



CERTIFICATION TEST REPORT

Report Number. : 11839308-E2V2

Applicant : UNALIWEAR, INC
3410 CHERRY LANE
AUSTIN, TX 78703, UNITED STATES

Model : KANEGA WATCH

FCC ID : 2AM4C-KANEGA
EUT Description : Cellular and 802.11b/g/n Enabled Watch (mPERS device)

Test Standard(s) : FCC 47 CFR PART 15 SUBPART B
ICES - 003 ISSUE 6

Date Of Issue:

October 24, 2017

Prepared by:

UL Verification Services Inc.
47173 Benicia Street
Fremont, CA 94538, U.S.A.
TEL: (510) 771-1000
FAX: (510) 661-0888



NVLAP LAB CODE 200065-0

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
V1	9/19/17	Initial Issue	---
V2	10/24/17	Updated highest frequency in sections 5.1 and 6.2	Huda Mustapha

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: UNALIWEAR, INC
3410 CHERRY LANE
AUSTIN, TX 78703, UNITED STATES

EUT DESCRIPTION: Cellular and 802.11b/g/n Enabled Watch (mPERS device)

SERIAL NUMBER: 87

DATE TESTED: JUNE 29, 2017

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC 47 CFR PART 15 SUBPART B	Pass
ICES - 003 ISSUE 6	Pass

UL Verification Services Inc. 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 Verification Services Inc. 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 Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. 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 and released for
UL Verification Services Inc. by:

Prepared by:

Huda Mustapha

Oren Stoelting

HUDA MUSTAPHA
CONSUMER TECHNOLOGY DIVISION
SENIOR PROJECT ENGINEER
UL VERIFICATION SERVICES INC

OREN STOELTING
CONSUMER TECHNOLOGY DIVISION
WISE LAB EMC TECHNICIAN
UL VERIFICATION SERVICES INC

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2014.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street
<input checked="" type="checkbox"/> Chamber A(IC: 2324B-1)	<input type="checkbox"/> Chamber D(IC: 22541-1)
<input type="checkbox"/> Chamber B(IC: 2324B-2)	<input type="checkbox"/> Chamber E(IC: 22541-2)
<input type="checkbox"/> Chamber C(IC: 2324B-3)	<input type="checkbox"/> Chamber F(IC: 22541-3)
	<input type="checkbox"/> Chamber G(IC: 22541-4)
	<input type="checkbox"/> Chamber H(IC: 22541-5)

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. Chambers A through C are covered under Industry Canada company address code 2324B with site numbers 2324B -1 through 2324B-3, respectively. Chambers D through H are covered under Industry Canada company address code 22541 with site numbers 22541 -1 through 22541-5, respectively.

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:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamp Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

4.3. MEASUREMENT UNCERTAINTY

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

Parameter	Uncertainty
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.84 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.65 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz	3.15 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	5.36 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.32 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.45 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.24 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a Cellular and 802.11 b/g/n WLAN enabled watch (mPERS device).

GENERAL INFORMATION

Power Requirements	Li-Po batteries (3.0-4.35V)
Highest frequency generated or used by the EUT	2462 MHz

5.2. TEST CONFIGURATIONS

The following configuration was tested:

EUT Configuration	Description
Typical	EUT standalone

Preliminary testing for radiated emissions was performed in X, Y and Z orientations of the EUT and Y position was found to be worst case. Therefore, final data was measured in Y position.

5.3. MODE(S) OF OPERATION

Mode	Description
Normal	EUT powered on and in idle mode

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was 1493

5.5. MODIFICATIONS

No modifications were made during testing.

5.6. DETAILS OF TESTED SYSTEM

SUPPORT EQUIPMENT & PERIPHERALS

N/A

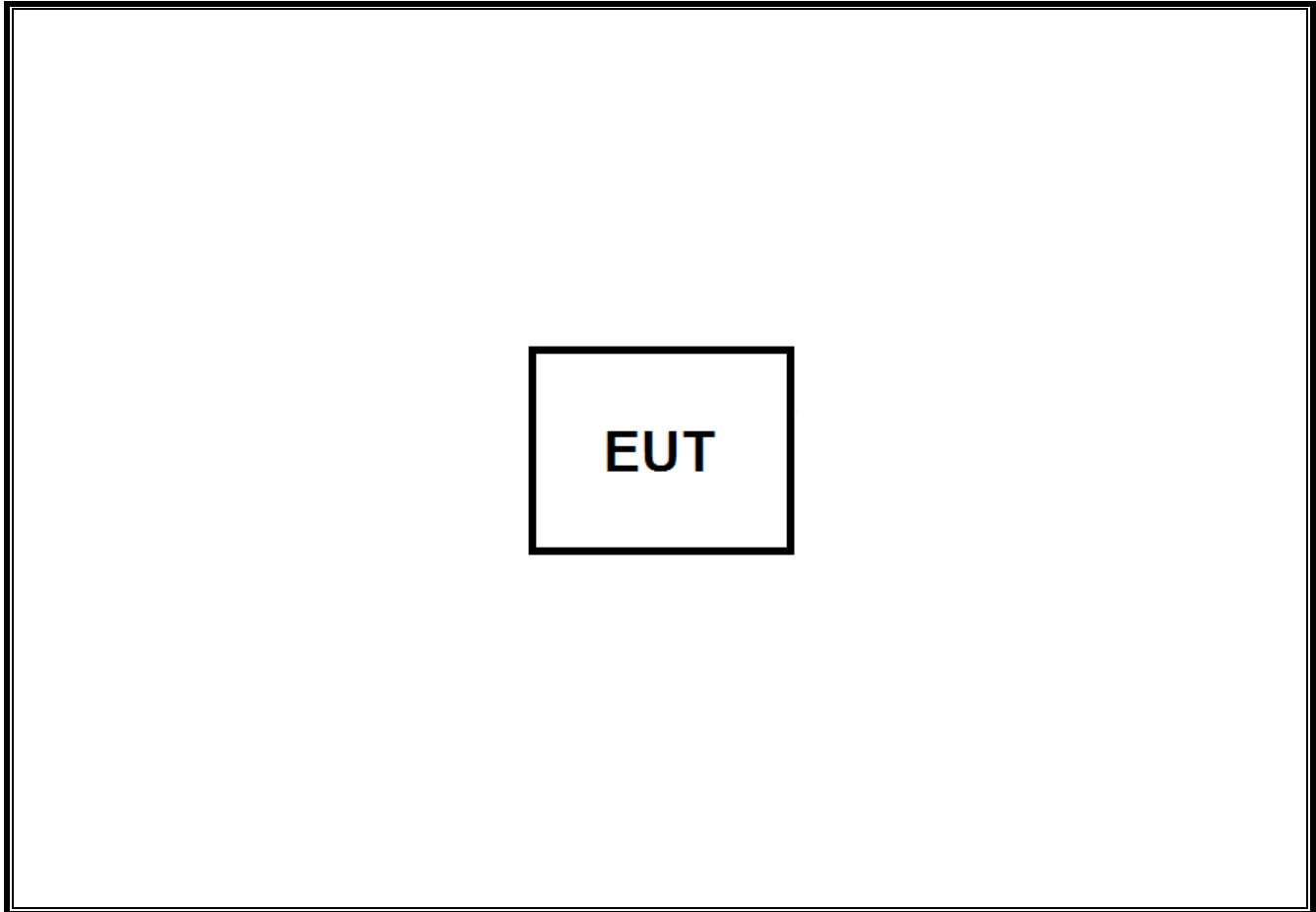
I/O CABLES

N/A

TEST SETUP

The EUT is a standalone battery powered unit for radiated testing.

SETUP DIAGRAM



6. APPLICABLE EMISSIONS LIMITS AND TEST RESULTS

6.1. EMISSIONS TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment List					
Description	Manufacturer	Model	T Number	Cal Date	Cal Due
Amplifier, 1 to 18 GHz	Miteq	AFS43-00101800-25-S-42	493	02/15/17	02/15/18
Amplifier, 1 to 8 GHz	Miteq	AMF-4D-01000800-30-29P	1170	04/28/17	04/28/18
Amplifier, 10KHz to 1GHz, 32dB	Keysight	8447D	300	11/10/16	11/10/17
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences	JB3	130	09/23/16	09/23/17
PXA Spectrum Analyzer, 3Hz to 44GHz	Agilent	N9030A	1466	04/11/17	04/11/18
EMI Reciever	Rohde & Schwarz	ESR-EMI	1436	01/06/17	01/06/18
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	862	06/09/17	06/09/18

Test Software List			
Description	Manufacturer	Model	Version
Radiated Software	UL	UL EMC	Ver 9.5, Apr 26, 2016

6.2. RADIATED EMISSIONS LIMITS AND RESULTS

LIMIT

FCC Part 15 Subpart B

§15.109 (a) Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Limits for radiated disturbance of Class B ITE at measuring distance of 3 m	
Frequency range (MHz)	Quasi-peak limits (dB μ V/m)
30 to 88	40
88 to 216	43.5
216 to 960	46
Above 960 MHz	54

Note: The lower limit shall apply at the transition frequency.

TEST PROCEDURE

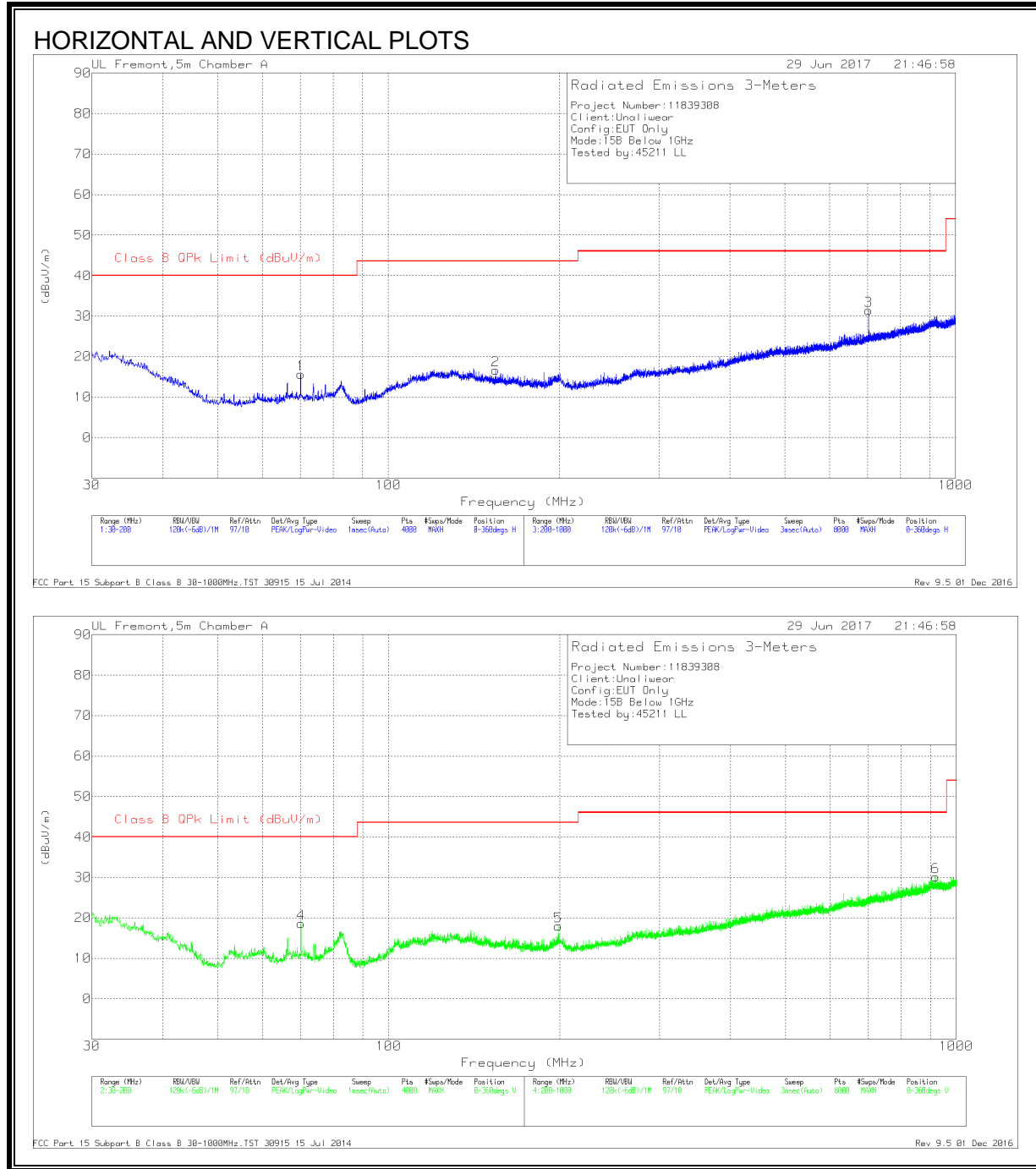
ANSI C63.4: 2014

The highest frequency generated or used in the EUT is 2462 MHz, therefore the frequency range was investigated from 30 MHz to 18 GHz.

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 108	1000
108-500	2000
500-1000	5000
Above 1000	5 th harmonic of the highest frequency or 40 GHz, whichever is lower

RESULTS

3 m RADIATED EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION)

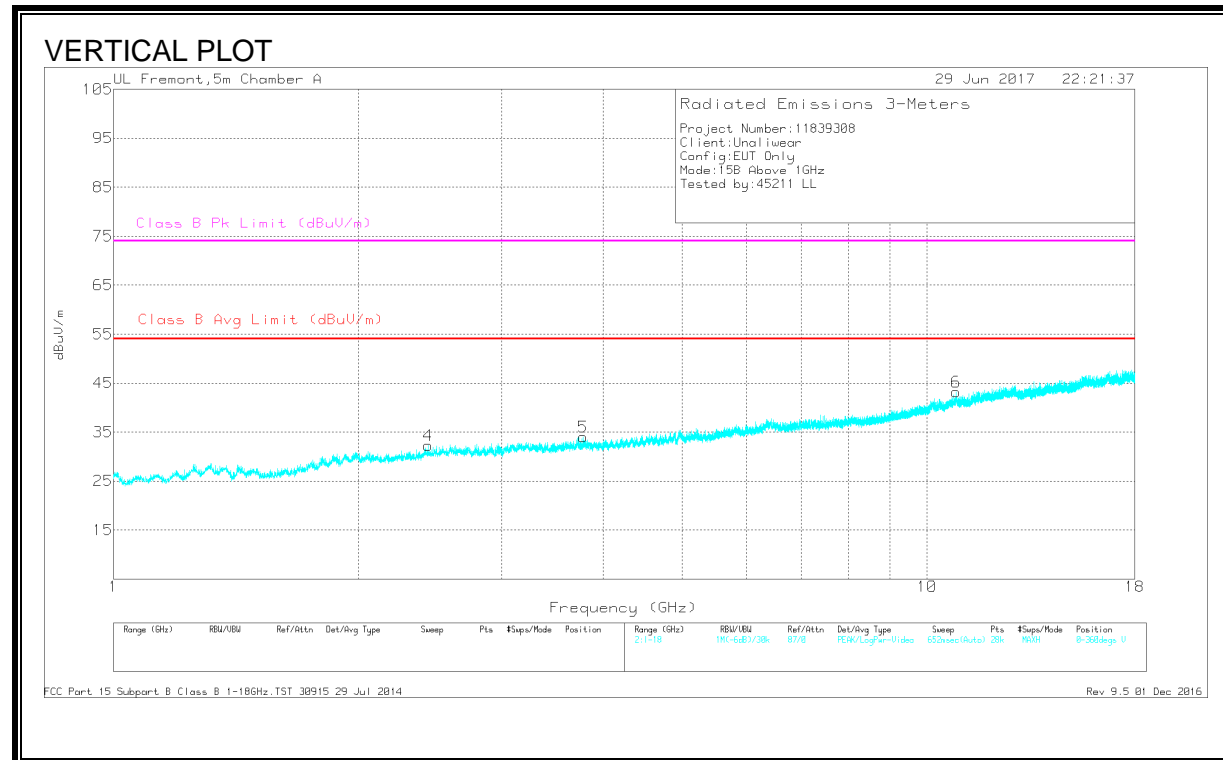
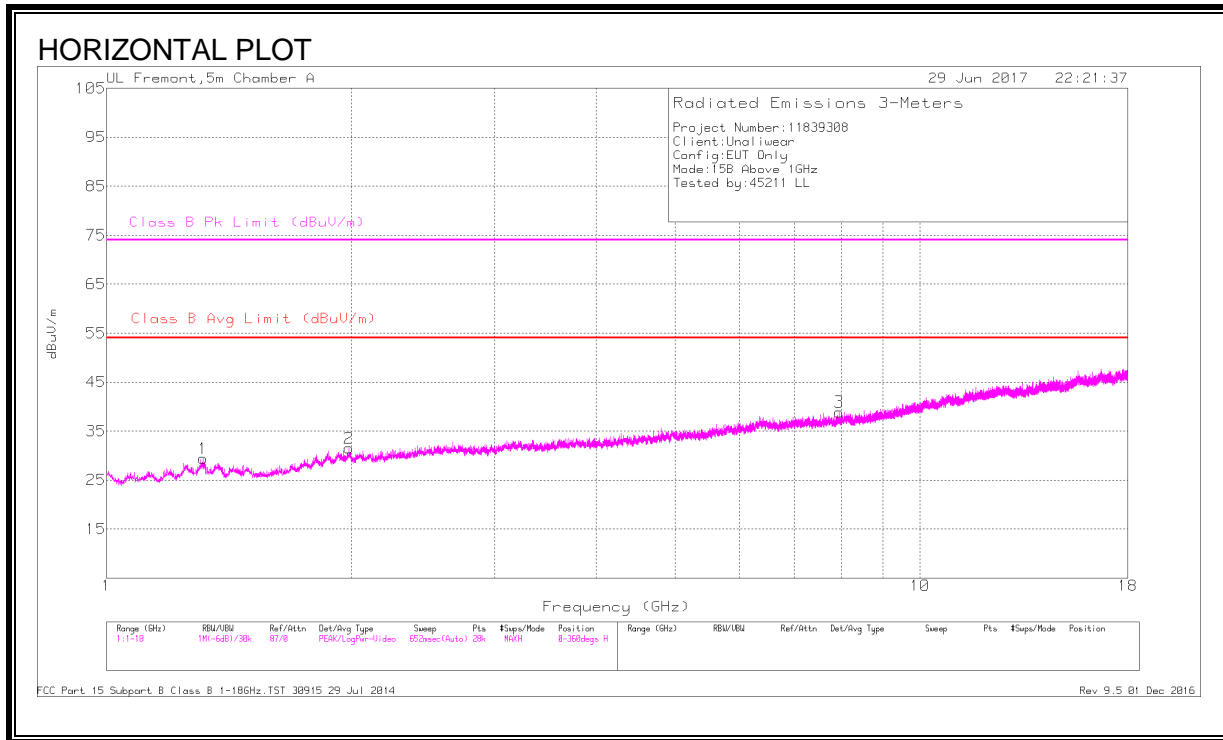


3 m WORST CASE EMISSIONS – DATA FOR 30 TO 1000 MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T130 (dB/m)	Amp/Cbl (dB/m)	Corrected Reading (dBuV/m)	Class B QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	70.0454	33.95	Pk	12.5	-30.8	15.65	40	-24.35	0-360	100	H
4	70.0454	36.86	Pk	12.5	-30.8	18.56	40	-21.44	0-360	100	V
2	154.4297	30.43	Pk	16.4	-30.2	16.63	43.52	-26.89	0-360	400	H
5	199.0662	31.08	Pk	16.7	-29.9	17.88	43.52	-25.64	0-360	100	V
3	703.2654	35.32	Pk	24.3	-28.2	31.42	46.02	-14.6	0-360	300	H
6	920.0936	30.41	Pk	26.9	-27.2	30.11	46.02	-15.91	0-360	101	V

Pk - Peak detector

3 m RADIATED EMISSIONS 1000 TO 18,000 MHz



3 m WORST CASE EMISSIONS – DATA FOR 1000 TO 18,000 MHz – FCC

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl (dB)	Corrected Reading dBuV/m	Class B Avg Limit (dBuV/m)	Margin (dB)	Class B Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.314	40.17	Pk	29.5	-33.3	36.37	-	-	74	-37.63	288	199	H
	1.314	27.86	Av	29.5	-33.3	24.06	54	-29.94	-	-	288	199	H
2	1.983	40.25	Pk	31.4	-32.5	39.15	-	-	74	-34.85	241	101	H
	1.983	27.28	Av	31.4	-32.5	26.18	54	-27.82	-	-	241	101	H
3	2.437	40.46	Pk	32.1	-31.7	40.86	-	-	74	-33.14	147	200	V
	2.437	26.28	Av	32.1	-31.7	26.68	54	-27.32	-	-	147	200	V
4	3.778	38.23	Pk	33.2	-29.8	41.63	-	-	74	-32.37	71	200	V
	3.778	25.24	Av	33.2	-29.8	28.64	54	-25.36	-	-	71	200	V
5	7.945	33.36	Pk	35.8	-23.4	45.76	-	-	74	-28.24	305	101	H
	7.945	20.73	Av	35.8	-23.4	33.13	54	-20.87	-	-	305	101	H
6	10.854	31.97	Pk	37.9	-19.1	50.77	-	-	74	-23.23	227	200	V
	10.854	19.01	Av	37.9	-19.1	37.81	54	-16.19	-	-	227	200	V

Pk - Peak detector
 Av - Average detection