

# FCC CFR47 PART 15 SUBPART C INDUSTRY CANADA RSS-247 ISSUE 1

BLUETOOTH LOW ENERGY CERTIFICATION TEST REPORT

FOR

**RADIO TRANSCEIVER DEVICE** 

**MODEL NUMBER: 1688** 

FCC ID: C3K1688 IC ID: 3048A-1688

REPORT NUMBER: 15U21746-E2V1

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M7

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**Revision History** 

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# **1. ATTESTATION OF TEST RESULTS**

COMPANY NAME: EUT DESCRIPTION: MODEL: SERIAL NUMBER: DATE TESTED: MICROSOFT CORP. RADIO TRANSCEIVER DEVICE 1688 26653556, 28453556 SEPTEMBER 15 – 24, 2015

APPLICABLE STANDARDS				
STANDARD	TEST RESULTS			
CFR 47 Part 15 Subpart C	Pass			
INDUSTRY CANADA RSS-247 Issue 1	Pass			
INDUSTRY CANADA RSS-GEN Issue 4	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.

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Tested By:

JONATHAN HSU CONSUMER TECHNOLOGY DIVISION LAB ENGINEER UL VERIFICATION SERVICES INC

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# 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, KDB 558074 D01 v03r03, ANSI C63.10-2013, RSS-GEN Issue 4, and RSS-247 Issue 1.

# 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
Chamber A(IC: 2324B-1)	Chamber D(IC: 2324B-4)
Chamber B(IC: 2324B-2)	Chamber E(IC: 2324B-5)
Chamber C(IC: 2324B-3)	Chamber F(IC: 2324B-6)
	Chamber G(IC: 2324B-7)
	Chamber H(IC: 2324B-8)

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <u>http://ts.nist.gov/standards/scopes/2000650.htm</u>.

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# 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:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	± 3.52 dB
Radiated Disturbance, 30 to 1000 MHz	± 4.94 dB
Radiated Disturbance, 1 to 6 GHz	± 3.86 dB
Radiated Disturbance, 6 to 18 GHz	± 4.23 dB
Radiated Disturbance, 18 to 26 GHz	± 5.30 dB
Radiated Disturbance, 26 to 40 GHz	± 5.23 dB

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

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# 5. EQUIPMENT UNDER TEST

# 5.1. DESCRIPTION OF EUT

The EUT is a radio transceiver device, which contains an integrated 802.11 a/b/g/n/ac and BT 4.1 radios.

## 5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2402-2480	BLE	5.38	3.45

# 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an FPCB antenna, with a maximum gain of 5.3dBi.

# 5.4. SOFTWARE AND FIRMWARE

The software installed in the EUT during testing was Microsoft Ver. Th2\_analog1\_dev.150917-2108.

The EUT HW Buid Phase: EV3B

The test utility software used during testing was Microsoft WiFi Tool, Ver 3.2.1 (526/2015)

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# 5.5. WORST-CASE CONFIGURATION AND MODE

Radiated emission and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

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

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# 5.6. DESCRIPTION OF TEST SETUP

## SUPPORT EQUIPMENT

Support Equipment List							
Description Manufacturer Model Serial Number FCC							
Laptop	Lenovo	X1 Carbon	N/A	N/A			
AC Adapter	Microsoft	1623	0D130B03GDE54	N/A			

#### I/O CABLES

I/O Cable List						
Cable	Cable         Port         # of identical         Connector         Cable Type         Cable         Remarks					
INO		ports	туре		Length (m)	
1	DC Power	1	Mini-USB	Shielded	1.2m	N/A

#### TEST SETUP

EUT was set in the BLE mode to enable BLE communications.

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#### SETUP DIAGRAM FOR TESTS



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# 6. 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	Asset	Cal Due		
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01069	12/20/15		
Spectrum Analyzer,9KHz-40GHz	HP	8564E	C00986	04/01/16		
EMI Test Receiver, 9 kHz-7 GHz	R & S	ESCI 7	1000741	08/13/16		
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	08/18/16		
Peak Power Meter	Agilent / HP	E4416A	C00963	12/13/15		
Peak / Average Power Sensor	Agilent / HP	E9327A	C00964	12/13/15		
Antenna, Horn, 1-18 GHz	ETS	3117	C01022	02/21/16		
Antenna, Horn,18- 26 GHz	ARA	MWH-1826/B	C00946	11/12/15		
Antenna, Horn, 26-40 GHz	ARA	MWH-2640	C00891	06/28/16		
Antenna, Bilog, 30MHz-1 GHz	Sunol Sciences	JB1	T243	03/06/16		
RF Preamplifier, 1GHz - 18GHz	Miteq	NSP4000-SP2	924343	03/23/16		
RF Preamplifier, 1GHz - 26.5GHz	HP	8449B	T404	06/29/16		
AC Power Supply, 2,500VA 45-500Hz	Elgar-Ametek	CW2501M	F00013	CNR		
RF Preamplifier, 1GHz - 40GHz	Miteq	NSP4000-SP2	C00990	08/20/16		
Attenuator / Switch driver	HP	11713A	F00204	CNR		
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	F00219	05/23/16		
High Pass Filter 6GHz	Micro-Tronics	HPS17542	F00222	05/22/16		
High Pass Filter 3GHz	Micro-Tronics	HPM17543	F00224	05/22/16		

Test Software List						
Description Manufacturer Model Version						
Radiated Software	UL	UL EMC	Version 9.5, 07/22/14			
Conducted Software	UL	UL EMC	Version 9.5, 05/17/14			
CLT Software	UL	UL RF	Version 1.0, 02/02/15			
Antenna Port Software	UL	UL RF	Version 2.1.1.1, 1/20/15			

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# 7. SUMMARY

FCC Part Section	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Worst Case
15.247 (a)(2)	RSS-247 5.2 (1)	Occupied Band width (6dB)	>500KHz		Pass	0.682 MHz
2.1051, 15.247 (d)	RSS-247 5.5	Band Edge / Conducted Spurious Emission	-20dBc	Conducted	Pass	-48.9 dBm
15.247	RSS-247 5.4 (4)	TX conducted output power	<30dBm	Conducted	Pass	5.38 dBm
15.247	RSS-247 5.2 (2)	PSD	<8dBm		Pass	-0.08 dBm
15.207 (a)	RSS-GEN 8.8	AC Power Line conducted emissions	Section 10	Padiatad	Pass	47.0dBuV(PK)
15.205, 15.209	RSS-GEN 8.9	Radiated Spurious Emission	< 54dBuV/m	naulaleu	Pass	44.28dBuV/m

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# ANTENNA PORT TEST RESULTS 8.1. 6 dB BANDWIDTH

#### <u>LIMITS</u>

FCC §15.247 (a) (2)

IC RSS-247 5.2.1

The minimum 6 dB bandwidth shall be at least 500 kHz.

#### TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

#### **RESULTS**

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2402	0.682	0.5
Middle	2440	0.676	0.5
High	2480	0.706	0.5

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#### 6 dB BANDWIDTH PLOTS

## LOW CHANNEL



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★ Agilent 13:46:35 Sep 15, 2015	Amplitude
APv3.3(080515),JS, Conducted B ▲ Mkr1 676 kHz Ref 10.9 dBm #Atten 10 dB 0.170 dB	RefLevel 10.90 dBm
Log 10 10 dB/	Attenuation 10.00 dB
Offst 10.9 dB DI	Scale/Div 10.00 dB
-2.0 dBm #PAvg 20	Scale Type
V1 S2 S3 FS AA	Presel Center
£(f): f>50k Swp 10.90 dBm	Presel Adjust [3-26 GHz]⊳ 0.000 Hz
Center 2.440 000 GHz Span 2 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 1 ms (1001 pts)	More 1 of 3
Copyright 2000–2011 Agilent Technologies	

# **MID CHANNEL**

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APv3.3(080515),JS, Conducted B       ▲ Mkr1 706 kHz         Ref 10.9 dBm       *Atten 10 dB       -0.132 dB         *Peak	🔆 Ag	<b>ilent</b> 14	:03:08	Sep 1	5,2015	)					L	Freq/Channel
Log       1       1       1         Log       1       1       1       1         10       dB/       0       1       1       1         Offst       10.9       0       0       0       2.47900000 GHz         10.9       0       0       0       0       0       0         -1.5       dBm       0       0       0       0       0       0         -1.5       dBm       0	APv3.3 Ref 10 #Peak	(08051 .9 dBm	5),JS,	Conduc: #Atten	ted B 10 dB				1 4	4kr1 7 –0.1	206 kHz .32 dB	Center Freq 2.48000000 GHz
Offst         10.9         Stop Freq           DI         -1.5         -1.5         -1.5           dBm         -1.5         -1.5         -1.5           gBm         -1.5         -1.5         -1.5           gBm         -1.5         -1.5         -1.5           AA         -1.5         -1.5         -1.5           AA         -1.5         -1.5         -1.5           AA         -1.5         -1.5         -1.5           AA         -1.5         -1.5         -1.5           GE(f):         -1.5         -1.5         -1.5           G(f)         -1.5	Log 10 dB/				1R //////		- 		m			<b>Start Freq</b> 2.47900000 GHz
-1.5	Offst 10.9 dB DI	~~!!	nd Na ha							The way		<b>Stop Freq</b> 2.48100000 GHz
20         V1         S2         Freq Offset           S3         FS         0.00000000         Hz           £(f):         Stignal Track         Signal Track           Swp         0.000         GHz         0.000           Center 2.480         000         GHz         Span 2         MHz           #Res BW 100         HZ         Sween 1         ms (1001         nts)	-1.5 dBm #PAvg		- <b>Y</b>									<b>CF Step</b> 200.000000 kHz <u>Auto</u> Man
£(f):         Signal Track           f>50k         Swp           Swp         Signal Track           Center 2.480 000 GHz         Span 2 MHz           #Res BW 100 kHz         #VBW 300 kHz	20 V1 S2 S3 FS AA											FreqOffset 0.00000000 Hz
Center 2.480 000 GHz Span 2 MHz #Res BW 100 kHz #VBW 300 kHz Sween 1 ms (1001 nts)	<b>£</b> (f): f>50k Swp											<b>Signal Track</b> <sup>On <u>Off</u></sup>
	Center #Res B	2.480 W 100	000 GH kHz	lz	#VB	W 300	kHz	Swe	eep 1 m	Span ıs (100	2 MHz 1 pts)	

# **HIGH CHANNEL**

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## 8.2. 99% **BANDWIDTH**

## LIMITS

None; for reporting purposes only.

### TEST PROCEDURE

Reference to KDB558074 D01 DTS Meas Guidance v03r03: The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth and to 1% of the span. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

#### **RESULTS**

Channel	Frequency	99% Bandwidth				
	(MHz)	(MHz)				
Low	2402	1.0602				
Middle	2440	1.0621				
High	2480	1.0631				

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#### 99% BANDWIDTH PLOTS

## LOW CHANNEL



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## MID CHANNEL



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## **HIGH CHANNEL**



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## 8.3. OUTPUT POWER

## <u>LIMITS</u>

FCC §15.247 (b)

IC RSS-247 5.4.4

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

#### TEST PROCEDURE

Peak power is measured using KDB558074 D01 DTS Meas Guidance v03r03 utilizing spectrum analyzer.

#### **RESULTS**

Channel	Frequency	Peak Power	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	2402	2.94	30	-27.060
Middle	2440	4.70	30	-25.300
High	2480	5.38	30	-24.620

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## **OUTPUT POWER PLOTS**

# LOW CHANNEL

🔆 Ag	ilent 13:	56:09	Sep 1	5,2015						L	Freq/Channel
Ref 20 Peak	dBm		Atten	20 dB				Mkr1	2.402 2.9	00 GHz 34 dBm	Center Freq 2.40200000 GHz
Log 10 dB/ Offst					: (	>					<b>Start Freq</b> 2.40050000 GHz
10.9 dB											<b>Stop Freq</b> 2.40350000 GHz
#PAvg											<b>CF Step</b> 300.000000 kHz <u>Auto</u> Man
M1 S2 S3 FC AA											FreqOffset 0.00000000 Hz
<b>£</b> (f): FTun Swp											<b>Signal Track</b> <sup>On <u>Off</u></sup>
Center #Res B	2.402 W 3 MHz	000 GH <u>2</u>	lz	 #VE	3W 3 M	Hz	Sn	reep 1	Span ms (10	3 MHz 1 pts)	
Copyri	ight 20	00-20	11 Ag	ilent To	echnol	ogies					

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# **MID CHANNEL**

🔆 Ag	<b>jilent</b> 13	:49:21	Sep 1	5,2015						L	Freq/Channel
Ref 20 Peak	dBm		Atten	20 dB				Mkr1	2.440 4.7	03 GHz 0 dBm	Center Freq 2.44000000 GHz
Log 10 dB/ Offst						1 Ø					Start Freq 2.43850000 GHz
10.9 dB											<b>Stop Freq</b> 2.44150000 GHz
#PAvg											<b>CF Step</b> 300.000000 kHz <u>Auto</u> Man
M1 S2 S3 FC AA											FreqOffset 0.00000000 Hz
<b>£</b> (f): FTun Swp											<b>Signal Track</b> <sup>On <u>Off</u></sup>
Center #Res B	2.440 W 3 MH	00 GHz z	2	 #V{	3W 3 M	  Hz	Sv	veep 1	Span ms (10	3 MHz 1 pts)	
Copyri	ight 20	00-20	)11 Ag	ilent T	echnol	ogies					

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🔆 Ag	ilent 14:05:20	) Sep 15, 2	015				L	Freq/Channel
Ref 20 Peak	dBm	Atten 20	dB		Mkr1	2.480 0 5.38	3 GHz dBm	Center Freq 2.48000000 GHz
Log 10 dB/ Offst				1 <b>0</b>				Start Freq 2.47850000 GHz
10.9 dB								<b>Stop Freq</b> 2.48150000 GHz
#PAvg								<b>CF Step</b> 300.000000 kHz <u>Auto</u> Man
M1 S2 S3 FC AA								FreqOffset 0.00000000 Hz
<b>£</b> (f): FTun Swp								<b>Signal Track</b> <sup>On <u>Off</u></sup>
Center #Res B	2.480 00 GH W 3 MHz	  z	#VBW 3 M	 1Hz	Sweep 1	Span 3 ms (101	) MHz pts)	
Copyri	ight 2000-2	2011 Agiler	it Technol	ogies				

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## 8.4. **AVERAGE POWER**

## <u>LIMITS</u>

None; for reporting purposes only.

#### TEST PROCEDURE

The transmitter output is connected to a power meter.

#### **RESULTS**

The cable assembly insertion loss of 11 dB (including 10 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency	AV power
Low	2402	2.66
Middle	2440	4.4
High	2480	5.18

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## 8.5. POWER SPECTRAL DENSITY

## <u>LIMITS</u>

FCC §15.247 (e)

IC RSS-247 5.2.2

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

#### TEST PROCEDURE

Power Spectral Density was performed utilizing the "Method PKPSD (Peak PSD)" under KDB558074 D01 DTS Meas Guidance v03r03.

#### **RESULTS**

Channel	Frequency	PSD	Limit	Margin	
	(MHz)	(dBm)	(dBm)	(dB)	
Low	2402	-2.41	8	-10.41	
Middle	2440	-0.88	8	-8.88	
High	2480	-0.08	8	-8.08	

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#### POWER SPECTRAL DENSITY PLOTS

## LOW CHANNEL



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🔆 Ag	<b>ilent</b> 13	:49:53	Sep 1	5,2015						L	Freq/Channel
APv3.3 Ref 20	(08051 dBm	5),JS, I	Conduc: Atten	:ed B 20 dB				Mkr1 :	2.439 8 -0.88	20 GHz 2 dBm	Center Freq
#Peak Log											2.44000000 0112
10 dB/ 044-1											<b>Start Freq</b> 2.43900000 GHz
dB DI			A M	~h	1 VV <sup>4 - 1</sup>	WWWWW MM	Mron	wy.hy			<b>Stop Freq</b> 2.44100000 GHz
8.0 dBm #PAvg 10	ww	1 Marth	/					<u>۷</u> ۳	h	mγ	<b>CF Step</b> 200.000000 kHz <u>Auto</u> Man
V1 S2 S3 FS AA		Y							V		FreqOffset 0.00000000 Hz
<b>£</b> (f): f>50k Swp											<b>Signal Track</b> <sup>On <u>Off</u></sup>
Center #Res B	2.440 W 30 ki	000 GH Iz	łz	#V{	3W 91 k	(Hz	Sweep ;	2.133 r	Span Span ns (100	2 MHz 1 pts)	
Copyri	ight 20	00-20	11 Ag	ilent T	echnol	ogies					

# **MID CHANNEL**

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## **HIGH CHANNEL**

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## 8.6. CONDUCTED SPURIOUS EMISSIONS

#### <u>LIMITS</u>

FCC §15.247 (d)

IC RSS-247 5.5

Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

#### TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

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## **RESULTS**

## SPURIOUS EMISSIONS, LOW CHANNEL

🔆 Agilent 13:58	:59 Sep 15, 201	5		L	Freq/Channel
APv3.3(080515), Ref 20 dBm Peak	JS, Conducted B Atten 20 dB		Mkr2 2.40 -5	00 00 GHz 6.87 dBm	Center Freq 2.40000000 GHz
Log 10 dB/					Start Freq 2.39500000 GHz
10.9 dB					<b>Stop Freq</b> 2.40500000 GHz
HIS.6 IdBm #PAvg	<u></u>			~~~~~	<b>CF Step</b> 1.00000000 MHz <u>Auto</u> Man
Center 2.400 00 #Res BW 100 kHz Marker Trac	GHz z #VI e Type	BW 300 kHz : X Axis	Spa Sweep 1 ms (1 Amu	an 10 MHz 1001 pts) plitude	Freq Offset 0.00000000 Hz
1 (1) 2 (1)	Freq Freq	2.399 98 GHz 2.400 00 GHz	-56.1 -56.1	28 dBm 87 dBm	<b>Signal Track</b> <sup>On <u>Off</u></sup>

## LOW CHANNEL BANDEDGE

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🔆 Ag	j <b>ilent</b> 14	:00:55	Sep 15	5,2015						L	Freq/Channel
APv3.3 Ref 20	(08051 dBm	5),JS,	Conduct #Atten :	ed B 20 dB				Mkr	4 24.9 -48.90	185 GHz 15 dBm	Center Freq 13.0150000 GHz
#Peak Log 10 dB/ Offst											Start Freq 30.0000000 MHz
10.9 dB DI										4-	<b>Stop Freq</b> 26.0000000 GHz
-15.6 dBm #PAvg			3	****						<u> </u>	<b>CF Step</b> 2.59700000 GHz <u>Auto</u> Man
Center #Res B	13.015 W 100	5 GHz kHz		#VB	W 300	kHz	Sweep	Sp 2.482	an 25.9 s (819	97 GHz 2 pts)	Freq Offset 0.00000000 Hz
Mark 1 2 3 4	er I	race (1) (1) (1) (1)	lype Freq Freq Freq Freq		× 2.4 4.8 7.2 24.9	402 GHz 402 GHz 304 GHz 206 GHz 385 GHz			Amplit 0.90 -60.46 -57.85 -48.90	ude dBm dBm dBm dBm	<b>Signal Track</b> On <u>Off</u>
Copyri	ight 20	00-20	)11 Agi	ilent T	echnol	ogies					

## LOW CHANNEL SPURIOUS

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#### SPURIOUS EMISSIONS, MID CHANNEL

## MID CHANNEL REFERENCE



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🔆 Ag	<b>ilent</b> 13	:52:24	Sep 15	5,2015	1					L	Freq/Channel
APv3.3 Ref 20 #Peak	(08051 dBm	5),JS,   	Conduct #Atten :	ed B 20 dB				Mkr	4 24.8 -50.00	65 GHz 5 dBm	Center Freq 13.0150000 GHz
Log 10 dB/ Offst											<b>Start Freq</b> 30.0000000 MHz
10.9 dB DI										4	<b>Stop Freq</b> 26.000000 GHz
-15.6 dBm #PAvg		2	3-						<b>~}™~anda</b> a	<u> </u>	<b>CF Step</b> 2.59700000 GHz <u>Auto</u> Man
Center #Res B	13.015 W 100 er T	5 GHz kHz	Туре	#VB	W 300	kHz Avis	Sweep	Sp 2.482	an 25.9 s (819	97 GHz 2 pts)	FreqOffset 0.00000000 Hz
1 2 3 4		(1) (1) (1) (1)	Freq Freq Freq Freq		2.4 4.8 7.3 24.8	440 GHz 380 GHz 320 GHz 365 GHz			3.43 -62.36 -58.61 -50.01	dBm dBm dBm dBm dBm	Signal Track <sup>On <u>Off</u></sup>
Copyri	ight 20	00-20	)11 Agi	ilent T	echnol	ogies					

# MID CHANNEL SPURIOUS

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#### SPURIOUS EMISSIONS, HIGH CHANNEL

🔆 Agilent 14:08:16	Sep 15, 201	.5		L	Freq/Channel
APv3.3(080515),JS, Ref 20 dBm	Conducted B Atten 20 dE	3	Mkr2	2.483 73 GHz -58.32 dBm	Center Freq 2.48350000 GHz
Log 10 dB/					<b>Start Freq</b> 2.47850000 GHz
10.9 dB DI					<b>Stop Freq</b> 2.48850000 GHz
-13.0 dBm #PAvg		\$\$	***	*****	<b>CF Step</b> 1.00000000 MHz <u>Auto</u> Man
Center 2.483 50 GH: #Res BW 100 kHz Marker Trace	Z #\ Type	/BW 300 kHz X Axis	Sweep 1 n	Span 10 MHz ns (1001 pts) Amplitude	Freq Offset 0.00000000 Hz
$ \begin{array}{cccc} 1 & (1) \\ 2 & (1) \end{array} $	Freq Freq	2.483 50 GHz 2.483 73 GHz		-59.58 dBm -58.32 dBm	Signal Track <sup>On <u>Off</u></sup>
Convright 2000-20	11 Agilent	Technologies			

## HIGH CHANNEL BANDEDGE

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HIGH CHANNEL SPURIOU	S
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# 9. RADIATED TEST RESULTS

# 9.1. LIMITS AND PROCEDURE

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

IC RSS-GEN Clause 7 (Receiver)

Frequency Range	Field Strength Limit	Field Strength Limit
(MHz)	(uV/m) at 3 m	(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 and 150cm for above 1GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and add duty cycle factor for average measurements. Duty cycle factor =  $10 \log (1/x)$ . For this sample: DCF =  $10 \log (1/0.71) = 1.47 \text{ dB}$ 

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

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.

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# 9.2. TRANSMITTER ABOVE 1 GHz RESTRICTED BANDEDGE (LOW CHANNEL)

5		Restnicted Banded Project Number:15U21746 Silent:MICROSOFT Sonfig:EUT + AC Adapter Mode:BLE BE 2482 Horizont Mode:BLE BE 2482 Horizont	ge al	2015 10:15:27
				***
15				1
5 Peak Limit (dBuU/m)			_	
.5				
5 Average Limit (dBuU/m)		2 		
	4		3	
15				
2.31	10.5MHz/	· · ·		2.4
Range (GHz) RBW/UBM Ref/Attn Det/Avg Type 1:2.31-2.415 IMC-6dB)/3M 187/18 PEak/Per-Avg(	Frequency (GH: Sweep Pts #Sups/Mode Position MS 20msecfAuto 800 MAXH 296 degs H 2:2:31-2:4	;) Hz) RBL/UBL Ref/Attn Det/Avg 5 1MC-6±80/3M 187/18 AVER/Pw	Type Sweep Pts r Avg(RMS) 28msec(Auto) 888	#Swps/Mode Position 1 100TAUG 295 degs H

## HORIZONTAL PEAK AND AVERAGE PLOT

## HORIZONTAL DATA

Marker	Frequency (GHz)	Meter Reading	Det	AF T136 (dB/m)	Amp/Cbl/Flt r/Pad (dB)	DC Corr (dB)	Corrected Reading (dBu)//m)	Average Limit (dBu)//m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2 20	40.09	DL	22	24.6	0	47.49	(ubuv/iii)		74	26.52	206	115	LL
1	2.59	40.06	PK	52	-24.0	0	47.46	-	-	74	-20.52	290	115	п
2	* 2.385	42.69	Pk	32	-24.6	0	50.09	-	-	74	-23.91	296	115	н
3	* 2.39	30.1	RMS	32	-24.6	1.47	38.97	54	-15.03	-	-	296	115	Н
4	* 2.359	31.3	RMS	31.9	-24.7	1.47	39.97	54	-14.03	-	-	296	115	Н

\* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

**RMS - RMS detection** 

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### VERTICAL PEAK AND AVERAGE PLOT



## **VERTICAL DATA**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Flt r/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	41.73	Pk	32	-24.6	0	49.13	-	-	74	-24.87	250	111	V
2	* 2.359	42.75	Pk	31.9	-24.7	0	49.95	-	-	74	-24.05	250	111	V
3	* 2.39	29.78	RMS	32	-24.6	1.47	38.65	54	-15.35	-	-	250	111	V
4	* 2.36	31.13	RMS	31.9	-24.7	1.47	39.8	54	-14.2	-	-	250	111	V

\* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

**RMS - RMS detection** 

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## AUTHORIZED BANDEDGE (HIGH CHANNEL)



## HORIZONTAL PEAK AND AVERAGE PLOT

## HORIZONTAL DATA

Marker	Frequency	Meter	Det	AF T136	Amp/Cbl/Flt	DC Corr (dB)	Corrected	Average	Margin	Peak Limit	PK Margin	Azimuth	Height	Polarity
	(GHz)	Reading		(dB/m)	r/Pad (dB)		Reading	Limit	(dB)	(dBuV/m)	(dB)	(Degs)	(cm)	
		(dBuV)					(dBuV/m)	(dBuV/m)						
1	* 2.484	39.31	Pk	32.1	-24.5	0	46.91	-	-	74	-27.09	307	107	Н
2	* 2.489	42.92	Pk	32.1	-24.5	0	50.52	-	-	74	-23.48	307	107	н
3	* 2.484	30.44	RMS	32.1	-24.5	1.47	39.51	54	-14.49	-	-	307	107	н
4	2.537	31.02	RMS	32.1	-24.4	1.47	40.19	54	-13.81	-	-	307	107	Н

\* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

**RMS - RMS detection** 

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## VERTICAL PEAK AND AVERAGE PLOT

#### **VERTICAL DATA**

Marker	Frequency (GHz)	Meter Reading	Det	AF T136 (dB/m)	Amp/Cbl/Flt r/Pad (dB)	DC Corr (dB)	Corrected Reading	Average Limit	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
		(dBuV)					(dBuV/m)	(dBuV/m)						
1	* 2.484	39.84	Pk	32.1	-24.5	0	47.44	-	-	74	-26.56	248	111	V
2	* 2.493	42.98	Pk	32.1	-24.5	0	50.58	-	-	74	-23.42	248	111	V
3	* 2.484	30.3	RMS	32.1	-24.5	1.47	39.37	54	-14.63	-	-	248	111	V
4	2.544	30.97	RMS	32.2	-24.5	1.47	40.14	54	-13.86	-	-	248	111	V

\* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

**RMS - RMS detection** 

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#### HARMONICS AND SPURIOUS EMISSIONS



LOW CHANNEL HORIZONTAL

Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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# Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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## LOW CHANNEL DATA

## Trace Markers

Marker	Frequency (GHz)	Meter Reading	Det	AF T136 (dB/m)	Amp/Cbl/Fltr /Pad (dB)	DC Corr (dB)	Corrected Reading	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
		(dBuV)					(dBuV/m)							
1	* 1.521	36.75	Pk	28.1	-25.6	0	39.25	-	-	74	-34.75	0-360	201	н
4	* 1.186	36.2	Pk	27.9	-26.1	0	38	-	-	74	-36	0-360	200	V
2	* 3.64	34.08	Pk	33.2	-32	0	35.28	-	-	74	-38.72	0-360	100	н
3	* 4.972	32.93	Pk	33.9	-30.3	0	36.53	-	-	74	-37.47	0-360	201	н
5	* 7.558	28.48	Pk	35.5	-25.6	0	38.38	-	-	74	-35.62	0-360	200	V
6	* 13.315	25.72	Pk	39.1	-22.4	0	42.42	-	-	74	-31.58	0-360	100	V

\* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

**Radiated Emissions** 

Frequenc	Meter	Det	AF T136	Amp/Cbl/	DC Corr	Corrected	Avg Limit	Margin	Peak	PK Margin	Azimuth	Height	Polarity
У	Reading		(dB/m)	Fltr/Pad	(dB)	Reading	(dBuV/m)	(dB)	Limit	(dB)	(Degs)	(cm)	
(GHz)	(dBuV)			(dB)		(dBuV/m)			(dBuV/m)				
* 1.522	44.93	PK2	28.1	-25.6	0	47.43	-	-	74	-26.57	360	202	н
* 1.522	33.09	MAv1	28.1	-25.6	1.47	37.06	54	-16.94	-	-	360	202	н
* 1.187	44.92	PK2	27.9	-26.1	0	46.72	-	-	74	-27.28	360	202	V
* 1.184	33.04	MAv1	27.9	-26.1	1.47	36.31	54	-17.69	-	-	360	202	V
* 3.639	42.31	PK2	33.2	-32	0	43.51	-	-	74	-30.49	360	100	Н
* 3.64	30.9	MAv1	33.2	-32	1.47	33.57	54	-20.43	-	-	360	100	Н
* 4.973	40.52	PK2	34	-30.3	0	44.22	-	-	74	-29.78	360	202	Н
* 4.97	29.68	MAv1	33.9	-30.3	1.47	34.75	54	-19.25	-	-	360	202	Н
* 7.556	36.32	PK2	35.5	-25.6	0	46.22	-	-	74	-27.78	360	202	V
* 7.559	25.23	MAv1	35.5	-25.6	1.47	36.6	54	-17.4	-	-	360	202	V
* 13.317	33.74	PK2	39.1	-22.4	0	50.44	-	-	74	-23.56	360	100	V
* 13.316	22.91	MAv1	39.1	-22.4	1.47	41.08	54	-12.92	-	-	360	100	V

\* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average



# Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was

at least 20dB below the specification limit.

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## **MID CHANNEL DATA**

## **Trace Markers**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Fitr /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	* 1.495	36.74	Pk	28.1	-25.6	0	39.24	-	-	74	-34.76	0-360	201	н
2	* 3.616	35.5	Pk	33.1	-32.2	0	36.4	-	-	74	-37.6	0-360	201	н
4	* 4.628	32.22	Pk	34.1	-30.5	0	35.82	-	-	74	-38.18	0-360	100	V
5	* 8.037	28.57	Pk	35.7	-25.1	0	39.17	-	-	74	-34.83	0-360	200	V
6	* 16.038	26.23	Pk	41	-22	0	45.23	-	-	74	-28.77	0-360	100	V
3	13	25.51	Pk	39.1	-22.1	0	42.51	-	-	-	-	0-360	201	Н

\* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

**Radiated Emissions** 

Frequenc	Meter	Det	AF T136	Amp/Cbl/	DC Corr	Corrected	Avg Limit	Margin (dB)	Peak	PK Margin	Azimuth	Height (cm)	Polarity
y (GHz)	(dBuV)		(05/11)	(dB)	(05)	(dBuV/m)	(ubuv/iii)	(05)	(dBuV/m)	(05)	(Degs)	(ciii)	
* 1.496	45.35	PK2	28.1	-25.6	0	47.85	-	-	74	-26.15	360	202	Н
* 1.496	33.19	MAv1	28.1	-25.6	1.47	37.16	54	-16.84	-	-	360	202	Н
* 3.615	42.49	PK2	33.1	-32.2	0	43.39	-	-	74	-30.61	360	202	Н
* 3.615	31.3	MAv1	33.1	-32.2	1.47	33.67	54	-20.33	-	-	360	202	Н
* 4.628	40.49	PK2	34.1	-30.5	0	44.09	-	-	74	-29.91	360	100	V
* 4.63	29.75	MAv1	34.1	-30.6	1.47	34.72	54	-19.28	-	-	360	100	V
* 8.035	37.59	PK2	35.7	-25.1	0	48.19	-	-	74	-25.81	360	201	V
* 8.039	25.67	MAv1	35.7	-25	1.47	37.84	54	-16.16	-	-	360	201	V
* 16.037	34.71	PK2	41	-22	0	53.71	-	-	74	-20.29	360	100	V
* 16.039	23.52	MAv1	41	-22	1.47	43.99	54	-10.01	-	-	360	100	V
13.001	22.59	MAv1	39.1	-22.1	1.47	41.06	-	-	-	-	360	202	Н
13.002	33.76	PK2	39.1	-22.2	0	50.66	-	-	-	-	360	202	Н

\* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

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HIGH CHANNEL HORIZONTAL

Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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## **HIGH CHANNEL VERTICAL**

Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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## HIGH CHANNEL DATA

## Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (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	* 1.306	35.95	Pk	28.8	-25.9	0	38.85	-	-	74	-35.15	0-360	100	н
2	* 4.302	34.46	Pk	33.5	-30.6	0	37.36	-	-	74	-36.64	0-360	201	н
3	* 7.406	28.46	Pk	35.6	-25.4	0	38.66	-	-	74	-35.34	0-360	100	н
5	* 11.412	25.68	Pk	37.9	-21.8	0	41.78	-	-	74	-32.22	0-360	100	V
6	* 15.848	26.27	Pk	40.6	-21.4	0	45.47	-	-	74	-28.53	0-360	100	V
4	1.636	36.54	Pk	28.2	-25.5	0	39.24	-	-	-	-	0-360	100	V

\* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

**Radiated Emissions** 

Frequenc	Meter	Det	AF T136	Amp/Cbl/	DC Corr	Corrected	Avg Limit	Margin	Peak	PK Margin	Azimuth	Height	Polarity
У	Reading		(dB/m)	Fltr/Pad	(dB)	Reading	(dBuV/m)	(dB)	Limit	(dB)	(Degs)	(cm)	
(GHz)	(dBuV)			(dB)		(dBuV/m)			(dBuV/m)				
* 1.304	45.38	PK2	28.8	-25.9	0	48.28	-	-	74	-25.72	1	100	н
* 1.305	32.91	MAv1	28.8	-25.9	1.47	37.28	54	-16.72	-	-	1	100	н
* 4.3	41.12	PK2	33.5	-30.6	0	44.02	-	-	74	-29.98	1	202	н
* 4.303	29.96	MAv1	33.5	-30.7	1.47	34.23	54	-19.77	-	-	1	202	н
* 7.408	35.99	PK2	35.5	-25.4	0	46.09	-	-	74	-27.91	1	100	Н
* 7.406	25.37	MAv1	35.6	-25.4	1.47	37.04	54	-16.96	-	-	1	100	н
* 11.41	33.88	PK2	37.9	-21.8	0	49.98	-	-	74	-24.02	1	100	V
* 11.411	22.73	MAv1	37.9	-21.8	1.47	40.3	54	-13.7	-	-	1	100	V
* 15.847	34.11	PK2	40.6	-21.4	0	53.31	-	-	74	-20.69	1	100	V
* 15.847	23.61	MAv1	40.6	-21.4	1.47	44.28	54	-9.72	-	-	1	100	V
1.635	44.99	PK2	28.2	-25.5	0	47.69	-	-	-	-	1	100	V
1.637	32.92	MAv1	28.2	-25.5	1.47	37.09	-	-	-	-	1	100	V

\* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

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# 9.3. WORST-CASE BELOW 1 GHz

## SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION) HORIZONTAL PLOT



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## **VERTICAL PLOT**



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#### REPORT NO: 15U21746-E2V1 MODEL: 1688

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T185 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
11	39.9875	33.54	PK	14.3	-27	20.84	40	-19.16	0-360	100	V
1	40.7525	43.5	РК	13.7	-27	30.2	40	-9.8	0-360	100	Н
2	55.6275	39.97	РК	7.1	-26.9	20.17	40	-19.83	0-360	300	Н
3	79.98	38.24	РК	8	-26.6	19.64	40	-20.36	0-360	400	н
4	98.4888	34.94	РК	9.4	-26.3	18.04	43.52	-25.48	0-360	300	Н
5	100.2525	39.49	РК	9.8	-26.3	22.99	43.52	-20.53	0-360	300	Н
6	211.2	38.97	РК	10.3	-25	24.27	43.52	-19.25	0-360	100	Н
12	211.2	47.66	РК	10.3	-25	32.96	43.52	-10.56	0-360	100	V
13	230.4	38.7	РК	11.1	-24.9	24.9	46.02	-21.12	0-360	100	V
7	249.6	38.16	РК	11.5	-24.7	24.96	46.02	-21.06	0-360	200	Н
14	249.6	50.16	РК	11.5	-24.7	36.96	46.02	-9.06	0-360	100	V
15	268.8	34.82	РК	13	-24.5	23.32	46.02	-22.7	0-360	100	V
16	288	35.34	РК	13.4	-24.4	24.34	46.02	-21.68	0-360	100	V
17	307.2	31.56	РК	13.4	-24.4	20.56	46.02	-25.46	0-360	100	V
18	326.4	35.01	РК	13.9	-24.4	24.51	46.02	-21.51	0-360	100	V
19	345.6	33.54	РК	14.2	-24.5	23.24	46.02	-22.78	0-360	100	V
20	364.8	37.73	РК	14.9	-24.6	28.03	46.02	-17.99	0-360	100	V
21	384	36.74	РК	15	-24.7	27.04	46.02	-18.98	0-360	100	V
22	403.2	35.95	РК	15.5	-24.8	26.65	46.02	-19.37	0-360	100	V
23	704.6	36.16	РК	20.1	-24.1	32.16	46.02	-13.86	0-360	200	V
8	706	48.05	РК	20.1	-24.1	44.05	46.02	-1.97	0-360	200	Н
24	709	43.56	РК	20.2	-24.1	39.66	46.02	-6.36	0-360	200	V
9	709.6	46.29	РК	20.2	-24.1	42.39	46.02	-3.63	0-360	300	Н
25	710.9	46.62	РК	20.2	-24.1	42.72	46.02	-3.3	0-360	100	V
26	713.2	39.64	PK	20.3	-24	35.94	46.02	-10.08	0-360	300	V
10	713.4	47.29	РК	20.3	-24	43.59	46.02	-2.43	0-360	200	Н

## **BELOW 1 GHz TABLE**

PK - Peak detector

**Radiated Emissions** 

Frequency (MHz)	Meter Reading (dBuV)	Det	AF T185 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
706.1778	23.17	QP	20.1	-24.1	19.17	46.02	-26.85	341	390	Н
709.6315	23.18	QP	20.2	-24.1	19.28	46.02	-26.74	236	300	Н
713.4433	33.61	QP	20.3	-24	29.91	46.02	-16.11	236	200	Н
710.9423	23.1	QP	20.2	-24.1	19.2	46.02	-26.82	236	100	V

QP - Quasi-Peak detector

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# 10. AC POWER LINE CONDUCTED EMISSIONS

### LIMITS

FCC §15.207 (a)

RSS-Gen 8.8

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

ANSI C63.10

### **RESULTS**

#### **6 WORST EMISSIONS**

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LINE 1 PLOT



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#### REPORT NO: 15U21746-E2V1 MODEL: 1688

Range 1	L: Line-L1 .15	- 30MHz								
Marker	Frequency	Meter	Det	T24 IL L1	LC Cables	Corrected	CFR 47	Margin	CFR 47	Margin
	(MHz)	Reading			1&3	Reading	Part 15	(dB)	Part 15	(dB)
		(dBuV)				dBuV	Class B QP		Class B	
									Avg	
7	.186	42.55	Pk	1	0	43.55	64.21	-20.66		
8	.1905	23.33	Av	1	0	24.33	-	-	54.01	-29.68
9	5.6715	34.79	Pk	.2	.1	35.09	60	-24.91		
10	5.6895	18.46	Av	.2	.1	18.76	-	-	50	-31.24
11	20.0625	35.02	Pk	.3	.2	35.52	60	-24.48		
12	20.0265	23.49	Av	.3	.2	23.99	-	-	50	-26.01

## **LINE 1 RESULTS**

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LINE 2 PLOT



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Range 2	Range 2: Line-L2 .15 - 30MHz												
Marker	Frequency	Meter	Det	T24 IL L2	LC Cables	Corrected	CFR 47	Margin	CFR 47	Margin			
	(MHz)	Reading			2&3	Reading	Part 15	(dB)	Part 15	(dB)			
		(dBuV)				dBuV	Class B QP		Class B				
									Avg				
1	.186	45.9	Pk	1.1	0	47	64.21	-17.21					
2	.186	18.66	Av	1.1	0	19.76	-	-	54.21	-34.45			
3	5.8515	34.93	Pk	.2	.1	35.23	60	-24.77					
4	5.8515	19.02	Av	.2	.1	19.32	-	-	50	-30.68			
5	8.583	33.56	Pk	.2	.1	33.86	60	-26.14					
6	8.5785	18.82	Av	.2	.1	19.12	-	-	50	-30.88			

**LINE 2 RESULTS** 

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