

Report No. 388656-2

Test Report

Product	UPCS Base Station
Name and address of the applicant	Panasonic Corporation of North America Two Riverfront Plaza, 9 th Floor Newark, 07102-5490, NJ, USA
Name and address of the manufacturer	Panasonic Corporation 1-62, 4-chome, Minoshima, Hakata-ku Fukuoka, 812-8531, Japan
Model	KX-TGM460
Rating	120V AC (AC Adaptor Model PNLV236)
Trademark	Panasonic
Serial number	/
Additional information	DECT 6.0
Tested according to	FCC Part 15, subpart D Isochronous UPCS Device, 1920 – 1930 MHz ISED Canada RSS 213, Issue 3 2 GHz License-Exempt Personal Communications Services (LE-PCS) Devices
Order number	388656
Tested in period	2016-02-03 to 2016-02-25 and 2019-12-10
Issue date	2020-01-15
Name and address of the testing laboratory	Norway www.nemko.comCAB Number: FCC: NO0001 ISED: NO0470CAB Number: FCC: N00001 ISED: NO0470Instituttveien 6 Kjeller, Norway www.nemko.comTEL: +47 22 96 03 30 FAX: +47 22 96 05 50Image: Carbon control of the control of
	Free AC Sycinc Junction Prepared by [Frode Sveinsen] Approved by [G.Suhanthakumar] except in full without the written approval of Nemko. Opinions and interpretations expressed within t accreditation. This report was originally distributed electronically with digital signatures. For more

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1 INFORMATION

1.1 Tested Item

Nama	Deneceria
Name	Panasonic
Model name	KX-TGM460 (USA Model)
	KX-TGM460C (Canada Model)
FCC ID	ACJ96NKX-TGM460
ISED Canada ID	216A-KXTGM460
Serial number	/
Hardware identity and/or version	PNLB2574xx
Software identity and/or version	SW301
Tested to ISED Canada Standard (RSS)	RSS-213 Issue 3, RSS-GEN Issue 5
Test Site ISED Canada Reg. No.	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	83 mW (Peak)
Antenna Connector	None
Number of Antennas	2
Antenna Diversity Supported	Yes
Power Supply	AC Adaptor Model: PNLV236
Interface	PSTN

1.2 Description of Tested Device

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

All tests in this report, except Power-Line Conducted Emissions, have been performed on a KX-TGM450 (FCC ID: ACJ96NKX-TGM450). Power Line Conducted Emissions have been tested on a KX-TGM460 with the correct AC adaptor. All other test results are from Nemko Report No. 304059-02.

The model KX-TGM460 (FCC ID: ACJ96NKX-TGM460) is identical to the model KX-TGM450, except the BT module is removed on the KX-TGM450. The BT module in KX-TGM460 is identical to the BT module in the model KX-TGM430.

Description	US Model	Canada Model	FCC ID	IC ID	Comment
DECT Base with	KX-TGM460	KX-TGM460C	ACJ96NKX-TGM460	216A-KXTGM460	Bluetooth and PNLV236
Speakerphone	KX-TGM450	KX-TGM450C	ACJ96NKX-TGM450	216A-KXTGM450	PNLV236, No Bluetooth
	KX-TGM430	KX-TGM430C	ACJ96NKX-TGM430	216A-KXTGM430	Bluetooth and PNLV226
	KX-TGM420	KX-TGM420C	ACJ96NKX-TGM420	216A-KXTGM420	PNLV226, No Bluetooth
DECT Handset	KX-TGMA45	KX-TGMA45C	ACJ96NKX-TGMA45	216A-KXTGMA45	50dB Amplified volume
	KX-TGMA44	KX-TGMA44C	ACJ96NKX-TGMA44	216A-KXTGMA44	40dB Amplified volume

See description of similarity in below table.

The only difference between the Base Stations are the BT Module and the AC adaptor. Models without BT have the same PCB, but the BT module is removed.



1.3 Test Environment

Temperature:	20.2 – 22.6 °C
Relative humidity:	22.1 – 42.7 %
Normal test voltage:	120 V AC

The values are the limit registered during the test period.

1.4 Test Engineer(s)

Frode Sveinsen / Thanh Tran

1.5 Test Equipment

See list of test equipment in clause 6.

1.6 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 Base Station 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 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 except Power-Line Conducted Emissions 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 ISED Canada RSS-213 Issue 3 / RSS-GEN Issue 5 / RSP-100 Issue 11.

All tests were conducted is accordance with ANSI C63.4-2014 and ANSI C63.17-2013.

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

New Submission

Class II Permissive Change

PUB Equipment Code

Production Unit
 Pre-production Unit
 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 #	ISED RSS-213 Paragraph #	Verdict
Power Line Conducted Emission	15.107(a) 15.207(a)	5.4 RSS-GEN 7.2 / 8.8	Complies
Digital Modulation Techniques	15.319(b)	5.1	Complies
Labeling requirements	15.19(a)(3)	RSP-100 3.1	Complies
Antenna Requirement	15.317, 15.203	RSS-GEN 6.8	Complies
Channel Frequencies	15.303	5.1	Complies
Automatic discontinuation of transmission	15.319(f)	5.2 (4)	Complies
Emission Bandwidth	15.323(a)	5.5 RSS-GEN 6.7	Complies
In-band emissions	15.323(d)	5.8.2	Complies
Out-of-band emissions	15.323(d)	5.8.1	Complies
Output Power and Antenna Gain	15.319(c)(e), 15.31(e)	5.6 RSS-GEN 8.3	Complies
Power Spectral Density	15.319(d)	5.7	Complies
Carrier frequency stability	15.323(f)	5.3	Complies
Frame repetition stability	15.323(e)	5.2 (13)	Complies
Frame period and jitter	15.323(e)	5.2 (13)	Complies
Monitoring threshold, Least interfered channel	15.323(c)(2);(5); (9)	5.2 (5)(9)	Complies
Monitoring of intended transmit window and maximum reaction time	15.323(c)(1)	5.2 (5)	Complies
Threshold monitoring bandwidth	15.323(c)(7)	5.2 (2)	Complies
Reaction time and monitoring interval	15.323(c)(1);(5); (7)	5.2 (7)	Complies
Access criteria test interval	15.323(c)(4);(6)	5.2 (11)	Complies
Access Criteria functional test	15.323(c)(4);(6)	5.2 (6)	Complies
Acknowledgements	15.323(c)(4)	5.2	Complies
Transmission duration	15.323(c)(3)	5.2	N/A ¹
Dual access criteria	15.323(c)(10)	5.2	N/A ¹
Alternative monitoring interval	15.323(c)(10);(11)	5.2 (11)(12)	N/A ²
Spurious Emissions (Radiated)	15.319(g) 15.109(a) 15.209(a)	RSS-GEN 7.3 / 8.9	N/A ³

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 Power Line Conducted Emissions

FCC Part 15.207(a)

ISED RSS-213 Issue 3, Clause 6.3 RSS-GEN Issue 5, Clause 7.2 / 8.8

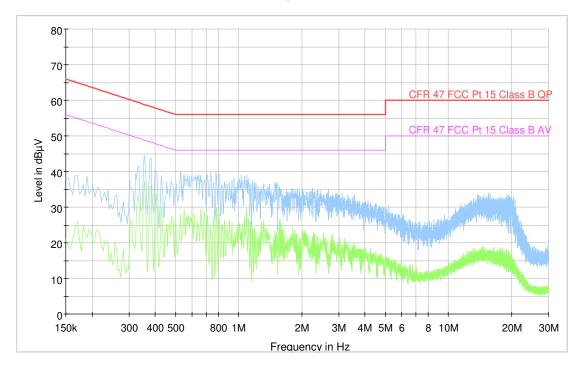
Measurement procedure:ANSI C63.4-2014 using 50 μH/50 ohms LISN.Test Results:CompliesMeasurement Data:See attached plots.

120V 60Hz, Handset OFF Hook:

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter
0.368	43.73		58.55	14.81	1000	9	N	OFF

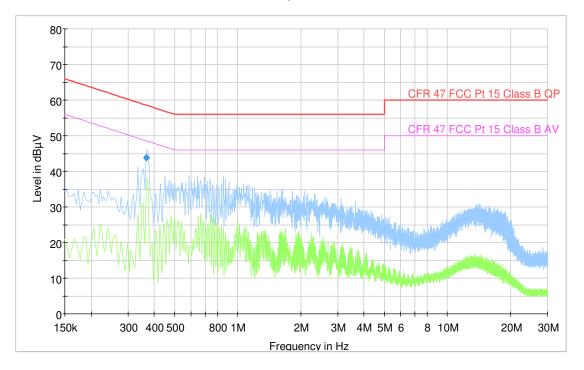


Full Spectrum



120V 60Hz, Handset Charging

Full Spectrum



120V 60Hz, Handset OFF Hook



3.2 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.

3.3 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

Requirement: FCC 15.303

Within 1920 -1930 MHz band for isochronous devices.

3.5 Antenna Requirement

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

Requirement: FCC 15.203, 15.204, 15.317.



3.6 Automatic Discontinuation of Transmission

Does the EUT transmit Control and Signaling Information?			
TYPE OF EUT :	INITIATING DEVICE	RESPONDING 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	A	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	В	Pass
6	Hook-On by Companion Device	В	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 does not have On/Off switch and cannot perform Hook-On)

Requirements, FCC 15.319(f), RSS-213 Issue 3, Clause 5.2:

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.



3.7 Peak Power Output

Test Method:

ANSI C63.17, clause 6.1.2.

Test Results: Complies

Measurement Data:

Maximum Conducted Output Power

Channel No.	Frequency (MHz)	Maximum Conducted Output Power (dBm)	Maximum Antenna Gain (dBi)	Maximum Radiated Output Power (dBm)
4	1921.536	19.1	0.0*	19.1
2	1924.992	19.2	0.0*	19.2
0	1928.448	19.1	0.0*	19.1

*Antenna Gain is value declared by manufacturer

For this test it was also checked that input voltage variation of 85 and 115% of nominal value did not have any effect on the measured output power.

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: 20.7 dBm (117 mW)

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

Requirements:

FCC 15.319(c)(e):

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

RSS-213 Issue 3, clause 5.6:

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

FCC 15.319(c)(e); RSS-213 Issue 3, clause 5.6:

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 😁		× Spectru		Spectrum 3	X Spe	ctrum 4 (×		\bigtriangledown
Ref Level 30 Att TRG:RFP(8GHz	.00 dBm Offse 20 dB • SWT		BW 3 MHz BW 10 MHz						
1 Zero Span	7								●1Pk Max
1 Zero opun								M1[
20 dBm									
10 dBm									
0 dBm									
-10 dBm									
-20 dBm									
-30 dBm									
wadulahaalmahuun									mulinasphan
-50 dBm									
-60 dBm									
	RG								
CF 1.921536 0	GHz			1001	pts				50.0 µs/
)[Measuring 【		03.02.2016 15:13:14

Lower Channel

	Spectrum	-	rum 2 X	Spectrum 3	× Spe	ectrum 4	×		
Ref Level 30 Att TRG:RFP(8GHz	.00 dBm Offs 20 dB • SWT	et 10.30 dB ● 500 µs	RBW 3 MHz VBW 10 MHz						
l Zero Span	,								●1Pk Max
								M1	[1] 19.12 dBr
	M1								2 . 500 µ
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LO dBm									
) dBm									
10 dBm									
20 dBm									
20 0811									
30 dBm									
har an an Andrea									Murahydrin
Hordeman human									- WAY WAY WAY
50 dBm				+					
60 dBm									
т	 RG								
E 1 000440 4	211-			100					
CF 1.928448 C				100	ι pι s				50.0 μs, 03.02.2016

Upper Channel



MultiView 8		(pectrum 2	×				
Ref Level 30.0 Att TRG:RFP(8GHz)	20 dB 🖷 SWT	et 10.30 dB • R 500 µs V	BW 3 MHz BW 10 MHz					
1 Zero Span	,							●1Pk Max
							M1	[1] 19.21 dBm 1.500 μs
20 dBm						 		
10 dBm								
0 dBm								
-10 dBm								
-20 dBm								
-30 dBm								
un and the second second								hally many more than
-50 dBm								
-60 dBm	G							
CF 1.924992 G	H7			1001	nte			50.0 µs/
GF 11924992 G				1001	гры			03.02.2016
	J					Measuring	() 🥠	14:56:35

Middle Channel



3.8 Emission Bandwidth *B*

Test Method:

ANSI C63.17, clause 6.1.3.

Test Results: Complies

Measurement Data:

Channel No.	Frequency (MHz)	Emission Bandwidth <i>B</i> (MHz)
4	1921.536	1.36
2	1924.992	1.36
0	1928.448	1.36

Channel No.	Frequency (MHz)	Occupied Bandwidth (MHz)
2	1924.992	1.23

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

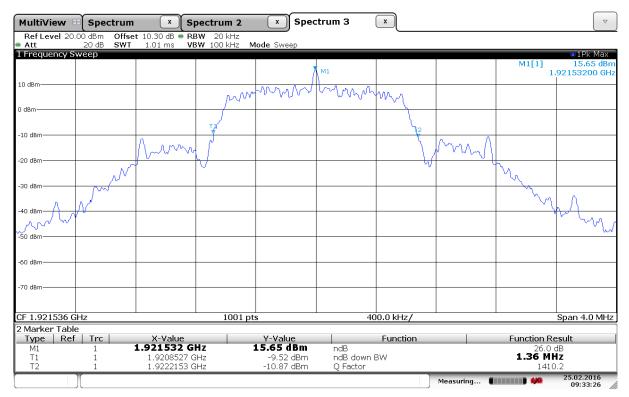
The Emission Bandwidth *B* shall be larger than 50 kHz and less than 2.5 MHz.

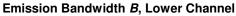
No requirements for 6 and 12 dB Bandwidth, these values are only used for testing Monitoring Bandwidth if the Simple Compliance test fails (ANSI C63.17, clause 7.4).

RSS-GEN Issue 5, clause 6.7:

Occupied Bandwidth (99%) is measured according to RSS-GEN Issue 5, clause 6.7. No requirement specified.



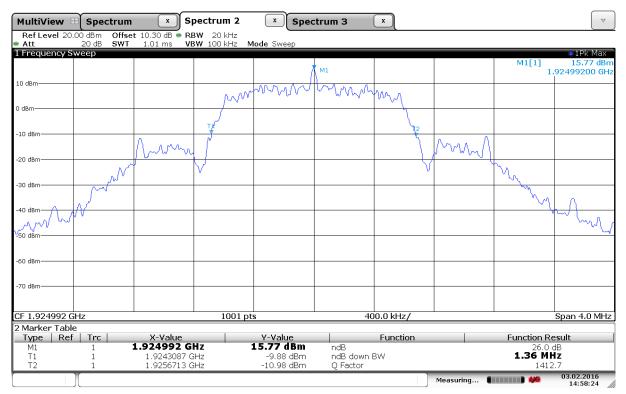


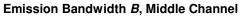


MultiView 8	Spectrum	×S	pectrum 2	× Spe	ctrum 3	×			
Ref Level 20.0		t 10.30 dB 🗕 RE							
Att 1 Frequency Sy	20 dB SWT	1.01 ms VE	3W 100 kHz N	lode Sweep					• 1Pk Max
I frequency 5	weep							M1[1]	15.69 dBm
				1	М1				92844800 GHz
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			a and	mm	how	ma			
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-10 dBm			T ⊉			₹2			
-10 0811		Λ	7			4	$\Delta \alpha \alpha \Lambda$		
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-20 dBm		ļ	∇			5		h	
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-30 dBm	-~~ [*]							- The	
	~ J							MM	0
-40 dBm	A/							× 1	\sim
and we									www.
-50 dBm									. (m
60 d0m									
-60 dBm									
-70 dBm									
CF 1.928448 G	Hz		1001 pt	S	40	0.0 kHz/			Span 4.0 MHz
2 Marker Table									
Type Ref	Trc	X-Value		Y-Value		Function		Function Re	esult
M1	1	1.928448 G		.5.69 dBm	ndB			26.0 (B
T1 T2	1	1.9277647 0 1.9291233 0		-9.34 dBm -9.70 dBm	ndB down I Q Factor	3VV		1.36 MH 1419	
12	1	1.9291233 0	112	9.70 UDIT	QTACLU				03.02.2016
							Measuring 🔳		15:05:24

Emission Bandwidth *B*, Upper Channel







MultiView	(<u> </u>	pectrum 2	× Spe	ctrum 3	×			
Ref Level 20. Att	.00 dBm Offse 20 dB SWT	et 10.30 dB • RE 1.09 ms VB	3W 20 kHz 3W 100 kHz N	Inda Swoon					
1 Occupied Ba		1.02 ms 06	100 KHZ 1	ioue oweep					●1Pk Max
					M1			M1[1]	15.69 dBm
10 10-1					1			1	92498840 GHz
10 dBm			~~~~	mm	MANN	MM T2			
					~ • • v V	* VV~~/_T2			
0 dBm			7			7			
			1 million and a second s			<u> </u>			
-10 dBm			7			ξ.		Λ	
		m	(1 Jam	LΛ	
-20 dBm							h/ ·	1 h	
	N	V					V	N.	
-30 dBm	w							V V	
									ha a
-40 dBm									~ mil
V W									4
-50 dBm									
-60 dBm									
00 00.00									
-70 dBm									
-70 0011									
CF 1.924992 G	ĠHz		1001 pt	s	36	50.0 kHz/		•	Span 3.6 MHz
2 Marker Tabl									
Type Ref		X-Value 1.9249884 G	H7 1	Y-Value L5.69 dBm		Function		Function Re	esult
T1	1.	1.92437342 (-1.47 dBm	Occ Bw		:	1.23356643	4 MHz
T2	1	1.92560699		-0.47 dBm					
) (Measuring 【		03.02.2016 14:59:54
							, ,		14:59:54

99% Bandwidth, Middle Channel



3.9 **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	2.9
0	1928.448	3.1

Averaged over 1000 sweeps.

Requirements, FCC 15.319(d), RSS-213 Issue 3, clause 5.7

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:

Ref Level 10 Att	20 dB SWT	t 10.30 dB = R 16.7 ms VI		de Sweep					o 1 Dir Mex
1 Frequency S	weep			M: X				M1[1] 1.	●1Pk Max 2.80 dBm 92153000 GHz
0 dBm	MANNAM	MAMA	AMAM	MMM	MMMM	MMMM	MAM	MARAMA.	
-10 dBm	h . A . a A A A	<u>, k∥ , k </u>	I VII VIII	UV					h.In
-20 dBm									₩\//
-30 dBm									hv
-40 dBm									
-50 dBm									
-60 dBm									
-70 dBm									
-80 dBm									
CF 1.921536	GHz		1001 pt	S	15	60.0 kHz/			Span 1.5 MHz 03.02.2016
Overview							Measuring 📲		15:15:56
MultiView 88	Spectrum	× Spectr	um 2 🛛 🗴	Spectrum 3	× Spe	ectrum 4 (×		▽
MultiView Ref Level 10 Att TRG:VID		et 10.30 dB ● F	_	Spectrum 3	x Spe	ectrum 4 (×	Cou	nt 1000/1000
MultiView 😁 Ref Level 10 • Att	0.00 dBm Offse	et 10.30 dB ● F	BW 3 kHz	Spectrum 3	X Spe	setrum 4 (×	Cour	nt 1000/1000 •1Sa Avg
MultiView Ref Level 10 Att TRG:VID	0.00 dBm Offse	et 10.30 dB • F 1 ms V	BW 3 kHz	Spectrum 3	X Spe	ectrum 4 (×)		nt 1000/1000 • 1Sa Avg 1] 2.94 dBm
MultiView Ref Level 10 Att TRG:VID 1 Zero Span	0.00 dBm Offse	et 10.30 dB • F 1 ms V	BW 3 kHz	Spectrum 3	X Spe	ectrum 4 (×		nt 1000/1000 • 1Sa Avg 1] 2.94 dBm
MultiView Control Cont	0.00 dBm Offse	et 10.30 dB • F 1 ms V	BW 3 kHz	Spectrum 3	X Spe	ctrum 4 (×		nt 1000/1000 • 1Sa Avg 1] 2.94 dBm
MultiView Control Cont	0.00 dBm Offse	et 10.30 dB • F 1 ms V	BW 3 kHz	Spectrum 3	X Spe	ectrum 4 (×		nt 1000/1000 • 1Sa Avg 1] 2.94 dBm
MultiView Constraints of the second s	.00 dBm Offse 20 dB • SWT	et 10.30 dB • F 1 ms V	BW 3 kHz	Spectrum 3	X Spe	ctrum 4 (×		nt 1000/1000 • 1Sa Avg 1] 2.94 dBm
MultiView Comparison C	.00 dBm Offse 20 dB • SWT	et 10.30 dB • F 1 ms V	BW 3 kHz	Spectrum 3	X Spe	ctrum 4 (×		nt 1000/1000 • 1Sa Avg 1] 2.94 dBm
MultiView Constraints of the second s	.00 dBm Offse 20 dB • SWT	et 10.30 dB • F 1 ms V	BW 3 kHz	Spectrum 3	X Spe	ctrum 4 (x		nt 1000/1000 • 1Sa Avg 1] 2.94 dBm
MultiView Ref Level 10 Att TRG:/ID 1 Zero Span 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm	.00 dBm Offse 20 dB • SWT	et 10.30 dB • F 1 ms V	BW 3 kHz	Spectrum 3	x Spe	2ctrum 4 (×		nt 1000/1000 • 1Sa Avg 1] 2.94 dBm
MultiView Ref Level 10 Att TRG:/ID 1 Zero Span 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm	.00 dBm Offse 20 dB • SWT	et 10.30 dB • F 1 ms V	BW 3 kHz	Spectrum 3	× Spe	2ctrum 4 (×		nt 1000/1000 • 1Sa Avg 1] 2.94 dBm

Averaged, 1000 Sweeps



Upper Channel:

MultiView 😁	Spectrum	× Spectru	ım 2 🛛 🗴	Spectrum 3	x Spe	ctrum 4 (×		
Ref Level 10 Att	0.00 dBm Offse 20 dB SWT	t 10.30 dB RE 14.5 ms VE	3WF 3 kHz 3WF 10 kHz Mo	de Sweep					
1 Frequency S	weep							M1[1]	●1Pk Max 2.99 dBm
				M:	1				92844150 GHz
0 dBm	1 a 10.	ALAAA	N.M.M.M	han and	Martal 1	A Alunh	A AAA	where a	
. MAN	11/1/1/17	110 11/10	$(M M) \sim$	M M M M M	VYVGY	WY CIMM	11 N M W N	$\mathbb{N}^{\mathbb{N}}$	MMIL
-10,d8m	No		v W	10	1	1 1		<u> </u>	r γ _Λ .
+20 dBm							V		
-30 dBm									
-40 dBm									
-50 dBm									
-60 dBm									
-70 dBm									
-80 dBm									
-00 0811									
CF 1.928448 (20-2		1001 pt		12	0.0 kHz/			Span 1.3 MHz
CI 1.920440 (1001 pt	3	15	0.0 KHZ/	Measuring 【		03.02.2016 15:10:29
overview									
MultiView 88	Spectrum	X Spectru et 10.30 dB • R		Spectrum 3	X Spe	ctrum 4 (×		
Ref Level 10 Att TRG:VID		et 10.30 dB • R		Spectrum 3	X Spe	ctrum 4 (×	Coui	 nt 1000/1000
MultiView Ref Level 10 Att	.00 dBm Offse	et 10.30 dB • R 1 ms V	BW 3 kHz	Spectrum 3	x Spe	ctrum 4 (x)	Cour M1[1]	
MultiView Ref Level 10 Att TRG:VID 1 Zero Span	.00 dBm Offse	et 10.30 dB • R	BW 3 kHz	Spectrum 3	x Spe	ctrum 4 (×)		▼ nt 1000/1000 ●1\$a Avg
MultiView Ref Level 10 Att TRG:VID	.00 dBm Offse	et 10.30 dB • R 1 ms V	BW 3 kHz	Spectrum 3	x Spe	ctrum 4 (×		⊽ nt 1000/1000 ●1Sa Avg 3.05 dBm
MultiView Ref Level 10 Att TRG:VID 1 Zero Span	.00 dBm Offse	et 10.30 dB • R 1 ms V	BW 3 kHz	Spectrum 3	X Spe	ctrum 4 (×		
MultiView Ref Level 10 • Att TRG:VID 1 Zero Span 0 dBm -10 dBm	.00 dBm Offse	et 10.30 dB • R 1 ms V	BW 3 kHz	Spectrum 3	X Spe	ctrum 4 (×		
MultiView Ref Level 10 • Att TRG:VID 1 Zero Span	.00 dBm Offse	et 10.30 dB • R 1 ms V	BW 3 kHz	Spectrum 3	x Spe	ctrum 4 (×		⊽ nt 1000/1000 ●1Sa Avg 3.05 dBm
MultiView Ref Level 10 Att TRG:VID 1 Zero Span 0 dBm -10 dBm -20 dBm	.00 dBm Offse	et 10.30 dB • R 1 ms V	BW 3 kHz	Spectrum 3	X Spe	ctrum 4 (×		
MultiView Ref Level 10 Att TRG:VID 1 Zero Span 0 dBm -10 dBm -20 dBm	.00 dBm Offse 20 dB = SWT	et 10.30 dB • R 1 ms V	BW 3 kHz	Spectrum 3	X Spe	ctrum 4 (×		
MultiView Ref Level 10 Att TRG:VID 1 Zero Span 0 dBm -10 dBm -20 dBm	.00 dBm Offse 20 dB = SWT	et 10.30 dB • R 1 ms V	BW 3 kHz	Spectrum 3	x Spe	ctrum 4 (×		
MultiView Ref Level 10 Att TRG:VID 1 Zero Span 0 dBm -10 dBm -20 dBm -20 dBm -40 dBm	.00 dBm Offse 20 dB = SWT	et 10.30 dB • R 1 ms V	BW 3 kHz	Spectrum 3	X Spe	ctrum 4 (×		
MultiView Control Cont	.00 dBm Offse 20 dB = SWT	et 10.30 dB • R 1 ms V	BW 3 kHz	Spectrum 3	X Spe	ctrum 4 (×		
MultiView Ref Level 10 Att TRG:VID 1 Zero Span 0 dBm -10 dBm -20 dBm -20 dBm -40 dBm	.00 dBm Offse 20 dB = SWT	et 10.30 dB • R 1 ms V	BW 3 kHz	Spectrum 3	x Spe	ctrum 4 (×		
MultiView Image: Constraint of the second seco	.00 dBm Offse 20 dB = SWT	et 10.30 dB • R 1 ms V	BW 3 kHz	Spectrum 3	X Spe	ctrum 4 (x		
MultiView Image: Constraint of the second seco	.00 dBm Offse 20 dB = SWT	et 10.30 dB • R 1 ms V	BW 3 kHz	Spectrum 3	X Spe	ctrum 4 (×		
MultiView Image: Constraint of the second seco	.00 dBm Offse 20 dB = SWT	et 10.30 dB • R 1 ms V	BW 3 kHz	Spectrum 3	x Spe	ctrum 4 (x		
MultiView :: Ref Level 10 • Att TRG:VID 1 Zero Span 0 dBm -10 dBm -20 dBm -20 dBm -50 dBm -60 dBm	.00 dBm Offse 20 dB = SWT	et 10.30 dB • R 1 ms V	BW 3 kHz	Spectrum 3	X Spe	ctrum 4 (x		
MultiView Image: Constraint of the second seco	00 dBm Offse 20 dB • SWT	et 10.30 dB • R 1 ms V	BW 3 kHz		x Spe	ctrum 4 (x		

Averaged, 1000 Sweeps



3.10 In-Band Unwanted Emissions, Conducted

Test Method:

ANSI C63.17, clause 6.1.6.1.

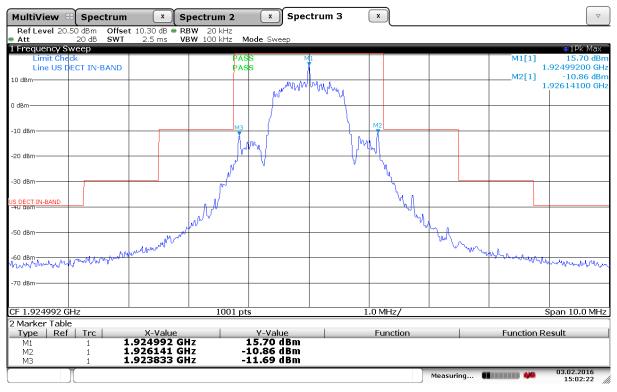
Test Results: Complies

Measurement Data:

See plots.

Requirements, FCC 15.323(d), RSS-213 Issue 3, clause 5.8.2:

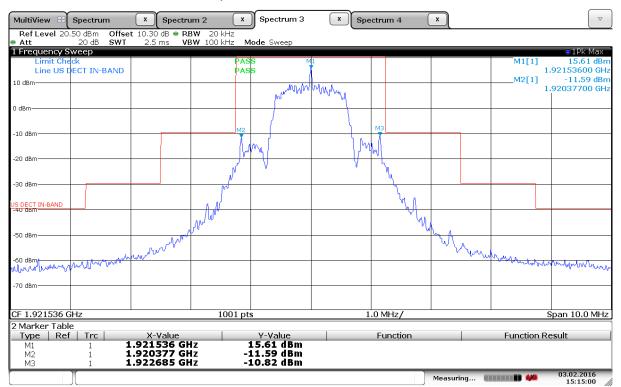
 $B < f \le 2B$: at least 30 dB below max. permitted peak power 2 $B < f \le 3B$: at least 50 dB below max. permitted peak power 3 $B < f \le$ UPCS Band Edge : at least 60 dB below max. permitted peak power



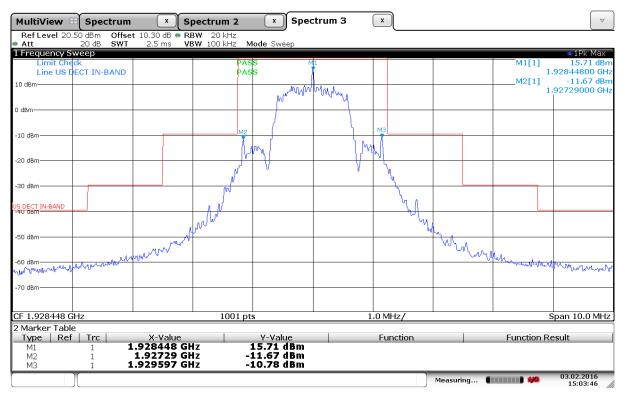
Middle Channel



In-Band Unwanted Emissions, Conducted



Lower Channel



Upper Channel



Test Method:

ANSI C63.17, clause 6.1.6.2.

Test Results: Complies

Measurement Data:

See plots.

Requirements, FCC 15.323(d), RSS-213 Issue 3, clause 5.8.1:

$f \le 1.25$ 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 😁	Spectrum	×	Spectrum 2	× Spe	ctrum 3	×			
Ref Level 10.0	0 dBm Offset 20 dB SWT	t 10.30 dB • I 12.5 ms	RBW 20 kHz VBW 100 kHz M						
1 Frequency Sw	еер	12.0 110							●1Pk Max
Limit Check	K CT OUT-OF-B <i>I</i>	ND	PAS					D2[1]	-0.85 dB -10.3900 MHz
				Ĩ				M1[1]	-57.07 dBm
0 dBm									1.9111840 GHz
-10 dBm									
-20 dBm									
-30 dBm									
JS DECT OUT-OF-BANE	0								
-50 dBm									ľ
						D2		M1 T	لير ا
-60 dBm						July		with the work	u ula WW
Ar Bratem Kerky March	the after we are by	Mallin III marke	-	Muhili u Ini ka Maat	handellen de men sous	W Water Marrie	Monumbleworth	n hrowingh	hampe
Ալեսպոստ գետը թրթվի	(Non	6 . 0. (Soul e	100 - 100 - 0010 4	- 440-20-0-0-	an (7 an 10 . 1 a				
-80 dBm									
1.87 GHz			1001 pt	 S	5	5.0 MHz/			1.92 GHz
	·						Measuring 🔳		03.02.2016 15:53:11



Lower Channel:

MultiView	B Spectrum	×S	pectrum 2	× Spec	trum 3	×			
Ref Level 10. Att	.00 dBm Offse 20 dB SWT	t 10.30 dB • RI 218 ms VI	BW 20 kHz BW 100 kHz M	ade Sween					
1 Frequency S		210 113 1	311 100 KHZ 14	oue oncep					●1Pk Max
Limit Che		AND	PAS PAS					M1[1]	-66.86 dBm 1.838280 GHz
0 dBm									
-10 dBm									
-20 dBm									
-30 dBm									
US DECT OUT-OF-BA	ND								
-50 dBm									
-60 dBm									M1
w7QvdBcatorhertonthyfr	Mindow Wardler	-v-whatbackpedathatta	when the state of the second second	hanna an traith an the state of	May and the second of the second s	hallaslankar.Aut	e Angeland Anna Alexandre and Alexandre and Alexandre and Alexandre and Alexandre and Alexandre and Alexandre a A new particular and Alexandre and Alexandre and Alexandre and Alexandre and Alexandre and Alexandre and Alexandr	لمحيرتين والمسالية ويتعالم	www.www.wheel
-80 dBm									
1.0.045			1001+		0	 7.0.MH=/			1.97.01-
1.0 GHz	١٢		1001 pt	5	8.	7.0 MHz/			1.87 GHz 03.02.2016
	Л						Measuring 🔳		15:53:44

MultiView 😁	Spectrum	×S	pectrum 2	× Spec	trum 3	×			
Ref Level 10.0 Att	20 dB SWT	t 10.30 dB • RI 250 ms VI	3W 20 kHz 3W 100 kHz M	lode Sweep					
		ND	PAS					M1[1]	●1Pk Max -64.89 dBm 550.400 MHz
0 dBm									
-10 dBm									
-20 dBm									
-30 dBm									
US DECT OUT-OF-BANK	D								
-50 dBm									
-00 dBm	and white and the second	there the the second as		hubberthermon	un when he walled	had a hard	eyerestronethetersty	whynywyhadarawda	madehionourou
-80 dBm									
1.0 MHz			1001 pts	s	go	9.9 MHz/			1.0 GHz
			1001 pt				Measuring 🔳	·····	03.02.2016 15:54:15



Upper Channel:

MultiView 🗄 Sp		pectrum 2	× Spectrum 3	x	
Ref Level 10.00 dBi Att 20 d		NBW 20 kHz NBW 100 kHz Mode	Sweep		
1 Frequency Sweep Limit Check Line US DECT C		PASS			●1Pk Max M2[1] -54,30 dBm 1,9388460 GHz
0 dBm		FA35			M1[1] -55.13 dBm 1,9491960 GHz
US DECT OUT-OF-BAND					
-20 dBm					
-30 dem					
-40 dBm					
-50 dBm	M1				
-60-g8m	The second se				
-60 dBm	Mananduladout Manad W	Marguerenauteral	May rehard make and the way	chore warder with the warder and	and warmen about the light the bound on the same
-80 dBm					
1.93 GHz		1001 pts	7.	.0 MHz/ Measuring	2.0 GHz
				measuring	15:55:23

MultiView 🗄 Spectrum 🛛 🗴 Sj	pectrum 2 🛛 🗴 Spe	ectrum 3 🛛 🔍		
RefLevel 10.00 dBm Offset 10.30 dB ■ RE ● Att 20 dB SWT 1 s VE	3W 20 kHz 3W 100 kHz Mode Sweep			
1 Frequency Sweep Limit Check Line US DECT OUT-OF-BAND	PASS PASS			●1Pk Max M1[1] -61.52 dBm 3.85210 GHz
0 dBm				
-10 dBm				
-20 dBm				
-30 dBm				
JS DECT OUT-OF-BAND				
-50 dBm				
-60 dBm	M1			
-> della Hallan den alma a lander and a halland	and many and many and the second	www.illowerficered. Martin working and haden	where the second of the second s	Humphron and the second the second
-80 dBm				
2.0 GHz	1001 pts	400.0 MHz/		6.0 GHz



Upper Channel:

MultiView 😁	Spectrum	X	Spectrum 2	×S	pectrum 3	×			
Ref Level 10.00	OdBm Offset		RBW 20 kHz						
Att 1 Frequency Sw	20 dB SWT	1.5 s	VBW 100 kHz N	iode Sweep					●1Pk Max
Limit Check			PAS					M1[1]	-64.84 dBm 11.18780 GHz
0 dBm									
-10 dBm									
-20 dBm									
-30 dBm									
US DECT OUT-OF-BAND)								
-50 dBm									
-60 dBm								M1	
Withhan white	statular mfrihansiag	- Marthan Marchandre	www.and white	had an all all and	1000 and Mary Mary and	Angene Marina	ahanan kalendar kalen	www.hrub.on.house	uhur wohn free months
-80 dBm									
6.0 GHz			1001 pt	s	6	00.0 MHz/			12.0 GHz
			1001 pt	3			Measuring 🚺	••••	03.02.2016 15:57:15

MultiView 🗄 Spectrum 🛛 💉	Spectrum 2 🛛 🛛 🛛	Spectrum 3	×			
	RBW 20 kHz VBW 100 kHz Mode Sv	veen				
1 Frequency Sweep		1.000				●1Pk Max
Limit Check Line US DECT OUT-OF-BAND	PASS PASS				M1[1]	-63.46 dBn 19.86010 GH:
0 dBm						
-10 dBm						
10 dBm						
-20 dBm						
-30 dBm						
JS DECT OUT-OF-BAND						
-50 dBm						
-60 dBm						M1
at a share with	wellighter the bolt in the second states of the second states and	is induce in which the of	-romant labor to a 1 labor	1 . Washerts	alumper out the	warmannah
10 200 March March March March March March 100	a na nanananananananananananananananana	and the second s	in man mathematic	Mundul		
-80 dBm						
12.0 GHz	1001 pts	8	300.0 MHz/		·····	20.0 GHz 03.02.2016



Lower Channel:

MultiView 😁 Spectrum	▽
RefLevel 0.00 dBm Offset 10.30 dB ● RBW 20 kHz ● Att 15 dB SWT 2.5 ms VBW 100 kHz Mode Sweep	
1 Frequency Sweep	●1Pk Max
Limit Check PASS M1[1]	-54.37 dBm 4307200 GHz
-10 dBm	
-20 dBm	
-30 dBm	
US DECT OUT-OF-BAND	
-50 dBm - M1	
-60 dBm	
-70 dBm	
work was a second where we was a second with the second seco	mount
-80 dBm	
-90 dBm	
CF 3.843072 GHz 1001 pts 1.0 MHz/ Sp	an 10.0 MHz
Measuring	25.02.2016 09:27:45

Mid Channel:

MultiView 😁 Spectrum							▽
Ref Level 0.00 dBm Offset 10.30 dB ■ RBW ● Att 15 dB SWT 2.5 ms VBW	✔ 20 kHz ✔ 100 kHz Moo	le Sweep					
1 Frequency Sweep Limit Check Line US DECT OUT-OF-BAND	PAS					M1[1] 3	● 1Pk Max -53.84 dBm .84998000 GHz
-10 dBm							
-20 dBm							
-30 dBm							
US DECT OUT-OF-BAND							
-50 dBm		M	1				
-60 dBm		March M	Line L				
-70 dBm	pr		<u>~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~</u>	<u>N.</u>			
-80 dBm-	www.	Υ	V	William	munumun	www.www.	mulummunu
-90 dBm							
CF 3.84998 GHz	1001 pts		1	.0 MHz/	1	5	5pan 10.0 MHz 25.02.2016



Upper Channel:

MultiView 🖽 Spe	ectrum							\bigtriangledown
Ref Level 0.00 dBm Att 15 dB	Offset 10.30 dB • RB SWT 2.5 ms VB	N 20 kHz N 100 kHz Mo	de Sween					
1 Frequency Sweep	2.5 113 404		ac oncep					●1Pk Max
Limit Check Line US DECT OL	JT-OF-BAND	PAS PAS					M1[1] 3	-53.96 dBm .85689600 GHz
-10 dBm								
-20 dBm								
20 00.00								
-30 dBm								
US DECT OUT-OF-BAND								
-50 dBm			м	1				
-60 dBm			mart	Arris				
			por y por	Why I my	6 A			
-70 dBm		/*						
-80 dBm	munikantanta	mmundur		٧	man	enmantenter	www.hull	ol Mariana Maria
-90 dBm								
CF 3.856896 GHz	1	1001 pts	6	1	.0 MHz/			Span 10.0 MHz
						Measuring 🔳		25.02.2016 09:25:41



3.12 Carrier Frequency Stability

Test Method:

ANSI C63.17, clause 6.2.1.

Test Results: Complies

Measurement Data:

Long Term Frequency Stability is measured with the Frequency Domain Analyzer. The Frequency Domain Analyzer was logged by a computer programmed to get new readings as fast as possible (about 3 readings per second) over the noted time period or 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)	
1924.991948	1.849	-2.960	-1.5	±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}	1924.9943	0	0	
85% of V _{nom}	1924.9942	-0.1	-0.1	±10 ppm
115% of V _{nom}	1924.9942	-0.1	-0.1	

Deviation ppm = ((Mean – Measured Frequency) / Mean) x 10^{6}

Frequency Stability over Temperature

Temperature	Measured Carrier Frequency (MHz)	Difference (kHz)	Deviation (ppm)	Limit
T = +20 °C	1924.9943	0	0	
T = -20 °C	1924.9841	-10.2	-5.3	±10 ppm
T = +50 °C	1924.9898	-4.5	-2.3	

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

Ref. FCC 15.323(e), RSS-213 Issue 3, clause 5.3



3.13 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	0.925	0.028

Limit:

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

Ref. FCC 15.323(e), RSS-213 Issue 3, clause 5.2

3.14 Frame Period and Jitter

Test Method:

ANSI C63.17, clause 6.2.3.

Test Results: Complies

Measurement Data:

Carrier Frequency (MHz)	Frame Period (ms)	Max Jitter (μs)	3xStandard Deviation of Jitter (μs)]
1924.992	10.000	-0.052	-0.048	

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

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), RSS-213 Issue 3, clause 5.2



1
/ L
99.999982005 1.000k samples
1/Mean 10.000ms
Std Dev 924.5ng
n Stability, Gated over 100 Frames
A
/ \
100.0025005 130.000k samples

Frame Period and Jitter



3.15 Monitoring Threshold, Least Interfered Channel

Monitoring Threshold Limits:

Lower Threshold:

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

Calculated values:

	FCC 15.323, RSS-213, Issue 3
Lower Threshold	-81.2 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 f2	Pass
c) f_1 at $T_L + U_M$, f_2 at $T_L + U_M + 7 \text{ dB}$	Transmission always on f1	Pass
d) f_1 at T _L + U _M + 1 dB, f_2 at T _L + U _M - 6 dB	Transmission always on f_2	Pass
e) f_1 at T _L + U _M - 6 dB, f_2 at T _L + U _M + 1 dB	Transmission always on fi	Pass

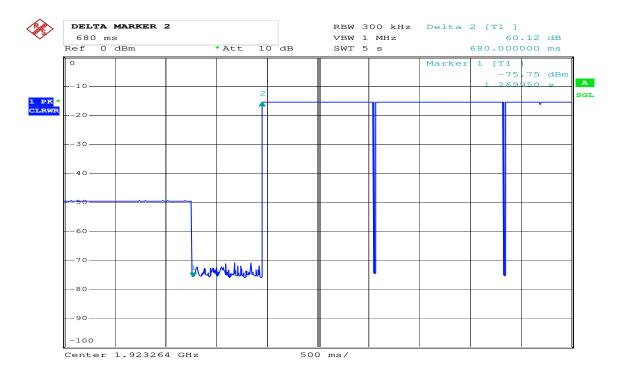


Selected Channel Confirmation, FCC 15.323(c)(1) and (5)

ANSI C63.17 clause 7.3.3	Observation	Verdict
b) Shall not transmit on <i>f</i> ₁	EUT transmits on f2	Pass
d) Shall not transmit on f ₂	EUT transmits on <i>f</i> ₁	Pass

Limits:

	FCC 15.323, RSS-213, Issue 3
Lower Threshold + 6 dB margin	-75.2 dBm



Date: 10.FEB.2016 12:17:23

7.3.4 Selected Channel Confirmation, Connection 0.68s After Interferer Removed



3.16 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), RSS-213 Issue 3, clause 5.2:

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



3.17 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_1 .

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/B), and with interference level raised 6 dB 	EUT transmits on f_I	Pass

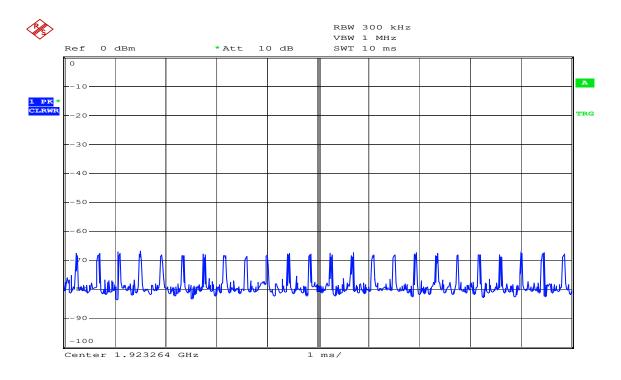
Comment: Since *B* is larger than 1.25 MHz the test was performed with pulse lengths of 50 µs and 35 µs.

Limits, FCC 15.323(c)(1), (5) and (7), RSS-213 Issue 3, clause 5.2:

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.

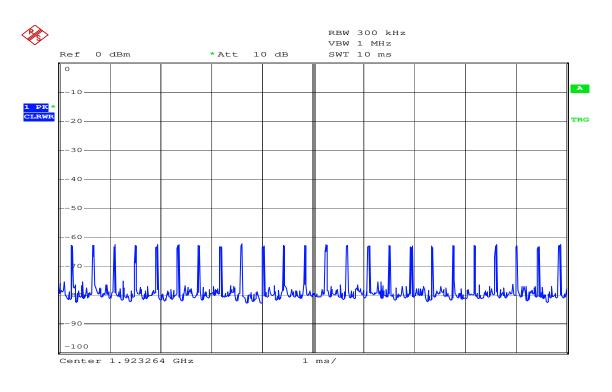
If a signal is detected that is 6 dB or more above the applicable threshold level, the maximum reaction time shall be 35xSQRT (1.25/emission bandwidth in MHz) microseconds but shall not be required to be less than $35 \ \mu$ s.





Date: 10.FEB.2016 12:24:33





Date: 10.FEB.2016 12:27:21

35 µs Pulses



3.18 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	EUT transmits on the interference free time-slot	Pass
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	Transmission paused every 1.28 s	Pass

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	EUT changes to the interference-free time-slot, and stays there	Pass

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 support the Random Waiting Interval option.

Limits:

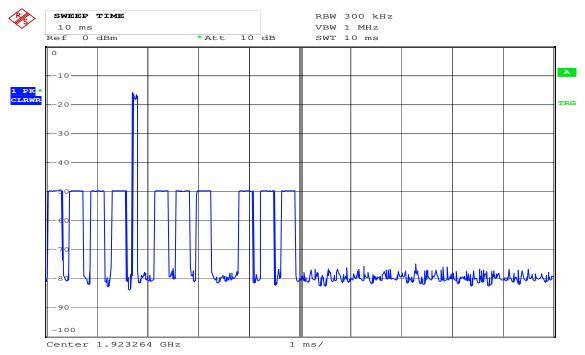
FCC 15.323(c)(4), RSS-213 Issue 3, clause 5.2, RSS-213 Issue 3, clause 5.2:

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), RSS-213 Issue 3, clause 5.2, RSS-213 Issue 3, clause 5.2:

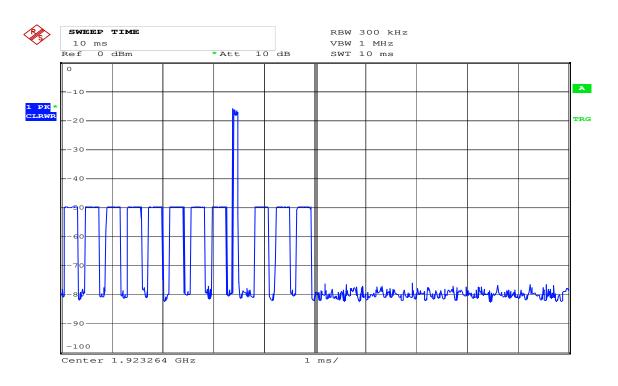
If the selected combined time and spectrum windows are unavailable, the device may either monitor and select different windows or seek to use the same windows after waiting an amount of time, randomly chosen from a uniform random distribution between 10 and 150 milliseconds, commencing when the channel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





Access Criteria Check





Date: 10.FEB.2016 12:36:46

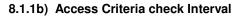
8.1.2c) EUT Transmits on Unblocked Slot, Before and After



DELTA MARKER 2 RBW 300 kHz Delta 2 [T1] 3.85 s Ref 0 dBm VBW 1 MHz 0.00 dB *Att 10 dB SWT 5 s 3.850000 s 0 Marker [T1 1 -15 86 dBm A 950 مم -10-1 SGL 1 PK * CLRWR TRG -20--30-40 -50--60-70 80 -90--100 Center 1.923264 GHz 500 ms/

Access Criteria Check

Date: 10.FEB.2016 12:35:10





3.19 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	Not applicable for EUT that transmits control and signaling information	N/A
c) Transmission time after loss of acknowledgements	10.0	Pass

Transmission Duration

Test ref. to ANSI C63.17 clause 8.2.2	Observation	Verdict
b) Transmission duration on same time and frequency window	Only for initiating device that controls which time slot is used	N/A

Comment: /

Limits, FCC 15.323(c)(3) and (4), RSS-213 Issue 3, clause 5.2:

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.



3.20 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 f_1 for TDMA systems. The Test is Pass if EUT can transmit	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	Verdict	
b) EUT is restricted to a single carrier <i>f_i</i> for TDMA systems. The Test is Pass if EUT can transmit	N/A	N/A
c) d) Transmission on interference-free receive time/spectrum window	N/A	N/A
e) f) Transmission on interference-free transmit time/spectrum window	N/A	N/A

Comment: This test is only applicable for EUT that can be initiating device.

Limits, FCC 15.323(c)(10), RSS-213 Issue 3, clause 5.2:

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.



3.21 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		±0.5 dB
Out of Band Emissions, Conducted (RBW < 100 kHz)	< 3.6 GHz	±0.6 dB
	> 3.6 GHz	±0.9 dB
Spurious Emissions, Radiated	< 1 GHz	±2.5 dB
	> 1 GHz	±2.2 dB
Emission Bandwidth	±4 %	
Power Line Conducted Emissions	+2.9 / -4.1 dB	
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

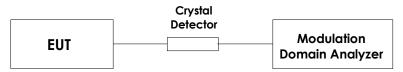


Test equipment included: 5, 9, 18

Test Set-up 1

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

5.2 Timing Measurements

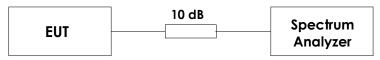


Test equipment included: 5, 7, 9, 18

Test Set-up 2

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

5.3 Conducted Emission Test

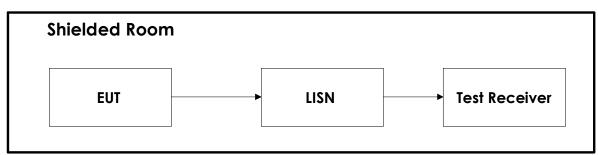


Test equipment included: 1, 2, 9, 18, 19, 24

Test Set-up 3

This setup is used for all conducted emission tests.

5.4 Power Line Conducted Emissions Test

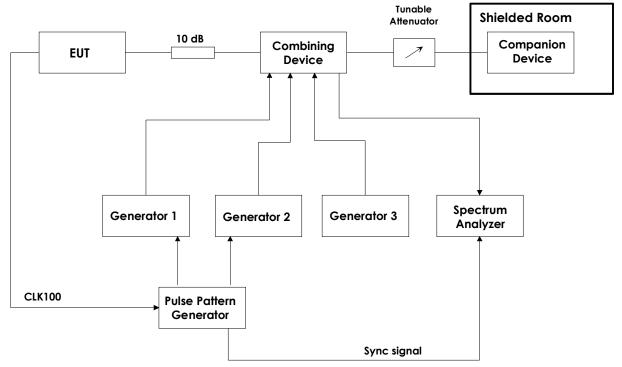


Test equipment: 8, 16, 17, 18

Test Set-Up 5



5.5 Monitoring Tests



Test equipment: 2, 3, 4, 6, 9, 10, 11, 12, 13, 14, 15, 19, 20, 21, 22, 23, 24

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	2015.10	2016.10
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	2016.01	2018.01
6	81104A	Pulse-/ Pattern Generator	Agilent	LR 1502	2015.05	2016.05
7	8470B	Crystal Detector	Hewlett Packard	LR 1207	N/A	
8	ESHS10	Measuring Receiver	Rohde & Schwarz	N-3528	2015.08	2016.08
9	6810.17B	Attenuator	Suhner	LR 1669	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	2014.04.23	2016.04.23
17	ESH3-Z2	Pulse Limiter	Rohde & Schwarz	LR 1074	2015.03.05	2017.03.05
18	6812B	AC Power Source	Agilent	LR 1515	2015.12	2016.12
19	Model 87 V	Multimeter	Fluke	N-4672	2015.10	2016.10
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	NRP-Z81	Wideband Power Sensor	Rohde & Schwarz	LR 1644	2015.11.03	2016.11.03
24	FSP30	Spectrum Analyzer	Rohde & Schwarz	LR 1551	2015.04.27	2017.04.27

Revision history

Version	Date	Comment	Sign
1.0	2016.02.23	First edition for KX-TGM460	FS