

Report No. 247328-2

Test Report

Г							
Product	DECT Transceiver in Alarm Sentral						
Name and address of the	CLIMAX TECHNOLOGY CO., LTD.						
applicant	No 258, Sinhu 2 nd Rd., Neihu District Taipei City 114, Taiwan (R.O.C.)						
Name and address of the manufacturer	Same as above						
Model	WTRVS3						
Rating	3.0 V DC (Primary Battery, 1xCR2 cell, Lithium)						
Trademark	CLIMAX						
Serial number	/						
Additional information	DECT 6.0						
Tested according to	FCC Part 15, subpart D Isochronous UPCS Device, 1920 – 1930 MHz Industry Canada RSS 213, Issue 3 2 GHz License-exempt Personal Communications Service Devices (LE-PCS)						
Order number	247328						
Tested in period	2014.04.04 to 2014.04.23 and 2015.06.12 to 2015.06.15						
Issue date	2014.08.07						
Name and address of the testing laboratory	Nemko FCC No: 994405 IC OATS: 2040D-1						
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This report abol! set be repredu	Fraction What have a series of the series						
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1 INFORMATION

1.1 Tested Item

Name :	CLIMAX
Model name :	WTRVS3
FCC ID :	GX9WTRVS
Industry Canada ID :	2304B-WTRVS
Serial number :	/
Hardware identity and/or version:	V1.1
Software identity and/or version :	HS100914D00
Tested to IC Radio Standard (RSS) :	RSS-213 Issue 3, RSS-GEN Issue 4
Test Site IC Reg. Number :	IC 2040D-1
Frequency Range :	1921.536 – 1928.448 MHz
Number of Channels :	5 RF Channels, 5x12 = 60 TDMA Duplex Channels
Type of Modulation :	Digital (Gaussian Frequency Shift Keying)
Conducted Output Power :	2.45 mW (Peak)
Antenna Connector :	None
Number of Antennas :	1
Antenna Diversity Supported :	No
Power Supply :	Primary Battery (1xCR2 cell, Lithium)

1.2 Description of Tested Device

The EUT is a DECT Alarm Transmitter and is an initiating device as described in ANSI C63.17 and is designed to operate together with a DECT Base Station, which is the responding device.

1.3 Exposure Evaluation

The EUT is designed to be used handheld and for the purposes of exposure evaluation this EUT is a portable device. The EUT is exempted from SAR testing due to very low output power.

The EUT is exempted from RF Exposure Evaluation to Industry Canada requirements since the output power complies with the power levels of section 2.5.1 of RSS-102 Issue 5.



1.4 Test Environment

Temperature:	20.1 – 23.5 °C
Relative humidity:	26 – 43 %
Normal test voltage:	3.0 V DC (Nominal battery voltage)

The values are the limit registered during the test period.

1.5 Test Engineer(s)

Frode Sveinsen

1.6 Test Equipment

See list of test equipment in clause 6.

1.7 Other Comments

The Monitoring and Time and Spectrum Window Access tests were performed with Test Set-Up 6 (Ref. clause 5). A clock signal from the companion device was used to synchronize the Pulse Pattern Generator and the Spectrum Analyzer to the start of the DECT time window. The EUT was limited by administrative commands to operate on only two frequency carriers. For the tests where the EUT was required to operate on only one frequency carrier, one carrier was blocked by applying a CW interfering signal from RF Generator 3. The Pulse Pattern Generator was used to apply time synchronized interference to time windows where this was required.

Since the EUT was programmed to operate on only two RF carriers, it was only necessary with two RF generators for the monitoring tests, however a third generator was applied for the tests that required specific time slots to be blocked.

This EUT supports Least Interfered Channel procedure (LIC), the Monitoring and Time and Spectrum Window Access tests were conducted as specified for EUTs that support LIC procedure.

All tests were performed in conducted mode with a temporary antenna connector.



2 TEST REPORT SUMMARY

2.1 General

All measurements are traceable to national standards.

The tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC CFR47 Part 15D for Isochronous UPCS Devices and Industry Canada RSS-213 Issue 3 / RSS-GEN Issue 4 / RSP-100 Issue 10.

All tests were conducted is accordance with ANSI C63.4-2014 and ANSI C63.17-2013. Antenna Gain tests were made in a 3m fully-anechoic chamber.

A description of the test facility is on file with the FCC and Industry Canada.

New Submission

Production Unit

Pre-production Unit

Class II Permissive Change

PUT Equipment Code

Family Listing



THIS TEST REPORT APPLIES ONLY TO THE ITEM(S) AND CONFIGURATIONS TESTED.

Deviations from, additions to, or exclusions from the test specifications are described in "Summary of Test Data".

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2.2 Test Summary

Name of test	FCC CFR 47 Paragraph #	IC RSS-213 Paragraph #	Verdict
Power Line Conducted Emission	15.107(a) 15.207(a)	6.3 RSS-GEN 8.8	N/A
Digital Modulation Techniques	15.319(b)	6.1	Complies
Labeling requirements	15.19(a)(3)	3 RSP-100 3.1	Complies
Antenna Requirement	15.317, 15.203	RSS-GEN 8.3	Complies
Channel Frequencies	15.303	1	Complies
Automatic discontinuation of transmission	15.319(f)	4.3.4(a)	Complies
Emission Bandwidth	15.323(a)	6.4 RSS-GEN 6.6	Complies
In-band emissions	15.323(d)	6.7.2	Complies
Out-of-band emissions	15.323(d)	6.7.1	Complies
Output Power and Antenna Gain	15.319(c)(e), 15.31(e)	6.5 and 4.1(e) RSS-GEN 8.3	Complies
Power Spectral Density	15.319(d)	4.3.2.1	Complies
Carrier frequency stability	15.323(f)	6.2	Complies
Frame repetition stability	15.323(e)	4.3.4(c)	Complies
Frame period and jitter	15.323(e)	4.3.4(c)	Complies
Monitoring threshold, Least interfered channel	15.323(c)(2);(5); (9)	4.3.4(b)	Complies
Monitoring of intended transmit window and maximum reaction time	15.323(c)(1)	4.3.4(b)	Complies
Threshold monitoring bandwidth	15.323(c)(7)	4.3.4(b)	Complies
Reaction time and monitoring interval	15.323(c)(1);(5); (7)	4.3.4(b)	Complies
Access criteria test interval	15.323(c)(4);(6)	4.3.4(b)	N/A ¹
Access Criteria functional test	15.323(c)(4);(6)	4.3.4(b)	N/A ¹
Acknowledgements	15.323(c)(4)	4.3.4(b)	Complies
Transmission duration	15.323(c)(3)	4.3.4(b)	Complies
Dual access criteria	15.323(c)(10)	4.3.4(b)	Complies
Alterative monitoring interval	15.323(c)(10);(11)	4.3.4(b)	N/A ²
Spurious Emissions (Radiated)	15.319(g) 15.109(a) 15.209(a)	4.3.3 RSS-GEN 8.9	N/A ³

¹ Only applies for equipment that transmits unacknowledged control and signaling information

¹ Only applies for EUT that can be initiating device

² The client declares that the tested equipment does not implement this provision

³ Not required if the Conducted Out-of-Band Emissions test is Passed



3 TEST RESULTS

3.1 Digital Modulation Techniques

The EUT uses Multi Carrier / Time Division Multiple Access / Time Division Duplex and Digital GFSK modulation. For further details see the operational description provided by the applicant.

Requirement, FCC 15.319(b):

All transmissions must use only digital modulation techniques.

3.2 Labeling Requirements

See separate documents showing the label design and the placement of the label on the EUT.

Requirements FCC 15.19

The FCC Identifier shall be displayed on the label, and the device(s) shall bear the following statement in a conspicuous location on the device or in the user manual if the device is too small:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The label itself shall be of a permanent type, not a paper label, and shall last the lifetime of the equipment.

UPCS CHANNEL	FREQUENCY (MHz)
Upper Band Edge	1930.000
0 (Highest)	1928.448
1	1926.720
2	1924.992
3	1923.264
4 (Lowest)	1921.536
Lower Band Edge	1920.000

3.3 Channel Frequencies

Requirement: FCC 15.303

Within 1920 -1930 MHz band for isochronous devices.



3.4 Antenna Requirement

Does the EUT have detachable antenna(s)?		NO
If detachable, is the antenna connector(s) non-standard?		
The tested equipment has only integral antennas. The conducted tests with a temporary antenna connector.	were perfo	ormed on a sample

Requirement: FCC 15.203, 15.204, 15.317.

3.5 Automatic Discontinuation of Transmission

Does the EUT transmit Control and	I Signaling Information?		NO
TYPE OF EUT :	☐ INITIATING DEVICE	RESPO	NDING DEVICE

The following tests simulate the reaction of the EUT in case of either absence of information to transmit or operational failure after a connection with the companion device is established.

Number	Test	EUT Reaction	Verdict
1	Power removed from EUT	С	Pass
2	Switch Off EUT	N/A	Pass
3	Hook-On by EUT	N/A	Pass
4	Power Removed from Companion Device	В	Pass
5	Switch Off Companion Device	N/A	Pass
6	Hook-On by Companion Device	N/A	Pass

A - Connection breakdown, Cease of all transmissions

B - Connection breakdown, EUT transmits control and signaling information

C - Connection breakdown, Companion Device transmits control and signaling information

N/A - Not Applicable (EUT/Companion Device does not have On/Off switch and cannot perform Hook-On)

Requirements, FCC 15.319(f)

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude transmission of control and signaling information or use of repetitive codes used by certain digital technologies to complete frame or burst intervals.



3.6 Peak Power Output

Test Method:

ANSI C63.17, clause 6.1.2.

Test Results: Complies

Measurement Data:

Maximum Conducted Output Power

Channel No.	Channel No. Frequency (MHz)		Maximum Antenna Gain (dBi)	Maximum Radiated Output Power (dBm)	
4	4 1921.536		-3.6*	0.3	
2	2 1924.992		-3.6*	0.2	
0 1928.448		3.8	-3.6*	0.2	

*Antenna Gain is value declared by manufacturer

Limit:

Conducted: 100 μ W x SQRT(*B*) where *B* is the measured Emission Bandwidth in Hz

FCC 15.319(c)(e) and RSS-213, Issue 3: 20.85 dBm (122 mW)

The antenna gain is below 3 dBi, no reduction in transmit power is necessary.

Requirements, FCC 15.319(c)(e); RSS-213, Issue 3; RSS-GEN, Issue 4

Peak transmit power shall not exceed 100 microwatts multiplied by the square root of the emission bandwidth in Hertz.

The peak transmit power shall be reduced by the amount in decibels that the maximum directional gain of the antenna exceeds 3 dBi.



Conducted Peak Output Power

MultiView 😁	Spectrum	× Spectrum 2	2 X	Spectrum 3	X Spe	ectrum 4	x		
Ref Level 20 Att TRG:RFP(8GHz	20 dB 🖷 SWT	et 10.30 dB • RBW 500 µs VBW	3 MHz 10 MHz	•			•		
1 Time Domai									●1Pk Max
								M1	
10 dBm					M1				
0 dBm									
-10 dBm							_		
-20 dBm									
-30 dBm									
-40 dBm									
-50 dBm								Unhur	an and the second
-60 dBm									
-70 dBm									
S								52	
CF 1.921536 0	GHz			1001	pts				50.0 µs/
2 Marker Tabl	e								
Type Ref		X-Value		Y-Value		ction	F	unction Result	
M1	1	224.0 µs	3	8.85 dBm	TD Pow RM	1S		3.71 dBm	
							Measuring	••••	04.04.2014 13:36:04 //

Lower Channel

MultiView 8	J -		ectrum 2	x					\bigtriangledown
Ref Level 20.0 Att TRG:RFP(8GHz)	0 dBm Offs 20 dB • SWT	et 10.30 dB ● R 500 µs V	BW 3 MHz BW 10 MHz						
1 Time Domain	Power								●1Pk Max
									M1[1] 3.80 dBm 290.500 μs
10 dBm						M1			
0 dBm									
-10 dBm									
-20 dBm									
-30 dBm									
-40 dBm									
-50 dBm								6	would will we have the
So dom									
-60 dBm									
-70 dBm									
S1								s2	
CF 1.928448 GH	Ηz			100	l pts				50.0 µs/
2 Marker Table					-				
Type Ref		X-Value		Y-Value	Func	tion		Function Res	ult
M1	1	290.5 µs		3.80 dBm	TD Pow RM	S		3.66 dBm	
							Measuring	••••••	04.04.2014 13:57:52 //

Upper Channel



MultiView 88	Spectrum	× Spectru	m 2 🛛 🗴	Spectrum 3	× Spe	ectrum 4	×		
Ref Level 20 Att TRG:RFP(8GHz	20 dB 🖷 SWT	: 10.30 dB ● RI 500 µs VI	BW 3 MHz BW 10 MHz						
1 Time Domain									●1Pk Max
								M1	
10 dBm				M1					
0 dBm									
-10 dBm									
-20 dBm									
-30 dBm									
-40 dBm									
-50 dBm								highlitere	monor provide
-60 dBm									
-70 dBm									
S	1							S2	
CF 1.924992	GHz			1001	pts	1	1		50.0 µs/
2 Marker Tabl					•				
Type Ref		X-Value		Y-Value	Euno	tion	Fu	unction Result	
M1	1	161.5 µs		3.83 dBm	TD Pow RM			3.68 dBm	
][Measuring	••••	04.04.2014 13:22:56

Middle Channel



3.7 Emission Bandwidth *B*

Test Method:

ANSI C63.17, clause 6.1.3.

Test Results: Complies

Measurement Data:

Channel No.	Frequency (MHz)	26 dB Bandwidth <i>B</i> (kHz)
4	1921.536	1483.5
0	1928.448	1483.5

Channel No.	Frequency (MHz)	99% Bandwidth (kHz)
2	1924.992	1208

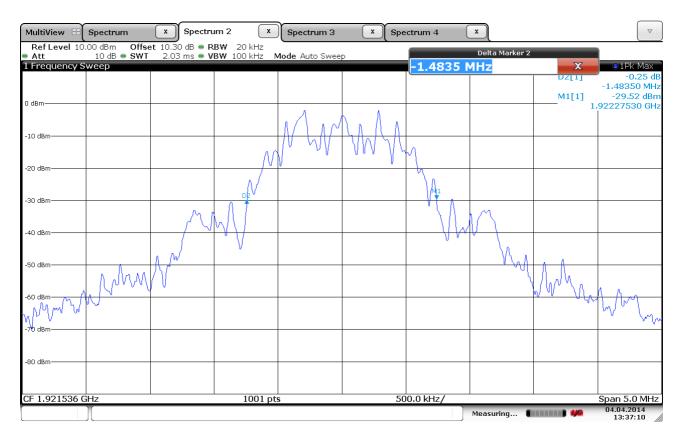
Requirements, FCC 15.323(a), RSS-213 Issue 3, clause 5.5

The Emission Bandwidth *B* shall be larger than 50 kHz and less than 2.5 MHz.

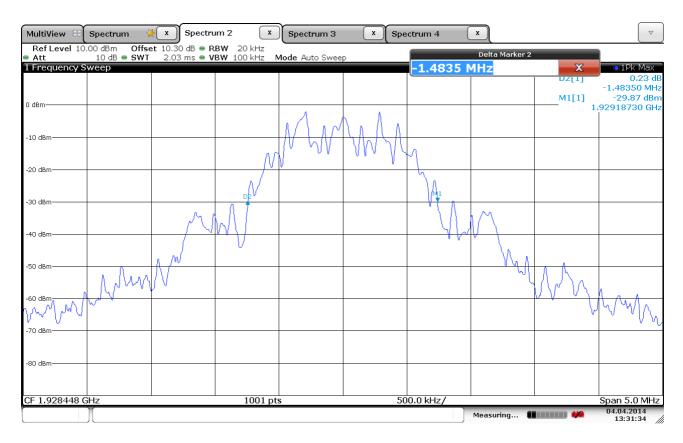
No requirements for 6 and 12 dB Bandwidth, these values are only used for testing Monitoring Bandwidth if the Simple Compliance test fails (ANSI C63.17, clause 7.4).

Occupied Bandwidth (99%) is measured according to RSS-GEN Issue 4, clause 6.6. This value is reported for information only.



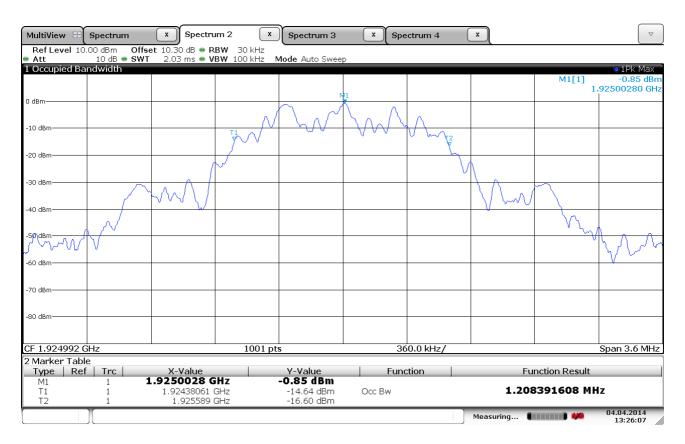






Emission Bandwidth *B*, Upper Channel





99% Bandwidth, Middle Channel



3.8 **Power Spectral Density**

Test Method:

ANSI C63.17, clause 6.1.5.

Test Results: Complies

Measurement Data:

Channel No.	Frequency (MHz)	Power Spectral Density (dBm)
4	1921.536	-4.4
0	1928.448	-4.7

Averaged over 1000 sweeps.

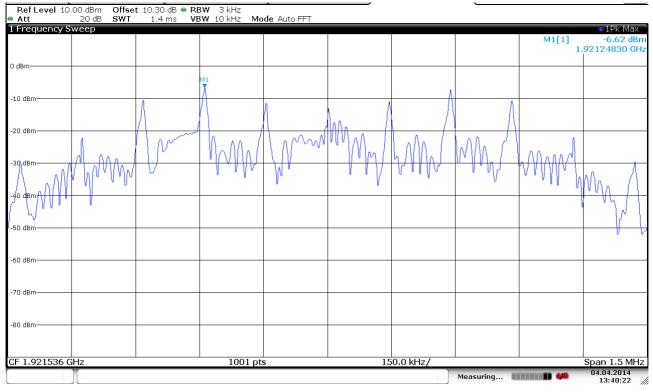
Requirements, FCC 15.319(d)

The Power Spectral Density shall be less than 3 mW (4.77 dBm) when averaged over at least 100 sweeps.



Power Spectral Density

Lower Channel:



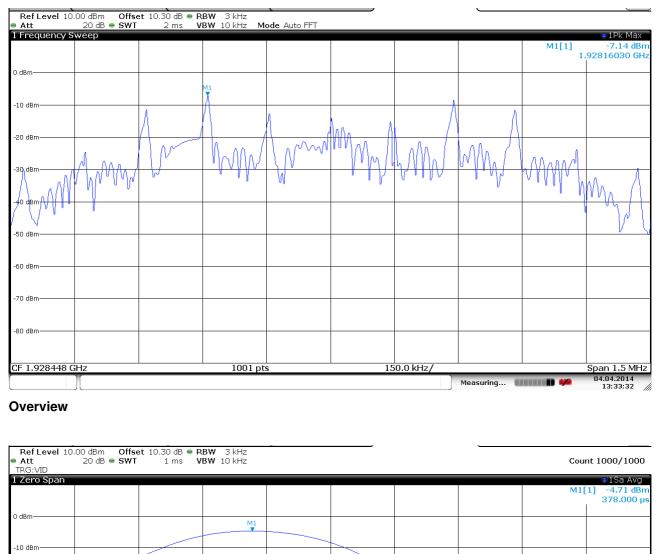
Overview

Att TRG:VID	20 dB 🖷 SWT	ıms V	BW 10 kHz					Cou	nt 1000/1000
Zero Span			1						●1Sa Avg
								M1[[1] -4.45 dBr 379.000 µ
									379.000 [
dBm			M1						
									1
0 dBm									
									1
0 dBm						<			
0 dbiii									1
									1
0 dBm									
									1
0 dBm							<u> </u>		
									1
0 dBm									
o abiii									1
									1
0 dBm									
									1
0 dBm								<u> </u>	
								\mathbf{X}	1
0 dBm								\sum	
o aom									
1.9212483	3 GHz	1	I	100	1 pts		1		100.0 µs

Averaged, 1000 Sweeps



Upper Channel:



1001 pts

.

CF 1.9281603 GHz

-20 dBm

-30 dBm

40 dBm

-50 dBm

-60 dBm

-70 dBm

-80 dBm

Averaged, 1000 Sweeps

FRG -40.000 dBm

10<u>0.0 µs/</u>

//

04.04.2014 13:34:52

Measuring...



3.9 In-Band Unwanted Emissions, Conducted

Test Method:

ANSI C63.17, clause 6.1.6.1.

Test Results: Complies

Measurement Data:

See plots.

Requirements, FCC 15.323(d):

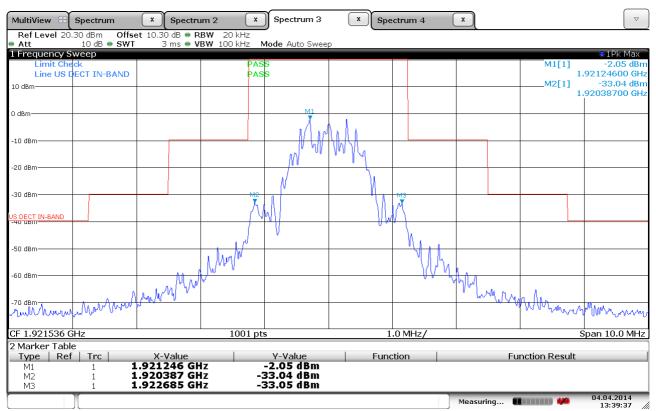
 $B < f \le 2B$:at least 30 dB below max. permitted peak power $2B < f \le 3B$:at least 50 dB below max. permitted peak power $3B < f \le$ UPCS Band Edge : at least 60 dB below max. permitted peak power

MultiView 😁	Spectrum	× Spectru	m 2 🛛 🗶	Spectrum 3	× Spe	ectrum 4	x		
Ref Level 20 Att	1.30 dBm Offse 10 dB ● SWT	et 10.30 dB = RI	3WF 20 kHz 3WF 100 kHz IMF	Inde Auto Swee	n				
1 Frequency S		5 113 - 11	54 100 KHZ 14	Note Auto Swee	Ρ				●1Pk Max
Limit Ch			PAS	5				M1[1]	-2.09 dBm
Line US I	ECT IN-BAND		PAS	5				1	.92470200 GHz
10 dBm								M2[1]	-32.86 dBm
								1	.92383300 GHz
0 dBm				M1					
					k. I.				
-10 dBm				N () NC					
-10 0600				l h					
				NN ^{**}					
-20 dBm					6				
				N	L A				
				γ	И.,				
-30 dBm			T	A Í	1 °1 k	M3			
			A	all l	1 - M-	173			
US DECT IN-BAND			V	ΨĮ	l V				
			(V					
			1 14			N N			
-50 dBm			. hu h/						
			1/2/2			1000			
-60 dBm		0.0				ר ער <i>יו</i>	Aur I		
00 40111		AN ANJE	×				"VIW AA		
	لاميم	h. ruger i					- will	1 60	
-70 dBm	IN I BOWNING	www						Ludrentin	ிலில்
workwhite	WILL MARIE							* ~ 000m)	Man Mar Mar
CF 1.924992 (ĠHz		1001 pts	;]	.0 MHz/			Span 10.0 MHz
2 Marker Tab	le								
Type Re		X-Value		Y-Value	Eun	ction	F	unction Result	
M1		924702 GH	Z ·	·2.09 dBm					
M2		923833 GH		2.86 dBm					
M3	1 1	926141 GH	z - 3	3.17 dBm					
							Measuring		04.04.2014
L									13:29:13

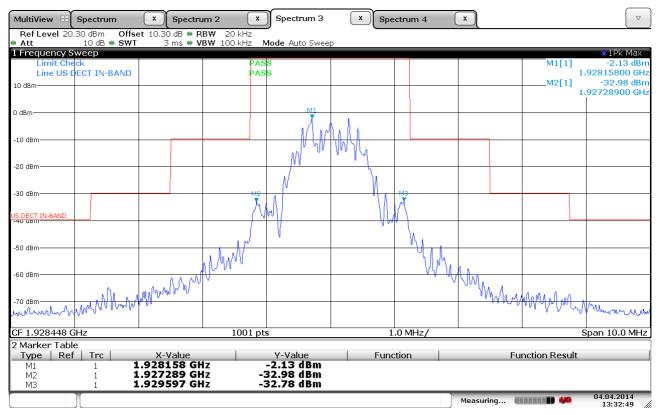
Middle Channel



In-Band Unwanted Emissions, Conducted



Lower Channel



Upper Channel



3.10 Out-of-band Emissions, Conducted

Test Method:

ANSI C63.17, clause 6.1.6.2.

Test Results: Complies

Measurement Data:

See plots.

Requirements, FCC 15.323(d):

$f \le 1.25$ MHz outside UPCS band :	≤ -9.5dBm
1.25 MHz $\leq f \leq 2.5$ MHz outside UPCS band :	≤ -29.5 dBm
$f \ge 2.5$ MHz outside UPCS band :	≤ -39.5 dBm

Out-of-Band Emissions, Conducted

Lower Channel:

MultiView 🗄 Sp	ectrum 🛛 🗙	Spectrum 2	× Spec	trum 3	×			
Ref Level 10.00 dBr Att 20 d		RBW 20 kHz VBW 100 kHz Mo	de Auto FFT					
1 Frequency Sweep Limit Check Line US DECT O	UT-OF-BAND	PASS					M1[1]	●1Pk Max -65.64 dBm 1.810850 GHz
0 dBm								
-10 dBm								
-20 dBm								
-30 dBm								
US DECT OUT-OF-BAND								
-50 dBm								
-60 dBm								
HZQ. of BERT when the beauting the second	how when the of the second	and mark was hard and	mittension	Woodwhat	mound	ananana ka	at war war to be the w	pdahart parmanter
-80 dBm								
1.8 GHz		1001 pts		1:	2.0 MHz/			1.92 GHz
						Measuring 🔳	•••	04.04.2014 13:43:26



Out-of-Band Emissions, Conducted

Lower Channel:

MultiView	8 Spectrum	×	Spectrum 2	× Spec	trum 3	×			\bigtriangledown
Ref Level 10 Att	0.00 dBm Offse 20 dB SWT	t 10.30 dB • F 11.6 ms • V		lode Auto FFT			Marker 1		
1 Frequency	Sweep					1.56144 (GHz	x	●1Pk Max
Limit Ch Line US	eck DECT OUT-OF-B	AND	PAS PAS					MILI	-68.77 dBm 1.561440 GHz
0 dBm									
-10 dBm						ļ			
-20 dBm									
-30 dBm									
US DECT OUT-OF-B	IAND								
-50 dBm			+						
-60 dBm									
						N	1		
-70 dBm	broken golunder	und the providence	where where where the	www.www.www.	Mar Marine Comme	Mr.unwerthered	Mariteraria	worwall and provide the	Moundantable
		U T							
-80 dBm									
1.0 GHz	~		1001 pt	5	80	D.0 MHz/			1.8 GHz
							Measuring 📗		04.04.2014 13:44:38
							Measuring 📗		
MultiView	B Spectrum	x	Spectrum 2	× Spec	trum 3	×	Measuring 🔳		
Ref Level 10	D.00 dBm Offse	t 10.30 dB • F	RBW 20 kHz		trum 3:	×	Measuring 📗		13:44:38
Ref Level 10 Att Frequency 1	0.00 dBm Offse 10 dB SWT Sweep	t 10.30 dB • F	RBW 20 kHz /BW 100 kHz M	lode Auto FFT	trum 3	×	Measuring 💵		13:44:38 /// ▽
Ref Level 10 Att Frequency : Limit Ch	0.00 dBm Offse 10 dB SWT Sweep	t 10.30 dB ● F 14.5 ms ● V	RBW 20 kHz	lode Auto FFT	trum 3	x	Measuring 📲	M1[1]	13:44:38
Ref Level 10 Att Frequency : Limit Ch	D.00 dBm Offse 10 dB SWT Sweep	t 10.30 dB ● F 14.5 ms ● V	RBW 20 kHz /BW 100 kHz M	lode Auto FFT	trum 3:	×	Measuring 💵		13:44:38 /// ⊽ ● 1Pk Max -75.89 dBm
Ref Level 10 Att 1 Frequency Limit Ch Line US	D.00 dBm Offse 10 dB SWT Sweep	t 10.30 dB ● F 14.5 ms ● V	ABW 20 kHz /BW 100 kHz M	lode Auto FFT	trum 3	×	Measuring		13:44:38 /// ⊽ ● 1Pk Max -75.89 dBm
Ref Level 10 Att 1 Frequency Limit Ch Line US	D.00 dBm Offse 10 dB SWT Sweep	t 10.30 dB ● F 14.5 ms ● V	ABW 20 kHz /BW 100 kHz M	lode Auto FFT	trum 3	×	Measuring 💵		13:44:38 /// ⊽ ● 1Pk Max -75.89 dBm
Ref Level 10 Att 1 Frequency Limit Ch Line US 0 dBm	D.00 dBm Offse 10 dB SWT Sweep	t 10.30 dB ● F 14.5 ms ● V	ABW 20 kHz /BW 100 kHz M	lode Auto FFT	:trum 3		Measuring		13:44:38 /// ⊽ ● 1Pk Max -75.89 dBm
Ref Level 10 Att 1 Frequency Limit Ch Line US 0 dBm	D.00 dBm Offse 10 dB SWT Sweep	t 10.30 dB ● F 14.5 ms ● V	ABW 20 kHz /BW 100 kHz M	lode Auto FFT	ctrum 3	×	Measuring		13:44:38 /// ⊽ ● 1Pk Max -75.89 dBm
Ref Level 10 Att 1 Frequency Limit Ch Line US 0 dBm -10 dBm	D.00 dBm Offse 10 dB SWT Sweep	t 10.30 dB ● F 14.5 ms ● V	ABW 20 kHz /BW 100 kHz M	lode Auto FFT	ctrum 3	×	Measuring		13:44:38 /// ⊽ ● 1Pk Max -75.89 dBm
Ref Level 10 Att 1 Frequency Limit Ch Line US 0 dBm -10 dBm	D.00 dBm Offse 10 dB SWT Sweep	t 10.30 dB ● F 14.5 ms ● V	ABW 20 kHz /BW 100 kHz M	lode Auto FFT	ctrum 3	x	Measuring		13:44:38 /// ⊽ ■ 1Pk Max -75.89 dBm
Ref Level 10 Att 1 Frequency Limit Ch Line US 0 dBm -10 dBm -20 dBm	D.00 dBm Offse 10 dB SWT Sweep	t 10.30 dB ● F 14.5 ms ● V	ABW 20 kHz /BW 100 kHz M	lode Auto FFT	2trum 3		Measuring		13:44:38 /// ⊽ ■ 1Pk Max -75.89 dBm
Ref Level 10 Att 1 Frequency Limit Ch Line US 0 dBm -10 dBm -20 dBm	0.00 dBm Offse 10 dB SWT Sweep leck DECT OUT-OF-B,	t 10.30 dB ● F 14.5 ms ● V	ABW 20 kHz /BW 100 kHz M	lode Auto FFT	2trum 3	×	Measuring		13:44:38 /// ⊽ ■ 1Pk Max -75.89 dBm
Ref Level 10 Att 1 Frequency Limit Ch Line US 0 dBm -10 dBm -20 dBm -30 dBm	0.00 dBm Offse 10 dB SWT Sweep leck DECT OUT-OF-B,	t 10.30 dB ● F 14.5 ms ● V	ABW 20 kHz /BW 100 kHz M	lode Auto FFT	ctrum 3	×	Measuring		13:44:38 /// ⊽ ■ 1Pk Max -75.89 dBm
Ref Level 10 Att 1 Frequency Limit Ch Line US 0 dBm -10 dBm -20 dBm -30 dBm	0.00 dBm Offse 10 dB SWT Sweep leck DECT OUT-OF-B,	t 10.30 dB ● F 14.5 ms ● V	ABW 20 kHz /BW 100 kHz M	lode Auto FFT	2trum 3	×	Measuring		13:44:38 /// ⊽ ■ 1Pk Max -75.89 dBm
Ref Level 10 Att 1 Frequency Limit Ch Line US 0 dBm -10 dBm -20 dBm -30 dBm US DECT OUT-OF-P -50 dBm	0.00 dBm Offse 10 dB SWT Sweep leck DECT OUT-OF-B,	t 10.30 dB ● F 14.5 ms ● V	ABW 20 kHz /BW 100 kHz M	lode Auto FFT	2trum 3		Measuring		13:44:38 /// ⊽ ■ 1Pk Max -75.89 dBm
Ref Level 10 Att 1 Frequency Limit Ch Line US 0 dBm -10 dBm -20 dBm -30 dBm US DECT OUT-OF-P	0.00 dBm Offse 10 dB SWT Sweep leck DECT OUT-OF-B,	t 10.30 dB ● F 14.5 ms ● V	ABW 20 kHz /BW 100 kHz M	lode Auto FFT	2trum 3		Measuring		13:44:38 /// ⊽ ■ 1Pk Max -75.89 dBm
Ref Level 10 Att 1 Frequency Limit Ch Line US 0 dBm -10 dBm -20 dBm -30 dBm US DECT OUT-OF-E -50 dBm	0.00 dBm Offse 10 dB SWT Sweep leck DECT OUT-OF-B,	t 10.30 dB ● F 14.5 ms ● V	ABW 20 kHz /BW 100 kHz M	lode Auto FFT	Ctrum 3		Measuring		13:44:38 /// ⊽ ■ 1Pk Max -75.89 dBm
Ref Level 10 Att 1 Frequency Limit Ch Line US 0 dBm -10 dBm -20 dBm -30 dBm US DECT OUT-OF-P -50 dBm	0.00 dBm Offse 10 dB SWT Sweep leck DECT OUT-OF-B,	t 10.30 dB ● F 14.5 ms ● V	ABW 20 kHz /BW 100 kHz M	lode Auto FFT	Ctrum 3		Measuring	M1[1]	13:44:38 ▼ • 1Pk Max -75.89 dBm 969.560 MHz
Ref Level 10 Att 1 Frequency Limit Ch Limit Ch 0 dBm -10 dBm -20 dBm -30 dBm US DECT OUT-OF-E -50 dBm -60 dBm	0.00 dBm Offse 10 dB SWT Sweep leck DECT OUT-OF-B,	t 10.30 dB ● F 14.5 ms ● V	ABW 20 kHz /BW 100 kHz M	lode Auto FFT			Measuring	M1[1]	13:44:38 /// ⊽ ● 1Pk Max -75.89 dBm

99.9 MHz/

1.0 MHz

1001 pts

1.0 GHz 04.04.2014 13:45:16

Measuring... 🔳 🗰 🚧



Out-of-Band Emissions, Conducted

Upper Channel:

Mult	iView 8	B Spectrum	x	Spectrum 2	× Spec	trum 3	×			
Ref	Level 10	.00 dBm Offse	t 10.30 dB •	RBW 20 kHz						
Att 1 Fre	quency S	20 dB SWT	1.05 ms 🖷	VBW 100 kHz M	ode Auto FFT					●1Pk Max
	Limit Che	sck		PAS					M1[1]	-69.24 dBm
		DECT OUT-OF-B	AND	PAS	5					1.9608040 GHz
0 dBm-										
US DEC	T OUT-OF-BA	ND								
-20 dBi	m									
-30 dB	m									
-40 dBi	m									
-50 dB	m									
1										
-60 dBi	m									
μų										
-79,dB	n	And America Barris dalla di Manara	and K. BARATER	Manuman	M1	ารสอสตร เป็นสถ	the Albert to a borrent of	La mutation in mo		
· • WV 0	Ambonime a	and the second second second	human a borr	and announce of the second	harandharan	N001-40-4	Mun and managed the		Truda - o Contraction of the	
-80 dBi	m									
1.93	GHz	Υ		1001 pts	5		7.0 MHz/			2.0 GHz 04.04.2014
][Measuring 【		13:46:31
Mult	tiView	B Spectrum	x	Spectrum 2	× Spee	trum 3	x			
Ref	Level 10		t 10.30 dB •	RBW 20 kHz		trum 3	X			
Ref • Att	Level 10	.00 dBm Offse 20 dB SWT	t 10.30 dB •	-		trum 3	×			□ 1Pk Max
Ref • Att 1 Fre	Level 10 quency S Limit Che	.00 dBm Offse 20 dB SWT weep	t 10.30 dB • 57.6 ms •	RBW 20 kHz VBW 100 kHz M	ode Auto FFT	strum 3	×		M1[1]	●1Pk Max -67.66 dBm
Ref • Att 1 Fre	Level 10 quency S Limit Che Line US [.00 dBm Offse 20 dB SWT weep	t 10.30 dB • 57.6 ms •	RBW 20 kHz VBW 100 kHz M	ode Auto FFT	ctrum 3	×		M1[1]	• 1Pk Max
Ref • Att 1 Fre	Level 10 quency S Limit Che Line US [.00 dBm Offse 20 dB SWT weep	t 10.30 dB • 57.6 ms •	RBW 20 kHz VBW 100 kHz M	ode Auto FFT	trum 3	×		M1[1]	●1Pk Max -67.66 dBm
Ref • Att 1 Fre	Level 10 quency S Limit Che Line US [.00 dBm Offse 20 dB SWT weep	t 10.30 dB • 57.6 ms •	RBW 20 kHz VBW 100 kHz M	ode Auto FFT	trum 3	×		M1[1]	●1Pk Max -67.66 dBm
Ref • Att 1 Fre	Level 10 quency S Limit Che Line US I	.00 dBm Offse 20 dB SWT weep	t 10.30 dB • 57.6 ms •	RBW 20 kHz VBW 100 kHz M	ode Auto FFT	ctrum 3	×		M1[1]	●1Pk Max -67.66 dBm
Ref Att 1 Fre	Level 10 quency S Limit Che Line US I	.00 dBm Offse 20 dB SWT weep	t 10.30 dB • 57.6 ms •	RBW 20 kHz VBW 100 kHz M	ode Auto FFT	etrum 3	×		M1[1]	●1Pk Max -67.66 dBm
Ref Att 1 Fre	Level 10 quency S Limit Che Line US [.00 dBm Offse 20 dB SWT weep	t 10.30 dB • 57.6 ms •	RBW 20 kHz VBW 100 kHz M	ode Auto FFT	etrum 3	×		M1[1]	●1Pk Max -67.66 dBm
Ref Att 1 Fre 0 dBm- -10 dBi	Level 10 quency S Limit Che Line US [.00 dBm Offse 20 dB SWT weep	t 10.30 dB • 57.6 ms •	RBW 20 kHz VBW 100 kHz M	ode Auto FFT	etrum 3	×		M1[1]	●1Pk Max -67.66 dBm
Ref Att 1 Fre 0 dBm- -10 dBi	Level 10 quency S Limit Che Line US I	.00 dBm Offse 20 dB SWT weep	t 10.30 dB • 57.6 ms •	RBW 20 kHz VBW 100 kHz M	ode Auto FFT	trum 3			M1[1]	●1Pk Max -67.66 dBm
Ref Att I Fre	Level 10 quency S Limit Che Line US I	.00 dBm Offse 20 dB SWT weep	t 10.30 dB • 57.6 ms •	RBW 20 kHz VBW 100 kHz M	ode Auto FFT	trum 3			M1[1]	●1Pk Max -67.66 dBm
Ref Att 1 Fre 0 dBm- -10 dBm -20 dBm -30 dBm	Level 10 quency S Limit Che Line US I	.00 dBm Offse 20 dB SWT weep ck JECT OUT-OF-B,	t 10.30 dB • 57.6 ms •	RBW 20 kHz VBW 100 kHz M	ode Auto FFT	trum 3			M1[1]	●1Pk Max -67.66 dBm
Ref Att 1 Fre 0 dBm- -10 dBm -20 dBm -30 dBm	Level 10 quency S Limit Che Line US I	.00 dBm Offse 20 dB SWT weep ck JECT OUT-OF-B,	t 10.30 dB • 57.6 ms •	RBW 20 kHz VBW 100 kHz M	ode Auto FFT	ctrum 3			M1[1]	●1Pk Max -67.66 dBm
Ref Att 1 Fre 0 dBm- -10 dBm -20 dBm -30 dBm	Level 10 quency S Limit Che Line US I m m TOUT-OF-B4	.00 dBm Offse 20 dB SWT weep ck JECT OUT-OF-B,	t 10.30 dB • 57.6 ms •	RBW 20 kHz VBW 100 kHz M	ode Auto FFT	etrum 3			M1[1]	●1Pk Max -67.66 dBm
Ref Att 1 Fre 0 dBm- -10 dBi -20 dBi -30 dBi	Level 10 quency S Limit Che Line US I m m TOUT-OF-B4	.00 dBm Offse 20 dB SWT weep ck JECT OUT-OF-B,	t 10.30 dB • 57.6 ms •	RBW 20 kHz VBW 100 kHz M	ode Auto FFT	etrum 3			M1[1]	●1Pk Max -67.66 dBm
Ref Att 1 Fre 0 dBm- -10 dBi -20 dBi -30 dBi	Level 10 quency S Limit Che Line US I m TOUT-OF-BA	.00 dBm Offse 20 dB SWT weep ck JECT OUT-OF-B,	t 10.30 dB • 57.6 ms •	RBW 20 kHz VBW 100 kHz M	ode Auto FFT	etrum 3			M1[1]	●1Pk Max -67.66 dBm
Ref Att. 1 Fre 0 dBm -10 dBi -20 dBi -30 dBi US DEC -50 dBi	Level 10 quency S Limit Che Line US I m TOUT-OF-BA	ND	t 10.30 dB • 57.6 ms •	RBW 20 kHz VBW 100 kHz M	ode Auto FFT	2trum 3			M1[1]	●1Pk Max -67.66 dBm
Ref Att Att I Fre 0 dBm- -10 dBi -20 dBi -30 dBi US DEC -50 dBi -60 dBi	Level 10 quency S Limit Che m m m m m m m m m m m m m m m m m m m	ND	t 10.30 dB • 57.6 ms •	RBW 20 kHz M VBW 100 kHz M PAS	ode Auto FFT					• 1Pk Max -67.66 dBm 2.50950 GHz
Ref Att Att I Fre 0 dBm- -10 dBi -20 dBi -30 dBi US DEC -50 dBi -60 dBi	Level 10 quency S Limit Che Line US I m TOUT-OF-BA	ND	t 10.30 dB • 57.6 ms •	RBW 20 kHz VBW 100 kHz M	ode Auto FFT			where the second		• 1Pk Max -67.66 dBm 2.50950 GHz
Ref Att 1 Fre 0 dBm- -10 dBi -20 dBi -30 dBi -50 dBi -50 dBi	Level 10 quency S Linit Che Line US [ND	t 10.30 dB • 57.6 ms •	RBW 20 kHz M VBW 100 kHz M PAS	ode Auto FFT			where the w		●1Pk Max -67.66 dBm
Ref Att Att I Fre 0 dBm- -10 dBi -20 dBi -30 dBi US DEC -50 dBi -60 dBi	Level 10 quency S Linit Che Line US [ND	t 10.30 dB • 57.6 ms •	RBW 20 kHz M VBW 100 kHz M PAS	ode Auto FFT			ulline ulline		• 1Pk Max -67.66 dBm 2.50950 GHz
Ref Att 1 Fre 0 dBm- -10 dBi -20 dBi -30 dBi -50 dBi -50 dBi	Level 10 quency S Linit Che Line US [ND	t 10.30 dB • 57.6 ms •	RBW 20 kHz M VBW 100 kHz M PAS	ode Auto FFT					• 1Pk Max -67.66 dBm 2.50950 GHz
Ref Att 1 Fre 0 dBm- -10 dBi -20 dBi -30 dBi -50 dBi -50 dBi	Level 10 quency S Limit Che m m m т т т т т т т т т т т т т т т т	ND	t 10.30 dB • 57.6 ms •	RBW 20 kHz M VBW 100 kHz M PAS	ode Auto FFT S S			utmenut Uuterm		• 1Pk Max -67.66 dBm 2.50950 GHz



Out-of-Band Emissions, Conducted

Upper Channel:

Mult	tiView 8	B Spectrum	x	Spectrum 2	× Spe	ctrum 3	×			
		.00 dBm Offse								
 Att 1 Fre 	quency S	10 dB SWT	86.2 ms =	• VBW 100 kHz 🛛 M	Iode Auto FFI					●1Pk Max
	Limit Che			PAS PAS					M1[1]	-75.72 dBm 11.37960 GHz
0 dBm-				FA3						11.37 900 012
U UBIII										
-10 dB	m									
-20 dB	m									
-30 dB	m									
US DEC	T OUT-OF-BA	ND								
-50 dB	m									
-60 dB	m									
-70 dB	m								M	
				1			and the test self-		and a superior where	White the second
-80 dB ատկղուկ	m - Must	perfer the barrent the star	www.manilow	the work was the New	and the second	Marthorapectular	-pound-the life Contraction of the	and a second		www.hululu-workingo
6.00	GHz			1001 pt	S	60	0.0 MHz/			12.0 GHz
								Measuring 📲		04.04.2014 13:51:43
Mult	Wiow 9	Epoctrum		Sportrum 2	x Spec	trum 3				
		B Spectrum		Spectrum 2 RBW 20 kHz	× Spe	ctrum 3	×			
Ref • Att	Level 10	.00 dBm Offse 10 dB SWT	t 10.30 dB 🖷	Spectrum 2 RBW 20 kHz VBW 100 kHz M		ctrum 3	×			
Ref • Att 1 Fre	Level 10 quency S Limit Che	.00 dBm Offse 10 dB SWT weep	t 10.30 dB 128 ms	RBW 20 kHz VBW 100 kHz M	1ode Auto FFT	ctrum 3	×		M1[1]	●1Pk Max -72.64 dBm
Ref • Att 1 Fre	Level 10 quency S Limit Che Line US E	.00 dBm Offse 10 dB SWT weep	t 10.30 dB 128 ms	RBW 20 kHz VBW 100 kHz №	1ode Auto FFT	ctrum 3	x		M1[1]	•1Pk Max
Ref • Att 1 Fre	Level 10 quency S Limit Che Line US E	.00 dBm Offse 10 dB SWT weep	t 10.30 dB 128 ms	RBW 20 kHz VBW 100 kHz M	1ode Auto FFT	ctrum 3	×		M1[1]	●1Pk Max -72.64 dBm
Ref • Att 1 Fre	Level 10 quency S Limit Che Line US E	.00 dBm Offse 10 dB SWT weep	t 10.30 dB 128 ms	RBW 20 kHz VBW 100 kHz M	1ode Auto FFT	ctrum 3	×		M1[1]	●1Pk Max -72.64 dBm
Ref • Att 1 Fre	Level 10 quency S Limit Che Line US E	.00 dBm Offse 10 dB SWT weep	t 10.30 dB 128 ms	RBW 20 kHz VBW 100 kHz M	1ode Auto FFT	ctrum 3	×		M1[1]	●1Pk Max -72.64 dBm
Ref Att 1 Fre	Level 10 quency S Limit Che Line US E	.00 dBm Offse 10 dB SWT weep	t 10.30 dB 128 ms	RBW 20 kHz VBW 100 kHz M	1ode Auto FFT	ctrum 3	x		M1[1]	●1Pk Max -72.64 dBm
Ref Att 1 Fre	Level 10 quency S Limit Che Line US E	.00 dBm Offse 10 dB SWT weep	t 10.30 dB 128 ms	RBW 20 kHz VBW 100 kHz M	1ode Auto FFT	ctrum 3	×		M1[1]	●1Pk Max -72.64 dBm
Ref Att 1 Fre 0 dBm- -10 dB	Level 10 quency S Limit Che Line US E	.00 dBm Offse 10 dB SWT weep	t 10.30 dB 128 ms	RBW 20 kHz VBW 100 kHz M	1ode Auto FFT	ctrum 3	×		M1[1]	●1Pk Max -72.64 dBm
Ref Att 1 Fre 0 dBm- -10 dB	Level 10 quency S Limit Che Line US D m	.00 dBm Offse 10 dB SWT weep	t 10.30 dB 128 ms	RBW 20 kHz VBW 100 kHz M	1ode Auto FFT	ctrum 3	×		M1[1]	●1Pk Max -72.64 dBm
Ref Att 1 Fre 0 dBm- -10 dB -20 dB	Level 10 quency S Limit Che Line US D m	.00 dBm Offse 10 dB SWT weep	t 10.30 dB 128 ms	RBW 20 kHz VBW 100 kHz M	1ode Auto FFT	ctrum 3	×		M1[1]	●1Pk Max -72.64 dBm
Ref Att 1 Fre 0 dBm- -10 dB -20 dB -30 dB	Level 10 quency S Limit Che Line US D m	.00 dBm Offse 10 dB SWT weep ck fECT OUT-OF-B/	t 10.30 dB 128 ms	RBW 20 kHz VBW 100 kHz M	1ode Auto FFT	ctrum 3	x		M1[1]	●1Pk Max -72.64 dBm
Ref Att 1 Fre 0 dBm- -10 dB -20 dB -30 dB	Level 10 quency S Limit Che Line US I m	.00 dBm Offse 10 dB SWT weep ck fECT OUT-OF-B/	t 10.30 dB 128 ms	RBW 20 kHz VBW 100 kHz M	1ode Auto FFT	ctrum 3	×		M1[1]	●1Pk Max -72.64 dBm
Ref Att 1 Fre 0 dBm- -10 dB -20 dB -30 dB	Level 10 quency S Limit Che Line US D m m T OUT-OF-BA	.00 dBm Offse 10 dB SWT weep ck fECT OUT-OF-B/	t 10.30 dB 128 ms	RBW 20 kHz VBW 100 kHz M	1ode Auto FFT	ctrum 3	×		M1[1]	●1Pk Max -72.64 dBm
Ref Att 1 Fre -10 dB -20 dB -30 dB	Level 10 quency S Limit Che Line US D m m T OUT-OF-BA	.00 dBm Offse 10 dB SWT weep ck fECT OUT-OF-B/	t 10.30 dB 128 ms	RBW 20 kHz VBW 100 kHz M	1ode Auto FFT	ctrum 3			M1[1]	●1Pk Max -72.64 dBm
Ref Att 1 Fre -10 dB -20 dB -30 dB	Level 10 quency S Limit Che Line US I m m T OUT-OF-BA	.00 dBm Offse 10 dB SWT weep ck fECT OUT-OF-B/	t 10.30 dB 128 ms	RBW 20 kHz VBW 100 kHz M	1ode Auto FFT	ctrum 3	×		M1[1]	●1Pk Max -72.64 dBm
Ref Att 1 Fre 0 dBm 10 dB -20 dB -30 dB US DEC -50 dB	Level 10 quency S Limit Che Line US I m m T OUT-OF-BA	.00 dBm Offse 10 dB SWT weep ck fECT OUT-OF-B/	t 10.30 dB 128 ms	RBW 20 kHz VBW 100 kHz M	1ode Auto FFT	ctrum 3	×		M1[1]	●1Pk Max -72.64 dBm
Ref Att 1 Fre 0 dBm 10 dB -20 dB -30 dB US DEC -50 dB	Level 10 quency S Limit Che m m T OUT-OF-BA	.00 dBm Offse 10 dB SWT weep ck fECT OUT-OF-B/	t 10.30 dB 128 ms	RBW 20 kHz VBW 100 kHz M	1ode Auto FFT	ctrum 3	×		M1[1]	• 1Pk Max -72.64 dBm 19.44460 GHz
Ref Att 1 Fre 0 dBm- -10 dB -20 dB -30 dB US DEC -50 dB -60 dB	Level 10 quency S Limit Che m m T OUT-OF-BA	ND	<pre>t 10.30 dB 128 ms 4</pre>	RBW 20 kHz M VBW 100 kHz M PAS PAS	tode Auto FFT					●1Pk Max -72.64 dBm
Ref Att 1 Fre 0 dBm- -10 dB -20 dB -30 dB -50 dB -60 dB -70 dB	Level 10 quency S Limit Che m m T OUT-OF-BA	ND	<pre>t 10.30 dB 128 ms 4</pre>	RBW 20 kHz VBW 100 kHz M	tode Auto FFT			Million Market Angelle		• 1Pk Max -72.64 dBm 19.44460 GHz
Ref Att 1 Fre 0 dBm- -10 dB -20 dB -30 dB -50 dB -60 dB -70 dB	Level 10 quency S Limit Che Line US D m m T OUT-OF-BA m m m	ND	<pre>t 10.30 dB 128 ms 4</pre>	RBW 20 kHz M VBW 100 kHz M PAS PAS	tode Auto FFT			huld we have been		• 1Pk Max -72.64 dBm 19.44460 GHz
Ref Att 1 Fre 0 dBm- -10 dB -20 dB -30 dB -50 dB -60 dB -70 dB	Level 10 quency S Limit Che m m m m m m m m m m m m m m m m m m m	ND	<pre>t 10.30 dB 128 ms 4</pre>	RBW 20 kHz M VBW 100 kHz M PAS PAS	iode Auto FFT			nully war way to		• 1Pk Max -72.64 dBm 19.44460 GHz



3.11 Carrier Frequency Stability

Test Method:

ANSI C63.17, clause 6.2.1.

Test Results: Complies

Measurement Data:

The Frequency Stability is measured with the Modulation Analyzer. The Modulation Analyzer was logged by a computer programmed to get new readings as fast as possible (about 2 readings per second) over the noted number of readings. The peak-to-peak difference was recorded and the mean value and deviation in ppm was calculated.

The Carrier Frequency Stability over Power Supply Voltage and over Temperature is measured with a Frequency Domain Analyzer in histogram mode.

Carrier Frequency Stability over Time at Nominal Temperature

Average Mean Carrier	Max. Diff.	Min. Diff.	Max. Dev.	Limit
Frequency (MHz)	(kHz)	(kHz)	(ppm)	
1924.989214	-2.050	-3.731	-0.5	±10 ppm

Deviation ppm = ((Diff. - Mean Diff) / Mean Carrier Freq.) $\times 10^{6}$

Deviation (ppm) is calculated from 3000 readings.

Frequency Stability over Power Supply Voltage at Nominal Temperature

Voltage	Measured Carrier Frequency (MHz)	Difference (kHz)	Deviation (ppm)	Limit
V _{nom}	/	/	/	
85% of V _{nom}	/	/	/	±10 ppm
115% of V _{nom}	/	/	/	

Deviation ppm = ((Mean – Measured Frequency) / Mean) x 10⁶

This test does not apply for EUT that is powered from batteries.

Frequency Stability over Temperature

Temperature	Measured Carrier Frequency (MHz)	Difference (kHz)	Deviation (ppm)	Limit
T = +20 °C	1924.984621	0	0	
T = -20 °C	1924.982666	-2.0	-1.0	±10 ppm
T = +50 °C	1924.979201	-5.4	-2.8	

Deviation ppm = $((Mean - Measured Frequency) / Mean) \times 10^{6}$



3.12 Frame Repetition Stability

Test Method:

ANSI C63.17, clause 6.2.2.

Test Results: Complies

Measurement Data:

The envelope of the RF signal from the EUT is detected with a Crystal Detector and the mean and standard deviation of the frame repetition frequency is then gated over 100 frames and measured with a Frequency Domain Analyzer. The frame repetition stability is 3 times the standard deviation.

Carrier Frequency	Mean	Standard Deviation	Frame Repetition
(MHz)	(Hz)	(µHz)	Stability (ppm)
1924.992	100.000	1.08	0.032

Limit:

Frame Repetition Stability	±10 ppm (TDMA)
----------------------------	----------------

Ref. FCC 15.323(e), ANSI C63.17, clause 6.2.2

3.13 Frame Period and Jitter

Test Method:

ANSI C63.17, clause 6.2.3.

Test Results: Complies

Measurement Data:

Carrier Frequency	Frame Period	Max Jitter	3xStandard Deviation
(MHz)	(ms)	(μs)	of Jitter (μs)
1924.992	10.000	-0.027	-0.018

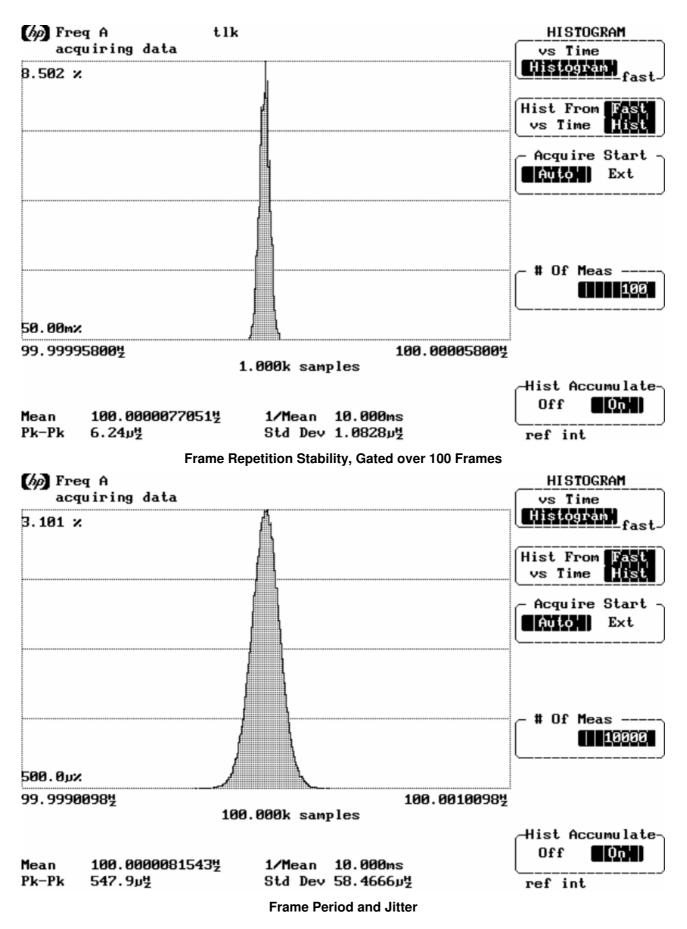
Max Jitter = (1/ (Frame period + Pk-Pk/2)) - (1/Frame Period), when Pk-Pk and Frame Period are in Hz $3xSt.Dev.Jitter = 3x (1/(Frame Period + St.Dev) - 1/St.Dev) x 10^{6}$

Limit:

Frame Period	20 or 10 ms
Max Jitter	25 μs
3 times St.Dev of Jitter	12.5 μs

Ref. FCC 15.323(e), ANSI C63.17, clause 6.2.3







3.14 Monitoring Threshold, Least Interfered Channel

Monitoring Threshold Limits:

Lower Threshold:

 $T_L = 15 \log B - 184 + 30 - P_{EUT}$ (dBm)

Upper Threshold:

 $T_U = T_L + 20$

(dBm)

B is measured Emission Bandwidth in Hz P_{EUT} is measured Transmitter Power in dBm

Calculated values:

FCC 15.323, RSS-213, Issue 3	
Lower Threshold	-65.3 dBm

Least Interfered Channel Procedure (LIC) may only be used by systems with more than 20 duplex system access channels. Systems with less than 20 duplex system access channels are not allowed to transmit when interferer level is above Lower Threshold.

Measurement Procedure:

Least Interfered Channel Procedure NOT used:			
Lower Threshold	N/A	The EUT uses LIC procedure	

Least Interfered Channel (LIC) Procedure Test, FCC 15.323(b), (c)(2) and (c)(5)

ANSI C63.17 clause 7.3.2 ref.	Observation	Verdict
b) f_1 at T _L + U _M + 7 dB, f_2 at T _L + U _M	Transmission always on f_2	Pass
c) f_1 at T _L + U _M , f_2 at T _L + U _M +7 dB	Transmission always on f_l	Pass
d) f_1 at T _L + U _M + 1 dB, f_2 at T _L + U _M - 6 dB	Transmission always on f2	Pass
e) f_1 at T _L + U _M - 6 dB, f_2 at T _L + U _M + 1 dB	Transmission always on f_l	Pass

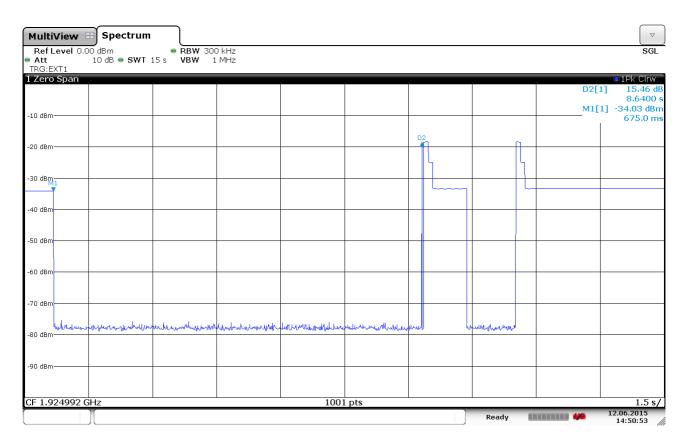


Selected Channel Confirmation, FCC 15.323(c)(1) and (5)

ANSI C63.17 clause 7.3.3	Observation	Verdict
b) Shall not transmit on f_I	EUT transmits on f2	Pass
d) Shall not transmit on f ₂	EUT transmits on fi	Pass

Limits:

	FCC 15.323, RSS-213, Issue 3
Lower Threshold + 6 dB margin	-59.3 dBm



7.3.4 Selected Channel Confirmation, Connection 8.6s After Interferer Removed



3.15 Threshold Monitoring Bandwidth

This test is only required if a dedicated monitoring receiver is used. However, if the test is not carried out the manufacturer shall declare and provide proper evidence that the monitoring is made through the radio receiver used for communication.

Measurement Procedure:

Simple Compliance Test, ANSI C63.17, clause 7.4.1

More Detailed Test, ANSI C63.17, clause 7.4.2

The test is passed if **either** the Simple Compliance Test or the More Detailed test is passed.

During this test the spectrum analyzer is observed visually to see if the EUT transmits or not.

Test Results:

Test performed	Observation	Verdict
Simple Compliance test, at $\pm 30\%$ of B	N/A	N/A
More Detailed Test, at -6 dB points	N/A	N/A
More Detailed Test, at -12 dB points	N/A	N/A

The more detailed test must be pass at both the -6 and -12 dB points if the Simple Compliance test fails.

Comment: The manufacturer declares that the tested EUT uses the same receiver for monitoring and communication, this test is therefore not required.

Limits, FCC 15.323(c)(7):

The monitoring system bandwidth must be equal to or greater than the emission bandwidth of the intended transmission.



3.16 Reaction Time and Monitoring Interval

Measurement Procedure

ANSI C63.17, clause 7.5

Test results:

By administrative commands and out-of-operating region interference, the EUT is restricted to operate on two RF carrier frequencies.

A CW interferer signal at a level T_L is applied on f_1 and time-synchronized pulsed interference at a level $T_L + U_M$ dB is applied on f_2 . The level on f_2 was raised 6 dB for part d) with 35 µs pulses.

The pulses are synchronized with the EUT timeslots and applied centered within all timeslots.

For both tests the test is passed if the EUT transmits on f_l .

Pulse Width, ref. to ANSI C63.17 clause 7.5	Observation	Verdict
c) > largest of 50 μ s and 50*SQRT(1.25/ <i>B</i>)	EUT transmits on f_1	Pass
d) > largest of 35 μs and 35*SQRT(1.25/ <i>B</i>), and with interference level raised 6 dB	EUT transmits on f_i	Pass

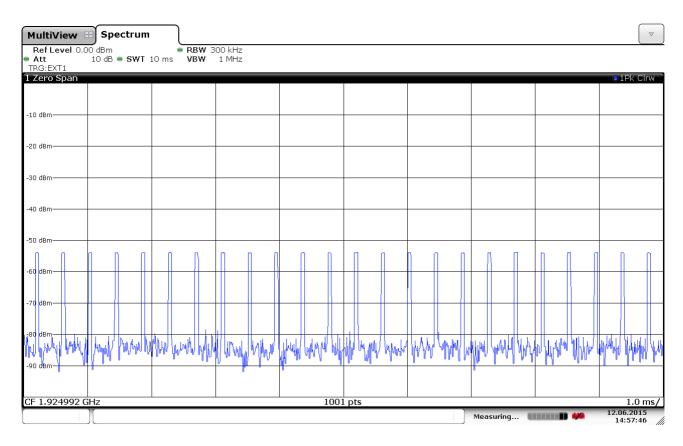
Comment: Since *B* is larger than 1.25 MHz the test was performed with pulse lengths of 50 µs and 35 µs.

Limits, FCC 15.323(c)(1), (5) and (7)

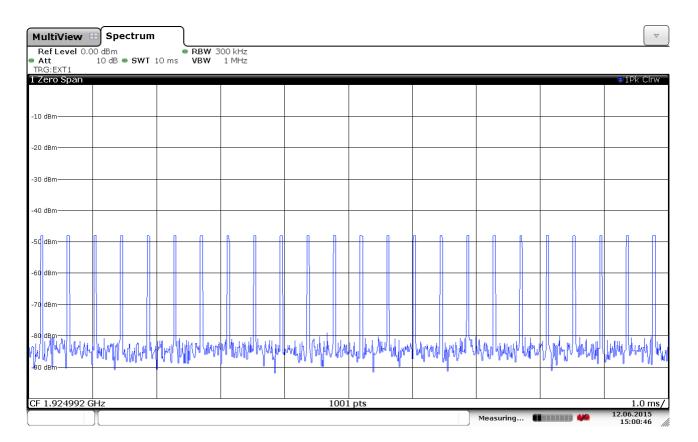
The maximum reaction time must be less than 50xSQRT (1.25/emission bandwidth in MHz) microseconds for signals at the applicable threshold level but shall not be required to be less than 50 μ s.

If a signal is detected that is 6 dB or more above the applicable threshold level, the maximum reaction time shall be 35xSQRT (1.25/emission bandwidth in MHz) microseconds but shall not be required to be less than $35 \ \mu$ s.





50 µs Pulses



35 µs Pulses



3.17 Time and Spectrum Window Access Procedure

This requirement is only for EUTs which transmit unacknowledged control and signaling information.

Measurement Procedure:

Timing for EUTs using control and signaling channel type transmissions: ANSI C63.17, clause 8.1

Test results:

Access Criteria, ref. to ANSI C63.17 clause 8.1.1	Observation	Verdict
b) Check that the EUT transmits on the interference free time-slot	N/A	N/A
b) The EUT must terminate or pause in its repetitive transmission of the control and signalling channel on the open channel to repeat the access criteria not less frequently than every 30 s	N/A	N/A

If FCC 15.323(c)(6) option, If Random Waiting Interval is NOT implemented

Access Criteria, ref. to ANSI C63.17 clause 8.1.2	Observation	Verdict
b) Check that the EUT changes to an interference-free slot when interference is introduced on the time slot in use	N/A	N/A

If FCC 15.323(c)(6) option, **Only if Random Waiting Interval is implemented**

Access Criteria, ref. to ANSI C63.17 clause 8.1.3	Observation	Verdict
b-d) Check that the EUT uses random waiting interval before continuing transmission on an interfered time slot	N/A	N/A

Comment: The tested EUT does not transmit unacknowledged control and signaling information.

Limits:

FCC 15.323(c)(4):

Once access to specific combined time and spectrum windows is obtained an acknowledgement from a system participant must be received by the initiating transmitter within one second or transmission must cease. Periodic acknowledgements must be received at least every 30 seconds or transmission must cease. Channels used exclusively for control and signaling information may transmit continuously for 30 seconds without receiving an acknowledgement, at which time the access criteria must be repeated.

FCC 15.323(c)(6):

If the selected combined time and spectrum windows are unavailable, the device may either monitor and select different windows or seek to use the same windows after waiting an amount of time, randomly chosen from a uniform random distribution between 10 and 150 milliseconds, commencing when the channel becomes available



3.18 Acknowledgements and Transmission Duration

Measurement Procedure:

Acknowledgements: ANSI C63.17, clause 8.2.1

Transmission Duration: ANSI C63.17, clause 8.2.2

During the test **Initial transmission without acknowledgements** the signal from the EUT to the companion device is blocked by circulators in addition to the tunable attenuator.

The test **Transmission time after loss of acknowledgements** is performed by cutting-off the signal from the companion device by a RF switch and measuring the time until the EUT stops transmitting.

The **Transmission Duration** test is performed by monitoring the slot in use and measuring the time until the EUT changes to a different slot.

Test Results:

Acknowledgements

Test ref. to ANSI C63.17 clause 8.2.1	Observation	Verdict
a) Initial transmission without acknowledgements	0.2 sec	Pass
c) Transmission time after loss of acknowledgements	13.7 sec*	Pass

Transmission Duration

Test ref. to ANSI C63.17 clause 8.2.2	Observation	Verdict
b) Transmission duration on same time and frequency window	10.7 sec*	Pass

Comment: *Maximum transmission time of the EUT is 13.7 seconds each time the alarm is activated.

Limits, FCC 15.323(c)(3) and (4)

Occupation of the same combined time and spectrum windows by a device or group of cooperating devices continuously over a period of time longer than 8 hours is not permitted without repeating the access criteria.

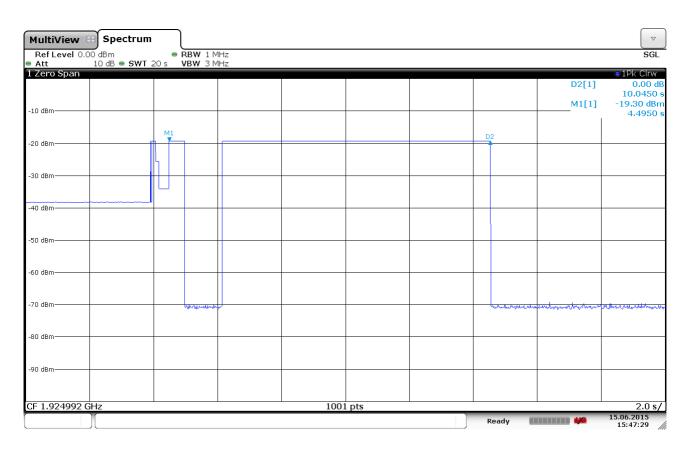
Once access to specific combined time and spectrum windows is obtained an acknowledgement from a system participant must be received by the initiating transmitter within one second or transmission must cease.

Periodic acknowledgements must be received at least every 30 seconds or transmission must cease. Channels used exclusively for control and signaling information may transmit continuously for 30 seconds without receiving an acknowledgement, at which time the access criteria must be repeated.



MultiView 🗄 Spectrum							
Ref Level 0.00 dBm ■ RBW 1 M ■ Att 10 dB SWT 5 s VBW 3 M							SGL
1 Zero Span							⊙1Pk Clrw
						D2[1]	0.00 dB 205.00 ms
-10 dBm						M1[1]	-15.49 dBm 1.67500 s
-20 dBm							
-30 dBm							
-40 dBm							
-50 dBm							
-60 dBm							
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-80 dBm							
-90 dBm							
CF 1.924992 GHz		100	l pts				500.0 ms/
		100	- p-0		Ready		15.06.2015 15:31:33

8.2.1a) Initial Transmission Without Acknowledgements



8.2.1c) Transmission Time After Loss of Acknowledgements



3.19 Dual Access Criteria Check

Measurement Procedure:

EUTs that does not implement the LIC procedure: ANSI C63.17, clause 8.3.1

EUTs that implement the LIC procedure: ANSI C63.17, clause 8.3.2

This test is required for equipment that uses the access criteria in FCC 15.323(c)(10).

Test Results:

EUTs that do NOT implements the LIC procedure:

Test ref. to ANSI C63.17 clause 8.3.1	Observation	Verdict
b) EUT is restricted to a single carrier <i>f</i> ₁ for TDMA systems. The Test is Pass if EUT can transmit	N/A	N/A
c) d) Interference at level $T_L + U_M$ on all timeslots except one receive slot where interference is at least 10 dB below T_L	N/A	N/A
e) f) Interference at level T_L + U_M on all timeslots except one transmit slot where interference is at least 10 dB below T_L	N/A	N/A

EUTs that implements the LIC procedure:

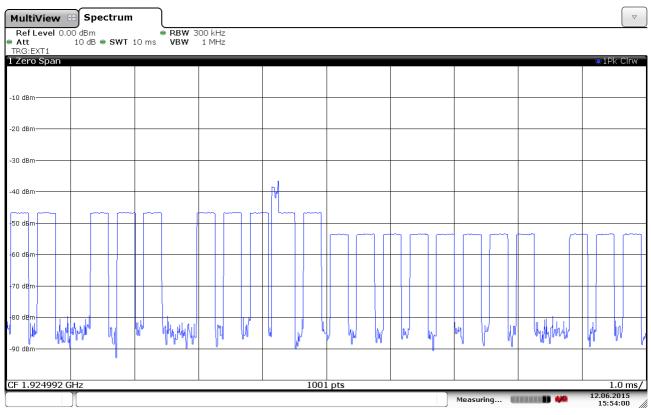
Test ref. to ANSI C63.17 clause 8.3.2	Observation	Verdict
b) EUT is restricted to a single carrier f_i for TDMA systems. The Test is Pass if EUT can transmit	EUT can transmit	Pass
c) d) Transmission on interference-free receive time/spectrum window	EUT transmits on interference free receive slot	Pass
e) f) Transmission on interference-free transmit time/spectrum window	EUT transmits on interference free transmit slot	Pass

Comment: See plots.

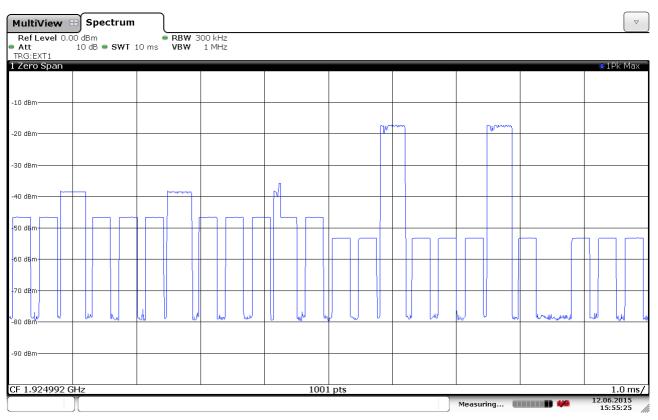
Limits, FCC 15.323(c)(10)

An initiating device may attempt to establish a duplex connection by monitoring both its intended transmit and receive time and spectrum windows. If both the intended transmit and receive time and spectrum windows meet the access criteria, then the initiating device can initiate a transmission in the intended transmit time and spectrum window. If the power detected by the responding device can be decoded as a duplex connection signal from the initiating device, then the responding device may immediately begin transmitting on the receive time and spectrum window monitored by the initiating device.



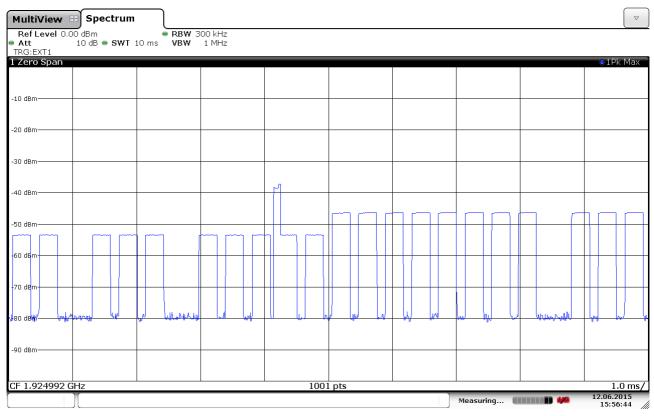


8.3.2c) EUT Transmits on Interference Free RECEIVE Slot, BEFORE

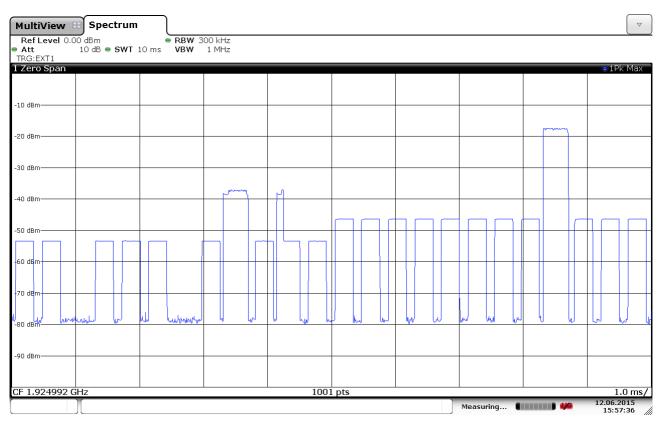


8.3.2c) EUT Transmits on Interference Free RECEIVE Slot, AFTER





8.3.2e) EUT Transmits on Interference Free TRANSMIT Slot, BEFORE



8.3.2e) EUT Transmits on Interference Free TRANSMIT Slot, AFTER



3.20 Alternative Monitoring Interval

Test procedure described in ANSI C63.17 clause 8.4.

This test is required if the EUT implements the provisions of FCC 15.323(c)(11).

Test result:

Not Tested. The tested EUT does not implement this provision. See manufacturers' declaration.



4 Measurement Uncertainty

Measurement Uncertainty Values				
Test Item	Uncertainty			
Output Power		±0.5 dB		
Power Spectral Density	Power Spectral Density			
Out of Band Emissions, Conducted (RBW < 100 kHz)	< 3.6 GHz	±0.6 dB		
	> 3.6 GHz	±0.9 dB		
Spurious Emissions, Radiated	±2.5 dB			
	±2.2 dB			
Emission Bandwidth	±4 %			
Power Line Conducted Emissions	Power Line Conducted Emissions			
Spectrum Mask Measurements	Frequency	±5 %		
	Amplitude	±1.0 dB		
Frequency Error		±0.6 ppm		
Timing and Jitter Measurements		±2.0 ns		
Frame Timing Measurements	±1.4 ppm			
Receiver Blocking Levels	±1.0 dB			
Temperature Uncertainty		±1 °C		

All uncertainty values are expanded standard uncertainty to give a confidence level of 95%, based on coverage factor $k{=}2$



5 Test Setups

5.1 Frequency Measurements

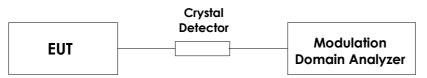


Test equipment included: 5, 9, 28

Test Set-up 1

This setup is used for measuring Carrier frequency stability at normal and extreme temperatures.

5.2 Timing Measurements

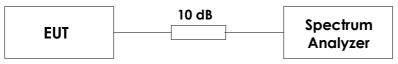


Test equipment included: 5, 7, 9, 28

Test Set-up 2

This setup is used for measuring Frame repetition stability, Frame period and Jitter.

5.3 Conducted Emission Test

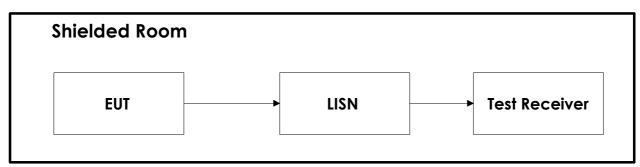


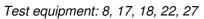
Test equipment included: 1, 2, 9, 26

Test Set-up 3

This setup is used for all conducted emission tests.

5.4 Power Line Conducted Emissions Test

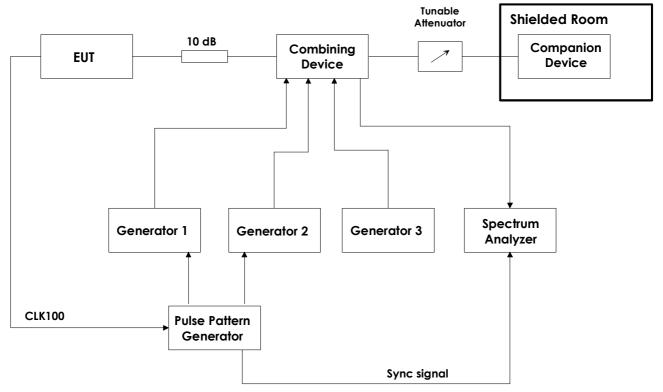




Test Set-Up 5



5.5 Monitoring Tests



Test equipment: 1, 2, 3, 4, 6, 9, 10, 11, 12, 13, 14, 15, 19, 23, 24, 25, 26

Test Set-Up 6

This test setup is used for all Monitoring and Time and Spectrum Access Procedure tests. The path loss from the signal generators to the EUT is measured with a power meter before the testing is started.

The CLK100 is used to synchronize the Pulse-/ Pattern generator to the start of the DECT frame, this signal always comes from the base station. If the EUT is a DECT Portable Part (i.e. a handset) the CLK100 signal will come from the Companion Device.

The sync signal to the Spectrum Analyzer is the CLK100 signal that is regenerated in the Pulse-/ Pattern Generator, this is used to synchronize the Spectrum Analyzer to the DECT frame when in zero span. The Pulse-/ Pattern Generator is used for tests that require time synchronized pulses or blocking of specific time slots.



6 Test Equipment Used

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment and ancillaries are identified (numbered) by the Testhouse.

No.	Model number	Description	Manufacturer	Ref. no.	Cal. date	Cal. Due
1	FSW26	Spectrum Analyzer	Rohde & Schwarz	LR 1640	2014.09	2015.09
2	SME03	Signal generator	Rohde & Schwarz	LR 1238	2015.05	2017.05
3	SMIQ03B	Signal generator	Rohde & Schwarz	LR 1516	2015.05	2017.05
4	SMHU52	Signal generator	Rohde & Schwarz	LR 1240	Cal b4 use	
5	53310A	Modulation Domain Analyzer	Hewlett Packard	LR 1483	2013.08.14	2015.08.14
6	81104A	Pulse-/ Pattern Generator	Agilent	LR 1502	Cal b4 use	
7	8470B	Crystal Detector	Hewlett Packard	LR 1207	N/A	
8	ESHS10	Measuring Receiver	Rohde & Schwarz	N- 3528	2014.09.15	2015.09.15
9	4768-10	Attenuator	Narda	LR1356	Cal b4 use	
10	745-69	Step Attenuator	Narda	LR 1442	N/A	
11	WE 1506A	Power Splitter	Weinchel	LR 244	Cal b4 use	
12	WE 1506A	Power Splitter	Weinchel	LR 245	Cal b4 use	
13	H-9	Hybrid	Anzac	LR 86	Cal b4 use	
14	H-9	Hybrid	Anzac	LR 257	Cal b4 use	
15	S212DS	RF Switch	Narda	LR 1244	N/A	
16	ESH3-Z5	Two Line V-Network	Rohde & Schwarz	LR 1076	Cal b4 use	
17	ESH3-Z2	Pulse Limiter	Rohde & Schwarz	LR 1074	Cal b4 use	
18	6812B	AC Power Source	Agilent	LR 1515	Cal b4 use	
19	Model 87 V	Multimeter	Fluke	N-4672	2014.09.17	2015.09
20	87H35-1	Circulator	Racal-MESL	s.no.: 140	N/A	
21	87H35-1	Circulator	Racal-MESL	s.no.: 141	N/A	
22	87H35-1	Circulator	Racal-MESL	s.no.: 142	N/A	
23	U2000A	Average Power Sensor	Agilent	LR 1523	2014.11	2015.11
24	RTX2012 UHS	DECT Tester	RTX Telecom	LR 1587	2014.12	2015.12



Revision history

Version	Date	Comment	Sign
1.0	2015.08.07	First edition	FS