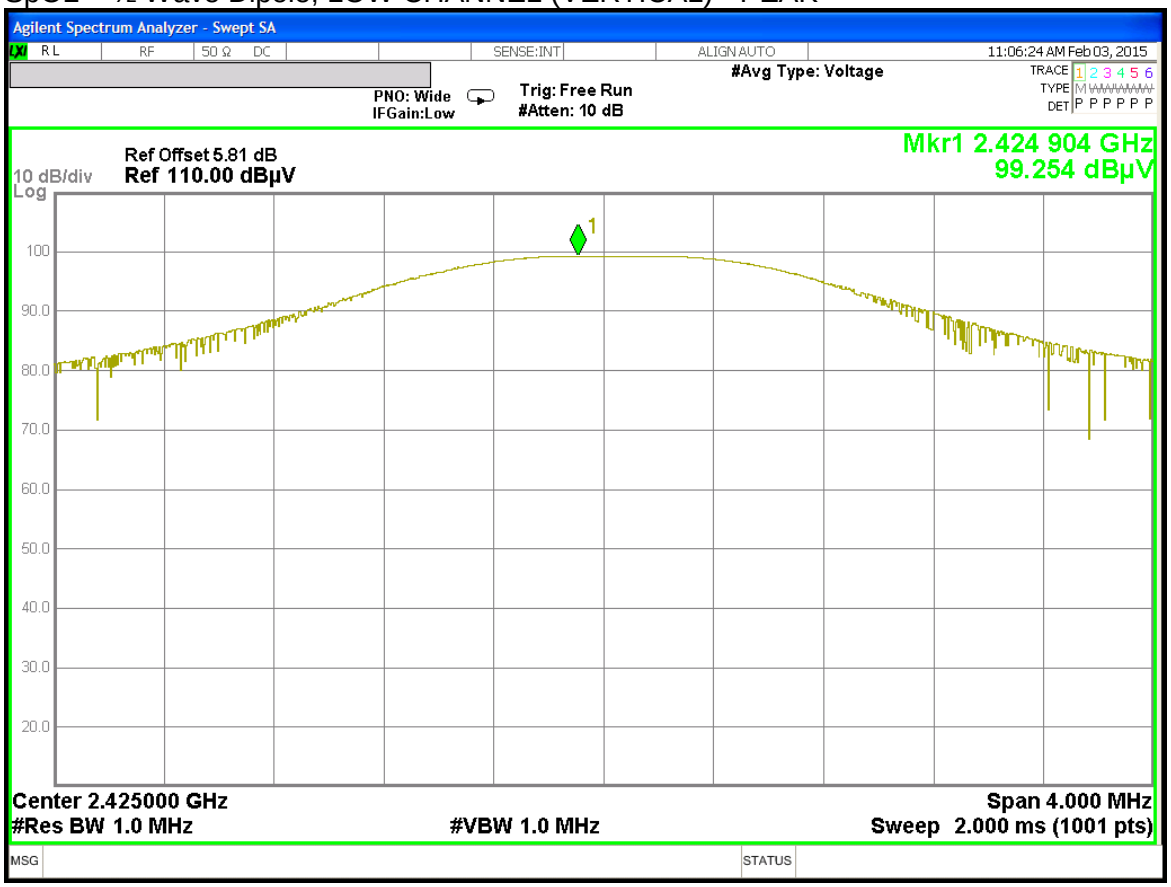


AVERAGE MEASUREMENT

Note: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB

Average E-field = Peak - 54.77dB = 102.83 dBuV/m – 54.77 dB = 48.06 dBuV/m

SpO2 – ½ Wave Dipole, LOW CHANNEL (VERTICAL) - PEAK



AVERAGE MEASUREMENT

Note: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB

Average E-field = Peak - 54.77dB = 99.25 dBuV/m – 54.77 dB = 44.48 dBuV/m

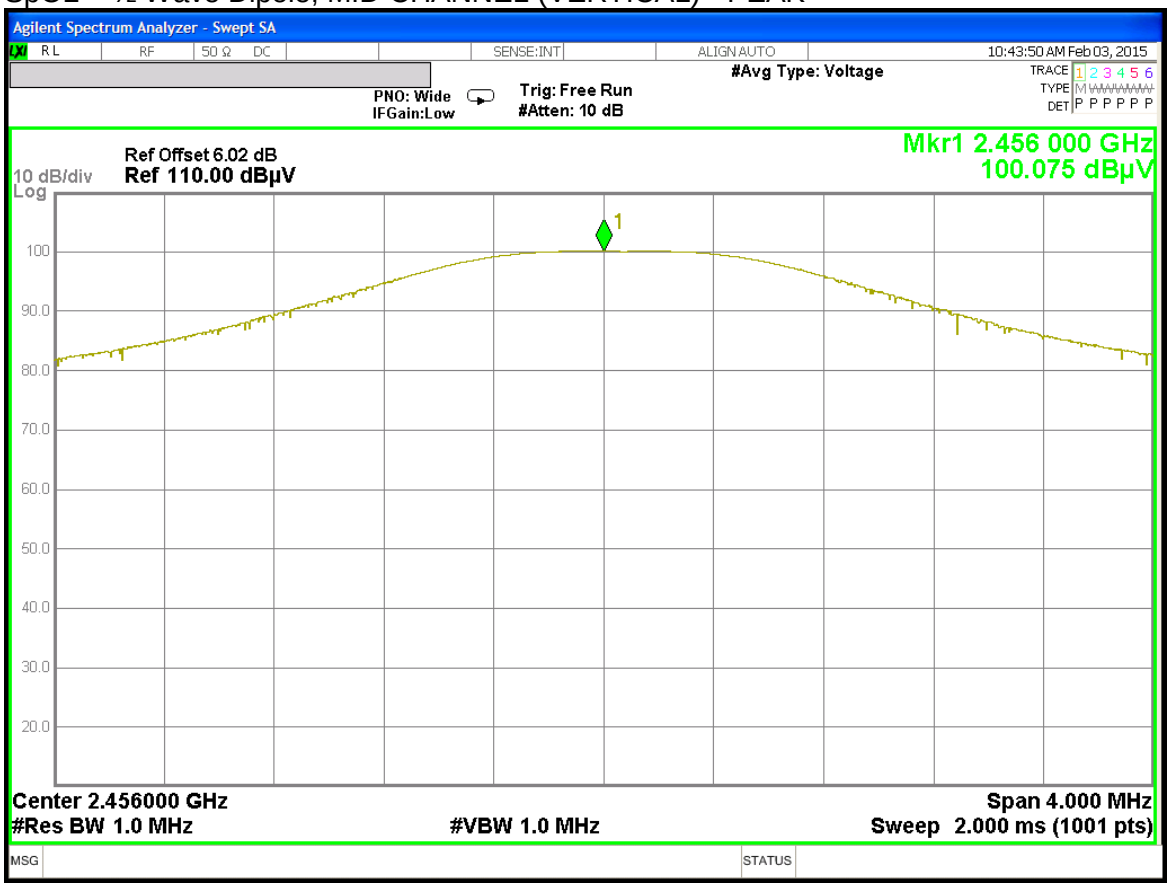
SpO2 – ½ Wave Dipole, LOW CHANNEL (HORIZONTAL) - PEAK

AVERAGE MEASUREMENT

Note: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB

Average E-field = Peak - 54.77dB = 94.66 dBuV/m – 54.77 dB = 39.89 dBuV/m

SpO2 – ½ Wave Dipole, MID CHANNEL (VERTICAL) - PEAK



AVERAGE MEASUREMENT

Note: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB

Average E-field = Peak - 54.77dB = 100.08 dBuV/m – 54.77 dB = 45.31 dBuV/m

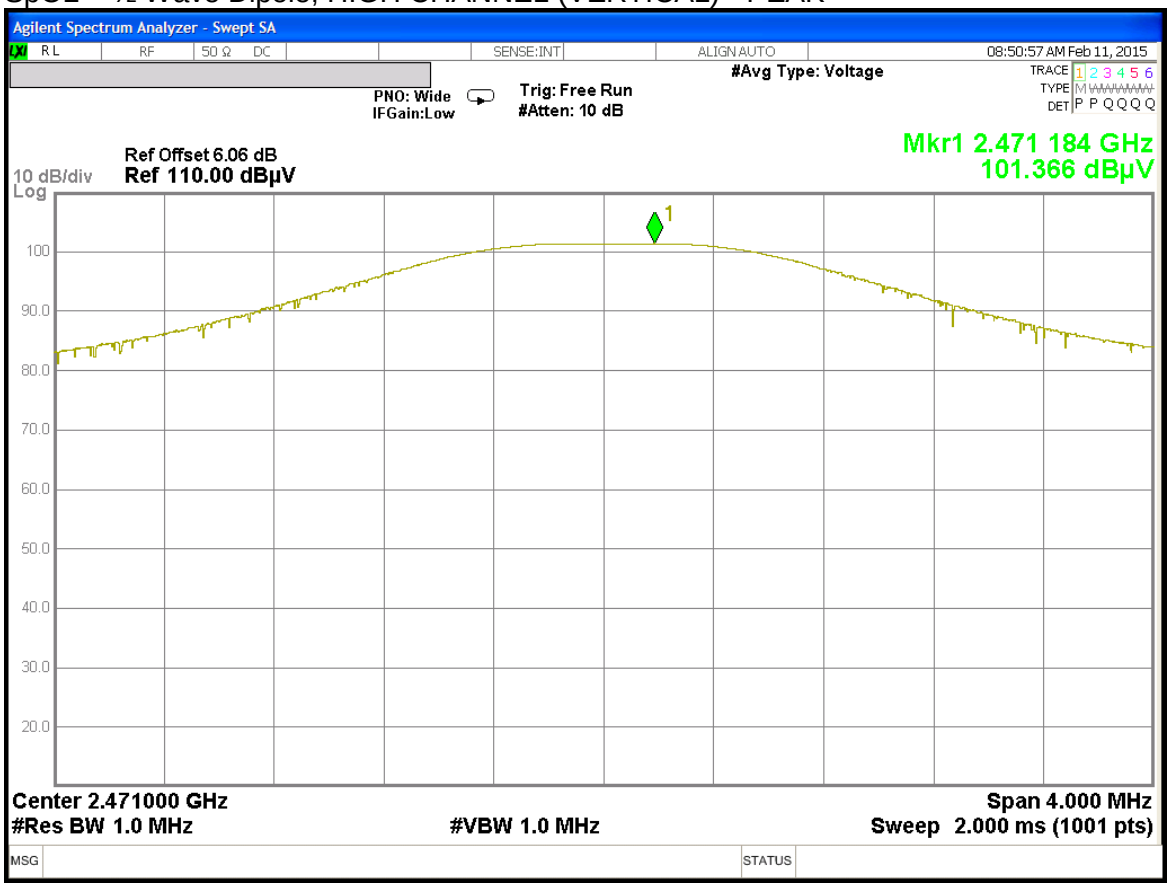
SpO2 – ½ Wave Dipole, MID CHANNEL (HORIZONTAL) - PEAK

AVERAGE MEASUREMENT

Note: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB

Average E-field = Peak - 54.77dB = 95.37 dBuV/m – 54.77 dB = 40.60 dBuV/m

SpO2 – ½ Wave Dipole, HIGH CHANNEL (VERTICAL) - PEAK

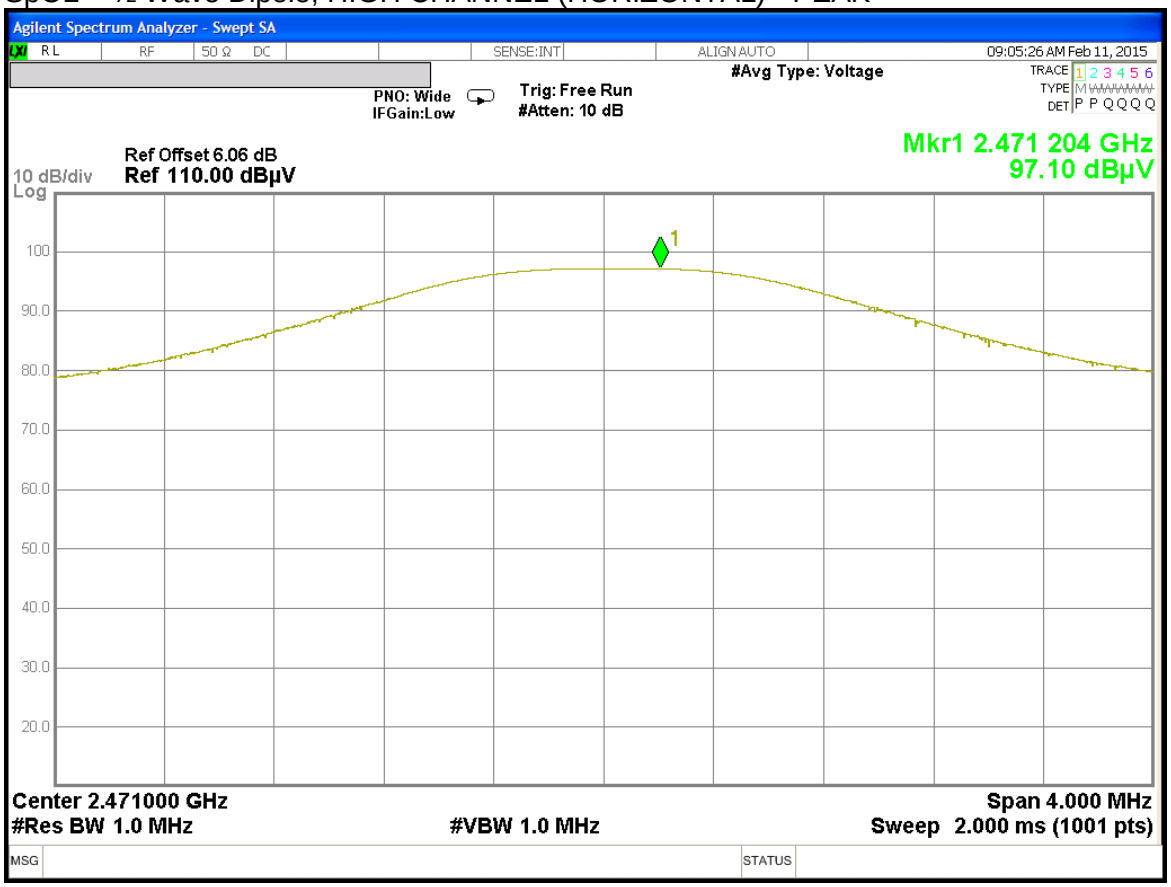


AVERAGE MEASUREMENT

Note: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB

Average E-field = Peak - 54.77dB = 101.37 dBuV/m – 54.77 dB = 46.60 dBuV/m

SpO2 – ½ Wave Dipole, HIGH CHANNEL (HORIZONTAL) - PEAK

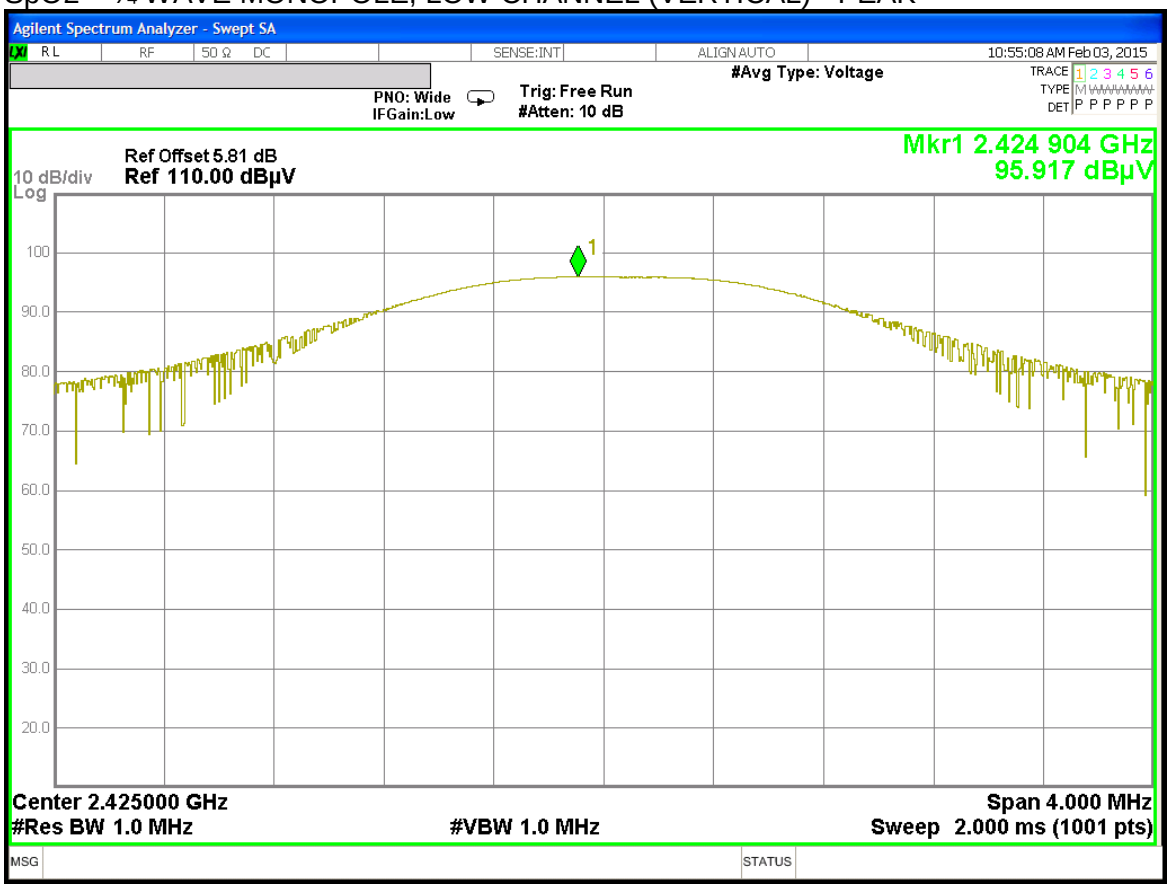


AVERAGE MEASUREMENT

Note: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB

Average E-field = Peak - 54.77dB = 97.10 dBuV/m – 54.77 dB = 42.33 dBuV/m

SpO2 – ¼ WAVE MONOPOLE, LOW CHANNEL (VERTICAL) - PEAK

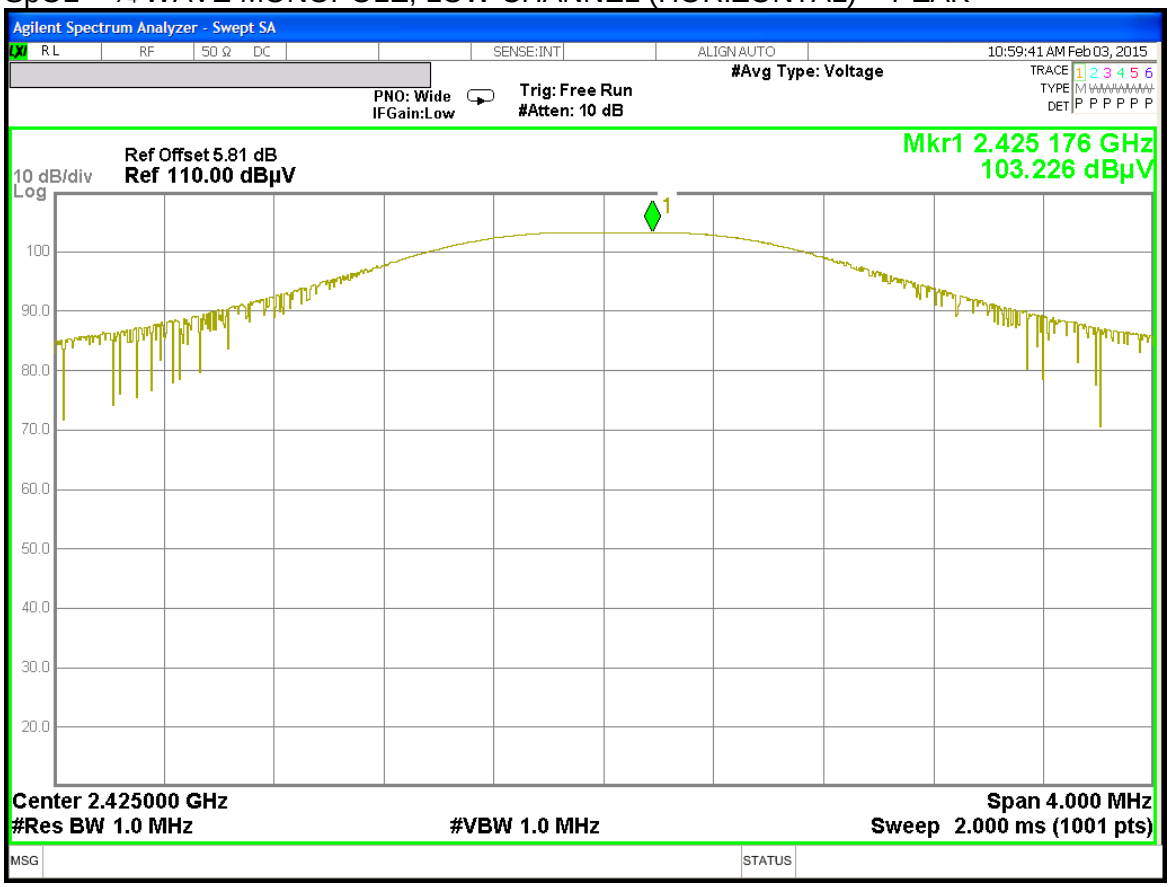


AVERAGE MEASUREMENT

Note: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB

Average E-field = Peak - 54.77dB = 95.92 dBuV/m – 54.77 dB = 41.15 dBuV/m

SpO2 – ¼ WAVE MONOPOLE, LOW CHANNEL (HORIZONTAL) - PEAK

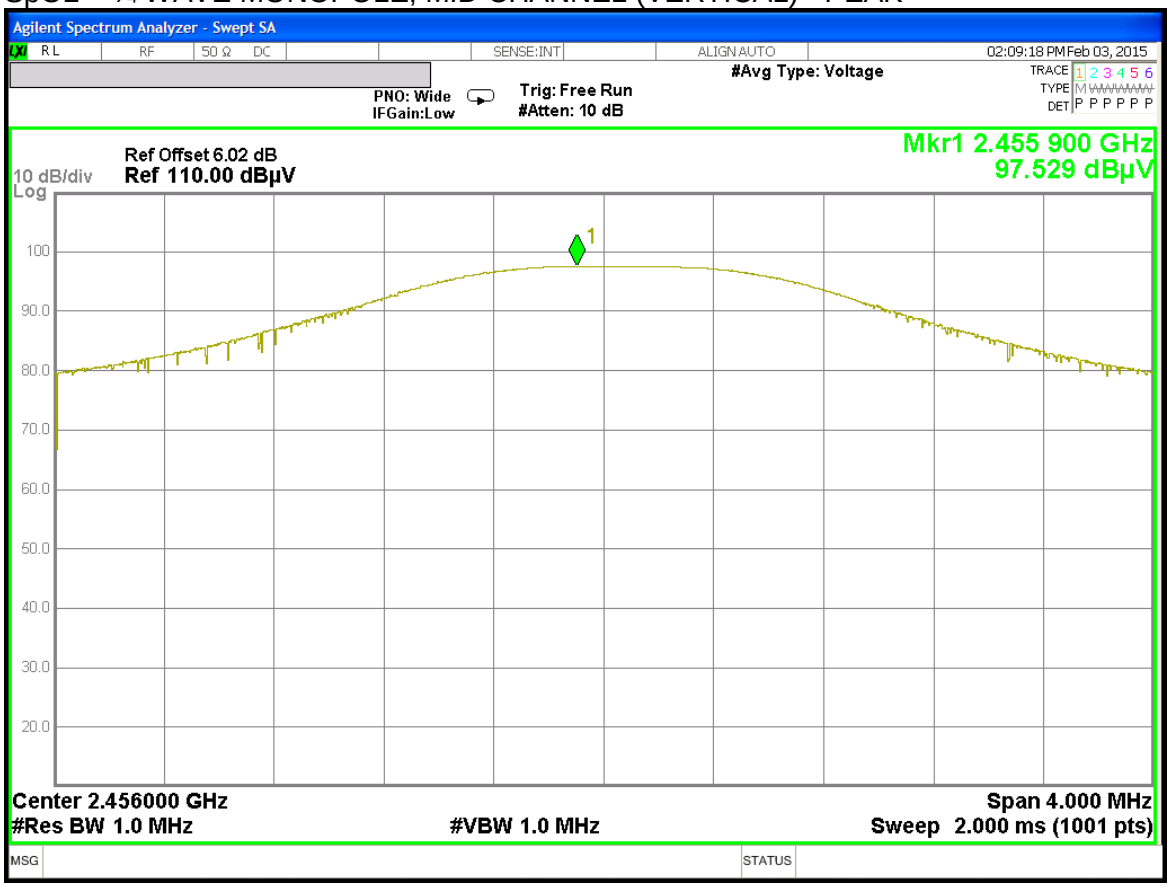


AVERAGE MEASUREMENT

Note: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB

Average E-field = Peak - 54.77dB = 103.23 dBuV/m – 54.77 dB = 48.46 dBuV/m

SpO2 – ¼ WAVE MONOPOLE, MID CHANNEL (VERTICAL) - PEAK

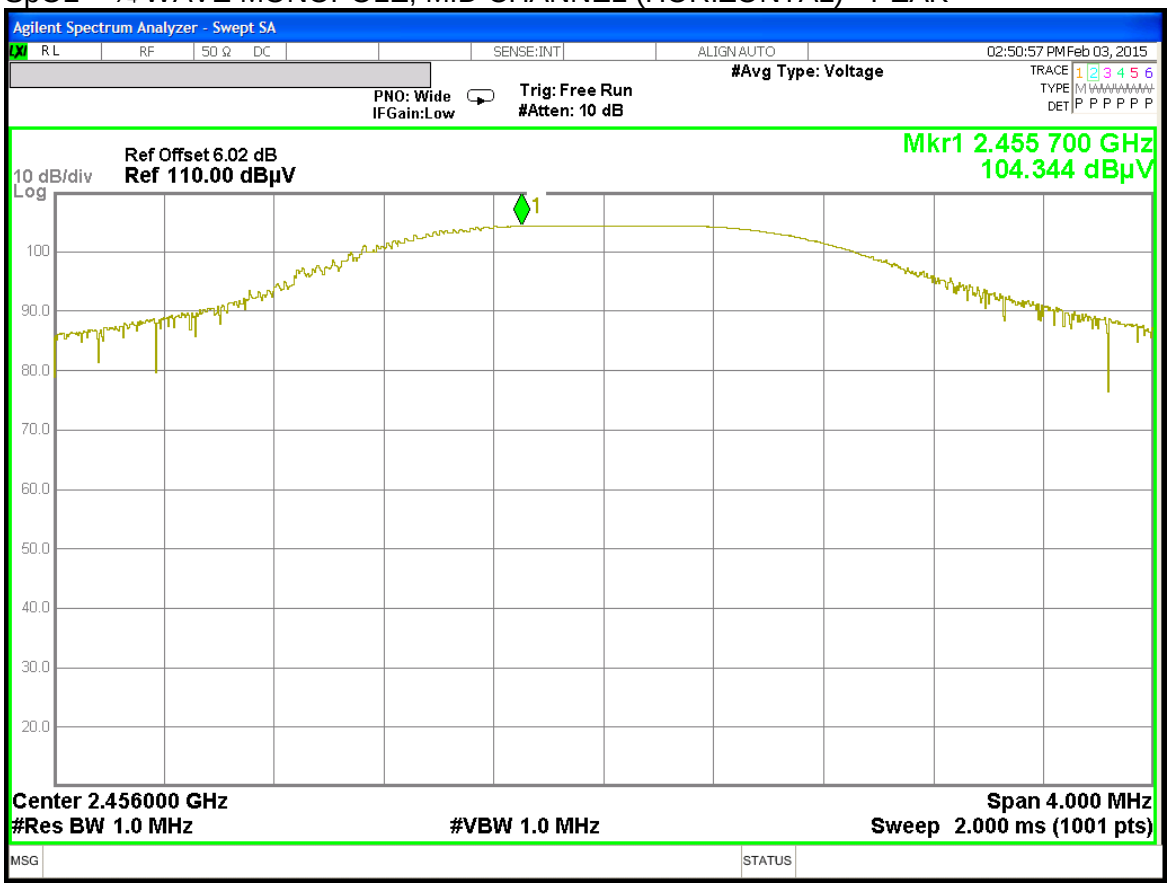


AVERAGE MEASUREMENT

Note: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB

Average E-field = Peak - 54.77dB = 97.53 dBuV/m – 54.77 dB = 42.76 dBuV/m

SpO2 – ¼ WAVE MONOPOLE, MID CHANNEL (HORIZONTAL) - PEAK

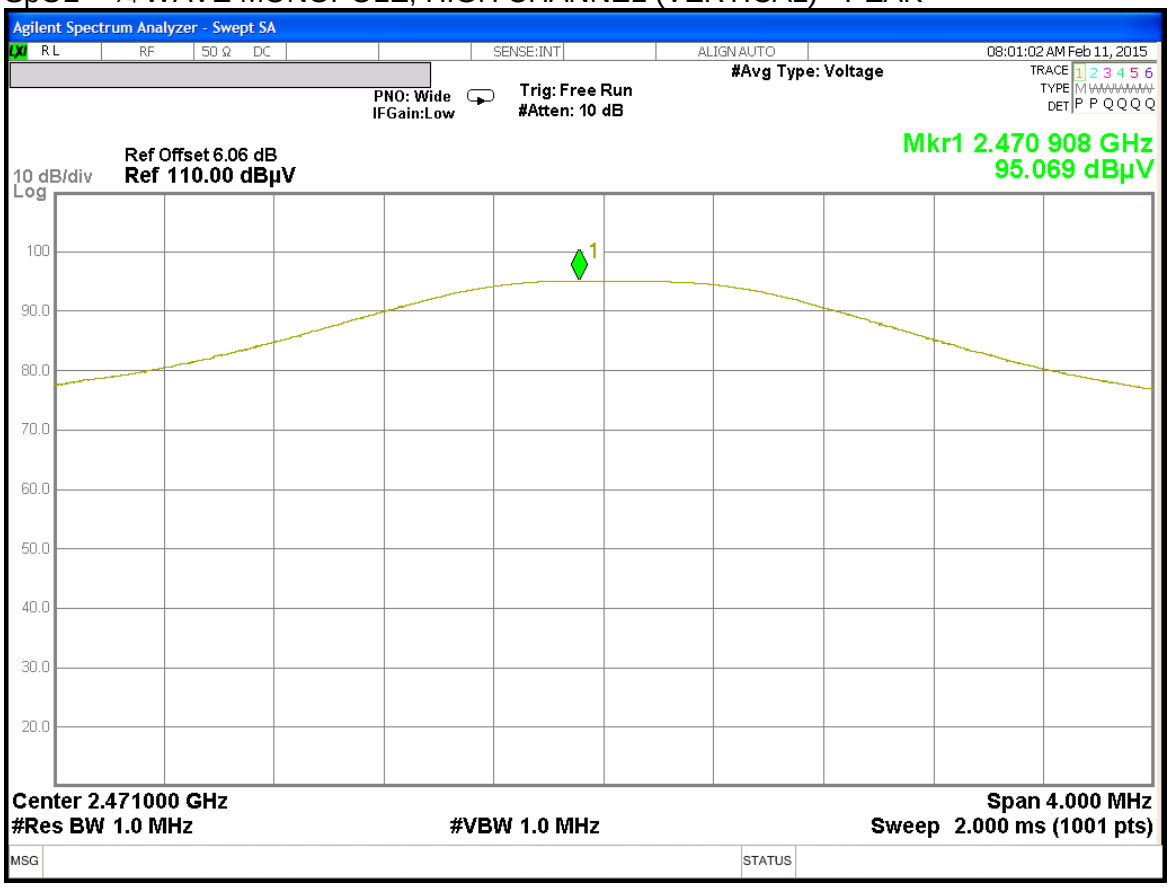


AVERAGE MEASUREMENT

Note: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB

Average E-field = Peak - 54.77dB = 104.34 dBuV/m – 54.77 dB = 49.57 dBuV/m

SpO2 – ¼ WAVE MONOPOLE, HIGH CHANNEL (VERTICAL) - PEAK

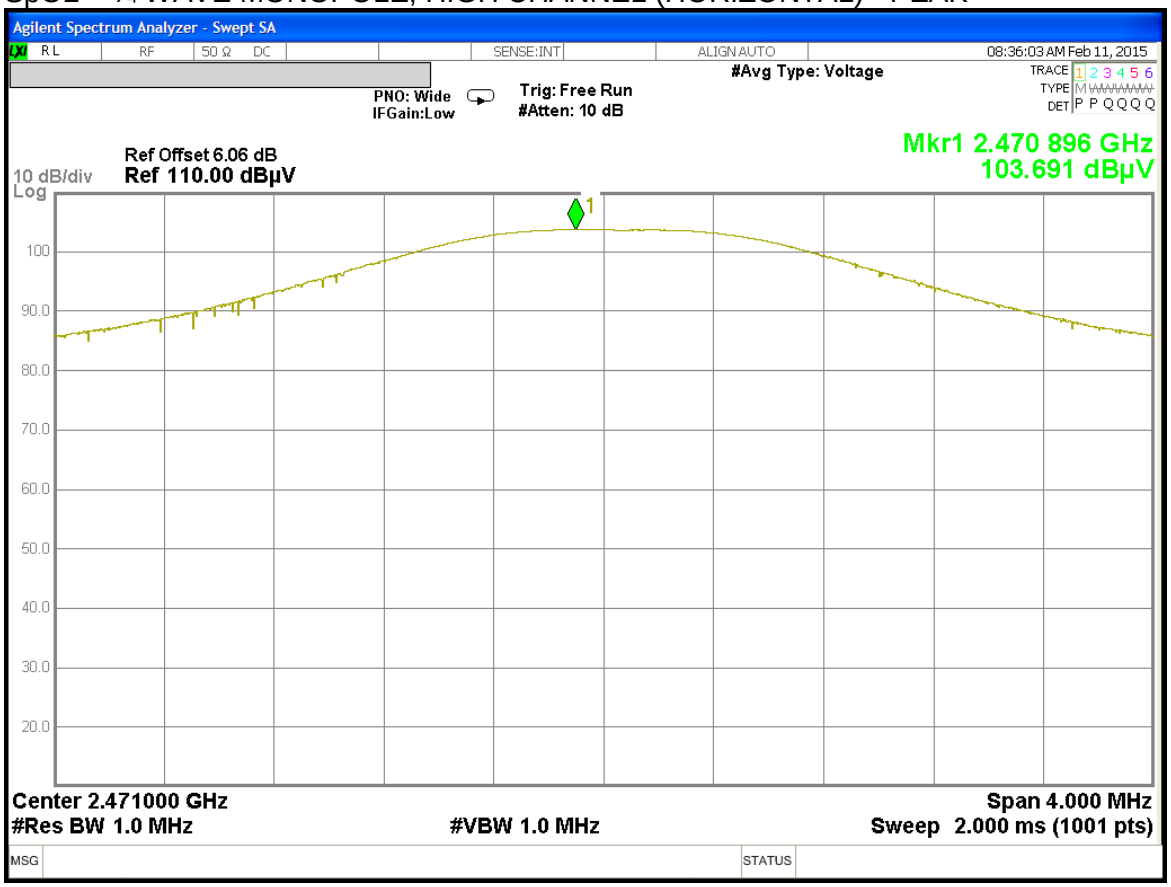


AVERAGE MEASUREMENT

Note: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB

Average E-field = Peak - 54.77dB = 95.07 dBuV/m – 54.77 dB = 40.30 dBuV/m

SpO2 – ¼ WAVE MONOPOLE, HIGH CHANNEL (HORIZONTAL) - PEAK



AVERAGE MEASUREMENT

Note: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB

Average E-field = Peak - 54.77dB = 103.69 dBuV/m – 54.77 dB = 48.92 dBuV/m

7.3.2. TRANSMITTER RESTRICTED BAND EDGES

All testing was performed independently on the ECG ½ wave dipole and ¼ wave monopole and SpO2 ½ wave dipole and ¼ wave monopole. The testing was performed one radio type at a time (ECG or SpO2) due to limitations of the manufacturer's test software.

The below calculations take the worst-case Band-Edge emissions for all ECG measurements and SpO2 measurements and combines those field strengths to show that the combined ECG and SpO2 Band-Edge field strengths meet FCC Part 15.249. Please note, although the ECG and SpO2 signals can be functional at the same time, they do not use the same channel frequencies (separated by a minimum of 1 MHz).

The Band-Edge field strength of the SpO2 and ECG radios were combined by converting the Electric Field Strength to Power Density, adding the ECG/SpO2 Power values together and converting back to Electric Field Strength:

$Pd = E^2$ (V/m) / 377Ω

Per the following plots, the worst-case band-edge field strengths are:

ECG = 67.5 dBuV/m
SpO2 = 67.6 dBuV/m

Combining the Field Strengths -

ECG = 67.5 dBuV/m => 2371.373 uV/m or 0.002371374 V/m = 0.000014916 mW/m2
SpO2 = 67.6 dBuV/m => 2398.8329 uV/m or 0.0023988 V/m = 0.000015264 mW/m2

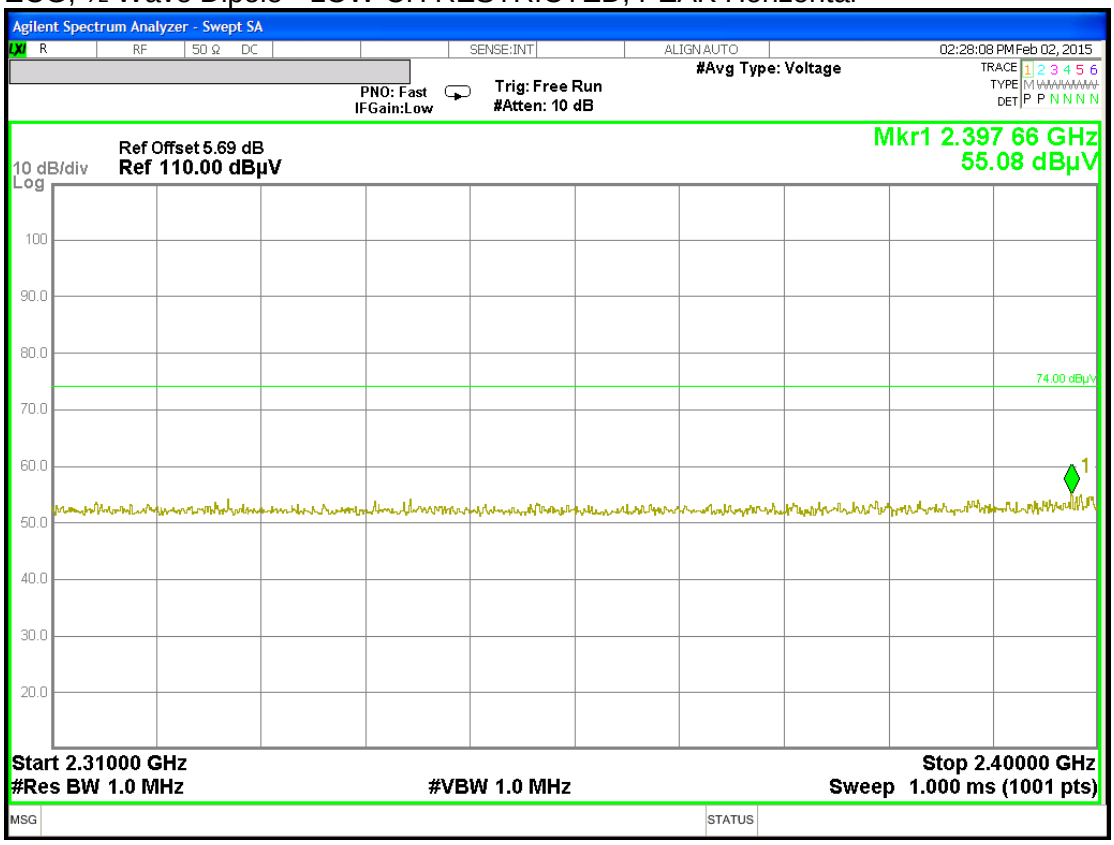
Combined = 0.00003018 mW/m2 = 0.003373089 V/m or 3373.089292 uV/m => 70.56 dBuV/m

Combined PK = 70.56 dBuV/m
Combined AVG = 15.79 dBuV/m

Note 1: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB
Average E-field = Peak - 54.77dB

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL) – ECG ½ WAVE DIPOLE

ECG, ½ Wave Dipole - LOW CH RESTRICTED, PEAK Horizontal



ECG, ½ Wave Dipole - LOW CH RESTRICTED, AVG, Horizontal

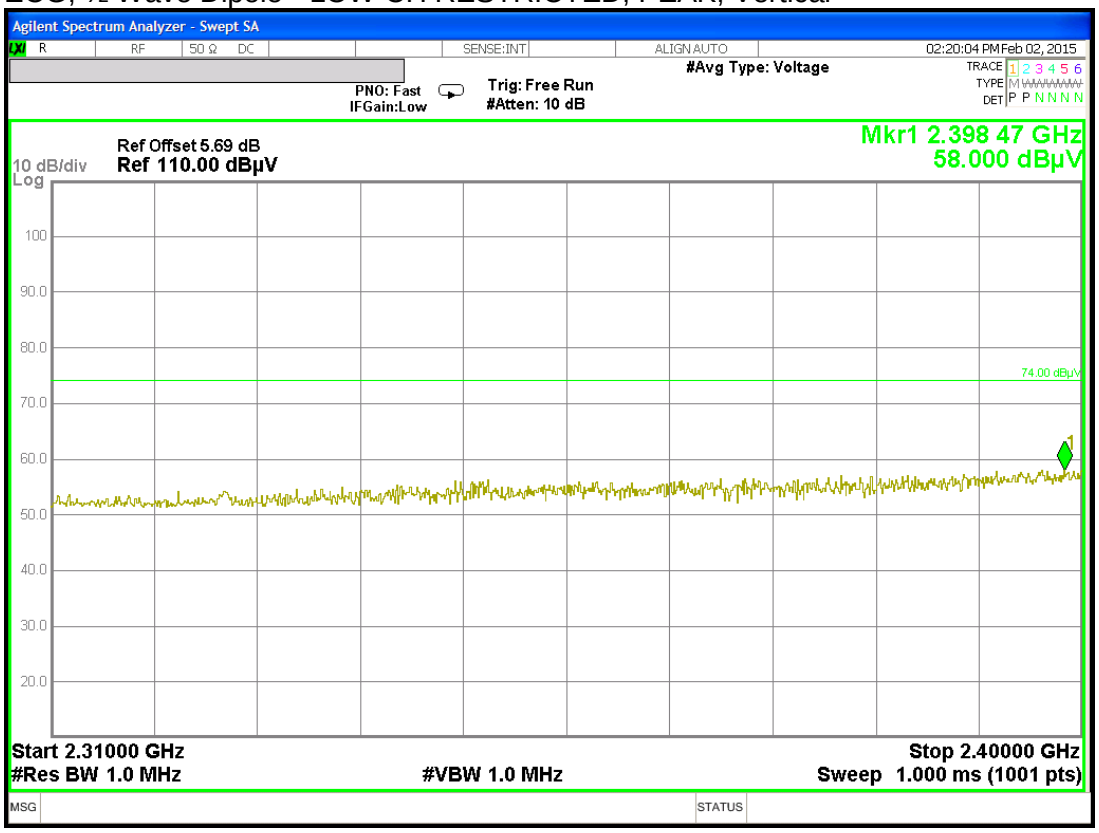
Note: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB

Average E-field = Peak - 54.77dB = 55.08 dBuV/m – 54.77 dB = 0.31 dBuV/m

Additionally, a reduced video bandwidth scan was performed to show no emissions were below the noise floor that is not related to the fundamental.

RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL) – ECG ½ WAVE DIPOLE

ECG, ½ Wave Dipole - LOW CH RESTRICTED, PEAK, Vertical

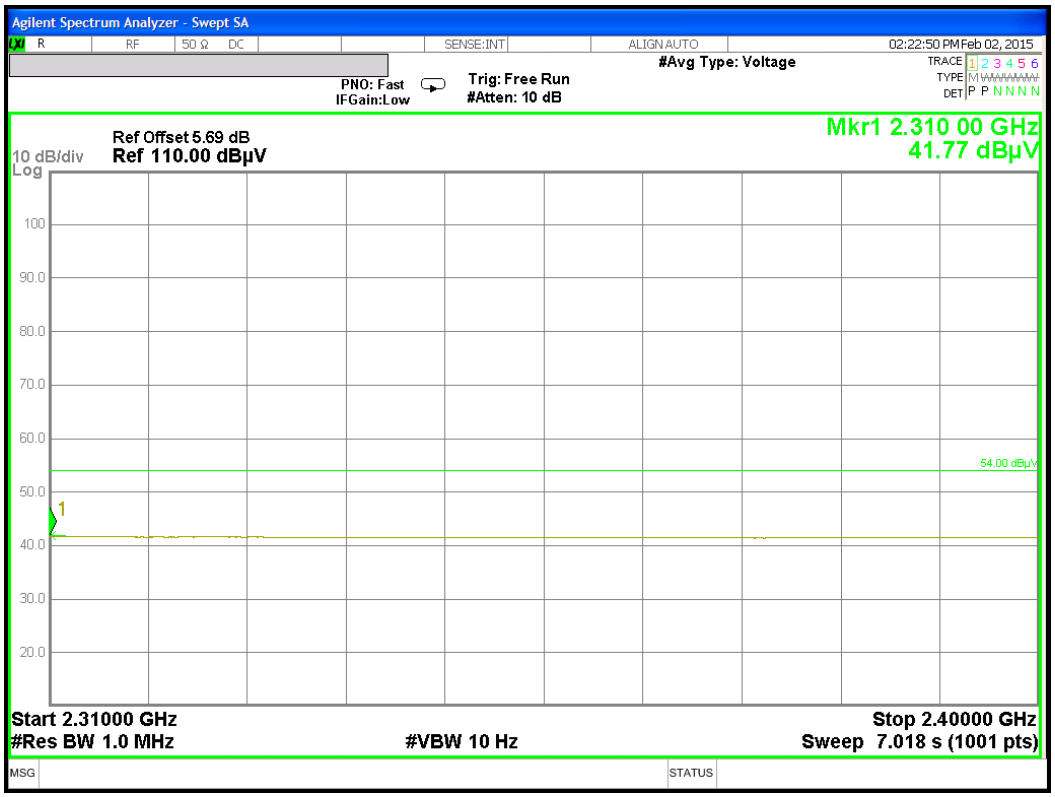


ECG, ½ Wave Dipole - LOW CH RESTRICTED, AVG, Vertical

Note: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB

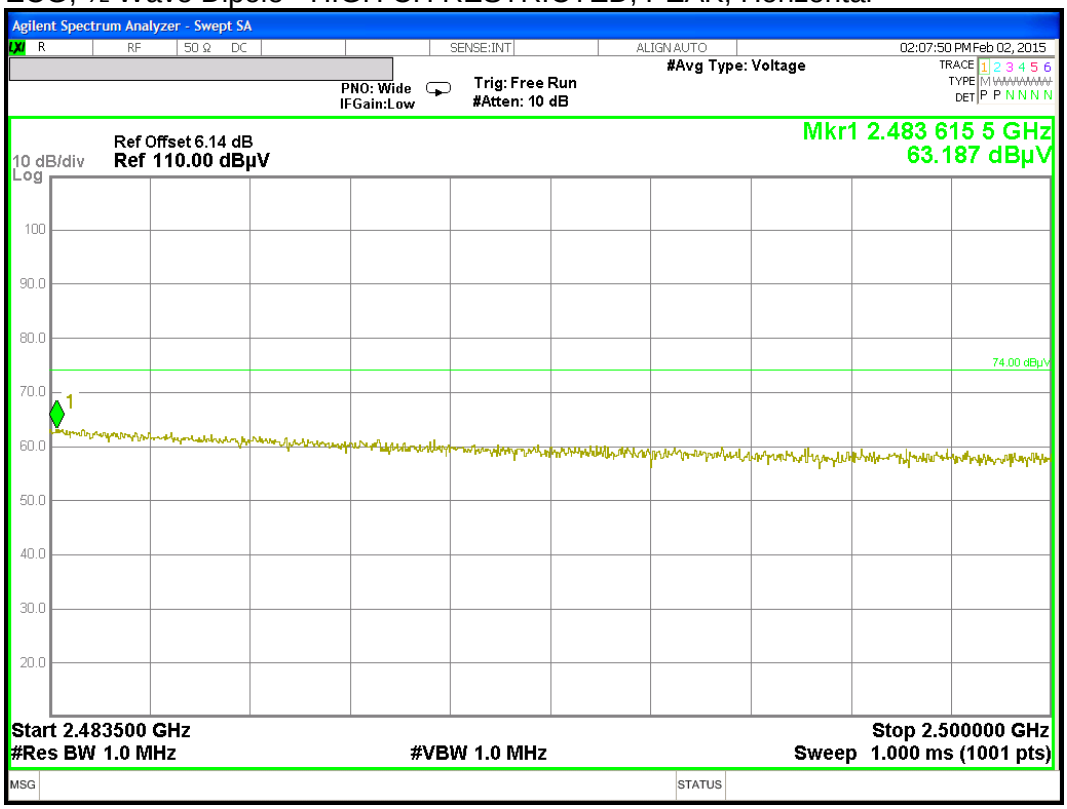
Average E-field = Peak - 54.77dB = 58 dBuV/m – 54.77 dB = 3.23 dBuV/m

Additionally, a reduced video bandwidth scan was performed to show no emissions were below the noise floor that is not related to the fundamental.



RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL) – ECG ½ WAVE DIPOLE

ECG, ½ Wave Dipole - HIGH CH RESTRICTED, PEAK, Horizontal

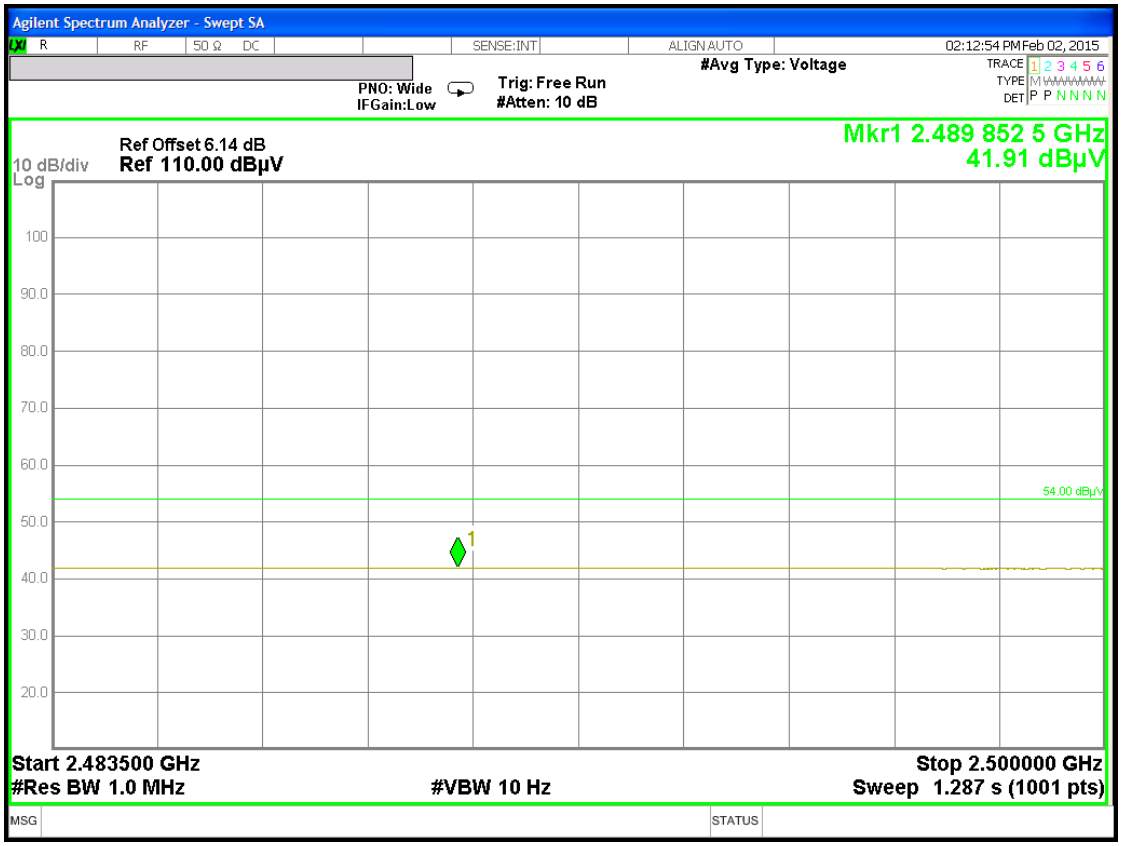


ECG, ½ Wave Dipole - HIGH CH RESTRICTED, AVG, Horizontal

Note: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB

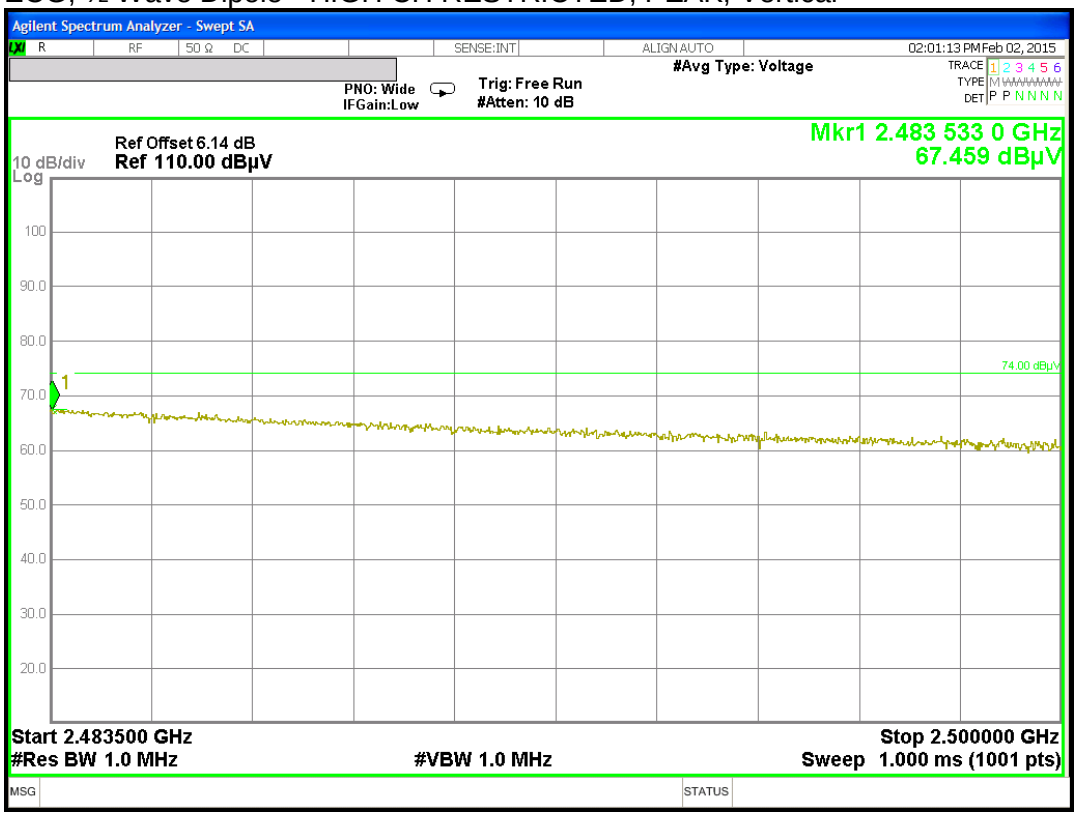
Average E-field = Peak - 54.77dB = 63.19 dBuV/m – 54.77 dB = 8.42 dBuV/m

Additionally, a reduced video bandwidth scan was performed to show no emissions were below the noise floor that is not related to the fundamental.



RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL) – ECG ½ WAVE DIPOLE

ECG, ½ Wave Dipole - HIGH CH RESTRICTED, PEAK, Vertical



ECG, ½ Wave Dipole - HIGH CH RESTRICTED, AVG, Vertical

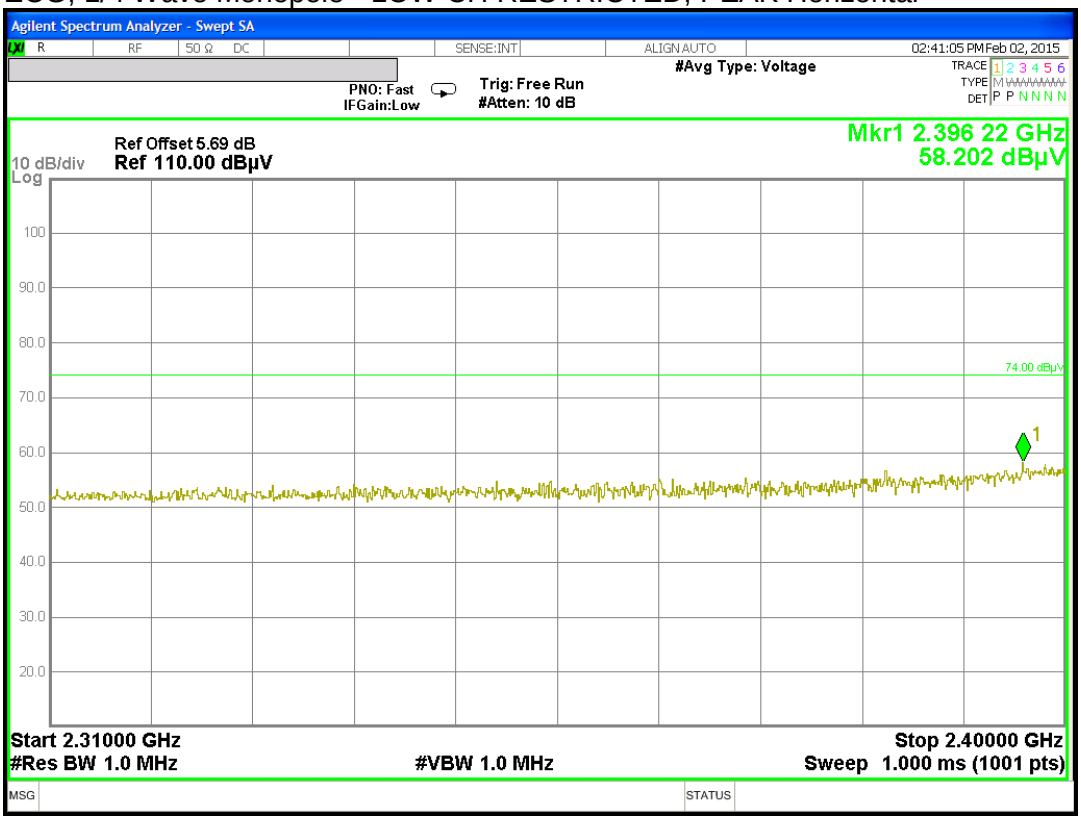
Note: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB

Average E-field = Peak - 54.77dB = 67.46 dBuV/m – 54.77 dB = 12.69 dBuV/m

Additionally, a reduced video bandwidth scan was performed to show no emissions were below the noise floor that is not related to the fundamental.

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL) – ECG ¼ WAVE MONOPOLE

ECG, 1/4 Wave Monopole - LOW CH RESTRICTED, PEAK Horizontal

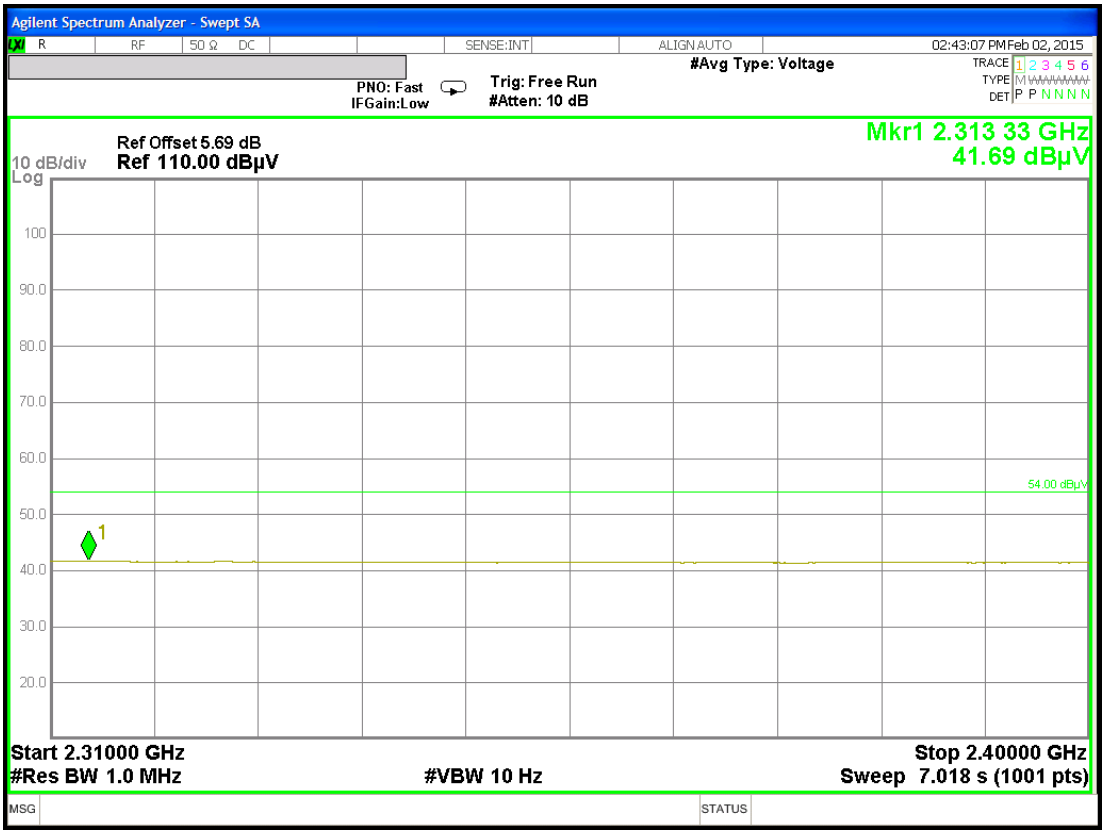


ECG, 1/4 Wave Monopole - LOW CH RESTRICTED, AVG, Horizontal

Note: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB

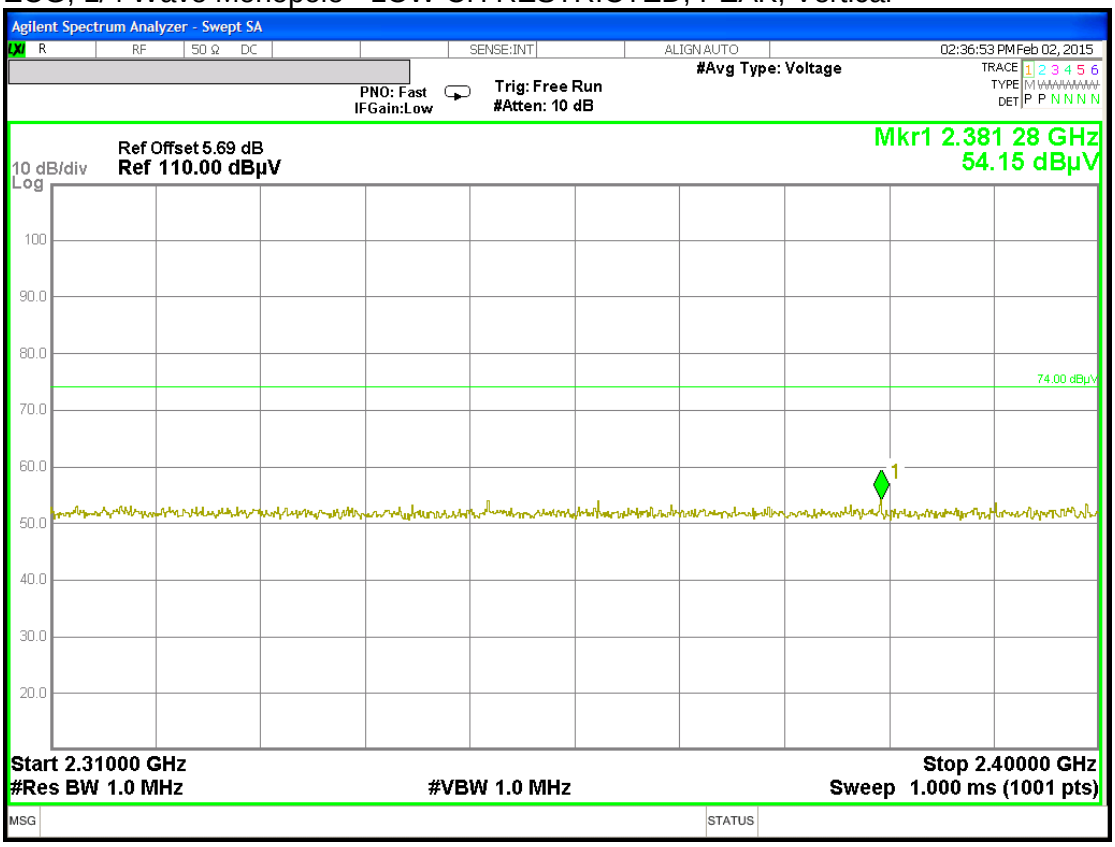
Average E-field = Peak - 54.77dB = 58.20 dBuV/m – 54.77 dB = 3.43 dBuV/m

Additionally, a reduced video bandwidth scan was performed to show no emissions were below the noise floor that is not related to the fundamental.



RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL) – ECG ¼ WAVE MONOPOLE

ECG, 1/4 Wave Monopole - LOW CH RESTRICTED, PEAK, Vertical

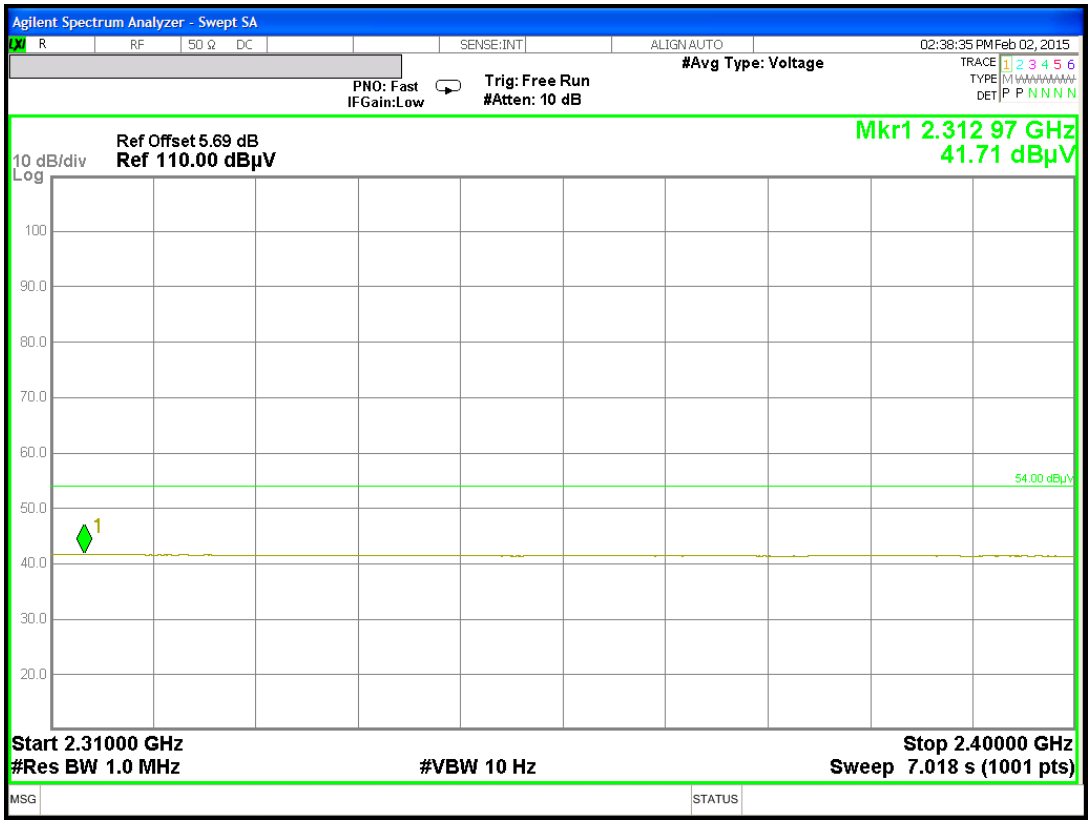


ECG, 1/4 Wave Monopole - LOW CH RESTRICTED, AVG, Vertical

Note: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB

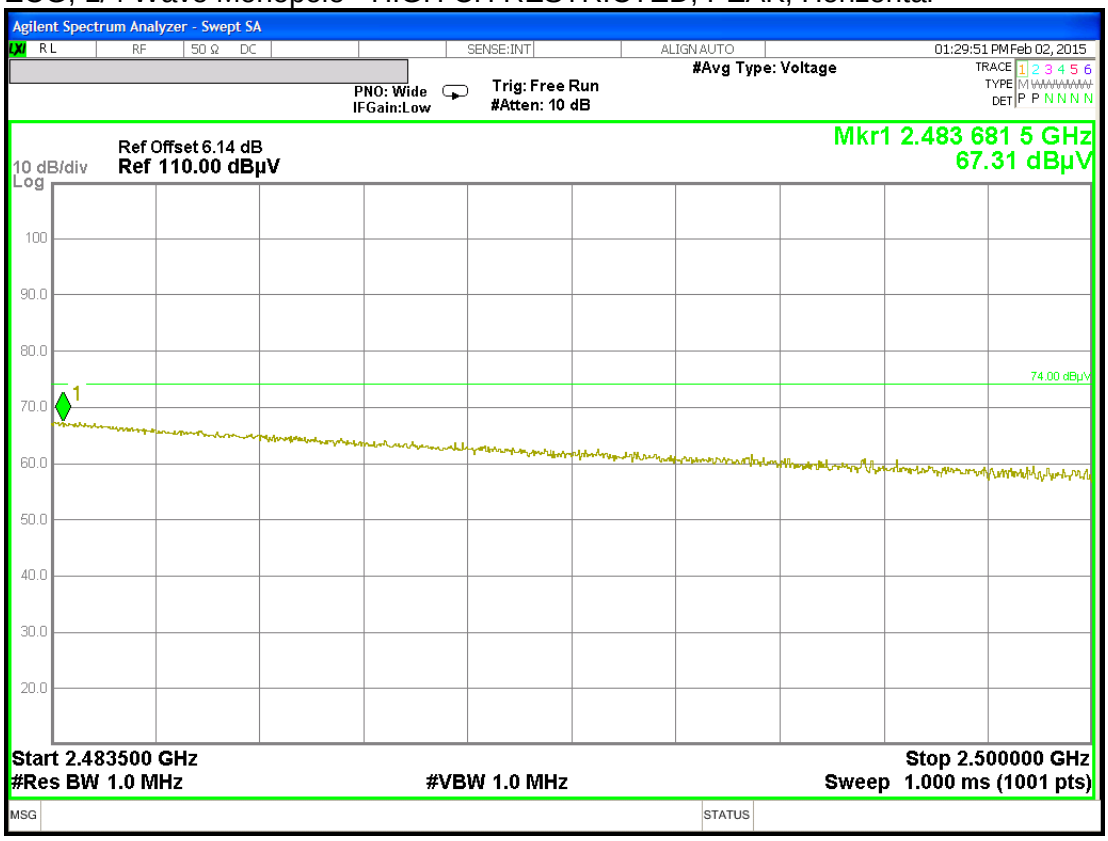
Average E-field = Peak - 54.77dB = 54.15 dBuV/m – 54.77 dB = -0.62 dBuV/m

Additionally, a reduced video bandwidth scan was performed to show no emissions were below the noise floor that is not related to the fundamental.



RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL) – ECG ¼ WAVE MONOPOLE

ECG, 1/4 Wave Monopole - HIGH CH RESTRICTED, PEAK, Horizontal

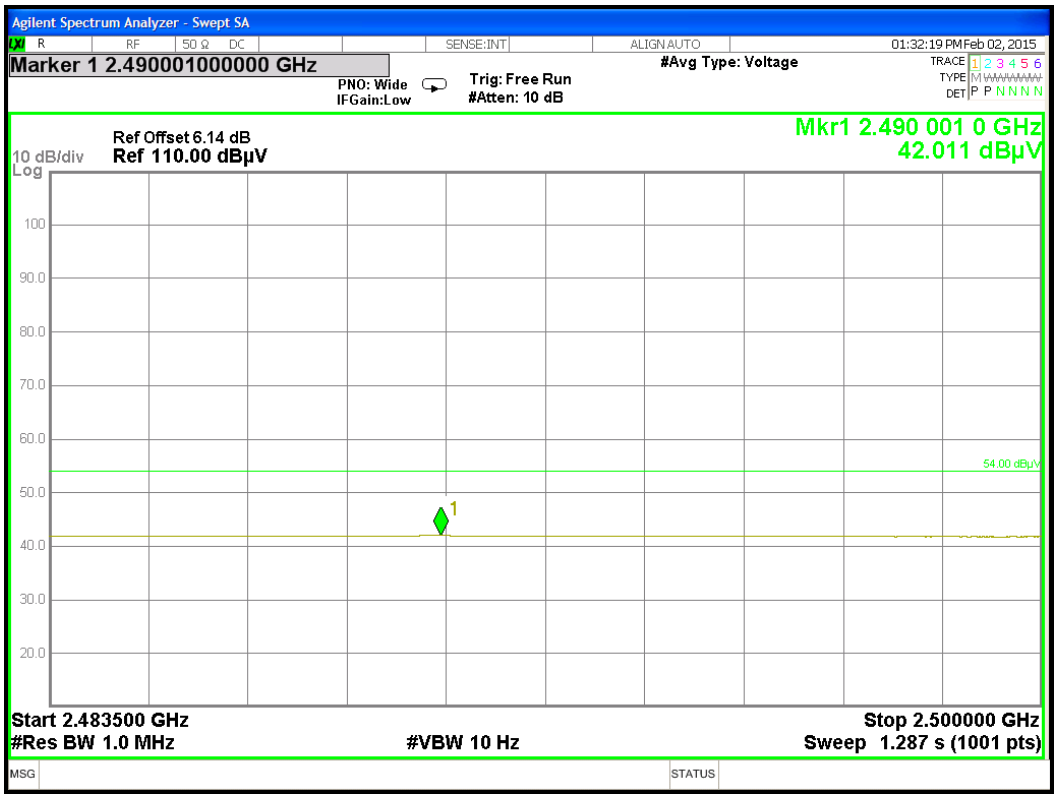


ECG, 1/4 Wave Monopole - HIGH CH RESTRICTED, AVG, Horizontal

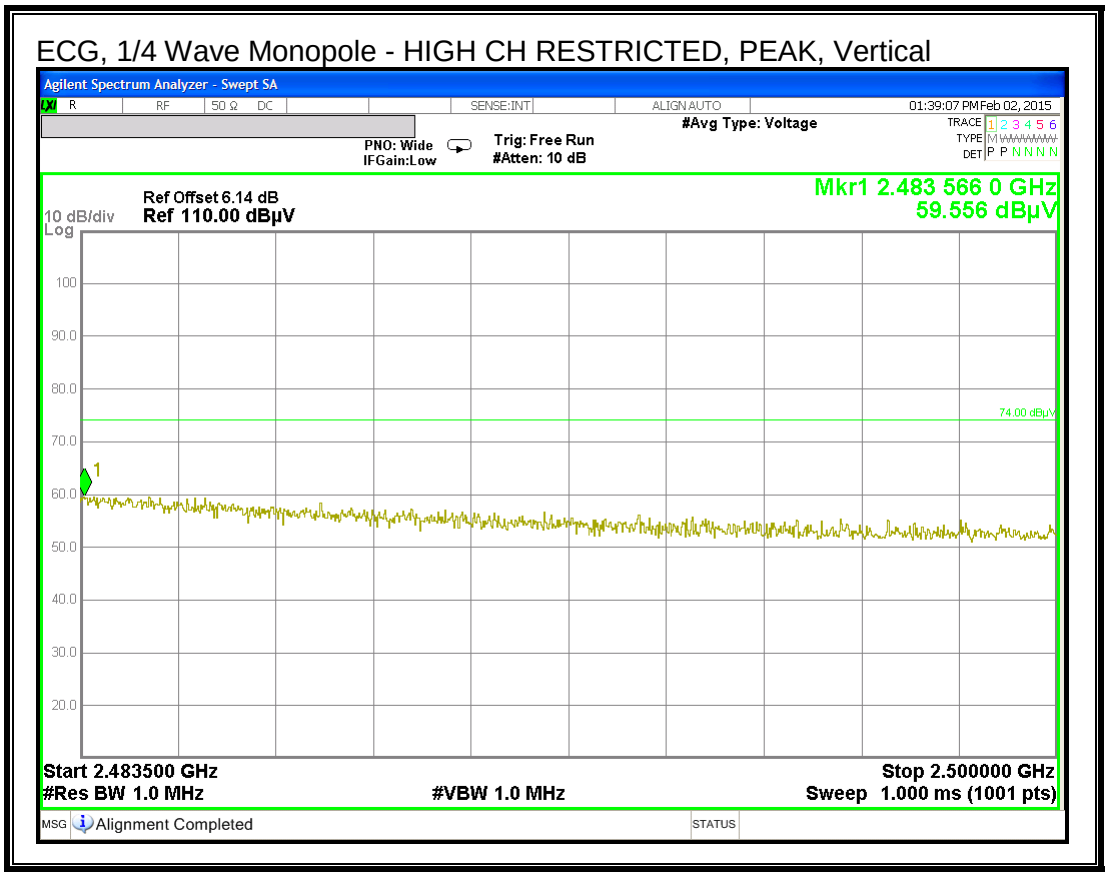
Note: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB

Average E-field = Peak - 54.77dB = 67.31 dBuV/m – 54.77 dB = 12.54 dBuV/m

Additionally, a reduced video bandwidth scan was performed to show no emissions were below the noise floor that is not related to the fundamental.



RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL) – ECG ¼ WAVE MONOPOLE



ECG, 1/4 Wave Monopole - HIGH CH RESTRICTED, AVG, Vertical

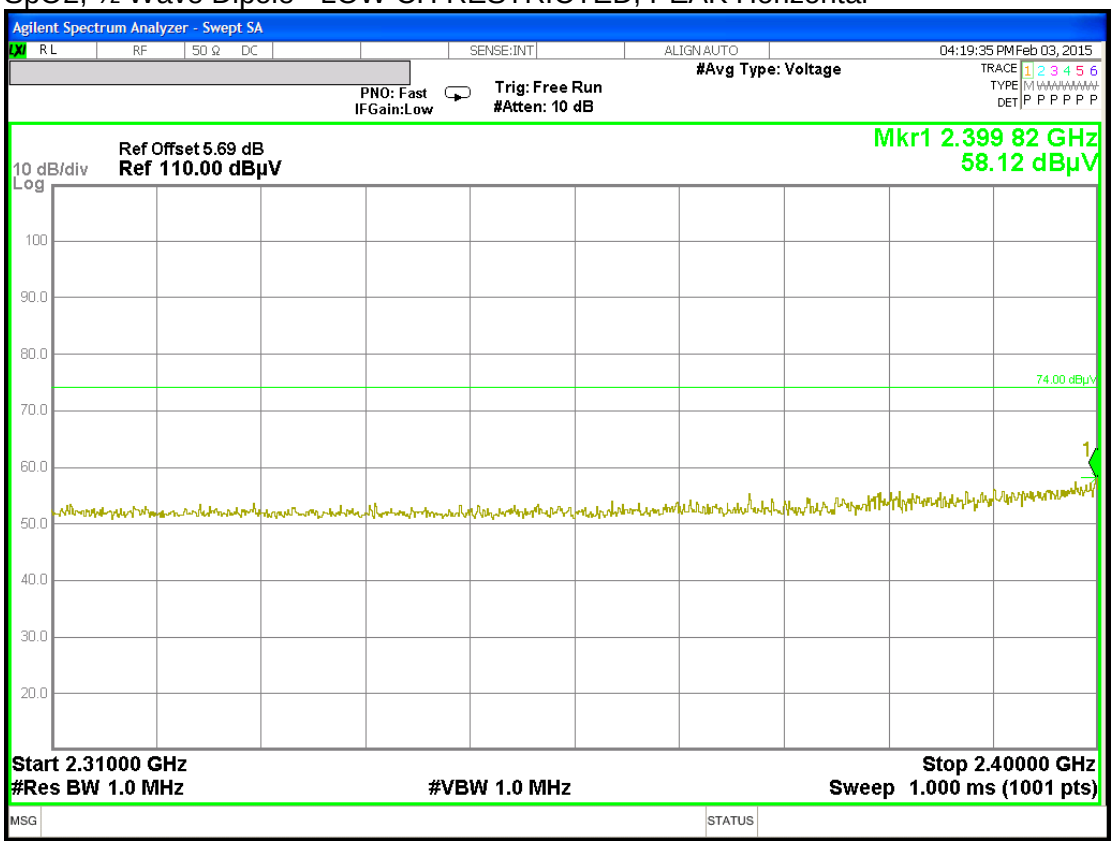
Note: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB

Average E-field = Peak - 54.77dB = 59.56 dBuV/m – 54.77 dB = 4.79 dBuV/m

Additionally, a reduced video bandwidth scan was performed to show no emissions were below the noise floor that is not related to the fundamental.

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL) – SpO2 ½ WAVE DIPOLE

SpO2, ½ Wave Dipole - LOW CH RESTRICTED, PEAK Horizontal

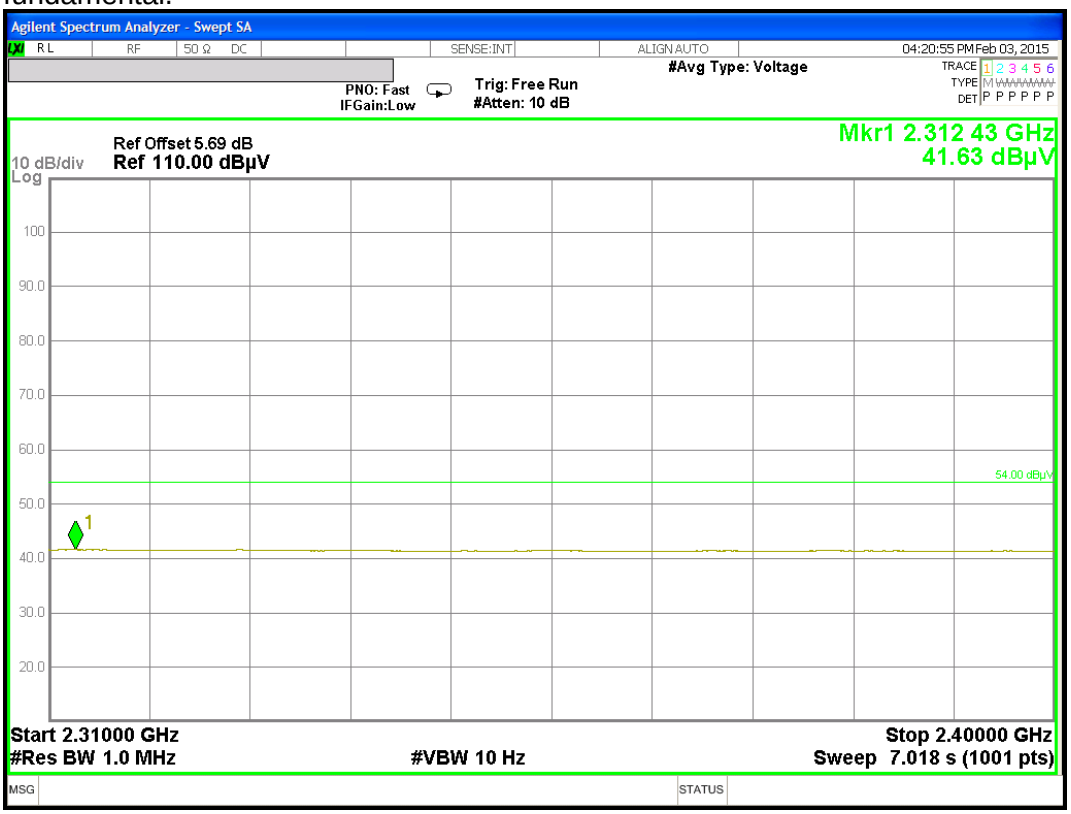


SpO2, ½ Wave Dipole - LOW CH RESTRICTED, AVG, Horizontal

Note: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB

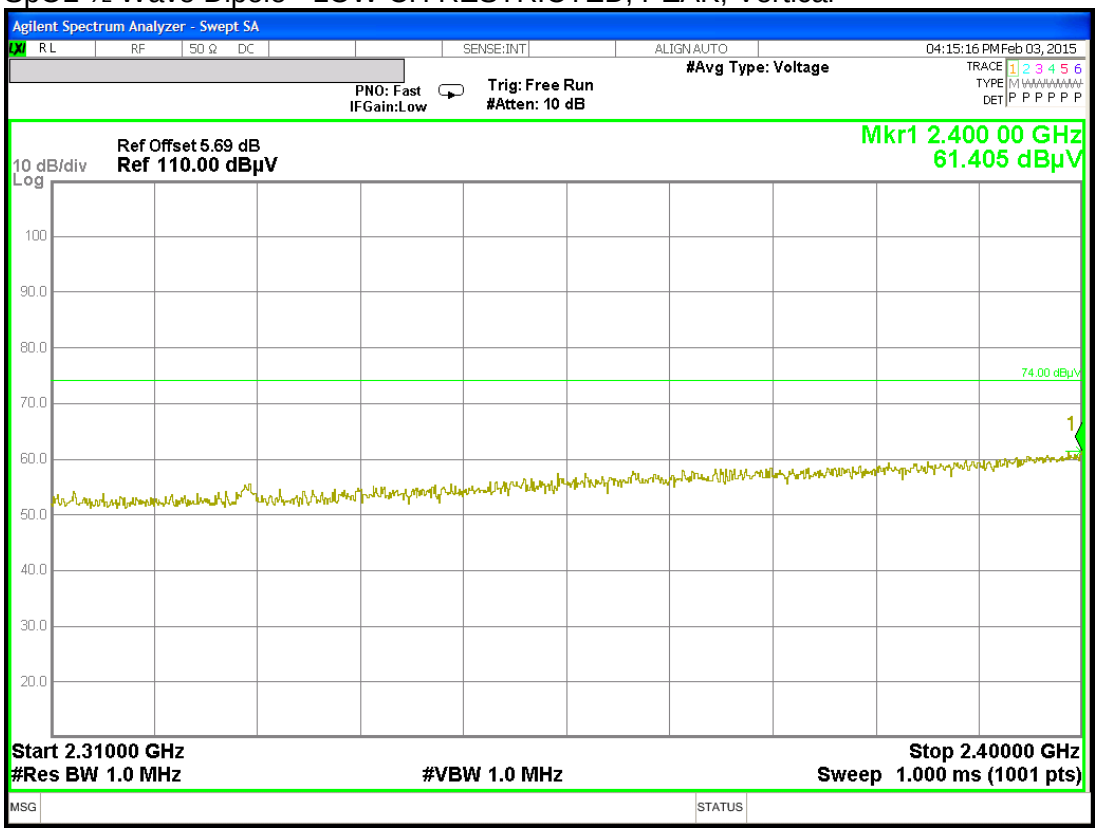
Average E-field = Peak - 54.77dB = 58.12 dBuV/m – 54.77 dB = 3.35 dBuV/m

Additionally, a reduced video bandwidth scan was performed to show no emissions were below the noise floor that is not related to the fundamental.



RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL) – SpO2 ½ WAVE DIPOLE

SpO2 ½ Wave Dipole - LOW CH RESTRICTED, PEAK, Vertical

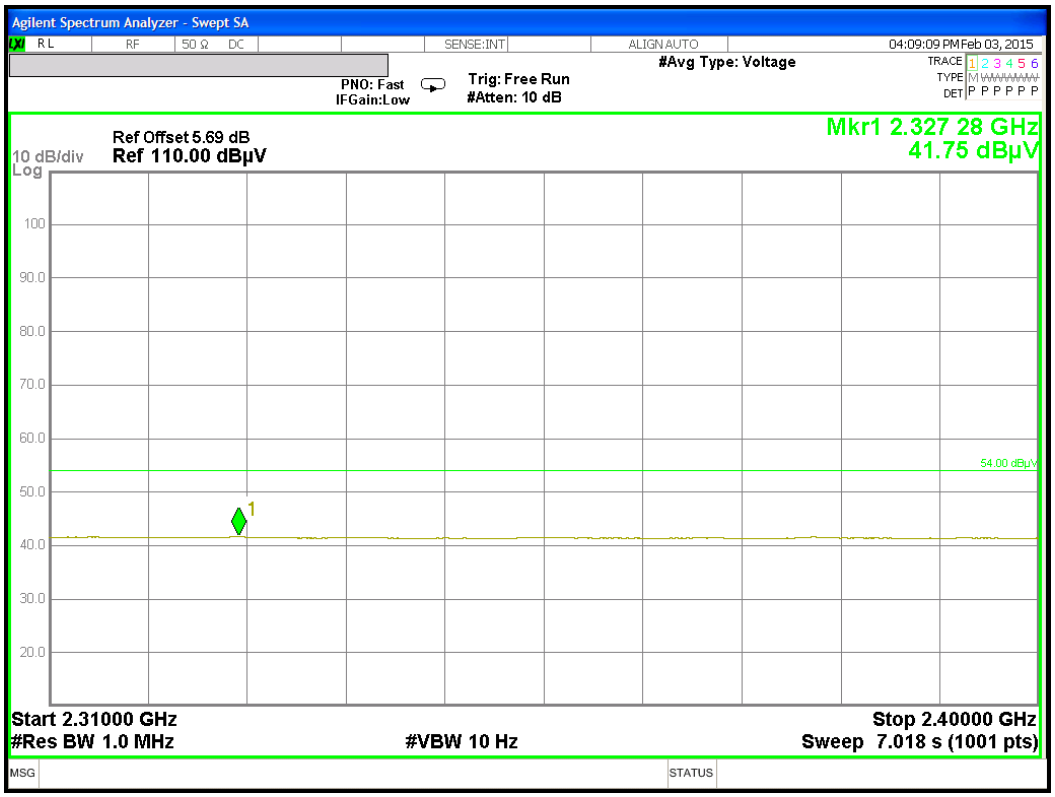


SpO2, ½ Wave Dipole - LOW CH RESTRICTED, AVG, Vertical

Note: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB

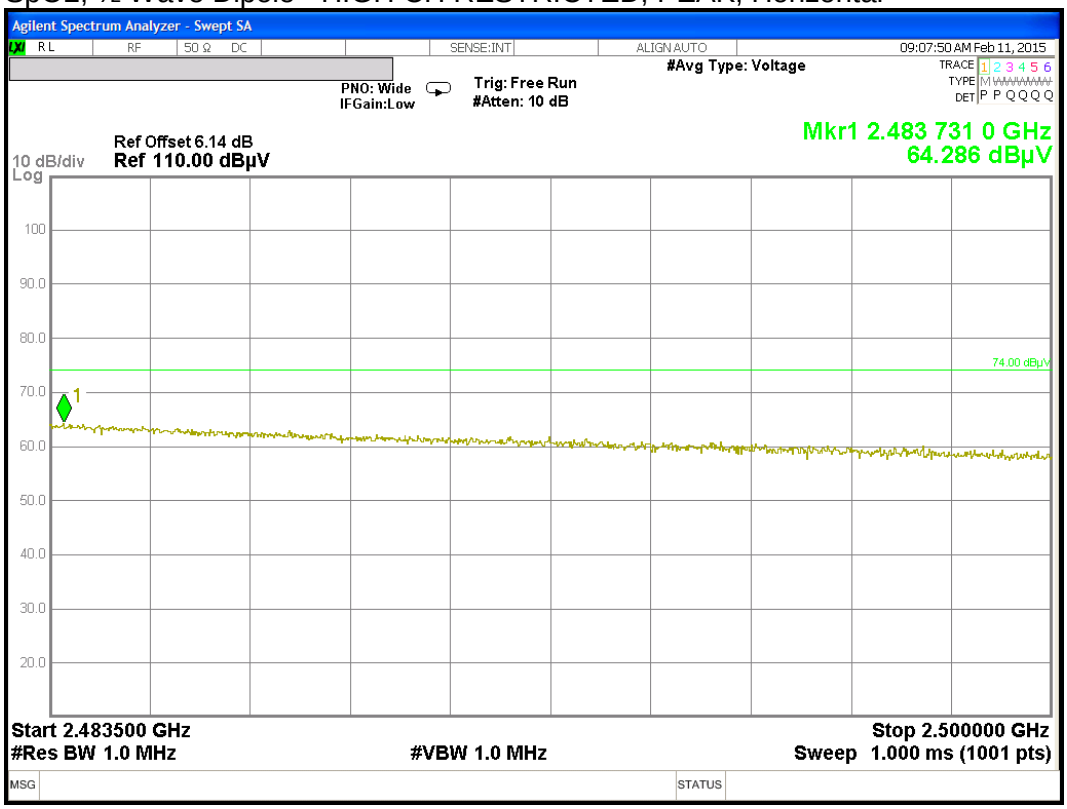
Average E-field = Peak - 54.77dB = 61.41 dBuV/m – 54.77 dB = 6.64 dBuV/m

Additionally, a reduced video bandwidth scan was performed to show no emissions were below the noise floor that is not related to the fundamental.



RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL) – SpO2 ½ WAVE DIPOLE

SpO2, ½ Wave Dipole - HIGH CH RESTRICTED, PEAK, Horizontal



SpO2, ½ Wave Dipole - HIGH CH RESTRICTED, AVG, Horizontal

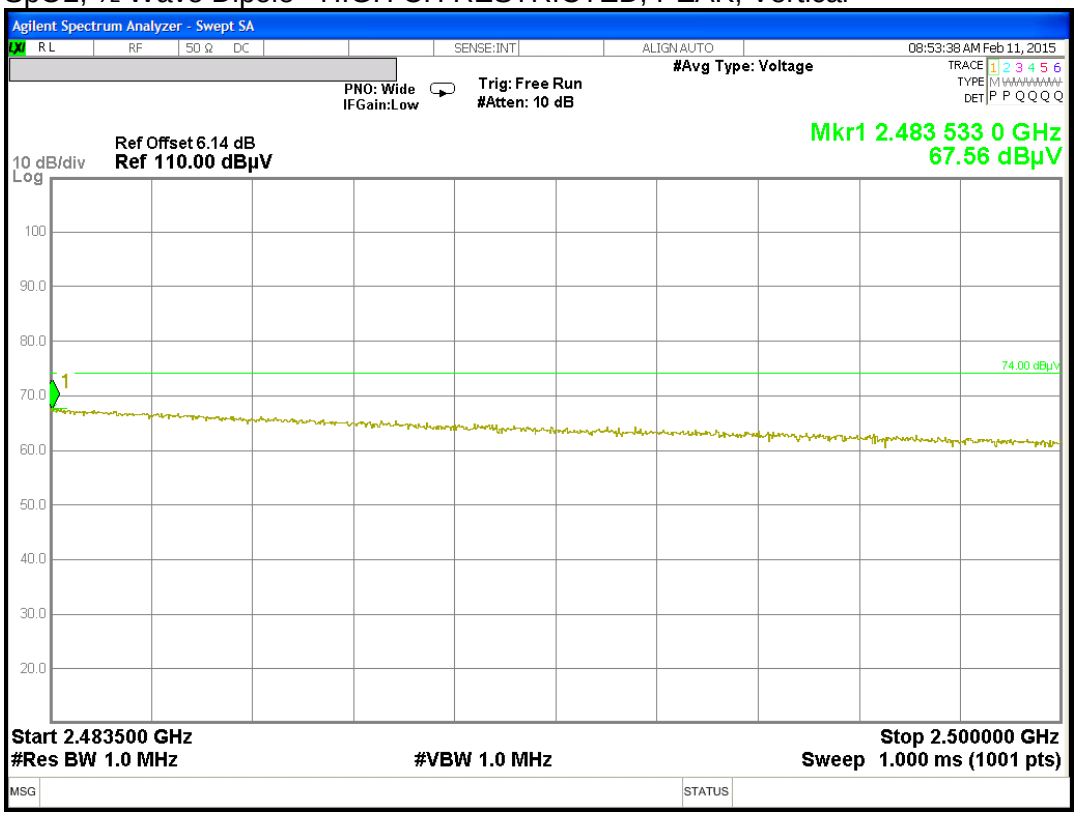
Note: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB

Average E-field = Peak - 54.77dB = 64.29 dBuV/m – 54.77 dB = 9.52 dBuV/m

Additionally, a reduced video bandwidth scan was performed to show no emissions were below the noise floor that is not related to the fundamental.

RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL) – SpO2 ½ WAVE DIPOLE

SpO2, ½ Wave Dipole - HIGH CH RESTRICTED, PEAK, Vertical

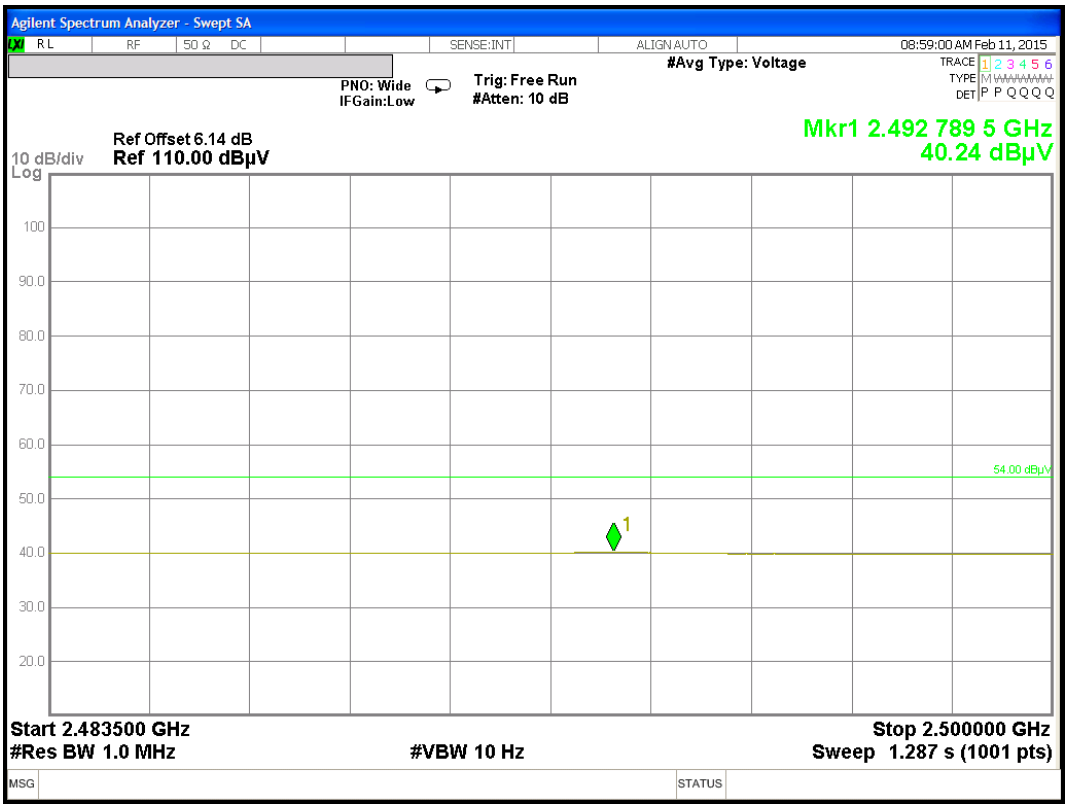


SpO2, ½ Wave Dipole - HIGH CH RESTRICTED, AVG, Vertical

Note: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB

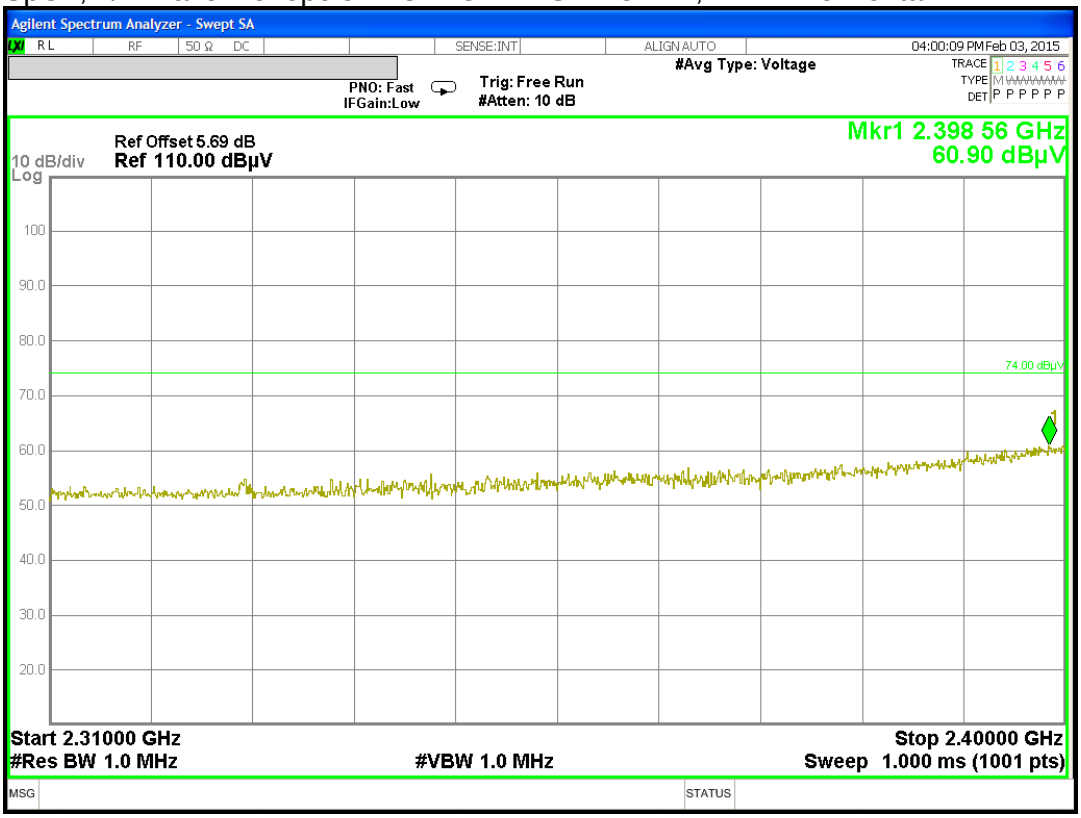
Average E-field = Peak - 54.77dB = 67.56 dBuV/m – 54.77 dB = 12.79 dBuV/m

Additionally, a reduced video bandwidth scan was performed to show no emissions were below the noise floor that is not related to the fundamental.



RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL) – SpO2 ¼ WAVE MONOPOLE

SpO2, 1/4 Wave Monopole - LOW CH RESTRICTED, PEAK Horizontal



SpO2, 1/4 Wave Monopole - LOW CH RESTRICTED, AVG, Horizontal

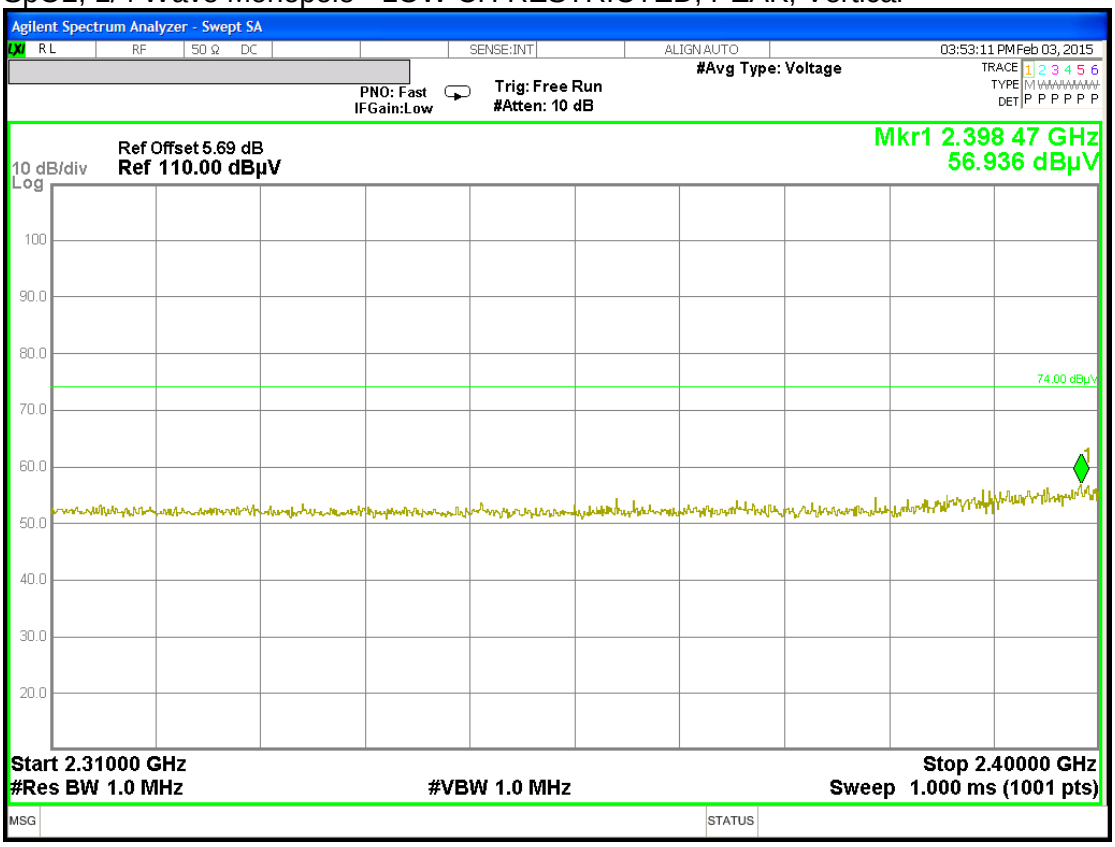
Note: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB

Average E-field = Peak - 54.77dB = 60.90 dBuV/m – 54.77 dB = 6.13 dBuV/m

Additionally, a reduced video bandwidth scan was performed to show no emissions were below the noise floor that is not related to the fundamental.

RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL) – SpO2 ¼ WAVE MONOPOLE

SpO2, 1/4 Wave Monopole - LOW CH RESTRICTED, PEAK, Vertical

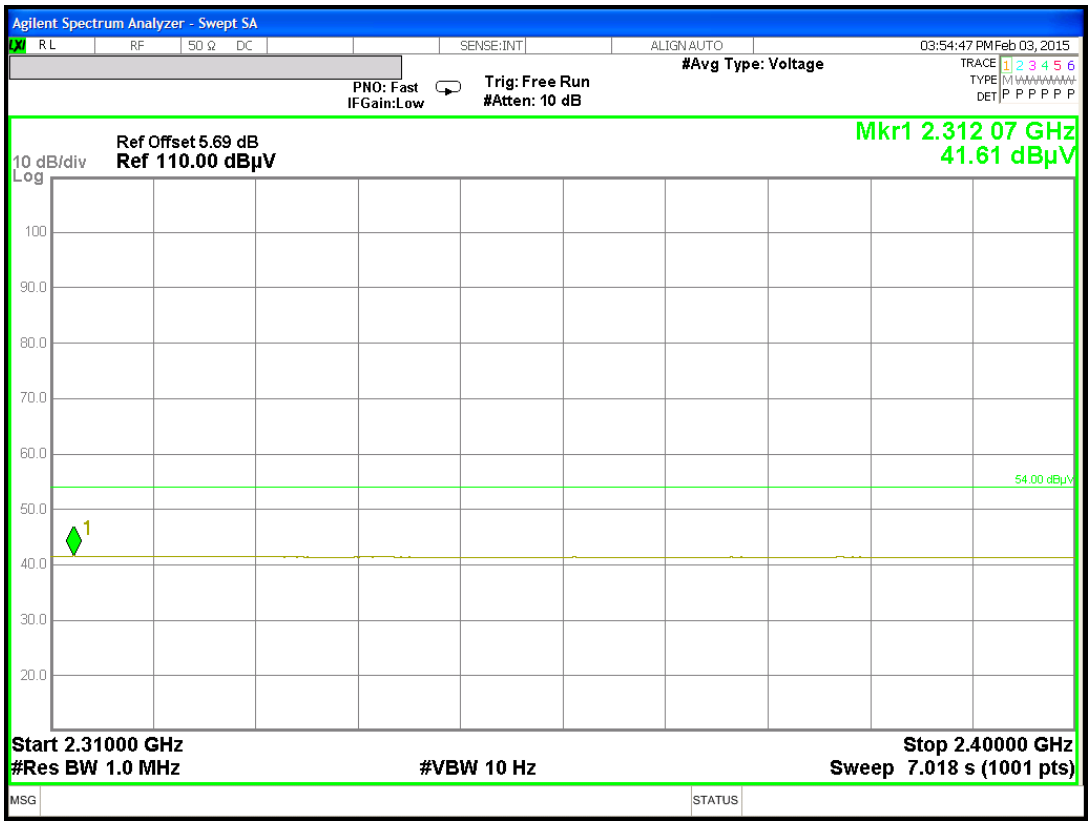


SpO2, 1/4 Wave Monopole - LOW CH RESTRICTED, AVG, Vertical

Note: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB

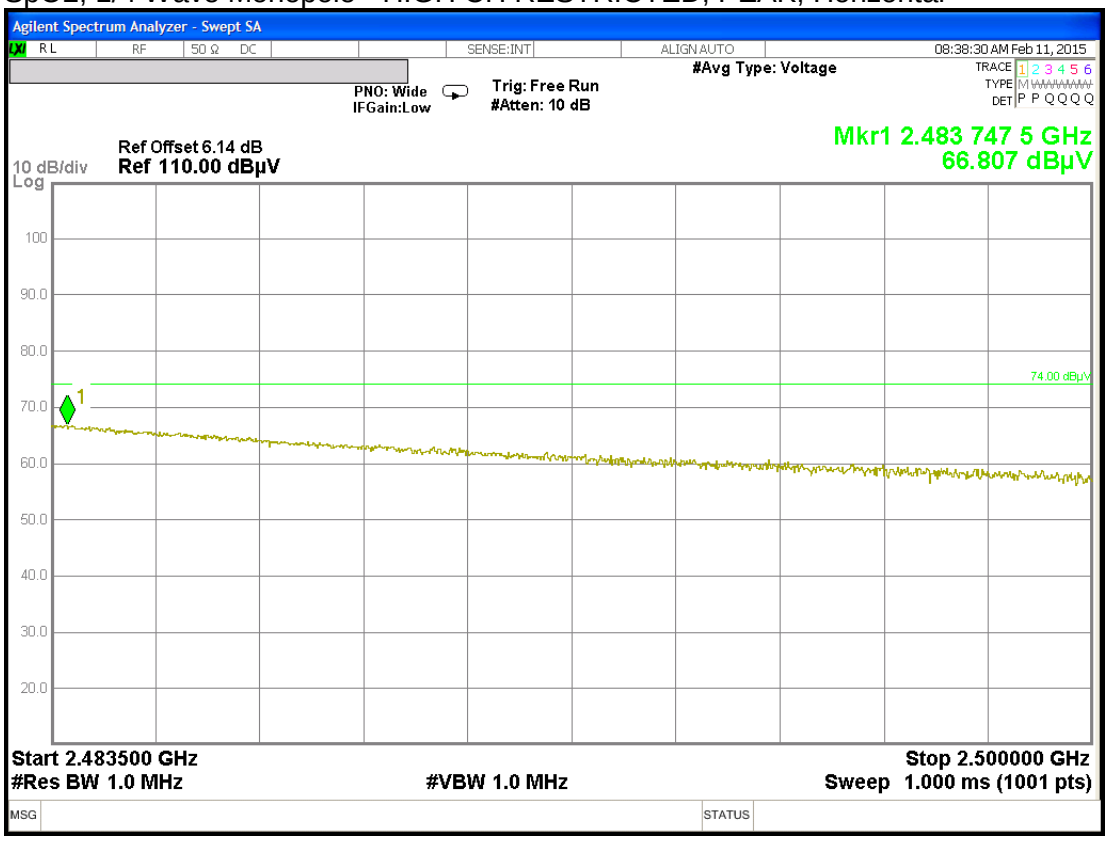
Average E-field = Peak - 54.77dB = 56.94 dBuV/m – 54.77 dB = 2.17 dBuV/m

Additionally, a reduced video bandwidth scan was performed to show no emissions were below the noise floor that is not related to the fundamental.



RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL) – SpO2 ¼ WAVE MONOPOLE

SpO2, 1/4 Wave Monopole - HIGH CH RESTRICTED, PEAK, Horizontal



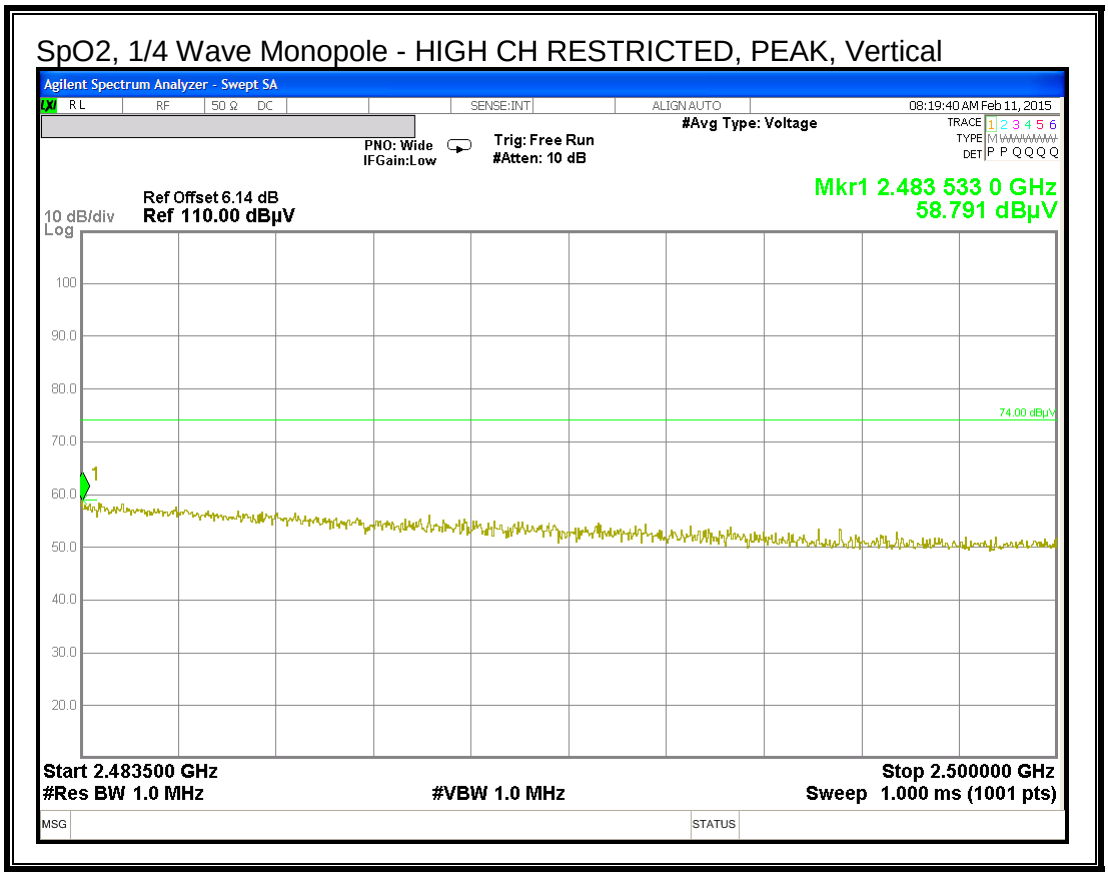
SpO2, 1/4 Wave Monopole - HIGH CH RESTRICTED, AVG, Horizontal

Note: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB

Average E-field = Peak - 54.77dB = 66.81 dBuV/m – 54.77 dB = 12.04 dBuV/m

Additionally, a reduced video bandwidth scan was performed to show no emissions were below the noise floor that is not related to the fundamental.

RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL) – SpO2 ¼ WAVE MONOPOLE



SpO2, 1/4 Wave Monopole - HIGH CH RESTRICTED, AVG, Vertical

Note: Using 182.57us duration supplied by customer and maximum period of 100ms allowed by FCC Part 15.35(c):
Duty cycle correction (DCC) = 20*log(0.18257/100) = -54.77dB

Average E-field = Peak - 54.77dB = 58.79 dBuV/m – 54.77 dB = 4.02 dBuV/m

Additionally, a reduced video bandwidth scan was performed to show no emissions were below the noise floor that is not related to the fundamental.

7.3.3. HARMONICS AND SPURIOUS EMISSIONS ABOVE 1GHz (1-18 GHz)

All testing was performed independently on the ECG ½ wave dipole and ¼ wave monopole and SpO2 ½ wave dipole and ¼ wave monopole. The testing was performed one radio type at a time (ECG or SpO2) due to limitations of the manufacturer's test software.

The below calculations take the worst-case 1-18 GHz Spurious emissions for all ECG measurements and SpO2 measurements and combines those field strengths to show that the combined ECG and SpO2 Spurious Emissions field strengths meet FCC Part 15.249. Please note, although the ECG and SpO2 signals can be functional at the same time, they do not use the same channel frequencies (separated by a minimum of 1 MHz).

The Spurious Emissions field strength of the SpO2 and ECG radios were combined by converting the Electric Field Strength to Power Density, adding the ECG/SpO2 Power values together and converting back to Electric Field Strength:

$Pd = E^2$ (V/m) / 377Ω

Per the following plots, the worst-case spurious field strengths are:

ECG = 60.5 dBuV/m PK, 48.1 dBuV/m AV
SpO2 = 59.6 dBuV/m PK, 47.5 dBuV/m AV

Combining the Field Strengths -

PEAK
ECG = 60.5 dBuV/m => 1059.2537 uV/m or 0.0010593 V/m = 0.000002976 mW/m2
SpO2 = 59.6 dBuV/m => 954.9927 uV/m or 0.00095499 V/m = 0.000002419 mW/m2

Combined = 0.000005395 mW/m2 = 0.001426154 V/m or 1426.154 uV/m => 63.1 dBuV/m

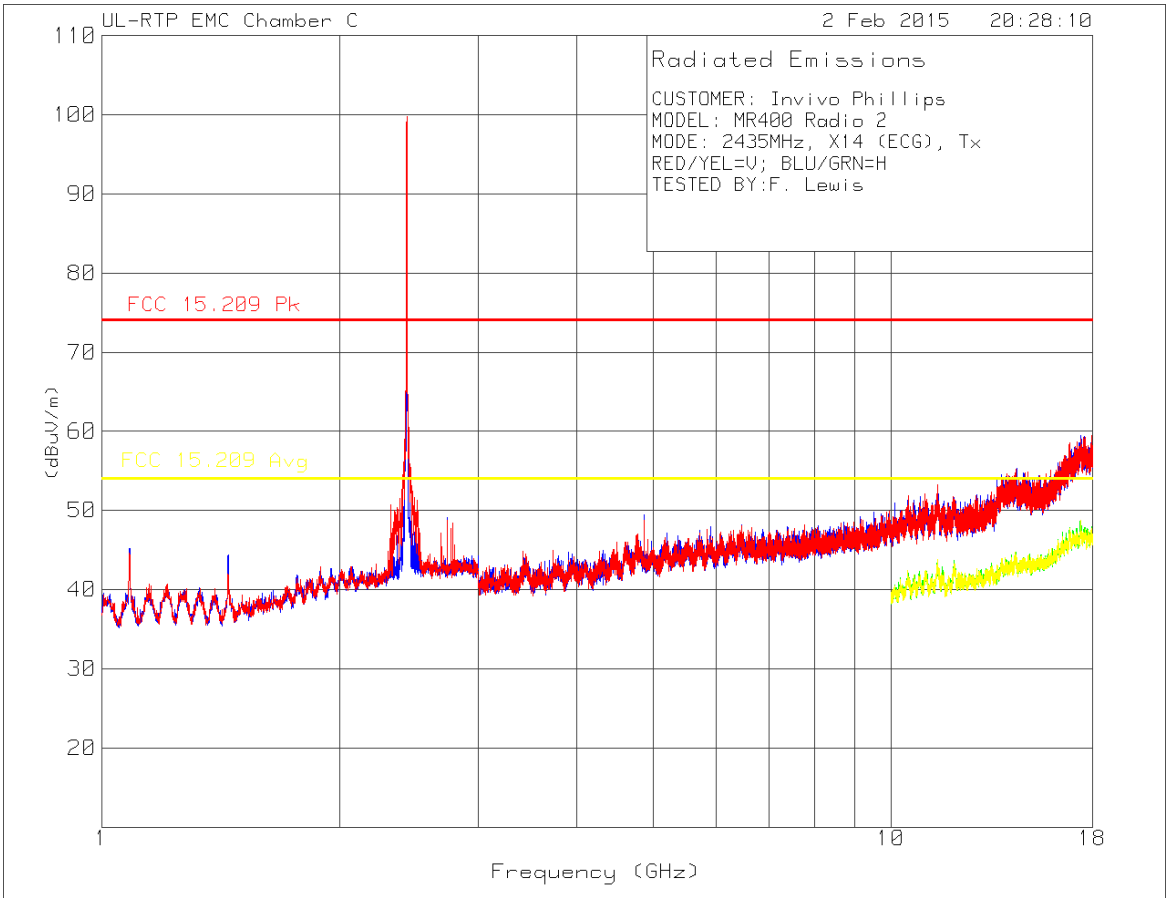
Combined PK = 63.1 dBuV/m

AVERAGE
ECG = 48.1 dBuV/m => 254.0973 uV/m or 0.000254097 V/m = 0.000000171 mW/m2
SpO2 = 47.5 dBuV/m => 237.1374 uV/m or 0.000237137 V/m = 0.000000149 mW/m2

Combined = 0.00000032 mW/m2 = 0.000347421 V/m or 347.4207 uV/m => 50.82 dBuV/m

Combined AVG = 50.82 dBuV/m

ECG – ½ WAVE DIPOLE – LOW CHANNEL PLOT



The yellow/green trace represents a reduced video bandwidth trace (10Hz) to show no emissions present.

ECG – ½ WAVE DIPOLE – LOW CHANNEL DATA

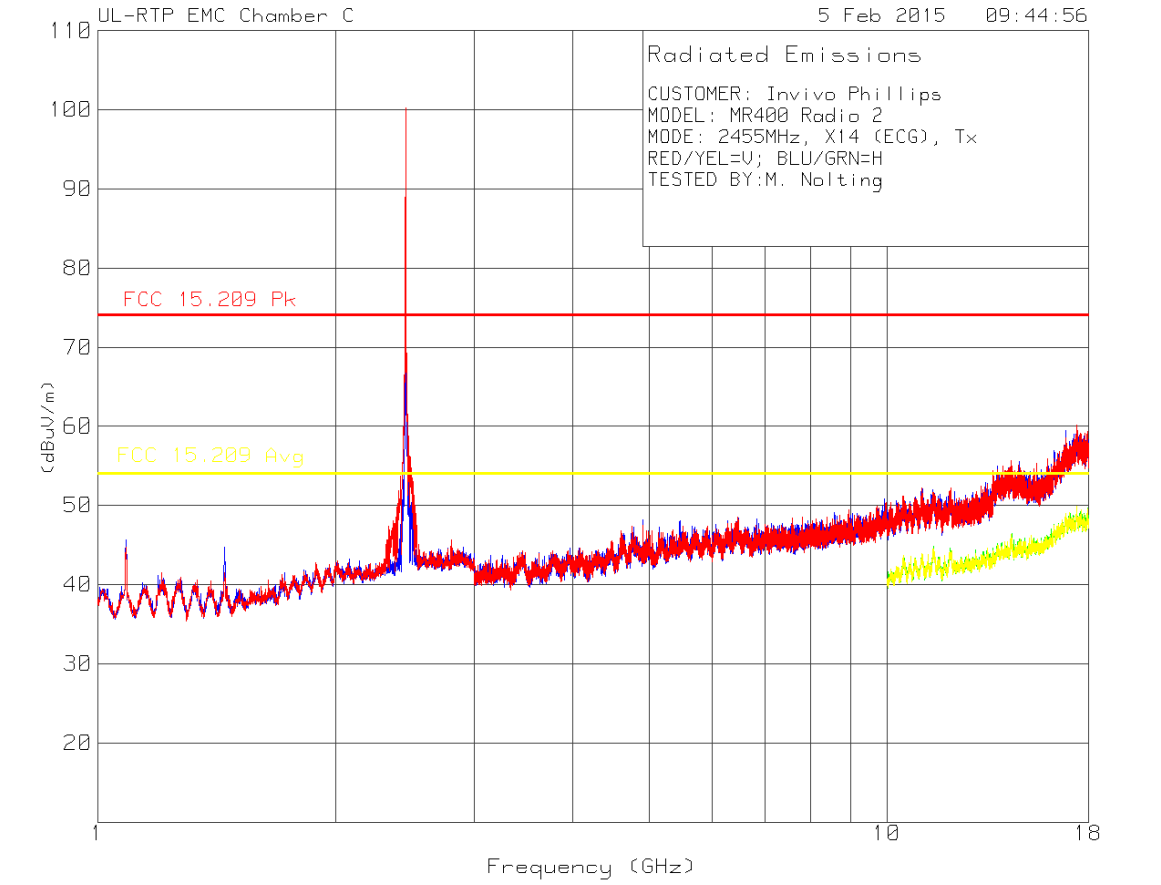
CUSTOMER: Invivo Phillips
MODEL: MR400 Radio 2
MODE: 2435MHz, X14 (ECG), Tx
RED/YEL=V; BLU/GRN=H
TESTED BY:F. Lewis

Freq (GHz)	Meter Reading [dBuV]	Detector	Antenna Factor [dB/m]	Gain/ Loss [dB]	DCCF (dB)	Field Strength [dBuV/m]	Peak Limit [dBuV/m]	Margin [dB]	Average Limit [dBuV/m]	Margin [dB]	Antenna Polarity
1.084	56.6	Pk	28.6	-40.0	0.0	45.2	74.0	-28.9	54.0	-8.9	H
1.446	54.7	Pk	28.5	-38.8	0.0	44.4	74.0	-29.6	54.0	-9.6	H
2.742	54.5	Pk	32.7	-36.0	0.0	51.2	74.0	-22.8	-	-	H
2.742	54.5	AvCalc	32.7	-36.0	-54.8	-3.6	-	-	54.0	-57.6	H
4.870	49.0	Pk	35.0	-32.9	0.0	51.1	74.0	-22.9	-	-	H
4.870	49.0	AvCalc	35.0	-32.9	-54.8	-3.7	-	-	54.0	-57.7	H
9.504	39.0	Pk	37.3	-27.6	0.0	48.7	74.0	-25.3	-	-	H
9.504	39.0	AvCalc	37.3	-27.6	-54.8	-6.1	-	-	54.0	-60.1	H
					0.0						
2.742	54.5	Pk	32.7	-36.0	0.0	51.2	74.0	-22.8	-	-	V
2.742	54.5	AvCalc	32.7	-36.0	-54.8	-3.6	-	-	54.0	-57.6	V
4.870	49.7	Pk	35.0	-32.9	0.0	51.8	74.0	-22.2	54.0	-	V
4.870	49.7	AvCalc	35.0	-32.9	-54.8	-2.9	-	-	54.0	-56.9	V
11.457	38.3	Pk	39.1	-23.9	0.0	53.5	74.0	-20.5	-	-	V
11.457	38.3	AvCalc	39.1	-23.9	-54.8	-1.3	-	-	54.0	-55.3	V
17.405	38.1	Pk	42.1	-19.7	0.0	60.5	74.0	-13.5	-	-	V
17.405	38.1	AvCalc	42.1	-20.0	-54.8	5.4	-	-	54.0	-48.6	V

*PK = Peak

AvCalc: Average Field Strength computed as follows for the above harmonics: PK + DCCF, where DCCF = 20*log(T_on/100ms)

ECG – ½ WAVE DIPOLE – MID CHANNEL PLOT



The yellow/green trace represents a reduced video bandwidth trace (10Hz) to show no emissions present.

ECG – ½ WAVE DIPOLE – MID CHANNEL DATA

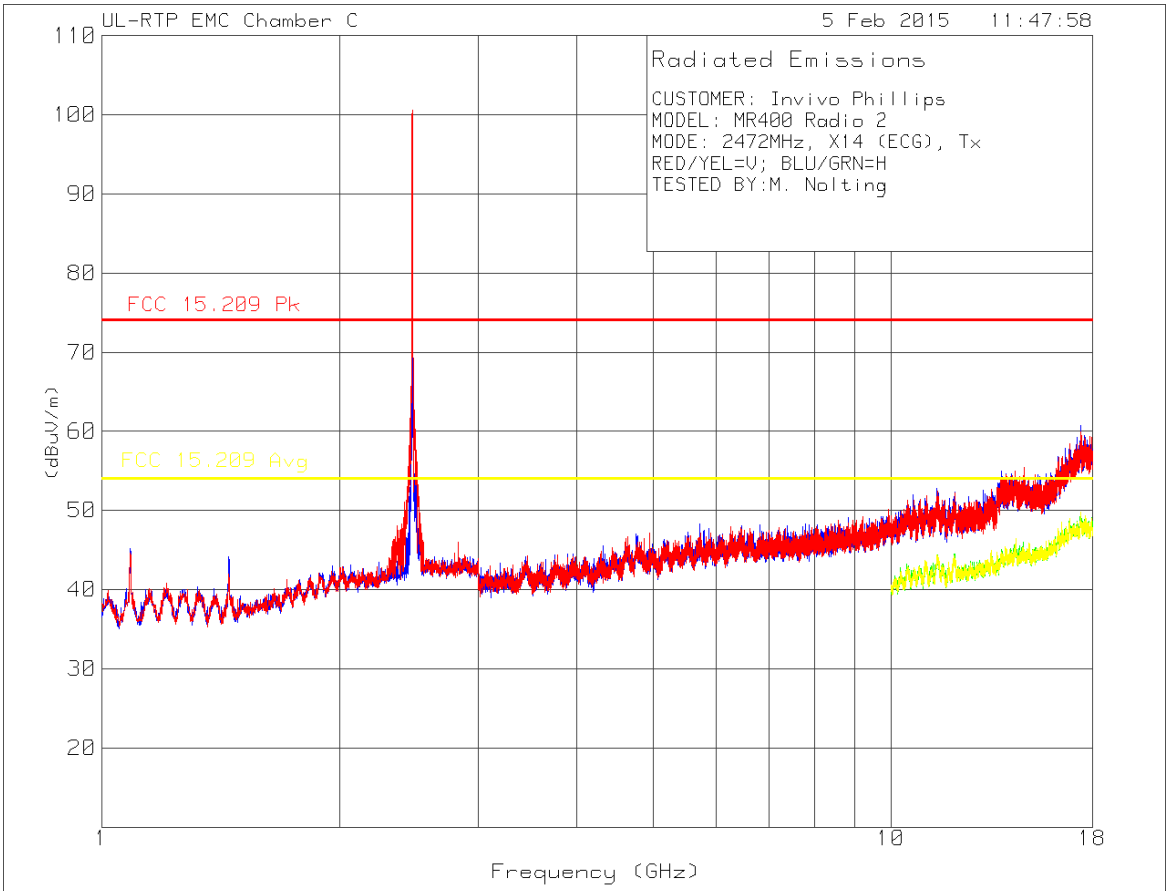
CUSTOMER: Invivo Phillips
MODEL: MR400 Radio 2
MODE: 2455MHz, X14 (ECG), Tx
RED/YEL=V; BLU/GRN=H
TESTED BY:M. Nolting

Freq (GHz)	Meter Reading [dBuV]	Detector	Antenna Factor [dB/m]	Gain/ Loss [dB]	DCCF (dB)	Field Strength [dBuV/m]	Peak Limit [dBuV/m]	Margin [dB]	Average Limit [dBuV/m]	Margin [dB]	Antenna Polarity
1.086	57.0	Pk	28.6	-40.0	0.0	45.6	74.0	-28.4	54.0	-8.4	H
1.447	55.1	Pk	28.4	-38.8	0.0	44.7	74.0	-29.3	54.0	-9.3	H
4.910	48.8	Pk	34.9	-33.2	0.0	50.5	74.0	-23.5	-	-	H
4.910	48.8	AvCalc	34.9	-33.2	-54.8	-4.3	-	-	54.0	-58.3	H
1.086	56.1	Pk	28.6	-40.0	0.0	44.7	74.0	-29.3	54.0	-9.3	V
1.447	52.0	Pk	28.4	-38.8	0.0	41.6	74.0	-32.5	54.0	-12.5	V
4.910	50.0	Pk	34.9	-33.2	0.0	51.7	74.0	-22.3	-	-	V
4.910	50.0	AvCalc	34.9	-33.2	-54.8	-3.0	-	-	54.0	-57.0	V
7.365	40.7	Pk	36.2	-28.5	0.0	48.4	74.0	-25.6	-	-	V
7.365	40.7	AvCalc	36.2	-28.5	-54.8	-6.4	-	-	54.0	-60.4	V
12.055	38.9	Pk	39.3	-24.8	0.0	53.4	74.0	-20.6	-	-	V
12.055	38.9	AvCalc	39.3	-24.8	-54.8	-1.4	-	-	54.0	-55.4	V

*PK = Peak

AvCalc: Average Field Strength computed as follows for the above harmonics: PK + DCCF, where DCCF = 20*log(T_on/100ms)

ECG – ½ WAVE DIPOLE – HIGH CHANNEL PLOT



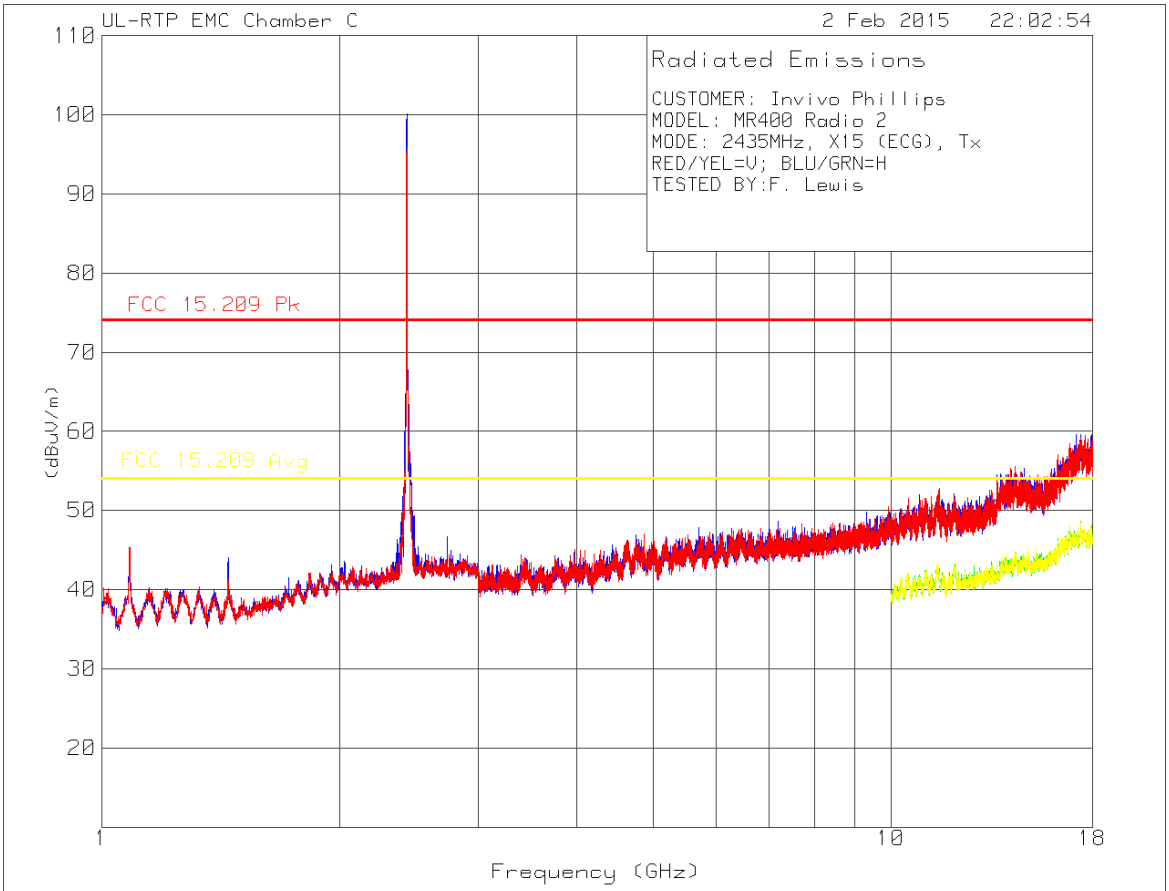
The yellow/green trace represents a reduced video bandwidth trace (10Hz) to show no emissions present.

ECG – ½ WAVE DIPOLE – HIGH CHANNEL DATA

CUSTOMER: Invivo Phillips
MODEL: MR400 Radio 2
MODE: 2472MHz, X14 (ECG), Tx
RED/YEL=V; BLU/GRN=H
TESTED BY:M. Nolting

Freq (GHz)	Meter Reading [dBuV]	Detector	Antenna Factor [dB/m]	Gain/ Loss [dB]	DCCF (dB)	Field Strength [dBuV/m]	Peak Limit [dBuV/m]	Margin [dB]	Average Limit [dBuV/m]	Margin [dB]	Antenna Polarity
1.087	56.6	Pk	28.6	-40.0	0.0	45.2	74.00	-28.9	54.0	-8.9	H
1.449	54.5	Pk	28.4	-38.8	0.0	44.1	74.00	-29.9	54.0	-9.9	H
4.944	47.5	Pk	34.8	-32.9	0.0	49.4	74.00	-24.6	-	-	H
4.944	47.5	AvCalc	34.8	-32.9	-54.8	-5.4	-	-	54.0	-59.4	H
1.087	56.0	Pk	28.6	-40.0	0.0	44.6	74.00	-29.4	54.0	-9.4	V
1.448	52.4	Pk	28.4	-38.8	0.0	42.0	74.00	-32.0	54.0	-12.0	V
4.944	48.6	Pk	34.8	-32.9	0.0	50.5	74.00	-23.5	-	-	V
4.944	48.6	AvCalc	34.8	-32.9	-54.8	-4.3	-	-	54.0	-58.3	V
*PK = Peak											
AvCalc: Average Field Strength computed as follows for the above harmonics: PK + DCCF, where DCCF = 20*log(T_on/100ms)											

ECG – 1/4 WAVE MONOPOLE – LOW CHANNEL PLOT



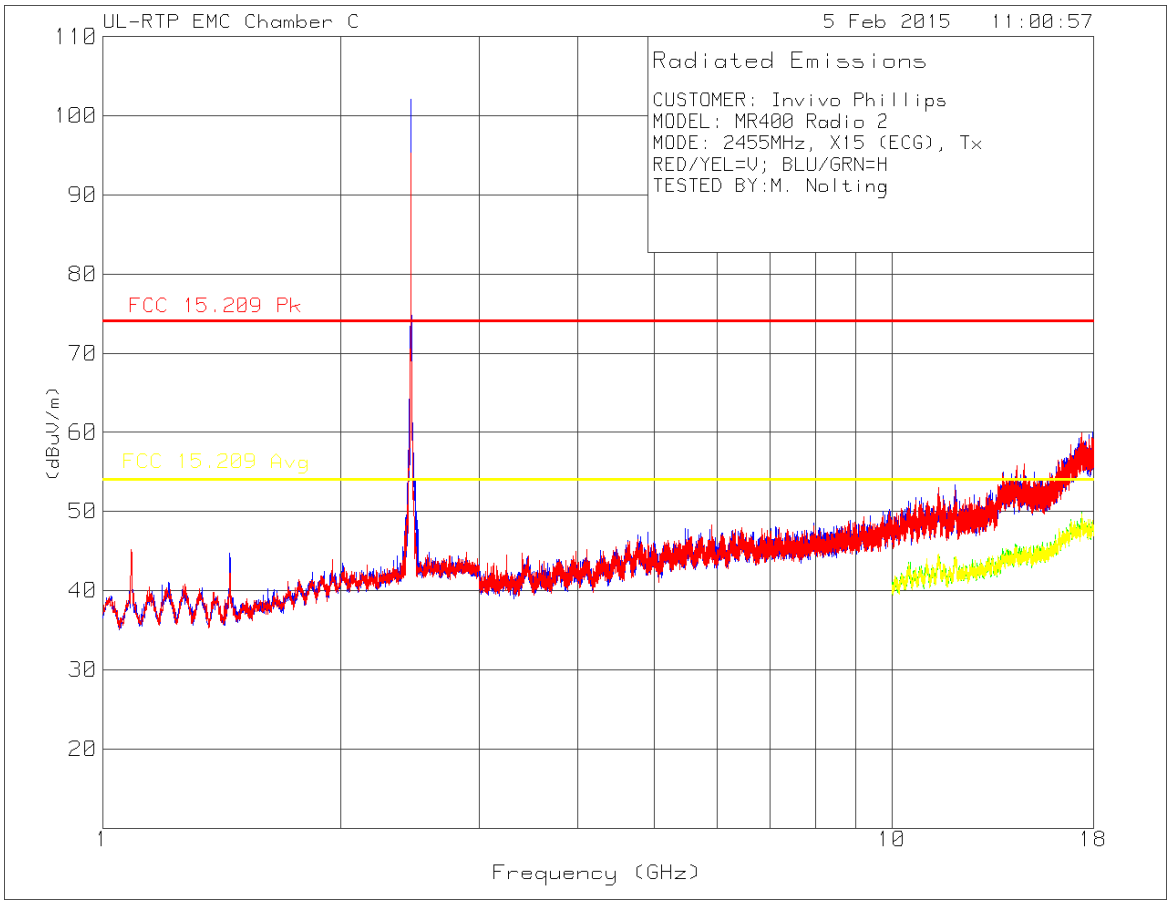
The yellow/green trace represents a reduced video bandwidth trace (10Hz) to show no emissions present.

ECG – 1/4 WAVE MONOPOLE – LOW CHANNEL DATA

CUSTOMER: Invivo Phillips
MODEL: MR400 Radio 2
MODE: 2435MHz, X15 (ECG), Tx
RED/YEL=V; BLU/GRN=H
TESTED BY:F. Lewis

Freq (GHz)	Meter Reading [dBuV]	Detector	Antenna Factor [dB/m]	Gain/ Loss [dB]	DCCF (dB)	Field Strength [dBuV/m]	Peak Limit [dBuV/m]	Margin [dB]	Average Limit [dBuV/m]	Margin [dB]	Antenna Polarity
1.084	56.7	Pk	28.6	-40.0	0.0	45.3	74.0	-28.7	54.0	-8.7	H
1.447	54.4	Pk	28.4	-38.8	0.0	44.0	74.0	-30.0	54.0	-10.0	H
2.741	50.0	Pk	32.7	-36.0	0.0	46.7	74.0	-27.3	54.0	-7.3	H
4.870	48.1	Pk	35.0	-32.8	0.0	50.3	74.0	-23.7	-	-	H
4.870	48.1	AvCalc	35.0	-32.8	-54.8	-4.5	-	-	54.0	-58.5	H
9.301	39.6	Pk	37.1	-27.7	0.0	49.0	74.0	-25.0	-	-	H
9.301	39.6	AvCalc	37.1	-27.7	-54.8	-5.8	-	-	54.0	-59.8	H
1.085	56.7	Pk	28.6	-40.0	0.0	45.3	74.0	-28.8	54.0	-8.8	V
4.870	48.9	Pk	35.0	-32.8	0.0	51.1	74.0	-22.9	-	-	V
4.870	48.9	AvCalc	35.0	-32.8	-54.8	-3.7	-	-	54.0	-57.7	V
11.479	37.9	Pk	39.2	-24.3	0.0	52.8	74.0	-21.2	-	-	V
11.479	37.9	AvCalc	39.2	-24.3	-54.8	-2.0	-	-	54.0	-56.0	V
*PK = Peak											
AvCalc: Average Field Strength computed as follows for the above harmonics: PK + DCCF, where DCCF = 20*log(T_on/100ms)											

ECG – 1/4 WAVE MONOPOLE – MID CHANNEL PLOT



The yellow/green trace represents a reduced video bandwidth trace (10Hz) to show no emissions present.

ECG – 1/4 WAVE MONOPOLE – MID CHANNEL DATA

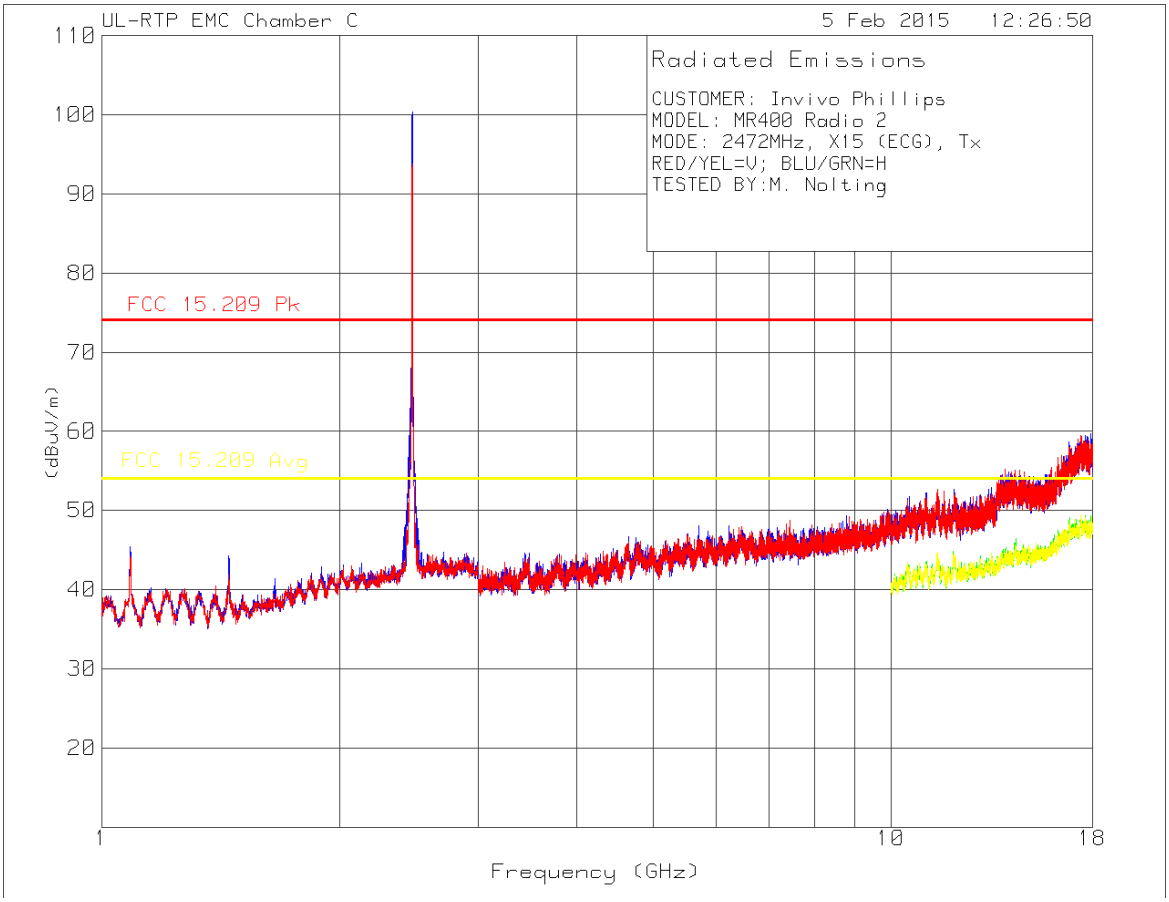
CUSTOMER: Invivo Phillips
MODEL: MR400 Radio 2
MODE: 2455MHz, X15 (ECG), Tx
RED/YEL=V; BLU/GRN=H
TESTED BY:M. Nolting

Freq (GHz)	Meter Reading [dBuV]	Detector	Antenna Factor [dB/m]	Gain/ Loss [dB]	DCCF (dB)	Field Strength [dBuV/m]	Peak Limit [dBuV/m]	Margin [dB]	Average Limit [dBuV/m]	Margin [dB]	Antenna Polarity
1.087	56.1	Pk	28.6	-40.0	0.0	44.7	74.0	-29.3	54.0	-9.3	H
1.448	55.2	Pk	28.4	-38.8	0.0	44.8	74.0	-29.2	54.0	-9.2	H
4.910	48.0	Pk	34.9	-33.2	0.0	49.7	74.0	-24.3	-	-	H
4.910	48.0	AvCalc	34.9	-33.2	-54.8	-5.1	-	-	54.0	-59.1	H
1.087	56.6	Pk	28.6	-40.0	0.0	45.2	74.0	-28.8	54.0	-8.8	V
1.449	52.6	Pk	28.4	-38.8	0.0	42.2	74.0	-31.9	54.0	-11.9	V
4.910	48.2	Pk	34.9	-33.2	0.0	49.9	74.0	-24.1	-	-	V
4.910	48.2	AvCalc	34.9	-33.2	-54.8	-4.8	-	-	54.0	-58.8	V
11.461	38.1	Pk	39.1	-24.0	0.0	53.2	74.0	-20.8	-	-	V
11.461	38.1	AvCalc	39.1	-24.0	-54.8	-1.6	-	-	54.0	-55.6	V

*PK = Peak

AvCalc: Average Field Strength computed as follows for the above harmonics: PK + DCCF, where DCCF = 20*log(T_on/100ms)

ECG – 1/4 WAVE MONOPOLE – HIGH CHANNEL PLOT



The yellow/green trace represents a reduced video bandwidth trace (10Hz) to show no emissions present.

ECG – 1/4 WAVE MONOPOLE – HIGH CHANNEL DATA

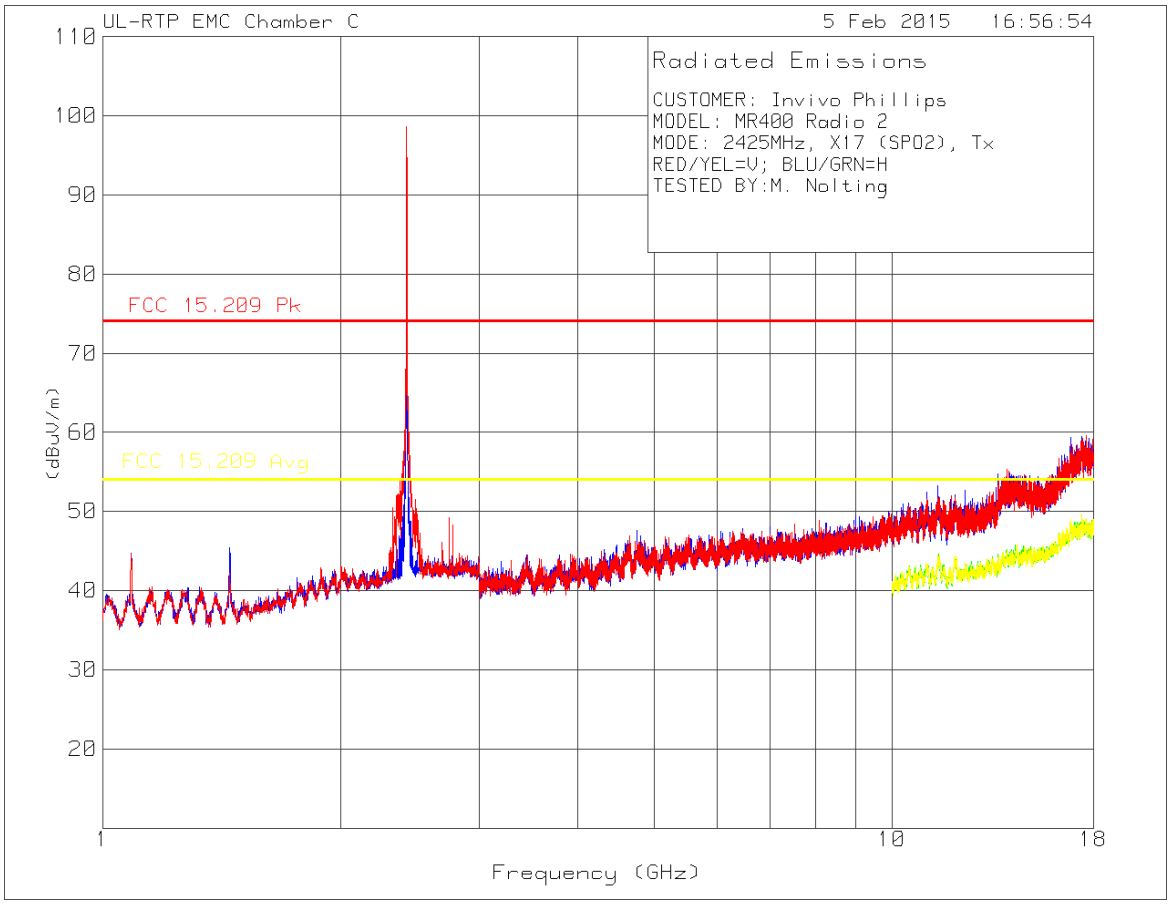
CUSTOMER: Invivo Phillips
MODEL: MR400 Radio 2
MODE: 2472MHz, X15 (ECG), Tx
RED/YEL=V; BLU/GRN=H
TESTED BY:M. Nolting

Freq (GHz)	Meter Reading [dBuV]	Detector	Antenna Factor [dB/m]	Gain/ Loss [dB]	DCCF (dB)	Field Strength [dBuV/m]	Peak Limit [dBuV/m]	Margin [dB]	Average Limit [dBuV/m]	Margin [dB]	Antenna Polarity
1.087	56.9	Pk	28.6	-40.0	0.0	45.5	74.0	-28.6	54.0	-8.6	H
1.448	54.7	Pk	28.4	-38.8	0.0	44.3	74.0	-29.7	54.0	-9.7	H
4.944	45.8	Pk	34.8	-32.9	0.0	47.7	74.0	-26.3	-	-	H
4.944	45.8	AvCalc	34.8	-32.9	-54.8	-7.0	-	-	54.0	-61.0	H
1.086	55.7	Pk	28.6	-40.0	0.0	44.3	74.0	-29.7	54.0	-9.7	V
1.448	52.2	Pk	28.4	-38.8	0.0	41.8	74.0	-32.2	54.0	-12.2	V
4.944	47.5	Pk	34.8	-32.9	0.0	49.4	74.0	-24.6	-	-	V
4.944	47.5	AvCalc	34.8	-32.9	-54.8	-5.4	-	-	54.0	-59.4	V
7.416	38.8	Pk	36.2	-28.6	0.0	46.4	74.0	-27.6	-	-	V
7.416	38.8	AvCalc	36.2	-28.6	-54.8	-8.4	-	-	54.0	-62.4	V
11.430	38.6	Pk	39.1	-24.1	0.0	53.6	74.0	-20.4	-	-	V
11.430	38.6	AvCalc	39.1	-24.1	-54.8	-1.2	-	-	54.0	-55.2	V

*PK = Peak

AvCalc: Average Field Strength computed as follows for the above harmonics: PK + DCCF, where DCCF = 20*log(T_on/100ms)

SpO2 – ½ WAVE DIPOLE – LOW CHANNEL PLOT



The yellow/green trace represents a reduced video bandwidth trace (10Hz) to show no emissions present.

SpO2 – ½ WAVE DIPOLE – LOW CHANNEL DATA

CUSTOMER: Invivo Phillips
MODEL: MR400 Radio 2
MODE: 2425MHz, X17 (SPO2), Tx
RED/YEL=V; BLU/GRN=H
TESTED BY:M. Nolting

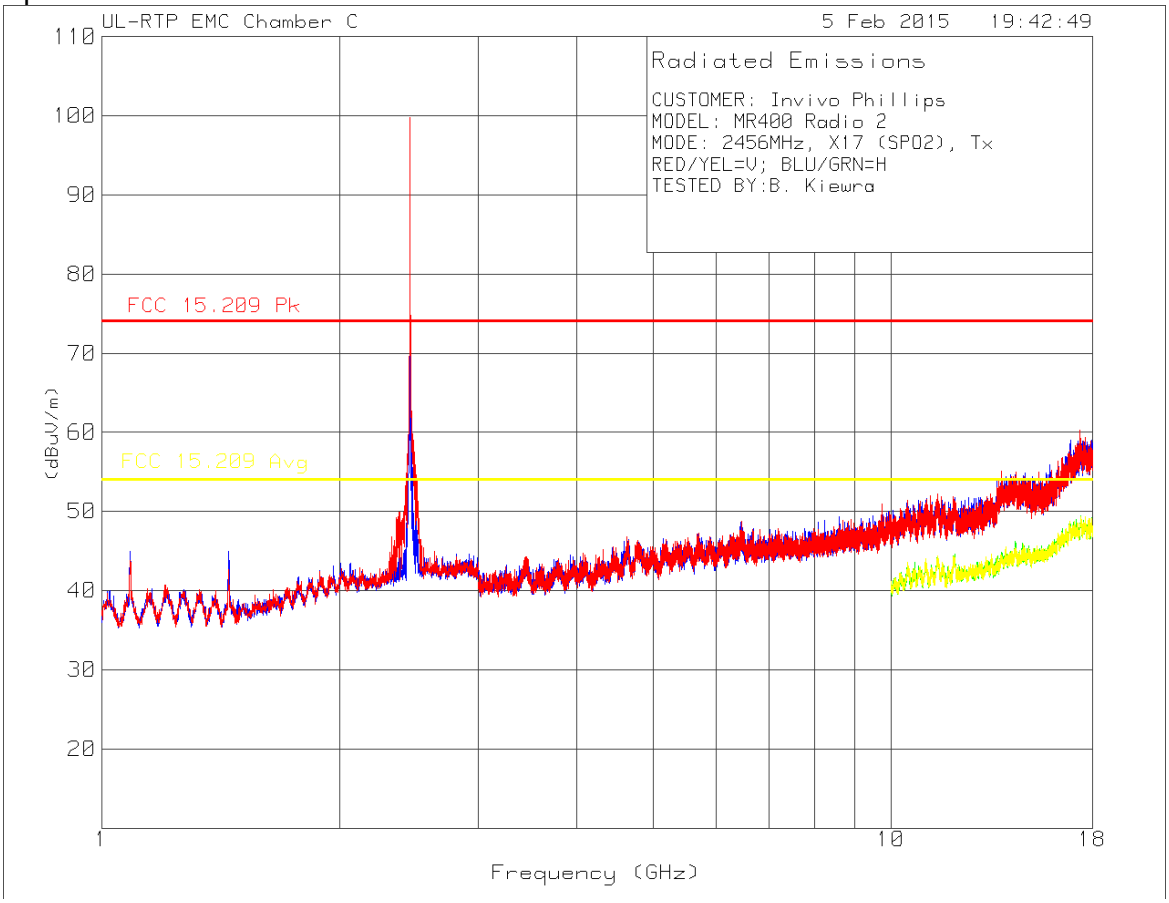
Freq (GHz)	Meter Reading [dBuV]	Detector	Antenna Factor [dB/m]	Gain/ Loss [dB]	DCCF (dB)	Field Strength [dBuV/m]	Peak Limit [dBuV/m]	Margin [dB]	Average Limit [dBuV/m]	Margin [dB]	Antenna Polarity	Comment #
1.086	56.2	Pk	28.6	-40.0	0.0	44.8	74.0	-29.3	54.0	-9.3	H	
1.449	55.8	Pk	28.4	-38.8	0.0	45.4	74.0	-28.6	54.0	-8.6	H	
2.775	53.0	Pk	32.7	-36.0	0.0	49.7	74.0	-24.3	-	-	H	1
2.775	53.0	AvCalc	32.7	-36.0	-54.8	-5.1	-	-	54.0	-59.1	H	1
4.850	46.1	Pk	35.1	-32.8	0.0	48.4	74.0	-25.6	-	-	H	
4.850	46.1	AvCalc	35.1	-32.8	-54.8	-6.4	-	-	54.0	-60.4	H	
11.434	37.2	Pk	39.1	-24.0	0.0	52.3	74.0	-21.7	-	-	H	
11.434	37.2	AvCalc	39.1	-24.0	-54.8	-2.5	-	-	54.0	-56.5	H	
1.086	56.0	Pk	28.6	-40.0	0.0	44.6	74.0	-29.4	54.0	-9.4	V	
1.448	52.6	Pk	28.4	-38.8	0.0	42.2	74.0	-31.8	54.0	-11.8	V	
2.745	54.9	Pk	32.7	-36.0	0.0	51.6	74.0	-22.4	-	-	V	1
2.745	54.9	AvCalc	32.7	-36.0	-54.8	-3.2	-	-	54.0	-57.2	V	1
2.775	55.0	Pk	32.7	-36.0	0.0	51.7	74.0	-22.3	-	-	V	1
2.775	55.0	AvCalc	32.7	-36.0	-54.8	-3.1	-	-	54.0	-57.1	V	1
4.850	47.0	Pk	35.1	-32.8	0.0	49.3	74.0	-24.7	-	-	V	
4.850	47.0	AvCalc	35.1	-32.8	-54.8	-5.5	-	-	54.0	-59.5	V	

*PK = Peak

AvCalc: Average Field Strength computed as follows for the above harmonics: PK + DCCF, where DCCF = 20*log(T_on/100ms)

1 - pulsed signal at same rate as fundamental

SpO2 – ½ WAVE DIPOLE – MID CHANNEL PLOT



The yellow/green trace represents a reduced video bandwidth trace (10Hz) to show no emissions present.

SpO2 – ½ WAVE DIPOLE – MID CHANNEL DATA

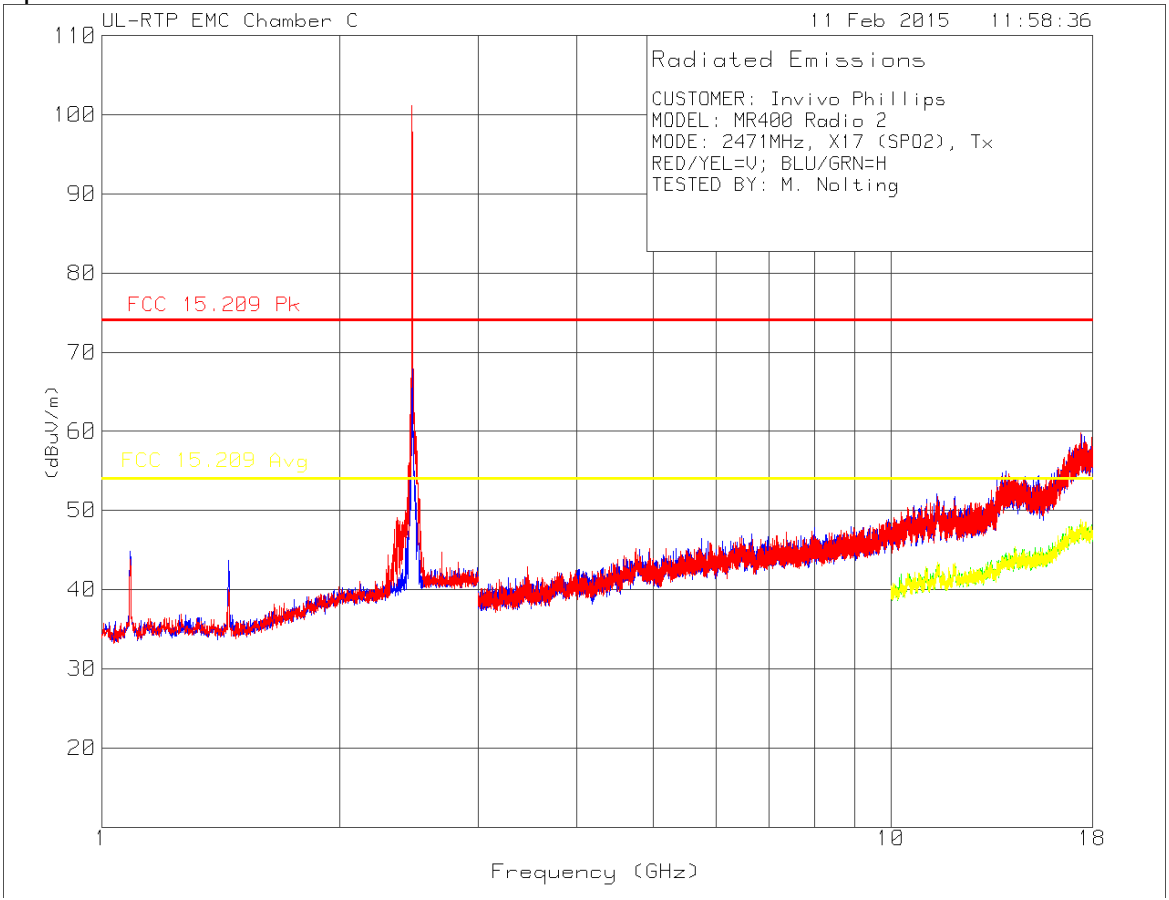
CUSTOMER: Invivo Phillips
MODEL: MR400 Radio 2
MODE: 2456MHz, X17 (SPO2), Tx
RED/YEL=V; BLU/GRN=H
TESTED BY:B. Kiewra

Freq (GHz)	Meter Reading [dBuV]	Detector	Antenna Factor [dB/m]	Gain/ Loss [dB]	DCCF (dB)	Field Strength [dBuV/m]	Peak Limit [dBuV/m]	Margin [dB]	Average Limit [dBuV/m]	Margin [dB]	Antenna Polarity
1.086	56.3	Pk	28.6	-40.0	0.0	44.9	74.0	-29.1	54.0	-9.1	H
1.448	55.4	Pk	28.4	-38.8	0.0	45.0	74.0	-29.0	54.0	-9.0	H
4.912	45.9	Pk	34.9	-33.2	0.0	47.6	74.0	-26.4	--	--	H
4.912	45.9	AvCalc	34.9	-33.2	-54.8	-7.2	--	--	54.0	-61.2	H
1.087	55.2	Pk	28.6	-40.0	0.0	43.8	74.0	-30.2	54.0	-10.2	V
1.448	53.1	Pk	28.4	-38.8	0.0	42.7	74.0	-31.3	54.0	-11.3	V
4.912	47.7	Pk	34.9	-33.2	0.0	49.4	74.0	-24.6	--	--	V
4.912	47.7	AvCalc	34.9	-33.2	-54.8	-5.4	--	--	54.0	-59.4	V
11.202	38.5	Pk	38.7	-26.0	0.0	51.2	74.0	-22.9	--	--	V
11.202	38.5	AvCalc	38.7	-26.0	-54.8	-3.6	--	--	54.0	-57.6	V

*PK = Peak

AvCalc: Average Field Strength computed as follows for the above harmonics: PK + DCCF, where DCCF = 20*log(T_on/100ms)

SpO2 – ½ WAVE DIPOLE – HIGH CHANNEL PLOT



The yellow/green trace represents a reduced video bandwidth trace (10Hz) to show no emissions present.

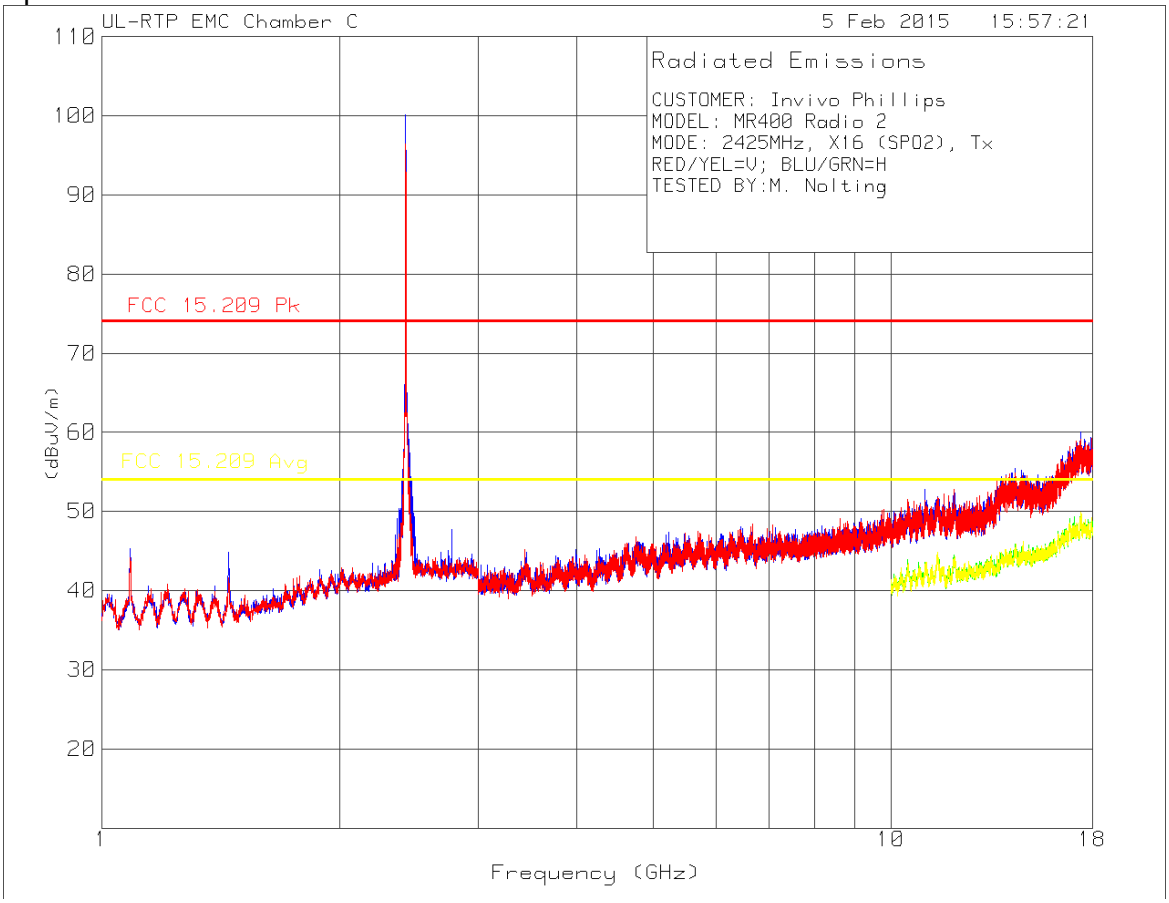
SpO2 – ½ WAVE DIPOLE – HIGH CHANNEL DATA

CUSTOMER: Invivo Phillips
MODEL: MR400 Radio 2
MODE: 2471MHz, X17 (SPO2), Tx
RED/YEL=V; BLU/GRN=H
TESTED BY: M. Nolting

Freq (GHz)	Meter Reading [dBuV]	Detector	Antenna Factor [dB/m]	Gain/ Loss [dB]	DCCF (dB)	Field Strength [dBuV/m]	Peak Limit [dBuV/m]	Margin [dB]	Average Limit [dBuV/m]	Margin [dB]	Antenna Polarity	Comment #
1.087	56.2	Pk	28.6	-40.0	0.0	44.8	74.0	-29.2	54.0	-9.2	H	
1.448	54.1	Pk	28.4	-38.8	0.0	43.7	74.0	-30.3	54.0	-10.3	H	
4.942	47.7	Pk	34.8	-32.9	0.0	49.6	74.0	-24.4	-	-	H	
4.942	47.7	AvCalc	34.8	-32.9	-54.8	-5.1	-	-	54.0	-59.1	H	
2.375	54.6	Pk	32.2	-36.7	0.0	50.1	74.0	-23.9	-	-	V	1
2.375	54.6	AvCalc	32.2	-36.7	-54.8	-4.7	-	-	54.0	-58.7	V	1
4.942	46.8	Pk	34.8	-32.9	0.0	48.7	74.0	-25.3	-	-	V	
4.942	46.8	AvCalc	34.8	-32.9	-54.8	-6.1	-	-	54.0	-60.1	V	
17.405	37.2	Pk	42.1	-19.7	0.0	59.6	74.0	-14.5	-	-	V	
17.405	37.2	AvCalc	42.1	-19.7	-54.8	4.8	-	-	54.0	-49.2	V	

*PK = Peak
AvCalc: Average Field Strength computed as follows for the above harmonics: PK + DCCF, where DCCF = 20*log(T_on/100ms)
1 - pulsed signal at same rate as fundamental

SpO2 – 1/4 WAVE MONOPOLE – LOW CHANNEL PLOT



The yellow/green trace represents a reduced video bandwidth trace (10Hz) to show no emissions present.

SpO2 – 1/4 WAVE MONOPOLE – LOW CHANNEL DATA

CUSTOMER: Invivo Phillips
MODEL: MR400 Radio 2
MODE: 2425MHz, X16 (SPO2), Tx
RED/YEL=V; BLU/GRN=H
TESTED BY:M. Nolting

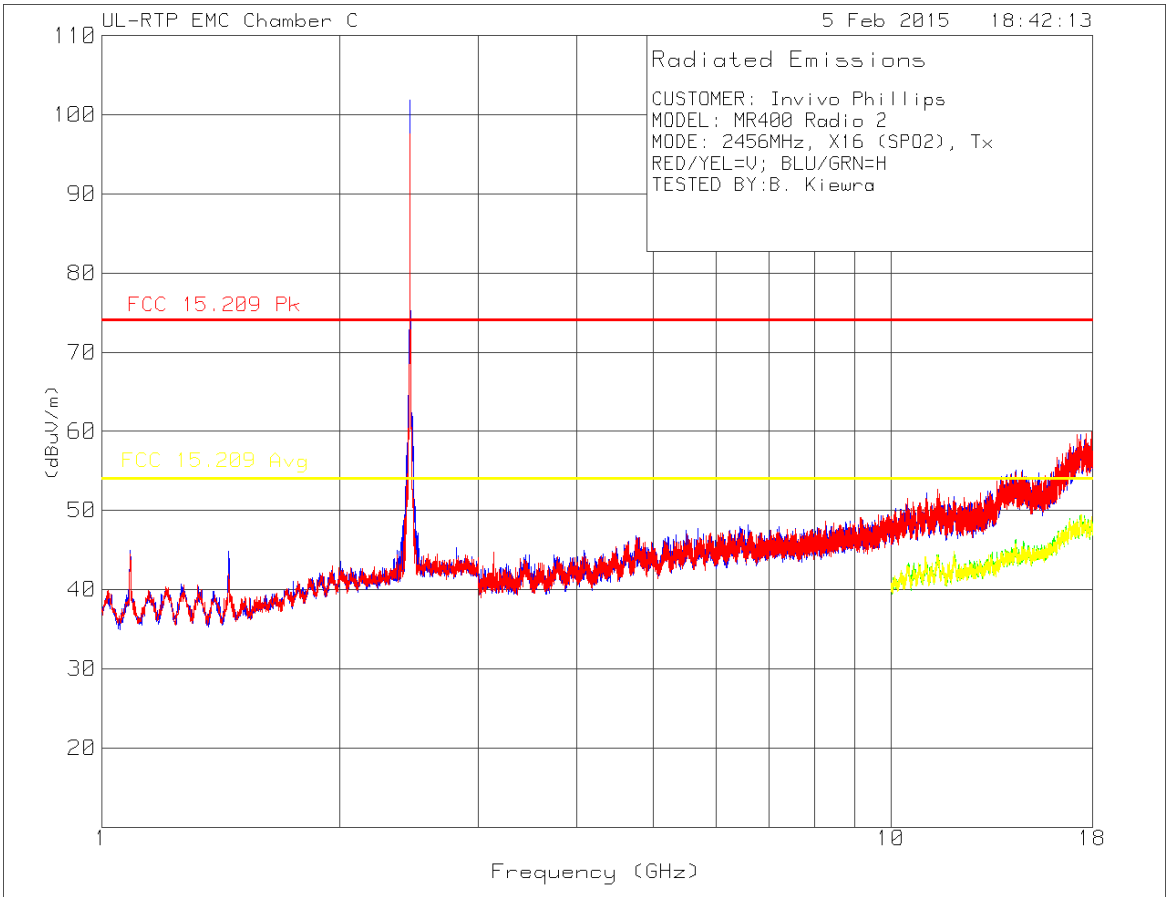
Freq (GHz)	Meter Reading [dBuV]	Detector	Antenna Factor [dB/m]	Gain/ Loss [dB]	DCCF (dB)	Field Strength [dBuV/m]	Peak Limit [dBuV/m]	Margin [dB]	Average Limit [dBuV/m]	Margin [dB]	Antenna Polarity	Comment #
1.086	56.7	Pk	28.6	-40.0	0.0	45.3	74.0	-28.7	54.0	-8.7	H	
1.448	55.2	Pk	28.4	-38.8	0.0	44.8	74.0	-29.2	54.0	-9.2	H	
2.775	52.5	Pk	32.7	-36.0	0.0	49.2	74.0	-24.8	-	-	H	1
2.775	52.5	AvCalc	32.7	-36.0	-54.8	-5.6	-	-	54.0	-59.6	H	1
4.850	47.8	Pk	35.1	-32.8	0.0	50.1	74.0	-23.9	-	-	H	
4.850	47.8	AvCalc	35.1	-32.8	-54.8	-4.7	-	-	54.0	-58.7	H	
11.046	37.2	Pk	38.6	-24.2	0.0	51.6	74.0	-22.4	-	-	H	
11.046	37.2	AvCalc	38.6	-24.2	-54.8	-3.1	-	-	54.0	-57.1	H	
1.087	55.5	Pk	28.6	-40.0	0.0	44.1	74.0	-29.9	54.0	-9.9	V	
1.448	52.0	Pk	28.4	-38.8	0.0	41.6	74.0	-32.4	54.0	-12.4	V	
4.850	48.3	Pk	35.1	-32.8	0.0	50.6	74.0	-23.4	-	-	V	
4.850	48.3	AvCalc	35.1	-32.8	-54.8	-4.2	-	-	54.0	-58.2	V	

*PK = Peak

AvCalc: Average Field Strength computed as follows for the above harmonics: PK + DCCF, where DCCF = 20*log(T_on/100ms)

1 - pulsed signal at same rate as fundamental

SpO2 – 1/4 WAVE MONOPOLE – MID CHANNEL PLOT



The yellow/green trace represents a reduced video bandwidth trace (10Hz) to show no emissions present.

SpO2 – 1/4 WAVE MONOPOLE – MID CHANNEL DATA

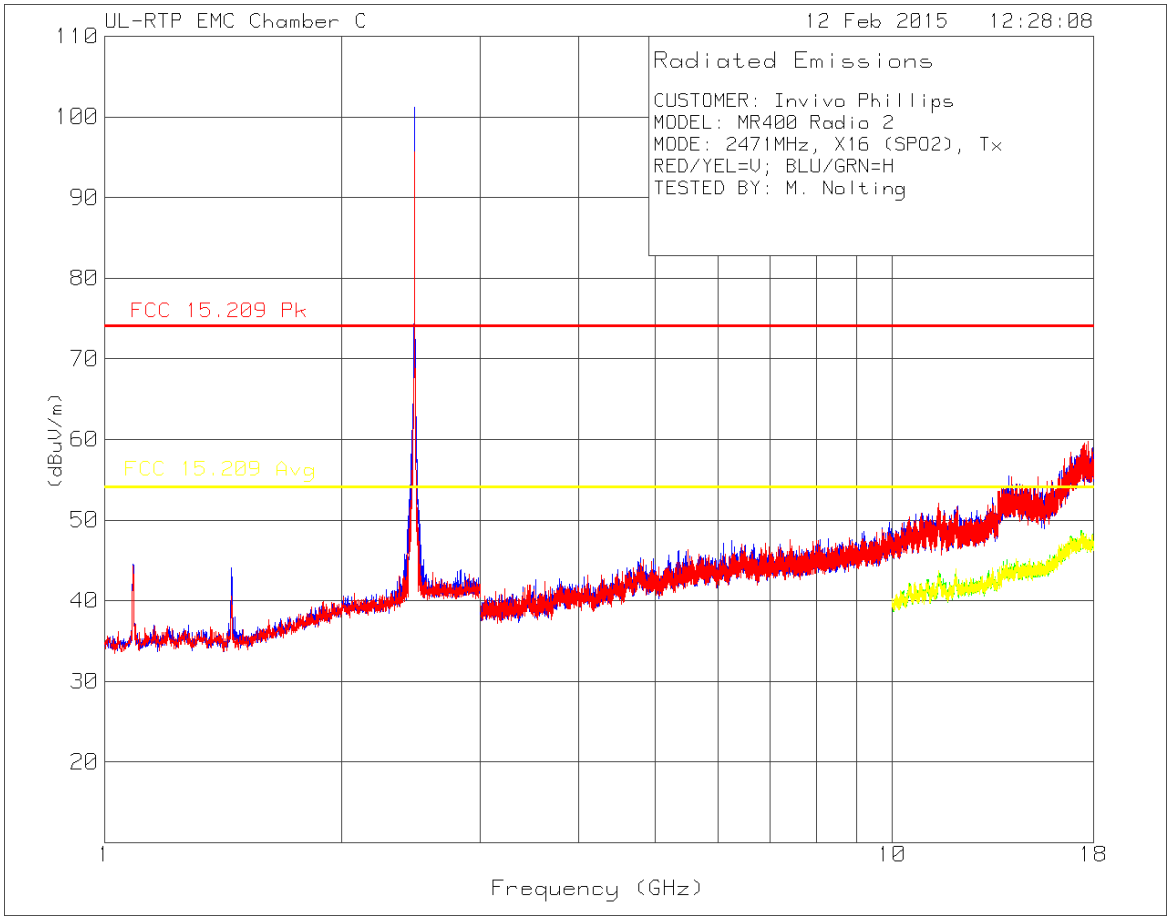
CUSTOMER: Invivo Phillips
MODEL: MR400 Radio 2
MODE: 2456MHz, X16 (SPO2), Tx
RED/YEL=V; BLU/GRN=H
TESTED BY:B. Kiewra

Freq (GHz)	Meter Reading [dBuV]	Detector	Antenna Factor [dB/m]	Gain/ Loss [dB]	DCCF (dB)	Field Strength [dBuV/m]	Peak Limit [dBuV/m]	Margin [dB]	Average Limit [dBuV/m]	Margin [dB]	Antenna Polarity
1.085	57.8	Pk	28.6	-40.0	0.0	46.4	74.0	-27.6	--	--	H
1.085	57.8	AvCalc	28.6	-40.0	-54.8	-8.4	--	--	54.0	-62.4	H
1.448	55.3	Pk	28.4	-38.8	0.0	44.9	74.0	-29.1	54.0	-9.1	H
4.912	46.7	Pk	34.9	-33.2	0.0	48.4	74.0	-25.6	--	--	H
4.912	46.7	AvCalc	34.9	-33.2	-54.8	-6.4	--	--	54.0	-60.4	H
1.085	55.1	Pk	28.6	-40.0	0.0	43.7	74.0	-30.3	54.0	-10.3	V
1.449	52.4	Pk	28.4	-38.8	0.0	42.0	74.0	-32.0	54.0	-12.0	V
4.912	46.7	Pk	34.9	-33.2	0.0	48.4	74.0	-25.6	--	--	V
4.912	46.7	AvCalc	34.9	-33.2	-54.8	-6.4	--	--	54.0	-60.4	V
11.445	37.8	Pk	39.1	-23.9	0.0	53.0	74.0	-21.0	--	--	V
11.445	37.8	AvCalc	39.1	-23.9	-54.8	-1.8	--	--	54.0	-55.8	V

*PK = Peak

AvCalc: Average Field Strength computed as follows for the above harmonics: PK + DCCF, where DCCF = 20*log(T_on/100ms)

SpO2 – 1/4 WAVE MONOPOLE – HIGH CHANNEL PLOT



The yellow/green trace represents a reduced video bandwidth trace (10Hz) to show no emissions present.

SpO2 – 1/4 WAVE MONOPOLE – HIGH CHANNEL DATA

CUSTOMER: Invivo Phillips
MODEL: MR400 Radio 2
MODE: 2471MHz, X16 (SPO2), Tx
RED/YEL=V; BLU/GRN=H
TESTED BY: M. Nolting

Freq (GHz)	Meter Reading [dBuV]	Detector	Antenna Factor [dB/m]	Gain/ Loss [dB]	DCCF (dB)	Field Strength [dBuV/m]	Peak Limit [dBuV/m]	Margin [dB]	Average Limit [dBuV/m]	Margin [dB]	Antenna Polarity
1.087	56.0	Pk	28.6	-40.0	0.0	44.6	74.0	-29.4	54.0	-9.4	H
1.448	54.4	Pk	28.4	-38.8	0.0	44.0	74.0	-30.0	54.0	-10.0	H
4.942	46.9	Pk	34.8	-32.9	0.0	48.8	74.0	-25.2	-	-	H
4.942	46.9	AvCalc	34.8	-32.9	-54.8	-6.0	-	-	54.0	-60.0	H
1.086	55.7	Pk	28.6	-40.0	0.0	44.3	74.0	-29.7	54.0	-9.7	V
4.942	46.3	Pk	34.8	-32.9	0.0	48.2	74.0	-25.8	-	-	V
4.942	46.3	AvCalc	34.8	-32.9	-54.8	-6.6	-	-	54.0	-60.6	V
14.181	37.2	Pk	39.6	-22.9	0.0	53.9	74.0	-20.1	-	-	V
14.181	37.2	AvCalc	39.6	-22.9	-54.8	-0.9	-	-	54.0	-54.9	V

*PK = Peak

AvCalc: Average Field Strength computed as follows for the above harmonics: PK + DCCF, where DCCF = 20*log(T_on/100ms)

7.3.4. WORST-CASE ABOVE 1 GHz (18-26 GHz)

All testing was performed independently on the ECG ½ wave dipole and ¼ wave monopole and SpO2 ½ wave dipole and ¼ wave monopole. The testing was performed one radio type at a time (ECG or SpO2) due to limitations of the manufacturer's test software.

The below calculations take the worst-case 18-26 GHz Spurious emissions for all ECG measurements and SpO2 measurements and combines those field strengths to show that the combined ECG and SpO2 Spurious Emissions field strengths meet FCC Part 15.249. Please note, although the ECG and SpO2 signals can be functional at the same time, they do not use the same channel frequencies (separated by a minimum of 1 MHz).

The Spurious Emissions field strength of the SpO2 and ECG radios were combined by converting the Electric Field Strength to Power Density, adding the ECG/SpO2 Power values together and converting back to Electric Field Strength:

$Pd = E^2$ (V/m) / 377Ω

Per the following plots, the worst-case fundamental field strengths are:

ECG = 48.5 dBuV/m PK, 47.6 dBuV/m AV
SpO2 = 48.2 dBuV/m PK, 46.9 dBuV/m AV

Combining the Field Strengths -

PEAK
ECG = 48.5 dBuV/m => 266.0725 uV/m or 0.00026607 V/m = 0.000000188 mW/m2
SpO2 = 48.2 dBuV/m => 257.0396 uV/m or 0.00025704 V/m = 0.000000175 mW/m2

Combined = 0.000000363 mW/m2 = 0.000370061 V/m or 370.061 uV/m => 51.37 dBuV/m

Combined PK = 51.37 dBuV/m

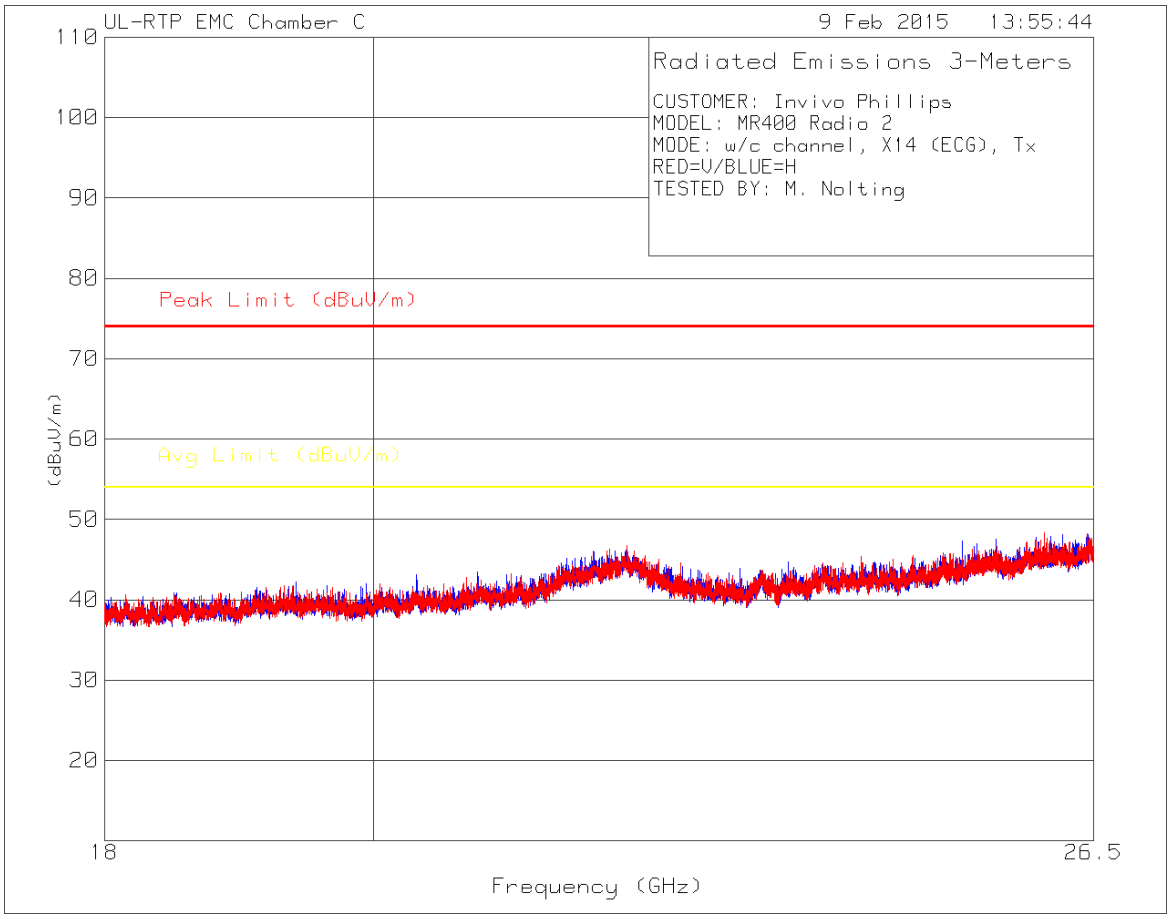
AVG
ECG = 47.6 dBuV/m => 239.8832 uV/m or 0.000239883 V/m = 0.000000153 mW/m2
SpO2 = 46.9 dBuV/m => 221.3094 uV/m or 0.000221309 V/m = 0.000000130 mW/m2

Combined = 0.000000283 mW/m2 = 0.000326587 V/m or 326.5867 uV/m => 50.28 dBuV/m

Combined AV = 50.28 dBuV/m

WORST-CASE SPURIOUS EMISSIONS 18 TO 26 GHz

ECG – ½ WAVE DIPOLE - PLOT



ECG – ½ WAVE DIPOLE - DATA

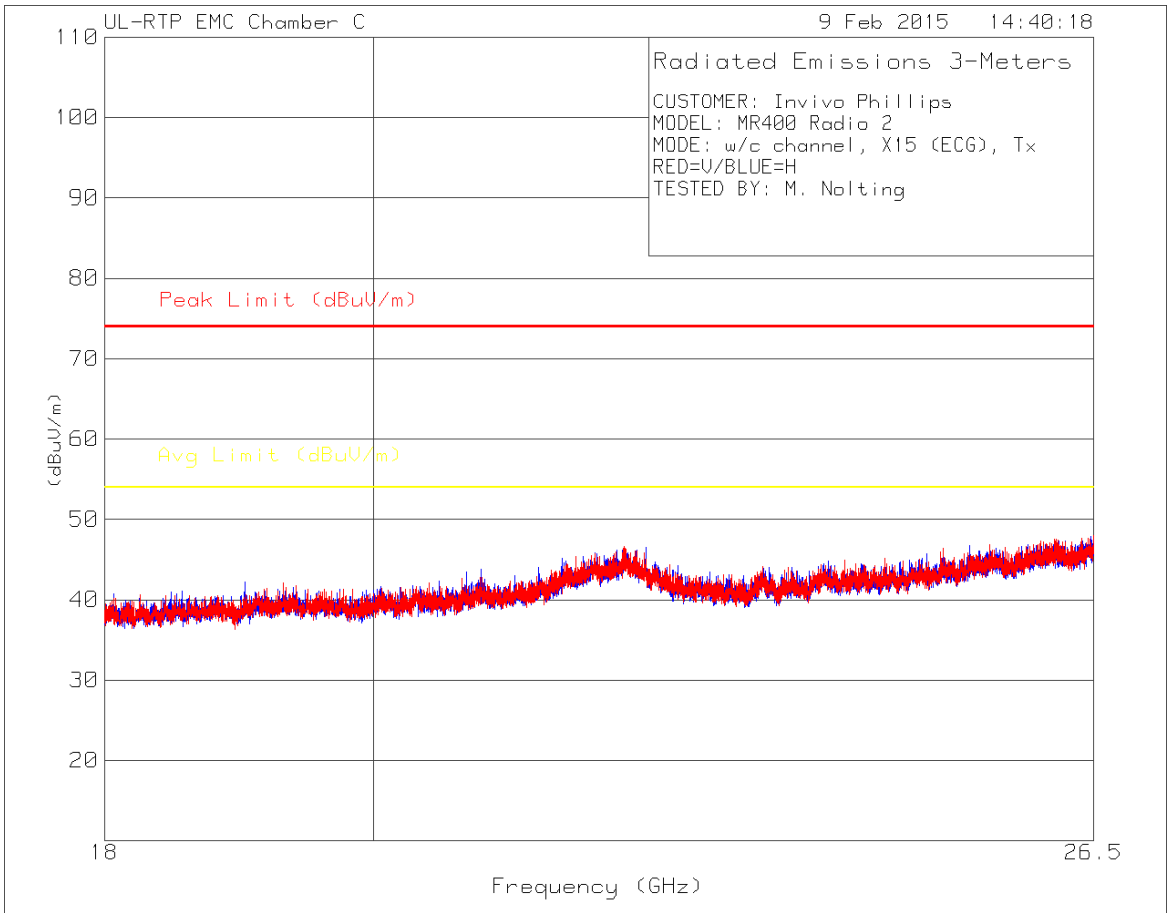
CUSTOMER: Invivo Phillips
MODEL: MR400 Radio 2
MODE: w/c channel, X14 (ECG), Tx
RED=V/BLUE=H
TESTED BY: M. Nolting

Freq (GHz)	Meter Reading [dBuV]	Detector	Antenna Factor [dB/m]	Gain/ Loss [dB]	DCCF (dB)	Field Strength [dBuV/m]	Peak Limit [dBuV/m]	Margin [dB]	Average Limit [dBuV/m]	Margin [dB]	Antenna Polarity
20.335	42.5	Pk	33.0	-32.4	0.0	43.1	74.0	-30.8	54.0	-10.8	H
20.825	42.6	Pk	33.3	-32.5	0.0	43.4	74.0	-30.5	54.0	-10.5	H
25.177	42.4	Pk	33.8	-28.8	0.0	47.4	74.0	-26.6	54.0	-6.6	H
25.511	42.5	Pk	33.8	-28.7	0.0	47.6	74.0	-26.4	54.0	-6.4	H
22.078	41.8	Pk	36.8	-31.9	0.0	46.7	74.0	-27.2	53.97	-7.2	V
25.993	42.8	Pk	34.0	-28.3	0.0	48.5	74.0	-5.5	-	-	V
25.993	42.8	AvCalc	34.0	-28.3	-54.8	-6.3	-	-	54.0	-60.3	V

*PK = Peak

AvCalc: Average Field Strength computed as follows for the above harmonics: PK + DCCF, where DCCF = 20*log(T_on/100ms)

ECG –1/4 WAVE MONOPOLE - PLOT

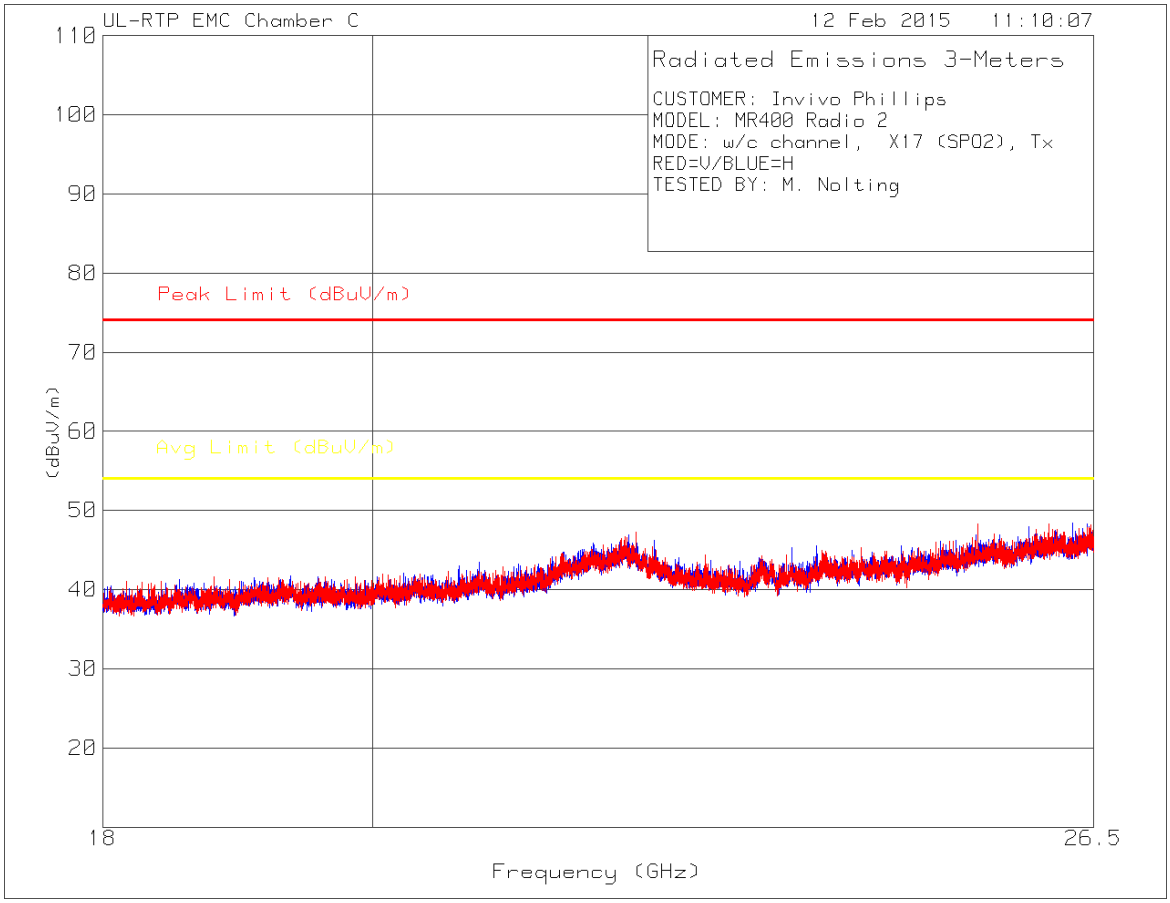


ECG –1/4 WAVE MONOPOLE - DATA

CUSTOMER: Invivo Phillips
MODEL: MR400 Radio 2
MODE: w/c channel, X15 (ECG), Tx
RED=V/BLUE=H
TESTED BY: M. Nolting

Freq (GHz)	Meter Reading [dBuV]	Detector	Antenna Factor [dB/m]	Gain/ Loss [dB]	DCCF (dB)	Field Strength [dBuV/m]	Peak Limit [dBuV/m]	Margin [dB]	Average Limit [dBuV/m]	Margin [dB]	Antenna Polarity
20.860	42.7	Pk	33.4	-32.3	0.0	43.8	74.0	-30.2	54.0	-10.2	H
22.249	42.5	Pk	36.0	-31.9	0.0	46.6	74.0	-27.4	54.0	-7.4	H
25.251	41.6	Pk	33.8	-28.7	0.0	46.7	74.0	-27.2	54.0	-7.2	H
22.058	41.4	Pk	36.9	-31.7	0.0	46.6	74.0	-27.4	54.0	-7.4	V
24.990	41.6	Pk	33.9	-29.1	0.0	46.4	74.0	-27.6	54.0	-7.6	V
25.449	41.8	Pk	33.9	-28.8	0.0	46.9	74.0	-27.1	54.0	-7.1	V
*PK = Peak											
AvCalc: Average Field Strength computed as follows for the above harmonics: PK + DCCF, where DCCF = 20*log(T_on/100ms)											

SpO2 – ½ WAVE DIPOLE - PLOT



SpO2 – ½ WAVE DIPOLE - DATA

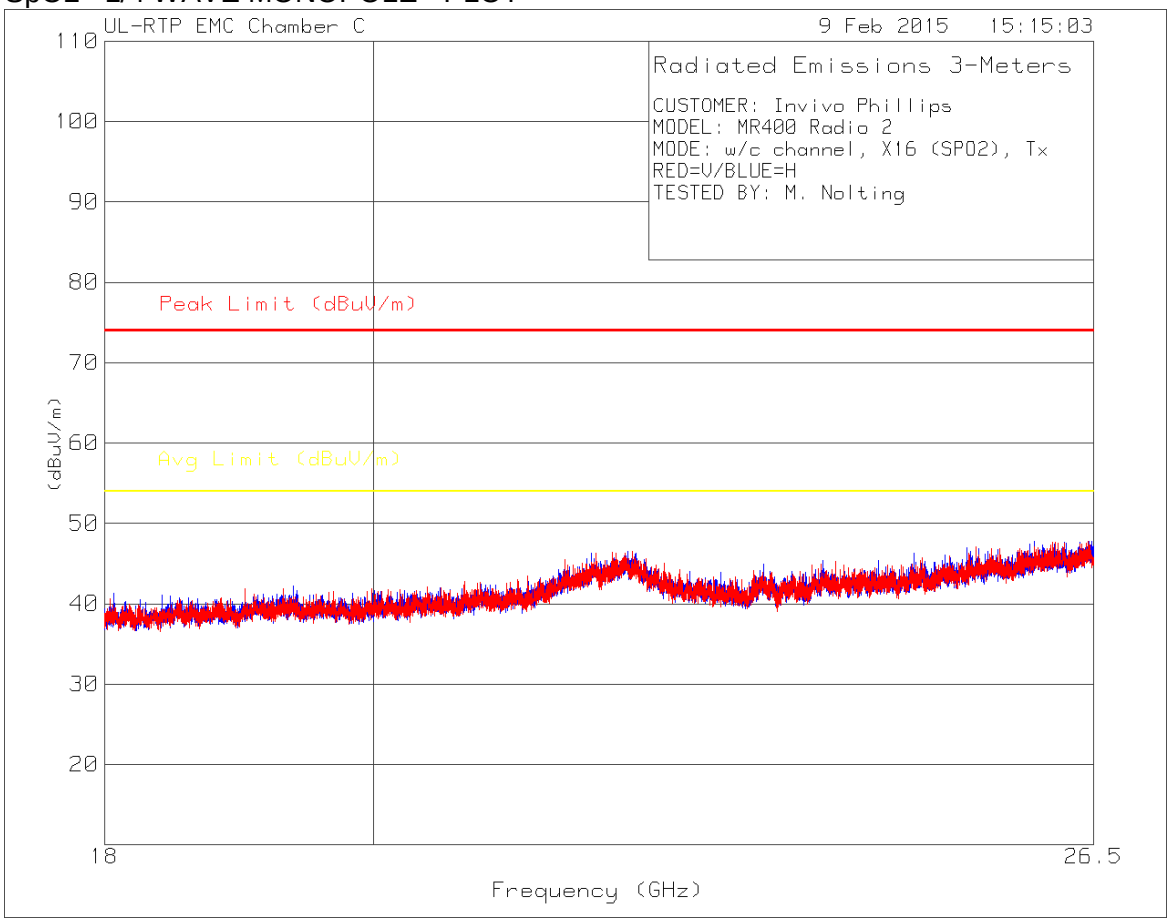
CUSTOMER: Invivo Phillips
MODEL: MR400 Radio 2
MODE: w/c channel, X17 (SPO2), Tx
RED=V/BLUE=H
TESTED BY: M. Nolting

Freq (GHz)	Meter Reading [dBuV]	Detector	Antenna Factor [dB/m]	Gain/ Loss [dB]	DCCF (dB)	Field Strength [dBuV/m]	Peak Limit [dBuV/m]	Margin [dB]	Average Limit [dBuV/m]	Margin [dB]	Antenna Polarity
22.105	42.4	Pk	36.8	-32.3	0.0	46.9	74.0	-27.1	54.0	-7.1	H
22.327	42.2	Pk	35.6	-31.5	0.0	46.3	74.0	-27.7	54.0	-7.7	H
26.282	42.2	Pk	34.2	-28.2	0.0	48.2	74.0	-25.8	-	-	H
26.282	42.2	AvCalc	34.2	-28.2	-54.8	-6.6	-	-	54.0	-60.6	H
25.326	42.2	Pk	33.9	-28.8	0.0	47.3	74.0	-26.7	-	-	V
25.326	42.2	AvCalc	33.9	-28.8	-54.8	-7.5	-	-	54.0	-61.5	V
26.043	42.5	Pk	34.0	-28.4	0.0	48.1	74.0	-25.8	-	-	V
26.043	42.5	AvCalc	34.0	-28.4	-54.8	-6.6	-	-	54.0	-60.6	V
22.163	42.3	Pk	36.4	-31.9	0.0	46.8	74.0	-27.2	-	-	V
22.163	42.3	AvCalc	36.4	-31.9	-54.8	-8.0	-	-	54.0	-62.0	V

*PK = Peak

AvCalc: Average Field Strength computed as follows for the above harmonics: PK + DCCF, where DCCF = 20*log(T_on/100ms)

SpO2 –1/4 WAVE MONOPOLE - PLOT



SpO2 –1/4 WAVE MONOPOLE - DATA

CUSTOMER: Invivo Phillips
MODEL: MR400 Radio 2
MODE: w/c channel, X16 (SPO2), Tx
RED=V/BLUE=H
TESTED BY: M. Nolting

Freq (GHz)	Meter Reading [dBuV]	Detector	Antenna Factor [dB/m]	Gain/ Loss [dB]	DCCF (dB)	Field Strength [dBuV/m]	Peak Limit [dBuV/m]	Margin [dB]	Average Limit [dBuV/m]	Margin [dB]	Antenna Polarity
21.774	41.8	Pk	36.3	-31.8	0.0	46.3	74.0	-27.7	54.0	-7.7	H
22.156	41.7	Pk	36.5	-31.9	0.0	46.3	74.0	-27.7	54.0	-7.7	H
25.895	42.1	Pk	34.1	-28.4	0.0	47.8	74.0	-26.2	-	-	H
25.895	42.1	AvCalc	34.1	-28.4	-54.8	-7.0	-	-	54.0	-61.0	H
21.956	41.5	Pk	36.9	-31.9	0.0	46.5	74.0	-27.5	53.97	-7.5	V
22.126	42.0	Pk	36.7	-32.1	0.0	46.6	74.0	-27.4	54.0	-7.4	V
25.311	42.2	Pk	33.9	-29.0	0.0	47.1	74.0	-26.8	53.97	-6.8	V
*PK = Peak											
AvCalc: Average Field Strength computed as follows for the above harmonics: PK + DCCF, where DCCF = 20*log(T_on/100ms)											

7.3.5. WORST-CASE BELOW 1 GHz

All testing was performed independently on the ECG ½ wave dipole and ¼ wave monopole and SpO2 ½ wave dipole and ¼ wave monopole. The testing was performed one radio type at a time (ECG or SpO2) due to limitations of the manufacturer's test software.

The below calculations take the worst-case 30-1000 MHz Spurious emissions for all ECG measurements and SpO2 measurements and combines those field strengths to show that the combined ECG and SpO2 Spurious Emissions field strengths meet FCC Part 15.249. Please note, although the ECG and SpO2 signals can be functional at the same time, they do not use the same channel frequencies (separated by a minimum of 1 MHz).

The Spurious Emissions field strength of the SpO2 and ECG radios were combined by converting the Electric Field Strength to Power Density, adding the ECG/SpO2 Power values together and converting back to Electric Field Strength:

$Pd = E^2 (V/m) / 377\Omega$

Per the following plots, the worst-case fundamental field strengths are:

ECG = 34.0 dBuV/m PK (655 MHz)
SpO2 = 37.9 dBuV/m PK (655 MHz)

Combining the Field Strengths -

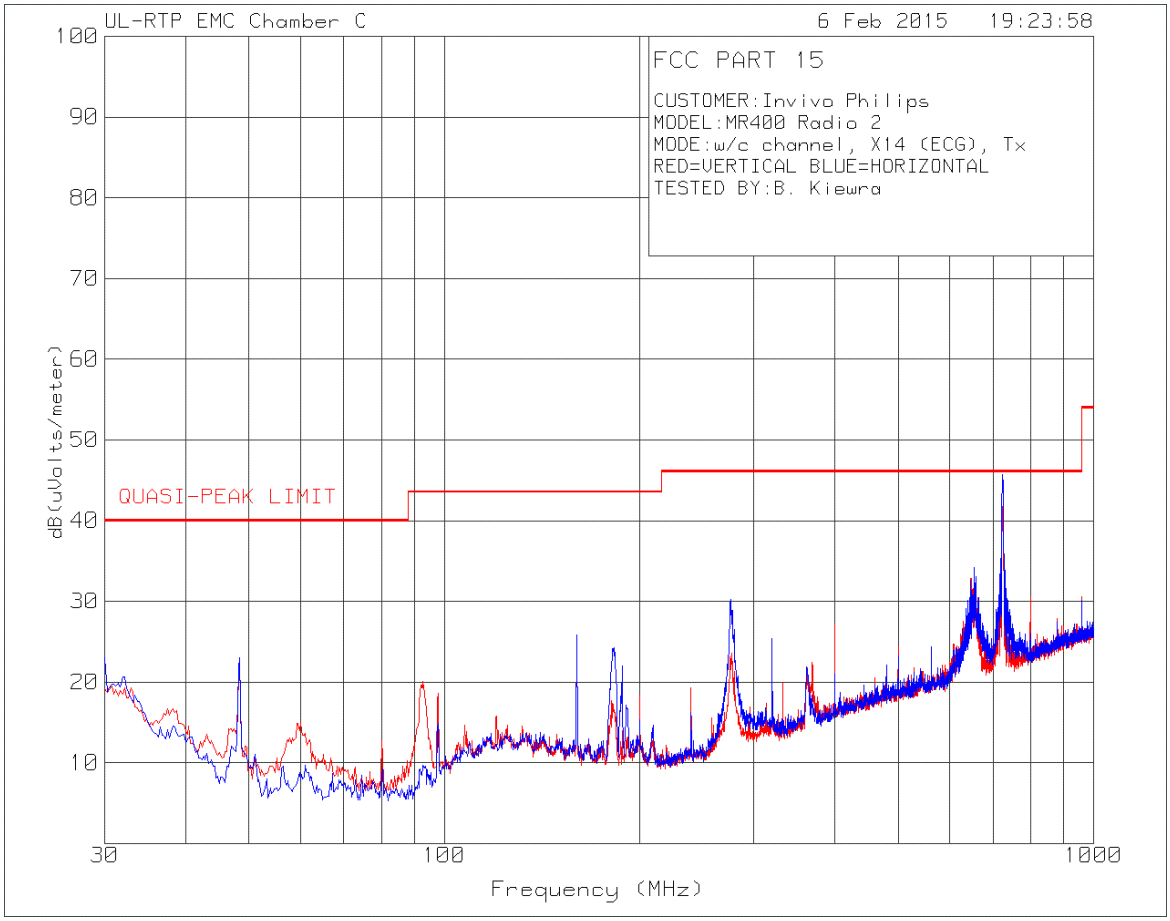
PEAK
ECG = 34.0 dBuV/m => 50.1187 uV/m or 0.000050119 V/m = 0.000000007 mW/m2
SpO2 = 37.9 dBuV/m => 78.5237 uV/m or 0.000078524 V/m = 0.000000016 mW/m2

Combined = 0.000000023 mW/m2 = 0.000093835 V/m or 93.8347 uV/m => 39.45 dBuV/m

Combined PK = 39.47 dBuV/m (655 MHz)

SPURIOUS EMISSIONS 30 TO 1000 MHz

ECG – ½ WAVE DIPOLE - PLOT



Note – It was determined during testing that the 723 MHz signal was associated with the host (IBP or Invasive Blood Pressure).

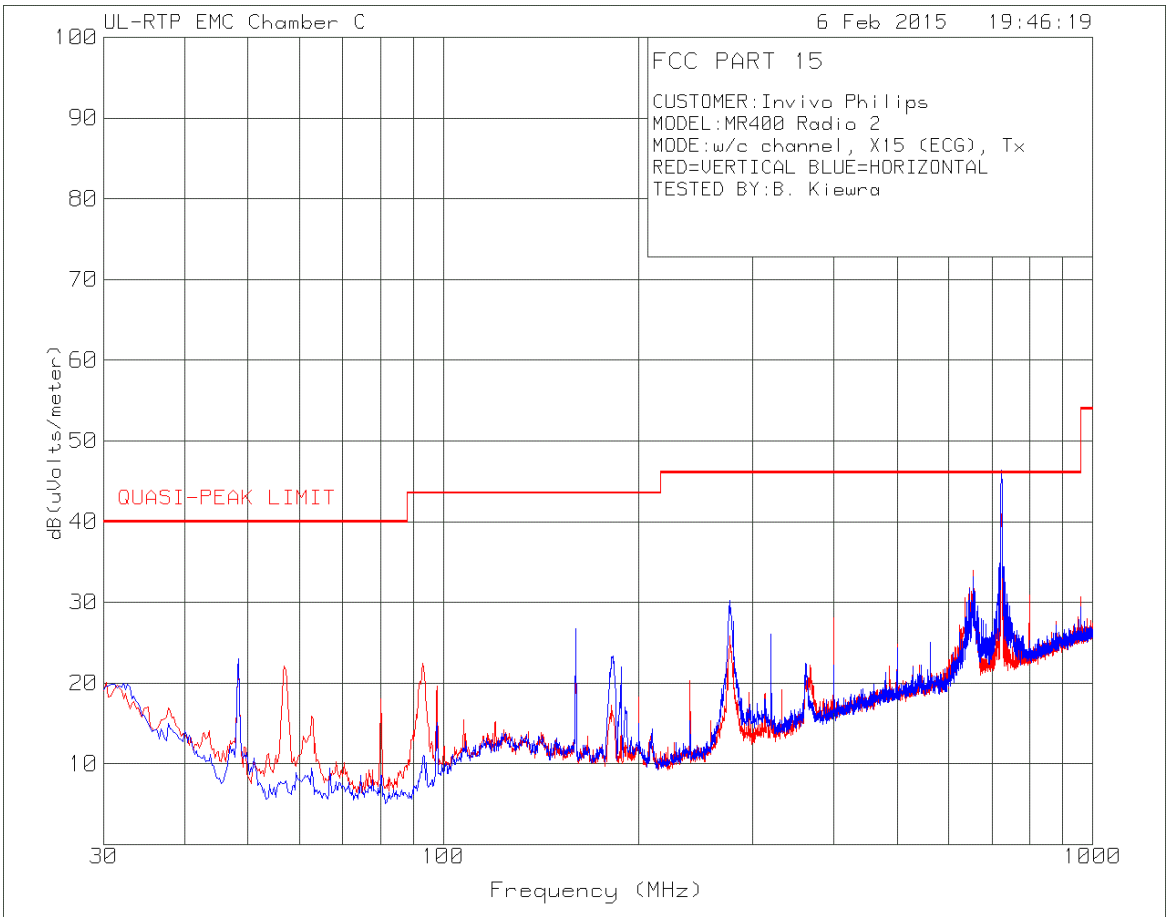
ECG – ½ WAVE DIPOLE - DATA

CUSTOMER: Invivo Philips
MODEL: MR400 Radio 2
MODE: w/c channel, X14 (ECG), Tx
RED=VERTICAL BLUE=HORIZONTAL
TESTED BY: B. Kiewra

Test Frequency [MHz]	Meter Reading [dBuV]	Detector*	Antenna [dB/m]	Gain/Loss [dB]	Field Strength [dBuV/m]	QP Limit [dBuV/m]	Margin [dB]	Polarity
48.425	45.6	Pk	8.5	-31.4	22.7	40.0	-17.3	V
159.947	43.9	Pk	12.1	-30.4	25.6	43.5	-18.0	V
723.809	46.6	Qp	20.5	-28.6	38.5	46.0	-7.6	V
159.947	44.1	Pk	12.1	-30.4	25.8	43.5	-17.7	H
276.076	46.7	Pk	13.4	-29.9	30.2	46.0	-15.8	H
723.774	52.3	Qp	20.5	-28.6	44.2	46.0	-1.8	H
*Pk = Peak, Qp = Quasi-Peak, AV = Average.								

Note – It was determined during testing that the 723 MHz signal was associated with the host (IBP or Invasive Blood Pressure).

ECG –1/4 WAVE MONOPOLE - PLOT



Note – It was determined during testing that the 723 MHz signal was associated with the host (IBP or Invasive Blood Pressure).

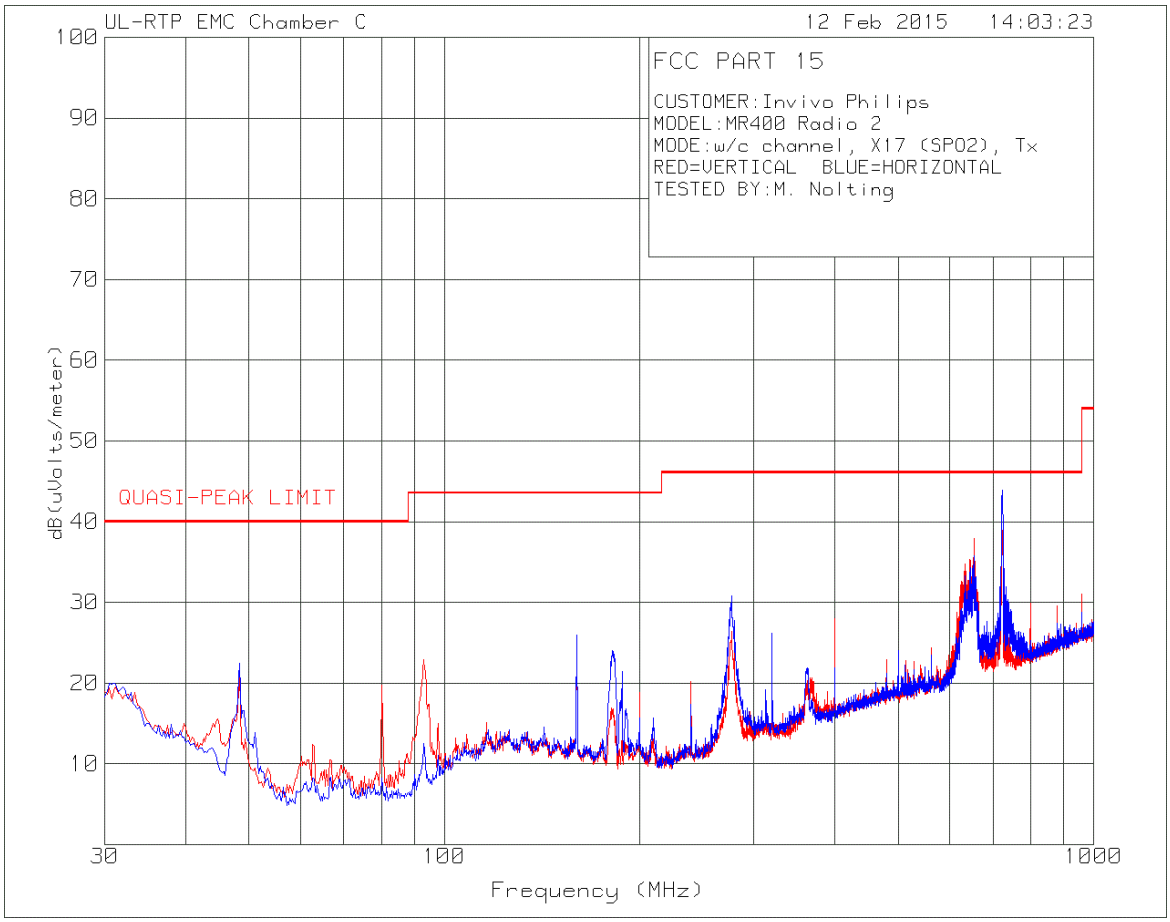
ECG –1/4 WAVE MONOPOLE - DATA

CUSTOMER:Invivo Philips
MODEL:MR400 Radio 2
MODE:w/c channel, X15 (ECG), Tx
RED=VERTICAL BLUE=HORIZONTAL
TESTED BY:B. Kiewra

Test Frequency [MHz]	Meter Reading [dBuV]	Detector*	Antenna [dB/m]	Gain/Loss [dB]	Field Strength [dBuV/m]	QP Limit [dBuV/m]	Margin [dB]	Polarity
48.425	45.4	Pk	8.5	-31.4	22.5	40.0	-17.5	V
93.034	45.0	Pk	8.3	-30.9	22.4	43.5	-21.1	V
655.250	43.0	Pk	19.7	-28.7	34.0	46.0	-12.1	V
723.066	46.5	Qp	20.5	-28.6	38.4	46.0	-7.6	V
276.561	46.8	Pk	13.4	-29.9	30.3	46.0	-15.8	H
723.487	52.6	Qp	20.5	-28.6	44.5	46.0	-1.5	H
*Pk = Peak, Qp = Quasi-Peak, AV = Average.								

Note – It was determined during testing that the 723 MHz signal was associated with the host (IBP or Invasive Blood Pressure).

SpO2 – ½ WAVE DIPOLE - PLOT



Note – It was determined during testing that the 723 MHz signal was associated with the host (IBP or Invasive Blood Pressure).

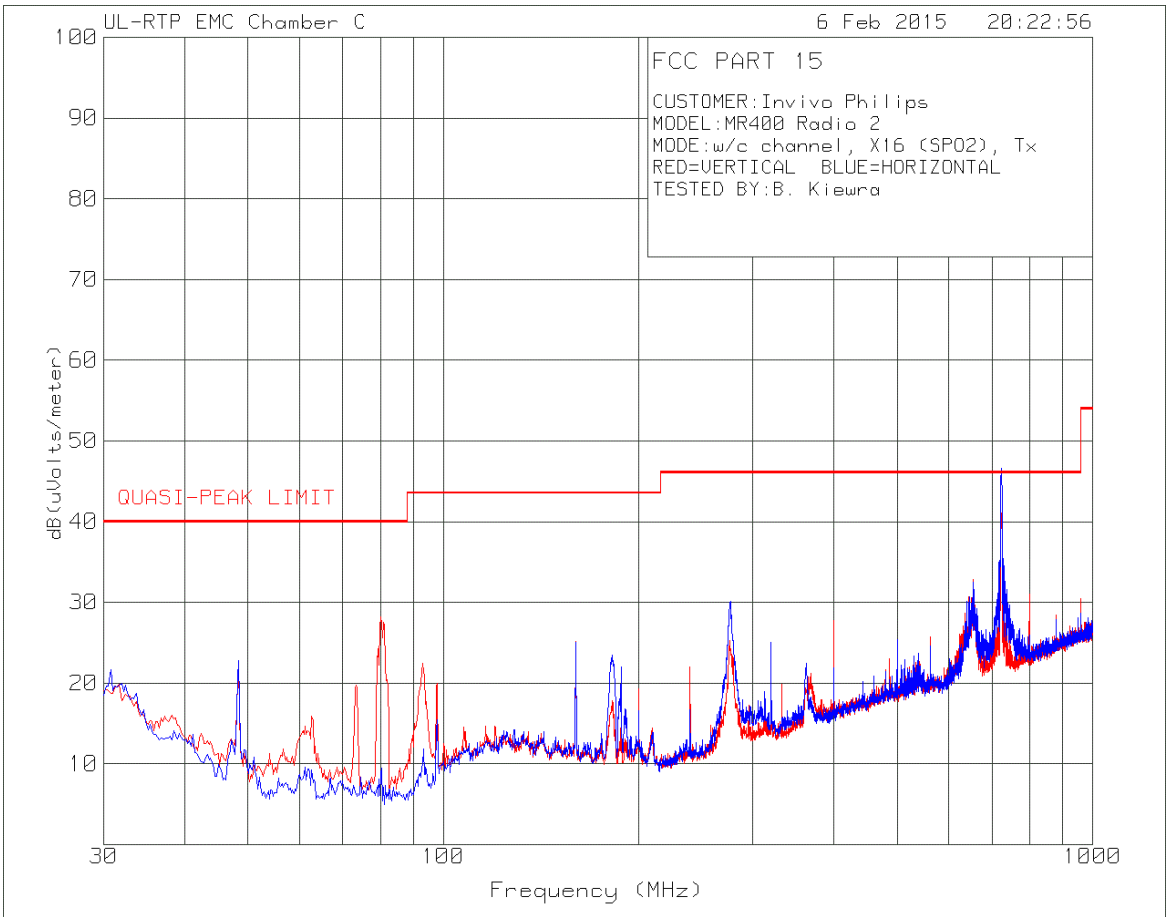
SpO2 – ½ WAVE DIPOLE - DATA

CUSTOMER:Invivo Philips
MODEL:MR400 Radio 2
MODE:w/c channel, X17 (SPO2), Tx
RED=VERTICAL BLUE=HORIZONTAL
TESTED BY:M. Nolting

Test Frequency [MHz]	Meter Reading [dBuV]	Detector*	Antenna [dB/m]	Gain/Loss [dB]	Field Strength [dBuV/m]	QP Limit [dBuV/m]	Margin [dB]	Polarity
93.034	45.5	Pk	8.3	-30.9	22.9	43.5	-20.6	V
277.045	42.9	Pk	13.4	-29.9	26.4	46.0	-19.6	V
655.250	46.9	Pk	19.7	-28.7	37.9	46.0	-8.1	V
722.902	44.6	Qp	20.5	-28.6	36.5	46.0	-9.5	V
159.947	44.2	Pk	12.1	-30.4	25.9	43.5	-17.6	H
277.045	47.3	Pk	13.4	-29.9	30.8	46.0	-15.2	H
658.887	42.1	Pk	19.8	-28.8	33.1	46.0	-12.9	H
722.902	50.2	Qp	20.5	-28.6	42.1	46.0	-3.9	H
*Pk = Peak, Qp = Quasi-Peak, AV = Average.								

Note – It was determined during testing that the 723 MHz signal was associated with the host (IBP or Invasive Blood Pressure).

SpO2 –1/4 WAVE MONOPOLE - PLOT



Note – It was determined during testing that the 723 MHz signal was associated with the host (IBP or Invasive Blood Pressure).

SpO2 –1/4 WAVE MONOPOLE - DATA

CUSTOMER: Invivo Philips
MODEL: MR400 Radio 2
MODE: w/c channel, X16 (SPO2), Tx
RED=VERTICAL BLUE=HORIZONTAL
TESTED BY: B. Kiewra

Test Frequency [MHz]	Meter Reading [dBuV]	Detector*	Antenna [dB/m]	Gain/Loss [dB]	Field Strength [dBuV/m]	QP Limit [dBuV/m]	Margin [dB]	Polarity
80.185	51.9	Pk	7.4	-31.1	28.2	40.0	-11.8	V
93.034	45.1	Pk	8.3	-30.9	22.5	43.5	-21.0	V
723.472	47.2	Qp	20.5	-28.6	39.1	46.0	-6.9	V
277.288	46.6	Pk	13.4	-29.9	30.1	46.0	-15.9	H
655.250	41.6	Pk	19.7	-28.7	32.6	46.0	-13.5	H
723.442	52.7	Qp	20.5	-28.6	44.6	46.0	-1.5	H
*Pk = Peak, Qp = Quasi-Peak, AV = Average.								

Note – It was determined during testing that the 723 MHz signal was associated with the host (IBP or Invasive Blood Pressure).

8. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

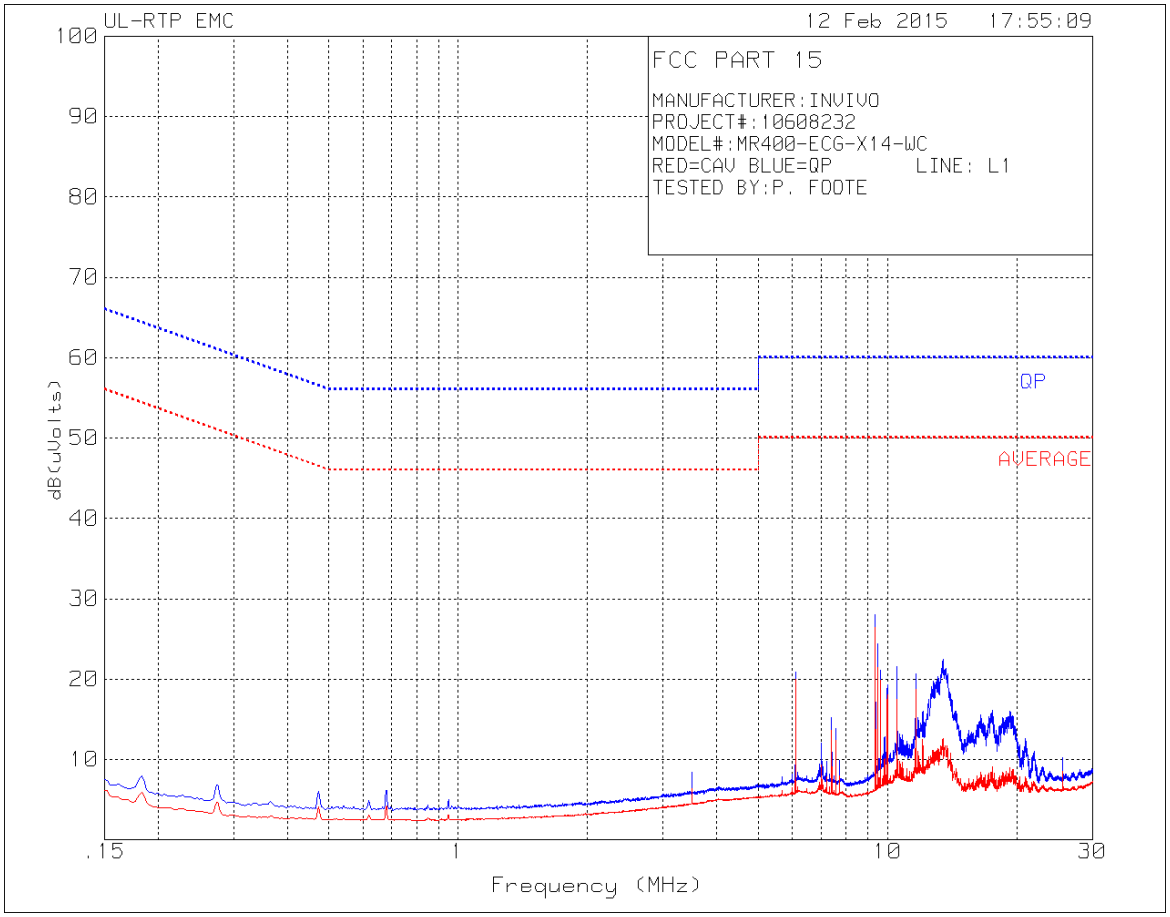
Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

6 WORST EMISSIONS

ECG –1/2 WAVE DIPOLE LINE 1 RESULTS

ECG –1/2 WAVE DIPOLE – LINE 1 PLOT



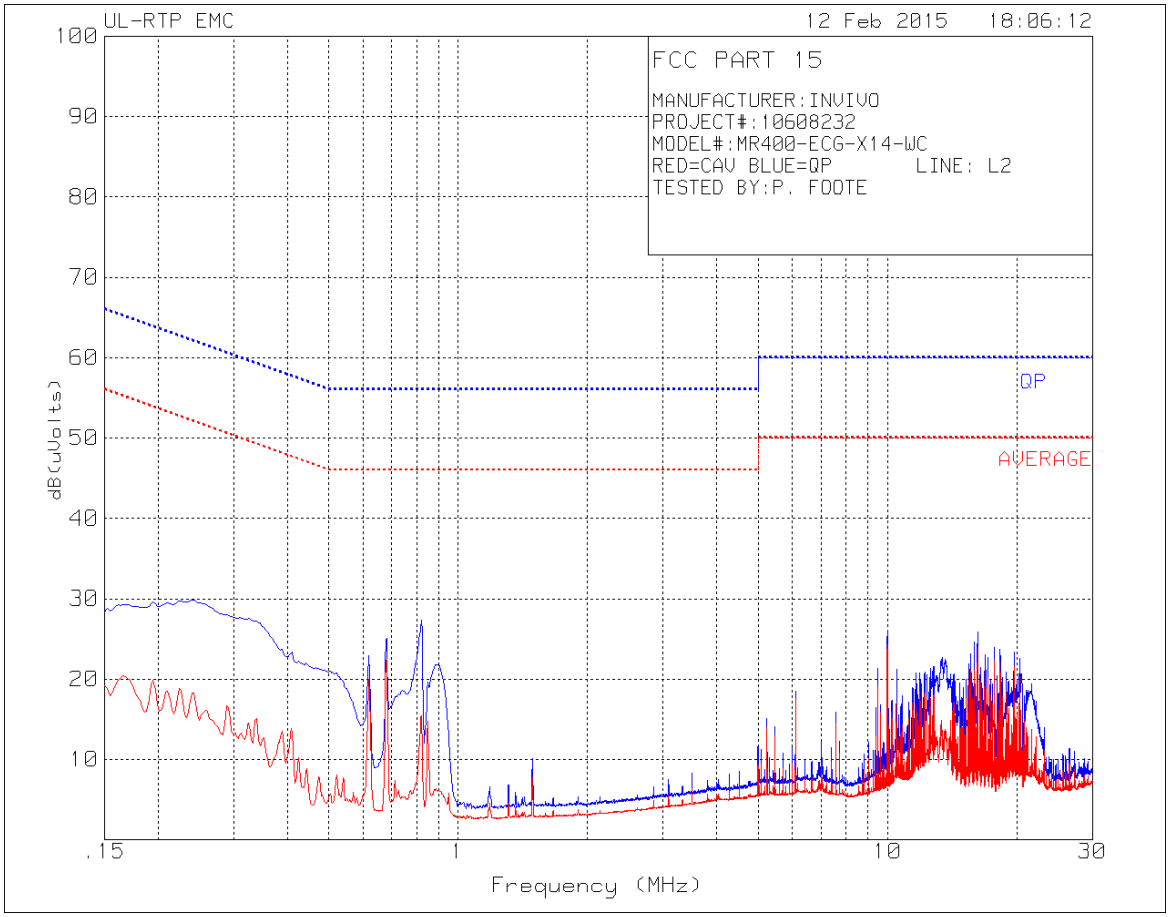
ECG –1/2 WAVE DIPOLE – LINE 1 DATA

MANUFACTURER:INVIVO
PROJECT#:10608232
MODEL#:MR400-ECG-X14-WC
RED=CAV BLUE=QP LINE: L1
TESTED BY:P. FOOTE

Test Frequency [MHz]	Meter Reading [dBuV]	Detector*	LISN [dB]	Cable Loss [dB]	RF Line Voltage [dBuV]	FCC 15.207 (QP) [dBuV]	Margin [dB]	FCC 15.207 (AV) [dBuV]	Margin [dB]
6.115	11.4	Qp	0.1	9.4	20.9	60.0	-39.1	-	-
9.350	18.6	Qp	0.1	9.4	28.1	60.0	-32.0	-	-
13.452	13.1	Qp	0.1	9.3	22.5	60.0	-37.5	-	-
6.115	10.5	Ca	0.1	9.4	20.0	-	-	50.0	-30.0
9.350	16.9	Ca	0.1	9.4	26.4	-	-	50.0	-23.6
13.451	3.3	Ca	0.1	9.3	12.7	-	-	50.0	-37.3
*PK = Peak, QP = Quasi-Peak, Av = Average									

ECG –1/2 WAVE DIPOLE LINE 2 RESULTS

ECG –1/2 WAVE DIPOLE – LINE 2 PLOT



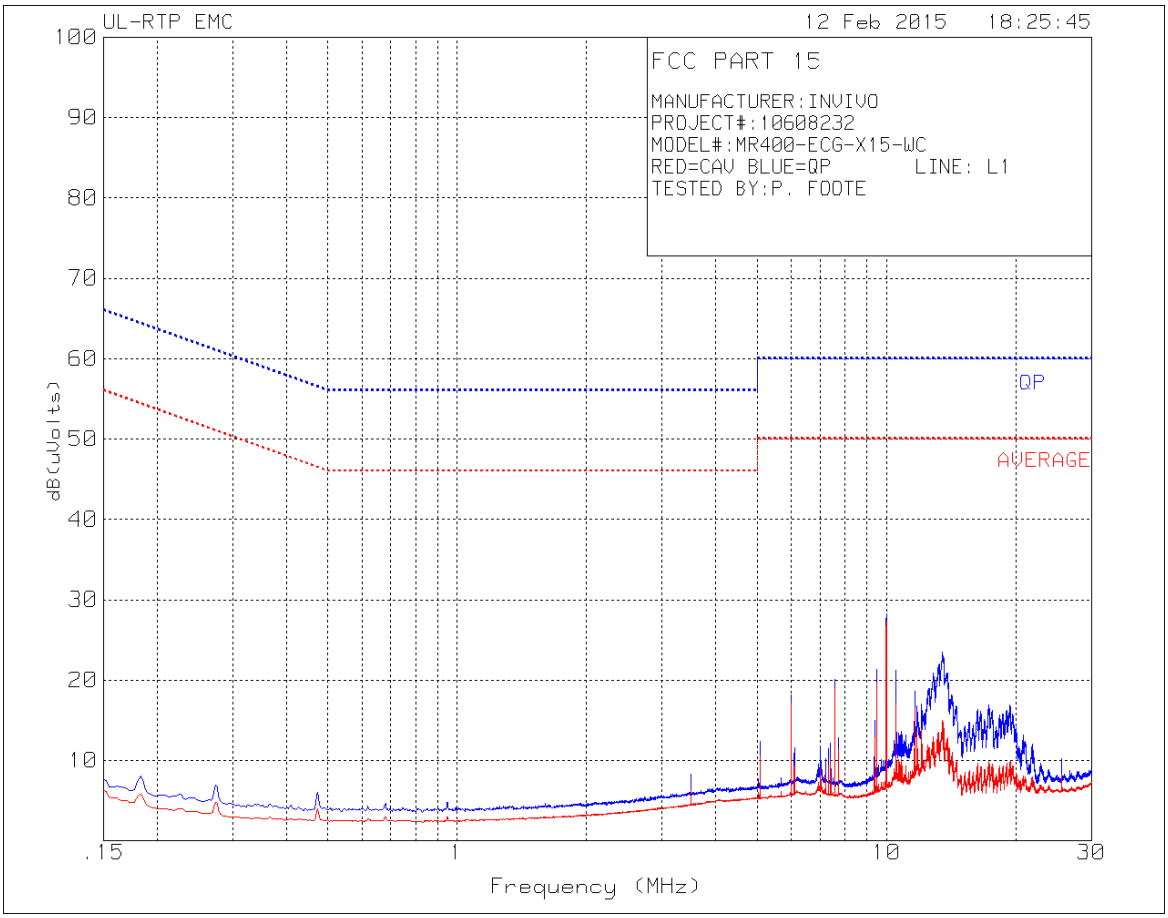
ECG –1/2 WAVE DIPOLE – LINE 2 DATA

MANUFACTURER:INVIVO
PROJECT#:10608232
MODEL#:MR400-ECG-X14-WC
RED=CAV BLUE=QP LINE: L2
TESTED BY:P. FOOTE

Test Frequency [MHz]	Meter Reading [dBuV]	Detector*	LISN [dB]	Cable Loss [dB]	RF Line Voltage [dBuV]	FCC 15.207 (QP) [dBuV]	Margin [dB]	FCC 15.207 (AV) [dBuV]	Margin [dB]
0.681	15.4	Qp	0.1	9.5	25.0	56.0	-31.0	-	-
0.823	17.8	Qp	0.0	9.5	27.3	56.0	-28.7	-	-
9.980	16.6	Qp	0.1	9.4	26.1	60.0	-33.9	-	-
0.681	12.9	Ca	0.1	9.5	22.5	-	-	46.0	-23.5
0.821	5.9	Ca	0.0	9.5	15.4	-	-	46.0	-30.6
9.980	14.8	Ca	0.1	9.4	24.3	-	-	50.0	-25.7
*PK = Peak, QP = Quasi-Peak, Av = Average									

ECG –1/4 WAVE MONOPOLE LINE 1 RESULTS

ECG –1/4 WAVE MONOPOLE – LINE 1 PLOT



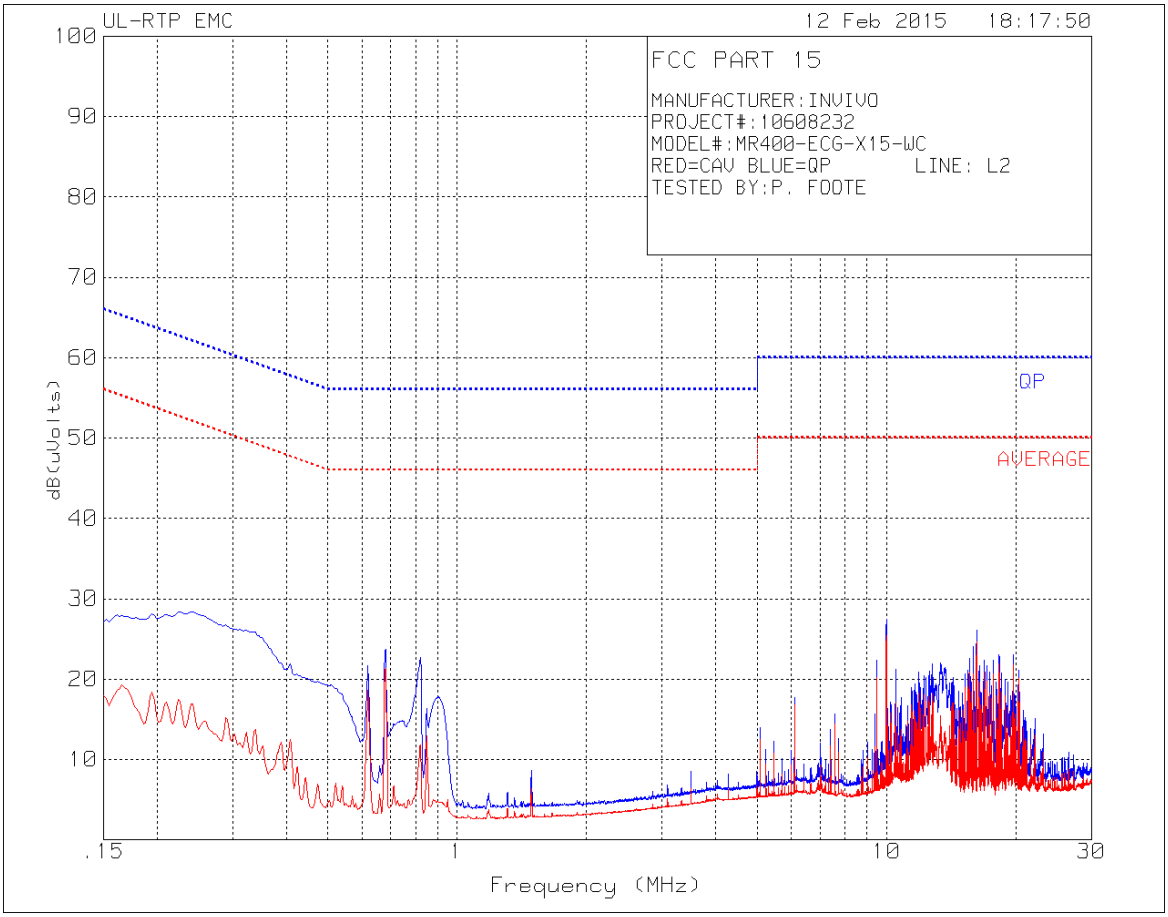
ECG –1/4 WAVE MONOPOLE – LINE 1 DATA

MANUFACTURER:INVIVO
PROJECT#:10608232
MODEL#:MR400-ECG-X15-WC
RED=CAV BLUE=QP LINE: L1
TESTED BY:P. FOOTE

Test Frequency [MHz]	Meter Reading [dBuV]	Detector*	LISN [dB]	Cable Loss [dB]	RF Line Voltage [dBuV]	FCC 15.207 (QP) [dBuV]	Margin [dB]	FCC 15.207 (AV) [dBuV]	Margin [dB]
7.571	10.6	Qp	0.1	9.4	20.1	60.0	-39.9	-	-
9.980	18.8	Qp	0.1	9.4	28.3	60.0	-31.7	-	-
13.493	14.1	Qp	0.1	9.3	23.5	60.0	-36.6	-	-
7.571	9.5	Ca	0.1	9.4	19.0	-	-	50.0	-31.1
9.980	17.8	Ca	0.1	9.4	27.3	-	-	50.0	-22.7
13.505	5.5	Ca	0.1	9.3	14.9	-	-	50.0	-35.1
*PK = Peak, QP = Quasi-Peak, Av = Average									

ECG –1/4 WAVE MONOPOLE LINE 2 RESULTS

ECG –1/4 WAVE MONOPOLE – LINE 2 PLOT



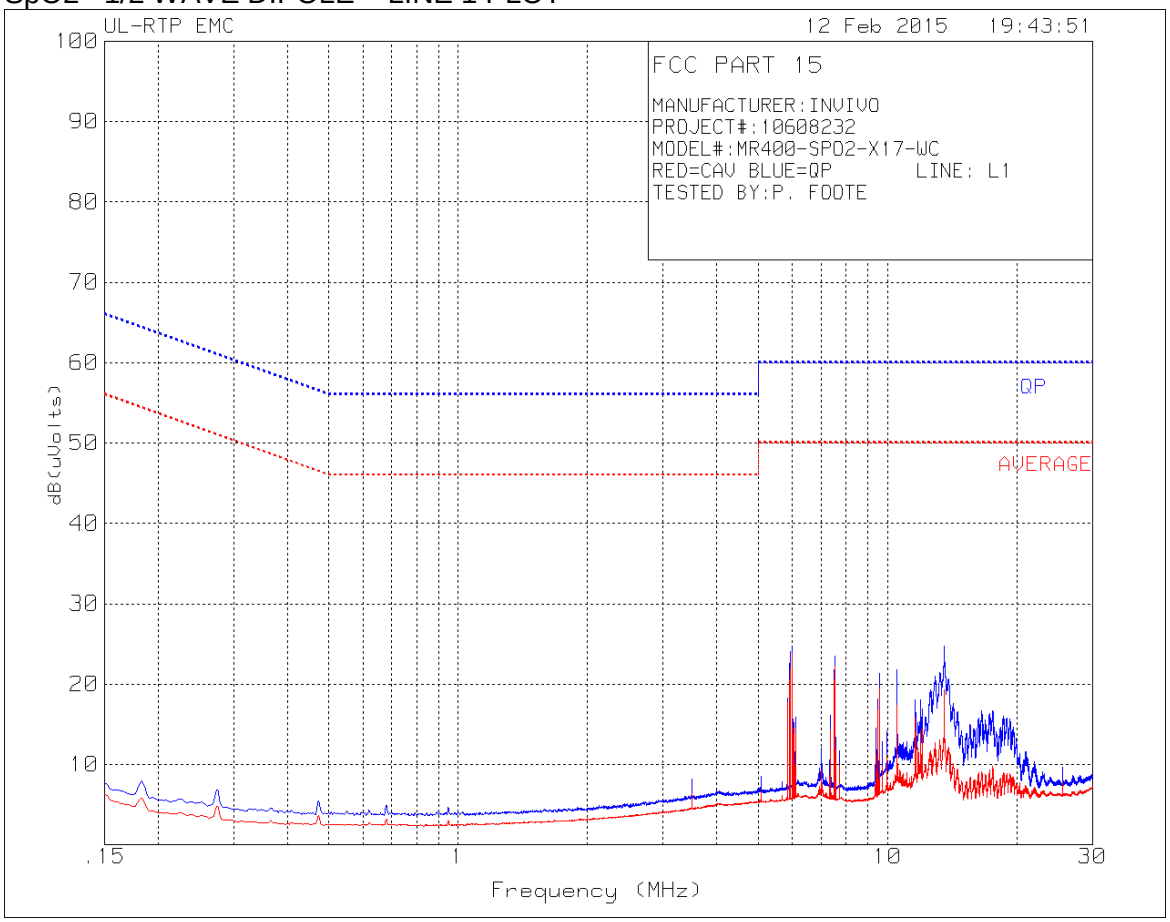
ECG –1/4 WAVE MONOPOLE – LINE 2 DATA

MANUFACTURER:INVIVO
PROJECT#:10608232
MODEL#:MR400-ECG-X15-WC
RED=CAV BLUE=QP LINE: L2
TESTED BY:P. FOOTE

Test Frequency [MHz]	Meter Reading [dBuV]	Detector*	LISN [dB]	Cable Loss [dB]	RF Line Voltage [dBuV]	FCC 15.207 (QP) [dBuV]	Margin [dB]	FCC 15.207 (AV) [dBuV]	Margin [dB]
0.681	14.1	Qp	0.1	9.5	23.7	56.0	-32.3	-	-
0.823	13.3	Qp	0.0	9.5	22.8	56.0	-33.3	-	-
9.980	17.9	Qp	0.1	9.4	27.4	60.0	-32.6	-	-
0.681	11.8	Ca	0.1	9.5	21.4	-	-	46.0	-24.6
0.821	2.3	Ca	0.0	9.5	11.8	-	-	46.0	-34.2
9.980	15.9	Ca	0.1	9.4	25.4	-	-	50.0	-24.6
*PK = Peak, QP = Quasi-Peak, Av = Average									

SpO2 –1/2 WAVE DIPOLE LINE 1 RESULTS

SpO2 –1/2 WAVE DIPOLE – LINE 1 PLOT



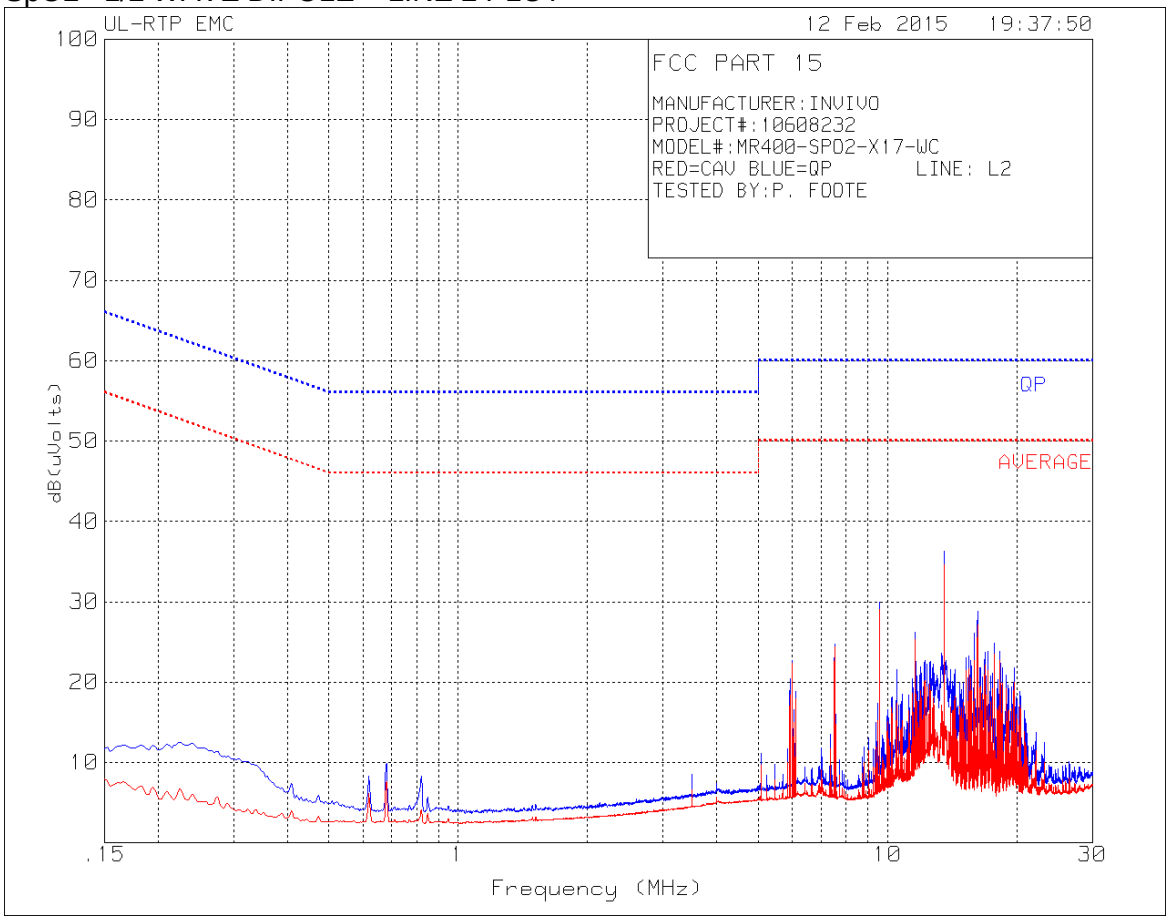
SpO2 –1/2 WAVE DIPOLE – LINE 1 DATA

MANUFACTURER:INVIVO
PROJECT#:10608232
MODEL#:MR400-SPO2-X17-WC
RED=CAV BLUE=QP LINE: L1
TESTED BY:P. FOOTE

Test Frequency [MHz]	Meter Reading [dBuV]	Detector*	LISN [dB]	Cable Loss [dB]	RF Line Voltage [dBuV]	FCC 15.207 (QP) [dBuV]	Margin [dB]	FCC 15.207 (AV) [dBuV]	Margin [dB]
6.000	15.2	Qp	0.1	9.4	24.7	60.0	-35.4	-	-
7.521	14.0	Qp	0.1	9.4	23.5	60.0	-36.5	-	-
13.560	15.4	Qp	0.1	9.3	24.8	60.0	-35.3	-	-
6.000	14.3	Ca	0.1	9.4	23.8	-	-	50.0	-26.2
7.521	12.8	Ca	0.1	9.4	22.3	-	-	50.0	-27.8
13.560	9.9	Ca	0.1	9.3	19.3	-	-	50.0	-30.7
*PK = Peak, QP = Quasi-Peak, Av = Average									

SpO2 –1/2 WAVE DIPOLE LINE 2 RESULTS

SpO2 –1/2 WAVE DIPOLE – LINE 2 PLOT



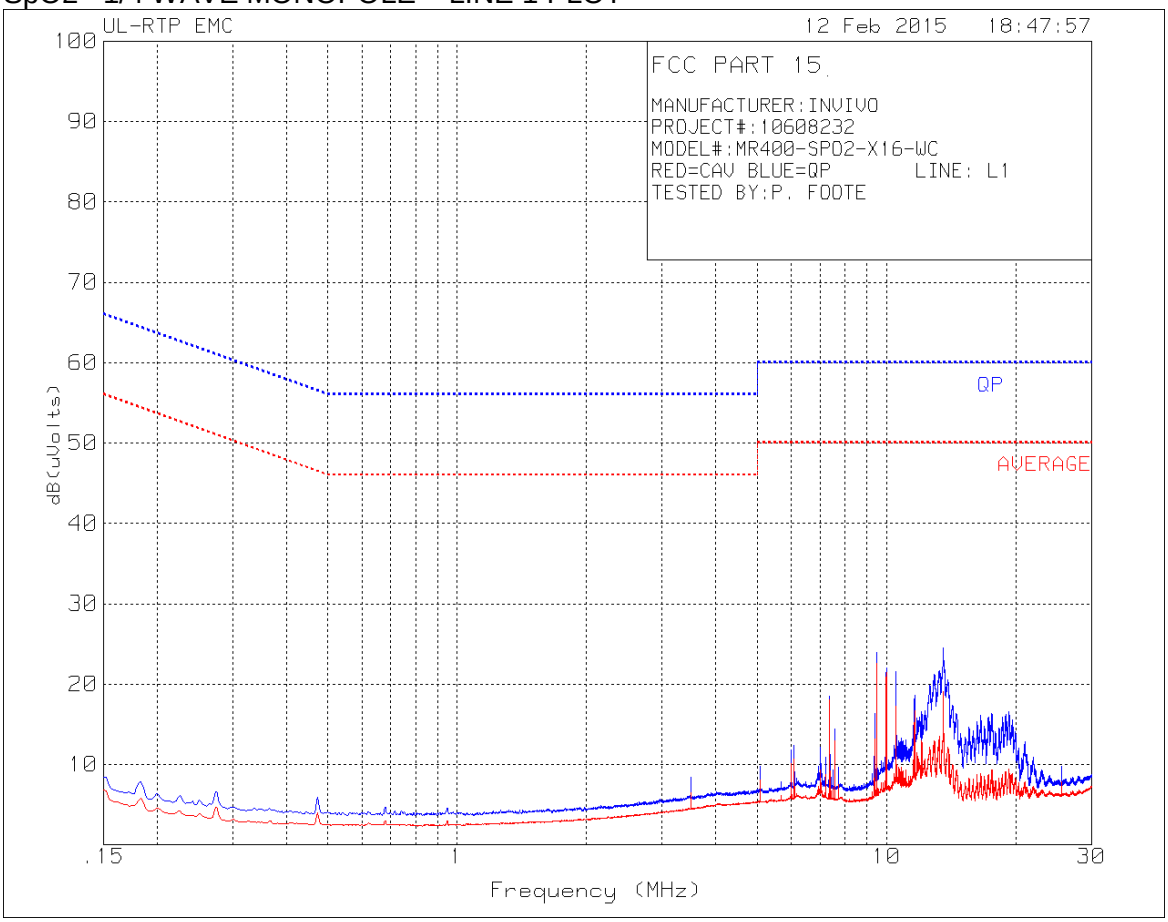
SpO2 –1/2 WAVE DIPOLE – LINE 2 DATA

MANUFACTURER:INVIVO
PROJECT#:10608232
MODEL#:MR400-SPO2-X17-WC
RED=CAV BLUE=QP LINE: L2
TESTED BY:P. FOOTE

Test Frequency [MHz]	Meter Reading [dBuV]	Detector*	LISN [dB]	Cable Loss [dB]	RF Line Voltage [dBuV]	FCC 15.207 (QP) [dBuV]	Margin [dB]	FCC 15.207 (AV) [dBuV]	Margin [dB]
7.521	15.3	Qp	0.1	9.4	24.8	60.0	-35.2	-	-
9.571	20.4	Qp	0.1	9.4	29.9	60.0	-30.1	-	-
13.560	26.9	Qp	0.1	9.3	36.3	60.0	-23.7	-	-
7.521	14.9	Ca	0.1	9.4	24.4	-	-	50.0	-25.6
9.571	19.5	Ca	0.1	9.4	29.0	-	-	50.0	-21.0
13.560	25.2	Ca	0.1	9.3	34.6	-	-	50.0	-15.4
*PK = Peak, QP = Quasi-Peak, Av = Average									

SpO2 –1/4 WAVE MONOPOLE LINE 1 RESULTS

SpO2 –1/4 WAVE MONOPOLE – LINE 1 PLOT



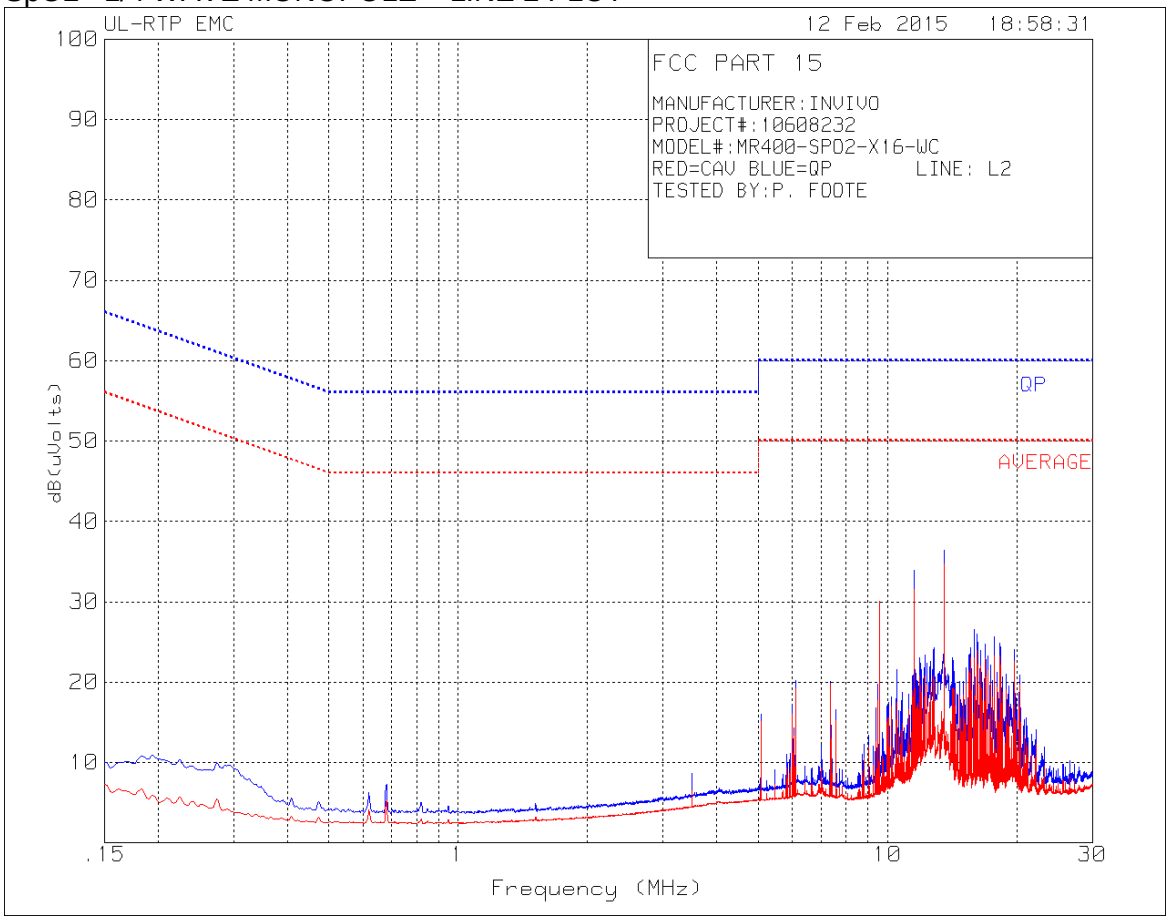
SpO2 –1/4 WAVE MONOPOLE – LINE 1 DATA

MANUFACTURER:INVIVO
PROJECT#:10608232
MODEL#:MR400-SPO2-X16-WC
RED=CAV BLUE=QP LINE: L1
TESTED BY:P. FOOTE

Test Frequency [MHz]	Meter Reading [dBuV]	Detector*	LISN [dB]	Cable Loss [dB]	RF Line Voltage [dBuV]	FCC 15.207 (QP) [dBuV]	Margin [dB]	FCC 15.207 (AV) [dBuV]	Margin [dB]
9.474	14.4	Qp	0.1	9.4	23.9	60.0	-36.1	-	-
10.500	12.2	Qp	0.1	9.3	21.6	60.0	-38.4	-	-
13.560	15.1	Qp	0.1	9.3	24.5	60.0	-35.5	-	-
9.474	13.0	Ca	0.1	9.4	22.5	-	-	50.0	-27.5
10.500	7.8	Ca	0.1	9.3	17.2	-	-	50.0	-32.8
13.560	9.7	Ca	0.1	9.3	19.1	-	-	50.0	-31.0
*PK = Peak, QP = Quasi-Peak, Av = Average									

SpO2 –1/4 WAVE MONOPOLE LINE 2 RESULTS

SpO2 –1/4 WAVE MONOPOLE – LINE 2 PLOT



SpO2 –1/4 WAVE MONOPOLE – LINE 2 DATA

MANUFACTURER:INVIVO
PROJECT#:10608232
MODEL#:MR400-SPO2-X16-WC
RED=CAV BLUE=QP LINE: L2
TESTED BY:P. FOOTE

Test Frequency [MHz]	Meter Reading [dBuV]	Detector*	LISN [dB]	Cable Loss [dB]	RF Line Voltage [dBuV]	FCC 15.207 (QP) [dBuV]	Margin [dB]	FCC 15.207 (AV) [dBuV]	Margin [dB]
9.571	20.6	Qp	0.1	9.4	30.1	60.0	-29.9	-	-
11.519	24.5	Qp	0.1	9.3	33.9	60.0	-26.1	-	-
13.560	27.0	Qp	0.1	9.3	36.4	60.0	-23.6	-	-
9.571	20.6	Ca	0.1	9.4	30.1	-	-	50.0	-20.0
11.519	22.1	Ca	0.1	9.3	31.5	-	-	50.0	-18.5
13.560	25.3	Ca	0.1	9.3	34.7	-	-	50.0	-15.3
*PK = Peak, QP = Quasi-Peak, Av = Average									

END OF REPORT