

FCC 47 CFR PART 15 SUBPART C INDUSTRY CANADA (ISED CANADA) RSS-247 ISSUE 2

CLASS 2 PERMISSIVE CHANGE TEST REPORT

FOR

WIRELESS ACCESS POINT

MODEL NUMBER: E71-308-01

FCC ID: 2AL4H-E7130801 IC: 22737-E7130801

REPORT NUMBER: R11669553-E1

ISSUE DATE: 2017-07-10

Prepared for TELEFONIX, INC.
2340 ERNIE KRUEGER CIRCLE WAUKEGAN, IL 60097-3442 USA

Prepared by
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NVLAP LAB CODE 200246-0

Revision History

Ver.	Issue Date	Revisions	Revised By
1	2017-06-07	Initial Issue	Brian Kiewra
2	2017-06-30	Corrected directional gain in power for TxBF modes	Brian Kiewra
3	2017-07-06	Removed power and PSD measurements from modes that referenced original grant measurements.	Brian Kiewra
4	2017-07-10	Revised and added differences in section 1.2. Revised EUT description and antenna spec in sections 6.1 and 6.3. Revised worse-case configuration text section 6.5	Brian Kiewra

FORM NO: 03-EM-F00858 TEL: (919) 549-1400

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1. DATA REUSE

1.1. INTRODUCTION

The 15.247 antenna port test results for E71-308-01 are represented by Aruba APIN0324 and APIN0325 reports 31560844.001 (FCC ID: Q9DAPIN0324325, IC: 4675A-APIN0324325). This report contains conducted power measurements and full Radiated Emissions measurements.

Telefonix takes full responsibility that the data as referenced in reports 31560844.001 (FCC ID: Q9DAPIN0324325, IC: 4675A-APIN0324325) represent compliance for this FCC ID.

1.2. DIFFERENCES

Telefonix device E71-308-01 and Aruba device APIN0324/APIN0325 have identical RF circuit boards and antennas. Differences between the two devices are as follows: power was lowered in 11a/g modes, deactivation of BT, and internal antenna use only. Therefore, APIN0324/APIN0325 antenna port test results are used in this report to represent how E71-308-01 operates from a conducted perspective. The exception to this is the conducted power and PSD measurements made on E71-308-01. Power was required to be lowered for 802.11g and 802.11nHT20 modes for bandedge compliancy.

1.3. TESTING PERFORMED

Testing performed under this report (R11669553-E1) are Conducted Output power, PSD, and Radiated Emissions. All other data is referenced to report 31560844.001 (FCC ID: Q9DAPIN0324325, IC: 4675A-APIN0324325)

1.4. REFERENCE DETAIL SECTION

Equipment Class	Reference FCC ID	Type Grant	Grant Date	Report Number
DTS	FCC ID: Q9DAPIN0324325, IC: 4675A-APIN0324325	New	2015-07-21	31560844.001

2. ATTESTATION OF TEST RESULTS

COMPANY NAME: Telefonix, Inc.

2340 Ernie Krueger Circle Waukegan, IL 60097-3442 USA

EUT DESCRIPTION: Wireless Access Point

MODEL: E71-308-01

SERIAL NUMBER: 0000000068

DATE TESTED: 2017-04-20 to 2017-06-30

APPLICABLE STANDARDS					
STANDARD	TEST RESULTS				
CFR 47 Part 15 Subpart C	Pass				
INDUSTRY CANADA (ISED CANADA) RSS-247 Issue 2	Pass				
INDUSTRY CANADA (ISED 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, or any agency of the U.S. Government.

Approved & Released

For UL LLC By:

Prepared By:

Jeffrey Moser EMC Program Manager

UL – Consumer Technology Division

Brian T. Kiewra EMC Engineer

UL – Consumer Technology Division

Ful. 4

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3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2013, RSS-GEN Issue 4 and RSS-247 Issue 2.

4. 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 and 2800 Suite B, Perimeter Park Drive, Morrisville, NC 27560.

12 Laboratory Dr., RTP, NC 27709					
☐ Chamber A					
☐ Chamber C					
2800 Suite B Perimeter Park Dr.,					
Morrisville, NC 27560					
☐ Chamber NORTH					

The onsite chambers are covered under Industry Canada company address code 2180C with site numbers 2180C -1 through 2180C-4, respectively.

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

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5. CALIBRATION AND UNCERTAINTY

5.1. 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.

5.2. 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

5.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Occupied Channel Bandwidth	±2.00%
RF output power, conducted	±1.3 dB
Power Spectral Density, conducted	±2.47 dB
Unwanted Emissions, conducted	±2.94dB
All emissions, radiated	±5.36 dB
Temperature	±0.07°C
Supply voltages	±2.40%
Time	±3.39%

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

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6. EQUIPMENT UNDER TEST

6.1. DESCRIPTION OF EUT

The EUT is an 802.11a/b/g/n/ac transceiver. EUT is strictly non TxBF in 802.11b/g modes and strictly TxBF in 802.11n mode.

6.2. MAXIMUM OUTPUT POWER

The transmitter has combined maximum conducted average output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
(IVITIZ)		(ubiii)	(IIIVV)
2412 - 2462	802.11b ¹	23.95	248.31
2412 - 2462	802.11g	23.84	242.10
2412 - 2462	802.11nHT20	24.32	270.40
2422 - 2452	802.11nHT40 ¹	22.81	190.99

Note 1: Original power from report number 31560844.001 of TUV Rheinland.

6.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes 4 omnidirectional antennas, each with a maximum gain of 4 dBi.

6.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was ipq806xqdart_csu3_evm_dpd_fixes_bdf v6.4.4.4-4.2.3.2_54910.

The test utility software used during testing was QSPR, ver. 5.0.0.

6.5. WORST-CASE CONFIGURATION AND MODE

Spot checks were performed at 1-18GHz and only worst-case channel was tested below 1GHz and above 18GHz. Worst-case radiated emissions were performed with the EUT set to transmit at the channel with the highest output power as worst-case scenario. Based on power, 802.11nHT20 mode was tested to cover 802.11nHT40 as well.

The fundamental of the EUT was investigated in three orthogonal orientations X,Y,Z, it was determined that Y orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Y orientation.

Worst-case data rates as provided by the client were:

802.11b mode: 1 Mbps 802.11g mode: 6Mbps 802.11n HT20mode: MCS0

6.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List							
Description	Manufacturer	Model	Serial Number	FCC ID			
Laptop	Lenovo	T450s	PC-0A2UQS 16/01	NA			
Power Supply	Lenovo	ADLX65NLC2A	11S45N0259Z1ZS97597WTW	NA			

I/O CABLES

	I/O Cable List								
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks			
1	DMC-MD20A	3	Banana	3 conductor	>3m	AC Mains			
2	DMC-MD20A	3	RJ45	ENET	>3m	Used to configure EUT			
3	DMC-MD20A	3	D-Sub	Stranded	>3m	Terminated w/ D-Sub Connector			
4	Antenna	3	SMA	RF	<3m	None			

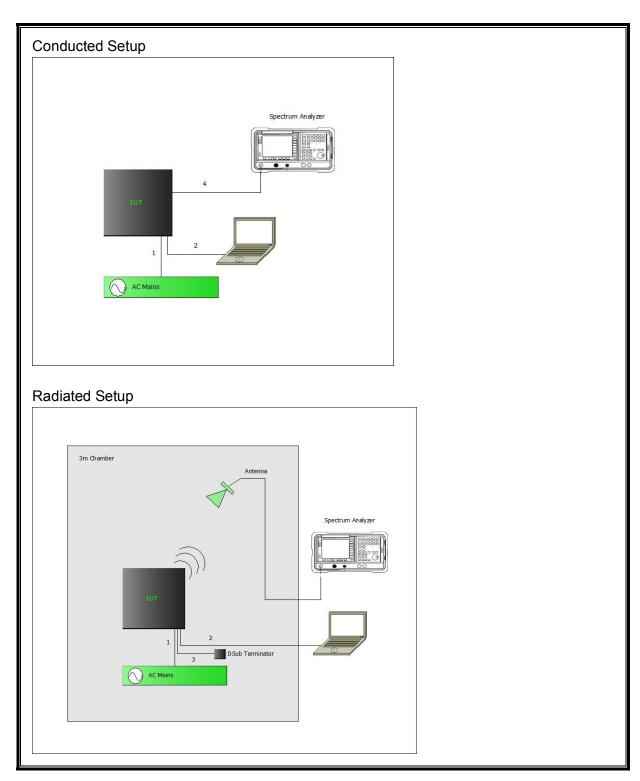
TEST SETUP

The EUT is installed as a standalone device.

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SETUP DIAGRAM FOR TESTS



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DATE: 2017-07-10

IC: 22737-E7130801

7. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville - South Chamber)

Equip.					
ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	30-1000 MHz				
AT0074	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2016-06-07	2017-06-30
	1-18 GHz				
AT0069	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2017-04-05	2018-04-05
	18-40 GHz				
AT0076	Horn Antenna, 18- 26.5GHz	ARA	MWH-1826/B	2016-09-06	2017-09-06
AT0077	Horn Antenna, 26-40GHz	ARA	MWH-2640/B	2016-09-06	2017-09-06
	Gain-Loss Chains				
S-SAC02	Gain-loss string: 30- 1000MHz	Various	Various	2016-06-26	2017-06-30
S-SAC03	Gain-loss string: 1- 18GHz	Various	Various	2016-08-28	2017-08-28
S-SAC04	Gain-loss string: 18- 40GHz	Various	Various	2017-03-03	2018-03-03
	Receiver & Software				
SA0025	Spectrum Analyzer	Agilent	N9030A	2017-04-10	2018-04-10
SA0026 (18- 40GHz RSE)	Spectrum Analyzer	Agilent	N9030A	2017-02-17	2018-02-28
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
	Additional Equipment used				
s/n 161024887	Environmental Meter	Fisher Scientific	15-077-963	2016-12-23	2018-12-23

Test Equipment Used - Wireless Conducted Measurement Equipment

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	Conducted Room 1				
SA0020	Spectrum Analyzer	Agilent Technologies	E4446A	2017-04-25	2018-04-25
PWM004	RF Power Meter	Keysight Technologies	N1911A	2016-06-22	2017-06-22
PWS003	Peak and Avg Power Sensor, 50MHz to 6GHz	Keysight Technologies	E9323A	2016-06-21	2017-06-21
SN 161024885	Environmental Meter	Fisher Scientific	15-077-963	2016-12-23	2018-12-23

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8. MEASUREMENT METHODS

On Time and Duty Cycle: KDB 558074 D01 v04, Section 6.0

Output Power: KDB 558074 D01 v04, Section 9.1.2.

Power Spectral Density: KDB 558074 D01 v04, Section 10.2.

Out-of-band emissions in non-restricted bands: KDB 558074 D01 v04, Section 11.0.

Out-of-band emissions in restricted bands: KDB 558074 D01 v04, Section 12.1.

Band-edge: KDB 558074 D01 v04, Section 13.3.1.

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9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

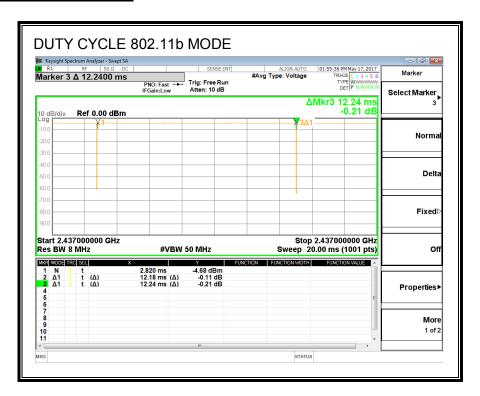
PROCEDURE

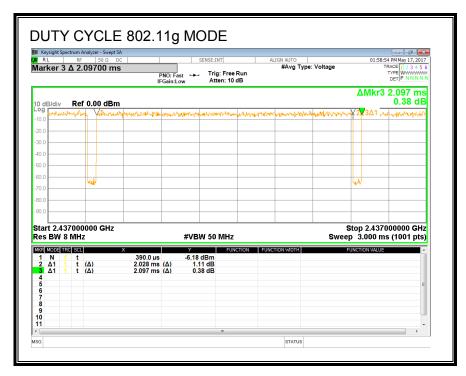
KDB 558074 Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS

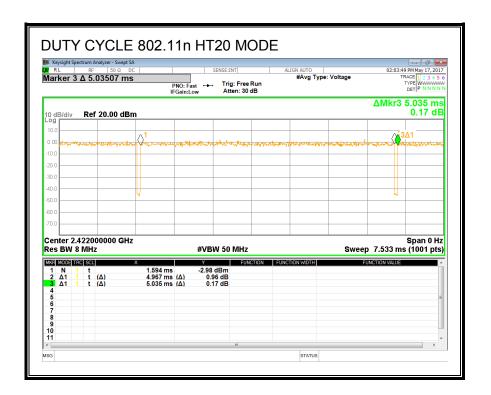
Mode	ON Time	Period	Duty Cycle	Duty	Duty Cycle	1/B
	В		x	Cycle	Correction Factor	Minimum VBW
	(msec)	(msec)	(linear)	(%)	(dB)	(kHz)
2.4GHz Band						
802.11b	12.180	12.240	0.995	99.51%	0.00	0.010
802.11g	2.028	2.097	0.967	96.71%	0.15	0.493
802.11n HT20	4.967	5.035	0.986	98.65%	0.00	0.010

DUTY CYCLE PLOTS





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Test Information

Date: 2017-05-17 Project: 11669553 Tester: John Manser

9.2. 802.11g MODE IN THE 2.4 GHz BAND

9.2.1. OUTPUT POWER

LIMITS

FCC §15.247 IC RSS-247 5.4

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

This EUT mode is 802.11g. No beamforming but cyclic delay diversity operation is assumed for this mode. However, acc. to KDB 66911, with $N_{ant} \le 4$ the array gain is zero. Total directional gain is equal to single antenna gain.

Chain 0	Chain 1	Chain 2	Chain 3	
Antenna	Antenna	Antenna	Antenna	Directional
Gain	Gain	Gain	Gain	Gain
(dBi)	(dBi)	(dBi)	(dBi)	(dBi)
4.00	4.00	4.00	4.00	4.00

RESULTS

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Limits

Channel	Frequency	Directional	FCC	IC	IC	Max
		Gain	Power	Power	EIRP	Power
			Limit	Limit	Limit	
	(MHz)	(dBi)	(dBm)	(dBm)	(dBm)	(dBm)
Low	2412	4.00	30.00	30	36	30.00
Low2	2417	4.00	30.00	30	36	30.00
Low3	2422	4.00	30.00	30	36	30.00
Low4	2427	4.00	30.00	30	36	30.00
Mid	2437	4.00	30.00	30	36	30.00
High3	2452	4.00	30.00	30	36	30.00
High2	2467	4.00	30.00	30	36	30.00
High	2462	4.00	30.00	30	36	30.00

Duty Cycle CF (dB) 0.00 Included in C	Calculations of Corr'd Power
---------------------------------------	------------------------------

Results

Channel	Frequency	Chain 0	Chain 1	Chain 2	Chain 3	Total	Power	Margin
		Meas	Meas	Meas	Meas	Corr'd	Limit	
		Power	Power	Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	2412	14.61	14.61	15.32	15.10	20.94	30.00	-9.06
Low2	2417	15.91	15.97	15.96	15.94	21.97	30.00	-8.03
Low3	2422	16.67	17.13	17.25	17.21	23.09	30.00	-6.91
Low4	2427	17.37	17.85	17.75	17.39	23.62	30.00	-6.38
Mid	2437	17.11	18.02	18.24	17.81	23.84	30.00	-6.16
High3	2452	17.57	17.67	17.55	17.75	23.66	30.00	-6.34
High2	2467	16.96	17.34	17.36	17.29	23.26	30.00	-6.74
High	2462	15.13	14.80	15.35	15.06	21.11	30.00	-8.89

Test Information

Date: 2017-04-20 and 2017-06-07

Project: 11669553

Tester: Jeff Cabrera and John Manser

TEL: (919) 549-1400

9.2.2. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 IC RSS-247 5.2

For digitally modulated systems, the power spectral density conducted form the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 KHz band during any time interval of continuous transmissions.

RESULTS

Antenna	10 * Log (4 chains)	Correlated Chains
Gain		Directional Gain
(dBi)	(dB)	(dBi)
4.00	6.02	10.02

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD

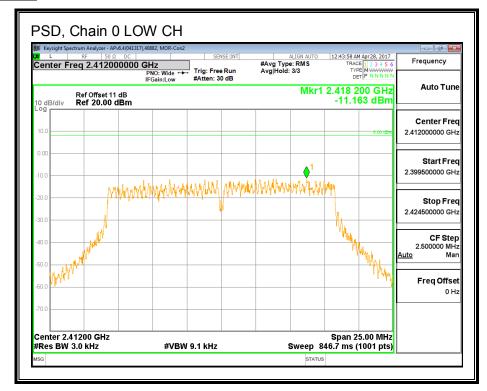
PSD Results

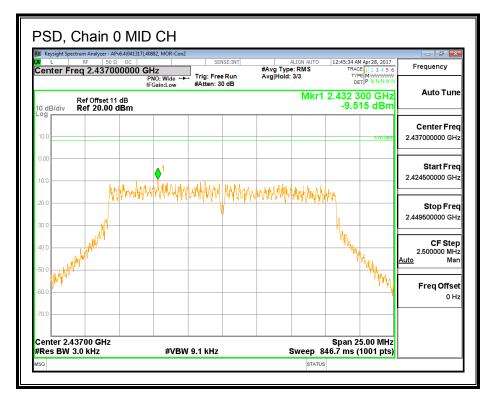
Channel	Frequency	Chain 0	Chain 1	Chain 2	Chain 3	Total	Limit	Margin
		Meas	Meas	Meas	Meas	PSD		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	2412	-11.16	-11.14	-9.02	-11.33	-4.53	8.0	-12.5
Mid	2437	-9.52	-8.47	-9.70	-9.60	-3.27	8.0	-11.3
High	2462	-10.28	-9.71	-9.03	-8.30	-3.24	8.0	-11.2

Test Information

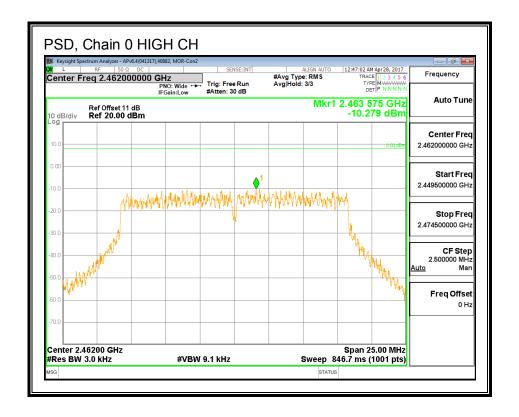
Date: 2017-04-28 Project: 11669553 Tester: Jeff Cabrera

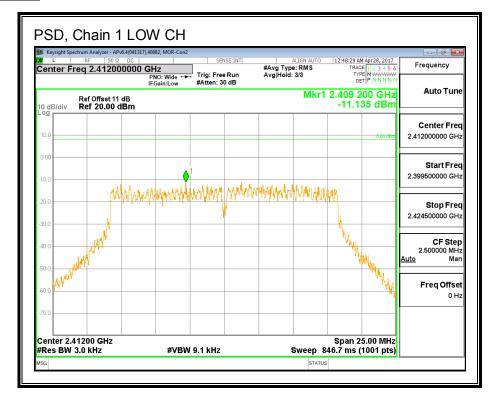
TEL: (919) 549-1400

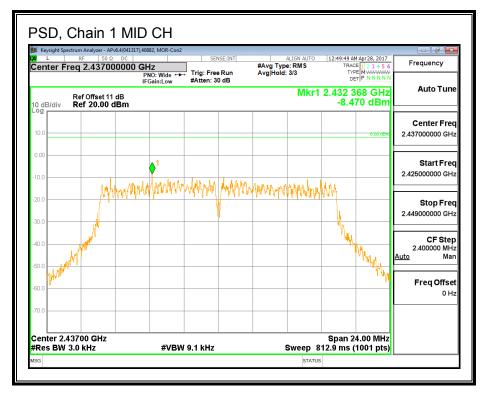




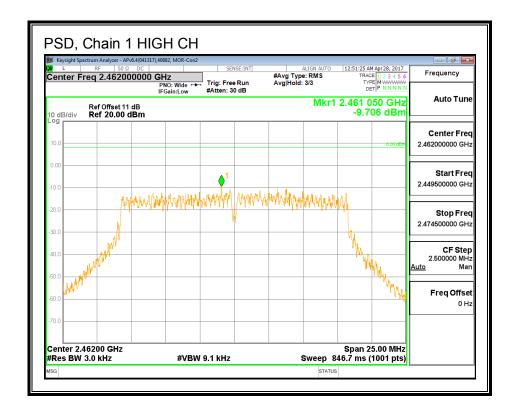
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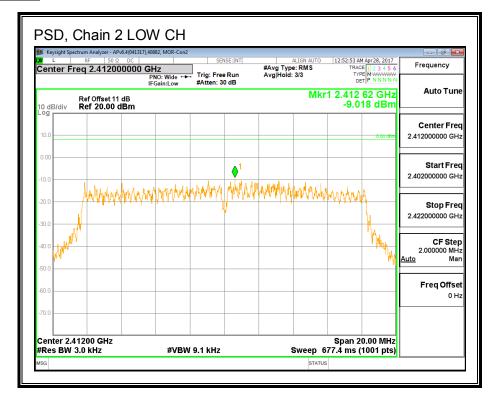


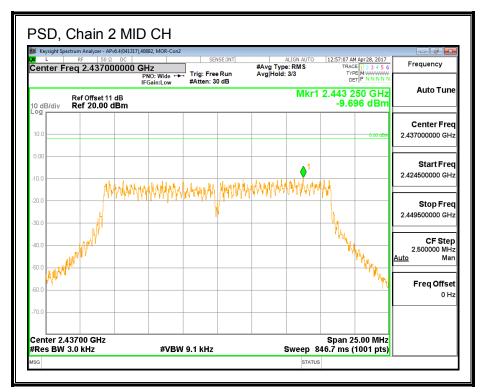




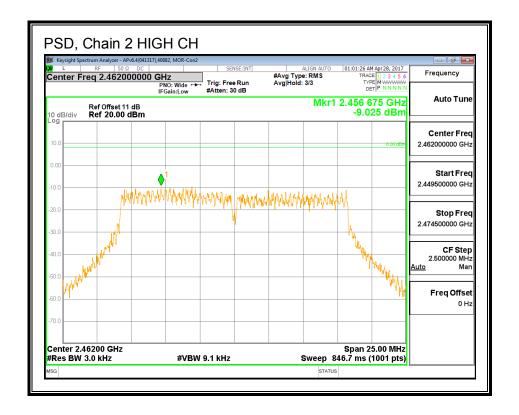
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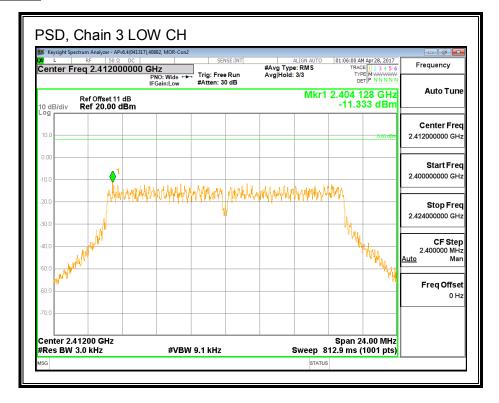


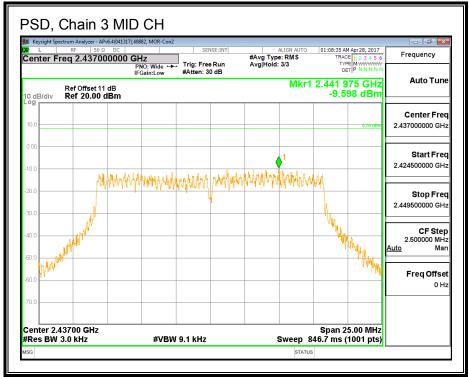




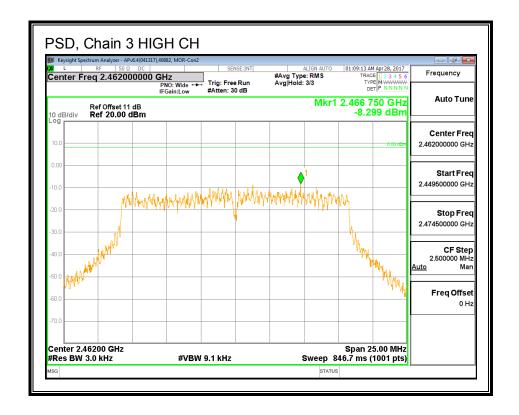
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9.1. 802.11n HT20 MODE IN THE 2.4 GHz BAND

9.1.1. OUTPUT POWER

LIMITS

FCC §15.247 IC RSS-247 5.4

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

This EUT mode is 802.11n. Per KDB 66911, with $N_{ant} \le 4$ the array gain is zero. Total directional gain is equal to single antenna gain.

Chain 0	Chain 1	Chain 2	Chain 3	
Antenna	Antenna	Antenna	Antenna	Directional
Gain	Gain	Gain	Gain	Gain
(dBi)	(dBi)	(dBi)	(dBi)	(dBi)
4.00	4.00	4.00	4.00	4.00

Results

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Limits

Channel	Frequency	Directional	FCC	IC	IC	Max
		Gain	Power	Power	EIRP	Power
			Limit	Limit	Limit	
	(MHz)	(dBi)	(dBm)	(dBm)	(dBm)	(dBm)
Low	2412	4.00	30.00	30	36	30.00
Low 1	2417	4.00	30.00	30	36	30.00
Low 2	2422	4.00	30.00	30	36	30.00
Mid	2437	4.00	30.00	30	36	30.00
High 2	2452	4.00	30.00	30	36	30.00
High 1	2457	4.00	30.00	30	36	30.00
High	2462	4.00	30.00	30	36	30.00

Duty Cycle CF (dB) 0.00	Included in Calculations of Corr'd Power
-------------------------	--

Results

Channel	Frequency	Chain 0	Chain 1	Chain 2	Chain 3	Total	Power	Margin
		Meas	Meas	Meas	Meas	Corr'd	Limit	
		Power	Power	Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	2412	12.93	13.17	13.41	13.15	19.19	30.00	-10.81
Low 1	2417	16.85	17.32	17.38	17.25	23.23	30.00	-6.77
Low 2	2422	17.93	18.26	18.35	18.07	24.18	30.00	-5.82
Mid	2437	18.21	17.73	18.29	18.05	24.10	30.00	-5.90
High 2	2452	17.94	18.34	18.40	18.51	24.32	30.00	-5.68
High 1	2457	17.65	17.97	18.12	18.02	23.96	30.00	-6.04
High	2462	15.83	16.03	16.25	16.20	22.10	30.00	-7.90

Test Information

Date: 2017-06-02 Project: 11669553 Tester: John Manser

TEL: (919) 549-1400

9.1.1. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 IC RSS-247 5.2

For digitally modulated systems, the power spectral density conducted form the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 KHz band during any time interval of continuous transmissions.

RESULTS

Antenna	10 * Log (4 chains) Correlated Chain		
Gain		Directional Gain	
(dBi)	(dB)	(dBi)	
4.00	6.02	10.02	

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD
--------------------	------	--

PSD Results

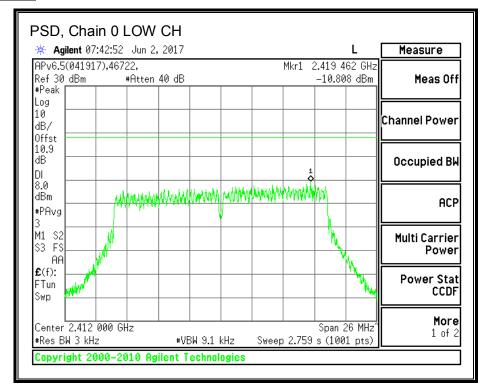
Channel	Frequency	Chain 0	Chain 1	Chain 2	Chain 3	Total	Limit	Margin			
		Meas	Meas	Meas	Meas	PSD					
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)			
Low	2412	-10.81	-12.24	-11.12	-11.84	-5.44	8.0	-13.4			
Mid	2437	-7.19	-5.80	-6.08	-6.39	-0.31	8.0	-8.3			
High	2462	-9.04	-9.31	-8.95	-8.74	-2.98	8.0	-11.0			

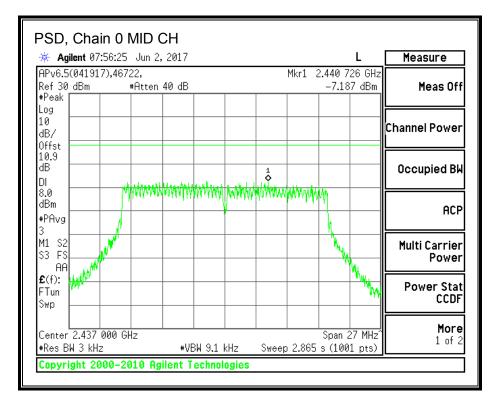
Test Information

UL LLC

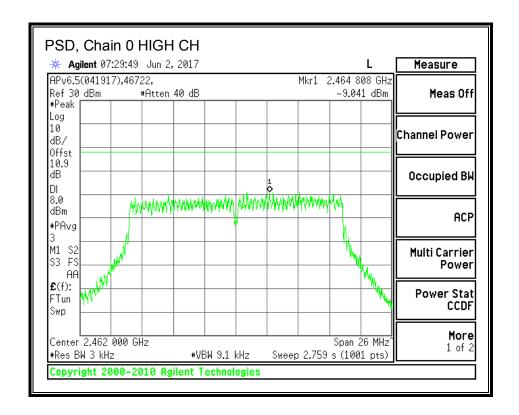
Date: 2017-06-02 Project: 11669553 Tester: John Manser

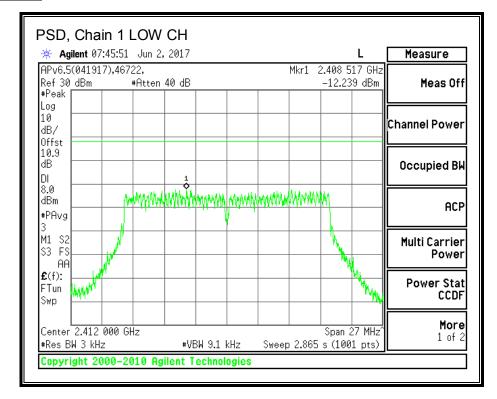
TEL: (919) 549-1400

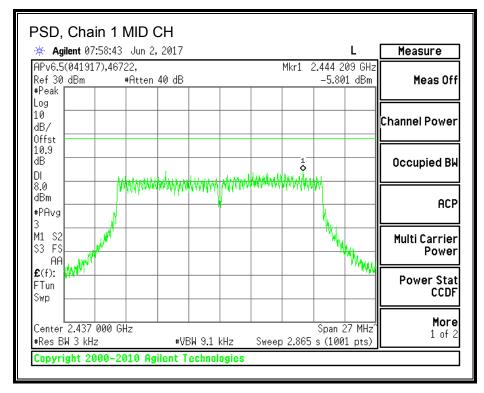




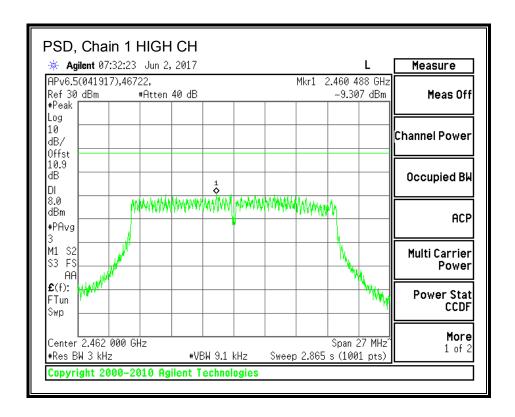
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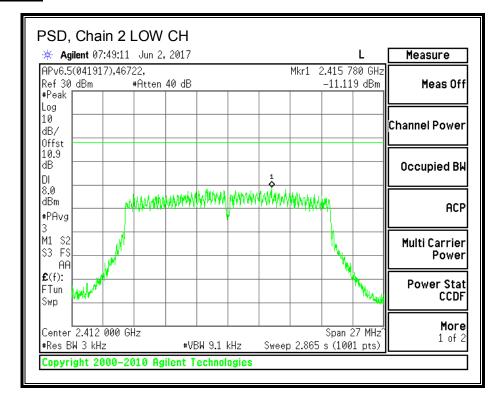


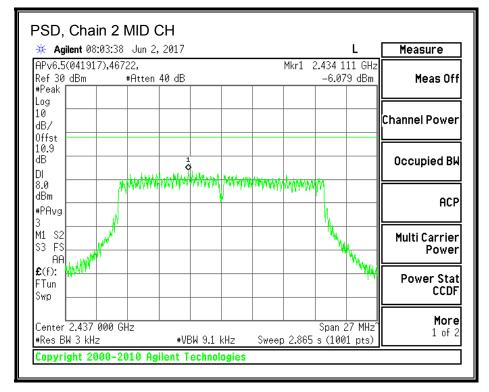




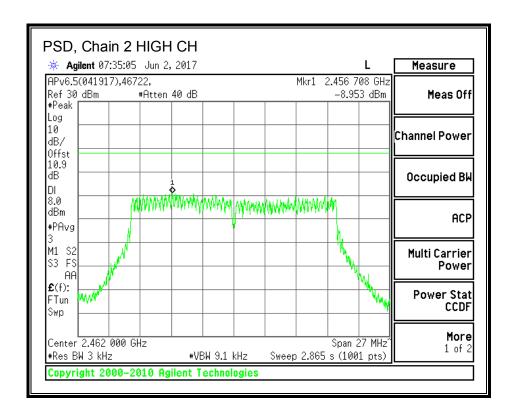
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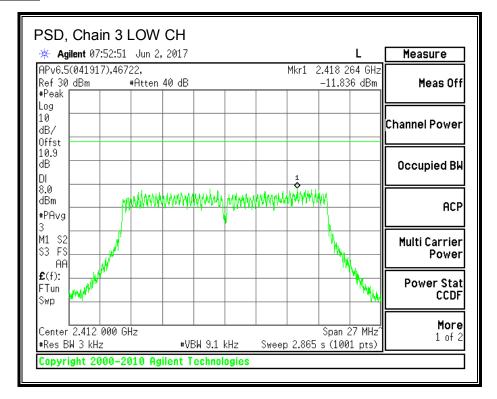


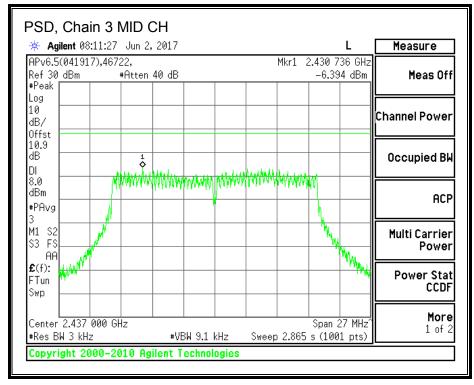


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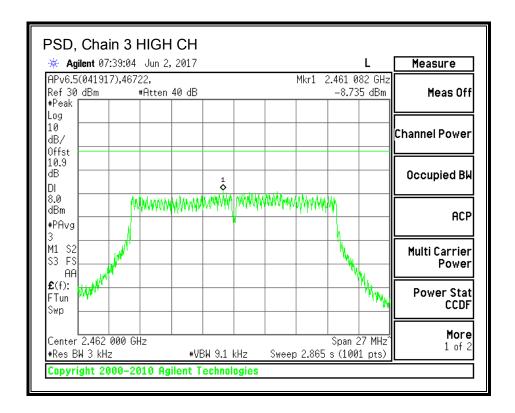


PSD, Chain 3





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REPORT NO: R11669553-E1 DATE: 2017-07-10 FCC ID: 2AL4H-E7130801 IC: 22737-E7130801

10. RADIATED TEST RESULTS

10.1. LIMITS AND PROCEDURE

FCC §15.205 and §15.209 IC RSS-GEN Clause 8.9 (Transmitter)

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for below 1GHz measurements and 1.5 m above the ground plane for above 1GHz measurements. The antenna to EUT distance is 3 meters.

For measurements below 1 GHz, the resolution bandwidth is set to 120 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For peak measurements above 1 GHz, the resolution bandwidth is set to 1 MHz and the video bandwidth is set to 3 MHz. For average measurements above 1GHz, the resolution bandwidth and video bandwidth are set as described in ANSI C63.10:2013 for the applicable measurement. The particular averaging method used for this test program was by RMS Averaging.

The spectrum from 1 to 18 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band. For below 1GHz and above 18 GHz, the worst-case channel was measured.

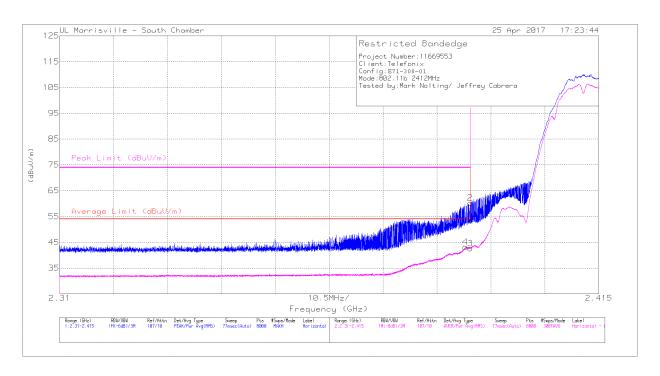
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

TEL: (919) 549-1400

10.2. TRANSMITTER ABOVE 1 GHz

10.2.1. TX ABOVE 1 GHz 802.11b MODE IN THE 2.4 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)



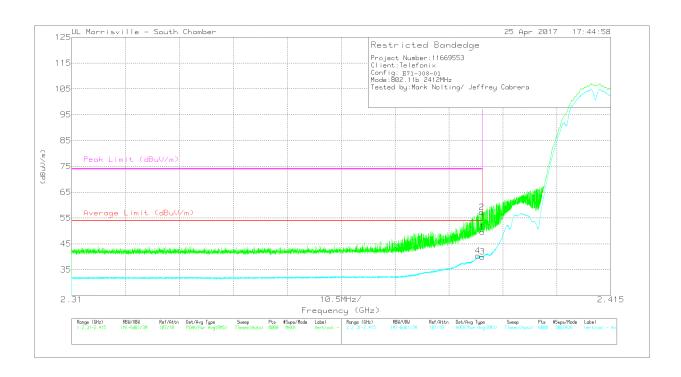
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 AF (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Limit	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	46.2	Pk	32	-24.5	0	53.7	-	-	74	-20.3	199	266	Н
2	* 2.39	52.73	Pk	32	-24.5	0	60.23	-	-	74	-13.77	199	266	Н
3	* 2.39	35.08	RMS	32	-24.5	0	42.58	54	-11.42	-	-	199	266	Н
4	* 2.389	35.66	RMS	32	-24.5	0	43.16	54	-10.84	-	-	199	266	Н

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

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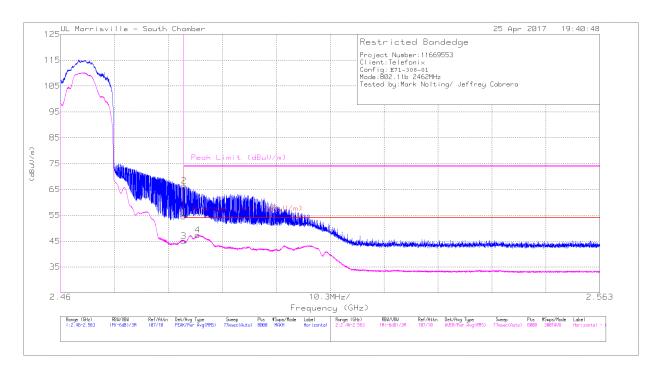


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det		Amp/Cbl/Fl tr/Pad (dB)	Corr	Corrected Reading (dBuV/m)	Limit	Margin (dB)	Peak Limit (dBuV/m)		Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	42.07	Pk	32	-24.5	0	49.57	-	-	74	-24.43	269	297	V
2	* 2.39	49.73	Pk	32	-24.5	0	57.23	-	-	74	-16.77	269	297	V
3	* 2.39	32.46	RMS	32	-24.5	0	39.96	54	-14.04	-	-	269	297	V
4	* 2.389	32.85	RMS	32	-24.5	0	40.35	54	-13.65	-	-	269	297	V

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

RMS - RMS detection

RESTRICTED BANDEDGE (HIGH CHANNEL)



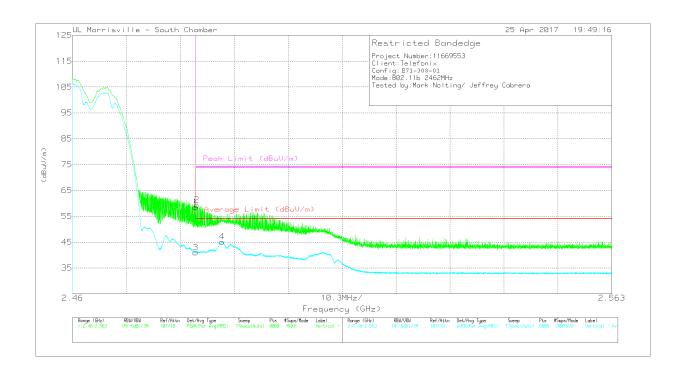
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 AF (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	(dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	46.53	Pk	32.4	-24.4	0	54.53	-	-	74	-19.47	175	264	Н
2	* 2.484	58.41	Pk	32.4	-24.4	0	66.41	-	-	74	-7.59	175	264	Н
3	* 2.484	36.97	RMS	32.4	-24.4	0	44.97	54	-9.03	-	-	175	264	Н
4	* 2.486	39.34	RMS	32.4	-24.4	0	47.34	54	-6.66	-	-	175	264	Н

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

UL LLC

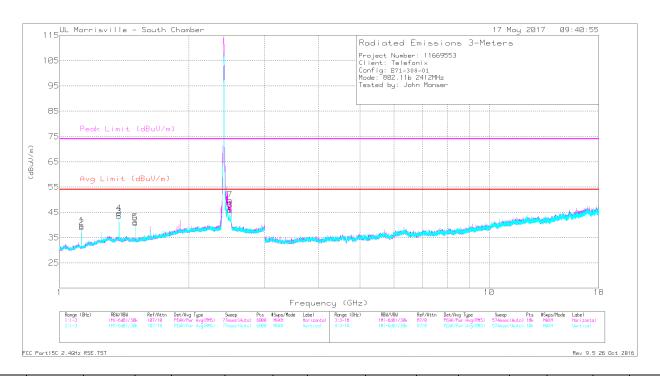


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 AF (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	50.52	Pk	32.4	-24.4	0	58.52	-	-	74	-15.48	218	320	V
2	* 2.484	51.35	Pk	32.4	-24.4	0	59.35	-	-	74	-14.65	218	320	V
3	* 2.484	33.03	RMS	32.4	-24.4	0	41.03	54	-12.97	-	-	218	320	V
4	* 2.489	37.12	RMS	32.4	-24.4	0	45.12	54	-8.88	-	-	218	320	V

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

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HARMONICS AND SPURIOUS EMISSIONS



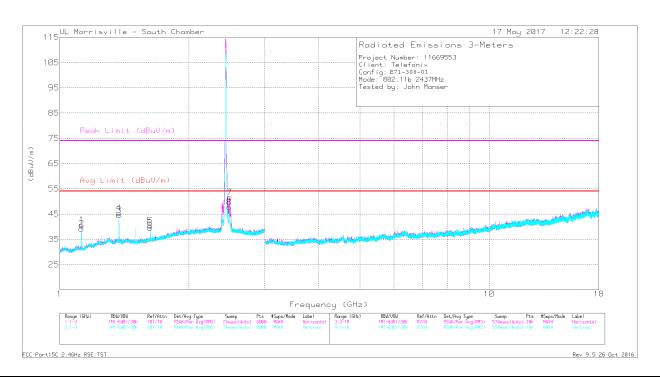
Marker	Freq (GHz)	Meter Reading	Det	AIUUng	Amp/Cbl /Fltr/Pad	DC Corr	Corrected Reading	Avg Limit (dBuV/m)	_	Peak Limit	PK Margin	Azimuth	Height	Polarity
	(GHZ)	(dBuV)		AF (UD/III)	(dB)	(dB)	(dBuV/m)	(ubuv/iii)	(ub)	(dBuV/m)		(Degs)	(CIII)	
1	* 1.125	41.07	PK2	27.6	-24.2	0	44.47	-	-	74	-29.53	109	187	Н
	* 1.125	36.25	MAv1	27.6	-24.2	0	39.65	54	-14.35	-	-	109	187	Н
3	* 1.375	41.17	PK2	28.9	-23	0	47.07	-	-	74	-26.93	88	199	Н
	* 1.375	36.28	MAv1	28.9	-23	0	42.18	54	-11.82	-	-	88	199	Н
5	* 1.5	39.47	PK2	27.9	-22.5	0	44.87	-	-	74	-29.13	344	109	Н
	* 1.5	32.92	MAv1	27.9	-22.5	0	38.32	54	-15.68	-	-	344	109	Н
7	* 2.489	46.55	PK2	32.4	-24.6	0	54.35	-	-	74	-19.65	96	233	Н
	* 2.493	36.5	MAv1	32.4	-24.6	0	44.3	54	-9.7	-	-	96	233	Н
2	* 1.125	39.84	PK2	27.6	-24.2	0	43.24	-	-	74	-30.76	116	111	V
	* 1.125	34.13	MAv1	27.6	-24.2	0	37.53	54	-16.47	-	-	116	111	V
4	* 1.375	41.45	PK2	28.9	-23	0	47.35	-	-	74	-26.65	278	107	V
	* 1.375	36.88	MAv1	28.9	-23	0	42.78	54	-11.22	-	-	278	107	V
6	* 1.5	38.86	PK2	27.9	-22.5	0	44.26	-	-	74	-29.74	24	107	V
	* 1.5	32.29	MAv1	27.9	-22.5	0	37.69	54	-16.31	-	-	24	107	V
8	* 2.492	47.24	PK2	32.4	-24.6	0	55.04	-	-	74	-18.96	155	352	V
	* 2.49	37.98	MAv1	32.4	-24.6	0	45.78	54	-8.22	-	-	155	352	V

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - Maximum Peak

MAv1 - Maximum RMS Average

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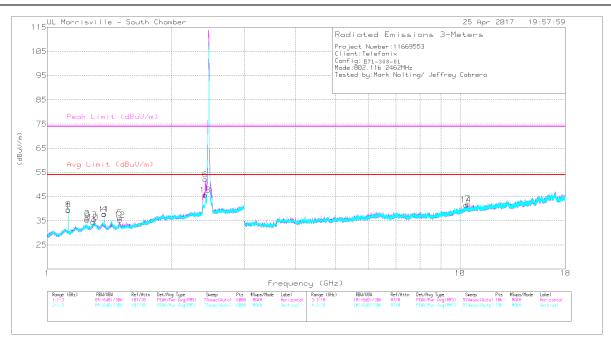


Marke r	Freq (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)		Azimuth (Degs)	Height (cm)	Polarity
1	* 1.125	40.54	PK2	27.6	-24.2	0	43.94	-	-	74	-30.06	115	191	Н
	* 1.125	35.51	MAv1	27.6	-24.2	0	38.91	54	-15.09	-	-	115	191	Н
3	* 1.375	42.14	PK2	28.9	-23	0	48.04	-	-	74	-25.96	282	163	Н
	* 1.375	38.27	MAv1	28.9	-23	0	44.17	54	-9.83	-	-	282	163	Н
5	* 1.625	39.17	PK2	28.4	-22.2	0	45.37	-	-	74	-28.63	222	174	Н
	* 1.625	31.85	MAv1	28.4	-22.2	0	38.05	54	-15.95	-	-	222	174	Н
7	* 2.488	50.54	PK2	32.4	-24.6	0	58.34	-	-	74	-15.66	175	271	Н
	* 2.486	42.89	MAv1	32.4	-24.6	0	50.69	54	-3.31	-	-	175	271	Н
2	* 1.125	39.42	PK2	27.6	-24.2	0	42.82	-	-	74	-31.18	74	102	V
	* 1.125	34.13	MAv1	27.6	-24.2	0	37.53	54	-16.47	-	-	74	102	V
4	* 1.375	42.1	PK2	28.9	-23	0	48	-	-	74	-26	276	104	V
	* 1.375	37.83	MAv1	28.9	-23	0	43.73	54	-10.27	-	-	276	104	V
6	* 1.625	39.34	PK2	28.4	-22.2	0	45.54	-	-	74	-28.46	211	208	V
	* 1.625	32.44	MAv1	28.4	-22.2	0	38.64	54	-15.36	-	-	211	208	V
8	* 2.484	46.83	PK2	32.4	-24.6	0	54.63	-	-	74	-19.37	116	258	V
	* 2.484	37.79	MAv1	32.4	-24.6	0	45.59	54	-8.41	-	-	116	258	V

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - Maximum Peak

MAv1 - Maximum RMS Average



Marker	Freq (GHz)	Meter Reading (dBuV)	Det	AT0067 AF (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	_	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.125	41.71	PK2	28.1	-26.6	0	43.21	-	-	74	-30.79	14	103	Н
	* 1.125	36.58	MAv1	28.1	-26.6	0	38.08	54	-15.92	-	-	14	103	Н
2	* 1.25	37.86	PK2	29.1	-25.9	0	41.06	-	-	74	-32.94	125	156	Н
	* 1.25	30.37	MAv1	29.1	-25.9	0	33.57	54	-20.43	-	-	125	156	Н
3	* 1.3	38.28	PK2	29.6	-25.7	0	42.18	-	-	74	-31.82	11	166	Н
	* 1.3	27.63	MAv1	29.6	-25.7	0	31.53	54	-22.47	-	-	11	166	Н
4	* 1.375	39.62	PK2	29.2	-25.4	0	43.42	-	-	74	-30.58	117	259	Н
	* 1.375	33.05	MAv1	29.2	-25.4	0	36.85	54	-17.15	-	-	117	259	Н
5	* 1.5	39.3	PK2	28	-24.9	0	42.4	-	-	74	-31.6	144	123	Н
	* 1.5	31.74	MAv1	28	-24.9	0	34.84	54	-19.16	-	-	144	123	Н
8	* 1.125	41.64	PK2	28.1	-26.6	0	43.14	-	-	74	-30.86	144	294	V
	* 1.125	37.15	MAv1	28.1	-26.6	0	38.65	54	-15.35	-	-	144	294	V
9	* 1.25	37.53	PK2	29.1	-25.9	0	40.73	-	-	74	-33.27	42	191	V
	* 1.25	28.17	MAv1	29.1	-25.9	0	31.37	54	-22.63	-	-	42	191	V
10	* 1.293	36.18	PK2	29.6	-25.7	0	40.08	-	-	74	-33.92	284	277	V
	* 1.294	24.26	MAv1	29.6	-25.7	0	28.16	54	-25.84	-	-	284	277	V
11	* 1.375	39.15	PK2	29.2	-25.4	0	42.95	-	-	74	-31.05	232	109	V
	* 1.375	32.13	MAv1	29.2	-25.4	0	35.93	54	-18.07	-	-	232	109	V
12	* 1.5	38.15	PK2	28	-24.9	0	41.25	-	-	74	-32.75	183	103	V
	* 1.5	30.41	MAv1	28	-24.9	0	33.51	54	-20.49	-	-	183	103	V
6	2.415	44.49	Pk	32.1	-24.5	0	52.09	-	-	-	-	0-360	199	Н
7	10.455	31.55	Pk	37.5	-27	0	42.05	-	-	-	-	0-360	102	Н
13	2.416	38.12	Pk	32.1	-24.5	0	45.72	-	-	-	-	0-360	102	V
14	10.335	30	Pk	37.4	-25.8	0	41.6	-	-	-	-	0-360	199	V

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - Maximum Peak

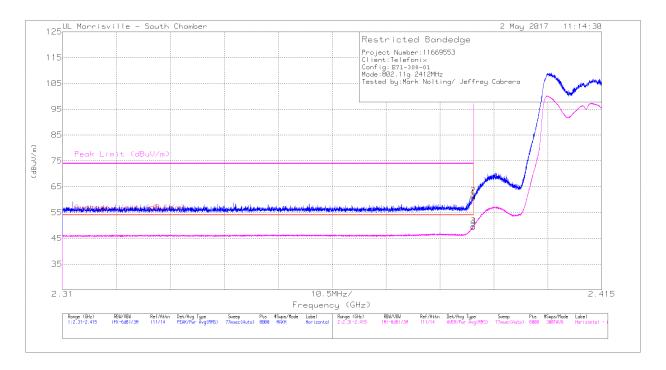
MAv1 - Maximum RMS Average

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UL LLC 12 Laboratory Dr., RTP, NC 27709 FORM NO: 03-EM-F00858 TEL: (919) 549-1400

10.2.2. TX ABOVE 1 GHz 802.11g MODE IN THE 2.4 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Pad (dB)	DC Corr (dB)	Reading	Limit	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	42.97	Pk	31.9	-24.1	10	0	60.77	-	-	74	-13.23	149	177	Н
2	* 2.39	43.7	Pk	31.9	-24.1	10	0	61.5	-	-	74	-12.5	149	177	Н
3	* 2.39	31.84	RMS	31.9	-24.1	10	.15	49.79	54	-4.21	-	-	149	177	Н
4	* 2.39	31.72	RMS	31.9	-24.1	10	.15	49.67	54	-4.33	-	-	149	177	Н

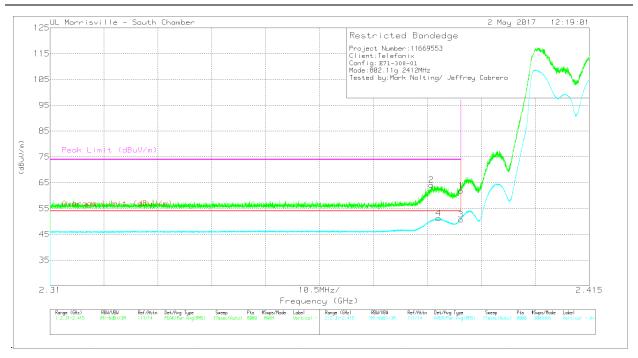
^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

UL LLC

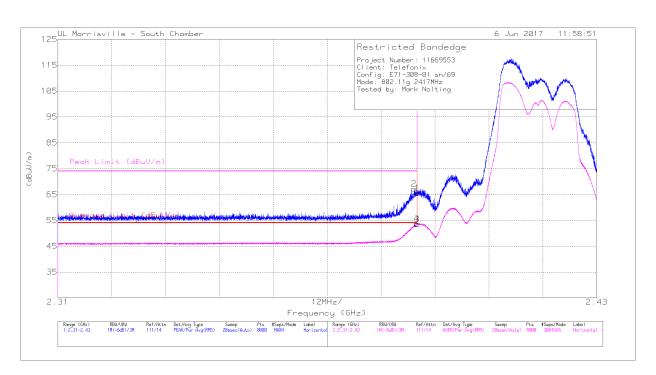
TEL: (919) 549-1400



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Limit	(dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	44.12	Pk	31.9	-24.1	10	0	61.92	-	-	74	-12.08	55	110	V
2	* 2.384	46.2	Pk	31.9	-24	10	0	64.1	-	-	74	-9.9	55	110	V
3	* 2.39	32.89	RMS	31.9	-24.1	10	.15	50.84	54	-3.16	-	-	55	110	V
4	* 2.386	33.3	RMS	31.9	-24	10	.15	51.35	54	-2.65	-	-	55	110	V

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

RMS - RMS detection

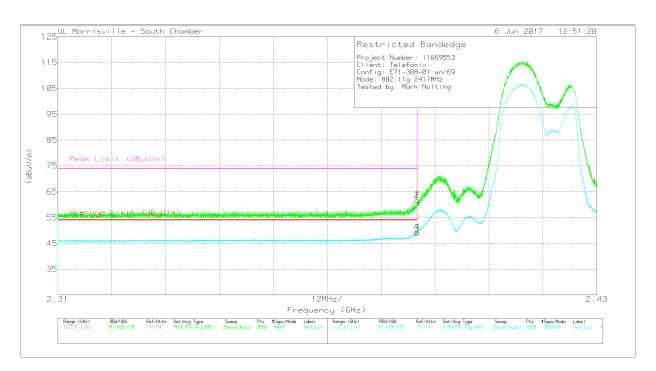


Mai	rker F	(GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Limit	(dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	2	* 2.389	49.34	Pk	31.9	-24.1	10	0	67.14	-	-	74	-6.86	200	127	Н
•	1	* 2.39	47.7	Pk	31.9	-24.1	10	0	65.5	-	-	74	-8.5	200	127	Н
:	3	* 2.39	35.53	RMS	31.9	-24.1	10	.15	53.48	54	52	-	-	200	127	Н
4	1	* 2.39	35.68	RMS	31.9	-24.1	10	.15	53.63	54	37	-	-	200	127	Н

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

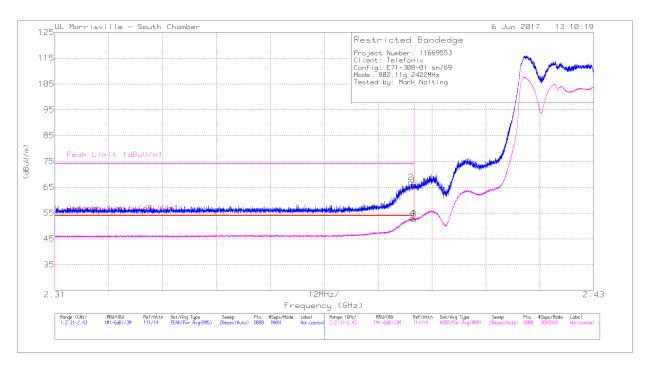
Pk - Peak detector RMS - RMS detection DATE: 2017-07-10

IC: 22737-E7130801



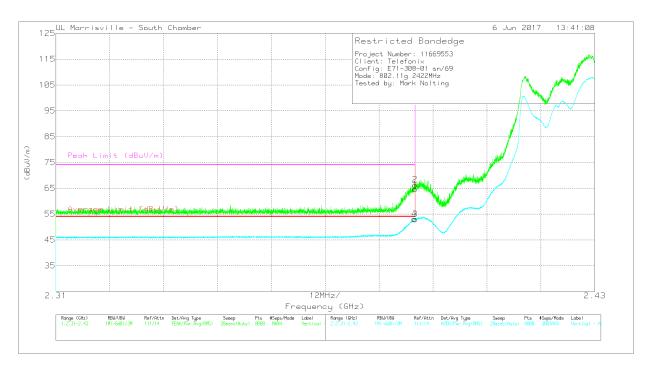
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl /Fltr/Pad (dB)	Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Limit	Margin (dB)	Peak Limit (dBuV/m)	wargin	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	43.86	Pk	31.9	-24.1	10	0	61.66	-	-	74	-12.34	261	318	V
2	* 2.39	43.91	Pk	31.9	-24.1	10	0	61.71	-	-	74	-12.29	261	318	V
3	* 2.39	31.14	RMS	31.9	-24.1	10	.15	49.09	54	-4.91	-	-	261	318	V
4	* 2.39	31.44	RMS	31.9	-24.1	10	.15	49.39	54	-4.61	-	-	261	318	V

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band



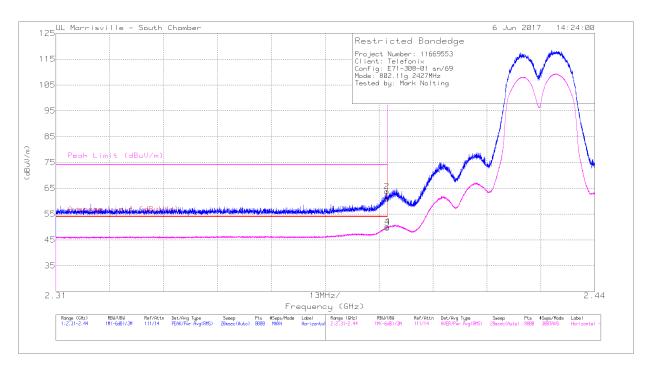
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl /Fltr/Pad (dB)	Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 2.389	49.14	Pk	31.9	-24.1	10	0	66.94	-	-	74	-7.06	285	101	Н
1	* 2.39	48	Pk	31.9	-24.1	10	0	65.8	-	-	74	-8.2	285	101	Н
3	* 2.39	34.62	RMS	31.9	-24.1	10	.15	52.57	54	-1.43	-	-	285	101	Н
4	* 2.39	35.05	RMS	31.9	-24.1	10	.15	53	54	-1	-	-	285	101	Н

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band



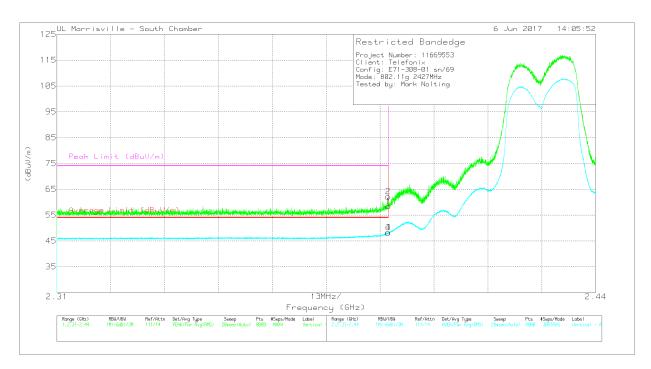
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	46.79	Pk	31.9	-24.1	10	0	64.59	-	-	74	-9.41	211	305	V
2	* 2.39	48.58	Pk	31.9	-24.1	10	0	66.38	-	-	74	-7.62	211	305	V
3	* 2.39	35.02	RMS	31.9	-24.1	10	.15	52.97	54	-1.03	-	-	211	305	V
4	* 2.39	35.15	RMS	31.9	-24.1	10	.15	53.1	54	9	-	-	211	305	V

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band Pk - Peak detector



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	43.14	Pk	31.9	-24.1	10	0	60.94	-	-	74	-13.06	261	387	Н
2	* 2.39	45.94	Pk	31.9	-24.1	10	0	63.74	-	-	74	-10.26	261	387	Н
3	* 2.39	31.8	RMS	31.9	-24.1	10	.15	49.75	54	-4.25	-	-	261	387	Н
4	* 2.39	32.16	RMS	31.9	-24.1	10	.15	50.11	54	-3.89	-	-	261	387	Н

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band Pk - Peak detector

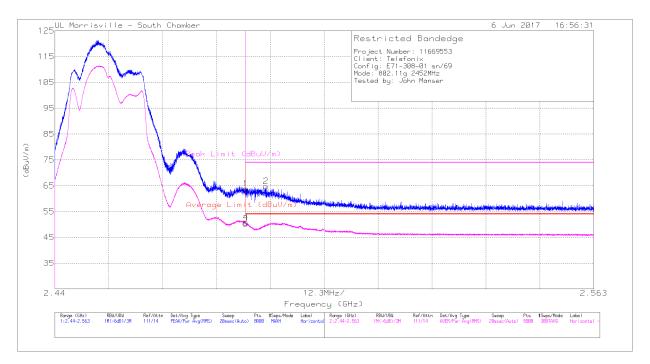


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Limit	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	40.6	Pk	31.9	-24.1	10	0	58.4	-	-	74	-15.6	199	258	V
2	* 2.39	44.34	Pk	31.9	-24.1	10	0	62.14	-	-	74	-11.86	199	258	V
3	* 2.39	30.25	RMS	31.9	-24.1	10	.15	48.2	54	-5.8	-	-	199	258	V
4	* 2.39	30.26	RMS	31.9	-24.1	10	.15	48.21	54	-5.79	-	-	199	258	V

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band Pk - Peak detector

REPORT NO: R11669553-E1 DATE: 2017-07-10 FCC ID: 2AL4H-E7130801 IC: 22737-E7130801

RESTRICTED BANDEDGE (HIGH CHANNEL)



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	46.09	Pk	32.4	-24.6	10	0	63.89	-	-	74	-10.11	3	239	Н
2	* 2.488	46.96	Pk	32.4	-24.6	10	0	64.76	-	-	74	-9.24	3	239	Н
3	* 2.484	32.34	RMS	32.4	-24.6	10	.15	50.29	54	-3.71	-	-	3	239	Н
4	* 2.484	32.81	RMS	32.4	-24.6	10	.15	50.76	54	-3.24	-	-	3	239	Н

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

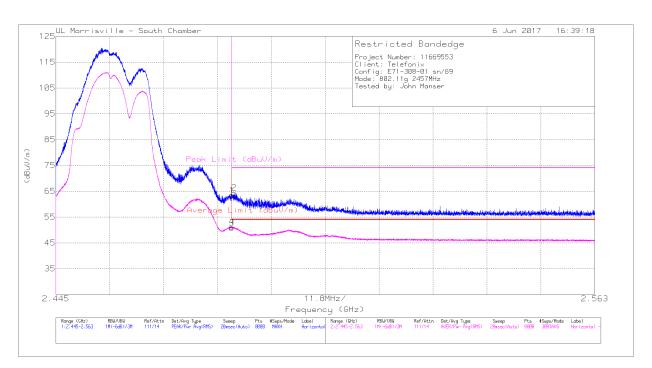
TEL: (919) 549-1400



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	42.6	Pk	32.4	-24.6	10	0	60.4	-	-	74	-13.6	193	352	V
3	* 2.484	30.21	RMS	32.4	-24.6	10	.15	48.16	54	-5.84	-	-	193	352	V
2	* 2.486	45.67	Pk	32.4	-24.6	10	0	63.47	-	-	74	-10.53	193	352	V
4	* 2.487	32.41	RMS	32.4	-24.6	10	.15	50.36	54	-3.64	-	-	193	352	V

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

RMS - RMS detection

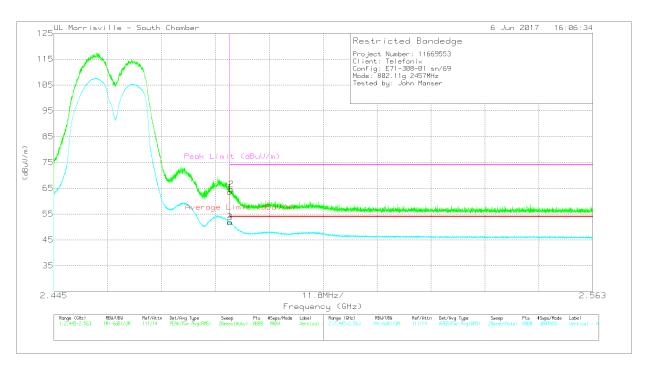


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	45.59	Pk	32.4	-24.6	10	0	63.39	-	-	74	-10.61	0	352	Н
2	* 2.484	46.51	Pk	32.4	-24.6	10	0	64.31	-	-	74	-9.69	0	352	Н
3	* 2.484	32.87	RMS	32.4	-24.6	10	.15	50.82	54	-3.18	-	-	0	352	Н
4	* 2.484	33.17	RMS	32.4	-24.6	10	.15	51.12	54	-2.88	-	-	0	352	Н

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

RMS - RMS detection

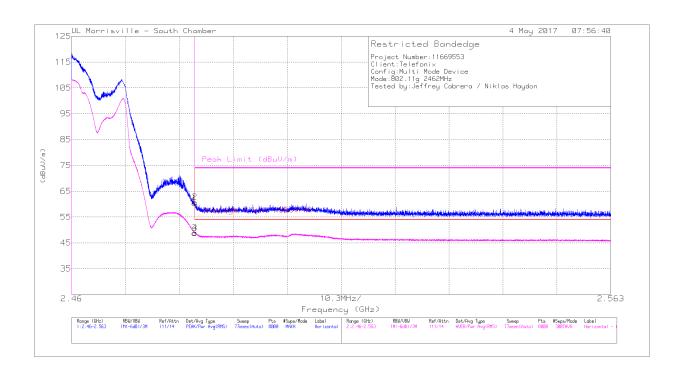
TEL: (919) 549-1400



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl /Fltr/Pad (dB)	Pad	DC Corr (dB)	Corrected Reading (dBuV/m)	Limit	(dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	45.72	Pk	32.4	-24.6	10	0	63.52	-	-	74	-10.48	179	308	V
2	* 2.484	46.74	Pk	32.4	-24.6	10	0	64.54	-	-	74	-9.46	179	308	V
3	* 2.484	33.86	RMS	32.4	-24.6	10	.15	51.81	54	-2.19	-	-	179	308	V
4	* 2.484	33.81	RMS	32.4	-24.6	10	.15	51.76	54	-2.24	-	-	179	308	V

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

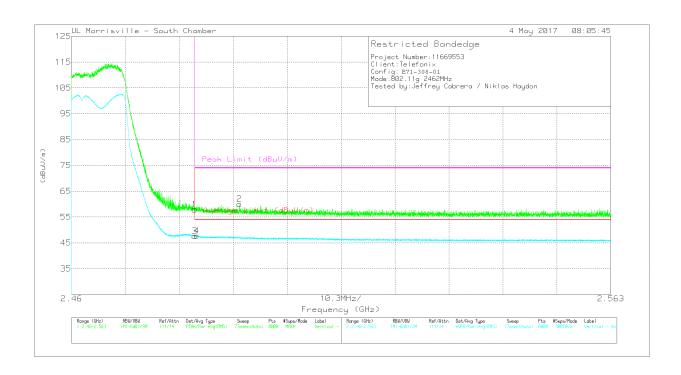
RMS - RMS detection



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	42.61	Pk	32.4	-24.6	10	0	60.41	-	-	74	-13.59	160	244	Н
2	* 2.484	42.96	Pk	32.4	-24.6	10	0	60.76	-	-	74	-13.24	160	244	Н
3	* 2.484	30.93	RMS	32.4	-24.6	10	.15	48.88	54	-5.12	-	-	160	244	Н
4	* 2.484	31.06	RMS	32.4	-24.6	10	.15	49.01	54	-4.99	-	-	160	244	Н

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector RMS - RMS detection



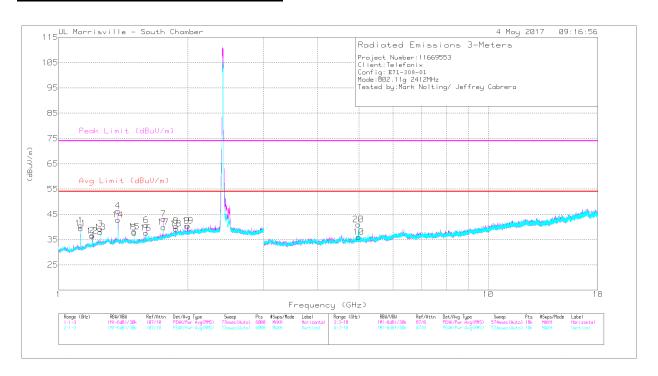
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	40.12	Pk	32.4	-24.6	10	0	57.92	-	-	74	-16.08	143	357	V
2	* 2.492	42.21	Pk	32.4	-24.6	10	0	60.01	-	-	74	-13.99	143	357	V
3	* 2.484	29.75	RMS	32.4	-24.6	10	.15	47.7	54	-6.3	-	-	143	357	V
4	* 2.484	29.99	RMS	32.4	-24.6	10	.15	47.94	54	-6.06	-	-	143	357	V

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector RMS - RMS detection

REPORT NO: R11669553-E1 DATE: 2017-07-10 FCC ID: 2AL4H-E7130801 IC: 22737-E7130801

HARMONICS AND SPURIOUS EMISSIONS



Marker	Freq. (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	_	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.125	40.23	PK2	27.6	-24.2	0	43.63	-	-	74	-30.37	154	216	Н
	* 1.125	35.08	MAv1	27.6	-24.2	.15	38.63	54	-15.37	-	-	154	216	Н
2	* 1.199	37.9	PK2	28.3	-23.8	0	42.4	-	-	74	-31.6	76	303	Н
	* 1.199	23.34	MAv1	28.3	-23.8	.15	27.99	54	-26.01	-	-	76	303	Н
3	* 1.25	37.68	PK2	28.6	-23.4	0	42.88	-	-	74	-31.12	300	302	Н
	* 1.25	28.71	MAv1	28.6	-23.4	.15	34.06	54	-19.94	-	-	300	302	Н
4	* 1.375	38.1	PK2	28.9	-23	0	44	-	-	74	-30	85	304	Н
	* 1.375	30.49	MAv1	28.9	-23	.15	36.54	54	-17.46	-	-	85	304	Н
5	* 1.5	38.44	PK2	27.9	-22.5	0	43.84	-	-	74	-30.16	150	305	Н
	* 1.5	31.37	MAv1	27.9	-22.5	.15	36.92	54	-17.08	-	-	150	305	Н
6	* 1.596	42.09	PK2	28.3	-22.3	0	48.09	-	-	74	-25.91	333	297	Н
	* 1.6	24.02	MAv1	28.3	-22.3	.15	30.17	54	-23.83	-	-	333	297	Н
10	* 4.99	46.65	PK2	34	-31.4	0	49.25	-	-	74	-24.75	184	211	Н
	* 4.99	27.92	MAv1	34	-31.4	.15	30.67	54	-23.33	-	-	184	211	Н
11	* 1.125	41.83	PK2	27.6	-24.2	0	45.23	-	-	74	-28.77	131	291	V
	* 1.125	37.9	MAv1	27.6	-24.2	.15	41.45	54	-12.55	-	-	131	291	V
12	* 1.197	39.85	PK2	28.2	-23.8	0	44.25	-	-	74	-29.75	200	239	V
	* 1.196	23.54	MAv1	28.2	-23.8	.15	28.09	54	-25.91	-	-	200	239	V
13	* 1.25	38.1	PK2	28.6	-23.4	0	43.3	-	-	74	-30.7	133	235	V
	* 1.25	29.45	MAv1	28.6	-23.4	.15	34.8	54	-19.2	-	-	133	235	V
14	* 1.375	39.97	PK2	28.9	-23	0	45.87	-	-	74	-28.13	42	238	V
	* 1.375	34.77	MAv1	28.9	-23	.15	40.82	54	-13.18	-	-	42	238	V
15	* 1.5	38.17	PK2	27.9	-22.5	0	43.57	-	-	74	-30.43	314	234	V
	* 1.5	30.69	MAv1	27.9	-22.5	.15	36.24	54	-17.76	-	-	314	234	V

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REPORT NO: R11669553-E1 DATE: 2017-07-10 FCC ID: 2AL4H-E7130801 IC: 22737-E7130801

Marker	Freq. (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	_	Peak Limit (dBuV/m)		Azimuth (Degs)	Height (cm)	Polarity
16	* 1.598	45.05	PK2	28.3	-22.3	0	51.05	-	-	74	-22.95	50	220	V
	* 1.599	24.31	MAv1	28.3	-22.3	.15	30.46	54	-23.54	-	-	50	220	V
20	* 4.983	50.34	PK2	34	-31.4	0	52.94	-	-	74	-21.06	264	182	V
	* 4.983	28.25	MAv1	34	-31.4	.15	31	54	-23	-	-	264	182	V
17	1.753	32.58	Pk	29.5	-22.2	0	39.88	-	-	-	-	0-360	101	V
7	1.754	35.92	Pk	29.5	-22.2	0	43.22	-	-	-	-	0-360	199	Н
8	1.875	31.97	Pk	30.7	-22.3	0	40.37	-	-	-	-	0-360	102	Н
9	1.991	31.92	Pk	31.1	-22.6	0	40.42	-	-	-	-	0-360	199	Н
18	1.875	30.87	Pk	30.7	-22.3	0	39.27	-	-	-	-	0-360	199	V
19	2	32.01	Pk	31.1	-22.7	0	40.41	-	-	-	-	0-360	101	V

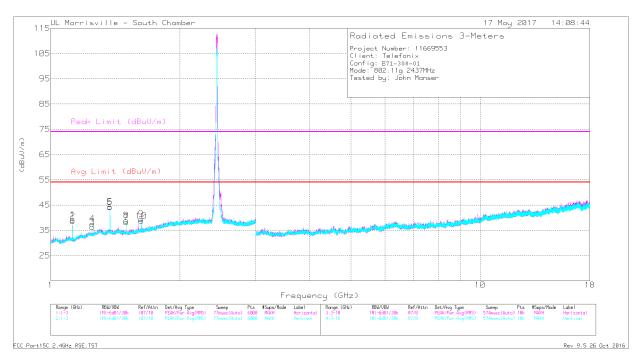
^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

PK2 - Maximum Peak

MAv1 - Maximum RMS Average

TEL: (919) 549-1400



Marker	Freq (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.125	40.43	PK2	27.6	-24.2	0	43.83	-	-	74	-30.17	111	193	Н
	* 1.125	35.64	MAv1	27.6	-24.2	.15	39.19	54	-14.81	-	-	111	193	Н
3	* 1.25	37.18	PK2	28.6	-23.4	0	42.38	-	-	74	-31.62	119	178	Н
	* 1.25	28.2	MAv1	28.6	-23.4	.15	33.55	54	-20.45	-	-	119	178	Н
5	* 1.375	41.42	PK2	28.9	-23	0	47.32	-	-	74	-26.68	87	204	Н
	* 1.375	37.03	MAv1	28.9	-23	.15	43.08	54	-10.92	-	-	87	204	Н
7	* 1.5	38.6	PK2	27.9	-22.5	0	44	•	-	74	-30	345	103	Н
	* 1.5	30.85	MAv1	27.9	-22.5	.15	36.4	54	-17.6	-	-	345	103	Н
9	* 1.625	39.09	PK2	28.4	-22.2	0	45.29	-	-	74	-28.71	214	172	Н
	* 1.625	32.94	MAv1	28.4	-22.2	.15	39.29	54	-14.71	-	-	214	172	Н
2	* 1.125	39.14	PK2	27.6	-24.2	0	42.54	-	-	74	-31.46	128	169	V
	* 1.125	33.33	MAv1	27.6	-24.2	.15	36.88	54	-17.12	-	-	128	169	V
4	* 1.25	36.09	PK2	28.6	-23.4	0	41.29	-	-	74	-32.71	60	126	V
	* 1.25	26.57	MAv1	28.6	-23.4	.15	31.92	54	-22.08	-	-	60	126	V
6	* 1.375	41.54	PK2	28.9	-23	0	47.44	-	-	74	-26.56	270	107	V
	* 1.375	37.48	MAv1	28.9	-23	.15	43.53	54	-10.47	-	-	270	107	V
8	* 1.5	37.95	PK2	27.9	-22.5	0	43.35	-	-	74	-30.65	20	339	V
	* 1.5	30.69	MAv1	27.9	-22.5	.15	36.24	54	-17.76	-	-	20	339	V
10	* 1.625	39.03	PK2	28.4	-22.2	0	45.23	-	-	74	-28.77	17	367	V
	* 1.625	31.97	MAv1	28.4	-22.2	.15	38.32	54	-15.68	-	-	17	367	V

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

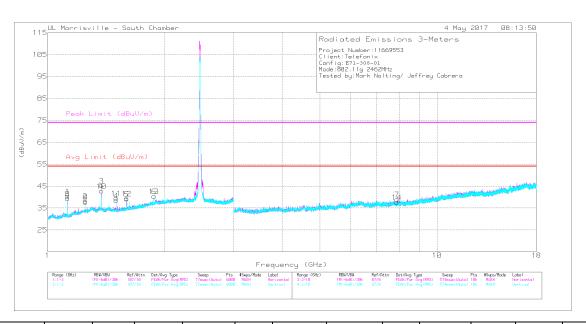
PK2 - Maximum Peak

UL LLC

MAv1 - Maximum RMS Average

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FORM NO: 03-EM-F00858 TEL: (919) 549-1400



Marker	Freq	Meter Reading	Det	AT0069 AF	Amp/Cbl/ Fltr/Pad	DC Corr	Corrected Reading	Avg Limit	_	Peak Limit	PK Margin	Azimuth	Height	Polarity
	(GHz)	(dBuV)		(dB/m)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV/m)	(dB)	(Degs)	(cm)	
1	* 1.125	40.11	PK2	27.6	-24.2	0	43.51	-	-	74	-30.49	89	102	Н
	* 1.125	35.17	MAv1	27.6	-24.2	.15	38.72	54	-15.28	-	-	89	102	Н
2	* 1.25	38.63	PK2	28.6	-23.4	0	43.83	-	-	74	-30.17	109	127	Н
	* 1.25	31.93	MAv1	28.6	-23.4	.15	37.28	54	-16.72	-	-	109	127	Н
3	* 1.375	43.62	PK2	28.9	-23	0	49.52	-	-	74	-24.48	190	130	Н
	* 1.375	40.53	MAv1	28.9	-23	.15	46.58	54	-7.42	-	-	190	130	Н
4	* 1.5	38.87	PK2	27.9	-22.5	0	44.27	-	-	74	-29.73	356	260	Н
	* 1.5	31.77	MAv1	27.9	-22.5	.15	37.32	54	-16.68	-	-	356	260	Н
5	* 1.597	44.39	PK2	28.3	-22.3	0	50.39	-	-	74	-23.61	336	249	Н
	* 1.596	24.81	MAv1	28.3	-22.3	.15	30.96	54	-23.04	-	-	336	249	Н
8	* 1.125	40.44	PK2	27.6	-24.2	0	43.84	-	-	74	-30.16	158	244	V
	* 1.125	35.53	MAv1	27.6	-24.2	.15	39.08	54	-14.92	-	-	158	244	V
9	* 1.25	37.36	PK2	28.6	-23.4	0	42.56	-	-	74	-31.44	95	255	V
	* 1.25	29.49	MAv1	28.6	-23.4	.15	34.84	54	-19.16	-	-	95	255	V
10	* 1.375	40.72	PK2	28.9	-23	0	46.62	-	-	74	-27.38	170	120	V
	* 1.375	35.94	MAv1	28.9	-23	.15	41.99	54	-12.01	-	-	170	120	V
11	* 1.5	39.48	PK2	27.9	-22.5	0	44.88	-	-	74	-29.12	177	112	V
	* 1.5	32	MAv1	27.9	-22.5	.15	37.55	54	-16.45	-	-	177	112	V
12	* 1.597	40.65	PK2	28.3	-22.3	0	46.65	-	-	74	-27.35	46	150	V
	* 1.598	23.78	MAv1	28.3	-22.3	.15	29.93	54	-24.07	-	-	46	150	V
6	1.875	31.98	Pk	30.7	-22.3	0	40.38	-	-	-	-	0-360	100	Н
7	7.898	31.28	Pk	35.8	-28.1	0	38.98	-	-	-	-	0-360	102	Н
13	1.875	31.98	Pk	30.7	-22.3	0	40.38	-	-	-	-	0-360	101	V
14	7.877	29.92	Pk	35.8	-28	0	37.72	-	-	-	-	0-360	199	V

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - Maximum Peak

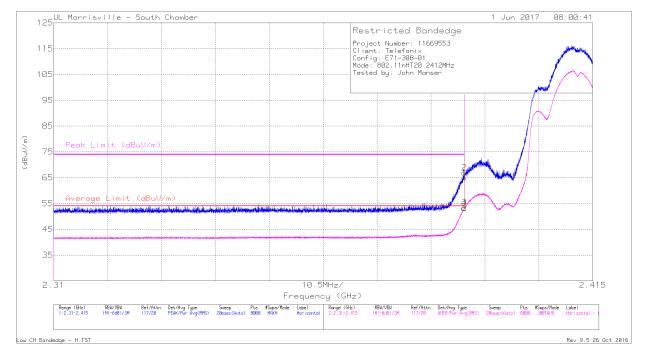
MAv1 - Maximum RMS Average

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UL LLC 12 Laboratory Dr., RTP, NC 27709 FORM NO: 03-EM-F00858 TEL: (919) 549-1400

10.2.1. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 2.4 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	57.28	Pk	31.9	-24.1	65.08	-	-	74	-8.92	8	327	Н
2	* 2.39	59.12	Pk	31.9	-24.1	66.92	-	-	74	-7.08	8	327	Н
3	* 2.39	45.56	RMS	31.9	-24.1	53.36	54	64	-	-	8	327	Н
4	* 2.39	45.36	RMS	31.9	-24.1	53.16	54	84	-	-	8	327	Н

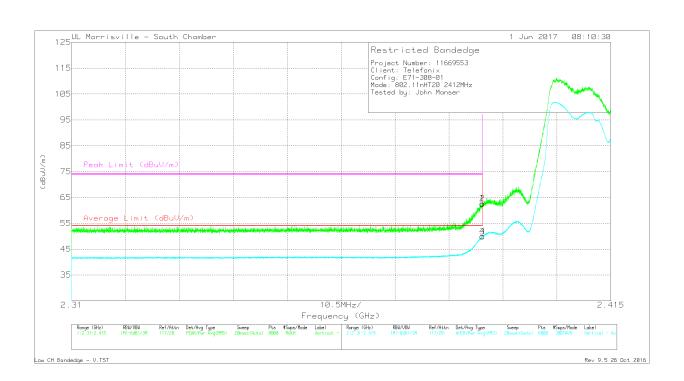
^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

UL LLC

TEL: (919) 549-1400



Marker	Frequency (GHz)	Meter Reading (dBuV)		AT0069 AF (dB/m)	Amp/Cbl /Fitr/Pad (dB)		Corrected Reading (dBuV/m)	Limit	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	54.75	Pk	31.9	-24.1	0	62.55	-	-	74	-11.45	316	390	V
2	* 2.39	54.83	Pk	31.9	-24.1	0	62.63	-	-	74	-11.37	316	390	V
3	* 2.39	42.01	RMS	31.9	-24.1	0	49.81	54	-4.19	-	-	316	390	V
4	* 2.39	42.14	RMS	31.9	-24.1	0	49.94	54	-4.06	-	-	316	390	V

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

RMS - RMS detection

DATE: 2017-07-10

IC: 22737-E7130801

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Limit	(dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	48.64	Pk	31.9	-24.1	10	0	66.44	-	-	74	-7.56	350	222	Н
2	* 2.387	49.16	Pk	31.9	-24.1	10	0	66.96	-	-	74	-7.04	350	222	Н
3	* 2.39	33.24	RMS	31.9	-24.1	10	0	51.04	54	-2.96	-	-	350	222	Н
4	* 2.388	35.88	RMS	31.9	-24.1	10	0	53.68	54	32	-	-	350	222	Н

12.5MHz/

Frequency (GHz)

| Ref/Attn | Det/Avg Tupe | Sueep | Pts | \$\frac{1}{2}\text{Nym} / Nde | Label | Range (BHz) | 111/14 | PEAK/Plur Avg(RMS) | 20\text{Neco}(Auto) | 8000 | MAXH | Horizonta | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435 | 2;2:31-2:435

Pk - Peak detector RMS - RMS detection

2.31

FORM NO: 03-EM-F00858

DATE: 2017-07-10

2.435

 Ref/Attn
 Det/Avg Type
 Sweep
 Pts
 \$swps/Mode
 Lobe!

 111/14
 AVER/Pur Avg(RMS)
 28msec(Auto)
 8000
 300TAV6
 Horizontal

IC: 22737-E7130801

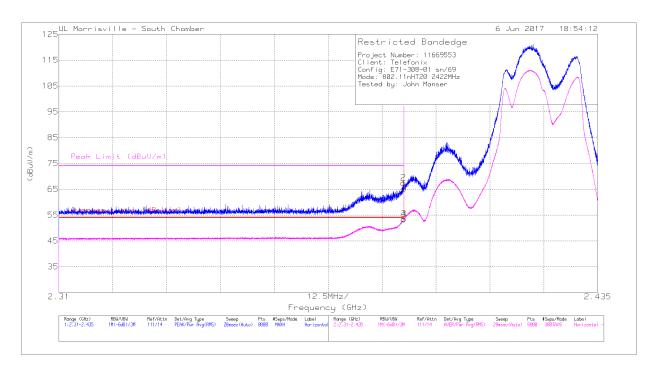
^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	44.53	Pk	31.9	-24.1	10	0	62.33	-	-	74	-11.67	253	270	V
2	* 2.39	46.76	Pk	31.9	-24.1	10	0	64.56	-	-	74	-9.44	253	270	V
3	* 2.39	33.3	RMS	31.9	-24.1	10	0	51.1	54	-2.9	-	-	253	270	V
4	* 2.39	33.45	RMS	31.9	-24.1	10	0	51.25	54	-2.75	-	-	253	270	V

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

RMS - RMS detection



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	(dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	47.28	Pk	31.9	-24.1	10	0	65.08	-	-	74	-8.92	347	231	Н
2	* 2.39	49.67	Pk	31.9	-24.1	10	0	67.47	-	-	74	-6.53	347	231	Н
3	* 2.39	35.75	RMS	31.9	-24.1	10	0	53.55	54	45	-	-	347	231	Н
4	* 2.39	35.52	RMS	31.9	-24.1	10	0	53.32	54	68	-	-	347	231	Н

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

RMS - RMS detection



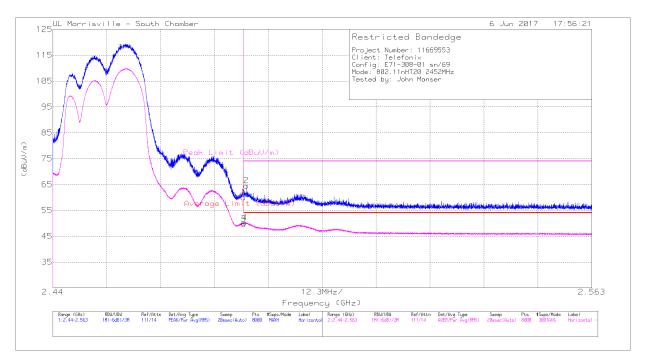
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	(dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	40.81	Pk	31.9	-24.1	10	0	58.61	-	-	74	-15.39	247	267	V
2	* 2.386	48.67	Pk	31.9	-24.1	10	0	66.47	-	-	74	-7.53	247	267	V
3	* 2.39	29.85	RMS	31.9	-24.1	10	0	47.65	54	-6.35	-	-	247	267	V
4	* 2.387	33.89	RMS	31.9	-24.1	10	0	51.69	54	-2.31	-	-	247	267	V

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

RMS - RMS detection

REPORT NO: R11669553-E1 DATE: 2017-07-10 FCC ID: 2AL4H-E7130801 IC: 22737-E7130801

RESTRICTED BANDEDGE (HIGH CHANNELS)



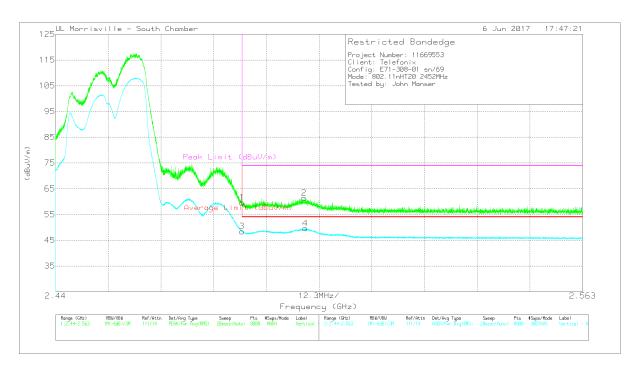
Marker	Frequency (GHz)	Meter Reading (dBuV)		AT0069 AF (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Limit	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	42.25	Pk	32.4	-24.6	10	0	60.05	-	-	74	-13.95	244	344	Н
2	* 2.484	46.76	Pk	32.4	-24.6	10	0	64.56	-	-	74	-9.44	244	344	Н
3	* 2.484	31.95	RMS	32.4	-24.6	10	0	49.75	54	-4.25	-	-	244	344	Н
4	* 2.484	32.43	RMS	32.4	-24.6	10	0	50.23	54	-3.77	-	-	244	344	Н

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

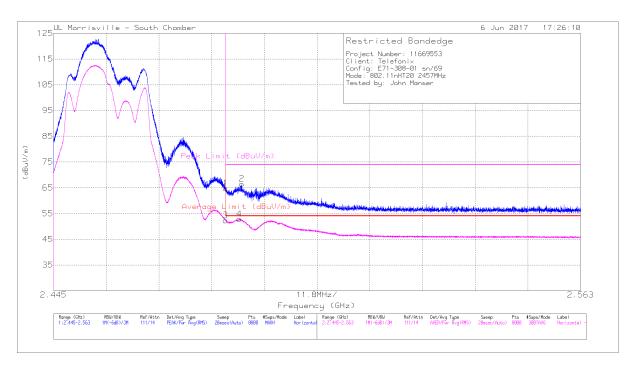
TEL: (919) 549-1400



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl /Fltr/Pad (dB)	Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	41.86	Pk	32.4	-24.6	10	0	59.66	-	-	74	-14.34	274	341	V
2	* 2.498	43.75	Pk	32.3	-24.6	10	0	61.45	-	-	74	-12.55	274	341	V
3	* 2.484	30.63	RMS	32.4	-24.6	10	0	48.43	54	-5.57	-	-	274	341	V
4	* 2.498	31.9	RMS	32.3	-24.6	10	0	49.6	54	-4.4	-	-	274	341	V

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

RMS - RMS detection



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl /Fltr/Pad (dB)	Pad	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	(dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	46.97	Pk	32.4	-24.6	10	0	64.77	-	-	74	-9.23	338	260	Н
2	* 2.487	48.7	Pk	32.4	-24.6	10	0	66.5	-	-	74	-7.5	338	260	Н
3	* 2.484	34.52	RMS	32.4	-24.6	10	0	52.32	54	-1.68	-	-	338	260	Н
4	* 2.487	35.09	RMS	32.4	-24.6	10	0	52.89	54	-1.11	-	-	338	260	Н

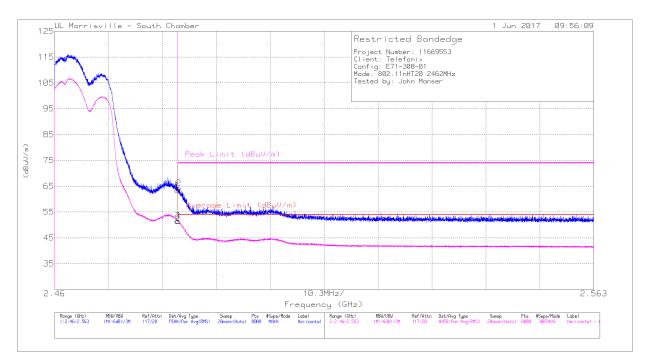
^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

RMS - RMS detection



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	43.95	Pk	32.4	-24.6	10	0	61.75	-	-	74	-12.25	322	300	V
2	* 2.491	45.92	Pk	32.4	-24.6	10	0	63.72	-	-	74	-10.28	322	300	V
3	* 2.484	31.26	RMS	32.4	-24.6	10	0	49.06	54	-4.94	-	-	322	300	V
4	* 2.492	33.32	RMS	32.4	-24.6	10	0	51.12	54	-2.88	-	-	322	300	V

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band Pk - Peak detector



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	55.63	Pk	32.4	-24.6	0	63.43	-	-	74	-10.57	278	126	Н
2	* 2.484	56.38	Pk	32.4	-24.6	0	64.18	-	-	74	-9.82	278	126	Н
3	* 2.484	43.69	RMS	32.4	-24.6	0	51.49	54	-2.51	-	-	278	126	Н
4	* 2.484	43.79	RMS	32.4	-24.6	0	51.59	54	-2.41	-	-	278	126	Н

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

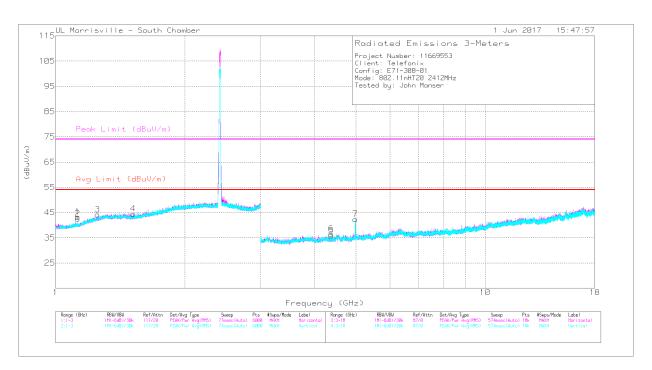


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	DC Corr (dB)				Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	50.18	Pk	32.4	-24.6	0	57.98	-	-	74	-16.02	118	122	V
2	* 2.484	51.6	Pk	32.4	-24.6	0	59.4	-	-	74	-14.6	118	122	V
3	* 2.484	37.89	RMS	32.4	-24.6	0	45.69	54	-8.31	-	-	118	122	V
4	* 2.484	38.24	RMS	32.4	-24.6	0	46.04	54	-7.96	-	-	118	122	V

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS



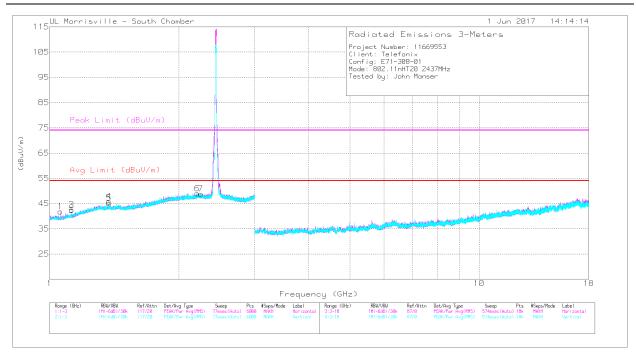
Marker	Freq (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	_	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.125	46.91	PK2	27.6	-24.2	0	50.31	-	-	74	-23.69	286	256	Н
	* 1.125	38.32	MAv1	27.6	-24.2	0	41.72	54	-12.28	-	-	286	256	Н
4	* 1.514	44.72	PK2	28	-22.5	0	50.22	-	-	74	-23.78	109	172	Н
	* 1.513	32.53	MAv1	28	-22.5	0	38.03	54	-15.97	-	-	109	172	Н
5	* 4.385	40.3	PK2	33.5	-32.4	0	41.4	-	-	74	-32.6	178	349	Н
	* 4.383	28.92	MAv1	33.5	-32.4	0	30.02	54	-23.98	-	-	178	349	Н
2	* 1.125	45.77	PK2	27.6	-24.2	0	49.17	-	-	74	-24.83	202	196	V
	* 1.125	36.49	MAv1	27.6	-24.2	0	39.89	54	-14.11	-	-	202	196	V
3	* 1.254	44.82	PK2	28.7	-23.4	0	50.12	-	-	74	-23.88	0	234	V
	* 1.251	32.31	MAv1	28.7	-23.4	0	37.61	54	-16.39	-	-	0	234	V
6	* 4.385	40.76	PK2	33.5	-32.4	0	41.86	-	-	74	-32.14	70	136	V
	* 4.383	28.94	MAv1	33.5	-32.4	0	30.04	54	-23.96	-	-	70	136	V
7	* 4.984	48.85	PK2	34	-31.4	0	51.45	-	-	74	-22.55	227	198	V
	* 4.984	28.22	MAv1	34	-31.4	0	30.82	54	-23.18	-	-	227	198	V

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

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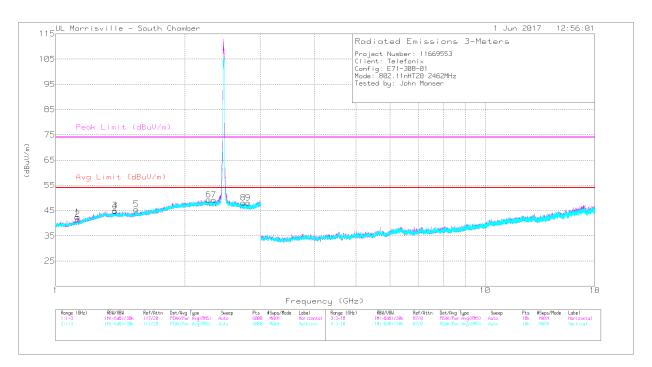


	Freq	Meter		AT0069	Amp/Cbl/	DC	Corrected	Avg Limit	Margin	Peak	PK	Azimuth	Height	
Marker	(GHz)	Reading (dBuV)	Det	AF (dB/m)	Fltr/Pad (dB)	Corr (dB)	Reading (dBuV/m)	(dBuV/m)	(dB)	Limit (dBuV/m)	Margin (dB)	(Degs)	(cm)	Polarity
1	* 1.061	43.9	PK2	27	-24.5	0	46.4	-	-	74	-27.6	324	309	Н
	* 1.059	31.9	MAv1	27	-24.5	0	34.4	54	-19.6	-	-	324	309	Н
2	* 1.125	45.3	PK2	27.6	-24.2	0	48.7	-	-	74	-25.3	231	203	Н
	* 1.125	36.38	MAv1	27.6	-24.2	0	39.78	54	-14.22	-	-	231	203	Н
4	* 1.375	45.7	PK2	28.9	-23	0	51.6	-	-	74	-22.4	9	190	Н
	* 1.375	35.69	MAv1	28.9	-23	0	41.59	54	-12.41	-	-	9	190	Н
6	* 2.206	45.66	PK2	31.8	-23.3	0	54.16	-	-	74	-19.84	237	209	Н
	* 2.207	33.91	MAv1	31.8	-23.3	0	42.41	54	-11.59	-	-	237	209	Н
3	* 1.125	45.58	PK2	27.6	-24.2	0	48.98	-	-	74	-25.02	69	186	V
	* 1.125	36.18	MAv1	27.6	-24.2	0	39.58	54	-14.42	-	-	69	186	V
5	* 1.375	46.34	PK2	28.9	-23	0	52.24	-	-	74	-21.76	195	159	V
	* 1.375	35.89	MAv1	28.9	-23	0	41.79	54	-12.21	-	-	195	159	V
7	* 2.248	45.81	PK2	31.9	-23.5	0	54.21	-	-	74	-19.79	329	189	V
	* 2.248	33.6	MAv1	31.9	-23.5	0	42	54	-12	-	-	329	189	V

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average



Marker	Freq (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl /Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	_	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.125	45.1	PK2	27.6	-24.2	0	48.5	-	-	74	-25.5	329	103	Н
	* 1.125	35.6	MAv1	27.6	-24.2	0	39	54	-15	-	-	329	103	Н
3	* 1.375	45.85	PK2	28.9	-23	0	51.75	-	-	74	-22.25	351	148	Н
	* 1.375	36.42	MAv1	28.9	-23	0	42.32	54	-11.68	-	-	351	148	Н
6	* 2.272	45.86	PK2	31.8	-23.6	0	54.06	-	-	74	-19.94	43	165	Н
	* 2.272	33.69	MAv1	31.8	-23.6	0	41.89	54	-12.11	-	-	43	165	Н
9	* 2.807	46.16	PK2	32.2	-26	0	52.36	-	-	74	-21.64	177	281	Н
	* 2.806	34.41	MAv1	32.2	-26	0	40.61	54	-13.39	-	-	177	281	Н
2	* 1.125	45.91	PK2	27.6	-24.2	0	49.31	-	-	74	-24.69	358	173	V
	* 1.125	36.68	MAv1	27.6	-24.2	0	40.08	54	-13.92	-	-	358	173	V
4	* 1.375	45.32	PK2	28.9	-23	0	51.22	-	-	74	-22.78	198	164	V
	* 1.375	34.71	MAv1	28.9	-23	0	40.61	54	-13.39	-	-	198	164	V
5	* 1.539	44.57	PK2	28.1	-22.4	0	50.27	-	-	74	-23.73	158	283	V
	* 1.541	32.57	MAv1	28.1	-22.4	0	38.27	54	-15.73	-	-	158	283	V
7	* 2.336	45.79	PK2	31.7	-23.8	0	53.69	-	-	74	-20.31	105	346	V
	* 2.335	33.98	MAv1	31.7	-23.8	0	41.88	54	-12.12	-	-	105	346	V
8	* 2.735	46.58	PK2	32.1	-25.9	0	52.78	-	-	74	-21.22	249	302	V
	* 2.737	34.57	MAv1	32.1	-25.9	0	40.77	54	-13.23	-	-	249	302	V

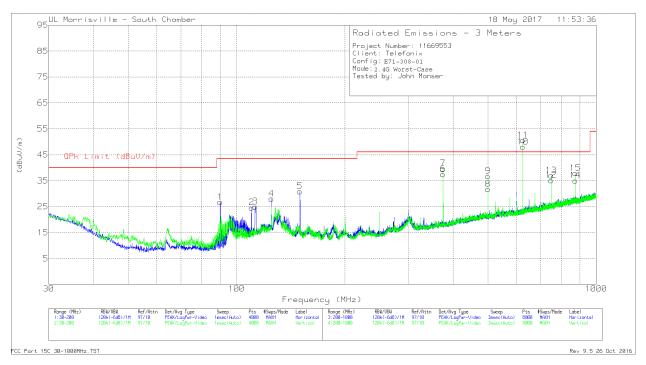
^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

TEL: (919) 549-1400

10.1. WORST-CASE CONFIGURATION SPURIOUS EMISSIONS 30 TO 1000 MHz



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0074 AF (dB/m)	Amp/Cbl (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 110.0057	38.64	Pk	16.9	-30.9	0	24.64	43.52	-18.88	0-360	99	Н
	* 110.0057	29.75	Qp	16.9	-30.9	0	15.75	43.52	-27.77	17	106	Н
3	* 112.7264	38.6	Pk	17.3	-30.9	0	25	43.52	-18.52	0-360	198	Н
	* 112.6443	25.28	Qp	17.3	-30.9	0	11.68	43.52	-31.84	42	103	Н
4	* 125.0121	40.65	Pk	18.2	-30.8	0	28.05	43.52	-15.47	0-360	198	Н
	* 125.0006	38.64	Qp	18.2	-30.8	0	26.04	43.52	-17.48	234	202	Н
5	* 150.0086	44.62	Pk	16.9	-30.6	0	30.92	43.52	-12.6	0-360	99	Н
	* 149.9985	33.5	Qp	16.9	-30.6	0	19.8	43.52	-23.72	216	180	Н
1	89.983	46.11	Pk	11.7	-31.1	0	26.71	-	-	0-360	399	Н
6	375.0228	47.03	Pk	19.8	-29.3	0	37.53	-	-	0-360	198	Н
8	500.039	38.44	Pk	22.1	-28.8	0	31.74	-	-	0-360	299	Н
10	625.0553	53.09	Pk	23.7	-28.7	0	48.09	-	-	0-360	198	Н
12	749.9715	38.2	Pk	25.2	-28.2	0	35.2	-	-	0-360	198	Н
14	874.9877	35.77	Pk	26.6	-27.3	0	35.07	-	-	0-360	102	Н
7	375.0228	49.24	Pk	19.8	-29.3	0	39.74	-	-	0-360	102	V
9	500.039	43.43	Pk	22.1	-28.8	0	36.73	-	-	0-360	102	V
11	625.0553	55.62	Pk	23.7	-28.7	0	50.62	-	-	0-360	102	V
13	749.9715	39.98	Pk	25.2	-28.2	0	36.98	-	-	0-360	102	V
15	874.9877	38.6	Pk	26.6	-27.3	0	37.9	-	-	0-360	102	V

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

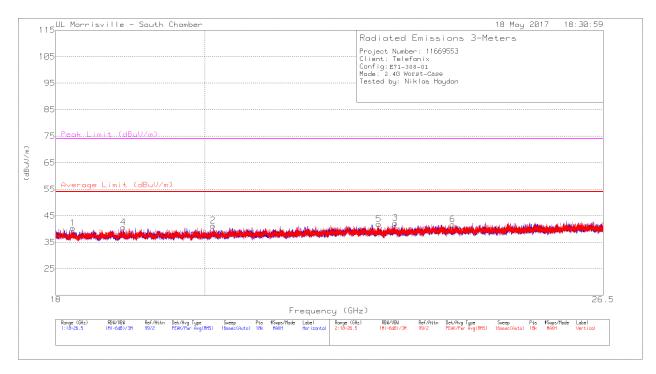
Pk - Peak detector

Qp - Quasi-Peak detector

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UL LLC 12 Laboratory Dr., RTP, NC 27709 FORM NO: 03-EM-F00858 TEL: (919) 549-1400 REPORT NO: R11669553-E1 DATE: 2017-07-10 FCC ID: 2AL4H-E7130801 IC: 22737-E7130801

SPURIOUS EMISSIONS 18 to 26GHz



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0076 (dB/m)	Amp/Cbl (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 18.221	47.63	PK2	32.6	-40.5	0	39.73	-	-	74	-34.27	276	136	Н
	* 18.22	36.24	MAv1	32.6	-40.4	0	28.44	54	-25.56	-	-	276	136	Н
2	* 20.115	47.44	PK2	33	-39.9	0	40.54	-	-	74	-33.46	245	381	Н
	* 20.116	36.05	MAv1	33	-39.9	0	29.15	54	-24.85	-	-	245	381	Н
3	* 22.879	48.2	PK2	33.7	-39	0	42.9	-	-	74	-31.1	262	190	Н
	* 22.879	35.63	MAv1	33.7	-39	0	30.33	54	-23.67	-	-	262	190	Н
4	* 18.881	48.76	PK2	32.8	-40.4	0	41.16	-	-	74	-32.84	260	146	V
	* 18.881	36.03	MAv1	32.8	-40.4	0	28.43	54	-25.57	-	-	260	146	V
5	* 22.615	47.39	PK2	33.5	-39	0	41.89	-	-	74	-32.11	25	371	V
	* 22.615	35.5	MAv1	33.5	-39	0	30	54	-24	-	-	25	371	V
6	* 23.828	46.9	PK2	34	-38.7	0	42.2	-	-	74	-31.8	319	381	V
	* 23.828	34.86	MAv1	34	-38.7	0	30.16	54	-23.84	-	-	319	381	V

^{* -} indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - Maximum Peak

MAv1 - Maximum RMS Average

TEL: (919) 549-1400