

FCC & ISED Certification Test Report For the Owlet Baby Care Inc. Wearable Sensor

FCC ID: 2AIEP-OSS1B ISED: 21386-OSS1B

WLL JOB# 14630-01 Rev 1 August 11, 2016 Revised September 23, 2016

Prepared for:

Owlet Baby Care Inc. 32 W. Center Street. Suite 201 Provo, UT 84601

Prepared By:

Washington Laboratories, Ltd. 7560 Lindbergh Drive Gaithersburg, Maryland 20879



Testing Certificate AT-1448

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Abstract

This report has been prepared on behalf of Owlet Baby Care Inc. to support the attached Application for Equipment Authorization. The test report and application are submitted for a Digital Transmission System (DTS) Transmitter under Part 15.247 (10/2014) of the FCC Rules and Regulations and Spectrum Management and Telecommunications Policy RSS-247 issue 1 of ISED. This Certification Test Report documents the test configuration and test results for the Owlet Baby Care Inc. Wearable Sensor.

Testing was performed on an Open Area Test Site (OATS) of Washington Laboratories, Ltd, 7560 Lindbergh Drive, Gaithersburg, MD 20879. Site description and site attenuation data have been placed on file with the FCC's Sampling and Measurements Branch at the FCC laboratory in Columbia, MD. The ISED OATS numbers are 3035A-1 and 3035A-2 for Washington Laboratories, Ltd. Site 1 and Site 2, respectively. Washington Laboratories, Ltd. has been accepted by the FCC and approved by ANAB under Certificate AT-1448 as an independent FCC test laboratory.

The Owlet Baby Care Inc. Wearable Sensor complies with the limits for a Digital Transmission System (DTS) Transmitter device under FCC Part 15.247 and ISED RSS-247.

Revision History	Description of Change	Date
Rev 0	Initial Release	August 11, 2016
Rev 1	Replaced typo in asset 281 cal due date, corrected transposed Bandwidth in table 6.	September 23, 2016 JR

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1 Introduction

1.1 Compliance Statement

The Owlet Baby Care Inc. Wearable Sensor complies with the limits for a Digital Transmission System (DTS) Transmitter device under FCC Part 15.247 (10/2014) and ISED RSS-247 issue 1 May 2015.

1.2 Test Scope

Tests for radiated emissions were performed. All measurements were performed in accordance with "C63.10 American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices". The measurement equipment conforms to ANSI C63.2 Specifications for Electromagnetic Noise and Field Strength Instrumentation.

1.3 Contract Information

Customer:

TEMS Consulting Inc. 140 River Road Georgetown, TX, 78628

On Behalf of:

1.4

1.5

	Owlet Baby Care Inc. 32 W. Center Street Suite 201 Provo, UT 84601
Quotation Number:	69359A
Test Dates	
Testing was performed on the following date(s):	6/15/2016 to 8/5/2016
Test and Support Personnel	
Washington Laboratories, LTD	James Ritter
Customer Representative	Stephen Berger

Abbreviations

Α	Ampere
ac	alternating current
AM	Amplitude Modulation
Amps	Amperes
b/s	bits per second
BW	BandWidth
CE	Conducted Emission
cm	Centimeter
CW	Continuous Wave
dB	decibel
dc	direct current
EMI	Electromagnetic Interference
EUT	Equipment Under Test
FM	Frequency Modulation
G	\mathbf{g} iga – prefix for 10 ⁹ multiplier
Hz	Hertz
IF	Intermediate Frequency
k	\mathbf{k} ilo – prefix for 10 ³ multiplier
LISN	Line Impedance Stabilization Network
Μ	$Mega - prefix$ for 10^6 multiplier
m	Meter
μ	m icro – prefix for 10^{-6} multiplier
NB	Narrowband
QP	Quasi-Peak
RE	Radiated Emissions
RF	Radio Frequency
rms	root-mean-square
SN	Serial Number
S/A	Spectrum Analyzer
V	Volt

2 Equipment Under Test

2.1 EUT Identification & Description

The Wearable Sensor is a portable monitoring unit. The Wearable sensor is built into a sock to be placed on an infant communicates via Bluetooth Low Energy technology.

ITEM	DESCRIPTION
Manufacturer:	Owlet Baby Care Inc.
FCC ID:	2AIEP-OSS1B
ISED:	21386-OSS1B
Model Number:	OSS 1.1
Model Name:	Wearable Sensor
FCC Rule Parts:	§15.247
ISED:	RSS-247
Frequency Range:	2402-2480MHz
Maximum Output Power:	17.95mW (12.54dBm) conducted
Modulation:	GFSK
Occupied Bandwidth:	783.4kHz
Keying:	Automatic
Type of Information:	Data
Number of Channels:	40
Power Output Level	Fixed
Antenna	integral
Antenna Type	0.52dBi trace antenna
Interface Cables:	None
Power Source & Voltage:	3.1VDC Battery
Emission Designator	783KFXD
Highest TX Spurious	267.6uV/m @3m (4960MHz)
Highest RX Spurious	12.5uV/m @3m (35.35MHz)

Table 1: Device Summary

2.2 Test Configuration

Six devices were submitted for testing, 3 units with the antenna replaced by a temporary antenna port and three with antennas for radiated testing. Each EUT was programmed to transmit at one of 3 frequencies (2402, 2440, & 2480MHz). All units were tested in a stand-alone configuration. All tests were performed in accordance with ANSI C63.10.

2.3 Testing Algorithm

The Wearable Sensor was programmed for DTS operation by the manufacturer. The EUT was set to transmit PRBS packets continuously at the desired transmit frequency. Worst case emission levels are provided in the test results data.

2.4 Test Location

All measurements herein were performed at Washington Laboratories, Ltd. test center in Gaithersburg, MD. Site description and site attenuation data have been placed on file with the FCC's Sampling and Measurements Branch at the FCC laboratory in Columbia, MD. The ISED OATS numbers are 3035A-1 and 3035A-2 for Washington Laboratories, Ltd. Site 1 and Site 2, respectively. Washington Laboratories, Ltd. has been accepted by the FCC and approved by ACLASS under Certificate AT-1448 as an independent FCC test laboratory.

2.5 Measurements

2.5.1 References

- ANSI C63.10:2013 American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
- ANSI C63.2 Specifications for Electromagnetic Noise and Field Strength Instrumentation
- RSS-Gen Issue 4 General Requirements for Compliance of Radio Apparatus
- RSS-247 issue 1 Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

2.6 Measurement Uncertainty

All results reported herein relate only to the equipment tested. The basis for uncertainty calculation uses ANSI/NCSL Z540-2-1997 (R2002) with a type B evaluation of the standard uncertainty. Elements contributing to the standard uncertainty are combined using the method described in Equation 1 to arrive at the total standard uncertainty. The standard uncertainty is multiplied by the coverage factor to determine the expanded uncertainty which is generally accepted for use in commercial, industrial, and regulatory applications and when health and safety are concerned (see

Equation 2). A coverage factor was selected to yield a 95% confidence in the uncertainty estimation.

Equation 1: Standard Uncertainty

$$u_{c} = \pm \sqrt{\frac{a^{2}}{div_{a}^{2}} + \frac{b^{2}}{div_{b}^{2}} + \frac{c^{2}}{div_{c}^{2}} + \dots}$$

Where u _c	= standard uncertainty
a, b, c,	= individual uncertainty elements
Div _a , _b , _c = the individual uncertainty element divisor on the probability distribution Divisor = 1.732 for rectangular distribution	
	Divisor = 1.414 for trapezoid distribution

Equation 2: Expanded Uncertainty

$$U = ku_c$$

Where U	= expanded uncertainty
k	= coverage factor
	$k \leq 2$ for 95% coverage (ANSI/NCSL Z540-2 Annex G)
uc	= standard uncertainty

The measurement uncertainty complies with the maximum allowed uncertainty from CISPR 16-4-2. Measurement uncertainty is <u>not</u> used to adjust the measurements to determine compliance. The expanded uncertainty values for the various scopes in the WLL accreditation are provided in table 2 below.

Table 2:	Expanded	Uncertainty List
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Scope	Standard(s)	Expanded Uncertainty
Conducted Emissions	CISPR11, CISPR22, CISPR14, FCC Part 15	<u>+</u> 2.63 dB
Radiated Emissions	CISPR11, CISPR22, CISPR14, FCC Part 15	<u>+</u> 4.55 dB

Parameter	Uncertainty	Actual (+/-)	Unit
Radio Frequency	$\pm 1 \ge 10^{-7}$	8.64E-08	parts
RF Power conducted (up to 160 W)	±0.75 dB	0.3	dB
Conducted RF Power variations using a test fixture	±0.75 dB	0.3	dB
Transmitter transient frequency (frequency difference)	±250 Hz	160.7	Hz
Transmitter transient time	±20 %	9.2	%

3 Test Equipment

Table 3 shows a list of the test equipment used for measurements along with the calibration information.

Test Name:	Conducted Emissions Voltage	Test Date:	8/5/2016
Asset #	Manufacturer/Model	Description	Cal. Due
823	AGILENT - N9010A	EXA SPECTRUM ANALYZER	8/5/2016

 Table 3: Test Equipment List

Test Name:	Radiated Emissions	Test Date:	8/3/2016
Asset #	Manufacturer/Model	Description	Cal. Due
725	B-Z TECHNOLOGIES - BZP118UD1X2	1 - 18GHZ LOW NOISE AMP	9/30/2016
627	AGILENT - 8449B	AMPLIFIER 1-26GHZ	9/30/2016
528	AGILENT - E4446A	3HZ - 44GHZ ANALYZER SPECTRUM	8/17/2016
644	SUNOL SCIENCES CORPORATION - JB1 925-833- 9936	BICONALOG ANTENNA	8/14/2017
559	HP - 8447D	AMPLIFIER	9/30/2016
281	ITC - 21A-3A1	WAVEGUIDE 4.51-10.0GHZ	10/22/2016
282	ITC - 21X-3A1	WAVEGUIDE 6.8-15GHZ	10/22/2016
453	AH SYSTEMS - PAM1840	PRE-AMPLIFIER 18GHZ-40 GHZ	9/30/2016
209	NARDA - V637	HORN STANDARD GAIN	CNR
210	NARDA - V638	HORN STANDARD GAIN	CNR
626	ARA - DRG-118/A	ANTENNA HORN	4/7/2018

4 Test Summary

The Table Below shows the results of testing for compliance with a Digital Transmission System in accordance with FCC Part 15.247 10/2014 and RSS47 issue 1, 5/2015. Full results are shown in section 5.

TX Test Summary (Digital Transmission System (DTS))						
FCC Rule Part	IC Rule Part	Description	Result			
15.247(a) (2)	RSS-247 [5.2 (1)]	6dB Bandwidth	Pass			
15.247 (b)(3)	RSS-247 [5.4 (4)]	Transmit Output Power	Pass			
15.247 (e)	RSS-247 [5.2 (2)]	Power Spectral Density	Pass			
15.247 (d)	RSS-247 [5.5]	/Out-of-Band Emissions	Pass			
		(Band Edge @ 20dB below)				
15.205	RSS-Gen 7.2.2	General Field Strength	Pass			
15.209		Limits (Restricted Bands &				
		RE Limits)				
15.207	RSS-Gen [7.2.4]	AC Conducted Emissions	NA (EUT does not TX			
			when Charging)			

Table 4: Test Summary Table

5 Test Results

5.1 Occupied (DTS) Bandwidth:

Occupied bandwidth was performed by monitoring the output of the EUT antenna port with a spectrum analyzer corrected for any cable/attenuator losses.

For Direct Sequence Spread Spectrum Systems, FCC Part 15.247 requires the minimum 6 dB bandwidth be at least 500 kHz.

5.1.1 Measurement Method:

Tests were performed as specified in ANSI C63.10 section 11.8 "DTS bandwidth" Option 1 (11.8.1).

Table 5: Occupied Bandwidth Spectrum Analyzer Settings

Resolution Bandwidth	Video Bandwidth				
100kHz	1MHz				

At full modulation, the occupied bandwidth was measured as shown in Figures 1-3.

Table 6 provides a summary of the Occupied Bandwidth Results.

Table 6: Occupied Bandwidth Results

Frequency	Bandwidth	Limit	Pass/Fail
Low Channel: 2402MHz	783.4kHz	<u>≥</u> 500kHz	Pass
Center Channel: 2440MHz	720.4kHz	≥500kHz	Pass
High Channel: 2480MHz	723.4kHz	≥500kHz	Pass



Figure 1: Occupied Bandwidth, Low Channel



Figure 2: Occupied Bandwidth, Center Channel



Figure 3: Occupied Bandwidth, High Channel

5.2 **RF Power Output:**

To measure the output power the unit was set to dwell on the low, high and middle channel. Testing was performed using the method from C63.10 section 11.9.1.1 "RBW \geq DTS bandwidth" at the antenna port as follows:

- a) Set the RBW \geq DTS bandwidth.
- b) Set VBW \geq [3 × RBW].
- c) Set span $\geq [3 \times RBW]$.
- d) Sweep time = auto couple.
- e) Detector = peak.
- f) Trace mode = max hold.
- g) Allow trace to fully stabilize.
- h) Use peak marker function to determine the peak amplitude level..

5.2.1 Measurement Method:

ANSI C63.10 section "11.9.1 Maximum peak conducted output power" subsection "11.9.1.1 RBW > DTS bandwidth"

Table 7: Spectrum Analyzer Settings

Resolution Bandwidth	Video Bandwidth				
1MHz	3MHz				

Table 8: RF Power Output Summary

Frequency	Level	Limit	Pass/Fail
Low Channel: 2402MHz	10.97dBm	30 dBm	Pass
Center Channel: 2440MHz	11.89dBm	30 dBm	Pass
High Channel: 2480MHz	12.54dBm	30 dBm	Pass

Agilent Spectr	um Analyzer - Swept SA							
Marker 1	RF 50 Ω AC 2.402057778889	CORREC S GHz PNO: Fast IFGain:Low	ENSE:INT Trig: Free F Atten: 20 d	Run B	IGN AUTO Avg Type: I Avg Hold:>1	Log-Pwr 100/100	02:04:39 PM TRACI TYP DE	1 Aug 04, 2016 = <mark>1 2</mark> 3 4 5 6 E M W////////////////////////////////////
10 dB/div	Ref Offset 10.4 dB Ref 20.00 dBm					Mkr1	2.402 057 10.96	′ 8 GHz 36 dBm
10.0				♦ ¹	· · · · · · · · · · · · · · · · · · ·			
0.00	- sterner -					U		Trans
10.0								and an and a second
20.0								
20.0								
-50.0								
-40.0								
-50.0		Low Chann	nel Peak Po	ower = 10	.97dBm			
-60.0								
-70.0								
Center 2.4 #Res BW	402000 GHz 1.0 MHz	#VBV	N 3.0 MHz			Sweep	Span 3. 5 1.07 ms (2	000 MHz 2000 pts)
MSG					I STATUS			

Figure 4: RF Peak Power, Low Channel



Figure 5: RF Peak Power, Center Channel



Figure 6: RF Peak Power, High Channel

5.3 Power Spectral Density:

Measurements for power spectral density were taken at the antenna port in accordance with ANSI C63.10. The spectrum analyzer was set to peak detect mode with a RBW of 3kHz ,VBW of 3MHz across a span 1.5x the DTS bandwidth using an auto sweep time..

5.3.1 Measurement Method:

ANSI C63.10 SECTION 11.10 "Maximum power spectral density level in the fundamental emission subsection 11.10.2 "Method PKPSD (peak PSD)"

The highest level detected across any 3 kHz band for continuous transmission was then recorded and compared to the limit 8dBm. The following table and plots give the results for power spectral density testing.

Frequency	Peak Level	Limit	Pass/Fail
Low Channel: 2402MHz	-2.47dBm	8 dBm	Pass
Center Channel: 2440MHz	-1.93dBm	8 dBm	Pass
High Channel: 2480MHz	0.41dBm	8 dBm	Pass

Table 9: Power Spectral Density



Figure 7: Power Spectral Density, Low Channel



Figure 8: Power Spectral Density, Center Channel



Figure 9: Power Spectral Density, High Channel

5.4 Conducted Spurious Emissions compliance

The EUT must comply with requirements for spurious emissions. Per §15.247(d) all spurious emissions in any 100 kHz bandwidth outside the frequency band in which the spread spectrum device is operating shall be attenuated 20 dB below the highest power level in a 100 kHz bandwidth within the band containing the highest level of the desired power.

Per ANSI C63.10 section 11.11 "Emissions in non-restricted frequency bands" this test may be performed in an antenna port conducted manner. The spectrum analyzer resolution bandwidth was set to 100 kHz and the video bandwidth was set to 300 kHz. The amplitude of the EUT carrier frequency was measured to determine the emissions limit (20 dB below the carrier frequency amplitude). The emissions outside of the allocated frequency band were then scanned from 30 MHz up to the tenth harmonic of the carrier. A peak detector was used for measurements.

As per ANSI C63.10 section 11.11.2 the high channel has the highest PSD and the limit for all channels was based on this level.

The following table shows the spurious emissions data.

5.4.1 Test Summary

The EUT complied with the requirements for spurious emissions at the antenna port.



Figure 10: Highest PSD in a 100 kHz Channel (High channel)



Figure 11: Low Channel Conducted Spurious Plot 1

Agilent	Spectru	n Analy:	zer - Swept SA								
LXI	T	RF	50 Ω AC	CORREC		SENSE:INT	AL	IGN AUTO		11:01:3:	1 AM Aug 05, 2016
Mark PASS	er 1 4 S	22.8	35570889	9 MHz	PNO: Fast 🕞	Trig: Freel Atten: 20 d	Run 18	Avg Type:⊓ Avg Hold:≻′	Log-Pwr 100/100	IF.	RACE 1 2 3 4 5 6 TYPE M₩₩₩₩₩₩ DET P S N N N N
10 dB/	div	Ref Of Ref 2	fset 10.4 dB 0.00 dBm		Comine on				N	/lkr1 422. -53.	836 MHz 488 dBm
10.0 -	Trace	1 Pas	S								
0.00 -		Limi	t								
-10.0			-								
-20.0											
-30.0											
-40.0											
-50.0	na to Madda a tha Na dh	الانطار والدرطار	jet however	مؤوساو ستأم المؤقر فأسأ فسر واست	a j filoso aktor d ut histo	1	a la la contrata a contrata de la co	a sa ing si pananana si sa si na si na si na	. Aufinite second to a shipt be	ath, an	ուսյություներին _{վերան} ին՝
-60.0	form til af der			and a state of the second s	ایند مرابط در در مربع مربع مربع م	and an end of a set of the set of	راي دو راي در و روي _و روي و در و دار و دار و دار و دار و دار و روي در و راي در و روي و در و در و دار و در و در و در و در و در و در و در و د	in an	<u>P </u>	<mark>ng ina anting proposition and information of a second second second second second second second second second se</mark>	(All Burth Block, park, pp and app)
-70.0				Low	Channel -	Conducted	l Spurious	Emissions			
Start #Res	Start 30.0 MHz Stop 1.0000 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 93.3 ms (40000 pts)								.0000 GHz (40000 pts)		
MSG								I STATUS			

Figure 12: Low Channel Conducted Spurious Plot 2

Agilent	Spectru	m Anal	yzer - Swept S/	N							
Mark	ker 1 2 <mark>S</mark>	.327 2.327	70351758	79 GHz	PNO: Fast 🕞) Trig: Free I Atten: 20 o	Run IB	Avg Type: Avg Hold:>*	Log-Pwr 100/100	11:U4:24 TF	4 AM AUGUS, 2016 RACE 1 2 3 4 5 6 TYPE MWWWWW DET PSNNNN
10 dB	/div	Ref C Ref)ffset 10.4 dE 20.00 dBm	3					Mkr	1 2.327 0 -51.	35 2 GHz 494 dBm
10.0	Trace	1 Pa	SS								
0.00 -											
-10.0	Lim	nit									
-20.0 -											
-30.0 -											
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-60.0	1997 1997 1997 1994 1997 1	on Frankla	and a second		Channel -	Conducter	Spurious	Emissions	provide (15) and a first of the	an a la factoria de la construcción	a na sina na sina kata kata kata kata kata kata kata ka
-70.0 -				2000			a opunious				
L Start #Res	: 1.000 BW 1	0 GH 00 k	iz Hz	1	#VB	W 300 kHz	1	1	Swee	Stop 2 p 131 ms	2.3400 GHz (40000 pts)
MSG								I STATUS			

Figure 13: Low Channel Conducted Spurious Plot 3



Figure 14: Low Channel Conducted Spurious Plot 4

Agilent	t Spectru	m Anal	yzer - Swept S	A							
Mark	ker 1 (RF 6.083	32020800	c correc)52 GHz	PNO: Fast	SENSE:INT	Run	IGN AUTO Avg Type: Avg Hold: 4	Log-Pwr 3/100	11:08:5 TF	8 AM Aug 05, 2016 RACE 1 2 3 4 5 6 TYPE M MANANAN DET P S N N N N
FAS	<u> </u>				IFGain:Low	Atten: 20 d	38			Millard C O	02.0.011-
10 dE	3/div	Ref C Ref :	offset 10.4 d 20.00 dBr	B n						-49.	853 dBm
	Trace	1 Pa	ss								
10.0											
0.00											
	Lim	it									
-10.0											
-20.0											
-30.0											
-40.0											
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					Low Chan	nel - Condu	ucted Spur	ious Emiss	ions		
-70.0					Low chan				10113		
Start	6 000		,							Stop 1	
#Res	5 BW 1	00 k	Hz		#VB	W 300 kHz			Swe	ep 384 ms	(40000 pts)
MSG								I STATUS			

Figure 15: Low Channel Conducted Spurious Plot 5

Agilent Spectr	rum Analyzer - Swept SA							
Marker 1	RF 50 Ω AC 13.69689242231	CORREC 1 GHz PNO: Fast C	SENSE:INT	Run dB	IGN AUTO Avg Type: I Avg Hold: 2	_og-Pwr 4/100	11:24:32 TR	2 AM Aug 05, 2016 ACE 1 2 3 4 5 6 I YPE MWWWWW DET P S N N N N
10 dB/div	Ref Offset 10.4 dB Ref 20.00 dBm	IFGalli.LUW	Addin 20			N	lkr1 13.6 -48.	96 9 GHz 223 dBm
10.0 Trac	e 1 Pass							
0.00	Limit							
-10.0								
-20.0								
-30.0								
-40.0								1
-50.0	n balaistin tiidata taadaa taaba daga baasa guy	enales and the state of the sta	dan karantik kupitat kup	Ladidy Harrison and the	to his of the sector had to be	Alandara a shaha katila katila a	parte de Halan Alendre en	
-60.0 <mark>4.41404.0</mark>	i Alexan, filo di testa più sta della sta filo di data dalla di prosta da p		n pananaka ka madipak			a ya fadan kana na ana ana ana ana ana ana ana a	and a second	
-70.0		Low Chanr	nei - Conduc	cted Spurio	us Emissio	ns		
Start 10.0 #Res BW	000 GHz 100 kHz	#V	/BW 300 kHz	 :		Swee	Stop 1 p 384 ms	4.000 GHz (40000 pts)
MSG					I STATUS		-	,

Figure 16: Low Channel Conducted Spurious Plot 6

Agilent S	pectrur	n Analy	zer - Swept SA	۱.								
Marke	er 1 1	RF 7.09	50 Ω AC 2577314	CORREC 433 GHz	PNO: Fact (<u> </u>	ENSE:INT	AL	IGN AUTO Avg Type: I Avg Hold: 3	_og-Pwr 0/100	11:26:2- TF	4 AM Aug 05, 2016 RACE <u>1 2 3 4 5 6</u> TYPE M M M M M M
PASS					FGain:Low	*	Atten: 20 d	В				DET P S N N N N
10 dB/c	liv	Ref O Ref 2	ffset 10.4 dE 2 0.00 dBm	3						Iv	1kr1 17.0 -44.	92 6 GHz 062 dBm
T	race	1 Pas	is									
10.0 —												
0.00												
	Lin	nit										
-10.0												
-20.0 —												
-30.0												
-40.0							Itt. att.	L. J. I. Britis	. Las dissolution of t	Han a cost dissibility for		al
-50.0		d dealer	والمحرور المروا ومعرول	la kiashi da bikata	ավերին ընդերություն		darent och på og som det som	aladih dalamin di mana ta matan	analihadinahihataata	and the second	angeneren an schende sterferene. An de seneren de la de seneren de la des	Del Al Magnet _{de} Meser (2014) Anna Carl
	elemente (till	And Printings	ann dharbhraine	and a state of the	en de la factor a cara a cara	- Loopad	te anne en la dert				i subra di	and the second secon
-60.0					w Chann	ച -	Conducte	ed Spuriou	s Emission	s		
-70.0							conduct					
Start 1 #Res I	14.00 BW 1	0 GH 00 kH	z Iz		#\	/BV	V 300 kHz			Swee	Stop 1 p 384 ms	8.000 GHz (40000 pts)
MSG		- • 11							I S STATUS	2.700		(

Figure 17: Low Channel Conducted Spurious Plot 7

Agilent Spectr	um Analyzer - Swept SA									
Marker 1	RF 50 Ω AC 21.3034825870	CORREC)65 GHz PNO: F IFGain:	ast 🕞 Low	ENSE:INT Trig: Free I Atten: 20 d	Run IB	IGN AUTO Avg Type: Avg Hold: 5	Log-Pwr 1/100	11:28:08 	TRACE 123456 TRACE 123456 TYPE MWWWW DET PSNNNN	
10 dB/div	Ref Offset 10.4 dB Ref 20.00 dBm						Ν	/lkr1 21.3 -40.	03 5 GHz 614 dBm	
10.0 Trac	e 1 Pass									
0.00										
-10.0	imit									
-20.0										
-30.0								1		
-40.0	(for each god from the later by some for some for the second	فقاع من الألى و الالاختلاط والعمر على من	a sphilisteau fer	al where the product of the	et, gillen om kønstet avterfor	مر بالدينة (المراجع المراجع ال مراجع المراجع ال	المالية المروطية المالي المراجع مالية بسيرين الأنفاذية إلى المراجع	lan sinan ana ang sana ang sana sana sana sana	lla barang manang bahaya Manang manang bahaya	
-50.0	<mark>ինքանի չերակությունը անչեցներին է ու ու չել</mark>	يى بىن يەرىپى يەرىلىدى يەرىلىدى يەرىلىك <u>بىلى بىن يەرىپى بىلىرى بىلىرى بىلىرى بىلىرى بىلىرى بىلىرى بىلىرى بىلى</u>	i i i i i i i i i i i i i i i i i i i	معد بر بر بر این می اینده المعد ال						
-70.0		Low	Channe	l - Conduc	ted Spuric	ous Emissio	ons			
Start 18 0	00 GHz							Stop 2	2 000 GHz	
#Res BW	100 kHz		#VBV	V 300 kHz			Swee	ep 384 ms	(40000 pts)	
MSG						I STATUS				

Figure 18: Low Channel Conducted Spurious Plot 8

Agilent Spectr	um Analyzer - Swept	SA							
LXI T	RF 50 Ω 4	AC CORREC		SENSE:INT	AL			11:29:35	5 AM Aug 05, 2016
Marker 1 PASS	24.84684617	1154 GHz	PNO: Fast 😱 Gain:Low	Trig: Free l Atten: 20 d	Run 18	Avg Type: Avg Hold:4	Log-Pwr 3/100		ACE 1 2 3 4 5 6 TYPE M
10 dB/div	Ref Offset 10.4 c Ref 20.00 dB	iB m					M	kr1 24.84 -37.	6 85 GHz 378 dBm
10.0	e 1 Páss								
0.00	imit								
-10.0									
-20.0									
-30.0									1_
-40.0	leting to a descended to a strategy of a let	ta dalahisan katala	al de fals de la del activitados	المحمودي ومعارض والدامة الالية. المحمودي ومعارض والدامة المحمود		and and the state of the state	a de la participa de la partic		n en genere genere genere de services de services de services de services de services de services de services La constance de services de
-50.0	y (d. free Shore y for a state of the second	ار الافراغ (میلادیند) در میروند و در این از میروند و در از مراجع از میروند. ا	_ow Chanr	el - Condu	cted Spuri	ous Emiss	ions		
-60.0									
-70.0									
Start 22.0 #Res BW	00 GHz 100 kHz		#VB	W 300 kHz	·	·	Swee	Stop 2 ep 288 ms	25.000 GHz (40000 pts)
MSG						I status			

Figure 19: Low Channel Conducted Spurious Plot 9



Figure 20: Center Channel Conducted Spurious Plot 1

Agilen	t Spectru	m Ana	lyzer - Swept S/	<u>۱</u>							
Marl PAS	ker 1 S	®⊧ 786.	32790819	8 MHz	PNO: Fast 🕞	SENSE:INT Trig: Free Atten: 20 o	Run B	IGN AUTO Avg Type: I Avg Hold:>*	Log-Pwr 100/100	05:58:0 TF	7PM Aug 04, 2016 RACE 123456 TYPE MWWWWW DET PSNNNN
10 dE	3/div	Ref (Ref	Dffset 10.4 dE 20.00 dBm	3					N	/lkr1 786. -52.	328 MHz 374 dBm
10.0	Trace	1 Pa	ISS								
0.00	1	.:.									
-10.0	LIII	110									
-20.0											
-30.0											
-40.0									1		
-50.0	ntin terliterin Mensenatury		j jila shi shi yaketi i shi shi shi s	ullangta Association at lassociat		Dag stan se an			a la Liter del distancia de la filma de la composición de la composición de la composición de la composición de	na staat ila si adalah kana Na staat ing sa sa sa sa sa sa sa	
-70.0				Cer	iter Chann	el - Condu	cted Spuri	ous Emissi	ons		
Stor	1 20 01	MU-								Stor	
#Res	s BW 1	00 k	Hz		#VB	W 300 kHz			Swee	ວ 93.3 ms	(40000 GHZ
MSG								I STATUS			

Figure 21: Center Channel Conducted Spurious Plot 2

Agilent Spec	trum Analyzer - Swept S	SA							
Marker ' PASS	RF 50Ω A 1 2.2950418760	ic correc 047 GHz IF	PNO: Fast 😱	SENSE:INT Trig: Free Atten: 20 o	AL Run 1B	IGN AUTO Avg Type: Avg Hold: 8	∟og-Pwr 0/100	05:59:39 TR 1	9 PM Aug 04, 2016 RACE 123456 TYPE MWWWWW DET PSNNNN
10 dB/div	Ref Offset 10.4 d Ref 20.00 dBr	IB n					Mkr	1 2.295 0 -52.	41 9 GHz 484 dBm
10.0 Trac	ce 1 Pass								
0.00	mit								
-10.0									
-20.0									
-30.0									
-40.0									1
-50.0	Dennis porti a del postata disente secto	a bear mouth free bear	lat still man to farte o	material and party	and Meastered ato	an adalah panapada di	lger jehrer Jahren der Kland	n jahan sa sa di sang kabapatén sa da	
-70.0	ann yn af far fan	Cer	ter Channe	el - Condu	cted Spurie	ous Emissi	ons		
								0 4	
start 1.0 #Res BW	000 GHZ / 100 kHz		#VB	W 300 kHz			Swee	Stop 2 p 131 ms	.3400 GHz (40000 pts)
MSG						I STATUS			

Figure 22: Center Channel Conducted Spurious Plot 3

Agilent	Spectru	n Analyze	er - Swept SA	l i i i i i i i i i i i i i i i i i i i							
Mark	⊤ aer 1 4 S	^{RF} •.8804	50 Ω AC 890122	correc 25 GHz	PNO: Fast 🖵	SENSE:INT Trig: Free I Atten: 20 o	Run 18	IGN AUTO Avg Type: Avg Hold: 2	Log-Pwr 2/100	06:01:03 TR 1	3PM Aug 04, 2016 ACE 123456 IYPE M WWWWW DET P SNNNN
10 dB/	/div	Ref Off: Ref 20	set 10.4 dE 0.00 dBm	3					N	lkr1 4.88 -41.	0 49 GHz 393 dBm
10.0 -	Trace	1 Pass									
0.00 -	Lim	it									
-10.0 -											
-20.0 -											
-30.0 -								1			
-50.0										. dellater d'her the	
-60.0 <mark>0</mark>			مىلىلىمى خاتىرى بىغلىرىم خاتىرى	analah dalam manja basi sa mahanakan sami karawan	and a start of the second	n kerakan pering platater Pering adara kerangan	n k jegn jeget bit som det som det som	n fan frei fi faste fa kultur statst. Genes gereef ken stjoerer stepster	le de la plan de la della d Nationa della de	alagi galari kanayara (paraya Magi galari kanayara (paraya	nee gesteren of the special sp
-70.0 -				Ce	enter Chan	nel - Condi	ucted Spur	ious Emiss	ions		
Start	2.540	GHz								Stop	6.000 GHz
#Res	BW 1	00 kHz	2		#VB	W 300 kHz			Swee	p 333 ms	(40000 pts)
MSG								I STATUS			

Figure 23: Center Channel Conducted Spurious Plot 4

Agilent Spe	ectrun	n Anal	yzer - Swept	t SA									
Marker	16	⊪ .15′	∣ ^{50 Ω} 180379ť	ac 0 5095 C	ORREC GHZ IF	PNO: Fast G		Trig: Free I Atten: 20 d	Run IB	ALIGN AUTO Avg Type: Avg Hold:>	Log-Pwr 100/100	06:05:1 Т	9 PM Aug 04, 2016 RACE 1 2 3 4 5 6 TYPE MWWWWW DET P S N N N N
10 dB/div	, 1	Ref0 Ref ∷	offset 10.4 20.00 dE	dB Sm								Mkr1 6.1 -49	51 8 GHz 478 dBm
10.0	ace	1 Pa	SS										
0.00													
-10.0	Lim	it											
-20.0													
-30.0													
-40.0	<u>↓</u> 1												
-50.0		la la constanta la constanta de la constanta de			ر المروانية المروانية مروانية مروانية	lan pérang bagan dalam perang se parta setember setember dalam perang	ul-realui ni-sialui		full the test of the	un and a state of the based	alter og han til bedrever og het.	ala ya ala belishina a ya ya Jabida a	
-60.0					Cor	ter Chan	nc	l - Condu	cted Spu	rious Emico	ione		
-70.0					Cer		lle		cteu spu				
Start 6. #Res B	000 W 10	GHz 00 ki	: Hz			#V	BW	/ 300 kHz			Swe	Stop eep 384 ms	10.000 GHz (40000 pts)
MSG										I STATUS			

Figure 24: Center Channel Conducted Spurious Plot 5

Agilent Spec	trum Analyzer - Swept S/	λ							
Marker	RF 50 Ω AC 1 13.652191304	CORREC 783 GHz	NO: Fast 🖵	SENSE:INT	Run	IGN AUTO Avg Type: I Avg Hold: 4	Log-Pwr 1/100	06:07:10 TR -) PM Aug 04, 2016 ACE 1 2 3 4 5 6 I YPE MWWWWW DFT P S N N N N
10 dB/div	Ref Offset 10.4 dE Ref 20.00 dBm	11- 3 1	Gain:Low	Atten: 20 G			N	lkr1 13.6 -49.	52 2 GHz 530 dBm
10.0	ce 1 Pass								
0.00 L	imit								
-10.0									
-30.0									
-40.0									● ¹
-50.0 Anstall	daan inaa filoo ya walio dha bi fadili ahayaa waxaa waxaa iyo iyo filo waxaa ha waxaa		la manana ang kalimating sa	ya padaasil dan tarih pangu Mangana kang bahari kang bahari kang	lin (i) and a sin a line if a same	ang pang bandaran banan ba Banan banan bana	nandara a tanang kanang ka Tang kang kanang kan	(geglesi (dahagi syate bayana Ay dashe Danasana Alimoto	<mark>de Marine and Andread and An Andread and Andread and Andr</mark>
-50.0		Cer	iter Chann	el - Condu	cted Spuri	ous Emissi	ons		
Start 40	000 CH2							Stor 4	4 000 CH-
#Res BV	100 GHZ		#VB	W 300 kHz			Swee	5.00 1 p 384 ms	4.000 GHZ (40000 pts)
MSG						I STATUS			

Figure 25: Center Channel Conducted Spurious Plot 6

Agilent Spectr	um Analyzer - Swept SA				
Marker 1 PASS	RF 50 Ω AC 0 17.278481962049	CORREC S GHz PNO: Fast IFGain:Low	ENSE:INT Trig: Free Run Atten: 20 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 89/100	06:09:12 PM Aug 04, 2016 TRACE 1 2 3 4 5 6 TYPE M WANAAAA DET P S N N N N
10 dB/div	Ref Offset 10.4 dB Ref 20.00 dBm				Mkr1 17.278 5 GHz -43.533 dBm
10.0	e 1 Pass				
0.00	mit				
-10.0					
-20.0					
-30.0					.1
-40.0	ىرىمى بىرىمى	ومواجعه ومعادية والمعالية والمعادية والمعادية والمعادية	, ihaa taha fa fa taha a	المعالمة على عن من الموالية المن معمل أو رأه على العالم على الموالي رايد. معالم المعالي عن من الموالية المعالم ال	the street little product less the state of a local street way
-50.0 Automotion		and we have the second s			
-70.0		Center C	nannel - Conduct	ed Spurious Emissior	IS
Ctort 14.0					Oton 19 000 CHa
start 14.0 #Res BW	100 GHZ 100 kHz	#VB\	N 300 kHz	S	stop 18.000 GHZ weep 384 ms (40000 pts)
MSG				STATUS	

Figure 26: Center Channel Conducted Spurious Plot 7

Agilent	t <mark>Spectru</mark>	m Analy:	zer - Swept S/	<u>ا</u>								
Stop	o Freq S	^{RE} 22.0	50Ω AC 0000000	0 GHz	PNO: Fast ⊂		Trig: Free F Atten: 20 d	AL Run IB	IGN AUTO Avg Type: I Avg Hold:>1	₋og-Pwr 100/100	06:11:0 TF	5PM Aug 04, 2016 RACE 123456 TYPE M WWWWW DET PSNNNN
10 dE	3/div	Ref Of Ref 2	fset 10.4 dE 0.00 dBr r	3						N	/lkr1 17.2	78 5 GHz dBm
10.0	Trace	1 Pas	S									
0.00	1 :											
-10.0	LIM											
-20.0												
-30.0						-						
-40.0	n Salaya tada t	կայաներերու	teaning fil at some that	,		na Luta Juri	and the special manufacture		te La dan san sa	l de la seconda de la		
-50.0	⊶ <u>,,,,,,</u> ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	, and the second state	ittel dinga på 21 octori på, på pis				and a second					
-70.0					Center Ch	ann	iel - Con	ducted Spu	irious Emis	sions		
	40.00										044-7	
Stari #Res	t 18.00 5 BW 1	0 GH2 00 kH	z Iz		#V	BW	300 kHz			Swee	Stop 2 p 384 ms	22.000 GHz (40000 pts)
MSG									I STATUS			

Figure 27: Center Channel Conducted Spurious Plot 8

Agilent Spect	trum Analyzer - Swept S	A							
LXI T	RF 50 Ω Α	C CORREC		SENSE:INT	AL	IGN AUTO		06:12:45	5 PM Aug 04, 2016
Marker ' PASS	1 24.983649591	240 GHz	'NO: Fast 😱 Gain:Low	Trig: Free l Atten: 20 d	Run 1B	Avg Type: Avg Hold:7	Log-Pwr 0/100		ACE 1 2 3 4 5 6 TYPE M WWWWWW DET P S N N N N
10 dB/div	Ref Offset 10.4 d Ref 20.00 dBn	B n					М	kr1 24.98 -36.	3 65 GHz 762 dBm
10.0	ce 1 Pass								
0.00	imit								
-10.0									
-20.0									
-30.0									1
-40.0	Ministry of the state	المراجع والمحافظ ومحافظ ومحافية ومحافية ومحافظ ومحافظ ومحافظ ومحافظ ومحافية ومحافظ ومحافظ ومحافظ ومحافة ومحافظ والمحافية ومحافظ والمحافظ والمحافظ والمحافظ والمحافظ ومحافظ ومحافظ ومحافظ ومحافية ومحافظ ومحافظ ومحافظ ومحافظ ومحافية ومحافظ ومحافظ ومحافظ ومحافي ومحافية ومحافظ ومحافظ ومحافظ ومحافية ومحافية ومحافي ومحافة ومحافظ ومحافية ومحافية ومحافية ومحافية ومحافية ومحافية ومحافظ ومحافظ ومح	n la disprissional al sur della managenera	n kon naktering kan sa sa kan	Lad Margaret Ballon and	ار این خون در بر از این	landar langun linaratur lit mad dama perseti ing pana	and a state of the second	alaya ay boloo ah daarah hoo ah boo ah ah ahaa
-50.0	Landers and the provide second s	اللغان وحالية الموسطة، وعلموها معاول ول	no and starting of the second second second	nggangajajasa steeringg	n n feifende de de la company de la comp	n. I ferreiten			
-60.0		(Center Cha	innel - Cor	ducted Sp	urious Em	issions		
70.0									
-70.0									
Start 22.0 #Res BW	000 GHz / 100 kHz	·	#VB	W 300 kHz			Swee	Stop 2 p 288 ms	25.000 GHz (40000 pts)
MSG						L STATUS			

Figure 28: Center Channel Conducted Spurious Plot 9



Figure 29: High Channel Conducted Spurious Plot 1

Agilent Spectro	um Analyzer - Swept SA	1							
Marker 1 PASS	RF 50 Ω AC 784.94562364	CORREC 1 MHz IF	PNO: Fast 😱	SENSE:INT Trig: Free l Atten: 20 d	Run IB	IGN AUTO Avg Type: Avg Hold:>1	Log-Pwr 100/100	05:13:31 TR 1	1 PM Aug 04, 2016 RACE 1 2 3 4 5 6 TYPE M WWWWW DET P S N N N N
10 dB/div	Ref Offset 10.4 dE Ref 20.00 dBm	3					N	/lkr1 784. -52.	946 MHz 566 dBm
10.0	e 1 Pass								
0.00	Limit								
-10.0									
-20.0									
-30.0									
-40.0									
-50.0	المربعة فالمقاد ولوا والتراب والمرابع	ne brah áltanti tanat de tecnes.	and an an an and the	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	وروبين والمراجع والمراجع والمراجع	ang tang dapat	Lubdabumarkfabrardiatafa	والمقاطرة والمراجع والمراجع	and the stand in section of the sect
-60.0	n ang pang kang kang kang kang mini kang kang (ina	na tanàna dia manjambana dia amin	n de gelen plan de la fostilistica	ي المانية (مريد من المريد من ا المريد المريد المريد المريد المريد المريد المريد المريد من المريد المريد المريد المريد المريد المريد المريد الم	(1011) - Aligan Angelan Angela	an _{a y} anthy dy a year year an air air an an direach an bh	n a la constanti fontan di fonta di ana tan e	un pelangan pangan pangkapal palakan	needeele daard oo bergegegen blaad oo berg
-70.0	Hi	igh Channe	el- Conduct	ed Spuriou	us Emissioi	าร			
L Start 30.0 #Res BW	MHz 100 kHz	1	#VB	W 300 kHz	1	1	Sweej	Stop 1 93.3 ms	.0000 GHz (40000 pts)
MSG						I STATUS			

Figure 30: High Channel Conducted Spurious Plot 2

Agilent Sp	oectrum Analyzer - Swept S	A							
Marke	r 1 2.2072696817	42 GHz	PNO: Fast	SENSE:INT Trig: Free l Atten: 20 o	AL Run 1B	IGN AUTO Avg Type: Avg Hold:>*	Log-Pwr 100/100	05:23:26 TR 1	5PM Aug 04, 2016 RACE 123456 TYPE MWWWWW DET PSNNNN
10 dB/di	Ref Offset 10.4 dl	3 1					Mkr	l 2.207 2 -52.	69 7 GHz 997 dBm
	race 1 Pass								
0.00									
-10.0	Limit								
-20.0									
-30.0									
-40.0									
-50.0			alan nal multi a na an		la transmanna datas	s , de la solute e l'ad, accuerte		lange, hjelenske skie er den	1 Ashing and the store
-60.0	stant (na final dan dari kana dari katan dar 1986 - Jan Barnara dari katan dari		and a start of the second s	ي بين مي بين المركز (غير منظر _{المركز} من الم		3. czy az firmentine demonstra dz	<mark>ya mangula, ding ng dinaka dinaka ng d</mark>	<mark>na a terpi (teratik) debek ter</mark> d	<mark>glatisti (21,000 mijos tiplo)</mark>
-70.0		⊥ Hi	gh Channe	I- Conduct	ed Spuriou	s Emission	IS		
L Start 1. #Res B	.0000 GHz SW 100 kHz	1	#VB	W 300 kHz	1		Swee	Stop 2 p 131 ms (2.3400 GHz (40000 pts)
MSG									

Figure 31: High Channel Conducted Spurious Plot 3



Figure 32: High Channel Conducted Spurious Plot 4

Agilent Spect	trum Analyz	er - Swept SA									
LXI T	RF	50 Ω AC	CORREC		SENSE:INT	AL	IGNAUTO		05:27:43	3PM Aug 04, 2016	
Marker ' PASS	1 6.1162	2029050	/3 GHz	PNO: Fast 🖵) Trig: Free Atten: 20 (Run dB	Avg Type: Avg Hold:3	Log-Pwr 0/100		TYPE M WWWWWW DET P S N N N N	
10 dB/div	Ref Off Ref 20	set 10.4 dB 0.00 dBm							Mkr1 6.1 -50.	16 2 GHz 535 dBm	
10.0	ce 1 Pass	3									
0.00	Limit										
-10.0											
-20.0											
-30.0											
-40.0											
-50.0 nstaller	aliphanging ding Night panging ding	ang da kan da kan da kan dan se	Heligan syn gyd yn ywl yn ywl Meligan yn ferfereddau (gyd yw	allallulasi Matabasa _{sa} uku Malimana matabili Masa sa s	allahash kapaptasarika Manda	linharmeliter met.	.WRITE AND A STREET AND A STREET	a the debeness Laster		(tip) a bar bahasar sa bi siya 	
-60.0			High (Channel- (onductod	Spurious F	missions	<mark>da _ 111 y da y da diferia y da tatu ya y</mark> a di	an an linn na an Alfahanan an Alfaha		
-70.0			- ingli (onducied						
Start 6.00 #Res BW	00 GHz / 100 kH	z		#VB	W 300 kHz			Swee	Stop 1 ep 384 ms	0.000 GHz (40000 pts)	
MSG											

Figure 33: High Channel Conducted Spurious Plot 5

Agilent Spectr	um Analyzer - Swept SA								
Marker 1 PASS	RF 50 Ω AC 13.72509312732	CORREC 28 GHz PNO: Fa IFGain:L	ast 😱	EENSE:INT Trig: Free I Atten: 20 d	Run IB	IGN AUTO Avg Type: Avg Hold: 8	Log-Pwr 2/100	05:29:37 TR 1	7 PM Aug 04, 2016 RACE 123456 TYPE MWWWWW DET PSNNNN
10 dB/div	Ref Offset 10.4 dB Ref 20.00 dBm						N	lkr1 13.7: -50.	25 1 GHz 997 dBm
10.0 Trace	e 1 Pass								
0.00	Limit								
-10.0									
-20.0									
-30.0									
-40.0									1
		h de hij lijderes wede sij Lepus de sil heters he Angel van geween de sij Lepus de sidere de si		that wat beyond the film way a second	n de finde og de progetikeling og de finde finde finde og de som	lan yang dalah kepilan terdenang Panaharan yang dalah kepilan terdenang		dist _{ere} kystististististististististist aluveneetiineetiinististiyysenteet	The first of the second state of the second st
-70.0		Hig	gh Cha	innel- Con	ducted Spi	urious Emi	ssions		
								0 4	
start 10.0 #Res BW	uu GHZ 100 kHz		#VB۱	W 300 kHz			Swee	1 stop 1 p 384 ms	4.000 GHZ (40000 pts)
MSG						I STATUS			

Figure 34: High Channel Conducted Spurious Plot 6

Agilent Spectre	um Analyzer - Swept SA	1							
LX/ T	RF 50 Ω AC	CORREC		SENSE:INT	ALI	IGN AUTO		05:30:54	4 PM Aug 04, 2016
Marker 1 PASS	16.573564339	109 GHz	PNO: Fast	Trig: Free I	Run	Avg Type: I Avg Hold: 2	Log-Pwr 7/100	TF ·	ACE 123456 TYPE MWWWWW DET PSNNNN
		LI II	Gamicow	Haten. 20 0			D.	Uze4 4.6 5	72 C CU-
10 dB/div	Ref Offset 10.4 dB Ref 20.00 dBm	3 I					IV	-43.	093 dBm
Trace	e 1 Pass								
10.0									
0.00	Linait								
-10.0									
-20.0									
-30.0									
						<u>^1</u>			
-40.0							and adde to be and the	t a the salar at	
-50.0 m. doi.t.t.		الإسترادم والالارين	(teggianti)-titeliseti)	n an an Allana an Anna Anna Anna Anna An	te been the second s	antering a supervised of the s	an ha siya sa ka	n and a state of the	energi sega bilanga bila
nglijk-Provinske	الأرادة فاستمز والاوادة والمروسين والحدائي	an da ann às an taite an taite an taite à sa tha an taite	and here a second s	and the second states of the second	and a state of the second				an a
-60.0									
		Hig	h Channel	- Conducte	d Spurious	Emissions	5		
-70.0									
Start 14.0 #Pes BM	00 GHz 100 kHz		#\/BI	M 300 kH2			Swoo	Stop 1	8.000 GHz
#RCS DVV			#VD	W JOU KHZ		r 1	Swee	µ J04 IIIS	(40000 pts)
MSG						STATUS			

Figure 35: High Channel Conducted Spurious Plot 7

Agilent Spectr	um Analyzer - Swept SA					
Marker 1 PASS	RF 50 Ω AC COF 21.301882547064 C	REC SHZ SHZ PNO: Fast S IFGain:Low	ENSE:INT Trig: Free Run Atten: 20 dB	ALIGN AUTO Avg Type: l Avg Hold: 8;	_og-Pwr 2/100	05:32:53 PM Aug 04, 2016 TRACE 1 2 3 4 5 6 TYPE MWWWWW DET P S N N N N
10 dB/div	Ref Offset 10.4 dB Ref 20.00 dBm				Mkr	1 21.301 9 GHz -39.745 dBm
10.0 Trace	e 1 Pass					
0.00	1 i					
-10.0						
-20.0						
-30.0						1
-40.0	والمعتقلة والمعتمين والمعتم والمحتول والمعتم وال	ไขปฏะเหล _{ายในเ} สม	na na mili a tara paga na mana a mana di sa di sa na mana di sa di sa na mana di sa di sa na mana di sa di sa n	Alf the former of the second		And the provide the strength of the strength o
-50.0 	رو ر	lán tárá na Anny _a n ann an ghu tha Bhiltin An Anna an A				
-60.0		High Chanr	el- Conducted	Spurious Emissi	ons	
-70.0						
Start 18.0 #Res BW	00 GHz 100 kHz	#VB\	N 300 kHz		Sweep 3	Stop 22.000 GHz 84 ms (40000 pts)
MSG				I STATUS		

Figure 36: High Channel Conducted Spurious Plot 8

Off Dec BO Q AC CORREC SERVET ALISANDO OC 333 14MA AUG0, 2015 Marker 1 24.983199579909 GHz MOSE Fost Trig: Free Run Atten: 20 dB Aug Type: Log-PWr Avg Type: Log-	Agilent Spectr	um Analyzer - Swept SA								
Ref Offset 10.4 dB Mkr1 24.983 20 GHz 100 Trace 1 Pass -37.415 dBm 100 Limit - 100 Limit - 100 Limit - -200 - - -300 - - -	Marker 1 PASS	RF 50 Ω AC 24.9831995799	correc 190 GHz P IFI	NO: Fast 🖵 Gain:Low	SENSE:INT Trig: Free Atten: 20 o	AL Run 18	IGN AUTO Avg Type: Avg Hold: 2	Log-Pwr 9/100	05:36:1- TF	4 PM Aug 04, 2016 RACE 123456 TYPE MWWWWW DET PSNNNN
Trace 1 Pess	10 dB/div	Ref Offset 10.4 dB Ref 20.00 dBm						М	kr1 24.98 -37.	3 20 GHz 415 dBm
0.00 Limit Image: Stop 25.000 GHz 10.0 High Channel- Conducted Spurious Emissions Image: Stop 25.000 GHz Start 22.000 GHz #VBW 300 kHz #VBW 300 kHz	10.0 Trace	e 1 Pass								
Limit Limit <thlimit< th=""> <thlimit< th=""> <thli< th=""><th>0.00</th><th>limit</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></thli<></thlimit<></thlimit<>	0.00	limit								
-200	-10.0									
-30.0 -30.0 <td< th=""><td>-20.0</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>	-20.0									
-40.0 -60.0 -7	-30.0									1 1 mai 1 mai 1 mara 1 mara
-70.0 -7	-40.0	a la la da la la casa da parte da serie	المارين والمراجع المارين والمراجع ومروم والمرا المحقق ومعاملة المارين ومروم ومرور والمرور	n ang dipang pang pang pang pang pang pang pang	an an an ann an Anna Anna Anna Anna Anna Anna Anna Ann Mar an Anna an Anna Anna Anna Anna Anna A	y dia ang katala pada ang katapanan Nationa na sapatanan kanang pang	ten ten perila perila perila di la sono di ante di la sono di senera di senera di senera di senera di senera d Na ferenza periori degli contra di senera d	and and the standard standards	a ta da	y analihila nin-bona tul
-70.0 High Channel- Conducted Spurious Emissions Start 22.000 GHz #Res BW 100 kHz #VBW 300 kHz Stop 25.000 GHz Sweep 288 ms (40000 pts)	-60.0	. I I realize the real								
Start 22.000 GHz Stop 25.000 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 288 ms (40000 pts)	-70.0		H	igh Chann	el- Conduc	ted Spurio	us Emissio	ns		
#Res BW 100 kHz #VBW 300 kHz Sweep 288 ms (40000 pts)	Start 22.0	00 GHz							Stop 2	25.000 GHz
	#Res BW	100 kHz		#VB	W 300 kHz		7	Swee	ep 288 ms	(40000 pts)

Figure 37: High Channel Conducted Spurious Plot 9



Figure 38: Lower Band Edge Low Channel



Figure 39: Upper Band Edge High Channel

5.5 Radiated Spurious Emissions:

The EUT must comply with the requirements for radiated spurious emissions that fall within the restricted bands. These emissions must meet the limits specified in §15.209 and §15.35(b) for peak measurements.

5.5.1 Test Procedure

The EUT was placed on motorized turntable for radiated testing on a 3-meter open field test site. The emissions from the EUT were measured continuously at every azimuth by rotating the turntable. Receiving antennas were mounted on an antenna mast to determine the height of maximum emissions. The height of the antenna was varied between 1 and 4 meters. Both the horizontal and vertical field components were measured.

The EUT was tested in 3 orthogonals with the worst case readings reported.

Above 1GHz the EUT was placed on a 1.5meter table with RF absorber material between the EUT and Receive antenna.

The emissions were measured using the following resolution bandwidths:

Frequency Range	Resolution Bandwidth	Video Bandwidth
30MHz-1000 MHz	100kHz	1MHz
>1000 MHz	1 MHz	3MHz

Table 10: Spectrum Analyzer Settings

Average measurements above 1GHz were made with the Spectrum analyzer set to RMS Average. Correction factors were then applied and the resulting value was compared to the limit.

The EUT was scanned up to 25GHz.

5.5.1.1 Duty Cycle Corrections

A duty cycle correction of 3.2dB was added to the RMS average readings to compensate for the on time of the EUT in accordance with C63.10 section 11.13.3.4.

The measured duty cycle = (Time on)/(Time on and Time off)=291.2us/625.1us=0.47 (47%)

Correction Calculation = 10*Log (1/(duty cycle) = 10*Log (1/0.47) = 3.2dBm



Figure 40: Duty Cycle Calculation

5.5.2 Test Summary

The EUT complied with the requirements for radiated spurious emissions.

Table 11: Radiated Emission Test Data (all Channels)(Restricted Bands)

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Duty Cycle Correction (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)
120.00	V	100.00	1.20	26.50	-9.3	0.0	7.3	150.0	-26.3
136.64	V	90.00	1.20	28.62	-9.8	0.0	8.8	150.0	-24.7
244.15	V	8\90	1.60	25.92	-11.2	0.0	5.4	200.0	-31.3
120.00	Н	90.00	3.60	26.68	-9.3	0.0	7.4	150.0	-26.1
137.42	Н	180.00	3.60	25.62	-9.8	0.0	6.1	150.0	-27.8
244.18	Н	270.00	2.60	26.70	-11.2	0.0	5.9	200.0	-30.6

Table 12: Radiated Emission Test Data, Low Channel

Low Channel @ 2402MHz

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Duty Cycle Correction (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Comments
2402.00	V	180.00	2.60	98.05	-2.4	0.0	60613.3	NA	NA	Fundamental-pk
2390.00	V	180.00	2.60	45.97	-2.7	0.0	146.2	5000.0	-30.7	pk
2390.00	V	180.00	2.60	39.32	-2.7	3.2	98.3	500.0	-14.1	Ave
4804.00	V	90.00	3.40	47.47	3.7	0.0	362.1	5000.0	-22.8	pk
4804.00	V	90.00	3.40	38.93	3.7	3.2	195.8	500.0	-8.1	Ave
12010.00	V	45.00	3.80	37.80	14.7	0.0	419.3	5000.0	-21.5	pk
12010.00	V	45.00	3.80	29.90	14.7	3.2	244.1	500.0	-6.2	Ave
2402.00	Н	45.00	2.80	96.85	-2.4	0.0	52792.0	NA	NA	Fundamental-pk
2390.00	Н	45.00	2.80	48.67	-2.4	0.0	204.9	5000.0	-27.7	pk
2390.00	Н	45.00	2.80	38.96	-2.4	3.2	96.8	500.0	-14.3	Ave
4804.00	Н	180.00	3.40	43.65	3.7	0.0	233.3	5000.0	-26.6	pk
4804.00	Н	180.00	3.40	37.48	3.7	3.2	165.7	500.0	-9.6	Ave
12010.00	Н	0.00	3.80	37.90	14.7	0.0	424.1	5000.0	-21.4	pk
12010.00	Н	0.00	3.80	28.60	14.7	3.2	210.1	500.0	-7.5	Ave

Table 13: Radiated Emission Test Data, Center Channel

Center Channel @ 2440 MHz

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Duty Cycle Correction (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Comments
2440.00	V	180.00	3.20	98.40	-2.1	0.0	65673.8	NA	NA	Fundamental-pk
4880.00	V	45.00	3.60	44.25	3.7	0.0	250.3	5000.0	-26.0	pk
4880.00	V	45.00	3.60	39.82	3.7	3.2	217.2	500.0	-7.2	Ave
7320.00	V	45.00	3.40	38.25	10.6	0.0	276.2	5000.0	-25.2	pk
7320.00	V	45.00	3.40	30.02	10.6	3.2	154.8	500.0	-10.2	Ave
12200.00	V	0.00	3.80	36.90	15.4	0.0	410.9	5000.0	-21.7	pk
12200.00	V	0.00	3.80	29.32	15.4	3.2	248.2	500.0	-6.1	Ave
2440.00	Н	90.00	45.00	99.10	-2.1	0.0	71185.5	NA	NA	Fundamental-pk
4880.00	Н	180.00	3.00	48.30	3.7	0.0	398.9	5000.0	-22.0	pk
4880.00	Н	180.00	3.00	41.43	3.7	3.2	261.5	500.0	-5.6	Ave
7320.00	Н	10.00	3.00	38.95	10.6	0.0	299.4	5000.0	-24.5	pk
7320.00	Н	10.00	3.00	31.40	10.6	3.2	181.5	500.0	-8.8	Ave
12200.00	Н	45.00	3.60	39.00	15.4	0.0	523.3	5000.0	-19.6	pk
12200.00	Н	45.00	3.60	28.80	15.4	3.2	233.7	500.0	-6.6	Ave

Table 14: Radiated Emission Test Data, High Channel

High Channel @ 2480MHz

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Duty Cycle Correction (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Comments
2480.00	V	90.00	3.60	98.15	-1.7	0.0	66502.5	NA	NA	Fundamental-pk
2483.50	V	90.00	3.60	55.87	-1.7	0.0	513.3	5000.0	-19.8	pk
2483.50	V	90.00	3.60	43.98	-1.7	3.2	188.8	500.0	-8.5	Ave
4960.00	V	180.00	3.40	45.90	3.8	0.0	307.2	5000.0	-24.2	pk
4960.00	V	180.00	3.40	38.30	3.8	3.2	185.1	500.0	-8.6	Ave
7440.00	V	180.00	3.60	40.71	10.4	0.0	361.2	5000.0	-22.8	pk
7440.00	V	180.00	3.60	30.88	10.4	3.2	168.4	500.0	-9.5	Ave
12400.00	V	270.00	3.50	38.50	16.0	0.0	531.5	5000.0	-19.5	pk
12400.00	V	270.00	3.50	27.80	16.0	3.2	224.1	500.0	-7.0	Ave
2480.00	Ш	00.00	2.40	00.02	17	0.0	01(07.0	NT A	NT A	Fundamental als
2480.00	п	90.00	5.40	99.95	-1./	0.0	81027.8	INA	INA	гипаателаа-рк
2483 50	н	90.00	3 40	62 20	-17	0.0	1063.9	5000.0	-13.4	nk
2483.50	Н	90.00	3.40	46.50	-1.7	3.2	252.3	500.0	-5.9	Ave
2.00.00		20100	0110			0.2	20210	20010	012	
4960.00	Н	0.00	3.00	47.20	3.8	0.0	356.8	5000.0	-22.9	pk
4960.00	Н	0.00	3.00	41.50	3.8	3.2	267.6	500.0	-5.4	Ave
7440.00	Н	45.00	3.20	38.66	10.4	0.0	285.3	5000.0	-24.9	pk
7440.00	Н	45.00	3.20	31.41	10.4	3.2	179.0	500.0	-8.9	Ave
12400.00	Н	60.00	3.80	39.43	16.0	0.0	591.6	5000.0	-18.5	pk
12400.00	Н	60.00	3.80	28.66	16.0	3.2	247.5	500.0	-6.1	Ave